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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																							
10												0008927012												ENGINEERING RELEASED												2017-06-06																																																											
D21 MLB - DVT (OK2FAB)																																																																																															
LAST_MODIFICATION= Tue Jun 6 18:57:04 2017																																																																																															
PAGE CSA CONTENTS																								SYNC												DATE												PAGE CSA CONTENTS																								SYNC												DATE											
1 1 TABLE OF CONTENTS																								sync												06/19/2016												46 62 I/O: USB PD																								sync												04/14/2017											
2 2 SYSTEM: BOM TABLES (1/2)																								sync												02/24/2017												47 63 I/O: Hydra																								sync												04/14/2017											
3 3 SYSTEM: BOM TABLES (2/2)																								test_mlb												03/17/2017												48 64 I/O: B2B DOCK																								sync												10/10/2016											
4 4 SYSTEM:MECH COMPONENTS																								sync												04/14/2017												49 65 SYSTEM: I2C MAP																								sync												04/14/2017											
5 5 SYSTEM: Testpoints																								sync												04/14/2017												50 80																								D21_MLB_DOE												07/18/2016											
6 6 BOOTSTRAPPING																								sync												09/19/2016												51 1 page1																																															
7 10 SOC: JTAG,USB,XTAL																								sync												04/14/2017												52 75 NFC																																															
8 11 SOC: PCIE																								sync												04/14/2017												53 1 FRONT PAGE																																															
9 12 SOC: MIPI + ISP																								sync												04/14/2017												54 2 HIERARCHY																																															
10 13 SOC: LPDP																								sync												04/14/2017												55 3 PMIC: BUCKS & LDOS																																															
11 14 SOC: SERIAL + SMC																								sync												04/14/2017												56 4 PMIC: CLOCKS & CONTROL																																															
12 15 SOC: GPIO + UART																								sync												04/14/2017												57 5 BB: POWER																																															
13 16 SOC: AOP																								sync												04/14/2017												58 6 BB: CONTROL & HS PERIPHERALS [6]																																															
14 17 SOC: Power (1/3)																								sync												04/14/2017												59 7 BB: GPIOs & QLINK																																															
15 18 SOC: Power (2/3)																								sync												04/14/2017												60 8 XCVR																																															
16 19 SOC: Power (3/3)																								sync												04/14/2017												61 9 XCVR																																															
17 26 NAND																								sync												04/14/2017												62 10 QPOET MODULE																																															
18 27 SYSTEM POWER: PMU Bucks (1/4)																								sync												04/14/2017												63 11 LB PAD																																															
19 28 SYSTEM POWER: PMU Bucks (2/4)																								sync												04/14/2017												64 12 HB PAD																																															
20 29 SYSTEM POWER: PMU LDos (3/4)																								sync												04/14/2017												65 13 UHB PAD																																															
21 30 SYSTEM POWER: PMU (4/4)																								sync												04/14/2017												66 14 2G PA																																															
22 31 SYSTEM POWER: Boost																								sync												04/14/2017												67 15 LB DSM																																															
23 32 SYSTEM POWER: B2B Battery																								sync												04/14/2017												68 16 HB DSM																																															
24 33 SYSTEM POWER: Charger																								sync												04/14/2017												69 17 COUPLER2																																															
25 34 SYSTEM POWER: Iktara																								sync												04/14/2017												70 18 LOWER ANTENNA																																															
26 35 SYSTEM POWER: B2B Cyclone																								sync												04/14/2017												71 19 UPPER ANTENNA																																															
27 36 SENSORS																								sync												04/14/2017												72 20 GNSS																																															
28 37 CAMERA: PMU (1/2)																								sync												04/14/2017												73 21 SIM, DEBUG CONN																																															
29 38 CAMERA: PMU (2/2)																								sync												04/14/2017												PROBE POINTS												07/18/2016																																			
30 39 CAMERA: B2B Wide (KY)																								sync												04/14/2017												74 1 FRONT PAGE																																															
31 40 CAMERA: B2B Tele (TN)																								sync												04/14/2017												76 2 METROCIRC																																															
32 41 CAMERA: Strobe Drivers																								sync												04/14/2017												77 3 UAT MATCH AND TUNER																																															
33 42 CAMERA: FCAM + FOREHEAD																								sync												04/14/2017												78 4 RFFE TO GPO TRANSLATOR																																															
34 43 CAMERA: B2B Strobe + Buttons																								sync												04/14/2017												79 1 SymbolPorts																																															
35 47 AUDIO: CODEC (1/2)																								sync												04/14/2017												80 4 Guinness																								WIFI												11/28/2016											
36 48 AUDIO: CODEC (2/2)																								sync												04/14/2017												81 5 WiFiANTFeeds																																				11/28/2016											
37 49 AUDIO: Speaker Amp Bottom																								sync												04/14/2017																																																											
38 50 AUDIO: Speaker Amp Top																								sync												04/14/2017																																																											
39 51 ARC: Driver																								sync												04/14/2017																																																											
40 55 CG: Niki																								sync												04/14/2017																																																											
41 56 CG: PMUs																								sync												04/14/2017																																																											
42 57 CG: B2B DISPLAY + TOUCH																								sync												04/14/2017																																																											
43 58 CG: B2B ORB + MESA																								sync												04/14/2017																																																											
44 59 I/O: Overvoltage Cut-Off Circuit																								sync												04/14/2017																																																											
45 61 I/O: Accessory Buck																								sync												04/14/2017																																																											
Sub Designs																																																																																															
PART# QTY DESCRIPTION REFERENCE DESIGNATOR(S) BOM OPTION												SOURCE PROJECT SUB-DESIGN NAME VERSION HARD/ SOFT SYNC_DATE/TIME																																																																																			
051-02159 1 SCH_MLB_D21 SCH ?												D21 RADIO_MLB 0.122.0 S 2017_06_06_17:14:31																																																																																			
820-00846 1 PCBF_MLB_D21 PCB ?												D20 NFC_MLB 0.50.0 S 2017_05_26_07:54:42																																																																																			
												D21 WIFI_MLB 0.20.0 S 2017_05_16_02:56:32																																																																																			
												D21 RADIO_MLB_FF 0.35.0 S 2017_06_02_14:56:02																																																																																			
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EEEE Codes

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7691	1	EEEE FOR (MLB, 639-94441, JP, ULTRA)	EEEE_J08R	CRITICAL	EEEE_ULTIMATE
825-7691	1	EEEE FOR (MLB, 639-93377, JP, EXTREME)	EEEE_HNV8	CRITICAL	EEEE_EXTREME
825-7691	1	EEEE FOR (MLB, 639-94442, ROW, ULTRA)	EEEE_J08X	CRITICAL	EEEE_ULTIMATE_ROW
825-7691	1	EEEE FOR (MLB, 639-93389, ROW, EXTREME)	EEEE_HNVF	CRITICAL	EEEE_EXTREME_ROW

D21x Specific

D21x Specific

D21x Specific

D21x Specific

SOC

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00416	1	SoC, H, 3GB 21nm DDR, B1	U1000	CRITICAL	COMMON

D21x Specific

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00415	339S00416	BOM_TABLE_ALTS	U1000	SoC, M, 3GB 20nm DDR, B1
339S00417	339S00416	BOM_TABLE_ALTS	U1000	SoC, S, 3GB 20nm DDR, B1
339S00418	339S00416	BOM_TABLE_ALTS	U1000	SoC, S, 3GB 1xnm DDR, B1
339S00429	339S00416	BOM_TABLE_ALTS	U1000	SoC, H, 3GB 20nm DDR, B1
339S00430	339S00416	BOM_TABLE_ALTS	U1000	SoC, M, 3GB 20nm DDR, B1
339S00431	339S00416	BOM_TABLE_ALTS	U1000	SoC, S, 3GB 20nm DDR, B1
339S00432	339S00416	BOM_TABLE_ALTS	U1000	SoC, S, 3GB 18nm DDR, B1

SIPs

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339M00011	339M00010	BOM_TABLE_ALTS	M5500	NIKI, STATS SIP
339M00013	339M00012	BOM_TABLE_ALTS	M4100	HUNT, STATS SIP

D21x Specific

SOFT-TERM CAP SUB BOMS

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
685-00152	685-00151	BOM_TABLE_ALTS	SUBBOM_CAP	SUBBOM_MLB, CAP, SOFT, D21
138S00049	138S0031	TYPICAL_CAP	ALL	CAP, 0201, 2.2UF, 6.3V, KYOCERA

To enable alt in SUBBOM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
685-00151	1	SUBBOM_MLB, SOFT-TERM, D21	SUBBOM_CAP		
ADRES OUTPUT	138S00159	9	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C2060, C2061, C2063, C2065, C2067, C2068, C2063	SOFT_CAP
	138S0031	9	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C2060, C2061, C2063, C2065, C2067, C2068, C2063	TYPICAL_CAP
ADRES INPUT	138S00159	15	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C3951, C3952, C3954, C3956, C3957, C3958, C3960	SOFT_CAP
	138S0031	15	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C3951, C3952, C3954, C3956, C3957, C3958, C3960	TYPICAL_CAP
	138S00159	10	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C3969, C3970, C3971, C3972, C3973, C3974, C3975, C3976, C3977	SOFT_CAP
	138S0031	10	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C3969, C3970, C3971, C3972, C3973, C3974, C3975, C3976, C3977	TYPICAL_CAP
12	138S00159	2	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C3351, C3352	SOFT_CAP
	138S0031	2	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C3351, C3352	TYPICAL_CAP
SENSORS	138S00159	3	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C3602, C3611, C3622	SOFT_CAP
	138S0031	3	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C3602, C3611, C3622	TYPICAL_CAP
ANGEL INPUT	138S00159	5	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C3791, C3795-C3798	SOFT_CAP
	138S0031	5	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C3791, C3795-C3798	TYPICAL_CAP
RCAR S205	138S00159	3	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C3909, C3925, C3926	SOFT_CAP
	138S0031	3	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C3909, C3925, C3926	TYPICAL_CAP
FOREHEAD S205	138S00159	2	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C4250, C4261	SOFT_CAP
	138S0031	2	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C4250, C4261	TYPICAL_CAP
STORAGE S205	138S00159	1	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C4303	SOFT_CAP
	138S0031	1	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C4303	TYPICAL_CAP
AUDIO	138S00159	5	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C4805, C4809, C4914, C4926, C4929	SOFT_CAP
	138S0031	5	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C4805, C4809, C4914, C4926, C4929	TYPICAL_CAP
	138S00159	5	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C5016, C5018, C5134, C5029, C5136	SOFT_CAP
	138S0031	5	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C5016, C5018, C5134, C5029, C5136	TYPICAL_CAP
MOJAVE	138S00159	1	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C5611	SOFT_CAP
	138S0031	1	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C5611	TYPICAL_CAP
DISPLAY S205	138S00159	4	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C5706, C5709, C5716, C5721	SOFT_CAP
	138S0031	4	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C5706, C5709, C5716, C5721	TYPICAL_CAP
DRS/MESA S205	138S00159	5	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C5802, C5804, C5811, C5808	SOFT_CAP
	138S0031	5	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C5802, C5804, C5811, C5808	TYPICAL_CAP
RAMBA L00	138S00159	1	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C5890	SOFT_CAP
	138S0031	1	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C5890	TYPICAL_CAP
ACC. BUSX OUTPUT	138S00159	5	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C6326, C6321, C6322, C6323, C6324	SOFT_CAP
	138S0031	5	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C6326, C6321, C6322, C6323, C6324	TYPICAL_CAP
	138S00160	4	CAP, SOFT-TERM, 10UF, 10V, 0402, MURATA	C4907, C4903, C4904, C4931	SOFT_CAP
	138S0079	4	CAP, TYPICAL, 10UF, 10V, 0402, MUR/KYO	C4907, C4903, C4904, C4931	TYPICAL_CAP
CHESTNUT L00	138S00160	5	CAP, SOFT-TERM, 10UF, 10V, 0402, MURATA	C5600, C5602, C5603, C5702, C5703	SOFT_CAP
	138S0079	5	CAP, TYPICAL, 10UF, 10V, 0402, MUR/KYO	C5600, C5602, C5603, C5702, C5703	TYPICAL_CAP
RCAR (TELE)	138S00159	2	CAP, SOFT-TERM, 2.2UF, 6.3V, 0201, KYOCERA	C4025, C4026	SOFT_CAP
	138S0031	2	CAP, TYPICAL, 2.2UF, 6.3V, 0201, MURATA	C4025, C4026	TYPICAL_CAP

Default is typical

D21x Specific

D21x Specific

IKTARA DIODES SUB BOMS

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
685-00172	685-00171	BOM_TABLE_ALTS	SUBBOM_DS	SUBBOM_MLB, SHOTTKY DIODES, 0509E1, D21

#31550972: Update Iktara Diodes APNs

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
685-00171	1	SUBBOM_MLB, SHOTTKY DIODES, DIODES, D21	SUBBOM_DS		
371S00133	4	DIODES, SHOTTKY DIODE, 30V, 2A, 9603	D3400, D3401, D3402, D3403		DIODES_DS
371S00132	4	ONSEMI, SHOTTKY DIODE, 30V, 2A, 9603	D3400, D3401, D3402, D3403		ONSEMI_DS

Footprint is ONSEMI

Primary is DIODES

PAGE TITLE			
SYSTEM: BOM TABLES (1/2)			
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NAND BOM Options

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00287	1	NAND, H, ULTRA, TLC	U2600	CRITICAL	ULTIMATE
335S00240	1	NAND, H, EXTREME, TLC	U2600	CRITICAL	EXTREME

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S00284	335S00287	BOM_TABLE_ALTS	U2600	T, 1z, ULTIMATE
335S00285	335S00287	BOM_TABLE_ALTS	U2600	T, B1CS3, ULTIMATE
335S00288	335S00287	BOM_TABLE_ALTS	U2600	S, B1CS3, ULTIMATE
335S00286	335S00287	BOM_TABLE_ALTS	U2600	SS, 3Dv4, ULTIMATE
335S00228	335S00240	BOM_TABLE_ALTS	U2600	T, B1CS3, EXTREME
335S00247	335S00240	BOM_TABLE_ALTS	U2600	S, B1CS3, EXTREME
335S00276	335S00240	BOM_TABLE_ALTS	U2600	SS, 3Dv4, EXTREME

Isolator Switch

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
311S00126	311S00114	BOM_TABLE_ALTS	ALL	SPDT, TI

Mamba LDO

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S00932	353S00576	BOM_TABLE_ALTS	U5890	STMICRO LDO

Load Switch

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S00999	353S01039	BOM_TABLE_ALTS	U6100	T1, LOAD SW, TPS22915C
353S01097	353S01039	BOM_TABLE_ALTS	U6100	ONSEMI, LOAD SW, MCP333

Crystal Alts

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	CRITICAL PART#	COMMENT
197S00128	197S00118	BOM_TABLE_ALTS	Y1000	NDK, XTAL, 24MHz, 1.6x1.2	197S00118	XTAL, 24M, 1612, TDK
197S00126	197S00118	BOM_TABLE_ALTS	Y1000	EPSON, XTAL, 24MHz, 1.6x1.2	197S0612	XTAL, 24M, 1612, NDK
					197S00120	XTAL, 24M, 1612, EPSON

PMID1 Zener Diode

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
371S00121	371S00030	BOM_TABLE_ALTS	DZ3300	DIODE, ZENER, 20V

ZRB Caps

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00803	1	1uF, 25V, 0402, X5R, 10%	C3301	CRITICAL	COMMON

CRITICAL PART#	COMMENT
138S00185	MUR, CAP, ZRB, 2.2UF, 25V, 0402
138S00186	MUR, CAP, ZRB, 4.7UF, 25V, 0603

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, X5R, 4.7UF, 6.3V, 0.30MM, 0402, 100%0
138S00024	138S0066	BOM_TABLE_ALTS	ALL	CAP, CER, 3.3UF, 1.5V, 20%, 4V, 0402, 1400000
138S0706	138S0739	BOM_TABLE_ALTS	ALL	CAP, CER, 10P, 20V, 20%, 10V, 0501, 00000A
138S0945	138S0739	BOM_TABLE_ALTS	ALL	CAP, CER, 10P, 20V, 20%, 10V, 0501, 00000A
138S0739	138S0706	BOM_TABLE_ALTS	ALL	CAP, CER, X5R, 0.220F, 20%, 6.3V, 20%
132S0436	132S0400	BOM_TABLE_ALTS	ALL	CAP, X5R, X5R, 0.220F, 20%, 6.3V, 0500
138S00133	138S00128	BOM_TABLE_ALTS	ALL	CAP, CER, X5R, 4.7UF, 20%, 6.3V, 01005
138S00148	138S00150	BOM_TABLE_ALTS	ALL	CAP, 0402, 150F, 4V, KYOCERA
138S00149	138S00150	BOM_TABLE_ALTS	ALL	CAP, 0402, 140F, 4V, MURATA
138S00151	138S00150	BOM_TABLE_ALTS	ALL	CAP, 0402, 150F, 4V, TAIYO
138S00144	138S00143	BOM_TABLE_ALTS	ALL	CAP, 0402, 280F, 4V, MURATA
138S00143	138S00144	BOM_TABLE_ALTS	ALL	CAP, 0402, 220F, 4V, KYOCERA
138S00139	138S00138	BOM_TABLE_ALTS	ALL	CAP, 0201, 4UF, 4V, MURATA
138S00138	138S00139	BOM_TABLE_ALTS	ALL	CAP, 0201, 4.7UF, 4V, KYOCERA
138S00145	138S00146	BOM_TABLE_ALTS	ALL	CAP, 0402, 280F, 6.3V, KYOCERA
138S00141	138S00140	BOM_TABLE_ALTS	ALL	CAP, 0201, 4UF, 6.3V, MURATA
138S00142	138S00140	BOM_TABLE_ALTS	ALL	CAP, 0201, 3UF, 6.3V, SAMSUNG
138S00142	138S00141	BOM_TABLE_ALTS	ALL	CAP, 0201, 3UF, 6.3V, SAMSUNG
138S00049	138S00831	BOM_TABLE_ALTS	ALL	CAP, 0201, 2.2UF, 6.3V, KYOCERA
138S00163	138S00143	BOM_TABLE_ALTS	ALL	CAP, 0402, 220F, 4V, TY
138S00164	138S00138	BOM_TABLE_ALTS	ALL	CAP, 0201, 4UF, 4V, TY
138S00165	138S00146	BOM_TABLE_ALTS	ALL	CAP, 0402, 280F, 6.3V, TY
138S00166	138S00140	BOM_TABLE_ALTS	ALL	CAP, 0201, 4UF, 6.3V, TY
138S00140	138S00141	BOM_TABLE_ALTS	ALL	CAP, 0201, 4UF, 6.3V, KYO
138S00048	138S00003	BOM_TABLE_ALTS	ALL	CAP, X5R, 150F, 6.3V, 0.30MM, 0402, X5R
132S0639	132S00008	BOM_TABLE_ALTS	ALL	CAP, X5R, 0.47UF, 25V, 0.20MM, 0201, X5R

CRITICAL PART#	COMMENT
118S0717	RES, 3.92K, 0.1%, 0201
138S0652	CAP, X5R, 4.7UF, 6.3V, 0.30MM, 0402
138S0706	CAP, CER, X5R, 1UF, 20%, 6.3V, 0201
132S0400	CAP, CER, X5R, 0.22UF, 20%, 6.3V, 01005
138S0831	CAP, CER, X5R, 2.2UF, 20%, 6.3V, 0201
138S00128	CAP, CER, X5R, 0.47UF, 20%, 6.3V, 01005

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 Alternates

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S00581	155S00067	BOM_TABLE_ALTS	ALL	FERR, 240OHM, 0.300MM DCR, 0201
155S00194	155S00610	BOM_TABLE_ALTS	ALL	FERR BD, 150OHM, TDK
155S00200	155S00610	BOM_TABLE_ALTS	ALL	FERR BD, 150OHM, TY
152S00558	152S00657	BOM_TABLE_ALTS	ALL	IND, 0.47UH, 20%, 2.5A, 60MO, 100%0, 100%
152S00655	152S00656	BOM_TABLE_ALTS	ALL	IND, MLD, 1.0UH, 20%, 3A, 60MO, H=0.5, 2012, TY
152S00653	152S00651	BOM_TABLE_ALTS	ALL	IND, MLD, 1.2UH, 2.5A, 180MO
152S00654	152S00652	BOM_TABLE_ALTS	ALL	IND, MLD, 1.2UH, 2.5A, 1A, 150MO, H=0.5, 2012, TY
155S00012	155S00168	BOM_TABLE_ALTS	ALL	FLTR, 05 OHMS, 0005
152S00710	152S00617	BOM_TABLE_ALTS	ALL	IND, 0.10H, 20MOHM, 6.3A, 1600, H=0.05
152S00711	152S00619	BOM_TABLE_ALTS	ALL	IND, 0.10H, 210MOHM, 7.2A, 2012, H=0.05
152S00713	152S00621	BOM_TABLE_ALTS	ALL	IND, 0.47UH, 20MOHM, 3.5A, 2012, H=0.05
152S00714	152S00622	BOM_TABLE_ALTS	ALL	IND, 1UH, 180MOHM, 2.1A, 2012, H=0.05
152S00716	152S00626	BOM_TABLE_ALTS	ALL	IND, 1UH, 70MOHM, 2.5A, 2012, H=0.00
152S00717	152S00631	BOM_TABLE_ALTS	ALL	IND, 1UH, 60MOHM, 3.2A, 2016, H=0.00
152S00718	152S00632	BOM_TABLE_ALTS	ALL	IND, 1UH, 52MOHM, 3.2A, 2016, H=0.00
152S00719	152S00639	BOM_TABLE_ALTS	ALL	IND, 0.47UH, 100MOHM, 3.5A, 2012, H=0.05
152S00720	152S00640	BOM_TABLE_ALTS	ALL	IND, 0.47UH, 100MOHM, 3.5A, 2012, H=0.05
152S00721	152S00641	BOM_TABLE_ALTS	ALL	IND, 1UH, 60MOHM, 3.5A, 2016, H=0.00
155S00338	155S00661	BOM_TABLE_ALTS	ALL	FERR BD, 330HM, 1.5A, 100MM DCR, 0201
155S00340	155S00876	BOM_TABLE_ALTS	ALL	FERR BD, 330HM, 1.5A, 100MM DCR, 0201
155S00339	155S00660	BOM_TABLE_ALTS	ALL	FERR BD, 220HM, 1.5A, 400MM DCR, 0201

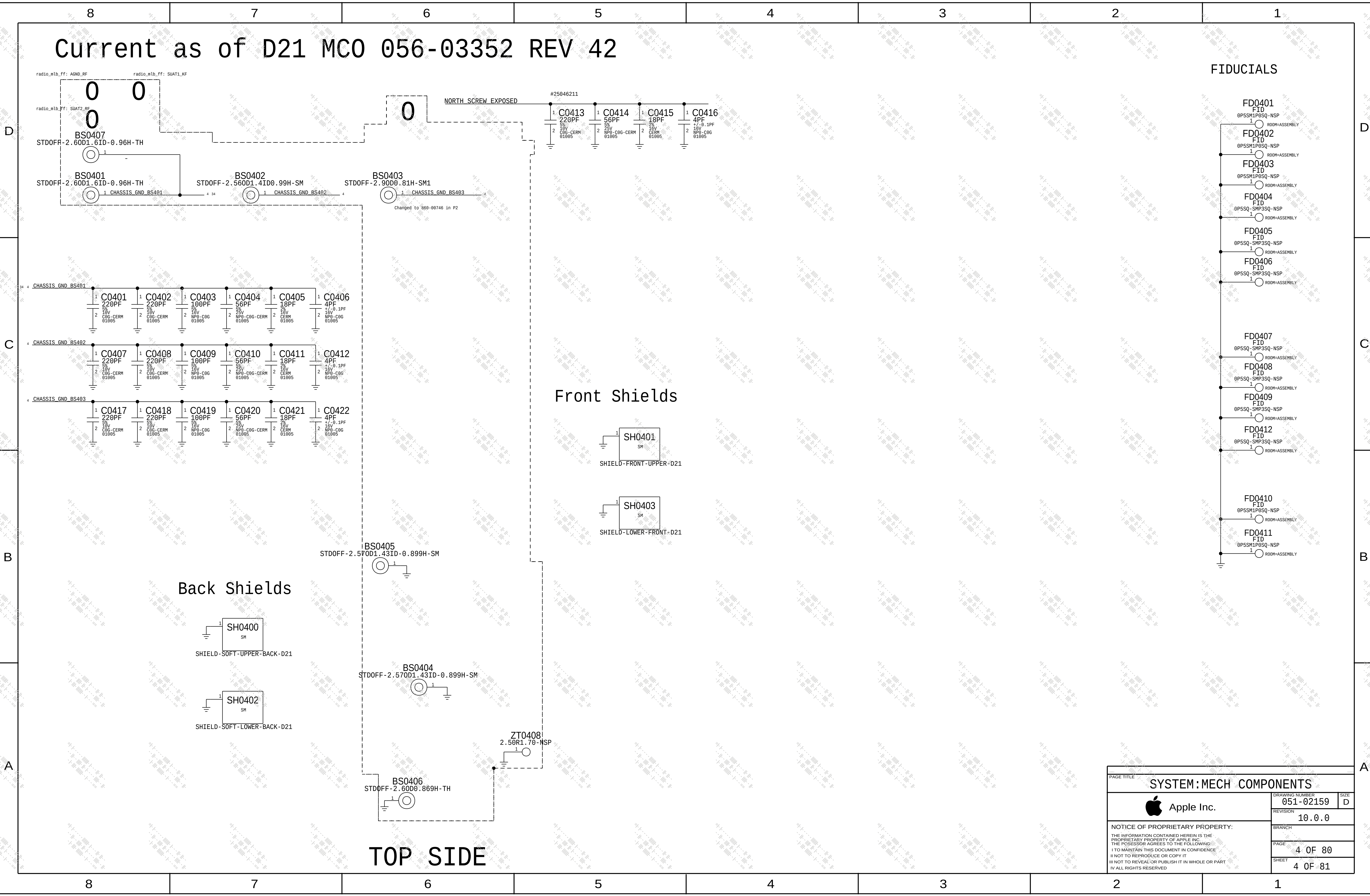
CRITICAL PART#	COMMENT
155S00610	FERR BD, 150OHM, 01005

CRITICAL PART#	COMMENT
152S00617	IND, MLD, 0.1UH, 20%, 3.5A, 29MOHM, H=0.05, 1608
152S00620	IND, MLD, 0.1UH, 20%, 7.2A, 17MOHM, H=0.08, 2012
152S00621	IND, MLD, 0.47UH, 20%, 2.5A, 52MO, H=0.05, 2012
152S00622	IND, MLD, 1.0UH, 20%, 2.1A, 100MO, H=0.05, 2012
152S00626	IND, MLD, 1.5UH, 20%, 1.1A, 160MO, H=0.05, 2012
152S00631	IND, MLD, 1.0UH, 20%, 2.5A, 70MO, H=0.05, 2012
152S00632	IND, MLD, 1.0UH, 20%, 3.2A, 60MO, H=0.08, 2016
152S00640	IND, MLD, 0.47UH, 3.0A, 55MO, H=0.05MM, 2012
152S00641	IND, MLD, 0.47UH, 4A, 48MO, H=0.08MM, 2012
152S00623	IND, MLD, 1UH, 3.6A, 60MO, H=0.09MM, 2016
152S00651	IND, 1.2UH, 3A, 2016, 0.652
152S00650	IND, 0.47UH, 6.6A, 3225, 0.62

Multi-Vendor Criticals

CRITICAL PART#	COMMENT	CRITICAL PART#	COMMENT
377S0106	SUPPR, TRANS, VARISTOR, 12V, 33PF, 01005	132S0288	CAP, CER, X5R, 0.1UF, 10%, 16V, 0201
197S0446	XTAL, 24MHZ, 30PPM, 9.5PF, 60 OHM MAX, 1612	132S0275	CAP, CER, X5R, 470PF, 10%, 10V, 01005
155S00576	FERR BD, 10 OHM, 50%, 750MA, 0.07 DCR, 01005	132S0249	CAP, CER, X7R, 220PF, 10%, 10V, 01005
155S00168	FLTR, NOISE, 65 OHMZ, 3.40MM, 0.7-20HZ, 0605	132S0245	CAP, CER, X5R, 0.01UF, 10%, 6.3V, 01005
130S0979	CAP, CER, X5R, 10UF, 20%, 10V, 0402, H=0.65MM	132S00093	CAP, X5R, 0.022UF, 20%, 6.3V, 01005
138S0692	CAP, CER, X5R, 1UF, 20%, 6.3V, 0201	132S00025	CAP, CER, X5R, 0.047UF, 20%, 6.3V, 01005
138S0683	CAP, CER, X5R, 1UF, 10%, 25V, 0402	132S00008	CAP, CER, 0.1UF, 10%, 50V, X7R, 0402
138S0652	CAP, CER, X5R, 4.7UF, 20%, 6.3V, H=0.65MM, 0402	131S00803	CAP, CER, NP0/C0G, 220PF, 2%, 50V, 0201
138S00070	CAP, X5R, 4.7UF, 20%, 25V, 0402	131S00004	CAP, CER, 27PF, 5%, C0G, 25V, 0201
138S00014	CAP, CER, 1UF, 20%, 16V, X5R, 0201, H=0.39MM	131S00307	CAP, CER, NP0/C0G, 100PF, 5%, 16V, 01005
132S00664	CAP, CER, 0.047UF, 10%, 25V, X5R, 0201	131S02225	CAP, CER, NP0/C0G, 15PF, 5%, 16V, 01005
132S00663	CAP, CER, X5R, 1UF, 10%, 25V, 0402	131S02223	CAP, CER, NP0/C0G, 27PF, 5%, 16V, 01005
132S00534	CAP, CER, X5R, 0.1UF, 10%, 25V, 0201	131S02220	CAP, CER, NP0/C0G, 12PF, 5%, 16V, 01005
132S0436	CAP, CER, X5R, 0.22UF, 20%, 6.3V, 01005	131S02216	CAP, CER, NP0/C0G, 47PF, 5%, 16V, 01005
132S0396	CAP, CER, X5R, 1000PF, 10%, 10V, 01005	131S00053	CAP, CER, C0G, 220PF, 5%, 10V, 01005
132S0316	CAP, CER, X5R, 0.1UF, 20%, 6.3V, 01005	118S00068	RES, MF, 3.3 MOHM, 1%, 200PPM, 1/20W, 0201
132S0304	CAP, CER, X5R, 0.22UF, 20%, 6.3V, 0201	117S00055	RES, MF, 1/20W, 2M OHM, 5, 0201, SMD
132S0296	CAP, CER, X5R, 1000PF, 10%, 6.3V, 01005	107S0257	THERMISTOR, NTC, 10K OHM, 1%, B=3435, 01005

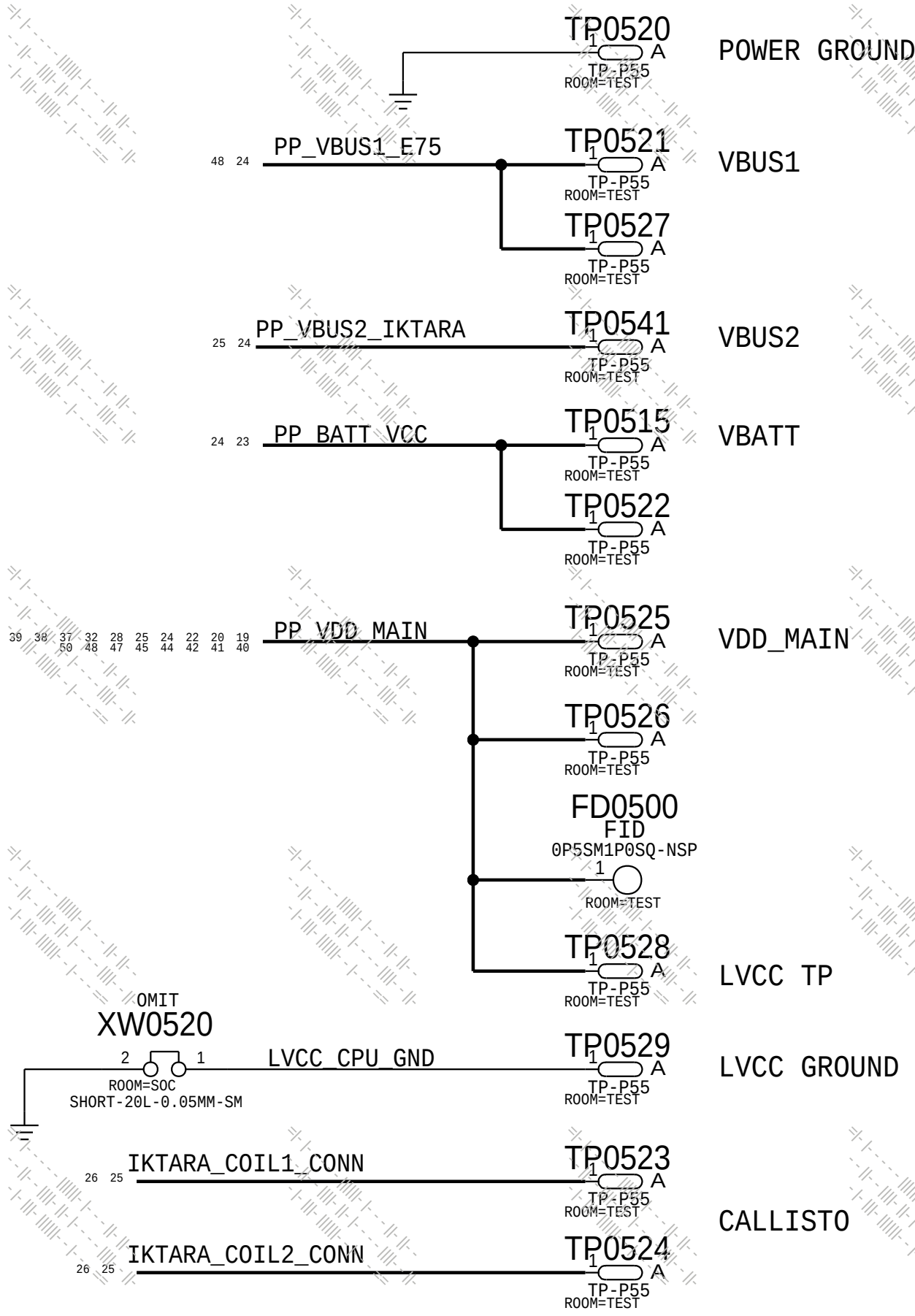
Current as of D21 MC0 056-03352 REV 42



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Test Points

POWER



DFU

FORCE DFU

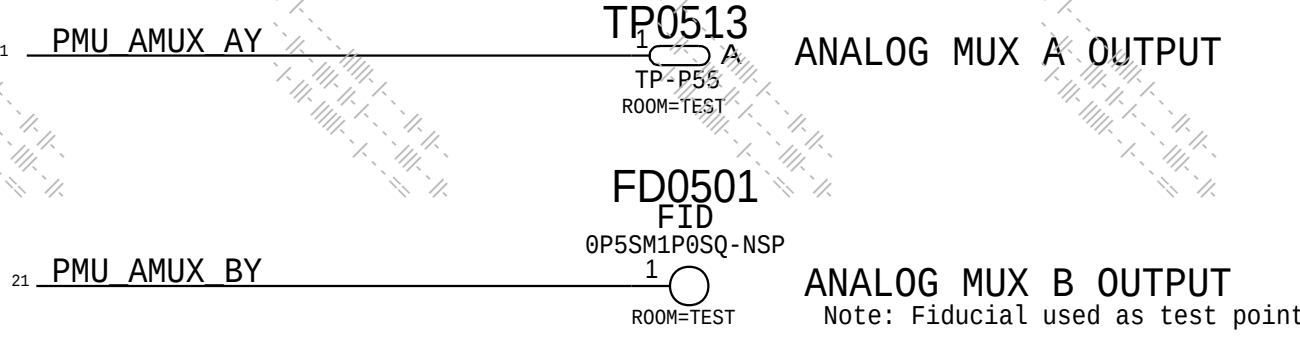
E75

ACCESSORY ID AND POWER

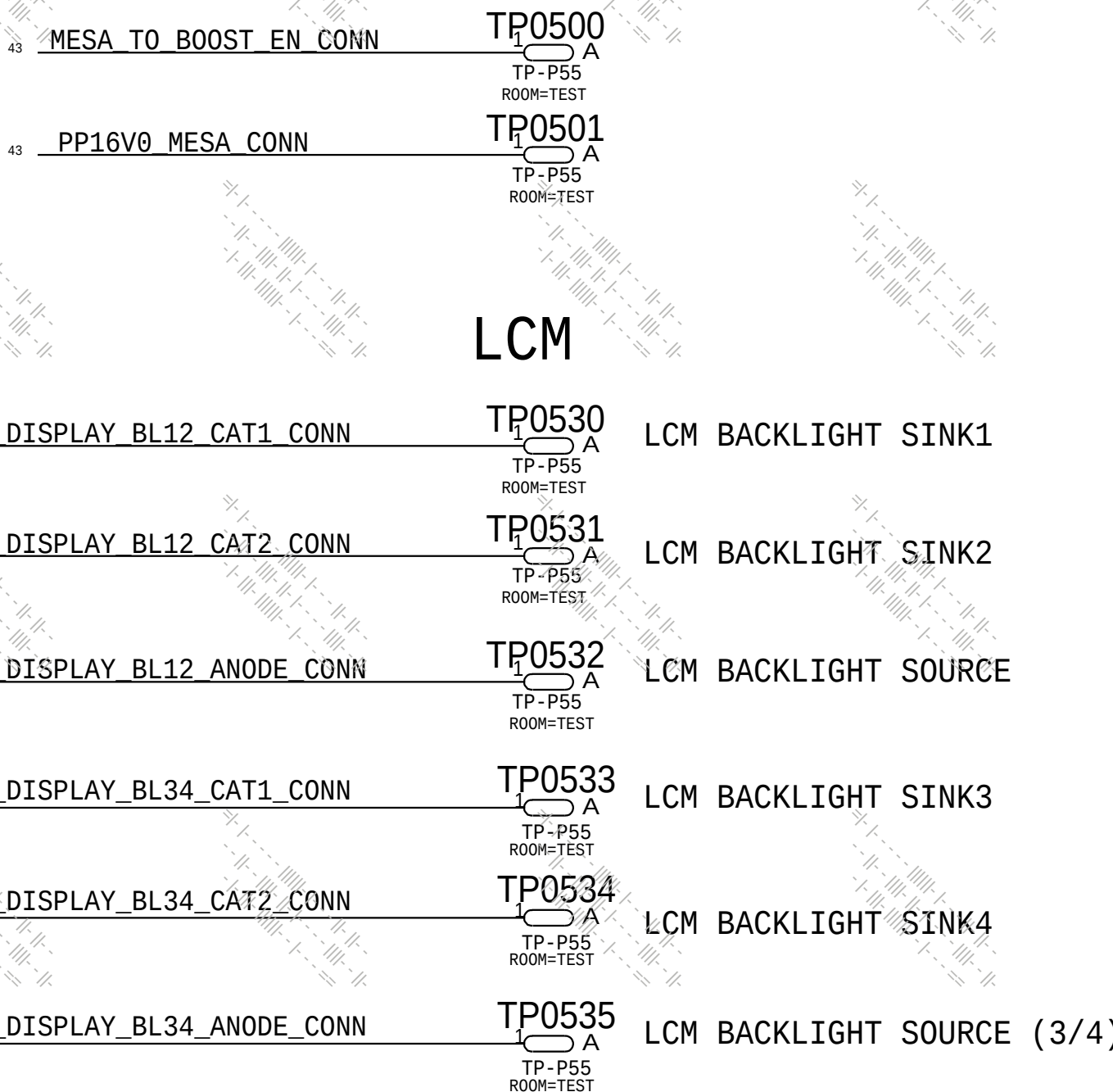
TP IS TO HELP WITH USB SI IN THE FACTORY FIXTURE.

FOR DIAGS

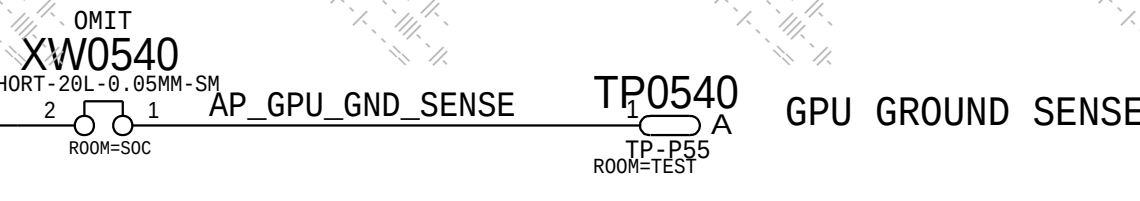
AMUX



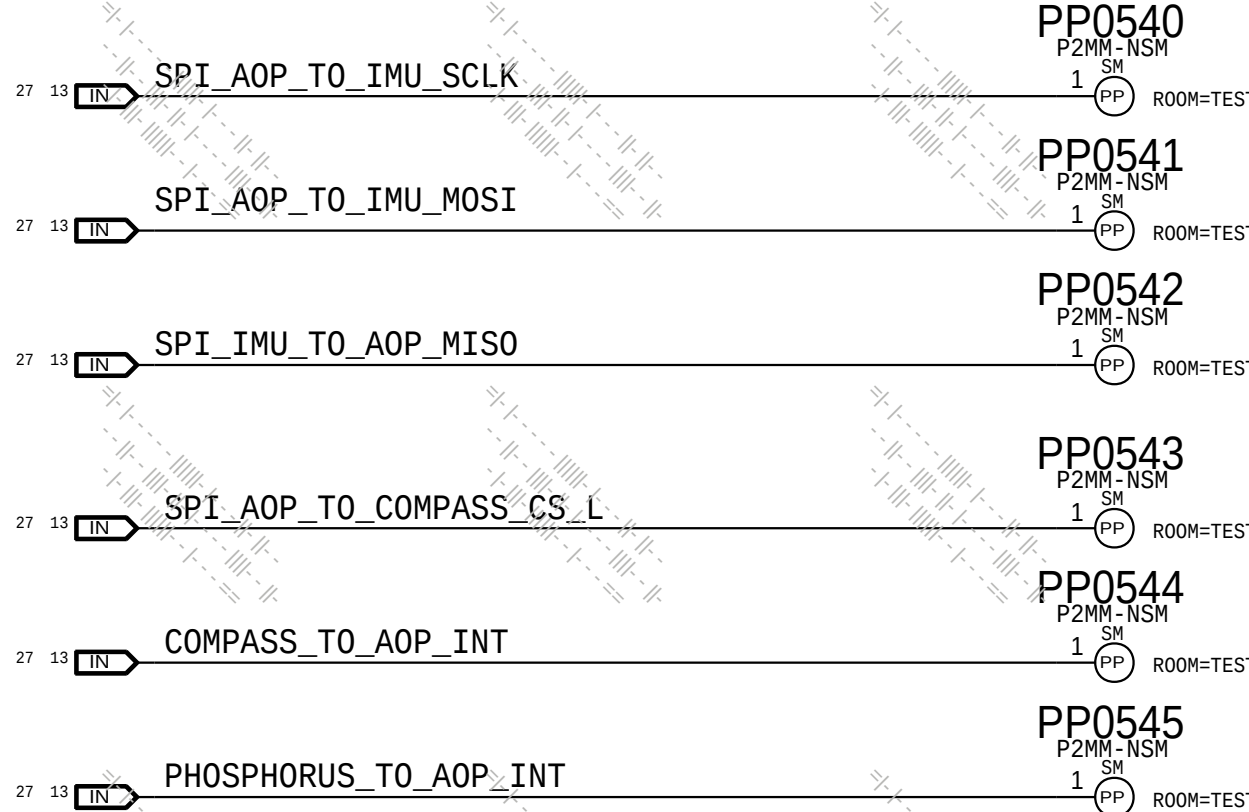
MOJAVE



SENSE TP

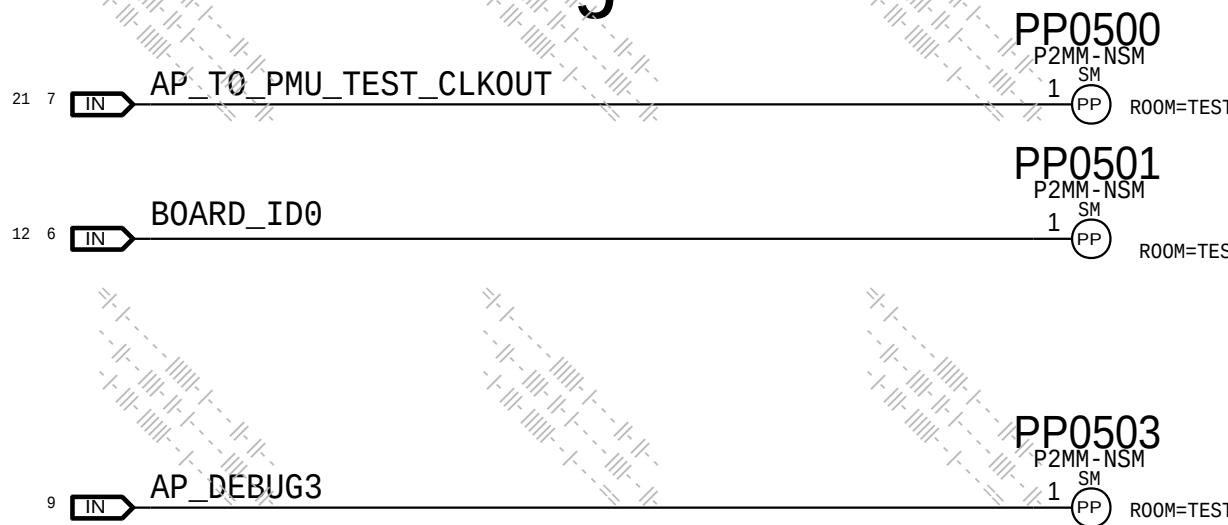


Sensor SPI

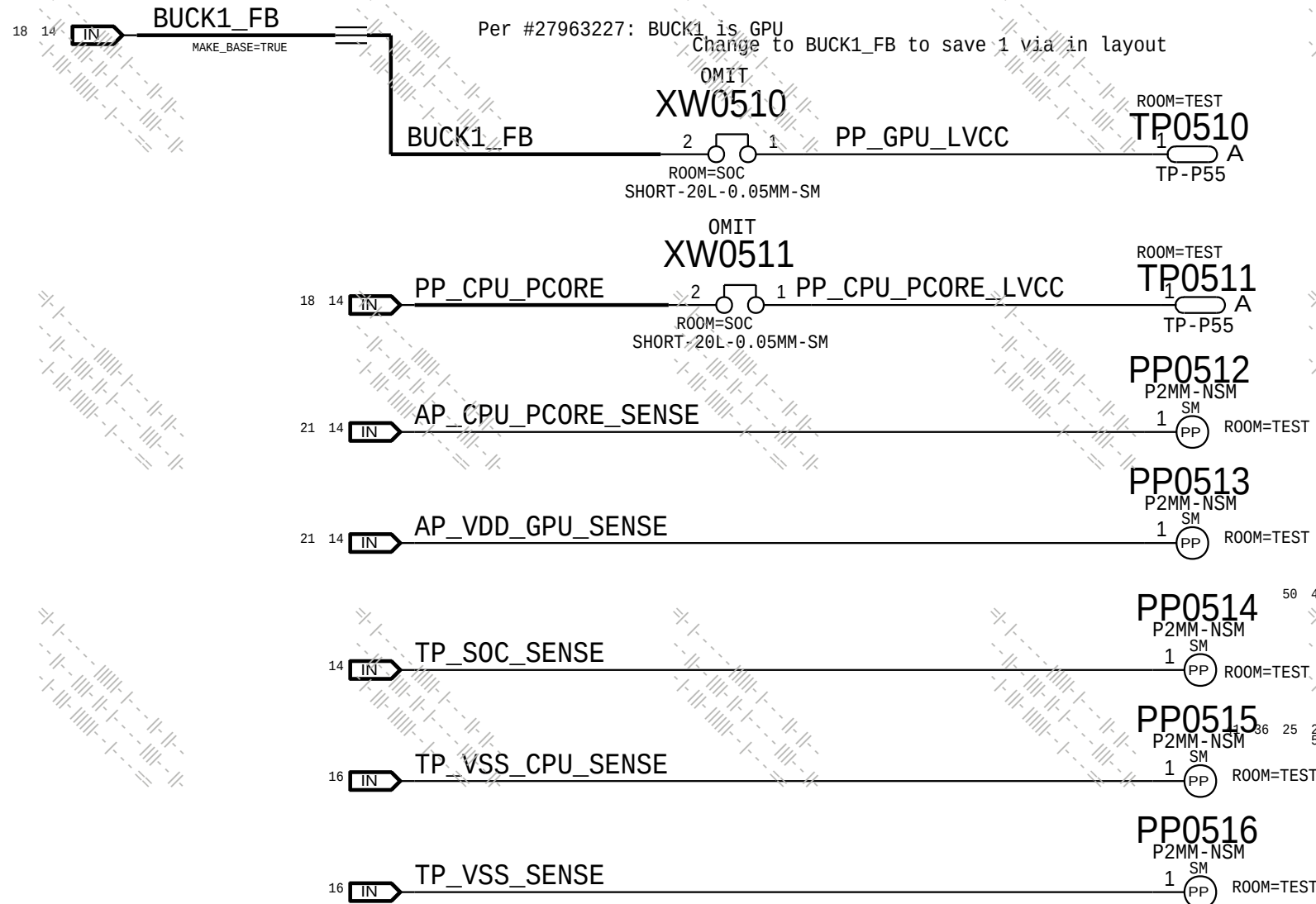


Probe Points

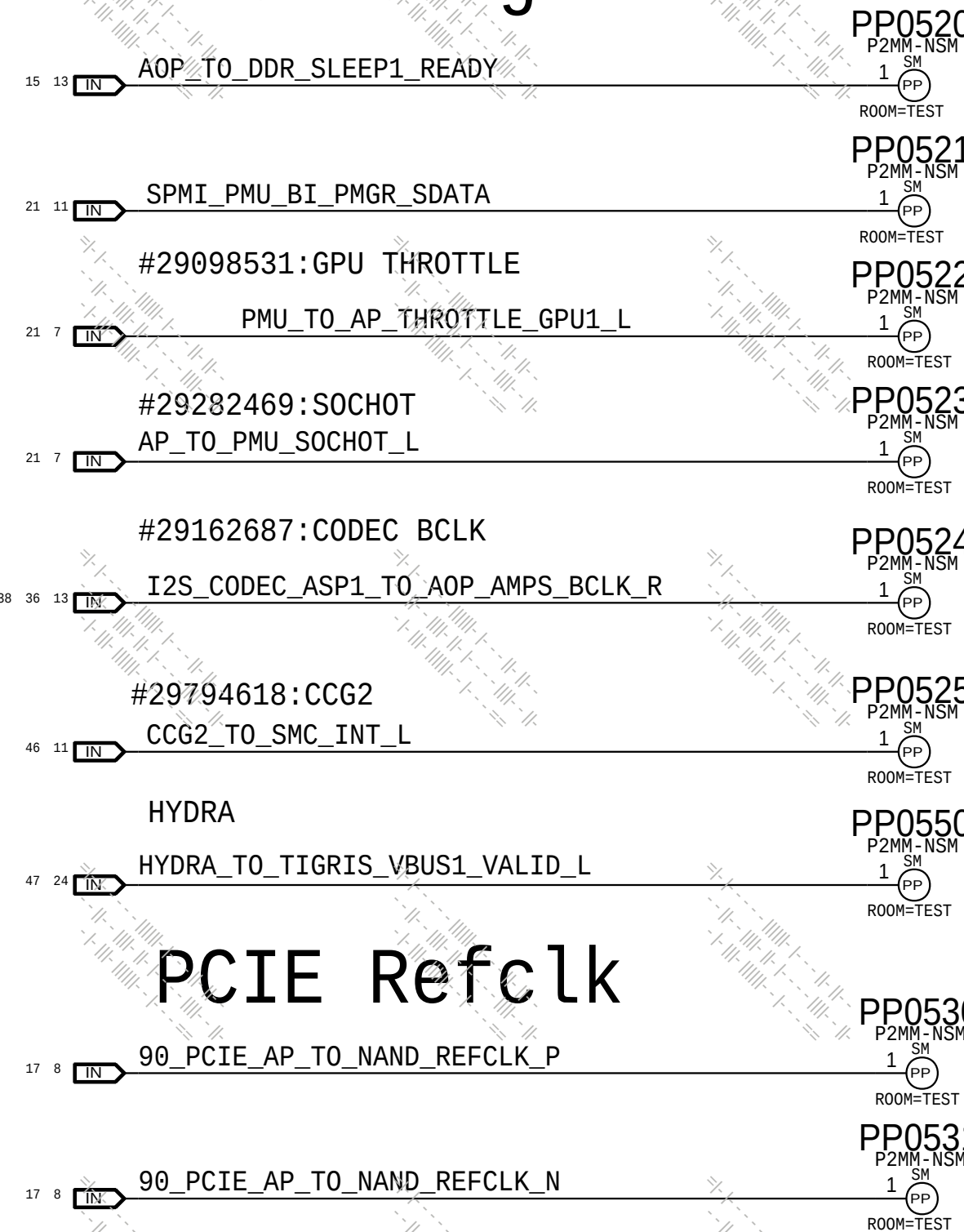
SOC Debug



SOC CPU/GPU

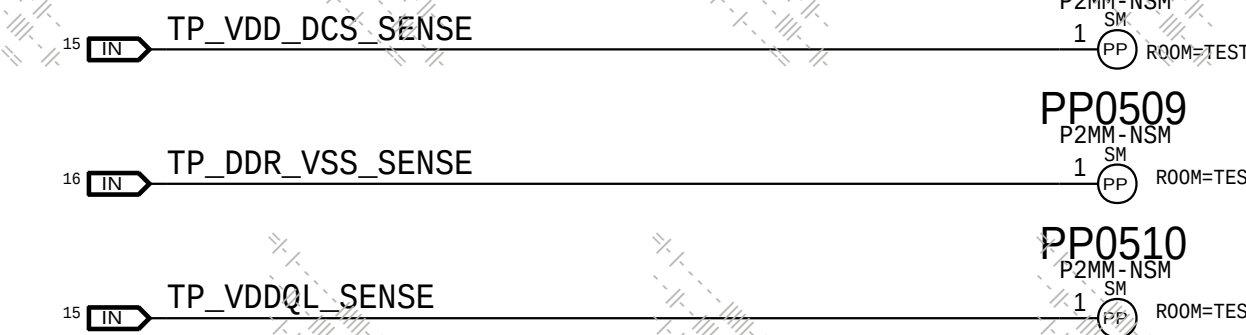


PMU Debug

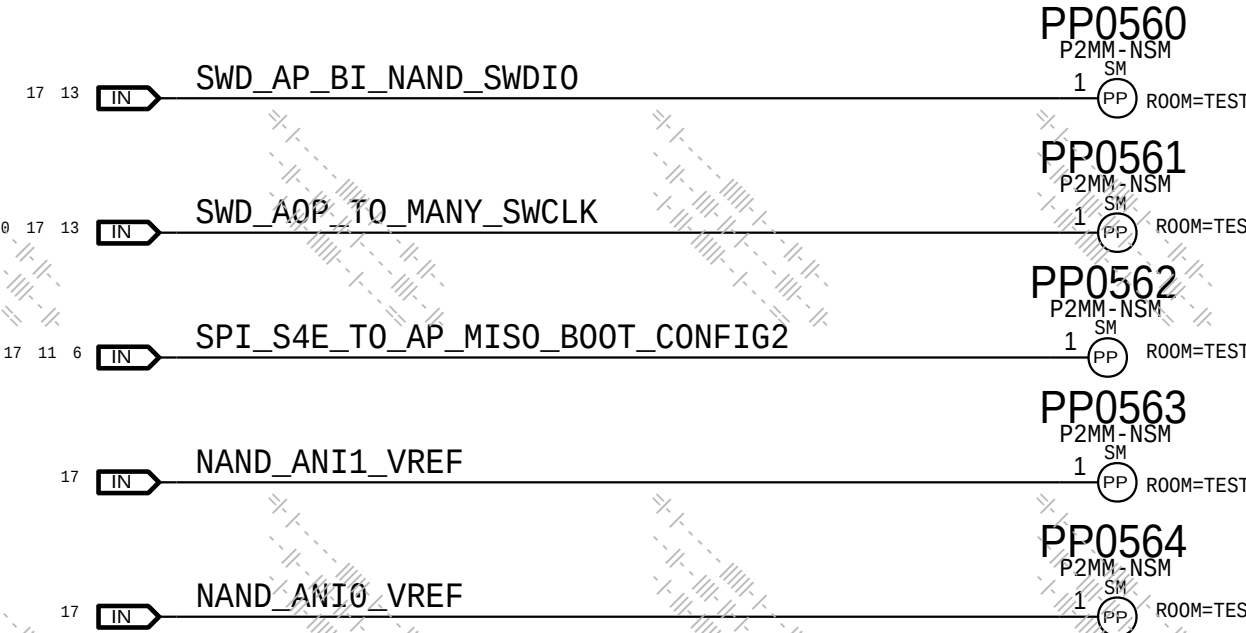


PCIE Refclk

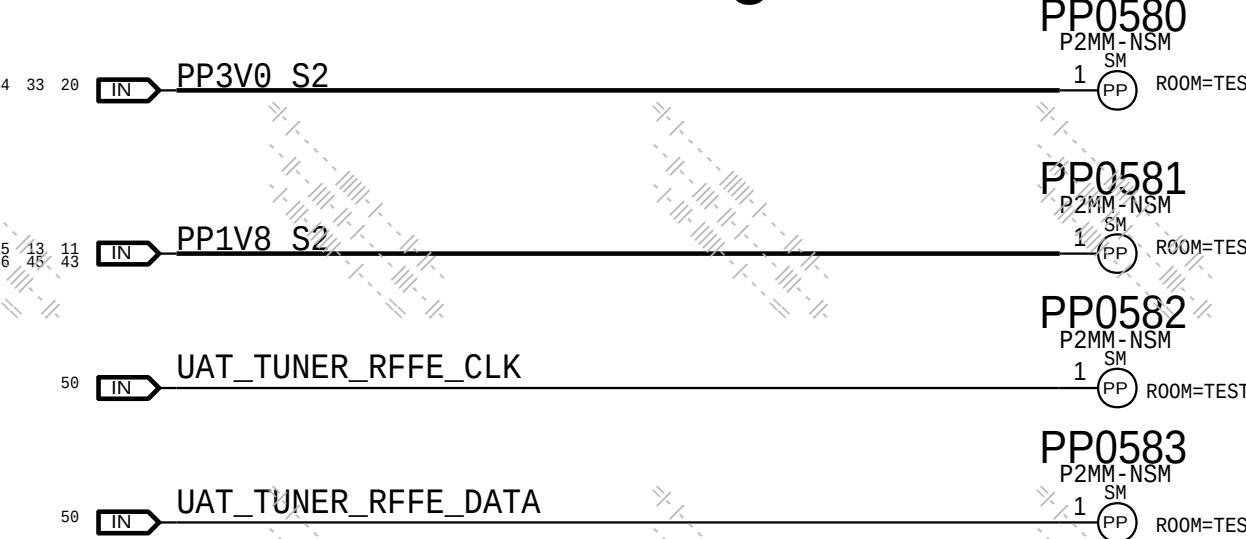
SOC DDR



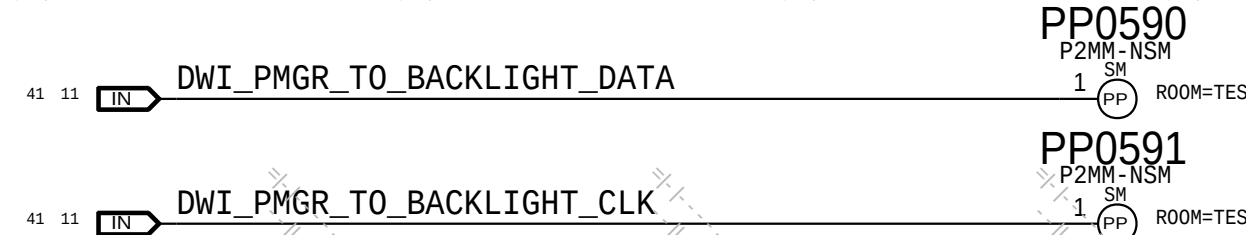
NAND Debug



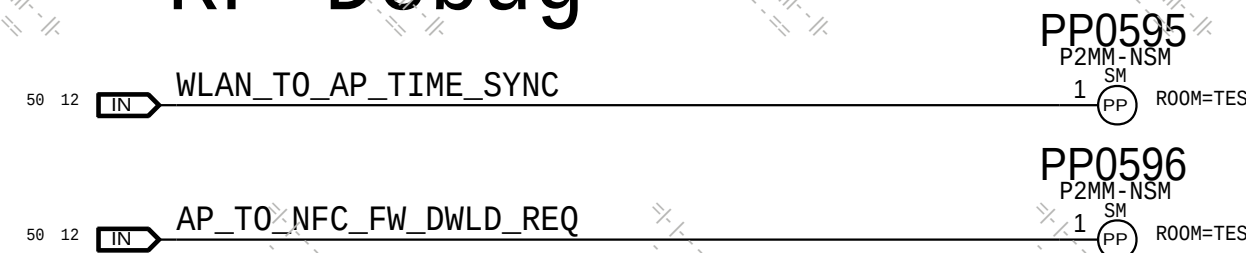
BB UAT Debug



BACKLIGHT Debug

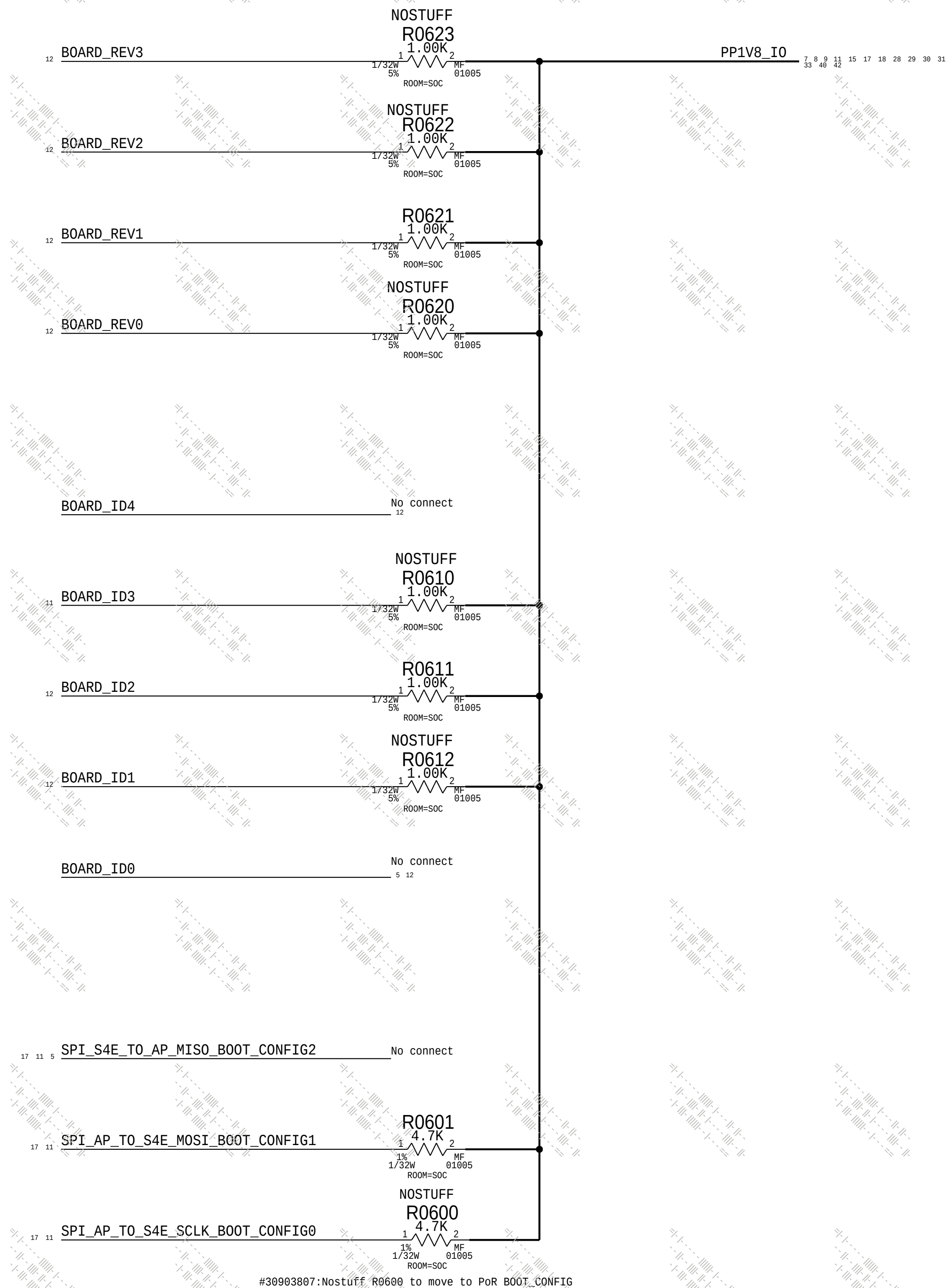


RF Debug



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BOOTSTRAPPING:BOARD REV
BOARD ID
BOOT CONFIG



```
BOARD_REV[3:0]
FLOAT=LOW, PULLUP=HIGH

1111 Pre-Proto (Placeholder)
1110 PROT01
1101 SPARE
1100 PROT02
1011 PROT02 (HALOGEN DOE)
1001 PROT02V5
xxxx SPARES
1000 EVT
xxxx SPARES
0100 CARRIER
xxxx SPARE
0010 DVT
xxxx SPARE
0000 PVT
```

Note: Future board revs TBD

BOARD_ID[4:0]
 FLOAT=LOW, PULLUP=HIGH
 00010 D20 MLB
 00011 D20 DEV
 00100 D21 MLB
 00101 D21 DEV
 01010 D201 MLB
 01011 D201 DEV
 01100 D211 MLB
 01101 D211 DEV

0=MLB, 1=DEV
 01=D20x, 10=D21x
 0=EUREKA, 1=KARO

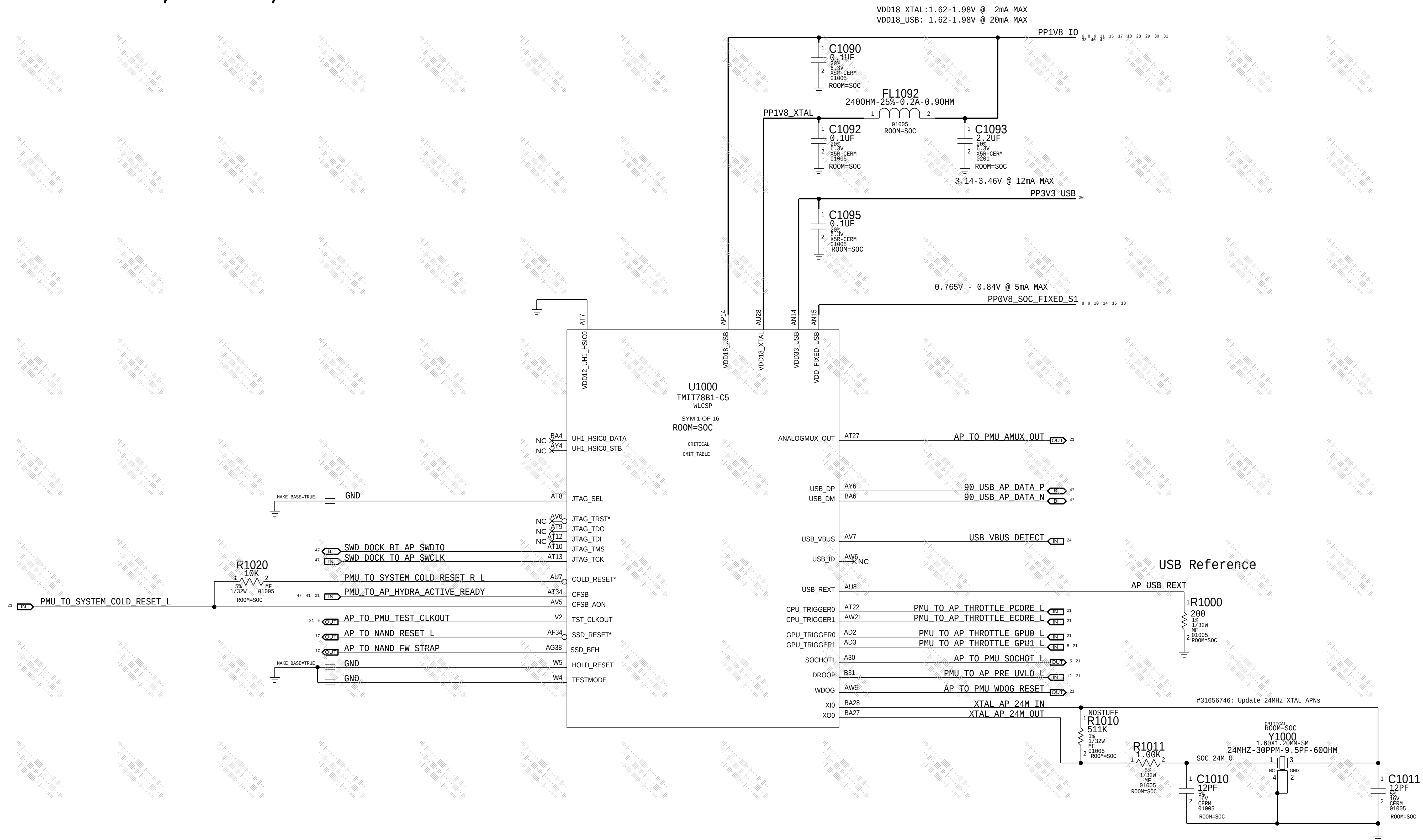
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BOOT_CONFIG[2:0]
FLOAT=LOW, PULLUP=HIGH
000    SPI0
001    SPI0 TEST MODE
010    SPI0 NAND
011    SPI0 NAND TEST
100    n/a
101    n/a
110    SLOW SPI0 TEST
111    FAST SPI0 TEST

```

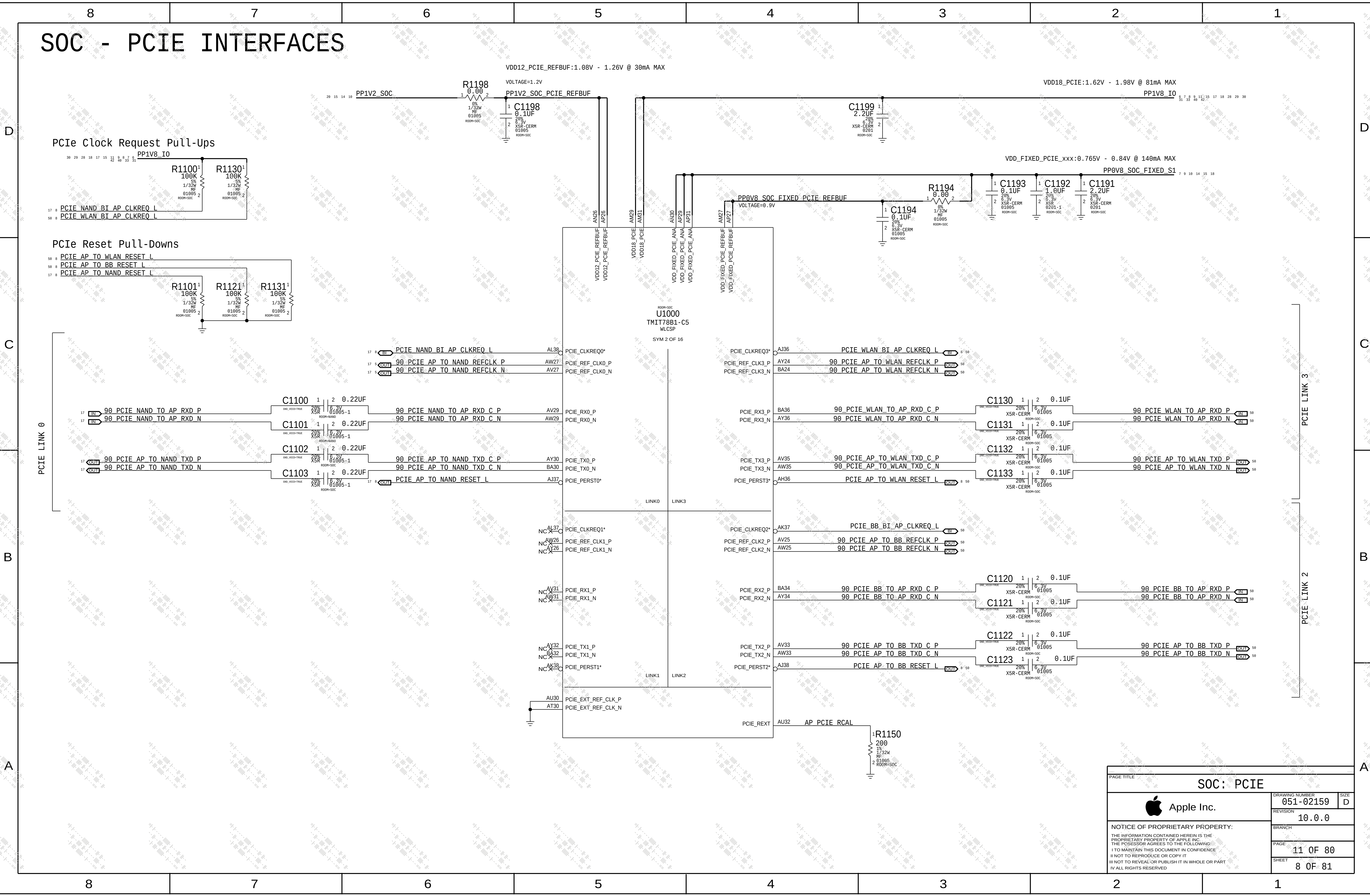
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SOC - USB, JTAG, XTAL



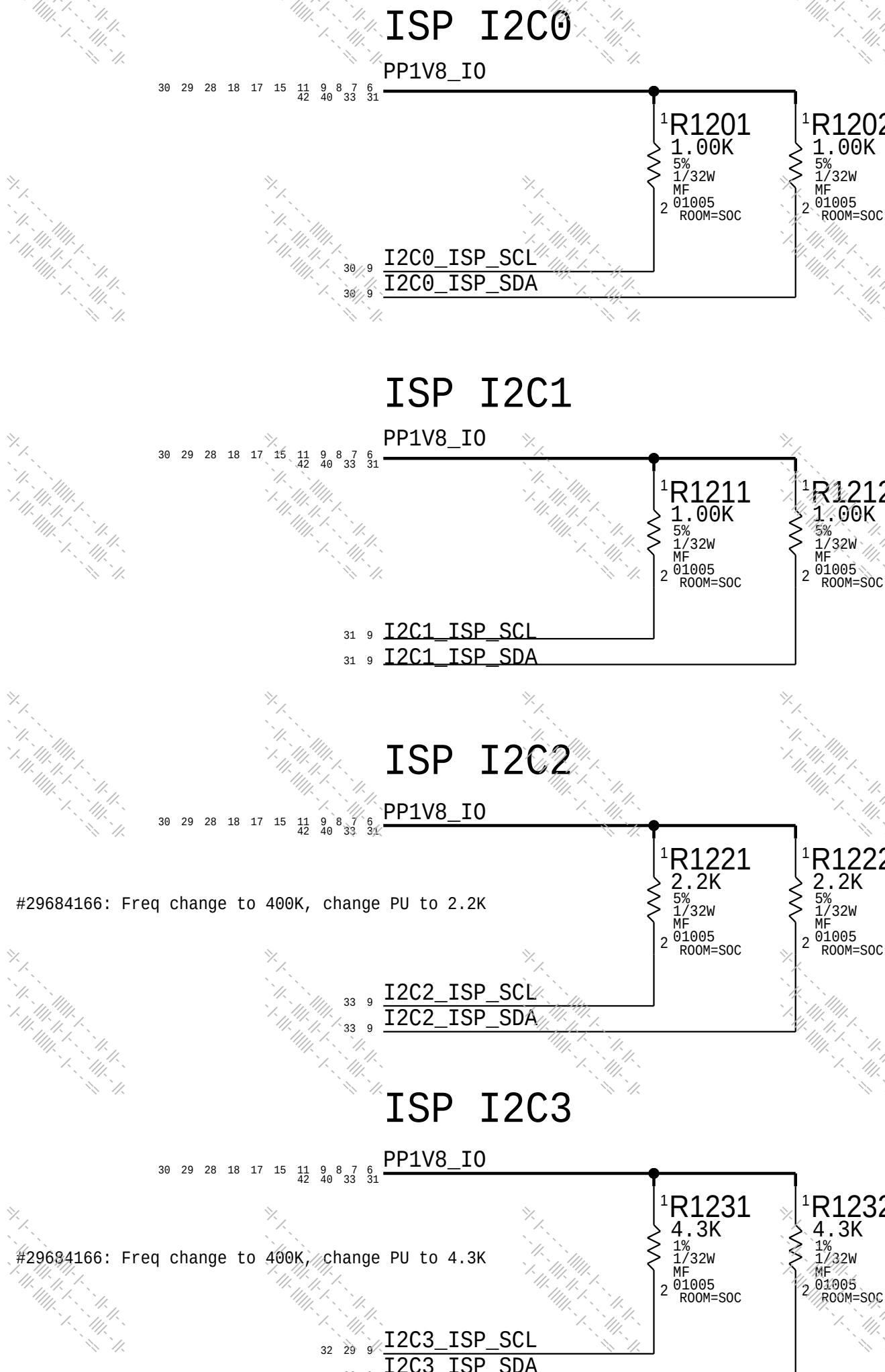
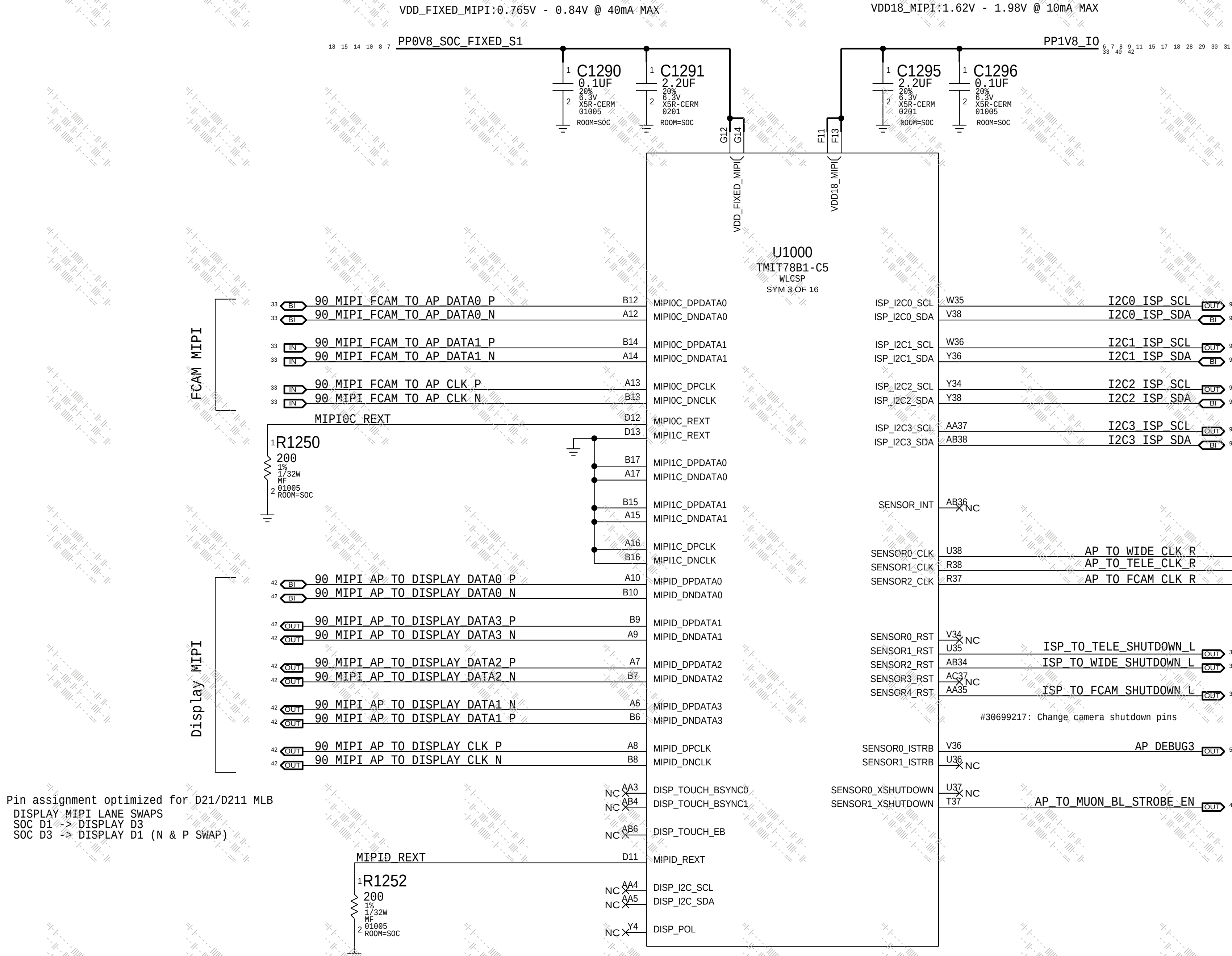
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SOC - PCIE INTERFACES

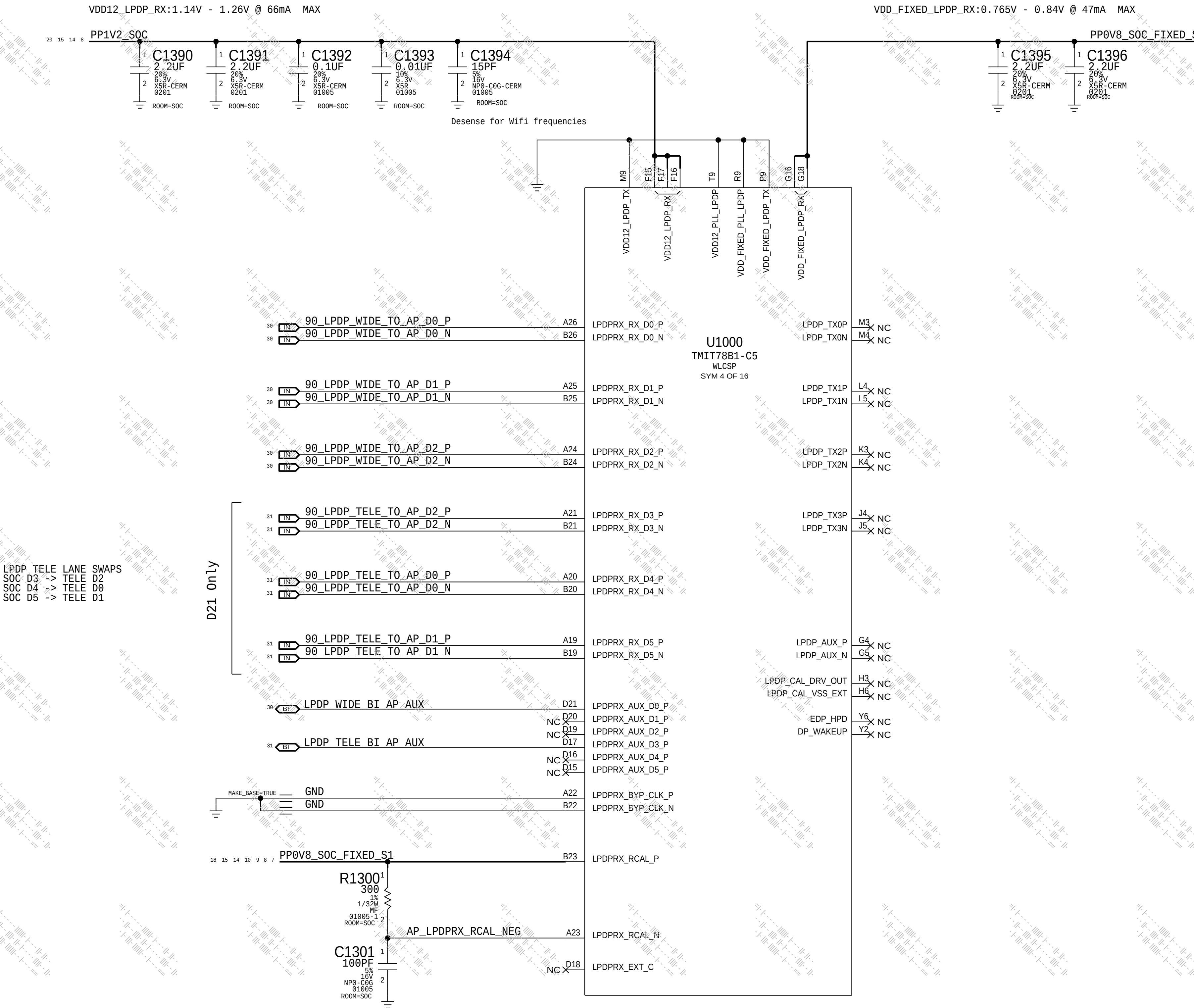


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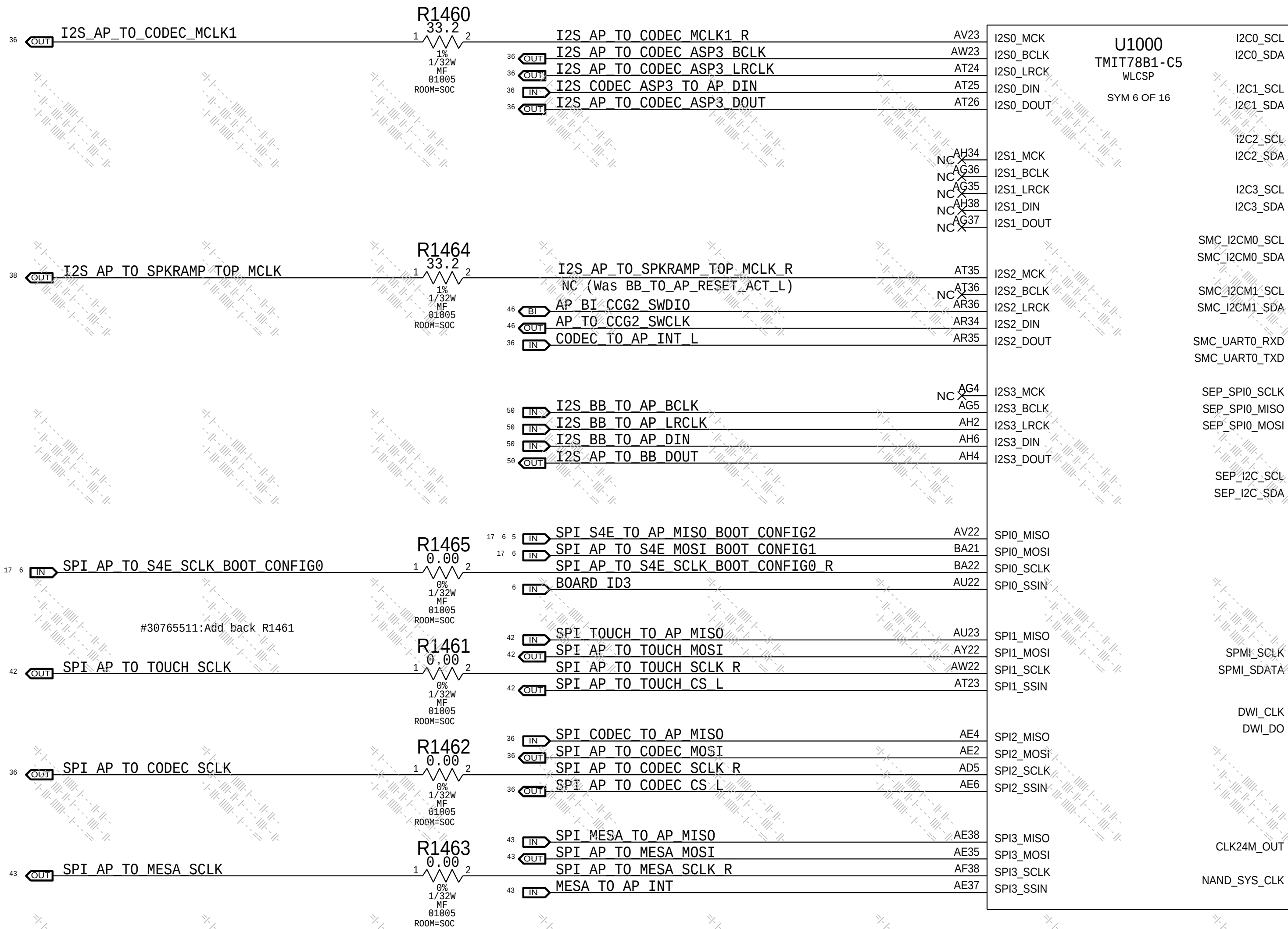
SOC - MIPI & ISP INTERFACES



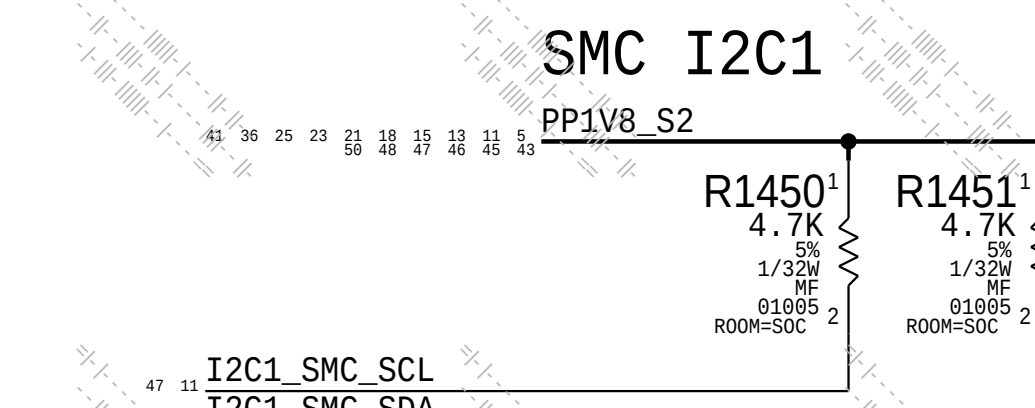
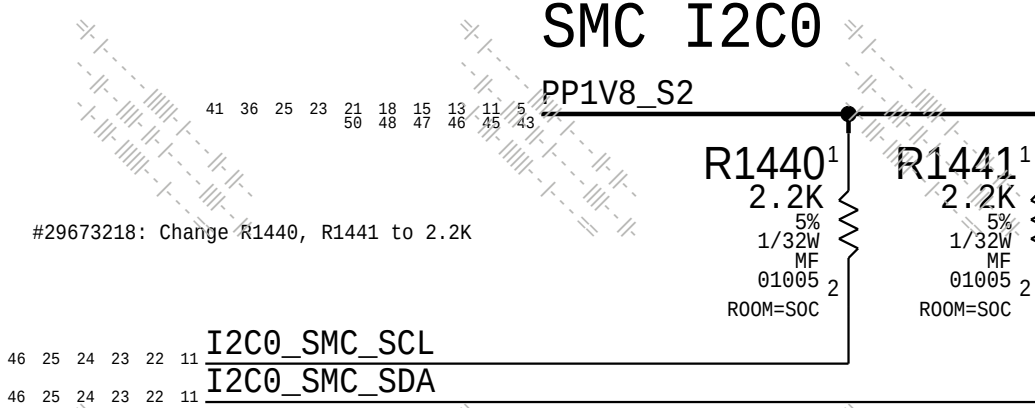
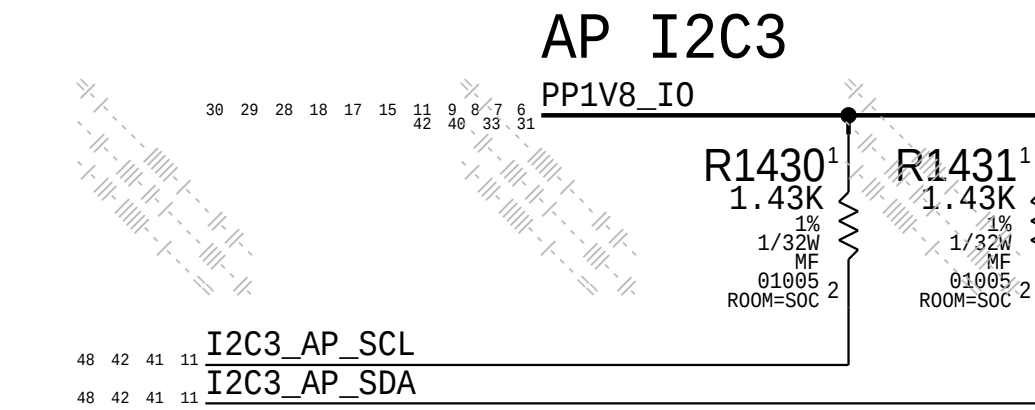
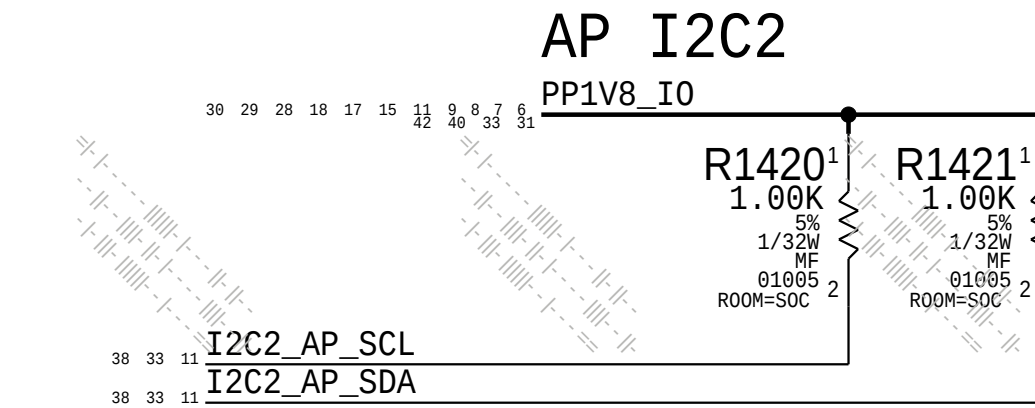
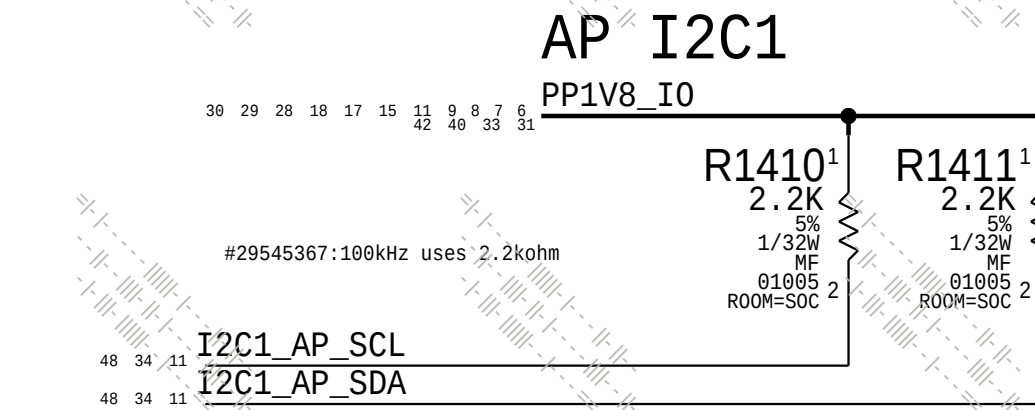
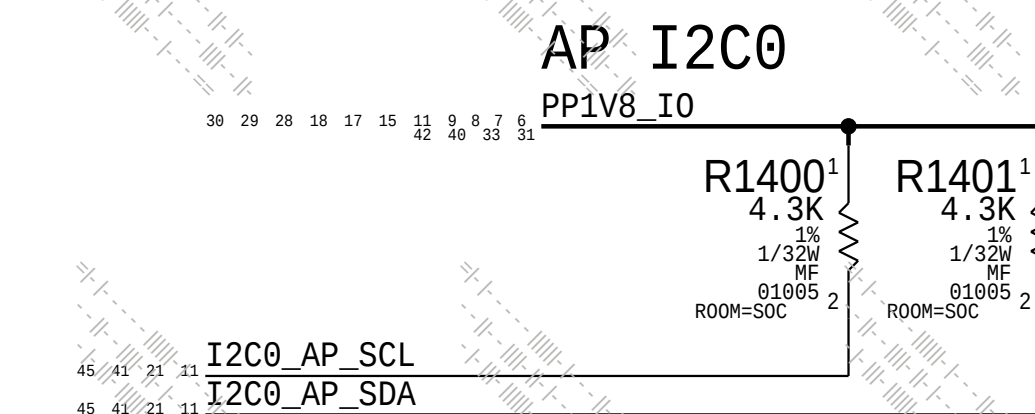
SOC - LPDP INTERFACES



SOC - SERIAL INTERFACES

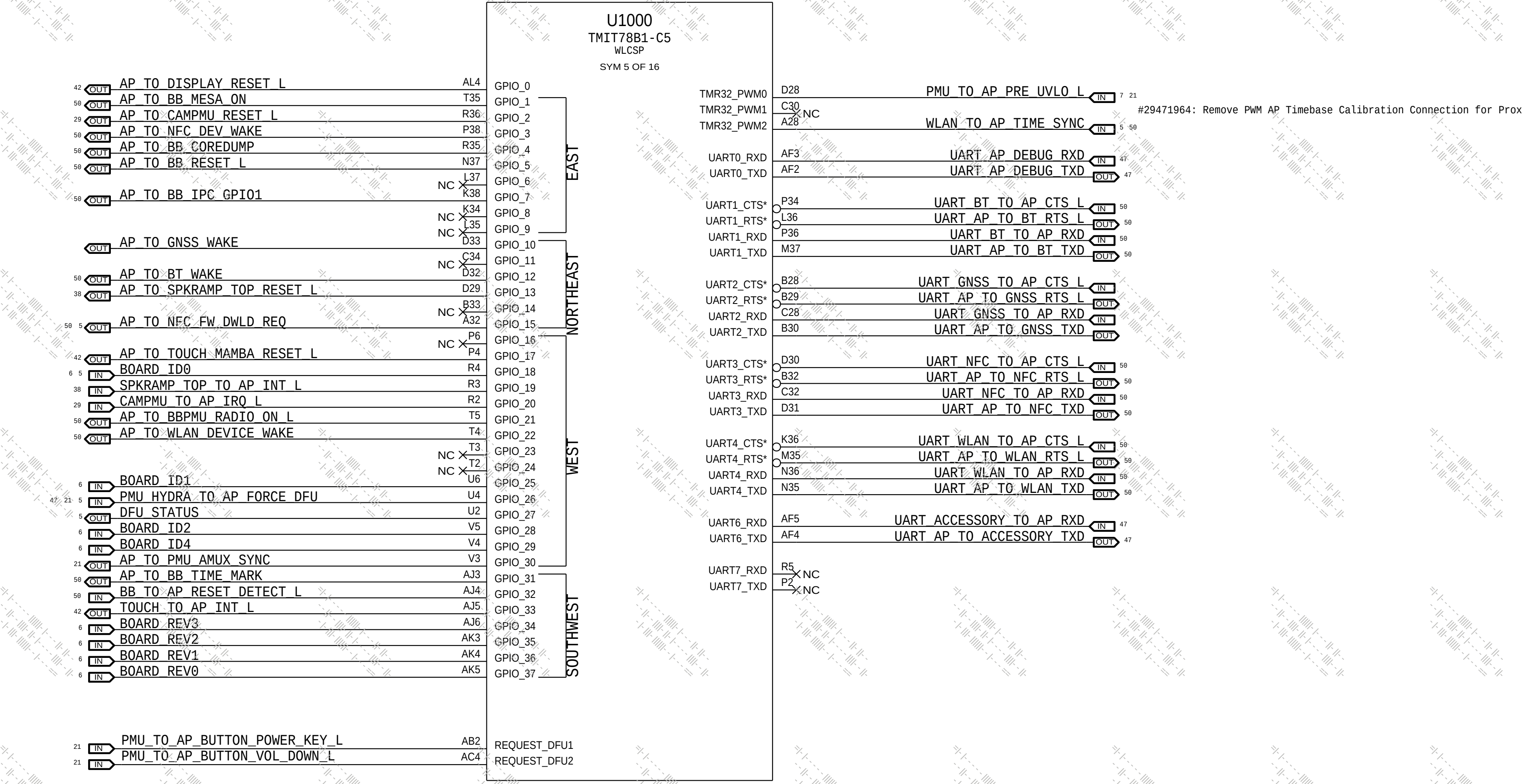


SPI: Route as Daisy-Chain (No T's Allowed)

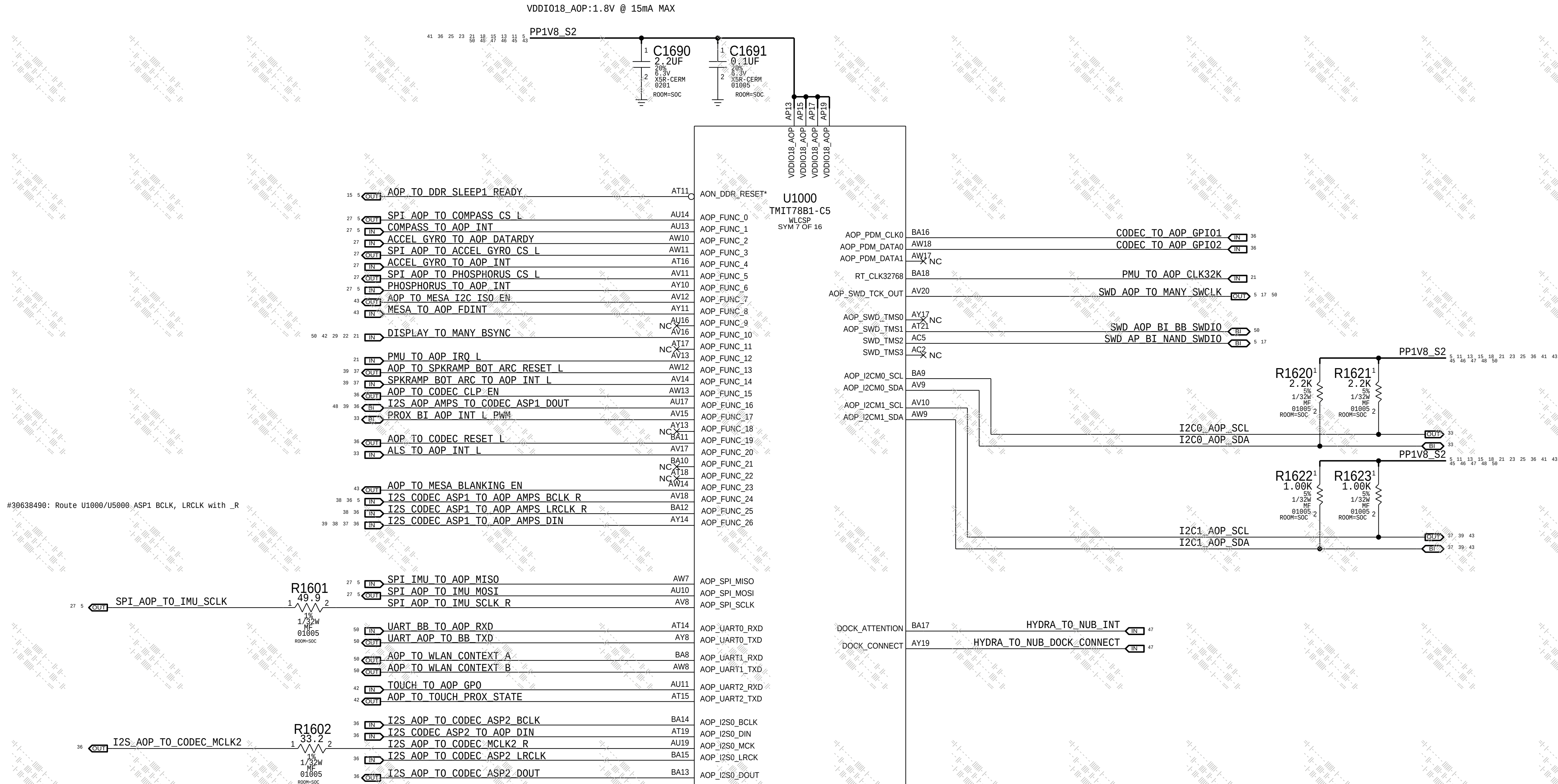


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SOC: SERIAL + SMC		
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SOC - GPIO INTERFACES



SOC - AOP

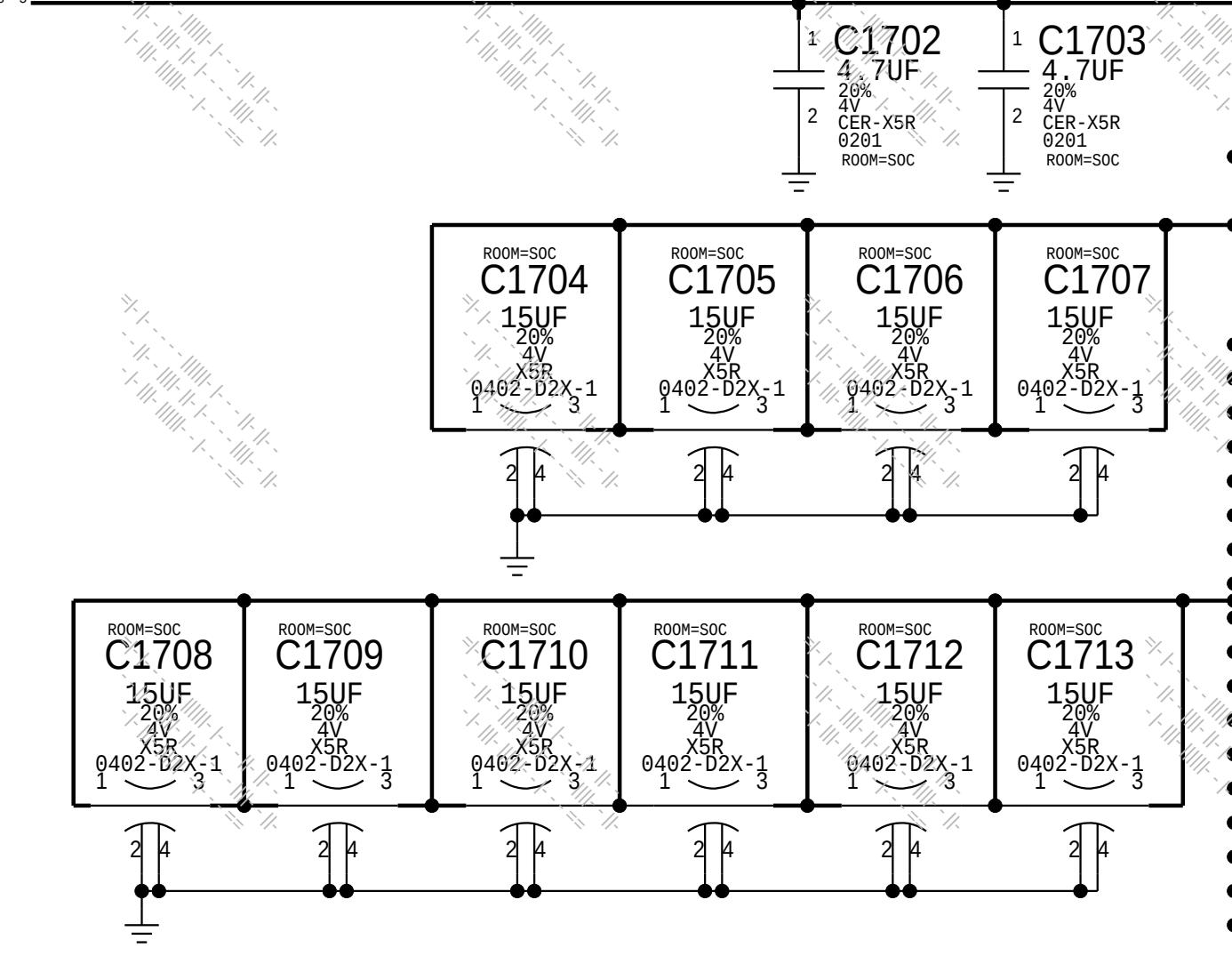


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SOC - CPU, GPU & SOC RAILS

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

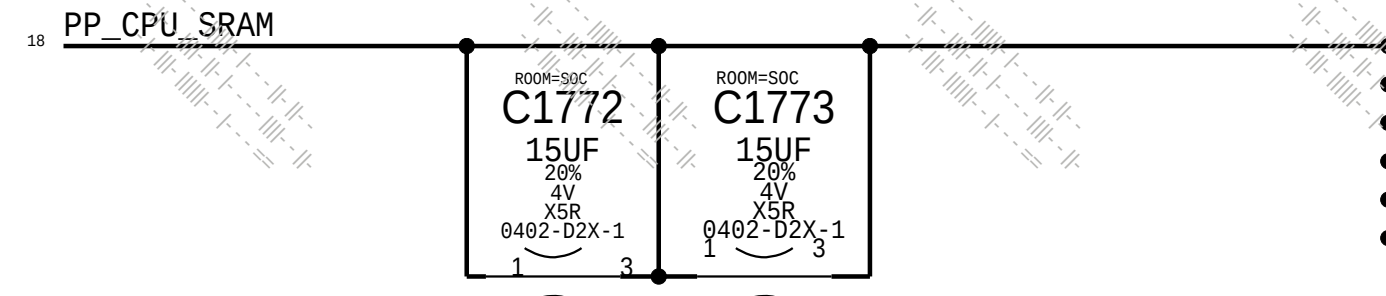
PP_CPU_PCORE



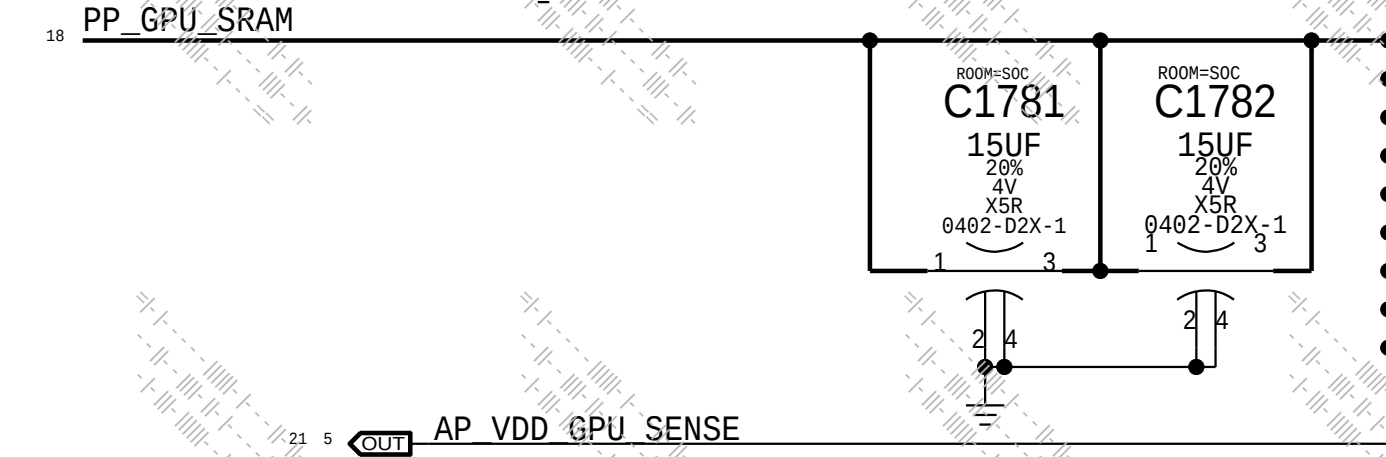
0.7V @ 75mA MAX
PP0V7_VDD_LOW_S2



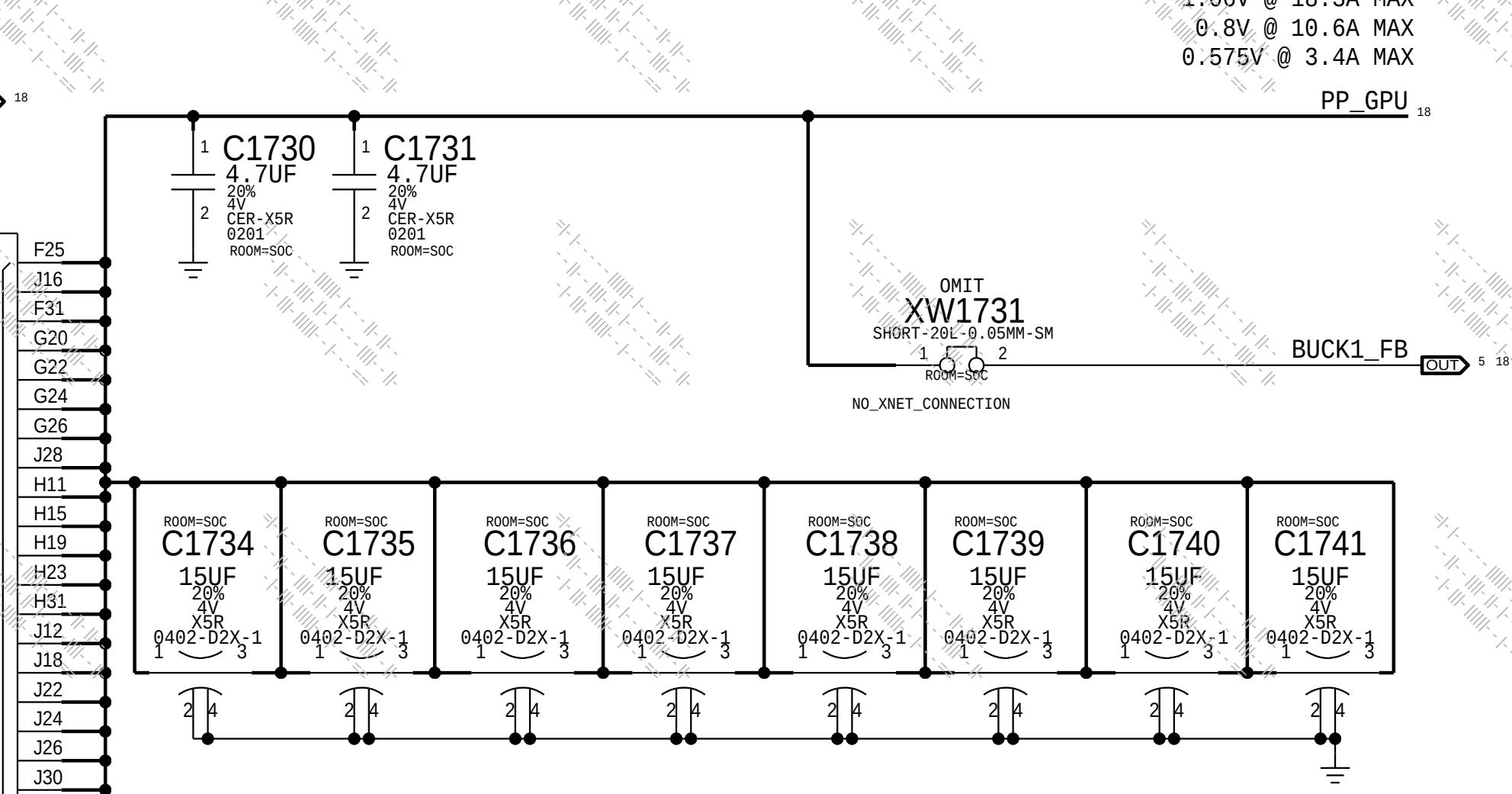
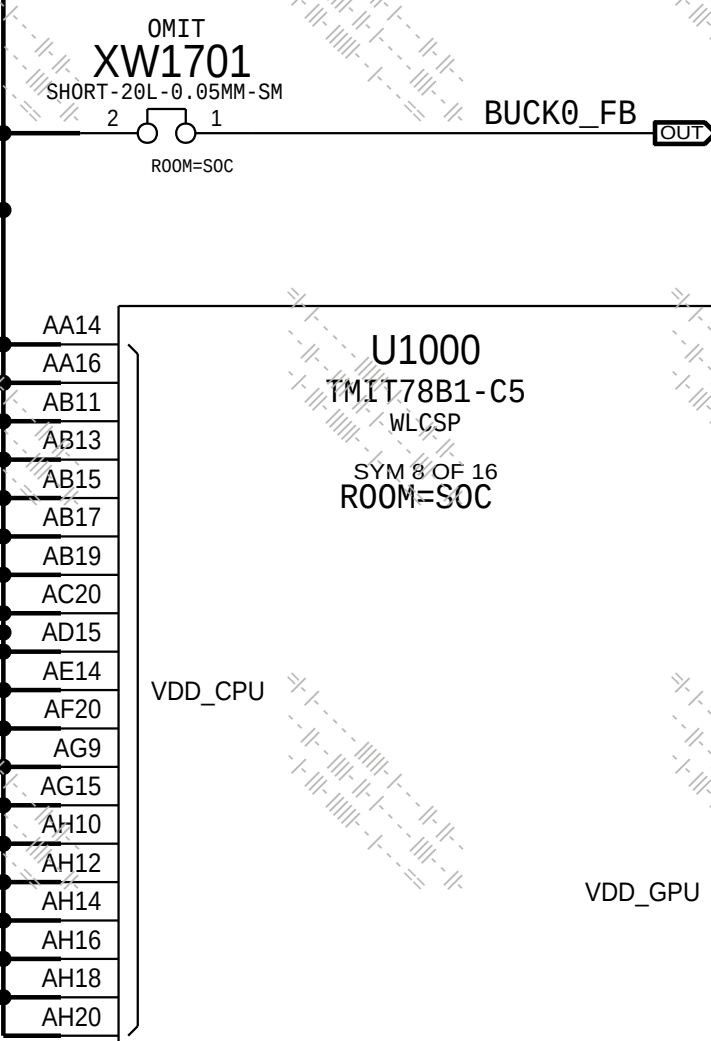
1.01V @ 2.1A MAX
0.735V @ 0.6A MAX
PP_CPU_SRAM



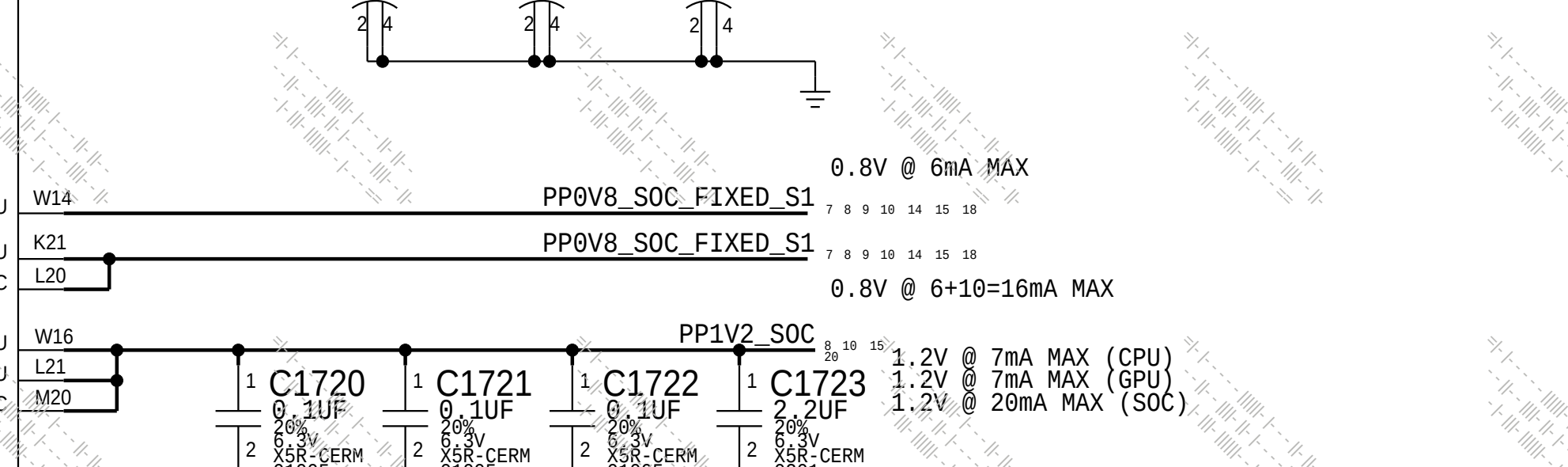
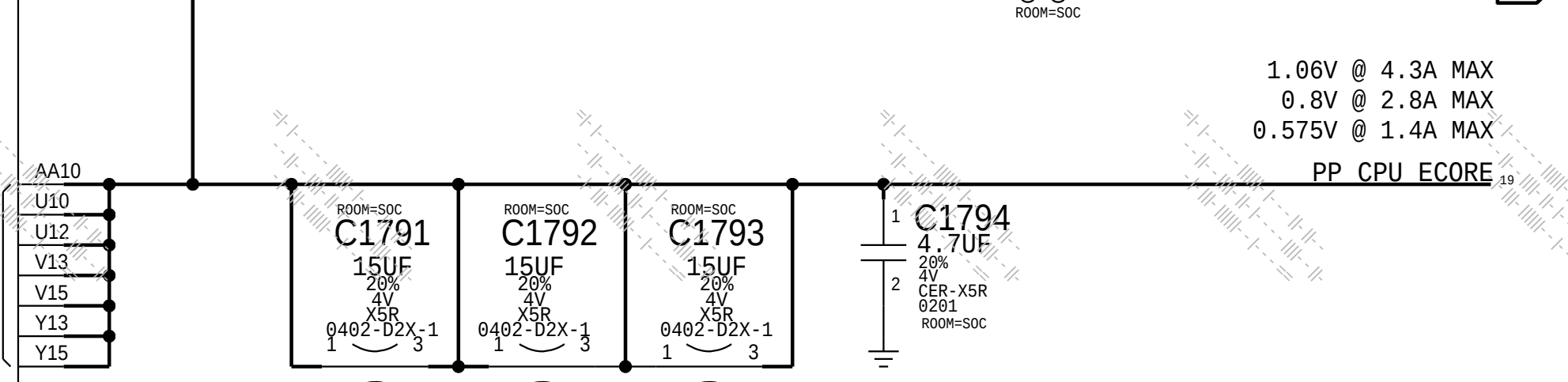
1.06V @ 1.1A MAX
0.80V @ 0.63A MAX
0.675V @ 0.19A MAX
PP_GPU_SRAM



AP_VDD_GPU_SENSE



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



0.8V @ 6mA MAX
PP0V8_SOC_FIXED_S1
0.8V @ 6+10=16mA MAX
PP1V2_SOC

1.2V @ 7mA MAX (CPU)
1.2V @ 7mA MAX (GPU)
1.2V @ 20mA MAX (SOC)

0.8V @ 6mA MAX
PP0V8_SOC_FIXED_S1
0.8V @ 6+10=16mA MAX
PP1V2_SOC

1.2V @ 7mA MAX (CPU)
1.2V @ 7mA MAX (GPU)
1.2V @ 20mA MAX (SOC)

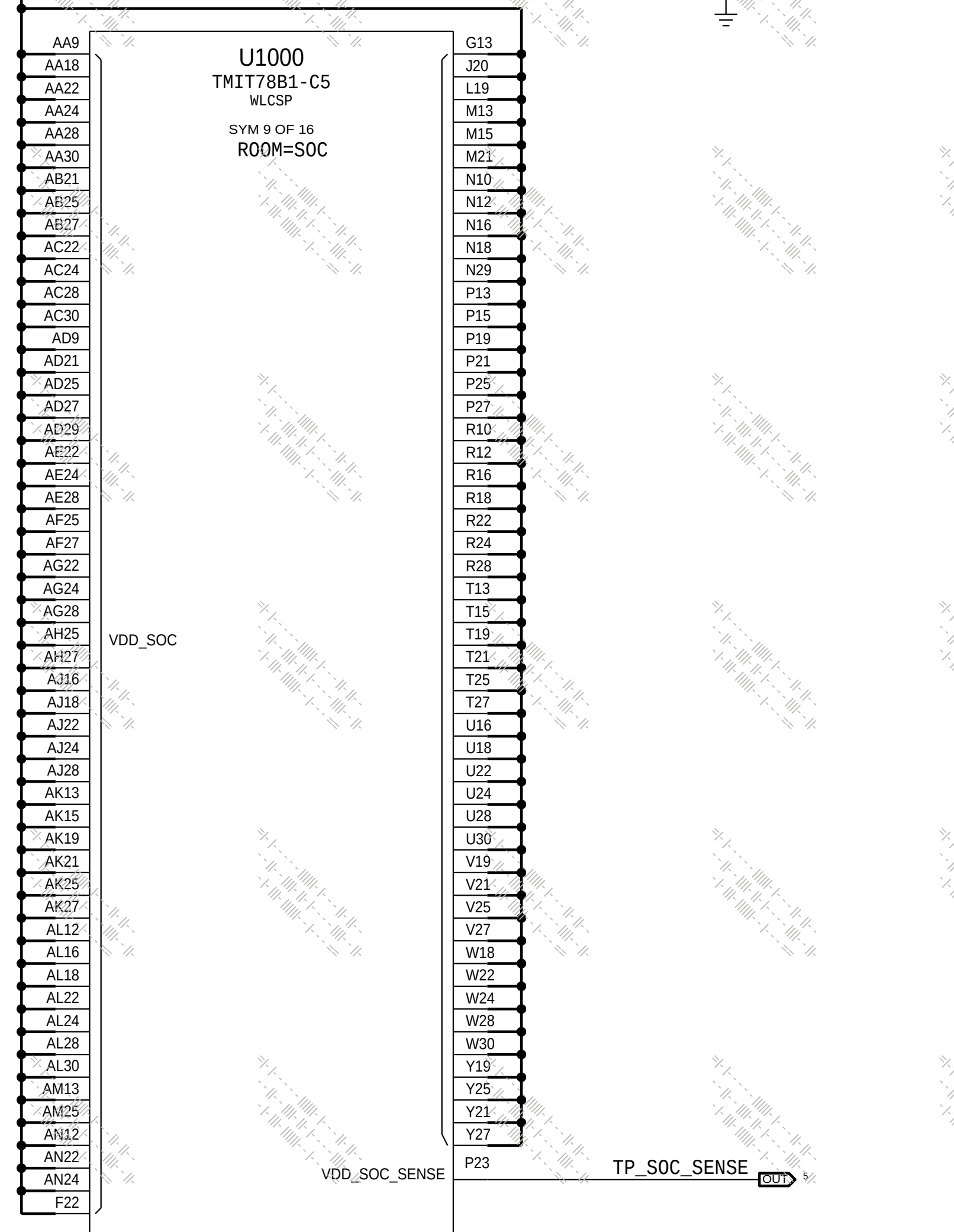
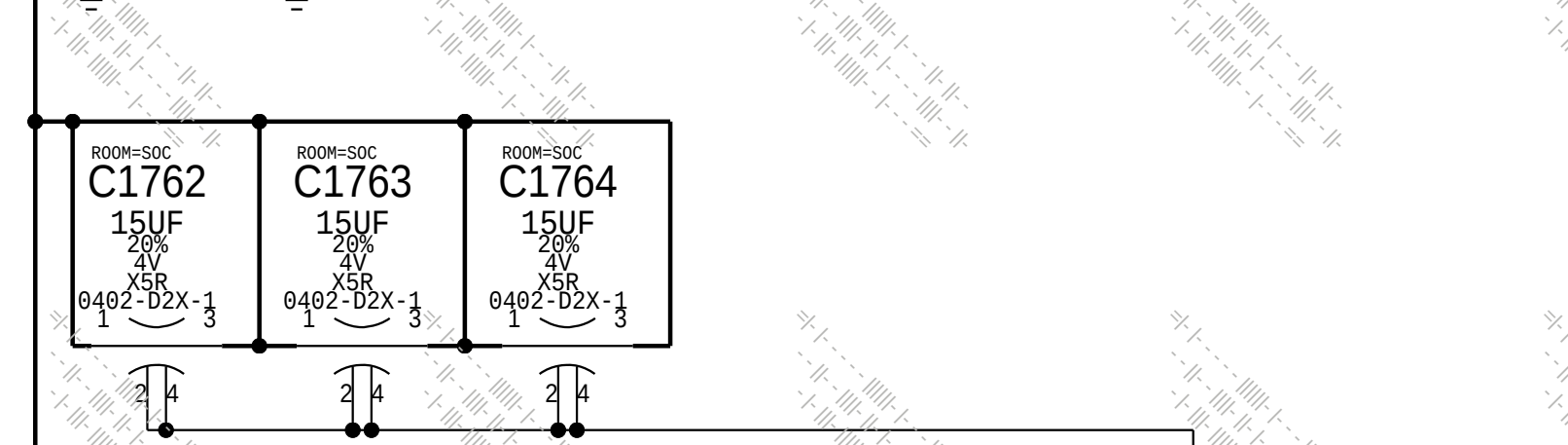
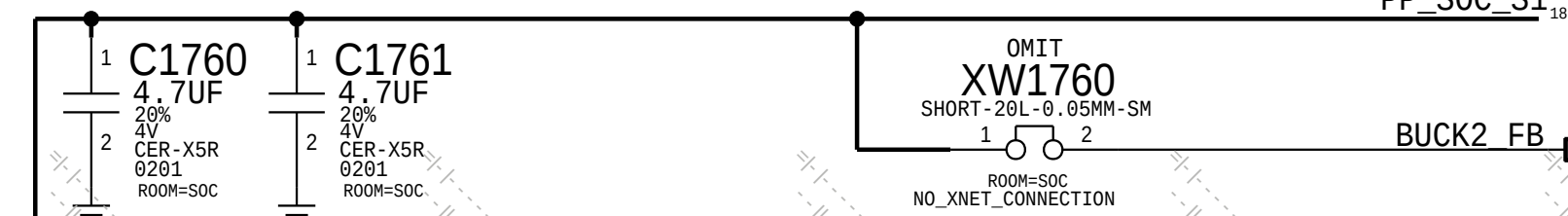
0.8V @ 6mA MAX
PP0V8_SOC_FIXED_S1
0.8V @ 6+10=16mA MAX
PP1V2_SOC

1.2V @ 7mA MAX (CPU)
1.2V @ 7mA MAX (GPU)
1.2V @ 20mA MAX (SOC)

0.8V @ 6mA MAX
PP0V8_SOC_FIXED_S1
0.8V @ 6+10=16mA MAX
PP1V2_SOC

1.2V @ 7mA MAX (CPU)
1.2V @ 7mA MAX (GPU)
1.2V @ 20mA MAX (SOC)

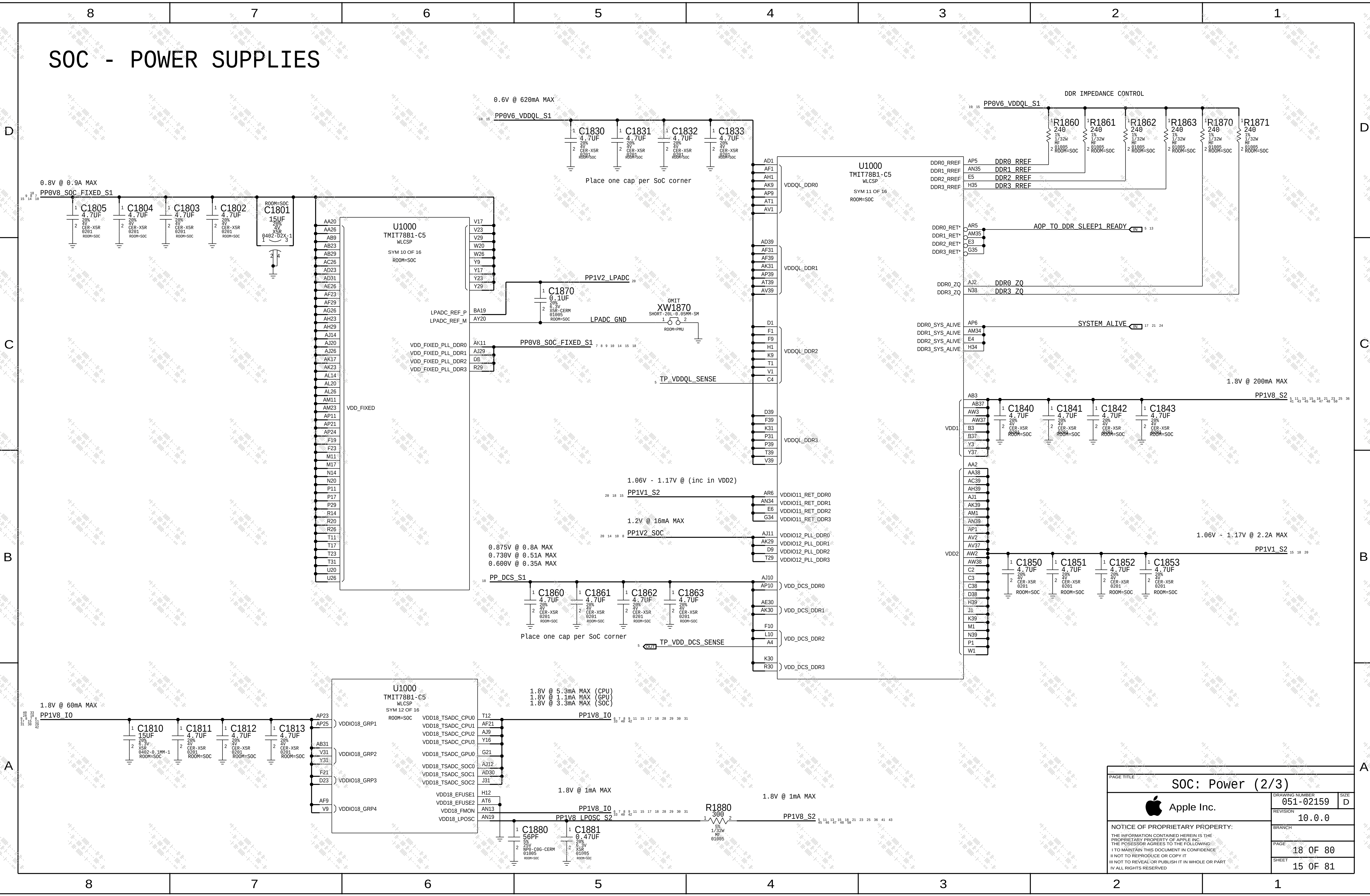
0.765V @ 4.9A MAX
0.635V @ 2.6A MAX
PP_SOC_S1



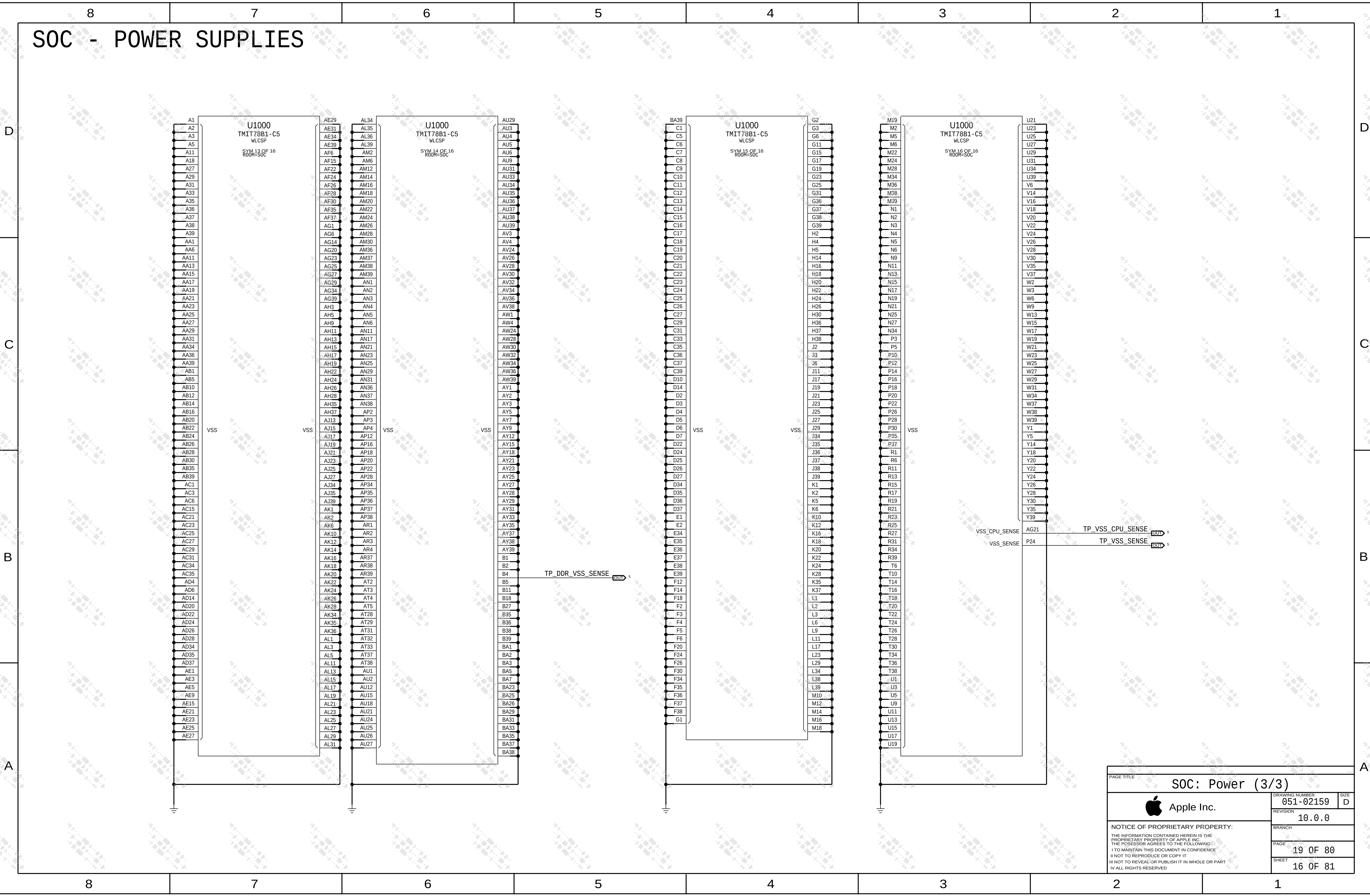
TP_SOC_SENSE

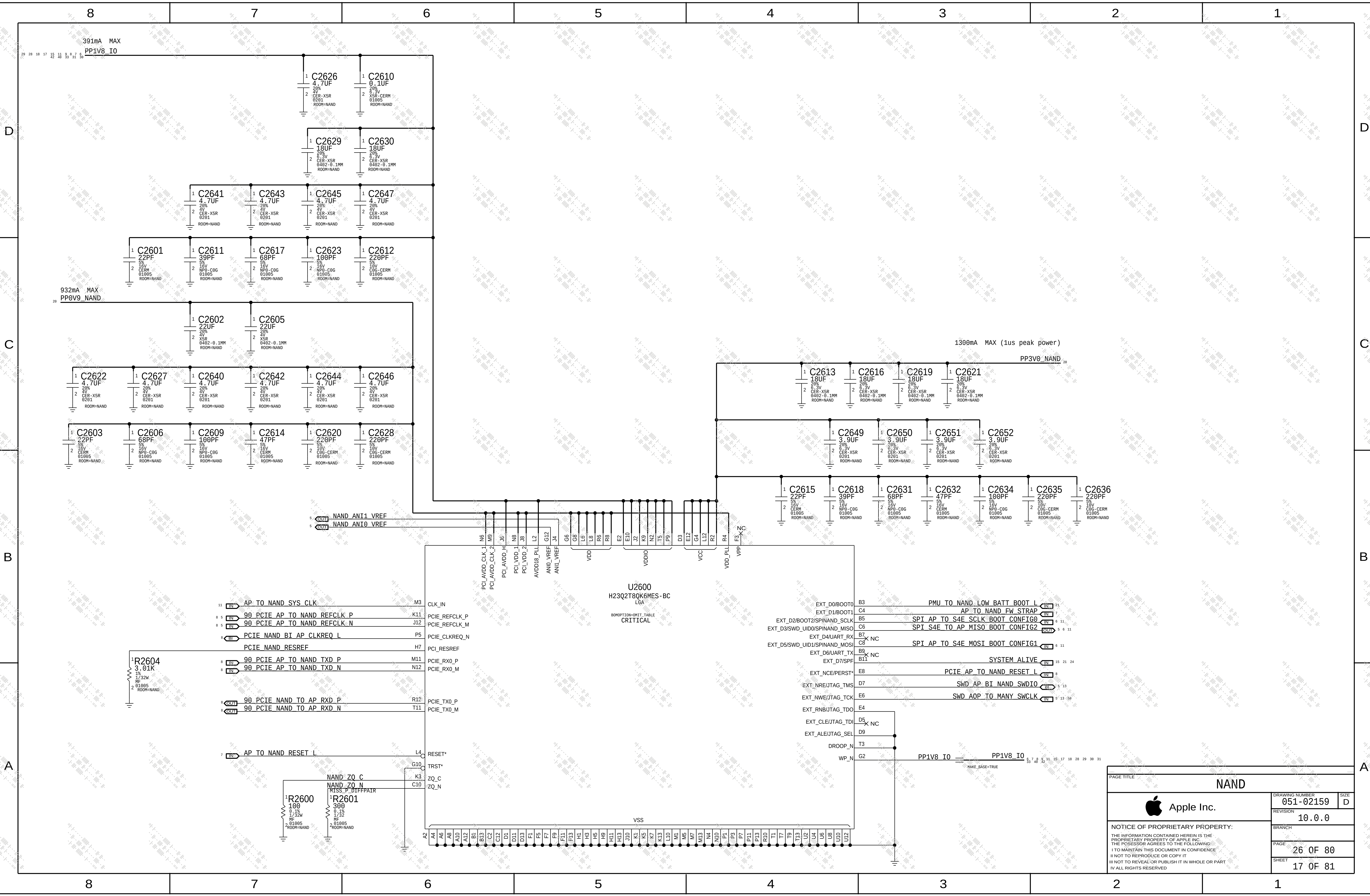
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	DRAWING NUMBER	051-02159	SIZE
	REVISION	10.0.0	D
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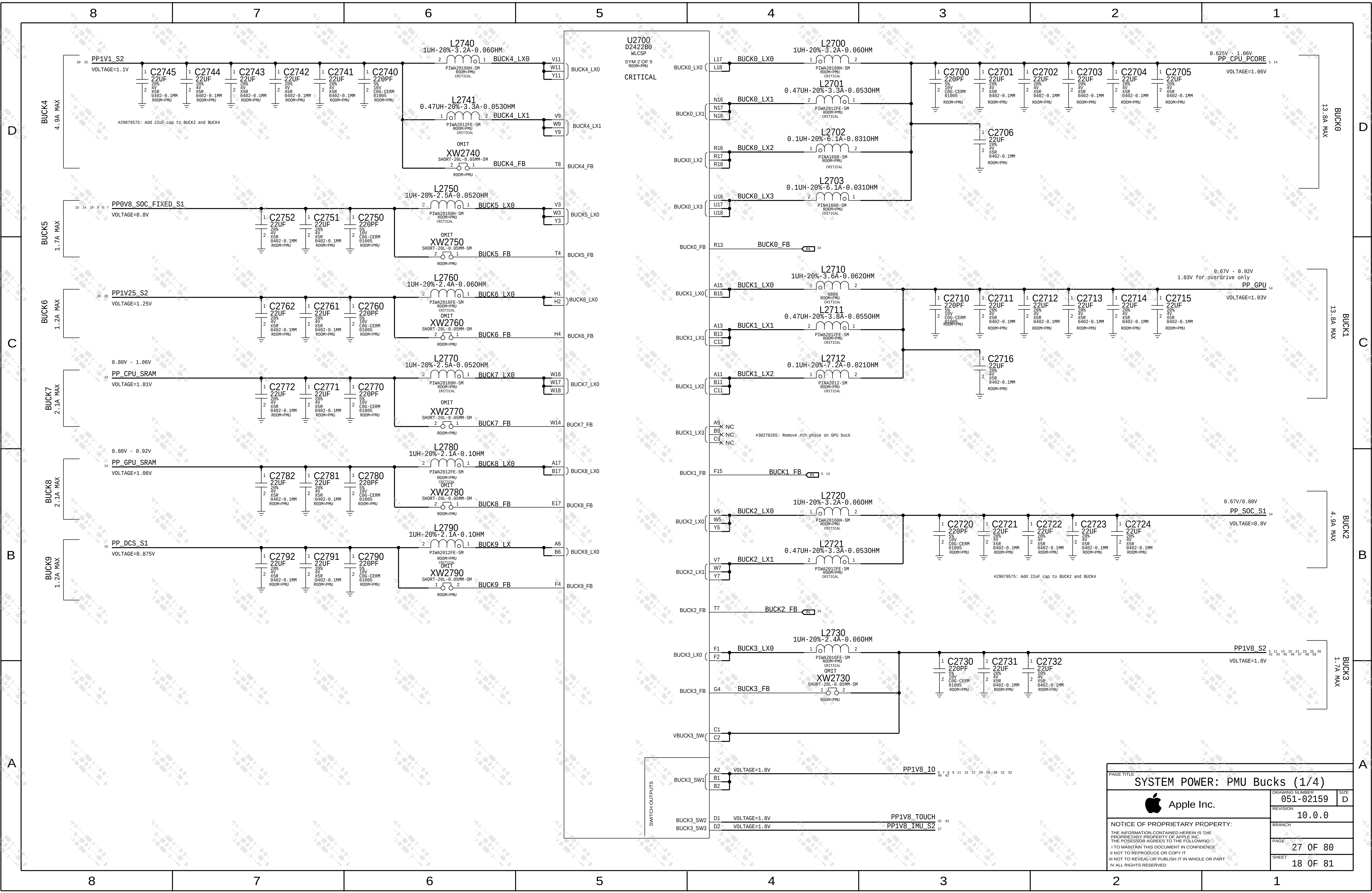
SOC - POWER SUPPLIES

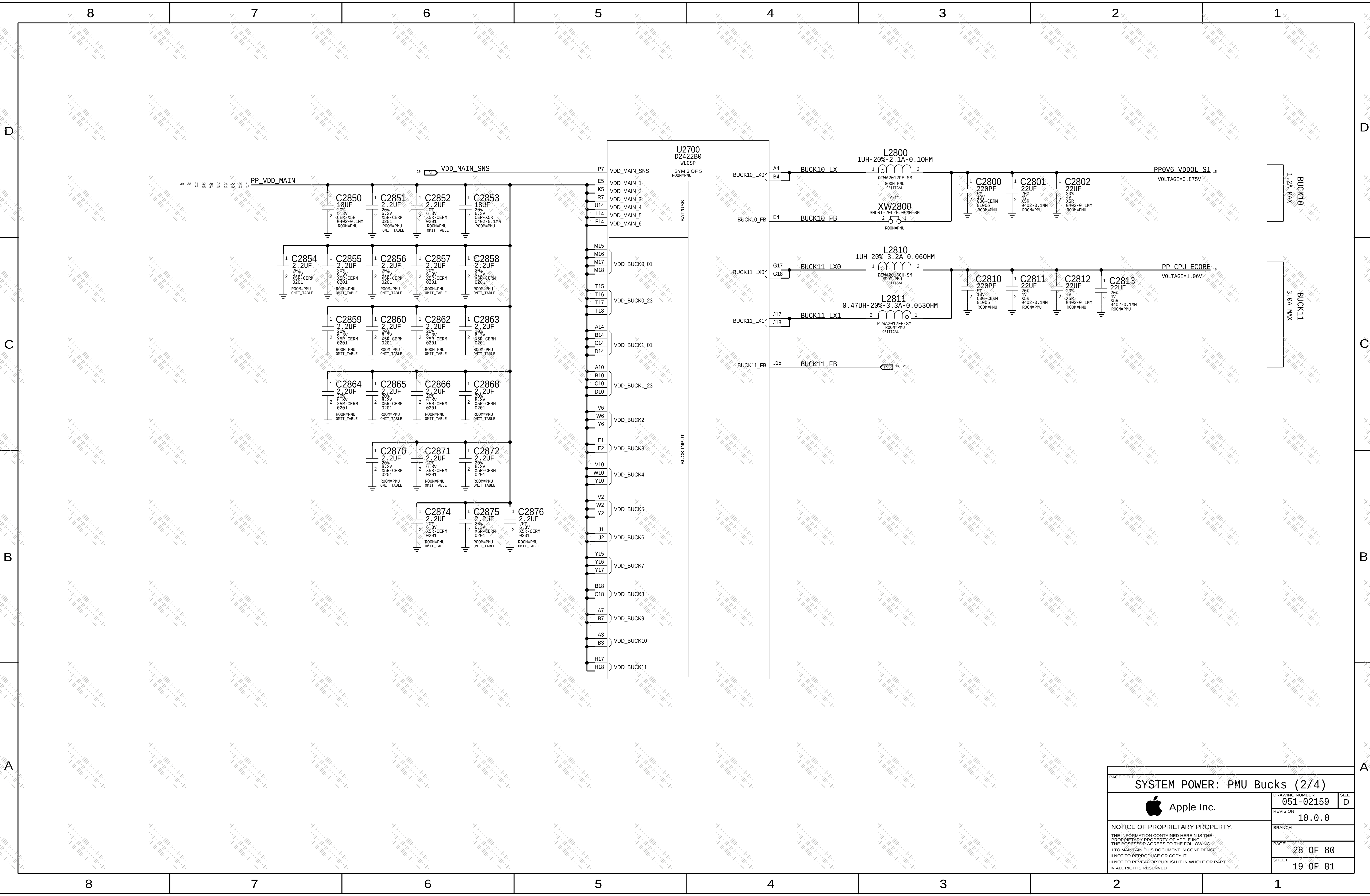


SOC - POWER SUPPLIES

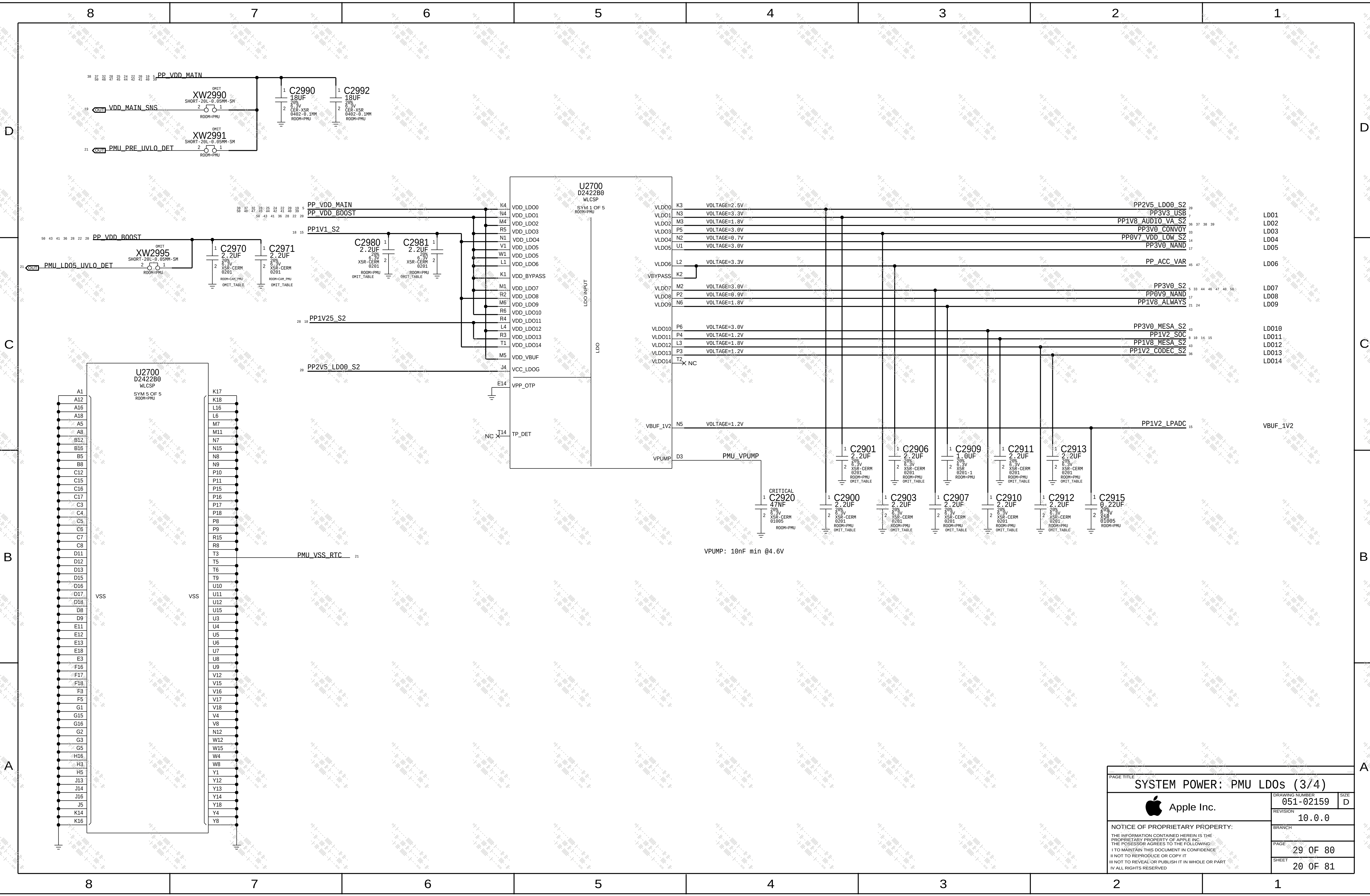






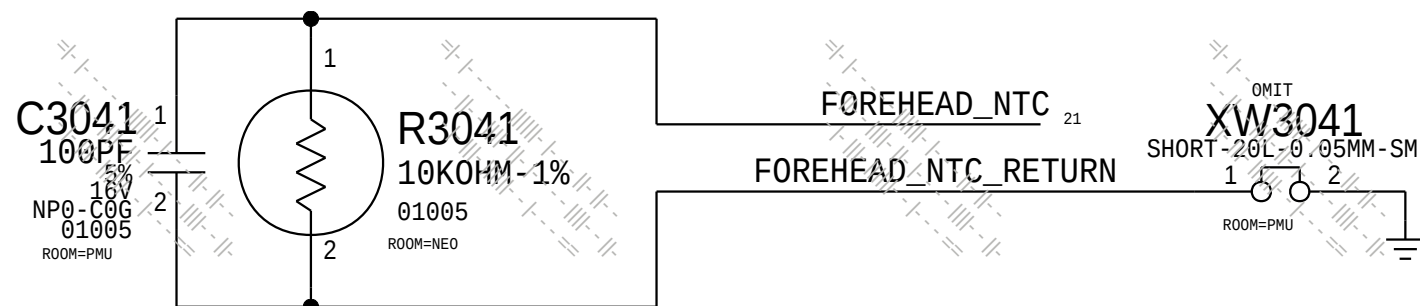


PAGE TITLE		
SYSTEM POWER: PMU Bucks (2/4)		
 Apple Inc.	DRAWING NUMBER	051-02159
	REVISION	10.0.0
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	PAGE	28 OF 80
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PAGE TITLE		
SYSTEM POWER: PMU LD0s (3/4)		
 Apple Inc.	DRAWING NUMBER	051-02159
	REVISION	10.0.0
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FOREHEAD NTC



The schematic shows two modules connected by wires:

- XW3045 Module:** The **CHARGE_NTC** pin is connected to the **CHARGER_NTC_RETURN** pin.
- Senna Module:** The **CHARGE_NTC** pin is connected to the **CHARGER_NTC_RETURN** pin.

A note indicates a short circuit: "SHORT - 26L - 0.05MM-SI". A ground symbol is also shown near the connection point.

```
#29404057:Damping R for ACTIVE_RDY
```

#29300440: Connect PMU crash to SoC

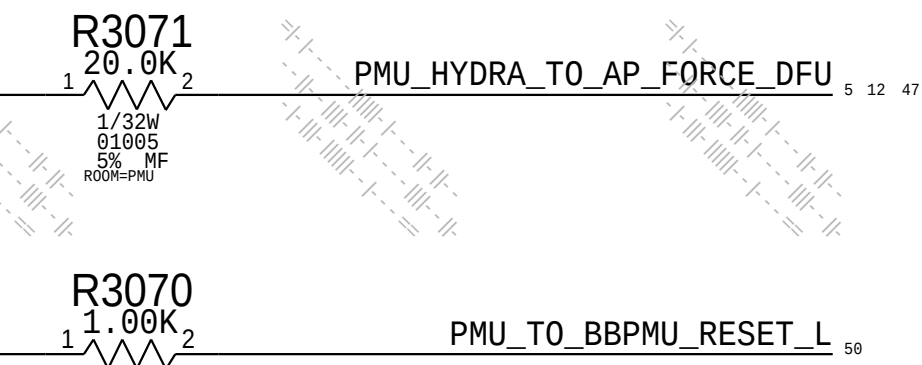
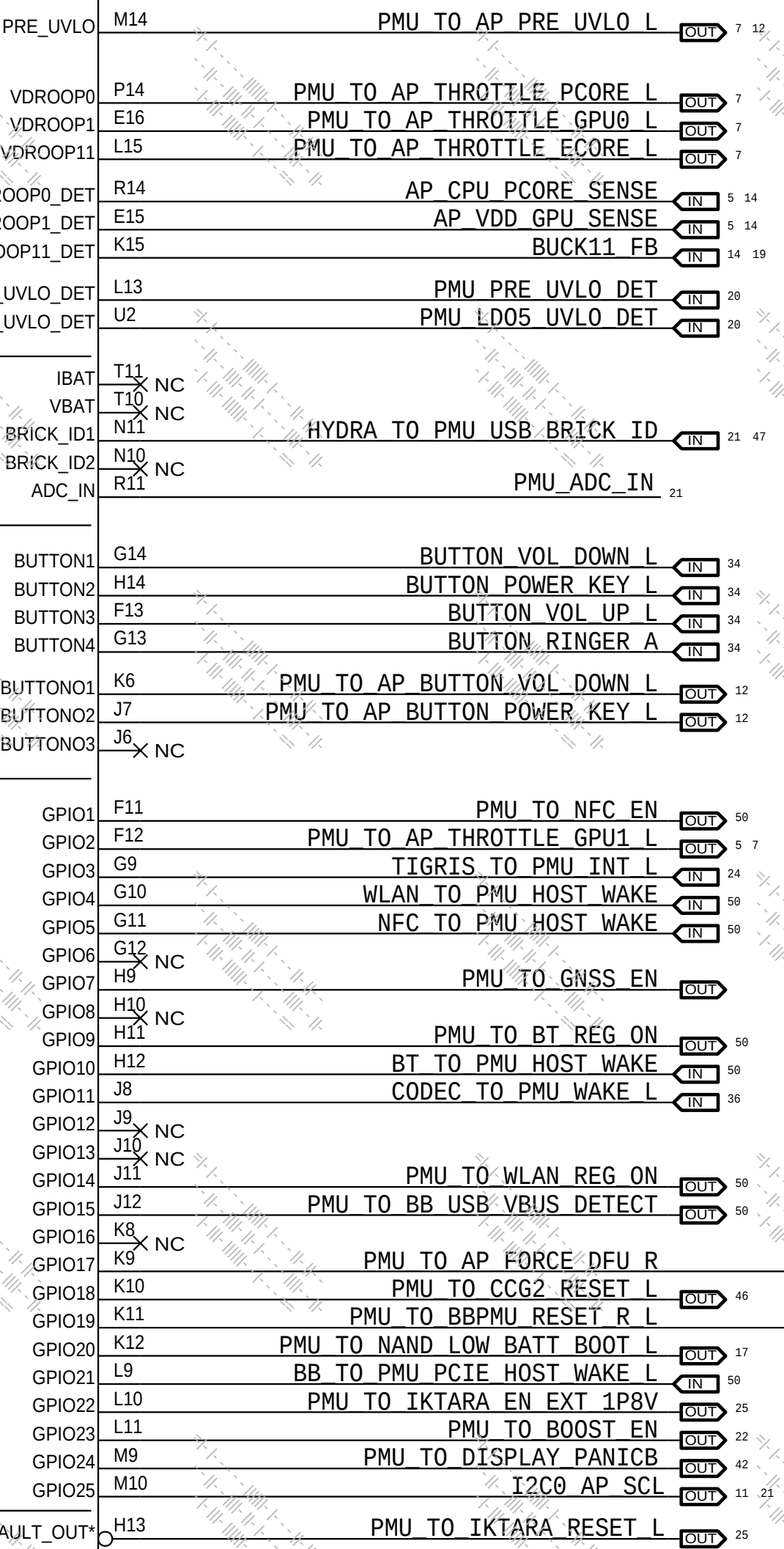
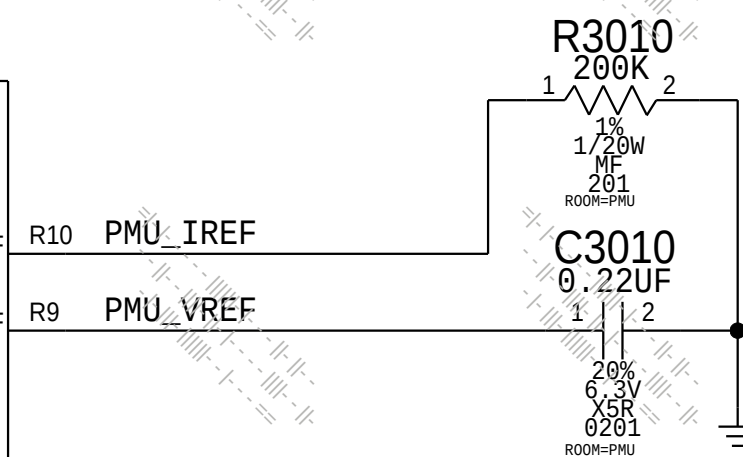
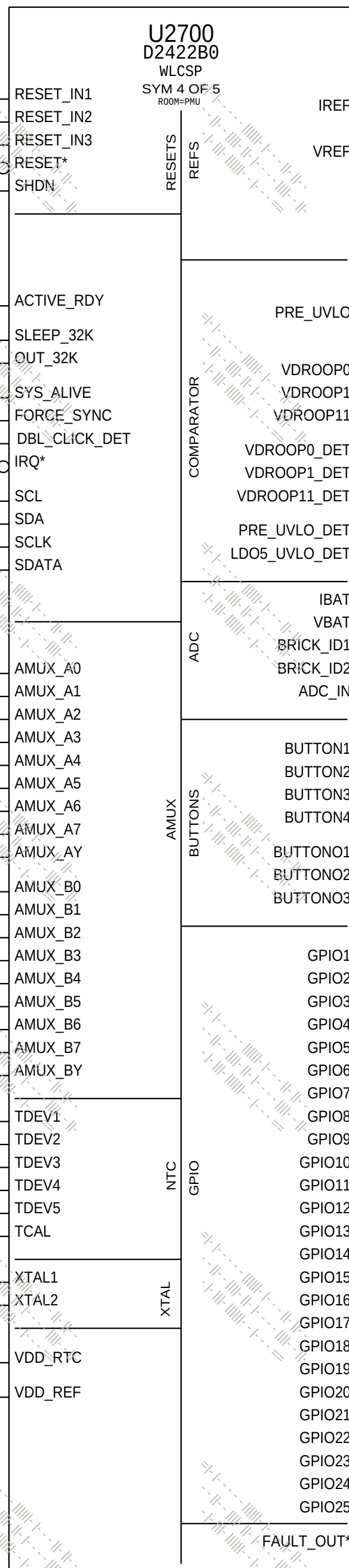
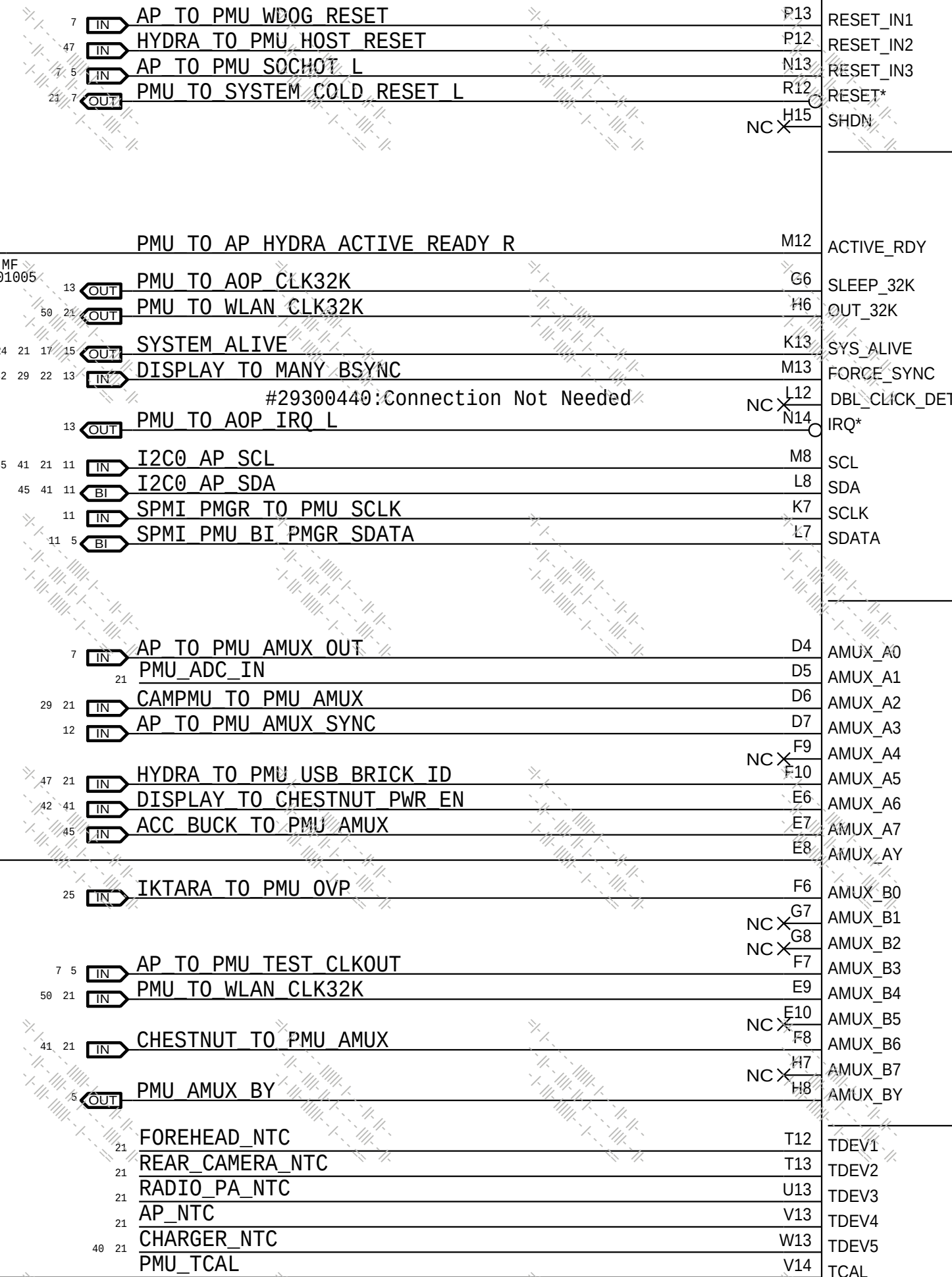
#27852679:No SDA R. PoR is SPMI

#25244799:200K pull-down

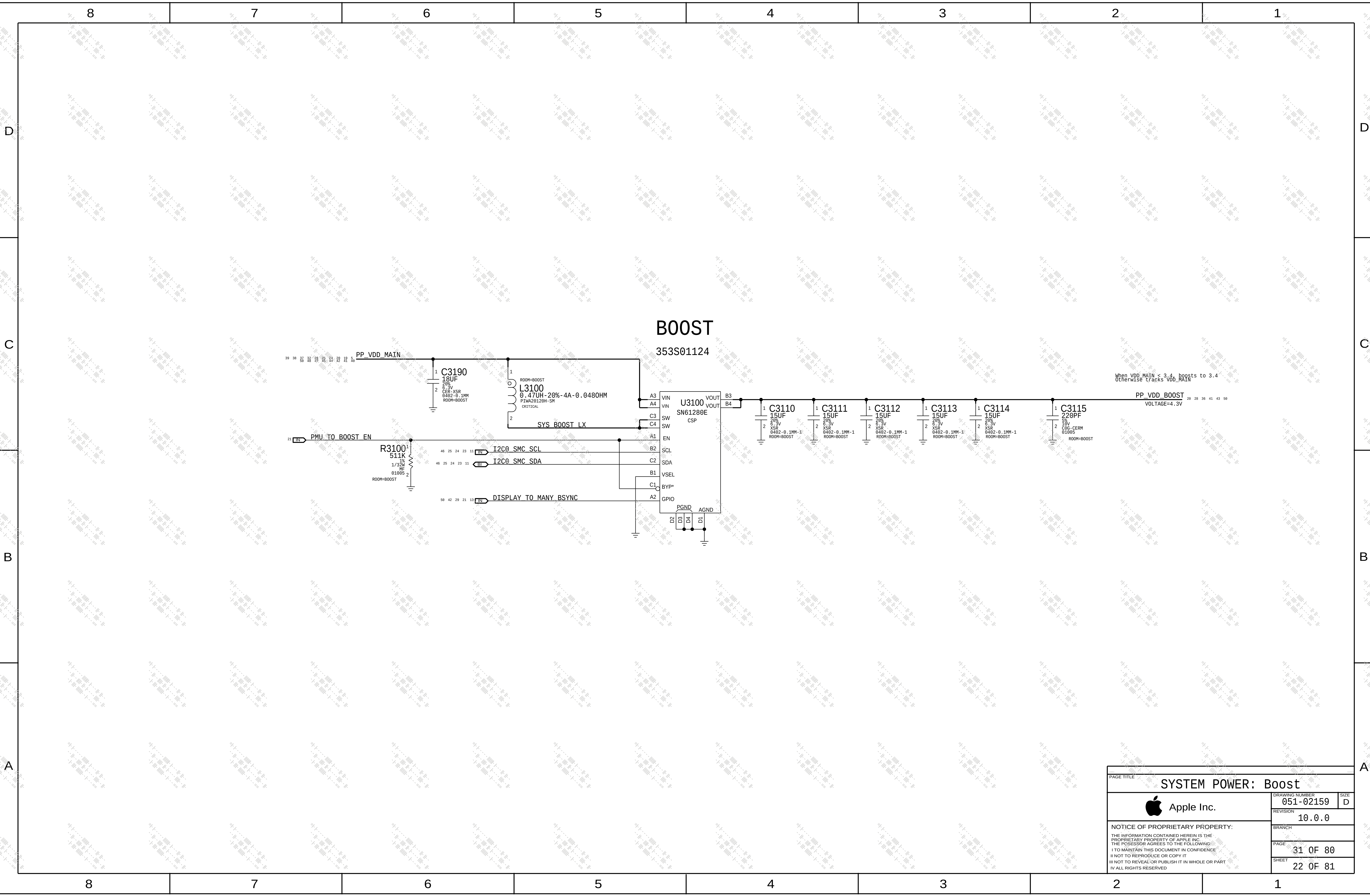
```
#25244799:CHESTNUT AMUX AND PWR_EN ON SAME CHANNEL
#28748132:CHESTNUT AMUX AND PWR_EN SWAP BETWEEN A6/B6
```

#25244799:OTP-AJ Connects XTAL1 to GND

#29312542: REPLACE PMU XTAL WITH XC



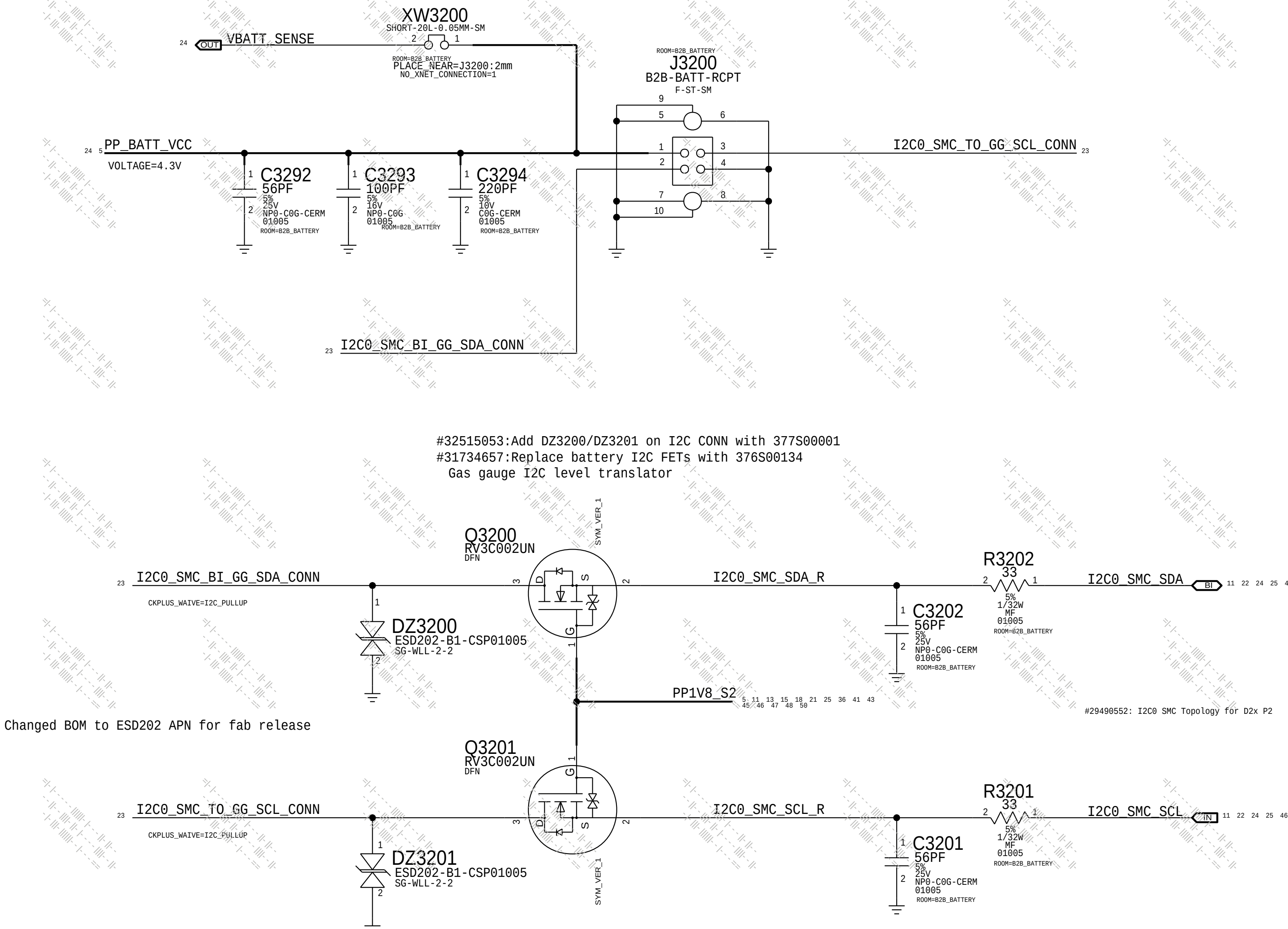
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SYSTEM POWER: PMU (4/4)			
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PAGE TITLE			SYSTEM POWER: Boost		
		DRAWING NUMBER		SIZE	
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		REVISION		10.0.0	
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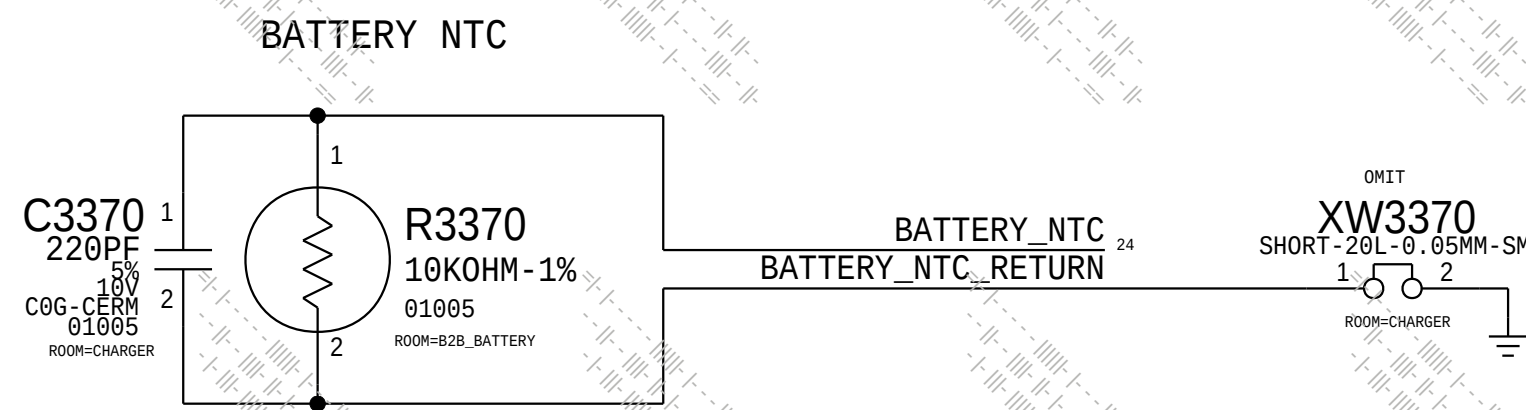
Battery Connector

THIS ONE ON MLB ---> 516S00232



PAGE TITLE		
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	PAGE	32 OF 80
	SHEET	23 OF 81

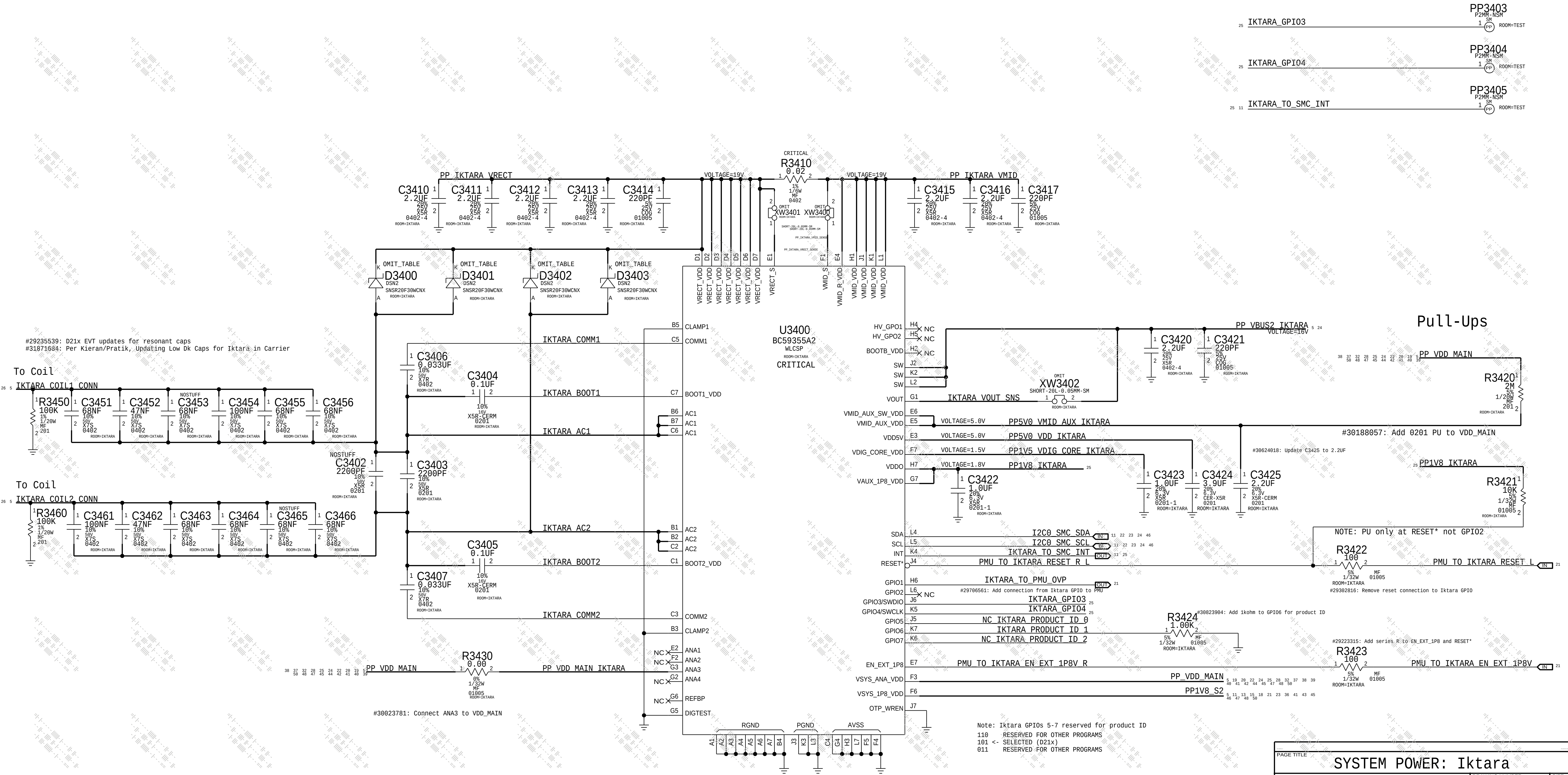
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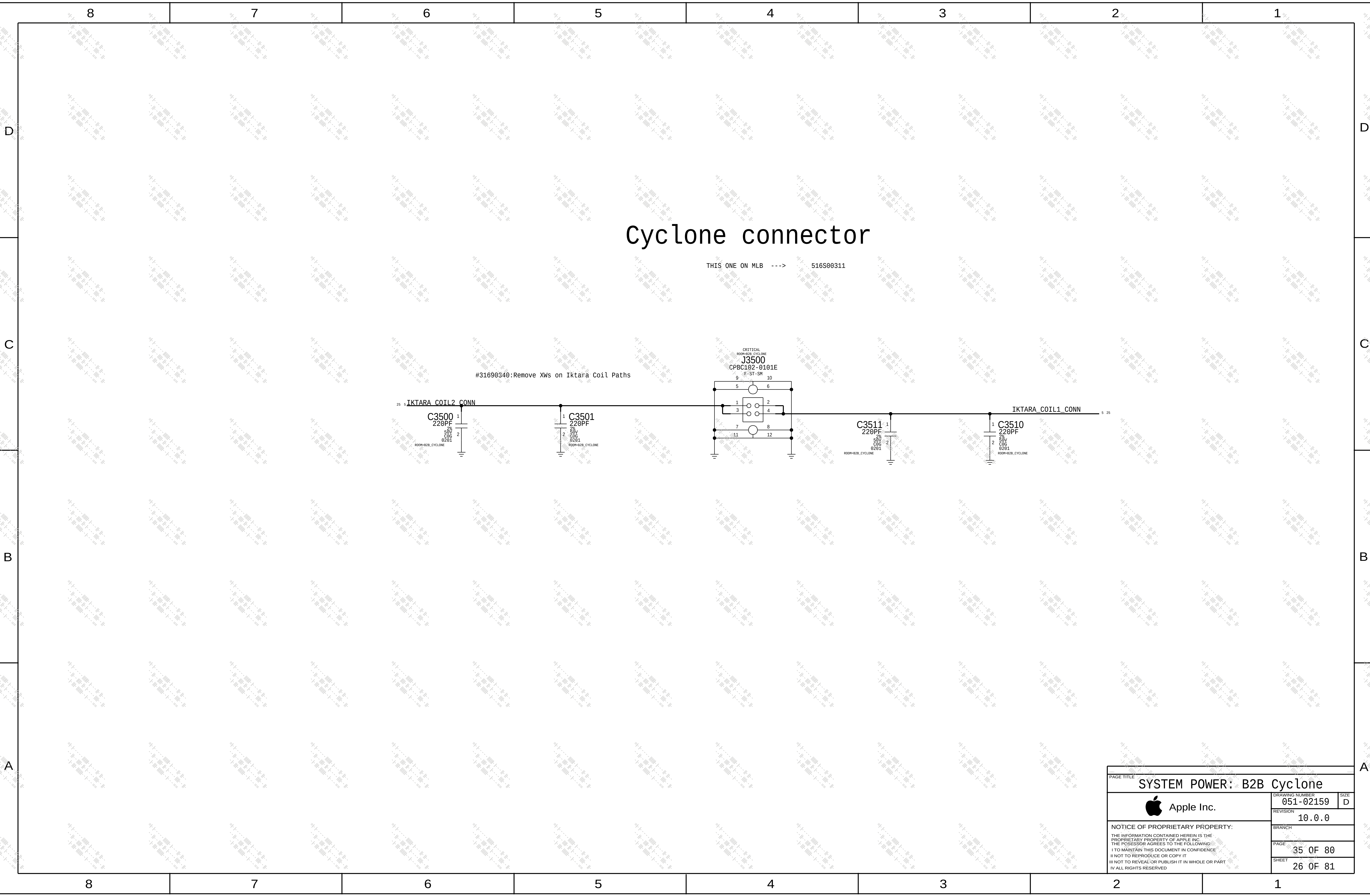
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Iktara

Iktara Debug

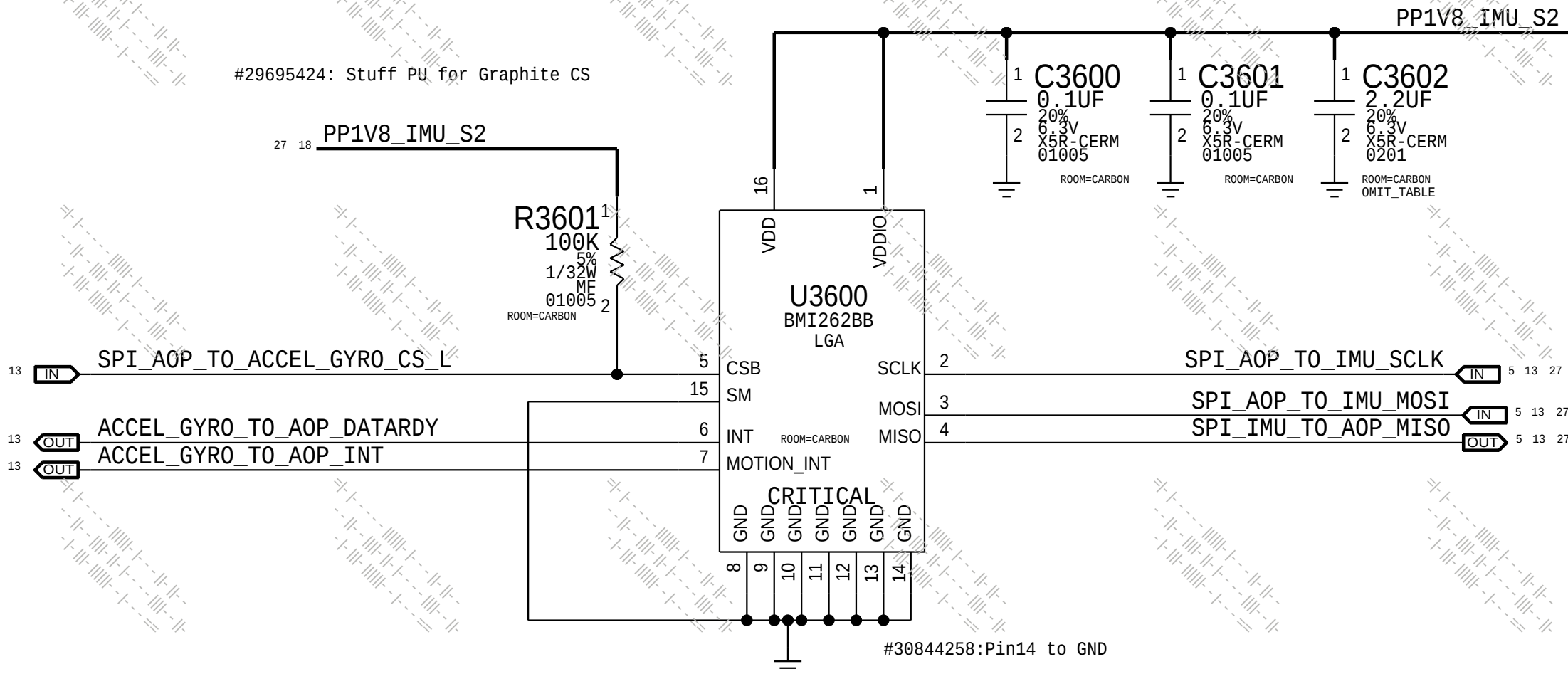


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Graphite - Accel & Gyro

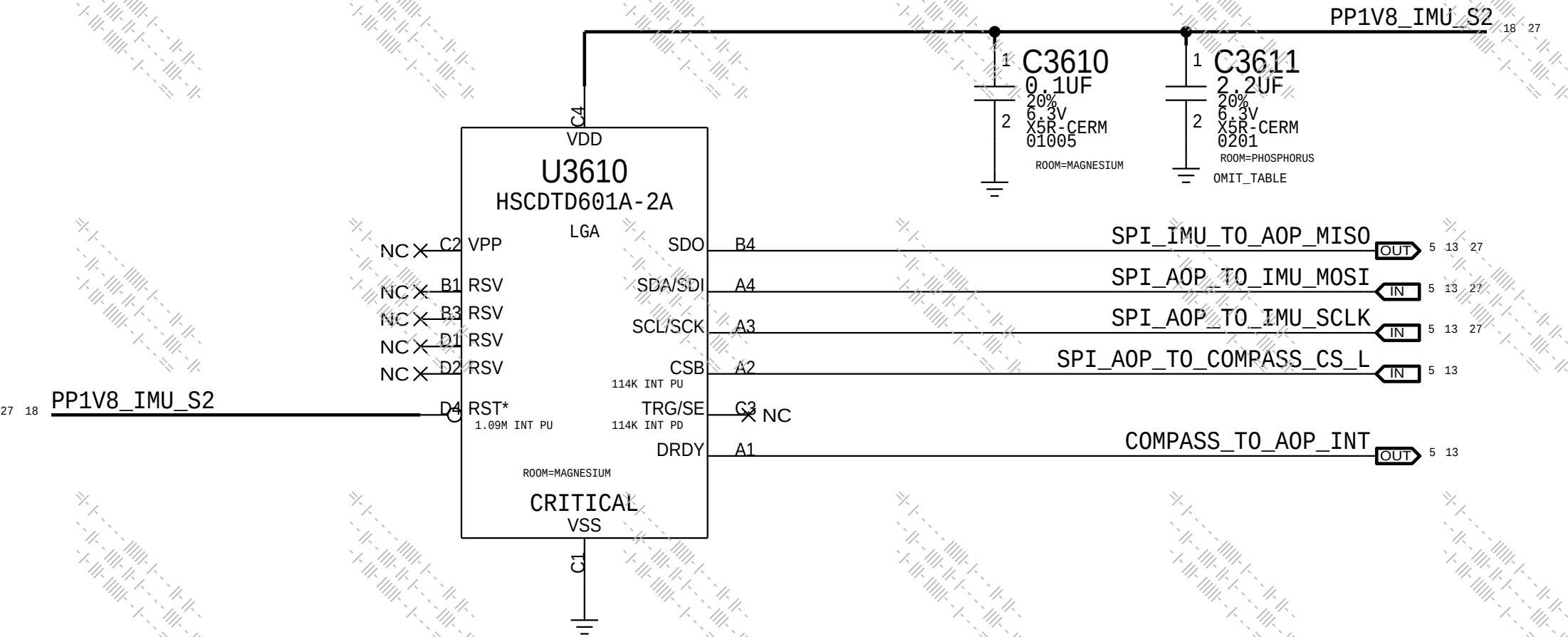
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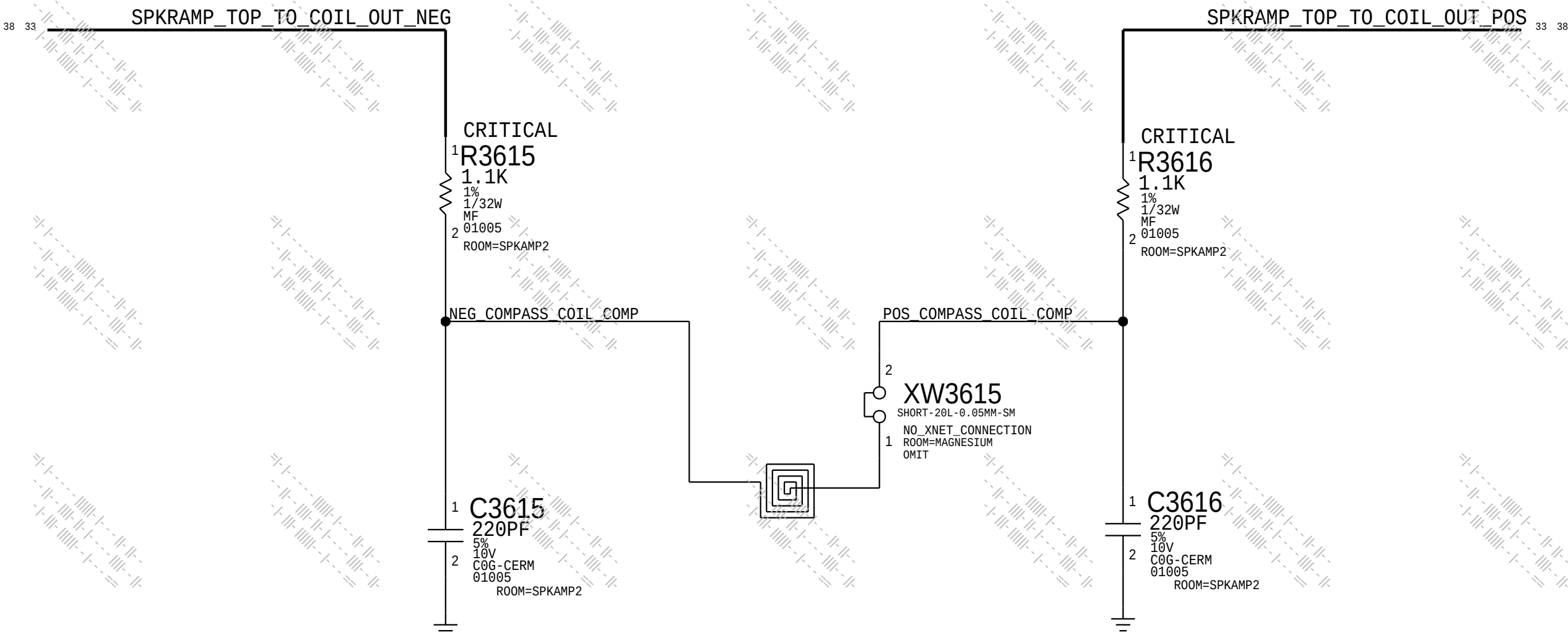
Magnesium - Compass

APN:338S00084

Shared decoupling with Phosphorus

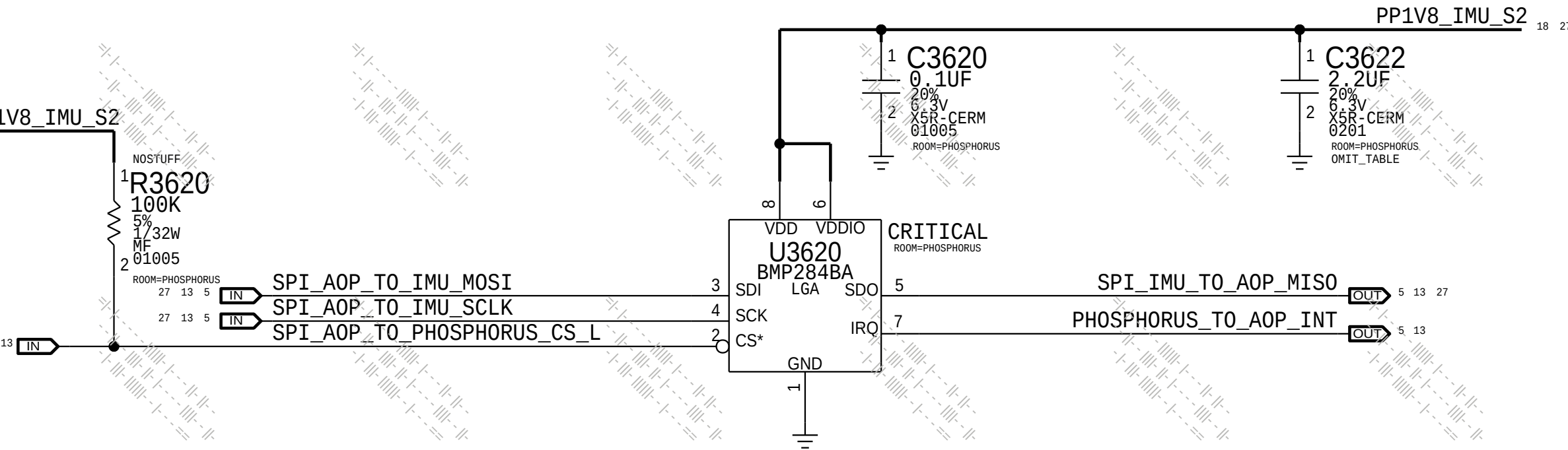


North Speaker Compass Compensation Coil



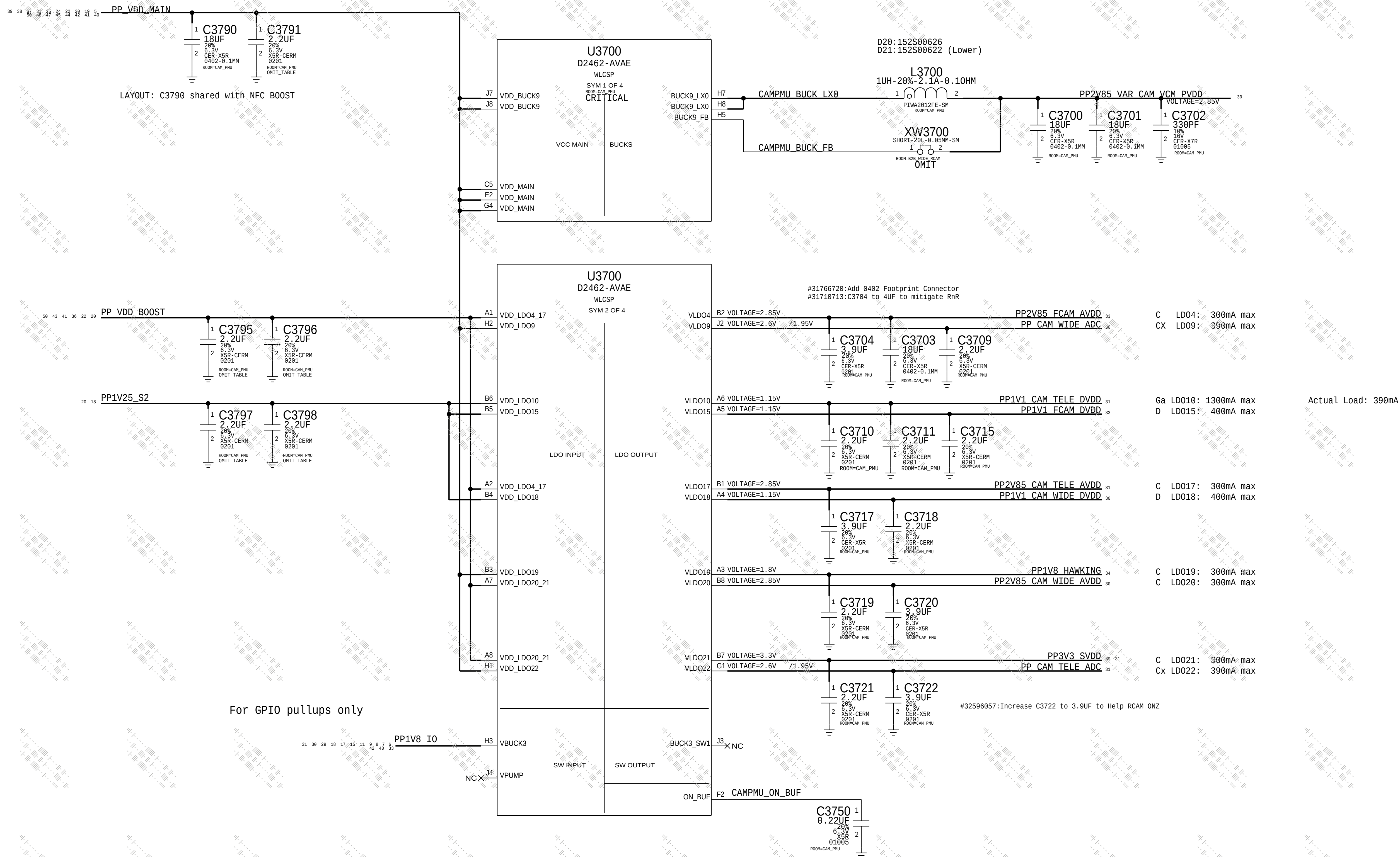
Phosphorus

APN: 338S00334

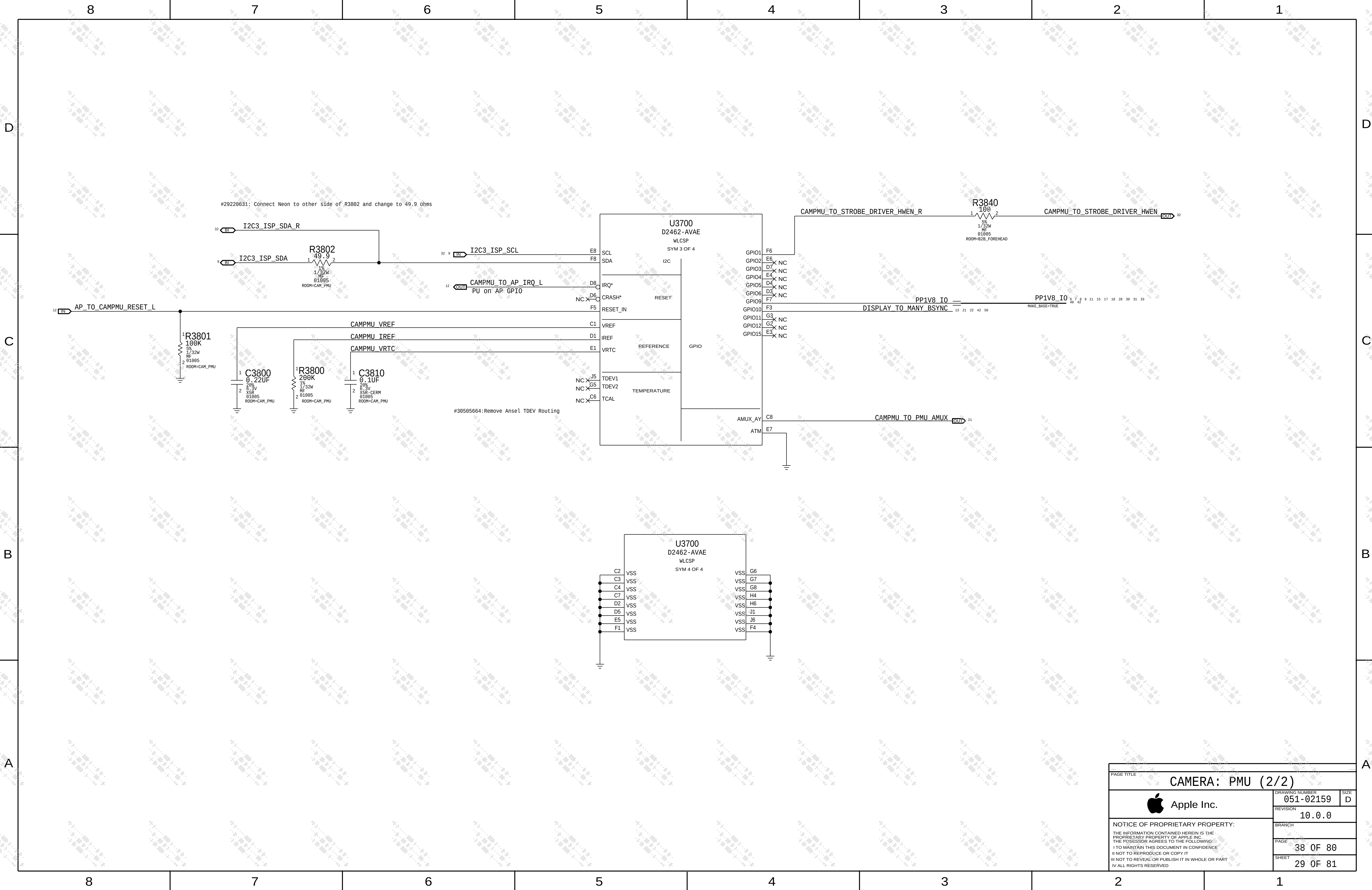


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Camera PMU



PAGE TITLE		CAMERA: PMU (1/2)	
 Apple Inc.	DRAWING NUMBER	051-02159	SIZE D
	REVISION	10.0.0	
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BRANCH			
PAGE		37 OF 80	
SHEET		28 OF 81	

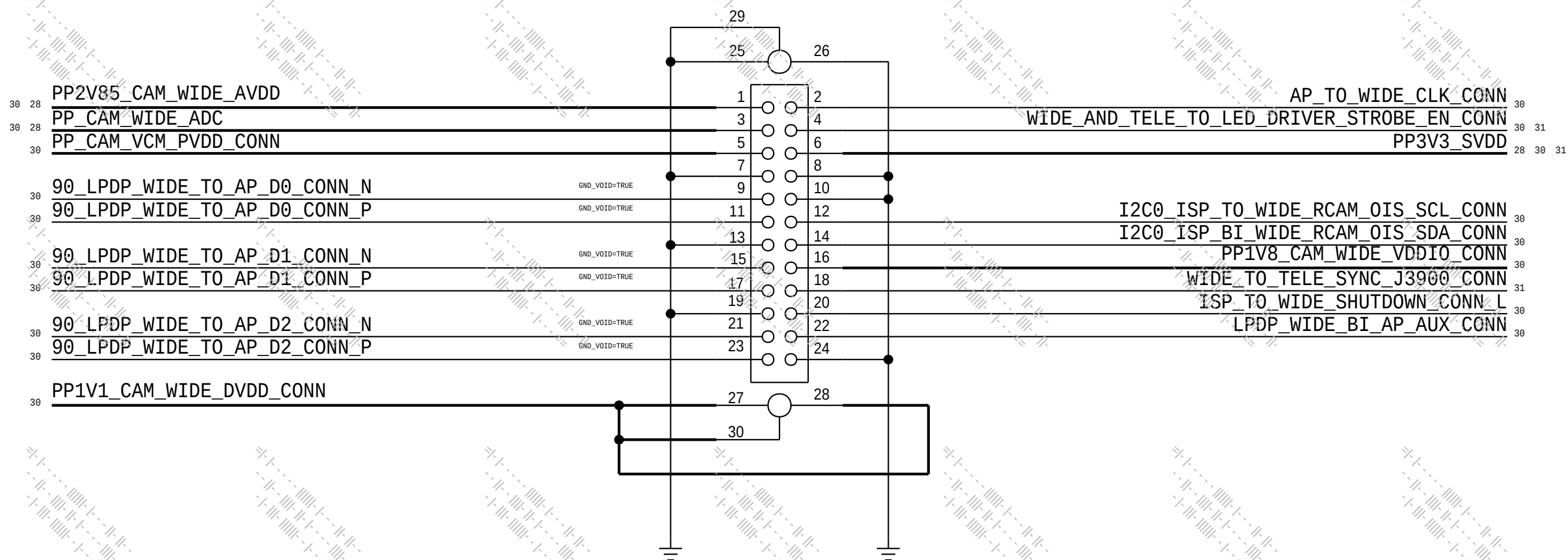


Wide Camera Connector

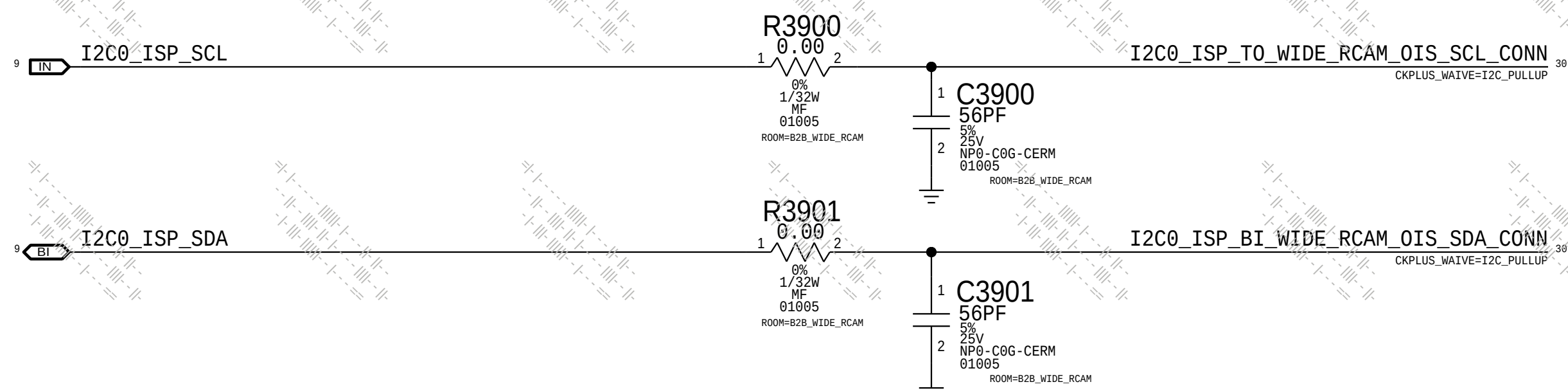
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516S00310/P2 RCPT (USED ON MLB)
516S00309/P2 PLUG (USED ON FLEX)

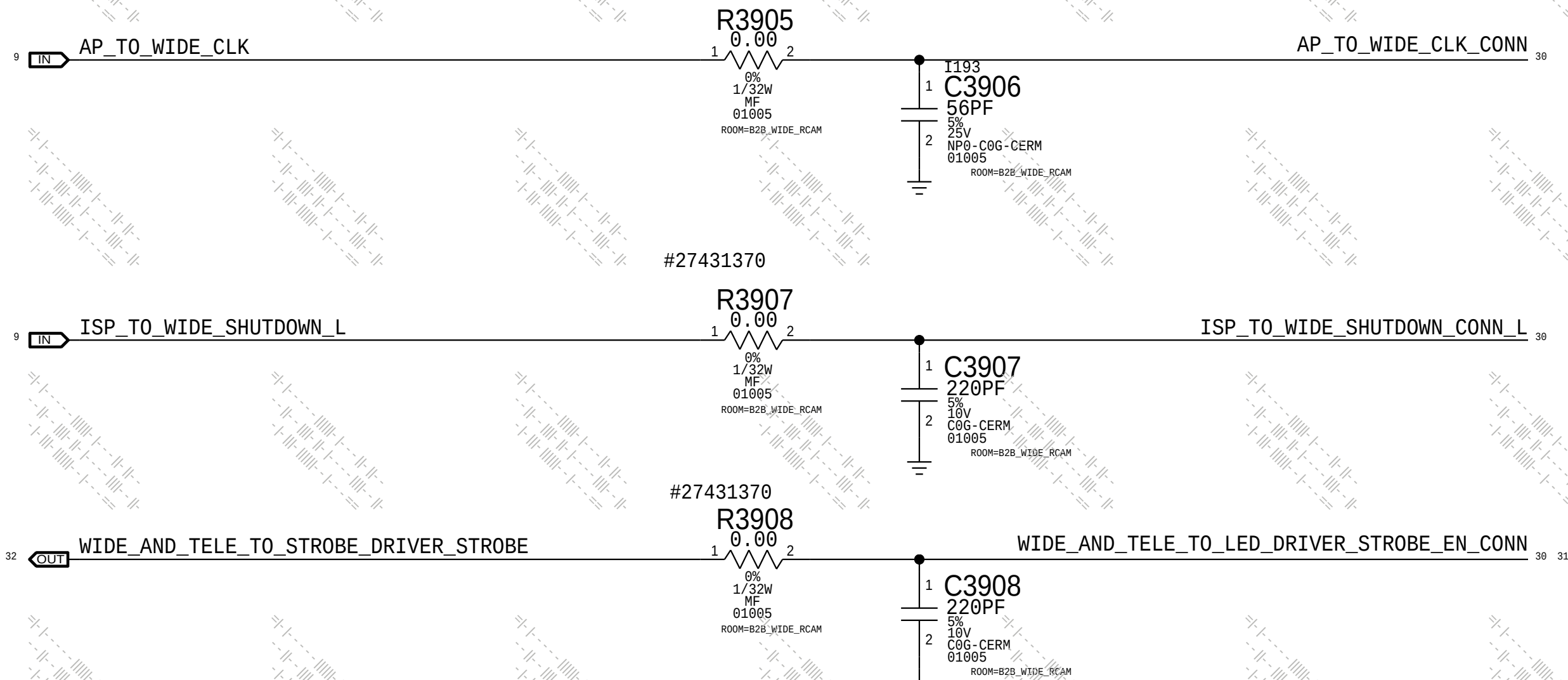
J3900
AA27DK-S024VA1
F-ST-SM



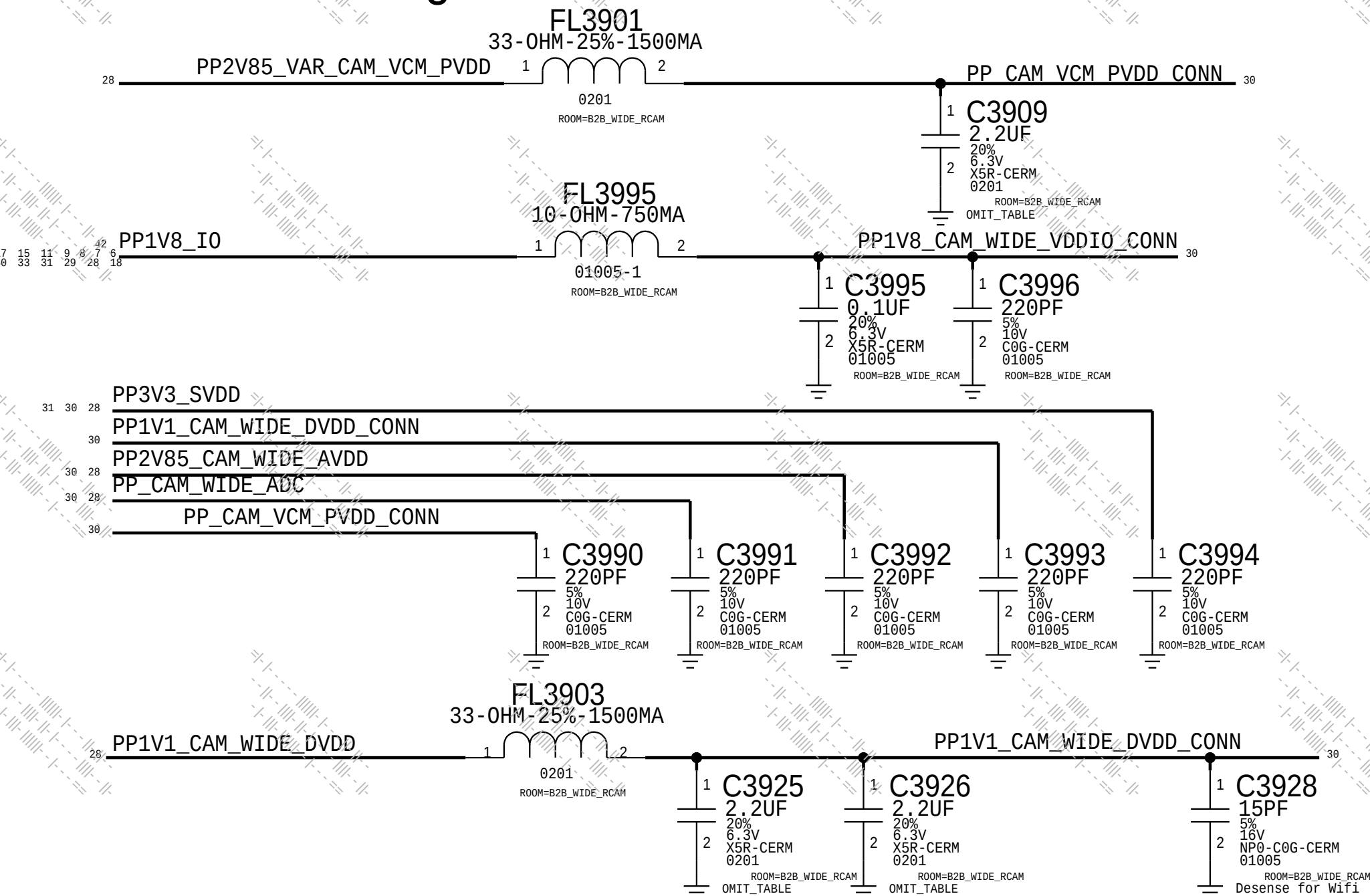
ISP I2C



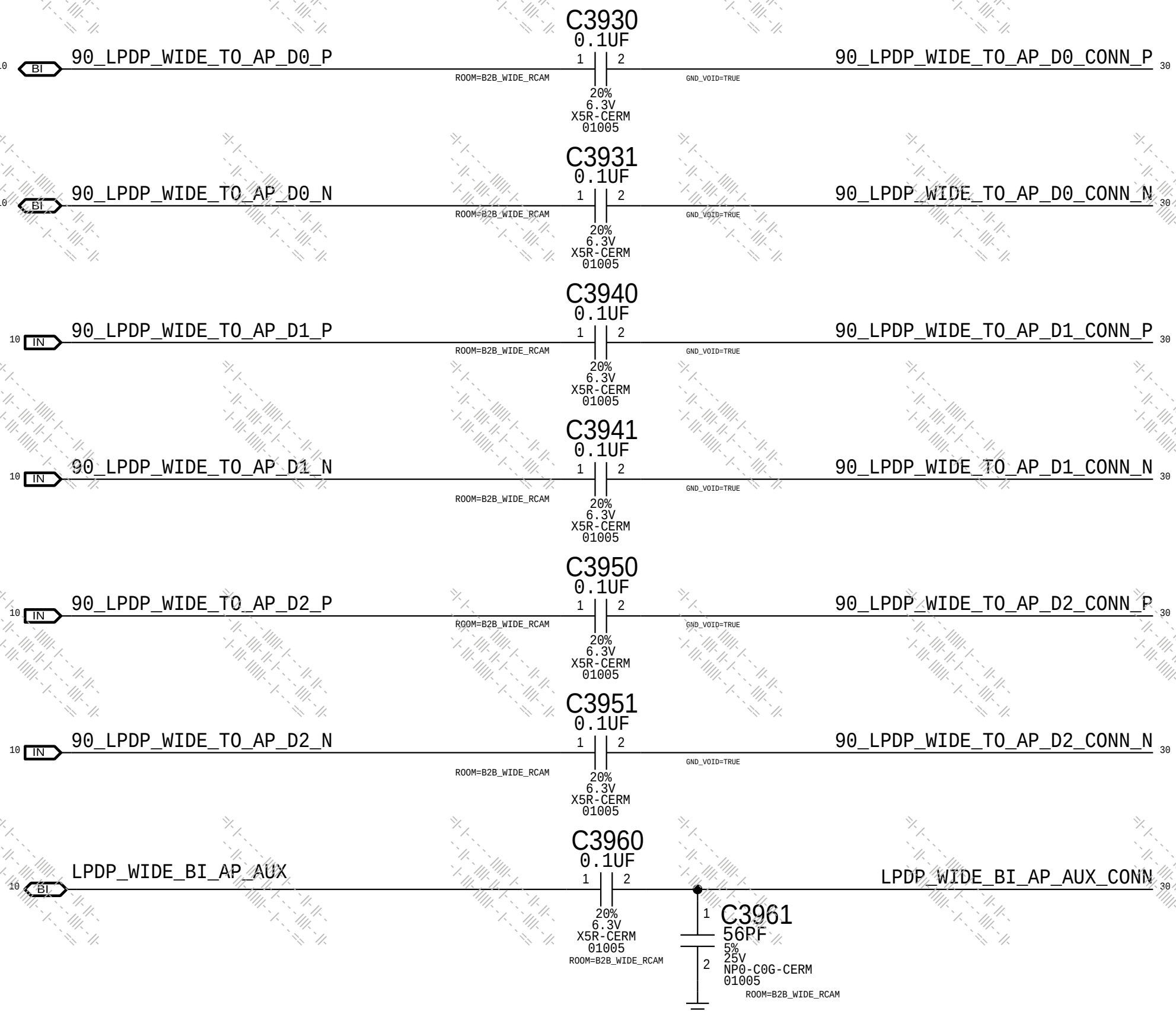
I0 Filters



Power Filtering



LPDP Filters

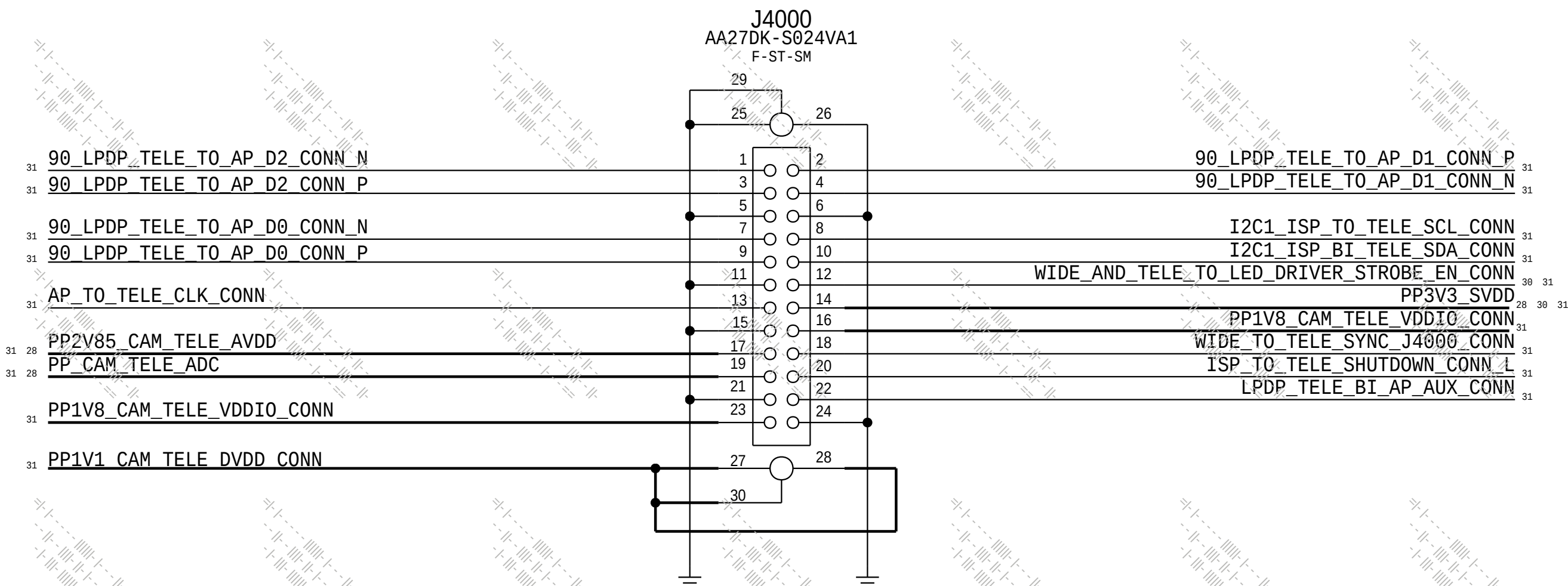


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		PAGE	39 OF 80
		SHEET	30 OF 81

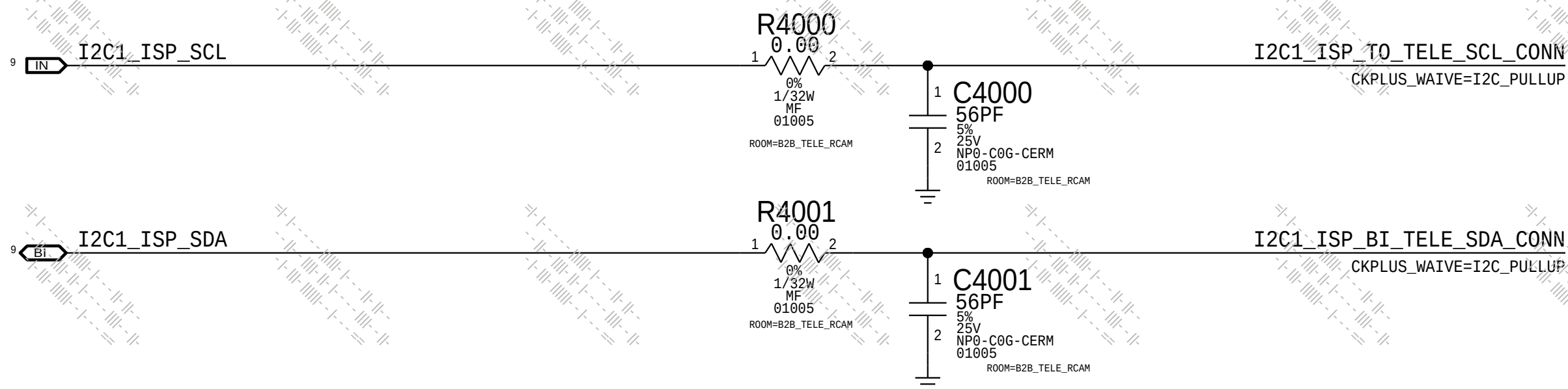
Tele Camera Connector

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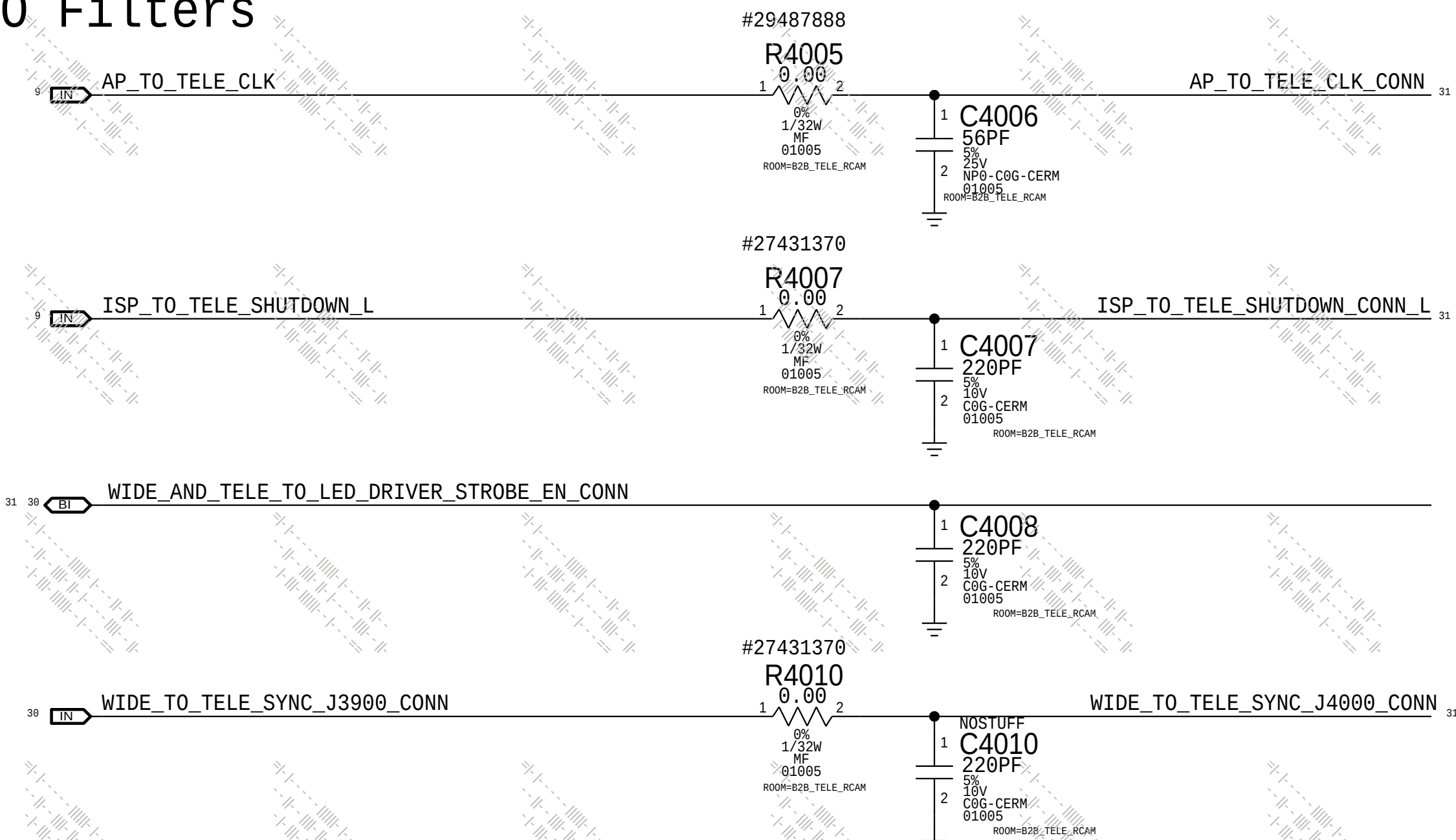
516S00310/P2 RCPT (USED ON MLB)
516S00309/P2 PLUG (USED ON FLEX)



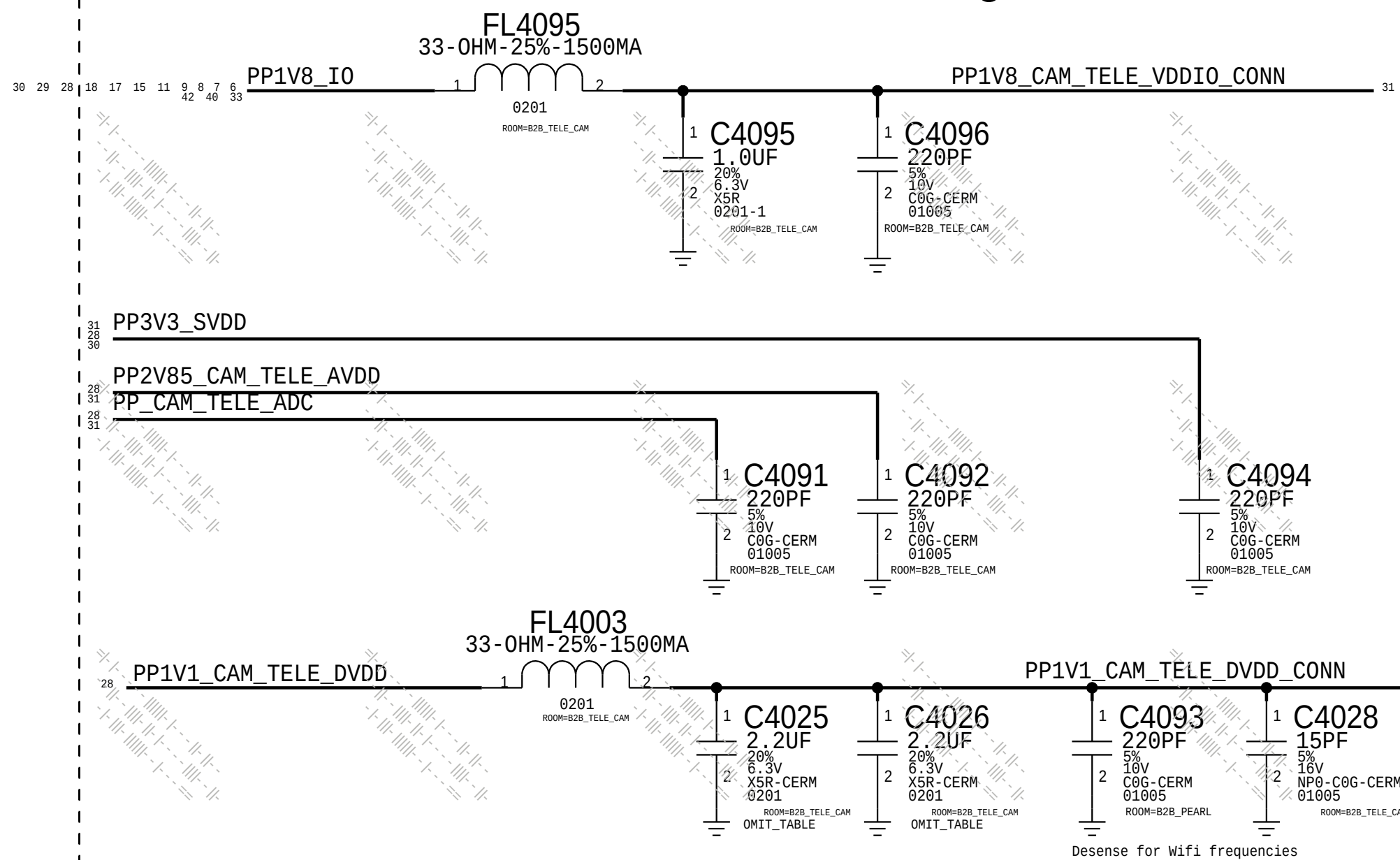
ISP I2C



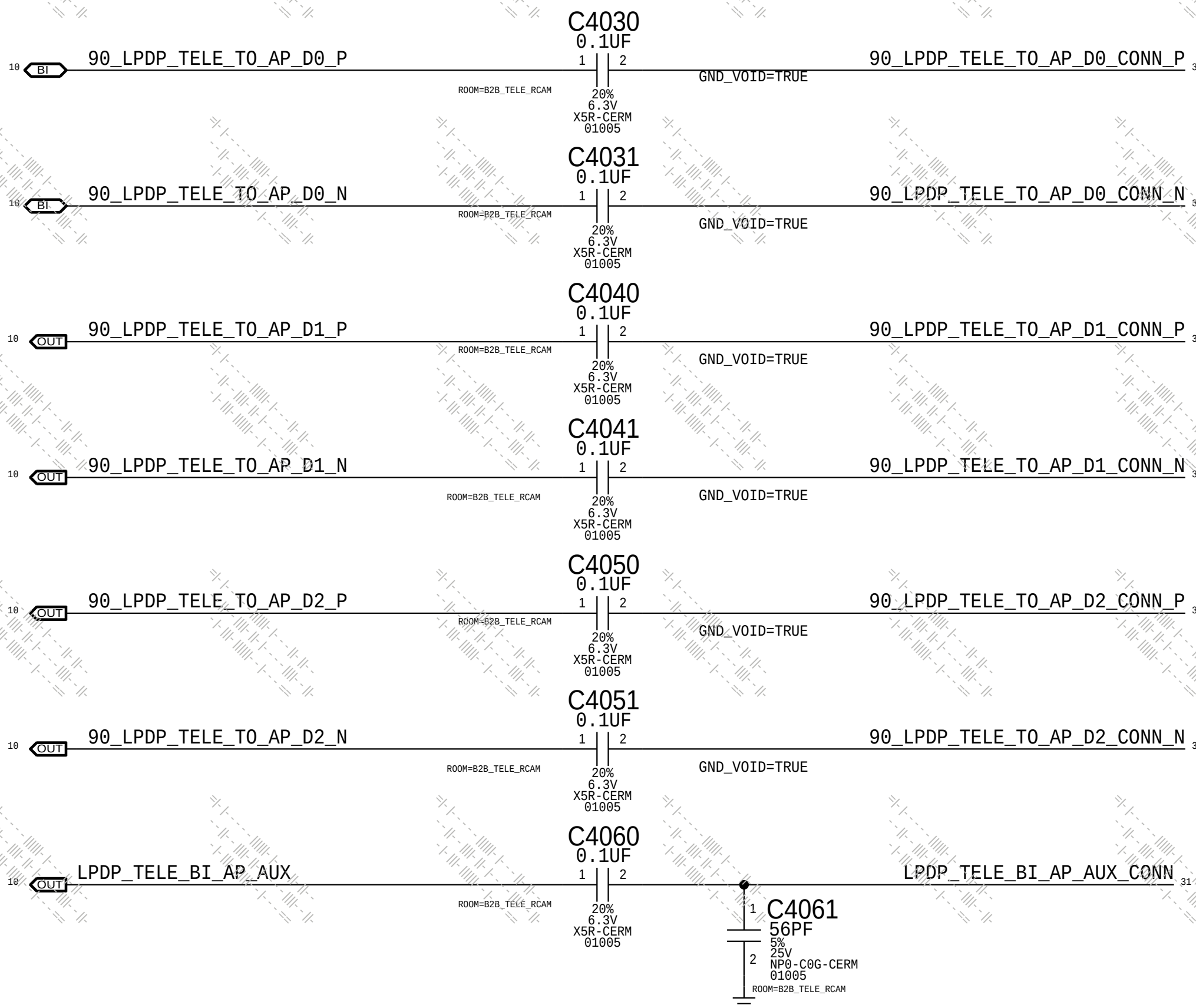
I/O Filters



Power Filtering



LPDP



CAMERA: B2B Tele (TN)

Apple Inc.

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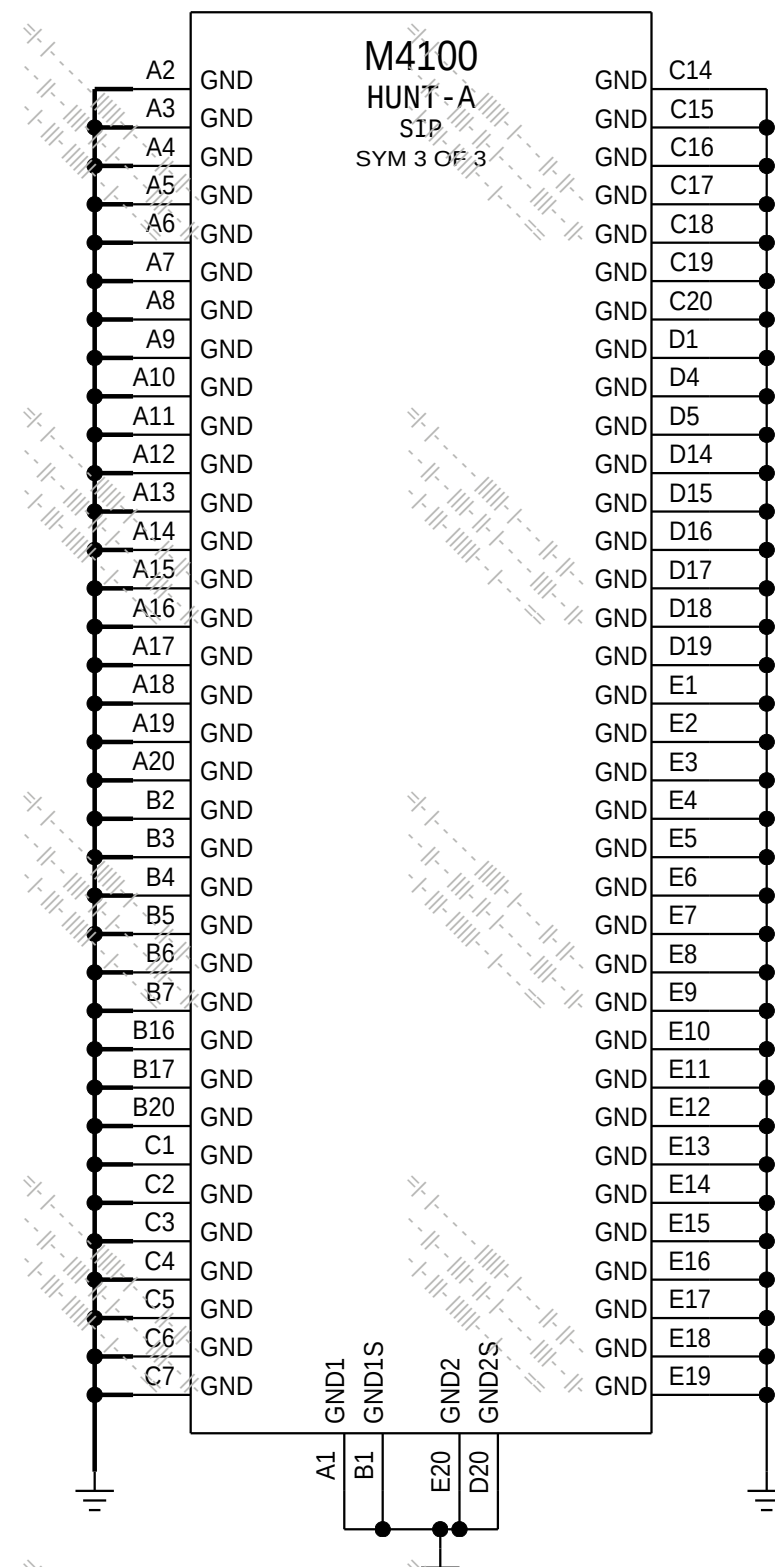
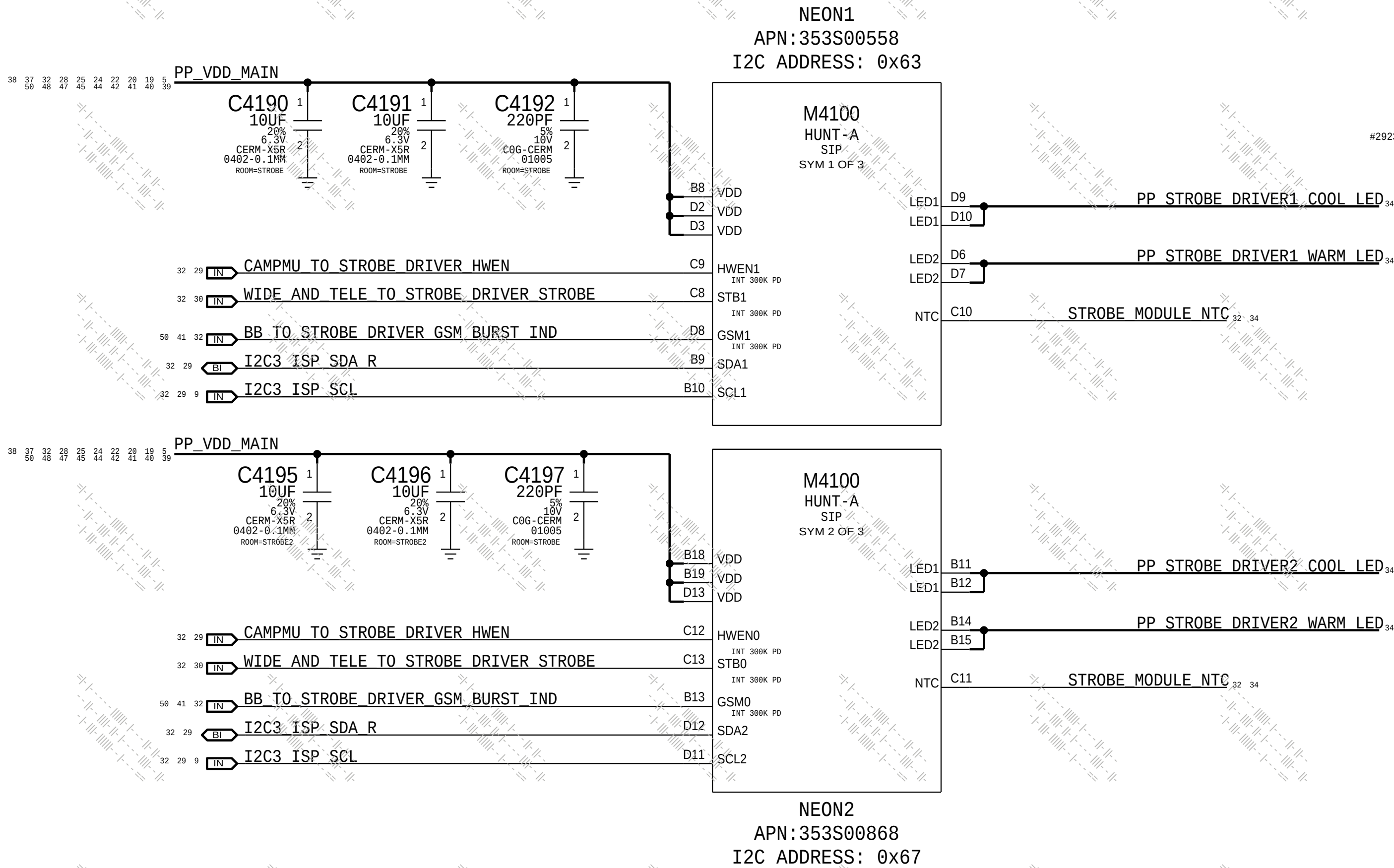
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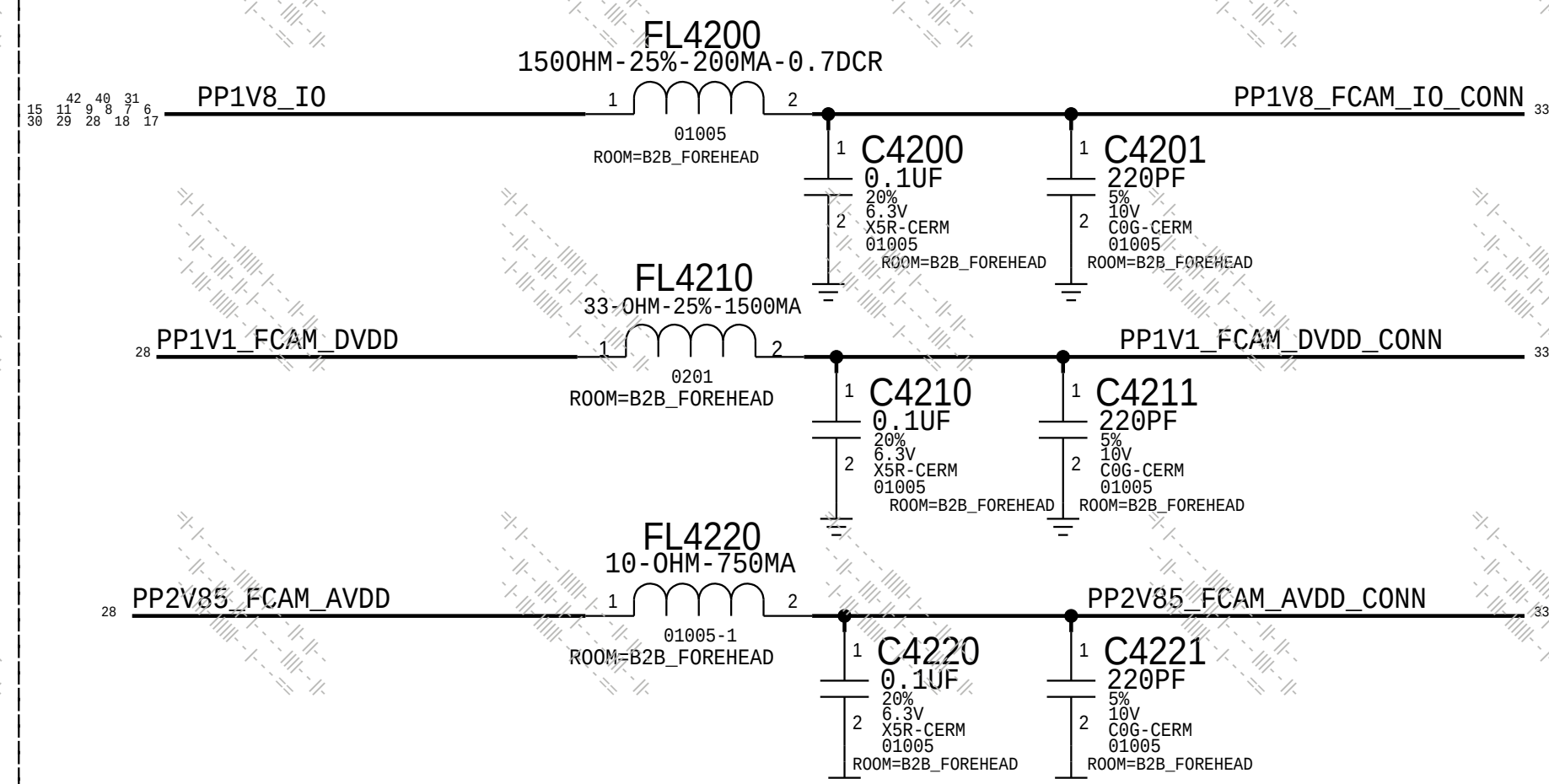
SHEET

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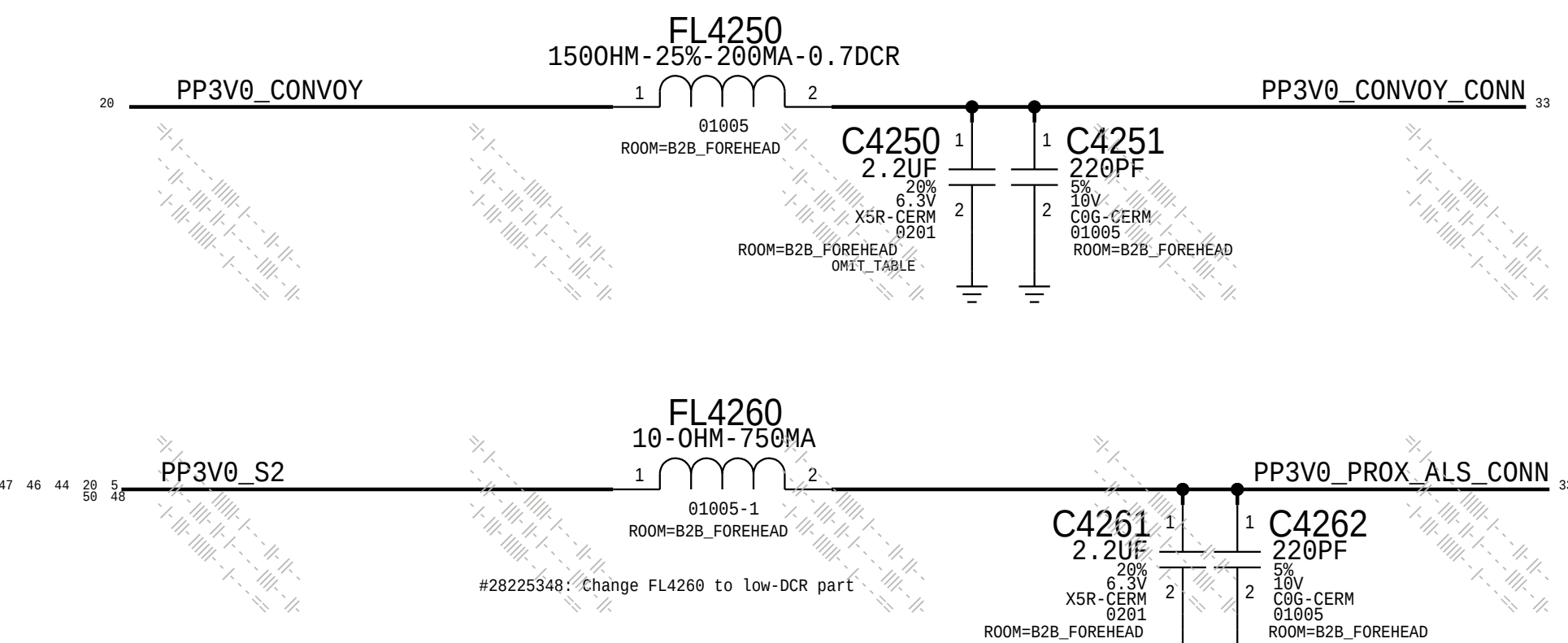
LED STROBE DRIVERS (NEON)



FCAM POWER

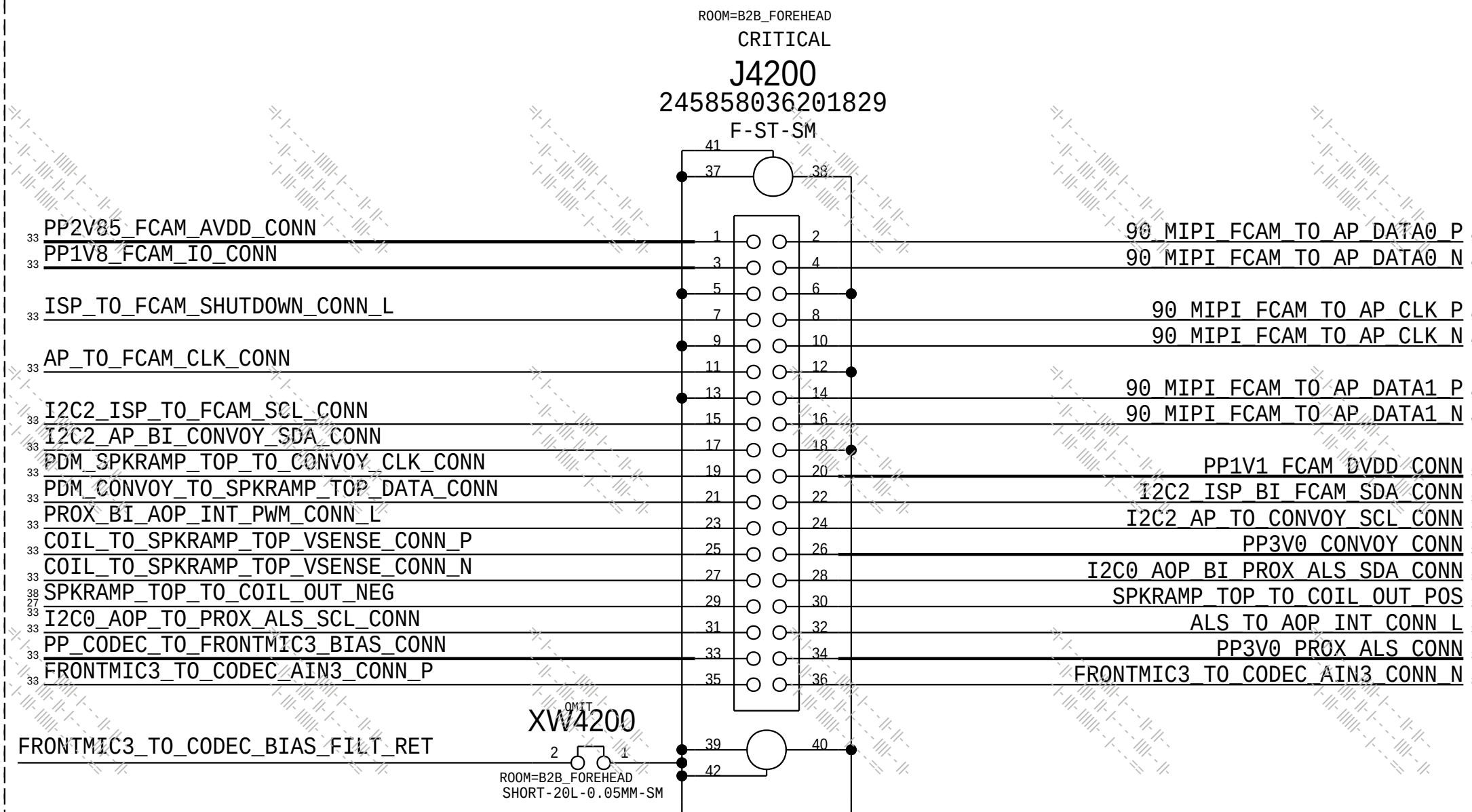


PROX + ALS + CONVOY POWER

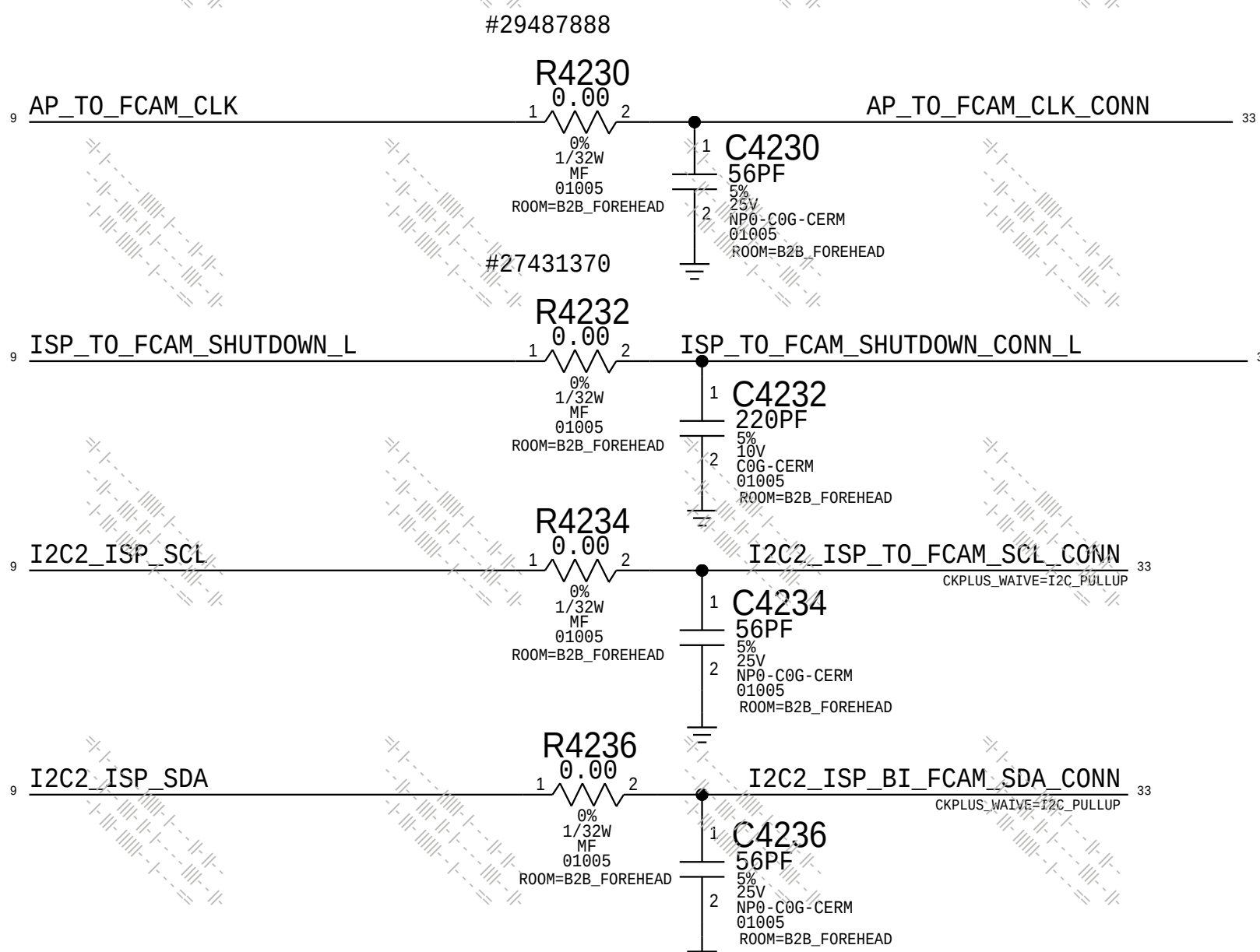


FOREHEAD CONNECTOR

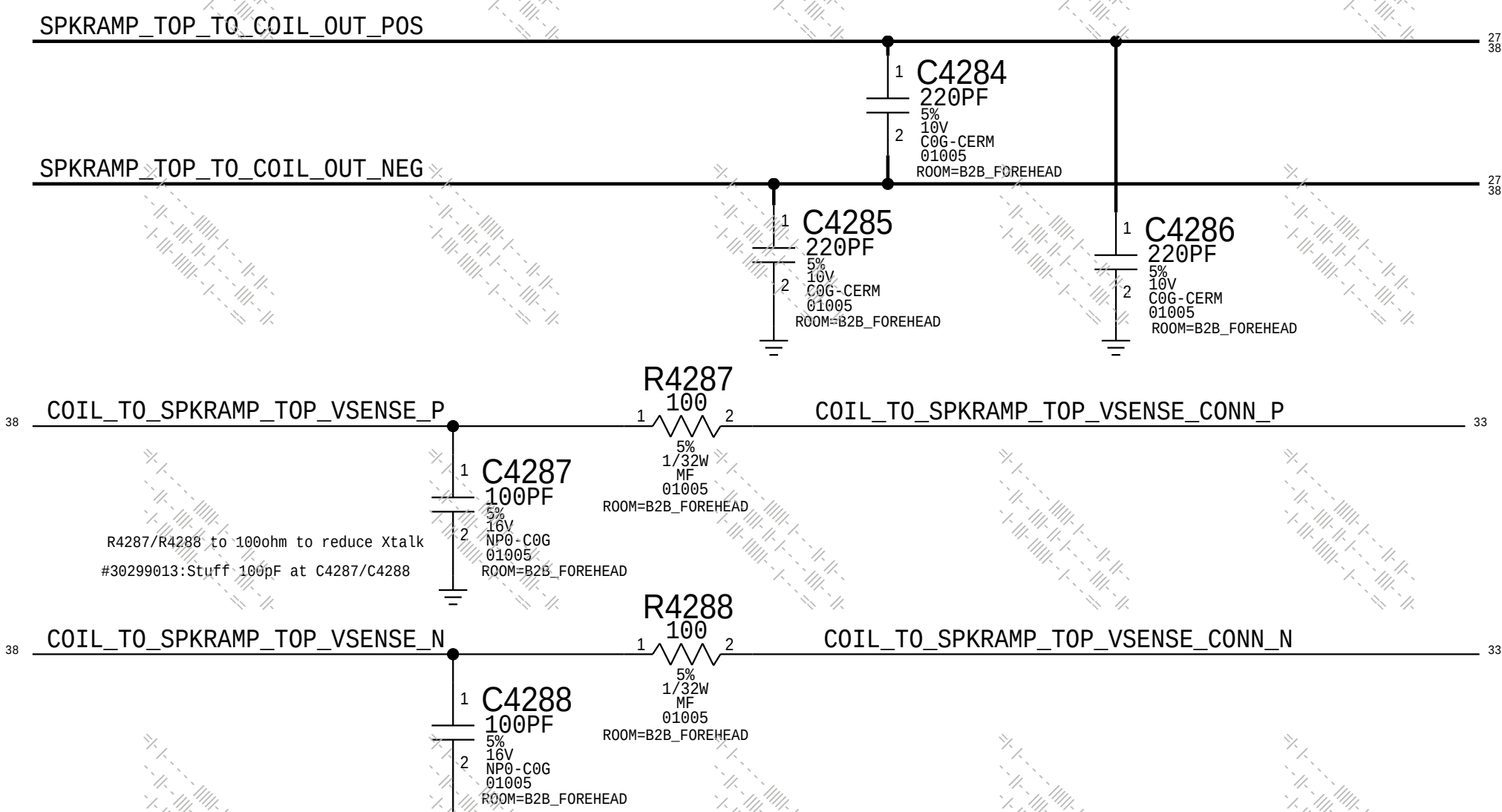
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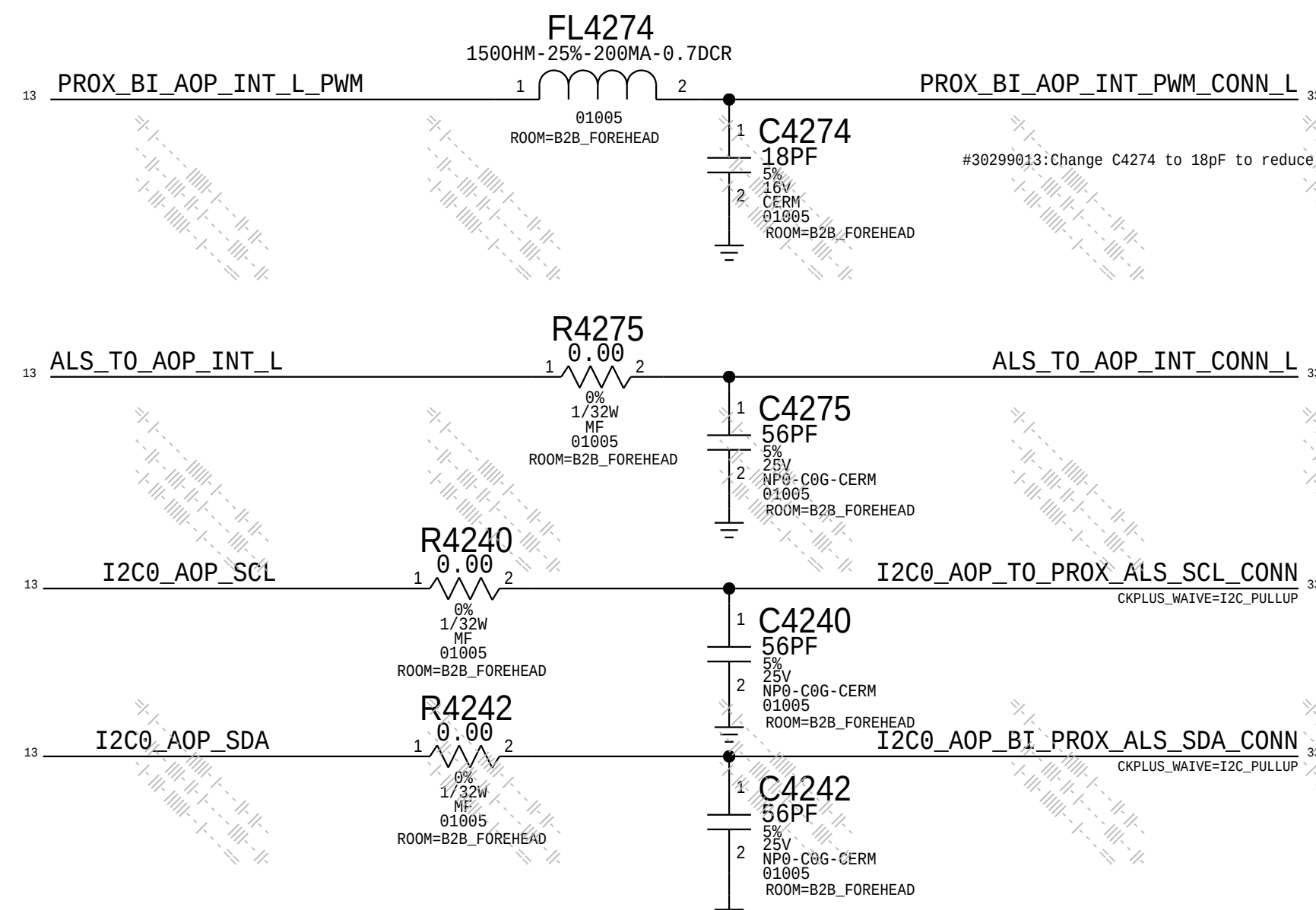
FCAM I/O



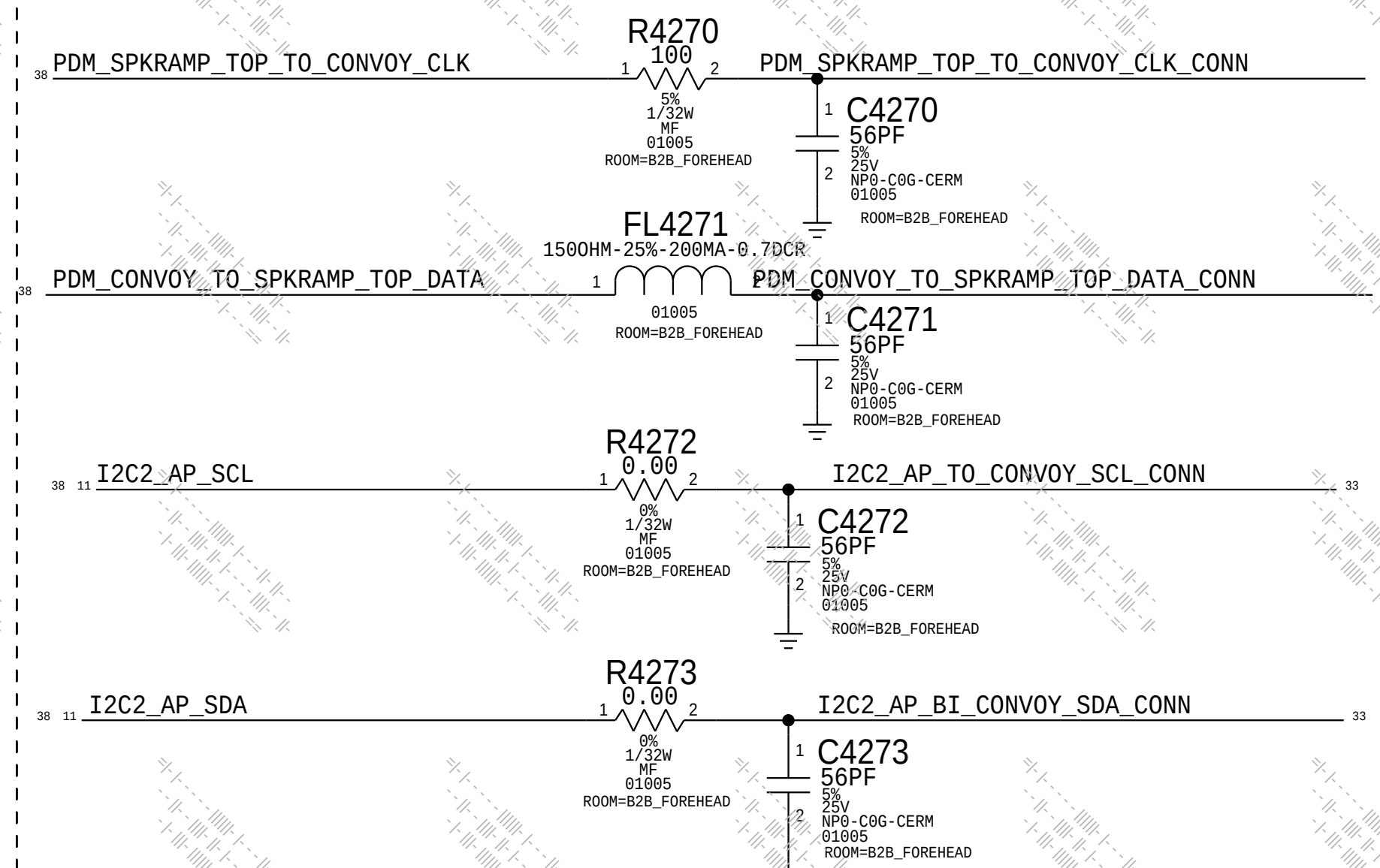
NORTH SPEAKER



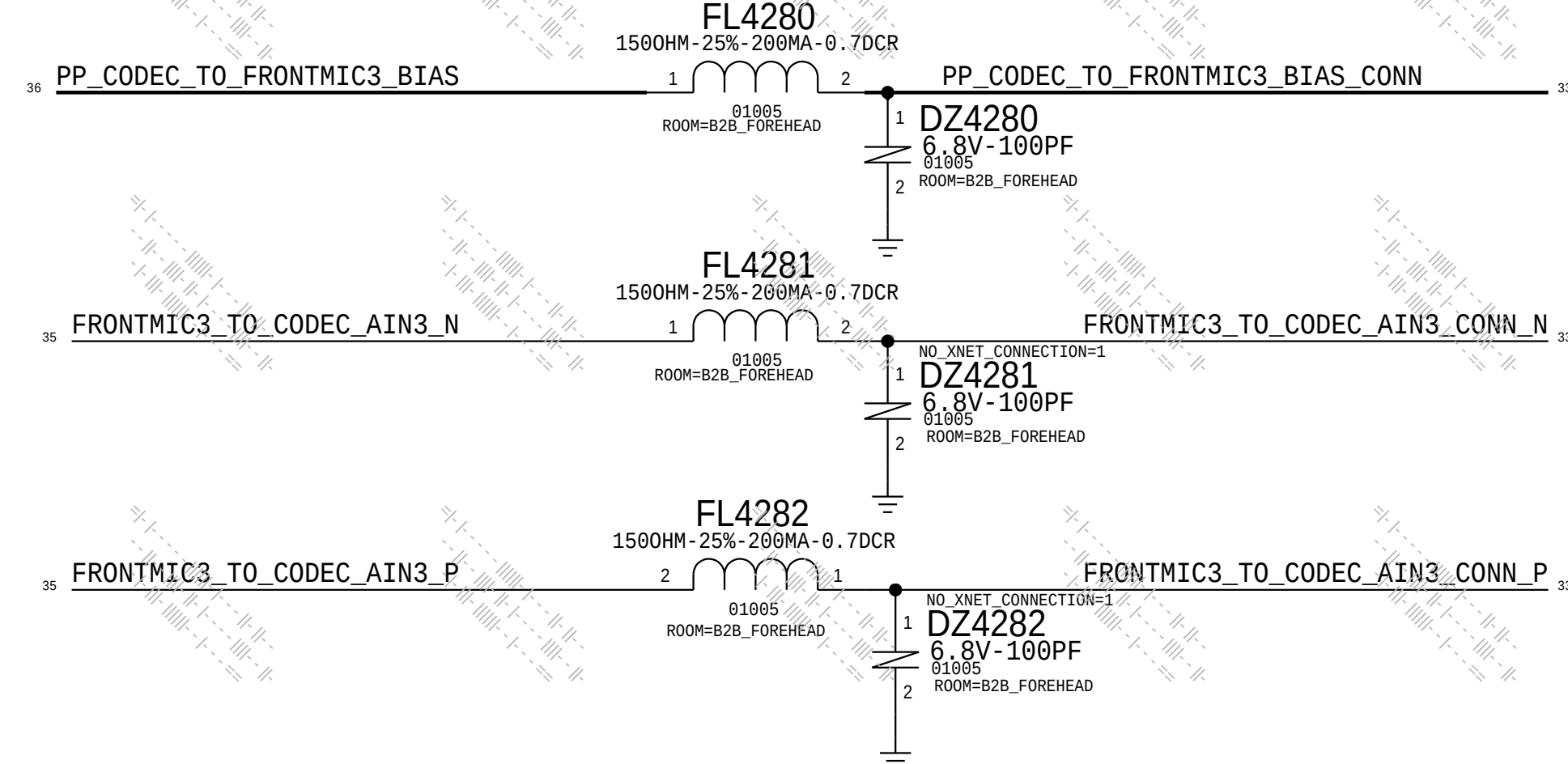
PROX + ALS I/O



CONVOY I/O

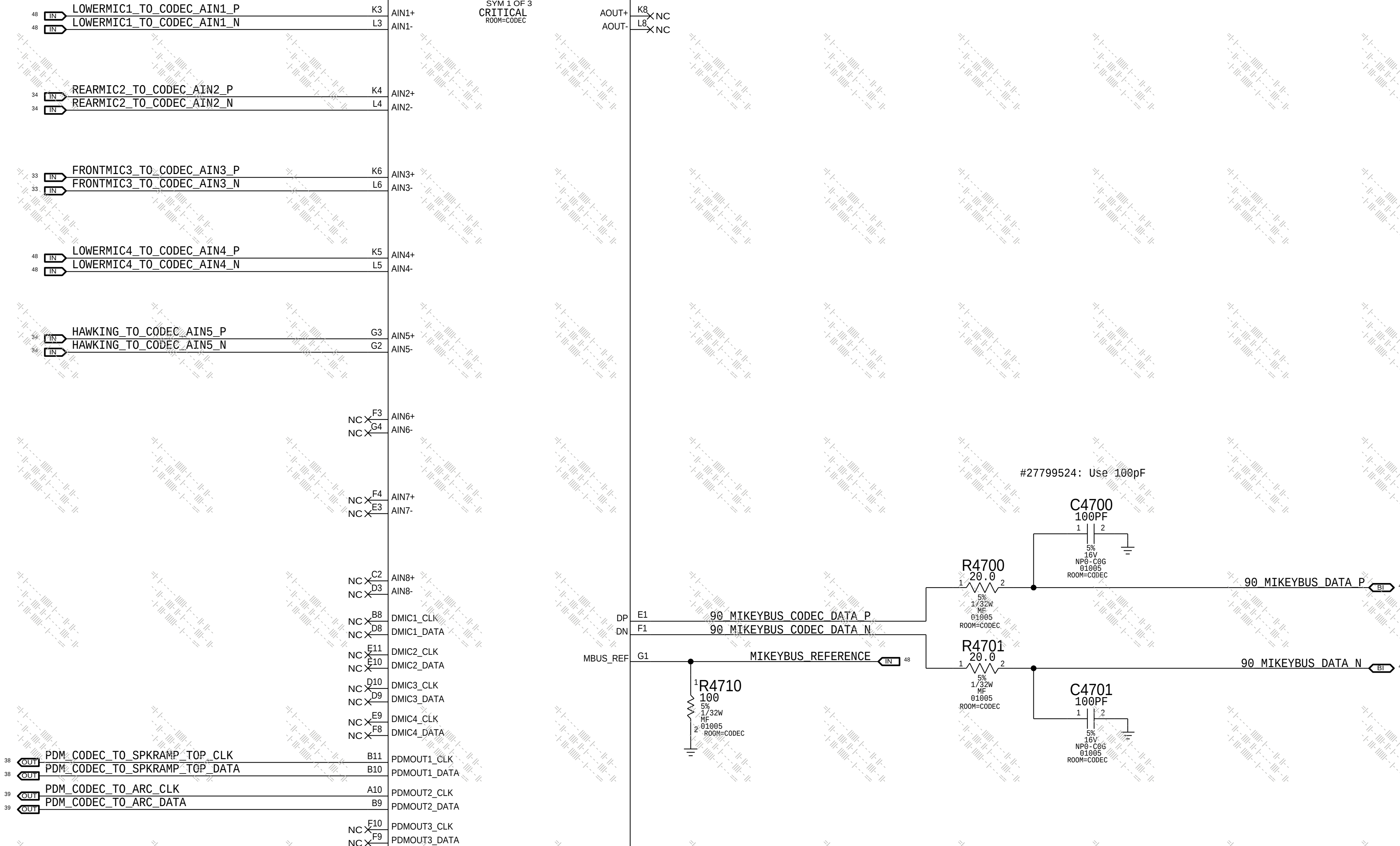


MIC3



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CALLAN AUDIO CODEC (ANALOG INPUTS & OUTPUTS)



CALLAN AUDIO CODEC (POWER & I/O)

D

C

B

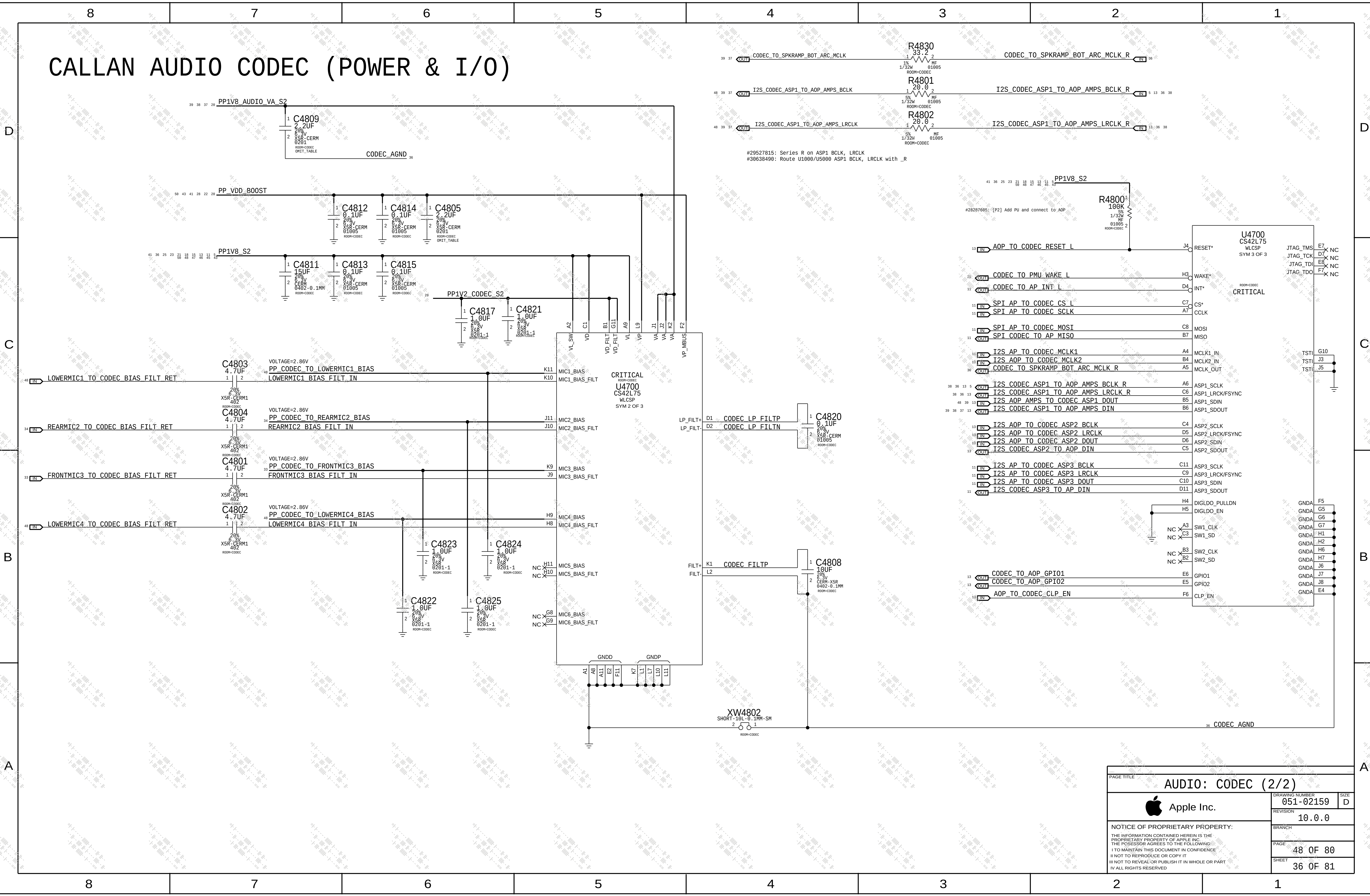
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D

C

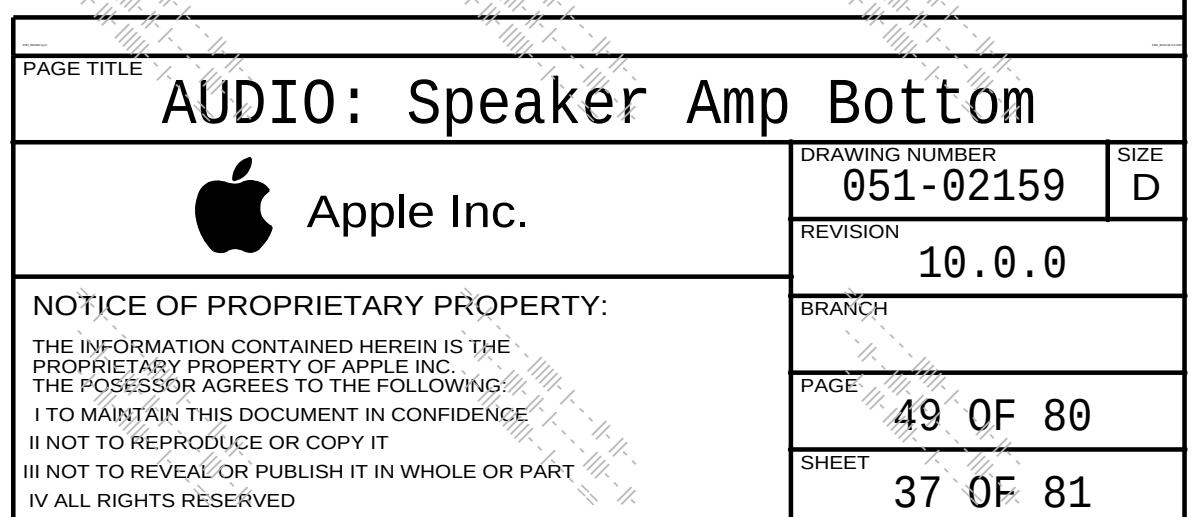
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A



PAGE TITLE			
AUDIO: CODEC (2/2)			
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		PAGE	48 OF 80
		SHEET	36 OF 81

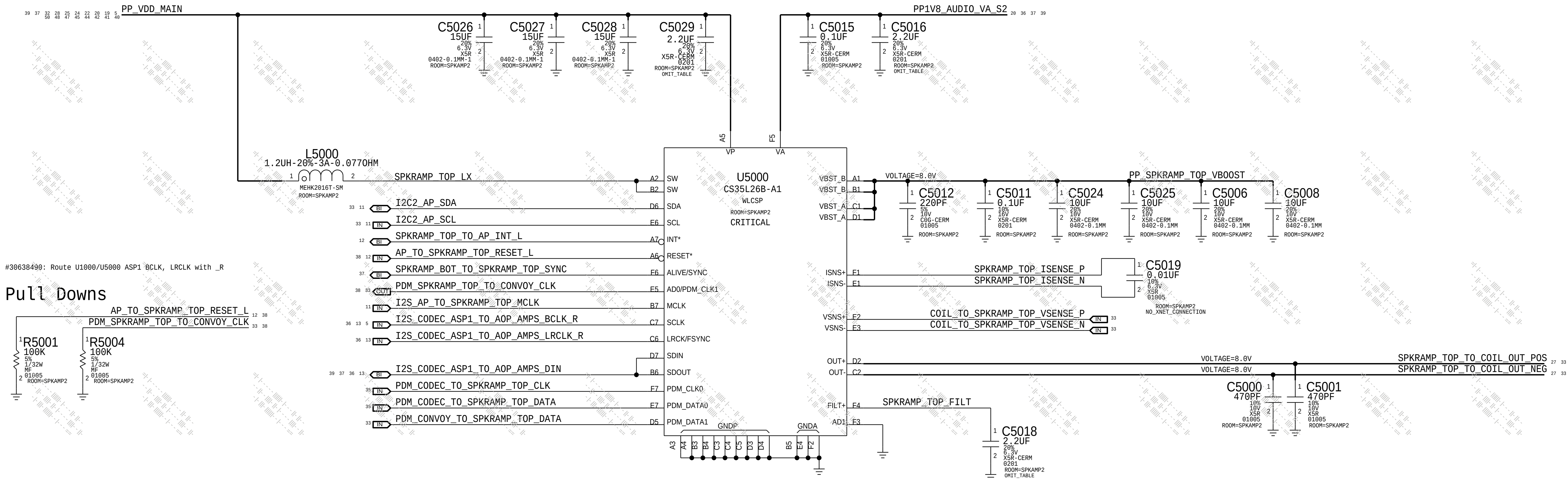
APN: 338S00143
I2C ADDRESS: 1000 000x0x80



North Speaker Amplifier

APN: 338S00295

I2C ADDRESS: 1000 000x (0x80)



PAGE TITLE		
AUDIO: Speaker Amp Top		
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		50 OF 80
		SHEET
		38 OF 81

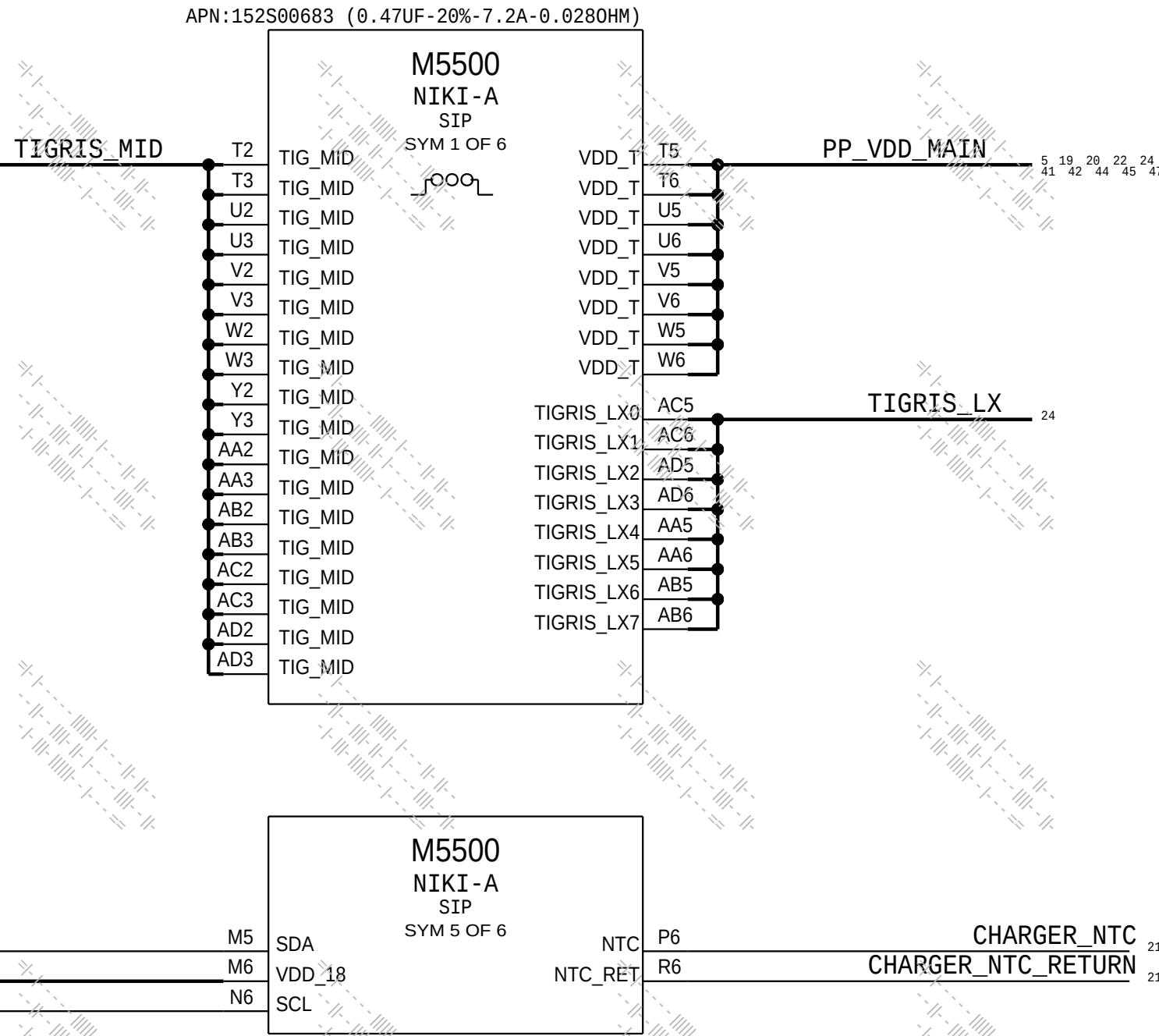
ARC D

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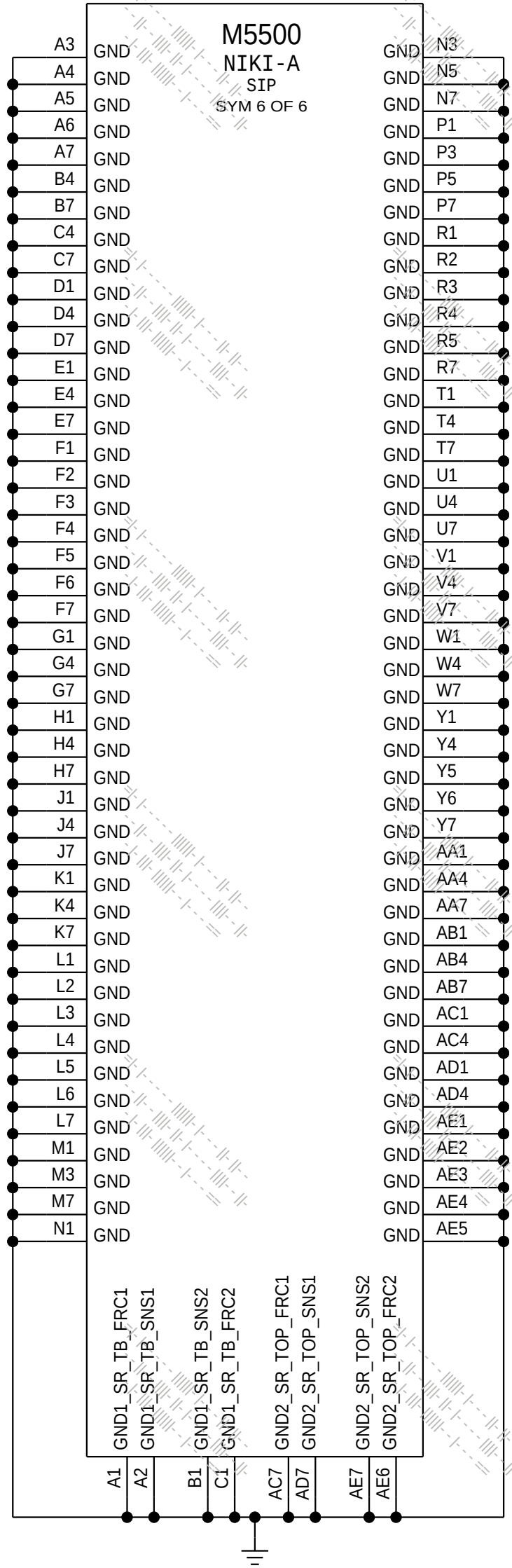
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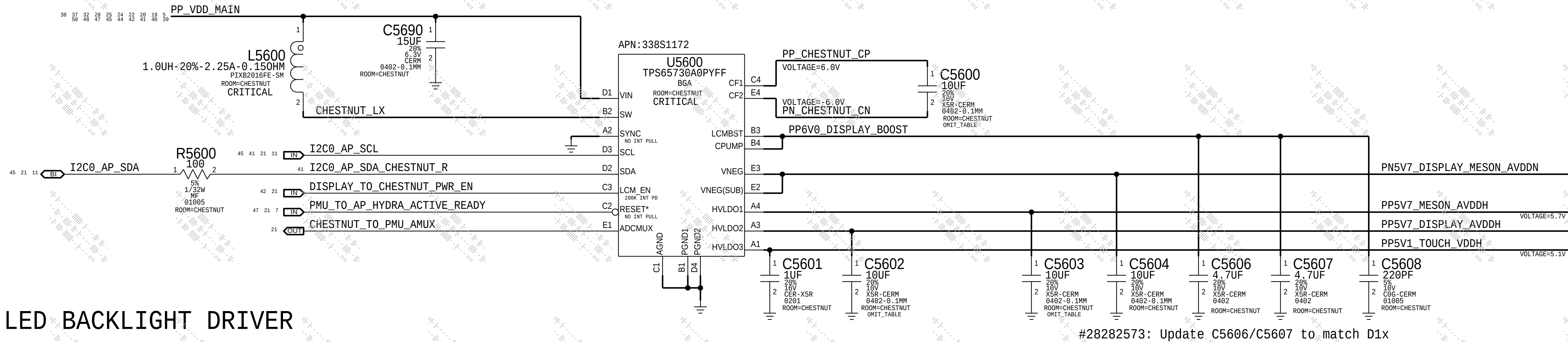
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SHEET		39 OF 81			



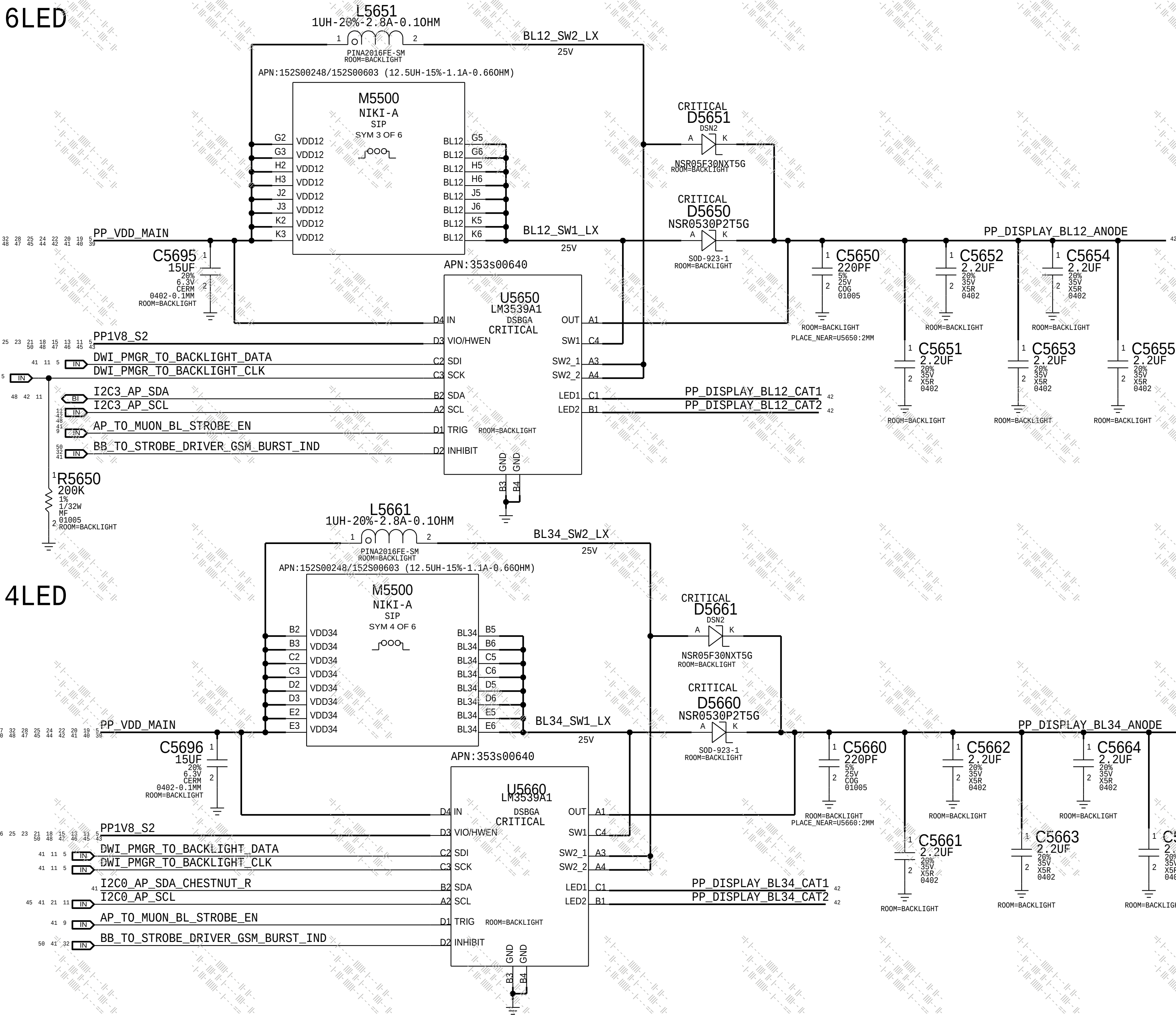
Note: inductors in SIP used for bottom speaker amplifier and backlight
See pages 49, and 56



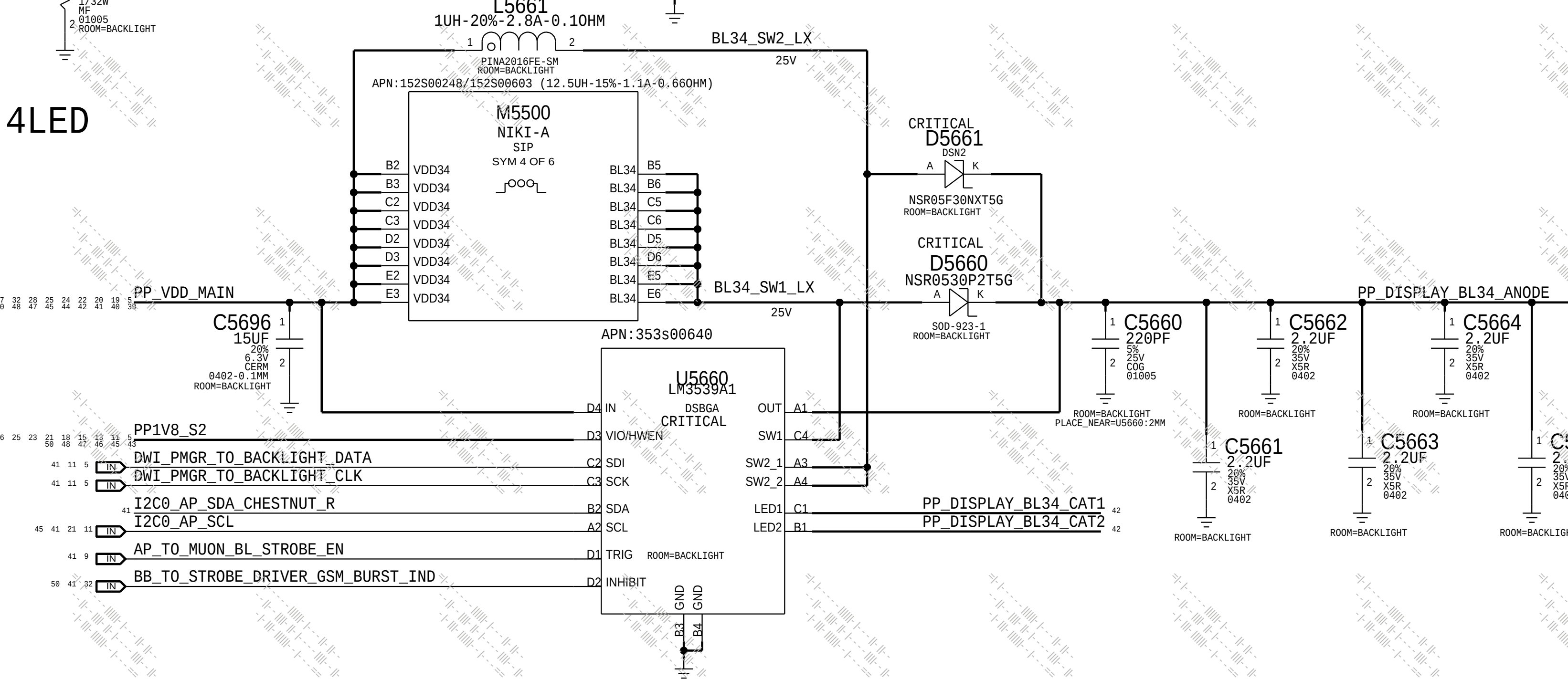
CHESTNUT DISPLAY PMU



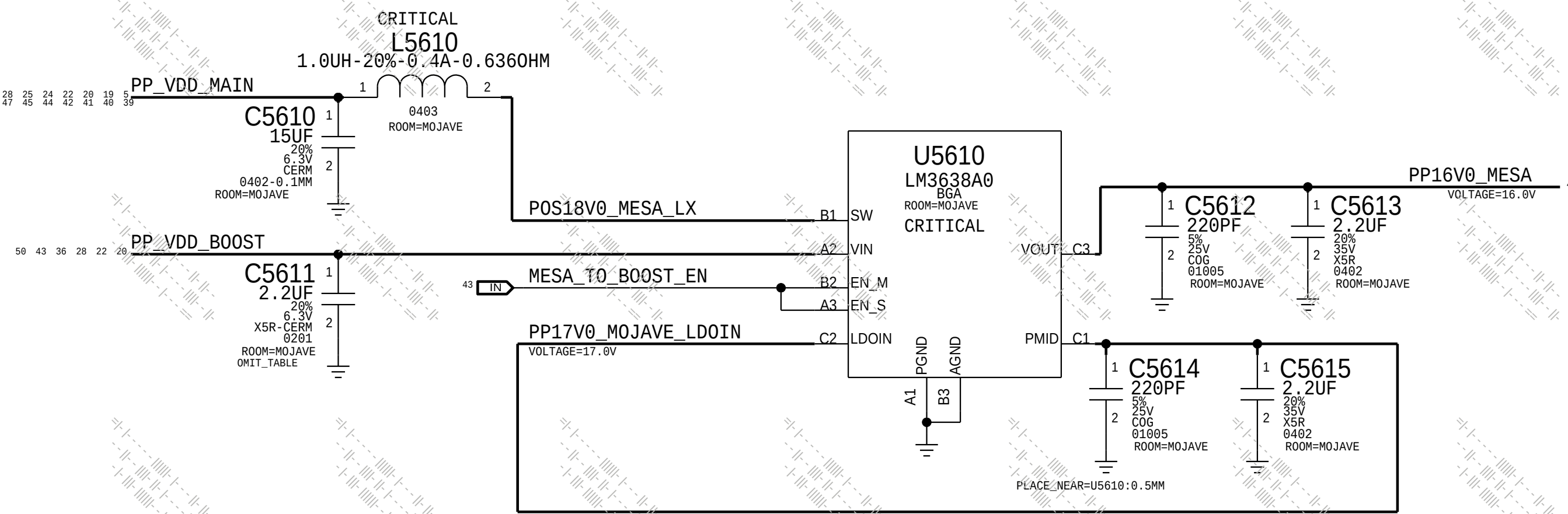
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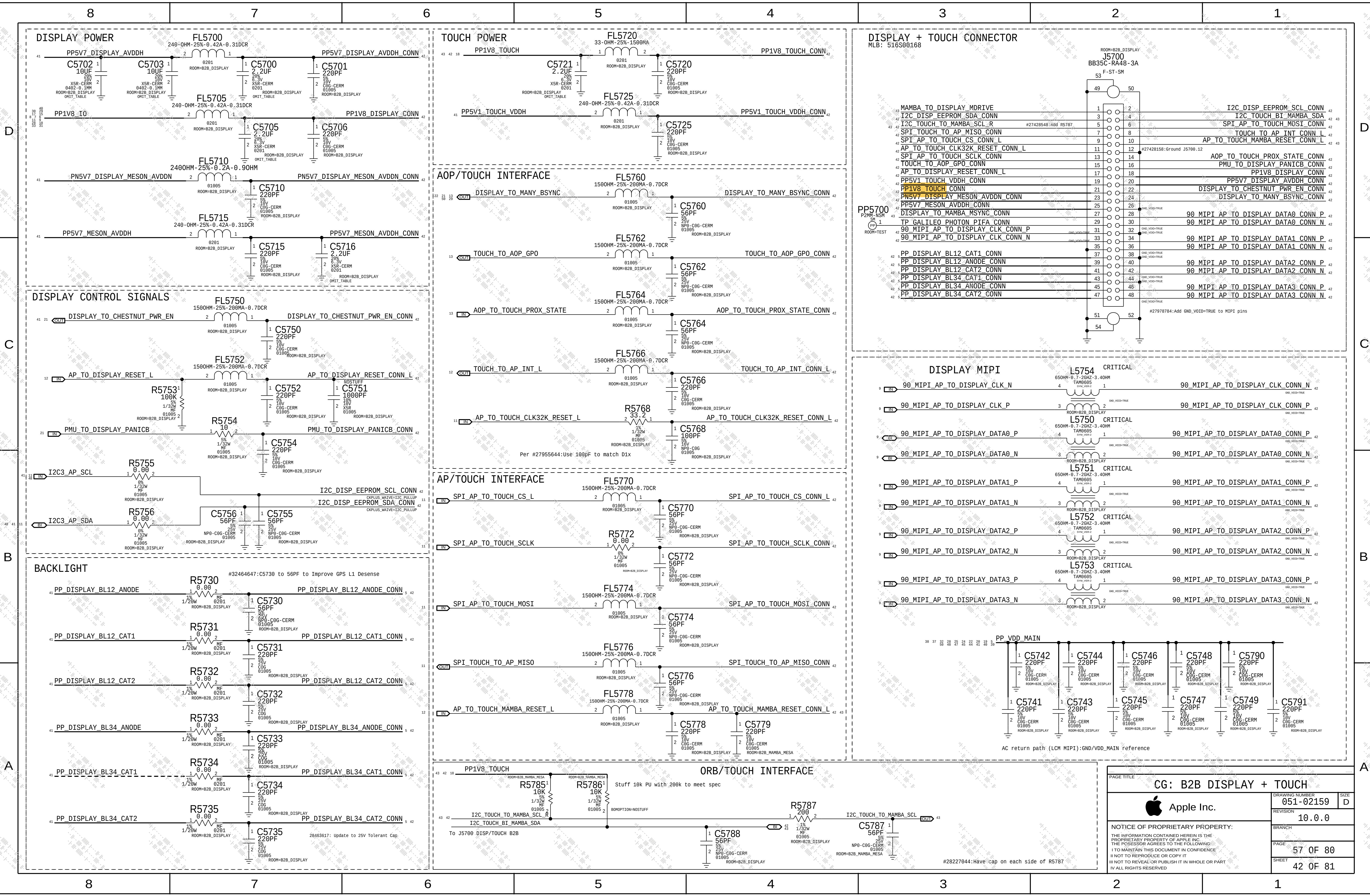
4LED



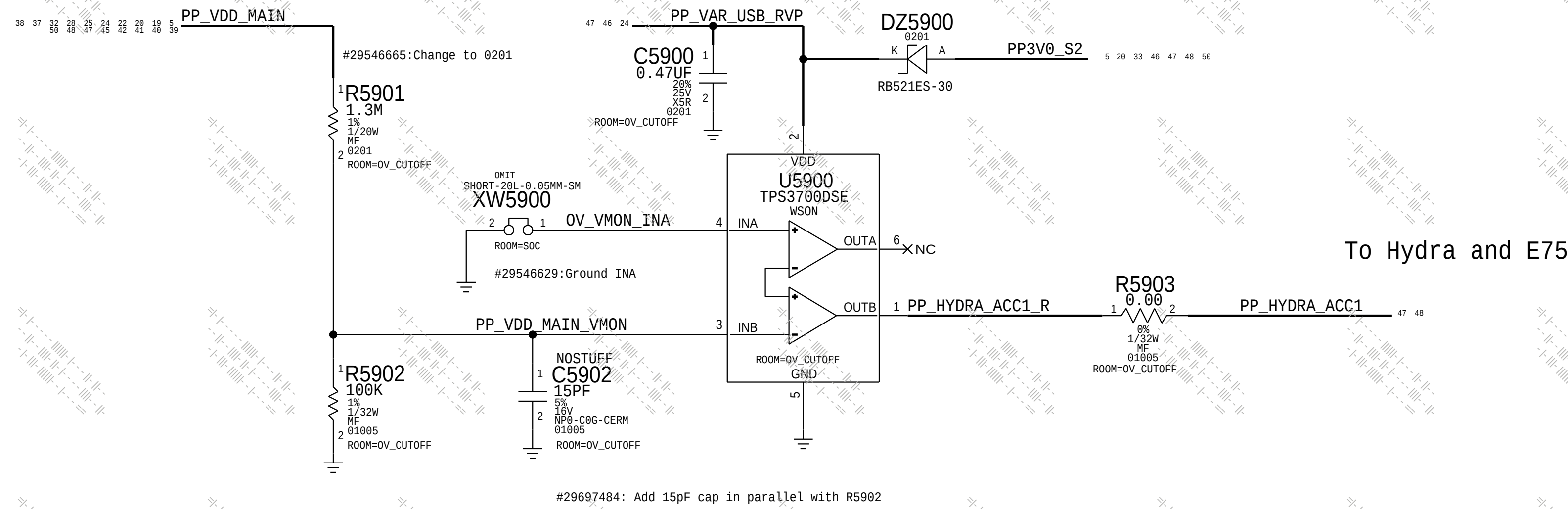
MOJAVE MESA BOOST



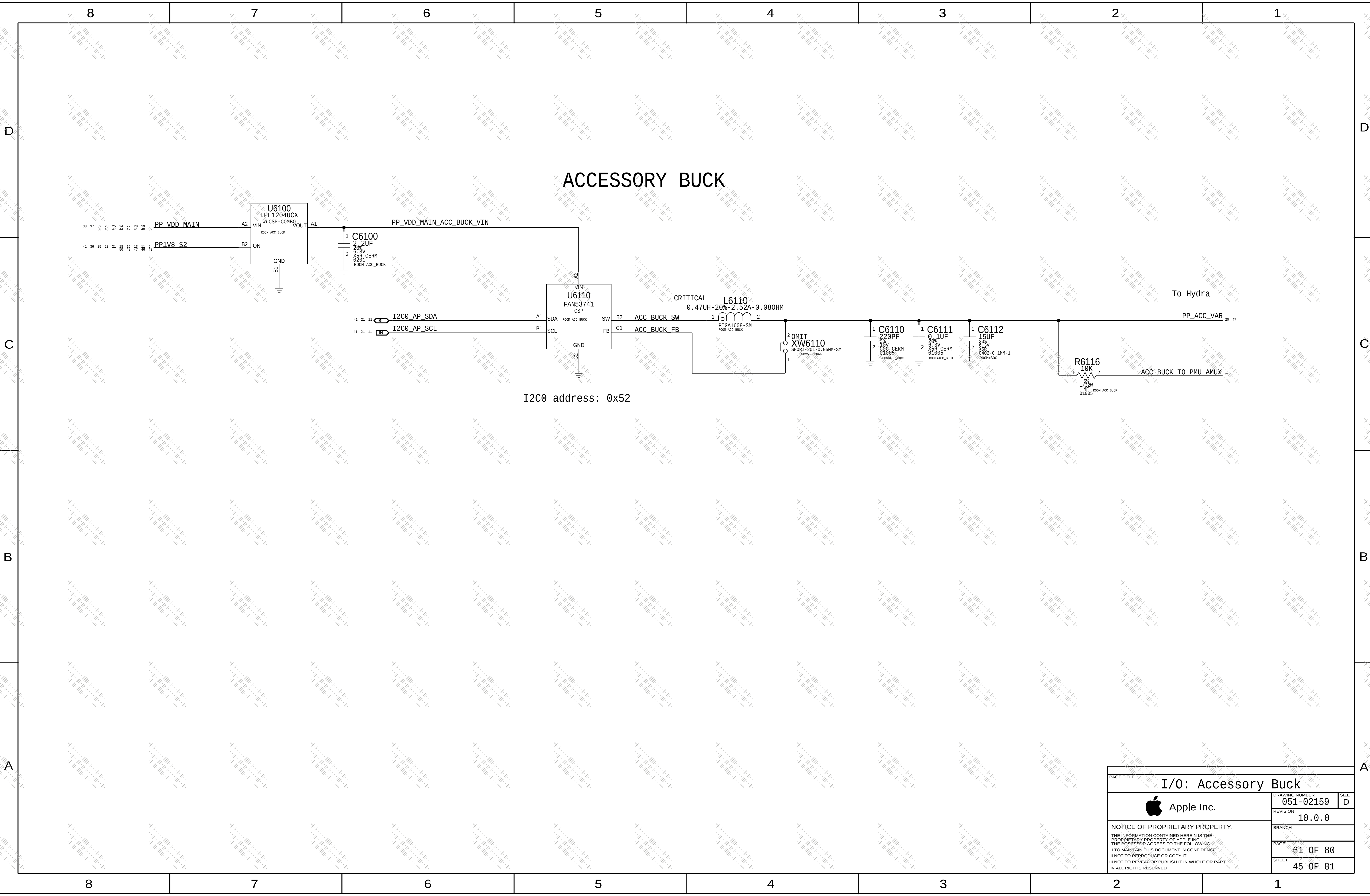
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	REVISION	10.0.0	D
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		PAGE	56 OF 80
		SHEET	41 OF 81

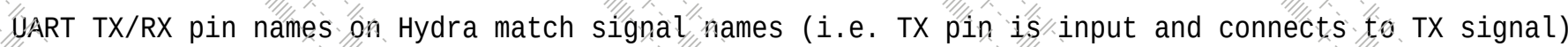


VDD_MAIN 0V CUT-OFF CIRCUIT

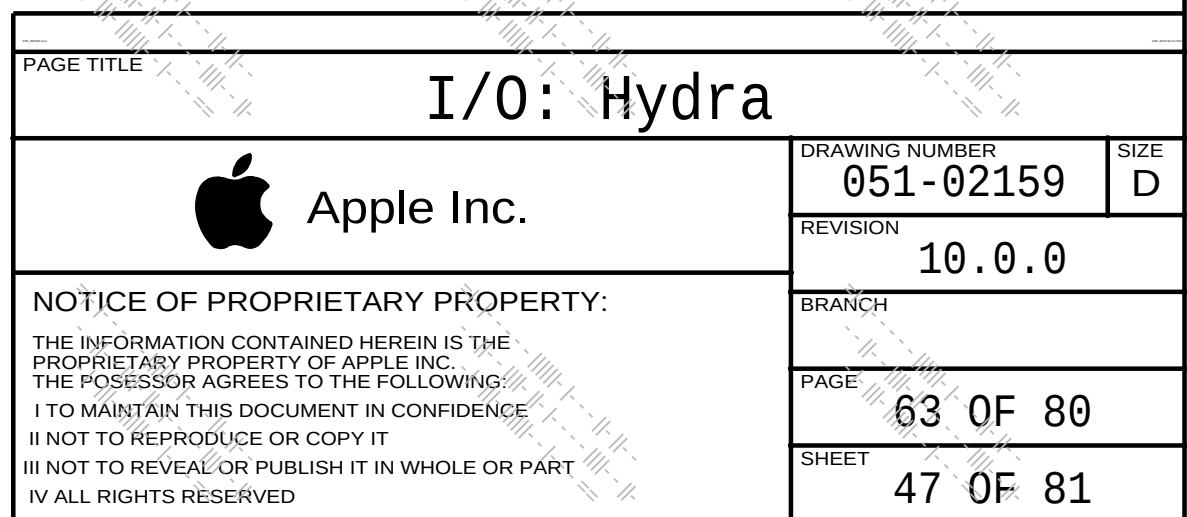


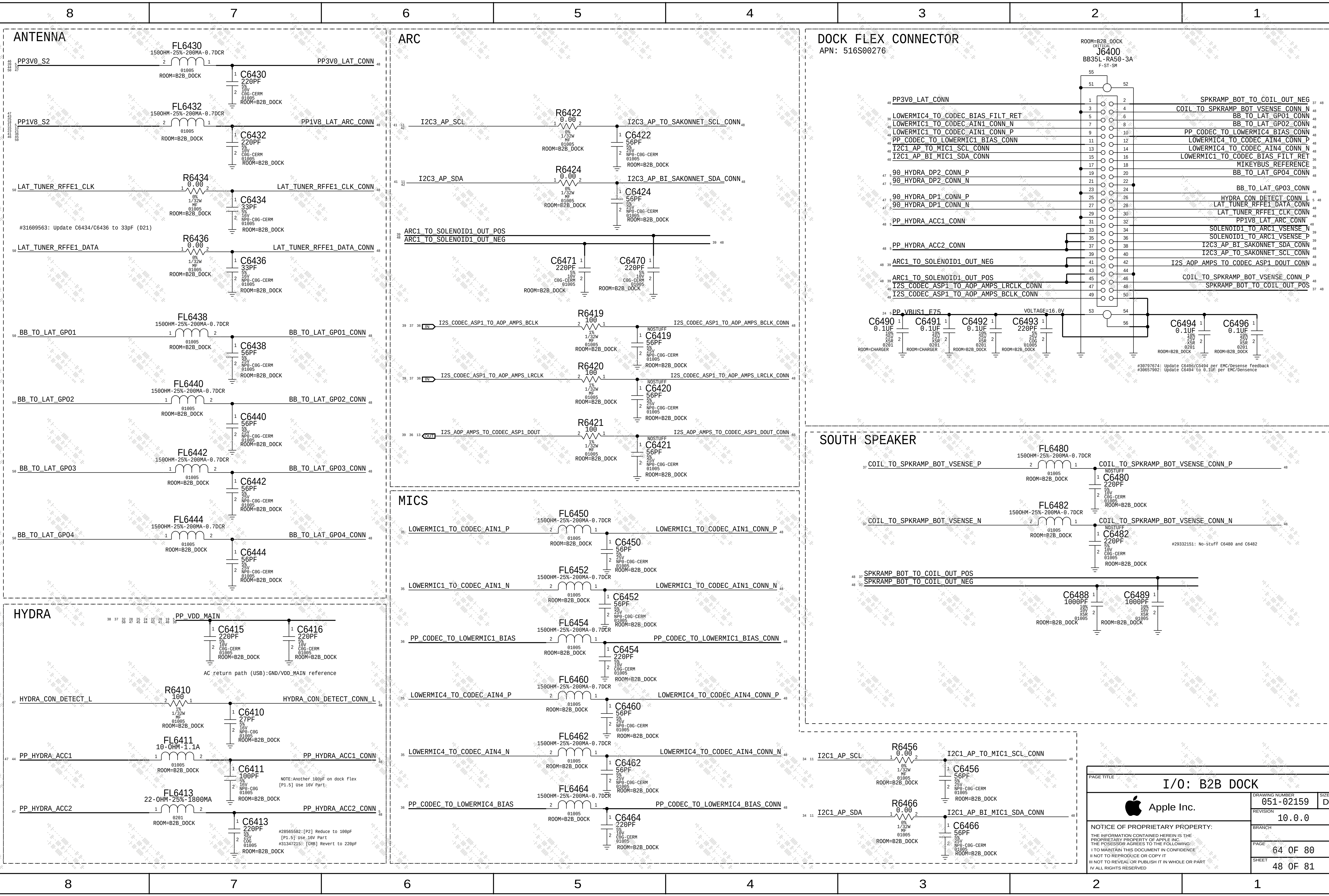
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 Apple Inc.		REVISION		
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MIPI



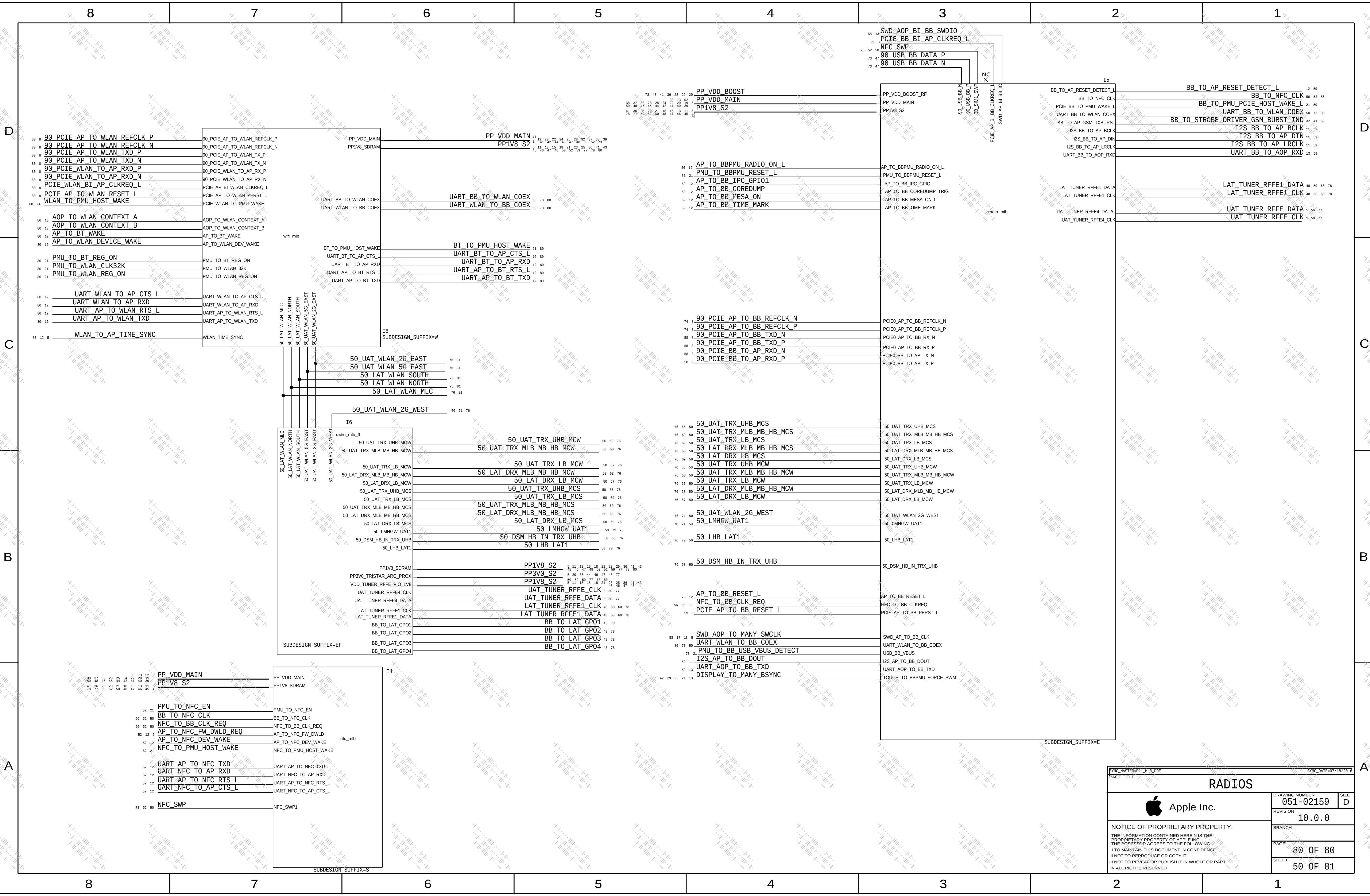


I2C MAP

(see #28857723 updates)

Diags ID	Bus	Device	7-Bit Address	8-Bit Address	Device Max Speed	Operating Speed	Net Name
0	AP I2C0	Agnes (System PMU)	0x74	0xE8	400 Kbps	400 Kbps	I2C0_AP
		Chestnut (Display PMU)	0x27	0x4E	400 Kbps		
		AccessoryBuck	0x52	0xA4	400 Kbps		
		Muon (Backlight Controller 2)	0x62	0xC4	1 Mbps		
1	AP I2C1	MIC1 Temp Sensor (South)	0x54	0xA8	1 Mbps	100 Kbps	I2C1_AP
		MIC2 Temp Sensor (North Rear)	0x56	0xAC	1 Mbps		
2	AP I2C2	Adare (Top Speaker Amp)	0x40	0x80	1 Mbps	1 Mbps	I2C2_AP
		Convoy (Top Speaker Cap Sense)	0x21	0x42	1 Mbps		
3	AP I2C3	EEPROM	0x51	0xA2	400 Kbps	400 Kbps	I2C3_AP
		Muon (Backlight Controller 1)	0x62	0xC4	400 Kbps		
		Sakonnet (Arc: Hall Effect Sensor)	0x08	0x10	1 Mbps		
		EEPROM	0x50	0xA0	400 Kbps		
	ISP I2C0	Casper (Rear Wide Camera)	0x10	0x20	1 Mbps	1 Mbps	I2C0_ISP
		Grunberg+ (AF/OIS Wide Camera)	0x3C	0x78	1 Mbps		
	ISP I2C1	Billings (Rear Tele Camera)	0x20	0x40	1 Mbps	1 Mbps	I2C1_ISP
		Edwin (AF Tele Camera)	0x0D	0x1A	1 Mbps		
	ISP I2C2	Concord (Front Camera)	0x10	0x20	1 Mbps	400 Kbps	I2C2_ISP
	ISP I2C3	Neon (Strobe - CW : LM3566)	0x63	0xC6	1 Mbps	400 Kbps	I2C3_ISP
		Ansel (Camera PMU)	0x40	0x80	1 Mbps		
		Neon (Strobe - AM : LM35662)	0x67	0xCE	1 Mbps		
	SEP I2C	EEPROM	0x51	0xA2	400 Kbps	400 Kbps	I2C4_AP
4	AOP I2C0	Doppler (Prox Sensor)	0x58	0xB0	1 Mbps	400 Kbps	I2C0_AOP
		CT709 (ALS : Firefish)	0x29	0x52	400 Kbps		
5	AOP I2C1	Adare (Bottom Speaker Amp)	0x40	0x80	1 Mbps	1 Mbps	I2C1_AOP
		Adare (Arc: Driver)	0x41	0x82	1 Mbps		
		Apache3 (Mesa Power Supply)	0x61	0xC2	1 Mbps		I2C1_AOP_ISO
		Turtle	0x2C	0x58	1 Mbps		
6	SMC I2C0	Tigris2 (Charger)	0x71	0xE2	400 Kbps	400 Kbps	I2C0_SMC
		TPS61280 (VDD Boost)	0x75	0xEA	400 Kbps		
		CCG2 (USB PD)	0x12 (0x08)	0x24 (0x10)	1 Mbps		
		Iktara	0x39	0x72	400 Kbps		
		SN45546 (Gas Gauge)	0x55	0xAA	400 Kbps		
7	SMC I2C1	Hydra	0x1A	0x34	400 Kbps	400 Kbps	I2C1_SMC

SYSTEM: I2C MAP		
 Apple Inc.	DRAWING NUMBER	051-02159
	REVISION	10.0.0
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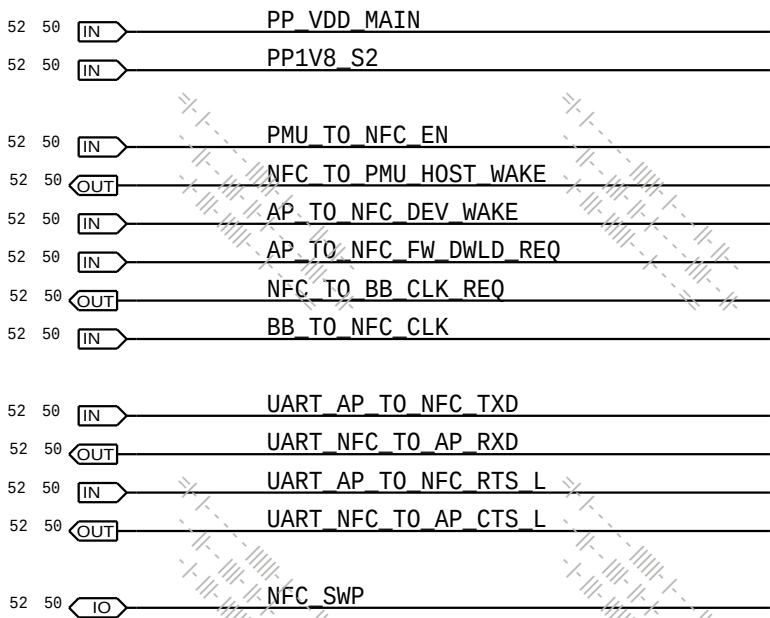
1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.

REV	ECN	DESCRIPTION OF REVISION	CK APPD DATE
10	0008927012	ENGINEERING RELEASED	2017-06-06

NFC_MLB D20/D21

MAY 15, 2017

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
138S0031	3	CAP, TYPICAL, 2.2UF, 6.3V, 0201	C7500_S, C7502_S, C7505_S	CRITICAL	TYPICAL_CAP



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
131S00882	1	390PF, 0201, 2%, 25V	C7514_S	D20_JPN
131S00026	1	820PF, 0201, 2%, 25V	C7515_S	D20_JPN
131S00033	1	680PF, 0201, 2%, 25V	C7516_S	D20_JPN
131S00883	1	220PF, 0201, 2%, 50V	C7518_S	D20_JPN
131S00025	1	1000PF, 0201, 2%, 25V	C7510_S	D20_JPN
131S00025	1	1000PF, 0201, 2%, 25V	C7513_S	D20_JPN
157S00022	1	TDK, BALUN, 11T	T7500_S	D20_JPN

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
131S00138	1	39PF, 0201, 2%, 50V	C7512_S	D20_ROW
131S00016	1	470PF, 0201, 2%, 25V	C7514_S	D20_ROW
131S00025	1	1000PF, 0201, 2%, 25V	C7515_S	D20_ROW
131S00825	1	560PF, 0201, 2%, 25V	C7516_S	D20_ROW
131S00883	1	220PF, 0201, 2%, 50V	C7518_S	D20_ROW
131S00026	1	820PF, 0201, 2%, 25V	C7510_S	D20_ROW
131S00026	1	820PF, 0201, 2%, 25V	C7513_S	D20_ROW
157S00022	1	TDK, BALUN, 11T	T7500_S	D20_ROW

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
131S00138	1	39PF, 0201, 2%, 50V	C7512_S	D201
131S00016	1	470PF, 0201, 2%, 25V	C7514_S	D201
131S00025	1	1000PF, 0201, 2%, 25V	C7515_S	D201
131S00825	1	560PF, 0201, 2%, 25V	C7516_S	D201
131S0083	1	220PF, 0201, 2%, 50V	C7518_S	D201
131S00026	1	820PF, 0201, 2%, 25V	C7510_S	D201
131S00026	1	820PF, 0201, 2%, 25V	C7513_S	D201
157S00022	1	TDK, BALUN, 11T	T7500_S	D201

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
131S00138	1	39PF, 0201, 2%, 50V	C7512_S	D21_JPN
131S00081	1	270PF, 0201, 2%, 25V	C7514_S	D21_JPN
131S00025	1	1000PF, 0201, 2%, 25V	C7515_S	D21_JPN
131S00033	1	680PF, 0201, 2%, 25V	C7516_S	D21_JPN
131S00019	1	150PF, 0201, 2%, 50V	C7518_S	D21_JPN
131S00033	1	680PF, 0201, 2%, 25V	C7510_S	D21_JPN
131S00033	1	680PF, 0201, 2%, 25V	C7513_S	D21_JPN
157S00023	1	MURATA, BALUN, 11T	T7500_S	D21_JPN

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
131S00138	1	39PF, 0201, 2%, 50V	C7512_S	D21_ROW
131S00081	1	270PF, 0201, 2%, 25V	C7514_S	D21_ROW
131S00025	1	1000PF, 0201, 2%, 25V	C7515_S	D21_ROW
131S00033	1	680PF, 0201, 2%, 25V	C7516_S	D21_ROW
131S00019	1	150PF, 0201, 2%, 50V	C7518_S	D21_ROW
131S00033	1	680PF, 0201, 2%, 25V	C7510_S	D21_ROW
131S00033	1	680PF, 0201, 2%, 25V	C7513_S	D21_ROW
157S00023	1	MURATA, BALUN, 11T	T7500_S	D21_ROW

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
131S00138	1	39PF, 0201, 2%, 50V	C7512_S	D211
131S00081	1	270PF, 0201, 2%, 25V	C7514_S	D211
131S00025	1	1000PF, 0201, 2%, 25V	C7515_S	D211
131S00033	1	680PF, 0201, 2%, 25V	C7516_S	D211
131S00019	1	150PF, 0201, 2%, 50V	C7518_S	D211
131S00033	1	680PF, 0201, 2%, 25V	C7510_S	D211
131S00033	1	680PF, 0201, 2%, 25V	C7513_S	D211
157S00023	1	MURATA, BALUN, 11T	T7500_S	D211

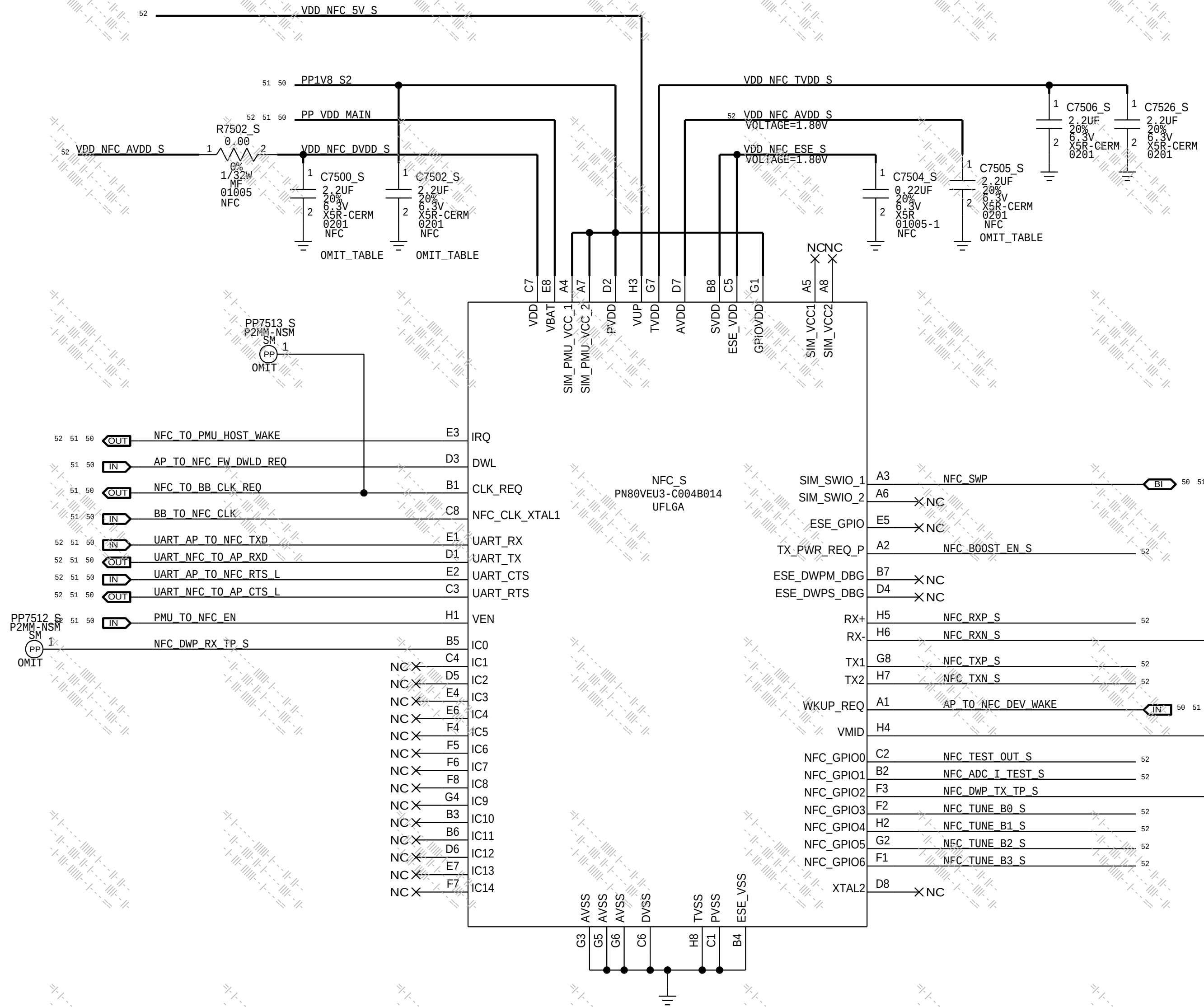
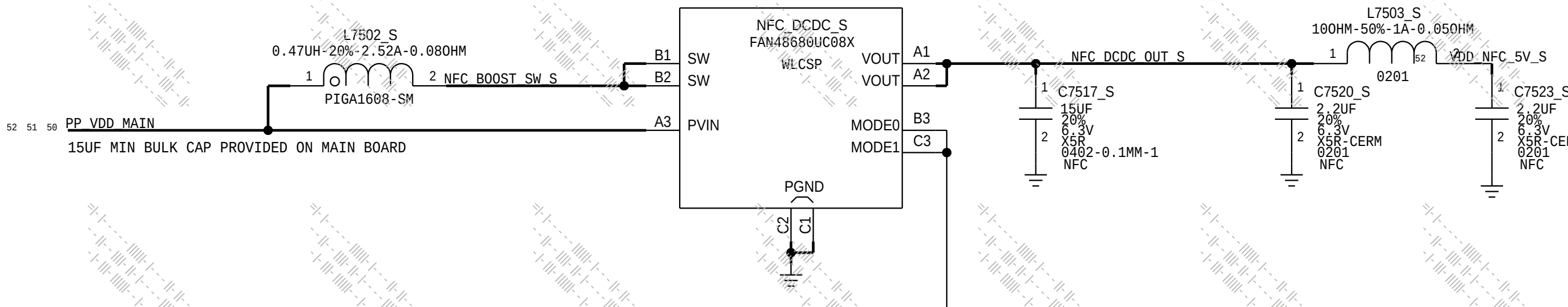
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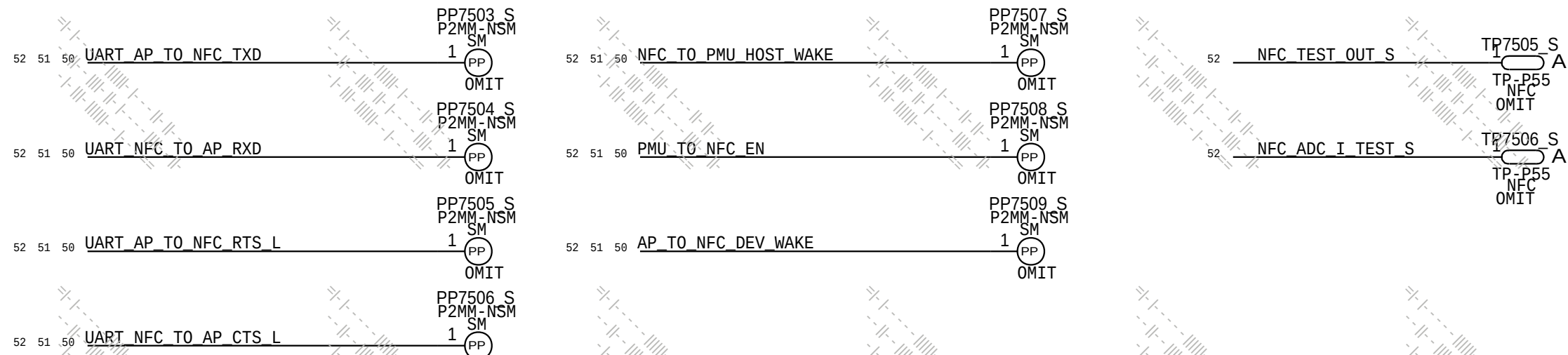
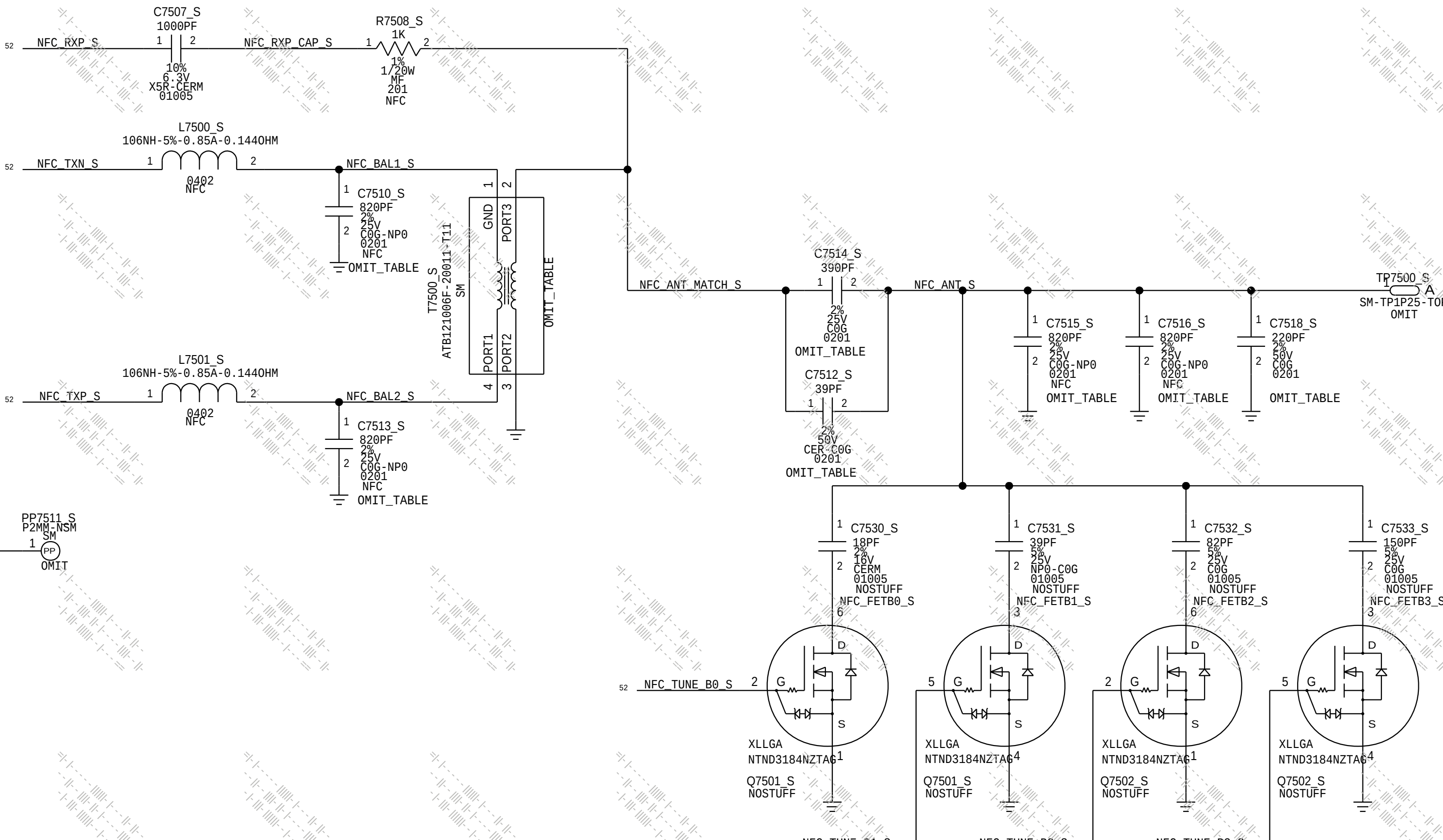
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5V BOOSTER

NFC CONTROLLER

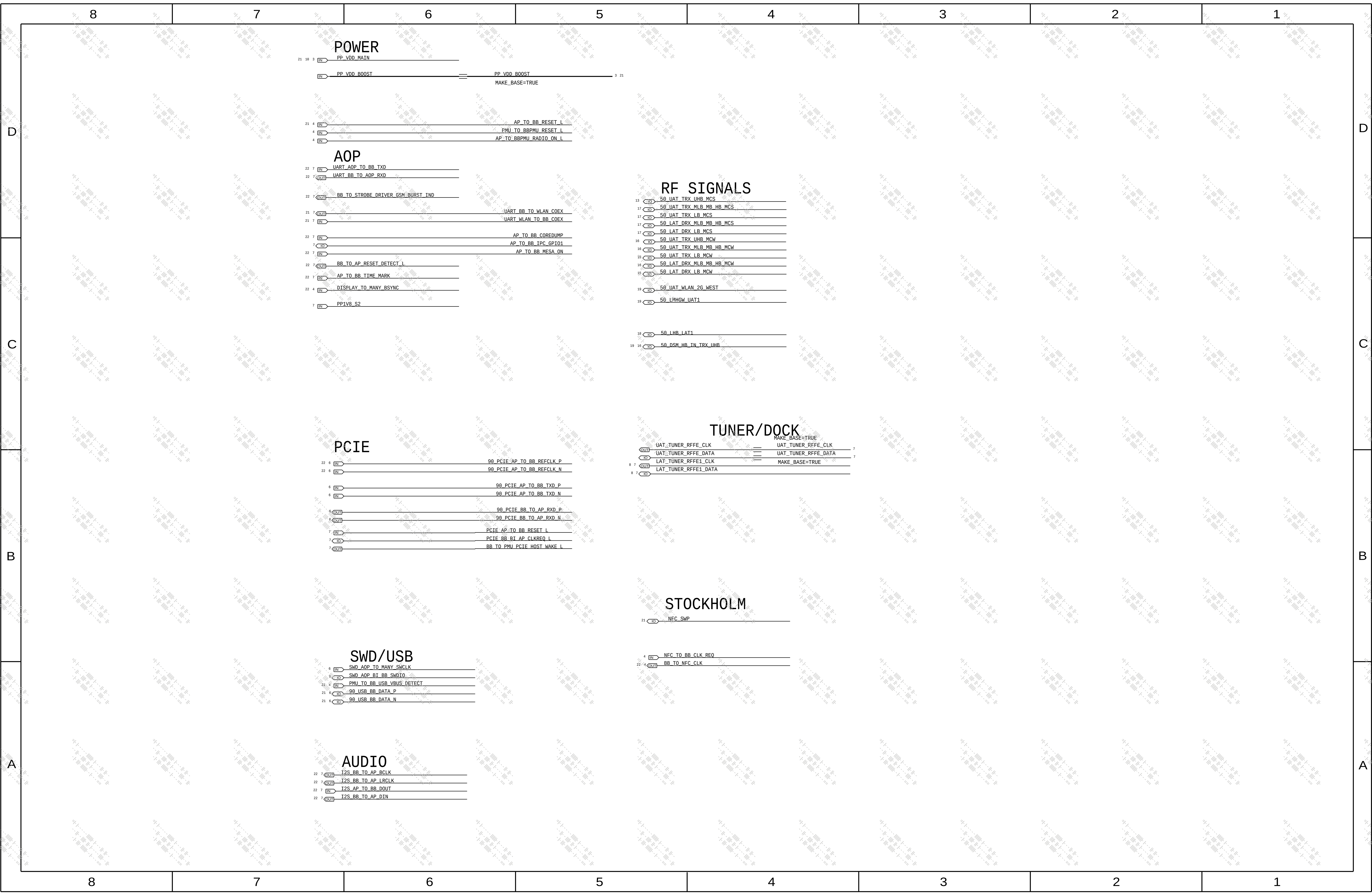


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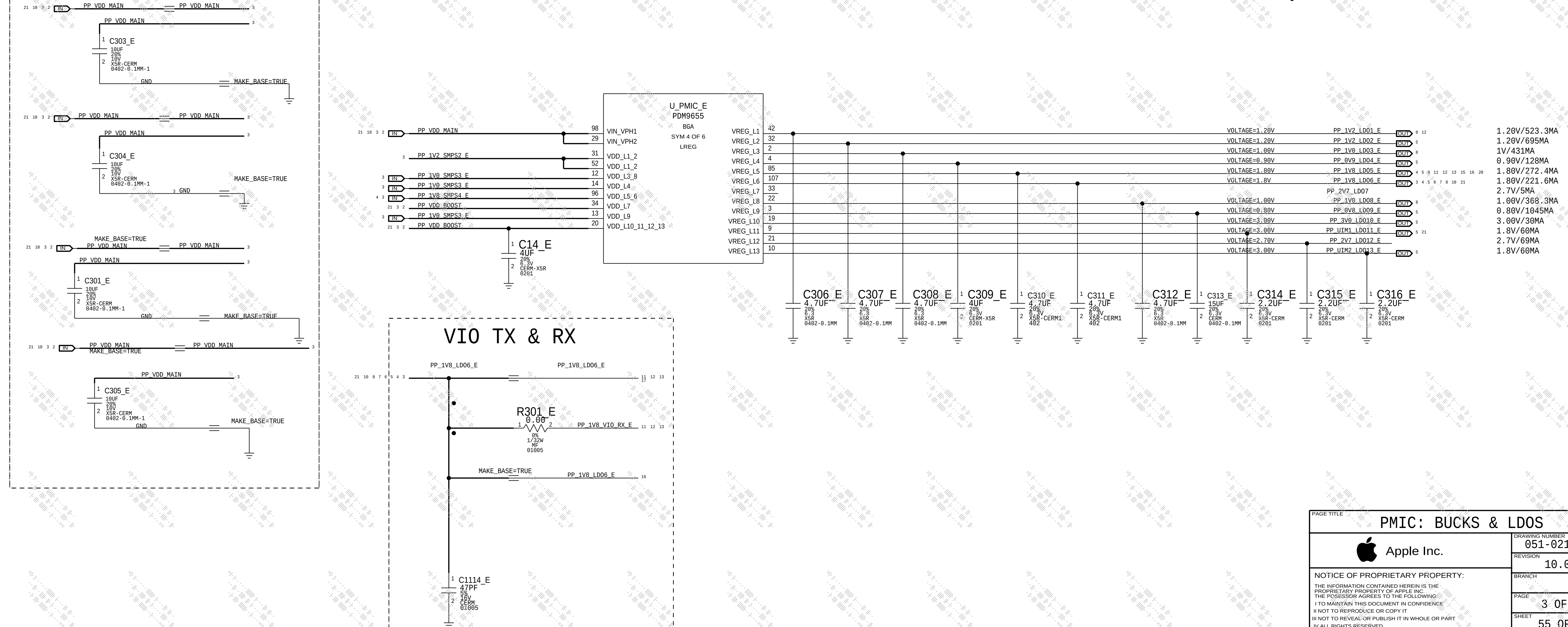
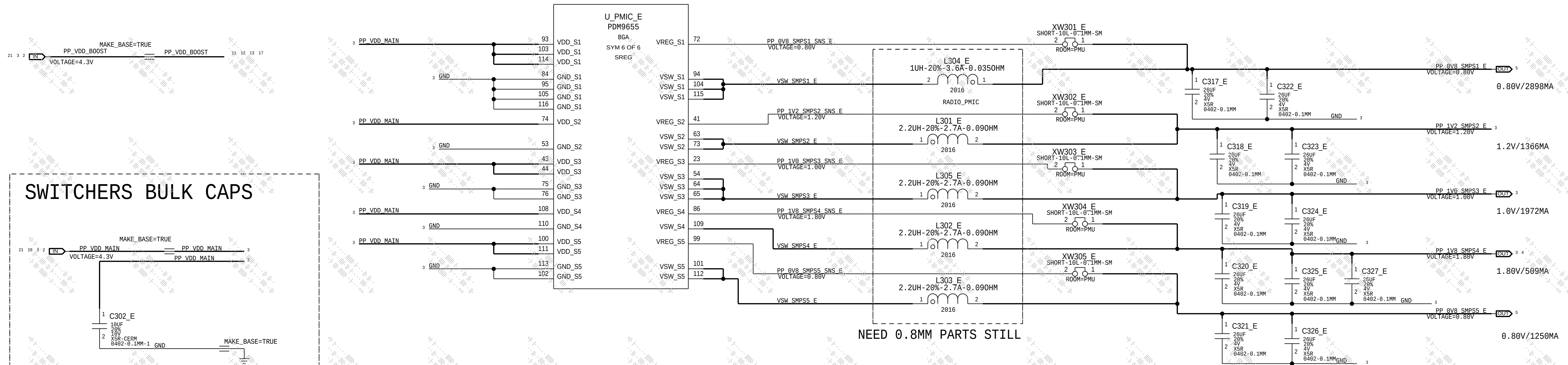
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(MAV17.2/3) D21 RADIO_MLB 06/06/2017 0.122.0 LAST_MODIFICATION= Tue Jun 6 18:57:01 2017 <table><thead><tr><th>PAGE</th><th>CSA</th><th>CONTENTS</th><th>SYNC</th><th>DATE</th></tr></thead><tbody><tr><td>53</td><td>1</td><td>FRONT PAGE</td><td></td><td></td></tr><tr><td>54</td><td>2</td><td>HIERARCHY</td><td></td><td></td></tr><tr><td>55</td><td>3</td><td>PMIC: BUCKS & LDOS</td><td></td><td></td></tr><tr><td>56</td><td>4</td><td>PMIC: CLOCKS & CONTROL</td><td></td><td></td></tr><tr><td>57</td><td>5</td><td>BB: POWER</td><td></td><td></td></tr><tr><td>58</td><td>6</td><td>BB: CONTROL & HS PERIPHERALS [6]</td><td></td><td></td></tr><tr><td>59</td><td>7</td><td>BB: GPIOs & QLINK</td><td></td><td></td></tr><tr><td>60</td><td>8</td><td>XCVR</td><td></td><td></td></tr><tr><td>61</td><td>9</td><td>XCVR</td><td></td><td></td></tr><tr><td>62</td><td>10</td><td>QPOET MODULE</td><td></td><td></td></tr><tr><td>63</td><td>11</td><td>LB PAD</td><td></td><td></td></tr><tr><td>64</td><td>12</td><td>HB PAD</td><td></td><td></td></tr><tr><td>65</td><td>13</td><td>UHB PAD</td><td></td><td></td></tr><tr><td>66</td><td>14</td><td>2G PA</td><td></td><td></td></tr><tr><td>67</td><td>15</td><td>LB DSM</td><td></td><td></td></tr><tr><td>68</td><td>16</td><td>HB DSM</td><td></td><td></td></tr><tr><td>69</td><td>17</td><td>COUPLER2</td><td></td><td></td></tr><tr><td>70</td><td>18</td><td>LOWER ANTENNA</td><td></td><td></td></tr><tr><td>71</td><td>19</td><td>UPPER ANTENNA</td><td></td><td></td></tr><tr><td>72</td><td>20</td><td>GNSS</td><td></td><td></td></tr><tr><td>73</td><td>21</td><td>SIM, DEBUG CONN</td><td></td><td></td></tr><tr><td>74</td><td>22</td><td>TEST POINTS</td><td>PROBE POINTS</td><td>07/18/2016</td></tr></tbody></table>																PAGE	CSA	CONTENTS	SYNC	DATE	53	1	FRONT PAGE			54	2	HIERARCHY			55	3	PMIC: BUCKS & LDOS			56	4	PMIC: CLOCKS & CONTROL			57	5	BB: POWER			58	6	BB: CONTROL & HS PERIPHERALS [6]			59	7	BB: GPIOs & QLINK			60	8	XCVR			61	9	XCVR			62	10	QPOET MODULE			63	11	LB PAD			64	12	HB PAD			65	13	UHB PAD			66	14	2G PA			67	15	LB DSM			68	16	HB DSM			69	17	COUPLER2			70	18	LOWER ANTENNA			71	19	UPPER ANTENNA			72	20	GNSS			73	21	SIM, DEBUG CONN			74	22	TEST POINTS	PROBE POINTS	07/18/2016	ALTERNATES <table><thead><tr><th>PART NUMBER</th><th>ALTERNATE FOR PART NUMBER</th><th>REFERENCE DESIGNATOR(S)</th><th>DESCRIPTION</th><th>BOM OPTION</th></tr></thead><tbody><tr><td>335S00013</td><td>335S0894</td><td>U_EEPROM_E</td><td>IC, EEPROM</td><td>BOM_TABLE_ALTS</td></tr><tr><td>197S00093</td><td>197S00065</td><td>Y401_E</td><td>XTAL, 38P4MHZ</td><td>BOM_TABLE_ALTS</td></tr><tr><td>197S00067</td><td>197S00065</td><td>Y401_E</td><td>XTAL, 38P4MHZ</td><td>BOM_TABLE_ALTS</td></tr><tr><td>353S01287</td><td>353S01109</td><td>U_QET_E</td><td>ET MODULE, QPOET</td><td>BOM_TABLE_ALTS</td></tr></tbody></table>				PART NUMBER	ALTERNATE FOR PART NUMBER	REFERENCE DESIGNATOR(S)	DESCRIPTION	BOM OPTION	335S00013	335S0894	U_EEPROM_E	IC, EEPROM	BOM_TABLE_ALTS	197S00093	197S00065	Y401_E	XTAL, 38P4MHZ	BOM_TABLE_ALTS	197S00067	197S00065	Y401_E	XTAL, 38P4MHZ	BOM_TABLE_ALTS	353S01287	353S01109	U_QET_E	ET MODULE, QPOET	BOM_TABLE_ALTS
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SCH # : 951-03059 PCB # : 920-02293 BOM # : 939-02493 FRONT PAGE DRAWING TITLE SCH, MLB, D21 Apple Inc. DRAWING NUMBER 051-02159 SIZE D REVISION 10.0.0 BRANCH PAGE 1 OF 22 SHEET 53 OF 81 NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. 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 IN WHOLE OR PART IV ALL RIGHTS RESERVED																																																																																																																																																															
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RF PMIC: SWITCHERS & LDOS

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RF PMIC: XTAL, CLOCKS AND MISCELLANEOUS

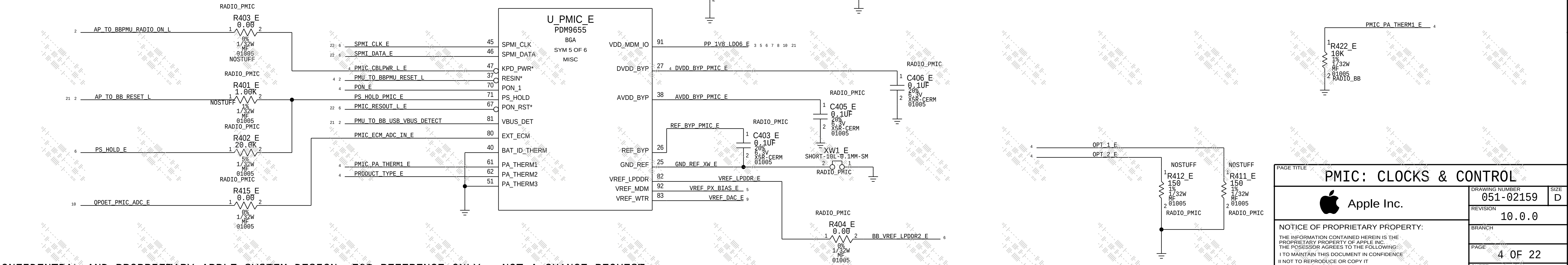
HW_REV_ID	R407	R408	MLB/RADIO_DEV
<0.10V	NOSTUFF	51.1K	T500/DEV1
0.15V-0.25V	422K	51.1K	PROT01.5
0.35V-0.45V	180K	51.1K	PROT02.5/DEV2
0.55V-0.65V	105K	51.1K	PROT01/DEV3
0.75V-0.85V	66.5K	51.1K	PROT02/DEV4
0.95V-1.05V	44.2K	51.1K	EVT
1.15V-1.25V	28K	51.1K	CARRIER/DEV5
1.35V-1.45V	16.5K	51.1K	DVT/DEV6
1.55V-1.65V	7.87K	51.1K	PVT/DEV7
1.75V-1.85V	10K	NOSTUFF	SPARE

NOTE XTAL SYMBOL MIRRORED COMPARED TO PREVIOUS SCH

PA_THERM2	R409	R410	PRODUCT TYPE	Y
0.00V-0.10V	NOSTUFF	51.1K	RADIO_DEV	1
0.15V-0.25V	422K	51.1K	3RD TYPE	2
0.35V-0.45V	180K	51.1K	POR MLB (FF)	3
0.55V-0.65V	105K	51.1K	SPARE	4
0.75V-0.85V	66.5K	51.1K	SPARE	5
0.95V-1.05V	44.2K	51.1K	SPARE	6
1.15V-1.25V	28K	51.1K	SPARE	7
1.35V-1.45V	16.5K	51.1K	SPARE	8
1.55V-1.65V	7.87K	51.1K	SPARE	9
1.75V-1.85V	10K	NOSTUFF	SPARE	A

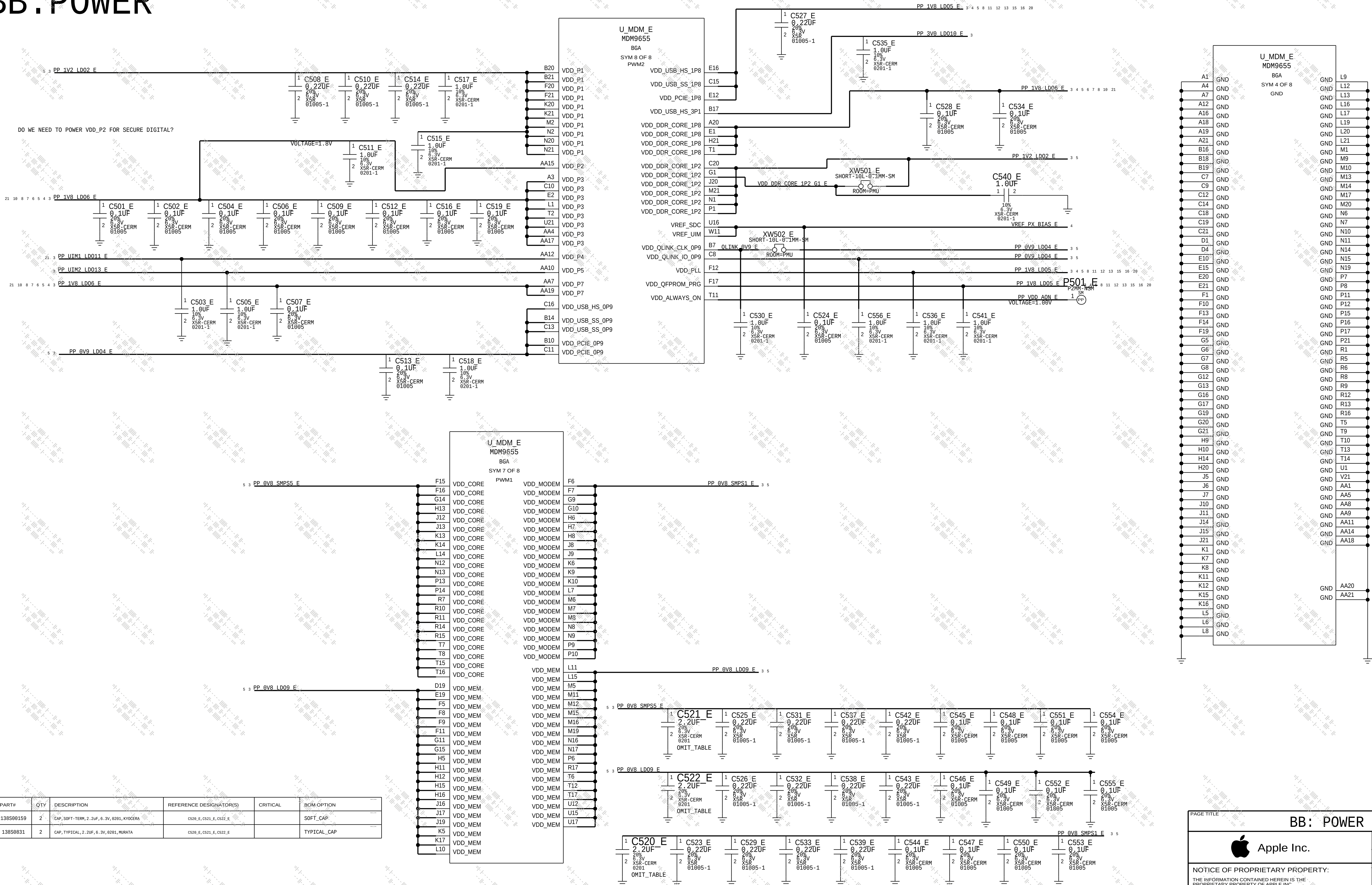
JPN_ROW_SEL	R430	R431	MAV PLATFORM	Y	SKU
<0.10V	NOSTUFF	51.1K	MAV17.0	0	ROW
0.15V-0.25V	422K	51.1K	MAV17.1	1	JPN
0.35V-0.45V	180K	51.1K	MAV17.2	2	ROW
0.55V-0.65V	105K	51.1K	MAV17.3	3	JPN
0.75V-0.85V	66.5K	51.1K	MAV17.4	4	ROW
0.95V-1.05V	44.2K	51.1K	MAV17.5	5	JPN
1.15V-1.25V	28K	51.1K	MAV17.6	6	ROW
1.35V-1.45V	16.5K	51.1K	MAV17.7	7	JPN
1.55V-1.65V	7.87K	51.1K	MAV17.8	8	ROW
1.75V-1.85V	10K	NOSTUFF	MAV17.9	9	JPN

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0606	1	RESISTOR, 01005, 105K OHMS	R430_E	CRITICAL	JPN
117S0197	1	RESISTOR, 01005, 100K OHMS	R430_E	CRITICAL	ROW



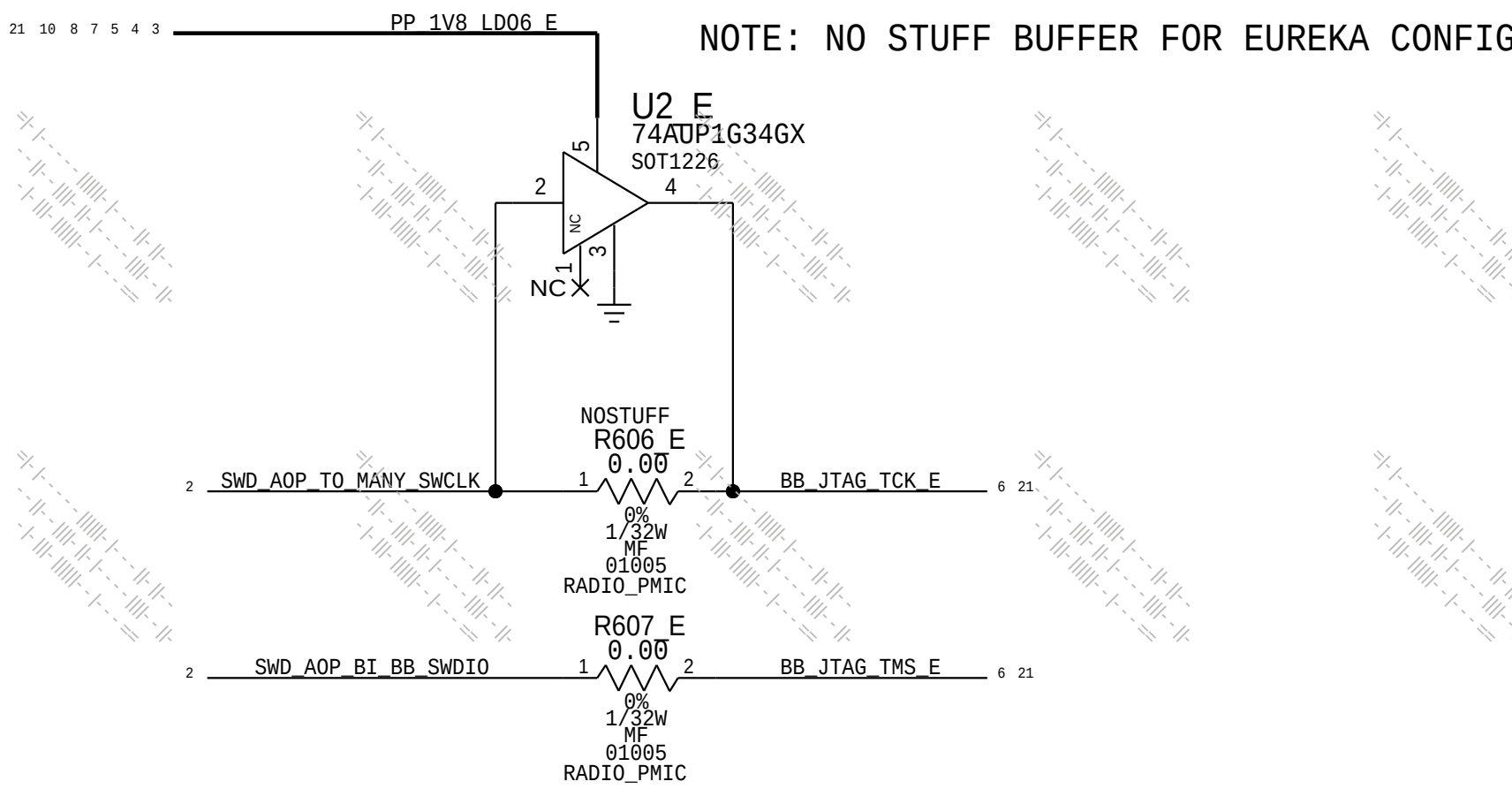
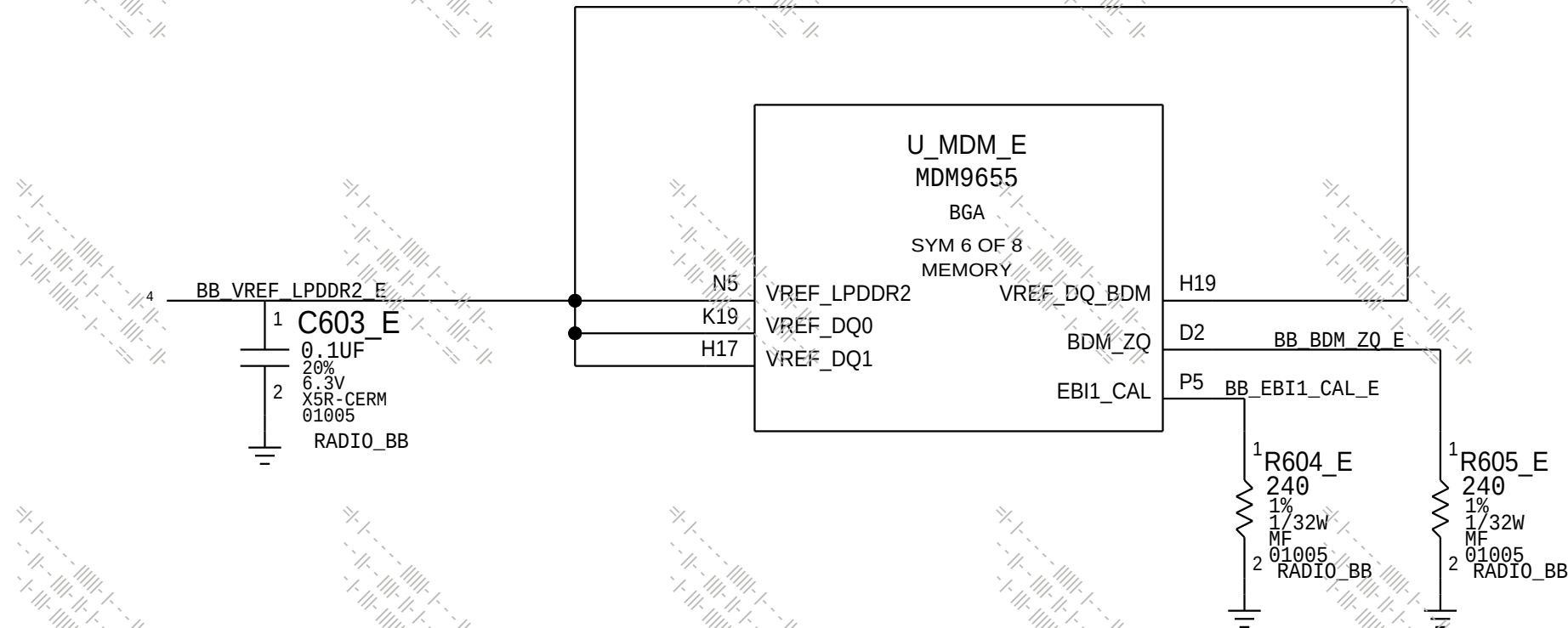
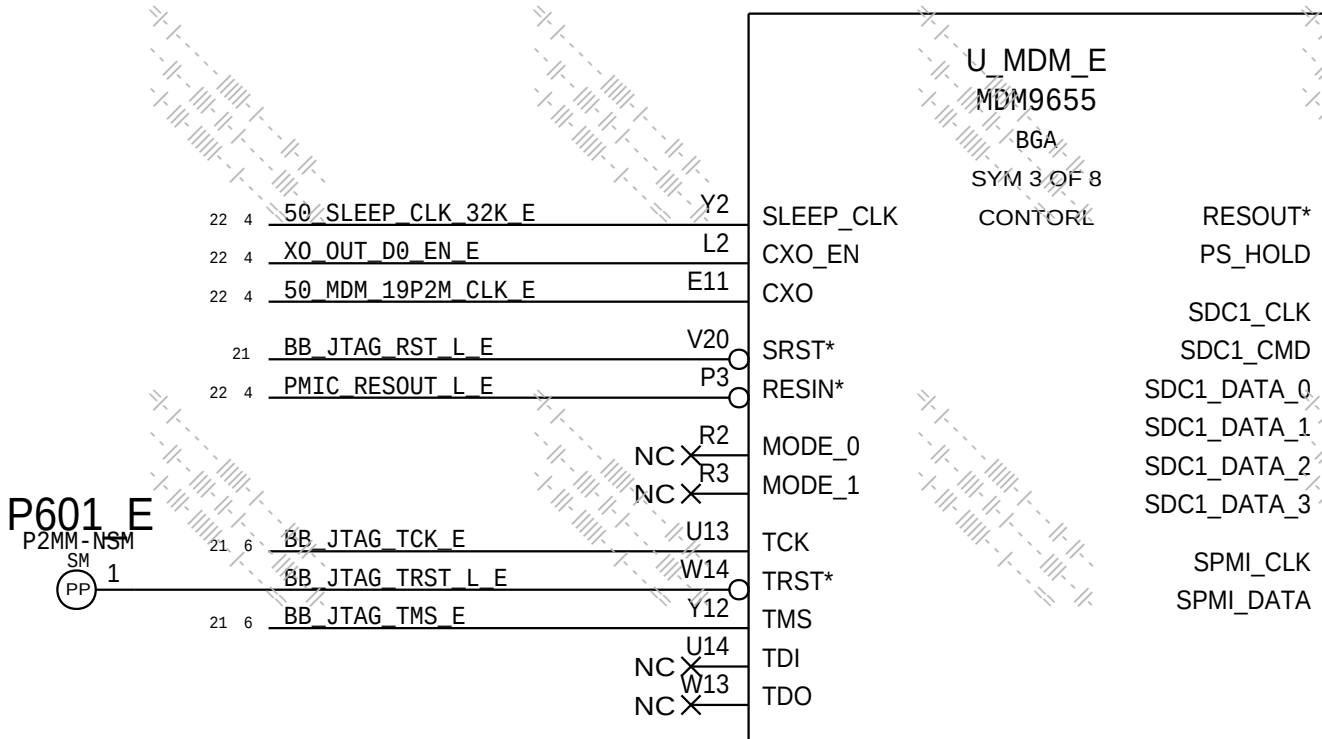
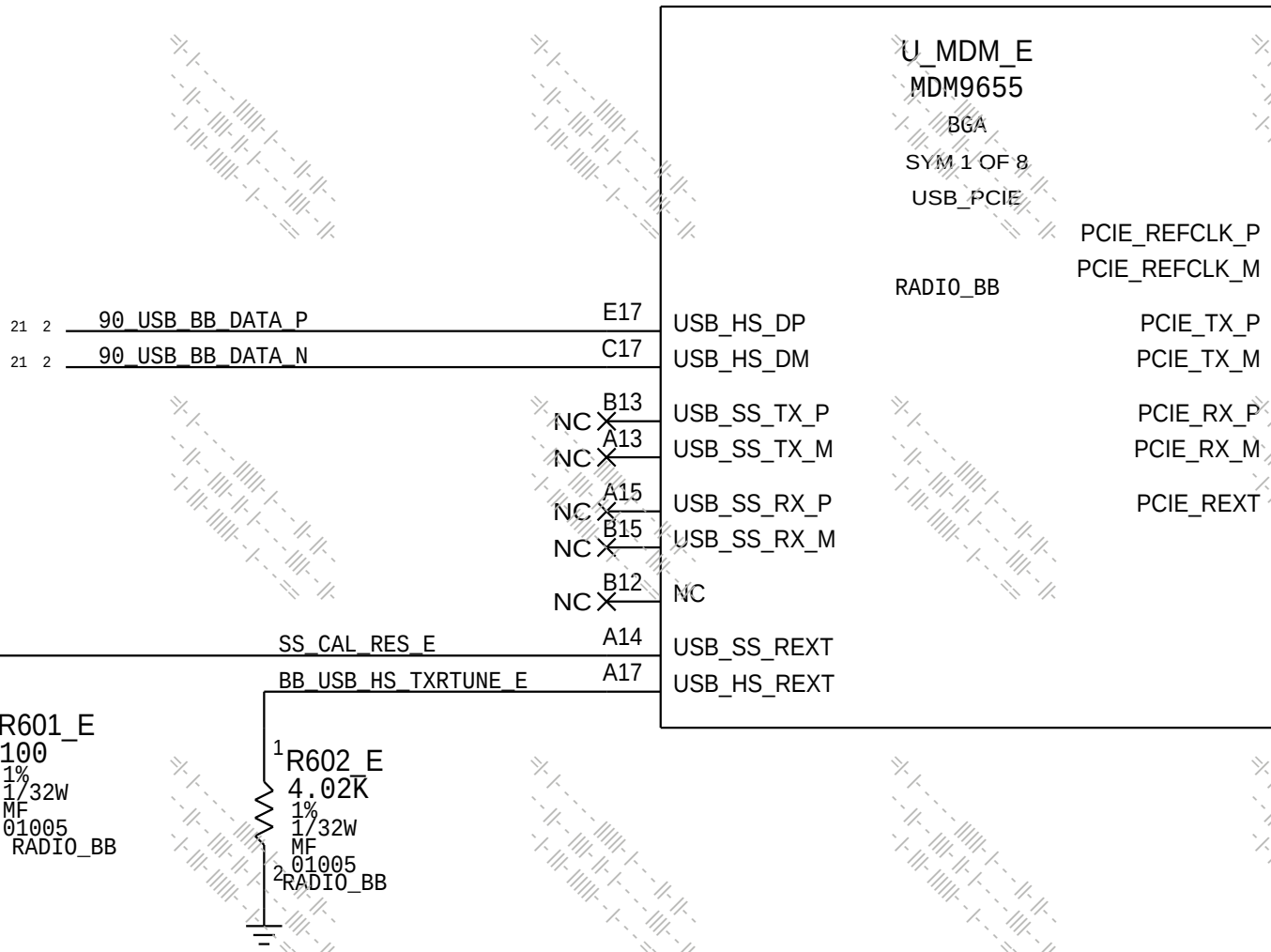
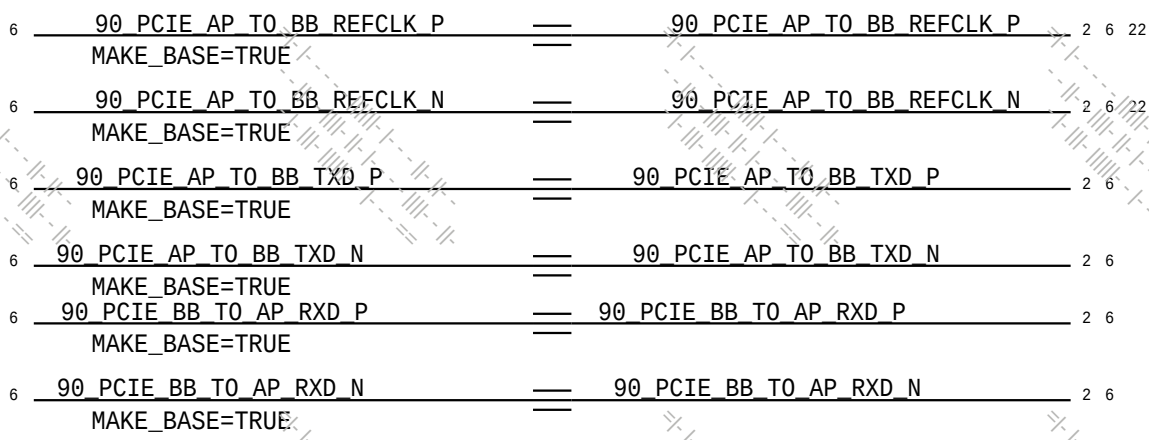
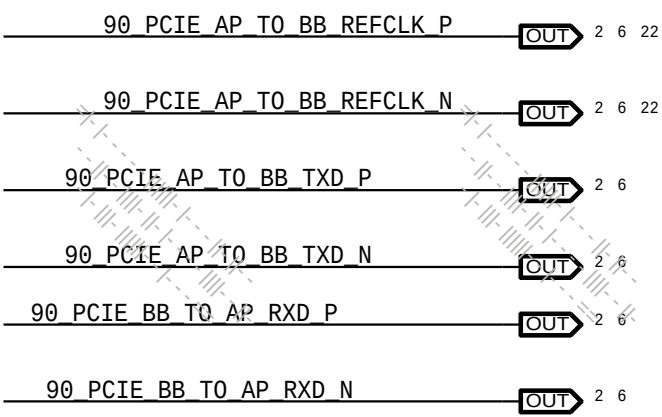
BB : POWER

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S00159	2	CAP, SOFT-TERM, 2.2uF, 6.3V, 0201, KYOCERA	C520, E, C521, E, C522, E		SOFT_CAP
138S0831	2	CAP, TYPICAL, 2.2uF, 6.3V, 0201, MURATA	C520, E, C521, E, C522, E		TYPICAL_CAP

BB: CONTROL & HS PERIPHERALS



BB:GPIOs & QLINK

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D

D

C

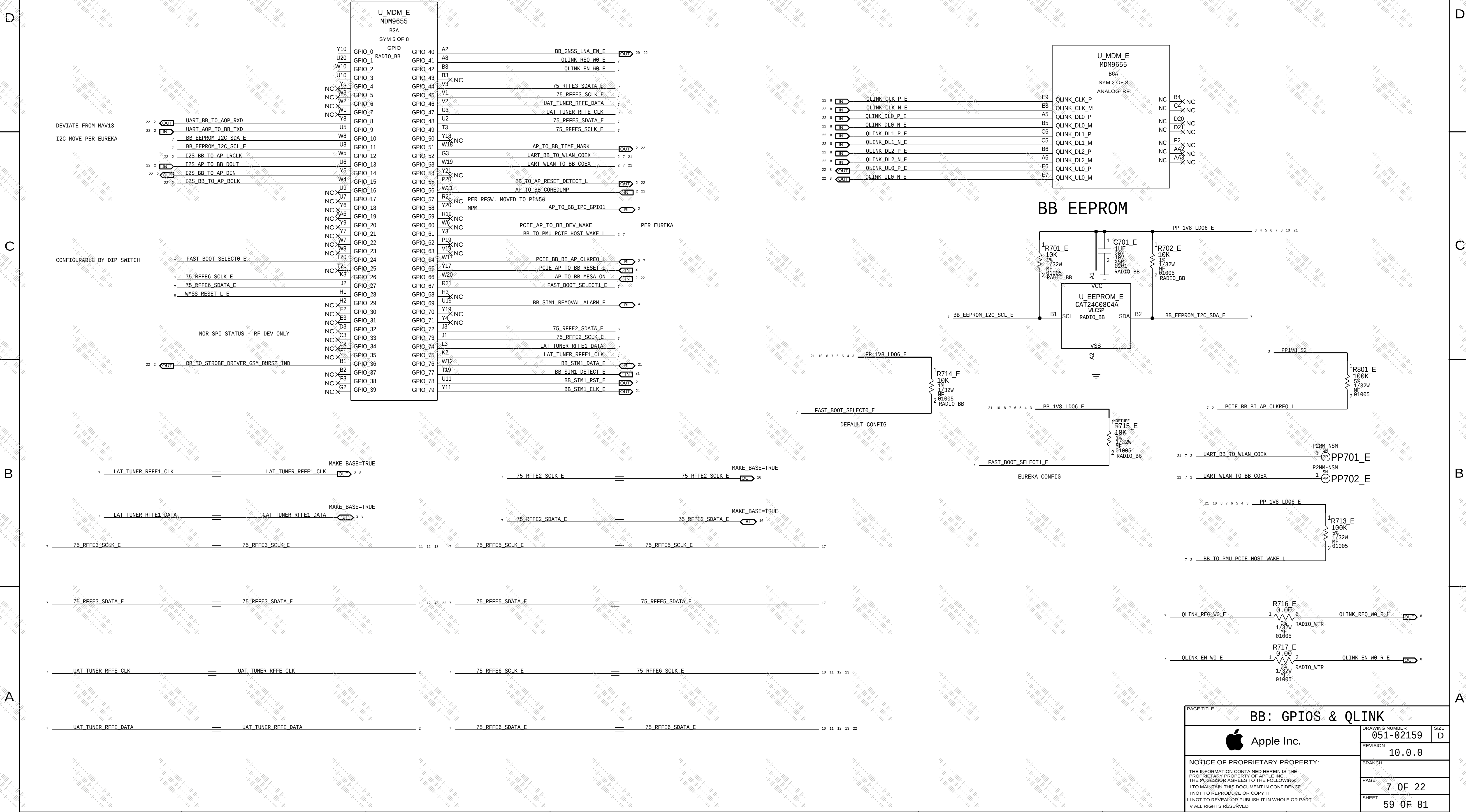
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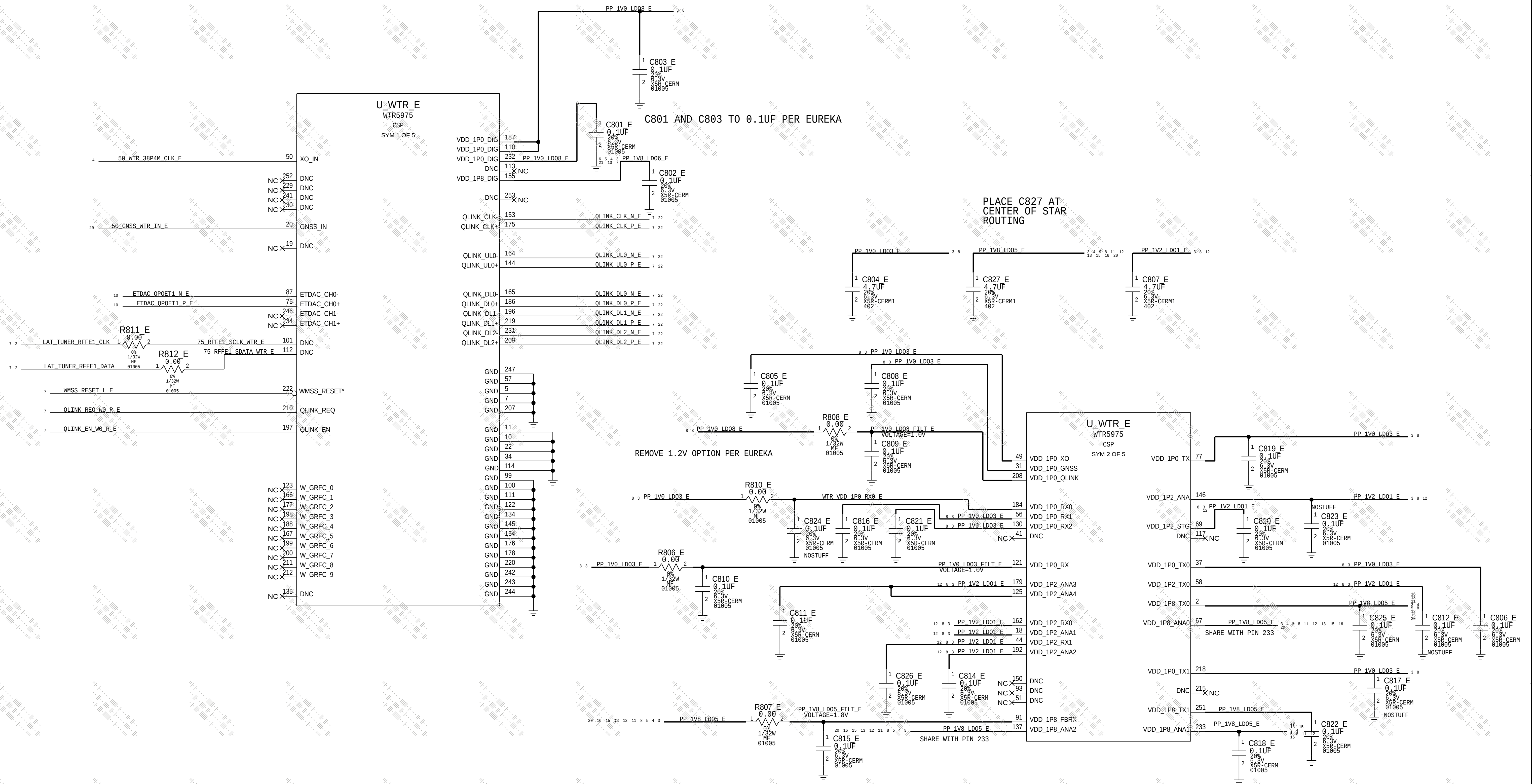
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TRANSCEIVER: QLINK & POWER

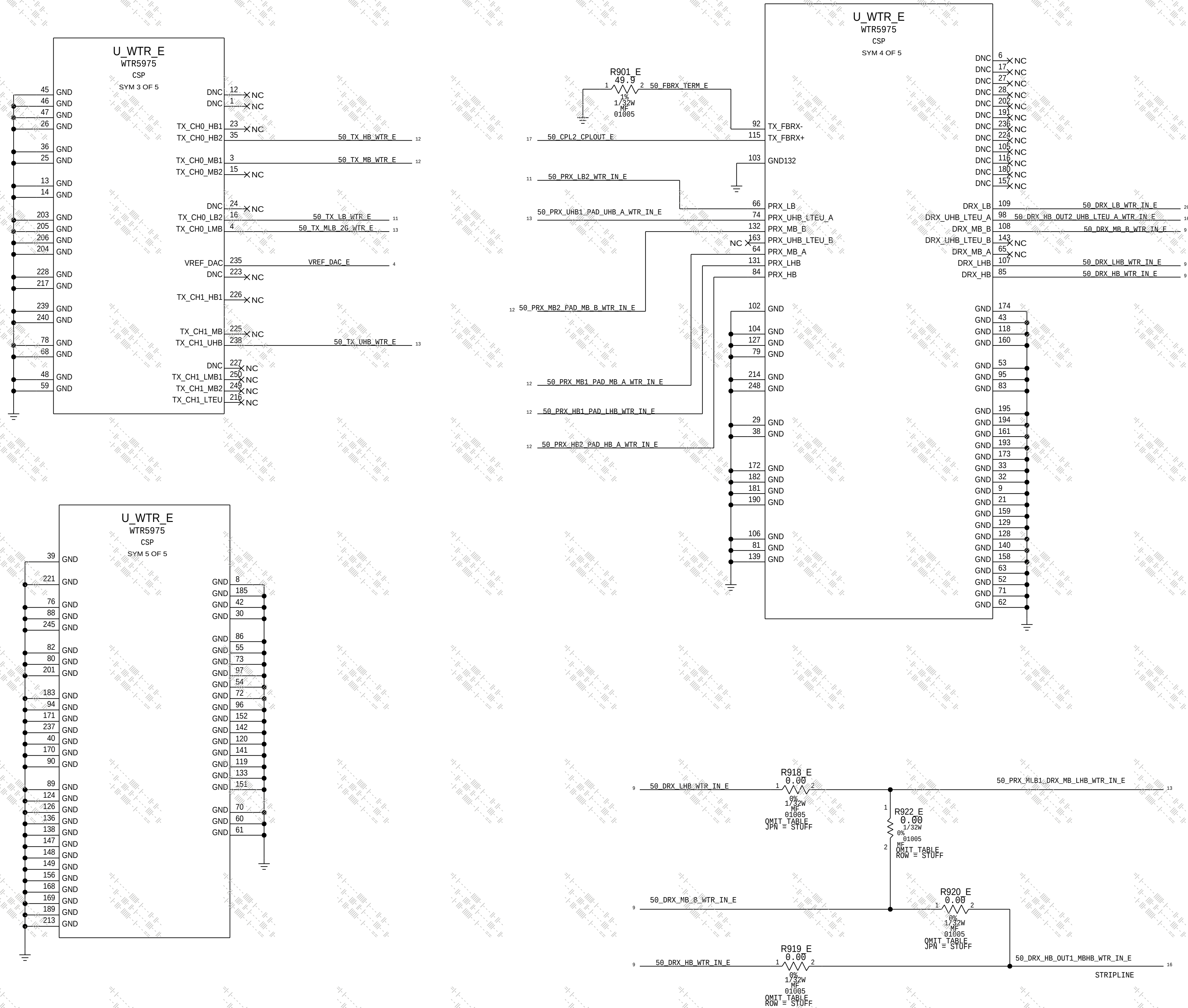


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TRANSCEIVER: TX & RX

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S0161	1	01005 0R	R919_E	CRITICAL	ROW
117S0161	1	01005 0R	R922_E	CRITICAL	ROW

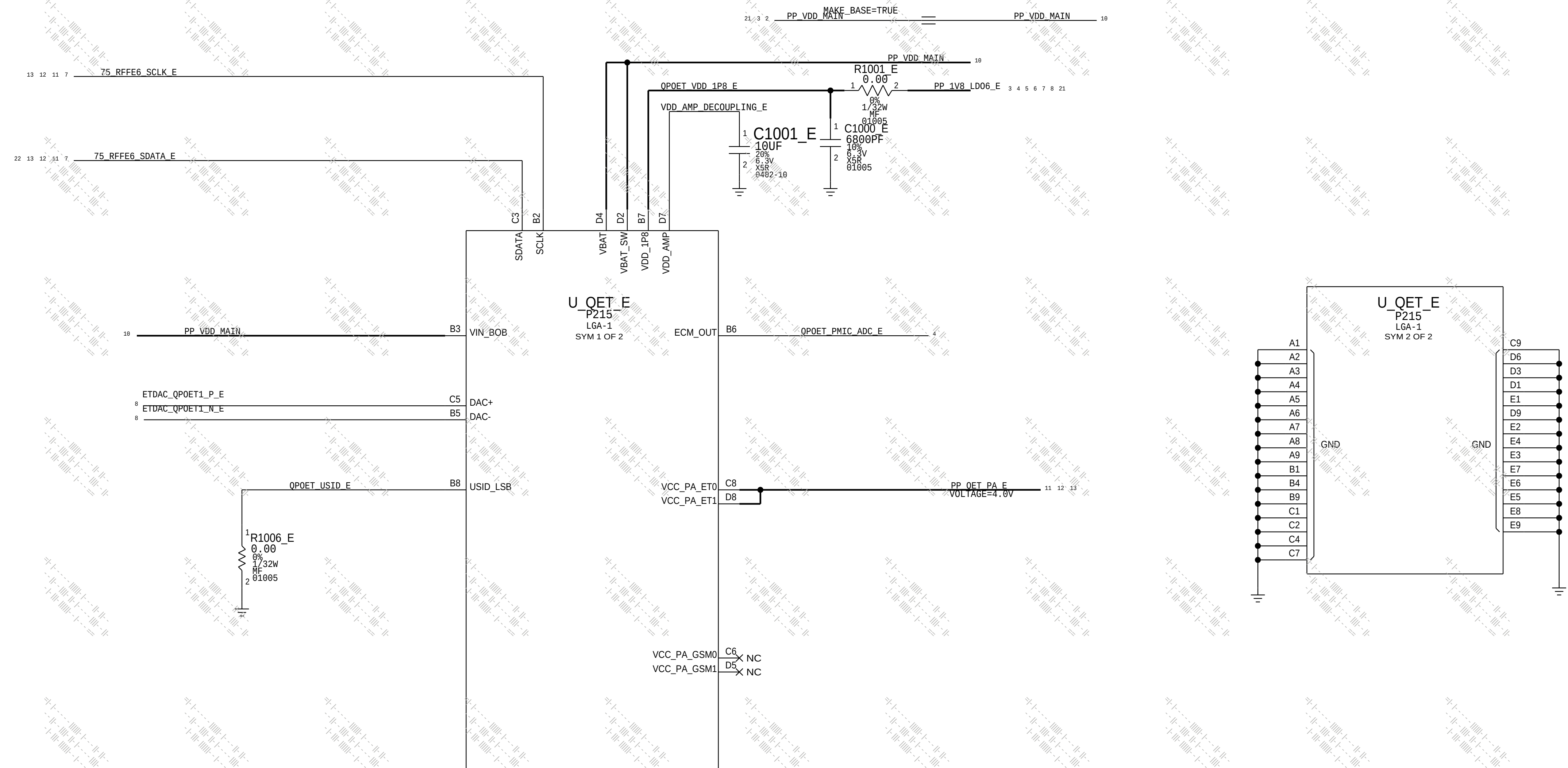


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S0161	1	01005 0R	R918_E	CRITICAL	JPN
117S0161	1	01005 0R	R920_E	CRITICAL	JPN

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QET: MODULE

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LB PAD

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0724	1	2G LB MATCH, 0 OHMS	R1108_E	CRITICAL	JPN
152S08021	1	6.8NH UHQ, LB ANT MATCH	R1104_E	CRITICAL	JPN
131S0555	1	1PF, LB ANT MATCH	L1101_E	CRITICAL	JPN
131S0176	1	2.4PF, 2G LB MATCH	L1102_E	CRITICAL	JPN

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
152S2086	1	6.2NH UHQ, LB ANT MATCH	R1104_E	CRITICAL	ROW

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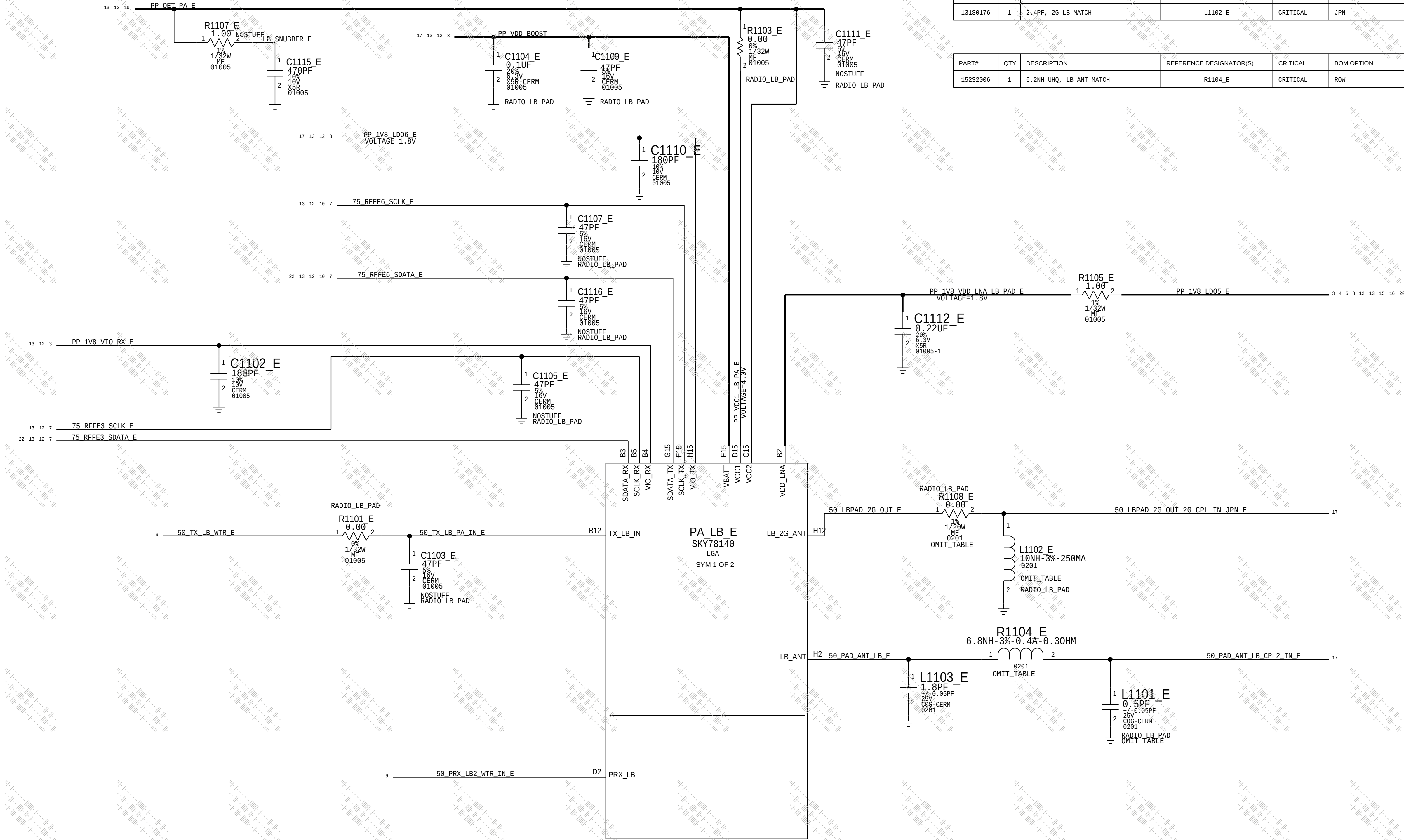
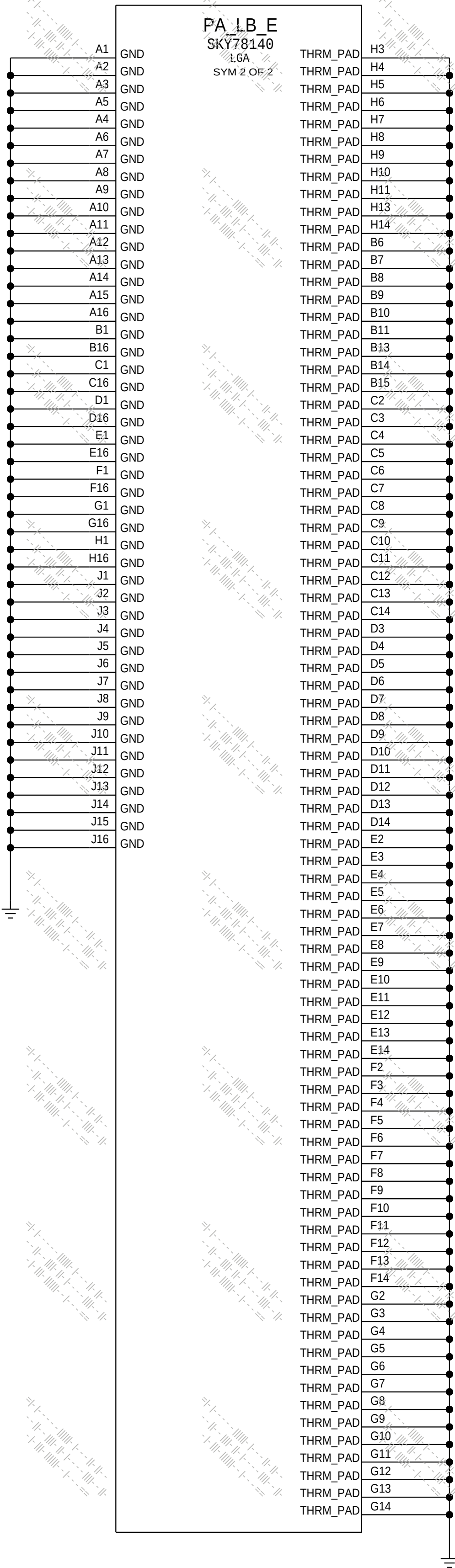
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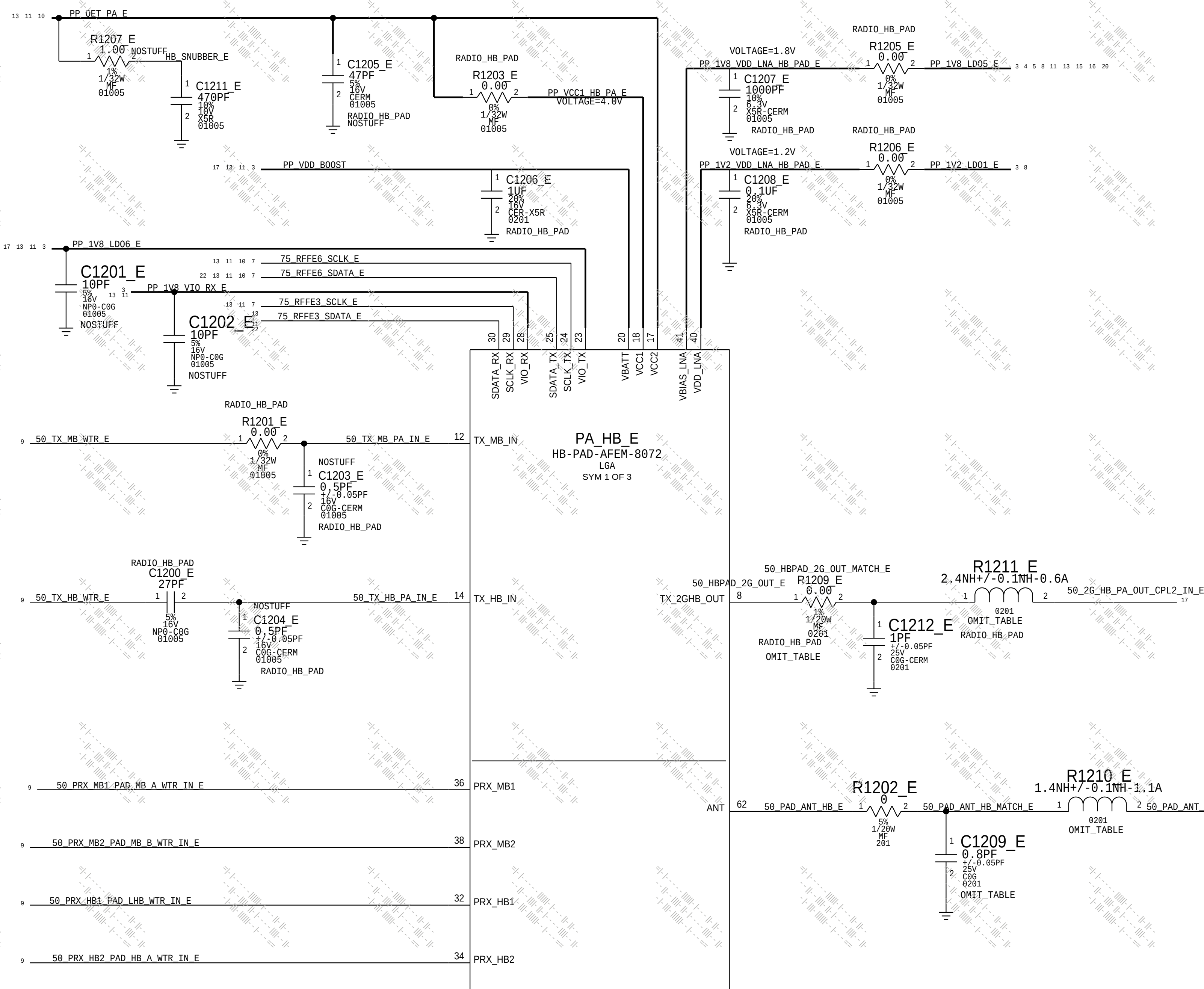
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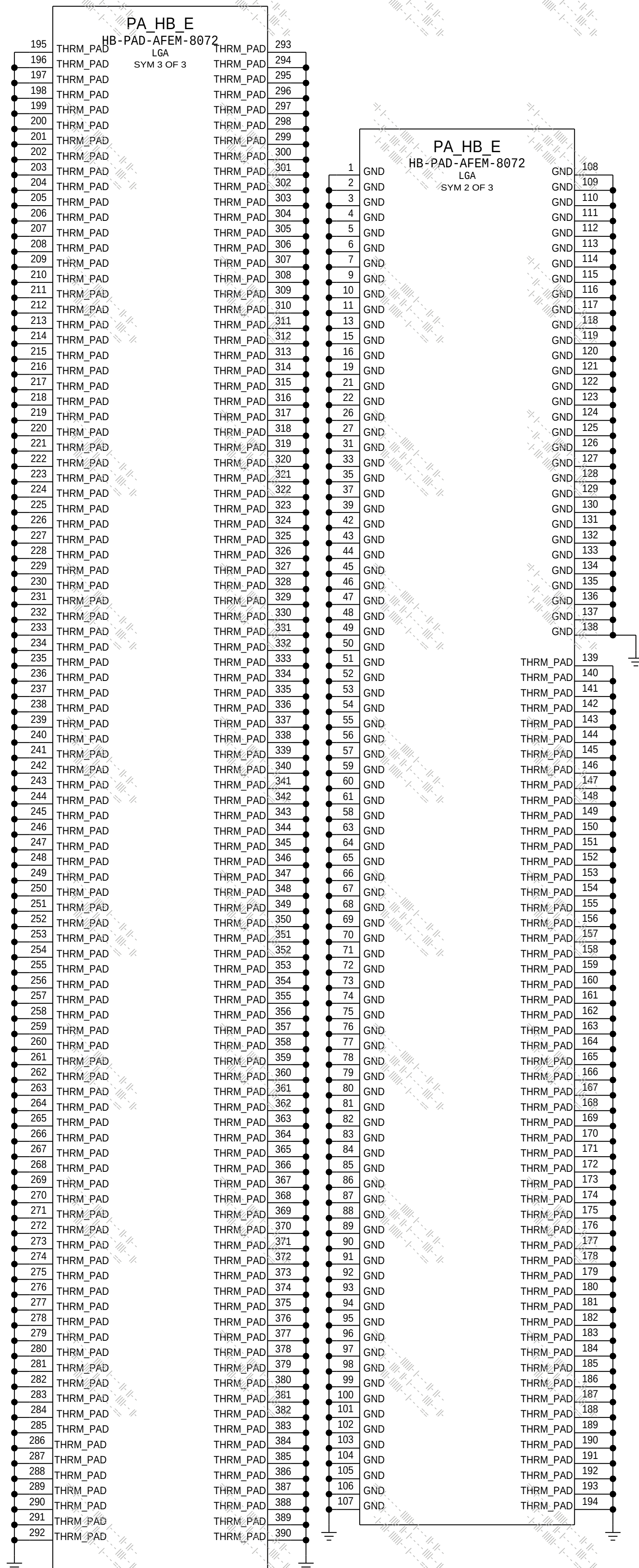
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HB PAD



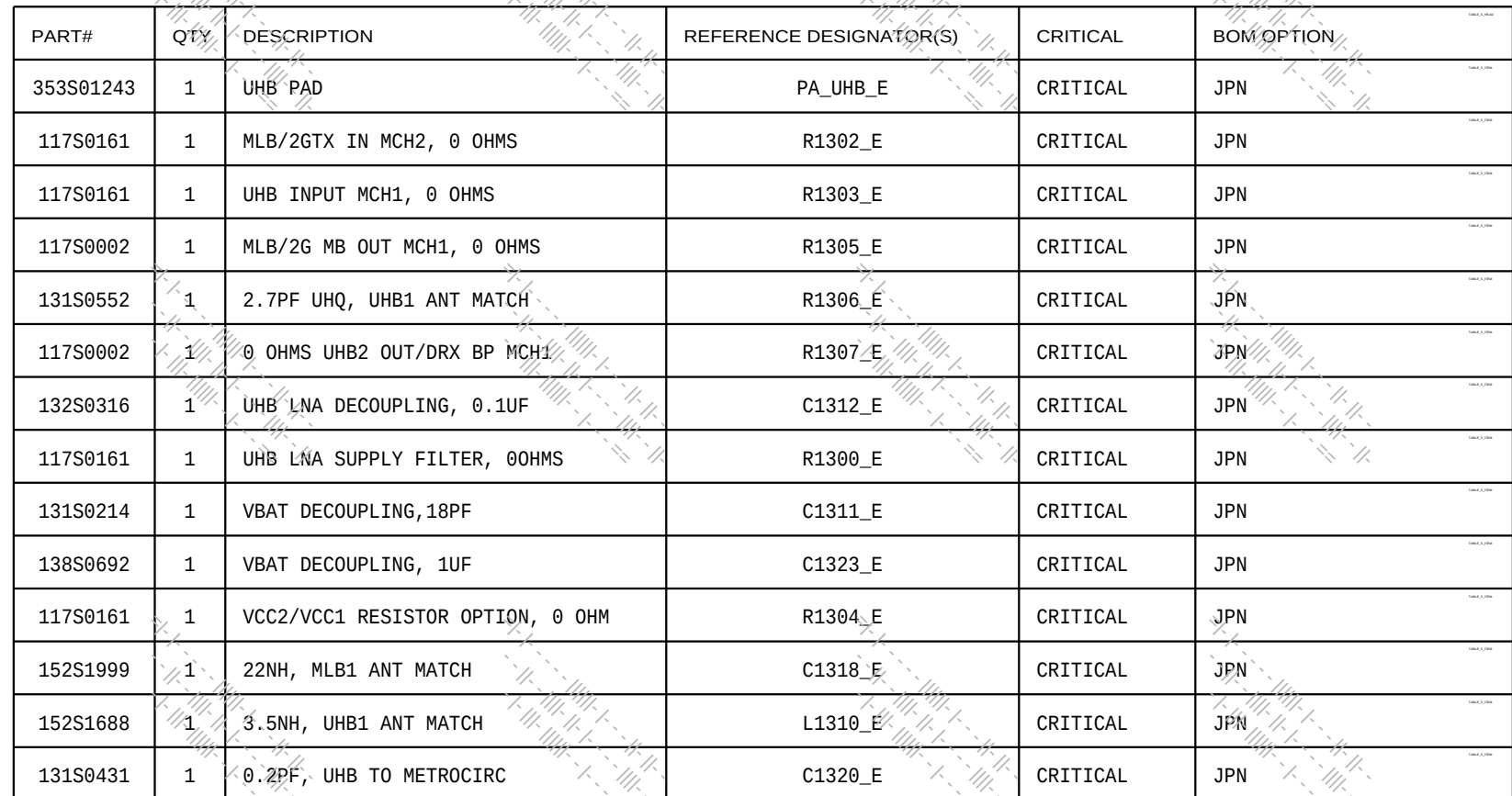
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152S2623	1	3.2NH UHQ, 2G HB PAD MATCH	R3269_E	CRITICAL	JPN
152S00153	1	1NH UHQ, 2G HB PAD MATCH	R1211_E	CRITICAL	JPN
131S0425	1	0.5PF, HB ANT MATCH	C1209_E	CRITICAL	JPN
152S2642	1	1.8NH UHQ, HB ANT MATCH	R1210_E	CRITICAL	JPN

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
131S0329	1	0.4PF, HB ANT MATCH	C1209_E	CRITICAL	ROW
152S2800	1	2.0NH UHQ, HB ANT MATCH	R1210_E	CRITICAL	ROW



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87654321

2G PA - ROW

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S01247	1	2G PA	PA_UHB_E	CRITICAL	ROW
117S0161	1	MLB/26TX IN MCH2, 0 OHMS	R1302_E	CRITICAL	ROW
117S0161	1	UHB INPUT MCH1, 0 OHMS	R1303_E	CRITICAL	ROW
118S0724	1	MLB/2G MB OUT MCH1, 0 OHMS	R1305_E	CRITICAL	ROW
118S0724	1	UHB2 OUT/DRX BP MCH1, 0 OHMS	R1307_E	CRITICAL	ROW
152S2053	1	4.7NH UHQ, 2G LB OUTPUT MCH2	R1309_E	CRITICAL	ROW
131S0214	1	VBAT DECOUPLING, 18PF	C1311_E	CRITICAL	ROW
138S0692	1	VBAT DECOUPLING, 10F	C1323_E	CRITICAL	ROW
117S0161	1	VCC2/VCC1 RESISTOR OPTION, 0 OHM	R1304_E	CRITICAL	ROW
103S00089	1	50 OHM TERMINATION FOR ROW ONLY	C1319_E	CRITICAL	ROW

PAGE TITLE

2G PA

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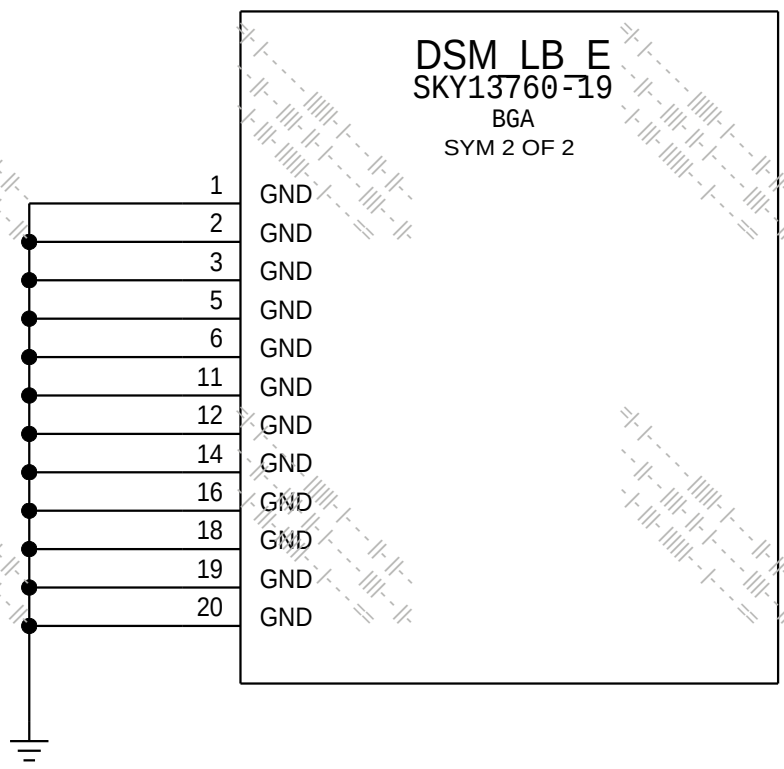
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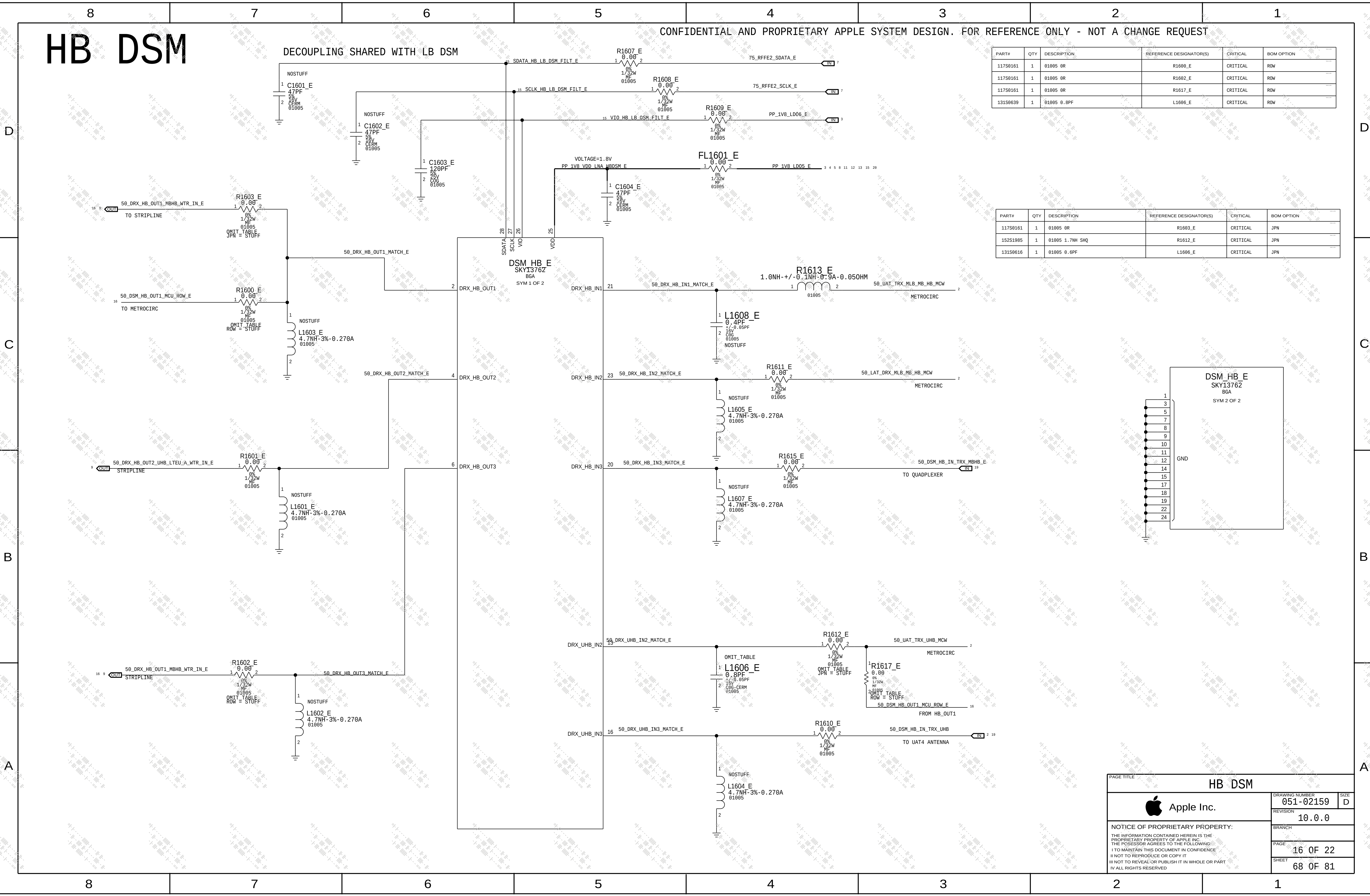
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HB DSM

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S0161	1	01005 0R	R1600_E	CRITICAL	ROW
117S0161	1	01005 6R	R1602_E	CRITICAL	ROW
117S0161	1	01005 0R	R1617_E	CRITICAL	ROW
131S0639	1	01005 0.8PF	L1606_E	CRITICAL	ROW

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S0161	1	01005 0R	R1603_E	CRITICAL	JPN
152S1985	1	01005 1.7NH SHQ	R1612_E	CRITICAL	JPN
131S0616	1	01005 0.6PF	L1606_E	CRITICAL	JPN



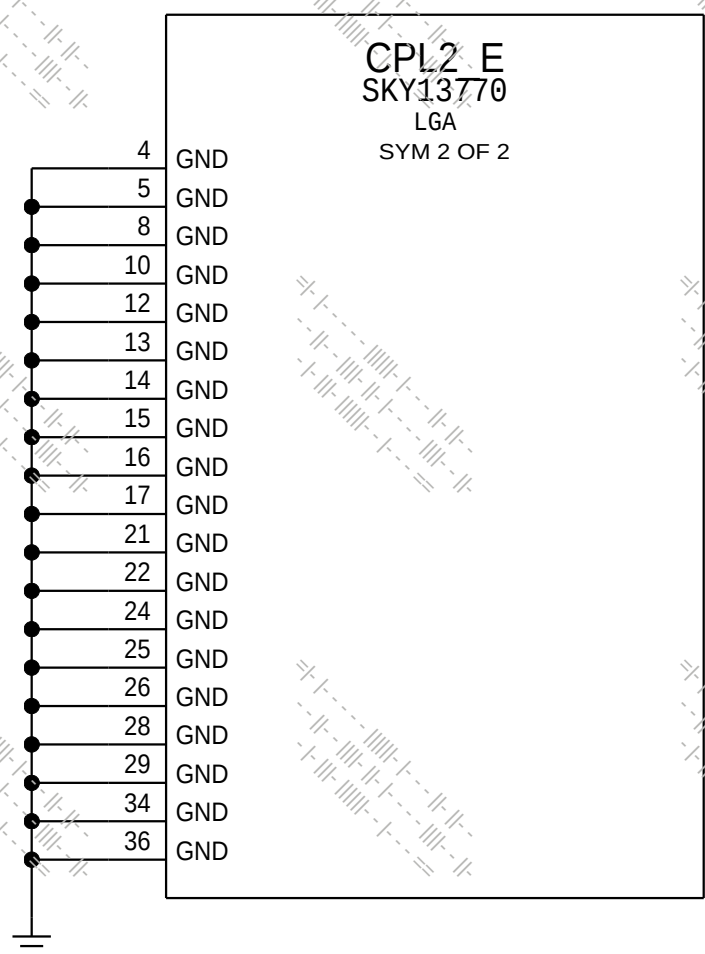
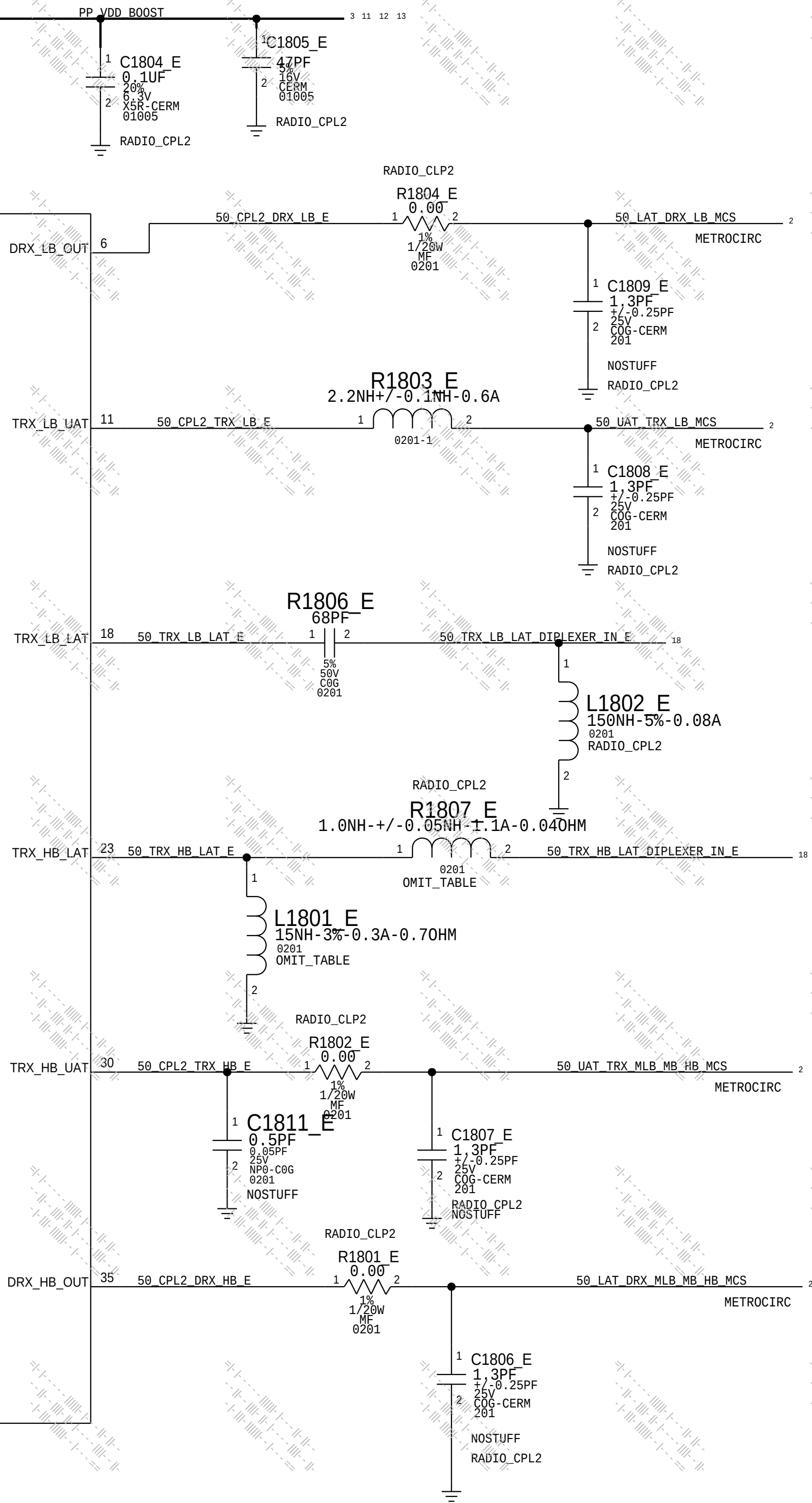
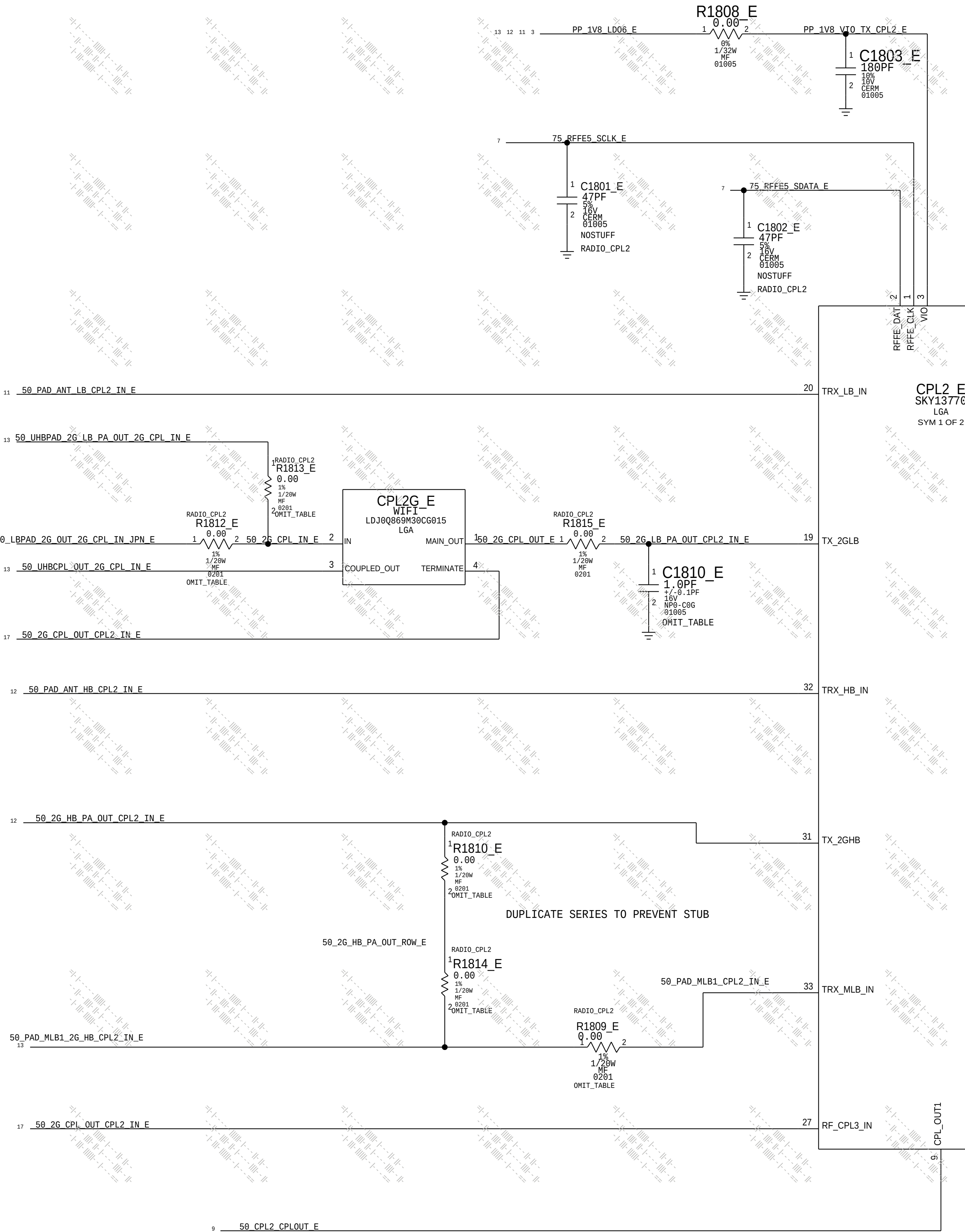
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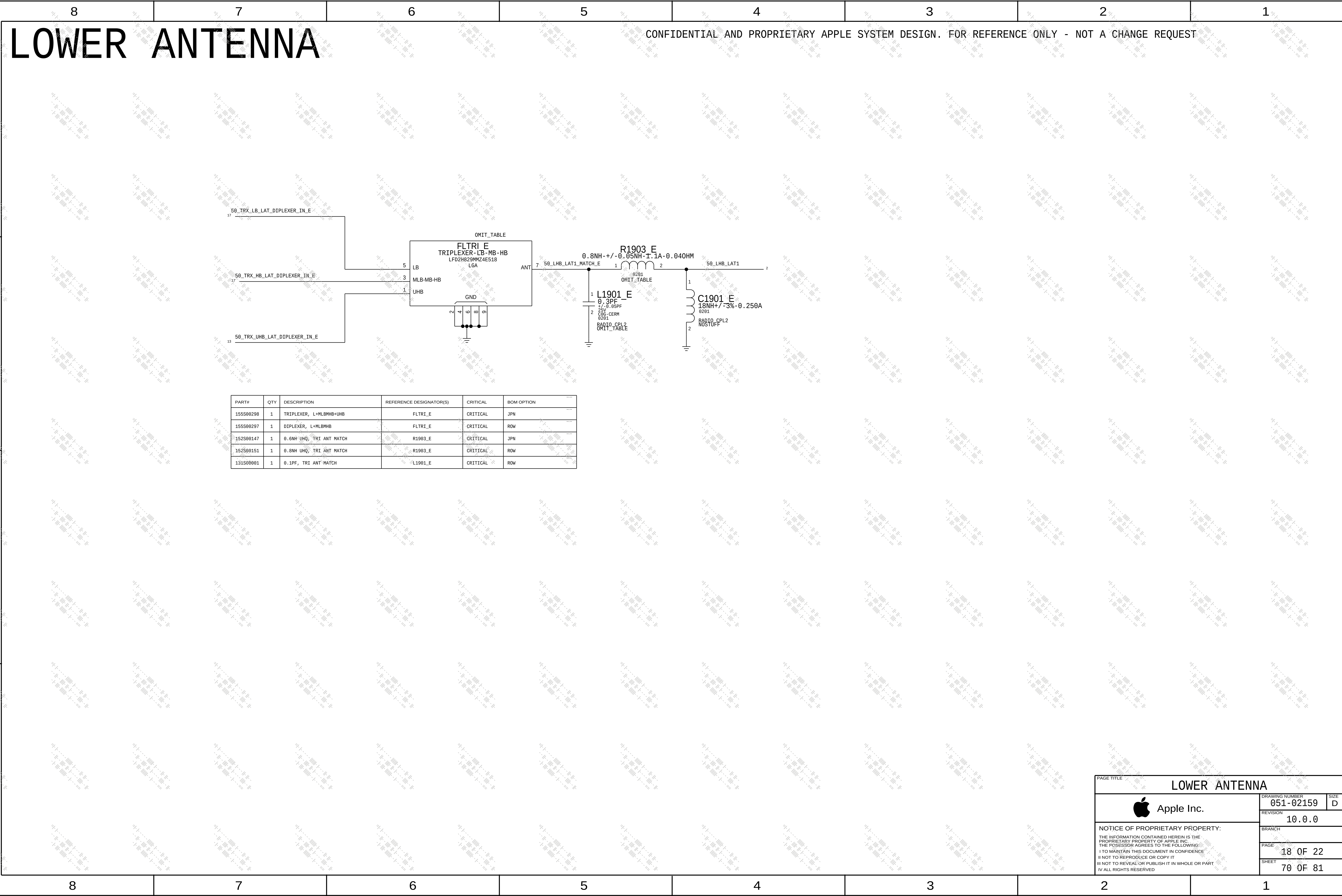
COUPLER2

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S9724	1	0201 0R	R1810_E	CRITICAL	ROW
131S90142	1	150PF, DC BLOCK FOR GSM	R1813_E	CRITICAL	ROW
118S9724	1	0201 0R	R1814_E	CRITICAL	ROW
131S90901	1	0.1PF, CPLR HB LAT MATCH	L1801_E	CRITICAL	ROW
152S2944	1	2.2NH, CPLR HB LAT MATCH	R1807_E	CRITICAL	ROW

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S9724	1	0201 0R	R1809_E	CRITICAL	JPN
152S2007	1	8.2NH 2G LB MATCH	R1812_E	CRITICAL	JPN
131S9431	1	0.2PF, CPLR HB LAT MATCH	L1801_E	CRITICAL	JPN
152S90955	1	2.6NH, CPLR HB LAT MATCH	R1807_E	CRITICAL	JPN
131S9249	1	2.2PF, 2G LB MATCH	C1810_E	CRITICAL	JPN





PAGE TITLE

LOWER ANTENNA

 Apple Inc.

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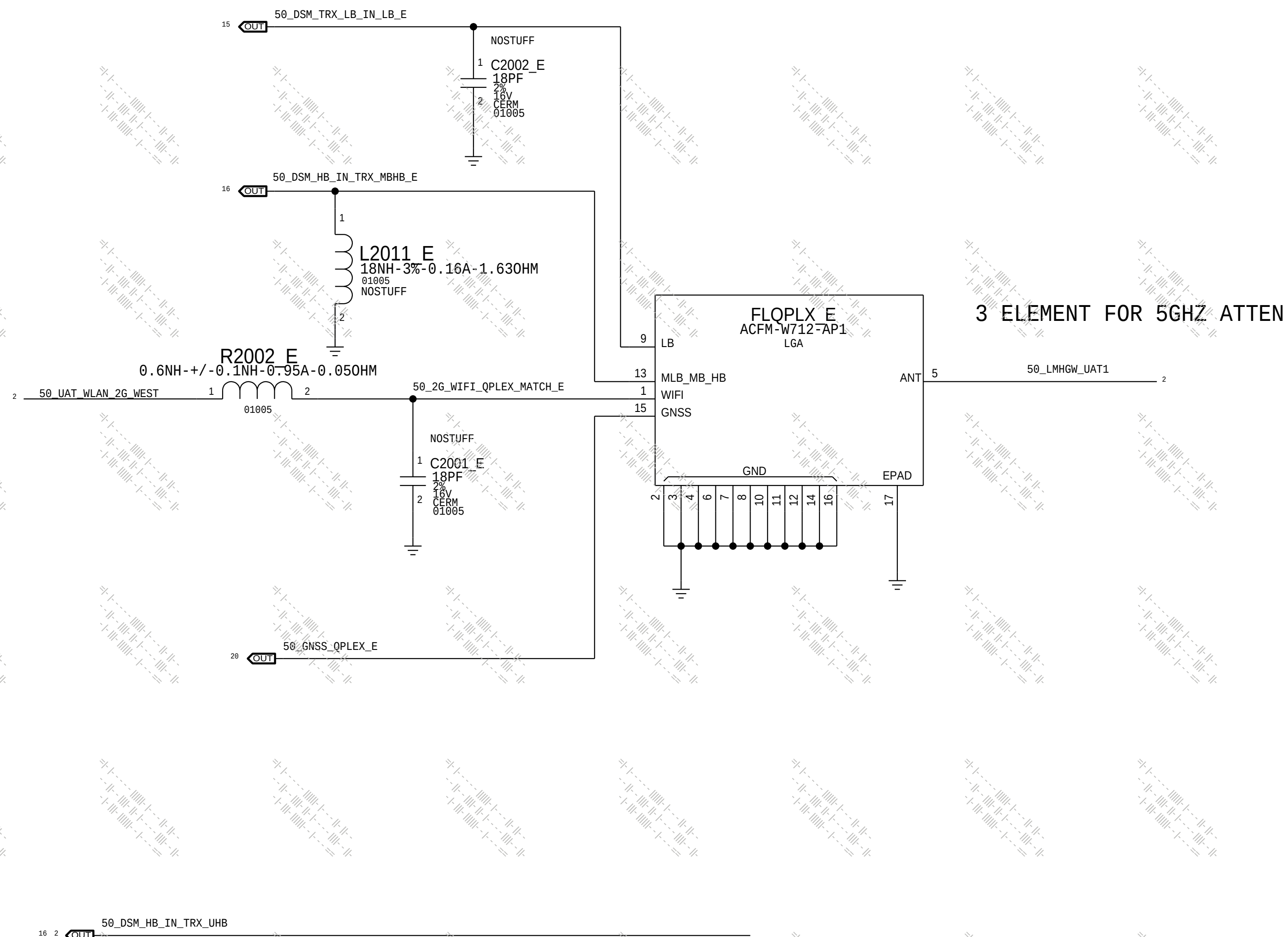
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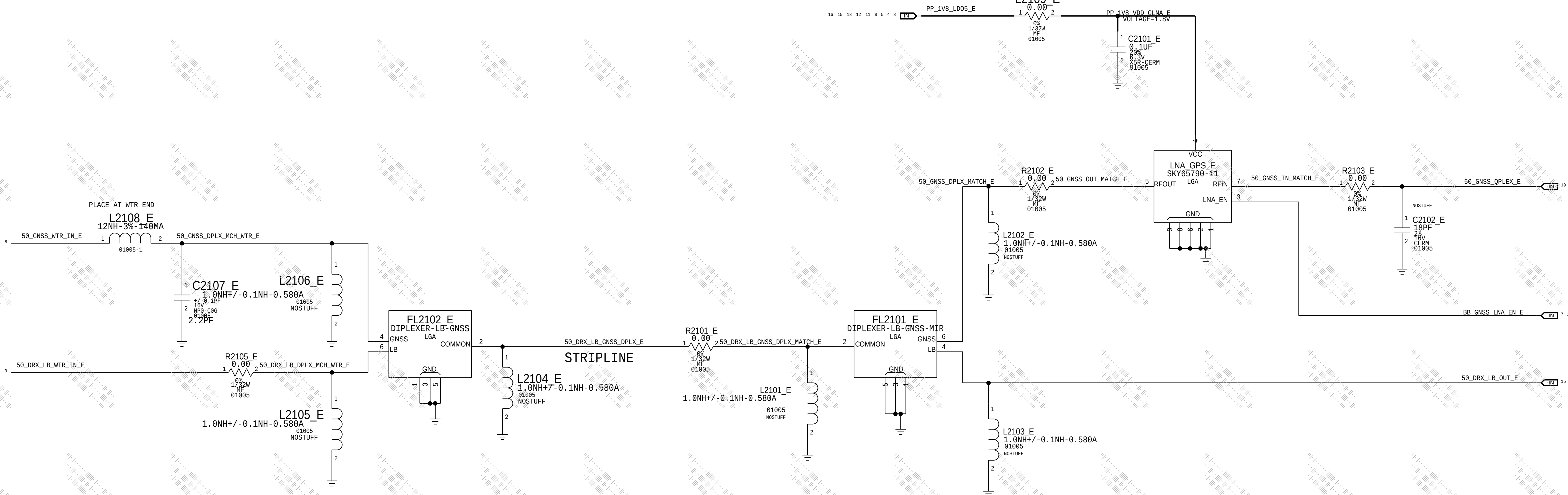
UAT & LB/UHB DIPLEXER

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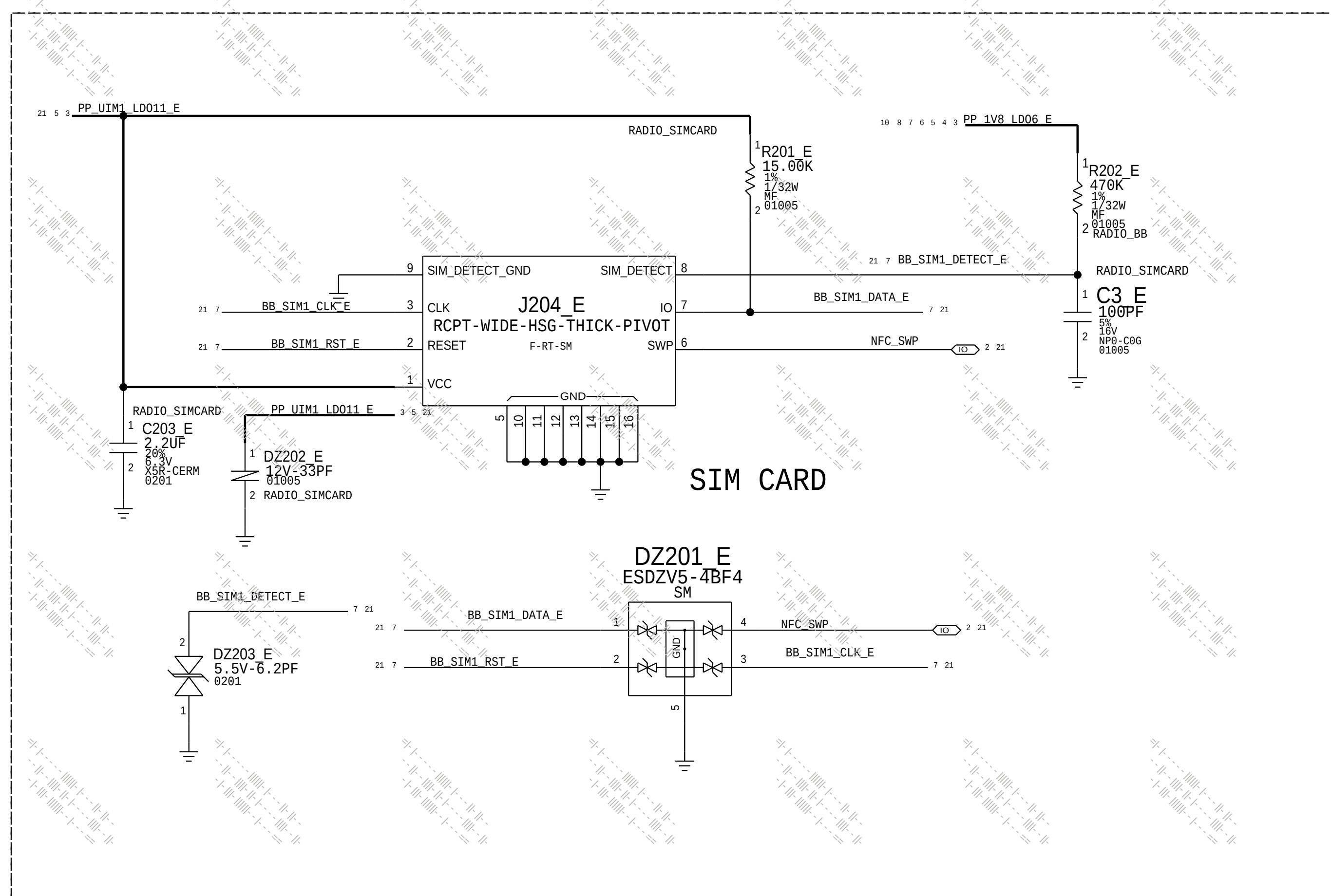
GPS & GPS/LB DIPLEXER



GNSS		
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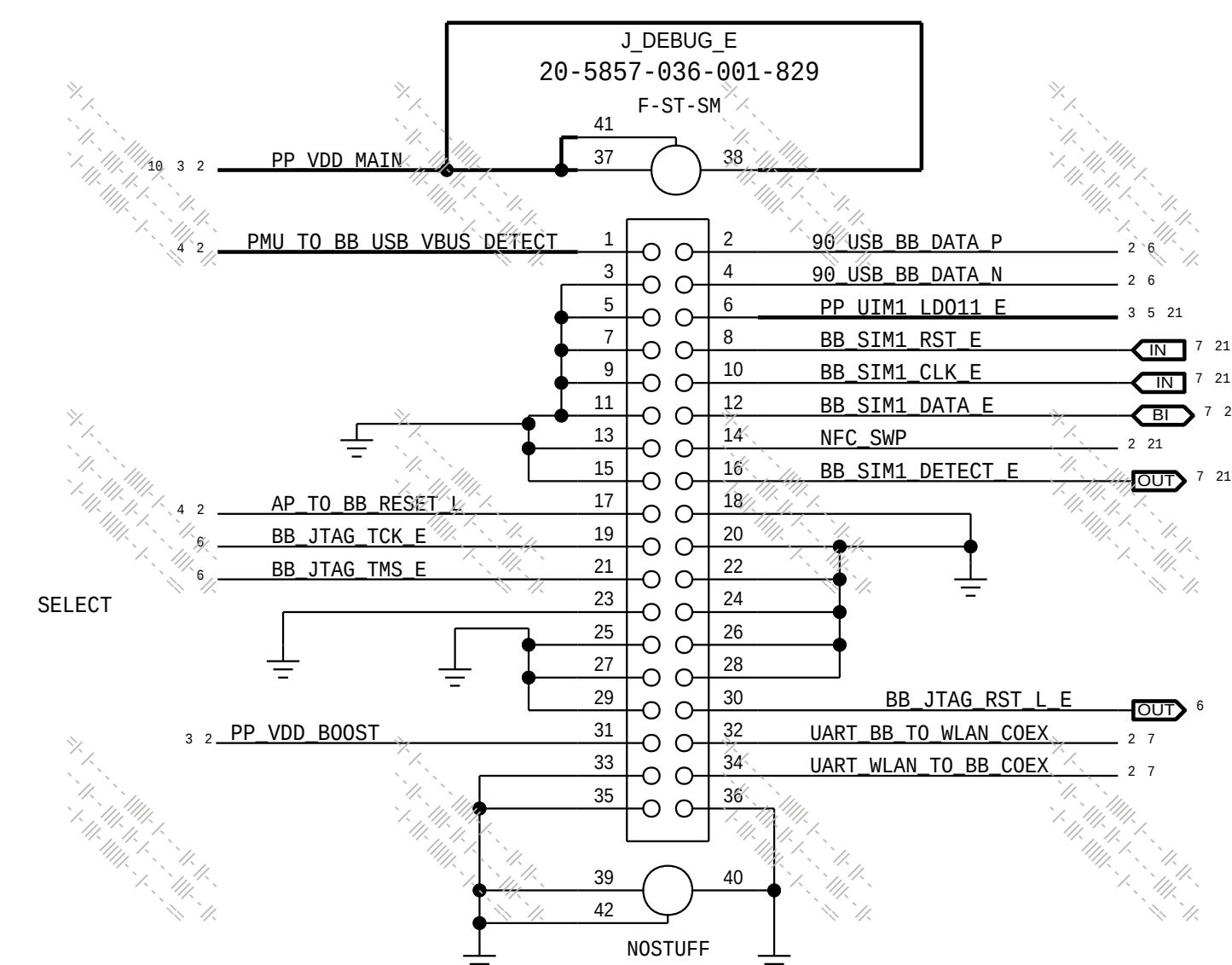
SIM CARD: CONNECTOR

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PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
512S00026	512S00017	BOM_TABLE_ALTS	J204_E	SINCRD, KYOCERA

DEBUG CONNECTOR



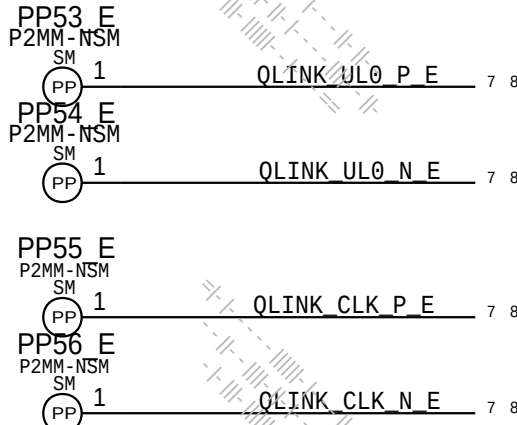
BB PROBE POINTS

QLINK

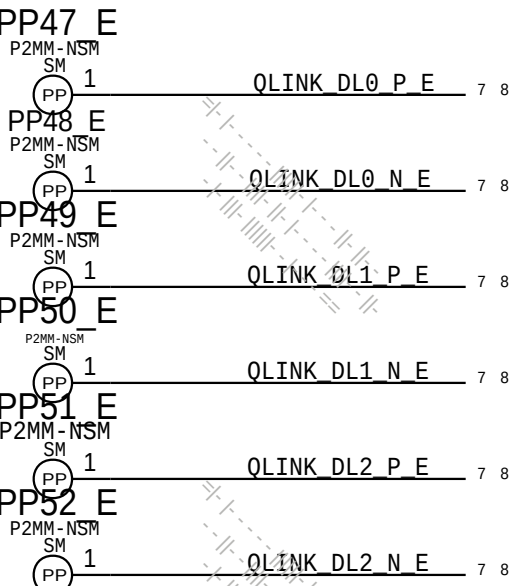
BASEBAND

CLK

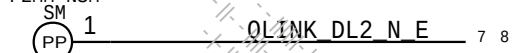
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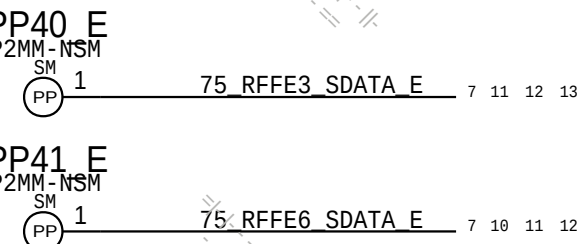
LAYOUT: VIA STUB AT BB PINS



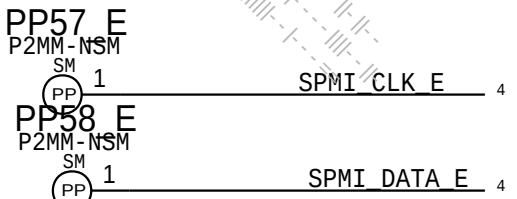
PP51, PP52



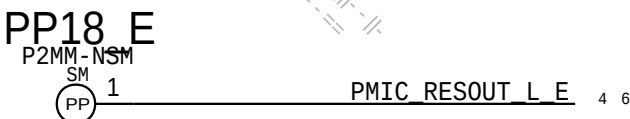
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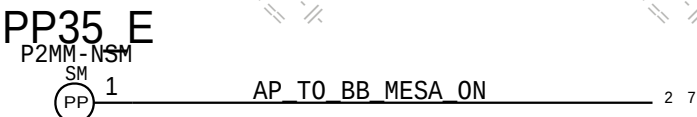
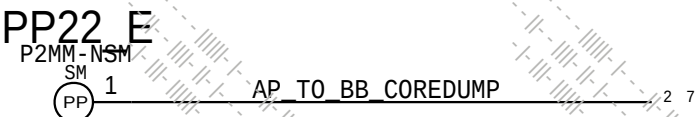
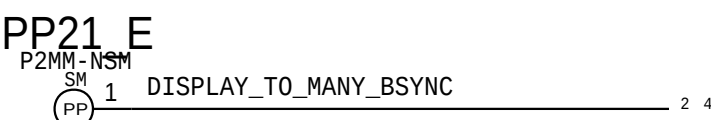
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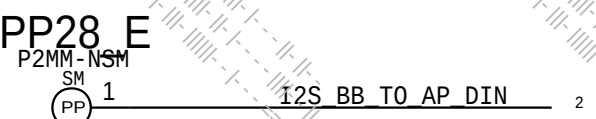
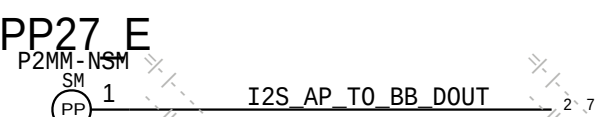
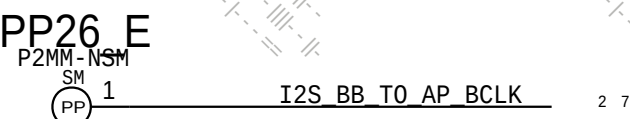
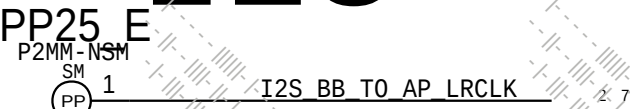
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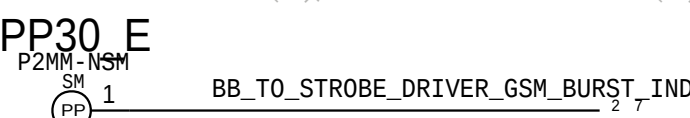
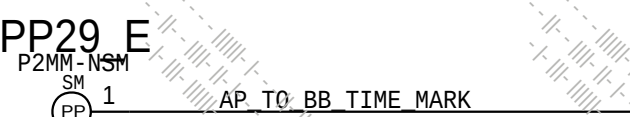
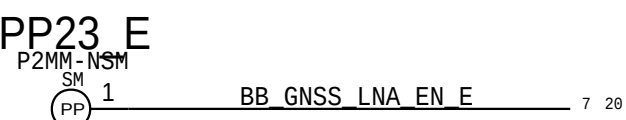
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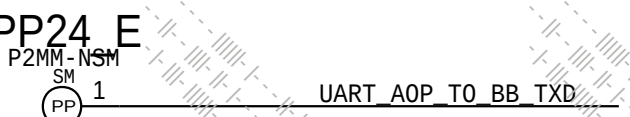
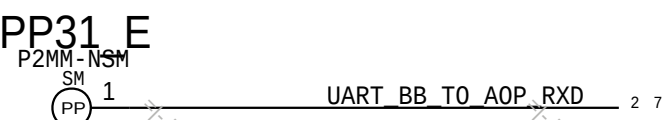
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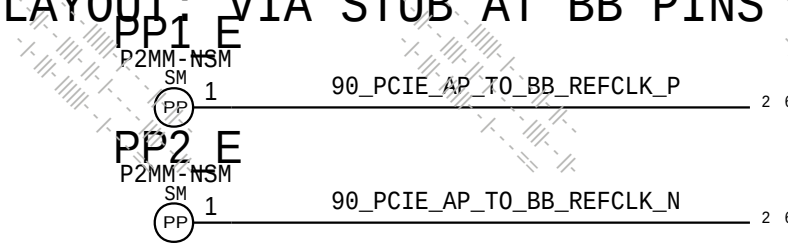
CTRL



UART



LAYOUT: VIA STUB AT BB PINS



PCIE

SYNC_MASTER=PROBE_POINTS		SYNC_DATE=07/18/2016		
PAGE TITLE				
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		BRANCH		
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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
10	0008927012	ENGINEERING RELEASED	2017-06-06

D21 RADIO_MLB_FF

5/22/2017

76 50 IO 50_UAT_TRX_UHB_MCS
76 50 IO 50_UAT_TRX_LB_MCS
76 50 IO 50_UAT_TRX_MLB_MB_HB_MCS
76 50 IN 50_LAT_DRX_MLB_MB_HB_MCS

76 50 IN 50_LAT_DRX_LB_MCS
76 50 IO 50_UAT_TRX_UHB_MCW
76 50 IO 50_UAT_TRX_MLB_MB_HB_MCW
76 50 IO 50_UAT_TRX_LB_MCW
76 50 OUT 50_LAT_DRX_MLB_MB_HB_MCW
76 50 OUT 50_LAT_DRX_LB_MCW

76 50 IO 50_LHB_LAT1
76 50 IO 50_LMHGW_UAT1
76 50 IO 50_DSM_HB_IN_TRX_UHB

76 50 IO 50_LAT_WLAN_NORTH
76 50 IO 50_LAT_WLAN_SOUTH
76 50 IO 50_UAT_WLAN_5G_EAST

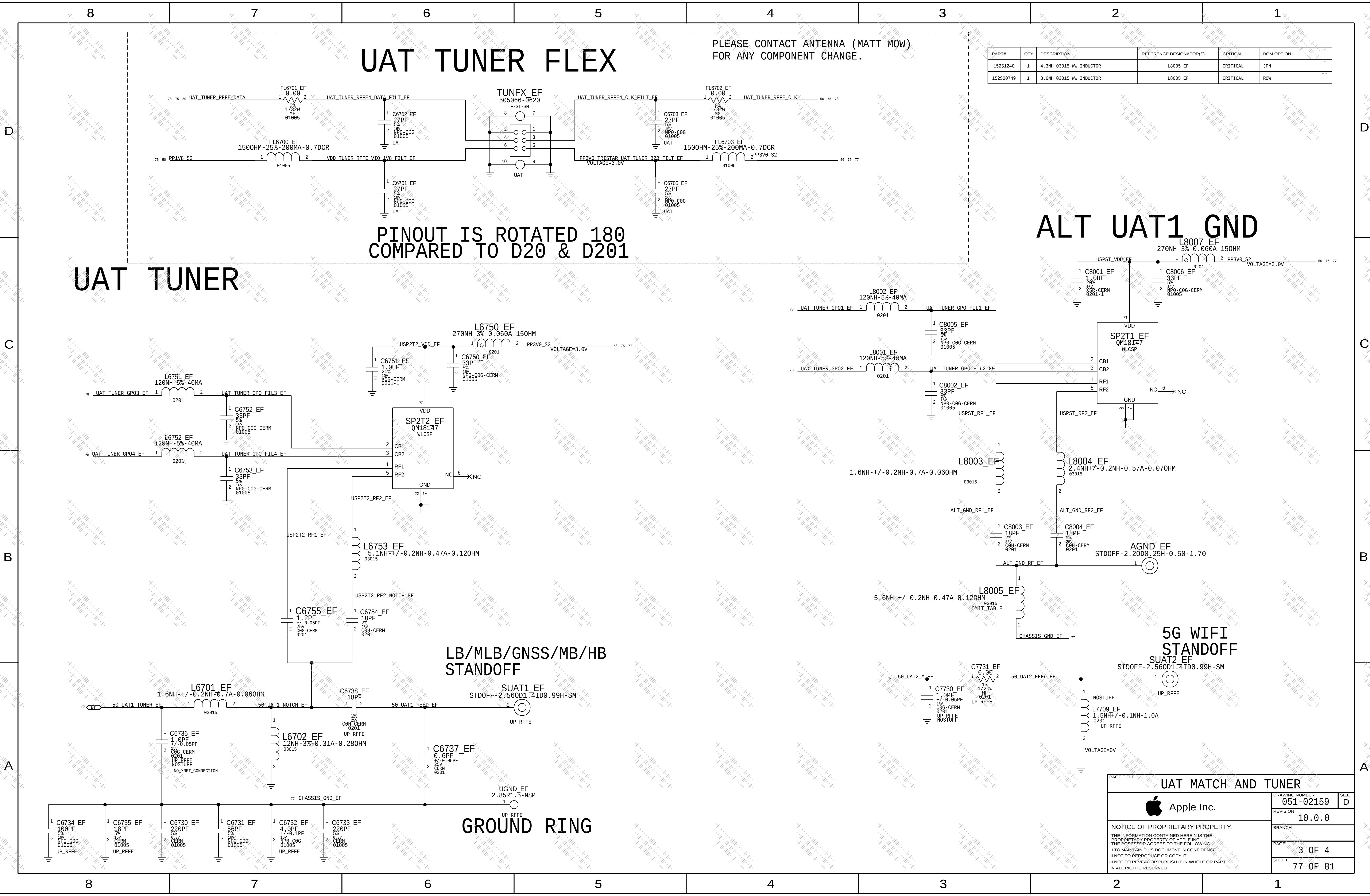
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76 50 IO 50_UAT_WLAN_2G_WEST
76 50 IO 50_LAT_WLAN_MLC

78 50 IN LAT_TUNER_REFE1_CLK
78 50 IO LAT_TUNER_REFE1_DATA
78 77 50 IN UAT_TUNER_REFE_CLK
78 77 50 IO UAT_TUNER_REFE_DATA
77 50 IO PP1V8_S2
77 50 IO PP3V0_S2
78 50 IN PP1V8_S2

78 50 OUT BB_TO_LAT_GP01
78 50 OUT BB_TO_LAT_GP02
78 50 OUT BB_TO_LAT_GP03
78 50 OUT BB_TO_LAT_GP04

FRONT PAGE

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PLEASE CONTACT ANTENNA (MATT MOW)
FOR ANY COMPONENT CHANGE.

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
152S1248	1	4.3NH 03015 WW INDUCTOR	L8805_EF	CRITICAL	JPN
152S00749	1	3.6NH 03015 WW INDUCTOR	L8805_EF	CRITICAL	ROW

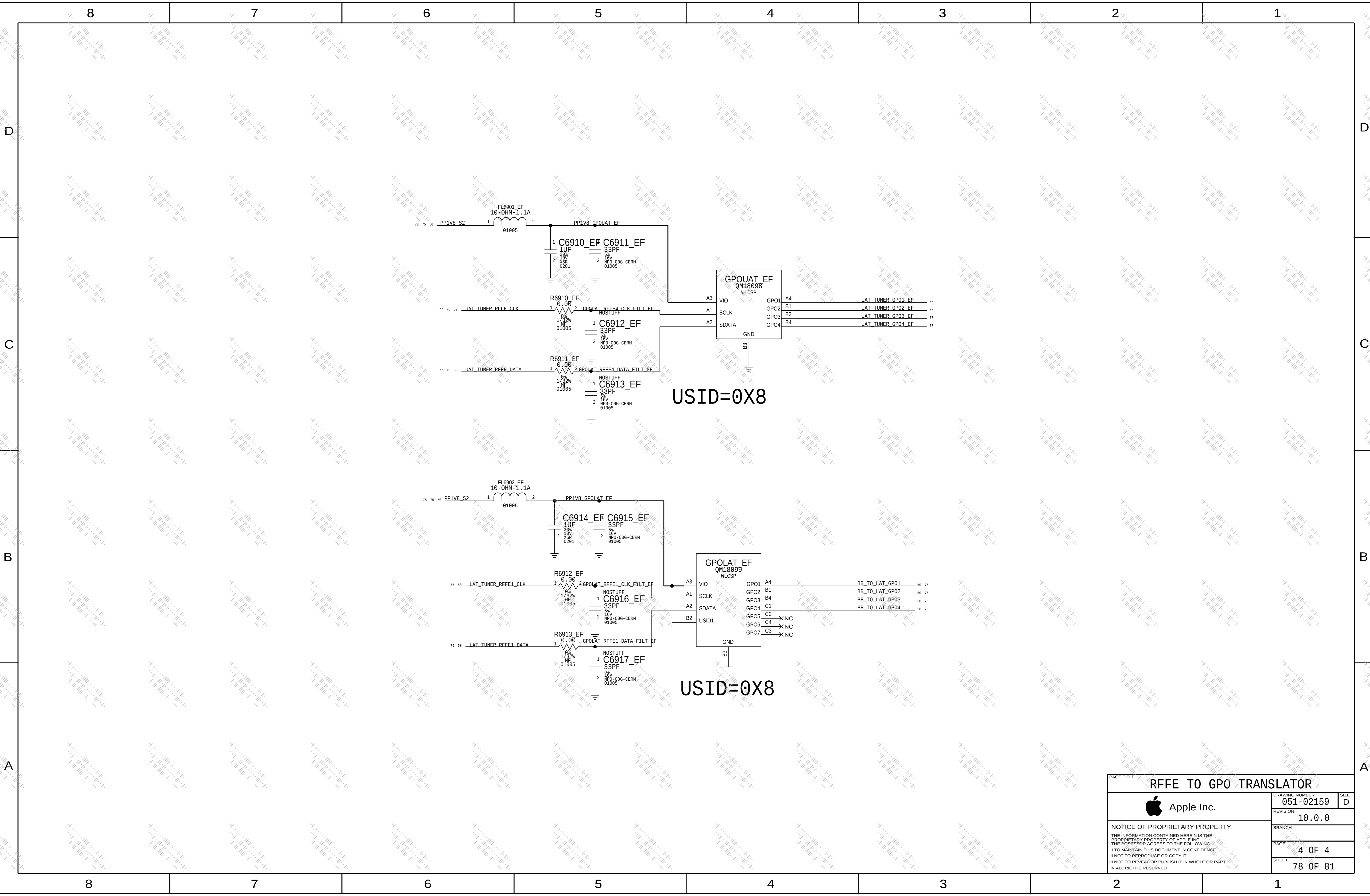
ALT UAT1 GND

LB/MLB/GNSS/MB/HB
STANDOFF

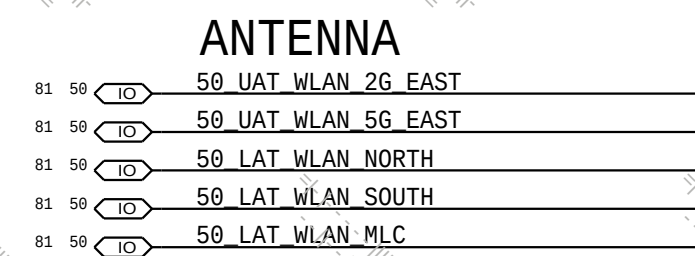
5G WIFI
STANDOFF

GROUND RING

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UAT MATCH AND TUNER		051-02159		
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		BRANCH		
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		SHEET		
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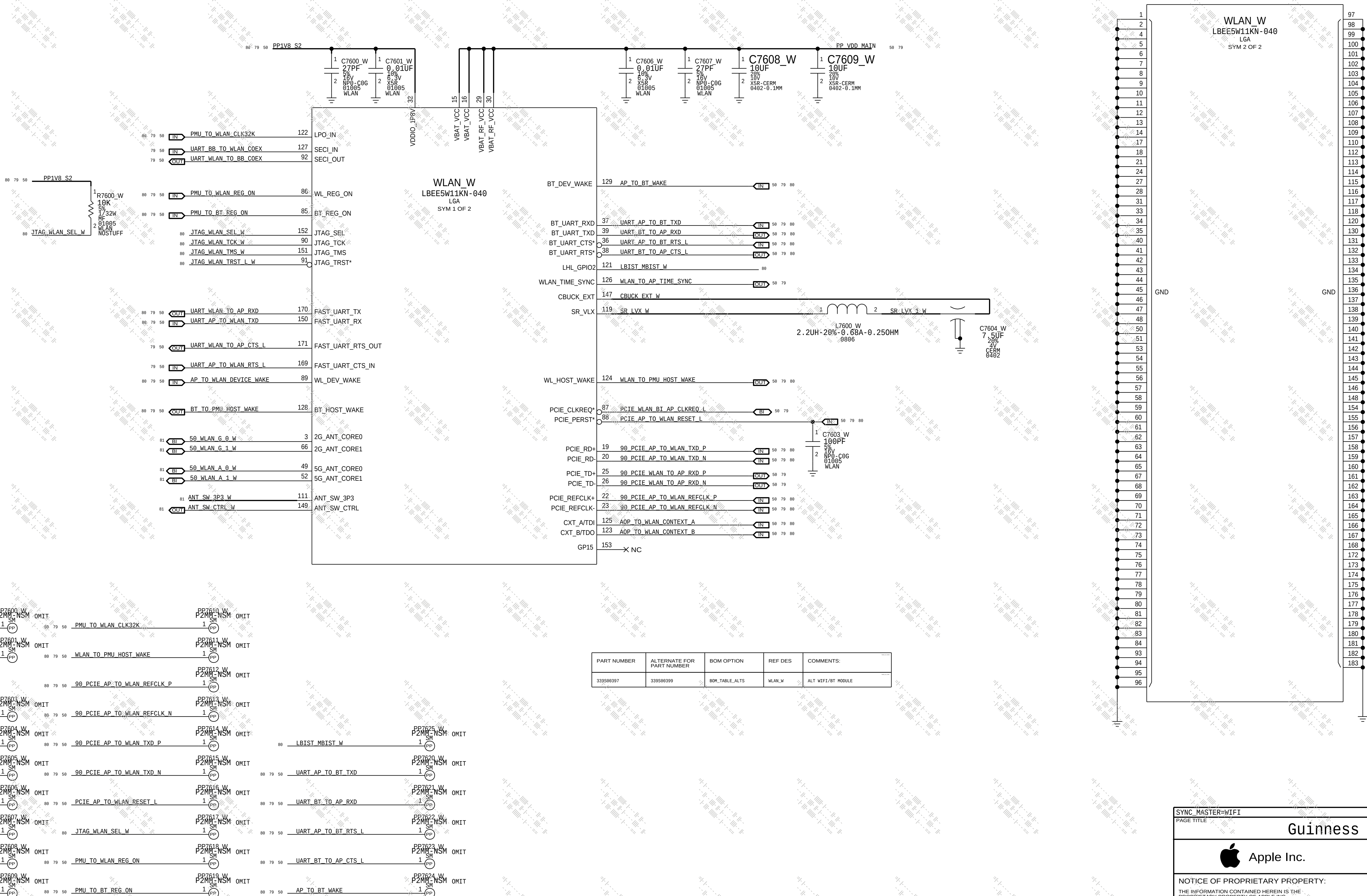


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2	76	GUINNESS
3	77	WIFI FRONT-END



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	051-02159		D
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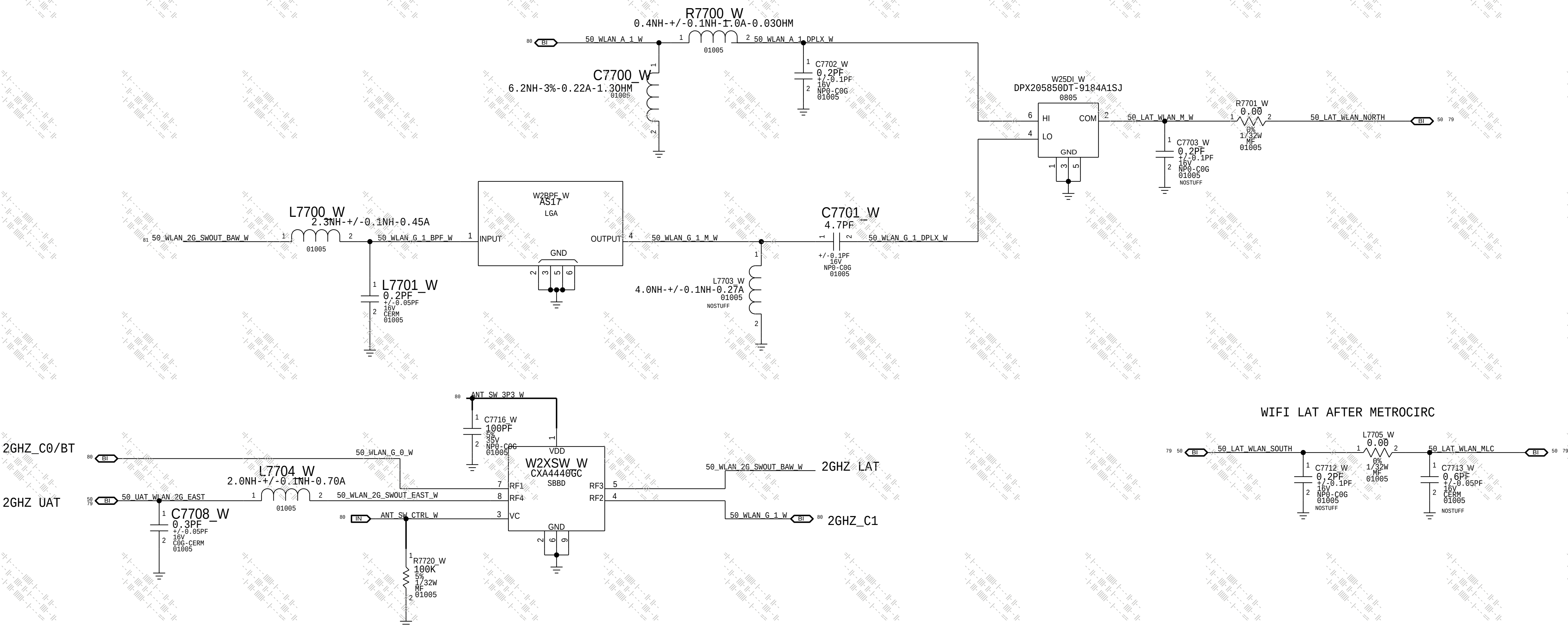
WIFI/BT



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339508397	339508399	BOM_TABLE_ALTS	WLAN_W	ALT WIFI/BT MODULE

SYNC_MASTER=WIFI		SYNC_DATE=11/28/2016	
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WIFI LOWER ANTENNA FEED



WIFI UPPER ANTENNA FEED

