

8			7			6			5			4			3			2			1																																								
1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%. 2. ALL CAPACITANCE VALUES ARE IN MICROFARADS. 3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.																		REV		ECN		DESCRIPTION OF REVISION		CK APPD																																					
																		8		0028006021		ENGINEERING RELEASED		DATE 2021-03-11																																					
LAST_MODIFICATION=Thu Mar 11 13:03:22 2021																		LAST_MODIFICATION=Thu Mar 11 13:03:22 2021																		LAST_MODIFICATION=Thu Mar 11 13:03:22 2021																									
PAGE		CSA		CONTENTS												SYNC		DATE		PAGE		CSA		CONTENTS												SYNC		DATE		PAGE		CSA		CONTENTS												SYNC		DATE			
1		1		SCHEM, MLB, T728														10/04/2019		61		138		SENSORS: LOW-SIDE (1/3)												HKUKRATI		05/15/2020		121		251		KEYBOARD IOX, SUPPORT												T585_REF_KBD_34PIN_0.2.0					
2		2		REFERENCE DESIGN TABLE														10/23/2019		62		139		SENSORS: LOW-SIDE (2/3)												HKUKRATI		03/02/2020		122		252		KEYBOARD SIGNAL CONNECTOR, ESD												RAYMOND		09/18/2020			
3		4		PD PARTS												GAREN		03/09/2020		63		140		SENSORS: LOW-SIDE (3/3)												HKUKRATI		03/25/2020		123		253		TRACKPAD SUPPORT												T724_HKUKRATI_MLB_S_009/18/2020					
4		5		SOC: CONFIG STRAPS												T585_REF_SOC_H13S_0.0.44				64		141		SENSORS:THERMAL												T724_HKUKRATI_MLB_S_205/28/2020				124		254		TRACKPAD CONNECTOR												HKUKRATI		01/18/2020			
5		6		SOC: RESETS, CLOCKS, SWD												T585_REF_SOC_H13S_0.0.44				65		144		SENSORS: MOTION												T585_REF_IMU_COBOL_0.0.6				125		255		TOUCHID CONN												JSHAO		03/02/2020			
6		8		SOC: GPIO, I2C, I2S, SPI, UART												T585_REF_SOC_H13S_0.0.44				66		145		FANS														01/10/2020		126		256		TOUCHID SUPPORT												T585_REF_MESA_SUPPORT_0.14.0					
7		10		SOC: LPDP, ISP, MIPI												T585_REF_SOC_H13S_0.0.44				67		150		USB-C: High Speed ATC0												T585_REF_USBC_ACE2_0.33.0				127		257		TOUCHID BACKLIGHT												T585_REF_MESA_BACKLIGHT_0.1.0					
8		12		SOC: PCIE												T585_REF_SOC_H13S_0.0.44				68		151		USB-C: High Speed ATC1												T585_REF_USBC_ACE2_0.33.0				128		266		FCT 1												SELIM		01/06/2021			
9		14		SOC: CIO, USB												T585_REF_SOC_H13S_0.0.44				69		152		USB-C: Support 1 ATC01												T585_REF_USBC_ACE2_0.33.0				129		267		FCT 2												SELIM		12/10/2020			
10		16		SOC: AOP, SMC, NUB												T585_REF_SOC_H13S_0.0.44				70		153		USB-C: Support 2 ATC01												T724_RUENJOU_MLB_S_0.05/26/2020				130		268		PMU TEST POINTS												SELIM		01/22/2021			
11		19		SOC: SHARED SUPPORT												BYRON		09/18/2020		71		154		USB-C: Port Controller ATC0												T724_RUENJOU_MLB_S_0.05/26/2020				131		271		Debug: LEDs, Koba												TAEWAN_T724		03/23/2020			
12		20		SOC: SPI NOR & SEP ROM												T585_REF_SOC_H13S_0.0.44				72		155		USB-C: Port Controller ATC1												T724_RUENJOU_MLB_S_0.05/26/2020				132		272		Debug: Buttons												TAEWAN_T724		03/23/2020			
13		21		PROJECT SUPPORT (1/2)												GAREN		09/18/2020		73		156		USB-C: Left Connectors												BYRON		04/01/2020		133		282		DESENSE_1												MLADEN		04/27/2020			
14		22		PROJECT SUPPORT (2/2)												T724_TKIM3_MLB_S_0.4602/19/2020				74		157		USB-C: HS Level Shifters												T585_REF_USBC_ACE2_0.40.0				134		295		DEBUG: VITAMIN-C												T724_TKIM3_MLB_S_0.3905/18/2020					
15		23		SOC: POWER (CPU, GPU)												T585_REF_SOC_H13S_0.0.44				75		158		USB-C: 5V Regulator												T585_REF_USBC_VR_LT8642_0.8.5				135		401		POWER ALIASES 1												DTUZMAN		01/31/2020			
16		25		SOC: POWER (SRAM, DISP, DCS)												T585_REF_SOC_H13S_0.0.44				76		159		USB-C: CC Protection												T728_MLB_1.15.0		11/20/2020		136		402		POWER ALIASES 2												DTUZMAN		01/28/2020			
17		27		SOC: POWER (VDD1, VDD2)												T585_REF_SOC_H13S_0.0.44				77		160		USB-C: High Speed ATC2												T585_REF_USBC_ACE2_0.33.0				137		403		POWER ALIASES CLVR												T585_REF_PMIC_MAVERICKS_0.82/02/2020					
18		29		SOC: POWER (VDDQ)												T585_REF_SOC_H13S_0.0.44				78		162		USB-C: Support 1 ATC23												T724_RUENJOU_MLB_S_0.02/18/2020				138		404		POWER ALIASES MPMU												T585_REF_PMIC_MAVERICKS_0.86.0					
19		31		SOC: POWER (AFR, ANE, CIO)												T585_REF_SOC_H13S_0.0.44				79		163		USB-C: Support 2 ATC23												T724_RUENJOU_MLB_S_0.05/26/2020				139		405		POWER ALIASES SPMU												T585_REF_PMIC_MAVERICKS_0.86.0					
20		33		SOC: POWER (FABRIC, FIXED)												T585_REF_SOC_H13S_0.0.44				80		164		USB-C: Port Controller ATC2												T724_RUENJOU_MLB_S_0.05/26/2020				140		406		SIGNAL ALIASES - 1 (HIGH SPEED)												GAREN		06/23/2020			
21		35		SOC: POWER (VDDIO)												T585_REF_SOC_H13S_0.0.44				81		166		USB-C: Right Connector												BYRON		04/01/2020		141		407		SIGNAL ALIASES 2														10/29/2019			
22		37		SOC: POWER (VDD2H0)												T585_REF_SOC_H13S_0.0.44				82		167		USB-C: HS Level Shifters												T585_REF_USBC_ACE2_0.40.0				142		408		SIGNAL ALIASES 3														06/24/2020			
23		39		SOC: POWER (VDD2H1)												T585_REF_SOC_H13S_0.0.44				83		168		USB-C: 5V Regulator												T585_REF_USBC_VR_TPS62180_0.6.3				143		409		SIGNAL ALIASES - 4												GAREN		06/23/2020			
24		41		SOC: GND-1												T585_REF_SOC_H13S_0.0.44				84		169		USB-C: CIO Redrivers 2/3												T585_REF_CIO_RDVR_COLUMBUS_0.7.0				144		411		SIGNAL ALIASES-T728														03/10/2020			
25		42		SOC: GND-2												T585_REF_SOC_H13S_0.0.44				85		170		USB-C: SUPPORT												T728_MLB_0.67.0		09/18/2020		145		501		17.2 RULES														CONSTRAINTS		01/08/2020	
26		50		Secure Element												T585_REF_SE_CERES_0.13.0				86		175		HDMI: CONNECTOR												T585_REF_HDMI_MADEA_0.15.1				146		502		17.2 PHYSICAL CSETS														CONSTRAINTS		01/08/2020	
27		51		BATTERY CONN												AMIR_T724		03/25/2020		87		176		HDMI: DESENSE FILTERS												T585_REF_HDMI_MADEA_0.15.1				147		503		17.2 SPACING CSETS, ISO														CONSTRAINTS		01/08/2020	
28		52		PBUS SUPPLY & BATTERY CHARGER												T585_REF_MAGSAFE_ACE2_0.68.0				88		177		HDMI: MADEA												T585_REF_HDMI_MADEA_0.15.1				148		504		17.2 SPACING CSETS, CLASS-CLASS														CONSTRAINTS		01/08/2020	
29		53		MAGSAFE: WHAMOLA SUPPORT												T585_REF_MAGSAFE_ACE2_0.68.0				89		178		HDMI: Project Support 1												T585_REF_HDMI_MADEA_0.15.1				149		601		BOM TABLES												T668_MLB		01/30/2020			
30		54		MAGSAFE: CONNECTOR												T585_REF_MAGSAFE_ACE2_0.68.0				90		179		HDMI: Project Support 2												T585_REF_HDMI_MADEA_0.15.1				150		602		BOM OPTION TABLES												T668_MLB_5.7.0		05/20/2020			
31		55		MAGSAFE: PORT CONTROLLER												T585_REF_MAGSAFE_ACE2_0.68.0				91		195		SDCARD CONTROLLER												T585_REF_SDCARD_GL9755_0.17.0				151		603		BOM GROUPS												T668_MLB_5.7.0		05/20/2020			
32		56		MAGSAFE: CONTROLLER SUPPORT												T585_REF_MAGSAFE_ACE2_0.68.0				92		196		SDCARD CONNECTOR												T585_REF_SDCARD_GL9755_0.17.0				152		604		BOM VARIANT TABLES												T668_MLB_5.7.0		05/20/2020			
33		57		POWER: 3V8 AON (1/2)												T585_REF_VR_ICEMAN_1.25.0				93		197		SDCARD IO LS/BUF SUPPORT												T585_REF_SDCARD_GL9755_0.17.0				153		611		BOM ALTERNATES												T668_MLB_5.7.0		05/01/2020			
34		58		POWER: 3V8 AON (2/2)												T585_REF_VR_ICEMAN_1.25.0				94		198		SDCARD POWER SUPPORT												T585_REF_SDCARD_GL9755_0.17.0				154		701		PACK OPTIONS														10/20/2019			
35		60		POWER: 3V8 AON OUTPUT THROTTLE												T585_REF_VR_ICEMAN_HP_0.25.0				95		200		WIFI/BT: MODULE												T585_REF_WIRELESS_TYPHOON_0.28.0				155		999		TEMPORARY ALIASES												GAREN		06/23/2020			
36		76		PMU BUCK OUTPUT DESENSE CAPS												T724_DTUZMAN_MLB_S_1.05/20/2020				96		201		WIFI/BT: ANTENNA and GND												T585_REF_WIRELESS_TYPHOON_0.28.0																									
37		77		PMIC SLAVE VIN/LDO/SW												T585_REF_PMIC_MAVERICKS_0.89.0				97		220		STORAGE: SSD0 S5E <0>												T585_REF_STORAGE_S5E_0.36.0																									
38		78		PMIC SLAVE BUCKS												T585_REF_PMIC_MAVERICKS_0.89.0				98		221		STORAGE: SSD0 S5E <1>												T585_REF_STORAGE_S5E_0.36.0																									
39		79		PMIC SLAVE GPIO & GND												T585_REF_PMIC_MAVERICKS_0.89.0				99		222		STORAGE: SSD0 S5E <2>												T585_REF_STORAGE_S5E_0.36.0																									
40		80		PMIC BUCK OUTPUT CAPS												T585_REF_PMIC_MAVERICKS_0.89.0				100		223		STORAGE: SSD0 S5E <3>												T585_REF_STORAGE_S5E_0.36.0																									
41		81		PMIC MASTER VIN/LDO/SW												T585_REF_PMIC_MAVERICKS_0.89.0				101		224		STORAGE: SSD0 OCARINA & NAND VCC												T585_REF_STORAGE_S5E_0.36.0																									
42		82		PMIC MASTER BUCKS												T585_REF_PMIC_MAVERICKS_0.89.0				102		225		STORAGE: SSD1 S5E <0>												T585_REF_STORAGE_S5E_0.36.0																									
43		83		PMIC MASTER GPIO & GND												T585_REF_PMIC_MAVERICKS_0.89.0				103		226		STORAGE: SSD1 S5E <1>												T585_REF_STORAGE_S5E_0.36.0																									
44		84		PMU PROJECT-SPECIFIC SUPPORT												T724_DTUZMAN_MLB_S_2.05/07/2020				104		227		STORAGE: SSD1 S5E <2>												T585_REF_STORAGE_S5E_0.36.0																									
45		85		PMU PROJECT SPECIFIC SUPPORT 2												T728_MLB_1.15.0		12/02/2020		105		228		STORAGE: SSD1 S5E <3>												T585_REF_STORAGE_S5E_0.36.0																									
46		92		VIPER SUPPORT												MLADEN		04/15/2020		106		229		STORAGE: SSD1 OCARINA & NAND VCC												T585_REF_STORAGE_S5E_0.36.0																									
47		93		VIPER CONTROLLER												T585_REF_VR_VIPER_0.61.0				107		230		STORAGE: SSD SUPPORT												WUDI_T668_MLB		09/18/2020																							
48		94		VIPER POWER STAGES 1												T585_REF_VR_VIPER_0.61.0				108		234		CAMERA: FLEX CONNECTOR												COLIN		09/10/2020																							
49		95		VIPER POWER STAGES 2												T585_REF_VR_VIPER_0.61.0				109		236		DISPLAY CONNECTOR												T728_YANIR_MLB_0.62.412/03/2020																									
50		101		MONACO 0												T585_REF_CLVR_MONACO_0.74.0				110		237		DISPLAY POWER SEQUENCER												T585_REF_PANELPWR_2D_0.7.0																									
51		102		MONACO 1												T585_REF_BLC_MONACO_0.74.0				111		238		LUXE LCD Backlight Driver												T585_REF_BLC_LUXE_0.28.0																									
52		105		MONACO 4												T585_REF_CLVR_MONACO_0.74.0				112		239		BCON CONNECTOR												T585_REF_BLC_LUXE_0.28.0																									
53		120		MONACO PROJECT SUPPORT												DTUZMAN		01/10/2020		113		242		SECDIS: LID ANGLE SENSOR												T585_REF_LAS_LID_0.6.09/18/2020																									
54		122		POWER: 5V S2 TPS62130												T585_REF_VR_5V_TPS62130_0.11.0				114		243		SECDIS: DMIC_LID_CONTROL												T585_REF_LAS_LID_0.6.0																									
55		130		I2C Connections - AP												APADRON7		03/04/2020		115		245		AUDIO JACK CODEC												T585_REF_CODEC_CARLOW_1.1.0																									
56		131		I2C Connections - SMC												APADRON7		03/04/2020		116		246		AUDIO AMPLIFIERS (1/2)												T585_REF_SPKRAMP_SN012776_3.3.0																									
57		132		I2C Connections - Other												APADRON7		03/04/2020		117		247		AUDIO AMPLIFIERS (2/2)												T585_REF_SPKRAMP_SN012776_3.3.0																									
58		135		SENSORS: HIGH-SIDE (1/2)												HKUKRATI		05/15/2020		118		248		AUDIO CONNECTORS: AMPS												RAYMOND		09/18/2020																							
59		136		SENSORS: HIGH-SIDE (2/2)												HKUKRATI		03/02/2020		119		249		Audio Flex Connectors												RAYMOND		09/18/2020																							
60		137		SENSORS: HIGH-SIDE												HKUKRATI		03/02/2020		120		250		BEN: KEYBD BKLT												T585_REF_BLC_BEN_KBD_ONLY_0.4.0																									
8			7			6			5			4			3			2			1																																								

SCHEM, MLB, T728

SCHEM, MLB-S, X2728


Apple Inc.

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

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


SOURCE PROJECT	SUB-DESIGN NAME	SUB-DESIGN PAGES	VERSION	HARD/ SOFT	SYNC_DATE/TIME
T585	REF_SOC_H13S	5,6,8,10,12,14,16,20,23,25,27,29,31,33,35,37,39,41,42	0.0.44	S	2020_08_25_19:51:48
T585	REF_SE_CERES	50	0.13.0	S	2020_02_27_16:33:46
T585	REF_MAGSAFE_ACE2	52-56	0.68.0	S	2021_01_29_16:52:02
T585	REF_VR_ICEMAN	57,58	1.25.0	S	2020_11_30_14:38:35
T585	REF_VR_ICEMAN_HP	60	0.25.0	S	2020_11_30_14:39:44
T585	REF_PMIC_MAVERICKS	77-83	0.89.0	S	2021_01_26_21:06:59
T585	REF_VR_VIPER	93,94,95	0.61.0	S	2021_01_27_13:09:56
T585	REF_CLVR_MONACO	101,102,105,106	0.74.0	S	2020_11_30_14:41:17
T585	REF_VR_5V_TPS62130	122	0.11.0	S	2020_12_01_11:36:35
T585	REF_IMU_COBOL	144	0.0.6	S	2020_12_01_11:35:58
T585	REF_USBC_ACE2	157,167	0.40.0	S	2021_01_11_12:16:11
T585	REF_CIO_RDVR_COLUMBUS	169	0.7.0	S	2021_01_14_12:53:02
T585	REF_USBC_VR_LT8642	158	0.8.5	S	2020_09_09_12:38:55
T585	REF_USBC_VR_TPS62180	168	0.6.3	S	2020_08_24_13:32:22
T585	REF_HDMI_MADEA	175-179	0.15.1	S	2020_12_01_17:03:28
T585	REF_SDCARD_GL9755	195-198	0.17.0	S	2021_01_19_14:27:56
T585	REF_WIRELESS_TYPHOON	200,201	0.28.0	S	2020_12_04_18:38:32
T585	REF_STORAGE_S5E	220-229	0.36.0	S	2020_05_01_14:39:35
T585	REF_PANELPWR_2D	237	0.7.0	S	2020_09_14_16:14:38
T585	REF_BLC_LUXE	238,239	0.28.0	S	2021_01_26_13:37:42
T585	REF_LAS_L1D	242,243	0.6.0	S	2020_09_08_18:41:24
T585	REF_CODECC_CARLOW	245	1.1.0	S	2020_12_01_11:32:53
T585	REF_SPKRAMP_SN012776	246,247	3.3.0	S	2020_12_01_11:32:10
T585	REF_BLC_BEN_KBD_ONLY	250	0.4.0	S	2020_03_29_14:11:13
T585	REF_KBD_34PIN	251	0.2.0	S	2020_05_26_18:38:49
T585	REF_MESA_SUPPORT	256	0.14.0	H	2020_03_13_12:25:09
T585	REF_MESA_BACKLIGHT	257	0.1.0	S	2021_01_26_10:53:41
J316.SAKKOC	MLB_S	268	?	?	?

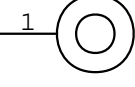
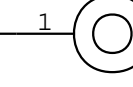
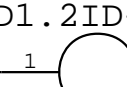
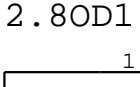
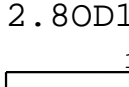
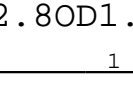
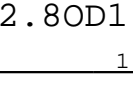
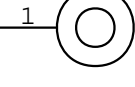
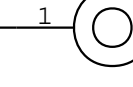
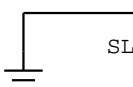
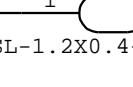
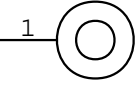
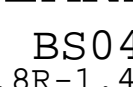

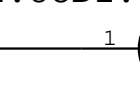
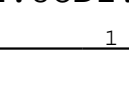
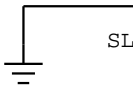
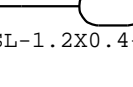
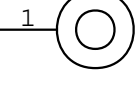

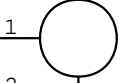
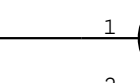
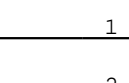
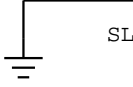
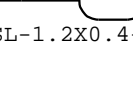
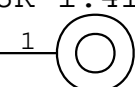
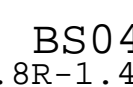
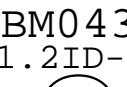
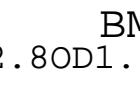
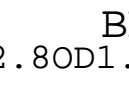
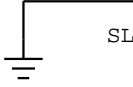
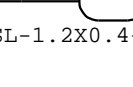
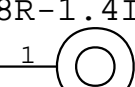

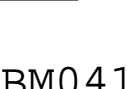


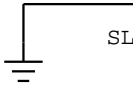
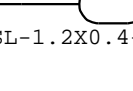
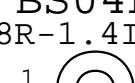

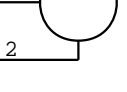
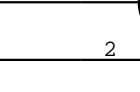

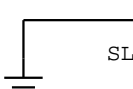
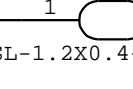
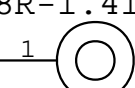





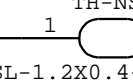

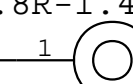
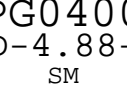
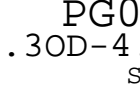
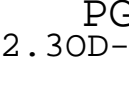

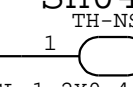
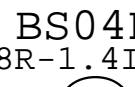
PIN DELAY MAPPING FILE	
REFERENCE DESIGNATOR	PIN DELAY CSV FILE NAME
U0600	SGA_PINDELAY_2020_01_08.CSV

PAGE TITLE			SYNC_DATE=10/23/2019		
REFERENCE DESIGN TABLE					
 Apple Inc.		DRAWING NUMBER		SIZE	
		051-05641		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		8.0.0	
		BRANCH		evt-2	
		PAGE		2 OF 999	
		SHEET		2 OF 155	

SOURCE PROJECT	SUB-DESIGN NAME	SUB-DESIGN PAGES	VERSION	HARD/ SOFT	SYNC_DATE/TIME
T585	REF_SOC_H13S	5,6,8,10,12,14,16,20,23,25,27,29,31,33,35,37,39,41,42	0.0.44	S	2020_08_25_19:51:48
T585	REF_SE_CERES	50	0.13.0	S	2020_02_27_16:33:46
T585	REF_MAGSAFE_ACE2	52-56	0.68.0	S	2021_01_29_16:52:02
T585	REF_VR_ICEMAN	57,58	1.25.0	S	2020_11_30_14:38:35
T585	REF_VR_ICEMAN_HP	60	0.25.0	S	2020_11_30_14:39:44
T585	REF_PMIC_MAVERICKS	77-83	0.89.0	S	2021_01_26_21:06:59
T585	REF_VR_VIPER	93,94,95	0.61.0	S	2021_01_27_13:09:56
T585	REF_CLVR_MONACO	101,102,105,106	0.74.0	S	2020_11_30_14:41:17
T585	REF_VR_5V_TPS62130	122	0.11.0	S	2020_12_01_11:36:35
T585	REF_IMU_COBOL	144	0.0.6	S	2020_12_01_11:35:58
T585	REF_USBC_ACE2	157,167	0.40.0	S	2021_01_11_12:16:11
T585	REF_CIO_RDVR_COLUMBUS	169	0.7.0	S	2021_01_14_12:53:02
T585	REF_USBC_VR_LT8642	158	0.8.5	S	2020_09_09_12:38:55
T585	REF_USBC_VR_TPS62180	168	0.6.3	S	2020_08_24_13:32:22
T585	REF_HDMI_MADEA	175-179	0.15.1	S	2020_12_01_17:03:28
T585	REF_SDCARD_GL9755	195-198	0.17.0	S	2021_01_19_14:27:56
T585	REF_WIRELESS_TYPHOON	200,201	0.28.0	S	2020_12_04_18:38:32
T585	REF_STORAGE_S5E	220-229	0.36.0	S	2020_05_01_14:39:35
T585	REF_PANELPWR_2D	237	0.7.0	S	2020_09_14_16:14:38
T585	REF_BLC_LUXE	238,239	0.28.0	S	2021_01_26_13:37:42
T585	REF_LAS_LID	242,243	0.6.0	S	2020_09_08_18:41:24
T585	REF_CODEC_CARLOW	245	1.1.0	S	2020_12_01_11:32:53
T585	REF_SPKRAMP_SN012776	246,247	3.3.0	S	2020_12_01_11:32:10
T585	REF_BLC_BEN_KBD_ONLY	250	0.4.0	S	2020_03_29_14:11:13
T585	REF_KBD_34PIN	251	0.2.0	S	2020_05_26_18:38:49
T585	REF_MESA_SUPPORT	256	0.14.0	H	2020_03_13_12:25:09
T585	REF_MESA_BACKLIGHT	257	0.1.0	S	2021_01_26_10:53:41
J316.SAKKOC	MLB_S	268	?	?	?

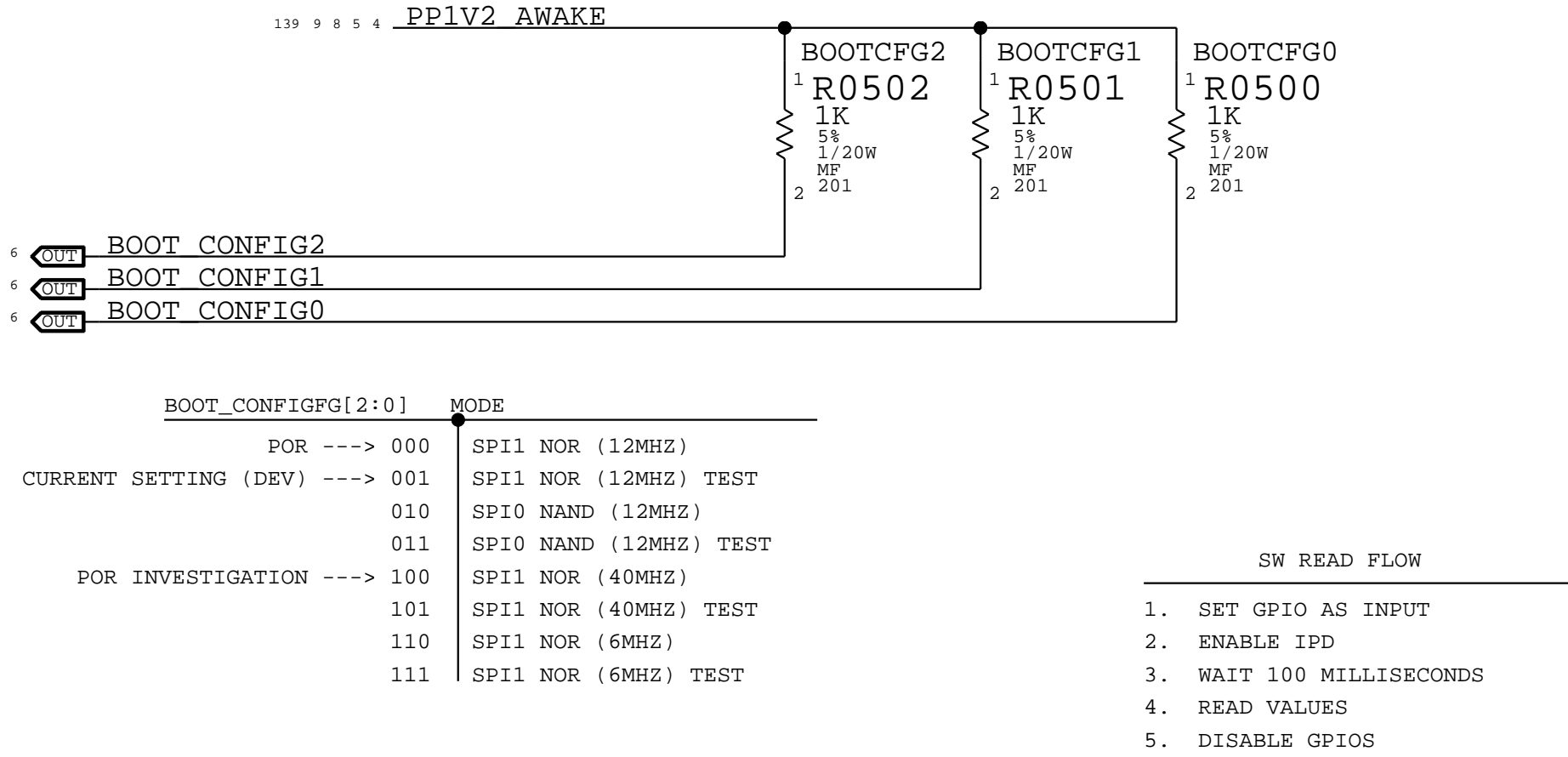
PIN DELAY MAPPING FILE	
REFERENCE DESIGNATOR	PIN DELAY CSV FILE NAME
U0600	SGA_PINDELAY_2020_01_08.CSV

PAGE TITLE			SYNC_DATE=10/23/2019	
REFERENCE DESIGN TABLE				
 Apple Inc.		DRAWING NUMBER	051-05641	SIZE
		REVISION	8.0.0	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	evt-2	
		PAGE	2 OF 999	
		SHEET	2 OF 155	

	8	7	6	5	4	3	2	1	
D	<div>MAGSAFE BOSS</div> <div>BS0450</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>LAS BOSS</div> <div>BS04R0</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>BUMPERS</div> <div>860-01715</div> <div>BM0400</div> <div>2.8OD1.2ID-2.0H-SM</div> <div></div>	<div>BUMPERS</div> <div>BM0401</div> <div>2.8OD1.2ID-2.0H-SM</div> <div></div>	<div>BUMPERS</div> <div>BM0402</div> <div>2.8OD1.2ID-2.0H-SM</div> <div></div>	<div>BUMPERS</div> <div>860-01722</div> <div>BM0407</div> <div>2.8OD1.2ID-4.6H-SM</div> <div></div>	<div>BUMPERS</div> <div>BM0408</div> <div>2.8OD1.2ID-4.6H-SM</div> <div></div>		
	<div>L USBC BOSS</div> <div>BS04F0</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>L SPEAKER BOSS</div> <div>BS04R2</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>				<div>SHIELD CAN SLOTS</div> <div>998-04440</div> <div>SH0400</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0401</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	ATC01 BBR Shield Can APN: 806-27113	
	<div>BS04F1</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>R SPEAKER BOSS</div> <div>BS04R3</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>BUMPERS</div> <div>860-01839</div> <div>BM0430</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0431</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0432</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>SH0402</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0403</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	Left Viper Shield Can APN: 806-27111	
C	<div>BS04F2</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>AUDIO JACK BOSS</div> <div>BS04R4</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>BM0433</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0434</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0435</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>SH0404</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0407</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	Right Viper Shield Can APN: 806-27112	
	<div>R USBC BOSS</div> <div>BS04G0</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>BS04R5</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>BM0436</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0437</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0438</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>SH0405</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0406</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	Columbus Redriver Shield Can APN: 806-27436	
	<div>BS04G1</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>TRACKPAD BOSS</div> <div>BS04T0</div> <div>BOSS-3.4OD1.75ID-2.6H-SM</div> <div></div>	<div>BM0411</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0412</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0413</div> <div>2.8OD1.2ID-2.0H-SM</div> <div></div>	<div>SH0408</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0409</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	SD Card Shield Can APN: 806-28825	
	<div>ANTENNA BOSS</div> <div>BS04L0</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>BS04T1</div> <div>BOSS-3.4OD1.75ID-2.6H-SM</div> <div></div>	<div>BM0413</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0414</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>BM0415</div> <div>2.8OD1.2ID-4.0H-SM</div> <div></div>	<div>SH0410</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0411</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	ATC2 BBR Shield Can APN: 806-27115	
B	<div>BS04L1</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>TOUCHID BOSS</div> <div>BS04T2</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>POGO PINS</div> <div>870-08821</div> <div>PG0400</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>	<div>PG0401</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>	<div>PG0402</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>	<div>SH0412</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0413</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	HDMI Madea Shield Can APN: 806-27117	
	<div>BS04L2</div> <div>BOSS-2.9X4.7-2.1H-SM</div> <div></div> <div>860-01841</div>	<div>BS04T3</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>	<div>PG0403</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>	<div>PG0404</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>	<div>PG0405</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>	<div>SH0414</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	<div>SH0415</div> <div>TH-NSP</div> <div>SL-1.2X0.4-1.5X0.7</div> <div></div>	Slave Maverick Shield Can APN: 806-27114	
	<div>DISP, CAM BOSS</div> <div>BS04P0</div> <div>2.7X1.8R-1.4ID-1.7H-SM</div> <div></div> <div>ALLOW_APPLE_PREFIX=BS</div> <div>860-01714</div>		<div>PG0406</div> <div>POGO-2.3OD-4.88-LOW FORCE</div> <div></div>						

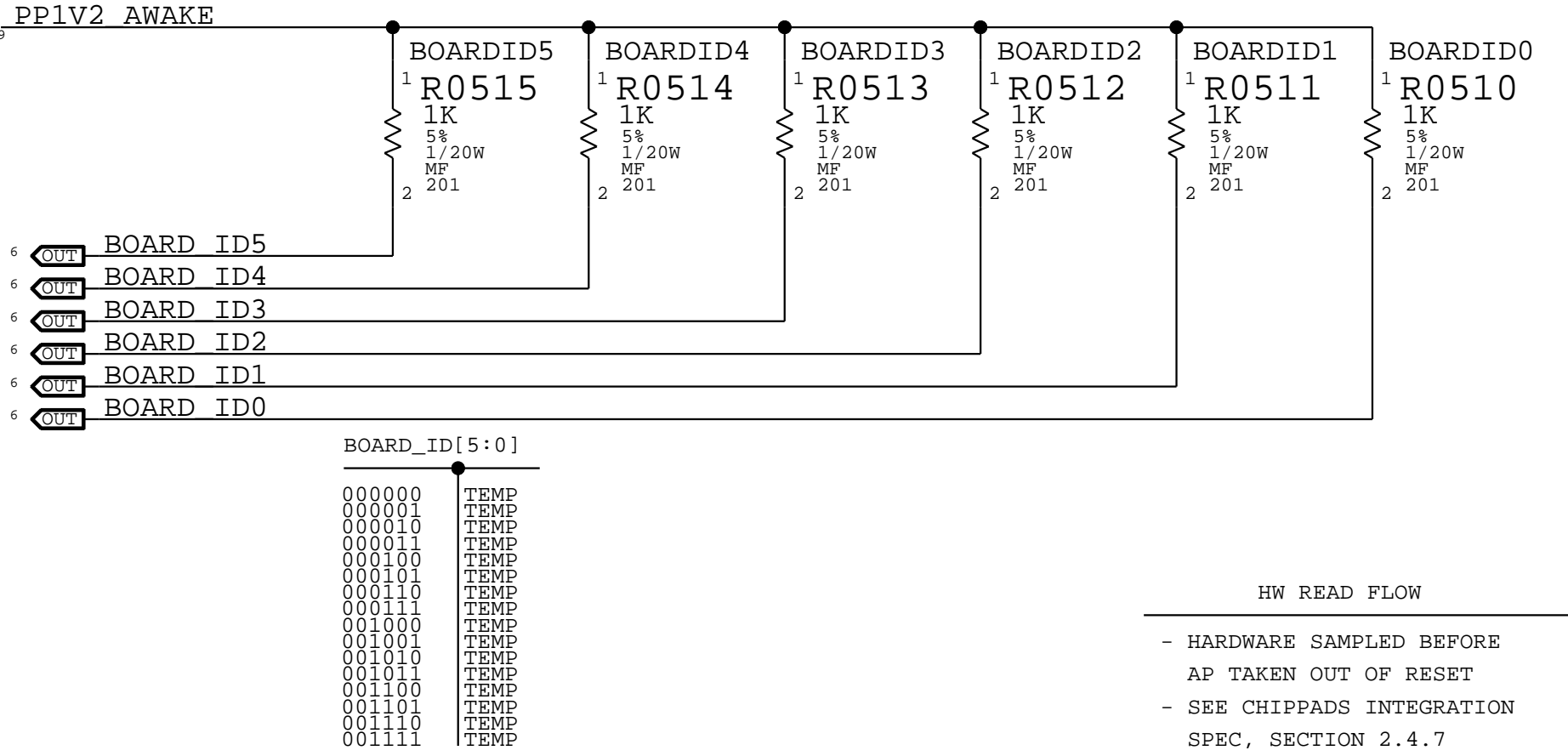
D

BOOT CONFIG



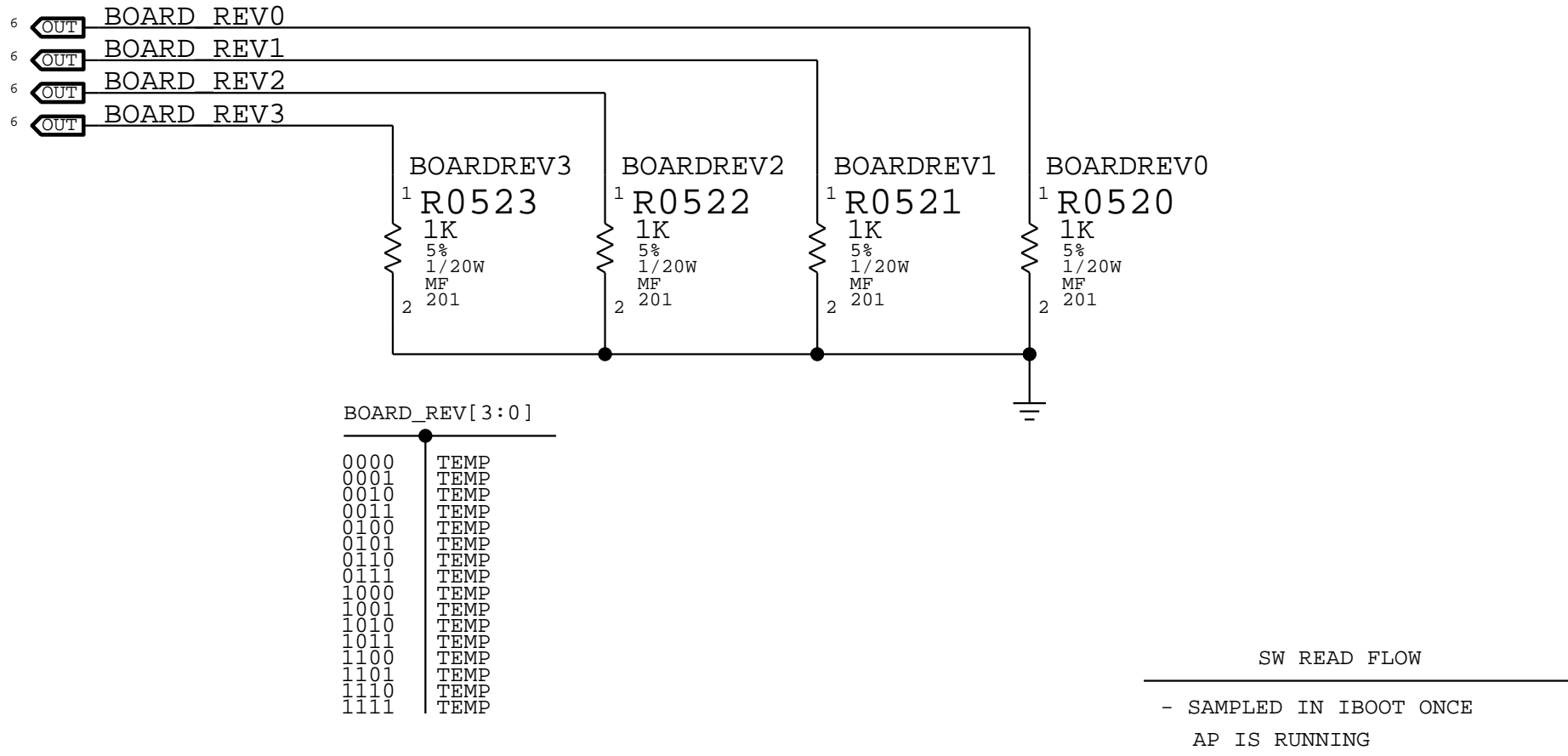
C

BOARD ID




B

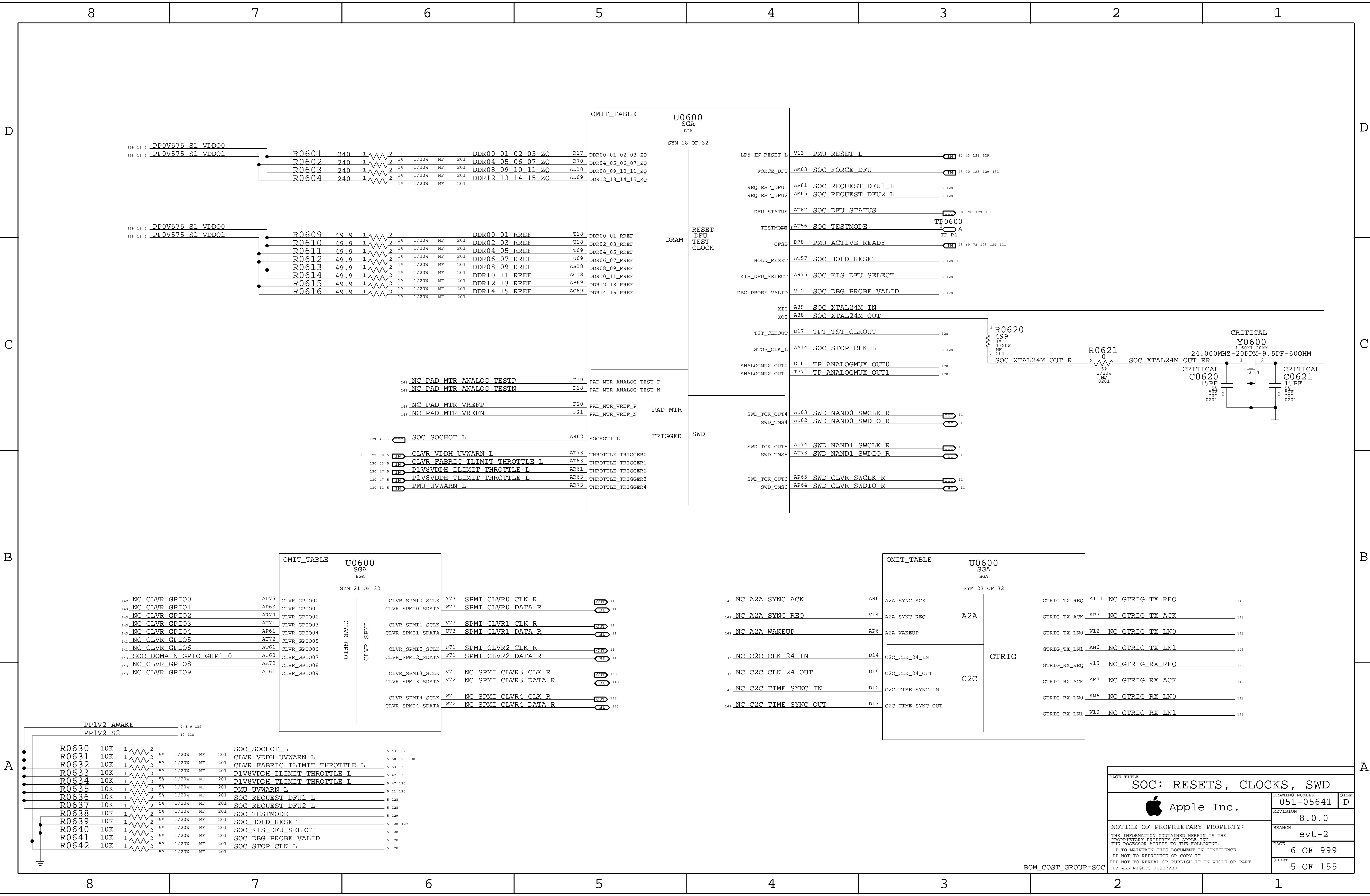
BOARD REV




A

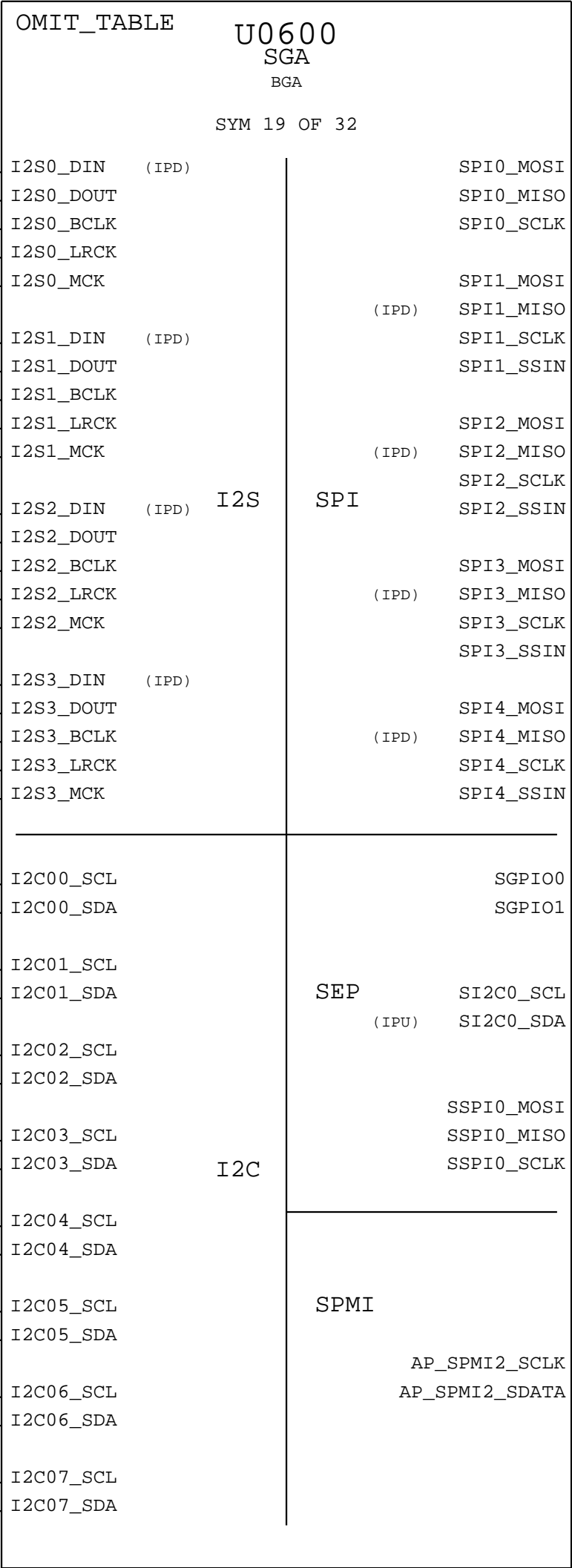
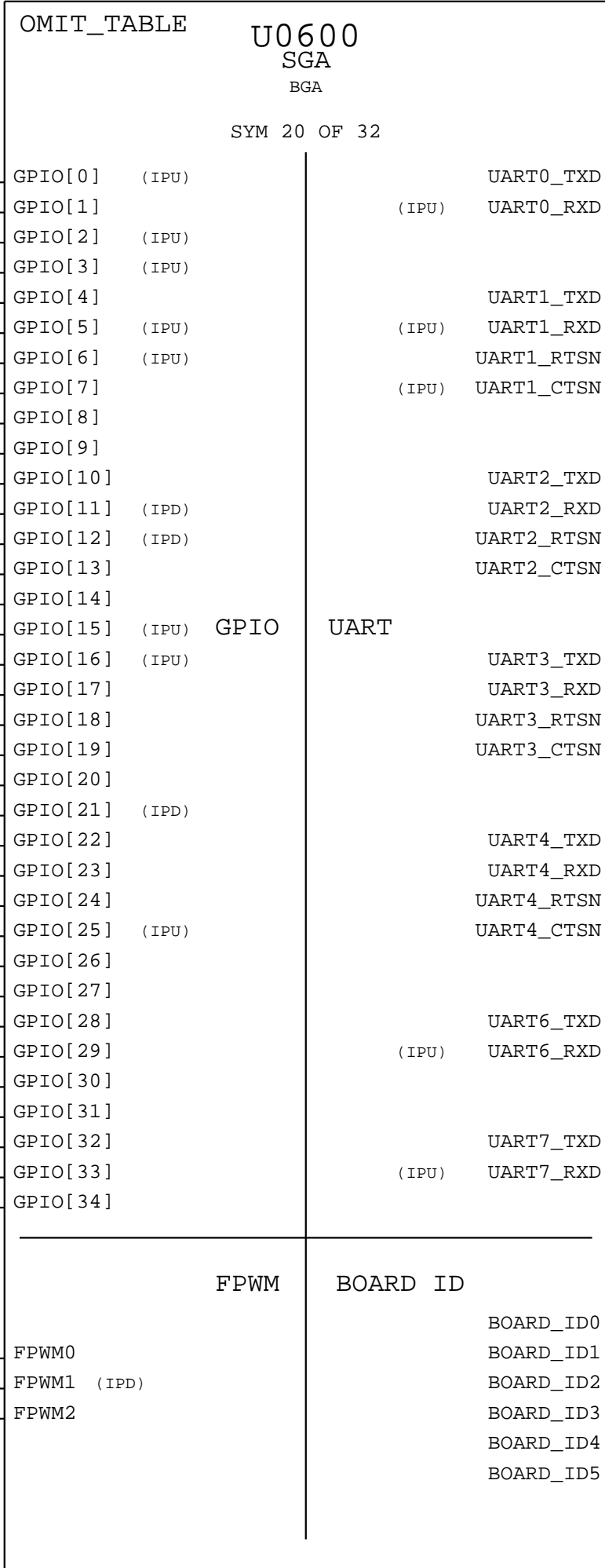
PAGE TITLE		
SOC: CONFIG STRAPS		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	5 OF 999
	SHEET	4 OF 155

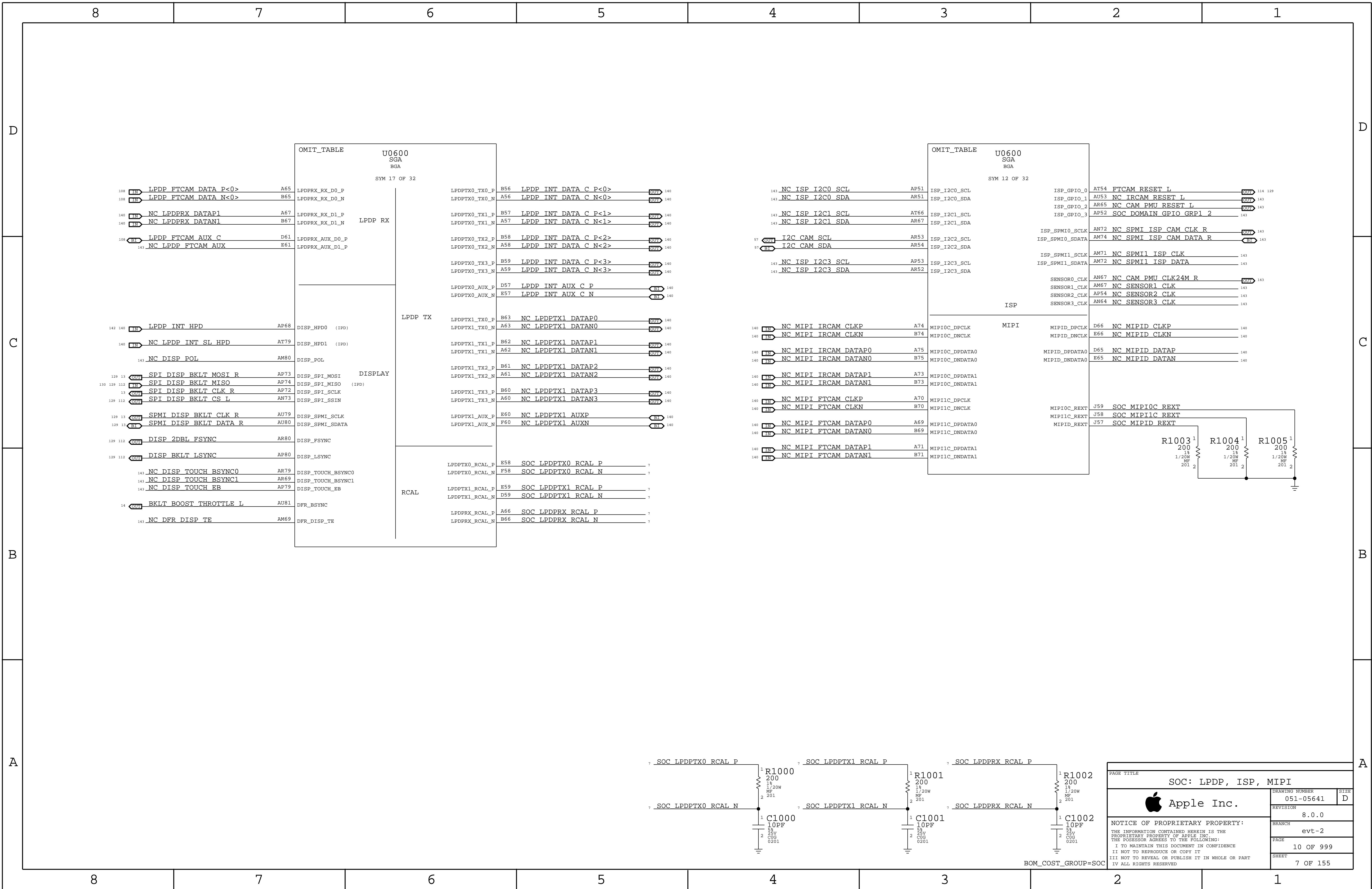
BOM\_COST\_GROUP=SOC

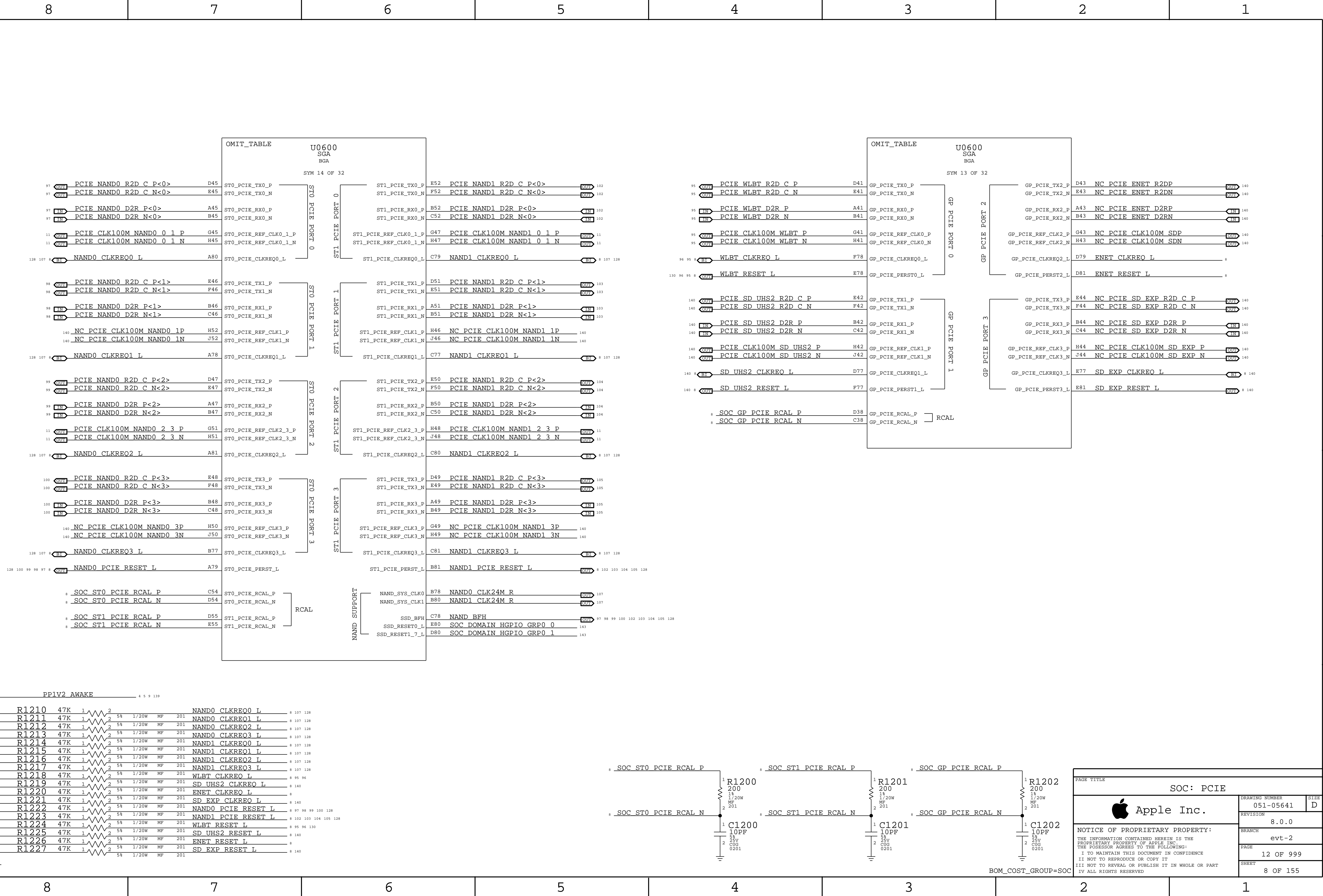


PAGE TITLE		
SOC: RESETS, CLOCKS, SWD		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
	BRANCH	evt-2
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE 6 OF 999
		SHEET 5 OF 155











D

C

B

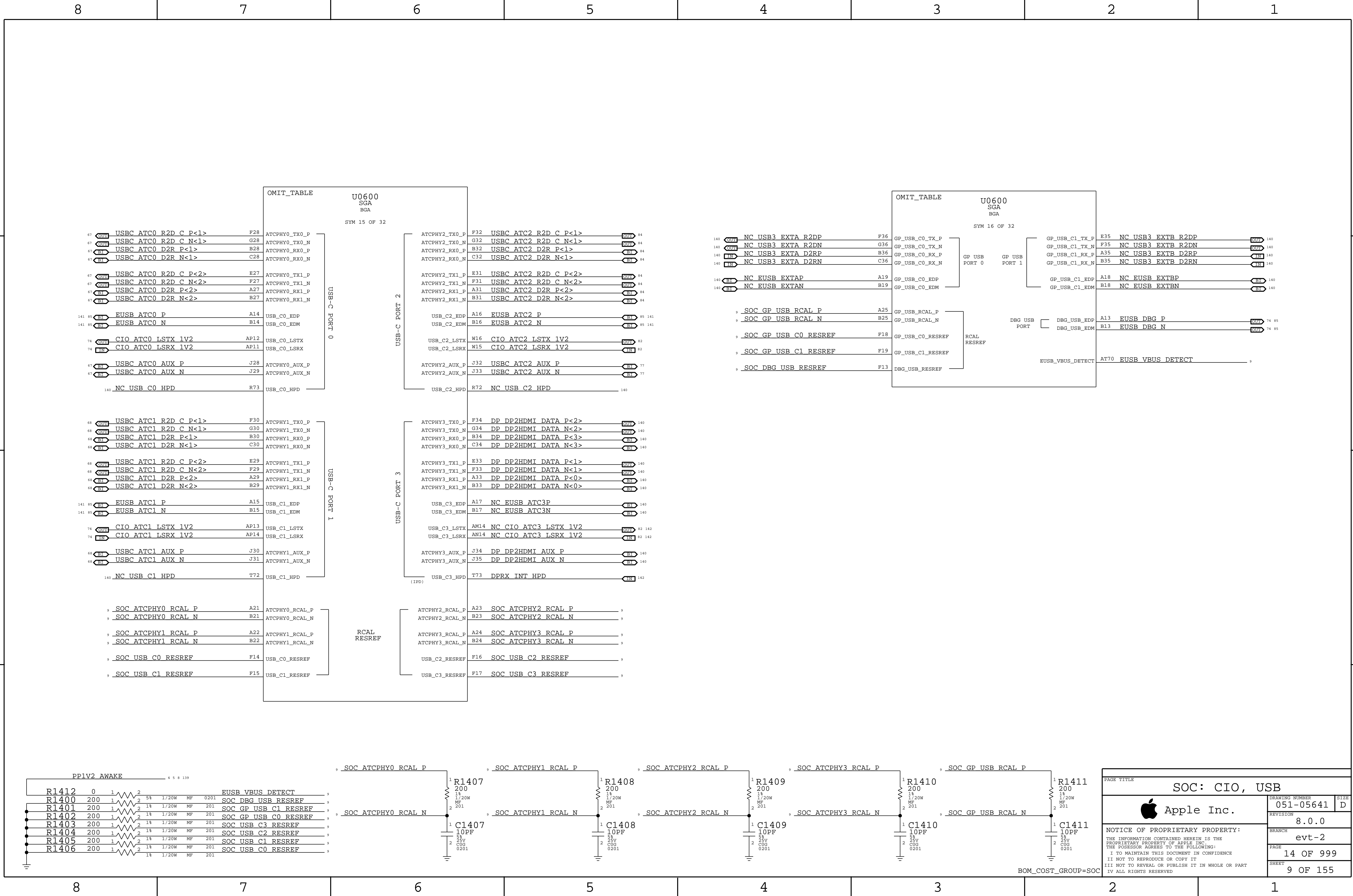
A

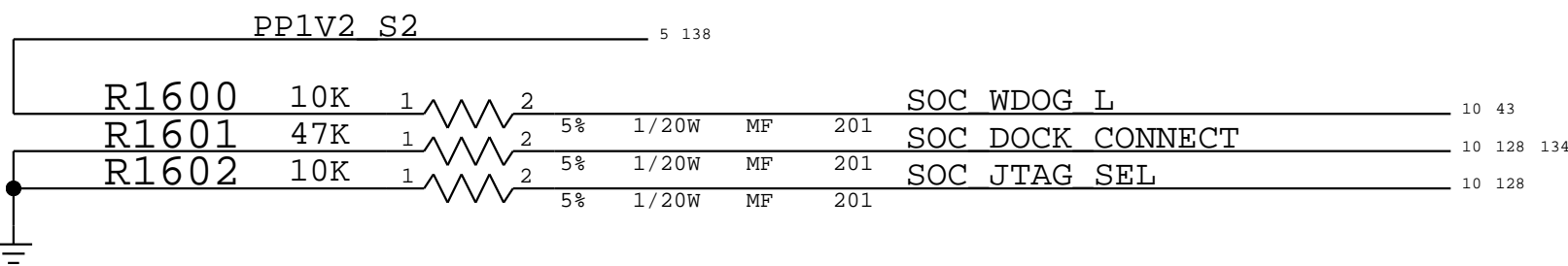
D


C

B

A



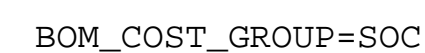


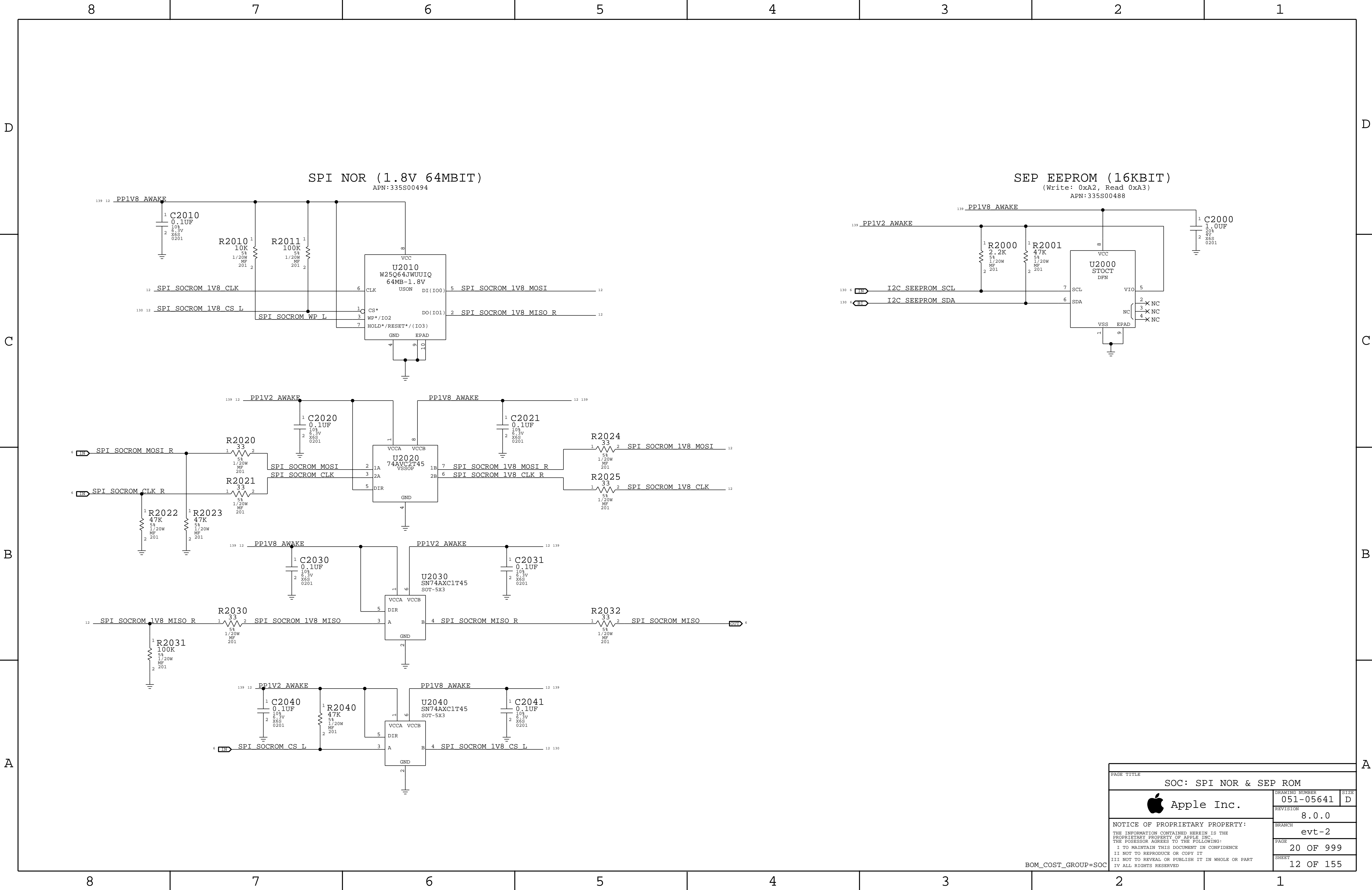
PAGE TITLE			
SOC: AOP, SMC, NUB			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
	REVISION		
NOTICE OF PROPRIETARY PROPERTY:		8.0.0	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH	
		evt-2	
		PAGE	16 OF 999
		SHEET	10 OF 155


D

## C

## B



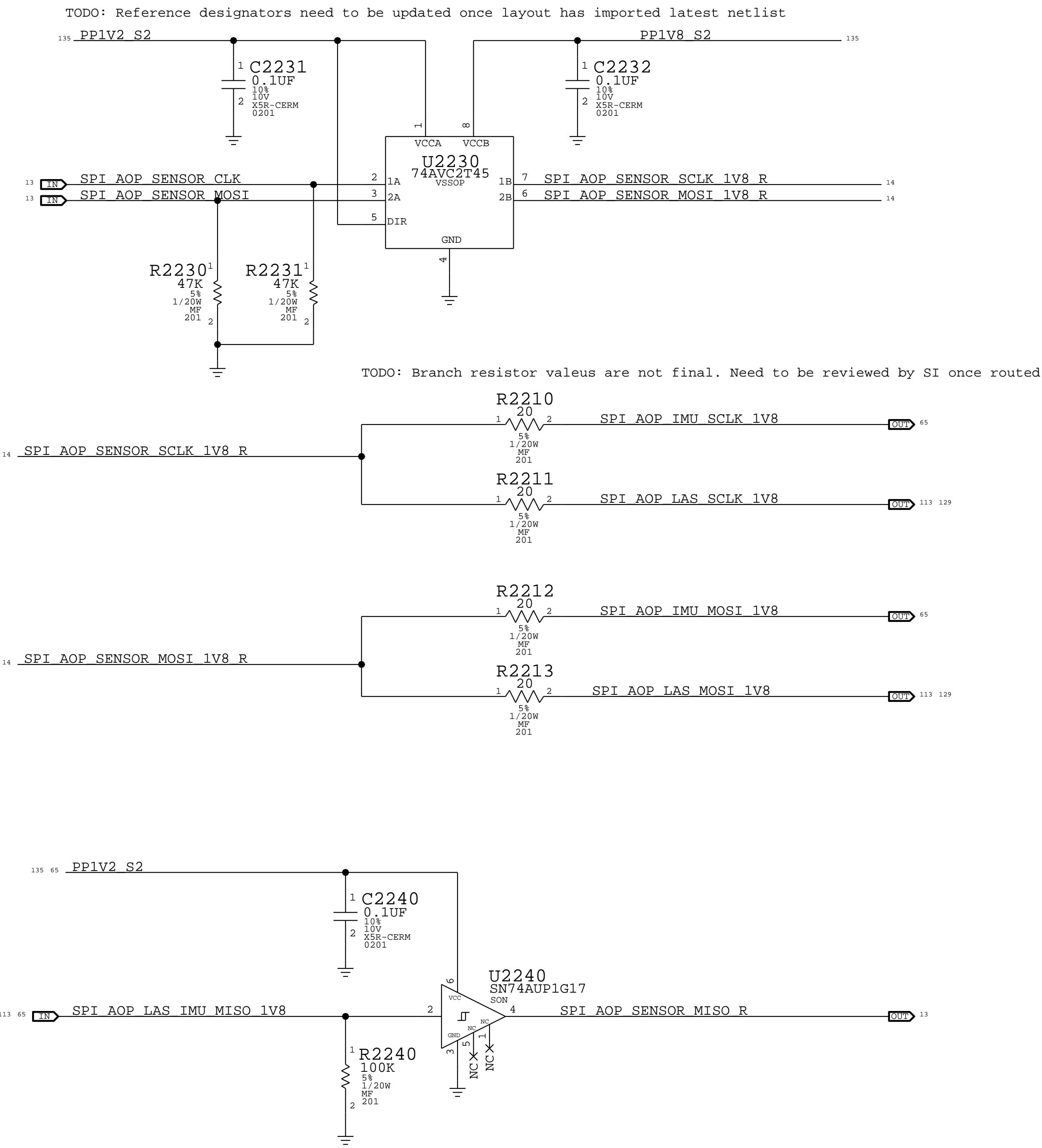


PAGE TITLE		
SOC: SPI NOR & SEP ROM		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	20 OF 999
	SHEET	12 OF 155

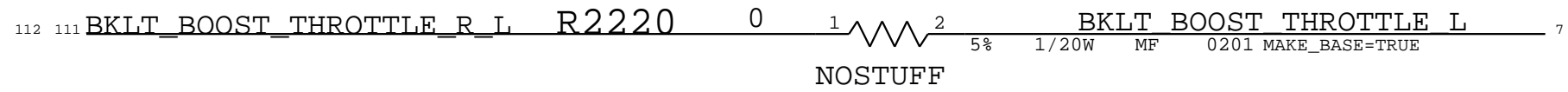




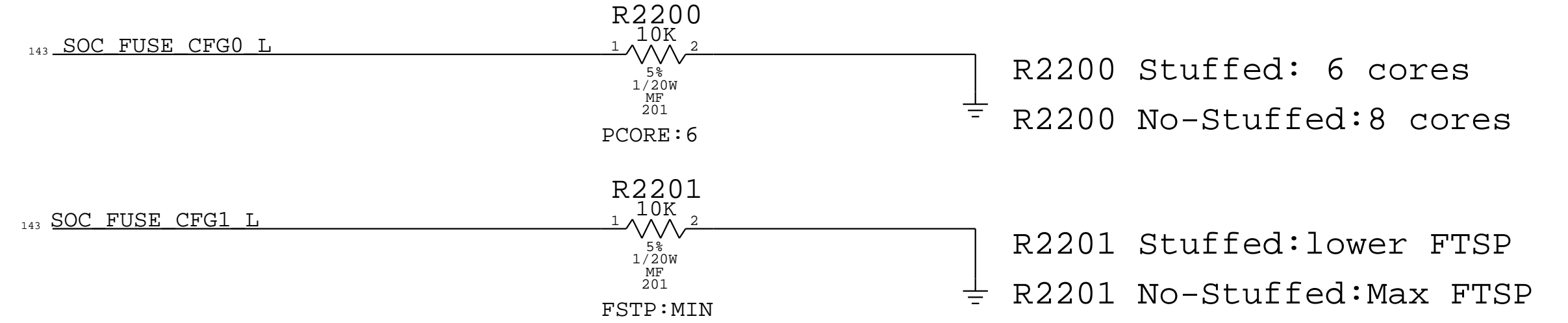
SPI AOP Sensor LS and Branch Resistors



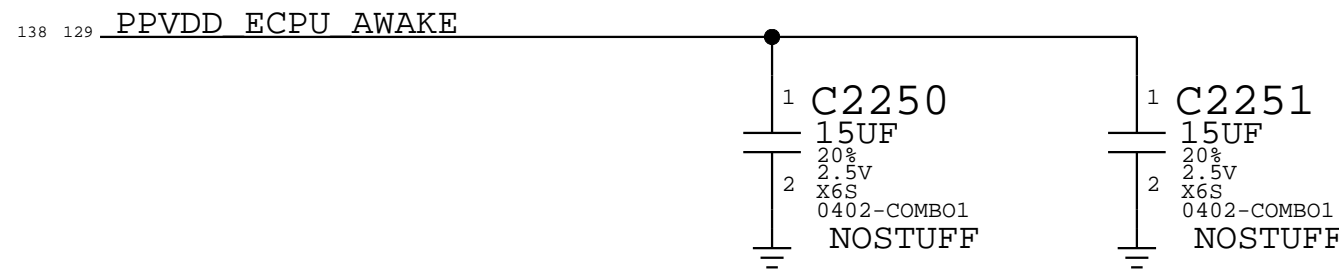
DISPLAY BACKLIGHT



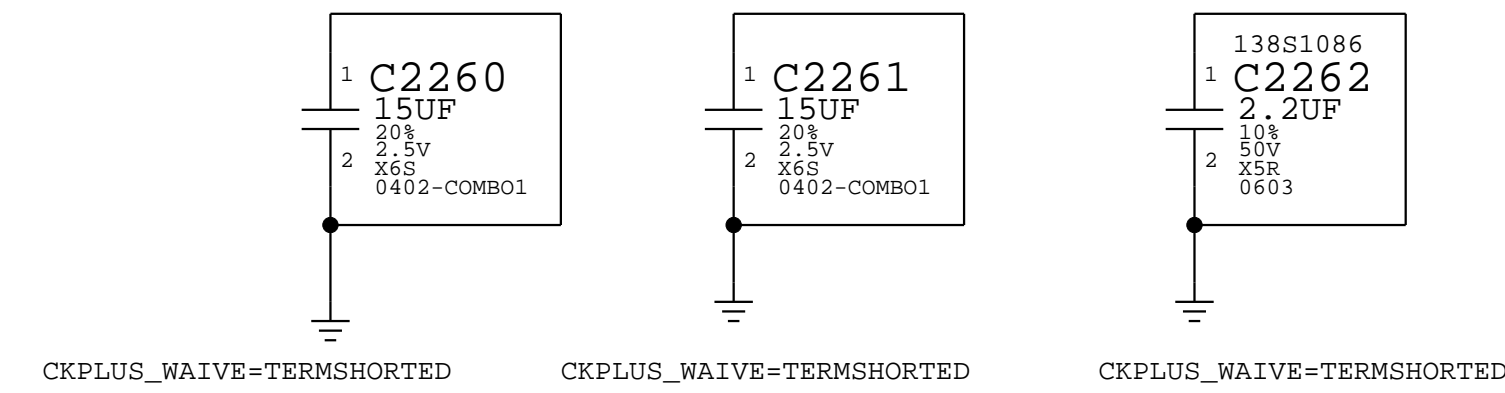
SoC POWER BINNING RESISTORS



rdar//73623710 Marginal PM on PPVDD\_ECPU\_AWAKE

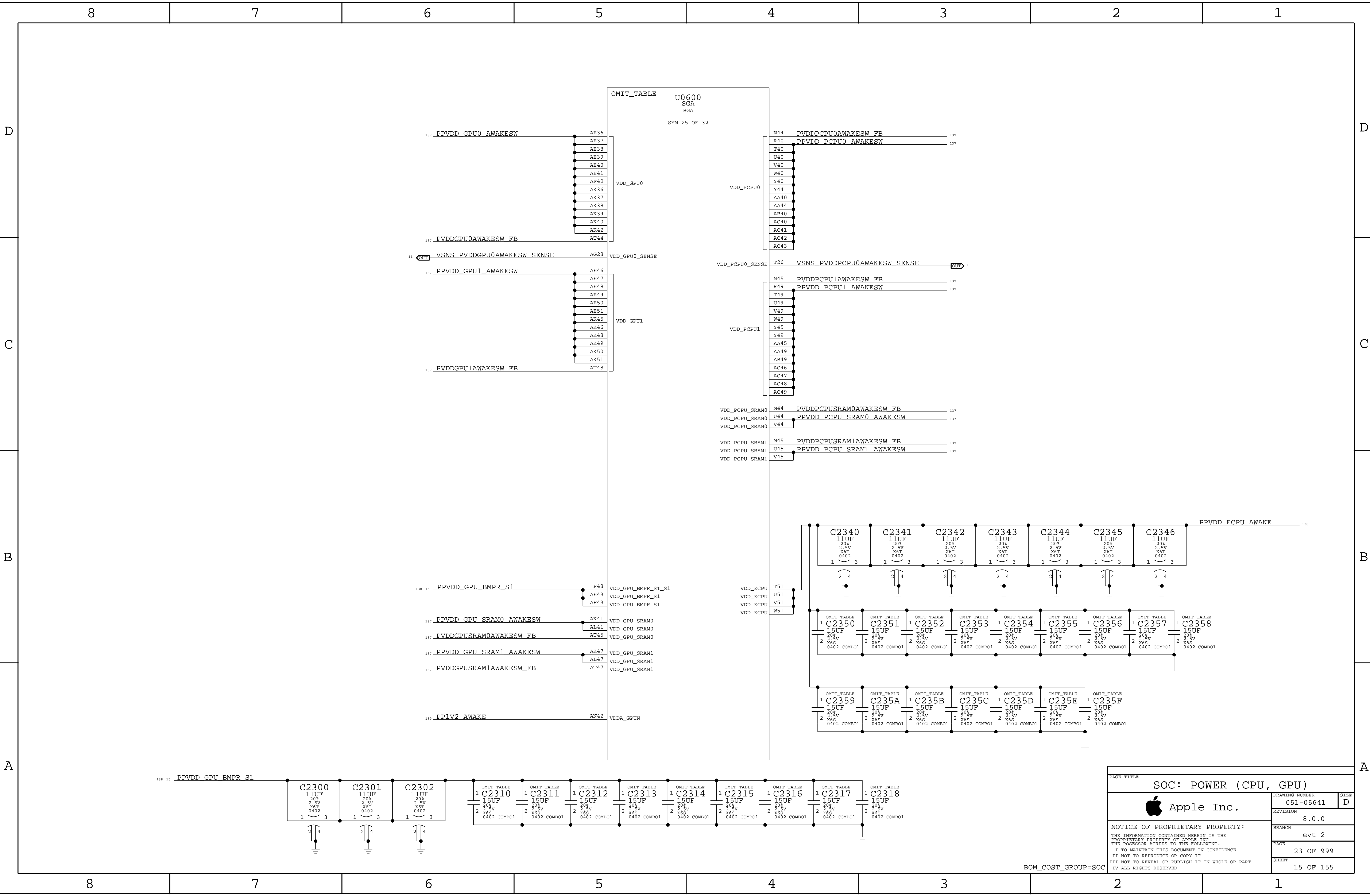


rdar//73770219 Add Dummy Caps for DFM



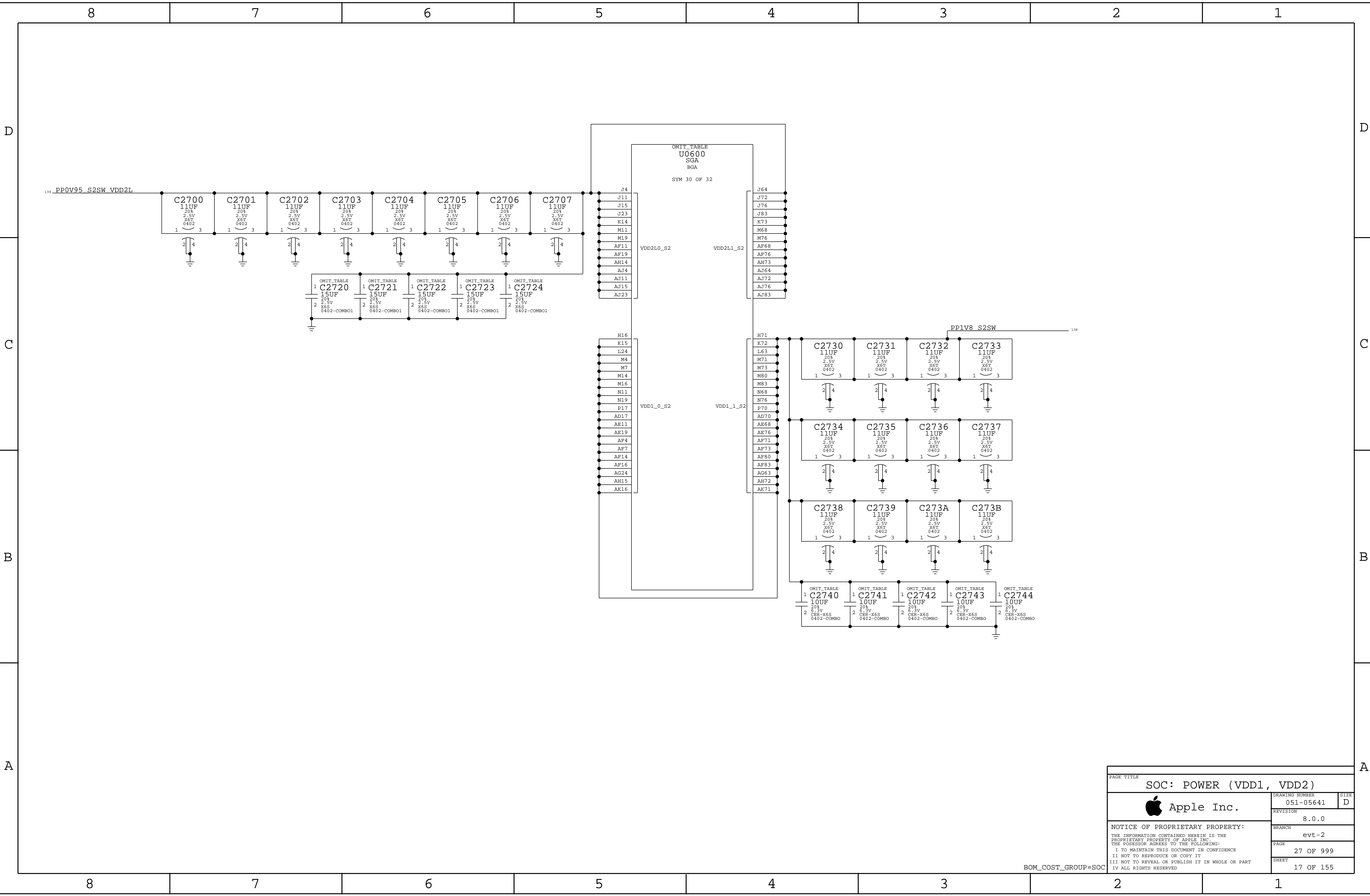
PAGE TITLE		
PROJECT SUPPORT (2/2)		
Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	22 OF 999
	SHEET	14 OF 155


BOM\_COST\_GROUP=SOC



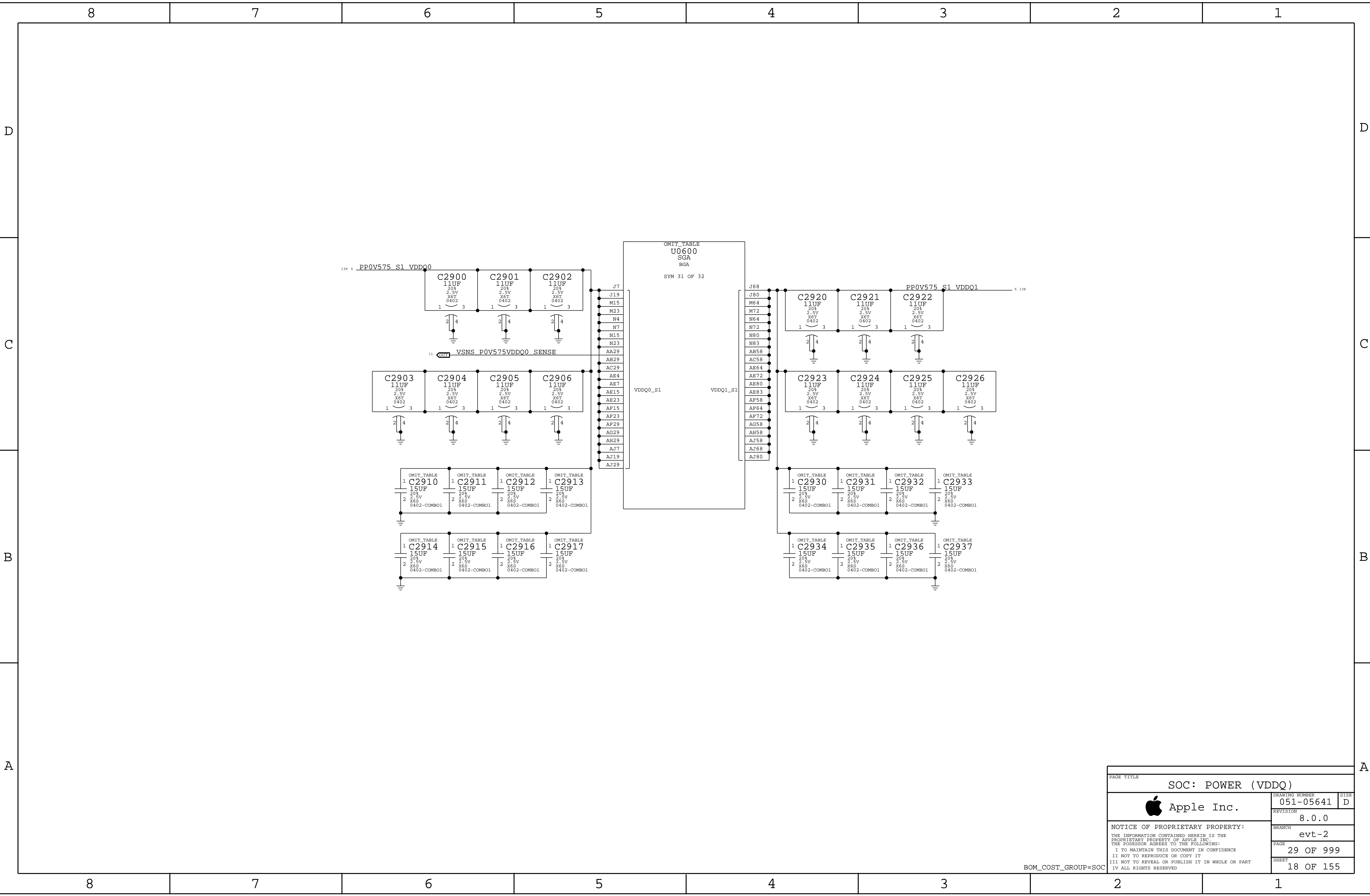
PAGE TITLE		
SOC: POWER (CPU, GPU)		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	23 OF 999
	SHEET	15 OF 155






PAGE TITLE		
SOC: POWER (VDD1, VDD2)		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	27 OF 999
	SHEET	17 OF 155

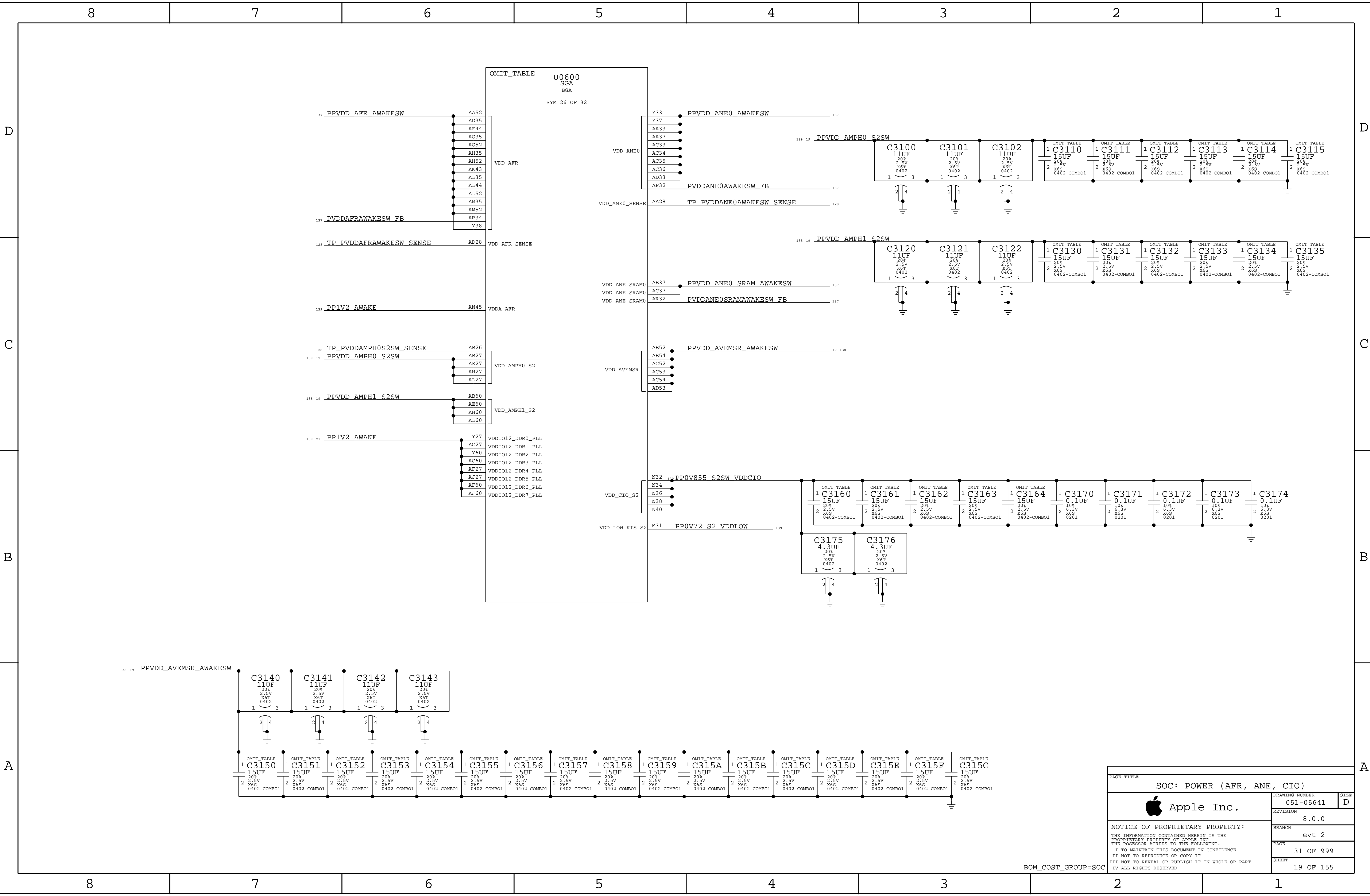
BOM\_COST\_GROUP=SOC




PAGE TITLE		
SOC: POWER (VDDQ)		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	29 OF 999
	SHEET	18 OF 155

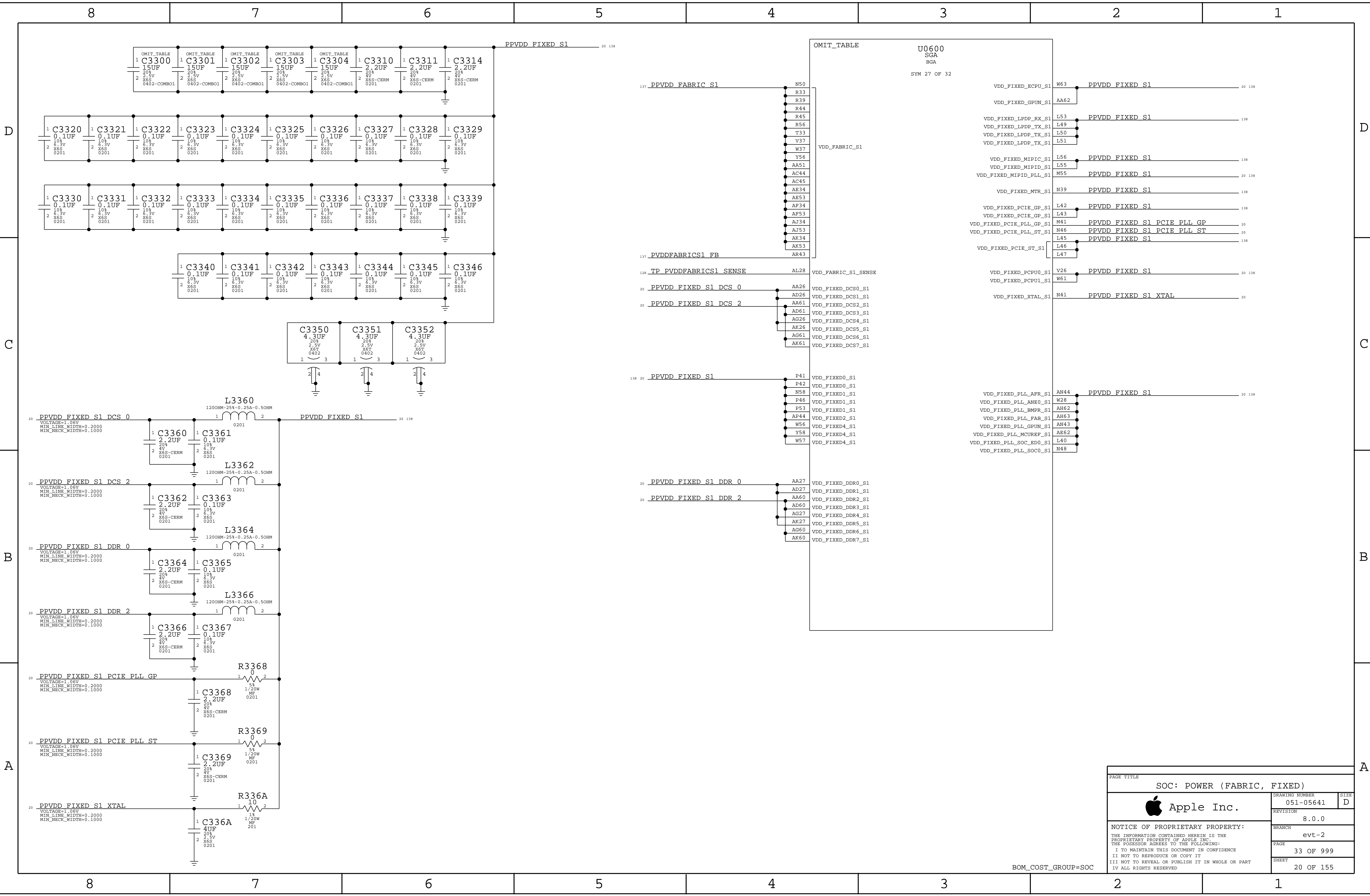
BOM\_COST\_GROUP=SOC




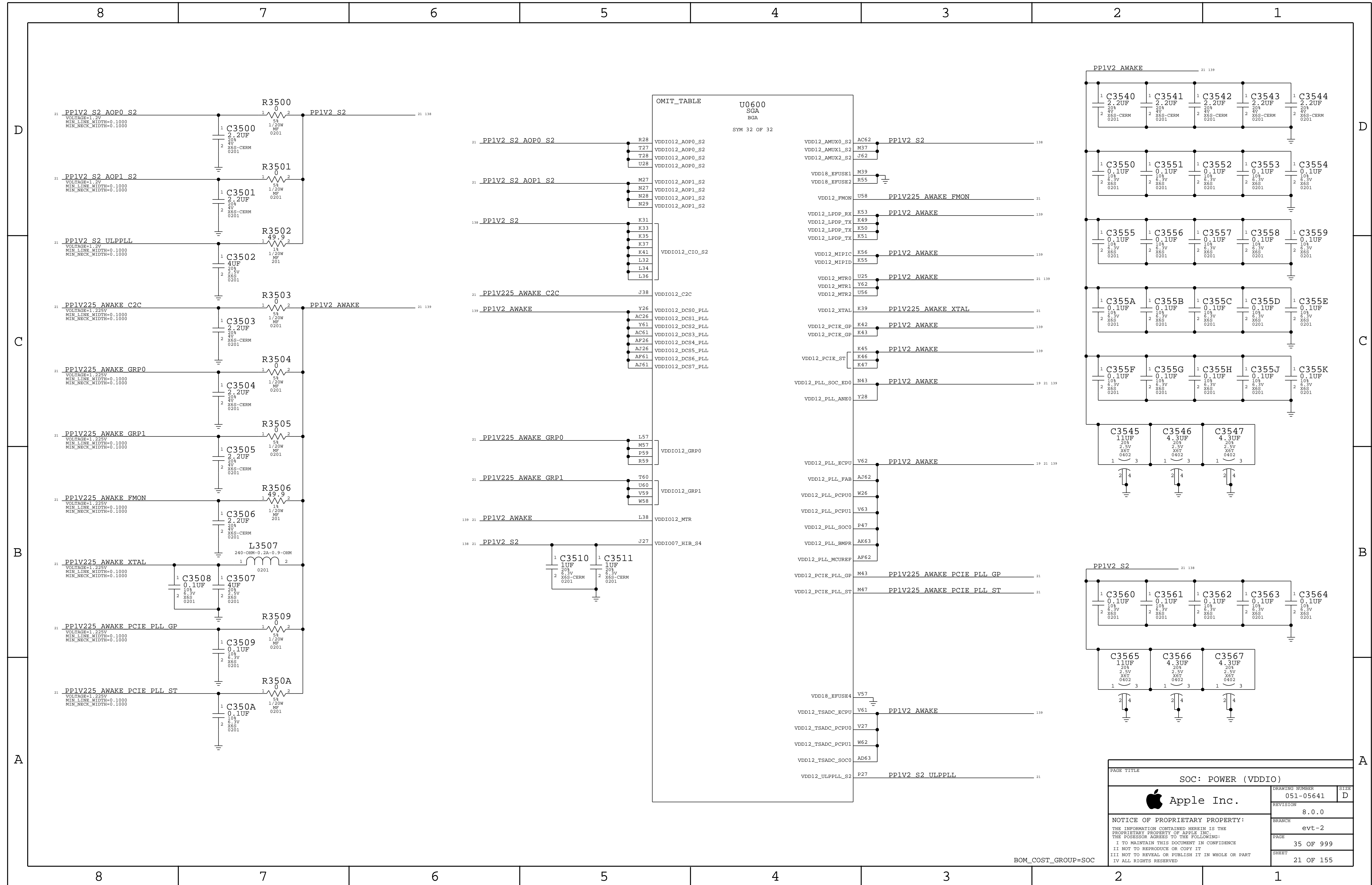


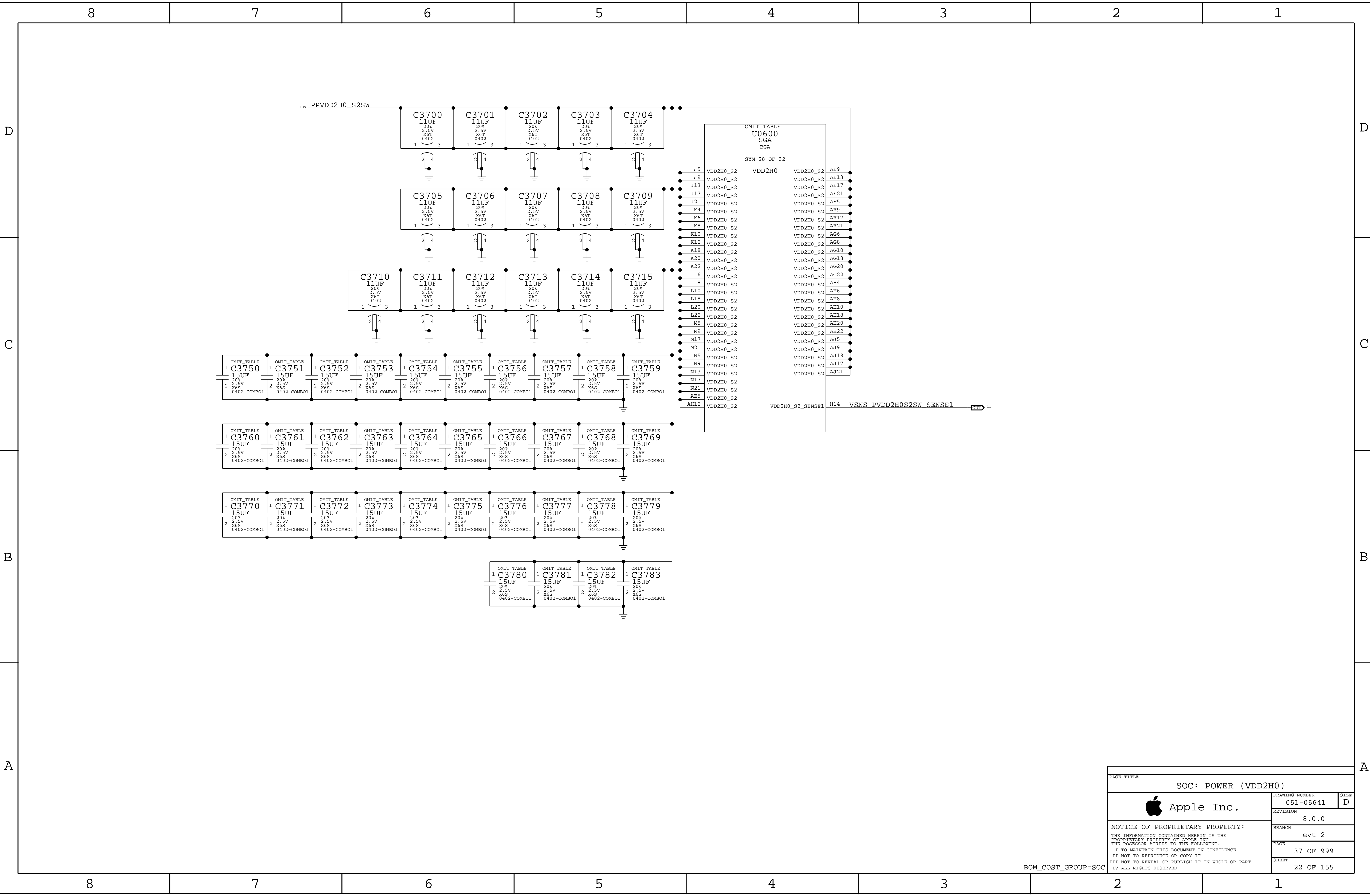
PAGE TITLE		
SOC: POWER (AFR, ANE, CIO)		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION	8.0.0
	BRANCH	evt-2
	PAGE	31 OF 999
	SHEET	19 OF 155


BOM\_COST\_GROUP=SOC



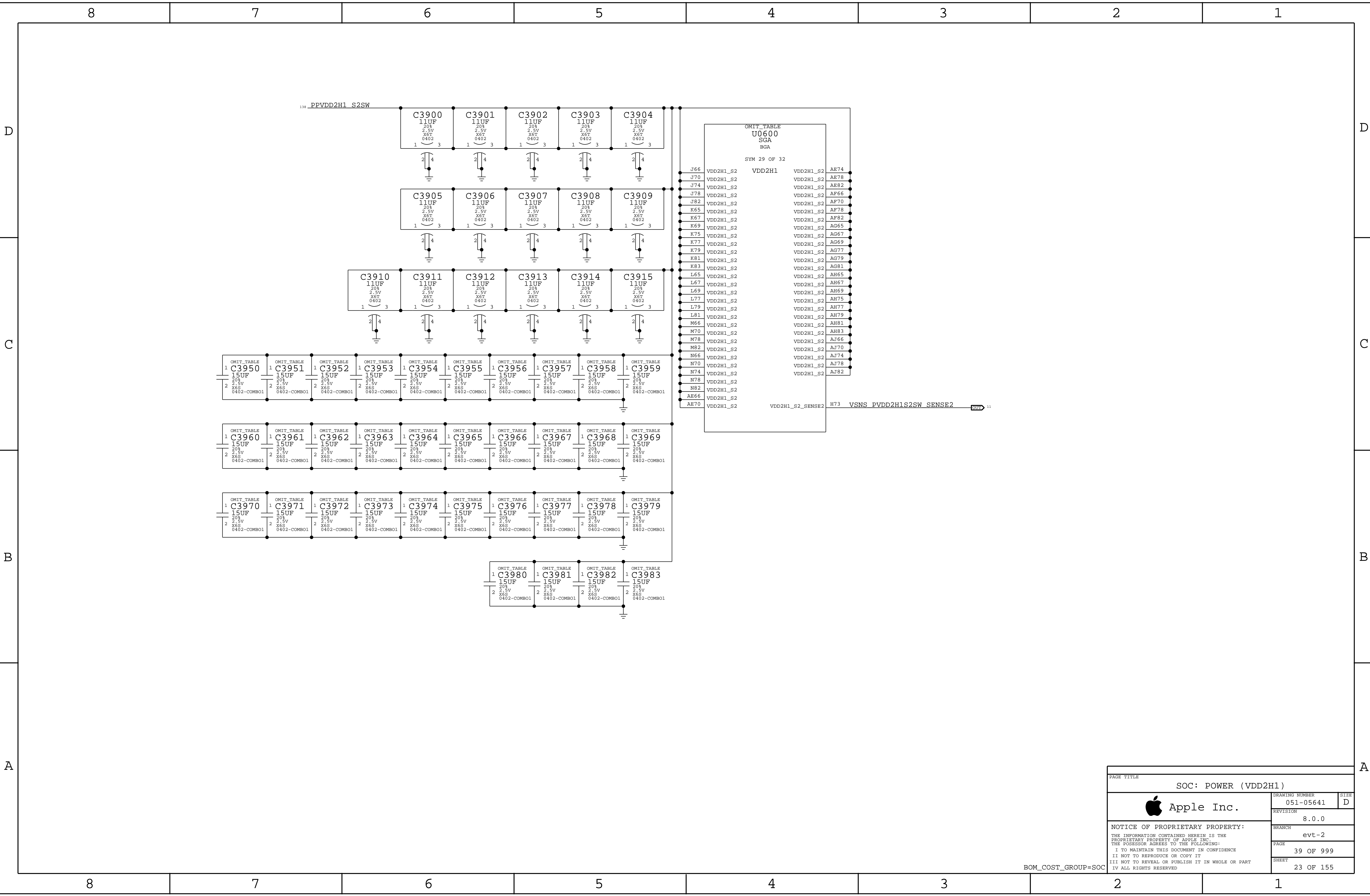
PAGE TITLE		
SOC: POWER (FABRIC, FIXED)		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION	8.0.0
	BRANCH	evt-2
	PAGE	33 OF 999
	SHEET	20 OF 155





PAGE TITLE		
SOC: POWER (VDD2H0)		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	37 OF 999
	SHEET	22 OF 155

BOM\_COST\_GROUP=SOC




PAGE TITLE		
SOC: POWER (VDD2H1)		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	39 OF 999
	SHEET	23 OF 155


BOM\_COST\_GROUP=SOC







PAGE TITLE		
SOC: GND-2		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	42 OF 999
	SHEET	25 OF 155

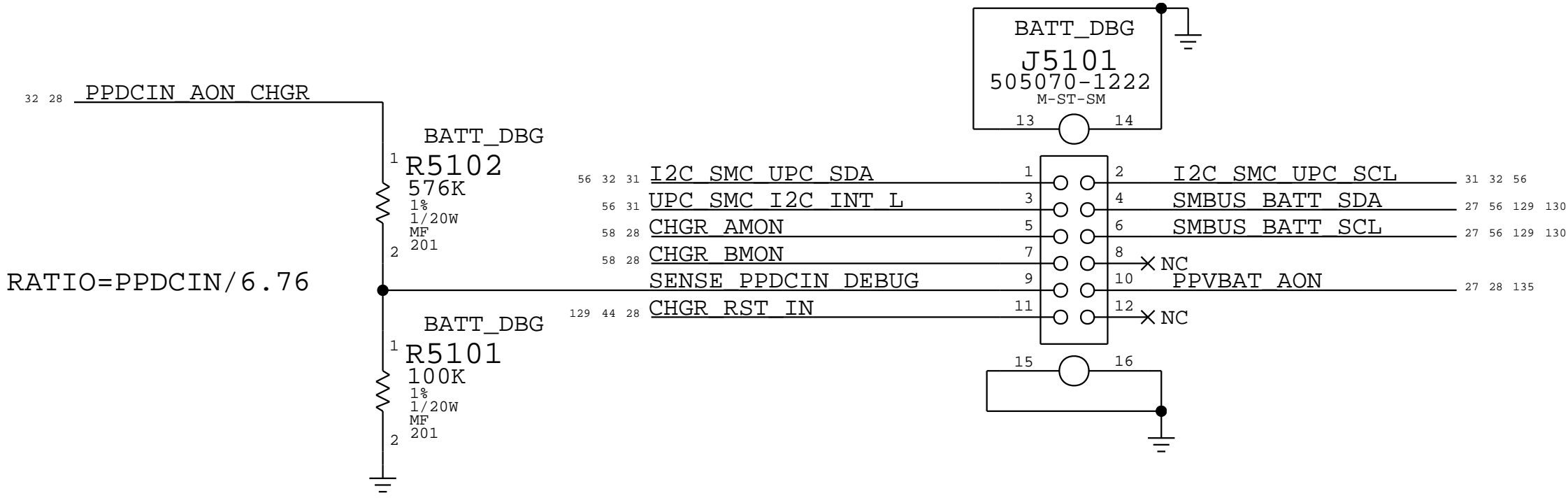
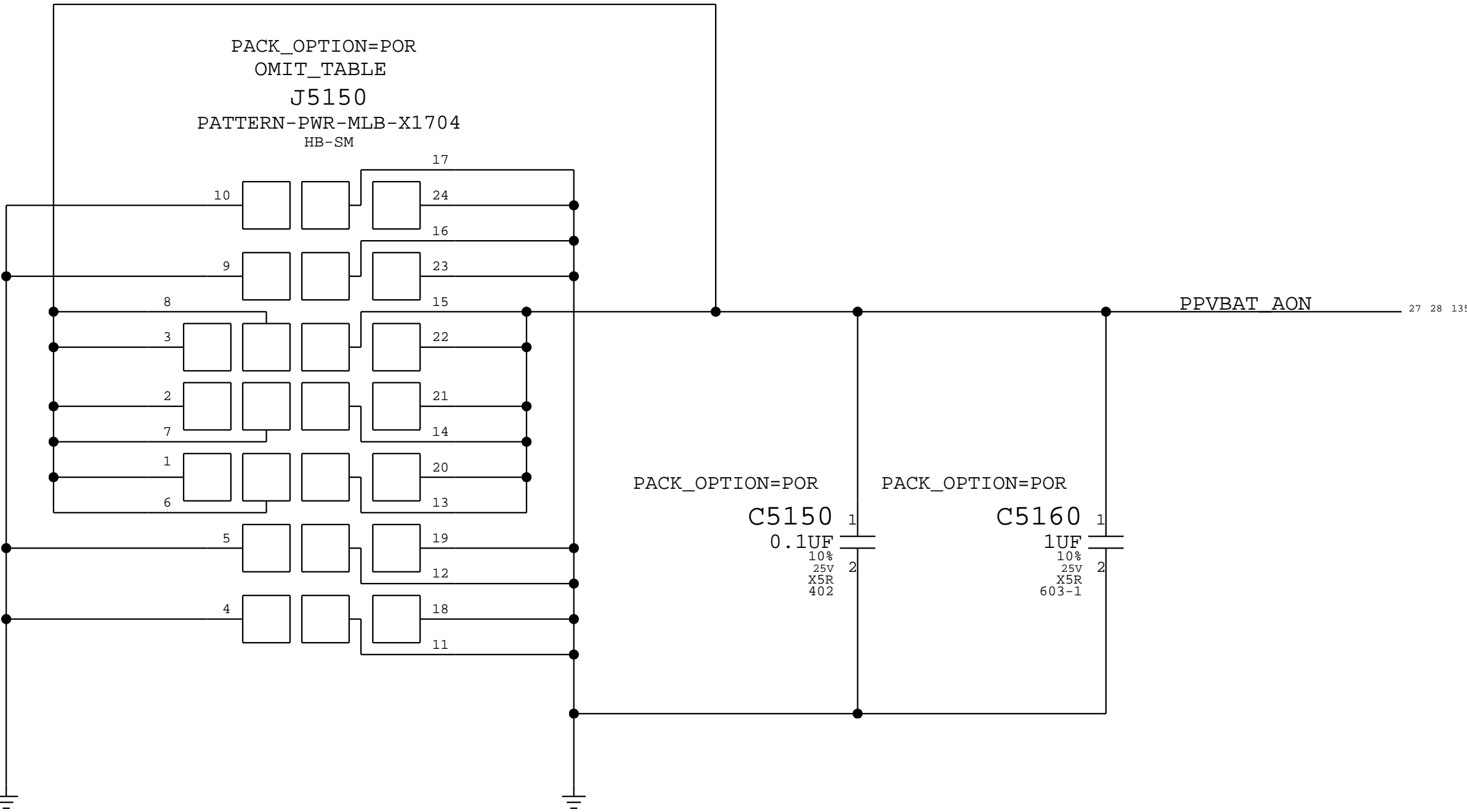
PAGE TITLE			
Secure Element			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
	REVISION		
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		8.0.0	
		BRANCH	
		evt-2	
		PAGE	50 OF 999
		SHEET	26 OF 155

Battery Sub-System Debug Connector  
AARDVARKANOID CONN

BMU POWER FLEX HOTBAR'd TO THE MLB:

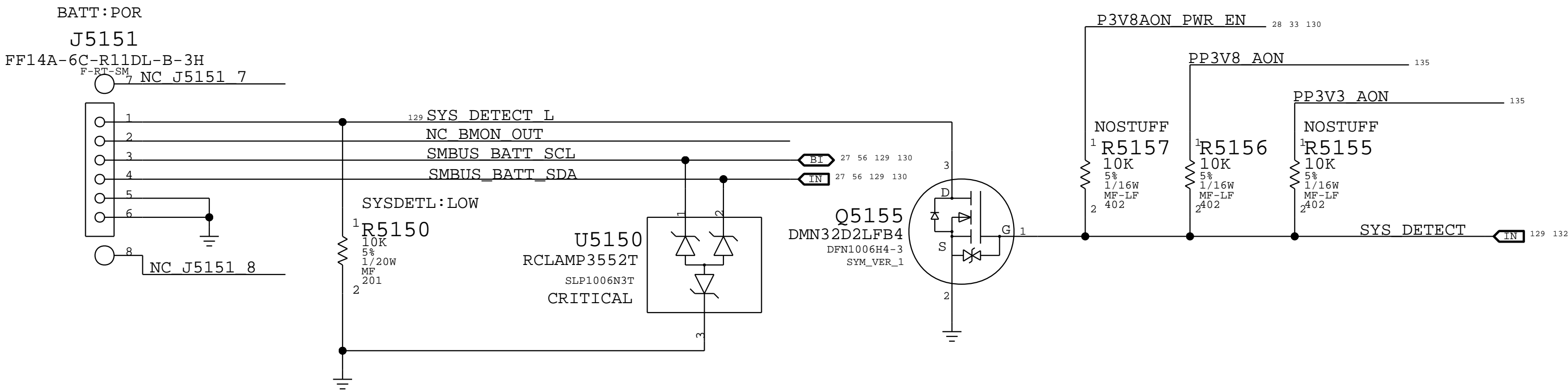
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
632-04146	1	PCBA,FLEX,FLEX,BMU-POWER,X1704	J5150	CRITICAL	BATT:POR

Flex Pad TO MLB 998-03780.  
J80 Battery Hotbar Flex Pads 998-03902



ARKANOID		MLB Connector / Signals	Saleae
J0301 - 1	6	SMBUS_BATT_SCL (= I2C_SMC_PWR_SCL)	0
J0301 - 3	4	SMBUS_BATT_SDA (= I2C_SMC_PWR_SDA)	1
J0301 - 5	2	I2C_SMC_UPC_SCL	2
J0301 - 7	1	I2C_SMC_UPC_SDA	3
J0302 - 1	3	UPC_SMC_I2C_INT_L	4
J0302 - 3	5	CHGR_AMON	5
J0302 - 5	7	CHGR_BMON	6
J0302 - 7	9	1 / 6.76 * PPDCIN_AON	7
J0303 - 1	11	CHGR_RST_IN	8
J0303 - 3	12	—	9
J0303 - 5	10	PPVBAT_AON	10
J0303 - 7	8	—	11

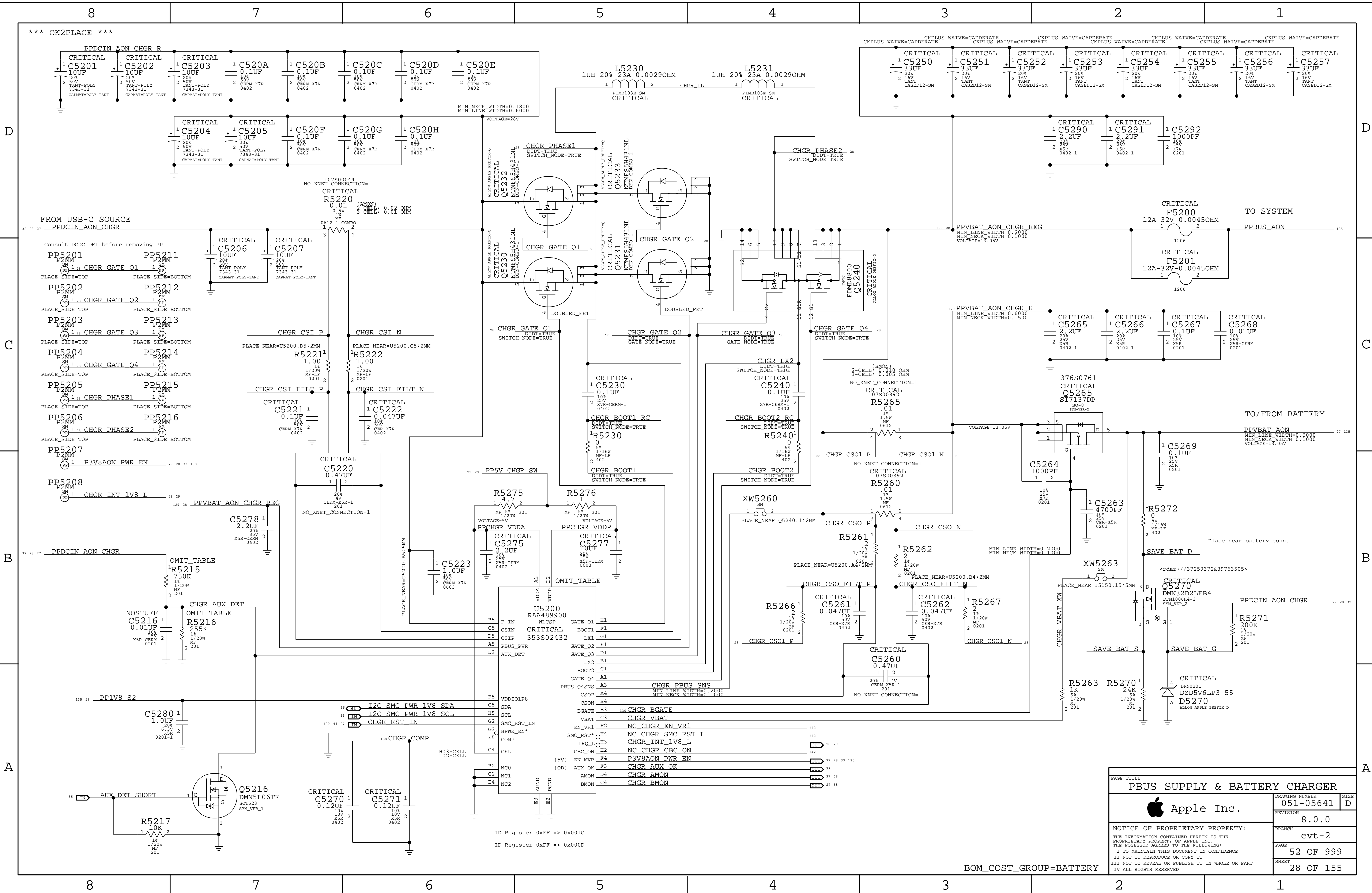
APN:518S0818



PAGE TITLE		
BATTERY CONN		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	51 OF 999
	SHEET	27 OF 155

BOM\_COST\_GROUP=BATTERY





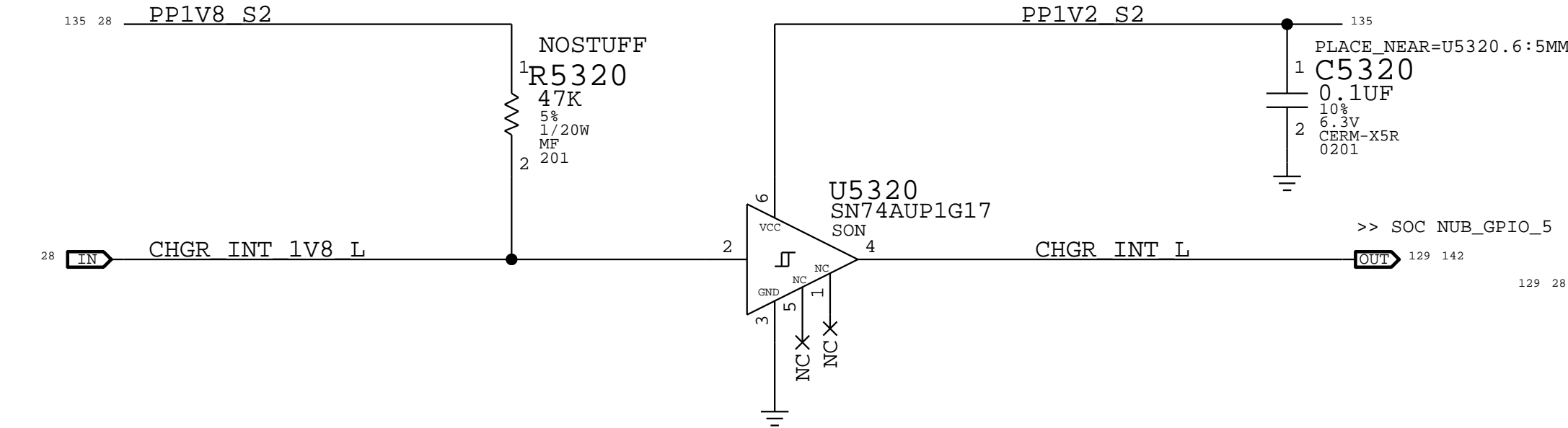


## CHGR I2C Level Translation

SMBUS\_CHGR\_LV8\_[SCL/SDA]: Level translation circuit to be placed in project specific I2C page.

## CHGR\_INT\_L Level Translation

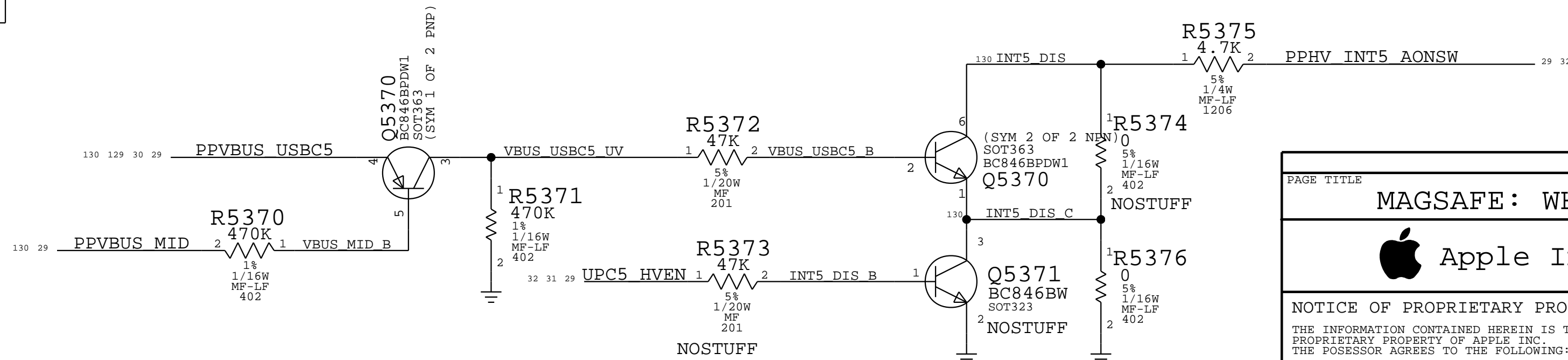
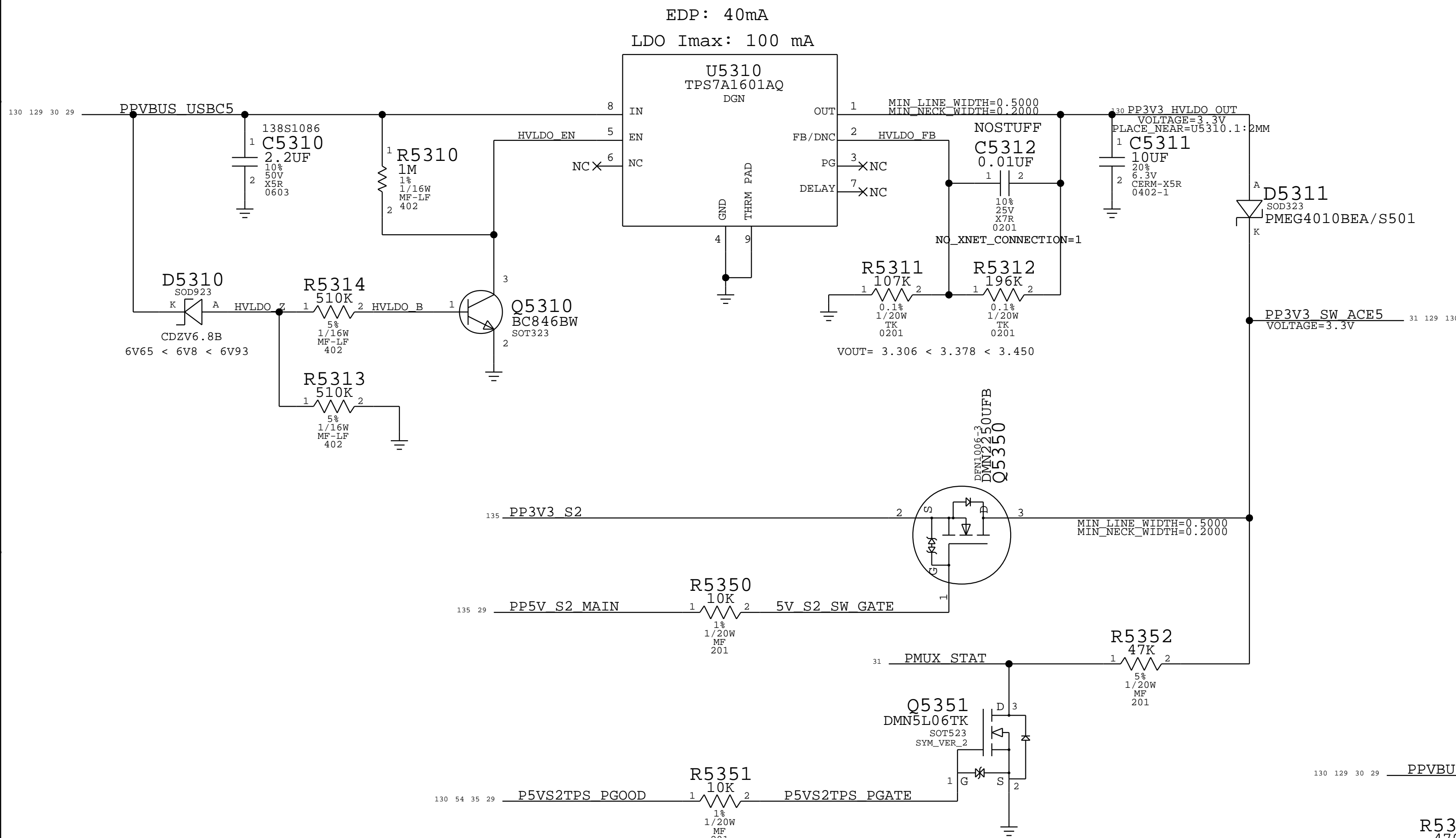
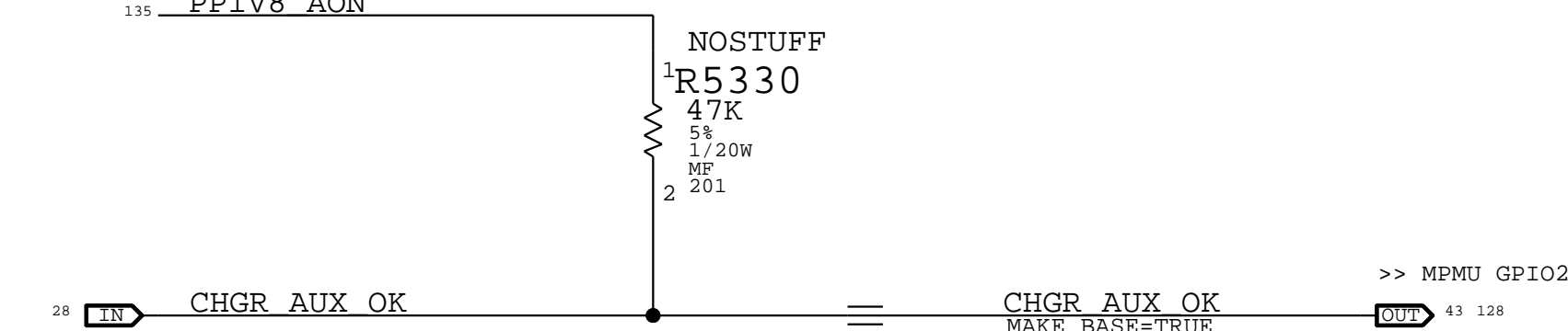
Stuff R5320 in case, glitch during power sequencing is a concern.




## CHGR\_AUX\_OK Pull Up

Pull up to MPMU LDO9, or rely on MPMU internal pull up.

OK, to completely remove pull up , but consult PMU architecture and check OTP before that.

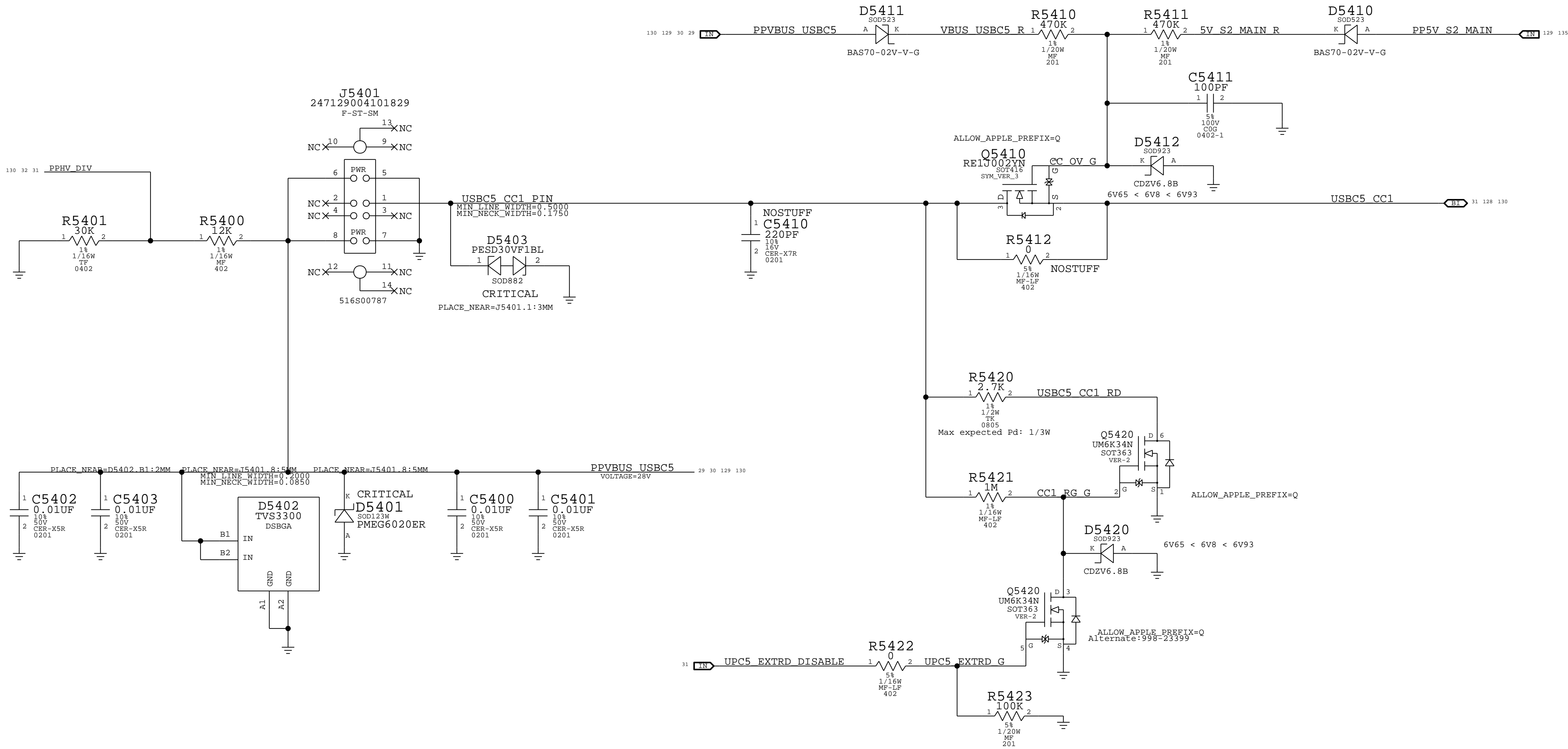


BOM\_COST\_GROUP=BATTERY

PAGE TITLE		
MAGSAFE: WHAMOLA SUPPORT		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	53 OF 999
	SHEET	29 OF 155


\*\* OK2PLACE \*\*

MAGSAFE MLB connector, CC OV and External RD



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0516	1	UVLO set RH=750K	R5215	CRITICAL	SUONA_UVLO
118S0236	1	UVLO set RL=255K	R5216	CRITICAL	SUONA_UVLO
118S0526	1	UVLO set RH=787K	R5215	CRITICAL	WHAMOLA_UVLO
118S0116	1	UVLO set RL=158K	R5216	CRITICAL	WHAMOLA_UVLO
353S02781	1	IC,RAA469900,PMIC,WHAMOLA,OTP-4,MCS940	U5200	CRITICAL	WHAMOLA:1A

BOM\_COST\_GROUP=MAGSAFE

PAGE TITLE		
MAGSAFE: CONNECTOR		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
	BRANCH	evt-2
	PAGE	54 OF 999
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 30 OF 155




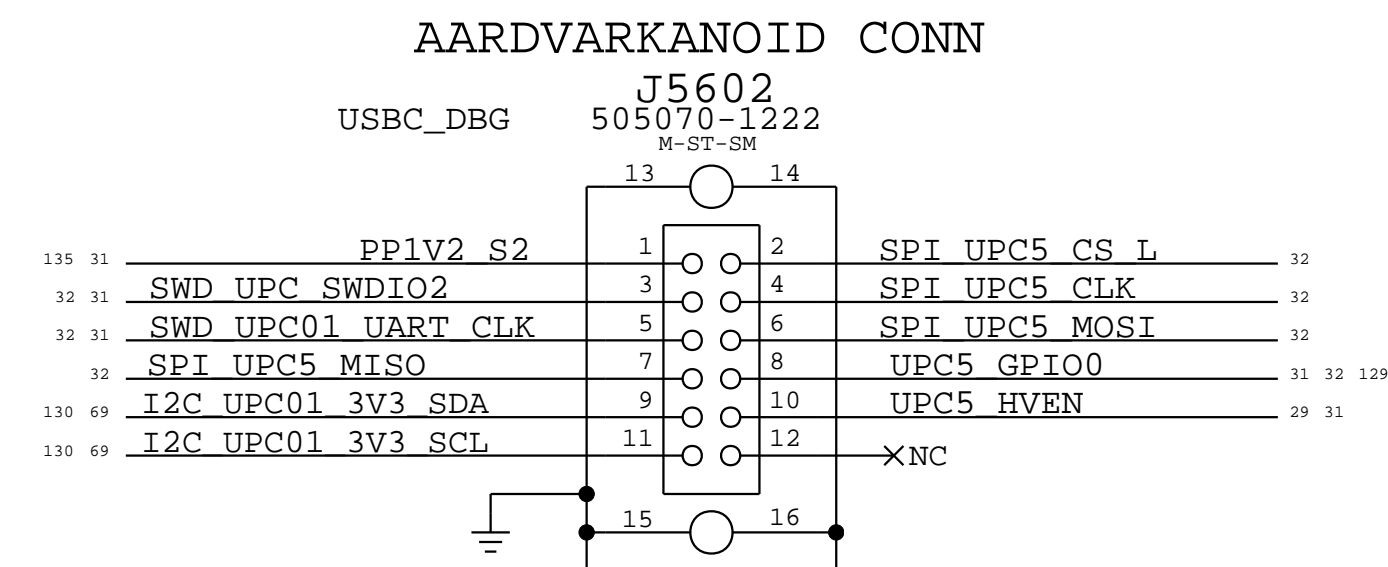
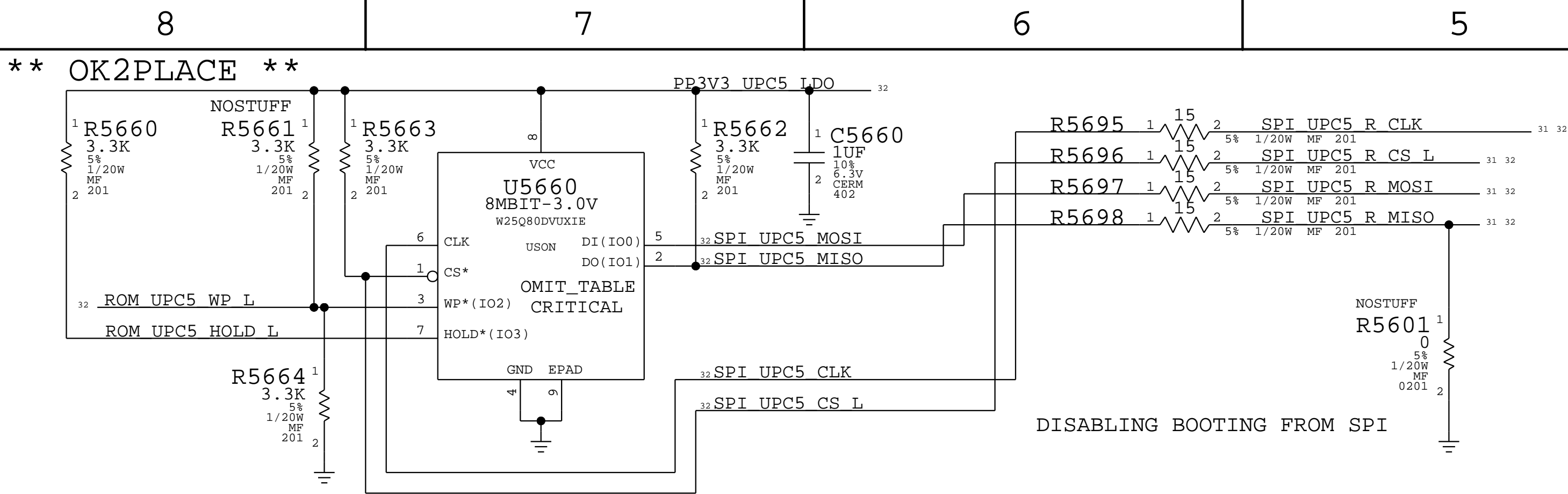
C



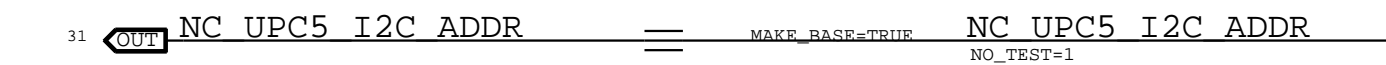
A

A

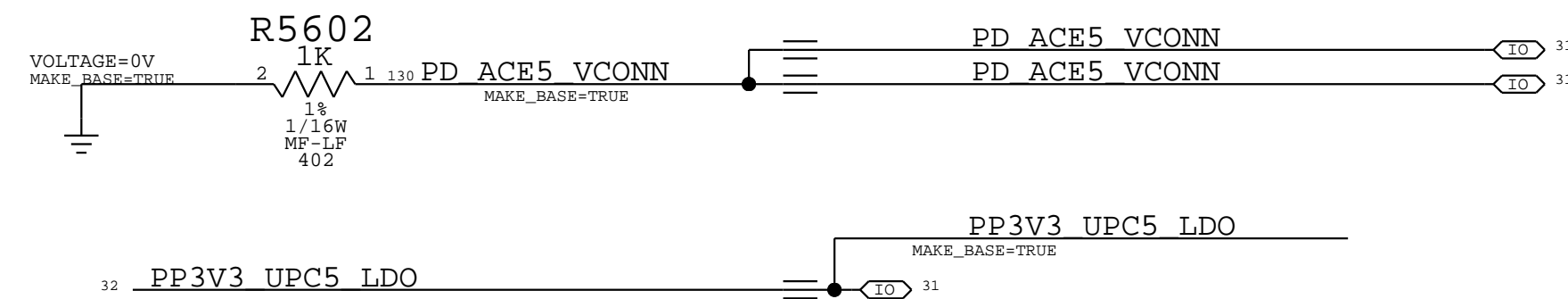
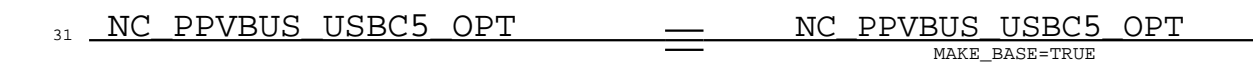
PAGE TITLE		
MAGSAFE: PORT CONTROLLER		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION	
	8.0.0	
	BRANCH	evt-2
	PAGE	55 OF 999
	SHEET	31 OF 155



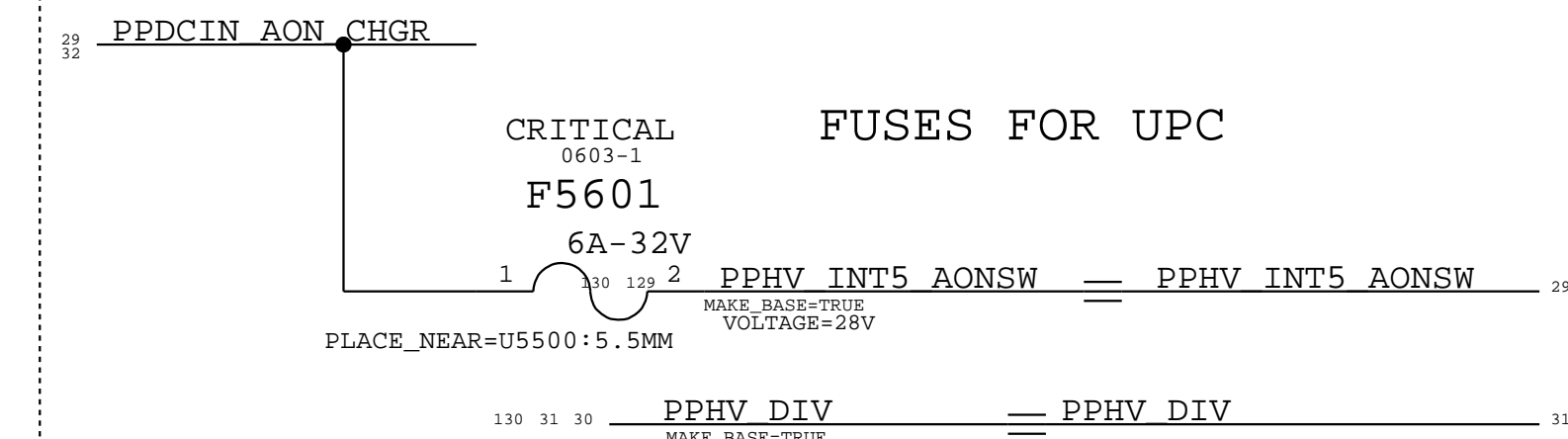
UPC5: I2C\_ADDR=Float, I2CM\_SCL\_CNFG=HIGH, SDA=LOW



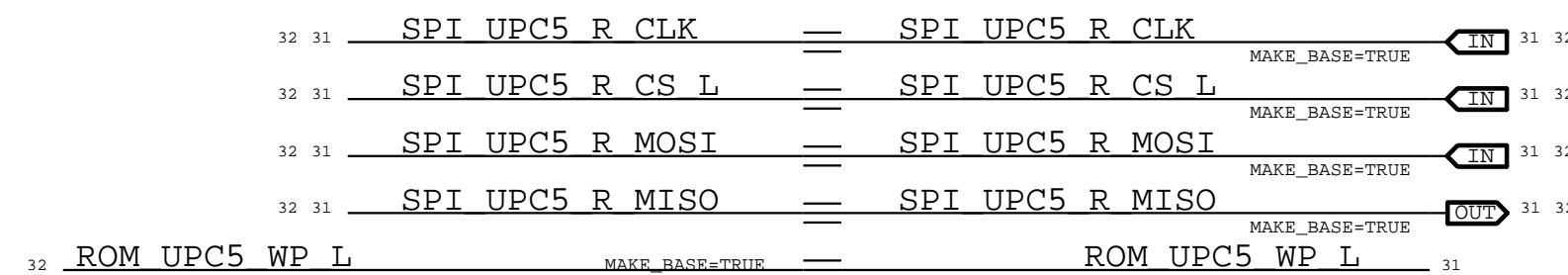
## POWER ALIASES



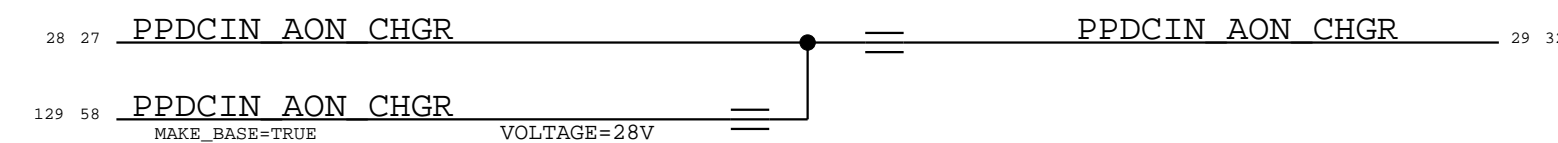
WE DO NOT NEED HIGHER  
VOLTAGE RATING  
FOR THIS FUSE  
CHECKED WITH MFGR



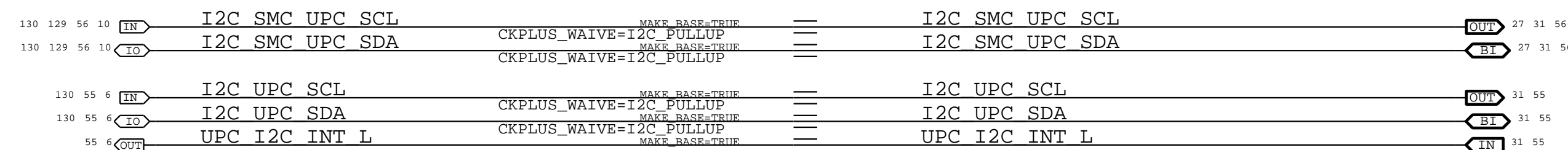
ACE5 IS SPI ROM ONLY



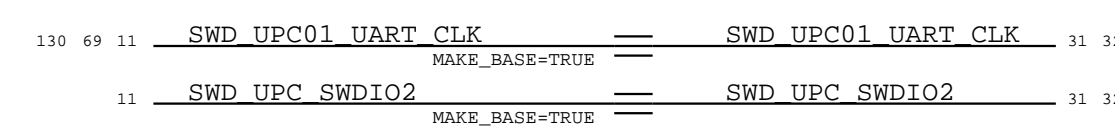
## CONNECTION TO CHARGER



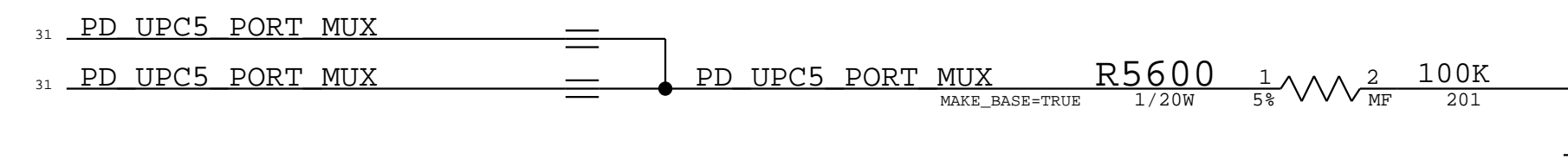
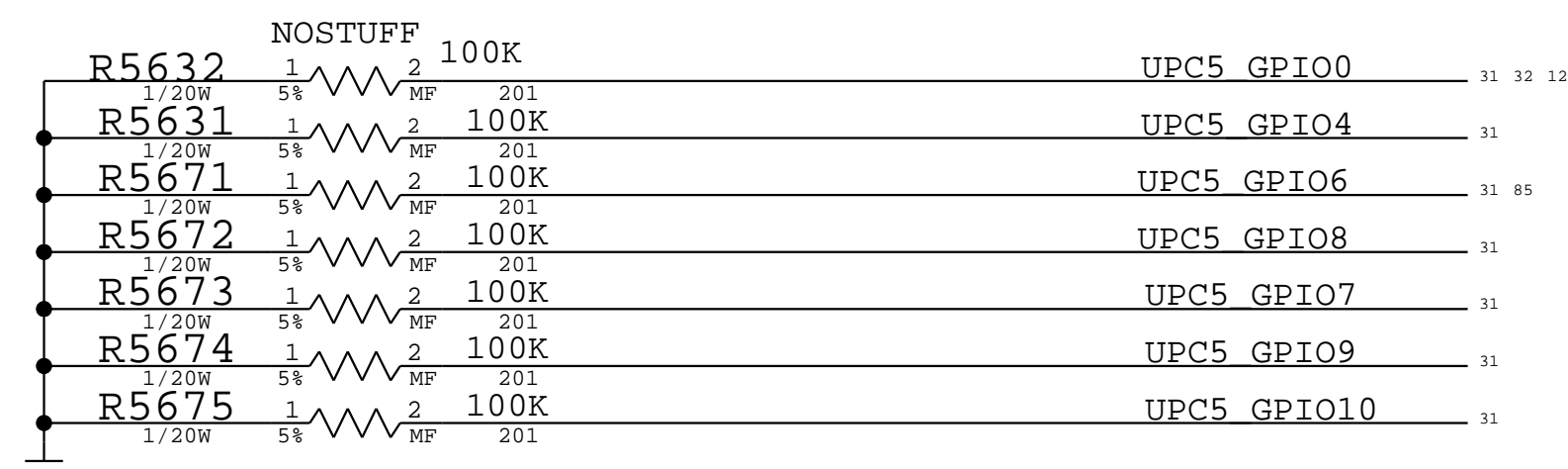
## CONNECTION TO SoC



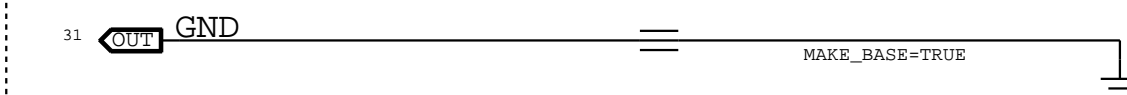
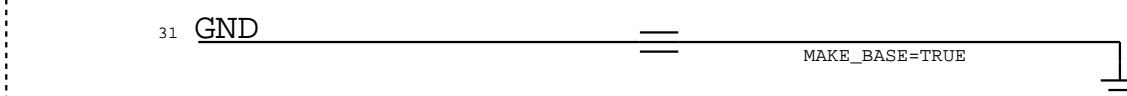
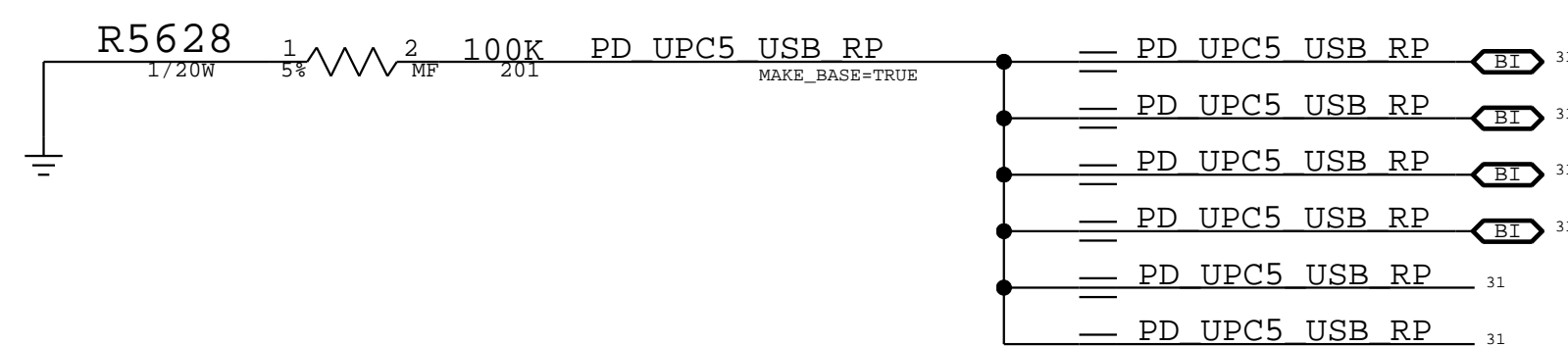
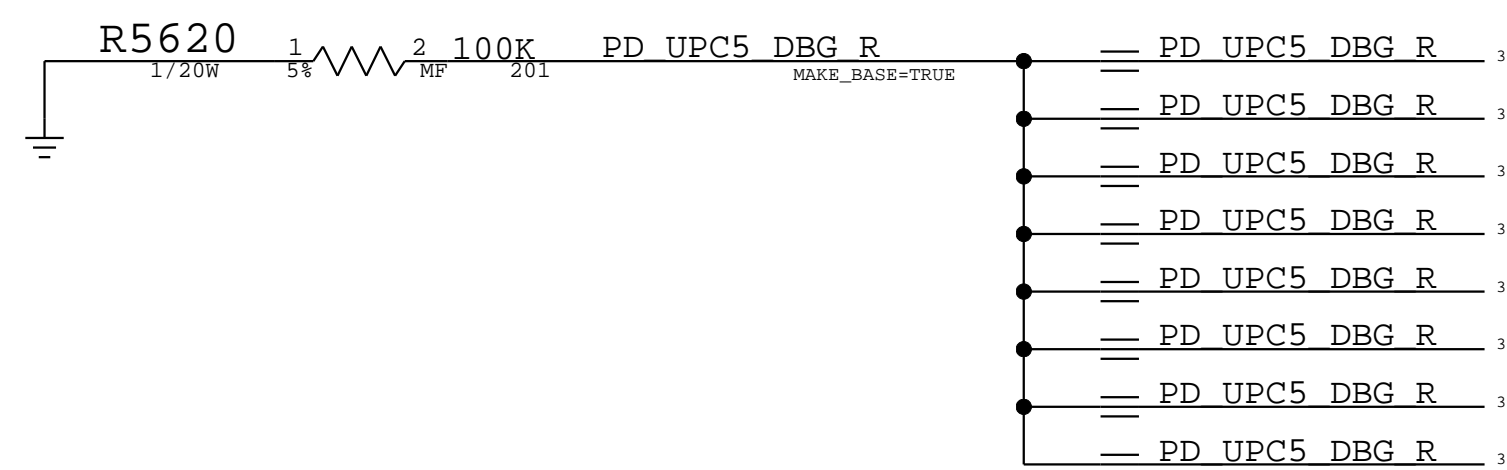
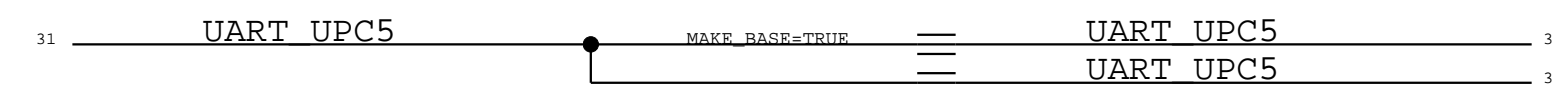
## SWD TO SoC



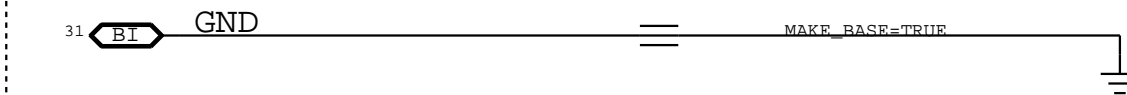
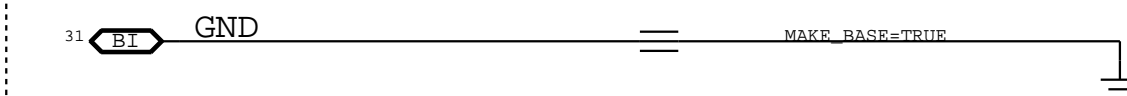
## Unused ports and GPIOs




## UART



ACE RPD STRAPPING



PAGE TITLE		
MAGSAFE: CONTROLLER SUPPORT		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	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	
	8.0.0	
	BRANCH	evt-2
	PAGE	
	56 OF 999	
	SHEET	
	32 OF 155	

BOM\_COST\_GROUP=MAGSAFE

D

C

B

A

D

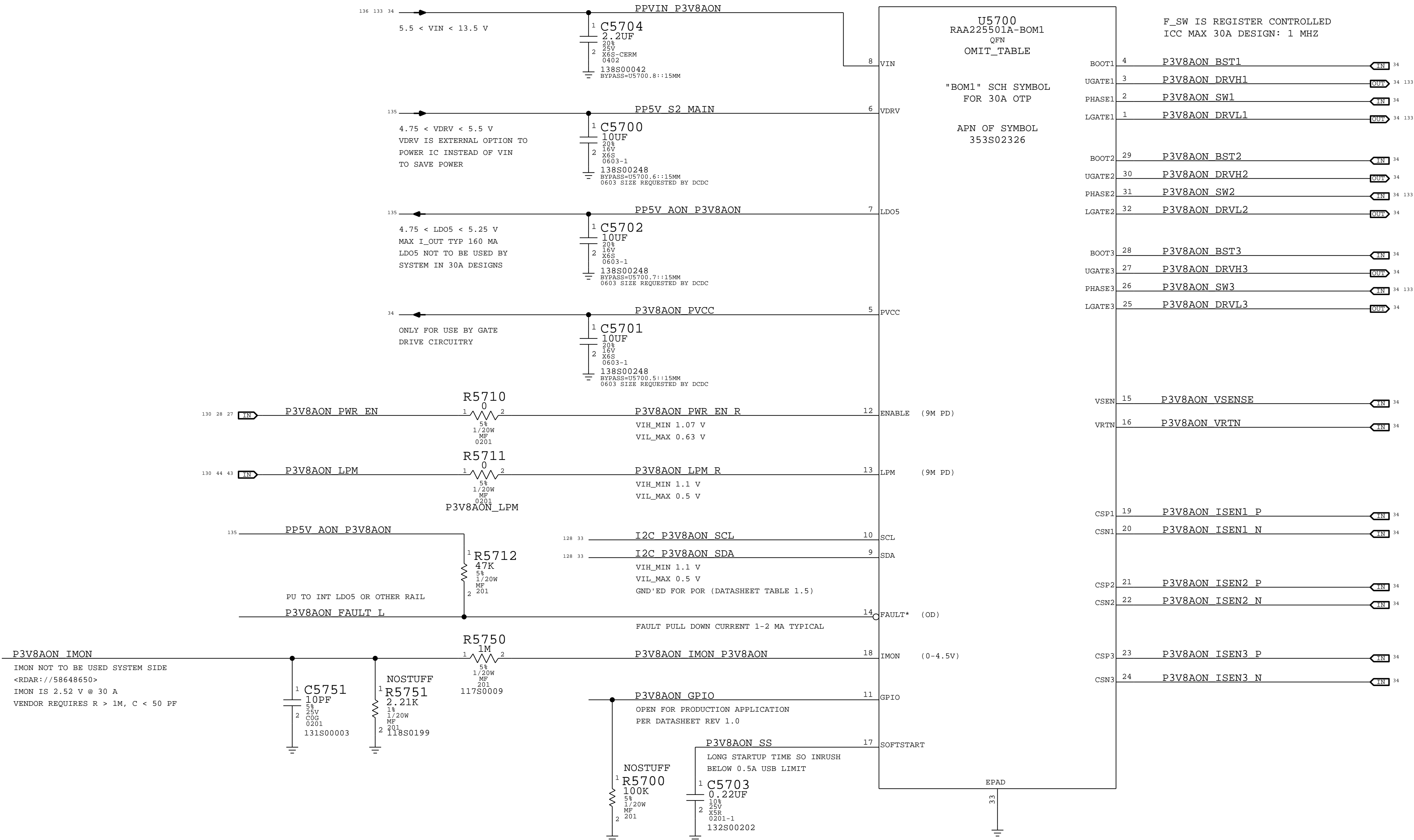
C

B

A

\*\*\* OK2RELEASE \*\*\*

3V8 AON CONTROLLER  
30A ICC MAX



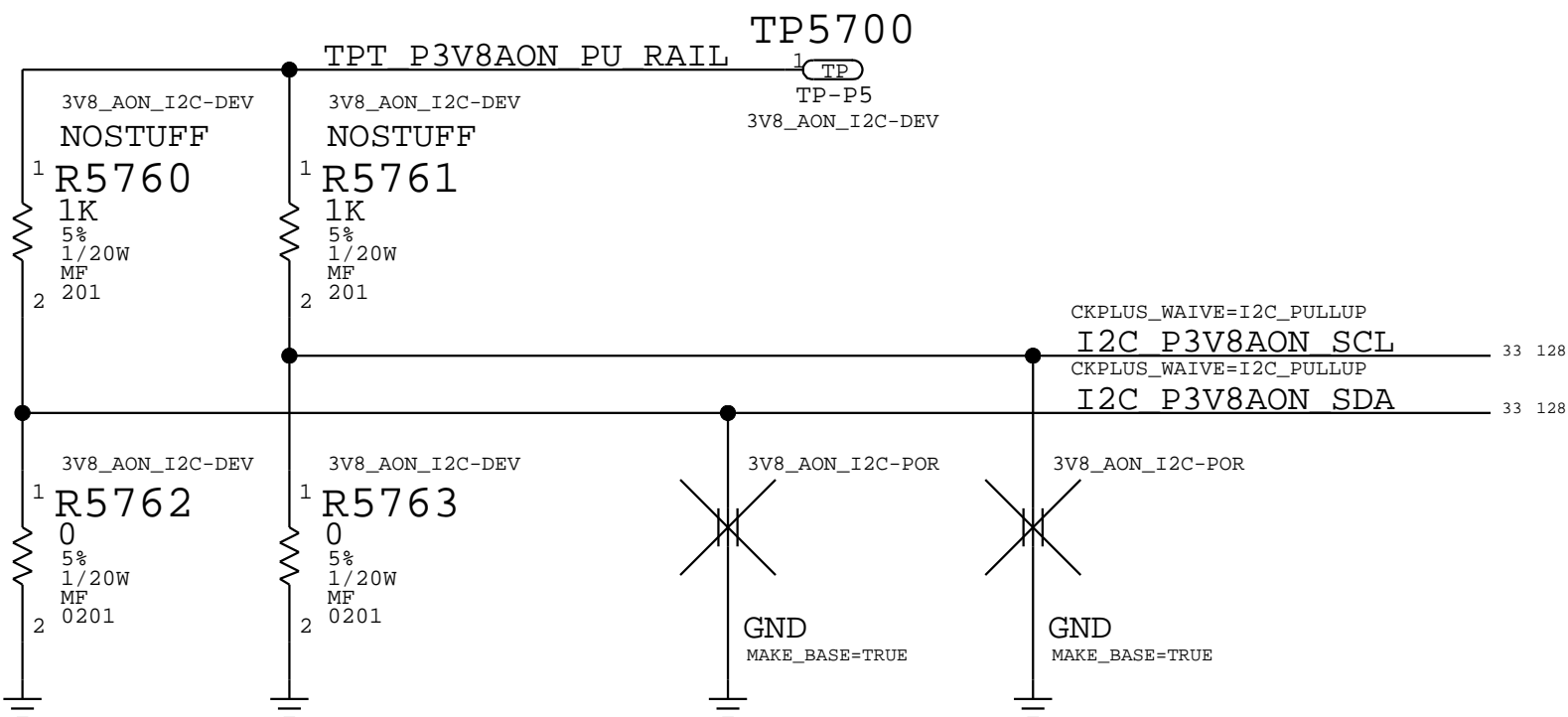
30A OTP CHANGES DOCUMENTED IN <RDAR:///61519509>

BOM5 IS A CONTINUATION OF BOM1 SINCE BOM1 IS FROZEN FOR TGA PROGRAMS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S02326	1	IC,RAA225501,3-PH VOLT REG,TQFN32	U5700	CRITICAL	P3V8AON_IC:A0
353S02472	1	IC,RAA225501B,ICE,BOM1,A1,OTP-R0B0,QFN32	U5700	CRITICAL	P3V8AON_IC:A1_R0B0
353S02544	1	IC,RAA225501B,ICE,BOM1,A1,OTP-R0B1,QFN32	U5700	CRITICAL	P3V8AON_IC:A1_R0B1
353S02560	1	IC,RAA225501B,ICE,BOM1,A1,OTP-R0B2,QFN32	U5700	CRITICAL	P3V8AON_IC:A1_R0B2
353S02576	1	IC,RAA225501B,ICE,BOM1,A1,OTP-R0B3,QFN32	U5700	CRITICAL	P3V8AON_IC:A1_R0B3
353S02592	1	IC,RAA225501B,ICE,BOM1,A2,OTP-R0B0,QFN32	U5700	CRITICAL	P3V8AON_IC:A2_R0B0
353S02645	1	IC,RAA225501C,ICE,BOM5,A2,OTP-R170,QFN32	U5700	CRITICAL	P3V8AON_IC:A2_R170

<- 30A BOM1 OTP TGA PROGRAMS ARE GOING TO RAMP WITH

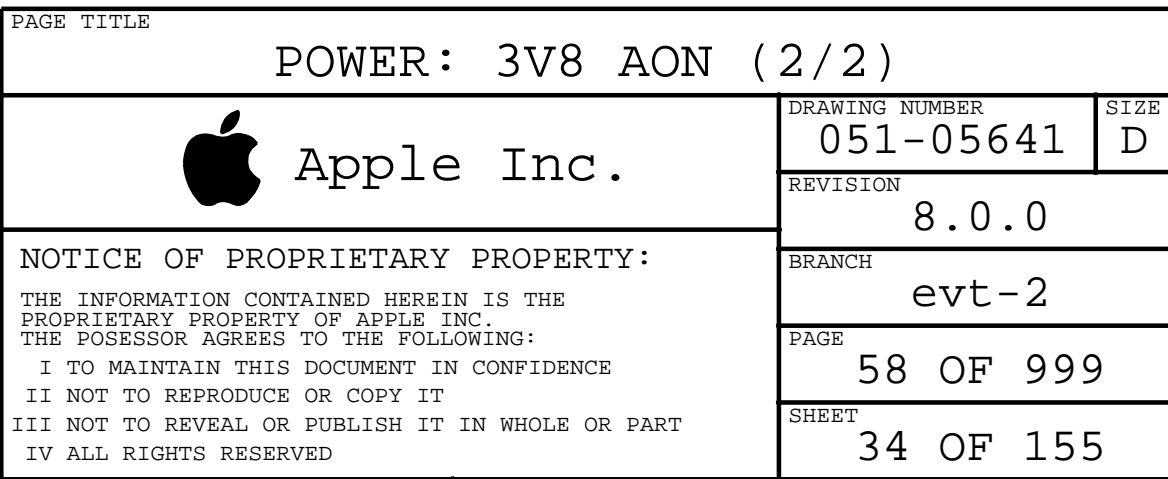
<- NEW BOM5 OTP FOR FUTURE PROGRAMS



BOM\_COST\_GROUP=SOC POWER

PAGE TITLE		
POWER: 3V8 AON (1/2)		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	57 OF 999
	SHEET	33 OF 155



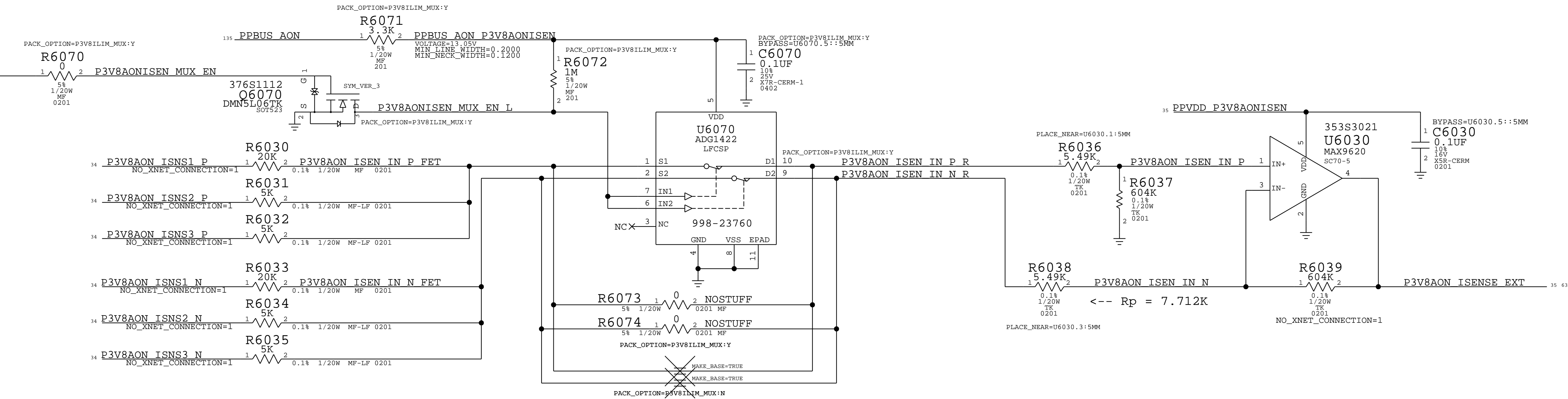




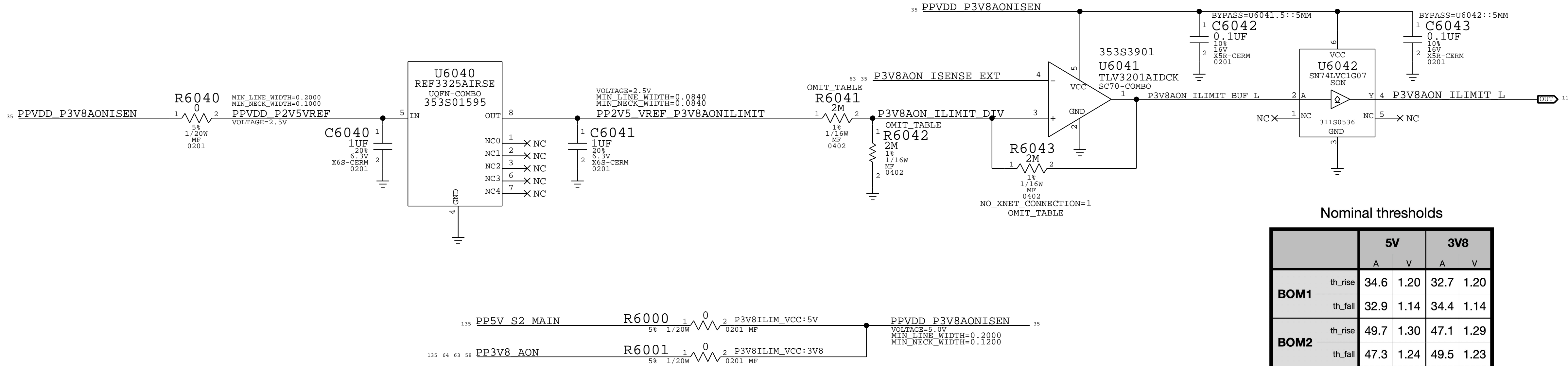
P3V8 LOW SIDE ISENSE AND ILIMIT (SUMMING AMP FOR 3 PHASES)

rdar://problem/69466996 Iceman Throttle Design Data

10A MAX ON PHASE 1, MAX TOTAL CURRENT SENSE @ PMU= 43.11A



PHASE 1 VSENSE GAIN: 8.75  
PHASE 2/3 VSENSE GAIN: 35  
4:1 WEIGHT FOR PHASE 1 RTREE



Nominal thresholds

		5V		3V8	
		A	V	A	V
BOM1	th_rise	34.6	1.20	32.7	1.20
	th_fall	32.9	1.14	34.4	1.14
BOM2	th_rise	49.7	1.30	47.1	1.29
	th_fall	47.3	1.24	49.5	1.23

Call one of these BOM GROUPs in the main BOM:

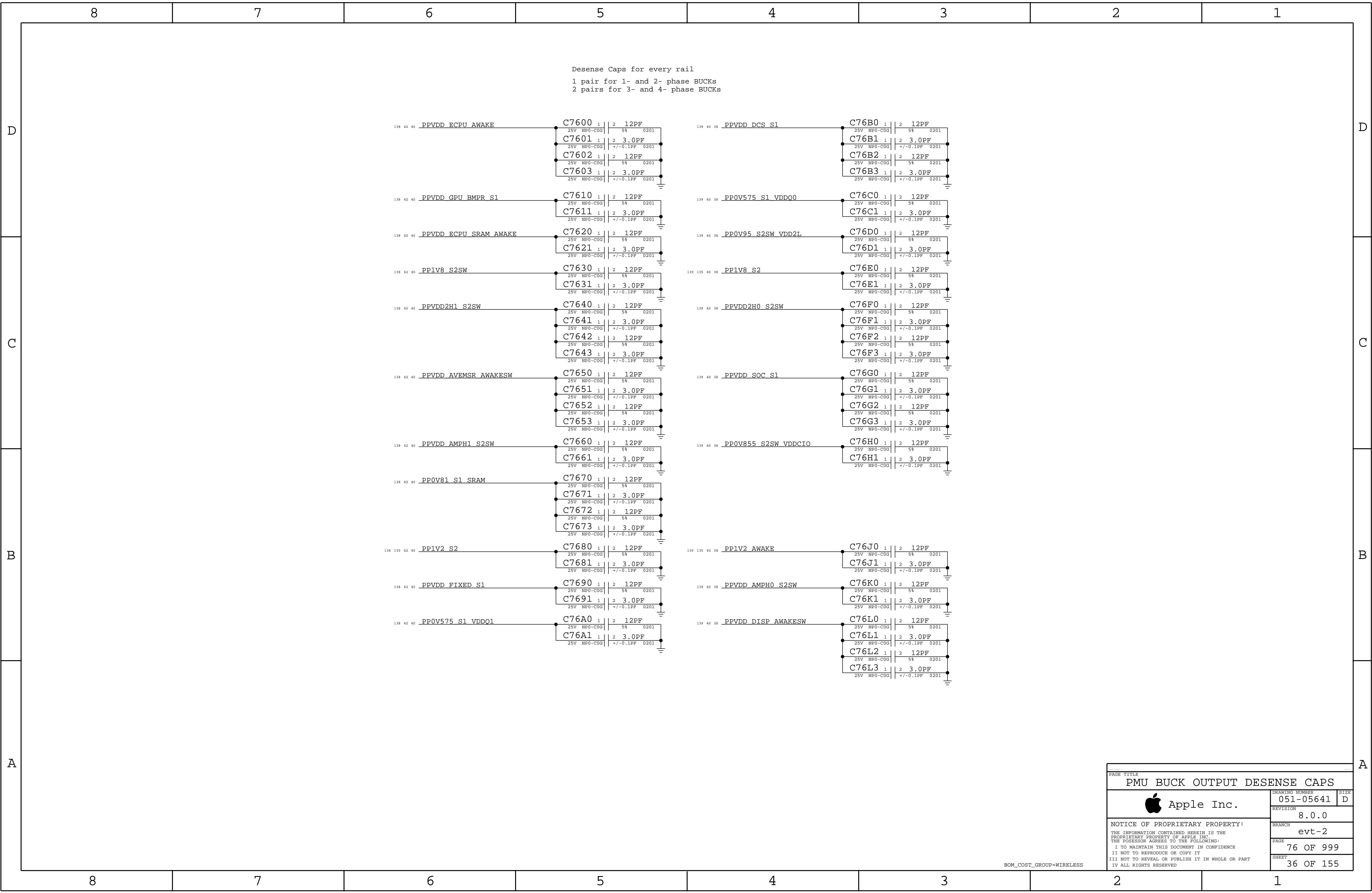
BOM GROUP	BOM OPTIONS
P3V8ILIM:BOM1_5V	P3V8ILIM_RT:23K2,P3V8ILIM_RB:20K,P3V8ILIM_RF:909K,P3V8ILIM_VCC:5V
P3V8ILIM:BOM2_5V	P3V8ILIM_RT:22K,P3V8ILIM_RB:22K,P3V8ILIM_RF:887K,P3V8ILIM_VCC:5V
P3V8ILIM:BOM1_3V8	P3V8ILIM_RT:23K2,P3V8ILIM_RB:20K,P3V8ILIM_RF:680K,P3V8ILIM_VCC:3V8
P3V8ILIM:BOM2_3V8	P3V8ILIM_RT:22K,P3V8ILIM_RB:22K,P3V8ILIM_RF:649K,P3V8ILIM_VCC:3V8

Don't Call these OPTIONs directly:

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
114S0349	1	RES,0402,1%,1/16W,23.2K	R6041	P3V8ILIM_RT:23K2
114S00141	1	RES,0402,1%,1/16W,22K	R6041	P3V8ILIM_RT:22K
114S0343	1	RES,0402,1%,1/16W,20K	R6042	P3V8ILIM_RB:20K
114S00141	1	RES,0402,1%,1/16W,22K	R6042	P3V8ILIM_RB:22K
114S0491	1	RES,0402,1%,1/16W,649K	R6043	P3V8ILIM_RF:649K
114S00146	1	RES,0402,1%,1/16W,680K	R6043	P3V8ILIM_RF:680K
114S0504	1	RES,0402,1%,1/16W,887K	R6043	P3V8ILIM_RF:887K
114S0505	1	RES,0402,1%,1/16W,909K	R6043	P3V8ILIM_RF:909K

BOM\_COST\_GROUP=SOC POWER

PAGE TITLE			
POWER: 3V8 AON OUTPUT THROTTLE			
	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
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	evt-2
		PAGE	60 OF 999
		SHEET	35 OF 155



8

7

6

5

4

3

2

1

BOM\_COST\_GROUP=WIRELESS

PMU BUCK OUTPUT DESENSE CAPS

Apple Inc.

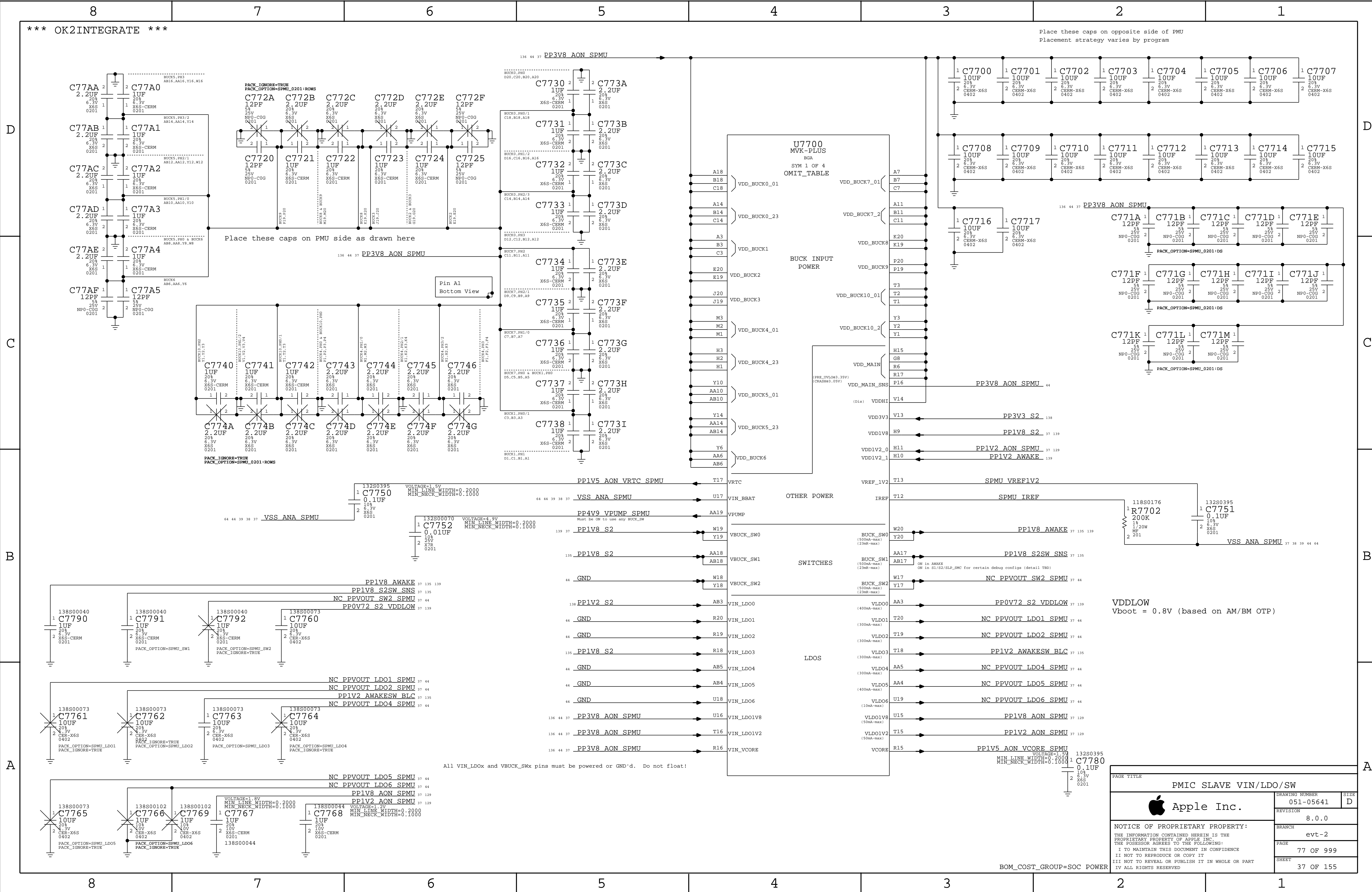
051-05641

8.0.0

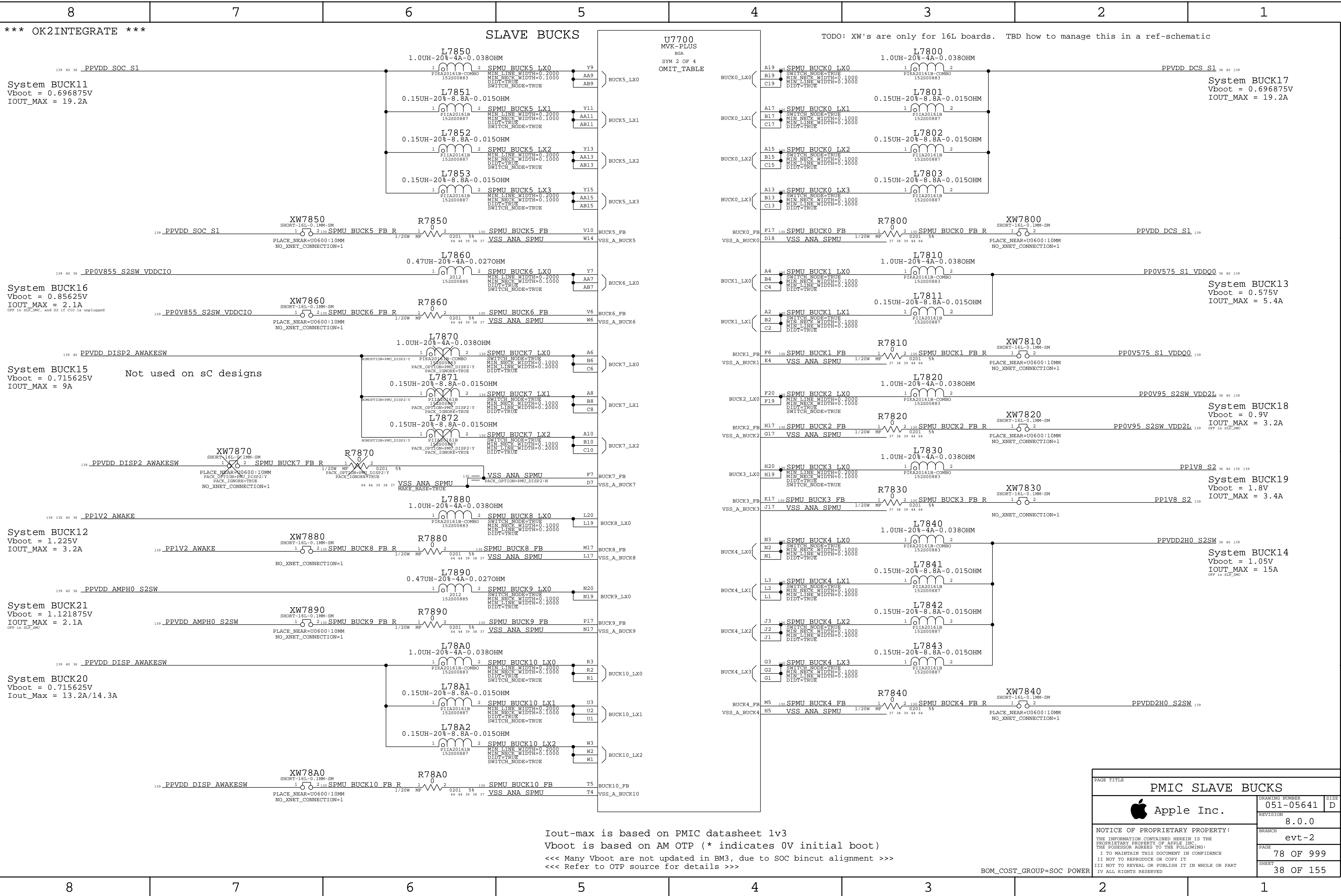
76 OF 999

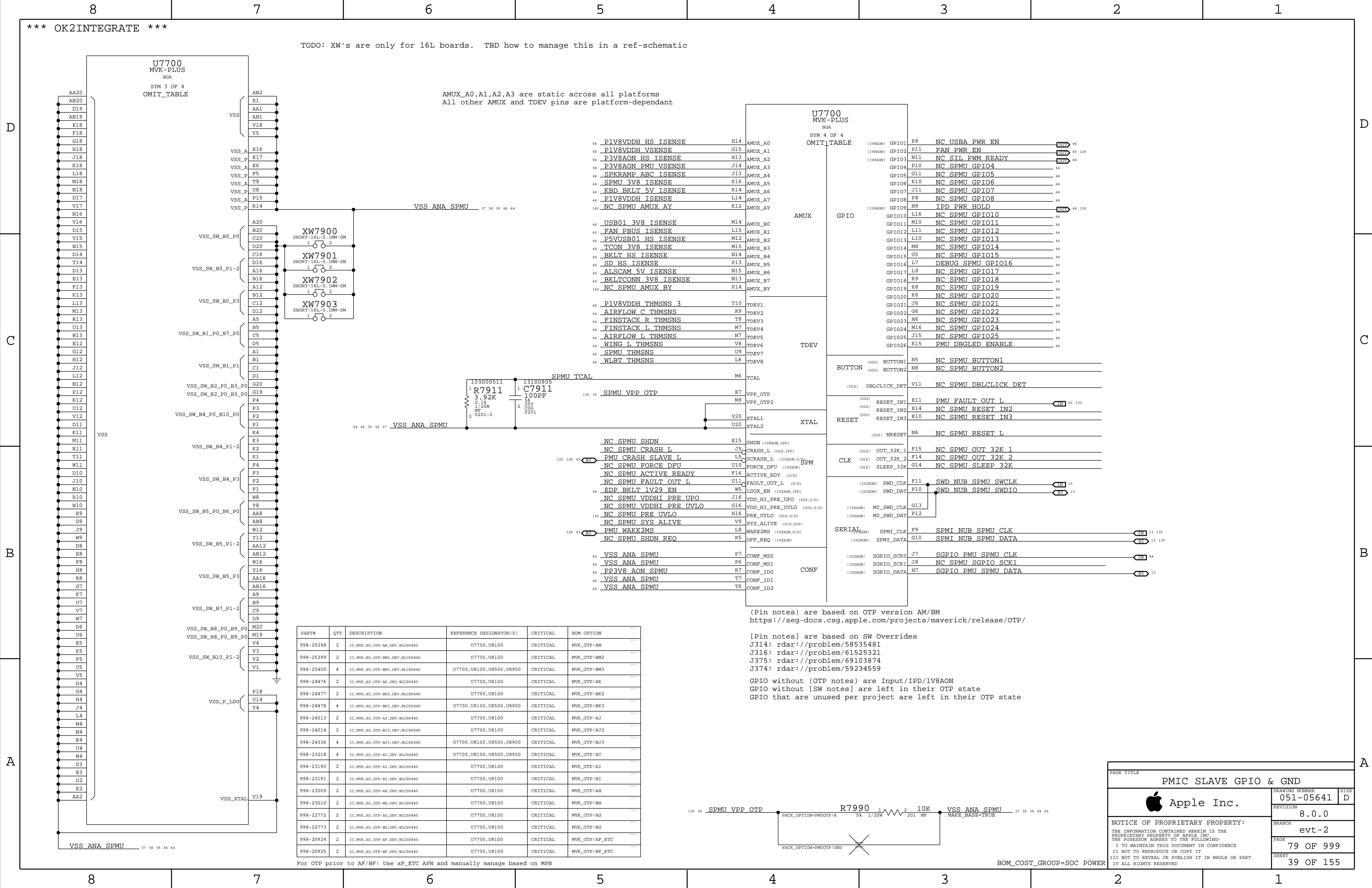
36 OF 155

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



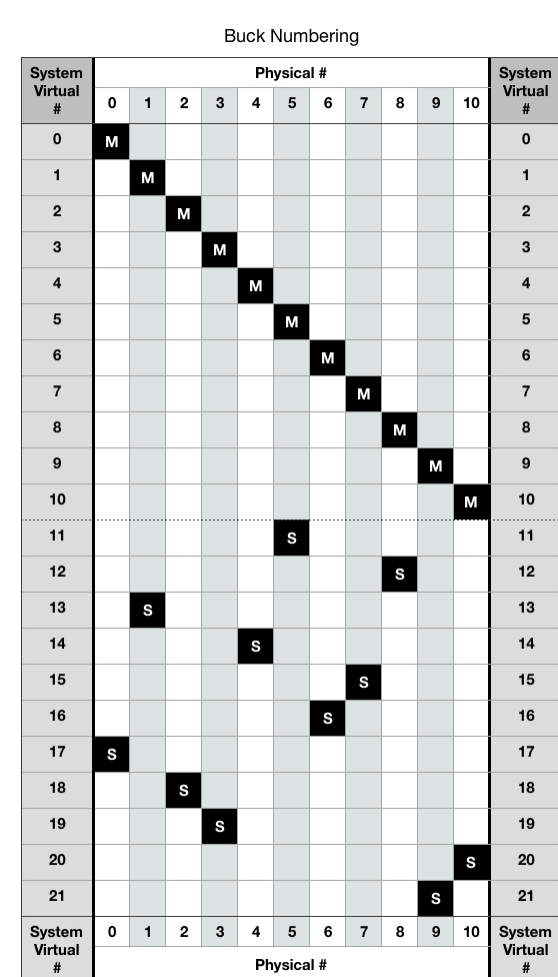
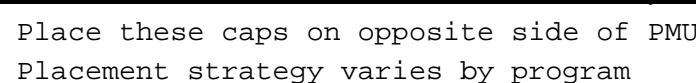








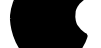


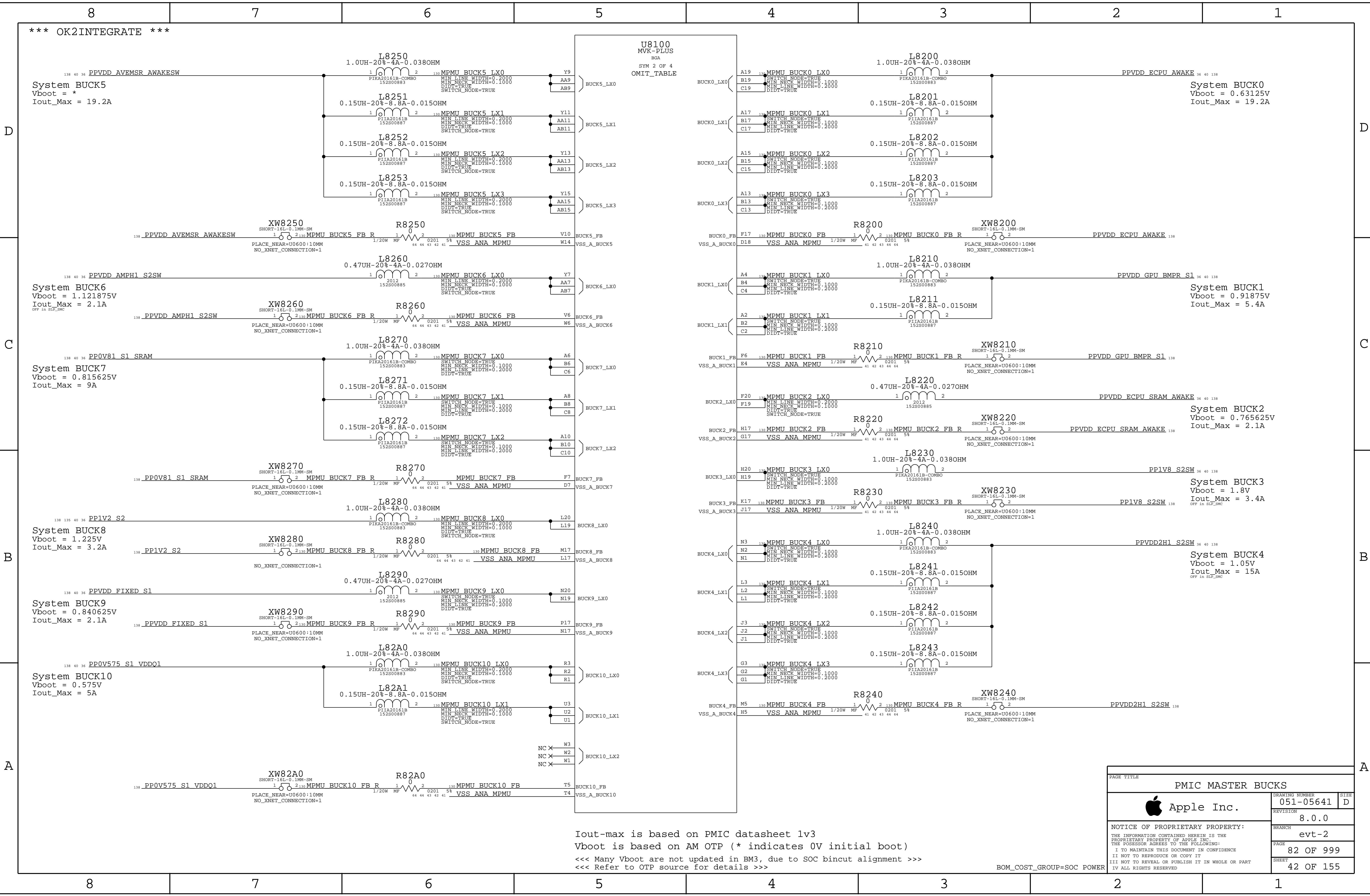


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
103S00496	1	RES,TK,1.07MOHM,0.1%,1/20W,0201	R8170	CRITICAL	PBUS:3S
103S00497	1	RES,TK,291KOHM,0.1%,1/20W,0201	R8171	CRITICAL	PBUS:3S
103S00498	1	RES,TK,1.1MOHM,0.1%,1/20W,0201	R8170	CRITICAL	PBUS:12VDCIN
103S00499	1	RES,TK,237KOHM,0.1%,1/20W,0201	R8171	CRITICAL	PBUS:12VDCIN

```
<== For 3S BATTERY (7V UVLO)
VDDHI = 1.49669V @ 7V-PBUS
VDDHI = 1.5V @ 7.0155V-PBUS
-----
<== For 12V DCIN (8.46V UVLO)
VDDHI = 1.49964V @ 8.46V-PBUS
VDDHI = 1.5V @ 8.46203V-PBUS
```

BOM\_COST\_GROUP=SOC POWER

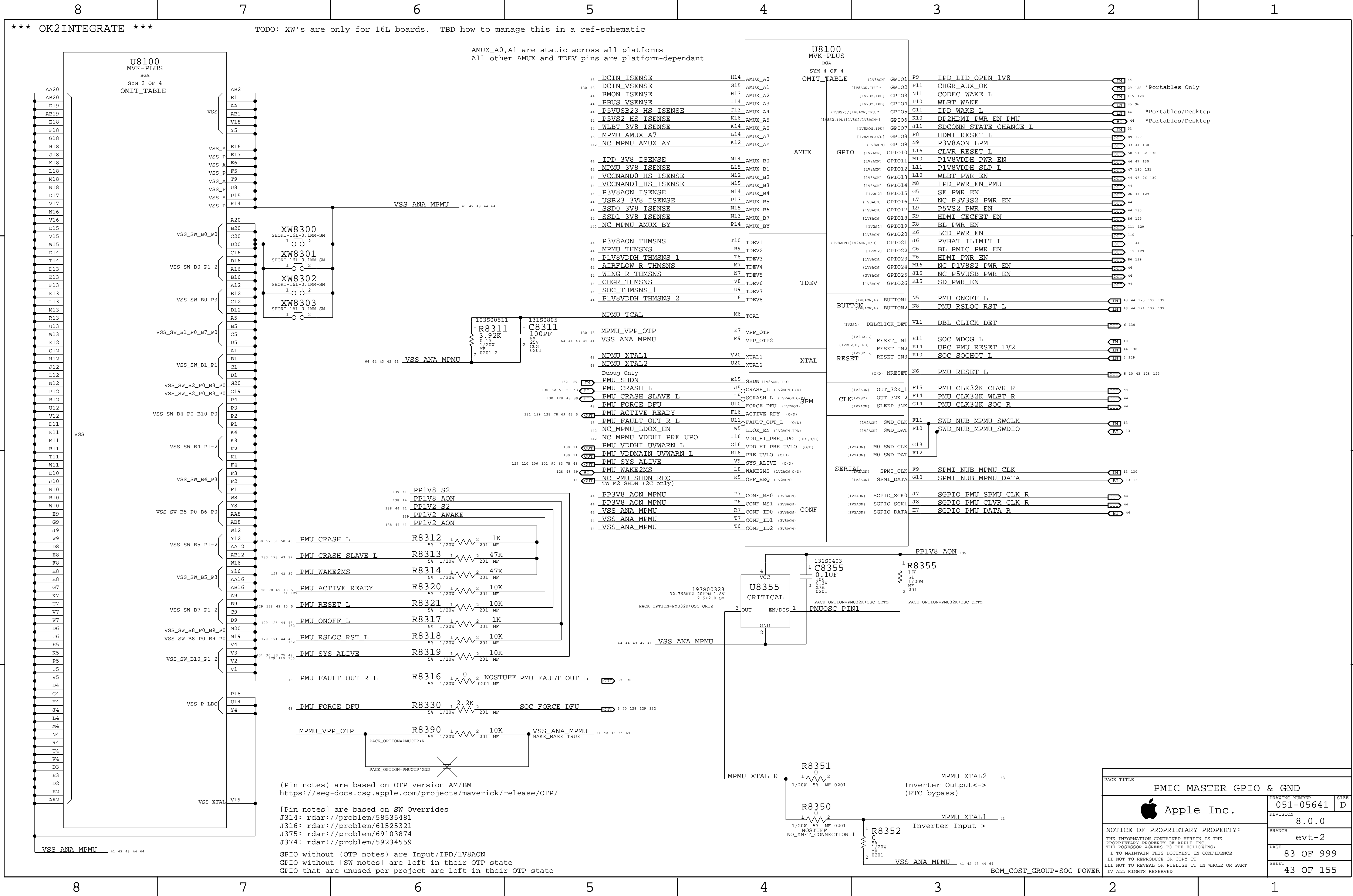
PAGE TITLE			
PMIC MASTER VIN/LDO/SW			
 Apple Inc.	DRAWING NUMBER	SIZE	
	051-05641	D	
	REVISION	8.0.0	
NOTICE OF PROPRIETARY PROPERTY:	BRANCH	evt-2	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:	PAGE	81 OF 999	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE	SHEET	41 OF 155	
II NOT TO REPRODUCE OR COPY IT			
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART			
IV ALL RIGHTS RESERVED			

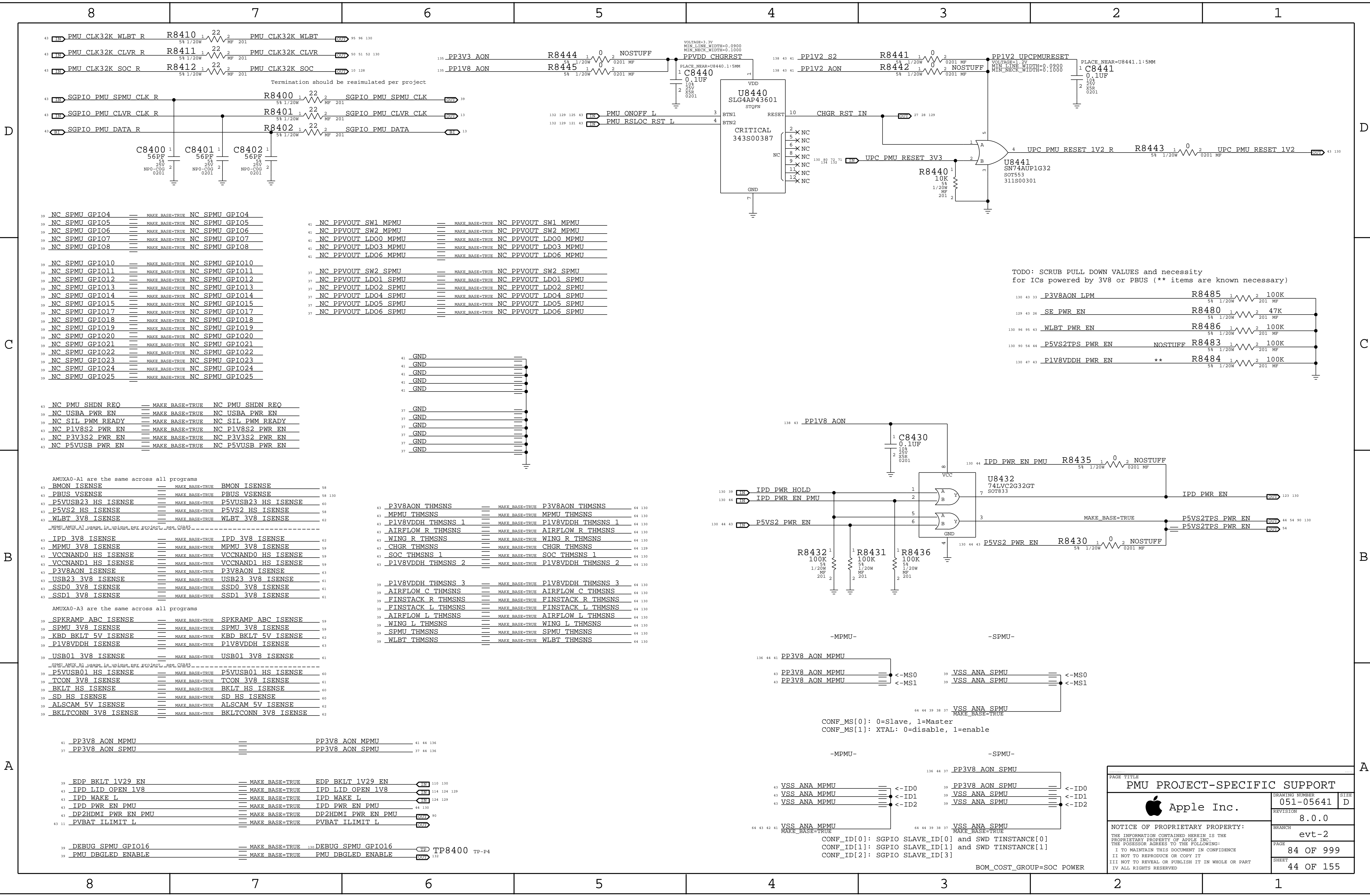



Iout-max is based on PMIC datasheet lv3  
Vboot is based on AM OTP (\* indicates 0V initial boot)  
<<< Many Vboot are not updated in BM3, due to SOC bincut alignment >>>  
<<< Refer to OTP source for details >>>

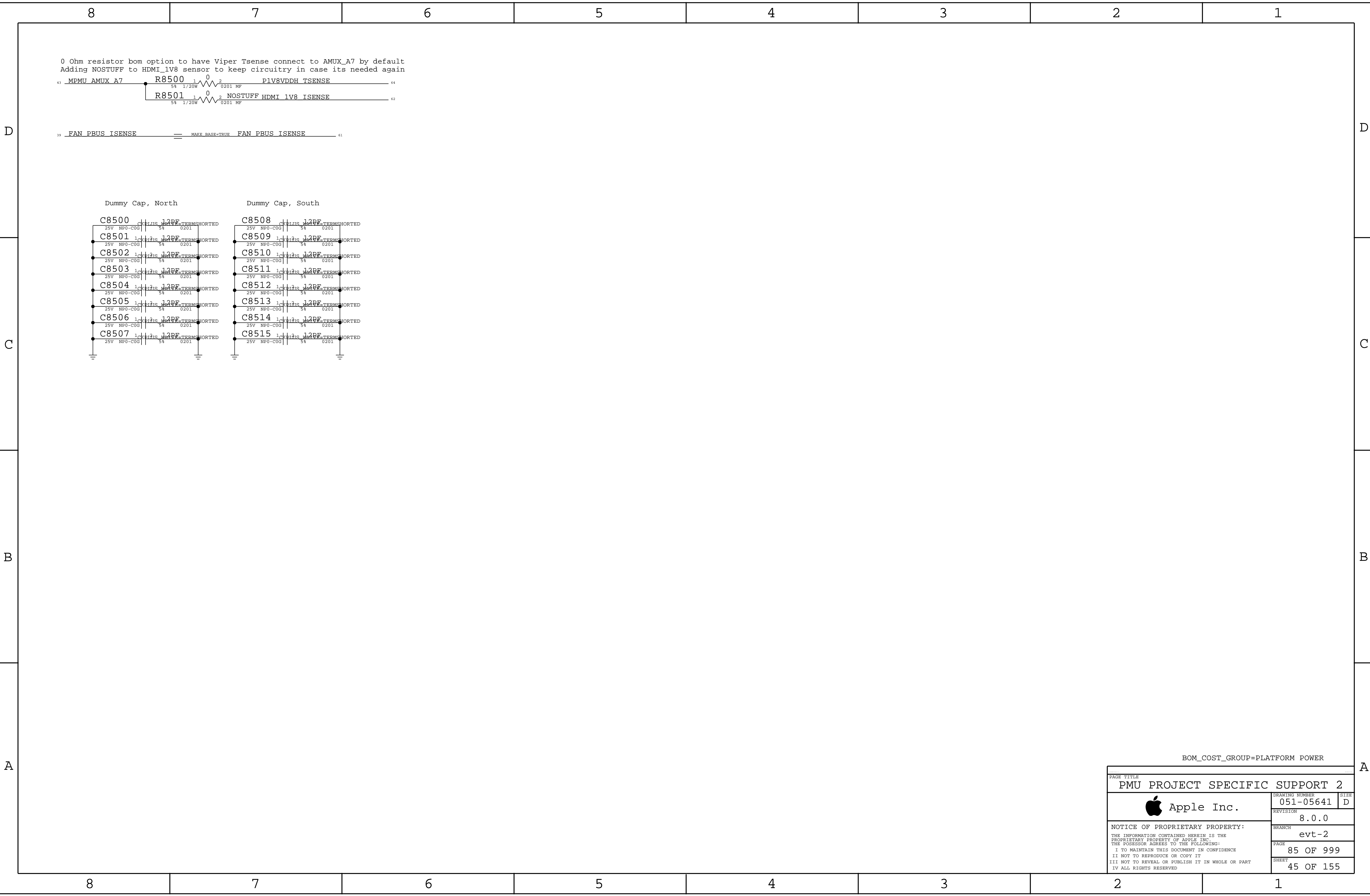
BOM\_COST\_GROUP=SOC POWER







PAGE TITLE		
PMU PROJECT-SPECIFIC SUPPORT		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	84 OF 999
	SHEET	44 OF 155



D

C

B

A

D

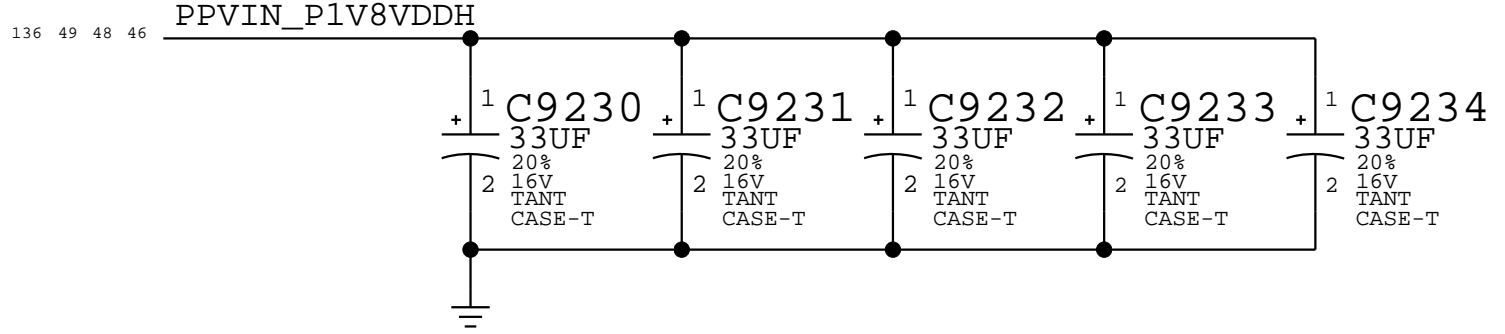
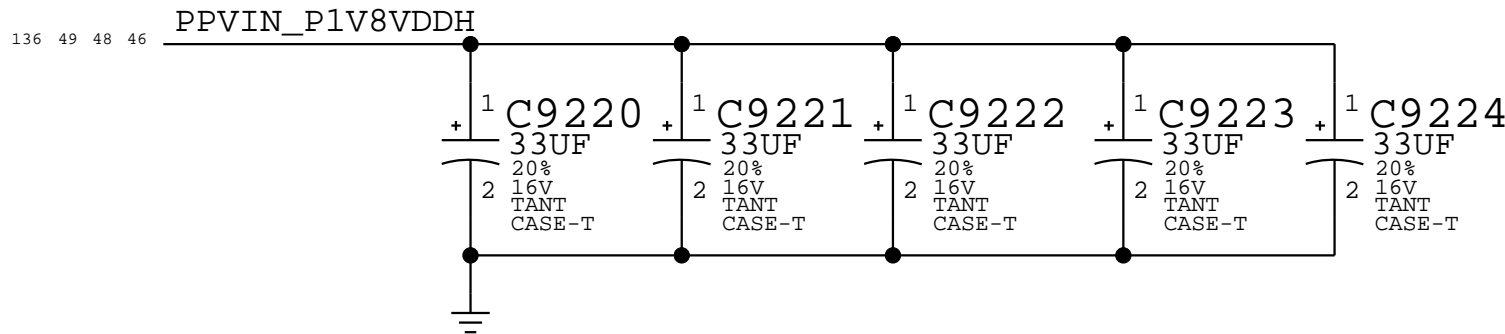
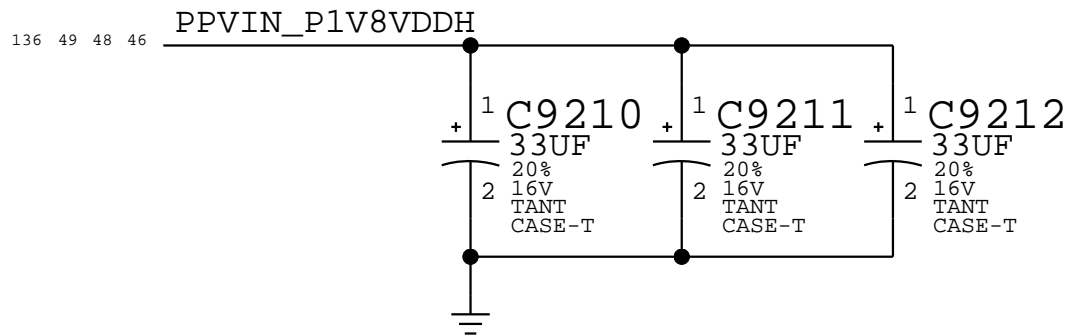
C

B

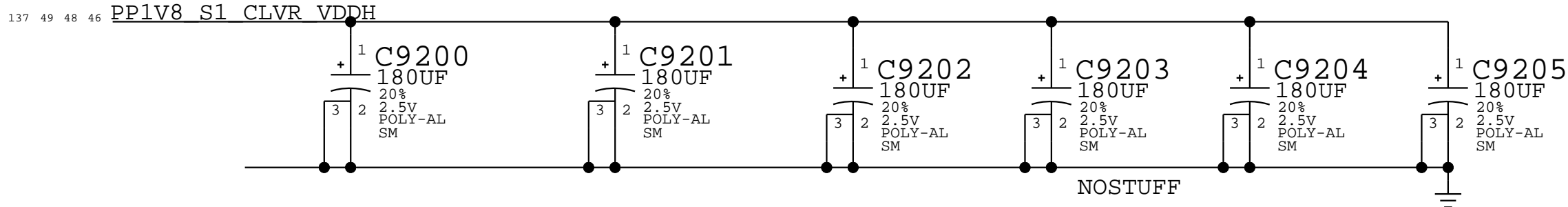
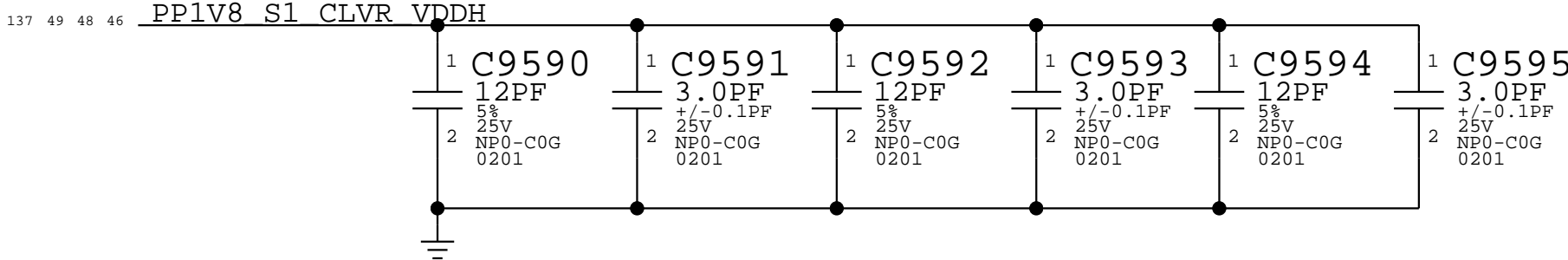
A

87654321

<rdar://problem/61127187> (P2\_ J316 Pls MLB Add PBUS caps on Viper input



ADDITIONAL VIPER DESENSE CAPS REQUIRED FOR T728 IN ADDITION TO DESENSE CAPS IN REF DESIGN



BOM\_COST\_GROUP=PLATFORM POWER

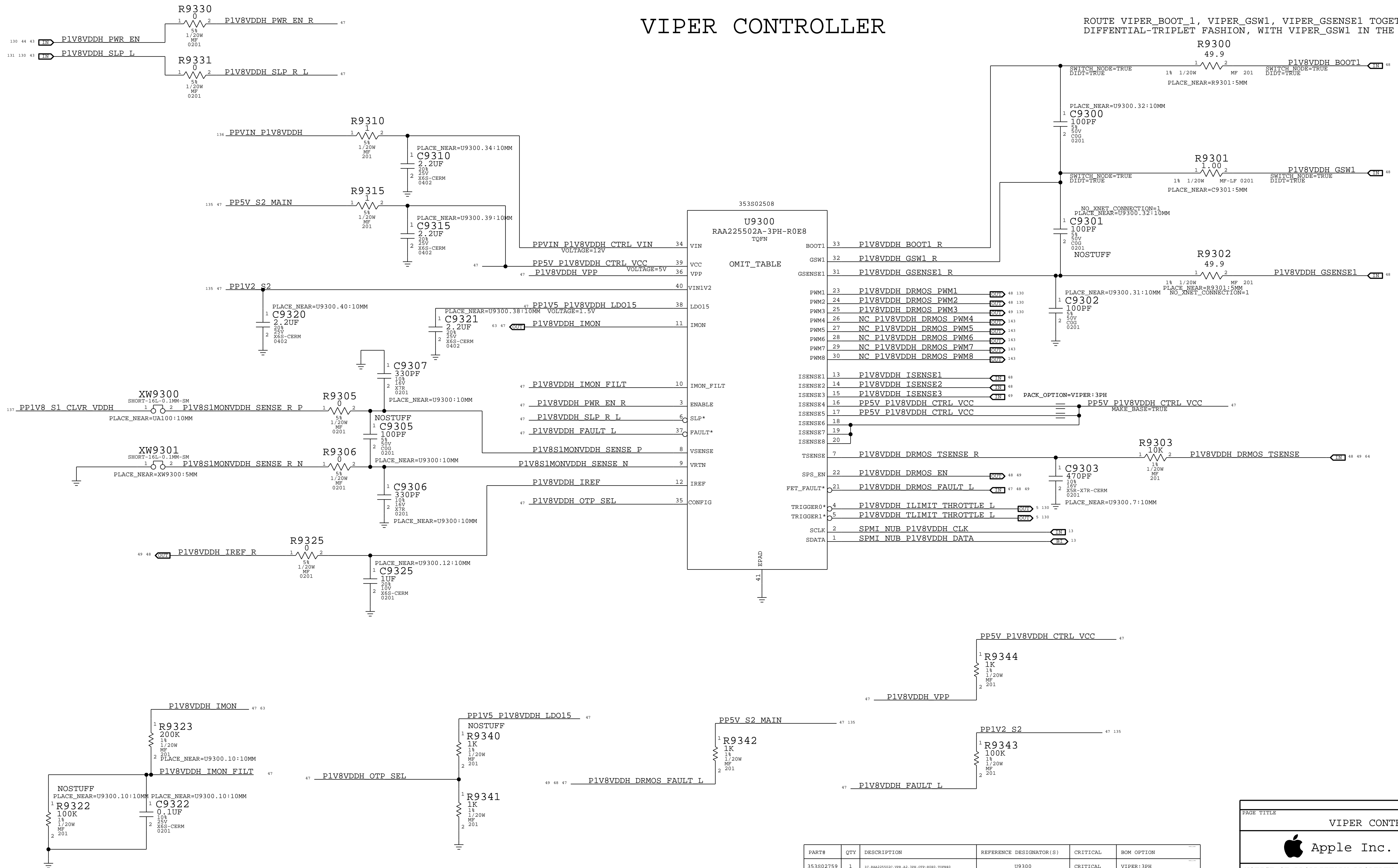
PAGE TITLE			PAGE TITLE		
Apple Inc.			DRAWING NUMBER		SIZE
			051-05641		D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED			REVISION		8.0.0
			BRANCH		evt-2
			PAGE		92 OF 999
			SHEET		46 OF 155



\*\*\*OK2INTEGRATE\*\*\*


## VIPER CONTROLLER

ROUTE VIPER\_BOOT\_1, VIPER\_GSW1, VIPER\_GSENSE1 TOGETHER IN DIFFENTIAL-TRIPLET FASHION, WITH VIPER\_GSW1 IN THE MIDDLE



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S02759	1	1C,8A0225502C,VPR,A2,3PH,OTF-R080,TQPN40	U9300	CRITICAL	VIPER:3PH
353S02760	1	1C,8A0225502C,VPR,A2,5PH,OTF-R0P0,TQPN40	U9300	CRITICAL	VIPER:5PH

BOM\_COST\_GROUP=SOC POWER

PAGE TITLE		
VIPER CONTROLLER		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	D
	REVISION	
	8.0.0	
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	evt-2	
PAGE	93 OF 999	
SHEET	47 OF 155	

8

7

6

5

4

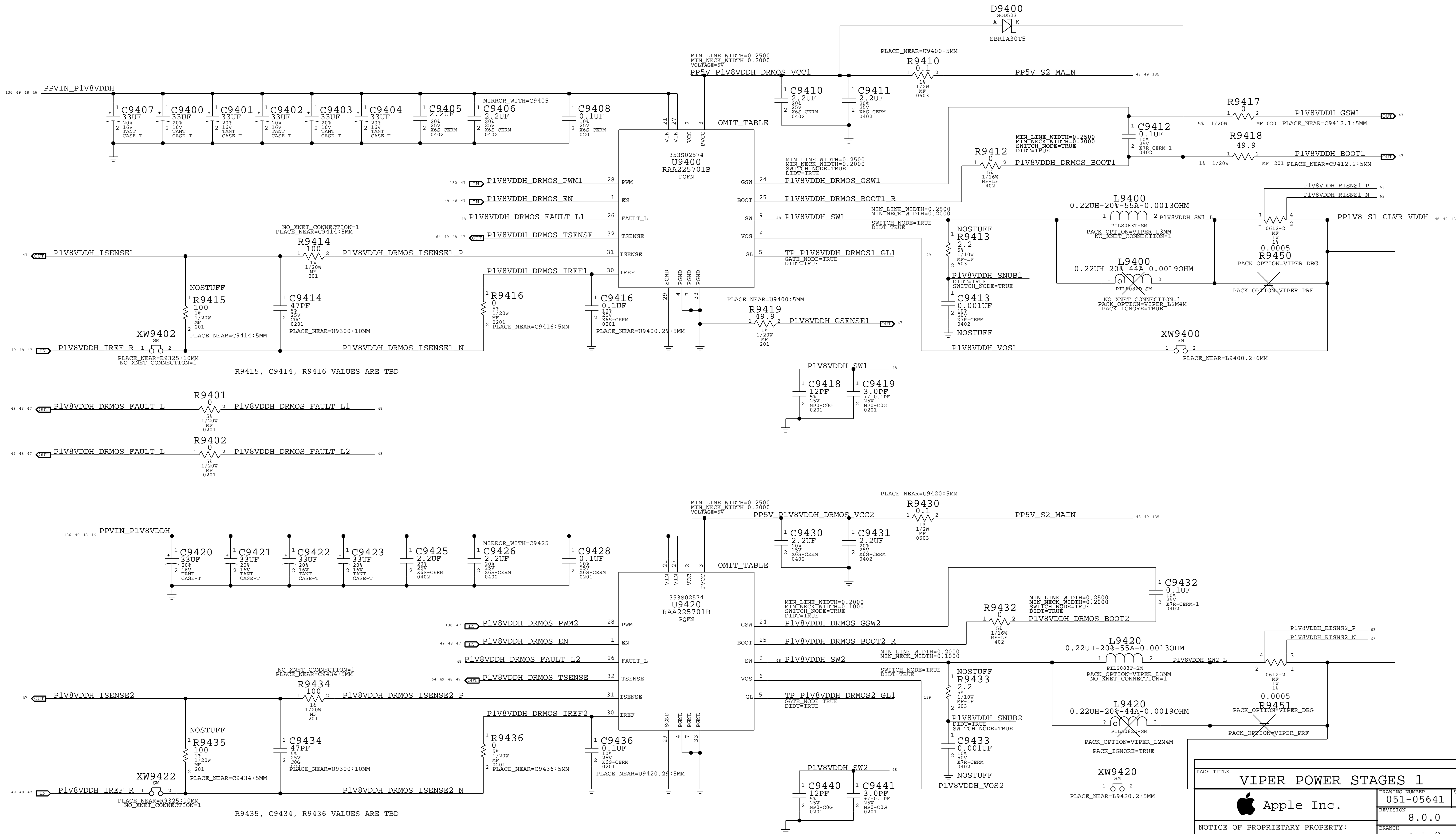
3

2

1

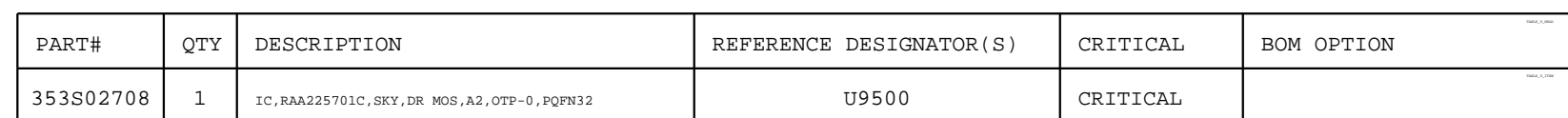
\*\*\*OK2INTEGRATE\*\*\*


## VIPER POWER STAGES 1



BOM\_COST\_GROUP=SOC POWER

## VIPER POWER STAGES 2



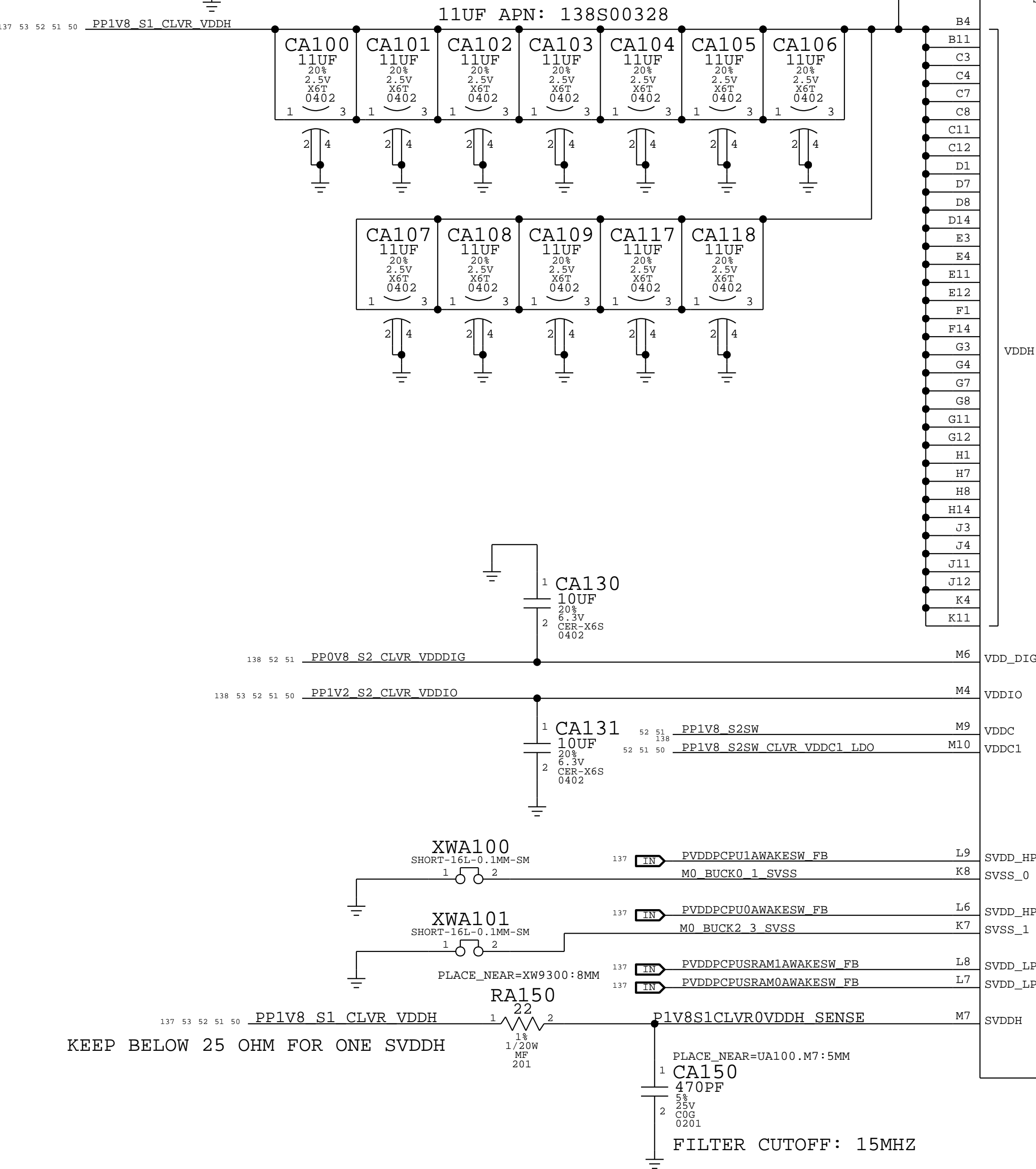
PAGE TITLE			VIPER POWER STAGES 2		
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE	D	
	REVISION	8.0.0			
	NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED				
BRANCH		evt-2			
PAGE		95 OF 999			
SHEET		49 OF 155			

BOM\_COST\_GROUP=SOC POWER

\*\*\*OK2INTEGRATE\*\*\*

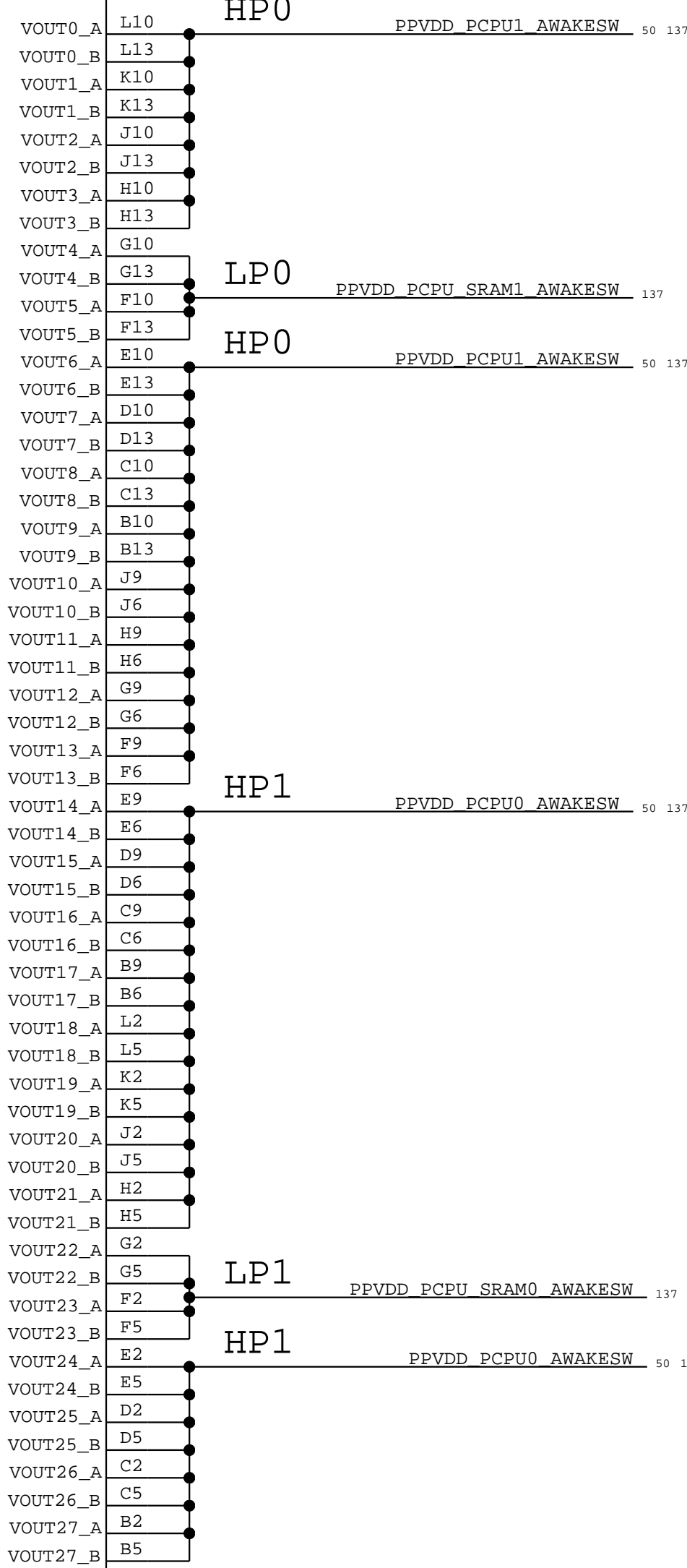
MONACO\_0

INSTANCE = C0  
SILICON:CFG = A0:A0, B0:D0  
SILICON:OTP = A0:ZP\_, B0:YP\_



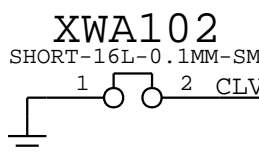
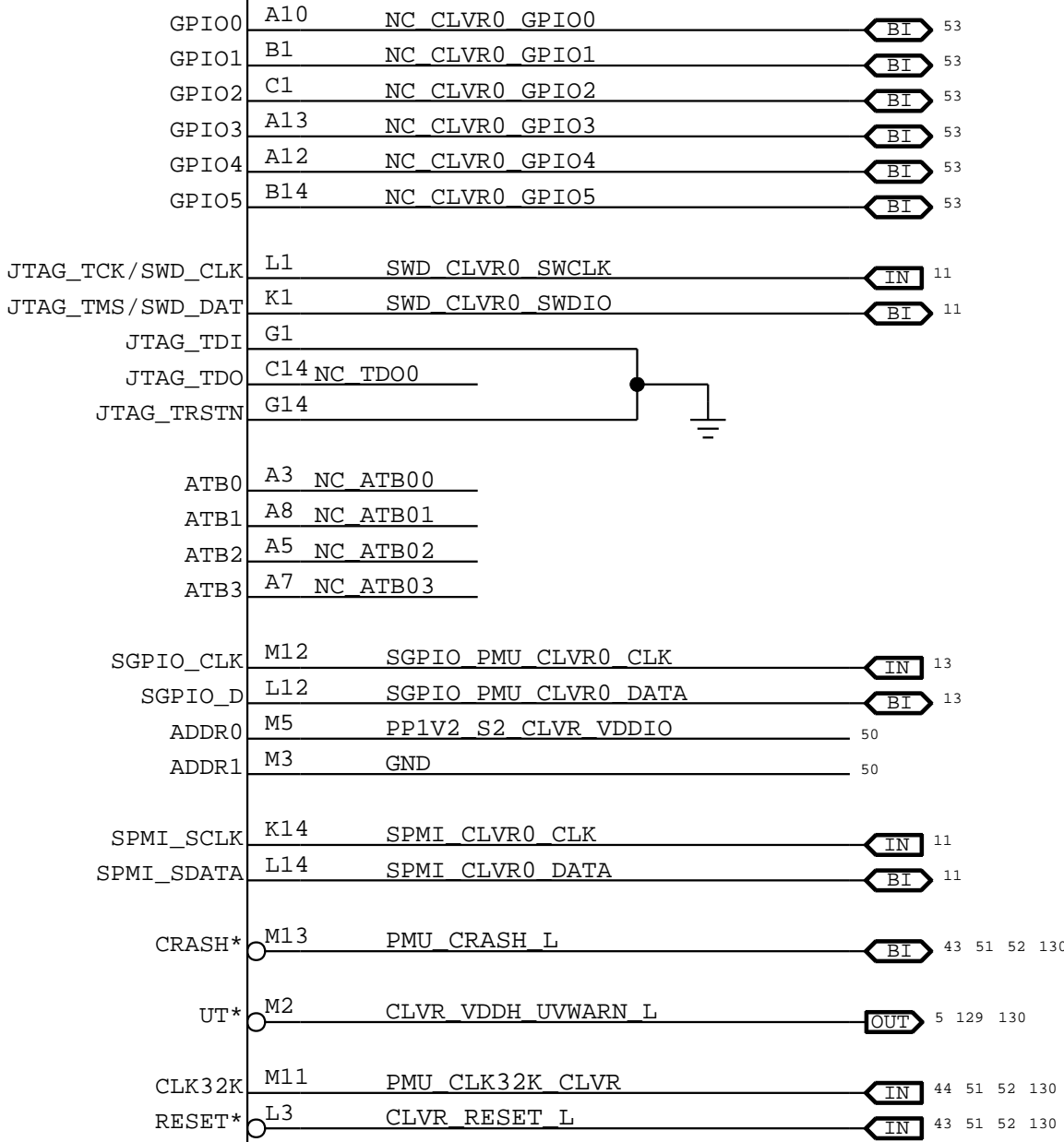
OMIT\_TABLE

UA100  
MON  
BGA  
SYM 1 OF 2

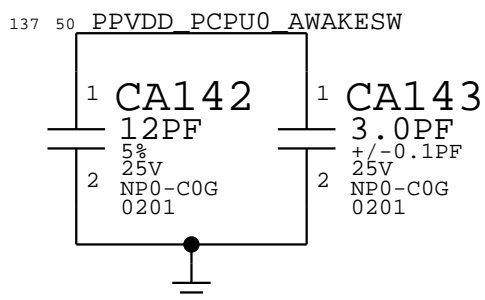
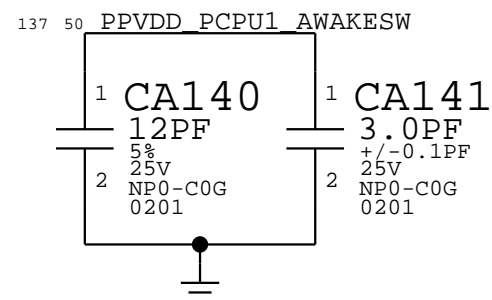
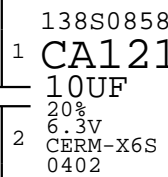


OMIT\_TABLE

UA100  
MON  
BGA  
SYM 2 OF 2




VOLTAGE=1.8V  
MIN\_NECK\_WIDTH=0.1000  
MIN\_LINE\_WIDTH=0.1000  
PP1V8\_S2SW CLVR VDDC1 LDO



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-24561	1	IC,MON,B0,OTP-YPJ,DEV,FCCSP168	UA100	CRITICAL	

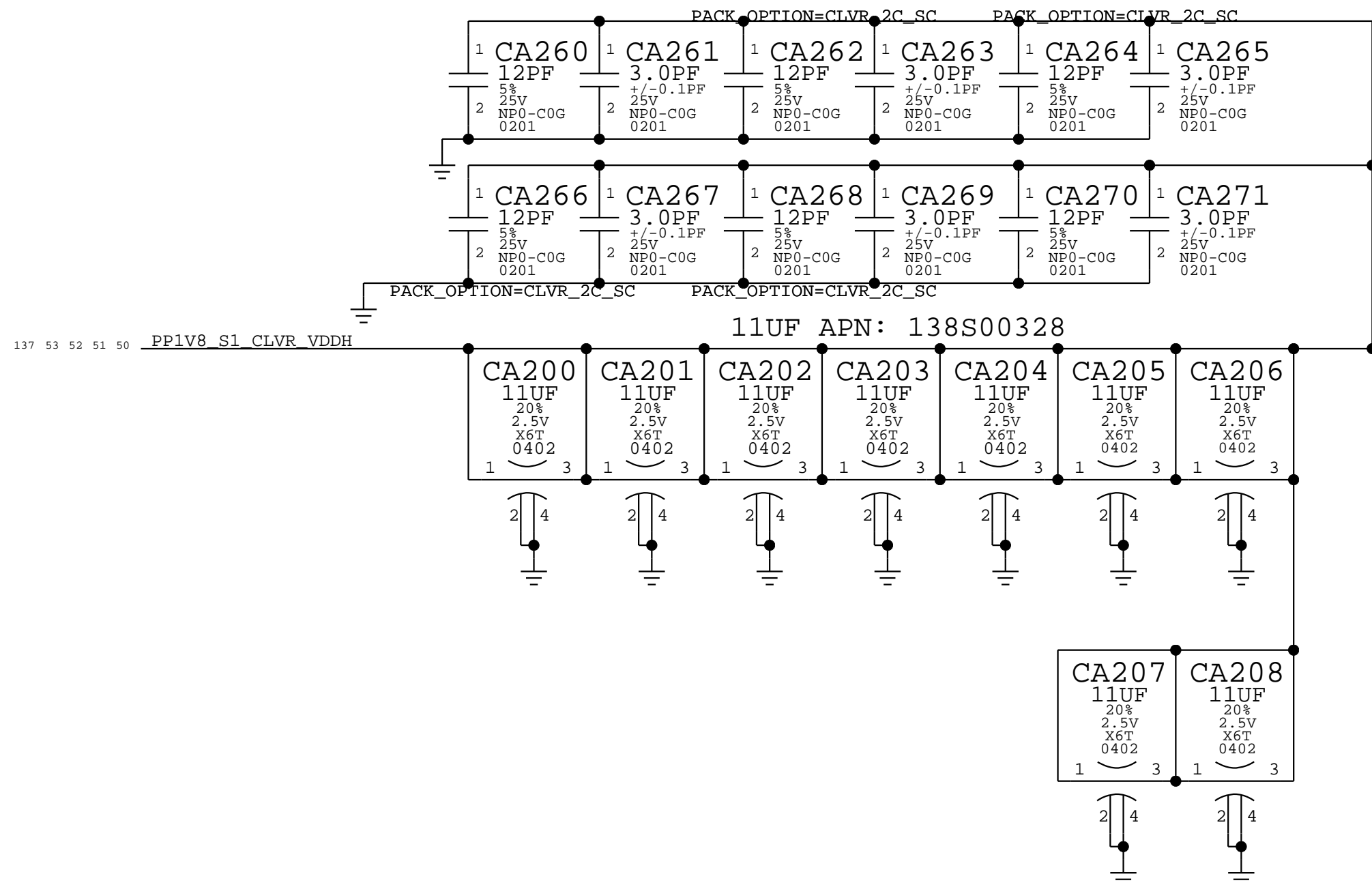
BOM\_COST\_GROUP=SOC POWER

MONACO 0			
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
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	evt-2	
	PAGE	101 OF 999	
	SHEET	50 OF 155	

\*\*\*OK2INTEGRATE\*\*\*

MONACO\_1

INSTANCE = C1  
CFG = A1  
OTP = BP\_



OMIT\_TABLE

UA200  
MON  
BGA  
SYM 1 OF 2

VOUT0\_A  
VOUT0\_B  
VOUT1\_A  
VOUT1\_B  
VOUT2\_A  
VOUT2\_B  
VOUT3\_A  
VOUT3\_B  
VOUT4\_A  
VOUT4\_B  
VOUT5\_A  
VOUT5\_B  
VOUT6\_A  
VOUT6\_B  
VOUT7\_A  
VOUT7\_B  
VOUT8\_A  
VOUT8\_B  
VOUT9\_A  
VOUT9\_B  
VOUT10\_A  
VOUT10\_B  
VOUT11\_A  
VOUT11\_B  
VOUT12\_A  
VOUT12\_B  
VOUT13\_A  
VOUT13\_B  
VOUT14\_A  
VOUT14\_B  
VOUT15\_A  
VOUT15\_B  
VOUT16\_A  
VOUT16\_B  
VOUT17\_A  
VOUT17\_B  
VOUT18\_A  
VOUT18\_B  
VOUT19\_A  
VOUT19\_B  
VOUT20\_A  
VOUT20\_B  
VOUT21\_A  
VOUT21\_B  
VOUT22\_A  
VOUT22\_B  
VOUT23\_A  
VOUT23\_B  
VOUT24\_A  
VOUT24\_B  
VOUT25\_A  
VOUT25\_B  
VOUT26\_A  
VOUT26\_B  
VOUT27\_A  
VOUT27\_B

VDDH

VDD\_DIG

VDDIO

VDDC

VDDC1

SVDD\_HP0

SVSS\_0

SVDD\_HP1

SVSS\_1

SVDD\_LP0

SVDD\_LP1

SVDDH

HP0

LP0

HP0

HP1

LP1

HP1

OMIT\_TABLE

UA200  
MON  
BGA  
SYM 2 OF 2

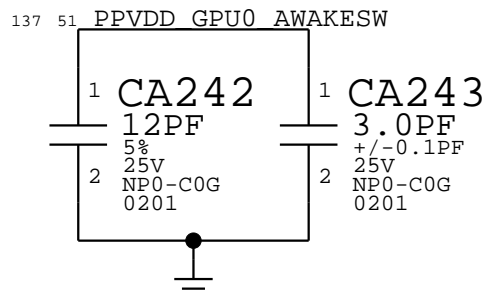
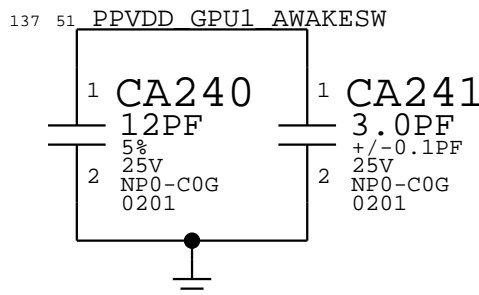
GPIO0  
GPIO1  
GPIO2  
GPIO3  
GPIO4  
GPIO5  
JTAG\_TCK/SWD\_CLK  
JTAG\_TMS/SWD\_DAT  
JTAG\_TDI  
JTAG\_TDO  
JTAG\_TRSTN  
ATB0  
ATB1  
ATB2  
ATB3  
SGPIO\_CLK  
SGPIO\_D  
ADDR0  
ADDR1  
SPMI\_SCLK  
SPMI\_SDATA  
CRASH\*  
UT\*  
CLK32K  
RESET\*

VSS

VSSC

51 GND  
51 PP1V2\_S2\_CLVR\_VDDIO MAKE BASE-TRUE  
50 51 52 53 138

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-24556	1	IC,MON,B0,OTP-BPU,DEV,FCCSP168	UA200	CRITICAL	



BOM\_COST\_GROUP=SOC POWER

PAGE TITLE			
MONACO 1			
	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
	BRANCH	evt-2	
	PAGE	102 OF 999	
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 51 OF 155



\*\*\*OK2INTEGRATE\*\*\*

MONACO\_4

SC

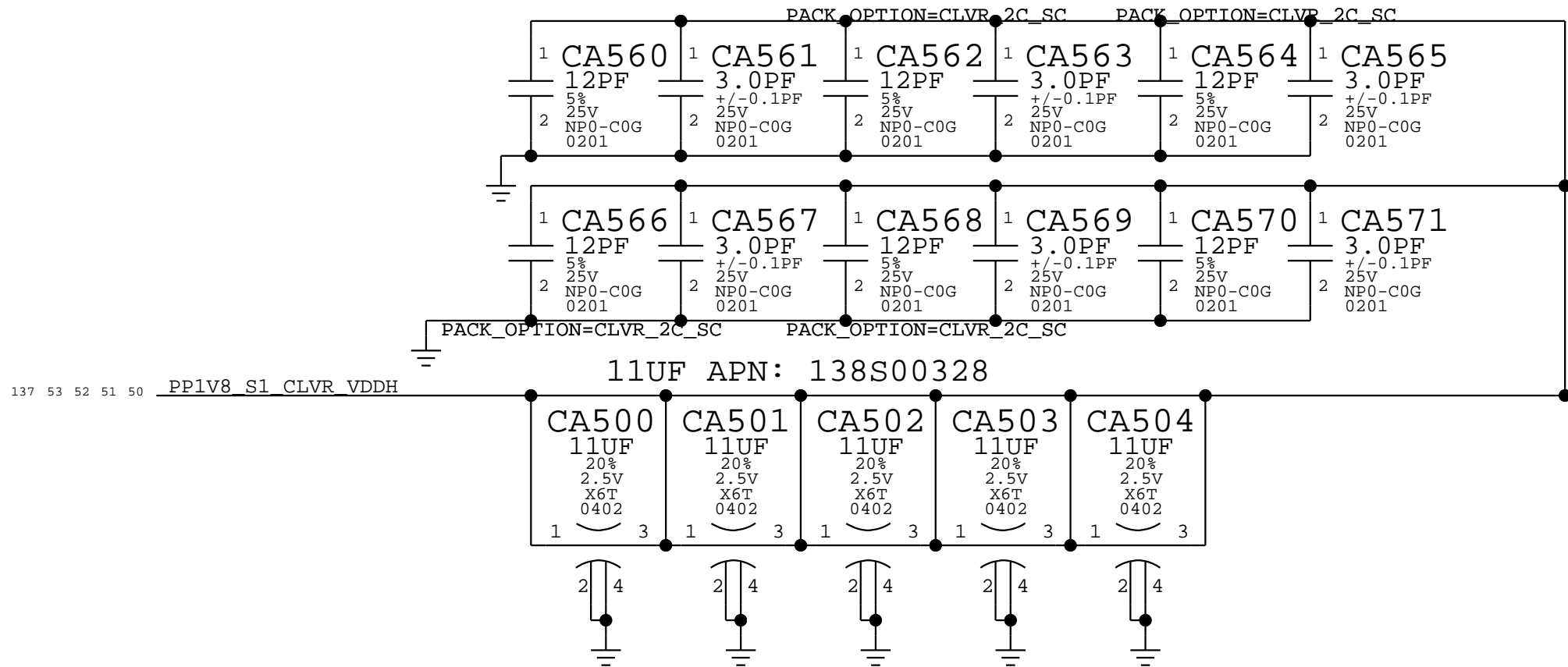
1C

2C

INSTANCE = C2  
CFG = C0  
OTP = QP\_

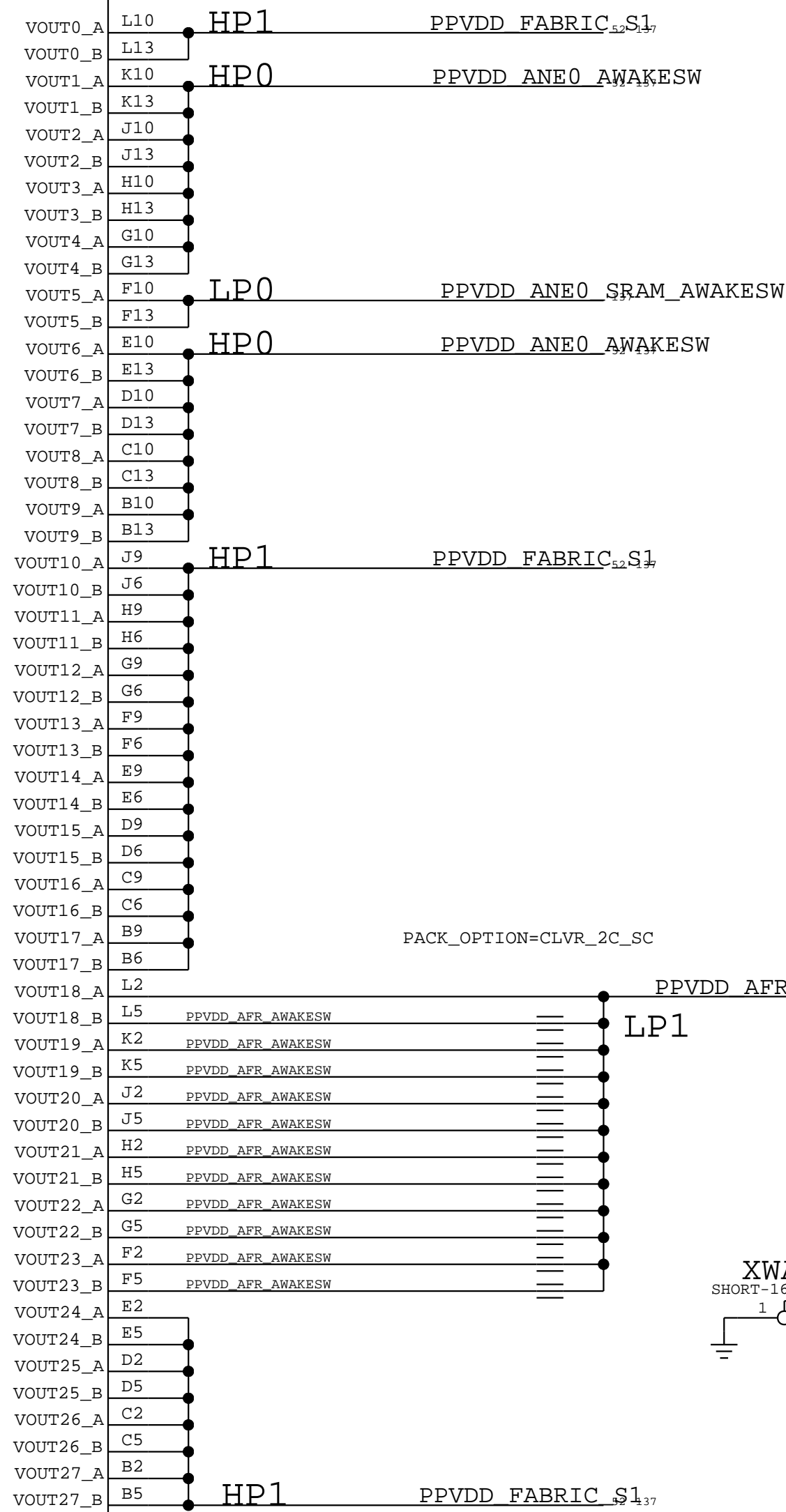
INSTANCE = C4  
CFG = C1  
OTP = RP\_

INSTANCE = C4  
CFG = C2  
OTP = SP\_



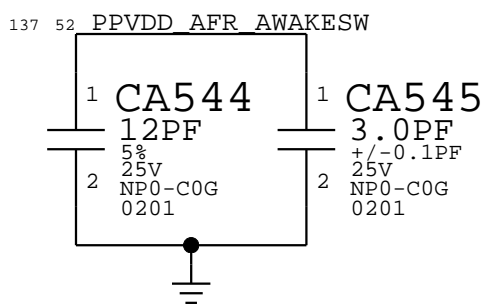
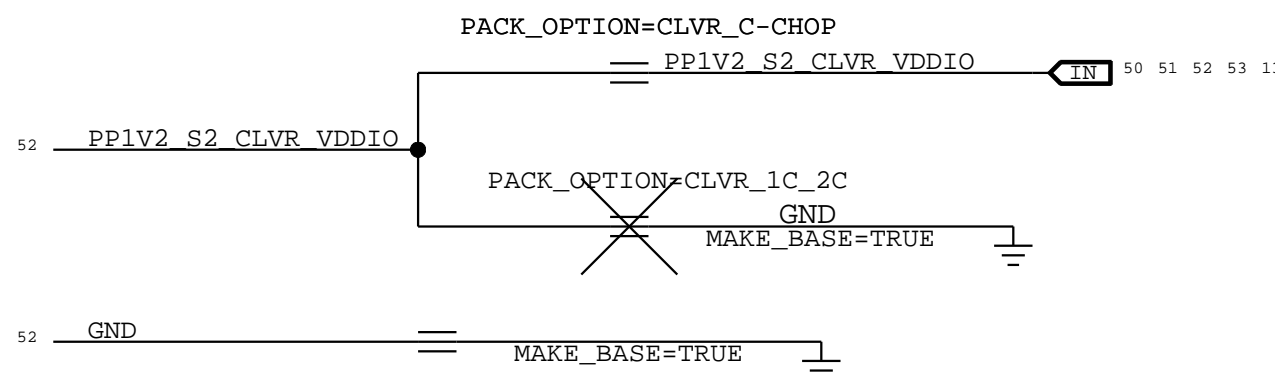
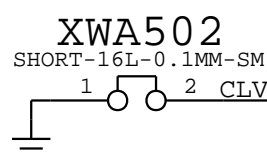
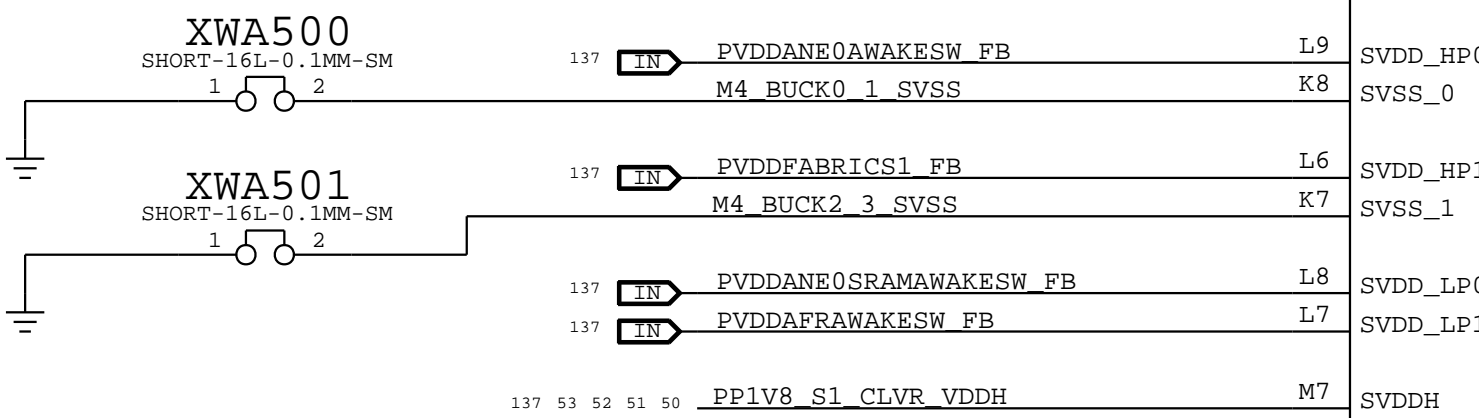
OMIT\_TABLE

UA500  
MON  
BGA  
SYM 1 OF 2

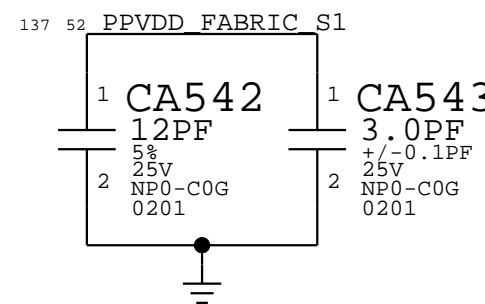
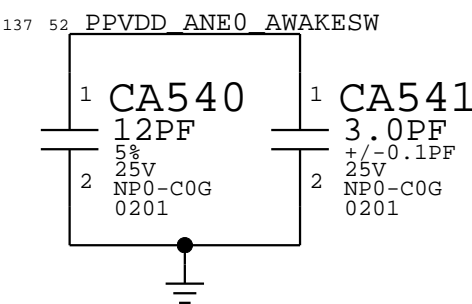


OMIT\_TABLE

UA500  
MON  
BGA  
SYM 2 OF 2



PACK\_OPTION=CLVR\_2C\_SC

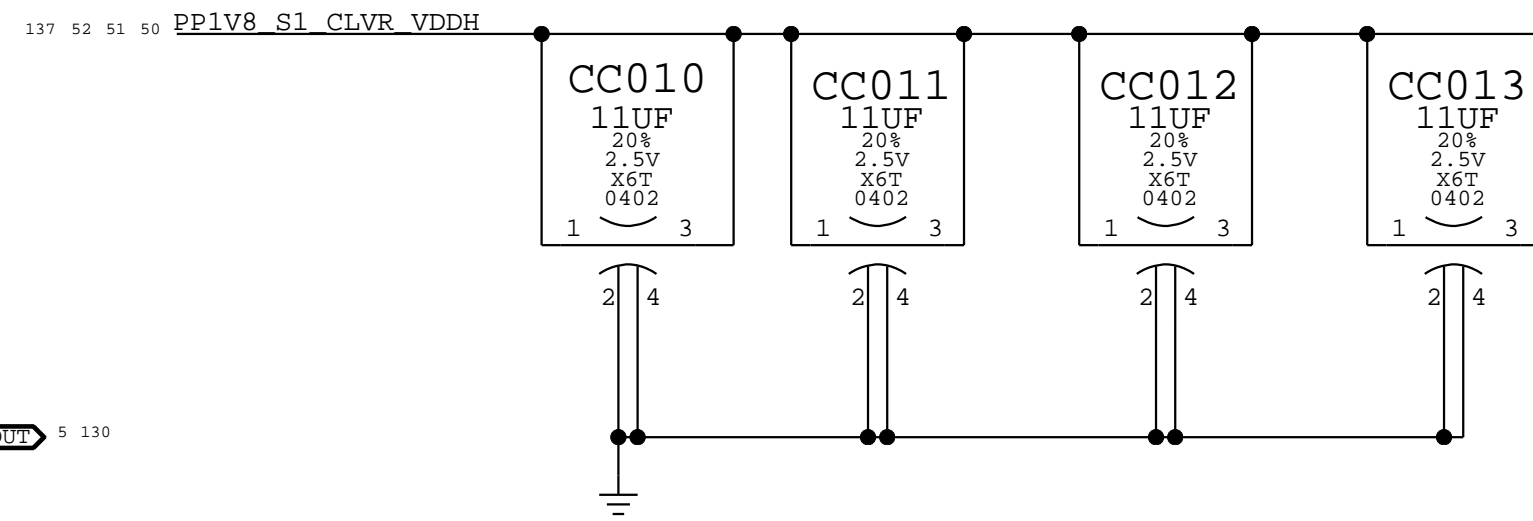
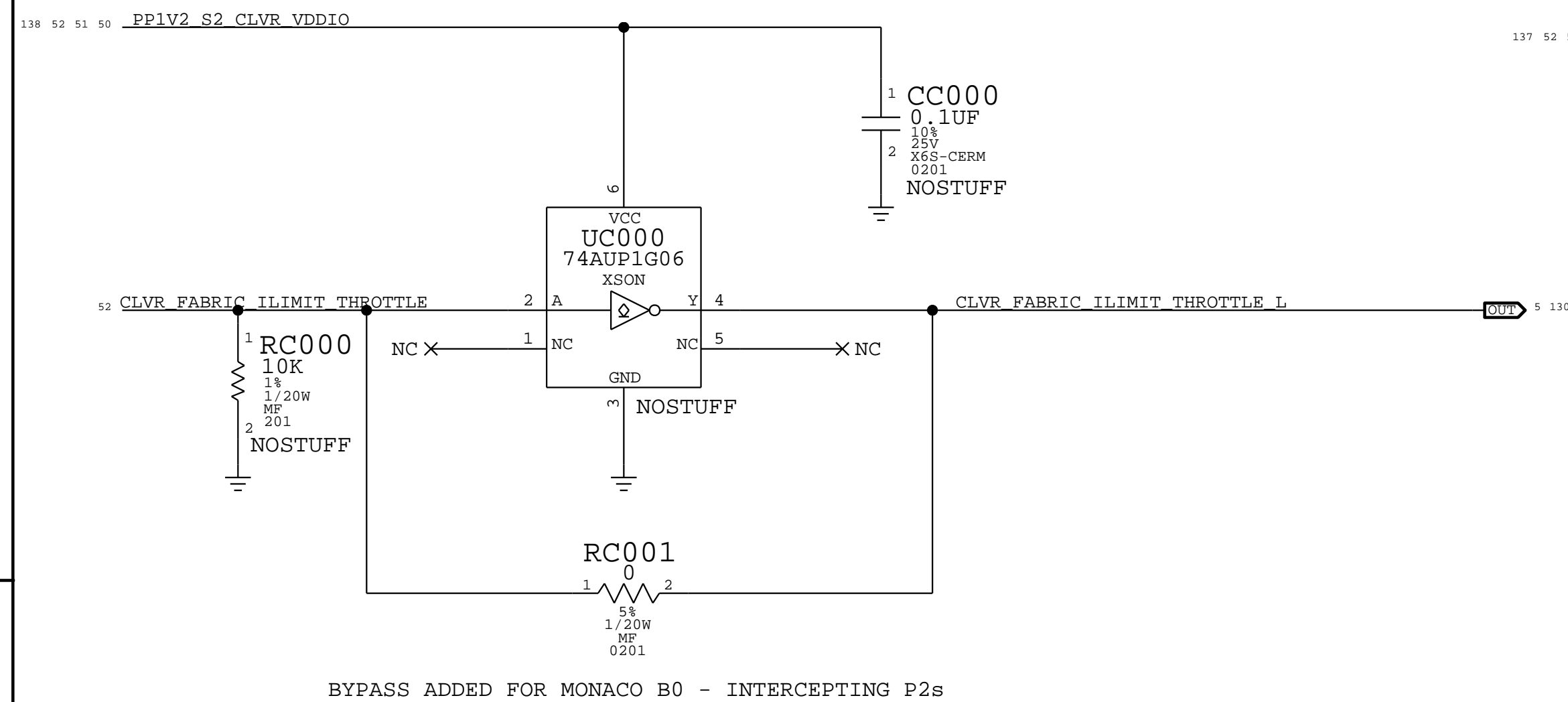


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-24558	1	1C,MON,B0,OTP-QP0,DEV,FC0SP168	UA500	CRITICAL	MONACO_SC
998-24559	1	1C,MON,B0,OTP-RP0,DEV,FC0SP168	UA500	CRITICAL	MONACO_1C

BOM\_COST\_GROUP=SOC POWER

PAGE TITLE		
MONACO 4		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
	BRANCH	evt-2
	PAGE	105 OF 999
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 52 OF 155





## MONACO UNUSED GPIO'S

					MAKE_BASE=TRUE		
50	NC	CLVR0	GPI00	==	NC	CLVR0	GPI00
	NC	CLVR0	GPI01	==	NC	CLVR0	GPI01
50	NC	CLVR0	GPI02	==	NC	CLVR0	GPI02
50	NC	CLVR0	GPI03	==	NC	CLVR0	GPI03
50	NC	CLVR0	GPI04	==	NC	CLVR0	GPI04
50	NC	CLVR0	GPI05	==	NC	CLVR0	GPI05
					MAKE_BASE=TRUE		
51	NC	CLVR1	GPI00	==	NC	CLVR1	GPI00
51	NC	CLVR1	GPI01	==	NC	CLVR1	GPI01
51	NC	CLVR1	GPI02	==	NC	CLVR1	GPI02
51	NC	CLVR1	GPI03	==	NC	CLVR1	GPI03
51	NC	CLVR1	GPI04	==	NC	CLVR1	GPI04
51	NC	CLVR1	GPI05	==	NC	CLVR1	GPI05
					MAKE_BASE=TRUE		
52	NC	CLVR4	GPI00	==	NC	CLVR4	GPI00
52	NC	CLVR4	GPI01	==	NC	CLVR4	GPI01
52	NC	CLVR4	GPI03	==	NC	CLVR4	GPI03
52	NC	CLVR4	GPI04	==	NC	CLVR4	GPI04
52	NC	CLVR4	GPI05	==	NC	CLVR4	GPI05

\* OK2INTEGRATE \*

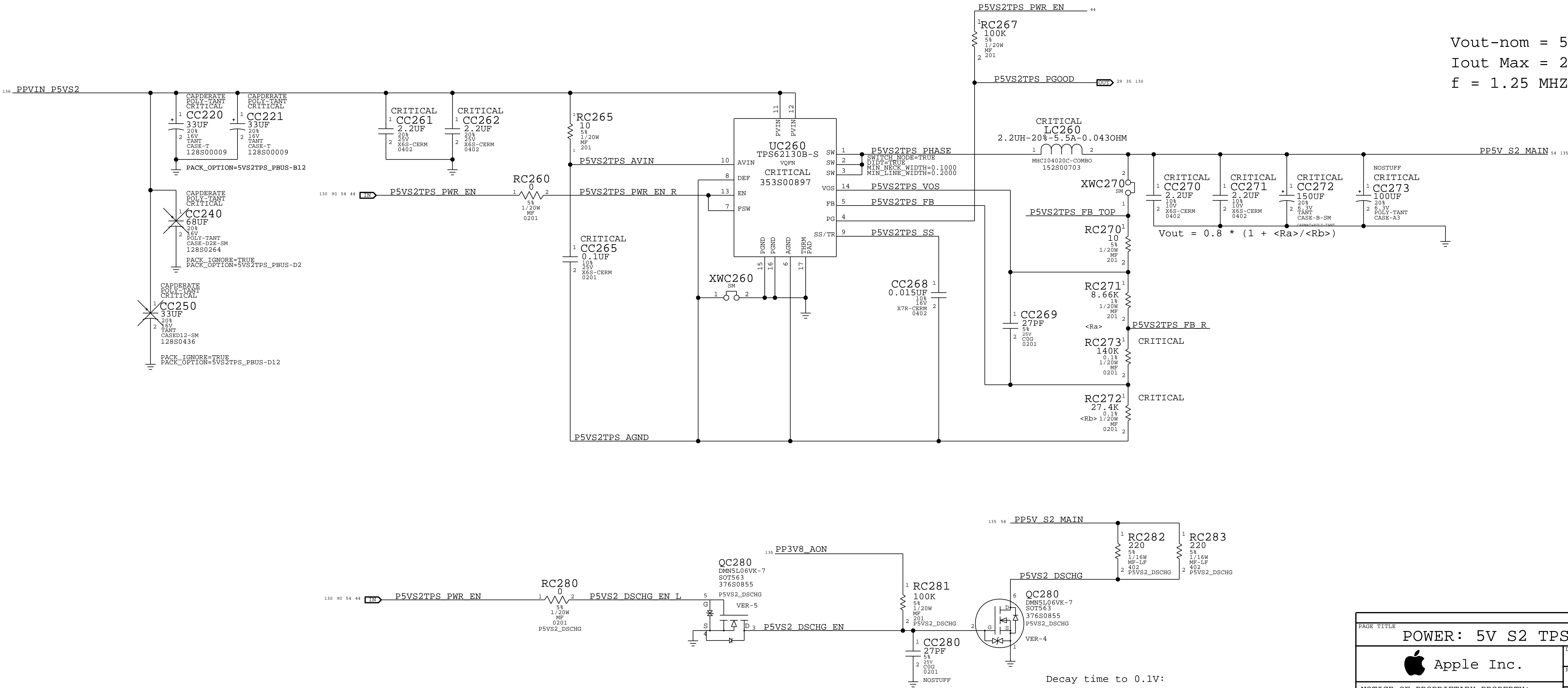
5V\_S2 Voltage Regulator (low power option)

SET ONE OPTION FOR PBUS CAPS


PACK\_OPTION=5VS2TPS\_PBUS-B12  
PACK\_OPTION=5VS2TPS\_PBUS-D2  
PACK\_OPTION=5VS2TPS\_PBUS-D12

START UP TIME = 4.7/7.5/10.5 MS  
(min/typ/max)

Vout-nom = 5.14V  
Iout Max = 2.1A  
f = 1.25 MHZ



Decay time to 0.1V:  
86ms-min / 114ms-typ / 148ms-max  
(Vout=5.14V5%, Cout=260uF20%, R=2x220R5%)

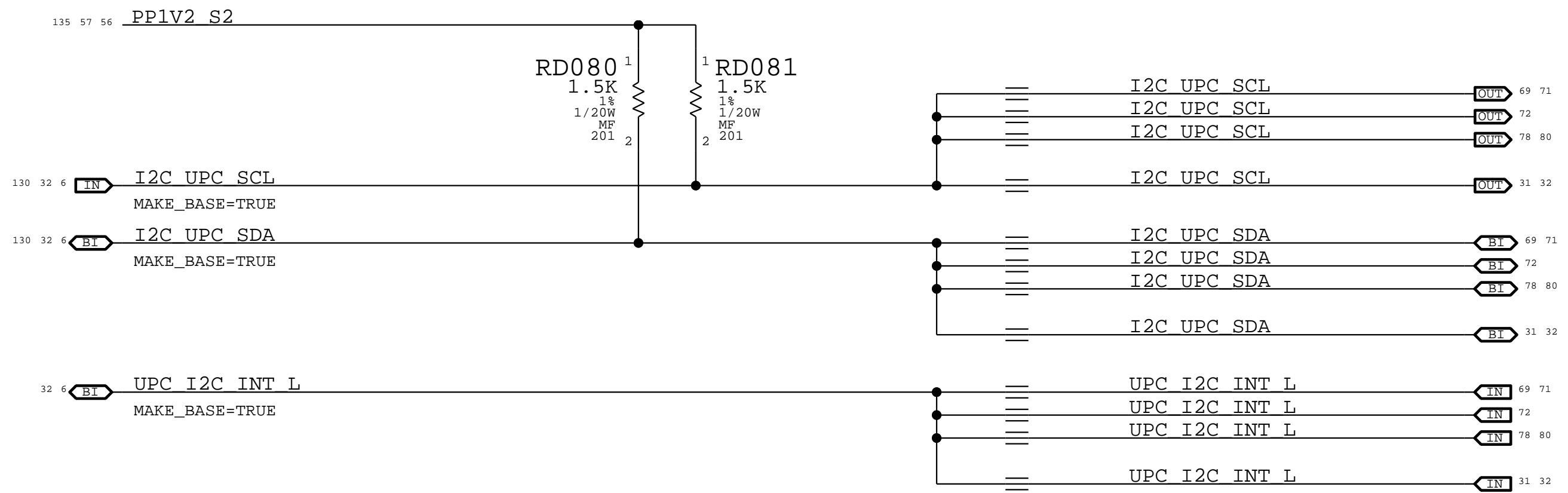
PAGE TITLE			
POWER: 5V S2 TPS62130			
 Apple Inc.	DRAWING NUMBER	SIZE	
	051-05641	D	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION	8.0.0	
	BRANCH	evt-2	
	PAGE	122 OF 999	
	SHEET	54 OF 155	

BOM\_COST\_GROUP=PLATFORM POWER

## AP\_I2C0

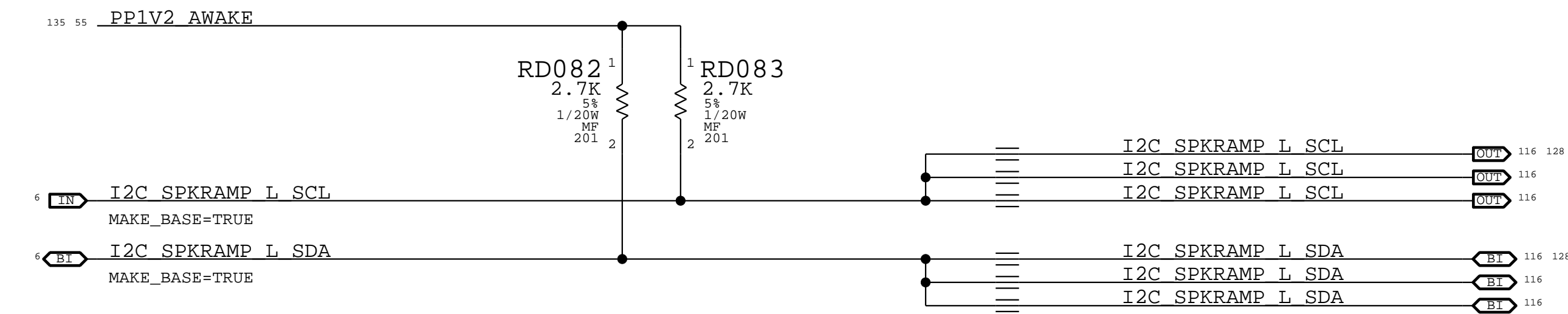
DEVICE	CARD/REFDES	7-BIT	8-BIT
ACE2 - 0 (DEBUG)	USB-C 0	0X38	0X70
ACE2 - 1 (DEBUG)	USB-C 0	0X3F	0X7E
ACE2 - 2 (DEBUG)	USB-C 1	0X3B	0X76
ACE2 - 5 (DEBUG)	USB-C 1	0X3A	0X74
BANK ALL CALL		0X6B	0XD6

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?



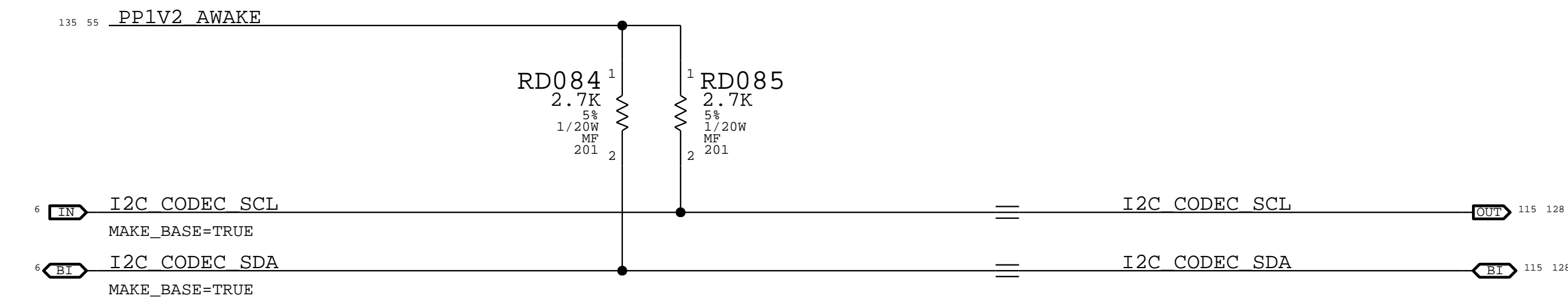
## AP\_I2C1

DEVICE	CARD/REFDES	7-BIT	8-BIT
SPKRAMP TAWANG A	SPKRAMP	0X38	0X70
SPKRAMP TAWANG B	SPKRAMP	0X39	0X72
SPKRAMP TAWANG C	SPKRAMP	0X3A	0X74



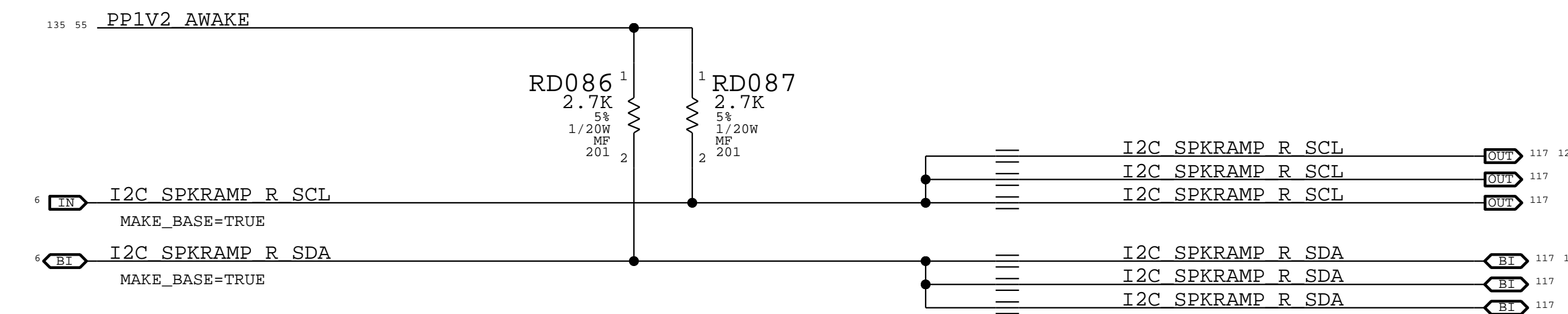
## AP\_I2C2

DEVICE	CARD/REFDES	7-BIT	8-BIT
CODEC - CLIFDEN	DMIC & CODEC	0X48	0X90
CODEC - CARLOW POR	DMIC & CODEC	0X4B	0X95



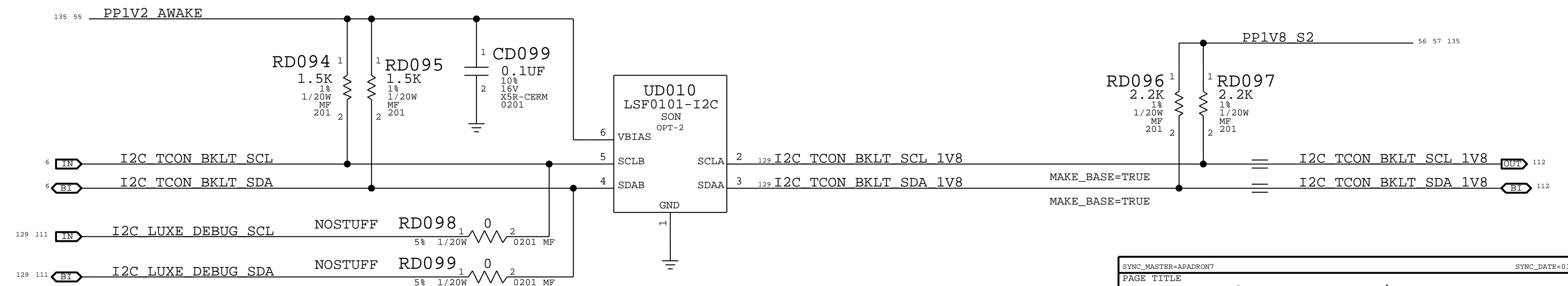
## AP\_I2C3

DEVICE	CARD/REFDES	7-BIT	8-BIT
SPKRAMP TAWANG D	SPKRAMP	0X3B	0X76
SPKRAMP TAWANG E	SPKRAMP	0X3C	0X78
SPKRAMP TAWANG F	SPKRAMP	0X3D	0X7A



## AP\_I2C7


DEVICE	CARD/REFDES	7-BIT	8-BIT
Avellino PMIC	Display	0xxx	0xx



UNUSED:

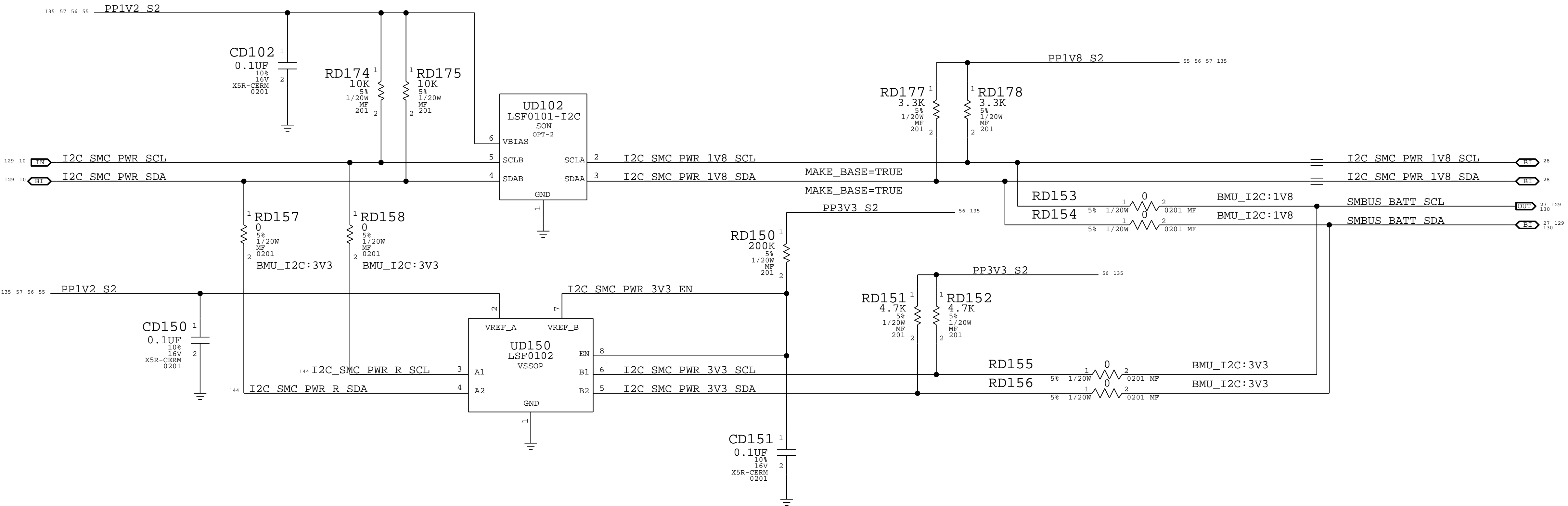
```
AOP_I2C1
ISP_I2C0
ISP_I2C1
ISP_I2C3
```

BOM\_COST\_GROUP=SOC

SYNC_MASTER=APAD007		SYNC_DATE=03/04/2020	
PAGE TITLE			
I2C Connections - AP			
 Apple Inc.	DRAWING NUMBER	SIZE	
	051-05641	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	8.0.0	
	BRANCH	evt-2	
	PAGE	130 OF 999	
	SHEET	55 OF 155	

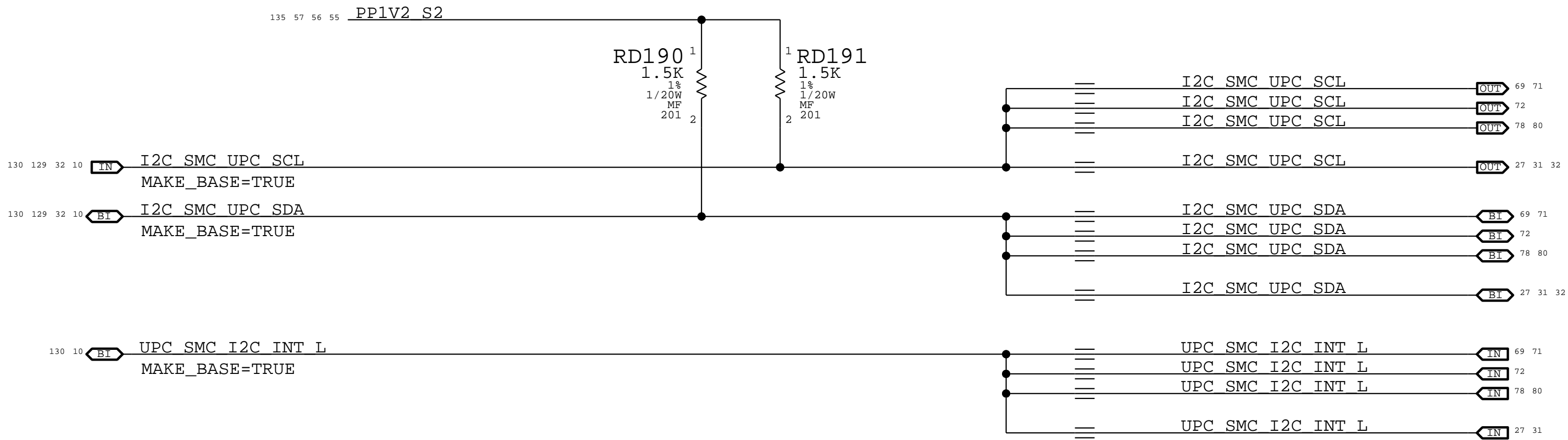
SMC\_I2C0

DEVICE	CARD/REFDES	7-BIT	8-BIT
CHARGER - SUONA	BATT/CHARGER	0X09	0X12
CHARGER - WHAMOLA	BATT/CHARGER	0X??	??
ICEMAN	U5700	0XXX	0XX
BMU	BMU	0X0B	0X16



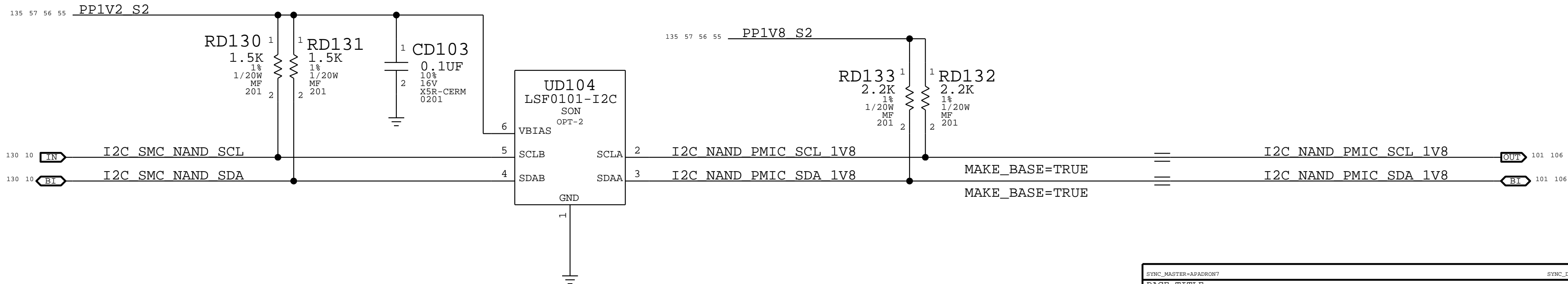
SMC\_I2C1

DEVICE	CARD/REFDES	7-BIT	8-BIT
ACE2 - 0 (DEBUG)	USB-C 0	0X38	0X70
ACE2 - 1 (DEBUG)	USB-C 0	0X3F	0X7E
ACE2 - 2 (DEBUG)	USB-C 1	0X3B	0X76
ACE2 - 5 (DEBUG)	USB-C 1	0X3A	0X74
BANK1 ALL CALL		0X6B	0XD6



SMC\_I2C2

DEVICE	CARD/REFDES	7-BIT	8-BIT
NAND PMIC 0	NAND 0	0X79	0XF2
NAND PMIC 1	NAND 1	0X78	0XF0




SYNC\_MASTER=ASAPROBT

SYNC\_DATE=03/04/2020

PAGE TITLE

I2C Connections - SMC

 Apple Inc.

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 NUMBER

051-05641

REVISION

8.0.0

BRANCH

evt-2

PAGE

131 OF 999

SHEET

56 OF 155

SIZE

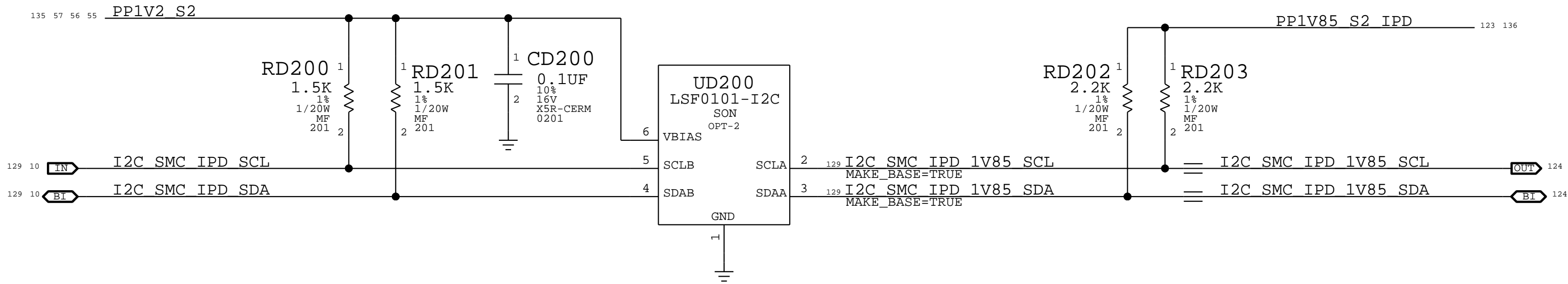
D

BOM\_COST\_GROUP=SOC

BOM\_COST\_GROUP=SOC

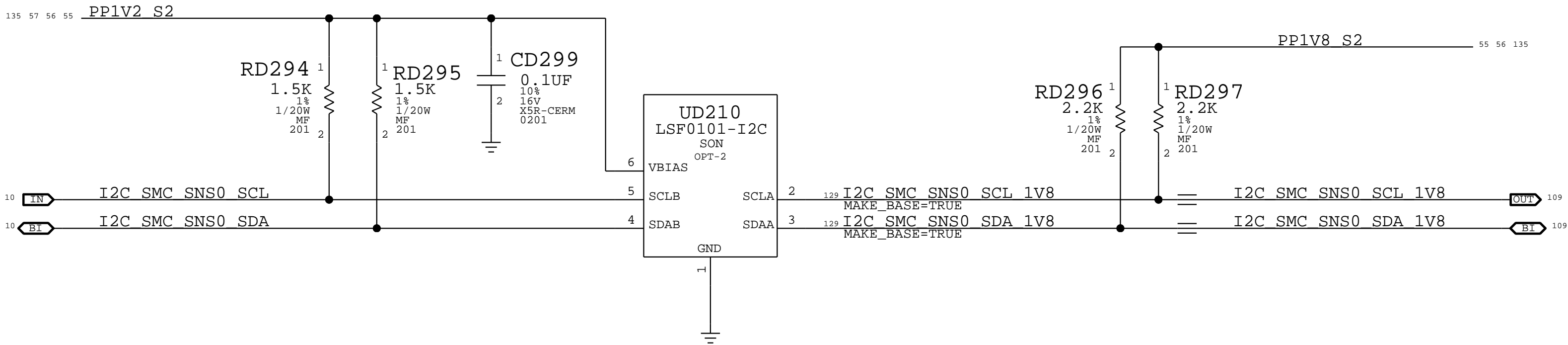
SMC\_I2C3

DEVICE	CARD/REFDES	7-BIT	8-BIT
Palm Rest Temp	IPD	0X4C	0X98



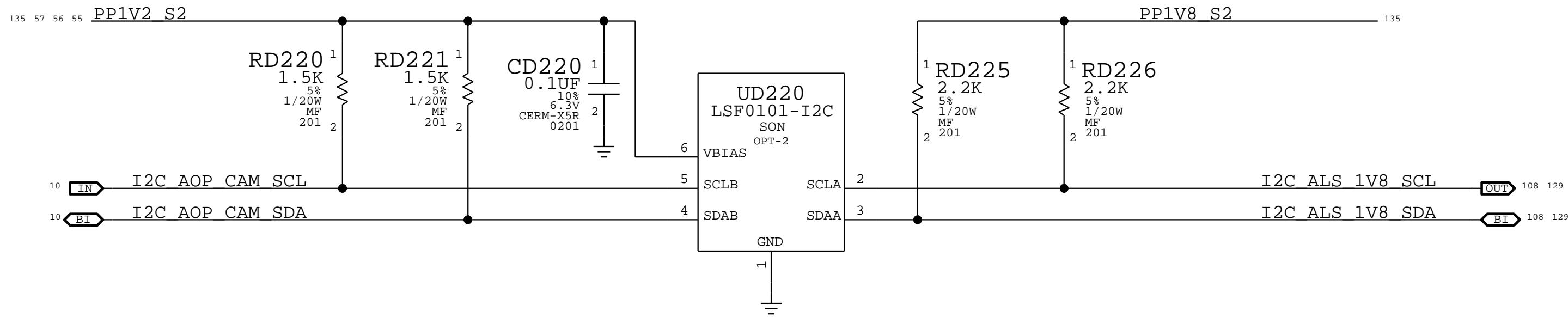
SMC\_I2C4

DEVICE	CARD/REFDES	7-BIT	8-BIT
Temp Sensors	DISPLAY TEMP SNS	0X48	0X90



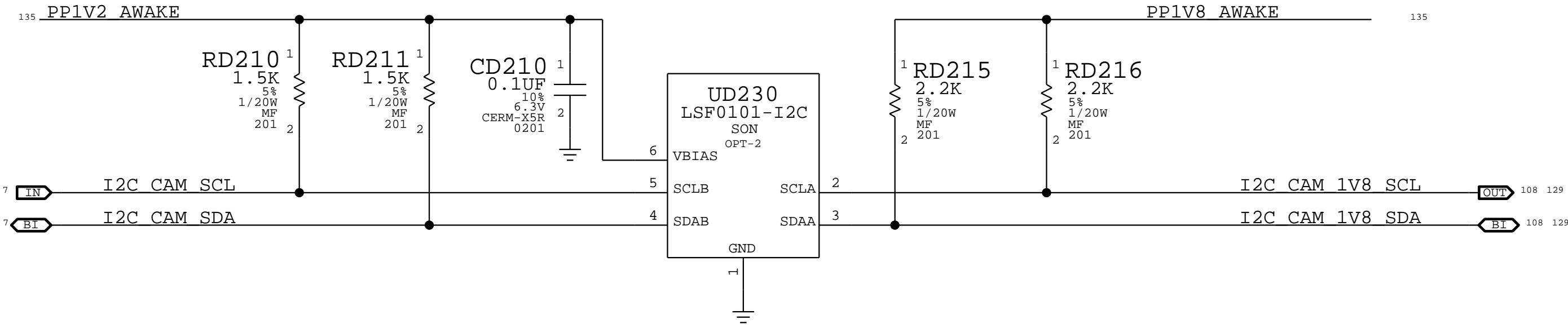
AOP\_I2C0

DEVICE	CARD/REFDES	7-BIT	8-BIT
ALS	Camera	0X29	0X52
ALS Temp	Camera	0X24	0X48



ISP\_I2C2

DEVICE	CARD/REFDES	7-BIT	8-BIT
FHSi+	Camera	0X10	0X20
Camera Sensor	Camera	0X6C	0XD8



UNUSED and already aliased  
ISP\_I2C0 SMC\_I2C6  
ISP\_I2C1  
ISP\_I2C3  
AOP\_I2C1

SI2C

DEVICE	CARD/REFDES	7-BIT	8-BIT
SEP EEPROM	U0500	0XXX	0XX

Need to confirm if this needs/has pull-ups


MISSING WLAN/BT, R1, CELL - VENDOR CARDS

SYNC\_MASTER=APADRON7

SYNC\_DATE=03/04/2020

PAGE TITLE

I2C Connections - Other

 Apple Inc.

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 NUMBER

051-05641

REVISION

8.0.0

BRANCH

evt-2

PAGE

132 OF 999

SHEET

57 OF 155

SIZE

D

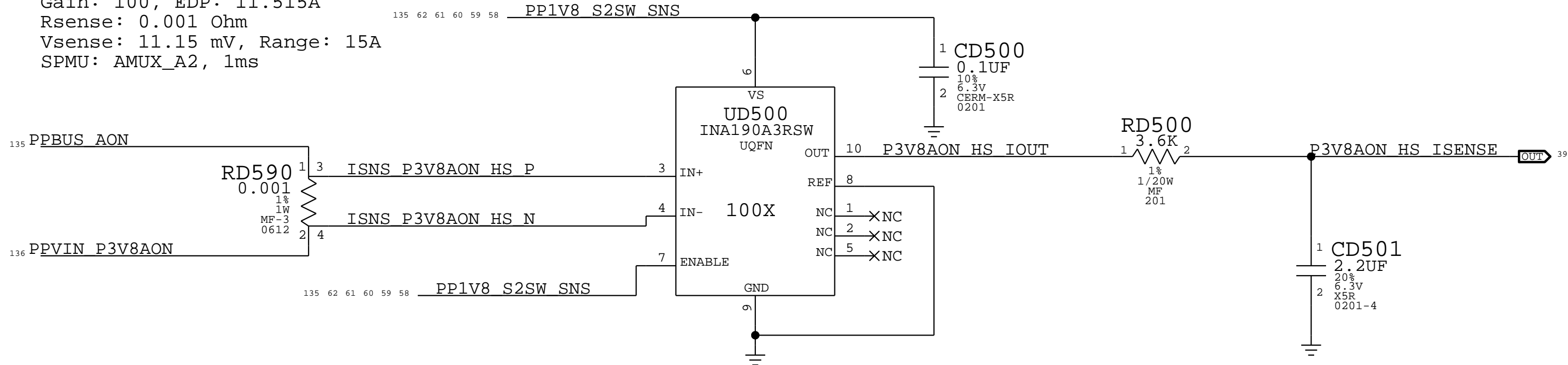
BOM\_COST\_GROUP=SOC

BOM\_COST\_GROUP=SOC



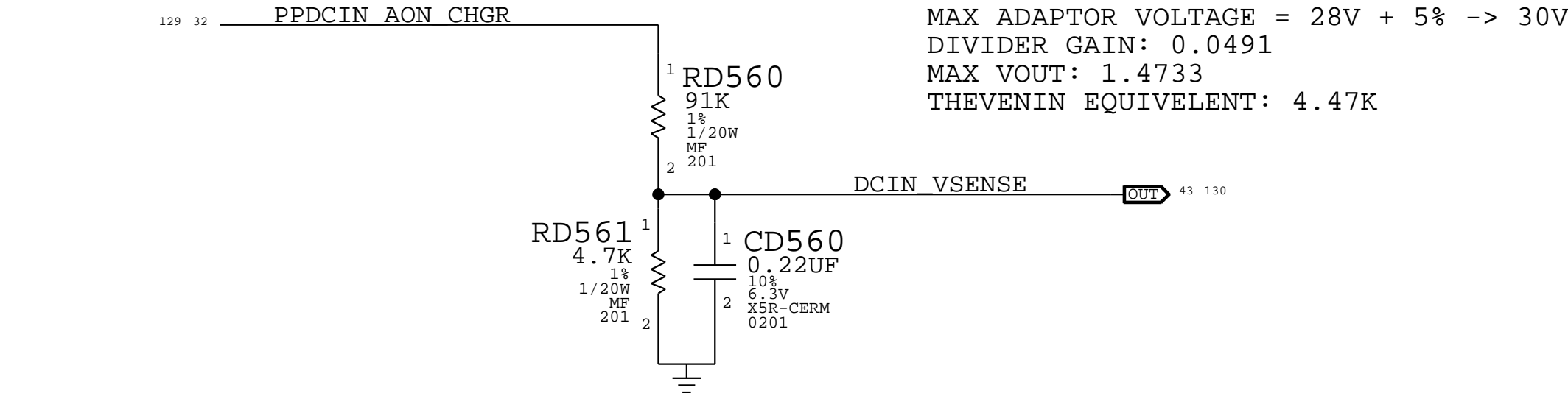
P3V8 AON HIGH SIDE ISENSE

Gain: 100, EDP: 11.515A  
Rsense: 0.001 Ohm  
Vsense: 11.15 mV, Range: 15A  
SPMU: AMUX\_A2, 1ms



DCIN VOLTAGE SENSE

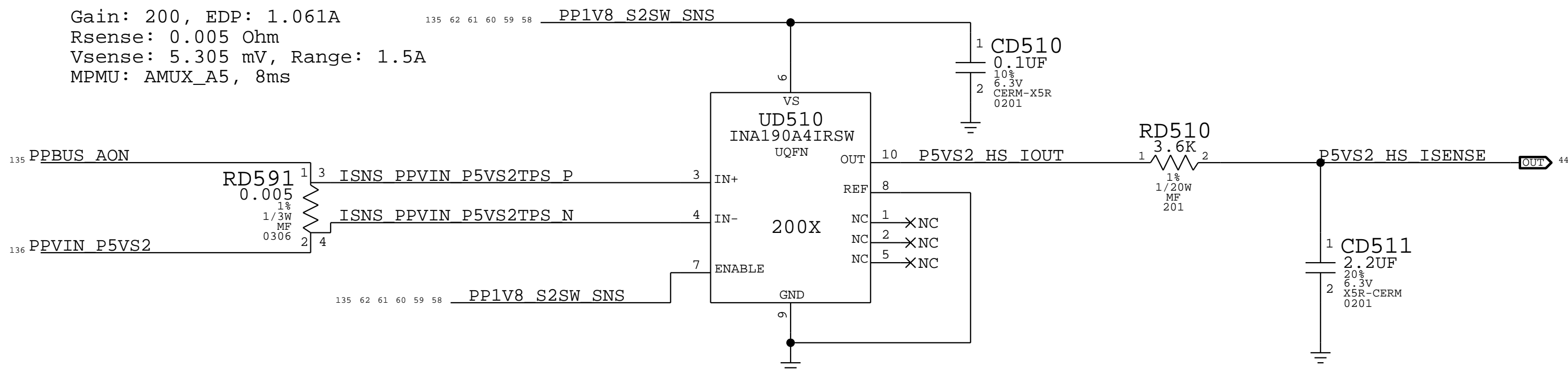
MPMU: AMUX\_A0, 1ms



MAX ADAPTOR VOLTAGE = 28V + 5% -> 30V  
DIVIDER GAIN: 0.0491  
MAX VOUT: 1.4733  
THEVENIN EQUIVELENT: 4.47K

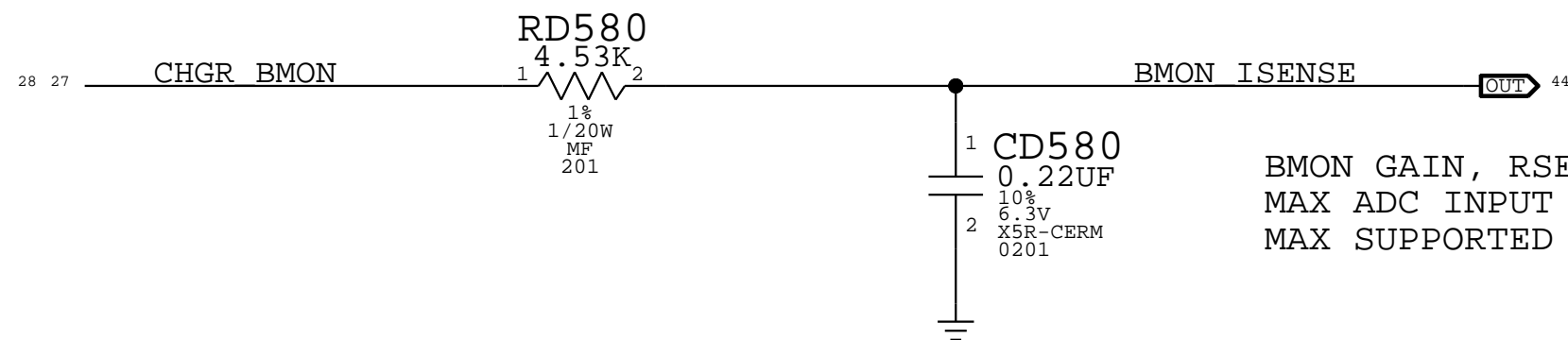
5V S2 VR HIGH SIDE ISENSE

Gain: 200, EDP: 1.061A  
Rsense: 0.005 Ohm  
Vsense: 5.305 mV, Range: 1.5A  
MPMU: AMUX\_A5, 8ms



BATTERY ISENSE BMON

MPMU: AMUX\_A2, 1ms

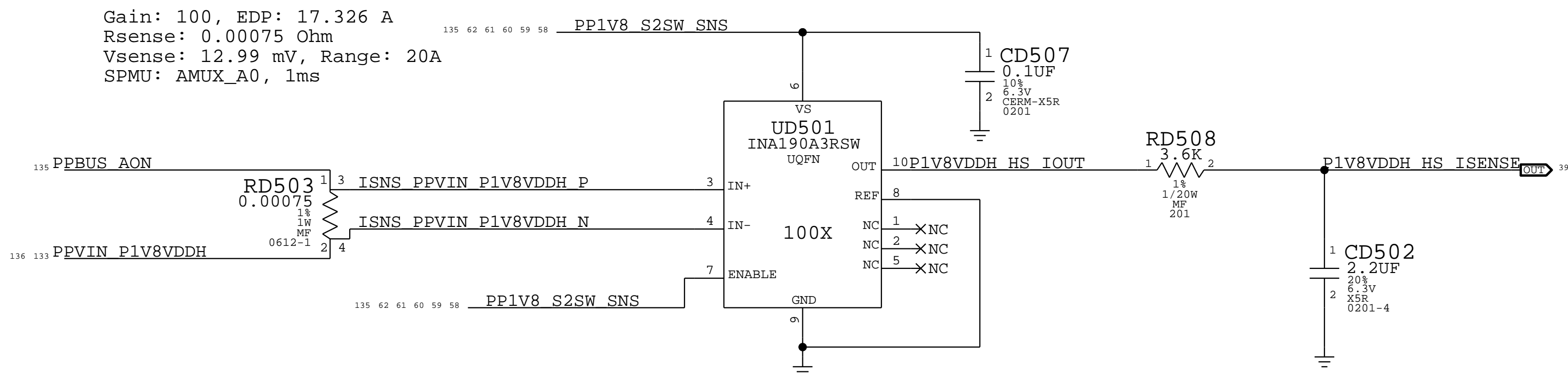


MAX ADAPTOR CURRENT: 5A  
AMON GAIN, RSENSE: 20X, 10m  
MAX AMON OUTPUT VOLTAGE: 1V

BMON GAIN, RSENSE: 7.9X, 5m  
MAX ADC INPUT VOLTAGE: 1.5V (G=1)  
MAX SUPPORTED BATTERY CURRENT SENSE: 37.97A

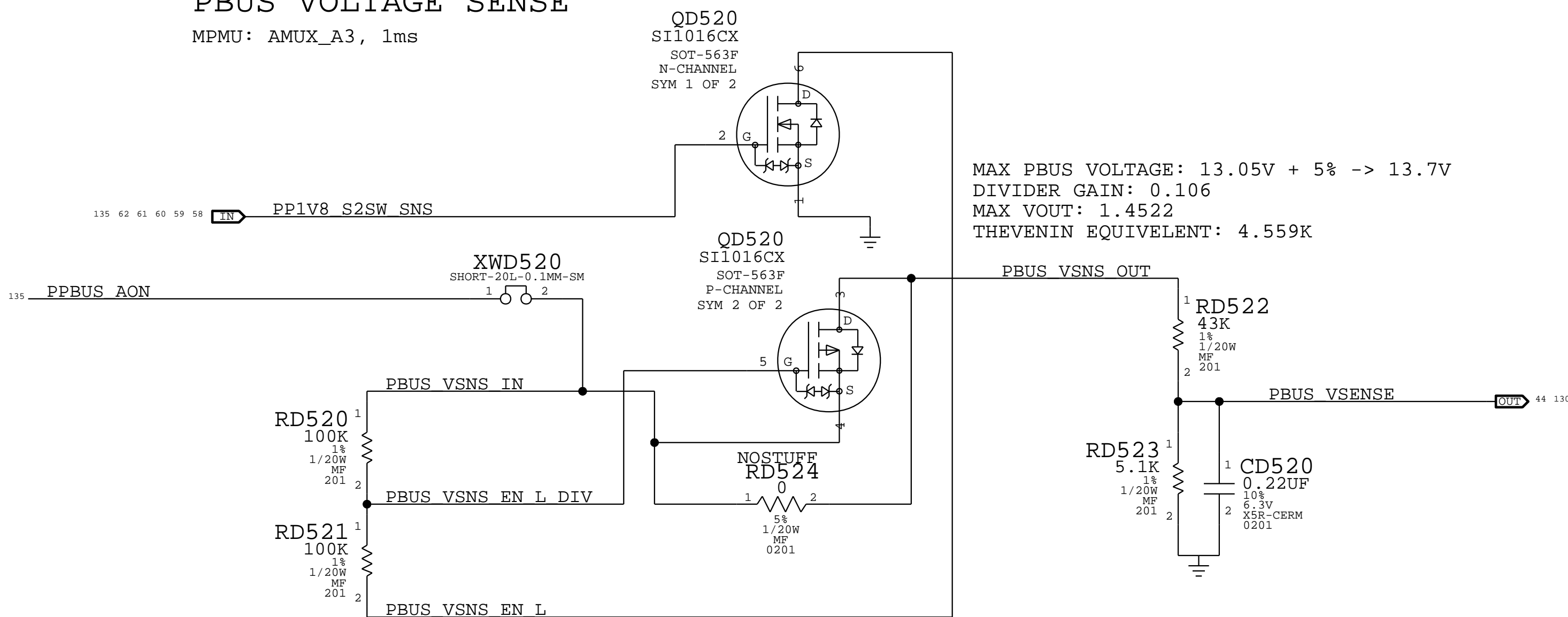
P1V8VDDH HIGH SIDE ISENSE

Gain: 100, EDP: 17.326 A  
Rsense: 0.00075 Ohm  
Vsense: 12.99 mV, Range: 20A  
SPMU: AMUX\_A0, 1ms



PBUS VOLTAGE SENSE

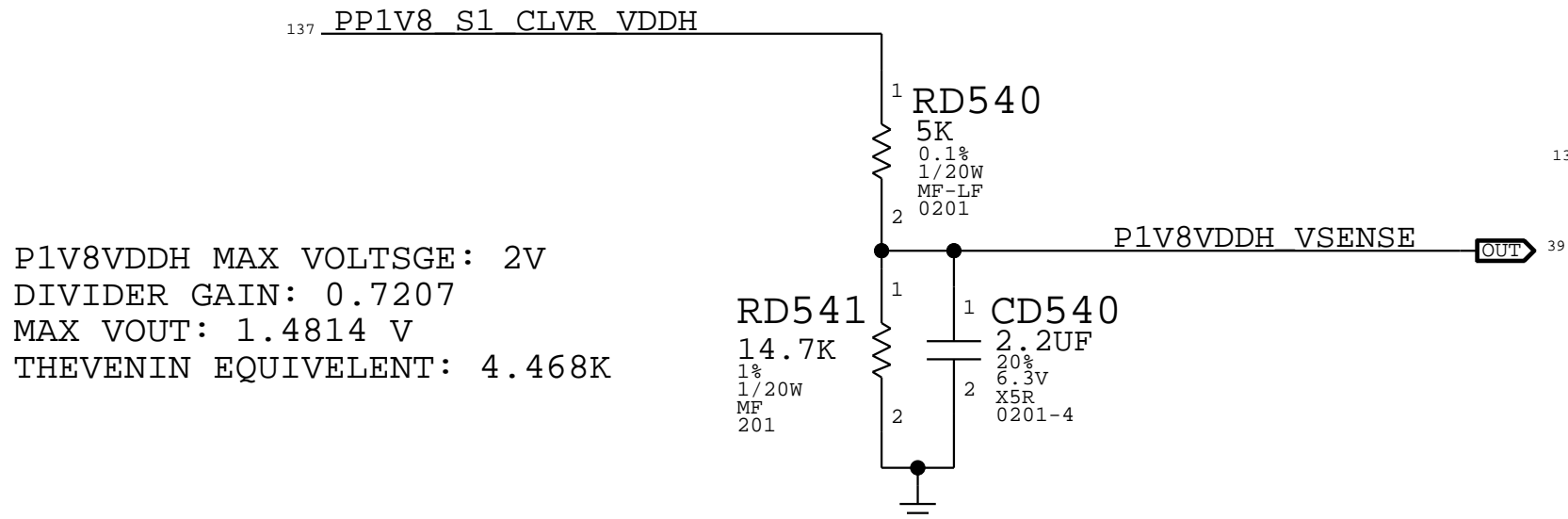
MPMU: AMUX\_A3, 1ms



MAX PBUS VOLTAGE: 13.05V + 5% -> 13.7V  
DIVIDER GAIN: 0.106  
MAX VOUT: 1.4522  
THEVENIN EQUIVELENT: 4.559K

P1V8VDDH VSENSE

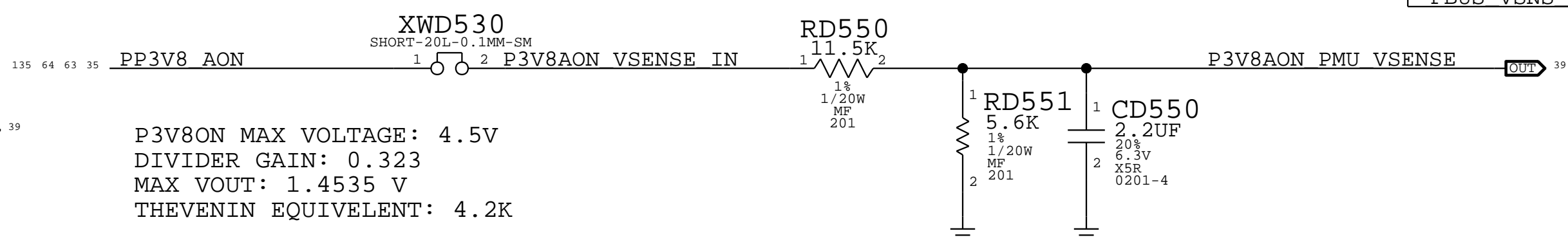
SPMU: AMUX\_A1, 1ms



P1V8VDDH MAX VOLTSGE: 2V  
DIVIDER GAIN: 0.7207  
MAX VOUT: 1.4814 V  
THEVENIN EQUIVELENT: 4.468K

P3V8AON VSENSE

SPMU: AMUX\_A2, 1ms



P3V8ON MAX VOLTAGE: 4.5V  
DIVIDER GAIN: 0.323  
MAX VOUT: 1.4535 V  
THEVENIN EQUIVELENT: 4.2K

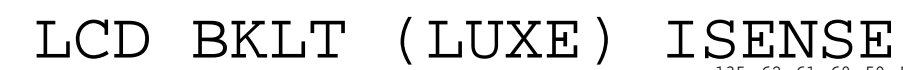
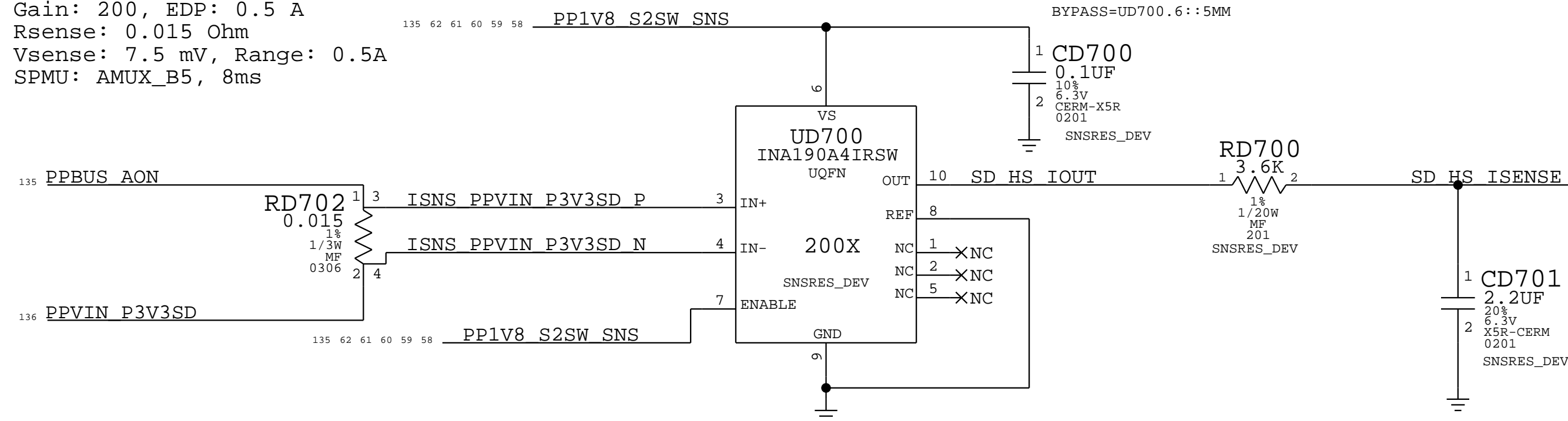
PAGE TITLE		
SENSORS: HIGH-SIDE (1/2)		
	DRAWING NUMBER	SIZE
	051-05641	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION	PAGE
	8.0.0	135 OF 999
		SHEET
		58 OF 155

BOM\_COST\_GROUP=SENSORS

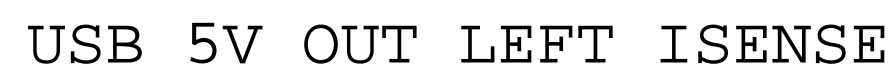
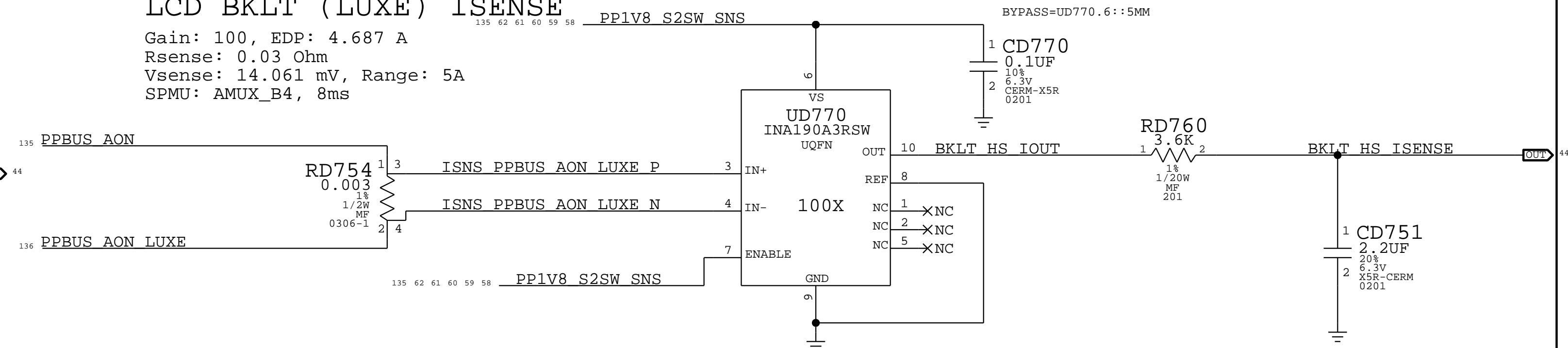




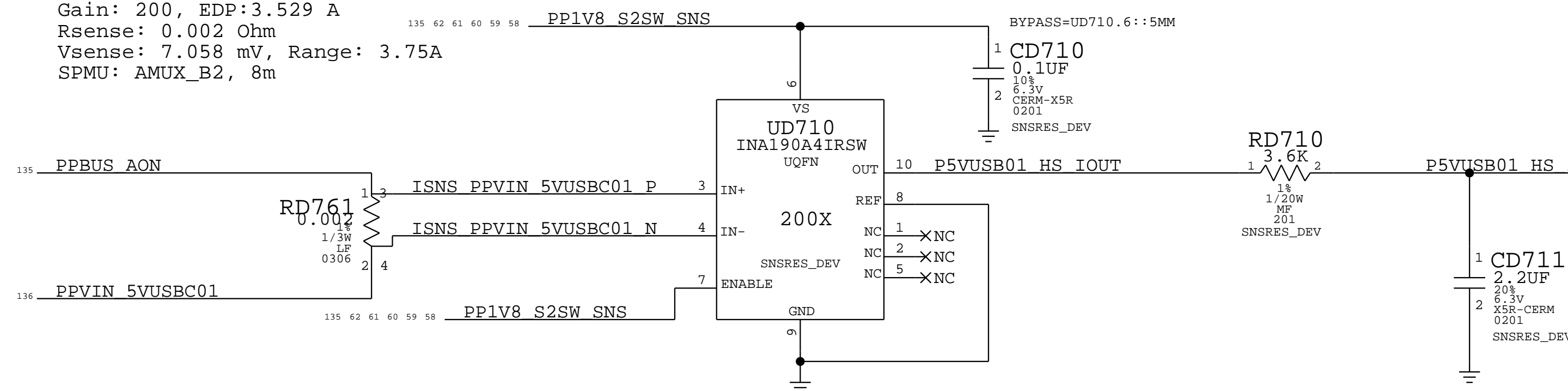
```
Gain: 200, EDP: 0.5 A
Rsense: 0.015 Ohm
Vsense: 7.5 mV, Range: 0.5A
SPMU: AMUX_B5, 8ms
```



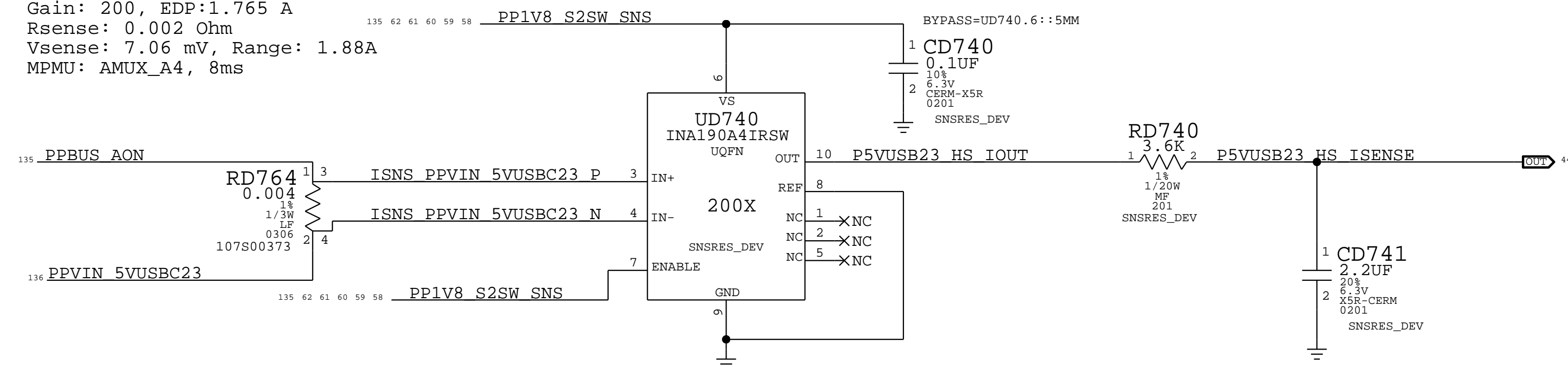
```
Gain: 100, EDP: 4.687 A
Rsense: 0.03 Ohm
Vsense: 14.061 mV, Range: 5A
SPMU: AMUX_B4, 8ms
```

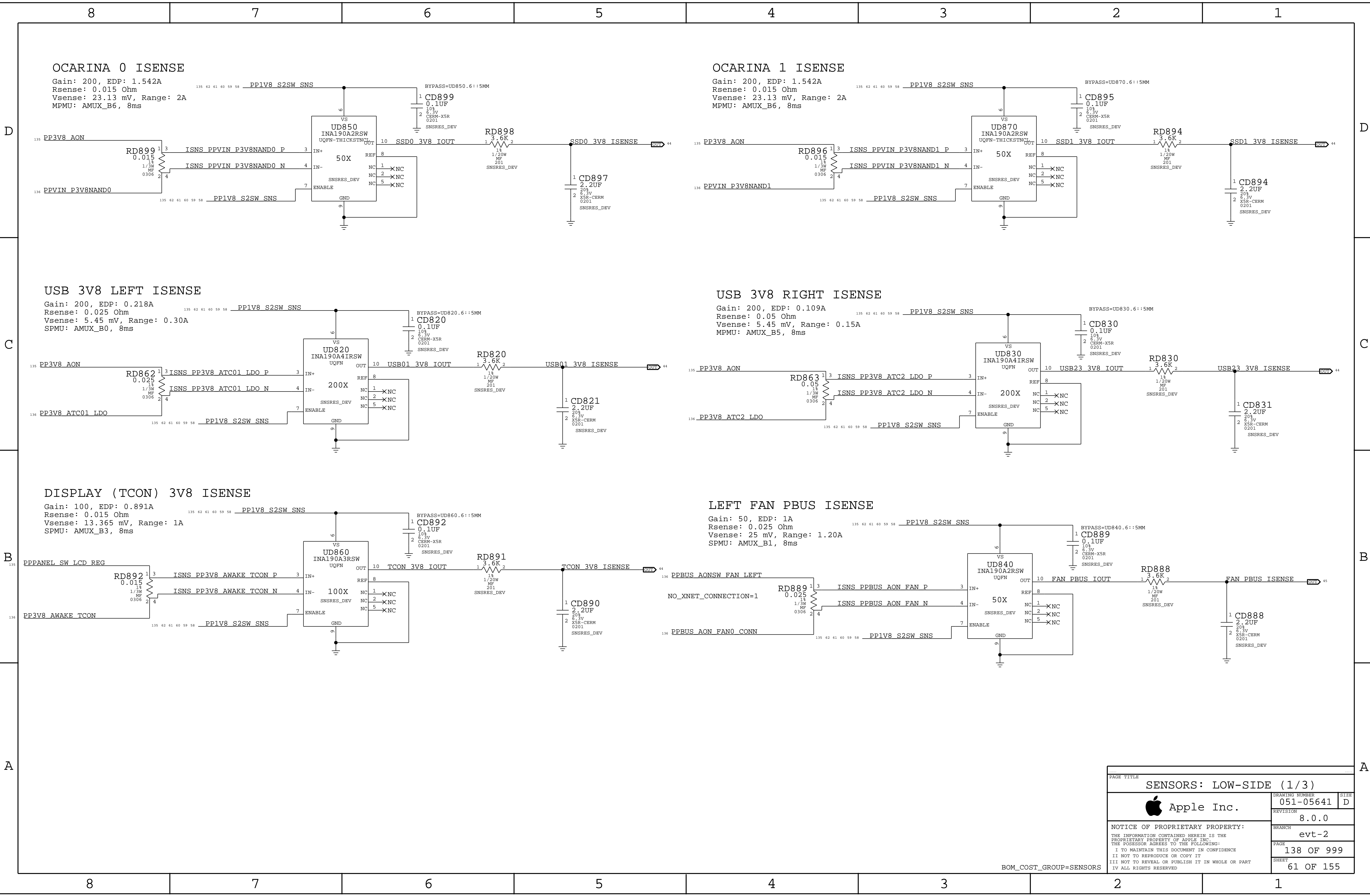


```
Gain: 200, EDP:3.529 A
Rsense: 0.002 Ohm
Vsense: 7.058 mV, Range: 3.75A
SPMU: AMUX_B2, 8m
```



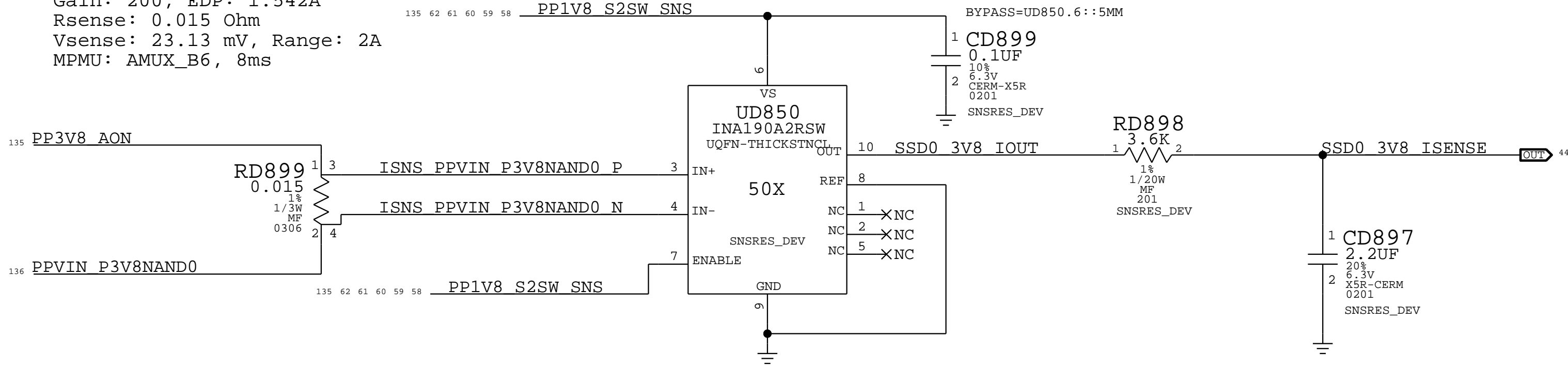
```
Gain: 200, EDP:1.765 A
Rsense: 0.002 Ohm
Vsense: 7.06 mV, Range: 1.88A
MPMU: AMUX_A4, 8ms
```





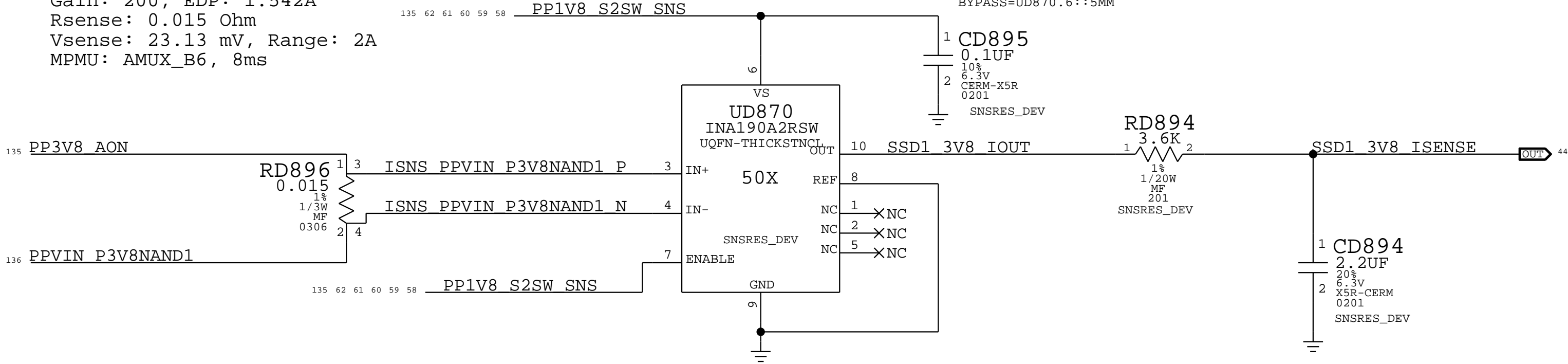
OCARINA 0 ISENSE

Gain: 200, EDP: 1.542A  
Rsense: 0.015 Ohm  
Vsense: 23.13 mV, Range: 2A  
MPMU: AMUX\_B6, 8ms



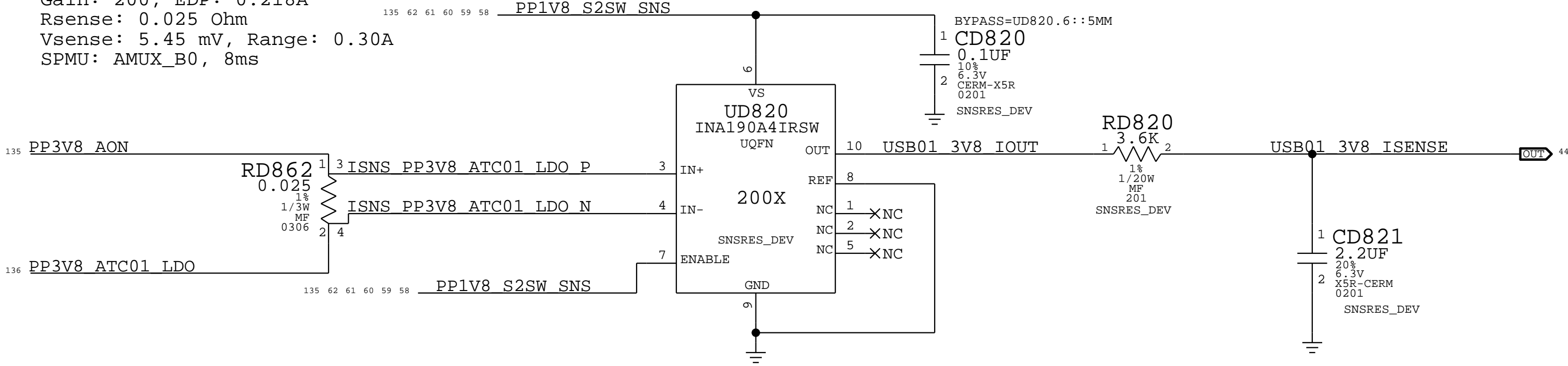
OCARINA 1 ISENSE

Gain: 200, EDP: 1.542A  
Rsense: 0.015 Ohm  
Vsense: 23.13 mV, Range: 2A  
MPMU: AMUX\_B6, 8ms



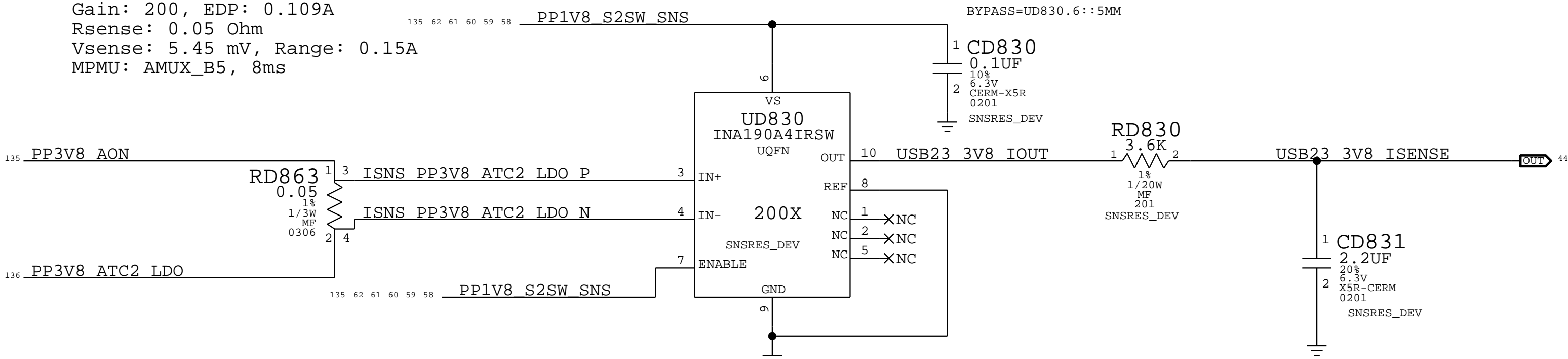
USB 3V8 LEFT ISENSE

Gain: 200, EDP: 0.218A  
Rsense: 0.025 Ohm  
Vsense: 5.45 mV, Range: 0.30A  
SPMU: AMUX\_B0, 8ms



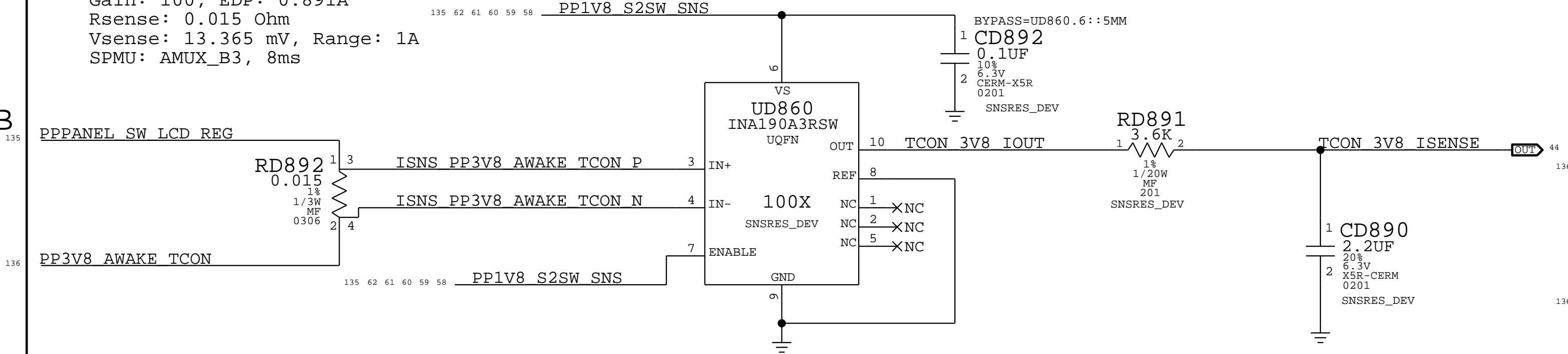
USB 3V8 RIGHT ISENSE

Gain: 200, EDP: 0.109A  
Rsense: 0.05 Ohm  
Vsense: 5.45 mV, Range: 0.15A  
MPMU: AMUX\_B5, 8ms



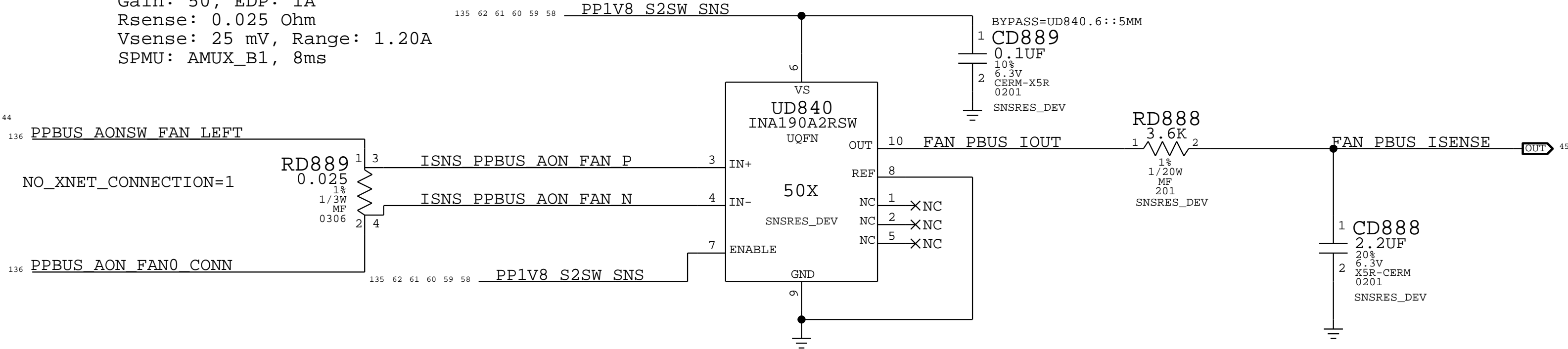
DISPLAY (TCON) 3V8 ISENSE


Gain: 100, EDP: 0.891A  
Rsense: 0.015 Ohm  
Vsense: 13.365 mV, Range: 1A  
SPMU: AMUX\_B3, 8ms



LEFT FAN PBUS ISENSE

Gain: 50, EDP: 1A  
Rsense: 0.025 Ohm  
Vsense: 25 mV, Range: 1.20A  
SPMU: AMUX\_B1, 8ms

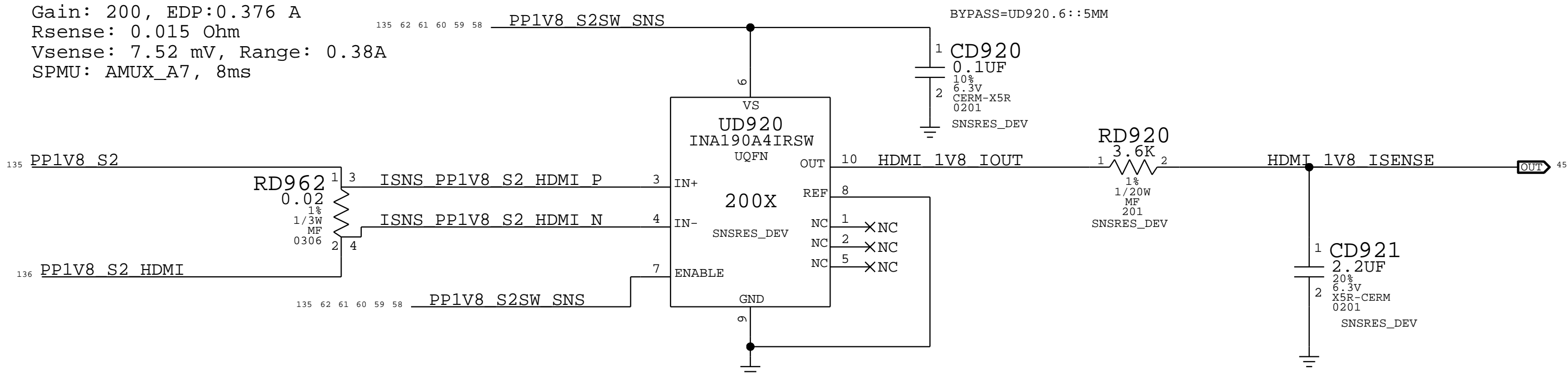


PAGE TITLE		
SENSORS: LOW-SIDE (1/3)		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	138 OF 999
	SHEET	61 OF 155

BOM\_COST\_GROUP=SENSORS

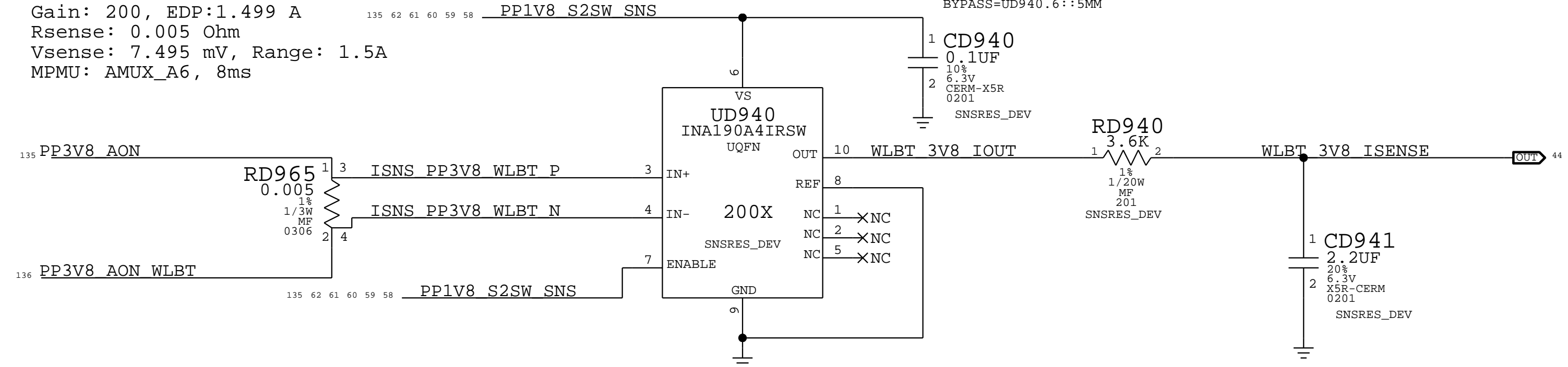
### HDMI 1V8 ISENSE

Gain: 200, EDP:0.376 A  
Rsense: 0.015 Ohm  
Vsense: 7.52 mV, Range: 0.38A  
SPMU: AMUX\_A7, 8ms



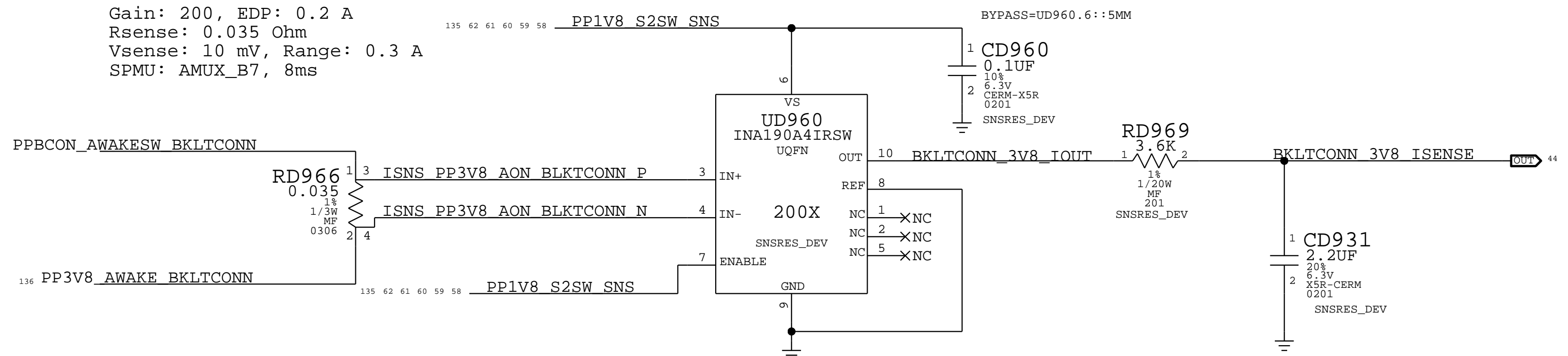
### WLAN BT 3V8 ISENSE

Gain: 200, EDP:1.499 A  
Rsense: 0.005 Ohm  
Vsense: 7.495 mV, Range: 1.5A  
MPMU: AMUX\_A6, 8ms



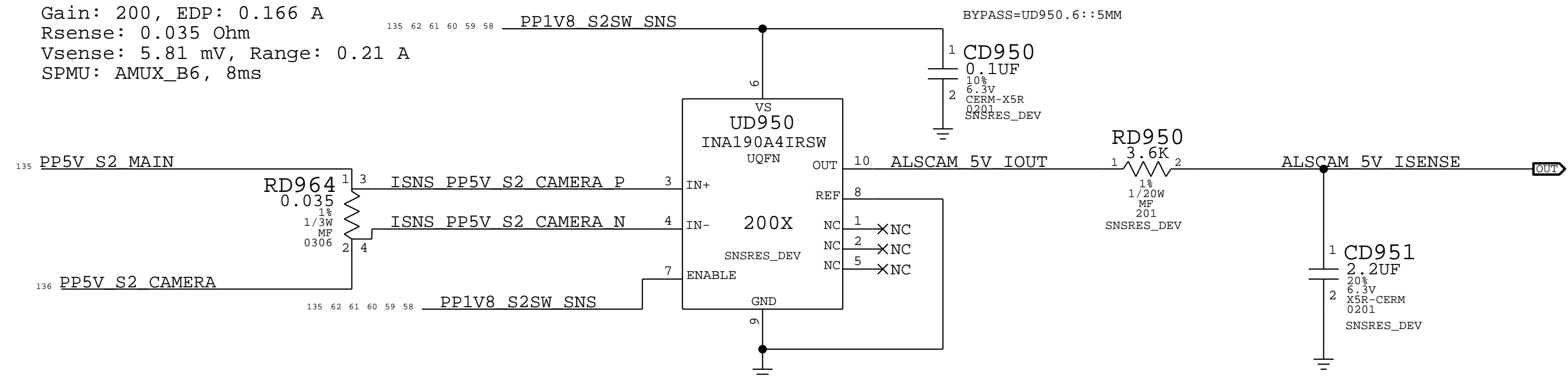
### DISPLAY BACKLIGHT 3V8 ISENSE

Gain: 200, EDP: 0.2 A  
Rsense: 0.035 Ohm  
Vsense: 10 mV, Range: 0.3 A  
SPMU: AMUX\_B7, 8ms



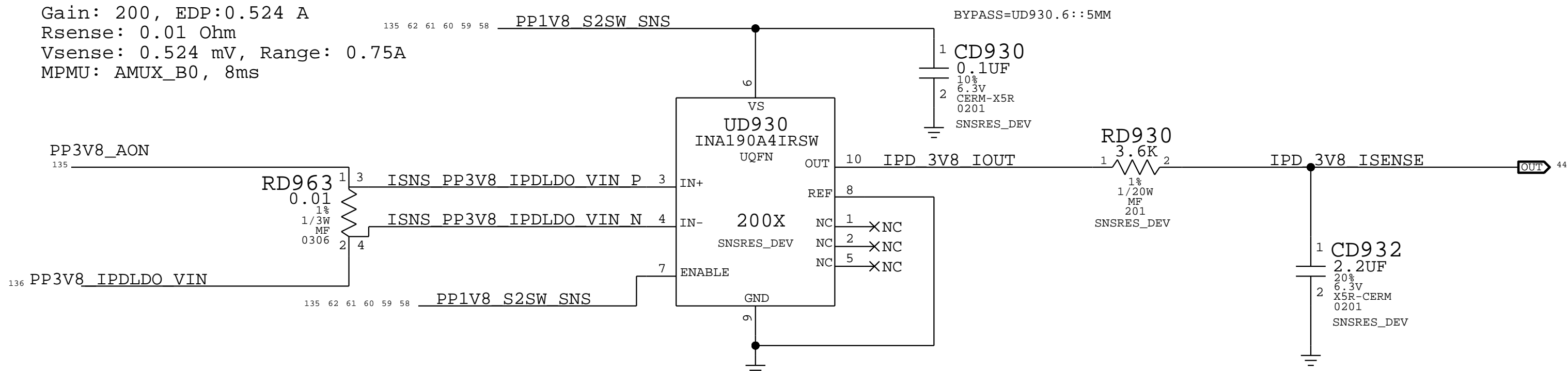
### CAMERA 5V ISENSE

Gain: 200, EDP: 0.166 A  
Rsense: 0.035 Ohm  
Vsense: 5.81 mV, Range: 0.21 A  
SPMU: AMUX\_B6, 8ms



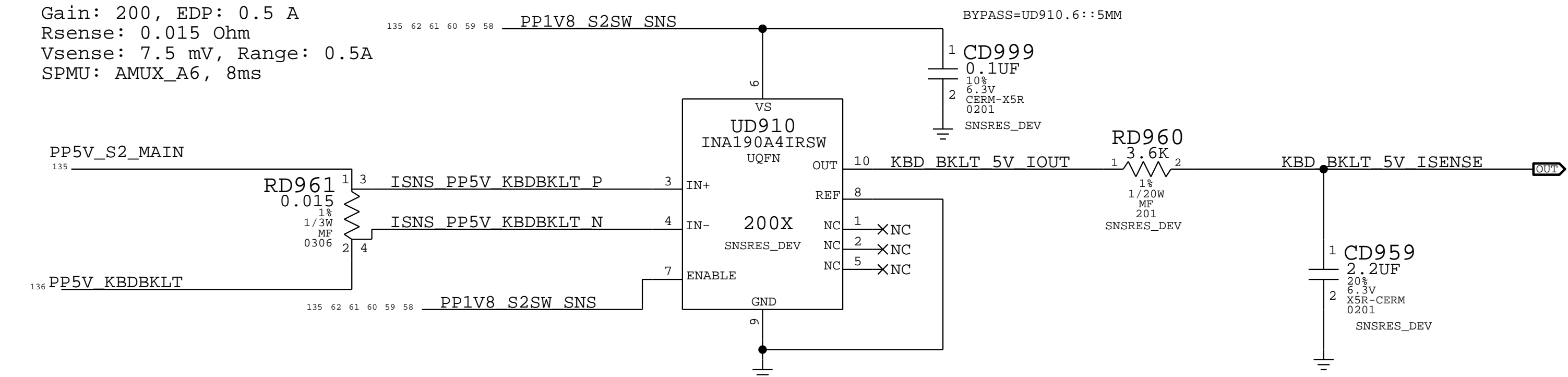
### IPD 3V8 ISENSE

Gain: 200, EDP:0.524 A  
Rsense: 0.01 Ohm  
Vsense: 0.524 mV, Range: 0.75A  
MPMU: AMUX\_B0, 8ms



### KBD BACKLIGHT ISENSE

Gain: 200, EDP: 0.5 A  
Rsense: 0.015 Ohm  
Vsense: 7.5 mV, Range: 0.5A  
SPMU: AMUX\_A6, 8ms



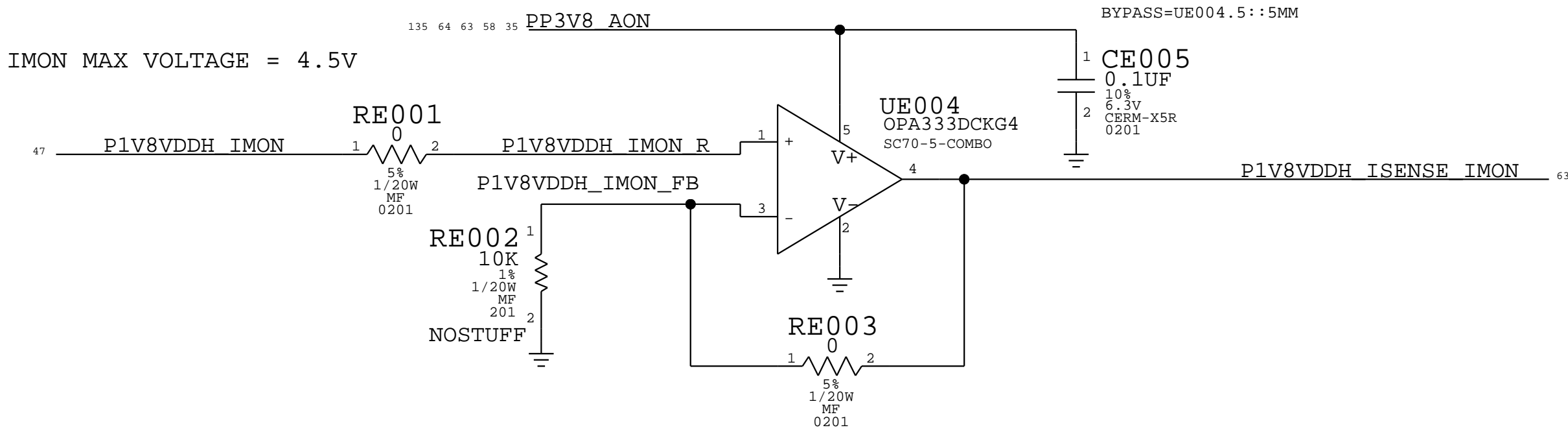
PAGE TITLE		
SENSORS: LOW-SIDE (2/3)		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	139 OF 999
	SHEET	62 OF 155

BOM\_COST\_GROUP=SENSORS



P1V8VDDH LOW SIDE ISENSE (IMON)

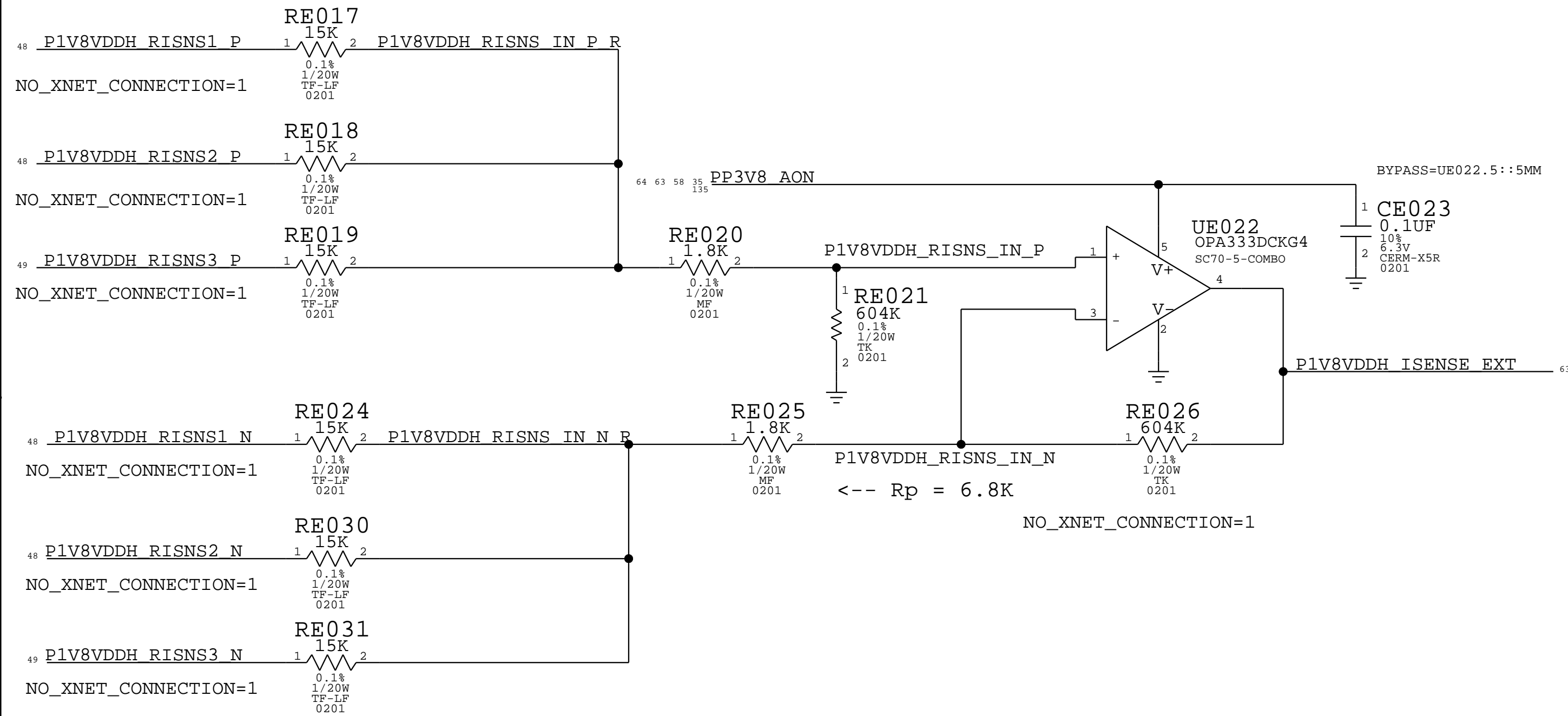
MPMU AMUX\_B4, 8ms, VMAX AFTER DIVIDER = 1.51V



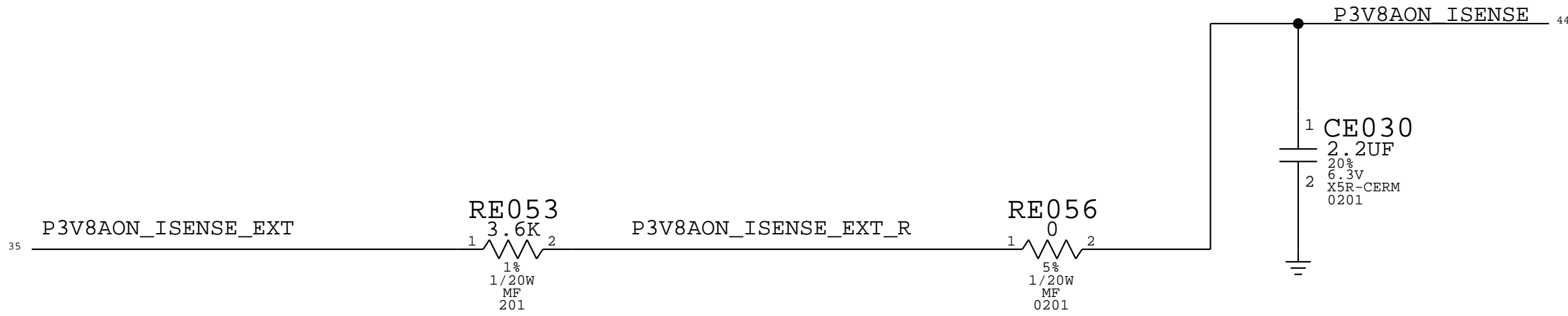
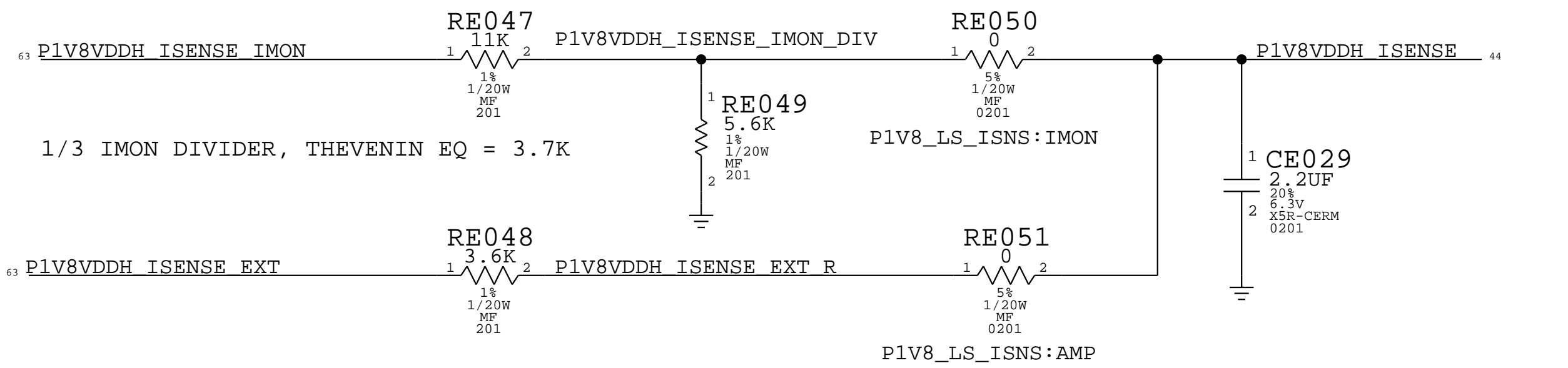
P1V8VDDH LOW SIDE ISENSE (SUMMING AMP FOR 3 PHASES)

EDP: 90A, 30A/PHASE, G=88.82, MAX CURRENT SENSE = 100A

SPMU AMUX\_A7, 8ms



RESISTOR STUFFING OPTION FOR IMON OR SUMMING AMP



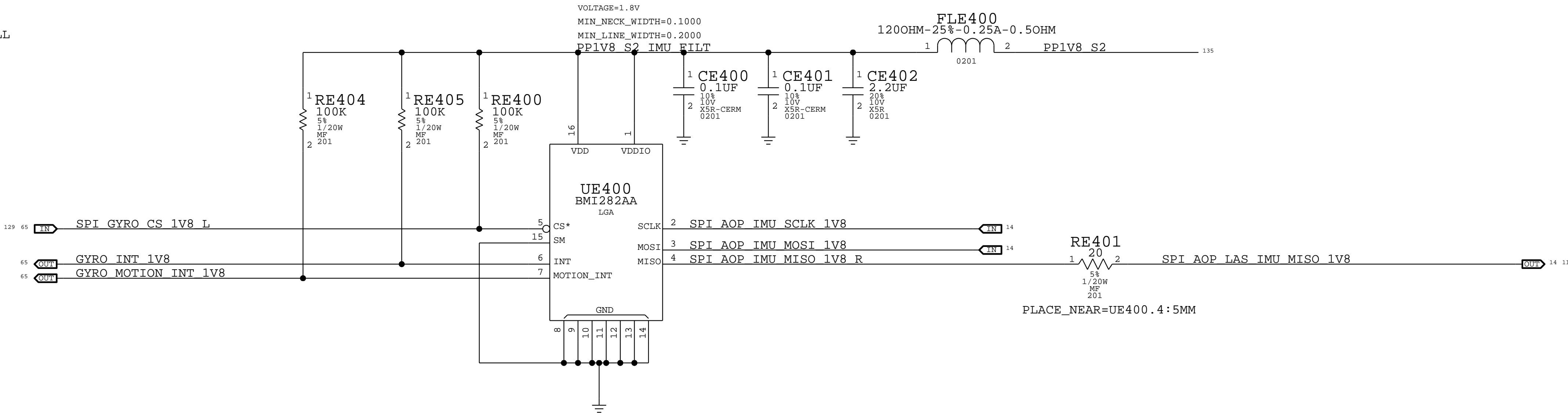
PAGE TITLE		
SENSORS: LOW-SIDE (3/3)		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	140 OF 999
	SHEET	63 OF 155

BOM\_COST\_GROUP=SENSORS

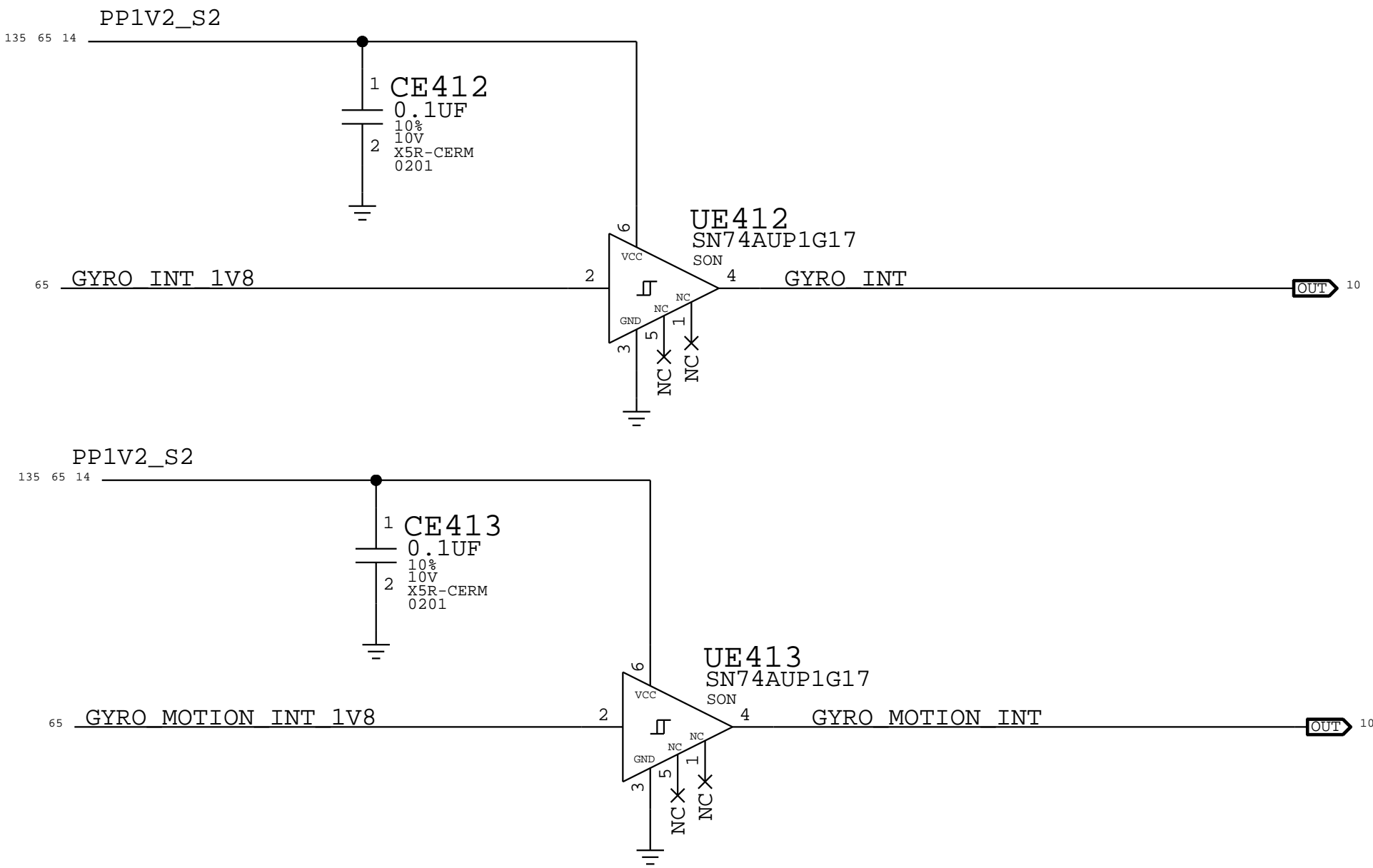
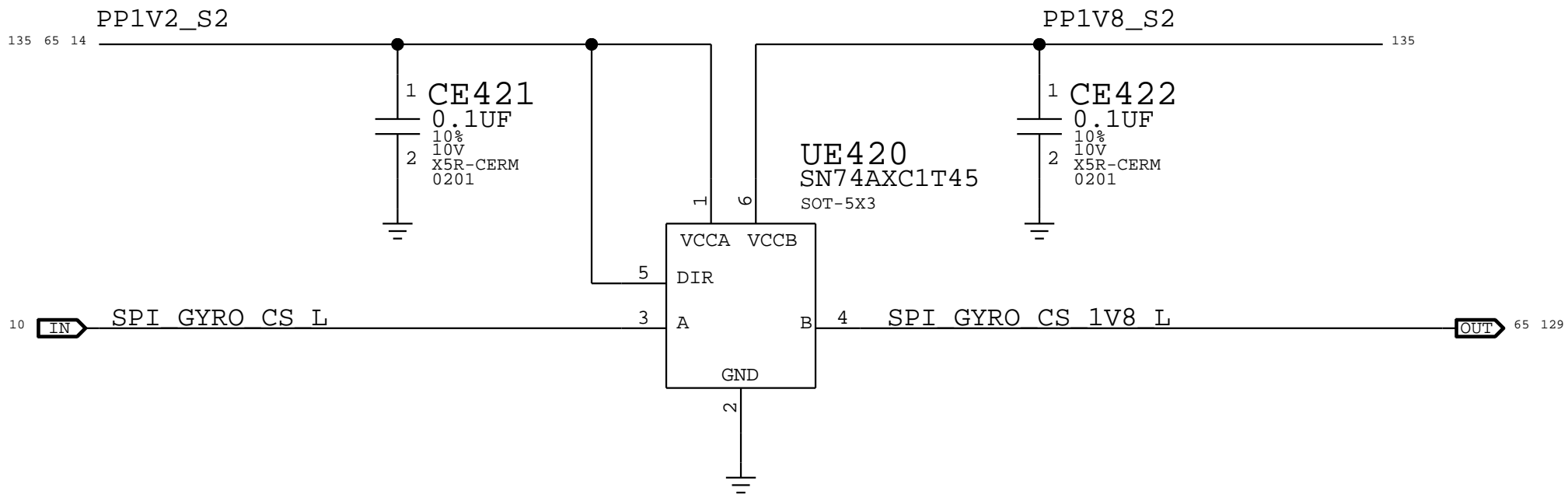



KOBOL: ACCEL & GYRO

FERRITE IS PLACEHOLDER ONLY  
J417 USES 1555S0686 (01005)  
MUST FIND PROPER PART, IF ONE IS NEEDED AT ALL



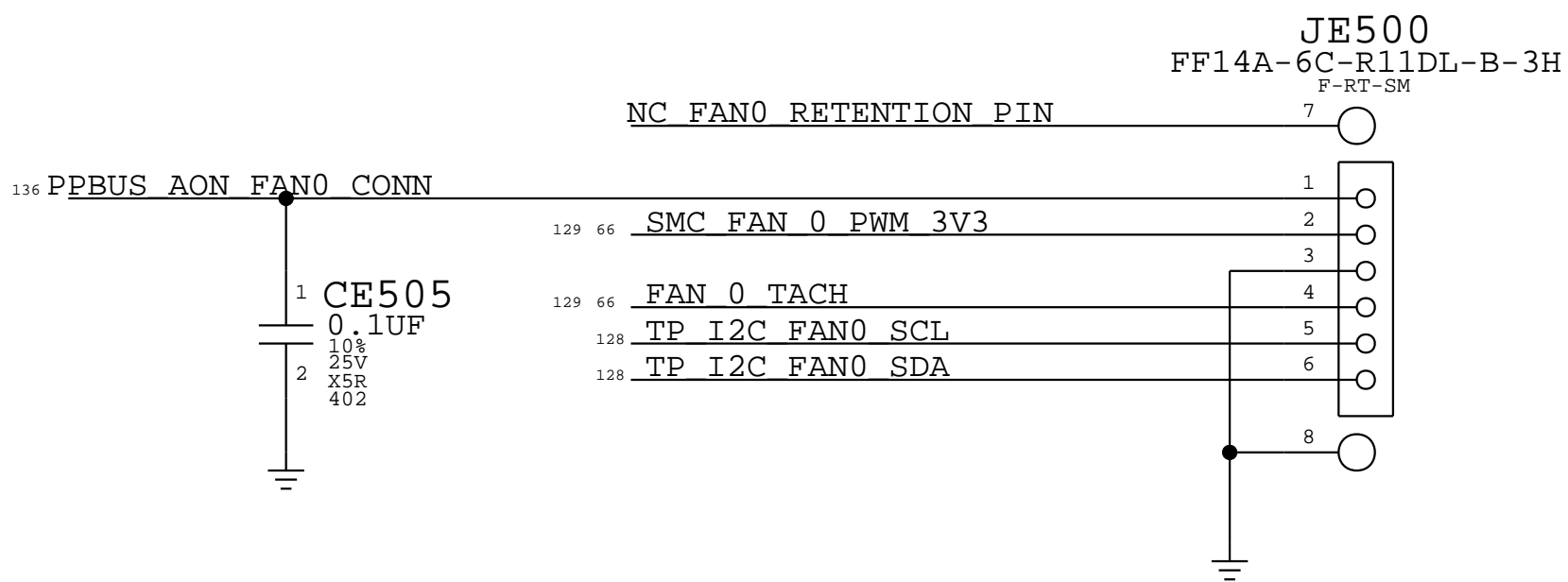
SPI LEVEL TRANSLATION



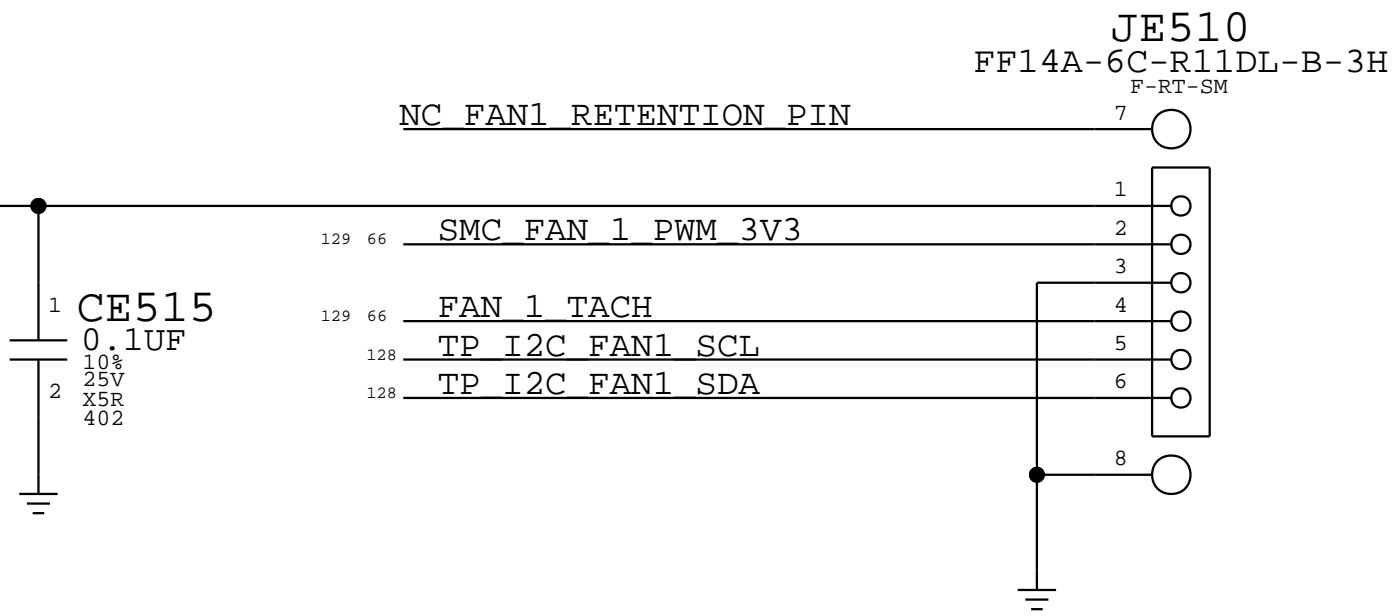
PAGE TITLE		
SENSORS: MOTION		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	144 OF 999
	SHEET	65 OF 155

BOM\_COST\_GROUP=SENSORS

FAN0 (LEFT) CONNECTOR

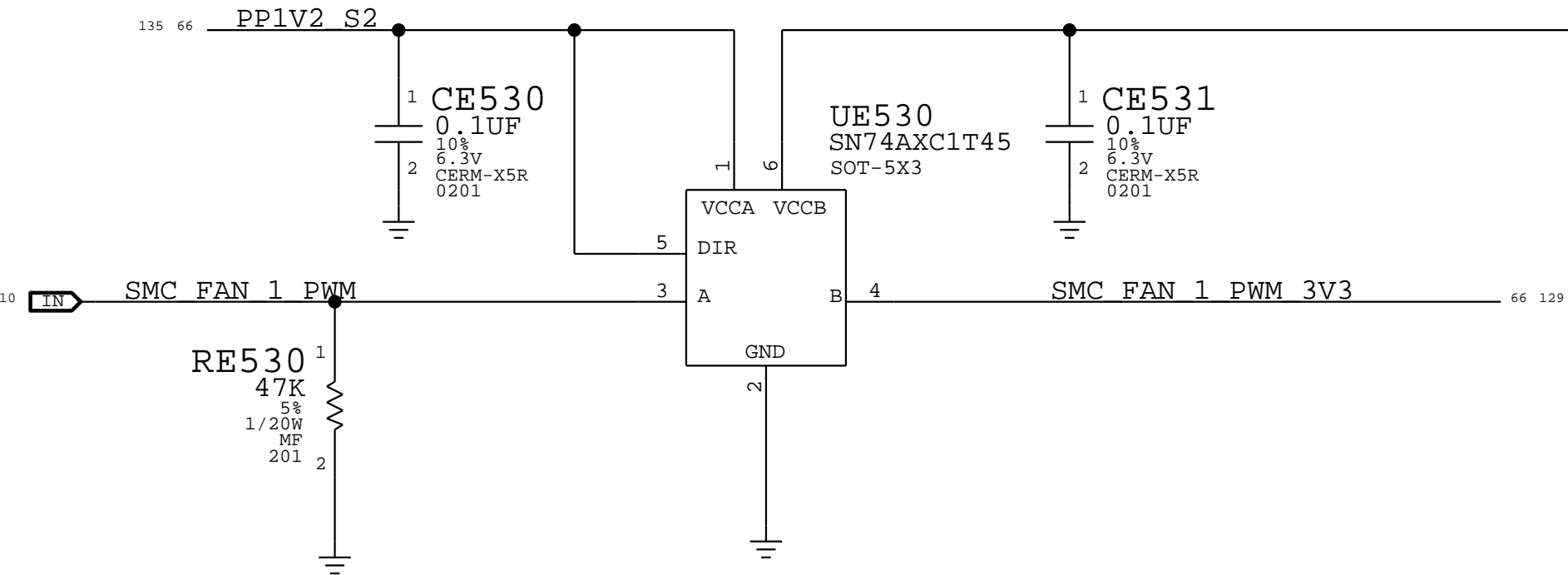
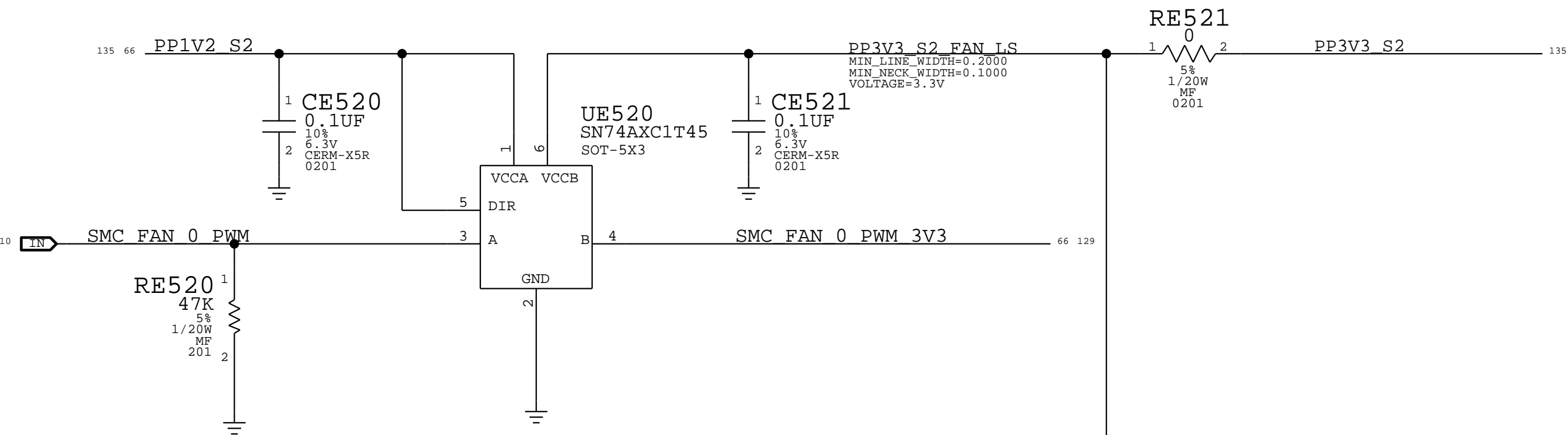
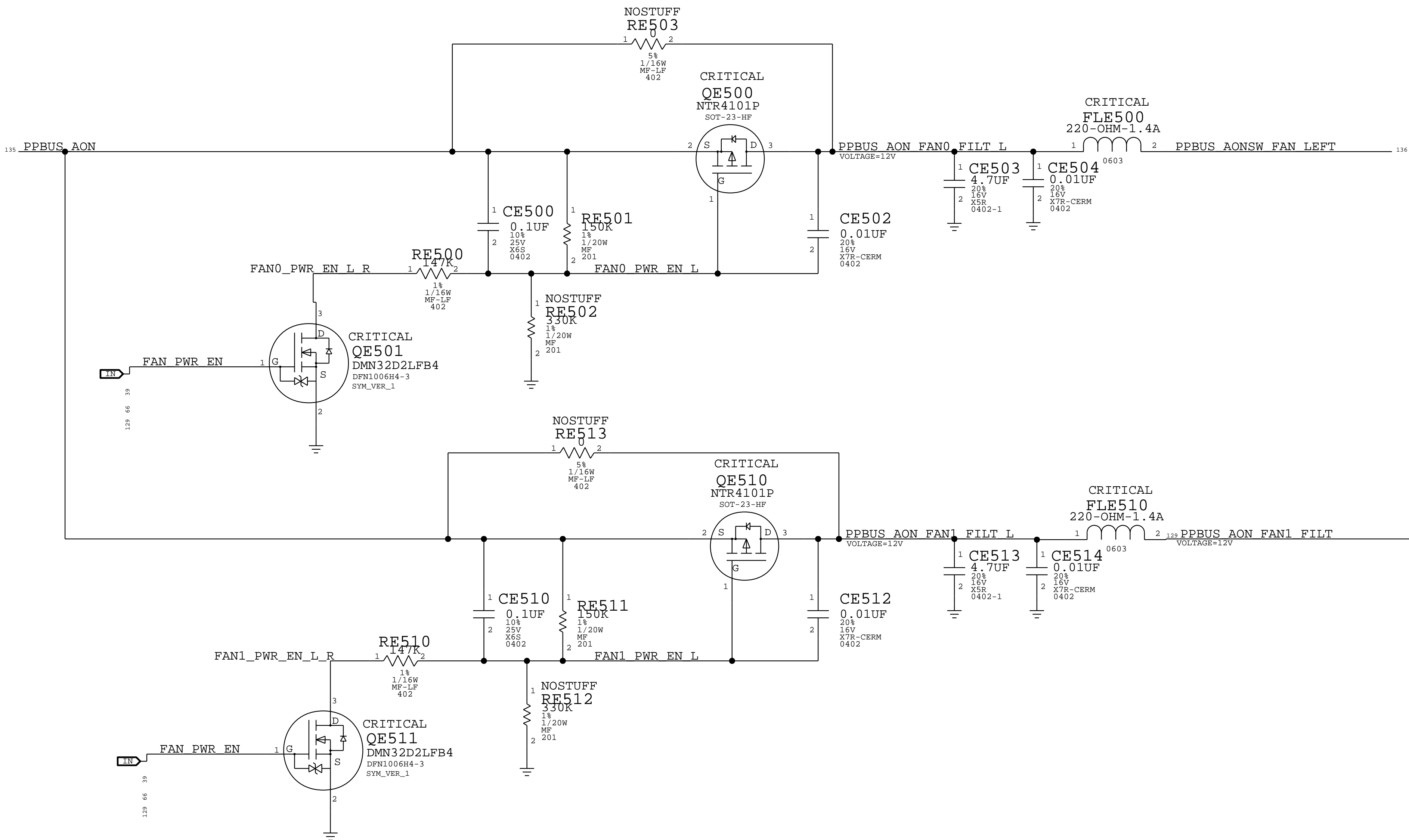
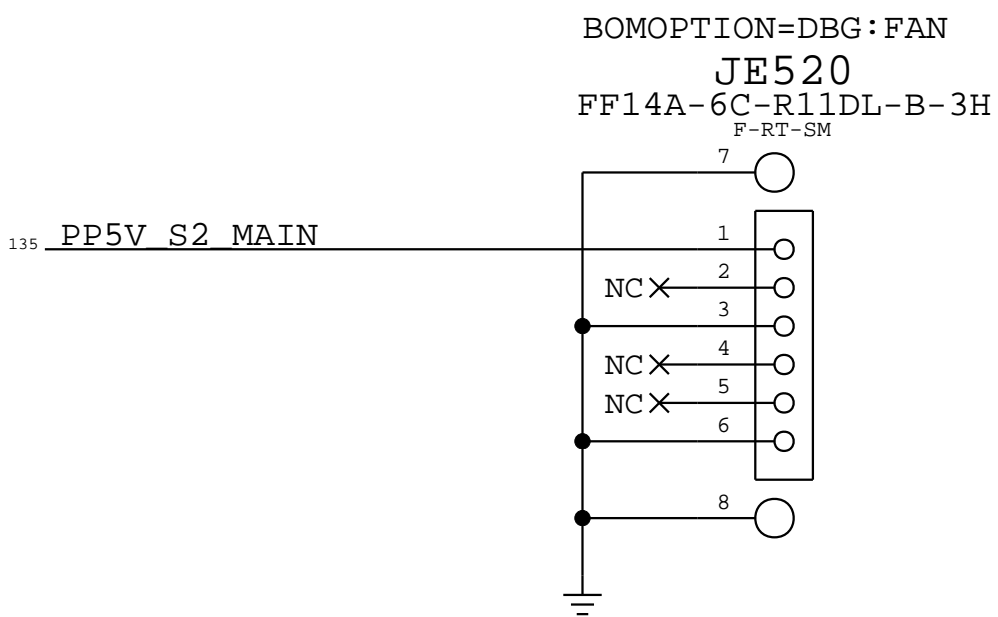



FAN1 (RIGHT) CONNECTOR

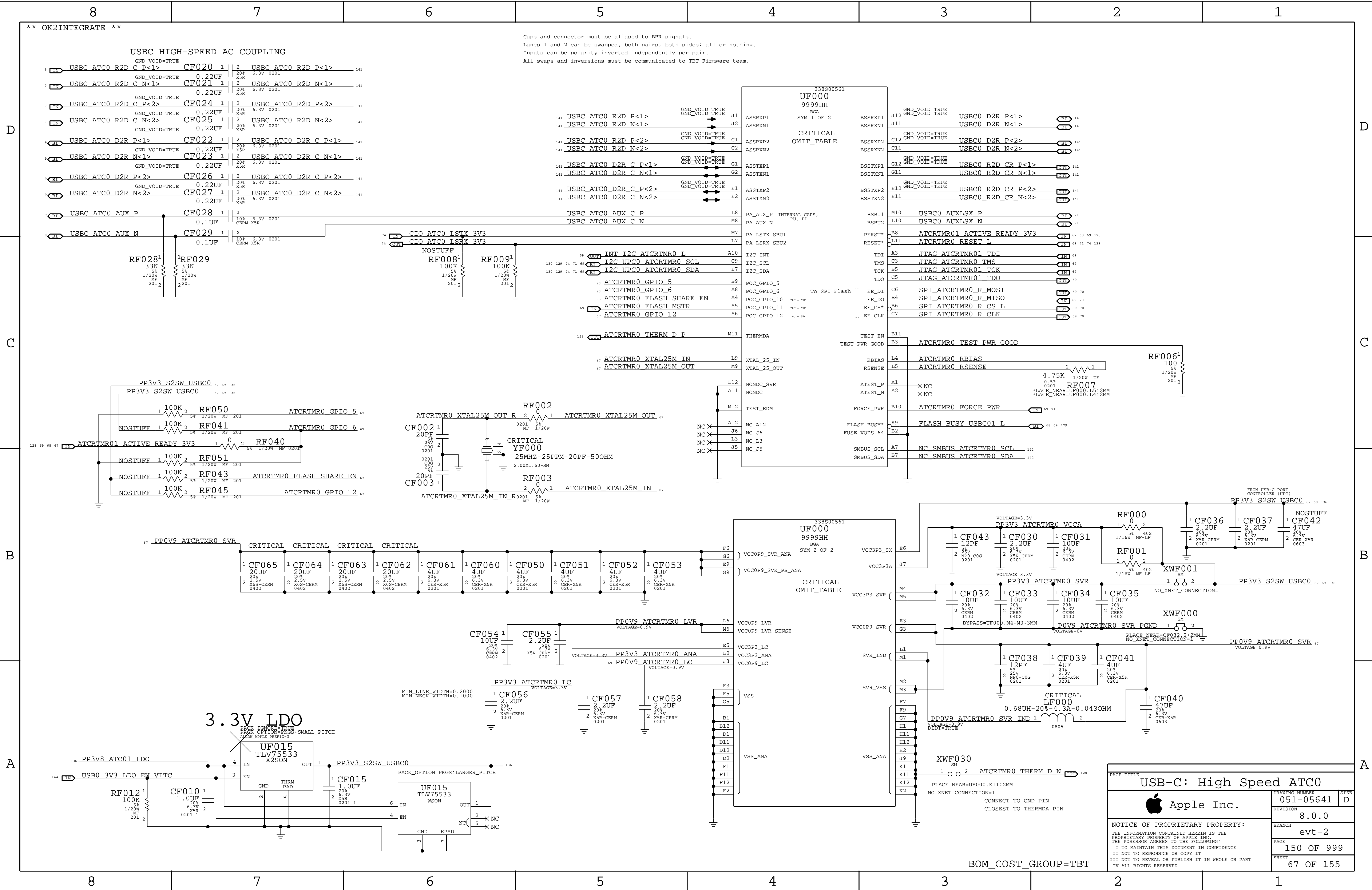


DUMMY COOLER CONNECTOR

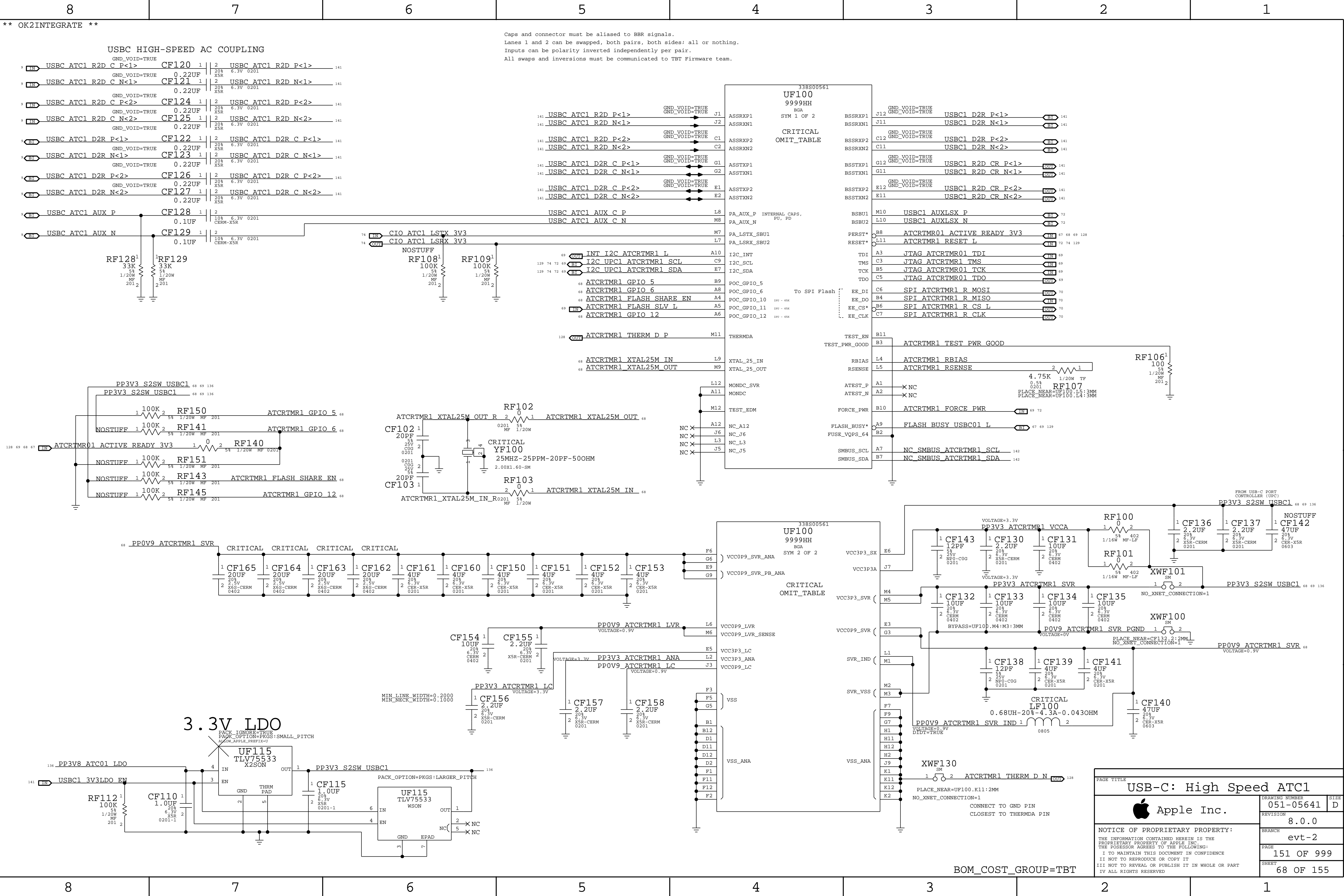
\*\*IN PROGRESS\*\*

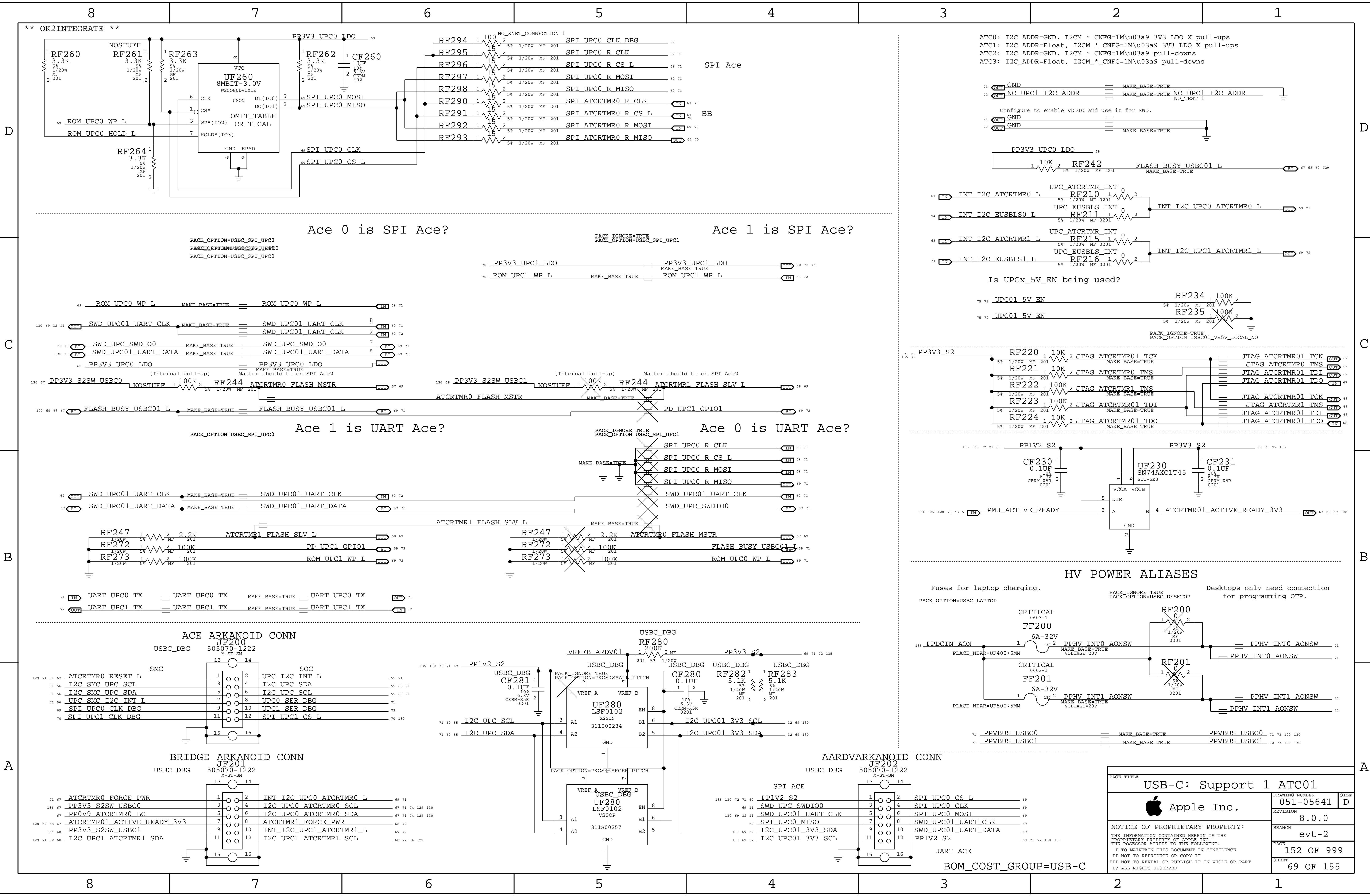


PAGE TITLE			
FANS			
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2	
	PAGE	145 OF 999	
	SHEET	66 OF 155	

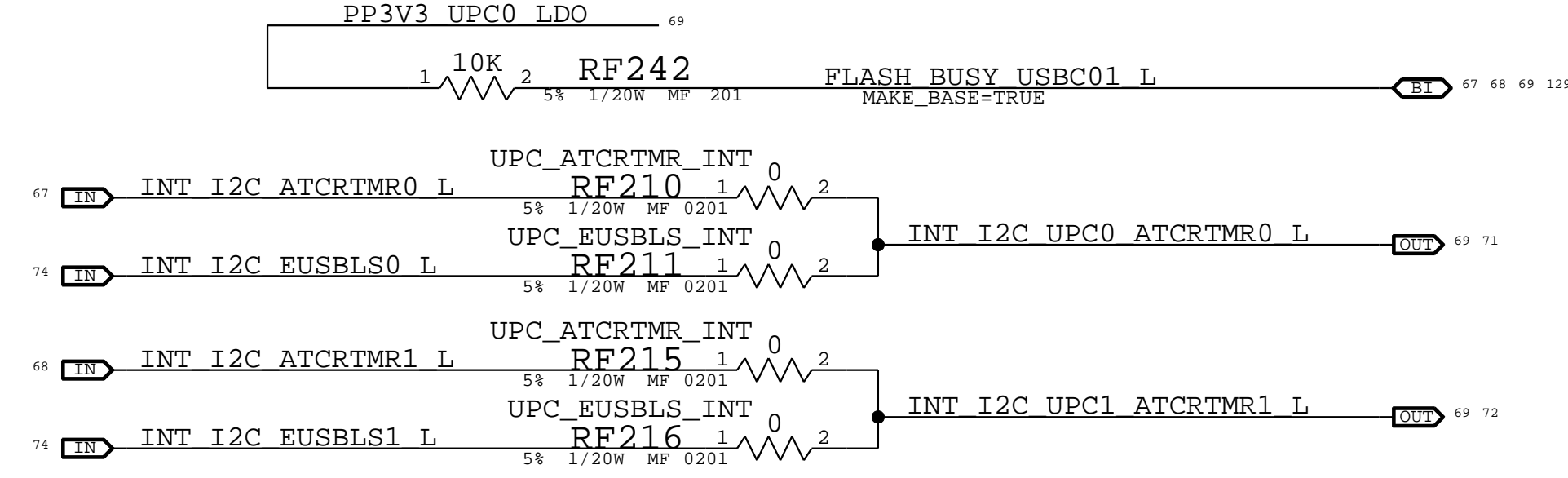
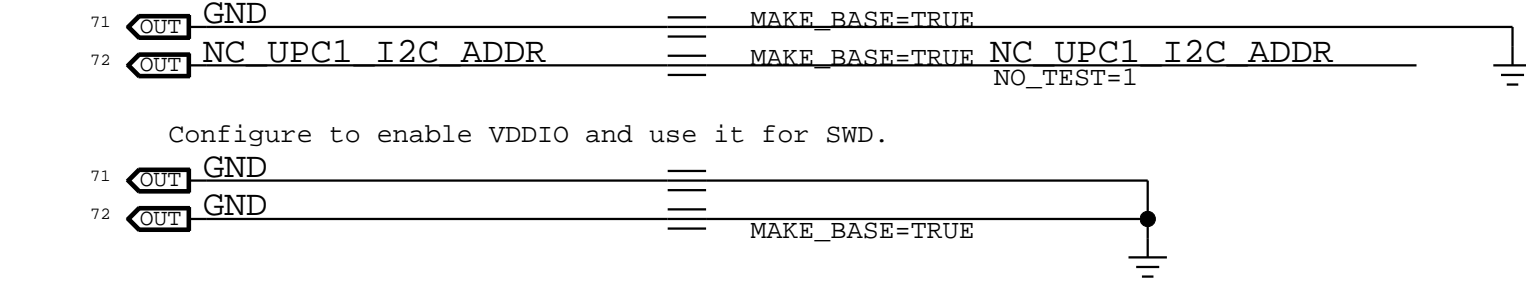




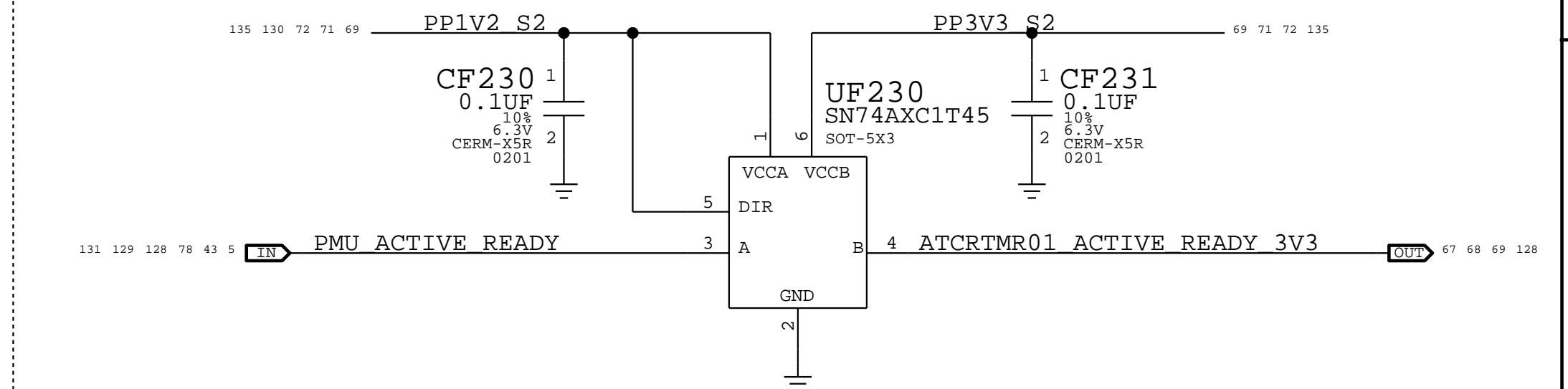
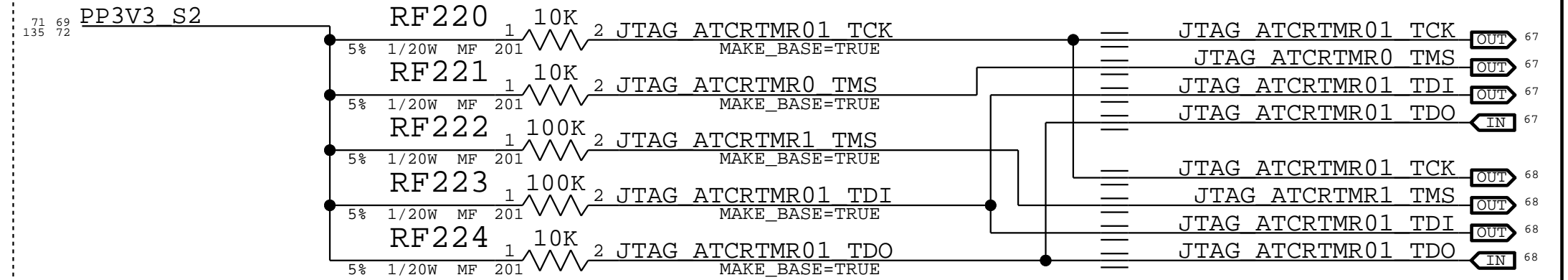
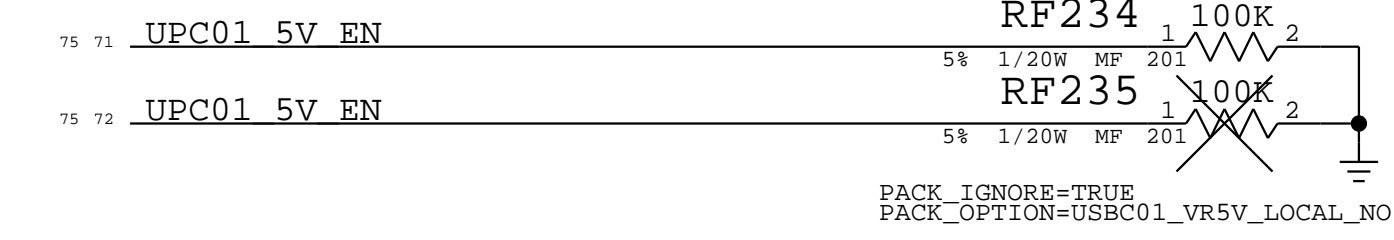




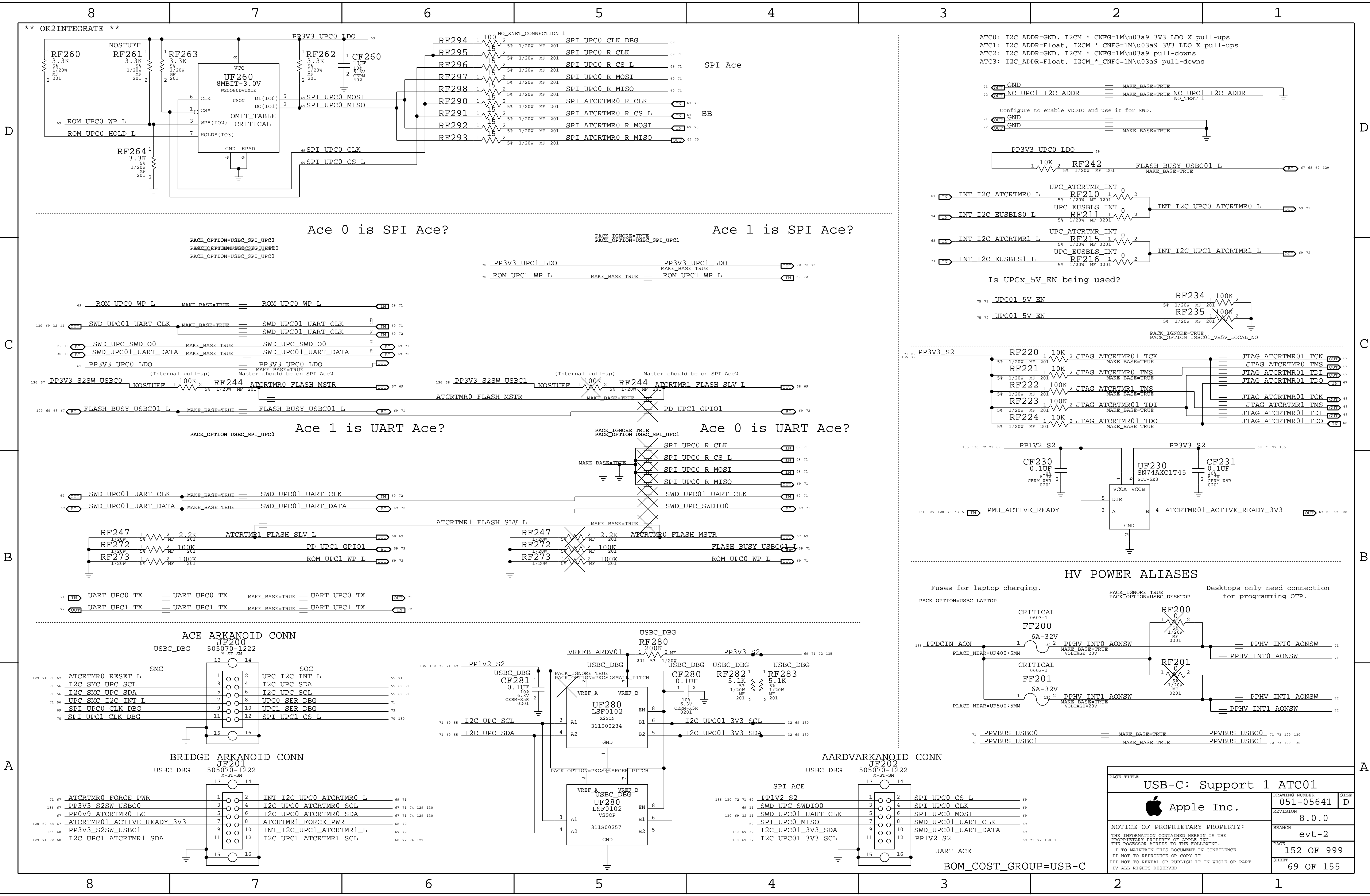
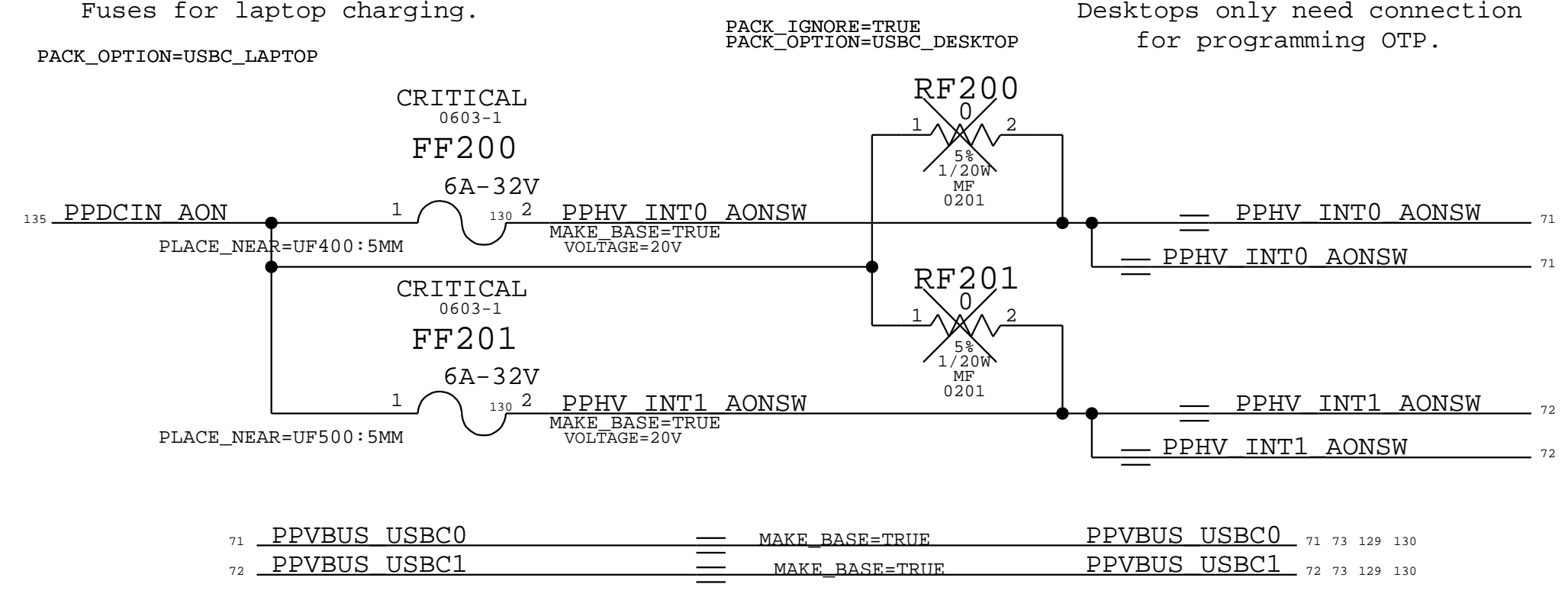
ATC0: I2C\_ADDR=GND, I2CM\_\*\_CNFG=1M\u03a9 3V3\_LDO\_X pull-ups  
ATC1: I2C\_ADDR=Float, I2CM\_\*\_CNFG=1M\u03a9 3V3\_LDO\_X pull-ups  
ATC2: I2C\_ADDR=GND, I2CM\_\*\_CNFG=1M\u03a9 pull-downs  
ATC3: I2C\_ADDR=Float, I2CM\_\*\_CNFG=1M\u03a9 pull-downs



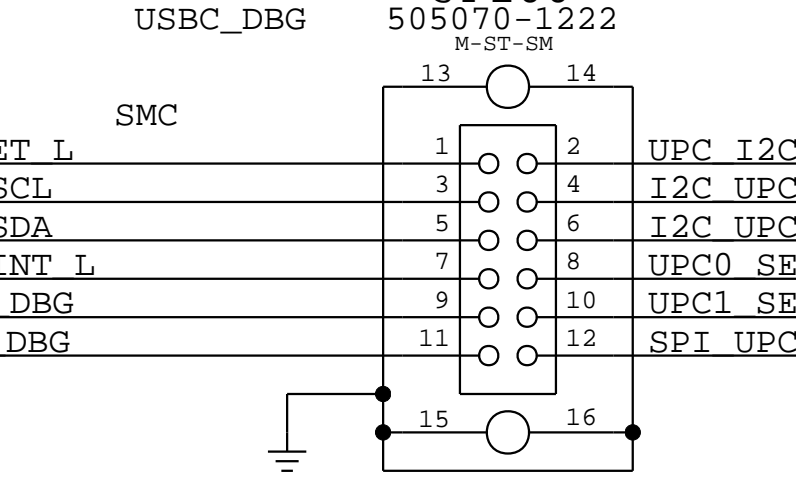
Is UPCL\_5V\_EN being used?



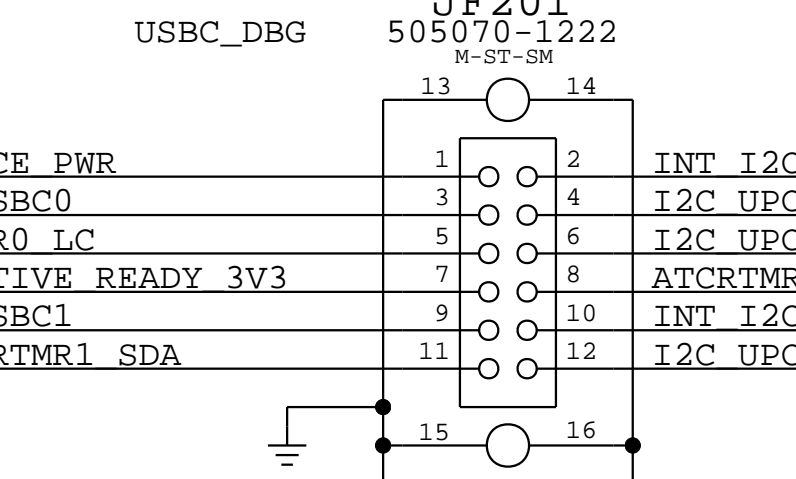
### HV POWER ALIASES



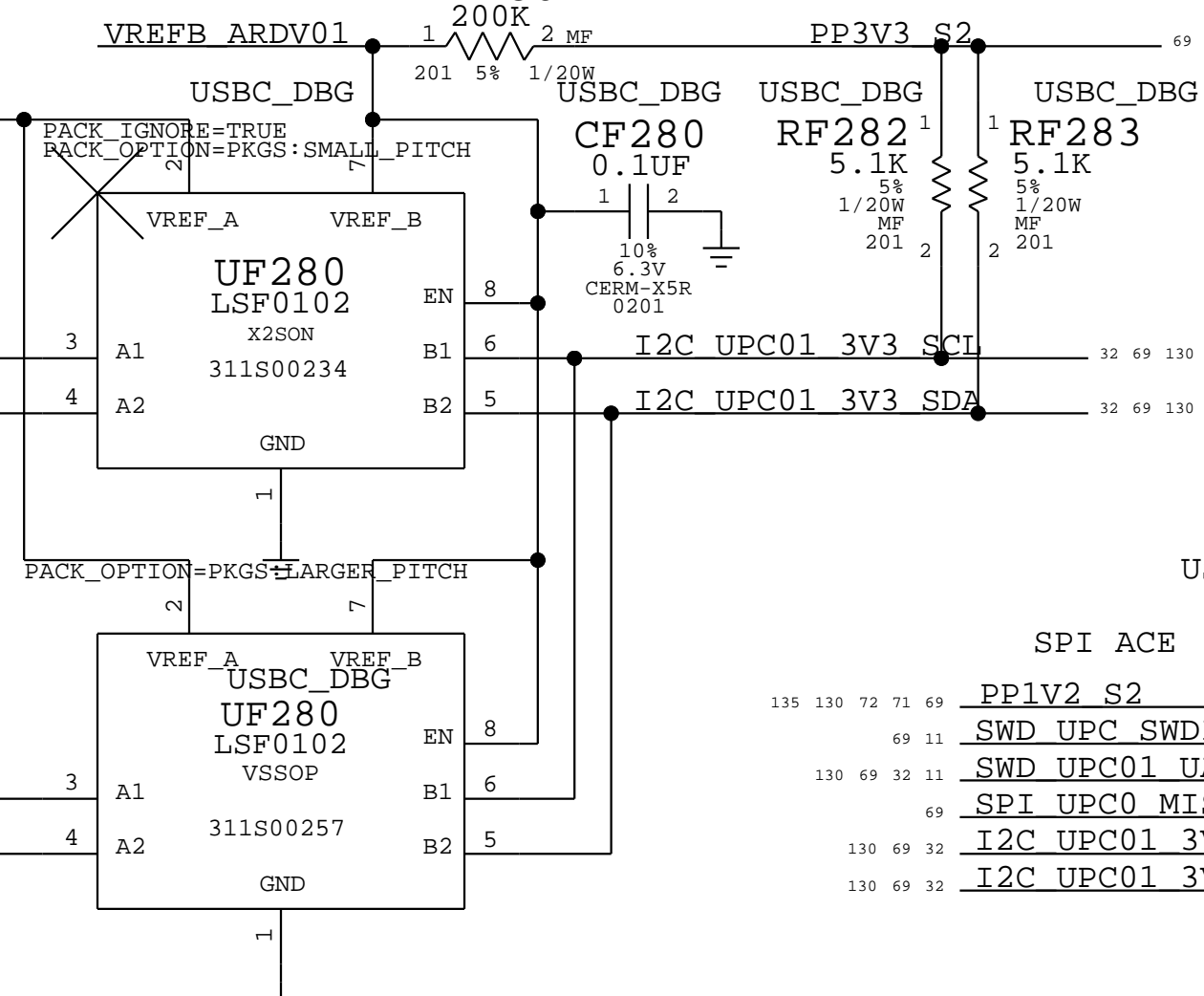
### ACE ARKANOID CONN



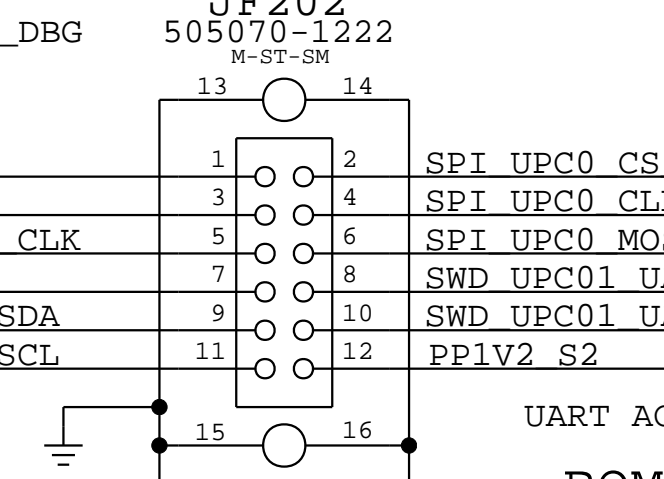
### BRIDGE ARKANOID CONN



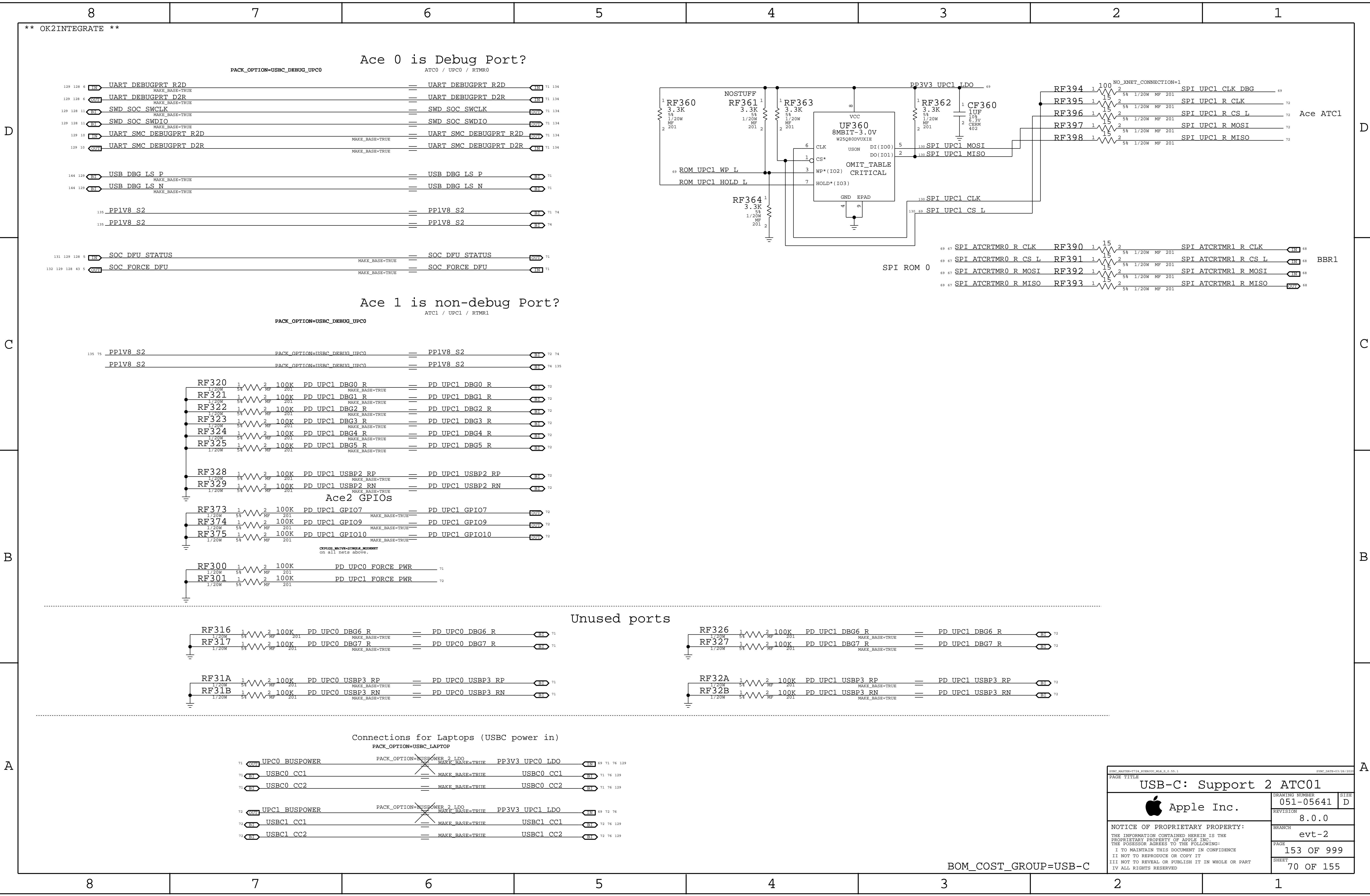
### USBC\_DBG

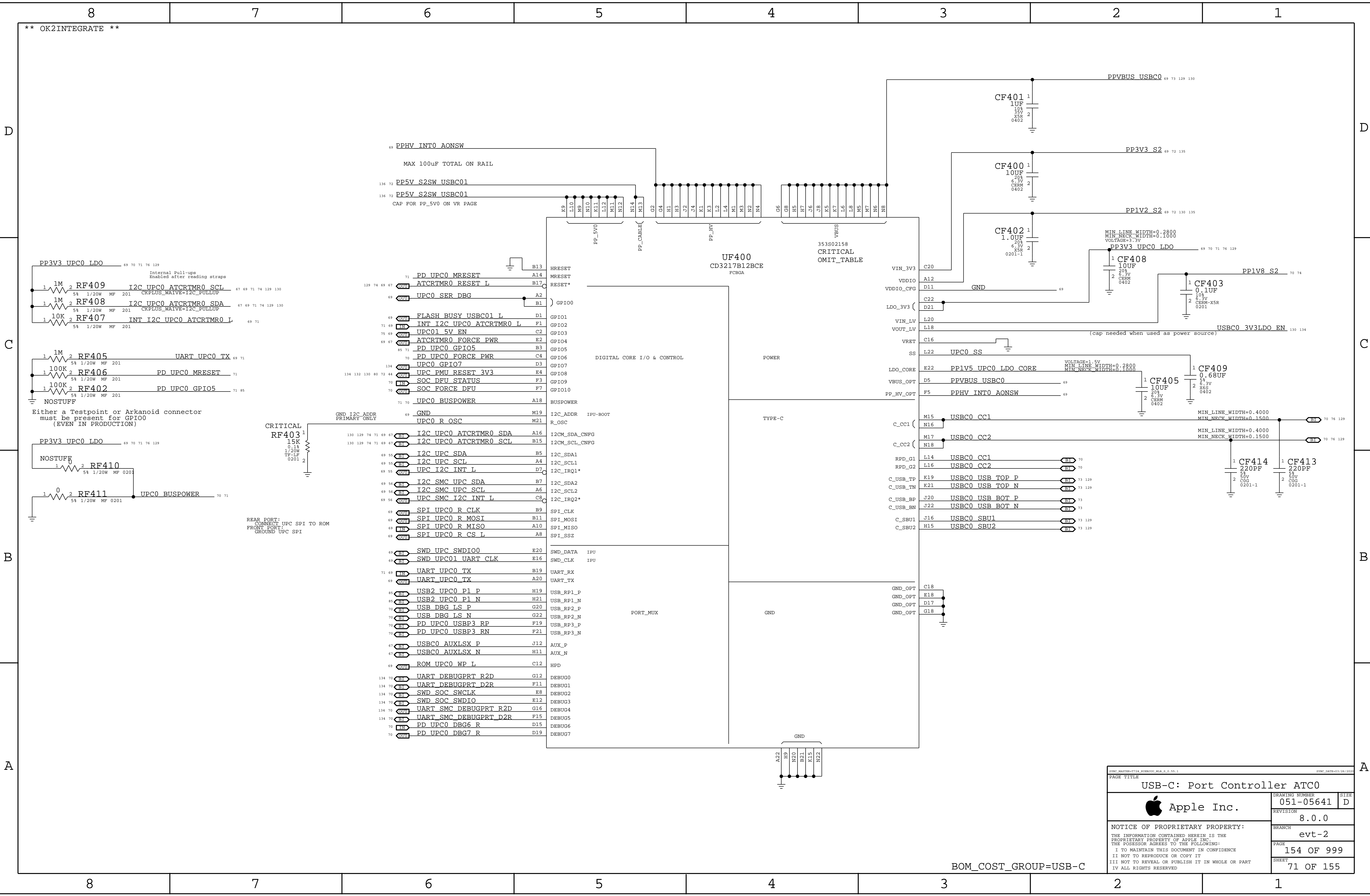



### AARDVARK ARKANOID CONN



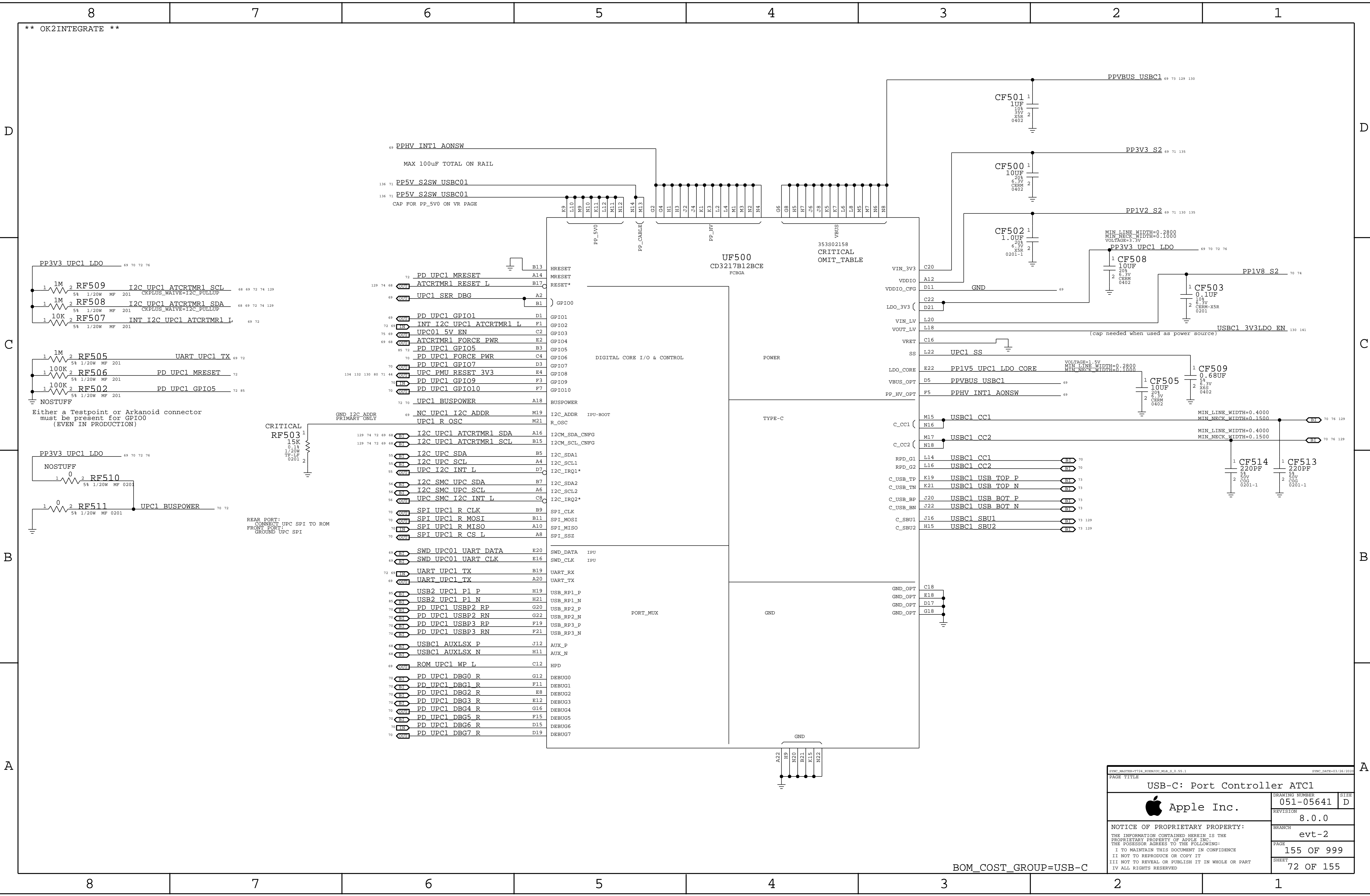
PAGE TITLE		
USB-C: Support 1 ATC01		
Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	152 OF 999
	SHEET	69 OF 155





PAGE TITLE		
USB-C: Port Controller ATC0		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	154 OF 999
	SHEET	71 OF 155





PAGE TITLE		
USB-C: Port Controller ATC1		
DRAWING NUMBER	051-05641	SIZE
	REVISION	D
NOTICE OF PROPRIETARY PROPERTY:		BRANCH
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		evt-2
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		PAGE
II NOT TO REPRODUCE OR COPY IT		155 OF 999
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		SHEET
IV ALL RIGHTS RESERVED		72 OF 155



# Left Side Port

D

C

B

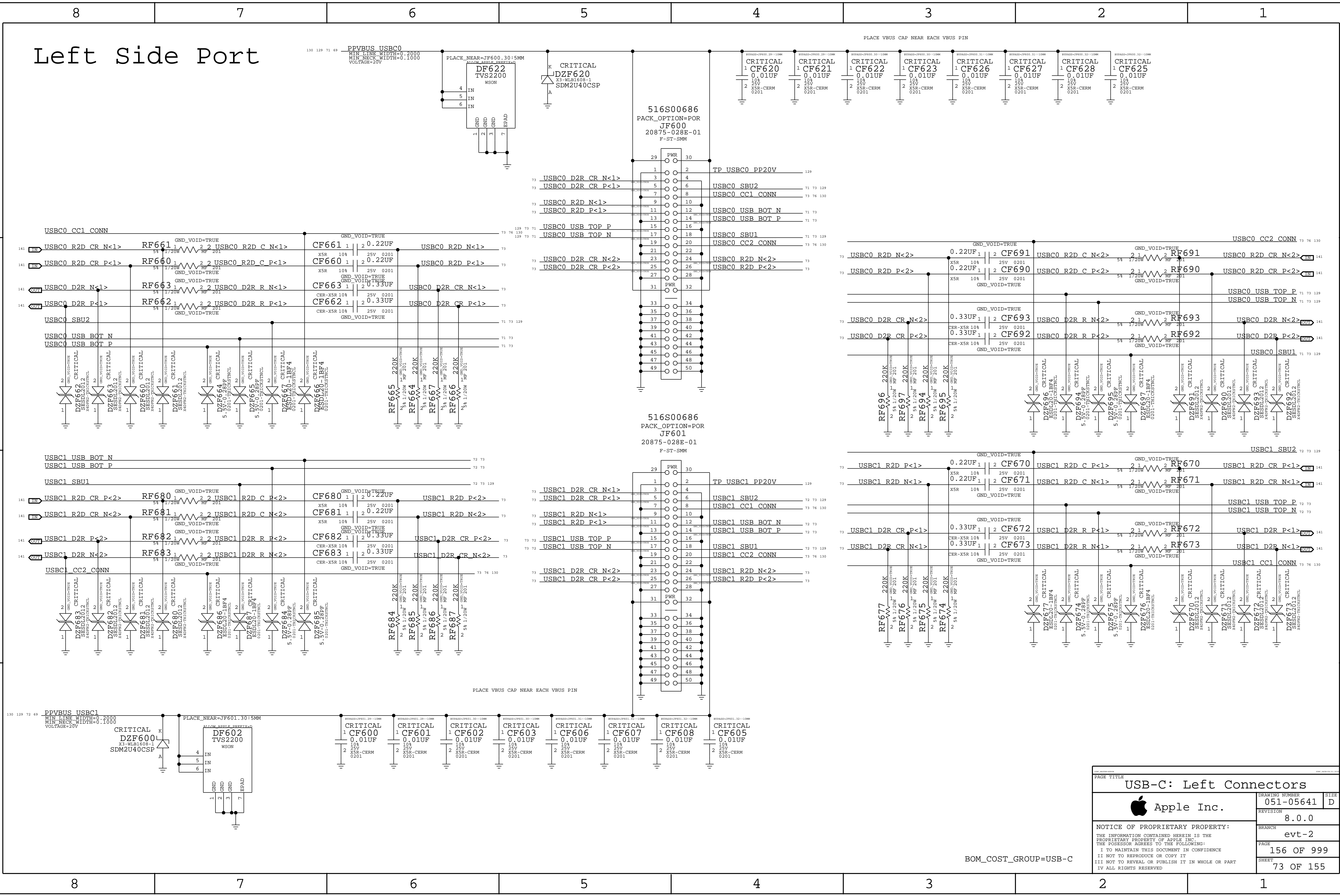
A

D


C

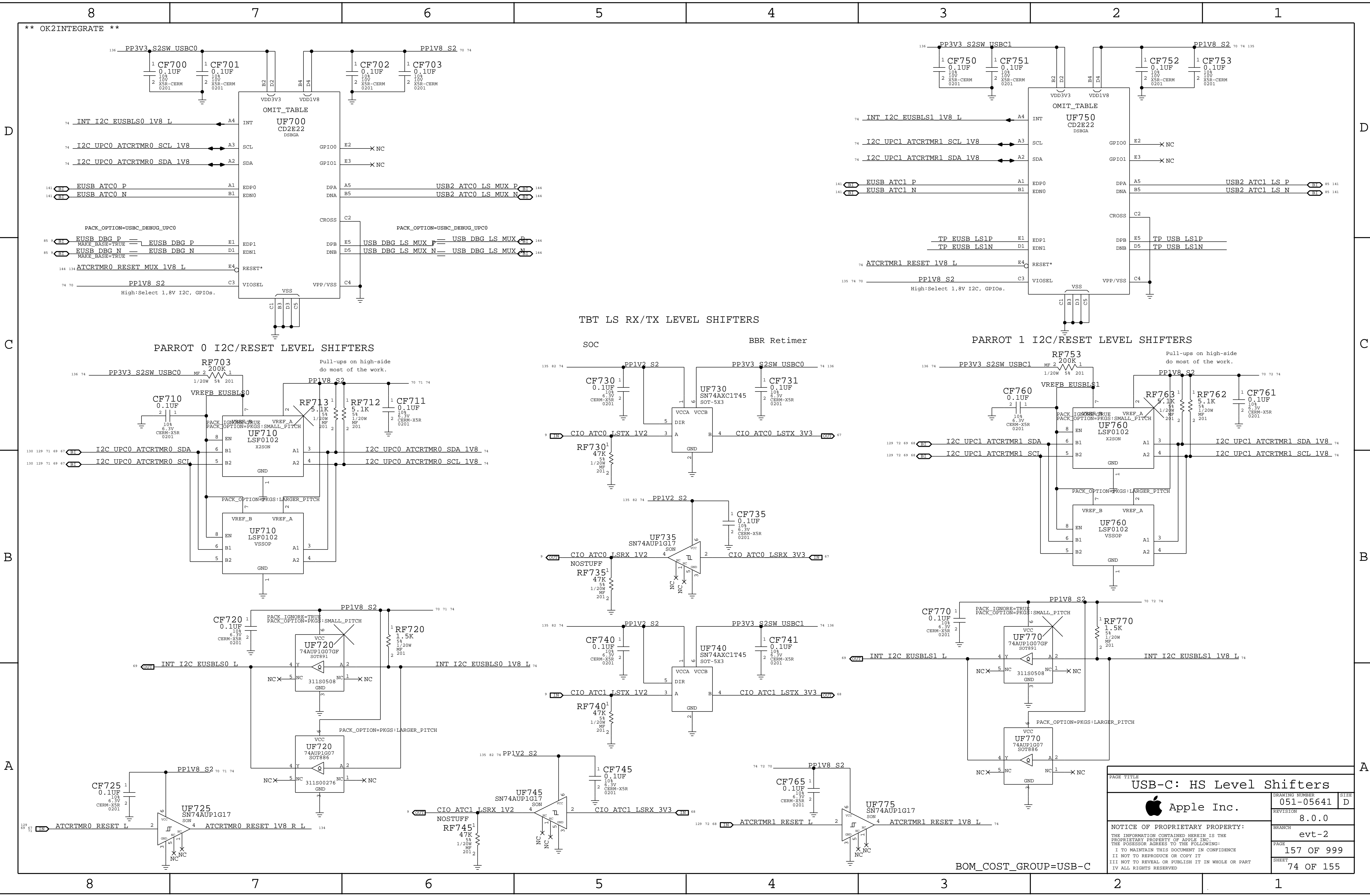
B

A

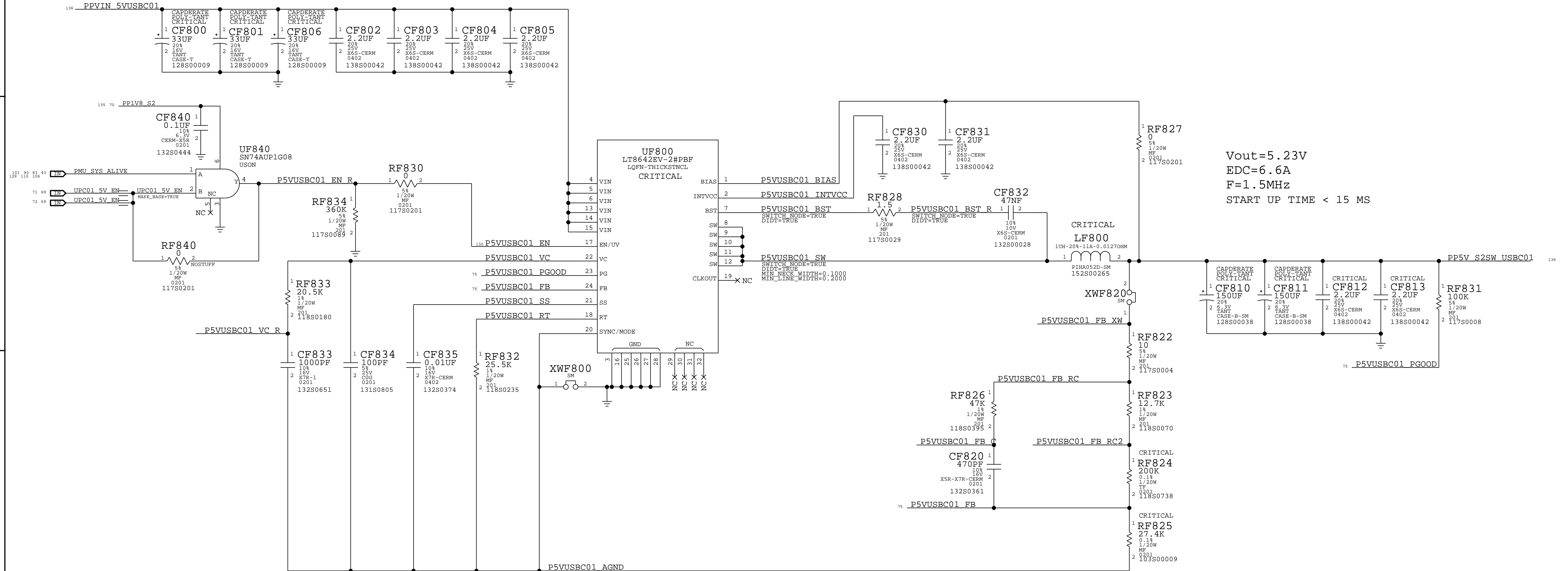



BOM\_COST\_GROUP=USB-C

PAGE TITLE		
USB-C: Left Connectors		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	156 OF 999
	SHEET	73 OF 155

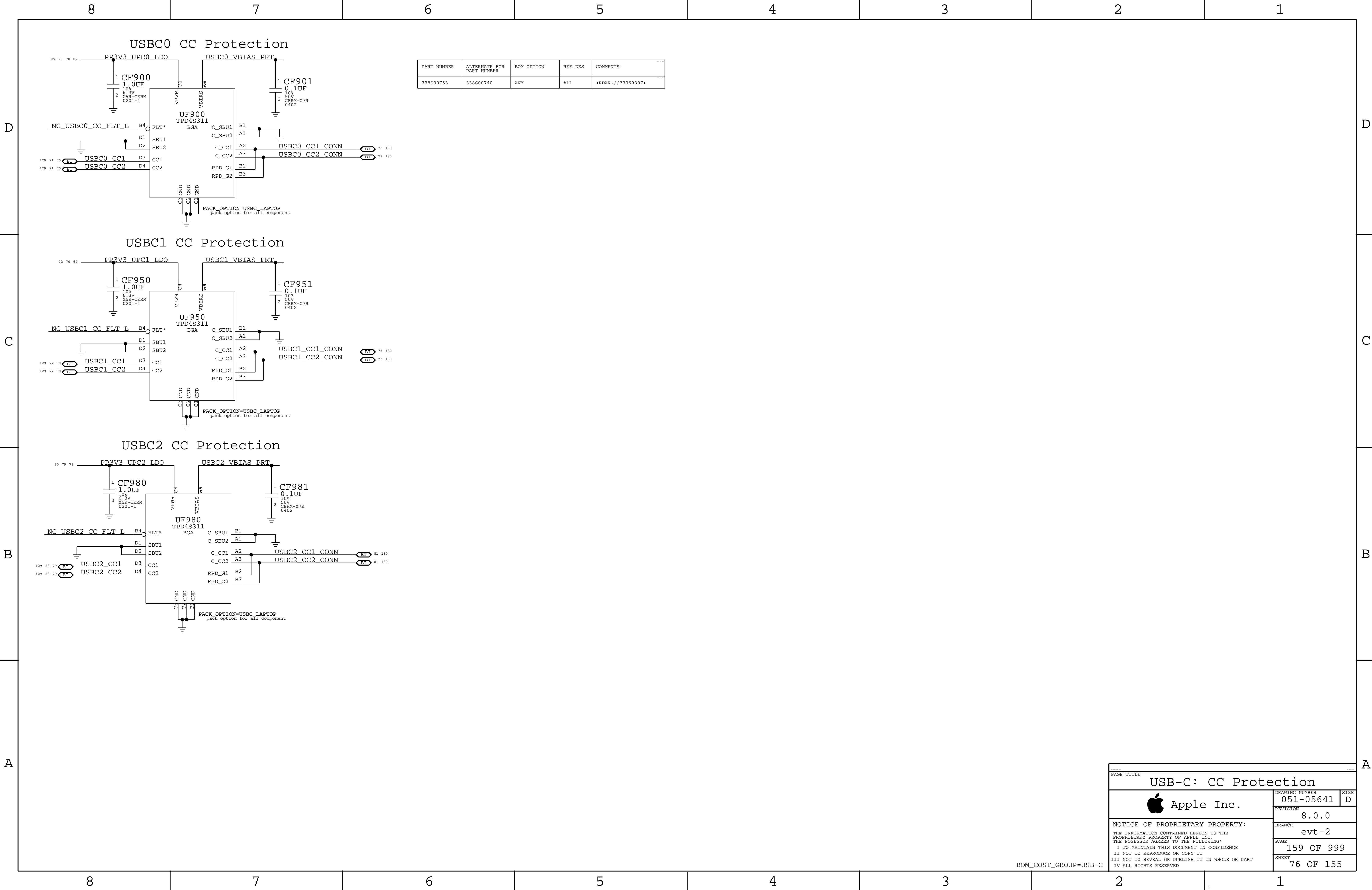


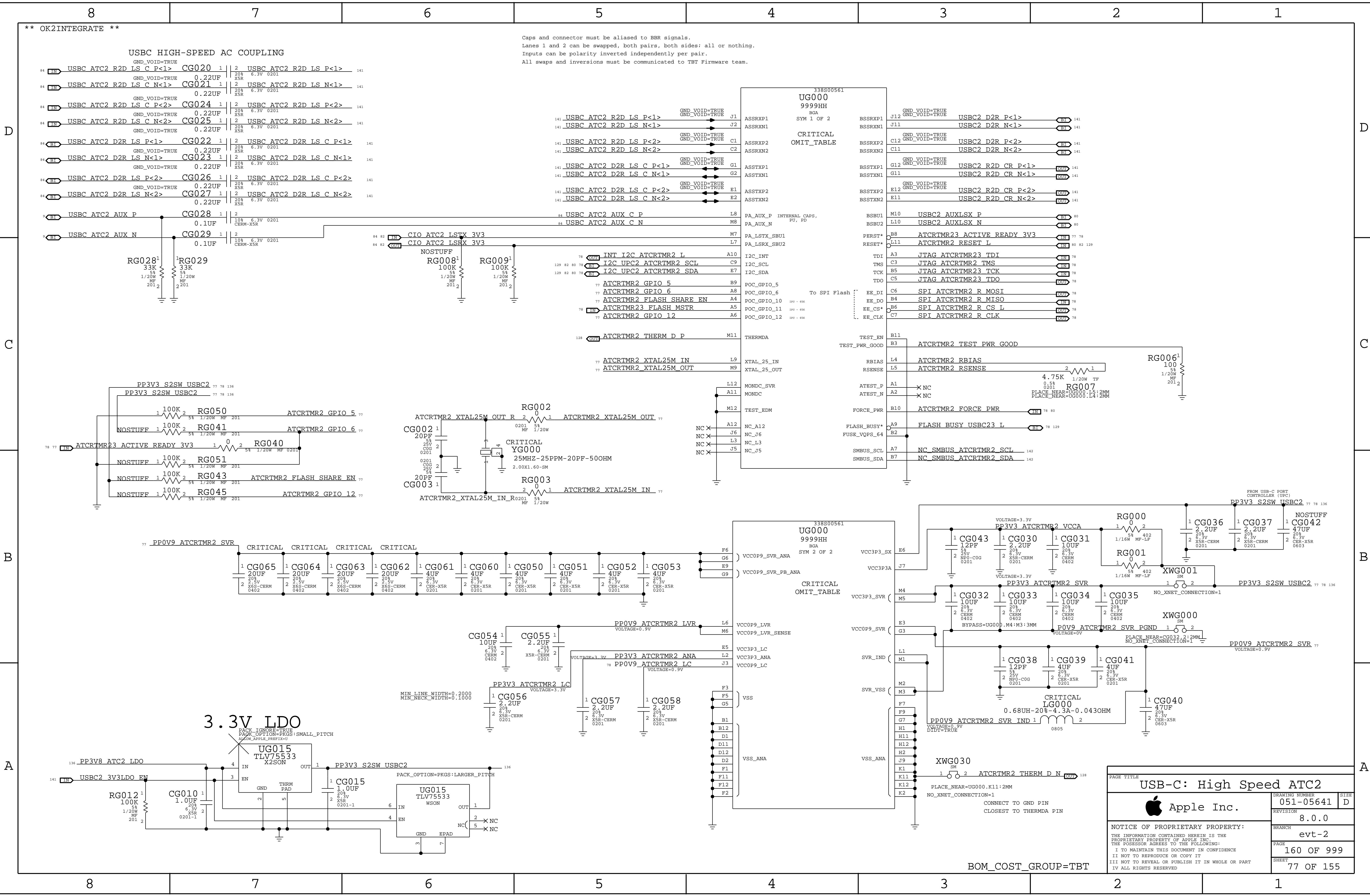
\*\*\* OK2INTEGRATE \*\*\*




PAGE TITLE		
USBC- 5V Regulator		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	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	
	8.0.0	
	BRANCH	
	evt-2	
	PAGE	
	158 OF 999	
	SHEET	
	75 OF 155	

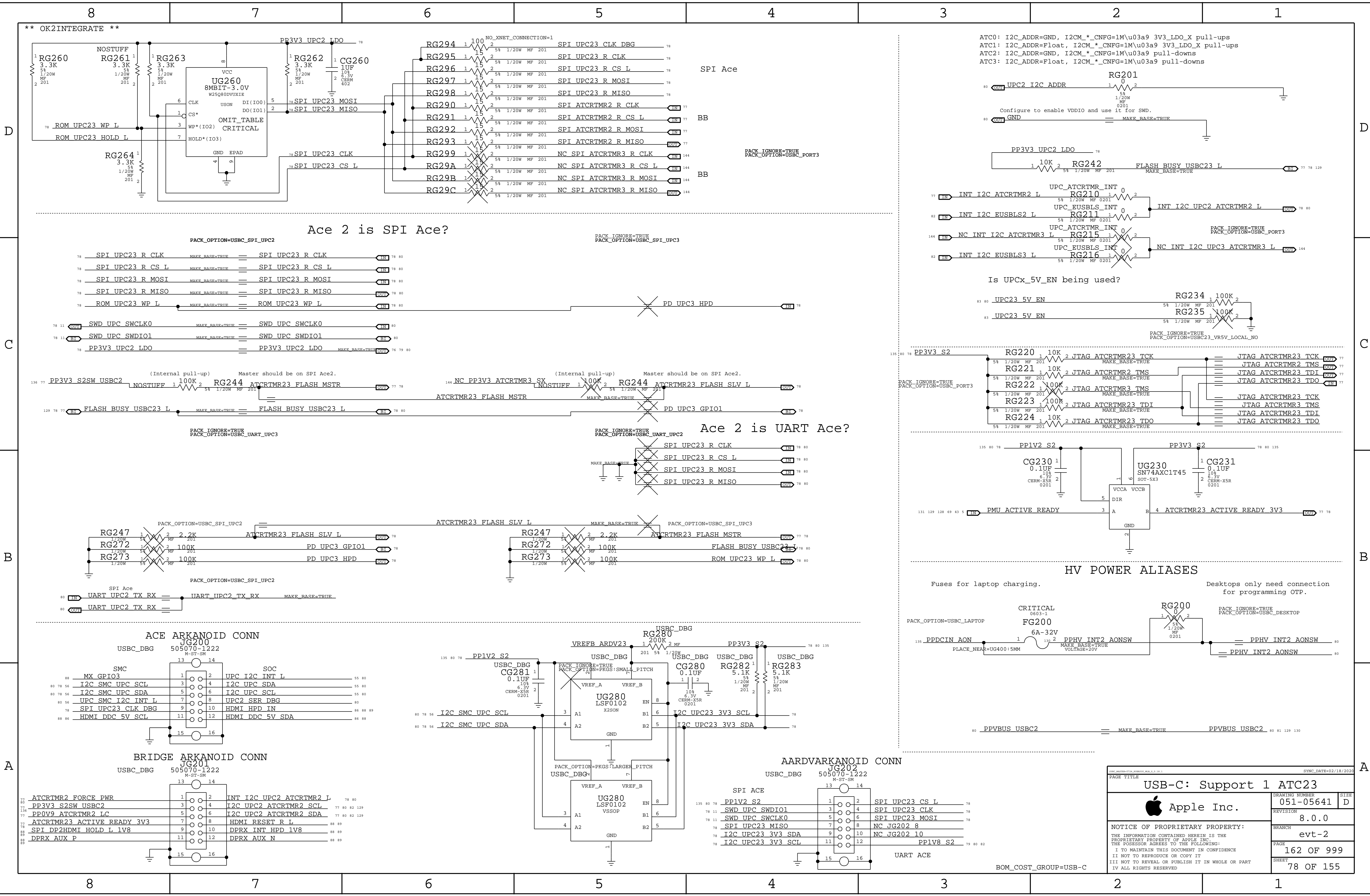
BOM\_COST\_GROUP=USB-C





PAGE TITLE		
USB-C: High Speed ATC2		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	160 OF 999
	SHEET	77 OF 155





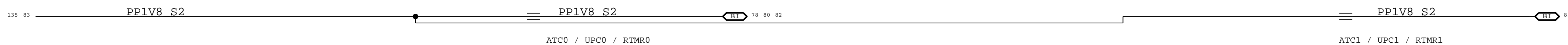
---

\*\* OK2INTEGRATE \*\*

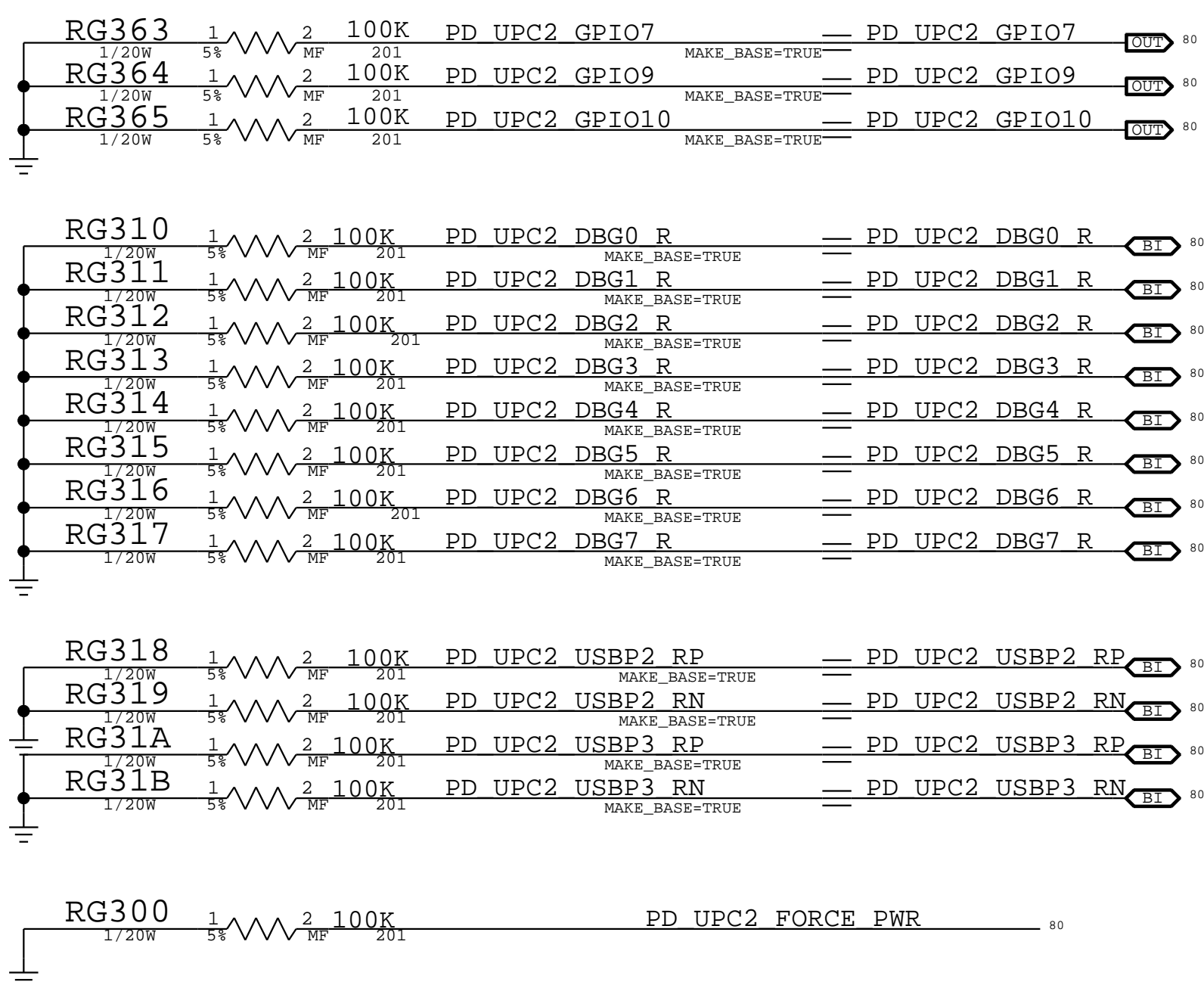
## USB-C Port assignments

This schematic not currently set up to allow ATC channels 2 or 3 be the debug port. These options can be added if needed.

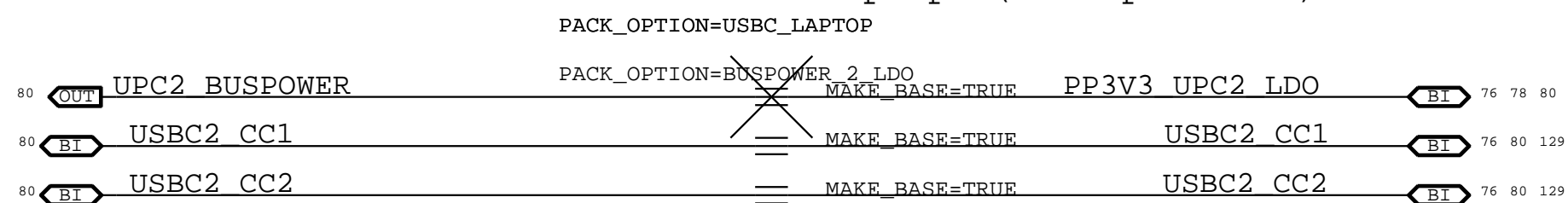
## Unused ports



## Ace2 GPIOs




## Connections for Laptops (USBC power in)

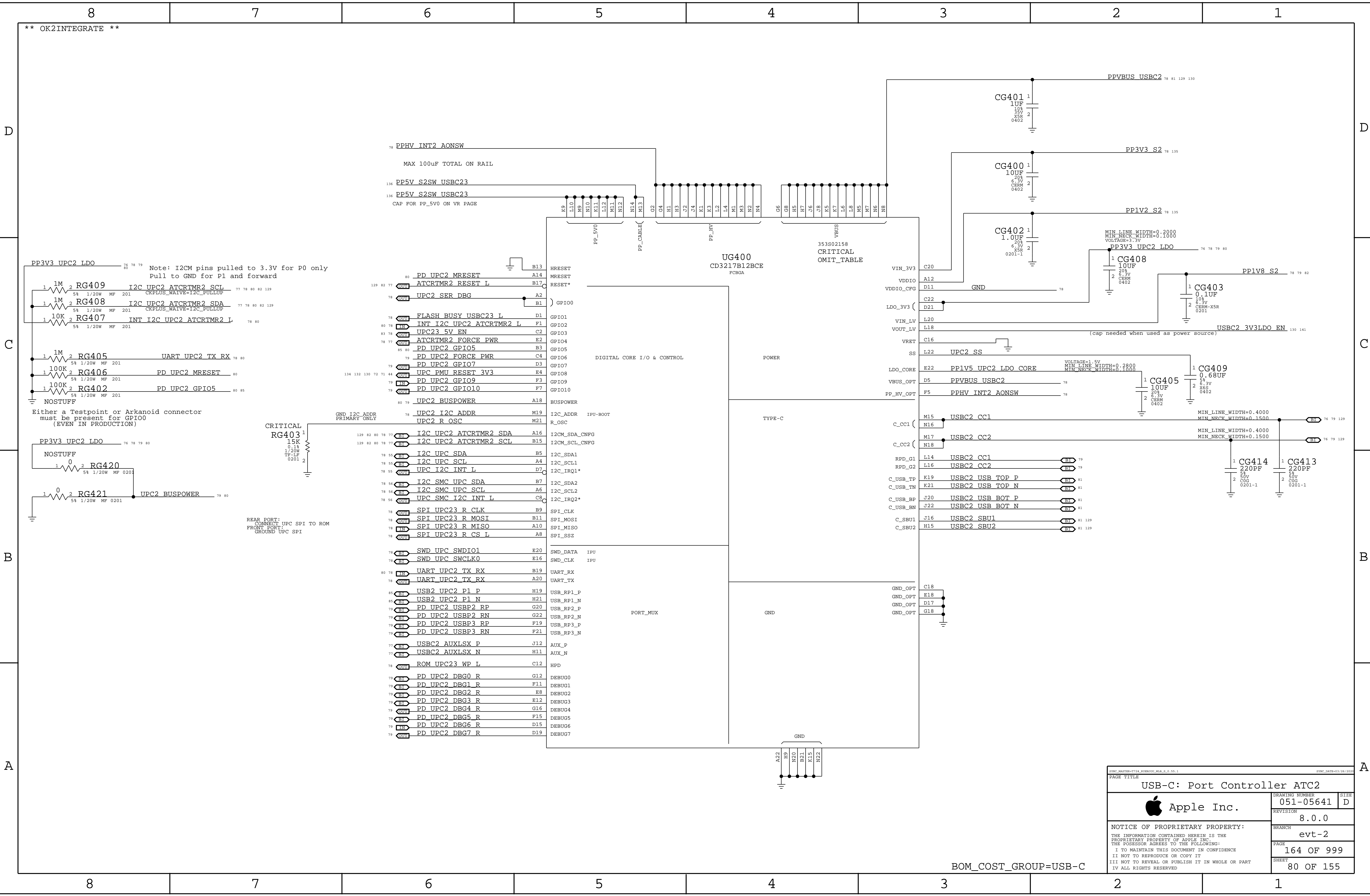



## Connections for Desktops (No USB-C power in)



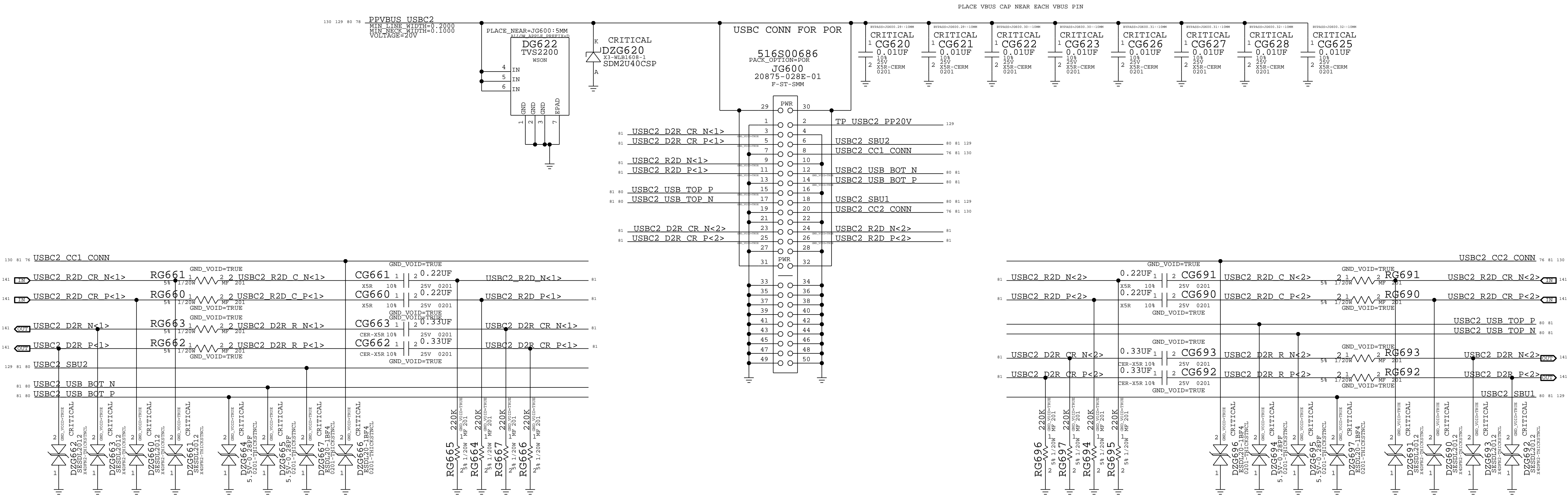
BOM\_COST\_GROUP=USB-C


PAGE TITLE		DRAWING NUMBER		DATE	
USB-C: Support 2 ATC23		051-05641		01/26/2016	
 Apple Inc.		REVISION		SIZE	
		8.0.0		D	
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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED			evt-2  PAGE 163 OF 999  SHEET 79 OF 155		



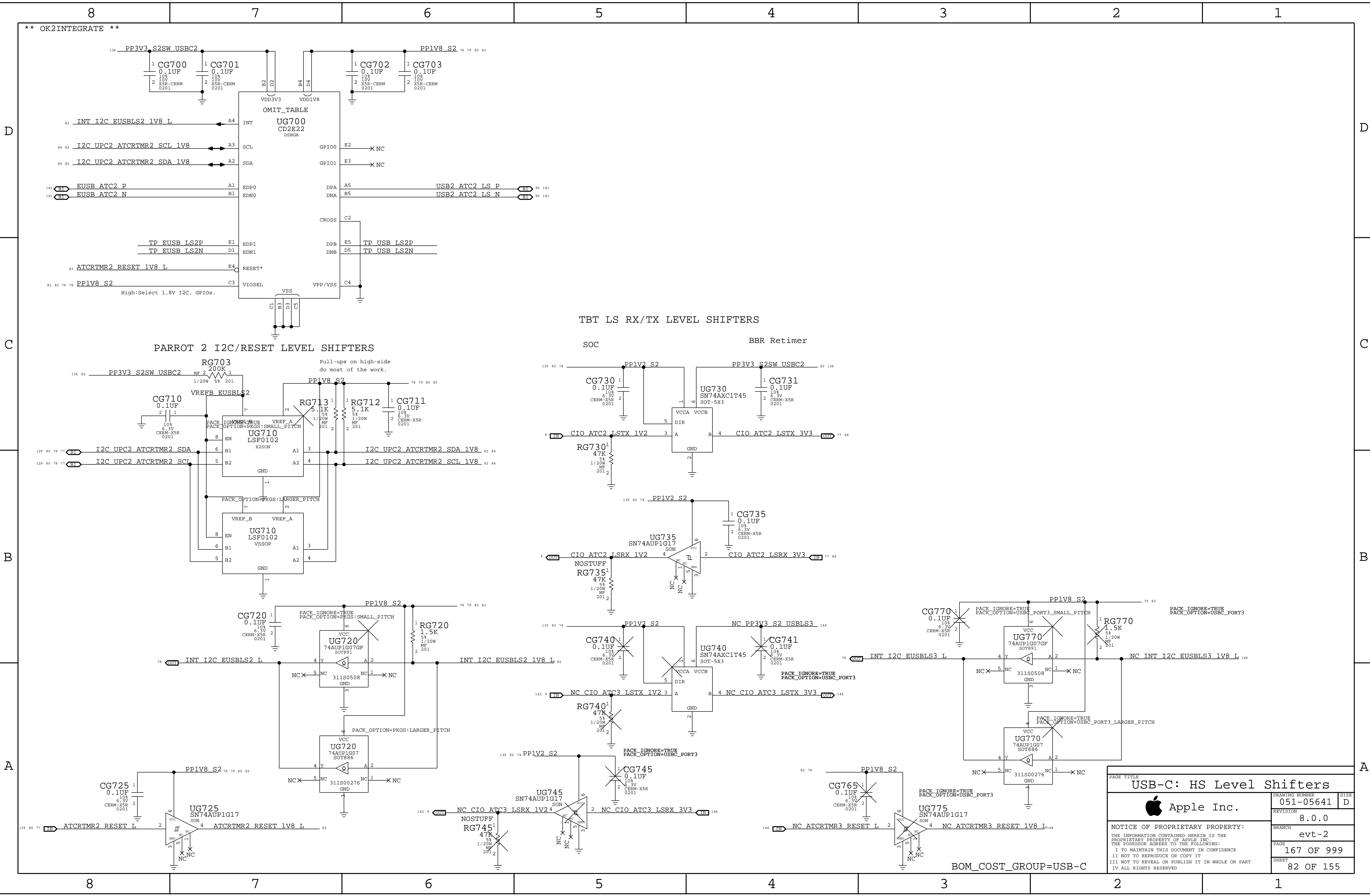
PAGE TITLE			
USB-C: Port Controller ATC2			
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE
	REVISION	8.0.0	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH	evt-2
		PAGE	164 OF 999
		SHEET	80 OF 155


Right Side Port



PAGE TITLE		
USB-C: Right Connector		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	166 OF 999
	SHEET	81 OF 155

BOM\_COST\_GROUP=USB-C

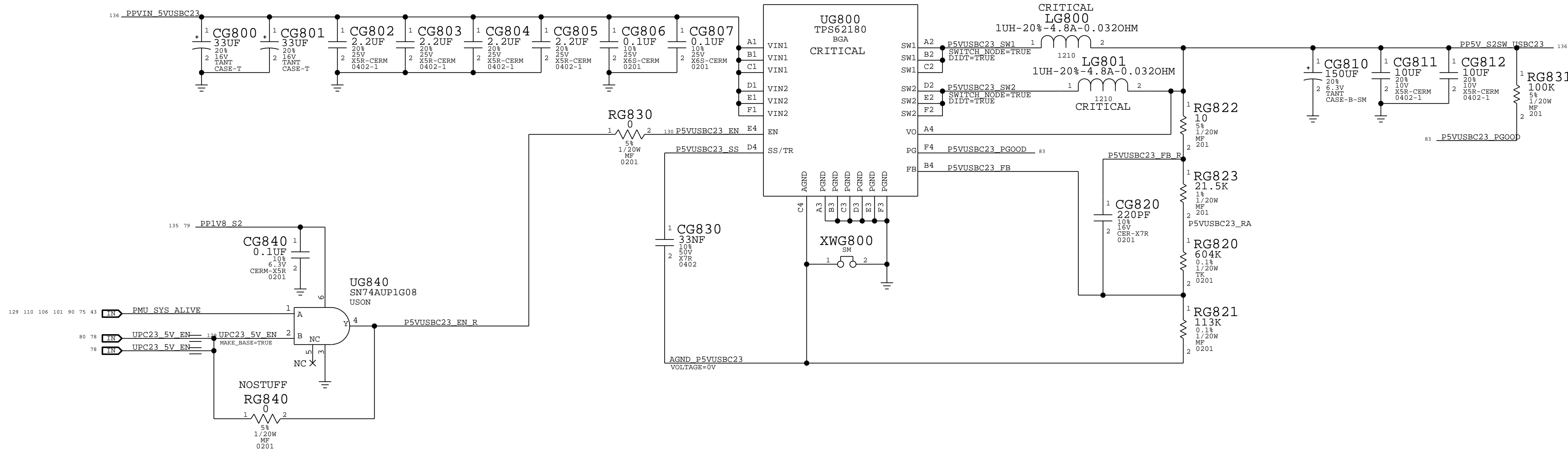



PAGE TITLE		
USB-C: HS Level Shifters		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	167 OF 999
	SHEET	82 OF 155



\*\*\* OK2INTEGRATE \*\*\*

Vout = 5.23V  
Freq = 1.9-2.0MHz  
OCP Max = 9A  
OCP Nom = 7A  
OCP Min = 4A  
Icc Max = 3.3A



PAGE TITLE		
USB-C: 5V Regulator		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	168 OF 999
	SHEET	83 OF 155

BOM\_COST\_GROUP=USB-C

D



D


C

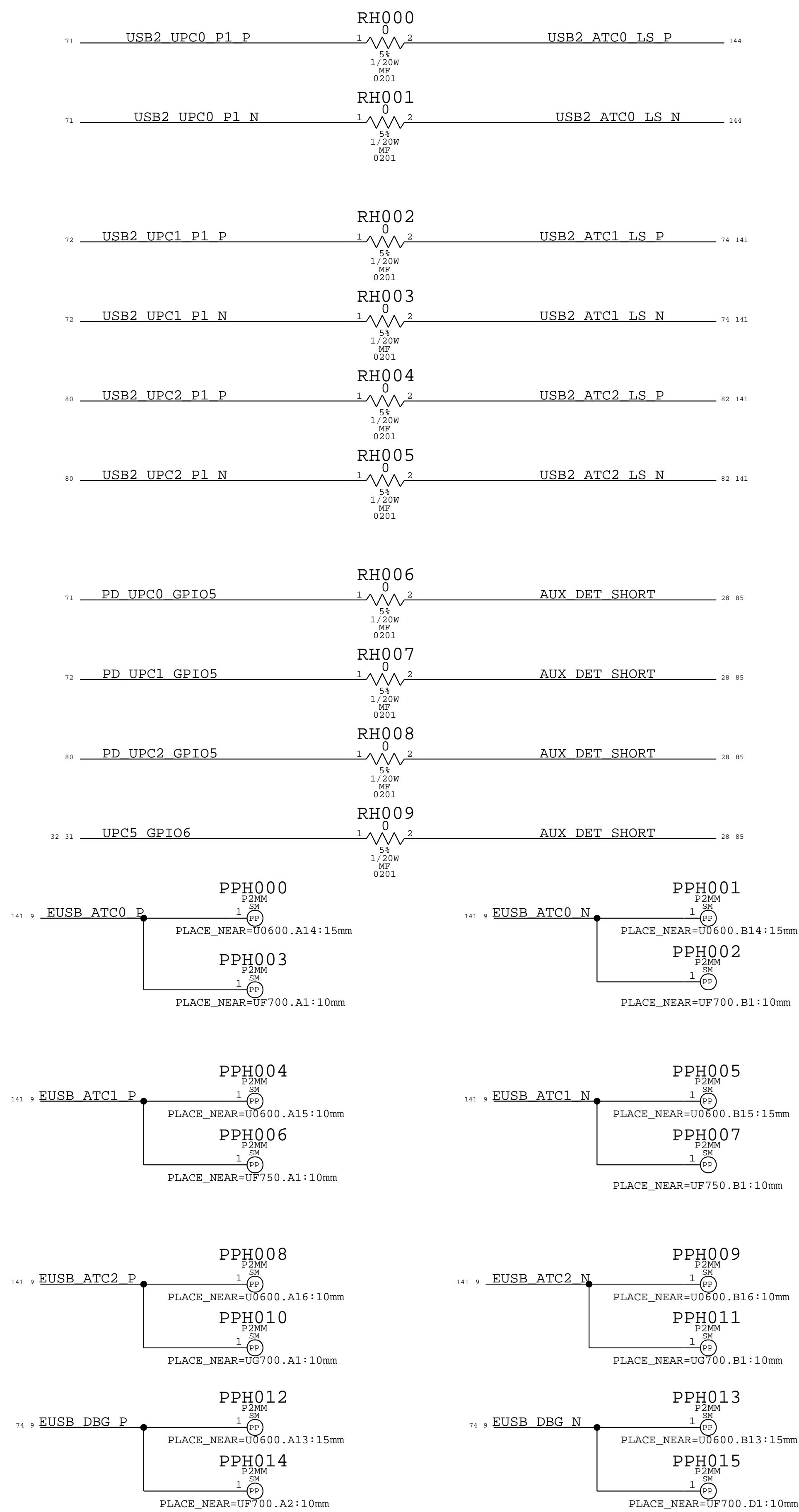
B


A

A

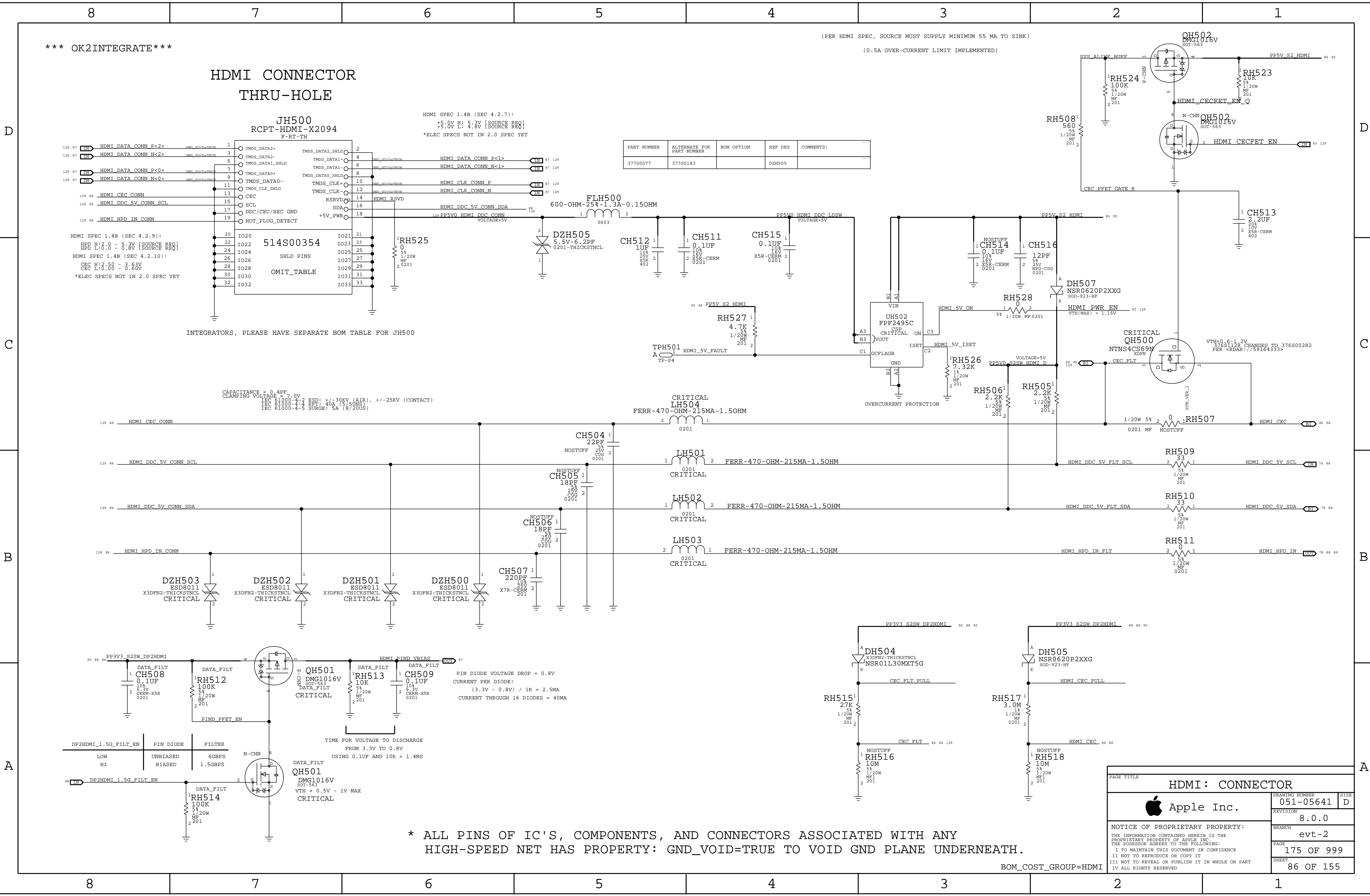
BOM\_COST\_GROUP=USB-C

PAGE TITLE		
USB-C: CIO Redrivers 2/3		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	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	
	8.0.0	
	BRANCH	
	evt-2	
	PAGE	
	169 OF 999	
	SHEET	
	84 OF 155	



PAGE TITLE		
USB-C: SUPPORT		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE FORSORER 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	
	8.0.0	
	BRANCH	
	evt-2	
	PAGE	
	170 OF 999	
	SHEET	
	85 OF 155	

BOM\_COST\_GROUP=USB-C



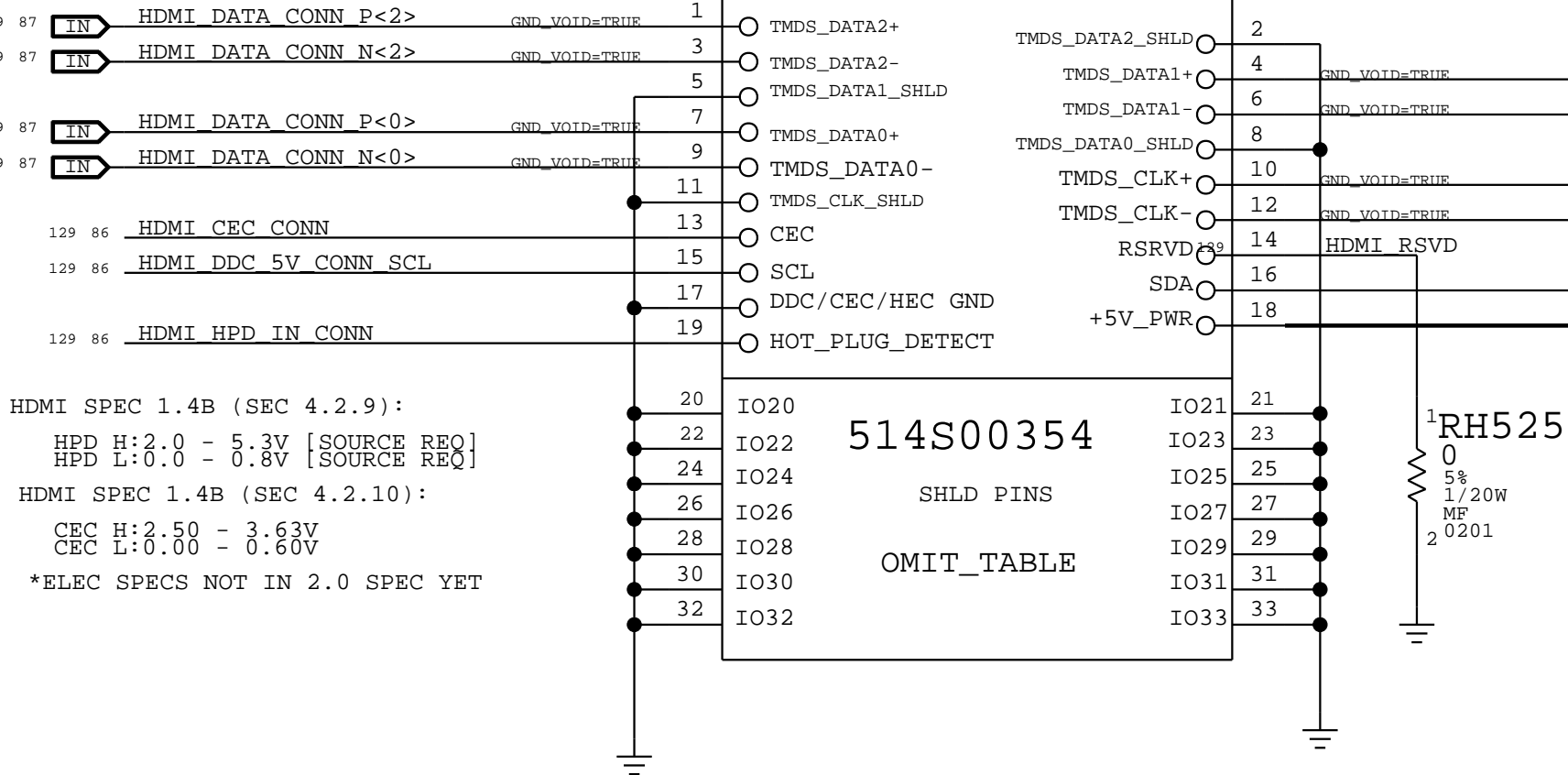
\*\*\* OK2INTEGRATE\*\*\*

# HDMI CONNECTOR THRU-HOLE

JH500  
RCPT-HDMI-X2094  
F-RT-TH

HDMI SPEC 1.4B (SEC 4.2.7):  
+5.0V E: 1.8V [SOURCE REQ]  
\*ELEC SPECS NOT IN 2.0 SPEC YET

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
377S0077	377S0183		DZH505	



INTEGRATORS, PLEASE HAVE SEPARATE BOM TABLE FOR JH500

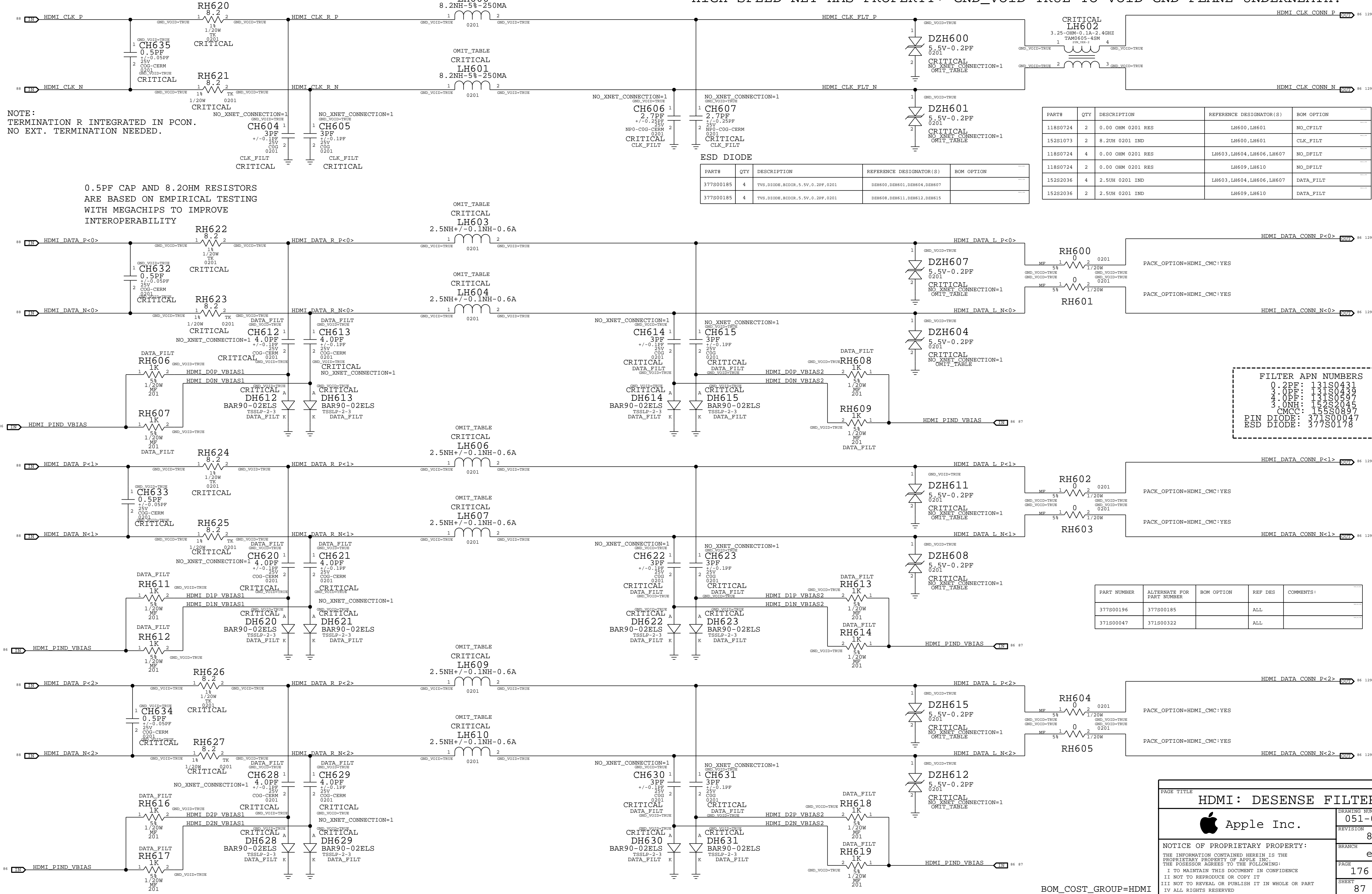
CAPACITANCE = 0.4PF  
CLAMPING VOLTAGE = 7.0V  
IEC 61000-4-2 ESD: 1(-30KV (AIR), +/-25KV (CONTACT))  
IEC 61000-4-4 EFT: 40A (5V50NS)  
IEC 61000-4-5 SURGB: 5A (8/20US)

\* ALL PINS OF IC'S, COMPONENTS, AND CONNECTORS ASSOCIATED WITH ANY  
HIGH-SPEED NET HAS PROPERTY: GND\_VOID=TRUE TO VOID GND PLANE UNDERNEATH.

BOM\_COST\_GROUP=HDMI

PAGE TITLE		
HDMI: CONNECTOR		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	175 OF 999
	SHEET	86 OF 155

\*\*\* OK2INTEGRATE\*\*\*



\* ALL PINS OF IC'S, COMPONENTS, AND CONNECTORS ASSOCIATED WITH ANY HIGH-SPEED NET HAS PROPERTY: GND\_VOID=TRUE TO VOID GND PLANE UNDERNEATH.

NOTE:  
TERMINATION R INTEGRATED IN PCON.  
NO EXT. TERMINATION NEEDED.

0.5PF CAP AND 8.2OHM RESISTORS  
ARE BASED ON EMPIRICAL TESTING  
WITH MEGACHIPS TO IMPROVE  
INTEROPERABILITY

#### ESD DIODE

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
377S00185	4	TVS,DIODE,BIDIR,5.5V,0.2PF,0201	DZH600,DZH601,DZH604,DZH607	
377S00185	4	TVS,DIODE,BIDIR,5.5V,0.2PF,0201	DZH608,DZH611,DZH612,DZH615	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
118S0724	2	0.00 OHM 0201 RES	LH600,LH601	NO_CFILT
152S1073	2	8.2UH 0201 IND	LH600,LH601	CLK_FILT
118S0724	4	0.00 OHM 0201 RES	LH603,LH604,LH606,LH607	NO_DFILT
118S0724	2	0.00 OHM 0201 RES	LH609,LH610	NO_DFILT
152S2036	4	2.5UH 0201 IND	LH603,LH604,LH606,LH607	DATA_FILT
152S2036	2	2.5UH 0201 IND	LH609,LH610	DATA_FILT

#### FILTER APN NUMBERS

0.2PF: 131S0431  
3.0PF: 131S0439  
4.0PF: 131S0437  
3.0NH: 152S2045  
CMCC: 152S0897  
PIN DIODE: 371S00047  
ESD DIODE: 377S0178

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
377S00196	377S00185		ALL	
371S00047	371S00322		ALL	

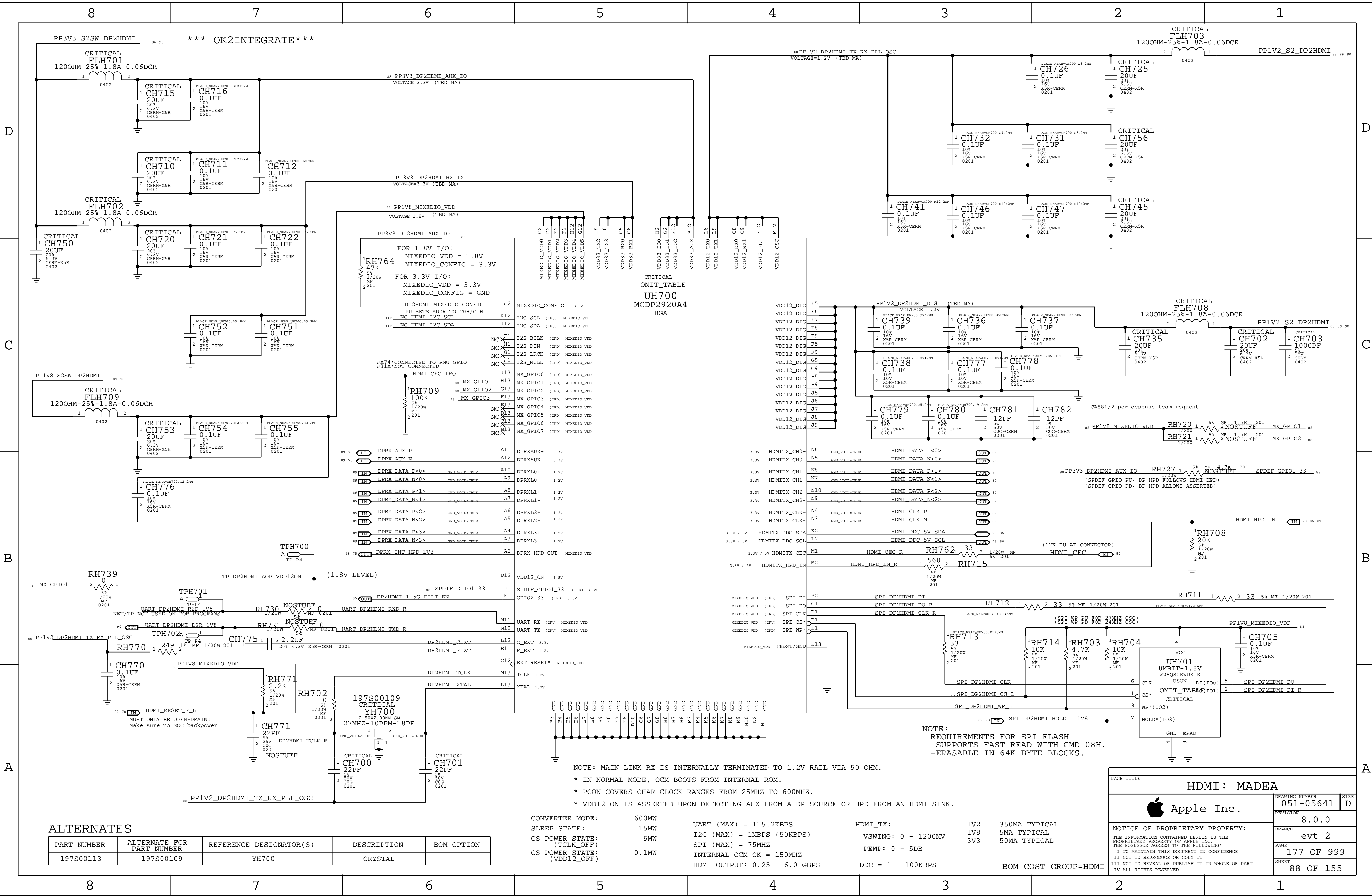
#### HDMI: DESENSE FILTERS

	DRAWING NUMBER	051-05641	SIZE	D
	REVISION	8.0.0		
	BRANCH	evt-2		
	PAGE	176 OF 999		
	SHEET	87 OF 155		

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

BOM\_COST\_GROUP=HDMI





D

C

B

A

5

4

3

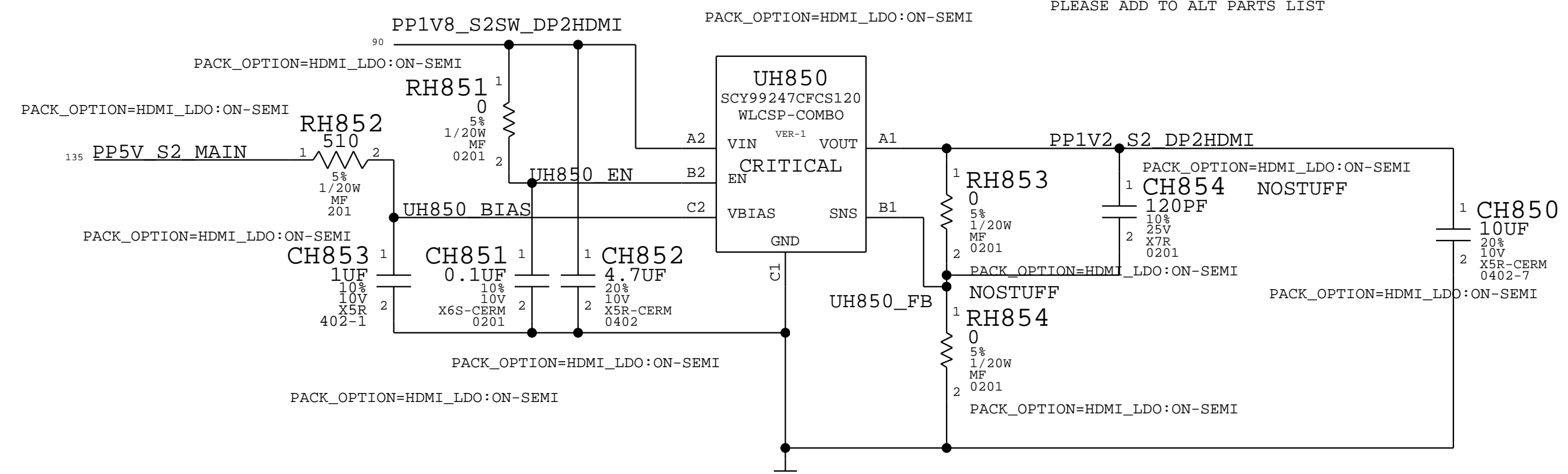
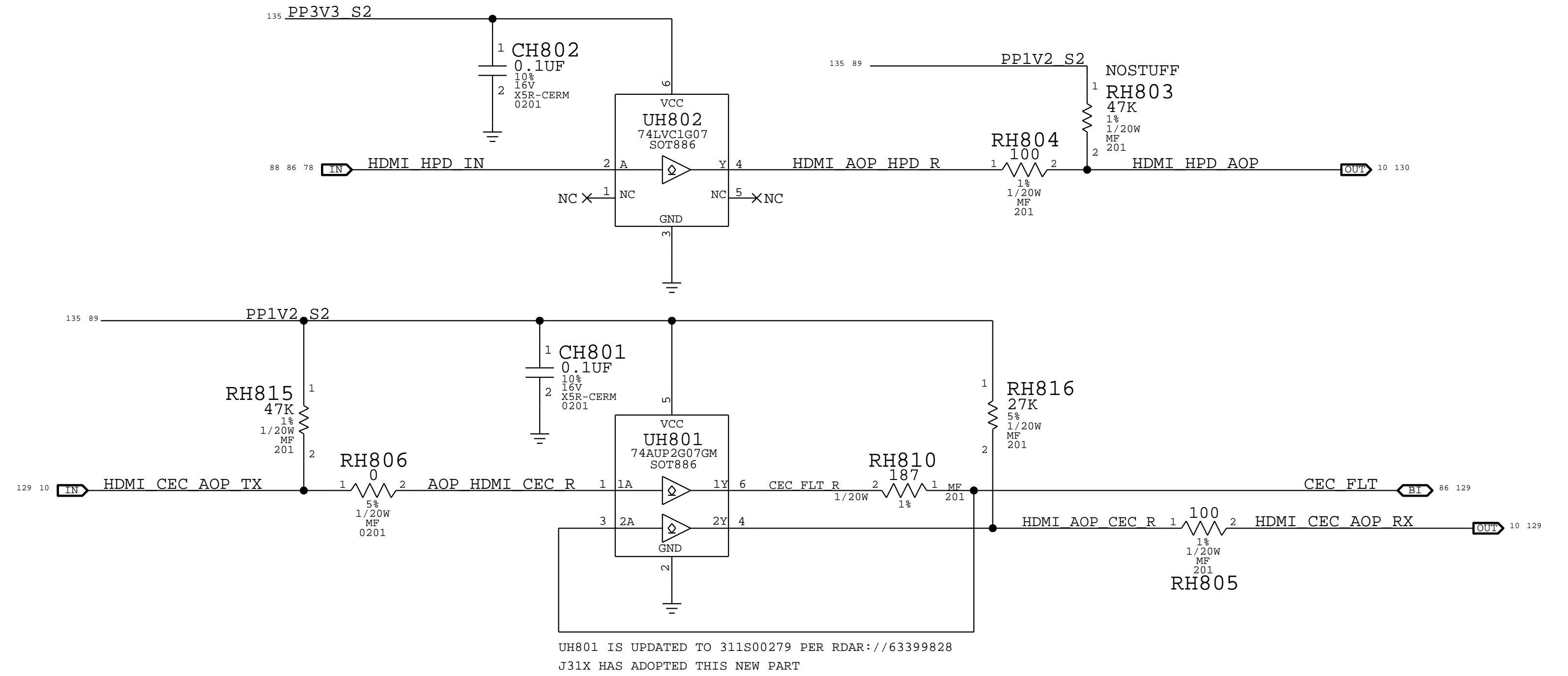
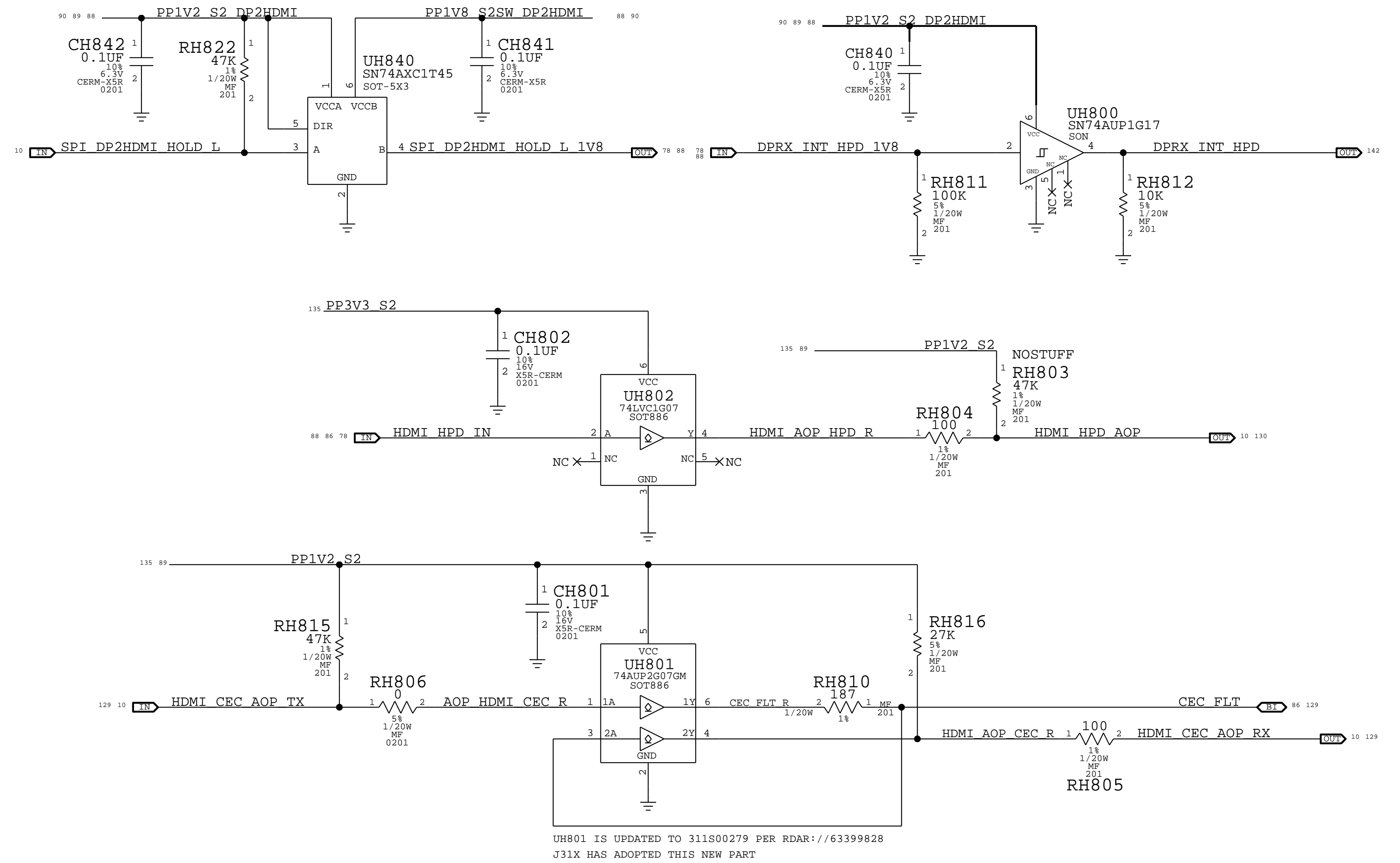
HDMI: Project Support 1

DRAWING NUMBER	SIZE
051-05641	D


BRANCH  
evt-2

PAGE 178 OF 999

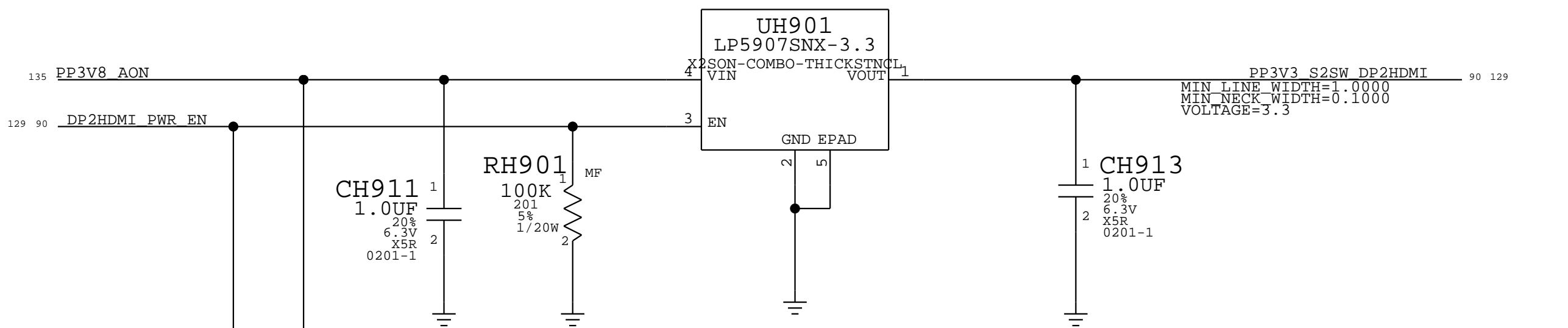
SHEET  
89 OF 155



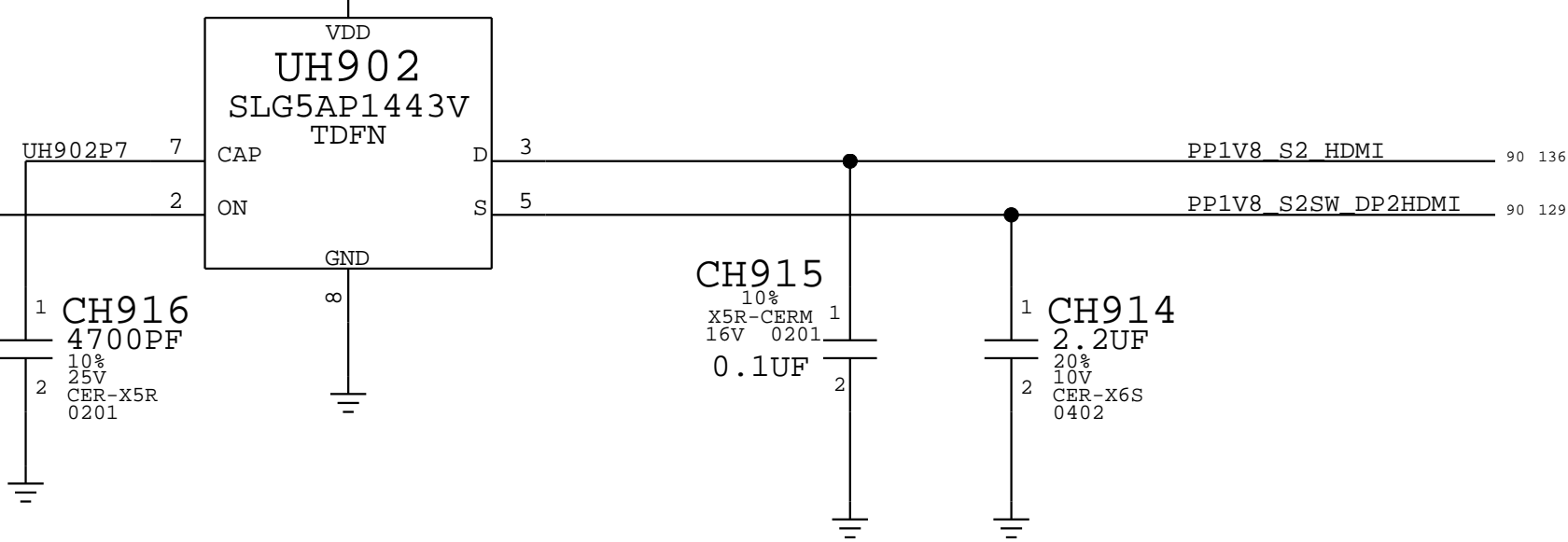
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
335S00049	1	MADEA SPI FLASH,8MB,1.8V,8P,USON	UH701	HDMI_ROM:BLANK
341S01592	1	IC,HDMI ROM,FW V1.130,X1814	UH701	HDMI_ROM:FW_V1P130
341S01701	1	ROM,HDMI (VXXX),PROTO-0,X2737	UH701	HDMI_ROM:PROTO0

PAGE TITLE		DRAWING NUMBER		SIZE	
HDMI: Project Support 1		051-05641		D	
 Apple Inc.		REVISION		8.0.0	
		BRANCH		evt-2	
NOTICE OF PROPRIETARY PROPERTY:		PAGE		178 OF 999	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		SHEET		89 OF 155	
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					

3.3V LDO

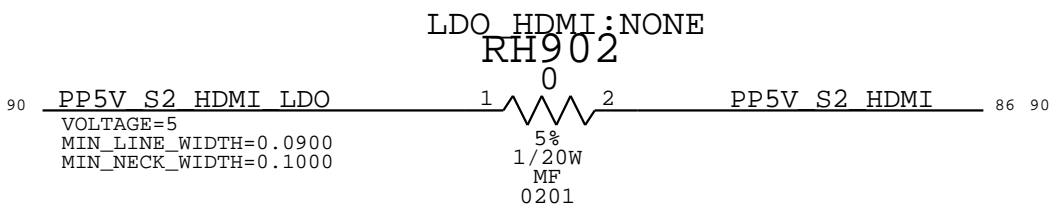


1.8V LOAD SW

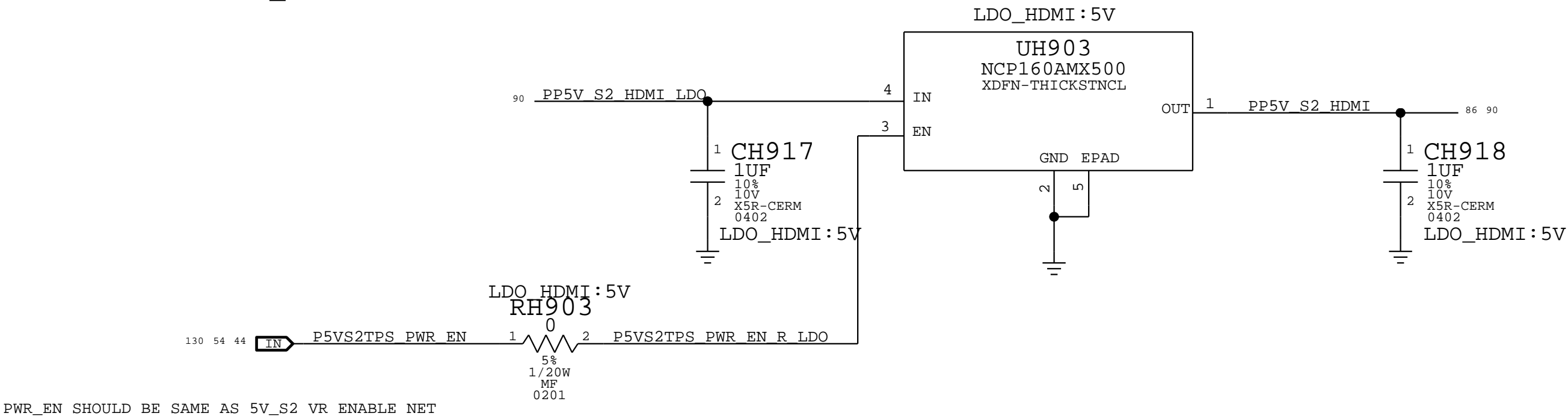


THIS IS USED FOR LONGER 5V POWER PATHS TO ENSURE GOOD 5V REGULATION

Enable BOMOPTION LDO\_HDMI:NONE to disable the LDO use

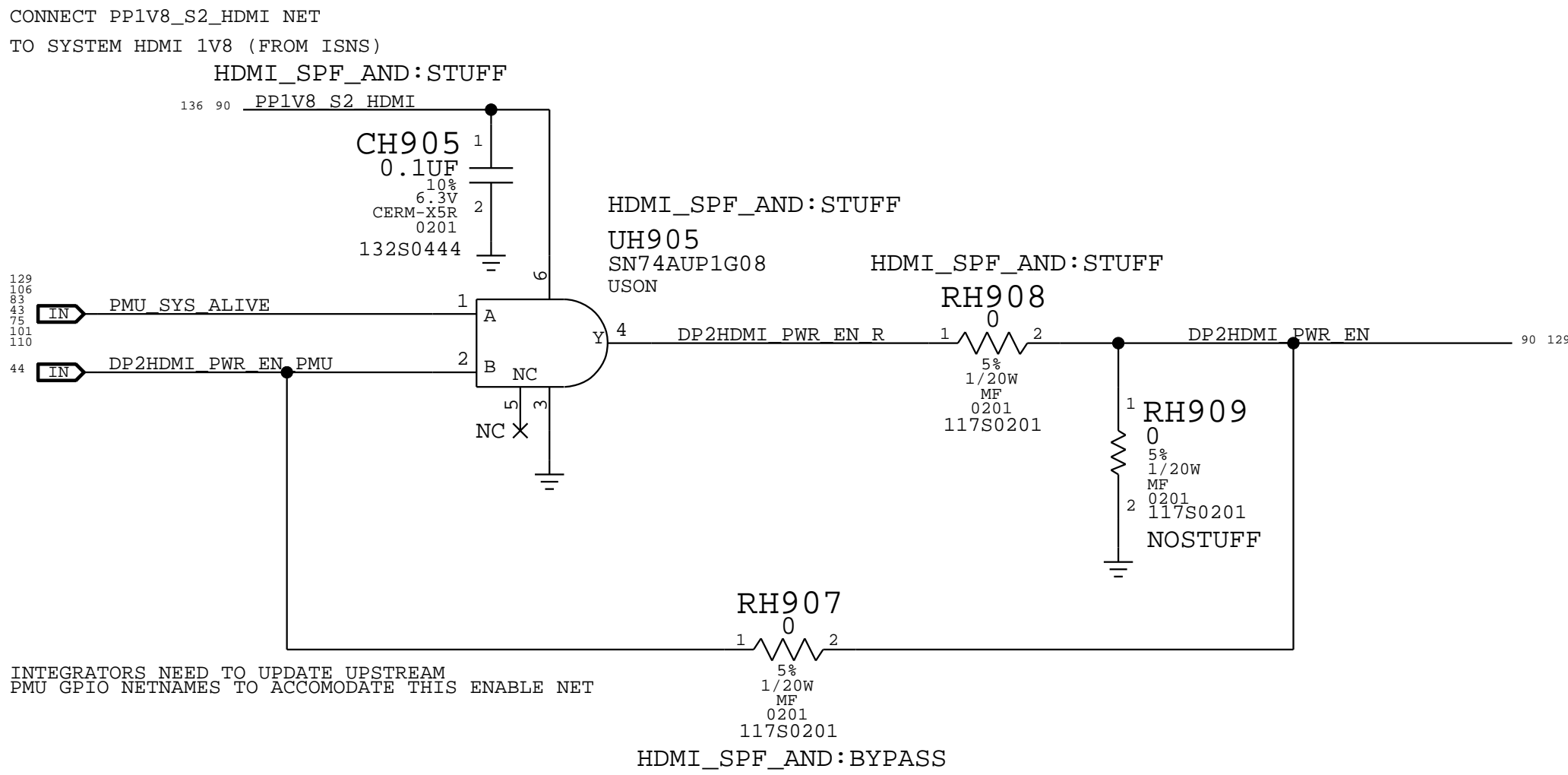


Enable BOMOPTION LDO\_HDMI:5V to test HDMI 5V limit to 5.3V

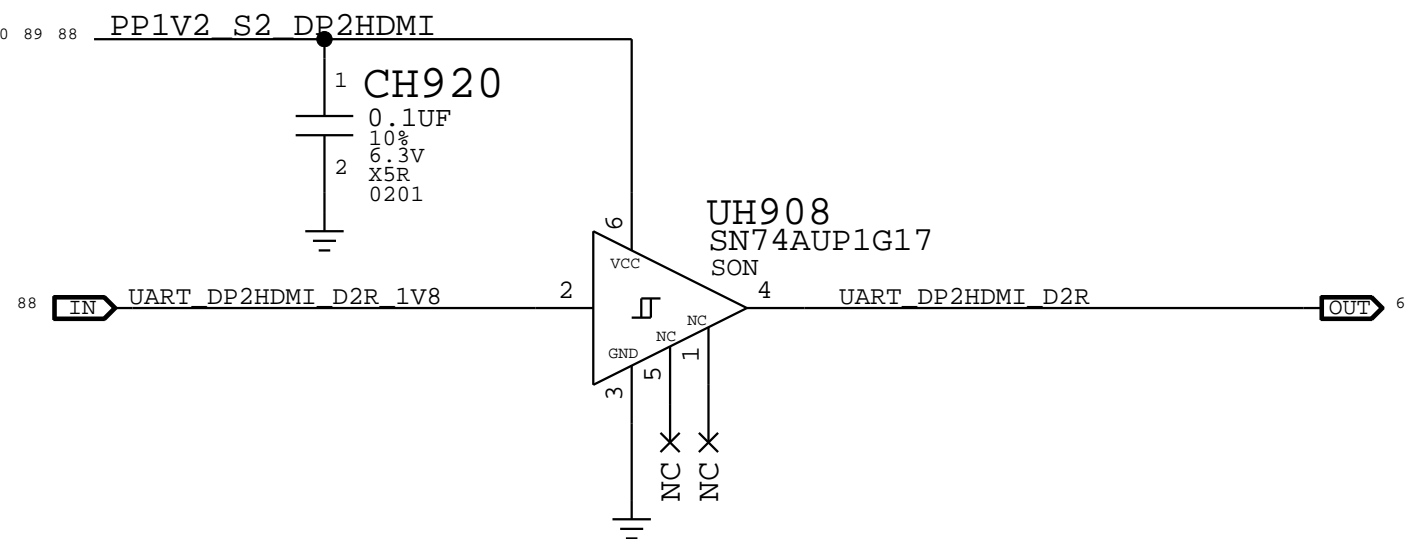


THIS IS USED FOR CONTROLLING HDMI PORT POWER VIA THE PMU SYS ALIVE NET

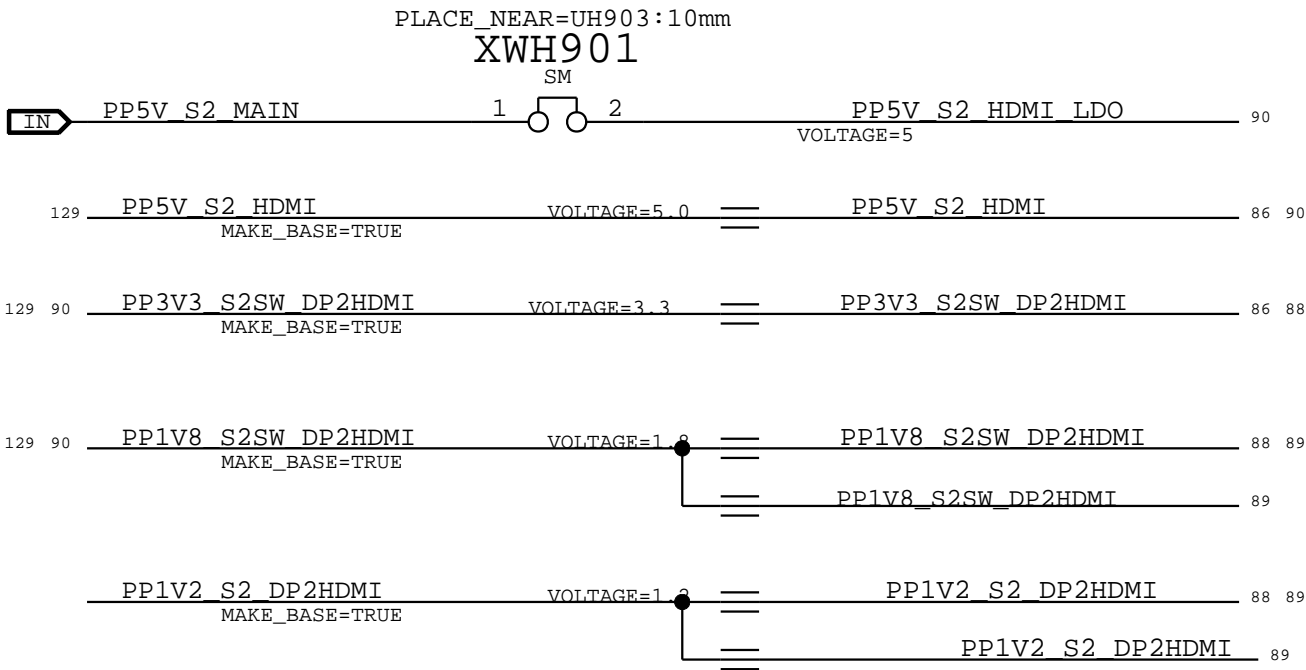
USE THE BYPASS BOMPTION TO NOT STUFF THESE OR NO STUFF ALL OF THESE FOR DESKTOPS



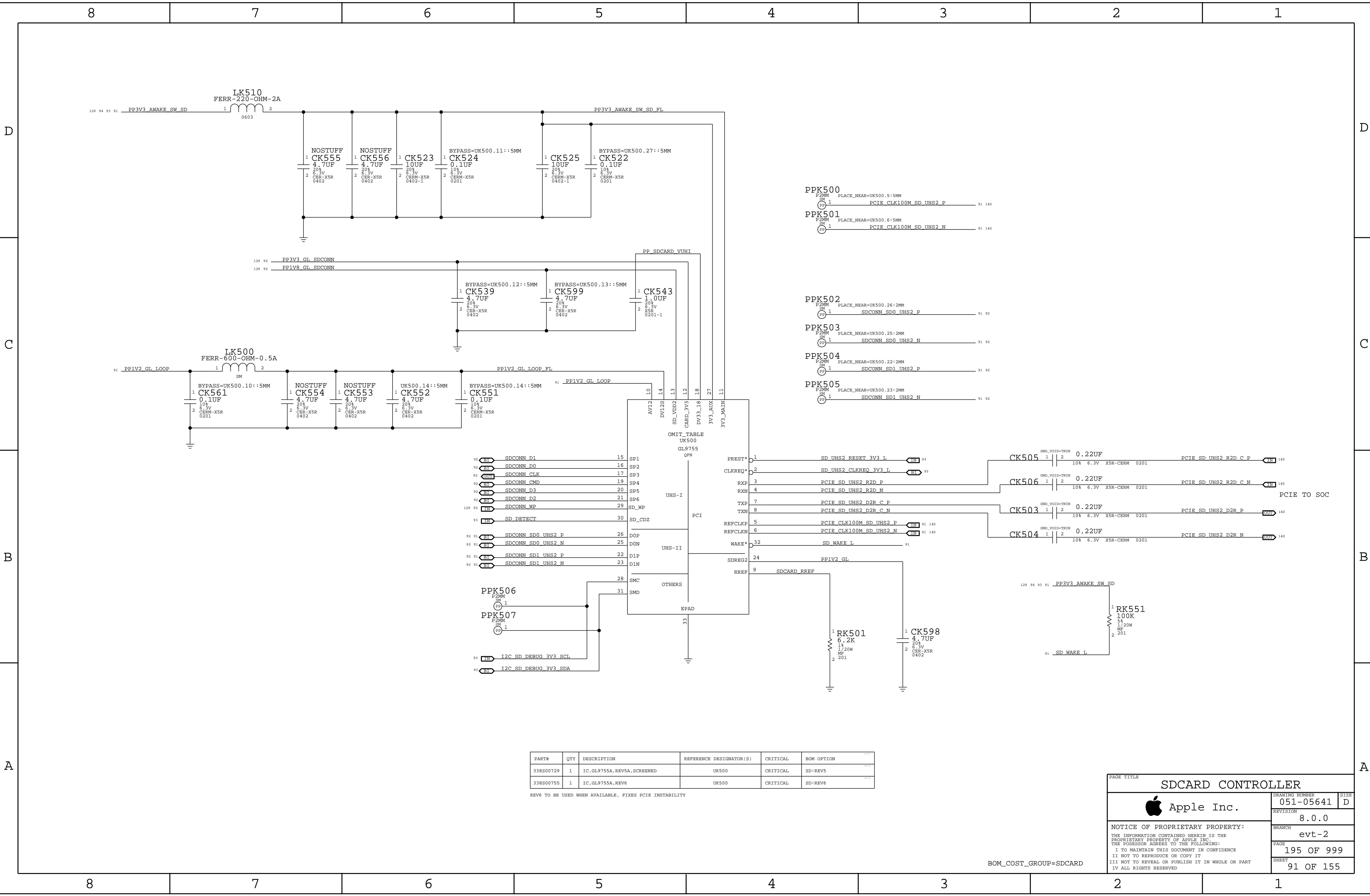
RH908/RH909 intended for potential resistor divider need after AND gate



CONNECT THIS NET TO 5V\_S2\_MAIN



PAGE TITLE		
HDMI: Project Support 2		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	179 OF 999
	SHEET	90 OF 155



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00729	1	IC, GL9755A, REV5A, SCREENED	UK500	CRITICAL	SD:REV5
338S00755	1	IC, GL9755A, REV6	UK500	CRITICAL	SD:REV6

REV6 TO BE USED WHEN AVAILABLE, FIXES PCIE INSTABILITY

PAGE TITLE		
SDCARD CONTROLLER		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	195 OF 999
	SHEET	91 OF 155

BOM\_COST\_GROUP=SDCARD

D

C

B

A

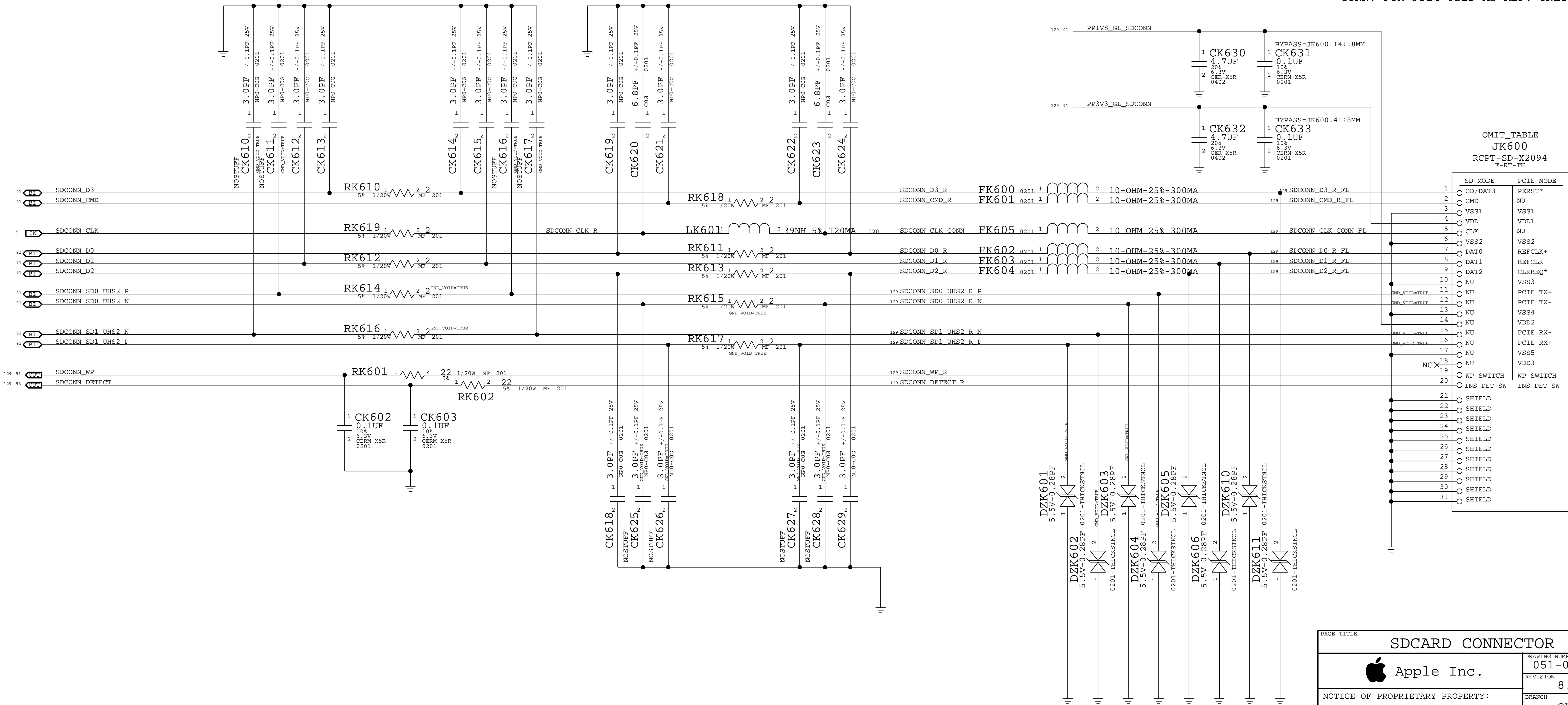
D

C

B

A

SD CARD CONNECTOR  
514-00175  
CONN. FOR J314 USED AS REF. ONLY



PAGE TITLE		
SDCARD CONNECTOR		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	196 OF 999
	SHEET	92 OF 155

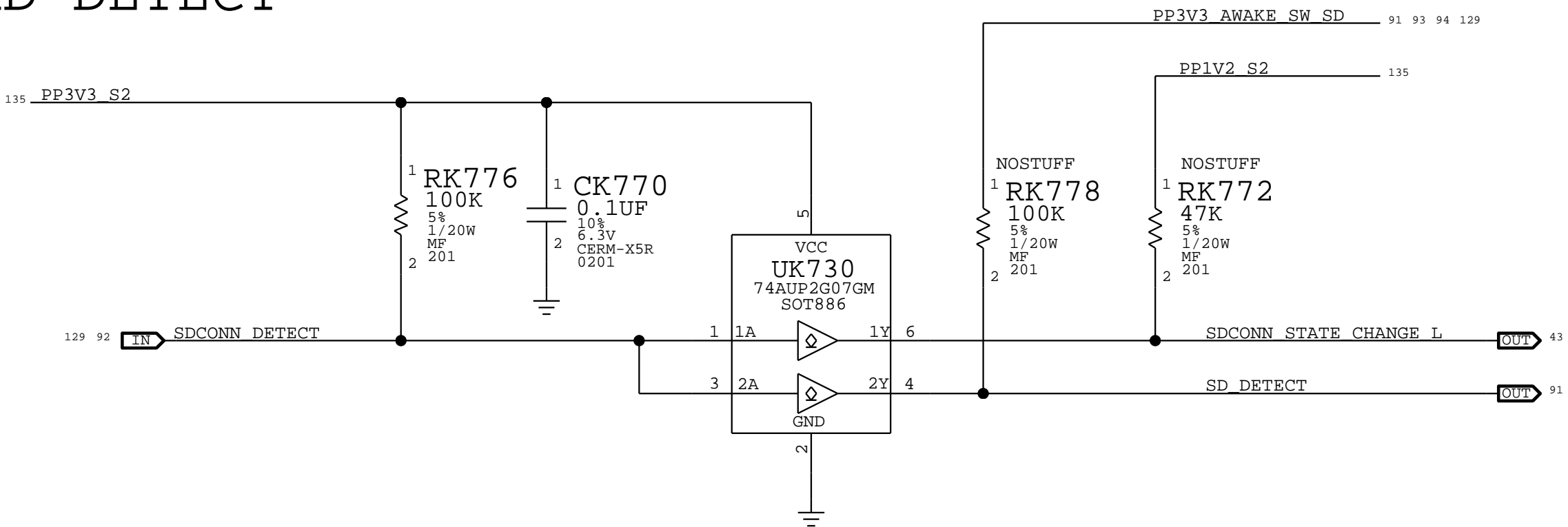
BOM\_COST\_GROUP=SDCARD



D

D

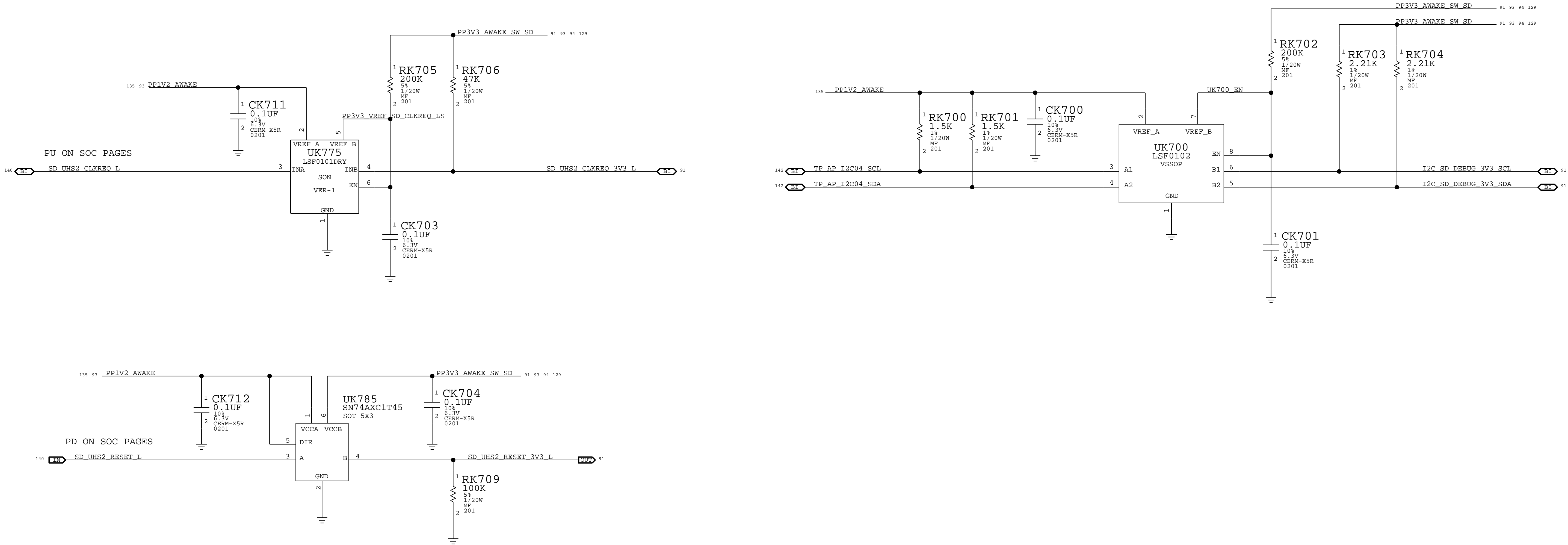
CARD DETECT



C

C

CONTROLLER IO




B

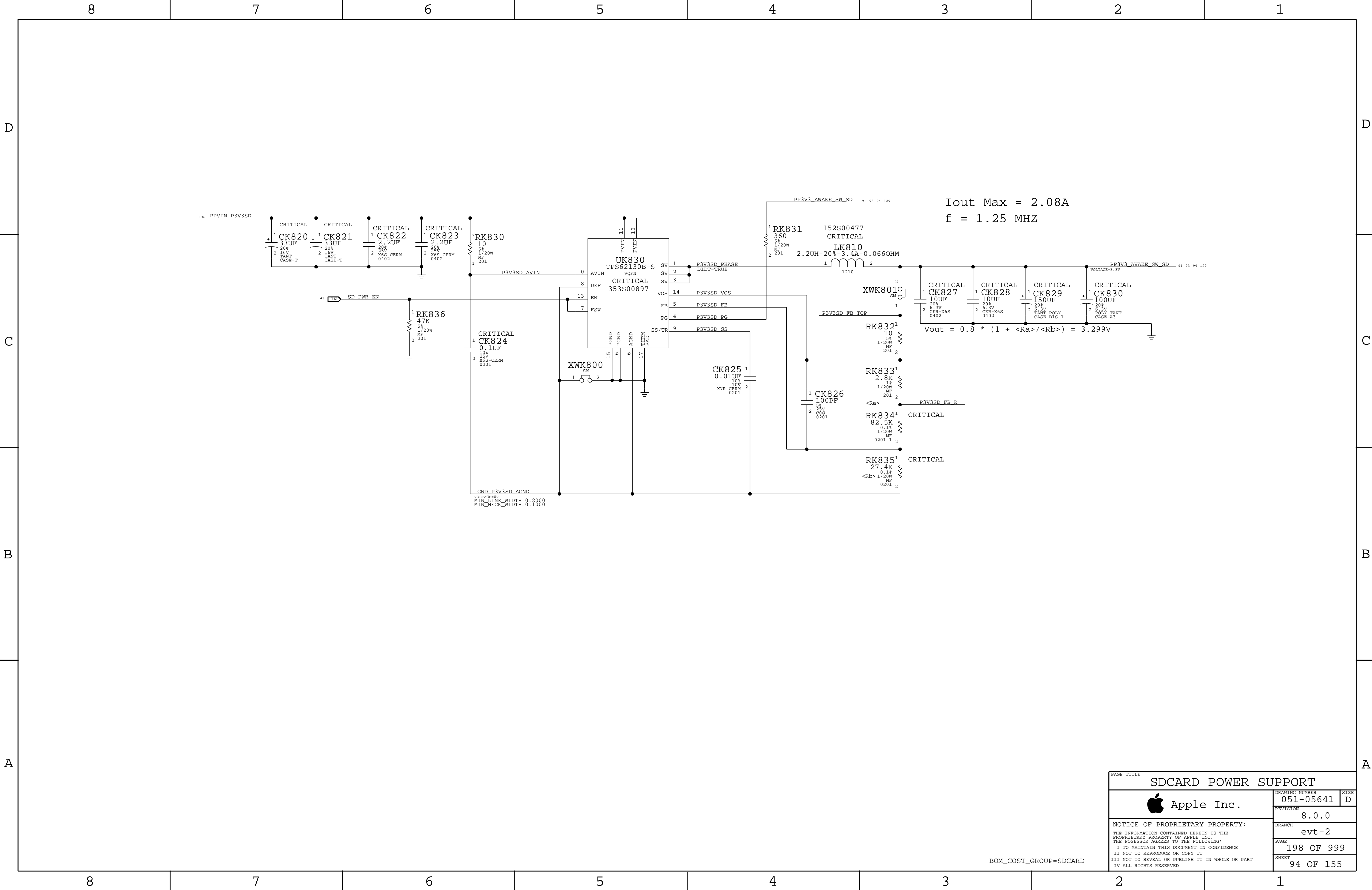
B

A

A

BOM\_COST\_GROUP=SDCARD

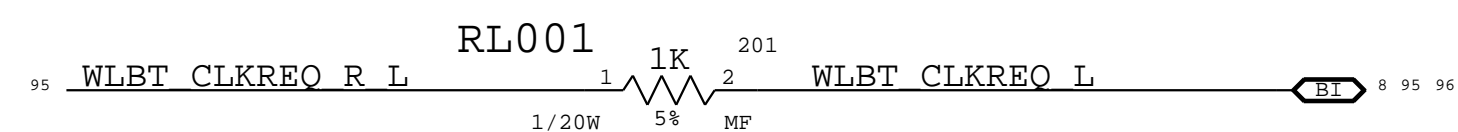
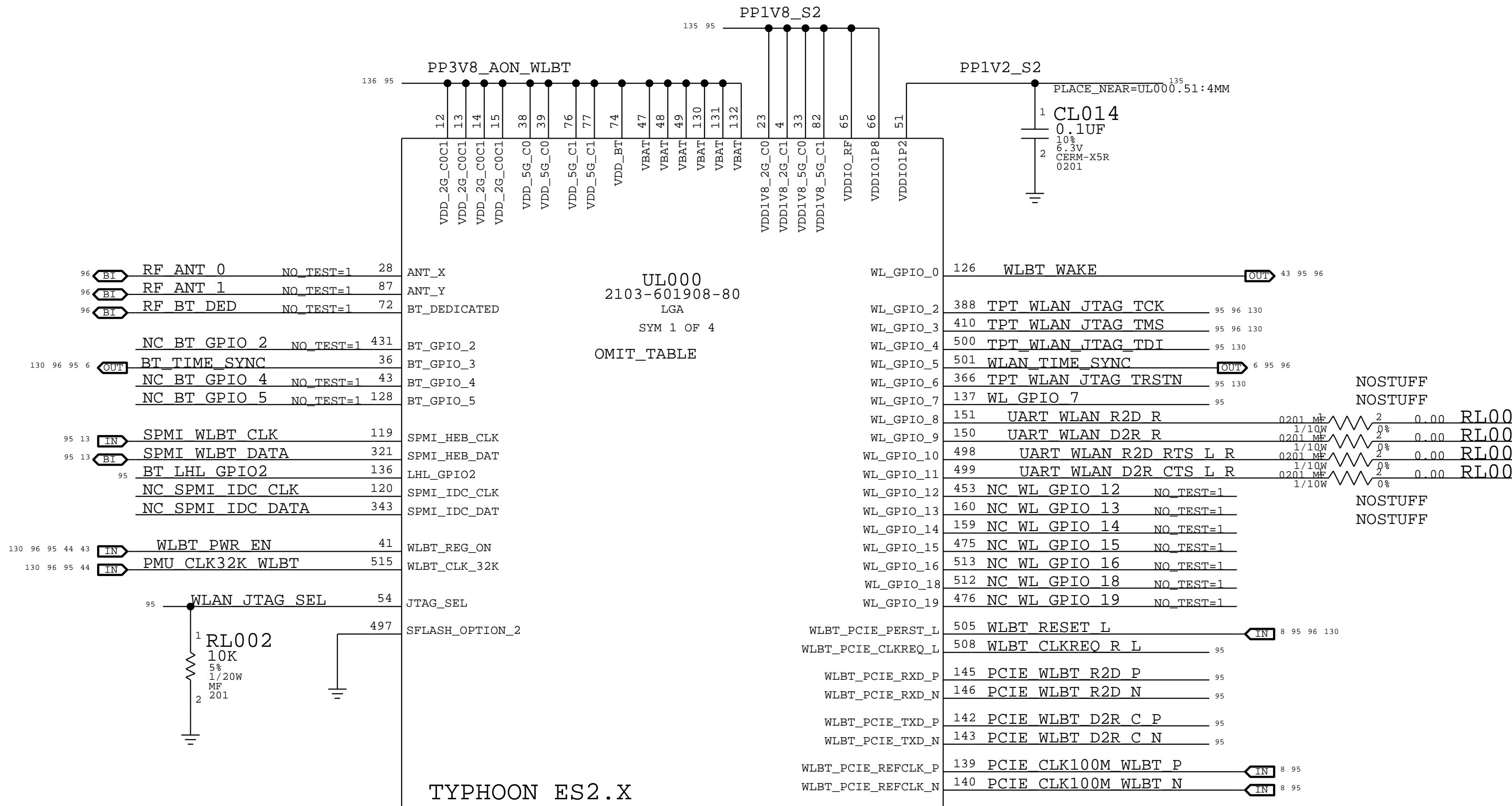
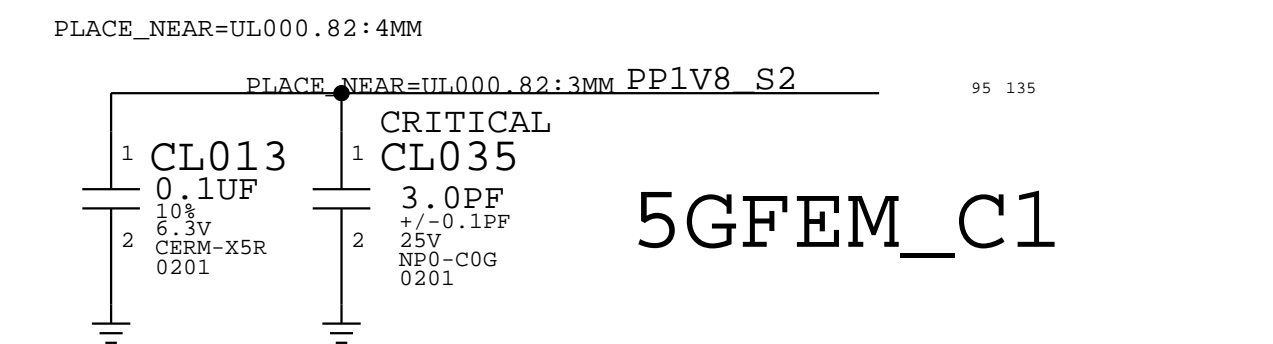
PAGE TITLE		
SDCARD IO LS/BUF SUPPORT		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	197 OF 999
	SHEET	93 OF 155



PAGE TITLE		
SDCARD POWER SUPPORT		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	198 OF 999
	SHEET	94 OF 155

BOM\_COST\_GROUP=SDCARD

FOR SYSTEM INTEGRATION INFORMATION REFER TO  
RDAR://PROBLEM/59047597



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00858	339S00813	ANY	UL000	TYPHOON ES2.7
339S00859	339S00813	ANY	UL000	TYPHOON ES2.9
339S00863	339S00813	ANY	UL000	TYPHOON ES4.1


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00813	1	MODULE,WLAN/BT,TYPHOON, ES2.5	UL000	CRITICAL	

```

PACK_OPTION=WLBST_D2R_TP_JADE
PPL026 1 F2MM PLACE_NEAR=U0600_A41:10MM PCIE WLBT D2R P 8 95
      (PR) PLACE_SIDE=BOTTOM

PACK_OPTION=WLBST_D2R_TP_JADE
PPL027 1 F2MM PLACE_NEAR=U0600_B41:10MM PCIE WLBT D2R N 8 95
      (PR) PLACE_SIDE=BOTTOM

```

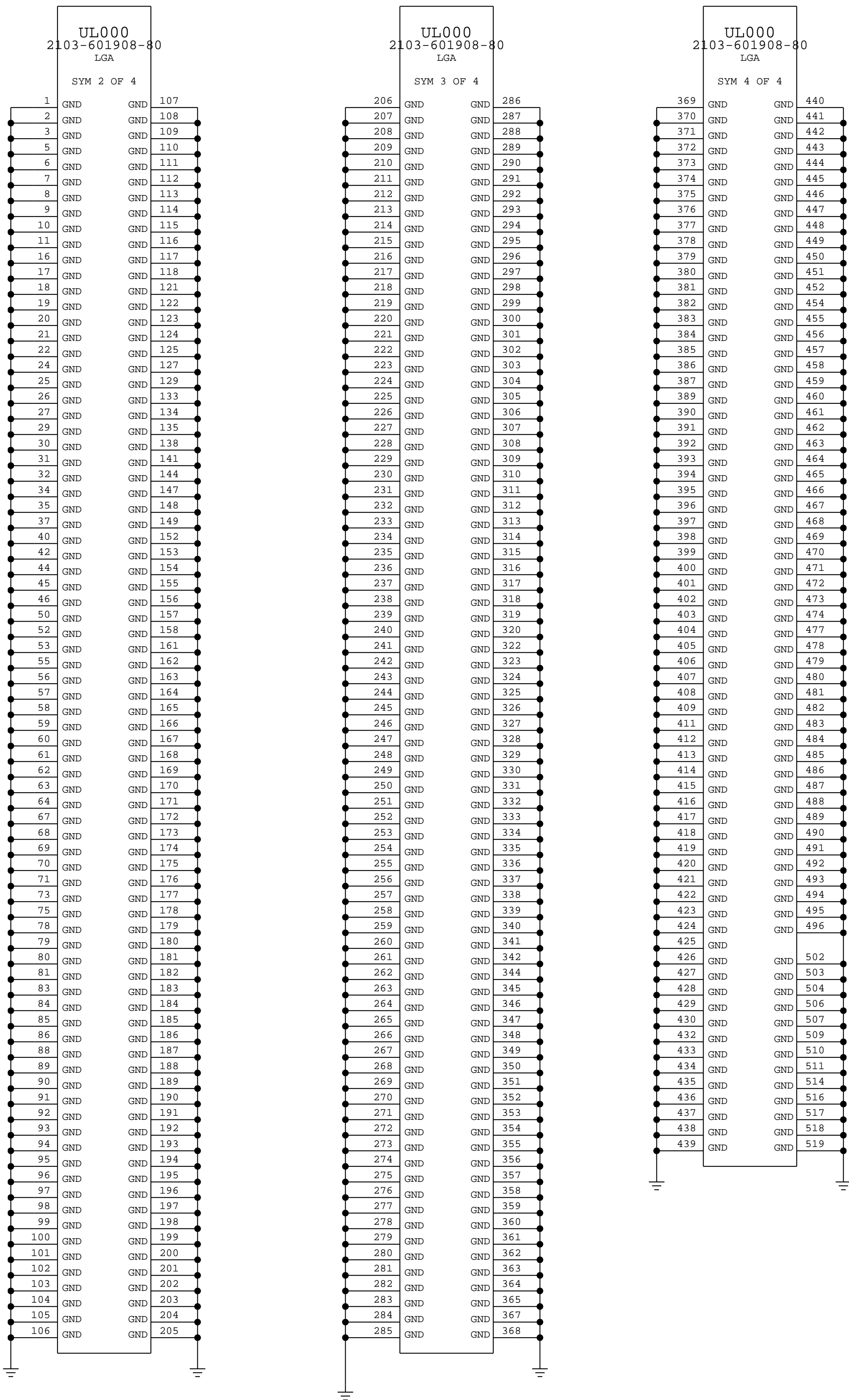
PAGE TITLE			
WIFI/BT: MODULE			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION		
	8.0.0		
	BRANCH		
	evt-2		
	PAGE		
	200 OF 999		
	SHEET		
	95 OF 155		

8 7 6 5 4 3 2 1

\*\*\* IN PROGRESS \*\*\*

# TYPHOON WIFI/BT MODULE GND

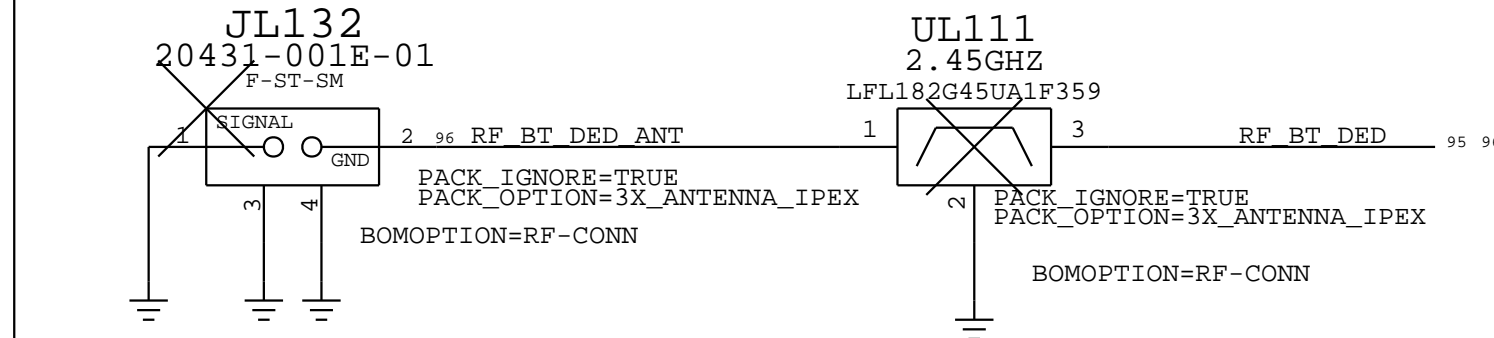
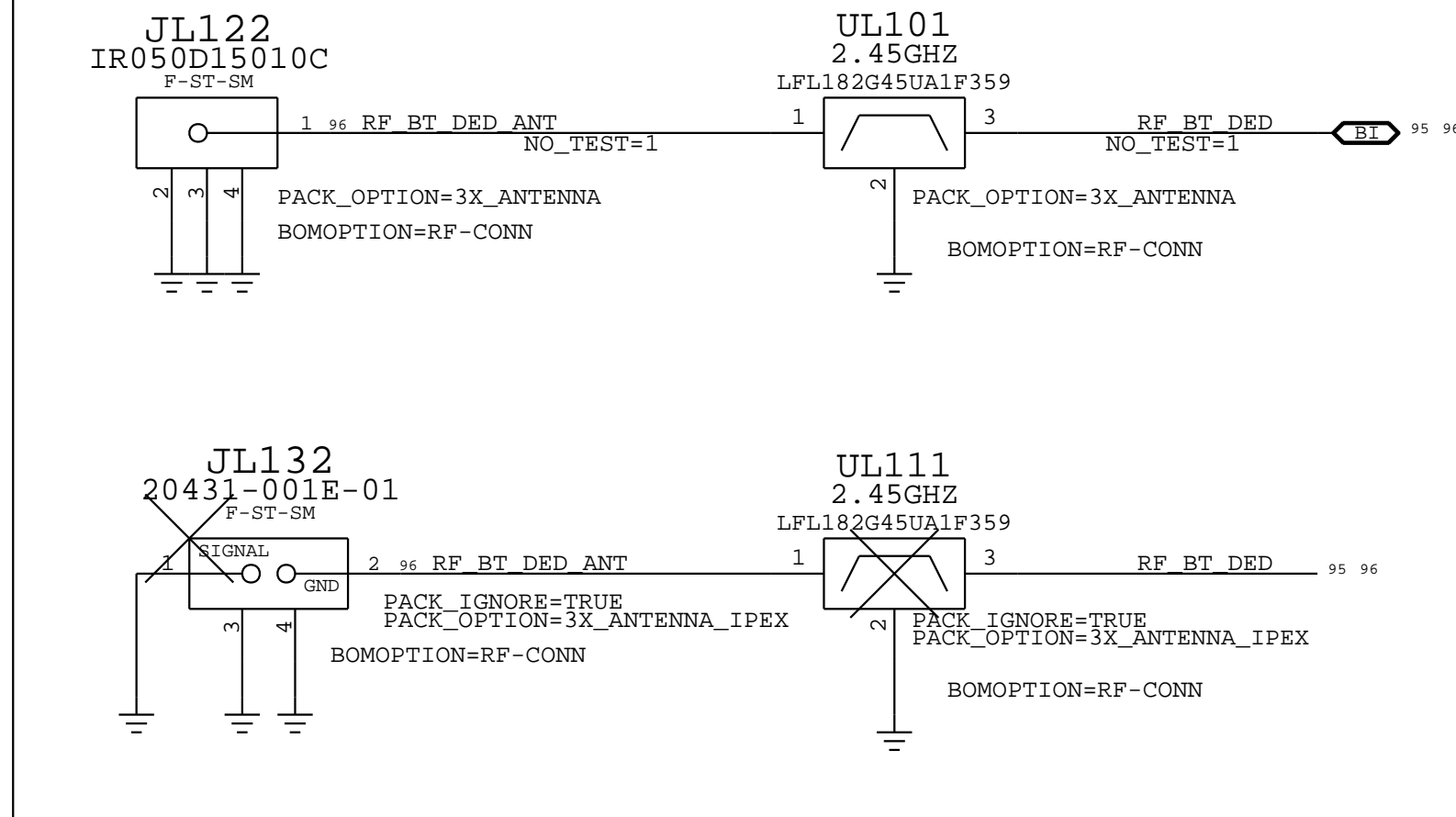
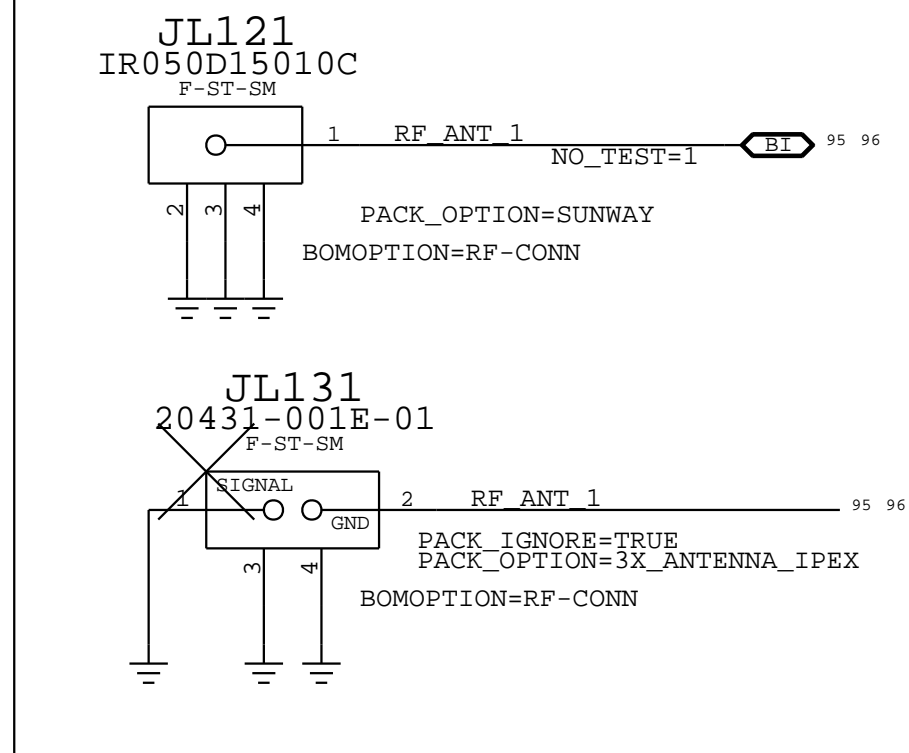
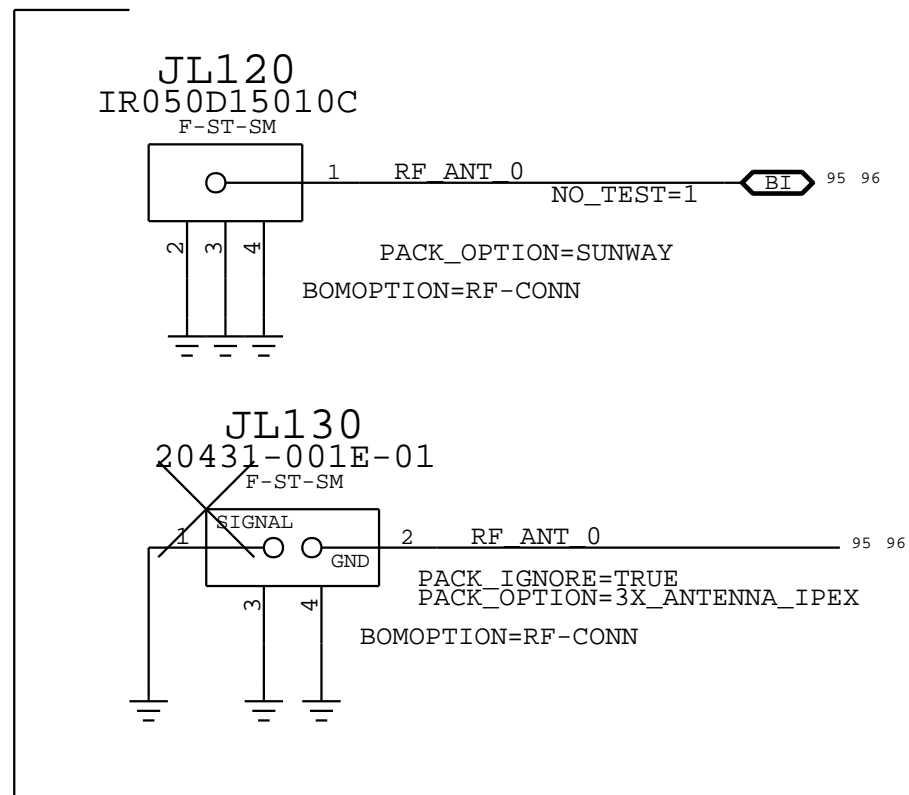
# ANTENNA CONNECTORS



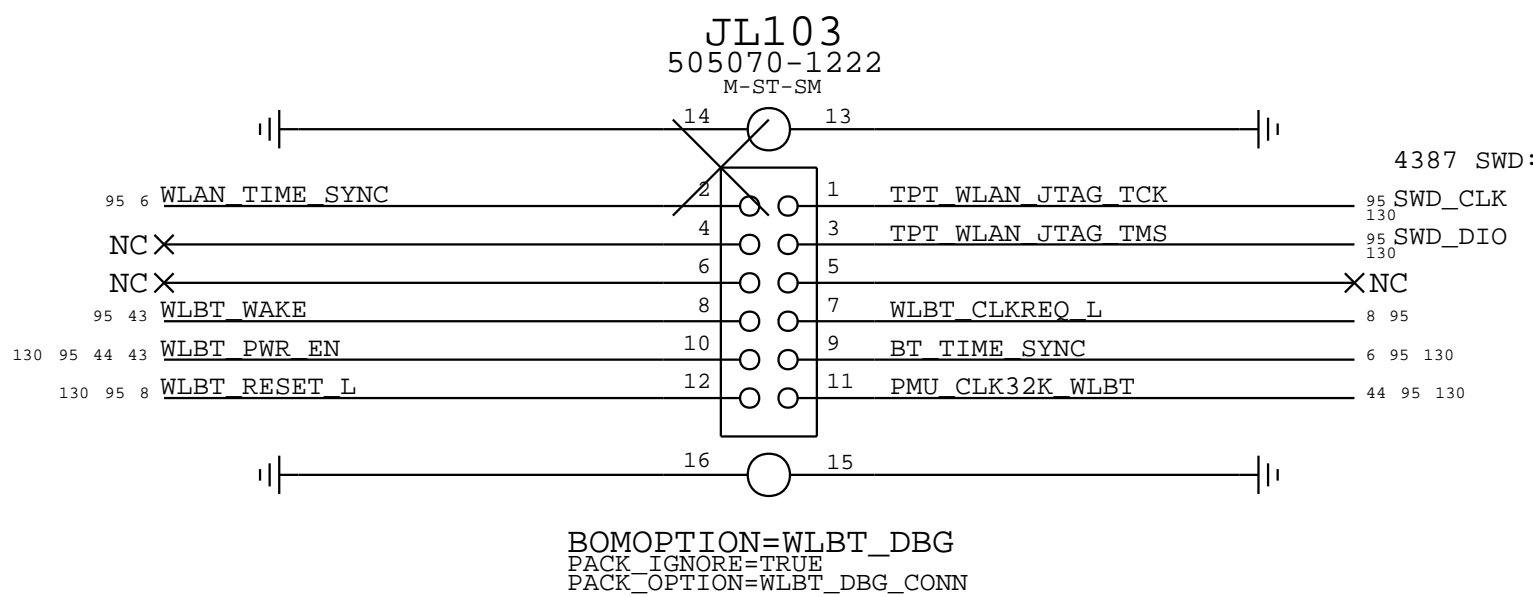
2G\_C0  
5G\_C0  
BT\_C0

2G\_C1  
5G\_C1  
BT\_C1

BT\_C1\_DED



# WLBT DEBUG CONNECTOR

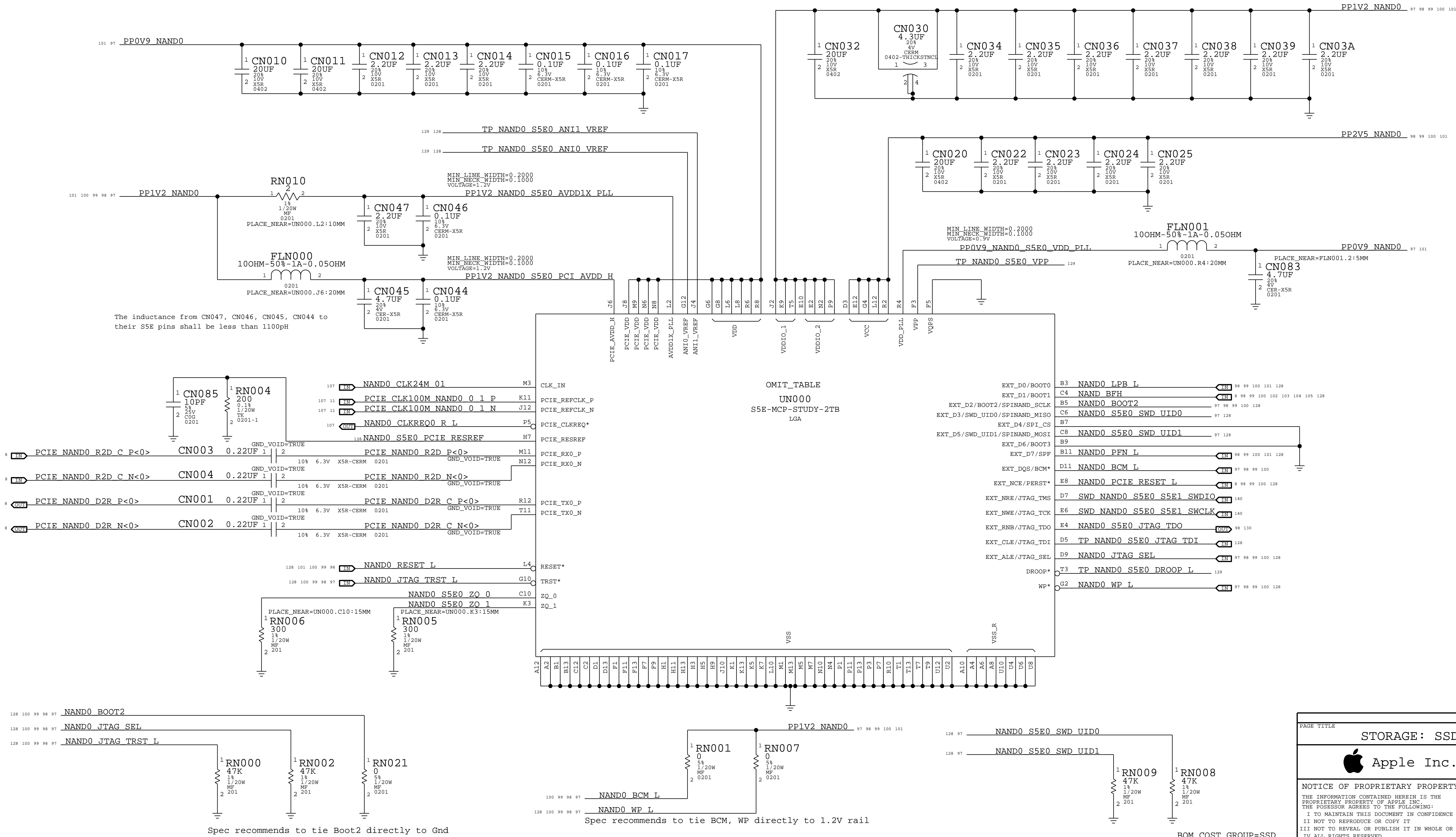



PAGE TITLE		
WIFI/BT: ANTENNA and GND		
Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	201 OF 999
	SHEET	96 OF 155

BOM\_COST\_GROUP=WIRELESS

\*\*\* OK2INTEGRATE \*\*\*

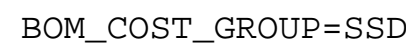
# NAND0 S5E0




PAGE TITLE		
STORAGE: SSD0 S5E <0>		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	220 OF 999
	SHEET	97 OF 155

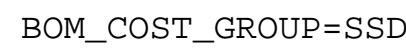


NAND0 S5E1

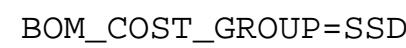



PAGE TITLE		STORAGE: SSD0 S5E <1>	
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	evt-2
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE IF NOT TO REPRODUCE OR COPY IT I I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IF ALL RIGHTS RESERVED		PAGE	221 OF 999
		SHEET	98 OF 155

NAND0	S5E2
-------	------



NAND0 S5E3



PAGE TITLE		STORAGE: SSD0 S5E <3>	
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
NOTICE OF PROPRIETARY PROPERTY:	BRANCH	evt-2	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:	PAGE	223 OF 999	
I I NOT TO REPRODUCE OR COPY IT	SHEET	100 OF 155	
I I I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART			
I I ALL RIGHTS RESERVED			

## D

D

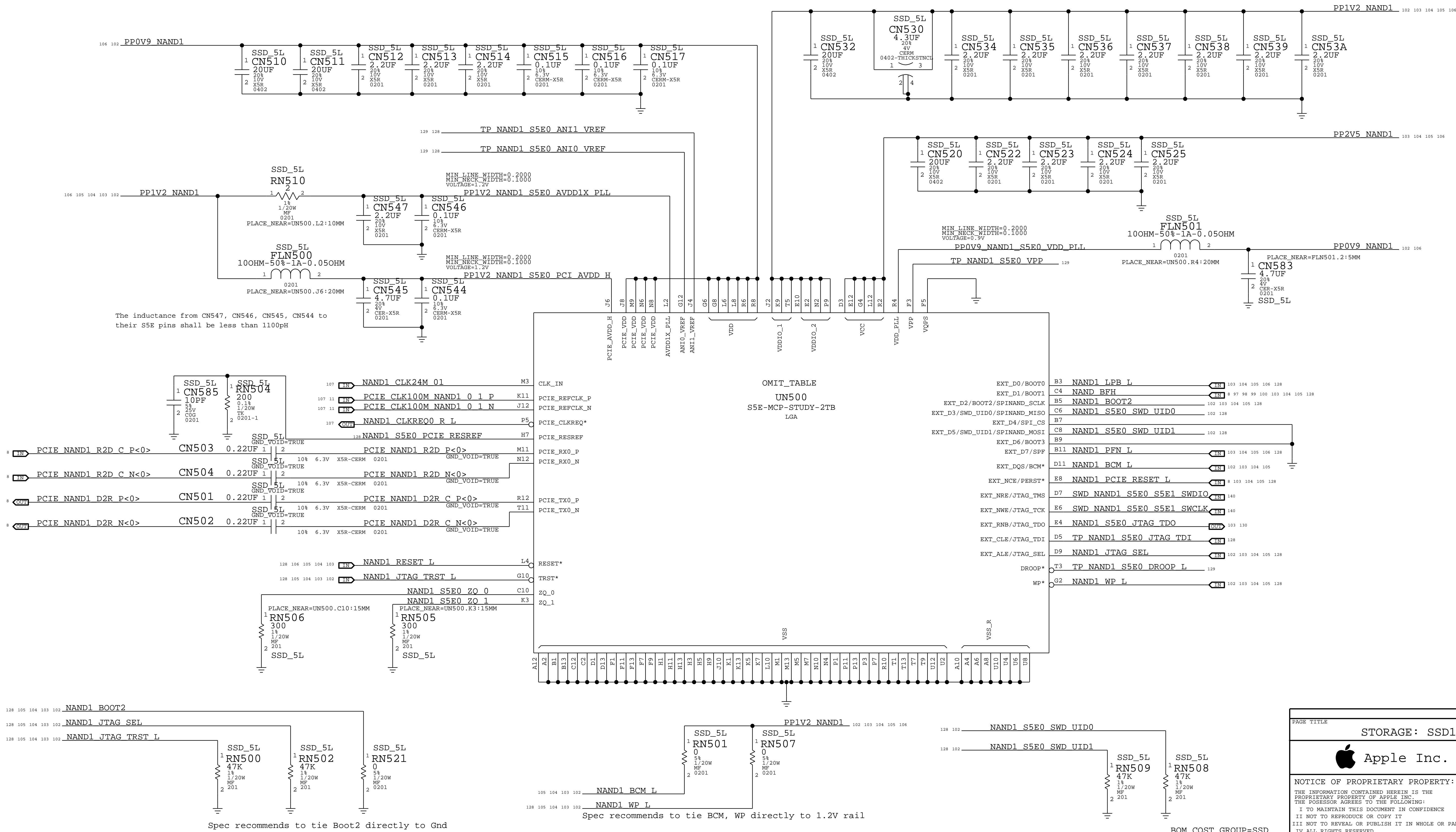
C


B

A

\*\*\* OK2INTEGRATE \*\*\*

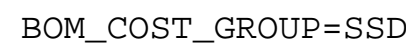
# NAND1 S5E0



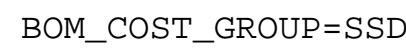
PAGE TITLE		
STORAGE: SSD1 S5E <0>		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	225 OF 999
	SHEET	102 OF 155



NAND1 S5E1

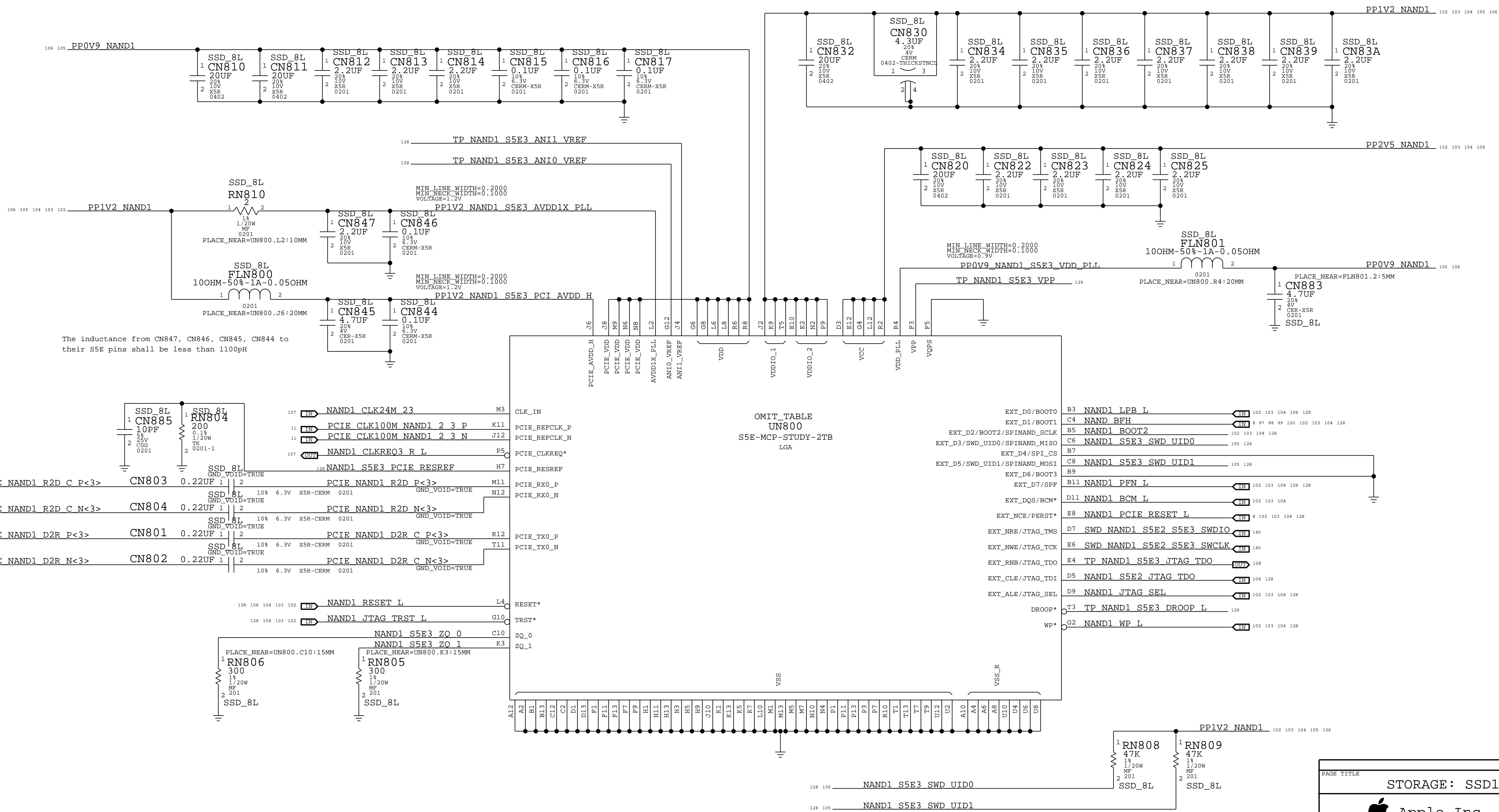



NAND1	S5E2
-------	------



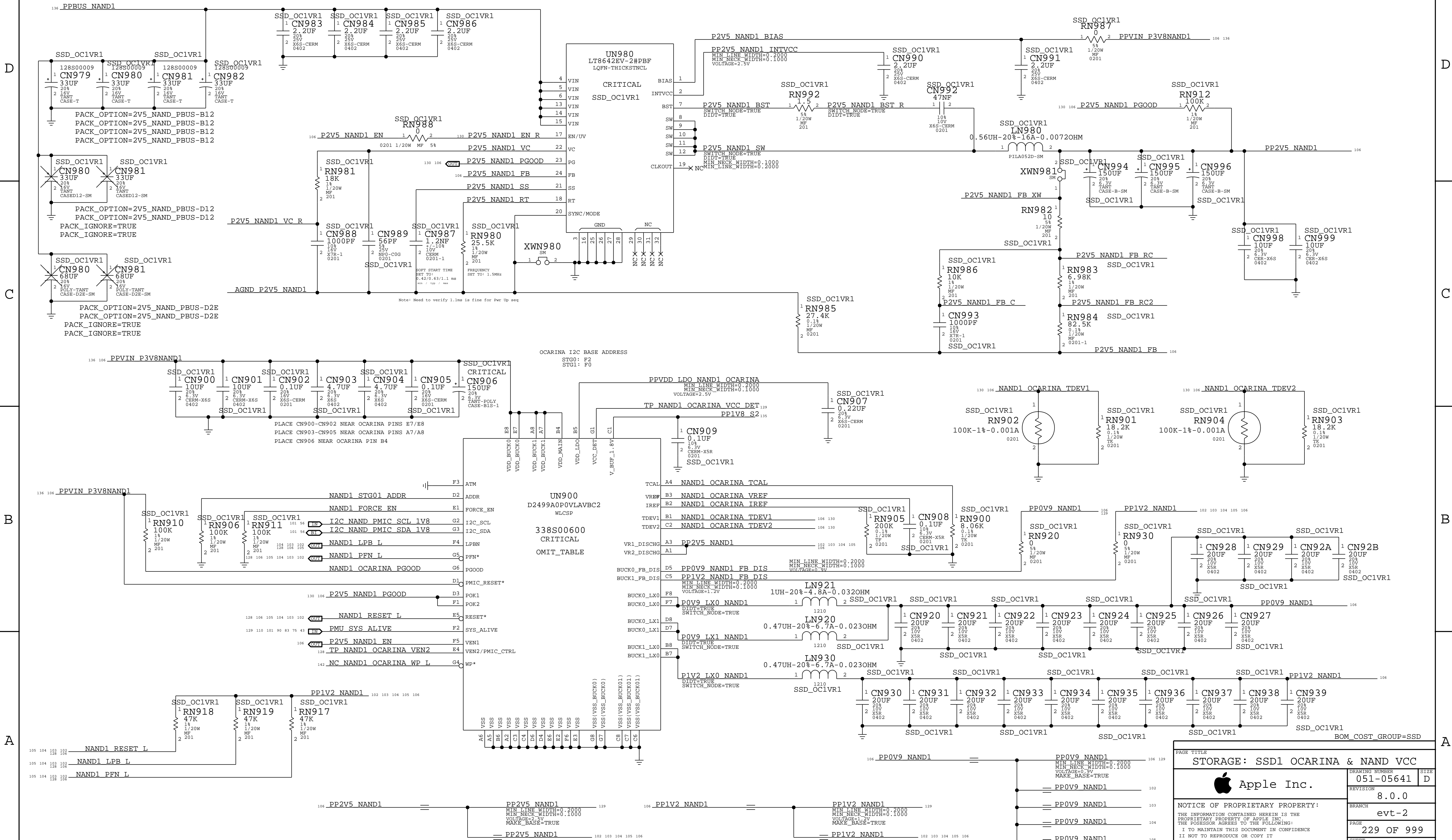
\*\*\* OK2INTEGRATE \*\*\*

NAND1	S5E3
-------	------

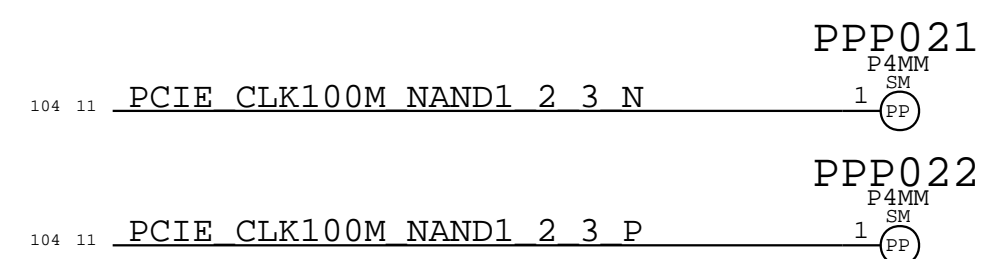
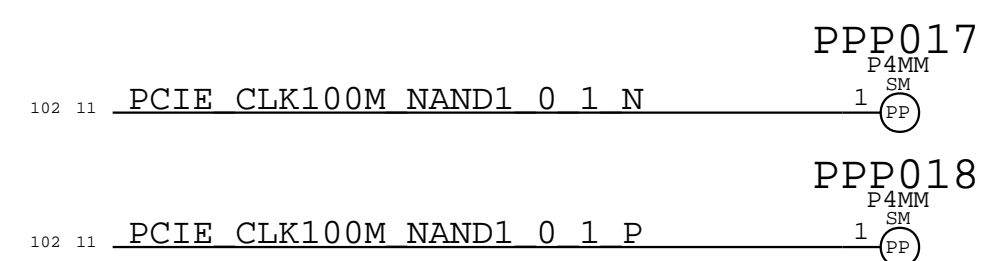
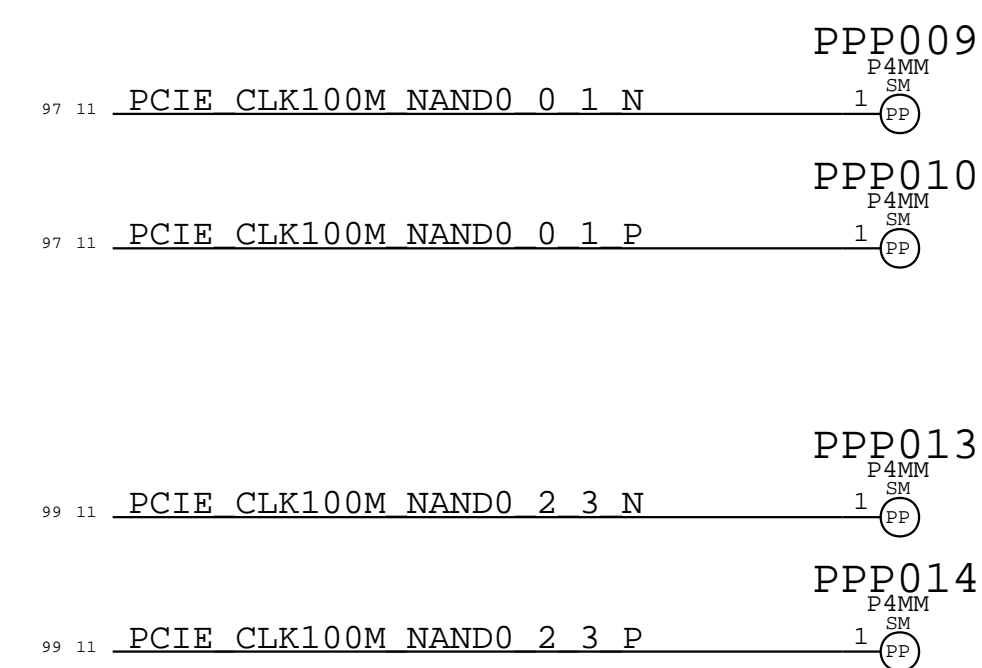
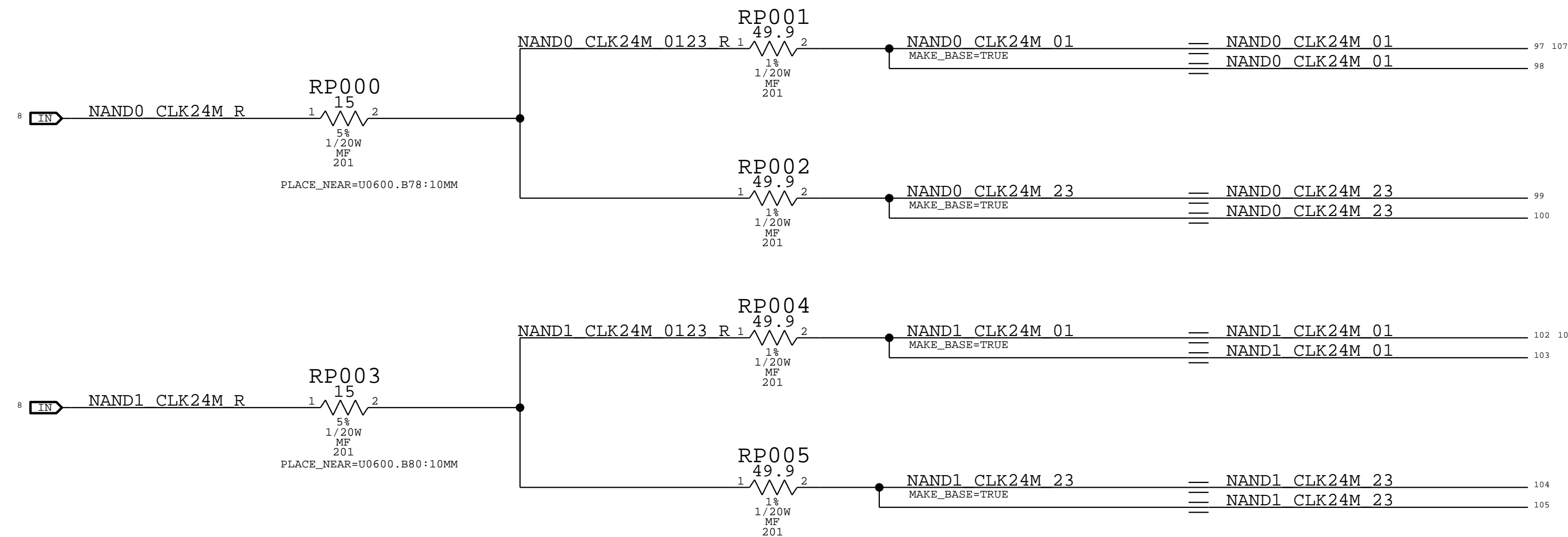
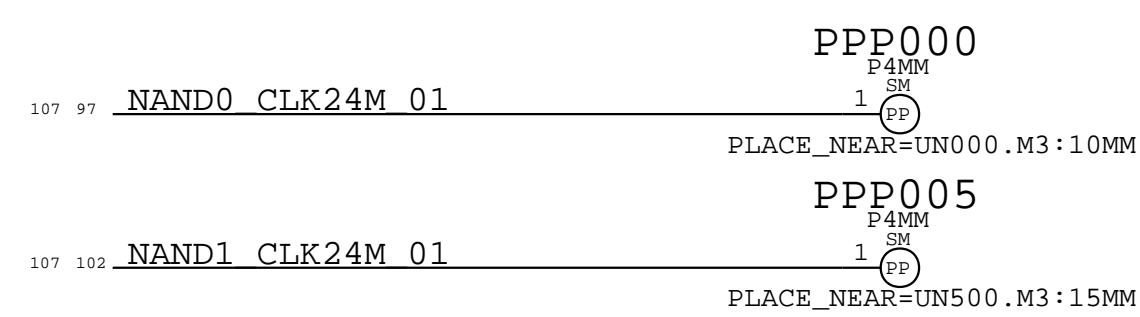


PAGE TITLE			
STORAGE: SSD1 S5E <3>			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
	REVISION		
		8.0.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		evt-2	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		PAGE	
II NOT TO REPRODUCE OR COPY IT		228 OF 999	
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		SHEET	
IV ALL RIGHTS RESERVED		105 OF 155	

\*\*\* OK2INTEGRATE \*\*\*



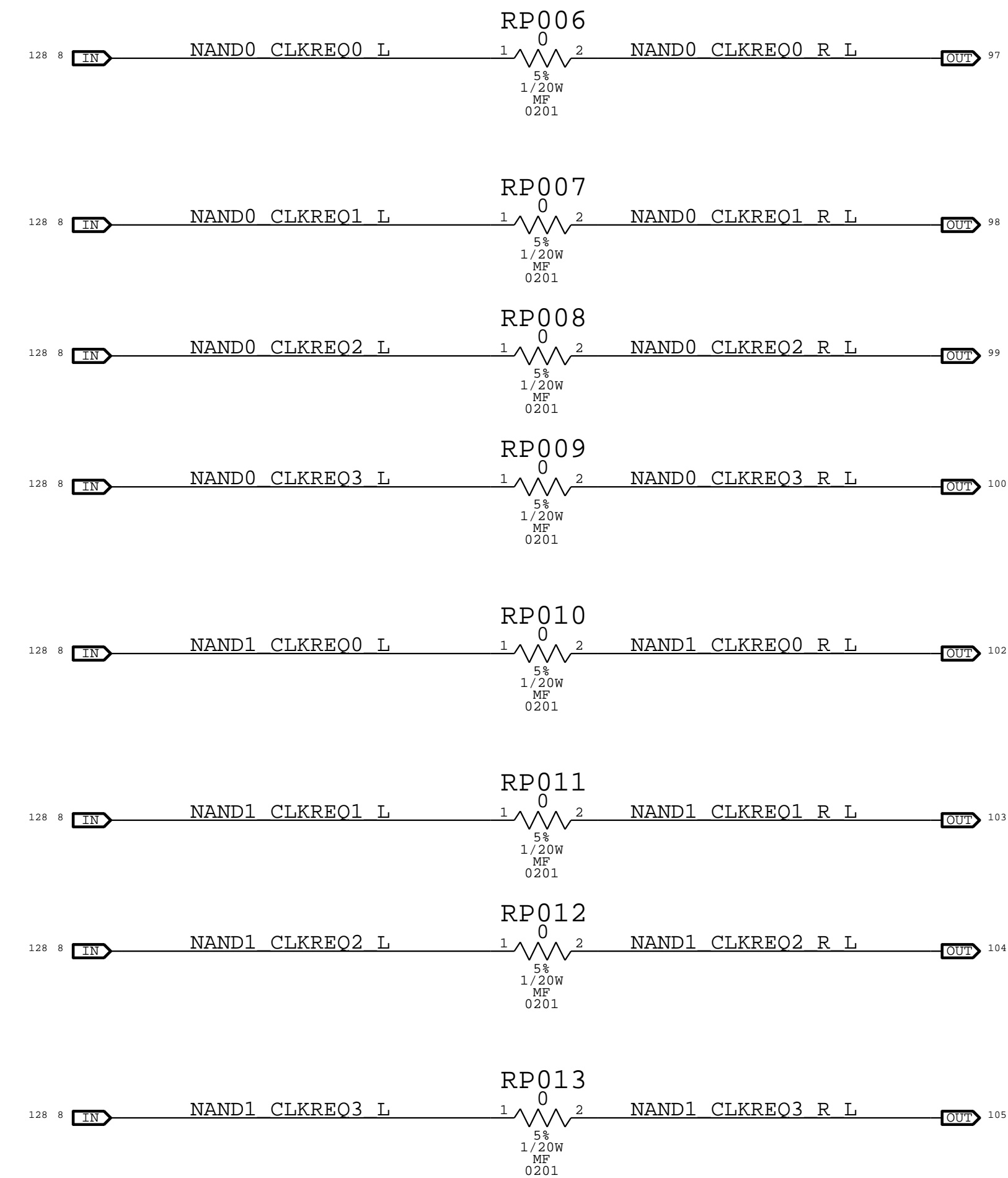
PAGE TITLE		
STORAGE: SSD1 OCARINA & NAND VCC		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
	BRANCH	evt-2
NOTICE OF PROPRIETARY PROPERTY:		PAGE
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		229 OF 999
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		SHEET
I1 NOT TO REPRODUCE OR COPY IT		106 OF 155
I11 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I14 ALL RIGHTS RESERVED		




## SSD 24M CLOCK TERMINATIONS

# NAND CLKREQ SERIES RESISTORS

TODO: RES VALUES NOT FINAL



PAGE TITLE		DRAWING NUMBER		SIZE
STORAGE: SSD SUPPORT		051-05641		D
 Apple Inc.		REVISION		
		8.0.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE FORSOWNER AGREES TO THE FOLLOWING:		evt-2		
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I I NOT TO REPRODUCE OR COPY IT		PAGE		
I I I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I V ALL RIGHTS RESERVED		230 OF 999		
		SHEET		
		107 OF 155		

BOM\_COST\_GROUP=SSD





D

C

B

A

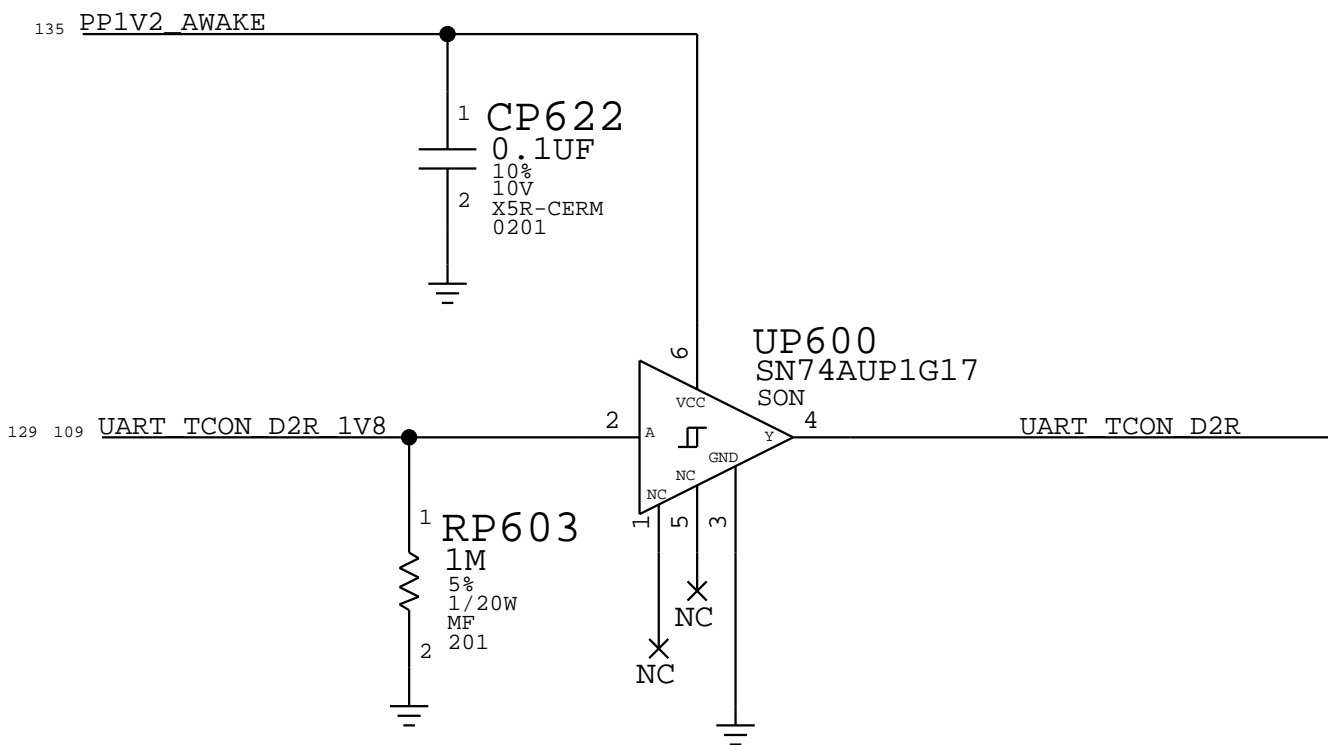
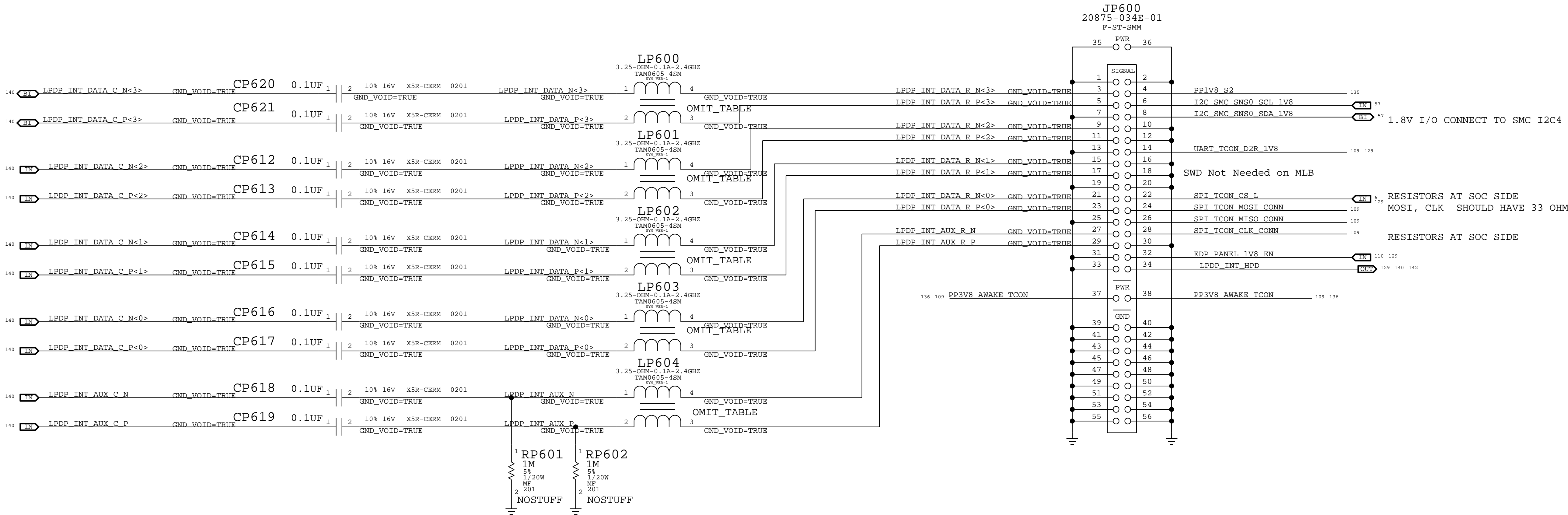
D

C

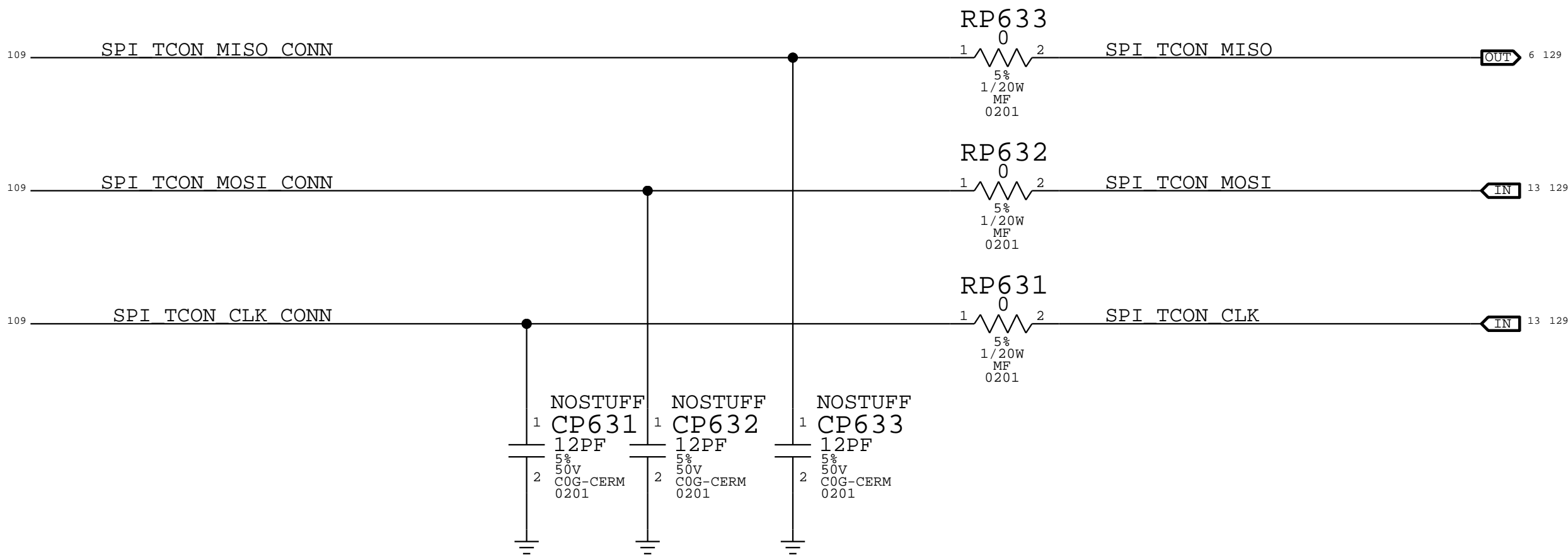
B

A

APN: 516S00682




RC FILTER



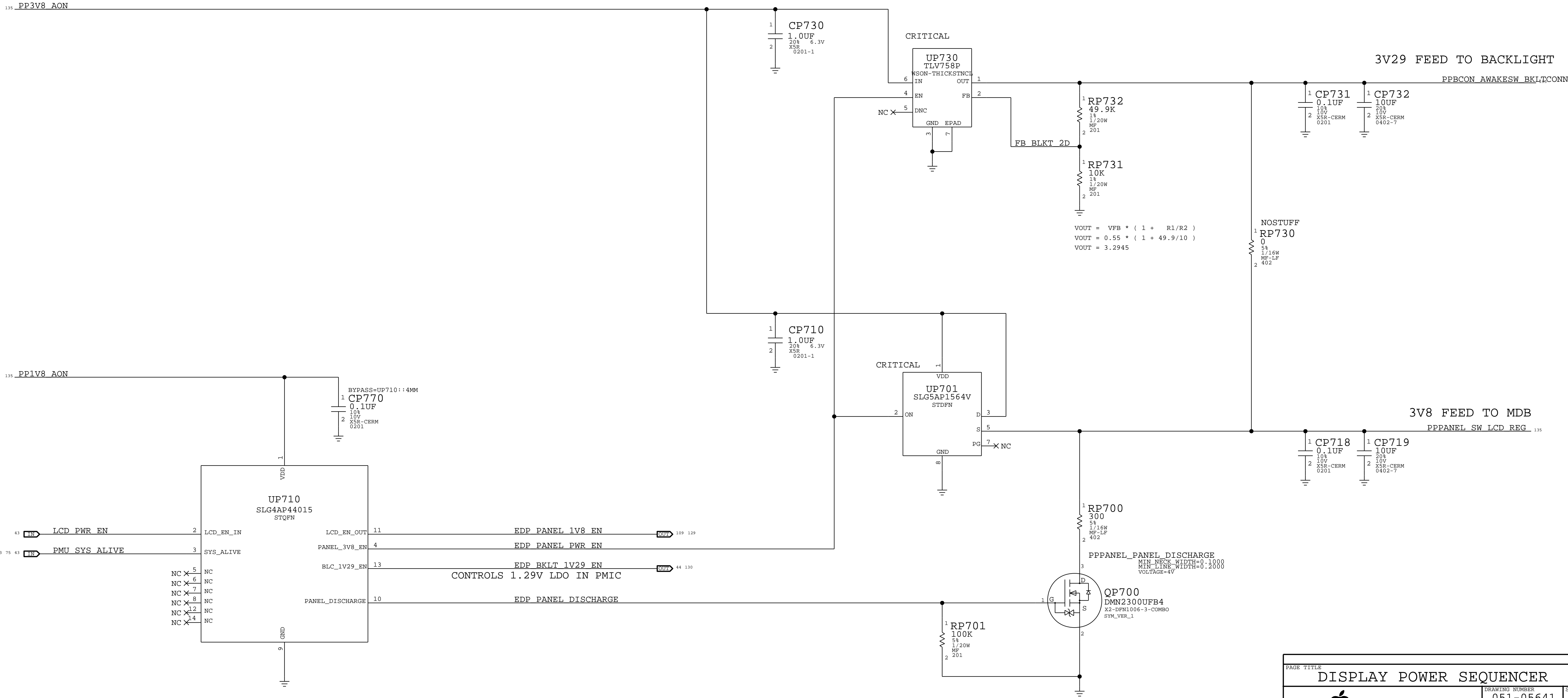
CMC

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
155S0943	5	FLTR,NOISE,8 OHMZ,2.6 OHM,100MA,0605	LP600-LP604	CRITICAL	

DISPLAY CONNECTOR		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	236 OF 999
	SHEET	109 OF 155

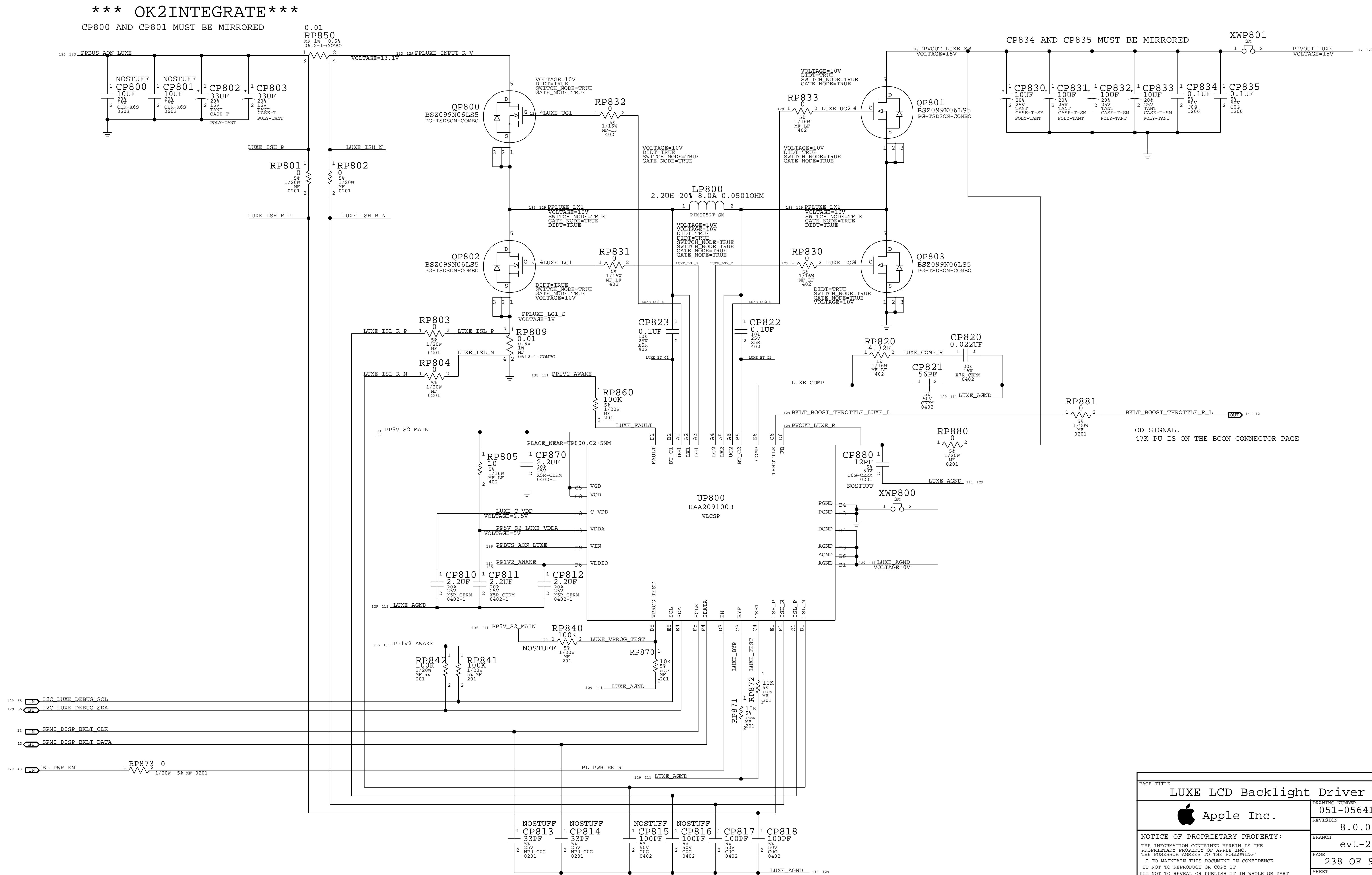
BOM\_COST\_GROUP=DISPLAY


\*\*\* OK2INTEGRATE \*\*\*

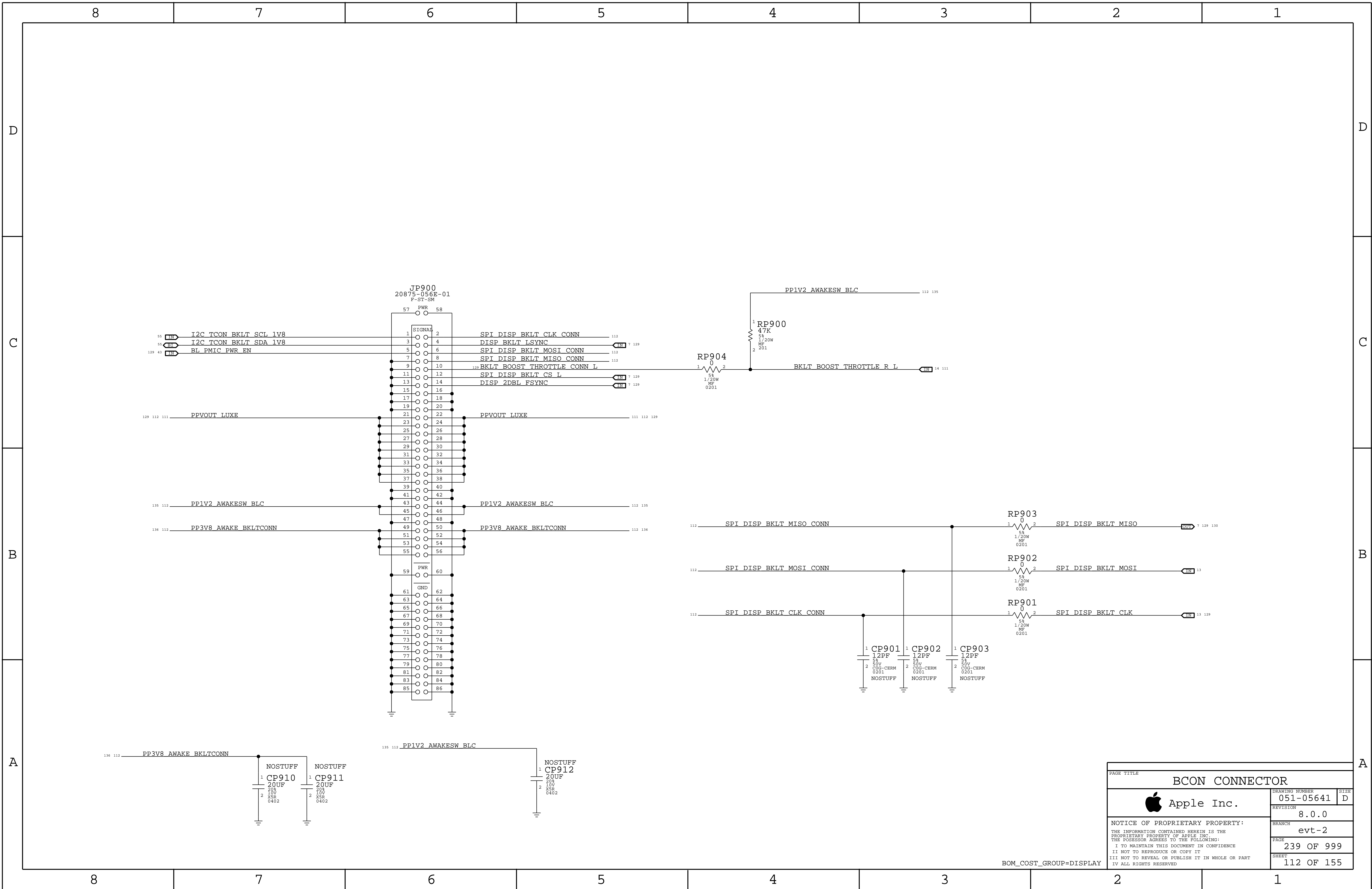


BOM\_COST\_GROUP=DISPLAY

PAGE TITLE		
DISPLAY POWER SEQUENCER		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	237 OF 999
	SHEET	110 OF 155



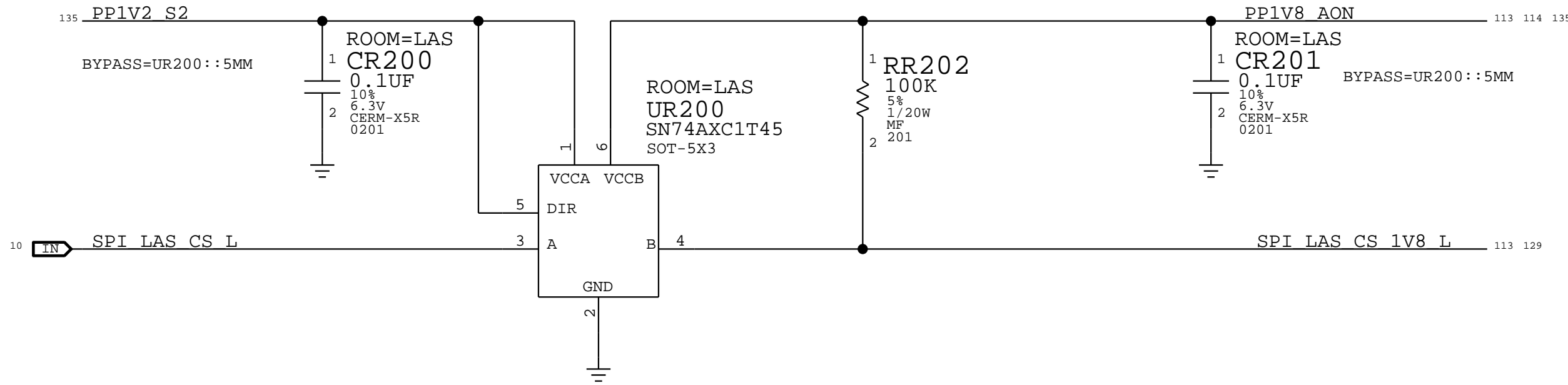
PAGE TITLE			
LUXE LCD Backlight Driver			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I I TO MAINTAIN IN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION		
			8.0.0
	BRANCH		evt-2
	PAGE		238 OF 999
	SHEET		111 OF 155



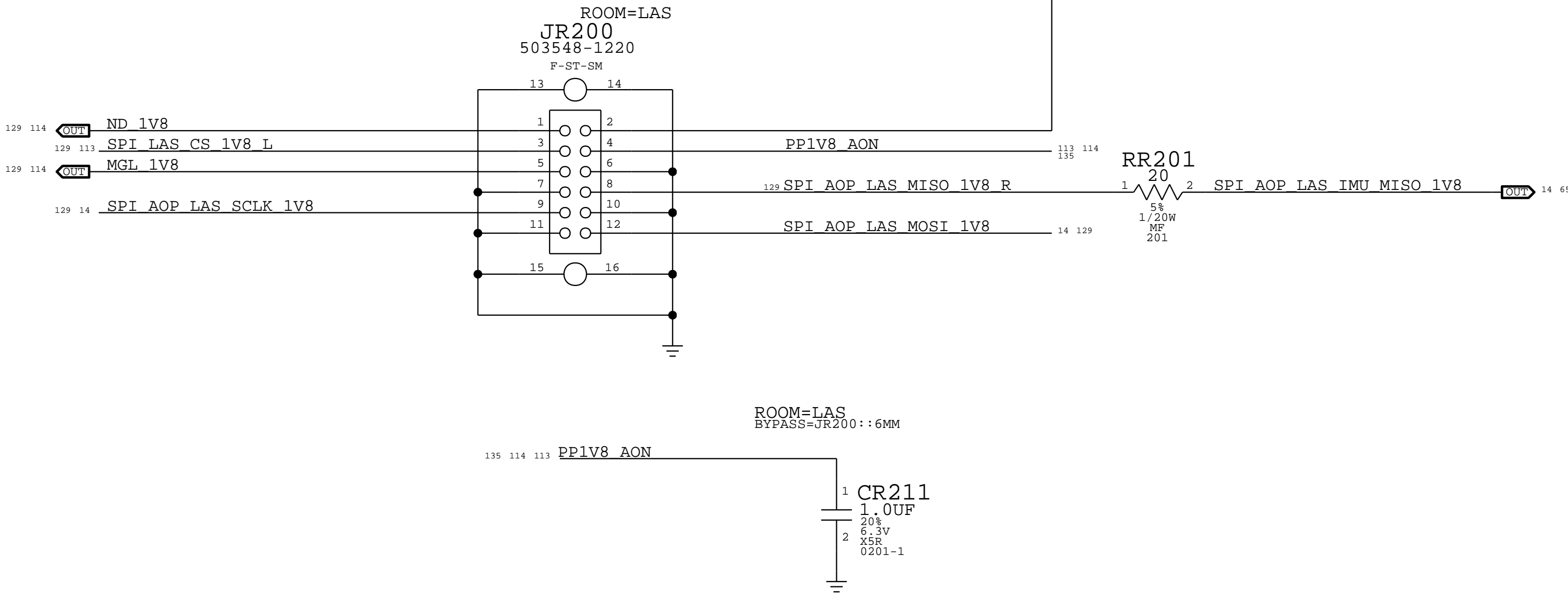


\*\*\* OK2INTEGRATE \*\*\*

LEVEL TRANSLATION



APN: 516S0873



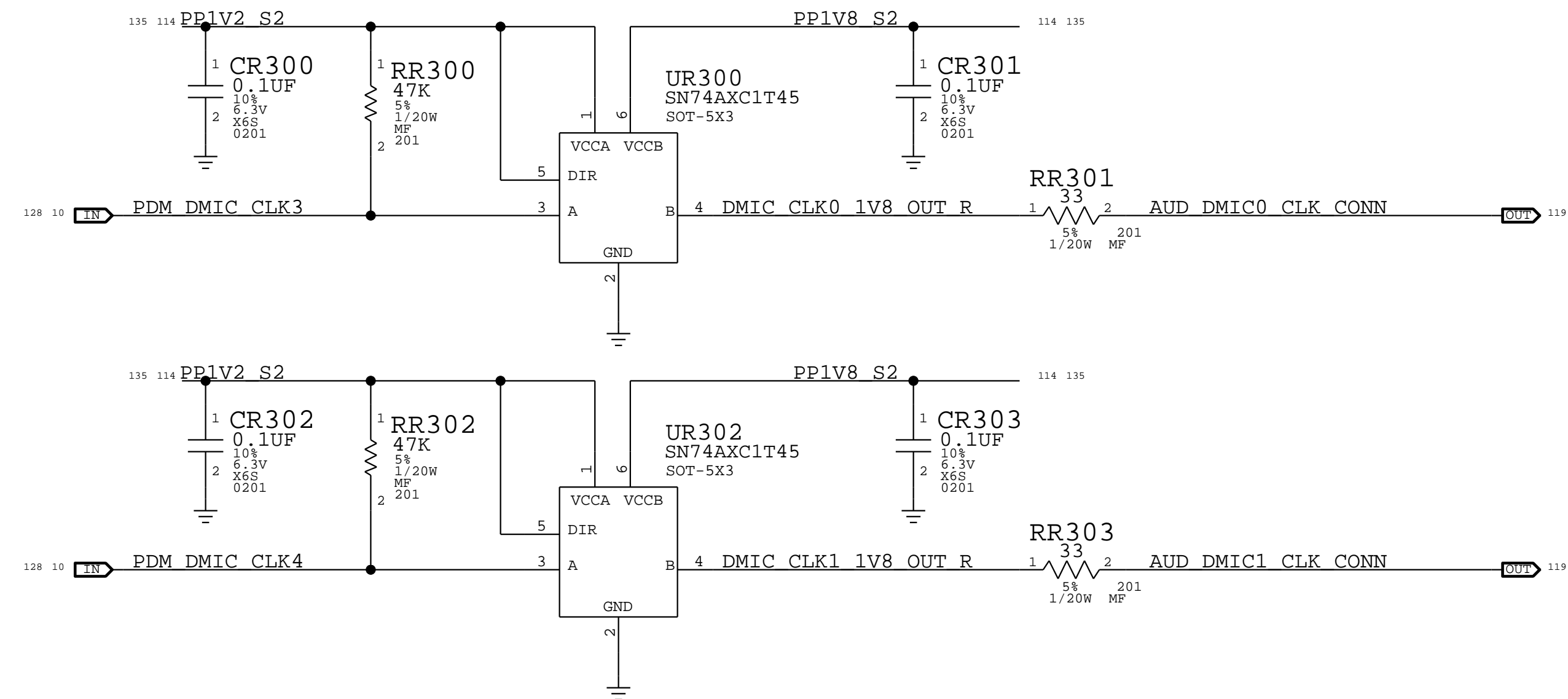
CURRENT PER RAIL

RAIL	TYPICAL	PEAK
1.2 S2	22UA	1.2MA
1.8 AON	30UA	8 MA
3.3 AON	1UA	10 MA

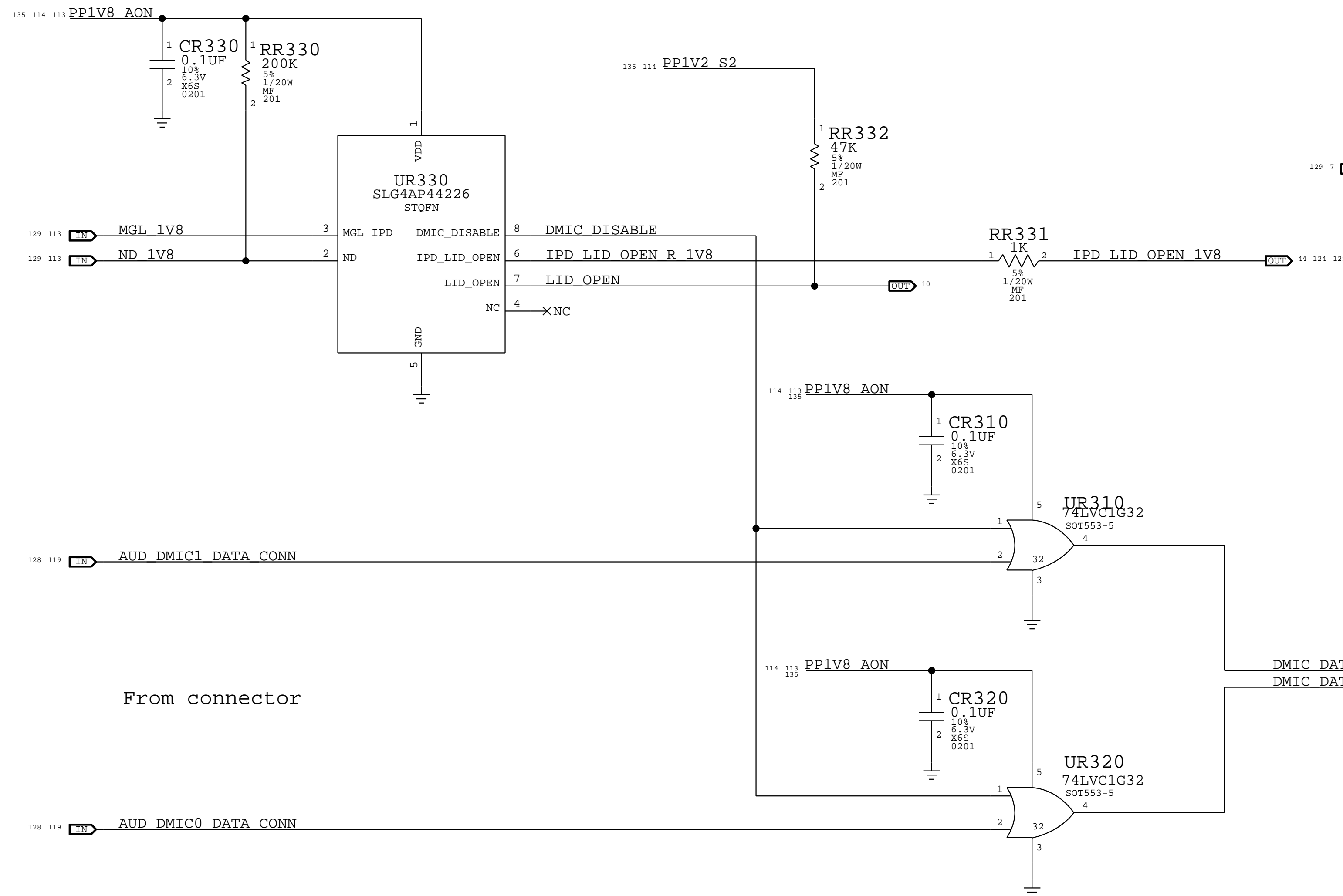
PAGE TITLE		
SECDIS: LID ANGLE SENSOR		
DRAWING NUMBER	051-05641	
	REVISION	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	8.0.0	
	BRANCH	
BOM_COST_GROUP=SOC	evt-2	
	PAGE	
		242 OF 999
		SHEET
		113 OF 155

\*\*\* OK2INTEGRATE \*\*\*

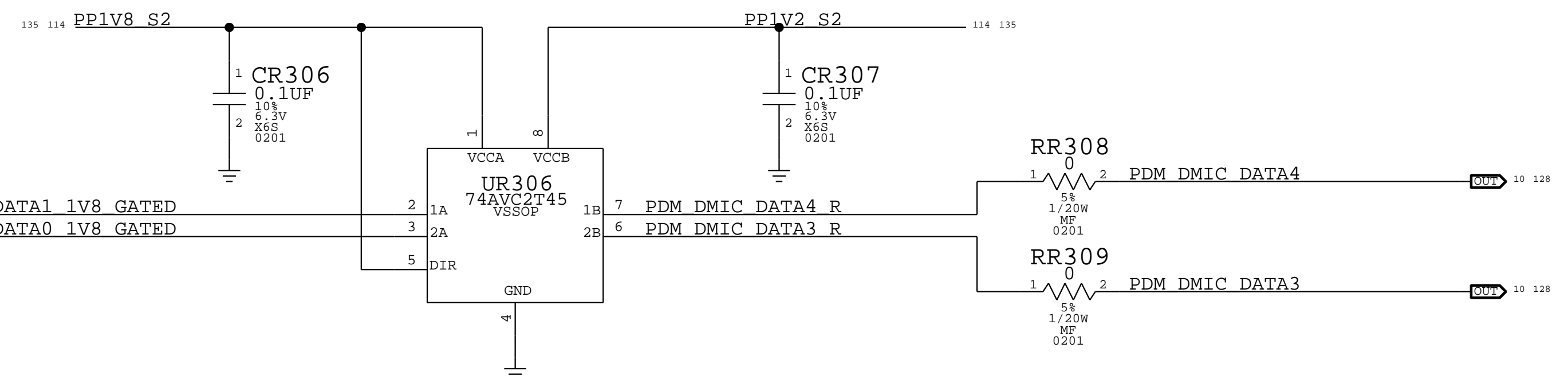
## Level Shifter - DMIC &amp; FTCAM




To connector



DIRECTION IS A->B for second source



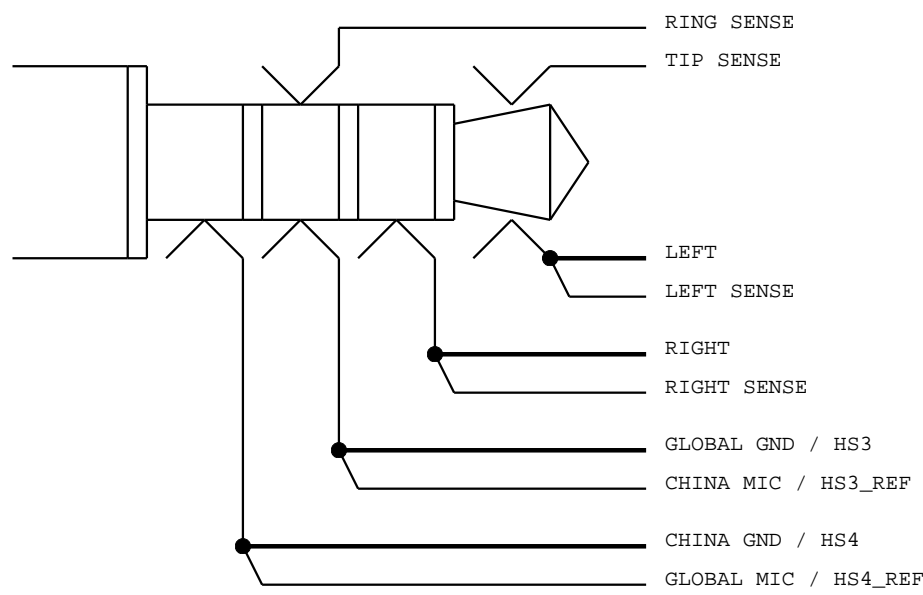
PAGE TITLE		
SECDIS: DMIC_LID_CONTROL		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-05641	D
	REVISION	
	8.0.0	
NOTICE OF PROPRIETARY PROPERTY:		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
II NOT TO REPRODUCE OR COPY IT		
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
IV ALL RIGHTS RESERVED		
BRANCH	evt-2	
PAGE	243 OF 999	
SHEET	114 OF 155	

BOM\_COST\_GROUP=SOC

\*\*\* OK2INTEGRATE \*\*\*

CARLOW CODEC I2C ADDRESS	
ADDR PIN	ADDRESS
0R TO GND	0X48
100K TO GND	0X49
100K TO VDDIO	0X4A
0R TO VDDIO	0X4B <--

#### AUDIO JACK PINOUT



119 AUDIO JACK LEFT OUT  
119 AUDIO JACK RIGHT OUT  
\* SEE NOTE

119 AUDIO JACK LEFT SNS  
119 AUDIO JACK RIGHT SNS  
119 AUDIO JACK CH GND  
119 AUDIO JACK GB GND  
\* SEE NOTE  
119 AUDIO JACK GB MIC  
119 AUDIO JACK CH MIC  
\* SEE NOTE

119 AUDIO JACK RING SNS  
119 AUDIO JACK TIP SNS

TO / FROM  
AUDIO JACK  
CONNECTOR

#### NOTES:

- SEE TEST POINT SIGNALS & LOCATIONS ON REF DESIGN PAGE 1
- THE FOLLOWING SIGNALS SHOULD HAVE A LOW DCR PATH:
  - VP SUPPLY
  - VCP SUPPLY
  - AUDIO\_JACK\_LEFT/RIGHT\_OUT
  - AUDIO\_JACK\_GB/CH\_GND
- GB\_MIC SIGNAL CONNECTS TO CH\_GND AT A/J CONNECTOR.  
CH\_MIC SIGNAL CONNECTS TO GB\_GND AT A/J CONNECTOR.
- VP SUPPLY RAIL ACCEPTS 3.0V TO 5.25V AND NEEDS TO COME UP FIRST AND TURN OFF LAST (NEED TO STAY UP WHEN THE OTHER RAILS GO DOWN)  
VP CURRENT CONSUMPTION WITH PART IN LOWEST POWER STATE:  
3.1UA (1V8 OFF, RST# LOW)  
TBD (1V8 ON, RST# LOW)  
37UA (1V8 OFF, RST# HIGH)

LR500  
FERR-22-OHM-1A-0.0550HM

135 PP1V2 AWAKE  
EDC CURRENT = 20MA  
TDC CURRENT = 10MA

115 PP1V2 CODEC VL VD  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000  
VOLTAGE=1.225V

CR500  
1.0UF  
20%  
6.3V  
X5R  
0201-1

CR501  
0.1UF  
10%  
6.3V  
CERM-X5R  
0201

LR503  
FERR-22-OHM-1A-0.0550HM

135 PP3V8 AON  
EDC CURRENT = 850MA  
TDC CURRENT = 110MA

128 PP3V8 CODEC VP  
MIN LINE WIDTH=0.3000  
MIN NECK WIDTH=0.1000  
VOLTAGE=3.8V

CR504  
10UF  
20%  
10V  
X5R-CERM  
0402-7

NO\_XNET\_CONNECTION=1  
NOSTUFF RR500  
1K  
5%  
1/20W  
MF  
201-2

NO\_XNET\_CONNECTION=1  
NOSTUFF RR501  
1K  
5%  
1/20W  
MF  
201-2

CR512 0.1UF  
0603 10%  
5%  
X7R

CR513 0.1UF  
0603 10%  
5%  
X7R

CODEC HSBIAS FILT  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000  
BYPASS=UR500.E3:D3:4MM  
1 CR510  
4.7UF  
20%  
10V  
X5R-CERM  
0402

CODEC HSBIAS FILT REF  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000

CODEC FILT  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000

NO\_XNET\_CONNECTION=1  
BYPASS=UR500.C1:C2:3 MM  
1 CR511  
10UF  
10%  
10V  
X5R  
0603-1

CODEC AGND 115

CRITICAL  
UR500  
CS42L84A  
WLCSP

CP\_LDO\_FILT  
CP\_FILTTP  
CP\_FILTIN  
GND\_CP  
LDO\_EN  
IRQ\*  
WAKE\*  
RESET\*  
MCLK  
ASP\_FSYNC  
ASP\_DIN  
ASP\_DOUT  
ASP\_BCLK  
I2C\_ADDR  
I2C\_SDA  
I2C\_SCL  
CP\_FLY1P  
CP\_FLY1N  
CP\_FLY2P  
CP\_FLY2N

D5  
E6  
G6  
F6  
C6  
B7  
C5  
D4  
A4  
B2  
B3  
B4  
A3  
B5  
B6  
A5  
D7  
E7  
F7  
G7

VDD\_P  
VDD\_IO  
VDD\_D  
VDD\_A  
VDD\_CP  
HP\_SENSEA  
OUTA\_HP  
HP\_SENSEB  
OUTB\_HP  
HS4  
HS4\_CLAMP  
HS3  
HS3\_CLAMP  
IN\_HSP  
IN\_HSN  
HS4\_REF  
HS3\_REF  
RING\_SENSE  
TIP\_SENSE  
HSBIAS\_FILT  
HSBIAS\_FILT\_REF  
FILTP  
TSTI  
GND\_IO  
GND\_D  
GND\_HS  
GND\_A

NO\_XNET\_CONNECTION=1  
BYPASS=UR500.D5:F6:5MM  
CR505  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
NO\_XNET\_CONNECTION=1  
BYPASS=UR500.E6:F6:4MM  
CR506  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
NO\_XNET\_CONNECTION=1  
BYPASS=UR500.F6:G6:4MM  
CR507  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
CODEC VCP FILTN  
MIN LINE WIDTH=0.1500  
MIN NECK WIDTH=0.1500

MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000  
VOLTAGE=1.8V  
PP1V8 CODEC VA  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000  
VOLTAGE=1.8V  
PP1V8 CODEC VCP  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1000  
VOLTAGE=1.8V  
CODEC CP LDO FILT  
NO\_XNET\_CONNECTION=1  
BYPASS=UR500.D5:F6:5MM  
CR505  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
CODEC VCP FILTP  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1500  
NO\_XNET\_CONNECTION=1  
BYPASS=UR500.E6:F6:4MM  
CR506  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
NO\_XNET\_CONNECTION=1  
BYPASS=UR500.F6:G6:4MM  
CR507  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
CODEC VCP FILTN  
MIN LINE WIDTH=0.1500  
MIN NECK WIDTH=0.1500

PLACE\_NEAR=UR500.G1:2MM  
XWR501  
SM

CODEC AGND 115

NO\_XNET\_CONNECTION=1  
BYPASS=UR500.D6:F6:6MM  
CR503  
2.2UF  
20%  
35V  
X5R-CERM  
0402-0.1MM  
CODEC VCP FILT GND  
MIN LINE WIDTH=0.2000  
MIN NECK WIDTH=0.1500  
PLACE\_NEAR=CR506.2:5MM  
XWR500  
SM

PP1V2 AWAKE  
PP1V2 S2  
NOSTUFF RR502  
47K  
5%  
1/20W  
MF  
201  
NOSTUFF RR503  
47K  
5%  
1/20W  
MF  
201  
CODEC INT L  
CODEC WAKE L  
CODEC RESET L  
RR504  
47K  
5%  
1/20W  
MF  
201  
PACK IGNORE=TRUE  
CODEC\_CARLOW\_USE\_MCLK  
TDM CODEC MCLK  
TDM CODEC FSYNC  
TDM CODEC R2D  
TDM CODEC D2R  
TDM CODEC BCLK  
I2C CODEC SDA  
I2C CODEC SCL

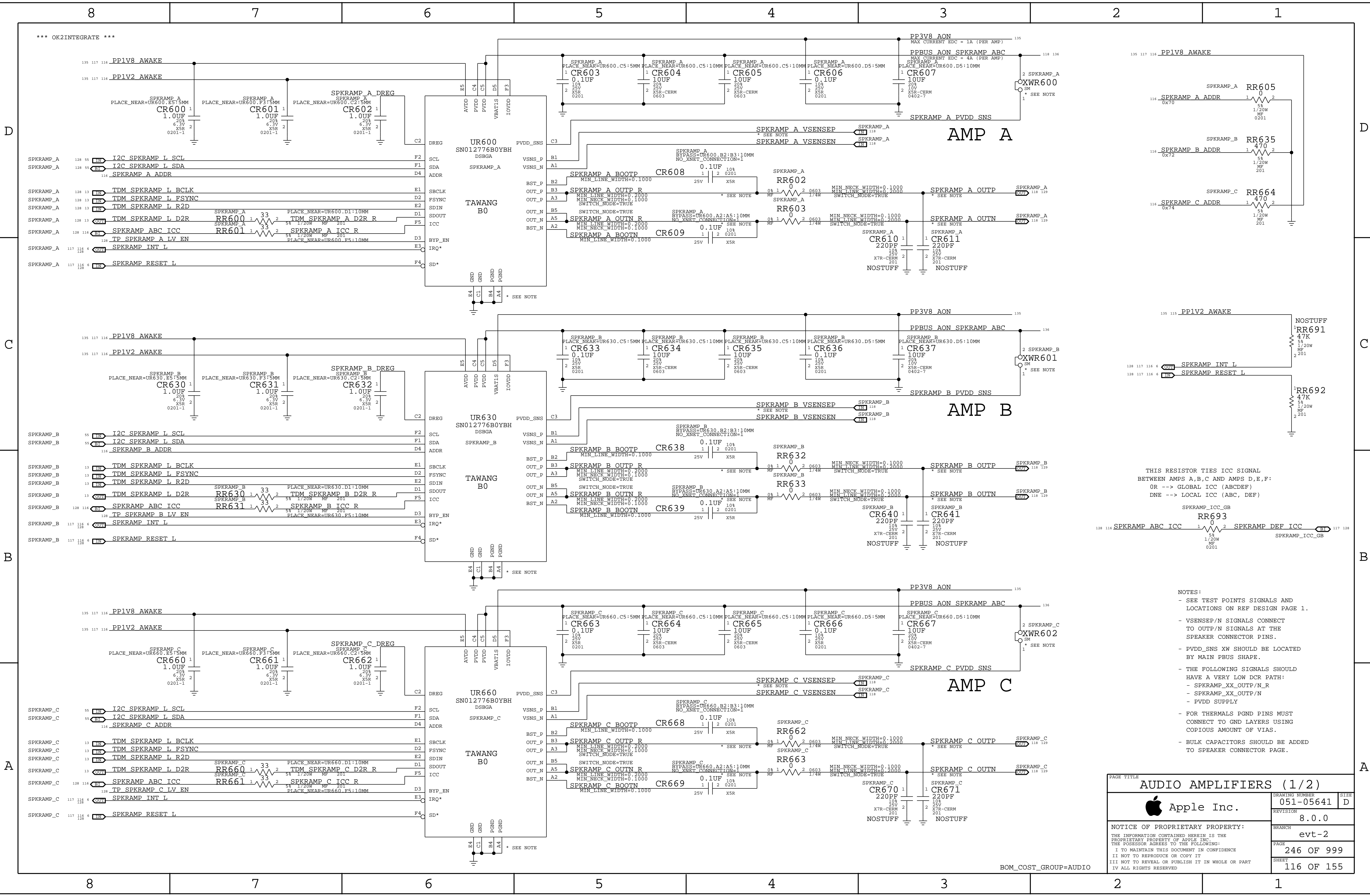
6 128  
43 128  
10 128  
13 128  
13 128  
6 128  
6 128  
55 128  
55 128

-> TO SOC  
-> TO PMU  
<- FROM SOC

CARLOW B0 SILICON

BOM\_COST\_GROUP=AUDIO

PAGE TITLE		
AUDIO JACK CODEC		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	245 OF 999
	SHEET	115 OF 155



NOTES:

- SEE TEST POINTS SIGNALS AND LOCATIONS ON REF DESIGN PAGE 1.

- VSENSE/P SIGNALS CONNECT TO OUTP/N SIGNALS AT THE SPEAKER CONNECTOR PINS.

- PVDD\_SNS XW SHOULD BE LOCATED BY MAIN PBUS SHAPE.

- THE FOLLOWING SIGNALS SHOULD HAVE A VERY LOW DCR PATH:

- SPKRAMP\_XX\_OUTP/N\_R
- SPKRAMP\_XX\_OUTP/N

- FOR THERMALS PGND PINS MUST CONNECT TO GND LAYERS USING COPIOUS AMOUNT OF VIAS.

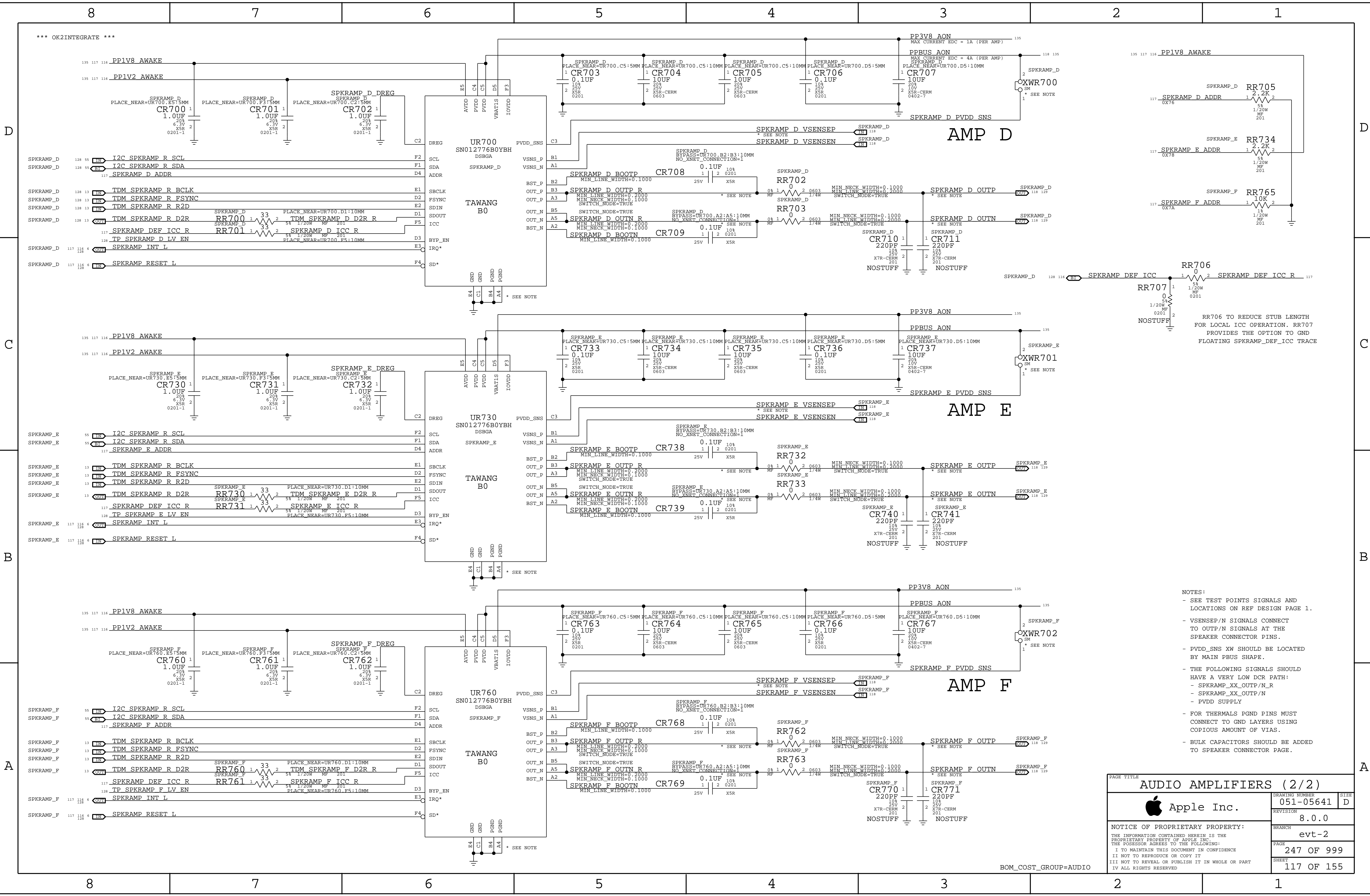
- BULK CAPACITORS SHOULD BE ADDED TO SPEAKER CONNECTOR PAGE.

PAGE TITLE		DRAWING NUMBER	
AUDIO AMPLIFIERS (1/2)		051-05641	
REVISION		8.0.0	
BRANCH		evt-2	
PAGE		246 OF 999	
SHEET		116 OF 155	

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=AUDIO

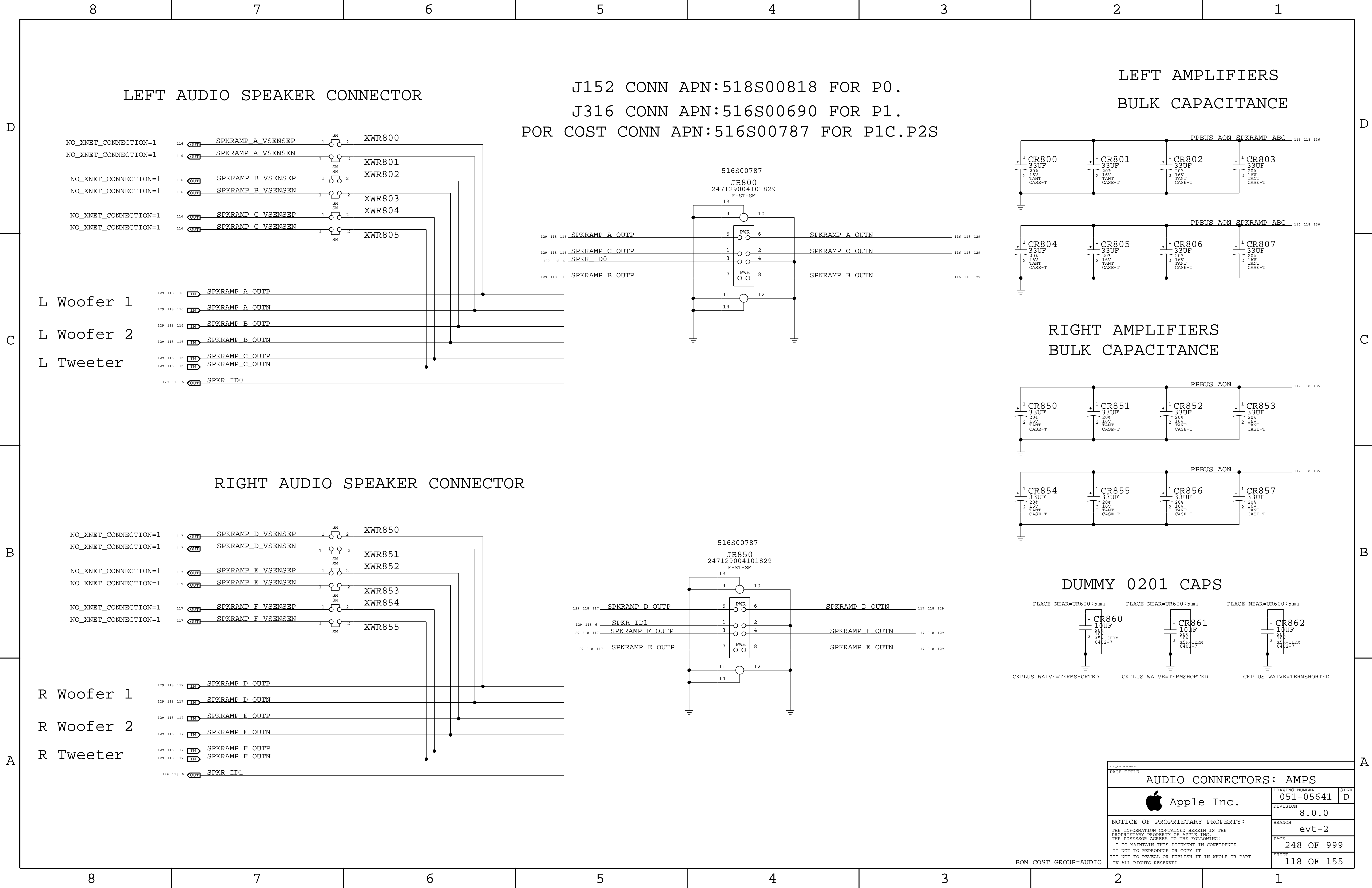


- NOTES:
- SEE TEST POINTS SIGNALS AND LOCATIONS ON REF DESIGN PAGE 1.
  - VSENSE/P/N SIGNALS CONNECT TO OUTP/N SIGNALS AT THE SPEAKER CONNECTOR PINS.
  - PVDD\_SNS XW SHOULD BE LOCATED BY MAIN PBUS SHAPE.
  - THE FOLLOWING SIGNALS SHOULD HAVE A VERY LOW DCR PATH:
    - SPKRAMP\_XX\_OUTP/N\_R
    - SPKRAMP\_XX\_OUTP/N
    - PVDD SUPPLY
  - FOR THERMALS PGND PINS MUST CONNECT TO GND LAYERS USING COPIOUS AMOUNT OF VIAS.
  - BULK CAPACITORS SHOULD BE ADDED TO SPEAKER CONNECTOR PAGE.

PAGE TITLE		
AUDIO AMPLIFIERS (2/2)		
Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	247 OF 999
	SHEET	117 OF 155

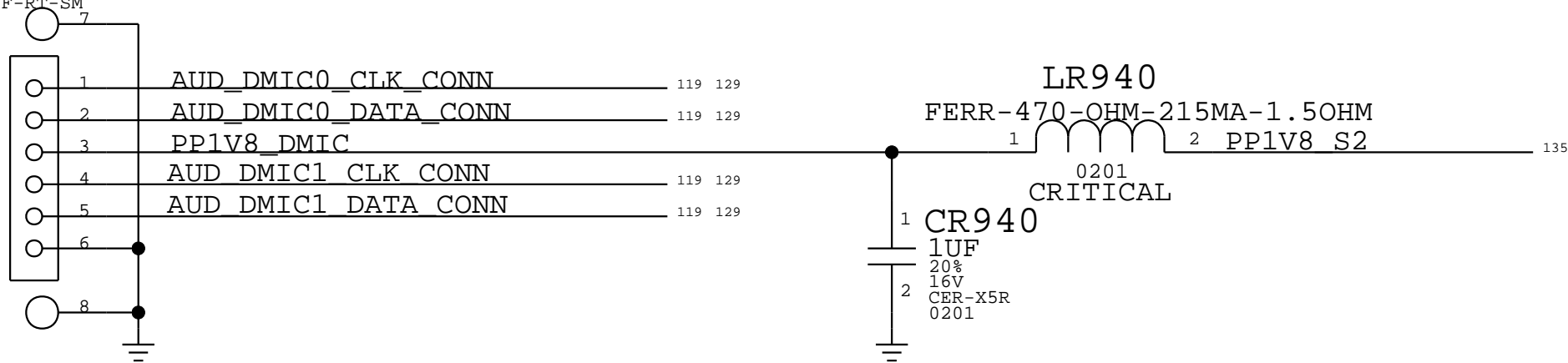
BOM\_COST\_GROUP=AUDIO





Digital Mic Flex Connector

APN: 518S0818  
JR940  
FF14A-6C-R11DL-B-3H



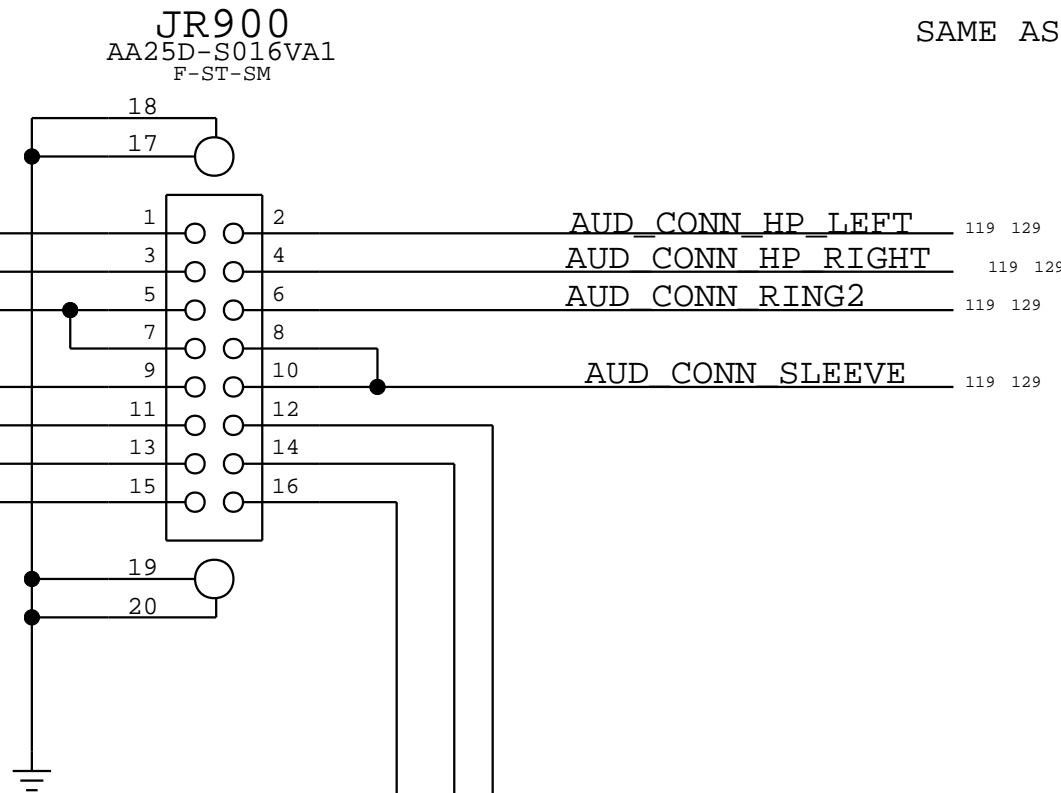
TODO: Check if zero ohms between connector an SECDIS are required

129	119	AUD_DMIC0_CLK_CONN	MAKP_BASE=TRUE	==	AUD_DMIC0_CLK_CONN	114
129	119	AUD_DMIC0_DATA_CONN	MAKP_BASE=TRUE	==	AUD_DMIC0_DATA_CONN	114 128
129	119	AUD_DMIC1_CLK_CONN	MAKP_BASE=TRUE	==	AUD_DMIC1_CLK_CONN	114
129	119	AUD_DMIC1_DATA_CONN	MAKP_BASE=TRUE	==	AUD_DMIC1_DATA_CONN	114 128

Audio Jack Flex Connector

PART\_NUMBER=516S1181

APN: 516S1181 ,MATINGM PLUG APN:516S1180  
SAME AS J214

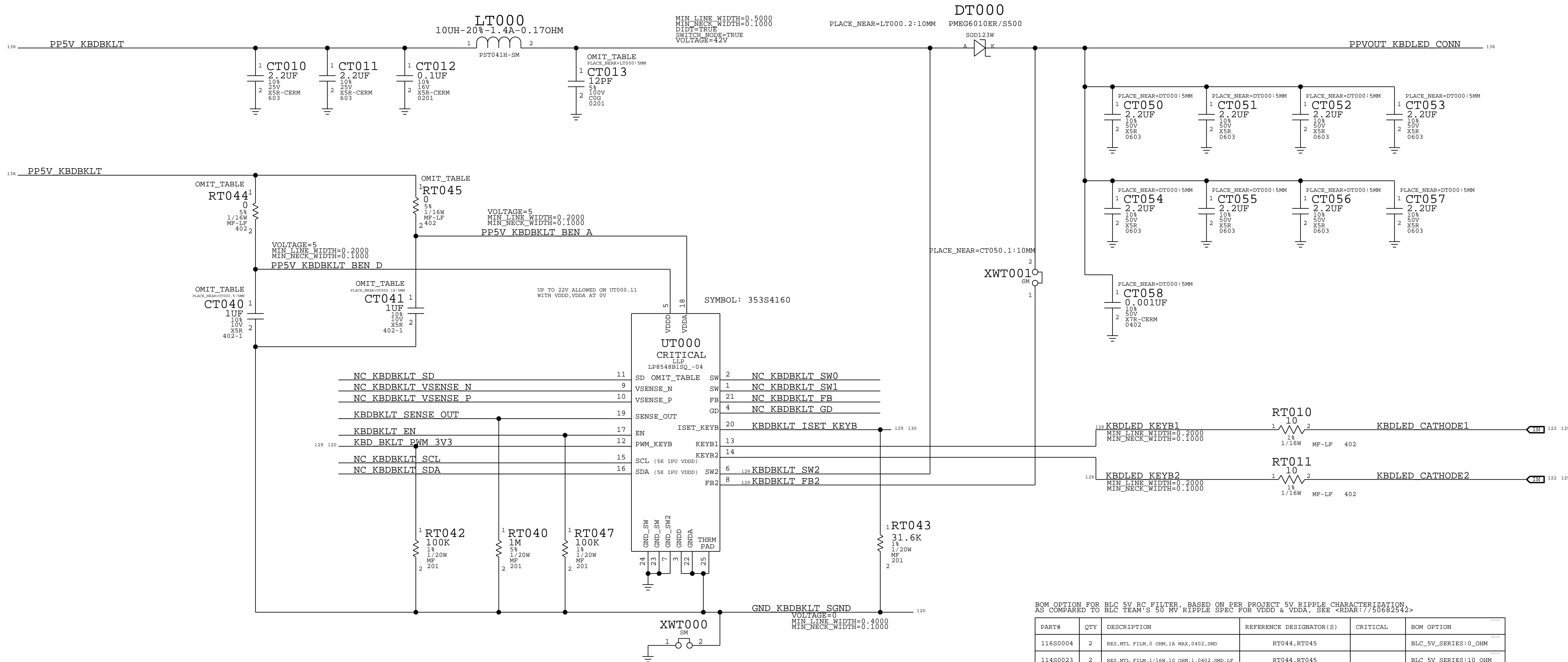


LAST CHANGE: Wed Feb 18 17:12:24 2015		
PAGE TITLE		
Audio Flex Connectors		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	249 OF 999
	SHEET	119 OF 155

BOM\_COST\_GROUP=AUDIO

\*\*\* OK2INTEGRATE \*\*\*

# BEN IC: KEYBOARD LED DRIVER

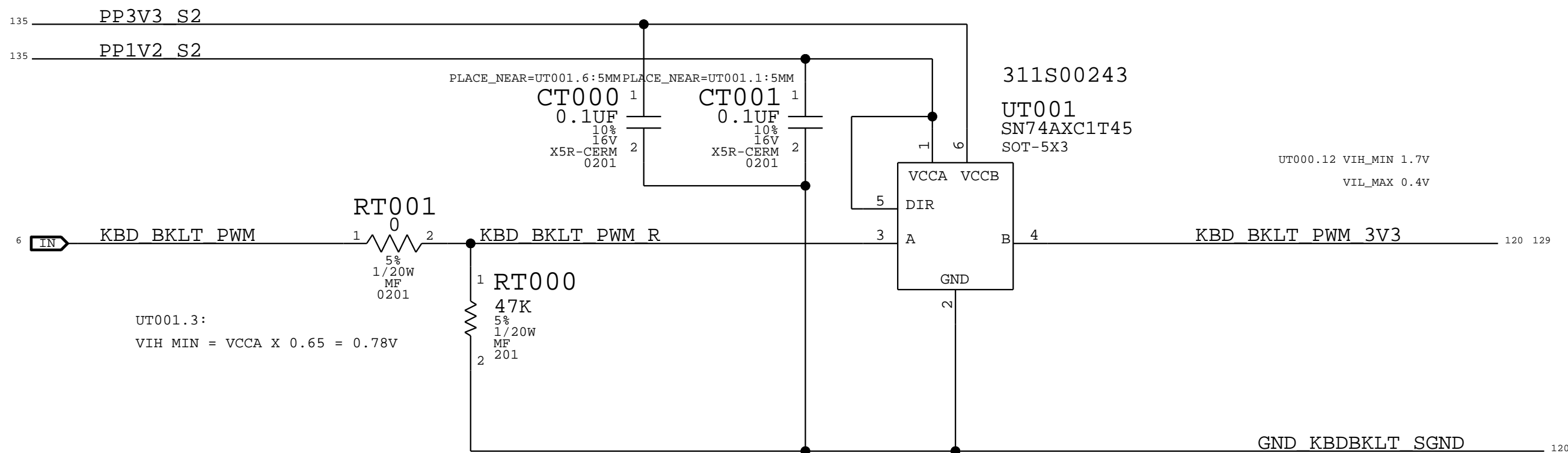


BOM OPTION FOR BLC 5V RC FILTER, BASED ON PER PROJECT 5V RIPPLE CHARACTERIZATION, AS COMPARED TO BLC TEAM'S 50 MV RIPPLE SPEC FOR VDDO & VDDA, SEE <RDAR://50682542>

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
116S0004	2	RES,MTL FILM,0 OHM,1A MAX,0402,SMD	RT044,RT045		BLC_5V_SERIES:0_OHM
114S0023	2	RES,MTL FILM,1/16W,10 OHM,1,0402,SMD,LF	RT044,RT045		BLC_5V_SERIES:10_OHM
138S0614	2	CAP,CER,XSR,1UF,10%,10V,0402	CT040,CT041		BLC_5V_CAP:1_UF
138S00070	2	CAP,CER,XSR,4.7UF,20%,25V,0402	CT040,CT041		BLC_5V_CAP:4P7_UF

## KEYBOARD BKLT PWM LEVEL-SHIFTER

UT001.4: V<sub>OH\_MIN</sub> = 2.3V  
V<sub>OL\_MAX</sub> = 0.1V @ PWM\_KEYB I<sub>MAX</sub> OF 1UA



BEN IC VERSION 4 VS 6 DEPENDS ON WHICH VERSION OF JERRY IC IS ON THE PANEL

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S01615	1	IC,LP8548B1-04,DC/DC CVTR,BST,AJZD,QFN-24	UT000		BLC_BEN_IC:V4
353S01685	1	IC,LP8548B1-06,DC/DC CVTR,BST,QFN24	UT000		BLC_BEN_IC:V6

ALTERNATE PART FOR BEN IC VERSION 4

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S4160	353S01615	BLC_BEN_IC:V4	ANY	RECOMMENDED BY LOUISA

KEYBOARD SWITCH NODE DESENSE OPTION

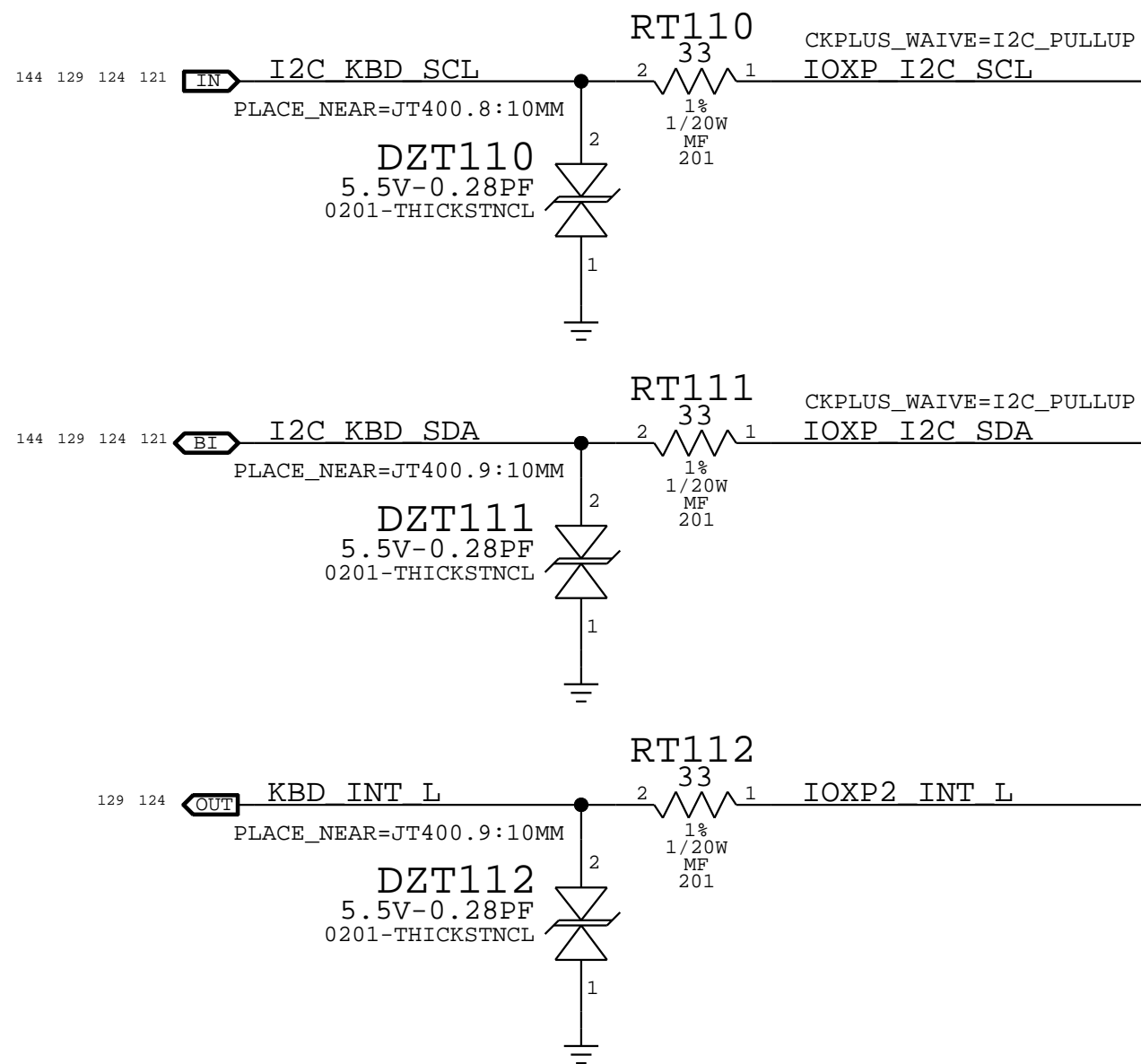
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
131S00141	1	CAP,CGG,12PF,5%,100V,0201	CT013		BLC_KBD_SW_NODE_DESENSE

BOM\_COST\_GROUP=DISPLAY

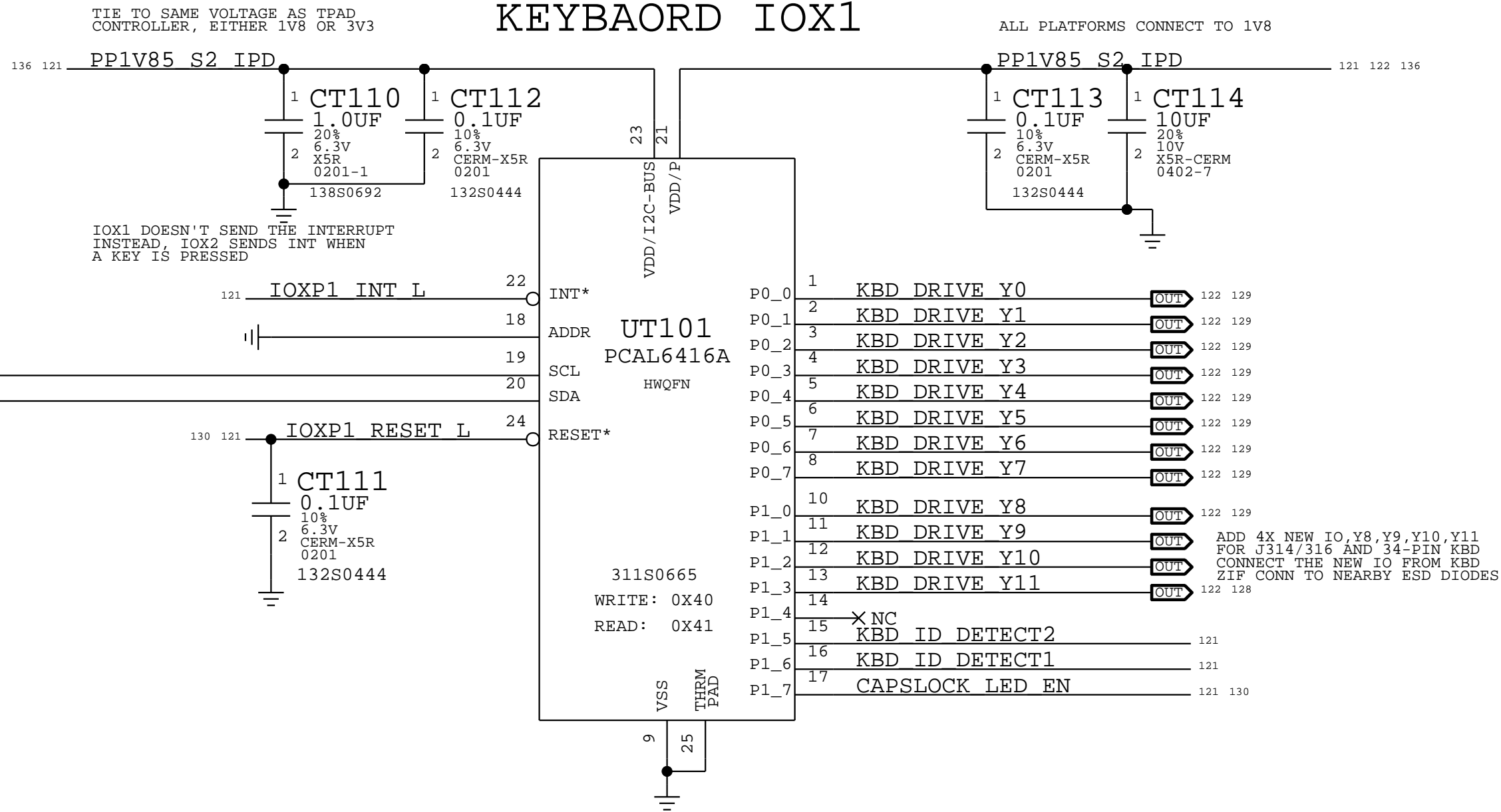
PAGE TITLE		
BEN: KEYBD BKLT		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	250 OF 999
SHEET		120 OF 155

\*\*\* OK2PLACE \*\*\*

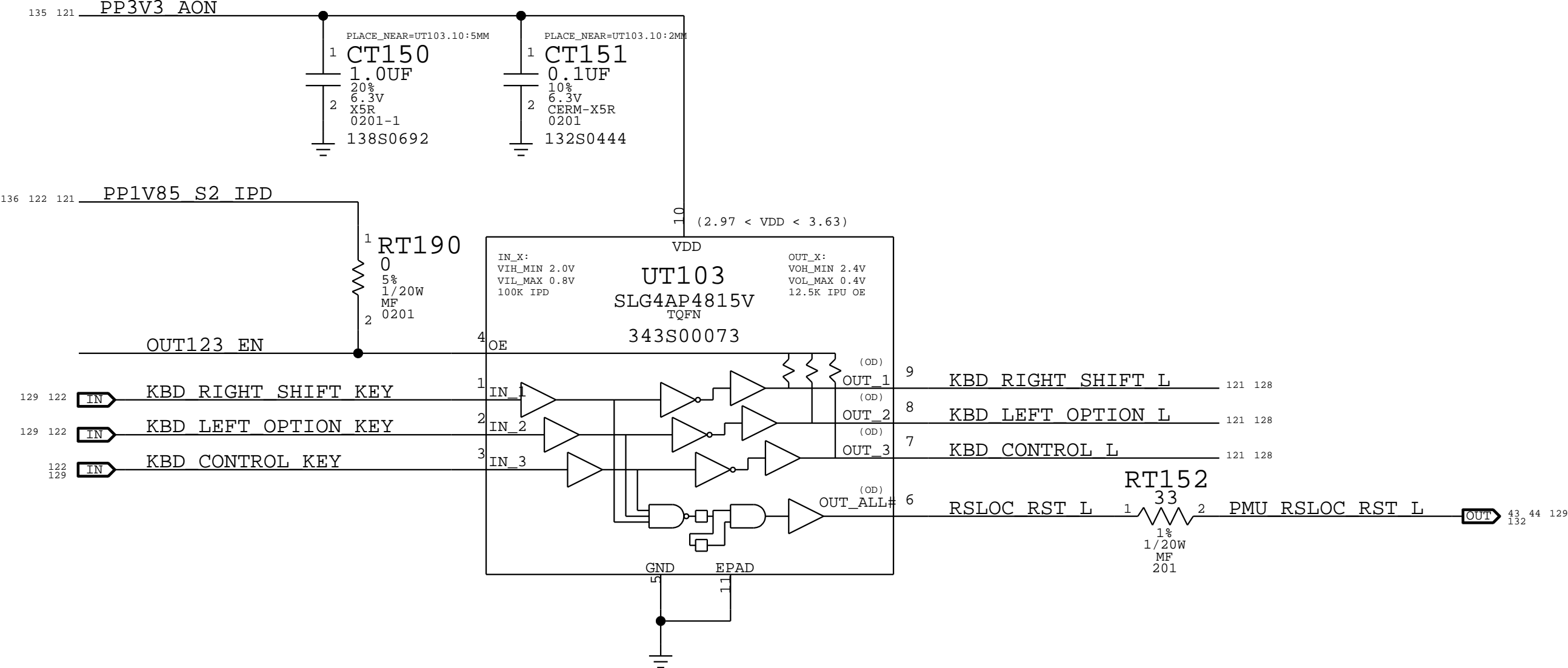
## TO/FROM TRACKPAD



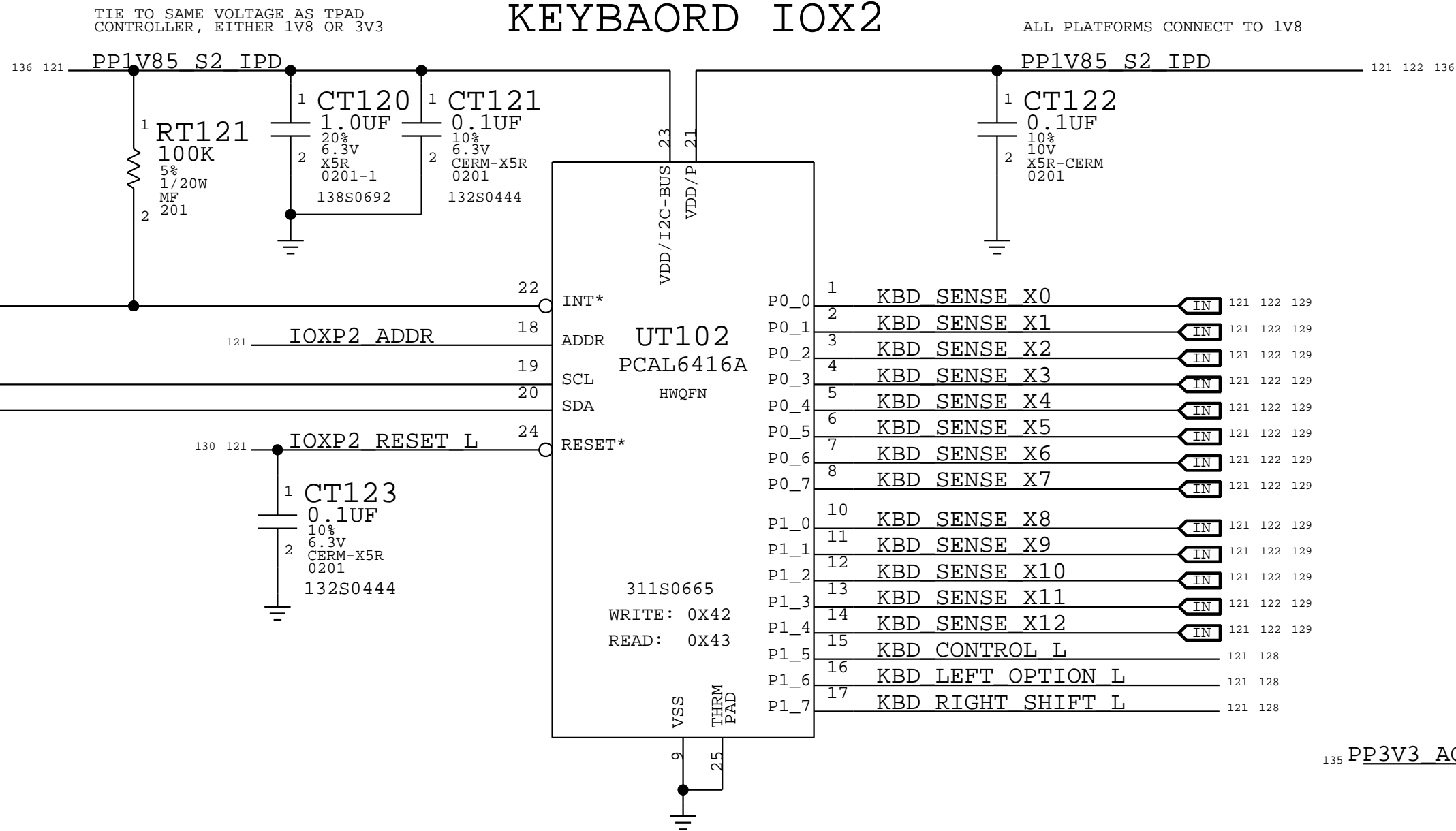
## KEYBAORD IOX1



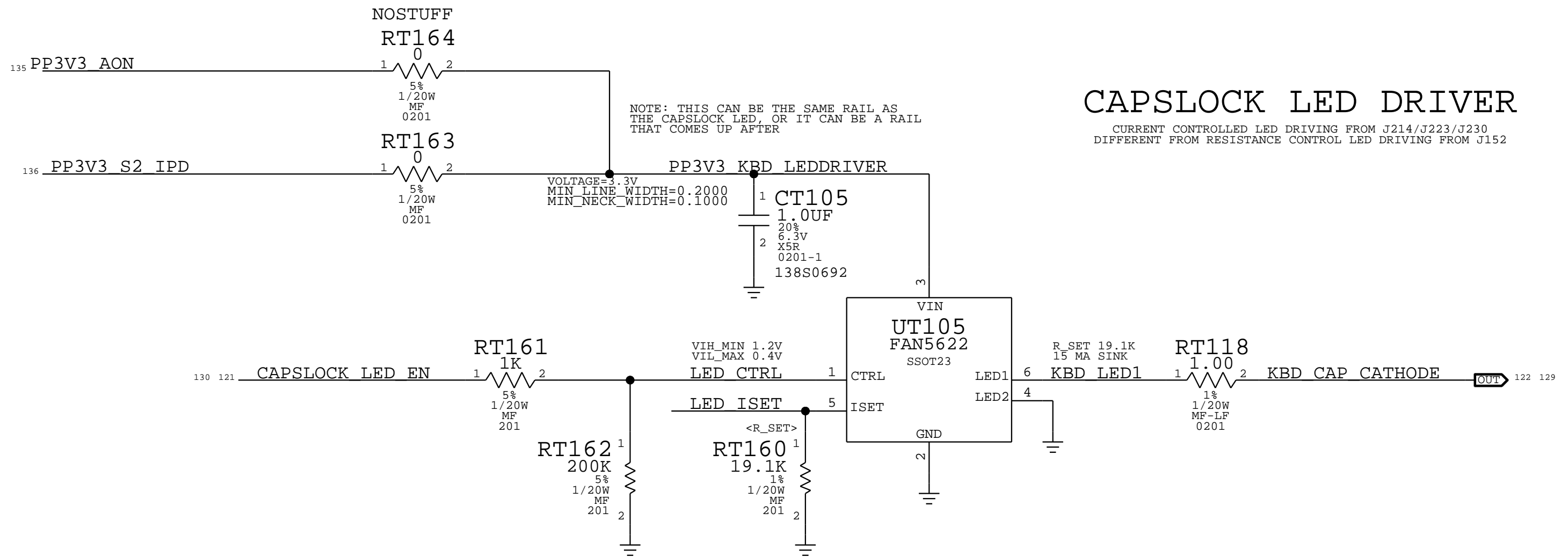
## 3.3V RSLOC ISOLATION KEYS/ASIC RESET



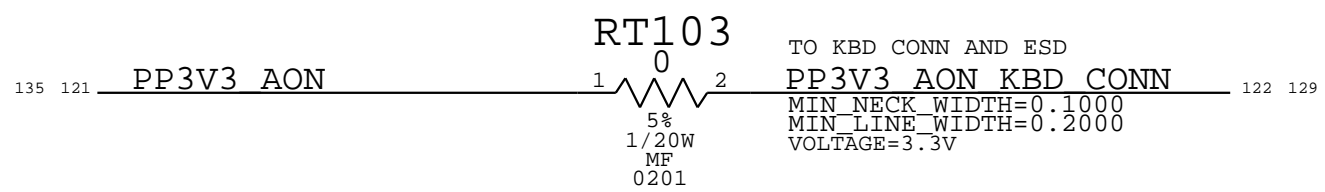
## KEYBAORD IOX2



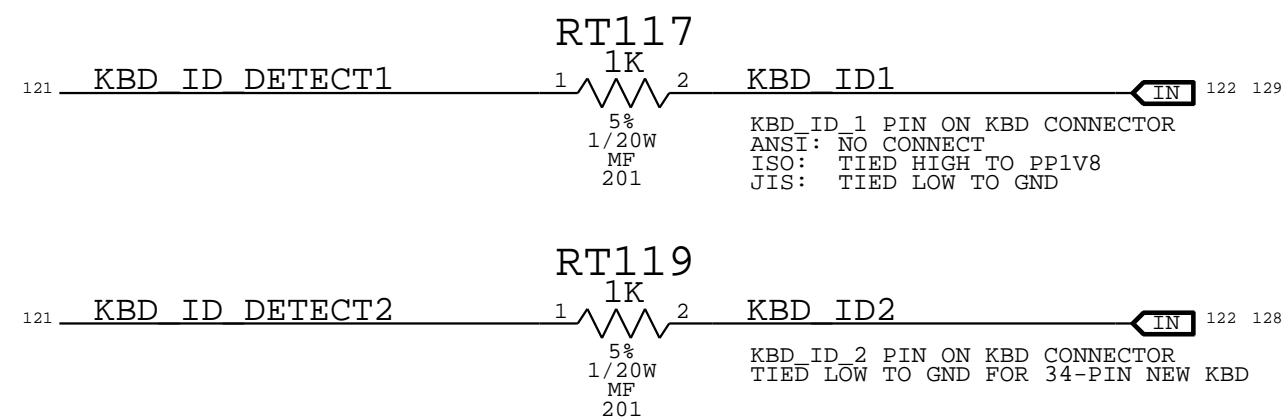
## CAPSLCK LED DRIVER



## 3V3 KBD CONN SERIES R



## ID\_DETECT SERIES R



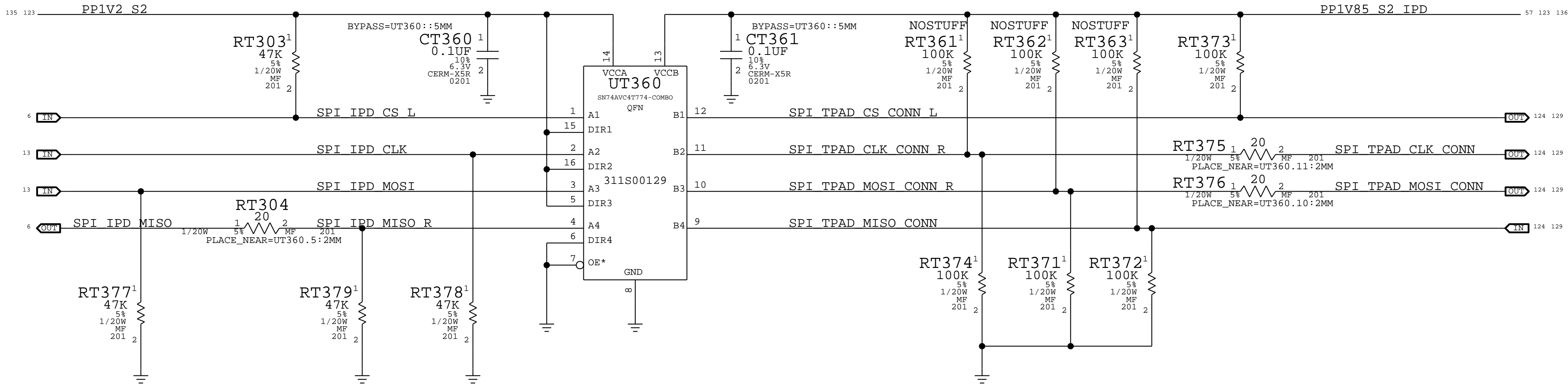
BOM\_COST\_GROUP=KEYBOARD

PAGE TITLE		
KEYBOARD IOX, SUPPORT		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	251 OF 999
	SHEET	121 OF 155





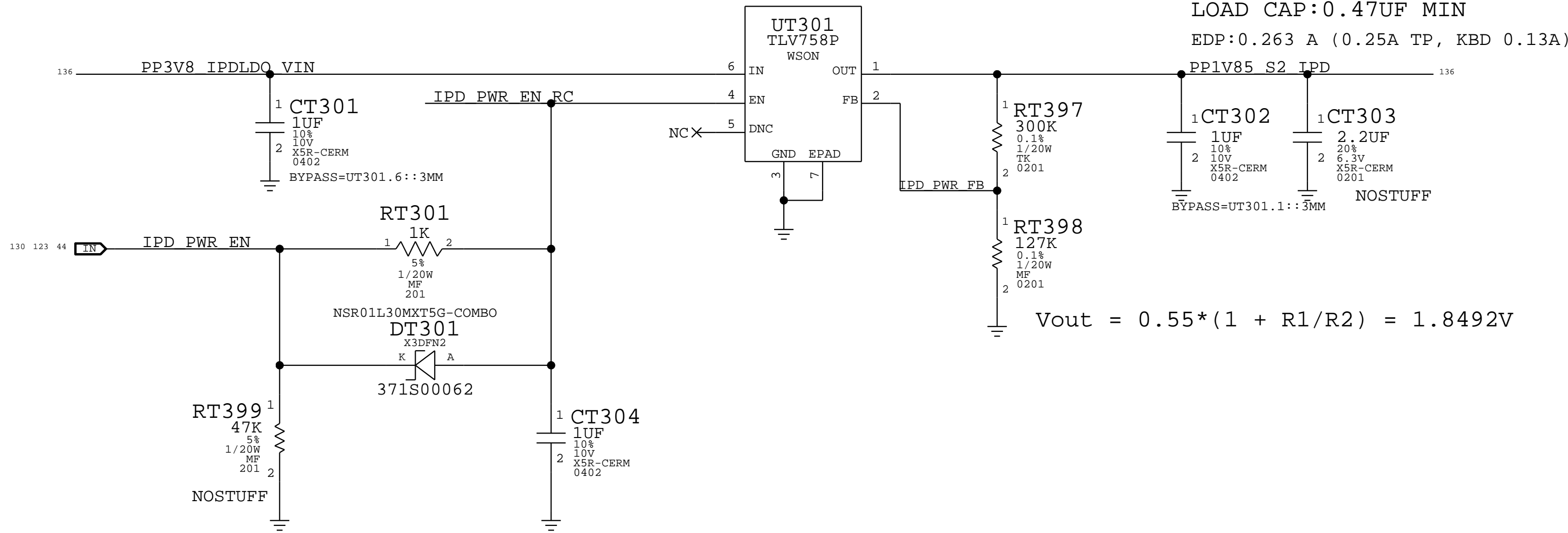
TRACKPAD SPI BUS LEVEL SHIFTER (+1.2V TO +1.8V)



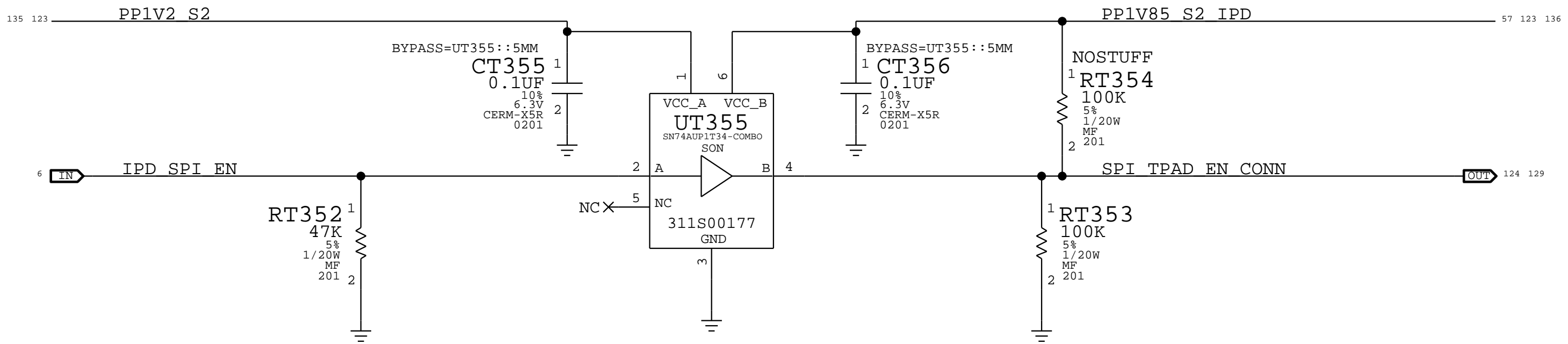
SN74AVC4T774 Truth Table

CTRL INPUTS		OUTPUT CIRCUITS		OPERATION
/OE	DIR	A PORT	B PORT	
L	L	Enabled	Hi-Z	B data to A data
L	H	Hi-Z	Enabled	A data to B data
H	X	Hi-Z	Hi-Z	Isolation

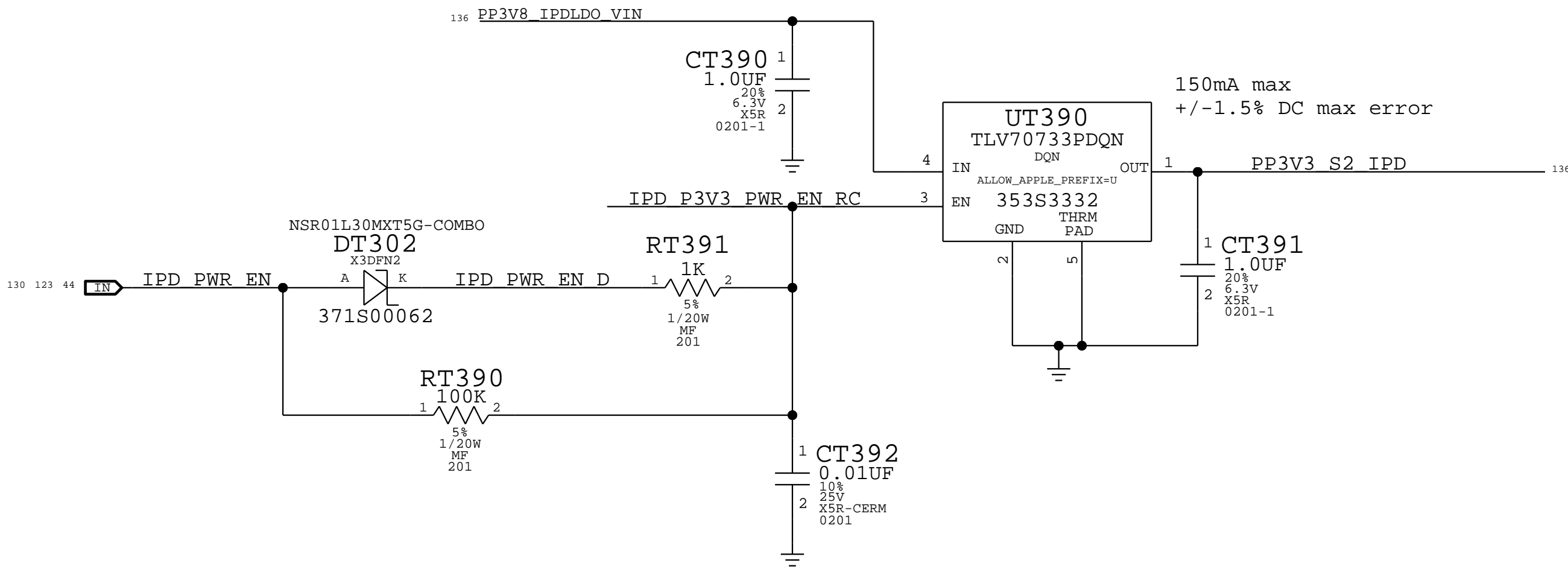
IPD LDO  
1.85 V FOR TRACKPAD AND KEYBOARD IOX



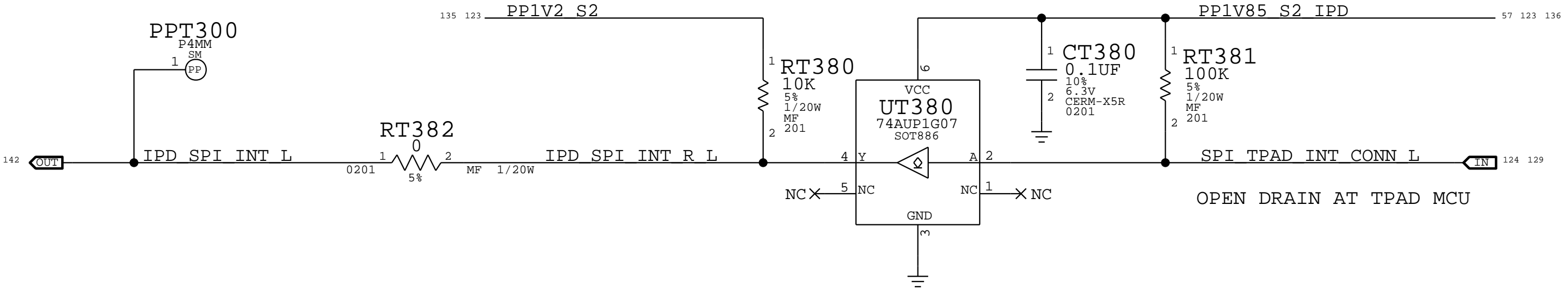
TRACKPAD SPI ENABLE LEVEL SHIFTER



3.3V S2 LDO FOR TPAD

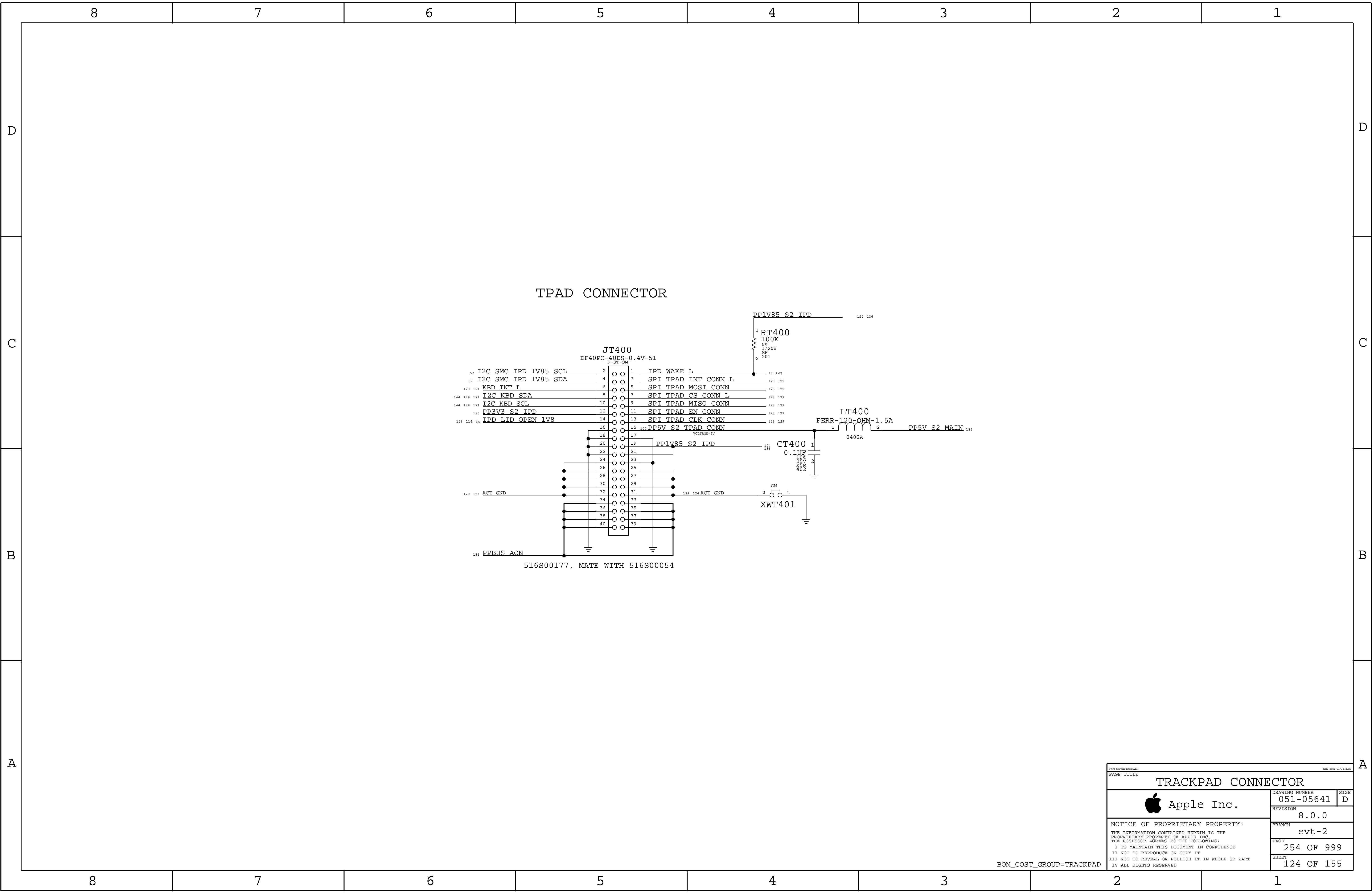


IPD SPI INTERRUPT LEVEL SHIFTER



TRACKPAD SUPPORT		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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 ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	253 OF 999
	SHEET	123 OF 155

BOM\_COST\_GROUP=TRACKPAD

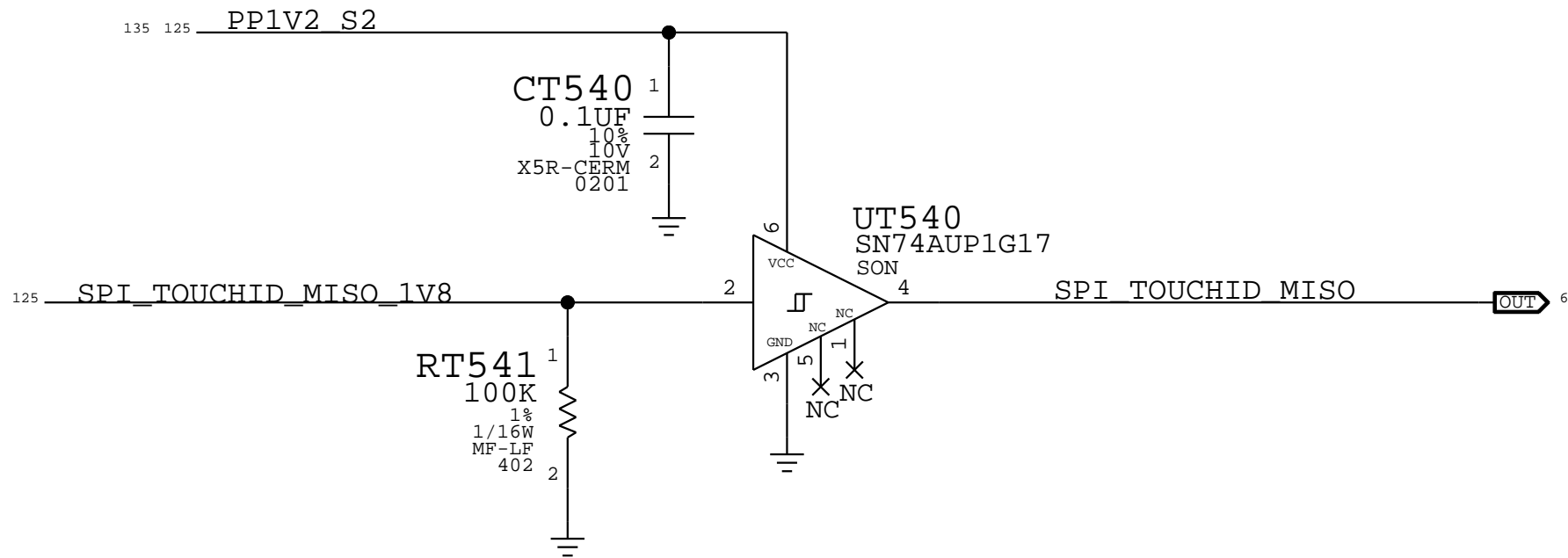
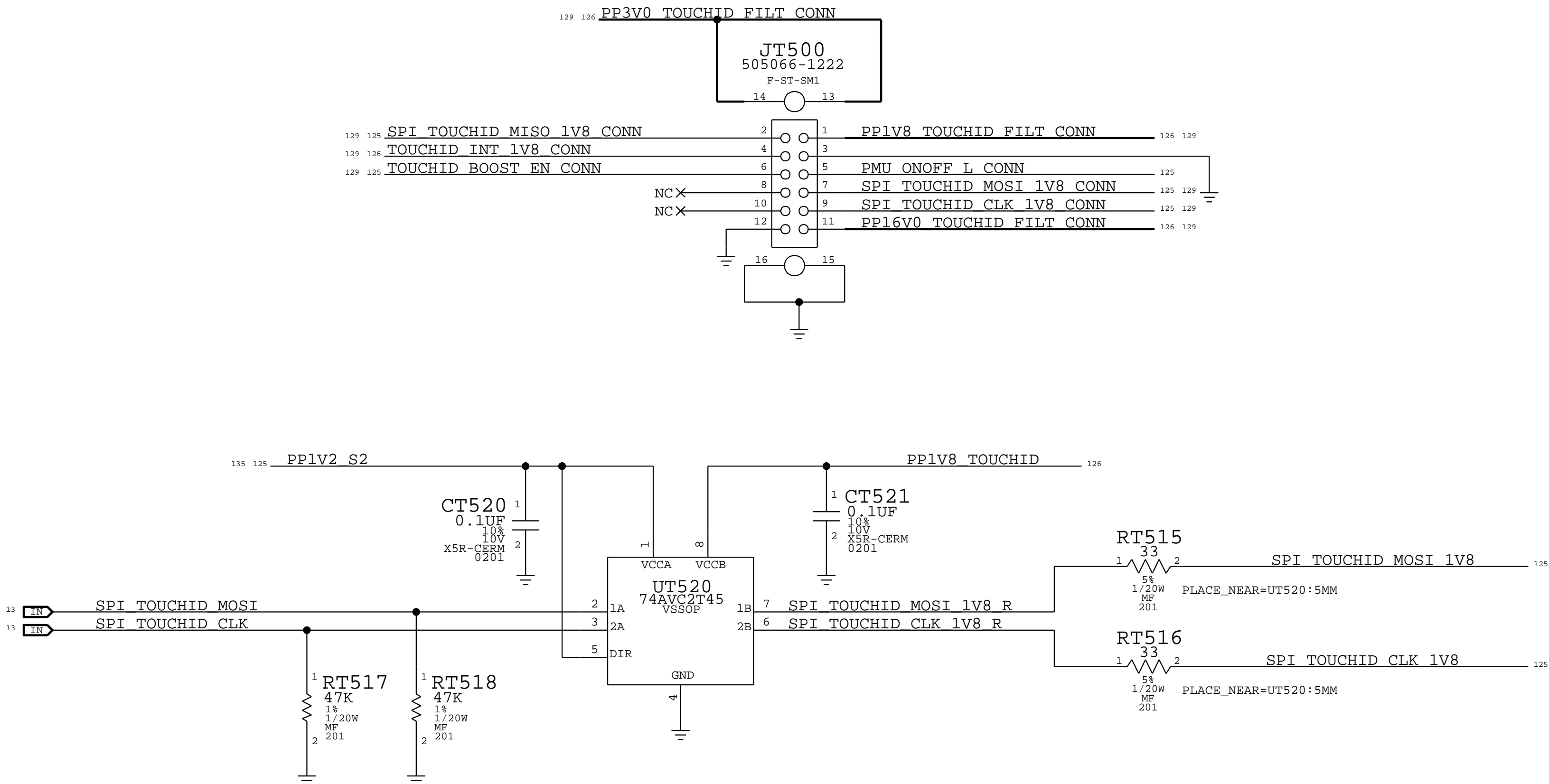
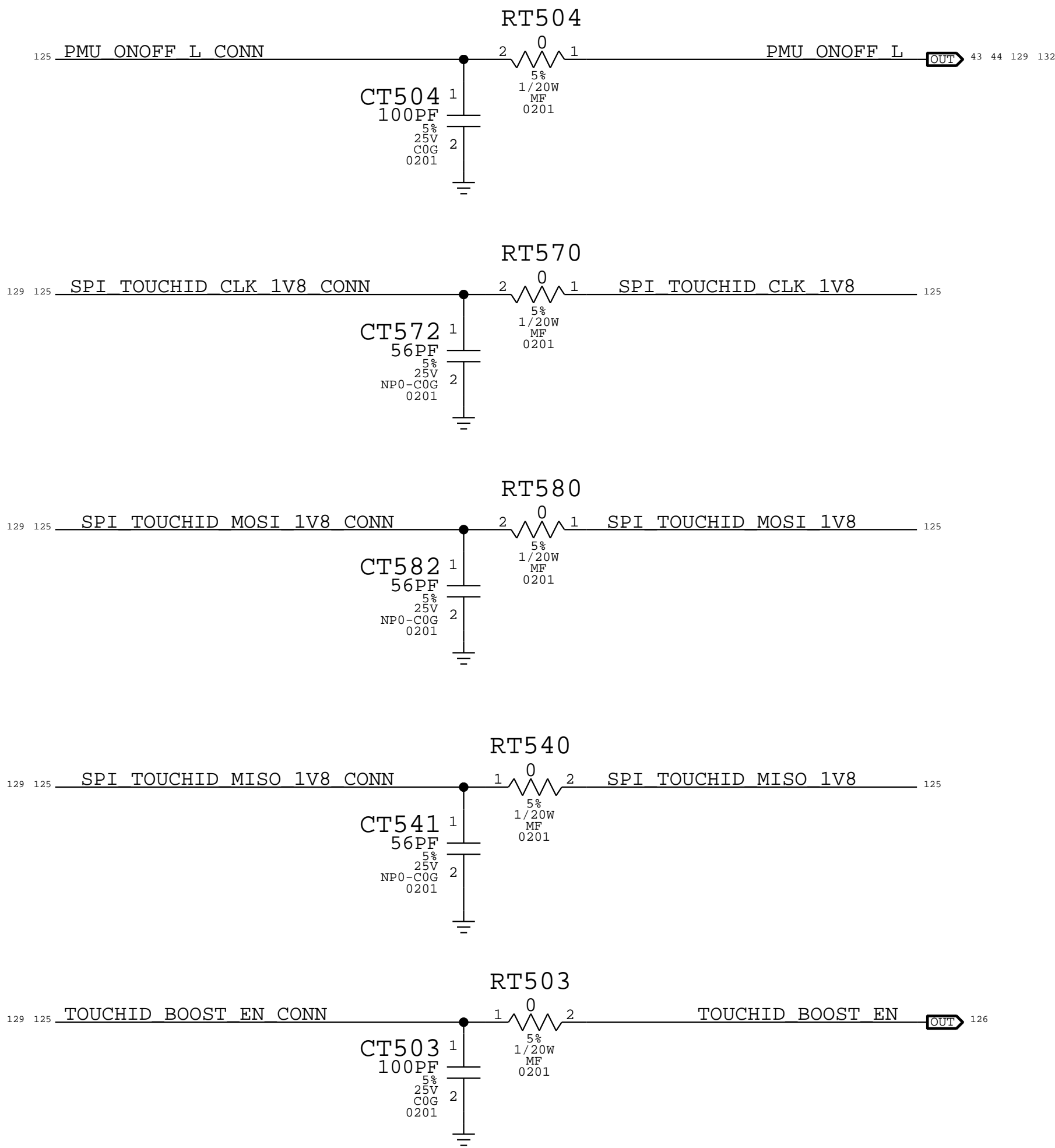


PAGE TITLE			DRAWING NUMBER			SIZE		
TRACKPAD CONNECTOR			051-05641			D		
Apple Inc.			REVISION			8.0.0		
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED			BRANCH			evt-2		
			PAGE			254 OF 999		
			SHEET			124 OF 155		


\*\*\* OK2INTEGRATE \*\*\*

THIS PAGE FOR REFERENCE ONLY - COPY ONCE, SYNC ONLY AS NEEDED

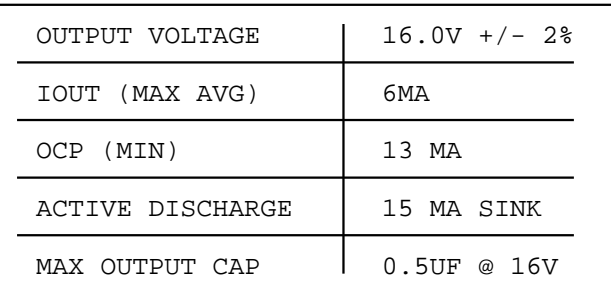
ISOLATE FROM OTHER COMPONENTS / NETS AS MUCH AS POSSIBLE



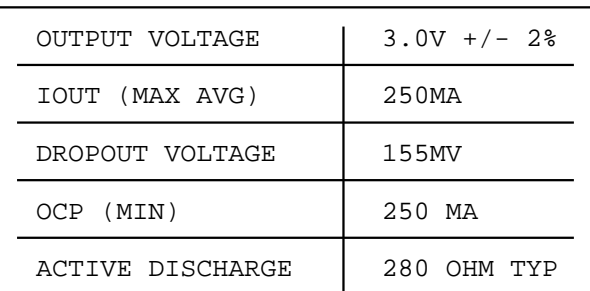
BOM\_COST\_GROUP=TOUCHID

SYNC_MASTER=JSHAO		
PAGE TITLE		
TOUCHID CONN		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	255 OF 999
	SHEET	125 OF 155

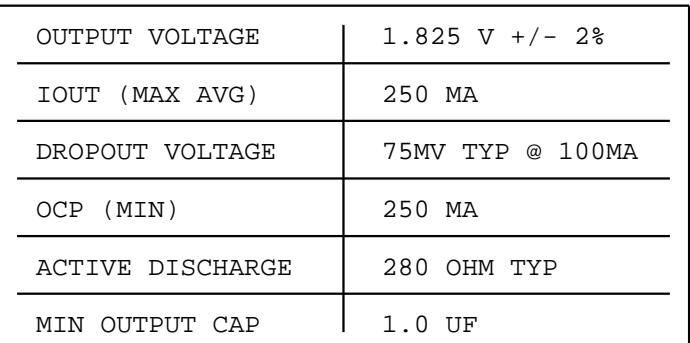
## EMC FILTER



## EMC FILTER



## EMC FILTER



129 125

TOUCHID INT 1V8 CONN

1 2

1k  
1/20W  
NF  
201

CT650  
100PF

1 2

25V  
C90  
0201

TOUCHID INT

128

1.33K  
1/20W  
NF  
201

D

## D




## C



## A

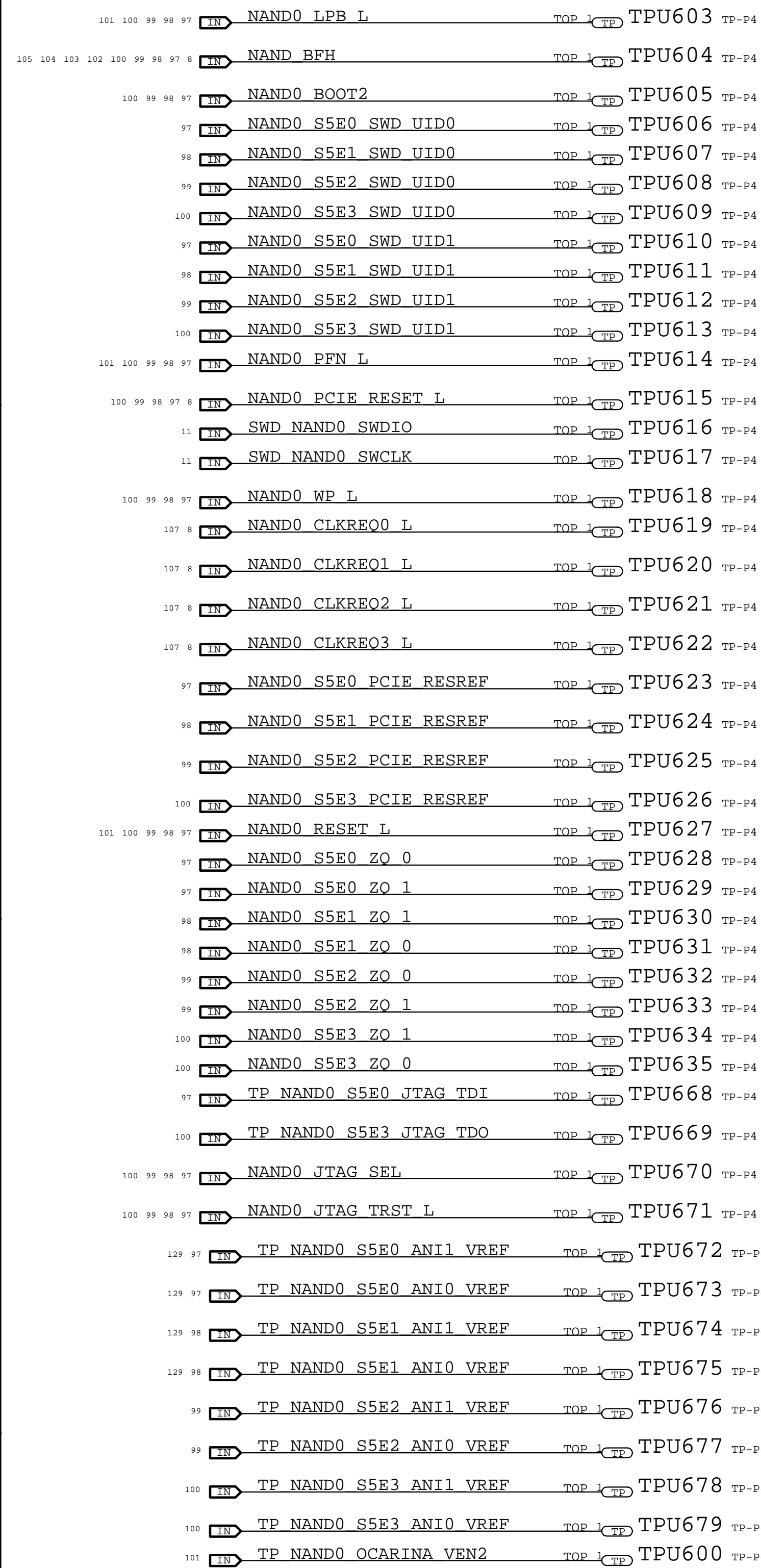
A

BOM\_COST\_GROUP=TOUCHID

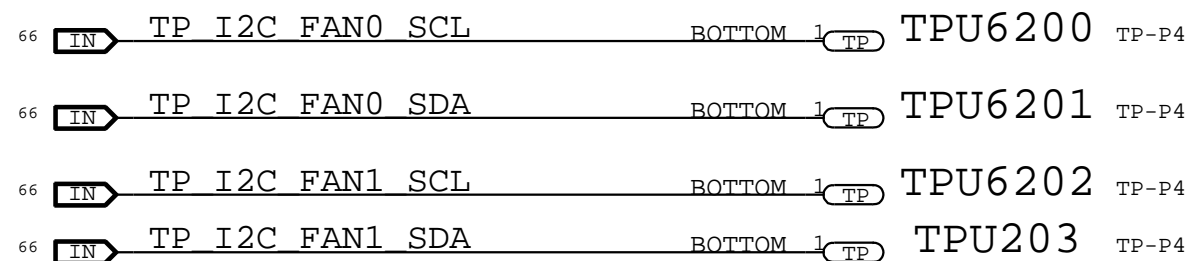
PAGE TITLE		TOUCHID_BACKLIGHT	
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
	REVISION		
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  II NOT TO REPRODUCE OR COPY IT  III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		8.0.0	
		BRANCH	
		evt-2	
		PAGE	
		257	OF 999
		SHEET	
		127	OF 155



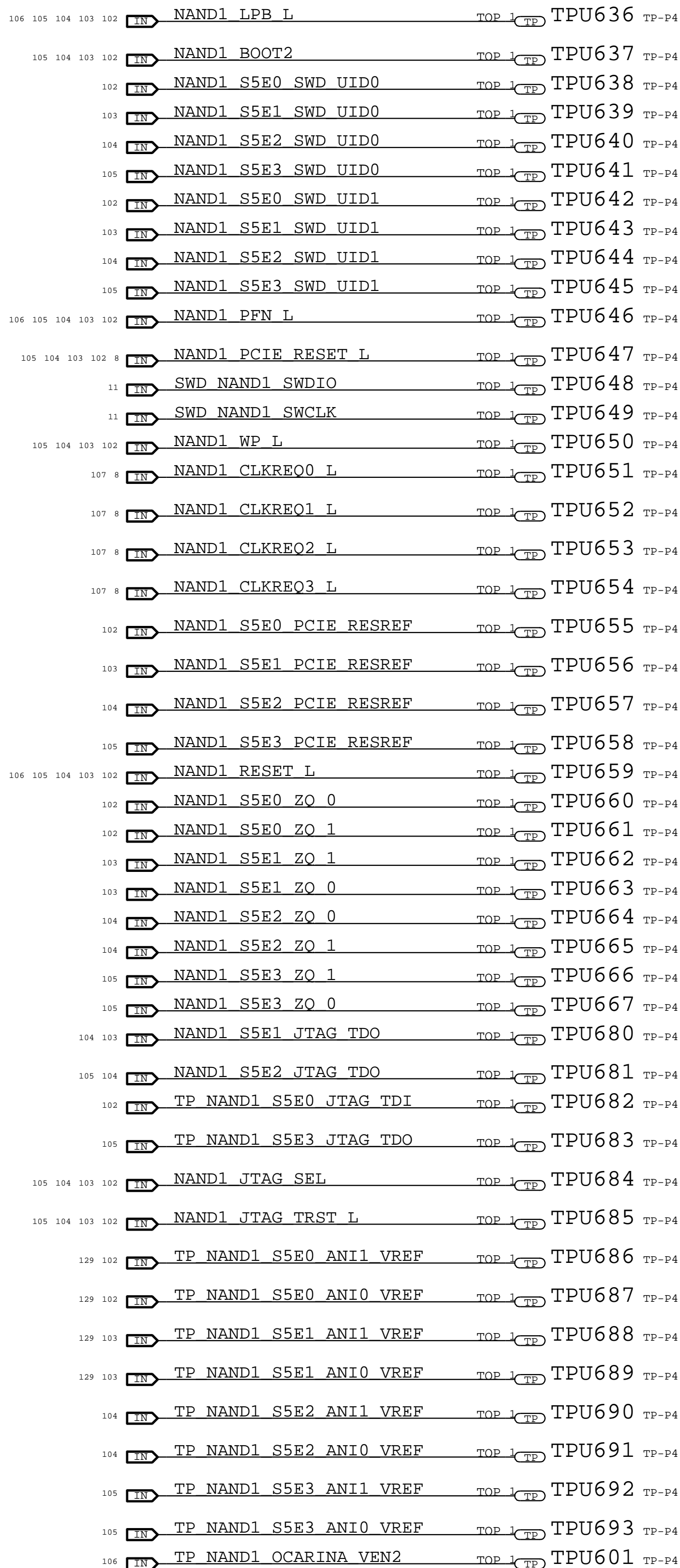
## NAND0 TEST POINTS



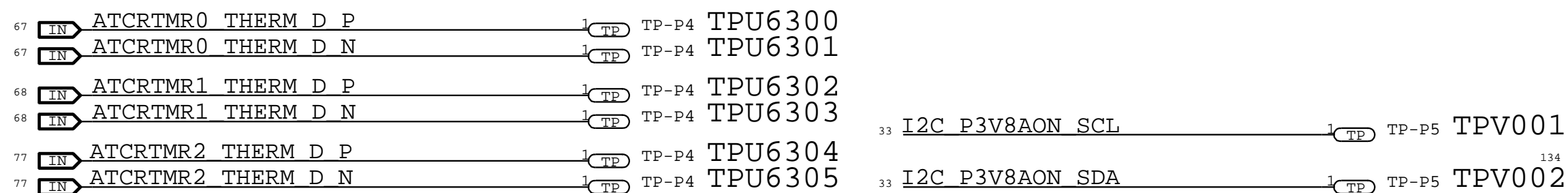
## FAN TEST POINTS



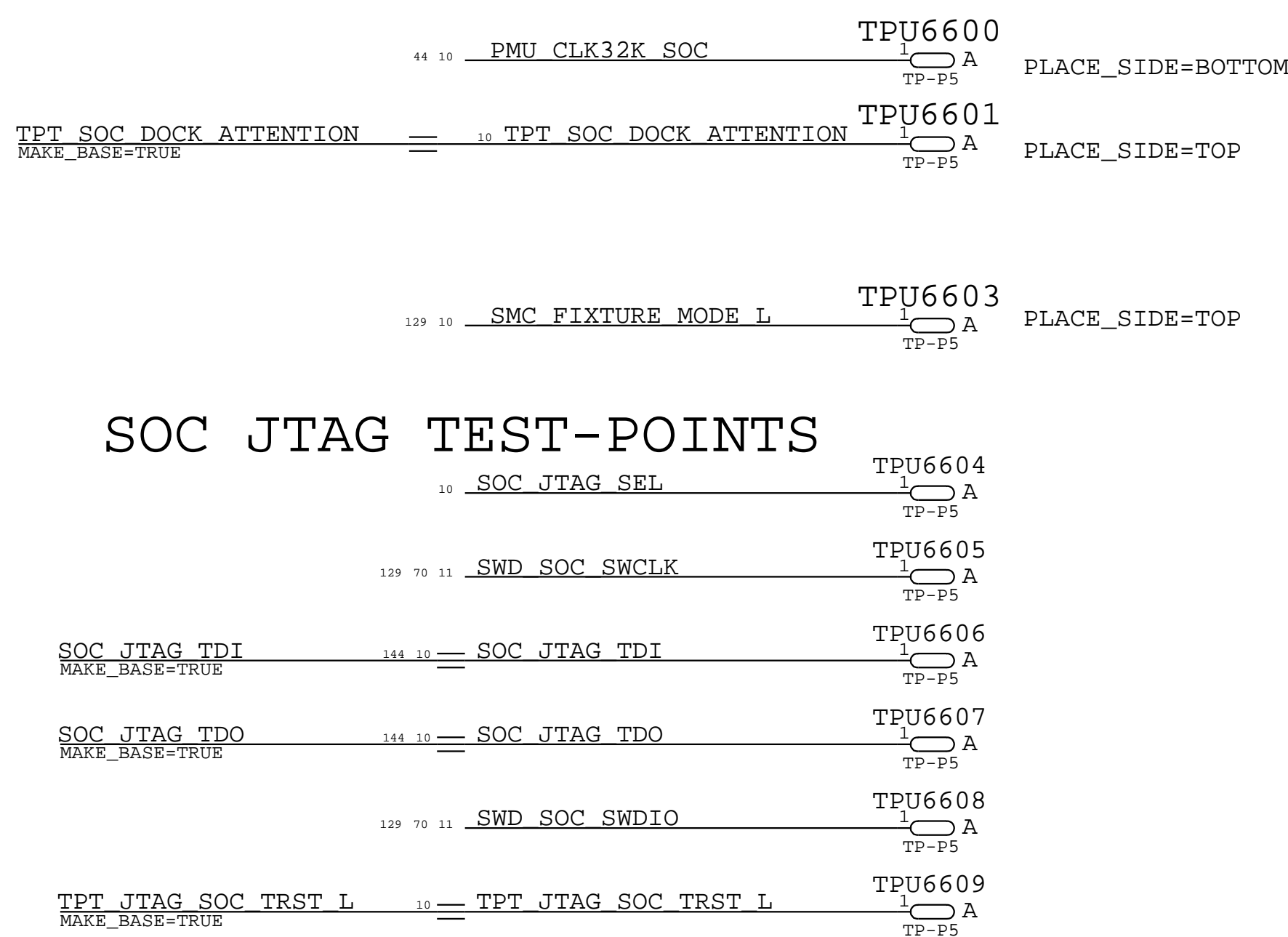
## NAND1 TEST POINTS



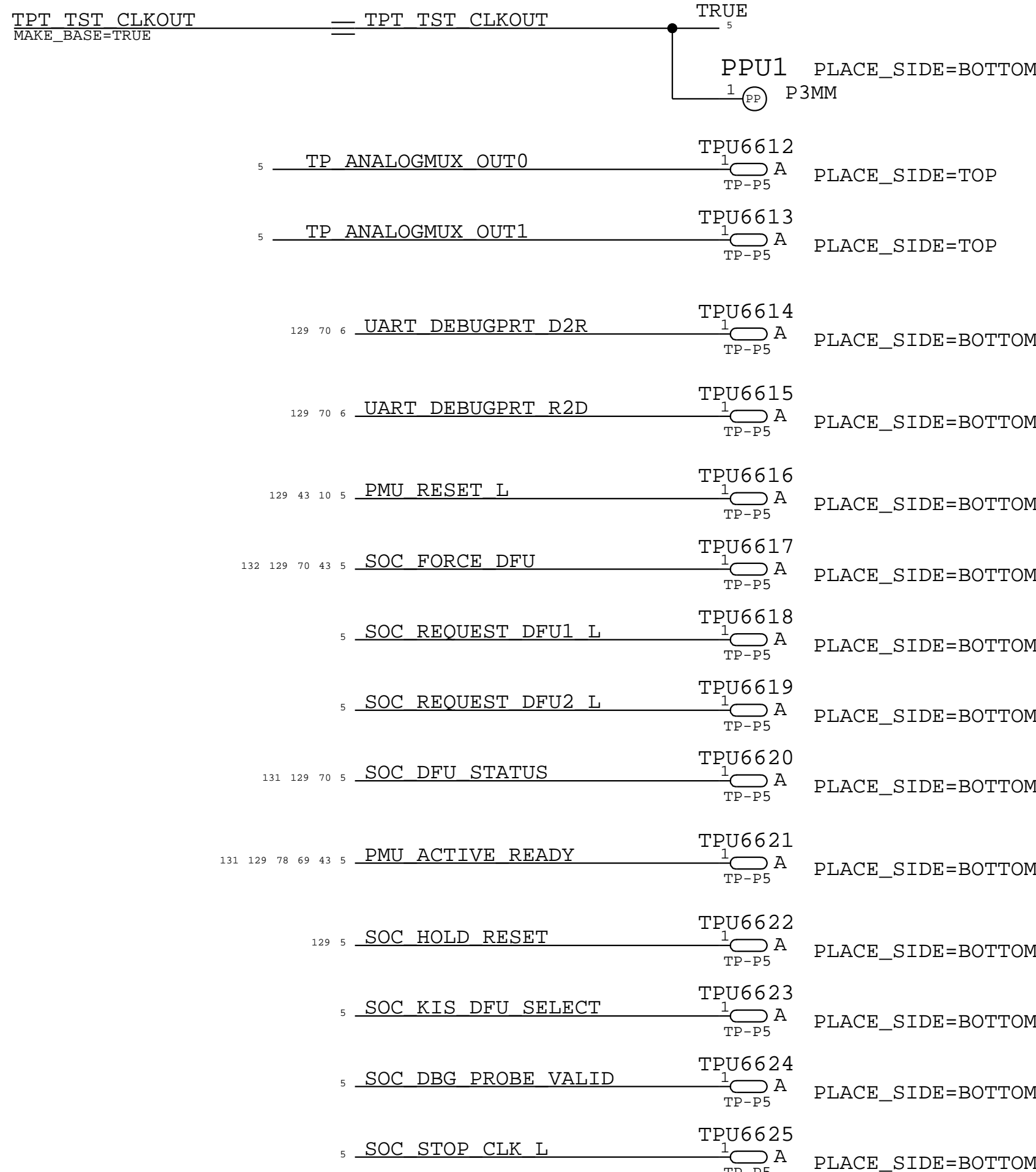
## BSB THERMAL TESTPOINTS



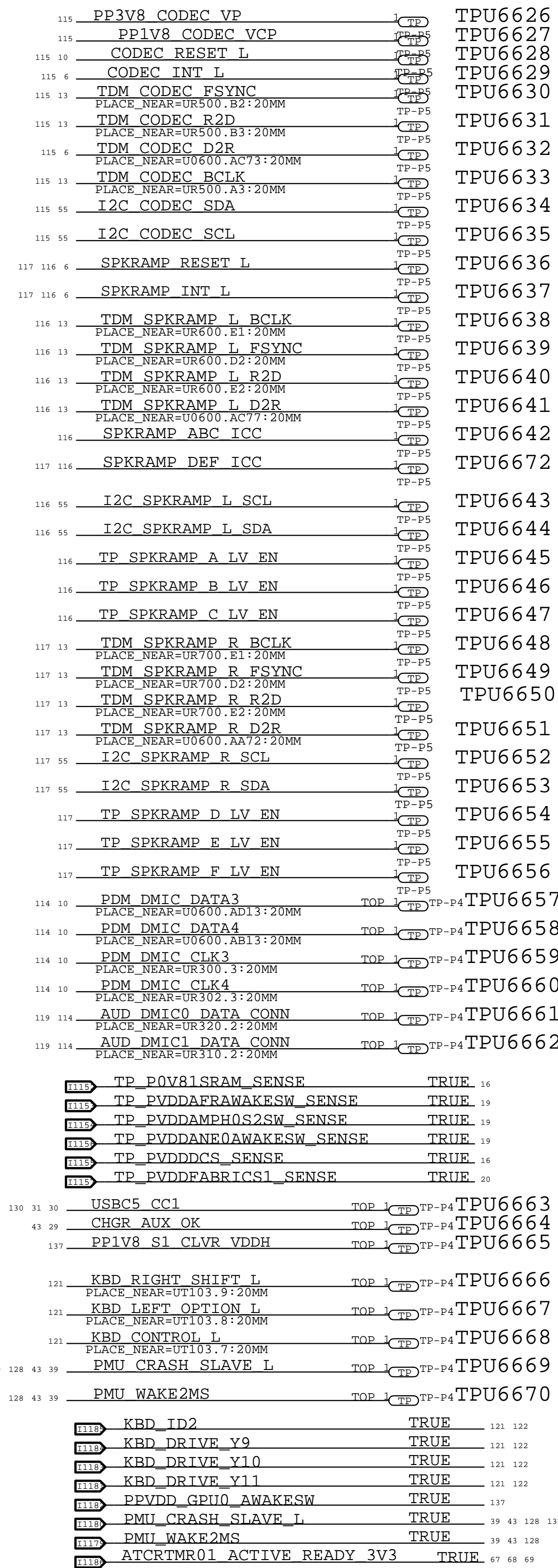
## SOC MISC DEBUG TEST-POINTS




# SOC DEBUG TEST-POINTS



TEST POINTS  
REQUESTED BY  
BY AUDIO TEAM



PAGE TITLE		FCT 1	
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE D
	REVISION	8.0.0	
NOTICE OF PROPRIETARY PROPERTY:	BRANCH	evt-2	
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	PAGE	266 OF 999	
	SHEET	128 OF 155	

D

C

B

A

DFU, Debug		FUNC_TEST	
115	USBC0_USB_TOP_P	TRUE	71 73
116	USBC0_USB_TOP_N	TRUE	71 73
117	USB2_ATC0_LS_P	TRUE	144
118	USB2_ATC0_LS_N	TRUE	144
119	USB_DBG_LS_N	TRUE	70 144
120	USB_DBG_LS_P	TRUE	70 144
121	SOC_FORCE_DFU	TRUE	5 43 70 128 132
122	SOC_DFU_STATUS	TRUE	5 70 128 131
123	SOC_FORCE_DFU_DBG	TRUE	132
124	UART_DEBUGPRT_R2D	TRUE	6 70 128
125	UART_DEBUGPRT_D2R	TRUE	6 70 128
126	SWD_SOC_SWCLK	TRUE	11 70 128
127	SWD_SOC_SWDIO	TRUE	10 70
128	UART_SMC_DEBUGPRT_R2D	TRUE	10 70
129	UART_SMC_DEBUGPRT_D2R	TRUE	10 70
130	SMC_FIXTURE_MODE_L	TRUE	10 128
131	I2C_SMC_UPC_SDA	TRUE	10 32 56 130
132	I2C_SMC_UPC_SCL	TRUE	10 32 56 130
133	PMU_SYS_ALIVE	TRUE	43 75 81 90 101
134	PMU_ACTIVE_READY	TRUE	43 69 78 128
135	PMU_ONOFF_L	TRUE	131
136	PMU_RSL0C_RST_L	TRUE	43 44 125 132
137	SOC_SOCHOT_L	TRUE	43 44 121 132
138	PMU_RESET_L	TRUE	5 43
139	PMU_SHDN	TRUE	5 10 43 128
140	SOC_TESTMODE	TRUE	5
141	SOC_HOLD_RESET	TPU7A1	TP-P4

Battery		FUNC_TEST	
135	PPVBAT_AON	TPU700	TP-P4
136	PPVBAT_AON	TPU701	TP-P4
137	PPVBAT_AON	TPU702	TP-P4
138	PPVBAT_AON	TPU703	TP-P4
139	PPVBAT_AON	TPU704	TP-P4
140	PPVBAT_AON	TPU705	TP-P4
141	PPVBAT_AON	TPU706	TP-P4
142	PPVBAT_AON	TPU707	TP-P4
143	PPVBAT_AON	TPU708	TP-P4
144	PPVBAT_AON	TPU709	TP-P4
145	PPVBAT_AON	TPU710	TP-P4
146	PPVBAT_AON	TPU711	TP-P4
147	PPVBAT_AON	TPU712	TP-P4
148	PPVBAT_AON	TPU713	TP-P4
149	PPVBAT_AON	TPU714	TP-P4
150	PPVBAT_AON	TPU715	TP-P4
151	PPVBAT_AON	TPU716	TP-P4
152	SMBUS_BATT_SDA	TRUE	27 56 130
153	SMBUS_BATT_SCL	TRUE	27 56 130
154	SYS_DETECT_L	TRUE	27
155	SYS_DETECT	TRUE	27 132
156	I2C_SMC_PWR_SCL	TRUE	10 56
157	I2C_SMC_PWR_SDA	TRUE	10 56 135 130
158	GND	TPU717	TP-P4

Charger		FUNC_TEST	
135	PPDCIN_AON	TPU718	TP-P4
136	PPDCIN_AON	TPU719	TP-P4
137	PPDCIN_AON	TPU720	TP-P4
138	PPDCIN_AON	TPU721	TP-P4
139	PPDCIN_AON	TPU722	TP-P4
140	PPDCIN_AON	TPU723	TP-P4
141	PPDCIN_AON	TPU724	TP-P4
142	PPDCIN_AON	TPU725	TP-P4
143	PPDCIN_AON	TPU726	TP-P4
144	PPDCIN_AON	TPU727	TP-P4
145	PPDCIN_AON	TPU728	TP-P4
146	PPDCIN_AON_CHGR	TRUE	32 59
147	PPHV_INT5_AONSW	TRUE	32 130
148	PPVBUS_USBC5	TPU729	TP-P4
149	PPVBUS_USBC5	TPU730	TP-P4
150	PPVBUS_USBC5	TPU731	TP-P4
151	PPVBUS_USBC5	TPU732	TP-P4
152	PPVBUS_USBC5	TPU733	TP-P4
153	PPVBUS_USBC5	TPU734	TP-P4
154	PPVBUS_USBC5	TPU735	TP-P4
155	PPVBUS_USBC5	TPU736	TP-P4
156	PPVBUS_USBC5	TPU737	TP-P4
157	PPVBUS_USBC5	TPU738	TP-P4
158	PPVBUS_USBC5	TPU739	TP-P4
159	PP5V_CHGR	TRUE	29
160	CHGR_INT_L	TRUE	29 142
161	CHGR_RST_IN	TRUE	27 28 44
162	CHGR_THSNS	TRUE	44 64
163	PP5V_CHGR_SW	TPU7A0	TP-P4
164	GND	TPU740	TP-P4
165	GND	TPU741	TP-P4
166	GND	TPU742	TP-P4
167	GND	TPU743	TP-P4
168	GND	TPU744	TP-P4
169	GND	TPU745	TP-P4
170	GND	TPU746	TP-P4
171	GND	TPU747	TP-P4
172	GND	TPU748	TP-P4
173	GND	TPU749	TP-P4
174	GND	TPU750	TP-P4

Power rails		FUNC_TEST	
135	PPBUS_AON	TPU751	TP-P4
136	PPBUS_AON	TPU752	TP-P4
137	PPBUS_AON	TPU753	TP-P4
138	PPBUS_AON	TPU754	TP-P4
139	PPBUS_AON	TPU755	TP-P4
140	PPBUS_AON	TPU756	TP-P4
141	PPBUS_AON	TPU757	TP-P4
142	PPBUS_AON	TPU758	TP-P4
143	PPBUS_AON	TPU759	TP-P4
144	PPBUS_AON	TPU760	TP-P4
145	PPBUS_AON	TPU761	TP-P4
146	PPVDD_DISP_AWAKESW	TRUE	135
147	PPOV81_S1_SRAM	TRUE	138
148	PPOV95_S2SW_VDD2L	TRUE	138
149	PP1V8_S2SW	TRUE	131 138
150	PPOV575_S1_VDDQ0	TRUE	139
151	PPOV575_S1_VDDQ1	TRUE	138
152	PPOV855_S2SW_VDDCIO	TRUE	139
153	PPVDD_GPU_BMER_S1	TRUE	138
154	PPVDD_AMPH1_S2SW	TRUE	138
155	PPVDD_AMPH0_S2SW	TRUE	139
156	PPVDD_ECPIU_AWAKE	TRUE	14 138
157	PP1V8_AWAKE	TRUE	139
158	PPVDD_AVEMSR_AWAKESW	TRUE	138
159	PPVDD_FIXED_S1	TRUE	138
160	PPVDD_SOC_S1	TRUE	139
161	PPVDD_DCS_S1	TRUE	139
162	PP1V8_S2	TRUE	129 139
163	PP1V8_S2	TRUE	129 139
164	PP1V2_S2	TRUE	138
165	PP1V8_AON	TRUE	138
166	PP1V2_AWAKE	TRUE	139
167	PPVDD2H0_S2SW	TRUE	138
168	PPVDD2H1_S2SW	TRUE	138
169	PP1V2_S2_CLVLR_VDDIO	TRUE	138
170	PP1V8_S2SW_CLVLR_VDDC1_LDO	TRUE	129 138
171	PPOV8_S2_CLVLR_VDDDIG	TRUE	129 138
172	PP1V2_AON	TRUE	138
173	PP1V5_AON_VCORE_MPMU	TRUE	41
174	PPOV9_NAND0	TRUE	101
175	PP1V2_NAND0	TRUE	101
176	PP2V5_NAND0	TRUE	101
177	PPOV9_NAND1	TRUE	106
178	PP1V2_NAND1	TRUE	106
179	PP2V5_NAND1	TRUE	106
180	PP3V3_S2SW_USBC0	TRUE	136
181	PP3V3_S2SW_USBC1	TRUE	136
182	PP3V3_S2SW_USBC2	TRUE	136
183	PP5V_S2SW_USBC01	TRUE	130 136
184	PP5V_S2SW_USBC23	TRUE	130 136
185	PPANEL_SW_LCD_REG	TRUE	135
186	PP3V3_AON	TRUE	131 135
187	PP3V3_S2	TRUE	131 138
188	PP5V_S2_MAIN	TPU762	TP-P4
189	GND	TPU763	TP-P4
190	PP3V3_UPC0_LDO	TRUE	69 70 71 76
191	PP5V0_HDMI_DDC_CONN	TRUE	86
192	PPVBAT_AON_CHGR_R	TRUE	86
193	PPVBAT_AON_CHGR_REG	TRUE	28
194	GND	TPU764	TP-P4
195	GND	TPU765	TP-P4
196	GND	TPU766	TP-P4
197	PPOV72_S2_VDDL0W	TRUE	139
198	PPOV8_S2_CLVLR_VDDDIG	TRUE	129 138
199	PP1V8_S2SW_CLVLR_VDDC1_LDO	TRUE	129 138
200	PP1V8_S2SW_SNS	TRUE	135
201	PP1V85_S2_IPD	TRUE	129 136
202	PPVDD_DISP2_AWAKESW	TRUE	139
203	PPVBUS_USBC0	TRUE	69 71 73 129 130
204	PPVBUS_USBC1	TRUE	69 72 73 129
205	PP5V_S2_HDMI	TRUE	75 80 81 129
206	PP1V2_AON_SPMU	TRUE	37
207	PP1V8_AON_SPMU	TRUE	37
208	PP1V8_S2SW_DP2HDMI	TRUE	91
209	PP3V3_AWAKE_SW_SD	TRUE	91 93 94
210	PP3V3_SW_ACR5	TRUE	29 31 130
211	PP3V3_S2SW_DP2HDMI	TRUE	90
212	PPBUS_AONSW_FAN_LEFT	TPU767	TP-P4
213	FAN_0_TACH	TPU768	TP-P4
214	PPBUS_AON_FAN1_FILT	TPU769	TP-P4
215	GND	TPU770	TP-P4
216	GND	TPU771	TP-P4
217	GND	TPU772	TP-P4
218	SMC_FAN_1_PWM_3V3	TRUE	46
219	FAN_1_TACH	TRUE	46
220	FAN_PWR_EN	TRUE	39 46
221	GND	TPU773	TP-P4
222	GND	TPU774	TP-P4
223	GND	TPU775	TP-P4
224	GND	TPU776	TP-P4

Fan		FUNC_TEST	
136	PPBUS_AONSW_FAN_LEFT	TPU767	TP-P4
137	FAN_0_TACH	TPU768	TP-P4
138	PPBUS_AON_FAN1_FILT	TPU769	TP-P4
139	GND	TPU770	TP-P4
140	GND	TPU771	TP-P4
141	GND	TPU772	TP-P4
142	SMC_FAN_1_PWM_3V3	TRUE	46
143	FAN_1_TACH	TRUE	46
144	FAN_PWR_EN	TRUE	39 46
145	GND	TPU773	TP-P4
146	GND	TPU774	TP-P4
147	GND	TPU775	TP-P4
148	GND	TPU776	TP-P4

USB-C		FUNC_TEST	
115	PPVBUS_USBC0	TPU778	TP-P4
		TPU779	TP-P4
		TPU780	TP-P4
		TPU781	TP-P4
		TPU782	TP-P4
		TPU783	TP-P4
116	USBC0_SBU1	TRUE	71 73
117	USBC0_SBU2	TRUE	71 73
118	USBC0_CC1	TRUE	70 71 76
119	USBC0_CC2	TRUE	70 71 76
120	TP_USBC0_PP20V	TRUE	73
121	I2C UPC0 ATCRTMR0_SCL	TRUE	67 69 71 74
122	I2C UPC0 ATCRTMR0_SDA	TRUE	67 69 71 74
123	ATCRTMR0_RESET_L	TRUE	67 69 71 74
124	GND	TPU784	TP-P4
125	PPVBUS_USBC1	TPU785	TP-P4
		TPU786	TP-P4
		TPU787	TP-P4
		TPU788	TP-P4
		TPU789	TP-P4
		TPU790	TP-P4
126	USBC1_CC1	TRUE	70 72 76
127	USBC1_CC2	TRUE	70 72 76
128	USBC1_SBU1	TRUE	72 73
129	USBC1_SBU2	TRUE	72 73
130	TP_USBC1_PP20V	TRUE	73
131	I2C UPC1 ATCRTMR1_SCL	TRUE	68 69 72 74
132	I2C UPC1 ATCRTMR1_SDA	TRUE	68 69 72 74
133	ATCRTMR1 RESET_L	TRUE	68 72 74
134	UPC01_5V_EN	TRUE	75
135	GND	TPU791	TP-P4
136	PPVBUS_USBC2	TPU792	TP-P4
		TPU793	TP-P4
		TPU794	TP-P4
		TPU795	TP-P4
		TPU796	TP-P4
		TPU797	TP-P4
137	USBC2_CC1	TRUE	76 79 80
138	USBC2_CC2	TRUE	76 79 80
139	USBC2_SBU1	TRUE	80 81
140	USBC2_SBU2	TRUE	80 81
141	TP_USBC2_PP20V	TRUE	81
142	I2C UPC2 ATCRTMR2_SCL	TRUE	77 78 80 82
143	I2C UPC2 ATCRTMR2_SDA	TRUE	77 78 80 82
144	ATCRTMR2 RESET_L	TRUE	77 80 82
145	UPC23_5V_EN	TRUE	83
146	GND	TPU798	TP-P4

SSD		FUNC_TEST	
133	TP_NAND0_S5E0_ANIO_VREF	TRUE	97 128
134	TP_NAND0_S5E0_ANI1_VREF	TRUE	97 128
135	TP_NAND0_S5E1_ANIO_VREF	TRUE	98 128
136	TP_NAND0_S5E1_ANI1_VREF	TRUE	98 128
137	TP_NAND1_S5E0_ANIO_VREF	TRUE	102 128
138	TP_NAND1_S5E0_ANI1_VREF	TRUE	102 128
139	TP_NAND1_S5E1_ANIO_VREF	TRUE	103 128
140	TP_NAND1_S5E1_ANI1_VREF	TRUE	103 128

Camera		FUNC_TEST	
134	PP5V_S2_CAMERA	TRUE	136
135	I2C_CAM_1V8_SDA	TRUE	57 108
136	I2C_ALS_1V8_SDA	TRUE	57 108
137	I2C_CAM_1V8_SCL	TRUE	57 108
138	I2C_ALS_1V8_SCL	TRUE	57 108
139	ALS_INT_L	TRUE	10 108
140	FTCAM_ENABLE_1V8_OUT	TRUE	114 142
141	LPDP_FTCAM_AUX	TRUE	108 129
142	FTCAM_RESET_L	TRUE	7 114
143	GND	TPU799	TP-P4

Display		FUNC_TEST	
149	PP3V8_AWAKE_TCON	TRUE	136
150	I2C_SMC_SNS0_SCL_1V8	TRUE	57
151	I2C_SMC_SNS0_SDA_1V8	TRUE	57
152	UART_TCON_D2R_1V8	TRUE	109
153	EDP_PANEL_1V8_EN	TRUE	109 110
154	LPDP_INT_HPD	TRUE	109 140 142
155	SPT_TCON_CS_L	TRUE	6 109
156	SPT_TCON_MISO	TRUE	6 109
157	SPT_TCON_MOSI	TRUE	13 109
158	SPT_TCON_CLK	TRUE	13 109
159	GND	TPU800	TP-P4

BCON		FUNC_TEST	
149	I2C_TCON_BKLT_SCL_1V8	TRUE	55
150	I2C_TCON_BKLT_SDA_1V8	TRUE	55
151	BL PMIC PWR_EN	TRUE	83 112
152	PPVOUT_LUXE	TRUE	111 112 129
		TPU801	TP-P4
		TPU802	TP-P4
		TPU803	TP-P4
		TPU804	TP-P4
		TPU805	TP-P4
		TPU806	TP-P4
153	PP1V2_AWAKESW_BLC	TRUE	135
154	PP3V8_AWAKE_BKLTCONN	TRUE	136
155	DISP_BKLT_LVSYNC	TRUE	7 112
156	BKLT_BOOST_THROTTLE_CONN_L	TRUE	112
157	DISP_2DBL_FSYNC	TRUE	7 112



## SPMU PPS

P 3MM	SM	PPU800	1	SPMU BUCK5 LX0	38
P 3MM	SM	PPU801	1	SPMU BUCK5 LX1	38
P 3MM	SM	PPU802	1	SPMU BUCK5 LX2	38
P 3MM	SM	PPU803	1	SPMU BUCK5 LX3	38
P 3MM	SM	PPU804	1	SPMU BUCK5 FB R	38
P 3MM	SM	PPU805	1	SPMU BUCK5 FB	38
P 3MM	SM	PPU806	1	SPMU BUCK6 LX0	38
P 3MM	SM	PPU807	1	SPMU BUCK6 FB R	38
P 3MM	SM	PPU808	1	SPMU BUCK6 FB	38
P 3MM	SM	PPU809	1	SPMU BUCK7 LX0	38
P 3MM	SM	PPU810	1	SPMU BUCK7 LX1	38
P 3MM	SM	PPU811	1	SPMU BUCK7 LX2	38
P 3MM	SM	PPU812	1	SPMU BUCK8 LX0	38
P 3MM	SM	PPU813	1	SPMU BUCK8 FB R	38
P 3MM	SM	PPU814	1	SPMU BUCK8 FB	38
P 3MM	SM	PPU815	1	SPMU BUCK9 LX0	38
P 3MM	SM	PPU816	1	SPMU BUCK9 FB R	38
P 3MM	SM	PPU817	1	SPMU BUCK9 FB	38
P 3MM	SM	PPU818	1	SPMU BUCK10 LX0	38
P 3MM	SM	PPU819	1	SPMU BUCK10 LX1	38
P 3MM	SM	PPU820	1	SPMU BUCK10 LX2	38
P 3MM	SM	PPU821	1	SPMU BUCK10 FB R	38
P 3MM	SM	PPU822	1	SPMU BUCK10 FB	38
P 3MM	SM	PPU823	1	SPMU BUCK0 LX0	38
P 3MM	SM	PPU824	1	SPMU BUCK0 LX1	38
P 3MM	SM	PPU825	1	SPMU BUCK0 LX2	38
P 3MM	SM	PPU826	1	SPMU BUCK0 LX3	38
P 3MM	SM	PPU827	1	SPMU BUCK0 FB	38
P 3MM	SM	PPU828	1	SPMU BUCK0 FB R	38
P 3MM	SM	PPU829	1	SPMU BUCK1 LX0	38
P 3MM	SM	PPU830	1	SPMU BUCK1 LX1	38
P 3MM	SM	PPU8031	1	SPMU BUCK1 FB	38
P 3MM	SM	PPU832	1	SPMU BUCK1 FB R	38
P 3MM	SM	PPU833	1	SPMU BUCK2 LX0	38
P 3MM	SM	PPU834	1	SPMU BUCK2 FB	38
P 3MM	SM	PPU835	1	SPMU BUCK2 FB R	38
P 3MM	SM	PPU836	1	SPMU BUCK3 LX0	38
P 3MM	SM	PPU837	1	SPMU BUCK3 FB	38
P 3MM	SM	PPU838	1	SPMU BUCK3 FB R	38
P 3MM	SM	PPU839	1	SPMU BUCK4 LX0	38

## PPU840

## PPU870

P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK0_LX2	42
PPU871				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK0_LX3	42
PPU872				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK0_FB	42
PPU873				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK0_FB_R	42
PPU874				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK1_LX0	42
PPU875				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK1_LX1	42
PPU876				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK1_FB	42
PPU877				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK1_FB_R	42
PPU878				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK2_LX0	42
PPU879				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK2_FB	42
PPU880				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK2_FB_R	42
PPU881				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK3_LX0	42
PPU882				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK3_FB	42
PP8				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK3_FB_R	42
PPU884				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK4_LX0	42
PPU885				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK4_LX1	42
PPU886				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK4_LX2	42
PPU887				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK4_LX3	42
PPU888				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK4_FB	42
PPU889				
P3MM	SM	$\textcircled{\text{PP}}^1$	MPMU_BUCK4_FB_R	42

UPC PMU RESET 1V2

TRUE

43

TPU

134 132 80 72 71 44

UPC PMU RESET 3V3

TRUE

43

TPU

PLACE\_SIDE=BOTTOM

EDP BKLT 1V29 EN

TRUE

44 110

EDP BKLT 1V29 EN

IPD PWR EN

TRUE

44 123

IPD PWR EN

IPD PWR EN PMU

TRUE

44

IPD PWR EN PMU

PPU8A0

P3MM

SM

PP

1

MPMU VPP OTP

43

MPMU VPP OTP

PPU8A3

P3MM

SM

PP

1

VSS ANA SPMU

38

VSS ANA SPMU

PPU8A5

P3MM

SM

PP

1

SPMU VPP OTP

39

SPMU VPP OTP

PPU8A8

P3MM

SM

PP

1

CLVR VDDH UVWARN L

5

CLVR VDDH UVWARN L

PPU8A9

P3MM

SM

PP

1

P1V8VDDH ILIMIT THROTTLE

5

P1V8VDDH ILIMIT THROTTLE

PPU8B0

P3MM

SM

PP

1

P1V8VDDH PWR EN

43

P1V8VDDH PWR EN

PPU8B1

P3MM

SM

PP

1

P1V8VDDH SLP L

43

P1V8VDDH SLP L

PPU8B2

P3MM

SM

PP

1

P3V8AON LPM

33

P3V8AON LPM

PPU8B7

P3MM

SM

PP

1

PMU UVWARN L

5

PMU UVWARN L

MAGSAFE PPs

29

PP3V3 HVLDQ\_OUT

BOTTOM

PP3V3 HVLDQ\_OUT

9 31 29

PP3V3 SW ACE5

BOTTOM

PP3V3 SW ACE5

130

HVSW\_G2

BOTTOM

HVSW\_G2

38 31 30

USBC5\_C01

BOTTOM

USBC5\_C01

16 32 10

I2C\_SMC\_UPC\_SCL

BOTTOM

I2C\_SMC\_UPC\_SCL

16 32 10

I2C\_SMC\_UPC\_SDA

BOTTOM

I2C\_SMC\_UPC\_SDA

29

VBUS\_USBC5\_UV

BOTTOM

VBUS\_USBC5\_UV

29

INT5\_DIS

BOTTOM

INT5\_DIS

29

INT5\_DIS\_C

BOTTOM

INT5\_DIS\_C

130 29

PPVBUS\_MID

BOTTOM

PPVBUS\_MID

USB-C ATC1 Aardvarkanoid PPs

69 11

SWD\_UPC01\_UART\_DATA

BOTTOM

SWD\_UPC01\_UART\_DATA

9 32 11

SWD\_UPC01\_UART\_CLK

BOTTOM

SWD\_UPC01\_UART\_CLK

70

SPI\_UPC1\_MISO

BOTTOM

SPI\_UPC1\_MISO

70

SPI\_UPC1\_MOSI

BOTTOM

SPI\_UPC1\_MOSI

70

SPI\_UPC1\_CLK

BOTTOM

SPI\_UPC1\_CLK

70 69

SPI\_UPC1\_CS\_L

BOTTOM

SPI\_UPC1\_CS\_L

69 32

I2C\_UPC01\_3V3\_SDA

BOTTOM

I2C\_UPC01\_3V3\_SDA

69 32

I2C\_UPC01\_3V3\_SCL

BOTTOM

I2C\_UPC01\_3V3\_SCL

72 61 69

PP1V2\_S2

BOTTOM

PP1V2\_S2

## USBC Debug 3mm PP PLACE\_SIDE=BOTTOM

129	73	71	69	PPVBS0_USBC0	1	CP
69				PPHV_INT0_AONSW	1	CP
136	129			PP5V_S2SW_USBC01	1	CP
129	73	72	69	PPVBS0_USBC1	1	CP
69				PPHV_INT1_AONSW	1	CP
129	81	80	78	PPVBS0_USBC2	1	CP
78				PPHV_INT2_AONSW	1	CP
136	129			PP5V_S2SW_USBC23	1	CP
129	30	29		PPVBS0_USBC5	1	CP
129	32			PPHV_INT5_AONSW	1	CP
32	31	30		PPHV_DIV	1	CP
32				PD_ACE5_VCONN	1	CP
DCDC Debug 3mm PP						
129	56	27		SMBUS_BATT_SCL	BOTTOM	1 CP
129	56	27		SMBUS_BATT_SDA	BOTTOM	1 CP
28				CHGR_COMP	TOP	1 CP
28				CHGR_BGATE	TOP	1 CP
48	47			PIV8VDDH_DRMOS_PWM1	TOP	1 CP
48	47			PIV8VDDH_DRMOS_PWM2	TOP	1 CP
48	47			PIV8VDDH_DRMOS_PWM3	TOP	1 CP
5 47						
129	56	27		SPI_DISP_BKLT_MISO	BOTTOM	1 CP
PLACE_NEAR=U0600.AP74:17MM						
129	56	27		PPVDD_ANE0_SRAM_AWAKESW	TRUE	137
129	56	27		PPVDD_GPU_SRAM0_AWAKESW	TRUE	137
129	56	27		I2C_UPC0_ATCRTMR0_SCL	TRUE	67 69
129	56	27		I2C_UPC0_ATCRTMR0_SDA	TRUE	67 69
129	56	27		USBC0_CC1_CONN	TRUE	73 76
129	56	27		USBC0_CC2_CONN	TRUE	73 76
129	56	27		USBC1_CC1_CONN	TRUE	73 76
129	56	27		USBC1_CC2_CONN	TRUE	73 76
129	56	27		USBC2_CC1_CONN	TRUE	76 81
129	56	27		USBC2_CC2_CONN	TRUE	76 81
129	56	27		P5VS2TPS_PGOOD	TRUE	29 35
129	56	27		HDMI_HPD_AOP	TRUE	10 89
129	56	27		PMU_VDDHI_UVWARN_L	TRUE	11 43
129	56	27		PMU_VDDMAIN_UVWARN_L	TRUE	11 43
129	56	27		DBL_CLICK_DET	TRUE	6 43
129	56	27		UPC_SMC_I2C_INT_L	TRUE	10 56
129	56	27		PIV8VDDH_TLIMIT_THROTTLE_L	TRUE	5 47
129	56	27		TP_AON_SLEEP1_RESET_L	TRUE	10
PPU2				PPVBS0_MID	TRUE	29 13
PPU3				HVSW_G1	TRUE	29
PPU4				HVSW_G2	TRUE	29 13
PPU5						
PPU6						
PPU7						
PPU7A						
PPU7B						
PPU7C						
PPU7D						
PPU8						
PPU9						
PPU10						
PPU11						
PPU12						
PPU13						
PPU14						
PPU15						
PPU16						
USB-C (cont.)						
129	56	27		I2C_UPC_SCL	TRUE	
129	56	27		I2C_UPC_SDA	TRUE	
129	56	27		I2C_UPC5_SCL	TRUE	
129	56	27		I2C_UPC5_SDA	TRUE	
129	56	27		P5VUSBC01_EN	TRUE	
129	56	27		P5VUSBC23_EN	TRUE	
129	56	27		USBC0_3V3LDO_EN	TRUE	
129	56	27		USBC1_3V3LDO_EN	TRUE	
129	56	27		USBC2_3V3LDO_EN	TRUE	
129	56	27		PMU_CRASH_L	TRUE	PLACE_SII
129	56	27		PMU_CRASH_SLAVE_L	TRUE	39 43 128
129	56	27		CLVR_FABRIC_ILIMIT_THROTTLE_L		
129	56	27		CLVR_RESET_L	TRUE	
129	56	27		P3V8AON_PWR_EN	TRUE	
129	56	27		P5VS2_PWR_EN	TRUE	
129	56	27		P5VS2TPS_PWR_EN	TRUE	
129	56	27		IPD_PWR_HOLD	TRUE	39 44

NAND (cont.)

PPU8C0	12C_SMC_NAND_SCL	TRUE	10 56
PPU8C1	12C_SMC_NAND_SDA	TRUE	10 56
PPU8C2	NAND0_OCARINA_VREF	TRUE	101
PPU8C3	NAND1_OCARINA_VREF	TRUE	106
PPU8C4	NAND1_S5E0_JTAG_TDO	TRUE	102 103
PPU8C5	P2V5_NAND0_PGOOD	TRUE	101
PPU8C6	P2V5_NAND1_PGOOD	TRUE	106
PPU8C7	PPVDD_LDO_NAND0_OCARINA	TRUE	101
PPU8C8	PPVDD_LDO_NAND1_OCARINA	TRUE	106
PPU8C9			
PPU8D0			
PPU8D1			
SoC		FUNC_TEST	
1669	SPI_SOCROM_1V8_CS_L	TRUE	12
1670	I2C_SEEPROM_SCL	TRUE	6 12
1668	I2C_SEEPROM_SDA	TRUE	6 12
PPU8D2			
PPU8D3			
NAND (cont.)		FUNC_TEST	
1670	NAND0_OCARINA_TDEV1	TRUE	101
1669	NAND1_OCARINA_TDEV2	TRUE	106 130
1670	NAND0_S5E0_JTAG_TDO	TRUE	97 98
1669	NAND0_S5E1_JTAG_TDO	TRUE	98 99
1670	NAND0_S5E2_JTAG_TDO	TRUE	99 100
1669	NAND1_OCARINA_TDEV1	TRUE	106
1670	NAND1_OCARINA_TDEV2	TRUE	106 130
1670	P2V5_NAND0_EN_R	TRUE	101
1670	P2V5_NAND1_EN_R	TRUE	106
PPU8D9			
PMICs		FUNC_TEST	
1670	PMU_CLK32K_CLVR	TRUE	44 50 51
1669	PMU_VDDHI	TRUE	41
1670	SPMI_NUB_MPMU_CLK	TRUE	13 43
1670	SPMI_NUB_MPMU_DATA	TRUE	13 43
1669	SPMI_NUB_SPMU_CLK	TRUE	13 39
1670	SPMI_NUB_SPMU_DATA	TRUE	13 39
1669	SWD_NUB_PMU_SWCLK	TRUE	11 13
1670	SWD_NUB_PMU_SWIO	TRUE	11 13
1669	PMU_FAULT_OUT_L	TRUE	39 43
1670	DEBUG_SPMU_GPIO16	TRUE	44
WLBT		FUNC_TEST	
1669	PMU_CLK32K_WLBT	TRUE	44 95 96
1669	TPT_WLAN_JTAG_TCK	TRUE	95 96
1669	TPT_WLAN_JTAG_TDI	TRUE	95
1669	TPT_WLAN_JTAG_TMS	TRUE	95 96
1669	TPT_WLAN_JTAG_TRSTN	TRUE	95
1669	WLBT_RESET_L		
1669	BT_TIME_SYNC	TRUE	6 95 96
1669	WLBT_PWR_EN	TRUE	43 44 95
IPD		FUNC_TEST	
1669	CAPSLCK_LED_EN	TRUE	121
1669	IOXP1_RESET_L	TRUE	121
1669	IOXP2_RESET_L	TRUE	121
1669	KBDBKLT_ISET_KEYB	TRUE	120 129
Sensor		FUNC_TEST	
1669	AIRFLOW_C_THMSNS	TRUE	44 64
1669	AIRFLOW_L_THMSNS	TRUE	44 64
1669	AIRFLOW_R_THMSNS	TRUE	44 64
1669	DCIN_VSENSE	TRUE	43 58
1669	FINSTACK_L_THMSNS	TRUE	44 64
1669	FINSTACK_R_THMSNS	TRUE	44 64
1669	MEMU_THMSNS	TRUE	44 64
1669	P1V8VDDH_THMSNS_1	TRUE	44 64
1669	P1V8VDDH_THMSNS_2	TRUE	44 64
1669	P1V8VDDH_THMSNS_3	TRUE	44 64
1669	P3V8AON_THMSNS	TRUE	44 64
1669	PRUS_VSENSE	TRUE	44 58
1669	SOC_THMSNS_1	TRUE	44 64
1669	SPMU_THMSNS	TRUE	44 64
1669	WING_L_THMSNS	TRUE	44 64
1669	WING_R_THMSNS	TRUE	44 64
1669	WLBT_THMSNS	TRUE	44 64

sensor

0900	AIRFLOW_C_THMSNS	TRUE	04 64
0900	AIRFLOW_L_THMSNS	TRUE	04 64
0900	AIRFLOW_R_THMSNS	TRUE	04 64
0902	DCIN_VSENSE	TRUE	03 50
0909	FINSTACK_L_THMSNS	TRUE	04 64
0909	FINSTACK_R_THMSNS	TRUE	04 64
0909	MPMU_THMSNS	TRUE	04 64
0900	P1V8VDDH_THMSNS_1	TRUE	04 64
0900	P1V8VDDH_THMSNS_2	TRUE	04 64
0900	P1V8VDDH_THMSNS_3	TRUE	04 64
0900	P3V8AON_THMSNS	TRUE	04 64
0900	PBUS_VSENSE	TRUE	04 64
0900	SOC_THMSNS_1	TRUE	04 64
0900	SPMU_THMSNS	TRUE	04 64
0900	WING_L_THMSNS	TRUE	04 64
0900	WING_R_THMSNS	TRUE	04 64
0900	WLBT_THMSNS	TRUE	04 64

```
SYNC_MASTER=SELIN
```

PAGE	TITLE
------	-------



Apple Inc.

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 NUMBER  
051 0564

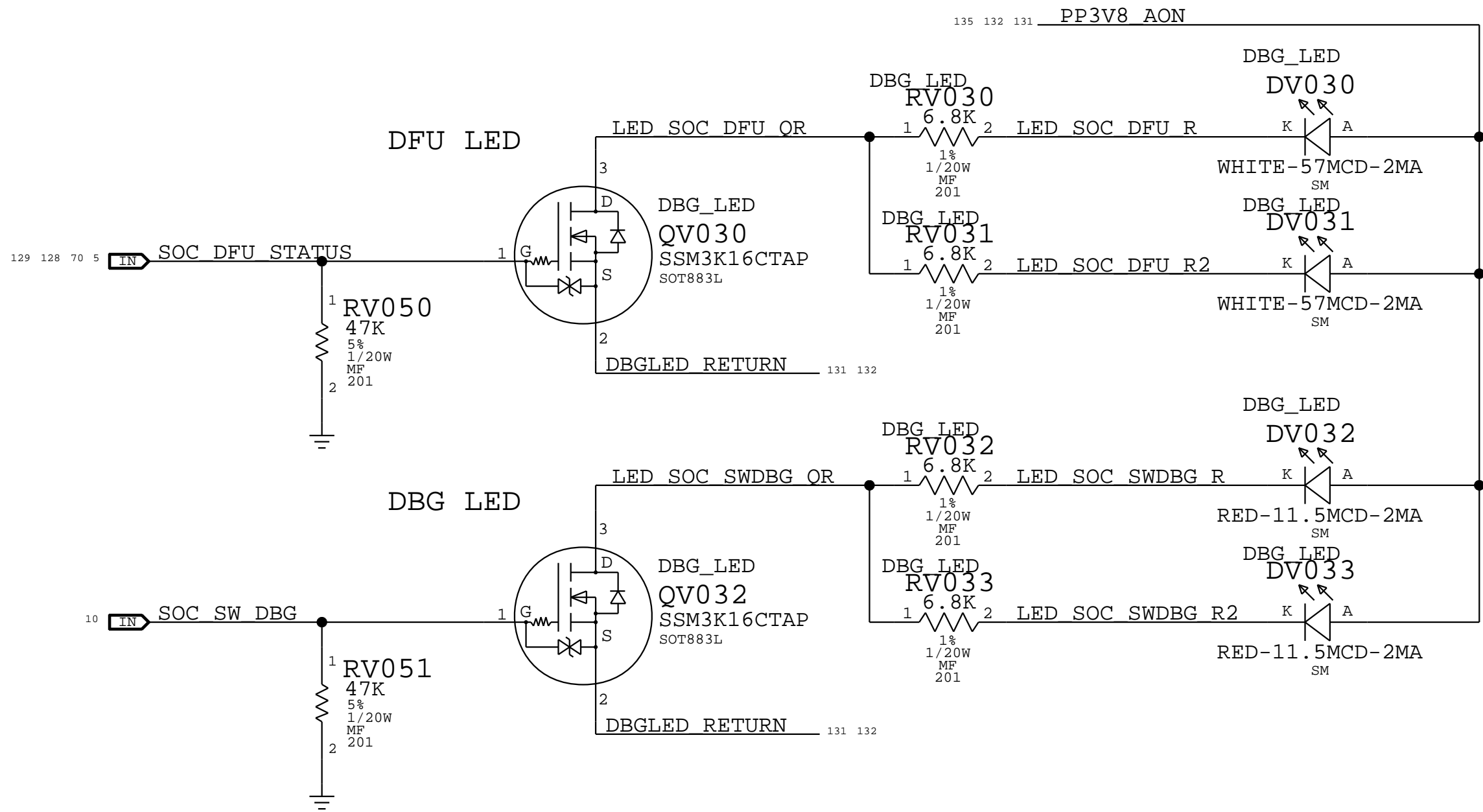
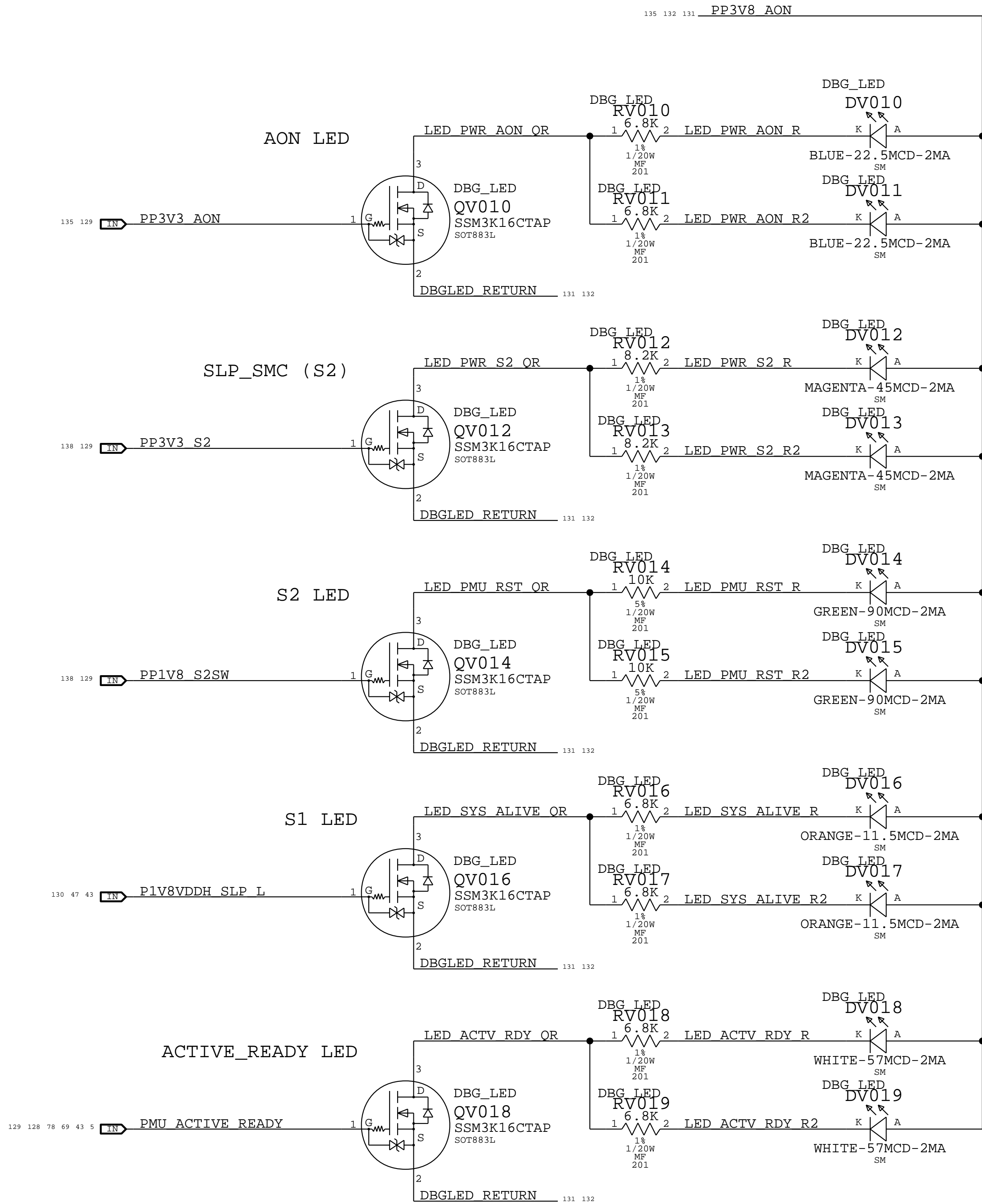
REVISION 8.0.0


evt-2

PAGE 268 OF 999

SHEET

Debug LEDs



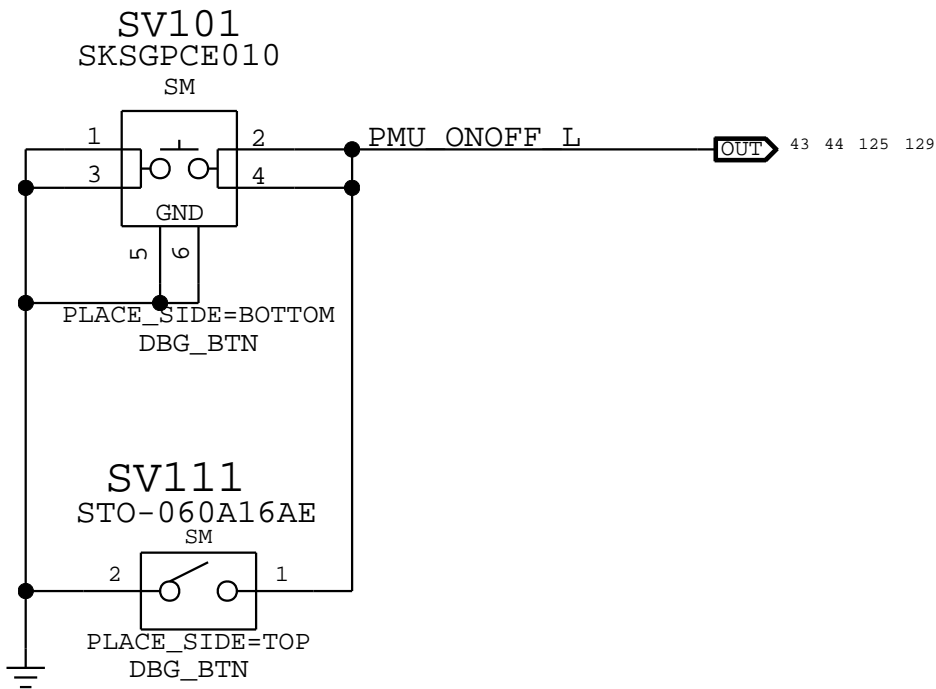
SYNC_MASTER=TAIWAN_T724			SYNC_DATE=03/23/2020			
PAGE TITLE						
Debug: LEDs, Koba						
 Apple Inc.			DRAWING NUMBER		SIZE	
			051-05641		D	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN 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		8.0.0	
			BRANCH		evt-2	
			PAGE		271 OF 999	
			SHEET		131 OF 155	

BOM\_COST\_GROUP=DEBUG

POWER BUTTON

Imitate a user-facing Power Button press, many functions:

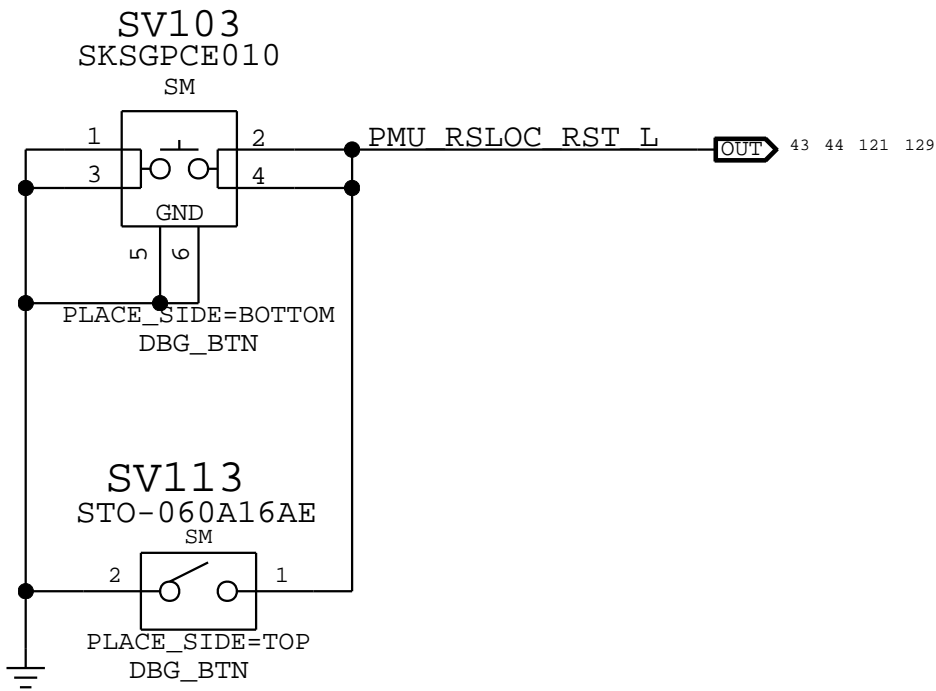
- Press to Wake from any state
- Combine with RSL0C (see RSL0C)
- Hold for 8sec to trigger "one-finger reset"
- - Similar to PMU RESET, except SW gets a warning to initiate panic-flow



RSLOC BUTTON

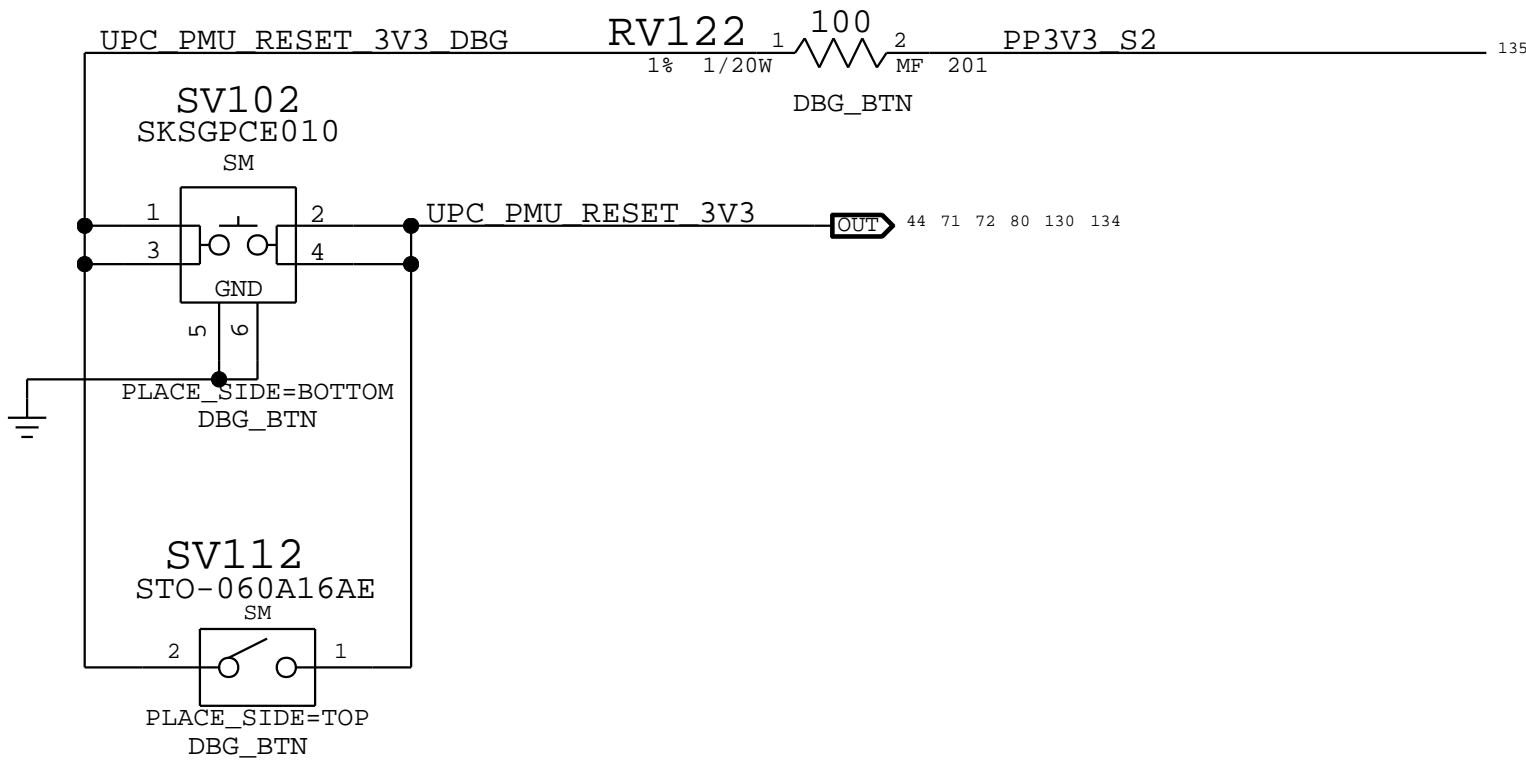
Imitate a user-facing key combo Right-Shift + Left-Option + Control:

- Hold RSL0C 4sec, then press Power Button to initiate PMU RESET
- Hold RSL0C 4sec, then hold Power Button 4sec to power-cycle P3V8AON VR
- Hold Power Button 1sec, then hold RSL0C 10sec to trigger PMU RESET into DFU (continue holding first button when second button is added)



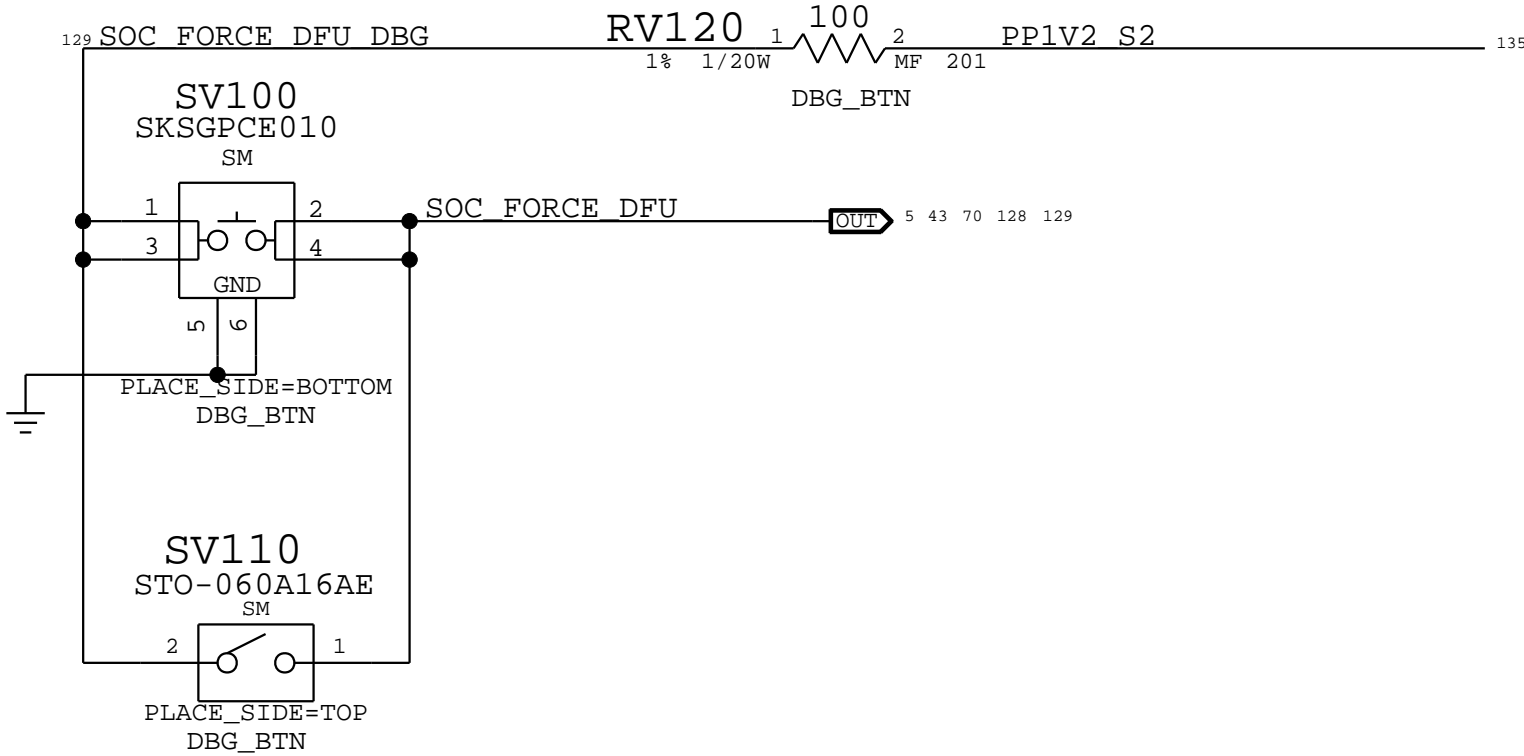
PMU RESET

PMU transitions to OFF and automatically proceeds up to AWAKE



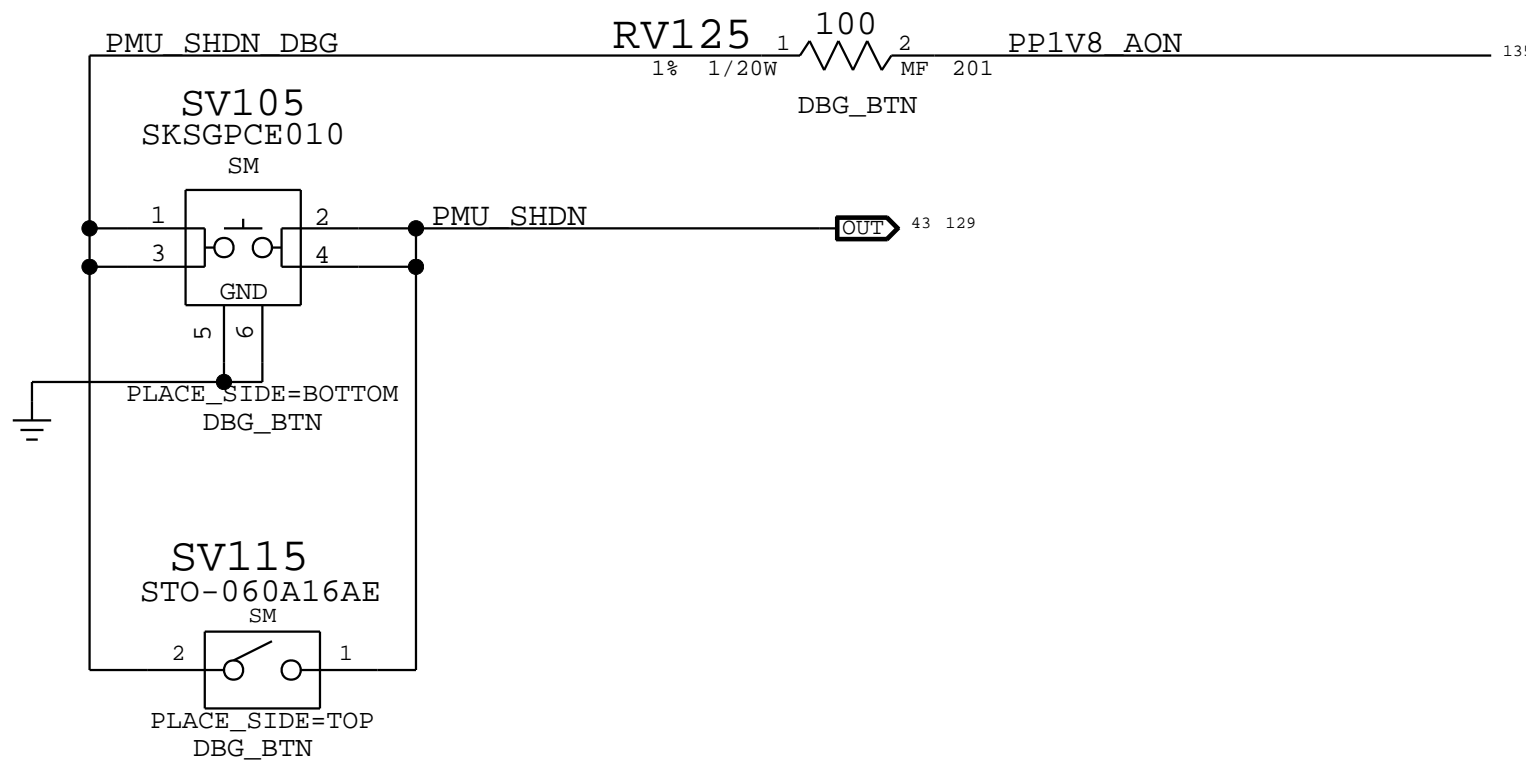
FORCE DFU

Hold during OFF->AWAKE transition to enter SOC's "Debug Firmware Update" mode



PMU SHUTDOWN

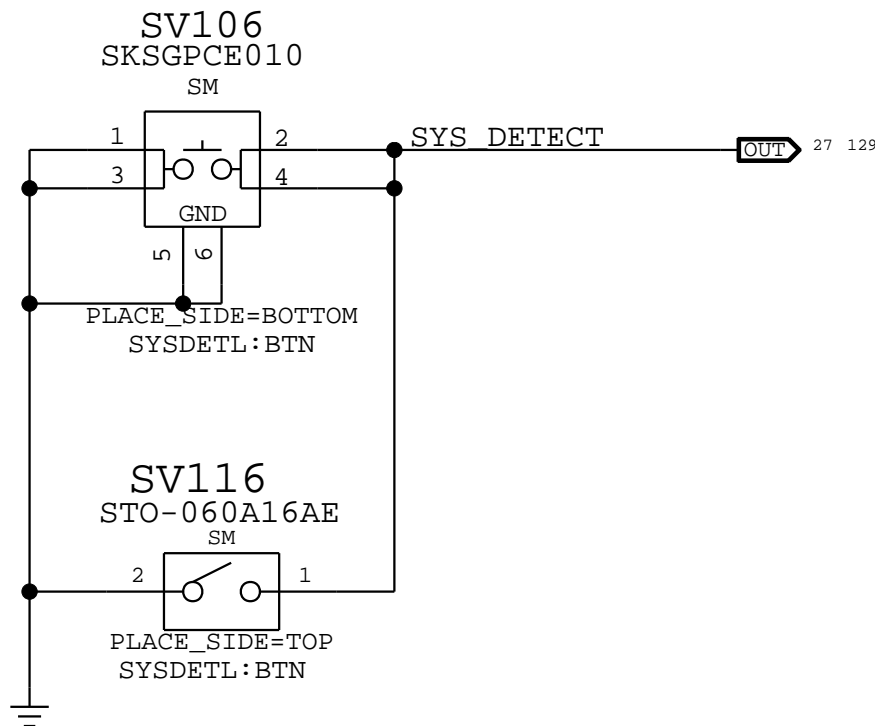
PMU transitions to OFF state and waits for a WAKE source\*



SYS\_DETECT (Battery Disconnect)

Imitate unplugging the battery signal flex, to disconnect MLB from Battery power

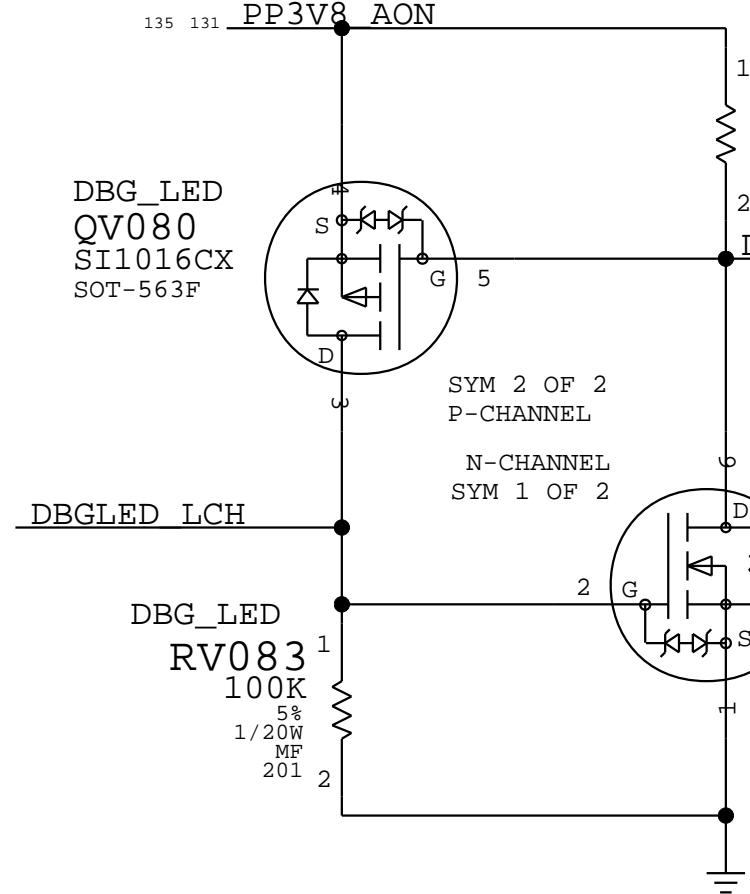
- Disconnect all DCIN sources, then hold SYS\_DETECT for 2sec. MLB will completely power down



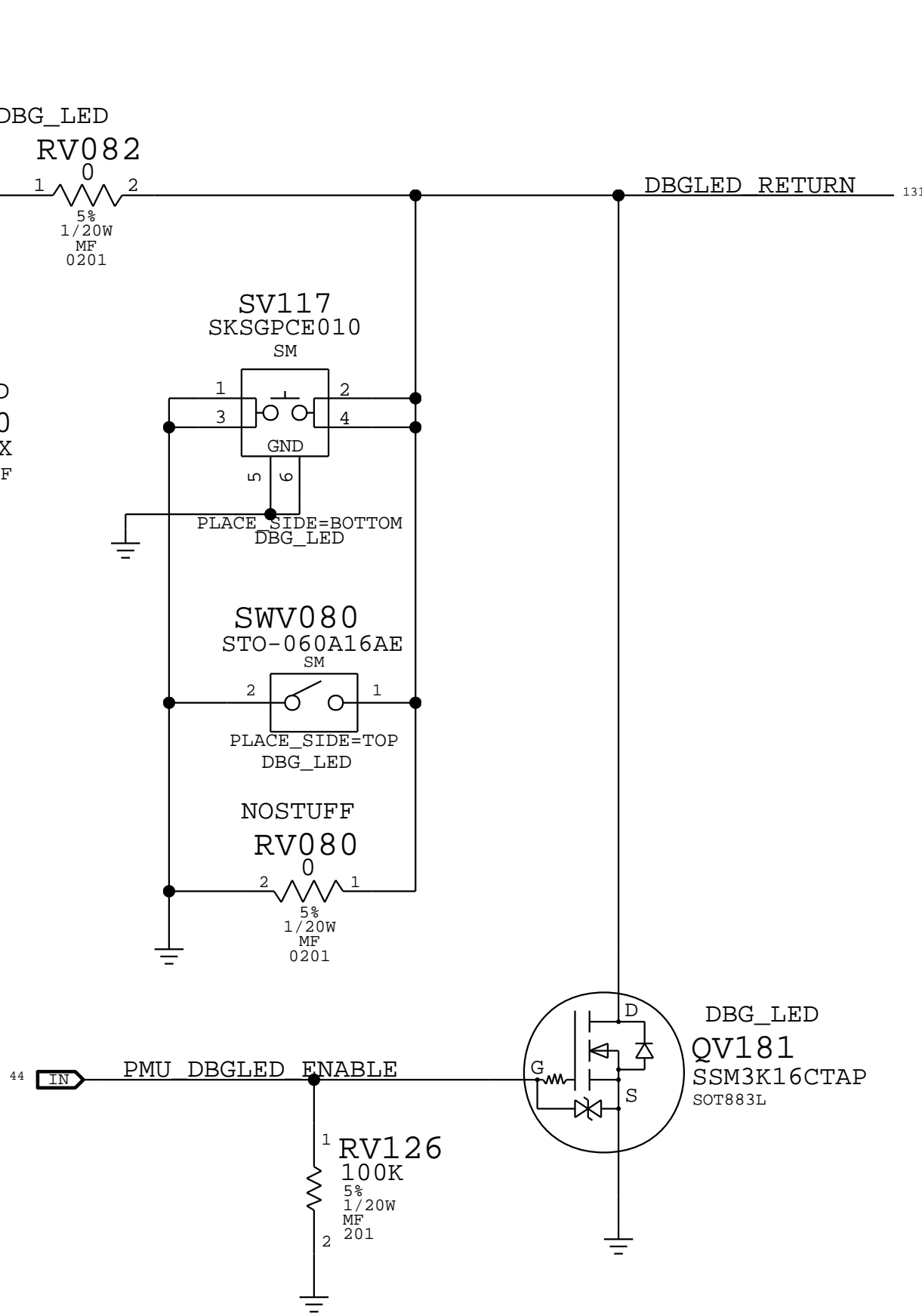
Debug LED Latch

Press button once to engage.

Remove power to disengage.



Debug LED Enable

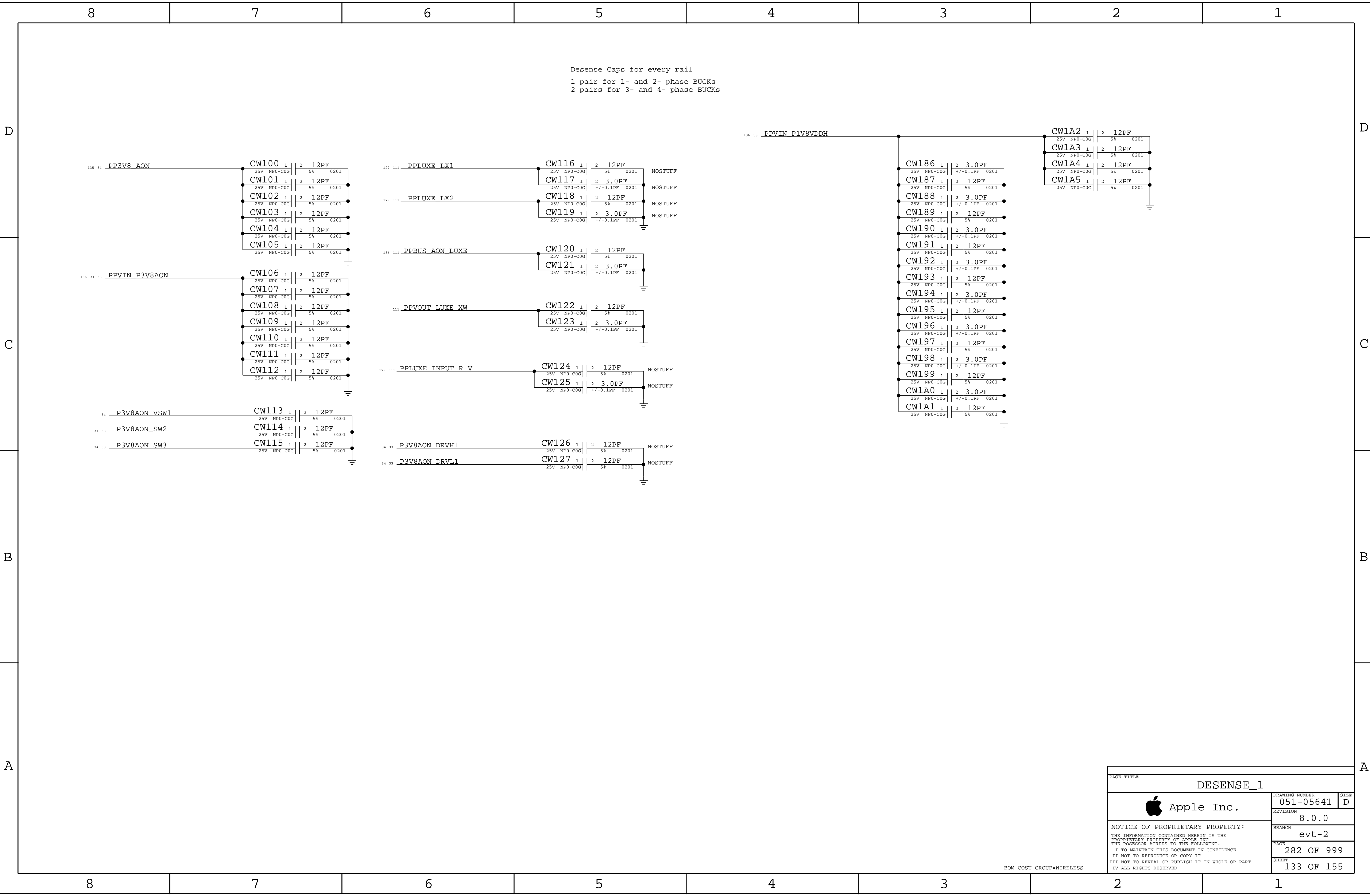



- \*WAKE sources in OFF:
- CHGR\_AUX\_OK (DCIN present)
  - IPD\_LID\_OPEN\_lV8 (Lid is open)
  - PMU\_ONOFF\_L (User Power Button)

PAGE TITLE		
Debug: Buttons		
	DRAWING NUMBER	051-05641
	REVISION	8.0.0
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	evt-2
	PAGE	272 OF 999
	SHEET	132 OF 155

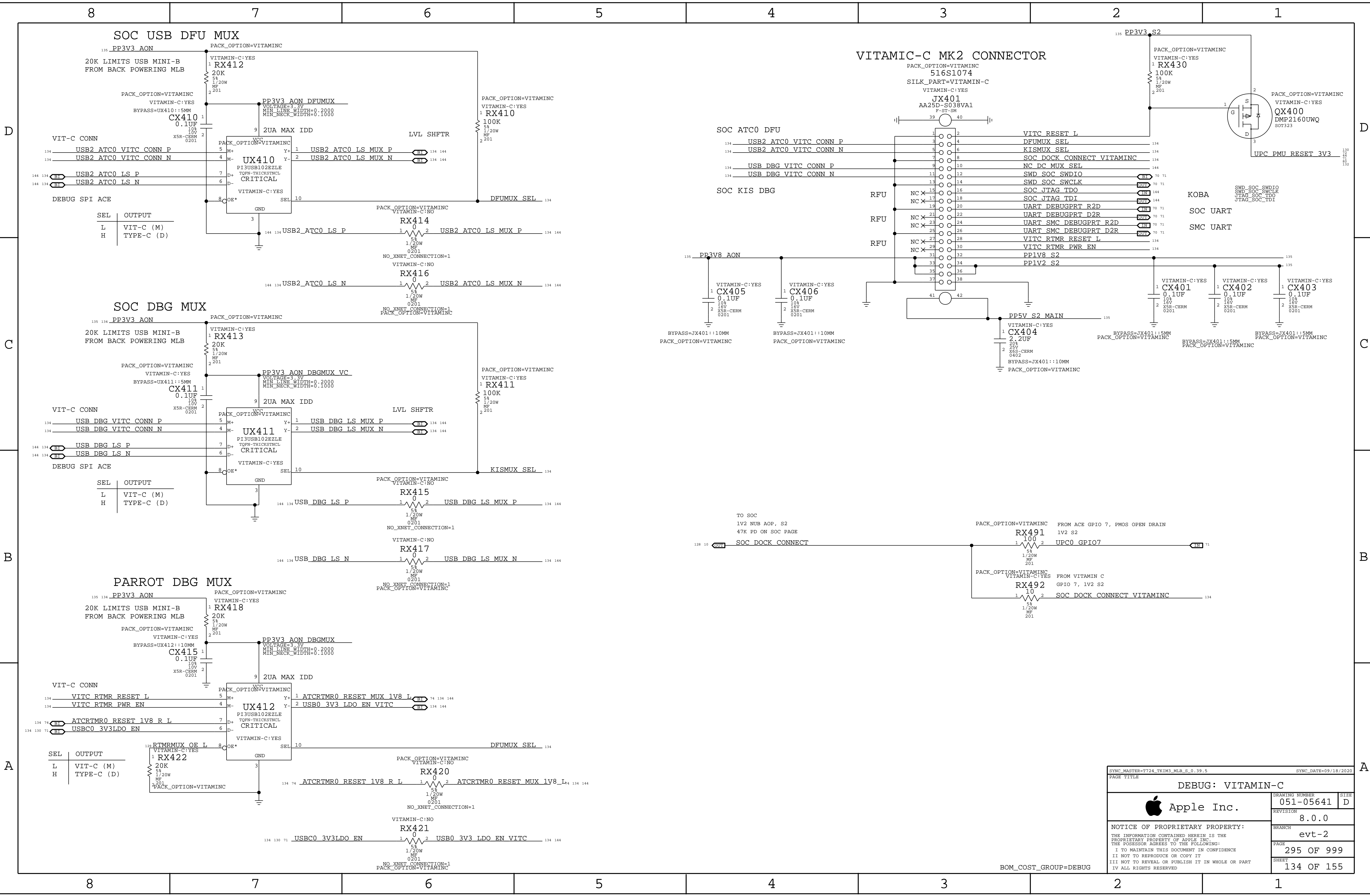
BOM\_COST\_GROUP=DEBUG




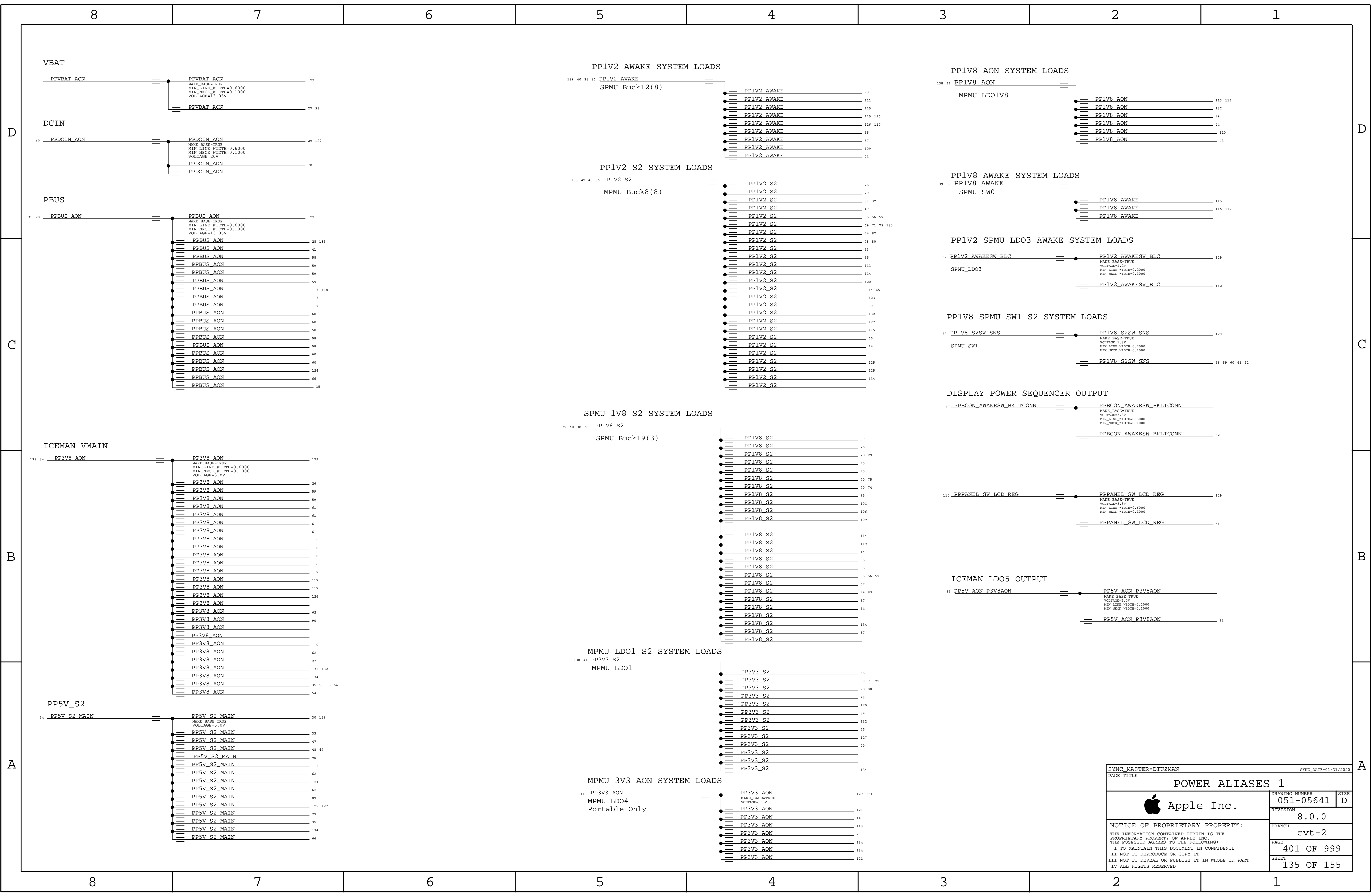



PAGE TITLE		
DESENSE_1		
 Apple Inc.	DRAWING NUMBER	051-05641
	REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	evt-2
	PAGE	282 OF 999
	SHEET	133 OF 155

BOM\_COST\_GROUP=WIRELESS



SYNC_MASTER=T724_TKIM3_MLB_S.0.39.5			SYNC_DATE=09/18/2020			
PAGE TITLE						
DEBUG: VITAMIN-C						
 Apple Inc.			DRAWING NUMBER		SIZE	
			051-05641		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		8.0.0	
			BRANCH		evt-2	
			PAGE		295 OF 999	
			SHEET		134 OF 155	



SYNC_MASTER=DTU2MAN		SYNC_DATE=01/31/2020	
PAGE TITLE		POWER ALIASES 1	
	Apple Inc.	DRAWING NUMBER	SIZE
		051-05641	D
		REVISION	8.0.0
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	evt-2
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	401 OF 999
		SHEET	135 OF 155

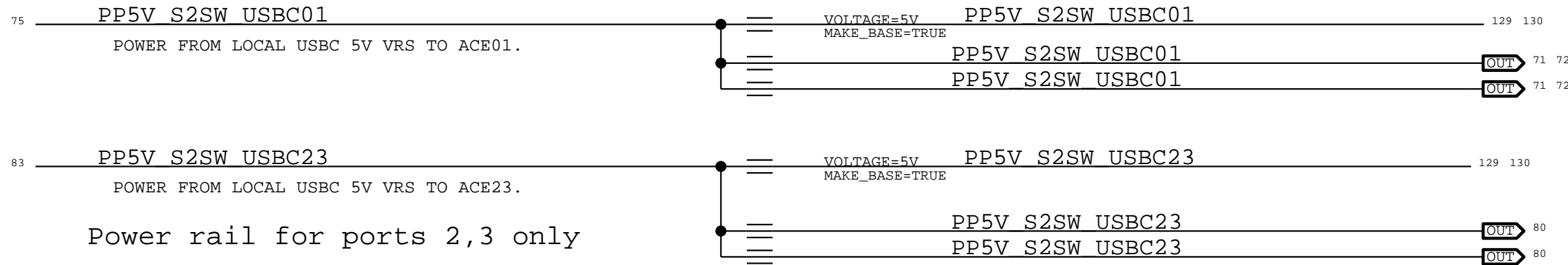
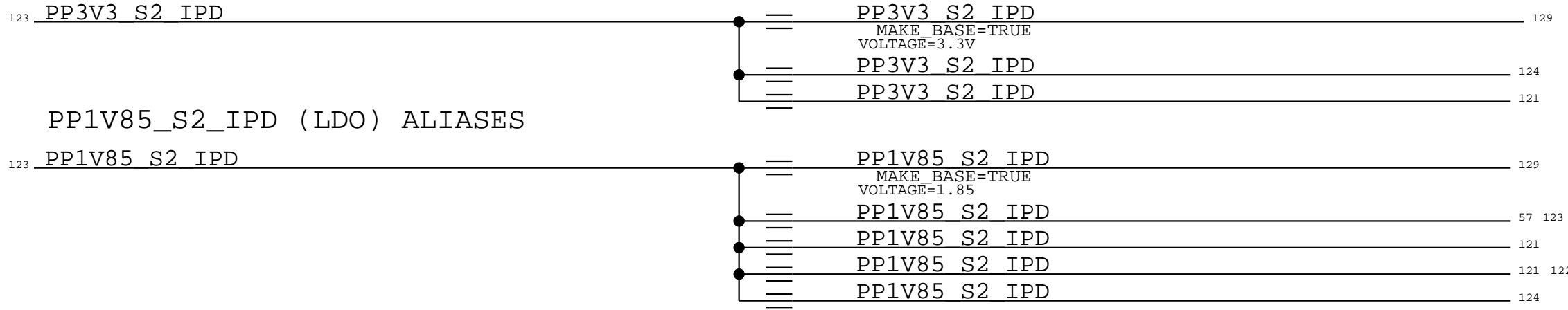
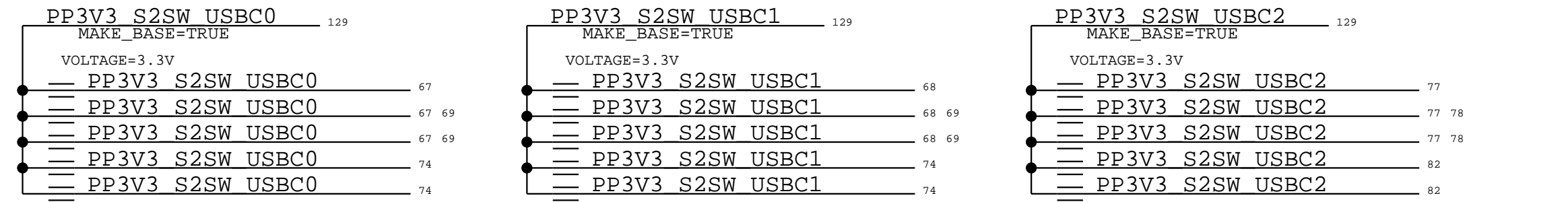
THIS PAGE WILL BE USED FOR SYSTEM / SUBSYSTEM ALIASES

USBC REQUIRED POWER ALIASES

IPD: KEYBOARD / TRACKPAD

PP3V3\_S2\_IPD (LDO) ALIASES

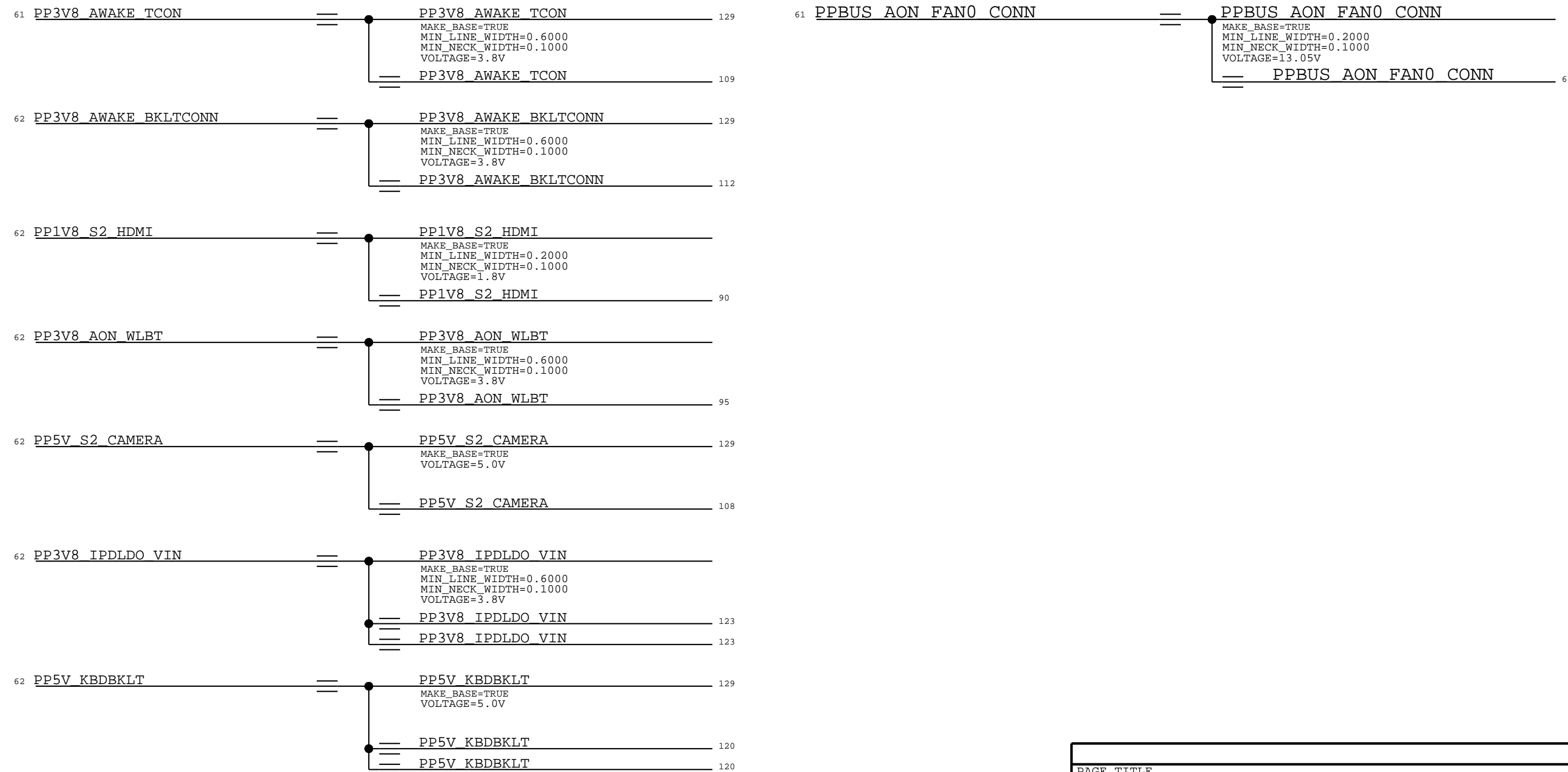
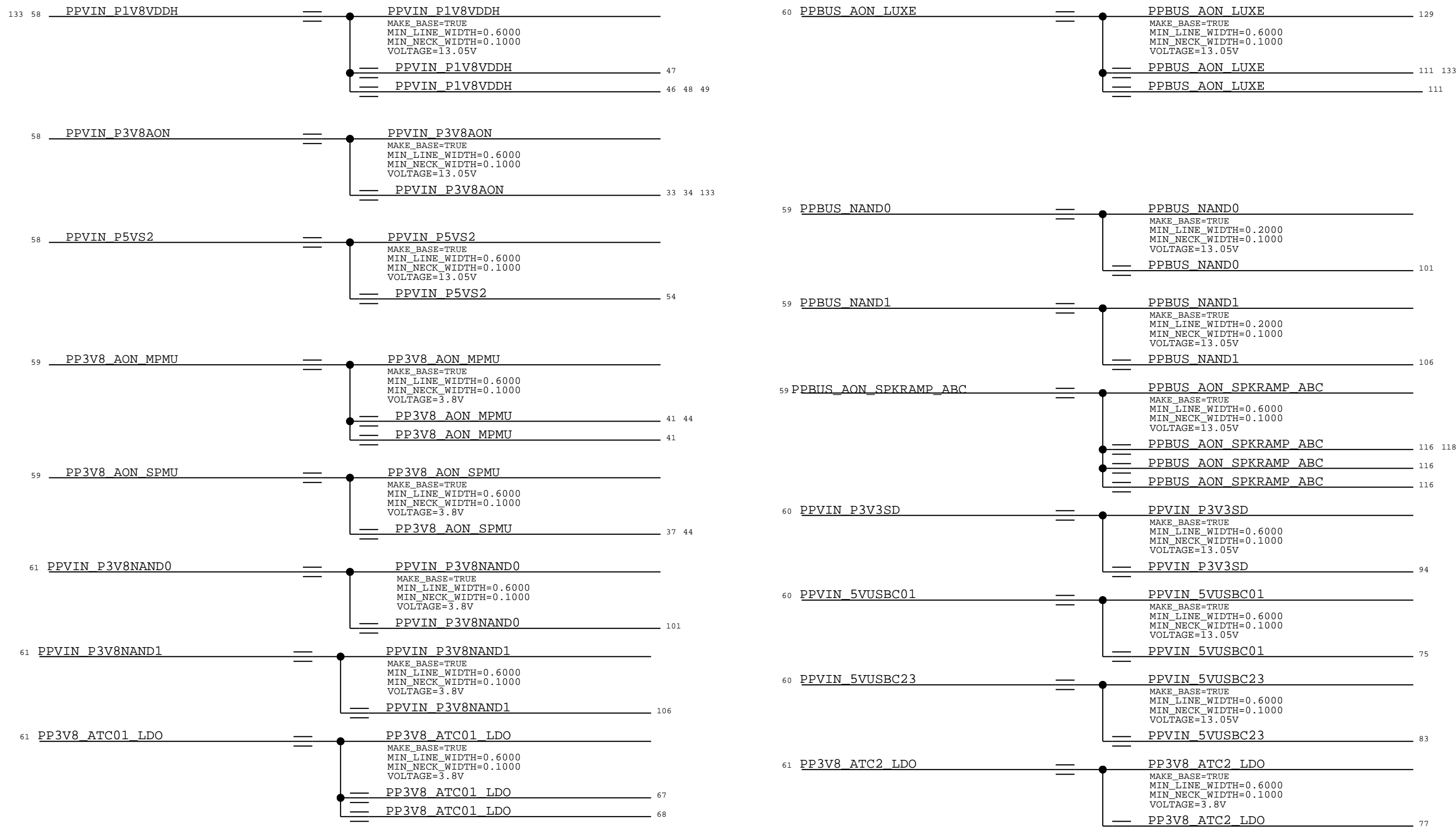
PP1V85\_S2\_IPD (LDO) ALIASES




KEYBOARD BACKLIGHT

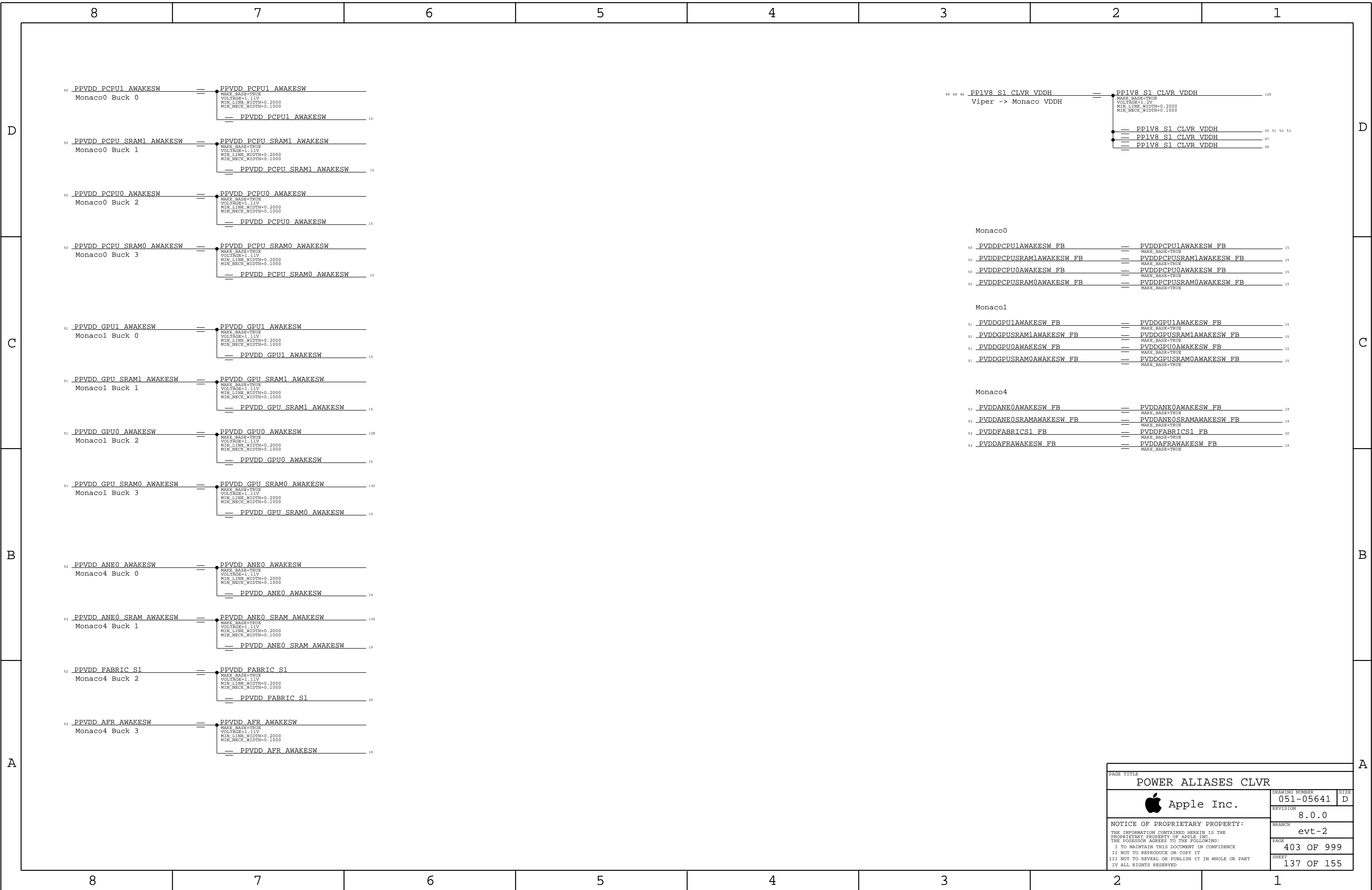
PBUS FAN SWITCH ALIAS

OUTPUT SENSOR ALIASES



PAGE\_TITLE=POWER ALIASES 2

PAGE TITLE			
 Apple Inc.		DRAWING NUMBER	051-05641
		REVISION	8.0.0
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	evt-2
		PAGE	402 OF 999
		SHEET	136 OF 155









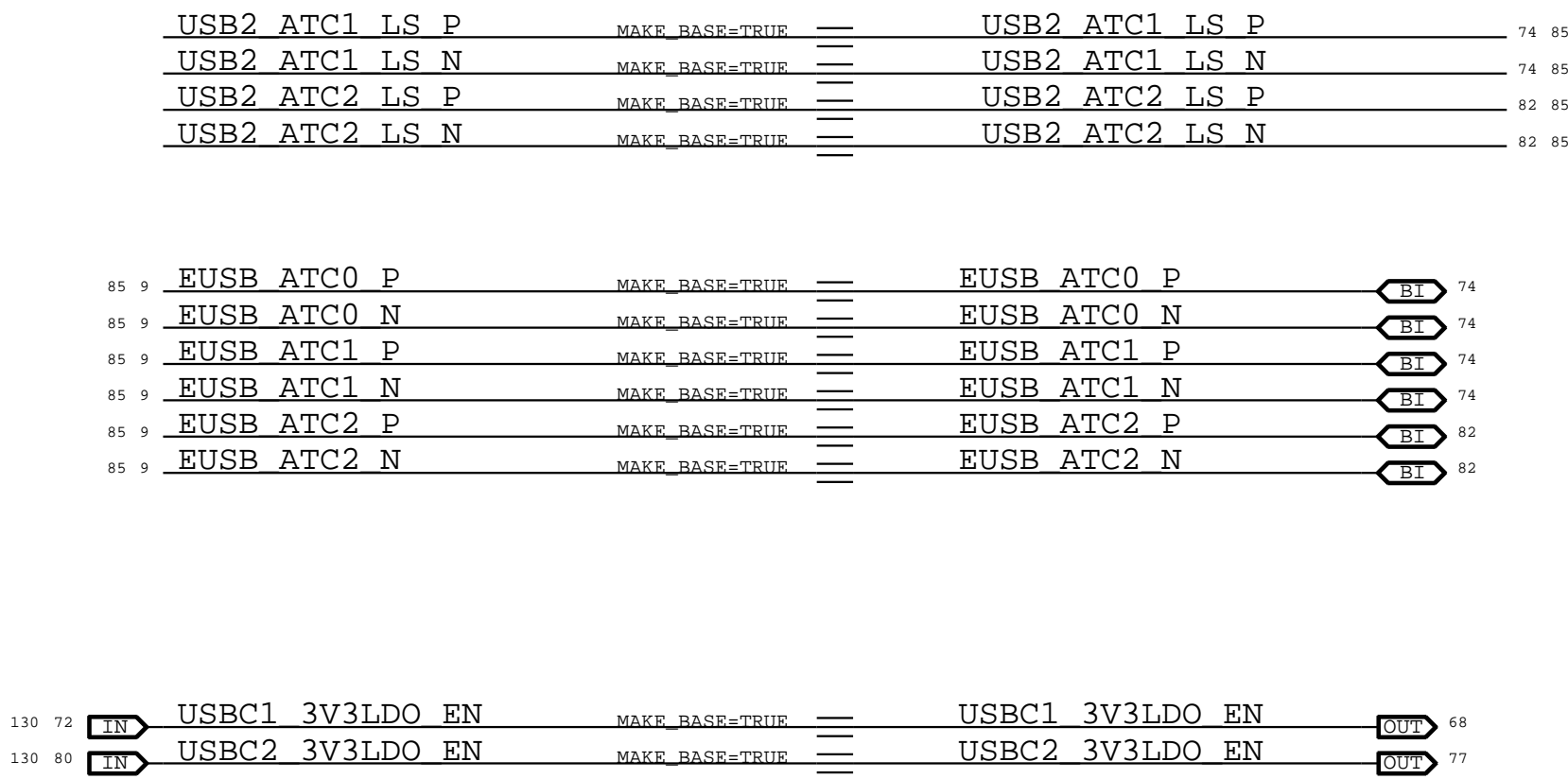
8			7			6			5			4			3			2			1			
LPDPTX																								
7	LPDP	INT	DATA	C	P<0>	==	LPDP	INT	DATA	C	P<0>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	N<0>	==	LPDP	INT	DATA	C	N<0>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	P<1>	==	LPDP	INT	DATA	C	P<1>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	N<1>	==	LPDP	INT	DATA	C	N<1>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	P<2>	==	LPDP	INT	DATA	C	P<2>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	N<2>	==	LPDP	INT	DATA	C	N<2>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	P<3>	==	LPDP	INT	DATA	C	P<3>	109	MAKE_BASE=TRUE											
7	LPDP	INT	DATA	C	N<3>	==	LPDP	INT	DATA	C	N<3>	109	MAKE_BASE=TRUE											
7	LPDP	INT	AUX	C	P	==	LPDP	INT	AUX	C	P	109	MAKE_BASE=TRUE											
7	LPDP	INT	AUX	C	N	==	LPDP	INT	AUX	C	N	109	MAKE_BASE=TRUE											
142	7	LPDP	INT	HPD	==	LPDP	INT	HPD	109	129	MAKE_BASE=TRUE													
7	NC	LPDPTX1	DATAP0	==	NC	LPDPTX1	DATAP0	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAN0	==	NC	LPDPTX1	DATAN0	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAP1	==	NC	LPDPTX1	DATAP1	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAN1	==	NC	LPDPTX1	DATAN1	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAP2	==	NC	LPDPTX1	DATAP2	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAN2	==	NC	LPDPTX1	DATAN2	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAP3	==	NC	LPDPTX1	DATAP3	MAKE_BASE=TRUE																
7	NC	LPDPTX1	DATAN3	==	NC	LPDPTX1	DATAN3	MAKE_BASE=TRUE																
7	NC	LPDPTX1	AUXP	==	NC	LPDPTX1	AUXP	MAKE_BASE=TRUE																
7	NC	LPDPTX1	AUXN	==	NC	LPDPTX1	AUXN	MAKE_BASE=TRUE																
7	NC	LPDP	INT	SL	HPD	==	NC	LPDP	INT	SL	HPD	MAKE_BASE=TRUE												
LPDPRX																								
7	NC	LPDPRX	DATAP1	==	NC	LPDPRX	DATAP1	MAKE_BASE=TRUE																
7	NC	LPDPRX	DATAN1	==	NC	LPDPRX	DATAN1	MAKE_BASE=TRUE																
NAND																								
8	NC	PCIE	CLK100M	NAND0	1P	==	NC	PCIE	CLK100M	NAND0	1P	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND0	1N	==	NC	PCIE	CLK100M	NAND0	1N	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND0	3P	==	NC	PCIE	CLK100M	NAND0	3P	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND0	3N	==	NC	PCIE	CLK100M	NAND0	3N	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND1	1P	==	NC	PCIE	CLK100M	NAND1	1P	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND1	1N	==	NC	PCIE	CLK100M	NAND1	1N	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND1	3P	==	NC	PCIE	CLK100M	NAND1	3P	MAKE_BASE=TRUE												
8	NC	PCIE	CLK100M	NAND1	3N	==	NC	PCIE	CLK100M	NAND1	3N	MAKE_BASE=TRUE												
97	SWD	NAND0	S5E0	S5E1	SWCLK	==	SWD	NAND0	S5E0	S5E1	SWCLK	MAKE_BASE=TRUE												
98	SWD	NAND0	S5E0	S5E1	SWCLK	==																		
99	SWD	NAND0	S5E2	S5E3	SWCLK	==	SWD	NAND0	S5E2	S5E3	SWCLK	MAKE_BASE=TRUE												
100	SWD	NAND0	S5E2	S5E3	SWCLK	==																		
97	SWD	NAND0	S5E0	S5E1	SWDIO	==	SWD	NAND0	S5E0	S5E1	SWDIO	MAKE_BASE=TRUE												
98	SWD	NAND0	S5E0	S5E1	SWDIO	==																		
99	SWD	NAND0	S5E2	S5E3	SWDIO	==	SWD	NAND0	S5E2	S5E3	SWDIO	MAKE_BASE=TRUE												
100	SWD	NAND0	S5E2	S5E3	SWDIO	==																		
102	SWD	NAND1	S5E0	S5E1	SWCLK	==	SWD	NAND1	S5E0	S5E1	SWCLK	MAKE_BASE=TRUE												
103	SWD	NAND1	S5E0	S5E1	SWCLK	==																		
104	SWD	NAND1	S5E2	S5E3	SWCLK	==	SWD	NAND1	S5E2	S5E3	SWCLK	MAKE_BASE=TRUE												
105	SWD	NAND1	S5E2	S5E3	SWCLK	==																		
102	SWD	NAND1	S5E0	S5E1	SWDIO	==	SWD	NAND1	S5E0	S5E1	SWDIO	MAKE_BASE=TRUE												
103	SWD	NAND1	S5E0	S5E1	SWDIO	==																		
104	SWD	NAND1	S5E2	S5E3	SWDIO	==	SWD	NAND1	S5E2	S5E3	SWDIO	MAKE_BASE=TRUE												
105	SWD	NAND1	S5E2	S5E3	SWDIO	==																		
MIPI																								
7	NC	MIPID	DATAP	==	NC	MIPID	DATAP	MAKE_BASE=TRUE																
7	NC	MIPID	DATAN	==	NC	MIPID	DATAN	MAKE_BASE=TRUE																
7	NC	MIPID	CLKP	==	NC	MIPID	CLKP	MAKE_BASE=TRUE																
7	NC	MIPID	CLKN	==	NC	MIPID	CLKN	MAKE_BASE=TRUE																
7	NC	MIPI	FTCAM	DATAP0	==	NC	MIPI	FTCAM	DATAP0	MAKE_BASE=TRUE														
7	NC	MIPI	FTCAM	DATAN0	==	NC	MIPI	FTCAM	DATAN0	MAKE_BASE=TRUE														
7	NC	MIPI	FTCAM	DATAP1	==	NC	MIPI	FTCAM	DATAP1	MAKE_BASE=TRUE														
7	NC	MIPI	FTCAM	DATAN1	==	NC	MIPI	FTCAM	DATAN1	MAKE_BASE=TRUE														
7	NC	MIPI	FTCAM	CLKP	==	NC	MIPI	FTCAM	CLKP	MAKE_BASE=TRUE														
7	NC	MIPI	FTCAM	CLKN	==	NC	MIPI	FTCAM	CLKN	MAKE_BASE=TRUE														
7	NC	MIPI	IRCAM	DATAP0	==	NC	MIPI	IRCAM	DATAP0	MAKE_BASE=TRUE														
7	NC	MIPI	IRCAM	DATAN0	==	NC	MIPI	IRCAM	DATAN0	MAKE_BASE=TRUE														
7	NC	MIPI	IRCAM	DATAP1	==	NC	MIPI	IRCAM	DATAP1	MAKE_BASE=TRUE														
7	NC	MIPI	IRCAM	DATAN1	==	NC	MIPI	IRCAM	DATAN1	MAKE_BASE=TRUE														
7	NC	MIPI	IRCAM	CLKP	==	NC	MIPI	IRCAM	CLKP	MAKE_BASE=TRUE														
7	NC	MIPI	IRCAM	CLKN	==	NC	MIPI	IRCAM	CLKN	MAKE_BASE=TRUE														
USB3																								
9	NC	USB3	EXTA	R2DP	==	NC	USB3	EXTA	R2DP	MAKE_BASE=TRUE														
9	NC	USB3	EXTA	R2DN	==	NC	USB3	EXTA	R2DN	MAKE_BASE=TRUE														
9	NC	USB3	EXTA	D2RP	==	NC	USB3	EXTA	D2RP	MAKE_BASE=TRUE														
9	NC	USB3	EXTA	D2RN	==	NC	USB3	EXTA	D2RN	MAKE_BASE=TRUE														
9	NC	EUSB	EXTAP	==	NC	EUSB	EXTAP	MAKE_BASE=TRUE																
9	NC	EUSB	EXTAN	==	NC	EUSB	EXTAN	MAKE_BASE=TRUE																
9	NC	USB3	EXTB	R2DP	==	NC	USB3	EXTB	R2DP	MAKE_BASE=TRUE														
9	NC	USB3	EXTB	R2DN	==	NC	USB3	EXTB	R2DN	MAKE_BASE=TRUE														
9	NC	USB3	EXTB	D2RP	==	NC	USB3	EXTB	D2RP	MAKE_BASE=TRUE														
9	NC	USB3	EXTB	D2RN	==	NC	USB3	EXTB	D2RN	MAKE_BASE=TRUE														
9	NC	EUSB	EXTBP	==	NC	EUSB	EXTBP	MAKE_BASE=TRUE																
9	NC	EUSB	EXTBN	==	NC	EUSB	EXTBN	MAKE_BASE=TRUE																
142	10	NC	PARROT	RESET	L	==	NC	PARROT	RESET	L	MAKE_BASE=TRUE													
10	NC	PARROT	INT	L	==	NC	PARROT	INT	L	MAKE_BASE=TRUE														
6	NC	USB	EXTA	OC	L	==	NC	USB	EXTA	OC	L	MAKE_BASE=TRUE												
6	SWD	UPC	SWDIO3	R	==	SWD	UPC	SWDIO3	R	MAKE_BASE=TRUE														
ATC3 - HDMI																								
9	DP	DP2HDMI	DATA	P<2>	==	DP	DP2HDMI	DATA	P<2>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	P<2>	==																			
9	DP	DP2HDMI	DATA	N<2>	==	DP	DP2HDMI	DATA	N<2>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	N<2>	==																			
9	DP	DP2HDMI	DATA	P<3>	==	DP	DP2HDMI	DATA	P<3>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	P<3>	==																			
9	DP	DP2HDMI	DATA	N<3>	==	DP	DP2HDMI	DATA	N<3>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	N<3>	==																			
9	DP	DP2HDMI	DATA	P<1>	==	DP	DP2HDMI	DATA	P<1>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	P<1>	==																			
9	DP	DP2HDMI	DATA	N<1>	==	DP	DP2HDMI	DATA	N<1>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	N<1>	==																			
9	DP	DP2HDMI	DATA	P<0>	==	DP	DP2HDMI	DATA	P<0>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	P<0>	==																			
9	DP	DP2HDMI	DATA	N<0>	==	DP	DP2HDMI	DATA	N<0>	MAKE_BASE=TRUE														
89	DP	DP2HDMI	DATA	N<0>	==																			
9	DP	DP2HDMI	AUX	P	==	DP	DP2HDMI	AUX	P	MAKE_BASE=TRUE														
89	DP	DP2HDMI	AUX	P	==																			
9	DP	DP2HDMI	AUX	N	==	DP	DP2HDMI	AUX	N	MAKE_BASE=TRUE														
89	DP	DP2HDMI	AUX	N	==																			
USBC																								
9	NC	USB	C0	HPD	==	NC	USB	C0	HPD	MAKE_BASE=TRUE														
9	NC	USB	C1	HPD	==	NC	USB	C1	HPD	MAKE_BASE=TRUE														
9	NC	USB	C2	HPD	==	NC	USB	C2	HPD	MAKE_BASE=TRUE														
ENET																								
8	NC	PCIE	ENET	R2DP	==	NC	PCIE	ENET	R2DP	MAKE_BASE=TRUE														
8	NC	PCIE	ENET	R2DN	==	NC	PCIE	ENET	R2DN	MAKE_BASE=TRUE														
8	NC	PCIE	ENET	D2RP	==	NC	PCIE	ENET	D2RP	MAKE_BASE=TRUE														
8	NC	PCIE	ENET	D2RN	==	NC	PCIE	ENET	D2RN	MAKE_BASE=TRUE														
8	NC	PCIE	CLK100M	SDP	==	NC	PCIE	CLK100M	SDP	MAKE_BASE=TRUE														
8	NC	PCIE	CLK100M	SDN	==	NC	PCIE	CLK100M	SDN	MAKE_BASE=TRUE														
6	NC	ENET	SELECT	1G	H	10G	L	==	NC	ENET	SELECT	1G	H	10G	L	MAKE_BASE=TRUE								
SD																								
8	PCIE	SD	UHS2	R2D	C	P	==	PCIE	SD	UHS2	R2D	C	P	91	MAKE_BASE=TRUE									
8	PCIE	SD	UHS2	R2D	C	N	==	PCIE	SD	UHS2	R2D	C	N	91	MAKE_BASE=TRUE									
8	PCIE	SD	UHS2	D2R	P	==	PCIE	SD	UHS2	D2R	P	91	MAKE_BASE=TRUE											
8	PCIE	SD	UHS2	D2R	N	==	PCIE	SD	UHS2	D2R	N	91	MAKE_BASE=TRUE											
8	PCIE	CLK100M	SD	UHS2	P	==	PCIE	CLK100M	SD	UHS2	P	91	MAKE_BASE=TRUE											
8	PCIE	CLK100M	SD	UHS2	N	==	PCIE	CLK100M	SD	UHS2	N	91	MAKE_BASE=TRUE											
8	SD	UHS2	RESET	L	==	SD	UHS2	RESET	L	93	MAKE_BASE=TRUE													
8	SD	UHS2	CLKREQ	L	==	SD	UHS2	CLKREQ	L	93	MAKE_BASE=TRUE													
8	NC	PCIE	SD	EXP	R2D	C	P	==	NC	PCIE	SD	EXP	R2D	C	P	MAKE_BASE=TRUE								
8	NC	PCIE	SD	EXP	R2D	C	N	==	NC	PCIE	SD	EXP	R2D	C	N	MAKE_BASE=TRUE								
8	NC	PCIE	SD	EXP	D2R	P	==	NC	PCIE	SD	EXP	D2R	P	MAKE_BASE=TRUE										
8	NC	PCIE	SD	EXP	D2R	N	==	NC	PCIE	SD	EXP	D2R	N	MAKE_BASE=TRUE										
8	NC	PCIE	CLK100M	SD	EXP	P	==	NC	PCIE	CLK100M	SD	EXP	P	MAKE_BASE=TRUE										
8	NC	PCIE	CLK100M	SD	EXP	N	==	NC	PCIE	CLK100M	SD	EXP	N	MAKE_BASE=TRUE										
8	SD	EXP	RESET	L	==	SD	EXP	RESET	L	MAKE_BASE=TRUE														
6	SD	EXP	CLKREQ	L	==	SD	EXP	CLKREQ	L	MAKE_BASE=TRUE														
6	NC	SDEXP	SEL	==	NC	SDEXP	SEL	MAKE_BASE=TRUE																
														9	NC	EUSB	ATC3P	==	NC	EUSB	ATC3P			
														9	NC	EUSB	ATC3N	==	NC	EUSB	ATC3N			

Internal signal aliases - Must be configured on project pages per notes below.


Internal signal aliases - Copied or debug circuitry added between.




Caps and connector must be aliased to BBR signals.  
BBR lanes 1 and 2 can be swapped, both pairs, both sides - all or nothing.  
BBR inputs can be polarity inverted independently per pair.  
All swaps and inversions must be communicated to TBT Firmware team.



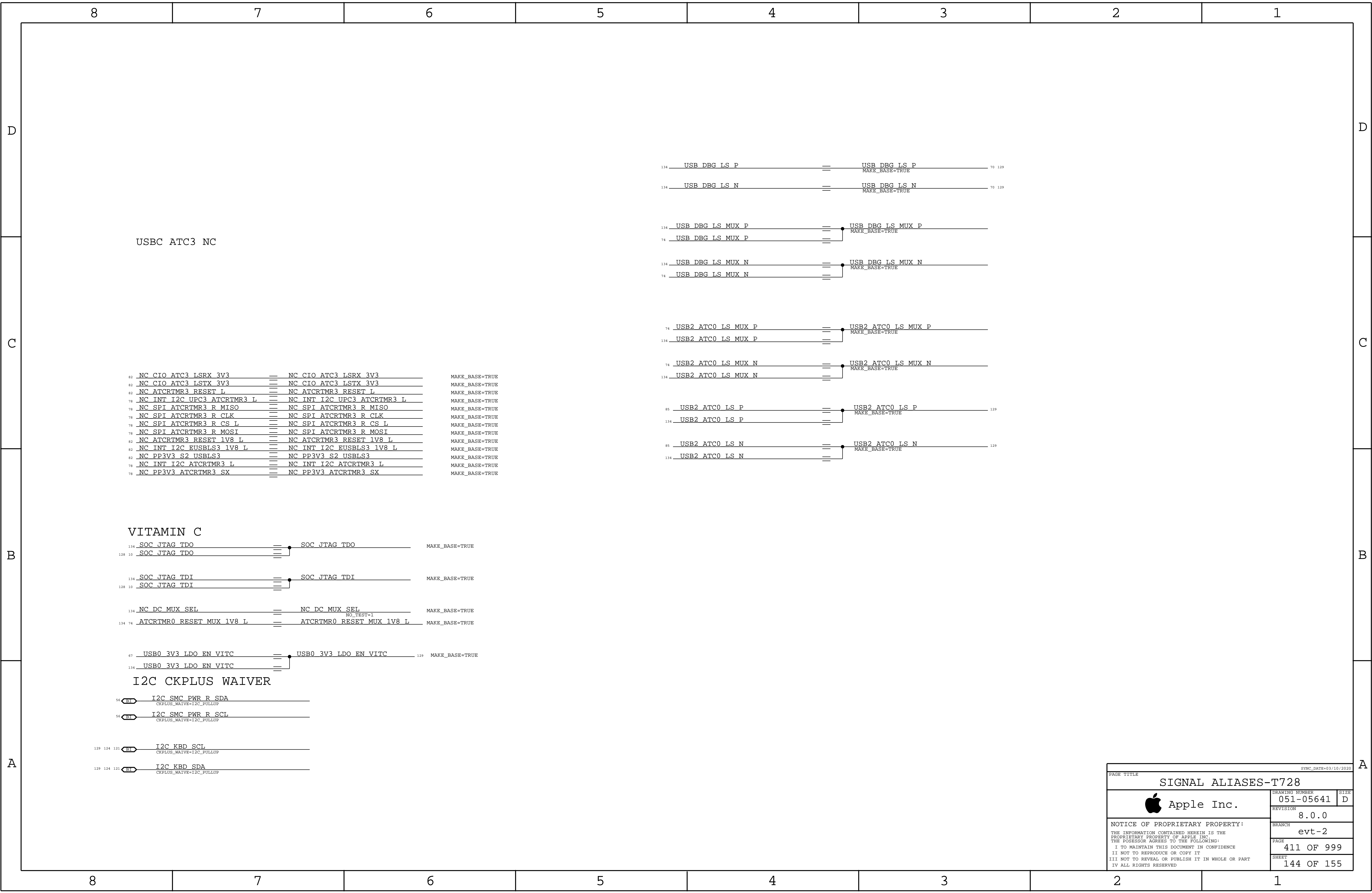
	8	7	6	5	4	3	2	1		
D	REF_SECDIS_SAK		NC SPN'S							D
	<div>108_FTCAM_ENABLE_1V8_OUT==FTCAM_ENABLE_1V8_OUT114_129MAKE_BASE=TRUE</div> <div>6_NC_DISABLE_STROBE==NC_DISABLE_STROBEMAKE_BASE=TRUE</div> <div>6_NC_FTCAM_DISABLE_L==NC_FTCAM_DISABLE_LMAKE_BASE=TRUE</div> <div>6_NC_DMIC_DISABLE_L==NC_DMIC_DISABLE_LMAKE_BASE=TRUE</div>		<div>28_NC_CHGR_EN_VR1==NC_CHGR_EN_VR1MAKE_BASE=TRUE</div> <div>67_NC_SMBUS_ATCRTMR0_SCL==NC_SMBUS_ATCRTMR0_SCLMAKE_BASE=TRUE</div> <div>67_NC_SMBUS_ATCRTMR0_SDA==NC_SMBUS_ATCRTMR0_SDAMAKE_BASE=TRUE</div> <div>68_NC_SMBUS_ATCRTMR1_SCL==NC_SMBUS_ATCRTMR1_SCLMAKE_BASE=TRUE</div> <div>68_NC_SMBUS_ATCRTMR1_SDA==NC_SMBUS_ATCRTMR1_SDAMAKE_BASE=TRUE</div> <div>77_NC_SMBUS_ATCRTMR2_SCL==NC_SMBUS_ATCRTMR2_SCLMAKE_BASE=TRUE</div> <div>77_NC_SMBUS_ATCRTMR2_SDA==NC_SMBUS_ATCRTMR2_SDAMAKE_BASE=TRUE</div> <div>28_NC_CHGR_SMC_RST_L==NC_CHGR_SMC_RST_LMAKE_BASE=TRUE</div> <div>28_NC_CHGR_CBC_ON==NC_CHGR_CBC_ONMAKE_BASE=TRUE</div> <div>43_NC_MPMU_AMUX_AY==NC_MPMU_AMUX_AYMAKE_BASE=TRUE</div> <div>39_NC_SPMU_AMUX_BY==NC_SPMU_AMUX_BYMAKE_BASE=TRUE</div> <div>39_NC_SPMU_PRE_UVLO==NC_SPMU_PRE_UVLOMAKE_BASE=TRUE</div> <div>43_NC_MPMU_AMUX_BY==NC_MPMU_AMUX_BYMAKE_BASE=TRUE</div> <div>39_NC_SPMU_AMUX_AY==NC_SPMU_AMUX_AYMAKE_BASE=TRUE</div> <div>43_NC_MPMU_LDOX_EN==NC_MPMU_LDOX_ENMAKE_BASE=TRUE</div> <div>88_NC_HDMI_I2C_SCL==NC_HDMI_I2C_SCLMAKE_BASE=TRUE</div> <div>88_NC_HDMI_I2C_SDA==NC_HDMI_I2C_SDAMAKE_BASE=TRUE</div> <div>101_NC_NAND0_OCARINA_WP_L==NC_NAND0_OCARINA_WP_LMAKE_BASE=TRUE</div> <div>26_NC_SE_GPIO0==NC_SE_GPIO0MAKE_BASE=TRUE</div> <div>106_NC_NAND1_OCARINA_WP_L==NC_NAND1_OCARINA_WP_LMAKE_BASE=TRUE</div> <div>82_9_NC_CIO_ATC3_LSRX_1V2==NC_CIO_ATC3_LSRX_1V2MAKE_BASE=TRUE</div> <div>82_9_NC_CIO_ATC3_LSTX_1V2==NC_CIO_ATC3_LSTX_1V2MAKE_BASE=TRUE</div> <div>6_NC_AP_GPIO1==NC_AP_GPIO1MAKE_BASE=TRUE</div> <div>6_NC_AP_GPIO8==NC_AP_GPIO8MAKE_BASE=TRUE</div> <div>5_NC_CLVR_GPIO0==NC_CLVR_GPIO0MAKE_BASE=TRUE</div> <div>43_NC_MPMU_VDDHI_PRE_UPO==NC_MPMU_VDDHI_PRE_UPOMAKE_BASE=TRUE</div> <div>6_NC_AP_I2S2_MCK==NC_AP_I2S2_MCKMAKE_BASE=TRUE</div>							
C	CHARGER									C
	<div>10_CHGR_INT_L==CHGR_INT_L29_129MAKE_BASE=TRUE</div>									
	HDMI									
	<div>9_DPRX_INT_HPD==DPRX_INT_HPD89MAKE_BASE=TRUE</div> <div>6_NC_UART_DP2HDMI_R2D==NC_UART_DP2HDMI_R2DMAKE_BASE=TRUE</div>									
C	LPDPCTX									C
	<div>140_109_129_LPDP_INT_HPD==LPDP_INT_HPD7_140MAKE_BASE=TRUE</div>									
	MACAW									
	<div>140_10_NC_PARROT_RESET_L==NC_PARROT_RESET_LMAKE_BASE=TRUE</div>									
B	IPD									B
	<div>10_IPD_SPI_INT_L==IPD_SPI_INT_L123MAKE_BASE=TRUE</div>									
	SMC_I2C5									
	<div>10_TB_NC_I2C_SMC_SNS1_SCL==NC_I2C_SMC_SNS1_SCLMAKE_BASE=TRUE</div> <div>10_TB_NC_I2C_SMC_SNS1_SDA==NC_I2C_SMC_SNS1_SDAMAKE_BASE=TRUE</div>									
B	AP_I2C4									B
	<div>93_TB_TP_AP_I2C04_SCL==TP_AP_I2C04_SCL6MAKE_BASE=TRUE</div> <div>93_TB_TP_AP_I2C04_SDA==TP_AP_I2C04_SDA6MAKE_BASE=TRUE</div>									
	AP_I2C5									
	<div>6_TB_NC_I2C_ENET_SCL==NC_I2C_ENET_SCLMAKE_BASE=TRUE</div> <div>6_TB_NC_I2C_ENET_SDA==NC_I2C_ENET_SDAMAKE_BASE=TRUE</div>									
A	AP_I2C6									A
	<div>6_TB_NC_I2C_USBA_LS_SCL==NC_I2C_USBA_LS_SCLMAKE_BASE=TRUE</div> <div>6_TB_NC_I2C_USBA_LS_SDA==NC_I2C_USBA_LS_SDAMAKE_BASE=TRUE</div>									
	8	7	6	5	4	3	2	1		

PAGE TITLE			SYNC_DATE=06/24/2020		
SIGNAL ALIASES 3					
 Apple Inc.		DRAWING NUMBER	051-05641	SIZE	D
		REVISION	8.0.0		
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	evt-2		
		PAGE	408 OF 999		
		SHEET	142 OF 155		

PAGE TITLE			SYNC_DATE=06/24/2020		
SIGNAL ALIASES 3					
 Apple Inc.		DRAWING NUMBER	051-05641	SIZE	
		REVISION	8.0.0	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		evt-2	
		PAGE		408 OF 999	
		SHEET		142 OF 155	







8

7

6

5

4

3

2

1

SCSET RULES

DIELECTRIC BASED SPACING RULES	
RULE DEFINITION	LIST OF VALUES
A_DIELECTRIC_N1X <small>Calculate dielectric in dielectric free standing. Minimum distance is and value 2 is defined</small>	VALUES: 1, 2, 5, 10, 20, 100 2-10
A_DIELECTRIC_N1XD XY, AVL, X <small>Calculate dielectric in dielectric free standing. Only and distance. Minimum distance is and value 2 is defined</small>	VALUES: 2, 10, 100, 20, 100, 100 PLEASE USE HYBRID TABLE
A_DIELECTRIC_N1XIN N1XOUT <small>Calculate dielectric in dielectric free standing. Minimum distance is and value 2 is defined</small>	VALUES: 2, 5, 10, 20

PHYSICAL CONSTRAINT SET, CLASS ASSIGNMENT

CLASS DEFINITIONS			COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*	CLASS DEFINITION
CLASS NAME	...	CONSTRAINT SET	DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)	Y/N
I2C	P	A_45_OHM_SE	*SMB*SCL*,*SMB*SDA*,*I2C*SCL*,*I2C*SDA*,*I2C*INT*	Y
SPI	P	A_45_OHM_SE	*SPI*MISO*,*SPI*MOSI*,*SP*CLK*,*SPI*CS*	Y
SPMI	P	A_45_OHM_SE	*SPMI*	Y
SWD	P	A_45_OHM_SE	SWD_NAND*,SWD_NUB*	Y
JTAG	P	A_45_OHM_SE	*JTAG*SEL,*JTAG*TCK,*JTAG*TDI,*JTAG*TDO,*JTAG*TMS	Y
CLOCK_24M	P	A_45_OHM_SE	SOC_24M_O_R_NAND0_CLK24M*	Y
SOC_XTAL_24M_IN	P	A_45_OHM_SE	SOC_XTAL24M_IN	Y
SOC_XTAL_24M_OUT	P	A_45_OHM_SE	SOC_XTAL24M_OUT	Y
CLOCK_32K	P	A_45_OHM_SE	PMU_CLK32K*	Y
TDM_LEFT	P	A_45_OHM_SE	TDM_SPKRAMP_L*,TDM_SPKRAMP_A*,TDM_SPKRAMP_B*	Y
TDM_RIGHT	P	A_45_OHM_SE	TDM_SPKRAMP_R*,TDM_SPKRAMP_D*,TDM_SPKRAMP_E*	Y
TDM_CODEC	P	A_45_OHM_SE	TDM_CODEC*	Y
SPKR_ICC	P	A_45_OHM_SE	SPKRAMP_ICC,SPKRAMP_*_ICC_R	Y
UART	P	A_45_OHM_SE	UART_*	Y
RESETS	P	A_45_OHM_SE	*RST*,*RESET*,*PERST*	Y
WDOG	P	A_45_OHM_SE	SOC_WDOG	Y
SOCHOT	P	A_45_OHM_SE	SOC_SOCHOT_L	Y
POWER_BUTTON	P	A_45_OHM_SE	*PMU_ONOFF*	Y
FAULT	P	A_45_OHM_SE	*FAULT*	Y
DMIC_PDM	P	A_45_OHM_SE	PDM_DMIC_DATA*,DMIC_DMIC_CLK*,DMIC_CLK*	Y
FAN_CTRL	P	A_45_OHM_SE	SMC_FAN_*	Y
USBC_SOC_BSB0_D2R_1	P	A_85_OHM_DIFF	DP:DP_USBC_ATC0_D2R_C_1	Y
USBC_SOC_BSB0_D2R_2	P	A_85_OHM_DIFF	DP:DP_USBC_ATC0_D2R_C_2	Y
USBC_SOC_BSB0_R2D_1	P	A_85_OHM_DIFF	DP:DP_USBC_ATC0_R2D_1	Y
USBC_SOC_BSB0_R2D_2	P	A_85_OHM_DIFF	DP:DP_USBC_ATC0_R2D_2	Y
USBC_SOC_BSB0_AUX	P	A_85_OHM_DIFF	DP:DP_USBC_ATC0_AUX	Y
USBC_SOC_BSB0_LSX	P	A_45_OHM_SE	CIO_ATC0_LS*	Y
USBC_BSB0_CONN_D2R_1	P	A_85_OHM_DIFF	DP:DP_USBC0_D2R_CR_1	Y
USBC_BSB0_CONN_D2R_2	P	A_85_OHM_DIFF	DP:DP_USBC0_D2R_CR_2	Y
USBC_BSB0_CONN_R2D_1	P	A_85_OHM_DIFF	DP:DP_USBC0_R2D_C_1	Y
USBC_BSB0_CONN_R2D_2	P	A_85_OHM_DIFF	DP:DP_USBC0_R2D_C_2	Y
USBC_BSB0_CONN_AUXLSX	P	A_85_OHM_DIFF	DP:DP_USBC0_AUXLSX	Y
USBC_UPC0_CONN_TOP	P	A_85_OHM_DIFF	DP:DP_USBC0_USB_TOP	Y
USBC_UPC0_CONN_BOT	P	A_85_OHM_DIFF	DP:DP_USBC0_USB_BOT	Y
USBC_UPC0_CONN_CC	P	A_45_OHM_SE	USBC0_CC*	Y
USBC_UPC0_CONN_SBU	P	A_45_OHM_SE	USBC0_SBU*	Y
USBC_SOC_RTMR0_USB2	P	A_85_OHM_DIFF	DP:DP_EUSB_ATC0	Y
USBC_RTMR0_MUX_USB2	P	A_85_OHM_DIFF	DP:DP_USB2_ATC0_LS_MUX	Y
USBC_MUX_UPC0_USB2	P	A_85_OHM_DIFF	DP:DP_USB2_ATC0_LS	Y
USBC_MUX_VITC_USB2	P	A_85_OHM_DIFF	DP:DP_USB2_ATC0_LS_VITAMINC	Y
USBC_SOC_BSB1_D2R_1	P	A_85_OHM_DIFF	DP:DP_USBC_ATC1_D2R_C_1	Y
USBC_SOC_BSB1_D2R_2	P	A_85_OHM_DIFF	DP:DP_USBC_ATC1_D2R_C_2	Y
USBC_SOC_BSB1_R2D_1	P	A_85_OHM_DIFF	DP:DP_USBC_ATC1_R2D_1	Y
USBC_SOC_BSB1_R2D_2	P	A_85_OHM_DIFF	DP:DP_USBC_ATC1_R2D_2	Y
USBC_SOC_BSB1_AUX	P	A_85_OHM_DIFF	DP:DP_USBC_ATC1_AUX	Y
USBC_SOC_BSB1_LSX	P	A_45_OHM_SE	CIO_ATC1_LS*	Y
USBC_BSB1_CONN_D2R_1	P	A_85_OHM_DIFF	DP:DP_USBC1_D2R_CR_1	Y
USBC_BSB1_CONN_D2R_2	P	A_85_OHM_DIFF	DP:DP_USBC1_D2R_CR_2	Y
USBC_BSB1_CONN_R2D_1	P	A_85_OHM_DIFF	DP:DP_USBC1_R2D_C_1	Y
USBC_BSB1_CONN_R2D_2	P	A_85_OHM_DIFF	DP:DP_USBC1_R2D_C_2	Y
USBC_BSB1_CONN_AUXLSX	P	A_85_OHM_DIFF	DP:DP_USBC1_AUXLSX	Y
USBC_UPC1_CONN_TOP	P	A_85_OHM_DIFF	DP:DP_USBC1_USB_TOP	Y
USBC_UPC1_CONN_BOT	P	A_85_OHM_DIFF	DP:DP_USBC1_USB_BOT	Y
USBC_UPC1_CONN_CC	P	A_45_OHM_SE	USBC1_CC*	Y
USBC_UPC1_CONN_SBU	P	A_45_OHM_SE	USBC1_SBU*	Y
USBC_SOC_RTMR1_USB2	P	A_85_OHM_DIFF	DP:DP_EUSB_ATC1	Y
USBC_RTMR1_UPC1_USB2	P	A_85_OHM_DIFF	DP:DP_USB2_ATC1_LS	Y
USBC_SOC_RTMR_USB2_DBG	P	A_85_OHM_DIFF	DP:DP_EUSB_DBG	Y
USBC_RTMR_MUX_USB2_DBG	P	A_85_OHM_DIFF	DP:DP_USB_DBG_LS_MUX	Y
USBC_MUX_UPC_USB2_DBG	P	A_85_OHM_DIFF	DP:DP_USB_DBG_LS	Y
USBC_MUX_VITC_USB2_DBG	P	A_85_OHM_DIFF	DP:DP_USB_DBG_LS_VITAMINC	Y
USBC_LSX	P	A_45_OHM_SE	*ATC*LS*X	Y
MIPI_FTCAM_CLK	P	A_85_OHM_DIFF	DP:DP_MIPI_FTCAM_CLK,DP_MIPI_CLOCK_CONN	Y
MIPI_FTCAM_DATA	P	A_85_OHM_DIFF	DP:DP_MIPI_FTCAM_DATA_0,DP_MIPI_DATA_CONN	Y
MIPI_DFR_CLK	P	A_85_OHM_DIFF	DP:DP_MIPI_DFR_CLK_CONN_FILT	Y
MIPI_DFR_DATA	P	A_85_OHM_DIFF	DP:DP_MIPI_DFR_DATA_CONN_FILT	Y
PCIE_WIFI_D2R	P	A_85_OHM_DIFF	DP:DP_PCIE_WLBT_D2R_C	Y
PCIE_WIFI_R2D	P	A_85_OHM_DIFF	DP:DP_PCIE_WLBT_R2D_C	Y
PCIE_WIFI_CLK	P	A_85_OHM_DIFF	DP:DP_PCIE_CLK100M_WLBT	Y
PCIE_NAND0_D2R	P	A_85_OHM_DIFF	DP:DP_PCIE_NAND0_D2R_C_0	Y
PCIE_NAND0_R2D	P	A_85_OHM_DIFF	DP:DP_PCIE_NAND0_R2D_C_0	Y
PCIE_NAND0_CLK	P	A_85_OHM_DIFF	DP:DP_PCIE_CLK100M_NAND0_0	Y
PCIE_NAND1_D2R	P	A_85_OHM_DIFF	DP:DP_PCIE_NAND0_D2R_C_1	Y
PCIE_NAND1_R2D	P	A_85_OHM_DIFF	DP:DP_PCIE_NAND0_R2D_C_1	Y
PCIE_NAND1_CLK	P	A_85_OHM_DIFF	DP:DP_PCIE_CLK100M_NAND0_1	Y
PCIE_CLKREQ	P	A_45_OHM_SE	*CLKREQ*	Y
PANEL_LPDP_DATA	P	A_85_OHM_DIFF	DP:DP_DP0,DP_DP1,DP_DP2,DP_DP3	Y
PANEL_LPDP_AUX	P	A_85_OHM_DIFF	DP:DP_AUX	Y
RCAL_PCIE	P	WIDTH_0P100	SOC_ST_PCIE_RCAL*,SOC_GP_PCIE_RCAL*	Y
RCAL_CIO	P	WIDTH_0P100	SOC_ATCPHY0_RCAL*,SOC_ATCPHY1_RCAL*	Y
RCAL_MIPI	P	WIDTH_0P100	*MIPI*REXT	Y
RCAL_EUSB	P	WIDTH_0P100	SOC_ATC*_USB_RESREF,SOC_USBDG_RESREF	Y
BOARD_ID	P	A_45_OHM_SE	BOARD_ID*	Y
BOARD_REV	P	A_45_OHM_SE	BOARD_REV*	Y
WIRELESS_TIME_SYNC	P	A_45_OHM_SE	*TIME_SYNC*	Y
KBD_PWM	P	A_45_OHM_SE	*KBD_BKLT_PWM*,BKLT_PWM_KEYB_3V3	Y

PHYSICAL CONSTRAINT SET, CLASS ASSIGNMENT


CLASS DEFINITIONS			COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*	CLASS DEFINITION
CLASS NAME	...	CONSTRAINT SET	DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)	Y/N
GROUND	P	DEFAULT	GND	Y
ANALOG_GROUND	P	DEFAULT	*AGND*,GND_*	Y
AUDIO_CONN_HEADPHONE_OUT	P	WIDTH_0P400	AUDIO_JACK_LEFT_OUT,AUDIO_JACK_RIGHT_OUT	Y
AUDIO_CONN_HEADPHONE_OUT	P	WIDTH_0P400	AUD_CONN_LEFT_OUT,AUD_CONN_RIGHT_OUT	Y
AUDIO_CONN_RETURN	P	WIDTH_0P500	AUDIO_JACK_GB_GND,AUDIO_JACK_CH_GND	Y
AUDIO_CONN_RETURN	P	WIDTH_0P500	AUD_CONN_RING2,AUD_CONN_SLEEVE	Y
AUDIO_CONN_SENSE	P	WIDTH_0P100	AUDIO_JACK_LEFT_SNS,AUDIO_JACK_RIGHT_SNS	Y
AUDIO_CONN_SENSE	P	WIDTH_0P100	AUDIO_JACK_TIP_SNS,AUDIO_JACK_RING_SNS	Y
AUDIO_CONN_SENSE	P	WIDTH_0P100	AUD_CONN_LEFT_SNS,AUD_CONN_RIGHT_SNS	Y
AUDIO_CONN_SENSE	P	WIDTH_0P100	AUD_CONN_TIP_SENSE,AUD_CONN_RING_SENSE	Y
SPEAKERAMP_OUTPUT	P	SPKRAMP_OUT_DIFF	DP:DP_SPKRAMP_*_OUT	Y
SENSE_DIFF	P	SENSE_DIFF	DP:DP_CHGR_CS*,DP_ISNS_*,DP_*VSNS_XW,DP_*_VSEN_XW	Y
SENSE_DIFF	P	SENSE_DIFF	DP:DP_SPMU_TDEV,DP_SPKRAMP_*_VSENSE	Y
SENSE_DIFF	P	SENSE_DIFF	DP:DP_P3V8AON_ISEN*,DP_THMSNS*,DP_ISNS_*LCD	Y
SENSE_DIFF	P	SENSE_DIFF	DP:DP_SOC_*_RCAL,DP_P3V8IDIF2_FB	Y
SENSE_DIFF	P	SENSE_DIFF	DP:DP_P3V8AON_VSNS,DP_ATCRTMR*_THERM_D	Y
RF_ANTENNA	P	WIDTH_0P100	RF_ANT_0,RF_ANT_1	Y
PMU_BUCK_FB	P	VR_FEEDBACK	BUCK*_FB*	Y
POWER	P	POWER	PP*	Y

SYNC\_MASTER-CONSTRAINTS

SYNC\_DATE=01/08/2020

PAGE TITLE

17.2 PHYSICAL CSETS

 Apple Inc.

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 NUMBER

051-05641

REVISION

8.0.0

BRANCH

evt-2

PAGE

502 OF 999

SHEET

146 OF 155

	8	7	6	5	4	3	2	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
D	SPACING CONSTRAINT SET, CLASS ASSIGNMENT								D																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
C	<table><tr><th colspan="2">CLASS DEFINITIONS</th><th colspan="2">COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*</th><th>CLASS</th></tr><tr><th>CLASS NAME</th><th></th><th>CONSTRAINT SET</th><th>DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)</th><th>Y/N</th></tr><tr><td>I2C</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>SPI</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>SPMI</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>SWD</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>JTAG</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>CLOCK_24M</td><td>S</td><td>A_DIELECTRIC_8X</td><td>=</td><td>Y</td></tr><tr><td>SOC_XTAL_24M_IN</td><td>S</td><td>A_DIELECTRIC_8X</td><td>=</td><td>Y</td></tr><tr><td>SOC_XTAL_24M_OUT</td><td>S</td><td>A_DIELECTRIC_8X</td><td>=</td><td>Y</td></tr><tr><td>CLOCK_32K</td><td>S</td><td>A_DIELECTRIC_8X</td><td>=</td><td>Y</td></tr><tr><td>TDM_LEFT</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>TDM_RIGHT</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>TDM_CODEC</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>SPKR_ICC</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>UART</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>RESETS</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>WDOG</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>SOCHOT</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>POWER_BUTTON</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>FAULT</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>DMIC_PDM</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>FAN_CTRL</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB0_D2R_1</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB0_D2R_2</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB0_R2D_1</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB0_R2D_2</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB0_AUX</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB0_LSX</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB0_CONN_D2R_1</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB0_CONN_D2R_2</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB0_CONN_R2D_1</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB0_CONN_R2D_2</td><td>S</td><td>A_DIELECTRIC_9X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB0_CONN_AUXLSX</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC0_CONN_TOP</td><td>S</td><td>A_DIELECTRIC_5X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC0_CONN_BOT</td><td>S</td><td>A_DIELECTRIC_5X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC0_CONN_CC</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC0_CONN_SBU</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_RTMR0_USB2</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_RTMR0_MUX_USB2</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_MUX_UPC0_USB2</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_MUX_VITC_USB2</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB1_D2R_1</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB1_D2R_2</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB1_R2D_1</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB1_R2D_2</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB1_AUX</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_BSB1_LSX</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB1_CONN_D2R_1</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB1_CONN_D2R_2</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB1_CONN_R2D_1</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB1_CONN_R2D_2</td><td>S</td><td>A_DIELECTRIC_10X</td><td>=</td><td>Y</td></tr><tr><td>USBC_BSB1_CONN_AUXLSX</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC1_CONN_TOP</td><td>S</td><td>A_DIELECTRIC_5X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC1_CONN_BOT</td><td>S</td><td>A_DIELECTRIC_5X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC1_CONN_CC</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>USBC_UPC1_CONN_SBU</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_RTMR1_USB2</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_RTMR1_UPC1_USB2</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_SOC_RTMR_USB2_DBG</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_RTMR_MUX_USB2_DBG</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_MUX_UPC_USB2_DBG</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_MUX_VITC_USB2_DBG</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>USBC_LSX</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>MIPI_FTCAM_CLK</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>MIPI_FTCAM_DATA</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>MIPI_DFR_CLK</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>MIPI_DFR_DATA</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_WIFI_D2R</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_WIFI_R2D</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_WIFI_CLK</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_NAND0_D2R</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_NAND0_R2D</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_NAND0_CLK</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_NAND1_D2R</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_NAND1_R2D</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_NAND1_CLK</td><td>S</td><td>A_DIELECTRIC_7X</td><td>=</td><td>Y</td></tr><tr><td>PCIE_CLKREQ</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>PANEL_LPDP_DATA</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>PANEL_LPDP_AUX</td><td>S</td><td>A_DIELECTRIC_6X</td><td>=</td><td>Y</td></tr><tr><td>RCAL_PCIE</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>RCAL_CIO</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>RCAL_MIPI</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>RCAL_EUSB</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>BOARD_ID</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>BOARD_REV</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>WIRELESS_TIME_SYNC</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>KBD_PWM</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>GROUND</td><td>S</td><td>DEFAULT</td><td>=</td><td>Y</td></tr><tr><td>ANALOG_GROUND</td><td>S</td><td>DEFAULT</td><td>=</td><td>Y</td></tr><tr><td>AUDIO_CONN_HEADPHONE_OUT</td><td>S</td><td>A_DIELECTRIC_3X</td><td>=</td><td>Y</td></tr><tr><td>AUDIO_CONN_RETURN</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>AUDIO_CONN_SENSE</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>SPEAKERAMP_OUTPUT</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>SENSE_DIFF</td><td>S</td><td>A_DIELECTRIC_2X</td><td>=</td><td>Y</td></tr><tr><td>RF_ANTENNA</td><td>S</td><td>RF_ANTENNA</td><td>=</td><td>Y</td></tr><tr><td>PMU_BUCK_FB</td><td>S</td><td>DEFAULT</td><td>=</td><td>Y</td></tr><tr><td>POWER</td><td>S</td><td>DEFAULT</td><td>=</td><td>Y</td></tr></table>								CLASS DEFINITIONS		COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*		CLASS	CLASS NAME		CONSTRAINT SET	DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)	Y/N	I2C	S	A_DIELECTRIC_3X	=	Y	SPI	S	A_DIELECTRIC_3X	=	Y	SPMI	S	A_DIELECTRIC_3X	=	Y	SWD	S	A_DIELECTRIC_3X	=	Y	JTAG	S	A_DIELECTRIC_2X	=	Y	CLOCK_24M	S	A_DIELECTRIC_8X	=	Y	SOC_XTAL_24M_IN	S	A_DIELECTRIC_8X	=	Y	SOC_XTAL_24M_OUT	S	A_DIELECTRIC_8X	=	Y	CLOCK_32K	S	A_DIELECTRIC_8X	=	Y	TDM_LEFT	S	A_DIELECTRIC_3X	=	Y	TDM_RIGHT	S	A_DIELECTRIC_3X	=	Y	TDM_CODEC	S	A_DIELECTRIC_3X	=	Y	SPKR_ICC	S	A_DIELECTRIC_3X	=	Y	UART	S	A_DIELECTRIC_2X	=	Y	RESETS	S	A_DIELECTRIC_3X	=	Y	WDOG	S	A_DIELECTRIC_3X	=	Y	SOCHOT	S	A_DIELECTRIC_3X	=	Y	POWER_BUTTON	S	A_DIELECTRIC_3X	=	Y	FAULT	S	A_DIELECTRIC_3X	=	Y	DMIC_PDM	S	A_DIELECTRIC_3X	=	Y	FAN_CTRL	S	A_DIELECTRIC_2X	=	Y	USBC_SOC_BSB0_D2R_1	S	A_DIELECTRIC_9X	=	Y	USBC_SOC_BSB0_D2R_2	S	A_DIELECTRIC_9X	=	Y	USBC_SOC_BSB0_R2D_1	S	A_DIELECTRIC_9X	=	Y	USBC_SOC_BSB0_R2D_2	S	A_DIELECTRIC_9X	=	Y	USBC_SOC_BSB0_AUX	S	A_DIELECTRIC_7X	=	Y	USBC_SOC_BSB0_LSX	S	A_DIELECTRIC_7X	=	Y	USBC_BSB0_CONN_D2R_1	S	A_DIELECTRIC_9X	=	Y	USBC_BSB0_CONN_D2R_2	S	A_DIELECTRIC_9X	=	Y	USBC_BSB0_CONN_R2D_1	S	A_DIELECTRIC_9X	=	Y	USBC_BSB0_CONN_R2D_2	S	A_DIELECTRIC_9X	=	Y	USBC_BSB0_CONN_AUXLSX	S	A_DIELECTRIC_7X	=	Y	USBC_UPC0_CONN_TOP	S	A_DIELECTRIC_5X	=	Y	USBC_UPC0_CONN_BOT	S	A_DIELECTRIC_5X	=	Y	USBC_UPC0_CONN_CC	S	A_DIELECTRIC_2X	=	Y	USBC_UPC0_CONN_SBU	S	A_DIELECTRIC_2X	=	Y	USBC_SOC_RTMR0_USB2	S	A_DIELECTRIC_6X	=	Y	USBC_RTMR0_MUX_USB2	S	A_DIELECTRIC_6X	=	Y	USBC_MUX_UPC0_USB2	S	A_DIELECTRIC_6X	=	Y	USBC_MUX_VITC_USB2	S	A_DIELECTRIC_6X	=	Y	USBC_SOC_BSB1_D2R_1	S	A_DIELECTRIC_10X	=	Y	USBC_SOC_BSB1_D2R_2	S	A_DIELECTRIC_10X	=	Y	USBC_SOC_BSB1_R2D_1	S	A_DIELECTRIC_10X	=	Y	USBC_SOC_BSB1_R2D_2	S	A_DIELECTRIC_10X	=	Y	USBC_SOC_BSB1_AUX	S	A_DIELECTRIC_7X	=	Y	USBC_SOC_BSB1_LSX	S	A_DIELECTRIC_7X	=	Y	USBC_BSB1_CONN_D2R_1	S	A_DIELECTRIC_10X	=	Y	USBC_BSB1_CONN_D2R_2	S	A_DIELECTRIC_10X	=	Y	USBC_BSB1_CONN_R2D_1	S	A_DIELECTRIC_10X	=	Y	USBC_BSB1_CONN_R2D_2	S	A_DIELECTRIC_10X	=	Y	USBC_BSB1_CONN_AUXLSX	S	A_DIELECTRIC_7X	=	Y	USBC_UPC1_CONN_TOP	S	A_DIELECTRIC_5X	=	Y	USBC_UPC1_CONN_BOT	S	A_DIELECTRIC_5X	=	Y	USBC_UPC1_CONN_CC	S	A_DIELECTRIC_2X	=	Y	USBC_UPC1_CONN_SBU	S	A_DIELECTRIC_2X	=	Y	USBC_SOC_RTMR1_USB2	S	A_DIELECTRIC_6X	=	Y	USBC_RTMR1_UPC1_USB2	S	A_DIELECTRIC_6X	=	Y	USBC_SOC_RTMR_USB2_DBG	S	A_DIELECTRIC_6X	=	Y	USBC_RTMR_MUX_USB2_DBG	S	A_DIELECTRIC_6X	=	Y	USBC_MUX_UPC_USB2_DBG	S	A_DIELECTRIC_6X	=	Y	USBC_MUX_VITC_USB2_DBG	S	A_DIELECTRIC_6X	=	Y	USBC_LSX	S	A_DIELECTRIC_6X	=	Y	MIPI_FTCAM_CLK	S	A_DIELECTRIC_6X	=	Y	MIPI_FTCAM_DATA	S	A_DIELECTRIC_6X	=	Y	MIPI_DFR_CLK	S	A_DIELECTRIC_6X	=	Y	MIPI_DFR_DATA	S	A_DIELECTRIC_6X	=	Y	PCIE_WIFI_D2R	S	A_DIELECTRIC_7X	=	Y	PCIE_WIFI_R2D	S	A_DIELECTRIC_7X	=	Y	PCIE_WIFI_CLK	S	A_DIELECTRIC_7X	=	Y	PCIE_NAND0_D2R	S	A_DIELECTRIC_7X	=	Y	PCIE_NAND0_R2D	S	A_DIELECTRIC_7X	=	Y	PCIE_NAND0_CLK	S	A_DIELECTRIC_7X	=	Y	PCIE_NAND1_D2R	S	A_DIELECTRIC_7X	=	Y	PCIE_NAND1_R2D	S	A_DIELECTRIC_7X	=	Y	PCIE_NAND1_CLK	S	A_DIELECTRIC_7X	=	Y	PCIE_CLKREQ	S	A_DIELECTRIC_2X	=	Y	PANEL_LPDP_DATA	S	A_DIELECTRIC_6X	=	Y	PANEL_LPDP_AUX	S	A_DIELECTRIC_6X	=	Y	RCAL_PCIE	S	A_DIELECTRIC_2X	=	Y	RCAL_CIO	S	A_DIELECTRIC_2X	=	Y	RCAL_MIPI	S	A_DIELECTRIC_2X	=	Y	RCAL_EUSB	S	A_DIELECTRIC_2X	=	Y	BOARD_ID	S	A_DIELECTRIC_2X	=	Y	BOARD_REV	S	A_DIELECTRIC_2X	=	Y	WIRELESS_TIME_SYNC	S	A_DIELECTRIC_2X	=	Y	KBD_PWM	S	A_DIELECTRIC_2X	=	Y	GROUND	S	DEFAULT	=	Y	ANALOG_GROUND	S	DEFAULT	=	Y	AUDIO_CONN_HEADPHONE_OUT	S	A_DIELECTRIC_3X	=	Y	AUDIO_CONN_RETURN	S	A_DIELECTRIC_2X	=	Y	AUDIO_CONN_SENSE	S	A_DIELECTRIC_2X	=	Y	SPEAKERAMP_OUTPUT	S	A_DIELECTRIC_2X	=	Y	SENSE_DIFF	S	A_DIELECTRIC_2X	=	Y	RF_ANTENNA	S	RF_ANTENNA	=	Y	PMU_BUCK_FB	S	DEFAULT	=	Y	POWER	S	DEFAULT	=	Y	C
CLASS DEFINITIONS		COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*		CLASS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
CLASS NAME		CONSTRAINT SET	DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)	Y/N																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
I2C	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SPI	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SPMI	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SWD	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
JTAG	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
CLOCK_24M	S	A_DIELECTRIC_8X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SOC_XTAL_24M_IN	S	A_DIELECTRIC_8X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SOC_XTAL_24M_OUT	S	A_DIELECTRIC_8X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
CLOCK_32K	S	A_DIELECTRIC_8X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
TDM_LEFT	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
TDM_RIGHT	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
TDM_CODEC	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SPKR_ICC	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
UART	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
RESETS	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
WDOG	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SOCHOT	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
POWER_BUTTON	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
FAULT	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
DMIC_PDM	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
FAN_CTRL	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB0_D2R_1	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB0_D2R_2	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB0_R2D_1	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB0_R2D_2	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB0_AUX	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB0_LSX	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB0_CONN_D2R_1	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB0_CONN_D2R_2	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB0_CONN_R2D_1	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB0_CONN_R2D_2	S	A_DIELECTRIC_9X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB0_CONN_AUXLSX	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC0_CONN_TOP	S	A_DIELECTRIC_5X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC0_CONN_BOT	S	A_DIELECTRIC_5X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC0_CONN_CC	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC0_CONN_SBU	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_RTMR0_USB2	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_RTMR0_MUX_USB2	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_MUX_UPC0_USB2	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_MUX_VITC_USB2	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB1_D2R_1	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB1_D2R_2	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB1_R2D_1	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB1_R2D_2	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB1_AUX	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_BSB1_LSX	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB1_CONN_D2R_1	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB1_CONN_D2R_2	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB1_CONN_R2D_1	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB1_CONN_R2D_2	S	A_DIELECTRIC_10X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_BSB1_CONN_AUXLSX	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC1_CONN_TOP	S	A_DIELECTRIC_5X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC1_CONN_BOT	S	A_DIELECTRIC_5X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC1_CONN_CC	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_UPC1_CONN_SBU	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_RTMR1_USB2	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_RTMR1_UPC1_USB2	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_SOC_RTMR_USB2_DBG	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_RTMR_MUX_USB2_DBG	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_MUX_UPC_USB2_DBG	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_MUX_VITC_USB2_DBG	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
USBC_LSX	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
MIPI_FTCAM_CLK	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
MIPI_FTCAM_DATA	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
MIPI_DFR_CLK	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
MIPI_DFR_DATA	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_WIFI_D2R	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_WIFI_R2D	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_WIFI_CLK	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_NAND0_D2R	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_NAND0_R2D	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_NAND0_CLK	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_NAND1_D2R	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_NAND1_R2D	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_NAND1_CLK	S	A_DIELECTRIC_7X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PCIE_CLKREQ	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PANEL_LPDP_DATA	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PANEL_LPDP_AUX	S	A_DIELECTRIC_6X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
RCAL_PCIE	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
RCAL_CIO	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
RCAL_MIPI	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
RCAL_EUSB	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
BOARD_ID	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
BOARD_REV	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
WIRELESS_TIME_SYNC	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
KBD_PWM	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
GROUND	S	DEFAULT	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
ANALOG_GROUND	S	DEFAULT	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
AUDIO_CONN_HEADPHONE_OUT	S	A_DIELECTRIC_3X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
AUDIO_CONN_RETURN	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
AUDIO_CONN_SENSE	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SPEAKERAMP_OUTPUT	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
SENSE_DIFF	S	A_DIELECTRIC_2X	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
RF_ANTENNA	S	RF_ANTENNA	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PMU_BUCK_FB	S	DEFAULT	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
POWER	S	DEFAULT	=	Y																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
B									B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
A	<table><tr><td colspan="2">SYNC_MASTER=CONSTRAINTS</td><td colspan="2">PAGE TITLE</td><td colspan="2">17.2 SPACING CSETS, ISO</td><td colspan="2">DRAWING NUMBER</td><td>051-05641</td><td>SIZE</td><td>D</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td>REVISION</td><td>8.0.0</td><td></td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td>BRANCH</td><td>evt-2</td><td></td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td>PAGE</td><td>503 OF 999</td><td></td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td>SHEET</td><td>147 OF 155</td><td></td></tr></table>								SYNC_MASTER=CONSTRAINTS		PAGE TITLE		17.2 SPACING CSETS, ISO		DRAWING NUMBER		051-05641	SIZE	D									REVISION	8.0.0										BRANCH	evt-2										PAGE	503 OF 999										SHEET	147 OF 155		A																																																																																																																																																																																																																																																																																																																																																																																																																																																			
SYNC_MASTER=CONSTRAINTS		PAGE TITLE		17.2 SPACING CSETS, ISO		DRAWING NUMBER		051-05641	SIZE	D																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
								REVISION	8.0.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
								BRANCH	evt-2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
								PAGE	503 OF 999																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
								SHEET	147 OF 155																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	8	7	6	5	4	3	2	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											



	8	7	6	5	4	3	2	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	SPACING CONSTRAINT SET ASSIGNMENT, CLASS-CLASS			SPACING CONSTRAINT SET ASSIGNMENT, CLASS-CLASS			SPACING CONSTRAINT SET ASSIGNMENT, CLASS-CLASS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
D	<table><tr><th colspan="3">CLASS TO CLASS SPACING</th></tr><tr><th>CLASS NAME</th><th>CLASS NAME</th><th>CONSTRAINT SET</th></tr><tr><td>I2C</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SPI</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SPMI</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SWD</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>JTAG</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>CLOCK_24M</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>CLOCK_32K</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>TDM_LEFT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>TDM_RIGHT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>TDM_CODEC</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SPKR_ICC</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>UART</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>RESETS</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>WDOG</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SOCHOT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>POWER_BUTTON</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>FAULT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>DMIC_PDM</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>FAN_CTRL</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>USBC_SOC_BSB0_D2R_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_D2R_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_R2D_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_R2D_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_AUX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_LSX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_D2R_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_D2R_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_R2D_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_R2D_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_AUXLSX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC0_CONN_TOP</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC0_CONN_BOT</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC0_CONN_CC</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>USBC_UPC0_CONN_SBU</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_RTMR0_USB2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_RTMR0_MUX_USB2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_UPC0_USB2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_VITC_USB2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_D2R_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_D2R_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_R2D_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_R2D_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_AUX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_LSX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_D2R_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_D2R_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_R2D_1</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_R2D_2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_AUXLSX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC1_CONN_TOP</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC1_CONN_BOT</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC1_CONN_CC</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>USBC_UPC1_CONN_SBU</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_RTMR1_USB2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_RTMR1_UPC1_USB2</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_RTMR_USB2_DBG</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_RTMR_MUX_USB2_DBG</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_UPC_USB2_DBG</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_VITC_USB2_DBG</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_FTCAM_CLK</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_FTCAM_DATA</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_DFR_CLK</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_DFR_DATA</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_WIFI_D2R</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_WIFI_R2D</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_WIFI_CLK</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND0_D2R</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND0_R2D</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND0_CLK</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND1_D2R</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND1_R2D</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND1_CLK</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_CLKREQ</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>PANEL_LPDP_DATA</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PANEL_LPDP_AUX</td><td>GROUND</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>RCAL_PCIE</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>RCAL_CIO</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>RCAL_MIPI</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>BOARD_ID</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>BOARD_REV</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>WIRELESS_TIME_SYNC</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>KBD_PWM</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>AUDIO_CONN_HEADPHONE_OUT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>AUDIO_CONN_RETURN</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>AUDIO_CONN_SENSE</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SPEAKERAMP_OUTPUT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SENSE_DIFF</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SOC_XTAL_24M_IN</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>SOC_XTAL_24M_OUT</td><td>GROUND</td><td>DEFAULT</td></tr><tr><td>POWER</td><td>GROUND</td><td>DEFAULT</td></tr></table>			CLASS TO CLASS SPACING			CLASS NAME	CLASS NAME	CONSTRAINT SET	I2C	GROUND	DEFAULT	SPI	GROUND	DEFAULT	SPMI	GROUND	DEFAULT	SWD	GROUND	DEFAULT	JTAG	GROUND	DEFAULT	CLOCK_24M	GROUND	DEFAULT	CLOCK_32K	GROUND	DEFAULT	TDM_LEFT	GROUND	DEFAULT	TDM_RIGHT	GROUND	DEFAULT	TDM_CODEC	GROUND	DEFAULT	SPKR_ICC	GROUND	DEFAULT	UART	GROUND	DEFAULT	RESETS	GROUND	DEFAULT	WDOG	GROUND	DEFAULT	SOCHOT	GROUND	DEFAULT	POWER_BUTTON	GROUND	DEFAULT	FAULT	GROUND	DEFAULT	DMIC_PDM	GROUND	DEFAULT	FAN_CTRL	GROUND	DEFAULT	USBC_SOC_BSB0_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_AUX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_LSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_AUXLSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC0_CONN_TOP	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC0_CONN_BOT	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC0_CONN_CC	GROUND	DEFAULT	USBC_UPC0_CONN_SBU	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_RTMR0_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_RTMR0_MUX_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_UPC0_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_VITC_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_AUX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_LSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_AUXLSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC1_CONN_TOP	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC1_CONN_BOT	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC1_CONN_CC	GROUND	DEFAULT	USBC_UPC1_CONN_SBU	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_RTMR1_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_RTMR1_UPC1_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_RTMR_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_RTMR_MUX_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_UPC_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_VITC_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_FTCAM_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_FTCAM_DATA	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_DFR_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_DFR_DATA	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_WIFI_D2R	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_WIFI_R2D	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_WIFI_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND0_D2R	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND0_R2D	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND0_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND1_D2R	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND1_R2D	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND1_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_CLKREQ	GROUND	DEFAULT	PANEL_LPDP_DATA	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	PANEL_LPDP_AUX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE	RCAL_PCIE	GROUND	DEFAULT	RCAL_CIO	GROUND	DEFAULT	RCAL_MIPI	GROUND	DEFAULT	BOARD_ID	GROUND	DEFAULT	BOARD_REV	GROUND	DEFAULT	WIRELESS_TIME_SYNC	GROUND	DEFAULT	KBD_PWM	GROUND	DEFAULT	AUDIO_CONN_HEADPHONE_OUT	GROUND	DEFAULT	AUDIO_CONN_RETURN	GROUND	DEFAULT	AUDIO_CONN_SENSE	GROUND	DEFAULT	SPEAKERAMP_OUTPUT	GROUND	DEFAULT	SENSE_DIFF	GROUND	DEFAULT	SOC_XTAL_24M_IN	GROUND	DEFAULT	SOC_XTAL_24M_OUT	GROUND	DEFAULT	POWER	GROUND	DEFAULT	<table><tr><th colspan="3">CLASS TO CLASS SPACING</th></tr><tr><th>CLASS NAME</th><th>CLASS NAME</th><th>CONSTRAINT SET</th></tr><tr><td>I2C</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SPI</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SPMI</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SWD</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>JTAG</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>CLOCK_24M</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>CLOCK_32K</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>TDM_LEFT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>TDM_RIGHT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>TDM_CODEC</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SPKR_ICC</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>UART</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>RESETS</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>WDOG</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SOCHOT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>POWER_BUTTON</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>FAULT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>DMIC_PDM</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>FAN_CTRL</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>USBC_SOC_BSB0_D2R_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_D2R_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_R2D_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_R2D_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_AUX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB0_LSX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_D2R_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_D2R_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_R2D_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_R2D_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB0_CONN_AUXLSX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC0_CONN_TOP</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC0_CONN_BOT</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC0_CONN_CC</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>USBC_UPC0_CONN_SBU</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_RTMR0_USB2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_RTMR0_MUX_USB2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_UPC0_USB2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_VITC_USB2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_D2R_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_D2R_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_R2D_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_R2D_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_AUX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_BSB1_LSX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_D2R_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_D2R_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_R2D_1</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_R2D_2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_BSB1_CONN_AUXLSX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC1_CONN_TOP</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC1_CONN_BOT</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_UPC1_CONN_CC</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>USBC_UPC1_CONN_SBU</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_RTMR1_USB2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_RTMR1_UPC1_USB2</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_SOC_RTMR_USB2_DBG</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_RTMR_MUX_USB2_DBG</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_UPC_USB2_DBG</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>USBC_MUX_VITC_USB2_DBG</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_FTCAM_CLK</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_FTCAM_DATA</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_DFR_CLK</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>MIPI_DFR_DATA</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_WIFI_D2R</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_WIFI_R2D</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_WIFI_CLK</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND0_D2R</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND0_R2D</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND0_CLK</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND1_D2R</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND1_R2D</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_NAND1_CLK</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PCIE_CLKREQ</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>PANEL_LPDP_DATA</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>PANEL_LPDP_AUX</td><td>POWER</td><td>DEFAULT_WITH_5X_LINE2SHAPE</td></tr><tr><td>RCAL_PCIE</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>RCAL_CIO</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>RCAL_MIPI</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>BOARD_ID</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>BOARD_REV</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>WIRELESS_TIME_SYNC</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>KBD_PWM</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>AUDIO_CONN_HEADPHONE_OUT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>AUDIO_CONN_RETURN</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>AUDIO_CONN_SENSE</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SPEAKERAMP_OUTPUT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SENSE_DIFF</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SOC_XTAL_24M_IN</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>SOC_XTAL_24M_OUT</td><td>POWER</td><td>DEFAULT</td></tr><tr><td>POWER</td><td>POWER</td><td>DEFAULT</td></tr></table>			CLASS TO CLASS SPACING			CLASS NAME	CLASS NAME	CONSTRAINT SET	I2C	POWER	DEFAULT	SPI	POWER	DEFAULT	SPMI	POWER	DEFAULT	SWD	POWER	DEFAULT	JTAG	POWER	DEFAULT	CLOCK_24M	POWER	DEFAULT	CLOCK_32K	POWER	DEFAULT	TDM_LEFT	POWER	DEFAULT	TDM_RIGHT	POWER	DEFAULT	TDM_CODEC	POWER	DEFAULT	SPKR_ICC	POWER	DEFAULT	UART	POWER	DEFAULT	RESETS	POWER	DEFAULT	WDOG	POWER	DEFAULT	SOCHOT	POWER	DEFAULT	POWER_BUTTON	POWER	DEFAULT	FAULT	POWER	DEFAULT	DMIC_PDM	POWER	DEFAULT	FAN_CTRL	POWER	DEFAULT	USBC_SOC_BSB0_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_AUX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB0_LSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB0_CONN_AUXLSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC0_CONN_TOP	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC0_CONN_BOT	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC0_CONN_CC	POWER	DEFAULT	USBC_UPC0_CONN_SBU	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_RTMR0_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_RTMR0_MUX_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_UPC0_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_VITC_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_AUX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_BSB1_LSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_BSB1_CONN_AUXLSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC1_CONN_TOP	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC1_CONN_BOT	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_UPC1_CONN_CC	POWER	DEFAULT	USBC_UPC1_CONN_SBU	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_RTMR1_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_RTMR1_UPC1_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_SOC_RTMR_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_RTMR_MUX_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_UPC_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE	USBC_MUX_VITC_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_FTCAM_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_FTCAM_DATA	POWER	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_DFR_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE	MIPI_DFR_DATA	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_WIFI_D2R	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_WIFI_R2D	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_WIFI_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND0_D2R	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND0_R2D	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND0_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND1_D2R	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND1_R2D	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_NAND1_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PCIE_CLKREQ	POWER	DEFAULT	PANEL_LPDP_DATA	POWER	DEFAULT_WITH_5X_LINE2SHAPE	PANEL_LPDP_AUX	POWER	DEFAULT_WITH_5X_LINE2SHAPE	RCAL_PCIE	POWER	DEFAULT	RCAL_CIO	POWER	DEFAULT	RCAL_MIPI	POWER	DEFAULT	BOARD_ID	POWER	DEFAULT	BOARD_REV	POWER	DEFAULT	WIRELESS_TIME_SYNC	POWER	DEFAULT	KBD_PWM	POWER	DEFAULT	AUDIO_CONN_HEADPHONE_OUT	POWER	DEFAULT	AUDIO_CONN_RETURN	POWER	DEFAULT	AUDIO_CONN_SENSE	POWER	DEFAULT	SPEAKERAMP_OUTPUT	POWER	DEFAULT	SENSE_DIFF	POWER	DEFAULT	SOC_XTAL_24M_IN	POWER	DEFAULT	SOC_XTAL_24M_OUT	POWER	DEFAULT	POWER	POWER	DEFAULT	<table><tr><th colspan="3">CLASS TO CLASS SPACING</th></tr><tr><th>CLASS NAME</th><th>CLASS NAME</th><th>CONSTRAINT SET</th></tr><tr><td>USBC_SOC_BSB0_D2R_1</td><td>USBC_SOC_BSB0_D2R_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_SOC_BSB0_R2D_1</td><td>USBC_SOC_BSB0_R2D_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_BSB0_CONN_D2R_1</td><td>USBC_BSB0_CONN_D2R_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_BSB0_CONN_R2D_1</td><td>USBC_BSB0_CONN_R2D_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_SOC_BSB1_D2R_1</td><td>USBC_SOC_BSB1_D2R_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_SOC_BSB1_R2D_1</td><td>USBC_SOC_BSB1_R2D_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_BSB1_CONN_D2R_1</td><td>USBC_BSB1_CONN_D2R_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>USBC_BSB1_CONN_R2D_1</td><td>USBC_BSB1_CONN_R2D_2</td><td>A_DIELECTRIC_6X</td></tr><tr><td>PANEL_LPDP_DATA</td><td>PANEL_LPDP_DATA</td><td>A_DIELECTRIC_5X</td></tr><tr><td>SOC_XTAL_24M_IN</td><td>SOC_XTAL_24M_OUT</td><td>A_DIELECTRIC_2X</td></tr></table>			CLASS TO CLASS SPACING			CLASS NAME	CLASS NAME	CONSTRAINT SET	USBC_SOC_BSB0_D2R_1	USBC_SOC_BSB0_D2R_2	A_DIELECTRIC_6X	USBC_SOC_BSB0_R2D_1	USBC_SOC_BSB0_R2D_2	A_DIELECTRIC_6X	USBC_BSB0_CONN_D2R_1	USBC_BSB0_CONN_D2R_2	A_DIELECTRIC_6X	USBC_BSB0_CONN_R2D_1	USBC_BSB0_CONN_R2D_2	A_DIELECTRIC_6X	USBC_SOC_BSB1_D2R_1	USBC_SOC_BSB1_D2R_2	A_DIELECTRIC_6X	USBC_SOC_BSB1_R2D_1	USBC_SOC_BSB1_R2D_2	A_DIELECTRIC_6X	USBC_BSB1_CONN_D2R_1	USBC_BSB1_CONN_D2R_2	A_DIELECTRIC_6X	USBC_BSB1_CONN_R2D_1	USBC_BSB1_CONN_R2D_2	A_DIELECTRIC_6X	PANEL_LPDP_DATA	PANEL_LPDP_DATA	A_DIELECTRIC_5X	SOC_XTAL_24M_IN	SOC_XTAL_24M_OUT	A_DIELECTRIC_2X	D	
	CLASS TO CLASS SPACING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
CLASS NAME	CLASS NAME	CONSTRAINT SET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
I2C	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPI	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPMI	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SWD	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
JTAG	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CLOCK_24M	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CLOCK_32K	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
TDM_LEFT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
TDM_RIGHT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
TDM_CODEC	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPKR_ICC	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
UART	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RESETS	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
WDOG	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOCHOT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
POWER_BUTTON	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
FAULT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
DMIC_PDM	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
FAN_CTRL	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_AUX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_LSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_AUXLSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_TOP	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_BOT	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_CC	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_SBU	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_RTMR0_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_RTMR0_MUX_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_UPC0_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_VITC_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_AUX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_LSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_D2R_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_D2R_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_R2D_1	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_R2D_2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_AUXLSX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_TOP	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_BOT	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_CC	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_SBU	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_RTMR1_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_RTMR1_UPC1_USB2	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_RTMR_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_RTMR_MUX_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_UPC_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_VITC_USB2_DBG	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_FTCAM_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_FTCAM_DATA	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_DFR_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_DFR_DATA	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_WIFI_D2R	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_WIFI_R2D	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_WIFI_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND0_D2R	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND0_R2D	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND0_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND1_D2R	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND1_R2D	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND1_CLK	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_CLKREQ	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PANEL_LPDP_DATA	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PANEL_LPDP_AUX	GROUND	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RCAL_PCIE	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RCAL_CIO	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RCAL_MIPI	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
BOARD_ID	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
BOARD_REV	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
WIRELESS_TIME_SYNC	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
KBD_PWM	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AUDIO_CONN_HEADPHONE_OUT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AUDIO_CONN_RETURN	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AUDIO_CONN_SENSE	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPEAKERAMP_OUTPUT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SENSE_DIFF	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOC_XTAL_24M_IN	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOC_XTAL_24M_OUT	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
POWER	GROUND	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CLASS TO CLASS SPACING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
CLASS NAME	CLASS NAME	CONSTRAINT SET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
I2C	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPI	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPMI	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SWD	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
JTAG	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CLOCK_24M	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CLOCK_32K	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
TDM_LEFT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
TDM_RIGHT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
TDM_CODEC	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPKR_ICC	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
UART	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RESETS	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
WDOG	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOCHOT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
POWER_BUTTON	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
FAULT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
DMIC_PDM	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
FAN_CTRL	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_AUX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_LSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_AUXLSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_TOP	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_BOT	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_CC	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC0_CONN_SBU	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_RTMR0_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_RTMR0_MUX_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_UPC0_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_VITC_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_AUX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_LSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_D2R_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_D2R_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_R2D_1	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_R2D_2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_AUXLSX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_TOP	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_BOT	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_CC	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_UPC1_CONN_SBU	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_RTMR1_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_RTMR1_UPC1_USB2	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_RTMR_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_RTMR_MUX_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_UPC_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_MUX_VITC_USB2_DBG	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_FTCAM_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_FTCAM_DATA	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_DFR_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
MIPI_DFR_DATA	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_WIFI_D2R	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_WIFI_R2D	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_WIFI_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND0_D2R	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND0_R2D	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND0_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND1_D2R	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND1_R2D	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_NAND1_CLK	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PCIE_CLKREQ	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PANEL_LPDP_DATA	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PANEL_LPDP_AUX	POWER	DEFAULT_WITH_5X_LINE2SHAPE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RCAL_PCIE	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RCAL_CIO	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RCAL_MIPI	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
BOARD_ID	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
BOARD_REV	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
WIRELESS_TIME_SYNC	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
KBD_PWM	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AUDIO_CONN_HEADPHONE_OUT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AUDIO_CONN_RETURN	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AUDIO_CONN_SENSE	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SPEAKERAMP_OUTPUT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SENSE_DIFF	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOC_XTAL_24M_IN	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOC_XTAL_24M_OUT	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
POWER	POWER	DEFAULT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CLASS TO CLASS SPACING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
CLASS NAME	CLASS NAME	CONSTRAINT SET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_D2R_1	USBC_SOC_BSB0_D2R_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB0_R2D_1	USBC_SOC_BSB0_R2D_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_D2R_1	USBC_BSB0_CONN_D2R_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB0_CONN_R2D_1	USBC_BSB0_CONN_R2D_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_D2R_1	USBC_SOC_BSB1_D2R_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_SOC_BSB1_R2D_1	USBC_SOC_BSB1_R2D_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_D2R_1	USBC_BSB1_CONN_D2R_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
USBC_BSB1_CONN_R2D_1	USBC_BSB1_CONN_R2D_2	A_DIELECTRIC_6X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
PANEL_LPDP_DATA	PANEL_LPDP_DATA	A_DIELECTRIC_5X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
SOC_XTAL_24M_IN	SOC_XTAL_24M_OUT	A_DIELECTRIC_2X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
C						C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
B							B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
A							A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	8	7	6	5	4	3	2	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

17.2 SPACING CSETS, CLASS-CLASS

Apple Inc.

DRAWING NUMBER

051-05641

REVISION

8.0.0

BRANCH

evt-2

PAGE

504 OF 999

SHEET


148 OF 155

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=CONSTRAINTS

SYNC\_DATE=01/08/2020

17.2 SPACING CSETS, CLASS-CLASS

 Apple Inc.

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 NUMBER  
051-05641

REVISION  
8.0.0

BRANCH  
evt-2

PAGE  
504 OF 999

SHEET  
148 OF 155

## SOC & Alternates

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
998-25463	998-25461	ANY	ALL	SS 16GB HP

Samsung 16GB HP

	8	7	6	5	4	3	2	1																																															
D	SOC/CPU																																																						
	<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>998-16917</td><td>1</td><td>IC,SGA,BGA2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:DEV</td></tr><tr><td>998-21824</td><td>1</td><td>IC,SGA,A0+16G,1Y,15C,DEV,AX,M,ATK,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:A0_16G</td></tr><tr><td>998-21826</td><td>1</td><td>IC,SGA,A0+32G,1Y,15C,DEV,AX,M,ATK,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:A0_32G</td></tr><tr><td>939-09653</td><td>1</td><td>PCBF,NANJING,X2737</td><td>U0600</td><td>CRITICAL</td><td>SOC:SOCKET</td></tr><tr><td>998-23472</td><td>1</td><td>IC,SGA,B0+16G,1Y,8C,DEV,AXX,H,SKC,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:B0_16G</td></tr><tr><td>998-23474</td><td>1</td><td>IC,SGA,B0+32G,1Y,8C,DEV,AXX,H,SKC,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:B0_32G</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	998-16917	1	IC,SGA,BGA2971	U0600	CRITICAL	SOC:DEV	998-21824	1	IC,SGA,A0+16G,1Y,15C,DEV,AX,M,ATK,B2971	U0600	CRITICAL	SOC:A0_16G	998-21826	1	IC,SGA,A0+32G,1Y,15C,DEV,AX,M,ATK,B2971	U0600	CRITICAL	SOC:A0_32G	939-09653	1	PCBF,NANJING,X2737	U0600	CRITICAL	SOC:SOCKET	998-23472	1	IC,SGA,B0+16G,1Y,8C,DEV,AXX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_16G	998-23474	1	IC,SGA,B0+32G,1Y,8C,DEV,AXX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_32G	Hynix 16GB LP						
	PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																	
	998-16917	1	IC,SGA,BGA2971	U0600	CRITICAL	SOC:DEV																																																	
	998-21824	1	IC,SGA,A0+16G,1Y,15C,DEV,AX,M,ATK,B2971	U0600	CRITICAL	SOC:A0_16G																																																	
	998-21826	1	IC,SGA,A0+32G,1Y,15C,DEV,AX,M,ATK,B2971	U0600	CRITICAL	SOC:A0_32G																																																	
	939-09653	1	PCBF,NANJING,X2737	U0600	CRITICAL	SOC:SOCKET																																																	
	998-23472	1	IC,SGA,B0+16G,1Y,8C,DEV,AXX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_16G																																																	
	998-23474	1	IC,SGA,B0+32G,1Y,8C,DEV,AXX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_32G																																																	
	<table><tr><td>998-25456</td><td>1</td><td>IC,SGA,B0+16G,1Y,8C,16PST,LP,AX,H,SKC,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:B0_16G_LP</td></tr><tr><td>998-25461</td><td>1</td><td>IC,SGA,B0+16G,1Y,8C,16fst,HP,AX,H,SKC,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:B0_16G_HP</td></tr><tr><td>998-25462</td><td>1</td><td>IC,SGA,B0+32G,1Y,8C,16PST,HP,AX,H,SKC,B2971</td><td>U0600</td><td>CRITICAL</td><td>SOC:B0_32G_HP</td></tr></table>						998-25456	1	IC,SGA,B0+16G,1Y,8C,16PST,LP,AX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_16G_LP	998-25461	1	IC,SGA,B0+16G,1Y,8C,16fst,HP,AX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_16G_HP	998-25462	1	IC,SGA,B0+32G,1Y,8C,16PST,HP,AX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_32G_HP	Hynix 16GB HP																														
998-25456	1	IC,SGA,B0+16G,1Y,8C,16PST,LP,AX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_16G_LP																																																		
998-25461	1	IC,SGA,B0+16G,1Y,8C,16fst,HP,AX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_16G_HP																																																		
998-25462	1	IC,SGA,B0+32G,1Y,8C,16PST,HP,AX,H,SKC,B2971	U0600	CRITICAL	SOC:B0_32G_HP																																																		
						Hynix 32GB HP																																																	
SPACE LEFT FOR ADDITIONAL SOC APNS																																																							
BBR IC																																																							
<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>998-13316</td><td>3</td><td>IC,BURNSIDE BRIDGE,USB/TB RTIMER,BGA105</td><td>UF000,UF100,UG000</td><td>CRITICAL</td><td>ATCRTMR:DEV</td></tr><tr><td>338S00561</td><td>3</td><td>IC,TBT,BBR,SLMN7,PRQ,A1,BGA105</td><td>UF000,UF100,UG000</td><td>CRITICAL</td><td>BBR:A1_PRQ</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	998-13316	3	IC,BURNSIDE BRIDGE,USB/TB RTIMER,BGA105	UF000,UF100,UG000	CRITICAL	ATCRTMR:DEV	338S00561	3	IC,TBT,BBR,SLMN7,PRQ,A1,BGA105	UF000,UF100,UG000	CRITICAL	BBR:A1_PRQ	ATC0																															
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
998-13316	3	IC,BURNSIDE BRIDGE,USB/TB RTIMER,BGA105	UF000,UF100,UG000	CRITICAL	ATCRTMR:DEV																																																		
338S00561	3	IC,TBT,BBR,SLMN7,PRQ,A1,BGA105	UF000,UF100,UG000	CRITICAL	BBR:A1_PRQ																																																		
						ATC1																																																	
						ATC2																																																	
ACE/UPC																																																							
<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>353S02158</td><td>3</td><td>IC,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123</td><td>UF400,UF500,UG400</td><td>CRITICAL</td><td>ACE2:B2</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	353S02158	3	IC,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123	UF400,UF500,UG400	CRITICAL	ACE2:B2																																						
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
353S02158	3	IC,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123	UF400,UF500,UG400	CRITICAL	ACE2:B2																																																		
BBR ROMs																																																							
<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>341S01899</td><td>1</td><td>ROM,ACE/BBR-P0 (V2.XX) EVT,X2728</td><td>UF260</td><td>CRITICAL</td><td>BBR_P0_ROM:EVT</td></tr><tr><td>341S01900</td><td>1</td><td>ROM,ACE/BBR-P1 (V2.XX) EVT,X2728</td><td>UF360</td><td>CRITICAL</td><td>BBR_P1_ROM:EVT</td></tr><tr><td>341S01901</td><td>1</td><td>ROM,ACE/BBR-P2 (V2.XX) EVT,X2728</td><td>UG260</td><td>CRITICAL</td><td>BBR_P2_ROM:EVT</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	341S01899	1	ROM,ACE/BBR-P0 (V2.XX) EVT,X2728	UF260	CRITICAL	BBR_P0_ROM:EVT	341S01900	1	ROM,ACE/BBR-P1 (V2.XX) EVT,X2728	UF360	CRITICAL	BBR_P1_ROM:EVT	341S01901	1	ROM,ACE/BBR-P2 (V2.XX) EVT,X2728	UG260	CRITICAL	BBR_P2_ROM:EVT																										
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
341S01899	1	ROM,ACE/BBR-P0 (V2.XX) EVT,X2728	UF260	CRITICAL	BBR_P0_ROM:EVT																																																		
341S01900	1	ROM,ACE/BBR-P1 (V2.XX) EVT,X2728	UF360	CRITICAL	BBR_P1_ROM:EVT																																																		
341S01901	1	ROM,ACE/BBR-P2 (V2.XX) EVT,X2728	UG260	CRITICAL	BBR_P2_ROM:EVT																																																		
Magsafe Ace ROM APN -> CSA 55																																																							
BBR BOM ALT parts																																																							
<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>335S00537</td><td>335S00133</td><td></td><td>ALL</td><td></td></tr></table>						PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	335S00537	335S00133		ALL																																									
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:																																																			
335S00537	335S00133		ALL																																																				
EUSB LEVEL SHIFTER																																																							
<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>338S00628</td><td>3</td><td>IC,PARROT,CD28226B,B9LSB1,OTP=6,CSP25</td><td>UF700,UF750,UG700</td><td>CRITICAL</td><td>EUSB_LS:PARROT</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	338S00628	3	IC,PARROT,CD28226B,B9LSB1,OTP=6,CSP25	UF700,UF750,UG700	CRITICAL	EUSB_LS:PARROT																																						
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
338S00628	3	IC,PARROT,CD28226B,B9LSB1,OTP=6,CSP25	UF700,UF750,UG700	CRITICAL	EUSB_LS:PARROT																																																		
OCARINA0																																																							
<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>338S00600</td><td>1</td><td>IC,PMU,OCARINA,D2499A0,OPT-BC,WLCSF56</td><td>UN400</td><td>CRITICAL</td><td>OCARINA0:A0_OTPBC</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	338S00600	1	IC,PMU,OCARINA,D2499A0,OPT-BC,WLCSF56	UN400	CRITICAL	OCARINA0:A0_OTPBC																																						
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
338S00600	1	IC,PMU,OCARINA,D2499A0,OPT-BC,WLCSF56	UN400	CRITICAL	OCARINA0:A0_OTPBC																																																		
OCARINA1																																																							
<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>338S00600</td><td>1</td><td>IC,PMU,OCARINA,D2499A0,OPT-BC,WLCSF56</td><td>UN900</td><td>CRITICAL</td><td>OCARINA1:A0_OTPBC</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	338S00600	1	IC,PMU,OCARINA,D2499A0,OPT-BC,WLCSF56	UN900	CRITICAL	OCARINA1:A0_OTPBC																																						
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
338S00600	1	IC,PMU,OCARINA,D2499A0,OPT-BC,WLCSF56	UN900	CRITICAL	OCARINA1:A0_OTPBC																																																		
SECURE ELEMENT																																																							
<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>338S00630</td><td>1</td><td>IC,SN210V,B1,CERES,PROD,VER=MU,WLCSF81</td><td>U5000</td><td>CRITICAL</td><td>SE:PROD_SW_MU</td></tr><tr><td>338S00629</td><td>1</td><td>IC,SN210V,B1,CERES,DEV,VER=LN,WLCSF81</td><td>U5000</td><td>CRITICAL</td><td>SE:DEV_SW_LN</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	338S00630	1	IC,SN210V,B1,CERES,PROD,VER=MU,WLCSF81	U5000	CRITICAL	SE:PROD_SW_MU	338S00629	1	IC,SN210V,B1,CERES,DEV,VER=LN,WLCSF81	U5000	CRITICAL	SE:DEV_SW_LN																																
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
338S00630	1	IC,SN210V,B1,CERES,PROD,VER=MU,WLCSF81	U5000	CRITICAL	SE:PROD_SW_MU																																																		
338S00629	1	IC,SN210V,B1,CERES,DEV,VER=LN,WLCSF81	U5000	CRITICAL	SE:DEV_SW_LN																																																		
HDMI MADEA																																																							
<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>338S00347</td><td>1</td><td>IC,HDMI,PUMA81,MCDP2920,A4,BGA117</td><td>UH700</td><td>CRITICAL</td><td></td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	338S00347	1	IC,HDMI,PUMA81,MCDP2920,A4,BGA117	UH700	CRITICAL																																							
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
338S00347	1	IC,HDMI,PUMA81,MCDP2920,A4,BGA117	UH700	CRITICAL																																																			
HDMI CONNECTOR BOM OPTIONS																																																							
<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>514S00354</td><td>1</td><td>CONN,RCPT,HDMI,X2094</td><td>JH500</td><td>CRITICAL</td><td></td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	514S00354	1	CONN,RCPT,HDMI,X2094	JH500	CRITICAL		HDMI CONN																																					
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
514S00354	1	CONN,RCPT,HDMI,X2094	JH500	CRITICAL																																																			
SD CONNECTOR BOM OPTIONS																																																							
<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>514-00180</td><td>1</td><td>CONN,RCPT,SD,X2094</td><td>JK600</td><td>CRITICAL</td><td></td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	514-00180	1	CONN,RCPT,SD,X2094	JK600	CRITICAL		SD CONN																																					
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
514-00180	1	CONN,RCPT,SD,X2094	JK600	CRITICAL																																																			
<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>514S00359</td><td>514S00354</td><td></td><td>ALL</td><td></td></tr><tr><td>514-00204</td><td>514-00180</td><td></td><td>ALL</td><td></td></tr></table>						PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	514S00359	514S00354		ALL		514-00204	514-00180		ALL		<table><tr><td>514S00373</td><td>514S00354</td><td></td><td>ALL</td><td></td></tr><tr><td>514-00214</td><td>514-00180</td><td></td><td>ALL</td><td></td></tr></table>		514S00373	514S00354		ALL		514-00214	514-00180		ALL																								
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:																																																			
514S00359	514S00354		ALL																																																				
514-00204	514-00180		ALL																																																				
514S00373	514S00354		ALL																																																				
514-00214	514-00180		ALL																																																				
C	NAND SOCKET																																																						
	<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>939-08815</td><td>1</td><td>PCBF,BANDIPUR,X1711</td><td>UN000,UN500</td><td>CRITICAL</td><td>NAND:SOCKET</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	939-08815	1	PCBF,BANDIPUR,X1711	UN000,UN500	CRITICAL	NAND:SOCKET																																					
	PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																	
	939-08815	1	PCBF,BANDIPUR,X1711	UN000,UN500	CRITICAL	NAND:SOCKET																																																	
	ENOISE CAP SELECTION																																																						
	1V8 CAPS																																																						
	<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>138S00037</td><td>5</td><td>CAP,CER,X6S,10UF,20%,4V,0402,LOW NOISE</td><td>C2740-C2744</td><td>CRITICAL</td><td>ENOISE_1V8_10UF:ZRB</td></tr><tr><td>138S00073</td><td>5</td><td>CAP,X6S,10UF,20%,6.3V,HZTL,MUR,0402</td><td>C2740-C2744</td><td>CRITICAL</td><td>ENOISE_1V8_10UF:HZTL</td></tr><tr><td>138S00036</td><td>5</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>C80E5-C80E9</td><td>CRITICAL</td><td>ENOISE_1V8_20UF:ZRB</td></tr><tr><td>138S00035</td><td>5</td><td>CAP,CER,20UF,20%,2.5V,X6S,HRZTL,0402</td><td>C80E5-C80E9</td><td>CRITICAL</td><td>ENOISE_1V8_20UF:HZTL</td></tr><tr><td>998-22077</td><td>5</td><td>CAP,X6S,20UF,20%,2.5V,LOW NOISE,MS,0402</td><td>C80E5-C80E9</td><td>CRITICAL</td><td>ENOISE_1V8_20UF:ZRX</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	138S00037	5	CAP,CER,X6S,10UF,20%,4V,0402,LOW NOISE	C2740-C2744	CRITICAL	ENOISE_1V8_10UF:ZRB	138S00073	5	CAP,X6S,10UF,20%,6.3V,HZTL,MUR,0402	C2740-C2744	CRITICAL	ENOISE_1V8_10UF:HZTL	138S00036	5	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	C80E5-C80E9	CRITICAL	ENOISE_1V8_20UF:ZRB	138S00035	5	CAP,CER,20UF,20%,2.5V,X6S,HRZTL,0402	C80E5-C80E9	CRITICAL	ENOISE_1V8_20UF:HZTL	998-22077	5	CAP,X6S,20UF,20%,2.5V,LOW NOISE,MS,0402	C80E5-C80E9	CRITICAL	ENOISE_1V8_20UF:ZRX													
	PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																	
	138S00037	5	CAP,CER,X6S,10UF,20%,4V,0402,LOW NOISE	C2740-C2744	CRITICAL	ENOISE_1V8_10UF:ZRB																																																	
	138S00073	5	CAP,X6S,10UF,20%,6.3V,HZTL,MUR,0402	C2740-C2744	CRITICAL	ENOISE_1V8_10UF:HZTL																																																	
138S00036	5	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	C80E5-C80E9	CRITICAL	ENOISE_1V8_20UF:ZRB																																																		
138S00035	5	CAP,CER,20UF,20%,2.5V,X6S,HRZTL,0402	C80E5-C80E9	CRITICAL	ENOISE_1V8_20UF:HZTL																																																		
998-22077	5	CAP,X6S,20UF,20%,2.5V,LOW NOISE,MS,0402	C80E5-C80E9	CRITICAL	ENOISE_1V8_20UF:ZRX																																																		
VDDH CAPS																																																							
<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>138S00036</td><td>30</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>C9560-C9569,C9570-C9579,C9580-C9589</td><td>CRITICAL</td><td>ENOISE_VDDH_20UF:ZRB</td></tr><tr><td>138S00035</td><td>30</td><td>CAP,CER,20UF,20%,2.5V,X6S,HRZTL,0402</td><td>C9560-C9569,C9570-C9579,C9580-C9589</td><td>CRITICAL</td><td>ENOISE_VDDH_20UF:HZTL</td></tr><tr><td>998-22077</td><td>30</td><td>CAP,X6S,20UF,20%,2.5V,LOW NOISE,MS,0402</td><td>C9560-C9569,C9570-C9579,C9580-C9589</td><td>CRITICAL</td><td>ENOISE_VDDH_20UF:ZRX</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	138S00036	30	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	C9560-C9569,C9570-C9579,C9580-C9589	CRITICAL	ENOISE_VDDH_20UF:ZRB	138S00035	30	CAP,CER,20UF,20%,2.5V,X6S,HRZTL,0402	C9560-C9569,C9570-C9579,C9580-C9589	CRITICAL	ENOISE_VDDH_20UF:HZTL	998-22077	30	CAP,X6S,20UF,20%,2.5V,LOW NOISE,MS,0402	C9560-C9569,C9570-C9579,C9580-C9589	CRITICAL	ENOISE_VDDH_20UF:ZRX																										
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
138S00036	30	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	C9560-C9569,C9570-C9579,C9580-C9589	CRITICAL	ENOISE_VDDH_20UF:ZRB																																																		
138S00035	30	CAP,CER,20UF,20%,2.5V,X6S,HRZTL,0402	C9560-C9569,C9570-C9579,C9580-C9589	CRITICAL	ENOISE_VDDH_20UF:HZTL																																																		
998-22077	30	CAP,X6S,20UF,20%,2.5V,LOW NOISE,MS,0402	C9560-C9569,C9570-C9579,C9580-C9589	CRITICAL	ENOISE_VDDH_20UF:ZRX																																																		
20UF ZRB SOC CAPS																																																							
<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>138S00036</td><td>27</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP1:20UF_ZRB</td></tr><tr><td>138S00036</td><td>22</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP1:20UF_ZRB</td></tr><tr><td>138S00036</td><td>33</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP1:20UF_ZRB</td></tr><tr><td>138S00036</td><td>25</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP2:20UF_ZRB</td></tr><tr><td>138S00036</td><td>84</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP2:20UF_ZRB</td></tr><tr><td>138S00036</td><td>22</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP3:20UF_ZRB</td></tr><tr><td>138S00036</td><td>15</td><td>CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402</td><td>138S00036</td><td>CRITICAL</td><td>ENOISE_GRP3:20UF_ZRB</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	138S00036	27	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP1:20UF_ZRB	138S00036	22	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP1:20UF_ZRB	138S00036	33	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP1:20UF_ZRB	138S00036	25	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP2:20UF_ZRB	138S00036	84	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP2:20UF_ZRB	138S00036	22	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP3:20UF_ZRB	138S00036	15	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP3:20UF_ZRB		
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
138S00036	27	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP1:20UF_ZRB																																																		
138S00036	22	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP1:20UF_ZRB																																																		
138S00036	33	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP1:20UF_ZRB																																																		
138S00036	25	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP2:20UF_ZRB																																																		
138S00036	84	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP2:20UF_ZRB																																																		
138S00036	22	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP3:20UF_ZRB																																																		
138S00036	15	CAP,CER,20UF,20%,2.5V,X6S,LOW NOISE,0402	138S00036	CRITICAL	ENOISE_GRP3:20UF_ZRB																																																		
15UF ZRX SOC CAPS																																																							
<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>998-22815</td><td>27</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP1:15UF_ZRX</td></tr><tr><td>998-22815</td><td>22</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP1:15UF_ZRX</td></tr><tr><td>998-22815</td><td>33</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP1:15UF_ZRX</td></tr><tr><td>998-22815</td><td>25</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP2:15UF_ZRX</td></tr><tr><td>998-22815</td><td>84</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP2:15UF_ZRX</td></tr><tr><td>998-22815</td><td>22</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP3:15UF_ZRX</td></tr><tr><td>998-22815</td><td>15</td><td>CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402</td><td>998-22815</td><td>CRITICAL</td><td>ENOISE_GRP3:15UF_ZRX</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	998-22815	27	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP1:15UF_ZRX	998-22815	22	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP1:15UF_ZRX	998-22815	33	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP1:15UF_ZRX	998-22815	25	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP2:15UF_ZRX	998-22815	84	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP2:15UF_ZRX	998-22815	22	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP3:15UF_ZRX	998-22815	15	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP3:15UF_ZRX		
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
998-22815	27	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP1:15UF_ZRX																																																		
998-22815	22	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP1:15UF_ZRX																																																		
998-22815	33	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP1:15UF_ZRX																																																		
998-22815	25	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP2:15UF_ZRX																																																		
998-22815	84	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP2:15UF_ZRX																																																		
998-22815	22	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP3:15UF_ZRX																																																		
998-22815	15	CAP,X6S,15UF,20%,2.5V,LOW NOISE,MS,0402	998-22815	CRITICAL	ENOISE_GRP3:15UF_ZRX																																																		
15UF HZTL SOC CAPS																																																							
<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>138S00392</td><td>27</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP1:15UF_HZTL</td></tr><tr><td>138S00392</td><td>22</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP1:15UF_HZTL</td></tr><tr><td>138S00392</td><td>33</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP1:15UF_HZTL</td></tr><tr><td>138S00392</td><td>25</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP2:15UF_HZTL</td></tr><tr><td>138S00392</td><td>84</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP2:15UF_HZTL</td></tr><tr><td>138S00392</td><td>22</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP3:15UF_HZTL</td></tr><tr><td>138S00392</td><td>15</td><td>CAP,X6S,15UF,20%,2.5V,HZTL,M,0402</td><td>138S00392</td><td>CRITICAL</td><td>ENOISE_GRP3:15UF_HZTL</td></tr></table>						PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	138S00392	27	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP1:15UF_HZTL	138S00392	22	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP1:15UF_HZTL	138S00392	33	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP1:15UF_HZTL	138S00392	25	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP2:15UF_HZTL	138S00392	84	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP2:15UF_HZTL	138S00392	22	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP3:15UF_HZTL	138S00392	15	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP3:15UF_HZTL		
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION																																																		
138S00392	27	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP1:15UF_HZTL																																																		
138S00392	22	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP1:15UF_HZTL																																																		
138S00392	33	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP1:15UF_HZTL																																																		
138S00392	25	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP2:15UF_HZTL																																																		
138S00392	84	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP2:15UF_HZTL																																																		
138S00392	22	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP3:15UF_HZTL																																																		
138S00392	15	CAP,X6S,15UF,20%,2.5V,HZTL,M,0402	138S00392	CRITICAL	ENOISE_GRP3:15UF_HZTL																																																		
B	BOM OPTION TABLES																																																						
	<table><tr><td colspan="2">DRAWING NUMBER</td><td>051-05641</td><td>SIZE</td></tr><tr><td colspan="2">REVISION</td><td>8.0.0</td><td>D</td></tr></table>						DRAWING NUMBER		051-05641	SIZE	REVISION		8.0.0	D																																									
	DRAWING NUMBER		051-05641	SIZE																																																			
	REVISION		8.0.0	D																																																			
	<table><tr><td colspan="2">BRANCH</td><td colspan="2">evt-2</td></tr><tr><td colspan="2">PAGE</td><td colspan="2">602 OF 999</td></tr><tr><td colspan="2">SHEET</td><td colspan="2">150 OF 155</td></tr></table>						BRANCH		evt-2		PAGE		602 OF 999		SHEET		150 OF 155																																						
	BRANCH		evt-2																																																				
	PAGE		602 OF 999																																																				
	SHEET		150 OF 155																																																				
	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																																																						
	A	BOM OPTION TABLES																																																					
<table><tr><td colspan="2">DRAWING NUMBER</td><td>051-05641</td><td>SIZE</td></tr><tr><td colspan="2">REVISION</td><td>8.0.0</td><td>D</td></tr></table>						DRAWING NUMBER		051-05641	SIZE	REVISION		8.0.0	D																																										
DRAWING NUMBER		051-05641	SIZE																																																				
REVISION		8.0.0	D																																																				
<table><tr><td colspan="2">BRANCH</td><td colspan="2">evt-2</td></tr><tr><td colspan="2">PAGE</td><td colspan="2">602 OF 999</td></tr><tr><td colspan="2">SHEET</td><td colspan="2">150 OF 155</td></tr></table>						BRANCH		evt-2		PAGE		602 OF 999		SHEET		150 OF 155																																							
BRANCH		evt-2																																																					
PAGE		602 OF 999																																																					
SHEET		150 OF 155																																																					
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																																																							



D	8	7	6	5	4	3	2	1	D																																																																																	
	BOM VARIANT TABLES																																																																																									
C	<table><tr><th>BOM NUMBER</th><th>BOM NAME</th><th>BOM OPTIONS</th></tr><tr><td>639-12852</td><td>PCBA,MLB-S,16GB,TS-512,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-512</td></tr><tr><td>639-13090</td><td>PCBA,MLB-S,16GB,HY-512,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_LP,SSD:HY-512</td></tr><tr><td>639-14421</td><td>PCBA,MLB-S,16GB,TS-1TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-1TB</td></tr><tr><td>639-14434</td><td>PCBA,MLB-S,16GB,HY-1TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-1TB</td></tr><tr><td>639-14422</td><td>PCBA,MLB-S,16GB,TS-2TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-2TB</td></tr><tr><td>639-15061</td><td>PCBA,MLB-S,16GB,WD-1TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:WD-1TB</td></tr><tr><td>639-14423</td><td>PCBA,MLB-S,16GB,WD-2TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:WD-2TB</td></tr><tr><td>639-14424</td><td>PCBA,MLB-S,16GB,TS-4TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-4TB</td></tr><tr><td>639-14425</td><td>PCBA,MLB-S,16GB,HY-4TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-4TB</td></tr><tr><td>639-12853</td><td>PCBA,MLB-S,16GB,TS-8TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-8TB</td></tr><tr><td>639-14426</td><td>PCBA,MLB-S,16GB,HY-8TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-8TB</td></tr><tr><td>639-14427</td><td>PCBA,MLB-S,32GB,HY-512,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-512</td></tr><tr><td>639-12946</td><td>PCBA,MLB-S,32GB,TS-512,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-512</td></tr><tr><td>639-13091</td><td>PCBA,MLB-S,32GB,HY-1TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-1TB</td></tr><tr><td>639-14428</td><td>PCBA,MLB-S,32GB,WD-1TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:WD-1TB</td></tr><tr><td>639-14429</td><td>PCBA,MLB-S,32GB,TS-1TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-1TB</td></tr><tr><td>639-14430</td><td>PCBA,MLB-S,32GB,WD-2TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:WD-2TB</td></tr><tr><td>639-15262</td><td>PCBA,MLB-S,32GB,TS-2TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-2TB</td></tr><tr><td>639-14431</td><td>PCBA,MLB-S,32GB,TS-4TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-4TB</td></tr><tr><td>639-14940</td><td>PCBA,MLB-S,32GB,HY-4TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-4TB</td></tr><tr><td>639-12947</td><td>PCBA,MLB-S,32GB,TS-8TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-8TB</td></tr><tr><td>639-14432</td><td>PCBA,MLB-S,32GB,HY-8TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-8TB</td></tr><tr><td>939-10452</td><td>PCBA,MLB-S,SOCKET,SOC,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:SOCKET,SSD:NDS5E</td></tr><tr><td>939-10453</td><td>PCBA,MLB-S,NO SOC,X2728</td><td>BASE_BOM,DEVEL_BOM,NAND:SOCKET</td></tr><tr><td>939-11387</td><td>PCBA,MLB-S,SOCKET-NAND,8L-DCDC,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,NAND:SOCKET,SSD:8L-DCDC</td></tr><tr><td>939-11388</td><td>PCBA,MLB-S,SPF-VAL,32GB,8TB,X2728</td><td>BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G,SSD:TS-8TB</td></tr></table>								BOM NUMBER	BOM NAME	BOM OPTIONS	639-12852	PCBA,MLB-S,16GB,TS-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-512	639-13090	PCBA,MLB-S,16GB,HY-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_LP,SSD:HY-512	639-14421	PCBA,MLB-S,16GB,TS-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-1TB	639-14434	PCBA,MLB-S,16GB,HY-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-1TB	639-14422	PCBA,MLB-S,16GB,TS-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-2TB	639-15061	PCBA,MLB-S,16GB,WD-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:WD-1TB	639-14423	PCBA,MLB-S,16GB,WD-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:WD-2TB	639-14424	PCBA,MLB-S,16GB,TS-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-4TB	639-14425	PCBA,MLB-S,16GB,HY-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-4TB	639-12853	PCBA,MLB-S,16GB,TS-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-8TB	639-14426	PCBA,MLB-S,16GB,HY-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-8TB	639-14427	PCBA,MLB-S,32GB,HY-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-512	639-12946	PCBA,MLB-S,32GB,TS-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-512	639-13091	PCBA,MLB-S,32GB,HY-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-1TB	639-14428	PCBA,MLB-S,32GB,WD-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:WD-1TB	639-14429	PCBA,MLB-S,32GB,TS-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-1TB	639-14430	PCBA,MLB-S,32GB,WD-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:WD-2TB	639-15262	PCBA,MLB-S,32GB,TS-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-2TB	639-14431	PCBA,MLB-S,32GB,TS-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-4TB	639-14940	PCBA,MLB-S,32GB,HY-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-4TB	639-12947	PCBA,MLB-S,32GB,TS-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-8TB	639-14432	PCBA,MLB-S,32GB,HY-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-8TB	939-10452	PCBA,MLB-S,SOCKET,SOC,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:SOCKET,SSD:NDS5E	939-10453	PCBA,MLB-S,NO SOC,X2728	BASE_BOM,DEVEL_BOM,NAND:SOCKET	939-11387	PCBA,MLB-S,SOCKET-NAND,8L-DCDC,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,NAND:SOCKET,SSD:8L-DCDC	939-11388	PCBA,MLB-S,SPF-VAL,32GB,8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G,SSD:TS-8TB	C
	BOM NUMBER	BOM NAME	BOM OPTIONS																																																																																							
	639-12852	PCBA,MLB-S,16GB,TS-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-512																																																																																							
	639-13090	PCBA,MLB-S,16GB,HY-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_LP,SSD:HY-512																																																																																							
	639-14421	PCBA,MLB-S,16GB,TS-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-1TB																																																																																							
	639-14434	PCBA,MLB-S,16GB,HY-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-1TB																																																																																							
	639-14422	PCBA,MLB-S,16GB,TS-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-2TB																																																																																							
	639-15061	PCBA,MLB-S,16GB,WD-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:WD-1TB																																																																																							
	639-14423	PCBA,MLB-S,16GB,WD-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:WD-2TB																																																																																							
	639-14424	PCBA,MLB-S,16GB,TS-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-4TB																																																																																							
	639-14425	PCBA,MLB-S,16GB,HY-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-4TB																																																																																							
	639-12853	PCBA,MLB-S,16GB,TS-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:TS-8TB																																																																																							
	639-14426	PCBA,MLB-S,16GB,HY-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_16G_HP,SSD:HY-8TB																																																																																							
	639-14427	PCBA,MLB-S,32GB,HY-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-512																																																																																							
	639-12946	PCBA,MLB-S,32GB,TS-512,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-512																																																																																							
	639-13091	PCBA,MLB-S,32GB,HY-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-1TB																																																																																							
	639-14428	PCBA,MLB-S,32GB,WD-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:WD-1TB																																																																																							
	639-14429	PCBA,MLB-S,32GB,TS-1TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-1TB																																																																																							
	639-14430	PCBA,MLB-S,32GB,WD-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:WD-2TB																																																																																							
	639-15262	PCBA,MLB-S,32GB,TS-2TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-2TB																																																																																							
	639-14431	PCBA,MLB-S,32GB,TS-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-4TB																																																																																							
	639-14940	PCBA,MLB-S,32GB,HY-4TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-4TB																																																																																							
	639-12947	PCBA,MLB-S,32GB,TS-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:TS-8TB																																																																																							
	639-14432	PCBA,MLB-S,32GB,HY-8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G_HP,SSD:HY-8TB																																																																																							
	939-10452	PCBA,MLB-S,SOCKET,SOC,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:SOCKET,SSD:NDS5E																																																																																							
	939-10453	PCBA,MLB-S,NO SOC,X2728	BASE_BOM,DEVEL_BOM,NAND:SOCKET																																																																																							
	939-11387	PCBA,MLB-S,SOCKET-NAND,8L-DCDC,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,NAND:SOCKET,SSD:8L-DCDC																																																																																							
	939-11388	PCBA,MLB-S,SPF-VAL,32GB,8TB,X2728	BASE_BOM,DEVEL_BOM,ALTERNATE,SOC:B0_32G,SSD:TS-8TB																																																																																							







D	8	7	6	5	4	3	2	1	D																																																																												
	<div>REF_CLVR_MONACO</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>CLVR_C-CHOP</td></tr><tr><td>CLVR_2C_SC</td></tr></table> <div>REF_VR_ICEMAN</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>3V8_AON_PBUS-B12</td></tr><tr><td>3V8_AON_I2C-DEV</td></tr><tr><td>3V8_EXT_DIODE</td></tr><tr><td>3V8_INDUCTOR:2P4MM</td></tr></table> <div>REF_VR_ICEMAN_HP</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>P3V8ILIM_MUX:Y</td></tr></table> <div>REF_VR_VIPER</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>VIPER:3PH</td></tr><tr><td>VIPER_DBG</td></tr><tr><td>VIPER_L3MM</td></tr><tr><td>VIPER_C9543</td></tr></table> <div>REF_VR_5V_TPS62130</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>5VS2TPS_PBUS-B12</td></tr></table> <div>REF_VR_3V3_TPS62135</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>3V3_S2_PBUS-B12</td></tr></table> <div>REF_USBC_ACE2</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>USBC_LAPTOP</td></tr><tr><td>USBC_SPI_UPC0</td></tr><tr><td>USBC_SPI_UPC2</td></tr><tr><td>USBC_DEBUG_UPC0</td></tr><tr><td>PKGS:LARGER_PITCH</td></tr></table> <div>REF_STORAGE_S5E</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>2V5_NAND_PBUS-B12</td></tr></table> <div>REF_SECDIS_SAK</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>PROD_SECDIS</td></tr><tr><td>JTAG_SECDIS:YES</td></tr><tr><td>PROD_SECDIS_NOTMIPI</td></tr><tr><td>PROTO_PULLDOWN_SECDIS</td></tr></table> <div>REF_SPKRAMP_SN012776</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>SPKRAMP_A</td></tr><tr><td>SPKRAMP_B</td></tr><tr><td>SPKRAMP_C</td></tr><tr><td>SPKRAMP_D</td></tr><tr><td>SPKRAMP_E</td></tr><tr><td>SPKRAMP_F</td></tr><tr><td>SPKRAMP_ICC_GB</td></tr></table>	PACK_OPTIONS TO INCLUDE IN NETLIST	CLVR_C-CHOP	CLVR_2C_SC	PACK_OPTIONS TO INCLUDE IN NETLIST	3V8_AON_PBUS-B12	3V8_AON_I2C-DEV	3V8_EXT_DIODE		3V8_INDUCTOR:2P4MM	PACK_OPTIONS TO INCLUDE IN NETLIST	P3V8ILIM_MUX:Y	PACK_OPTIONS TO INCLUDE IN NETLIST	VIPER:3PH	VIPER_DBG	VIPER_L3MM	VIPER_C9543	PACK_OPTIONS TO INCLUDE IN NETLIST	5VS2TPS_PBUS-B12	PACK_OPTIONS TO INCLUDE IN NETLIST	3V3_S2_PBUS-B12	PACK_OPTIONS TO INCLUDE IN NETLIST	USBC_LAPTOP	USBC_SPI_UPC0	USBC_SPI_UPC2	USBC_DEBUG_UPC0	PKGS:LARGER_PITCH	PACK_OPTIONS TO INCLUDE IN NETLIST	2V5_NAND_PBUS-B12	PACK_OPTIONS TO INCLUDE IN NETLIST	PROD_SECDIS	JTAG_SECDIS:YES	PROD_SECDIS_NOTMIPI	PROTO_PULLDOWN_SECDIS	PACK_OPTIONS TO INCLUDE IN NETLIST	SPKRAMP_A	SPKRAMP_B	SPKRAMP_C	SPKRAMP_D	SPKRAMP_E	SPKRAMP_F	SPKRAMP_ICC_GB	<div>REF_WIRELESS_TYPHOON</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>SUNWAY</td></tr><tr><td>3X_ANTENNA</td></tr><tr><td>WLBT_D2R_TP_JADE</td></tr></table> <div>REF_PMIC_MAVERICKS</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>PMU_IPD</td></tr><tr><td>SPMU_LDO3</td></tr><tr><td>MPMU_LDO4</td></tr><tr><td>SPMU_SW1</td></tr><tr><td>SPMU_LDO3</td></tr><tr><td>PMUOTP:R</td></tr><tr><td>PMU_DISP2:N</td></tr><tr><td>PMU32K:OSC_QRTZ</td></tr><tr><td>PMU_BBAT:N</td></tr><tr><td>SPMU_0201:DS</td></tr></table> <div>REF_HDMI_MADEA</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>HDMI_LDO:ON-SEMI</td></tr><tr><td>HDMI_CMC:YES</td></tr><tr><td>HDMI2SOC:ATC3</td></tr></table>	PACK_OPTIONS TO INCLUDE IN NETLIST	SUNWAY	3X_ANTENNA	WLBT_D2R_TP_JADE	PACK_OPTIONS TO INCLUDE IN NETLIST	PMU_IPD	SPMU_LDO3	MPMU_LDO4	SPMU_SW1	SPMU_LDO3	PMUOTP:R	PMU_DISP2:N	PMU32K:OSC_QRTZ	PMU_BBAT:N	SPMU_0201:DS	PACK_OPTIONS TO INCLUDE IN NETLIST	HDMI_LDO:ON-SEMI	HDMI_CMC:YES	HDMI2SOC:ATC3	<div>REF_SOC_H13S</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>SEEPROM_DEV</td></tr><tr><td>LPDPTX_X4</td></tr><tr><td>LPDPRX_X1</td></tr><tr><td>MIPID_DEV</td></tr><tr><td>MIPID_NC</td></tr><tr><td>ENET_NC</td></tr><tr><td>ATC3_HDMI</td></tr><tr><td>NAND_8X</td></tr><tr><td>SDCARD</td></tr><tr><td>SPMI_R</td></tr><tr><td>GPCCIE3_DEV</td></tr></table>	PACK_OPTIONS TO INCLUDE IN NETLIST	SEEPROM_DEV	LPDPTX_X4	LPDPRX_X1	MIPID_DEV	MIPID_NC	ENET_NC	ATC3_HDMI	NAND_8X	SDCARD	SPMI_R	GPCCIE3_DEV	<div>T728 MLB for P0</div> <table><tr><td>PACK_OPTIONS TO INCLUDE IN NETLIST</td></tr><tr><td>P1</td></tr><tr><td>POR</td></tr><tr><td>VITAMINC</td></tr></table>	PACK_OPTIONS TO INCLUDE IN NETLIST	P1	POR	VITAMINC					
	PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																				
	CLVR_C-CHOP																																																																																				
CLVR_2C_SC																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
3V8_AON_PBUS-B12																																																																																					
3V8_AON_I2C-DEV																																																																																					
3V8_EXT_DIODE																																																																																					
3V8_INDUCTOR:2P4MM																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
P3V8ILIM_MUX:Y																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
VIPER:3PH																																																																																					
VIPER_DBG																																																																																					
VIPER_L3MM																																																																																					
VIPER_C9543																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
5VS2TPS_PBUS-B12																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
3V3_S2_PBUS-B12																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
USBC_LAPTOP																																																																																					
USBC_SPI_UPC0																																																																																					
USBC_SPI_UPC2																																																																																					
USBC_DEBUG_UPC0																																																																																					
PKGS:LARGER_PITCH																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
2V5_NAND_PBUS-B12																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
PROD_SECDIS																																																																																					
JTAG_SECDIS:YES																																																																																					
PROD_SECDIS_NOTMIPI																																																																																					
PROTO_PULLDOWN_SECDIS																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
SPKRAMP_A																																																																																					
SPKRAMP_B																																																																																					
SPKRAMP_C																																																																																					
SPKRAMP_D																																																																																					
SPKRAMP_E																																																																																					
SPKRAMP_F																																																																																					
SPKRAMP_ICC_GB																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
SUNWAY																																																																																					
3X_ANTENNA																																																																																					
WLBT_D2R_TP_JADE																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
PMU_IPD																																																																																					
SPMU_LDO3																																																																																					
MPMU_LDO4																																																																																					
SPMU_SW1																																																																																					
SPMU_LDO3																																																																																					
PMUOTP:R																																																																																					
PMU_DISP2:N																																																																																					
PMU32K:OSC_QRTZ																																																																																					
PMU_BBAT:N																																																																																					
SPMU_0201:DS																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
HDMI_LDO:ON-SEMI																																																																																					
HDMI_CMC:YES																																																																																					
HDMI2SOC:ATC3																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
SEEPROM_DEV																																																																																					
LPDPTX_X4																																																																																					
LPDPRX_X1																																																																																					
MIPID_DEV																																																																																					
MIPID_NC																																																																																					
ENET_NC																																																																																					
ATC3_HDMI																																																																																					
NAND_8X																																																																																					
SDCARD																																																																																					
SPMI_R																																																																																					
GPCCIE3_DEV																																																																																					
PACK_OPTIONS TO INCLUDE IN NETLIST																																																																																					
P1																																																																																					
POR																																																																																					
VITAMINC																																																																																					
C	8	7	6	5	4	3	2	1	C																																																																												
										C																																																																											
											C																																																																										
												C																																																																									
B	8	7	6	5	4	3	2	1	B																																																																												
										B																																																																											
											B																																																																										
												B																																																																									
A	8	7	6	5	4	3	2	1	A																																																																												
										A																																																																											
											A																																																																										
												A																																																																									

PAGE TITLE			SYNC_DATE=10/20/2019		
PACK OPTIONS					
 Apple Inc.		DRAWING NUMBER		051-05641	
		REVISION		8.0.0	
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		evt-2	
		PAGE		701 OF 999	
		SHEET		154 OF 155	

  |  |  |  |  |  |  |  |

PAGE TITLE		SYNC_DATE=10/20/2019	
PACK OPTIONS			
 Apple Inc.	DRAWING NUMBER	051-05641	SIZE
	REVISION	8.0.0	
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	evt-2	
	PAGE	701 OF 999	
	SHEET	154 OF 155	

8		7		6		5		4		3		2		1	
TEMPORARY ALIASES															
8		7		6		5		4		3		2		1	

SYNC_MASTER=GAREN		SYNC_DATE=06/23/2020	
PAGE TITLE			
TEMPORARY ALIASES			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-05641		D
	REVISION		
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	8.0.0		
	BRANCH		
	evt-2		
	PAGE		
	999 OF 999		
SHEET			
155 OF 155			