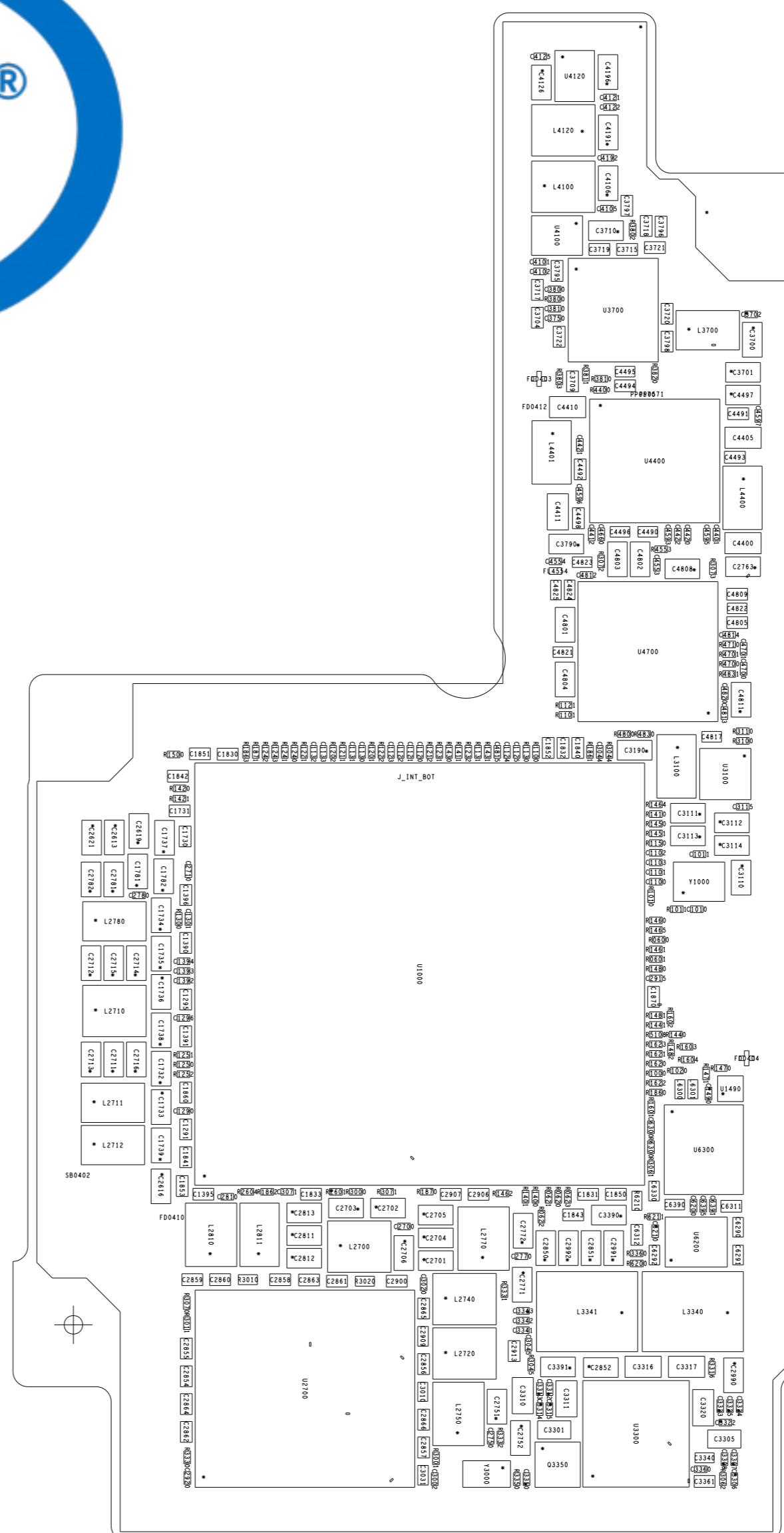
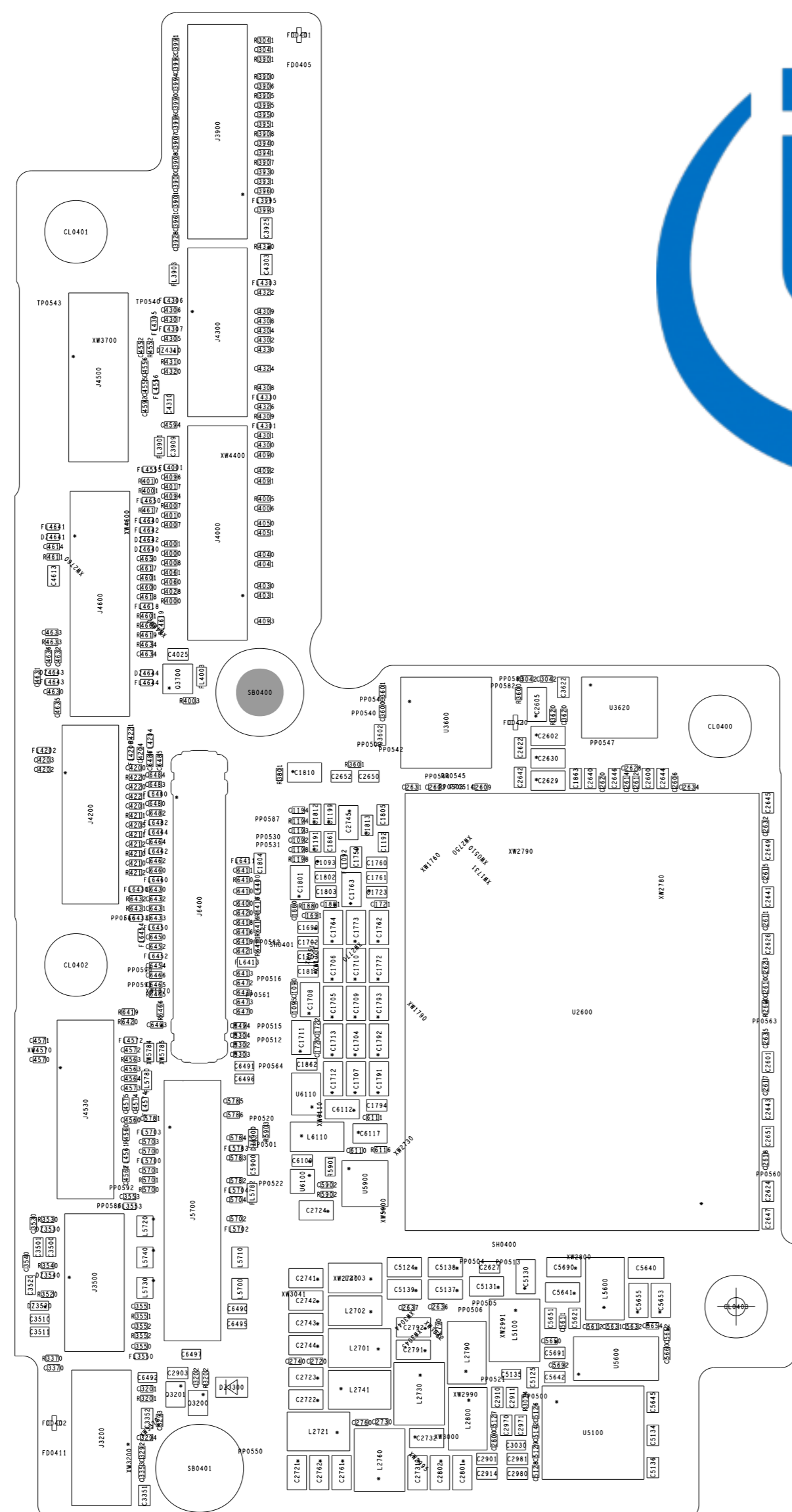
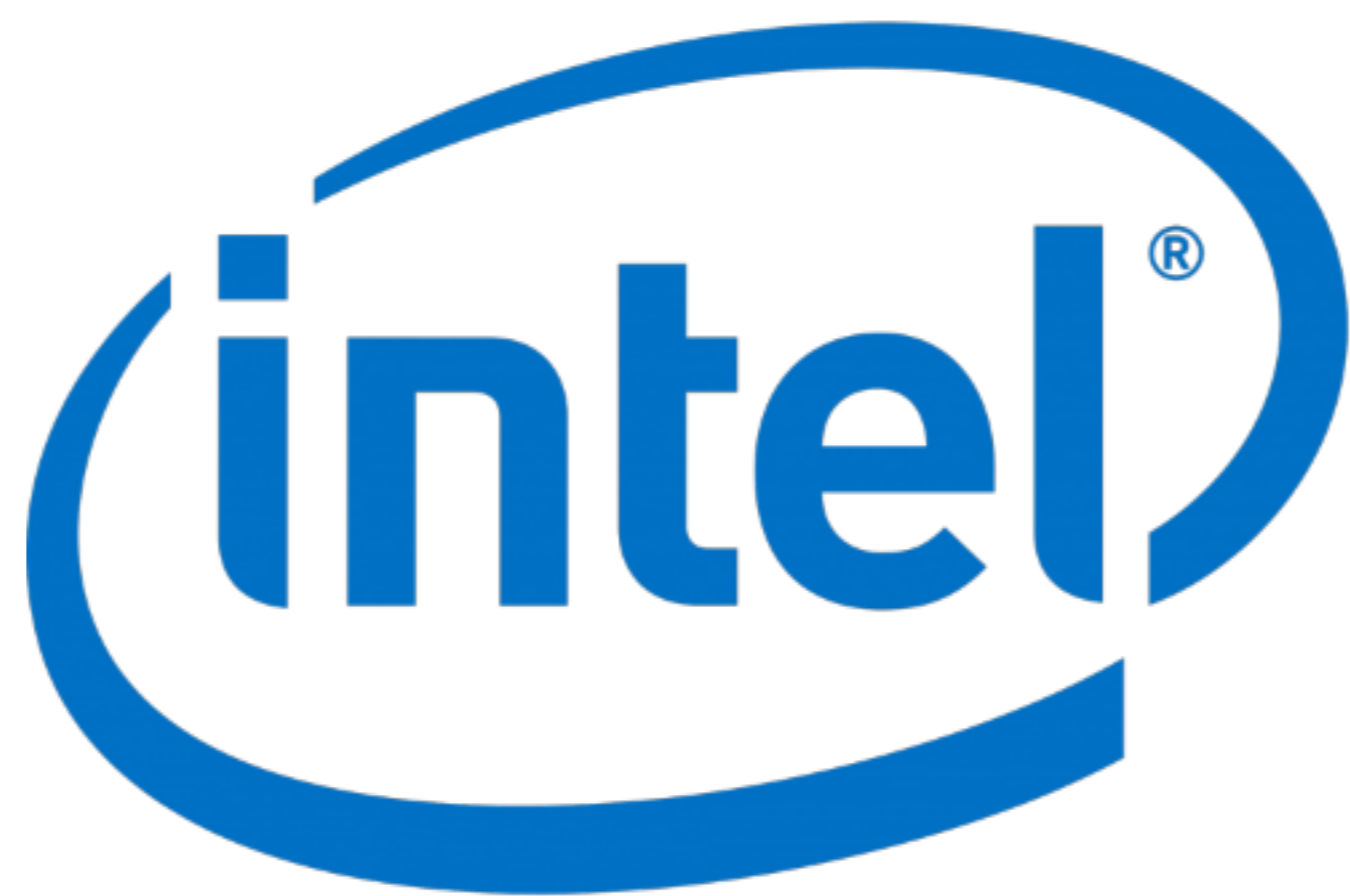


PCB 820-00863-09 X891 Intel Edition TOP MLB



TOP BOTTOM SIDE ASSEMBLY

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ORIG DIV	DESIGNER	DATE	SCALE	DRAWING NUMBER	
	KEN KIPLINGER	03/31/17	1:1	820-00863-09	
NOTES NETWORK VIEWED FROM COMPONENT SIDE. PCB SHALL CONFORM TO STANDARDS AS DEFINED IN APPLE SPECIFICATION 060-226 (FLEXIBLE PRINTED CIRCUIT BOARDS) OR 062-003 (MULTI-LAYER BOARDS) AS APPLICABLE.				NOTICE OF PROPRIETARY PROPERTY THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE. THE POSSESSOR AGREES TO THE FOLLOWING: (i) TO MAINTAIN THIS DOCUMENT IN CONFIDENCE (ii) NOT TO REPRODUCE OR COPY IT (iii) NOT TO REVEAL OR PUBLISH IT	

1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
 2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
 3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.

REV	ECN	DESCRIPTION OF REVISION	CK APPD	DATE
9	0008409760	ENGINEERING RELEASED		2017-04-05

X891/X893 MLB Top: EVT


LAST MODIFICATION=Mon Apr 3 13:03:06 2017

PAGE	CSA	CONTENTS	SYNC	DATE	PAGE	CSA	CONTENTS	SYNC	DATE
1	1	TABLE OF CONTENTS			46	61	I/O: Accessory Buck	test_mlb	10/17/2016
2	2	SYSTEM:BOM Tables	test_mlb	10/13/2016	47	62	I/O: USB PD	test_mlb	10/13/2016
3	4	SYSTEM: Mechanical Components			48	63	I/O: Hydra	test_mlb	10/13/2016
4	5	SYSTEM: Testpoints (Top)	test_mlb	10/13/2016	49	64	I/O: B2B Dock	test_mlb	10/13/2016
5	6	BOOTSTRAPPING	test_mlb	10/13/2016	50	65	I/O: Interposer (Bottom)	test_mlb	10/13/2016
6	10	SOC: JTAG,USB,XTAL	test_mlb	10/17/2016	51	80	RADIOS		06/04/2015
7	11	SOC: PCIE	test_mlb	10/17/2016					
8	12	SOC: MIPI & ISP	test_mlb	10/13/2016					
9	13	SOC: LPDP	test_mlb	10/13/2016					
10	14	SOC: Serial	test_mlb	10/17/2016					
11	15	SOC: GPIO & UART	test_mlb	10/13/2016					
12	16	SOC: AOP	test_mlb	10/17/2016					
13	17	SOC: Power (1/3)	test_mlb	10/17/2016					
14	18	SOC: Power (2/3)	test_mlb	10/17/2016					
15	19	SOC: Power (3/3)	test_mlb	10/17/2016					
16	26	NAND	test_mlb	10/13/2016					
17	27	SYSTEM POWER: PMU Bucks (1/4)	test_mlb	10/13/2016					
18	28	SYSTEM POWER: PMU Bucks (2/4)	test_mlb	10/13/2016					
19	29	SYSTEM POWER: PMU LDOs (3/4)	test_mlb	10/13/2016					
20	30	SYSTEM POWER: PMU (4/4)	test_mlb	11/01/2016					
21	31	SYSTEM POWER: Boost	test_mlb	10/13/2016					
22	32	SYSTEM POWER: B2B Battery	test_mlb	10/13/2016					
23	33	SYSTEM POWER: Charger	test_mlb	10/13/2016					
24	34	SYSTEM POWER: Iktara							
25	35	SYSTEM POWER: B2B Cyclone + Button	test_mlb	10/13/2016					
26	36	SENSORS	test_mlb	10/13/2016					
27	37	CAMERA: PMU (1/2)	test_mlb	10/13/2016					
28	38	CAMERA: PMU (2/2)	test_mlb	10/13/2016					
29	39	CAMERA: B2B Wide (WY)	test_mlb	10/13/2016					
30	40	CAMERA: B2B Tele (MT)	test_mlb	10/13/2016					
31	41	CAMERA: Strobe Drivers	test_mlb	10/13/2016					
32	42	CAMERA: B2B FCAM	test_mlb	10/13/2016					
33	43	CAMERA: B2B Strobe + Hold Button	test_mlb	10/13/2016					
34	44	PEARL: Power	test_mlb	10/13/2016					
35	45	PEARL: B2B Romeo + Juliet	test_mlb	10/13/2016					
36	46	PEARL: B2B Rosaline + Misc	test_mlb	10/13/2016					
37	47	AUDIO: CODEC (1/2)	test_mlb	10/13/2016					
38	48	AUDIO: CODEC (2/2)	test_mlb	10/13/2016					
39	49	AUDIO: Speaker Amp Bottom		08/25/2015					
40	50	AUDIO: Speaker Amp Top		08/25/2015					
41	51	ARC: Driver	test_mlb	10/13/2016					
42	56	CG: Power Supplies - Touch & Display	test_mlb	10/13/2016					
43	57	CG: B2B Display	test_mlb	10/13/2016					
44	58	CG: B2B Orb & Touch		08/25/2015					
45	59	I/O: Overvoltage Cut-Off Circuit	sync	01/10/2017					

BOM:639-04583 (Ultimate)
 BOM:639-03409 (Extreme)
 MCO:056-04077

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
051-02221	1	SCH_MLB_TOP_X891	SCH	NO	COMMON
820-00863	1	PCB_MLB_TOP_X891	PCB	NO	COMMON

TABLE OF CONTENTS

DRAWING TITLE		SCH,MLB, TOP, X891	
 Apple Inc.	DRAWING NUMBER	051-02221	SIZE
	REVISION	9.0.0	D
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		PAGE	1 OF 80
		SHEET	1 OF 51

EEEE Codes

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7691	1	EEEE FOR (MLB_TOP,639-04583,ULTIMATE)	EEEE_J2WJ	NO	ULTIMATE
825-7691	1	EEEE FOR (MLB_TOP,639-03409,EXTREME)	EEEE_HP26	NO	EXTREME

SOC

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00358	1	SKYE+3GB, B0, M, DEV	U1000	CRITICAL	COMMON

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00359	339S00358	BOM_TABLE_ALTS	U1000	DDR-H,3G, B0
339S00360	339S00358	BOM_TABLE_ALTS	U1000	DDR-S-20,3G, B0
339S00361	339S00358	BOM_TABLE_ALTS	U1000	DDR-S-18,3G, B0

NAND

Ultimate

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00287	1	HYNIX, 3DV3, ULTIMATE	U2600	CRITICAL	ULTIMATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S00284	335S00287	BOM_TABLE_ALTS	U2600	TOSHIBA, 1Z, ULTIMATE
335S00285	335S00287	BOM_TABLE_ALTS	U2600	TOSHIBA, B1CS3, ULTIMATE
335S00286	335S00287	BOM_TABLE_ALTS	U2600	SANDISK, B1CS3, ULTIMATE
335S00288	335S00287	BOM_TABLE_ALTS	U2600	SAMSUNG, 3DV4, ULTIMATE

Extreme

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00240	1	HYNIX, 3DV3, EXTREME	U2600	CRITICAL	EXTREME

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S00228	335S00240	BOM_TABLE_ALTS	U2600	TOSHIBA, B1CS3, EXTREME
335S00247	335S00240	BOM_TABLE_ALTS	U2600	SANDISK, B1CS3, EXTREME
335S00276	335S00240	BOM_TABLE_ALTS	U2600	SAMSUNG, 3DV4, EXTREME

Global Capacitors

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00148	138S00149	BOM_TABLE_ALTS	ALL	0402-3T,10.5uF@1V, Kyocera
138S00150	138S00149	BOM_TABLE_ALTS	ALL	0402-3T,10.5uF@1V, SEMCO
138S00151	138S00149	BOM_TABLE_ALTS	ALL	0402-3T,10.5uF@1V, TY

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00143	138S00144	BOM_TABLE_ALTS	ALL	0402,16uF@1V, Kyocera
138S00163	138S00144	BOM_TABLE_ALTS	ALL	0402,16uF@1V, Taiyo

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00138	138S00139	BOM_TABLE_ALTS	ALL	0201,3uF@1V, Kyocera
138S00164	138S00139	BOM_TABLE_ALTS	ALL	0201,3uF@1V, Taiyo

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00145	138S00146	BOM_TABLE_ALTS	ALL	0402,5.1uF@3V, Kyocera
138S00165	138S00146	BOM_TABLE_ALTS	ALL	0402,5.1uF@3V, Taiyo

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00140	138S00141	BOM_TABLE_ALTS	ALL	0201,1.1uF@3V, Kyocera
138S00142	138S00141	BOM_TABLE_ALTS	ALL	0201,1.1uF@3V, SEMCO
138S00166	138S00141	BOM_TABLE_ALTS	ALL	0201,1.1uF@3V, Taiyo

CRITICAL PART#	COMMENT
138S00149	0402-3T,10.5uF@1V

CRITICAL PART#	COMMENT
138S00144	0402,16uF@1V

CRITICAL PART#	COMMENT
138S00139	0201,3uF@1V

CRITICAL PART#	COMMENT
138S00146	0402,5.1uF@3V

CRITICAL PART#	COMMENT
138S00141	0201,1.1uF@3V

Global Ferrites

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S00194	155S00610	BOM_TABLE_ALTS	ALL	FERR BD, 1500HM, TDE
155S00200	155S00610	BOM_TABLE_ALTS	ALL	FERR BD, 1500HM, TY

CRITICAL PART#	COMMENT
155S00610	FERR BD, 1500HM, 01005

Global R/C Alternates

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
118S0764	118S0717	BOM_TABLE_ALTS	ALL	RES, 3.92K, 0.1%, 0201
138S0648	138S0652	BOM_TABLE_ALTS	ALL	CAP,XSR,4.7UF,4.7V,0.5MM,0.002,7500
138S0739	138S0706	BOM_TABLE_ALTS	ALL	CAP,CER,XSR,0.22UF,20%,6.3V,20%
132S0436	132S0400	BOM_TABLE_ALTS	ALL	CAP,CER,XSR,0.22UF,20%,6.3V,01005
138S00049	138S0831	BOM_TABLE_ALTS	ALL	CAP,CER,XSR,2.2UF,20%,6.3V,0201

CRITICAL PART#	COMMENT
118S0717	RES, 3.92K, 0.1%, 0201
138S0652	CAP,XSR,4.7UF,6.3V,0.65MM,0402
138S0706	CAP,CER,XSR,0.22UF,20%,6.3V,20%
132S0400	CAP,CER,XSR,0.22UF,20%,6.3V,01005
138S0831	CAP,CER,XSR,2.2UF,20%,6.3V,0201

Global Inductors

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
152S00710	152S00617	BOM_TABLE_ALTS	ALL	IND,MLD,0.10UH,20%,6.1A,29MOHM,H=65,1608
152S00712	152S00620	BOM_TABLE_ALTS	ALL	IND,MLD,0.10UH,20%,7.2A,17MOHM,H=0,8,2012
152S00713	152S00621	BOM_TABLE_ALTS	ALL	IND,MLD,0.47UH,20%,3.5A,53MO,H=65,2012
152S00714	152S00622	BOM_TABLE_ALTS	ALL	IND,MLD,1.00UH,20%,2.1A,100MO,H=65,2012
152S00716	152S00626	BOM_TABLE_ALTS	ALL	IND,MLD,1.50UH,20%,1.1A,160MO,H=65,2012
152S00717	152S00631	BOM_TABLE_ALTS	ALL	IND,MLD,1.50UH,20%,1.1A,160MO,H=0,8,2012
152S00718	152S00632	BOM_TABLE_ALTS	ALL	IND,MLD,1.00UH,20%,3.2A,60MO,H=0,8,2016
152S00720	152S00640	BOM_TABLE_ALTS	ALL	IND,MLD,0.47UH,3.8A,55MO,H=0,65MM,2012
152S00721	152S00641	BOM_TABLE_ALTS	ALL	IND,MLD,0.47UH,4A,48MO,H=0,8MM,2012
152S00715	152S00623	BOM_TABLE_ALTS	ALL	IND,MLD,10UH,3.6A,60MO,H=0,8MM,2016
152S00653	152S00651	BOM_TABLE_ALTS	ALL	IND,1.20H,3A,2016,0.65Z
152S00649	152S00650	BOM_TABLE_ALTS	L3340,L3341	IND,0.47UH,6.6A,3225,0.8Z

CRITICAL PART#	COMMENT
152S00617	IND,MLD,0.10UH,20%,6.1A,29MOHM,H=65,1608
152S00620	IND,MLD,0.10UH,20%,7.2A,17MOHM,H=0,8,2012
152S00621	IND,MLD,0.47UH,20%,3.5A,53MO,H=65,2012
152S00622	IND,MLD,1.00UH,20%,2.1A,100MO,H=65,2012
152S00626	IND,MLD,1.50UH,20%,1.1A,160MO,H=65,2012
152S00631	IND,MLD,1.50UH,20%,1.1A,160MO,H=0,8,2012
152S00632	IND,MLD,1.00UH,20%,3.2A,60MO,H=0,8,2016
152S00640	IND,MLD,0.47UH,3.8A,55MO,H=0,65MM,2012
152S00641	IND,MLD,0.47UH,4A,48MO,H=0,8MM,2012
152S00623	IND,MLD,10UH,3.6A,60MO,H=0,8MM,2016
152S00651	IND,1.20H,3A,2016,0.65Z
152S00650	IND,0.47UH,6.6A,3225,0.8Z

XTAL Alternate

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S0612	197S0446	BOM_TABLE_ALTS	Y1000	XTAL, 24M, 1612

CRITICAL PART#	COMMENT
197S0446	XTAL, 24M, 1612

Multi-Vendor Criticals

CRITICAL PART#	COMMENT	CRITICAL PART#	COMMENT
377S0106	SUPPR_TRANS_VARISTOR,12V,33PF,01005	132S0288	CAP,CER,XSR,0.1UF,10%,16V,0201
197S0446	XTAL,24MHZ,30PPM,9.5PF,60 OHM MAX,1612	132S0275	CAP,CER,XSR,470PF,10%,10V,01005
155S0576	FERR BD,10 OHM,50A,750MA,0.07 DCR,01005	132S0249	CAP,CER,X7R,220PF,10%,10V,01005
155S00168	FLTR_NOISE,65 OHM,3.40MM,0.7-20HZ,0605	132S0245	CAP,CER,XSR,0.01UF,10%,6.3V,01005
138S0979	CAP,CER,XSR,10UF,20%,10V,0402,H=0.65MM	132S0093	CAP,XSR,0.022UF,20%,6.3V,01005
138S0692	CAP,CER,XSR,1UF,20%,6.3V,0201	132S00225	CAP,CER,XSR,0.047UF,20%,6.3V,01005
138S0683	CAP,CER,XSR,1UF,10%,25V,0402	132S00008	CAP,CER,0.1UF,10%,50V,X7R,0402
138S0652	CAP,CER,XSR,4.7UF,20%,6.3V,H=0.65MM,0402	131S0883	CAP,CER,NPO/COG,220PF,2A,50V,0201
138S00070	CAP,XSR,4.7UF,20%,25V,0402	131S0804	CAP,CER,27PF,5A,COG,25V,0201
138S00014	CAP,CER,1UF,20%,16V,XSR,0201,H=0.39MM	131S0307	CAP,CER,NPO/COG,100PF,5A,16V,01005
132S0664	CAP,CER,0.047UF,10%,25V,XSR,0201	131S0225	CAP,CER,NPO/COG,15PF,5A,16V,01005
132S0663	CAP,CER,XSR,1UF,10%,25V,0402	131S0223	CAP,CER,NPO/COG,27PF,5A,16V,01005
132S0534	CAP,CER,XSR,0.1UF,10%,25V,0201	131S0220	CAP,CER,NPO/COG,12PF,5A,16V,01005
132S0436	CAP,CER,XSR,0.22UF,20%,6.3V,01005	131S0216	CAP,CER,NPO/COG,47PF,5A,16V,01005
132S0396	CAP,CER,XSR,1000PF,10%,10V,01005	131S00553	CAP,CER,COG,220PF,5A,10V,01005
132S0316	CAP,CER,XSR,0.1UF,20%,6.3V,01005	118S00068	RES,WF,1.3 MOHM,1%,200PPM,1/20W,0201
132S0304	CAP,CER,XSR,0.22UF,20%,6.3V,0201	117S0055	RES,WF,1/20W,2M OHM,5,0201,SMD
132S0296	CAP,CER,XSR,1000PF,10%,6.3V,01005	107S0257	THERMISTOR,NTC,10K OHM,1%,B=3435,01005
132S0318	CAP,CER,XSR,820PF,10%,10V,01005		

Soft-Term Cap Sub BOMs

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
685-00155	1	SUBBOM,MLB_TOP_CAP,TYPICAL,X891	SUBBOM_CAP	CRITICAL	COMMON

Agnes Input

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	4	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA	C2970,C2971,C2980,C2981	CRITICAL	SOFT_CAP
138S0831	4	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA	C2970,C2971,C2980,C2981	CRITICAL	TYPICAL_CAP

Agnes Output

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	9	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA		CRITICAL	SOFT_CAP
138S0831	9	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA		CRITICAL	TYPICAL_CAP

Sensors

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	2	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA	C3602,C3622	CRITICAL	SOFT_CAP
138S0831	2	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA	C3602,C3622	CRITICAL	TYPICAL_CAP

RCAM B2Bs

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	3	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA	C3909,C3925,C4025	CRITICAL	SOFT_CAP
138S0831	3	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA	C3909,C3925,C4025	CRITICAL	TYPICAL_CAP

Strobe B2B

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	1	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA	C4303	CRITICAL	SOFT_CAP
138S0831	1	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA	C4303	CRITICAL	TYPICAL_CAP

Audio

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	2	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA	C4809,C4805	CRITICAL	SOFT_CAP
138S0831	2	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA	C4809,C4805	CRITICAL	TYPICAL_CAP

Pearl B2B

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	1	CAP,SOPF-TERRM,2.2UF,6.3V,0201,KYOCERA	C4613	CRITICAL	SOFT_CAP
138S0831	1	CAP,TYPICAL,2.2UF,6.3V,0201,NEBATA	C4613	CRITICAL	TYPICAL_CAP

Acorn

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FIDUCIALS

FD0401

FID

0P5SQ-CROSS-NSP

ROOM-ASSEMBLY

1

FD0402

FID

0P5SQ-CROSS-NSP

ROOM-ASSEMBLY

1

FD0403

FID

0P5SQ-CROSS-NSP

ROOM-ASSEMBLY

1

FD0404

FID

0P5SQ-CROSS-NSP

ROOM-ASSEMBLY

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FD0420

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FD0411

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ROOM-ASSEMBLY

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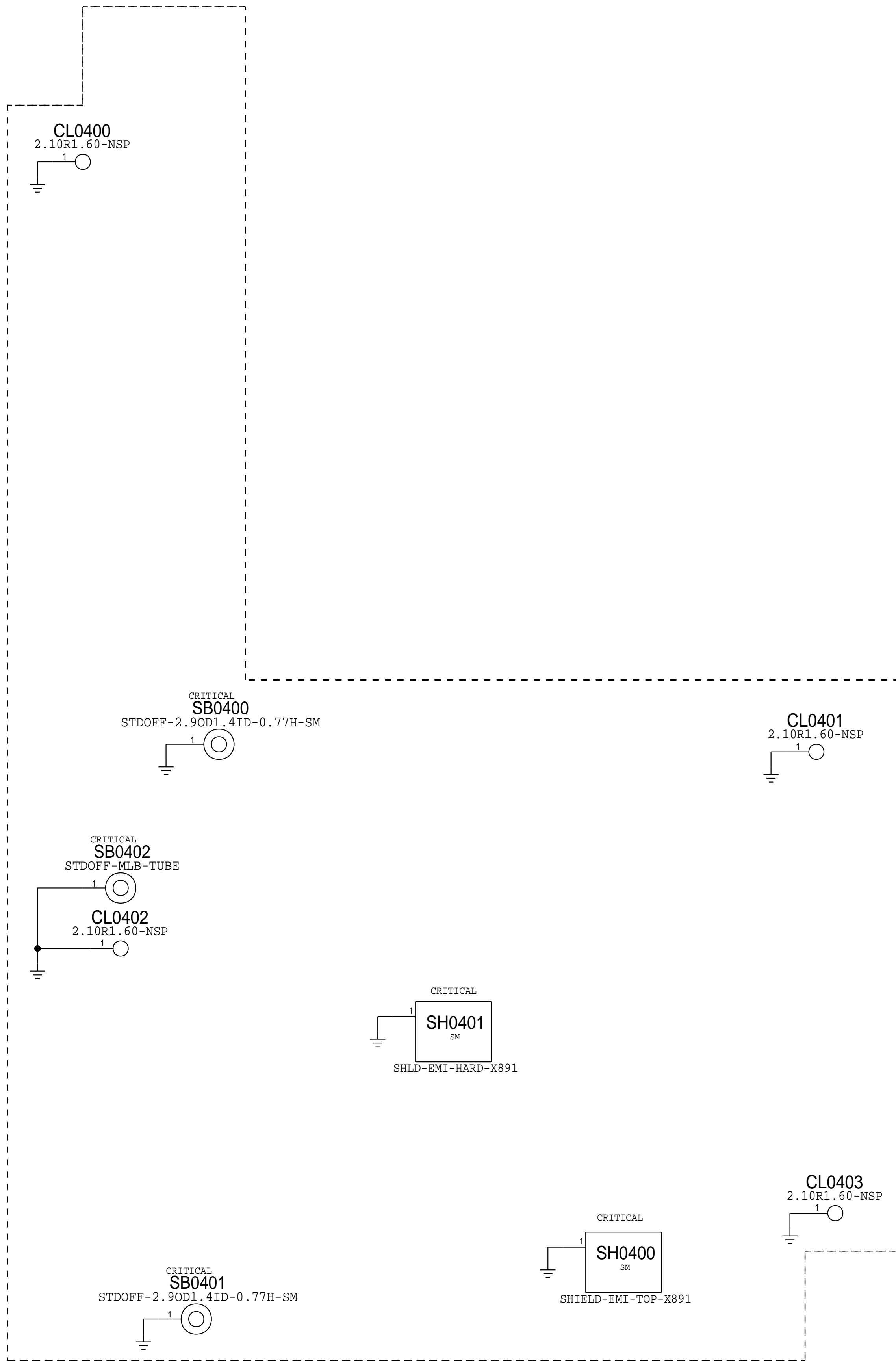
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ROOM-ASSEMBLY

1



PAGE TITLE		
SYSTEM: Mechanical Components		
Apple Inc.	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	4 OF 80
	SHEET	3 OF 51

8

7

6

5

4

3

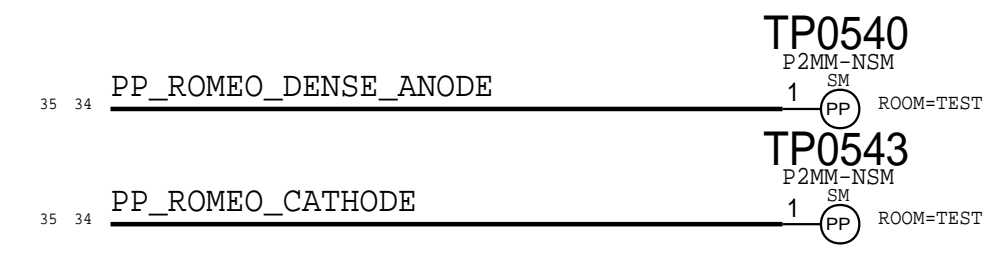
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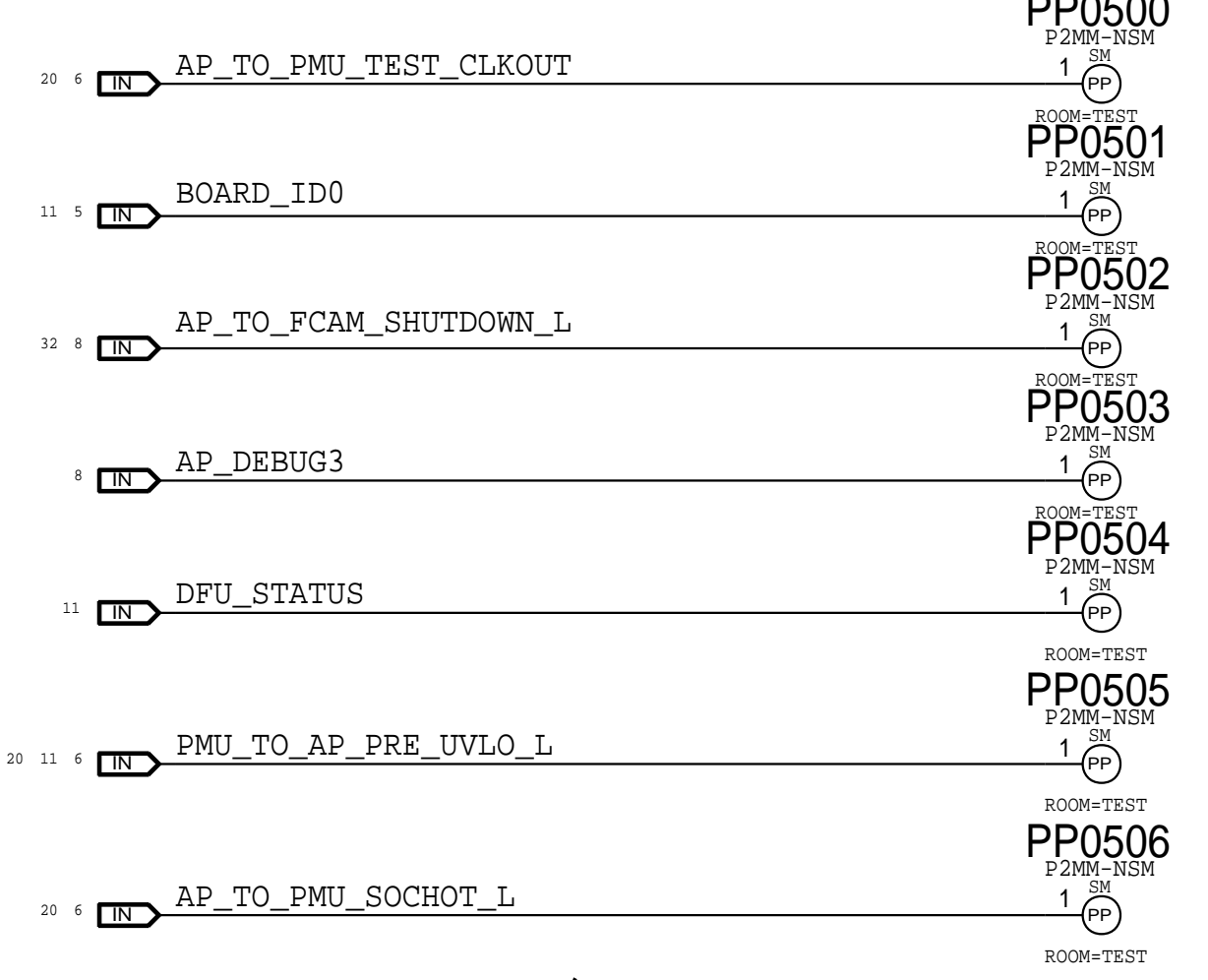
Test Points

Probe Points

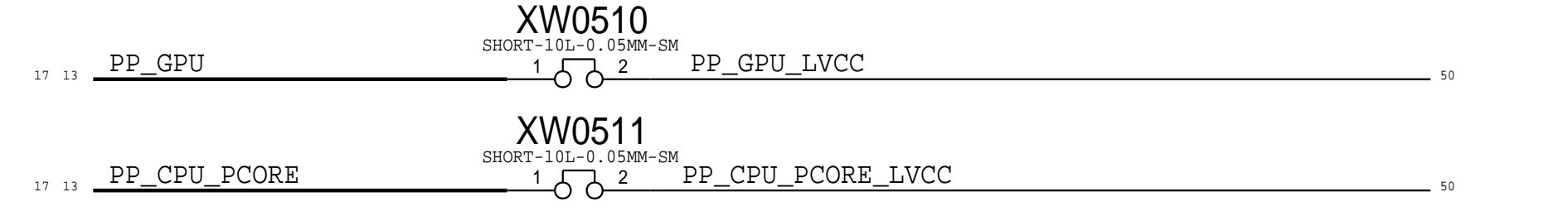
POWER



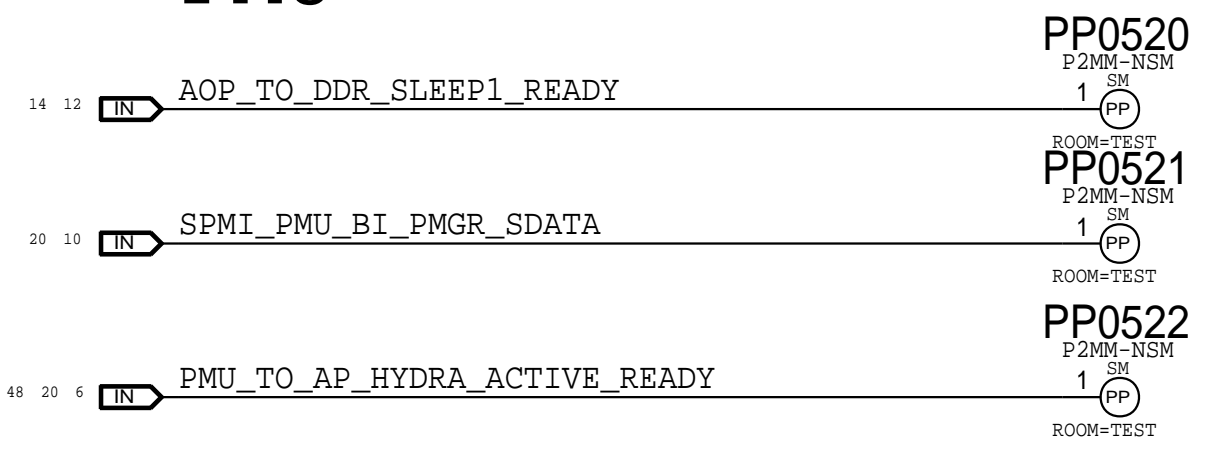
SOC Debug



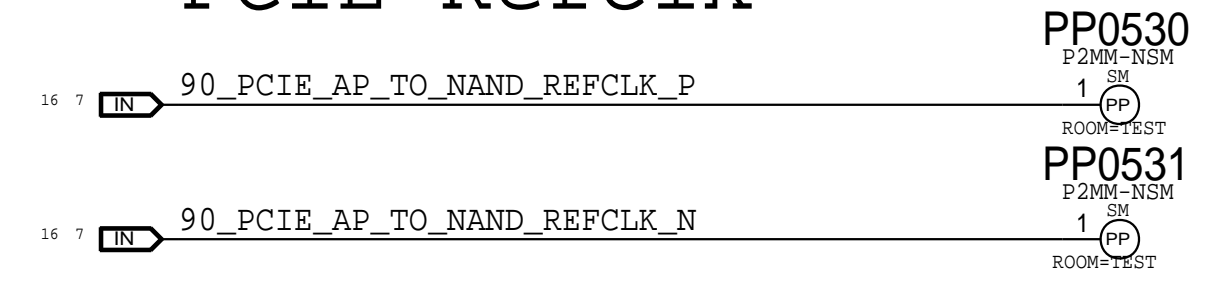
SOC CPU/GPU



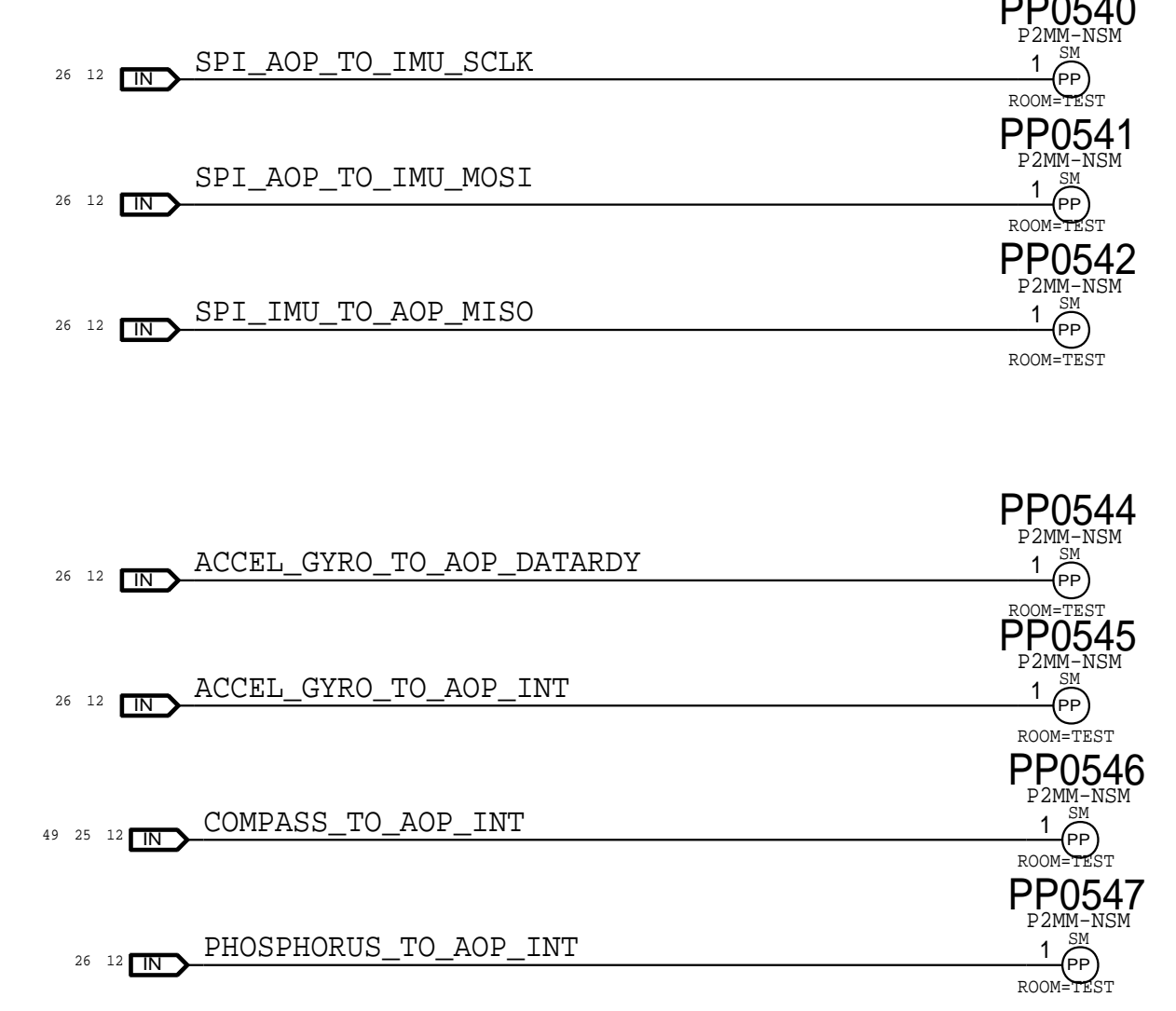
PMU



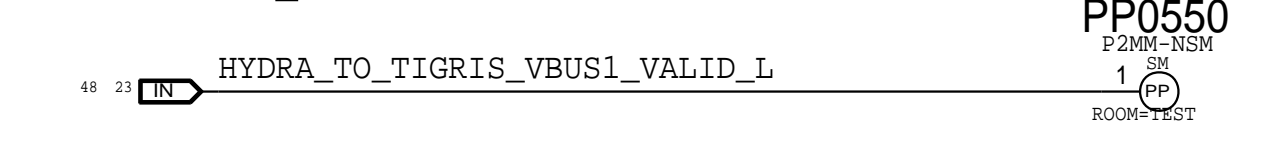
PCIE Refclk



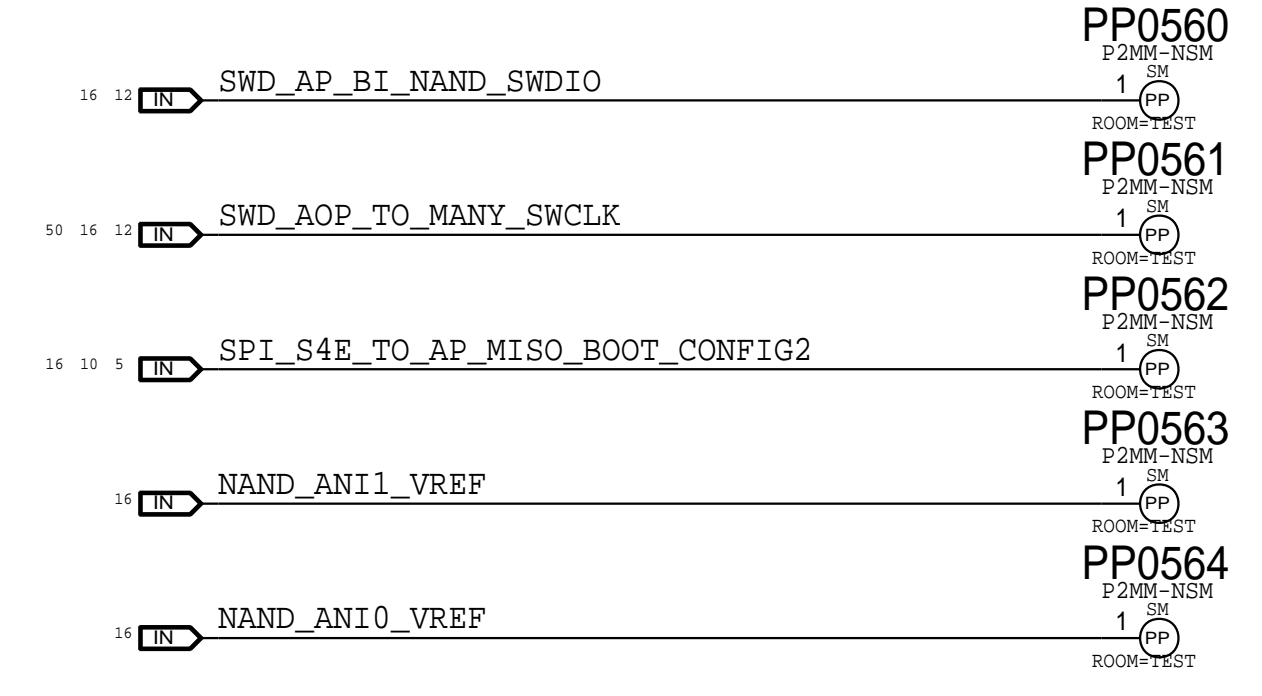
Sensors



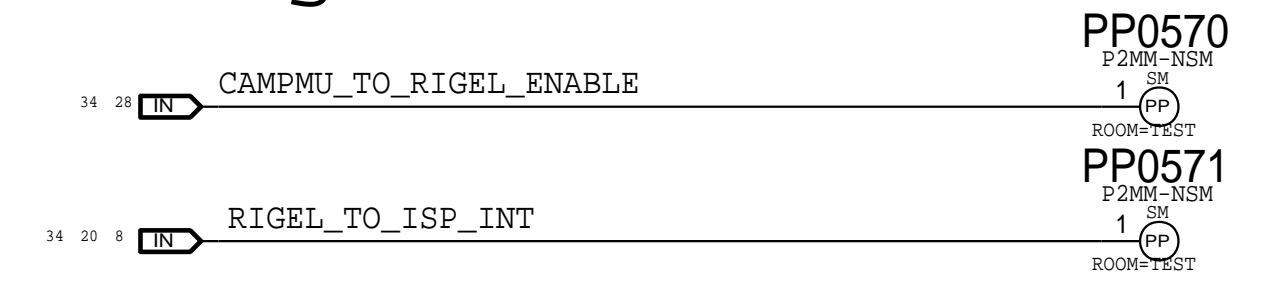
Hydra VBUS



NAND



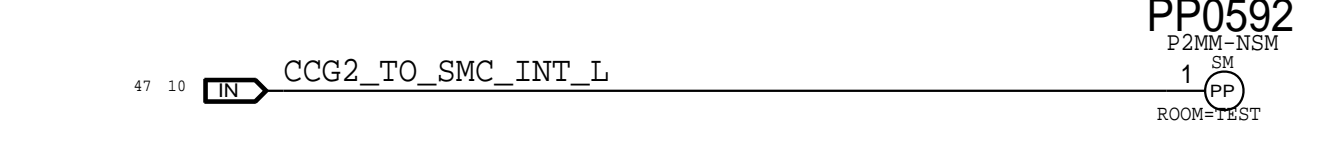
Rigel



SOC I2C1_AOP

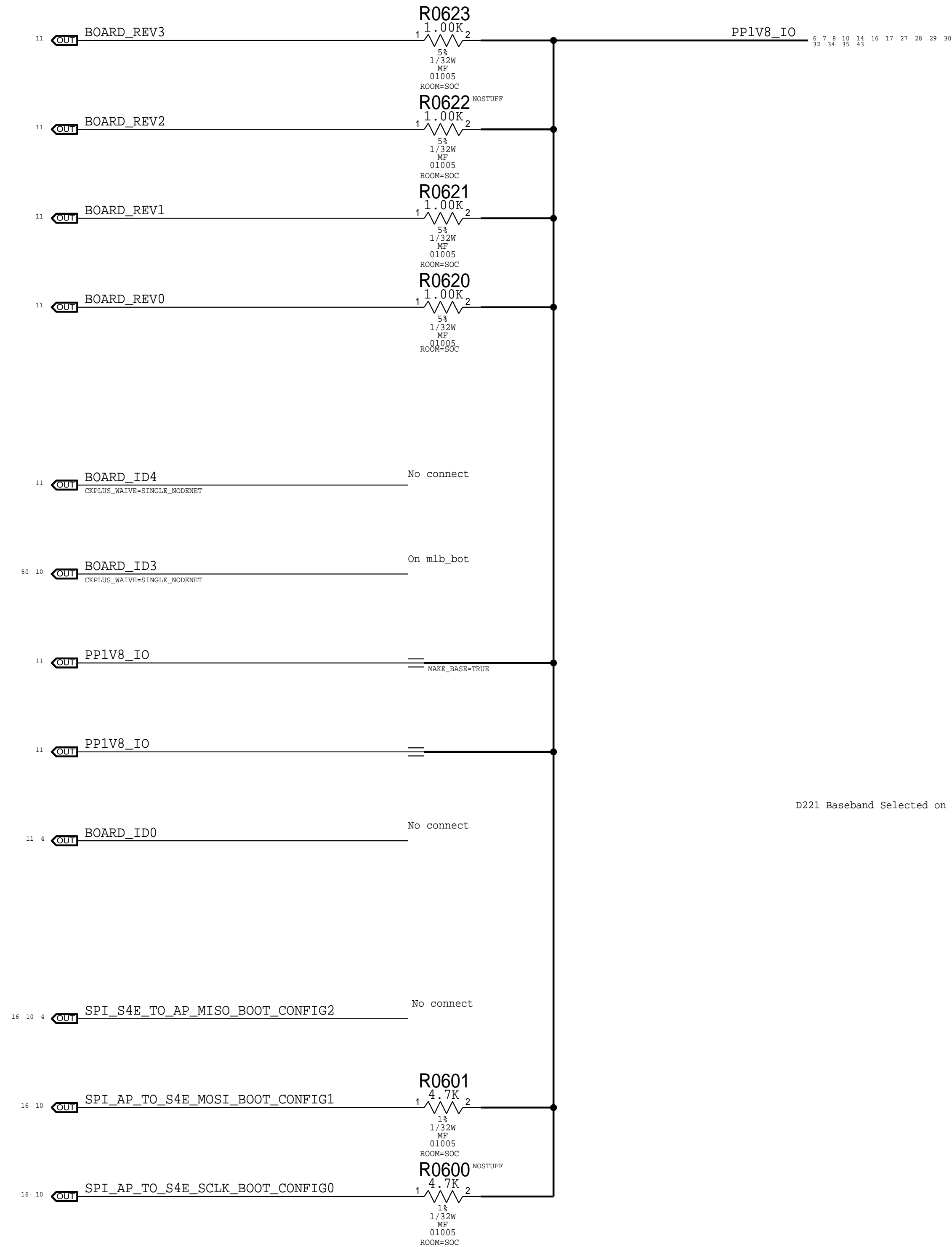


CCG2



PAGE TITLE		
SYSTEM: Testpoints (Top)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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		SHEET
		4 OF 51

BOOTSTRAPPING: BOARD REV BOARD ID BOOT CONFIG



Board Rev[3:0]				
Float=Low PU=High				
	3	2	1	0
	Build Major		Build Minor	
Proto 1	1	1	1	1
Proto 1 (DOE6)	1	1	1	0
Proto 2	1	1	0	1
Proto 3	1	1	0	0
EVT	1	0	1	1
(Spare)	1	0	1	0
Carrier	0	1	1	1
(Spare)	0	1	1	0
DVT	0	0	1	1
(Spare)	0	0	1	0
(Spare)	0	0	0	1
PVT	0	0	0	0

Board ID[4:0]					
Float=Low PU=High					
	4	3	2	1	0
	X	Baseband	Form Factor	MLB/Dev	
D20 MLB	0	0	0	1	0
D20 Dev	0	0	0	1	1
D21 MLB	0	0	1	0	0
D21 Dev	0	0	1	0	1
D22 MLB	0	0	1	1	0
D22 Dev	0	0	1	1	1
D201 MLB	0	1	0	1	0
D201 Dev	0	1	0	1	1
D211 MLB	0	1	1	0	0
D211 Dev	0	1	1	0	1
D221 MLB	0	1	1	1	0
D221 Dev	0	1	1	1	1

Boot Config[2:0]			
Float=Low PU=High			
	2	1	0
SPI0	0	0	0
SPI0 Test Mode	0	0	1
SPI0 NAND	0	1	0
SPI0 NAND Test	0	1	1
Slow SPI0 Test	1	1	0

SELECTED -->

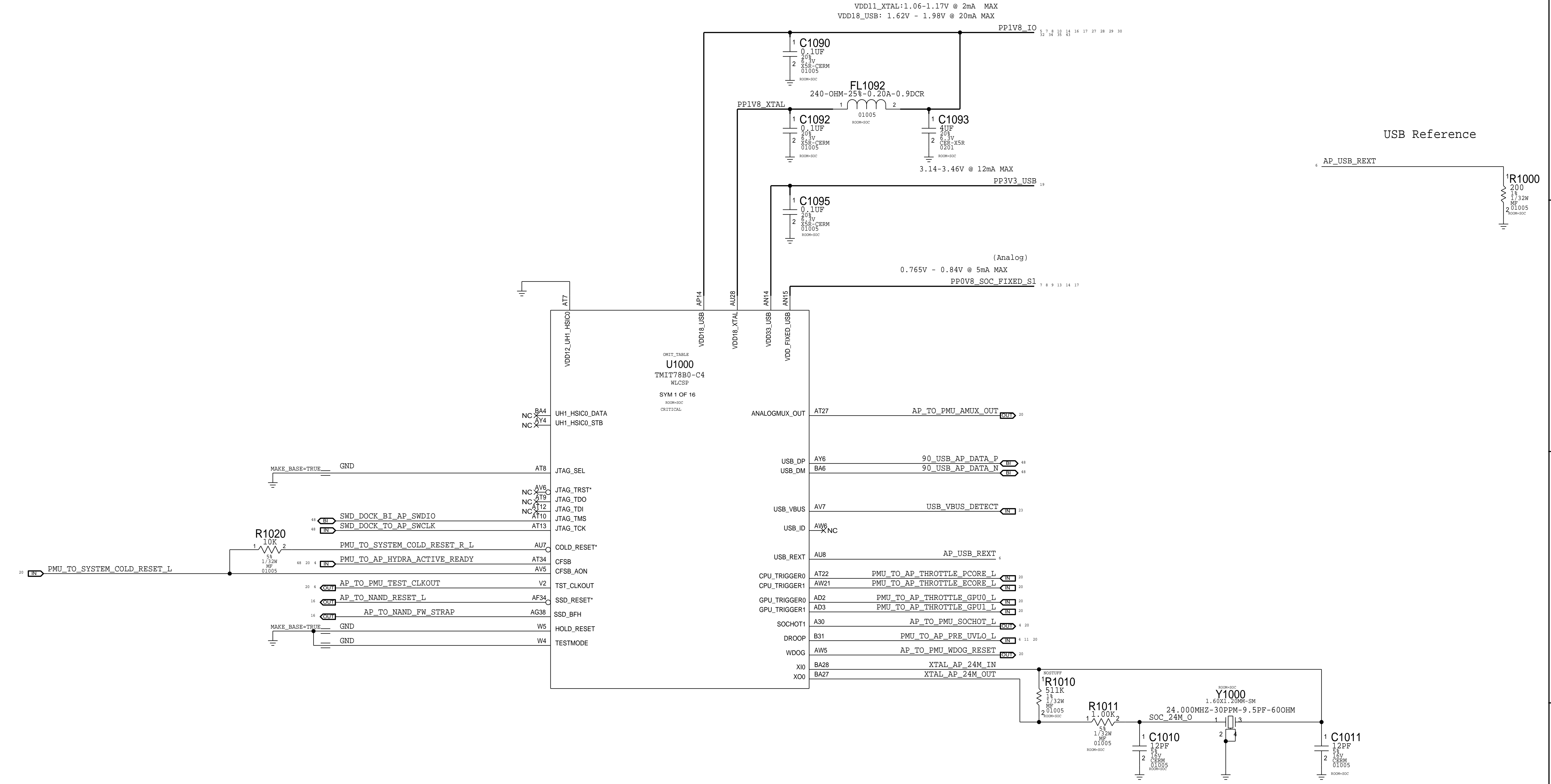
SELECTED -->

D221 Baseband Selected on RF Board

SELECTED -->

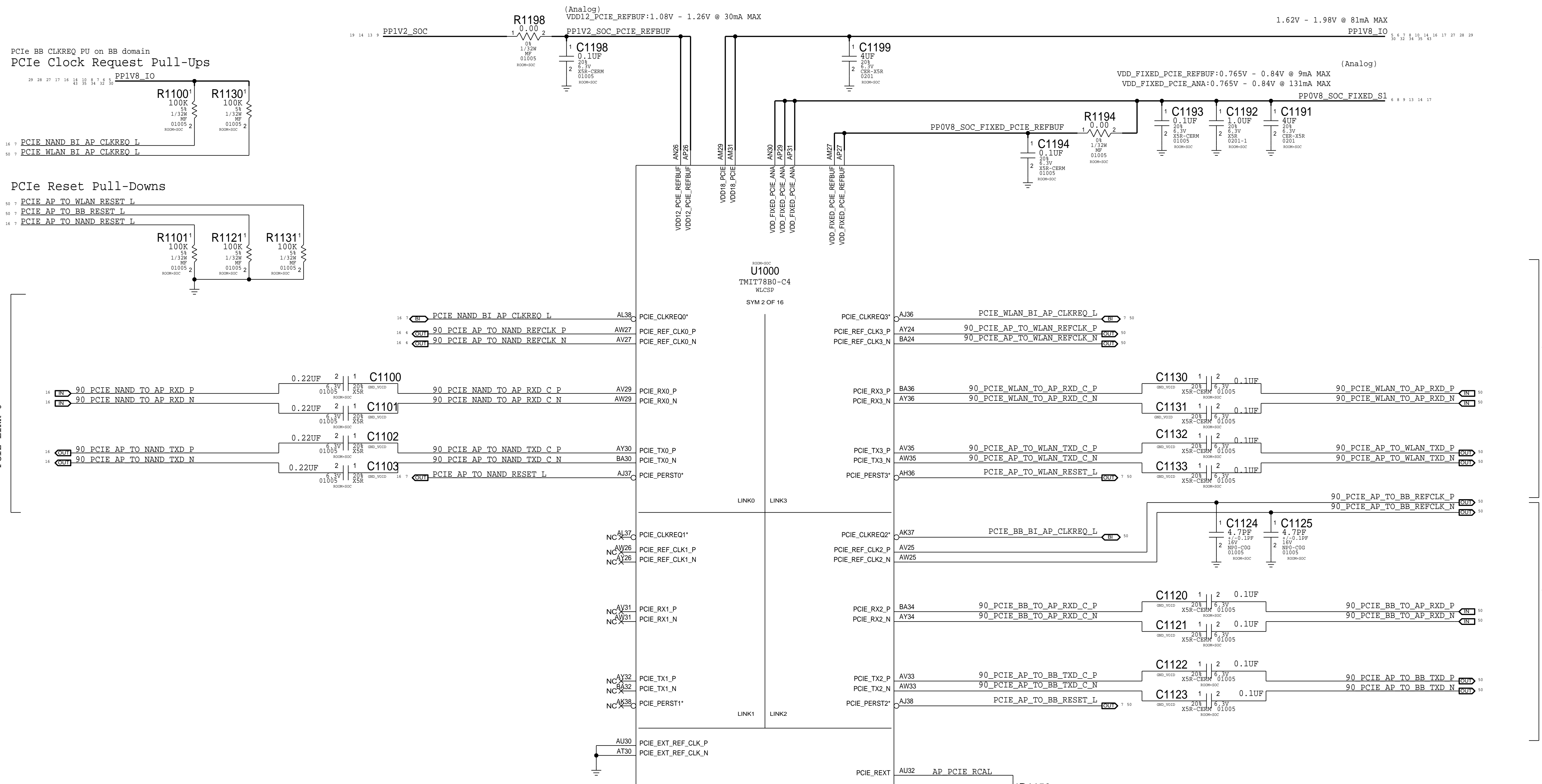
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BOOTSTRAPPING		
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	PAGE	6 OF 80
	SHEET	5 OF 51

SOC - USB, JTAG, XTAL



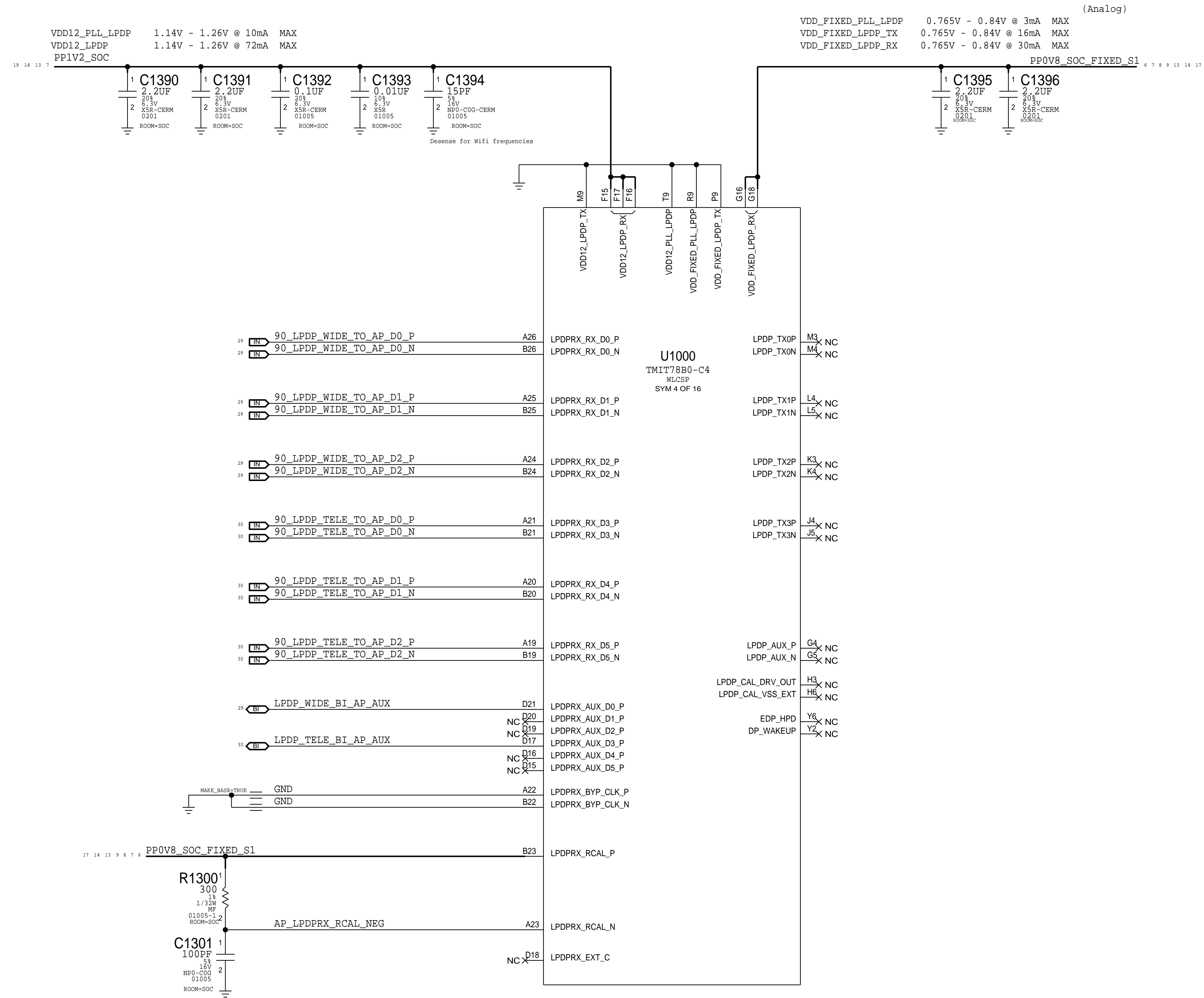
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SOC: JTAG, USB, XTAL		
	DRAWING NUMBER	051-02221
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	PAGE	10 OF 80
	SHEET	6 OF 51

SOC - PCIE INTERFACES



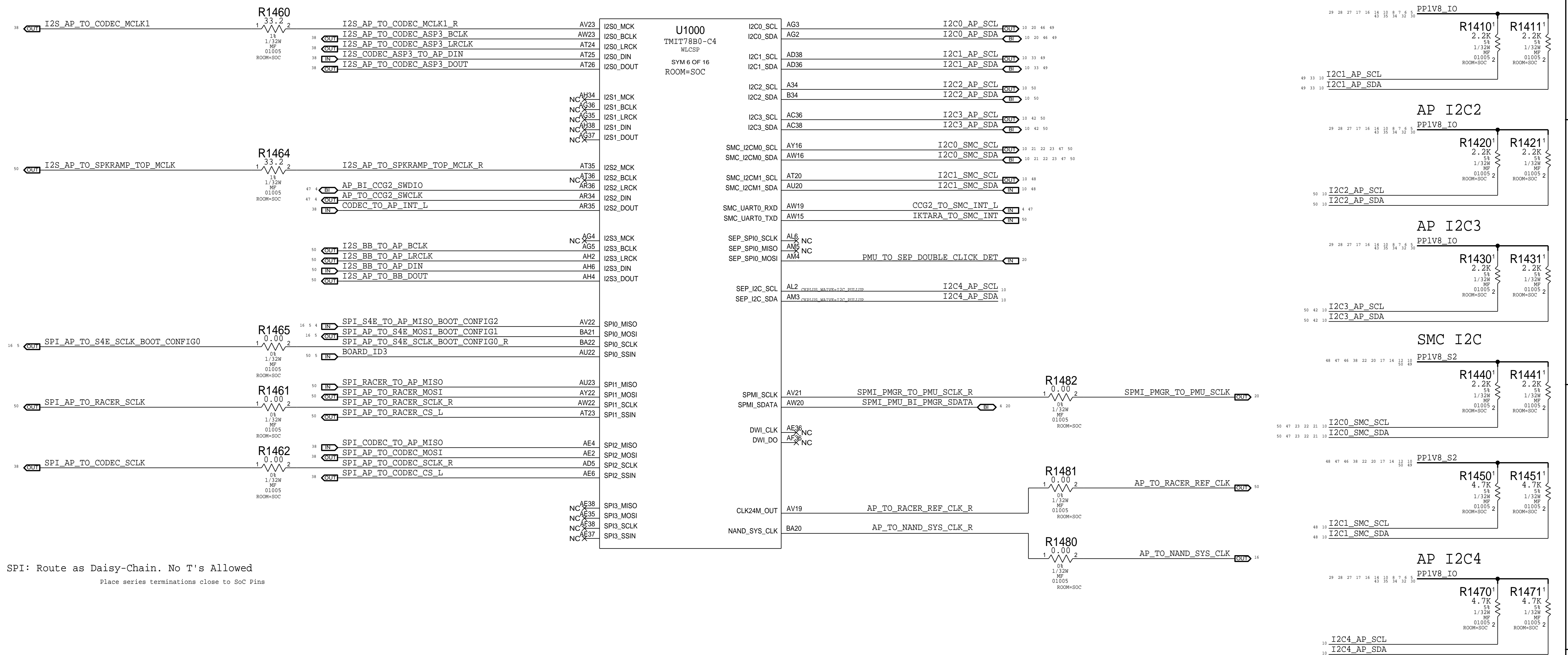
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SOC: PCIE		
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	PAGE	11 OF 80
	SHEET	7 OF 51

SOC - LPDP

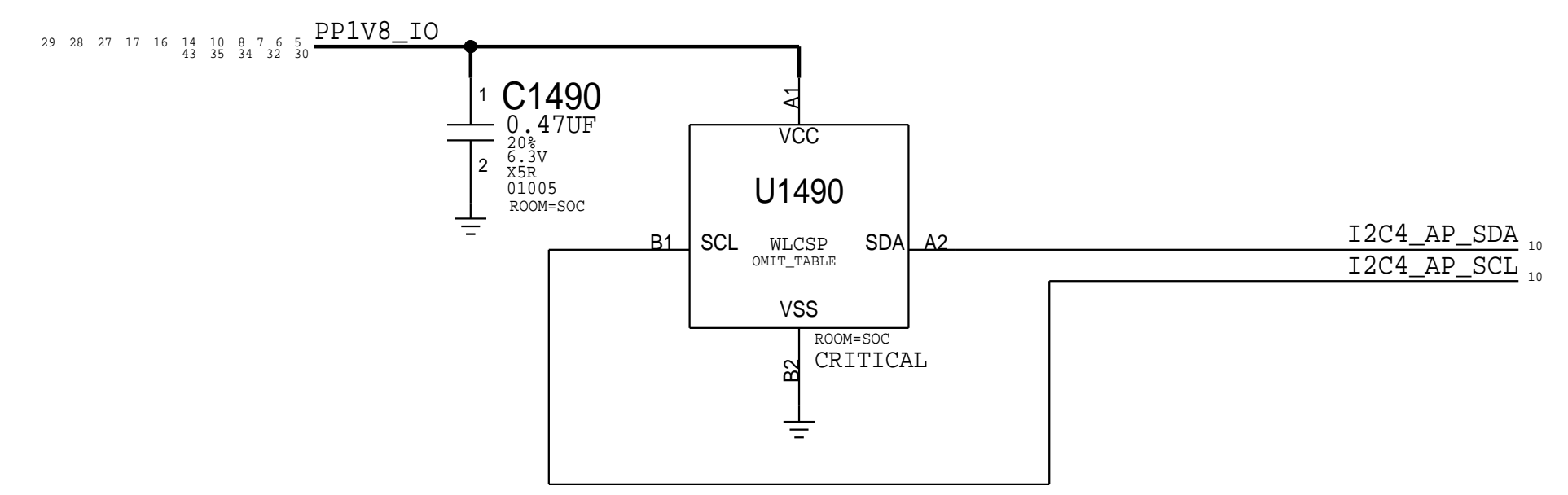


PAGE TITLE SOC: LPDP		
Apple Inc.	DRAWING NUMBER 051-02221	SIZE D
	REVISION 9.0.0	
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	PAGE 13 OF 80	
	SHEET 9 OF 51	

SOC - SERIAL INTERFACES



SPI: Route as Daisy-Chain. No T's Allowed
Place series terminations close to SoC Pins

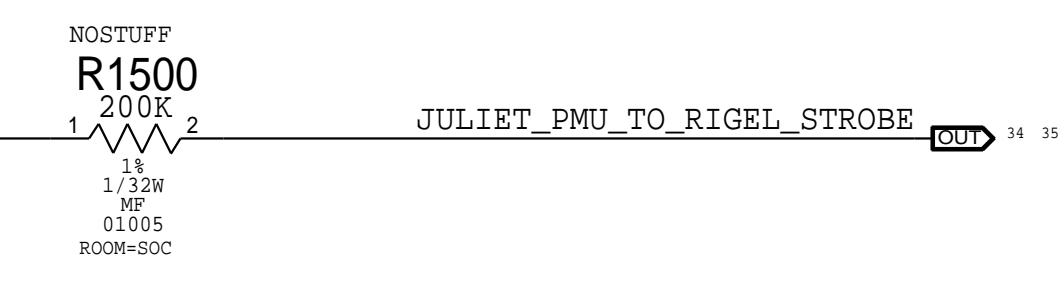
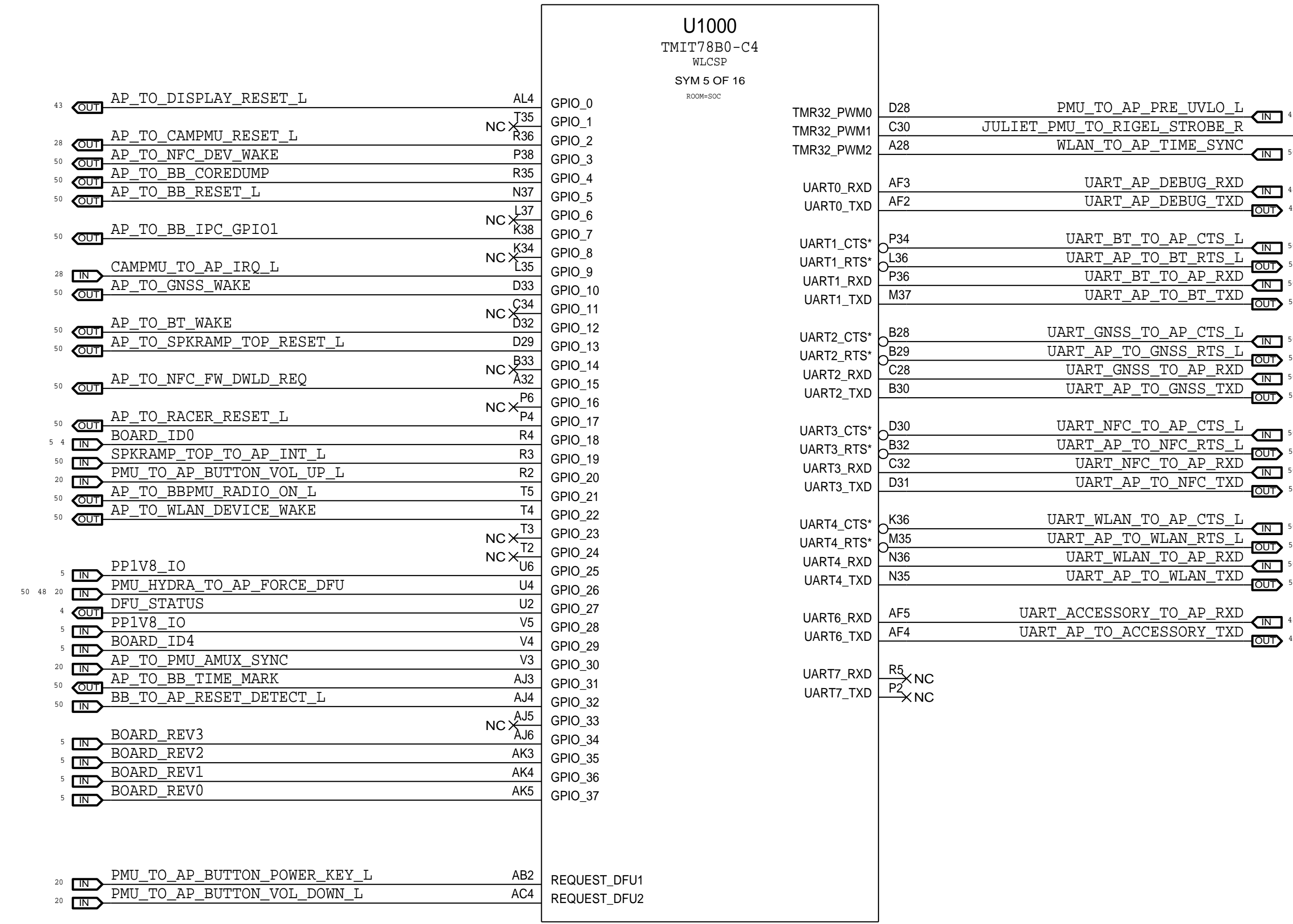


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335800234	1	WLCSP	U1490	CRITICAL	COMMON

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335800233	335800234	BOM_TABLE_ALTS	U1490	U1490

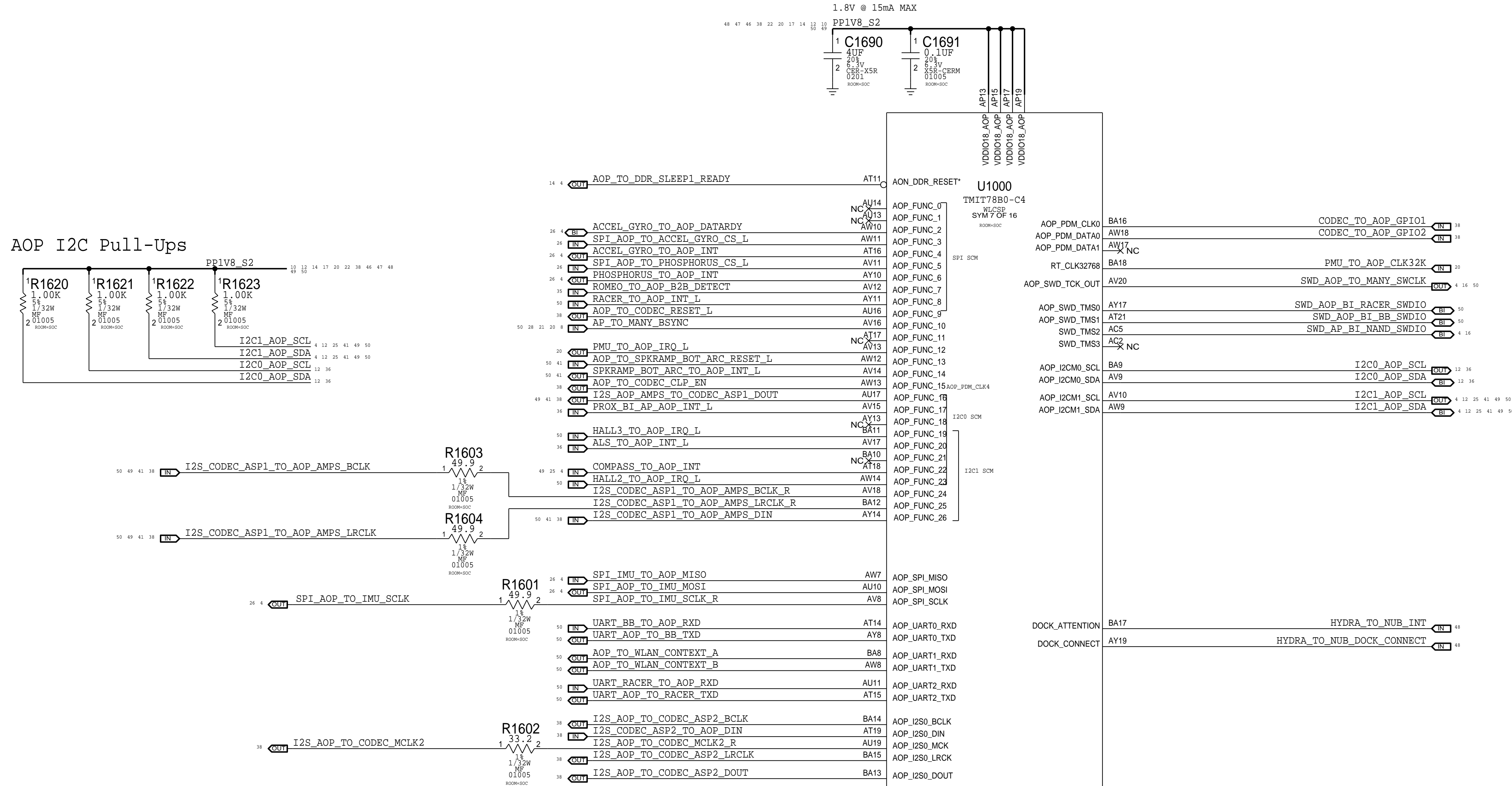
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		PAGE	14 OF 80
		SHEET	10 OF 51

SOC - GPIO INTERFACES



PAGE TITLE		
SOC: GPIO & UART		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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BRANCH	evt-1	
PAGE	15 OF 80	
SHEET	11 OF 51	

SOC - AOP



PAGE TITLE		
SOC: AOP		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	16 OF 80
	SHEET	12 OF 51

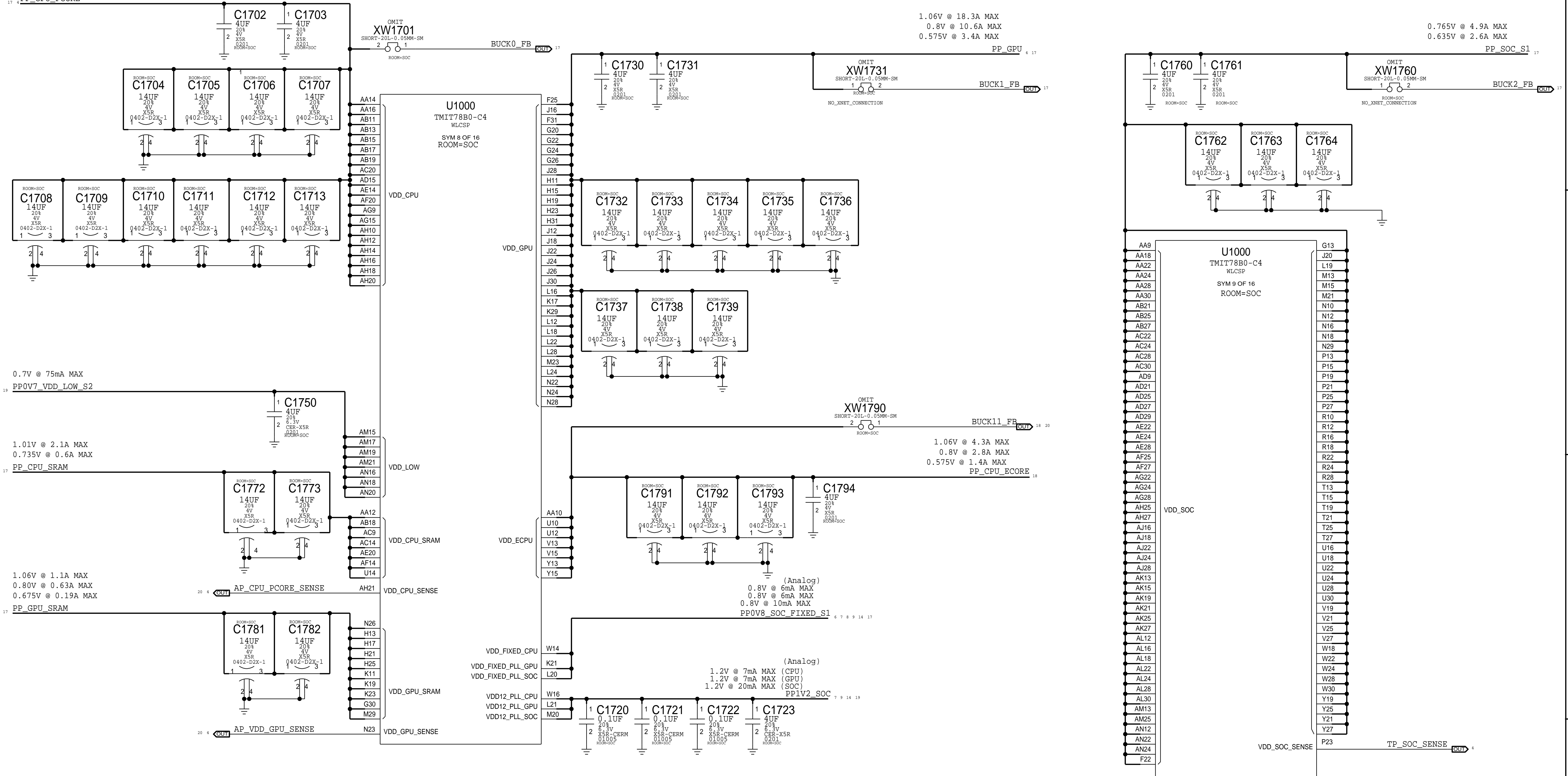
SOC - CPU, GPU & SOC RAILS

1.06V @ 11.0A MAX
 0.8V @ 6A MAX
 0.575V @ 2.7A MAX

PP_CPU_PCORE

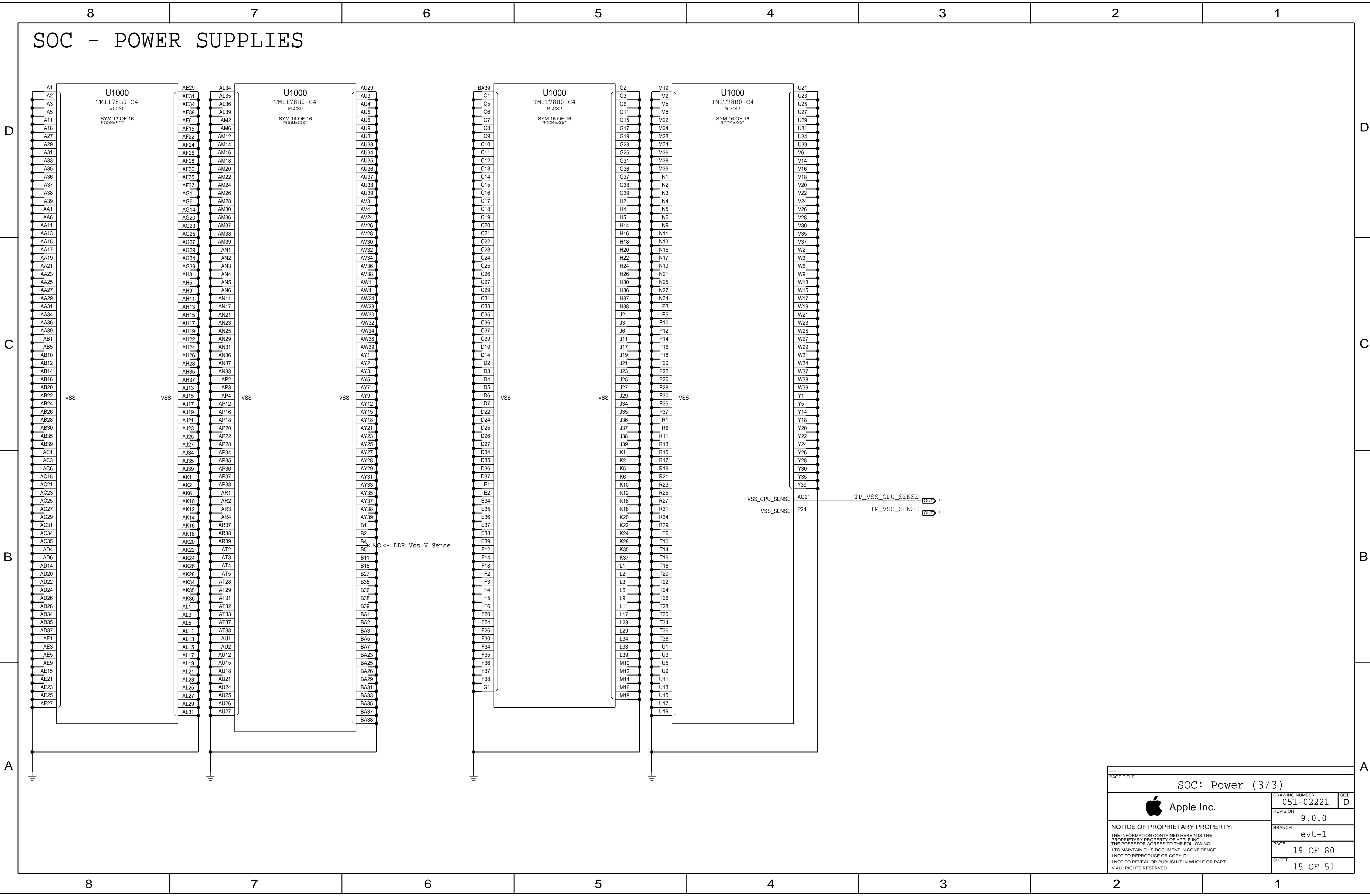
1.06V @ 18.3A MAX
 0.8V @ 10.6A MAX
 0.575V @ 3.4A MAX

0.765V @ 4.9A MAX
 0.635V @ 2.6A MAX



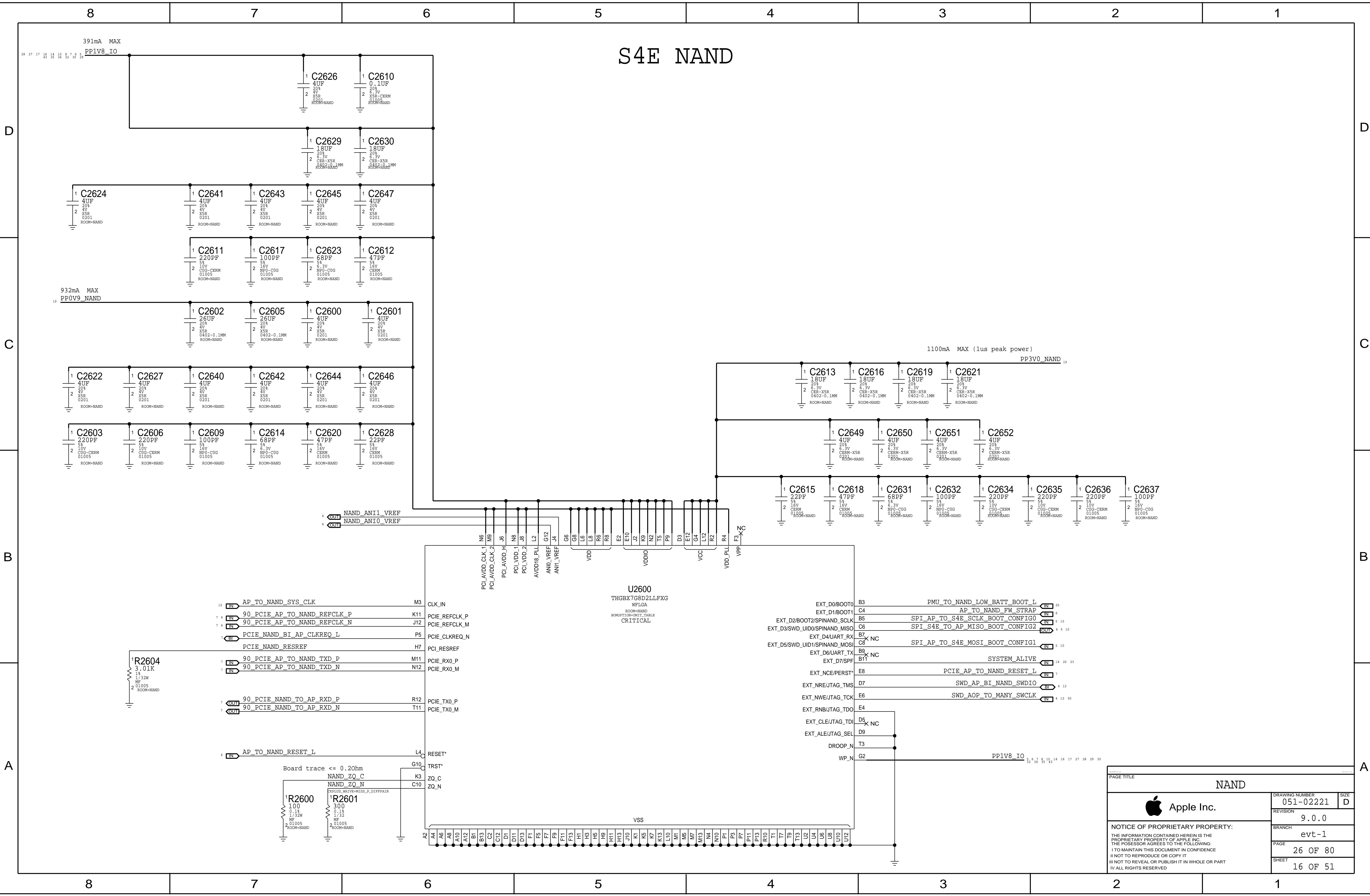
PAGE TITLE		
SOC: Power (1/3)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	17 OF 80
	SHEET	13 OF 51
	SIZE	D

SOC - POWER SUPPLIES

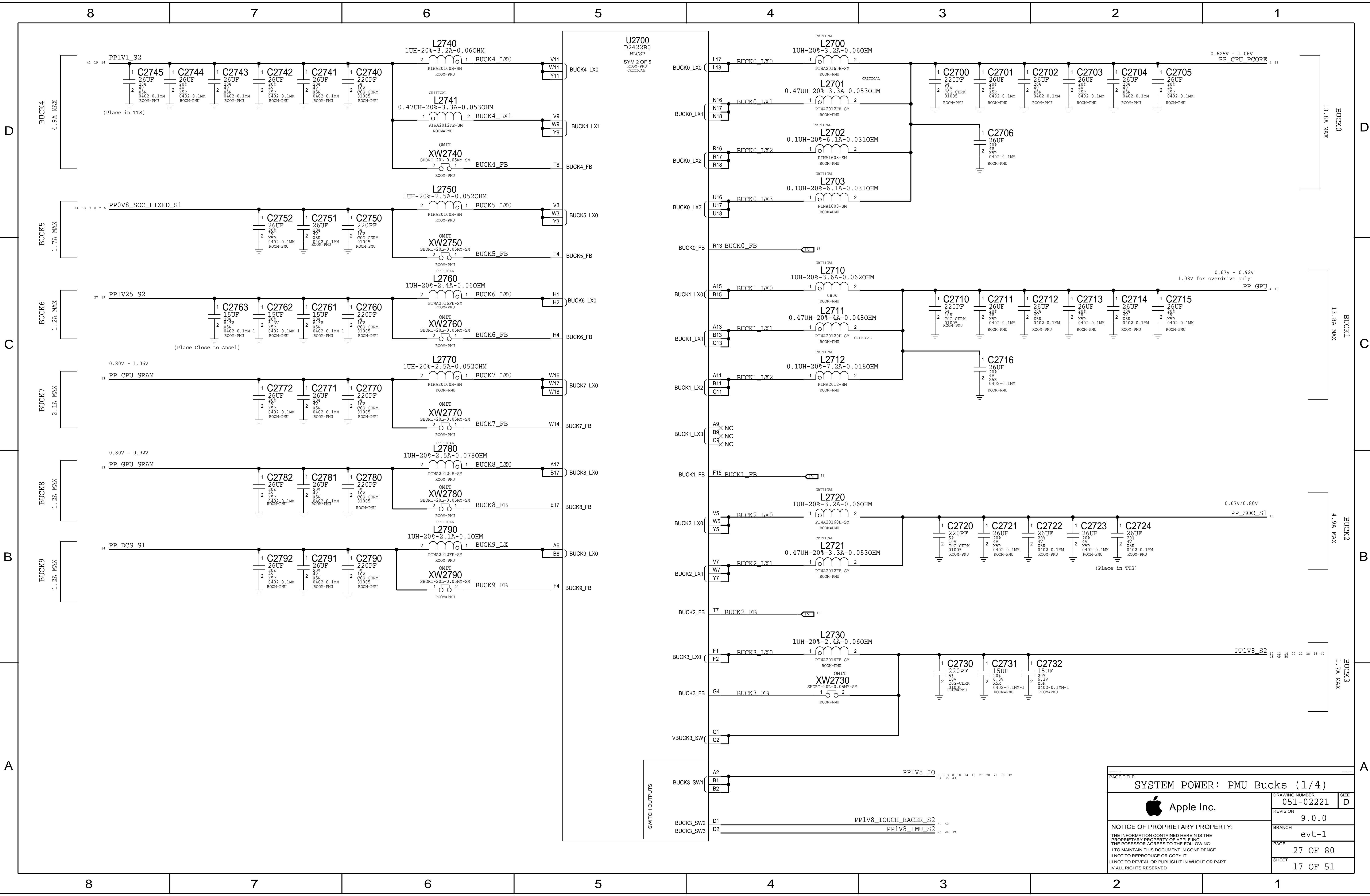


PAGE TITLE		
SOC: Power (3/3)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	19 OF 80
	SHEET	15 OF 51

S4E NAND



PAGE TITLE		
NAND		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	26 OF 80
	SHEET	16 OF 51



PAGE TITLE		
SYSTEM POWER: PMU Bucks (1/4)		
DRAWING NUMBER		SIZE
051-02221		D
REVISION		
9.0.0		
BRANCH		
evt-1		
PAGE		
27 OF 80		
SHEET		
17 OF 51		

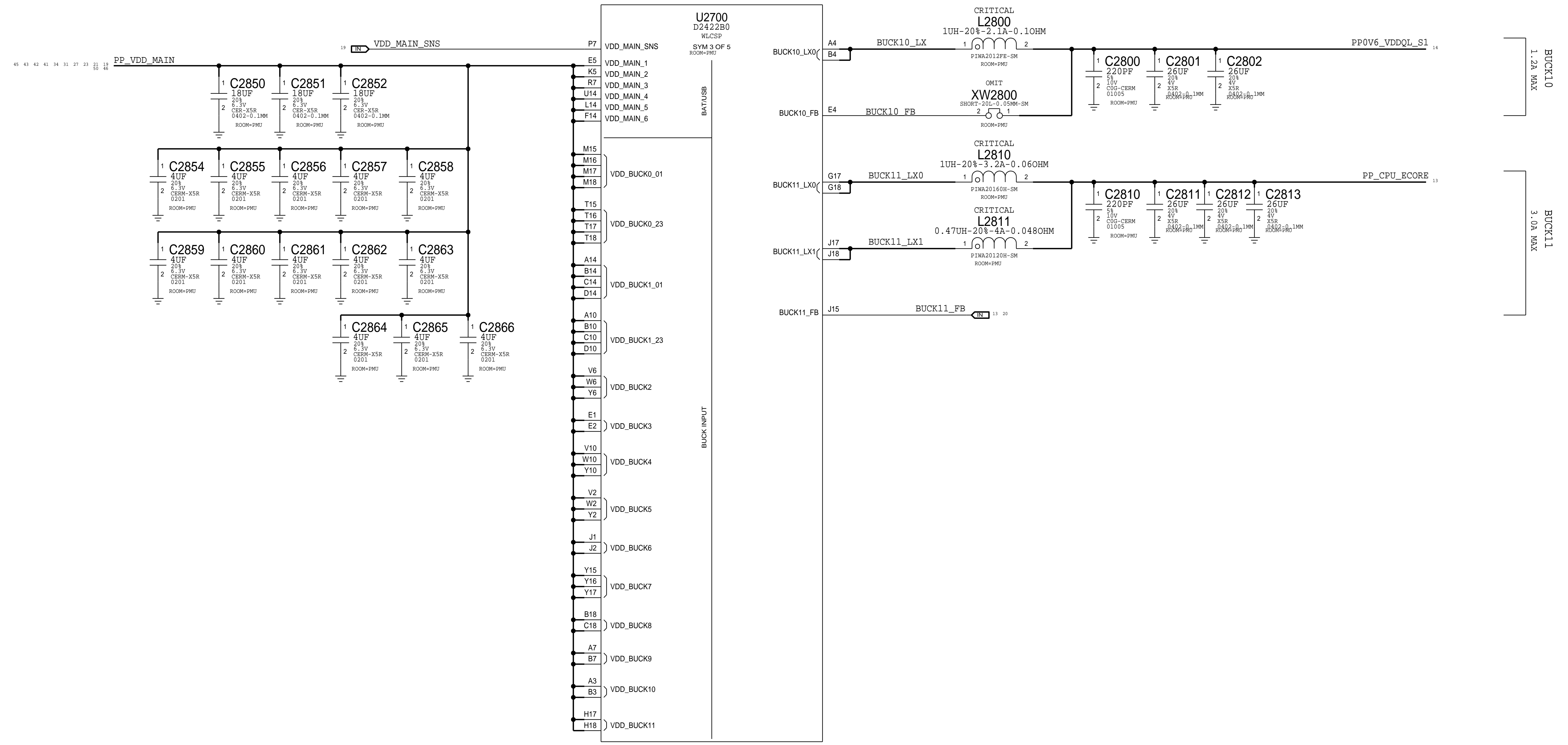
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D

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B

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PAGE TITLE		
SYSTEM POWER: PMU Bucks (2/4)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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D

C

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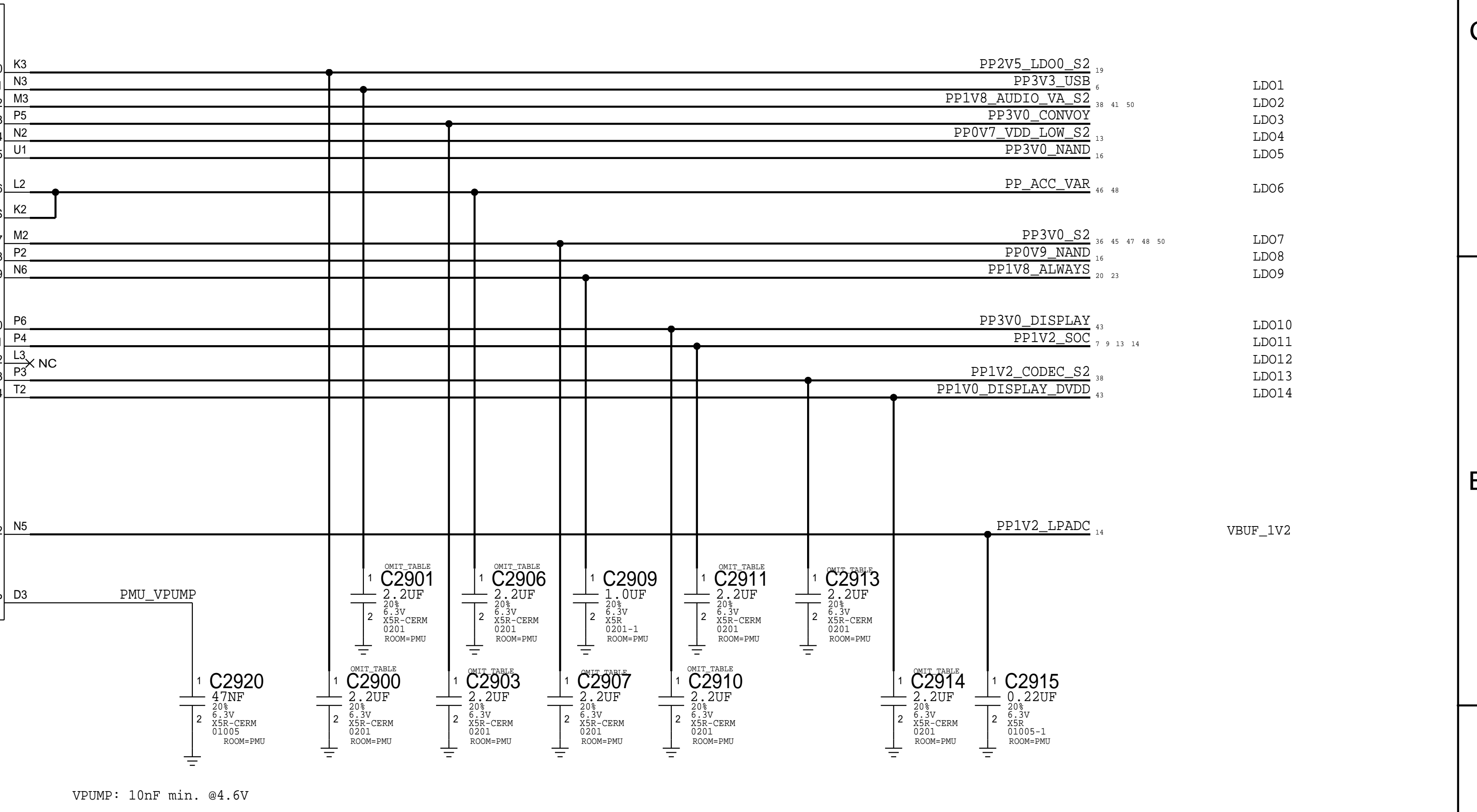
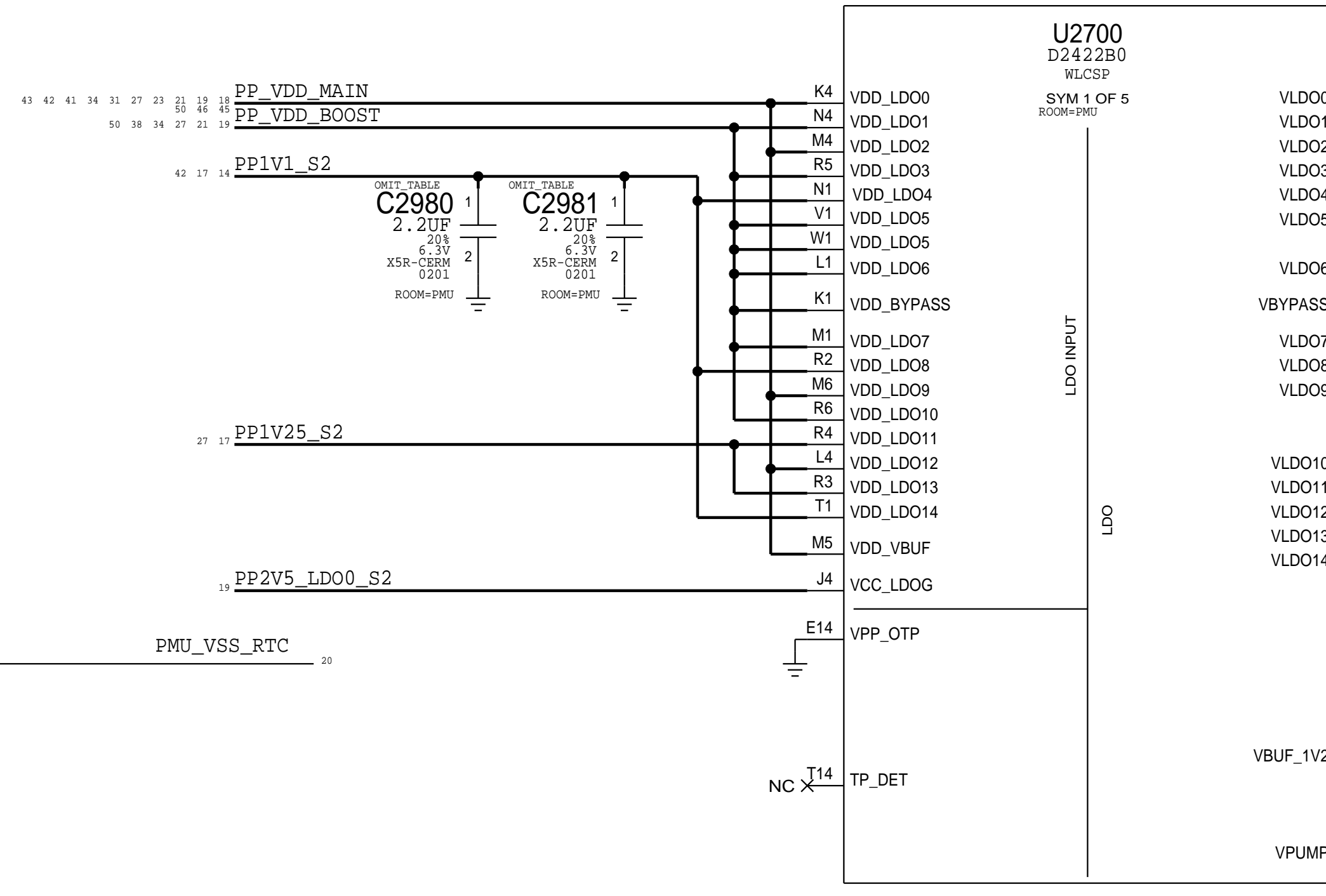
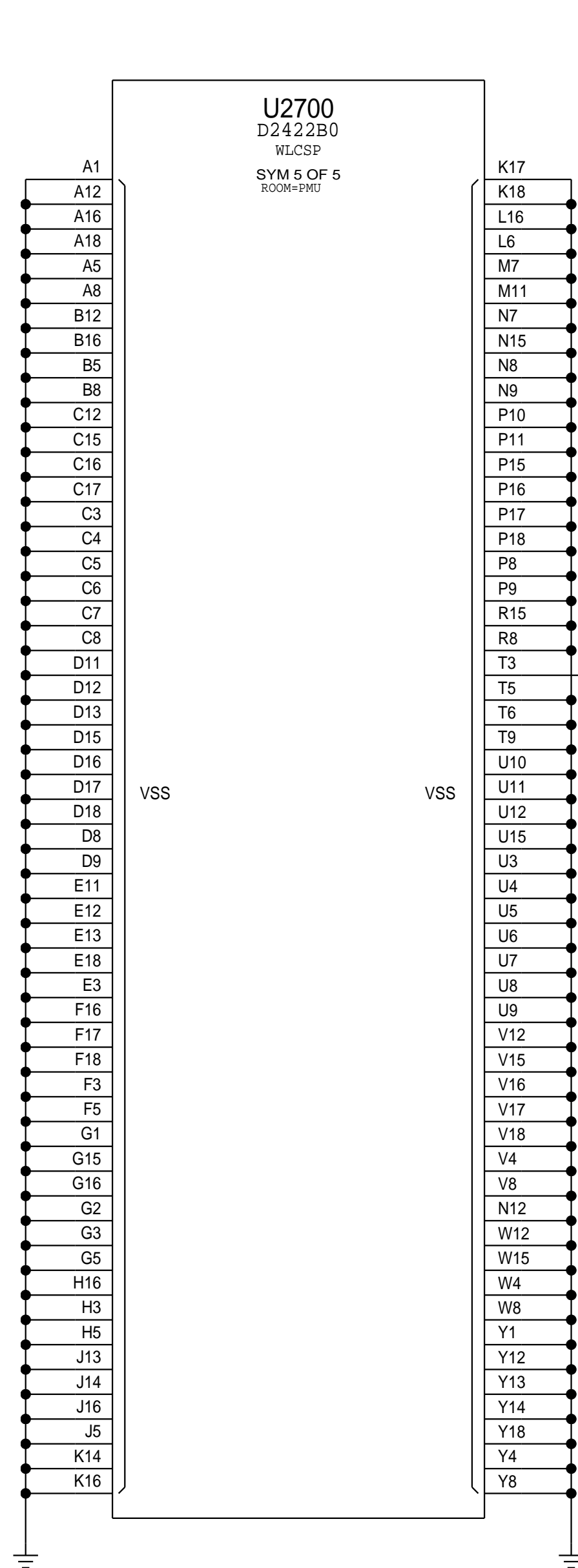
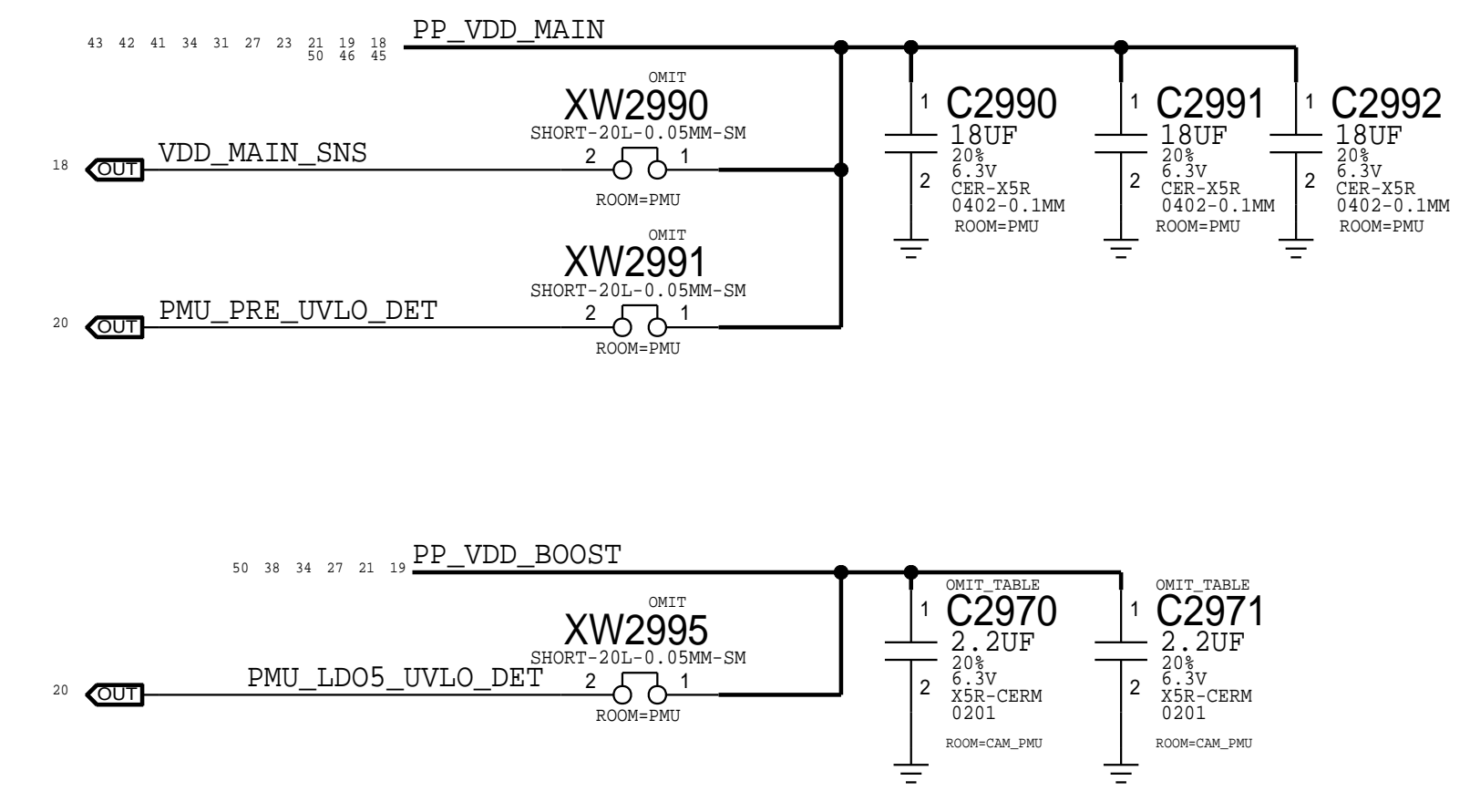
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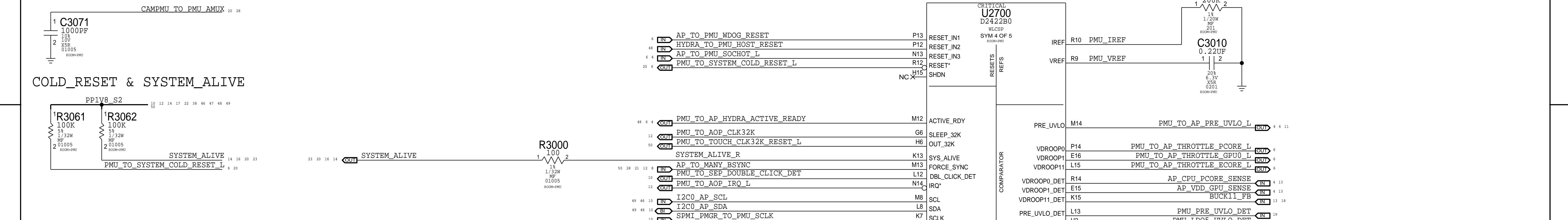
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A

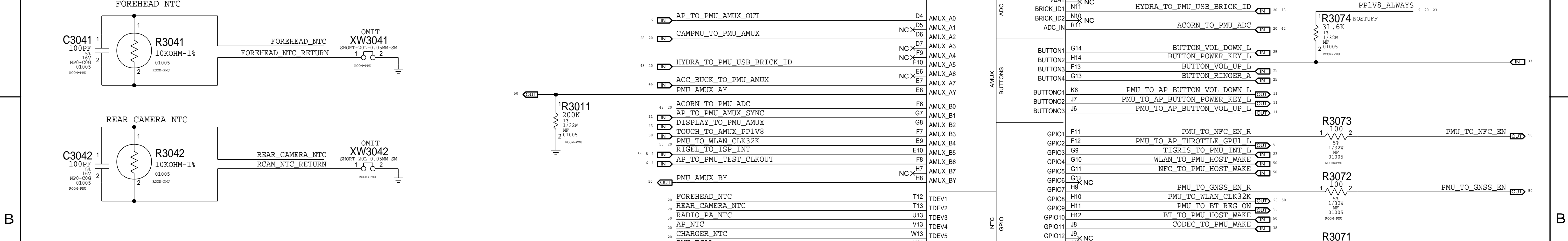


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	REVISION	9.0.0
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	PAGE	29 OF 80
	SHEET	19 OF 51

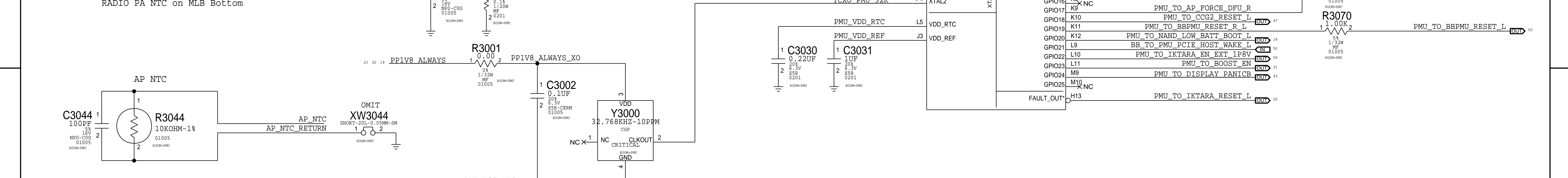
D Ansel AMUX



C NTCs



B

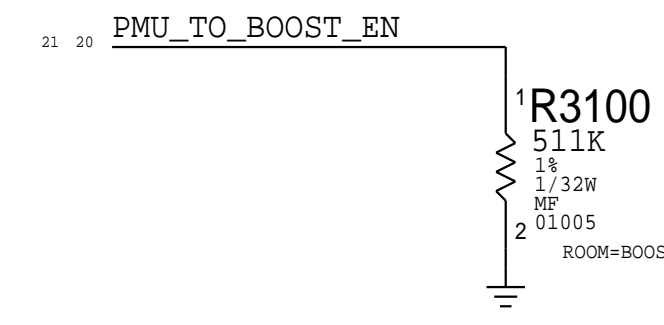


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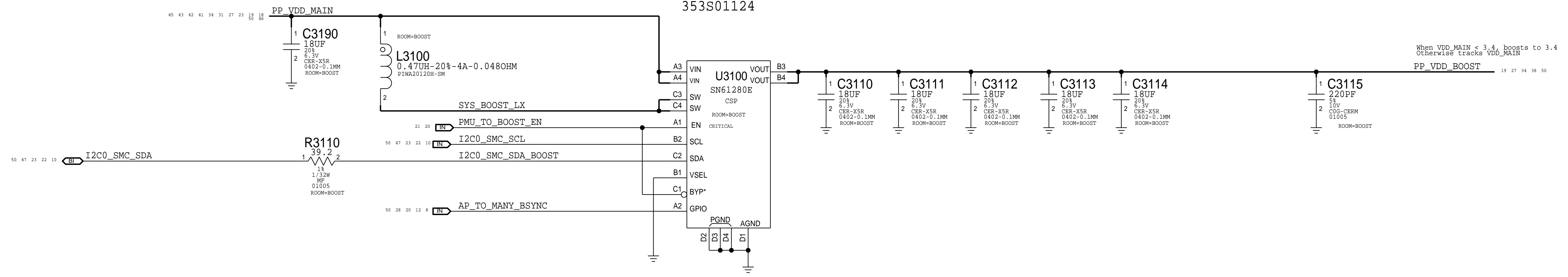
NOTE: 100PF CAPS ARE THE SAMPLING CAPS FOR PMU ADC

PAGE TITLE		
SYSTEM POWER: PMU (4/4)		
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	PAGE	30 OF 80
	SHEET	20 OF 51

Boost Enable Pull



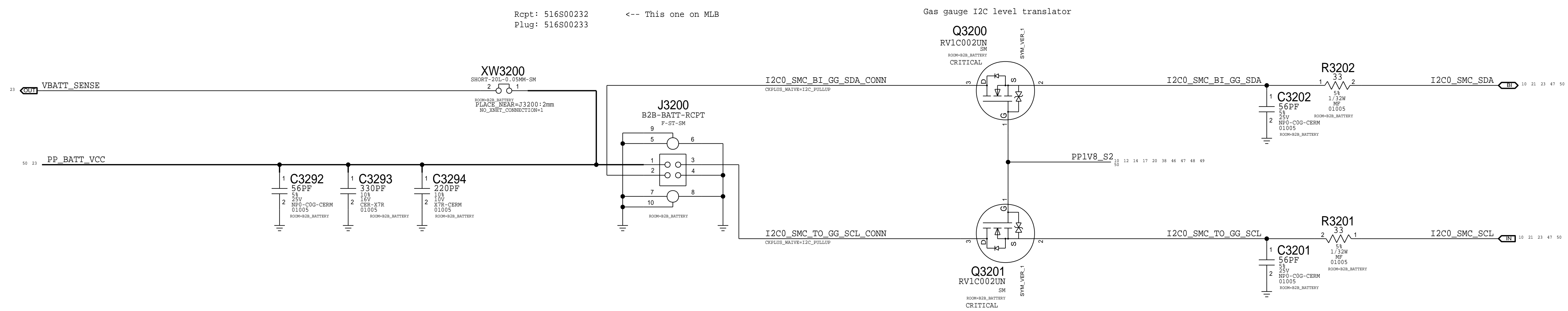
BOOST
353S01124



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SYSTEM POWER: Boost		
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	PAGE	31 OF 80
	SHEET	21 OF 51

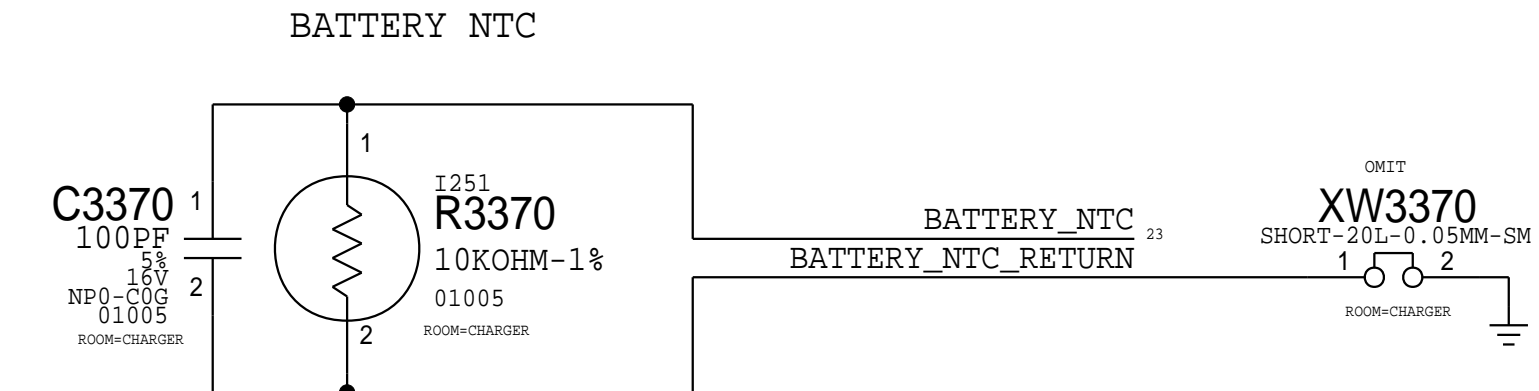
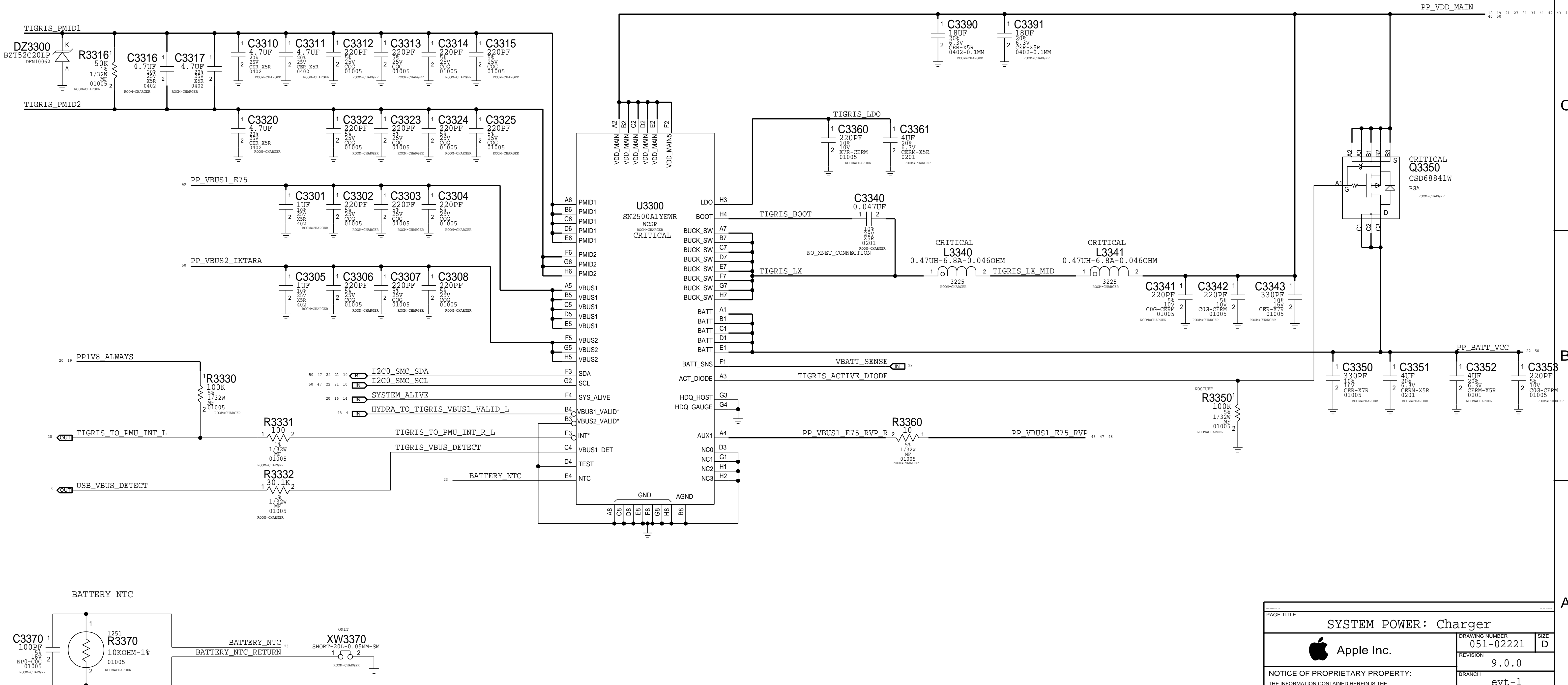
BATTERY CONNECTOR

Rcpt: 516S00232 <-- This one on MLB
 Plug: 516S00233



PAGE TITLE		
SYSTEM POWER: B2B Battery		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	32 OF 80
	SHEET	22 OF 51

TIGRIS2 CHARGER



PAGE TITLE		
SYSTEM POWER: Charger		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	33 OF 80
	SHEET	23 OF 51

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Iktara Components on MLB Bottom

PAGE TITLE		SYSTEM POWER: Iktara	
DRAWING NUMBER	051-02221	SIZE	D
	REVISION		9.0.0
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8

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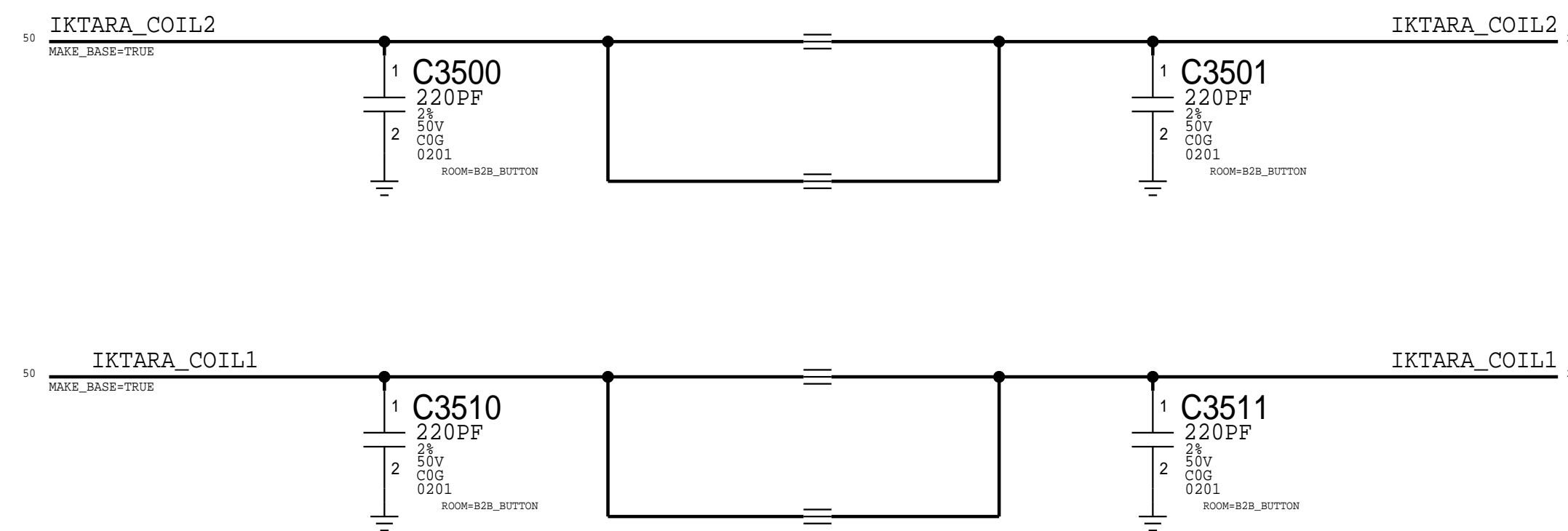
2

1

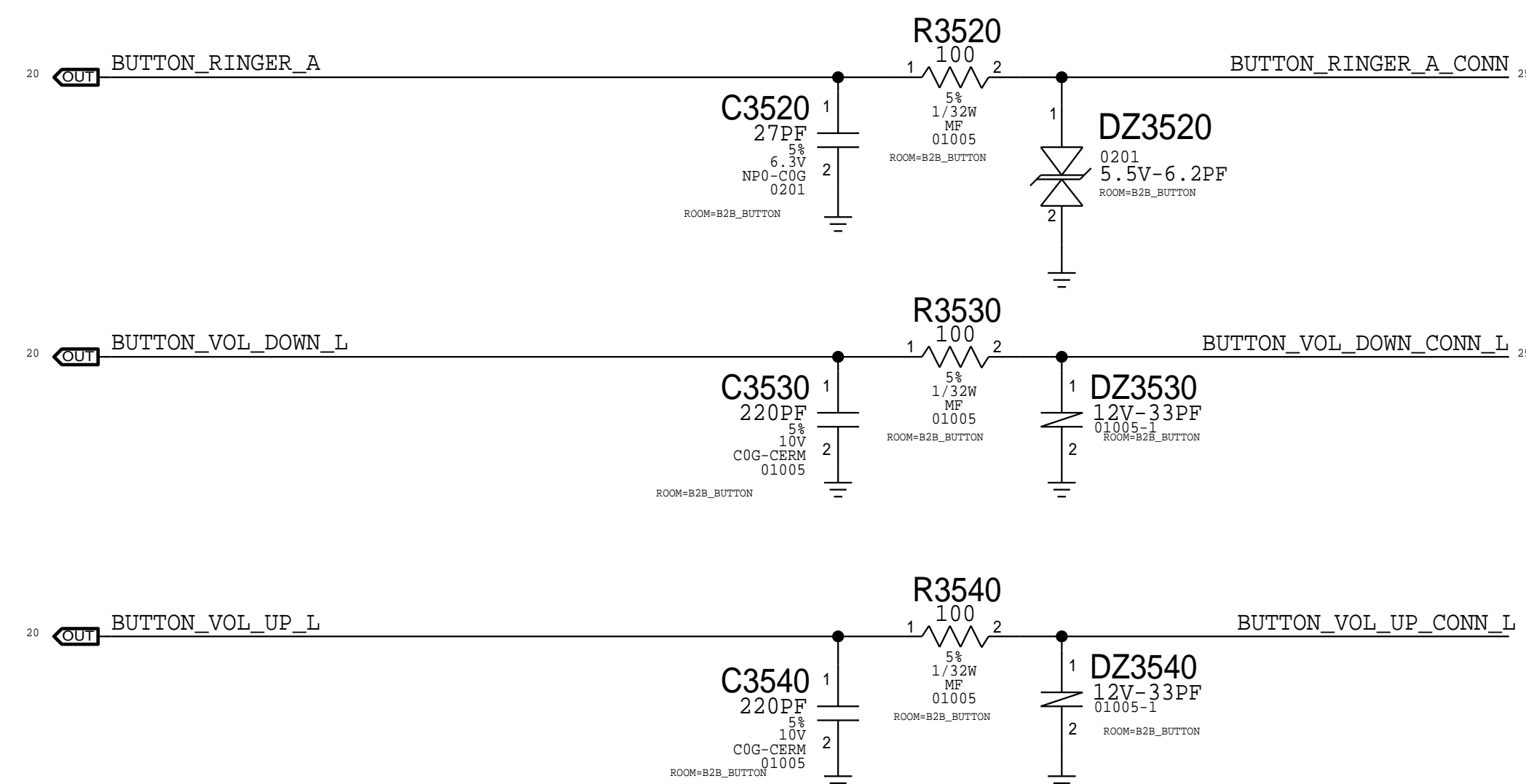
Cyclone + Button Connector

Rcpt: 516S00289 <-- This one on MLB
 Plug: 516S00290

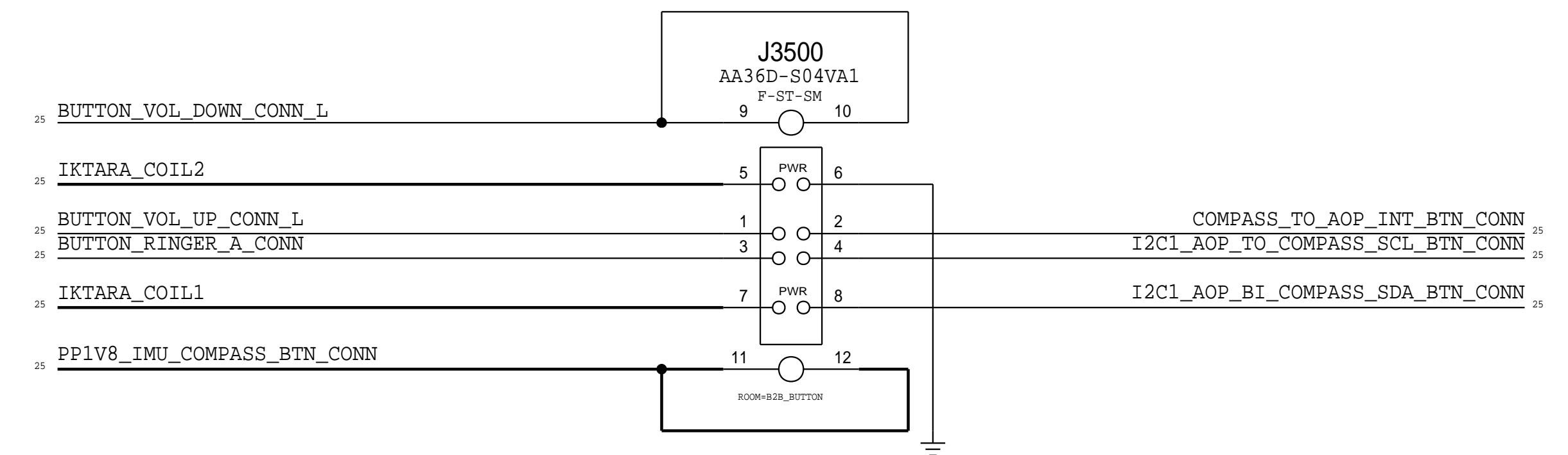
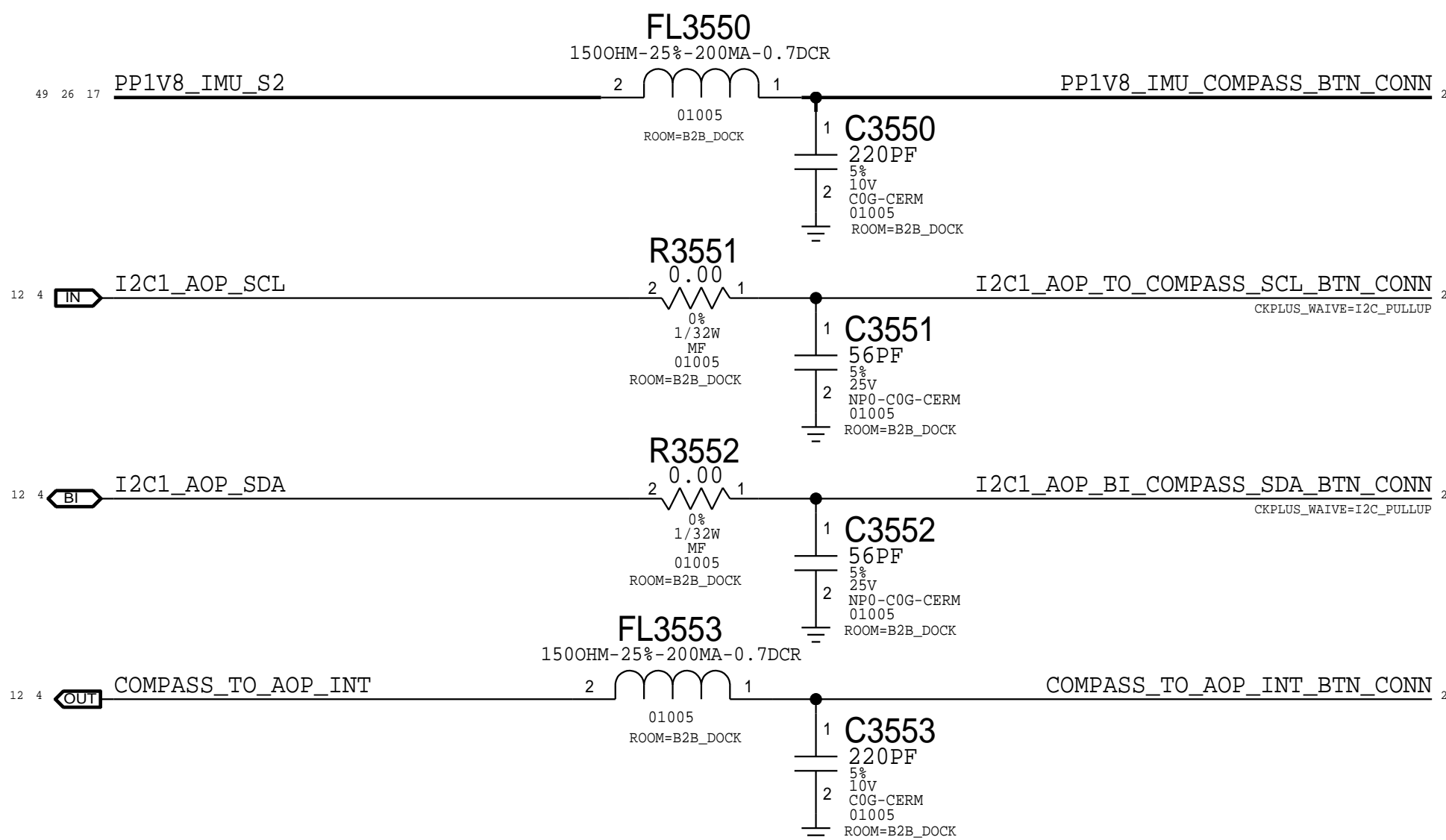
Cyclone Filtering



BUTTONS



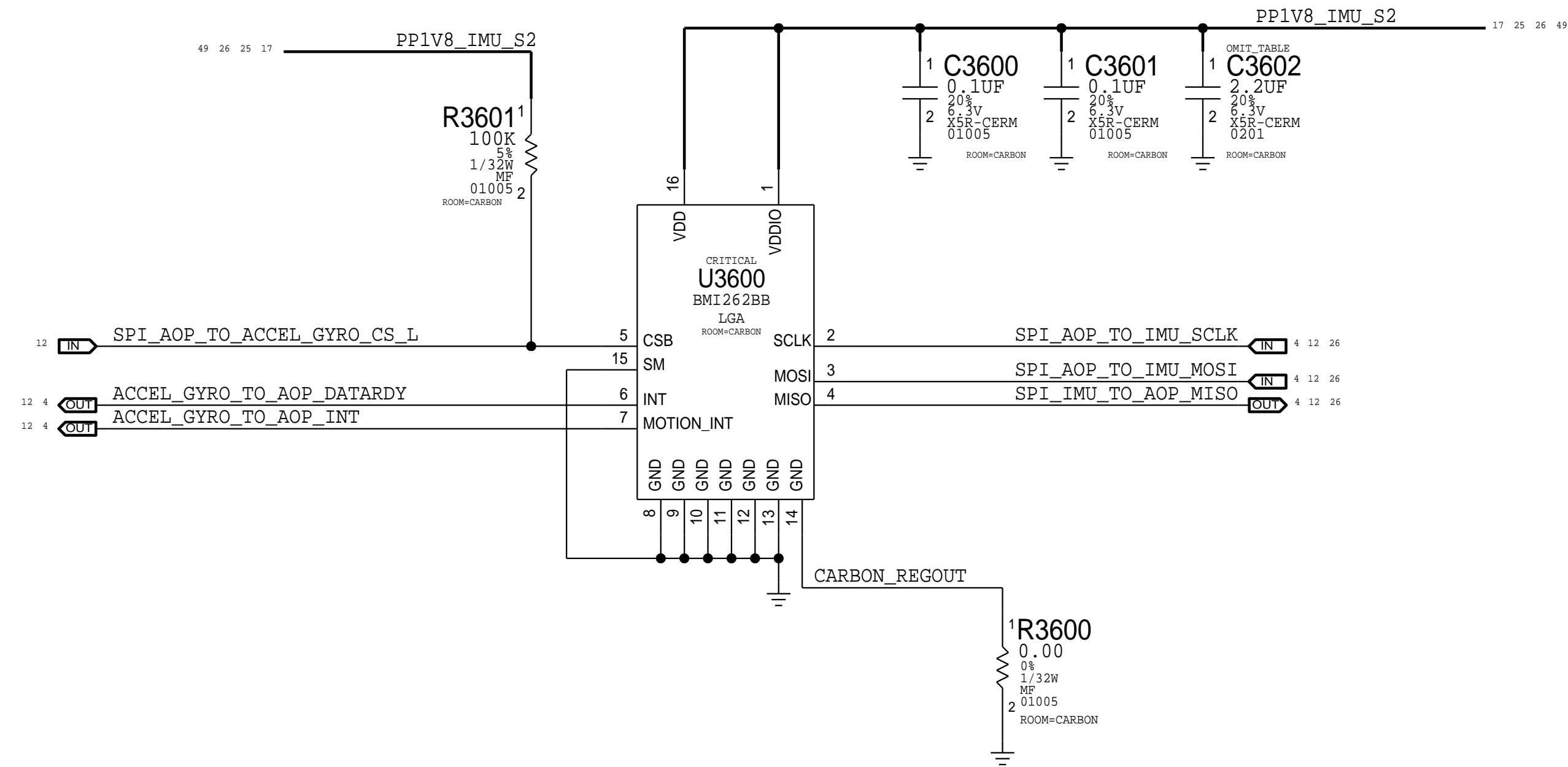
Compass (Button Flex Location)



PAGE TITLE		
SYSTEM POWER: B2B Cyclone + Button		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	35 OF 80
	SHEET	25 OF 51

Graphite - Accel & Gyro

APN: 338S00304

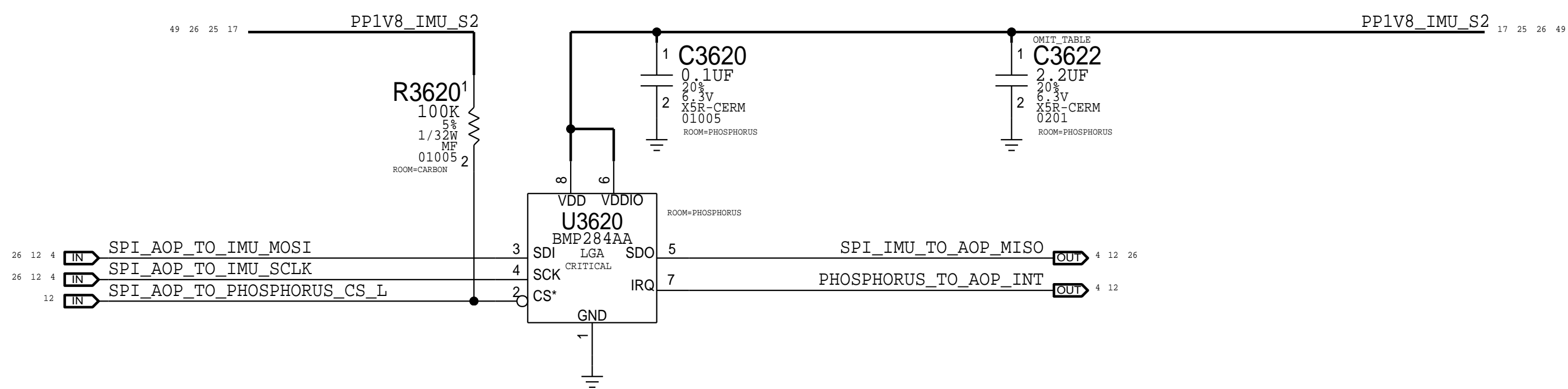


Magnesium - Compass

(On Dock or Button Flex)

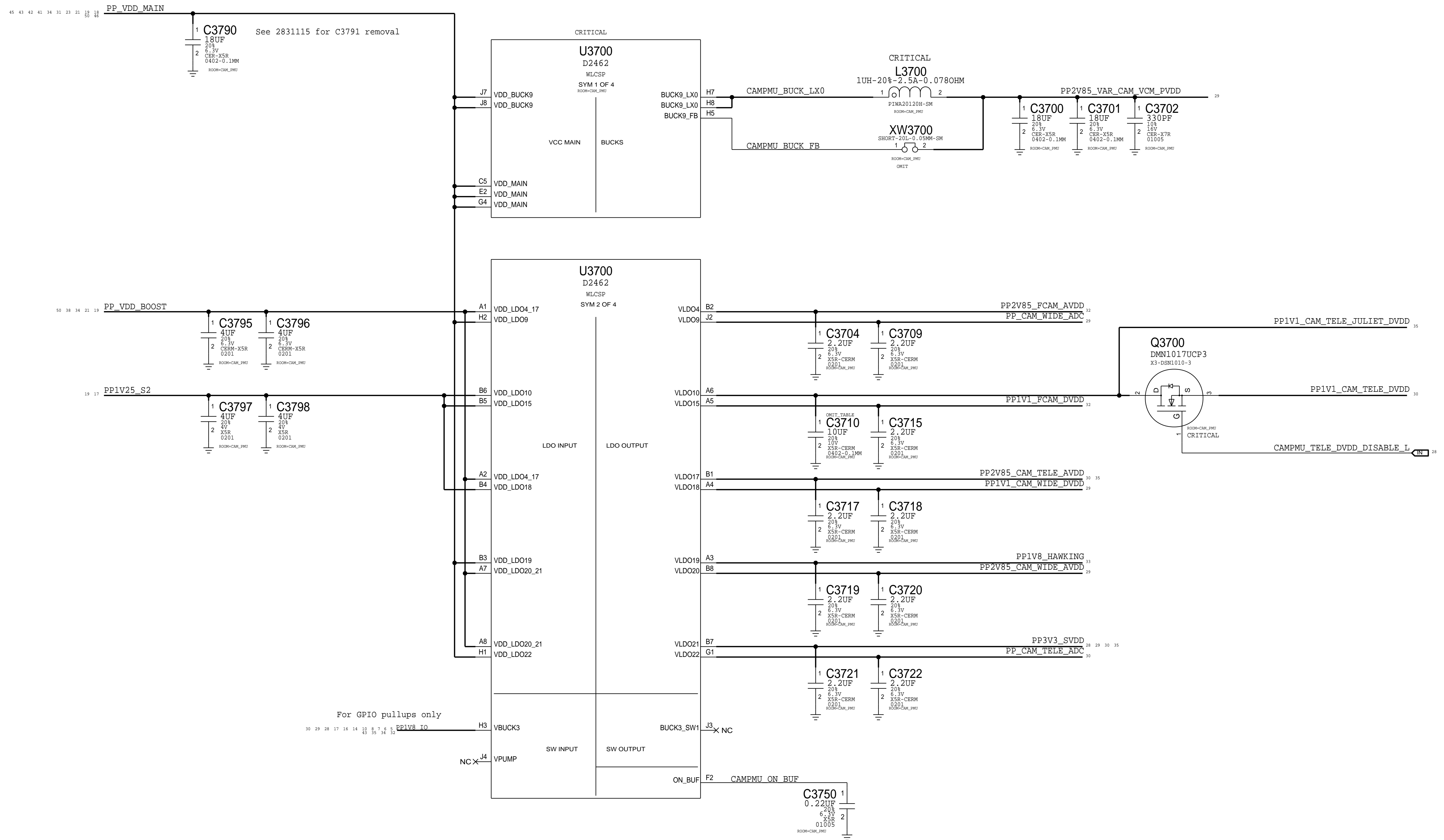
Phosphorus

BOSCH (APN: 338S00188)
ST (APN: 338S00230)



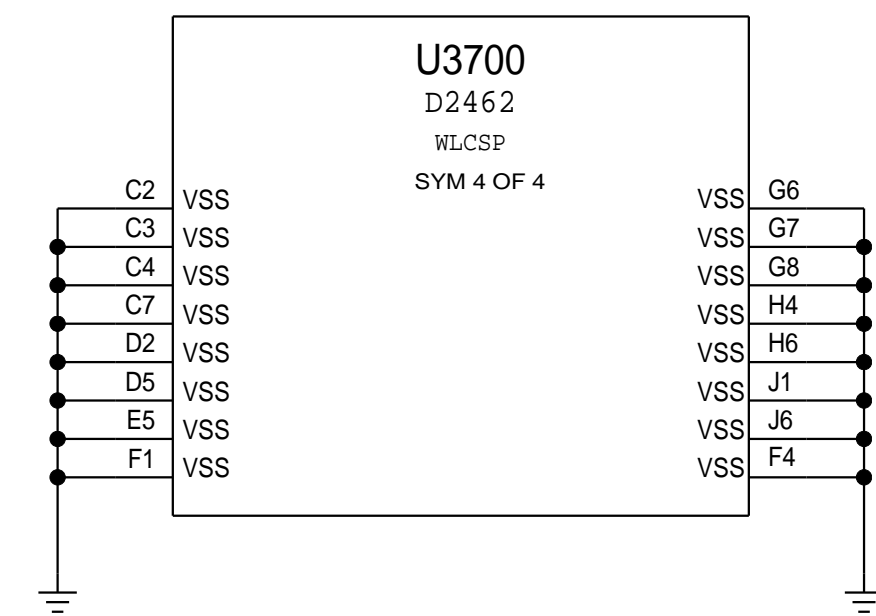
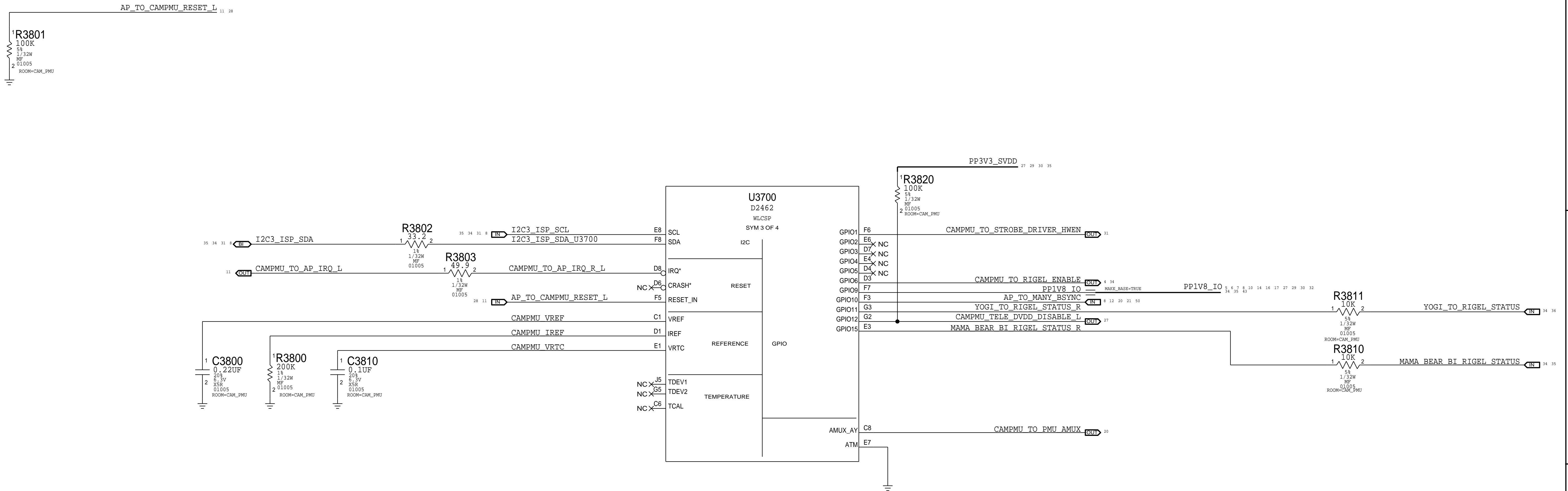
PAGE TITLE		
SENSORS		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	36 OF 80
	SHEET	26 OF 51

Camera PMU



PAGE TITLE		
CAMERA: PMU (1/2)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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BRANCH	evt-1	
PAGE	37 OF 80	
SHEET	27 OF 51	

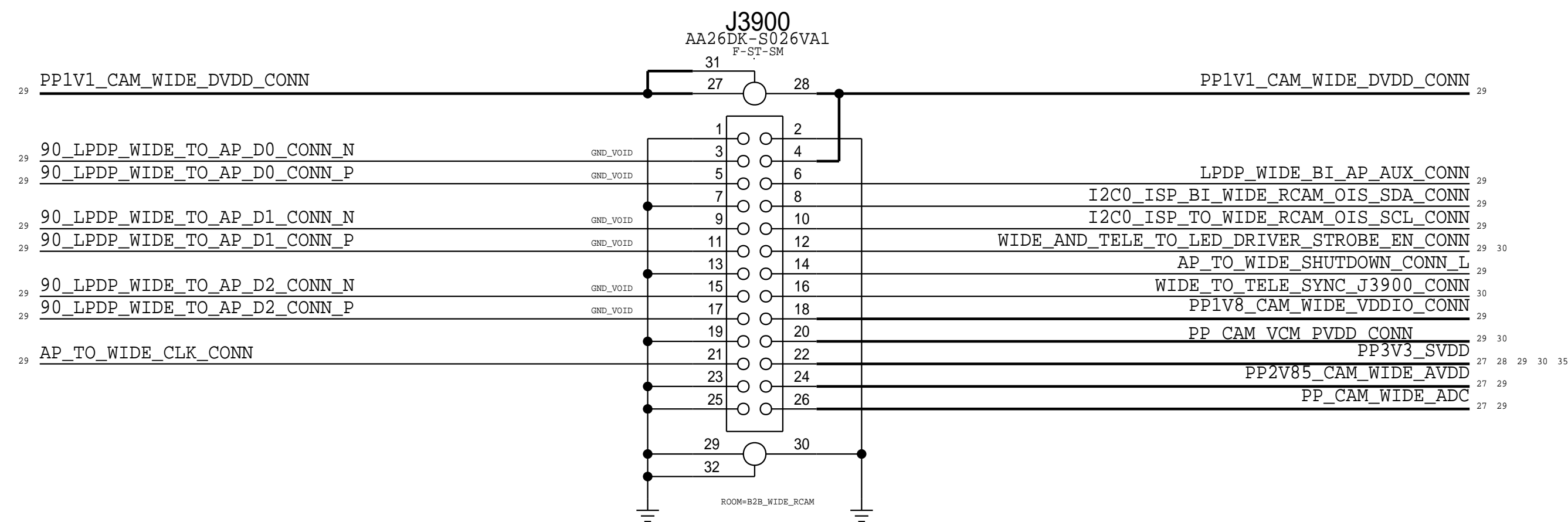
Pull Downs



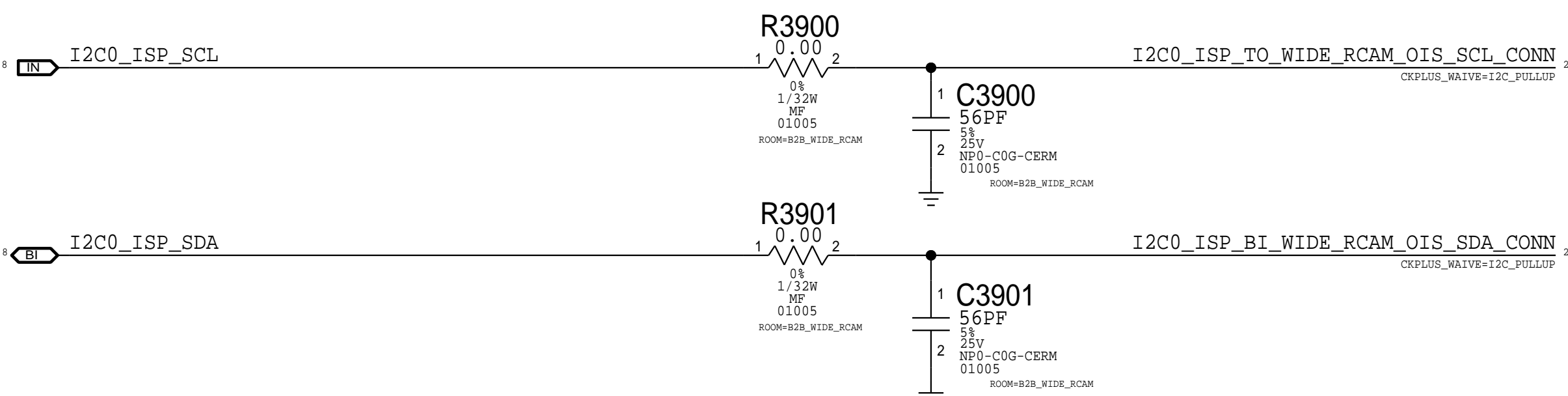
PAGE TITLE		
CAMERA: PMU (2/2)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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		PAGE
		SHEET
		D
		evt-1
		38 OF 80
		28 OF 51

Wide Camera Connector

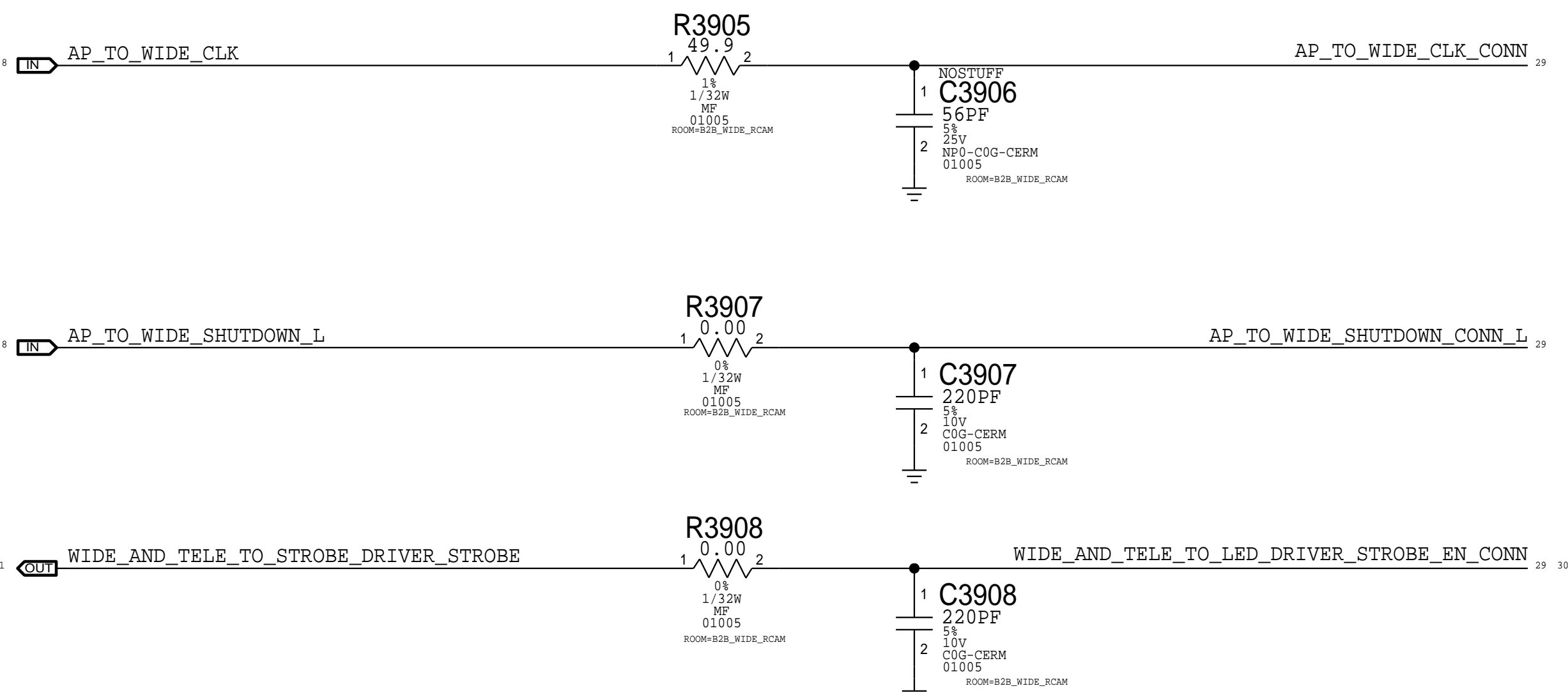
Rcpt: 516S00313
 Plug: 516S00314
 <-- This one on MLB



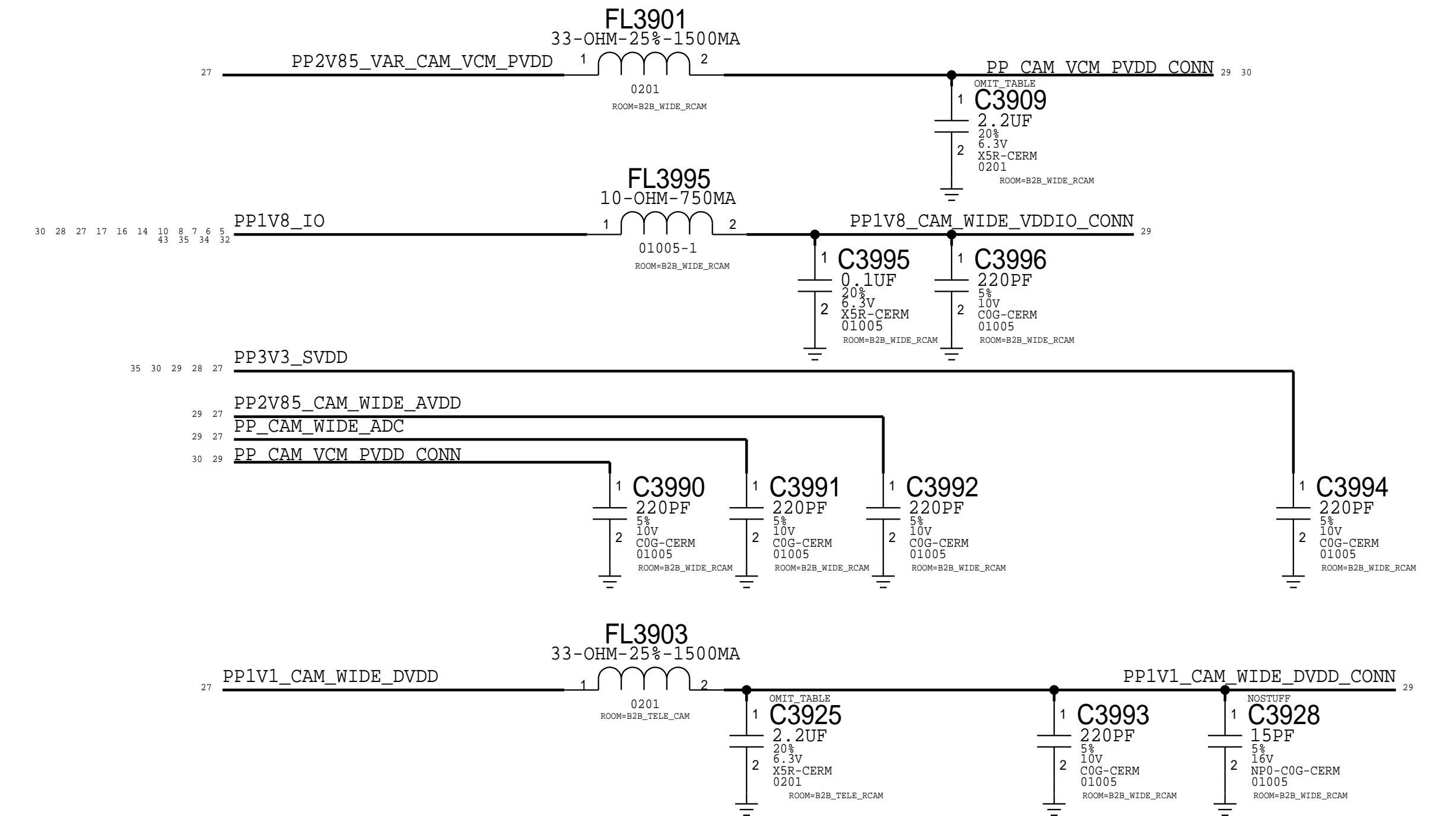
ISP I2C



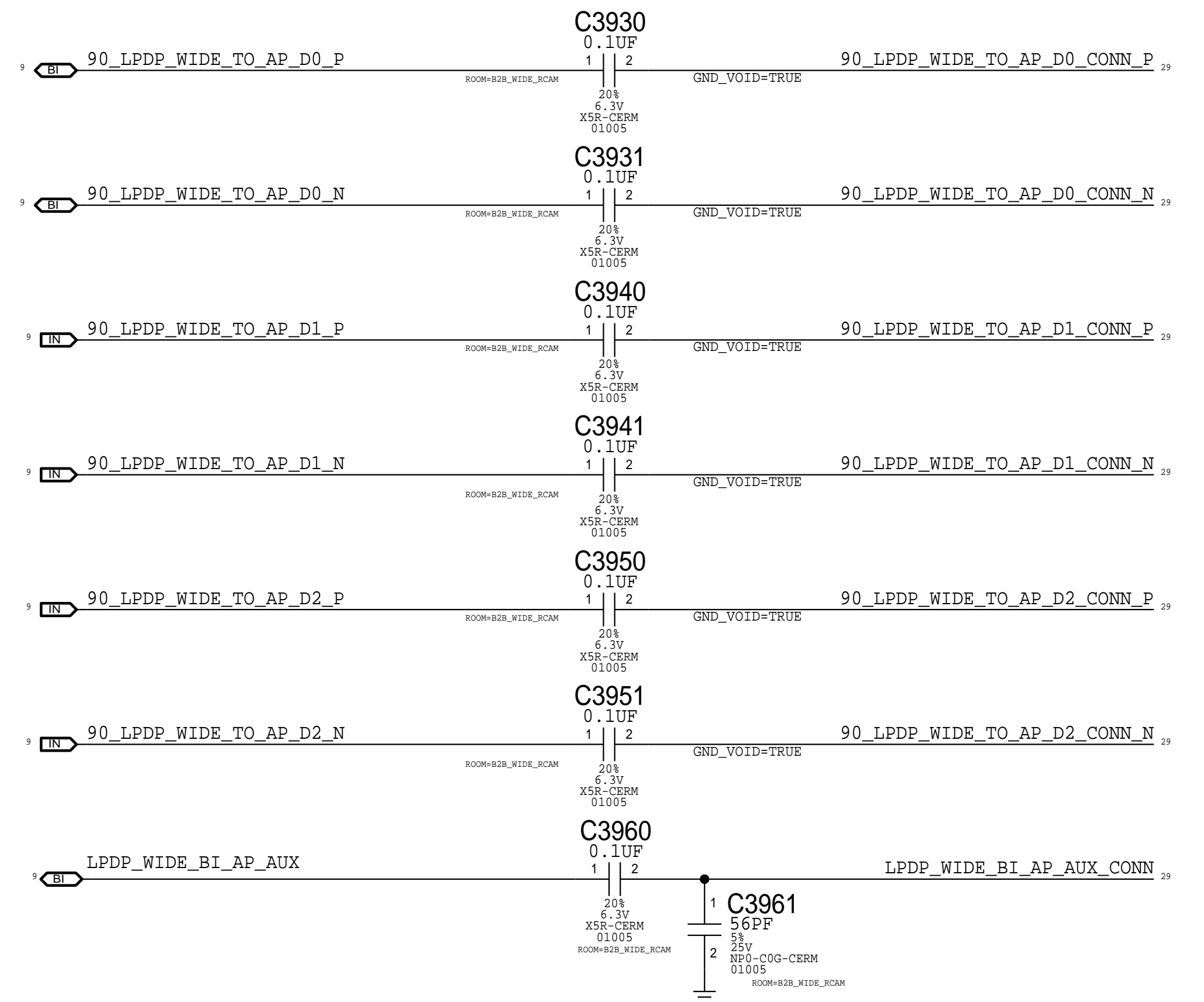
IO Filters



Power Filtering



LPDP Filters

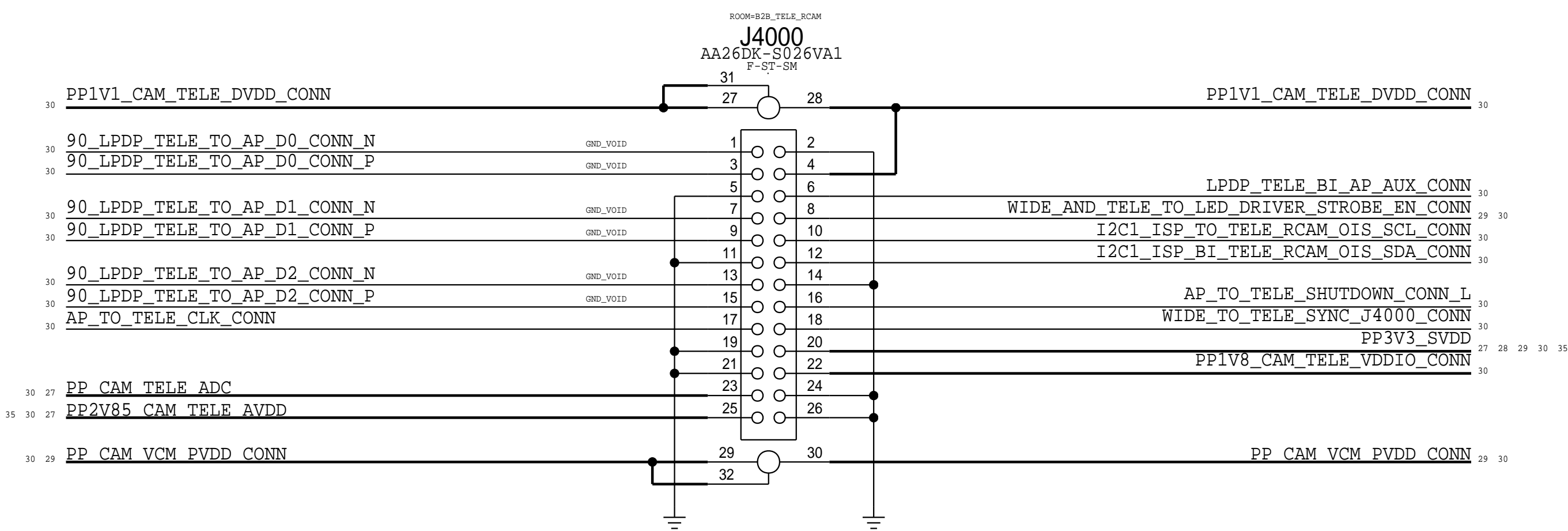


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CAMERA: B2B Wide (WY)		
	DRAWING NUMBER	SIZE
	051-02221	D
REVISION		
9.0.0		
BRANCH		
evt-1		
PAGE		
39 OF 80		
SHEET		
29 OF 51		
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Tele Camera Connector

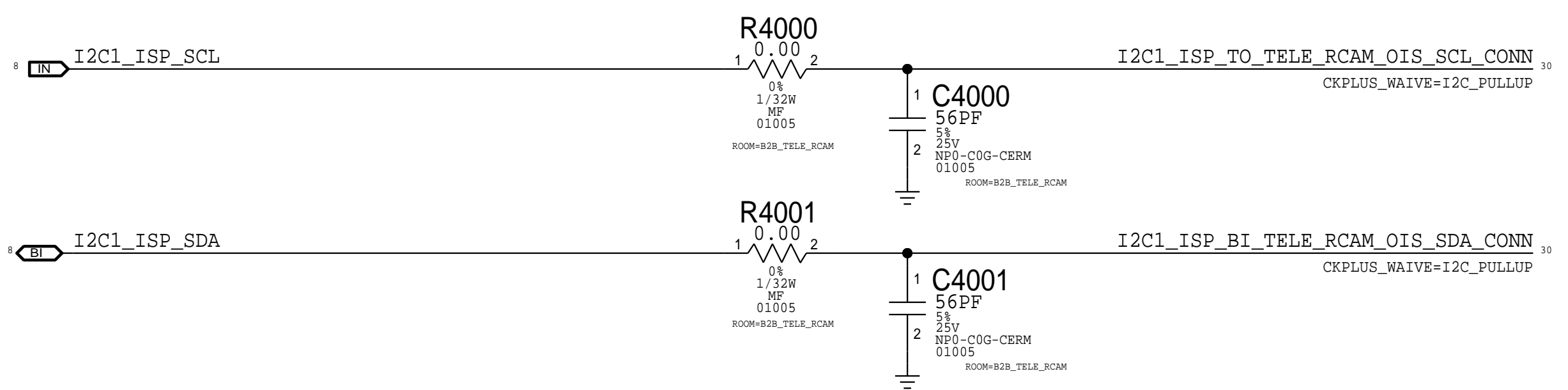
Rcpt: 516S00313 <-- This one on MLB
 Plug: 516S00314

D



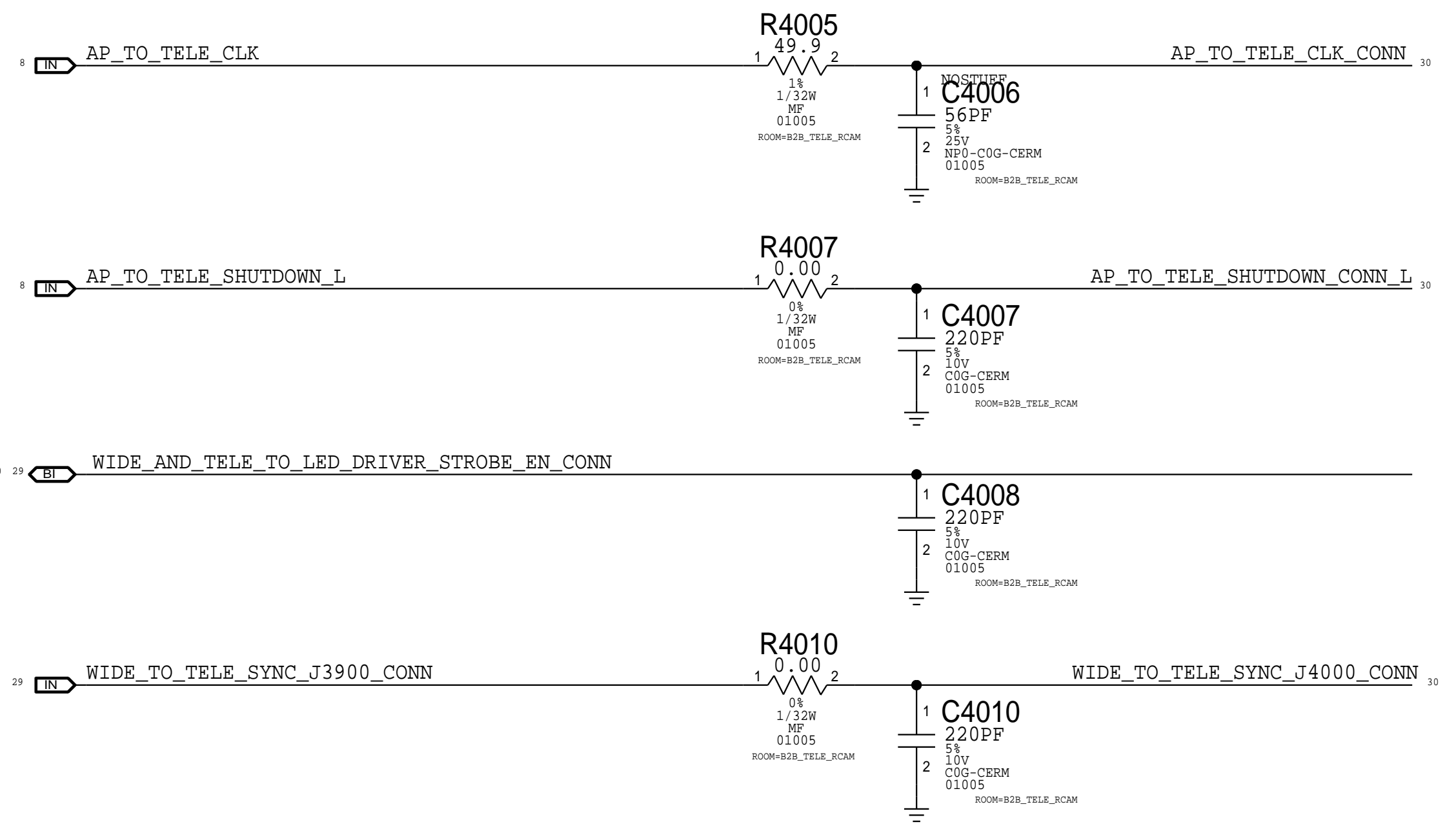
ISP I2C

C



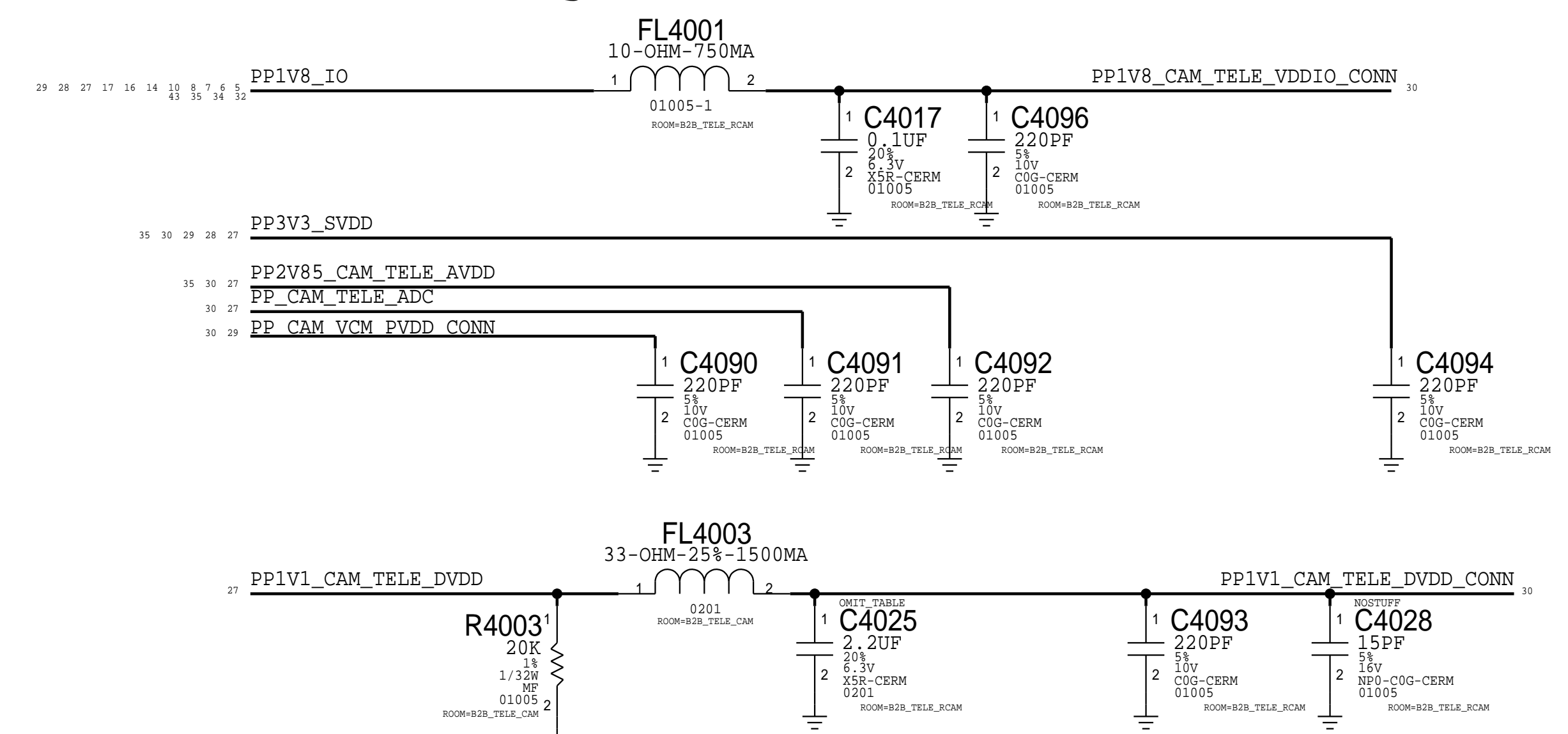
IO Filters

B

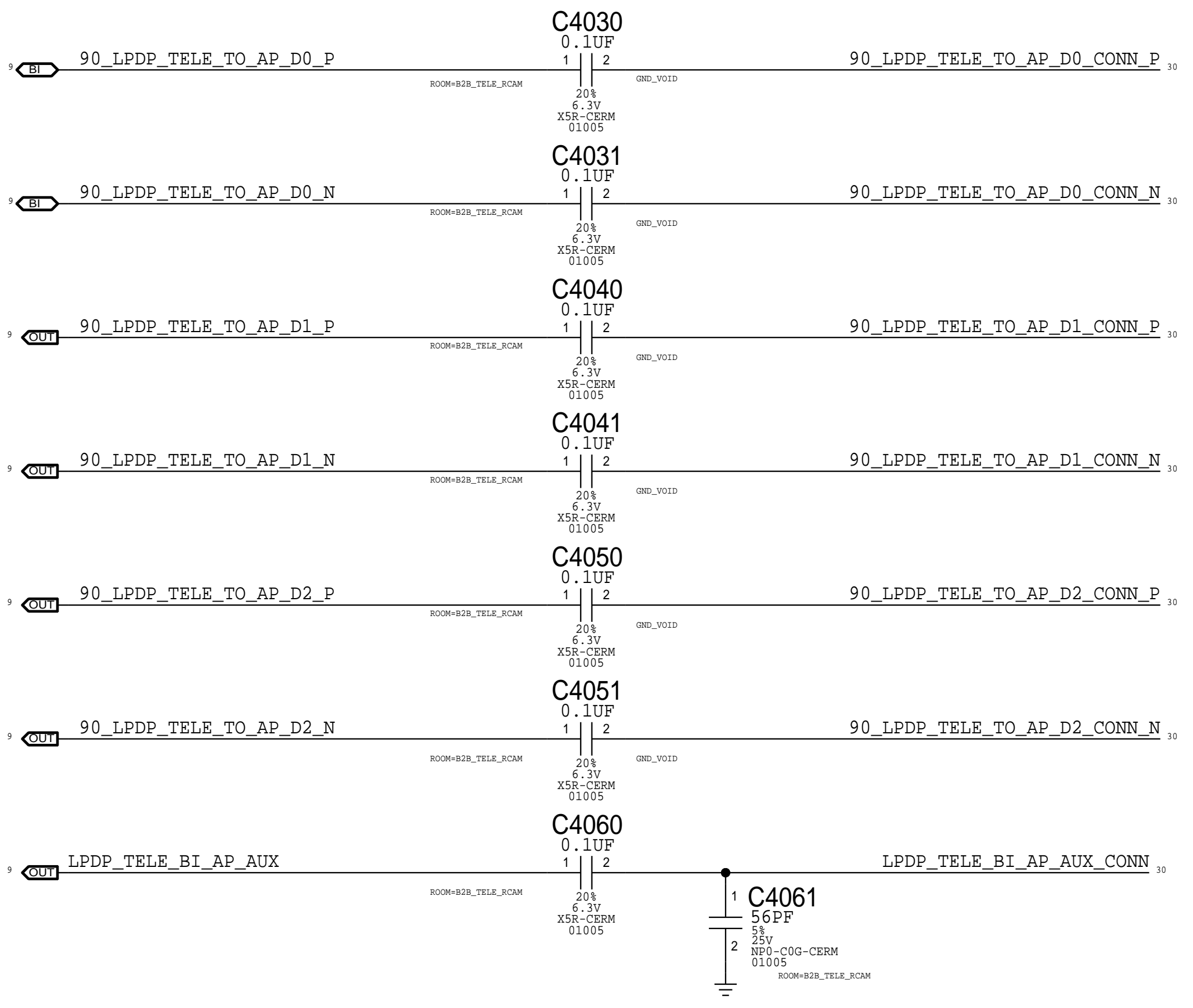


A

Power Filtering



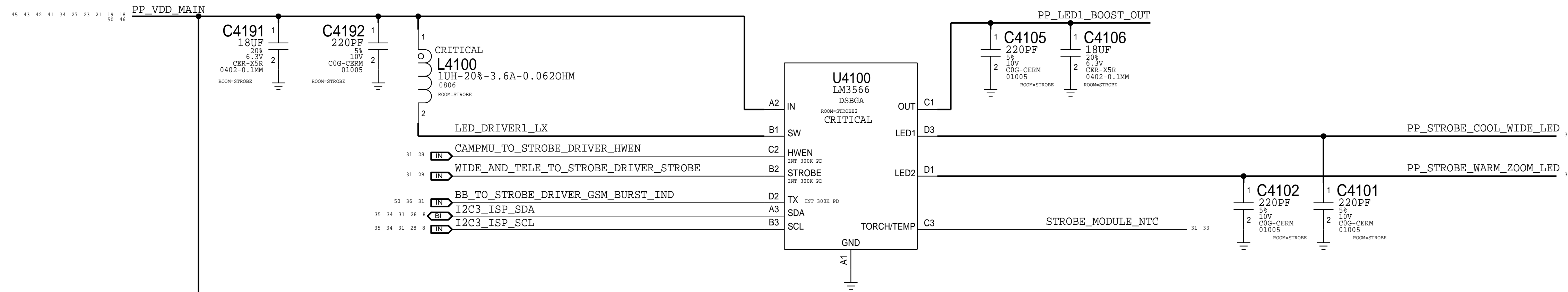
LPDP



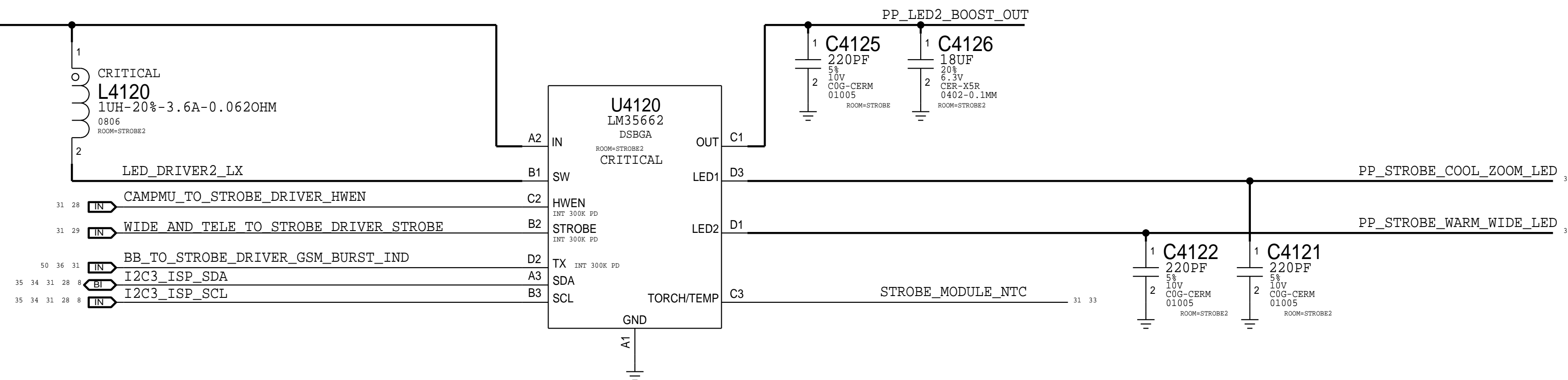
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CAMERA: B2B Tele (MT)		
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	REVISION	9.0.0
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	PAGE	40 OF 80
	SHEET	30 OF 51

LED STROBE DRIVERS (NEON)

APN:353S00558
I2C Address (7-bit): 0x63



APN:353S00868
I2C Address (7-bit): 0x67

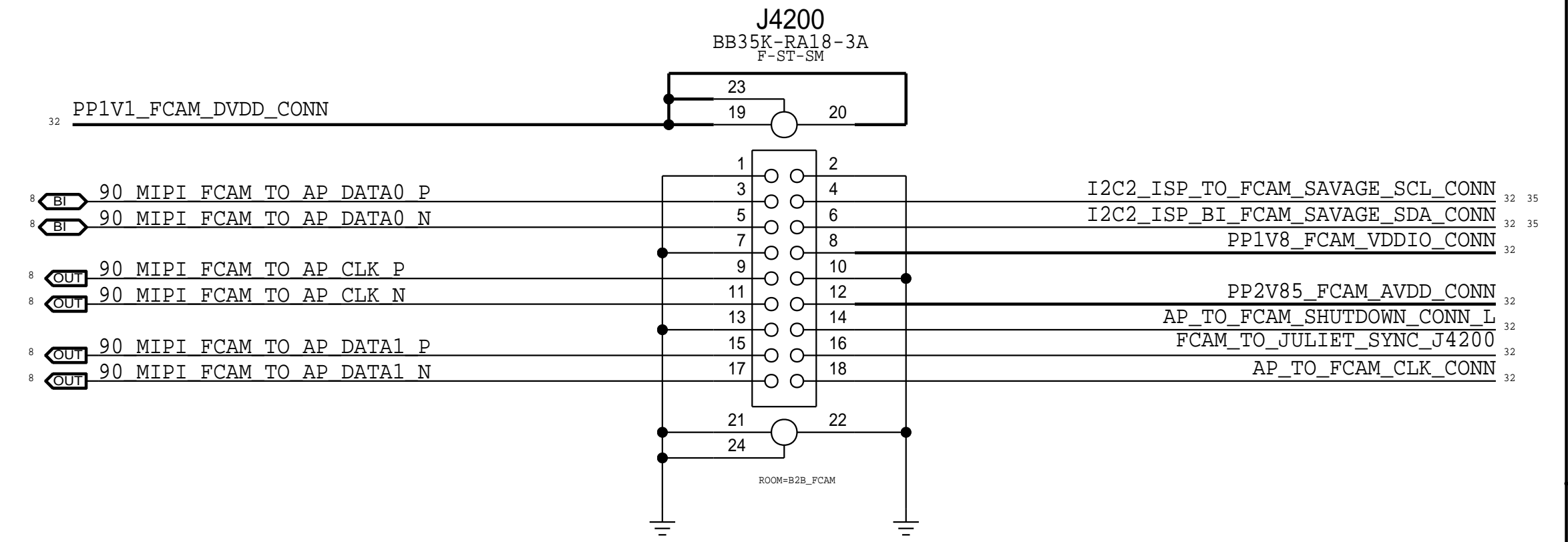
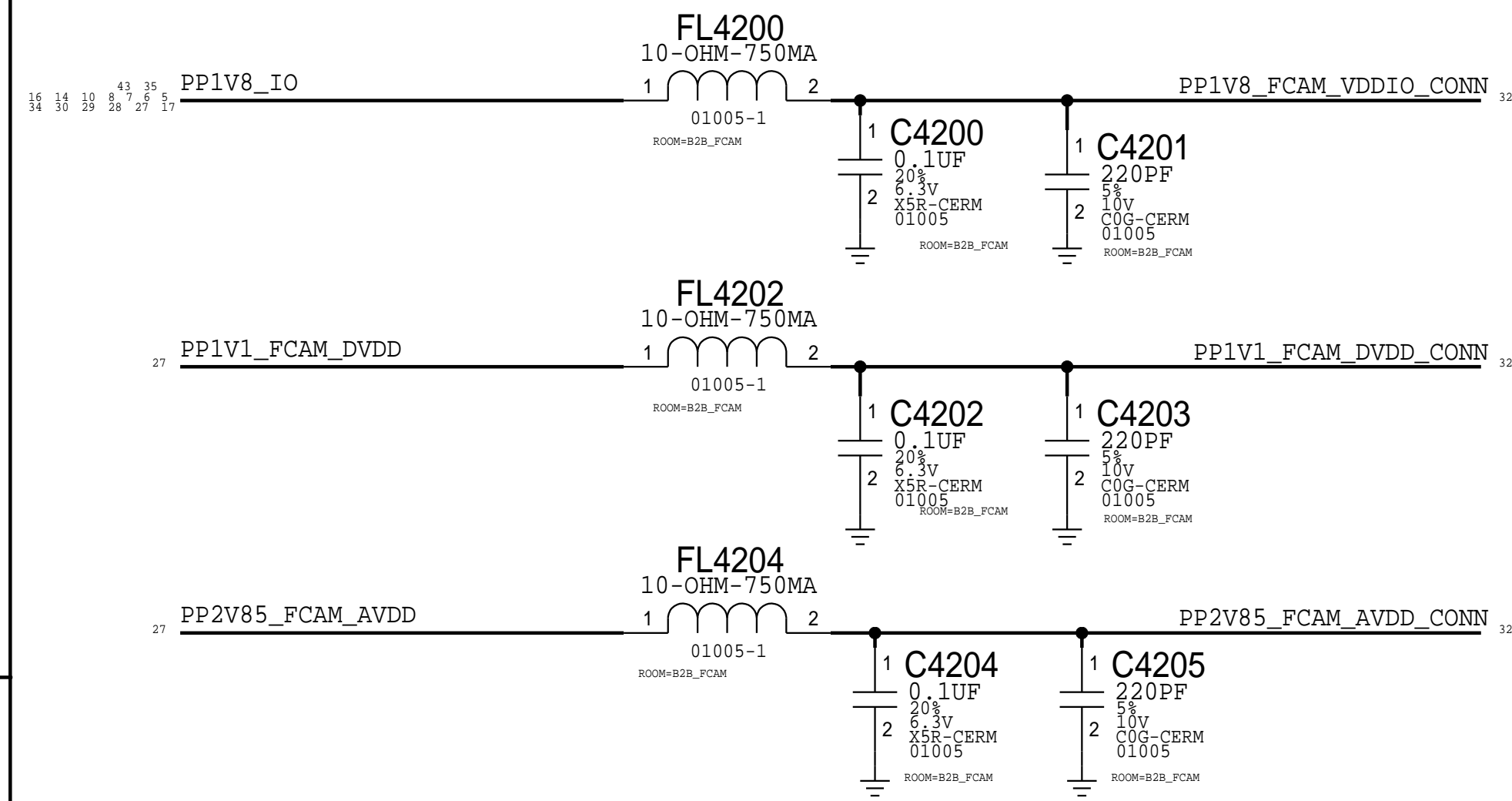


PAGE TITLE		
CAMERA: Strobe Drivers		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY:		BRANCH
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		SHEET
		41 OF 80
		31 OF 51

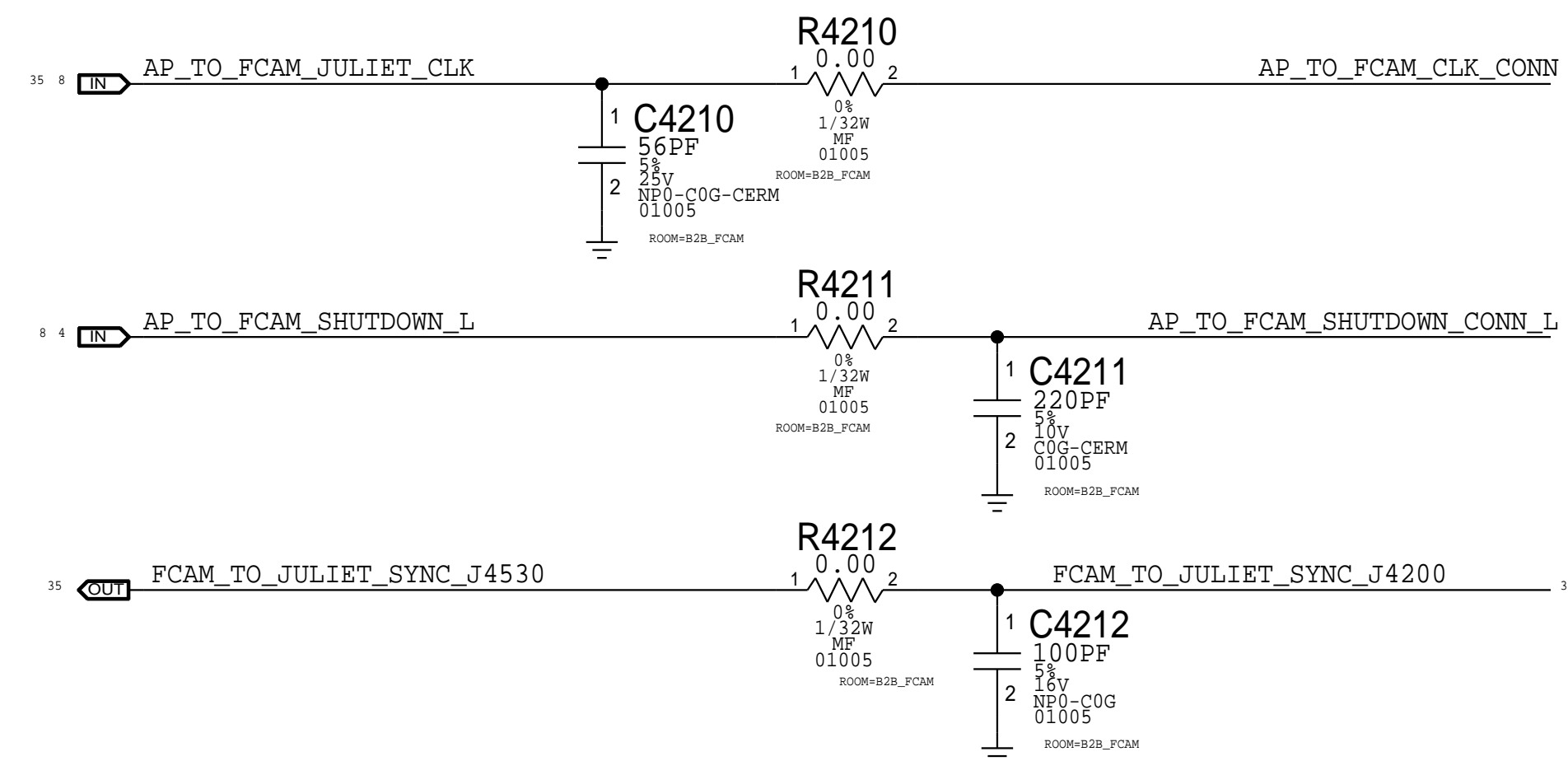
NEW HAMPSHIRE POWER

FCAM Connector

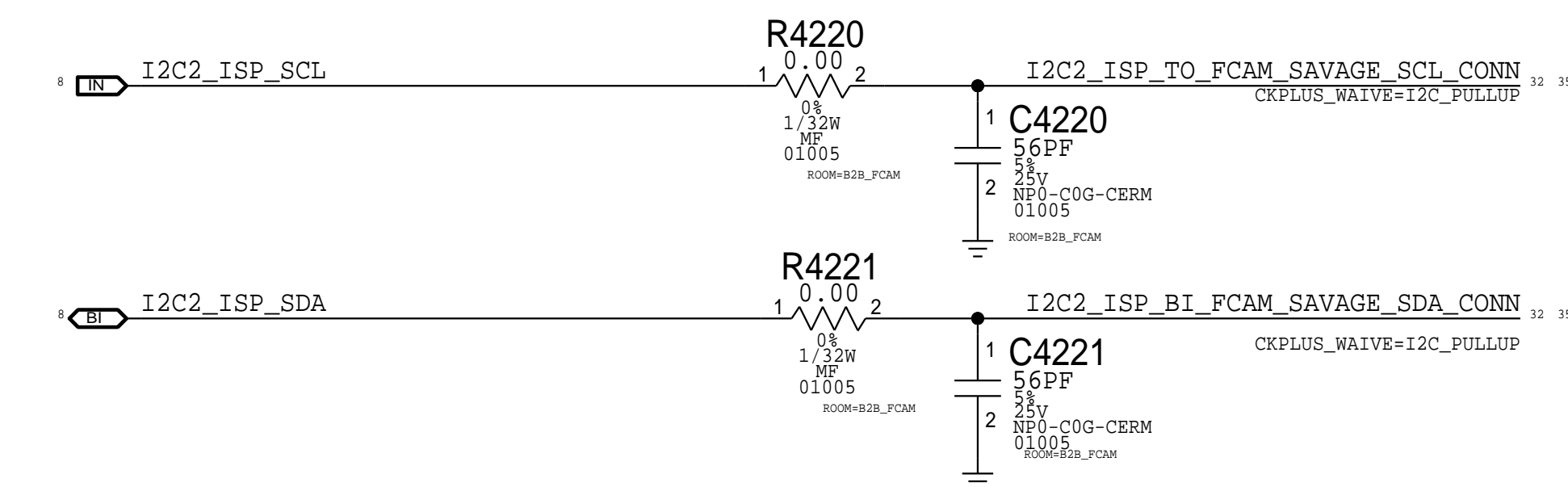
Rcpt: 516S00244 <-- This one on MLB
 Plug: 516S00245



FCAM I/O

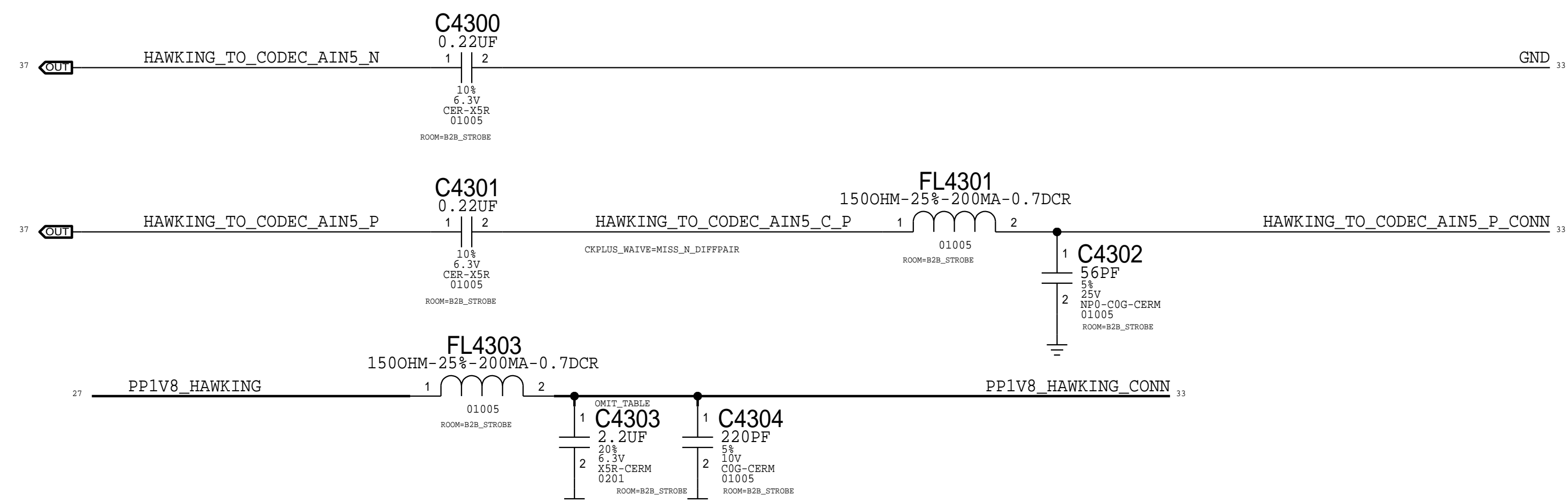


ISP I2C2

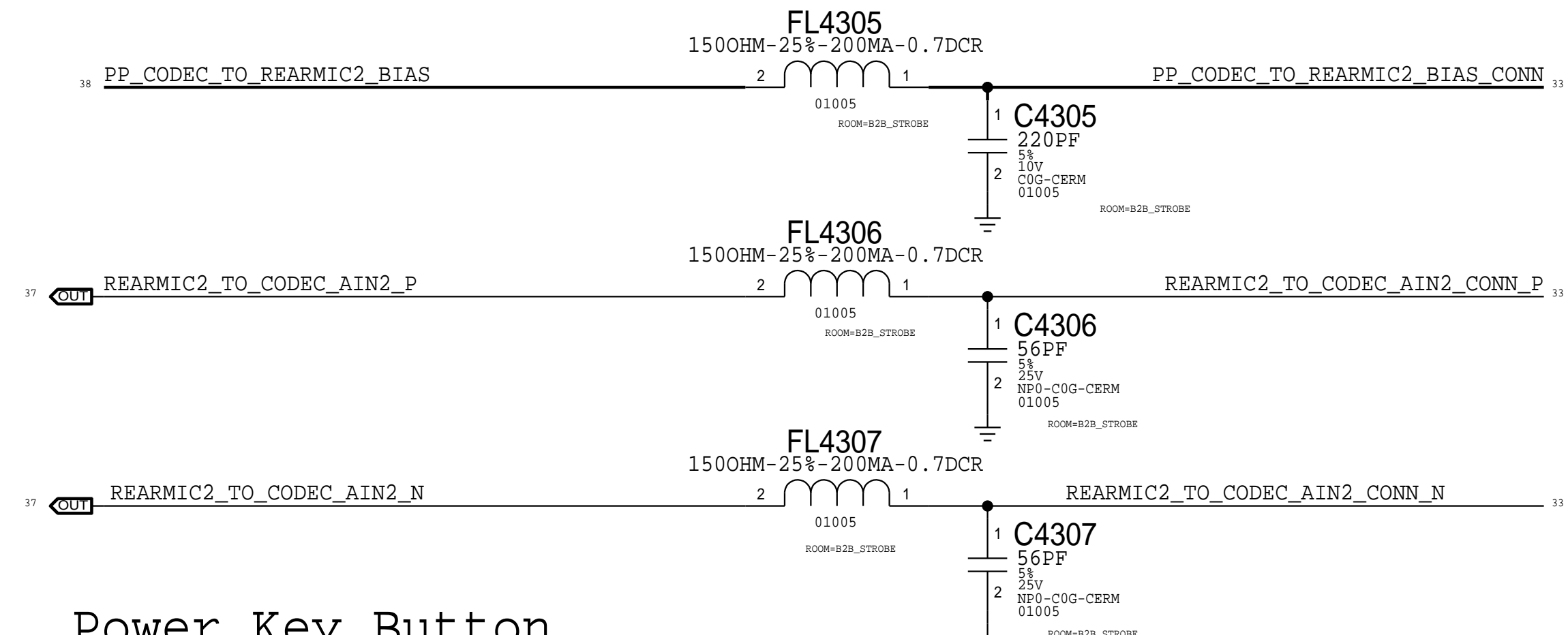


PAGE TITLE		
CAMERA: B2B FCAM		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	42 OF 80
	SHEET	32 OF 51

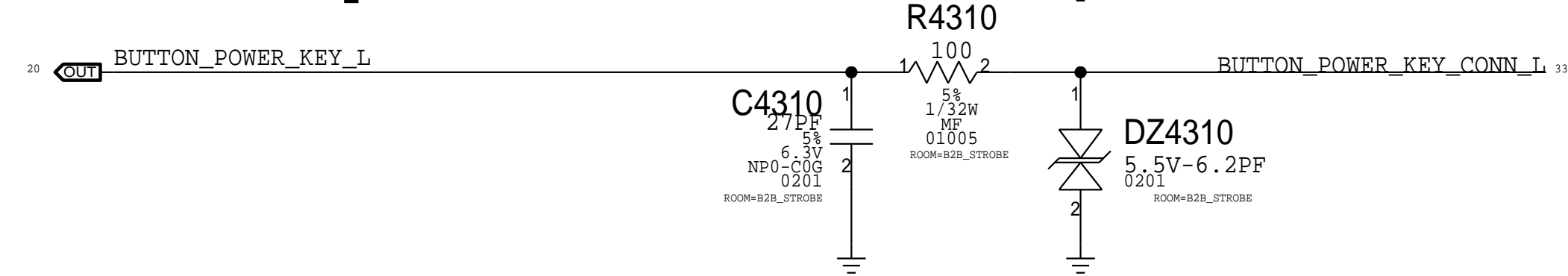
HAWKING



MIC2 (ANC REF)

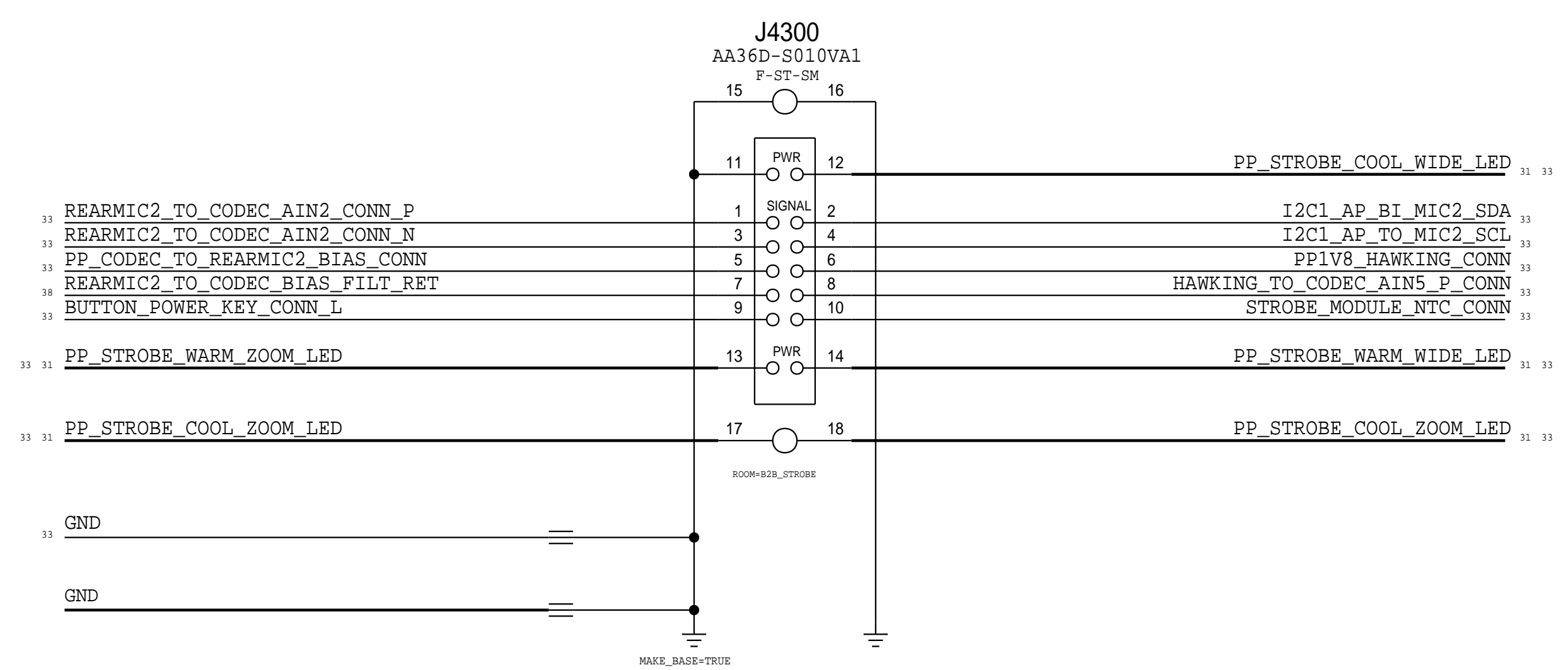


Power Key Button

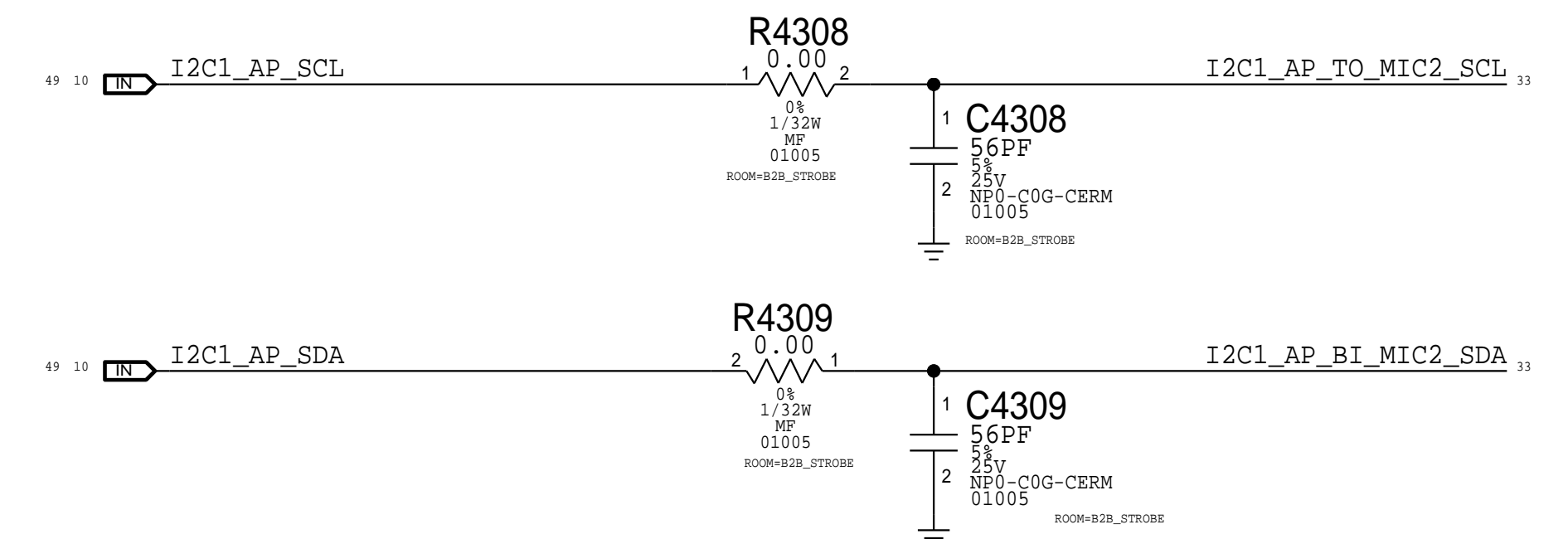
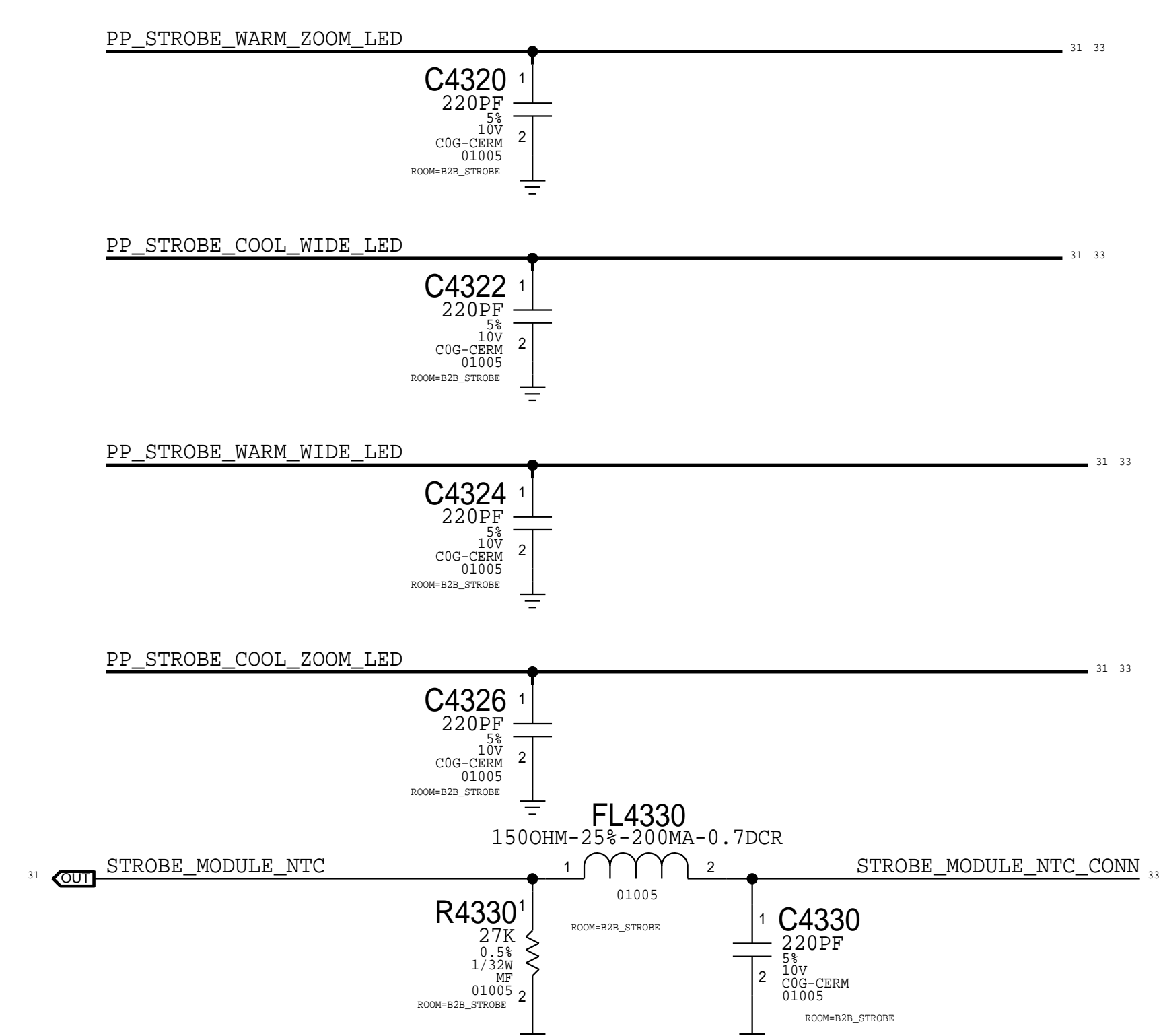


Strobe Connector

Rcpt: 516S00267 <-- This one on MLB
Plug: 516S00268

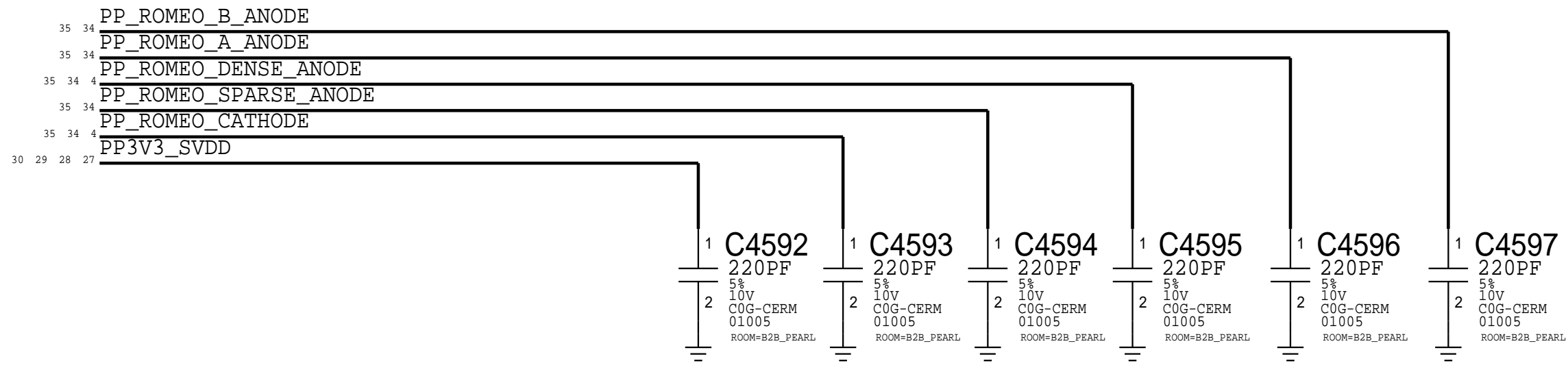


Strobe Filtering

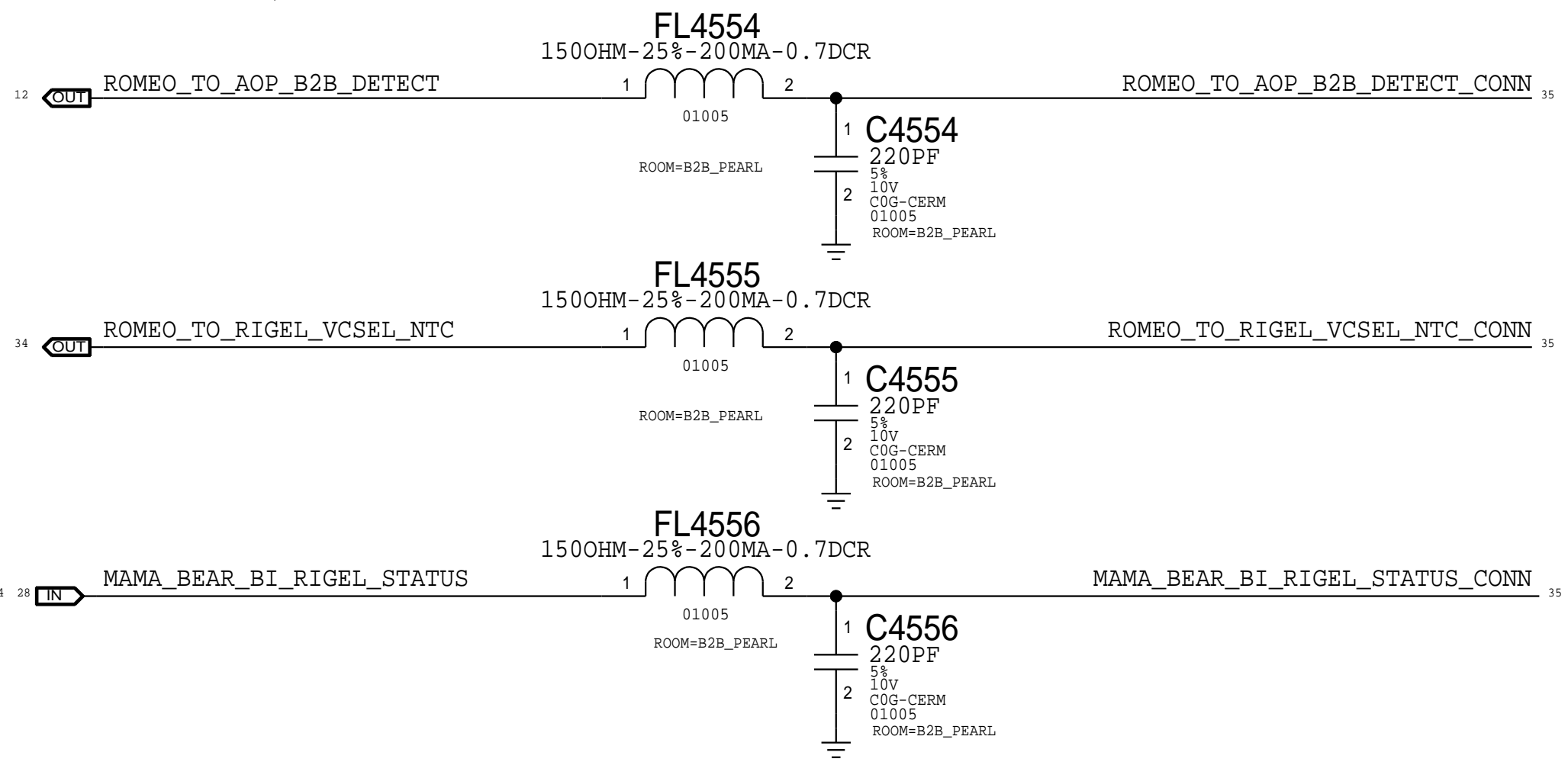


PAGE TITLE CAMERA: B2B Strobe + Hold Button		
	DRAWING NUMBER 051-02221	SIZE D
	REVISION 9.0.0	BRANCH evt-1
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PAGE 43 OF 80		SHEET 33 OF 51

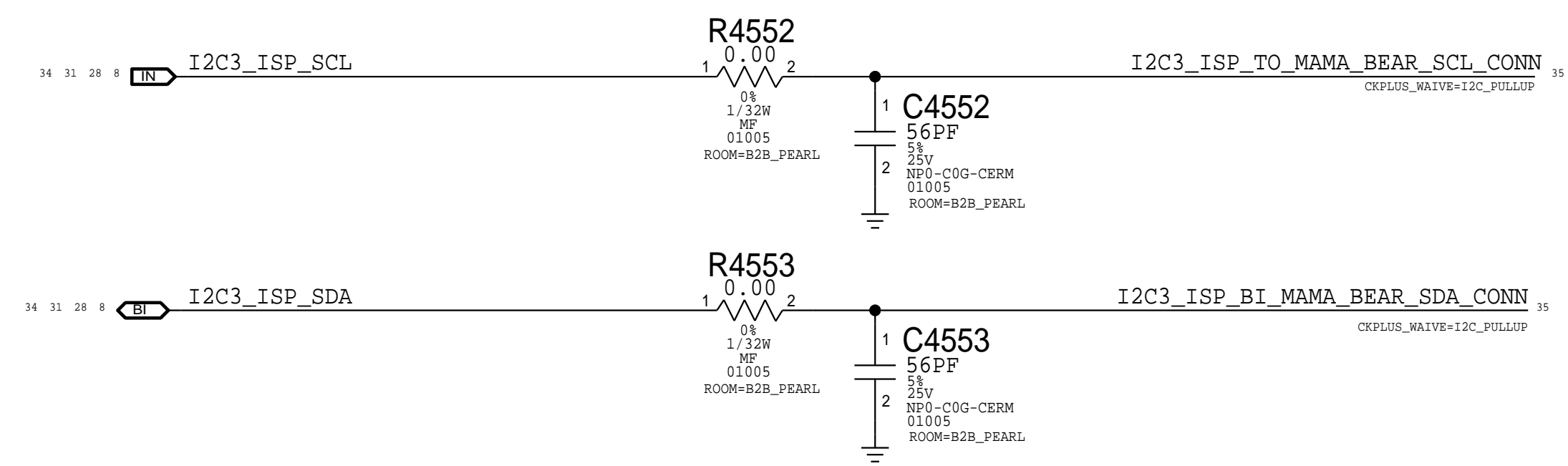
Romeo Power Filtering



Romeo I/O

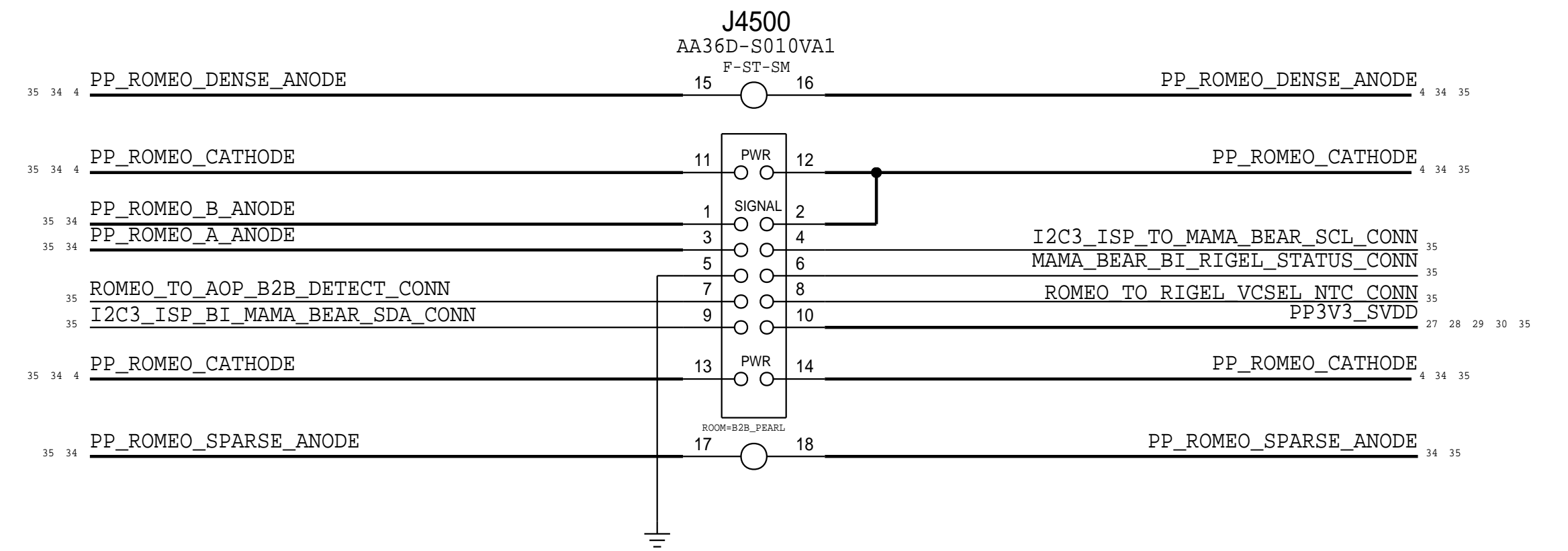


ISP I2C3

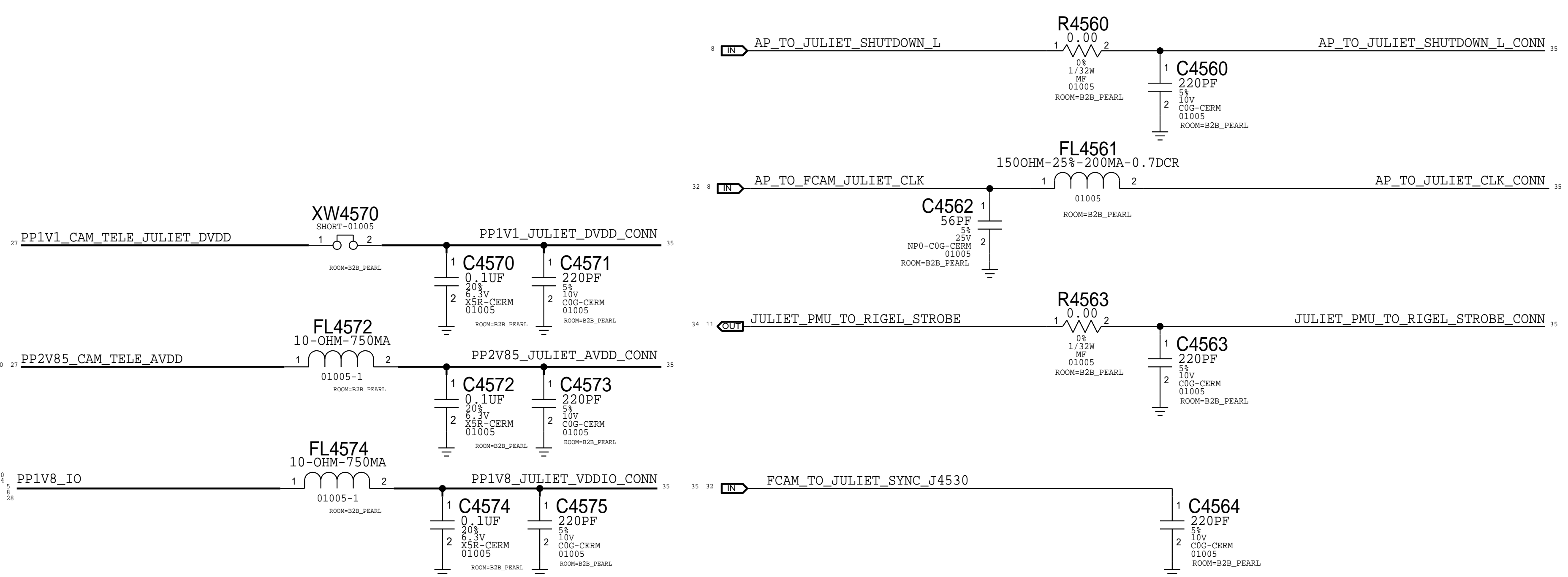


Romeo Connector

Rcpt: 516S00267 <-- This one on MLB
Plug: 516S00268

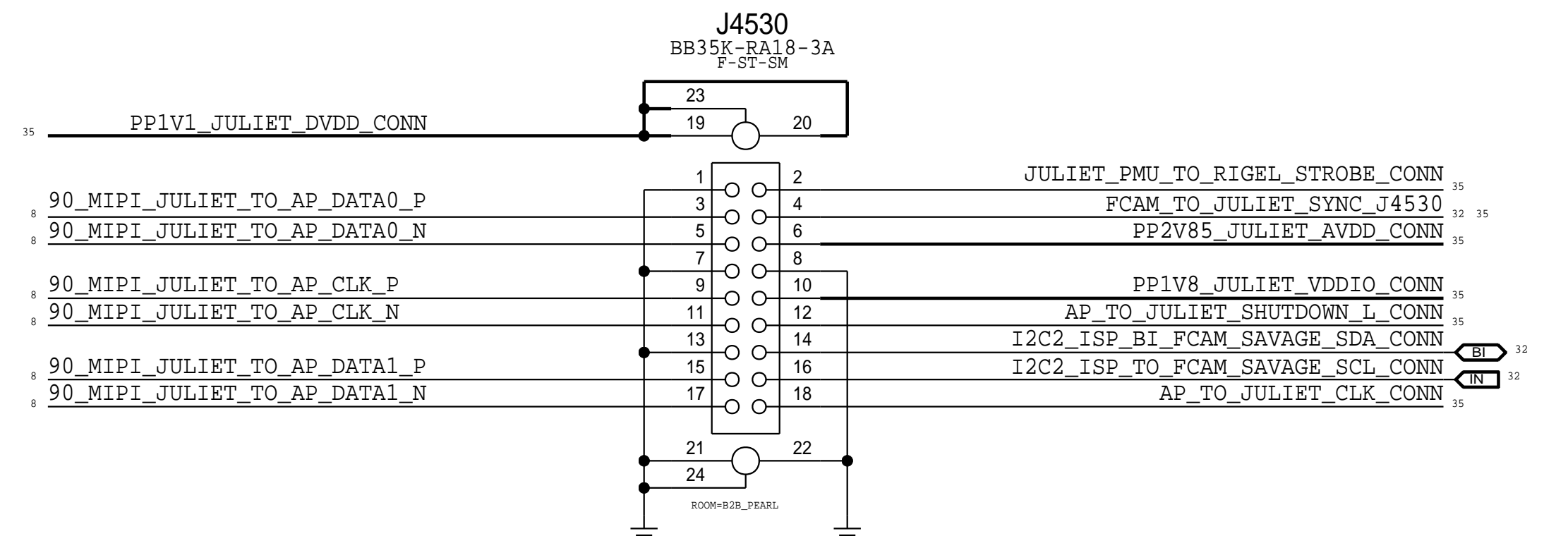


Juliet Power and I/O



Juliet Connector

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Plug: 516S00245

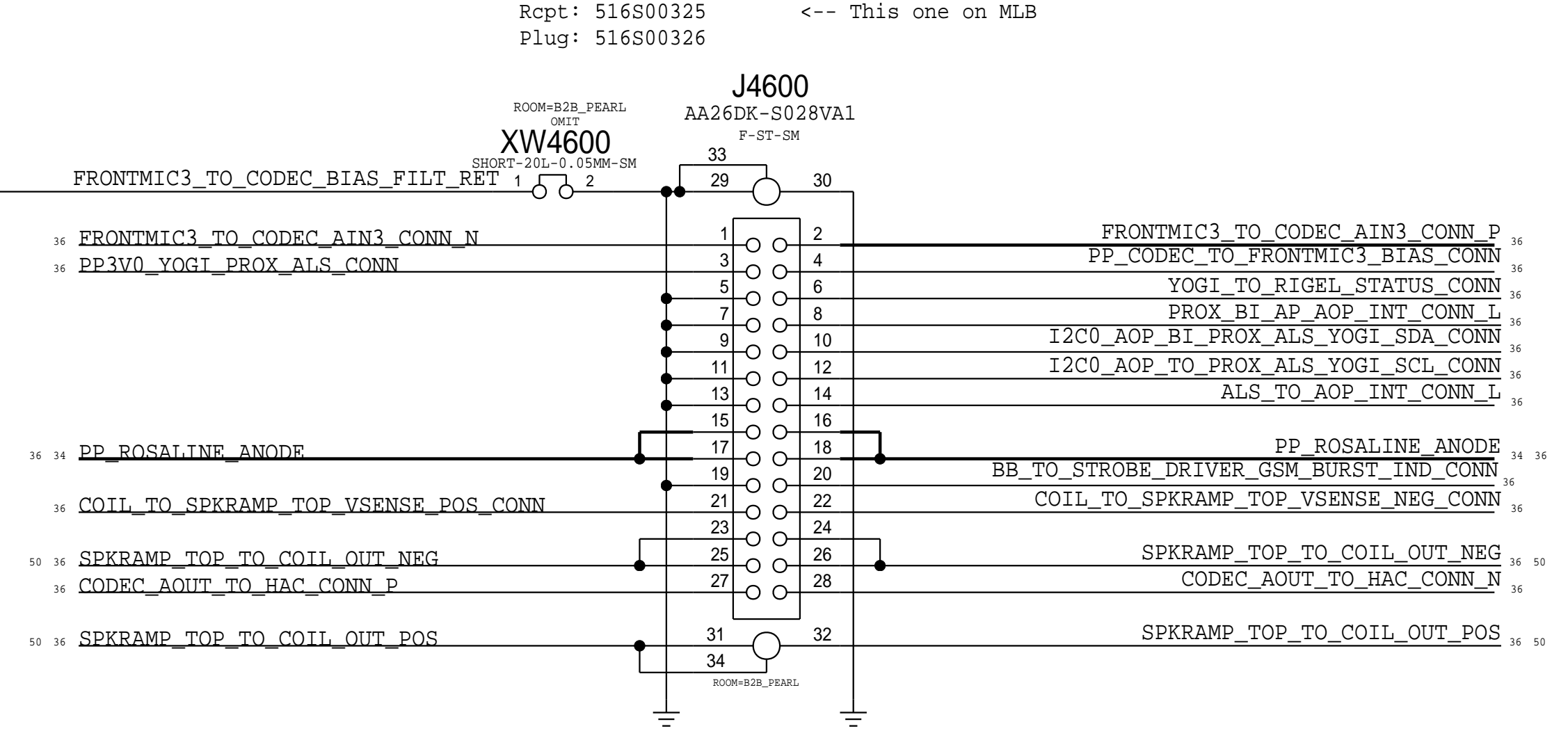
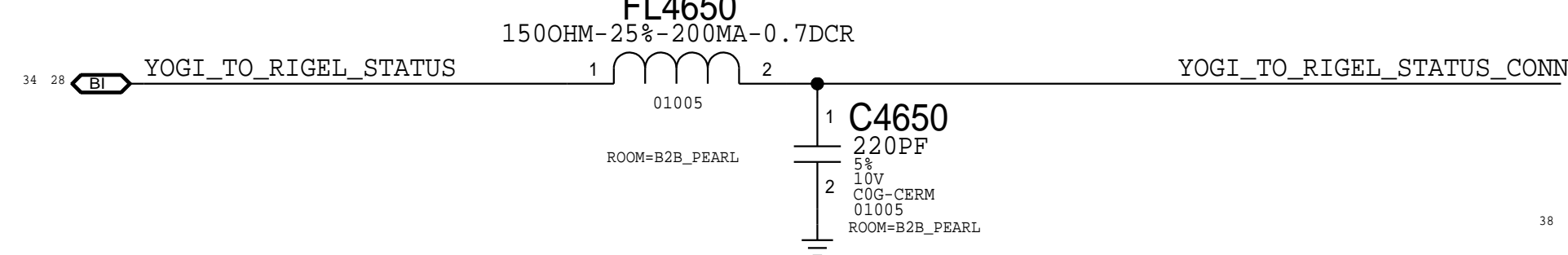
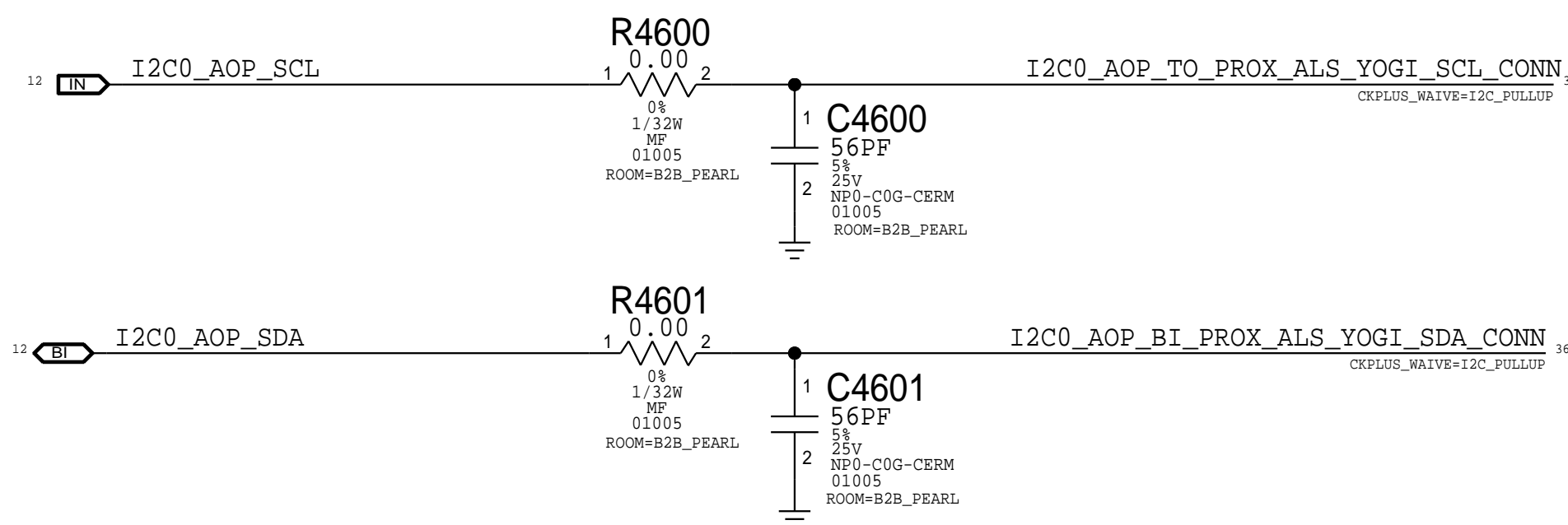


PAGE TITLE PEARL: B2B Romeo + Juliet		
	DRAWING NUMBER 051-02221	SIZE D
	REVISION 9.0.0	BRANCH evt-1
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PAGE 45 OF 80		SHEET 35 OF 51

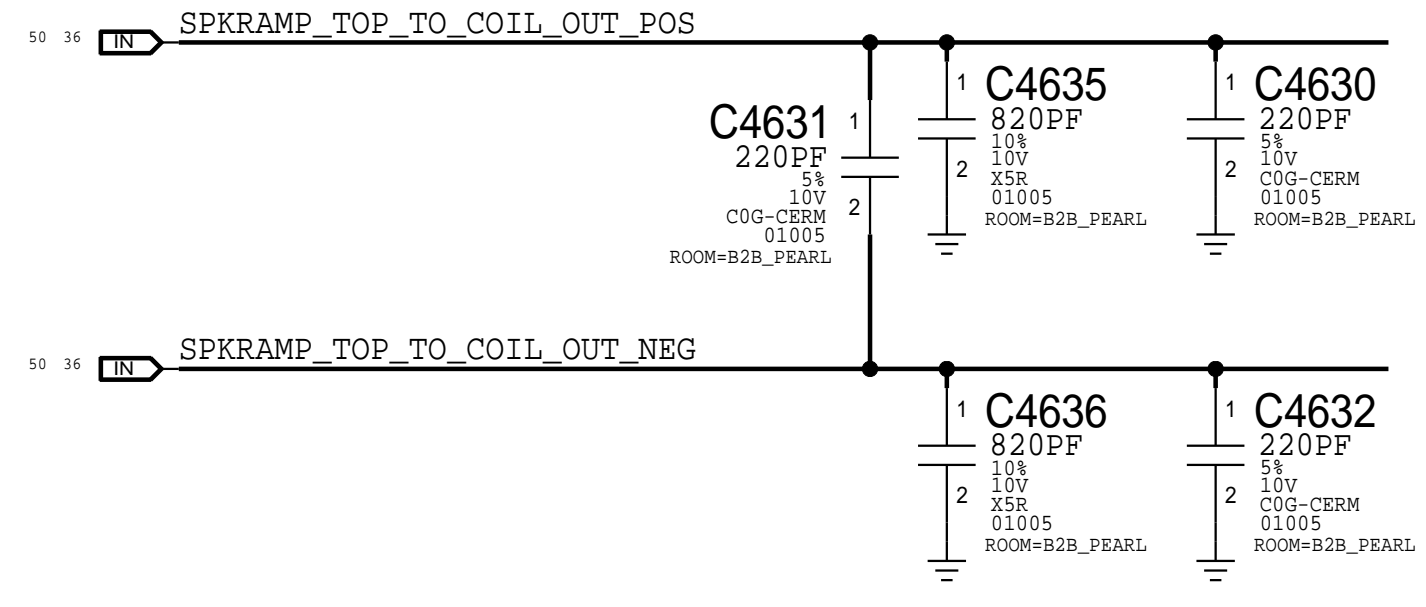
AOP I2C

Yogi Signals

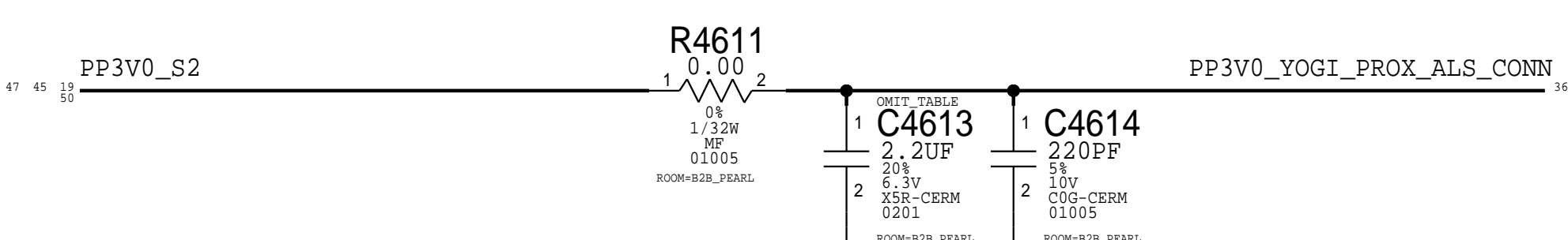
Rosaline + Misc Connector



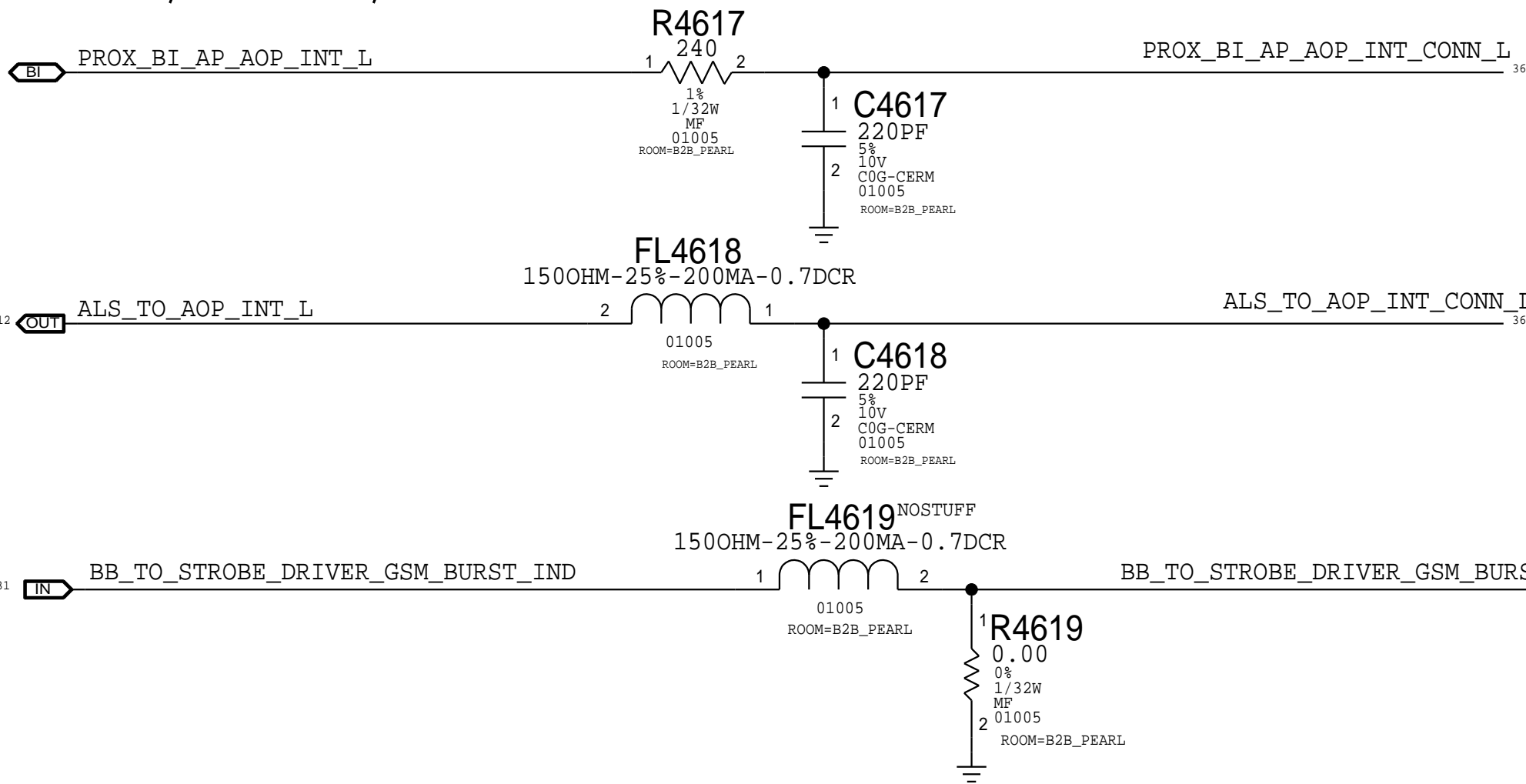
SPEAKER2



PROX & ALS POWER



PROX/ALS I/O

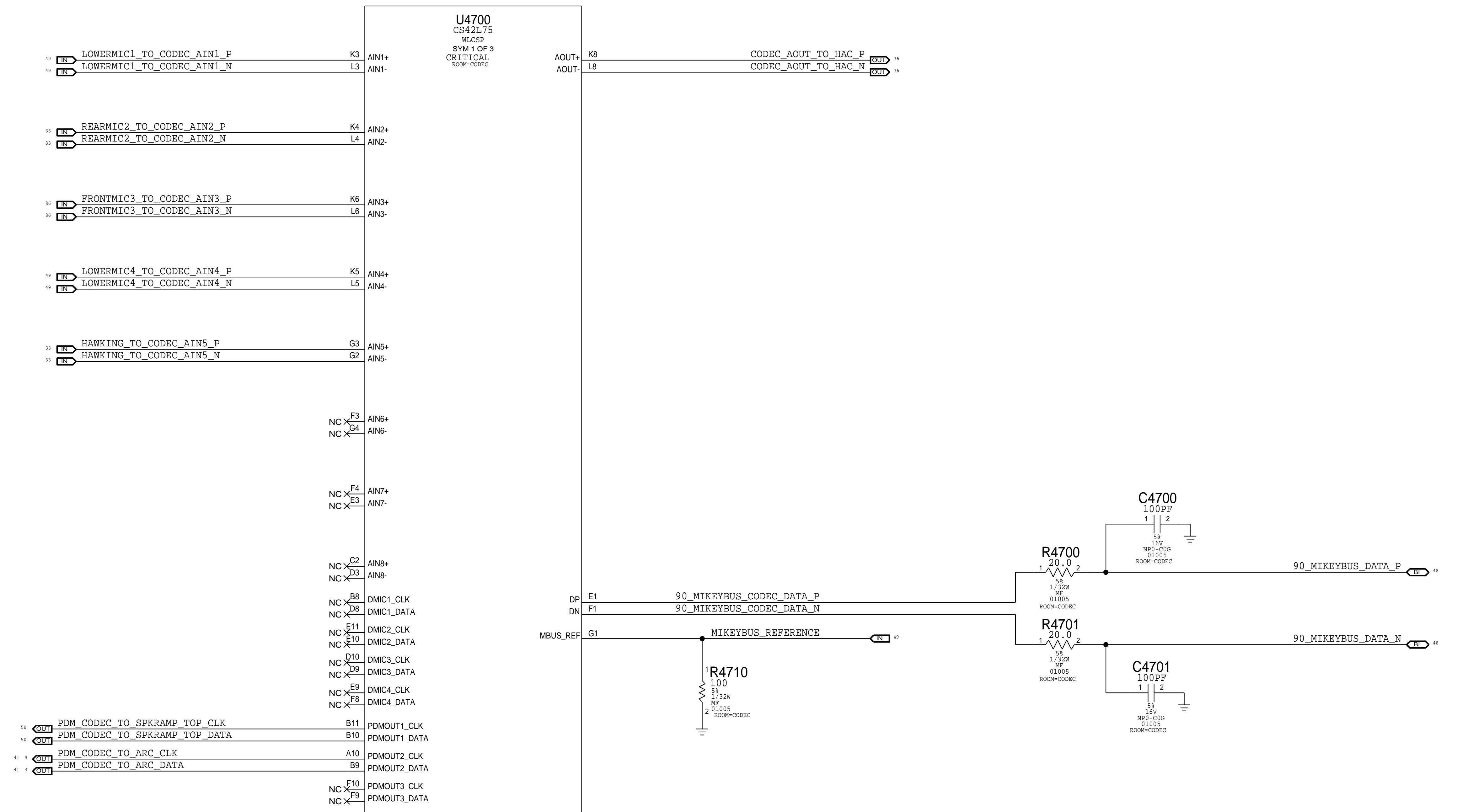


MIC3



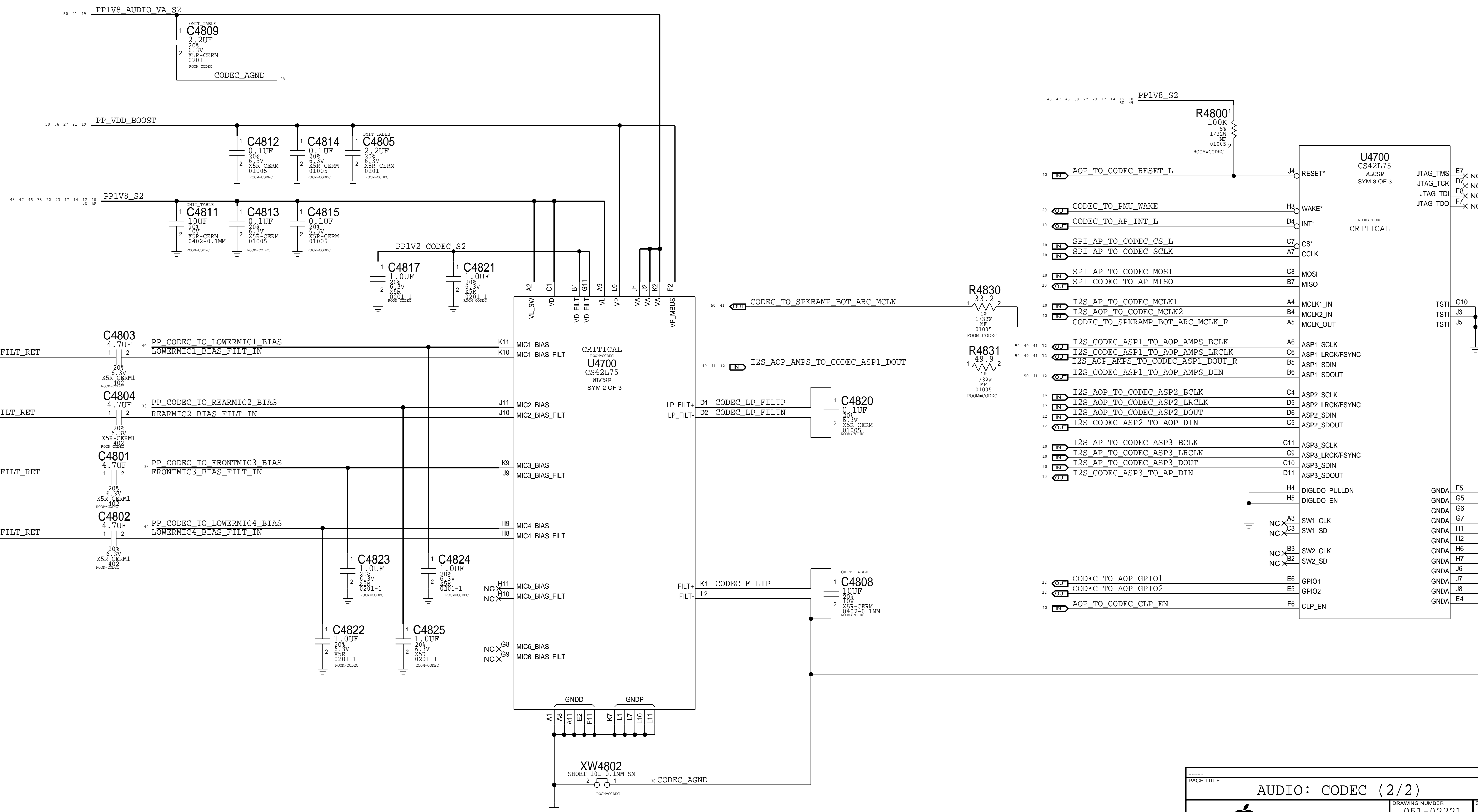
PAGE TITLE PEARL: B2B Rosaline + Misc		
Apple Inc.	DRAWING NUMBER 051-02221	SIZE D
	REVISION 9.0.0	BRANCH evt-1
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PAGE 46 OF 80		SHEET 36 OF 51

CALLAN AUDIO CODEC (ANALOG INPUTS & OUTPUTS)



PAGE TITLE		
AUDIO: CODEC (1/2)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	47 OF 80
	SHEET	37 OF 51

CALLAN AUDIO CODEC (POWER & I/O)



PAGE TITLE		
AUDIO: CODEC (2/2)		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	48 OF 80
	SHEET	38 OF 51

8

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South Speaker Amplifier on MLB Bottom

PAGE TITLE		AUDIO: Speaker Amp Bottom		SYNC_DATE=08/25/2015	
 Apple Inc.	DRAWING NUMBER	051-02221	SIZE	D	
	REVISION	9.0.0			
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			PAGE	49 OF 80	
			SHEET	39 OF 51	

8

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North Speaker Amplifier on MLB Bottom

SYNC_DATE=08/25/2015

PAGE TITLE		AUDIO: Speaker Amp Top	
DRAWING NUMBER	051-02221	SIZE	D
	REVISION		9.0.0
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
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II NOT TO REPRODUCE OR COPY IT		50 OF 80	
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		SHEET	
IV ALL RIGHTS RESERVED		40 OF 51	

8

7

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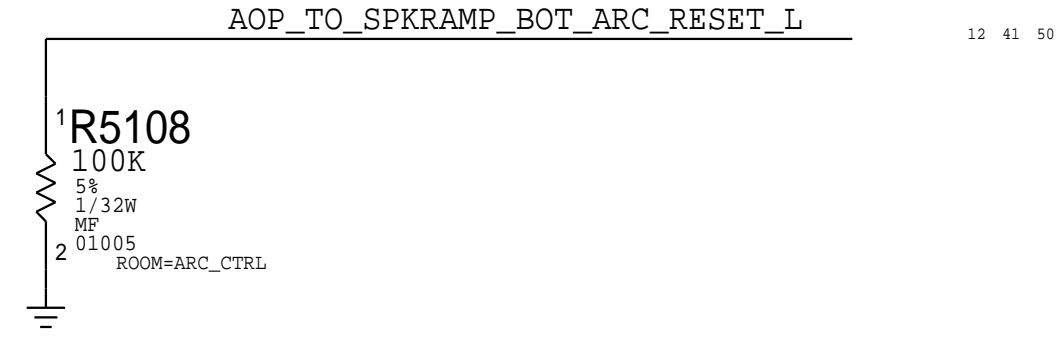
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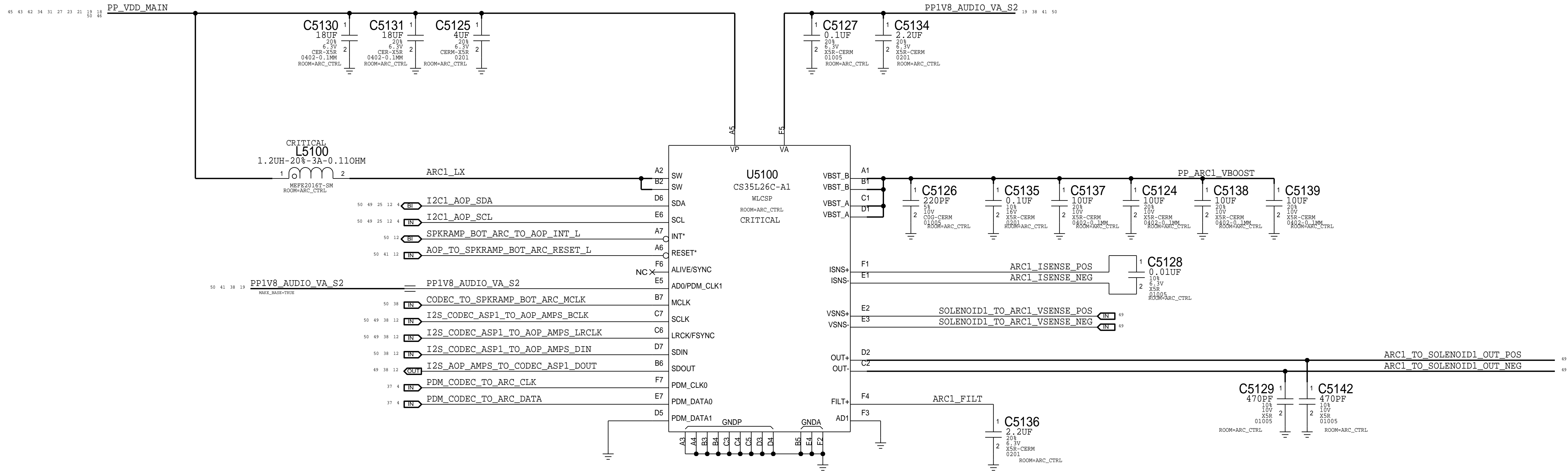
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Pull Downs



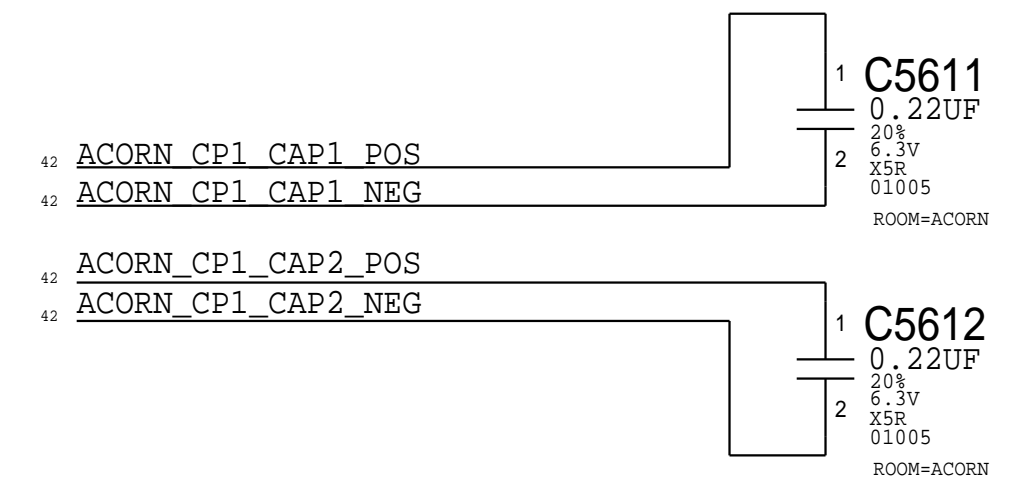
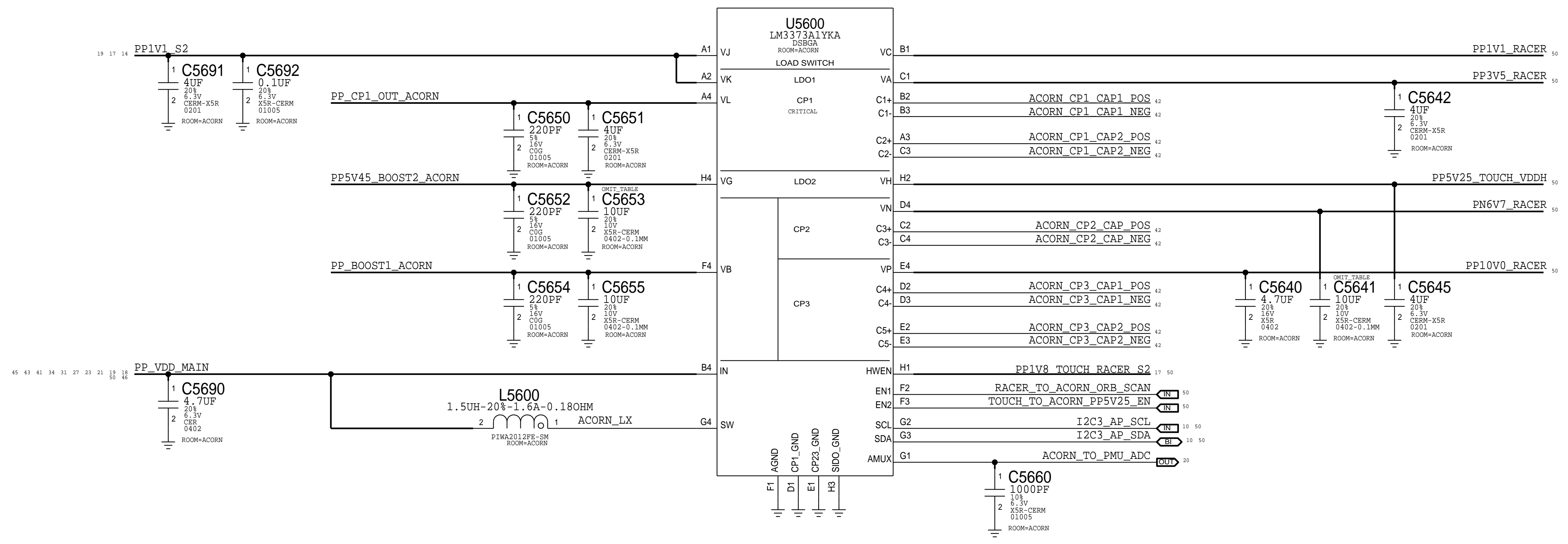
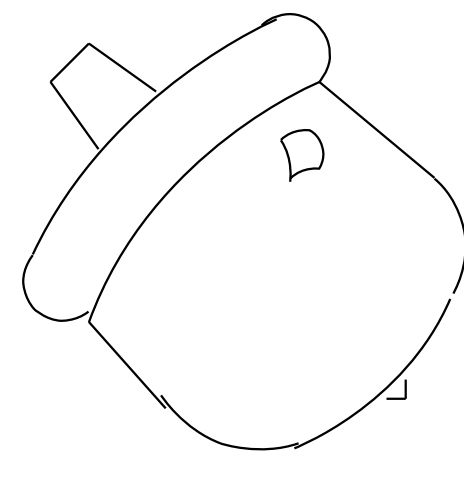
ARC DRIVER

APN: 338S00296
I2C ADDRESS: 1000 001x
0x82

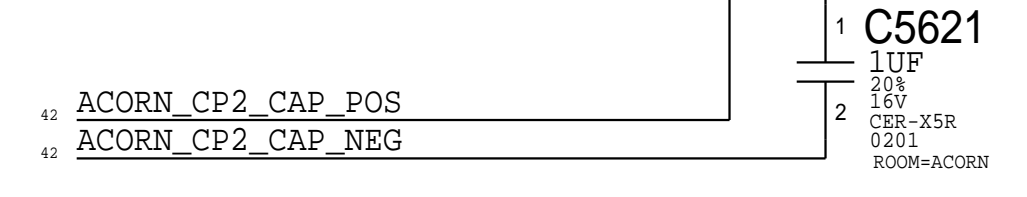


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	REVISION	9.0.0	
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		PAGE	51 OF 80
		SHEET	41 OF 51

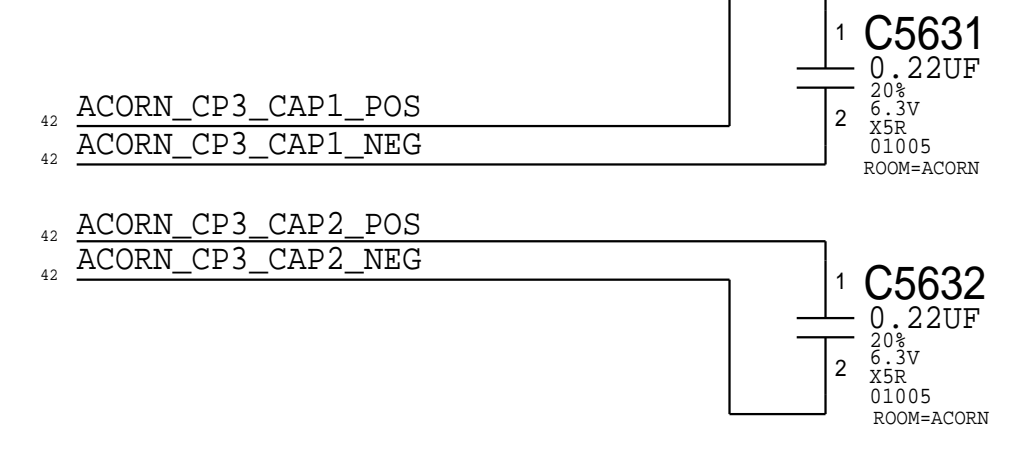
Acorn PMU



Charge Pump 2 Caps



Charge Pump 3 Caps

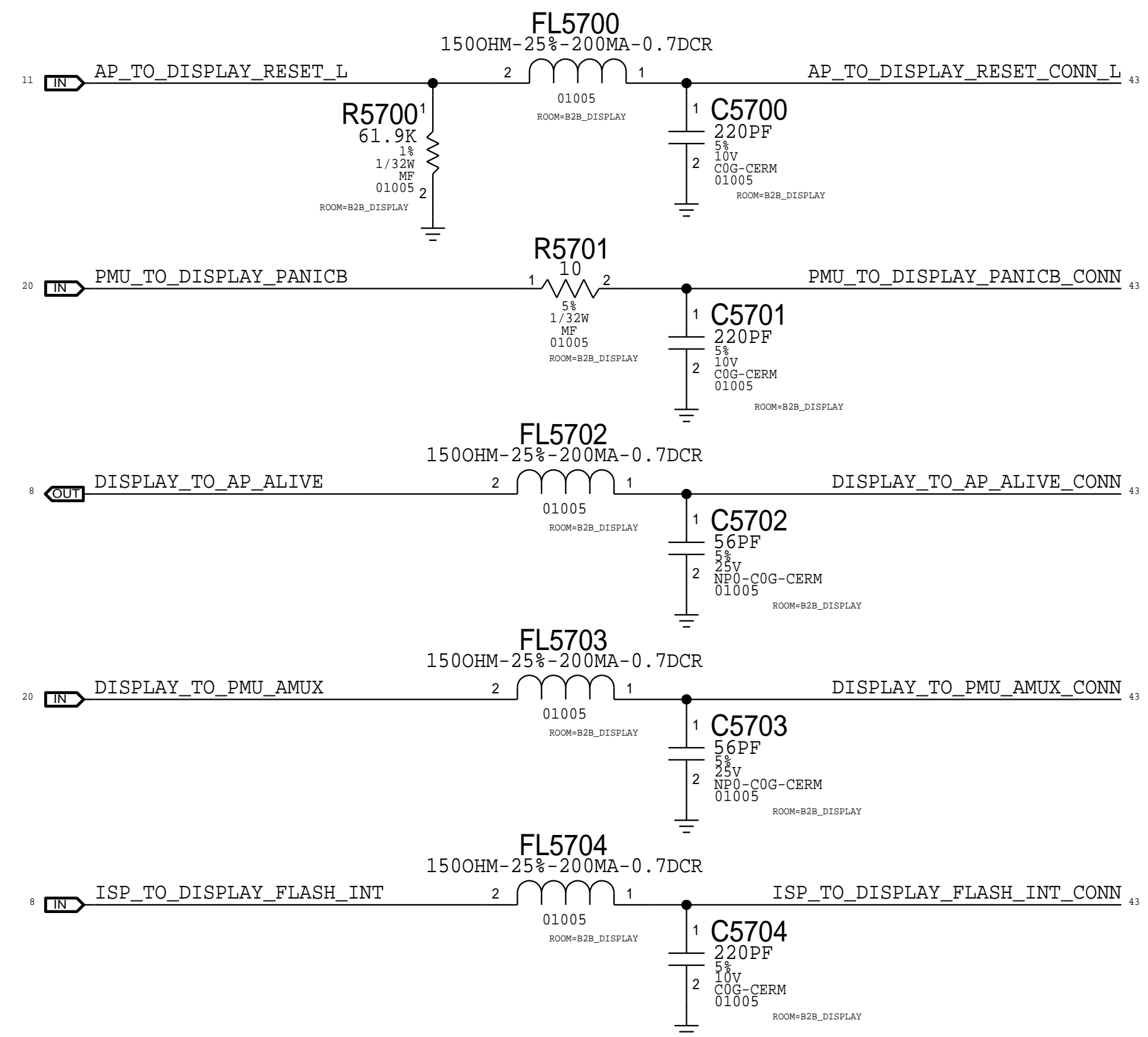


PAGE TITLE		
CG: Power Supplies - Touch & Display		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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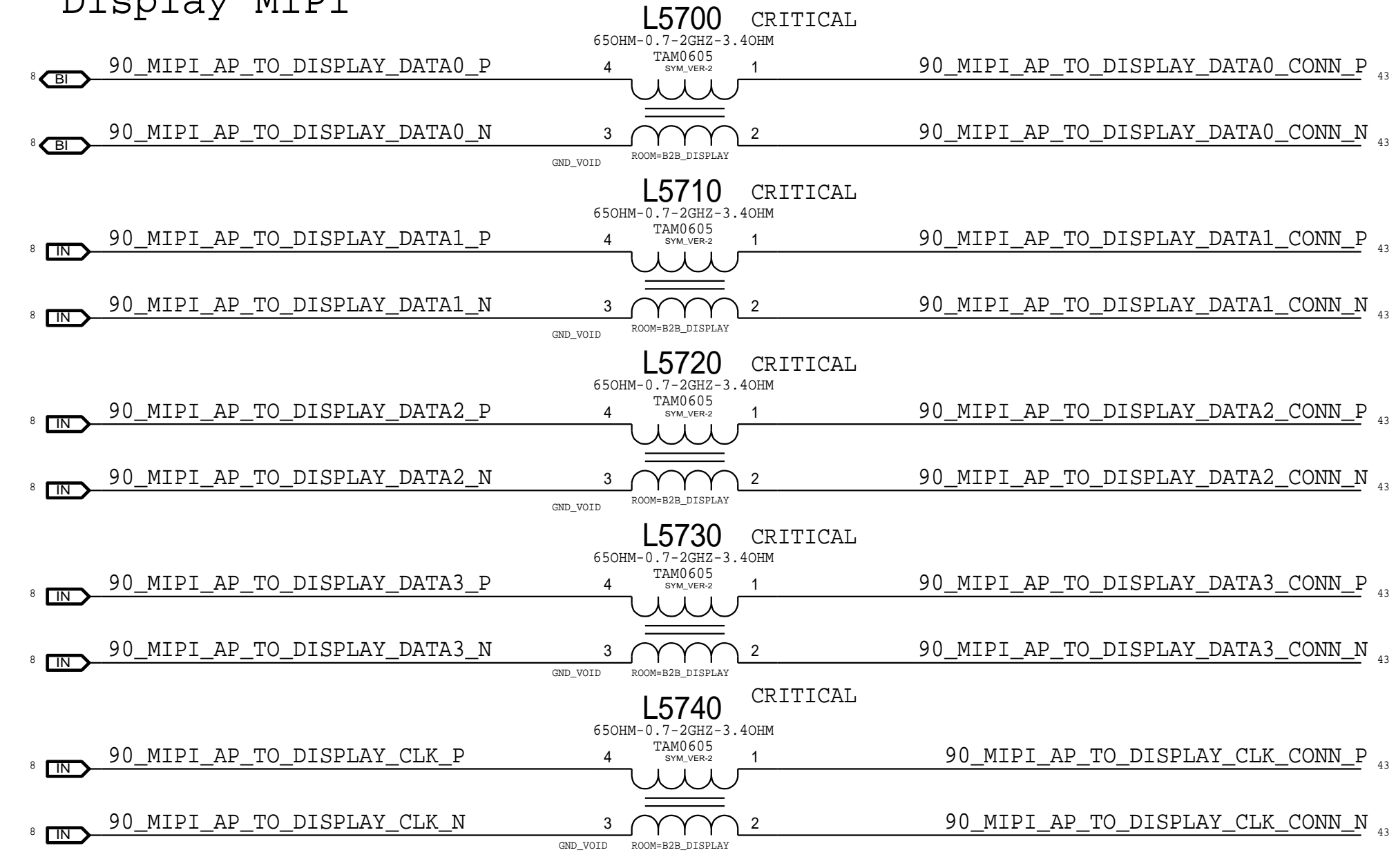
Display Flex Connector

Rept: 516S00210 <-- This one on MLB
 Plug: 516S00211

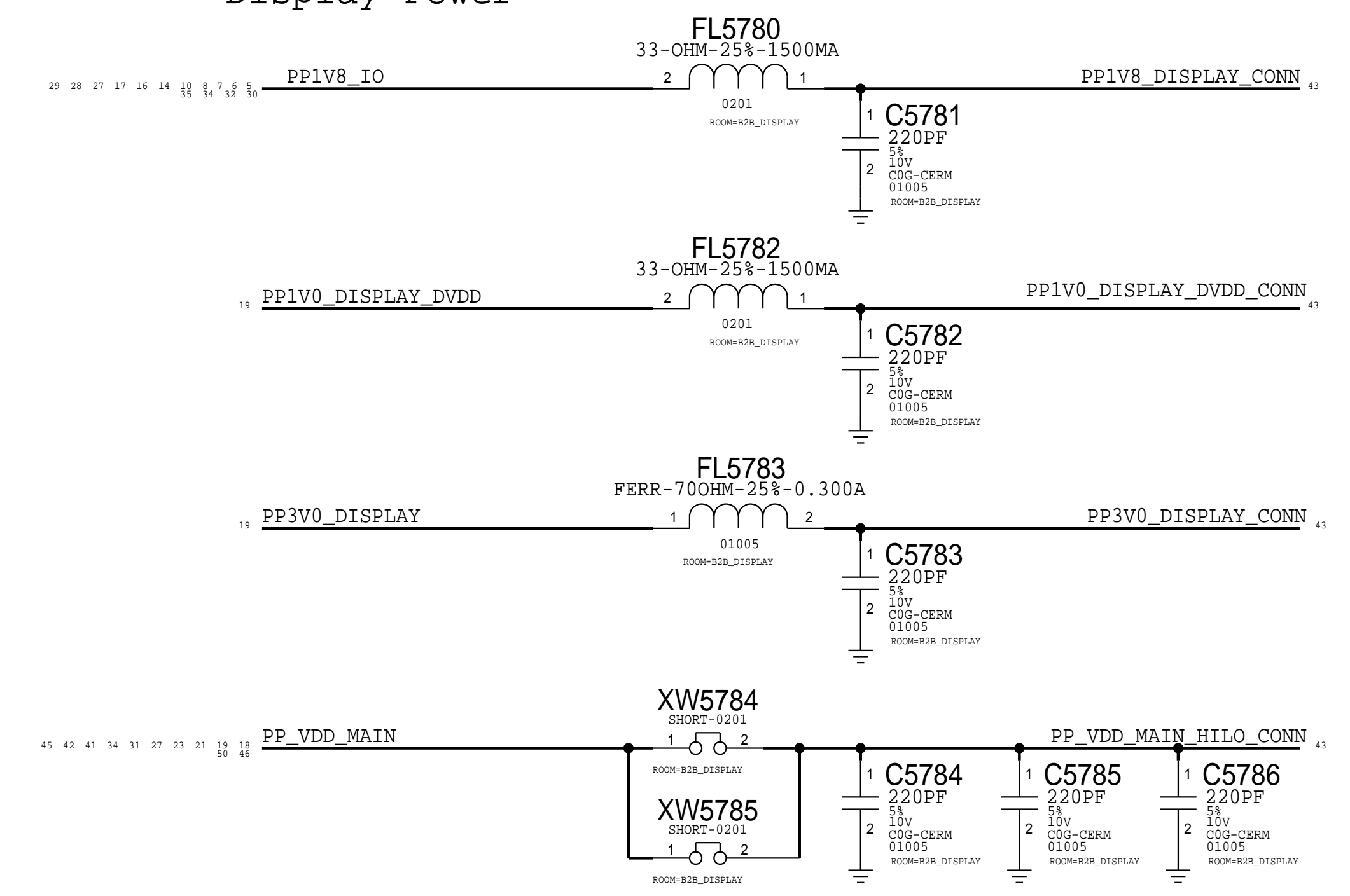
Display Control Signals



Display MIPI



Display Power



PAGE TITLE		
CG: B2B Display		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	57 OF 80
	SHEET	43 OF 51

8

7

6

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Orb + Touch Connector on MLB Bottom

PAGE TITLE		CG: B2B Orb & Touch		SYNC_DATE=08/25/2015	
 Apple Inc.	DRAWING NUMBER	051-02221	SIZE	D	
	REVISION	9.0.0			
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	PAGE	58 OF 80			
	SHEET	44 OF 51			

8

7

6

5

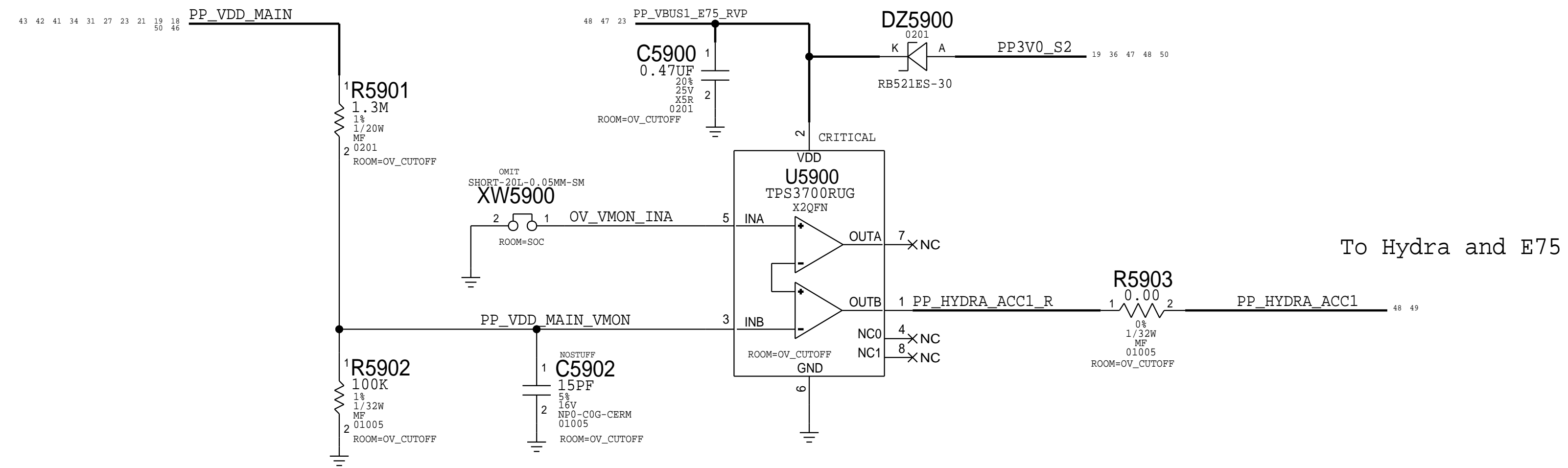
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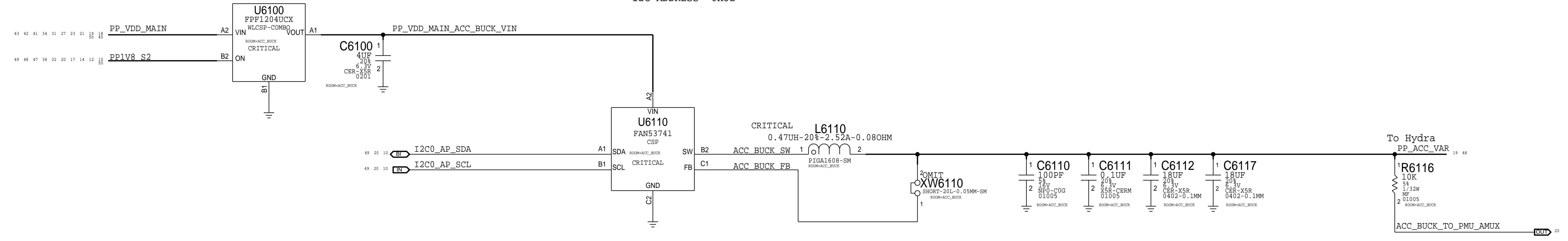
VDD_MAIN OV CUT-OFF CIRCUIT



PAGE TITLE		
I/O: Overvoltage Cut-Off Circuit		
	DRAWING NUMBER	051-02221
	REVISION	9.0.0
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	PAGE	59 OF 80
	SHEET	45 OF 51

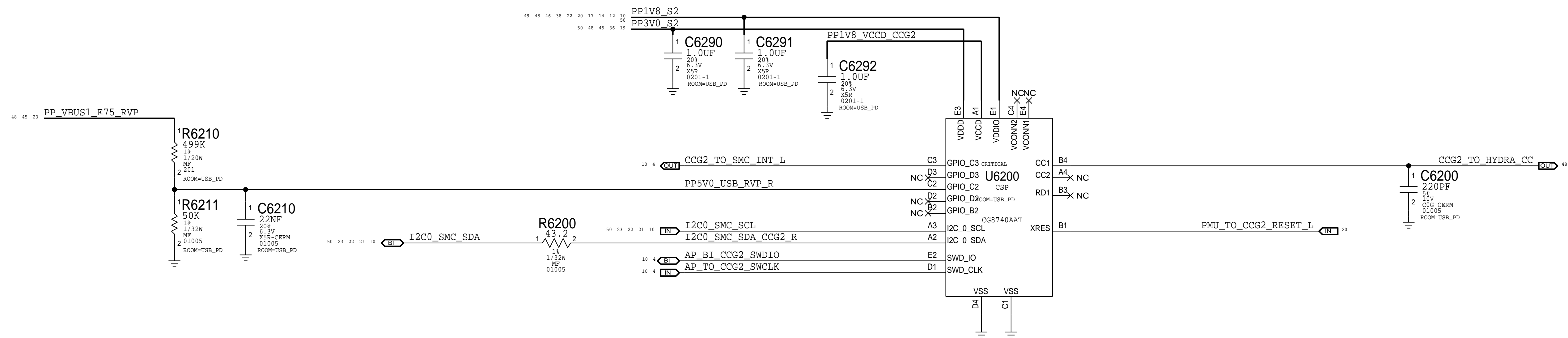
ACCESSORY BUCK

I2C ADDRESS: 0x52



PAGE TITLE		
I/O: Accessory Buck		
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	PAGE	61 OF 80
	SHEET	46 OF 51

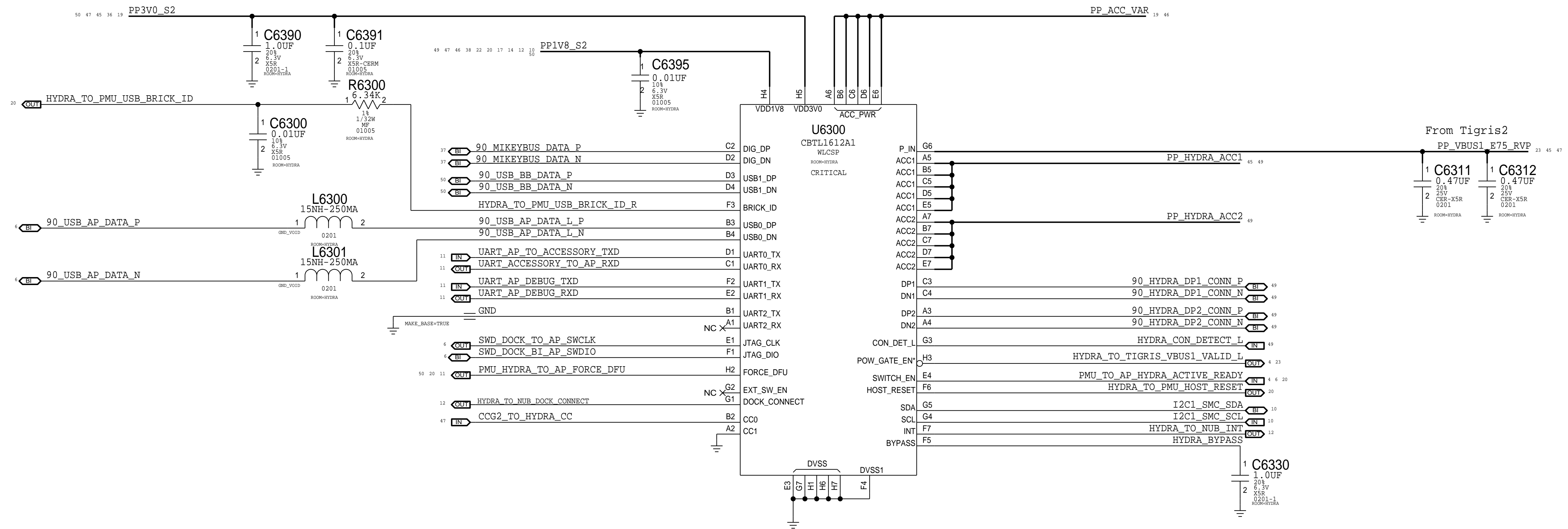
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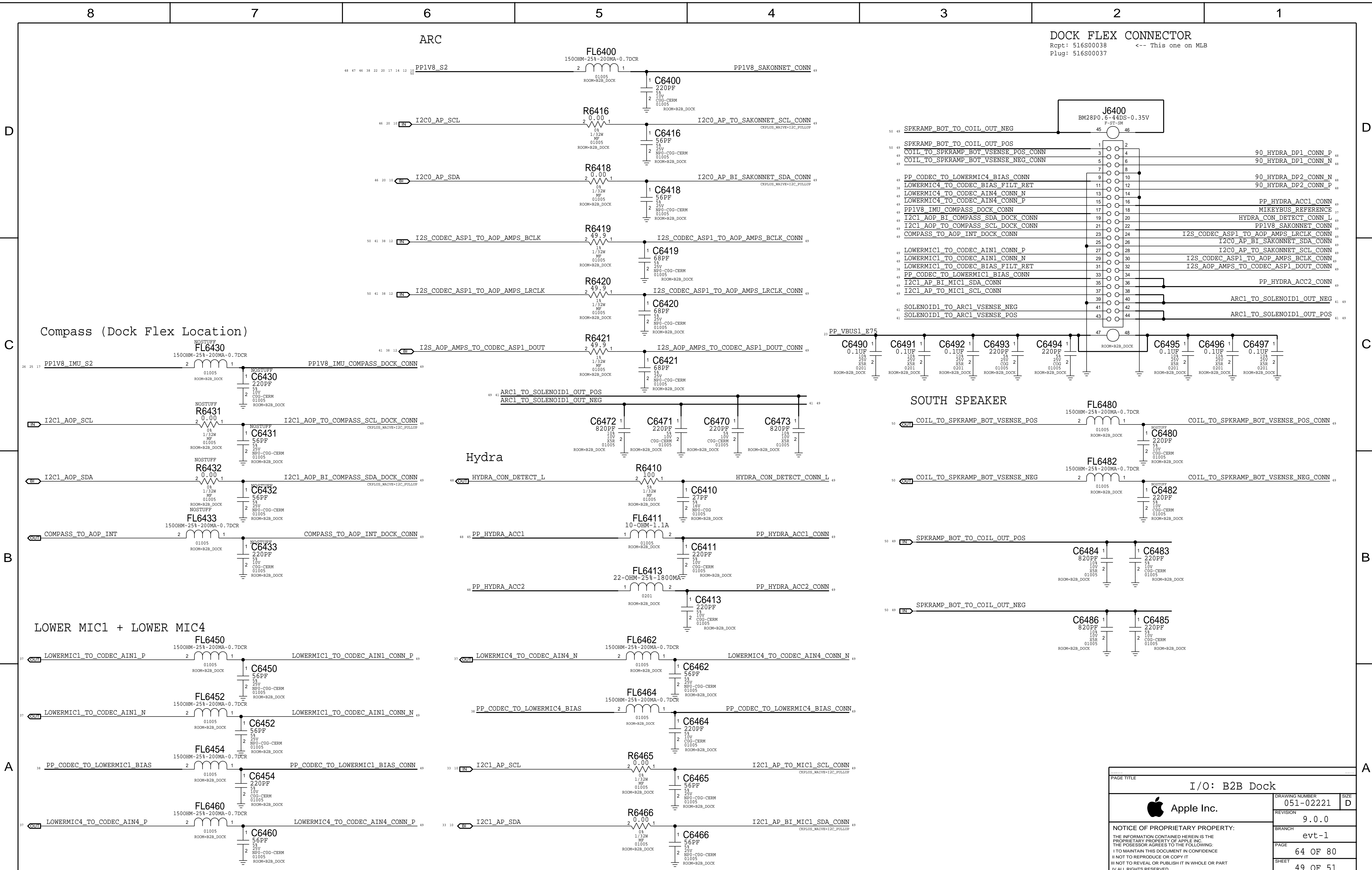
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			PAGE	62 OF 80	
			SHEET	47 OF 51	

Hydra

I2C Address: 0011010X



PAGE TITLE			
I/O: Hydra			
	DRAWING NUMBER	051-02221	
	REVISION	9.0.0	
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		PAGE	63 OF 80
		SHEET	48 OF 51



PAGE TITLE		
I/O: B2B Dock		
		DRAWING NUMBER 051-02221
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		BRANCH evt-1
PAGE 64 OF 80		SHEET 49 OF 51

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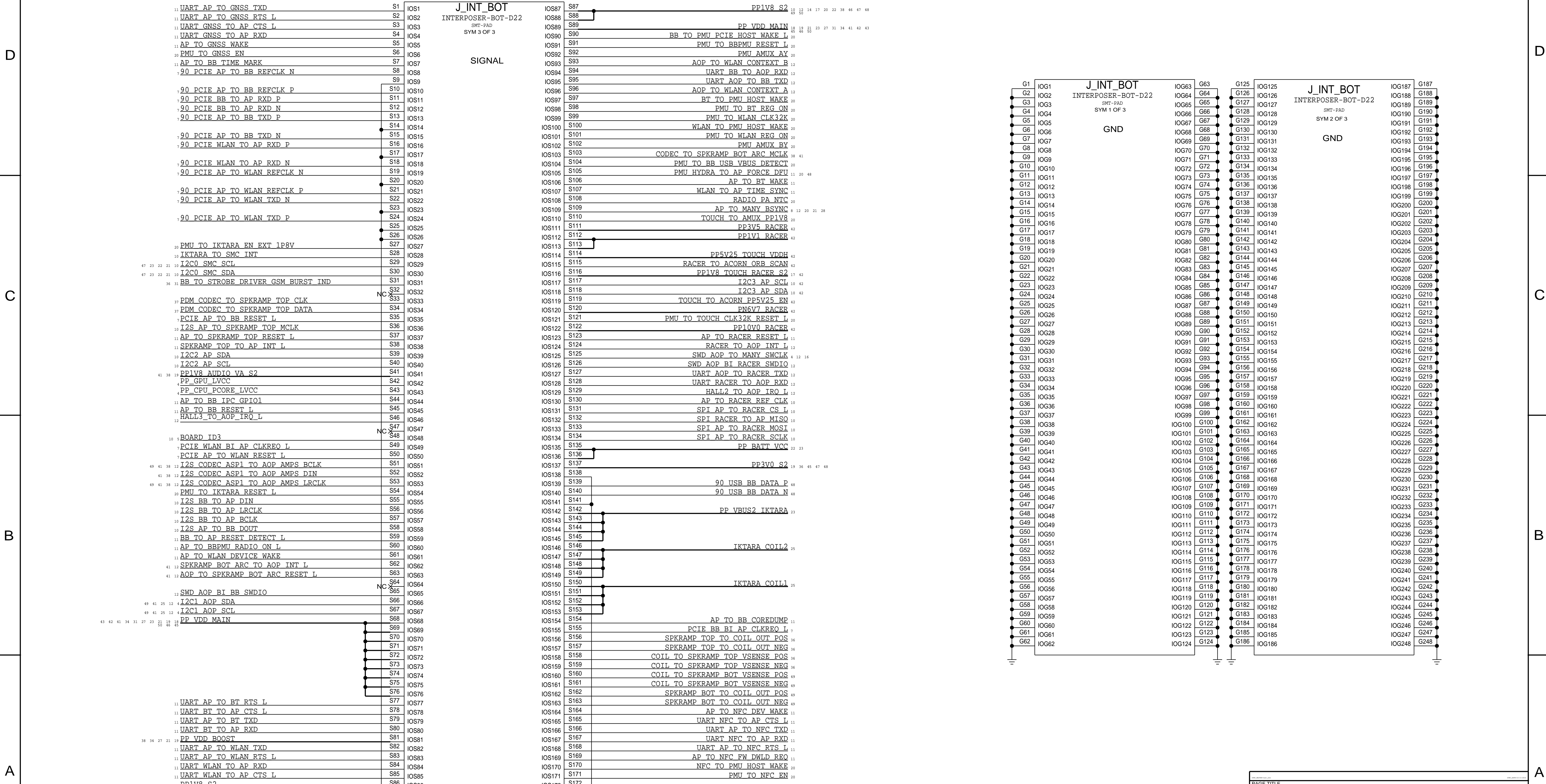
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PAGE TITLE I/O: Interposer (Bottom)		
	DRAWING NUMBER 051-02221	SIZE D
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BRANCH evt-1	PAGE 65 OF 80	SHEET 50 OF 51

8

7

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Radios on MLB Bottom

PAGE TITLE		RADIOS		SYNC_DATE=06/04/2015	
 Apple Inc.	DRAWING NUMBER	051-02221	SIZE	D	
	REVISION	9.0.0			
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	PAGE	80 OF 80			
	SHEET	51 OF 51			

8

7

6

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EEEE Codes

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7691	1	EEEE FOR (MLB_BOT, 639-03229)	EEEE_HM07	NO	COMMON

Global Capacitors

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00148	138S00149	BOM_TABLE_ALTS	ALL	0402-3T,10.5uF@1V, Kyocera
138S00150	138S00149	BOM_TABLE_ALTS	ALL	0402-3T,10.5uF@1V, SEMCO
138S00151	138S00149	BOM_TABLE_ALTS	ALL	0402-3T,10.5uF@1V, TY

CRITICAL PART#	COMMENT
138S00149	0402-3T,10.5uF@1V

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00143	138S00144	BOM_TABLE_ALTS	ALL	0402.16uF@1V, Kyocera
138S00163	138S00144	BOM_TABLE_ALTS	ALL	0402.16uF@1V, Taiyo

CRITICAL PART#	COMMENT
138S00144	0402.16uF@1V

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00138	138S00139	BOM_TABLE_ALTS	ALL	0201.3uF@1V, Kyocera
138S00164	138S00139	BOM_TABLE_ALTS	ALL	0201.3uF@1V, Taiyo

CRITICAL PART#	COMMENT
138S00139	0201.3uF@1V

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00145	138S00146	BOM_TABLE_ALTS	ALL	0402.5.1uF@3V, Kyocera
138S00165	138S00146	BOM_TABLE_ALTS	ALL	0402.5.1uF@3V, Taiyo

CRITICAL PART#	COMMENT
138S00146	0402.5.1uF@3V

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S00140	138S00141	BOM_TABLE_ALTS	ALL	0201.1.1uF@3V, Kyocera
138S00142	138S00141	BOM_TABLE_ALTS	ALL	0201.1.1uF@3V, SEMCO
138S00166	138S00141	BOM_TABLE_ALTS	ALL	0201.1.1uF@3V, Taiyo

CRITICAL PART#	COMMENT
138S00141	0201.1.1uF@3V

Global Ferrites

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
152S00558	152S00557	BOM_TABLE_ALTS	ALL	IMD_MLD,0.47UH,20H,2.5A,89M,1608
155S00194	155S0610	BOM_TABLE_ALTS	ALL	FERR BD,150 OHM,25A,200MA,0.7 DCR,01005
155S00200	155S0610	BOM_TABLE_ALTS	ALL	FERR BD,150 OHM,25A,200MA,0.7 DCR,01005

CRITICAL PART#	COMMENT
152S00557	IMD_MLD,0.47UH,20H,2.5A,89M,1608
155S0610	FERR BD,150 OHM,25A,200MA,0.7 DCR,01005

Global R/C Alternates

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S0648	138S0652	BOM_TABLE_ALTS	ALL	CAP_XSR,4.7UF,6.3V,0.45MM,0402,TAIYO
138S00024	138S0986	BOM_TABLE_ALTS	ALL	CAP_CER,3-TEMP,7.5UF,20V,4V,0402,TAIYO/TSE
138S0706	138S0739	BOM_TABLE_ALTS	ALL	CAP_CER,1UF,20V,10V,XSR,0201,NEBRATA
138S0945	138S0739	BOM_TABLE_ALTS	ALL	CAP_CER,1UF,20V,10V,XSR,0201,NEBRATA
138S0739	138S0706	BOM_TABLE_ALTS	ALL	CAP_CER,XSR,0.22UF,20V,6.3V,20H
132S0436	132S0400	BOM_TABLE_ALTS	ALL	CAP_CER,XSR,0.22UF,20V,6.3V,01005
138S00049	138S0831	BOM_TABLE_ALTS	ALL	CAP_CER,XSR,2.2UF,20V,6.3V,0201

CRITICAL PART#	COMMENT
138S0652	CAP_XSR,4.7UF,6.3V,0.45MM,0402,TAIYO
138S0986	CAP_CER,3-TEMP,7.5UF,20V,4V,0402,TAIYO/TSE
138S0739	CAP_CER,1UF,20V,10V,XSR,0201,NEBRATA

CRITICAL PART#	COMMENT
138S0706	CAP_CER,XSR,0.22UF,20V,6.3V,20H
132S0400	CAP_CER,XSR,0.22UF,20V,6.3V,01005
138S0831	CAP_CER,XSR,2.2UF,20V,6.3V,0201

Global Inductors

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
152S00653	152S00651	BOM_TABLE_ALTS	ALL	IND,1.2UH,3A,2016,0.65Z
152S00654	152S00652	BOM_TABLE_ALTS	ALL	IND,1.2UH,3A,2016,0.8Z

CRITICAL PART#	COMMENT
152S00651	IND,1.2UH,3A,2016,0.65Z
152S00652	IND,1.2UH,3A,2016,0.8Z

Multi-Vendor Criticals

CRITICAL PART#	COMMENT	CRITICAL PART#	COMMENT
138S0979	CAP_CER,XSR,1UF,20V,10V,0402,H=0.65MM	132S00008	CAP_CER,0.1UF,10V,50V,XTR,0402
138S0683	CAP_CER,XSR,1UF,10V,25V,0402	131S0804	CAP_CER,27PF,5A,COG,25V,0201
132S0663	CAP_CER,XSR,1UF,10V,25V,0402	131S0307	CAP_CER,NPO/COG,100PF,5V,16V,01005
132S0288	CAP_CER,XSR,0.1UF,10V,16V,0201	131S00053	CAP_CER,COG,220PF,5V,10V,01005
132S0275	CAP_CER,XSR,470PF,10V,10V,01005	117S0055	RES,MP,1/20W,2M OHM,5,0201,SHD
132S0245	CAP_CER,XSR,0.01UF,10V,6.3V,01005	107S0257	THERMISTOR,NTC,10K OHM,1A,B=3435,01005

Iktara

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
132S00021	8	CAP_CER,0.082UF,10V,50V,XTR,0402	C3403,C3403,C3404,C3405,C3405,C3405,C3404	NO	COMMON
132S0423	2	CAP_CER,0.022UF,50V,XTR,10V,0402	C3451,C3465	CRITICAL	COMMON
132S0423	2	CAP_CER,0.022UF,50V,XTR,10V,0402	C3455,C3466	CRITICAL	NOSTUFF

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
685-00185	685-00184	BOM_TABLE_ALTS	SUBBOM_DS	SUBBOM_MLB_BOT,DIODES,DIODES,8893

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
685-00184	1	SUBBOM_MLB_BOT,DIODES,DIODES,8893	SUBBOM_DS	CRITICAL	COMMON
371S00133	4	DIODES,SHOTTKY DIODE,30V,2A,0603	D3400,D3401,D3402,D3403	CRITICAL	DIODES_DS
371S00132	4	ONSEMI,SHOTTKY DIODE,30V,2A,0603	D3400,D3401,D3402,D3403	CRITICAL	ONSEMI_DS

Soft-Term Cap Sub BOMs

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
685-00159	1	SUBBOM_MLB_BOT,CAP,TYPICAL,8893	SUBBOM_CAP	CRITICAL	COMMON

Touch/Luna B2B

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	1	CAP,SOFT-TERM,2.2UF,6.3V,0201,KYOCERA	C5890	CRITICAL	SOFT_CAP
138S0831	1	CAP,TYPICAL,2.2UF,6.3V,0201,NEBRATA	C5890	CRITICAL	TYPICAL_CAP

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
685-00160	685-00159	BOM_TABLE_ALTS	SUBBOM_CAP	SUBBOM_MLB_BOT,CAP,SOFT,8893

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		PAGE	2 OF 80
		SHEET	2 OF 34

8

7

6

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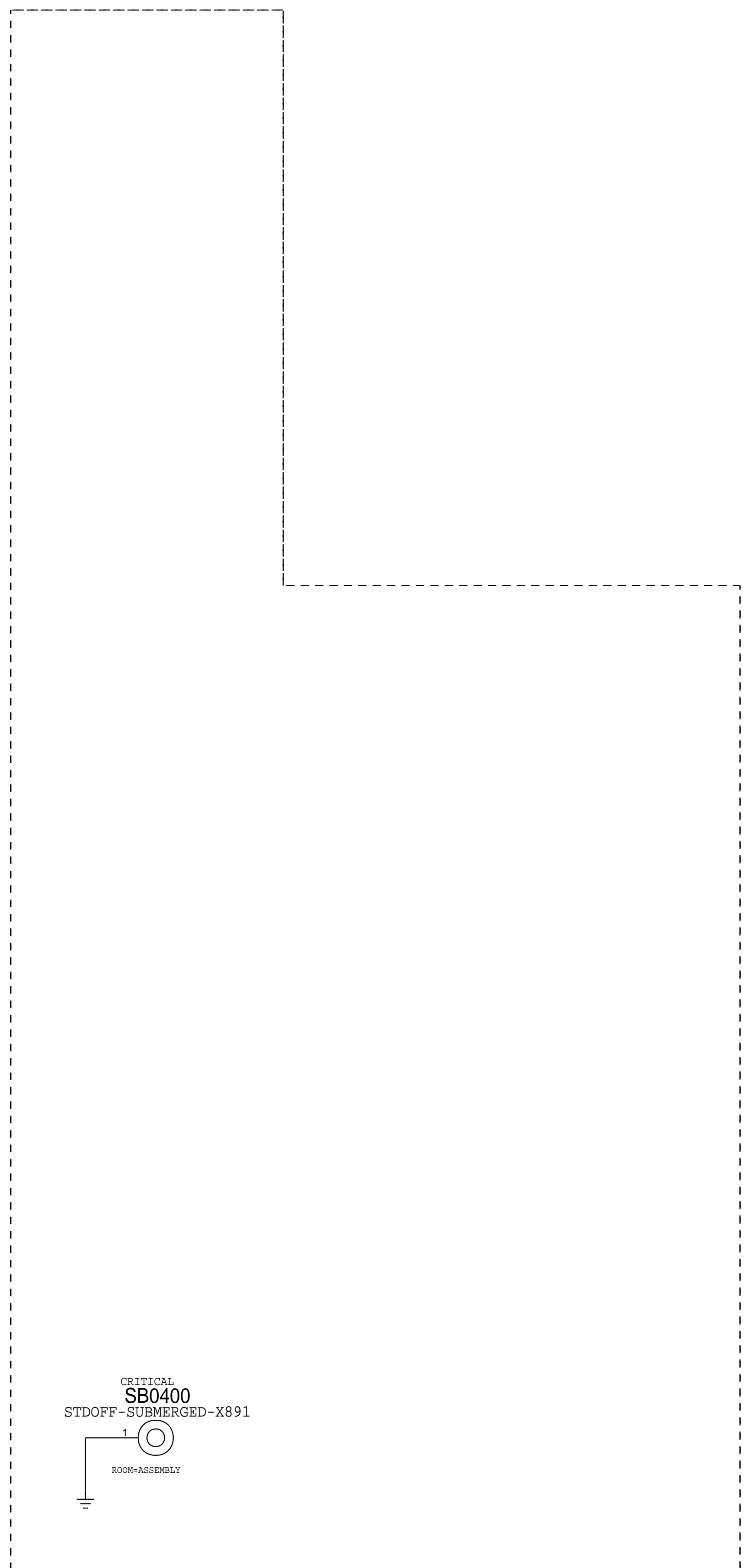
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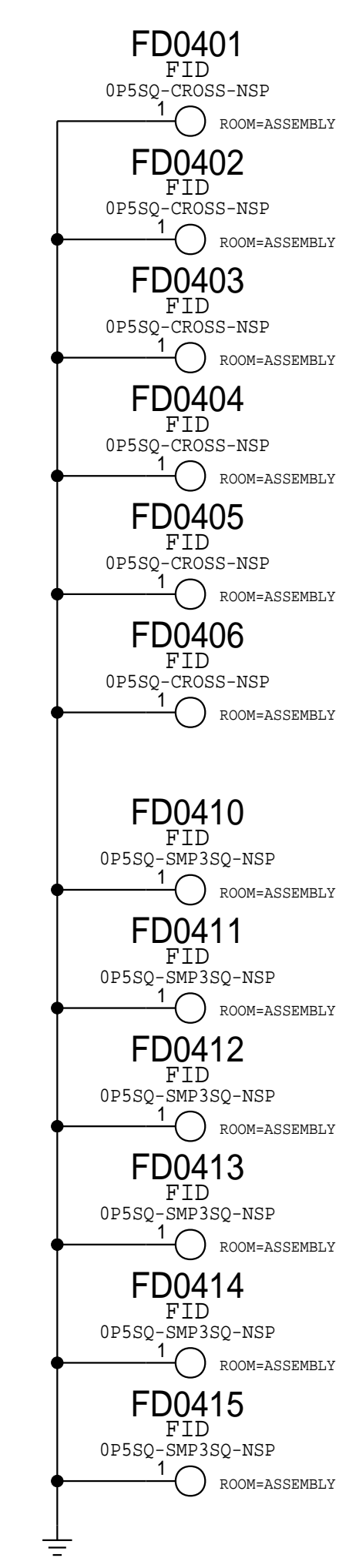
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FIDUCIALS



PAGE TITLE			SYSTEM: Mechanical Components
Apple Inc.	DRAWING NUMBER	051-02247	SIZE D
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	PAGE	4 OF 80	
	SHEET	3 OF 34	

8

7

6

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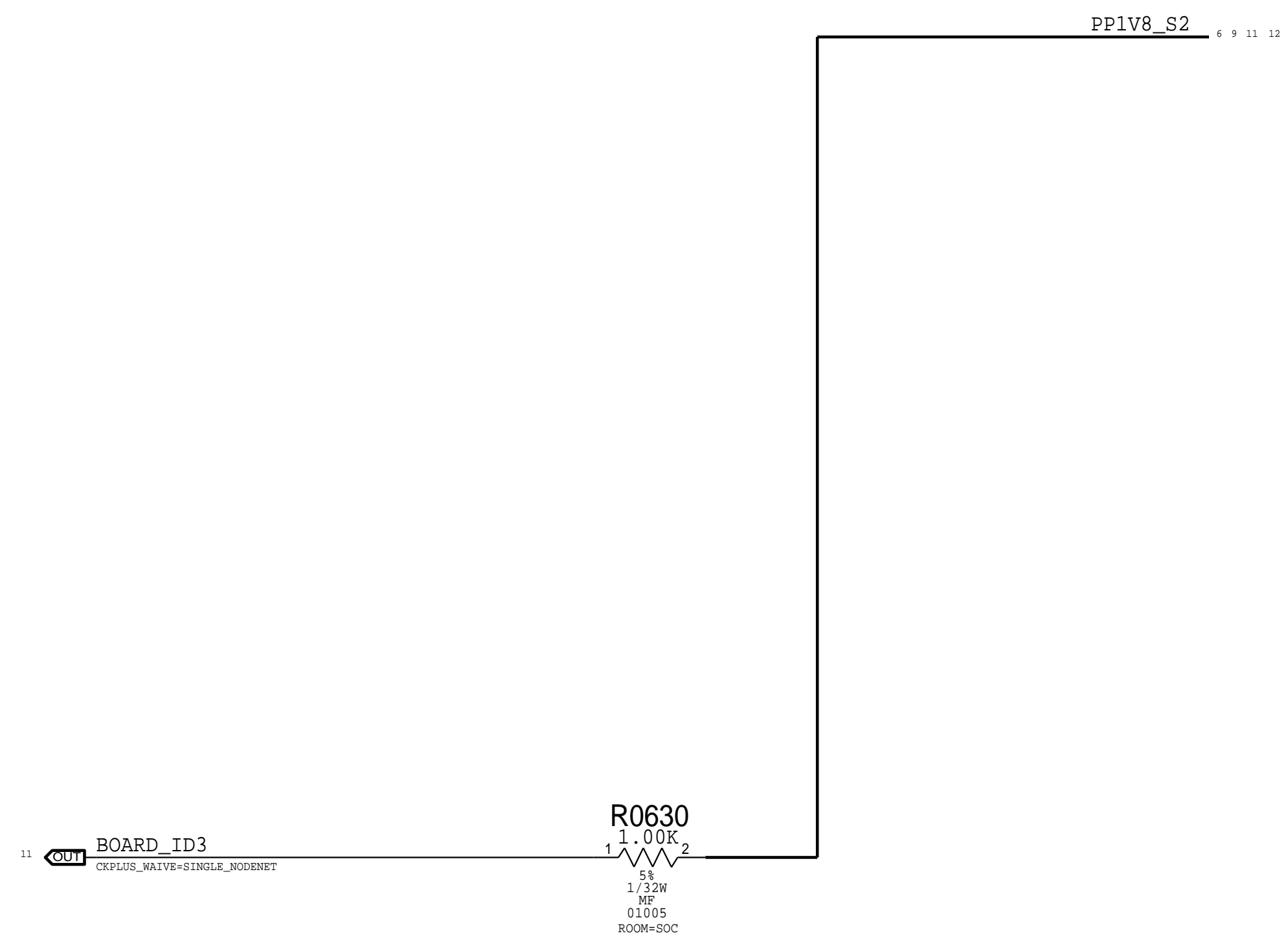
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BOOTSTRAPPING: BOARD ID[3]



D221 Selected (BOARD_ID3) ->

Board Rev[3:0]				
Float=Low PU=High				
	3	2	1	0
	Build Major		Build Minor	
Proto 1	1	1	1	1
Proto 2	1	1	1	0
Proto 3	1	1	0	1
(Spare)	1	1	0	0
EVT	1	0	1	1
(Spare)	1	0	1	0
Carrier	0	1	1	1
(Spare)	0	1	1	0
DVT	0	0	1	1
(Spare)	0	0	1	0
(Spare)	0	0	0	1
PVT	0	0	0	0

Board ID[4:0]					
Float=Low PU=High					
	4	3	2	1	0
	X	Baseband	Form Factor	MLB/Dev	
D20 MLB	0	0	0	1	0
D20 Dev	0	0	0	1	1
D21 MLB	0	0	1	0	0
D21 Dev	0	0	1	0	1
D22 MLB	0	0	1	1	0
D22 Dev	0	0	1	1	1
D201 MLB	0	1	0	1	0
D201 Dev	0	1	0	1	1
D211 MLB	0	1	1	0	0
D211 Dev	0	1	1	0	1
D221 MLB	0	1	1	1	0
D221 Dev	0	1	1	1	1

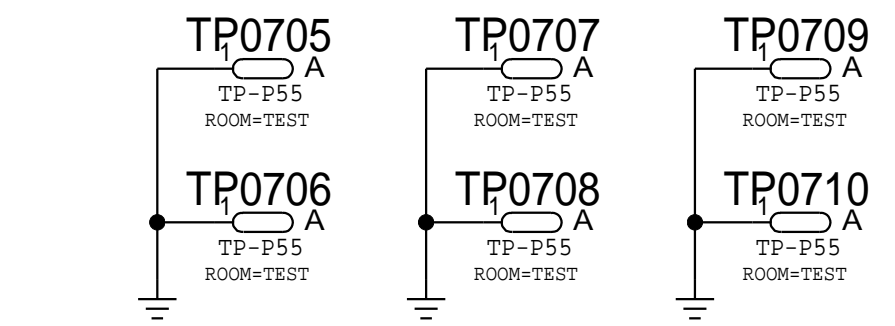
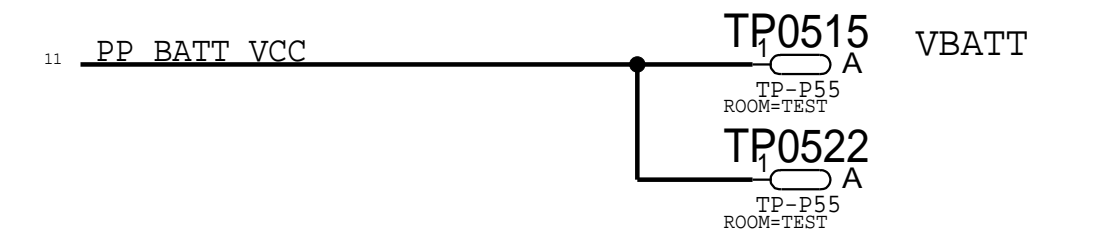
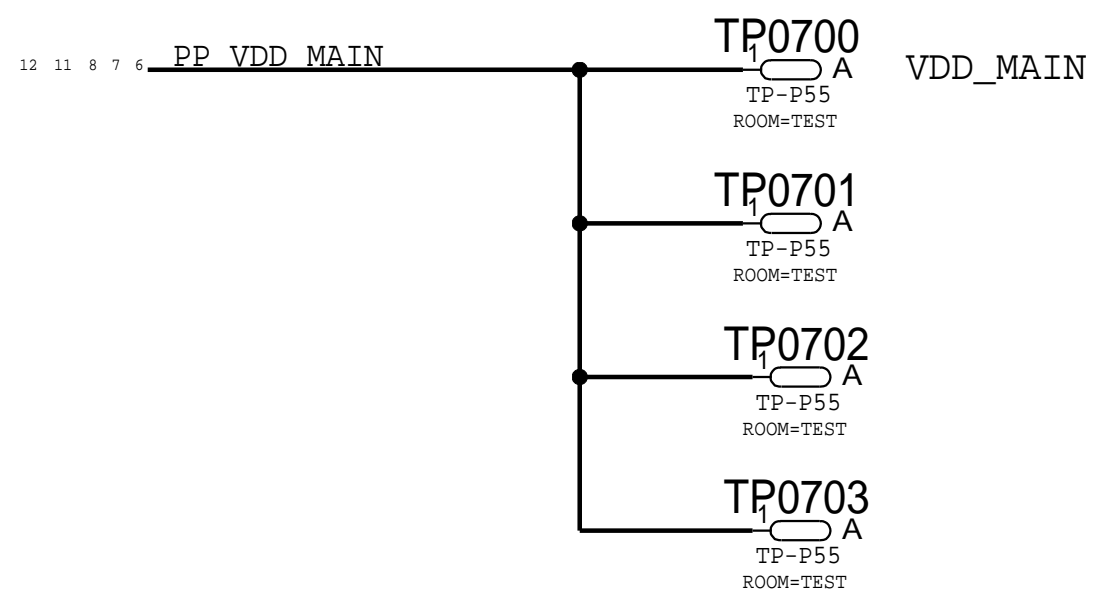
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Float=Low PU=High			
	2	1	0
SPI0	0	0	0
SPI0 Test Mode	0	0	1
SPI0 NAND	0	1	0
SPI0 NAND Test	0	1	1
Slow SPI0 Test	1	1	0

PAGE TITLE			BOOTSTRAPPING		
DRAWING NUMBER		051-02247	SIZE		D
REVISION		7.0.0	BRANCH		evt-1
PAGE		6 OF 80	SHEET		4 OF 34
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Test Points

Probe Points

Iktara Debug



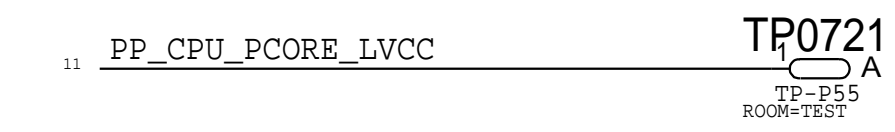
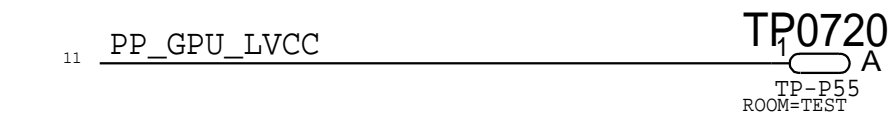
AMUX



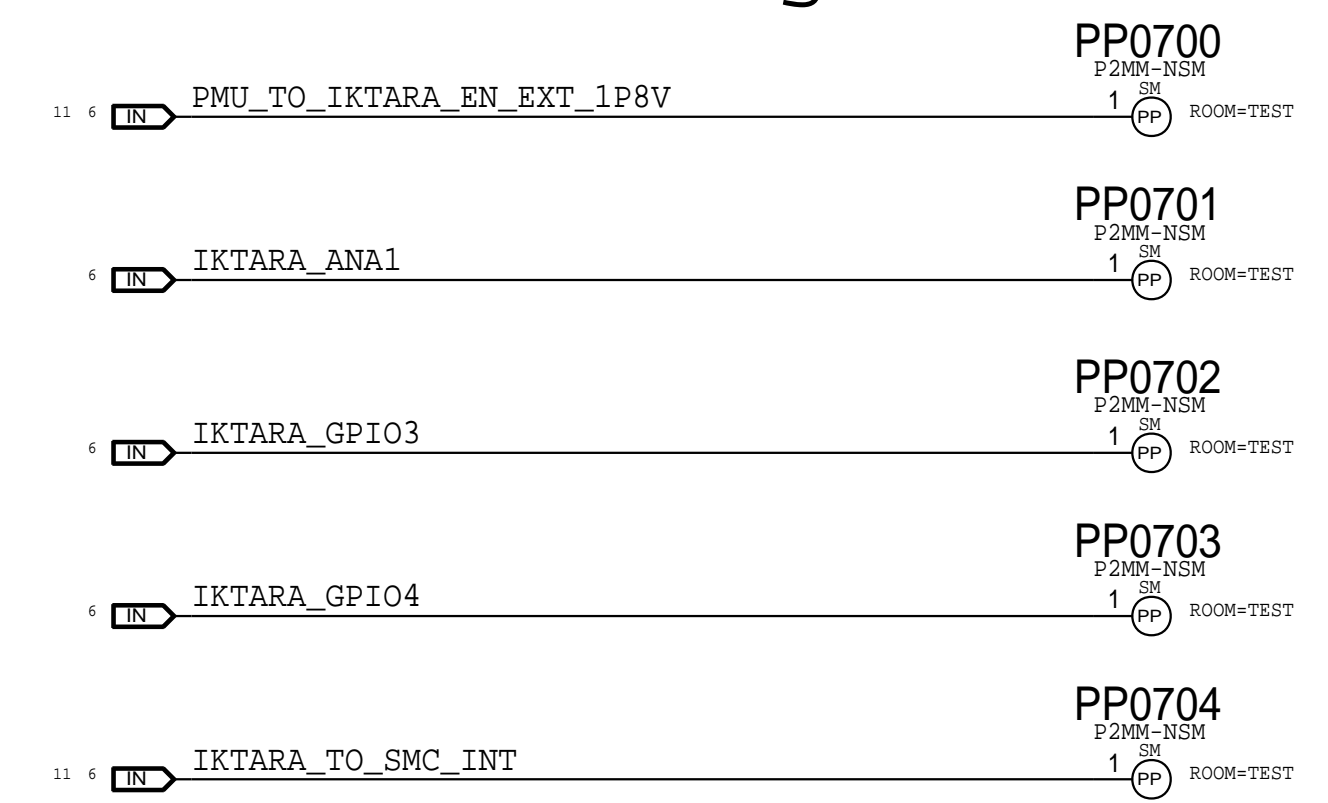
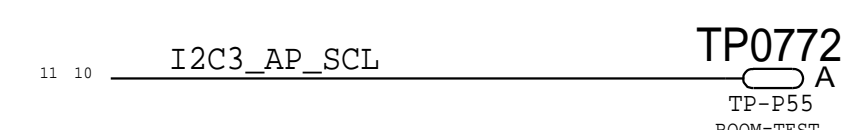
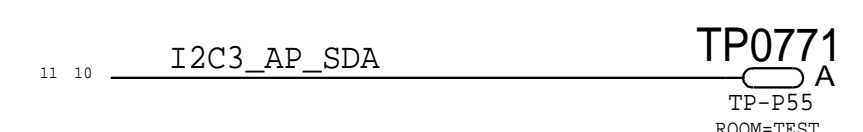
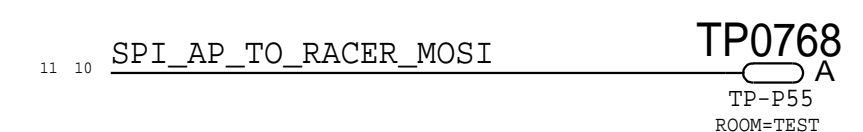
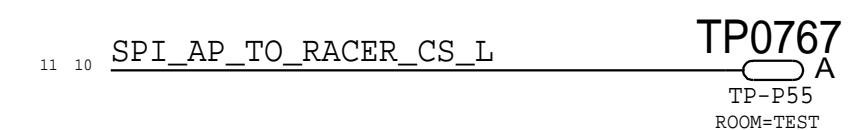
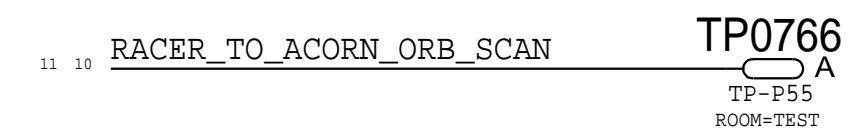
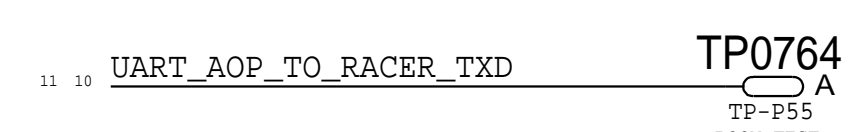
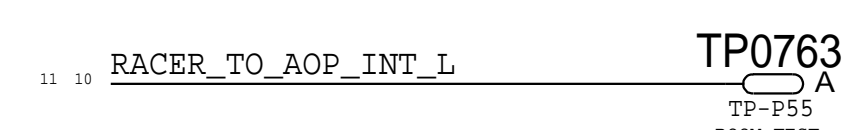
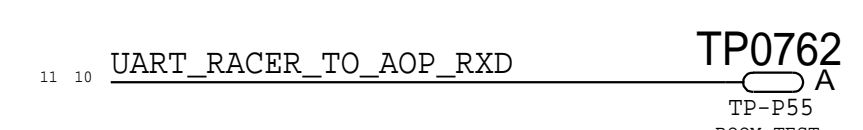
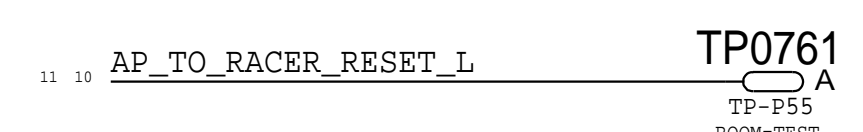
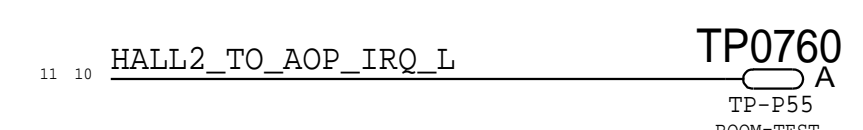
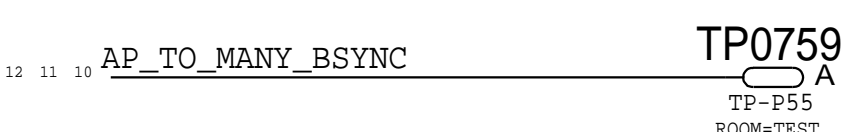
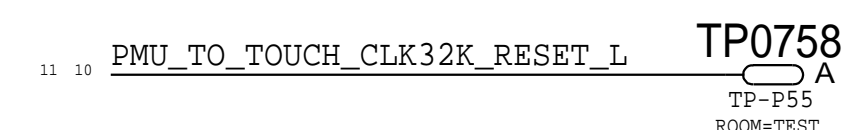
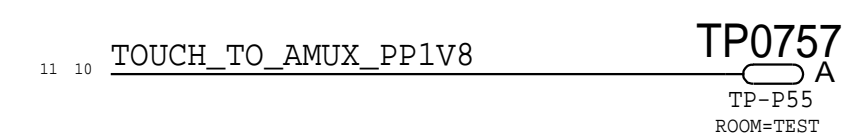
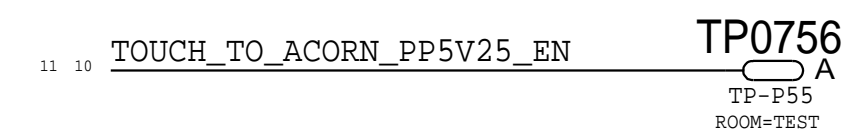
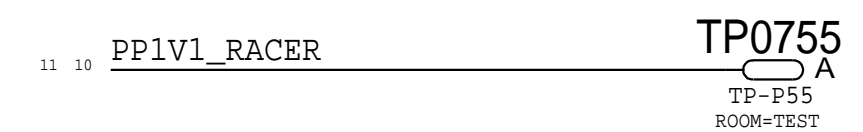
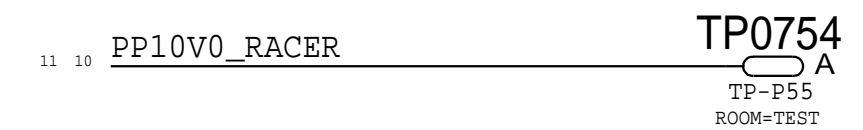
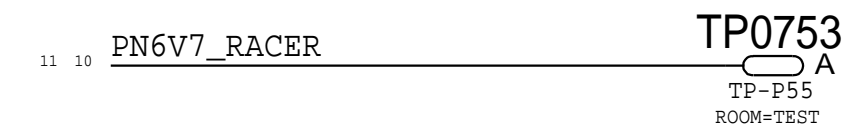
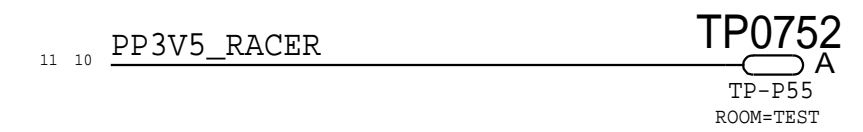
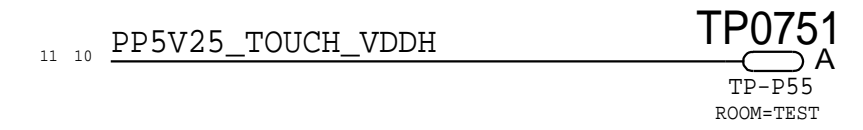
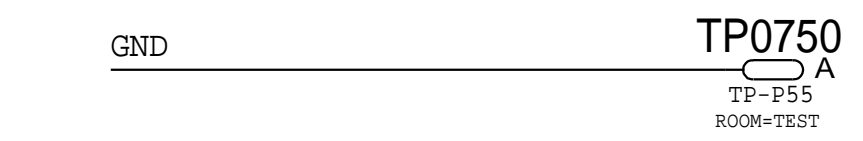
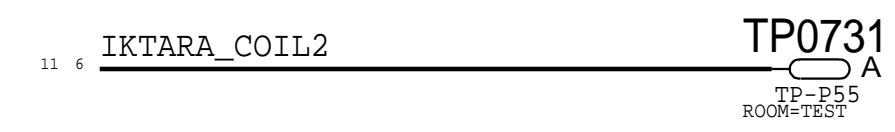
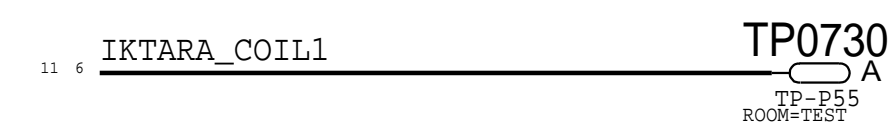
DFU



LVCC

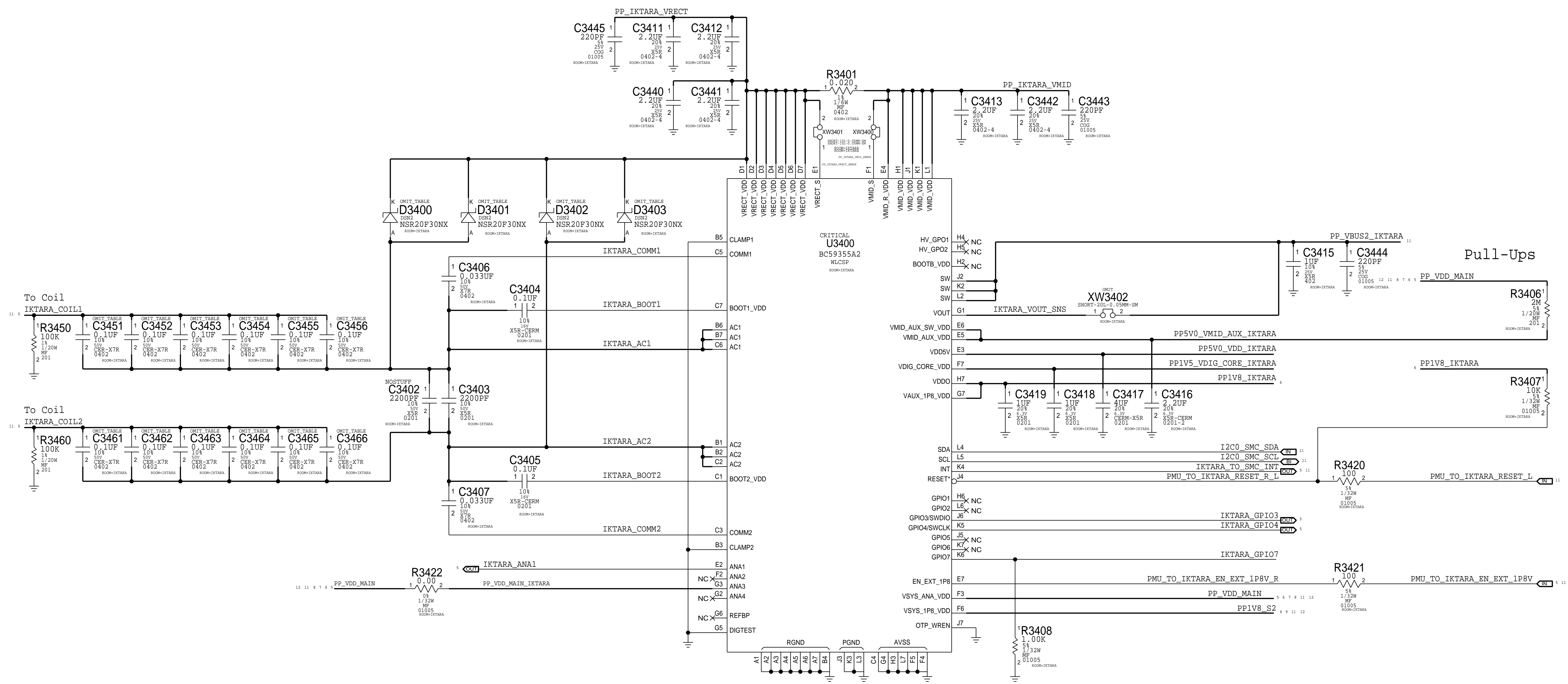


COIL



PAGE TITLE		SYSTEM: Testpoints (Bottom)	
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Iktara

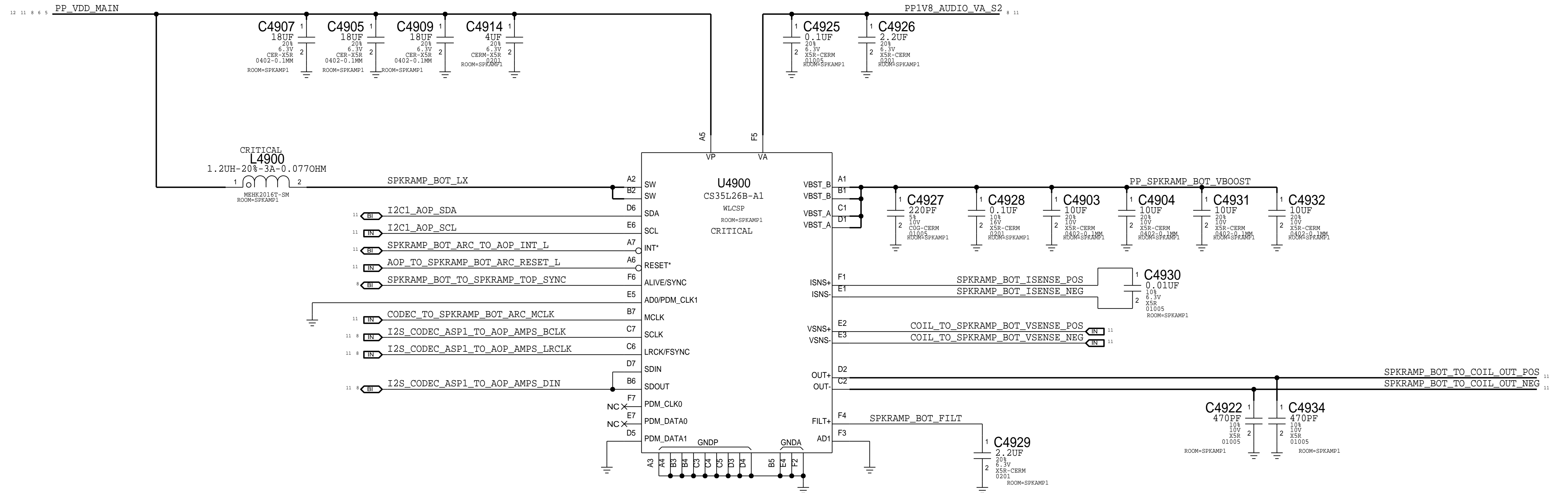


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	PAGE	34 OF 80
	SHEET	6 OF 34

South Speaker Amplifier

APN: 338S00295

I2C ADDRESS: 1000 000x
0x80



PAGE TITLE		
AUDIO: Speaker Amp Bottom		
	DRAWING NUMBER	051-02247
	REVISION	7.0.0
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BRANCH	evt-1	
PAGE	49 OF 80	
SHEET	7 OF 34	

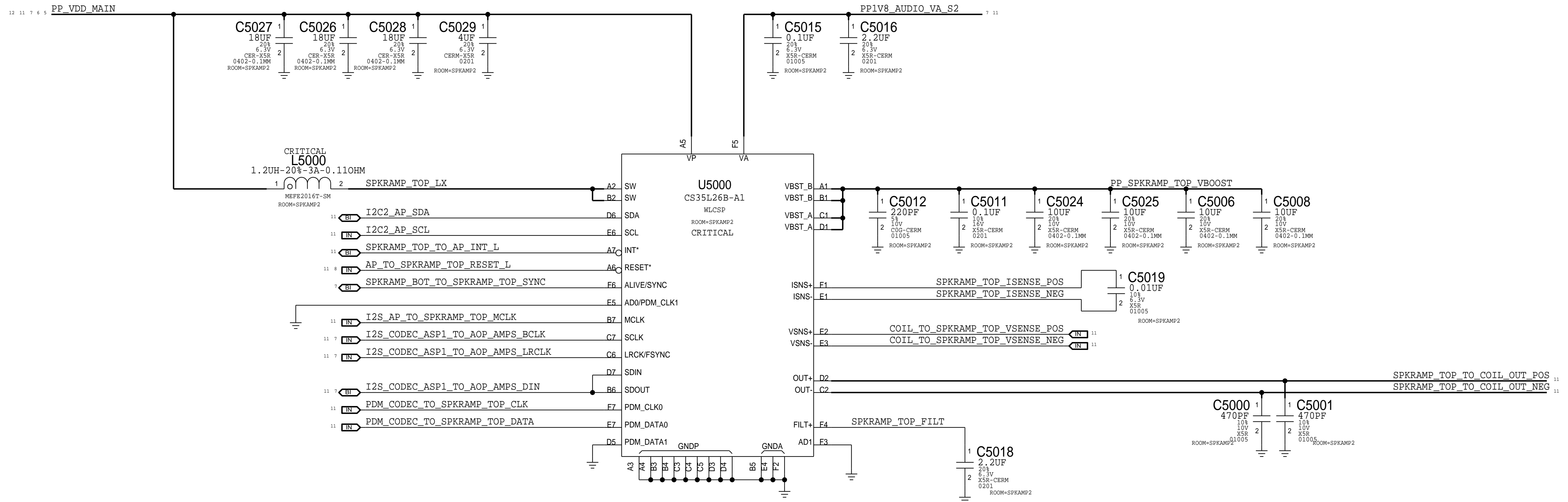
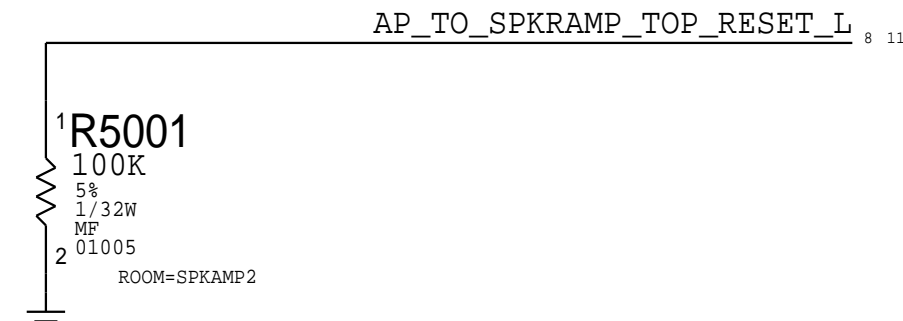
North Speaker Amplifier

APN: 338S00295

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Pull Downs



PAGE TITLE		
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8

7

6

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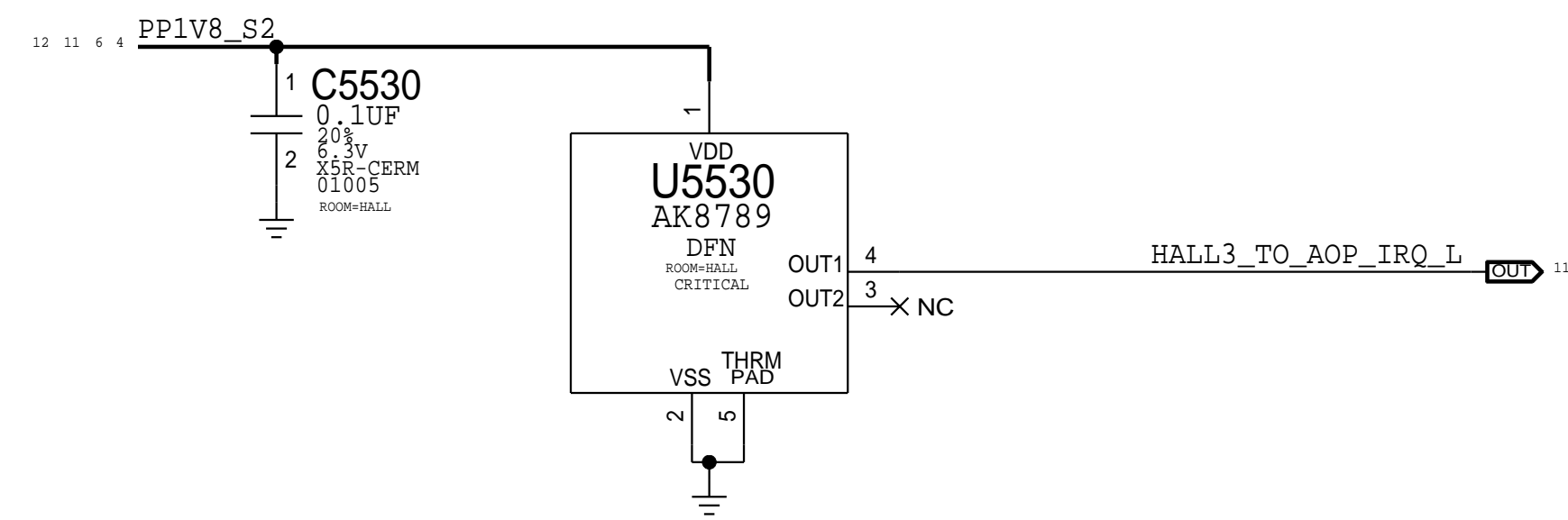
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Hall Effect

APN: 353S3697



PAGE TITLE			HALL EFFECT		
	DRAWING NUMBER	051-02247	SIZE	D	
	REVISION	7.0.0			
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	PAGE	55 OF 80			
	SHEET	9 OF 34			

8

7

6

5

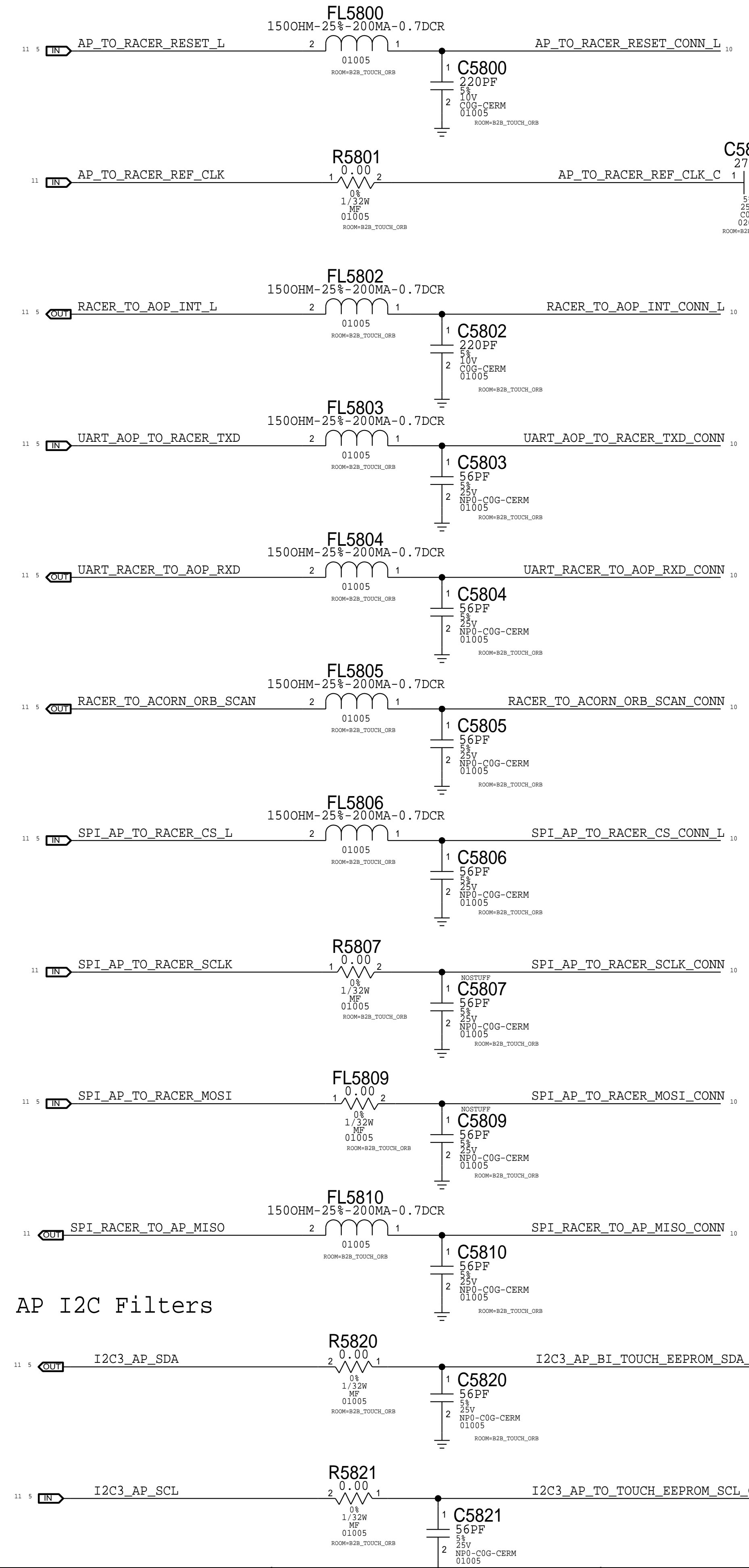
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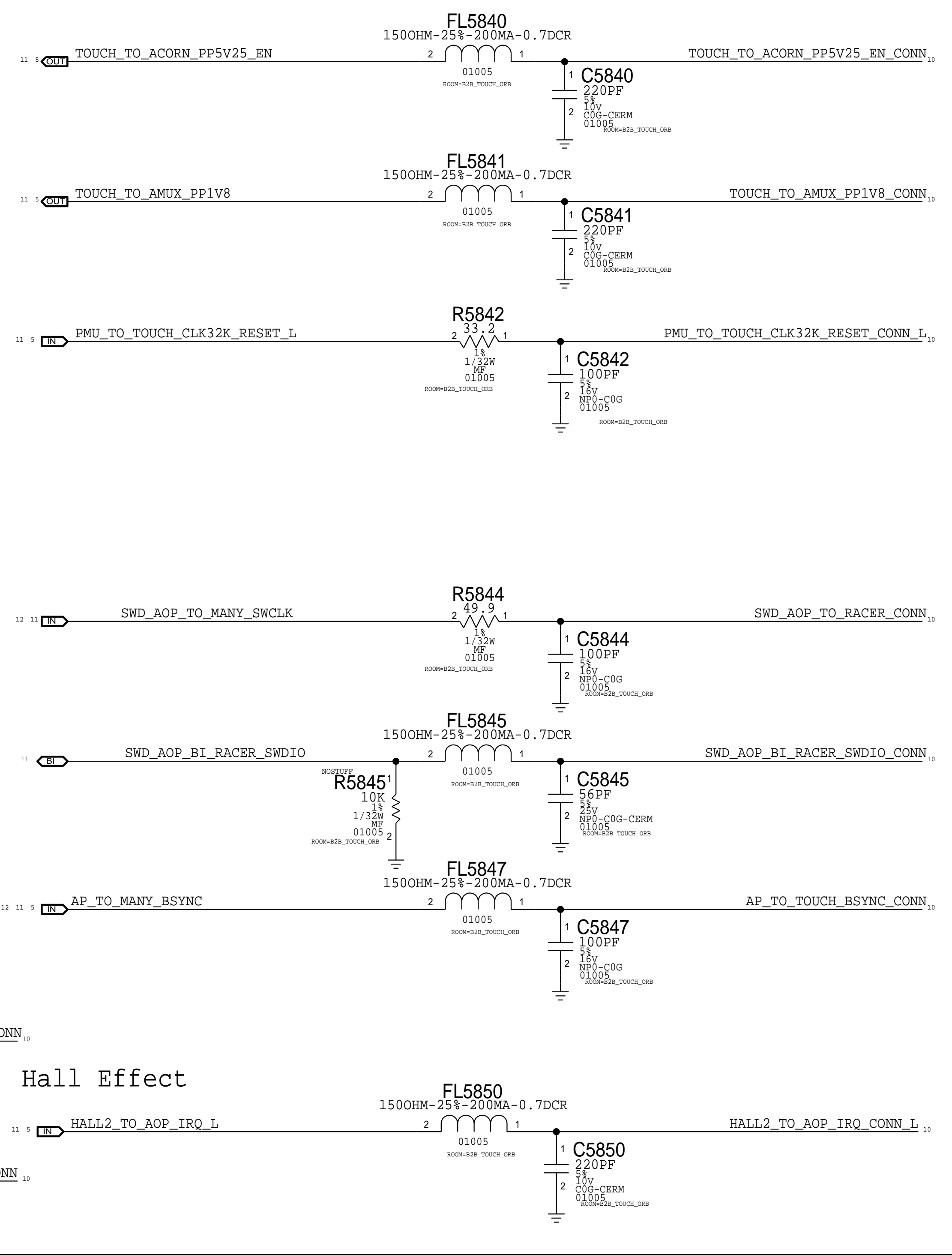
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Racer I/O



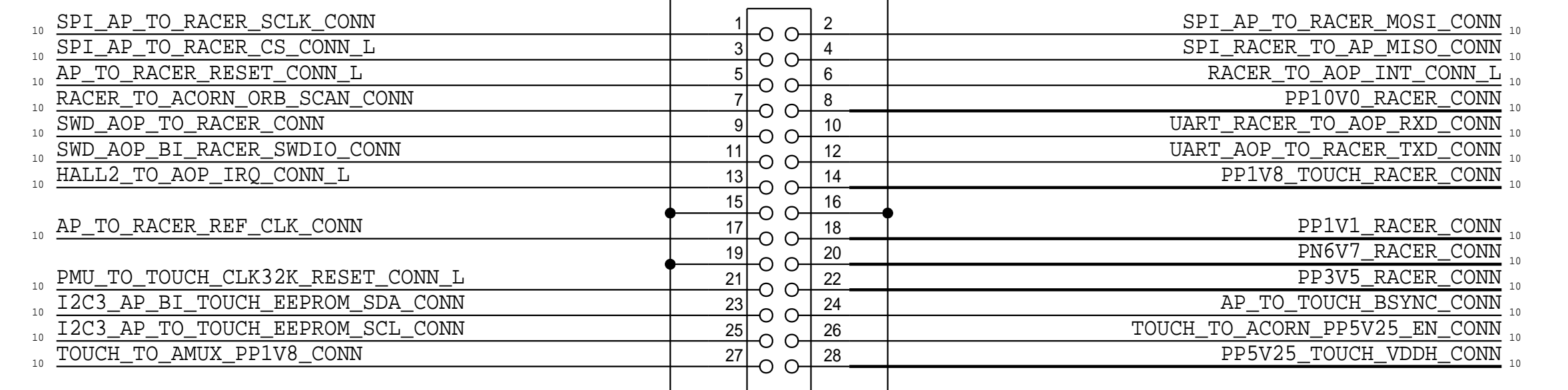
Touch and Misc I/O



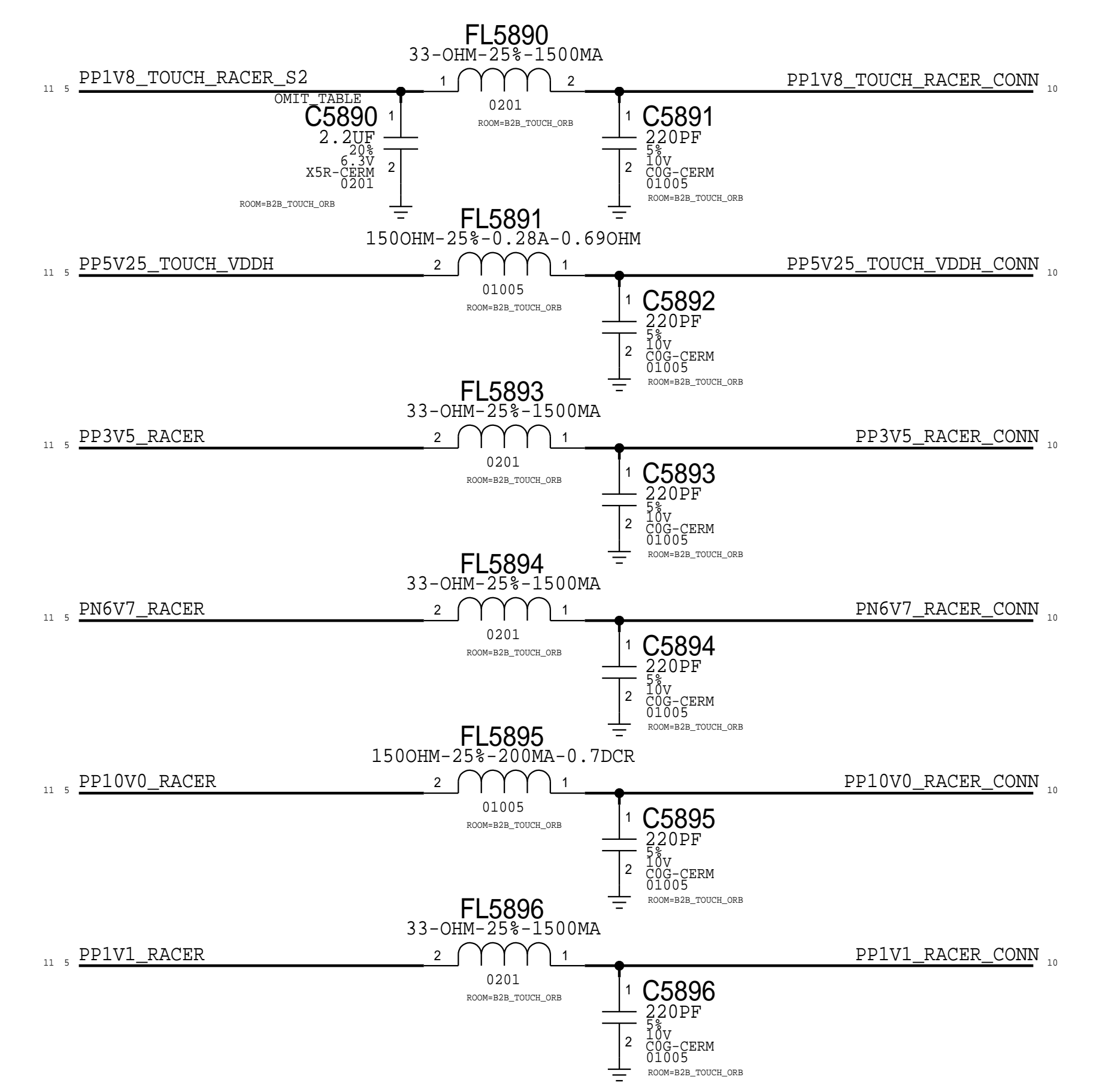
Luna + Touch Connector

Rcpt: 516S00325
Plug: 516S00326

J5800



Touch And Racer Power



AP I2C Filters

Hall Effect

PAGE TITLE		CG: B2B Luna & Touch	
DRAWING NUMBER		051-02247	SIZE
REVISION		7.0.0	D
BRANCH		evt-1	
PAGE		58 OF 80	
SHEET		10 OF 34	

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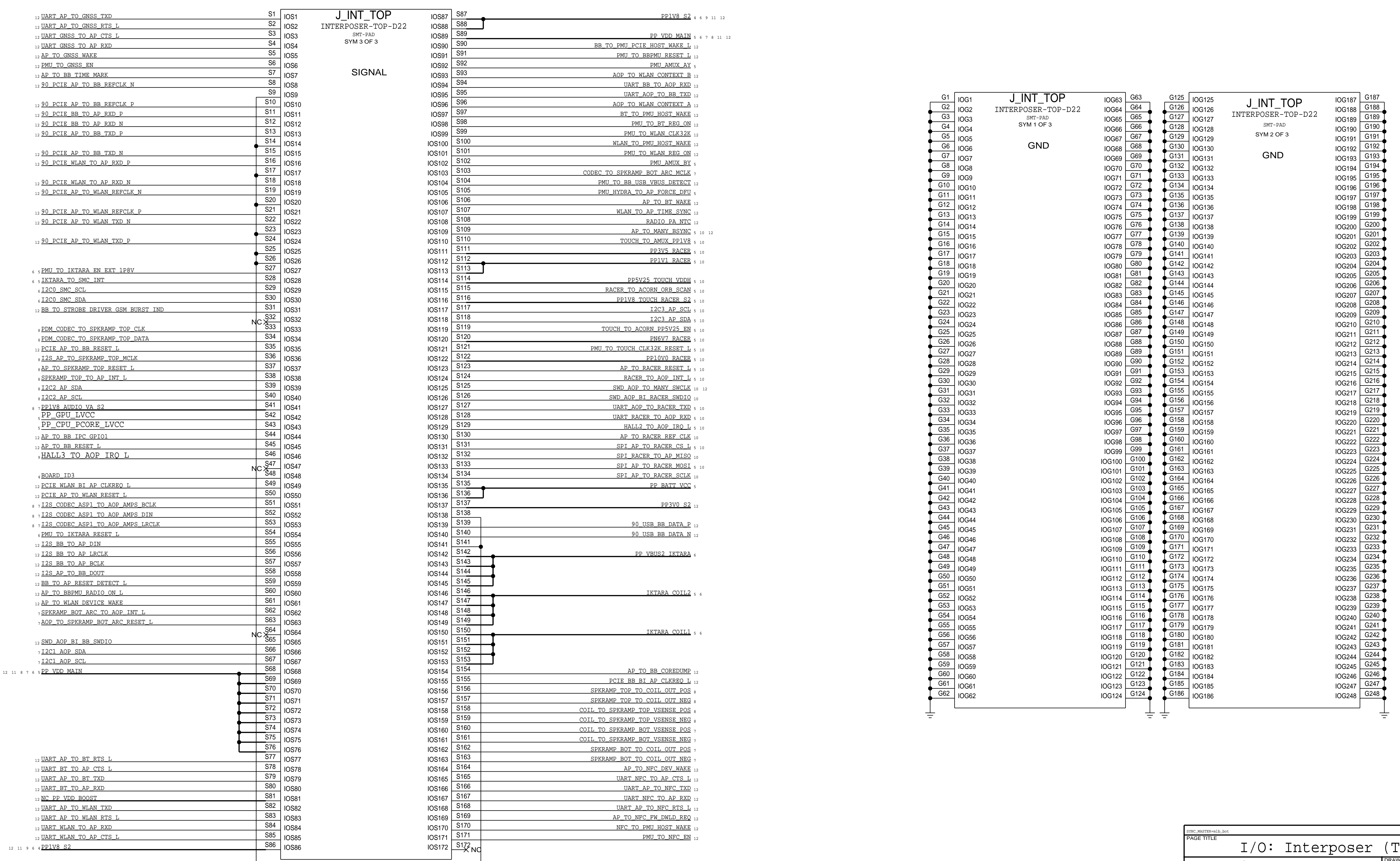
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I/O: Interposer (Top)		DRAWING NUMBER 051-02247	SIZE D
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D

C

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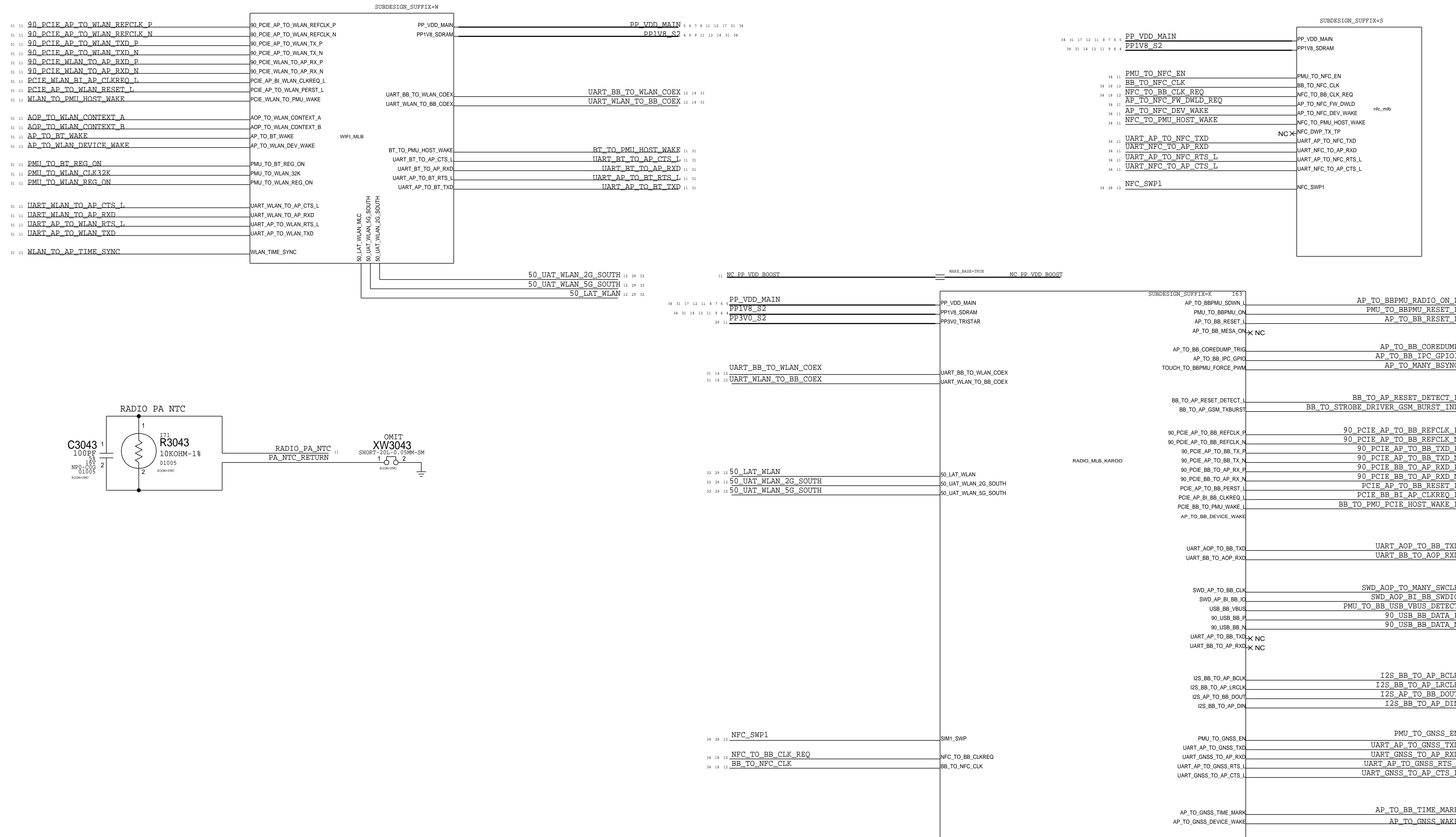
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PAGE TITLE			RADIOS		
DRAWING NUMBER		051-02247	SIZE	D	
REVISION		7.0.0			
BRANCH		evt-1			
PAGE		80 OF 80			
SHEET		12 OF 34			
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1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.

REV	ECN	DESCRIPTION OF REVISION	CK APPD	DATE
7	0008448938	ENGINEERING RELEASED		2017-04-11

ICE17.2 RADIO_MLB

Tue Apr 11 16:10:08 2017

PDF PAGE	CSA PAGE	CONTENTS
2	2	BASEBAND
3	3	BASEBAND MEMORY/DEBUG
4	4	BASEBAND POWER
5	5	BASEBAND PMIC
6	6	TRANSCEIVERS
7	7	ET MODULATOR
8	8	TDD TRANSMIT
9	9	FDD TRANSMIT
10	10	PRIMARY RECEIVE
11	11	LOWER ANTENNA & COUPLERS
12	12	DIVERSITY RECEIVE ASM'S
13	13	DIVERSITY RECEIVE LNA'S
14	14	UPPER ANTENNA FEEDS
15	15	GNSS
16	16	TEST POINTS & SIM

ALTERNATES

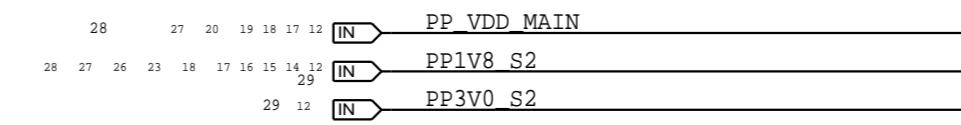
PART NUMBER	ALTERNATE FOR PART NUMBER	REFERENCE DESIGNATOR(S)	DESCRIPTION	BOM OPTION
197S00040	197S00044	VTCXO_K	AVX VC-TCXO	?
197S00042	197S00044	VTCXO_K	NDK VC-TCXO	?
335S00013	335S0894	EPROM_K	ON SEMI EEPROM	?
138S0719	138S1103	C522_K	MURATA	?
138S00133	138S00128	C509_K, C523_K, C605_K, C624_K, C626_K, C1114_K, C1116_K	MURATA	?
138S00049	138S00032	C402_K, C433_K, C437_K, C510_K, C720_K	MURATA	?
138S0831	138S00032	C402_K, C433_K, C437_K, C510_K, C720_K	MURATA	?
138S00086	138S0884	C500_K, C501_K, C502_K, C514_K, C515_K	MURATA	?
339S00363	339S00353	GNSS_K	PILSNER STATS	?

BOM OPTIONS

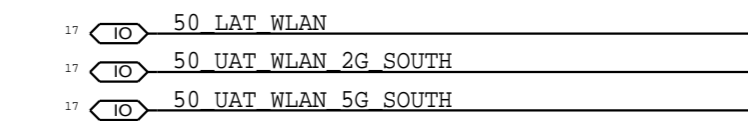
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-05780	1	BASEBAND, UNFUSED	U_BB_K	CRITICAL	BB_UNFUSED
998-05781	1	BASEBAND, LOCAL FUSED	U_BB_K	CRITICAL	BB_LOCAL_FUSED
998-05782	1	BASEBAND, DEV FUSED	U_BB_K	CRITICAL	BB_DEV_FUSED
337800244	1	BASEBAND, PRODUCTION FUSED	U_BB_K	CRITICAL	BB_PROD_FUSED
138S00159	7	CAP, SOFT-TERM, 2.2uF, 6.3V, 0201, KYOCERA	R01L_K, R01L_K, R01L_K, R01L_K, R01L_K, R01L_K, R01L_K		SOFT_CAP
138S0831	7	CAP, TYPICAL, 2.2uF, 6.3V, 0201, MURATA	R01L_K, R01L_K, R01L_K, R01L_K, R01L_K, R01L_K, R01L_K		TYPICAL_CAP

RADIO_MLB PORTS

POWER



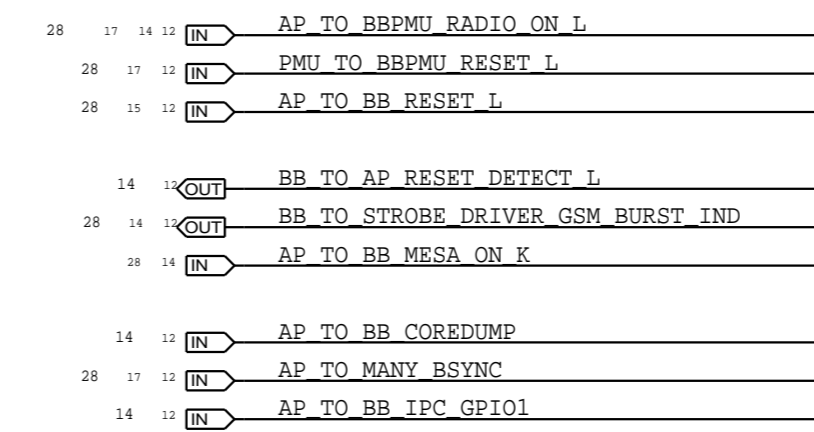
ANTENNA FEEDS



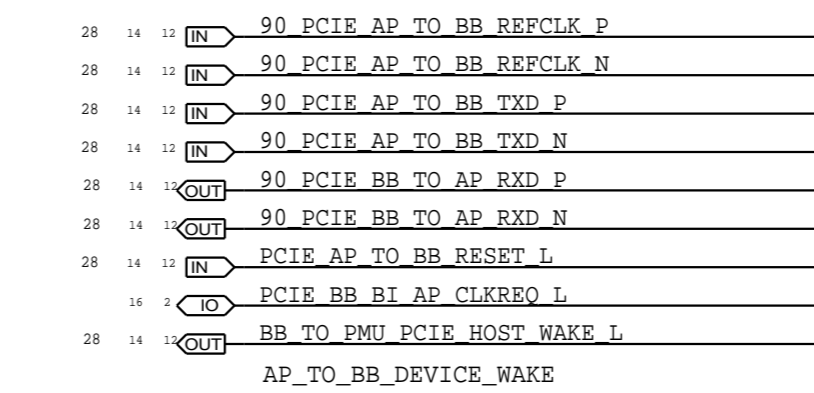
CLOCKS

PMU_TO_BB_GNSS_32K

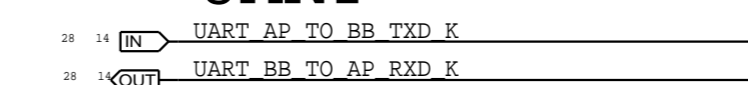
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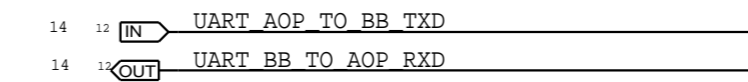
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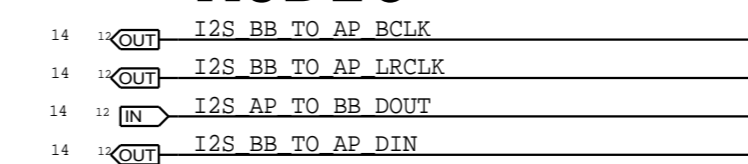
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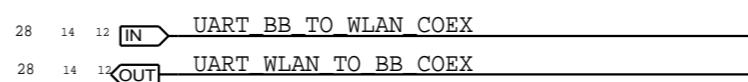
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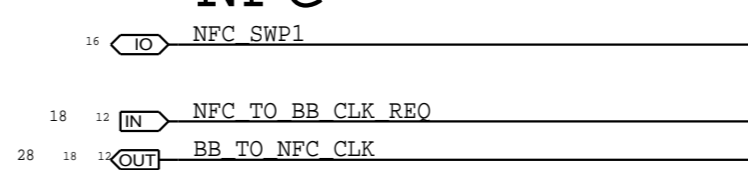
AUDIO



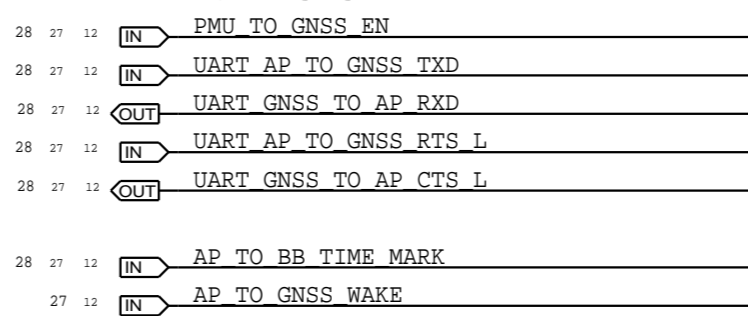
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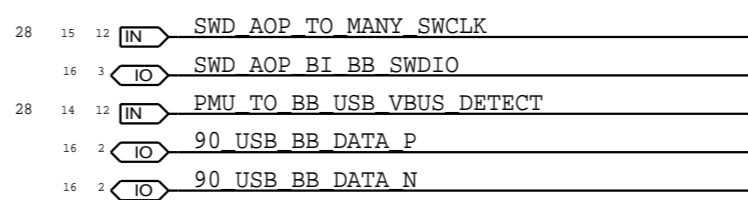
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GNSS



DEBUG



RADIO_MLB

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SCH, MLB, BOT, X893		051-02247	D
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		PAGE	1 OF 17
		SHEET	13 OF 34

BASEBAND MEMORY/DEBUG

8

7

6

5

4

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2

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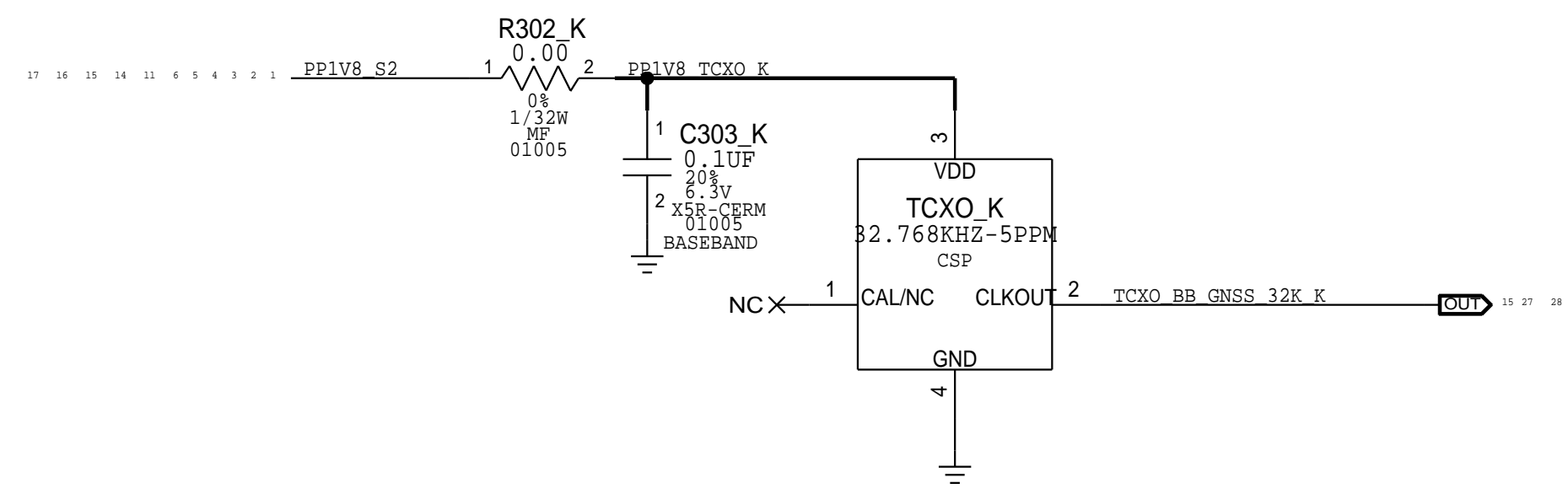
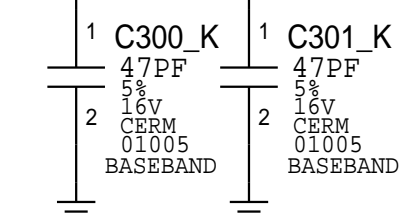
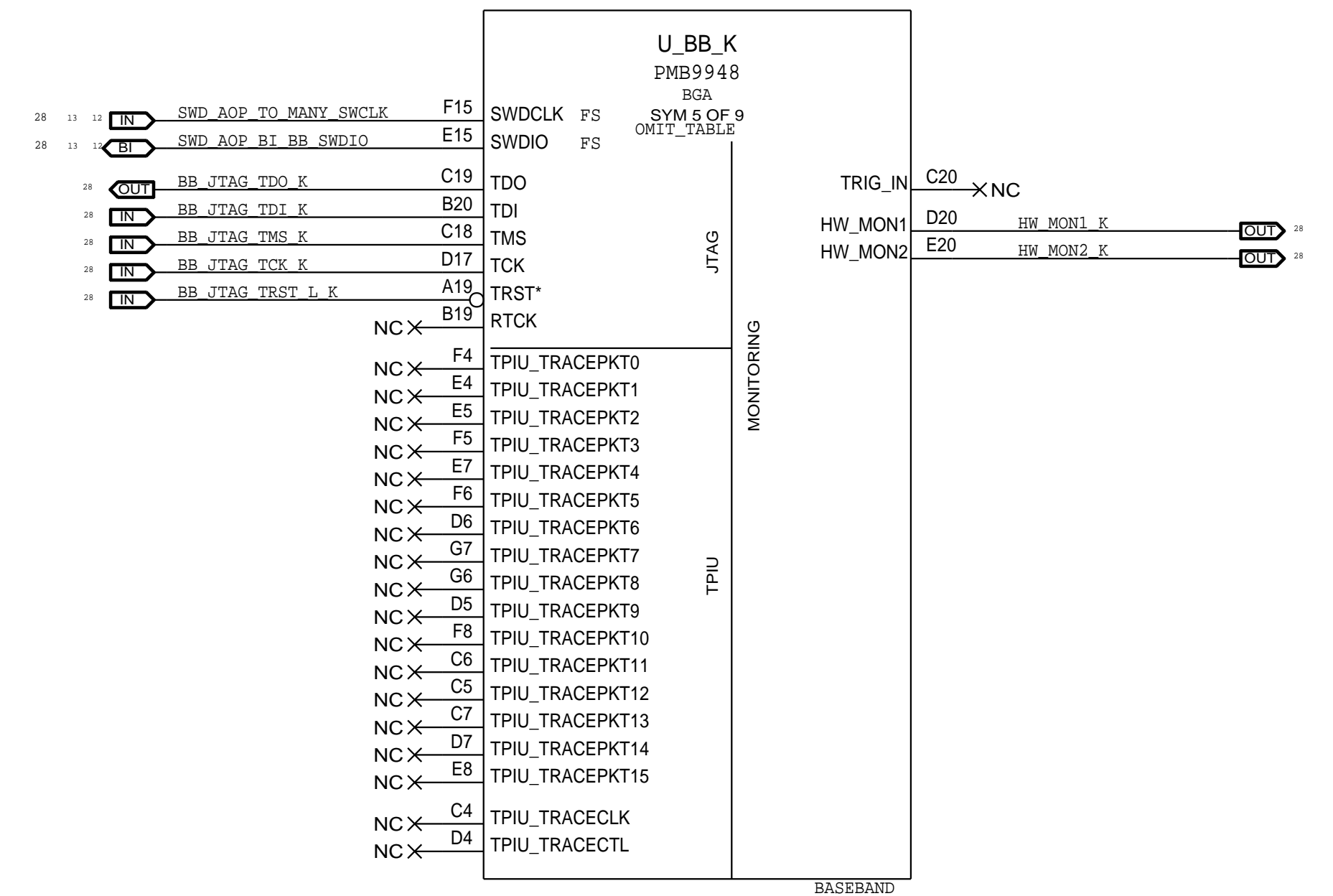
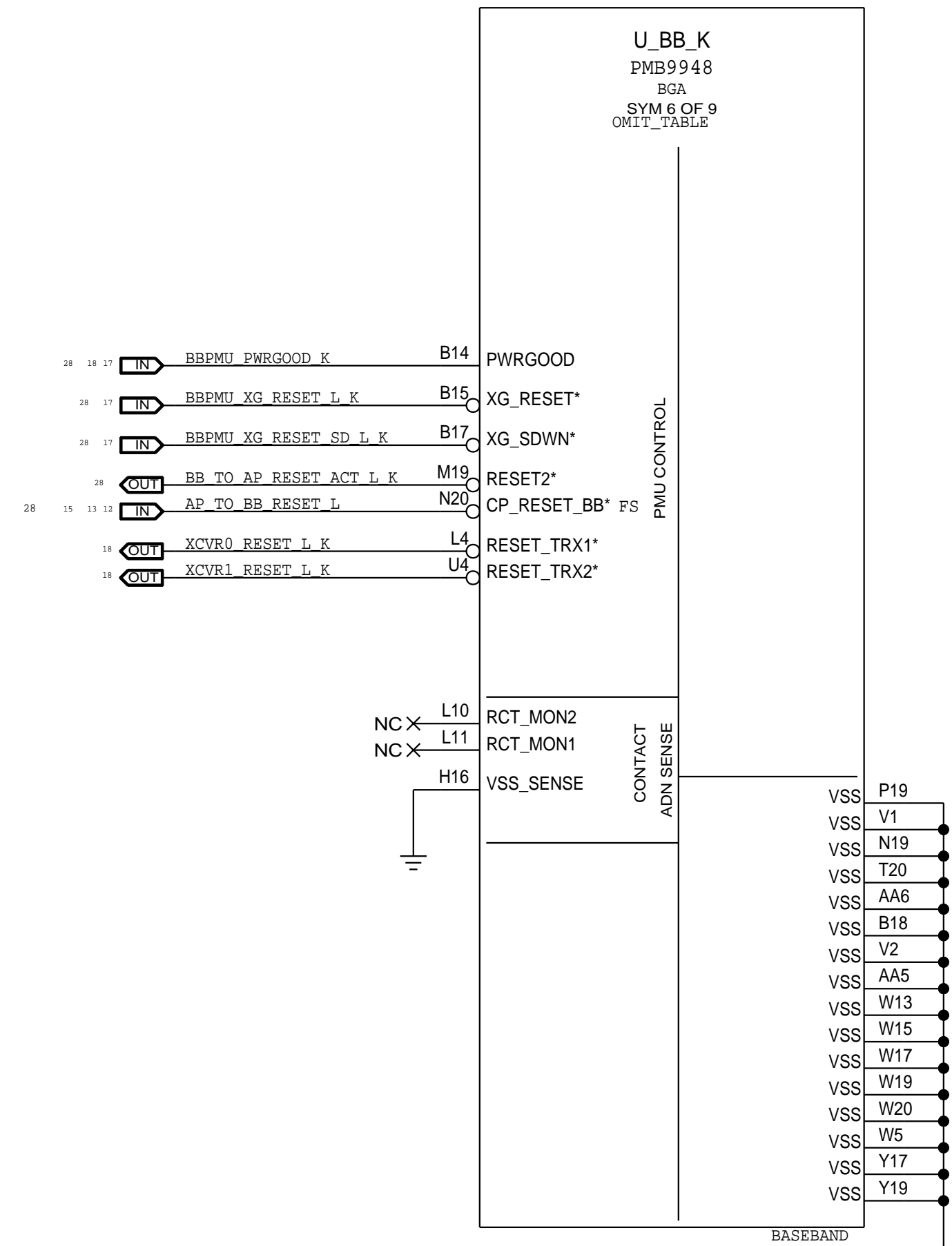
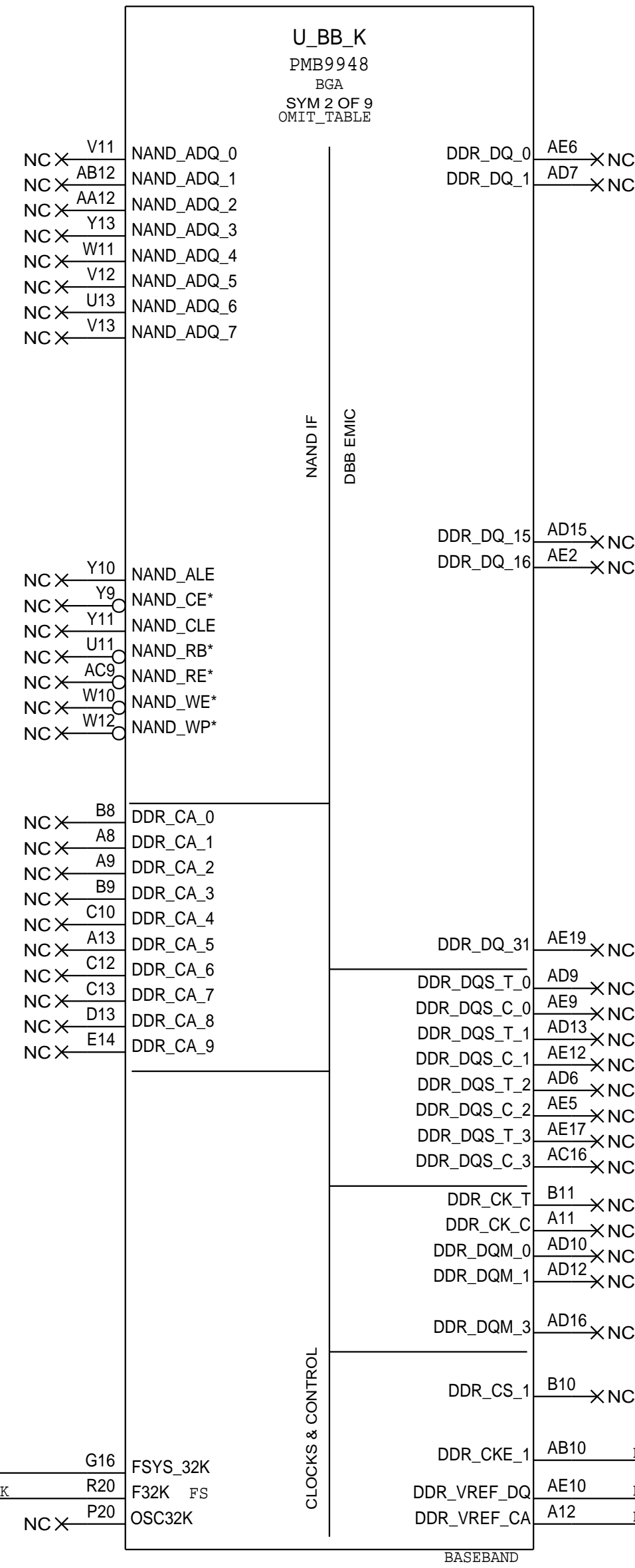
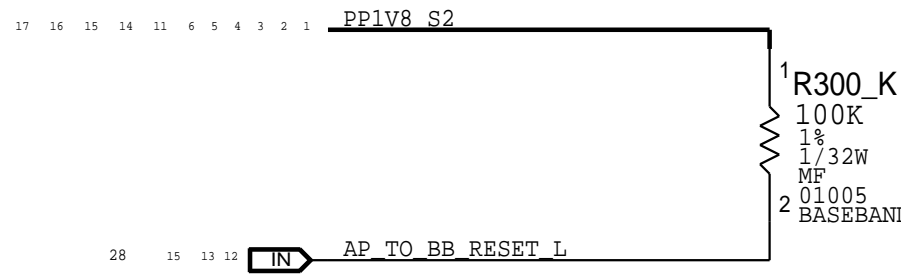
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PAGE TITLE BASEBAND MEMORY/DEBUG		
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	REVISION 7.0.0	BRANCH evt-1
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8

7

6

5

4

3

2

1

BASEBAND POWER

D

C

B

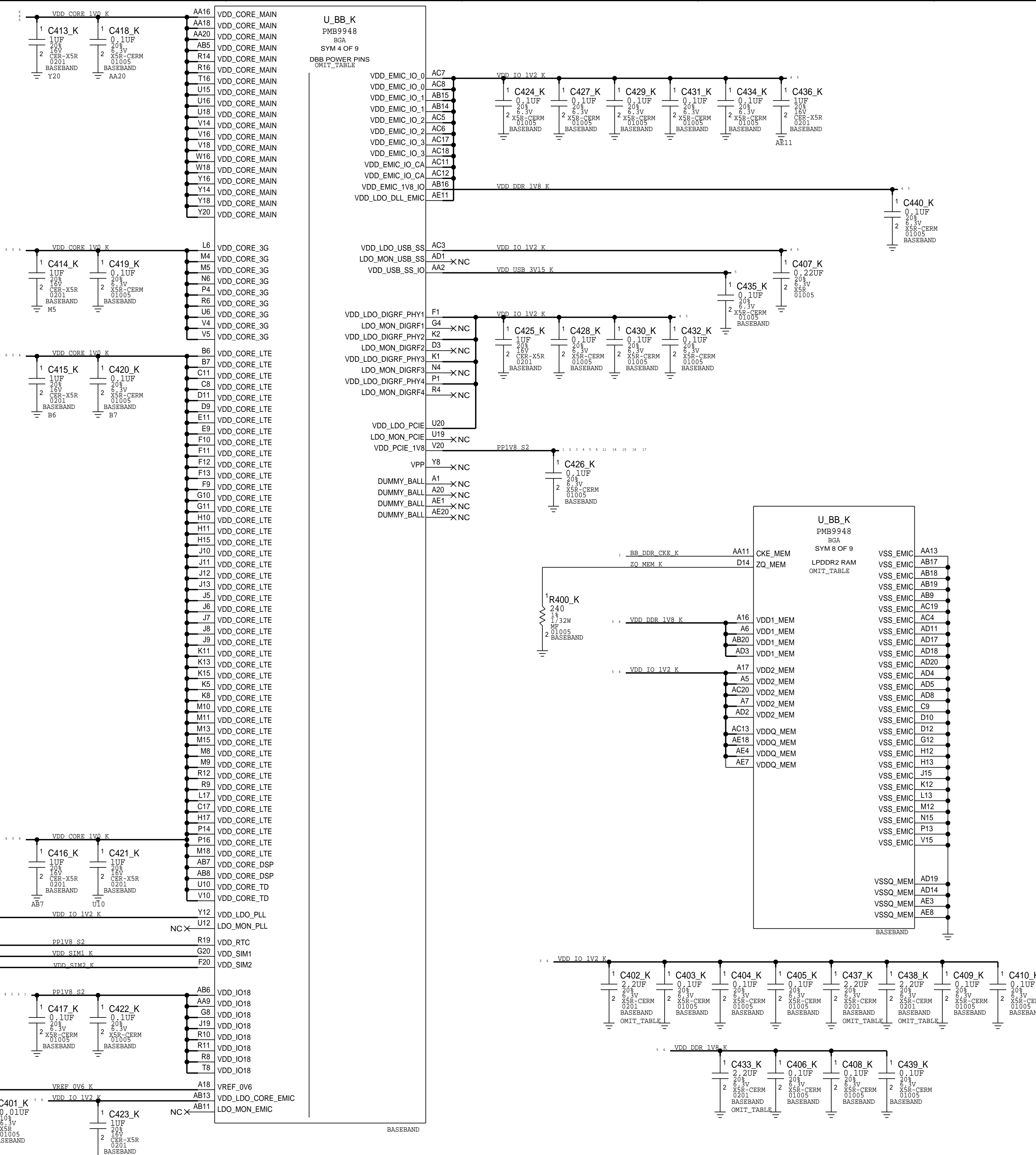
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U_BB_K PMB9948 BGA SYM 3 OF 9 GROUND OMIT_TABLE		U_BB_K PMB9948 BGA SYM 8 OF 9 OMIT_TABLE	
A10	VSS	AB3	VSS_USB
A14	VSS	W9	VSS_PLL
A2	VSS	W14	VSS_PLL
A4	VSS	E3	VSS_MPHY_1
AA14	VSS	F3	VSS_MPHY_1
AA17	VSS	H3	VSS_MPHY_2
AA19	VSS	J3	VSS_MPHY_2
AA8	VSS	M3	VSS_MPHY_3
M17	VSS	N3	VSS_MPHY_3
AC10	VSS	R3	VSS_MPHY_4
B1	VSS	T3	VSS_MPHY_4
B2	VSS		
B3	VSS	V19	VSS_PCIE_TX
B4	VSS		
B5	VSS	N10	VSS
C1	VSS	N11	VSS
D8	VSS	N12	VSS
E10	VSS	N13	VSS
E12	VSS	N14	VSS
E13	VSS	N16	VSS
E6	VSS	N17	VSS
F14	VSS	N7	VSS
F2	VSS	N8	VSS
F7	VSS	N9	VSS
G13	VSS	P10	VSS
G14	VSS	P11	VSS
G3	VSS	P12	VSS
G9	VSS	P15	VSS
H5	VSS	P17	VSS
H6	VSS	P2	VSS
H7	VSS	P3	VSS
H8	VSS	P6	VSS
H9	VSS	P7	VSS
J16	VSS	P8	VSS
K10	VSS	P9	VSS
K16	VSS	R13	VSS
K3	VSS	R15	VSS
K6	VSS	R17	VSS
K7	VSS	R7	VSS
K9	VSS	T11	VSS
L16	VSS	T12	VSS
L3	VSS	T13	VSS
L5	VSS	T15	VSS
L7	VSS	T17	VSS
L8	VSS	T7	VSS
L9	VSS	U14	VSS
M16	VSS	U17	VSS
D16	VSS	R18	VSS
AB4	VSS	U3	VSS
M6	VSS	V17	VSS
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PAGE TITLE BASEBAND POWER		
	DRAWING NUMBER	051-02247
	REVISION	7.0.0
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	PAGE	4 OF 17
	SHEET	16 OF 34

8

7

6

5

4

3

2

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8

7

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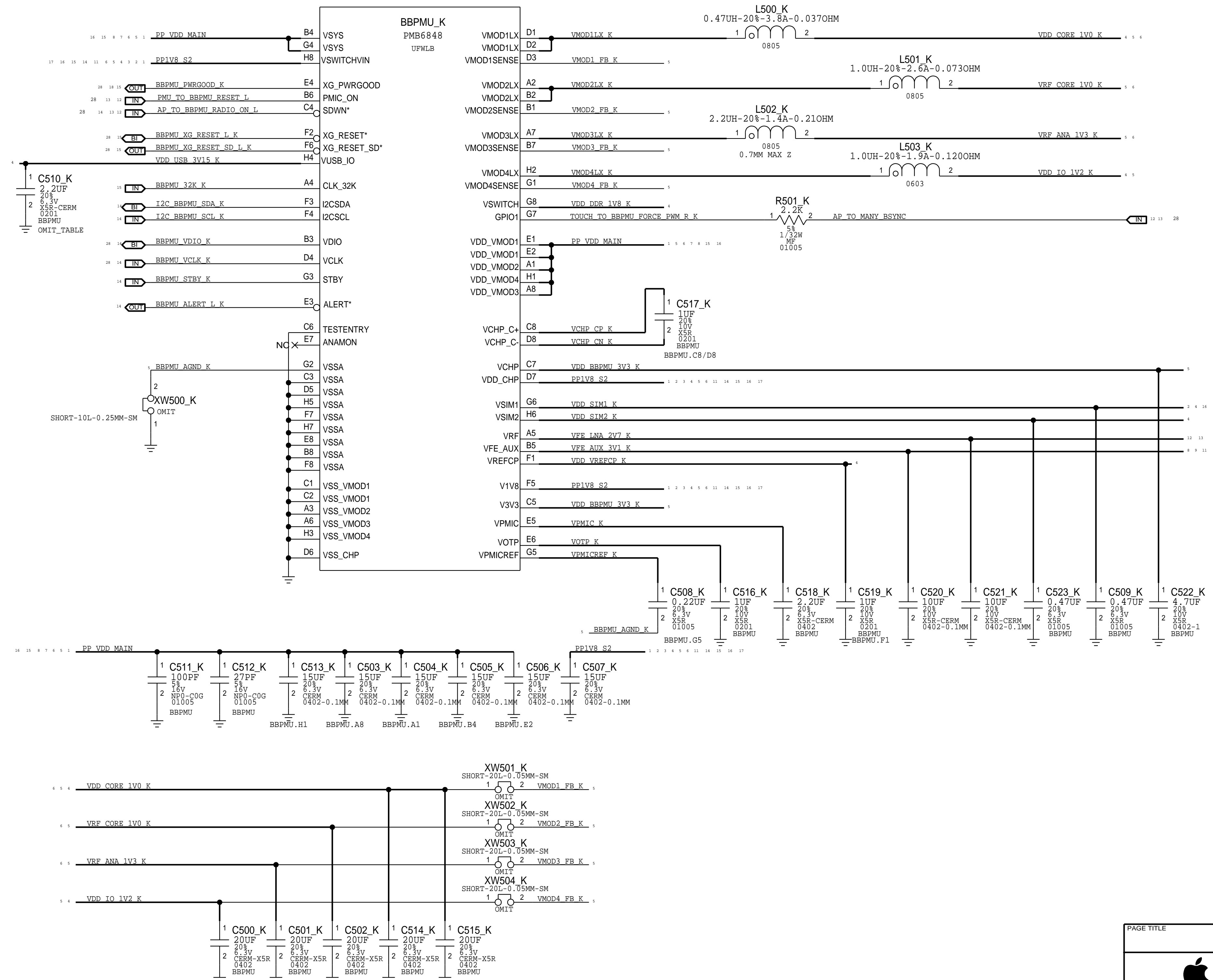
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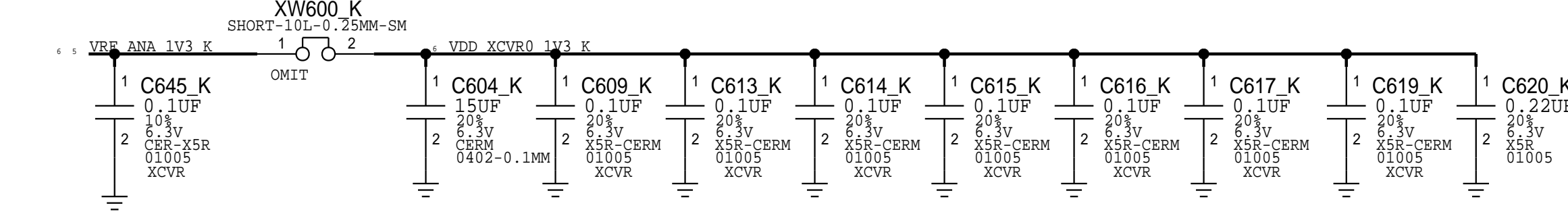
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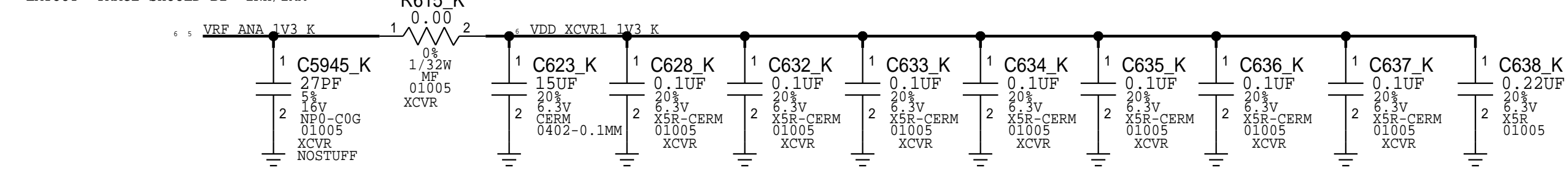
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	PAGE	5 OF 17
	SHEET	17 OF 34

TRANSCIEVERS

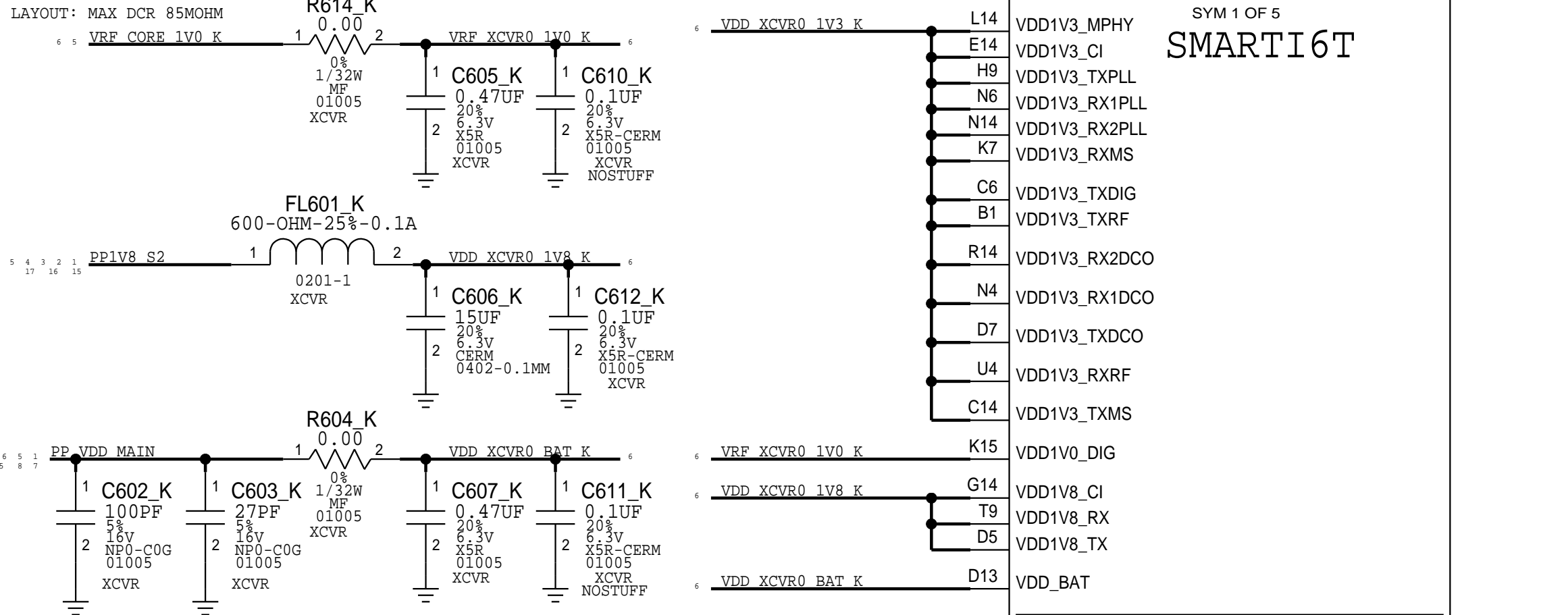
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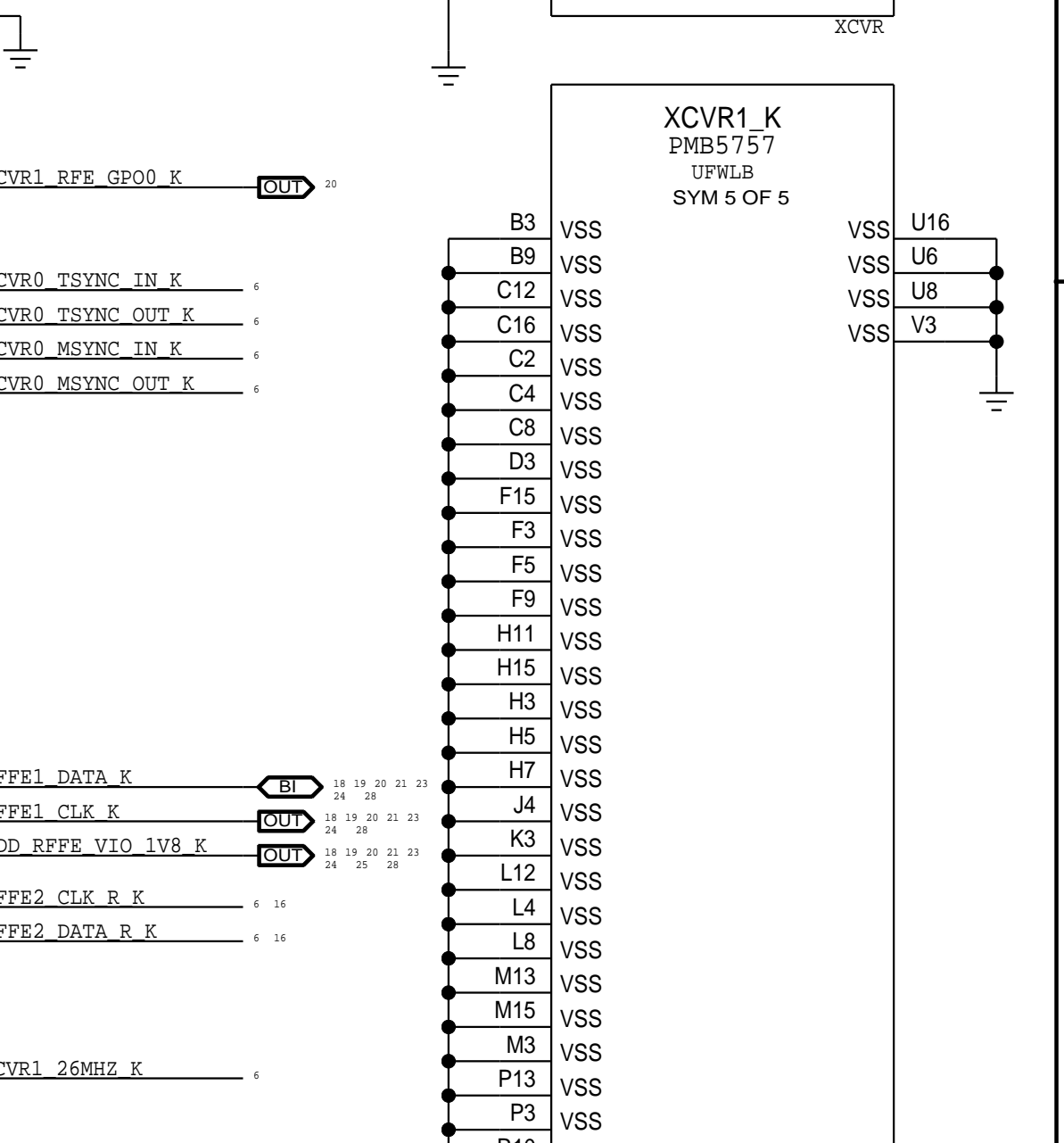
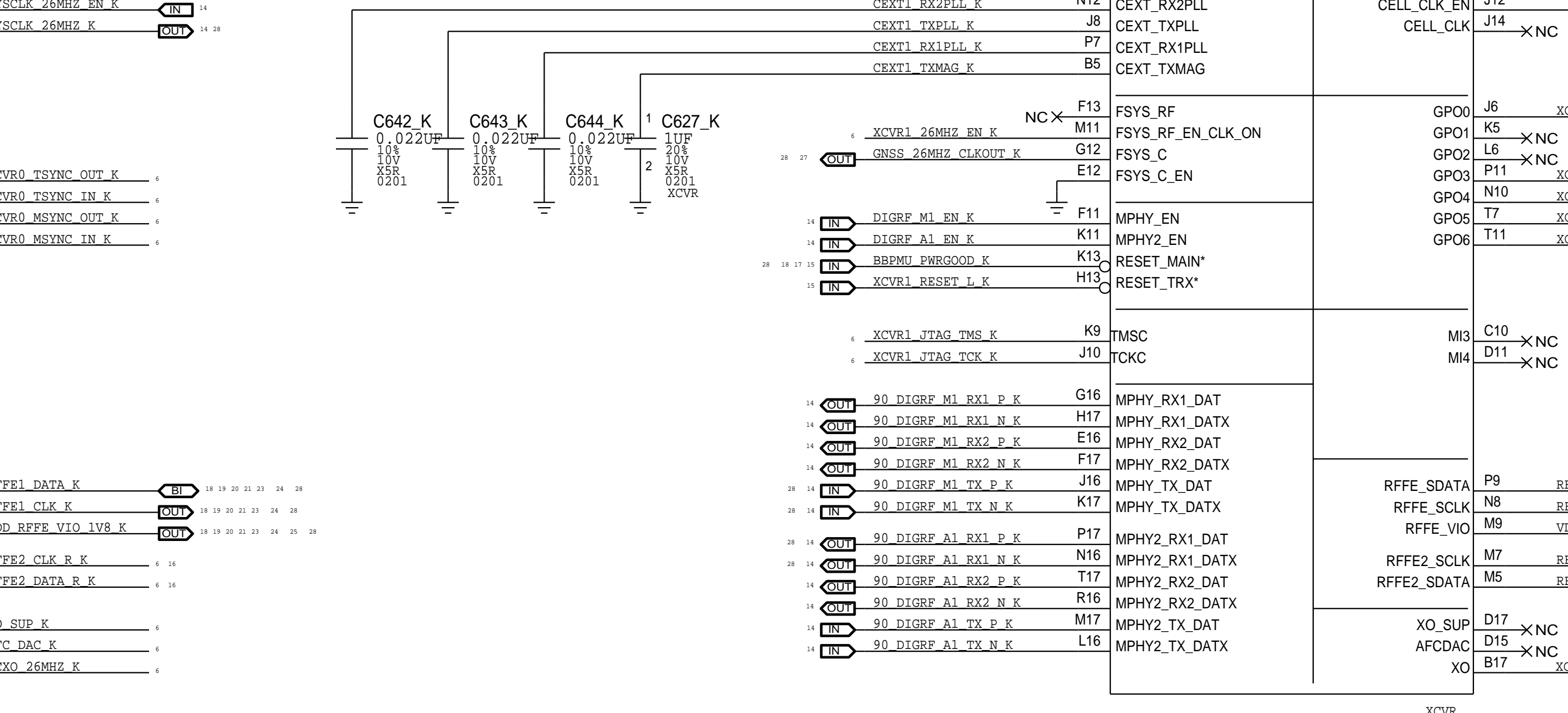
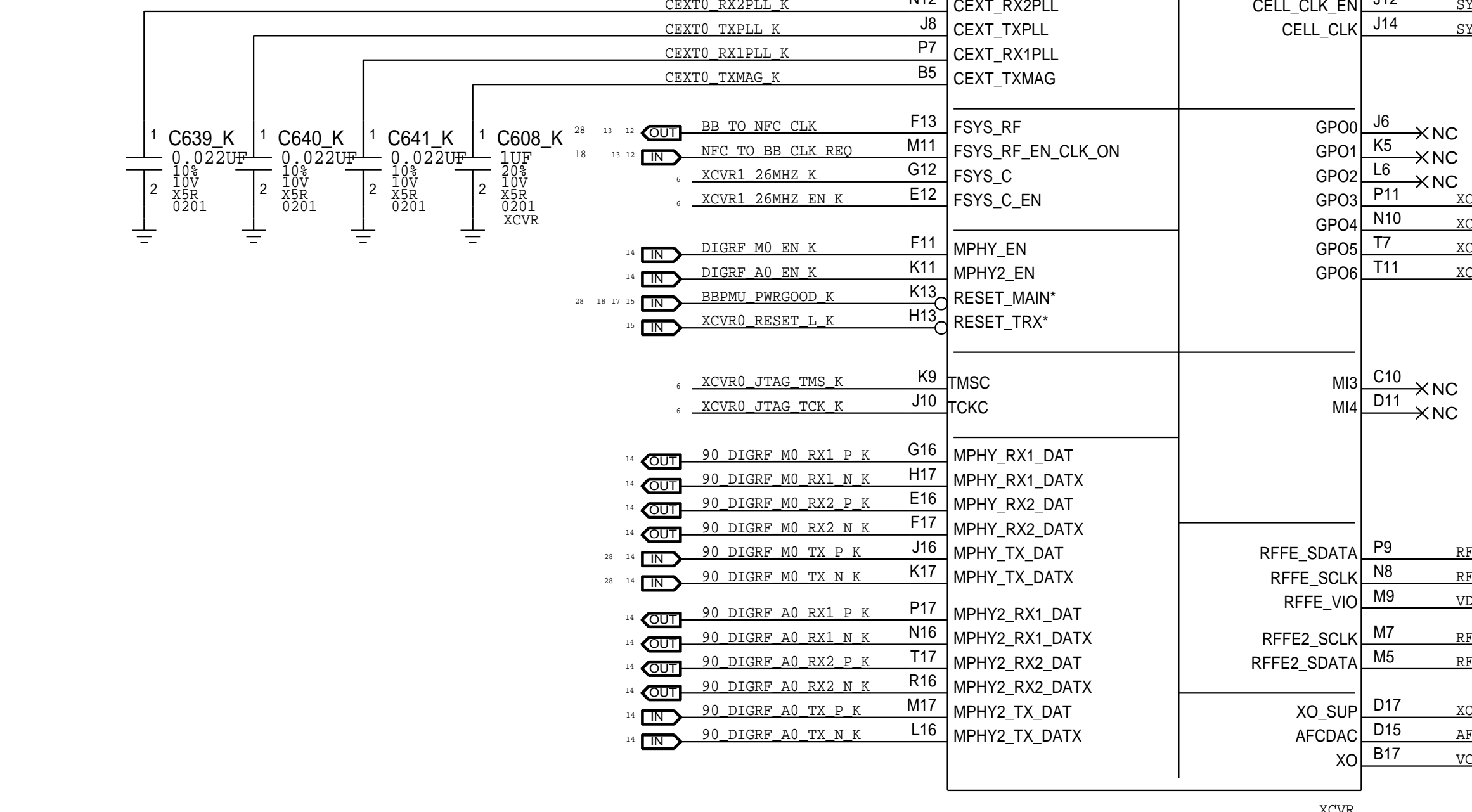
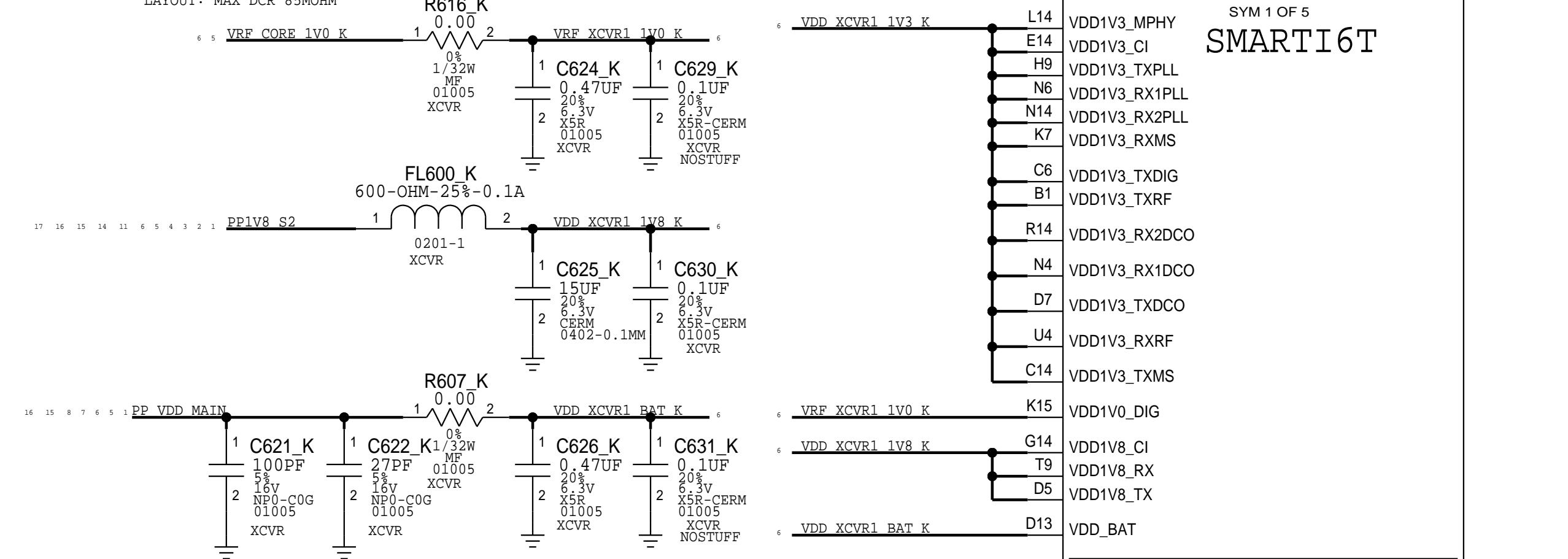
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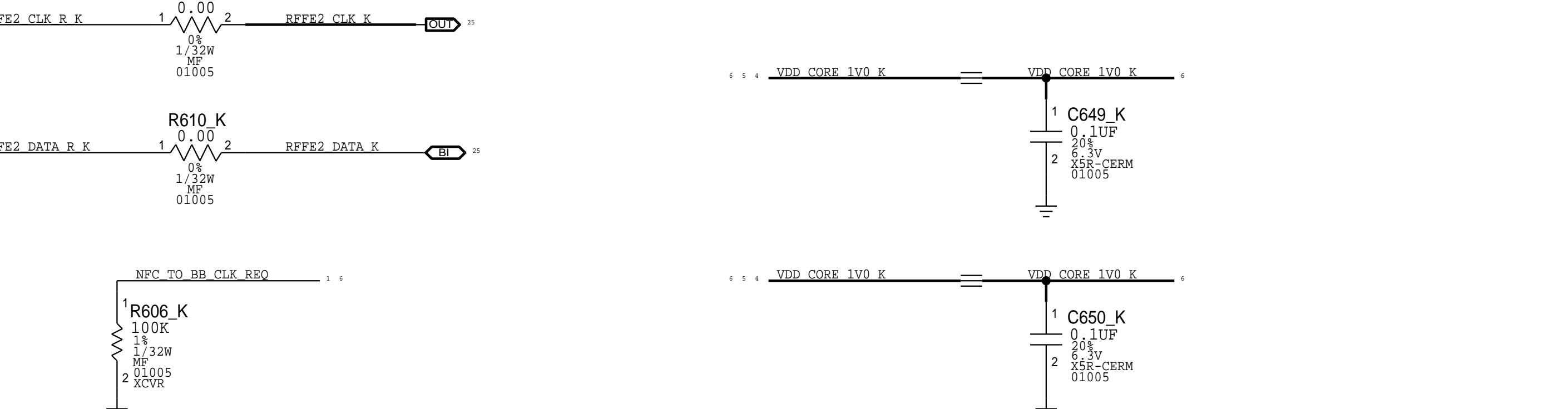
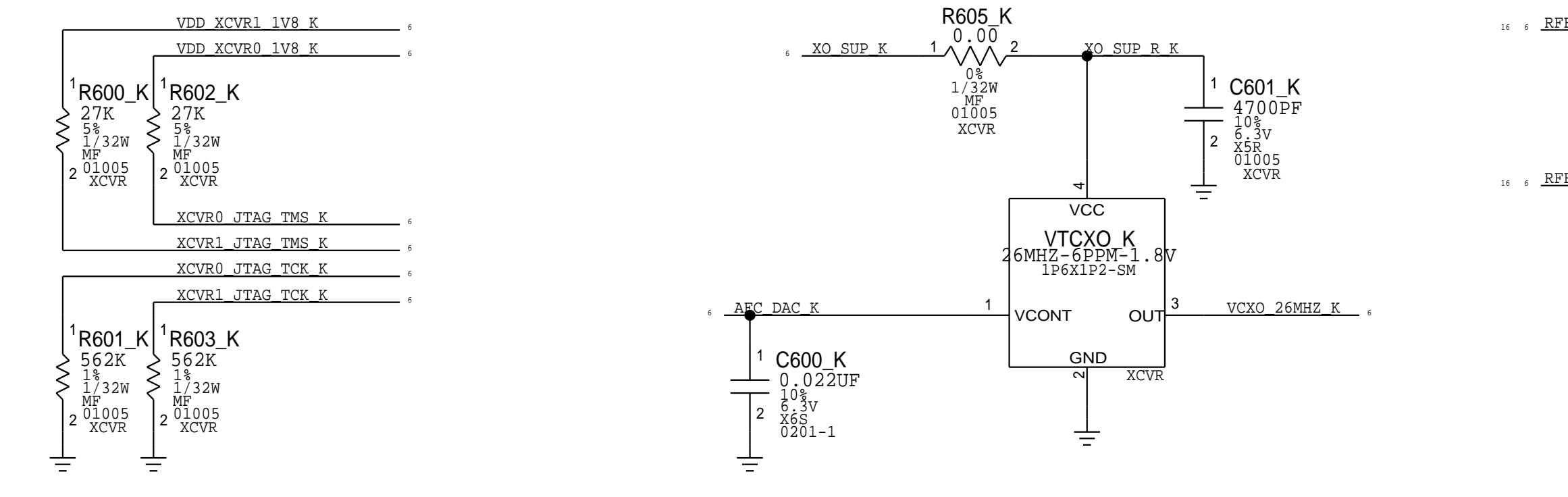
LAYOUT: MAX DCR 85MOHM



LAYOUT: MAX DCR 85MOHM



VCTCXO



NOTE: GNSS_CLK REQUESTED WITH AT@CMD

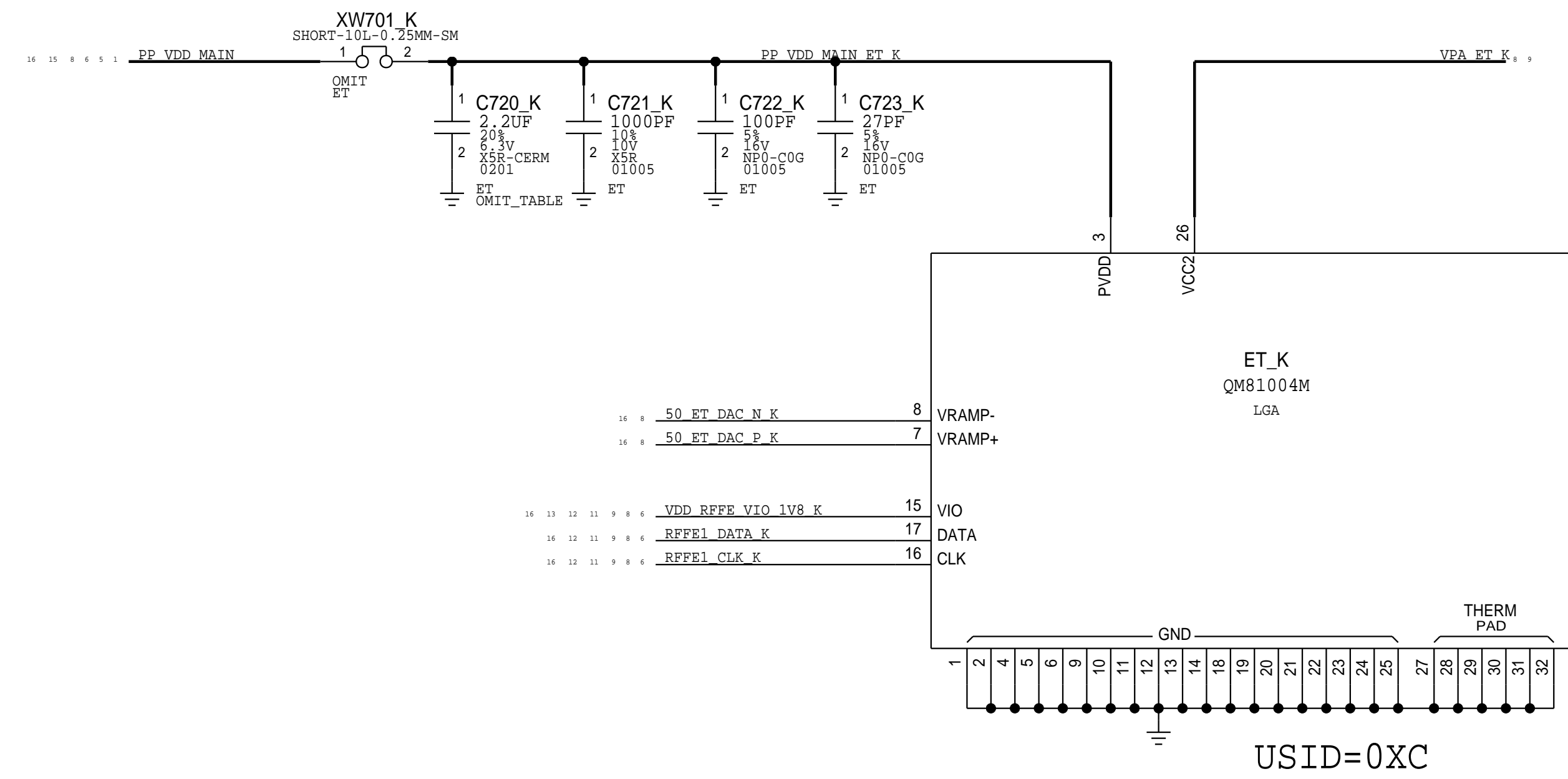
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PAGE TITLE		TRANSCIEVERS	
DRAWING NUMBER		051-02247	
REVISION		7.0.0	
BRANCH		evt-1	
PAGE		6 OF 17	
SHEET		18 OF 34	

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ET MODULATOR

ALPES II MODULE

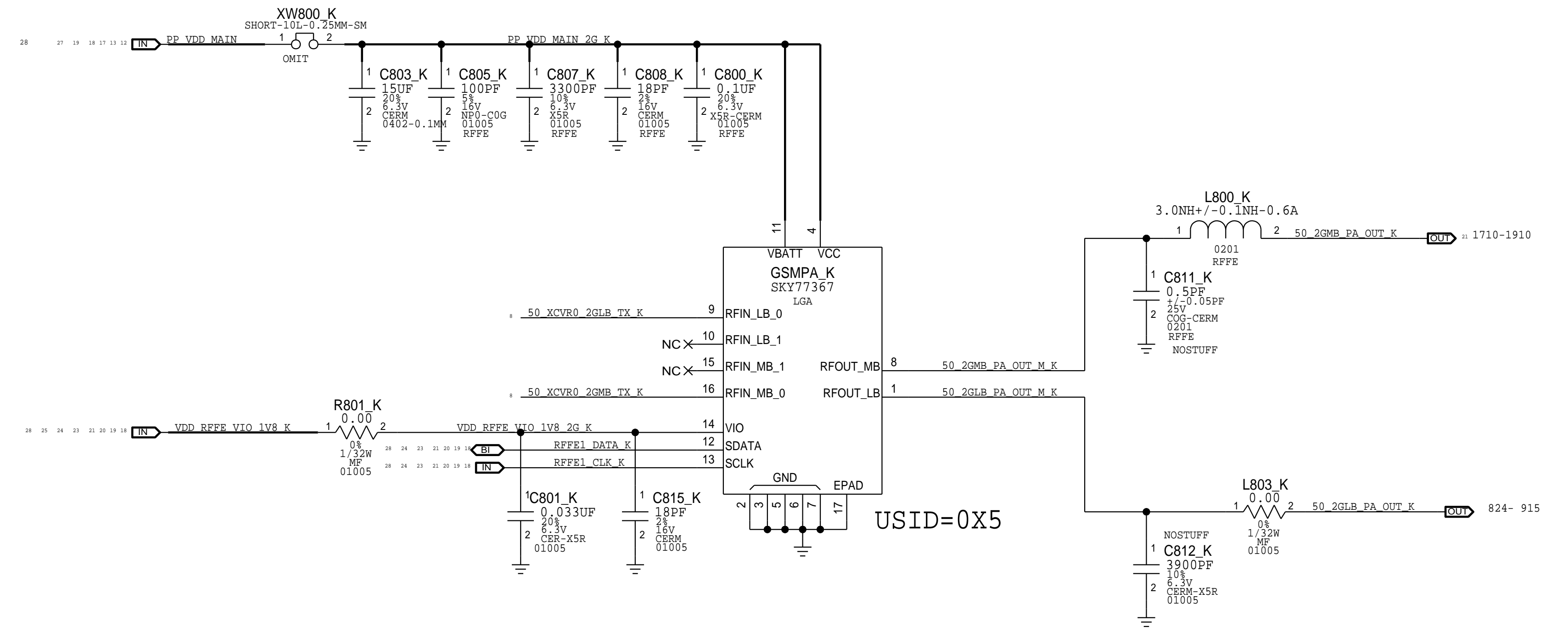
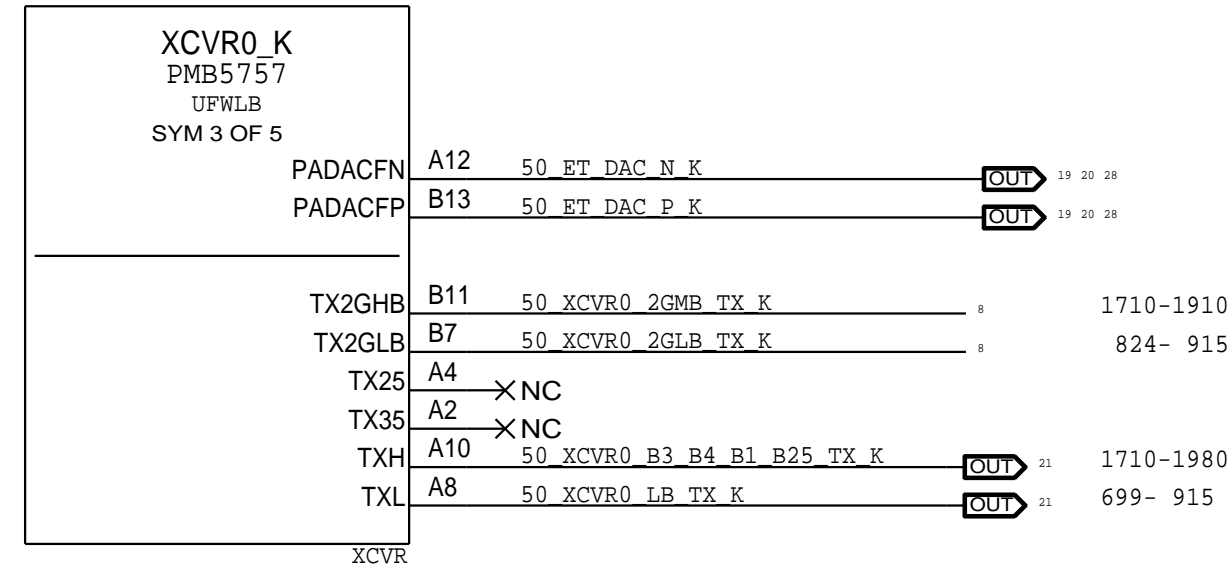


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TDD TRANSMIT

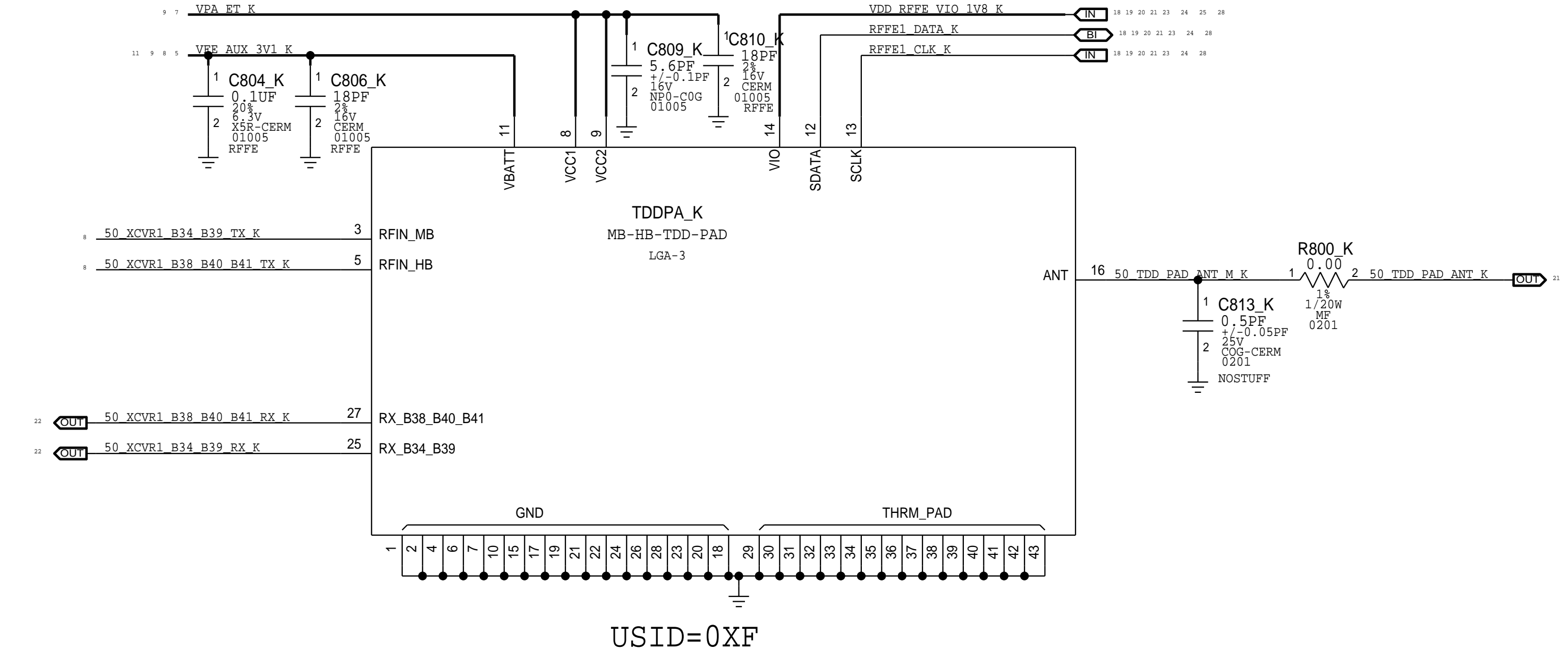
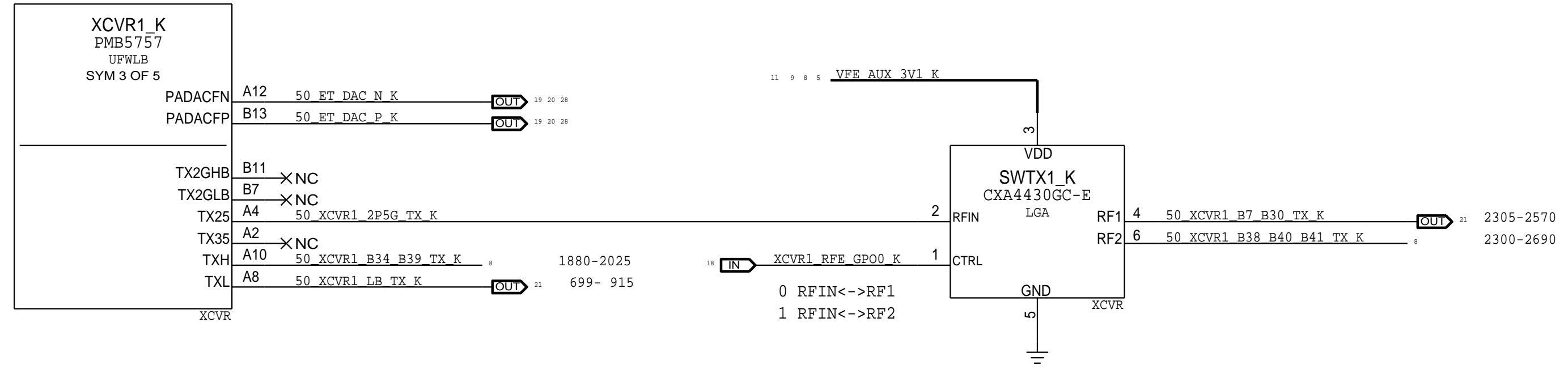
2G PA

XCVR0 TX



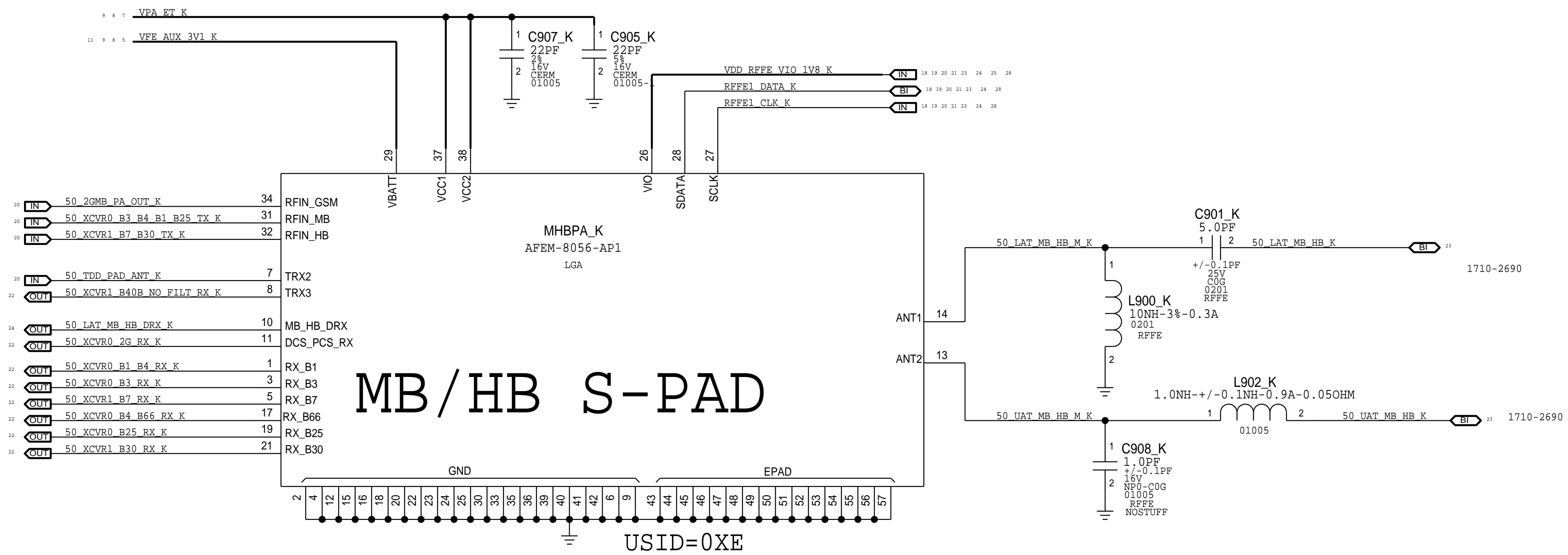
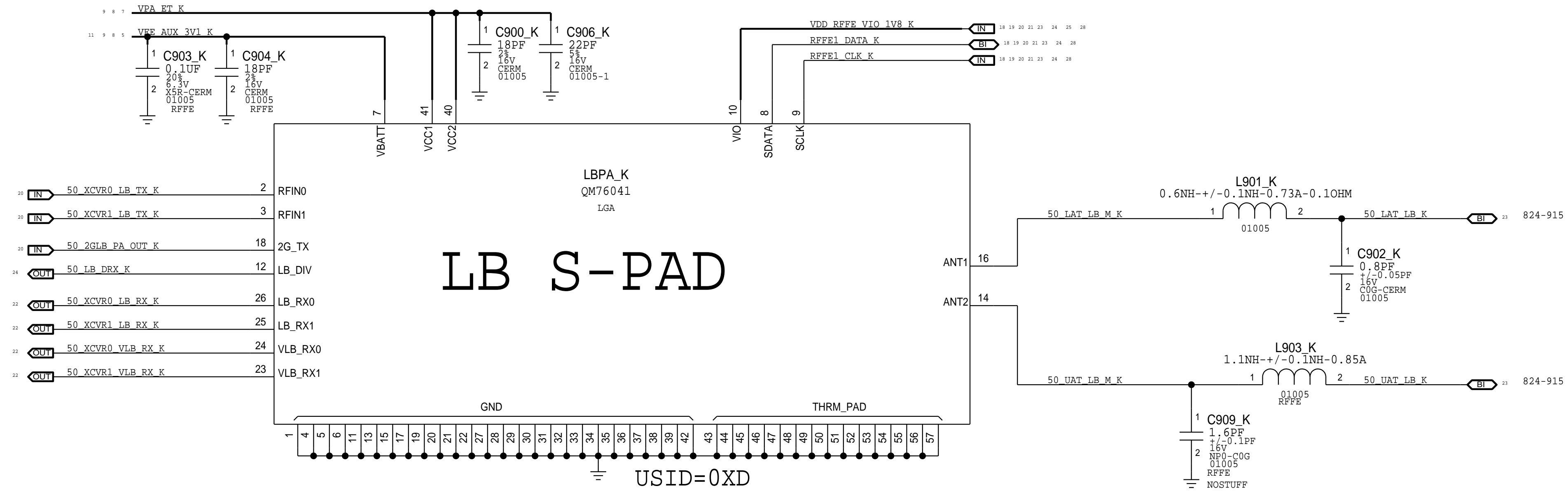
MB HB TDD S-PAD

XCVR1 TX



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	PAGE	8 OF 17
	SHEET	20 OF 34

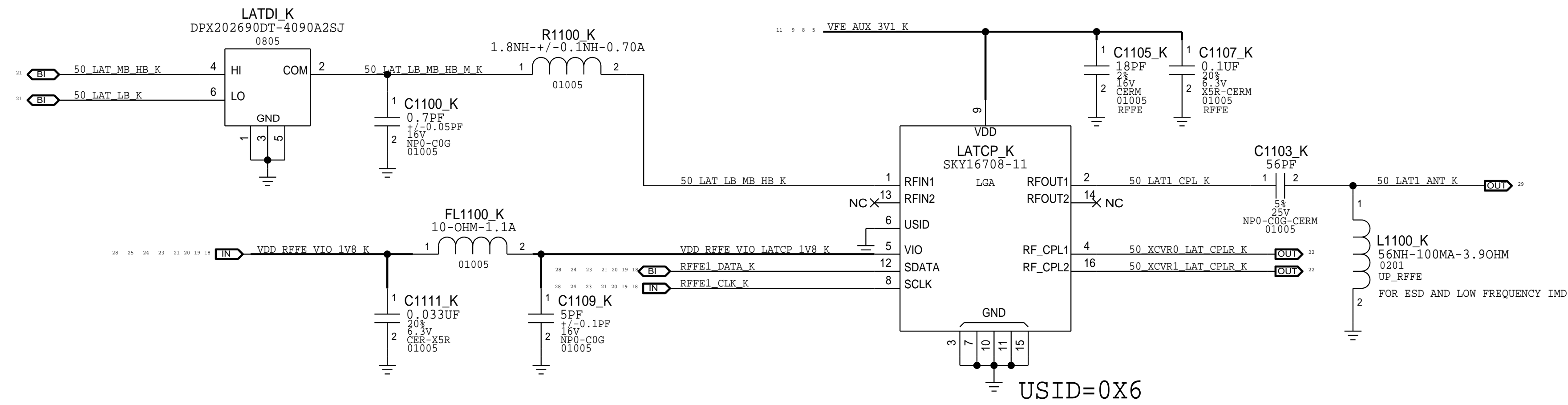
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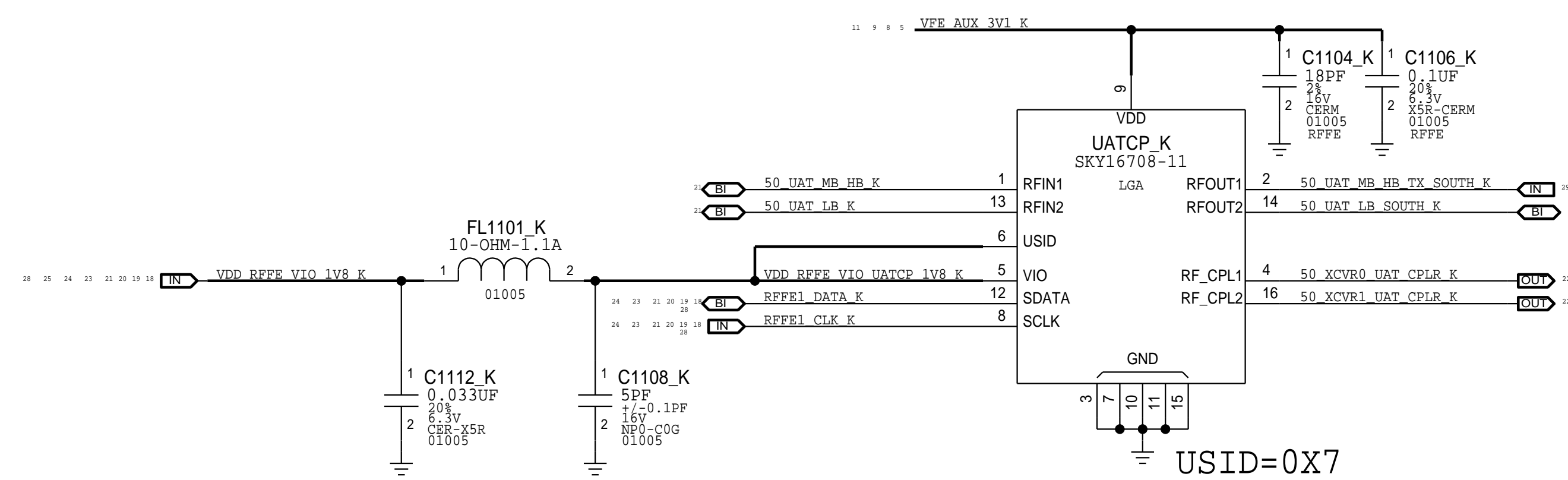
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		PAGE
		SHEET
		21 OF 34

LOWER ANTENNA AND COUPLER

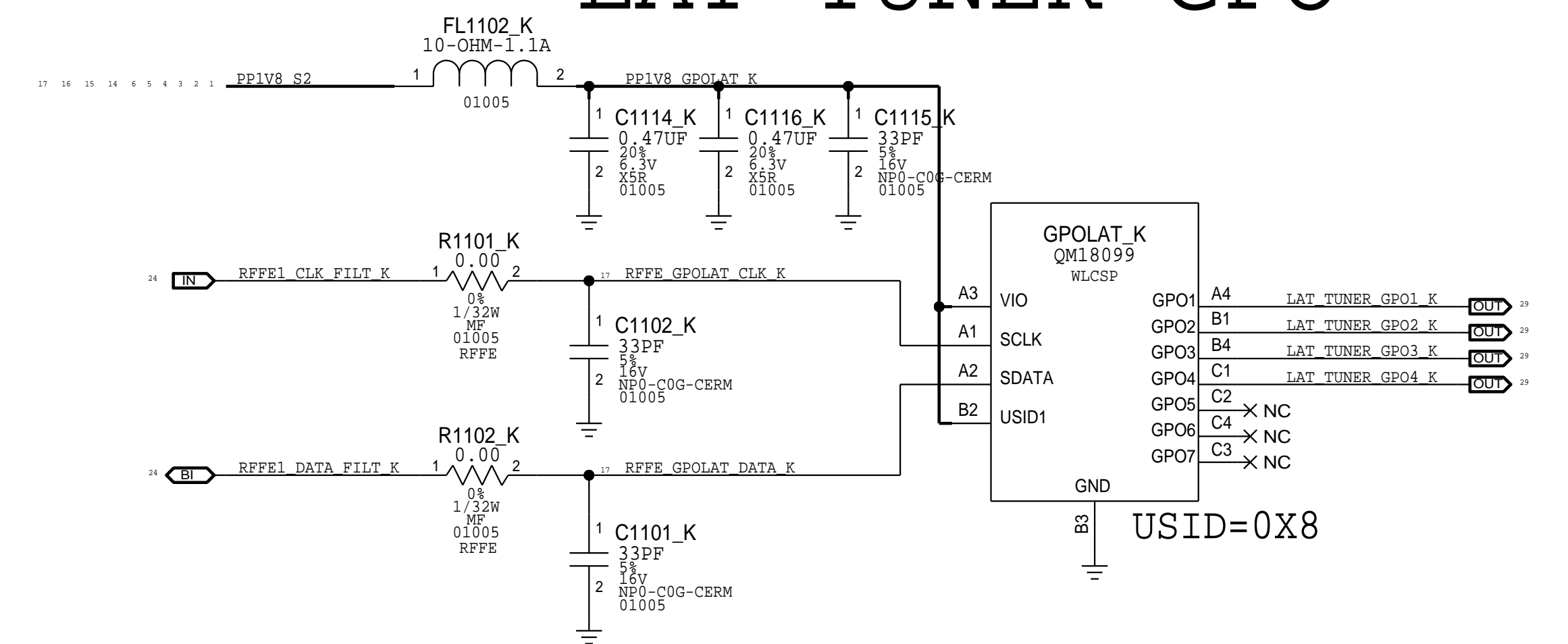
LOWER ANTENNA COUPLER



UPPER ANTENNA COUPLER



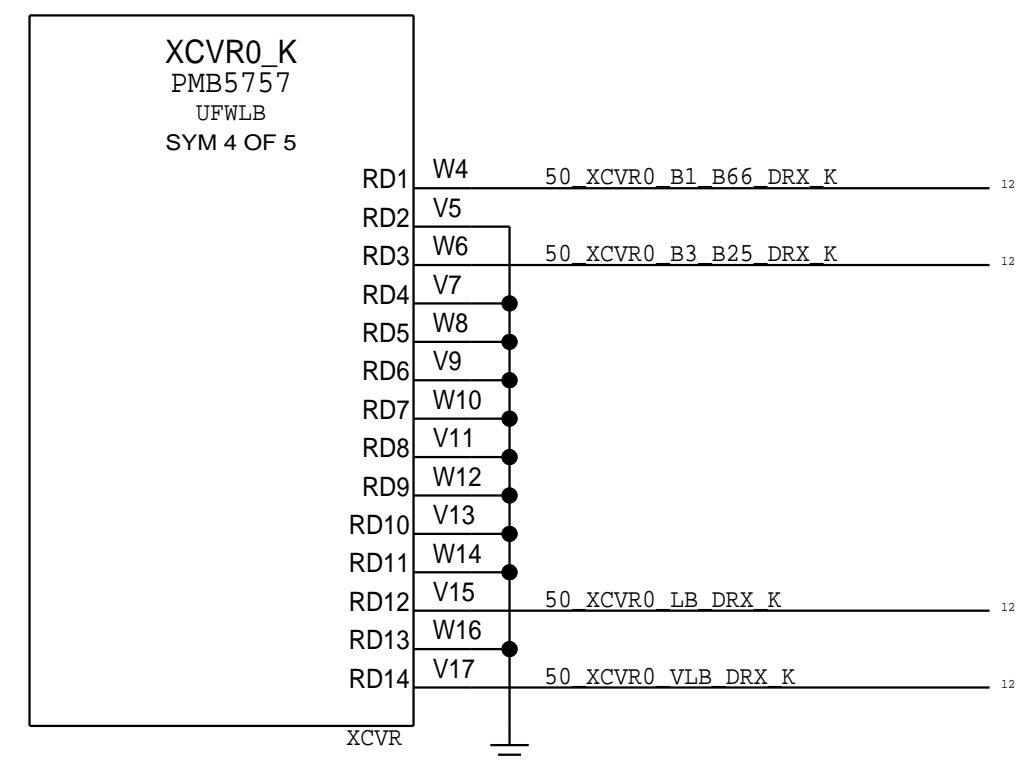
LAT TUNER GPO



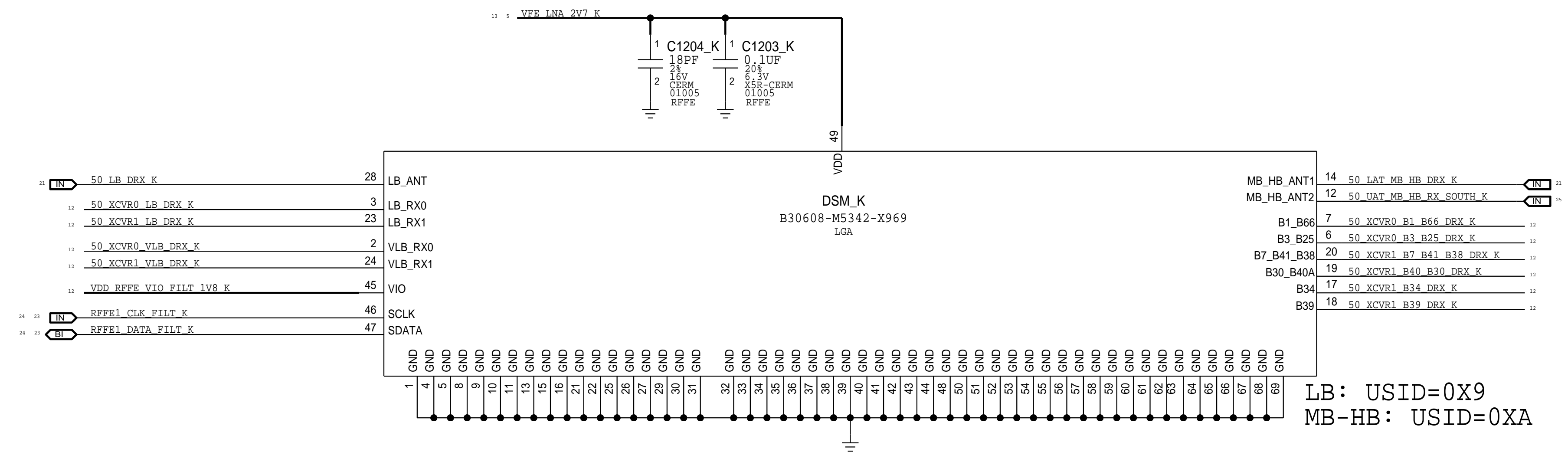
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BRANCH evt-1	PAGE 11 OF 17	SHEET 23 OF 34

DIVERSITY RECEIVE ASM'S

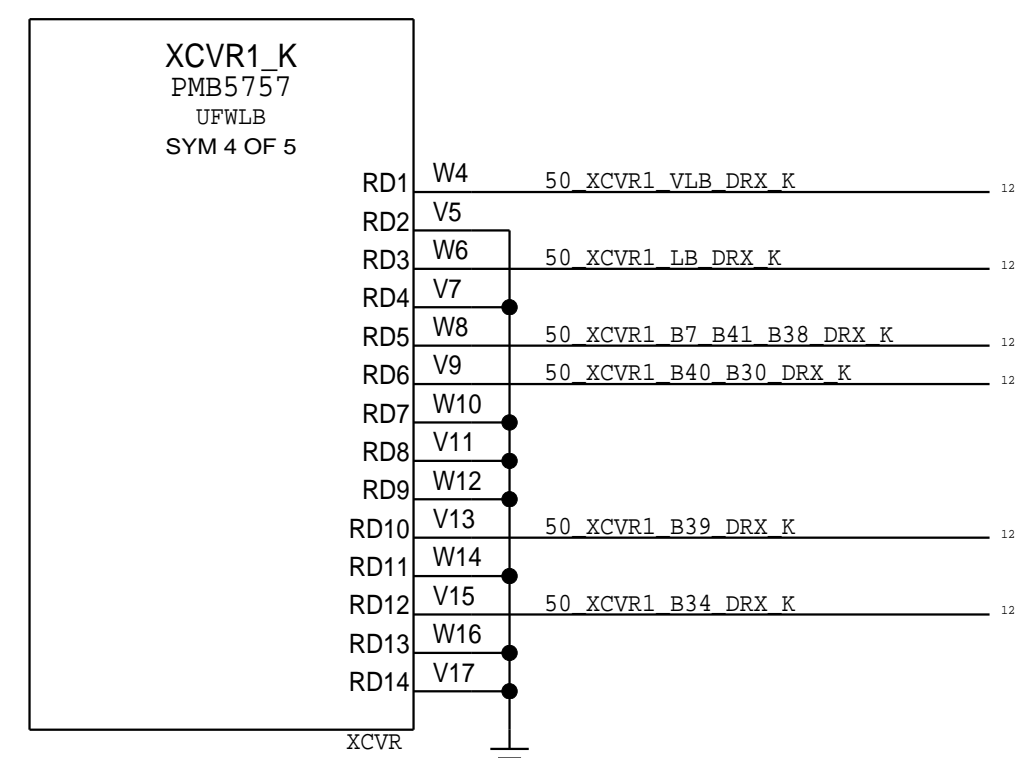
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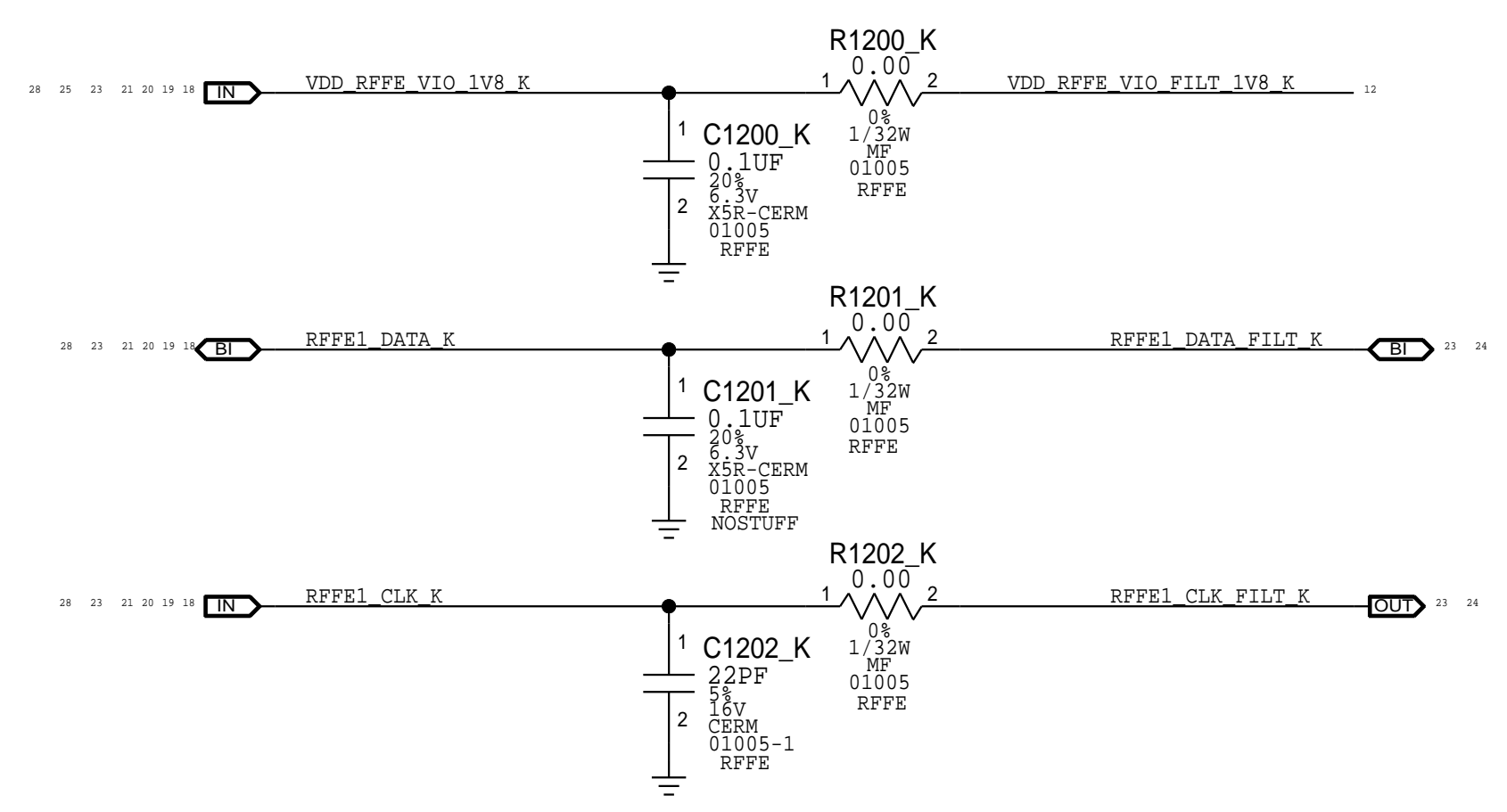
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XCVR1 DRX



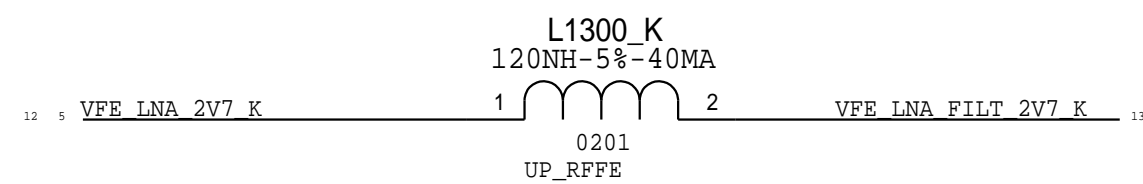
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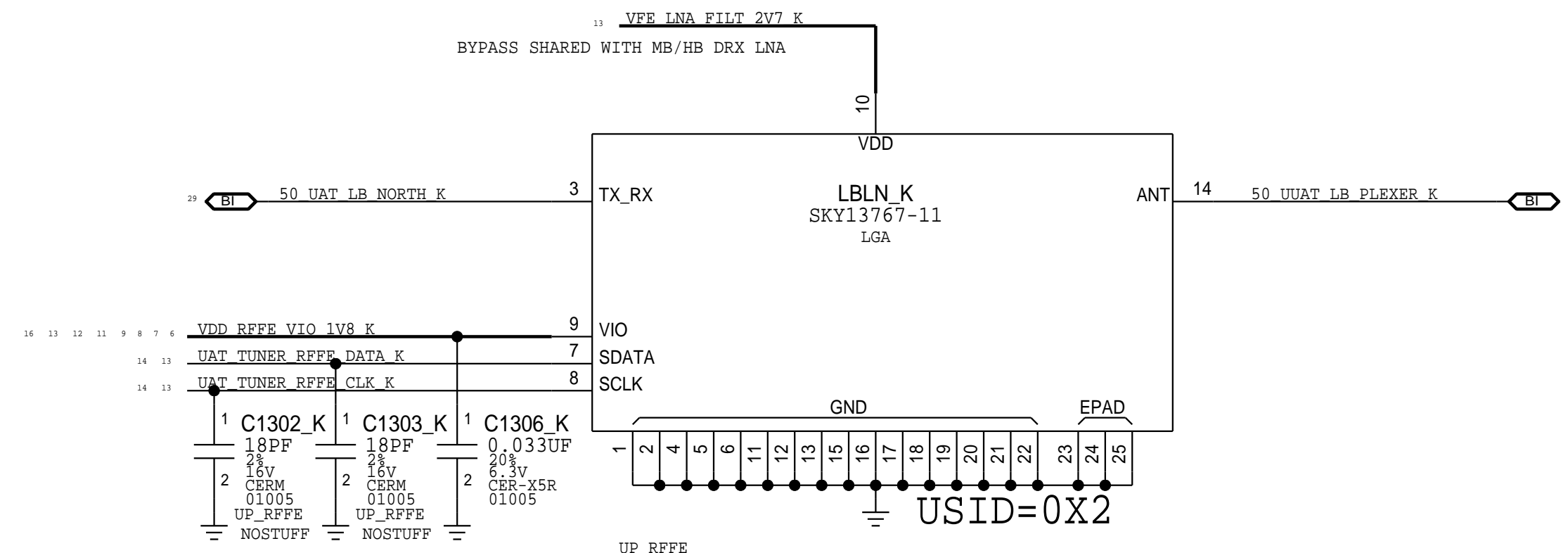
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PAGE 12 OF 17		SHEET 24 OF 34

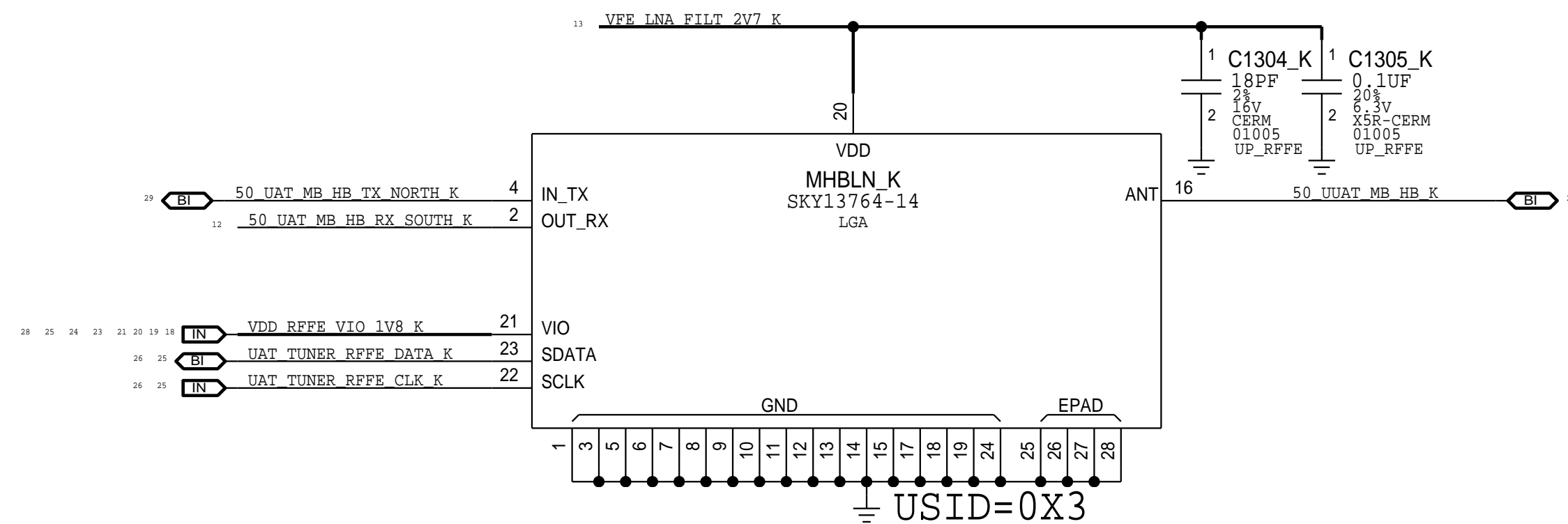
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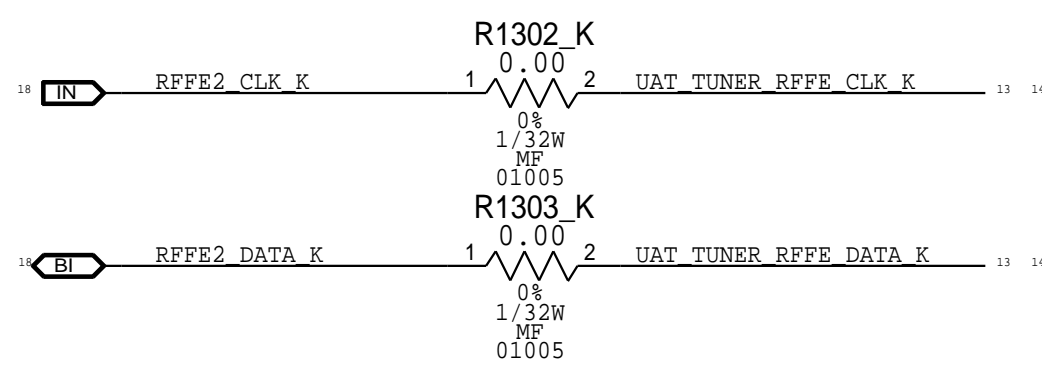
LB DRX LNA



MB/HB DRX LNA



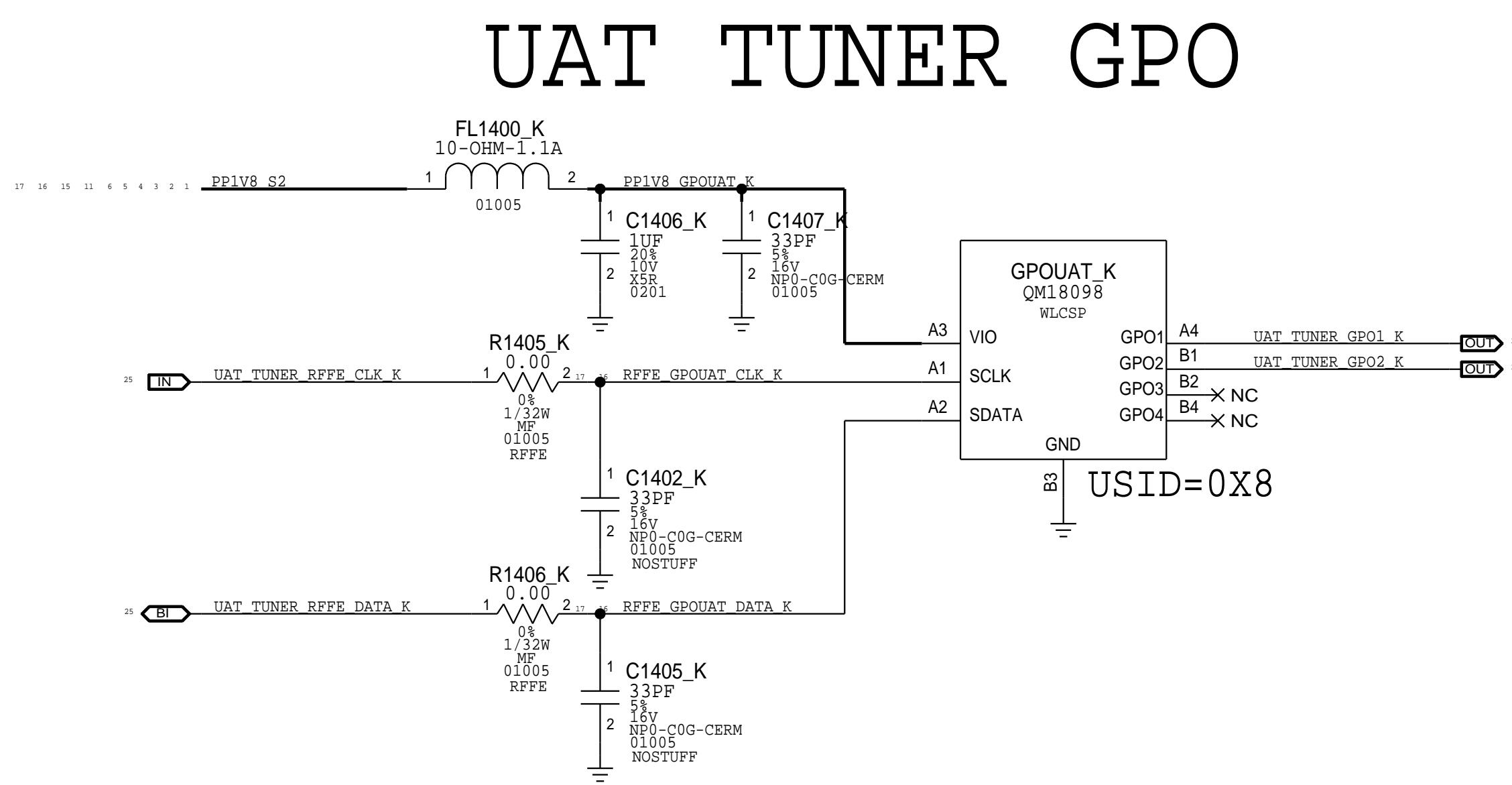
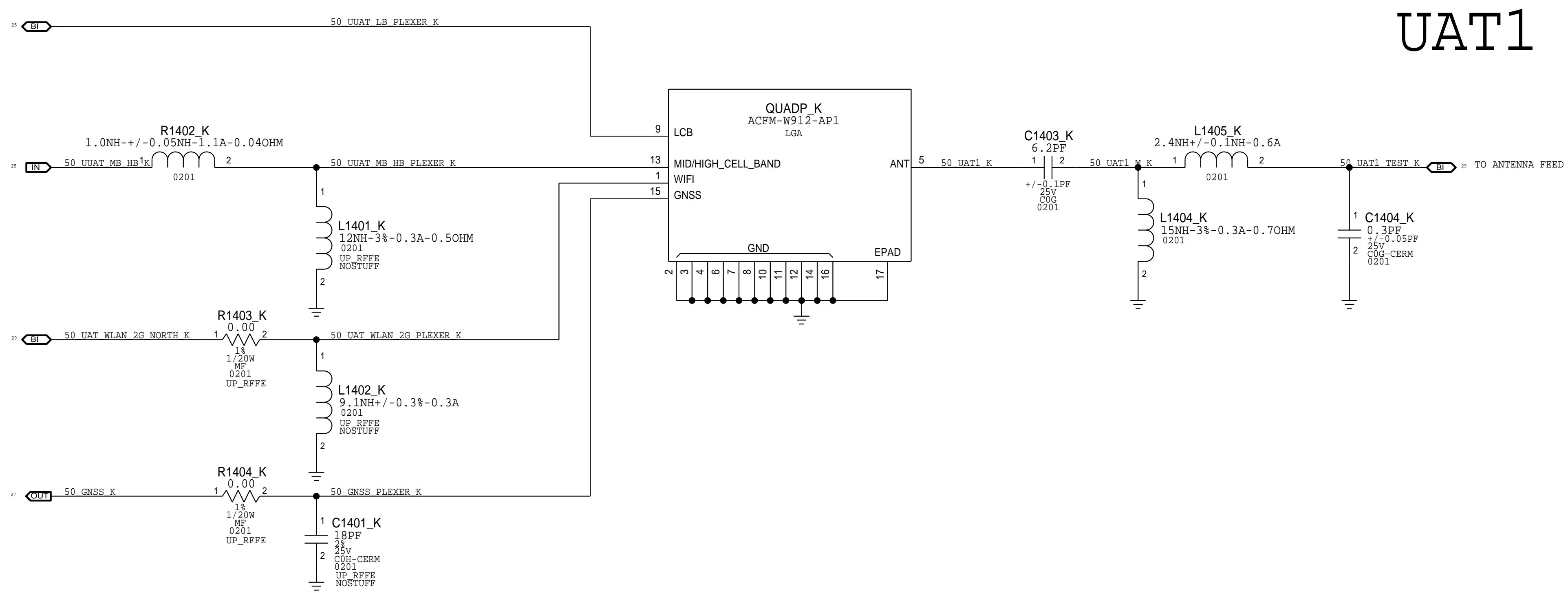
RFFE2 IMPEDANCE MATCHING



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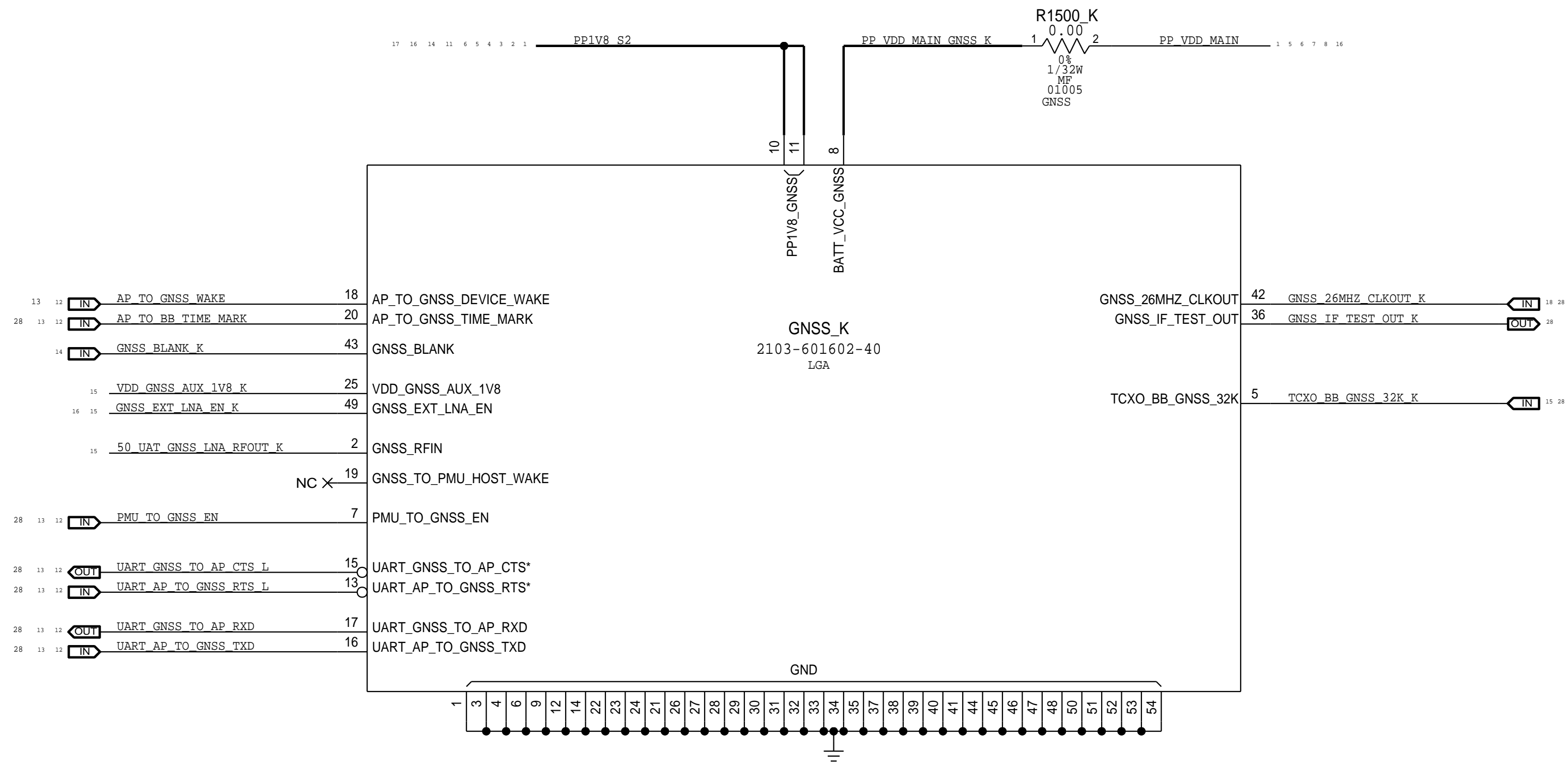
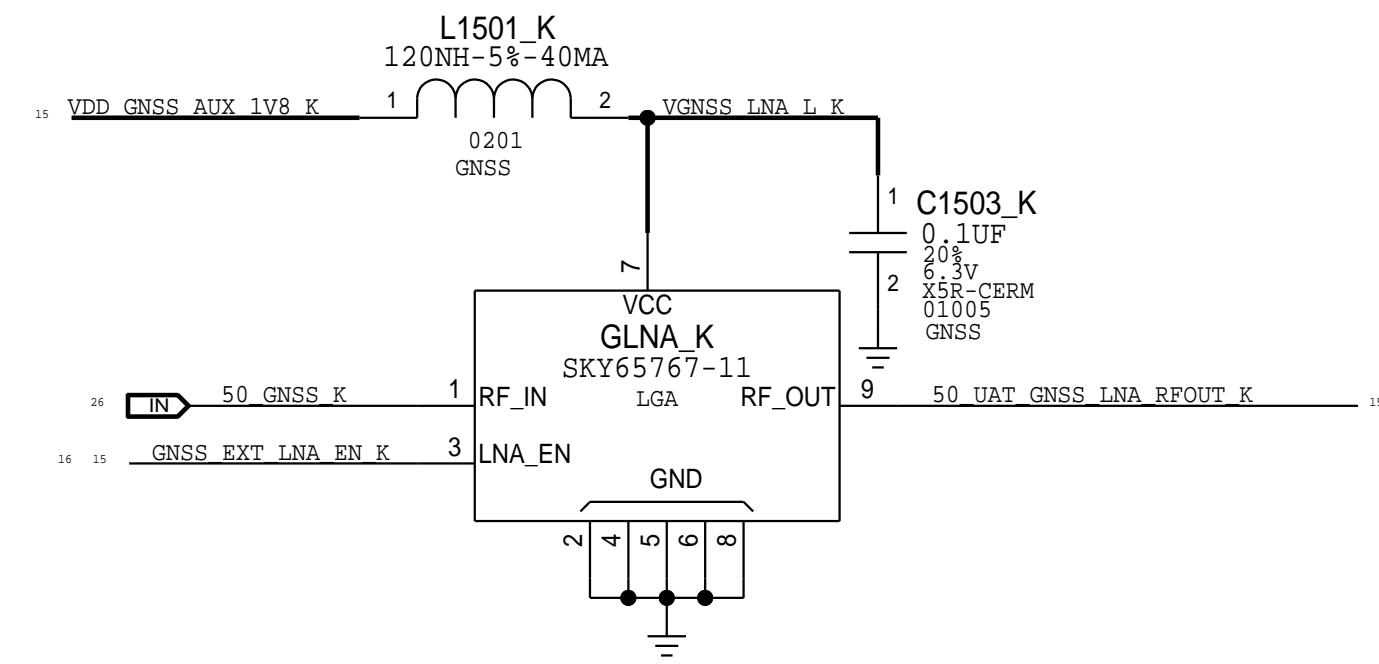
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		SHEET 25 OF 34

UPPER ANTENNA FEEDS



PAGE TITLE UPPER ANTENNA FEEDS		
	DRAWING NUMBER 051-02247	SIZE D
	REVISION 7.0.0	
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BRANCH evt-1	PAGE 14 OF 17	SHEET 26 OF 34

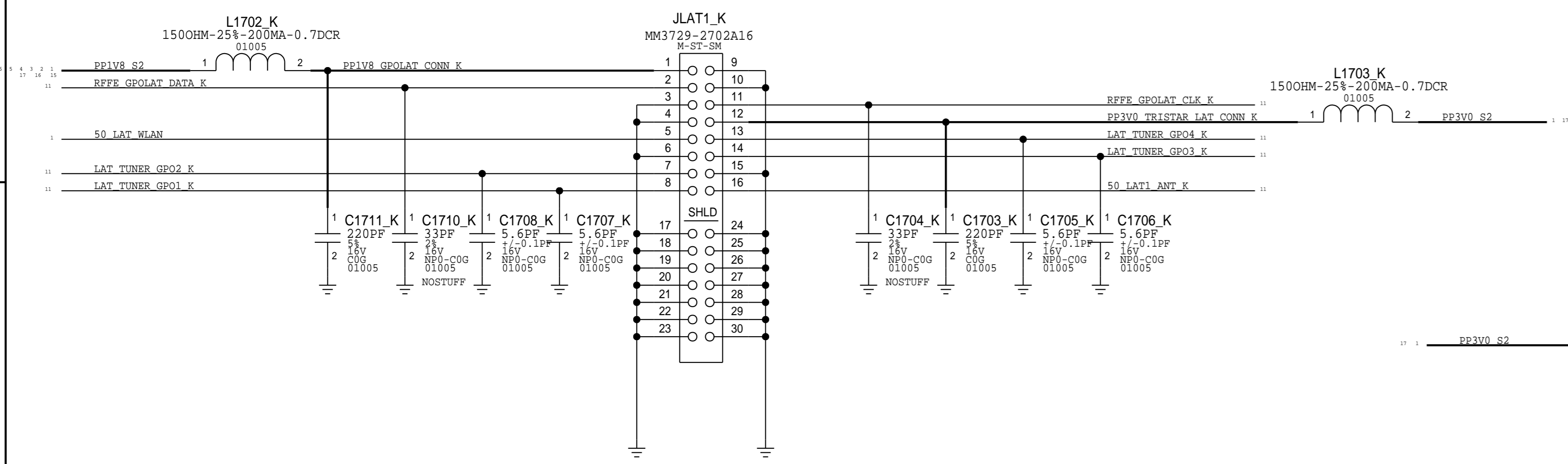
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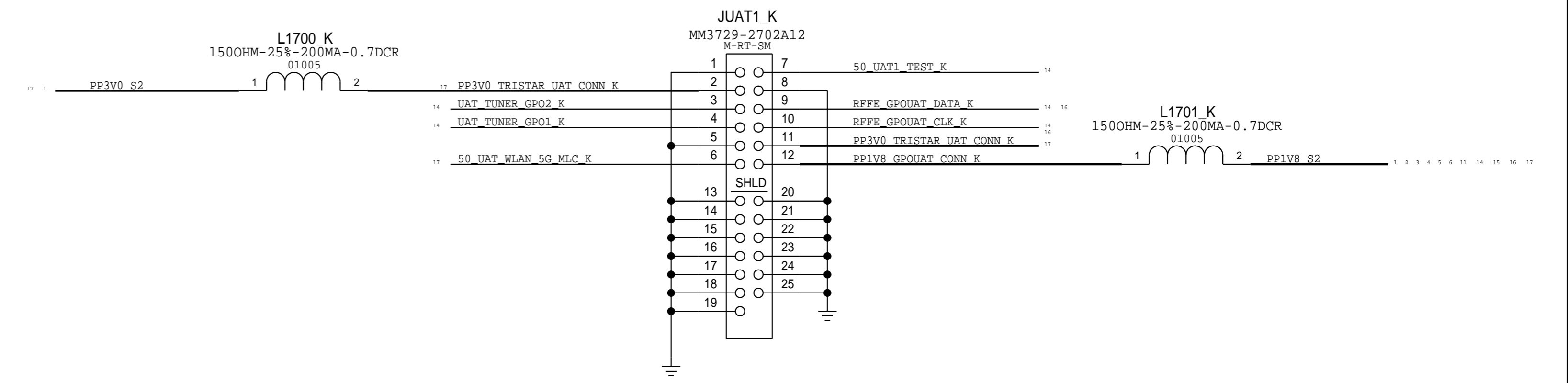
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RF CONNECTORS AND METROCIRC

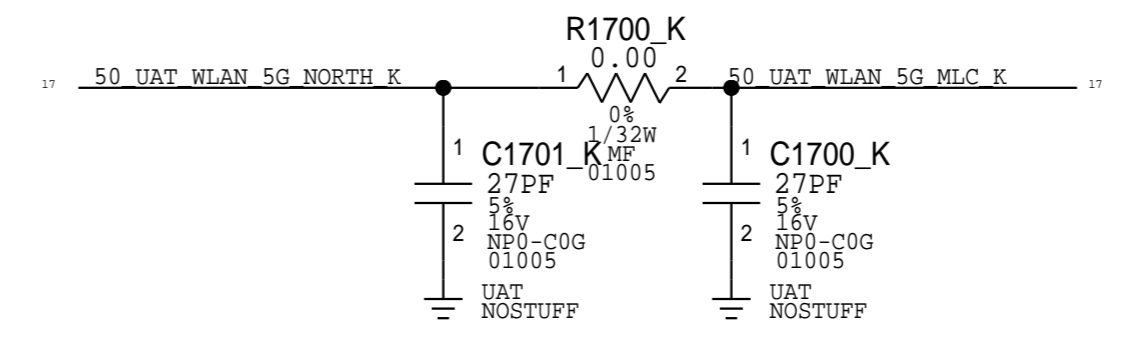
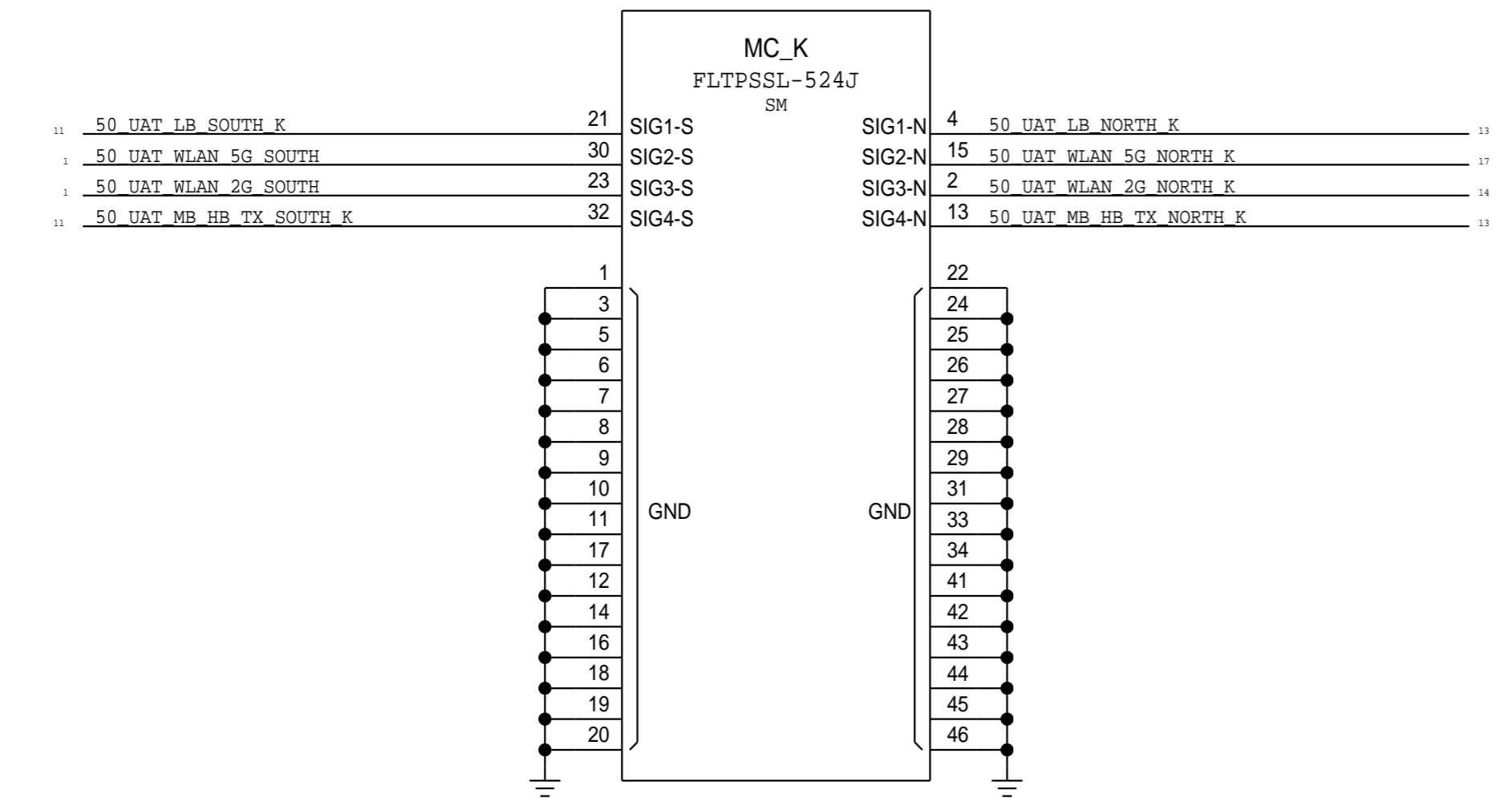
LAT MLC



UAT1 MLC



4-IN-1 METROCIRC CABLE



1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
 2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
 3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.

REV	ECN	DESCRIPTION OF REVISION	CK APPD	DATE
7	0008448938	ENGINEERING RELEASED		2017-04-11

D22/D221 WIFI_MLB (GUINNESS)

APR 03, 2017

PDF PAGE	CSA PAGE	CONTENTS
2	76	GUINNESS
3	77	WIFI FRONT-END

POWER

- 12 IN PP_VDD_MAIN
- 12 IN PPIV8_S2

CLOCKS

- 12 IN PMU_TO_WLAN_CLK32K
- 12 IN WLAN_TO_AP_TIME_SYNC

CONTROL

- 12 IN PMU_TO_WLAN_REG_ON
- 12 IN PMU_TO_BT_REG_ON
- 12 OUT BT_TO_PMU_HOST_WAKE
- 12 IN AP_TO_BT_WAKE

WLAN PCIE

- 12 IN 90_PCIE_AP_TO_WLAN_REFCLK_P
- 12 IN 90_PCIE_AP_TO_WLAN_REFCLK_N
- 12 IN 90_PCIE_AP_TO_WLAN_TXD_P
- 12 IN 90_PCIE_AP_TO_WLAN_TXD_N
- 12 OUT 90_PCIE_WLAN_TO_AP_RXD_P
- 12 OUT 90_PCIE_WLAN_TO_AP_RXD_N
- 12 IN PCIE_AP_TO_WLAN_RESET_L
- 12 TO PCIE_WLAN_BI_AP_CLKREQ_L
- 12 OUT WLAN_TO_PMU_HOST_WAKE
- 12 IN AP_TO_WLAN_DEVICE_WAKE

WLAN UART

- 12 OUT UART_WLAN_TO_AP_RXD
- 12 IN UART_AP_TO_WLAN_TXD
- 12 OUT UART_WLAN_TO_AP_CTS_L
- 12 IN UART_AP_TO_WLAN_RTS_L

BLUETOOTH UART

- 12 IN UART_AP_TO_BT_TXD
- 12 OUT UART_BT_TO_AP_RXD
- 12 IN UART_AP_TO_BT_RTS_L
- 12 OUT UART_BT_TO_AP_CTS_L

AOP

- 12 IN AOP_TO_WLAN_CONTEXT_A
- 12 IN AOP_TO_WLAN_CONTEXT_B

COEX

- 12 IN UART_BB_TO_WLAN_COEX
- 12 OUT UART_WLAN_TO_BB_COEX

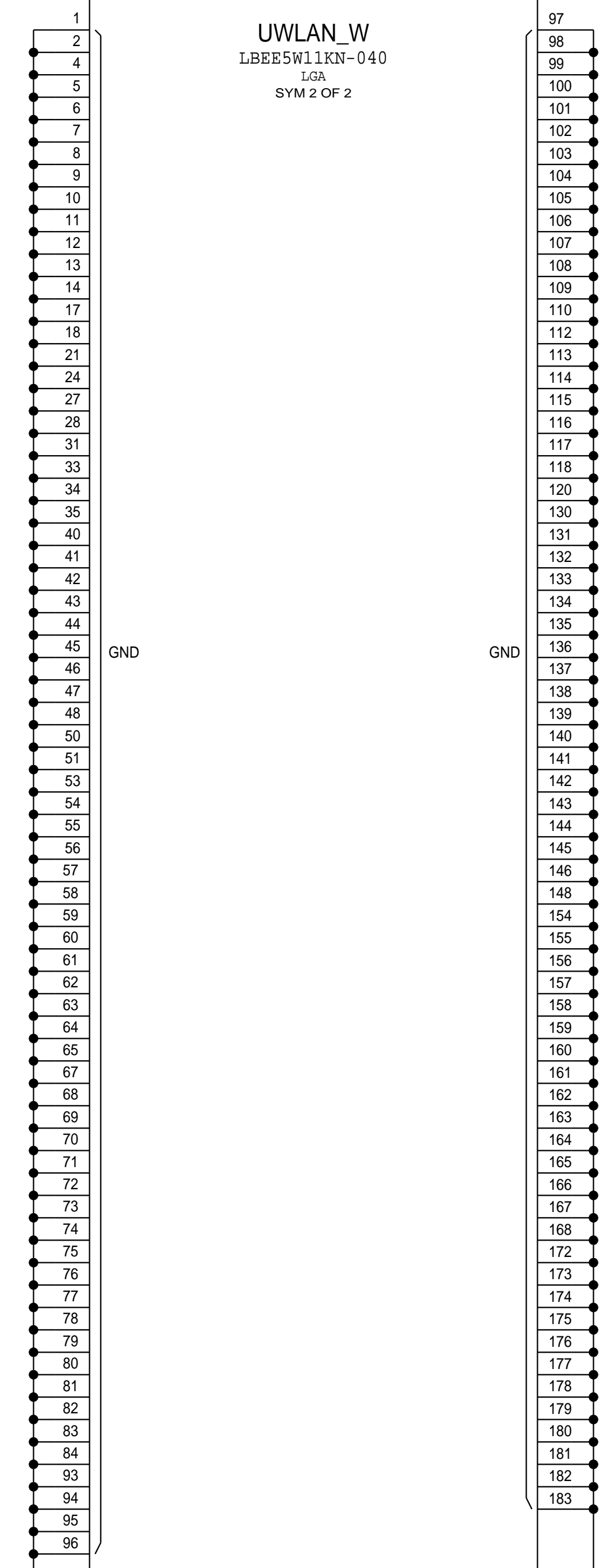
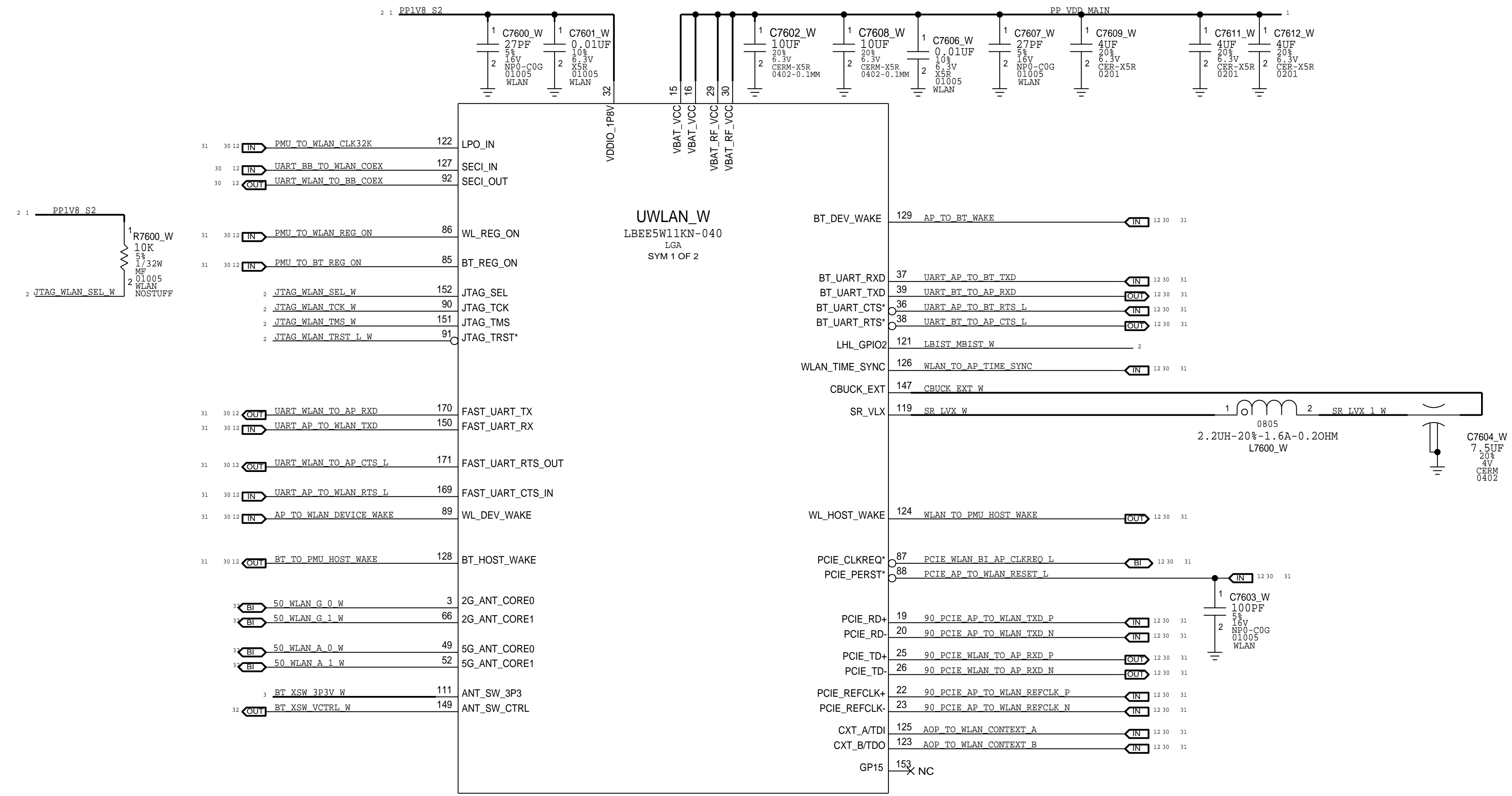
ANTENNA

- 3 TO 50_UAT_WLAN_2G_SOUTH
- 3 TO 50_UAT_WLAN_5G_SOUTH
- 3 TO 50_LAT_WLAN

SymbolPorts

DRAWING TITLE		SCH, MLB, BOT, X893	
Apple Inc.	DRAWING NUMBER	051-02247	SIZE D
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		PAGE	1 OF 5
		SHEET	30 OF 34

WIFI/BT



REF DES	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
1 AOP TO WLAN CONTEXT A	PP7600 W	F2MM-NSM OMIT	1 AOP TO WLAN CONTEXT B	PP7601 W
1 AOP TO WLAN CONTEXT B	PP7601 W	F2MM-NSM OMIT	1 AOP TO WLAN TXD	PP7604 W
1 AOP TO WLAN TXD	PP7604 W	F2MM-NSM OMIT	1 JTAG WLAN TCK W	PP7605 W
1 JTAG WLAN TCK W	PP7605 W	F2MM-NSM OMIT	1 JTAG WLAN TMS W	PP7606 W
1 JTAG WLAN TMS W	PP7606 W	F2MM-NSM OMIT	1 JTAG WLAN TRST L W	PP7607 W
1 JTAG WLAN TRST L W	PP7607 W	F2MM-NSM OMIT	1 AP TO WLAN DEVICE WAKE	PP7608 W
1 AP TO WLAN DEVICE WAKE	PP7608 W	F2MM-NSM OMIT	1 BT TO PMU HOST WAKE	PP7609 W
1 BT TO PMU HOST WAKE	PP7609 W	F2MM-NSM OMIT	1 PMU TO WLAN CLK32K	PP7610 W
1 PMU TO WLAN CLK32K	PP7610 W	F2MM-NSM OMIT	1 WLAN TO PMU HOST WAKE	PP7611 W
1 WLAN TO PMU HOST WAKE	PP7611 W	F2MM-NSM OMIT	1 90 PCIE AP TO WLAN REFCLK P	PP7612 W
1 90 PCIE AP TO WLAN REFCLK P	PP7612 W	F2MM-NSM OMIT	1 90 PCIE AP TO WLAN TXD P	PP7614 W
1 90 PCIE AP TO WLAN TXD P	PP7614 W	F2MM-NSM OMIT	1 90 PCIE AP TO WLAN TXD N	PP7615 W
1 90 PCIE AP TO WLAN TXD N	PP7615 W	F2MM-NSM OMIT	1 PCIE AP TO WLAN RESET L	PP7616 W
1 PCIE AP TO WLAN RESET L	PP7616 W	F2MM-NSM OMIT	1 JTAG WLAN SEL W	PP7617 W
1 JTAG WLAN SEL W	PP7617 W	F2MM-NSM OMIT	1 90 PCIE WLAN TO AP RXD P	PP7621 W
1 90 PCIE WLAN TO AP RXD P	PP7621 W	F2MM-NSM OMIT	1 90 PCIE WLAN TO AP RXD N	PP7622 W
1 90 PCIE WLAN TO AP RXD N	PP7622 W	F2MM-NSM OMIT	1 90 PCIE AP TO WLAN REFCLK P	PP7623 W
1 90 PCIE AP TO WLAN REFCLK P	PP7623 W	F2MM-NSM OMIT	1 90 PCIE AP TO WLAN REFCLK N	PP7624 W
1 90 PCIE AP TO WLAN REFCLK N	PP7624 W	F2MM-NSM OMIT	1 UART AP TO BT TXD	PP7625 W
1 UART AP TO BT TXD	PP7625 W	F2MM-NSM OMIT	1 UART BT TO AP RXD	PP7626 W
1 UART BT TO AP RXD	PP7626 W	F2MM-NSM OMIT	1 UART AP TO BT RTS L	PP7627 W
1 UART AP TO BT RTS L	PP7627 W	F2MM-NSM OMIT	1 UART BT TO AP CTS L	PP7631 W
1 UART BT TO AP CTS L	PP7631 W	F2MM-NSM OMIT		

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
998-10376	998-10147	BOM_TABLE_ALTS	UWLAN_W	USI ES6.1 WIFI MODULE

SYNC_MASTER=WIFI SYNC_DATE=01/30/2014

PAGE TITLE

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Apple Inc.

DRAWING NUMBER: 051-02247 SIZE: D

REVISION: 7.0.0

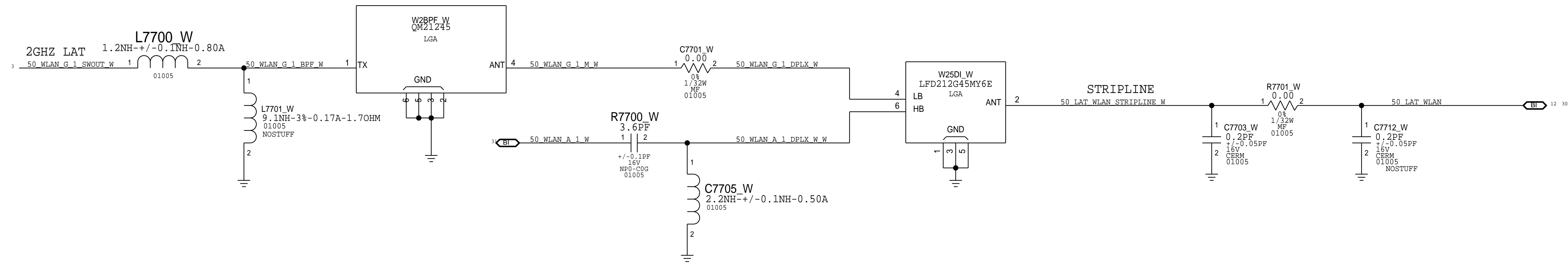
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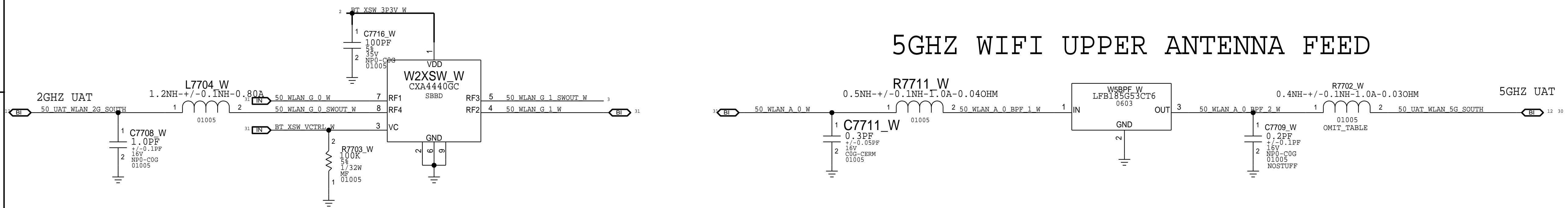
SHEET: 31 OF 34

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WIFI LOWER ANTENNA FEED



5GHZ WIFI UPPER ANTENNA FEED



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S0161	1	5GHZ CO BPF OUTPUT MATCH	R7702_W	CRITICAL	D221
152S00498	1	5GHZ CO BPF OUTPUT MATCH	R7702_W	CRITICAL	ROW
152S00498	1	5GHZ CO BPF OUTPUT MATCH	R7702_W	CRITICAL	JFN

PAGE TITLE		
WiFiANTFeeds		
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	REVISION	7.0.0
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	PAGE	5 OF 5
	SHEET	32 OF 34

8

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4

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2

1

1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
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REV	ECN	DESCRIPTION OF REVISION	CK APPD	DATE
7	0008448938	ENGINEERING RELEASED		2017-04-11


D22 NFC_MLB

MARCH 22, 2017

14	IN	PP_VDD_MAIN
14	IN	PP1V8_S2
14	IN	PMU_TO_NFC_EN
14	OUT	NFC_TO_PMU_HOST_WAKE
14	IN	AP_TO_NFC_DEV_WAKE
14	IN	AP_TO_NFC_FW_DWLD_REQ
14	OUT	NFC_TO_BB_CLK_REQ
14	IN	BB_TO_NFC_CLK
14	IN	NFC_DWP_TX_TP_S
14	IN	UART_AP_TO_NFC_TXD
14	OUT	UART_NFC_TO_AP_RXD
14	IN	UART_AP_TO_NFC_RTS_L
14	OUT	UART_NFC_TO_AP_CTS_L
14	IO	NFC_SWP1

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	3	CAP,SOFT-TERM,2.2UF,6.3V,0201	C7500_S,C7502_S,C7505_S	CRITICAL	SOFT_CAP
138S0831	3	CAP,TYPICAL,2.2UF,6.3V,0201	C7500_S,C7502_S,C7505_S	CRITICAL	TYPICAL_CAP

page1

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	PAGE	1 OF 75	
	SHEET	33 OF 34	

8

7

6

5

4

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2

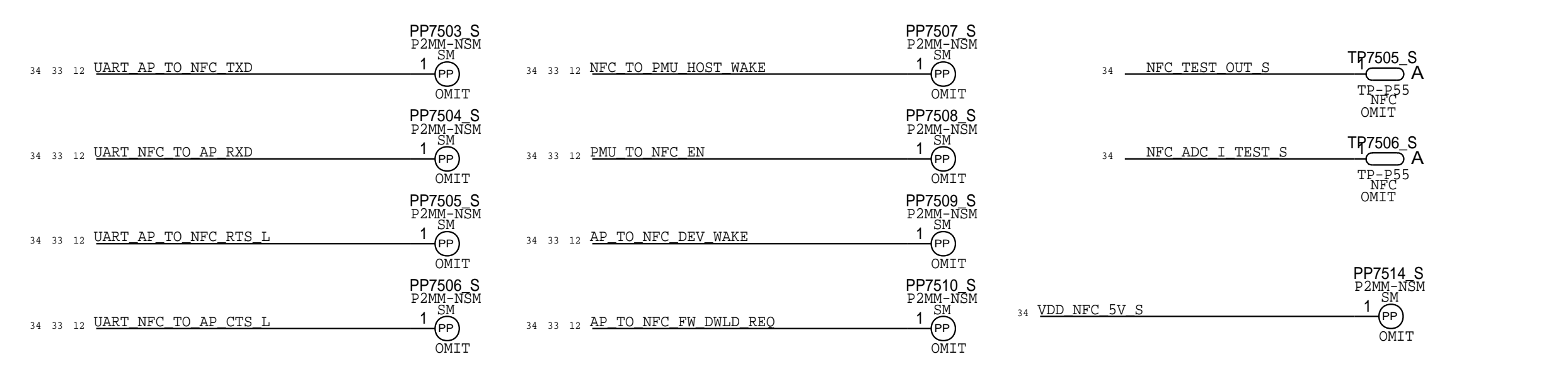
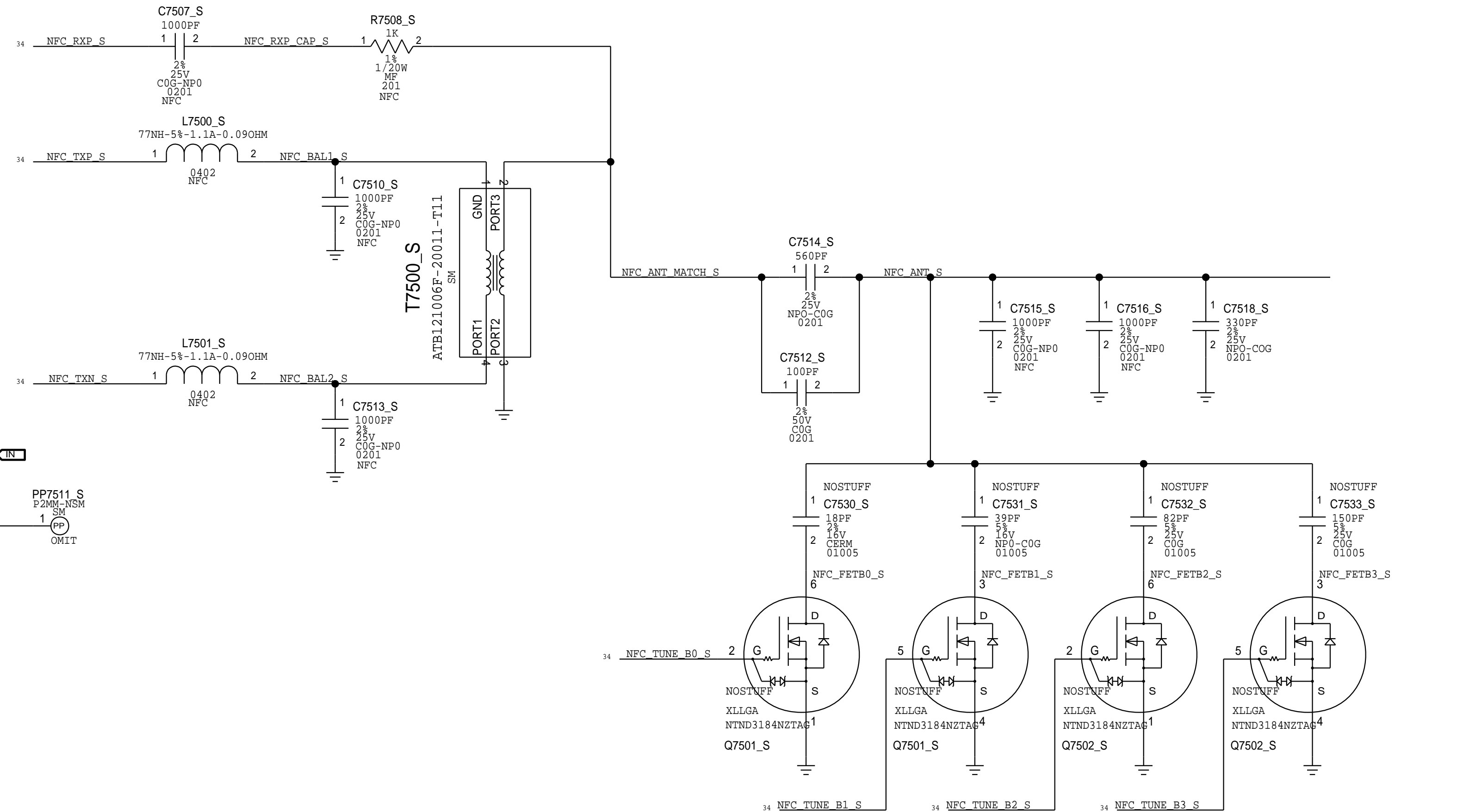
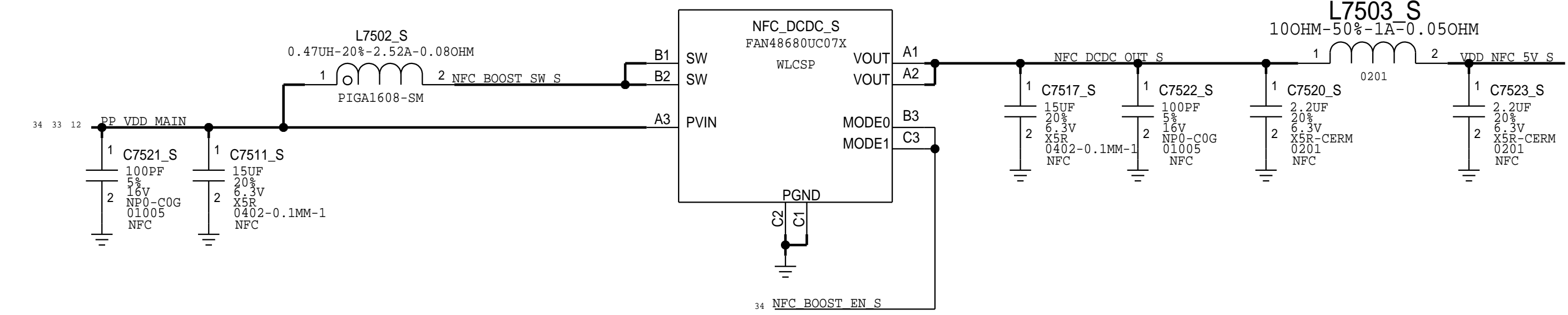
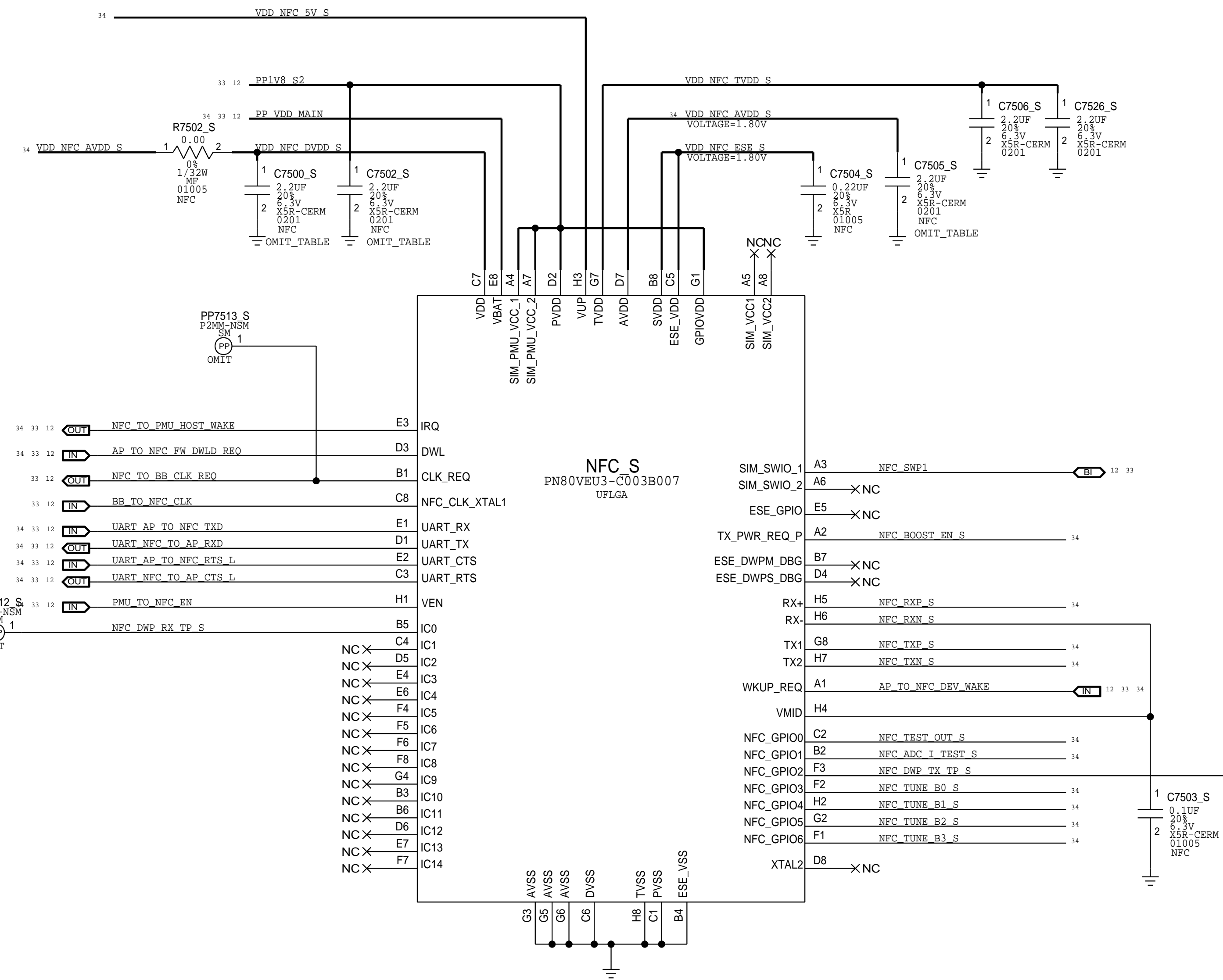
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STOCKHOLM

5V BOOSTER

NFC CONTROLLER

NFC FRONT END



PAGE TITLE		NFC	
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		REVISION	7.0.0
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		PAGE	75 OF 75
		SHEET	34 OF 34