

8		7		6		5		4		3		2		1									
<div>1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.</div> <div>2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.</div> <div>3. ALL CRYSTALS &amp; OSCILLATOR VALUES ARE IN HERTZ.</div> <div>X362 MLB SCHEMATIC</div> <div>LAST_MODIFICATION=</div> <div>Tue Aug 30 11:06:16 2016</div>												REV	ECN	DESCRIPTION OF REVISION	CK APPD DATE								
												9	0006939272	ENGINEERING RELEASED	2016-08-30								
D	PAGE	CSA	CONTENTS	SYNC	DATE	PAGE	CSA	CONTENTS	SYNC	DATE	?												
	1	1	Table of Contents			61	63	AUDIO JACK CODEC	J79_JCURCIO	05/13/2016													
	2	2	BOM Configuration	SHART_J44	11/27/2012	62	64	Left Speaker Amps & Conn	J79_JCURCIO	11/18/2015													
	3	3	BOM Configuration	J79_JACK	04/07/2016	63	65	Right Speaker Amps & Conn	J79_JCURCIO	12/03/2015													
	4	4	PD Parts	LDUNN_J44	01/13/2013	64	66	AUDIO JACK CONNECTOR	J79_JCURCIO	12/18/2015													
	5	5	CPU GFX	J130_DEV_MLB_U	04/29/2015	65	69	DC-In & Battery Connectors	J79_JSHAO	12/03/2015													
	6	6	CPU MISC/JTAG/CFG/RSVD	J130_DEV_MLB_U	04/28/2015	66	70	PBUS Supply & Battery Charger	J79_JSHAO	12/03/2015													
	7	7	CPU LPDDR3 Interface	J52_MLB	05/12/2015	67	71	CORE & SA IMVP IC	J79_JSHAO	03/02/2016													
	8	8	CPU & PCH Power	J79_JSHAO	03/14/2016	68	72	CORE & SA IMVP POWER BLOCK	J79_JSHAO	12/03/2015													
	9	9	CPU & PCH Grounds	J79_ALFRED	05/12/2015	69	73	Empty	J79_SILUCHEN	04/02/2015													
	10	10	CPU Core Decoupling	J79_JSHAO	08/28/2015	70	74	GT & GTX IMVP POWER BLOCK	J79_JSHAO	09/25/2015													
	11	11	CPU GT Decoupling	J79_JSHAO	08/28/2015	71	75	Empty	J79_SILUCHEN	03/27/2015													
	12	12	PCH Decoupling	J79_JSHAO	03/14/2016	72	76	Power - 5V 3.3V Supply	J79_JSHAO	03/23/2016													
	13	13	PCH Audio/LPC/SPI/SMBus	J130_MLB	02/22/2016	73	77	Power - EOPIO EDRAM Supply	J79_JSHAO	04/12/2016													
	14	14	PCH Power Management	J130_MLB	05/04/2016	74	78	PMIC-1 & Power Control	J79_JSHAO	09/09/2015													
	15	15	PCH PCIE/USB/CLKS	J130_MLB	06/23/2015	75	79	PMIC-1 1.2V 0.6V VCCIO	J79_JSHAO	12/03/2015													
	16	16	PCH SPI/UART/GPIO	J130_MLB	12/08/2015	76	80	PMIC-1 1V 1.8V VCCPCH	J79_JSHAO	12/03/2015													
	17	18	CPU/PCH Merged XDP	J130_MLB	12/08/2015	77	81	PMIC-1 Aliases & TPs	J79_SILUCHEN	07/17/2015													
	18	19	Chipset Support 1	J79_GREG	09/09/2015	78	82	Power FETs	J79_JSHAO	03/14/2016													
	19	20	Chipset Support 2	J79_GREG	07/05/2016	79	84	LCD Backlight Driver	J79_RUENJOU	09/09/2015													
C	20	22	LPDDR3 VREF Margining	J52_MLB	05/12/2015	80	85	eDP Display Connector	J79_RUENJOU	09/12/2015													
	21	23	LPDDR3 DRAM Channel A (00-31)	J52_MLB	05/12/2015	81	86	S3X CORE PCIE	J79_RUENJOU	08/20/2015													
	22	24	LPDDR3 DRAM Channel A (32-63)	J52_MLB	05/12/2015	82	87	S3X POWER	J79_RIO	06/18/2015													
	23	25	LPDDR3 DRAM Channel B (00-31)	J52_MLB	05/12/2015	83	88	S3X GND	J79_RIO	06/18/2015													
	24	26	LPDDR3 DRAM Channel B (32-63)	J52_MLB	05/12/2015	84	89	Connector	J79_RUENJOU	09/09/2015													
	25	27	LPDDR3 DRAM Termination	J52_MLB	05/12/2015	85	90	NAND VR, I2C ROM, TEMP SENSORS	J79_RUENJOU	09/12/2015													
	26	28	USB-C HIGH SPEED 1	J79_GREG	07/27/2015	86	91	ANI[3:0]	J79_RUENJOU	09/25/2015													
	27	29	USB-C HIGH SPEED 2	J79_GREG	09/09/2015	87	92	ANI[7:4]	J79_RUENJOU	09/25/2015													
	28	30	USB-C Support	J79_GREG	08/08/2016	88	93	PICCOLO PMIC	J79_RUENJOU	09/24/2015													
	29	31	USB-C PORT CONTROLLER A	J79_GREG	08/08/2016	89	94	SSD NAND VR	J79_JSHAO	12/18/2015													
	30	32	USB-C PORT CONTROLLER B	J79_GREG	02/28/2016	90	95	Empty	J14	10/23/2012													
	31	33	USB-C CONNECTOR A	J79_GREG	07/05/2016	91	96	LIFEBOAT	J79_RUENJOU	09/09/2015													
	32	34	USB-C CONNECTOR B	J79_GREG	03/24/2016	92	110	USB-C HIGH SPEED 1	J79_GREG	07/28/2015													
	33	35	TBT 5V REGULATOR	J79_JSHAO	12/18/2015	93	111	USB-C HIGH SPEED 2	J79_GREG	08/28/2015													
	34	36	Display Mux	J79_GREG	02/28/2016	94	112	USB-C Support	J79_GREG	07/05/2016													
	35	37	WIFI/BT: MODULE 1	J79_METE	05/17/2016	95	113	USB-C PORT CONTROLLER A	J79_GREG	02/28/2016													
	36	38	WIFI/BT: MODULE 2	J79_METE	03/02/2016	96	114	USB-C PORT CONTROLLER B	J79_GREG	02/28/2016													
	37	39	Camera/DFR 1	J80_MLB_BAFFIN	07/22/2016	97	115	USB-C CONNECTOR A	J79_GREG	07/05/2016													
	38	40	Camera/DFR 2	J79_ANDREW	03/22/2016	98	116	USB-C CONNECTOR B	J79_GREG	03/24/2016													
	B	39	41	Camera/DFR 3	J79_ANDREW	04/25/2016	99	117	TBT 5V REGULATOR	J79_JSHAO						12/18/2015							
40		42	Berkelium - 1	J79_ANDREW	03/14/2016	100	120	Power Aliases - 1	J79_ALFRED	06/17/2015													
41		43	Berkelium - 2	J79_ANDREW	02/01/2016	101	121	Power Aliases - 2	J79_ALFRED	06/18/2015													
42		44	T208 Support	J79_ANDREW	07/01/2016	102	122	Signal Aliases	SHART_J44	11/19/2012													
43		45	Connectors&ESD	J79_GAREN	11/21/2015	103	123	LPDDR3 Bit & Byte Swizzle	AHARTMAN_J52	10/29/2013													
44		46	Empty	J79_DAYU	05/26/2015	104	124	ICT FCT 1	YHARTANTO_J44	12/18/2012													
45		47	Empty	J79_DAYU	05/26/2015	105	125	ICT FCT 2	YHARTANTO_J44	12/18/2012													
46		48	Empty	J79_DAYU	05/12/2015	106	127	Desense Capacitors	YHARTANTO_J44	01/09/2013													
47		49	MESA	J79_ANDREW	01/06/2016	107	129	Empty	J79_RIO	06/18/2015													
48		50	SMC	J79_JACK	04/11/2016	108	130	PCB Rule Definitions	YHARTANTO_J44	12/14/2012													
49		51	SMC Shared Support	J79_JACK	04/14/2016	109	131	CPU Constraints	YHARTANTO_J44	01/13/2013													
50		52	SMC Project Support	J79_JACK	04/11/2016	110	132	PCH Constraints	YHARTANTO_J44	01/08/2013													
51		53	SMBus Connections	J79_JACK	03/31/2016	111	133	Memory Constraints	YHARTANTO_J44	01/02/2013													
52		54	Power Sensors: High Side	J79_JACK	12/07/2015	112	134	TBT DP HDMI Constraints	J79_JACK	05/19/2015													
53		55	Power Sensors: Load Side	J79_JACK	04/03/2016	113	135	PCIe Constraints	J79_JACK	05/19/2015													
54		56	Power Sensors: Extended	J79_JACK	01/08/2016	114	136	USB Constraints	J79_JACK	05/21/2015													
55		57	Power Sensors: Extended 2	J79_JACK	05/10/2016	115	137	SMC Constraints	YHARTANTO_J44	01/02/2013													
56		58	Thermal Sensors	J79_JACK	09/24/2015	116	138	Camera Constraints	YHARTANTO_J44	01/09/2013													
57		59	Power Sensors:Extended 3	J79_JACK	04/14/2016	117	139	Sensors & Audio Constraints	YHARTANTO_J44	01/04/2013													
A		58	60	Fans	J79_JACK	08/21/2015	118	140	References	J79_RUENJOU_CONSTRAINTS						06/18/2015							
	59	61	SPI Debug Connector	J52_MLB	05/12/2015	119	145	Alternates BOM Table	J80_MLB	12/12/2015													
	60	62	HDA Bridge	J79_JCURCIO	03/24/2016																		
Schematic / PCB #'s																DRAWING TITLE SCHEM,MLB,X362				DRAWING NUMBER 051-00515		SIZE D	
PART NUMBER		QTY	DESCRIPTION		REFERENCE DES		CRITICAL		BOM OPTION							REVISION 9.0.0		BRANCH dvt-fab09-0		PAGE 1 OF 145			
051-00515		1	SCHEM,MLB,X362		SCH		CRITICAL									SHEET 1 OF 119							
820-00239		1	PCBF,MLB,X362		PCB		CRITICAL																
8		7		6		5		4		3		2		1									

www.vinafix.com

8		7		6		5		4		3		2		1																																																																																																																																														
D	<div>BOM Groups</div> <table><tr><th>BOM GROUP</th><th colspan="5">BOM OPTIONS</th></tr><tr><td>X362_COMMON</td><td colspan="5">ALTERNATE,COMMON,X362_COMMON1,X362_COMMON2,X362_COMMON3,X362_PROGPARTS</td></tr><tr><td>X362_COMMON1</td><td colspan="5">SE:PROD,BOARD_ID:8,T208_PROG:REV5,TBTTHRM_SNS,S3XCLK:INT</td></tr><tr><td>X362_COMMON2</td><td colspan="5">EDP_ENABLE,XDP:YES,PCH_CLK:GRMCLK,TBT_DBG,SAMCONN,SKIP_S3V33:AUDIBLE,SOC_BOOT:SPI</td></tr><tr><td>X362_COMMON3</td><td colspan="5">CPUTHRM:ALRT,TBTTHRM:ALRT,LOADRC:NO,CUMULUS_IPD,S3_STATE:YES,VCCPLLOC:S3</td></tr><tr><td>X362_PROGPARTS</td><td colspan="5">BOOTROM_PROG,SMC_PROG,AR_LT_PROG,AR_RT_PROG,WIFI_PROG,BTROM_PROG</td></tr><tr><td>X362_DEVEL:ENG</td><td colspan="5">ALTERNATE,DBGLED,USBC_DBG,XDP_CONN:YES,WIFI_DBG,S3X_DBG,DEBUG_BUTTON,LOADISNS</td></tr><tr><td>X362_DEVEL:DVT</td><td colspan="5">ALTERNATE,USBC_DBG,XDP_CONN:YES,WIFI_DBG</td></tr><tr><td>X362_DEVEL:PVT</td><td colspan="5">ALTERNATE</td></tr></table> <div>Module Parts</div> <table><tr><th>PART NUMBER</th><th>QTY</th><th>DESCRIPTION</th><th>REFERENCE DES</th><th>CRITICAL</th><th>BOM OPTION</th></tr><tr><td>337S00266</td><td>1</td><td>CPU,SKLU,SR2JK,PRQ,2.9,28W,1.05,B1356</td><td>U0500</td><td>CRITICAL</td><td>CPU_SKL23:2.9G</td></tr><tr><td>337S00267</td><td>1</td><td>CPU,SKLU,SR2JJ,PRQ,3.1,28W,1.1,B1356</td><td>U0500</td><td>CRITICAL</td><td>CPU_SKL23:3.1G</td></tr><tr><td>337S00268</td><td>1</td><td>CPU,SKLU,SR2JH,PRQ,3.3,28W,1.1,B1356</td><td>U0500</td><td>CRITICAL</td><td>CPU_SKL23:3.3G</td></tr><tr><td>998-04195</td><td>1</td><td>INTERPOSER,VTT ADAPTER,SKL-U,BGA1356</td><td>U0500</td><td>CRITICAL</td><td>CPU_SOCKET</td></tr></table> <table><tr><td>338S00254</td><td>2</td><td>IC,TBT,ALPINE RIDGE,QSTY,PRQ,C1,CSP337</td><td>U2800,UB000</td><td>CRITICAL</td><td></td></tr><tr><td>353S00961</td><td>4</td><td>IC,CD3215,ACE,C00,USB PWR SW,BLNX,BGA96</td><td>U3100,U3200,UB300,UB400</td><td>CRITICAL</td><td></td></tr></table> <table><tr><td>338S00276</td><td>1</td><td>IC,CWTLR,S3X,B1,FCBGA900</td><td>U8600</td><td>CRITICAL</td><td></td></tr><tr><td>333S00055</td><td>1</td><td>IC,LPODR3-1600,4GBIT,25NM,A,276B</td><td>POP8600</td><td>CRITICAL</td><td>POP_4GBIT</td></tr><tr><td>333S00056</td><td>1</td><td>IC,LPODR3-1600,8GBIT,25NM,A,276B</td><td>POP8600</td><td>CRITICAL</td><td>POP_8GBIT</td></tr></table> <table><tr><td>343S00147</td><td>1</td><td>IC,SL64AP41172,PAK3,STQFN20</td><td>U3620</td><td>CRITICAL</td><td></td></tr><tr><td>338S00221</td><td>1</td><td>IC,PMU,SM650839,7X7MM,BGA168</td><td>U7800</td><td>CRITICAL</td><td></td></tr></table> <table><tr><td>353S01016</td><td>1</td><td>IC,1SL9239H12,PMU,TUBA,WCSF40,2.1X3.3MM</td><td>U7000</td><td>CRITICAL</td><td></td></tr><tr><td>338S00227</td><td>1</td><td>IC,PMU,PICCOLO,D2231A0,OTF-A8,WLCSP96</td><td>U9300</td><td>CRITICAL</td><td></td></tr></table>														BOM GROUP	BOM OPTIONS					X362_COMMON	ALTERNATE,COMMON,X362_COMMON1,X362_COMMON2,X362_COMMON3,X362_PROGPARTS					X362_COMMON1	SE:PROD,BOARD_ID:8,T208_PROG:REV5,TBTTHRM_SNS,S3XCLK:INT					X362_COMMON2	EDP_ENABLE,XDP:YES,PCH_CLK:GRMCLK,TBT_DBG,SAMCONN,SKIP_S3V33:AUDIBLE,SOC_BOOT:SPI					X362_COMMON3	CPUTHRM:ALRT,TBTTHRM:ALRT,LOADRC:NO,CUMULUS_IPD,S3_STATE:YES,VCCPLLOC:S3					X362_PROGPARTS	BOOTROM_PROG,SMC_PROG,AR_LT_PROG,AR_RT_PROG,WIFI_PROG,BTROM_PROG					X362_DEVEL:ENG	ALTERNATE,DBGLED,USBC_DBG,XDP_CONN:YES,WIFI_DBG,S3X_DBG,DEBUG_BUTTON,LOADISNS					X362_DEVEL:DVT	ALTERNATE,USBC_DBG,XDP_CONN:YES,WIFI_DBG					X362_DEVEL:PVT	ALTERNATE					PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	337S00266	1	CPU,SKLU,SR2JK,PRQ,2.9,28W,1.05,B1356	U0500	CRITICAL	CPU_SKL23:2.9G	337S00267	1	CPU,SKLU,SR2JJ,PRQ,3.1,28W,1.1,B1356	U0500	CRITICAL	CPU_SKL23:3.1G	337S00268	1	CPU,SKLU,SR2JH,PRQ,3.3,28W,1.1,B1356	U0500	CRITICAL	CPU_SKL23:3.3G	998-04195	1	INTERPOSER,VTT ADAPTER,SKL-U,BGA1356	U0500	CRITICAL	CPU_SOCKET	338S00254	2	IC,TBT,ALPINE RIDGE,QSTY,PRQ,C1,CSP337	U2800,UB000	CRITICAL		353S00961	4	IC,CD3215,ACE,C00,USB PWR SW,BLNX,BGA96	U3100,U3200,UB300,UB400	CRITICAL		338S00276	1	IC,CWTLR,S3X,B1,FCBGA900	U8600	CRITICAL		333S00055	1	IC,LPODR3-1600,4GBIT,25NM,A,276B	POP8600	CRITICAL	POP_4GBIT	333S00056	1	IC,LPODR3-1600,8GBIT,25NM,A,276B	POP8600	CRITICAL	POP_8GBIT	343S00147	1	IC,SL64AP41172,PAK3,STQFN20	U3620	CRITICAL		338S00221	1	IC,PMU,SM650839,7X7MM,BGA168	U7800	CRITICAL		353S01016	1	IC,1SL9239H12,PMU,TUBA,WCSF40,2.1X3.3MM	U7000	CRITICAL		338S00227	1	IC,PMU,PICCOLO,D2231A0,OTF-A8,WLCSP96	U9300	CRITICAL					
BOM GROUP	BOM OPTIONS																																																																																																																																																											
X362_COMMON	ALTERNATE,COMMON,X362_COMMON1,X362_COMMON2,X362_COMMON3,X362_PROGPARTS																																																																																																																																																											
X362_COMMON1	SE:PROD,BOARD_ID:8,T208_PROG:REV5,TBTTHRM_SNS,S3XCLK:INT																																																																																																																																																											
X362_COMMON2	EDP_ENABLE,XDP:YES,PCH_CLK:GRMCLK,TBT_DBG,SAMCONN,SKIP_S3V33:AUDIBLE,SOC_BOOT:SPI																																																																																																																																																											
X362_COMMON3	CPUTHRM:ALRT,TBTTHRM:ALRT,LOADRC:NO,CUMULUS_IPD,S3_STATE:YES,VCCPLLOC:S3																																																																																																																																																											
X362_PROGPARTS	BOOTROM_PROG,SMC_PROG,AR_LT_PROG,AR_RT_PROG,WIFI_PROG,BTROM_PROG																																																																																																																																																											
X362_DEVEL:ENG	ALTERNATE,DBGLED,USBC_DBG,XDP_CONN:YES,WIFI_DBG,S3X_DBG,DEBUG_BUTTON,LOADISNS																																																																																																																																																											
X362_DEVEL:DVT	ALTERNATE,USBC_DBG,XDP_CONN:YES,WIFI_DBG																																																																																																																																																											
X362_DEVEL:PVT	ALTERNATE																																																																																																																																																											
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																																																																																																																							
337S00266	1	CPU,SKLU,SR2JK,PRQ,2.9,28W,1.05,B1356	U0500	CRITICAL	CPU_SKL23:2.9G																																																																																																																																																							
337S00267	1	CPU,SKLU,SR2JJ,PRQ,3.1,28W,1.1,B1356	U0500	CRITICAL	CPU_SKL23:3.1G																																																																																																																																																							
337S00268	1	CPU,SKLU,SR2JH,PRQ,3.3,28W,1.1,B1356	U0500	CRITICAL	CPU_SKL23:3.3G																																																																																																																																																							
998-04195	1	INTERPOSER,VTT ADAPTER,SKL-U,BGA1356	U0500	CRITICAL	CPU_SOCKET																																																																																																																																																							
338S00254	2	IC,TBT,ALPINE RIDGE,QSTY,PRQ,C1,CSP337	U2800,UB000	CRITICAL																																																																																																																																																								
353S00961	4	IC,CD3215,ACE,C00,USB PWR SW,BLNX,BGA96	U3100,U3200,UB300,UB400	CRITICAL																																																																																																																																																								
338S00276	1	IC,CWTLR,S3X,B1,FCBGA900	U8600	CRITICAL																																																																																																																																																								
333S00055	1	IC,LPODR3-1600,4GBIT,25NM,A,276B	POP8600	CRITICAL	POP_4GBIT																																																																																																																																																							
333S00056	1	IC,LPODR3-1600,8GBIT,25NM,A,276B	POP8600	CRITICAL	POP_8GBIT																																																																																																																																																							
343S00147	1	IC,SL64AP41172,PAK3,STQFN20	U3620	CRITICAL																																																																																																																																																								
338S00221	1	IC,PMU,SM650839,7X7MM,BGA168	U7800	CRITICAL																																																																																																																																																								
353S01016	1	IC,1SL9239H12,PMU,TUBA,WCSF40,2.1X3.3MM	U7000	CRITICAL																																																																																																																																																								
338S00227	1	IC,PMU,PICCOLO,D2231A0,OTF-A8,WLCSP96	U9300	CRITICAL																																																																																																																																																								
C	<div>Programmables (All Builds)</div> <div>EFI ROM</div> <table><tr><td>341S00698</td><td>1</td><td>IC,EPI ROM (V0193) DVT,X362</td><td>U6100</td><td>CRITICAL</td><td>BOOTROM_PROG</td></tr></table> <div>SMC ROM</div> <table><tr><td>341S00700</td><td>1</td><td>IC,SMC-B1,EXT (V2.37F6) PVT,X362</td><td>U5000</td><td>CRITICAL</td><td>SMC_PROG</td></tr></table> <div>TBT ROMs</div> <table><tr><th>PART NUMBER</th><th>QTY</th><th>DESCRIPTION</th><th>REFERENCE DES</th><th>CRITICAL</th><th>BOM OPTION</th></tr><tr><td>341S00717</td><td>1</td><td>T29,AR1 (VTBD) PVT,X362</td><td>U2890</td><td>CRITICAL</td><td>AR_LT_PROG</td></tr><tr><td>341S00718</td><td>1</td><td>T29,AR2 (VTBD) PVT,X362</td><td>UB090</td><td>CRITICAL</td><td>AR_RT_PROG</td></tr></table> <div>WIFI/BT ROM</div> <table><tr><th>PART NUMBER</th><th>QTY</th><th>DESCRIPTION</th><th>REFERENCE DES</th><th>CRITICAL</th><th>BOM OPTION</th></tr><tr><td>341S00715</td><td>1</td><td>IC,BT ROM (V32) PVT,X362/X363</td><td>U3750</td><td>CRITICAL</td><td>BTROM_PROG</td></tr><tr><td>341S00716</td><td>1</td><td>WIFI ROM (P108) PVT,WW1,X362/X363</td><td>U3710</td><td>CRITICAL</td><td>WIFI_PROG</td></tr></table>														341S00698	1	IC,EPI ROM (V0193) DVT,X362	U6100	CRITICAL	BOOTROM_PROG	341S00700	1	IC,SMC-B1,EXT (V2.37F6) PVT,X362	U5000	CRITICAL	SMC_PROG	PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	341S00717	1	T29,AR1 (VTBD) PVT,X362	U2890	CRITICAL	AR_LT_PROG	341S00718	1	T29,AR2 (VTBD) PVT,X362	UB090	CRITICAL	AR_RT_PROG	PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	341S00715	1	IC,BT ROM (V32) PVT,X362/X363	U3750	CRITICAL	BTROM_PROG	341S00716	1	WIFI ROM (P108) PVT,WW1,X362/X363	U3710	CRITICAL	WIFI_PROG																																																																																														
341S00698	1	IC,EPI ROM (V0193) DVT,X362	U6100	CRITICAL	BOOTROM_PROG																																																																																																																																																							
341S00700	1	IC,SMC-B1,EXT (V2.37F6) PVT,X362	U5000	CRITICAL	SMC_PROG																																																																																																																																																							
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																																																																																																																							
341S00717	1	T29,AR1 (VTBD) PVT,X362	U2890	CRITICAL	AR_LT_PROG																																																																																																																																																							
341S00718	1	T29,AR2 (VTBD) PVT,X362	UB090	CRITICAL	AR_RT_PROG																																																																																																																																																							
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																																																																																																																							
341S00715	1	IC,BT ROM (V32) PVT,X362/X363	U3750	CRITICAL	BTROM_PROG																																																																																																																																																							
341S00716	1	WIFI ROM (P108) PVT,WW1,X362/X363	U3710	CRITICAL	WIFI_PROG																																																																																																																																																							
B	<div>Variable BOM Groups</div> <div>Development/Base BOMs</div> <table><tr><th>PART NUMBER</th><th>QTY</th><th>DESCRIPTION</th><th>REFERENCE DES</th><th>CRITICAL</th><th>BOM OPTION</th></tr><tr><td>685-00055</td><td>1</td><td>COMMON PARTS,MLB,X362</td><td>BASE</td><td>CRITICAL</td><td>BASE_BOM</td></tr><tr><td>985-00070</td><td>1</td><td>DEV,MLB,X362</td><td>DEVEL</td><td>CRITICAL</td><td>DEVEL_BOM</td></tr></table>														PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	685-00055	1	COMMON PARTS,MLB,X362	BASE	CRITICAL	BASE_BOM	985-00070	1	DEV,MLB,X362	DEVEL	CRITICAL	DEVEL_BOM																																																																																																																												
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																																																																																																																							
685-00055	1	COMMON PARTS,MLB,X362	BASE	CRITICAL	BASE_BOM																																																																																																																																																							
985-00070	1	DEV,MLB,X362	DEVEL	CRITICAL	DEVEL_BOM																																																																																																																																																							
<div>Main DRAM Parts</div> <table><tr><th>PART NUMBER</th><th>QTY</th><th>DESCRIPTION</th><th>REFERENCE DES</th><th>CRITICAL</th><th>BOM OPTION</th></tr><tr><td>333S00069</td><td>4</td><td>IC,SDRAM,LPODR3-2133,16GBIT,20NM,BGA178</td><td>U2300,U2400,U2500,U2600</td><td>CRITICAL</td><td>8G_MICRON_2133</td></tr><tr><td>333S00070</td><td>4</td><td>IC,SDRAM,LPODR3-2133,32GBIT,20NM,BGA178</td><td>U2300,U2400,U2500,U2600</td><td>CRITICAL</td><td>16G_MICRON_2133</td></tr><tr><td>333S00068</td><td>4</td><td>IC,SDRAM,LPODR3-2133,16GBIT,20NM,BGA178</td><td>U2300,U2400,U2500,U2600</td><td>CRITICAL</td><td>8G_SAMSUNG_2133</td></tr><tr><td>333S00050</td><td>4</td><td>IC,SDRAM,LPODR3-2133,32GBIT,20NM,BGA178</td><td>U2300,U2400,U2500,U2600</td><td>CRITICAL</td><td>16G_SAMSUNG_2133</td></tr></table>														PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	333S00069	4	IC,SDRAM,LPODR3-2133,16GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	8G_MICRON_2133	333S00070	4	IC,SDRAM,LPODR3-2133,32GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	16G_MICRON_2133	333S00068	4	IC,SDRAM,LPODR3-2133,16GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	8G_SAMSUNG_2133	333S00050	4	IC,SDRAM,LPODR3-2133,32GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	16G_SAMSUNG_2133																																																																																																																	
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																																																																																																																							
333S00069	4	IC,SDRAM,LPODR3-2133,16GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	8G_MICRON_2133																																																																																																																																																							
333S00070	4	IC,SDRAM,LPODR3-2133,32GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	16G_MICRON_2133																																																																																																																																																							
333S00068	4	IC,SDRAM,LPODR3-2133,16GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	8G_SAMSUNG_2133																																																																																																																																																							
333S00050	4	IC,SDRAM,LPODR3-2133,32GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	16G_SAMSUNG_2133																																																																																																																																																							
<div>Main DRAM SPD Straps</div> <table><tr><th>BOM GROUP</th><th>BOM OPTIONS</th></tr><tr><td>RAM_8G_MICRON_2133</td><td>8G_MICRON_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG1_L</td></tr><tr><td>RAM_16G_MICRON_2133</td><td>16G_MICRON_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG1_L</td></tr><tr><td>RAM_8G_SAMSUNG_2133</td><td>8G_SAMSUNG_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG0_L</td></tr><tr><td>RAM_16G_SAMSUNG_2133</td><td>16G_SAMSUNG_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG0_L</td></tr></table>														BOM GROUP	BOM OPTIONS	RAM_8G_MICRON_2133	8G_MICRON_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG1_L	RAM_16G_MICRON_2133	16G_MICRON_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG1_L	RAM_8G_SAMSUNG_2133	8G_SAMSUNG_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG0_L	RAM_16G_SAMSUNG_2133	16G_SAMSUNG_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG0_L																																																																																																																																					
BOM GROUP	BOM OPTIONS																																																																																																																																																											
RAM_8G_MICRON_2133	8G_MICRON_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG1_L																																																																																																																																																											
RAM_16G_MICRON_2133	16G_MICRON_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG1_L																																																																																																																																																											
RAM_8G_SAMSUNG_2133	8G_SAMSUNG_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG0_L																																																																																																																																																											
RAM_16G_SAMSUNG_2133	16G_SAMSUNG_2133,RAMCFG4_L,RAMCFG3_L,RAMCFG0_L																																																																																																																																																											
<div>NAND Parts</div> <table><tr><th>PART NUMBER</th><th>QTY</th><th>DESCRIPTION</th><th>REFERENCE DES</th><th>CRITICAL</th><th>BOM OPTION</th></tr><tr><td>335S00124</td><td>4</td><td>NAND,12NM,64GB,TOGG,HPW,128G,LGA60</td><td>U9100,U9120,U9200,U9220</td><td>CRITICAL</td><td>NAND_SDISK_256GB</td></tr><tr><td>335S00125</td><td>4</td><td>NAND,12NM,128GB,TOGG,HPW,128G,LGA60</td><td>U9100,U9120,U9200,U9220</td><td>CRITICAL</td><td>NAND_SDISK_512GB</td></tr><tr><td>335S00126</td><td>4</td><td>NAND,12NM,256GB,TOGG,HPW,128G,LGA60</td><td>U9100,U9120,U9200,U9220</td><td>CRITICAL</td><td>NAND_SDISK_1TB</td></tr><tr><td>335S00261</td><td>4</td><td>NAND,TGDDR2,128GX4,15NM,HP,USHD,T2,LGA60</td><td>U9100,U9120,U9200,U9220</td><td>CRITICAL</td><td>NAND_TSHBA_256GB</td></tr><tr><td>335S00262</td><td>4</td><td>NAND,TGDDR2,128GX8,15NM,HP,USHD,T2,LGA60</td><td>U9100,U9120,U9200,U9220</td><td>CRITICAL</td><td>NAND_TSHBA_512GB</td></tr><tr><td>335S00263</td><td>4</td><td>NAND,TGDDR2,128GX16,15NM,HP,UHD,T2,LGA60</td><td>U9100,U9120,U9200,U9220</td><td>CRITICAL</td><td>NAND_TSHBA_1TB</td></tr></table>														PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	335S00124	4	NAND,12NM,64GB,TOGG,HPW,128G,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_SDISK_256GB	335S00125	4	NAND,12NM,128GB,TOGG,HPW,128G,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_SDISK_512GB	335S00126	4	NAND,12NM,256GB,TOGG,HPW,128G,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_SDISK_1TB	335S00261	4	NAND,TGDDR2,128GX4,15NM,HP,USHD,T2,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_TSHBA_256GB	335S00262	4	NAND,TGDDR2,128GX8,15NM,HP,USHD,T2,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_TSHBA_512GB	335S00263	4	NAND,TGDDR2,128GX16,15NM,HP,UHD,T2,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_TSHBA_1TB																																																																																																					
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																																																																																																																							
335S00124	4	NAND,12NM,64GB,TOGG,HPW,128G,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_SDISK_256GB																																																																																																																																																							
335S00125	4	NAND,12NM,128GB,TOGG,HPW,128G,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_SDISK_512GB																																																																																																																																																							
335S00126	4	NAND,12NM,256GB,TOGG,HPW,128G,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_SDISK_1TB																																																																																																																																																							
335S00261	4	NAND,TGDDR2,128GX4,15NM,HP,USHD,T2,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_TSHBA_256GB																																																																																																																																																							
335S00262	4	NAND,TGDDR2,128GX8,15NM,HP,USHD,T2,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_TSHBA_512GB																																																																																																																																																							
335S00263	4	NAND,TGDDR2,128GX16,15NM,HP,UHD,T2,LGA60	U9100,U9120,U9200,U9220	CRITICAL	NAND_TSHBA_1TB																																																																																																																																																							
<div>NAND Straps</div> <table><tr><th>BOM GROUP</th><th>BOM OPTIONS</th></tr><tr><td>SAND_256G</td><td>ALTERNATE,NAND_SDISK_256GB,POP_4GBIT,CAPACITY1,CAPACITY0</td></tr><tr><td>SAND_512G</td><td>ALTERNATE,NAND_SDISK_512GB,POP_4GBIT,CAPACITY2</td></tr><tr><td>SAND_1T</td><td>ALTERNATE,NAND_SDISK_1TB,POP_8GBIT,CAPACITY2,CAPACITY0</td></tr><tr><td>TOSH_256G</td><td>ALTERNATE,NAND_TSHBA_256GB,POP_4GBIT,CAPACITY1,CAPACITY0</td></tr><tr><td>TOSH_512G</td><td>ALTERNATE,NAND_TSHBA_512GB,POP_4GBIT,CAPACITY2</td></tr><tr><td>TOSH_1T</td><td>ALTERNATE,NAND_TSHBA_1TB,POP_8GBIT,CAPACITY2,CAPACITY0</td></tr></table>														BOM GROUP	BOM OPTIONS	SAND_256G	ALTERNATE,NAND_SDISK_256GB,POP_4GBIT,CAPACITY1,CAPACITY0	SAND_512G	ALTERNATE,NAND_SDISK_512GB,POP_4GBIT,CAPACITY2	SAND_1T	ALTERNATE,NAND_SDISK_1TB,POP_8GBIT,CAPACITY2,CAPACITY0	TOSH_256G	ALTERNATE,NAND_TSHBA_256GB,POP_4GBIT,CAPACITY1,CAPACITY0	TOSH_512G	ALTERNATE,NAND_TSHBA_512GB,POP_4GBIT,CAPACITY2	TOSH_1T	ALTERNATE,NAND_TSHBA_1TB,POP_8GBIT,CAPACITY2,CAPACITY0																																																																																																																																	
BOM GROUP	BOM OPTIONS																																																																																																																																																											
SAND_256G	ALTERNATE,NAND_SDISK_256GB,POP_4GBIT,CAPACITY1,CAPACITY0																																																																																																																																																											
SAND_512G	ALTERNATE,NAND_SDISK_512GB,POP_4GBIT,CAPACITY2																																																																																																																																																											
SAND_1T	ALTERNATE,NAND_SDISK_1TB,POP_8GBIT,CAPACITY2,CAPACITY0																																																																																																																																																											
TOSH_256G	ALTERNATE,NAND_TSHBA_256GB,POP_4GBIT,CAPACITY1,CAPACITY0																																																																																																																																																											
TOSH_512G	ALTERNATE,NAND_TSHBA_512GB,POP_4GBIT,CAPACITY2																																																																																																																																																											
TOSH_1T	ALTERNATE,NAND_TSHBA_1TB,POP_8GBIT,CAPACITY2,CAPACITY0																																																																																																																																																											
A	<div>Strategic Silicon</div> <table><tr><th>PART#</th><th>STRATEGIC VALUE</th><th>COMMENT</th></tr><tr><td>337S00266</td><td>08</td><td>CPU</td></tr><tr><td>337S00267</td><td>08</td><td>CPU</td></tr><tr><td>337S00268</td><td>08</td><td>CPU</td></tr><tr><td>333S00050</td><td>07</td><td>MEMORY</td></tr><tr><td>333S00068</td><td>07</td><td>MEMORY</td></tr><tr><td>333S00069</td><td>07</td><td>MEMORY</td></tr><tr><td>333S00070</td><td>07</td><td>MEMORY</td></tr><tr><td>335S00124</td><td>02</td><td>NAND</td></tr><tr><td>335S00125</td><td>02</td><td>NAND</td></tr><tr><td>335S00126</td><td>02</td><td>NAND</td></tr><tr><td>335S00261</td><td>02</td><td>NAND</td></tr><tr><td>335S00262</td><td>02</td><td>NAND</td></tr><tr><td>335S00263</td><td>02</td><td>NAND</td></tr><tr><td>333S00025</td><td>02</td><td>S3X DRAM</td></tr><tr><td>333S00026</td><td>02</td><td>S3X DRAM</td></tr><tr><td>333S00055</td><td>02</td><td>S3X DRAM</td></tr><tr><td>333S00056</td><td>02</td><td>S3X DRAM</td></tr><tr><td>333S00107</td><td>02</td><td>S3X DRAM</td></tr><tr><td>333S00108</td><td>02</td><td>S3X DRAM</td></tr><tr><td>998-06736</td><td>02</td><td>S3X CONTROLLER</td></tr></table>														PART#	STRATEGIC VALUE	COMMENT	337S00266	08	CPU	337S00267	08	CPU	337S00268	08	CPU	333S00050	07	MEMORY	333S00068	07	MEMORY	333S00069	07	MEMORY	333S00070	07	MEMORY	335S00124	02	NAND	335S00125	02	NAND	335S00126	02	NAND	335S00261	02	NAND	335S00262	02	NAND	335S00263	02	NAND	333S00025	02	S3X DRAM	333S00026	02	S3X DRAM	333S00055	02	S3X DRAM	333S00056	02	S3X DRAM	333S00107	02	S3X DRAM	333S00108	02	S3X DRAM	998-06736	02	S3X CONTROLLER																																																																															
PART#	STRATEGIC VALUE	COMMENT																																																																																																																																																										
337S00266	08	CPU																																																																																																																																																										
337S00267	08	CPU																																																																																																																																																										
337S00268	08	CPU																																																																																																																																																										
333S00050	07	MEMORY																																																																																																																																																										
333S00068	07	MEMORY																																																																																																																																																										
333S00069	07	MEMORY																																																																																																																																																										
333S00070	07	MEMORY																																																																																																																																																										
335S00124	02	NAND																																																																																																																																																										
335S00125	02	NAND																																																																																																																																																										
335S00126	02	NAND																																																																																																																																																										
335S00261	02	NAND																																																																																																																																																										
335S00262	02	NAND																																																																																																																																																										
335S00263	02	NAND																																																																																																																																																										
333S00025	02	S3X DRAM																																																																																																																																																										
333S00026	02	S3X DRAM																																																																																																																																																										
333S00055	02	S3X DRAM																																																																																																																																																										
333S00056	02	S3X DRAM																																																																																																																																																										
333S00107	02	S3X DRAM																																																																																																																																																										
333S00108	02	S3X DRAM																																																																																																																																																										
998-06736	02	S3X CONTROLLER																																																																																																																																																										
<table><tr><td>PART#</td><td>STRATEGIC VALUE</td><td>COMMENT</td></tr><tr><td>338S00227</td><td>02</td><td>PICCOLO</td></tr><tr><td>343S00135</td><td>10</td><td>T208</td></tr><tr><td>343S00136</td><td>10</td><td>T208</td></tr><tr><td>343S00137</td><td>10</td><td>T208</td></tr><tr><td>343S00138</td><td>10</td><td>T208</td></tr><tr><td>338S00193</td><td>09</td><td>BERKELIUM</td></tr><tr><td>353S3978</td><td>02</td><td>MOJAVE</td></tr><tr><td>338S00147</td><td>02</td><td>SECURE ELEMENT</td></tr><tr><td>338S00254</td><td>08</td><td>ALPINE RIDGE</td></tr><tr><td>353S00961</td><td>09</td><td>ACE</td></tr><tr><td>338S00142</td><td>09</td><td>CLIFDEN</td></tr><tr><td>353S00685</td><td>07</td><td>AUDIO AMP</td></tr><tr><td>353S4316</td><td>08</td><td>BAYSIDE</td></tr><tr><td>338S00221</td><td>08</td><td>BAMJO</td></tr><tr><td>353S01016</td><td>09</td><td>TUBA</td></tr><tr><td>339S00056</td><td>05</td><td>ICEBOCK</td></tr><tr><td>343S00147</td><td>08</td><td>PAK</td></tr><tr><td>359S00006</td><td>08</td><td>GREEN CLOCK</td></tr><tr><td>353S00795</td><td>09</td><td>DEBUG MUX</td></tr></table>														PART#	STRATEGIC VALUE	COMMENT	338S00227	02	PICCOLO	343S00135	10	T208	343S00136	10	T208	343S00137	10	T208	343S00138	10	T208	338S00193	09	BERKELIUM	353S3978	02	MOJAVE	338S00147	02	SECURE ELEMENT	338S00254	08	ALPINE RIDGE	353S00961	09	ACE	338S00142	09	CLIFDEN	353S00685	07	AUDIO AMP	353S4316	08	BAYSIDE	338S00221	08	BAMJO	353S01016	09	TUBA	339S00056	05	ICEBOCK	343S00147	08	PAK	359S00006	08	GREEN CLOCK	353S00795	09	DEBUG MUX																																																																																			
PART#	STRATEGIC VALUE	COMMENT																																																																																																																																																										
338S00227	02	PICCOLO																																																																																																																																																										
343S00135	10	T208																																																																																																																																																										
343S00136	10	T208																																																																																																																																																										
343S00137	10	T208																																																																																																																																																										
343S00138	10	T208																																																																																																																																																										
338S00193	09	BERKELIUM																																																																																																																																																										
353S3978	02	MOJAVE																																																																																																																																																										
338S00147	02	SECURE ELEMENT																																																																																																																																																										
338S00254	08	ALPINE RIDGE																																																																																																																																																										
353S00961	09	ACE																																																																																																																																																										
338S00142	09	CLIFDEN																																																																																																																																																										
353S00685	07	AUDIO AMP																																																																																																																																																										
353S4316	08	BAYSIDE																																																																																																																																																										
338S00221	08	BAMJO																																																																																																																																																										
353S01016	09	TUBA																																																																																																																																																										
339S00056	05	ICEBOCK																																																																																																																																																										
343S00147	08	PAK																																																																																																																																																										
359S00006	08	GREEN CLOCK																																																																																																																																																										
353S00795	09	DEBUG MUX																																																																																																																																																										
8		7		6		5		4		3		2		1																																																																																																																																														

CPU DRAM CFG Chart

DIE REV	CFG 4
A	0
B	1

SPEED	CFG 3
2133	0
1866	1

CAPACITY	CFG 2
8GB	0
16GB	1

VENDOR	CFG 1	CFG 0
HYNIX	0	0
MICRON	0	1
SAMSUNG	1	0
N/A	1	1





8		7		6		5		4		3		2		1	
BOARD MECHANICALS															
Shield Cans - BOTTOM SIDE				Shield Cans - TOP SIDE				POGO PINS				Cowling Bosses - BOTTOM SIDE			
ALPINE RIDGE - LIO (U2800) - 806-06077				T208 (U3900) - 806-06264				LIO and RIO -2X (870-5071)				DFR TOUCH CONN (J4402) - 860-00414			
LPDDR3 (U2300 ~ U2600) - 806-06167				DIPLEXERS - 806-06266				AROUND THE FAN AND CENTER - 8X (870-01518)				USB-C CONN - LIO (J3300) - 860-00392			
NAND - BOTTOM SOUTH (U9120) - 806-05945				NAND - TOP SOUTH (U9100) - 806-06262								DFR DISPLAY CONN (J4401) - 860-00412			
												IPD CONN (J4501) - 860-00412			
S3X (U8600) - 806-06023				NAND - TOP NORTH (9220) - 806-06258								KBD CONN (J4500) - 860-00412			
												USB-C CONN - RIO (JB500) - 860-00392			
NAND - BOTTOM NORTH (U9200) - 806-06265												AUDIO JACK CONN (J6600) - 860-00399			
ALPINE RIDGE - RIO (UB000) - 806-06077															
Shield CAN Alignment Slots 14X - 998-04440 (1.2mm X 0.4mm)												MESA CONN (J4900) - 860-00399			
												LIFEBOAT CONN (J9600) - 860-00413			
												Cowling Bosses - TOP SIDE			
												eDP CONN (J8500) - 860-00415			
TOP Rubber Mount Standoffs - 12X - (860-00430)															
BOM_COST_GROUP=MECHANICALS															
8		7		6		5		4		3		2		1	

SYNC_MASTER=LDUNN_J44			SYNC_DATE=01/13/2013		
PAGE TITLE			PD Parts		
			DRAWING NUMBER	STEP	
			051-00515	D	
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			REVISION	9.0.0	
			BRANCH	dvt-fab09-0	
			PAGE	4 OF 145	
			SHEET	4 OF 119	

D

D

C

C

B

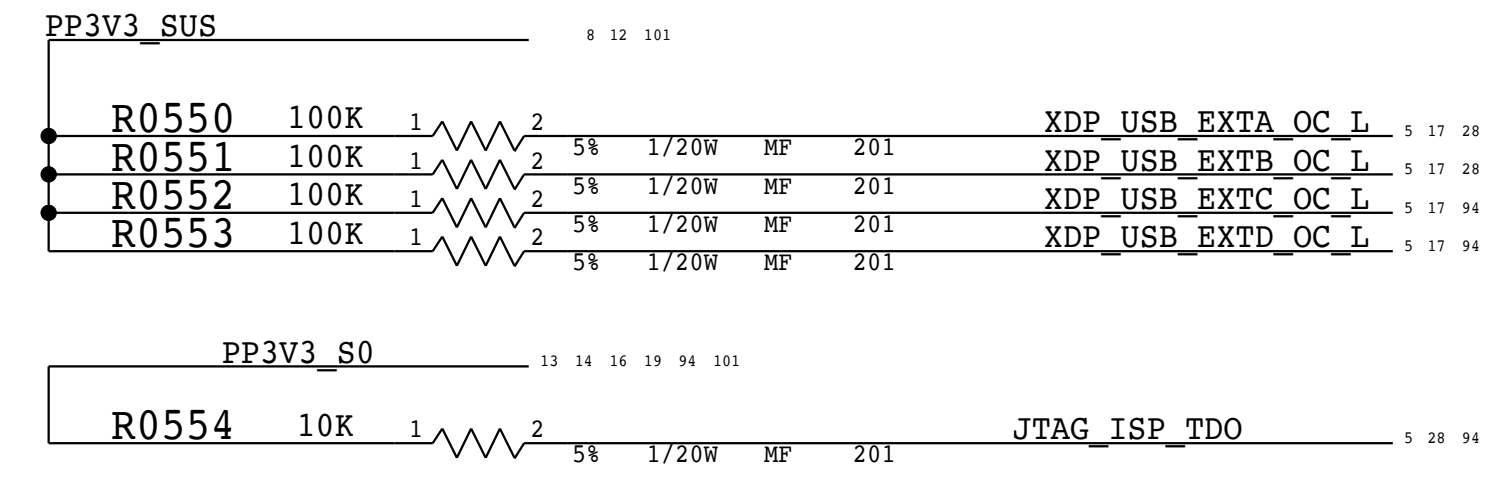
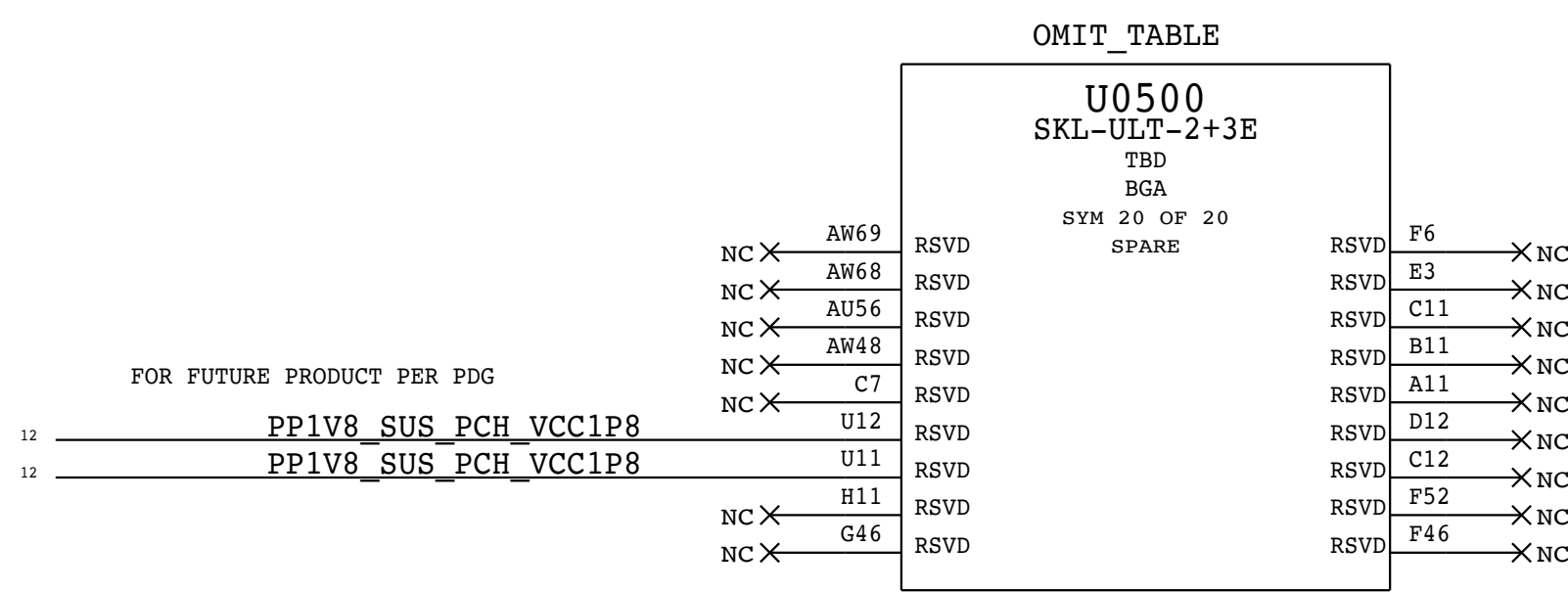
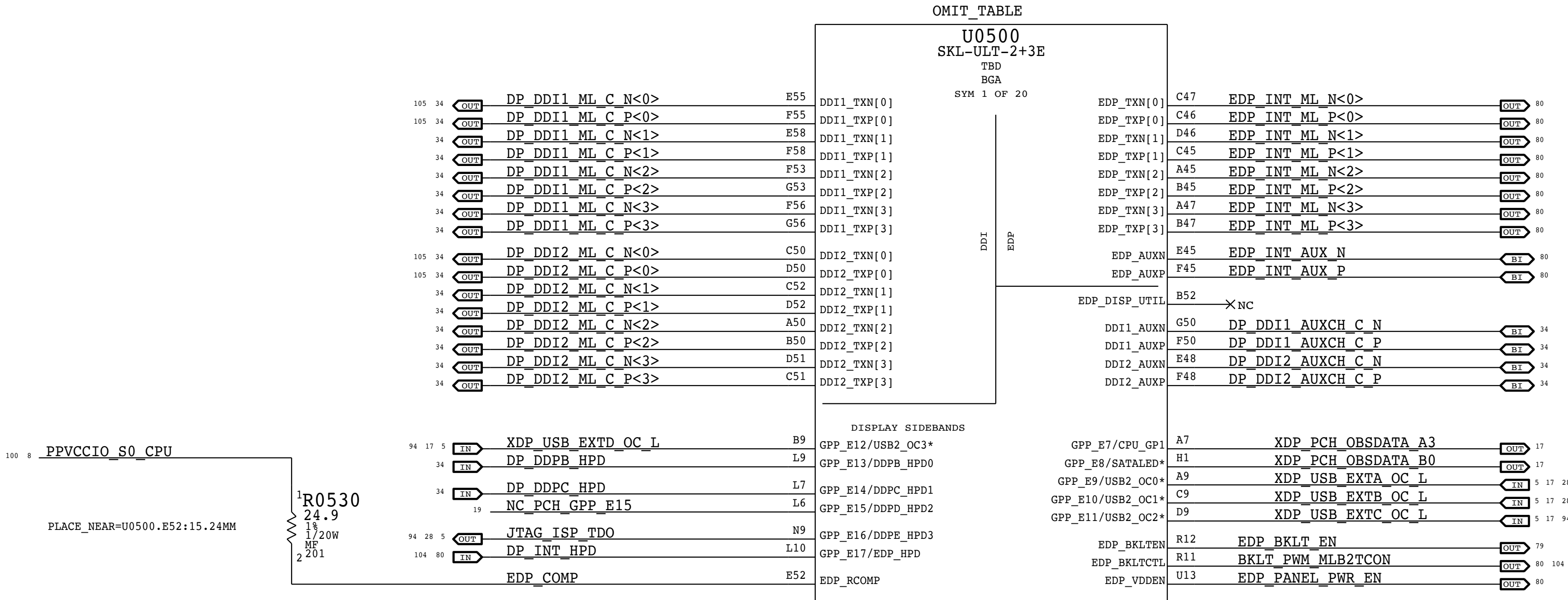
B


A

A

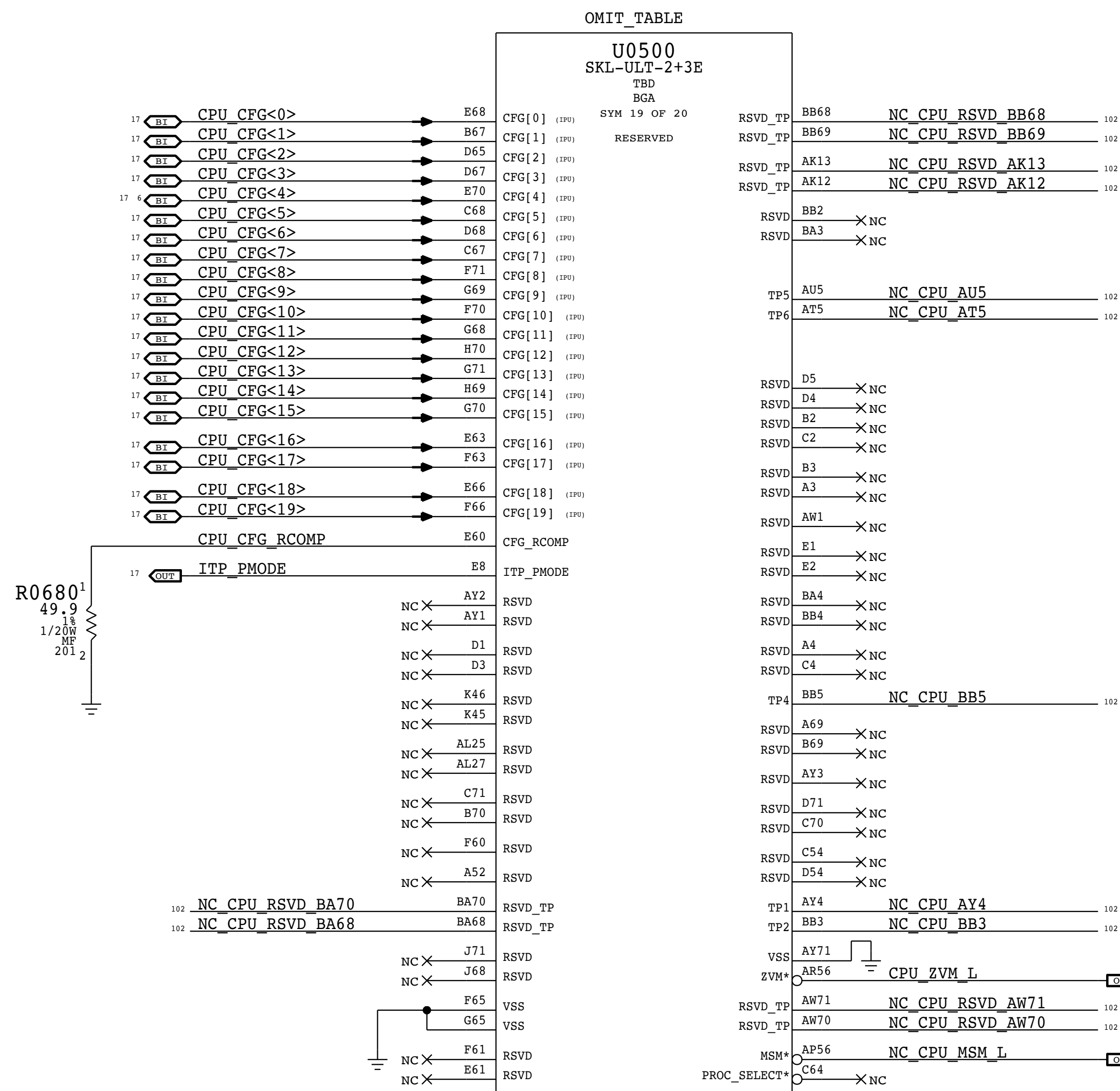
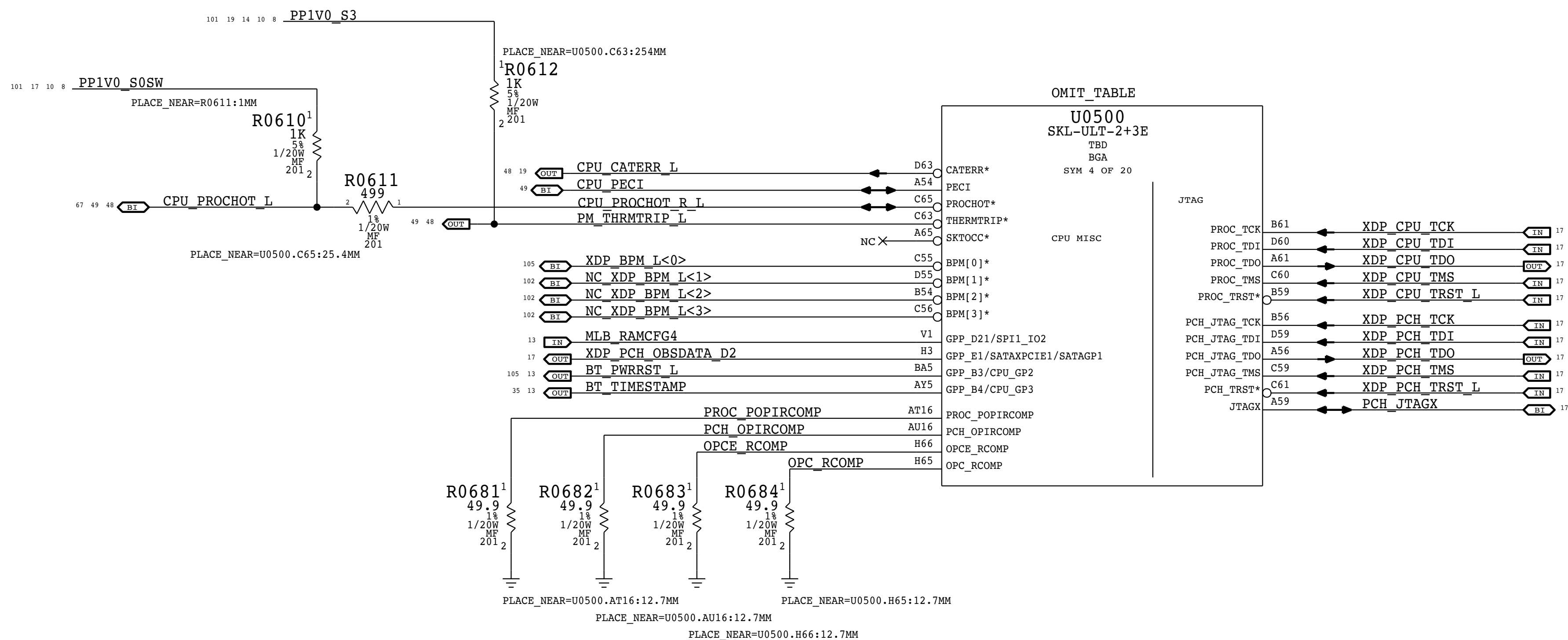
8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1

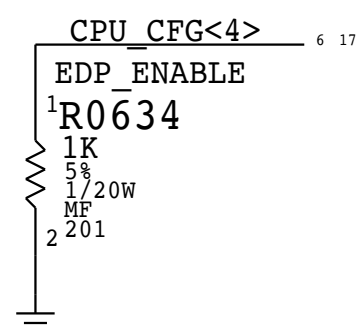


DESIGN: X502/DEV MLB U		
LAST CHANGE: Tue Apr 28 20:32:21 2015		
PAGE TITLE		
CPU GFX		
 Apple Inc.	DRANTING NUMBER	051-00515
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	5 OF 145
	SHEET	5 OF 119

BOM\_COST\_GROUP=CPU & CHIPSET

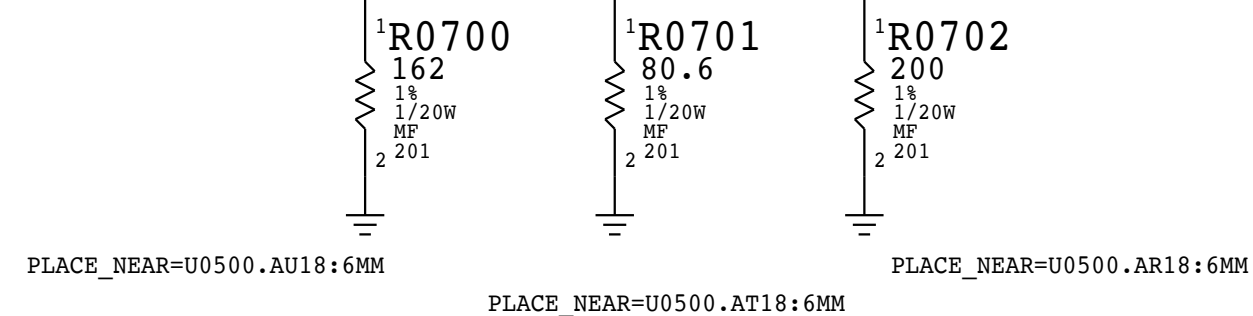
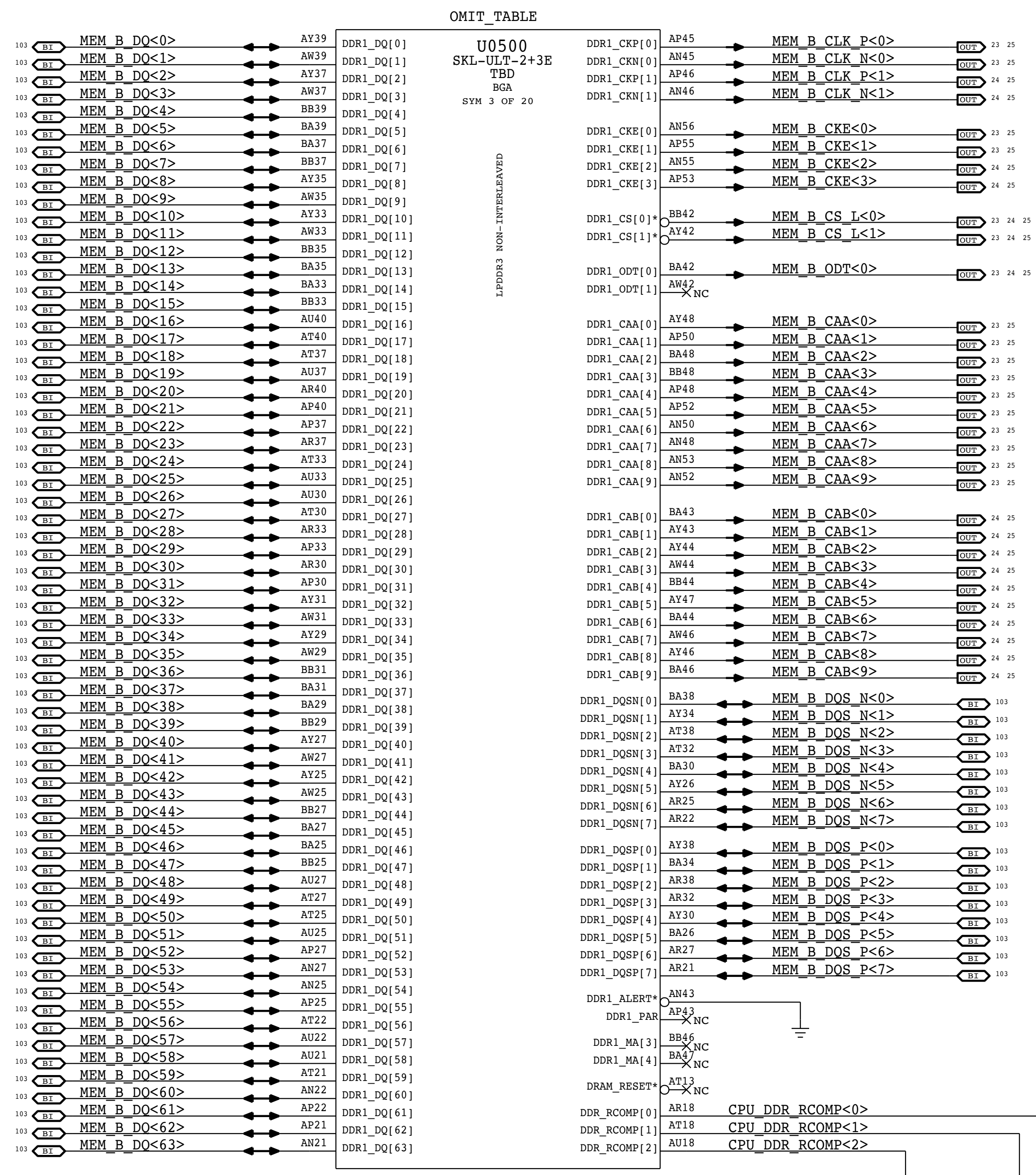
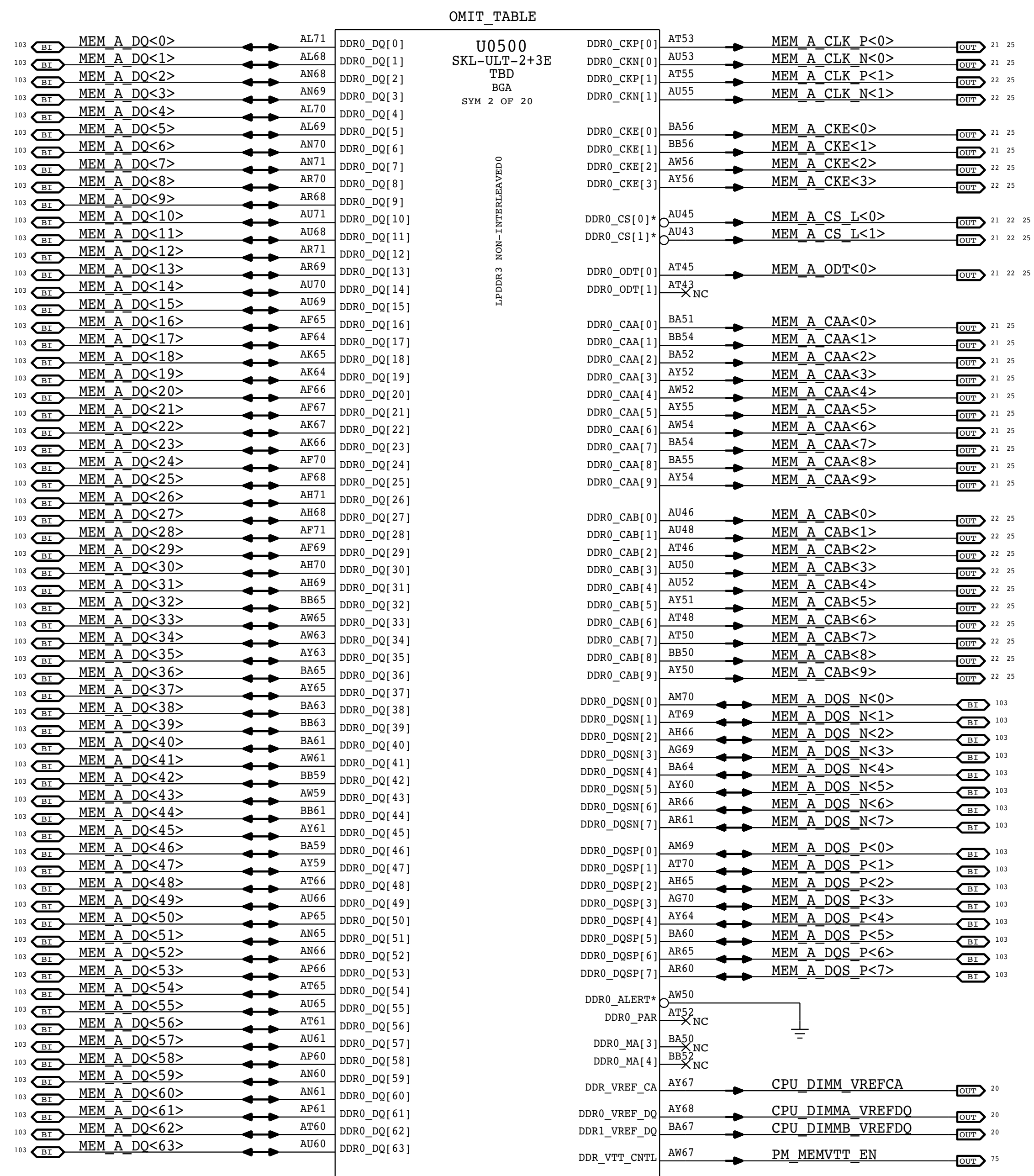


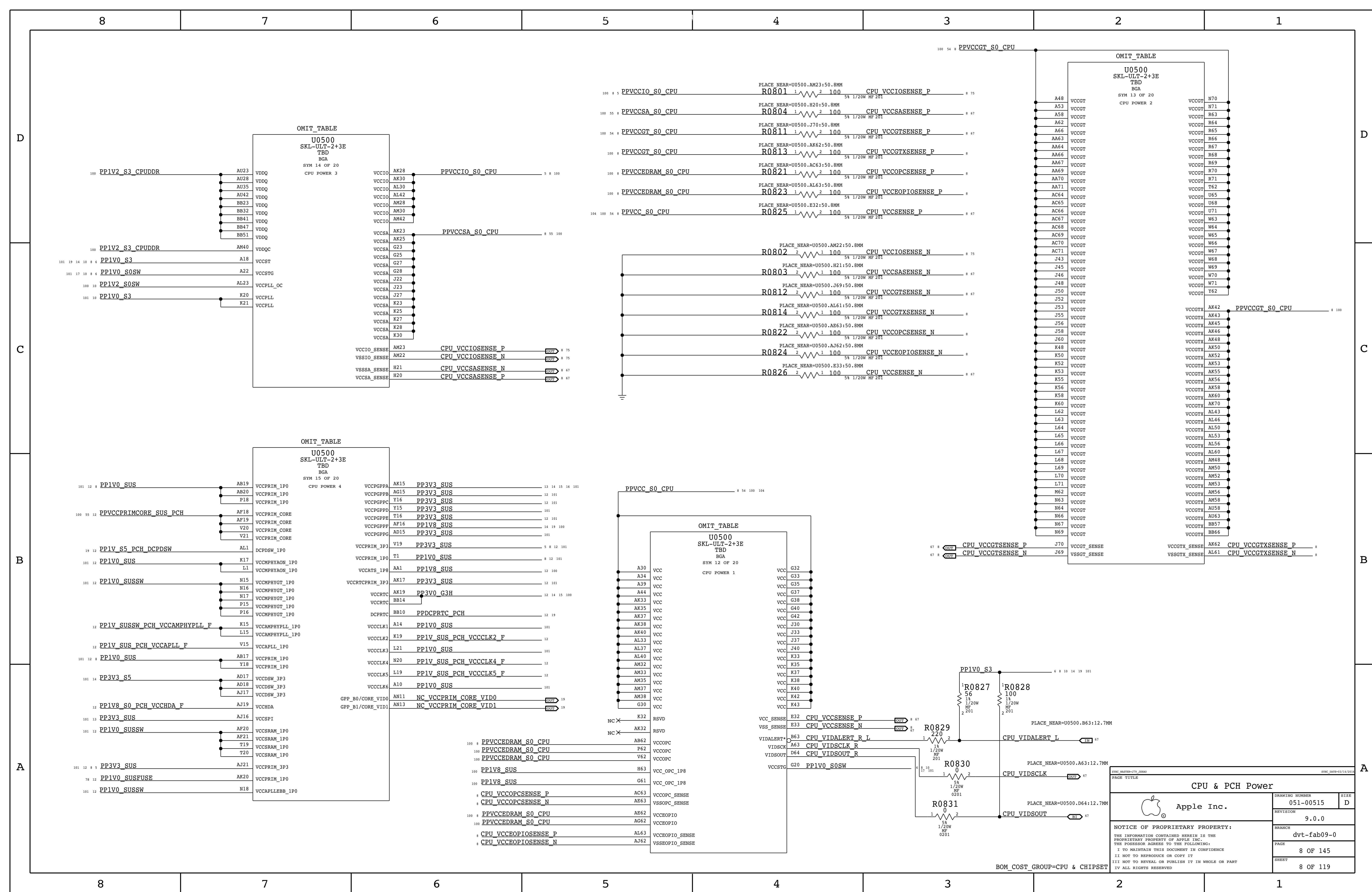
```
CFG<4>: 1eDP ENABLE/DISABLE          1 = DISABLED          0 = ENABLED
```



BOM\_COST\_GROUP=CPU & CHIPSET









D

C

B

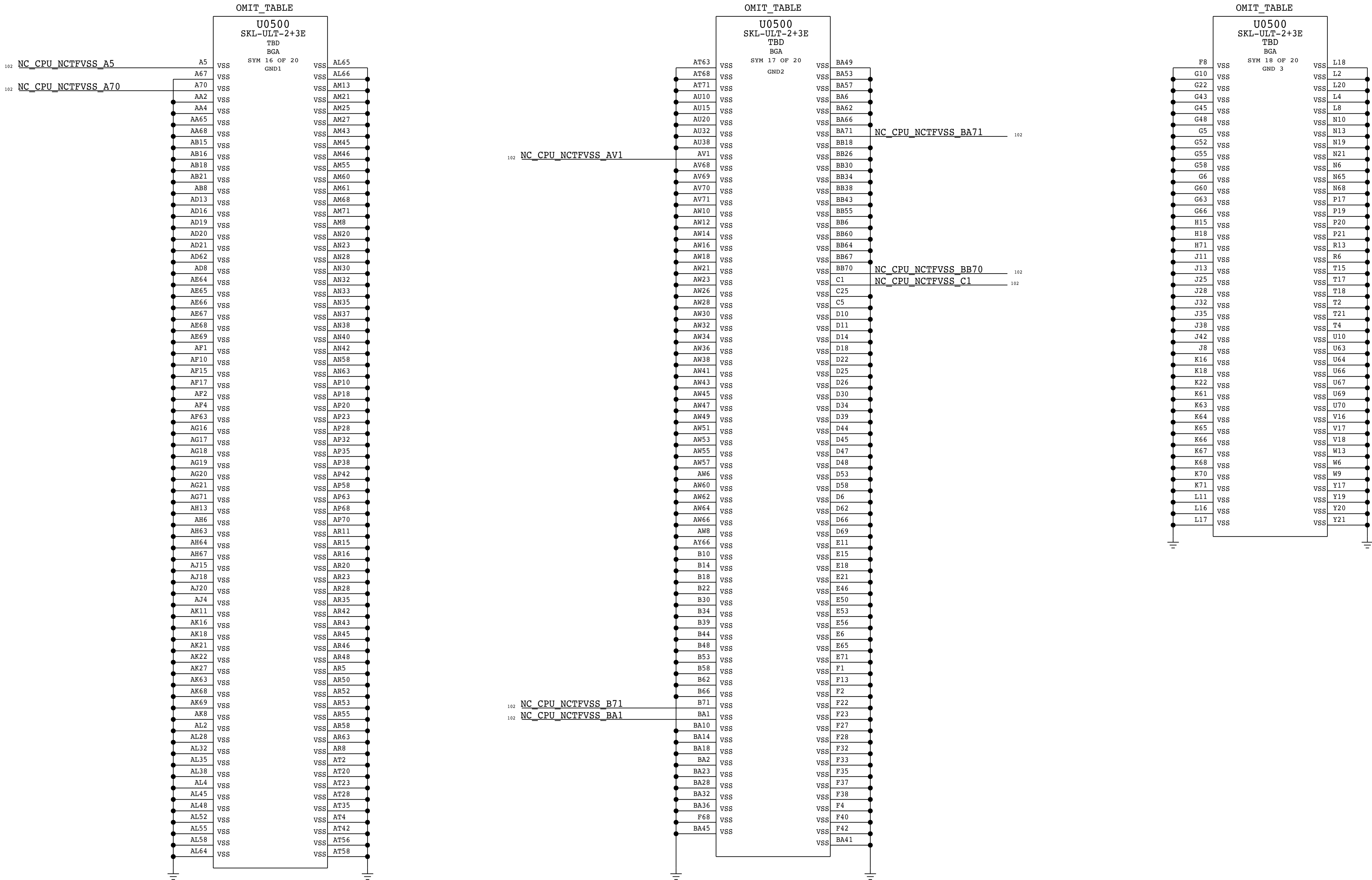
A


D

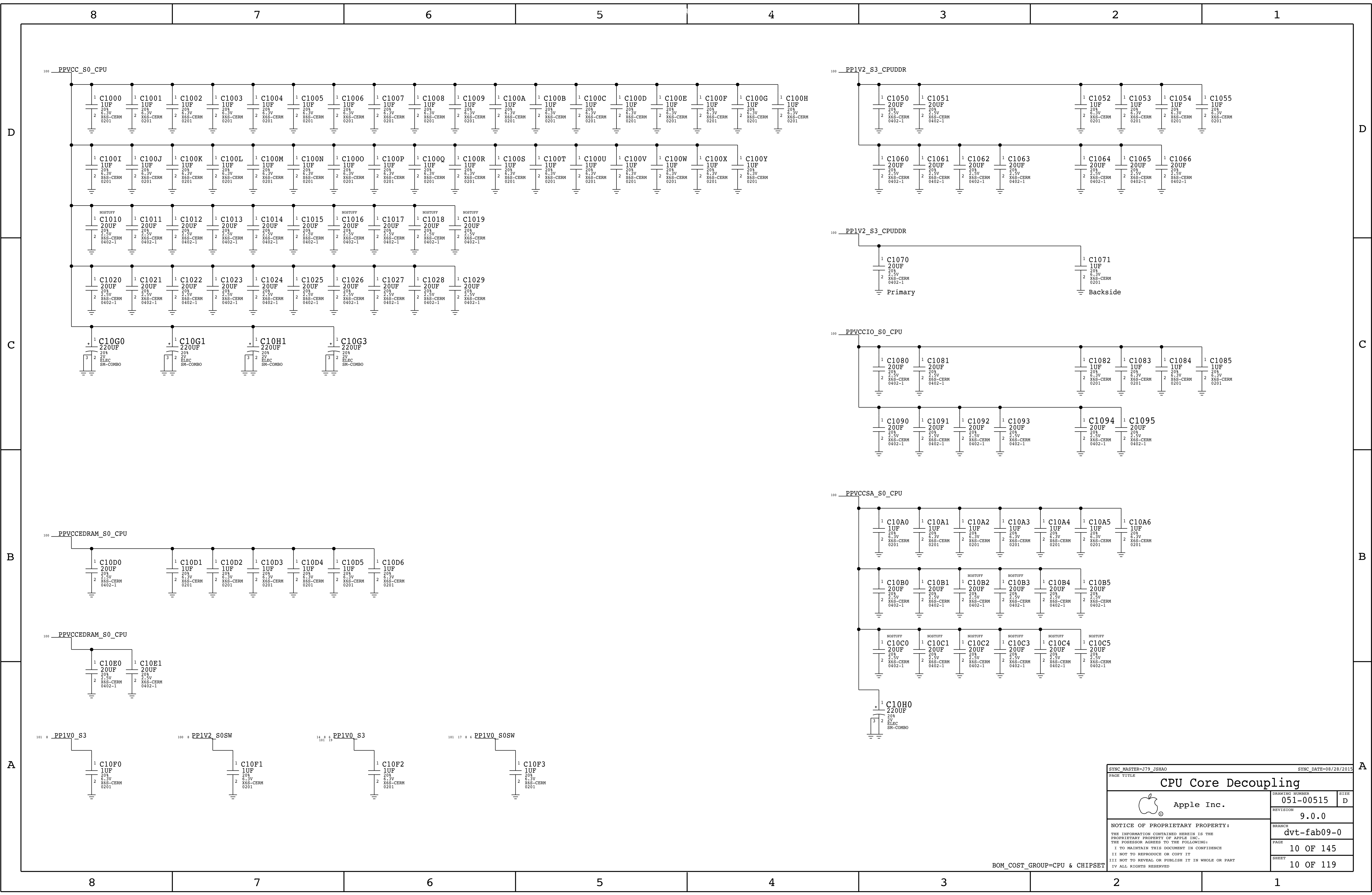
C


B

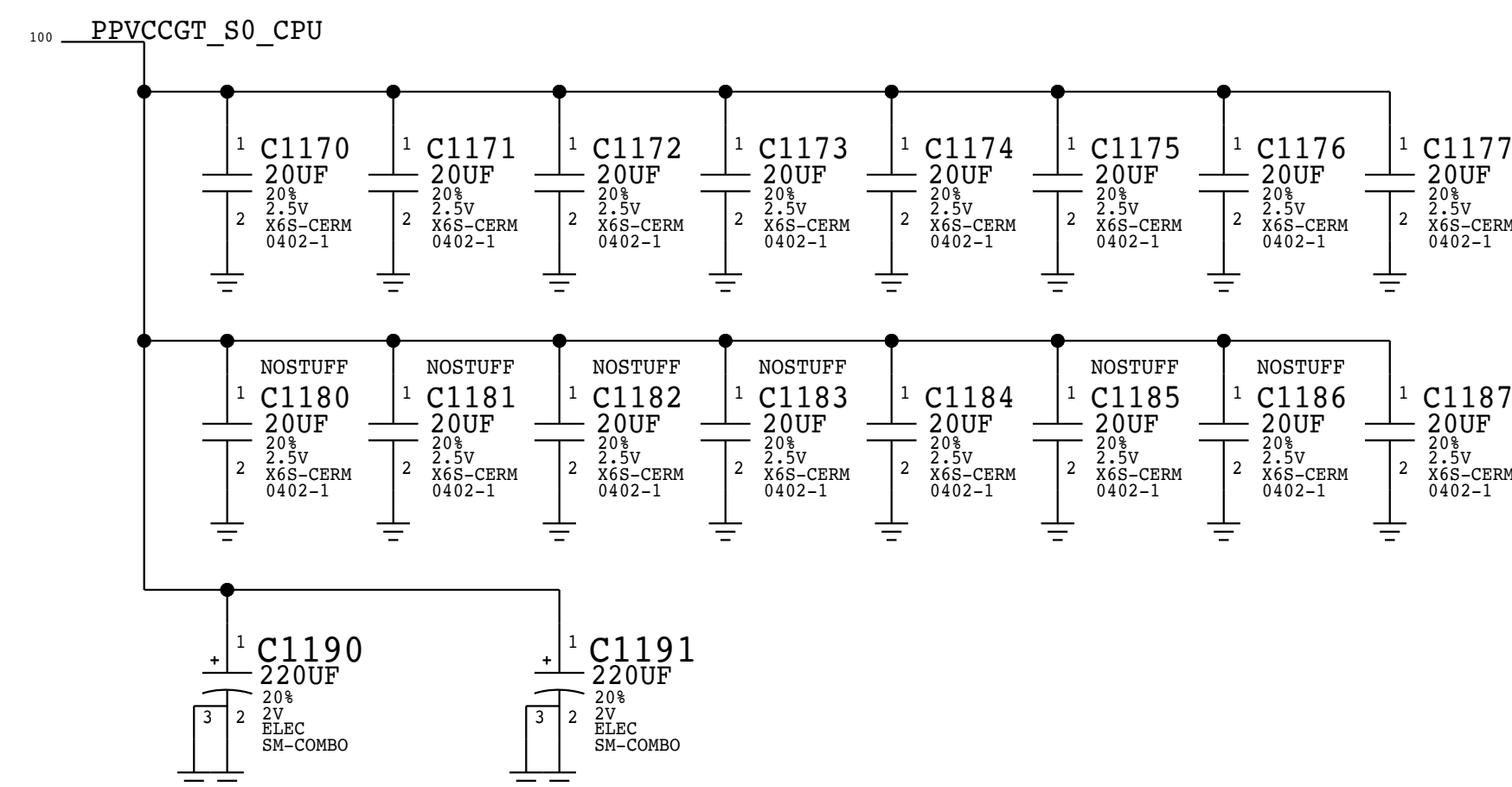
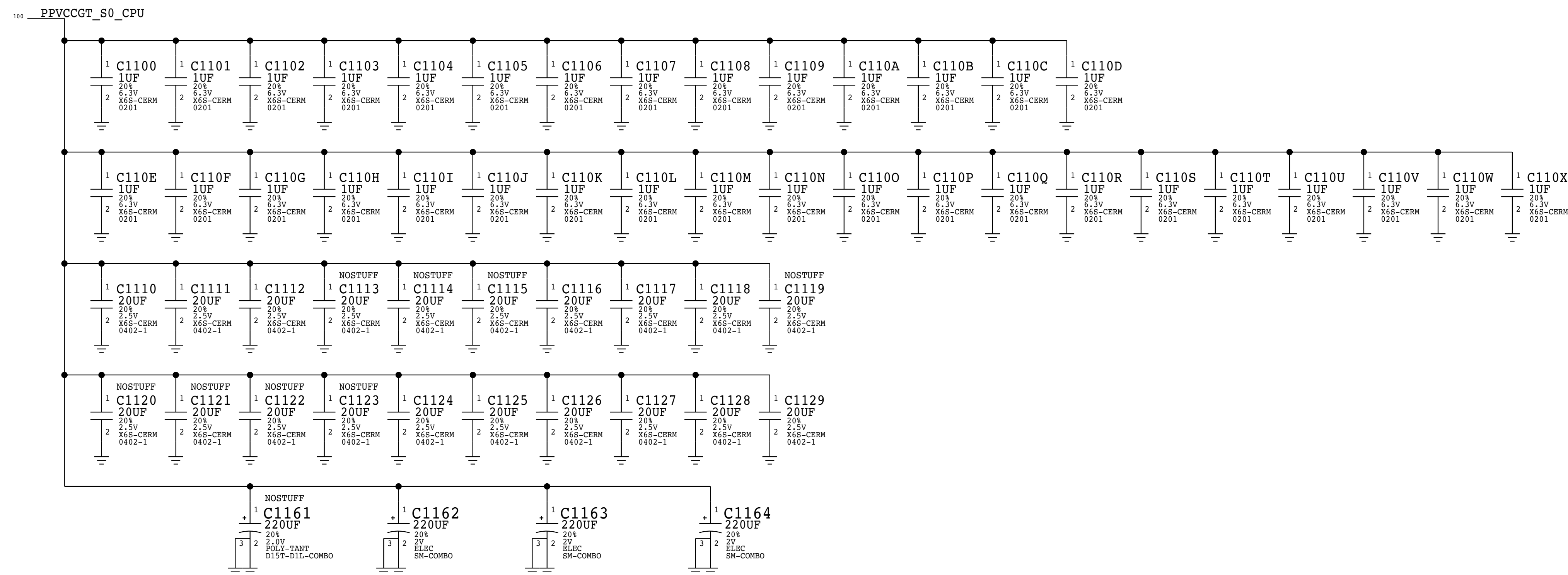
A




SYNC_MASTER=J79_ALFRED		SYNC_DATE=05/12/2015	
PAGE TITLE			
CPU & PCH Grounds			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
<b>NOTICE OF PROPRIETARY PROPERTY:</b> 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	REVISION		
	9.0.0		
	BRANCH		
	dvt-fab09-0		
	PAGE		
		9 OF 145	
		SHEET	
		9 OF 119	



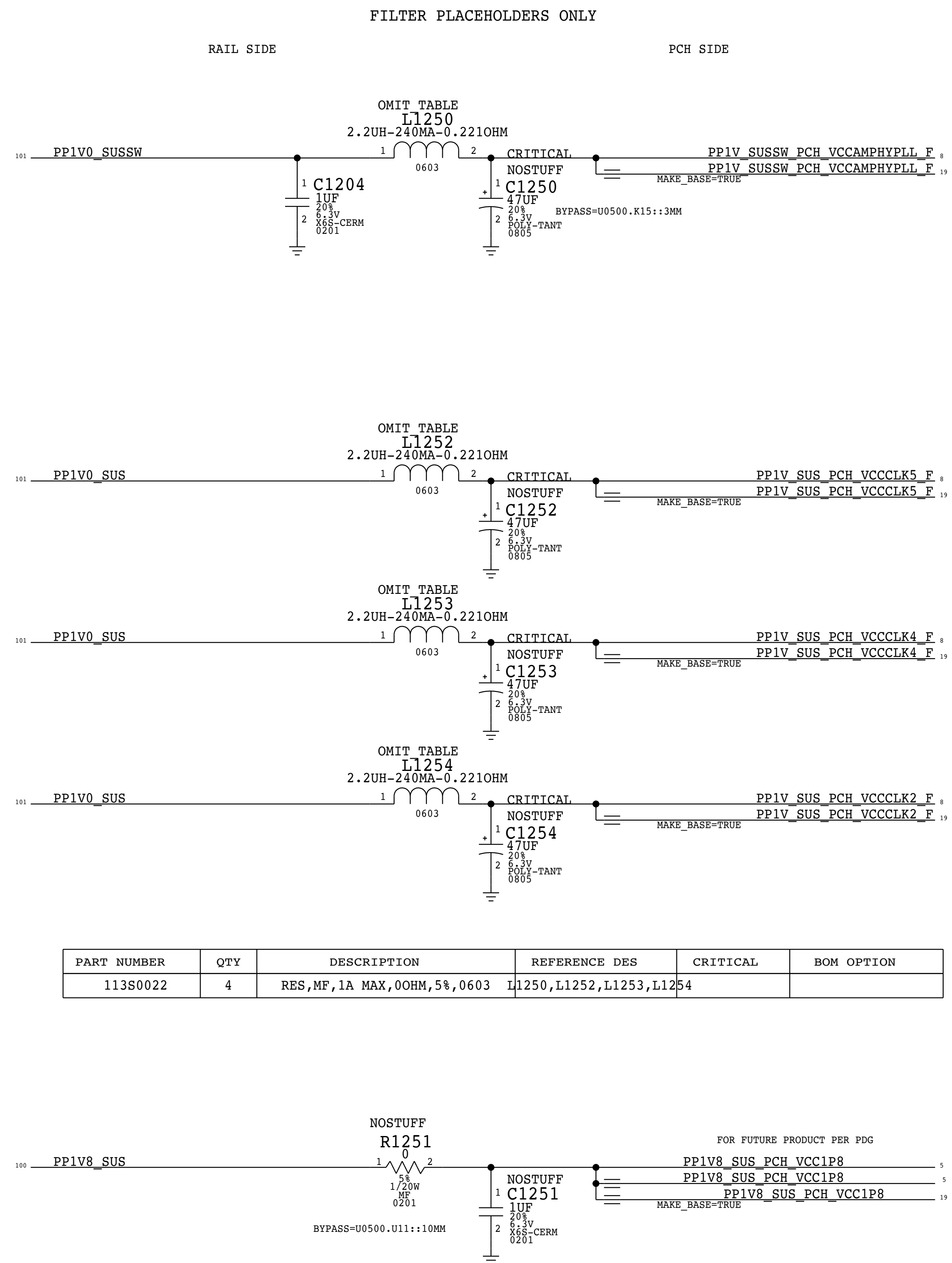
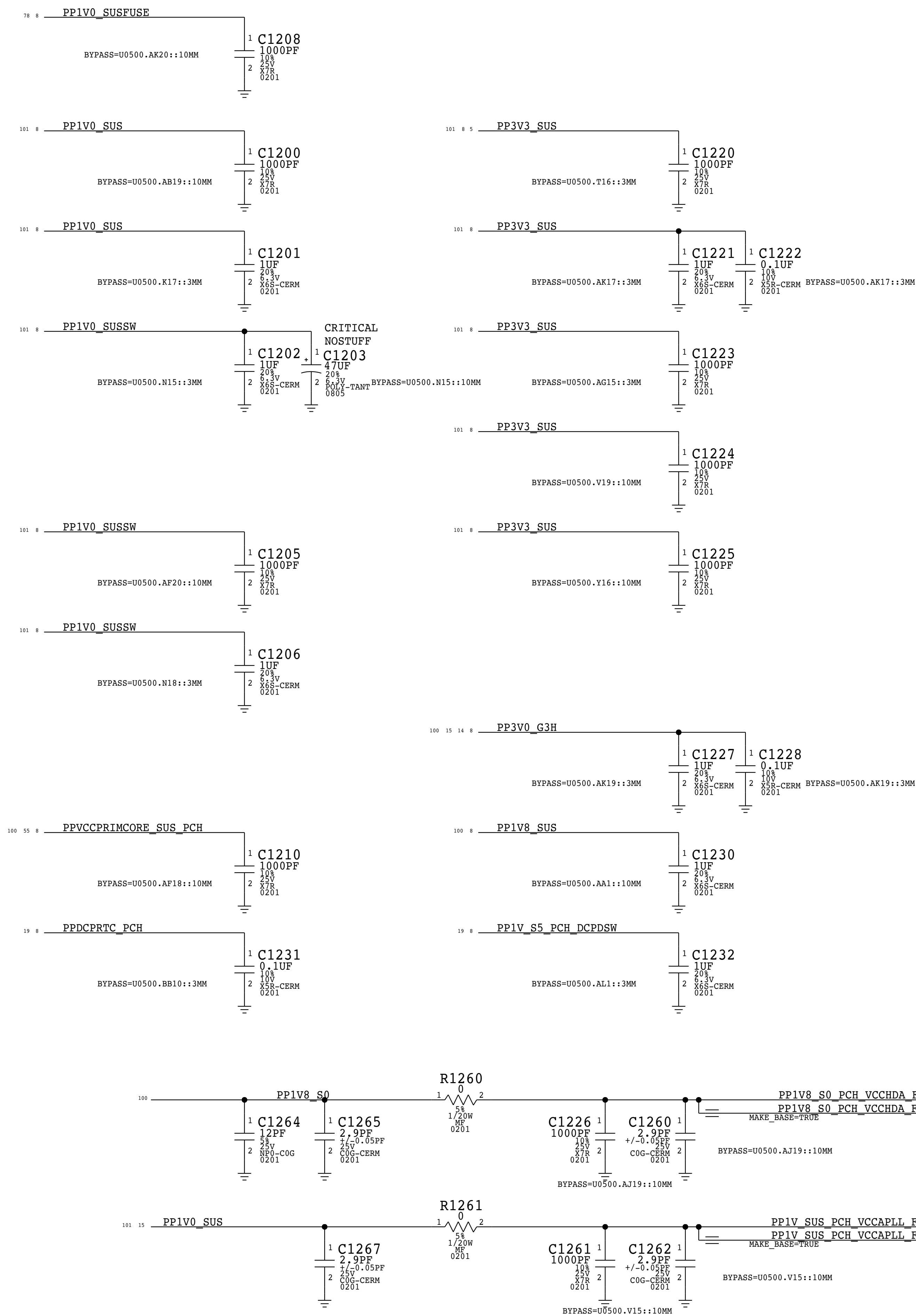
SYNC_MASTER=J79_JSHAO		SYNC_DATE=08/28/2015			
PAGE TITLE					
CPU Core Decoupling					
 Apple Inc.		DRAWING NUMBER	051-00515	SIZE	D
		REVISION	9.0.0		
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART					



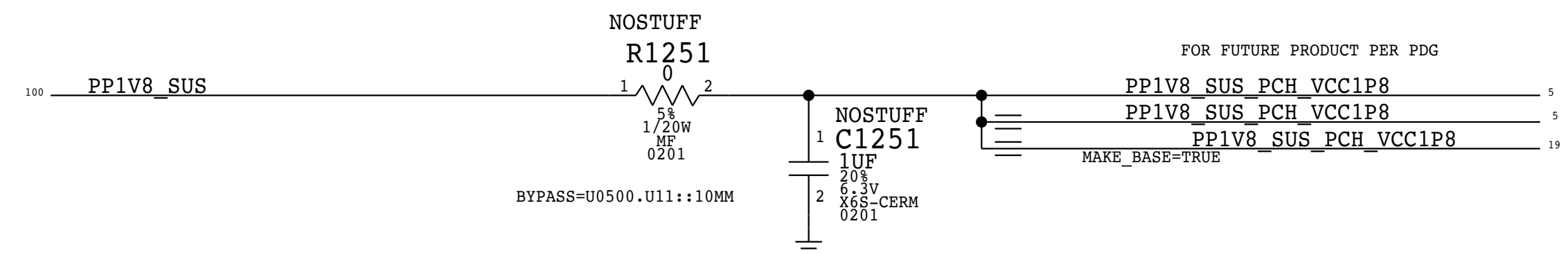
SYNC MASTER=J79 J5HAO		SYNC DATE=08/28/2015	
PAGE TITLE			
CPU GT Decoupling			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION		
	9.0.0		
	BRANCH		
	dvt-fab09-0		
	PAGE	11 OF 145	
	SHEET	11 OF 119	


BOM\_COST\_GROUP=CPU & CHIPSET





PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
113S0022	4	RES,MF,1A MAX,00HM,5%,0603	L1250,L1252,L1253,L1254		



PAGE TITLE		PCH Decoupling	
 Apple Inc.	DRAWING NUMBER		STATE
	051-00515		D
	REVISION		
	9.0.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
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		dvt-fab09-0	
		PAGE	
		12 OF 145	
		SHEET	
		12 OF 119	

BOM\_COST\_GROUP=CPU & CHIPSET

D

C

B

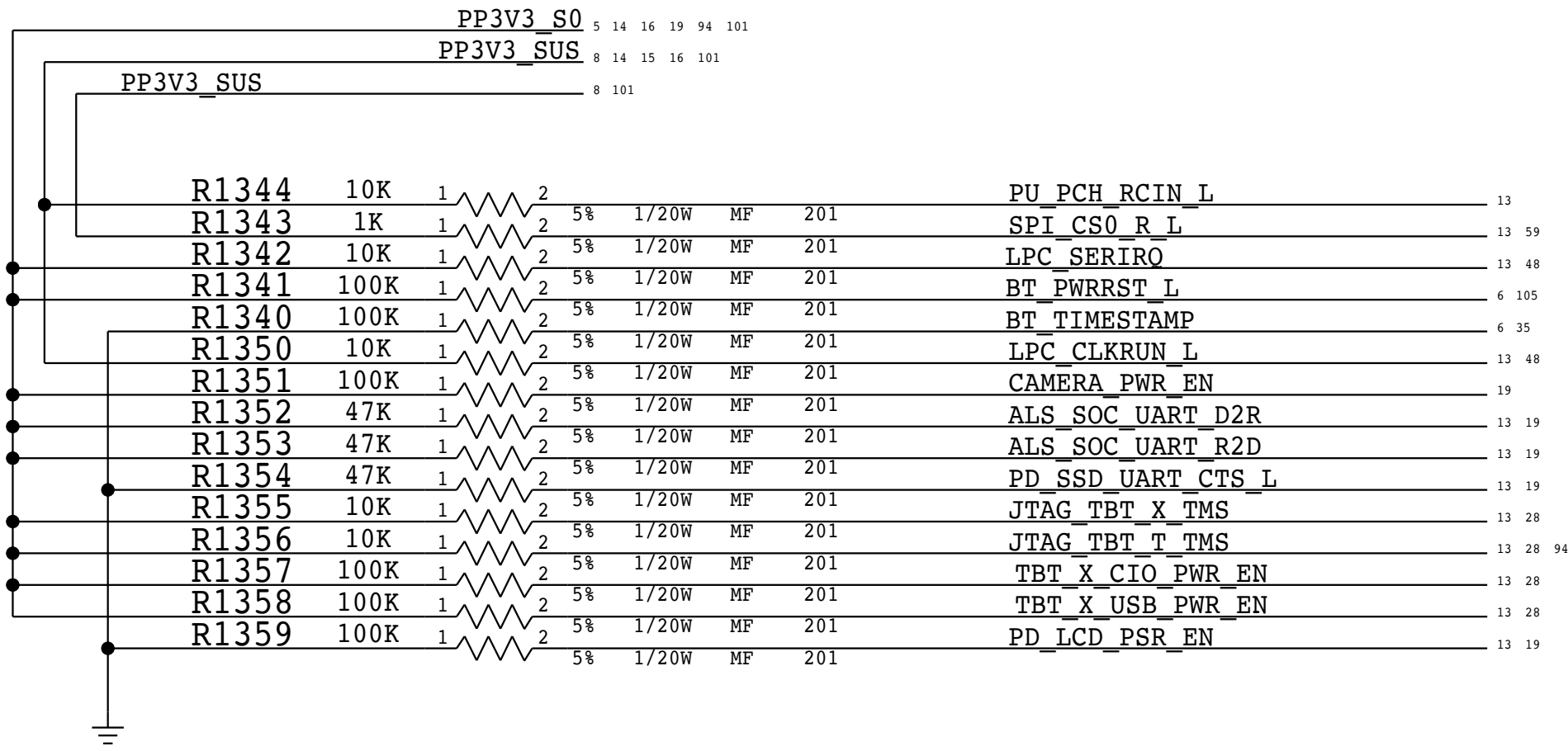
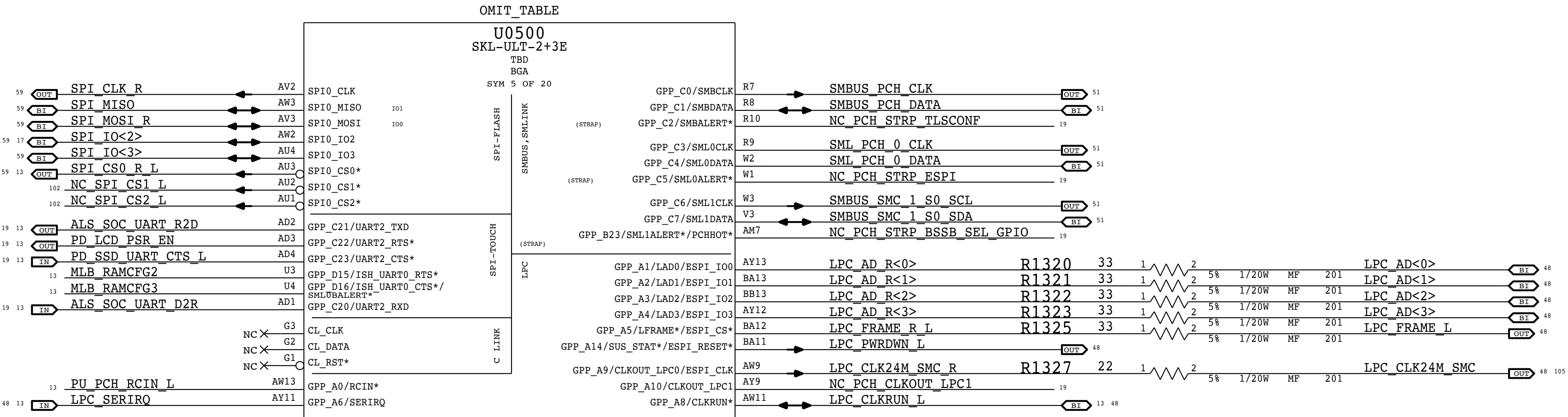
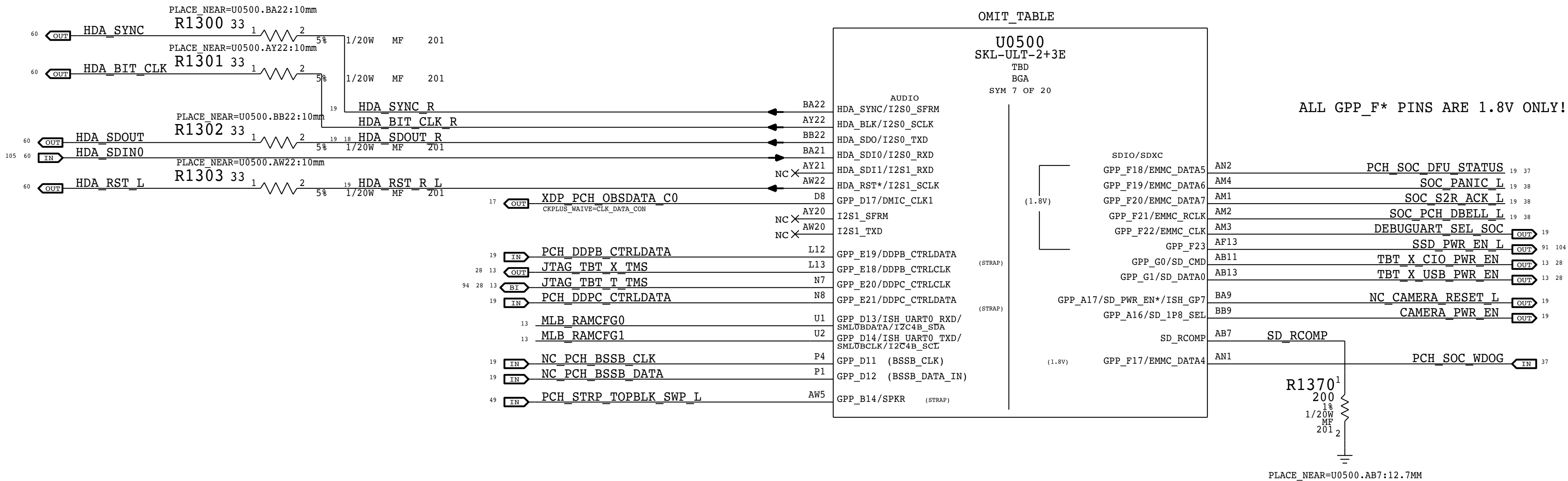
A

D

C

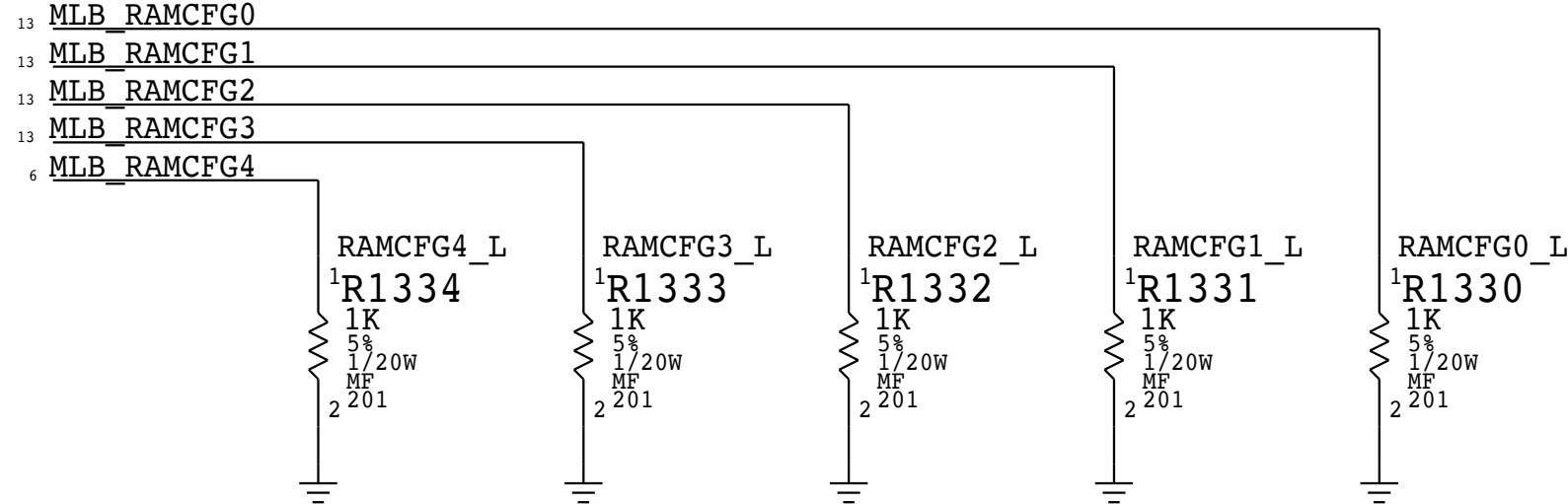
B

A



MEMORY CONFIGURATION STRAPS.

PCH INTERNAL PULL-UPS ARE TO 3.3V.



BOM GROUP	BOM OPTIONS
RAMCFG_SLOT	RAMCFG4_L, RAMCFG3_L, RAMCFG2_L, RAMCFG1_L, RAMCFG0_L

BOM\_COST\_GROUP=CPU & CHIPSET

DESIGN: X502/MLB		
LAST CHANGE: Tue Feb 2 13:18:21 2016		
PAGE TITLE		
PCH Audio/LPC/SPI/SMBus		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	13 OF 145
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		13 OF 119
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I ALL RIGHTS RESERVED		

D

C

B

A

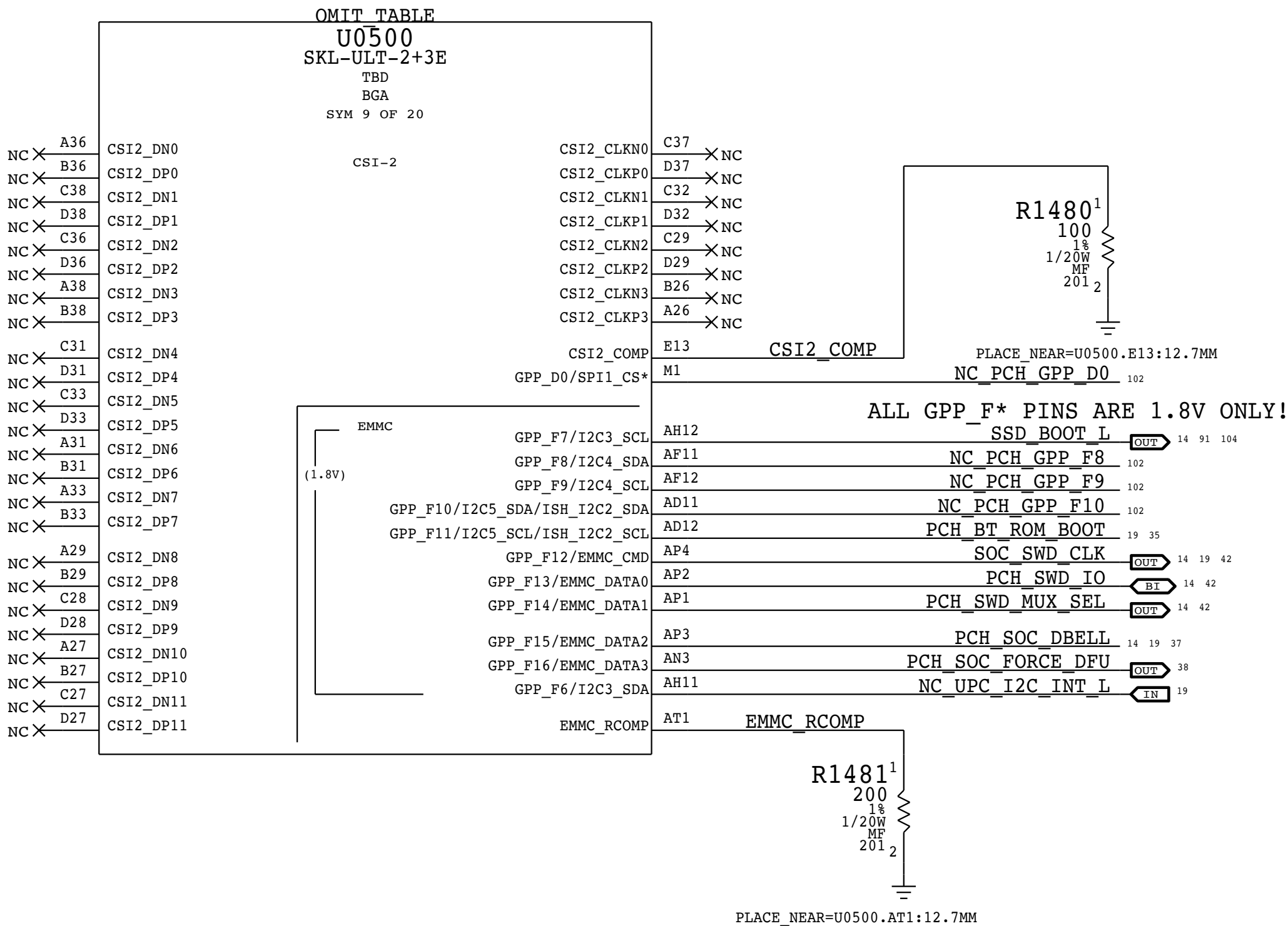
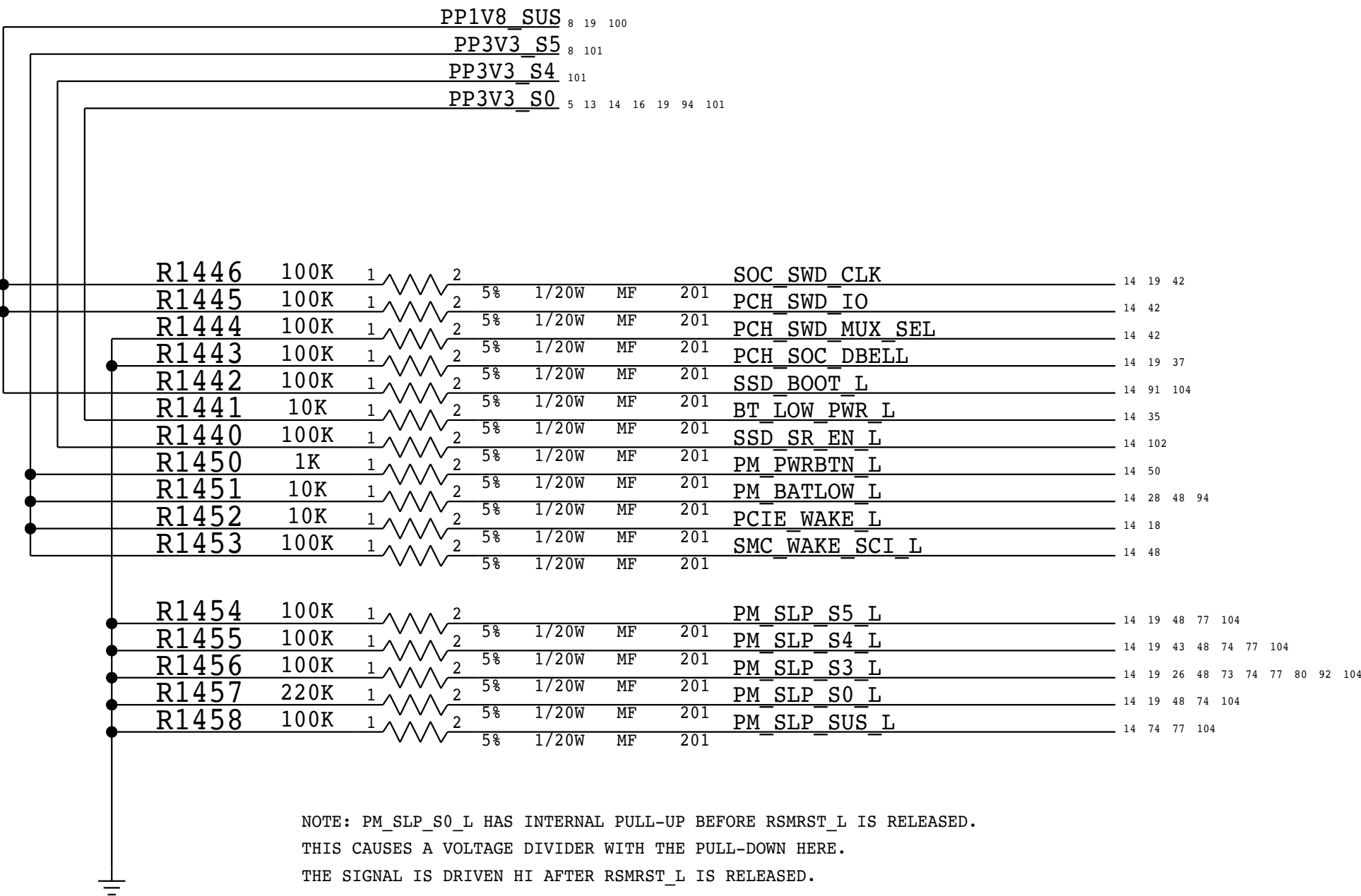
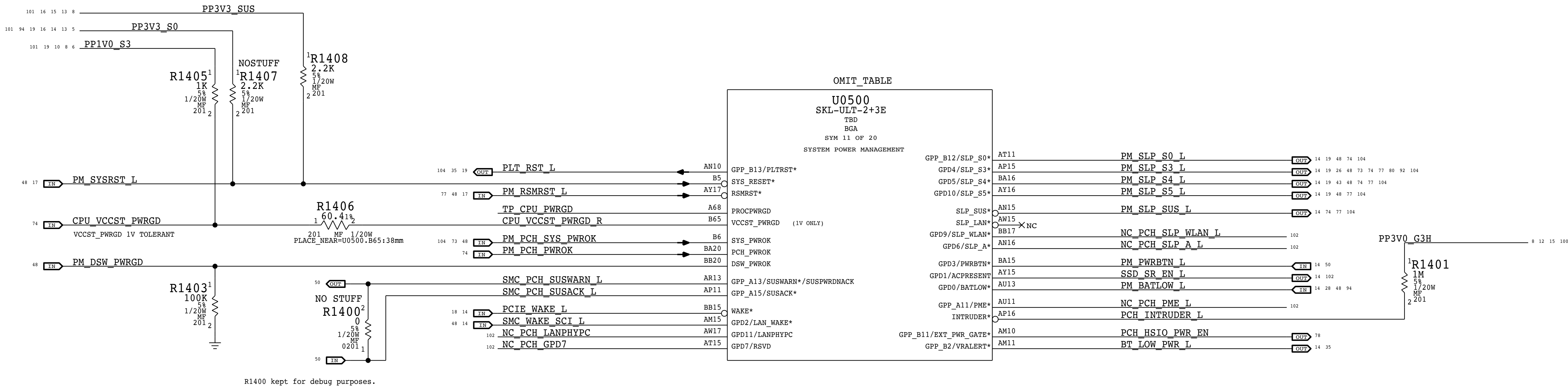
D

C

B

A

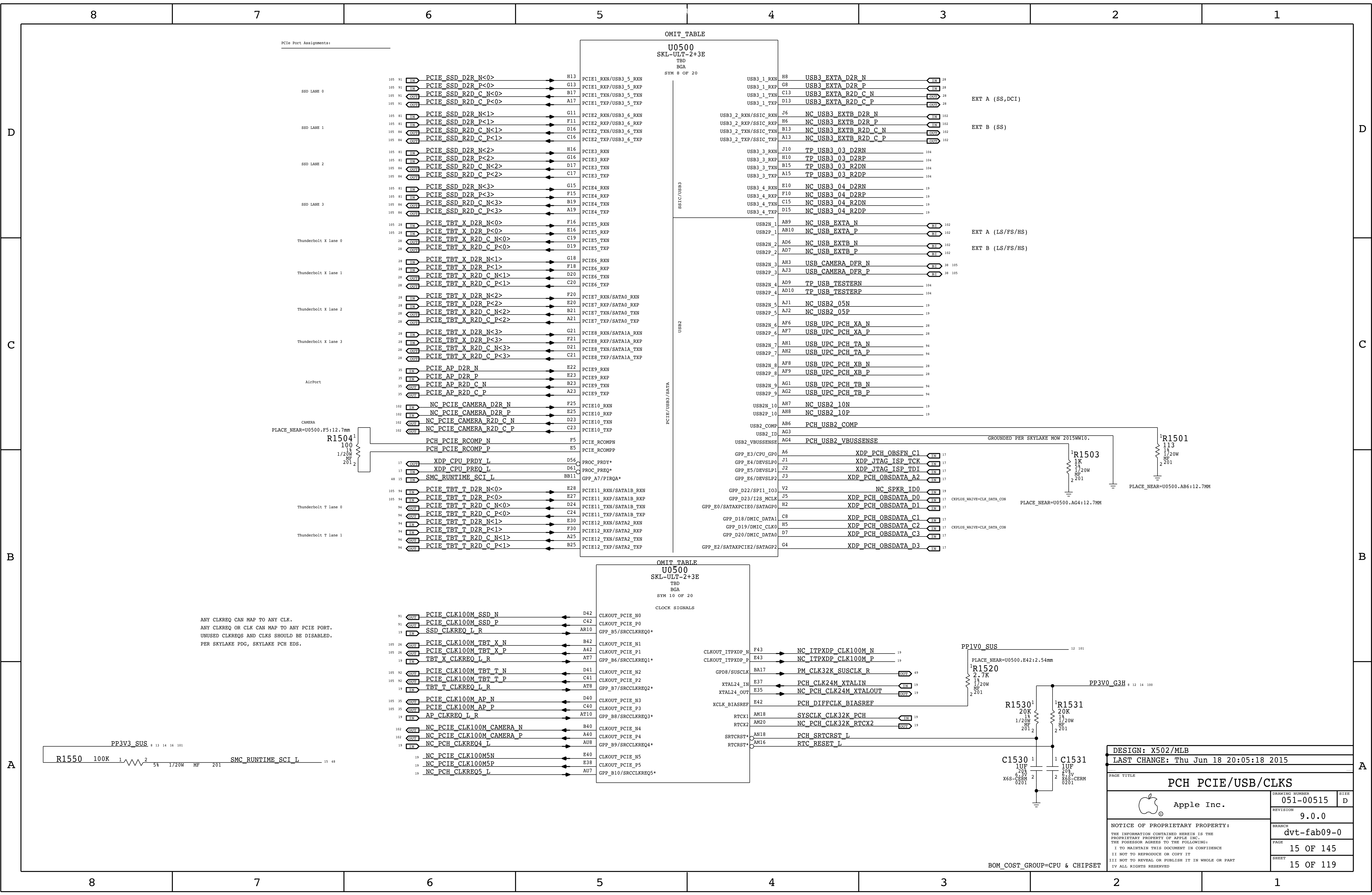
PCH Reset Button



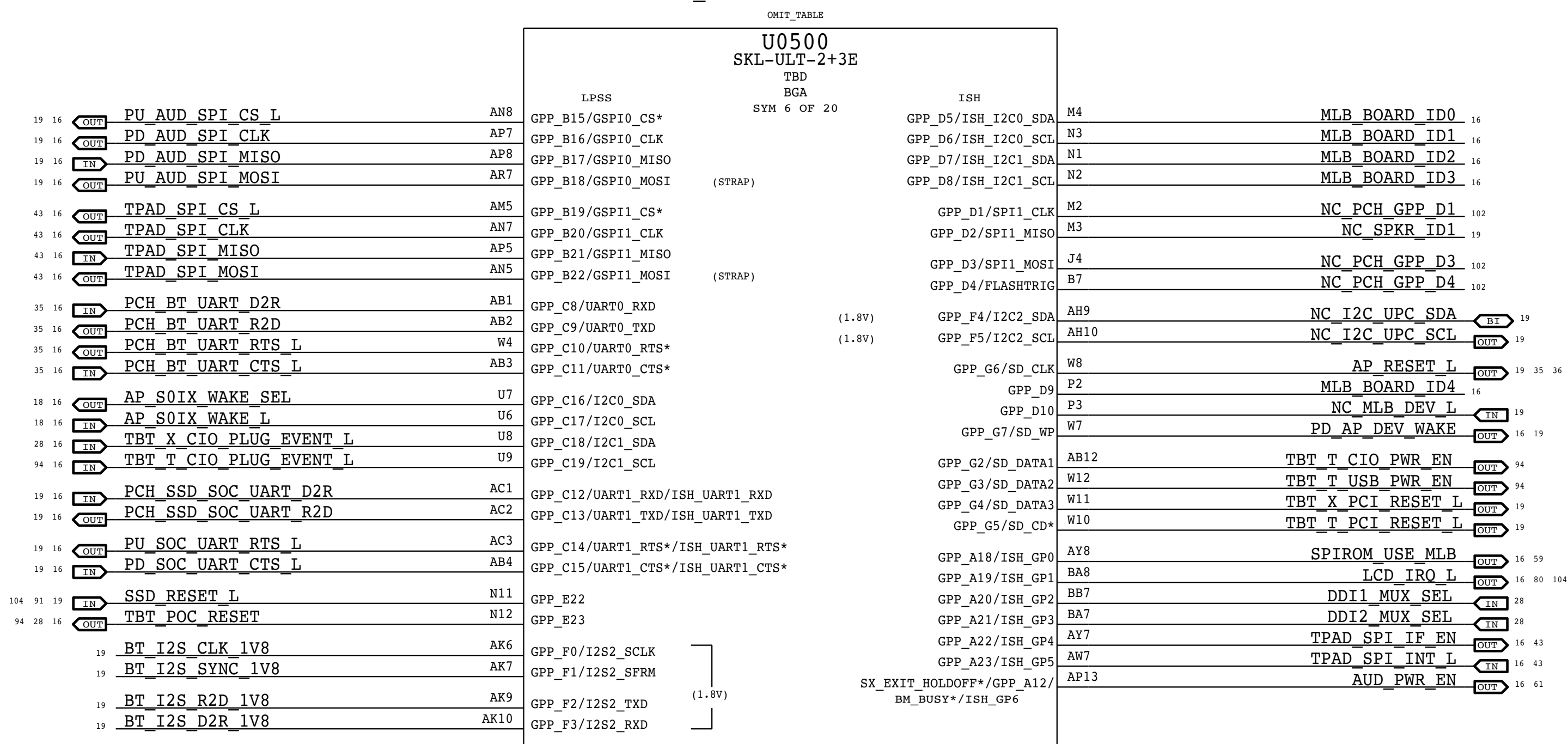
BOM\_COST\_GROUP=CPU & CHIPSET

DESIGN: X502/MLB		
LAST CHANGE: Tue May 3 17:45:28 2016		
PAGE TITLE		
PCH Power Management		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	14 OF 145
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		14 OF 119
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		



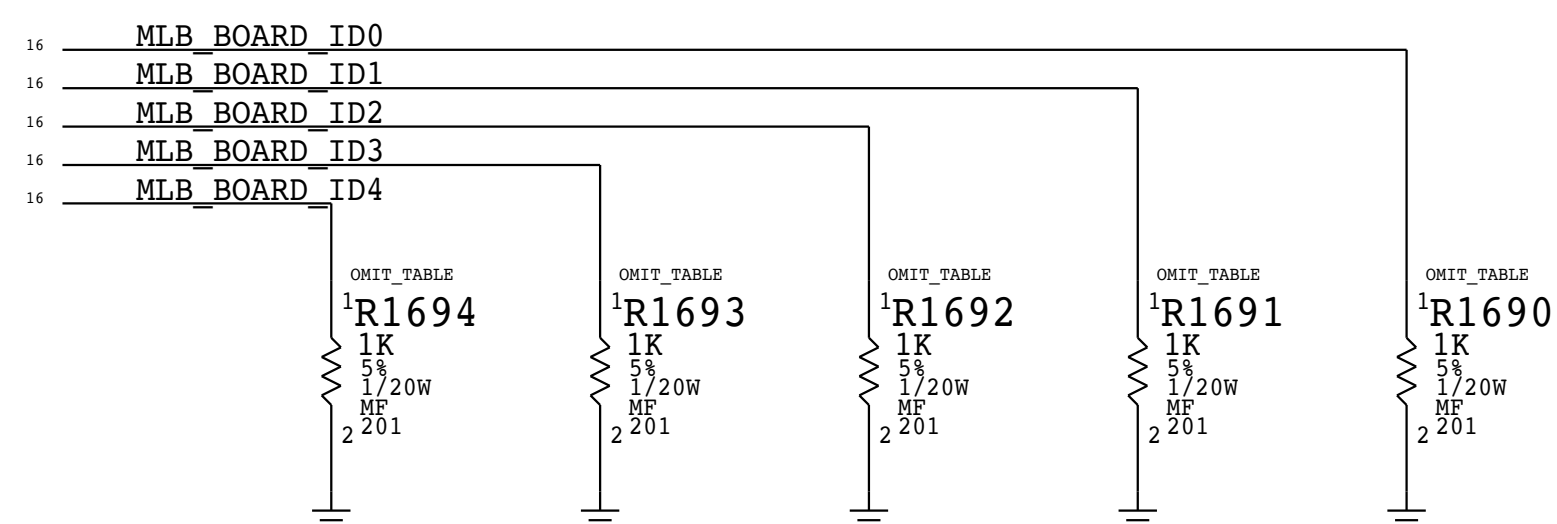


ALL GPP\_F\* PINS ARE 1.8V ONLY!




MLB ID STRAPS.

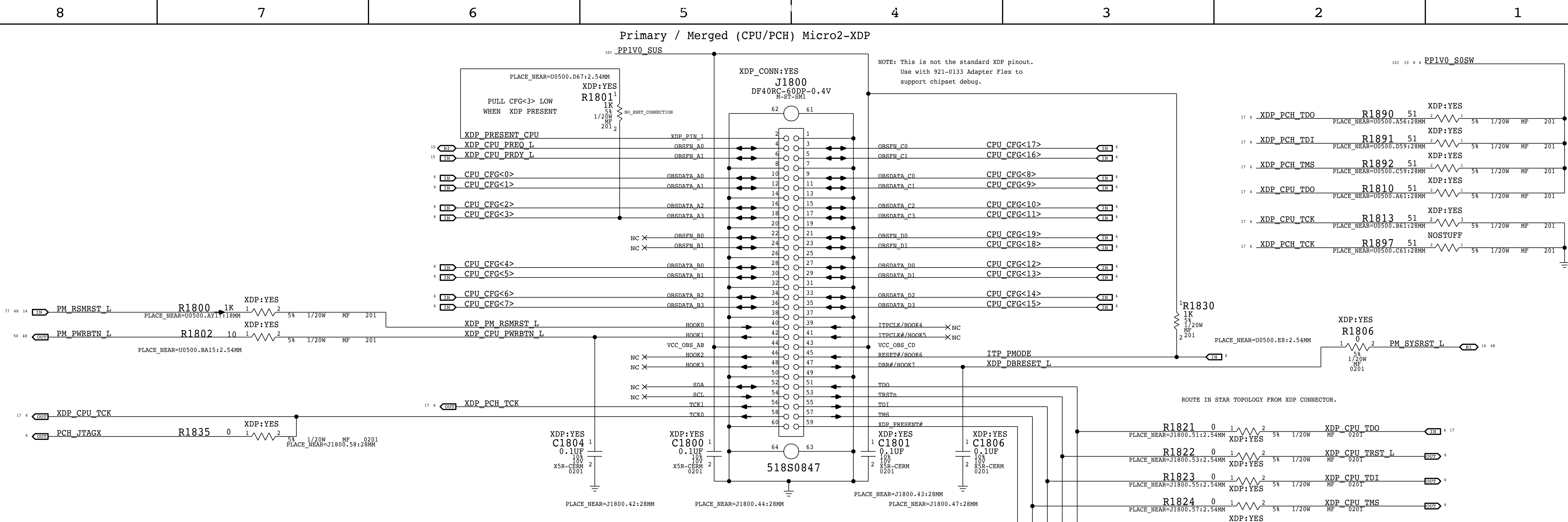
PCH INTERNAL PULL-UPS ARE TO VCCGPPD = 3.3V.



PAR#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	CODE
117S0006	0	RES,MF,1/20W/1K OHM,5,0201,SMD		BOARD_ID:0	<11111>
117S0006	1	RES,MF,1/20W/1K OHM,5,0201,SMD	R1690	BOARD_ID:1	<11110>
117S0006	1	RES,MF,1/20W/1K OHM,5,0201,SMD	R1691	BOARD_ID:2	<11101>
117S0006	2	RES,MF,1/20W/1K OHM,5,0201,SMD	R1691,R1690	BOARD_ID:3	<11100>
117S0006	1	RES,MF,1/20W/1K OHM,5,0201,SMD	R1692	BOARD_ID:4	<11011>
117S0006	2	RES,MF,1/20W/1K OHM,5,0201,SMD	R1692,R1690	BOARD_ID:5	<11010>
117S0006	2	RES,MF,1/20W/1K OHM,5,0201,SMD	R1692,R1691	BOARD_ID:6	<11001>
117S0006	3	RES,MF,1/20W/1K OHM,5,0201,SMD	R1692,R1691,R1690	BOARD_ID:7	<11000>
117S0006	1	RES,MF,1/20W/1K OHM,5,0201,SMD	R1693	BOARD_ID:8	<10111>
117S0006	2	RES,MF,1/20W/1K OHM,5,0201,SMD	R1693,R1690	BOARD_ID:9	<10110>
117S0006	2	RES,MF,1/20W/1K OHM,5,0201,SMD	R1693,R1691	BOARD_ID:10	<10101>
117S0006	3	RES,MF,1/20W/1K OHM,5,0201,SMD	R1693,R1691,R1690	BOARD_ID:11	<10100>
117S0006	1	RES,MF,1/20W/1K OHM,5,0201,SMD	R1694	BOARD_ID:16	<01111>

BOM\_COST\_GROUP=CPU & CHIPSET

DESIGN: X502/MLB		
LAST CHANGE: Wed Oct 28 12:50:22 2015		
PAGE TITLE		
PCH SPI/UART/GPIO		
 Apple Inc.	DRAWING NUMBER 051-00515	
	REVISION 9.0.0	
	BRANCH dvt-fab09-0	
	PAGE 16 OF 145	
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		
SHEET 16 OF 119		



## PCH XDP Signals

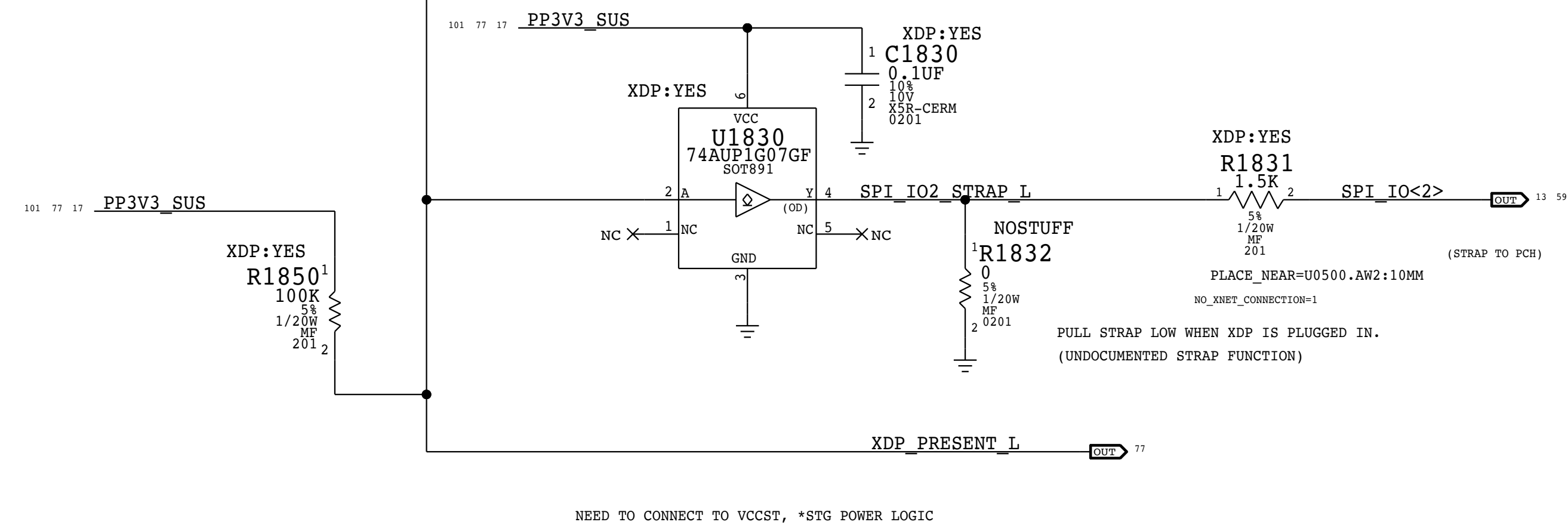
These signals do not connect to the Primary (Merged) XDP connector in this architecture.  
The PDG puts them on a secondary XDP connector that is only needed in some PCH debugging situation.  
They are listed here to show their secondary XDP functions and to provide test points for signals that are not used elsewhere


PCH/XDP Signals					Non-XDP Signals				
15	IN	XDP_JTAG_ISP_TCK	MAKE_BASE=TRUE	==			XDP_JTAG_ISP_TCK	OUT	94
15	IN	XDP_JTAG_ISP_TDI	MAKE_BASE=TRUE	==			XDP_JTAG_ISP_TDI	OUT	94
15	IN	XDP_PCH_OBSDATA_A2		TP-P6	TP1870				
15	IN	XDP_PCH_OBSDATA_A3		TP-P6	TP1871				
5	IN	XDP_PCH_OBSDATA_B0		TP-P6	TP1872				
13	IN	XDP_PCH_OBSDATA_C0		TP-P6	TP1873				
15	IN	XDP_PCH_OBSDATA_C1		TP-P6	TP1874				
15	IN	XDP_PCH_OBSDATA_C2		TP-P6	TP1875				
15	IN	XDP_PCH_OBSDATA_C3		TP-P6	TP1876				
15	IN	XDP_PCH_OBSDATA_D0		TP-P6	TP1877				
15	IN	XDP_PCH_OBSDATA_D1		TP-P6	TP1878				
6	IN	XDP_PCH_OBSDATA_D2		TP-P6	TP1879				
15	IN	XDP_PCH_OBSDATA_D3		TP-P6	TP1880				
15	IN	XDP_PCH_OBSFN_C1		TP-P6	TP1881				
28	OUT	XDP_USB_EXT_A_OC_L	MAKE_BASE=TRUE	==			XDP_USB_EXT_A_OC_L	IN	101
28	OUT	XDP_USB_EXT_B_OC_L	MAKE_BASE=TRUE	==			XDP_USB_EXT_B_OC_L	IN	101
94	OUT	XDP_USB_EXT_C_OC_L	MAKE_BASE=TRUE	==			XDP_USB_EXT_C_OC_L	IN	101
94	OUT	XDP_USB_EXT_D_OC_L	MAKE_BASE=TRUE	==			XDP_USB_EXT_D_OC_L	IN	101

Unused GPIOs have TPS.

USB Overcurrents are aliased, do not cause USB OC# events during PCH debug.

JTAG\_ISP (non-TMS) nets are aliased, do not attempt bit-banged JTAG during PCH debug.



DESIGN: X502/MLB				
LAST CHANGE: Thu Oct 22 19:53:09 2015				
PAGE TITLE				
CPU/PCH Merged XDP				
 Apple Inc.		DRAWING NUMBER		SHEET
		051-00515		D
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		REVISION		
		9.0.0		
		BRANCH		dvt-fab09-0
		PAGE		
		18 OF 145		
		SHEET		
		17 OF 119		

BOM\_COST\_GROUP=DEBUG



## D



## B

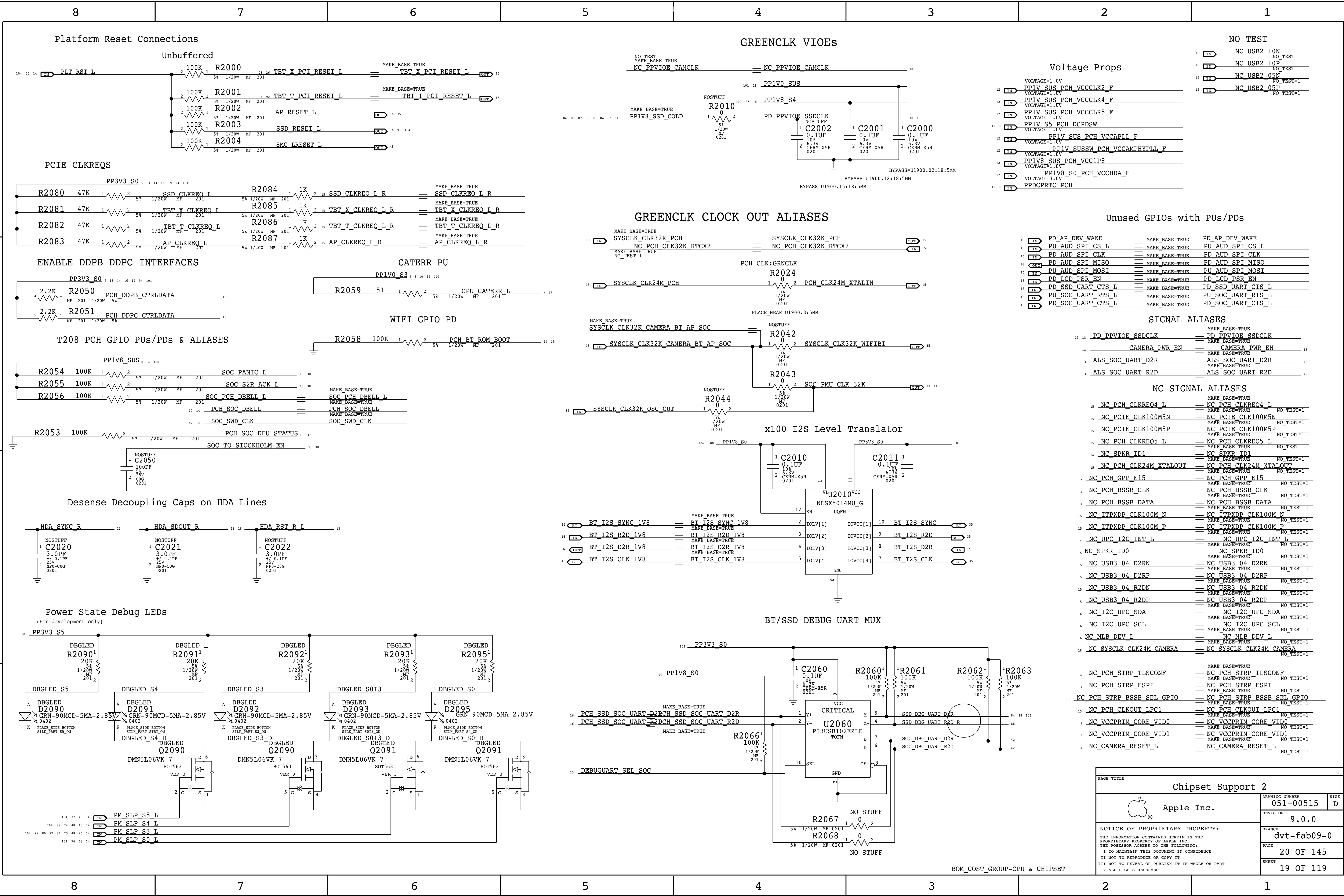


## D



B

A



## D



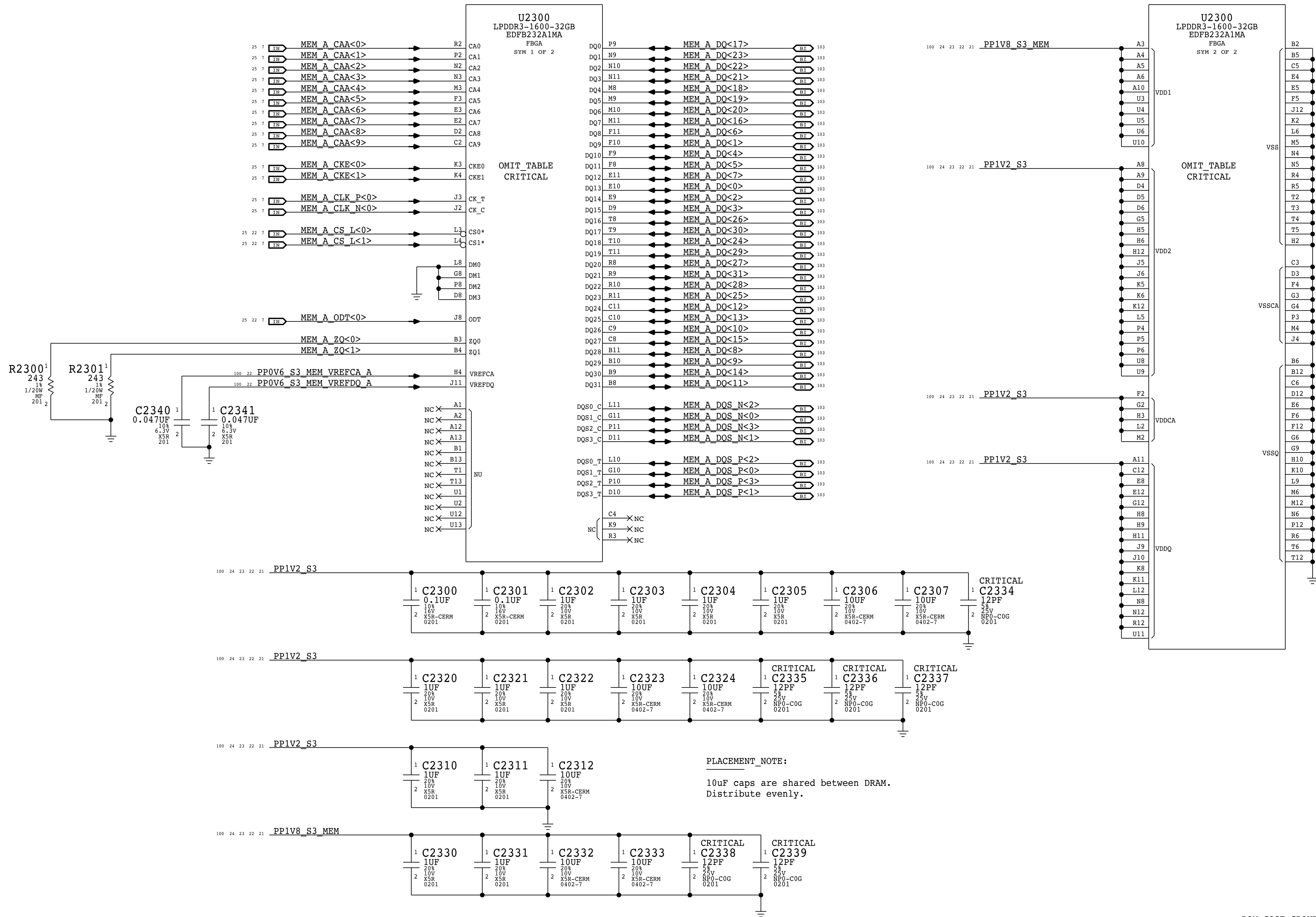
B

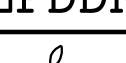
A

BOM\_COST\_GROUP=CPU &amp; CHIPSET



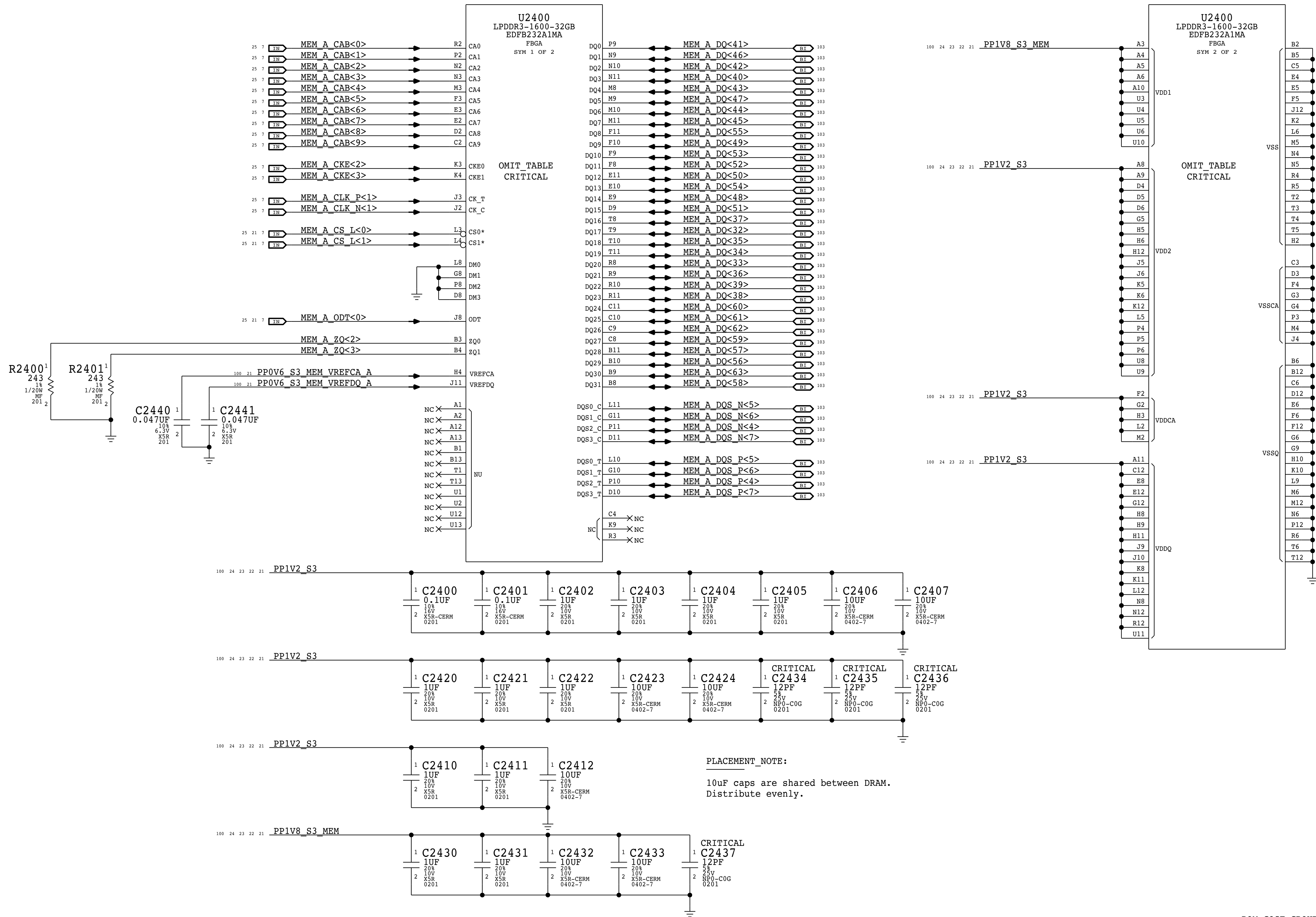
# LPDDR3 CHANNEL A (0-31)

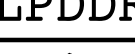


SYNC_MASTER=J52_MLB			SYNC_DATE=05/12/2015			
PAGE TITLE						
LPDDR3 DRAM Channel A (00-31)						
 Apple Inc.			DRAWING NUMBER		STEP	
			051-00515		D	
<b>NOTICE OF PROPRIETARY PROPERTY:</b>  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  I I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  I I I NOT TO REPRODUCE OR COPY IT  I I I I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART  I I I I I ALL RIGHTS RESERVED			REVISION		9.0.0	
			BRANCH		dvt-fab09-0	
			PAGE		23 OF 145	
			SHEET		21 OF 119	

BOM\_COST\_GROUP=DRAM

# LPDDR3 CHANNEL A (32-63)



SYNC_MASTER=J52_MLB		SYNC_DATE=05/12/2015	
PAGE TITLE			
LPDDR3 DRAM Channel A (32-63)			
	DRAWING NUMBER	051-00515	STEP
	REVISION	9.0.0	D
Apple Inc.			
NOTICE OF PROPRIETARY PROPERTY:			
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		BRANCH	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		dvt-fab09-0	
II NOT TO REPRODUCE OR COPY IT		PAGE	
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		24 OF 145	
IV ALL RIGHTS RESERVED		SHEET	
		22 OF 119	

BOM\_COST\_GROUP=DRAM

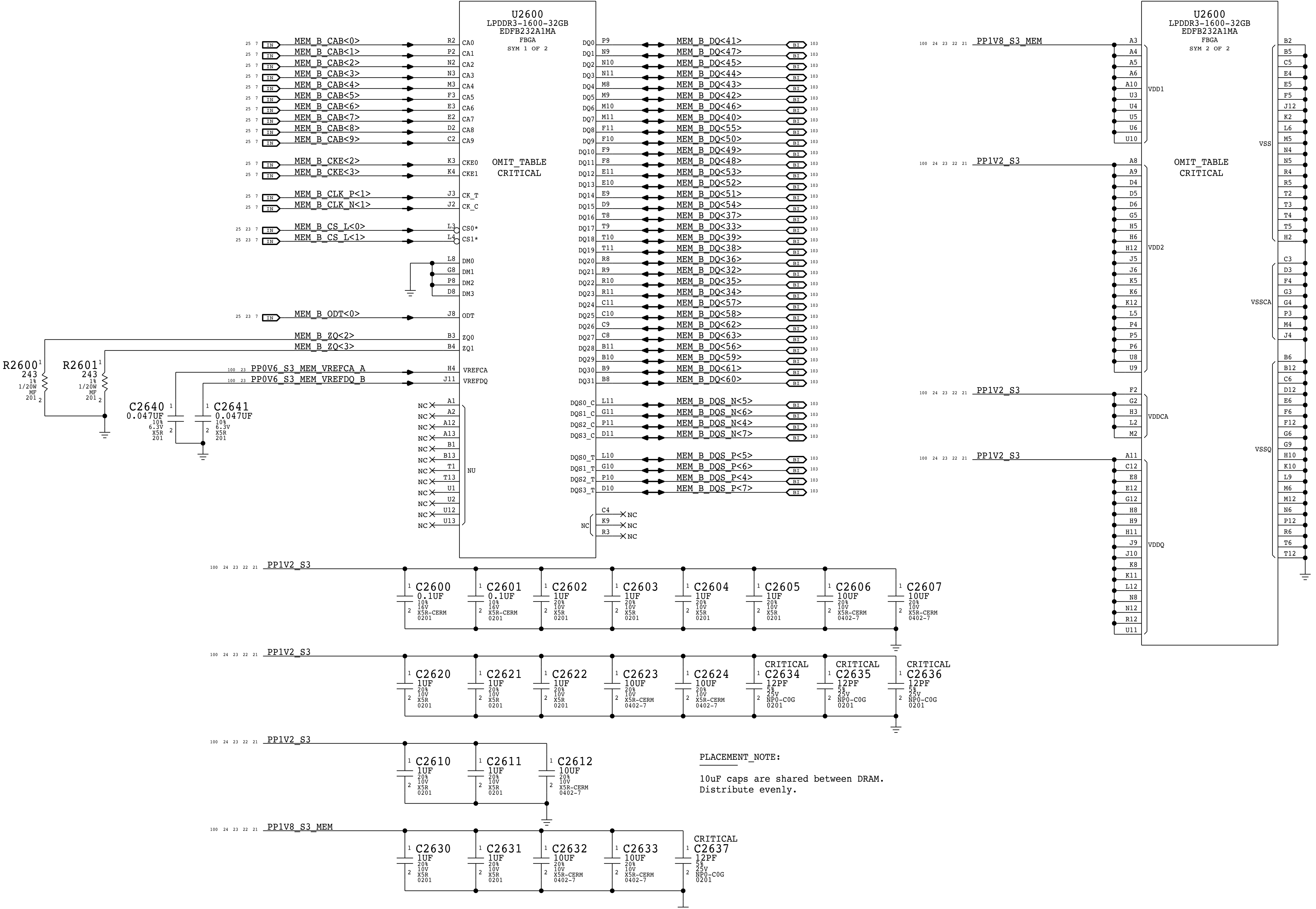
## D


C

B

A

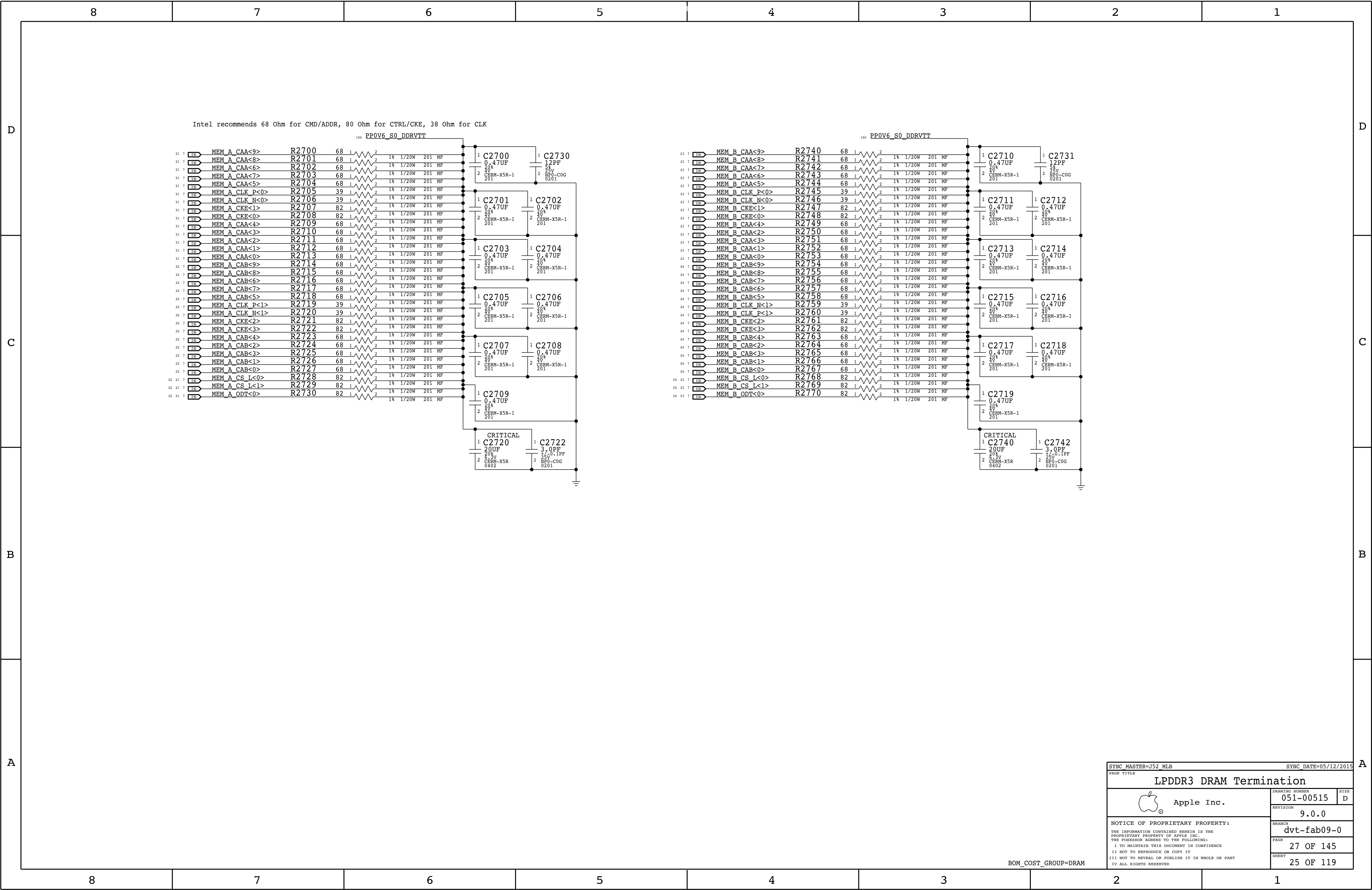
LPDDR3 CHANNEL B (32-63)

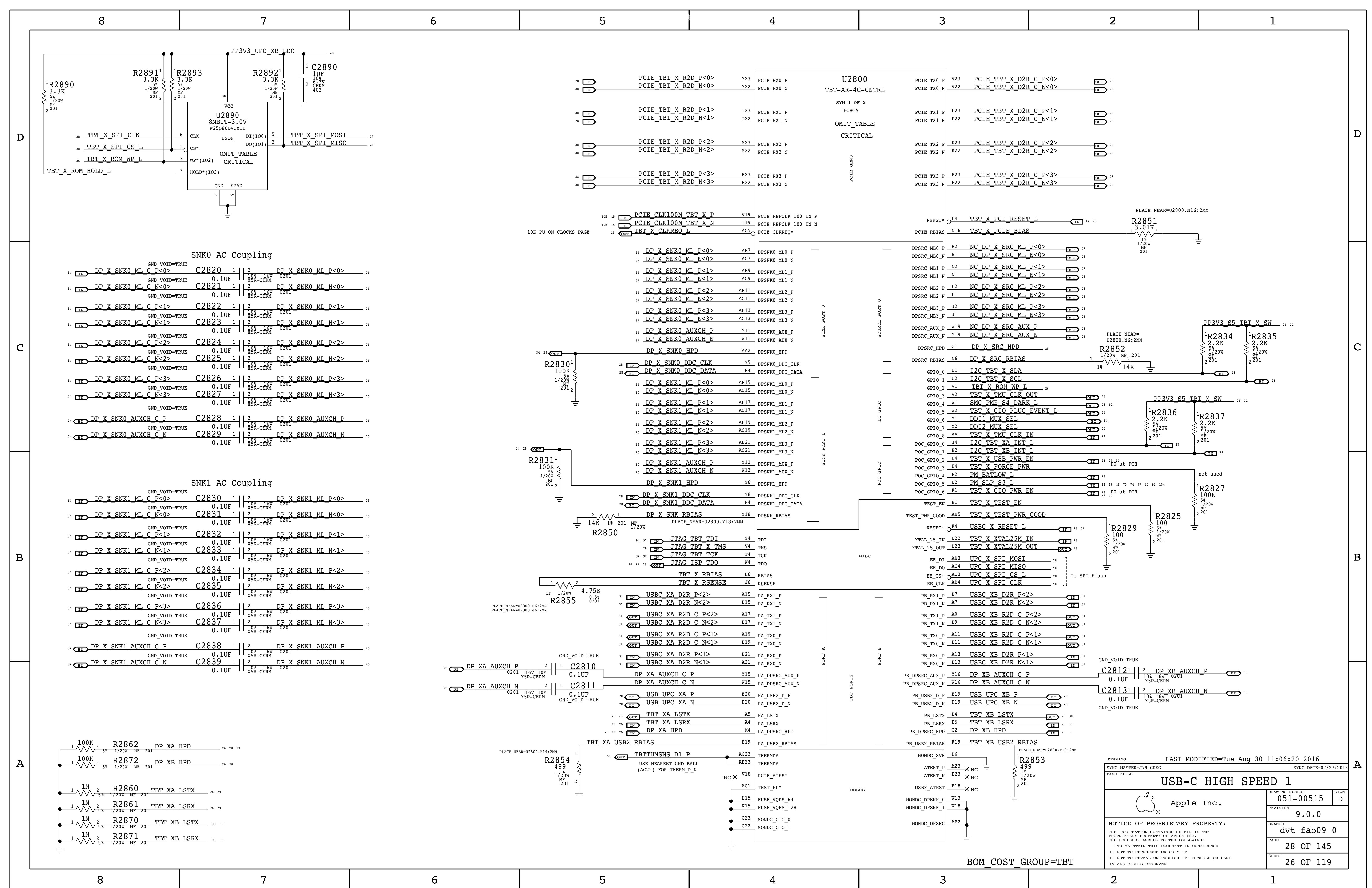


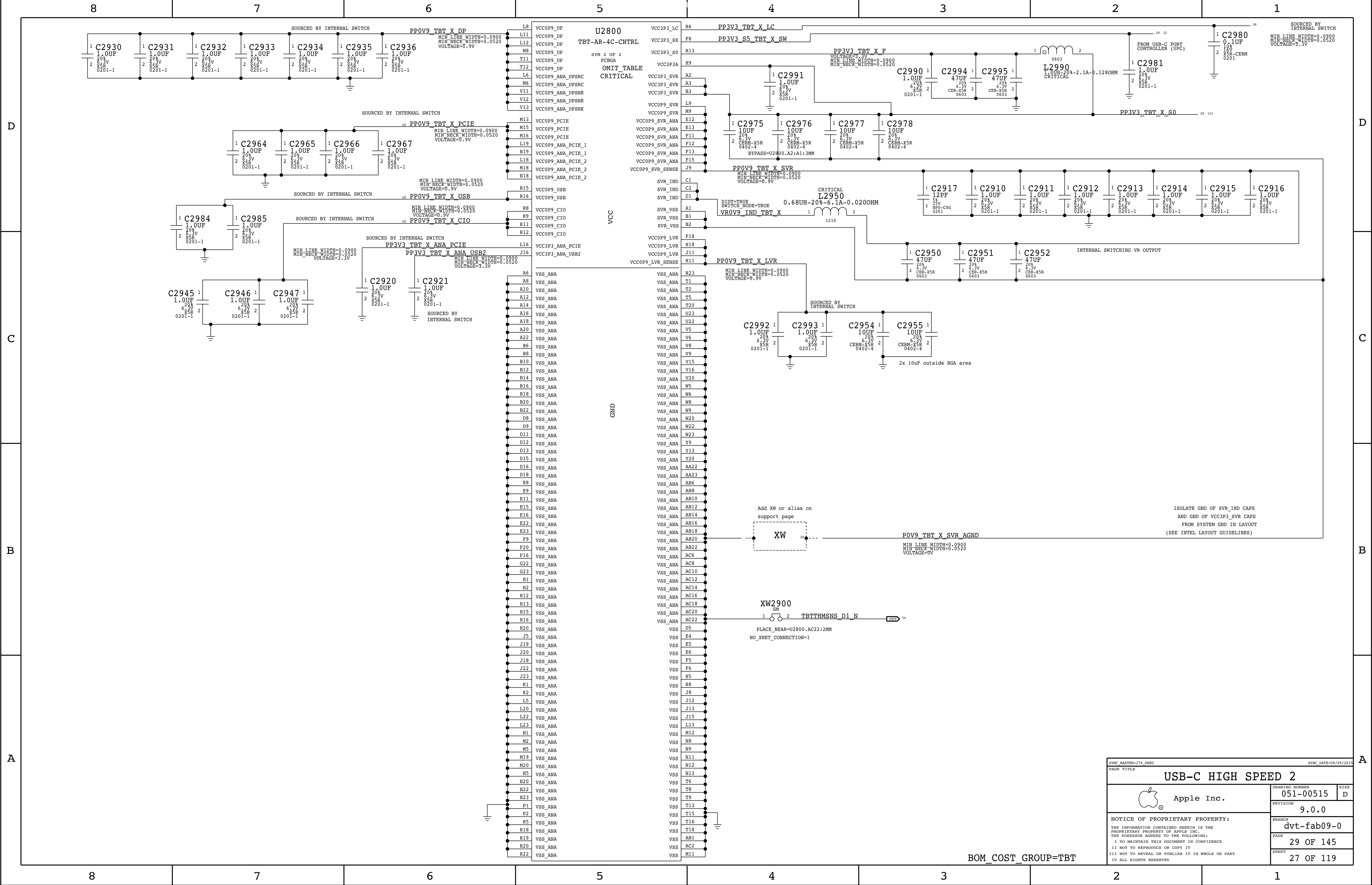
SYNC_MASTER=J52_MLB		SYNC_DATE=05/12/2015	
PAGE TITLE			
LPDDR3 DRAM Channel B (32-63)			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS 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	REVISION		
	9.0.0		
	BRANCH		
	dvt-fab09-0		
	PAGE	26 OF 145	
	SHEET	24 OF 119	

BOM\_COST\_GROUP=DRAM

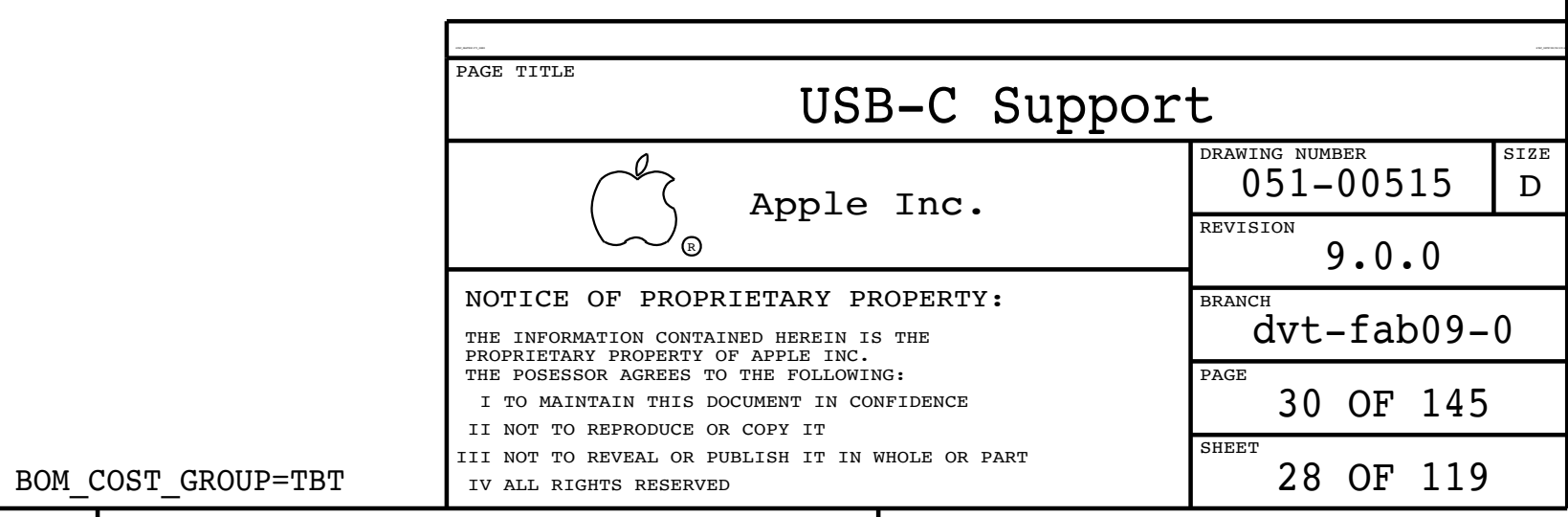
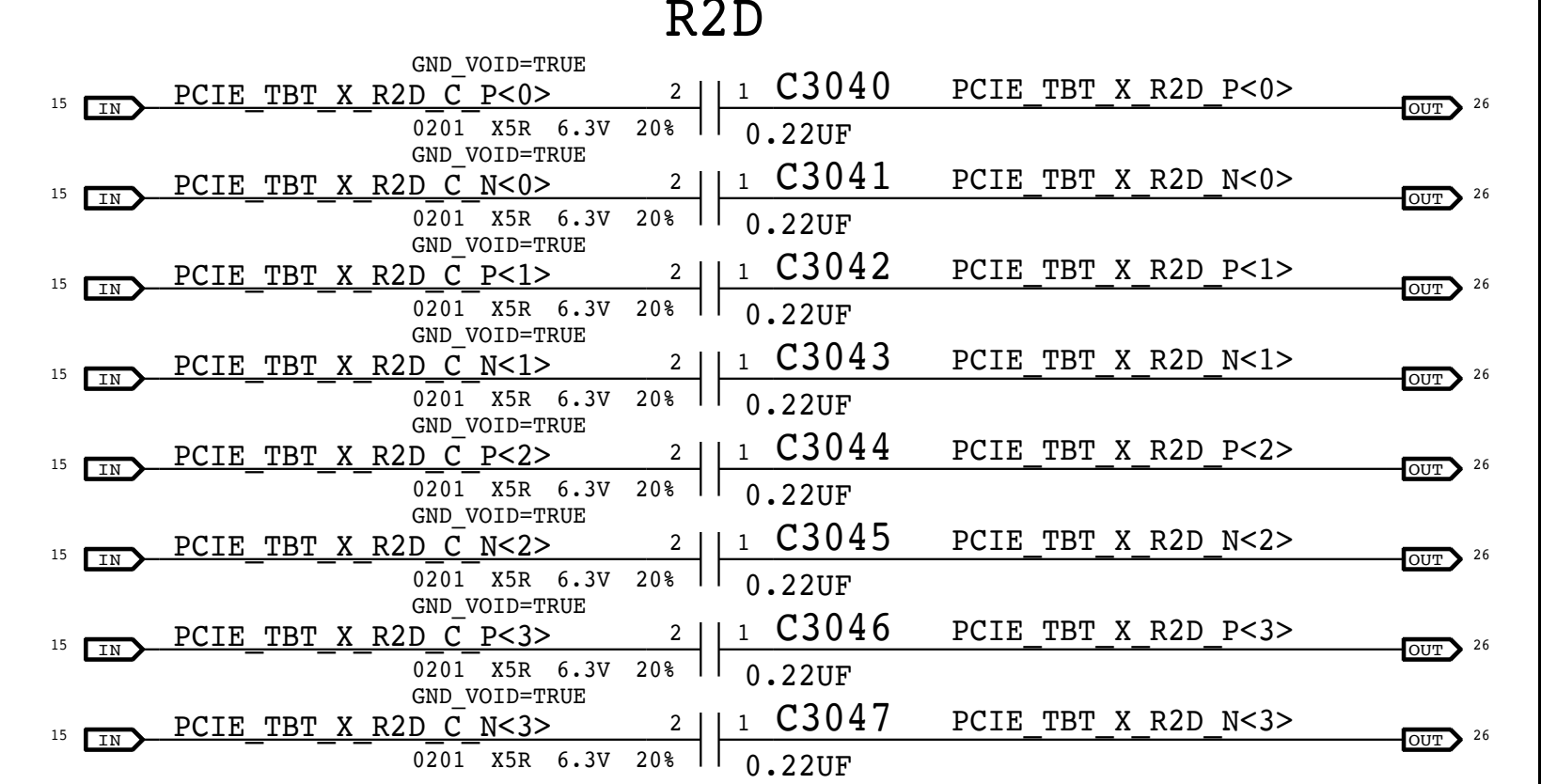
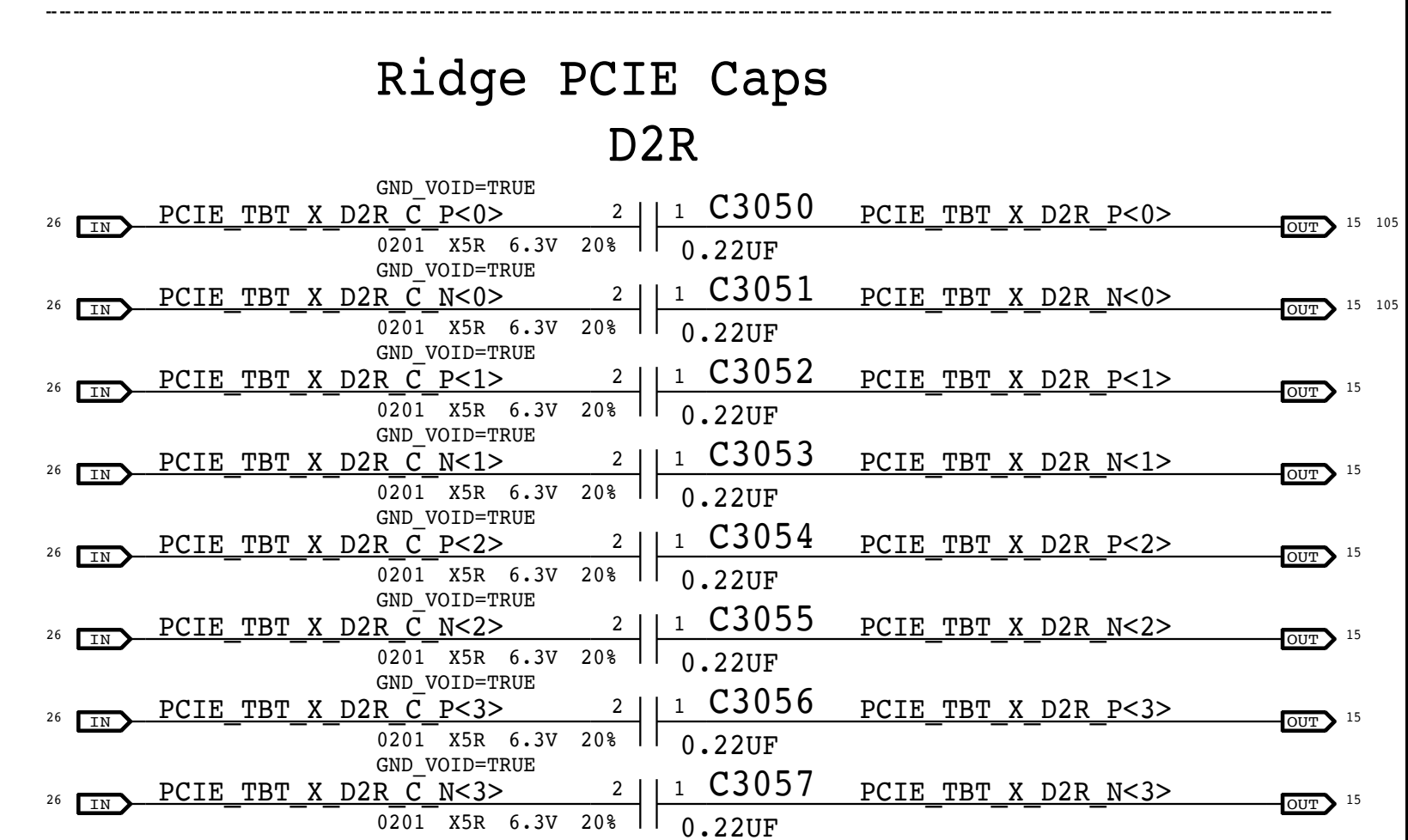
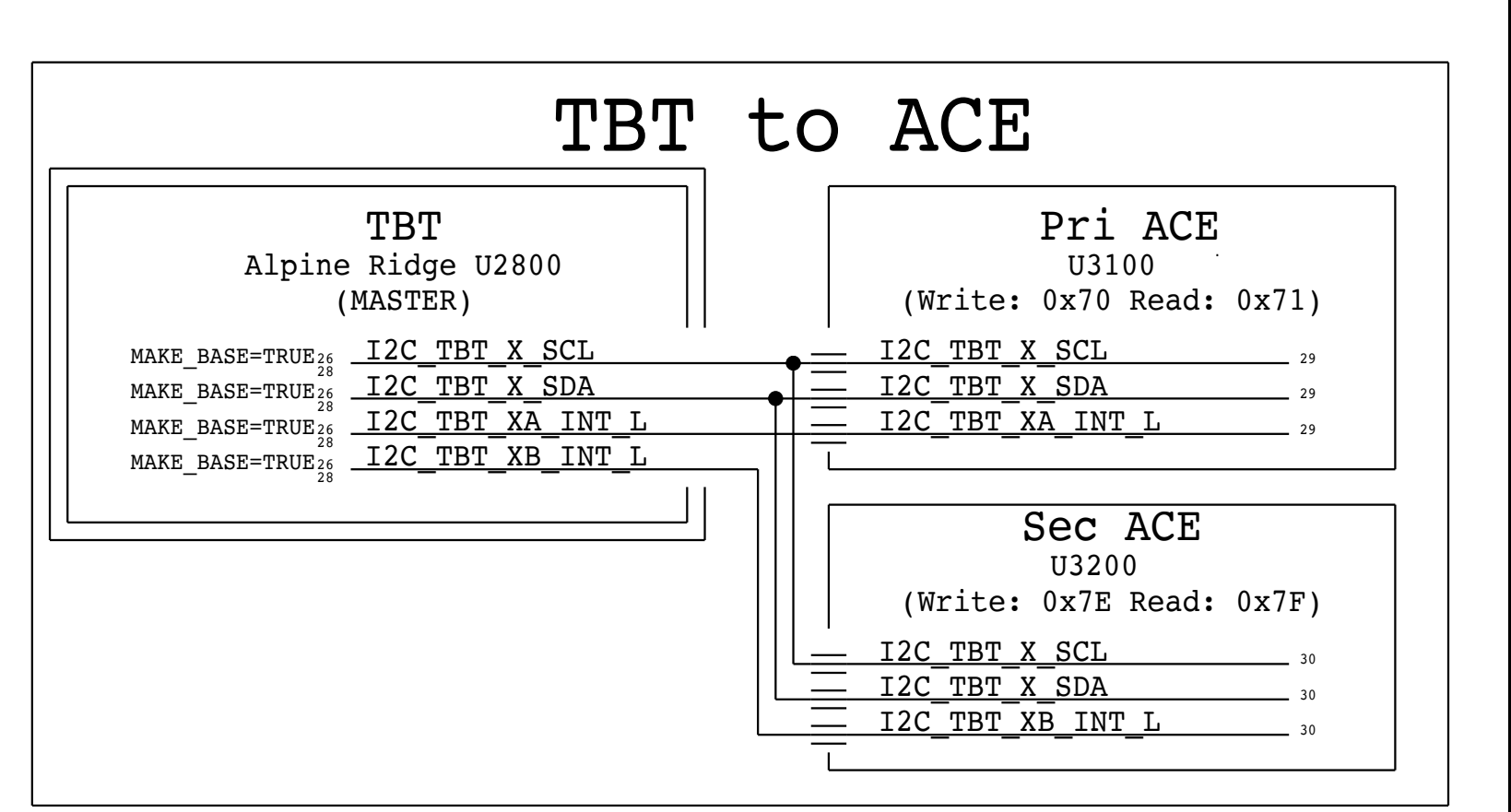
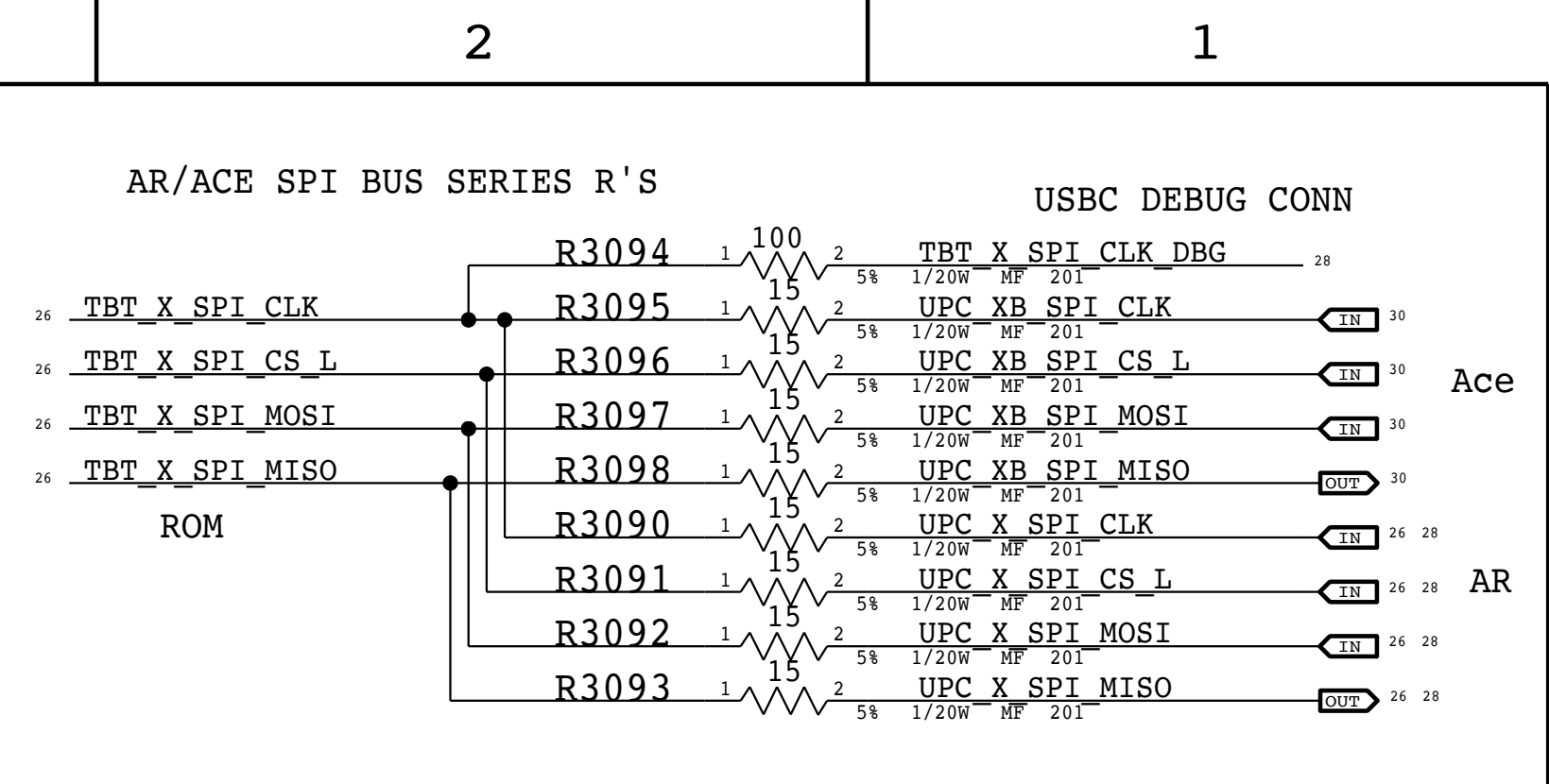
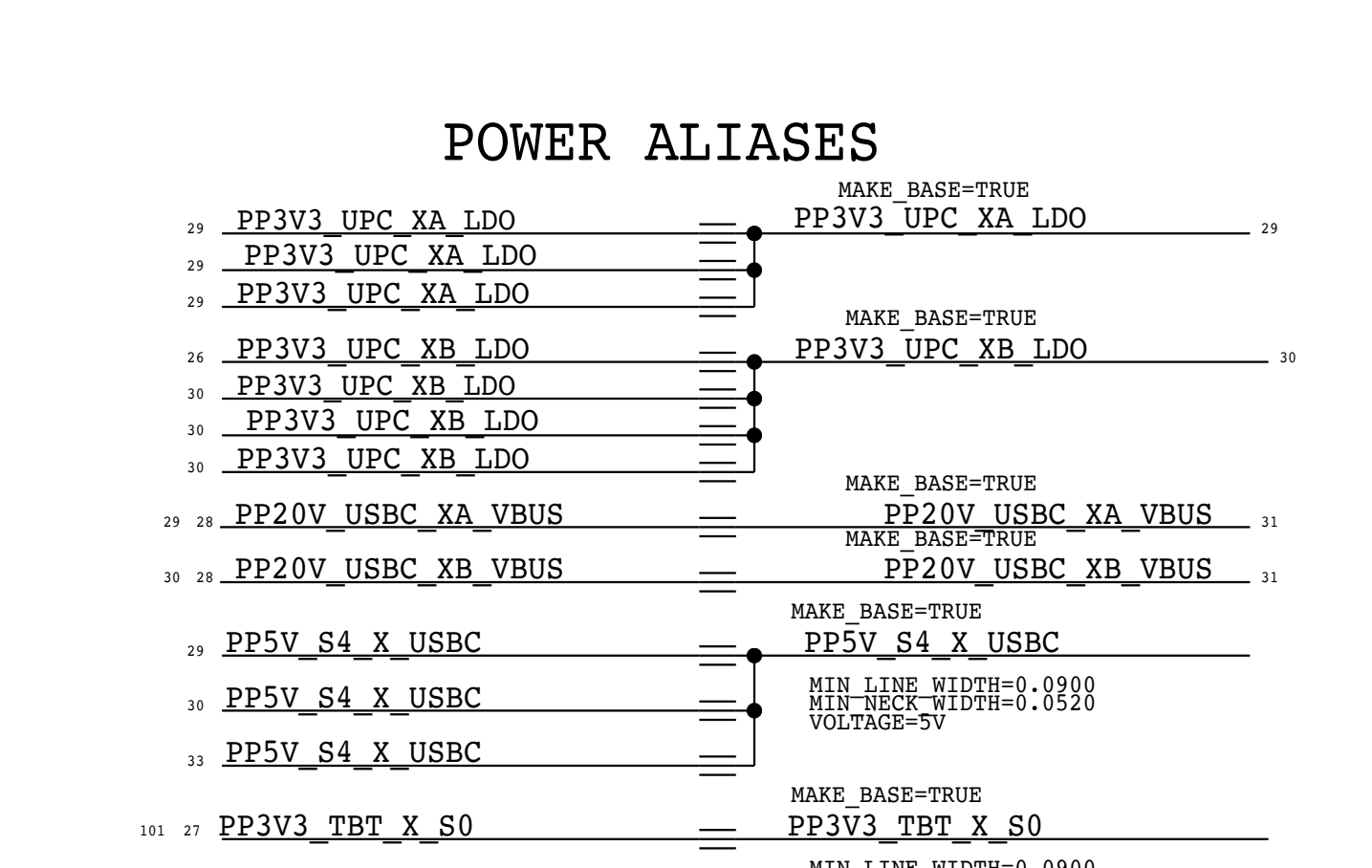
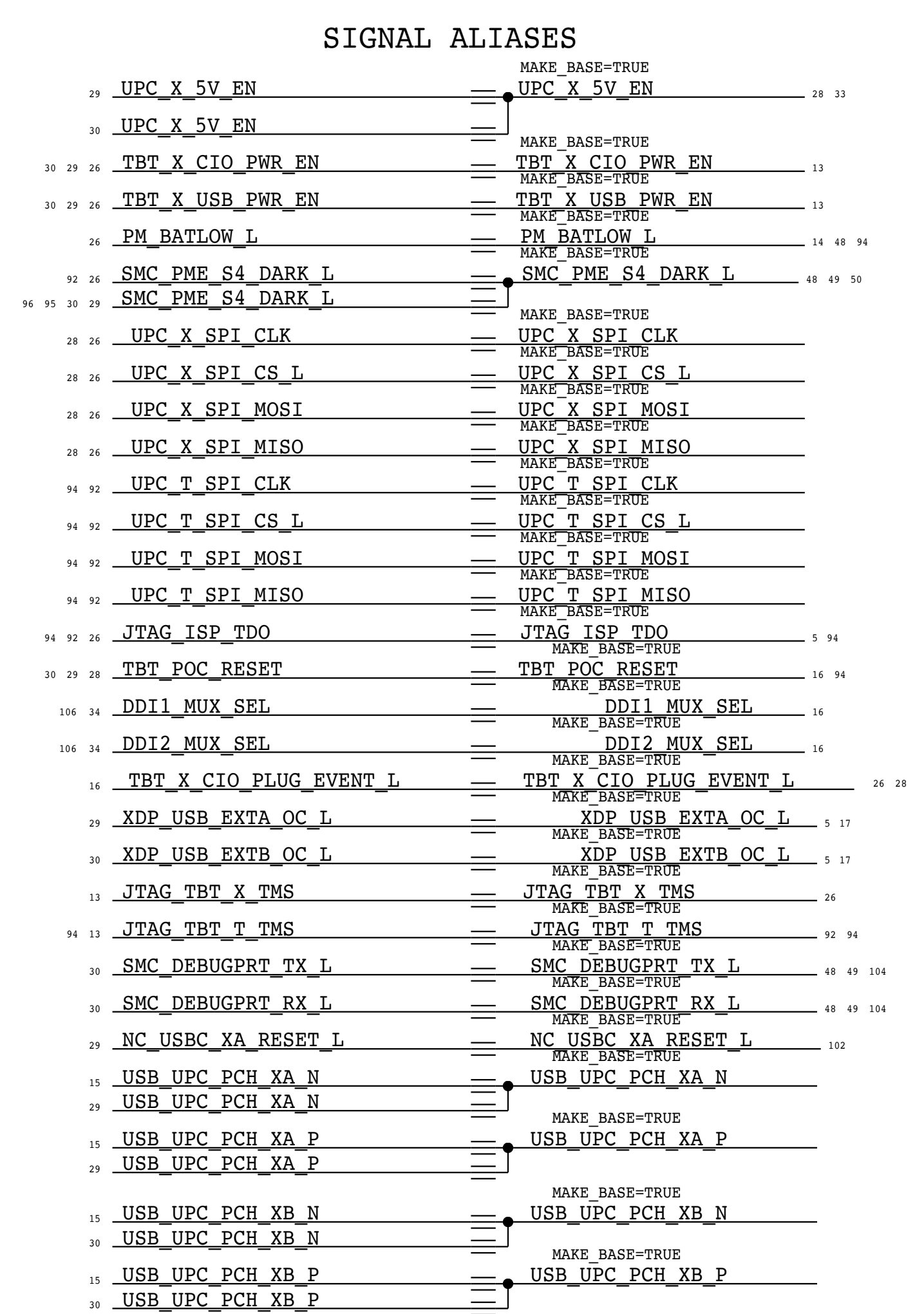
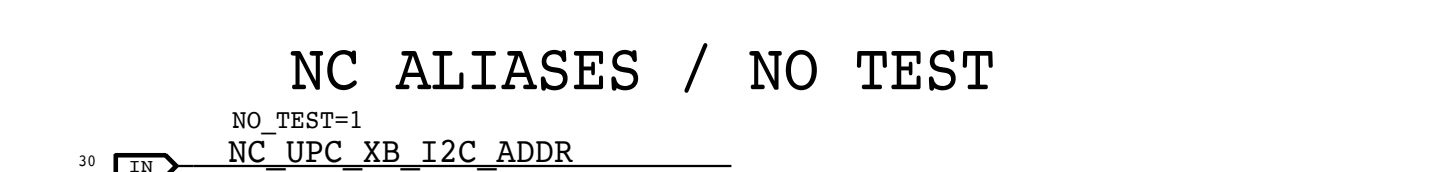
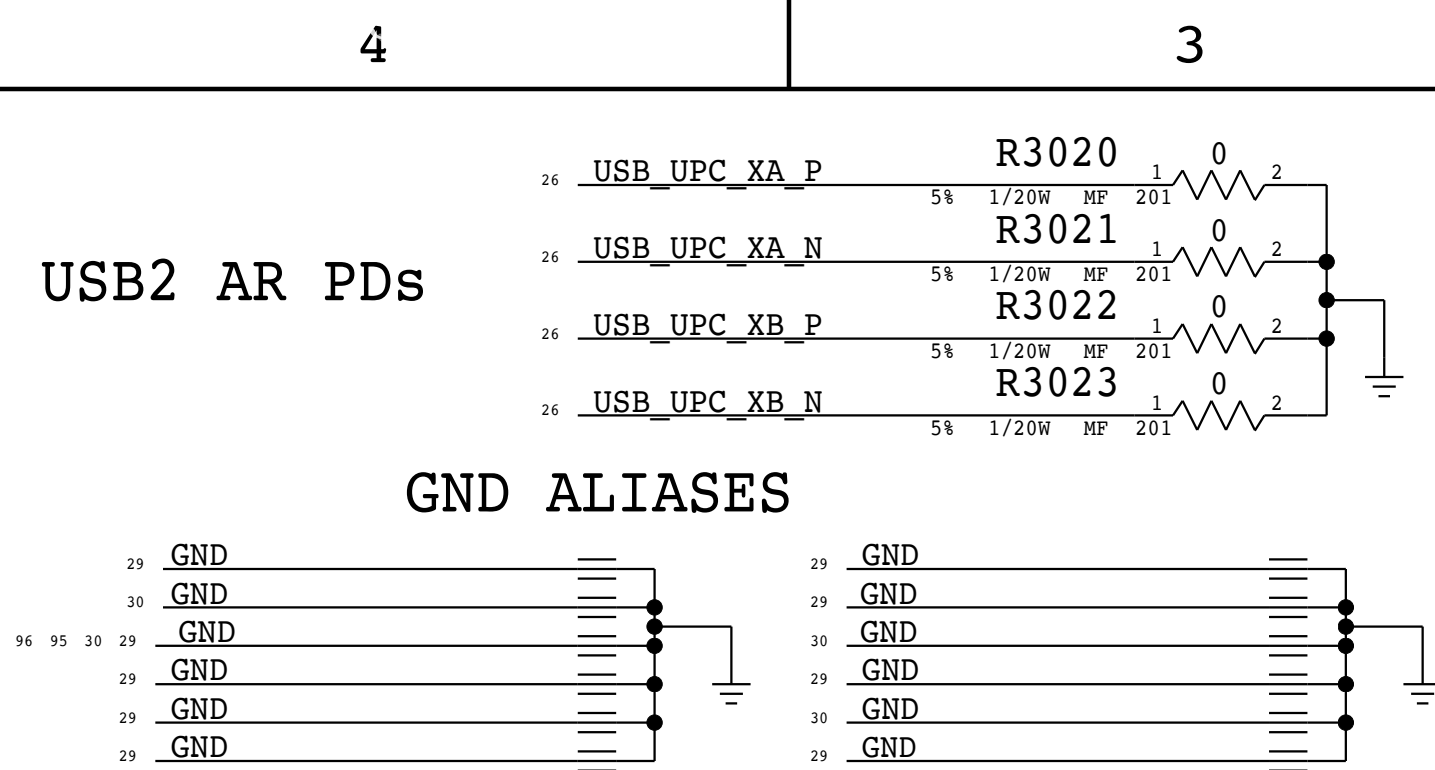
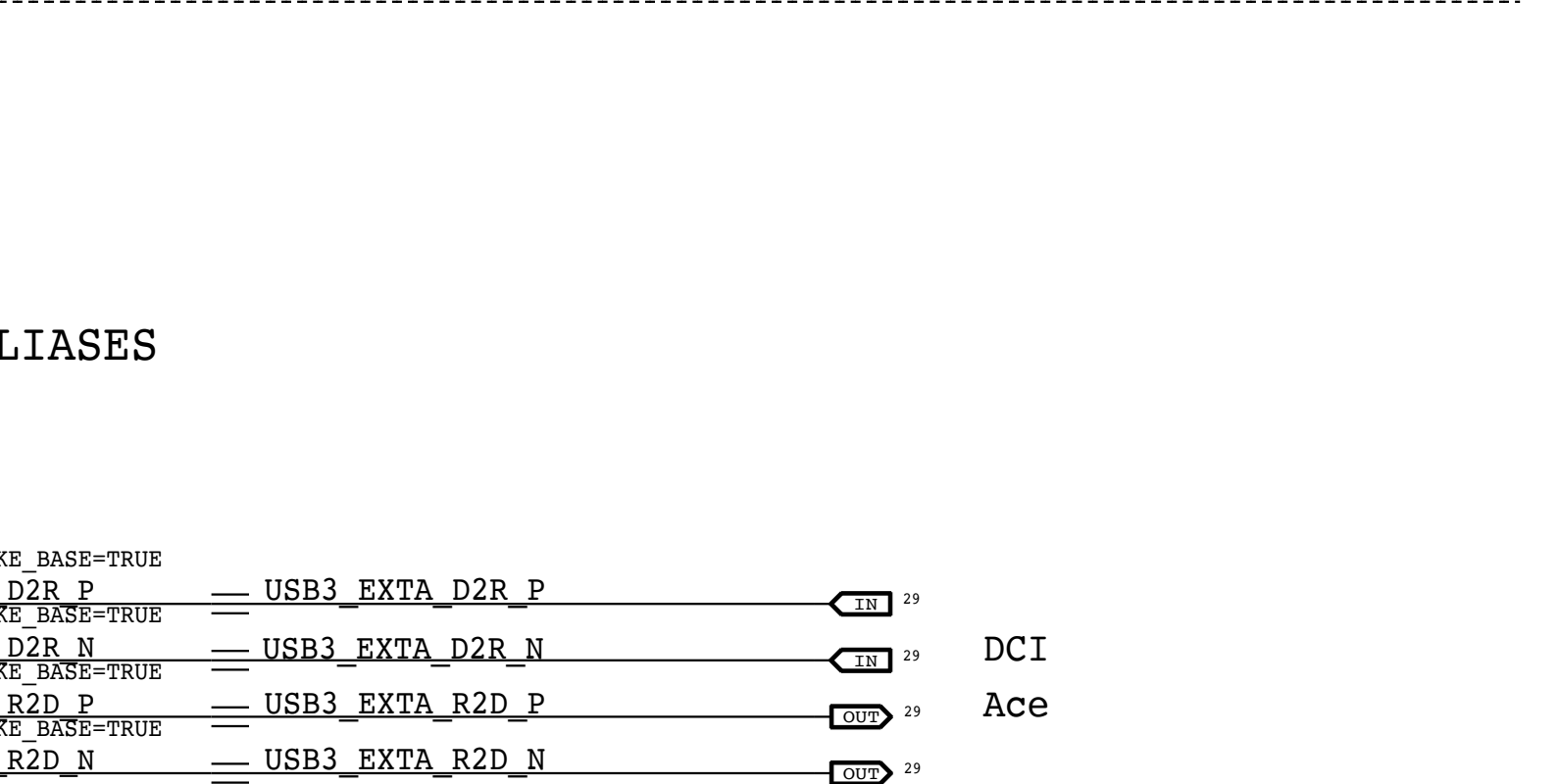
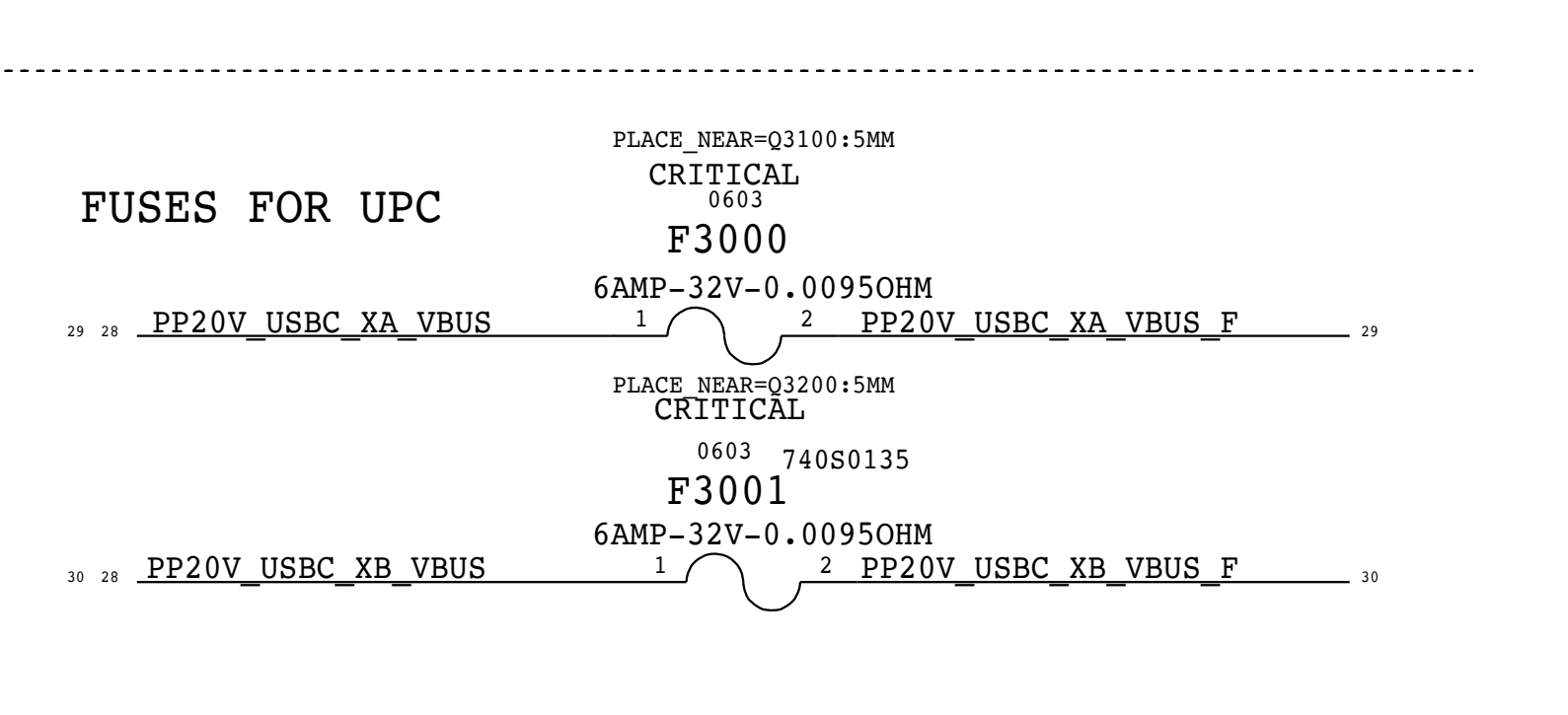
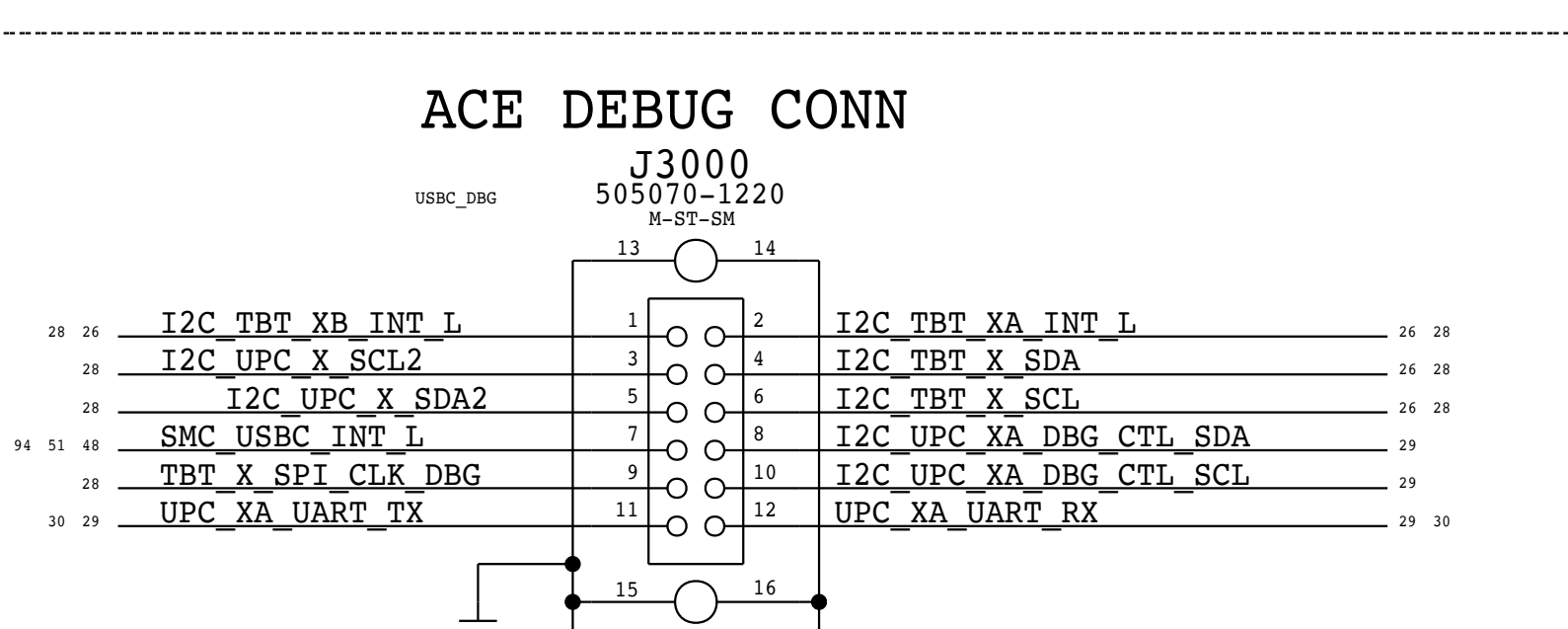
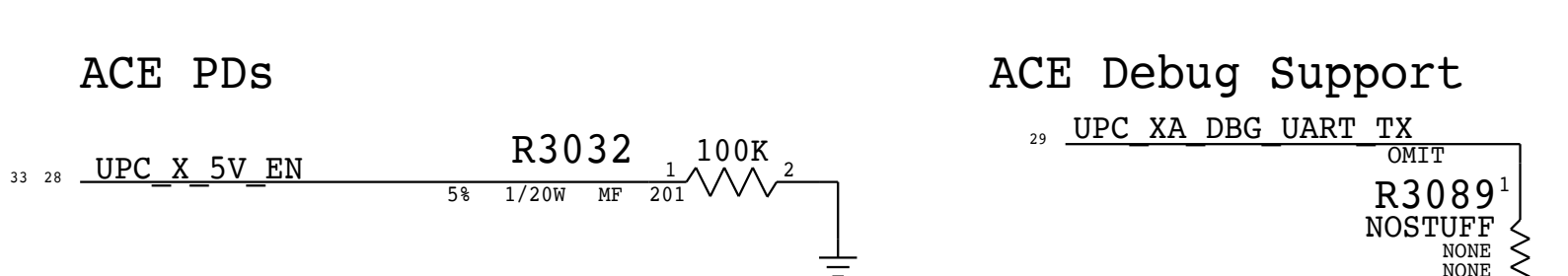
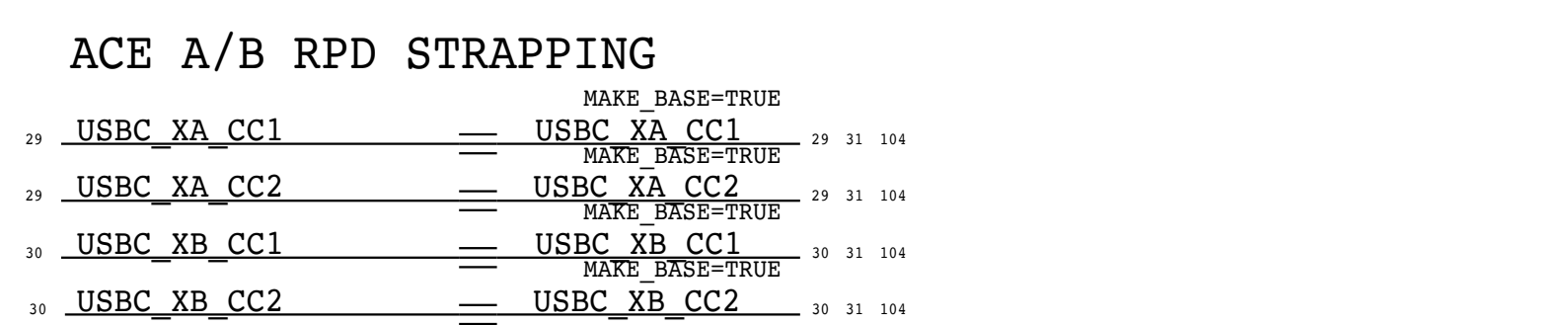
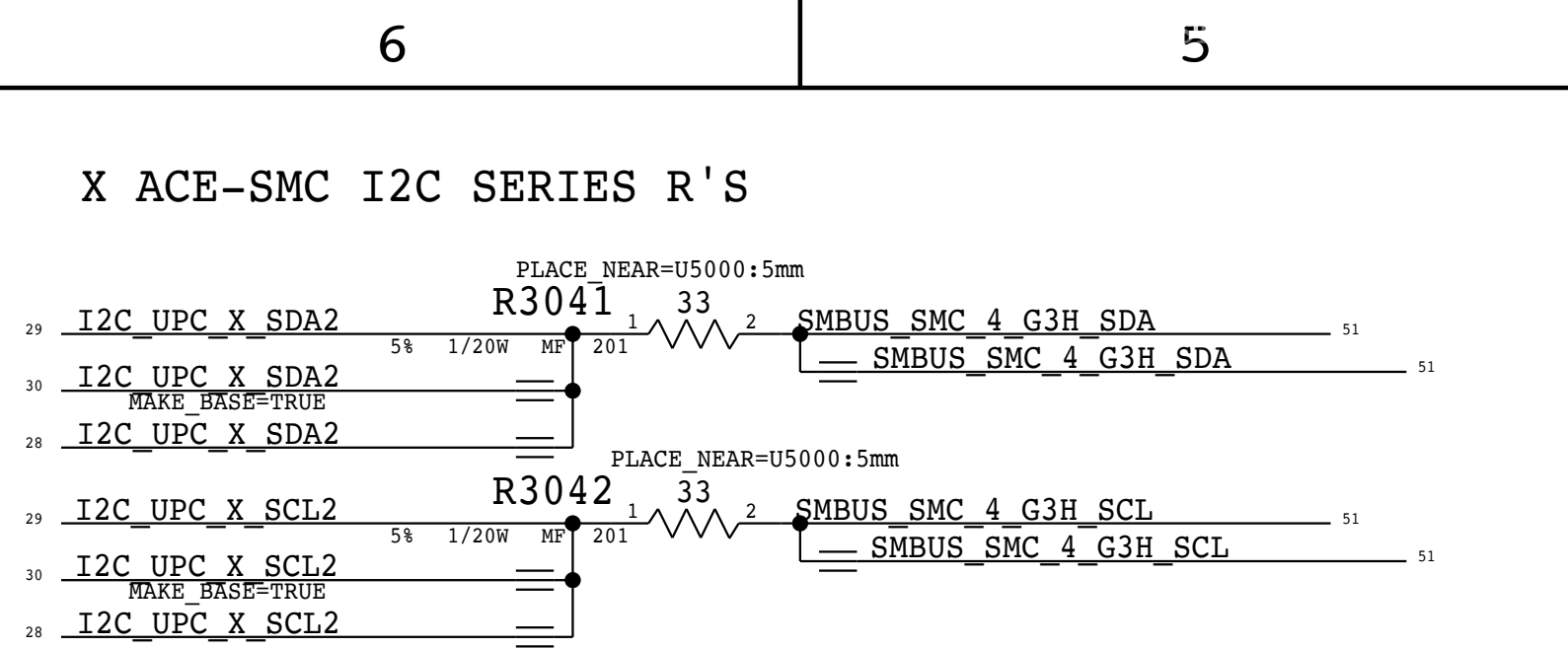
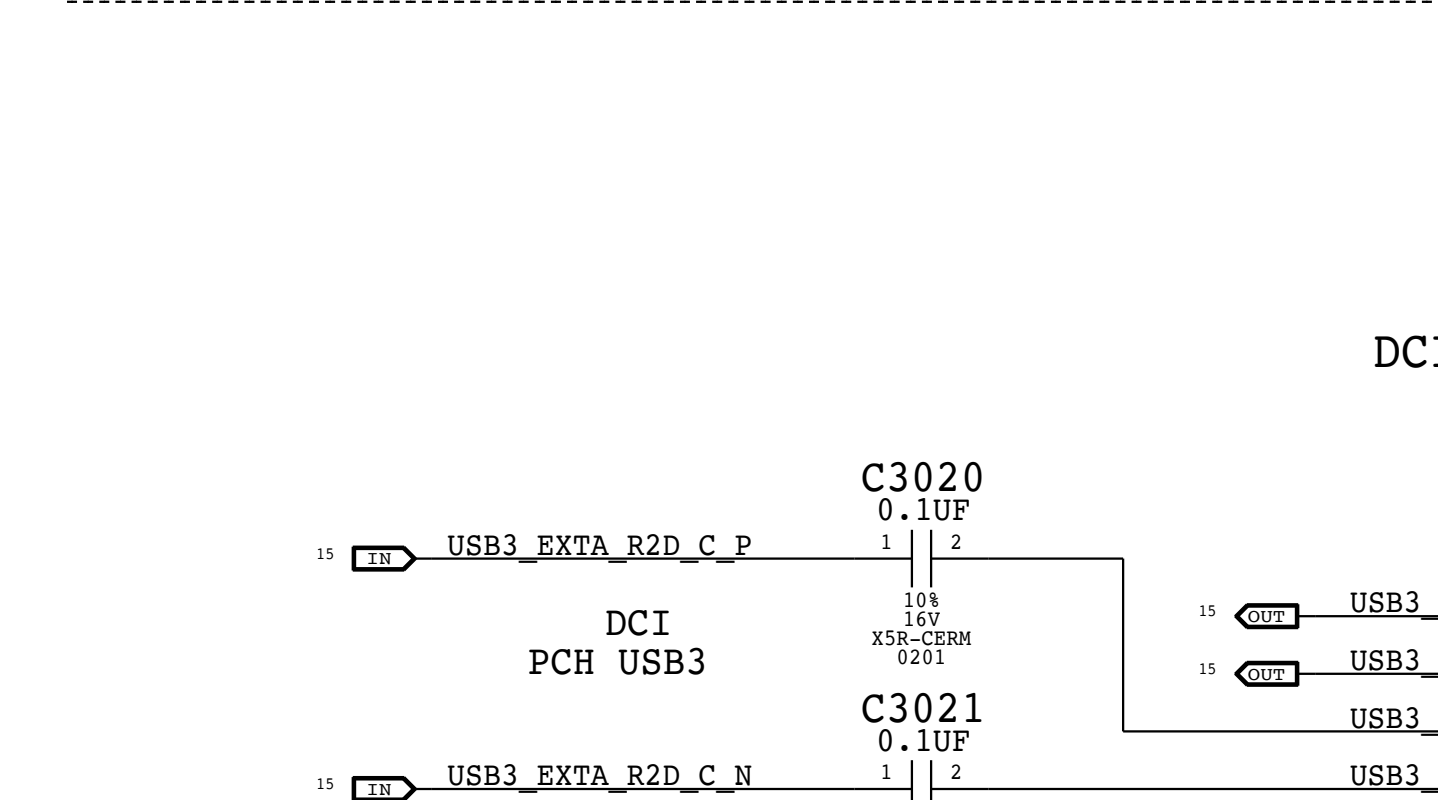
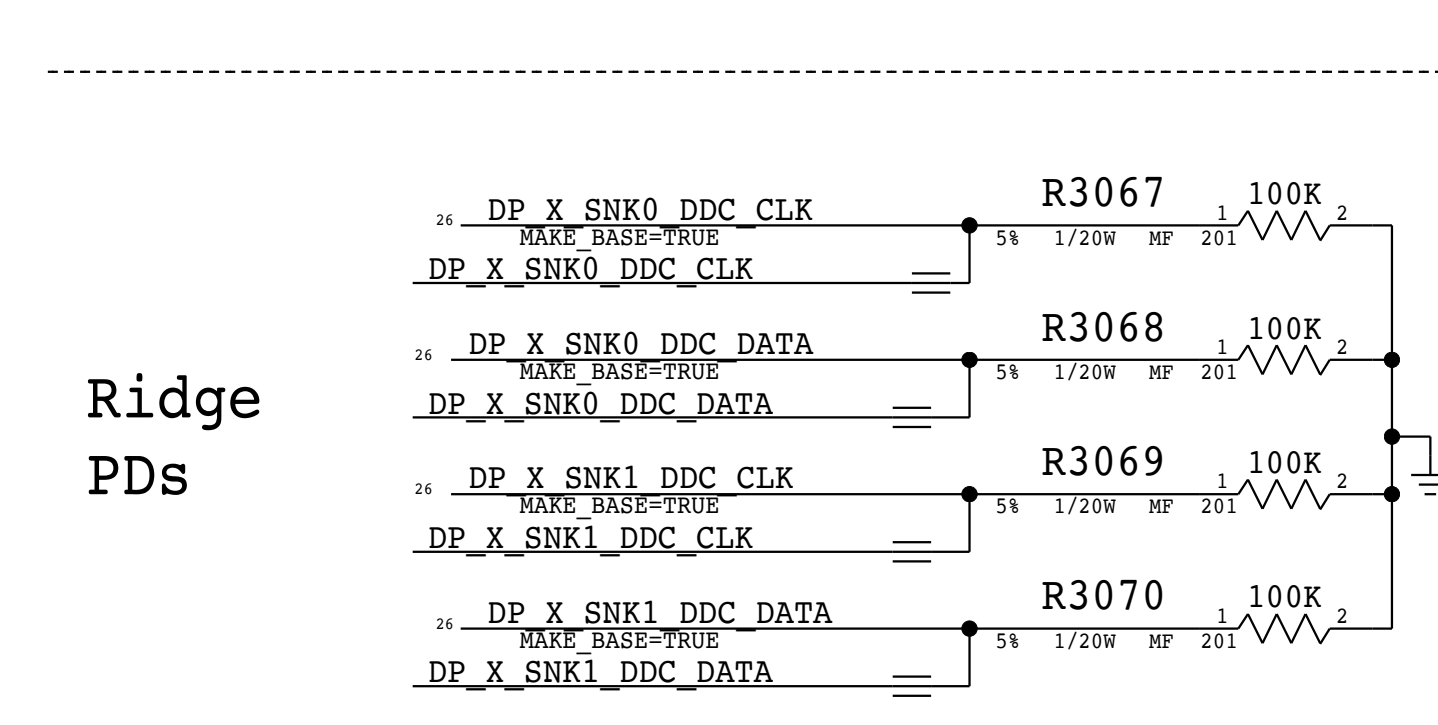
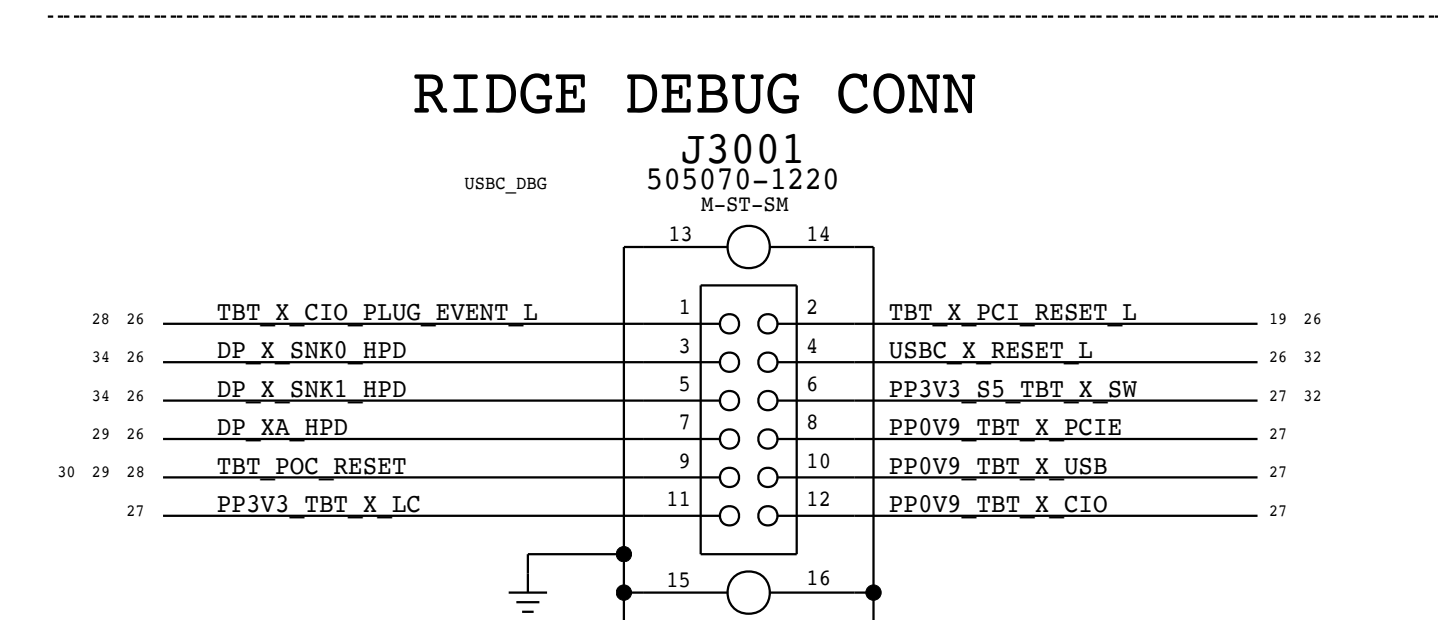
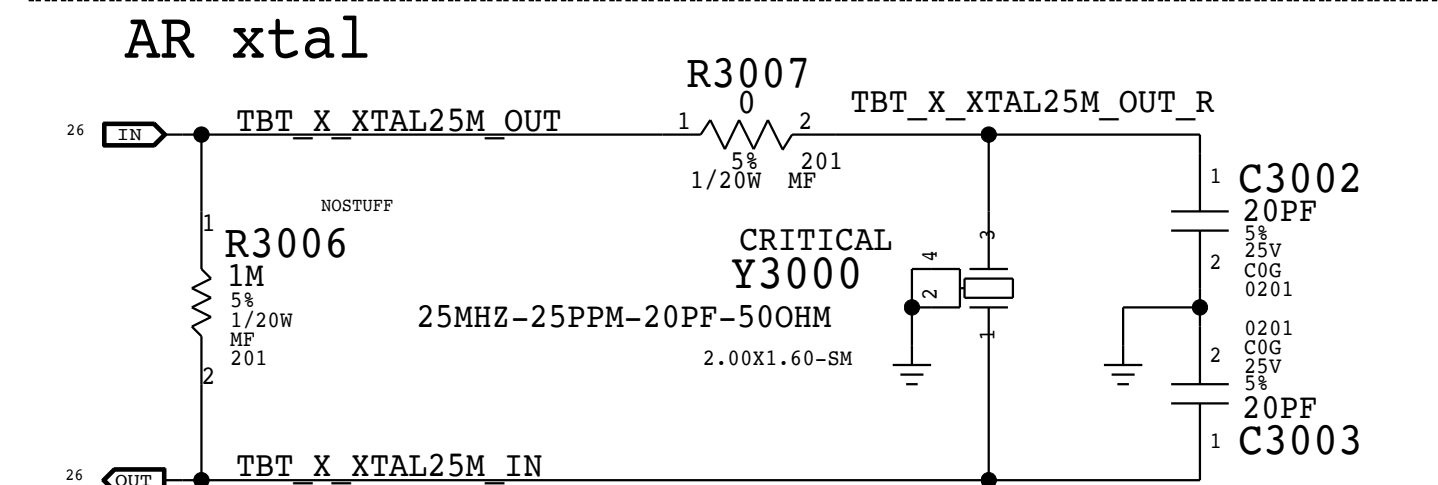
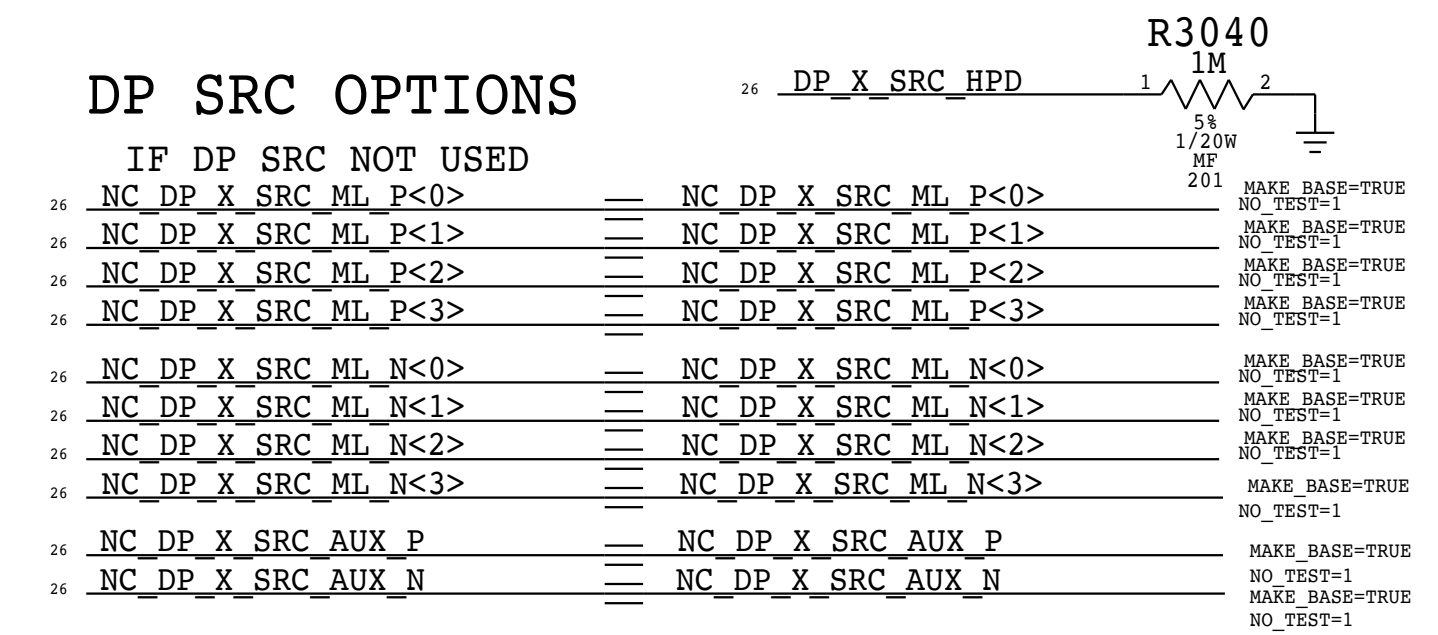
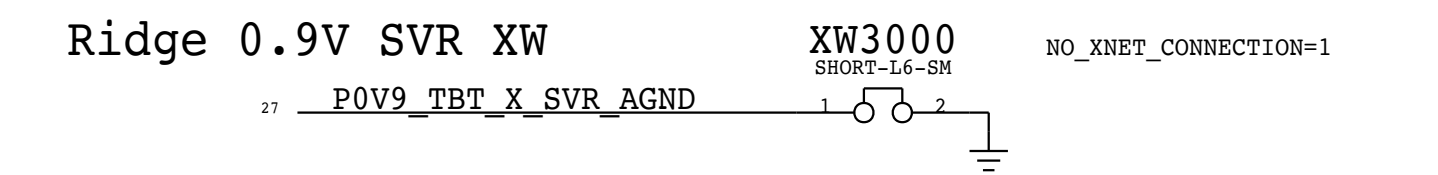
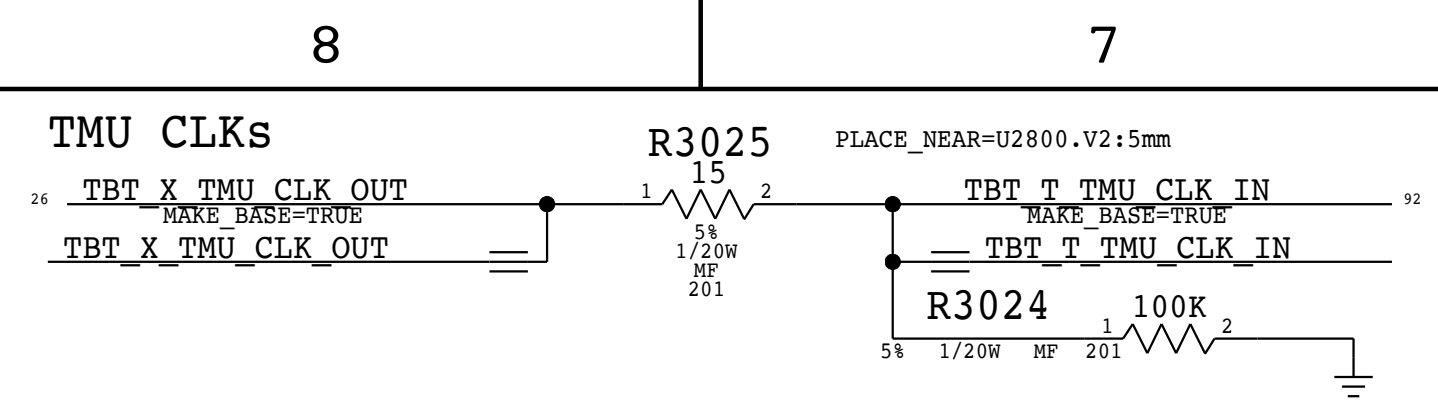






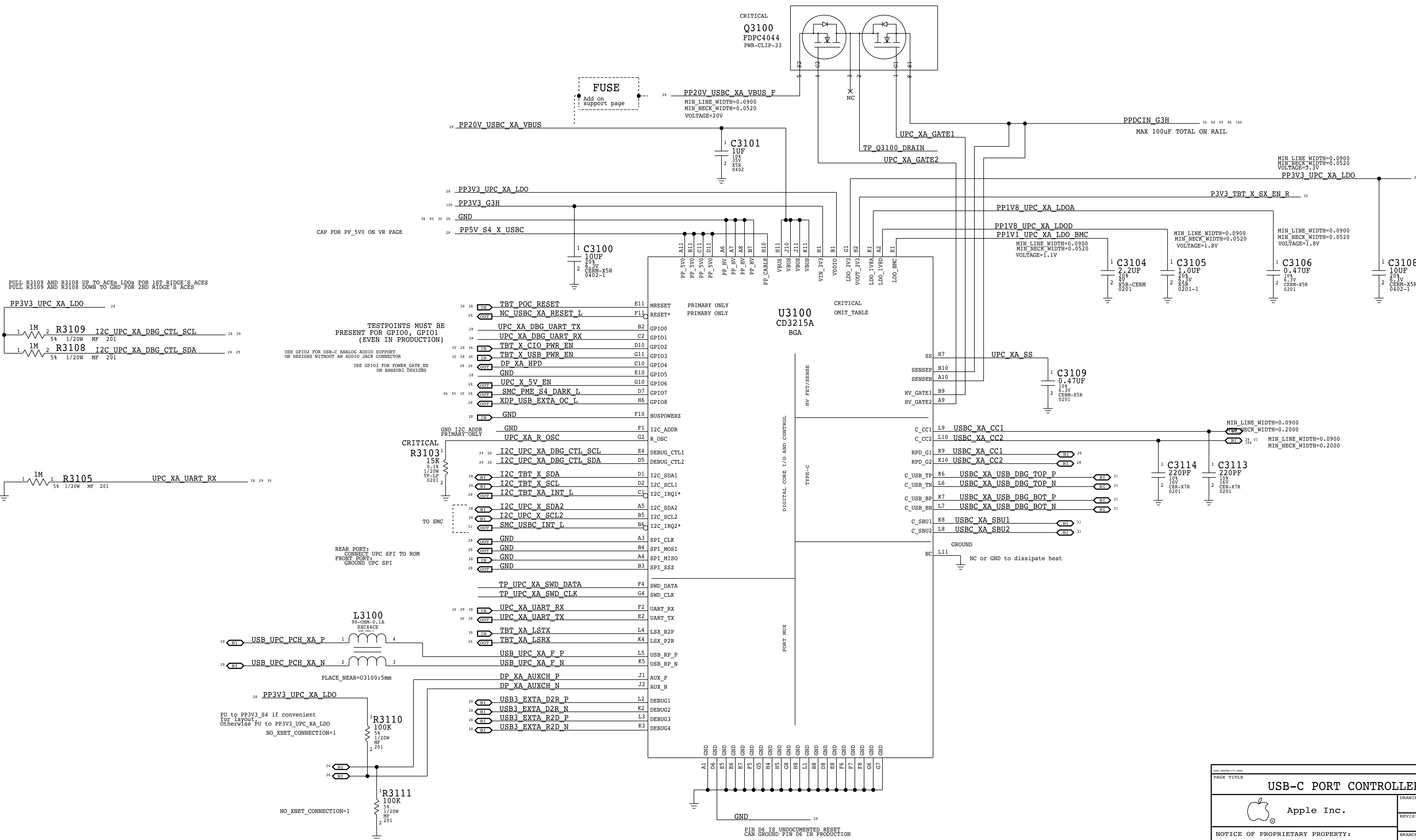






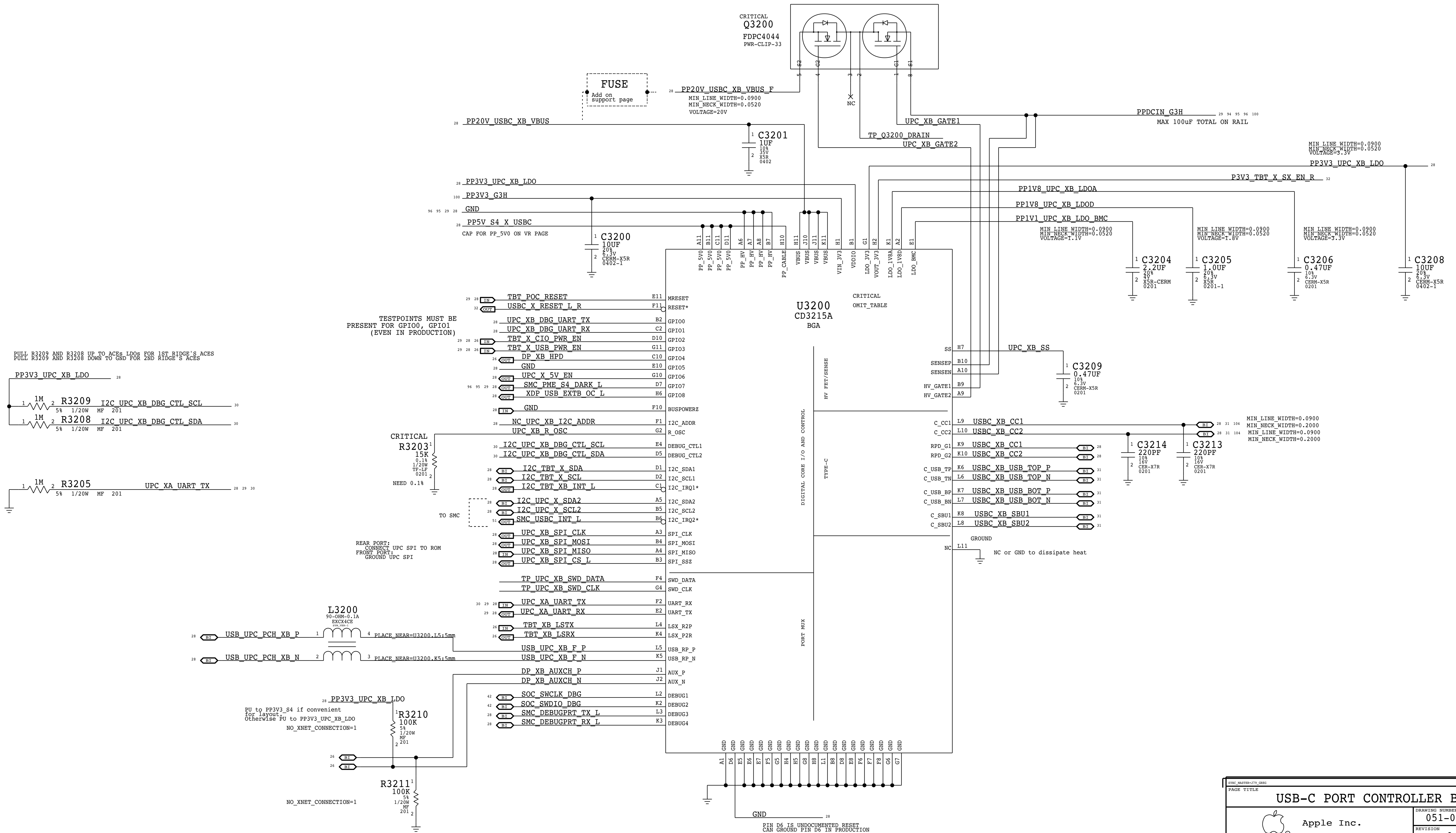


PRIMARY ACE USB-C PORT CONTROLLER (UPC)




PAGE TITLE		
USB-C PORT CONTROLLER A		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	31 OF 145
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		29 OF 119
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I1 NOT TO REPRODUCE OR COPY IT		
I11 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I111 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I1111 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		

## SECONDARY ACE USB-C PORT CONTROLLER (UPC)



BOM COST GROUP=USB-C

EPC: A41874-079.000 PAGE TITLE		EPC: 041874-02/28/2018	
USB-C PORT CONTROLLER B			
 Apple Inc.	DRAWING NUMBER 051-00515	SIZE D	
	REVISION 9.0.0		
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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		BRANCH dvt-fab09-0  PAGE 32 OF 145  SHEET 30 OF 119	

D

C

B

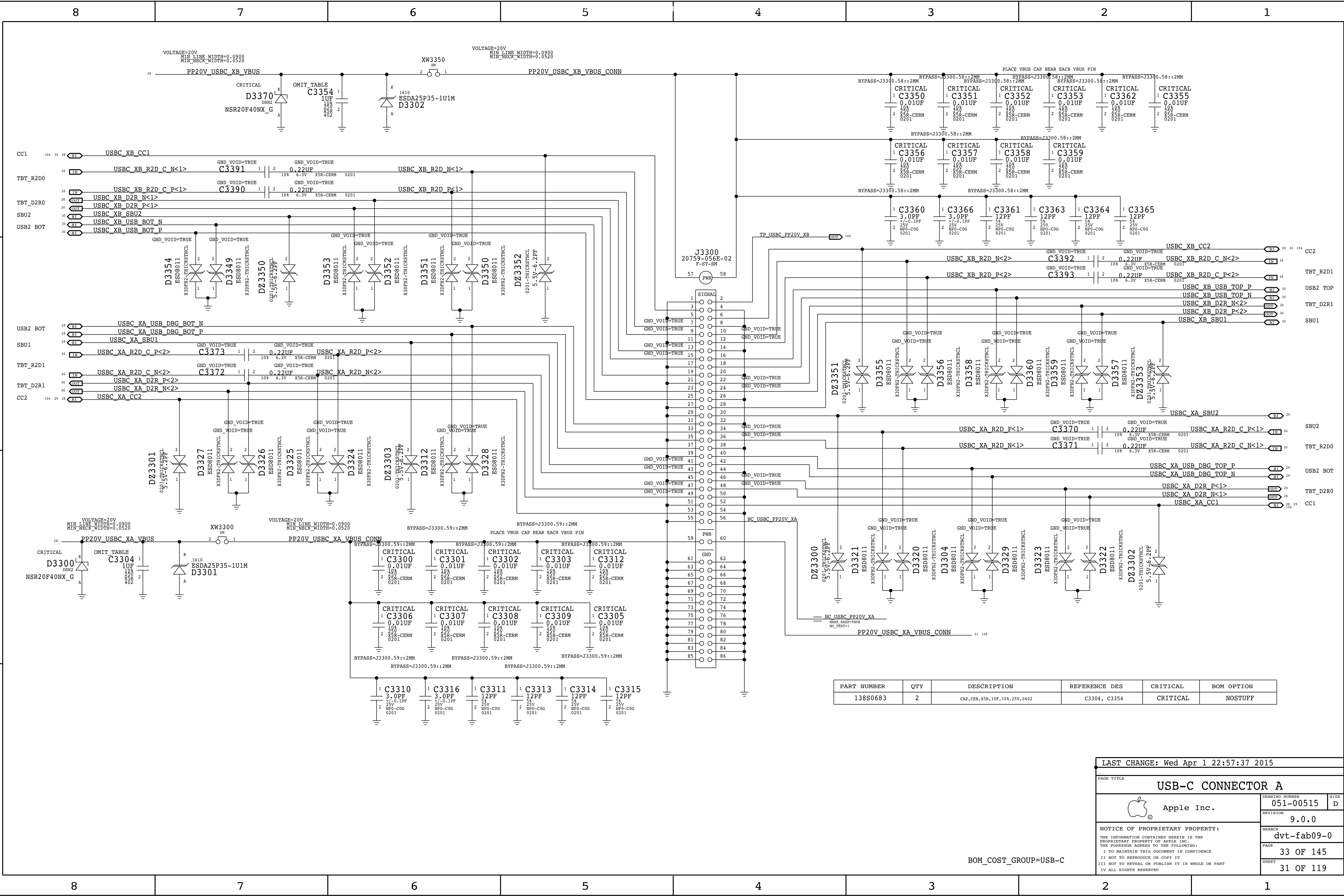
A

D


C

B

A



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0683	2	CAP,CER,X5R,1UF,10%,25V,0402	C3304, C3354	CRITICAL	NOSTUFF

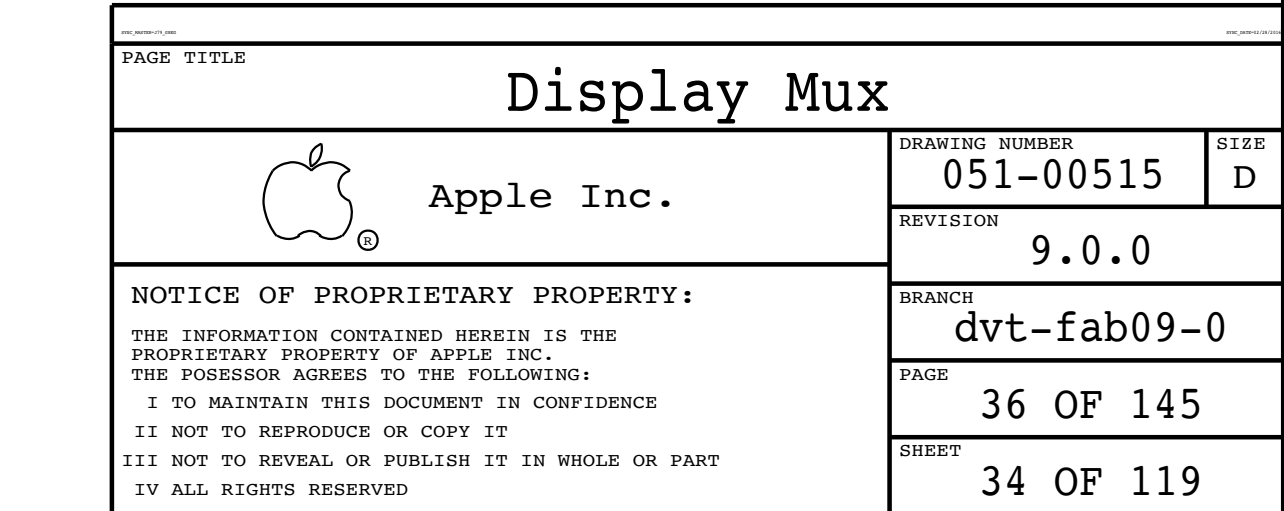
LAST CHANGE: Wed Apr 1 22:57:37 2015		
PAGE TITLE		
USB-C CONNECTOR A		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	33 OF 145
	SHEET	31 OF 119

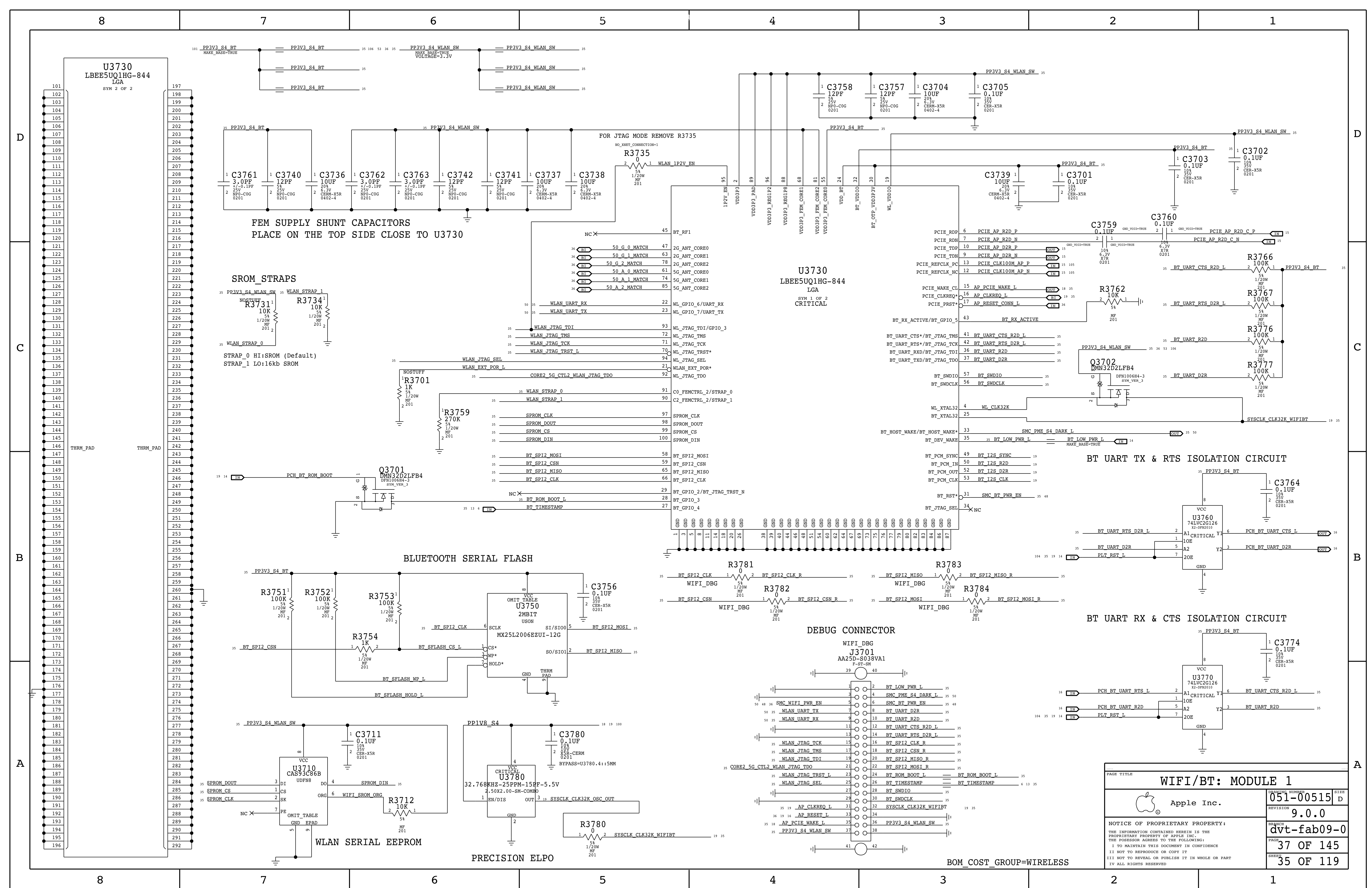
BOM\_COST\_GROUP=USB-C



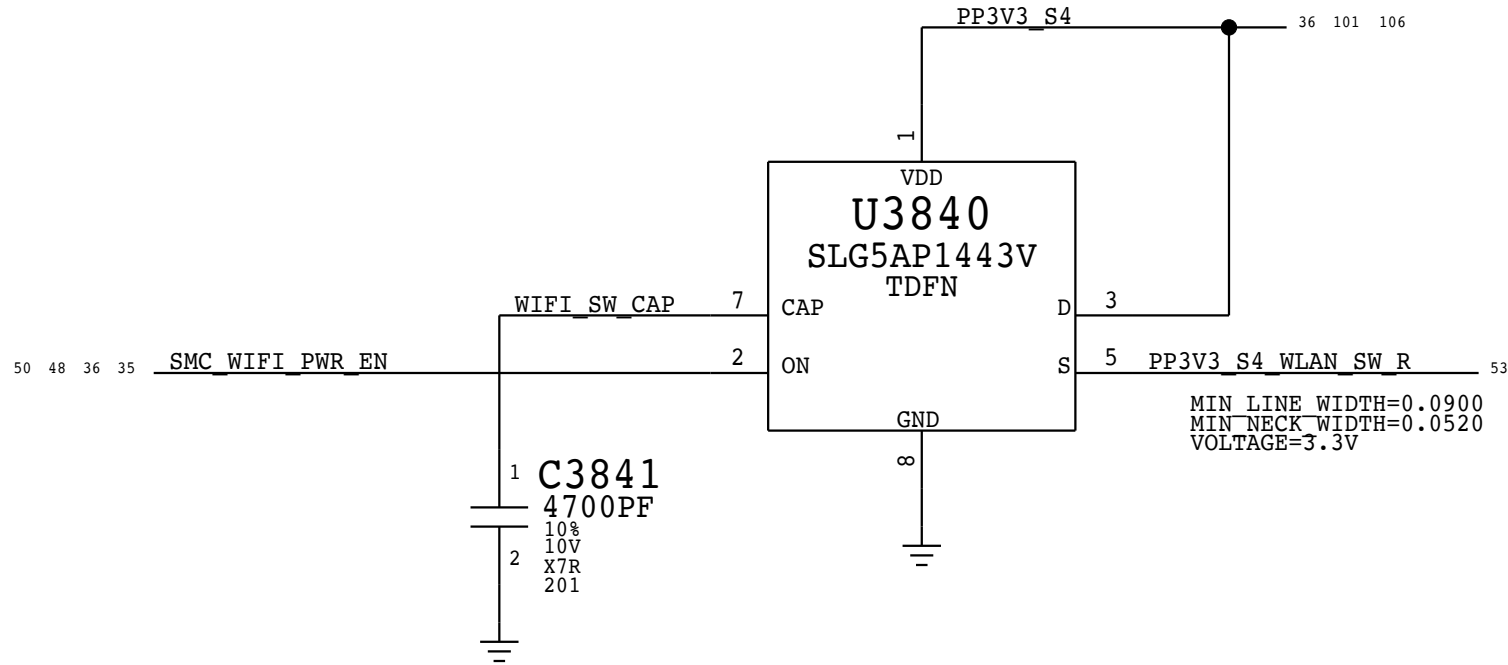






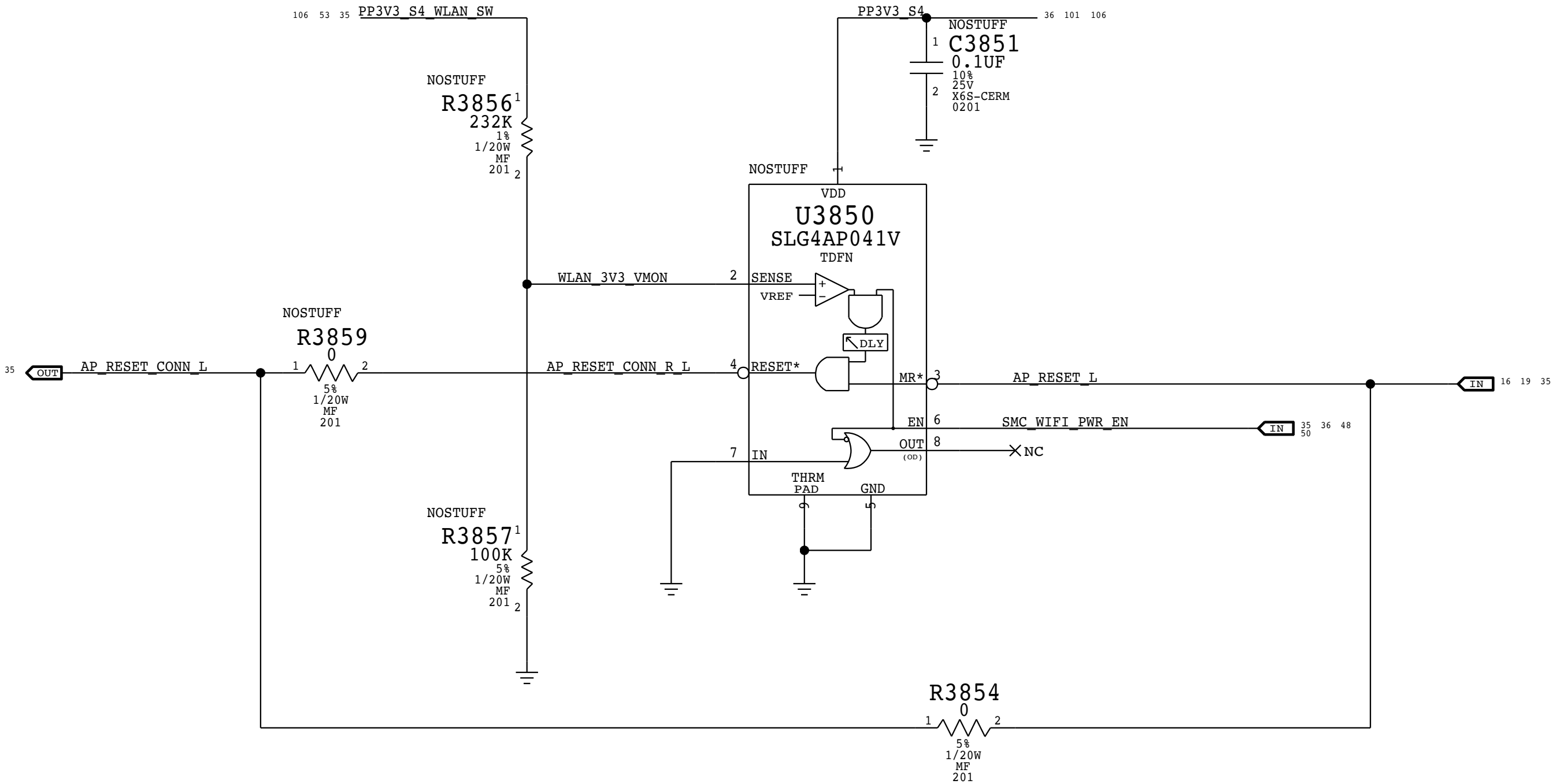


WLAN Power Switch

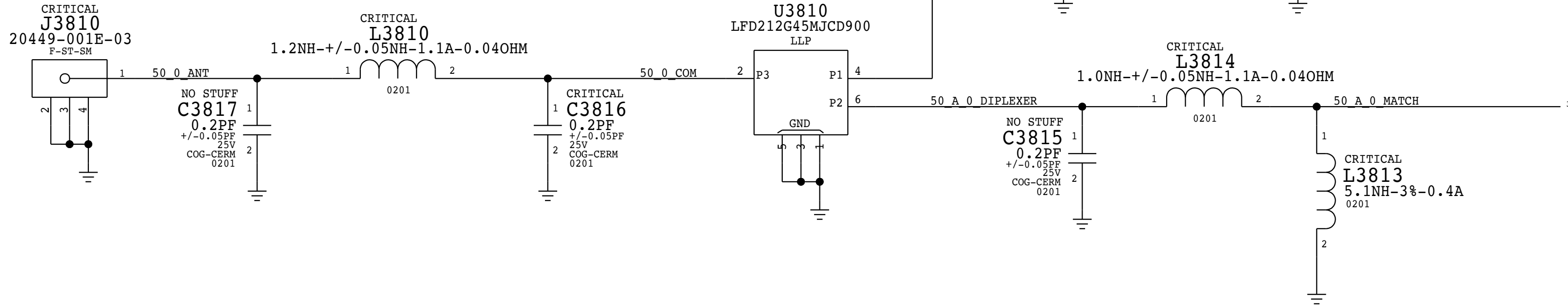


Supervisor & CLKREQ# Isolation

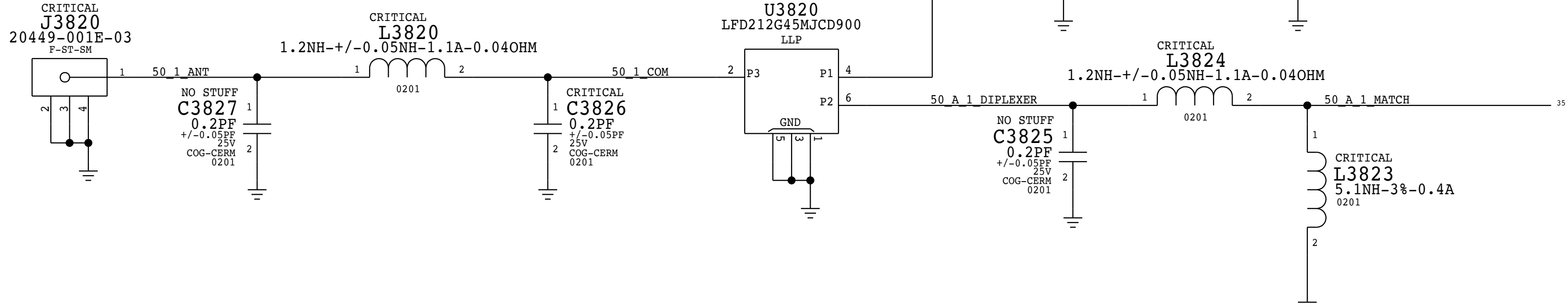
Delay = 130ms +/- 20%



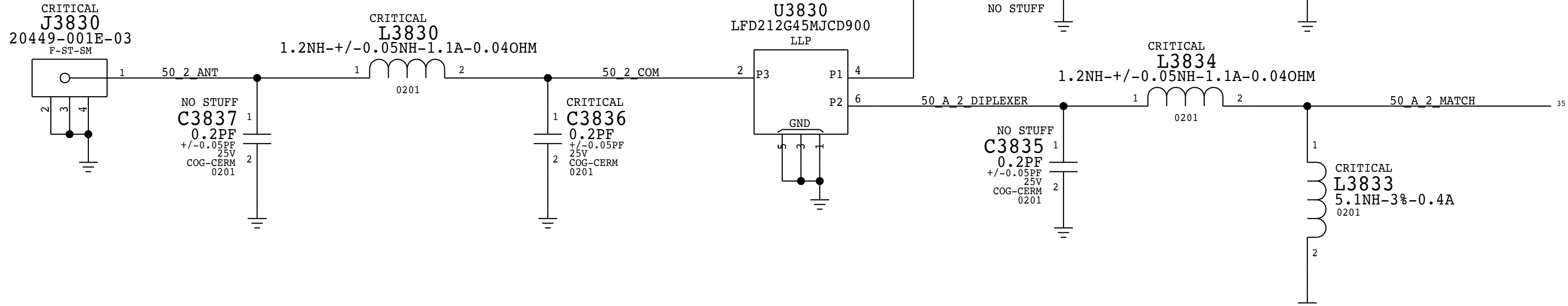
CORE0 DIPLEXER AND MATCHING



CORE1 DIPLEXER AND MATCHING



CORE2 DIPLEXER AND MATCHING




BOM\_COST\_GROUP=WIRELESS

EYRC\_MASTER=J73\_NETE

EYRC\_DATE=02/02/2016

PAGE TITLE

WIFI/BT: MODULE 2



Apple Inc.

DRAWING NUMBER

051-00515

SHEET

D

REVISION

9.0.0

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

BRANCH

dvt-fab09-0

PAGE

38 OF 145

SHEET

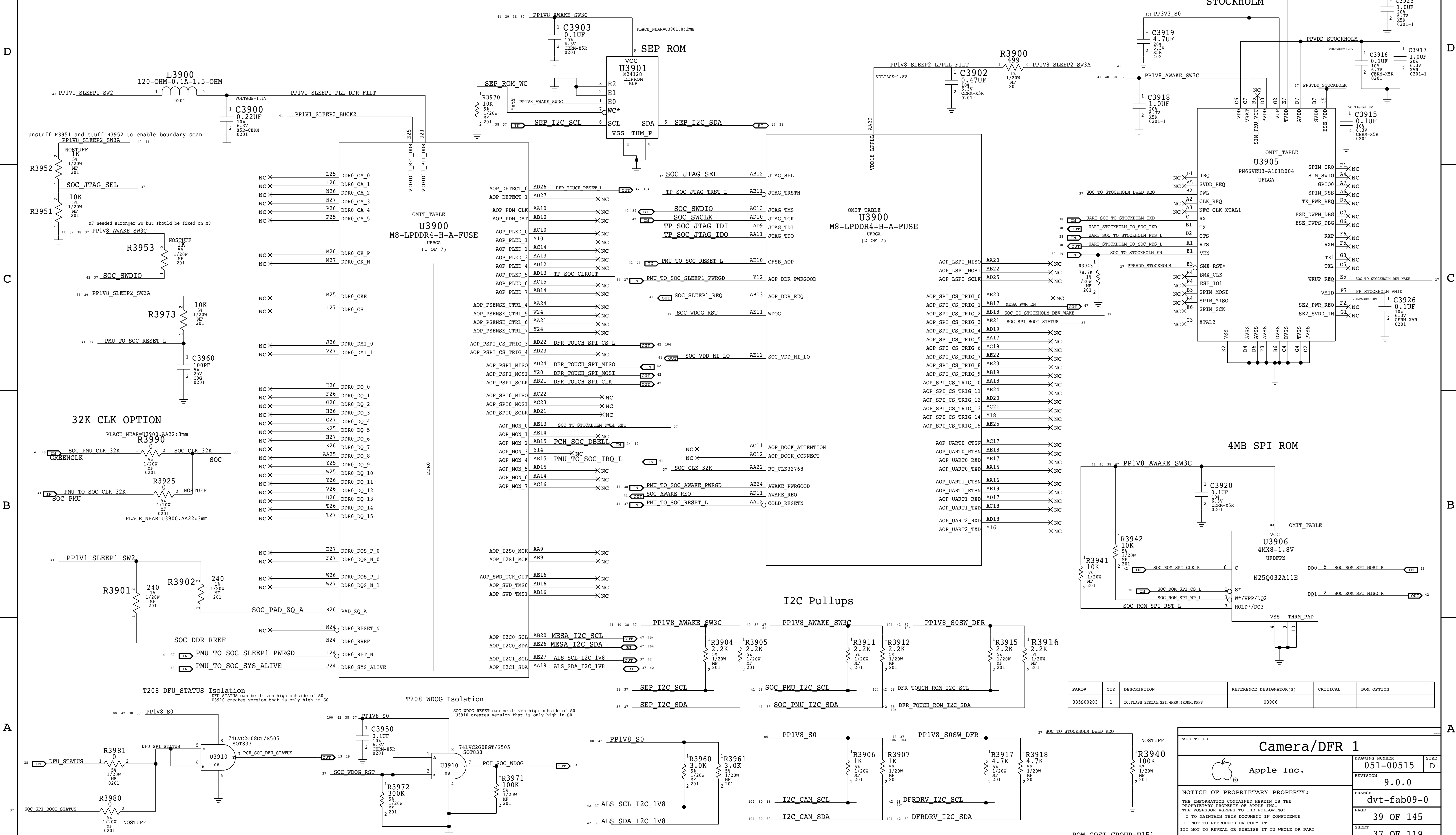
36 OF 119




PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
343S00135	1	IC,M8+512MB 20NM DDR,A12,S,CK,BGA700	U3900	CRITICAL	

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
338S00147	1	IC,RTM2,DEV,PN549A1,P61D0	U3905	CRITICAL	SE:DEV
338S00097	1	IC,RTM2,MP,PN549A1,P61D0	U3905	CRITICAL	SE:PROD

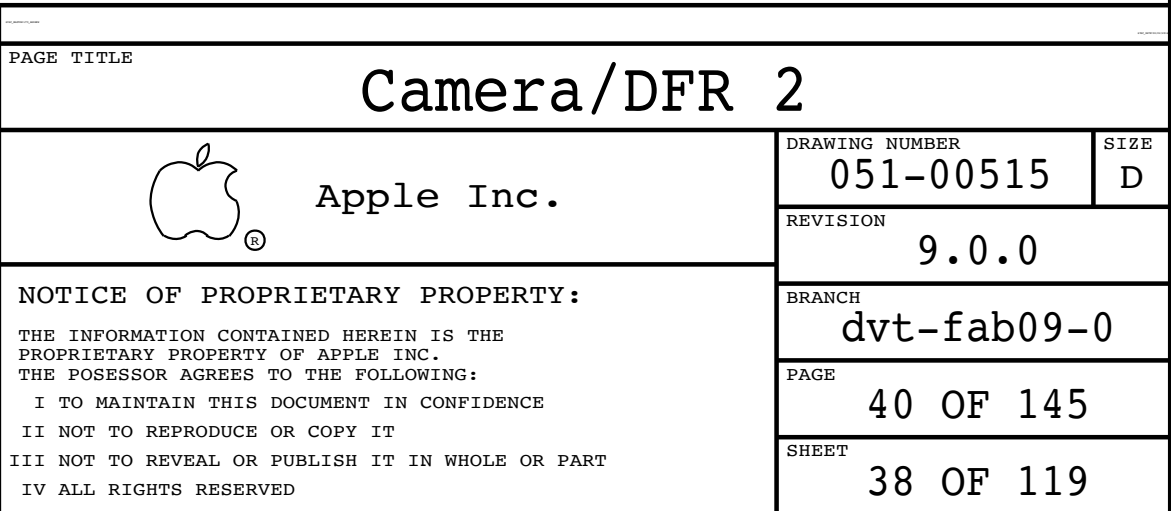
T208

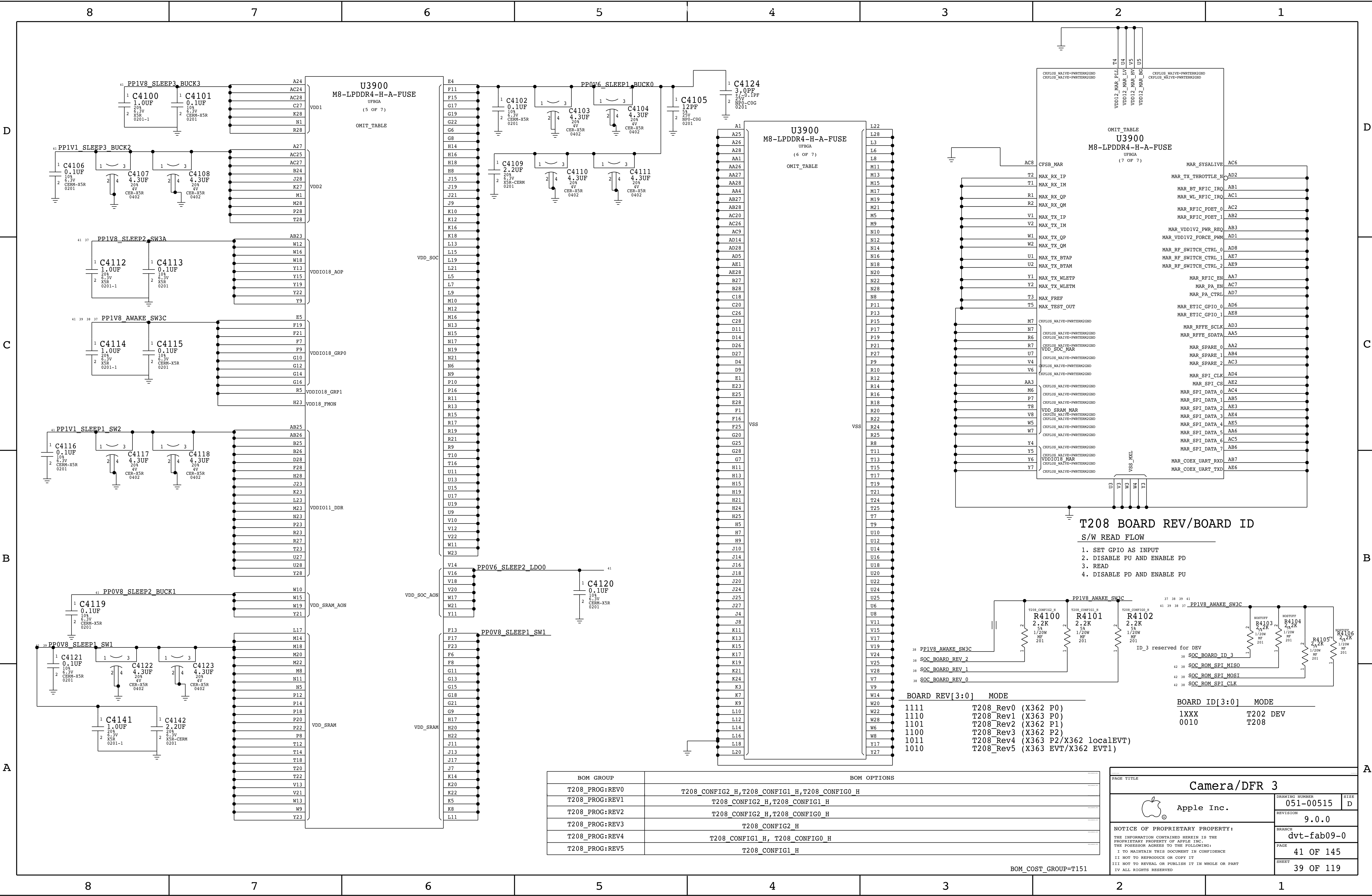


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00203	1	IC,FLASH,SERIAL,SPT,4MX8,4X3MM,DFN8	U3906		

PAGE TITLE		Camera/DFR 1	
	Apple Inc.		DRAWING NUMBER <b>051-00515</b>
			SITE <b>D</b>
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		REVISION <b>9.0.0</b>	
		BRANCH <b>dvt-fab09-0</b>	
		PAGE <b>39 OF 145</b>	
		SHEET <b>37 OF 119</b>	

BOM\_COST\_GROUP=T151





Berkelium

FB for Bucks

D

D

C

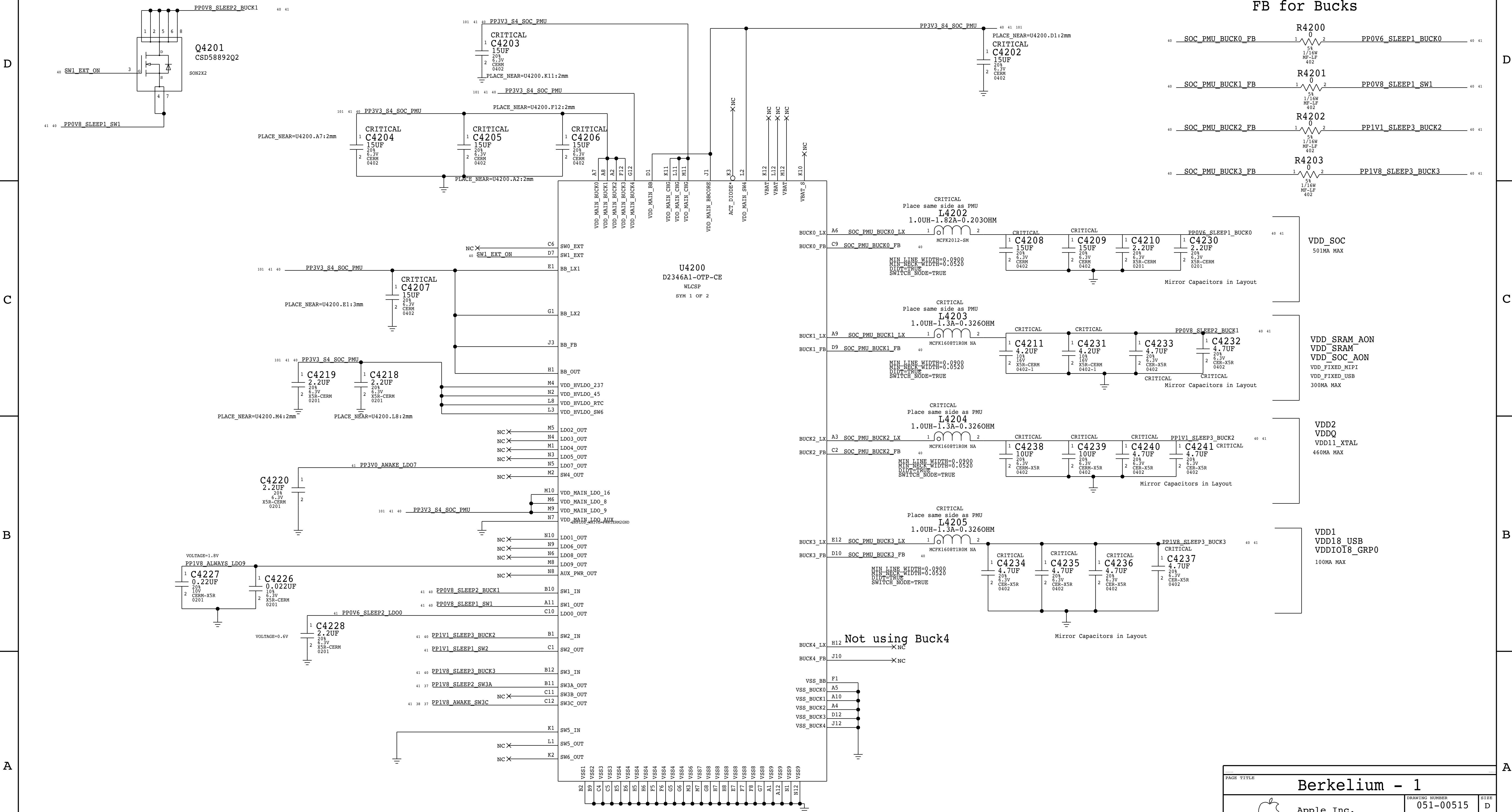
C


B

B

A

A

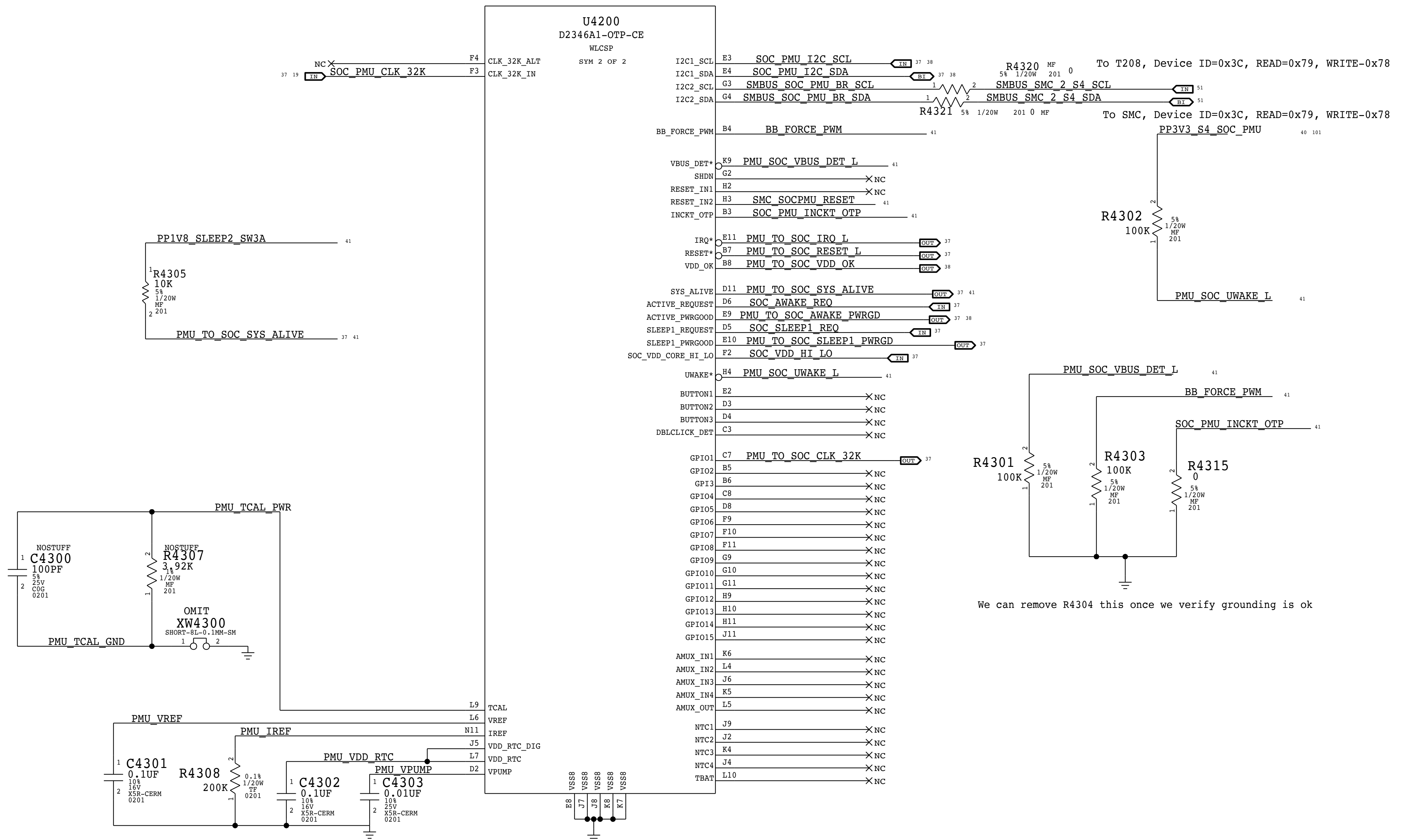


PAGE TITLE		
Berkelium - 1		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: 1 TO MAINTAIN THIS DOCUMENT IN CONFIDENCE 11 NOT TO REPRODUCE OR COPY IT 111 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART 1V ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	42 OF 145
	SHEET	40 OF 119

BOM\_COST\_GROUP=T151

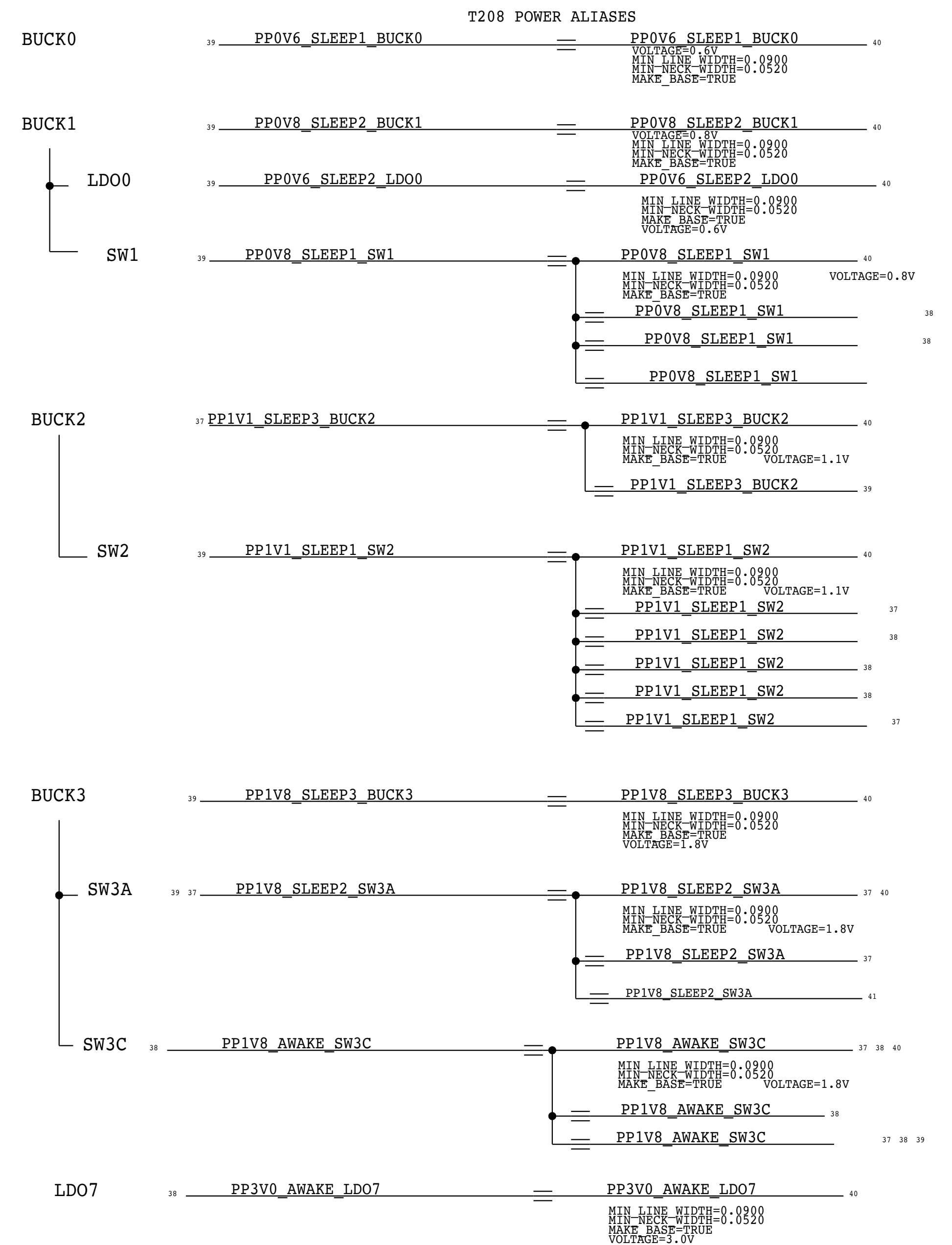
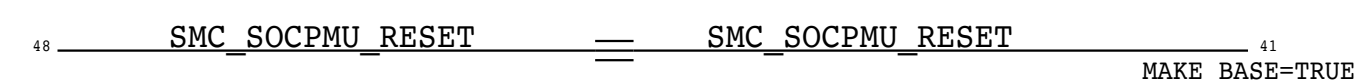



## Berkelium - 2



We can remove R4304 this once we verify grounding is ok

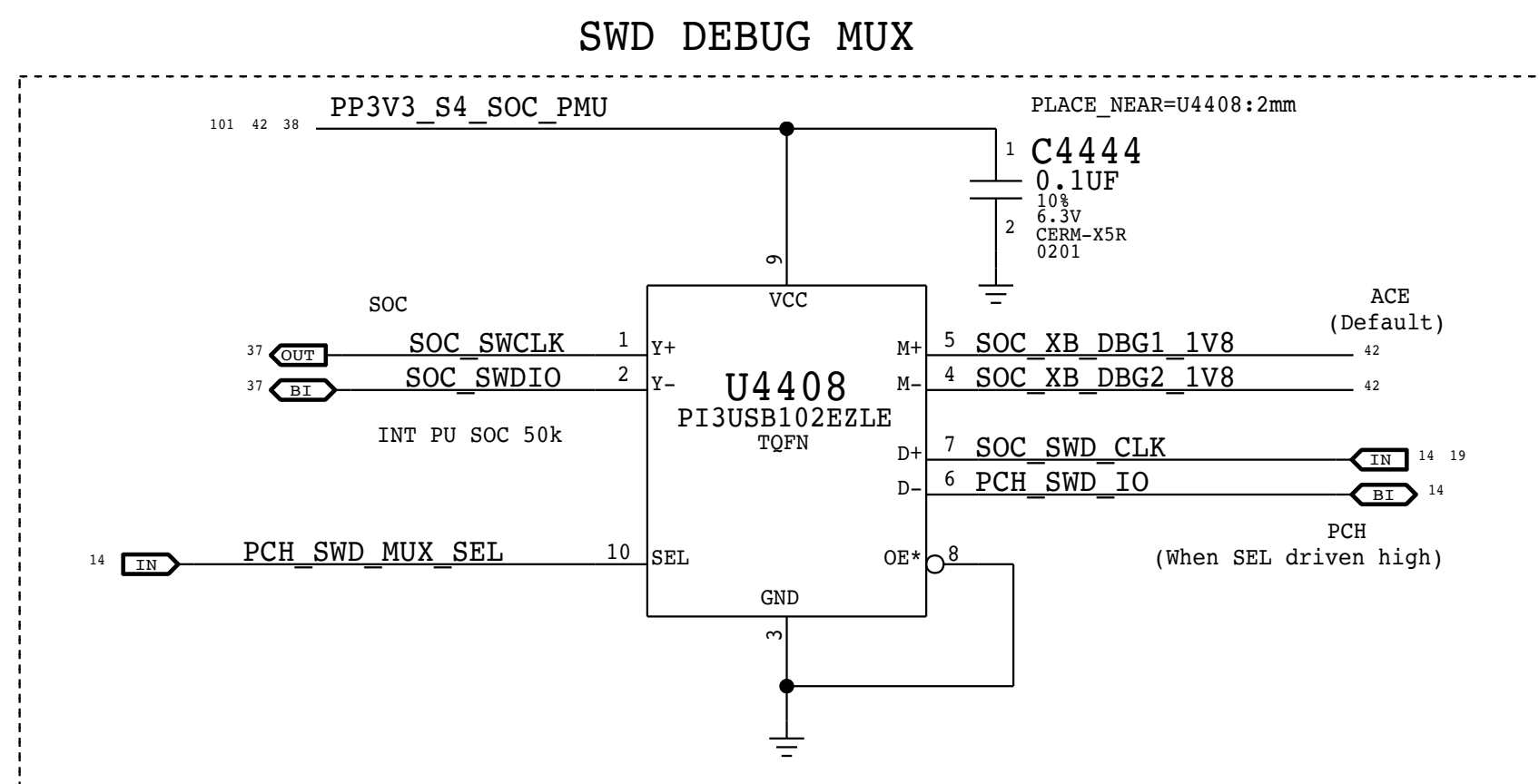
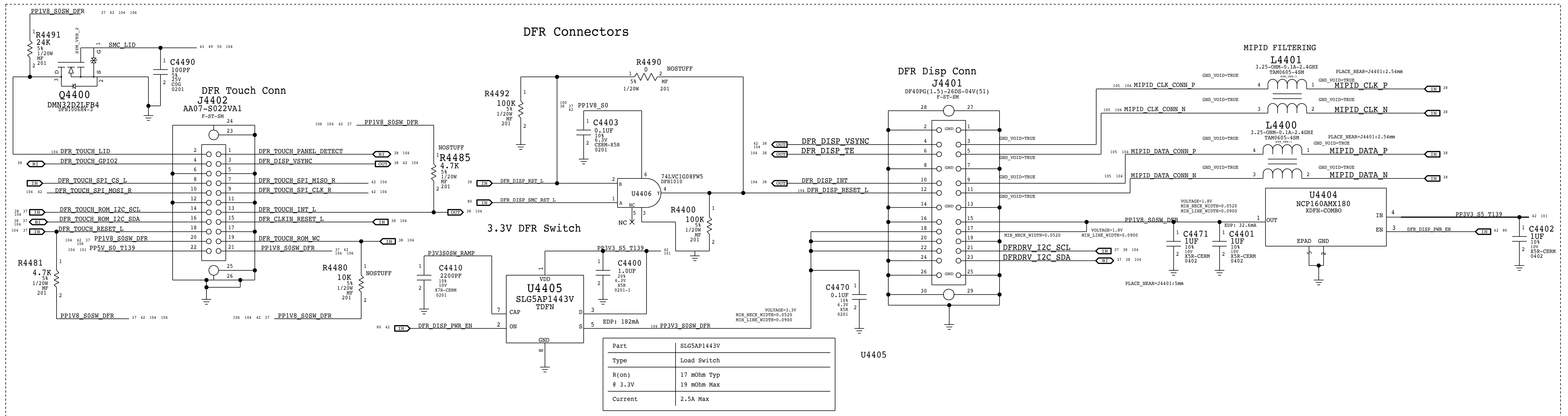
## Signal Aliases



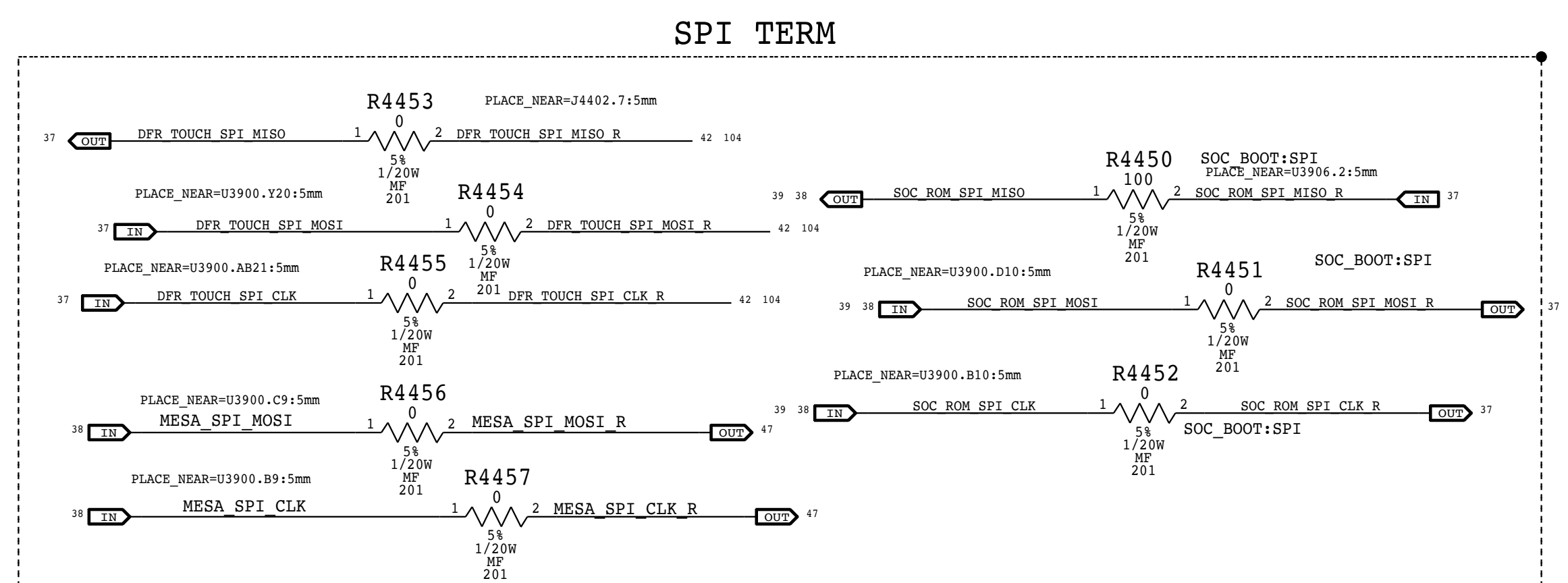
PAGE TITLE		
Berkelium - 2		
 Apple Inc.	DRAWING NUMBER	SHEET
	051-00515	D
	REVISION	
	9.0.0	
NOTICE OF PROPRIETARY PROPERTY:		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THIS FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		
BRANCH	dvt-fab09-0	
PAGE	43 OF 145	
SHEET	41 OF 119	

BOM\_COST\_GROUP=T151

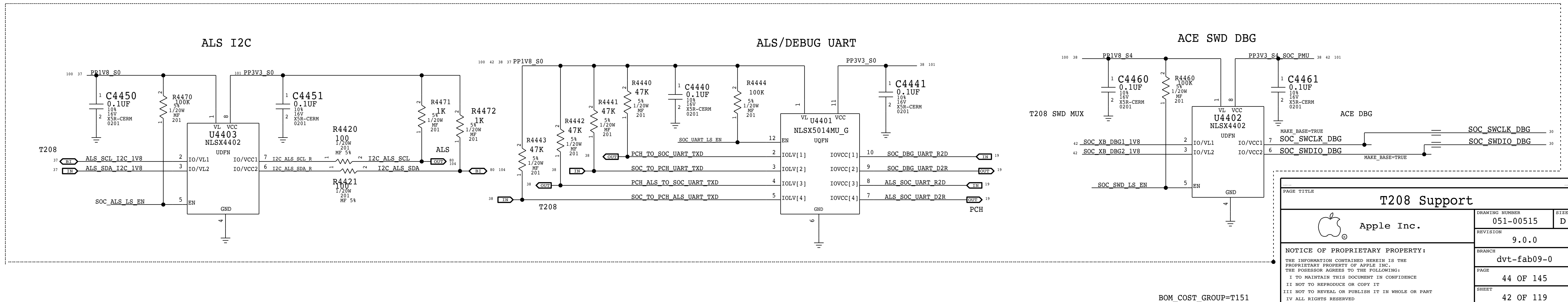
# T208 Support



T208 I2C Mapping				
Bus	Device	7-bit Address	8-bit Address	
			Read	Write
AP0	PMU	0011110 (0x3C)	0x79	0x78
AP1	Touch EEPROM	1010000 (0x50)	0xA1	0xA0
AP2_0	Tesla	1010100 (0x4C)	0x99	0x98
AOP0	Mesa EEPROM	101000x (0x50/0x51)	0xA1/A3	0xA0/A2
AOP1	ALS	0111001 (0x39)	0x73	0x72
SEP	M34128 EEPROM	1010001 (0x51)	0xA3	0xA2



## T208 LEVEL SHIFTING



D

C

B

A

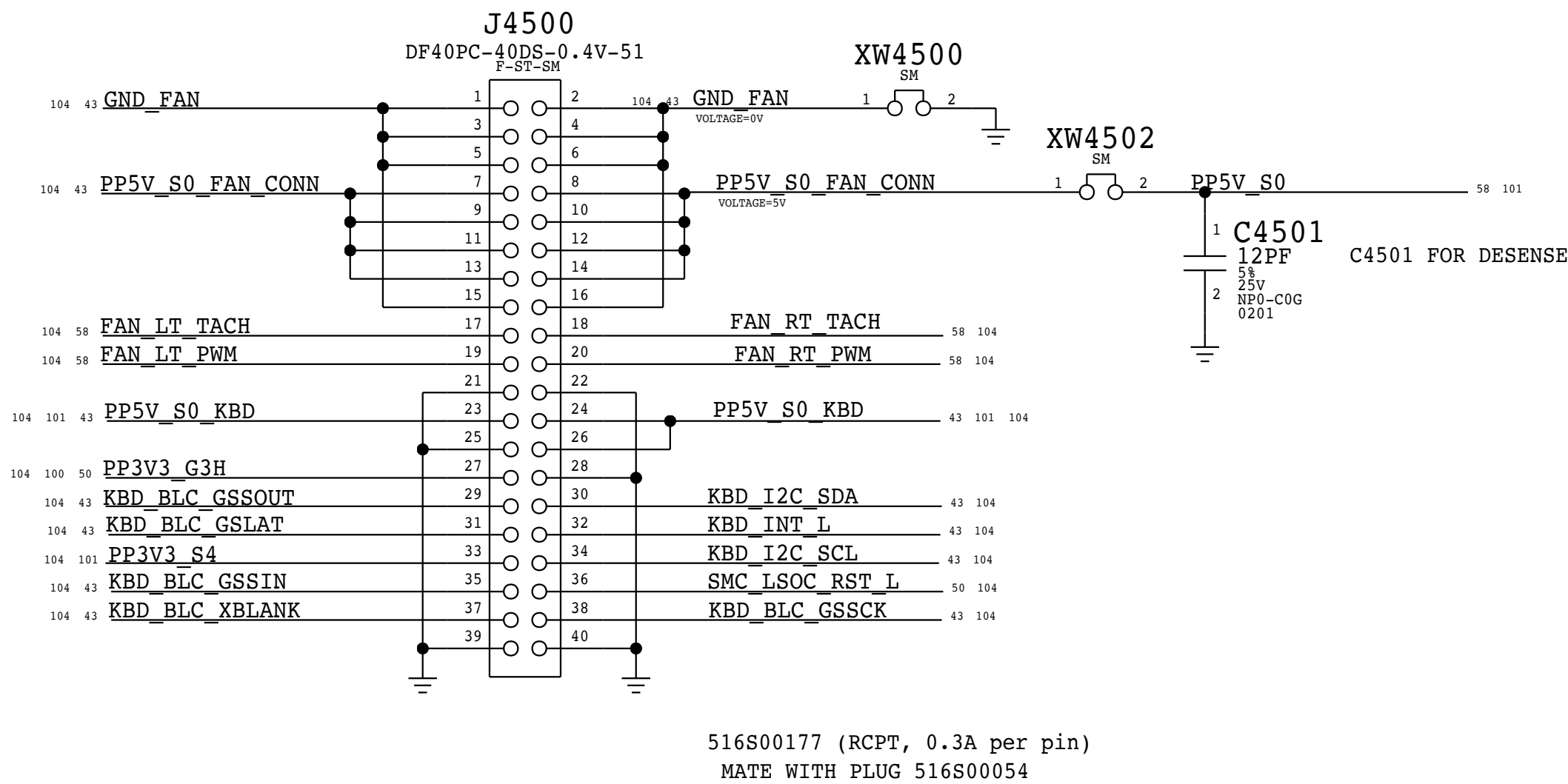
D

C

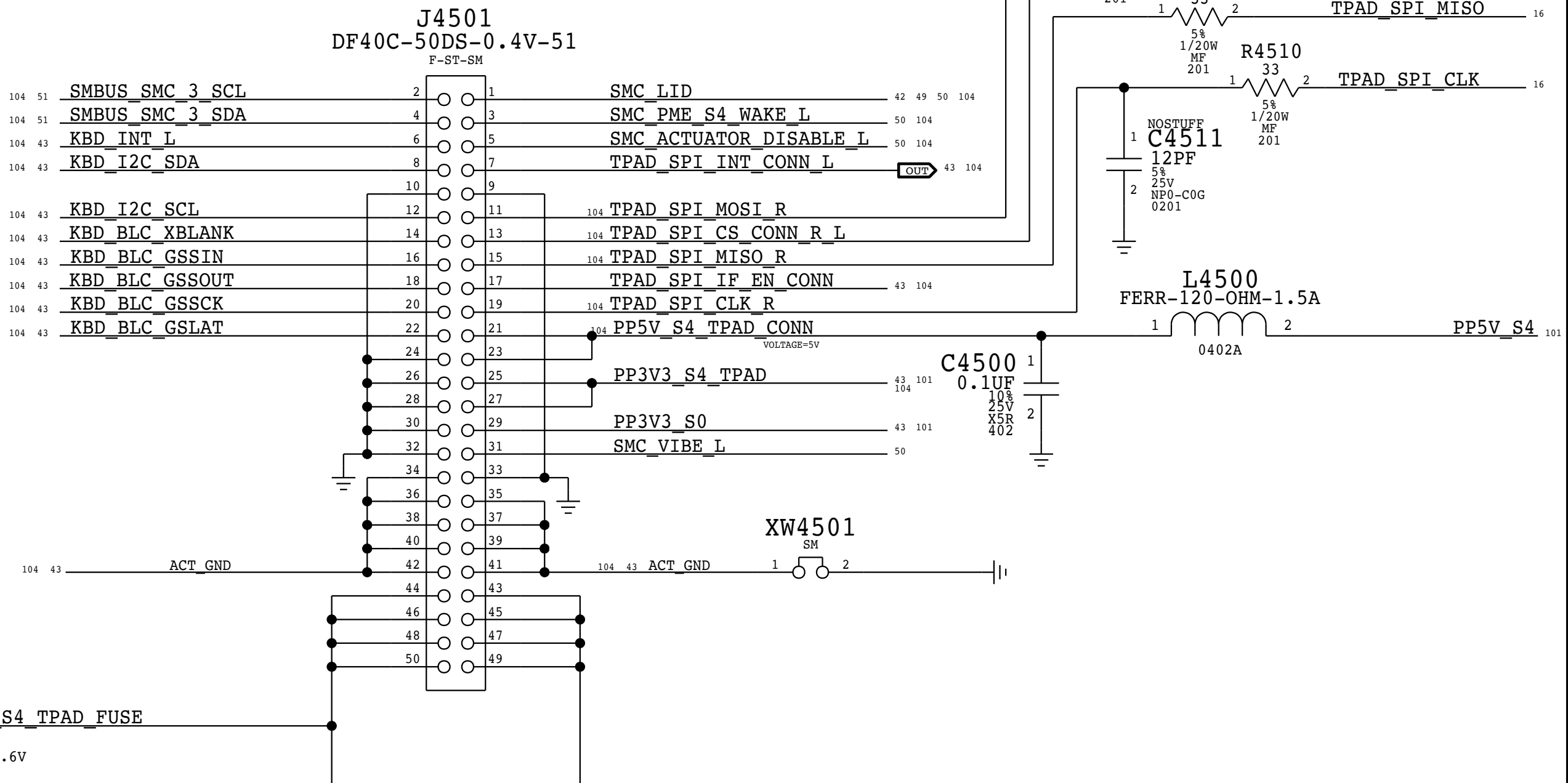
B

A

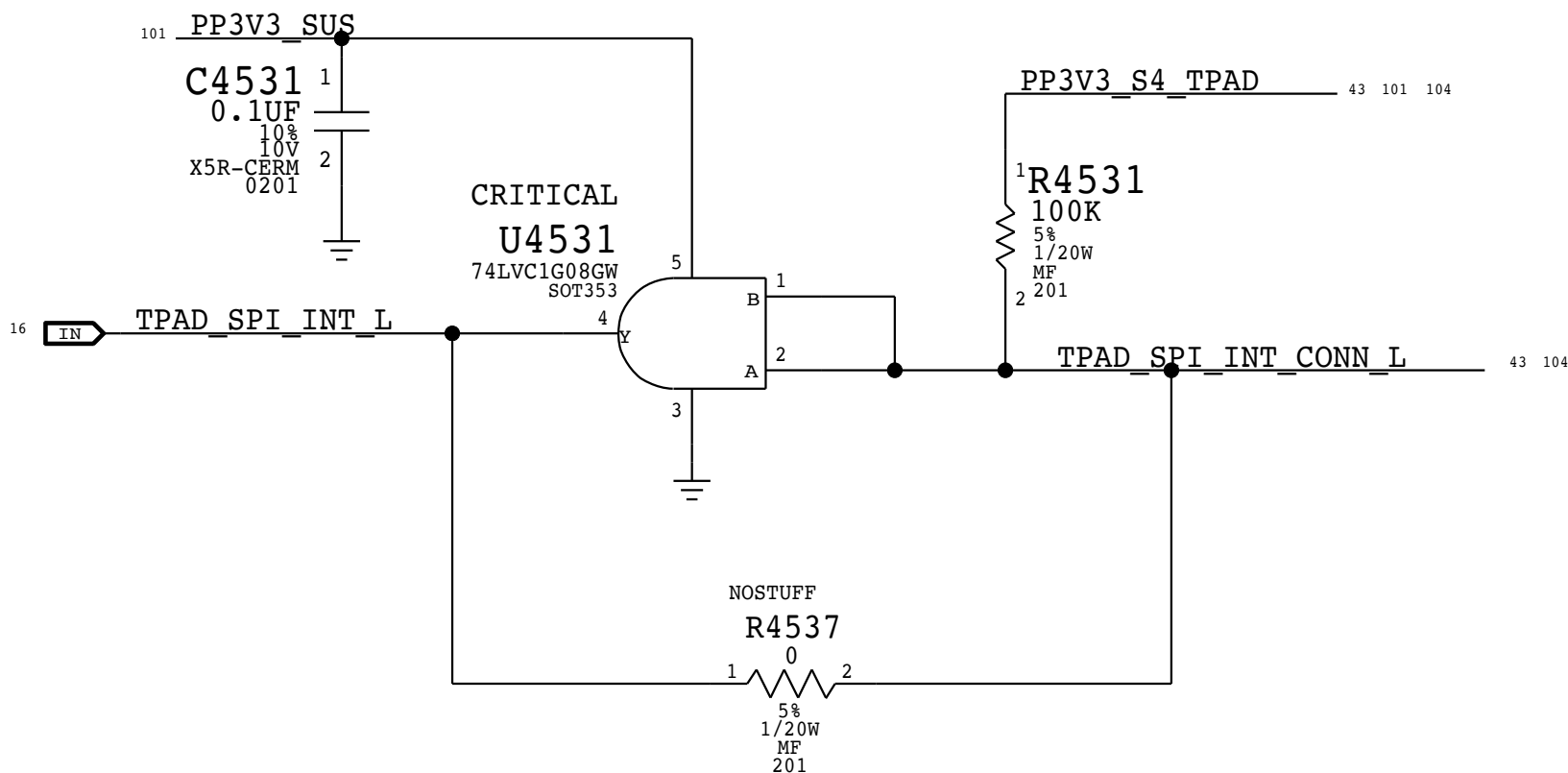
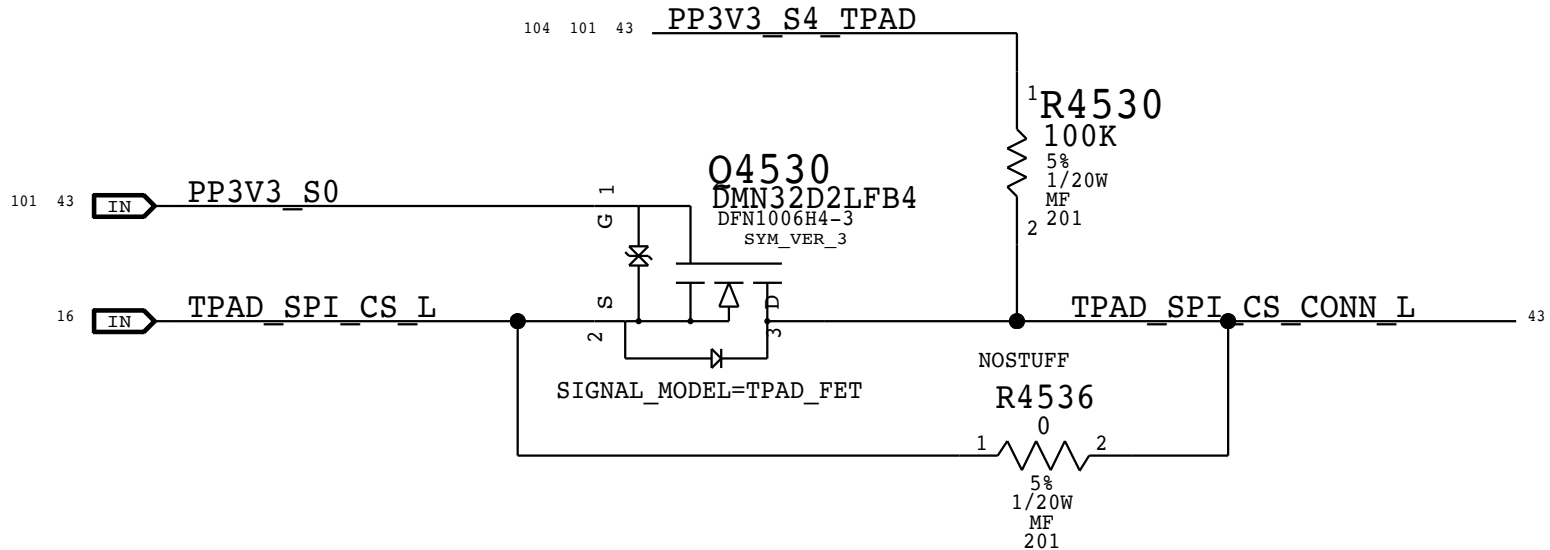
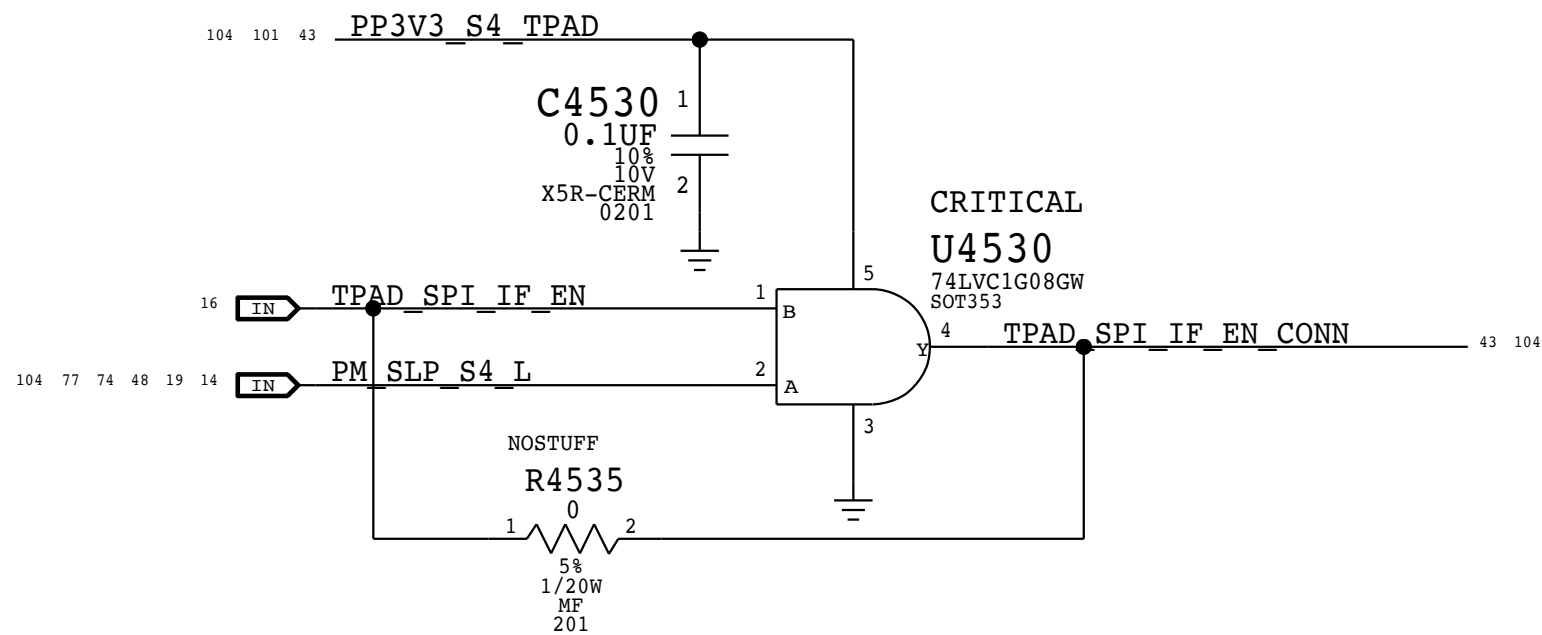
KBD CONNECTOR



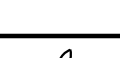
TPAD CONNECTOR




TRACKPAD ISOLATION




BOM\_COST\_GROUP=KEYBOARD

SYNC_MASTER=J79_GAREN		SYNC_DATE=11/21/2015	
PAGE TITLE			
Connectors&ESD			
 Apple Inc.		DRAWING NUMBER	051-00515
		REVISION	9.0.0
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		BRANCH	dvt-fab09-0
		PAGE	45 OF 145
		SHEET	43 OF 119


8		7		6		5		4		3		2		1			
D																D	
C																C	
B																B	
A																A	
8		7		6		5		4		3		2		1			


SYNC MASTER=J79 DAYU			SYNC DATE=05/26/2015		
PAGE TITLE					
Empty					
 Apple Inc.			DRAWING NUMBER		SIZE
			051-00515		D
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			REVISION		
			9.0.0		
			BRANCH		
			dvt-fab09-0		
			PAGE		
			46 OF 145		
			SHEET		
			44 OF 119		

SYNC_MASTER=J79_DAYU			SYNC_DATE=05/26/2015		
PAGE TITLE					
Empty					
 Apple Inc.®			DRAWING NUMBER		SIZE
			051-00515		D
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			REVISION		9.0.0
			BRANCH		
			PAGE		46 OF 145
			SHEET		




8		7		6		5		4		3		2		1		
																D
																C
																B
																A
8		7		6		5		4		3		2		1		

SYNC MASTER=J79 DAYU										SYNC DATE=05/26/2015									
PAGE TITLE																			
Empty																			
 Apple Inc.										DRAWING NUMBER					SIZE				
										051-00515					D				
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										REVISION									
										9.0.0									
										BRANCH									
										dvt-fab09-0									
										PAGE									
										47 OF 145									
										SHEET									
										45 OF 119									

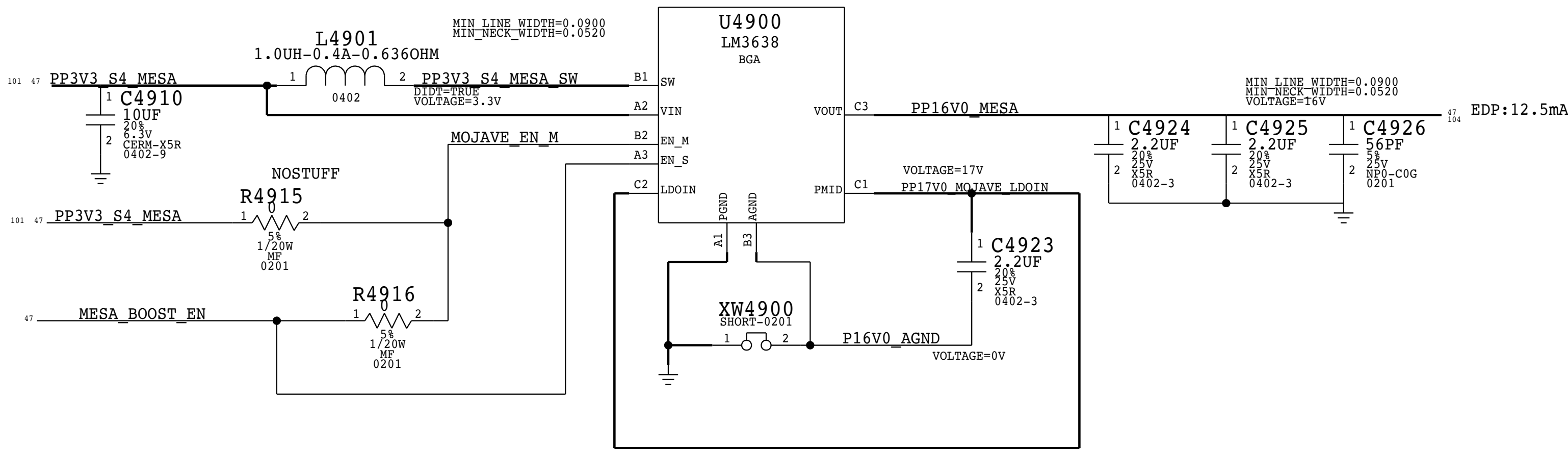
SYNC_MASTER=J79_DAYU										SYNC_DATE=05/26/2015					
PAGE TITLE										Empty					
 Apple Inc.®										DRAWING NUMBER		051-00515			
										REVISION		9.0.0			
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE 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										BRANCH		dvt-fab09-0			
										PAGE		47 OF 145			
										SHEET		45 OF 119			

8	7	6	5	4	3	2	1
D							D
C							C
B							B
A							A
8	7	6	5	4	3	2	1

SYNC_MASTER=J79_DAYU		SYNC_DATE=05/12/2015	
PAGE TITLE			
Empty			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
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	REVISION		9.0.0
	BRANCH		
	dvt-fab9-0		
	PAGE		
	48 OF 145		
SHEET			
46 OF 119			

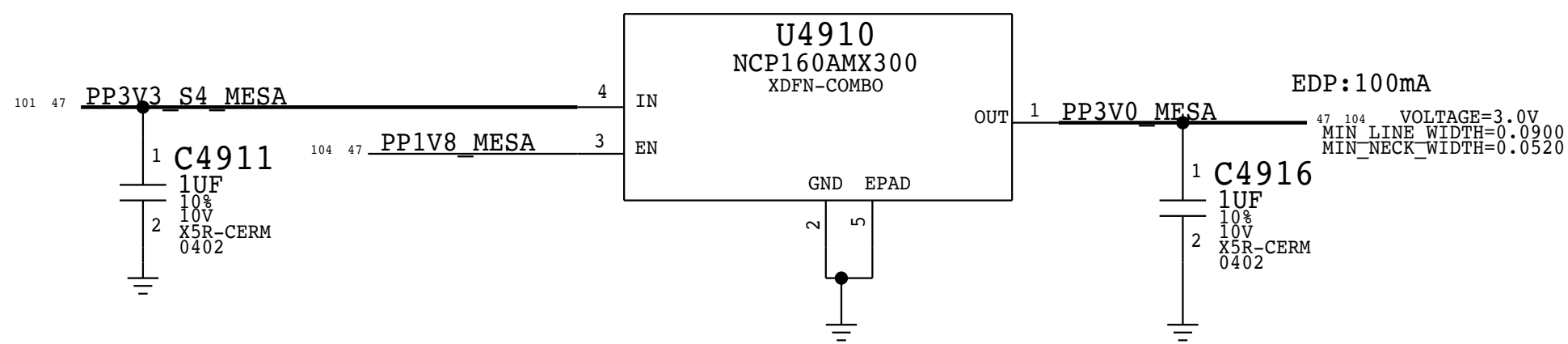
D

MOJAVE 16V BOOST

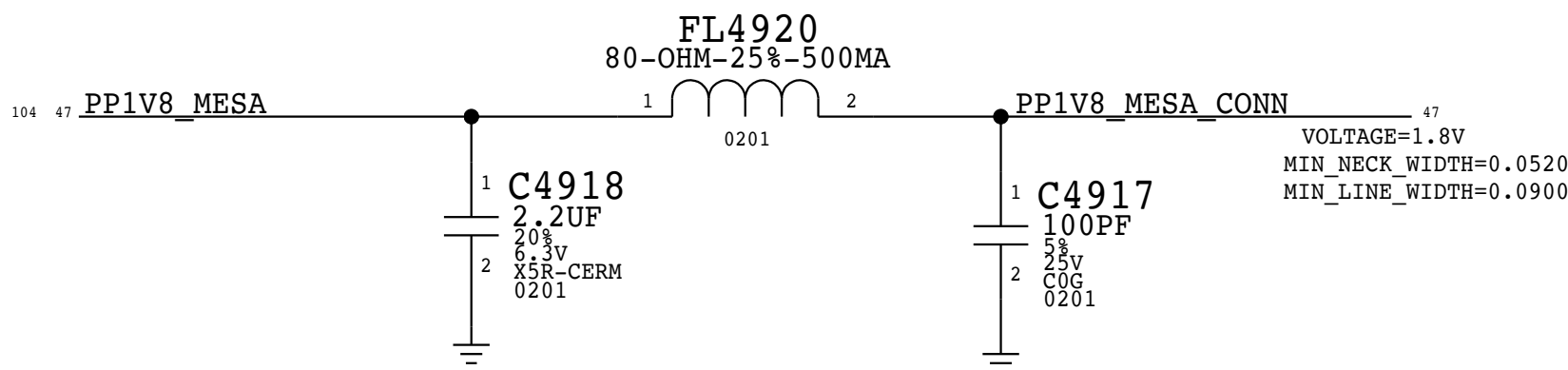
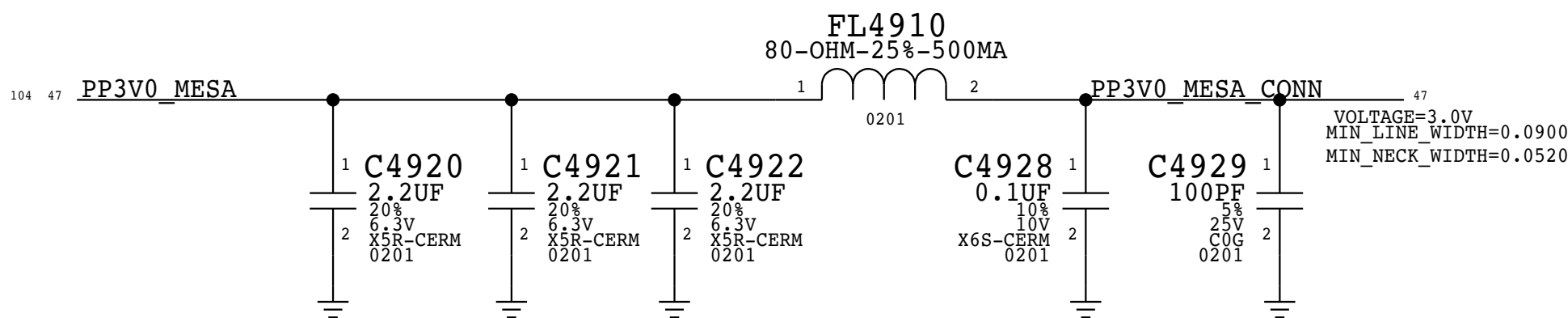
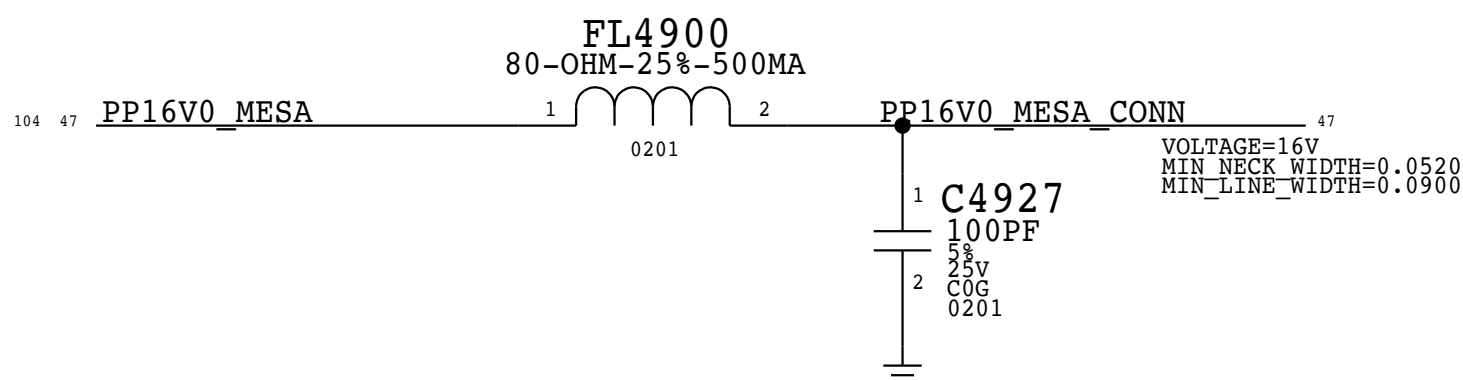
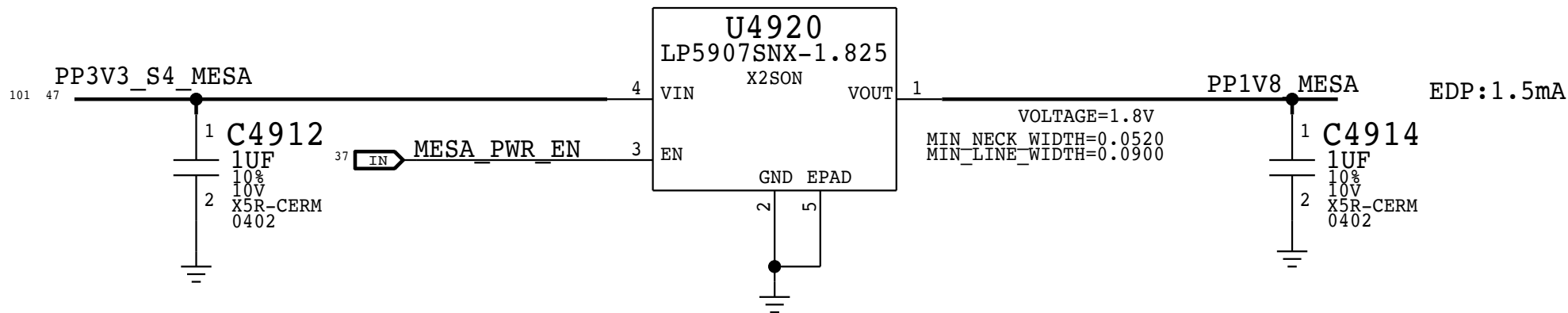


3.0V MESA

Option to feed LDO from 5V in case of dropout issue



1.8V MESA



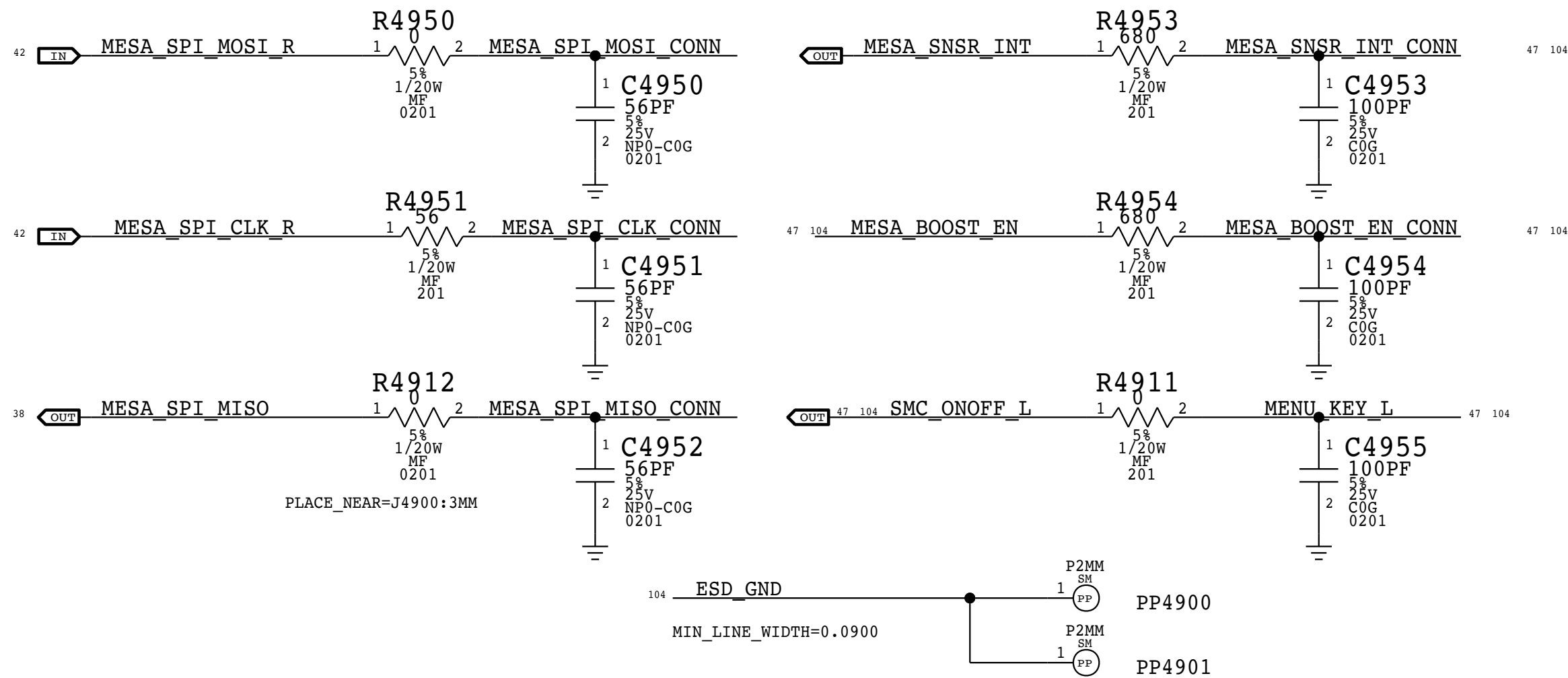
D

C

B

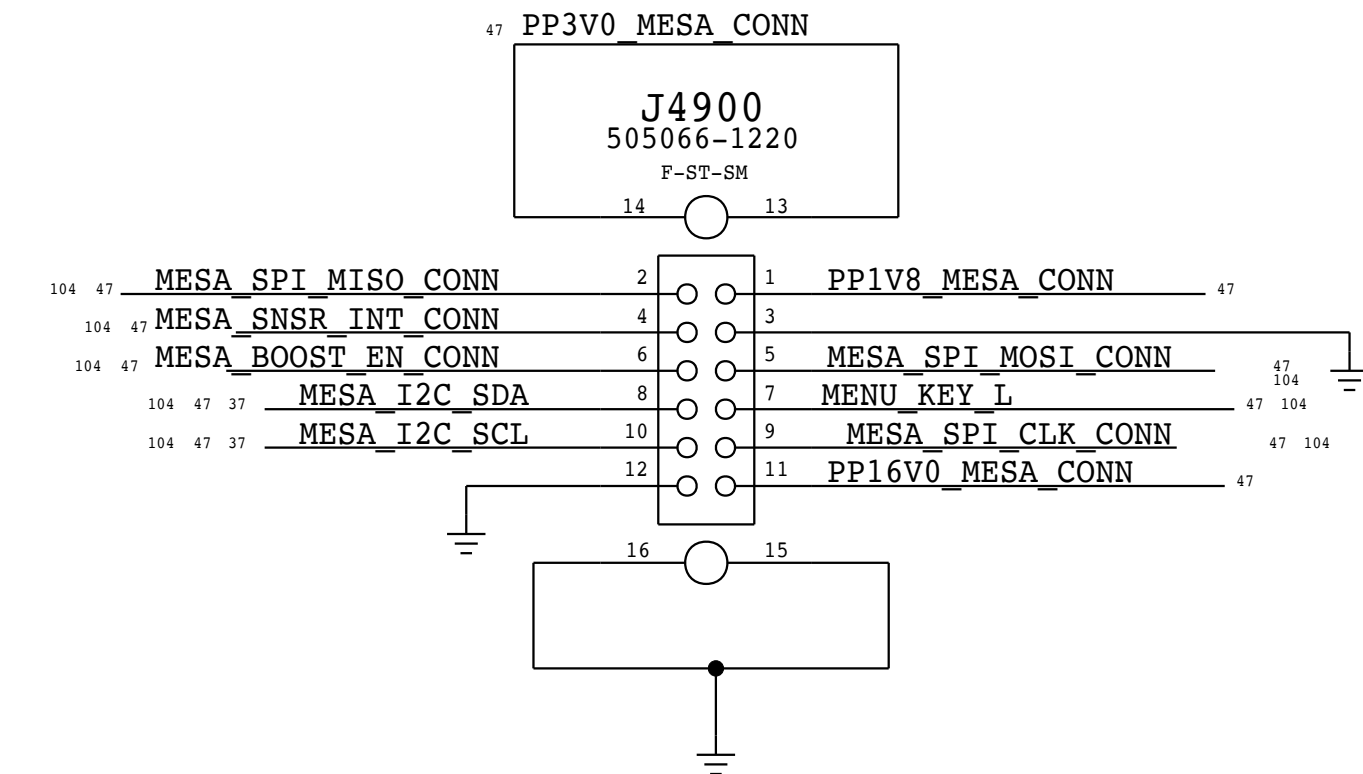
A

ISOLATE FROM OTHER COMPONENTS/NETS AS MUCH AS POSSIBLE



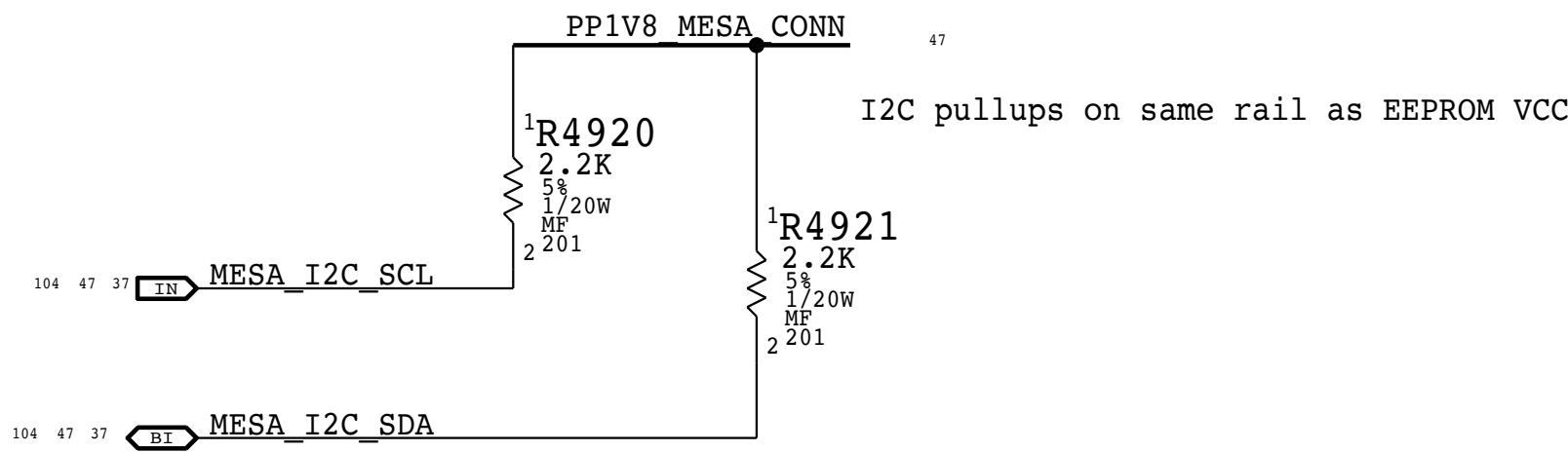
MESA FLEX CONNECTOR

Protol Connector for X434/X435 Support  
PLUG (516S00115) - X434/ X435 Jumper  
Recptacle (516S00203) - X362/X363 MLB



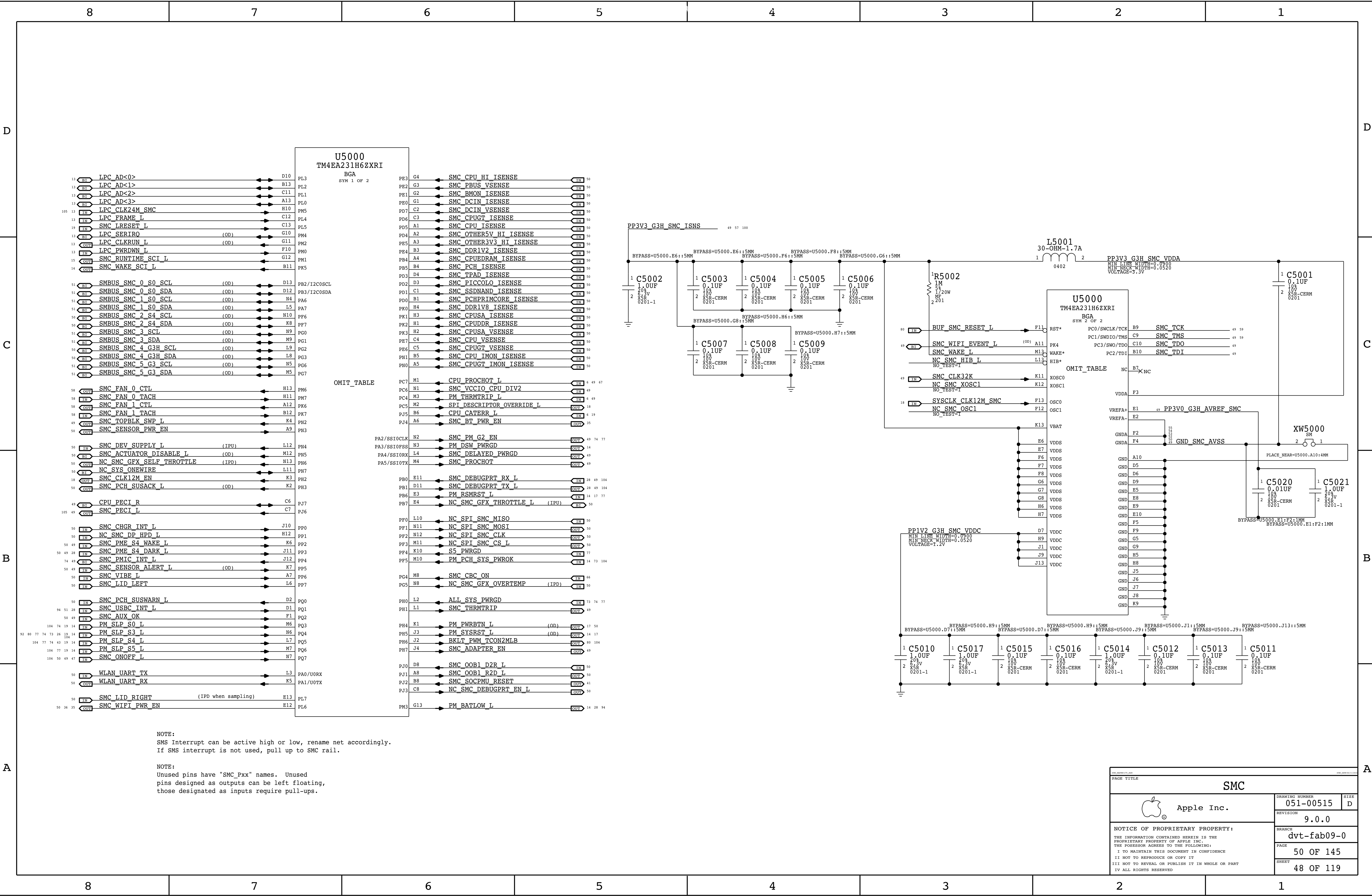
Mesa Power Sequencing Requirements

Power On: 1V8 -> 3V3 -> 16V0



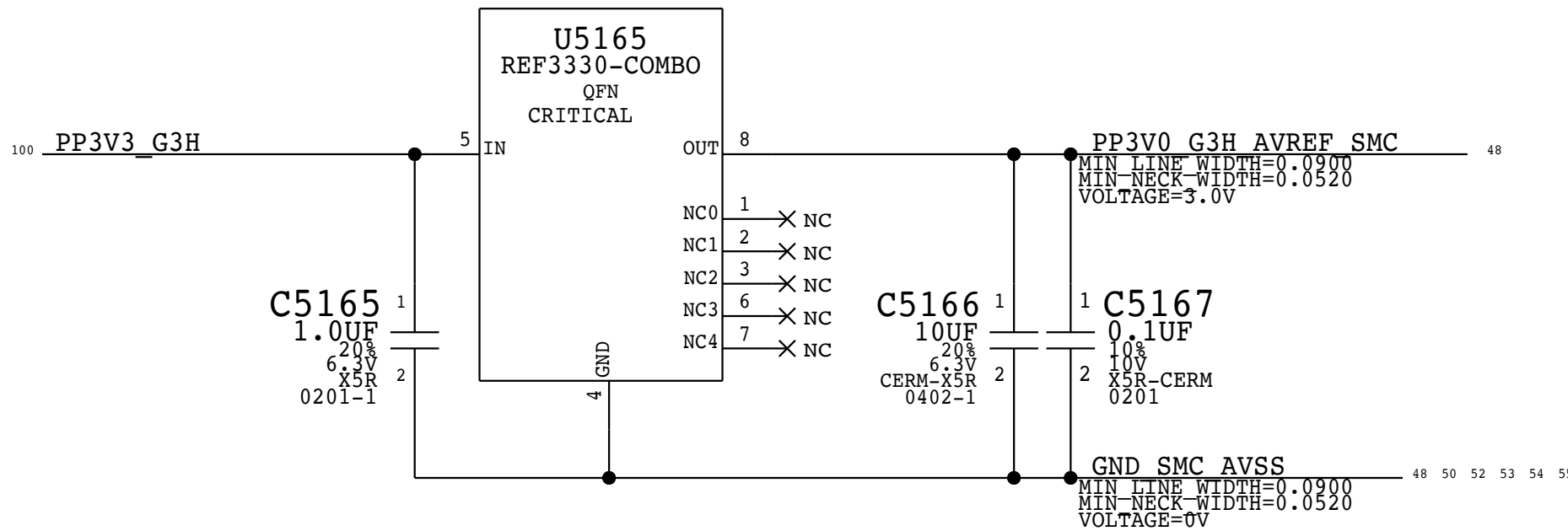
BOM\_COST\_GROUP=T151

PAGE TITLE		
MESA		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
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	BRANCH	dvt-fab09-0
	PAGE	49 OF 145
	SHEET	47 OF 119

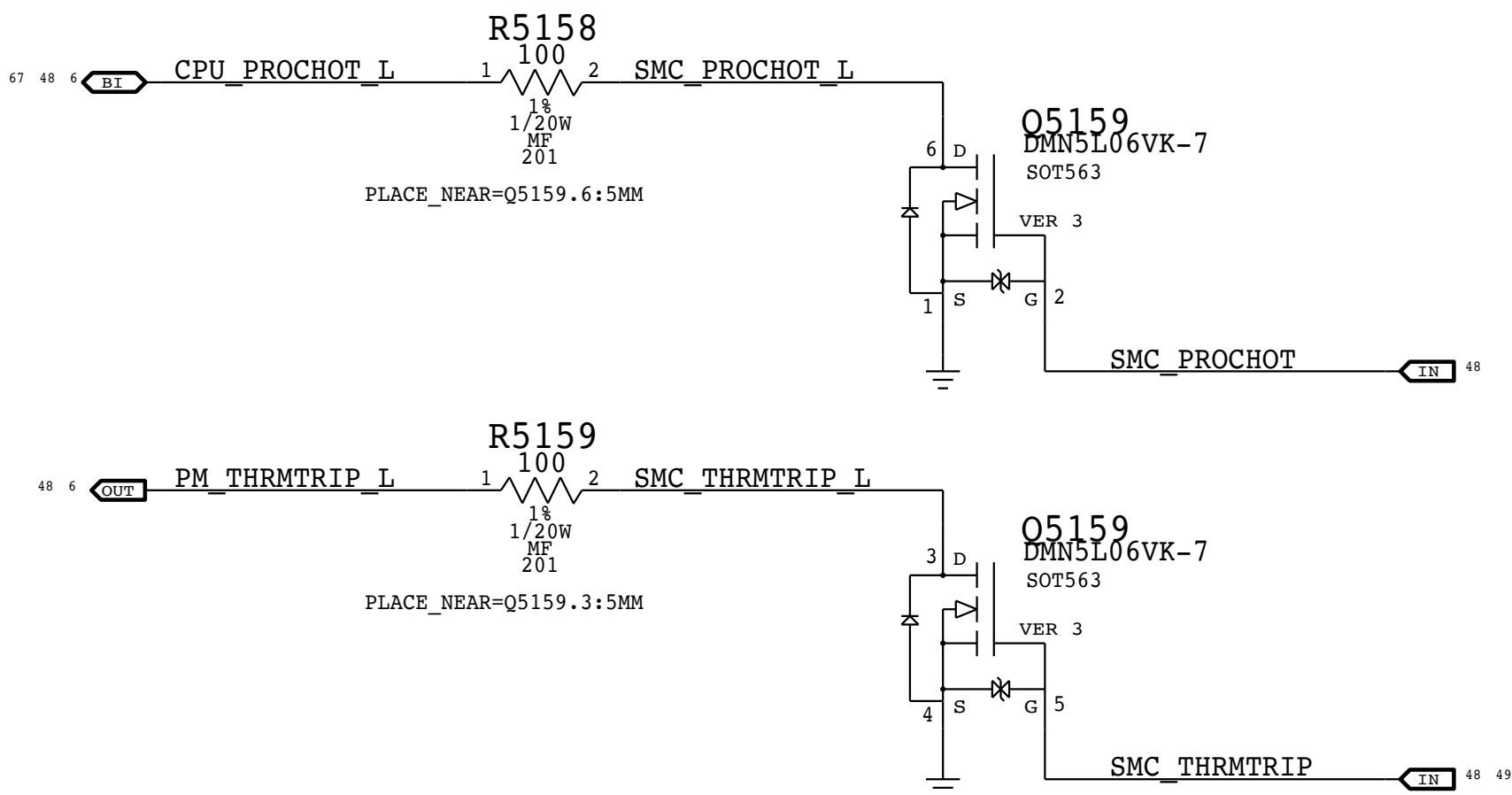




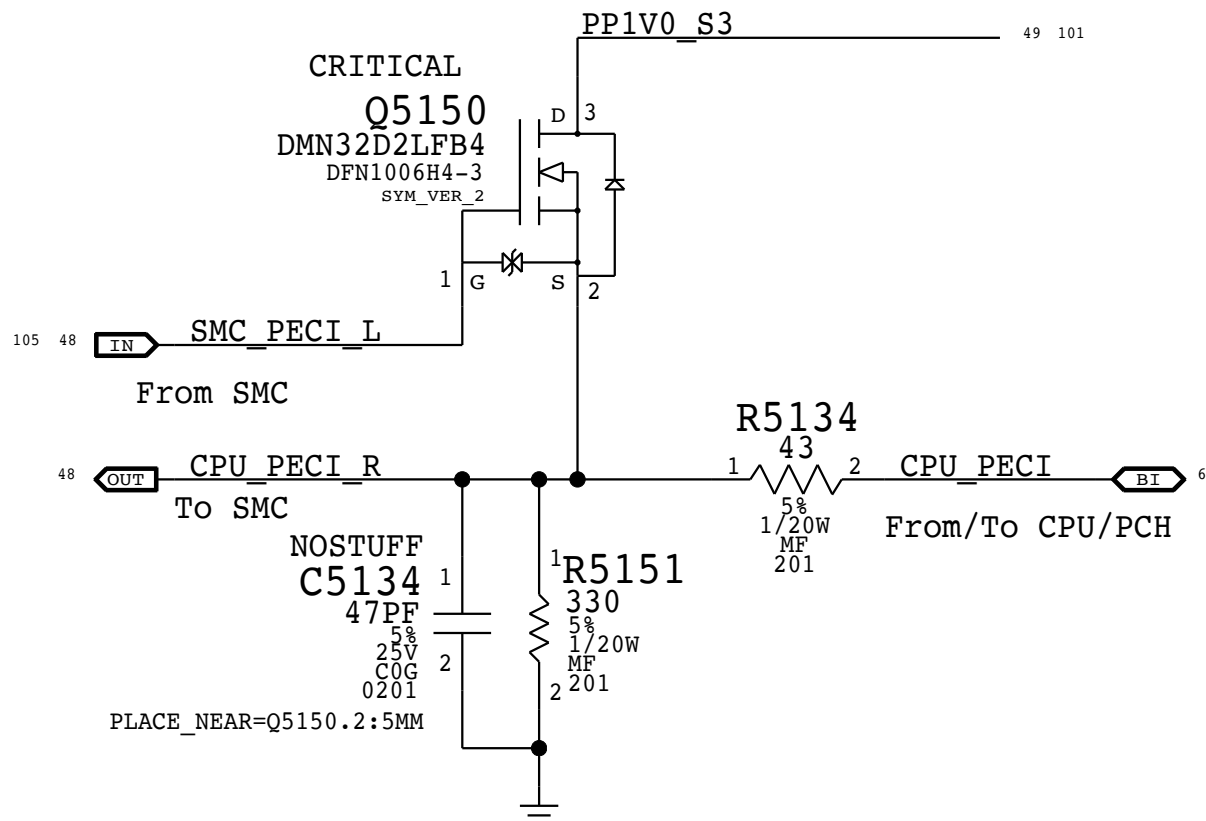
SMC AVREF Supply



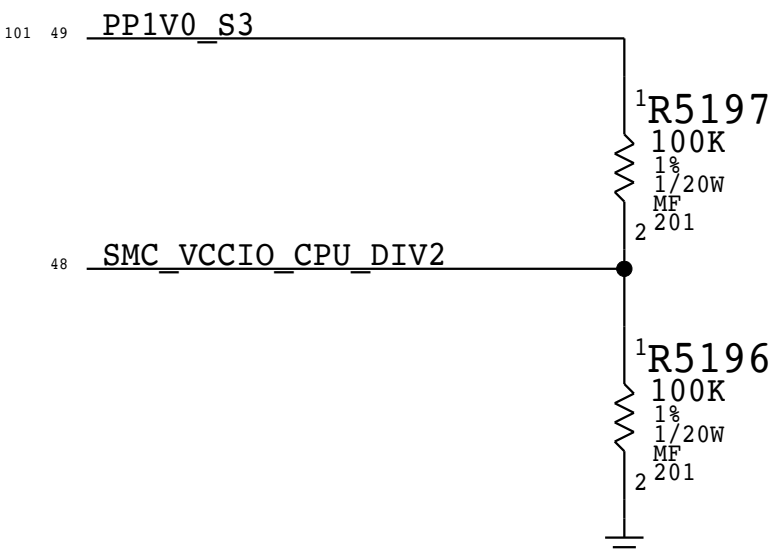
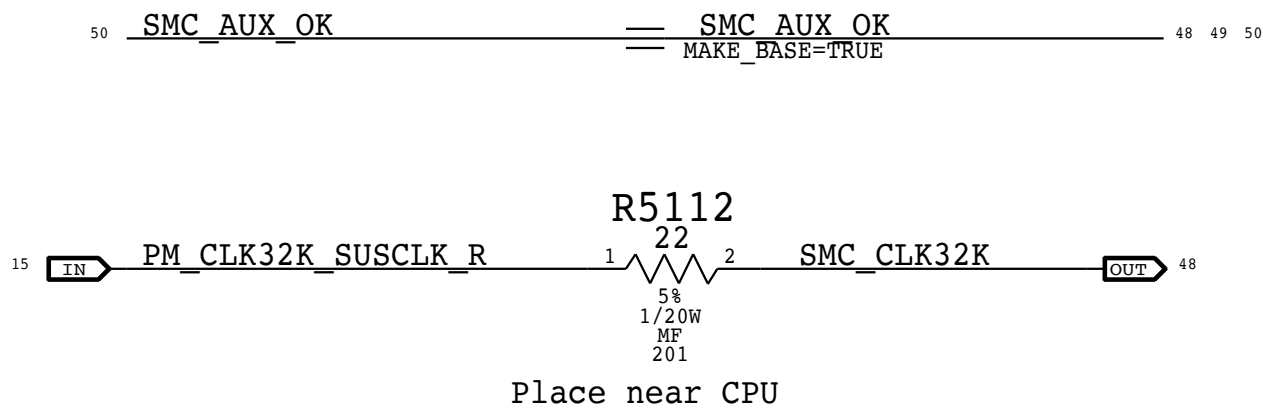
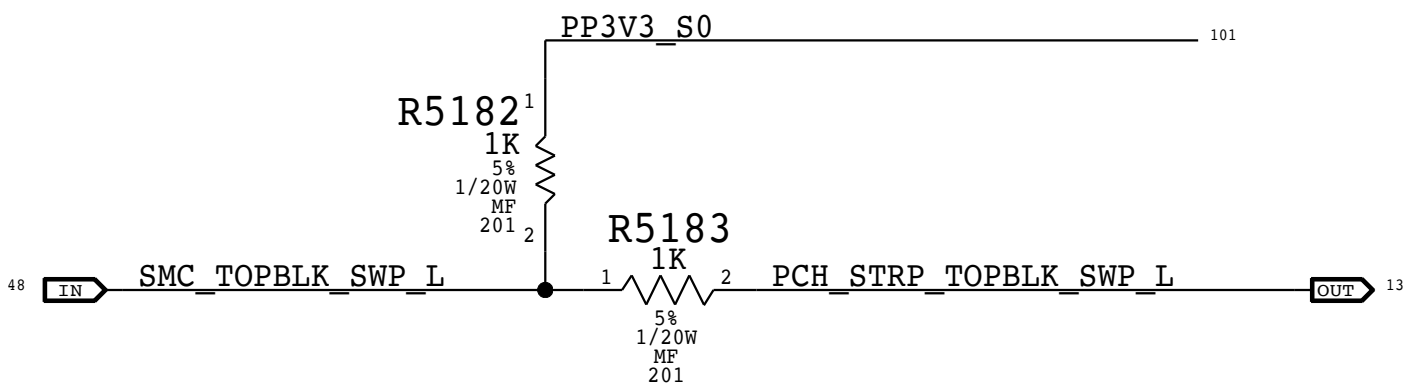
PROCHOT/THRMTRIP Support



PECI Support



Top-Block Swap




		100 57 48 PP3V3_G3H_SMC_ISNS		101 50 PP3V3_S4		101 PP3V3_S0			
50 48	SMC PME S4 WAKE_L	R5166	100K	1	2	5%	1/20W	MF	201
50 48 28	SMC PME S4 DARK_L	R5167	100K	1	2	5%	1/20W	MF	201
48	SMC WIRT_EVENT_L	R5168	100K	1	2	5%	1/20W	MF	201
74 48	SMC PMIC_INT_L	R5169	100K	1	2	5%	1/20W	MF	201
104 50 48 47	SMC_ONOFF_L	R5170	10K	1	2	5%	1/20W	MF	201
50 48	SMC_SENSOR_ALERT_L	R5172	10K	1	2	5%	1/20W	MF	201
104 50 43 42	SMC_LID	R5171	330K	1	2	5%	1/20W	MF	201
104 48 28	SMC_DEBUGPRT_TX_L	R5175	20K	1	2	5%	1/20W	MF	201
104 48 28	SMC_DEBUGPRT_RX_L	R5176	20K	1	2	5%	1/20W	MF	201
59 48	SMC_TMS	R5177	10K	1	2	5%	1/20W	MF	201
48	SMC_TDO	R5178	10K	1	2	5%	1/20W	MF	201
48	SMC_TDI	R5179	10K	1	2	5%	1/20W	MF	201
59 48	SMC_TCK	R5180	10K	1	2	5%	1/20W	MF	201
50 49 48	SMC_AUX_OK	R5187	100K	1	2	5%	1/20W	MF	201
48	SMC_ADAPTER_EN	R5185	100K	1	2	5%	1/20W	MF	201
49 48	SMC_THRMTRIP	R5186	10K	1	2	5%	1/20W	MF	201
48	SMC_DELAYED_PWRGD	R5191	100K	1	2	5%	1/20W	MF	201
77 74 48	SMC_PM_G2_EN	R5192	100K	1	2	5%	1/20W	MF	201

SYMC\_MASTER=J79\_JACK

SYMC\_DATE=04/14/2016

SMC Shared Support

 Apple Inc.

DRANTING NUMBER  
051-00515

REVISION  
9.0.0

BRANCH  
dvt-fab09-0

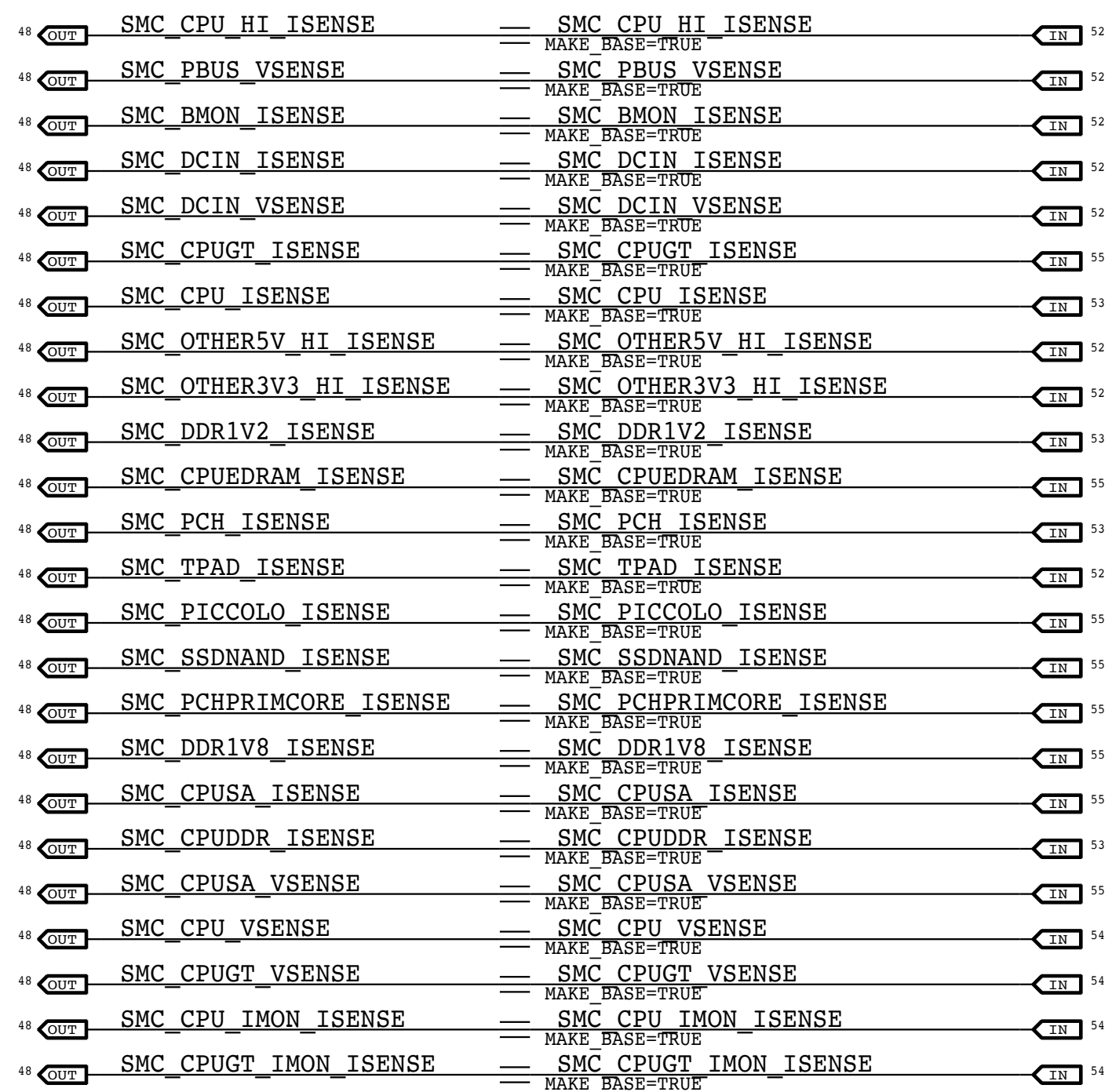
PAGE  
51 OF 145

SHEET  
49 OF 119

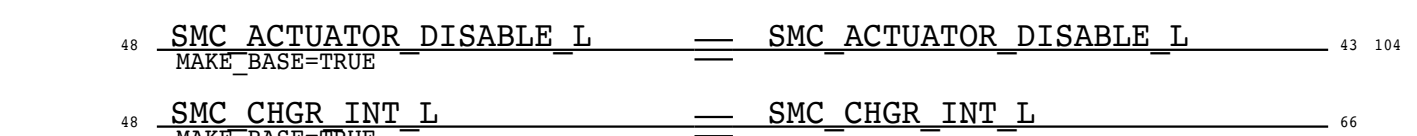
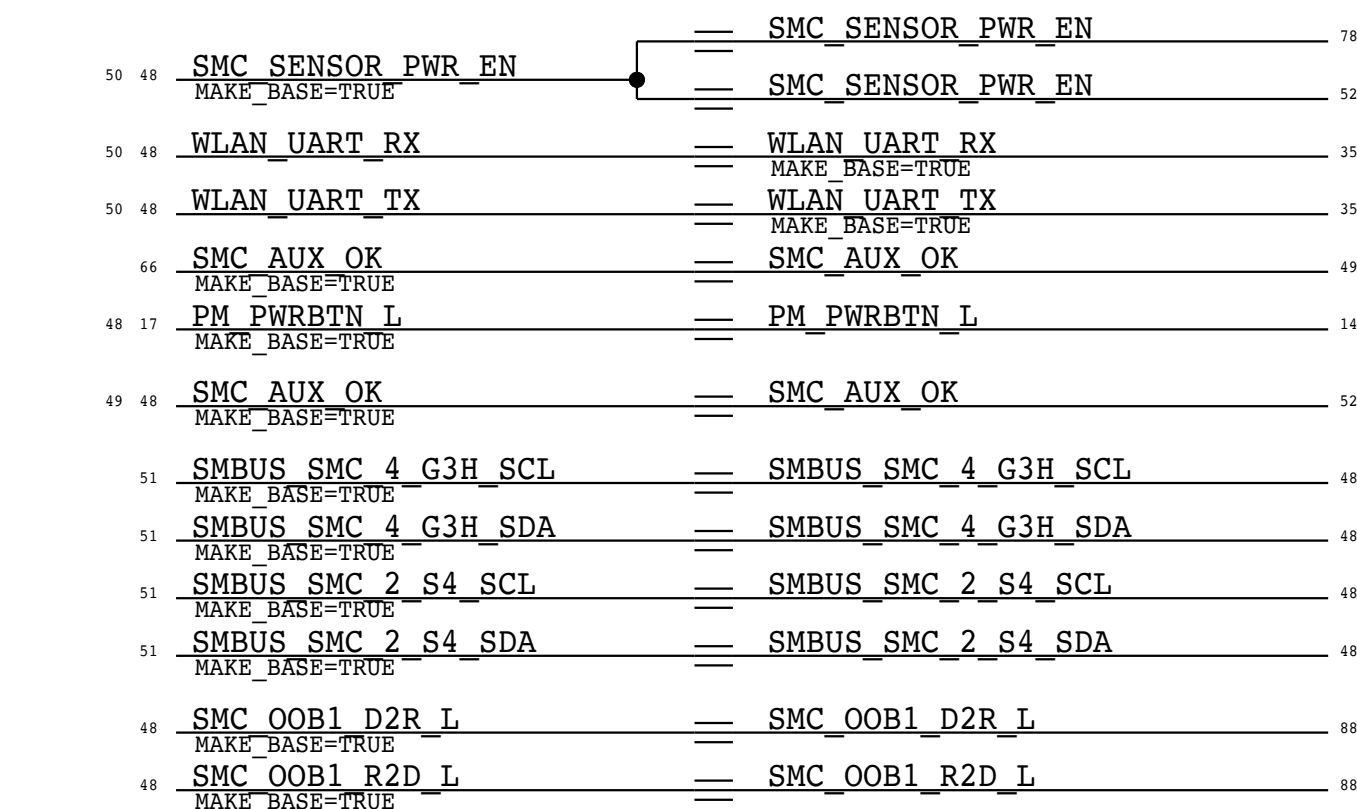
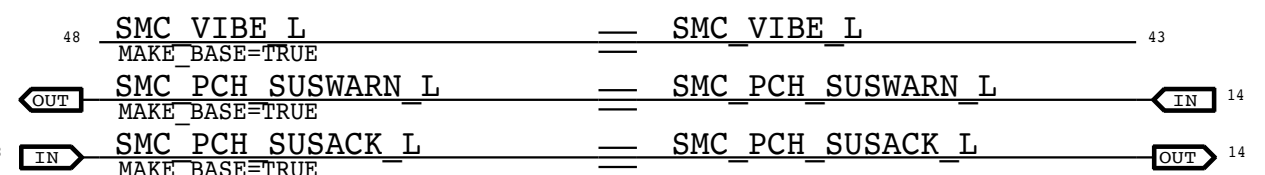
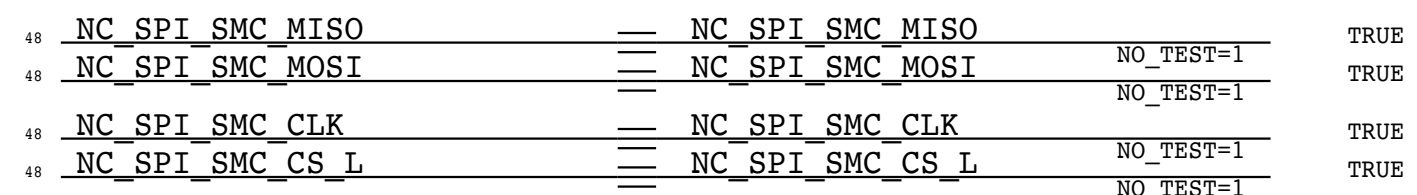
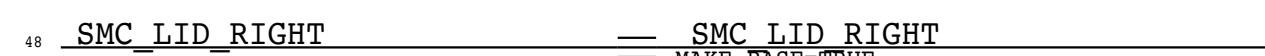
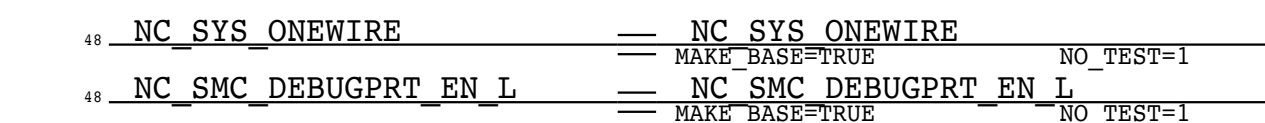
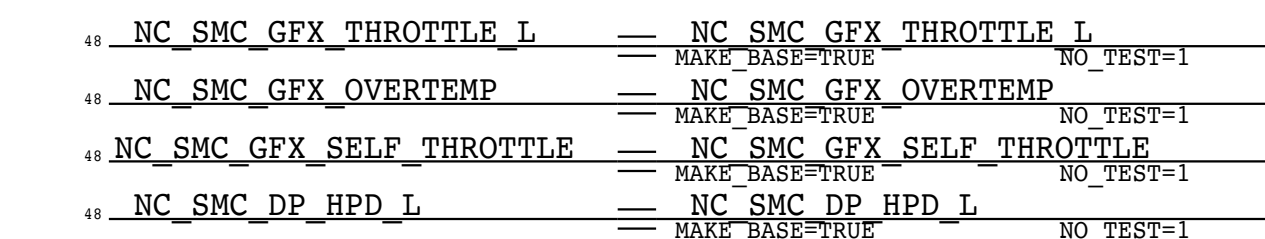
NOTICE OF PROPRIETARY PROPERTY:  
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.  
THE POSSESSOR AGREES TO THE FOLLOWING:  
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  
II NOT TO REPRODUCE OR COPY IT  
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART  
IV ALL RIGHTS RESERVED

BOM\_COST\_GROUP=SMC

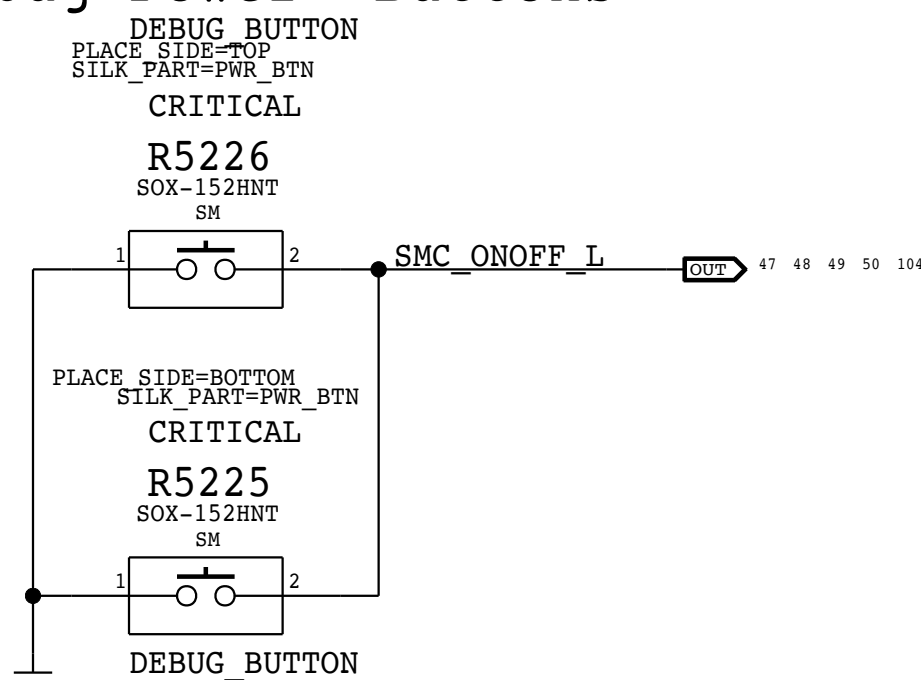
# SMC12 ADC Assignments



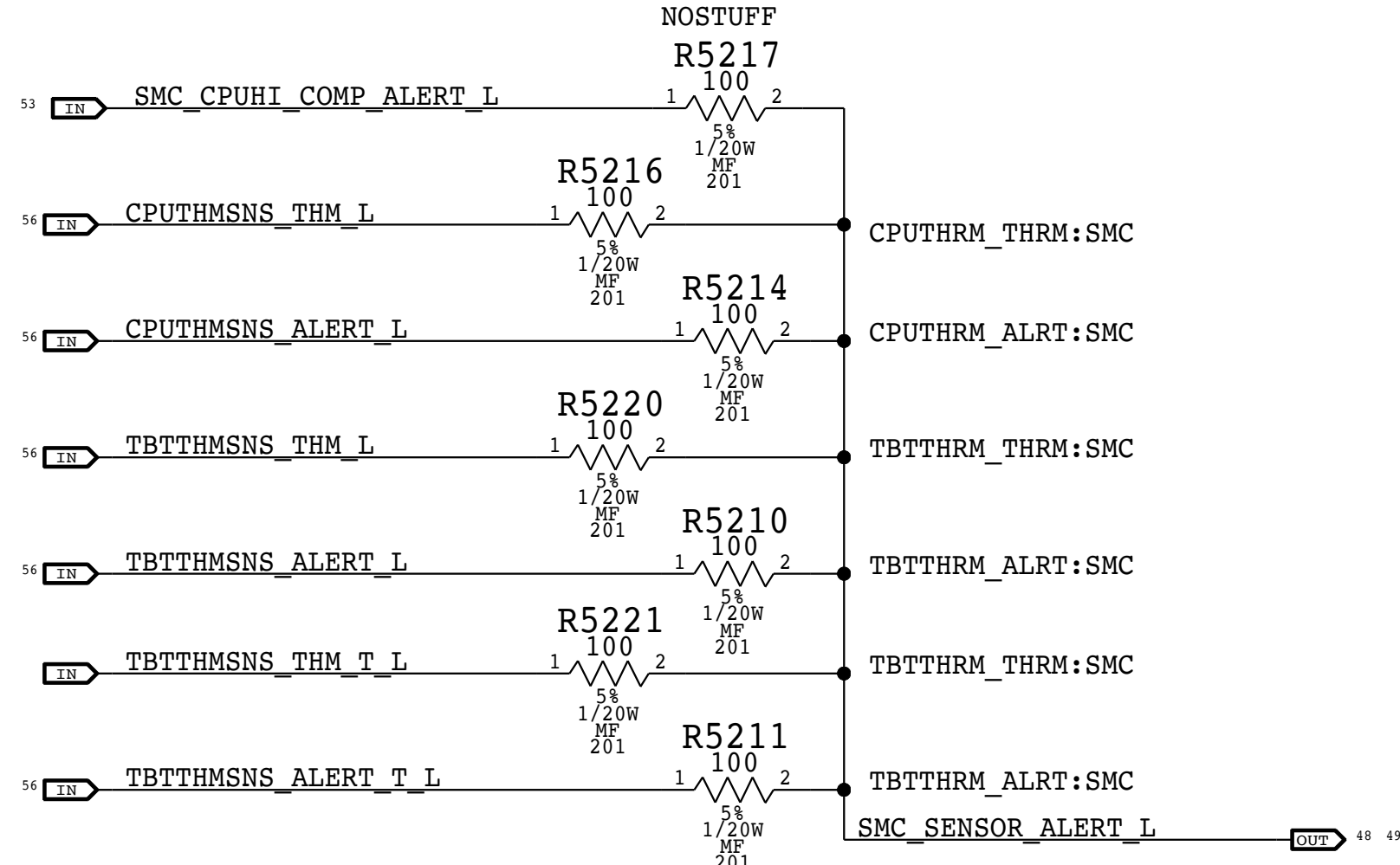
## SMC12 Pin Assignments



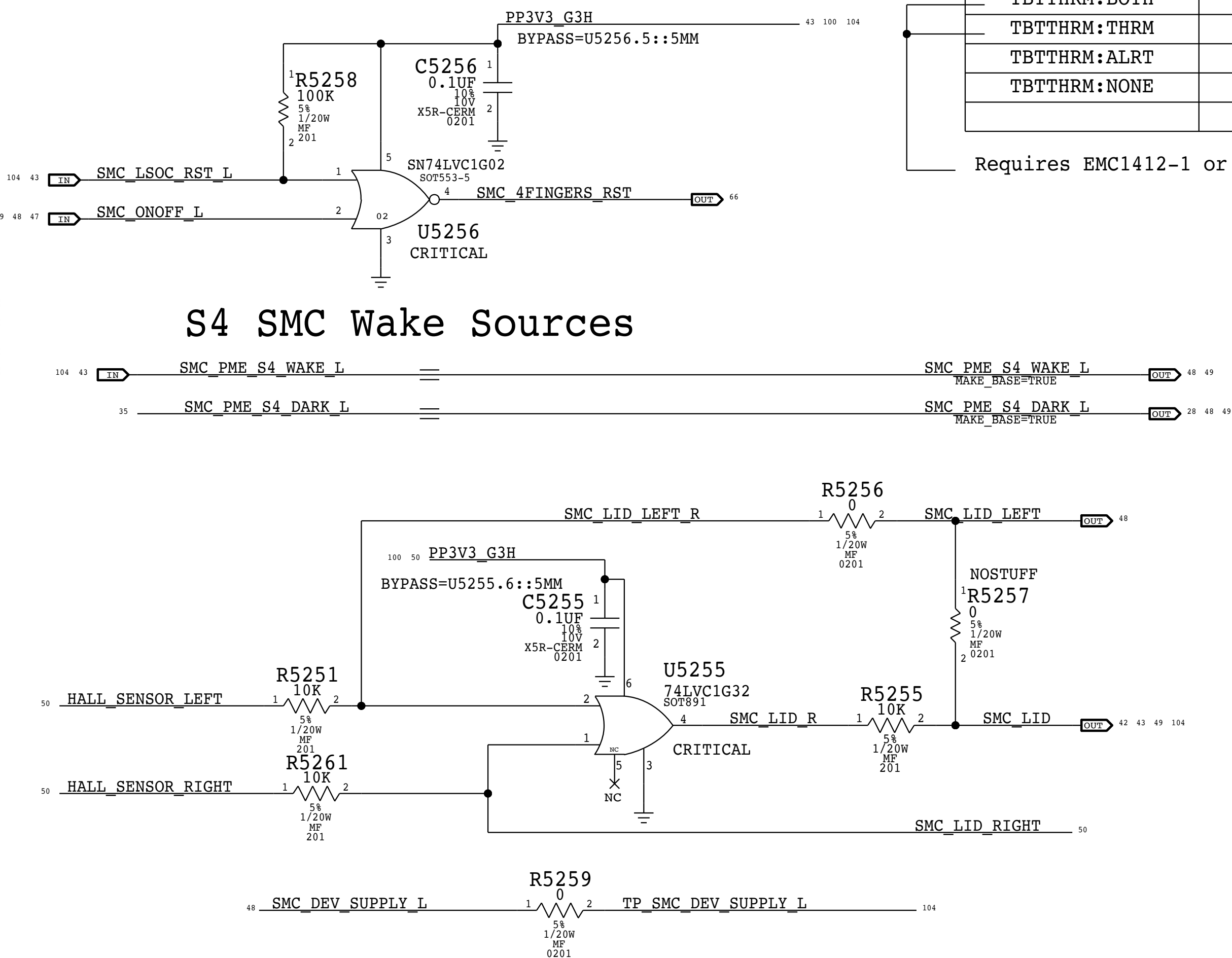
## Debug Power "Buttons"



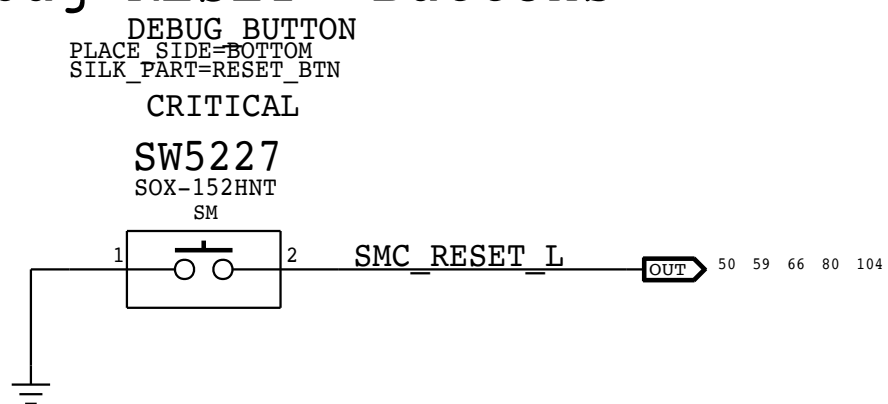
## Thermal Alerts



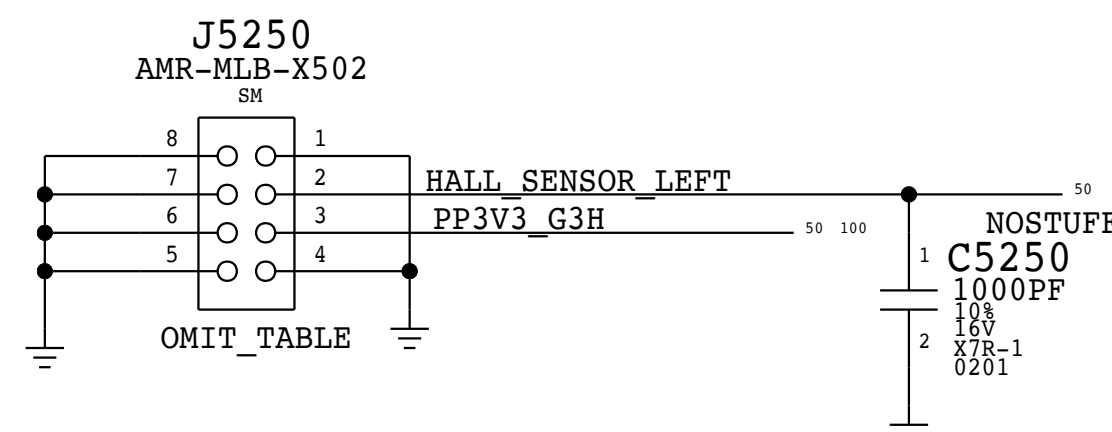
## S4 SMC Wake Sources



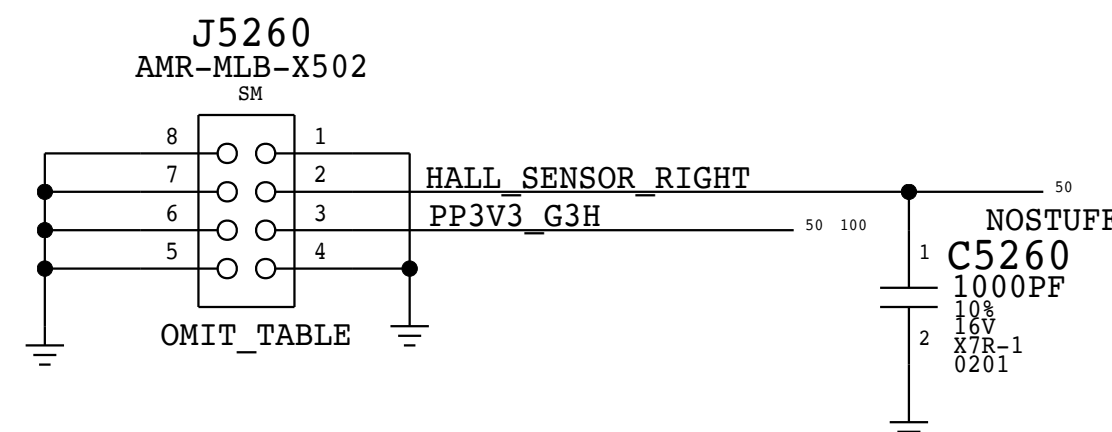
## Debug RESET "Buttons"



## Hall Effect Pads - Left



## Hall Effect Pads - Right



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
677-04255	2	SUBASSY (T&R) PCBA,HES INTERPOSER,X502	J5250, J5260	CRITICAL	

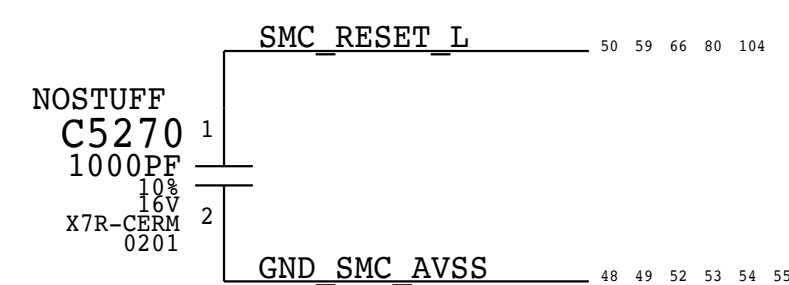
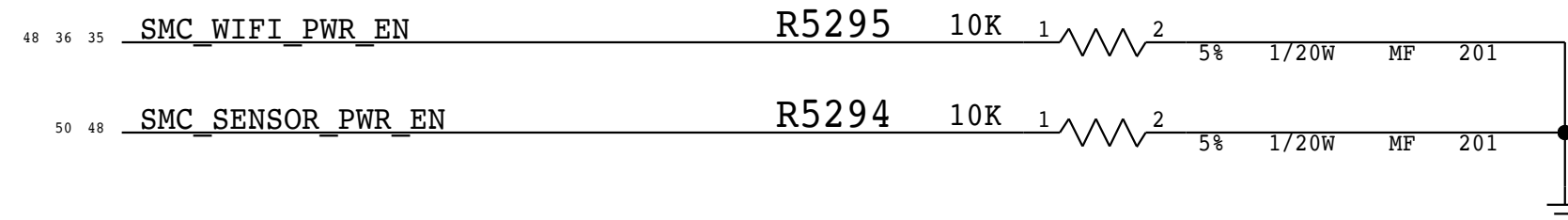
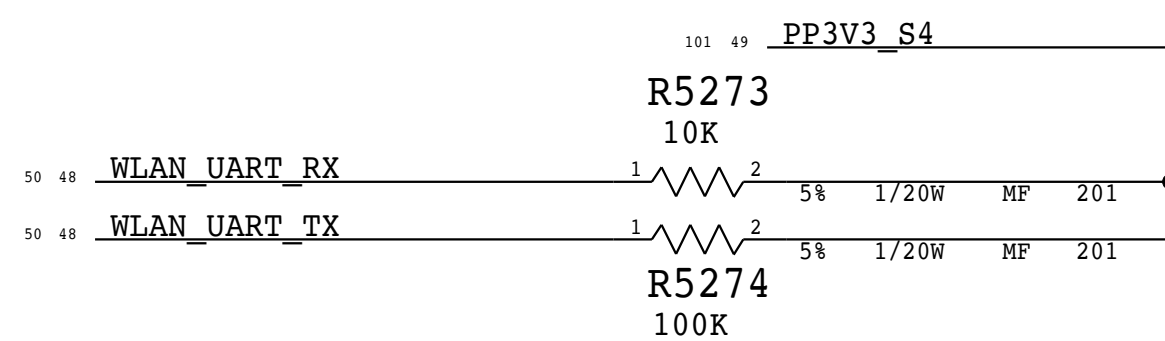
Specify one of these BOM GROUPs.


BOM GROUP	BOM OPTIONS
CPUTHRM:BOTH	CPUTHRM_THRM:SMC,CPUTHRM_ALRT:SMC
CPUTHRM:THRM	CPUTHRM_THRM:SMC,CPUTHRM_ALRT:PU
CPUTHRM:ALRT	CPUTHRM_ALRT:SMC
CPUTHRM:NONE	CPUTHRM_ALRT:PU

Specify one of these BOM GROUPs.

BOM GROUP	BOM OPTIONS
TBTTHRM:BOTH	TBTTHRM_THRM:SMC,TBTTHRM_ALRT:SMC
TBTTHRM:THRM	TBTTHRM_THRM:SMC,TBTTHRM_ALRT:PU
TBTTHRM:ALRT	TBTTHRM_THRM:PU,TBTTHRM_ALRT:SMC
TBTTHRM:NONE	TBTTHRM_THRM:PU,TBTTHRM_ALRT:PU

Requires EMC1412-1 or EMC1412-2 instead of EMC1412-A, new APN needs to be created.



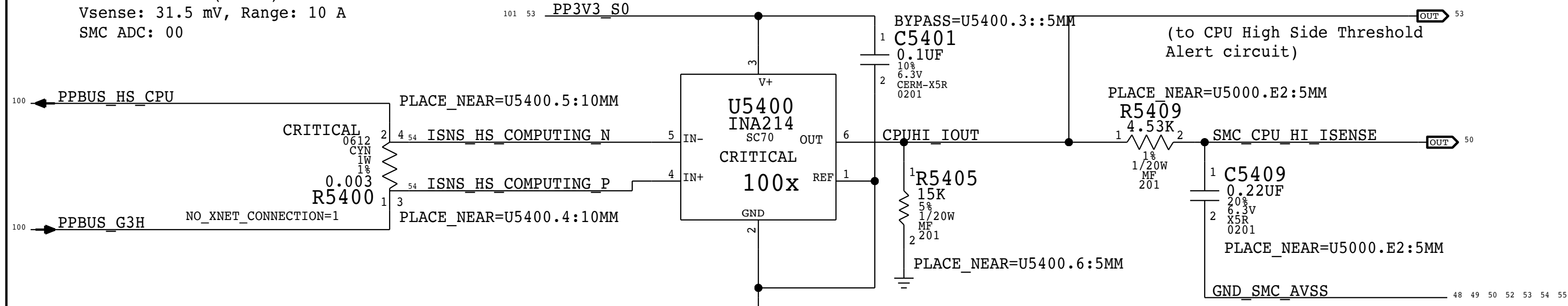
PAGE TITLE		
PAGE_TITLE=SMC Project Support		
 Apple Inc. ®	DRAWING NUMBER	051-00515
	STEEL	D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  II NOT TO REPRODUCE OR COPY IT  III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART  IV ALL RIGHTS RESERVED	DRAWING SCALE	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	52 OF 145
	SHEET	50 OF 119

BOM\_COST\_GROUP=SMC



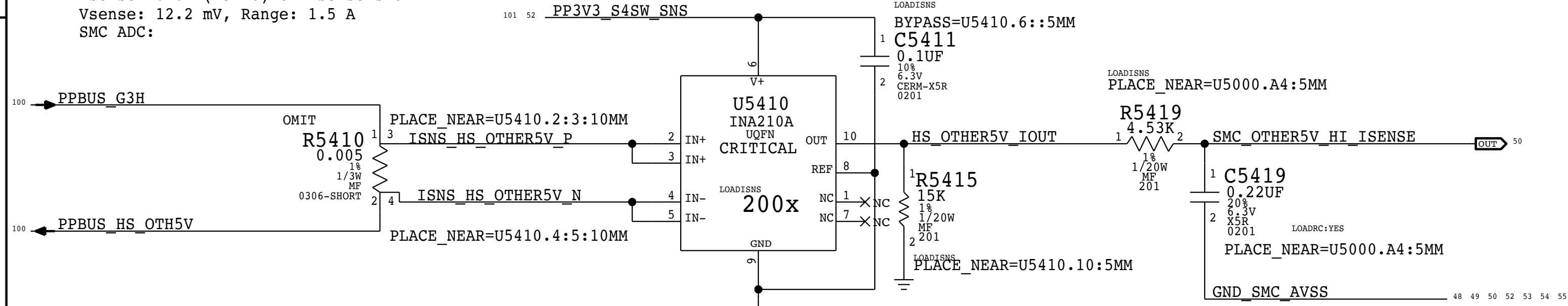
## CPU High Side Current Sense (IC0R)

Gain: 100x, EDP: 10.5 A  
Rsense: 0.003 (R5400)  
Vsense: 31.5 mV, Range: 10 A  
SMC ADC: 00



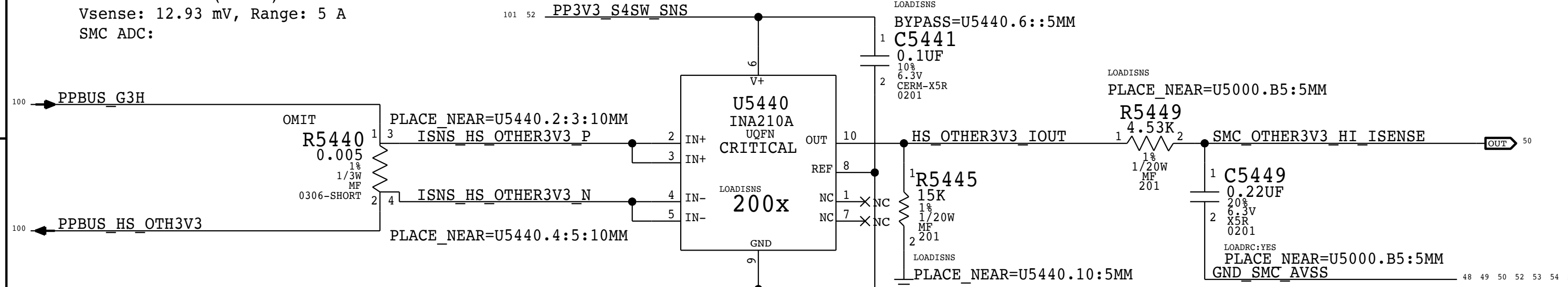
## OTHER 5V High Side Current Sense (IO5R)

Gain: 200x, EDP: 1.22 A  
Rsense: 0.01 (R5410) or Rsense SHORT  
Vsense: 12.2 mV, Range: 1.5 A  
SMC ADC:



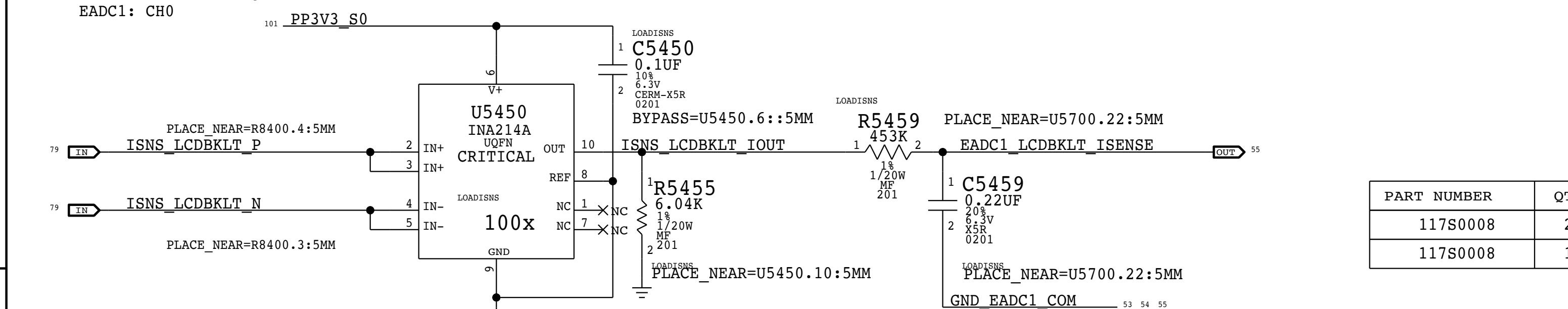
## OTHER 3.3V High Side Current Sense (IO3R)

Gain: 200x, EDP: 4.31 A  
Rsense: 0.003 (R5440) or Rsense SHORT  
Vsense: 12.93 mV, Range: 5 A  
SMC ADC:



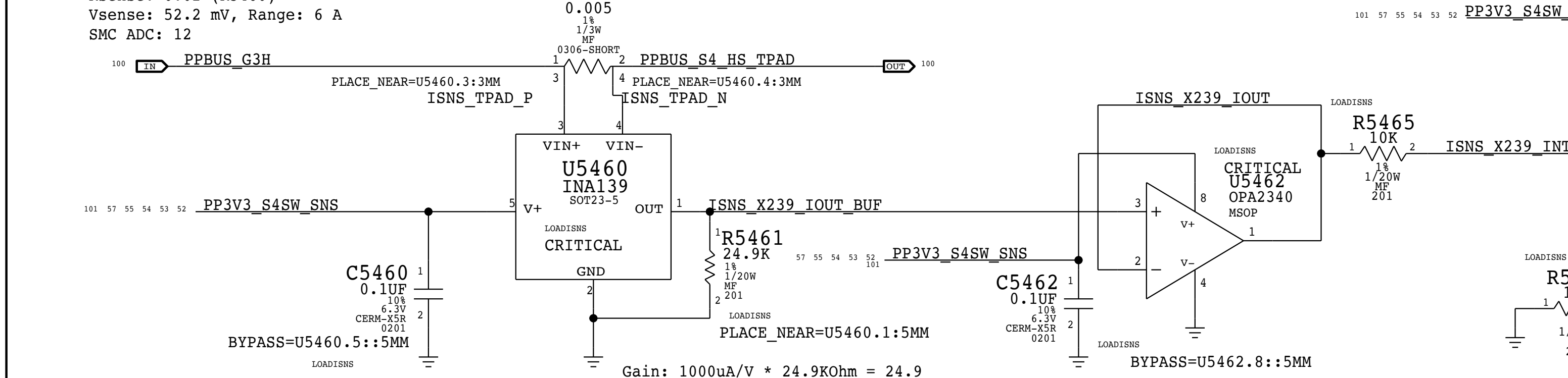
## LCD Backlight Current Sense (IBLR)

Gain: 100x. EDP: 1 A  
Rsense: 0.025 (R8400)  
Vsense: 25 mV, Range: 2.4 A  
EADC1: CH0



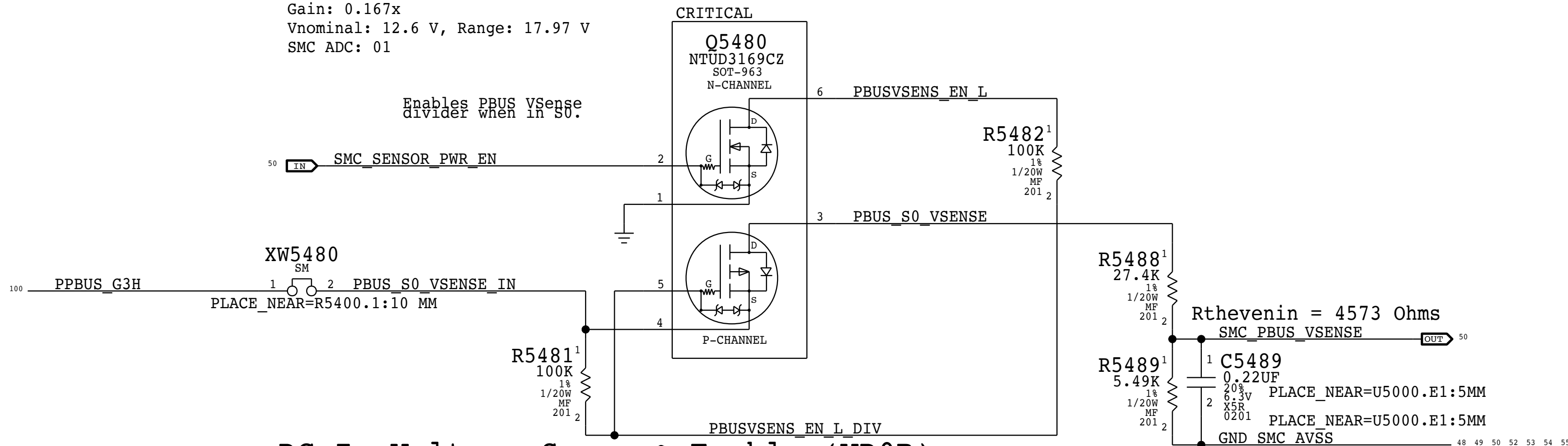
## Trackpad Actuator X239 Current Sense (ITAR)

Gain: 24.9x, EDP: 2.61 A (Transient)  
Rsense: 0.02 (R5460)  
Vsense: 52.2 mV, Range: 6 A  
SMC ADC: 12



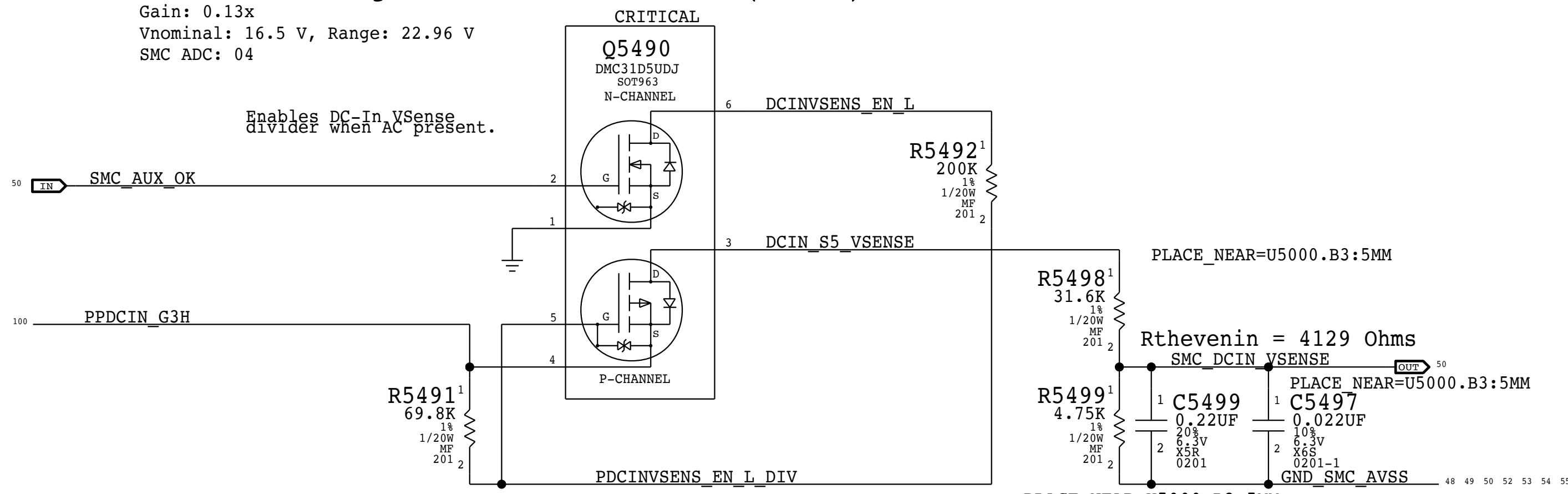
## PBUS Voltage Sense & Enable (VP0R)

Gain: 0.167x  
Vnominal: 12.6 V, Range: 17.97 V  
SMC ADC: 01



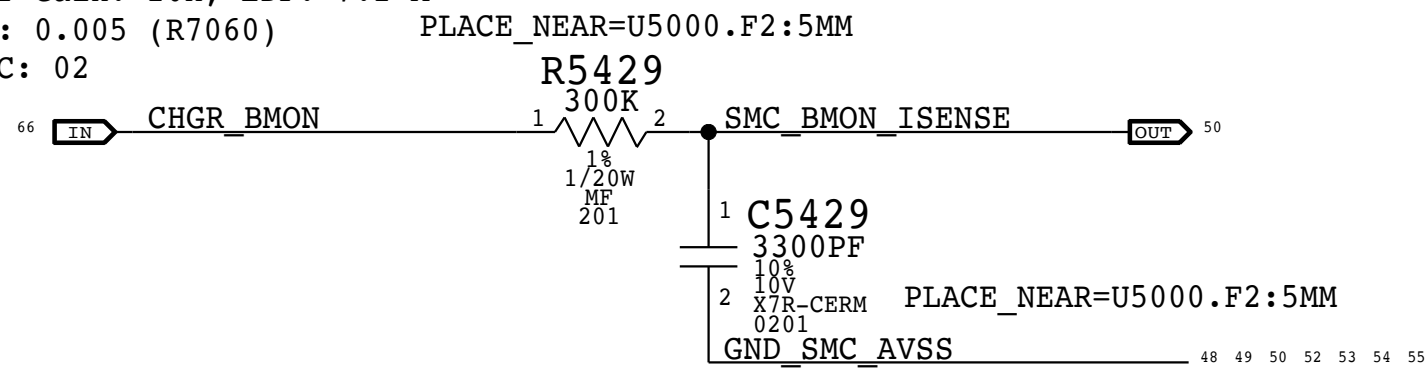
## DC In Voltage Sense & Enable (VD0R)

Gain: 0.13x  
Vnominal: 16.5 V, Range: 22.96 V  
SMC ADC: 04



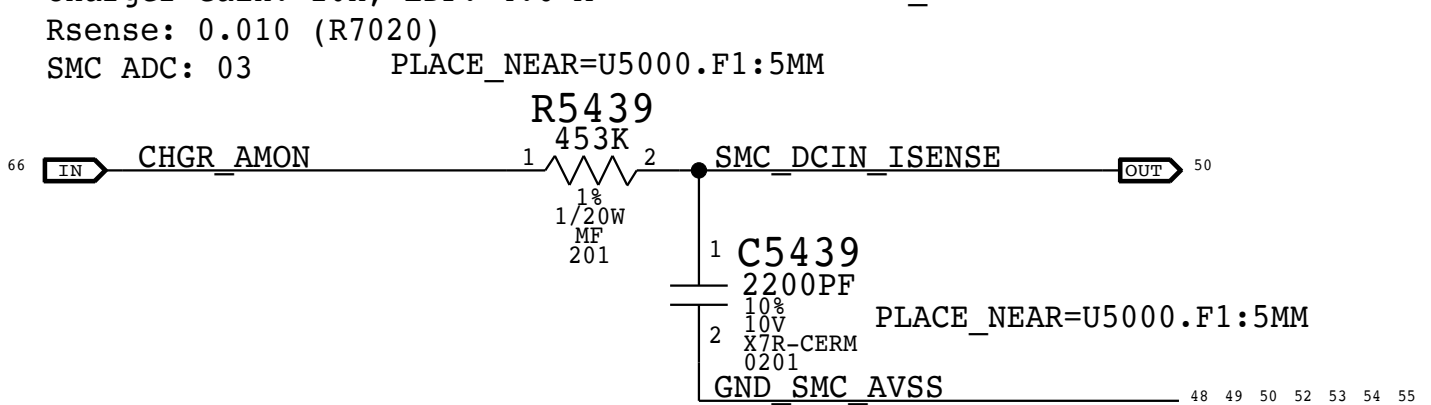
## Charger (BMON) Current Sense (IPBR)

Charger Gain: 20x, EDP: 7.2 A  
Rsense: 0.005 (R7060)  
SMC ADC: 02




## DC-IN (AMON) Current Sense (ID0R)

Charger Gain: 20x, EDP: 4.6 A  
Rsense: 0.010 (R7020)  
SMC ADC: 03



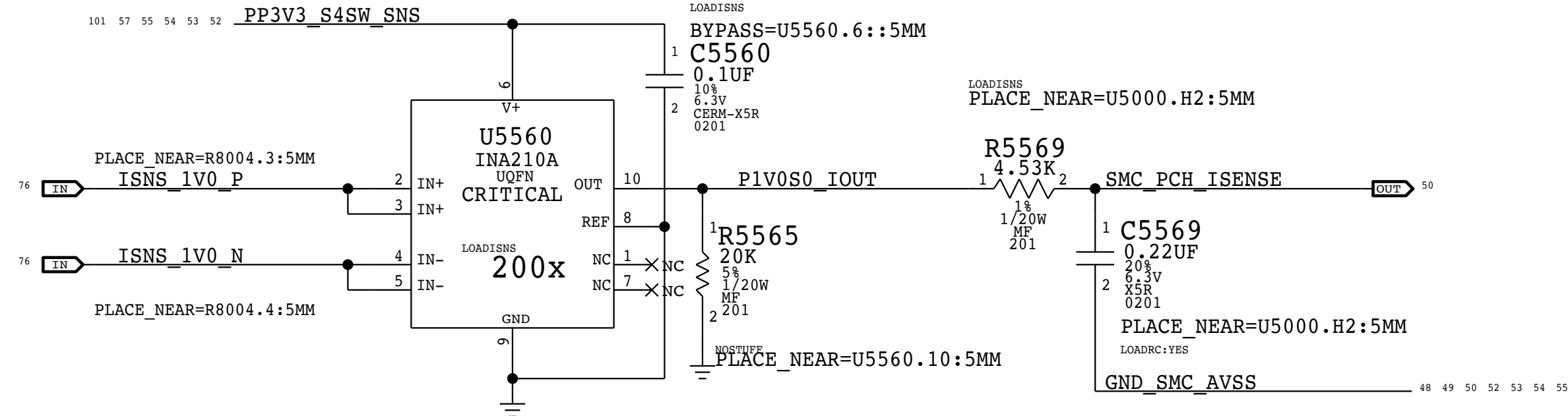
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	2	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	C5419,C5449		LOADRC:NO
117S0008	1	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	C5469		LOADRC:NO

Power Sensors: High Side		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	54 OF 145
	SHEET	52 OF 119



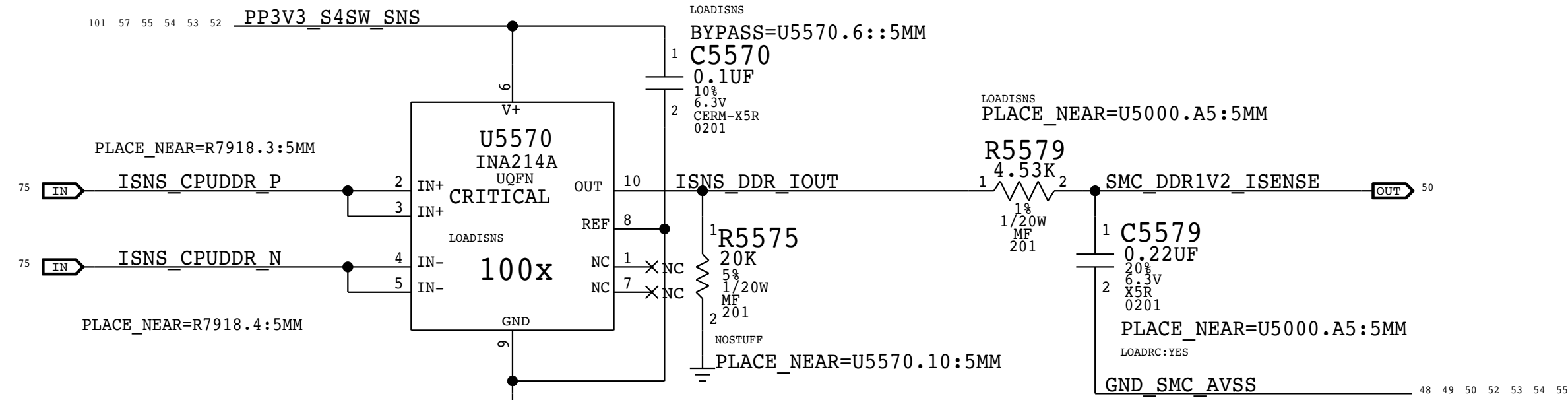
### PCH 1.0V Current Sense (IS1C)

Gain: 200x, EDP: 3.29 A  
Rsense: 0.003 (R8004) or Rsense SHORT  
Vsense: 9.87 mV, Range: 5 A  
SMC ADC: 11



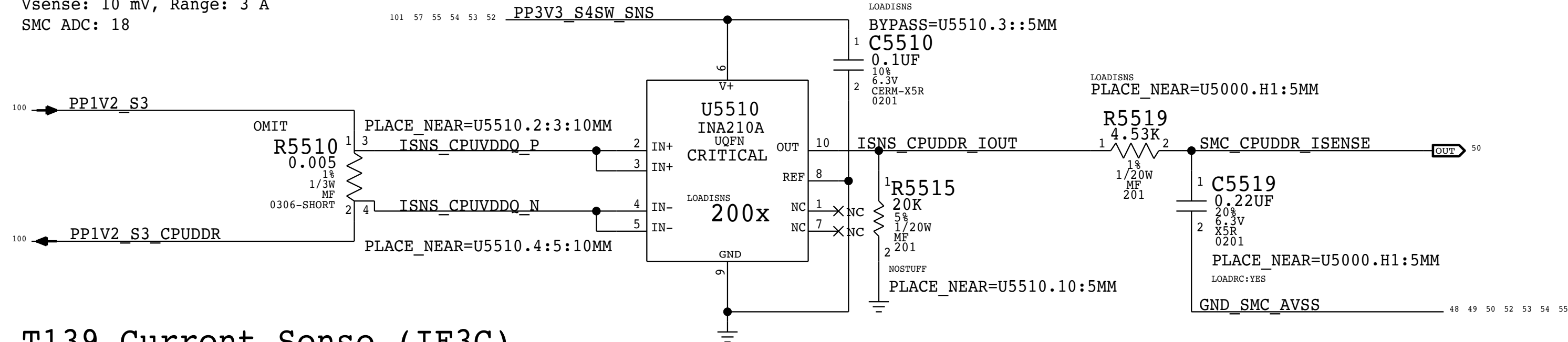
### DDR 1.2V S3 (CPU & Memory) Current Sense (IM0C)

Gain: 100x, EDP: 8.21 A  
Rsense: 0.003 (R7918) or XWTBD  
Vsense: 24.63 mV, Range: 10 A  
SMC ADC: 09



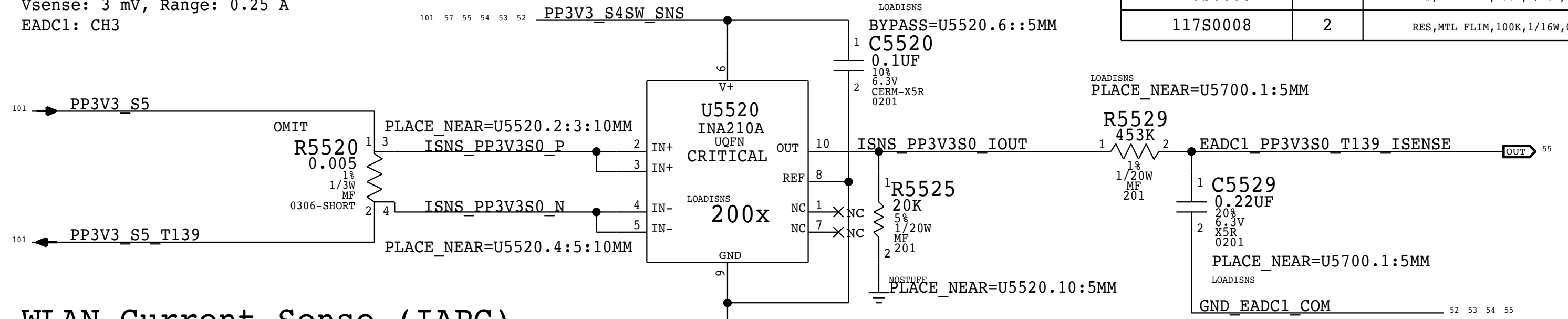
### CPU DDR 1.2V S3 (CPU Only) Current Sense (IMCC)

Gain: 200x, EDP: 2 A  
Rsense: 0.005 (R5510) or Rsense SHORT  
Vsense: 10 mV, Range: 3 A  
SMC ADC: 18



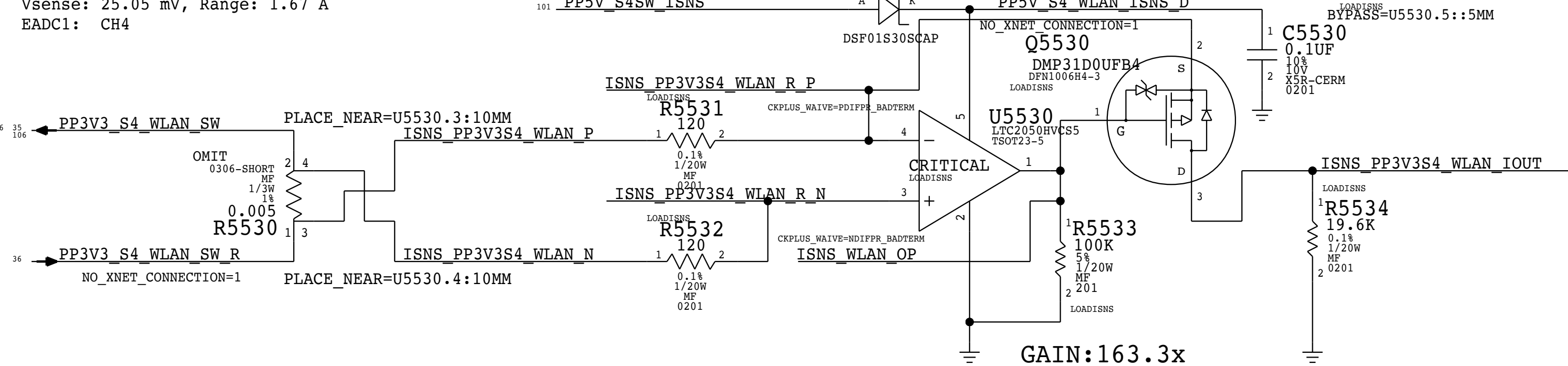
### T139 Current Sense (IF3C)

Gain: 200x, EDP: 0.06 A  
Rsense: 0.05 (R5520) or Rsense SHORT  
Vsense: 3 mV, Range: 0.25 A  
EADC1: CH3



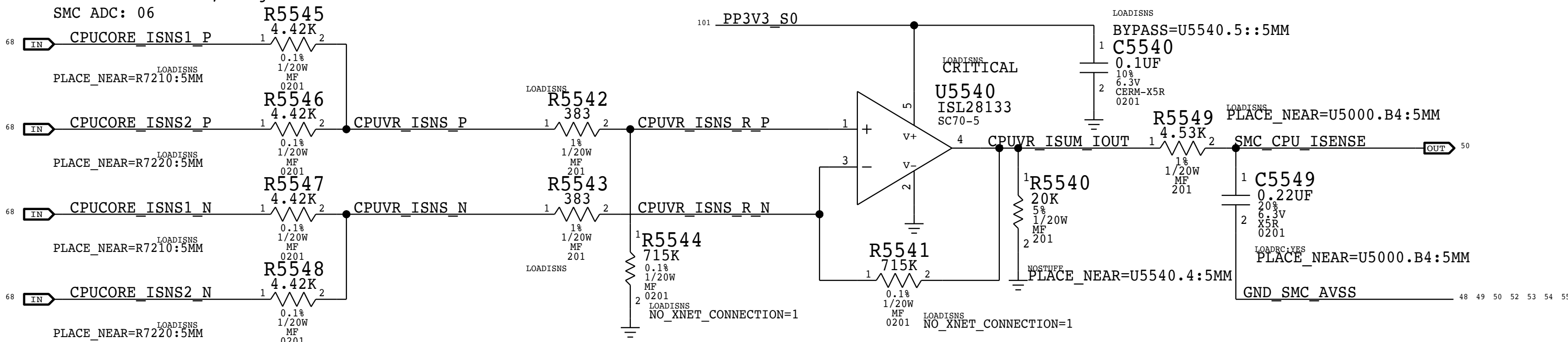
### WLAN Current Sense (IAPC)

Gain: 163.3x, EDP: 1.67 A  
Rsense: 0.015 (R5530) or Rsense SHORT  
Vsense: 25.05 mV, Range: 1.67 A  
EADC1: CH4



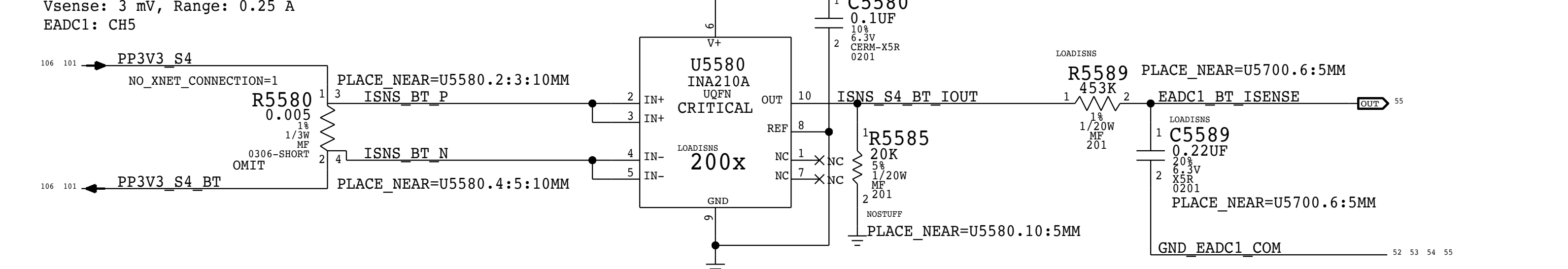
### CPU Fixed Current Sense (ICAC)

Gain: 275.74x, EDP: 29 A  
Rsense: 2x of 0.00075 (R7310, R7320), Rsum: 0.000375  
Vsense: 10.875 mV, Range: 29.01 A  
SMC ADC: 06



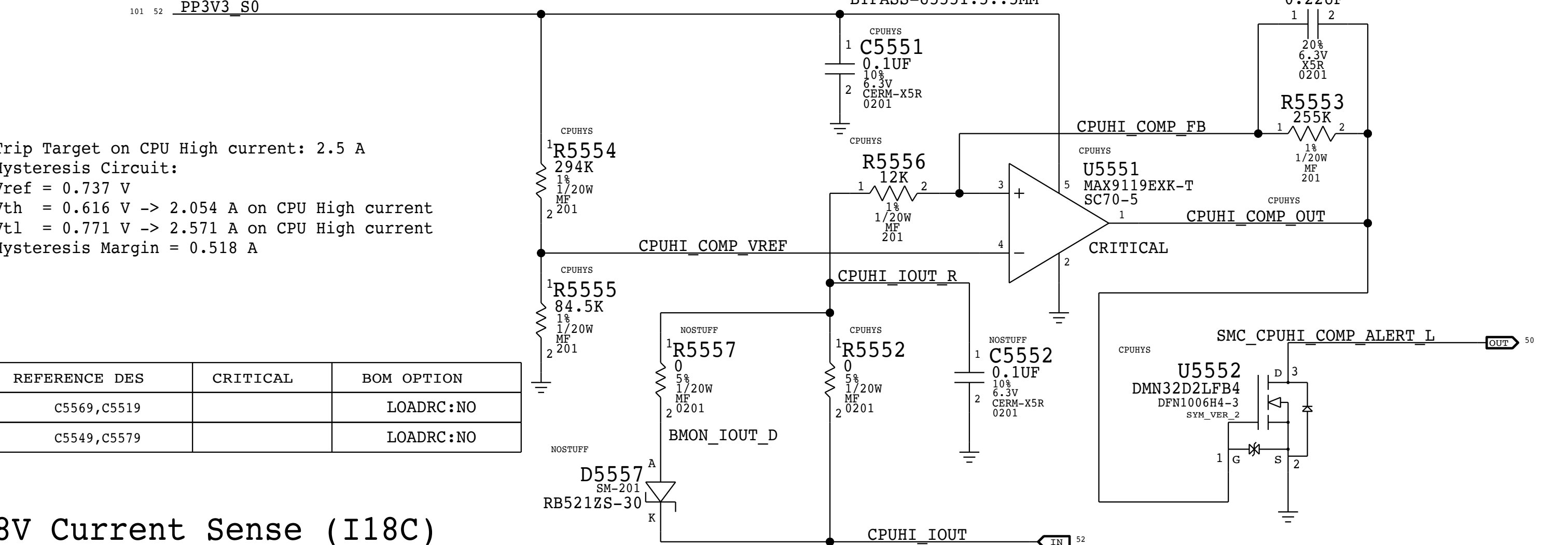
### BT Current Sense (IBTC)

Gain: 200x, EDP: 0.06 A  
Rsense: 0.05 (R5580)  
Vsense: 3 mV, Range: 0.25 A  
EADC1: CH5



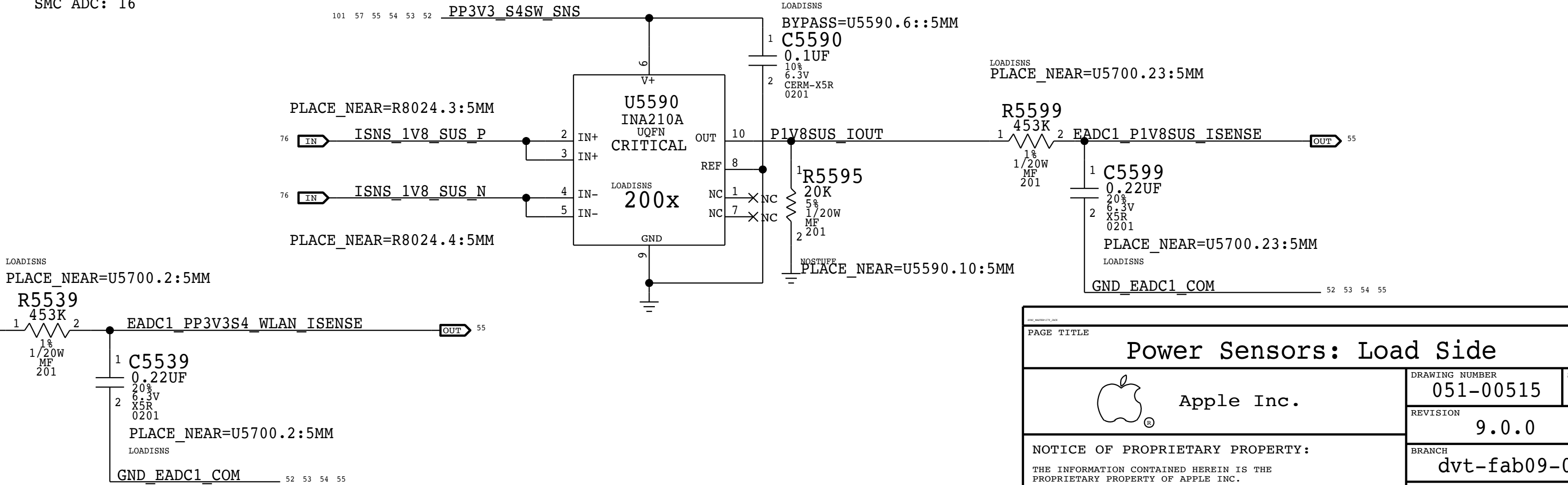
### CPU High Side Current (IC0R) Threshold Alert

Gain: 100x  
Rsense: 0.003 (R5400)



### 1.8V Current Sense (I18C)

Gain: 200x, EDP: 0.7 A  
Rsense: 0.025 (R8024) or Rsense SHORT  
Vsense: 17.5 mV, Range: 0.6 A  
SMC ADC: 16



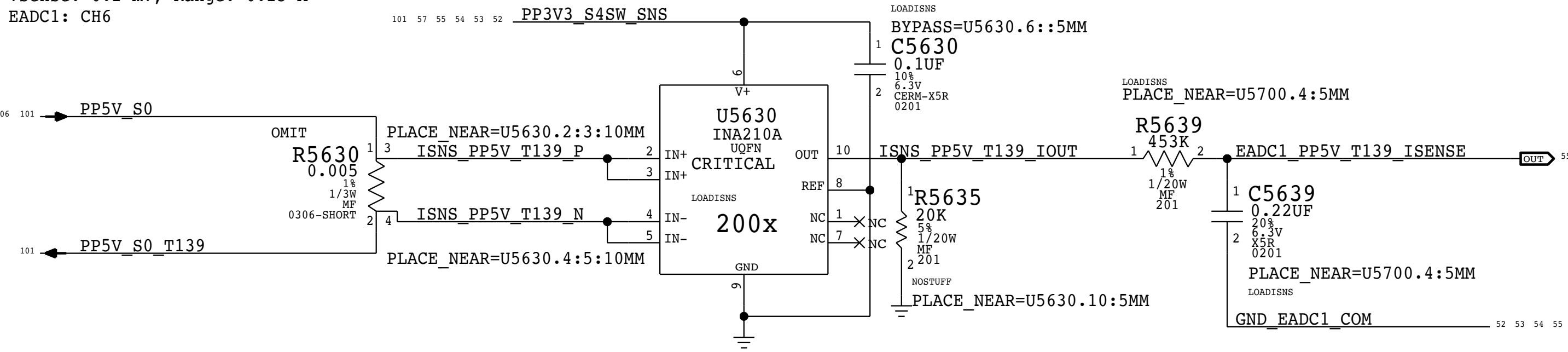
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	2	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	C5569,C5519		LOADRC:NO
117S0008	2	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	C5549,C5579		LOADRC:NO

### Power Sensors: Load Side

Apple Inc.	051-00515	STAR
9.0.0		
dvt-fab09-0		
55 OF 145		
53 OF 119		

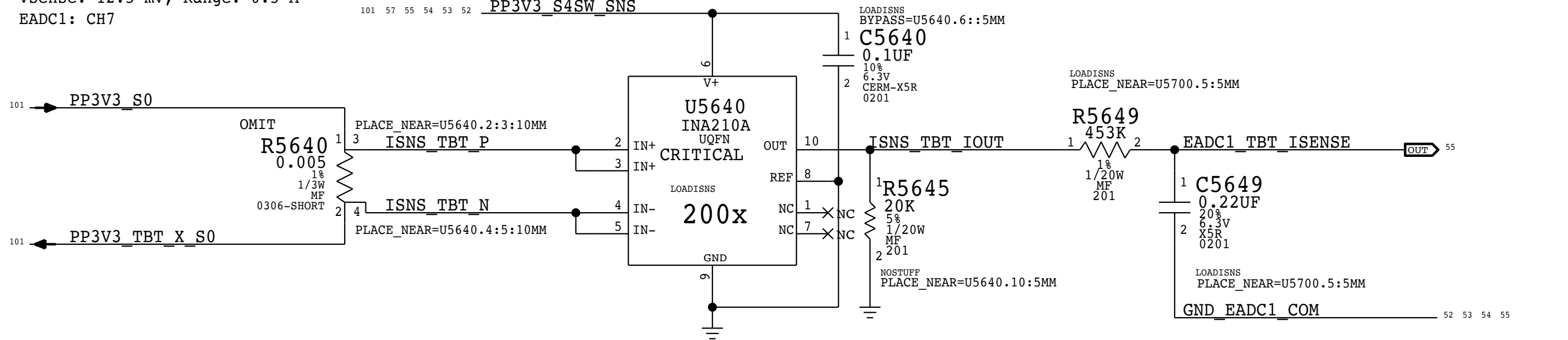
### T139 5V Current Sense (IF5C)

Gain: 200x, EDP: 0.004 A  
Rsense: 0.05 (R5630) or Rsense SHORT  
Vsense: 0.2 mV, Range: 0.25 A  
EADC1: CH6



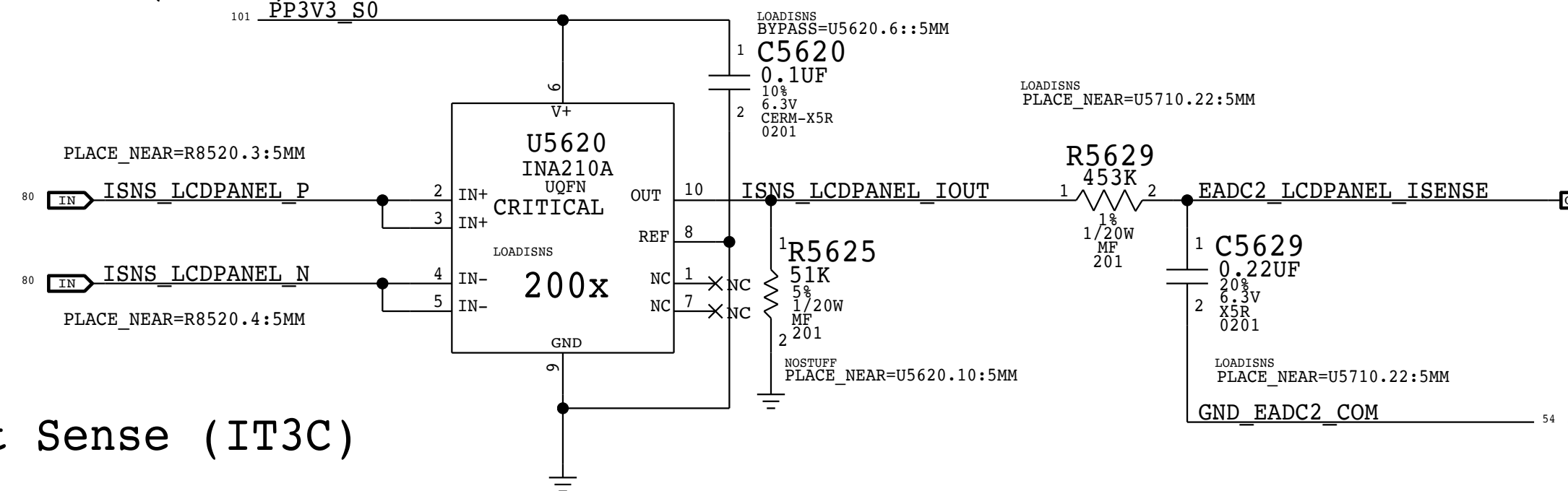
### Thunderbolt TBT Current Left (IULC)

Gain: 200x, EDP: 0.5 A  
Rsense: 0.025 (R5640) or Rsense SHORT  
Vsense: 12.5 mV, Range: 0.5 A  
EADC1: CH7



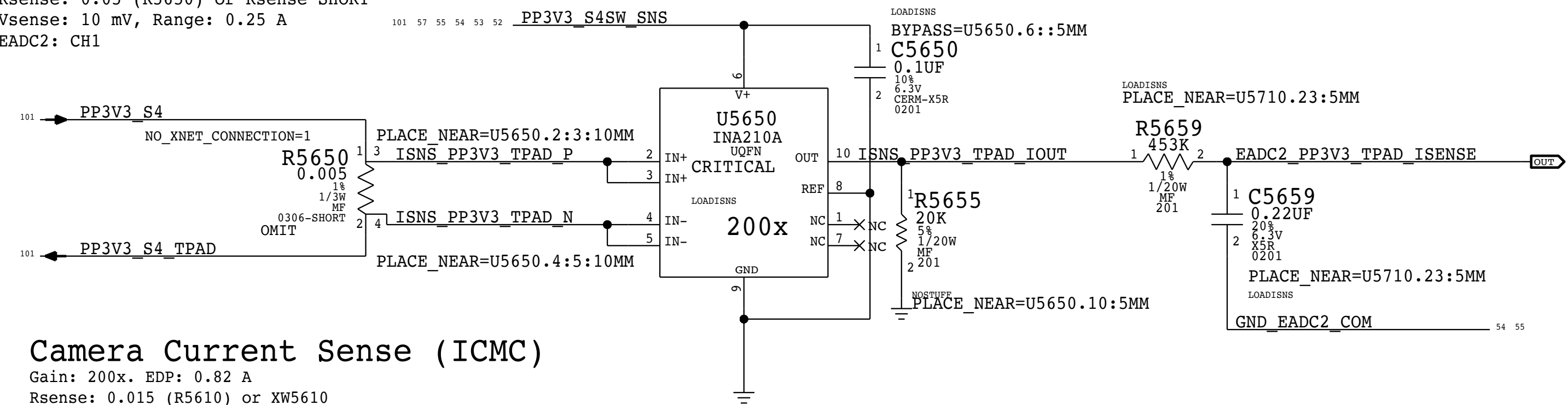
### LCD Panel Current Sense (ILDC)

Gain: 200x, EDP: 1 A  
RSENSE: 0.01 (R8520) or Rsense SHORT  
Vsense: 5 mV, Range: 1.25 A  
EADC2: CH0



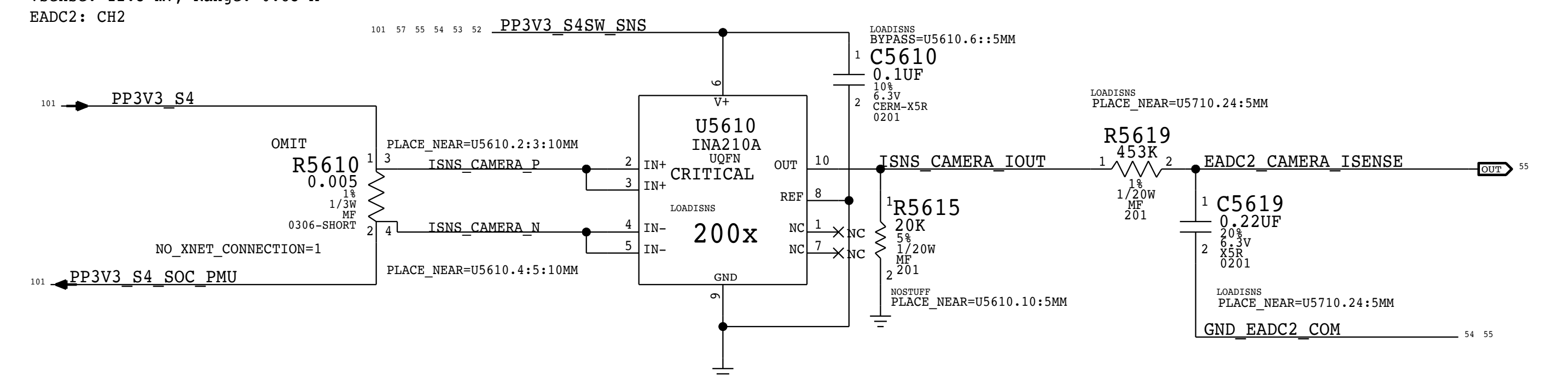
### Trackpad 3V Current Sense (IT3C)

Gain: 200x, EDP: 0.2 A  
Rsense: 0.05 (R5650) or Rsense SHORT  
Vsense: 10 mV, Range: 0.25 A  
EADC2: CH1

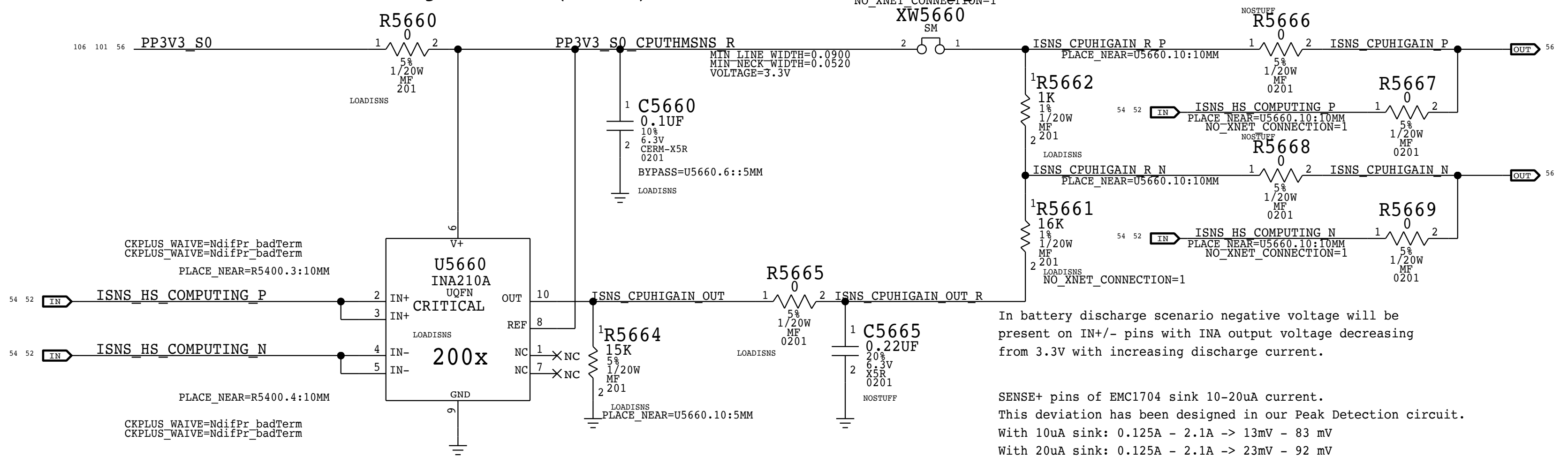


### Camera Current Sense (ICMC)

Gain: 200x, EDP: 0.82 A  
Rsense: 0.015 (R5610) or XW5610  
Vsense: 12.3 mV, Range: 0.83 A  
EADC2: CH2

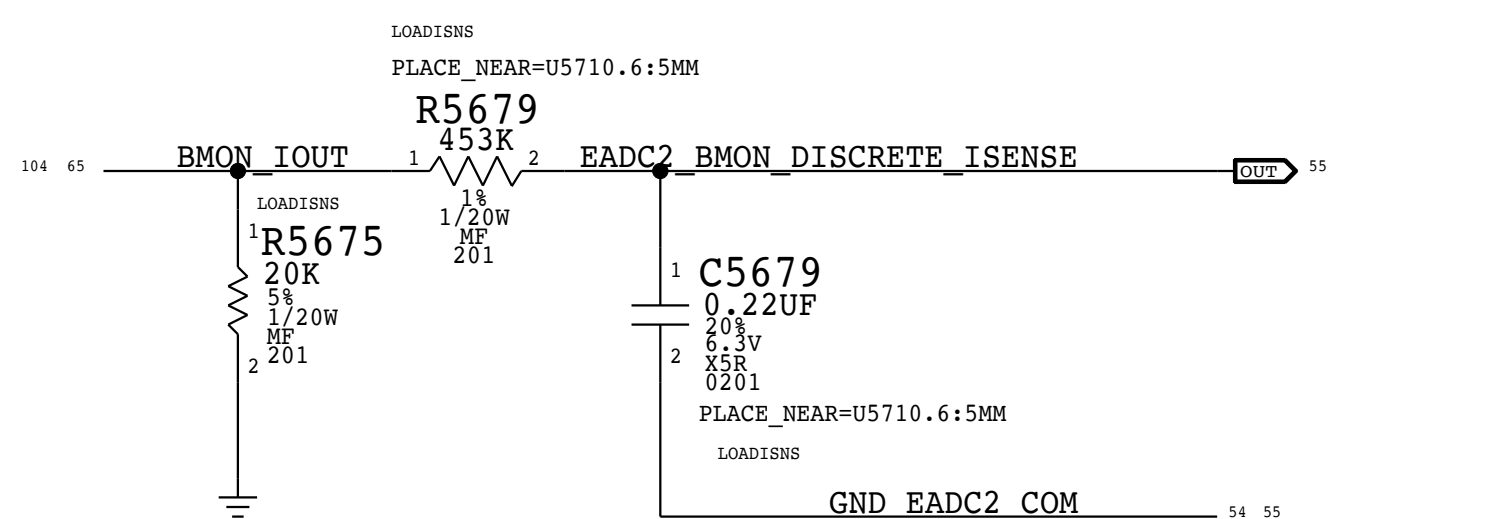


### CPU High Side (IC0R) Peak Detection Support



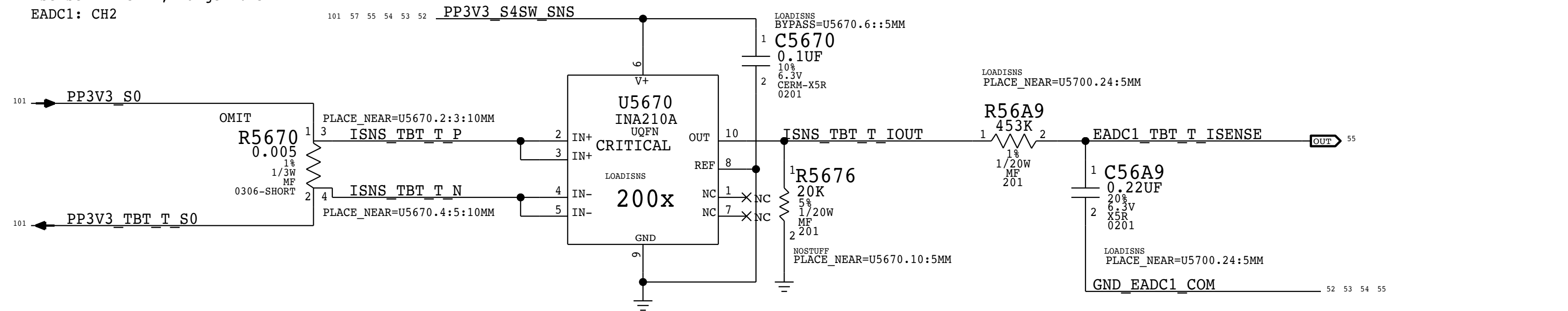
### Battery Discrete Current Sense (IB0L)

Gain: 2940x, EDP: 8 A  
Rsense: 0.003 (R501//R502)  
Vsense: 24 mV, Range: 0.28 A  
EADC2: CH5



### Thunderbolt TBT Current Right (IURC)

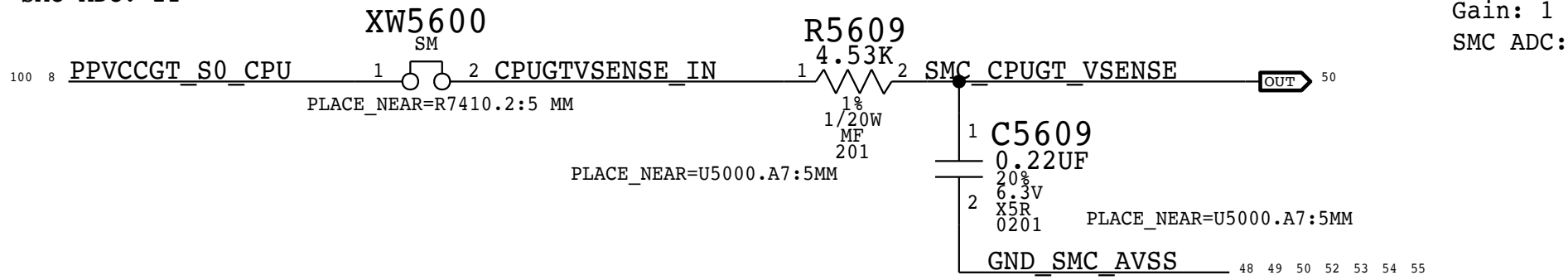
Gain: 200x, EDP: 0.5 A  
Rsense: 0.025 (R5670) or Rsense SHORT  
Vsense: 12.5 mV, Range: 0.5 A  
EADC1: CH2



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	2	RES,MTL FLTM,100K,1/16W,0201,SMD,LF	C5608, C5699		LOADRC:NO

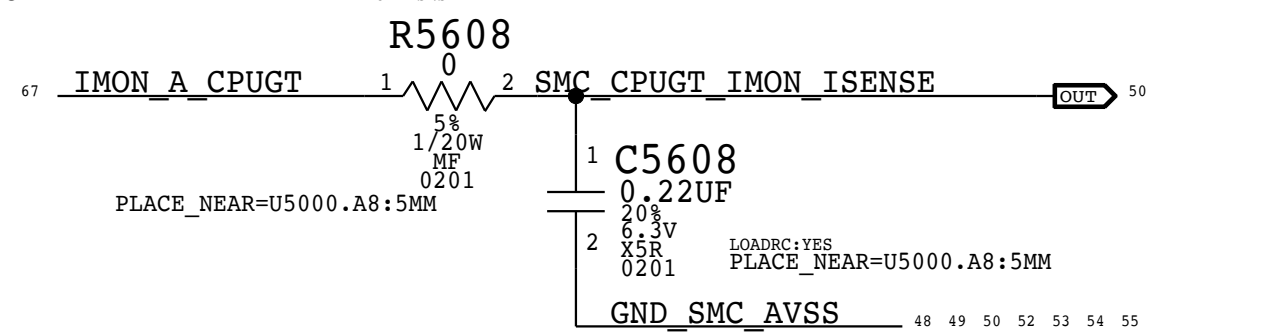
### CPU GT Voltage Sense (VCGC)

SMC ADC: 21



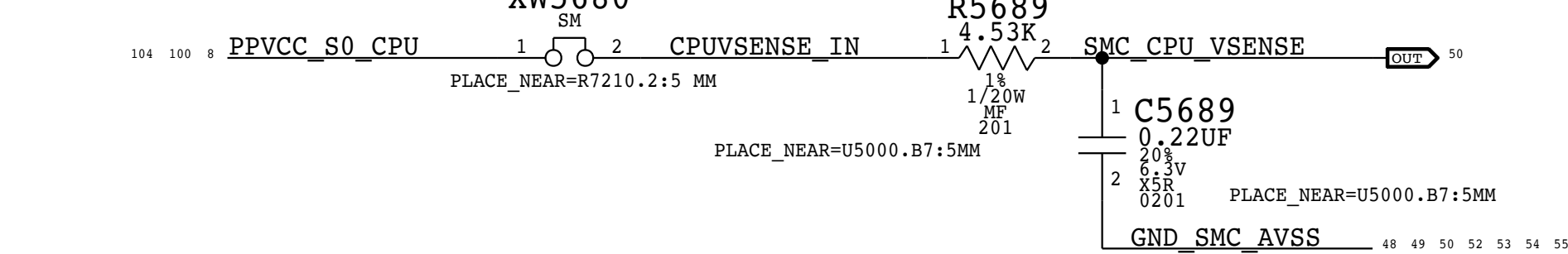
### CPU GT IMON Current Sense (ICGM)

Gain: 1 A / 17.963 mV, Range: 64 A.  
SMC ADC: 23



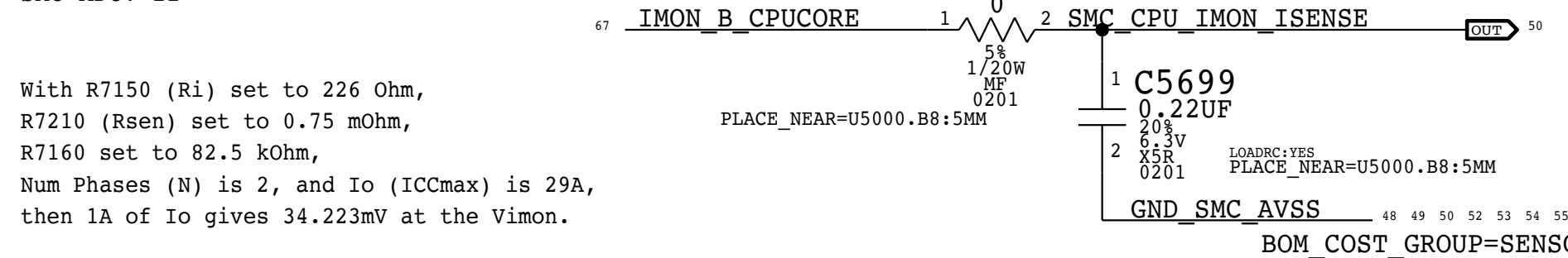
### CPU Core Voltage Sense (VCAC)

SMC ADC: 20



### CPU Core IMON Current Sense (ICAM)

Gain: 1 A / 34.223 mV, Range: 29 A.  
SMC ADC: 22

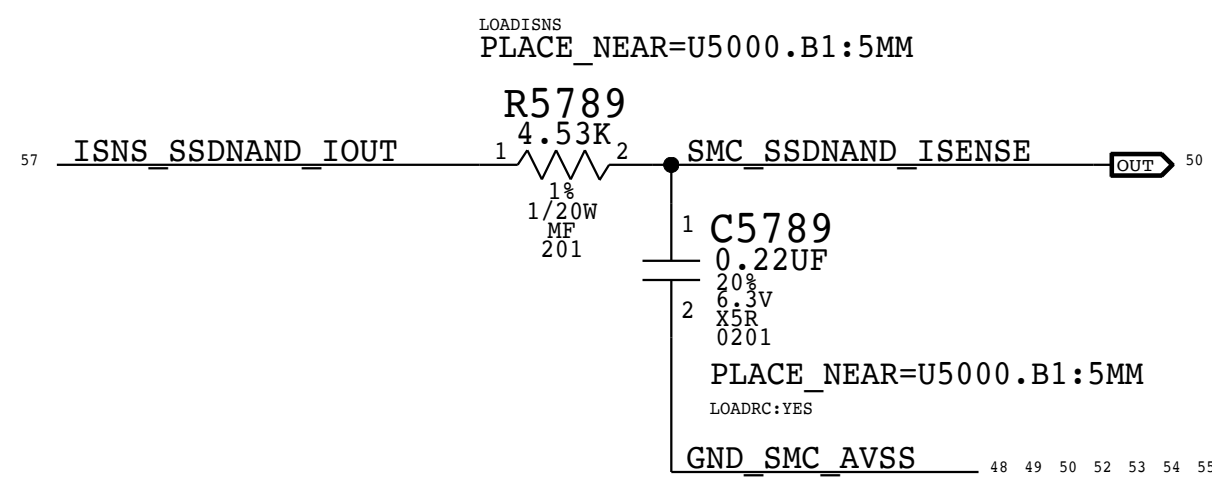


With R7150 (Ri) set to 226 Ohm,  
R7210 (Rsen) set to 0.75 mOhm,  
R7160 set to 82.5 kohm,  
Num Phases (N) is 2, and Io (ICMax) is 29A,  
then 1A of Io gives 34.223mV at the Vimon.

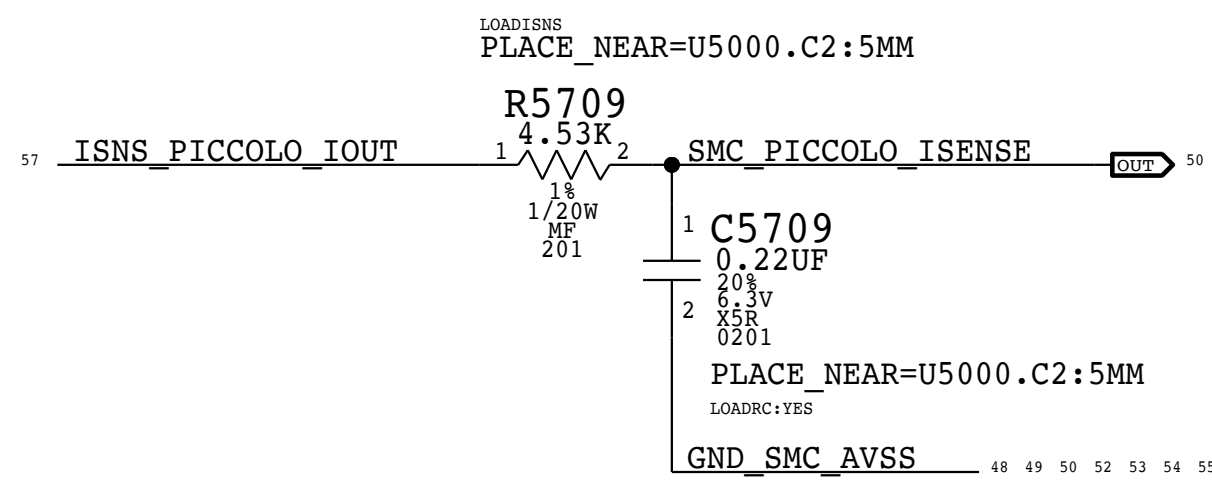
PAGE TITLE		
Power Sensors: Extended		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	56 OF 145
	SHEET	54 OF 119



NAND Current Sense (IHNC)

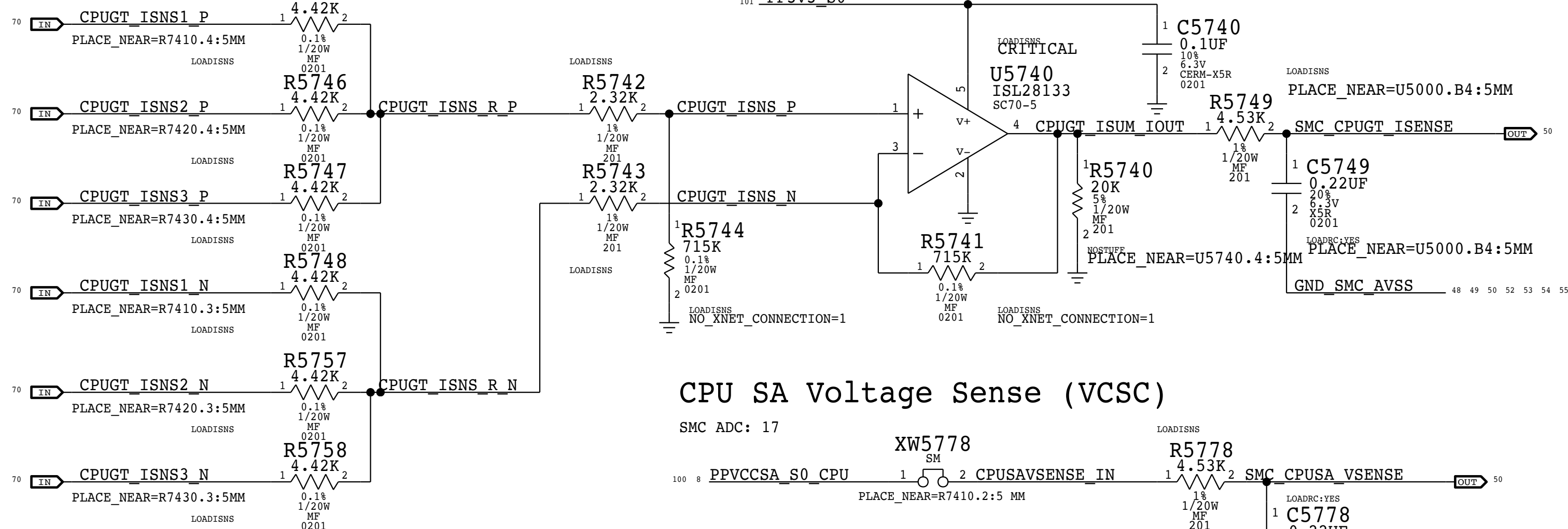


PICCOLO Current Sense (IHCC)



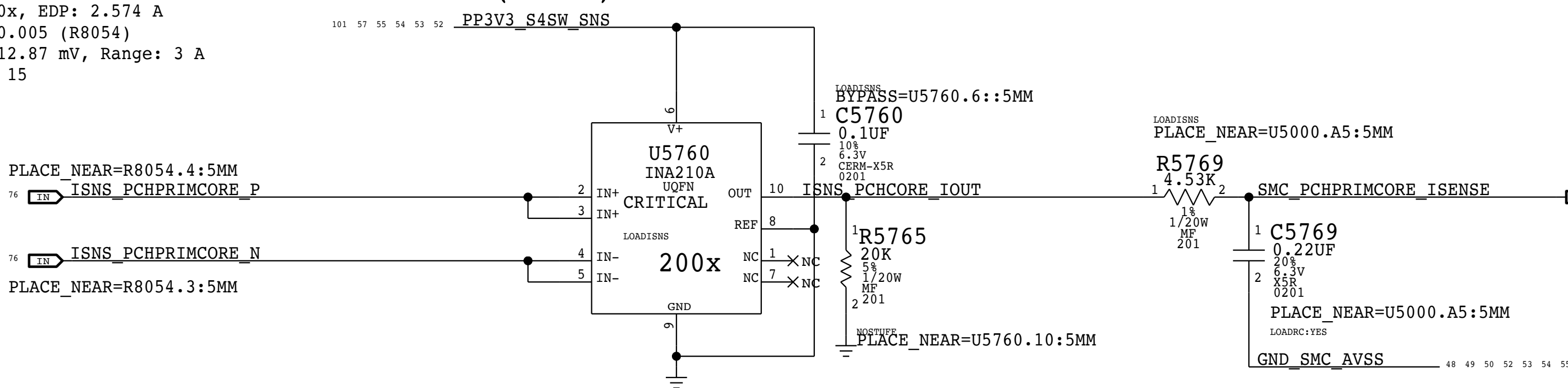
CPU GT+GTX Current Sense (ICGC)

Gain: 188.49x, EDP: 64 A  
Rsense: 3x of 0.00075 (R7410, R7420, R7430), Rsum: 0.00025  
Vsense: 16 mV, Range: 63.66 A  
SMC ADC: 5



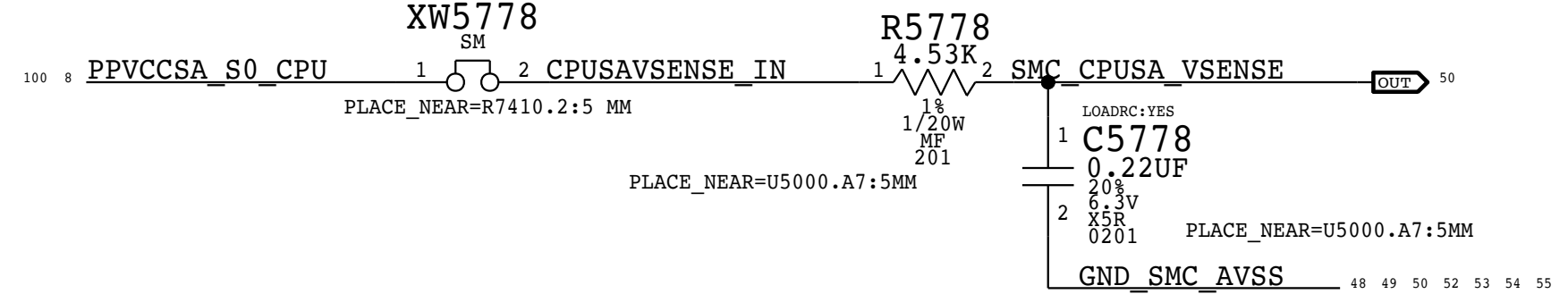
PCH PrimeCore Current Sense (ISCC)

Gain: 200x, EDP: 2.574 A  
Rsense: 0.005 (R8054)  
Vsense: 12.87 mV, Range: 3 A  
SMC ADC: 15



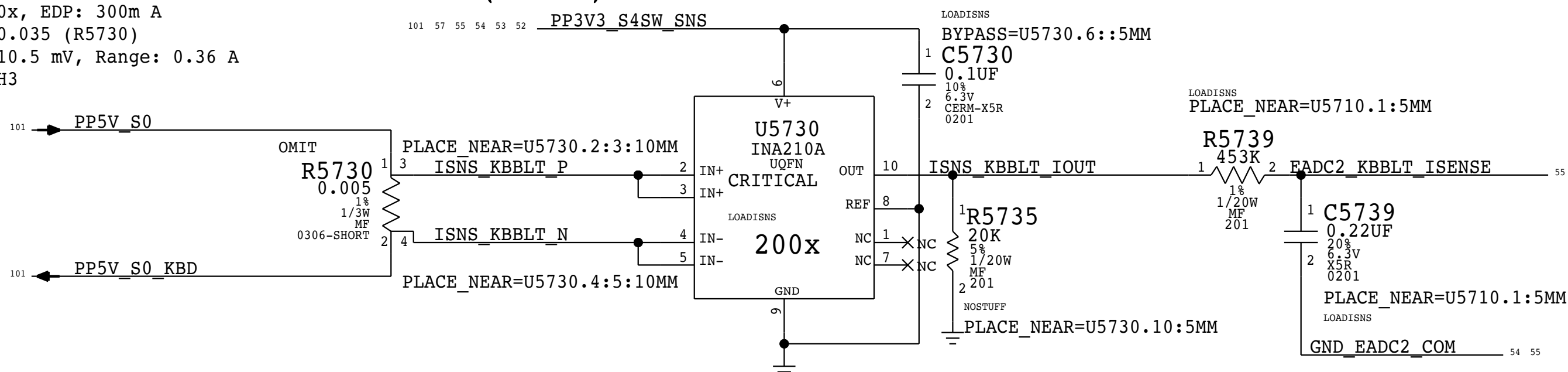
CPU SA Voltage Sense (VCSC)

SMC ADC: 17



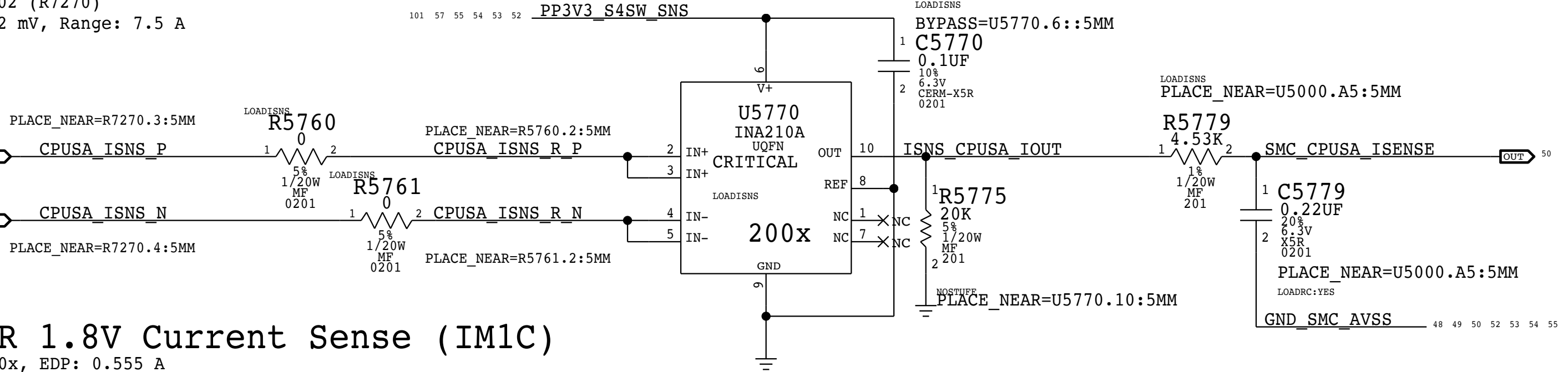
KB backlite Current Sense (IKBC)

Gain: 200x, EDP: 300m A  
Rsense: 0.035 (R5730)  
Vsense: 10.5 mV, Range: 0.36 A  
EADC2: CH3



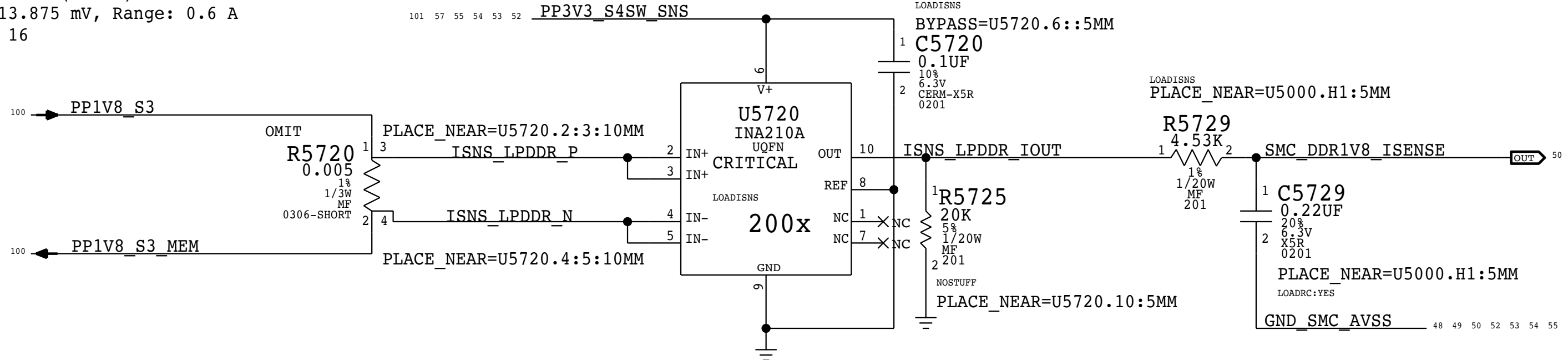
CPU SA Current Sense (ICSC)

Gain: 200x, EDP: 5.1 A  
Rsense: 0.002 (R7270)  
Vsense: 10.2 mV, Range: 7.5 A  
SMC ADC: 19



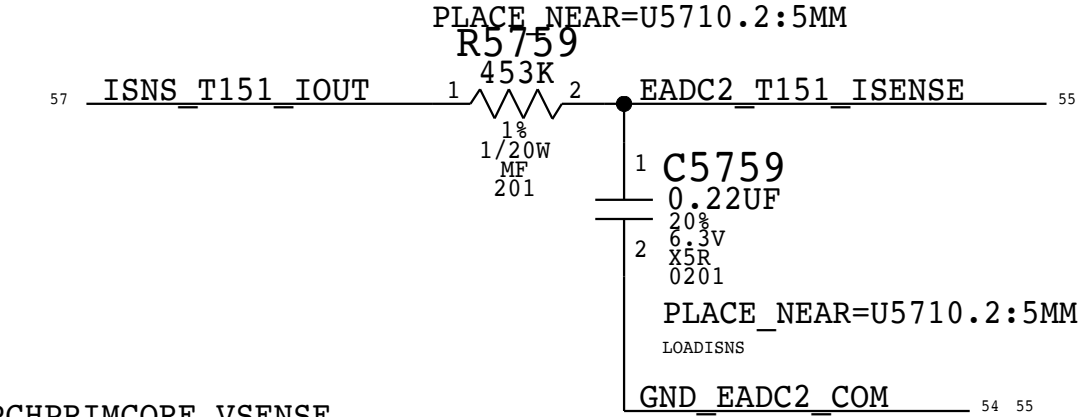
LPDDR 1.8V Current Sense (IM1C)

Gain: 200x, EDP: 0.555 A  
Rsense: 0.025 (R5720) or Rsense SHORT  
Vsense: 13.875 mV, Range: 0.6 A  
SMC ADC: 16



T151 Current Sense (IIDC)

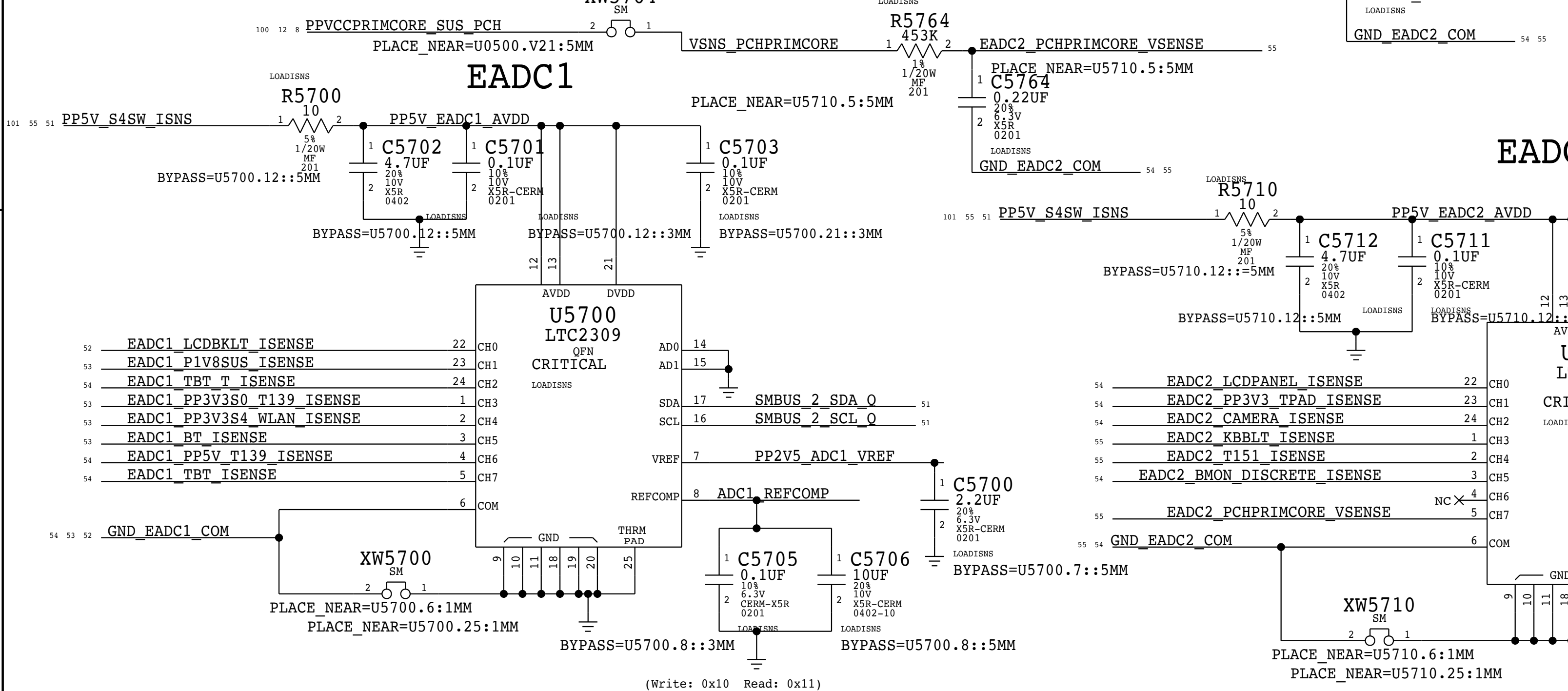
EADC2: CH4



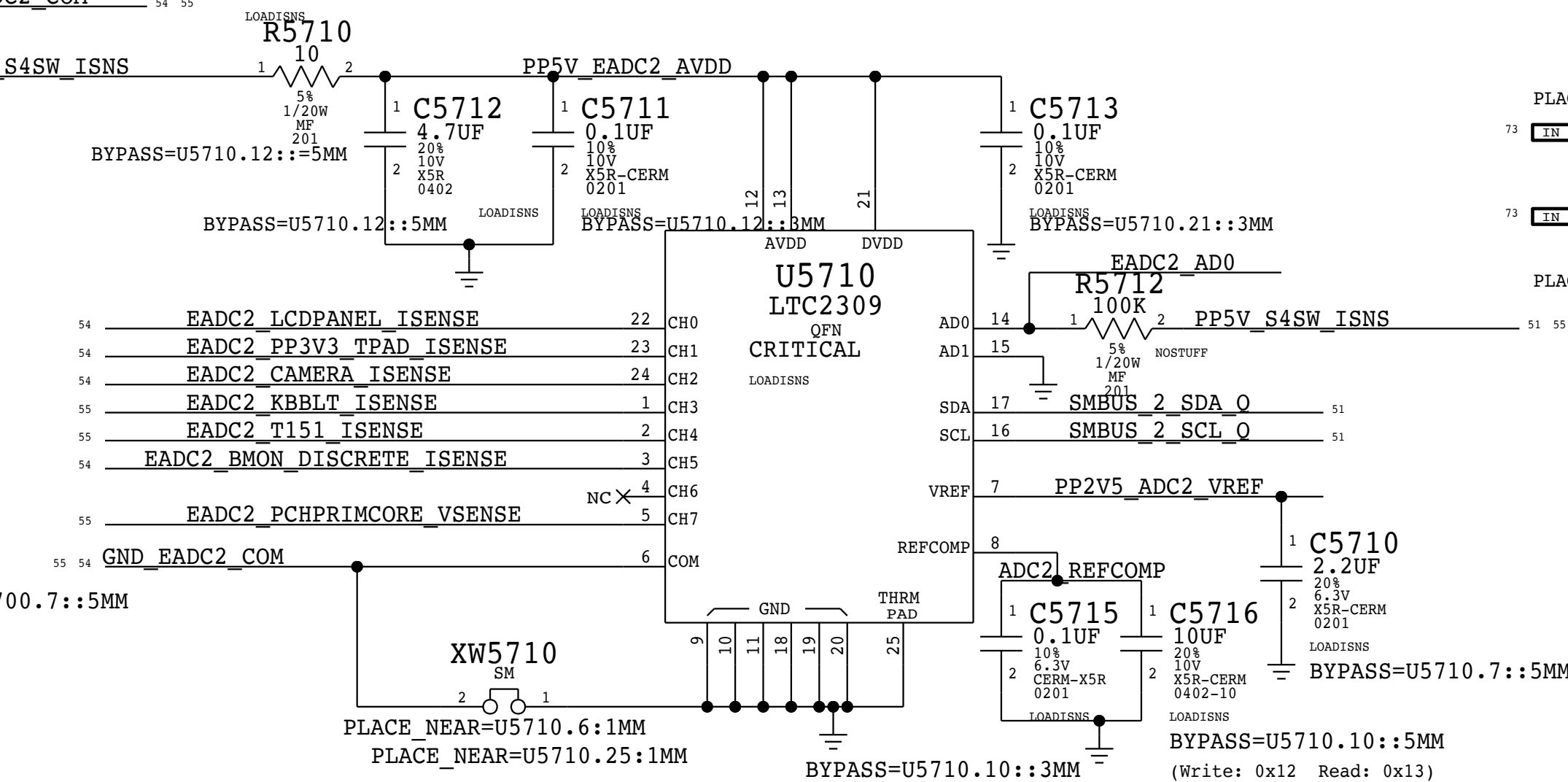
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	2	RES,MTL FLIN,100K,1/16W,0201,SMD,LF	C5769,C5778		LOADRC:NO
117S0008	2	RES,MTL FLIN,100K,1/16W,0201,SMD,LF	C5749,C5779		LOADRC:NO
117S0008	2	RES,MTL FLIN,100K,1/16W,0201,SMD,LF	C5729,C5799		LOADRC:NO
117S0008	2	RES,MTL FLIN,100K,1/16W,0201,SMD,LF	C5709,C5789		LOADRC:NO

PCH PrimeCore Voltage Sense (VSCC)

EADC2: CH7

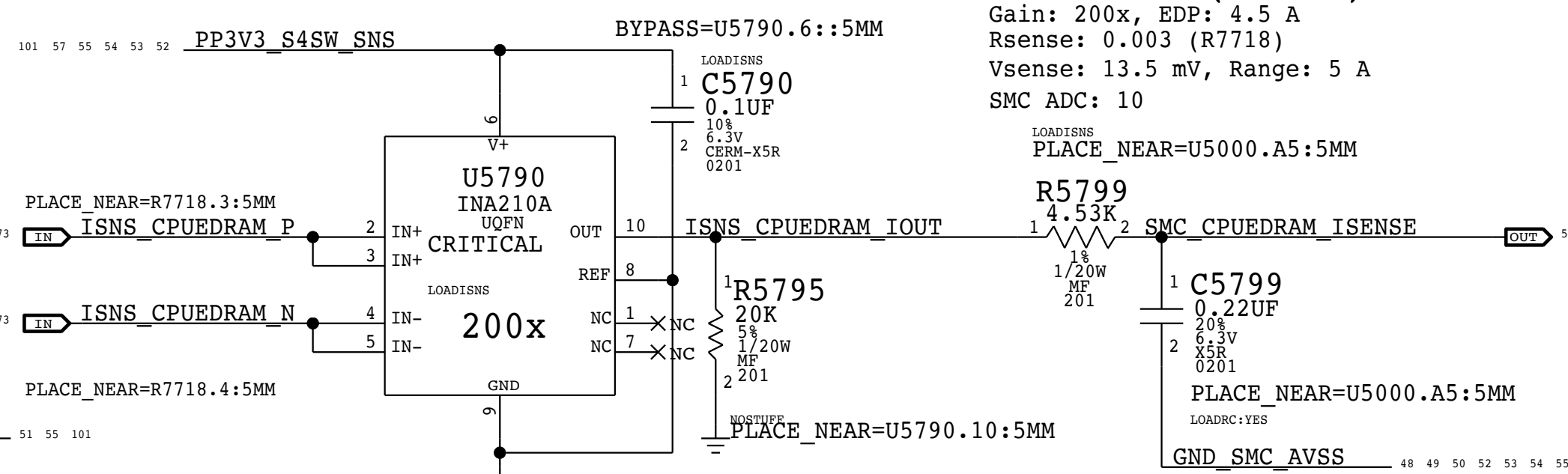


EADC2



CPU EDRAM Current Sense (ICEC)

Gain: 200x, EDP: 4.5 A  
Rsense: 0.003 (R7718)  
Vsense: 13.5 mV, Range: 5 A  
SMC ADC: 10



PAGE TITLE		
Power Sensors: Extended 2		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: 1 TO MAINTAIN THIS DOCUMENT IN CONFIDENCE 11 NOT TO REPRODUCE OR COPY IT 111 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART 1V ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	57 OF 145
BOM_COST_GROUP=SENSORS	SHEET	55 OF 119

I2C Write: 0xD8, I2C Read: 0xD9

Placement Note:

The P leg connects to THERMDA pin of the TBT chip, the N leg connect to pin AC22.



Note: Use GND pin AC22 on U2800 for N leg.

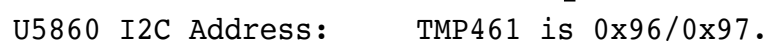
Placement Note:

Place U5850 on the BOTTOM side, on the left portion of the board, 1" to the right of USB connector.

```
I2C Write: 0xB8, I2C Read: 0xB9
```

Placement Note:

Placement Note:  
The P leg connects to THERMDA pin of the TBT chip, the N leg connect to pin AC22.



Placement Note:

Place U5860 on the BOTTOM side, on the right portion of the board, 1" to the left of USB connector.

-----  
Placement note:  
PLACE U5820 ON BOTTOM NEAR X100

I2C Write: 0xB8, I2C Read: 0xB9

Placement Note:

Place Q5871, Airflow thermal indicator, above the X100, on the TOP side.



Placement Note:


Place Q5873 under the CPU,  
on the BOTTOM side.

Placement Note:

Place Q5872 between two rows of Memory devices,  
between channel A and B, on the BOTTOM side.

Placement Note:

Place U5870 at corner near right Fan,  
on the TOP side.

PAGE TITLE		Thermal Sensors	
 Apple Inc.	DRAWING NUMBER	051-00515	
	SIZE	D	
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	REVISION	9.0.0	
	BRANCH	dvt-fab09-0	
	PAGE	58 OF 145	
	SHEET	56 OF 119	

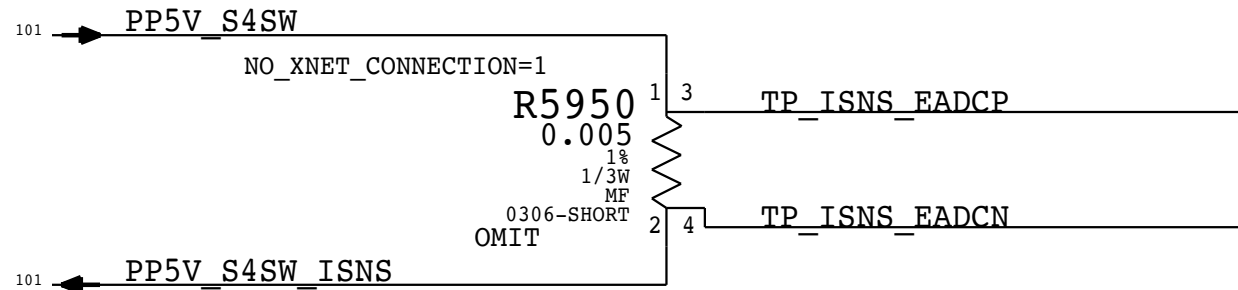


D

D

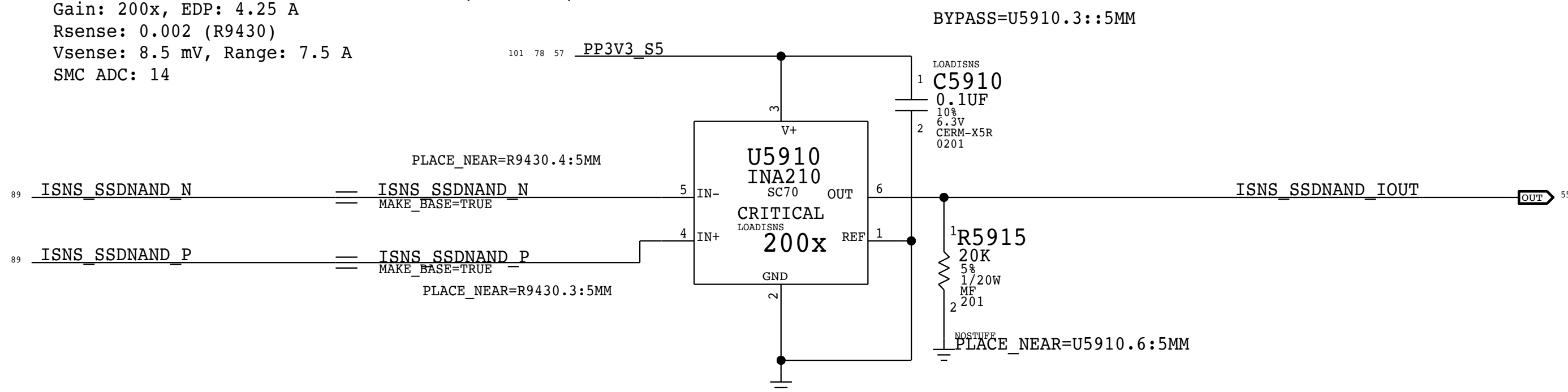
EADC Current Sense (IADC)

Gain: 200x, EDP: 200m A  
Rsense: 0.050 (R5950) or Rsense SHORT  
Vsense: 10 mV, Range: 0.25 A  
EADC2: CH7



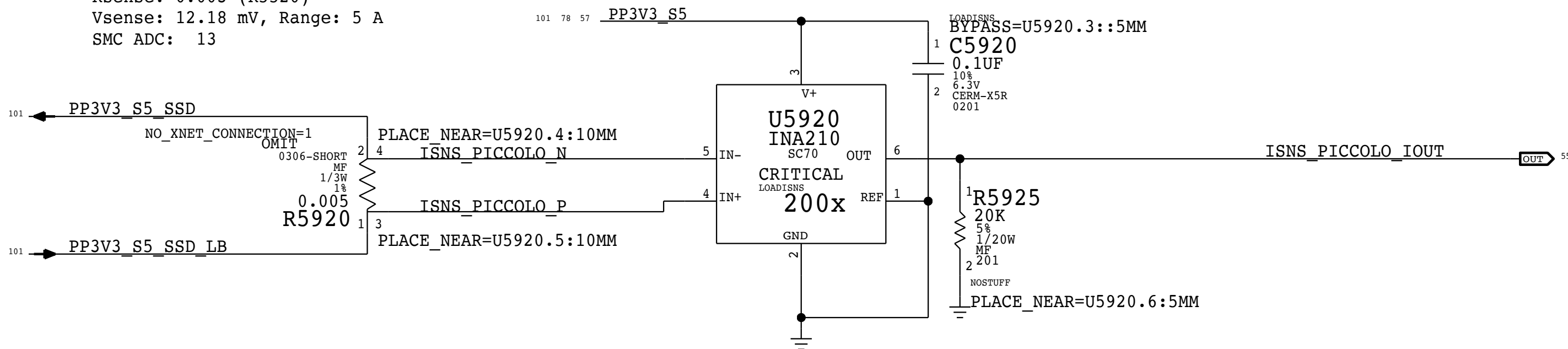
NAND Current Sense (IHNC)

Gain: 200x, EDP: 4.25 A  
Rsense: 0.002 (R9430)  
Vsense: 8.5 mV, Range: 7.5 A  
SMC ADC: 14



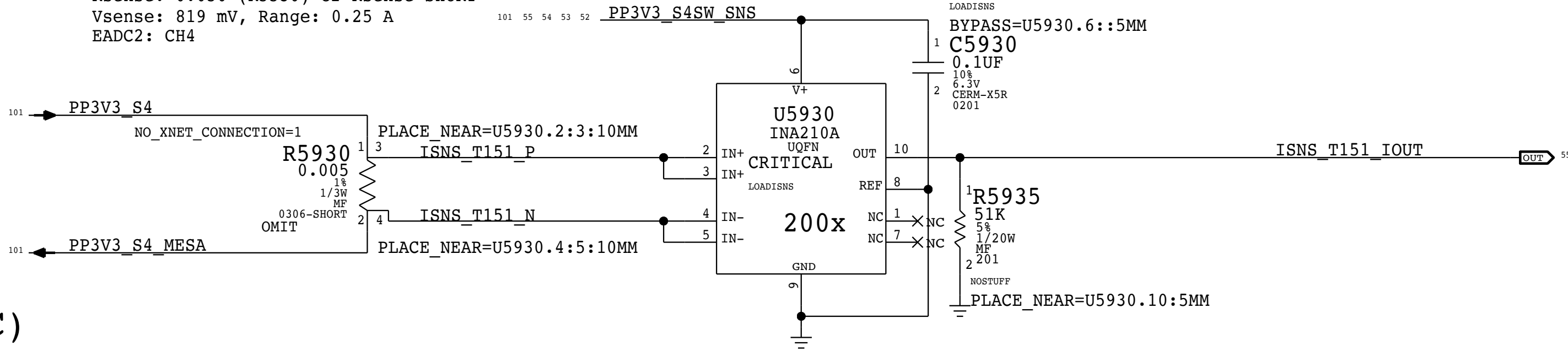
Piccolo Current Sense (IHCC)

Gain: 200x, EDP: 4.06 A  
Rsense: 0.003 (R5520)  
Vsense: 12.18 mV, Range: 5 A  
SMC ADC: 13



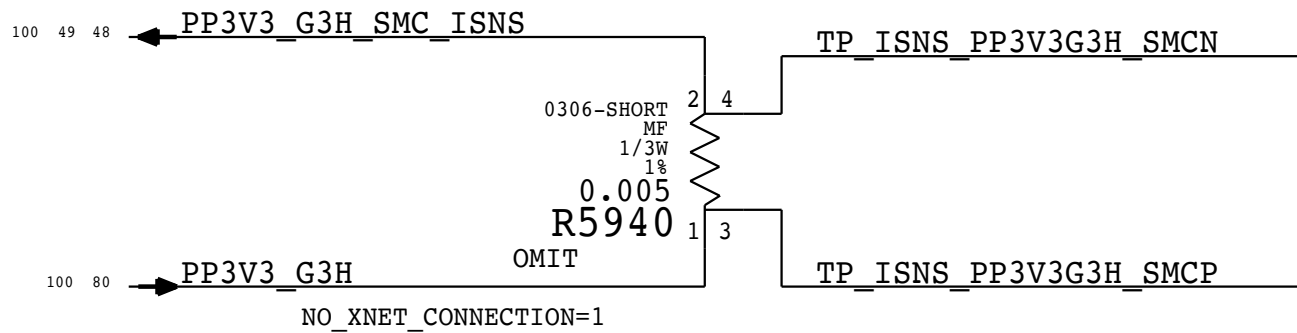
T151 Current Sense (IIDC)

Gain: 200x, EDP: 163.8m A  
Rsense: 0.050 (R5530) or Rsense SHORT  
Vsense: 819 mV, Range: 0.25 A  
EADC2: CH4




SMC Current Sense (ISMC)

Gain: 391.67x, EDP: 0.2 A  
Rsense: 0.05 (R5940) or Rsense SHORT  
Vsense: 10 mV, Range: 0.21A  
EADC2: CH6

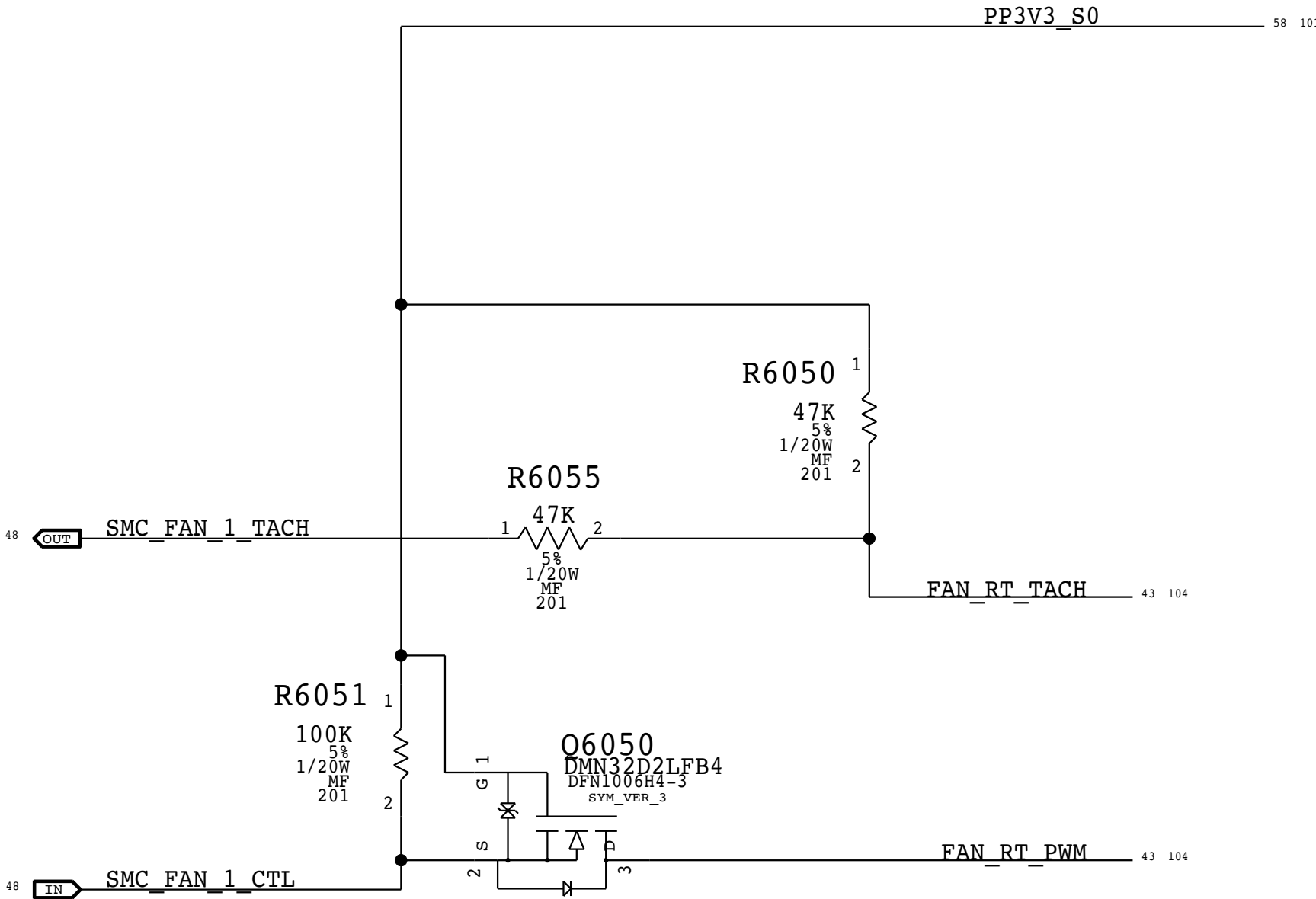
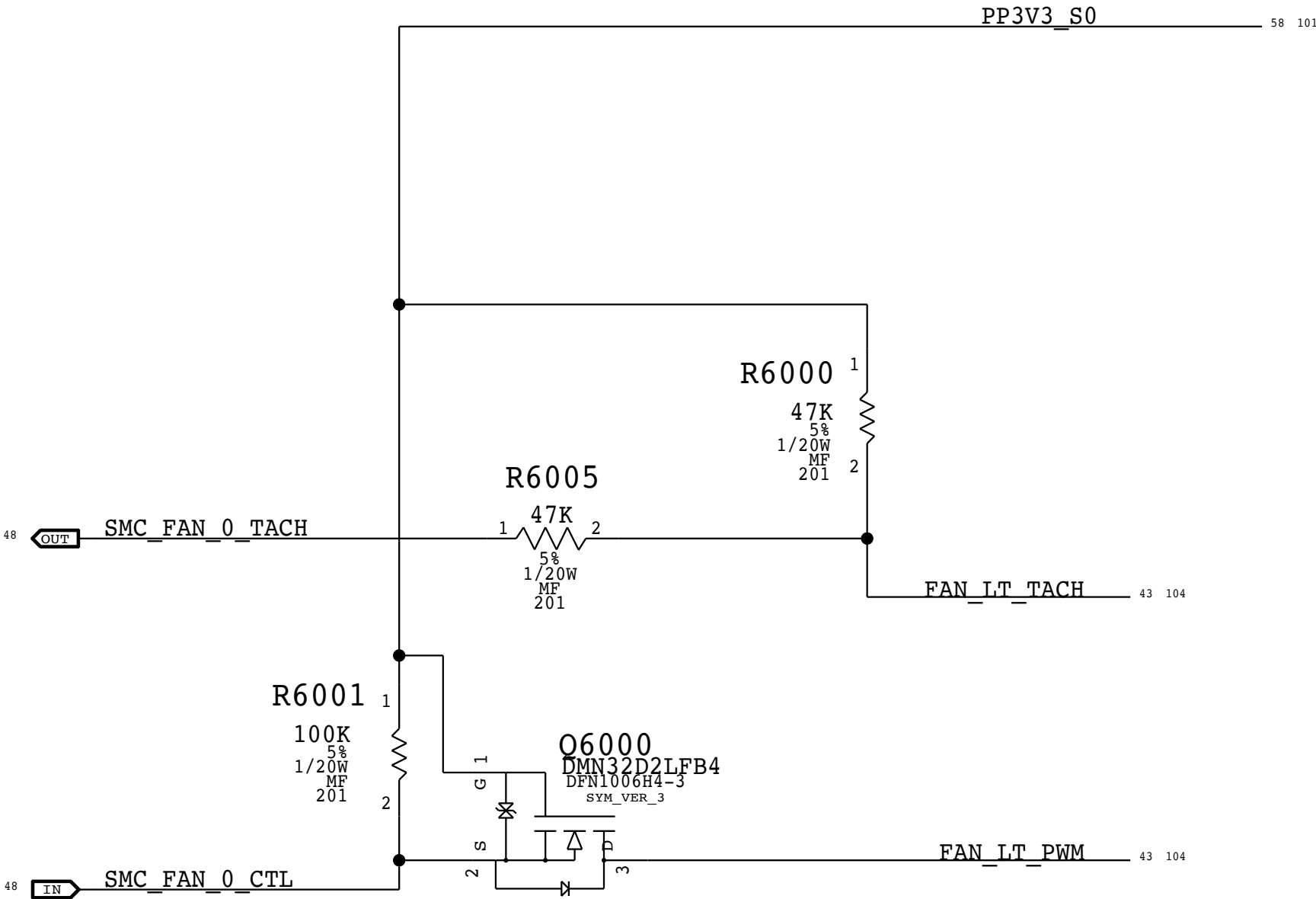


A

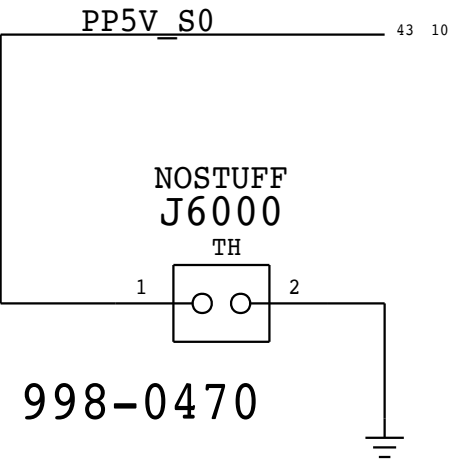
BOM\_COST\_GROUP=SENSORS


PAGE TITLE		
Power Sensors:Extended 3		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	59 OF 145
	SHEET	57 OF 119

FAN CONTROL



FOR DEBUG FAN POWER

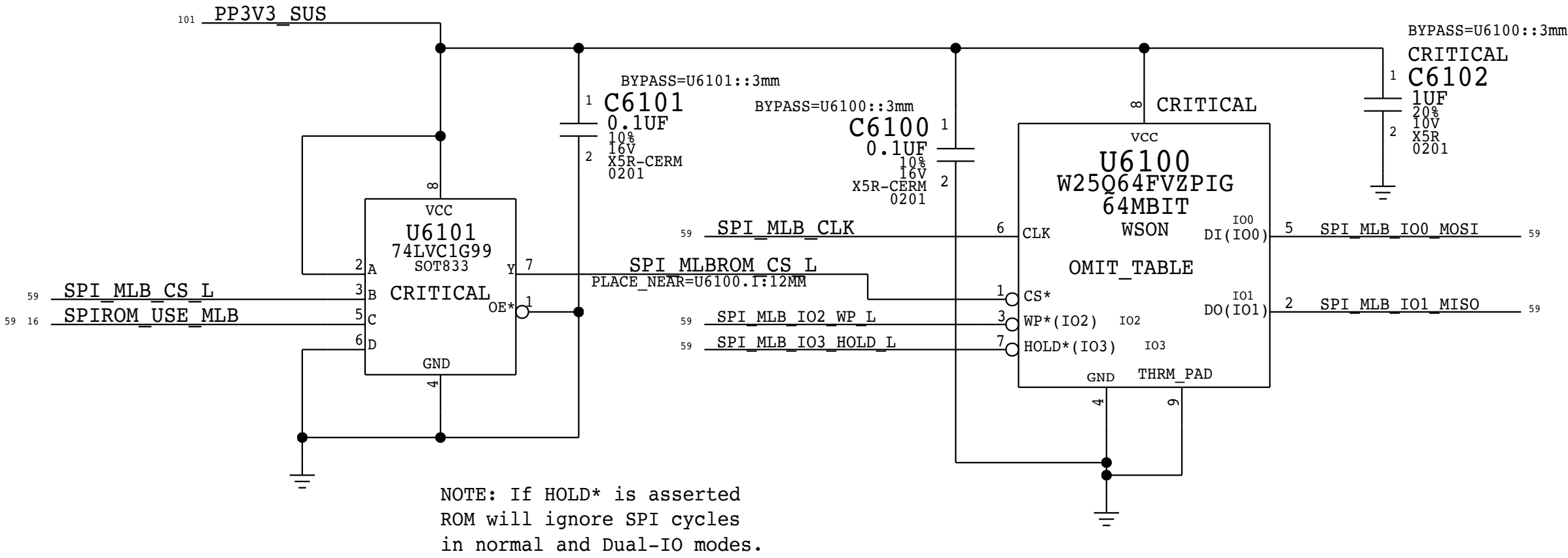


EYRC_MASTER=J79_JACK			SYNC_DATE=08/21/2015		
PAGE TITLE					
Fans					
 Apple Inc.			DRAWING NUMBER		SIZE
			051-00515		D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.  THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  II NOT TO REPRODUCE OR COPY IT  III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART  IV ALL RIGHTS RESERVED			REVISION		9.0.0
			BRANCH		
			PAGE		dvt-fab09-0
			SHEET		
			60 OF 145		
			58 OF 119		

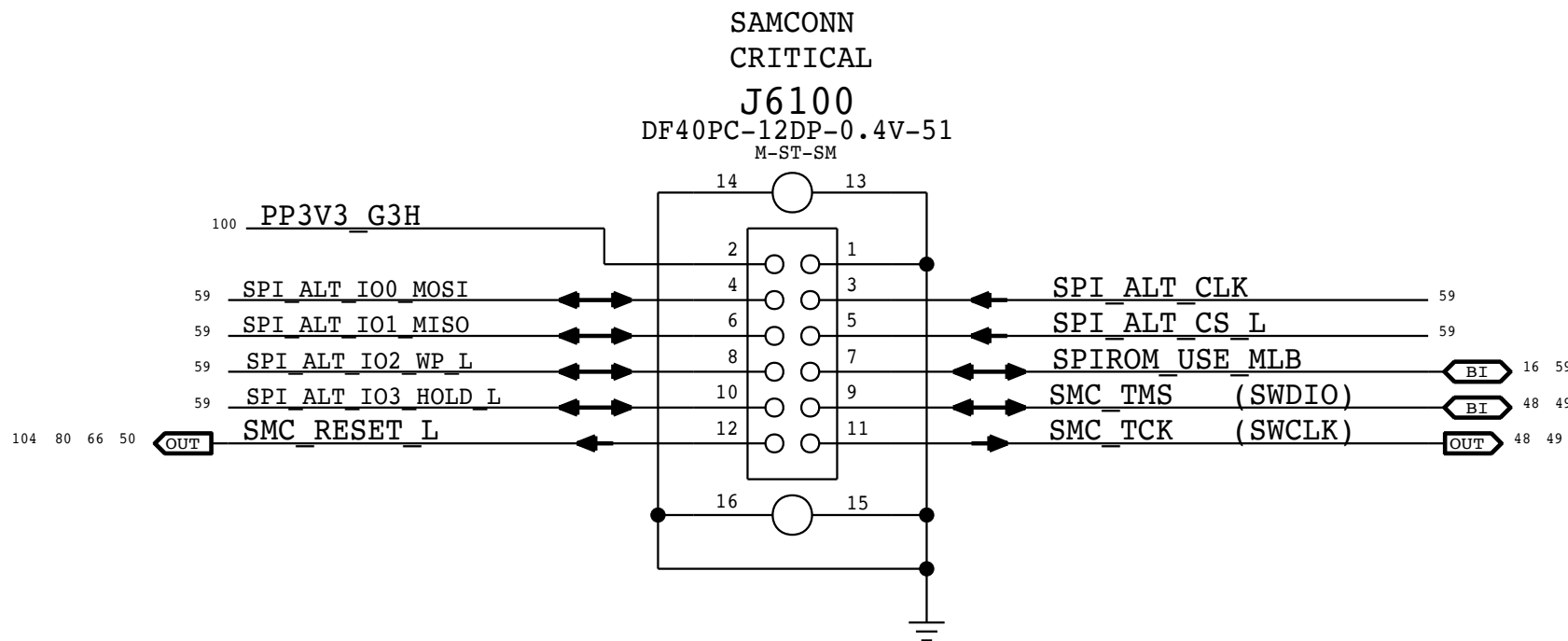
BOM\_COST\_GROUP=FAN

SPI ROM

Quad-I/O Mode (Mode 0 & 3) supported.  
SPI Frequency: 50MHz for CPU, 20MHz for SMC.



SPI+SWD SAM Connector




Quad SPI and QPI instructions require the non-volatile Quad Enable bit (QE) in Status Register-2 to be set. When QE=1, the /WP pin becomes IO2 and /HOLD pin becomes IO3.

SPI Bus Series Termination (Modified per PDG)

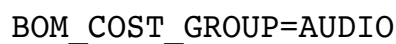
CPU Master


Sam Card ROM Slave

SPI ROM Slave

SYNC_MASTER=J52_MLB		SYNC_DATE=05/12/2015	
PAGE TITLE			
SPI Debug Connector			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
<b>NOTICE OF PROPRIETARY PROPERTY:</b>  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	REVISION		
	9.0.0		
	BRANCH		
	dvt-fab09-0		
	PAGE		
61 OF 145			
SHEET			
59 OF 119			

BOM\_COST\_GROUP=CPU & CHIPSET

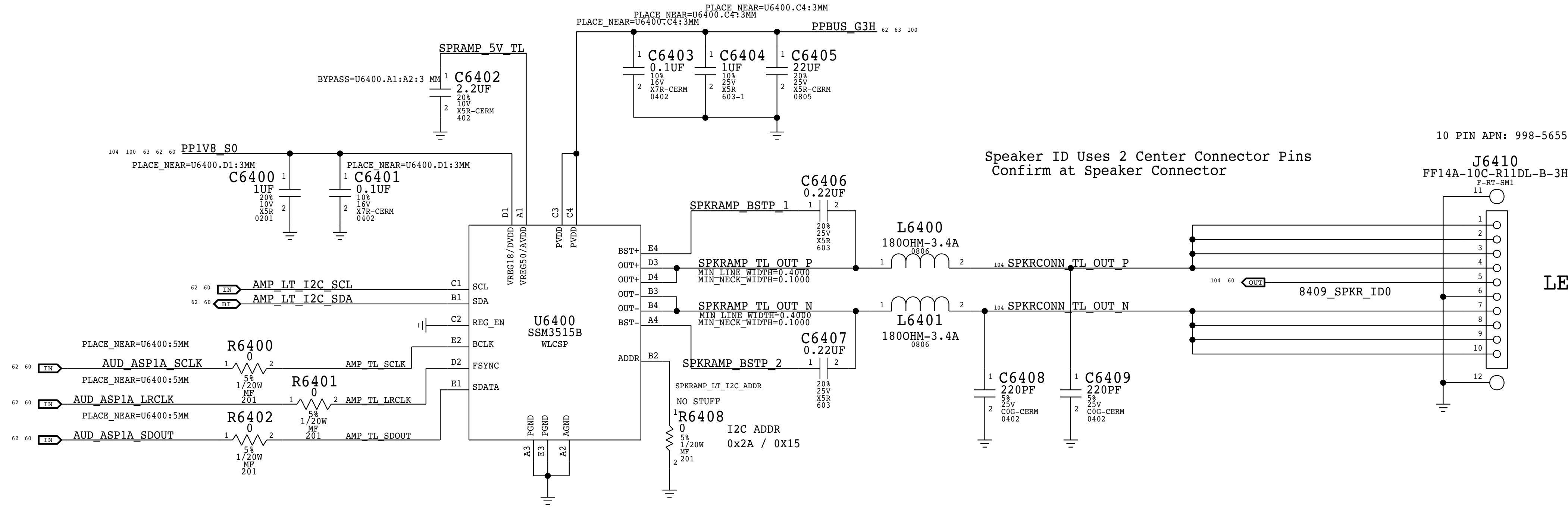


DESIGN: X502/DEV MLB U			
LAST CHANGE: Wed Feb 18 17:12:24 2015			
SYNC MASTER=J79_JCUBIO		SYNC DATE=03/24/2016	
PAGE TITLE			
HDA Bridge			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
	REVISION		
	9.0.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY 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		dvt-fab09-0	
		PAGE	
		62	OF 145
		SHEET	
		60	OF 119

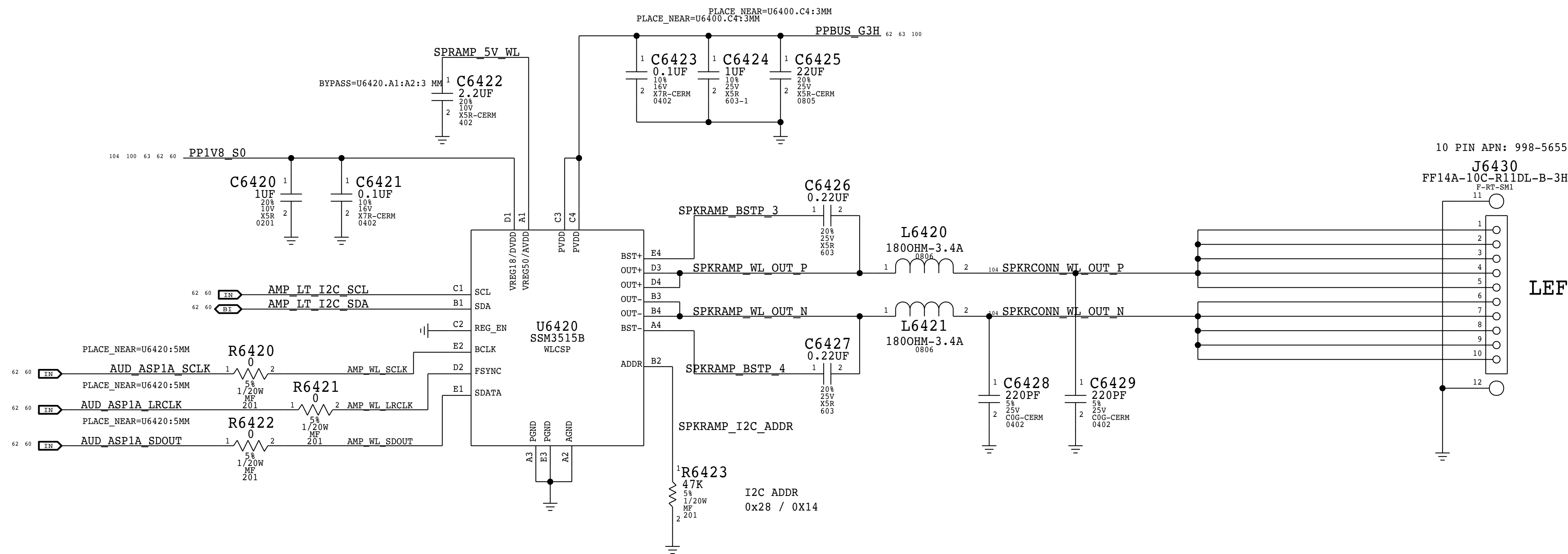




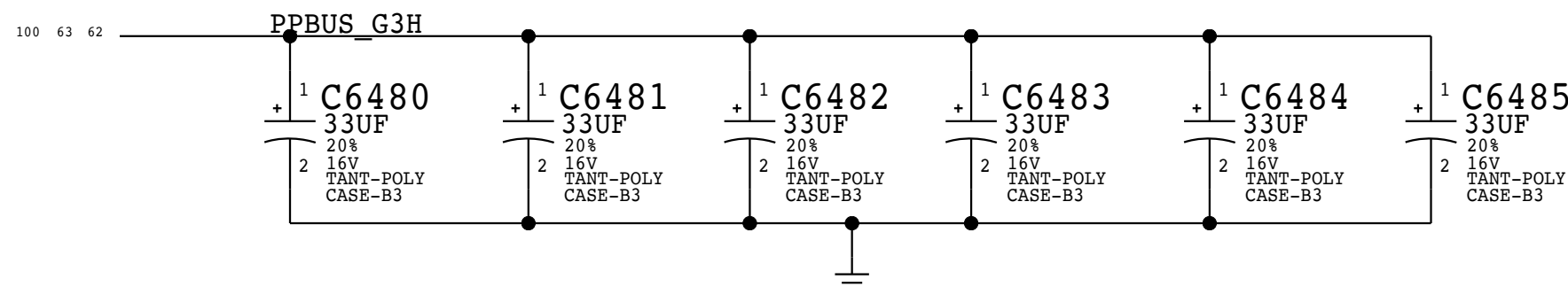
2X MONO SPEAKER AMPLIFIERS  
APN: 35384074  
GAIN = TBD



LEFT TWEETER SPEAKER CONNECTOR



LEFT WOOFER SPEAKER CONNECTOR




DESIGN: X502/DEV MLB U		
LAST CHANGE: Wed Feb 18 17:12:24 2015		
PAGE TITLE		
Left Speaker Amps & Conn		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	64 OF 145
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		SHEET 62 OF 119

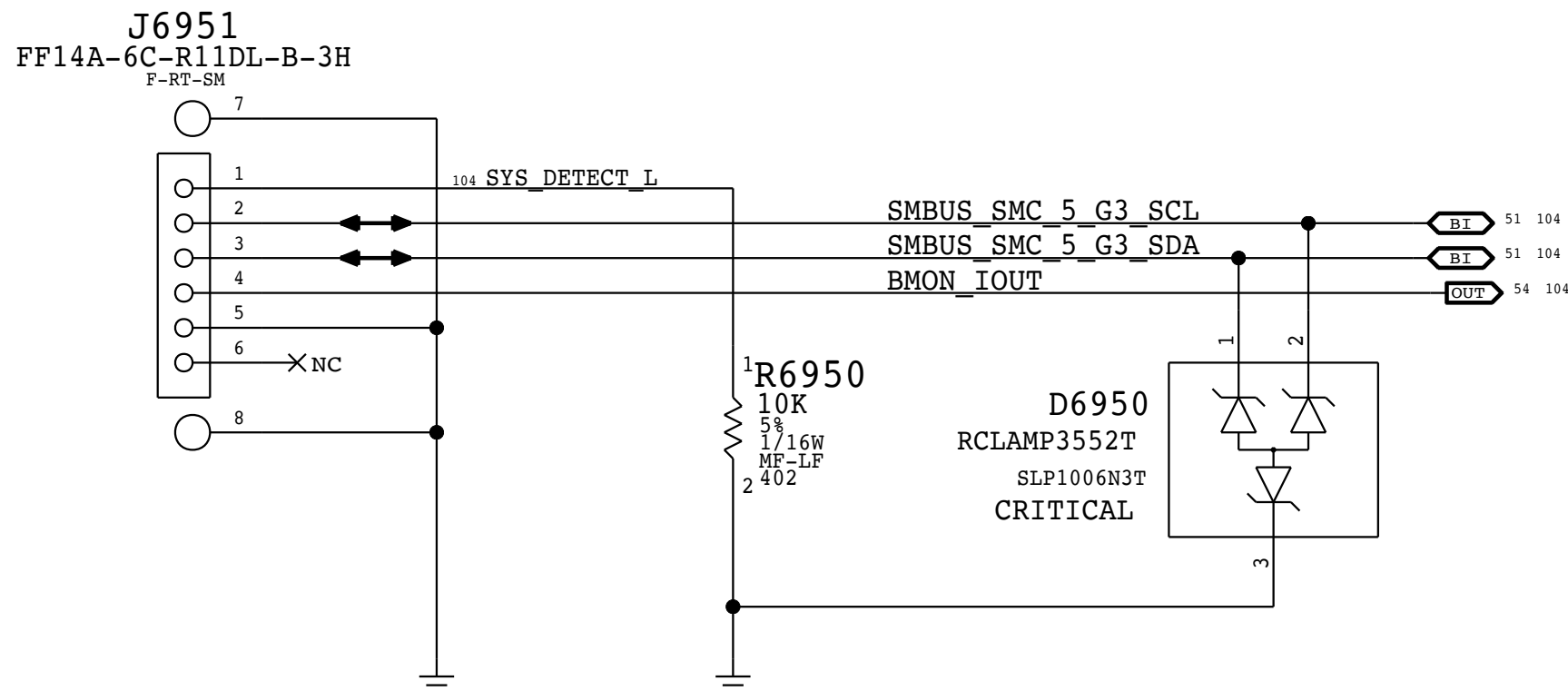
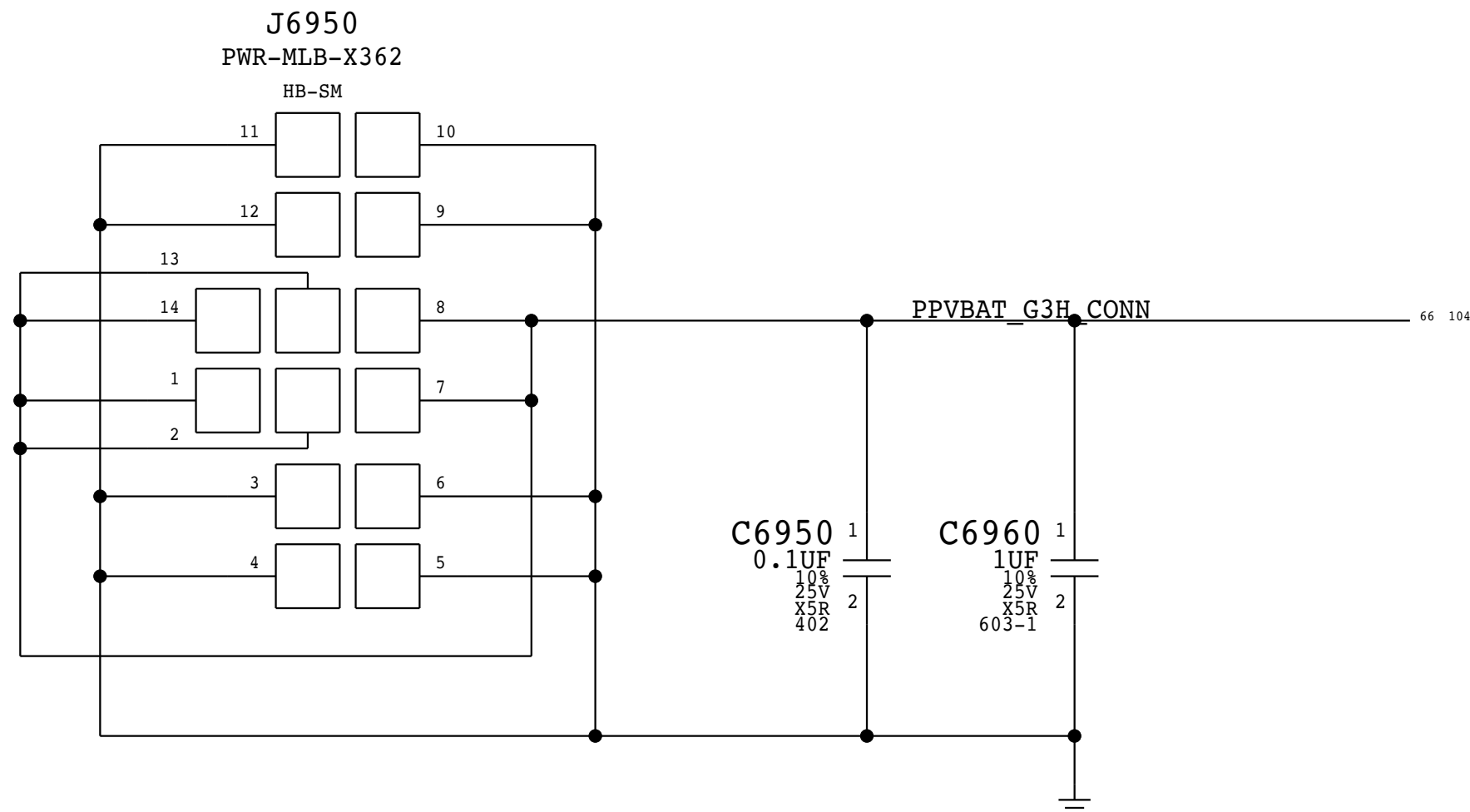
BOM\_COST\_GROUP=AUDIO

BOM COST GROUP=AUDIO

BOM\_COST\_GROUP=AUDIO

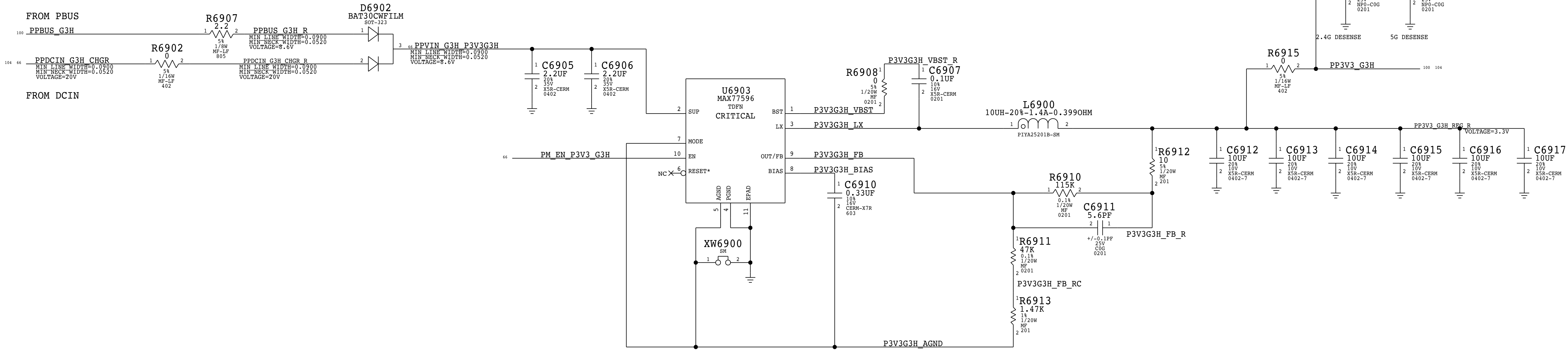
DESIGN: X502/DEV MLB U		
LAST CHANGE: Wed Feb 18 17:12:24 2015		
PAGE TITLE		
AUDIO JACK CONNECTOR		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	66 OF 145
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE 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		SHEET 64 OF 119

J79 Battery Hotbar Flex Pads



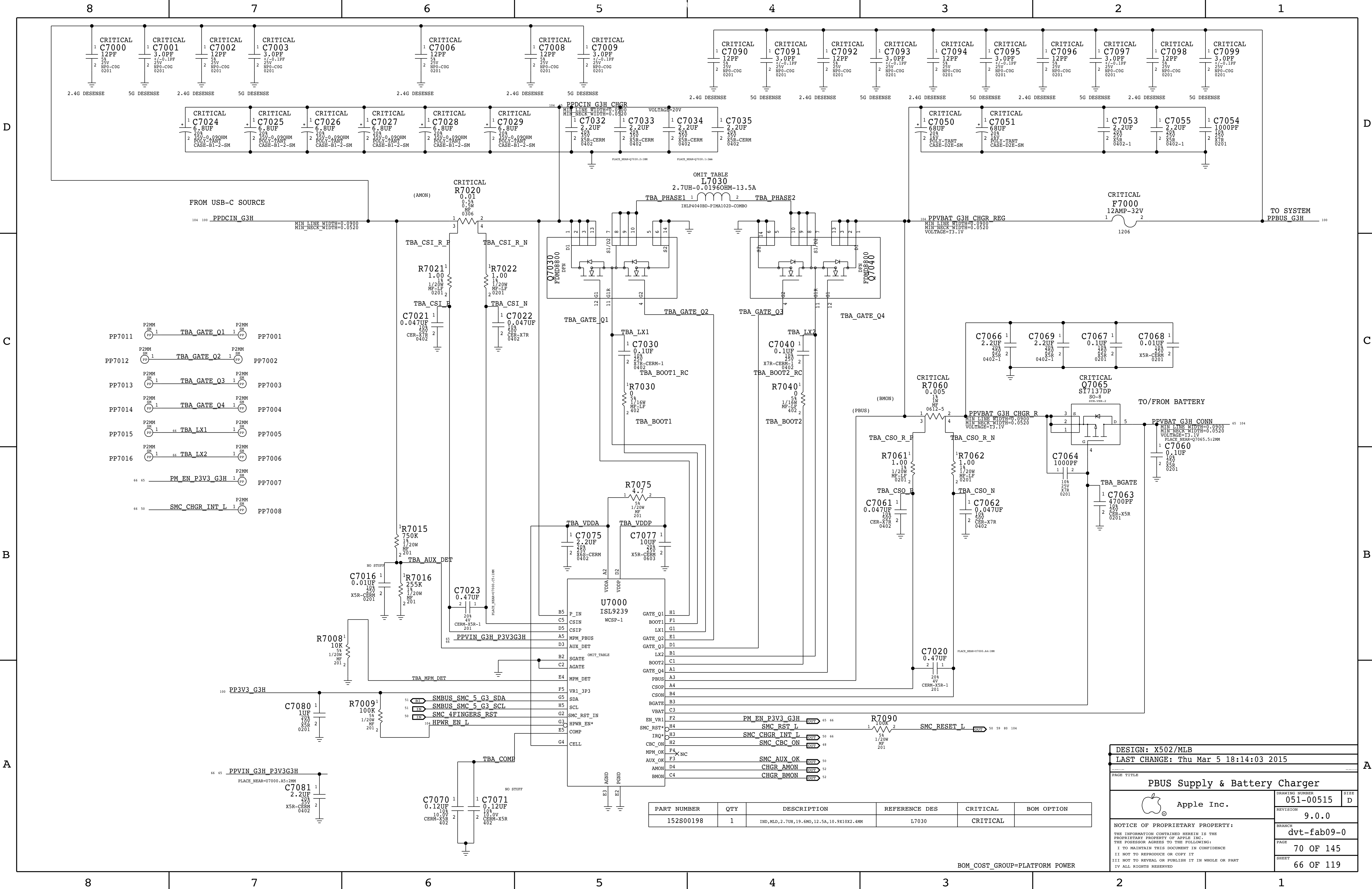
BMU POWER FLEX HOTBAR'd TO THE MLB:

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
632-00566	1	PCBA,FLEX,BMU PWR,X362	J6950	CRITICAL	



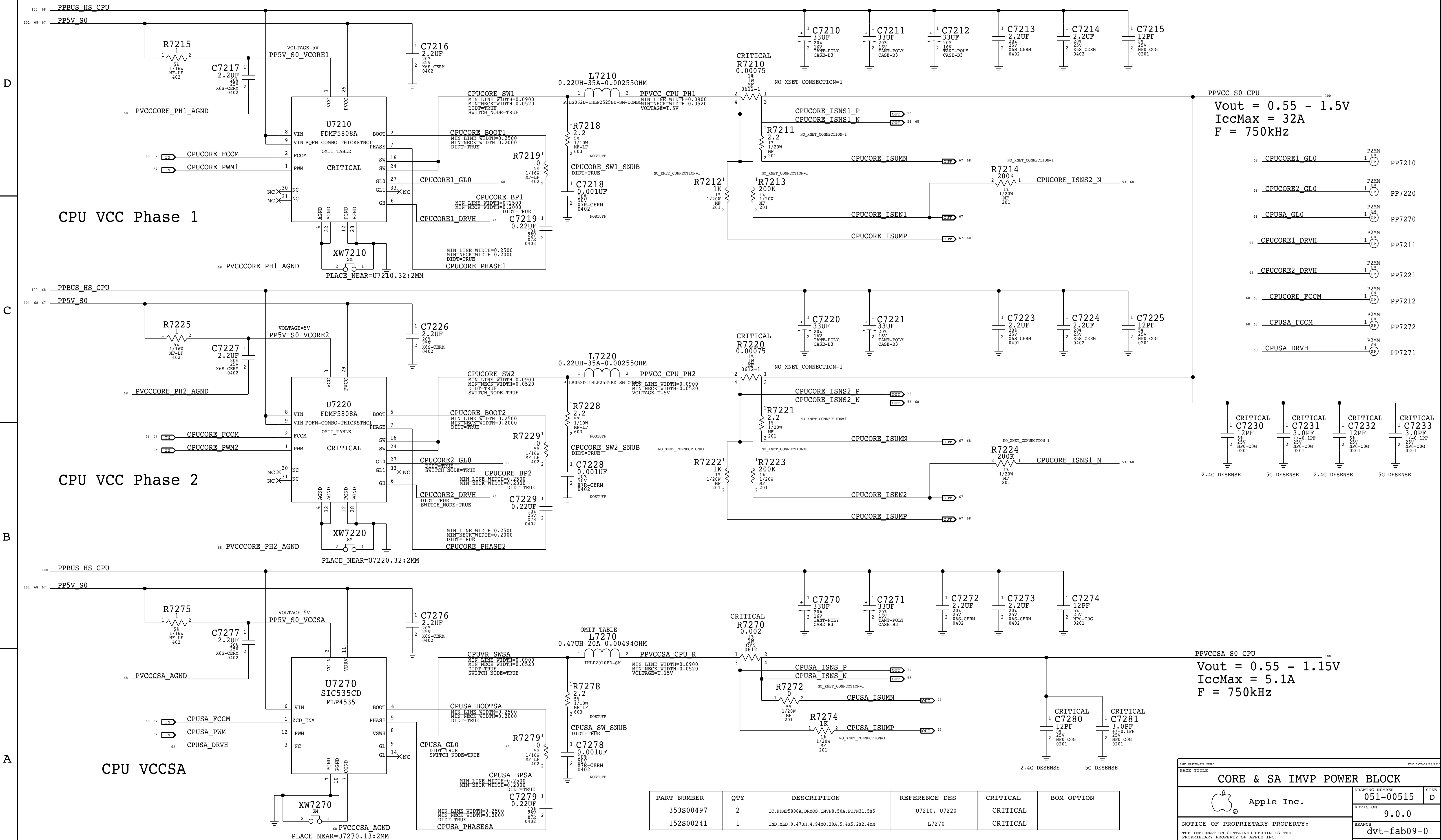
PAGE TITLE		
DC-In & Battery Connectors		
	DRANTING NUMBER	051-00515
	REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	69 OF 145
	SHEET	65 OF 119

BOM\_COST\_GROUP=PLATFORM POWER











PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00497	2	IC,FDPF5808A,DRMOS,IMVF8,50A,PQFN31,5X5	U7210, U7220	CRITICAL	
152S00241	1	IND,MHD,0,47UH,4.94MH,20A,5.4X5.2X2.4MM	L7270	CRITICAL	

SYMC_BALETTER-079_00000		SYMC_BALETTER-12/073/00000	
PAGE TITLE			
<div style="text-align: center;"> <h1>CORE &amp; SA IMVP POWER BLOCK</h1> <div style="display: flex; align-items: center; justify-content: center;"> <div> <h2>Apple Inc.</h2> </div> </div> </div>			
<p><b>NOTICE OF PROPRIETARY PROPERTY:</b></p> <p>THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.</p> <p>THE POSSESSOR AGREES TO THE FOLLOWING:</p> <p>I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE</p> <p>II NOT TO REPRODUCE OR COPY IT</p> <p>III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART</p> <p>IV ALL RIGHTS RESERVED</p>		<p>DRAWING NUMBER</p> <p style="font-size: 24px; text-align: center;">051-00515</p>	<p>SHEET</p> <p style="font-size: 24px; text-align: center;">D</p>
		<p>REVISION</p> <p style="font-size: 24px; text-align: center;">9.0.0</p>	
		<p>BRANCH</p> <p style="font-size: 24px; text-align: center;">dvt-fab09-0</p>	
		<p>PAGE</p> <p style="font-size: 24px; text-align: center;">72 OF 145</p>	
		<p>SHEET</p> <p style="font-size: 24px; text-align: center;">68 OF 119</p>	

BOM\_COST\_GROUP=CPU &amp; CHIPSET

8		7		6		5		4		3		2		1		
																D
																C
																B
																A
8		7		6		5		4		3		2		1		

SYNC MASTER=J79 SILUCHEN			SYNC DATE=04/02/2015		
PAGE TITLE					
Empty					
 Apple Inc.			DRAWING NUMBER		SIZE
			051-00515		D
<b>NOTICE OF PROPRIETARY PROPERTY:</b> 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			REVISION		
			9.0.0		
			BRANCH		
			dvt-fab09-0		
			PAGE		
			73 OF 145		
			SHEET		
			69 OF 119		

SYNC_MASTER=J79_SILUCHEN			SYNC_DATE=04/02/2015		
PAGE TITLE			Empty		
 Apple Inc.®			DRANTING NUMBER	051-00515	
			REVISION	9.0.0	
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			BRANCH	dvt-fab09-0	
			PAGE	73 OF 145	
			SHEET	69 OF 119	

8

7

6

5

4

3

2

1

## CPU VCCGT/GTx Phase 1

PLACE\_NEAR=U7410.32:2MM  
70 PVCCCGT\_PH1\_AGND

## CPU VCCGT/GTx Phase 2

PLACE\_NEAR=U7420.32:2MM  
70 PVCCCGT\_PH2\_AGND

## CPU VCCGT/GTx Phase 3

PLACE\_NEAR=U7430.32:2MM  
70 PVCCCGT\_PH3\_AGND


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00497	3	IC,FDMF5808A,DRMOS,1MVP8,50A,PQFN31,5X5	U7410, U7420, U7430	CRITICAL	


Vout = 0.55 - 1.5V  
IccMax = 64A  
F = 750kHz

GT & GTX IMVP POWER BLOCK			DRAWING NUMBER 051-00515	STEP D
Apple Inc.			REVISION 9.0.0	
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			BRANCH dvt-fab09-0	
			PAGE 74 OF 145	
			SHEET 70 OF 119	

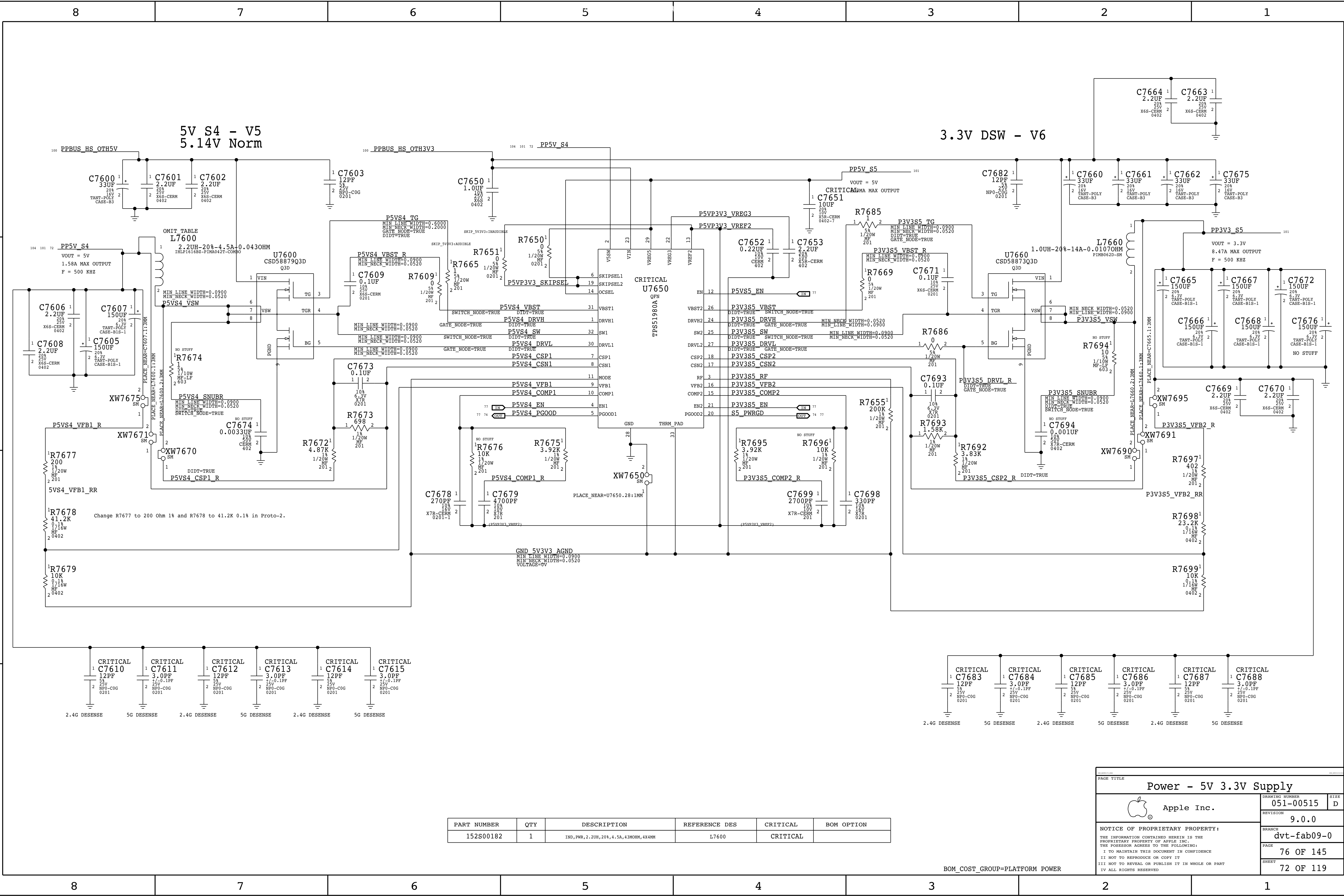
BOM\_COST\_GROUP=CPU &amp; CHIPSET

8		7		6		5		4		3		2		1			
D																D	
C																C	
B																B	
A																A	
8		7		6		5		4		3		2		1			

SYNC MASTER=J79_SILUCHEN														SYNC DATE=03/27/2015			
PAGE TITLE																	
Empty																	
 Apple Inc.												DRAWING NUMBER		051-00515		SIZE	
												REVISION		9.0.0		D	
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												BRANCH		dvt-fab09-0			
												PAGE		75 OF 145			
												SHEET		71 OF 119			

SYNC_MASTER=J79_SILUCHEN										SYNC_DATE=03/27/2015					
PAGE TITLE										Empty					
 Apple Inc.®										DRAWING NUMBER		051-00515			
										REVISION		9.0.0			
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										BRANCH		dvt-fab09-0			
										PAGE		75 OF 145			
										SHEET		71 OF 119			



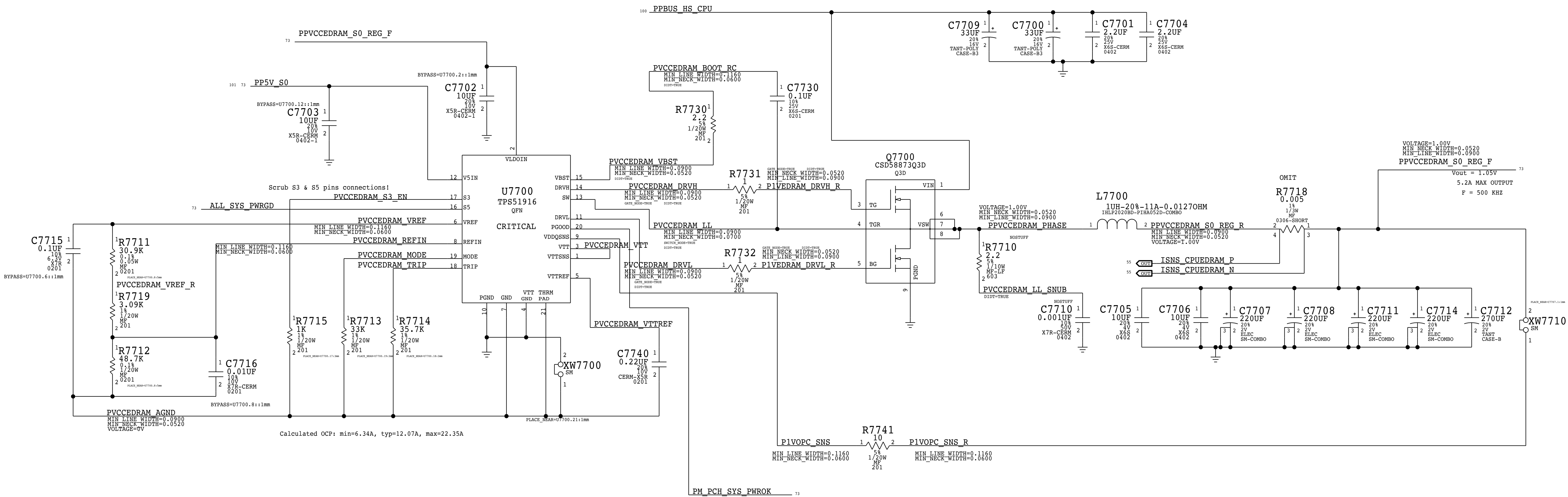


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
152S00182	1	IND, PWR, 2.2UH, 20%, 4.5A, 43MOHM, 4X4MM	L7600	CRITICAL	

Power - 5V 3.3V Supply		
	DRAWING NUMBER	051-00515
	REVISION	9.0.0
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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0
	PAGE	76 OF 145
	SHEET	72 OF 119

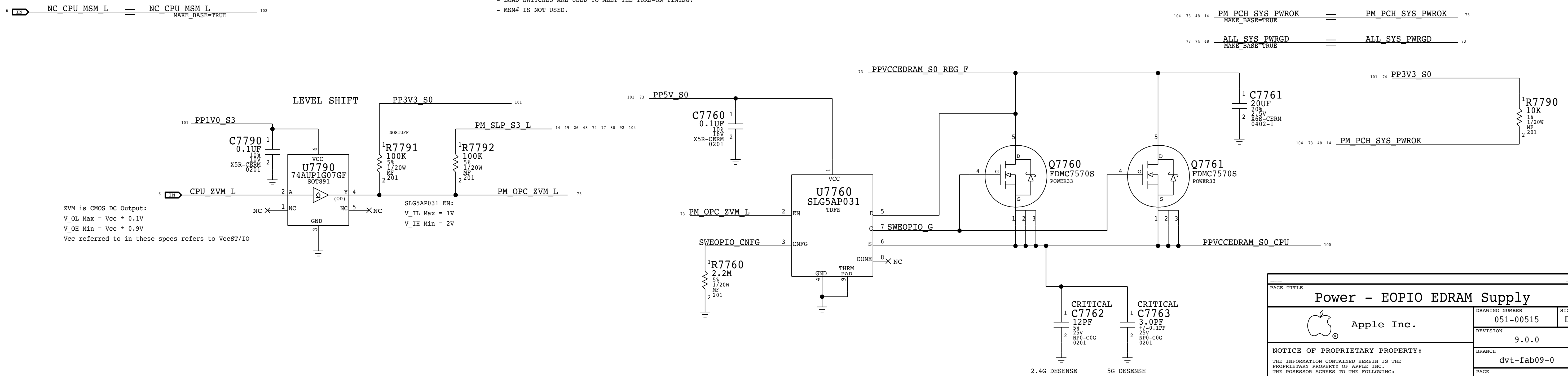
BOM\_COST\_GROUP=PLATFORM POWER


## 1V EDRAM & EOPIO



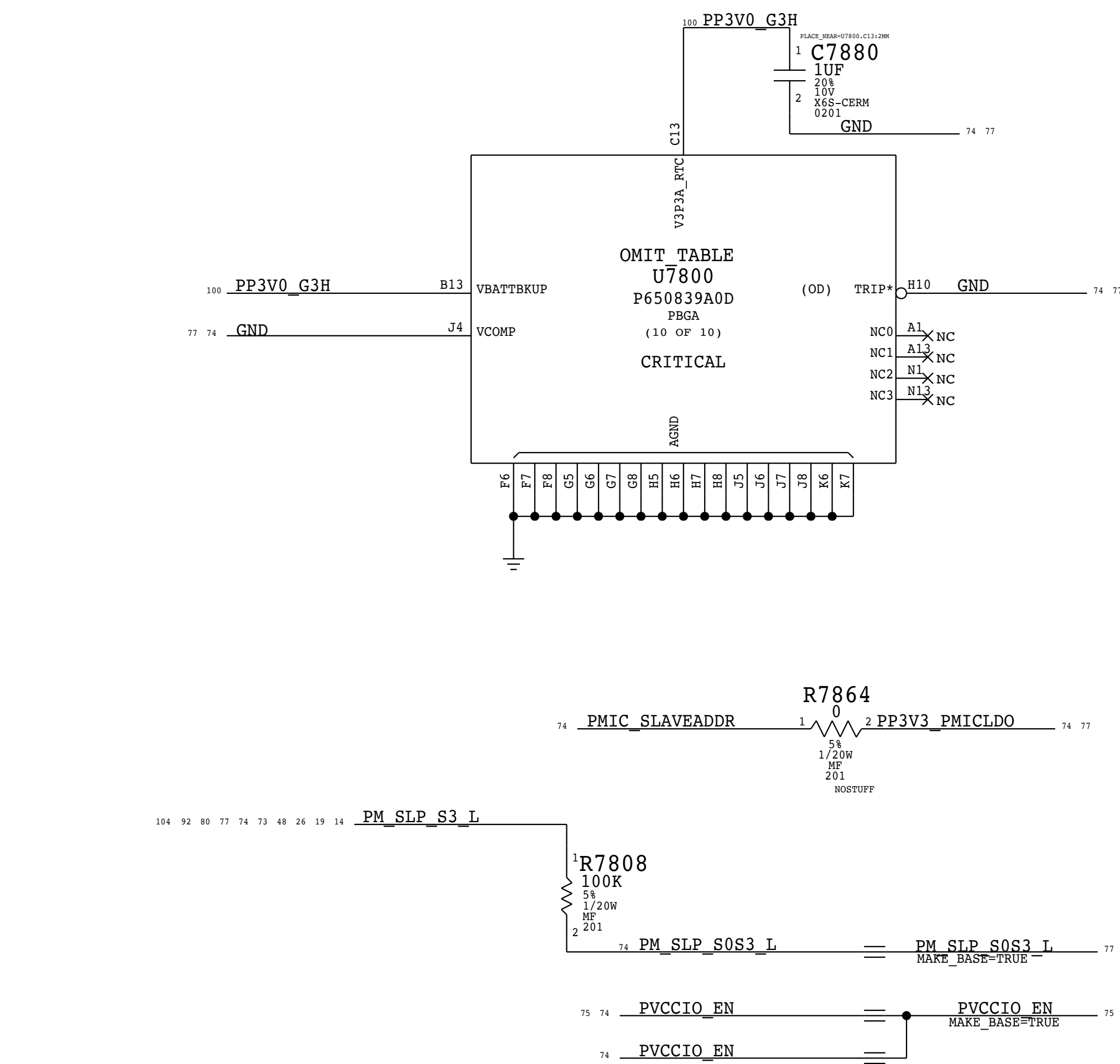
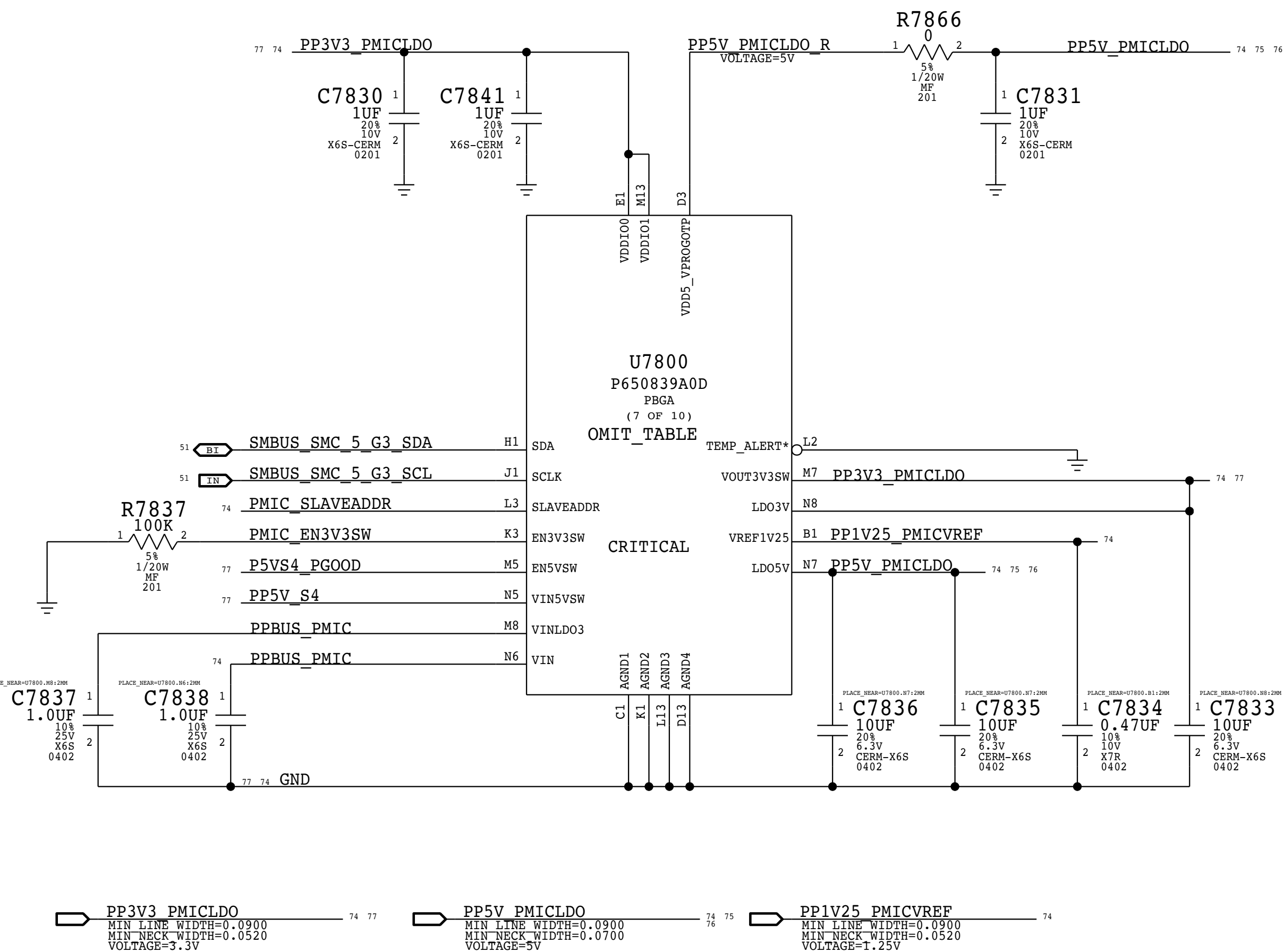
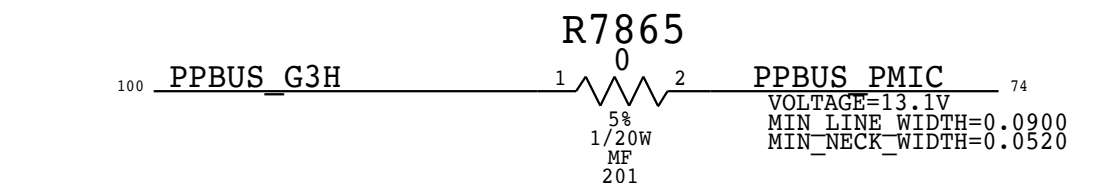
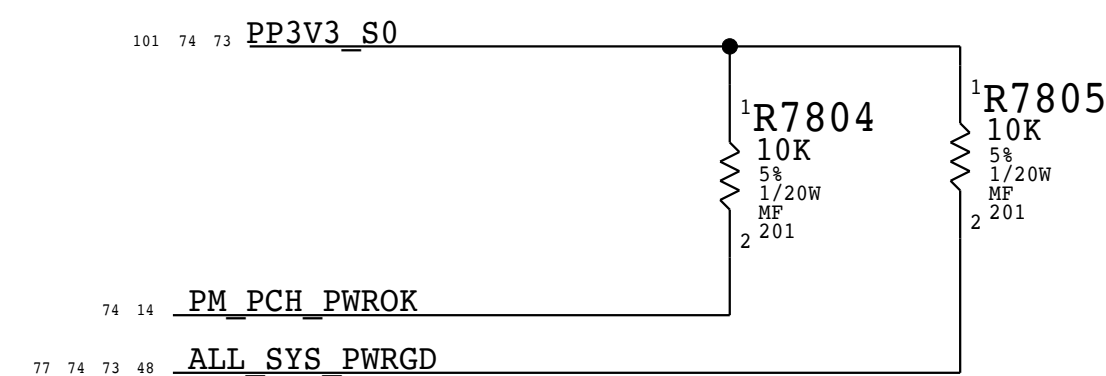
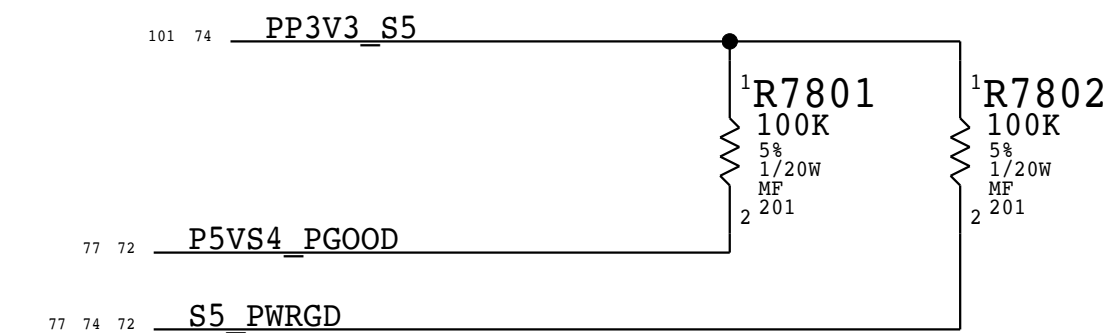
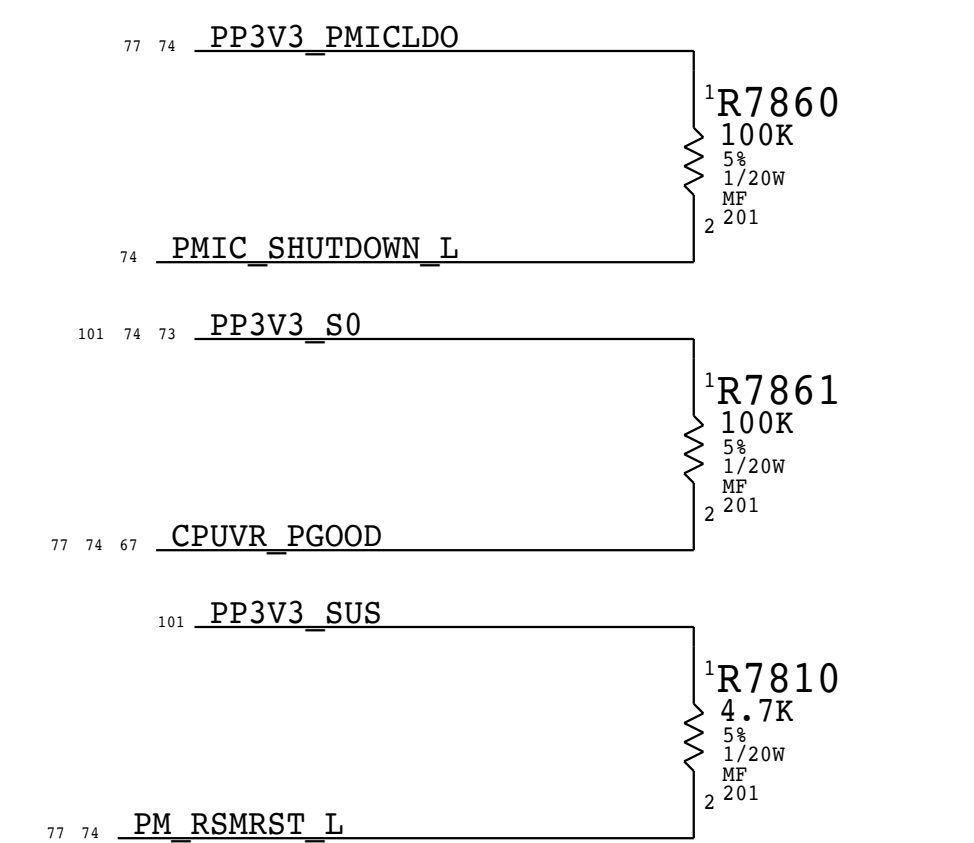
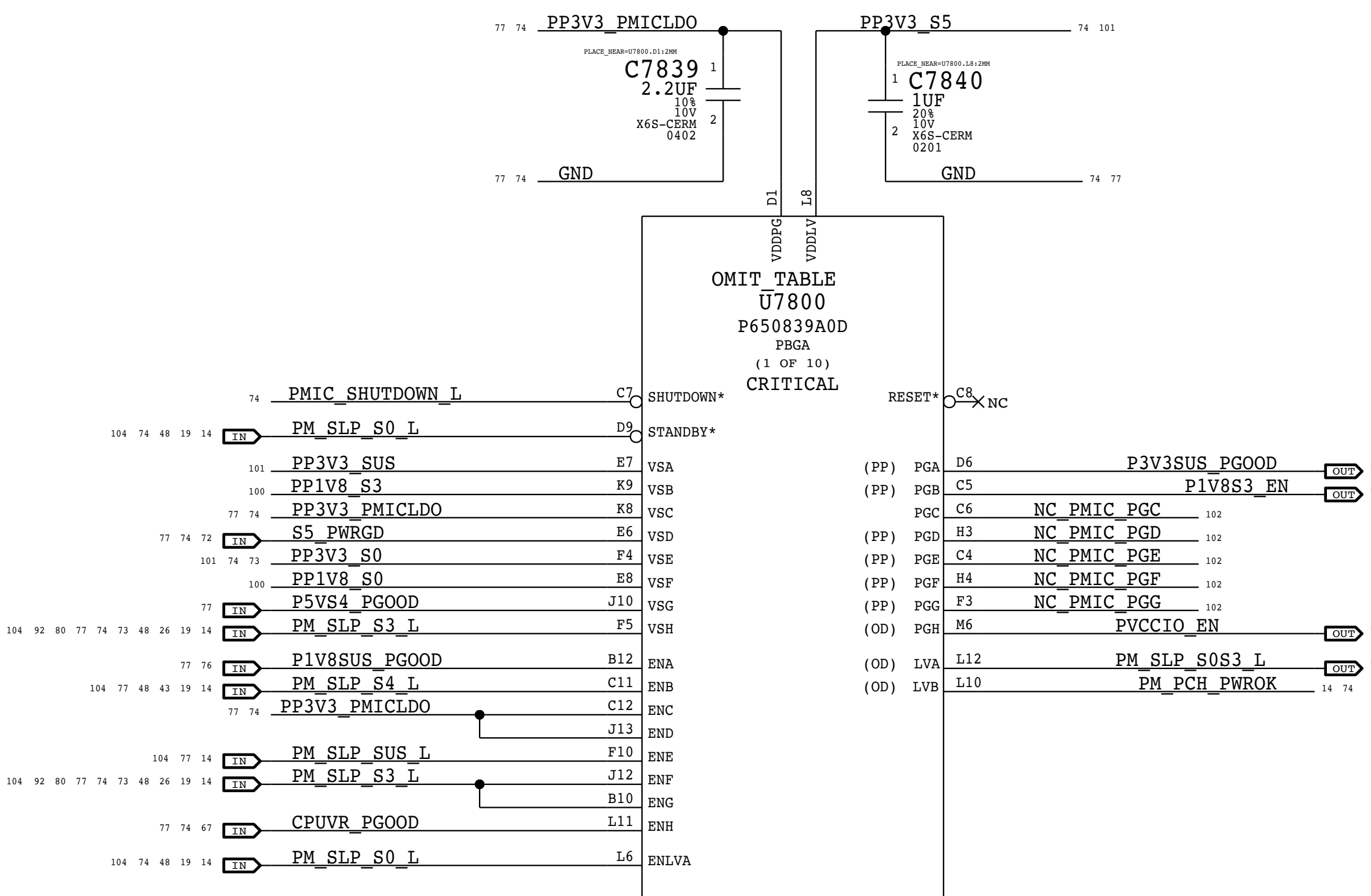
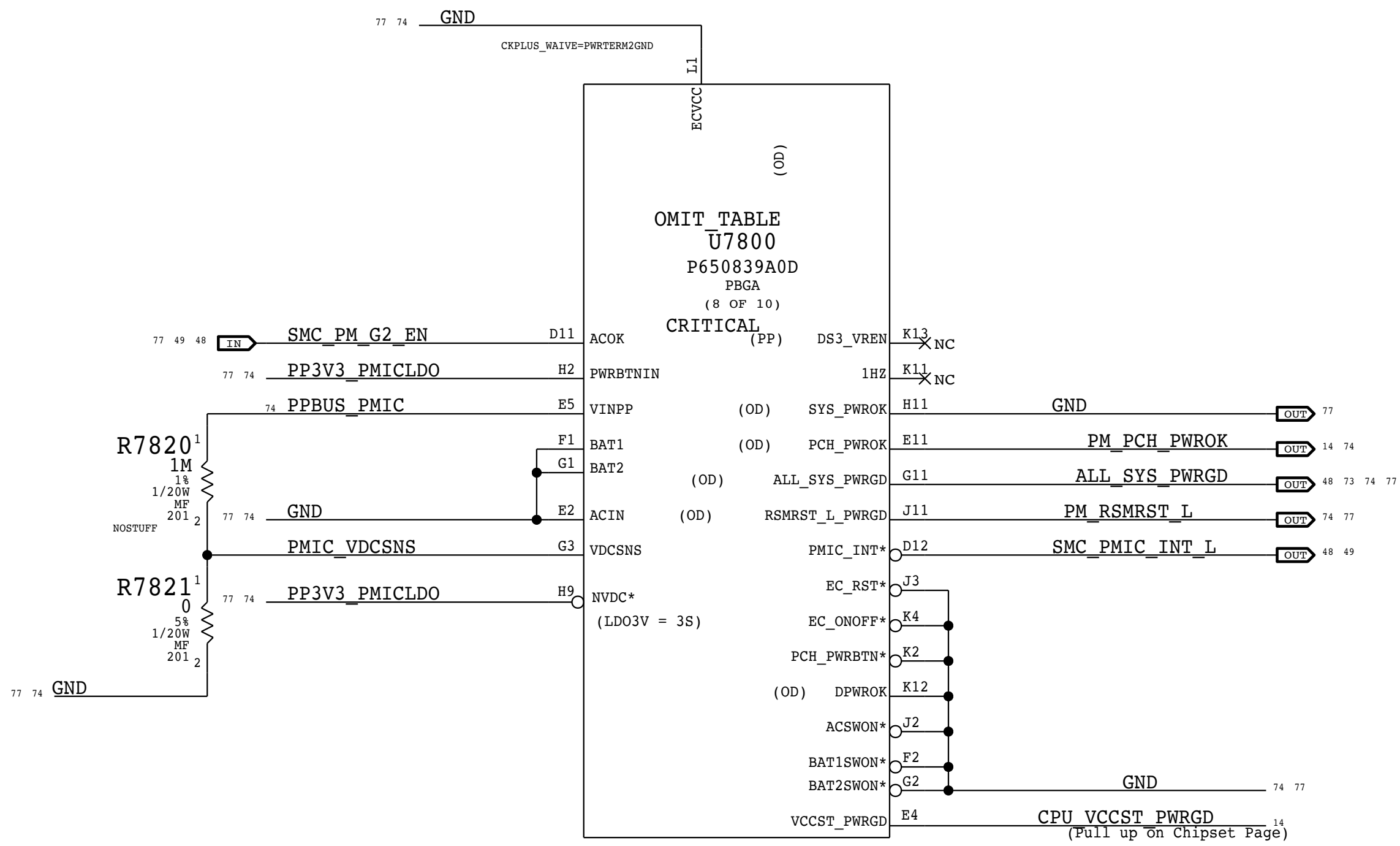
THE FOLLOWING SHORTCUTS ARE USED:


- OPC (EDRAM) IS POWERED FROM ONE VR.
- LOAD SWITCHES ARE USED TO MEET THE TURN-ON TIMING.
- MSM# IS NOT USED.



PAGE TITLE		DRAWING NUMBER		STANDARD
Power - EOP10 EDRAW Supply		051-00515		1
 Apple Inc.		REVISION		9.0.0
NOTICE OF PROPRIETARY PROPERTY:		BRANCH		dvt-fab09-0
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		PAGE		77 OF 145
		SHEET		73 OF 119

# BANJO - PMIC Control



DTC: MASTER-1710_0000		DTC: DATE=01/01/2010	
PAGE TITLE			
PMIC-1 & Power Control			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
	REVISION		
	9.0.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.		dvt-fab09-0	
THE POSSESSOR AGREES TO THE FOLLOWING:		PAGE	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		78 OF 145	
II NOT TO REPRODUCE OR COPY IT		SHEET	
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		74 OF 119	
IV ALL RIGHTS RESERVED			

## D



## C



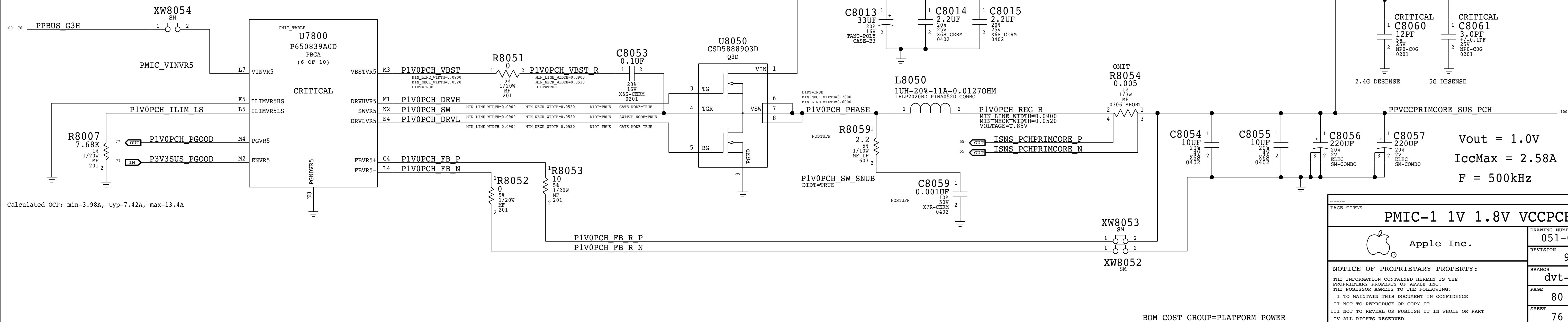
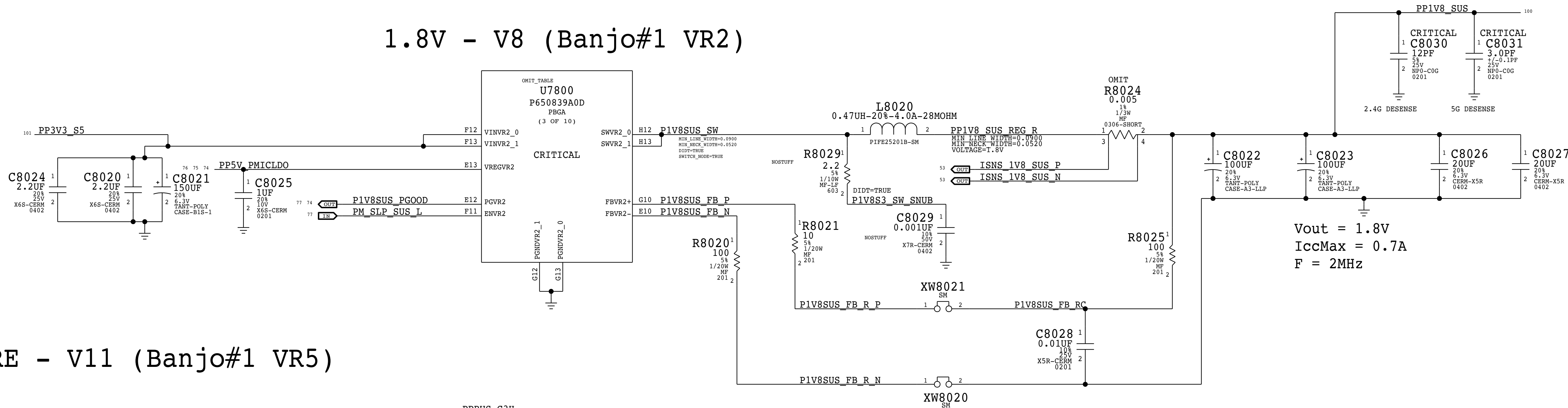
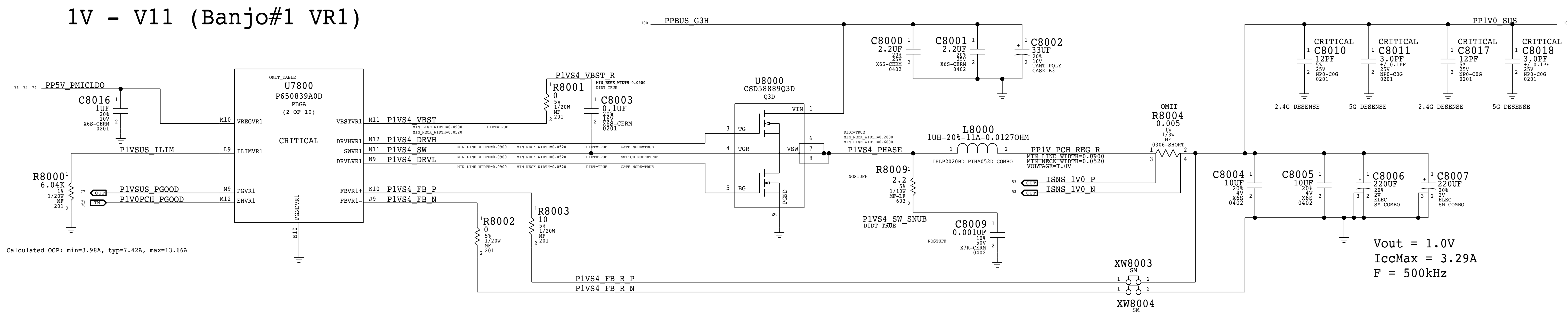
## B




A

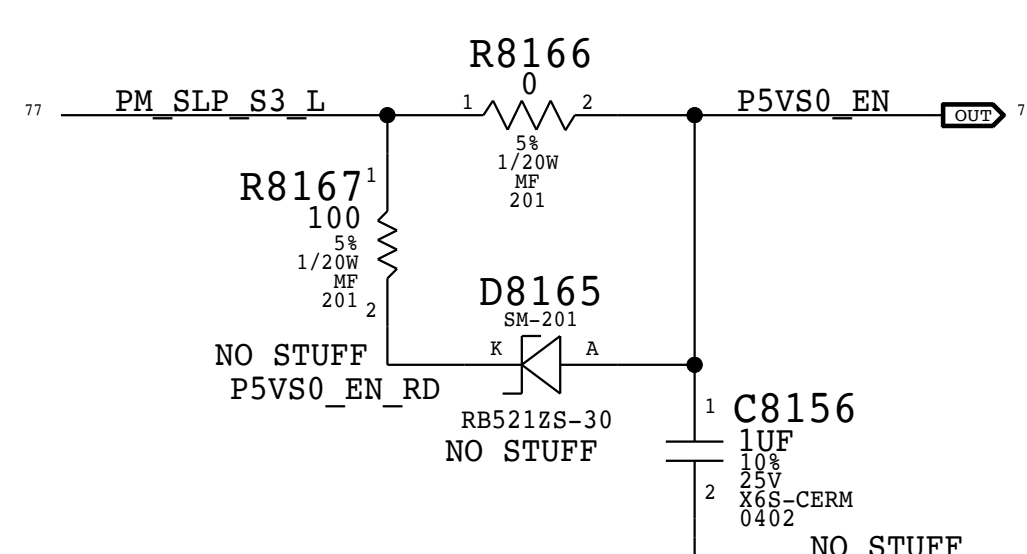
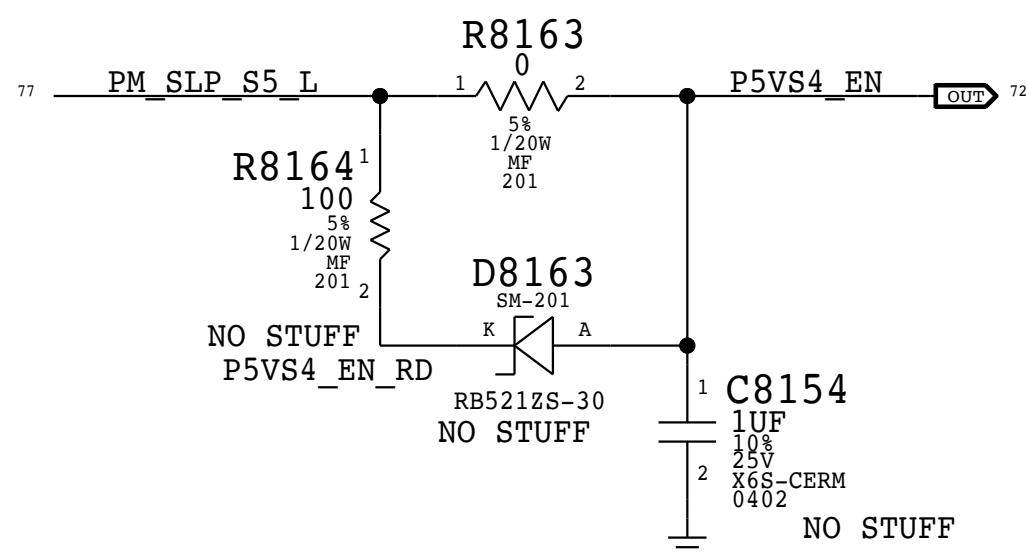
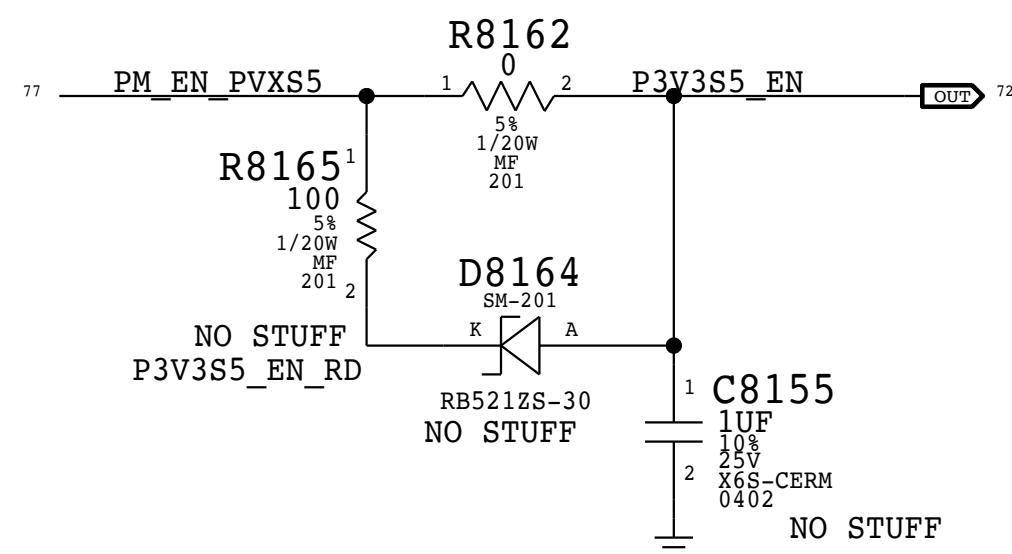
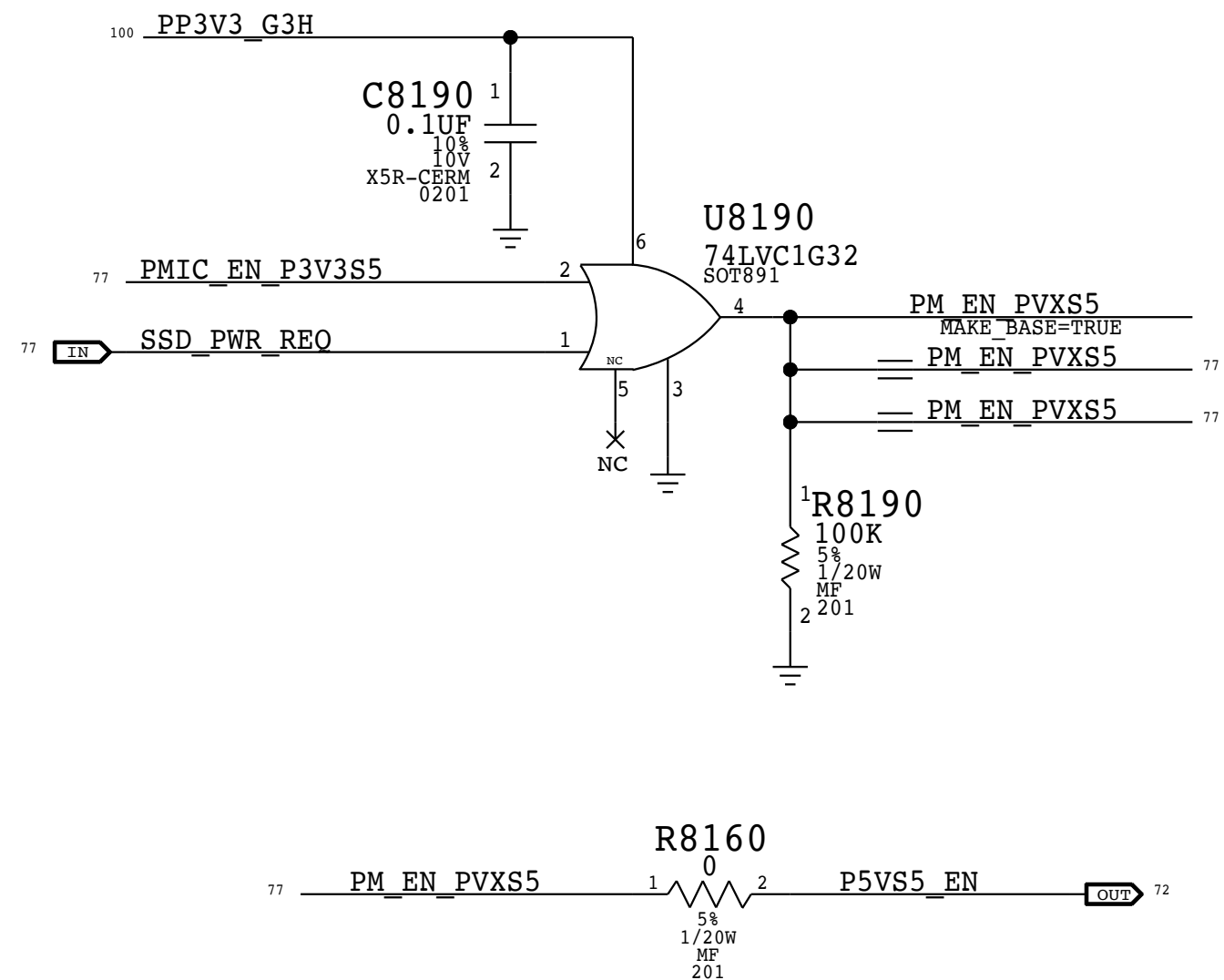
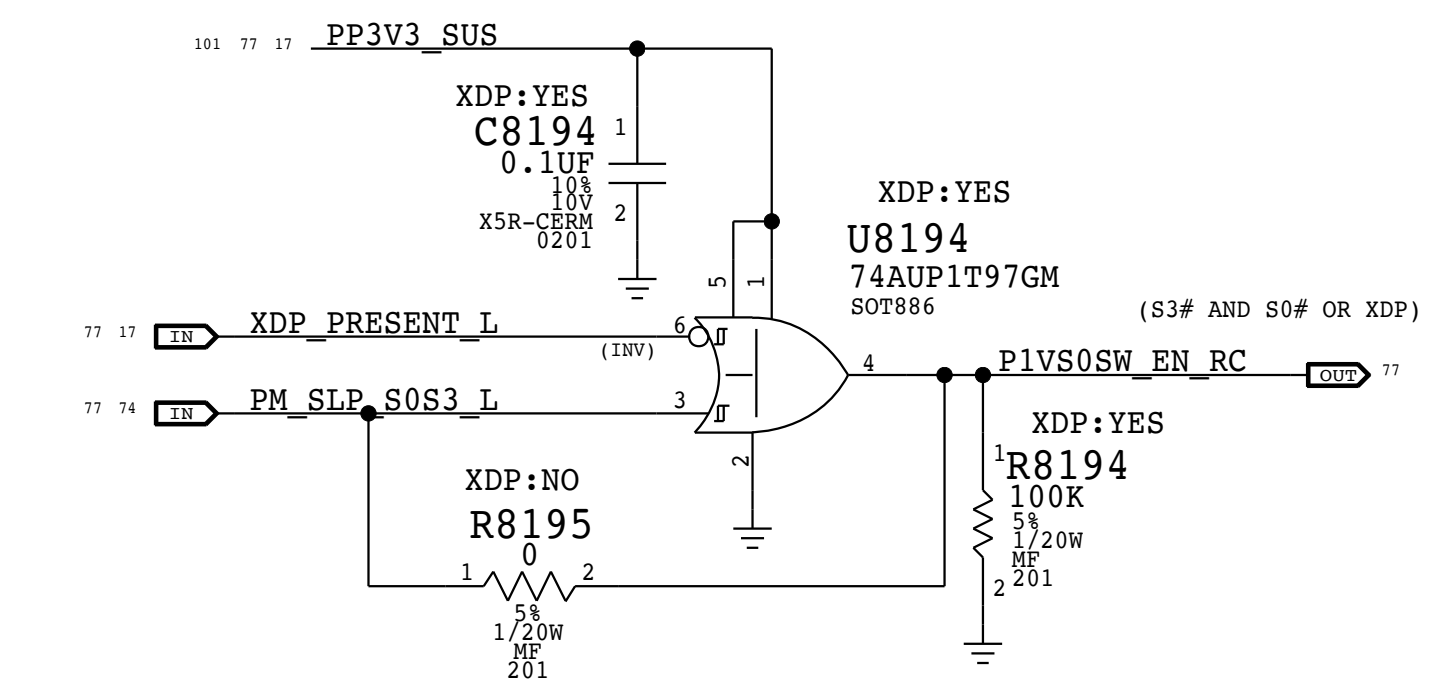
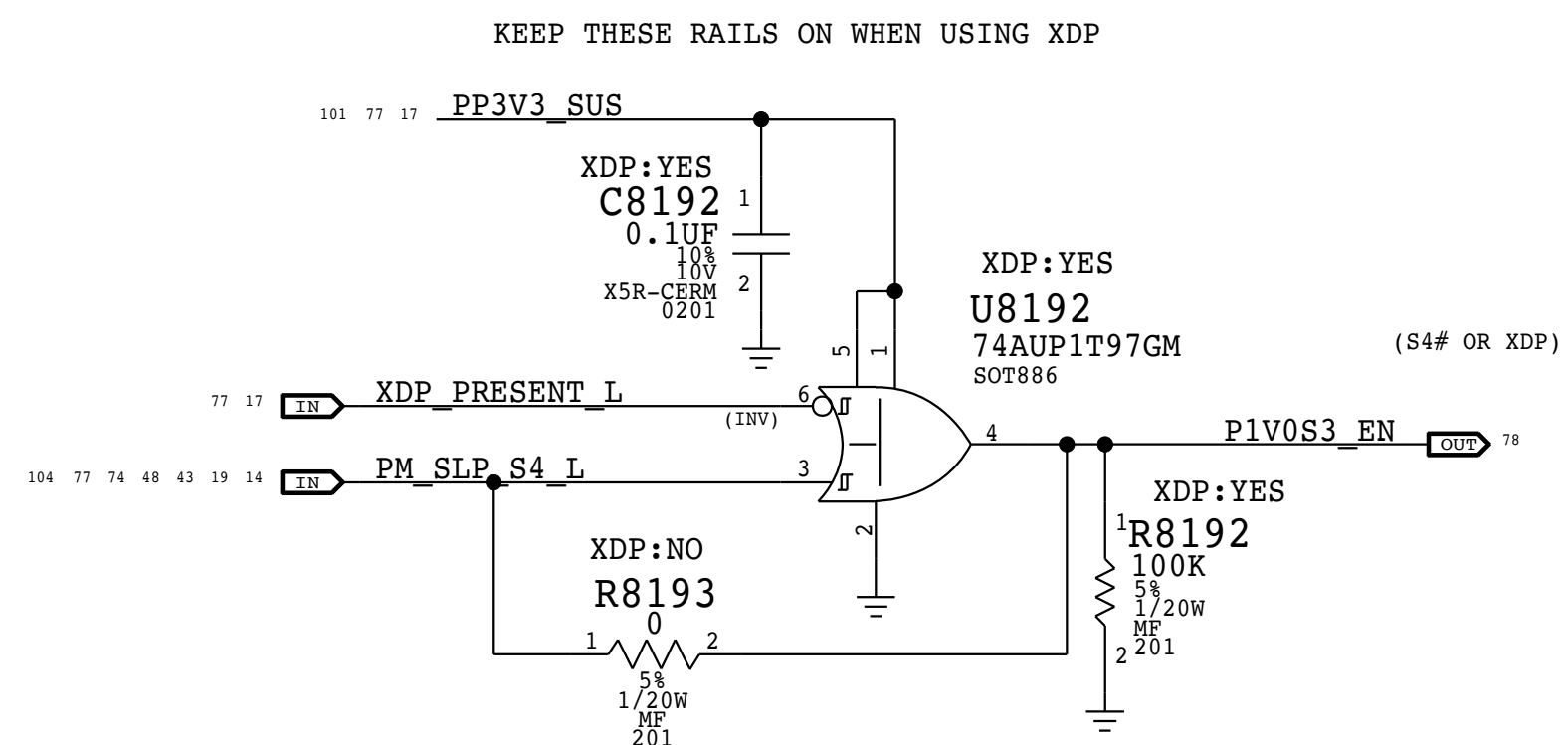
A


1



PAGE TITLE		PMIC-1 1V 1.8V VCCPCH	
 Apple Inc.	DRAWING NUMBER	051-00515	SIZE D
	REVISION	9.0.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	dvt-fab09-0
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I 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		PAGE	80 OF 145
		SHEET	76 OF 119





PAGE TITLE		DRAWING NUMBER		SITE	
PMIC-10 Aliases & TPs		051-00515		D	
 Apple Inc.		REVISION		9.0.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH		dvt-fab09-0	
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		PAGE		81 OF 145	
		SHEET		77 OF 119	



Page Notes

Power aliases required by this page:

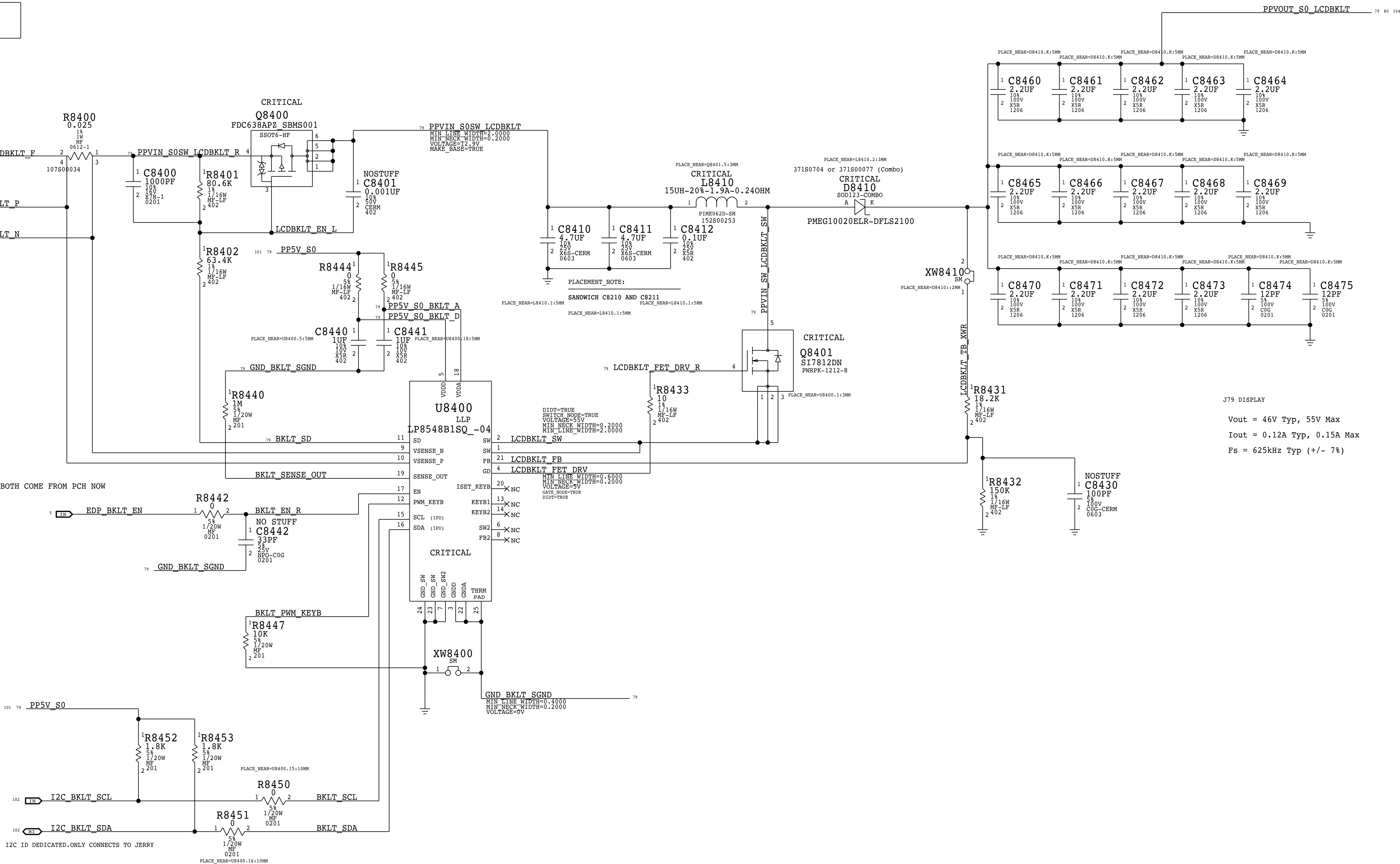
- ~PPVIN\_S0SW\_LCDBKLT\_FET (9-12.6V LCD BACKLIGHT INPUT)
- ~PP5V\_S0\_BKLT (5V BACKLIGHT DRIVER INPUT)

D

C

B

A



D

C

B

A

LINE WIDTHS

PP5V\_S0\_BKLT\_A  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=5V

PP5V\_S0\_BKLT\_D  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=5V

BKLT\_SD  
MIN LINE WIDTH=0.2500  
MIN NECK WIDTH=0.2000

PBUS LINE WIDTHS

PPVIN\_S0SW\_LCDBKLT\_F  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=12.9V

PPVIN\_S0SW\_LCDBKLT\_R  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=12.9V

PPVIN\_S0SW\_LCDBKLT  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=12.9V

LCD BKLT LINE WIDTHS

LCD BKLT FET DRV\_R  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=5V

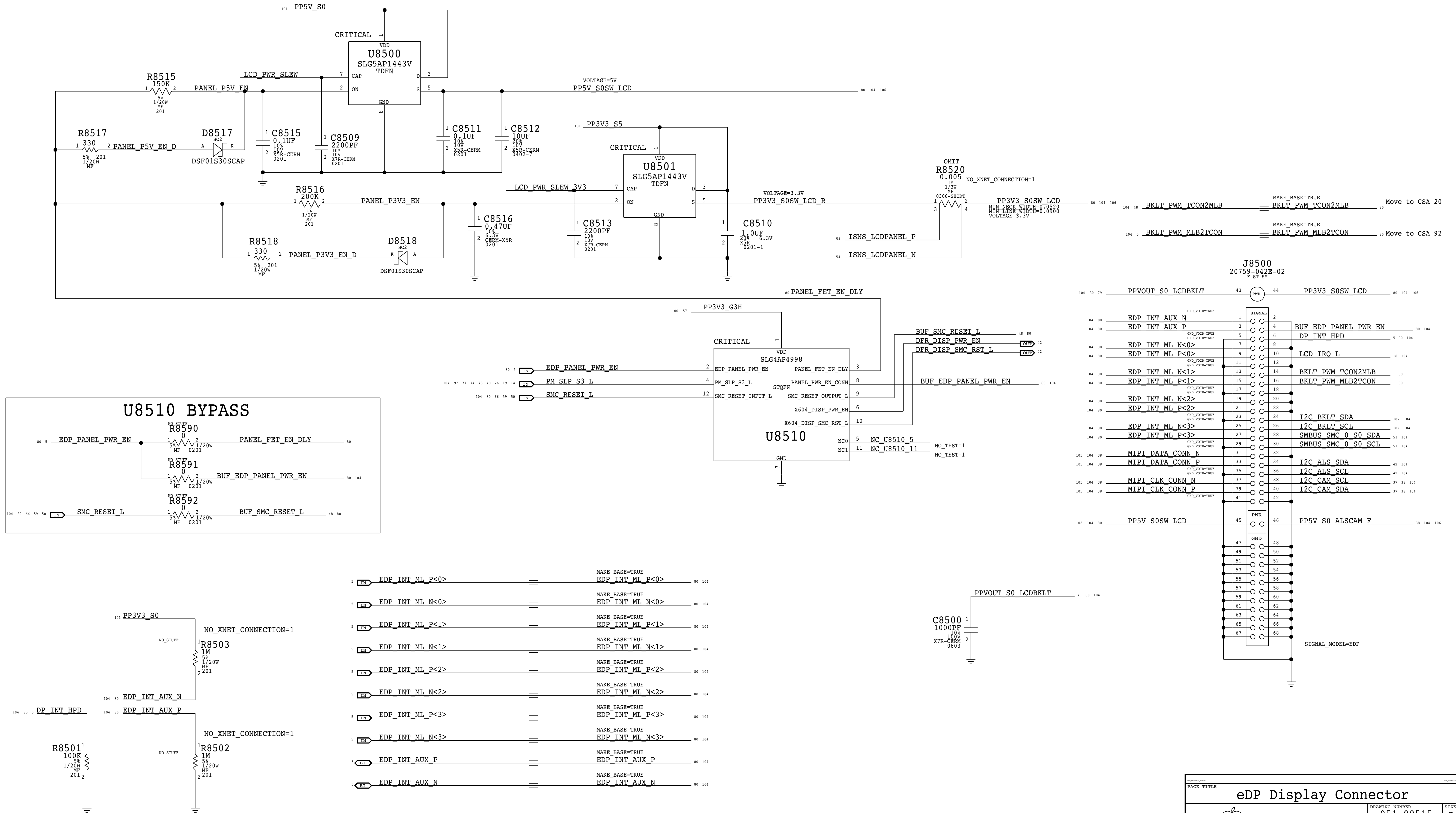
PPVIN\_SW\_LCDBKLT\_SW  
MIN LINE WIDTH=2.0000  
MIN NECK WIDTH=0.2000  
VOLTAGE=5V

PPVOUT\_S0\_LCDBKLT  
MIN LINE WIDTH=0.5000  
MIN NECK WIDTH=0.1500  
VOLTAGE=5V

BOM\_COST\_GROUP=DISPLAY

PAGE TITLE		
LCD Backlight Driver		
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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	51-00515
	PAGE	9.0.0
	SHEET	dvt-fab09-0
		84 OF 145
		79 OF 119

## LCD PANEL INTERFACE (eDP) + Camera (MIPI)



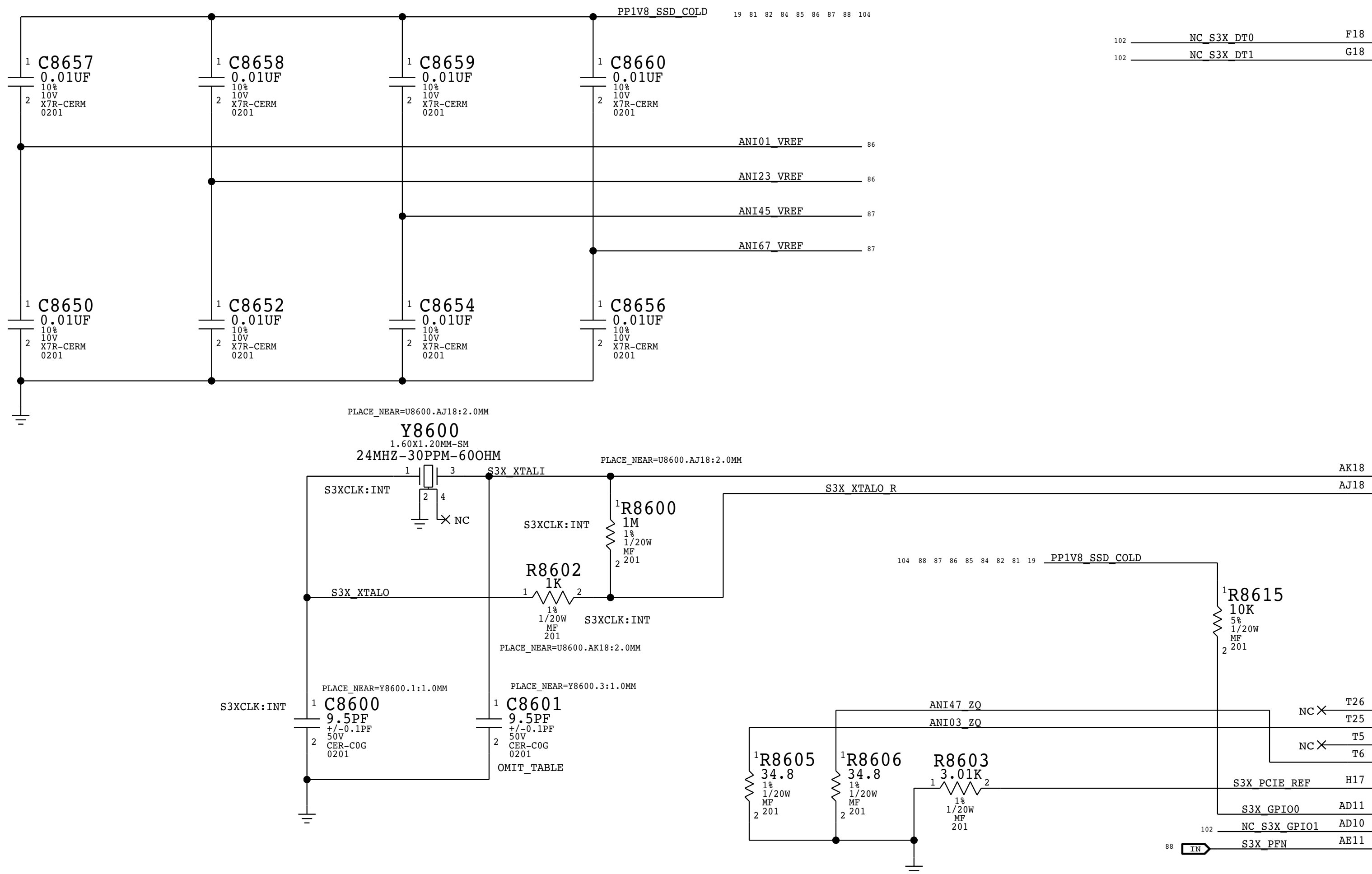
## LCD Panel HPD & AUX strapping

8		
NAND LANDINGS		
CONFIG	LANDING1 R8601	LANDING2 R8602
00 - 2	NOSTUFF	NOSTUFF
01 - 4	NOSTUFF	ASSEMBLE
10 - 8	ASSEMBLE	NOSTUFF
11 - RESERVED	ASSEMBLE	ASSEMBLE

6		5	
NAND CONFIGURATION			
CONFIG	ROMBOOT2 R8617	ROMBOOT1 R8618	ROMBOOT0 R8616
000 - MLC SD/TOS 1Y/1Z(W/ HARD RESET)	NOSTUFF	NOSTUFF	NOSTUFF
001 - MLC SD/TOS 1Y/1Z (W/O HARD RESET)	NOSTUFF	NOSTUFF	ASSEMBLE
010 - RESERVED	NOSTUFF	ASSEMBLE	NOSTUFF
011 - MLC HYNIX 3D-V2	NOSTUFF	ASSEMBLE	ASSEMBLE
100 - RESERVED	ASSEMBLE	NOSTUFF	NOSTUFF
101 - RESERVED	ASSEMBLE	NOSTUFF	ASSEMBLE
110 - RESERVED	ASSEMBLE	ASSEMBLE	NOSTUFF
111 - RESERVED	ASSEMBLE	ASSEMBLE	ASSEMBLE

PRODUCT CAPACITY			
CONFIG	CAPACITY2 R8664	CAPACITY1 R8663	CAPACITY0 R8662
- 32GB	NOSTUFF	NOSTUFF	NOSTUFF
- 64GB	NOSTUFF	NOSTUFF	ASSEMBLE
- 128GB	NOSTUFF	ASSEMBLE	NOSTUFF
- 256GB	NOSTUFF	ASSEMBLE	ASSEMBLE
- 512GB	ASSEMBLE	NOSTUFF	NOSTUFF
- 1024GB	ASSEMBLE	NOSTUFF	ASSEMBLE
- 2048GB	ASSEMBLE	ASSEMBLE	NOSTUFF
- RESERVED	ASSEMBLE	ASSEMBLE	ASSEMBLE

OPERATION MODE (ODT, CLK FREQ, ETC)				
CONFIG	OP_MODE2 R8614	OP_MODE1 R8615	OP_MODE0 R8680	
000 - TEABERRY	NOSTUFF	NOSTUFF	NOSTUFF	
001 - XB58 GS	NOSTUFF	NOSTUFF	ASSEMBLE	
010 - RESERVED	NOSTUFF	ASSEMBLE	NOSTUFF	
011 - RESERVED	NOSTUFF	ASSEMBLE	ASSEMBLE	
100 - RESERVED	ASSEMBLE	NOSTUFF	NOSTUFF	
101 - RESERVED	ASSEMBLE	NOSTUFF	ASSEMBLE	
110 - RESERVED	ASSEMBLE	ASSEMBLE	NOSTUFF	
111 - RESERVED	ASSEMBLE	ASSEMBLE	ASSEMBLE	



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
131S00077	1	CAP,9.5PF,50V,0201	C8601	CRITICAL	S3XCLR:INT
117S0002	1	RES,MF,0 OHM,1/20W,0201	C8601	CRITICAL	S3XCLR:EXT

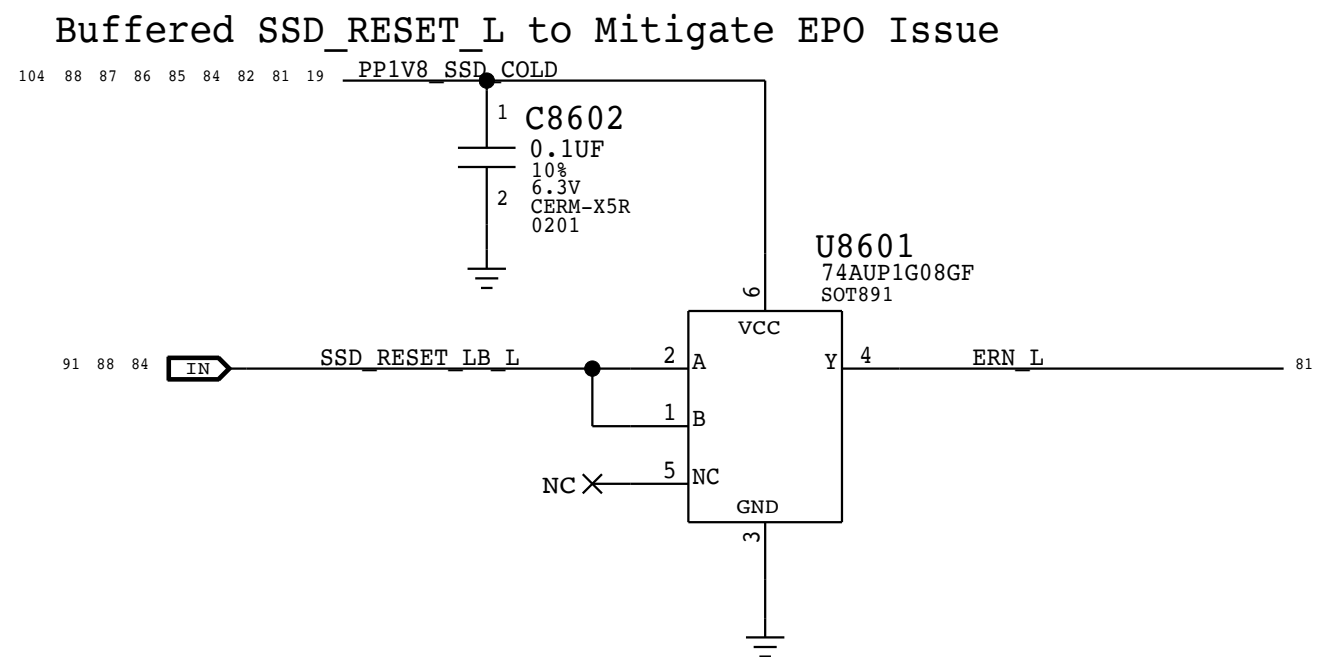


TABLE 35 2 3 5 9 0006939272 ENGINEER

0

REFCLK\_P A19 PCIE\_CLK100M\_SSD\_LB\_P 91 105

REFCLK\_N A18 PCIE\_CLK100M\_SSD\_LB\_N 91 105

PCIE\_TX0\_P A17 PCIE\_SSD\_D2R\_C\_P<0> 81

PCIE\_TX0\_N A16 PCIE\_SSD\_D2R\_C\_N<0> 81

PCIE\_TX1\_P A15 PCIE\_SSD\_D2R\_C\_P<1> 81

PCIE\_TX1\_N A14 PCIE\_SSD\_D2R\_C\_N<1> 81

PCIE\_TX2\_P A13 PCIE\_SSD\_D2R\_C\_P<2> 81

PCIE\_TX2\_N A12 PCIE\_SSD\_D2R\_C\_N<2> 81

PCIE\_TX3\_P A11 PCIE\_SSD\_D2R\_C\_P<3> 81

PCIE\_TX3\_N A10 PCIE\_SSD\_D2R\_C\_N<3> 81

PCIE\_RX0\_P C17 PCIE\_SSD\_R2D\_LB\_P<0> 84

PCIE\_RX0\_N C16 PCIE\_SSD\_R2D\_LB\_N<0> 84

PCIE\_RX1\_P C15 PCIE\_SSD\_R2D\_P<1> 84

PCIE\_RX1\_N C14 PCIE\_SSD\_R2D\_N<1> 84

PCIE\_RX2\_P C13 PCIE\_SSD\_R2D\_P<2> 84

PCIE\_RX2\_N C12 PCIE\_SSD\_R2D\_N<2> 84

PCIE\_RX3\_P C11 PCIE\_SSD\_R2D\_P<3> 84

PCIE\_RX3\_N C10 PCIE\_SSD\_R2D\_N<3> 84

DDR\_ATO J21 NC\_S3X\_DDR\_ATO 102

BOOT\_FROM\_LPSR AF17 S3X\_COLD\_BOOT\_L 88

CLK\_IN AG18 S3X\_EXT\_SE\_24MHZ\_CLK\_IN

CLK\_IN\_SEL AD17 S3X\_CLK\_IN\_SEL

PCIE\_ATB0 G16 NC\_S3X\_PCIE\_ATB0 102

PCIE\_ATB1 G17 NC\_S3X\_PCIE\_ATB1 102

PCIE\_CLKREQ F12 S3X\_PCIE\_CLKREQ\_L

JTAG\_TRST\* AE18 S3X\_JTAG\_TRST\_L 84 104

RESET\* AF18 S3X\_RESET\_L

HOLD\_RESET AE18 S3X\_HOLD\_RESET

PERST\* E12 S3X\_PERST\_L

JTAG\_SEL AG20 S3X\_JTAG\_SEL

JTAG\_TCK AH19 S3X\_JTAG\_TCK

JTAG\_TDI AH17 S3X\_JTAG\_TDI

JTAG\_TDO AD20 S3X\_JTAG\_TDO

JTAG\_TMS AF19 S3X\_JTAG\_TMS

I2C\_SCL F8 S3X\_I2C\_SCL

I2C\_SDA F8 S3X\_I2C\_SDA

PMIC\_CTRL0 AF20 S3X\_PMIC\_CTRL0

PMIC\_CTRL1 AE20 S3X\_PMIC\_CTRL1

PMIC\_CTRL2 AG17 NC\_S3X\_PMIC\_CTRL\_2

PMIC\_EXT\_CLK\_DIS AH20 S3X\_PMIC\_EXT\_CLK\_DIS

PMIC\_LOW\_PWR AD21 S3X\_PMIC\_LOW\_PWR

RET\_LPSR\_CLEAR AE17 S3X\_RET\_LPSR\_CLEAR

SPI\_CLK F11 S3X\_SPI\_CLK

SPI\_CS\* G12 SSD\_BOOT\_LB\_L 84 88 91

SPI\_MISO E11 S3X\_SPI\_MISO

SPI\_MOSI G10 S3X\_SPI\_MOSI

SPI\_NOR\_CLK E9 S3X\_BOOTSTRAP0

SPI\_NOR\_CS\* G11 NC\_S3X\_BOOTSTRAP1

SPI\_NOR\_S100 H10 ERN\_L 81

SPI\_NOR\_S01 C8 S3X\_BOOTSTRAP3

SPI\_NOR\_S02 F10 S3X\_BOOTSTRAP4

SPI\_NOR\_S03 G9 S3X\_BOOTSTRAP5

SPI\_NOR\_RFN E10 NC\_S3X\_BOOTSTRAP6

UART0\_RX B8 S3X\_SMC\_OOB\_UART\_R2D

UART0\_TX A8 S3X\_SMC\_OOB\_UART\_D2R

UART1\_RX B7 S3X\_DEBUG\_UART\_R2D

UART1\_TX A7 S3X\_DEBUG\_UART\_D2R

RETEN\_EN H18 S3X\_RET\_EN\_L

DDR\_PHY\_DATA\_VREF AD12 S3X\_DDR\_PHY\_DATA\_VREF

DDR\_PHY\_ZQ G21 S3X\_DDR\_PHY\_ZQ

DDR\_VREF1\_ALIVE B23 S3X\_DDR\_VREF1\_ALIVE

DDR\_VREF1\_ZQ J20 S3X\_DDR\_VREF1\_ZQ

DDR\_VREF0 AH16 S3X\_DDR\_VREF0

DDR\_ZQ B26 S3X\_DDR\_ZQ

DDR\_CKE0 C20 S3X\_DDR\_CKE0

DDR\_CKE1 C21 S3X\_DDR\_CKE1

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_LB\_P<0> C8610 1 2 PCIE\_SSD\_D2R\_C\_P<0>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_LB\_N<0> C8611 1 2 PCIE\_SSD\_D2R\_C\_N<0>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_P<1> C8613 1 2 PCIE\_SSD\_D2R\_C\_P<1>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_N<1> C8612 1 2 PCIE\_SSD\_D2R\_C\_N<1>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_P<2> C8614 1 2 PCIE\_SSD\_D2R\_C\_P<2>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_N<2> C8615 1 2 PCIE\_SSD\_D2R\_C\_N<2>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_P<3> C8617 1 2 PCIE\_SSD\_D2R\_C\_P<3>

GND\_VOID=TRUE 0.22UF GND\_VOID=TRUE

PCIE\_SSD\_D2R\_N<3> C8616 1 2 PCIE\_SSD\_D2R\_C\_N<3>

104 88 87 86 85 84 82 81 19 PPIV8 SSD\_COLD

R8604 100K 0.1% 1/20W MF 201

R8676 10K 5% 1/20W MF 201

R8677 10K 5% 1/20W MF 201

R8674 1K 5% 1/20W MF 201

S3XCLK:EXT

S3XCLK:EXT R8698 1 33 2 SYSCI 1/20W MF 201 PLACE\_NEAR=U1900.1612.0MM

S3XCLK:INT

R8609 1K 5% 1/20W MF 201

R8699 0 5% 1/20W MF 201 S3XCLK:INT

R8624 10K 1 2

R8612 10K 1 2

104 88 87 86 85 84 82 81 19 PPIV8 SSD\_COLD

NAND\_CFG0 R8616 10K 5% 1/20W MF 201

NAND\_CFG2 R8617 10K 5% 1/20W MF 201

NAND\_CFG1 R8618 10K 5% 1/20W MF 201

R8660 10K 5% 1/20W MF 201

CAPACIT0 R8662 10K 5% 1/20W MF 201

CAPACIT1 R8663 10K 5% 1/20W MF 201

CAPACIT2 R8664 10K 5% 1/20W MF 201

R8629 10K 1 2

SYNC\_MASTER=J79\_RUEKJOU

PAGE TITLE

S3X CORE PCIE

Apple Inc.

Apple logo

DRAWING NUMBER

051-00515

SITE

D

REVISION

9.0.0

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

BRANCH

dvt-fab09-0

PAGE

86

OF

145

SHEET

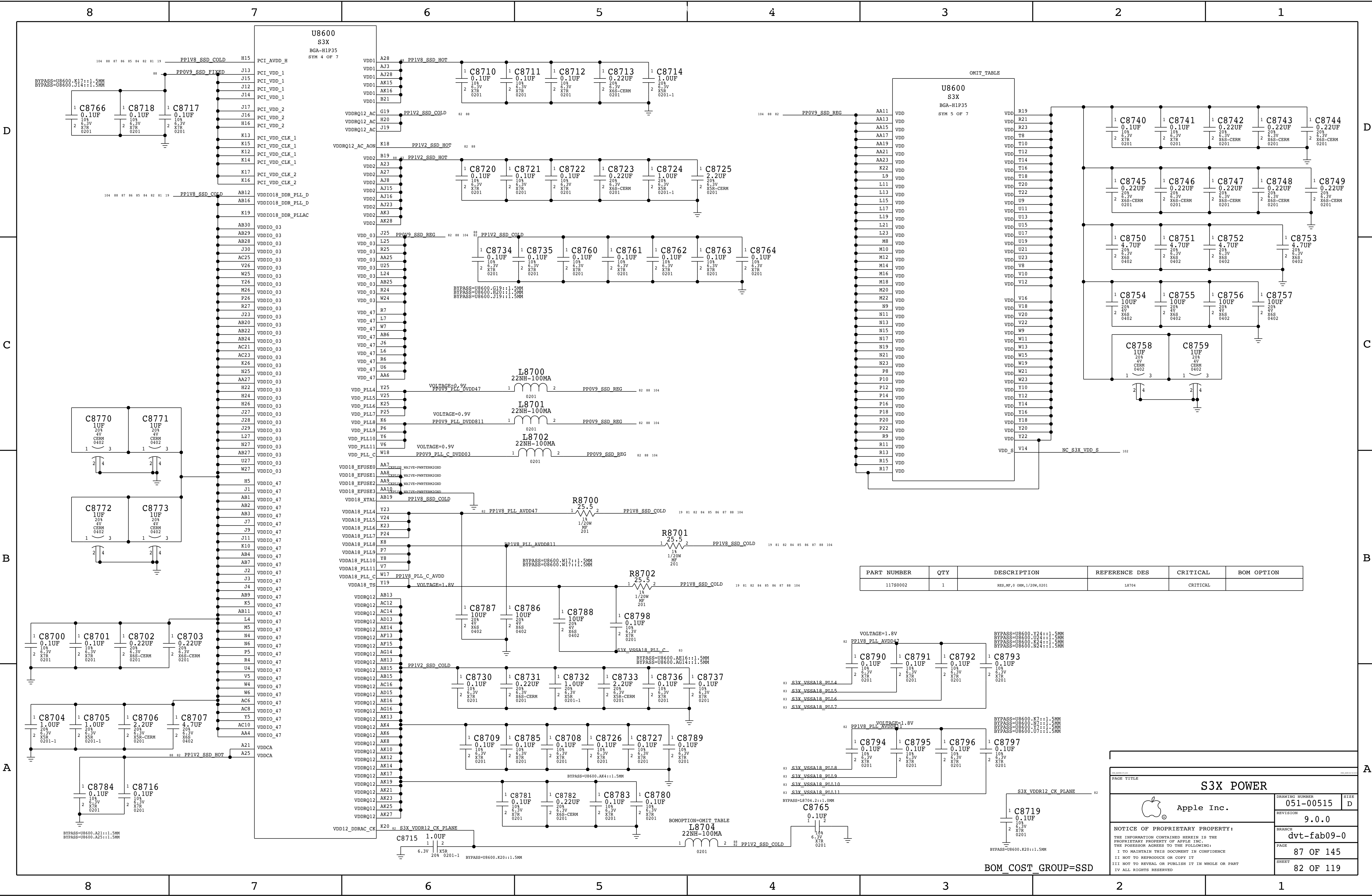
81

OF

119

BOM\_COST\_GROUP=SSD





PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
11750002	1	RES,MF,0 OHM,1/20W,0201	L8704	CRITICAL	

Apple Inc.

NOTICE OF PROPRIETARY PROPERTY:  
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  
1 TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  
11 NOT TO REPRODUCE OR COPY IT  
111 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART  
1111 ALL RIGHTS RESERVED

051-00515

9.0.0

dvt-fab09-0

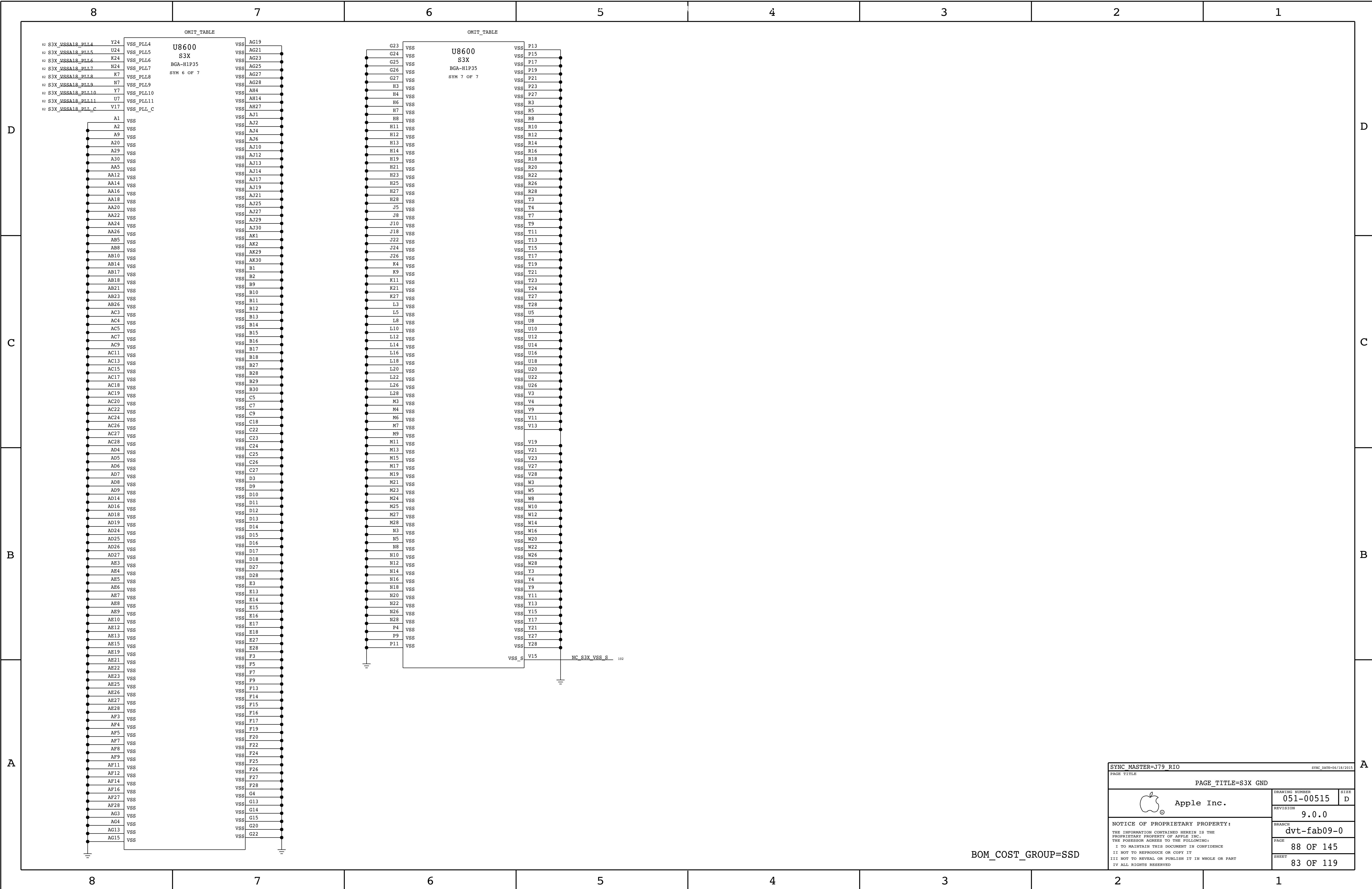
87 OF 145

82 OF 119

051-00515

D

BOM\_COST\_GROUP=SSD



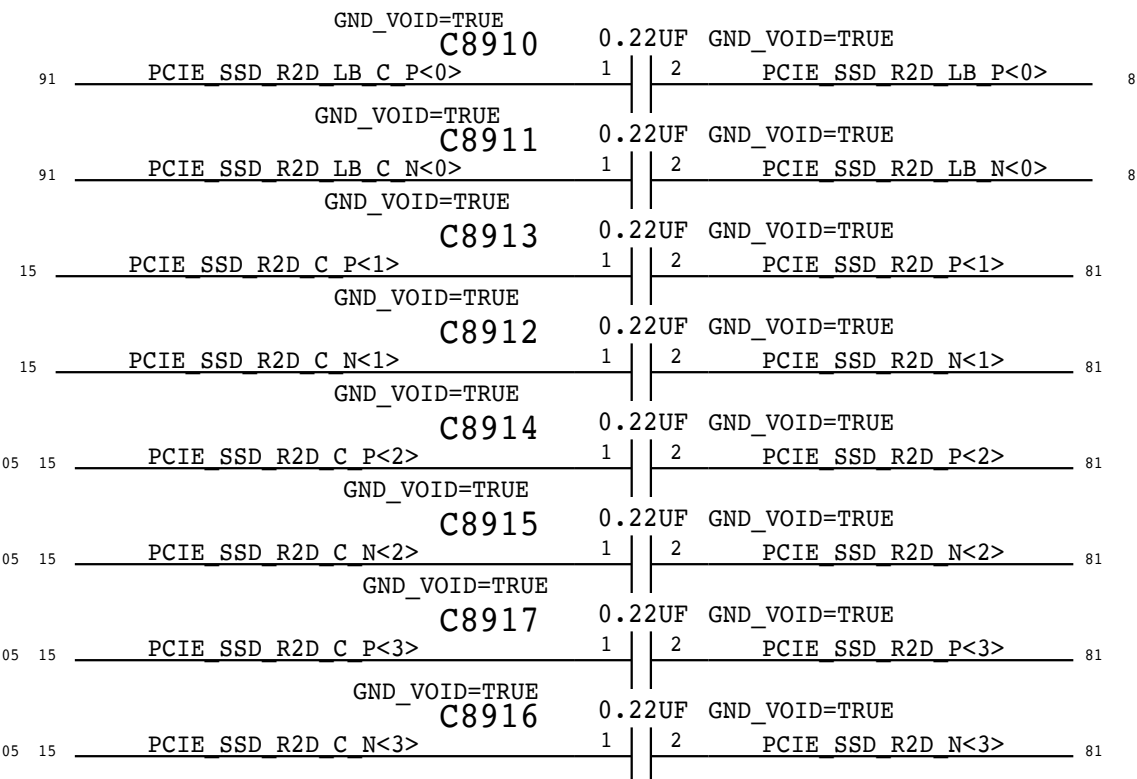
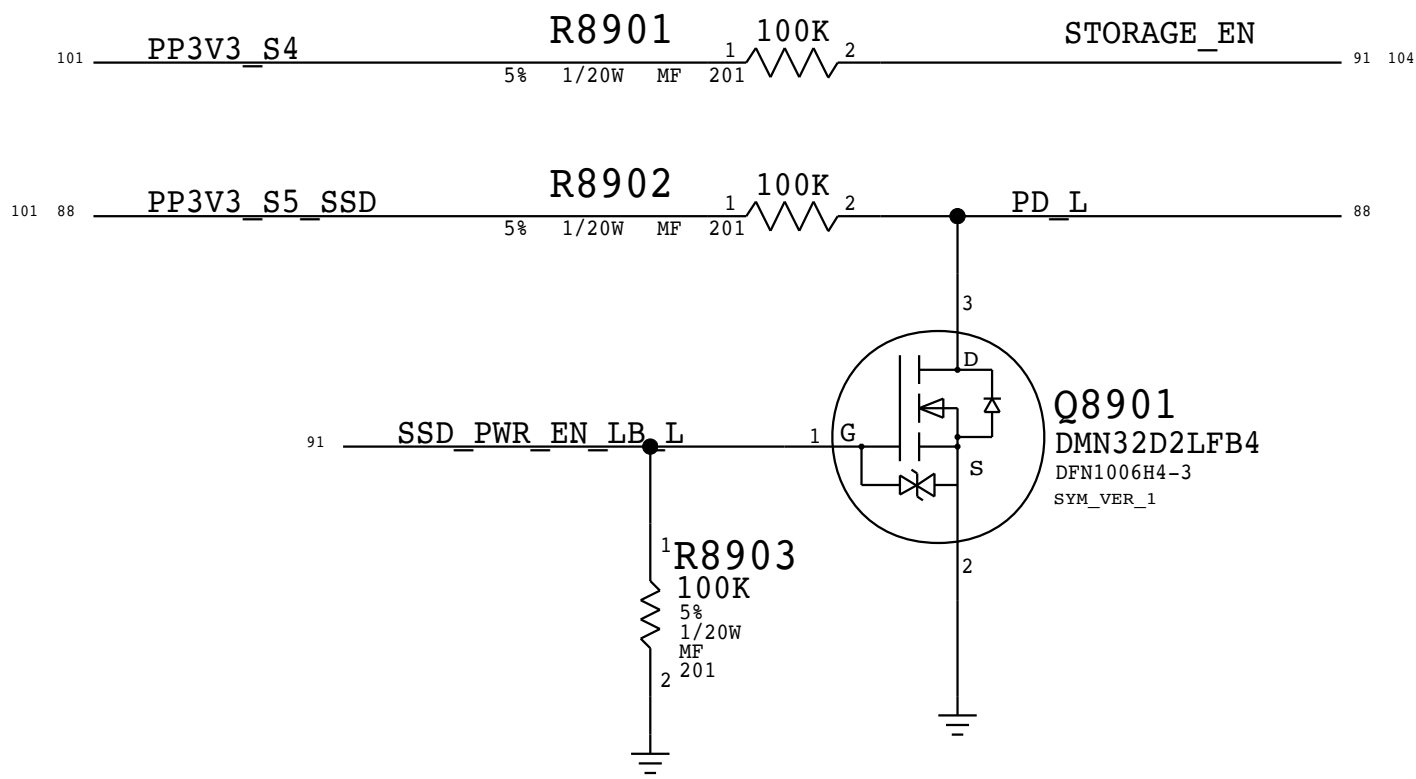
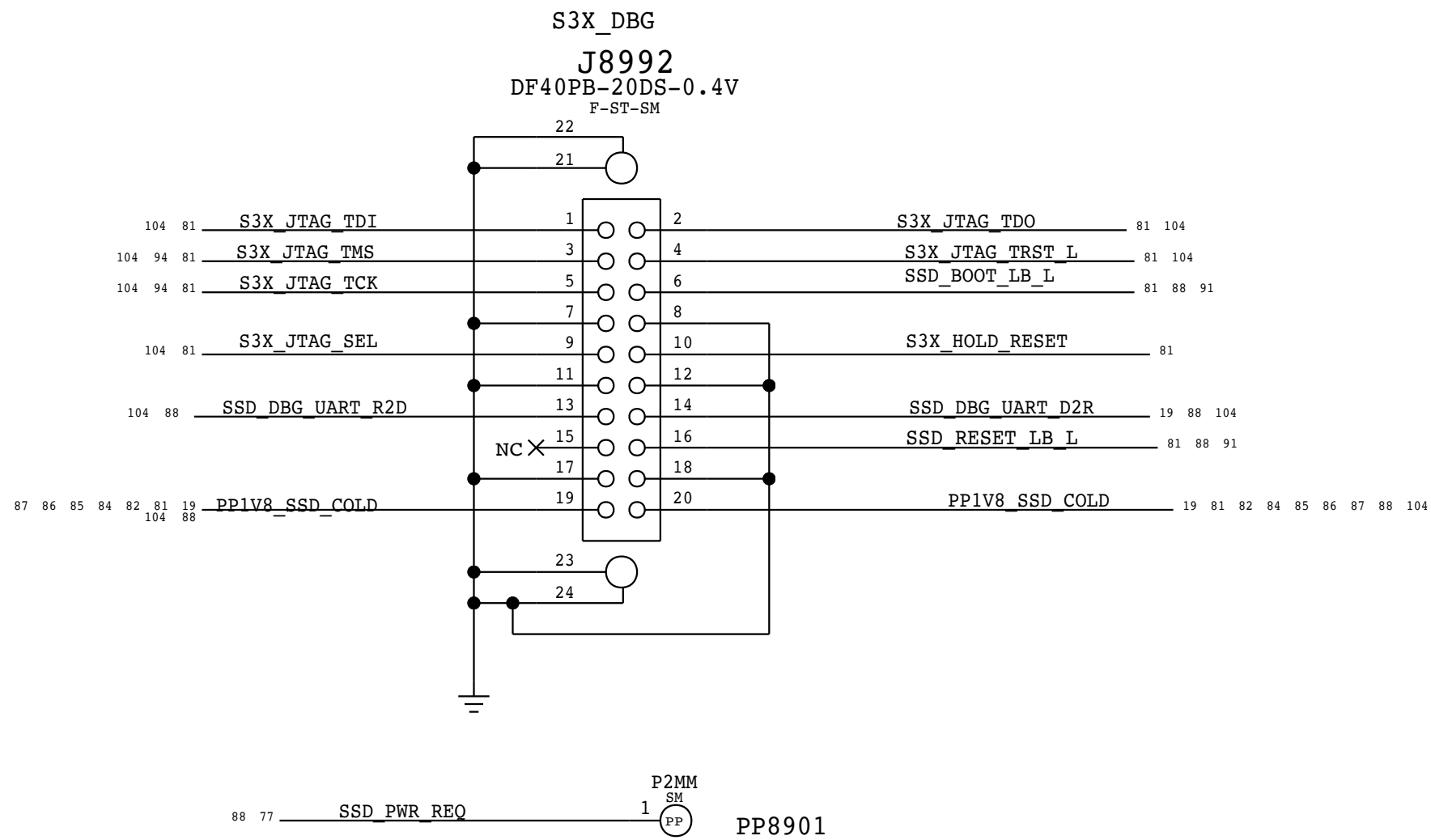
D

C

B

A

JTAG (DEBUG 1)




D

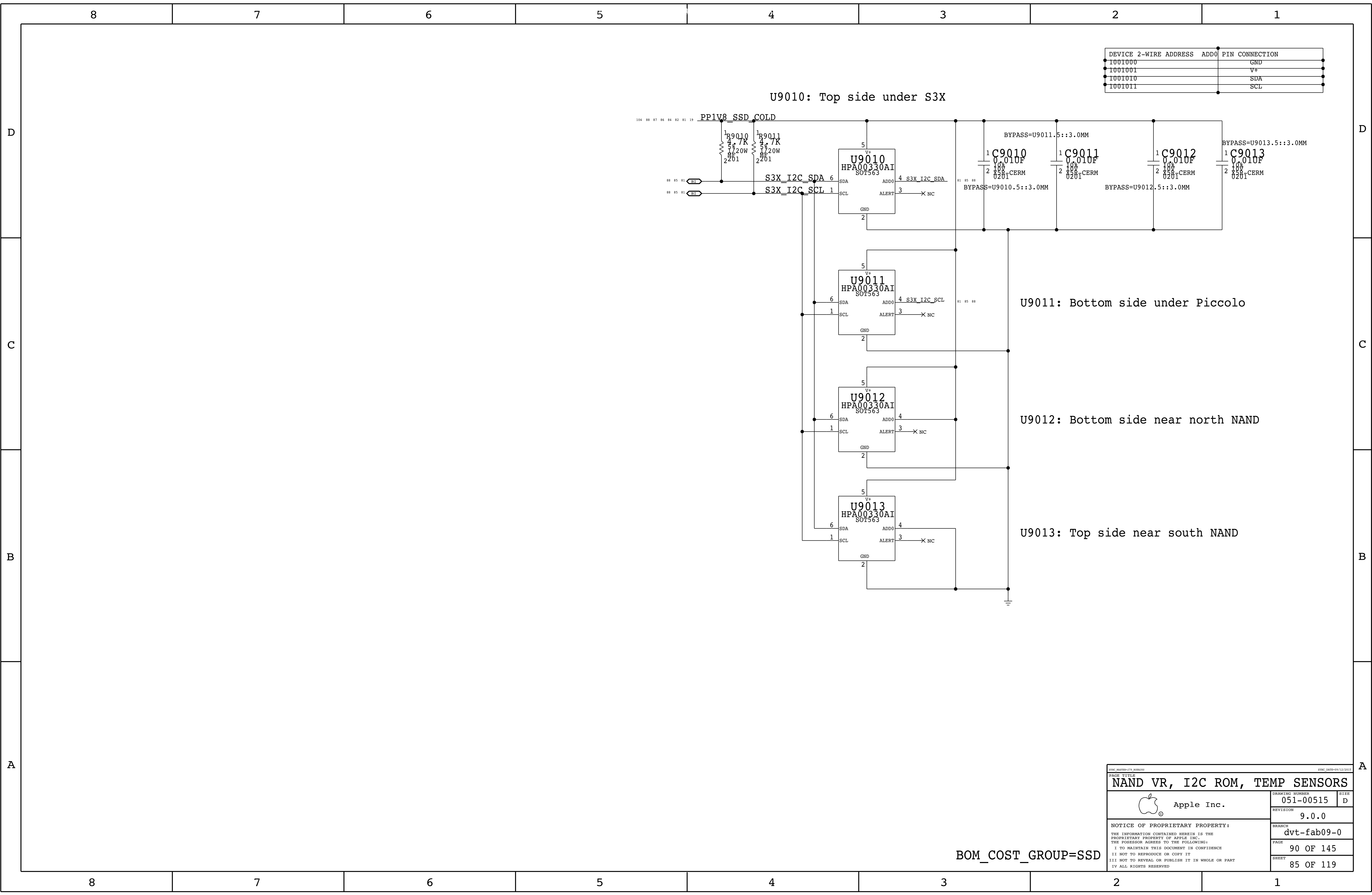
C

B

A

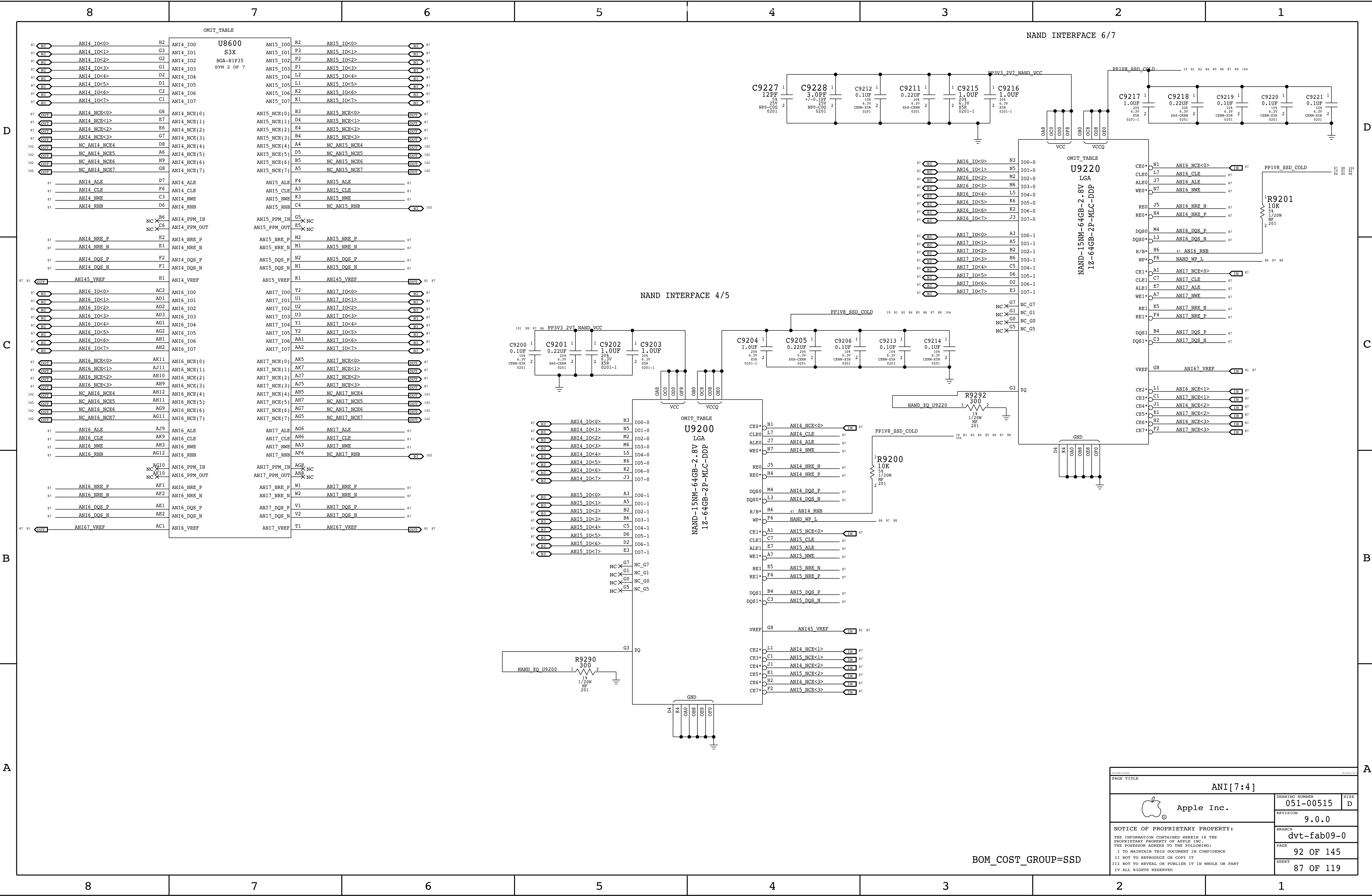
BOM\_COST\_GROUP=SSD

PAGE TITLE		
Connector		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
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	BRANCH	dvt-fab09-0
	PAGE	89 OF 145
	SHEET	84 OF 119











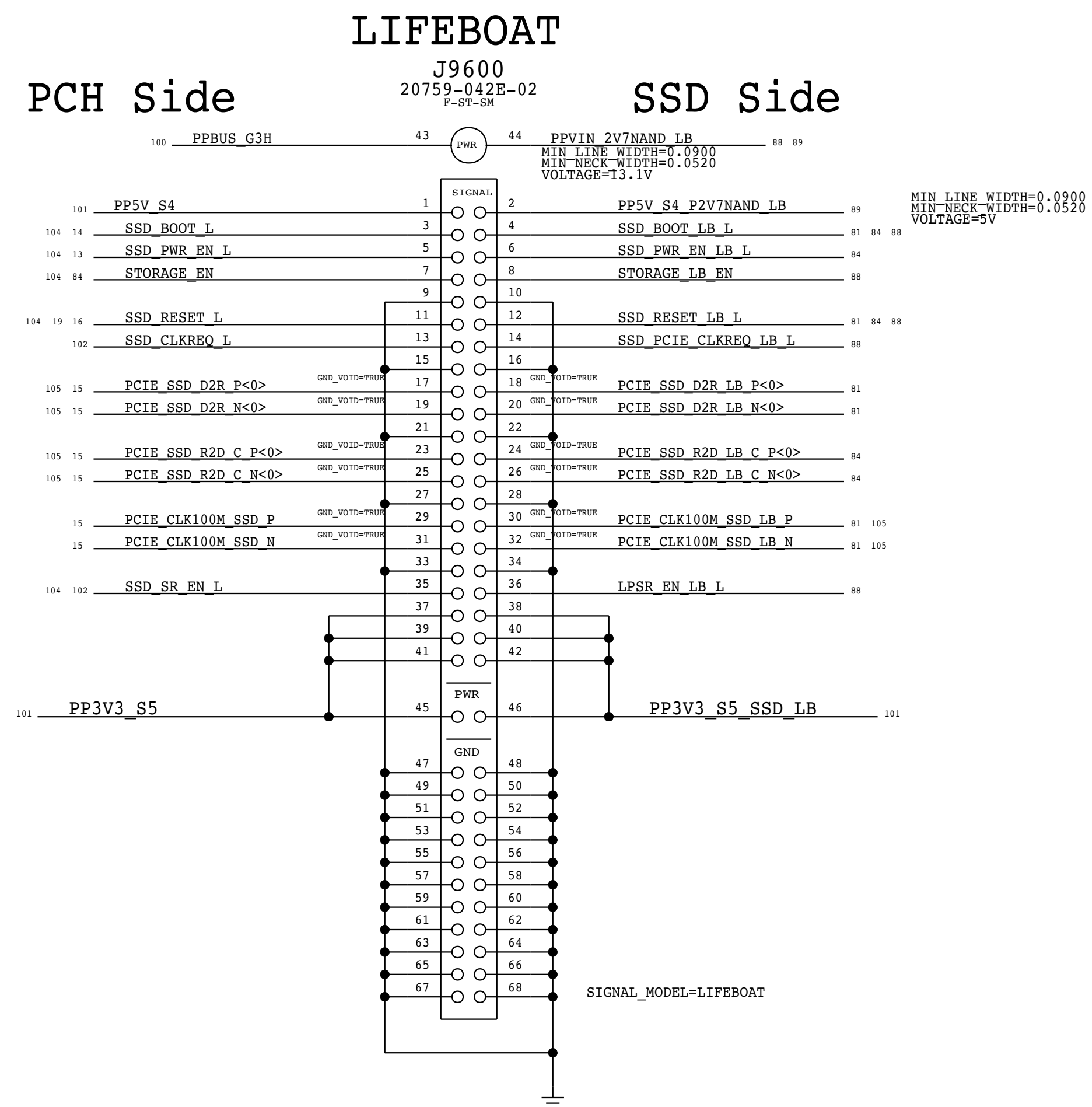




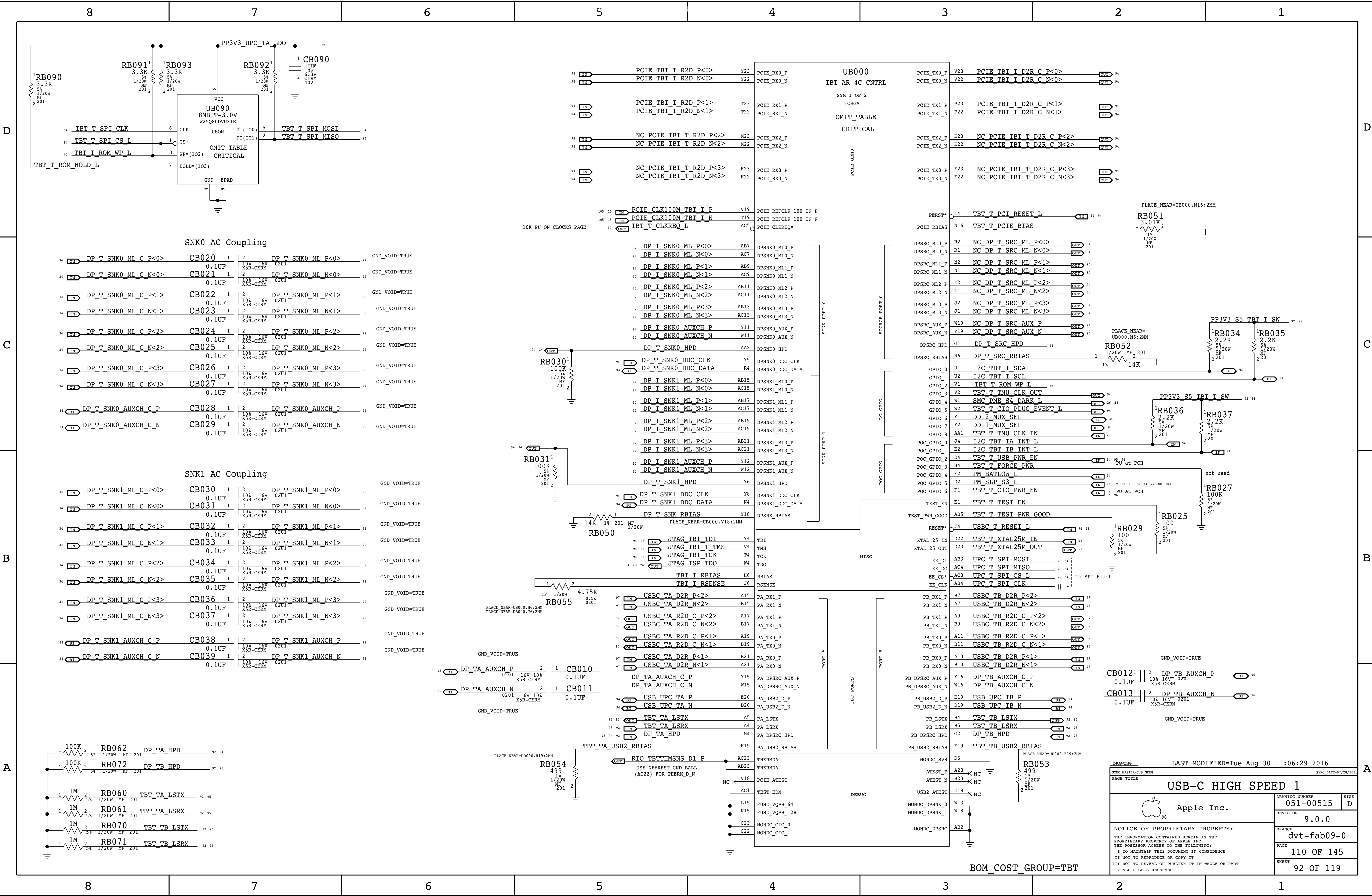
8		7		6		5		4		3		2		1			
D																D	
C																C	
B																B	
A																A	
8		7		6		5		4		3		2		1			

SYNC_MASTER=J14		SYNC_DATE=10/23/2012							
PAGE TITLE									
Empty									
 Apple Inc.		DRAWING NUMBER		051-00515		SIZE		D	
		REVISION		9.0.0					
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		BRANCH		dvt-fab09-0					
		PAGE		95 OF 145					
		SHEET		90 OF 119					

SYNC_MASTER=J14			SYNC_DATE=10/23/2012		
PAGE TITLE			Empty		
 Apple Inc.®			DRANTING NUMBER	051-00515	
			REVISION	9.0.0	
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			BRANCH	dvt-fab09-0	
			PAGE	95 OF 145	
			SHEET	90 OF 119	







DRAWING

LAST MODIFIED=

Tue Aug 30 11:06:29 2016

SYNC\_MASTER=

J79\_GREG

PAGE TITLE

SYNC\_DATE=

07/28/2015

051-00515

STR

D

9.0.0

REVISION

dvt-fab09-0

BRANCH

110 OF 145

PAGE

92 OF 119

SHEET

NOTICE OF PROPRIETARY PROPERTY:

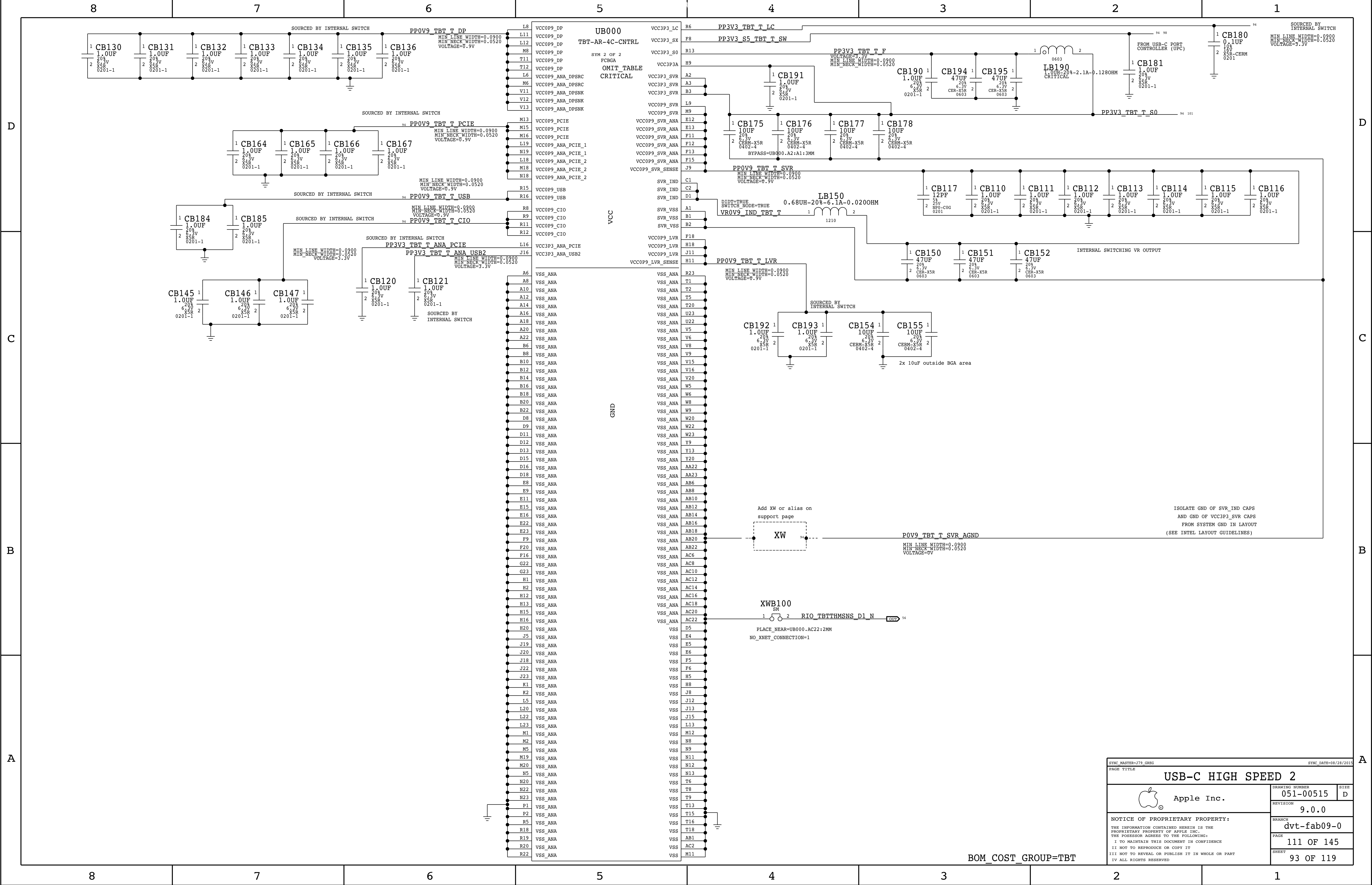
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:


I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE

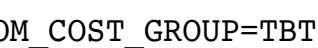
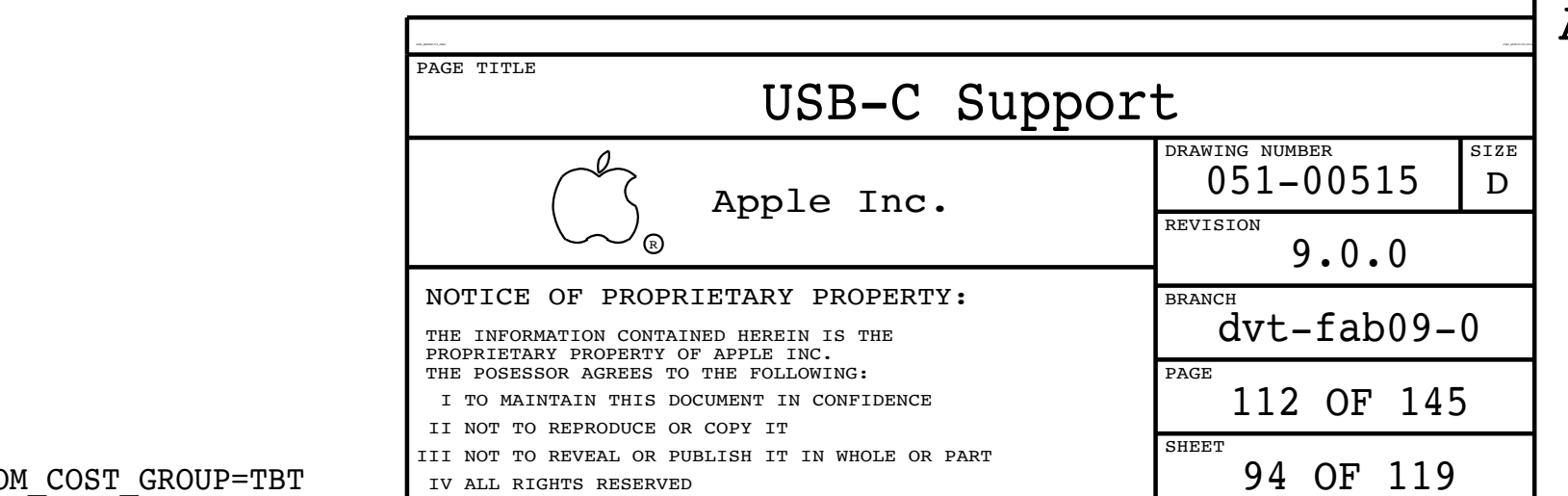
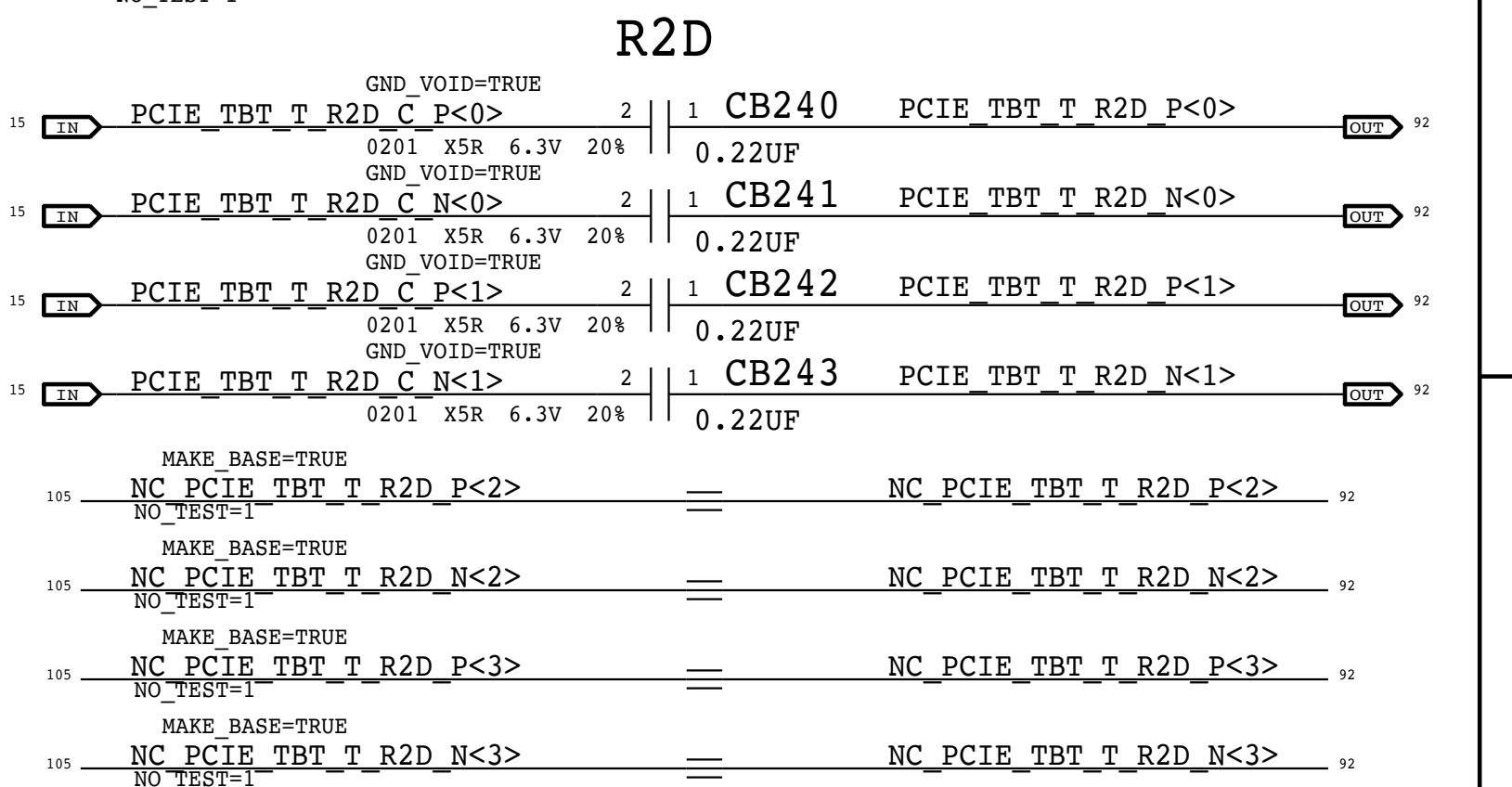
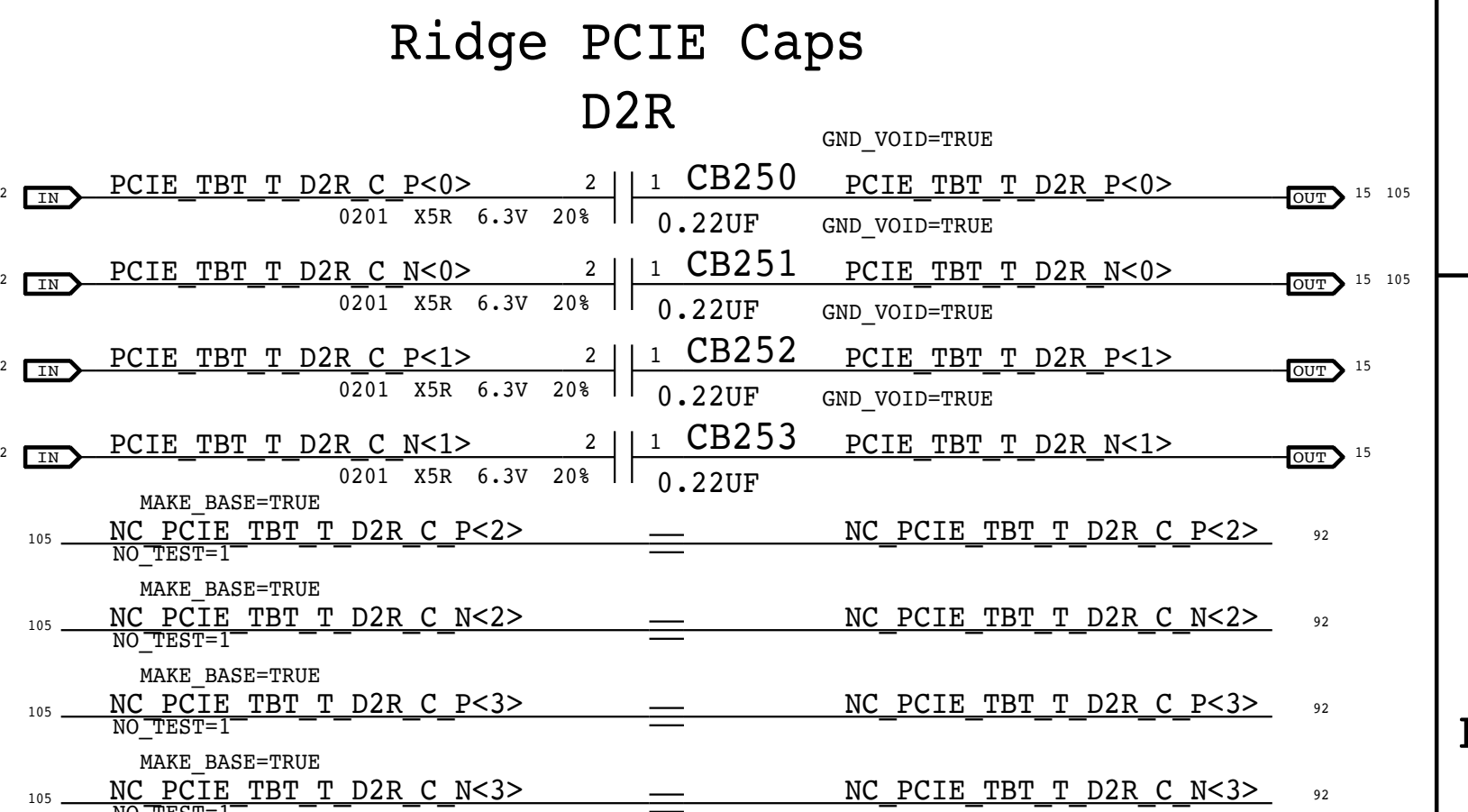
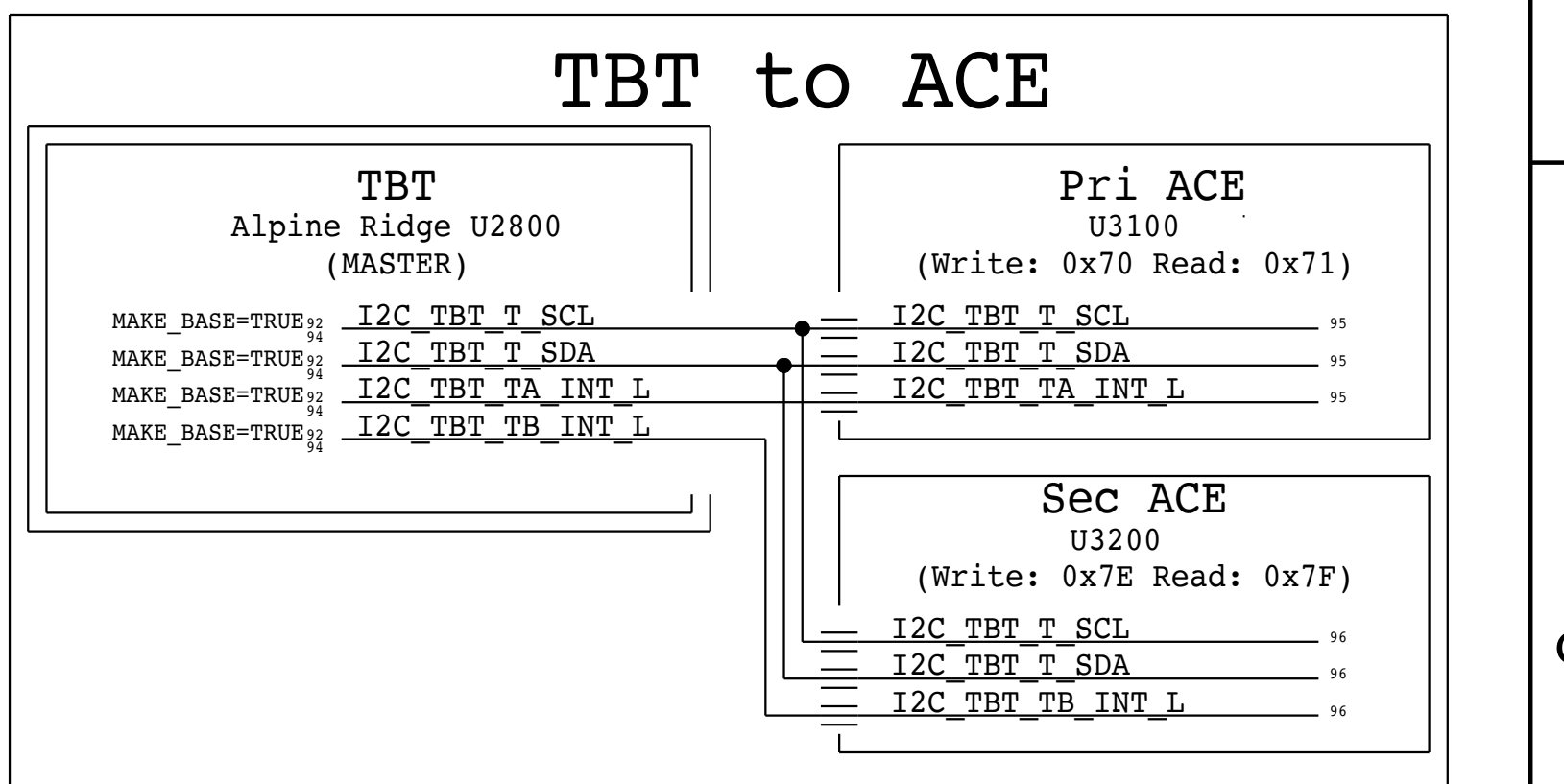
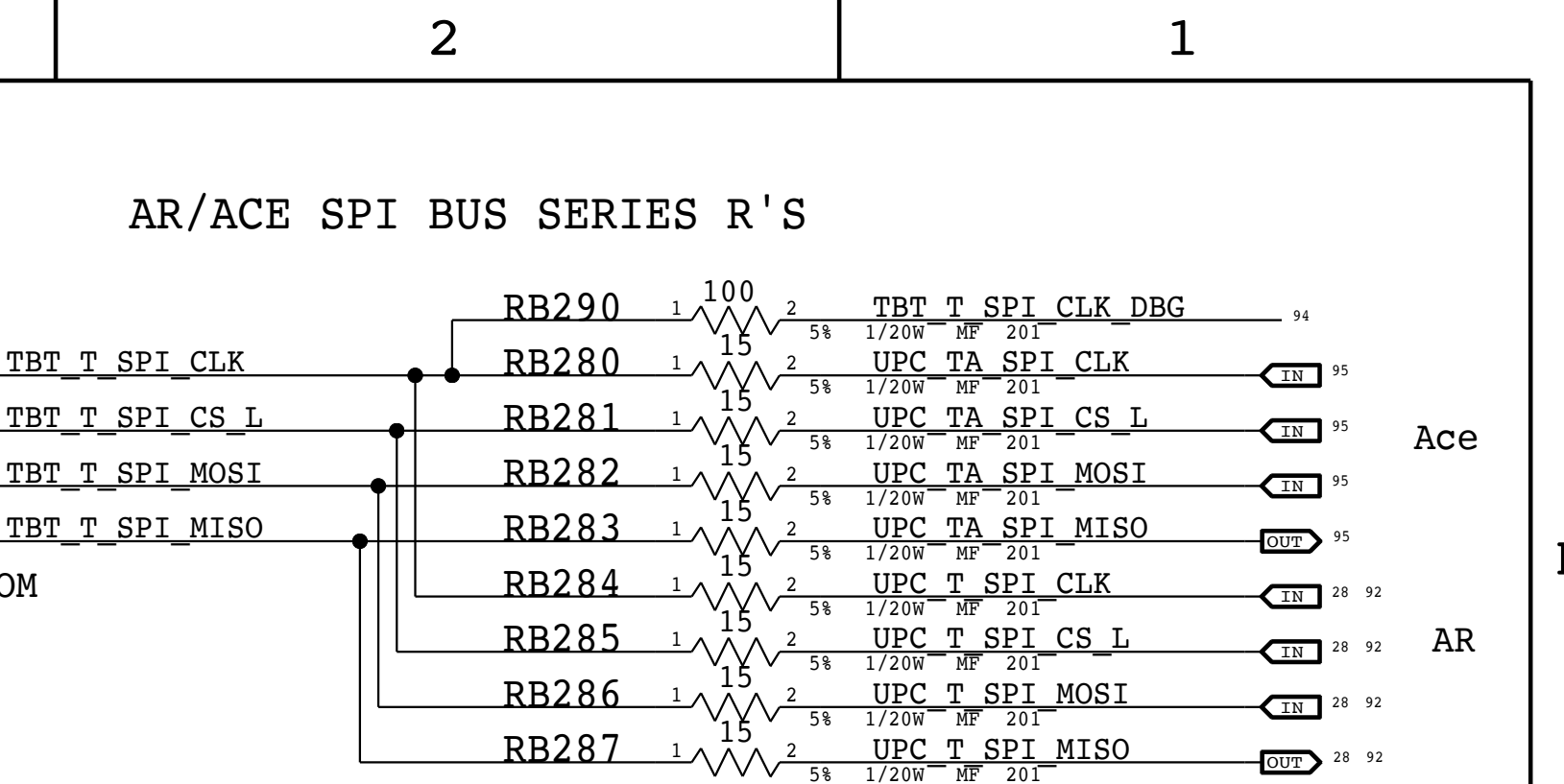
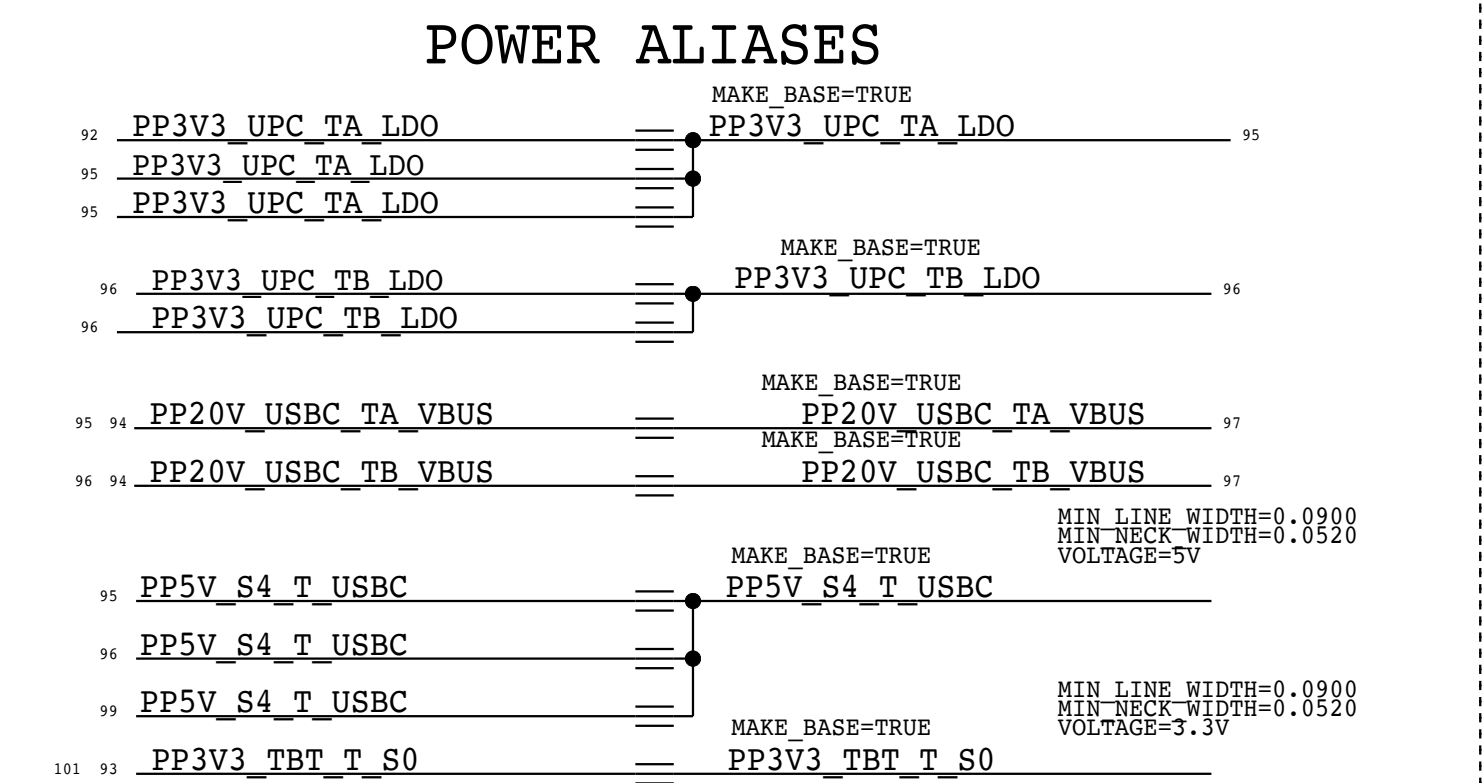
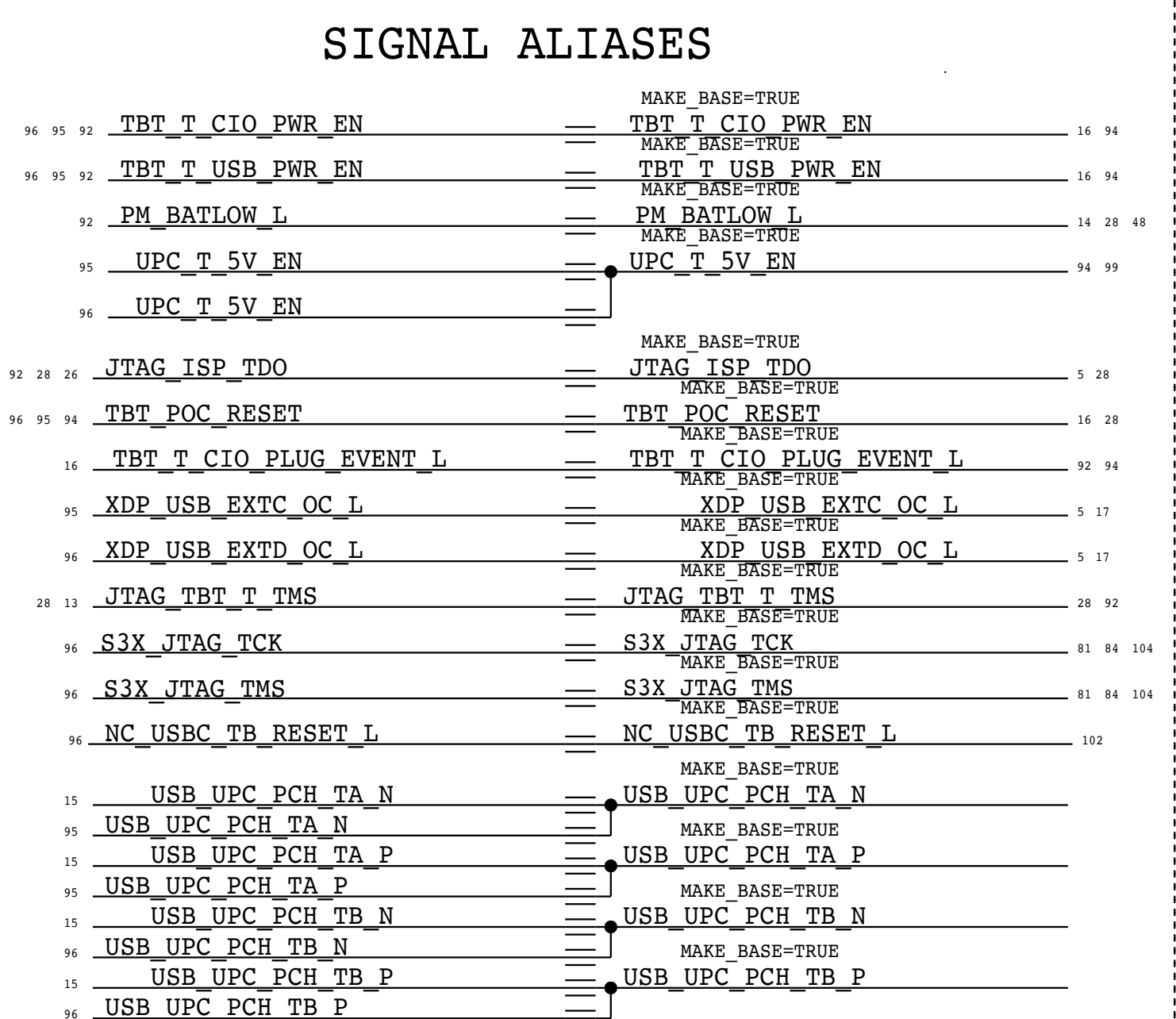
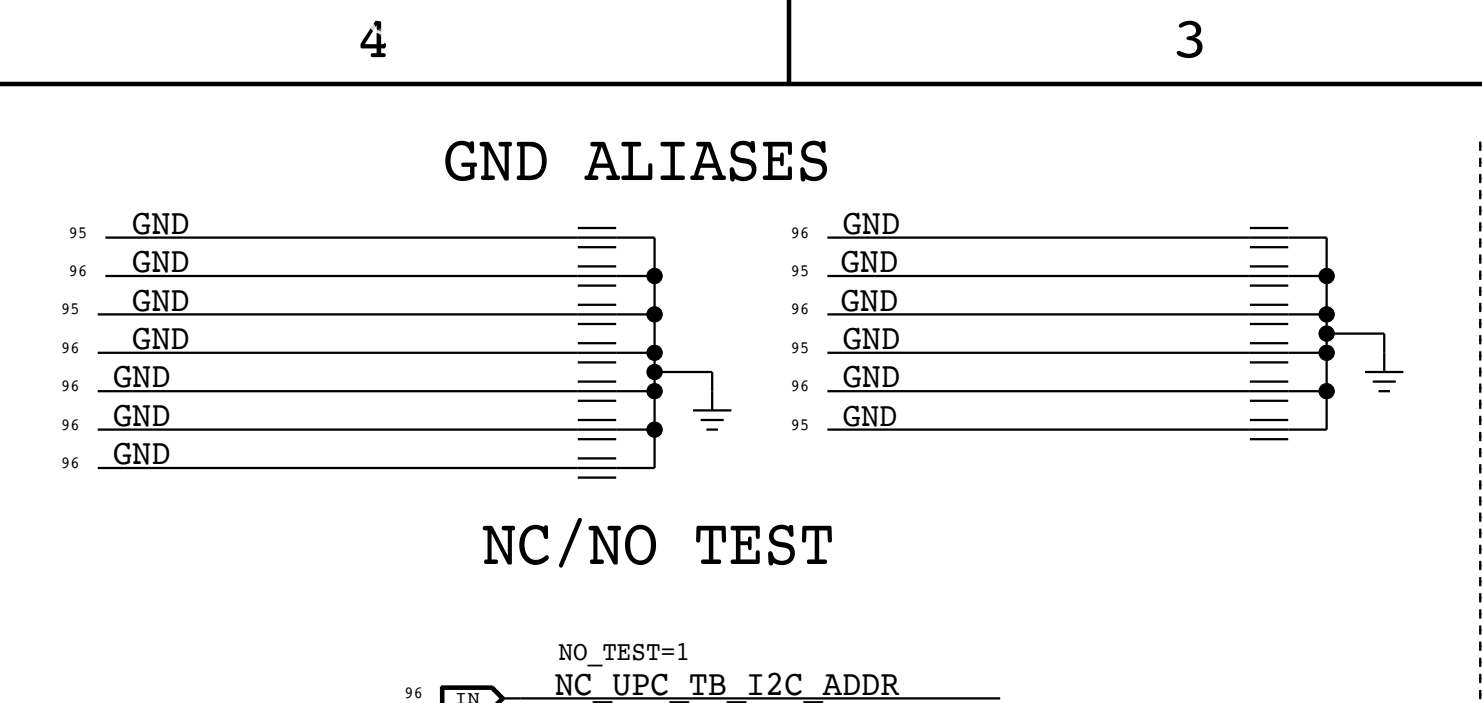
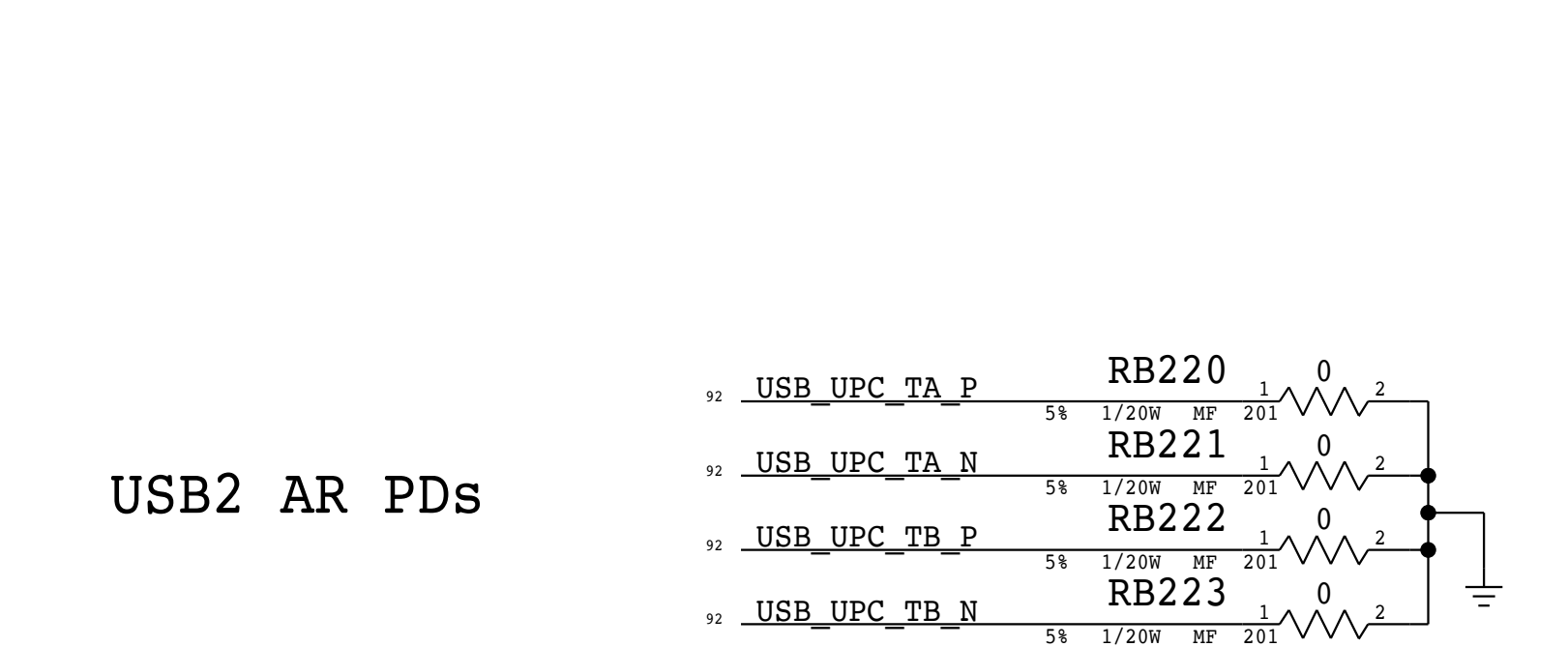
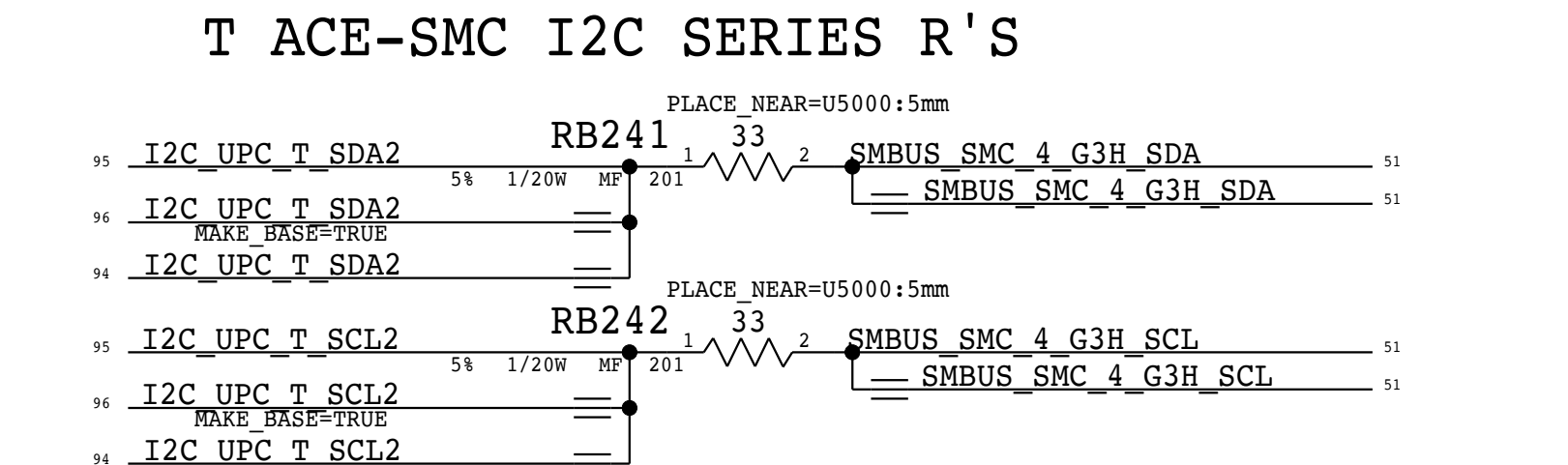
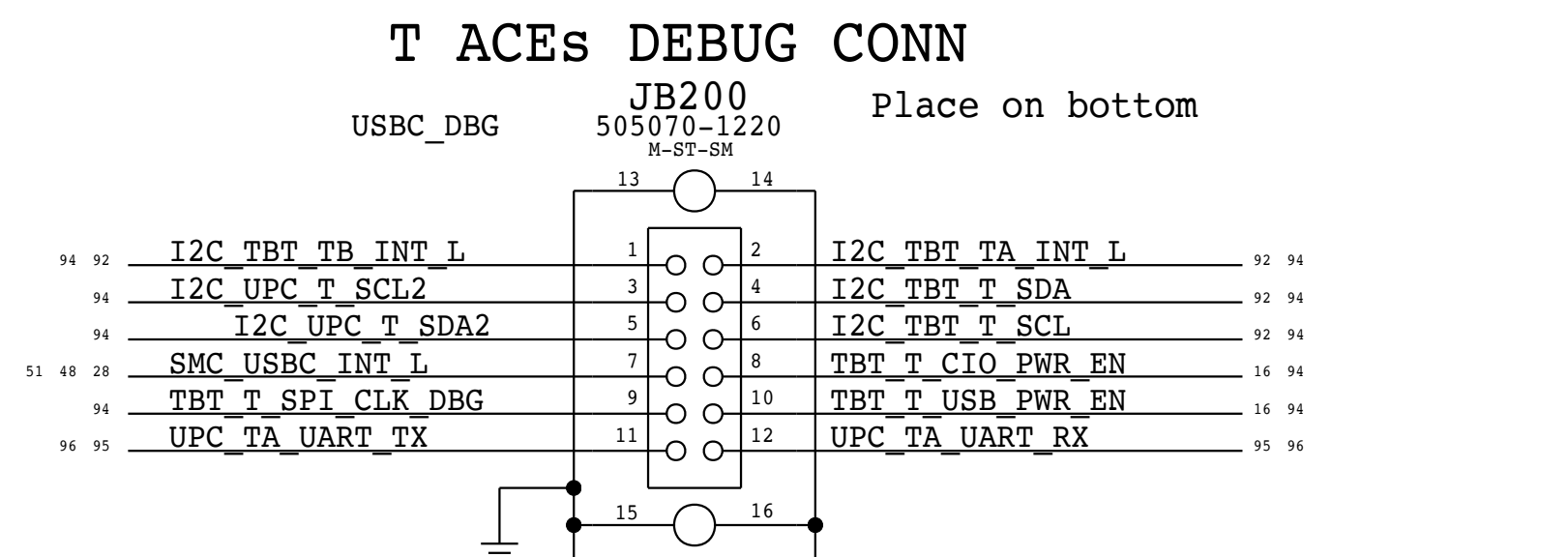
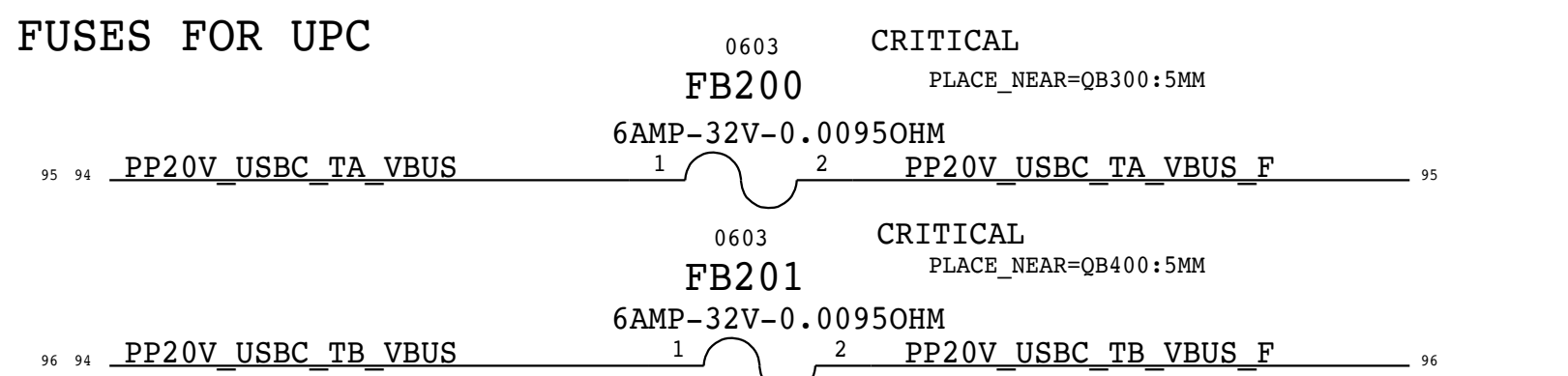
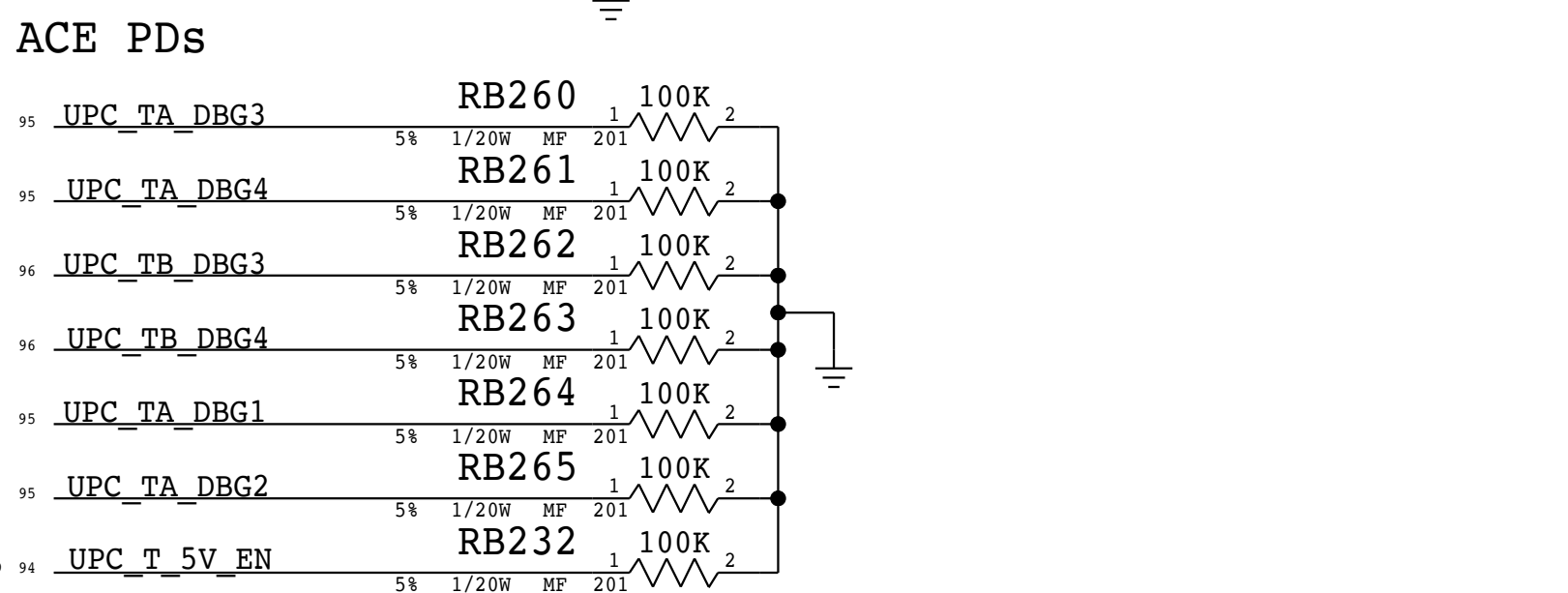
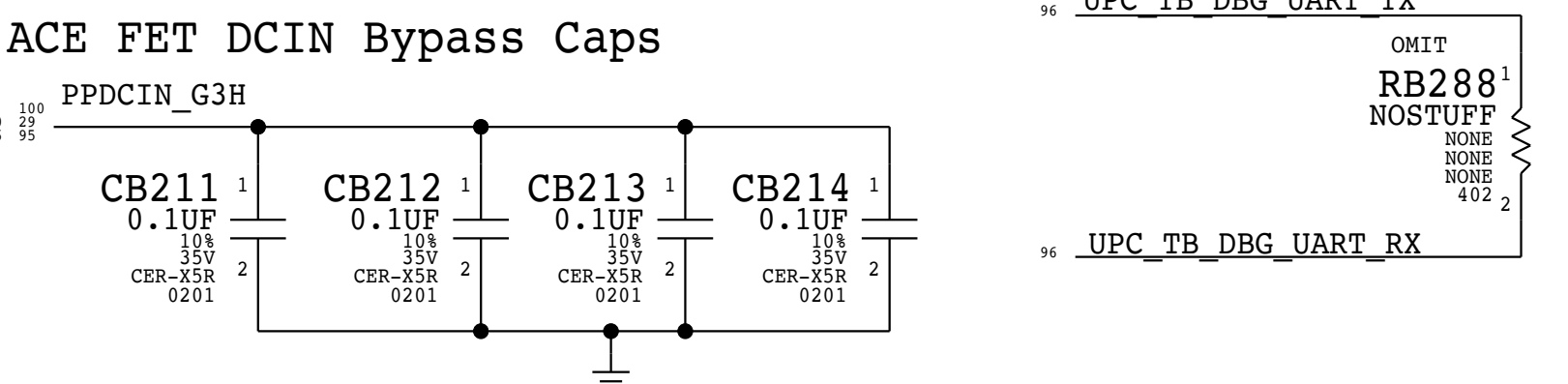
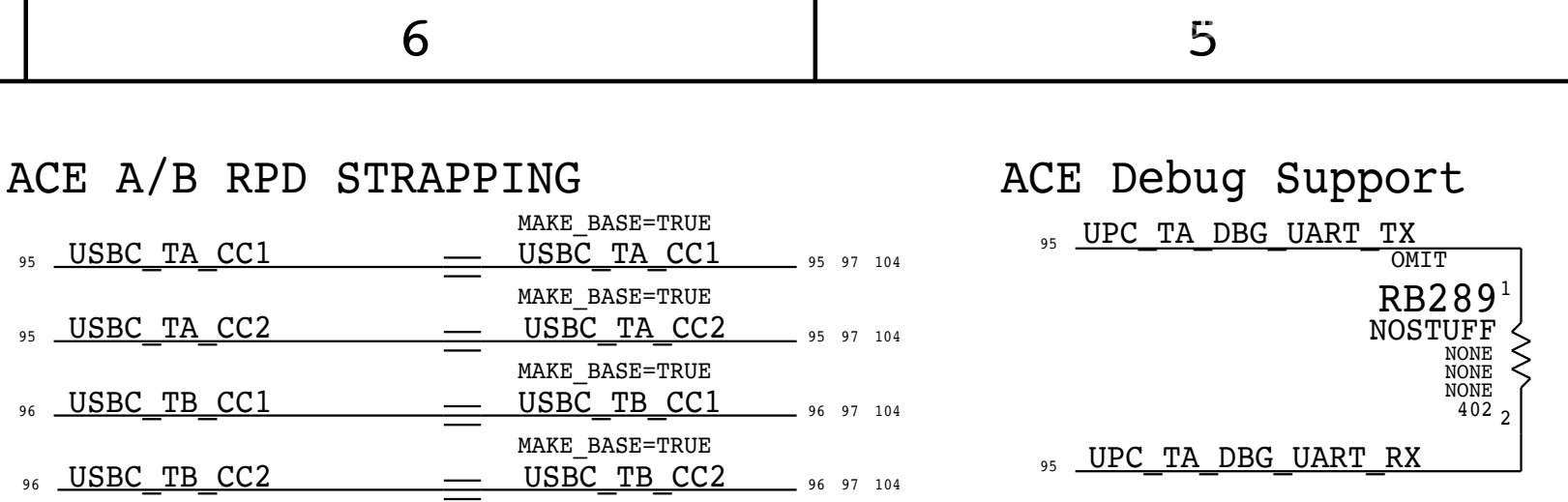
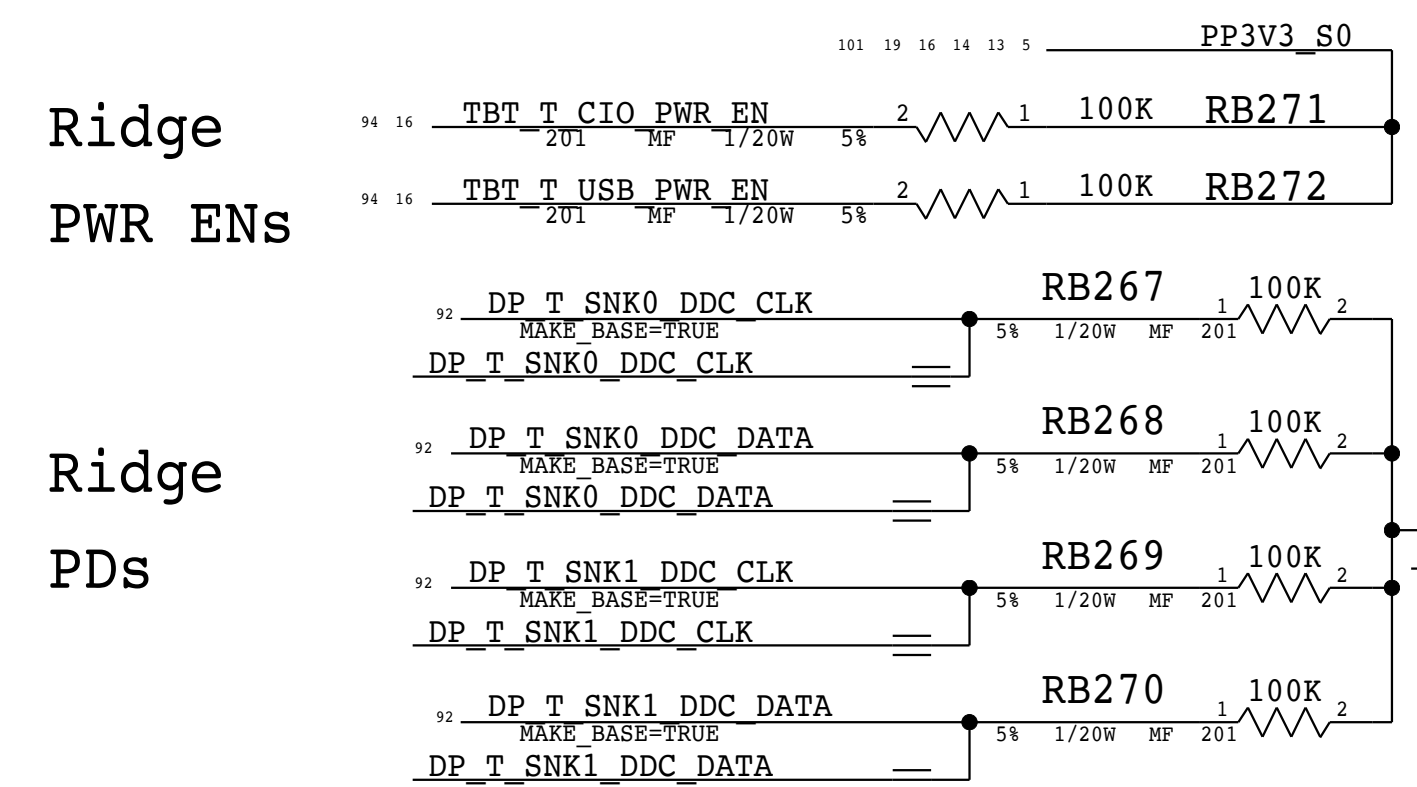
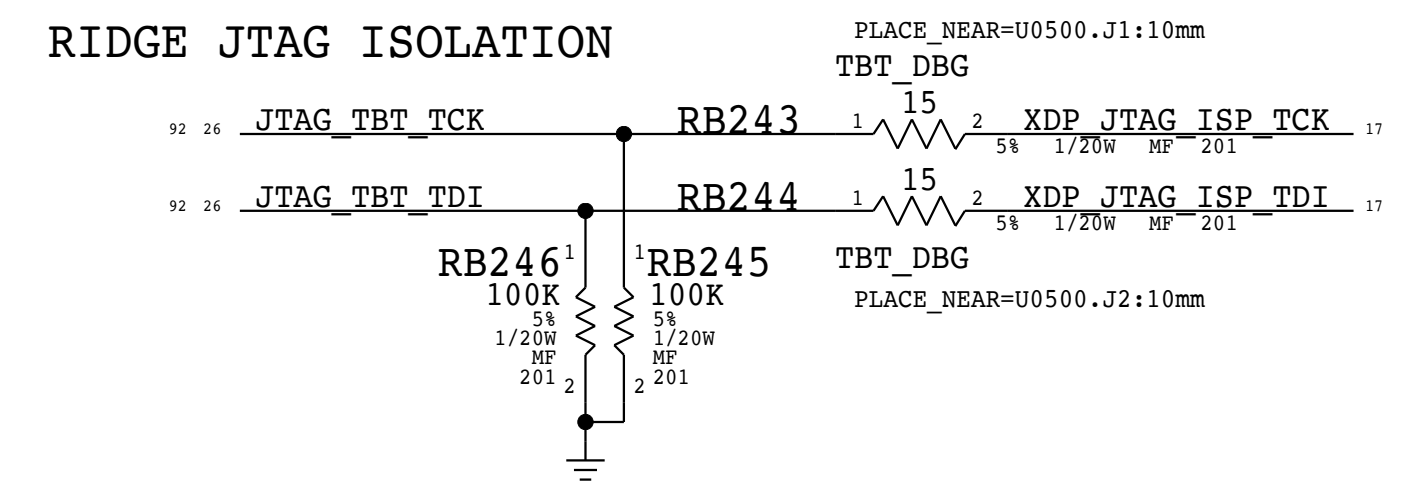
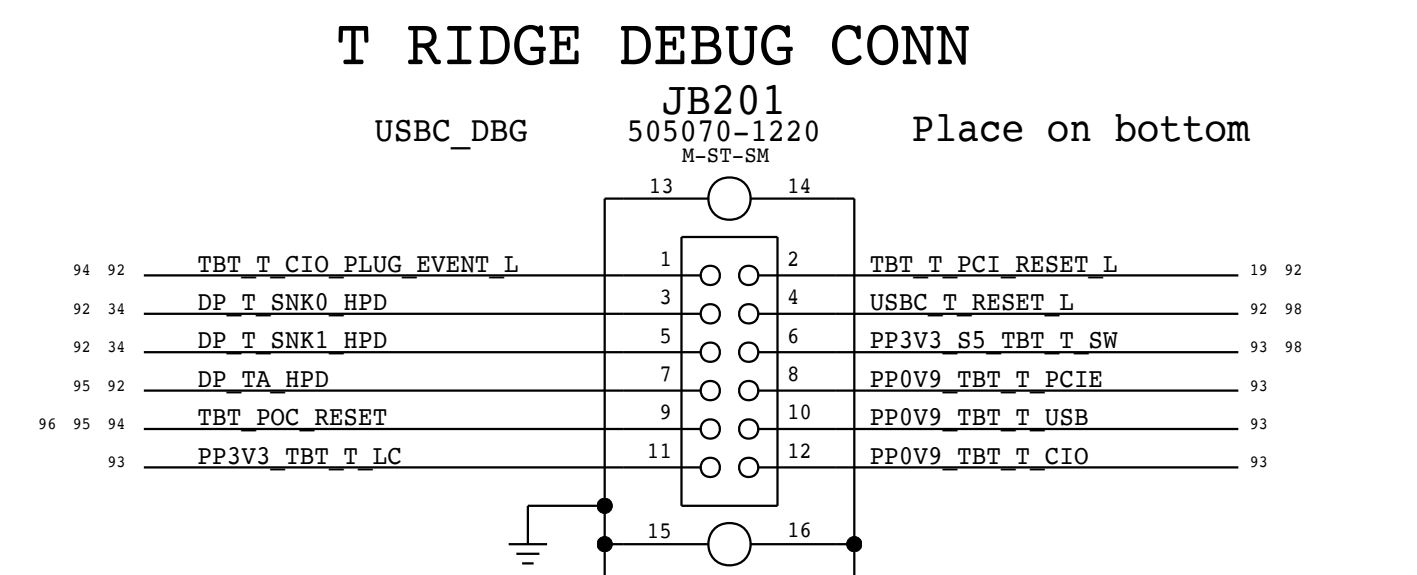
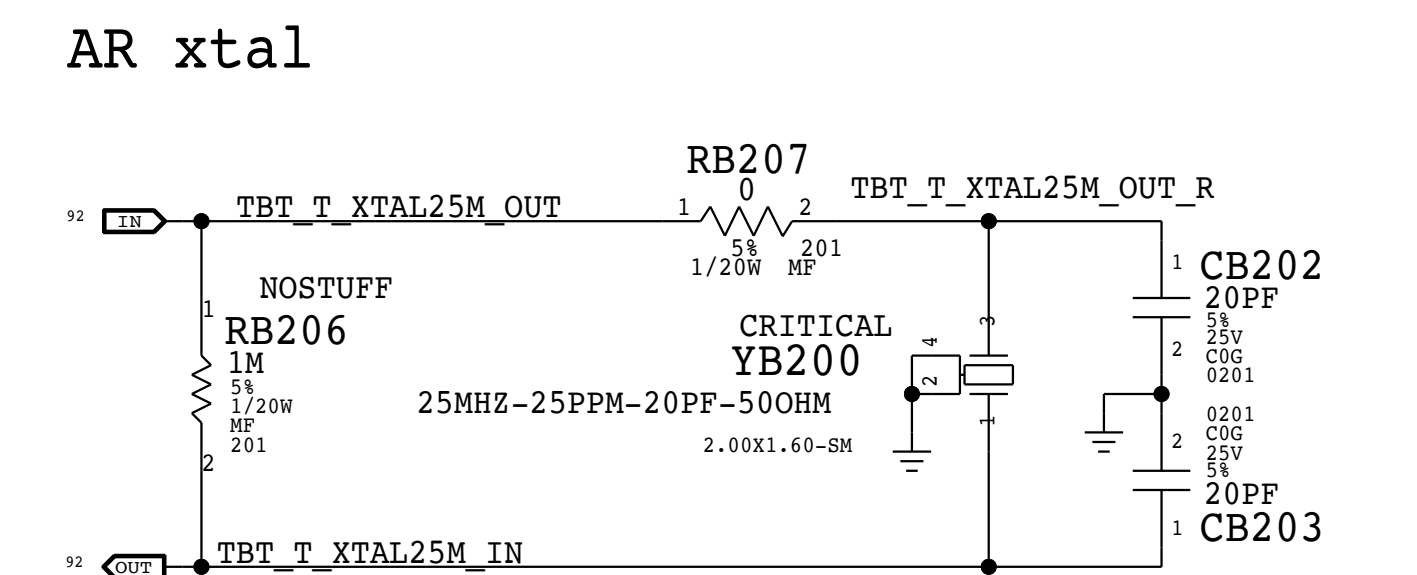
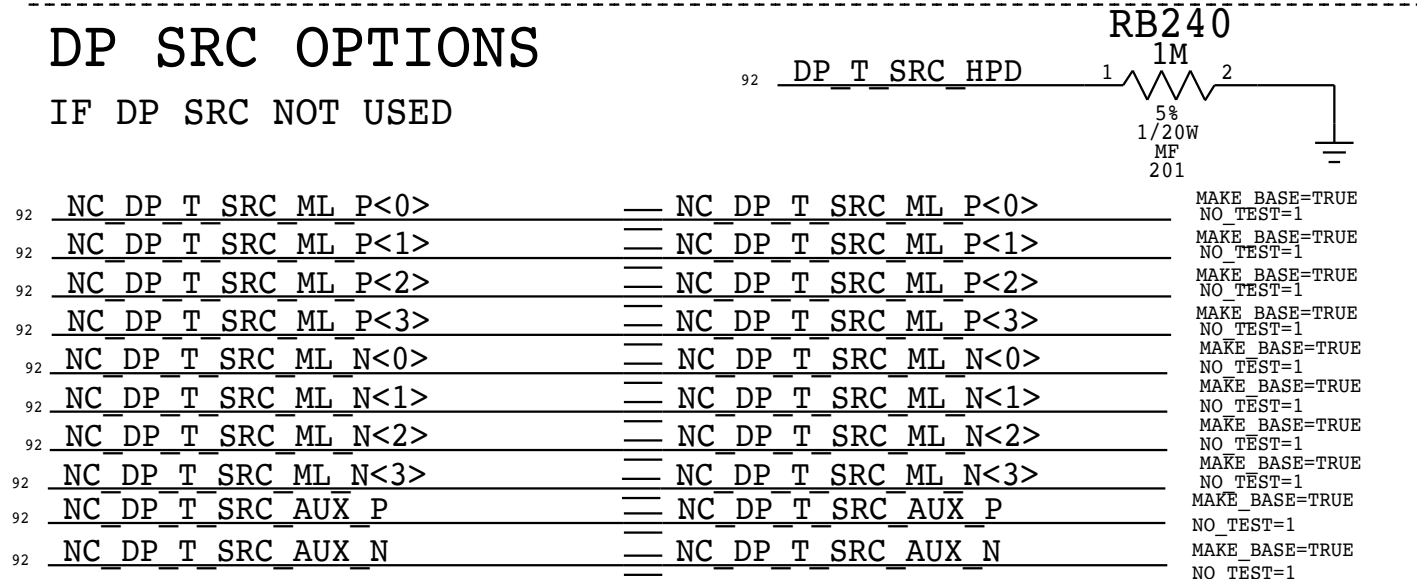
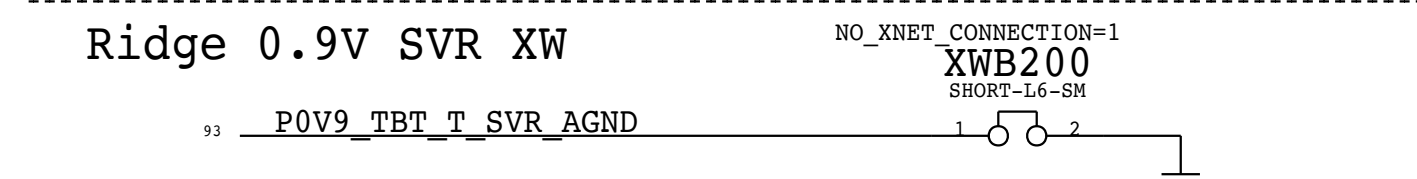
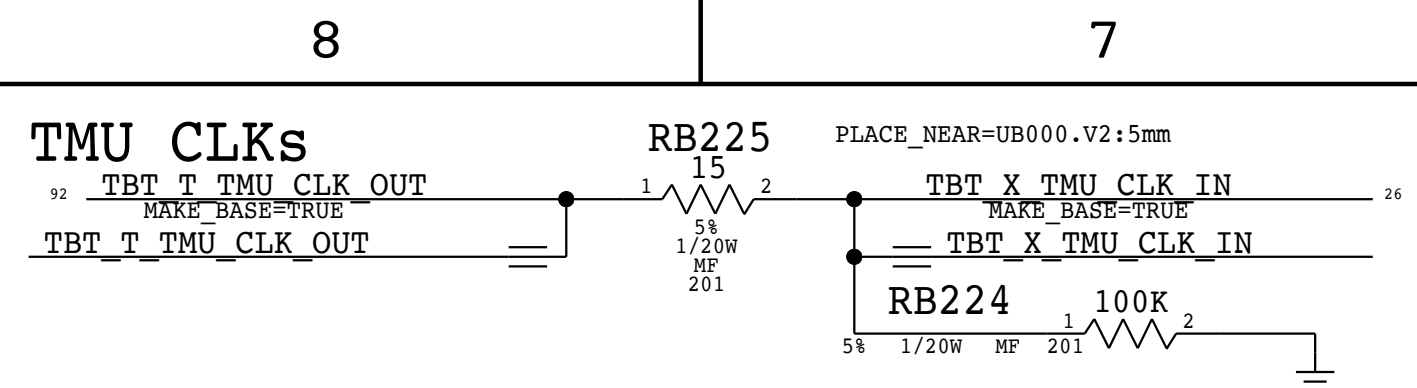
II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART

IV ALL RIGHTS RESERVED

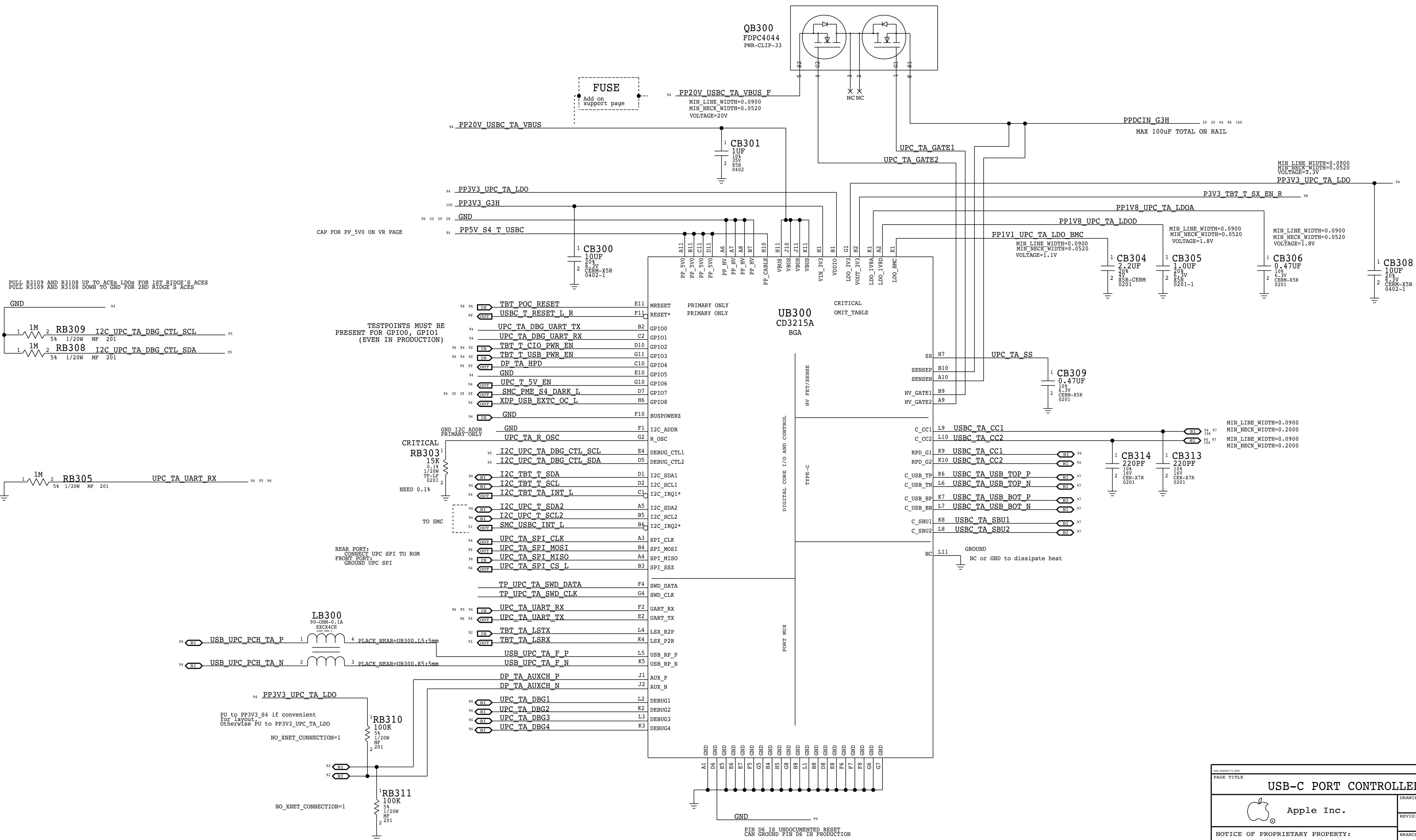


SYNC_MASTER=J79_GREG		SYNC_DATE=08/28/2015	
PAGE TITLE			
USB-C HIGH SPEED 2			
	Apple Inc.	DRAWING NUMBER	051-00515
		REVISION	9.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH	dvt-fab09-0
		PAGE	111 OF 145
		SHEET	93 OF 119






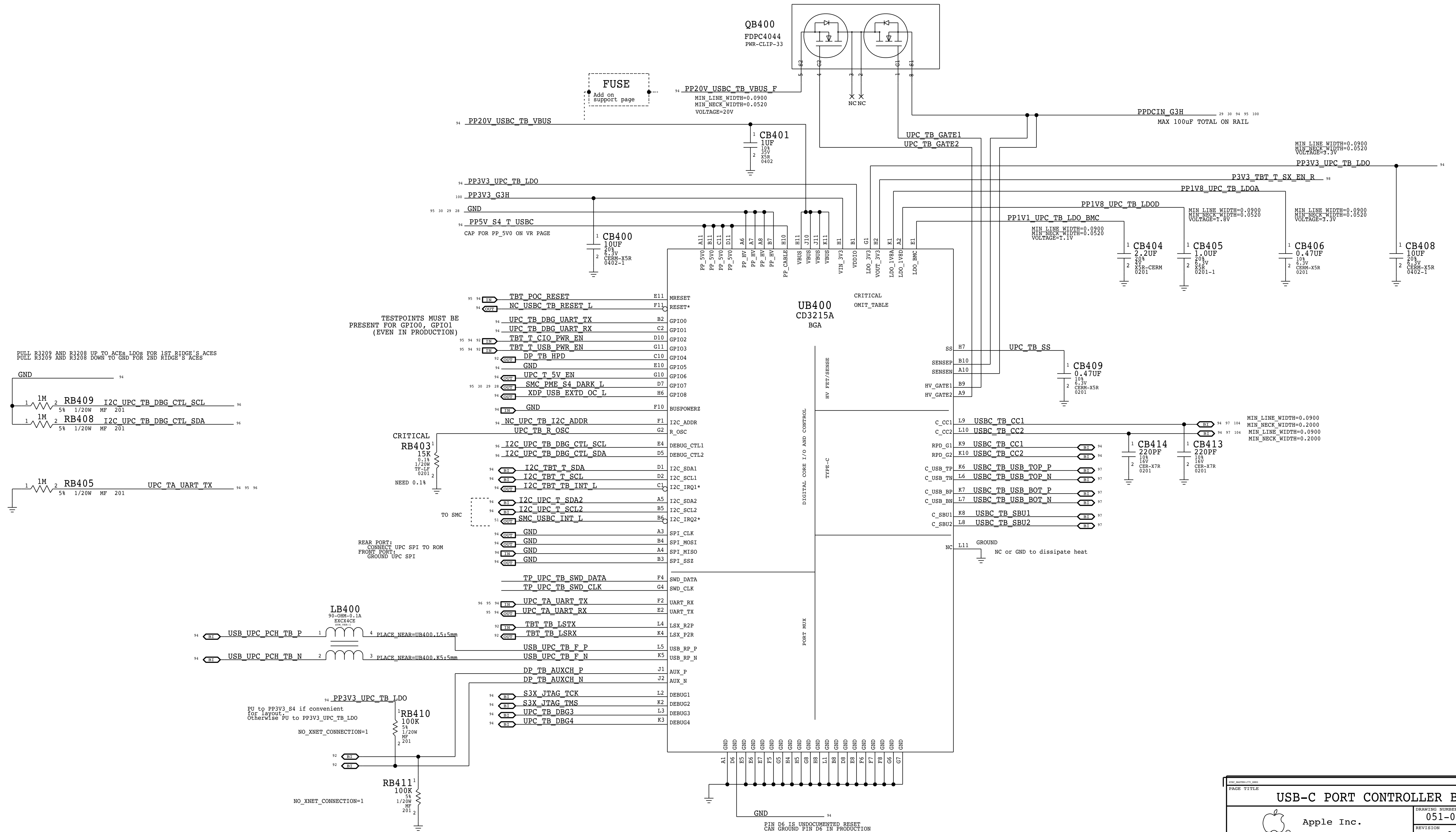
PRIMARY ACE USB-C PORT CONTROLLER (UPC)




BOM\_COST\_GROUP=USB-C

PAGE TITLE		
USB-C PORT CONTROLLER A		
 Apple Inc.	DRAWING NUMBER	051-00515
	REVISION	9.0.0
	BRANCH	dvt-fab09-0
	PAGE	113 OF 145
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		95 OF 119
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I ALL RIGHTS RESERVED		

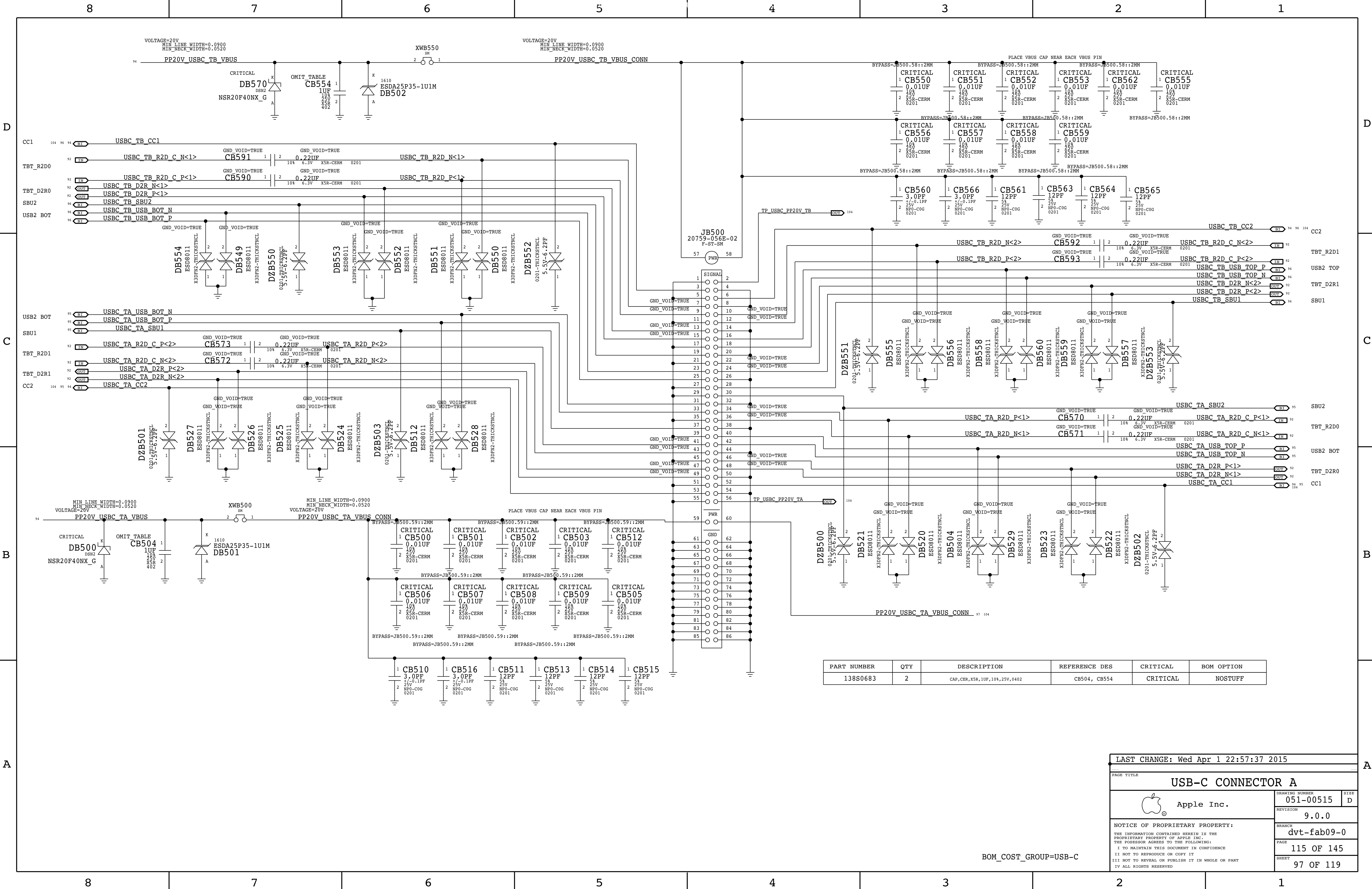
## SECONDARY ACE USB-C PORT CONTROLLER (UPC)




BOM COST GROUP=USB-C

PAGE NUMBER=073_0000		PAGE=002=013/04/2015	
PAGE TITLE			
USB-C PORT CONTROLLER B			
 Apple Inc.	DRAWING NUMBER 051-00515		SIZE D
	REVISION 9.0.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH dwt-fab09-0	
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		PAGE 114 OF 145	
		SHEET 96 OF 119	





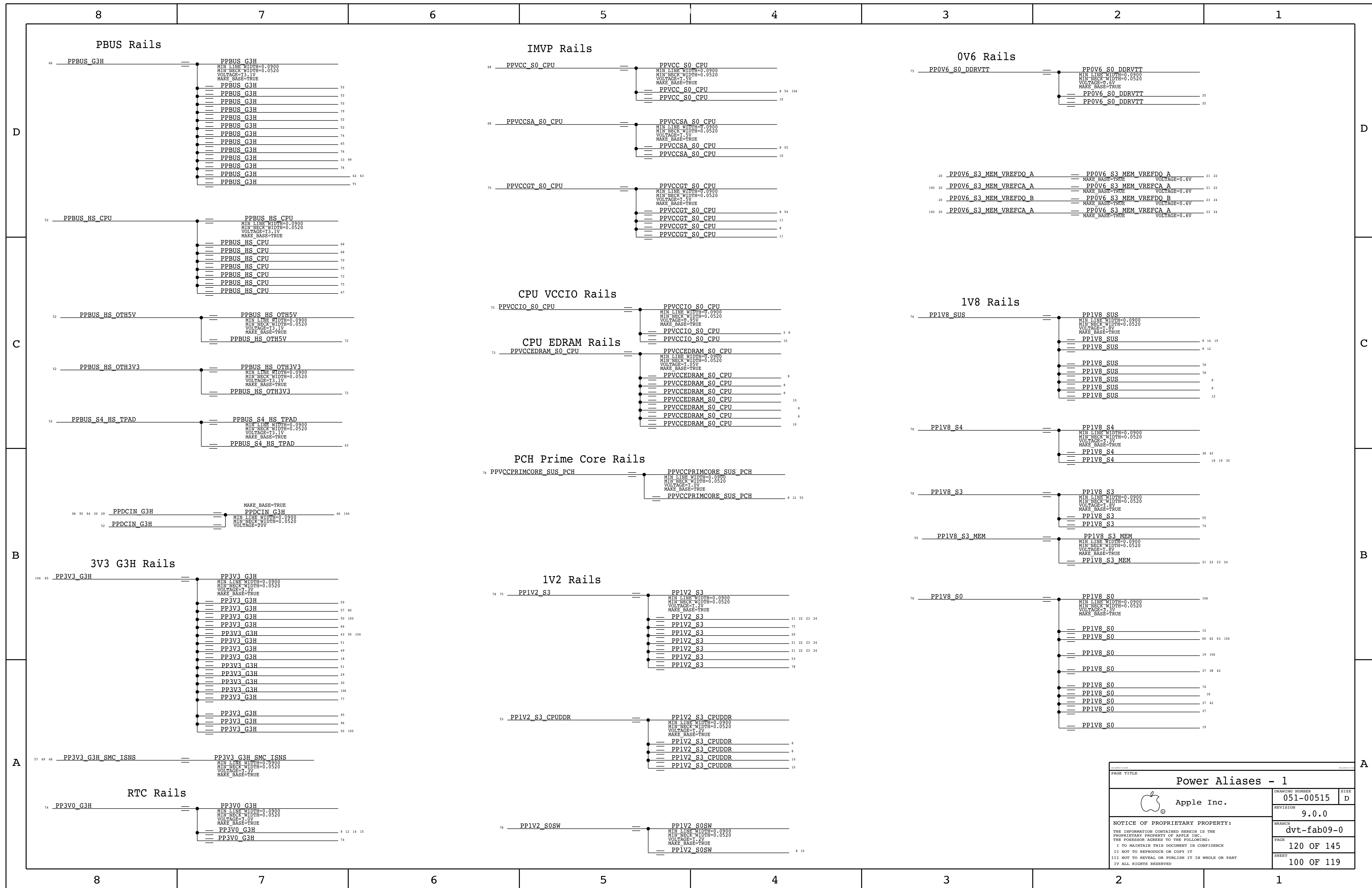
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0683	2	CAP,CER,X5R,10F,25V,0402	CB504, CB554	CRITICAL	NOSTUFF

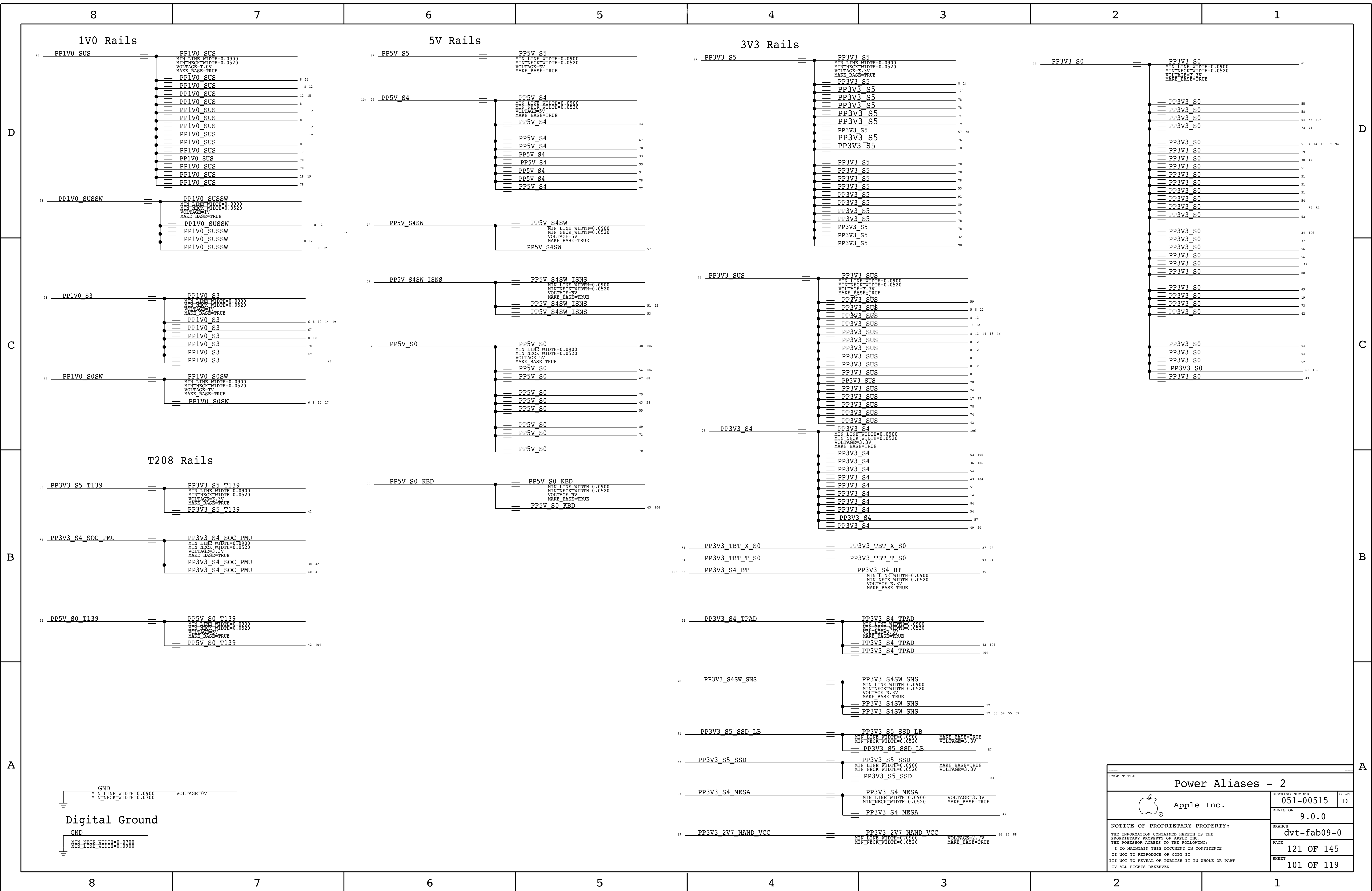
LAST CHANGE: Wed Apr 1 22:57:37 2015			
PAGE TITLE			
USB-C CONNECTOR A			
 Apple Inc.	DRAWING NUMBER	051-00515	STEP D
	REVISION	9.0.0	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	dvt-fab09-0	
	PAGE	115 OF 145	
	SHEET	97 OF 119	

BOM\_COST\_GROUP=USB-C











	8	7	6	5	4	3	2	1	
D	UNUSED TP ALIASES			UNUSED TP ALIASES			UNUSED SIGNAL ALIAS		
							<div><div>66</div><div>100</div><div>66</div><div>100</div><div>66</div><div>100</div></div> <div>NC_ANI0_NCE4 NC_ANI0_NCE5 NC_ANI0_NCE6 NC_ANI0_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI0_NCE4 NC_ANI0_NCE5 NC_ANI0_NCE6 NC_ANI0_NCE7</div>		D
							<div><div>66</div><div>100</div><div>66</div><div>100</div><div>66</div><div>100</div></div> <div>NC_ANI1_NCE4 NC_ANI1_NCE5 NC_ANI1_NCE6 NC_ANI1_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI1_NCE4 NC_ANI1_NCE5 NC_ANI1_NCE6 NC_ANI1_NCE7</div>		
							<div><div>66</div><div>100</div><div>66</div><div>100</div><div>66</div><div>100</div></div> <div>NC_ANI2_NCE4 NC_ANI2_NCE5 NC_ANI2_NCE6 NC_ANI2_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI2_NCE4 NC_ANI2_NCE5 NC_ANI2_NCE6 NC_ANI2_NCE7</div>		
							<div><div>66</div><div>100</div><div>66</div><div>100</div><div>66</div><div>100</div></div> <div>NC_ANI3_NCE4 NC_ANI3_NCE5 NC_ANI3_NCE6 NC_ANI3_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI3_NCE4 NC_ANI3_NCE5 NC_ANI3_NCE6 NC_ANI3_NCE7</div>		
							<div><div>67</div><div>100</div><div>67</div><div>100</div><div>67</div><div>100</div></div> <div>NC_ANI4_NCE4 NC_ANI4_NCE5 NC_ANI4_NCE6 NC_ANI4_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI4_NCE4 NC_ANI4_NCE5 NC_ANI4_NCE6 NC_ANI4_NCE7</div>		
							<div><div>67</div><div>100</div><div>67</div><div>100</div><div>67</div><div>100</div></div> <div>NC_ANI5_NCE4 NC_ANI5_NCE5 NC_ANI5_NCE6 NC_ANI5_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI5_NCE4 NC_ANI5_NCE5 NC_ANI5_NCE6 NC_ANI5_NCE7</div>		C
							<div><div>67</div><div>100</div><div>67</div><div>100</div><div>67</div><div>100</div></div> <div>NC_ANI6_NCE4 NC_ANI6_NCE5 NC_ANI6_NCE6 NC_ANI6_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI6_NCE4 NC_ANI6_NCE5 NC_ANI6_NCE6 NC_ANI6_NCE7</div>		
							<div><div>67</div><div>100</div><div>67</div><div>100</div><div>67</div><div>100</div></div> <div>NC_ANI7_NCE4 NC_ANI7_NCE5 NC_ANI7_NCE6 NC_ANI7_NCE7</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI7_NCE4 NC_ANI7_NCE5 NC_ANI7_NCE6 NC_ANI7_NCE7</div>		
							<div><div>66</div><div>100</div><div>66</div><div>100</div><div>66</div><div>100</div></div> <div>NC_ANI1_RNB NC_ANI3_RNB NC_ANI5_RNB NC_ANI7_RNB</div> <div>== == == ==</div> <div>MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE MAKE_BASE=TRUE</div> <div>NO_TEST=1 NO_TEST=1 NO_TEST=1 NO_TEST=1</div> <div>NC_ANI1_RNB NC_ANI3_RNB NC_ANI5_RNB NC_ANI7_RNB</div>		B
							<div><div>19</div><div>100</div><div>19</div><div>100</div></div> <div>SSD_CLKREQ_L</div> <div>==</div> <div>SSD_CLKREQ_L</div> <div>91</div>		
							<div><div>14</div><div>100</div><div>14</div><div>100</div></div> <div>SSD_SR_EN_L</div> <div>==</div> <div>SSD_SR_EN_L</div> <div>91 104</div>		
							<div><div>79</div><div>100</div><div>79</div><div>100</div></div> <div>I2C_BKLT_SCL</div> <div>==</div> <div>I2C_BKLT_SCL</div> <div>80 104</div>		
							<div><div>79</div><div>100</div><div>79</div><div>100</div></div> <div>I2C_BKLT_SDA</div> <div>==</div> <div>I2C_BKLT_SDA</div> <div>80 104</div>		
							<div><div>79</div><div>100</div><div>79</div><div>100</div></div> <div>I2C_BKLT_SCL</div> <div>==</div> <div>I2C_BKLT_SCL</div> <div>80 104</div>		
							<div><div>79</div><div>100</div><div>79</div><div>100</div></div> <div>I2C_BKLT_SDA</div> <div>==</div> <div>I2C_BKLT_SDA</div> <div>80 104</div>		
A	8	7	6	5	4	3	2	1	A

D

D

C

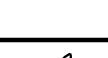
C

B

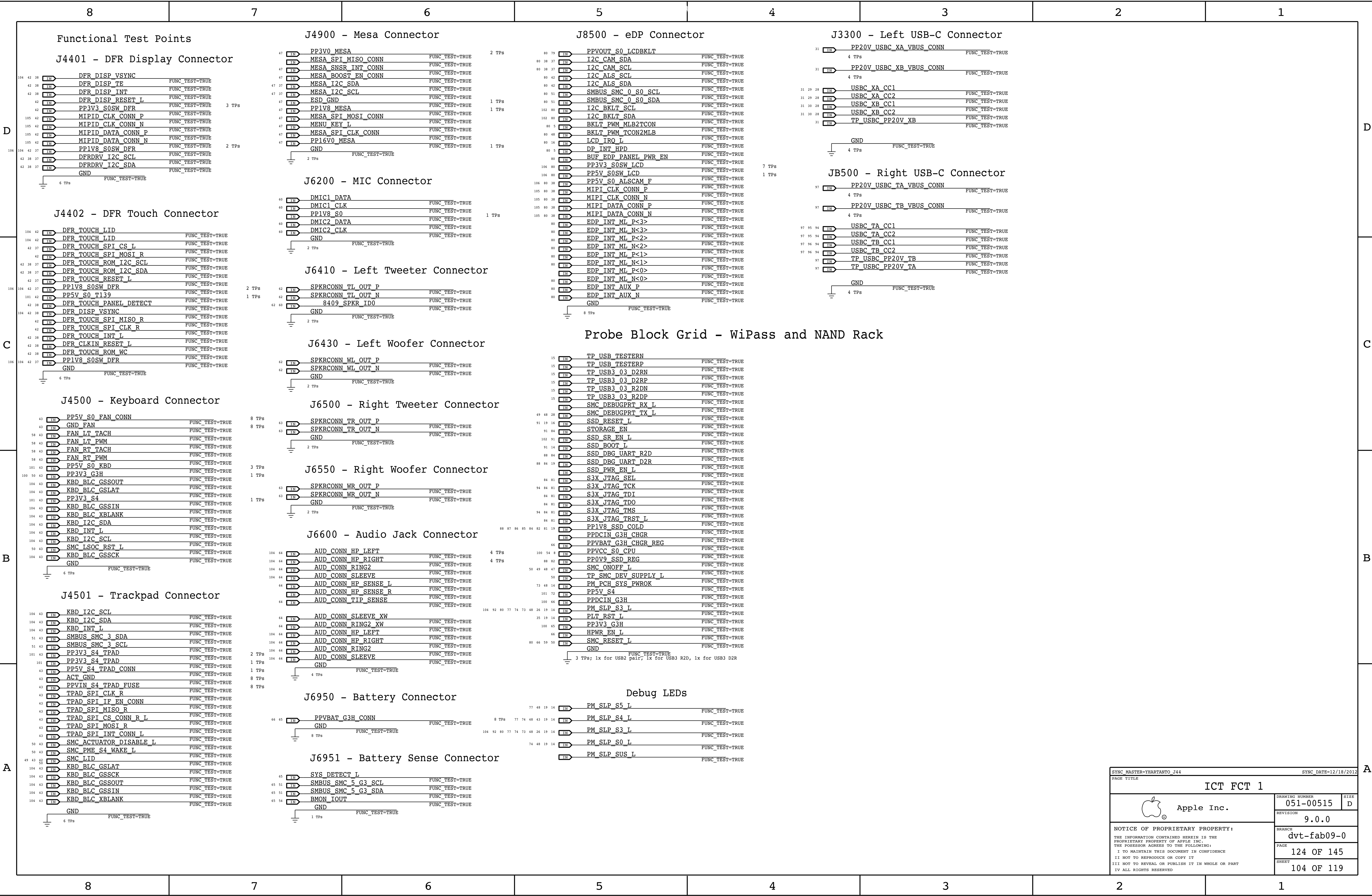
B

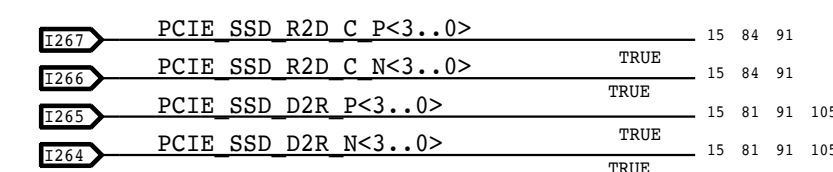
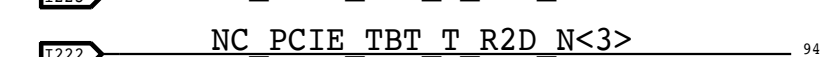
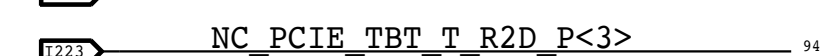
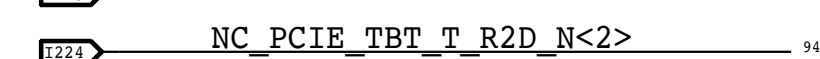
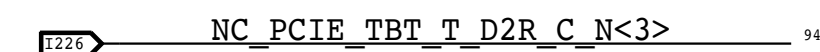
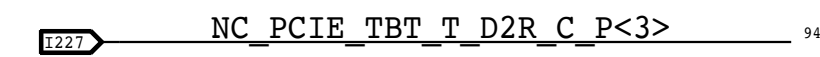
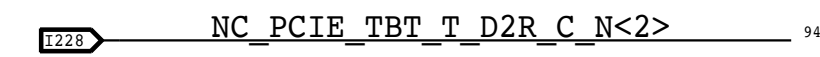
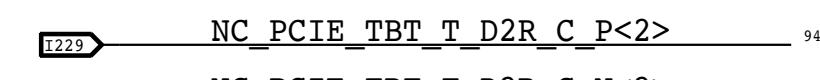
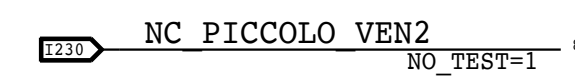
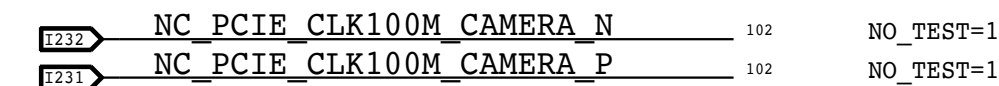
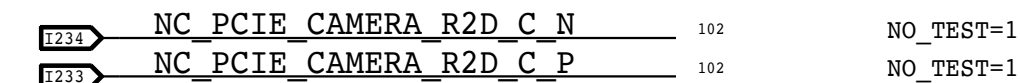
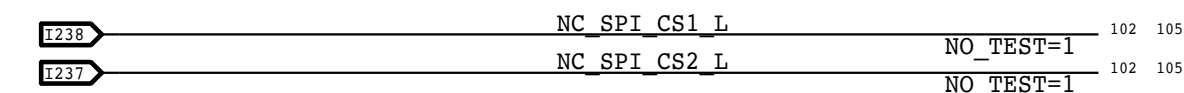
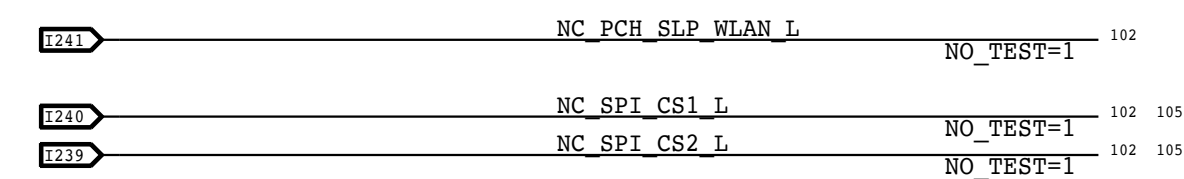
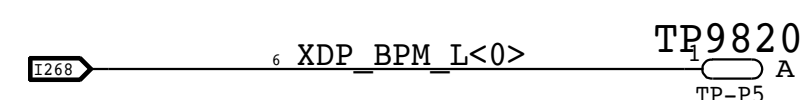
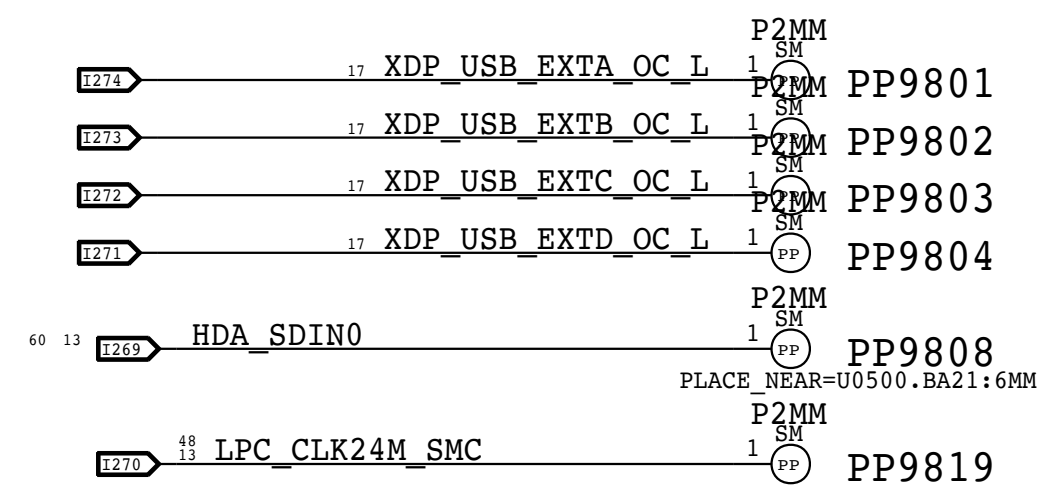
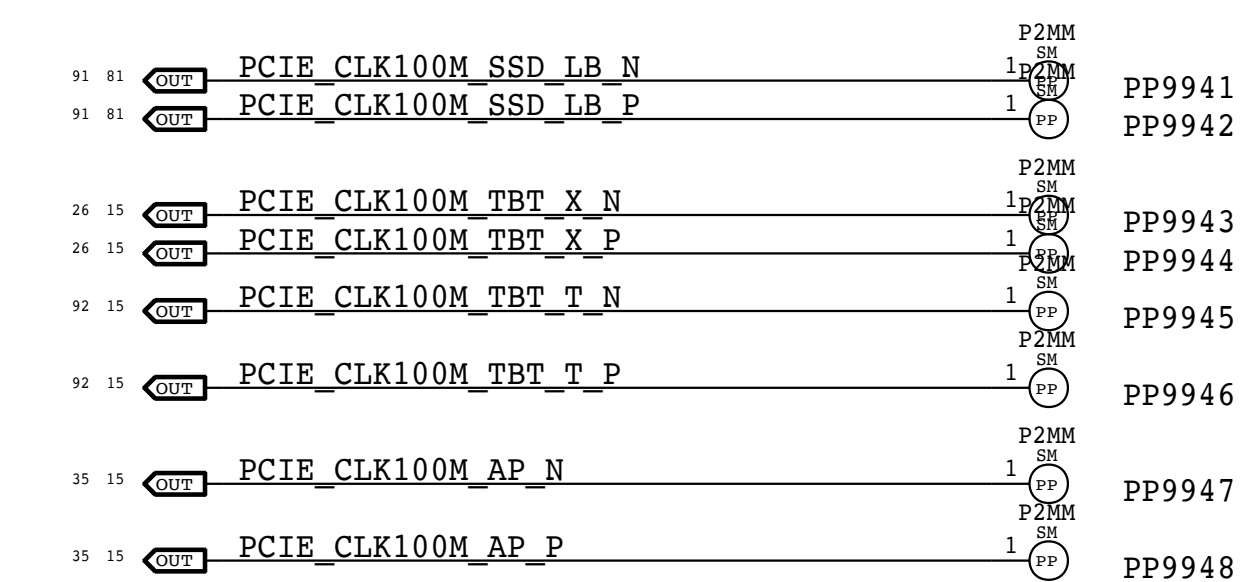
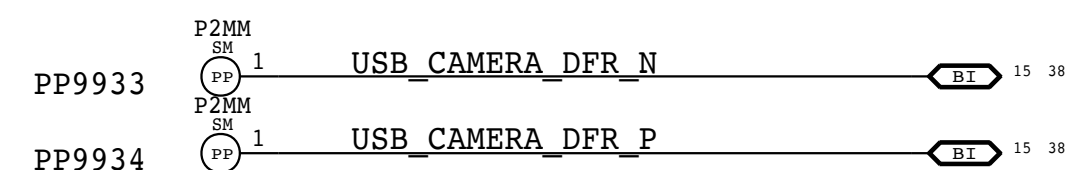
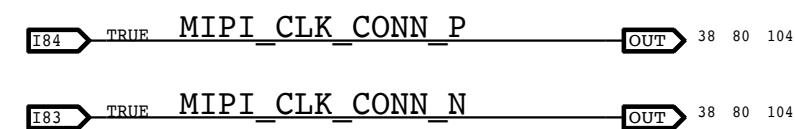
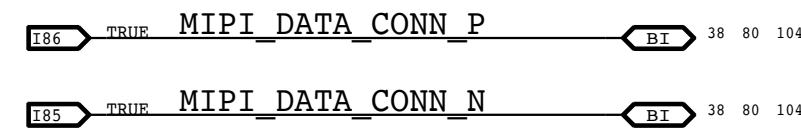
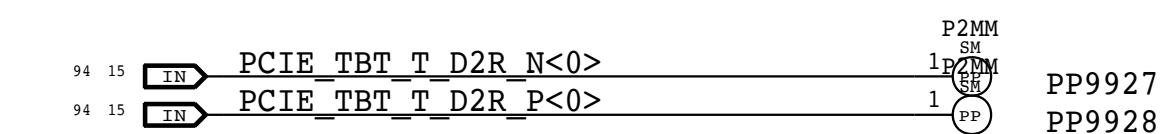
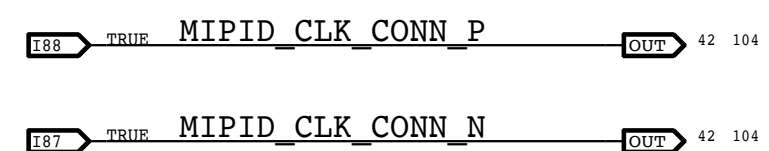
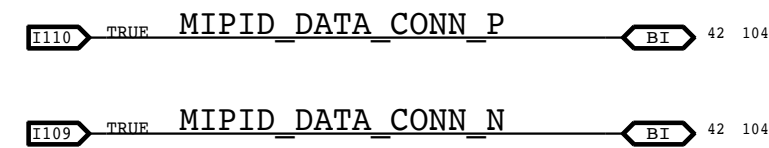
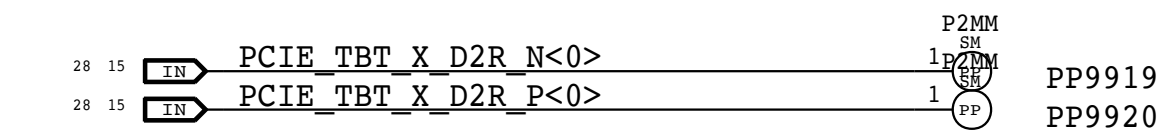
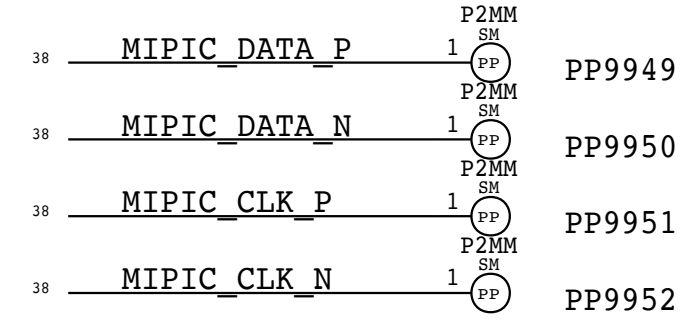
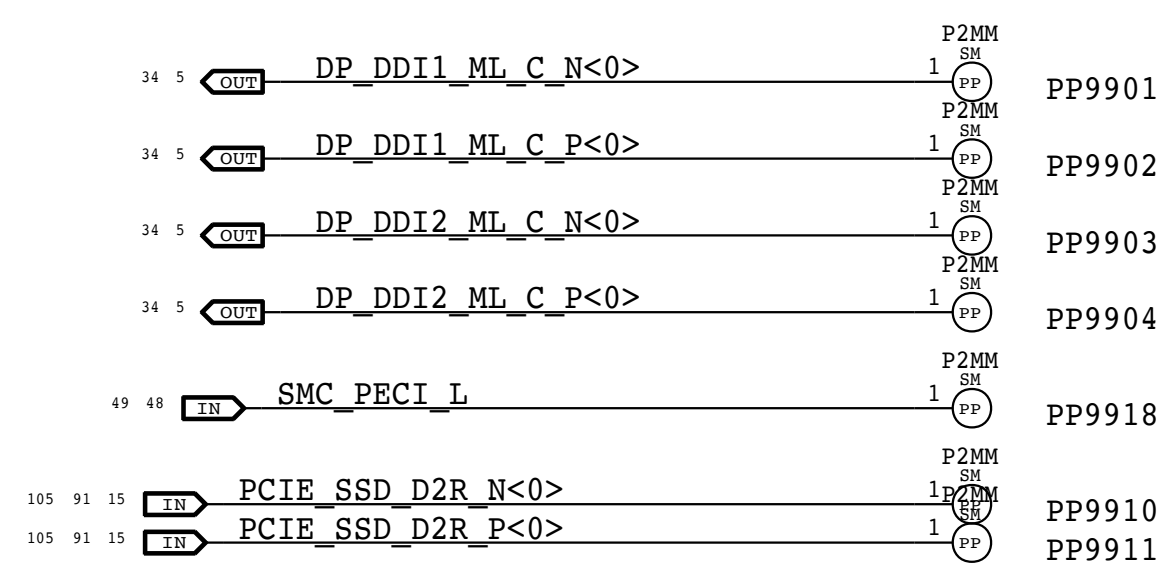
A

A

SYNC_MASTER=SHART_J44		SYNC_DATE=11/19/2012	
PAGE TITLE			
Signal Aliases			
 Apple Inc.		DRAWING NUMBER	051-00515
		REVISION	D
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		9.0.0	
		BRANCH	
		dvt-fab9-0	
		PAGE	122 OF 145
		SHEET	102 OF 119

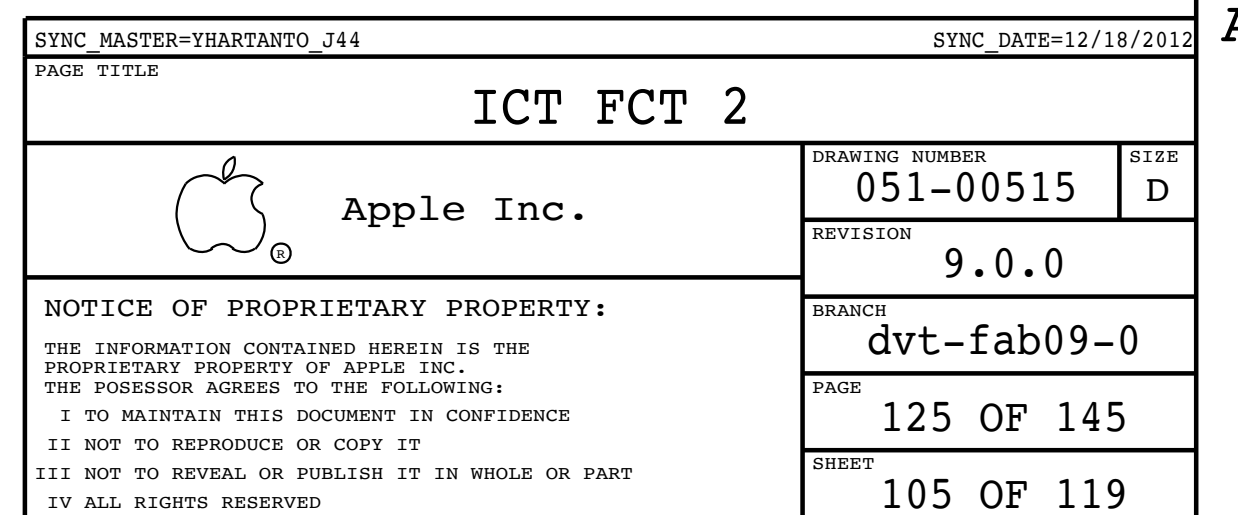
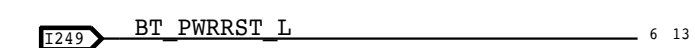




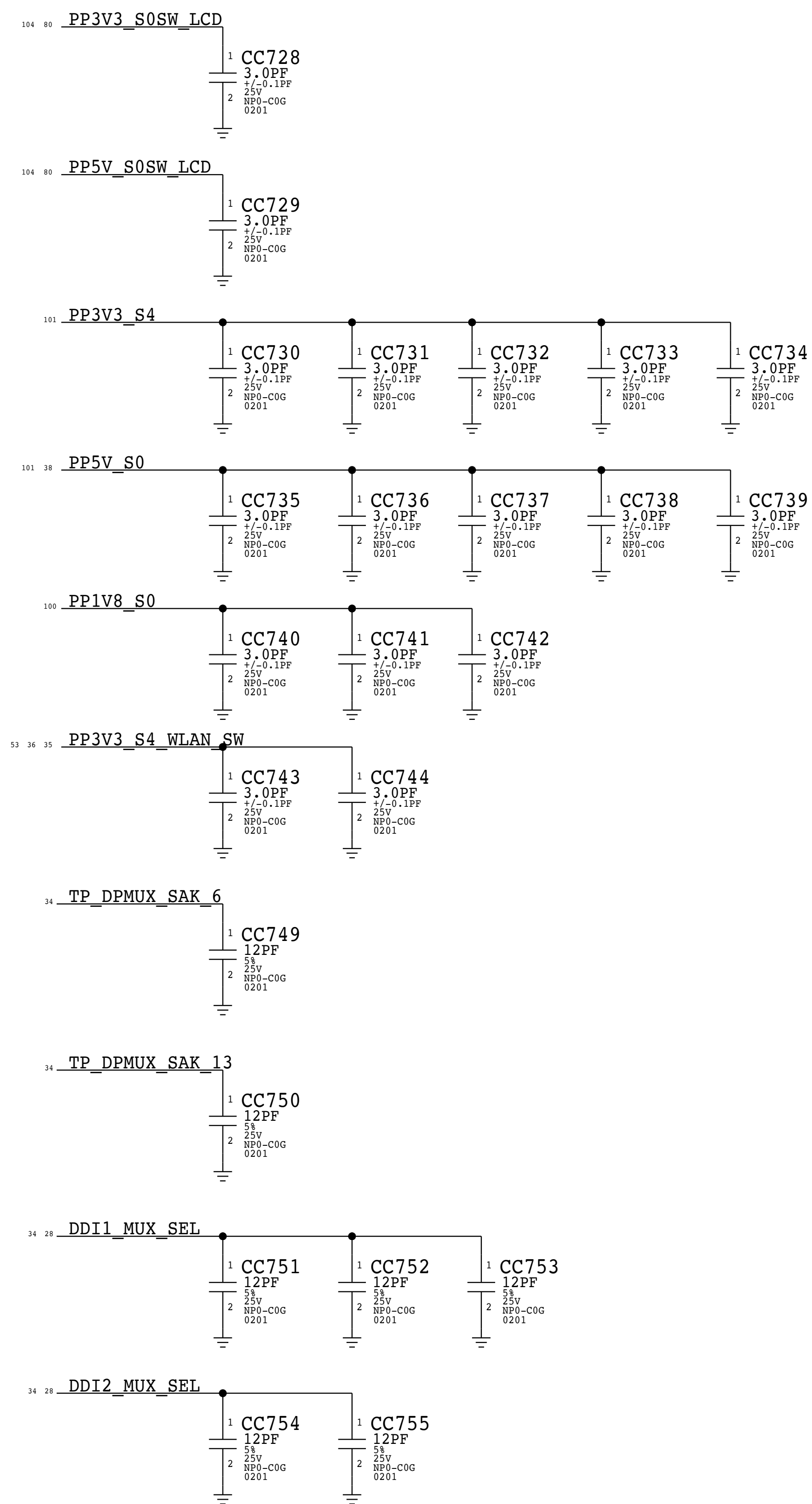
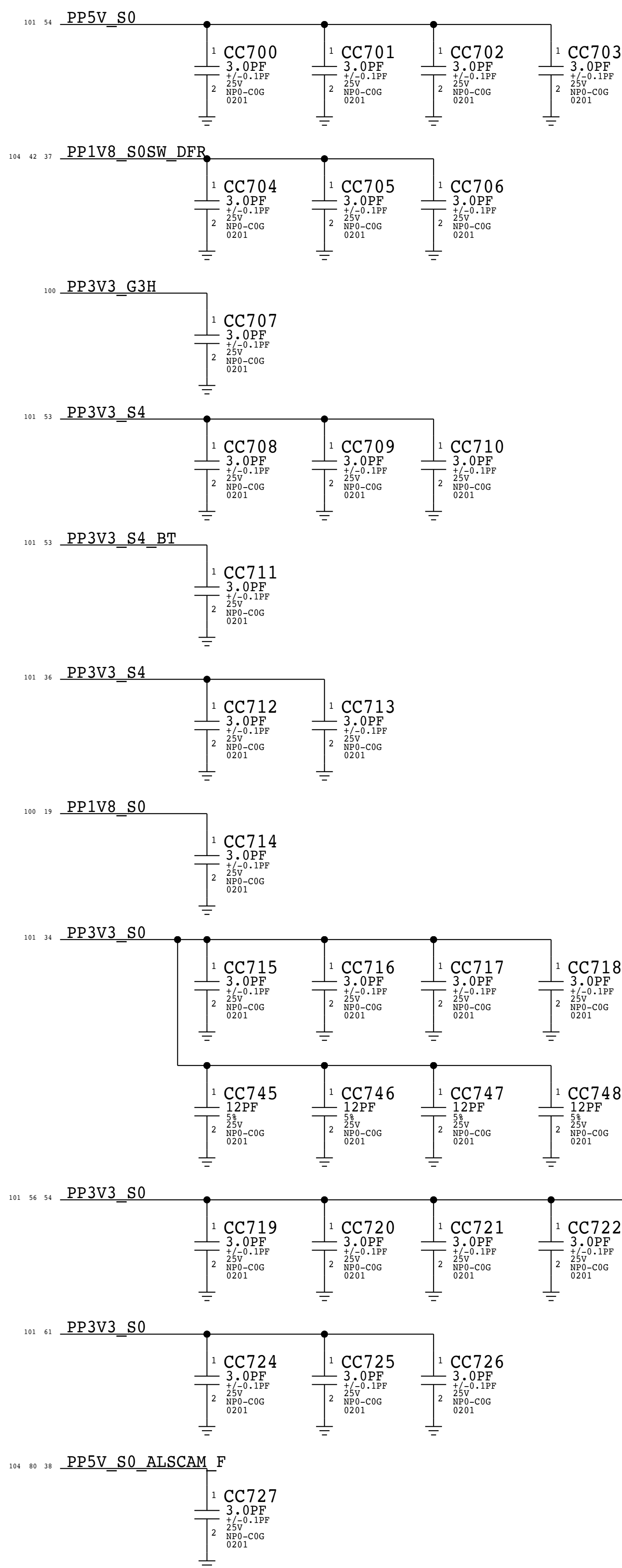



Unused nets with offpage

(Nets with offpages not used on this project)








SYNC MASTER=YHARTANTO J44		SYNC DATE=01/09/2013	
PAGE TITLE			
Desense Capacitors			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-00515		D
	REVISION		
	9.0.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
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		dvt-fab09-0	
		PAGE	
		127	OF 145
		SHEET	
		106	OF 119


BOM COST GROUP=WIRELESS




8		7		6		5		4		3		2		1			
D																D	
C																C	
B																B	
A																A	
8		7		6		5		4		3		2		1			

SYNC MASTER=J79 RIO				SYNC DATE=06/18/2015			
PAGE TITLE							
Empty							
 Apple Inc.®				DRAWING NUMBER		051-00515	
				REVISION		9.0.0	
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				BRANCH		dvt-fab09-0	
				PAGE		129 OF 145	
				SHEET		107 OF 119	

8		7		6		5		4		3		2		1	
J79 BOARD-SPECIFIC SPACING & PHYSICAL CONSTRAINTS															
D														D	
C														C	
B														B	
A														A	
8		7		6		5		4		3		2		1	

SYNC_MASTER=YHARTANTO_J44			SYNC_DATE=12/14/2012		
PAGE TITLE					
PCB Rule Definitions					
 Apple Inc.		DRAWING NUMBER		051-00515	
		REVISION		9.0.0	
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		BRANCH		dvt-fab09-0	
		PAGE		130 OF 145	
		SHEET		108 OF 119	

SYNC_MASTER=YHARTANTO_J44										SYNC_DATE=12/14/2012									
PAGE TITLE																			
PCB Rule Definitions																			
 Apple Inc.										DRAWING NUMBER					SIZE				
										051-00515					D				
<b>NOTICE OF PROPRIETARY PROPERTY:</b>  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										REVISION					9.0.0				
										BRANCH					dvt-fab09-0				
										PAGE					130 OF 145				
										SHEET					108 OF 119				











## PCI Express Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
PCIE_85D	*	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF
CLK_PCIE_85D	*	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PCIE_2SAME	*	=3X_DIELECTRIC	?
PCIE_TXR	*	=6X_DIELECTRIC	?
PCIE_2OTHER	*	=4X_DIELECTRIC	?
PCIE_2CLK	*	=7X_DIELECTRIC	?
PCIECLK_2OTHER	*	=7X_DIELECTRIC	?

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
PCIE_*	*	*	PCIE_20THER
PCIE_*	=SAME	*	PCIE_2SAME
PCIE_*	CLK_*	*	PCIE_2CLK
CLK_PCIE	*	*	PCIECLK_2OTHER
PCIE_TX	*_RX	*	PCIE_TXRX
PCIE_RX	*_TX	*	PCIE_TXRX


## PCI Express Properties

ELECTRICAL CONST SET		NET TYPE	
		PHYSICAL	SPACING



## SMC SMBus & Charger Net Properties

ELECTRICAL CONST SET	NET TYPE	
	PHYSICAL	SPACING

SYNC MASTER=YHARTANTO J44		SYNC DATE=01/02/2013	
PAGE TITLE			
 Apple Inc.		DRAWING NUMBER	
		051-00515	
		SIZE	
		D	
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		REVISION	
		9.0.0	
		BRANCH	
		dvt-fab09-0	
		PAGE	
		137 OF 145	
		SHEET	
		115 OF 119	







Change List:

```
<RDAR://COMPONENT/XXXXXX> J79 HW EE SCHEMATIC | PROTO 0
```

Kismet:

AFP://KISMET.APPLE.COM/KISMET-PROJECTS/J79

### Useful Wiki Links:

Schematic Conventions - <https://hmts.ecs.apple.com/wiki/index.php/User:Wferry/SchConventions>

Schematic Design Wiki - [https://hmts.ecs.apple.com/wiki/index.php/Schematic\\_Design](https://hmts.ecs.apple.com/wiki/index.php/Schematic_Design)

## MobileMac HW Radar:

```
<rdar://component/XXXXXX> MobileMac HW | Task
```

```
<rdar://component/XXXXXX> MobileMac HW | Schematic
```

<rdar://component/XXXXXX> MobileMac HW	New Bugs
--	----------


<rdar://component/XXXXXX> MobileMac HW	Layout
--	--------




<rdar://component/XXXXXX> MobileMac HW	Investigation
--	---------------


<rdar://component/XXXXXX>	MobileMac	HW	Architecture
---------------------------	-----------	----	--------------

Other Info:

Page Allocations - [rdar://problem/19817053](https://www.electronicsworkbench.com/forums/problem/19817053) 2015 Schematic Page Allocations

FORM NUMBER=CTR_BORDERS_CUSTOMARY2012		FORM DATE=06/11/2013	
PAGE TITLE			
 Apple Inc.		DRAWING NUMBER	SIZE
		051-000515	D
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		REVISION	9.0.0
		BRANCH	dvt-fab09-0
		PAGE	140 OF 145
		SHEET	118 OF 119

8		7		6		5		4		3		2		1																																																																																																																																																																													
D	Alternate Parts															D																																																																																																																																																																											
	<table><tr><th>PART NUMBER</th><th>ALTERNATE FOR PART NUMBER</th><th>BOM OPTION</th><th>REF DES</th><th>COMMENTS:</th></tr><tr><td>107800033</td><td>107800034</td><td></td><td>ALL</td><td></td></tr><tr><td>13880738</td><td>13881101</td><td></td><td>ALL</td><td>Samsung alt to Murata</td></tr><tr><td>13880846</td><td>13880811</td><td></td><td>ALL</td><td>Samsung alt to Murata</td></tr><tr><td>152800359</td><td>152800253</td><td></td><td>ALL</td><td>Chillisin alt to Cyntec</td></tr><tr><td>37180704</td><td>371800077</td><td></td><td>ALL</td><td>NXP alt to Diodes</td></tr><tr><td>37681053</td><td>37680604</td><td></td><td>ALL</td><td>Diodes alt to Fairchild</td></tr><tr><td>37681106</td><td>37680678</td><td></td><td>ALL</td><td>Fairchild alt to Vishay</td></tr><tr><td>740800027</td><td>74080159</td><td></td><td>ALL</td><td>Bourns alt to Little Fuse</td></tr><tr><td>10780249</td><td>10780251</td><td></td><td>ALL</td><td></td></tr><tr><td>107800015</td><td>107800011</td><td></td><td>ALL</td><td></td></tr><tr><td>107800071</td><td>107800053</td><td></td><td>ALL</td><td></td></tr><tr><td>12880364</td><td>12880264</td><td></td><td>ALL</td><td>Kemet w/ Panasonic</td></tr><tr><td>12880325</td><td>12880397</td><td></td><td>ALL</td><td></td></tr><tr><td>128800009</td><td>128800007</td><td></td><td>ALL</td><td></td></tr><tr><td>128800029</td><td>128800007</td><td></td><td>ALL</td><td></td></tr><tr><td>128800070</td><td>128800007</td><td></td><td>ALL</td><td></td></tr><tr><td>128800010</td><td>128800011</td><td></td><td>ALL</td><td></td></tr><tr><td>128800031</td><td>128800011</td><td></td><td>ALL</td><td></td></tr><tr><td>128800026</td><td>128800011</td><td></td><td>ALL</td><td></td></tr><tr><td>132800064</td><td>13280409</td><td></td><td>ALL</td><td></td></tr><tr><td>13880614</td><td>13880578</td><td></td><td>ALL</td><td></td></tr><tr><td>13880703</td><td>13880648</td><td></td><td>ALL</td><td></td></tr><tr><td>138800032</td><td>13880831</td><td></td><td>ALL</td><td></td></tr><tr><td>138800049</td><td>13880831</td><td></td><td>ALL</td><td></td></tr><tr><td>13880863</td><td>13880853</td><td></td><td>ALL</td><td></td></tr><tr><td>13880775</td><td>13880860</td><td></td><td>ALL</td><td></td></tr><tr><td>138800084</td><td>138800060</td><td></td><td>ALL</td><td></td></tr><tr><td>152800369</td><td>152800268</td><td></td><td>ALL</td><td>Cyntec w/ NEC</td></tr><tr><td>155800188</td><td>15580275</td><td></td><td>ALL</td><td>Murata w/ Taiyo</td></tr><tr><td>15580694</td><td>15580387</td><td></td><td>ALL</td><td></td></tr><tr><td>15580660</td><td>15580513</td><td></td><td>ALL</td><td></td></tr><tr><td>155800018</td><td>15580664</td><td></td><td>ALL</td><td>Murata w/ Taiyo</td></tr><tr><td>155800007</td><td>15580667</td><td></td><td>ALL</td><td></td></tr></table>																PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	107800033	107800034		ALL		13880738	13881101		ALL	Samsung alt to Murata	13880846	13880811		ALL	Samsung alt to Murata	152800359	152800253		ALL	Chillisin alt to Cyntec	37180704	371800077		ALL	NXP alt to Diodes	37681053	37680604		ALL	Diodes alt to Fairchild	37681106	37680678		ALL	Fairchild alt to Vishay	740800027	74080159		ALL	Bourns alt to Little Fuse	10780249	10780251		ALL		107800015	107800011		ALL		107800071	107800053		ALL		12880364	12880264		ALL	Kemet w/ Panasonic	12880325	12880397		ALL		128800009	128800007		ALL		128800029	128800007		ALL		128800070	128800007		ALL		128800010	128800011		ALL		128800031	128800011		ALL		128800026	128800011		ALL		132800064	13280409		ALL		13880614	13880578		ALL		13880703	13880648		ALL		138800032	13880831		ALL		138800049	13880831		ALL		13880863	13880853		ALL		13880775	13880860		ALL		138800084	138800060		ALL		152800369	152800268		ALL	Cyntec w/ NEC	155800188	15580275		ALL	Murata w/ Taiyo	15580694	15580387		ALL		15580660	15580513		ALL		155800018	15580664		ALL	Murata w/ Taiyo	155800007	15580667		ALL		BLC
	PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:																																																																																																																																																																																						
	107800033	107800034		ALL																																																																																																																																																																																							
	13880738	13881101		ALL	Samsung alt to Murata																																																																																																																																																																																						
	13880846	13880811		ALL	Samsung alt to Murata																																																																																																																																																																																						
	152800359	152800253		ALL	Chillisin alt to Cyntec																																																																																																																																																																																						
	37180704	371800077		ALL	NXP alt to Diodes																																																																																																																																																																																						
	37681053	37680604		ALL	Diodes alt to Fairchild																																																																																																																																																																																						
	37681106	37680678		ALL	Fairchild alt to Vishay																																																																																																																																																																																						
740800027	74080159		ALL	Bourns alt to Little Fuse																																																																																																																																																																																							
10780249	10780251		ALL																																																																																																																																																																																								
107800015	107800011		ALL																																																																																																																																																																																								
107800071	107800053		ALL																																																																																																																																																																																								
12880364	12880264		ALL	Kemet w/ Panasonic																																																																																																																																																																																							
12880325	12880397		ALL																																																																																																																																																																																								
128800009	128800007		ALL																																																																																																																																																																																								
128800029	128800007		ALL																																																																																																																																																																																								
128800070	128800007		ALL																																																																																																																																																																																								
128800010	128800011		ALL																																																																																																																																																																																								
128800031	128800011		ALL																																																																																																																																																																																								
128800026	128800011		ALL																																																																																																																																																																																								
132800064	13280409		ALL																																																																																																																																																																																								
13880614	13880578		ALL																																																																																																																																																																																								
13880703	13880648		ALL																																																																																																																																																																																								
138800032	13880831		ALL																																																																																																																																																																																								
138800049	13880831		ALL																																																																																																																																																																																								
13880863	13880853		ALL																																																																																																																																																																																								
13880775	13880860		ALL																																																																																																																																																																																								
138800084	138800060		ALL																																																																																																																																																																																								
152800369	152800268		ALL	Cyntec w/ NEC																																																																																																																																																																																							
155800188	15580275		ALL	Murata w/ Taiyo																																																																																																																																																																																							
15580694	15580387		ALL																																																																																																																																																																																								
15580660	15580513		ALL																																																																																																																																																																																								
155800018	15580664		ALL	Murata w/ Taiyo																																																																																																																																																																																							
155800007	15580667		ALL																																																																																																																																																																																								
<table><tr><th>PART NUMBER</th><th>ALTERNATE FOR PART NUMBER</th><th>BOM OPTION</th><th>REF DES</th><th>COMMENTS:</th></tr><tr><td>197800046</td><td>197800036</td><td></td><td>ALL</td><td>Epson w/ TXC</td></tr><tr><td>197800047</td><td>197800036</td><td></td><td>ALL</td><td>Kyocera w/ TXC</td></tr><tr><td>197800048</td><td>197800036</td><td></td><td>ALL</td><td>Murata w/ TXC</td></tr><tr><td>197800053</td><td>197800050</td><td></td><td>ALL</td><td>Kyocera w/ TXC</td></tr><tr><td>197800054</td><td>197800050</td><td></td><td>ALL</td><td>NDK w/ TXC</td></tr><tr><td>197800055</td><td>197800050</td><td></td><td>ALL</td><td>Murata w/ TXC</td></tr><tr><td>31180596</td><td>31180593</td><td></td><td>ALL</td><td>NXP w/ Diodes</td></tr><tr><td>10780276</td><td>107800020</td><td></td><td>ALL</td><td>Cyntec w/ TFT</td></tr><tr><td>107800021</td><td>10780284</td><td></td><td>ALL</td><td>TFT w/ Yageo</td></tr><tr><td>152800343</td><td>15281682</td><td></td><td>ALL</td><td>NXP w/ Diodes</td></tr><tr><td>107800087</td><td>107800029</td><td></td><td>ALL</td><td>TFT w/ Yageo</td></tr><tr><td>128800058</td><td>128800018</td><td></td><td>ALL</td><td>NEC w/ Rohm</td></tr><tr><td>13880706</td><td>13880739</td><td></td><td>ALL</td><td>NEC w/ Vishay</td></tr><tr><td>13880945</td><td>13880739</td><td></td><td>ALL</td><td>NEC w/ Rohm</td></tr><tr><td>152800358</td><td>152800208</td><td></td><td>ALL</td><td>Murata w/ Chillisin</td></tr><tr><td>152800400</td><td>152800361</td><td></td><td>ALL</td><td>Murata w/ Cyntec</td></tr><tr><td>15281872</td><td>152800361</td><td></td><td>ALL</td><td>Murata w/ Cyntec</td></tr><tr><td>155800034</td><td>15580706</td><td></td><td>ALL</td><td>Taiyo w/ Murata</td></tr></table>															PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	197800046	197800036		ALL	Epson w/ TXC	197800047	197800036		ALL	Kyocera w/ TXC	197800048	197800036		ALL	Murata w/ TXC	197800053	197800050		ALL	Kyocera w/ TXC	197800054	197800050		ALL	NDK w/ TXC	197800055	197800050		ALL	Murata w/ TXC	31180596	31180593		ALL	NXP w/ Diodes	10780276	107800020		ALL	Cyntec w/ TFT	107800021	10780284		ALL	TFT w/ Yageo	152800343	15281682		ALL	NXP w/ Diodes	107800087	107800029		ALL	TFT w/ Yageo	128800058	128800018		ALL	NEC w/ Rohm	13880706	13880739		ALL	NEC w/ Vishay	13880945	13880739		ALL	NEC w/ Rohm	152800358	152800208		ALL	Murata w/ Chillisin	152800400	152800361		ALL	Murata w/ Cyntec	15281872	152800361		ALL	Murata w/ Cyntec	155800034	15580706		ALL	Taiyo w/ Murata																																																																														
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:																																																																																																																																																																																							
197800046	197800036		ALL	Epson w/ TXC																																																																																																																																																																																							
197800047	197800036		ALL	Kyocera w/ TXC																																																																																																																																																																																							
197800048	197800036		ALL	Murata w/ TXC																																																																																																																																																																																							
197800053	197800050		ALL	Kyocera w/ TXC																																																																																																																																																																																							
197800054	197800050		ALL	NDK w/ TXC																																																																																																																																																																																							
197800055	197800050		ALL	Murata w/ TXC																																																																																																																																																																																							
31180596	31180593		ALL	NXP w/ Diodes																																																																																																																																																																																							
10780276	107800020		ALL	Cyntec w/ TFT																																																																																																																																																																																							
107800021	10780284		ALL	TFT w/ Yageo																																																																																																																																																																																							
152800343	15281682		ALL	NXP w/ Diodes																																																																																																																																																																																							
107800087	107800029		ALL	TFT w/ Yageo																																																																																																																																																																																							
128800058	128800018		ALL	NEC w/ Rohm																																																																																																																																																																																							
13880706	13880739		ALL	NEC w/ Vishay																																																																																																																																																																																							
13880945	13880739		ALL	NEC w/ Rohm																																																																																																																																																																																							
152800358	152800208		ALL	Murata w/ Chillisin																																																																																																																																																																																							
152800400	152800361		ALL	Murata w/ Cyntec																																																																																																																																																																																							
15281872	152800361		ALL	Murata w/ Cyntec																																																																																																																																																																																							
155800034	15580706		ALL	Taiyo w/ Murata																																																																																																																																																																																							
<table><tr><td>353800711</td><td>35382073</td><td></td><td>ALL</td><td>On Semi w/ TI</td></tr></table>															353800711	35382073		ALL	On Semi w/ TI																																																																																																																																																																								
353800711	35382073		ALL	On Semi w/ TI																																																																																																																																																																																							
C	<table><tr><td>740800019</td><td>740800007</td><td></td><td>ALL</td><td>Bourns w/ Polytronics</td></tr><tr><td>155800189</td><td>15580342</td><td></td><td>ALL</td><td>Murata w/ Taiyo</td></tr><tr><td>13880714</td><td>13880713</td><td></td><td>ALL</td><td>Murata w/ Samsung</td></tr><tr><td>13880715</td><td>13880732</td><td></td><td>ALL</td><td>Murata w/ Samsung</td></tr><tr><td>107800086</td><td>107800056</td><td></td><td>ALL</td><td>TFT w/ Cyntec</td></tr><tr><td>13880875</td><td>13880678</td><td></td><td>ALL</td><td>Taiyo w/ Mur&amp;SS</td></tr><tr><td>13880786</td><td>13880705</td><td></td><td>ALL</td><td>Murata w/ Samsung</td></tr><tr><td>15282052</td><td>15281954</td><td></td><td>ALL</td><td>Taiyo w/ Cyntec</td></tr><tr><td>15282015</td><td>15281958</td><td></td><td>ALL</td><td>Taiyo w/ Cyntec</td></tr><tr><td>13880789</td><td>13880941</td><td></td><td>ALL</td><td>Murata w/ SS</td></tr><tr><td>107800101</td><td>107800005</td><td></td><td>ALL</td><td>Cyntec w/ Yageo</td></tr><tr><td>107800102</td><td>107800017</td><td></td><td>ALL</td><td>Cyntec w/ Yageo</td></tr><tr><td>107800100</td><td>107800057</td><td></td><td>ALL</td><td>Cyntec w/ TFT</td></tr><tr><td>107800103</td><td>107800058</td><td></td><td>ALL</td><td>Cyntec w/ Yageo</td></tr><tr><td>107800104</td><td>107800061</td><td></td><td>ALL</td><td>Cyntec w/ Yageo</td></tr><tr><td>107800105</td><td>107800062</td><td></td><td>ALL</td><td>Cyntec w/ Yageo</td></tr><tr><td>152800403</td><td>152800322</td><td></td><td>ALL</td><td>Murata w/ Chillisin</td></tr></table>															740800019	740800007		ALL	Bourns w/ Polytronics	155800189	15580342		ALL	Murata w/ Taiyo	13880714	13880713		ALL	Murata w/ Samsung	13880715	13880732		ALL	Murata w/ Samsung	107800086	107800056		ALL	TFT w/ Cyntec	13880875	13880678		ALL	Taiyo w/ Mur&SS	13880786	13880705		ALL	Murata w/ Samsung	15282052	15281954		ALL	Taiyo w/ Cyntec	15282015	15281958		ALL	Taiyo w/ Cyntec	13880789	13880941		ALL	Murata w/ SS	107800101	107800005		ALL	Cyntec w/ Yageo	107800102	107800017		ALL	Cyntec w/ Yageo	107800100	107800057		ALL	Cyntec w/ TFT	107800103	107800058		ALL	Cyntec w/ Yageo	107800104	107800061		ALL	Cyntec w/ Yageo	107800105	107800062		ALL	Cyntec w/ Yageo	152800403	152800322		ALL	Murata w/ Chillisin	C																																																																																						
	740800019	740800007		ALL	Bourns w/ Polytronics																																																																																																																																																																																						
	155800189	15580342		ALL	Murata w/ Taiyo																																																																																																																																																																																						
	13880714	13880713		ALL	Murata w/ Samsung																																																																																																																																																																																						
	13880715	13880732		ALL	Murata w/ Samsung																																																																																																																																																																																						
	107800086	107800056		ALL	TFT w/ Cyntec																																																																																																																																																																																						
	13880875	13880678		ALL	Taiyo w/ Mur&SS																																																																																																																																																																																						
	13880786	13880705		ALL	Murata w/ Samsung																																																																																																																																																																																						
	15282052	15281954		ALL	Taiyo w/ Cyntec																																																																																																																																																																																						
	15282015	15281958		ALL	Taiyo w/ Cyntec																																																																																																																																																																																						
13880789	13880941		ALL	Murata w/ SS																																																																																																																																																																																							
107800101	107800005		ALL	Cyntec w/ Yageo																																																																																																																																																																																							
107800102	107800017		ALL	Cyntec w/ Yageo																																																																																																																																																																																							
107800100	107800057		ALL	Cyntec w/ TFT																																																																																																																																																																																							
107800103	107800058		ALL	Cyntec w/ Yageo																																																																																																																																																																																							
107800104	107800061		ALL	Cyntec w/ Yageo																																																																																																																																																																																							
107800105	107800062		ALL	Cyntec w/ Yageo																																																																																																																																																																																							
152800403	152800322		ALL	Murata w/ Chillisin																																																																																																																																																																																							
<table><tr><td>128800062</td><td>128800067</td><td></td><td>ALL</td><td></td></tr><tr><td>128800069</td><td>128800067</td><td></td><td>ALL</td><td></td></tr><tr><td>132800012</td><td>13280401</td><td></td><td>ALL</td><td></td></tr><tr><td>13880660</td><td>13880684</td><td></td><td>ALL</td><td></td></tr><tr><td>13881103</td><td>13880719</td><td></td><td>ALL</td><td></td></tr><tr><td>138800097</td><td>13880750</td><td></td><td>ALL</td><td></td></tr><tr><td>138800111</td><td>138800036</td><td></td><td>ALL</td><td></td></tr><tr><td>155800203</td><td>15580894</td><td></td><td>ALL</td><td></td></tr><tr><td>197800082</td><td>197800081</td><td></td><td>ALL</td><td></td></tr><tr><td>311800060</td><td>31180273</td><td></td><td>ALL</td><td></td></tr><tr><td>311800118</td><td>31180489</td><td></td><td>ALL</td><td></td></tr><tr><td>31180271</td><td>311800008</td><td></td><td>ALL</td><td></td></tr><tr><td>311800104</td><td>311800091</td><td></td><td>ALL</td><td></td></tr><tr><td>31180437</td><td>311800112</td><td></td><td>ALL</td><td></td></tr><tr><td>335800213</td><td>33580888</td><td></td><td>ALL</td><td></td></tr><tr><td>343800136</td><td>343800135</td><td></td><td>ALL</td><td></td></tr><tr><td>343800137</td><td>343800135</td><td></td><td>ALL</td><td></td></tr><tr><td>343800138</td><td>343800135</td><td></td><td>ALL</td><td></td></tr><tr><td>353800880</td><td>35383452</td><td></td><td>ALL</td><td></td></tr><tr><td>353800878</td><td>353800599</td><td></td><td>ALL</td><td></td></tr><tr><td>353800879</td><td>353800754</td><td></td><td>ALL</td><td></td></tr><tr><td>353800750</td><td>353800877</td><td></td><td>ALL</td><td></td></tr><tr><td>371800089</td><td>371800085</td><td></td><td>ALL</td><td></td></tr><tr><td>37780178</td><td>377800031</td><td></td><td>ALL</td><td></td></tr></table>															128800062	128800067		ALL		128800069	128800067		ALL		132800012	13280401		ALL		13880660	13880684		ALL		13881103	13880719		ALL		138800097	13880750		ALL		138800111	138800036		ALL		155800203	15580894		ALL		197800082	197800081		ALL		311800060	31180273		ALL		311800118	31180489		ALL		31180271	311800008		ALL		311800104	311800091		ALL		31180437	311800112		ALL		335800213	33580888		ALL		343800136	343800135		ALL		343800137	343800135		ALL		343800138	343800135		ALL		353800880	35383452		ALL		353800878	353800599		ALL		353800879	353800754		ALL		353800750	353800877		ALL		371800089	371800085		ALL		37780178	377800031		ALL																																																						
128800062	128800067		ALL																																																																																																																																																																																								
128800069	128800067		ALL																																																																																																																																																																																								
132800012	13280401		ALL																																																																																																																																																																																								
13880660	13880684		ALL																																																																																																																																																																																								
13881103	13880719		ALL																																																																																																																																																																																								
138800097	13880750		ALL																																																																																																																																																																																								
138800111	138800036		ALL																																																																																																																																																																																								
155800203	15580894		ALL																																																																																																																																																																																								
197800082	197800081		ALL																																																																																																																																																																																								
311800060	31180273		ALL																																																																																																																																																																																								
311800118	31180489		ALL																																																																																																																																																																																								
31180271	311800008		ALL																																																																																																																																																																																								
311800104	311800091		ALL																																																																																																																																																																																								
31180437	311800112		ALL																																																																																																																																																																																								
335800213	33580888		ALL																																																																																																																																																																																								
343800136	343800135		ALL																																																																																																																																																																																								
343800137	343800135		ALL																																																																																																																																																																																								
343800138	343800135		ALL																																																																																																																																																																																								
353800880	35383452		ALL																																																																																																																																																																																								
353800878	353800599		ALL																																																																																																																																																																																								
353800879	353800754		ALL																																																																																																																																																																																								
353800750	353800877		ALL																																																																																																																																																																																								
371800089	371800085		ALL																																																																																																																																																																																								
37780178	377800031		ALL																																																																																																																																																																																								
B	<table><tr><td>15580914</td><td>15580897</td><td></td><td>ALL</td><td></td></tr><tr><td>155800190</td><td>15580897</td><td></td><td>ALL</td><td></td></tr><tr><td>311800004</td><td>31180370</td><td></td><td>ALL</td><td></td></tr><tr><td>311800013</td><td>31180508</td><td></td><td>ALL</td><td>NXP w/ Diodes</td></tr><tr><td>353800107</td><td>35383239</td><td></td><td>ALL</td><td></td></tr><tr><td>353800525</td><td>35384471</td><td></td><td>ALL</td><td></td></tr><tr><td>37280186</td><td>37280185</td><td></td><td>ALL</td><td></td></tr><tr><td>376800014</td><td>37680761</td><td></td><td>ALL</td><td></td></tr><tr><td>376800086</td><td>37680761</td><td></td><td>ALL</td><td></td></tr><tr><td>37681080</td><td>37680820</td><td></td><td>ALL</td><td></td></tr><tr><td>376800074</td><td>37680855</td><td></td><td>ALL</td><td></td></tr><tr><td>37681089</td><td>37681128</td><td></td><td>ALL</td><td></td></tr><tr><td>74080144</td><td>74080118</td><td></td><td>ALL</td><td></td></tr><tr><td>740800028</td><td>74080118</td><td></td><td>ALL</td><td></td></tr><tr><td>740800003</td><td>74080135</td><td></td><td>ALL</td><td></td></tr><tr><td>998-04070</td><td>998-04071</td><td></td><td>ALL</td><td>Hynix alt to SS</td></tr></table>															15580914	15580897		ALL		155800190	15580897		ALL		311800004	31180370		ALL		311800013	31180508		ALL	NXP w/ Diodes	353800107	35383239		ALL		353800525	35384471		ALL		37280186	37280185		ALL		376800014	37680761		ALL		376800086	37680761		ALL		37681080	37680820		ALL		376800074	37680855		ALL		37681089	37681128		ALL		74080144	74080118		ALL		740800028	74080118		ALL		740800003	74080135		ALL		998-04070	998-04071		ALL	Hynix alt to SS	B																																																																																											
	15580914	15580897		ALL																																																																																																																																																																																							
	155800190	15580897		ALL																																																																																																																																																																																							
	311800004	31180370		ALL																																																																																																																																																																																							
	311800013	31180508		ALL	NXP w/ Diodes																																																																																																																																																																																						
	353800107	35383239		ALL																																																																																																																																																																																							
	353800525	35384471		ALL																																																																																																																																																																																							
	37280186	37280185		ALL																																																																																																																																																																																							
	376800014	37680761		ALL																																																																																																																																																																																							
	376800086	37680761		ALL																																																																																																																																																																																							
37681080	37680820		ALL																																																																																																																																																																																								
376800074	37680855		ALL																																																																																																																																																																																								
37681089	37681128		ALL																																																																																																																																																																																								
74080144	74080118		ALL																																																																																																																																																																																								
740800028	74080118		ALL																																																																																																																																																																																								
740800003	74080135		ALL																																																																																																																																																																																								
998-04070	998-04071		ALL	Hynix alt to SS																																																																																																																																																																																							
- T208																																																																																																																																																																																											
A																A																																																																																																																																																																											
8		7		6		5		4		3		2		1																																																																																																																																																																													
<table><tr><td colspan="5">PAGE TITLE</td></tr><tr><td colspan="5">Alternates BOM Table</td></tr><tr><td colspan="2"> Apple Inc.</td><td>DRAWING NUMBER</td><td>051-00515</td><td>SIZE</td><td>D</td></tr><tr><td colspan="2" rowspan="4">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</td><td>REVISION</td><td colspan="3">9.0.0</td></tr><tr><td>BRANCH</td><td colspan="3">dvt-fab09-0</td></tr><tr><td>PAGE</td><td colspan="3">145 OF 145</td></tr><tr><td>SHEET</td><td colspan="3">119 OF 119</td></tr></table>															PAGE TITLE					Alternates BOM Table					 Apple Inc.		DRAWING NUMBER	051-00515	SIZE	D	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		REVISION	9.0.0			BRANCH	dvt-fab09-0			PAGE	145 OF 145			SHEET	119 OF 119																																																																																																																																													
PAGE TITLE																																																																																																																																																																																											
Alternates BOM Table																																																																																																																																																																																											
 Apple Inc.		DRAWING NUMBER	051-00515	SIZE	D																																																																																																																																																																																						
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		REVISION	9.0.0																																																																																																																																																																																								
		BRANCH	dvt-fab09-0																																																																																																																																																																																								
		PAGE	145 OF 145																																																																																																																																																																																								
		SHEET	119 OF 119																																																																																																																																																																																								

PAGE TITLE				PAGE TITLE	
<div>Alternates BOM Table</div>				DRWTING NUMBER	STEP
<div><div> Apple Inc.</div></div>				051-00515	D
<div>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</div>				REVISION	9.0.0
				BRANCH	dvt-fab09-0
				PAGE	145 OF 145
				SHEET	119 OF 119