



Module Parts

CPU

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S00592	1	CPU,AMS-Y,QQQF,PQ6,1.6,1.15,BGA1515	U0500	CRITICAL	CPU_AMLY:QQQE
337S00593	1	CPU,AMS-Y,QQQF,PQ6,1.6,1.15,BGA1515	U0500	CRITICAL	CPU_AMLY:QQQF
337S00594	1	CPU,AMS-Y,QQQF,PQ6,1.6,1.15,BGA1515	U0500	CRITICAL	CPU_AMLY:QQQG
337S00613	1	CPU,AMS-Y,QQQF,PQ6,HD,1.6,7W,1.15,B1515	U0500	CRITICAL	CPU_AMLY:QQQM
337S00614	1	CPU,AMS-Y,QQQF,PQ6,HD,1.6,7W,1.1,BA1515	U0500	CRITICAL	CPU_AMLY:QQQN
337S00615	1	CPU,AMS-Y,QQQF,PQ6,HD,1.6,7W,1.15,B1515	U0500	CRITICAL	CPU_AMLY:QQQP
337S00621	1	CPU,AMS-Y,QQQF,PQ6,HD,1.6,7W,1.15,B1515	U0500	CRITICAL	CPU_AMLY:QQQQ
337S00622	1	CPU,AMS-Y,QQQF,PQ6,HD,1.6,7W,1.1,BA1515	U0500	CRITICAL	CPU_AMLY:QQQR
337S00623	1	CPU,AMS-Y,QQQF,PQ6,HD,1.6,7W,1.15,B1515	U0500	CRITICAL	CPU_AMLY:QQQS
337S00624	1	CPU,AMS-Y,SREKQ,FQ4,1.6,7W,1.1,BA1515	U0500	CRITICAL	CPU_AMLY:SREKN
337S00625	1	CPU,AMS-Y,SREKQ,FQ4,1.6,7W,1.1,BA1515	U0500	CRITICAL	CPU_AMLY:SREKP
337S00626	1	CPU,AMS-Y,SREKQ,FQ4,1.6,7W,1.15,BGA1515	U0500	CRITICAL	CPU_AMLY:SREKQ
998-15364	1	INTERPOSER,VMTT ADAPTER,ASC-Y,BGA1515	U0500	CRITICAL	CPU_AMLY:INTERPOSER

TBT Titan Ridge

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00305	1	IC,TBT,TITAN RIDGE,QT1E,P,ES,A0,CBP337	U2800	CRITICAL	TBT_TR:A0
338S00356	1	IC,TBT,TITAN RIDGE DP,QT1E,B02,B0,CBP337	U2800	CRITICAL	TBT_TR:B0
338S00399	1	IC,TBT,TITAN RIDGE DP,QT1E,B02,C0,CBP337	U2800	CRITICAL	TBT_TR:C0
338S00408	1	IC,TBT,TITAN RIDGE DP,Q04K,Q0,CT,CBP337	U2800	CRITICAL	TBT_TR:C1
338S00441	1	IC,TBT,TITANRIDGE DP,ESAB0,FQ4,CT,CBP337	U2800	CRITICAL	TBT_TR:PRQ

Ace

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00961	2	IC,CD3215,ACE,C03,DSB PWR SW,BLAW,BGA96	U3100,U3200	CRITICAL	ACE:C0_BGA
335S01442	2	IC,CD3215,ACE,C03,DSB PWRSW,BLAW,MFG046	U3100,U3200	CRITICAL	ACE:C0_NFRGA

Wireless

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00448	1	MODULE,WIFI,T88100 CD386,T,88A,9,UGA160	U3700	CRITICAL	WIRELESS:USI
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
339S00446	339S00448		ALL	Murata Module	

SOC

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00370	1	POP,GLOBALT7A+10P 20NM,M,B0,SCY,CBP1406	U3900	CRITICAL	SOC:B0_1G
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
339S00371	339S00370	SOC:B0_1G	ALL	Hynix 1GB SCK	
339S00375	339S00370	SOC:B0_1G	ALL	Micron 1GB SCK	
339S00376	339S00370	SOC:B0_1G	ALL	Hynix 1GB ATK	
339S00372	1	POP,GLOBALT7A+20P 20NM,M,B0,SCY,CBP1406	U3900	CRITICAL	SOC:B0_2G
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
339S00373	339S00372	SOC:B0_2G	ALL	Hynix 2GB SCK	
339S00377	339S00372	SOC:B0_2G	ALL	Micron 2GB ATK	
339S00378	339S00372	SOC:B0_2G	ALL	Hynix 2GB ATK	

PMU

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00267	1	IC,PMU,CA9P,10249A0,OTF-A1,CBP324,6,4P	U7800	CRITICAL	PMU:A0_A

DRAM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
333S00052	2	IC,SDRAM,LPDDR3-1866,32GBIT,20NM,BGA253	U2300,U2500	CRITICAL	DRAM:SAMSUNG_8GB
333S00130	2	IC,LPDDR3-1866,64GBIT,18NM,S,BGA253	U2300,U2500	CRITICAL	DRAM:SAMSUNG_16GB
333S00110	2	IC,LPDDR3-1866,32GBIT,21NM,BGA253	U2300,U2500	CRITICAL	DRAM:HYNIX_8GB
333S00111	2	IC,LPDDR3-1866,64GBIT,21NM,BGA253	U2300,U2500	CRITICAL	DRAM:HYNIX_16GB
333S00082	2	IC,LPDDR3-1866,32GBIT,20NM,BGA253	U2300,U2500	CRITICAL	DRAM:MICRON_8GB_1866
333S00113	2	IC,LPDDR3-1866,64GBIT,20NM,M,BGA253	U2300,U2500	CRITICAL	DRAM:MICRON_16GB
333S00199	2	IC,LPDDR3-2133,32GBIT,20NM,BGA253	U2300,U2500	CRITICAL	DRAM:MICRON_8GB

NAND

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00273	2	NAND,1E,128GBM,64K,128G,SD,HPM1,UGA110	U8600,U8700	CRITICAL	NAND:HPM1_256G_ZL
335S00289	3	NAND,3DV3,42GBP,XXX,64K,170G,T,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_128G_TO
335S00301	3	NAND,3DV3,42GBP,XXX,64K,170G,SD,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_128G_SD
335S00290	3	NAND,3DV3,65GBP,XXX,64K,170G,T,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_256G_TO
335S00302	3	NAND,3DV3,65GBP,XXX,64K,170G,SD,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_256G_SD
335S00292	3	NAND,3DV3,170GBP,XXX,64K,170G,T,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_512G_TO
335S00304	3	NAND,3DV3,170GBP,XXX,64K,170G,SD,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_512G_SD
998-12416	3	NAND,3DV3,42GBP,64K,170G,T,SDM,X,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_128G_TO_NM
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
998-12417	998-12416	NAND:PMLC_128G_TO_NM	ALL	TO 128G Substrate 2	
335S00323	3	NAND,3DV3,42GBP,XXX,64K,170G,SD,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_128G_SD_NM
998-12418	3	NAND,3DV3,65GBP,64K,170G,T,SDM,X,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_256G_TO_NM
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
998-12419	998-12418	NAND:PMLC_256G_TO_NM	ALL	TO 256G Substrate 2	
335S00324	3	NAND,3DV3,65GBP,XXX,64K,170G,SD,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_256G_SD_NM
998-12422	3	NAND,3DV3,170GBP,64K,170G,T,SDM,X,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_512G_TO_NM
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
998-12423	998-12422	NAND:PMLC_512G_TO_NM	ALL	TO 512G Substrate 2	
335S00326	3	NAND,3DV3,170GBP,XXX,64K,170G,SD,UGA110	U8600,U8700,U8800	CRITICAL	NAND:PMLC_512G_SD_NM
335S00322	3	NAND,3DV4,512GBM,XXX,256K,SS,UGA110	U8600,U8700,U8800	CRITICAL	NAND:3DV4_1P5T_SS
335S00373	3	NAND,3DV4,512GBM,XXX,256K,M03,SS,UGA110	U8600,U8700,U8800	CRITICAL	NAND:3DV4_1P5T_SS_MG3

Programmables

TBT ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00133	1	IC,EFI SERIAL FLASH,M815T,3,0V,UGM8	U2890	CRITICAL	TBT_ROM:BLANK
341S00905	1	IC,NVM (V5,T) PHOTO-0,X1032	U2890	CRITICAL	TBT_ROM:P0
341S00922	1	IC,NVM (V1,1) NVM,PHOTO-0,X1032	U2890	CRITICAL	TBT_ROM:P0_B0
341S00942	1	IC,NVM (V5,1) PHOTO-1,X1032	U2890	CRITICAL	TBT_ROM:P1
341S00982	1	IC,NVM (VXXX) PHOTO-2,X1032	U2890	CRITICAL	TBT_ROM:P2
341S01046	1	IC,NVM (VXXX) EVT,X1032	U2890	CRITICAL	TBT_ROM:EVT
341S01150	1	IC,NVM (VXXX) PHOTO-3,X1032	U2890	CRITICAL	TBT_ROM:P3
341S01177	1	IC,NVM (VXXX) EVT-2,X1032	U2890	CRITICAL	TBT_ROM:EVT2

BT ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00256	1	IC,BT SERIAL FLASH,M815T,1,0V,UGM8	U3770	CRITICAL	BT_ROM:BLANK
341S00745	1	IC,BT ROM (V4) PHOTO-0,X1032	U3770	CRITICAL	BT_ROM:P0
341S00939	1	BT SPLASH ROM (V22,33,40) PHOTO-1,X1032	U3770	CRITICAL	BT_ROM:P1
341S00983	1	BT SPLASH ROM (VXXX) PHOTO-1,X1032	U3770	CRITICAL	BT_ROM:P2
341S01042	1	BT SPLASH ROM (VXXX) EVT,X1032	U3770	CRITICAL	BT_ROM:EVT
341S01176	1	BT SPLASH ROM (VXXX) EVT-2,X1032	U3770	CRITICAL	BT_ROM:EVT2
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
335S00248	335S00256	BT_ROM:BLANK	ALL	Macronix	
335S00255	335S00256	BT_ROM:BLANK	ALL	Adesto	

Wifi ROM


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00145	1	IC,EEPROM,4KBIT,1,0V,SELECT ONO,UGM8	U3780	CRITICAL	WIFI_ROM:BLANK
341S00744	1	WIFI ROM (P101) PHOTO-0,M01,X1032	U3780	CRITICAL	WIFI_ROM:P0
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
335S00236	335S00145	WIFI_ROM:BLANK	ALL	Rohm	

SOC ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00203	1	IC,FLASH,SERIAL,8PT,40KX1,1,0V,4X1MM,UGM8	U4770	CRITICAL	SOC_ROM:BLANK

EFI ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00371	1	IC,SERIAL FLASH,128MBIT,1,0V,6W1,M0M8	U2100	CRITICAL	EFI_ROM:BLANK
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	
335S00370	335S00371		ALL	Macronix	
335S00376	335S00371		ALL	Adesto	

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	PAGE	2 OF 145
	SHEET	2 OF 85

8

7

6

5

4

3

2

1

BOM Groups

BOM GROUP	BOM OPTIONS
MLB_COMMON	SCHEM,PCBF,ALTERNATE,COMMON,MLB_PROGPARTS,MLB_USBC,MLB_POWER,MLB_WIRELESS,MLB_MECH1,MLB_MECH2,MLB_MISC,PVT
MLB_USBC	TBT_PCIE_4LANES,TBT_TR:PRQ,ACE:C0_BGA
MLB_PROGPARTS	BT_ROM:EVT2,SOC_ROM:BLANK,TBT_ROM:EVT2,WIFI_ROM:P0,SE:PROD_2017
MLB_POWER	PMU:A0_A
MLB_WIRELESS	WIRELESS:USI
MLB_MECH1	BRACKET,BUSBARLONG,BUSBARTOP,BUSBARBOTTOM
MLB_MECH2	SHLD_CAN_DRAM,SHLD_FNC_NAND,SHLD_CAN_TR,SHLD_FNC_SOC,SHLD_CAN_DPLXR
MLB_MISC	BOARDID0,BOARDID1,BOARDID2,BOARDID4,SYSDET:FET,NAND_VCC:2V5,BOOTCFG0

See <rdar://problem/39661910> for BOARDID straps

Build Specific Groups

BOM GROUP	BOM OPTIONS
PROTO3	MAF,EFI_ROM:BLANK
PREEVT2	BOARDREV0,SAF,FCHFLTR:FERRITE
PVT	BOARDREV1,SAF,FCHFLTR:FERRITE

NAND Configs

BOM GROUP	BOM OPTIONS
NANDCFG:HPN1_256G_2L	NAND:HPN1_256G_2L,SSDJTAG:2L,SOC:B0_1G
NANDCFG:PMLC_128G_TO	NAND:PMLC_128G_TO_NM,SOC:B0_1G
NANDCFG:PMLC_128G_SD	NAND:PMLC_128G_SD_NM,SOC:B0_1G
NANDCFG:PMLC_256G_TO	NAND:PMLC_256G_TO_NM,SOC:B0_1G
NANDCFG:PMLC_256G_SD	NAND:PMLC_256G_SD_NM,SOC:B0_1G
NANDCFG:PMLC_512G_TO	NAND:PMLC_512G_TO_NM,SOC:B0_1G
NANDCFG:PMLC_512G_SD	NAND:PMLC_512G_SD_NM,SOC:B0_1G
NANDCFG:3DV4_1P5T_SS	NAND:3DV4_1P5T_SS_MG3,SOC:B0_2G

CPU DRAM SPD Straps

BOM GROUP	BOM OPTIONS
DRAMCFG:SAMSUNG_8GB	DRAM:SAMSUNG_8GB,AMCFG0_L
DRAMCFG:SAMSUNG_16GB	DRAM:SAMSUNG_16GB,AMCFG0_L,AMCFG2_L,AM_16GB
DRAMCFG:HYNIX_8GB	DRAM:HYNIX_8GB,AMCFG0_L,AMCFG1_L
DRAMCFG:HYNIX_16GB	DRAM:HYNIX_16GB,AMCFG0_L,AMCFG1_L,AMCFG2_L,AM_16GB
DRAMCFG:MICRON_8GB	DRAM:MICRON_8GB
DRAMCFG:MICRON_16GB	DRAM:MICRON_16GB,AMCFG2_L,AM_16GB

AMCFGx strap is low if in table.

CPU DRAM CFG Chart

Vendor	CFG 1	CFG 0	Vendor	CFG 2
Hynix	0	0	8GB	1
Samsung	1	0	16GB	0
Unused	0	1		
Micron	1	1		

BOM Configuration

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051-04039

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2.0.0

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PAGE

3 OF 145


SHEET

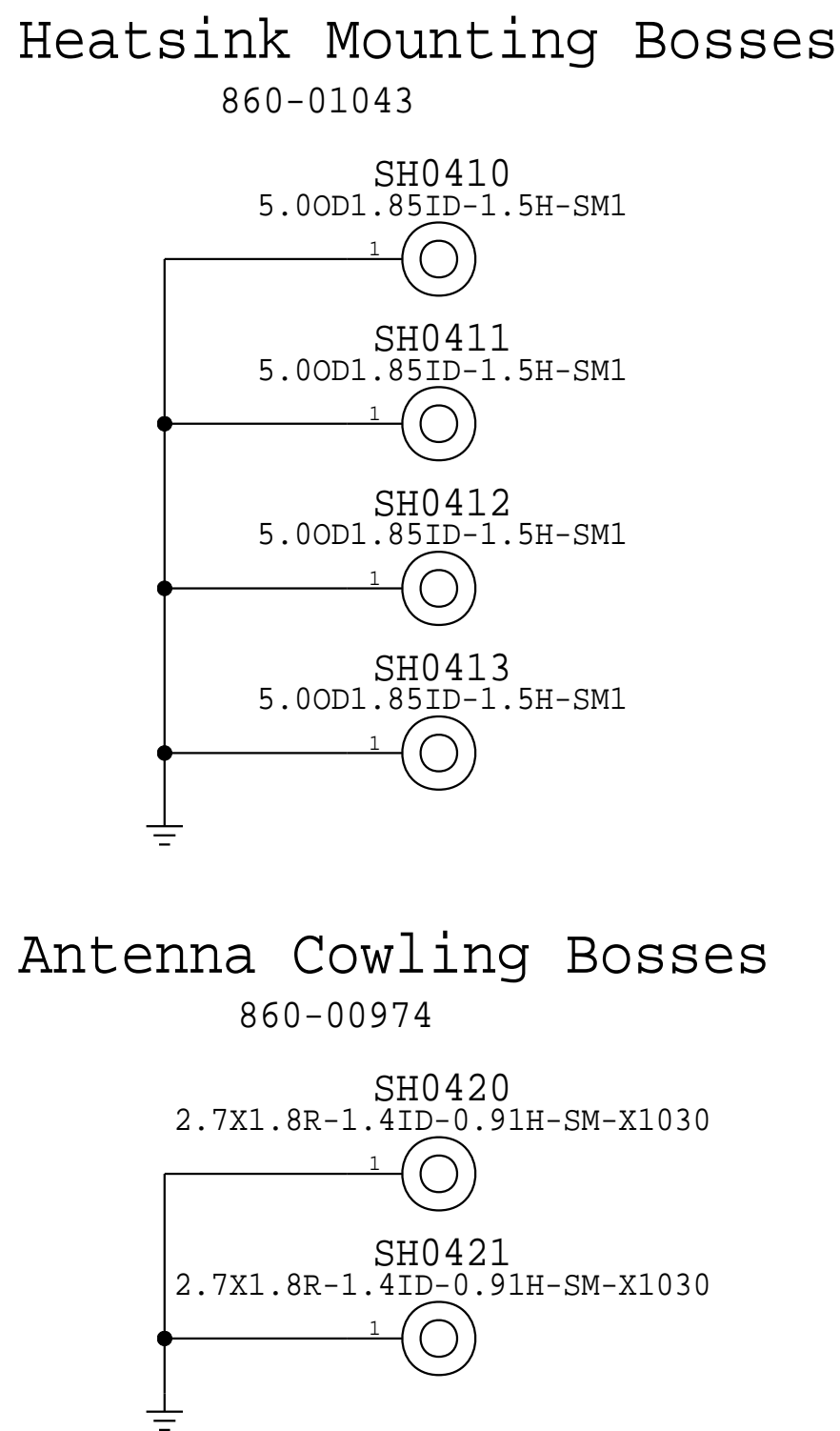
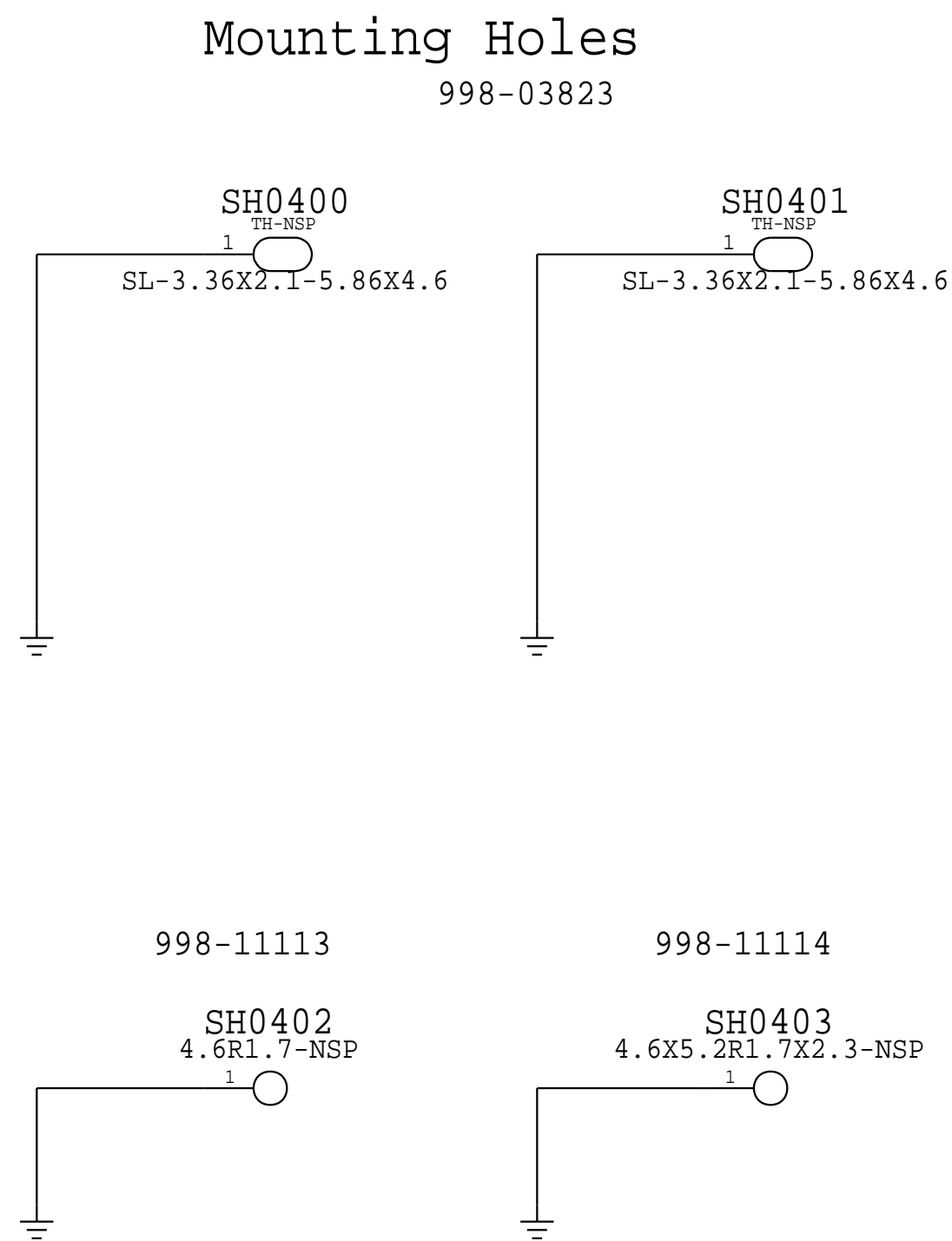
3 OF 85

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
685-00251	1	COMMON PARTS,MLB_BTTF,X1032	CBOM	CRITICAL	CNN_PARTS_BOM
985-00733	1	DEV PARTS,MLB_BTTF,X1032	DEV1	CRITICAL	DEV_PARTS_BOM

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	PAGE	3 OF 145
	SHEET	3 OF 85



## DRAM Shield Can

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-12387	1	SHIELD CAN,DRAM,X1030	SHLD1	CRITICAL	SHLD_CAN_DRAM

## NAND Shield Fence

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-12384	1	SHIELD FENCE, MEMORY, SINGLE, X1030	SHLD2	CRITICAL	SHLD_FNC_NAND

TR Shield Can

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-12386	1	SHIELD CAN,TITAN RIDGE,X1030	SHLD3	CRITICAL	SHLD_CAN_TR

# SOC/NAND Shield Fence


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-12385	1	SHIELD FENCE,GIBRALTOR AND MEMORY,X1030	SHLD4	CRITICAL	SHLD_FNC_SOC

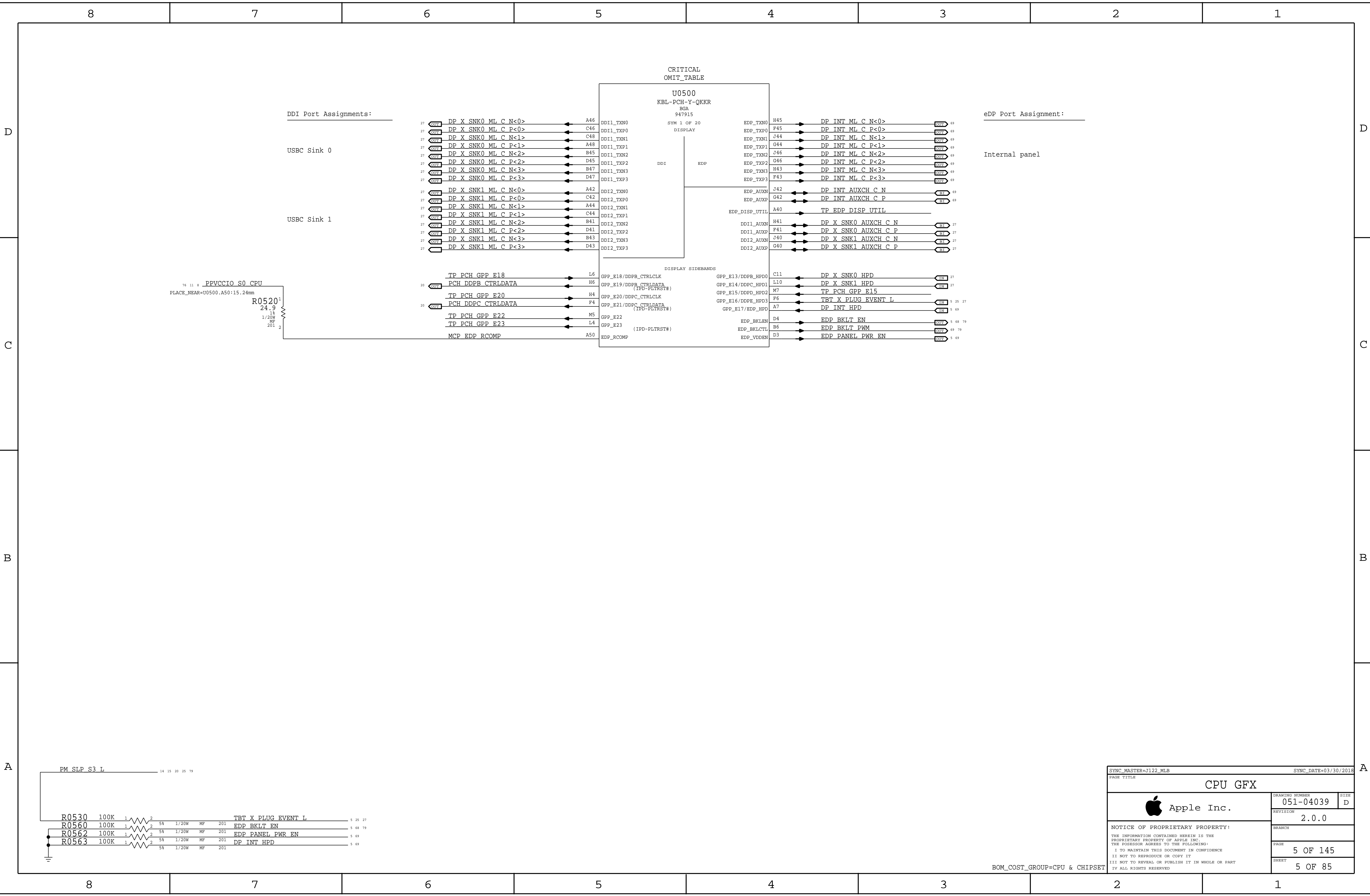
Diplexer Shield Can

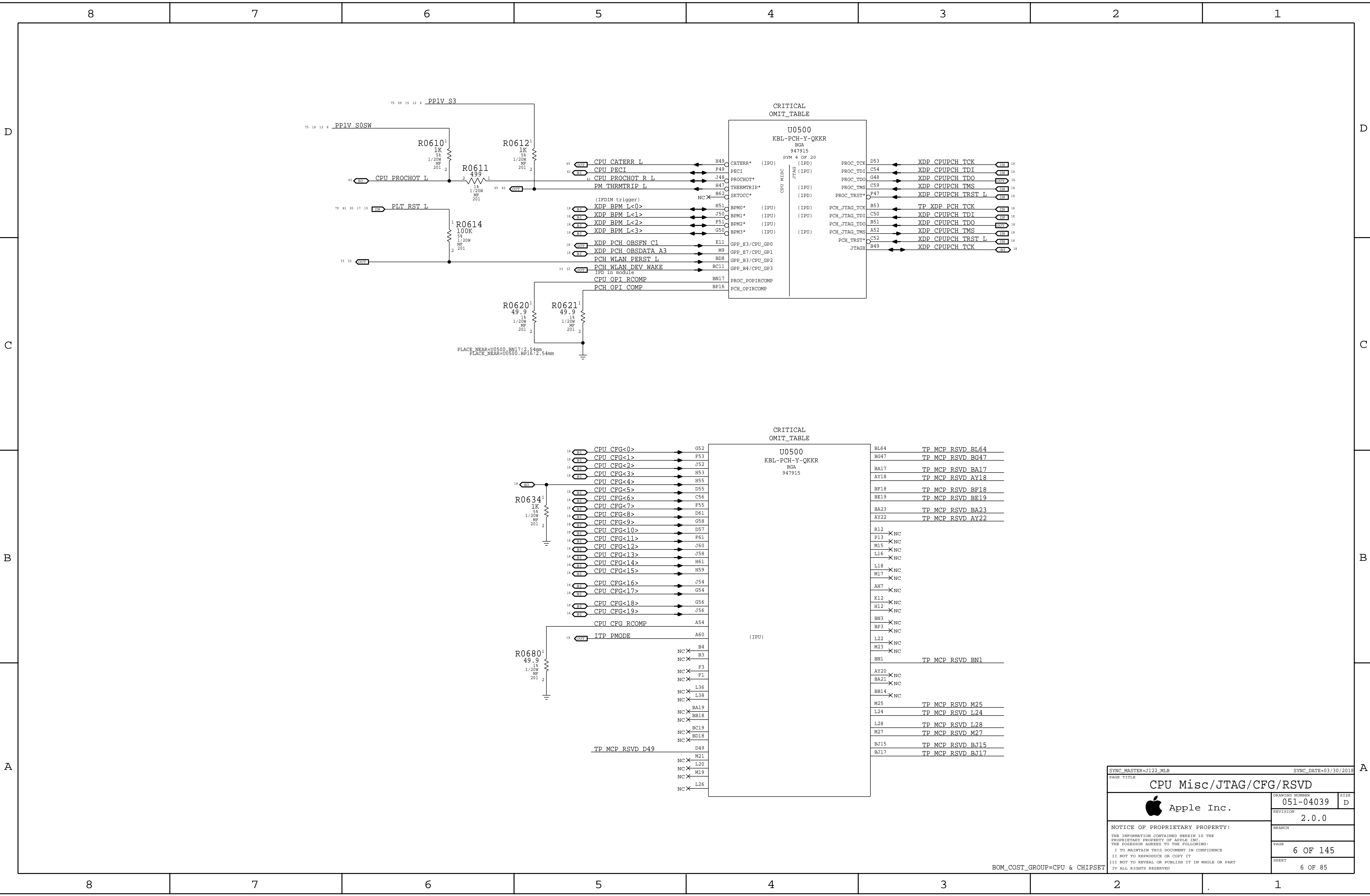
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-12650	1	SHIELD CAN,DIPLEX,SUS,X1030	SHLD5	CRITICAL	SHLD_CAN_DPLXR


## Bus Bars

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-16920	2	BUSBAR_MLB_LONG_BOTTOM_X1032	BB0400,BB0403	CRITICAL	BUSBARLONG
806-16921	1	BUSBAR_MLB_TOP_X1032	BB0401	CRITICAL	BUSBARTOP
806-16922	1	BUSBAR_MLB_LONG_BOTTOM_X1032	BB0402	CRITICAL	BUSBARBOTTOM

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PAGE		4 OF 145	
SHEET		4 OF 85	



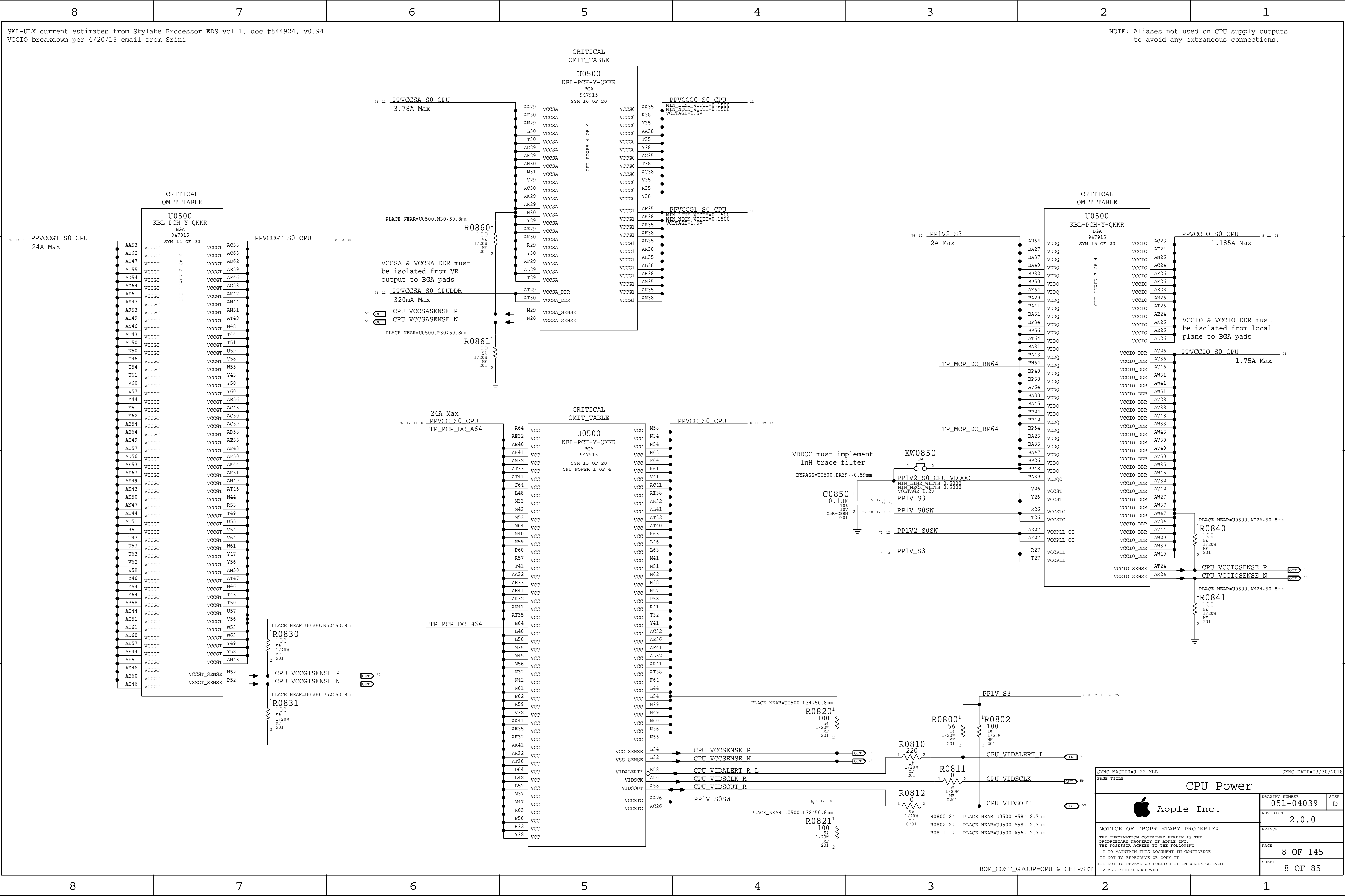


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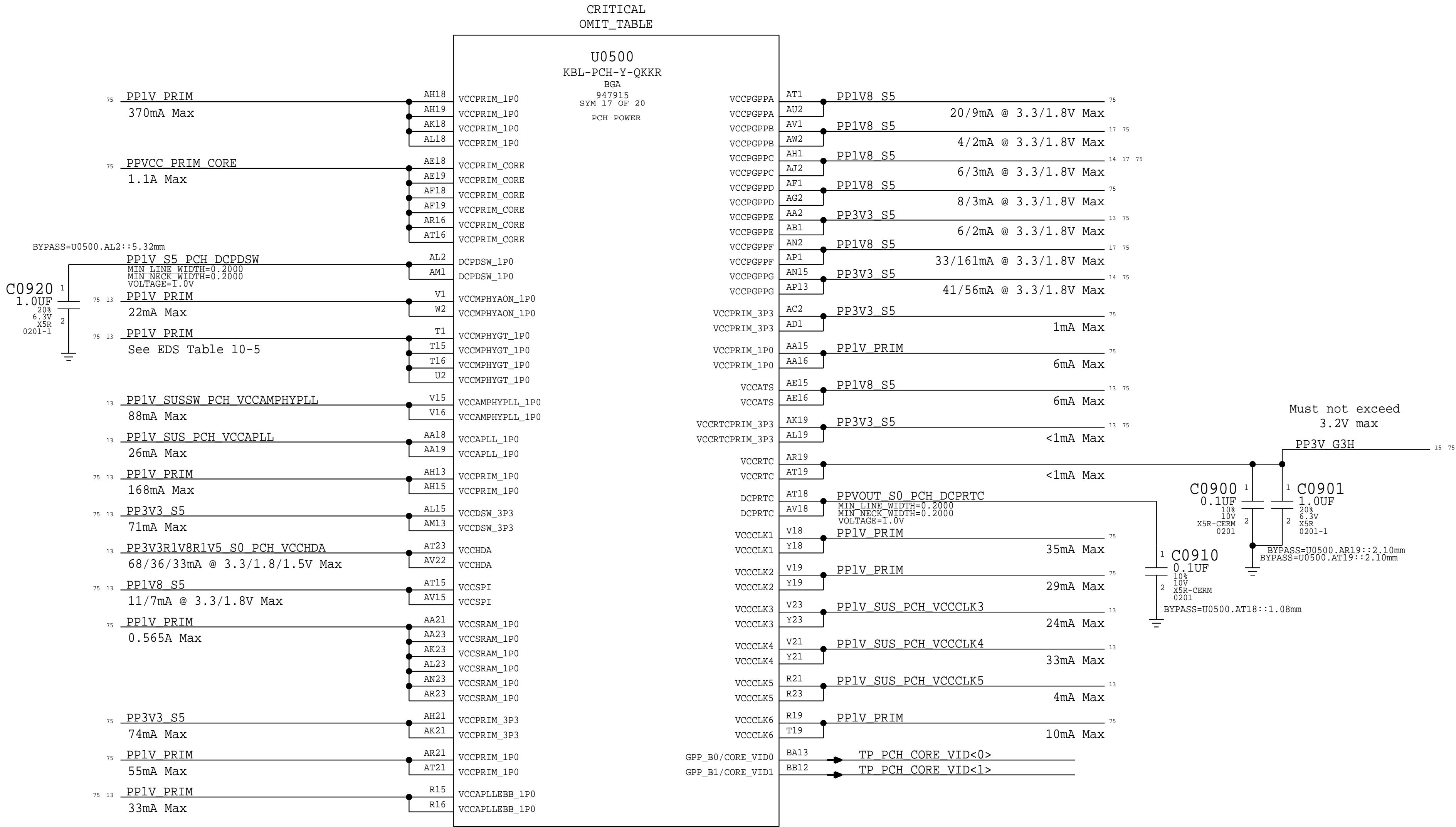







SPT-LP current estimates from Sunrise Point-LP PCH EDS vol 1, doc #545659, vl.2.  
VCCAMPHYPLL\_1P0 and VCCPRIM\_1P0 / VCCPRIM\_3P3 breakdowns from Srimi email 4/13/15

NOTE: Aliases not used on CPU supply outputs  
to avoid any extraneous connections.



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			PAGE		9 OF 145
			SHEET		9 OF 85

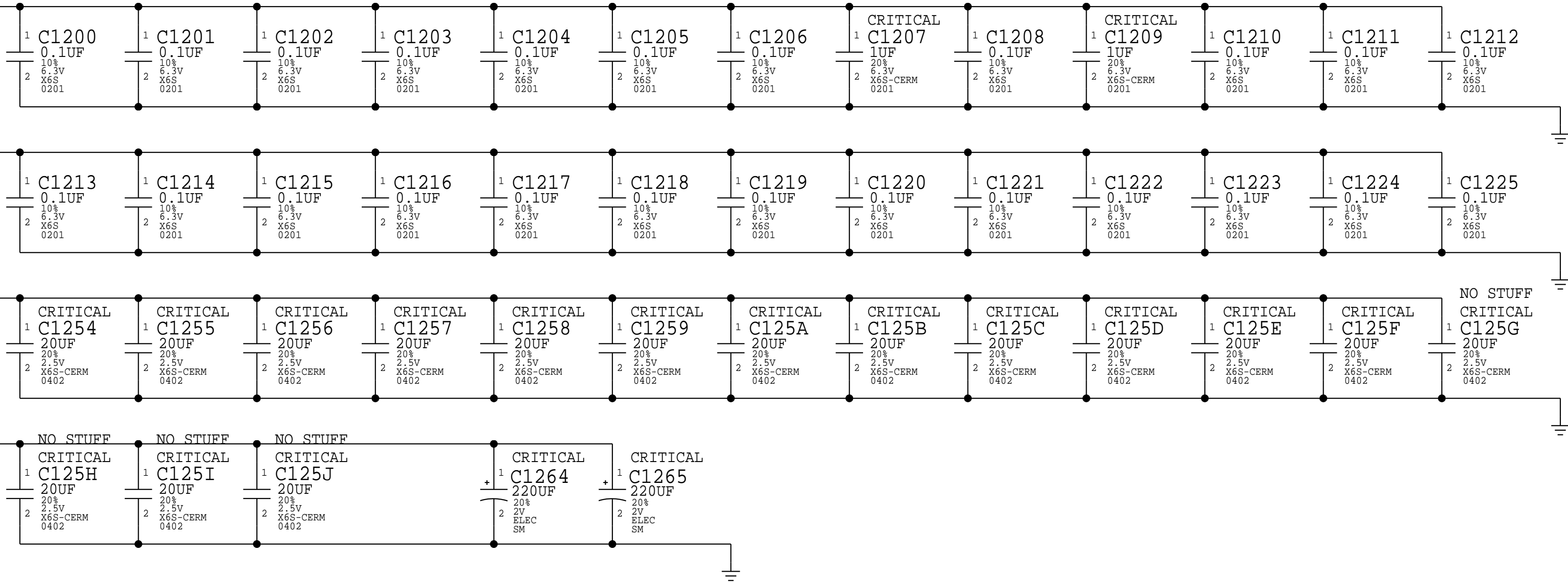
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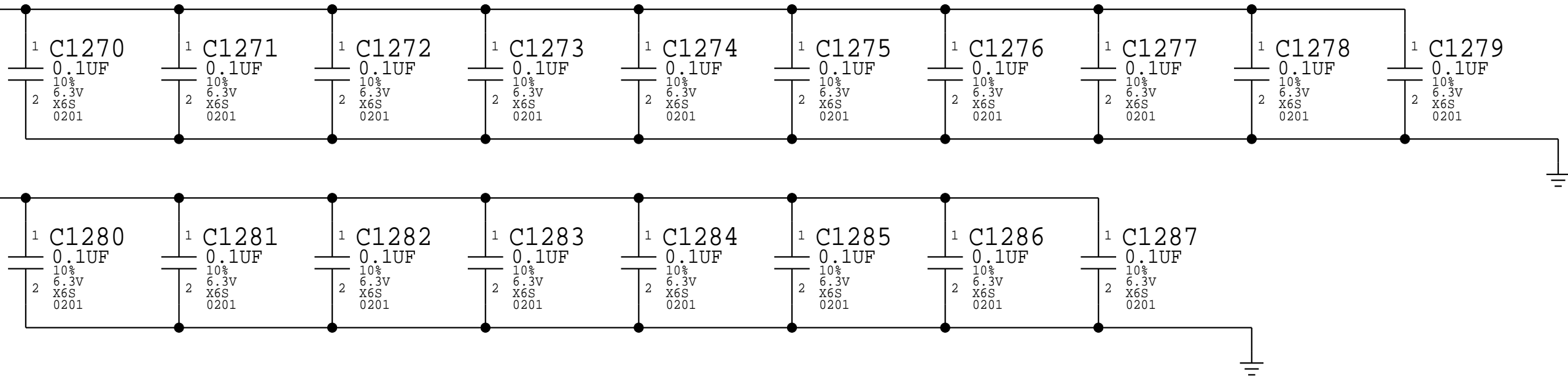
CPU GT Decoupling

Intel implementation (#561280, Table 49-2): 12x 0.1uF 0201, 2x 1uF 0402, 9x 47uF 0805  
Apple implementation: 24x 0.1uF 0201, 2x 1uF 0201, 10x 20uF 0402 STUFF (6x NOSTUFF), 2x 220uF D1 STUFF

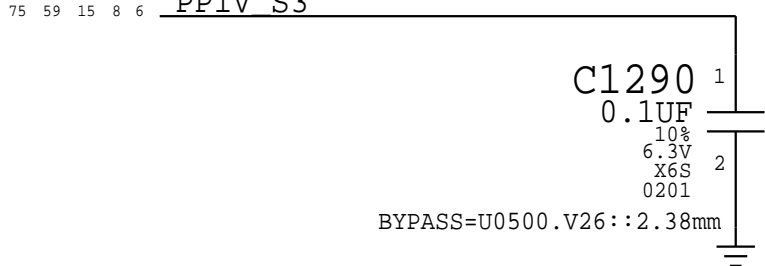


CPU VDDQ DECOUPLING

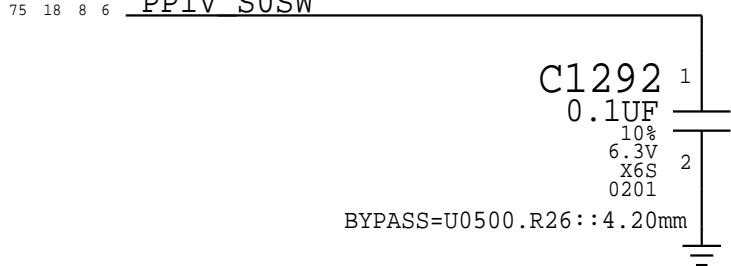
Intel implementation (#561280, Table 49-2): 18x 0.1uF 0201  
Apple implementation: 18x 0.1uF 0201



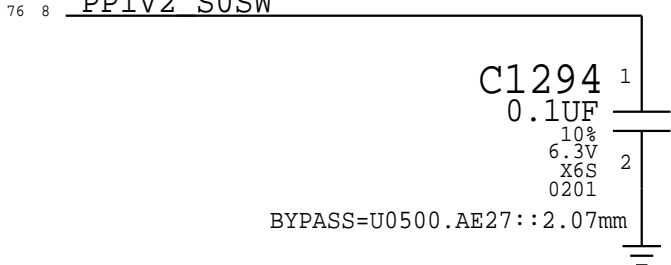
CPU VCCST BYPASS  
(CPU 1.0V SUSTAIN PWR)



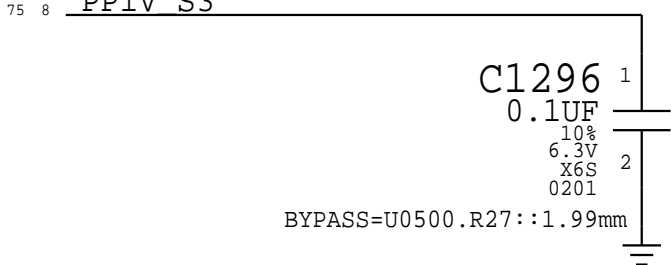
CPU VCCSTG BYPASS  
(CPU 1.0V SUSTAIN GATED PWR)



CPU VCCPLL\_OC BYPASS  
(CPU 1.2V PLL PWR)



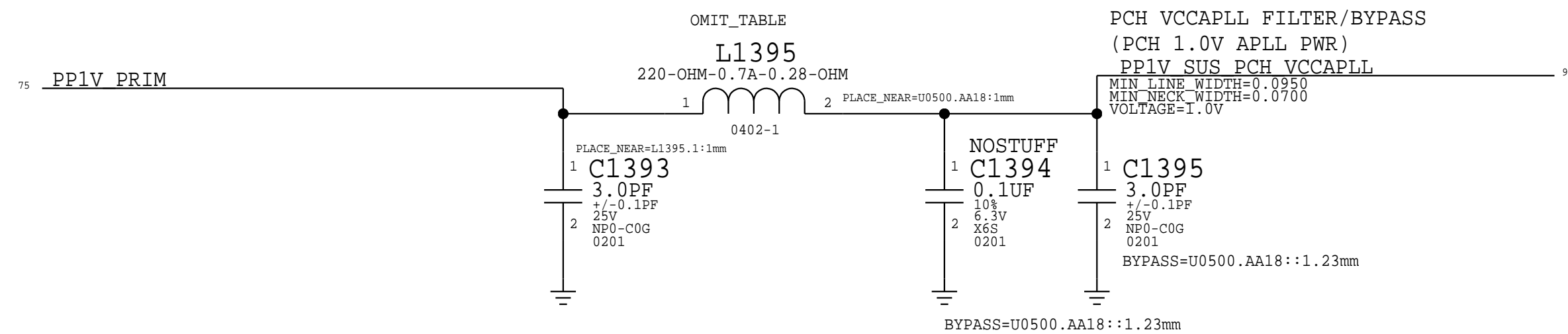
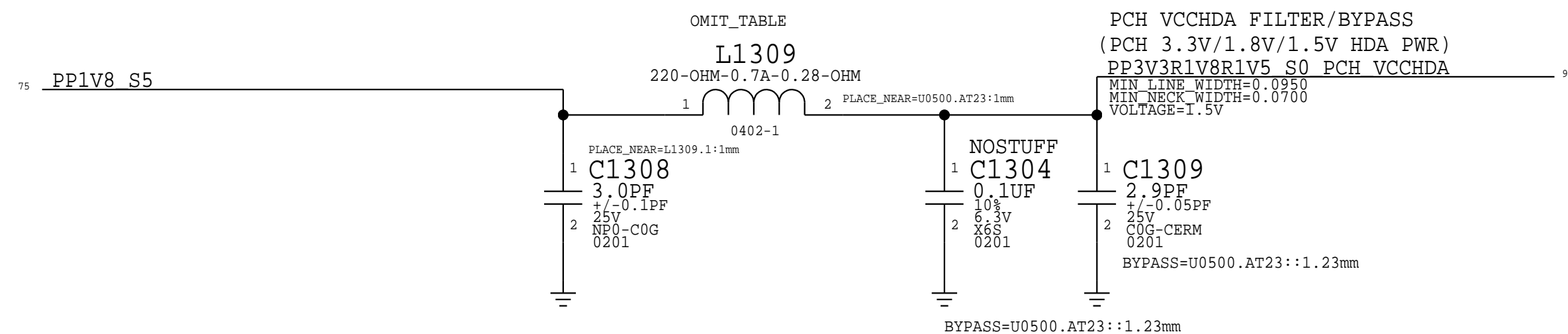
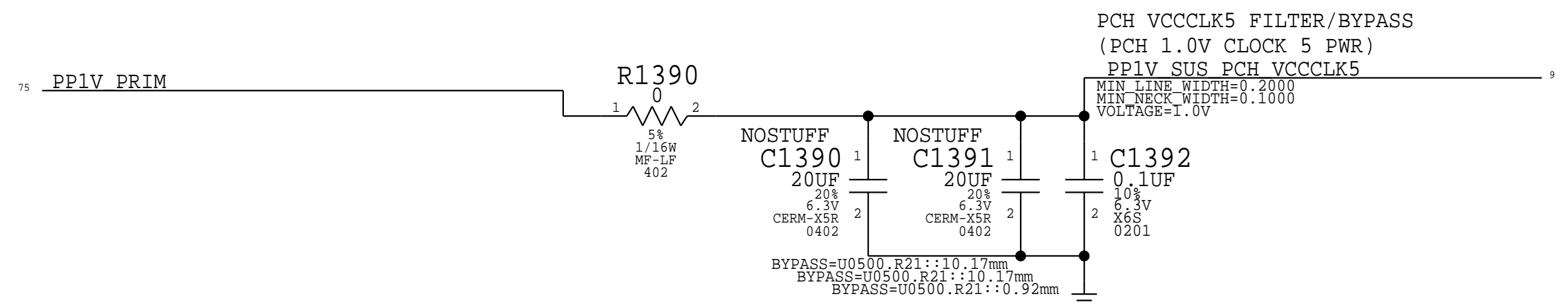
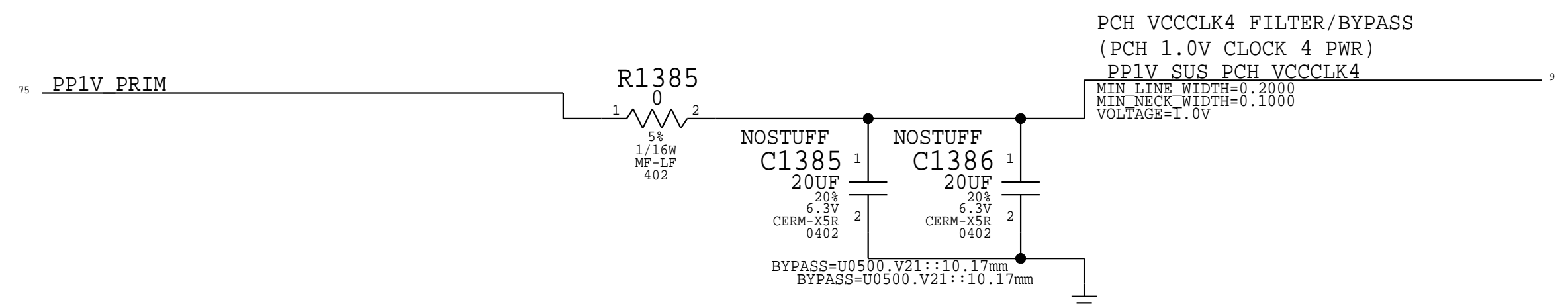
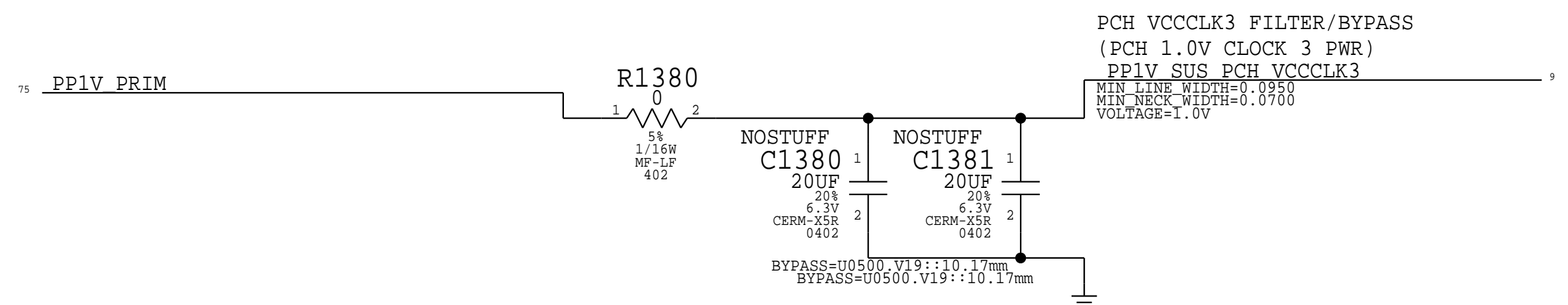
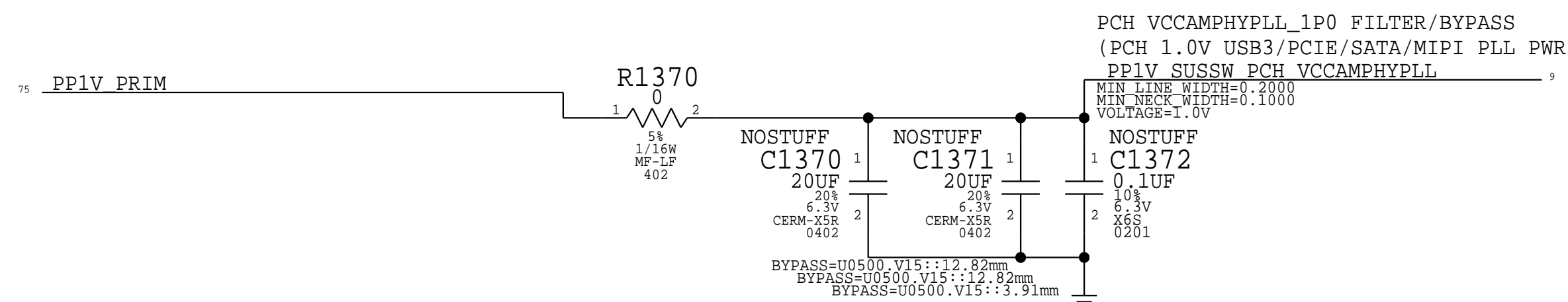
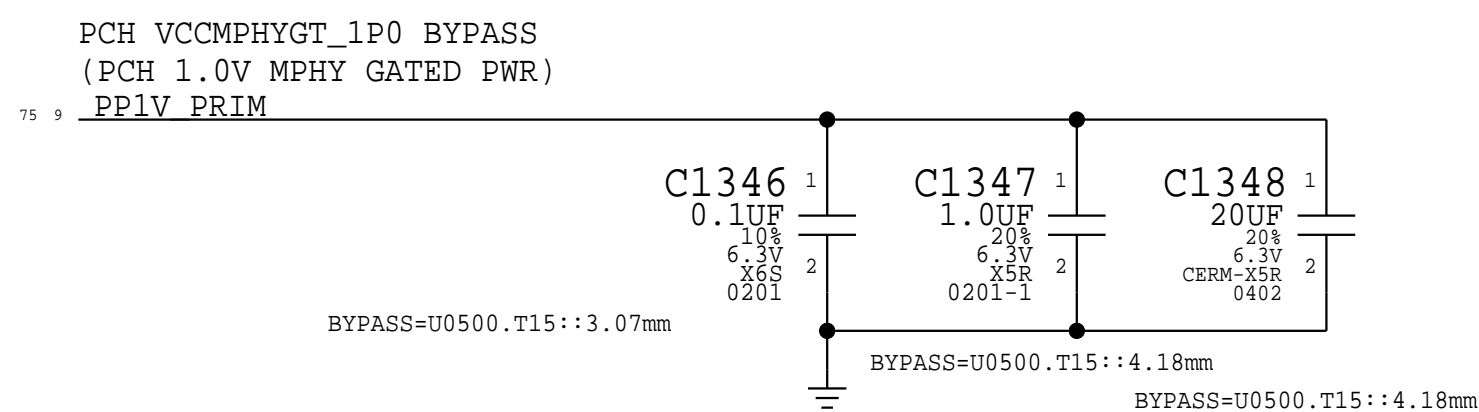
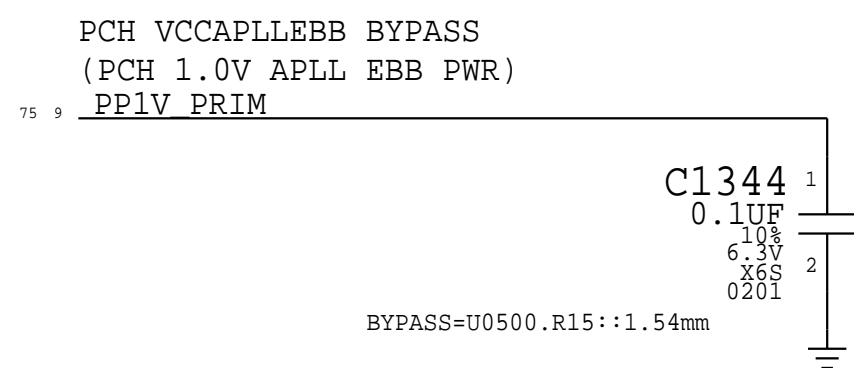
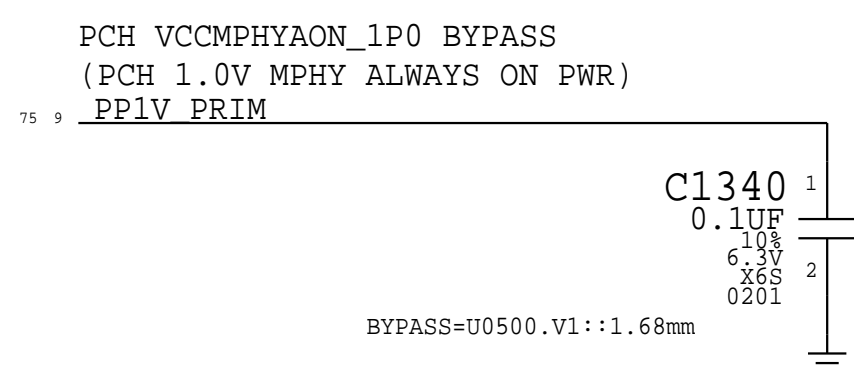
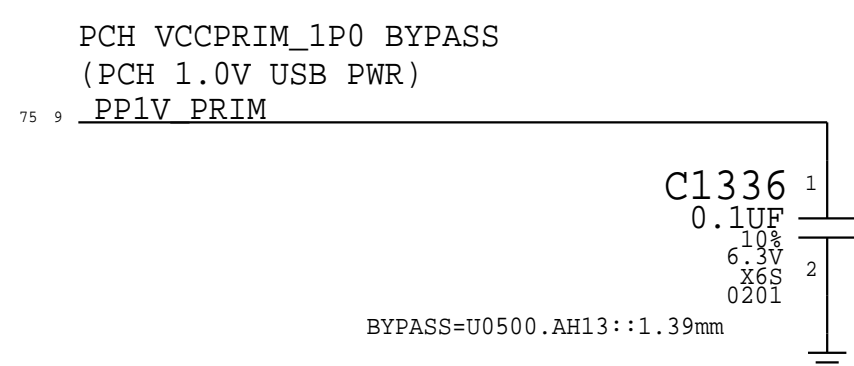
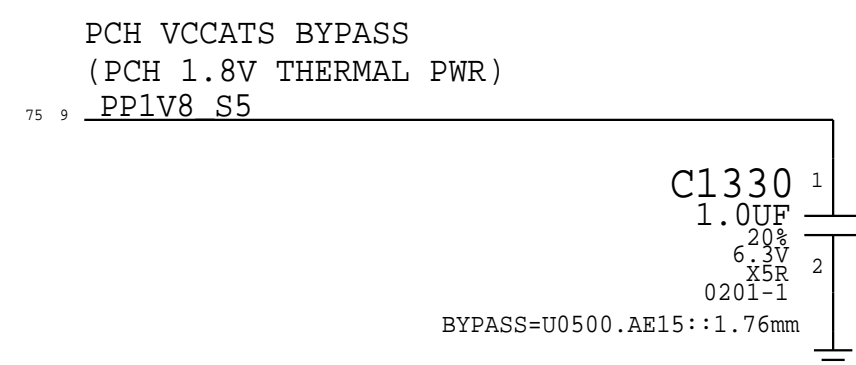
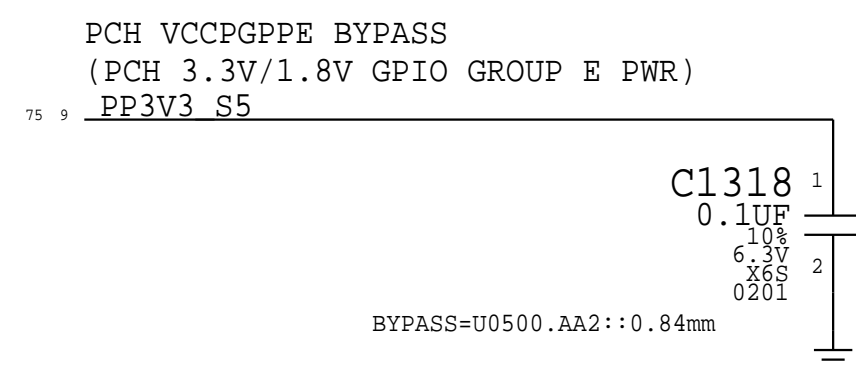
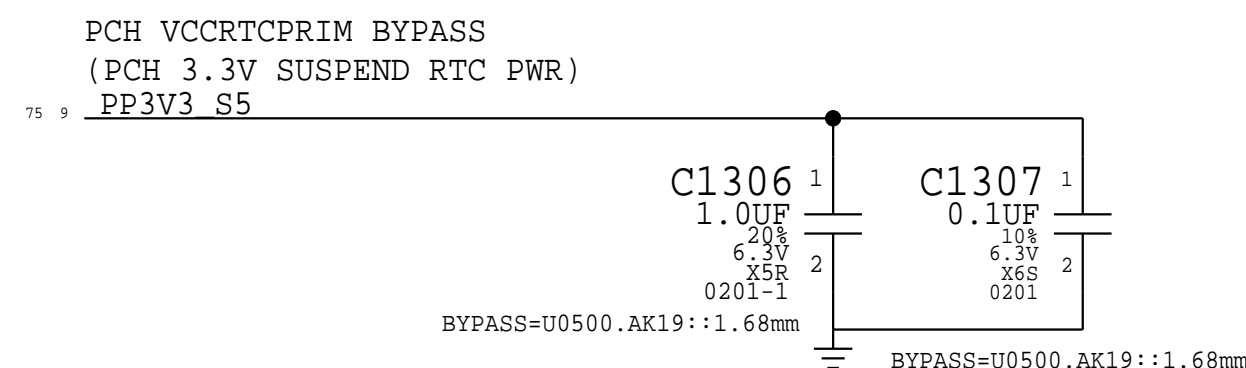
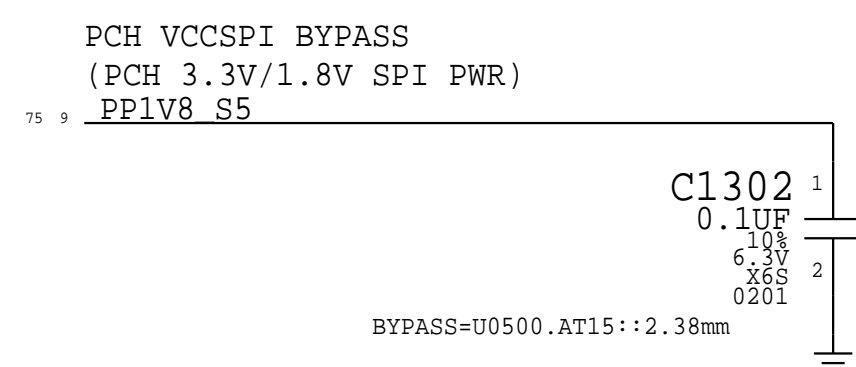
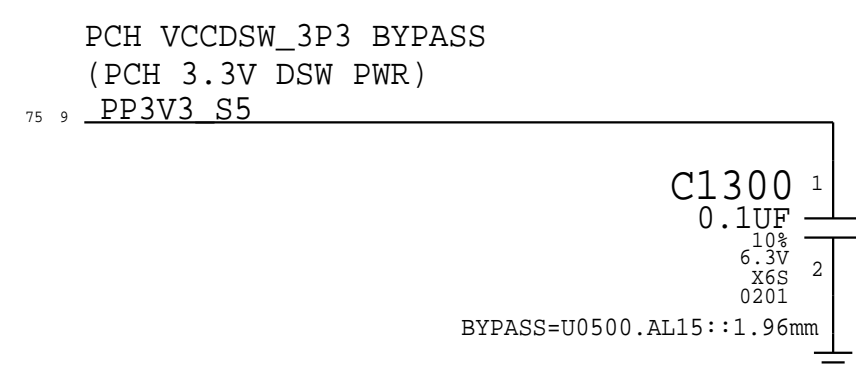
CPU VCCPLL BYPASS  
(CPU 1.0V DIGITAL PLL PWR)




NOTE: Bypass calcs based on 0.1mm trace width with worst case stackup and 500pH added for power/ground via pair.

BOM\_COST\_GROUP=CPU & CHIPSET

PAGE TITLE			SYNC_MASTER=J122_MLB			SYNC_DATE=03/30/2018		
CPU Decoupling 2			DRAWING NUMBER			051-04039		
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			SHEET			12 OF 85		



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
155S0391	2	FERR BD,220 OHM,25%,700MA,0.28 DCR,0402	L1309,L1395	PCHFLTR:FERRITE
116S0004	2	RES,MTL FILM,0 OHM,1A MAX,0402,SMD	L1309,L1395	PCHFLTR:BYPASS
155S00480	2	FERR BD,30 OHM,25%,0.6A,0.449 OHM,0402	L1309,L1395	PCHFLTR:FERRITE30

SYNC_MASTER=J122_MLB		SYNC_DATE=03/30/2018	
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PCH Decoupling			
 Apple Inc.	DRAWING NUMBER		SIZE
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		13 OF 145	
		SHEET	
		13 OF 85	

BOM\_COST\_GROUP=CPU & CHIPSET





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C

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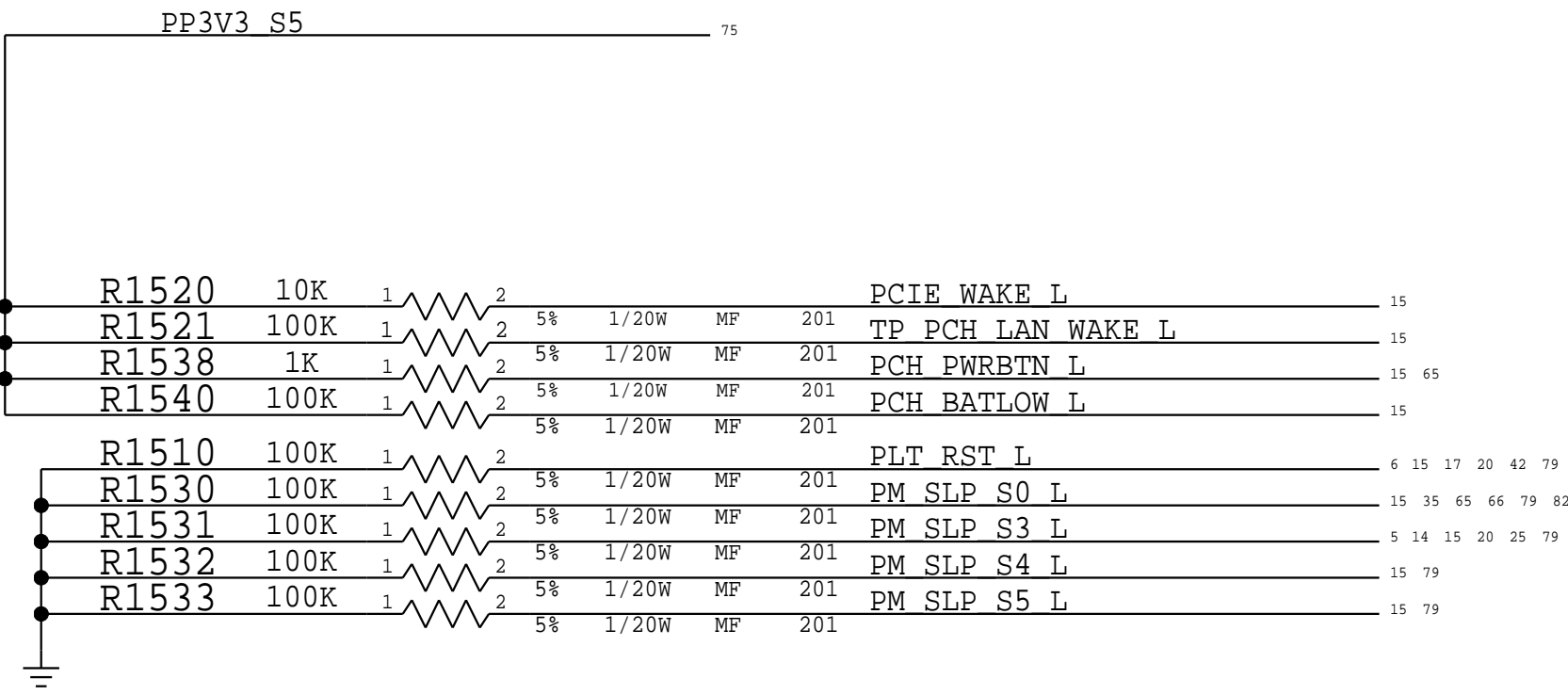
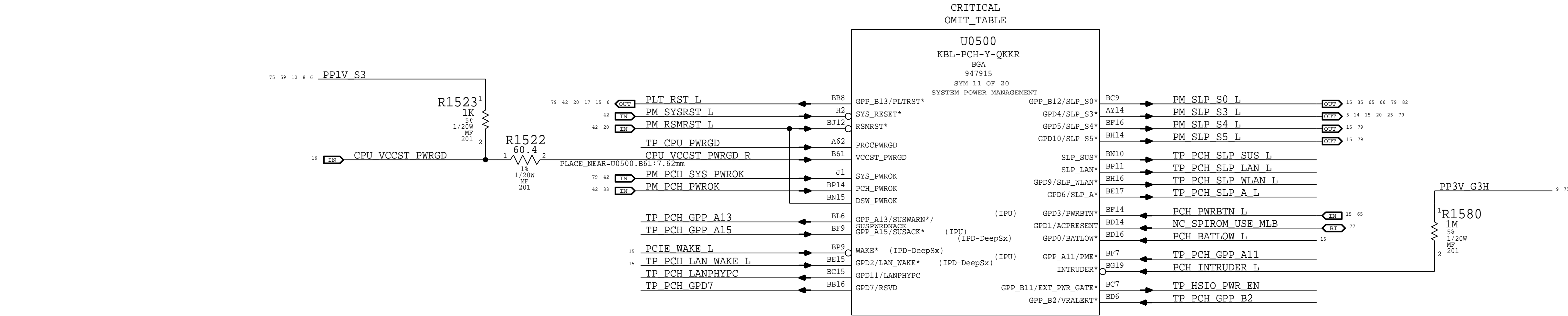
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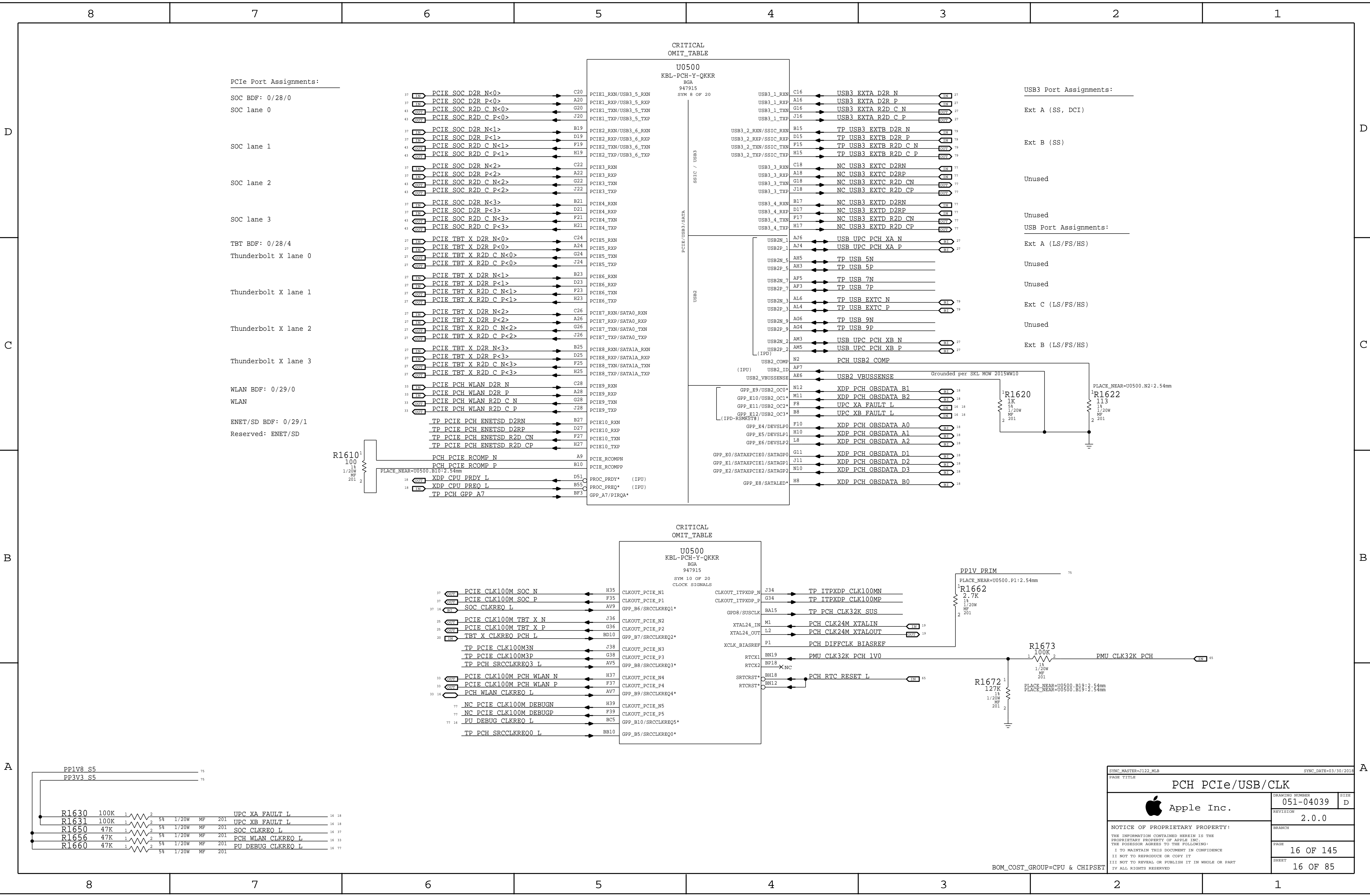
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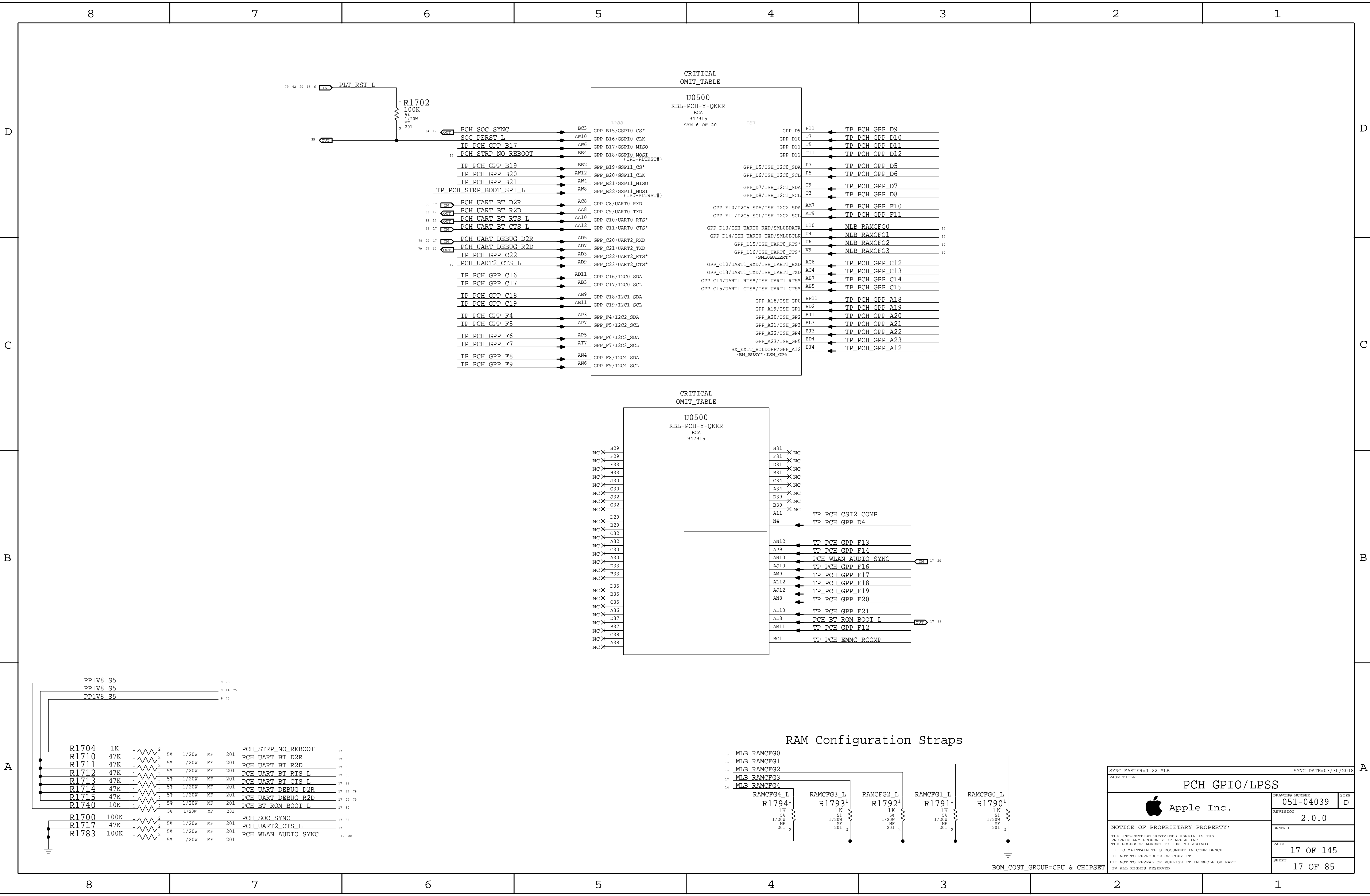
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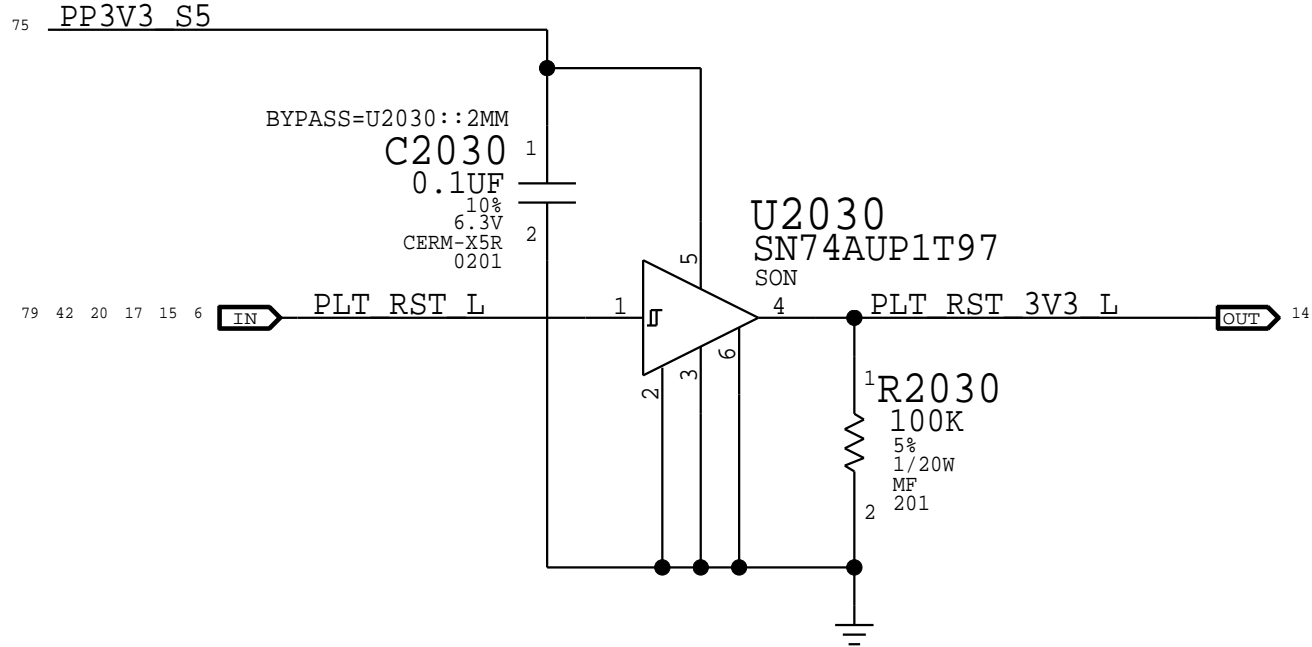




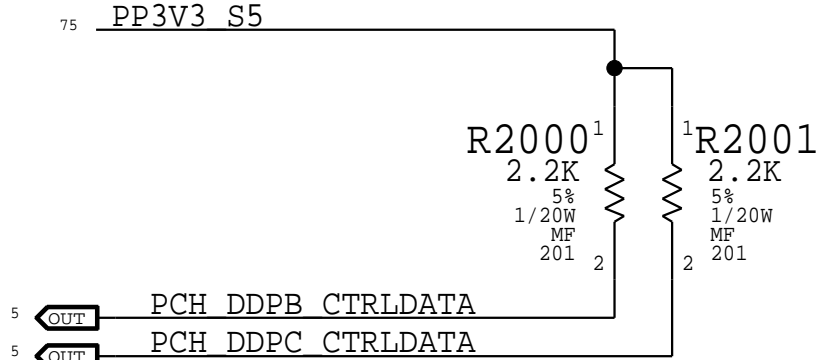




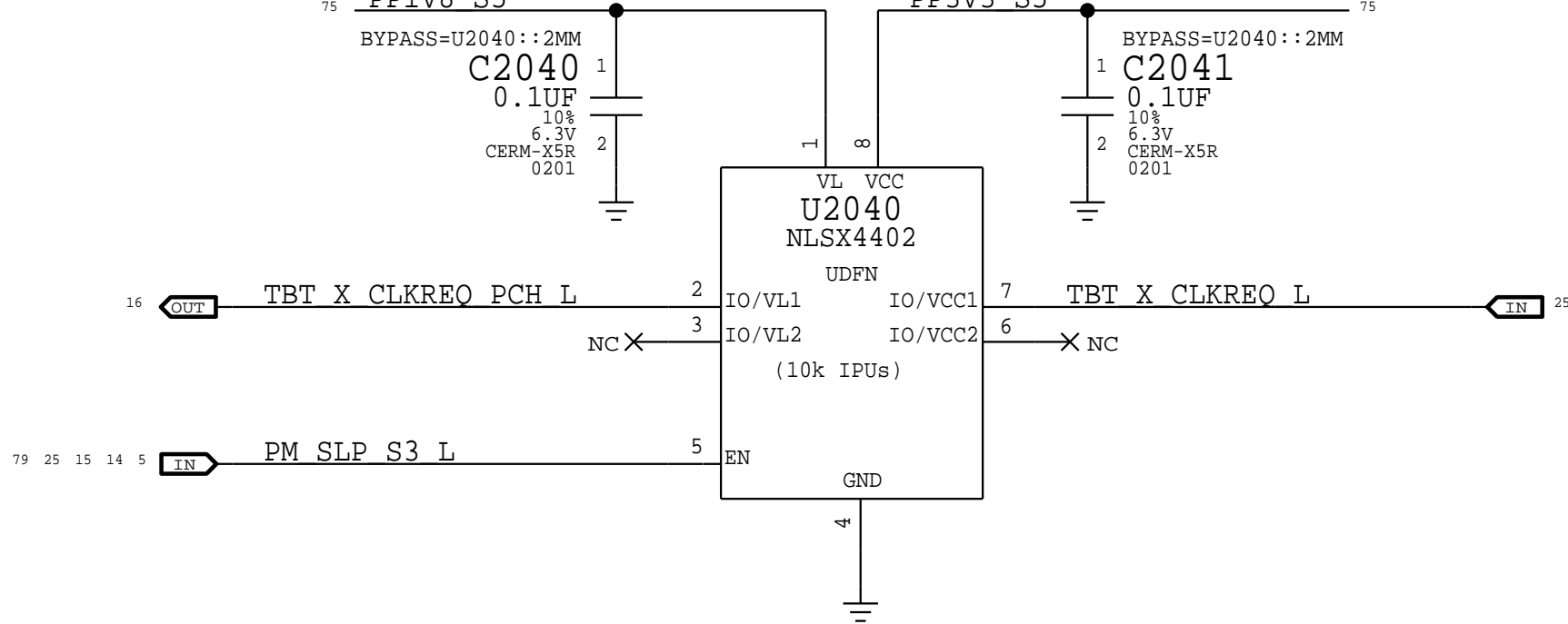
PLTRST# 3.3V Level Shifter



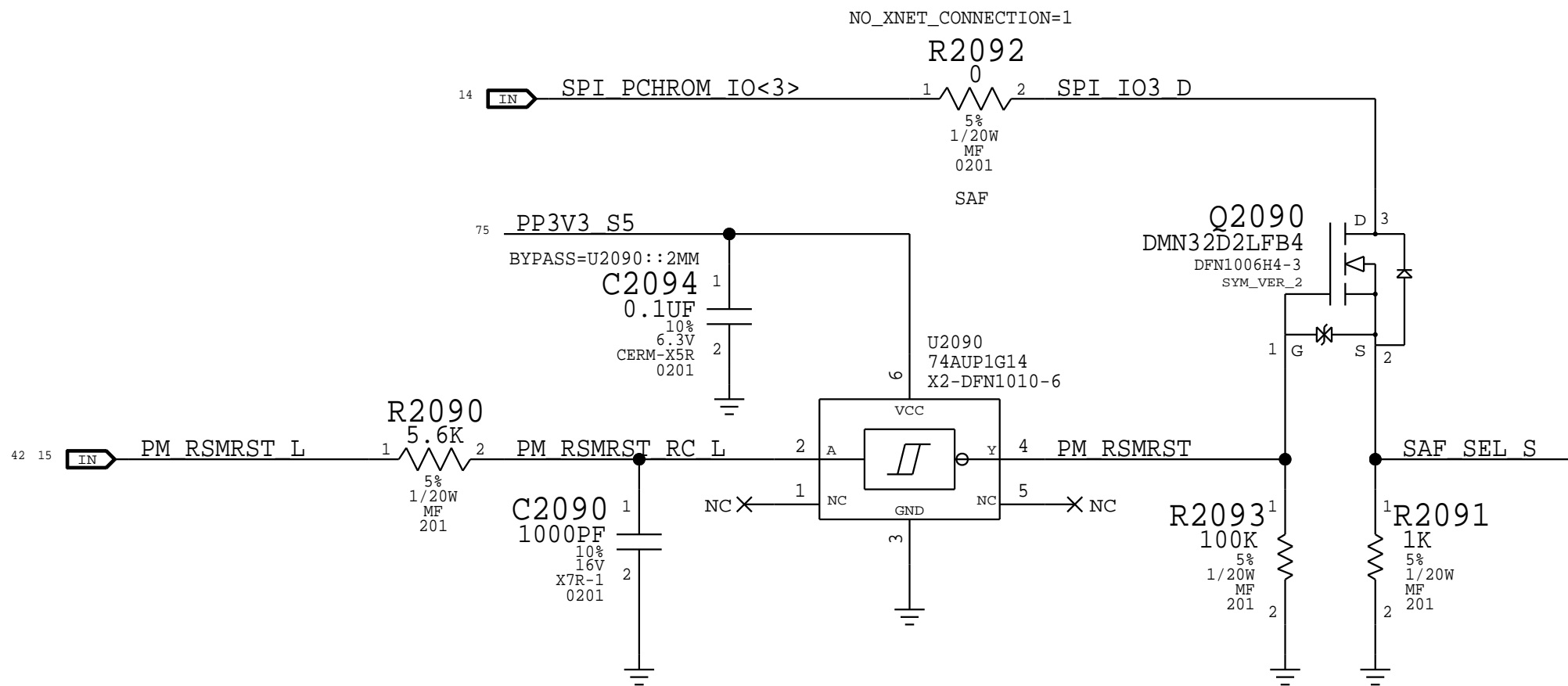
DP DDP Straps



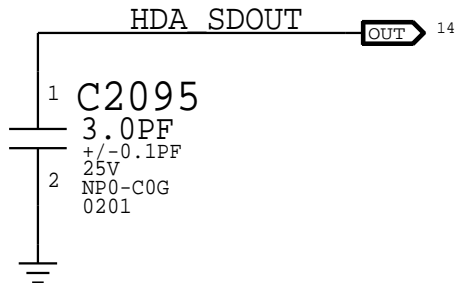
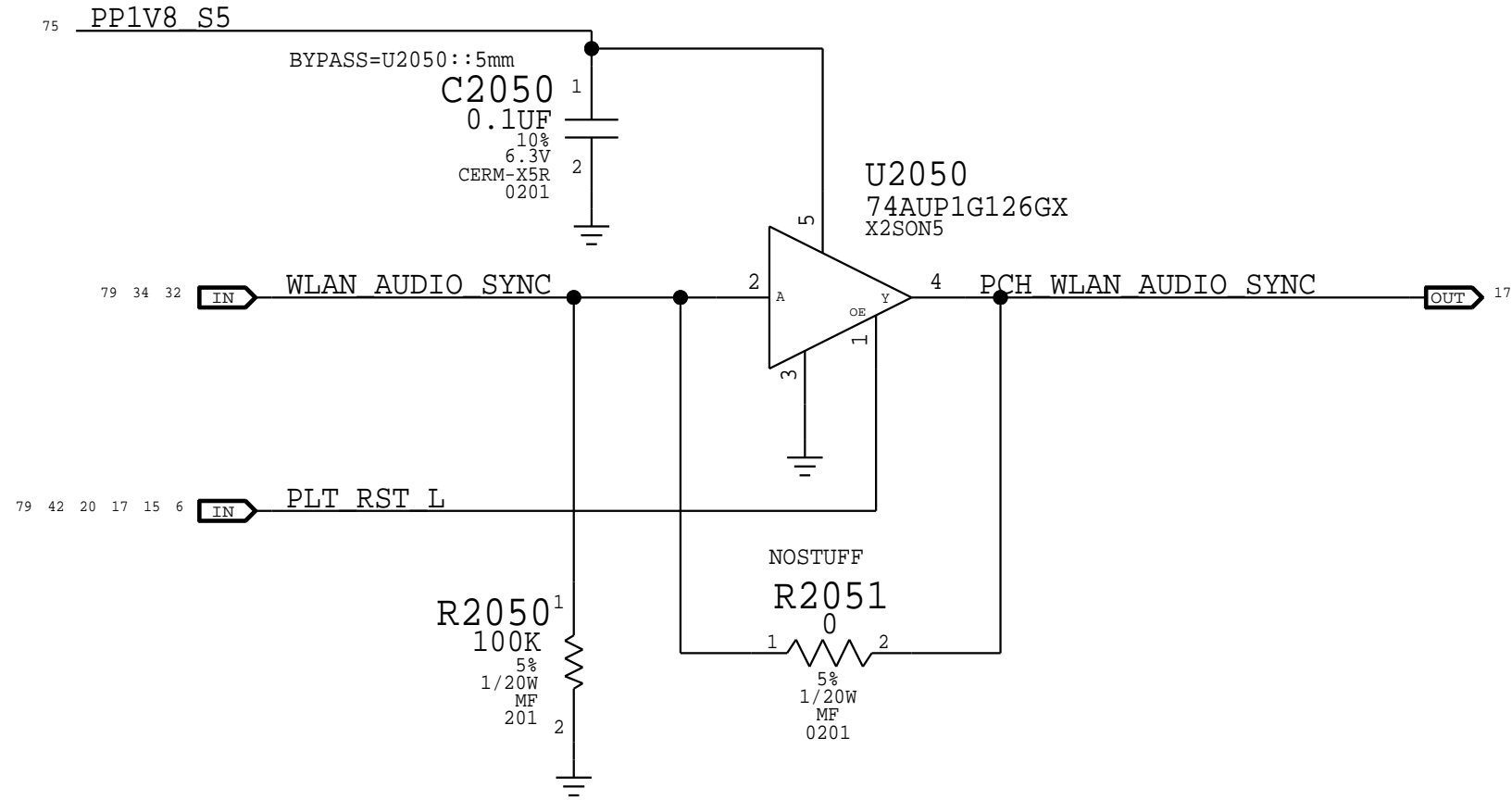
TBT X CLKREQ Level Shifter




SAF Selector

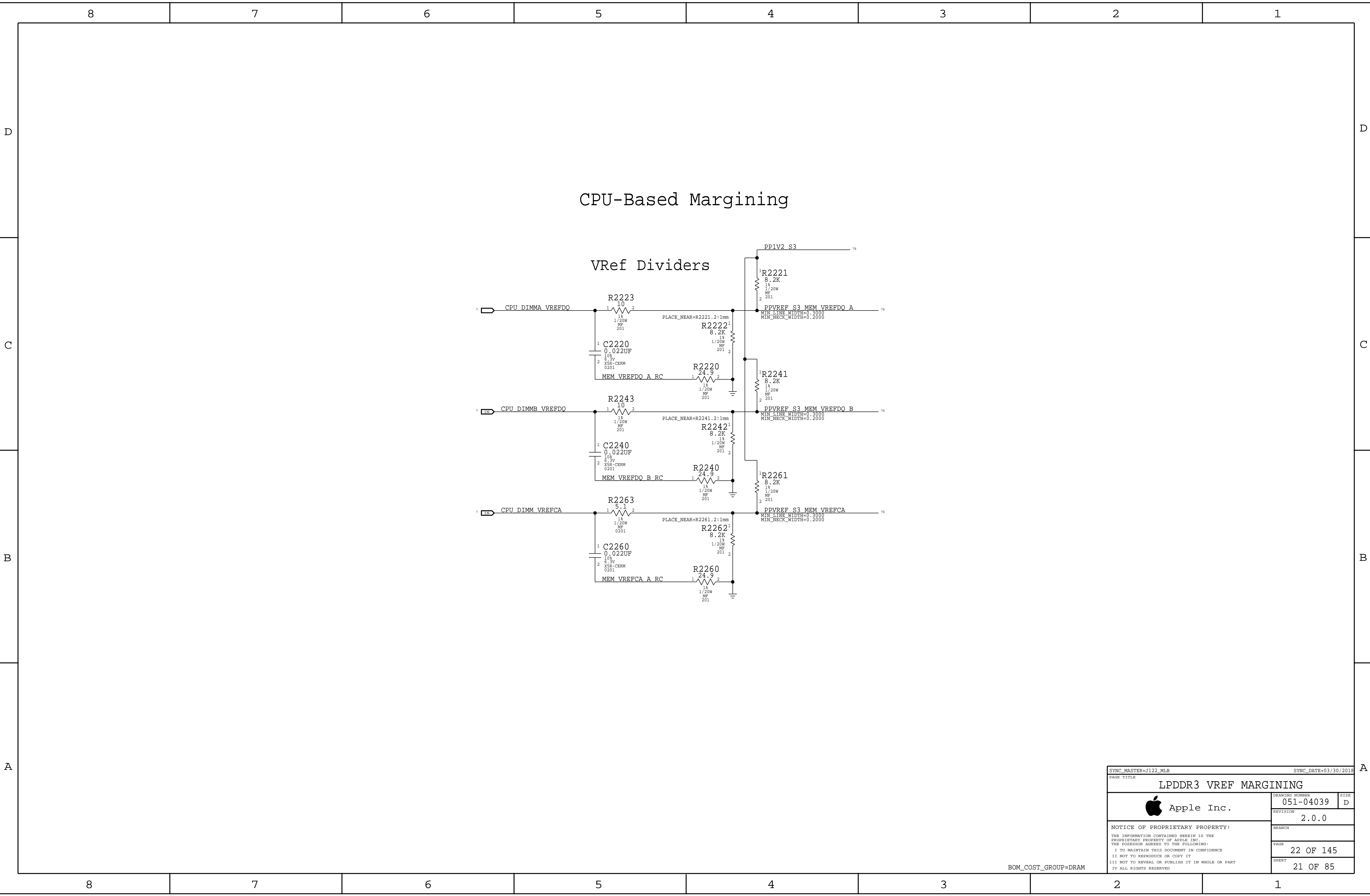


WLAN\_AUDIO\_SYNC Isolation



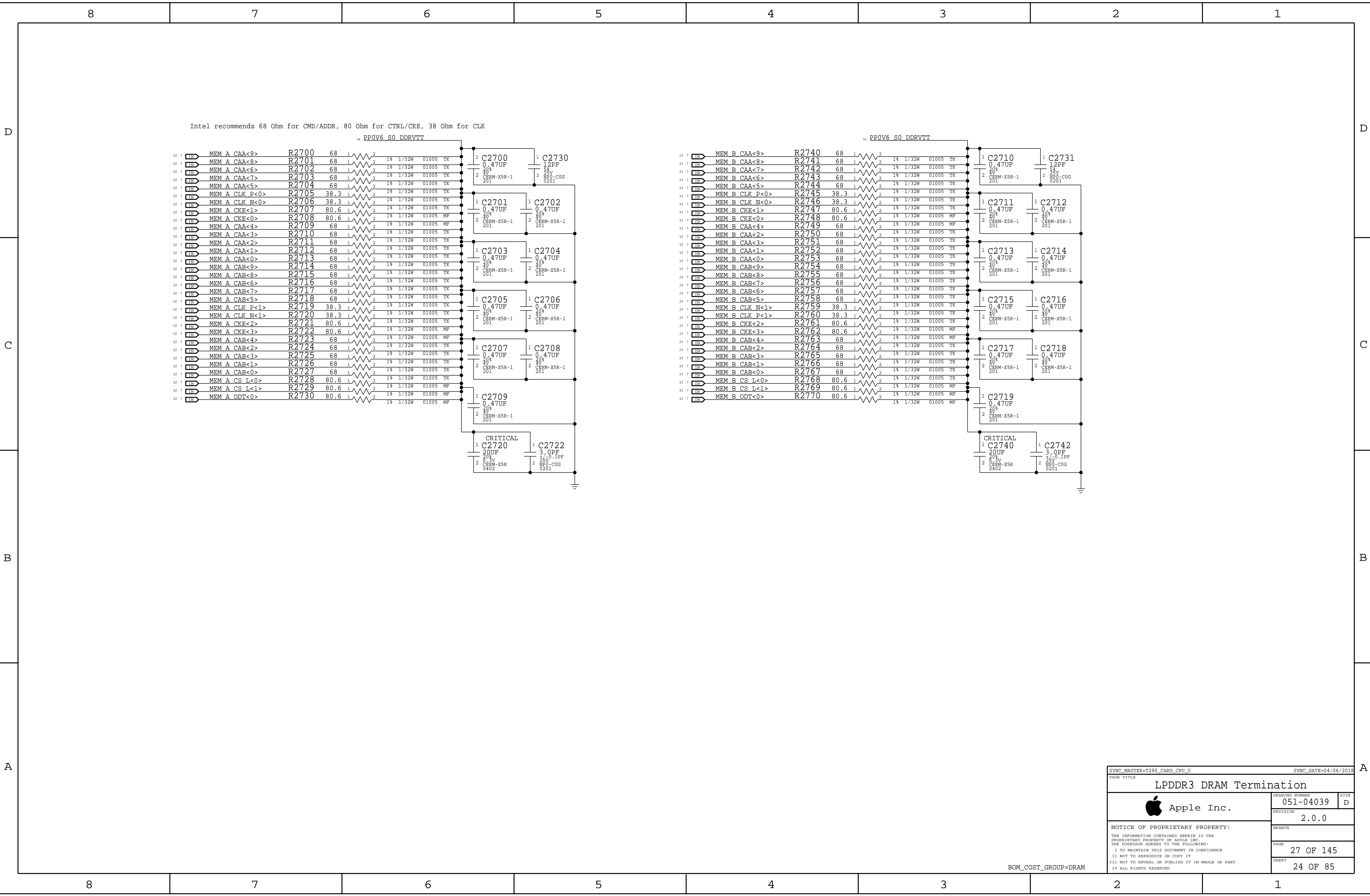
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		PAGE	20 OF 145
		SHEET	20 OF 85




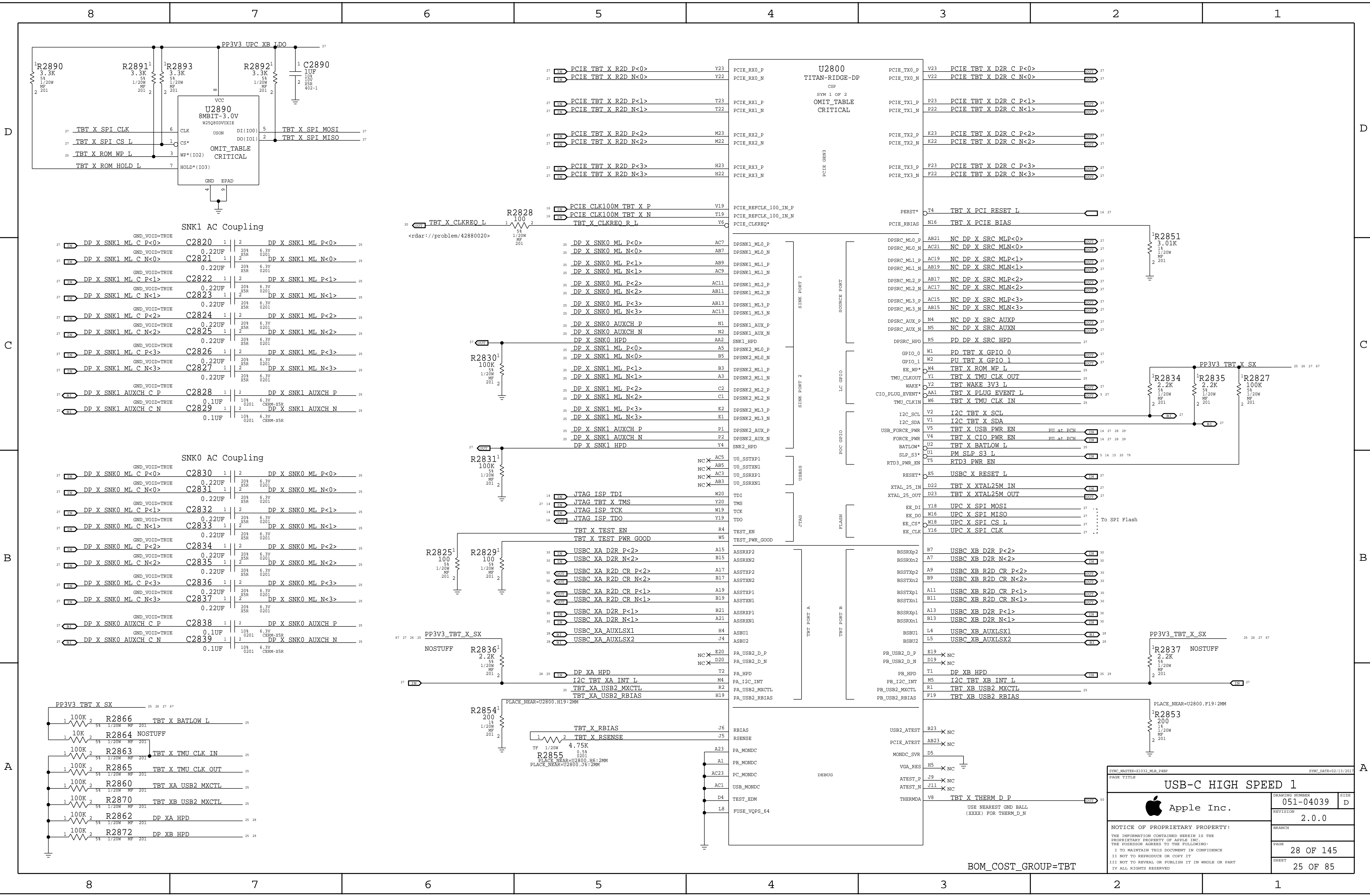








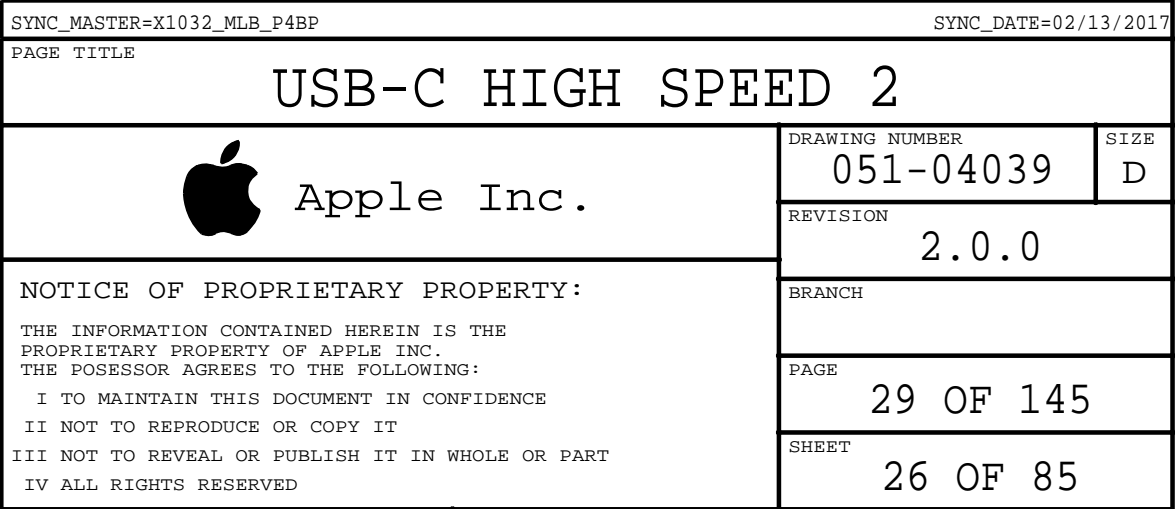
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	PAGE		27 OF 145
	SHEET		24 OF 85



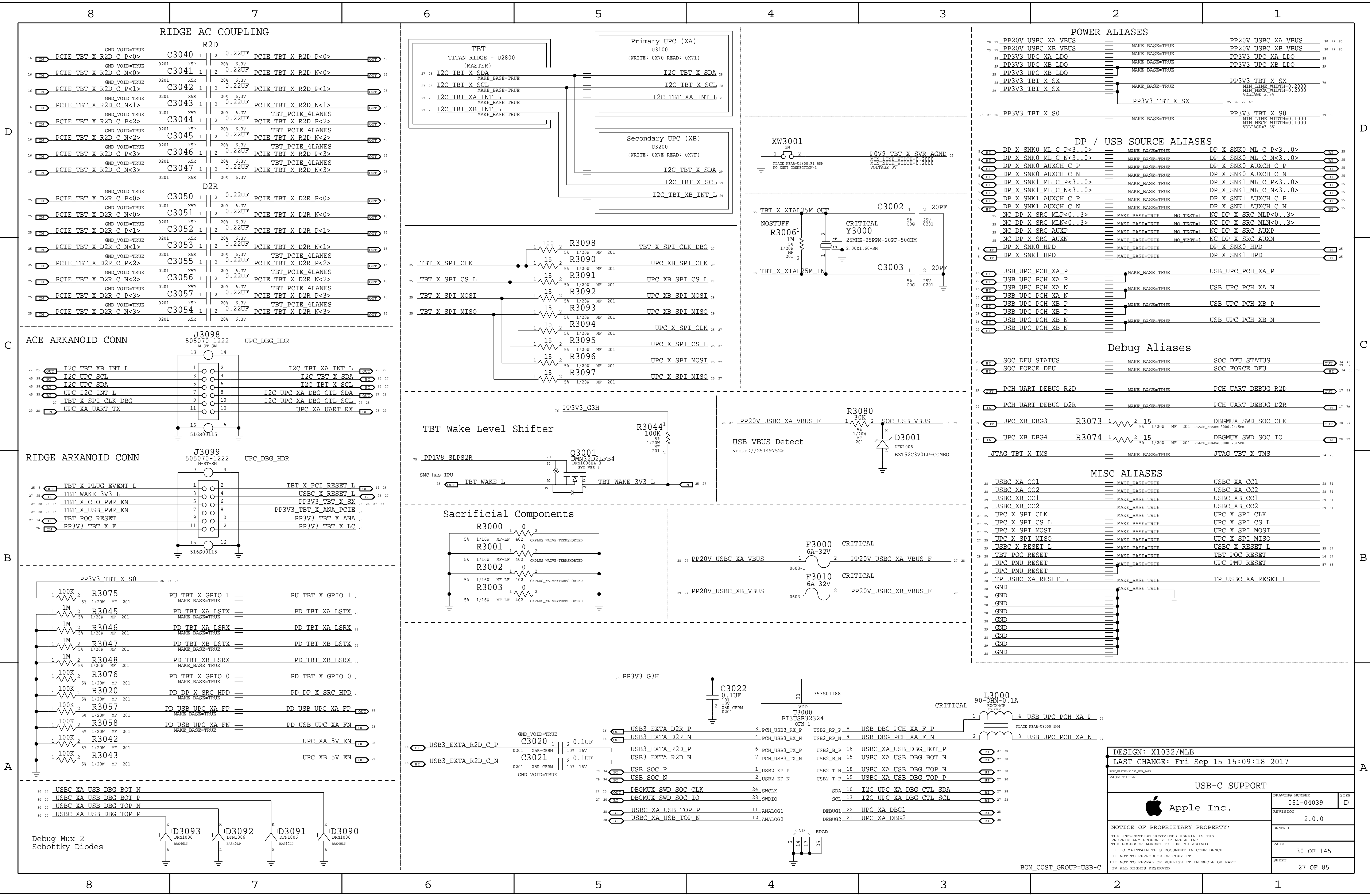
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PAGE			28 OF 145					
SHEET			25 OF 85					

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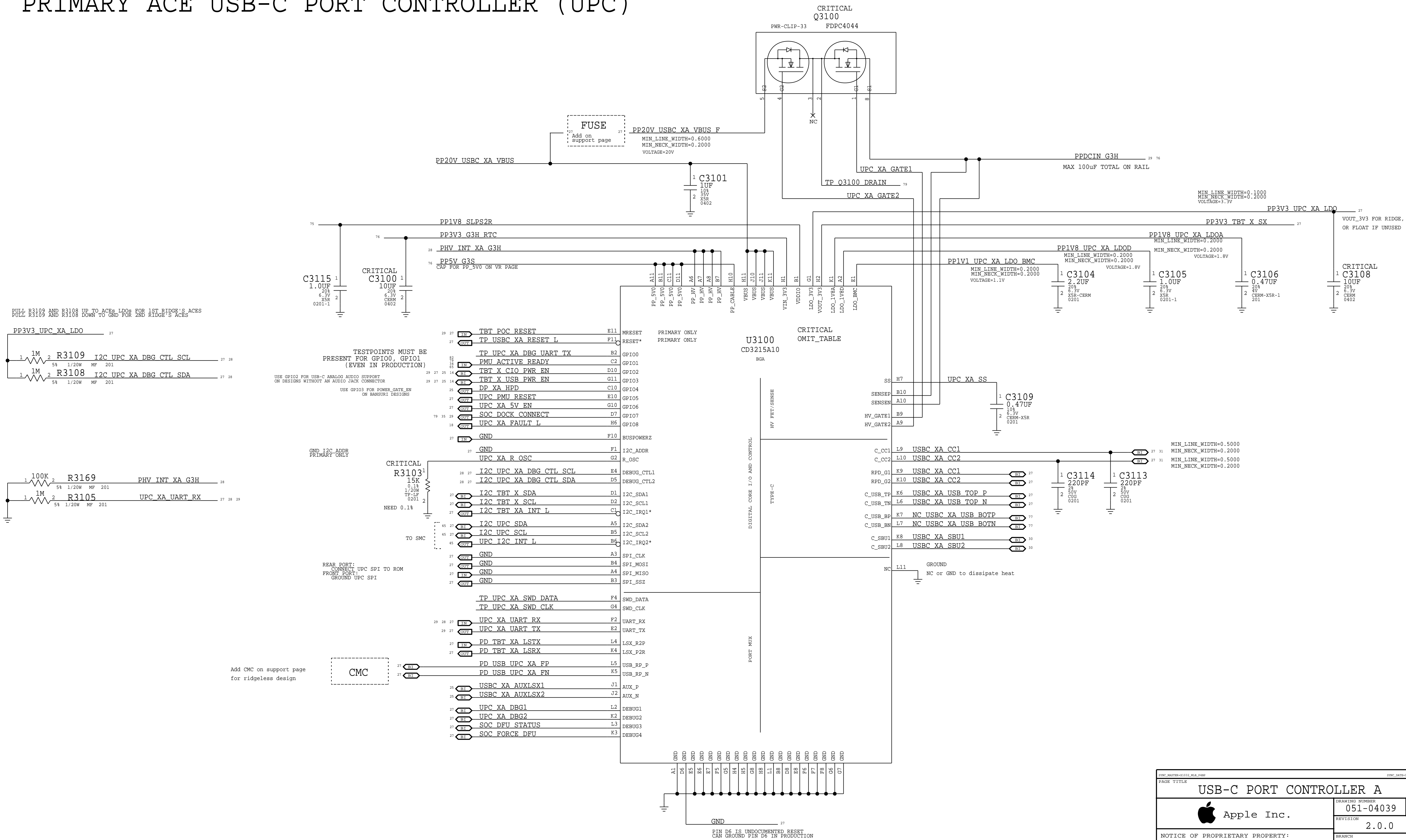








PRIMARY ACE USB-C PORT CONTROLLER (UPC)



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SHEET		28 OF 85

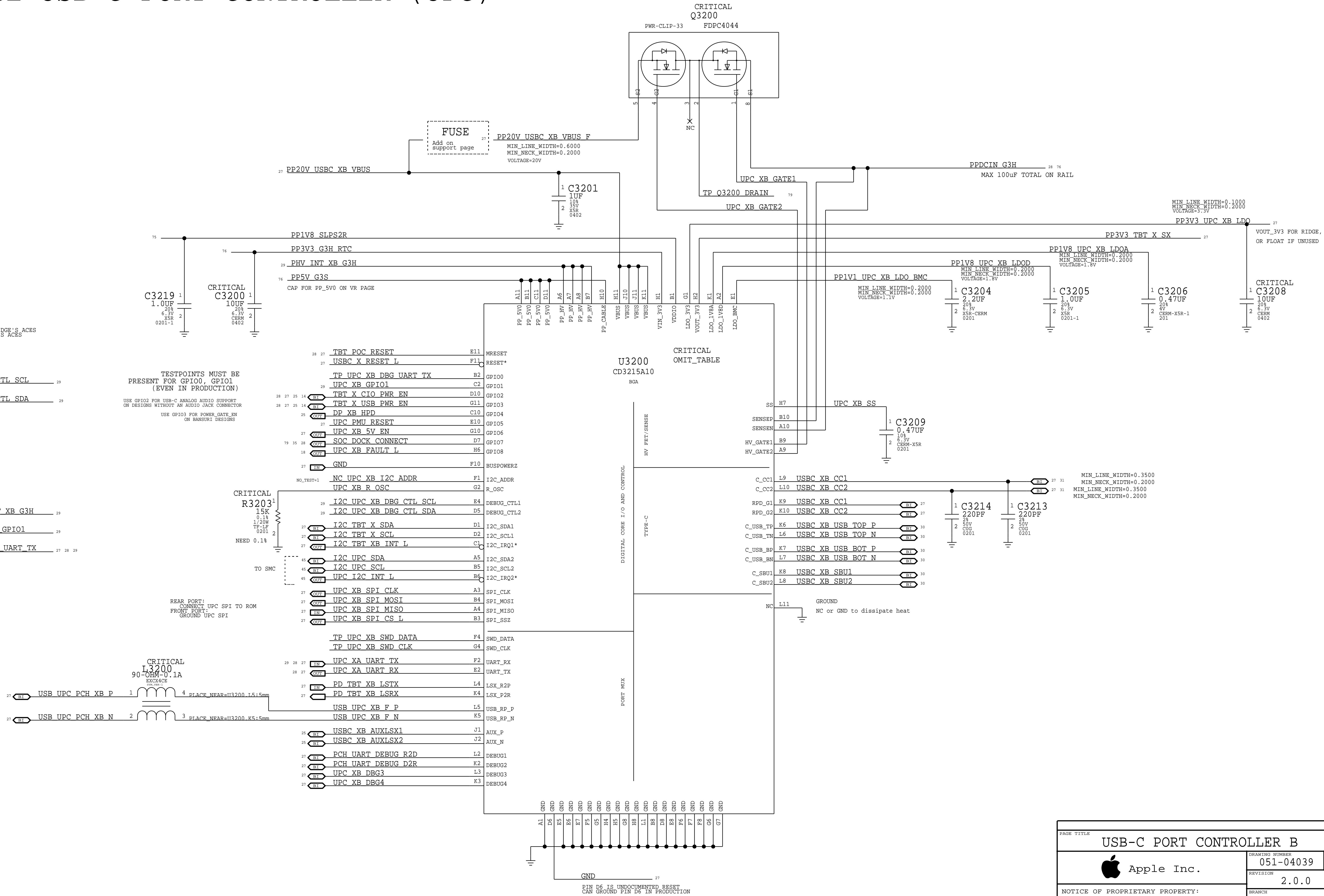
SECONDARY ACE USB-C PORT CONTROLLER (UPC)

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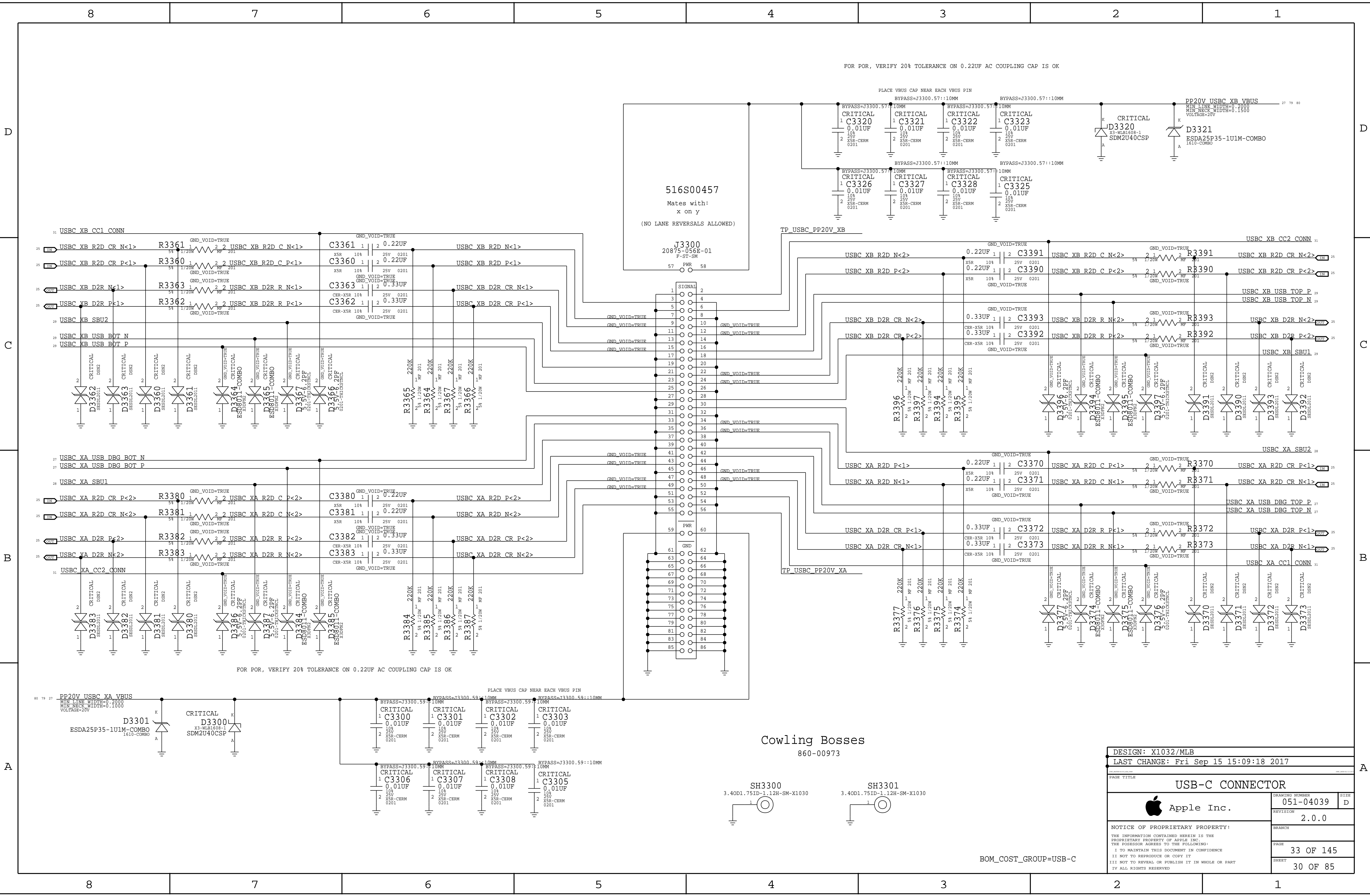
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	PAGE	32 OF 145
	SHEET	29 OF 85

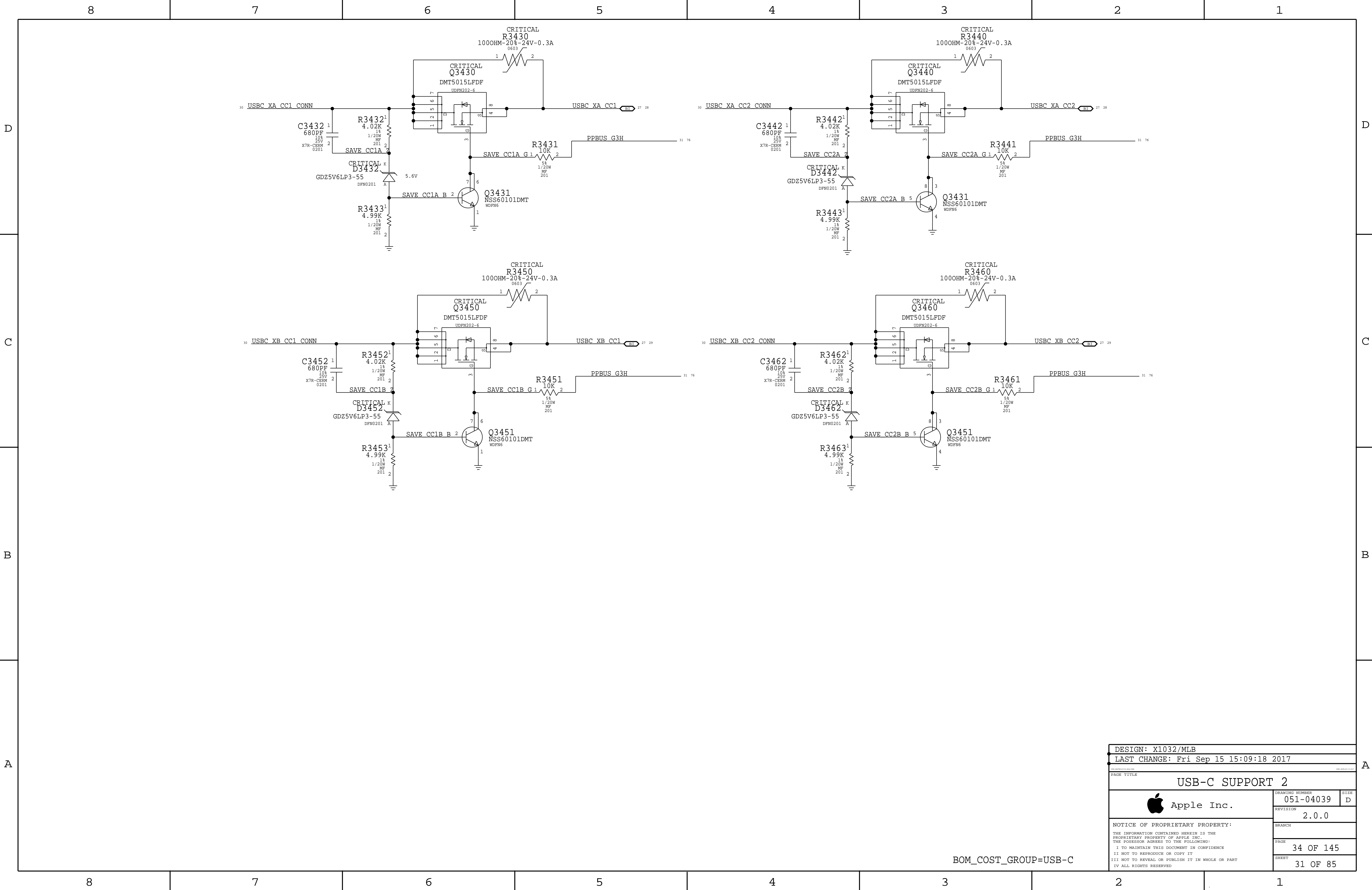
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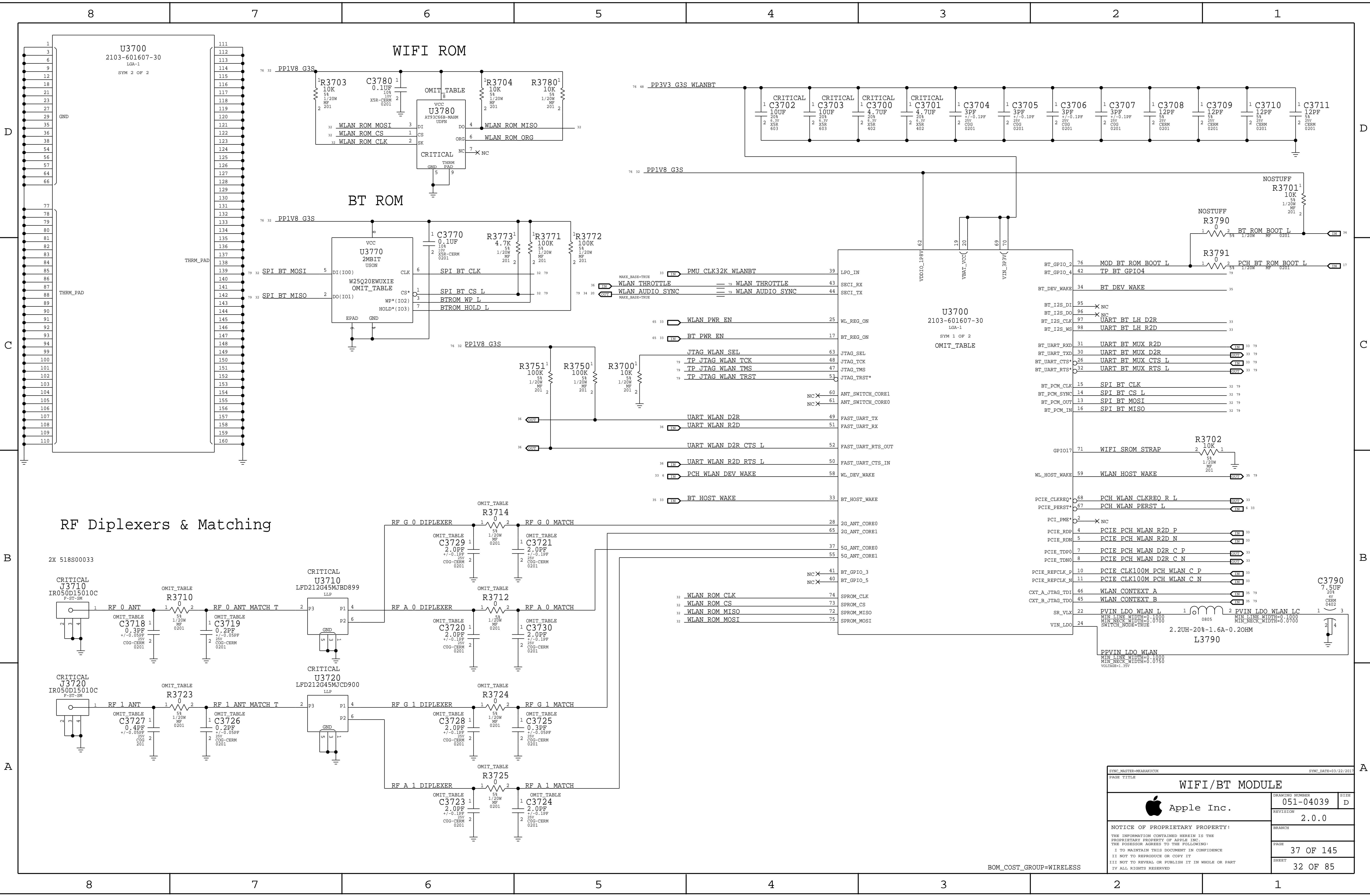
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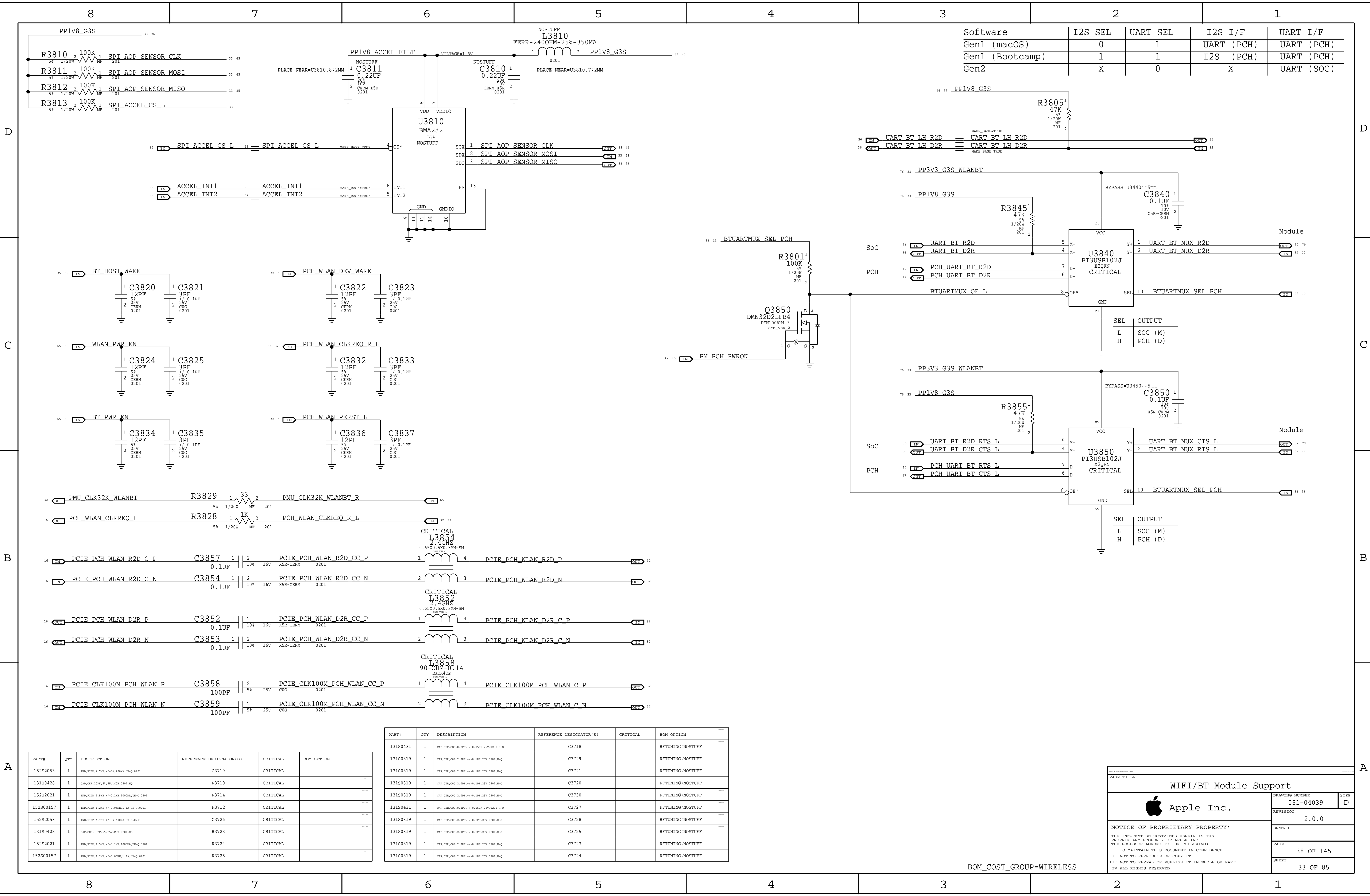
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	PAGE	34 OF 145
	SHEET	31 OF 85

BOM\_COST\_GROUP=USB-C



WIFI/BT MODULE		
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	REVISION	2.0.0
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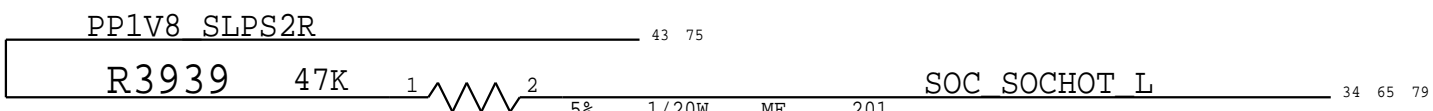
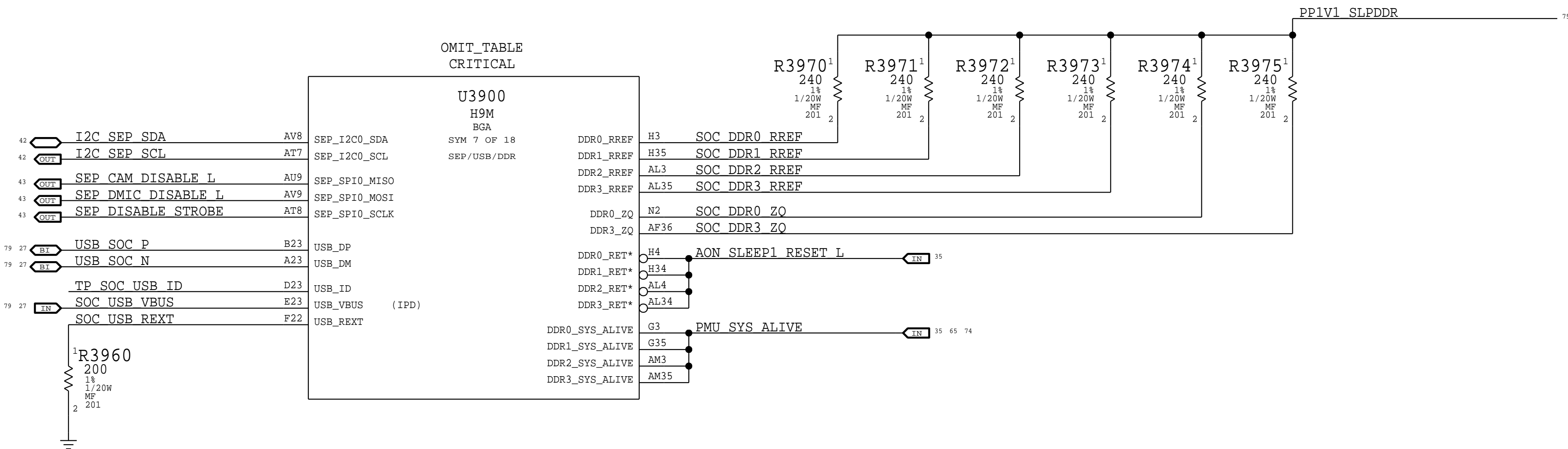
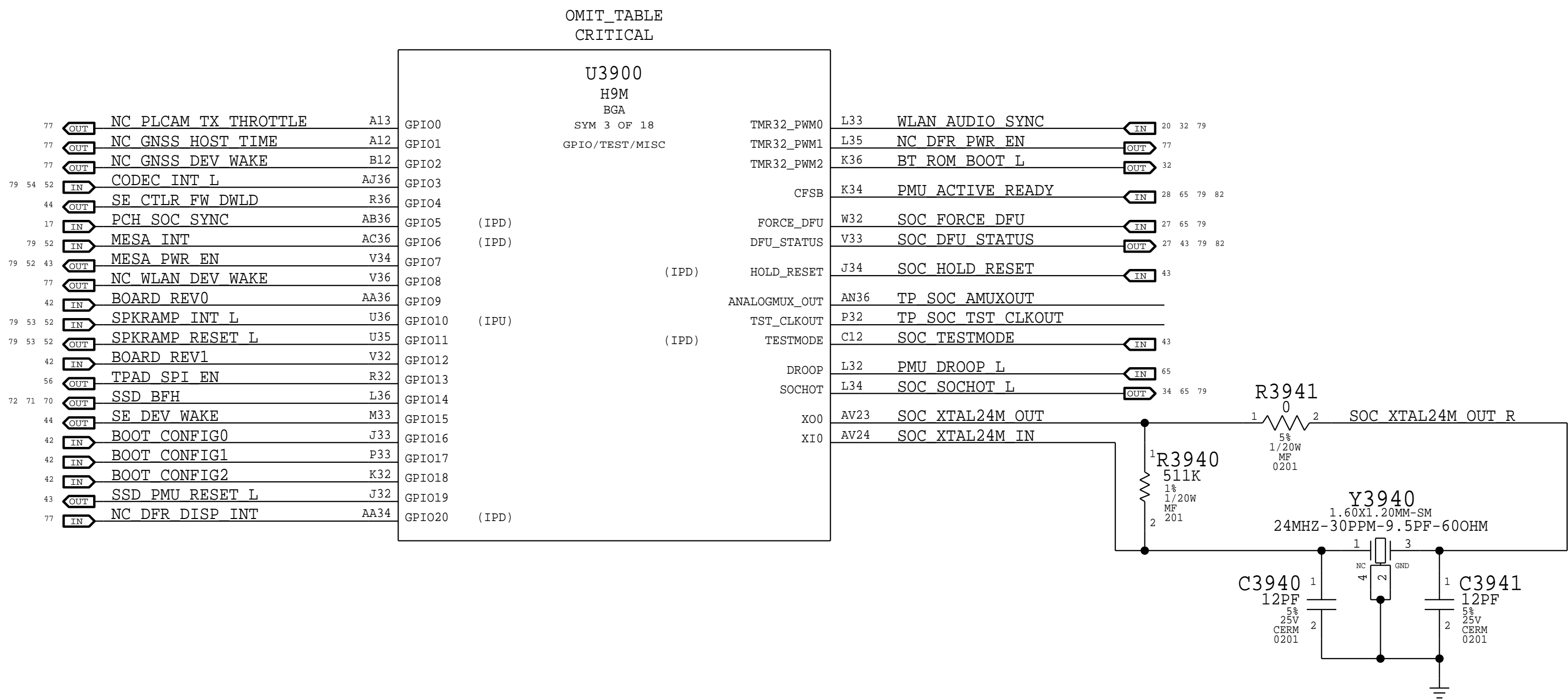
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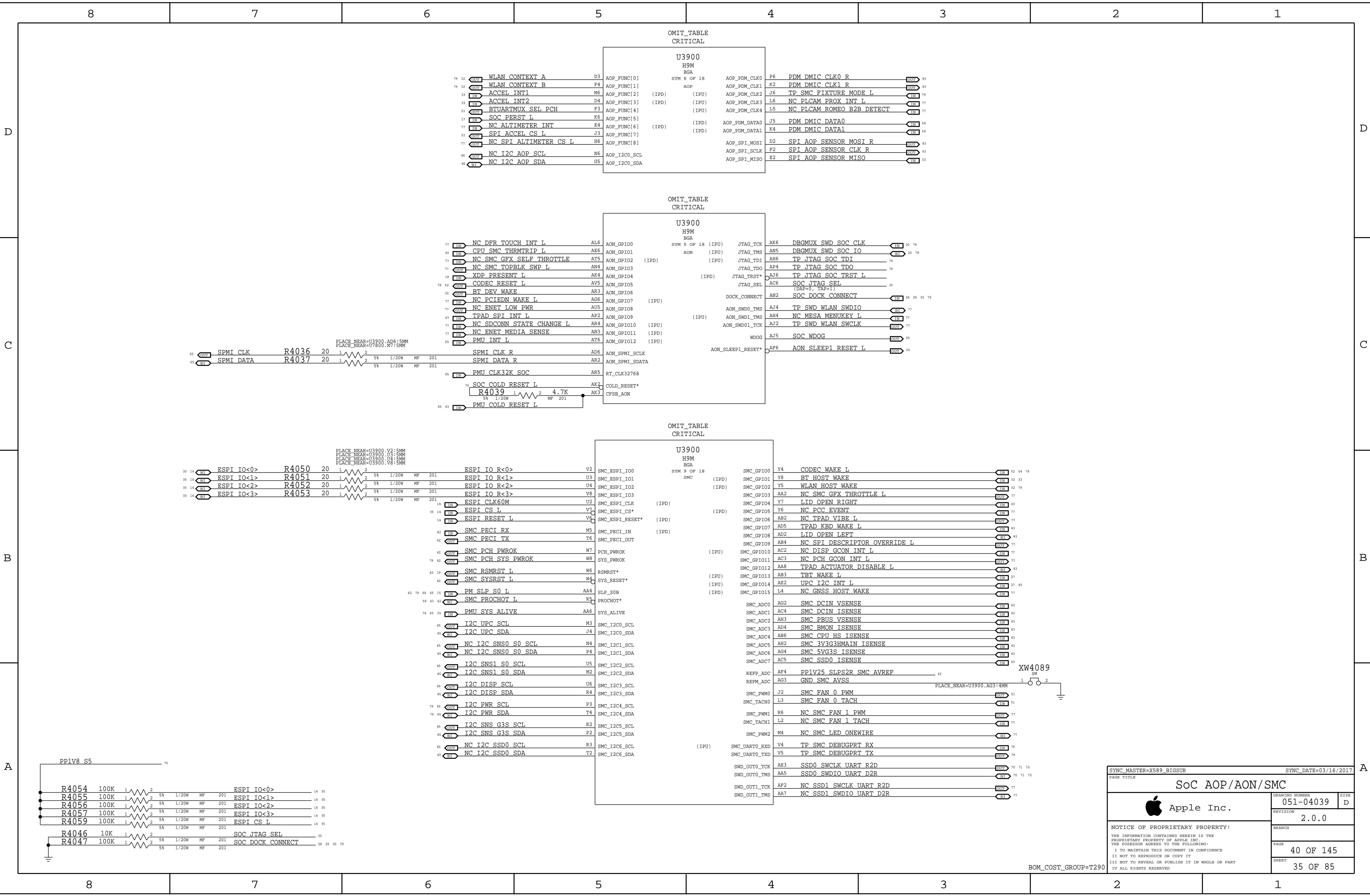
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Note 1) IPU represents SW configured state, not HW default



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SoC GPIO/SEP/USB/DDR/Test			
 Apple Inc.	DRAWING NUMBER	051-04039	SIZE
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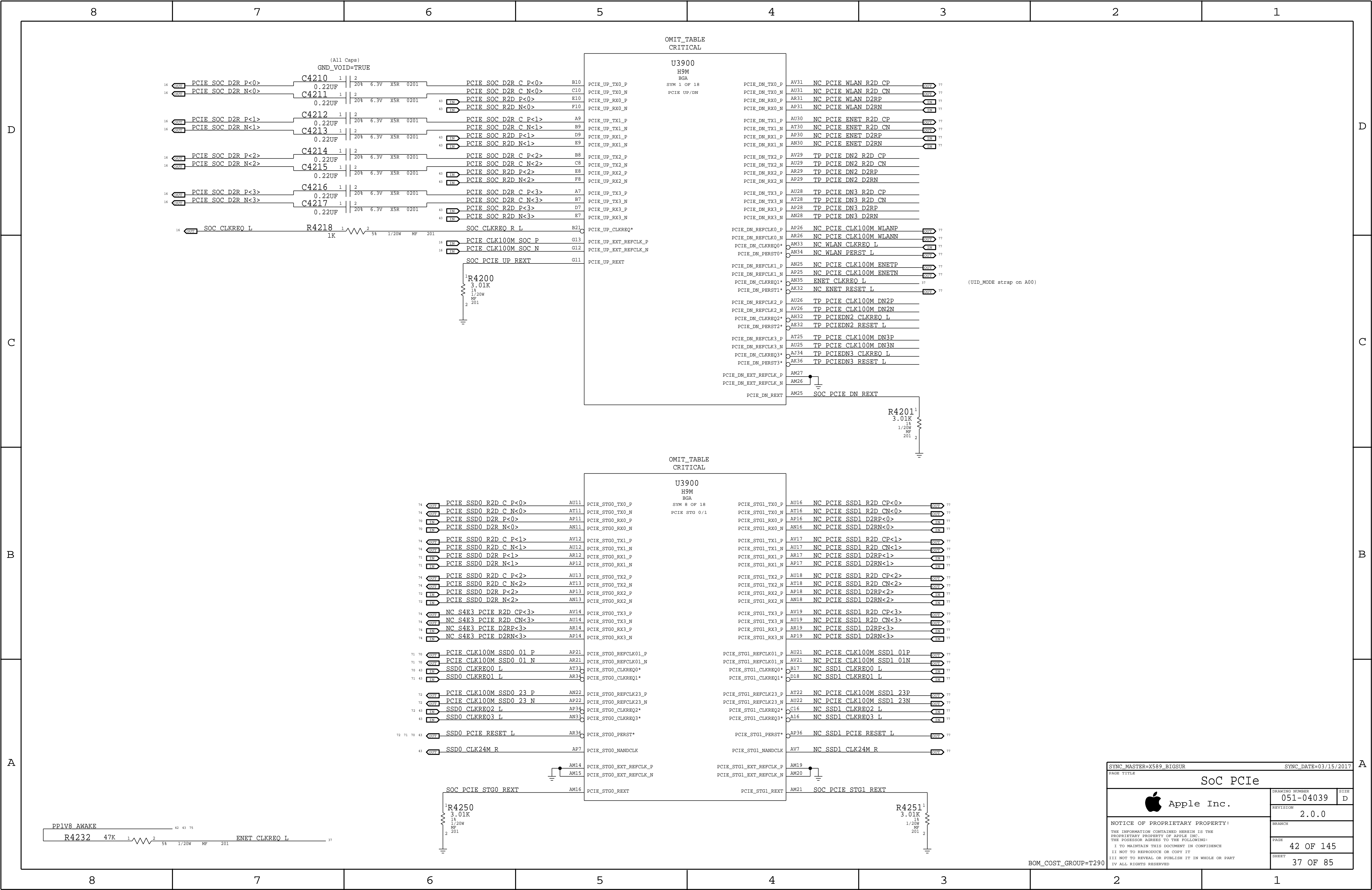
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SHEET		35 OF 85	

BOM\_COST\_GROUP=T290



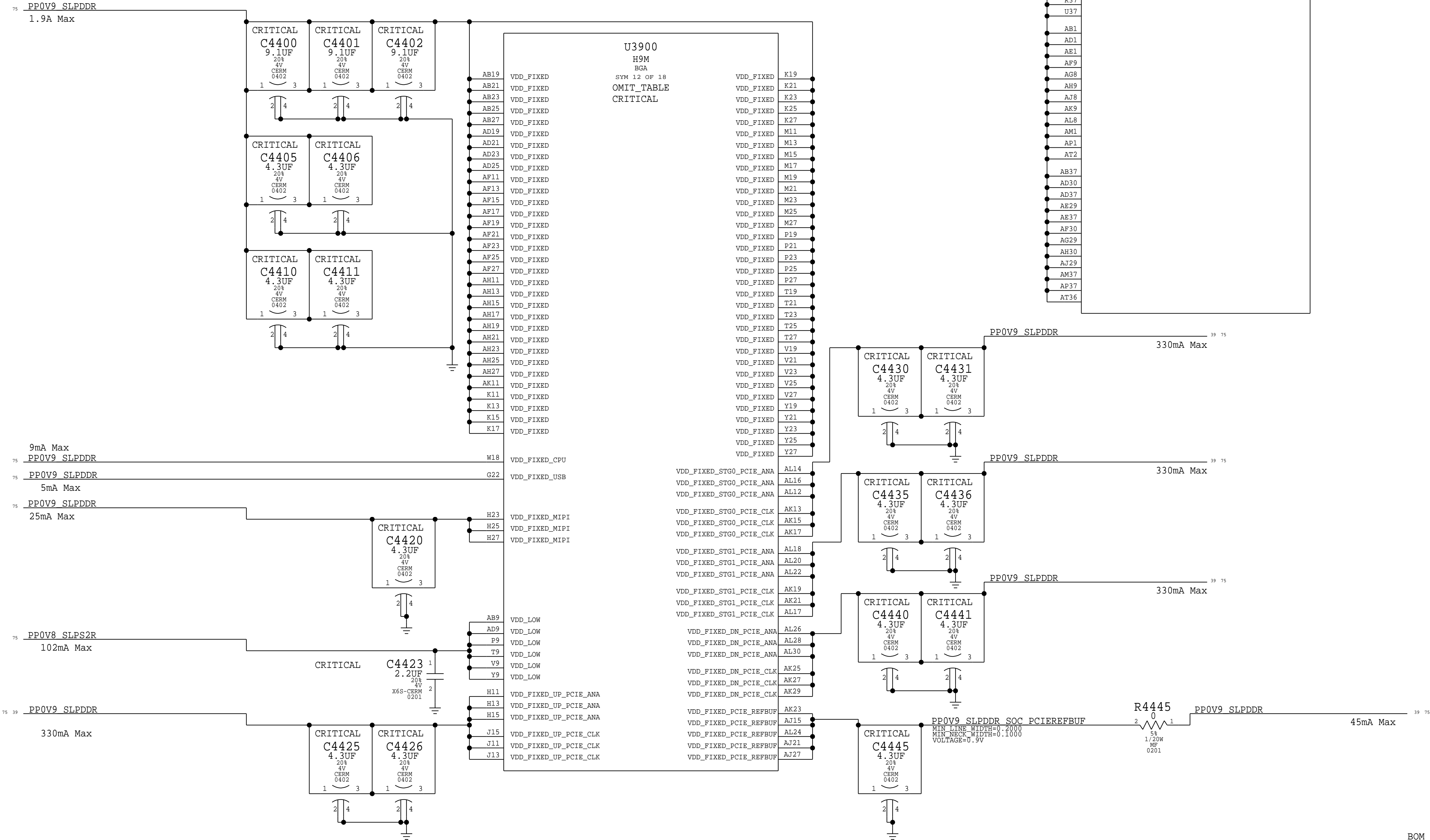









Current estimates @ 105C & 2GB from Gibraltar Power Specification Rev 0.5.3



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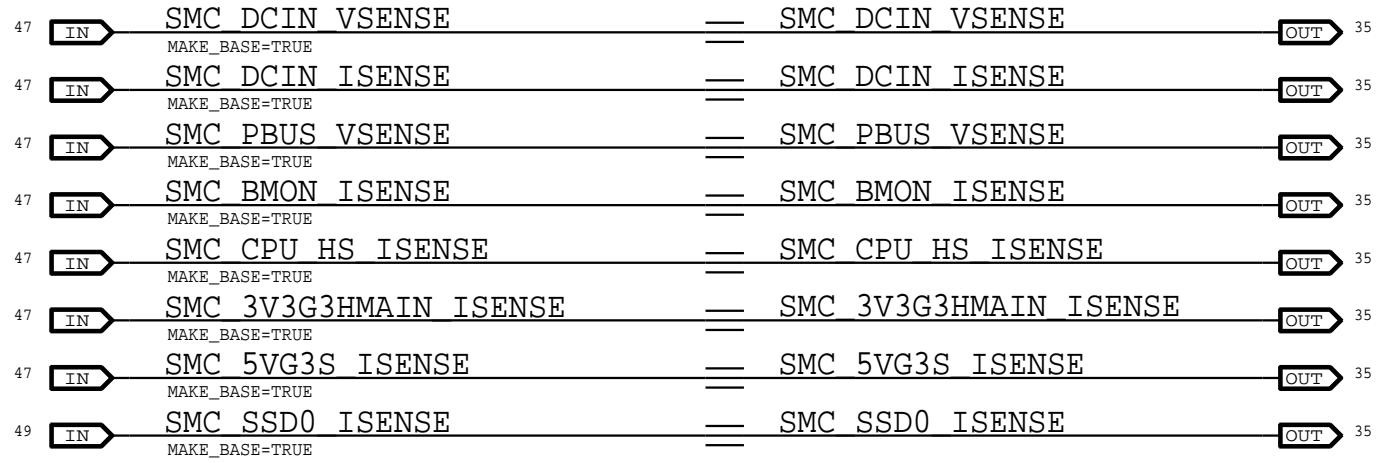
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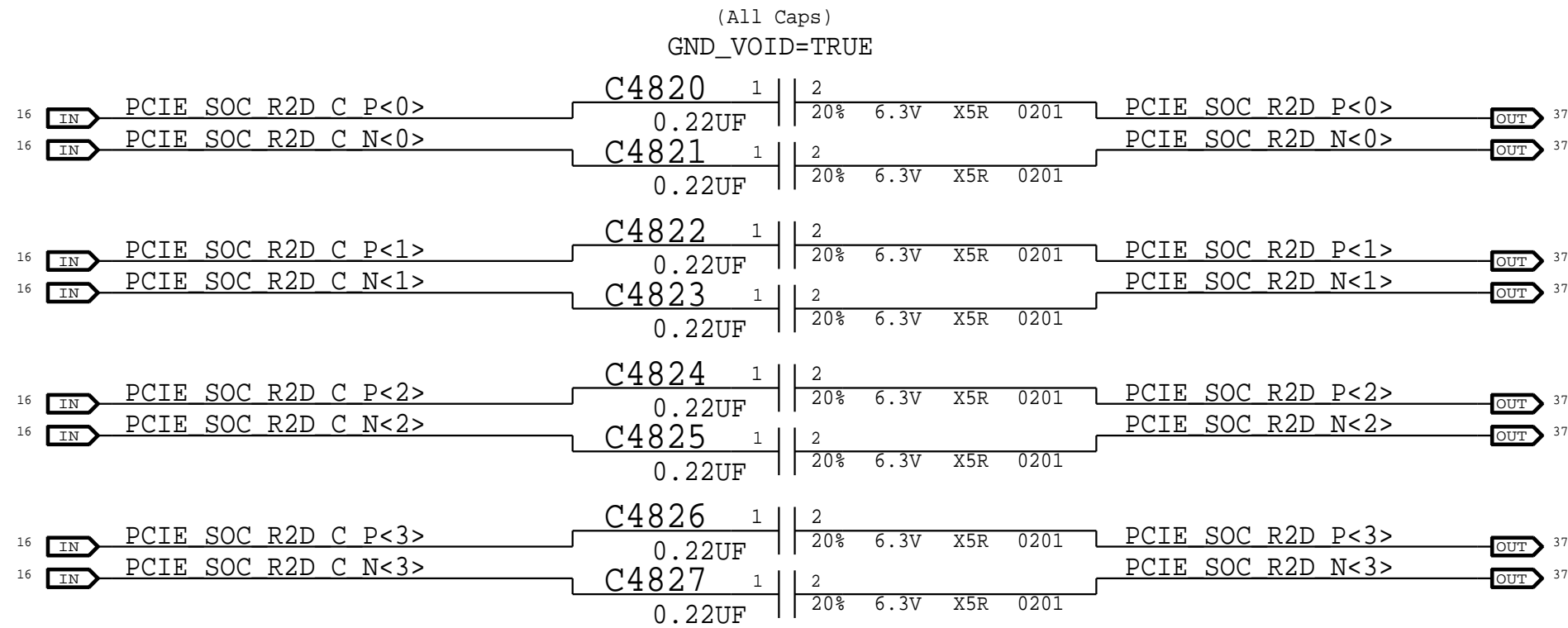




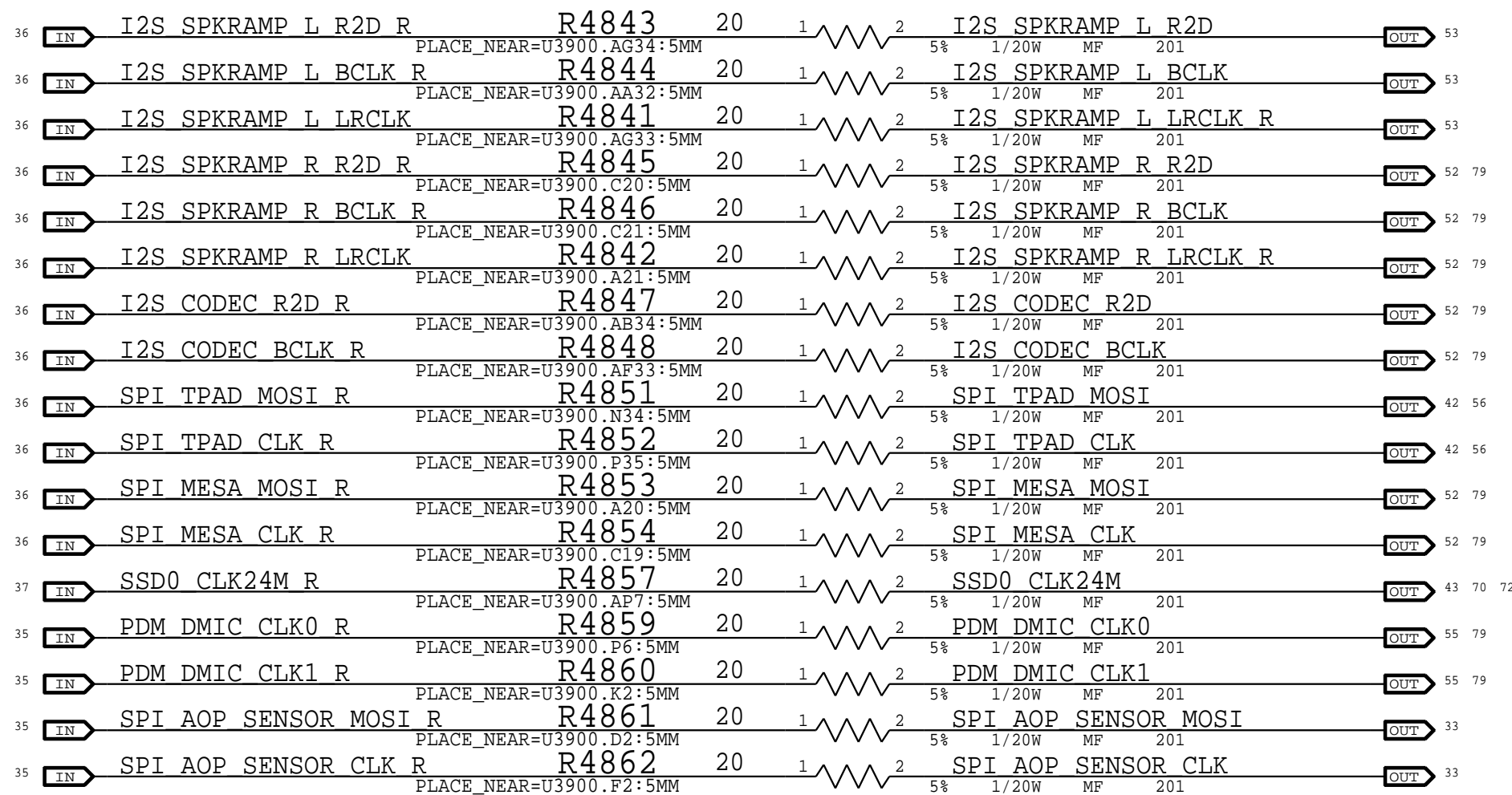
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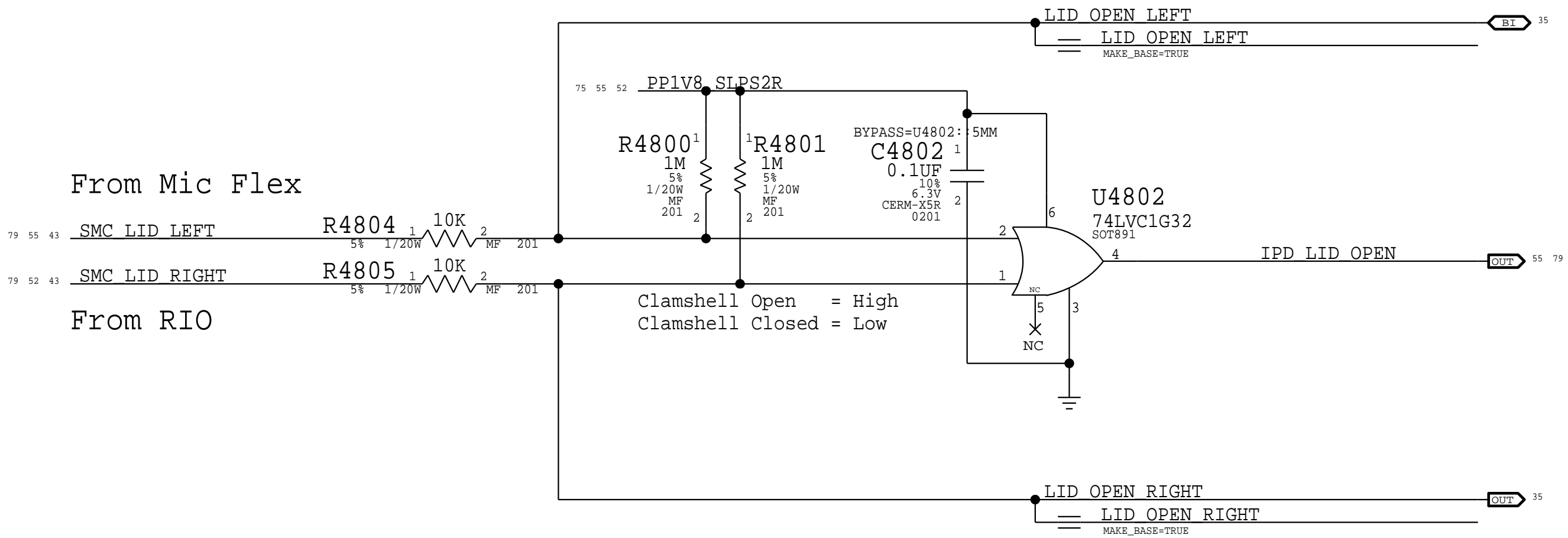
PCIe Up R2D AC Caps



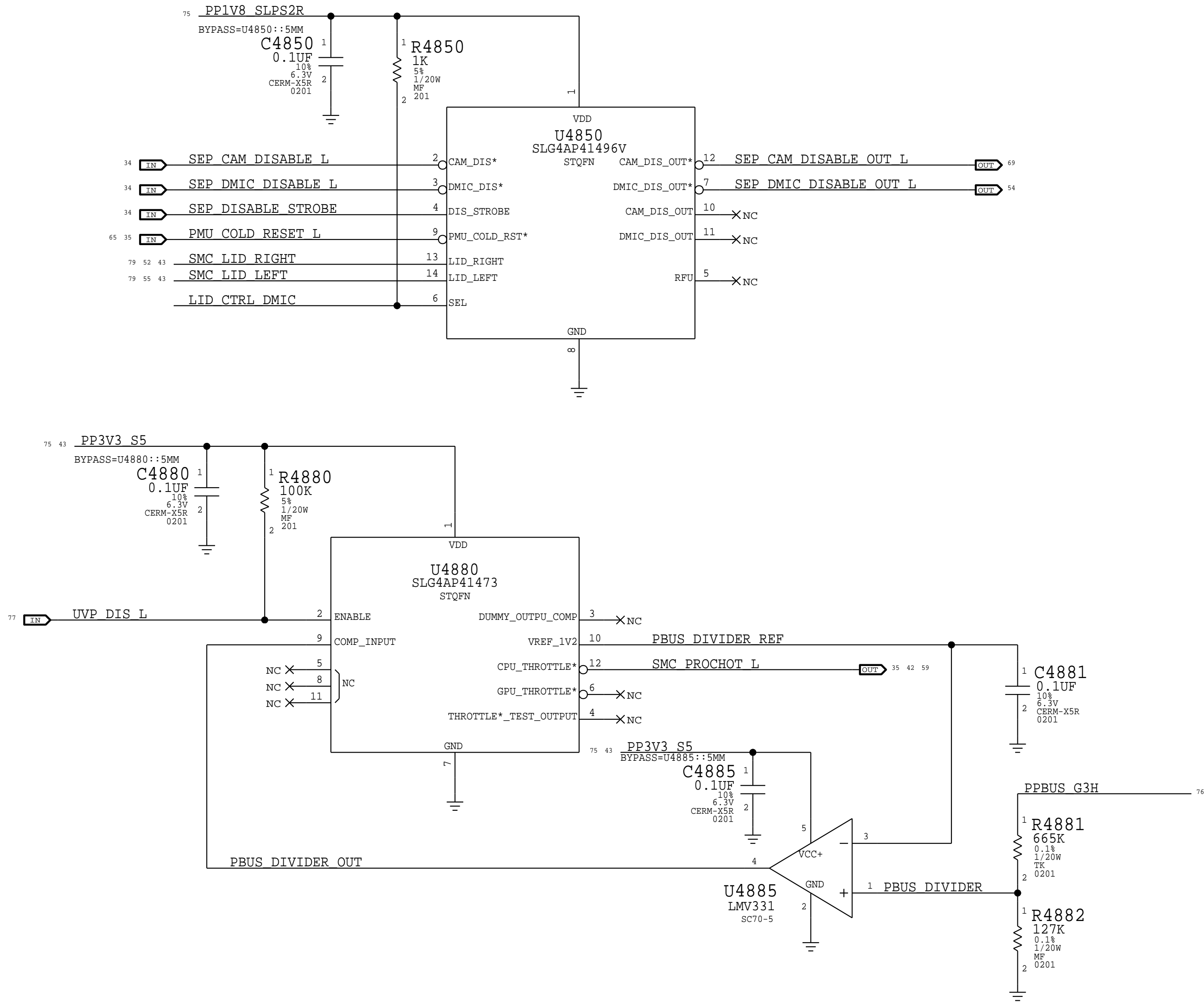
GPIO Source Termination



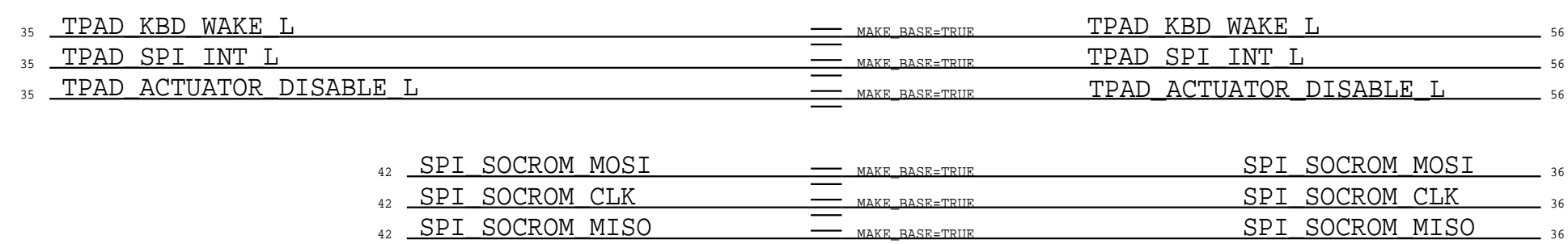
Lid Detect Logic



Secure Disable



Overloaded GPIOs



SYNC\_MASTER=X589\_BIGSUR

SYNC\_DATE=02/13/2017

SoC Project Support

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PAGE

48 OF 145

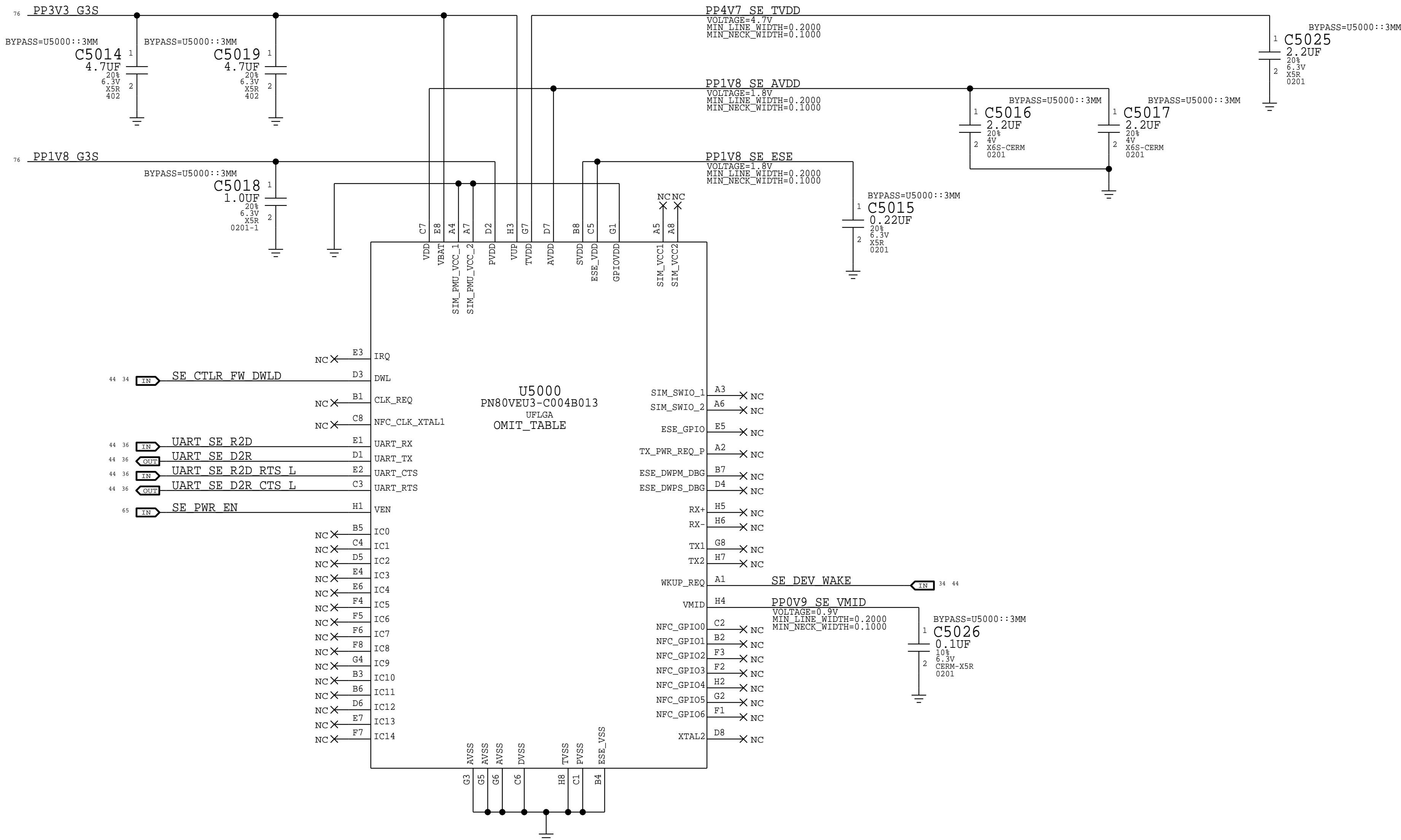
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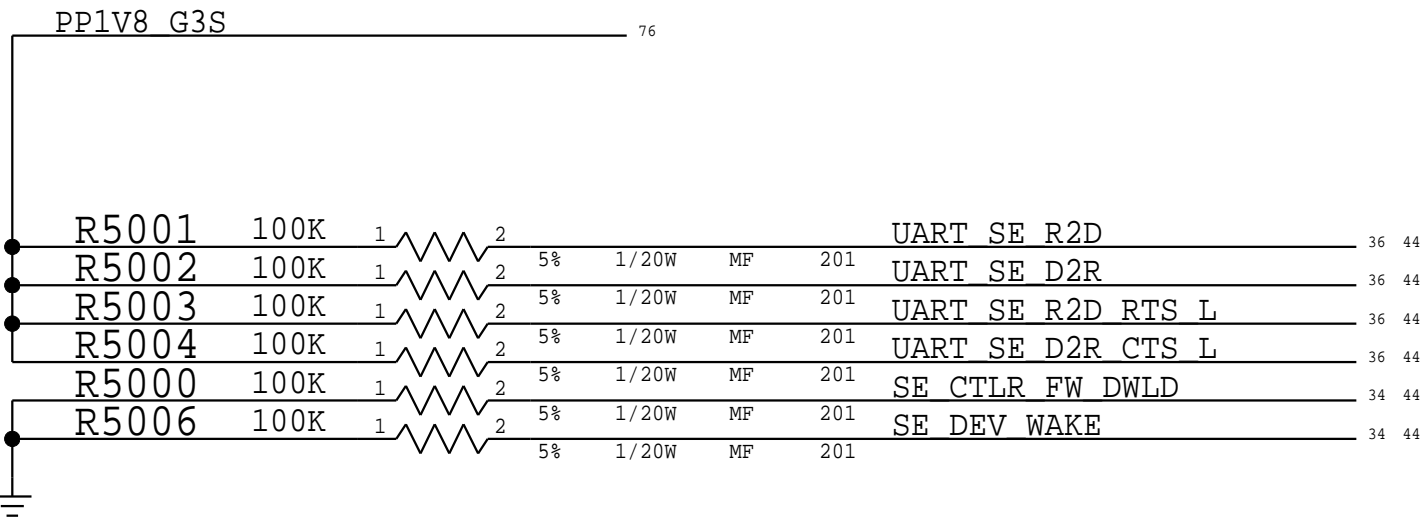
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


STOCKHOLM 2017



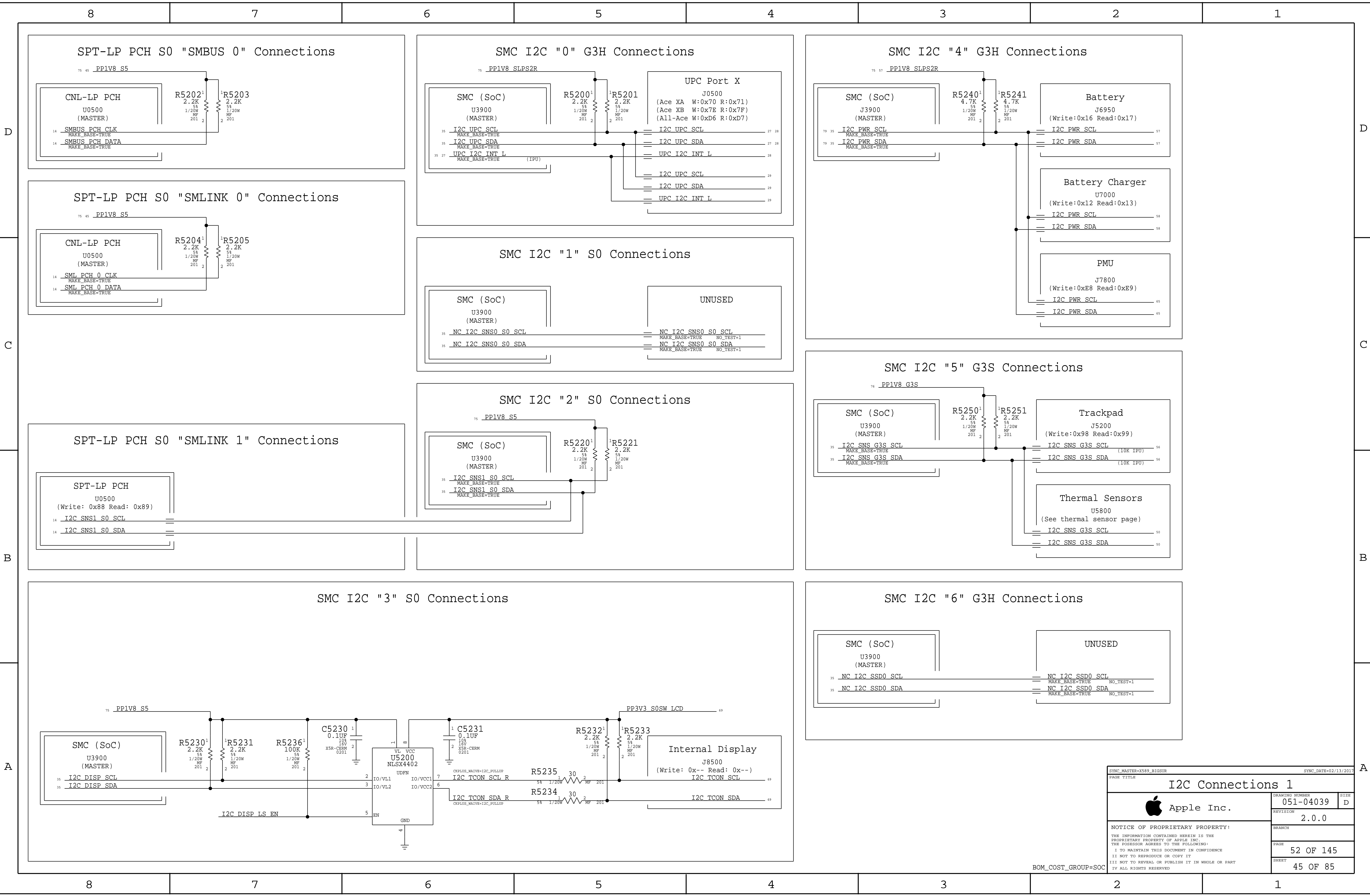
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-11132	1	IC,RTM4,ES2.1.1,PN80V,DEV_KY,S/W-M,UFLGA64	U5000	CRITICAL	SE:DEV_2017
338S00253	1	MODULE,NFC,NXP,LGA64	U5000	CRITICAL	SE:PROD_2017




SYNC_MASTER=X941_MLB		SYNC_DATE=03/10/2017	
PAGE TITLE			
Secure Element		Drawing	
	Apple Inc.	DRAWING NUMBER	SIZE
		051-04039	D
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		BRANCH	
		PAGE	50 OF 145
		SHEET	44 OF 85

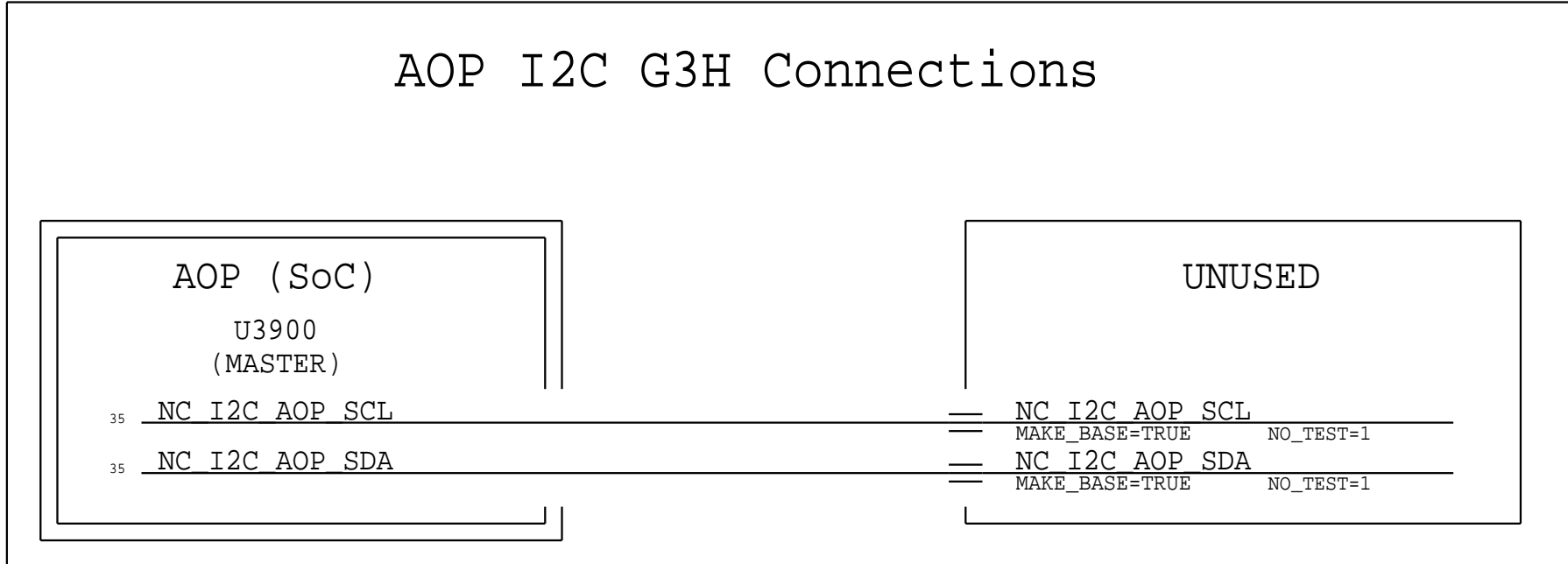
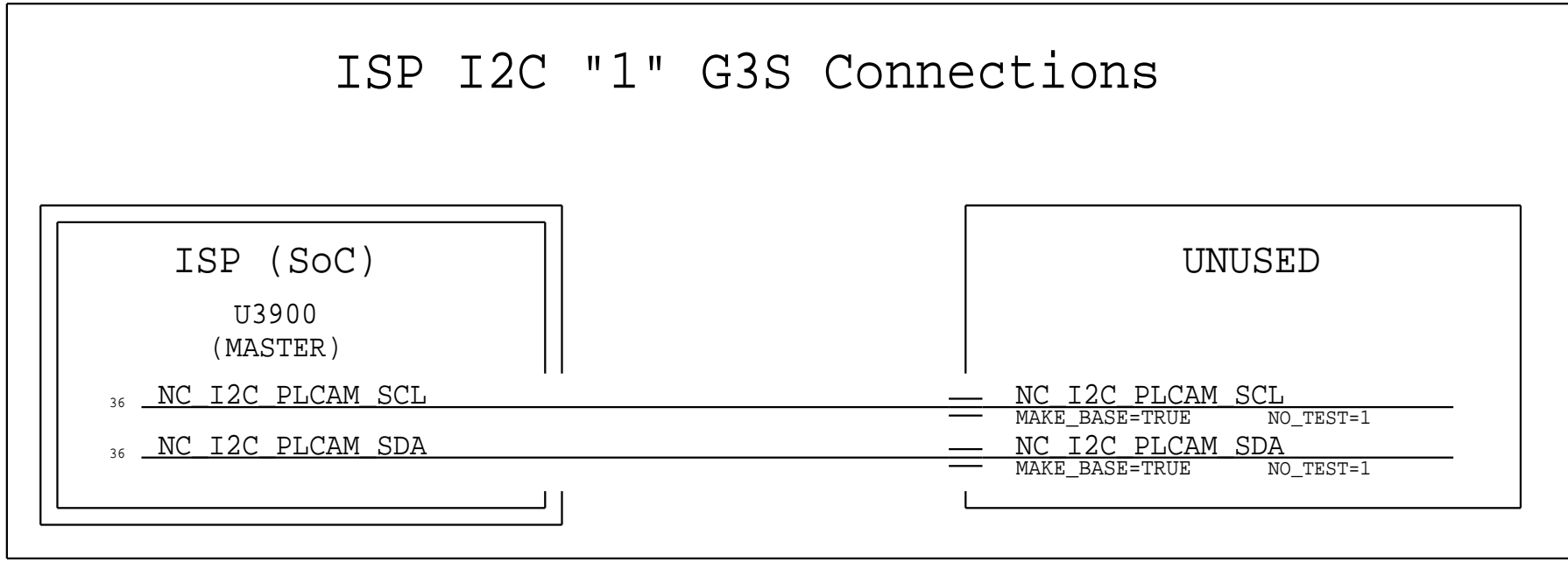
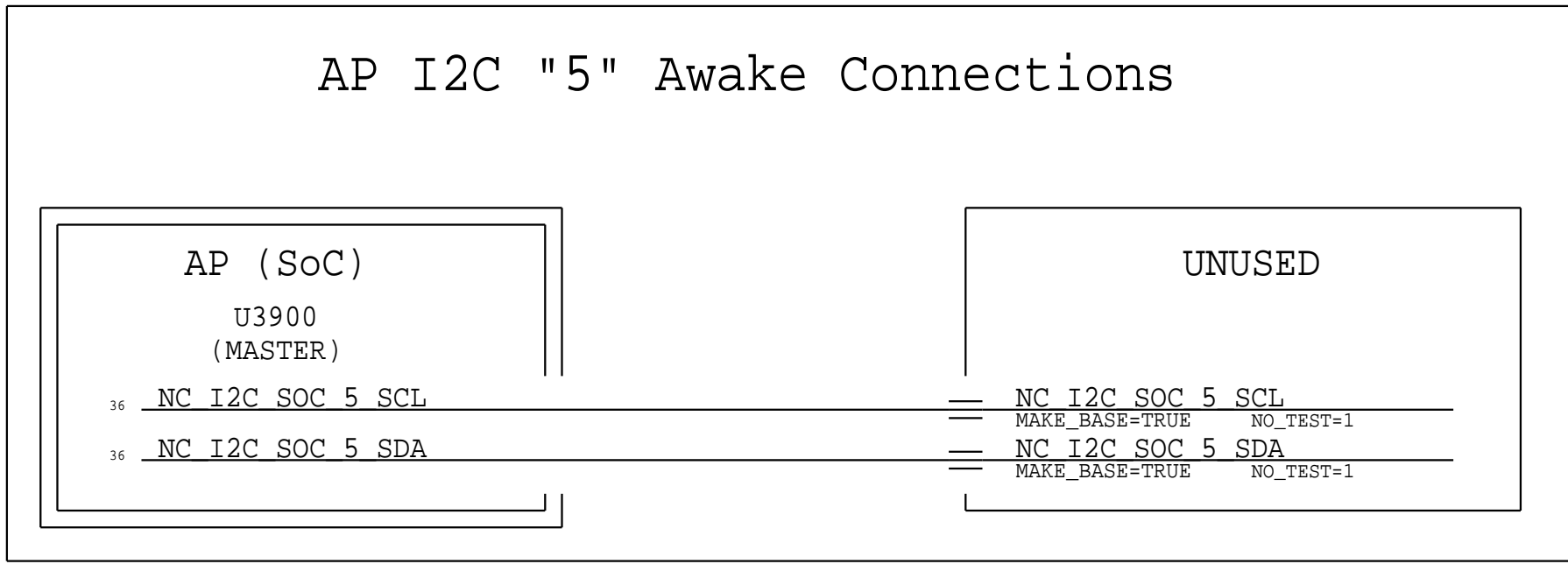
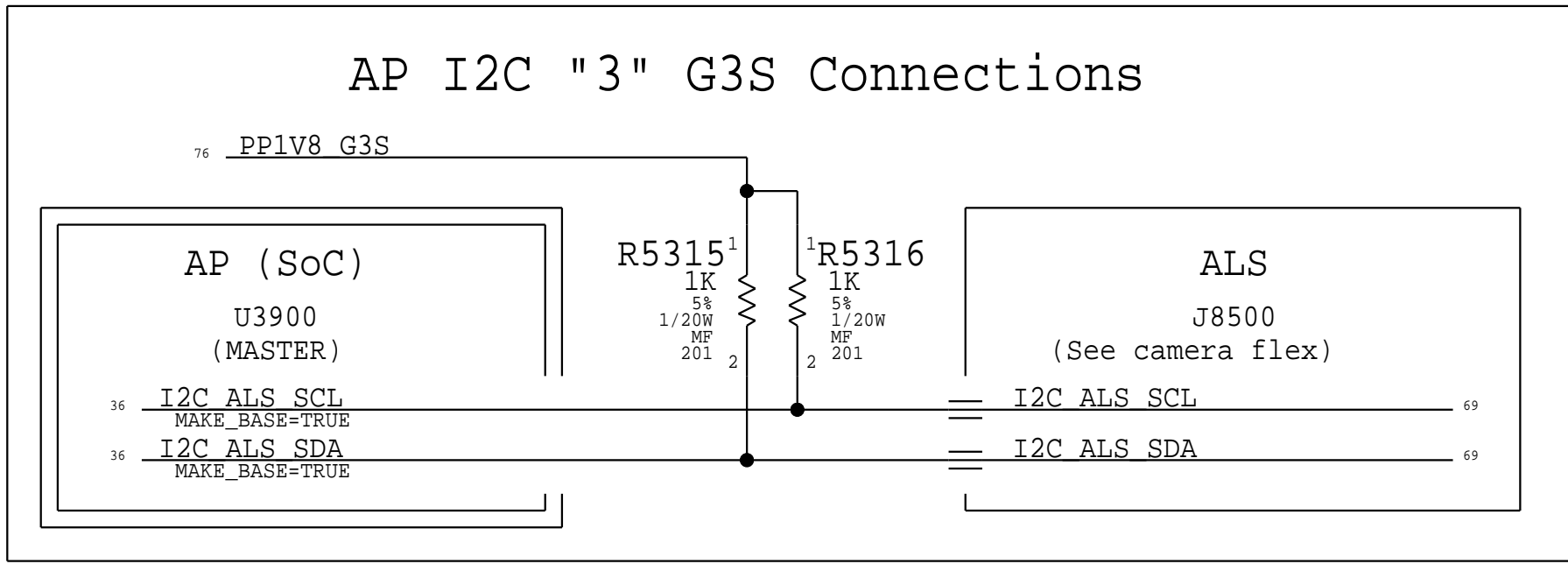
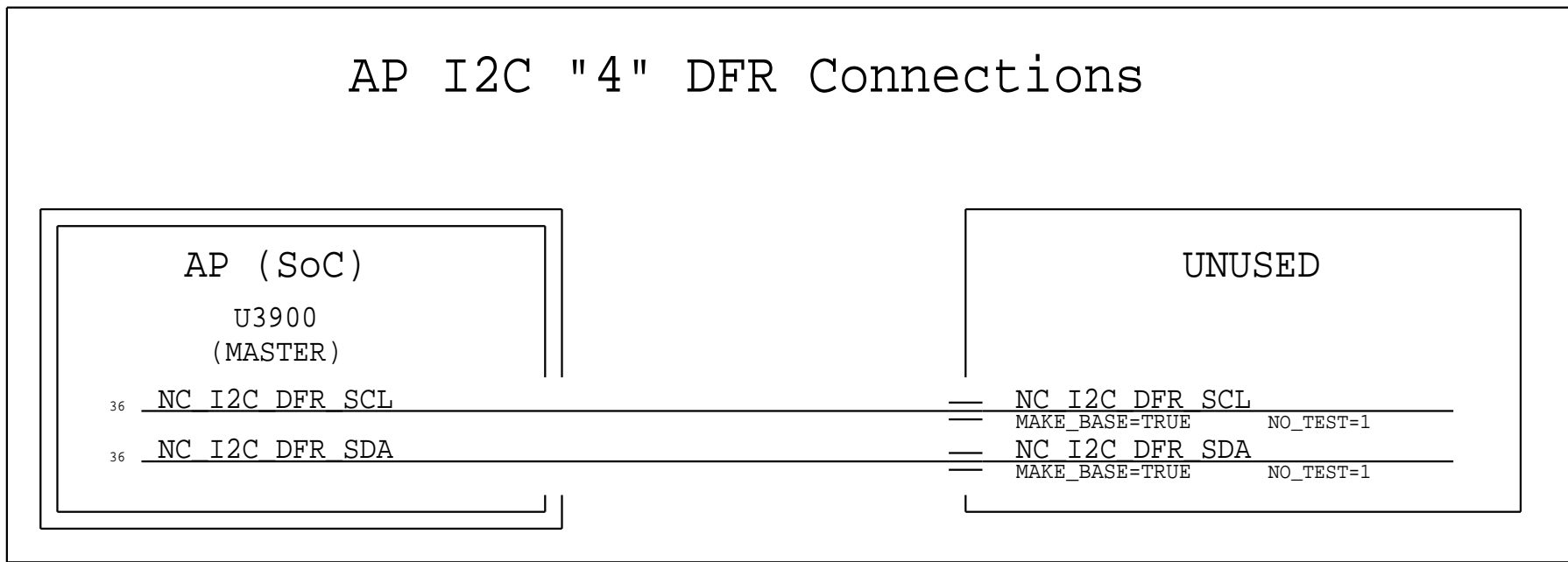
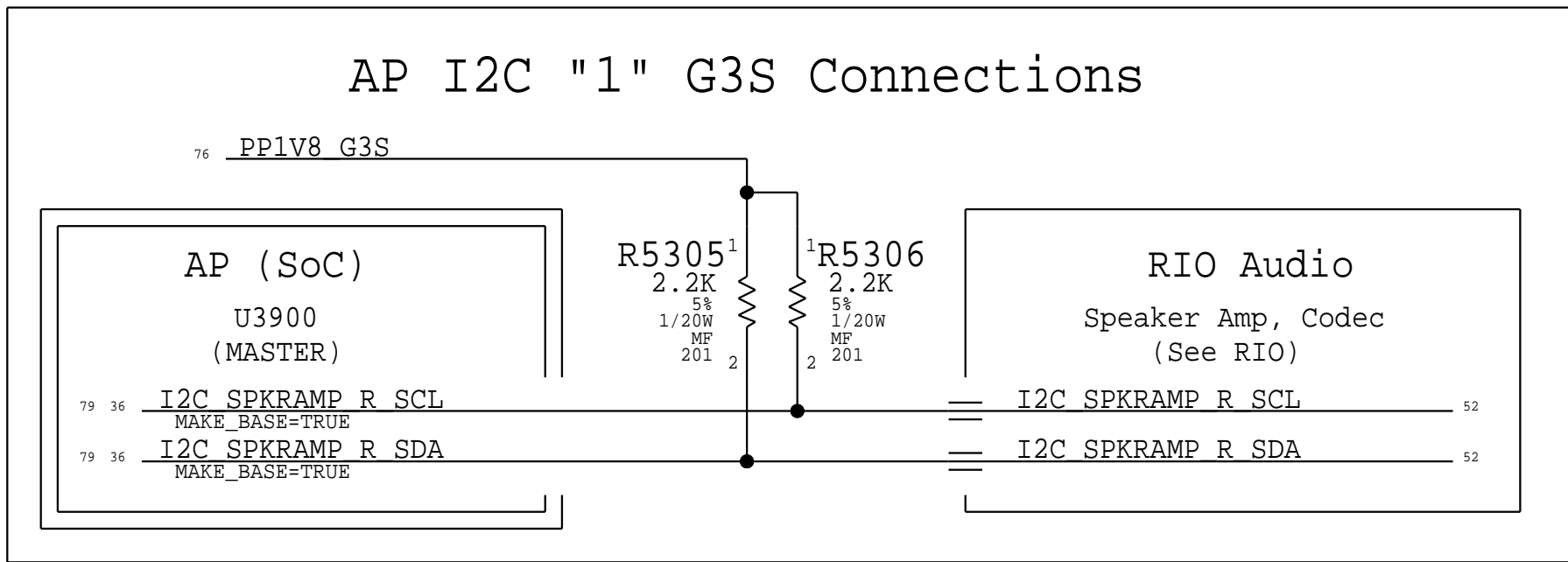
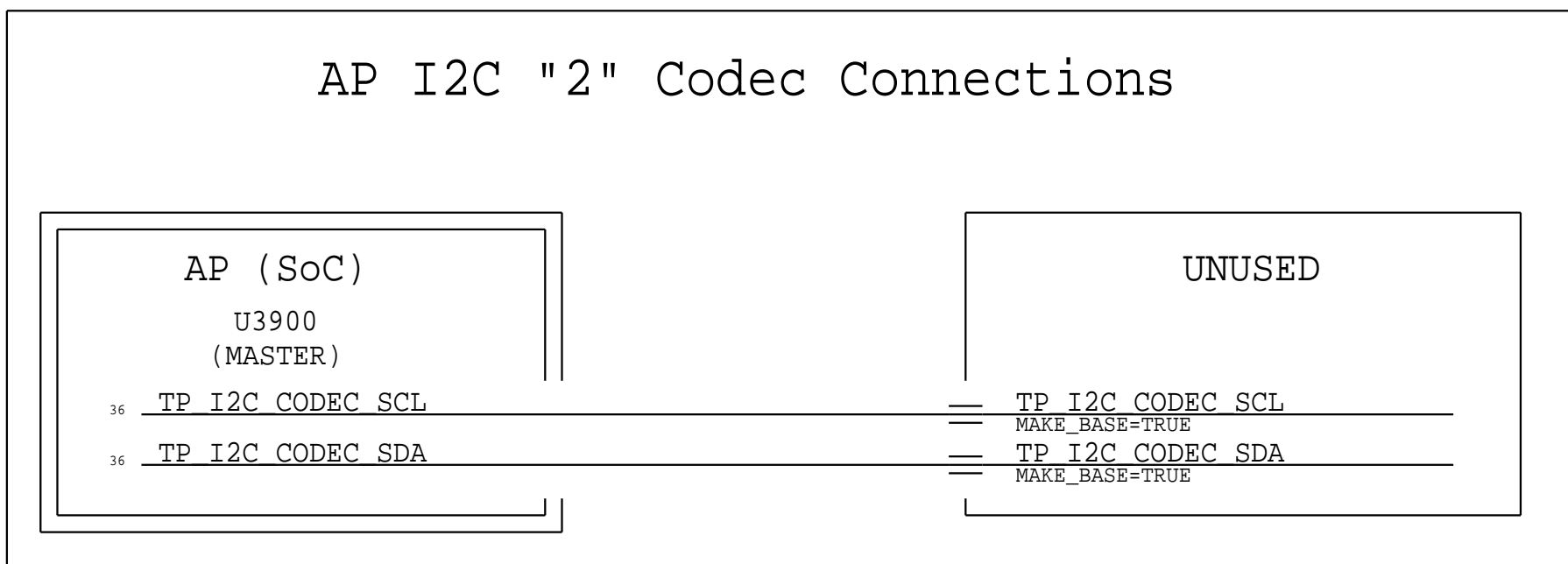
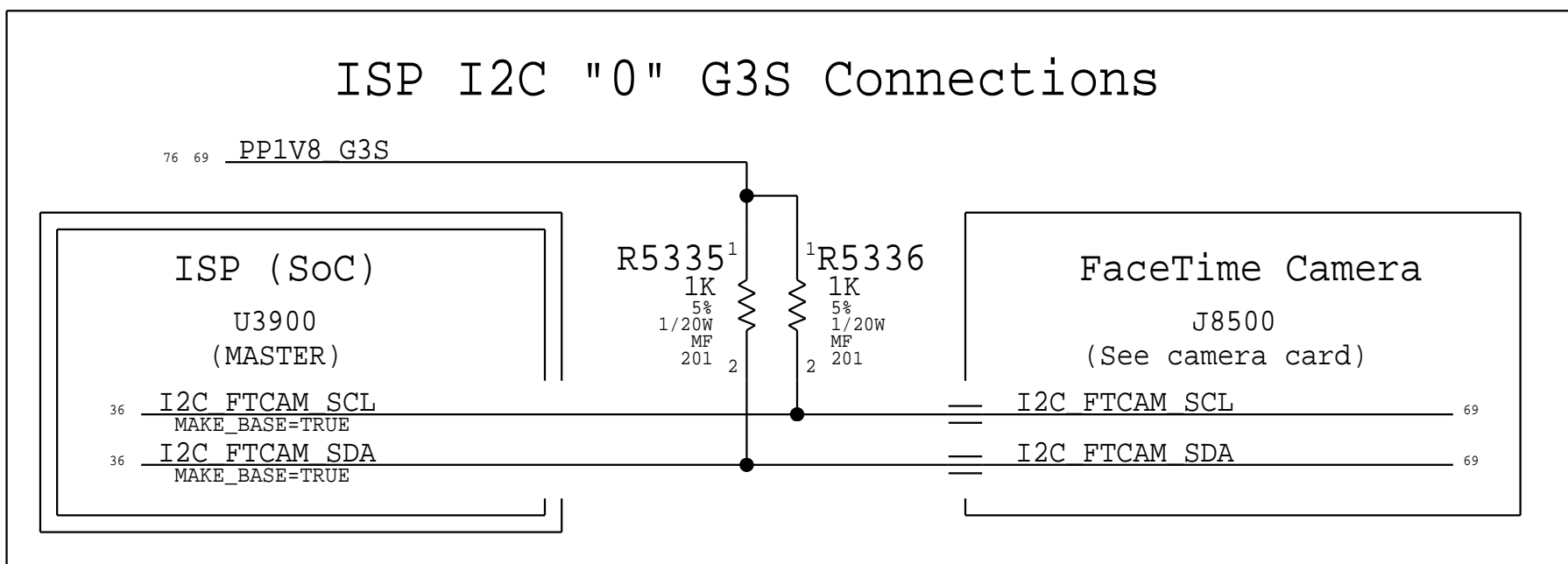
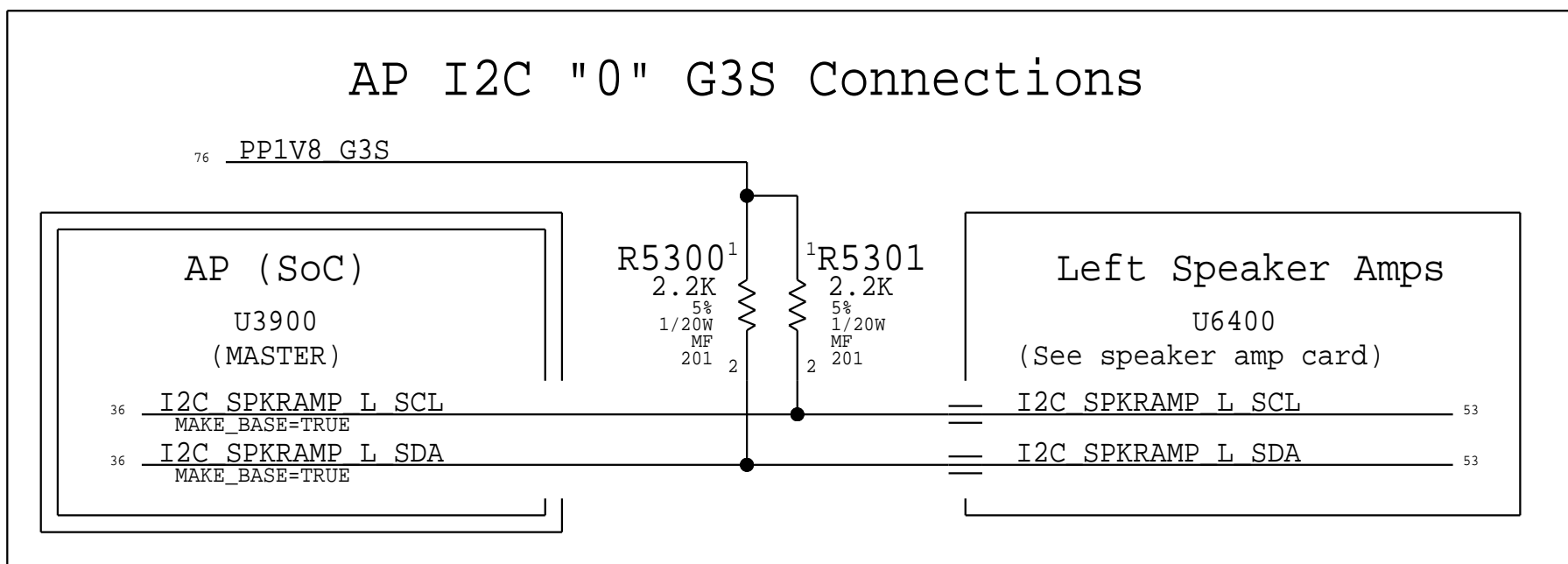
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I2C Connections 1			
	Apple Inc.	DRAWING NUMBER	SIZE
		051-04039	D
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		PAGE	52 OF 145
		SHEET	45 OF 85

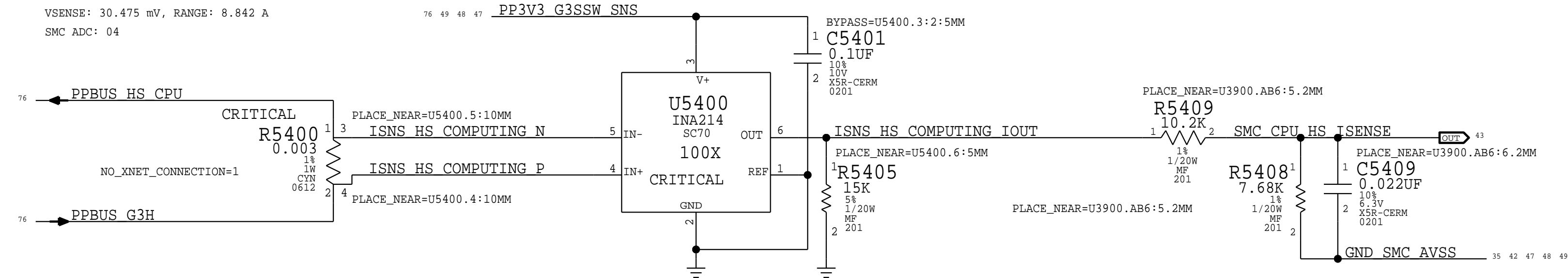
BOM\_COST\_GROUP=SOC



INA21X PARTS HAVE MINOR LEAKAGE PATH FROM INPUTS TO OUTPUT WHEN UNPOWERED.  
PULL-DOWN RESISTERS ON INA OUTPUTS BLEED OFF THE LEAKAGE CURRENT TO PREVENT  
SIGNAL PUMP-UP.

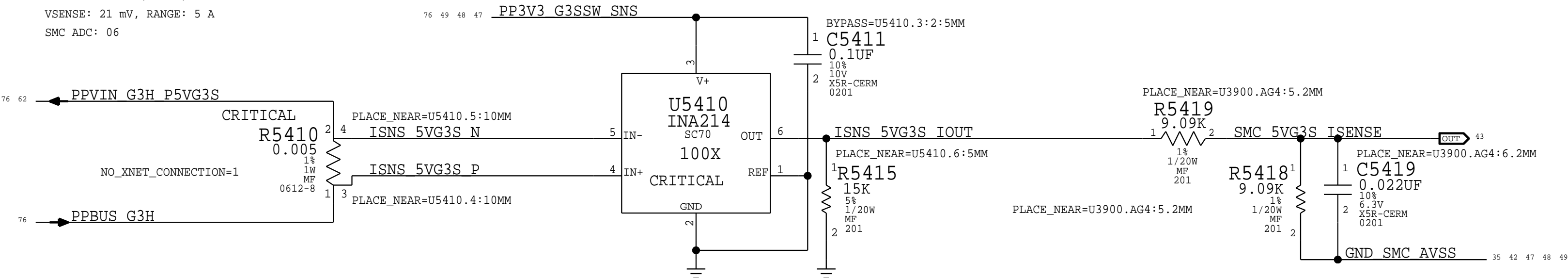
## CPU High Side Current Sense (IC0R)

GAIN: 100X, EDP: 10.16 A  
Rsense: 0.003 (R5400)  
VSENSE: 30.475 mV, RANGE: 8.842 A  
SMC ADC: 04



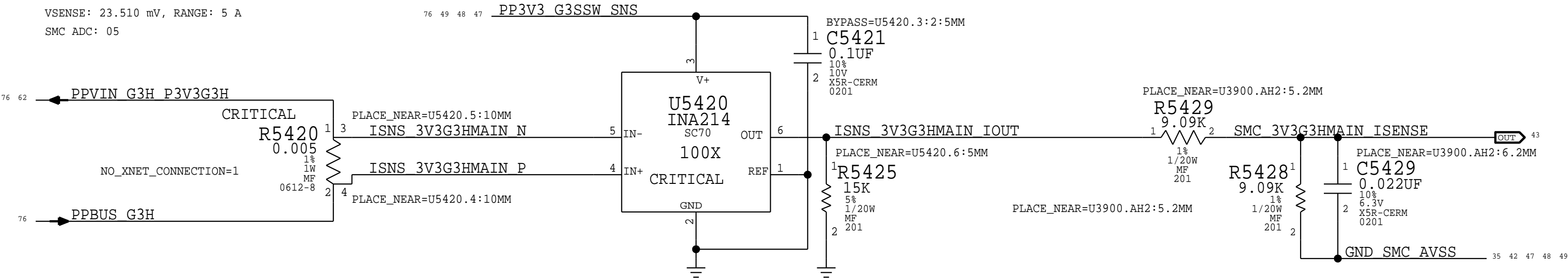
5V G3S (I05R)

GAIN: 100X, EDP: 4.2 A  
Rsense: 0.005 (R5410)  
VSENSE: 21 mV, RANGE: 5 A  
SMC ADC: 06



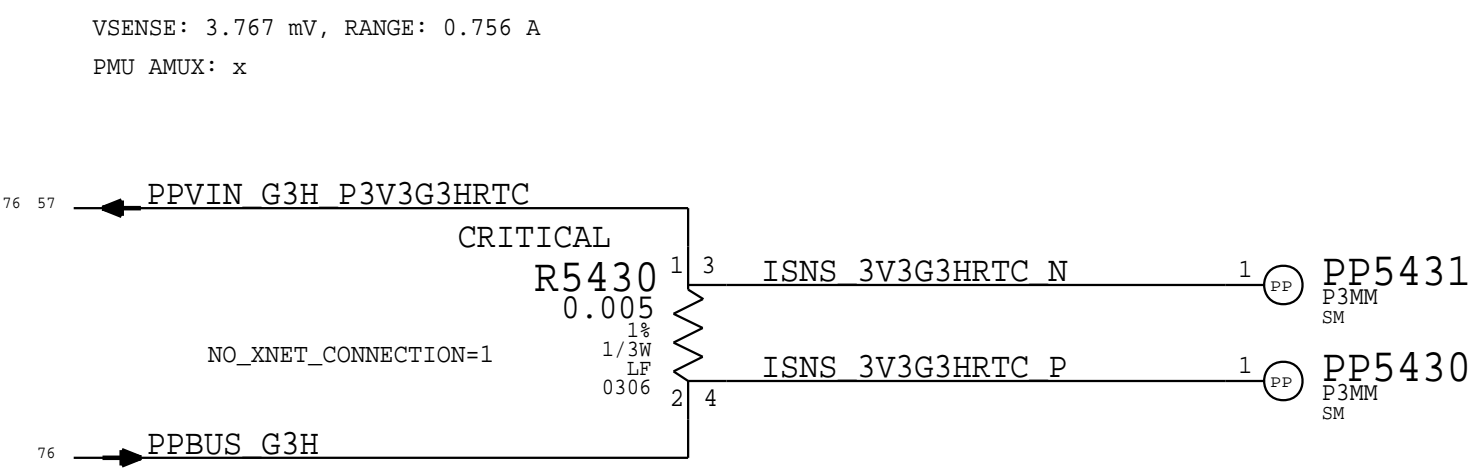
## 3V3 G3H MAIN (IO3R)

```
GAIN: 100X, EDP: 4.702 A
Rsense: 0.005 (R5420)
VSENSE: 23.510 mV, RANGE: 5 A
SMC ADC: 05
```



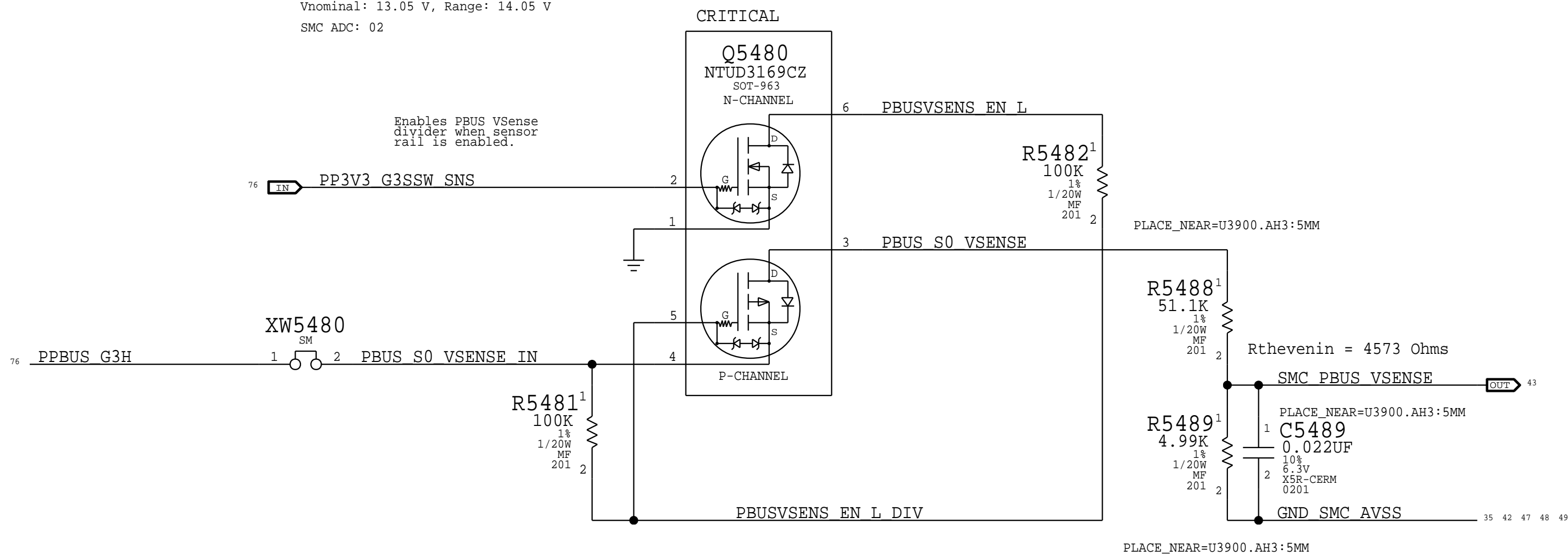
## 3V3 G3H RTC (xxxx)

```
GAIN: X, EDP: 0.753 A
Rsense: 0.005 (R5430)
VSENSE: 3.767 mV, RANGE: 0.756 A
PMU AMUX: x
```



## PBUS Voltage Sense & Enable (VP0R)

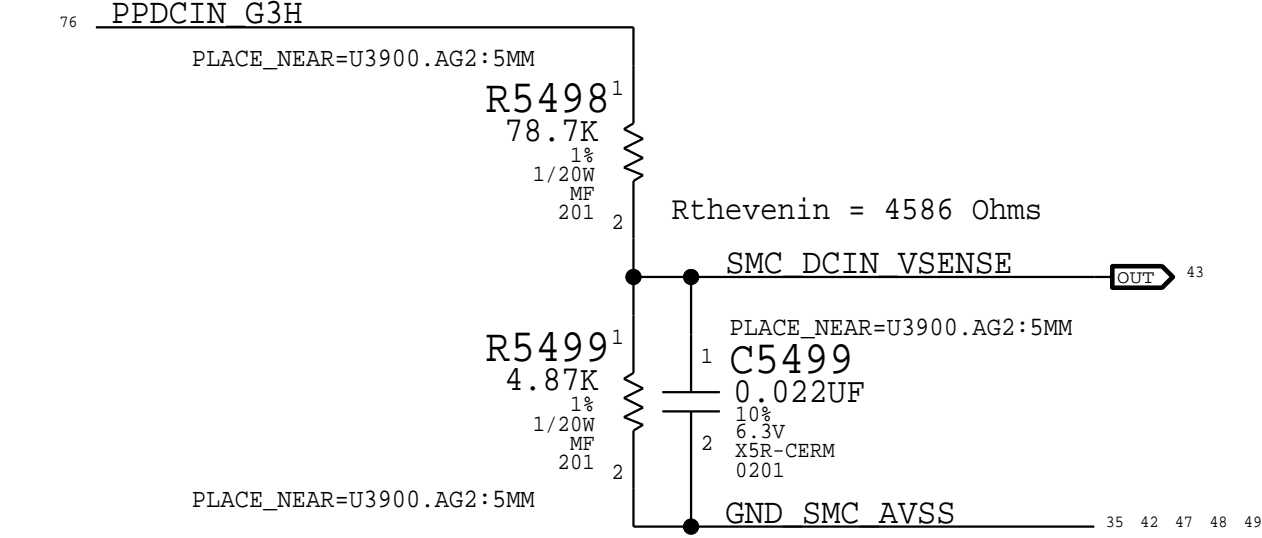
Gain: 0.089x  
Vnominal: 13.05 V, Range: 14.05 V  
SMC ADC: 02



### DC In Voltage Sense & Enable (VD0R)

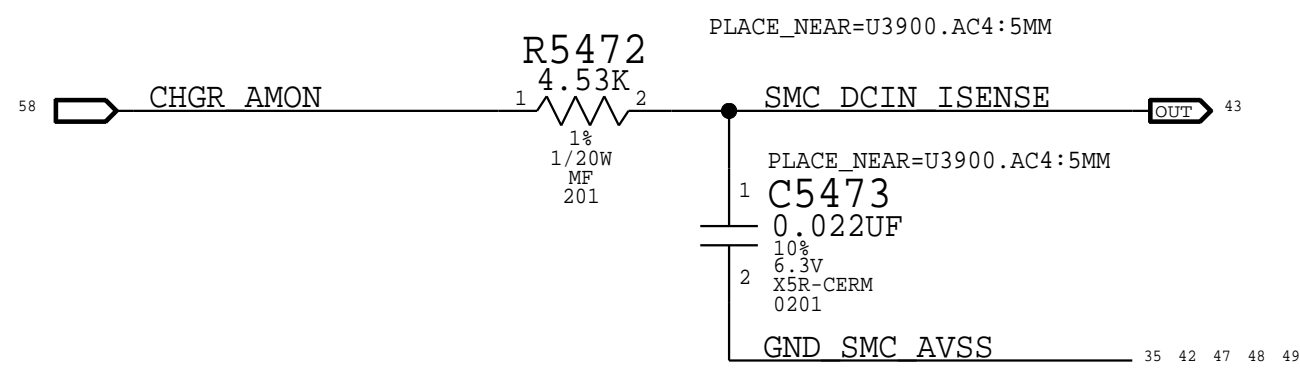
Gain: 0.148x  
Vnominal: 16.5 V, Range: 22.29 V  
SMC ADC: 00

DCIN sensing no longer gated.  
FETs removed to avoid power  
draw on PU on CHGR\_AUX\_OK.



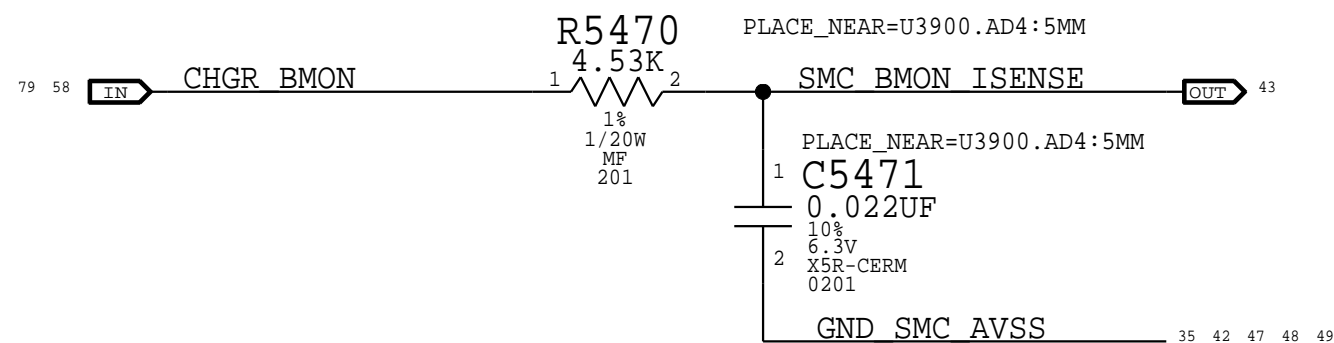
## DC-IN (AMON) Current Sense (ID0R)

Charger Gain: 20x, EDP: 3.0 A  
RSENSE: 0.010 (R7020)  
SMC ADC: 01



## Charger (BMON) Current Sense (IPBR)

Charger Gain: 7.9x, EDP: 6.5 A  
RSENSE: 0.005 (R7060)  
SMC ADC: 03



DESIGN: X1032/MLB		
LAST CHANGE: Fri Sep 15 15:09:18 2017		
PAGE TITLE		
Power Sensors High Side		
 Apple Inc.	DRAWING NUMBER 051-04039	
	REVISION 2.0.0	
	BRANCH	
	PAGE 54 OF 145	
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SHEET		47 OF 85

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C

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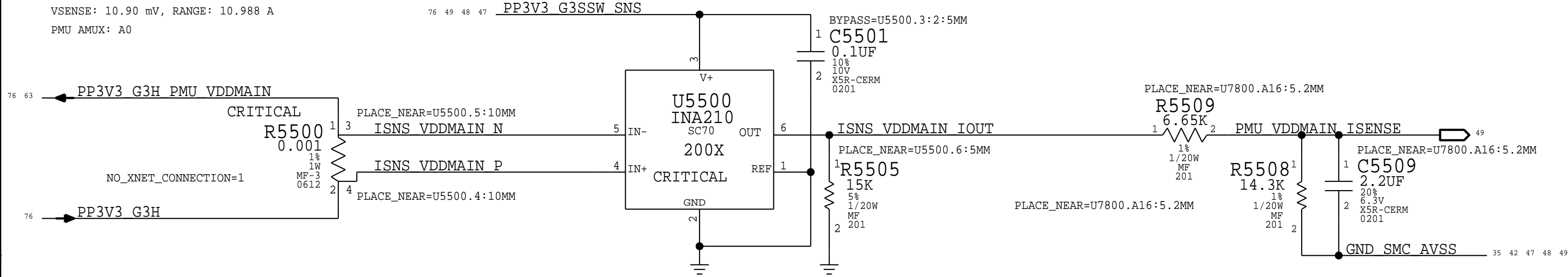
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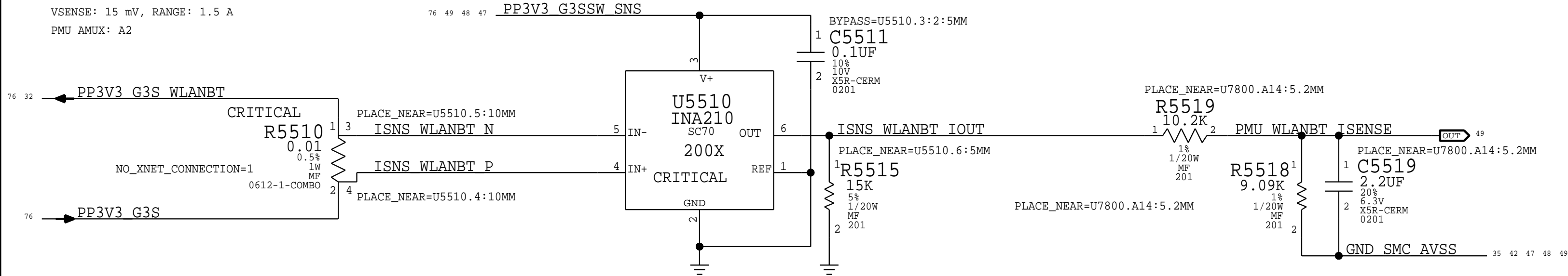
VDDMAIN (ISLC)


GAIN: 200X, EDP: 10.90 A  
Rsense: 0.001 (R5500)  
VSENSE: 10.90 mV, RANGE: 10.988 A  
PMU AMUX: A0



Wireless (IAPC)

GAIN: 200X, EDP: 1.5 A  
Rsense: 0.010 (R5510)  
VSENSE: 15 mV, RANGE: 1.5 A  
PMU AMUX: A2

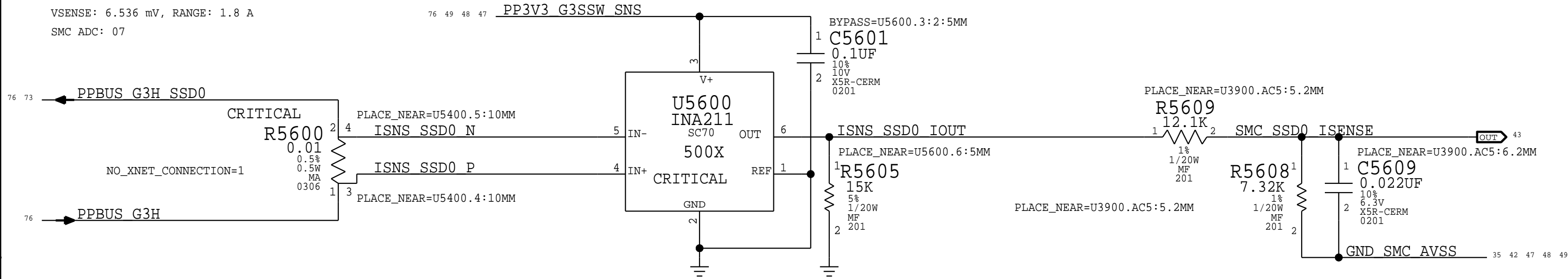


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LAST CHANGE: Fri Sep 15 15:09:18 2017		
PAGE TITLE		
Power Sensors Load Side		
 Apple Inc.	DRAWING NUMBER	051-04039
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	PAGE	55 OF 145
	SHEET	48 OF 85

BOM\_COST\_GROUP=SENSORS

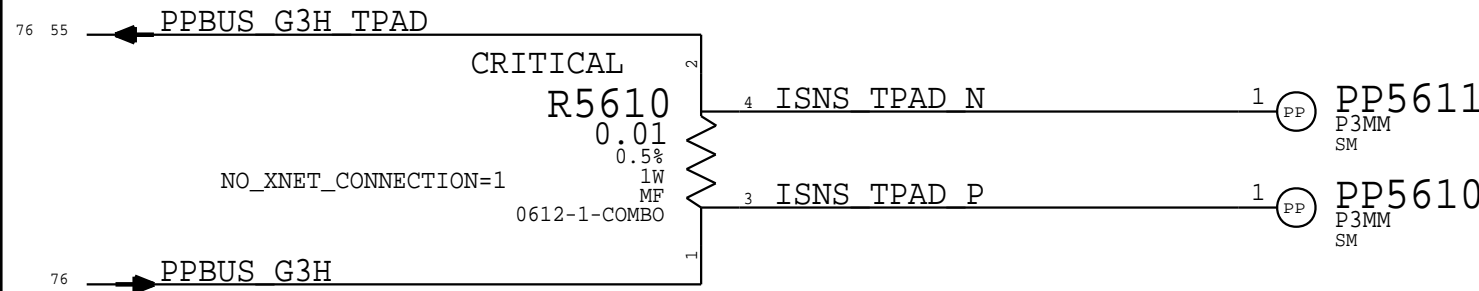
SSD (IH0R)

GAIN: 500X, EDP: 0.654 A  
Reense: 0.010 (R5600)  
VSENSE: 6.536 mV, RANGE: 1.8 A  
SMC ADC: 07



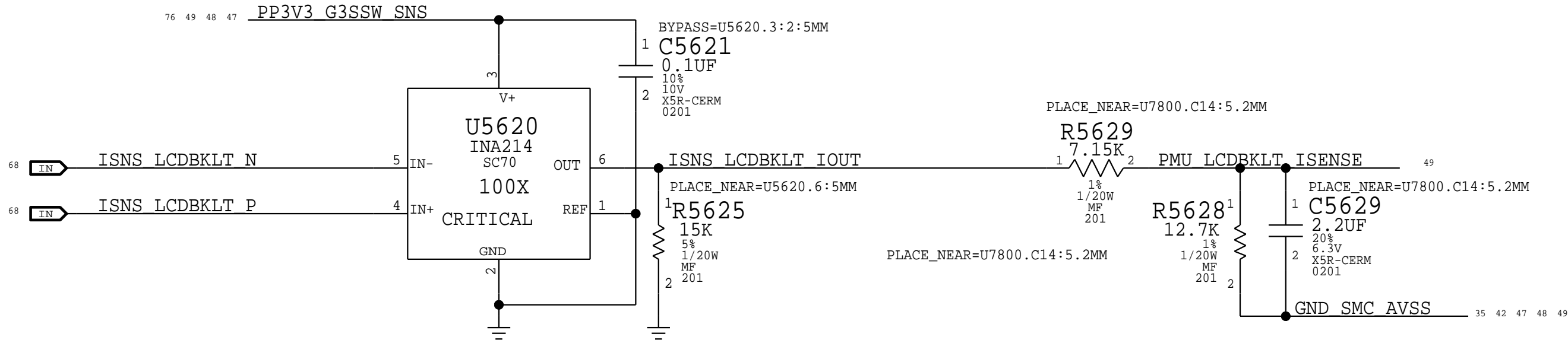
Trackpad (xxxx)

GAIN: x, EDP: 2.3 A  
Reense: 0.010 (R5610)  
VSENSE: 23 mV, RANGE: 2.344 A  
PMU AMUX: x

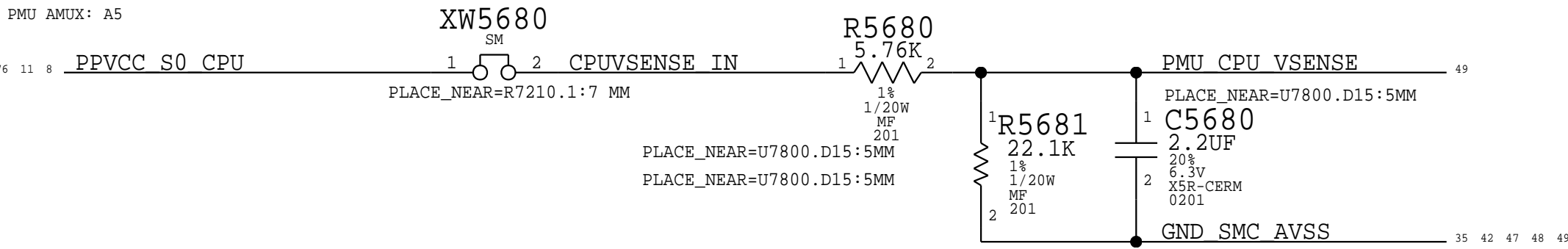


LCD Backlight (IBLR)

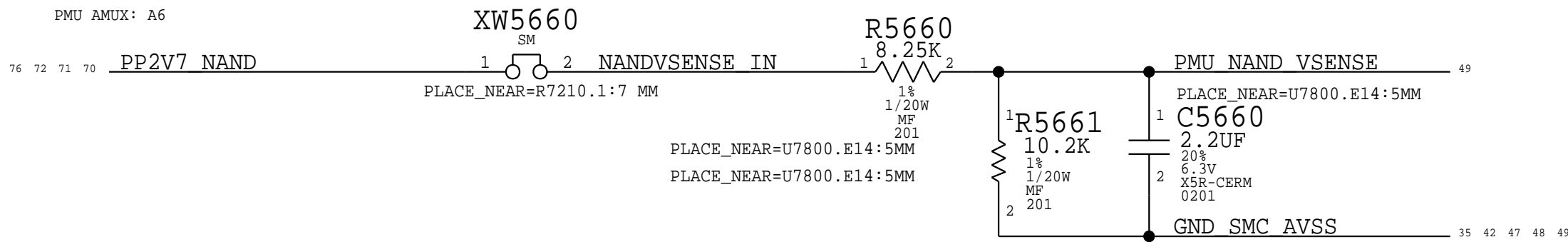
GAIN: 100X, EDP: 0.902 A  
Reense: 0.025 (R8400)  
VSENSE: 22.549 mV, RANGE: 0.902 A  
PMU AMUX: A4



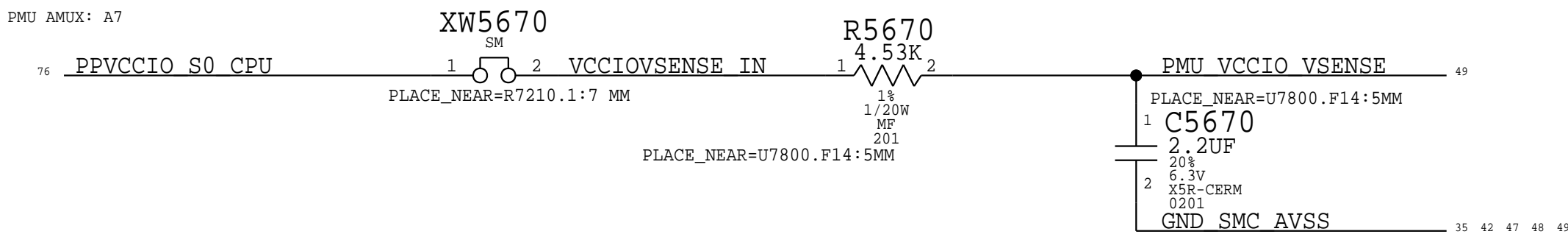
CPU CORE VOLTAGE SENSE (VCAC)



NAND 2V7 VOLTAGE SENSE (VHNC)



VCCIO VOLTAGE SENSE (VCIC)

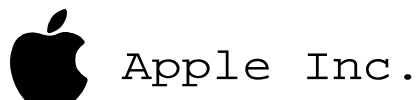


PMU ADC Assignments

PMU_VDDMAIN_ISENSE	=	PMU_VDDMAIN_ISENSE
NC_PMU_AMUX_A1	=	NC_PMU_AMUX_A1
PMU_WLANBT_ISENSE	=	PMU_WLANBT_ISENSE
NC_PMU_AMUX_A3	=	NC_PMU_AMUX_A3
PMU_LCDBKLT_ISENSE	=	PMU_LCDBKLT_ISENSE
PMU_CPU_VSENSE	=	PMU_CPU_VSENSE
PMU_NAND_VSENSE	=	PMU_NAND_VSENSE
PMU_VCCIO_VSENSE	=	PMU_VCCIO_VSENSE

DESIGN: X1032/MLB  
LAST CHANGE: Fri Sep 15 15:09:18 2017

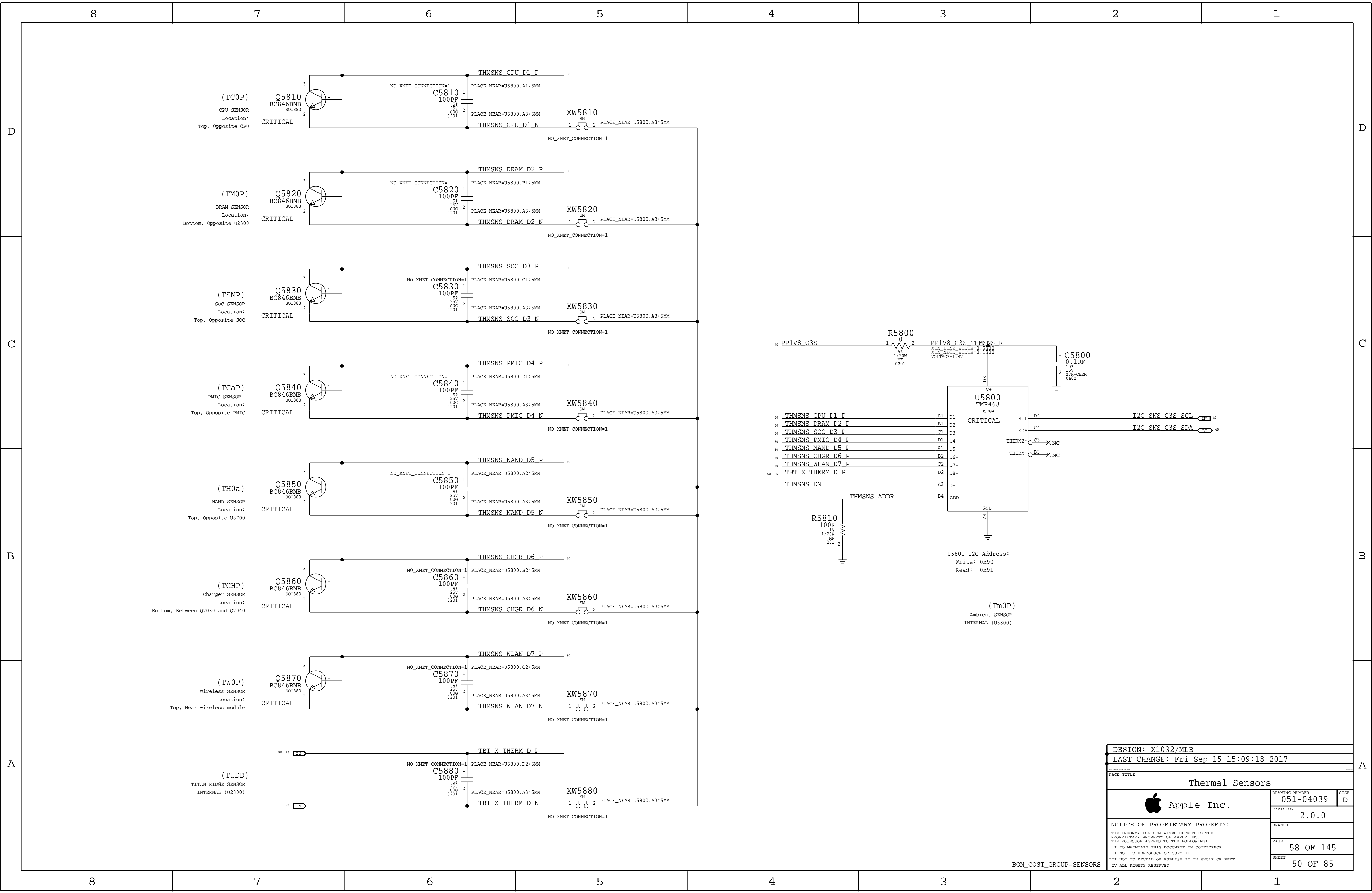
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Power Sensors Extended



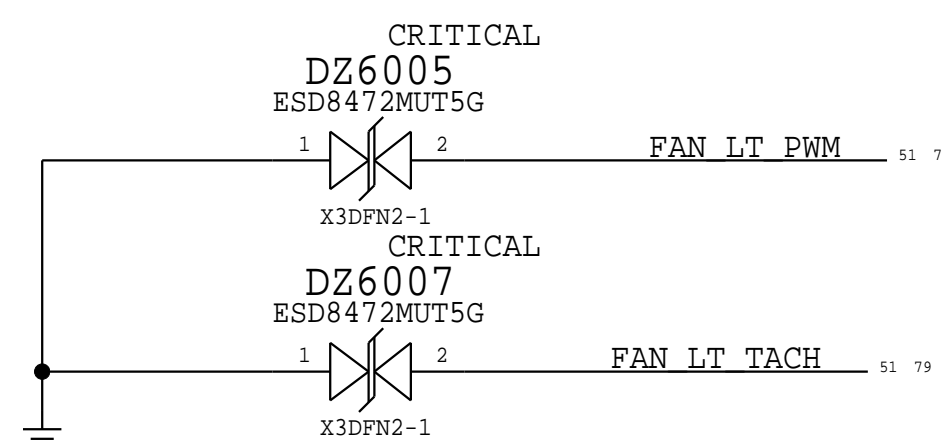
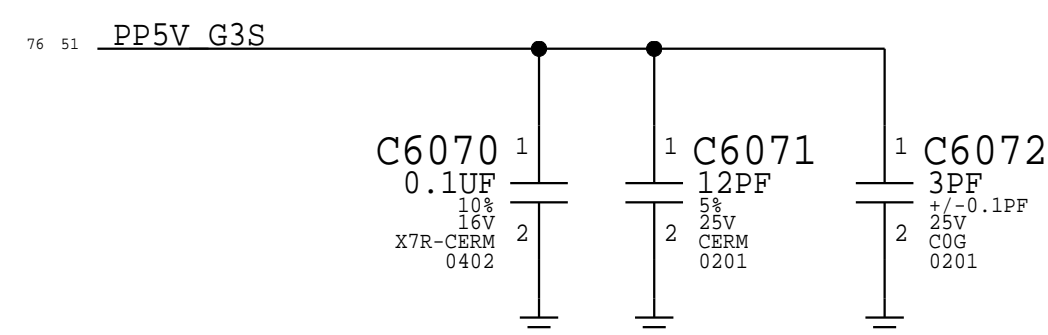
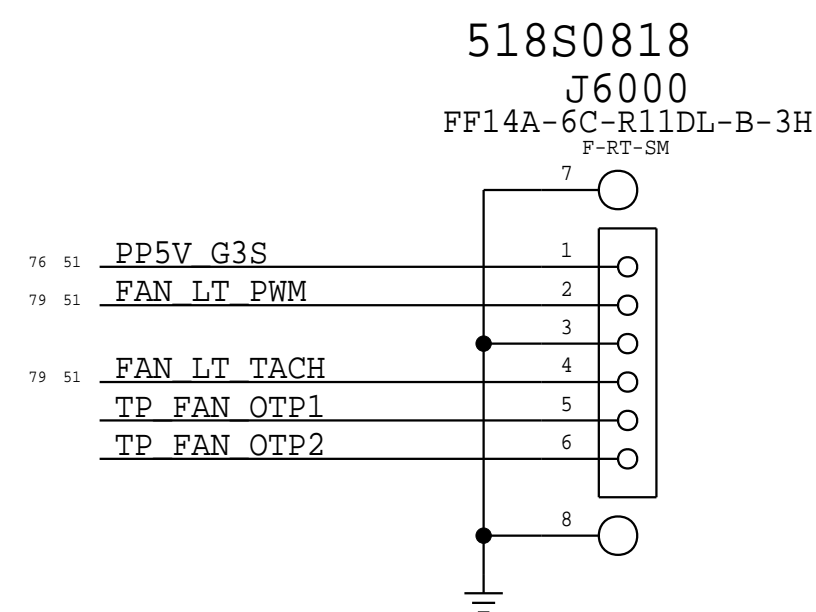
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REVISION	2.0.0	BRANCH	
PAGE	56 OF 145	SHEET	49 OF 85

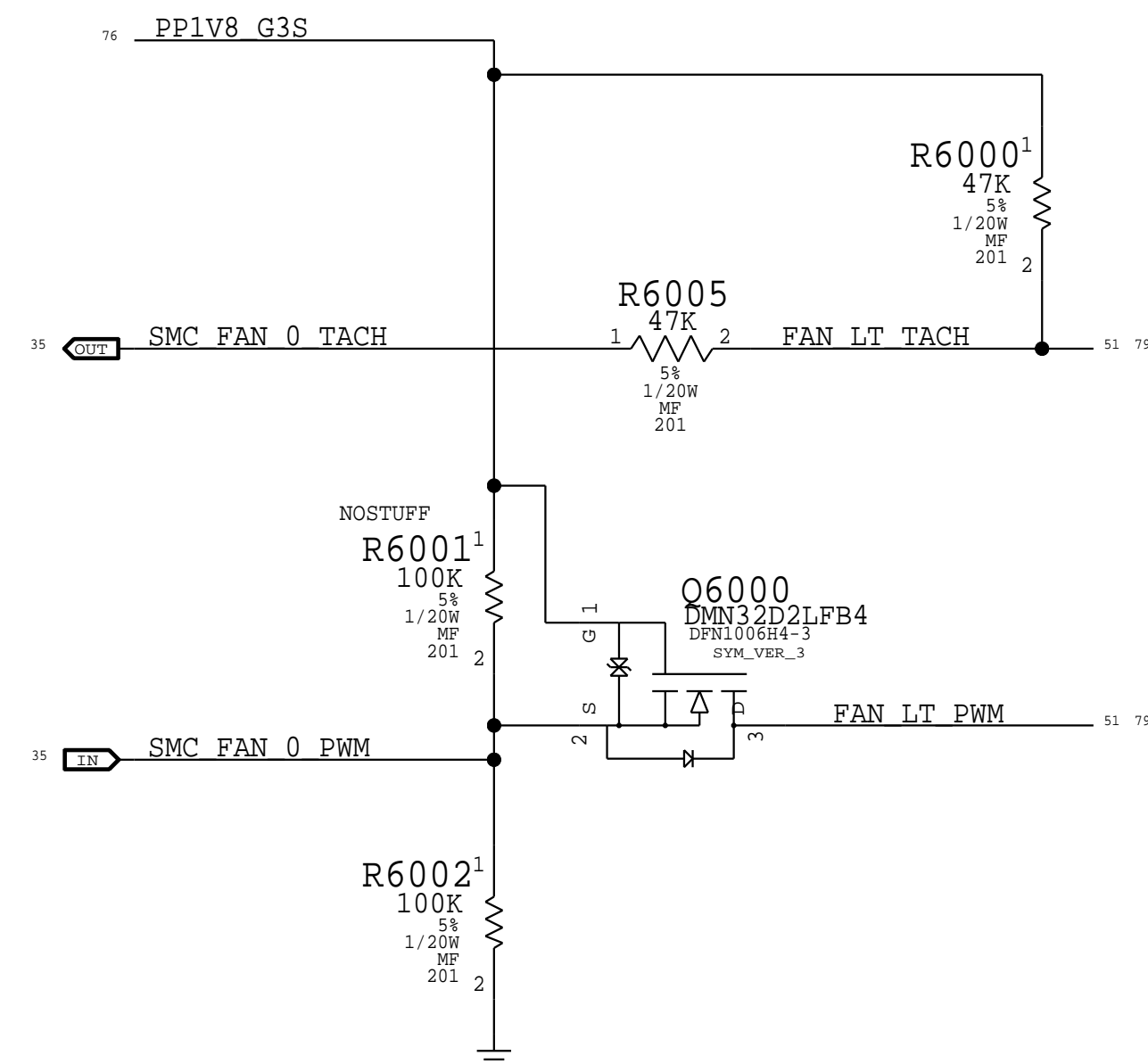
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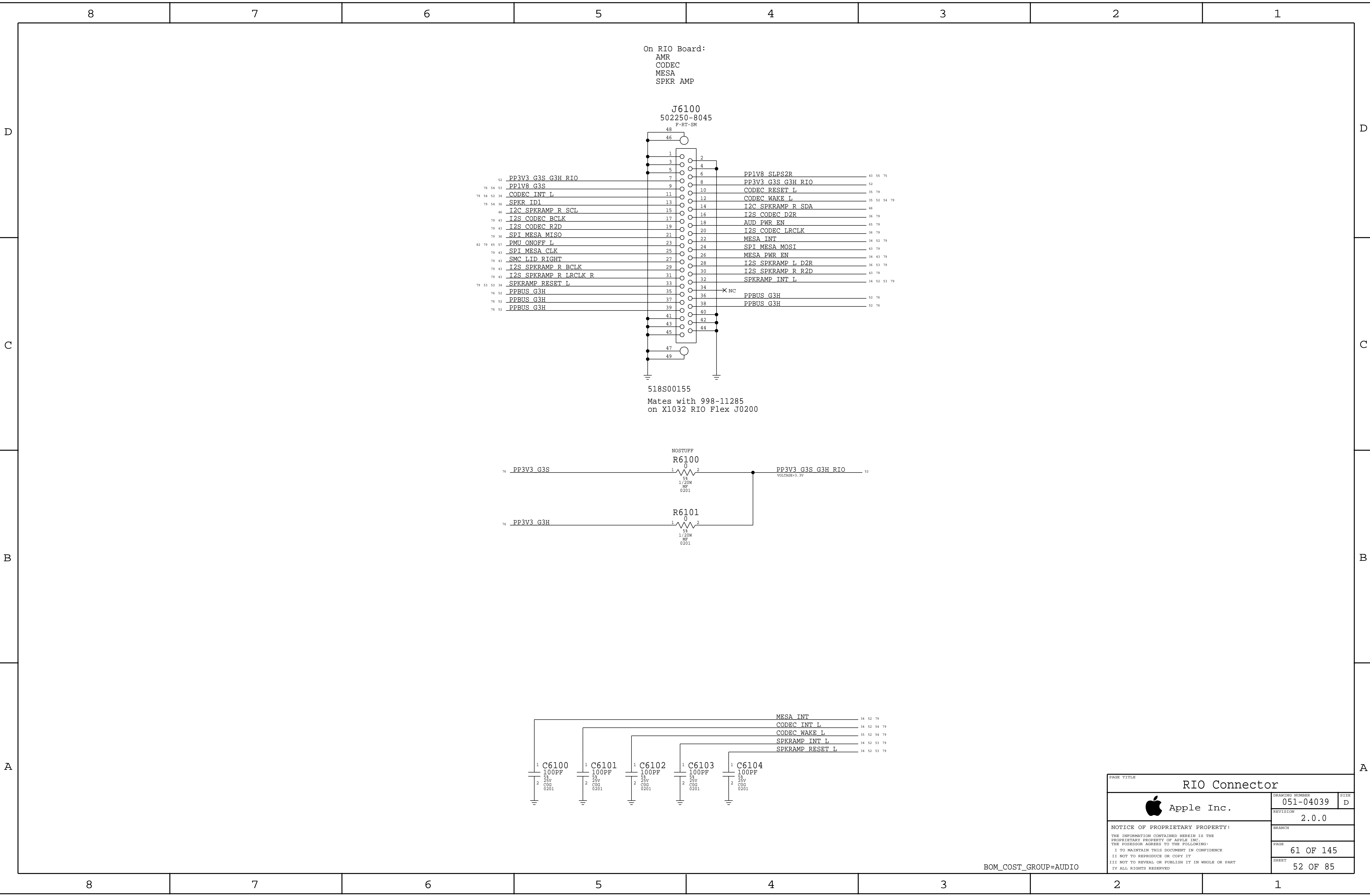


## FAN SUPPORT



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		2.0.0	
		BRANCH	
		PAGE	60 OF 145
		SHEET	
		51 OF 85	

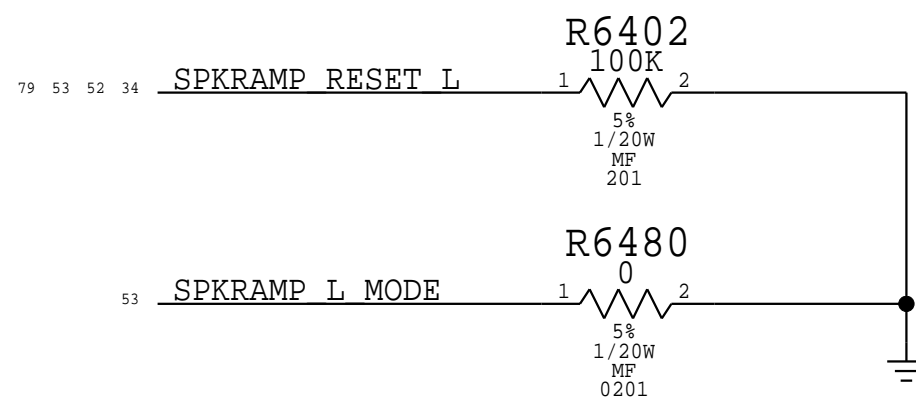
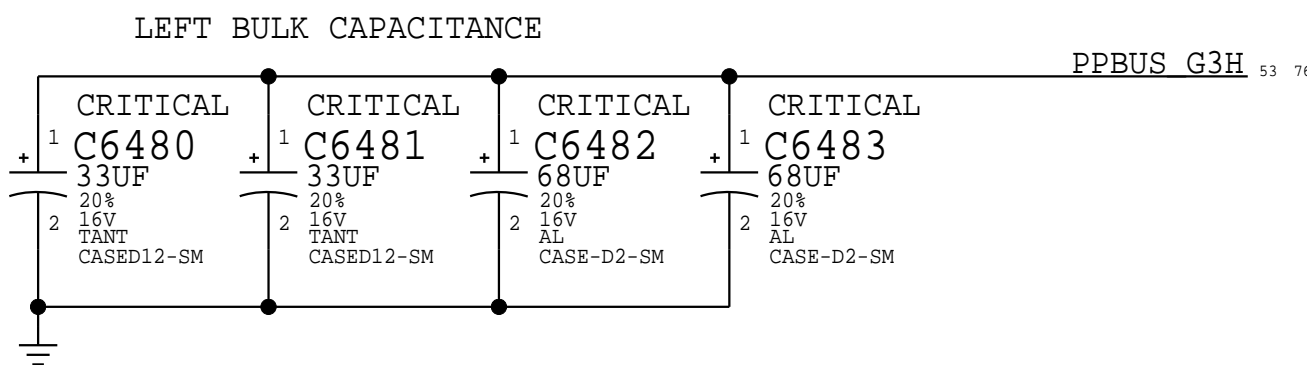
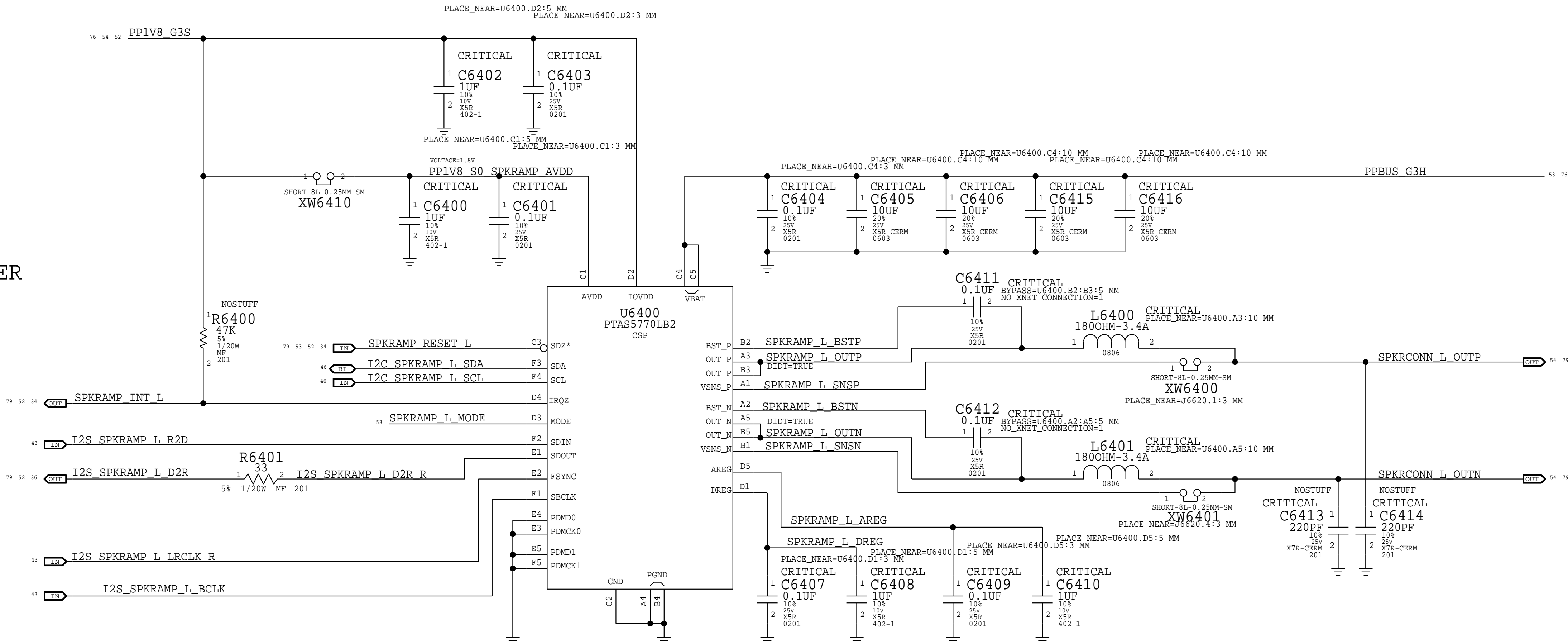
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1X MONO SPEAKER AMPLIFIER


APN: 353S01629  
GAIN: 0DBFS = 6.31 VRMS

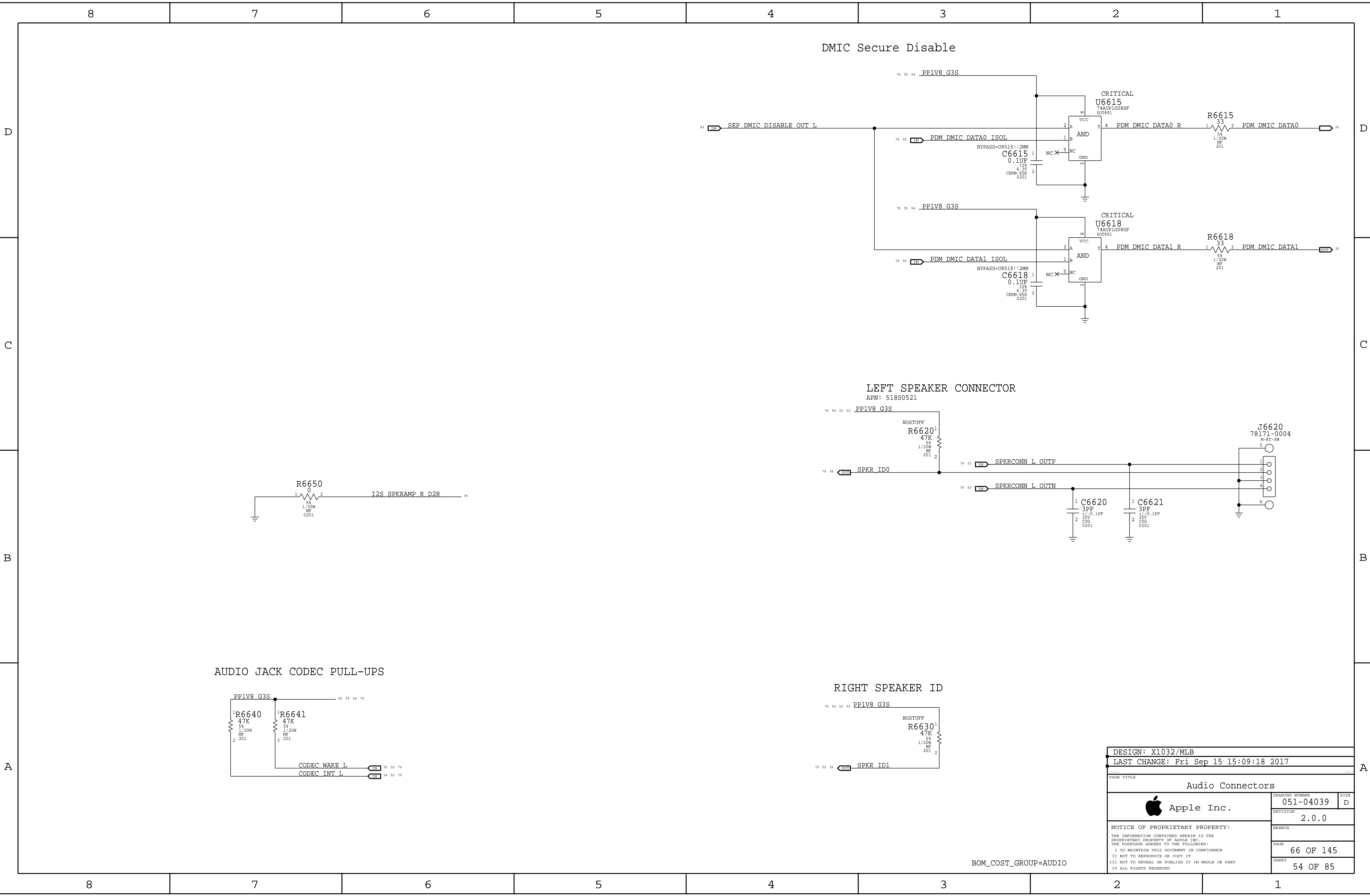
LEFT AMPLIFIER



MODE	PIN	I2C ADDR	CHANNEL
GND		0x31	LEFT
470 to GND		0x32	
470 to IOVDD		0x33	
2k2 to GND		0x34	
2k2 to IOVDD		0x35	
10k to GND		0x36	
10k to IOVDD		0x37	
47k to IOVDD		0x38	RIGHT

BOM\_COST\_GROUP=AUDIO

DESIGN: X1032/MLB		
LAST CHANGE: Fri Sep 15 15:09:18 2017		
PAGE TITLE		
Audio Speaker Amplifiers		
 Apple Inc.	DRAWING NUMBER	051-04039
	REVISION	2.0.0
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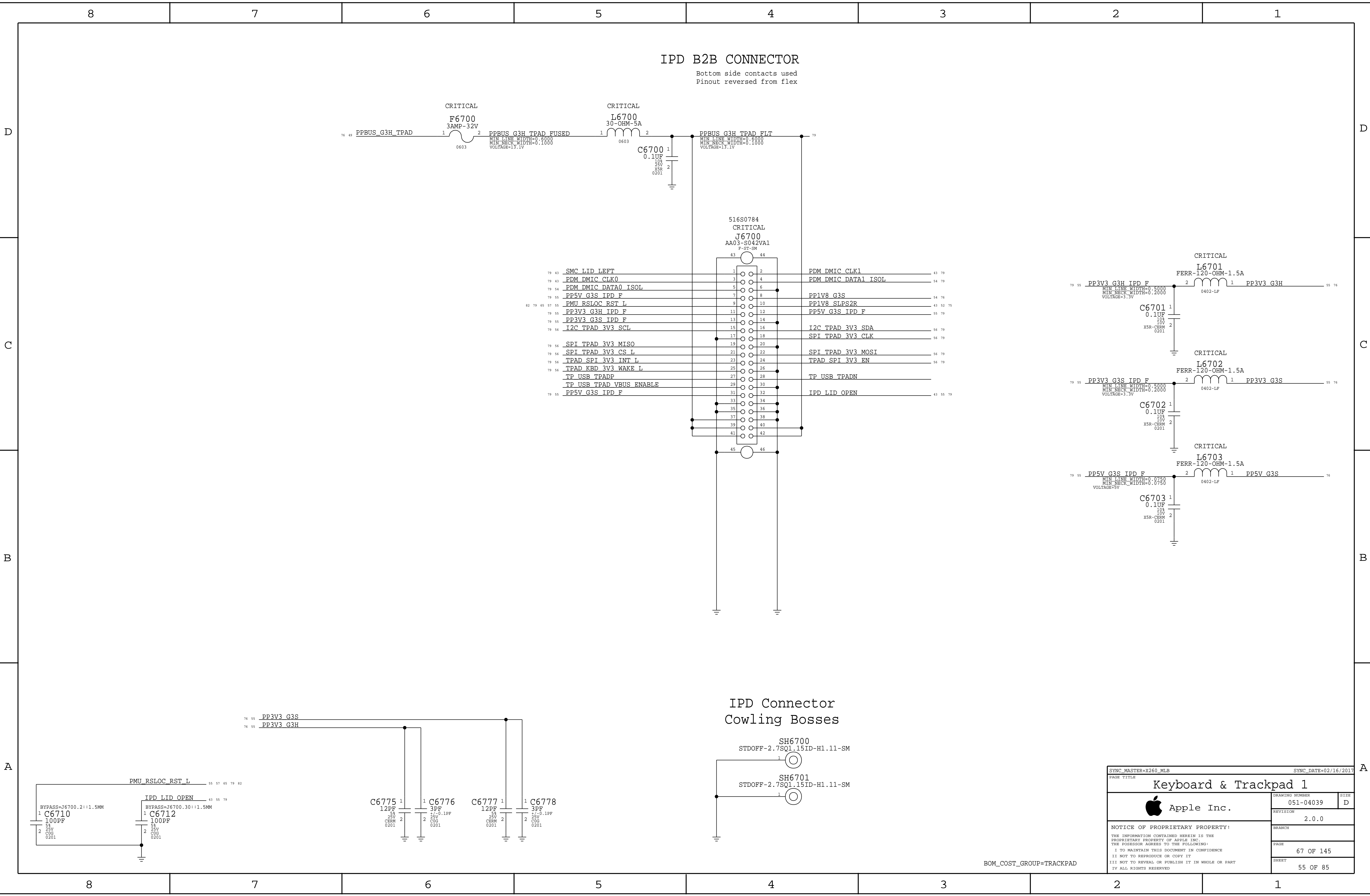
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DESIGN: X1032/MLB		
LAST CHANGE: Fri Sep 15 15:09:18 2017		
PAGE TITLE		
Audio Connectors		
	DRAWING NUMBER	051-04039
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	PAGE	66 OF 145
	SHEET	54 OF 85

BOM\_COST\_GROUP=AUDIO



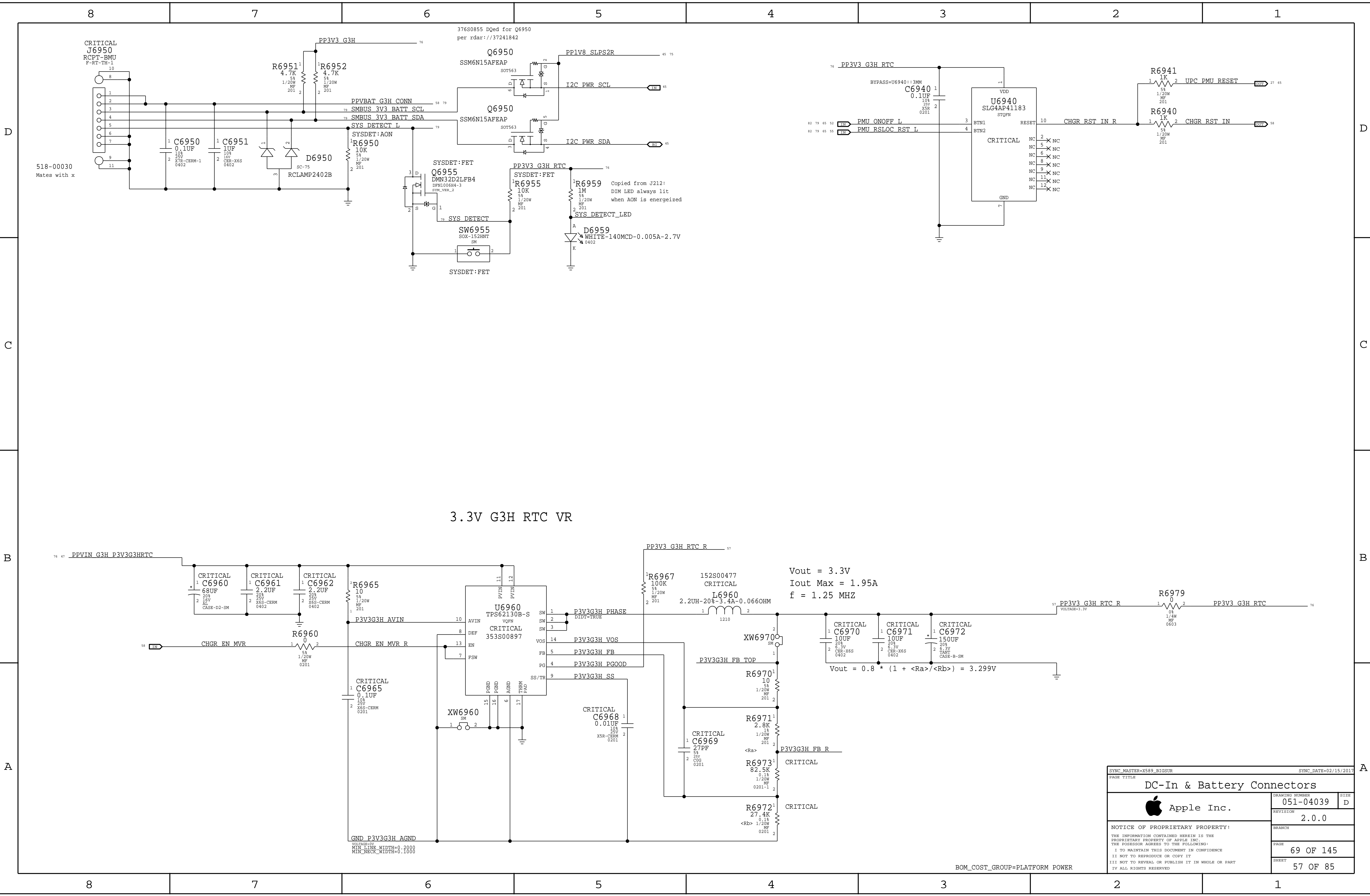
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PAGE TITLE			
Keyboard & Trackpad 1			
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		BRANCH	
		PAGE	
		67 OF 145	
		SHEET	
		55 OF 85	


## D



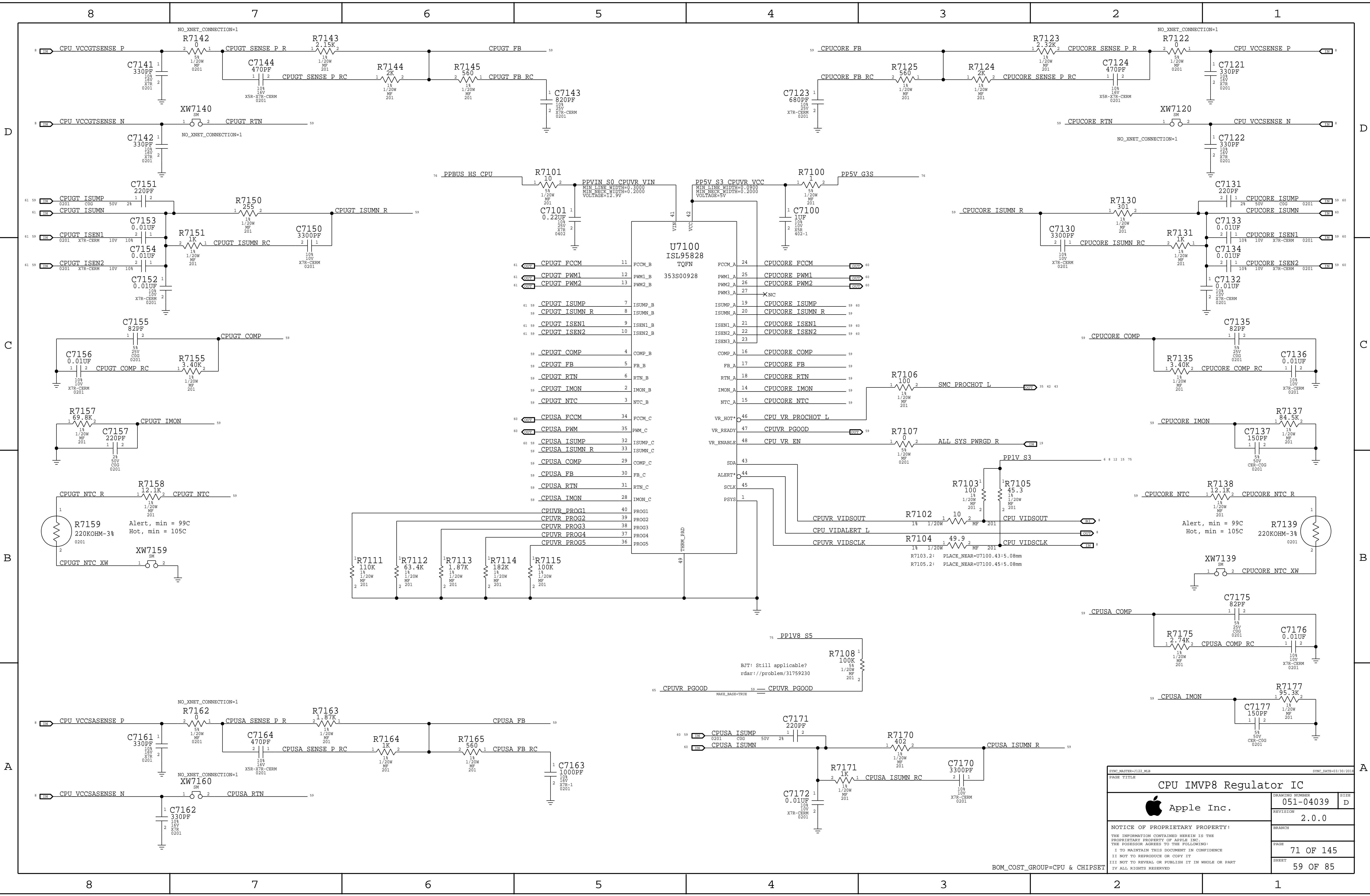
BOM\_COST\_GROUP=TRACKPAD






SYNC_MASTER=X589_BIGSUR		SYNC_DATE=02/15/2017	
PAGE TITLE			
DC-In & Battery Connectors			
 Apple Inc.	DRAWING NUMBER	051-04039	SIZE
	REVISION	2.0.0	D
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BRANCH			
PAGE		69 OF 145	
SHEET		57 OF 85	

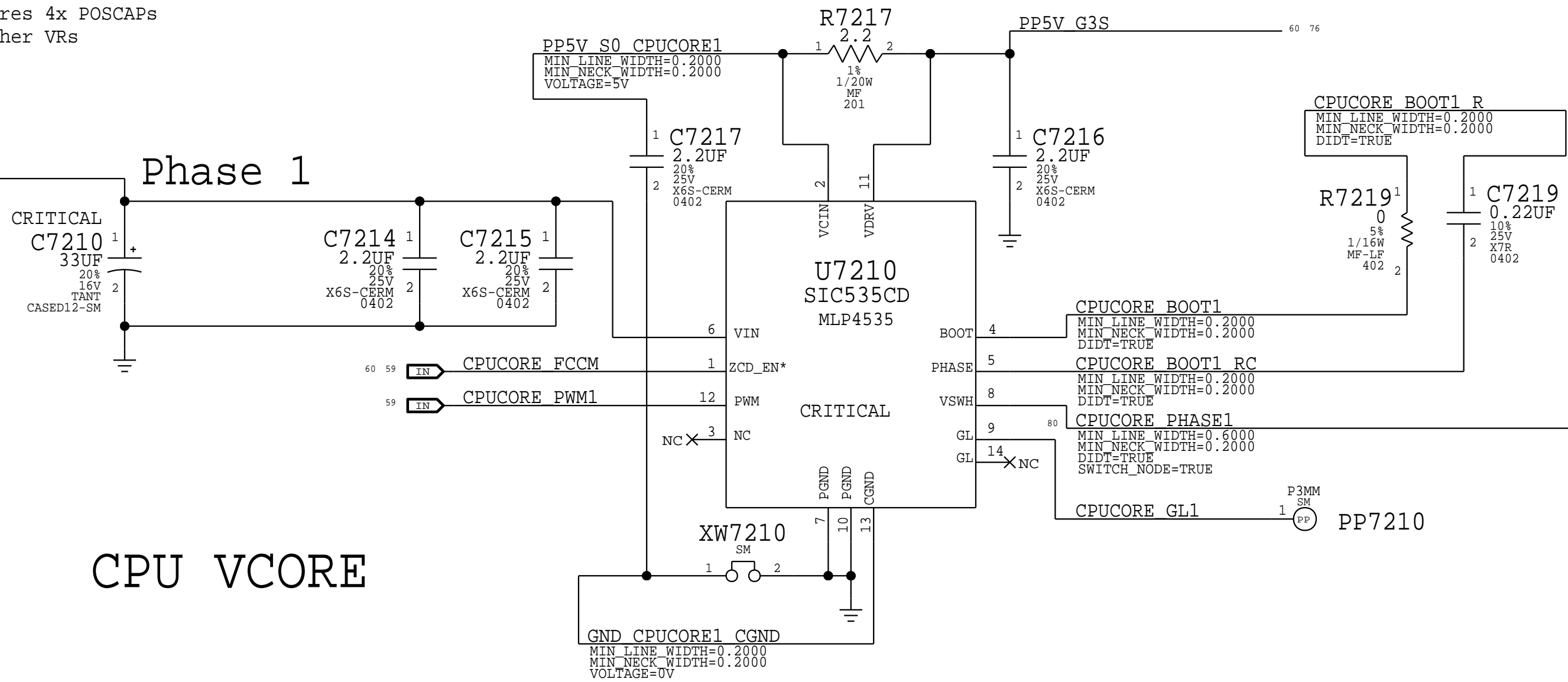




SYNC_MASTER=3122_MLB		SYNC_DATE=03/10/2018	
PAGE TITLE			
CPU IMVP8 Regulator IC			
 Apple Inc.	DRAWING NUMBER	051-04039	SIZE D
	REVISION	2.0.0	
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	SHEET	59 OF 85	

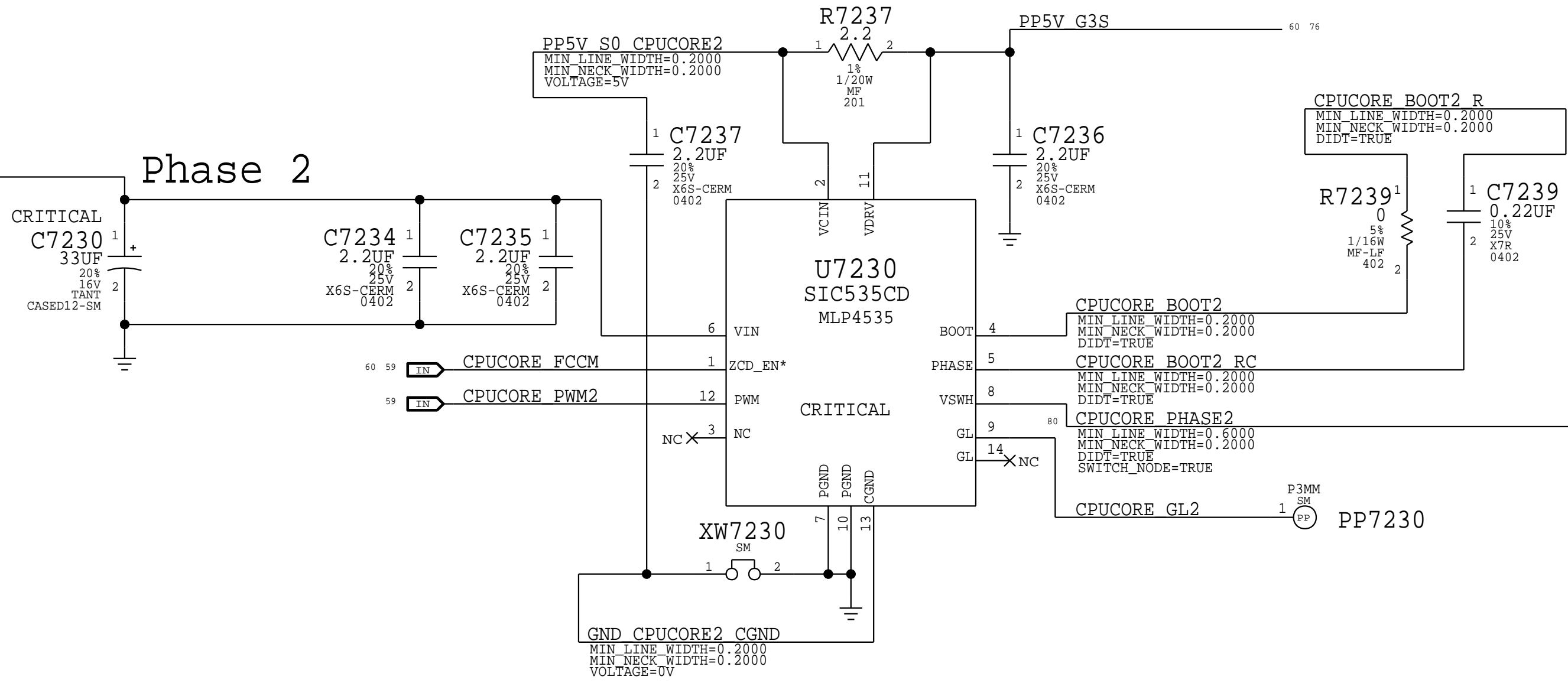
Note:Vcore design requires 4x POSCAPs  
3x shared from other VRs

### Phase 1

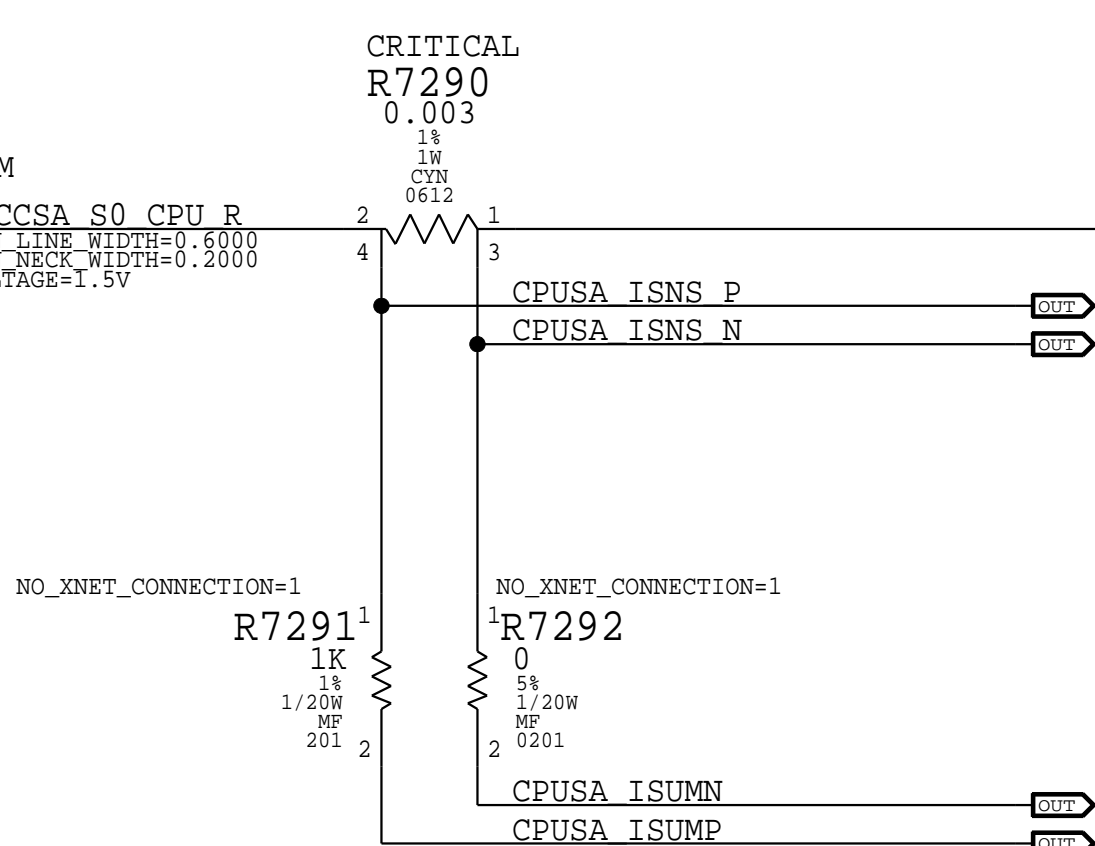
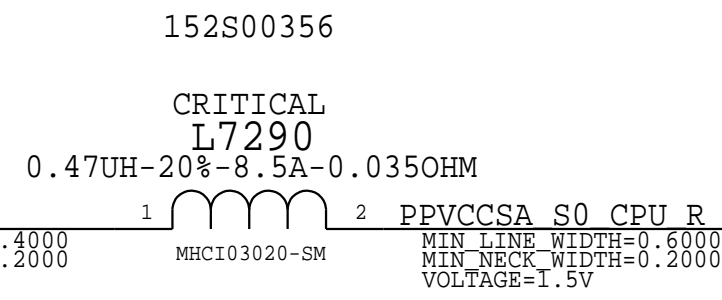
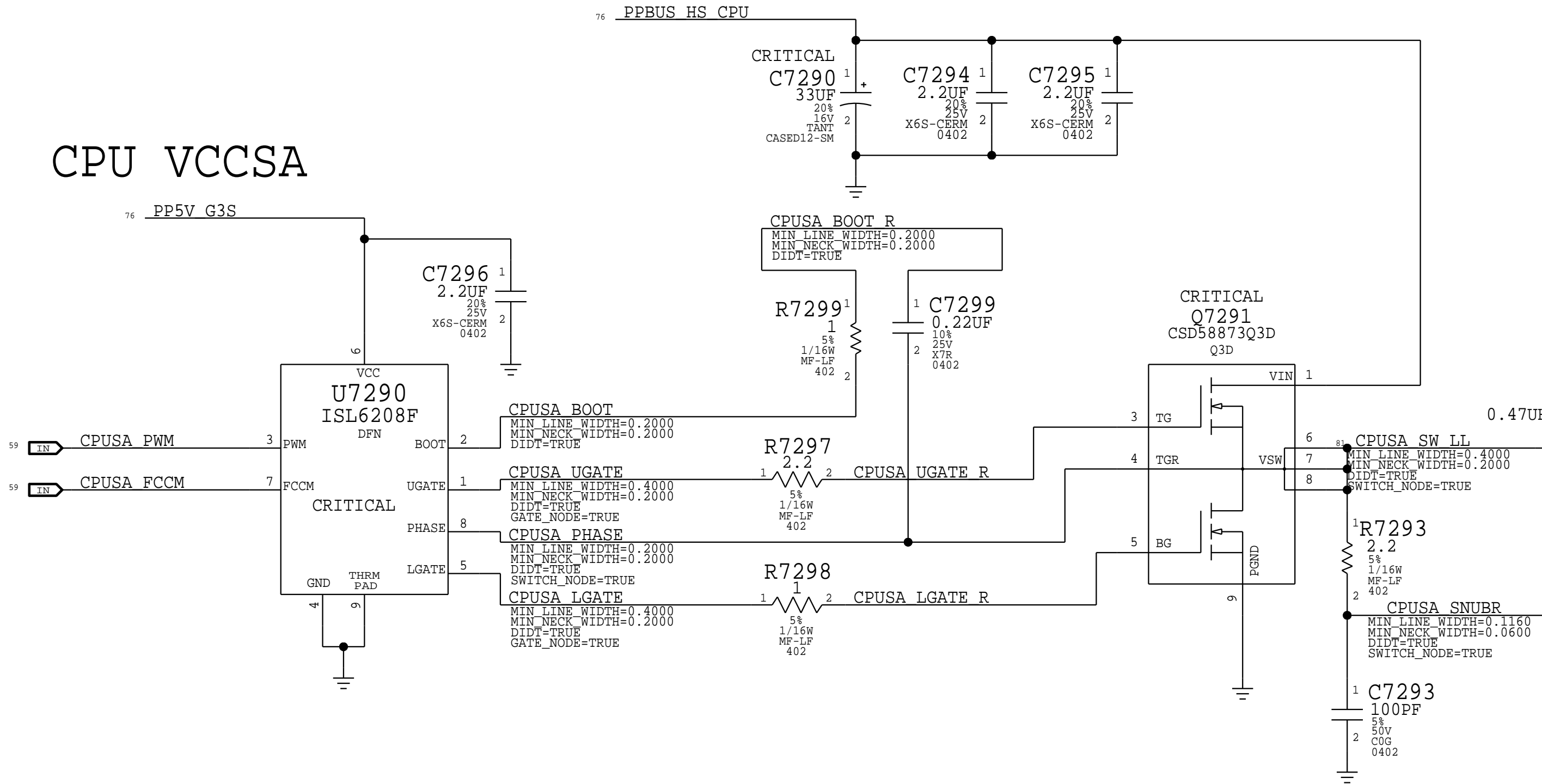


### CPU Vcore


### Phase 2



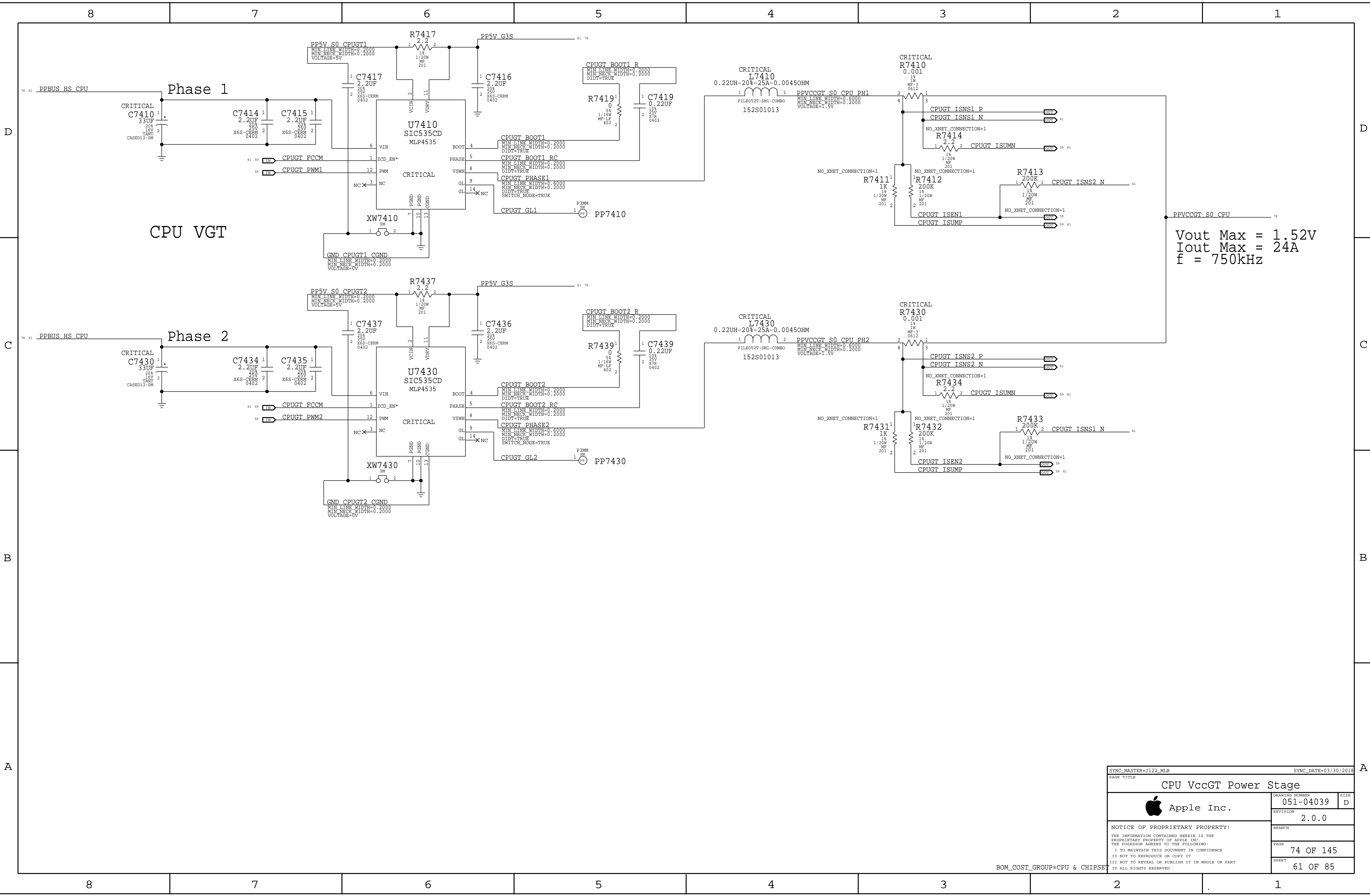
### CPU VCCSA




Vout Max = 1.52V  
Iout Max = 4.1A  
f = 750kHz

SYNC_MASTER=J122_MLB		SYNC_DATE=03/30/2018	
PAGE TITLE			
CPU VCore/VccSA Power Stage			
	DRAWING NUMBER	051-04039	
	REVISION	2.0.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
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		SHEET	60 OF 85

BOM\_COST\_GROUP=CPU & CHIPSET



SYNC_MASTER=J122_MLB		SYNC_DATE=03/30/2018	
PAGE TITLE			
CPU VccGT Power Stage			
	DRAWING NUMBER	051-04039	SIZE D
	REVISION	2.0.0	
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NOTICE OF PROPRIETARY PROPERTY:		PAGE	74 OF 145
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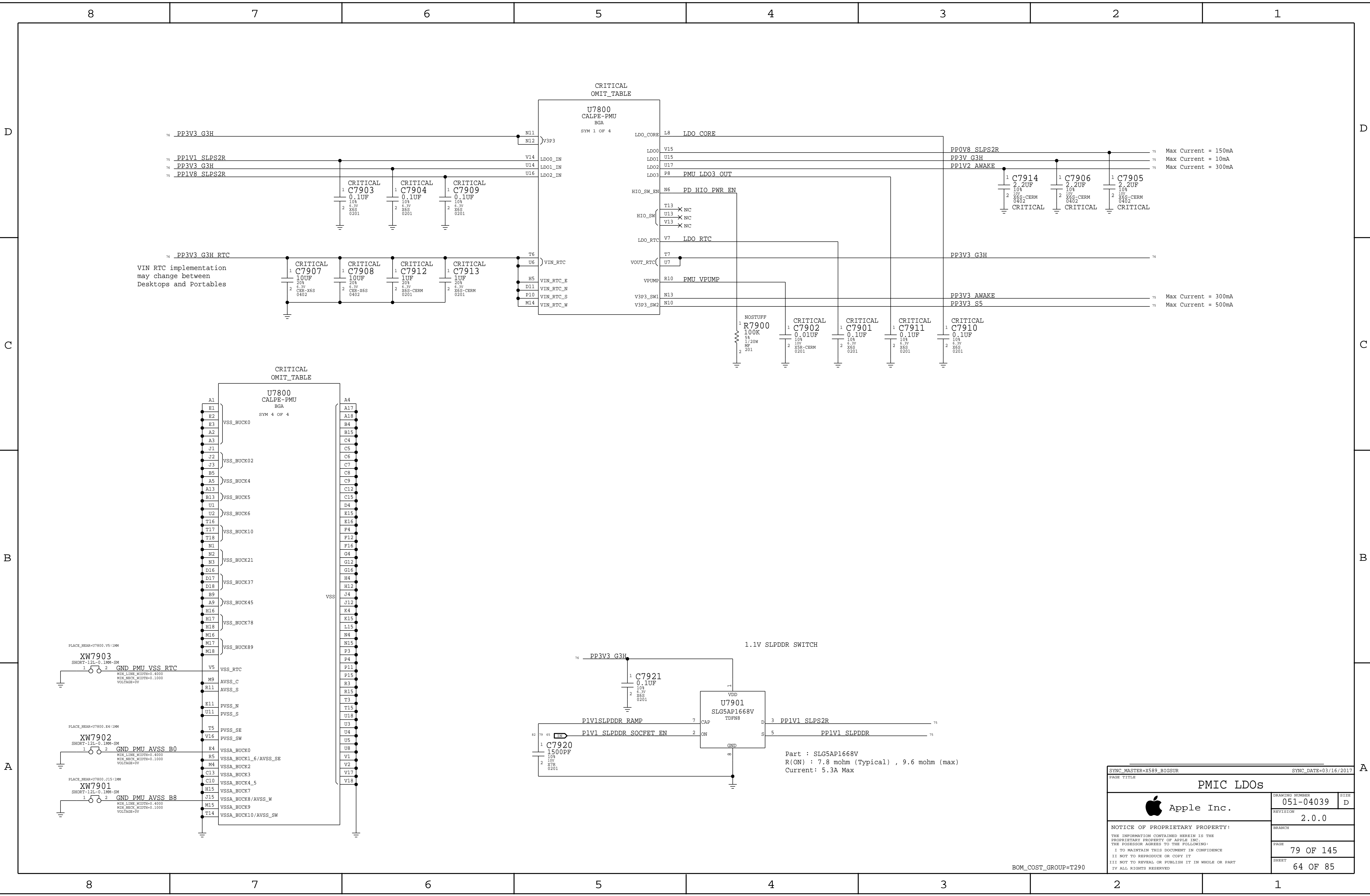
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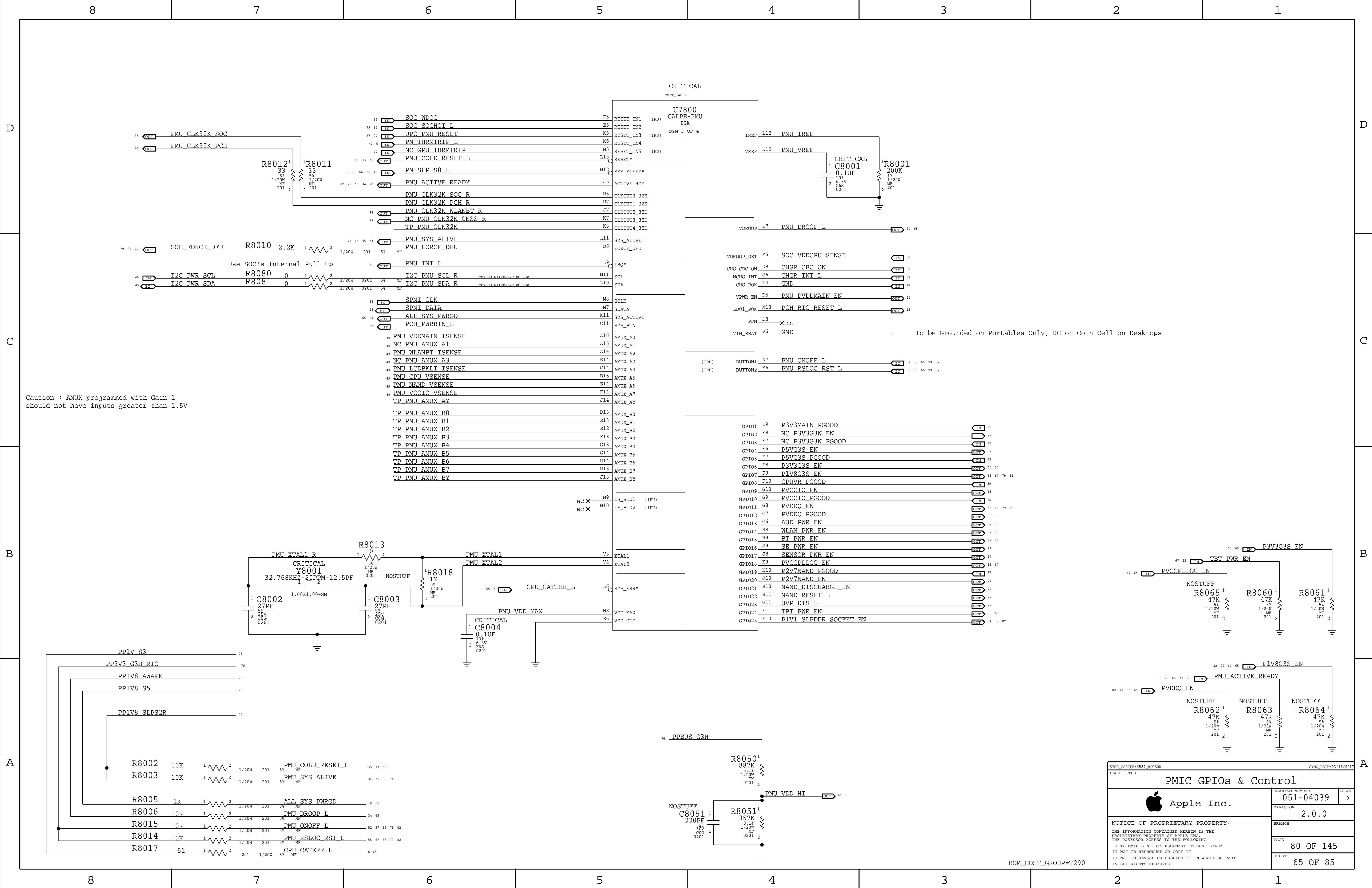


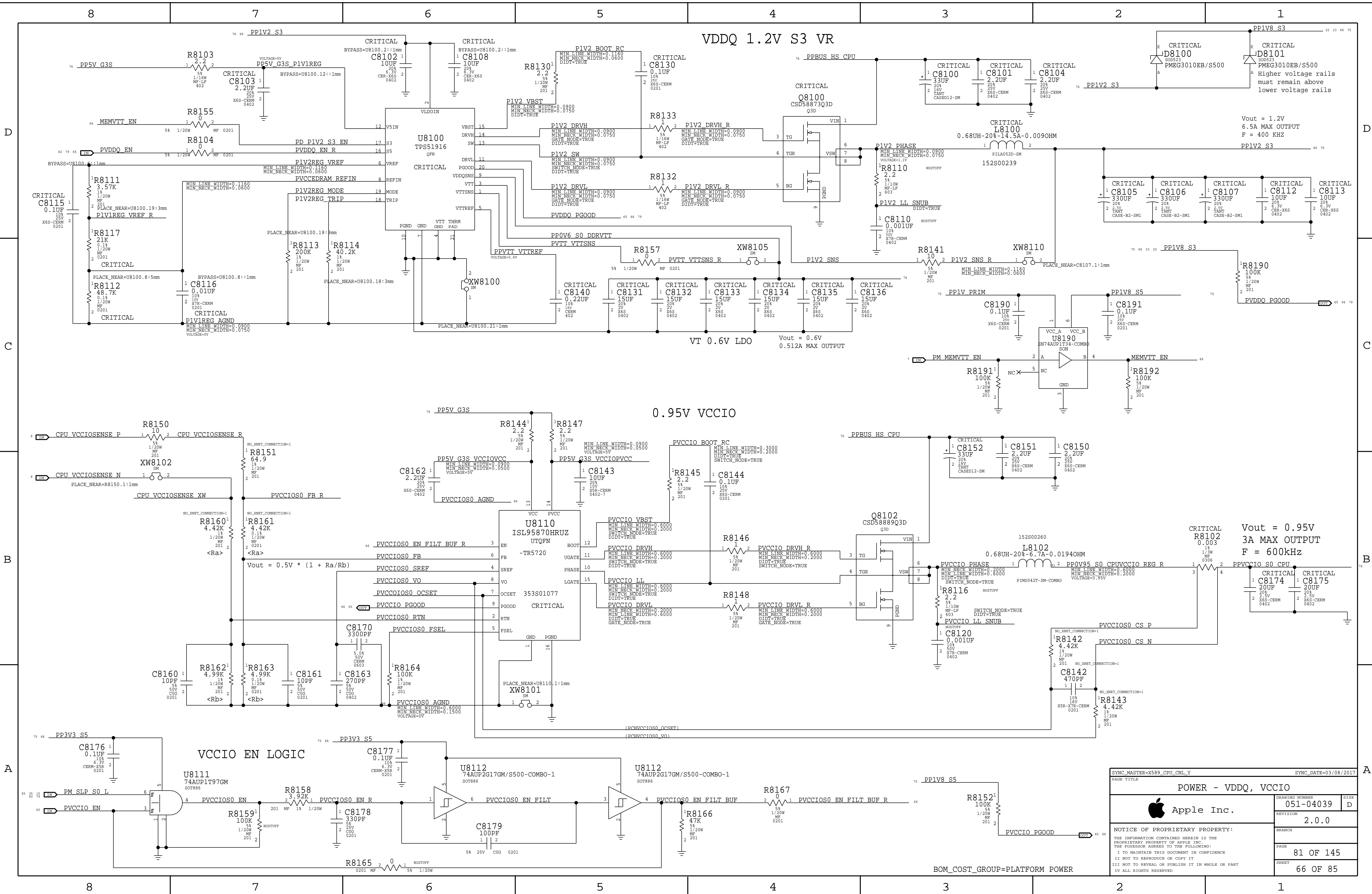




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	PAGE	79 OF 145	
	SHEET	64 OF 85	

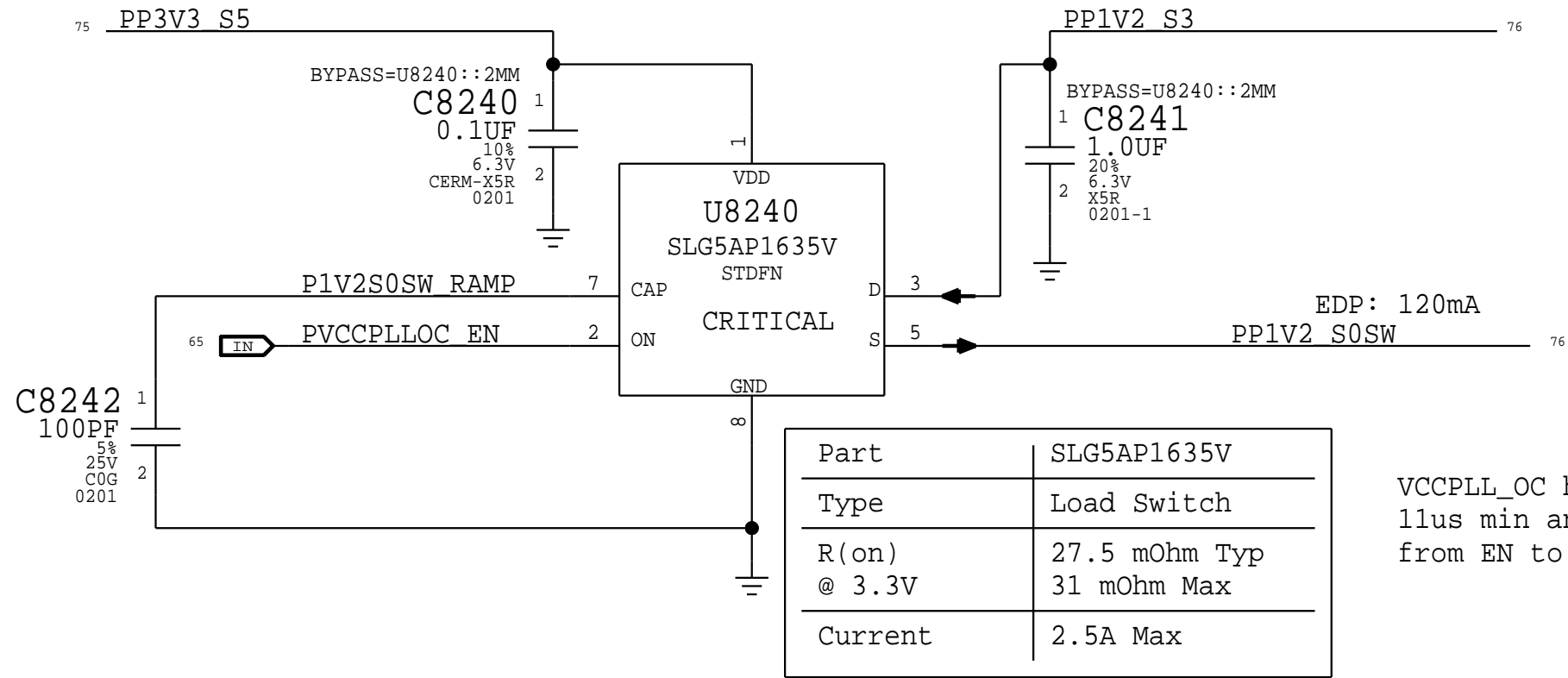
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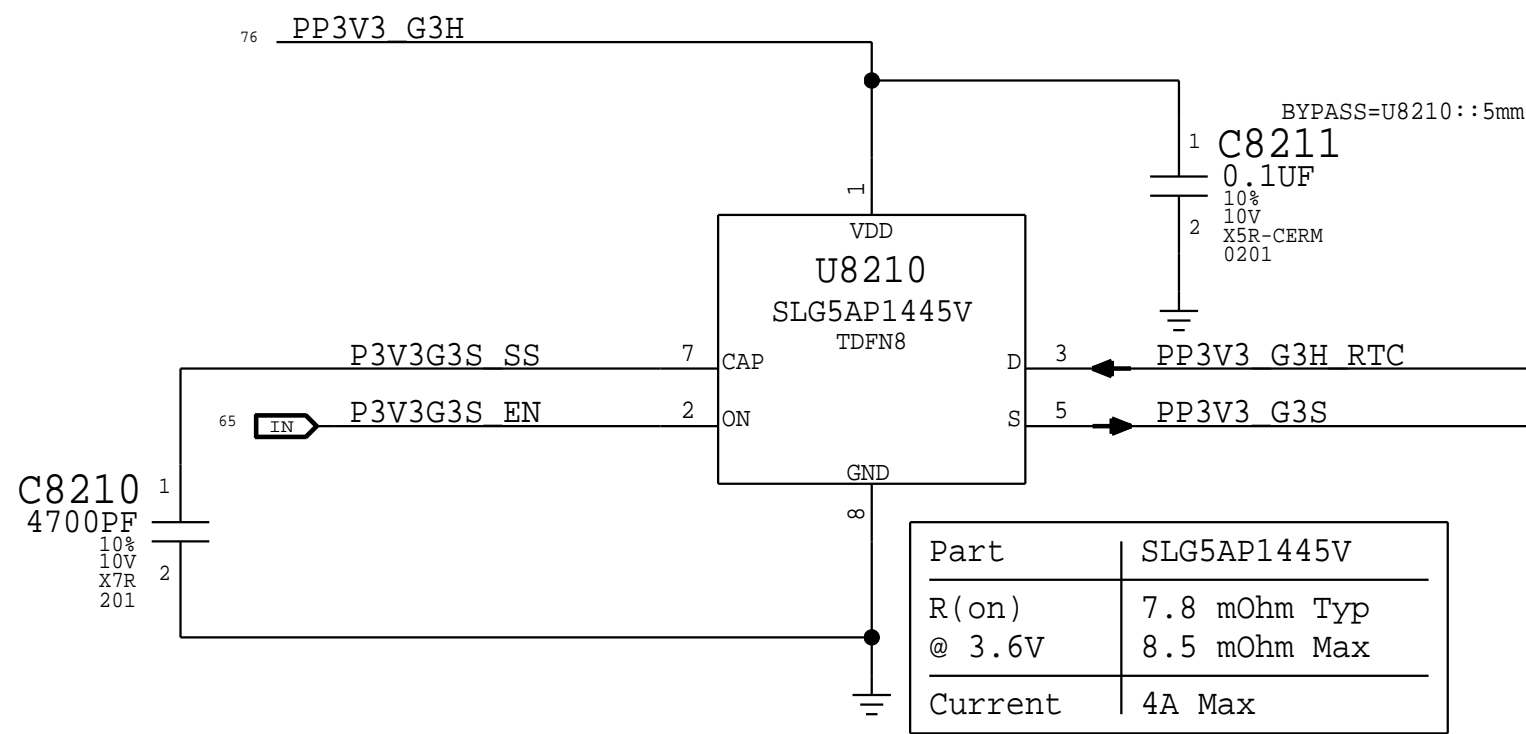


1.2V S0SW VCCPLL\_OC Switch



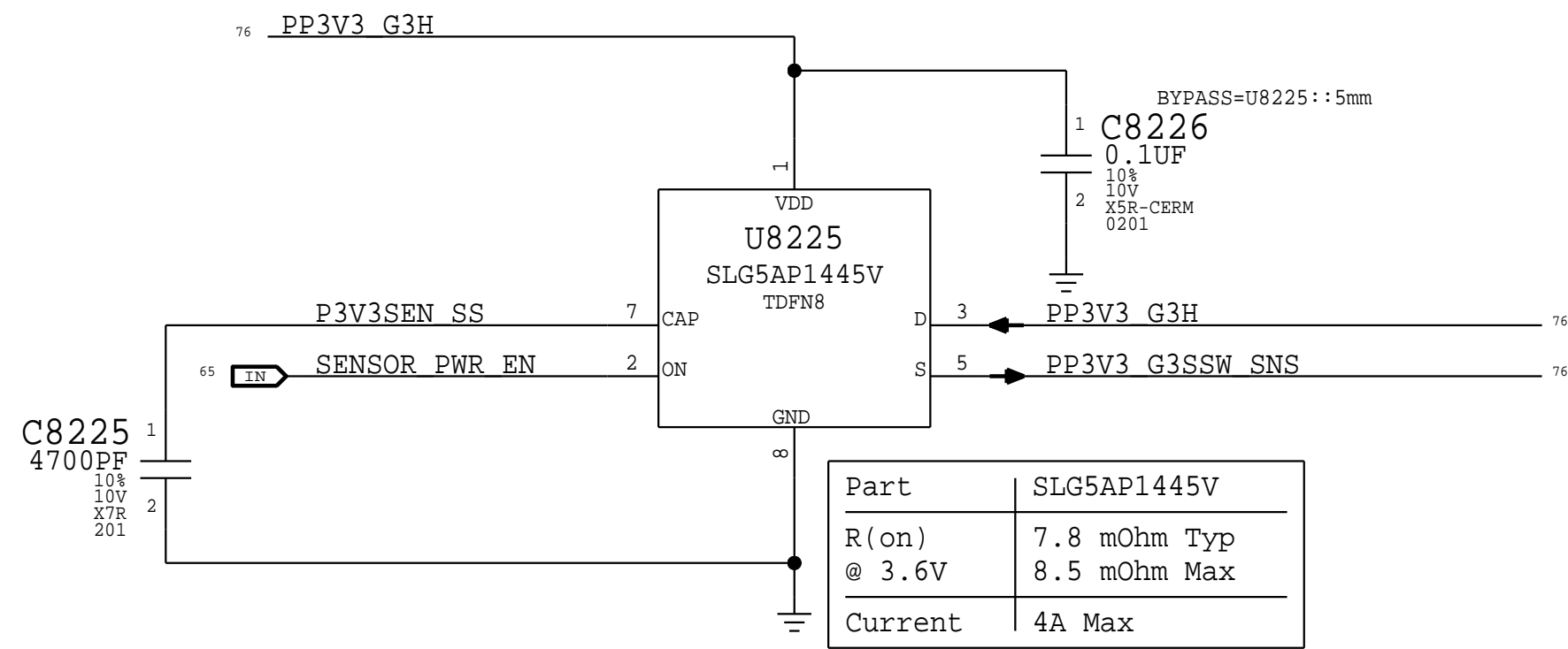
VCCPLL\_OC had turn-on requirement of 11us min and 240us max from EN to 1.2V

3.3V G3 Standby Switch



EG: Check load current & shrink switch?

3.3V Sensors Switch

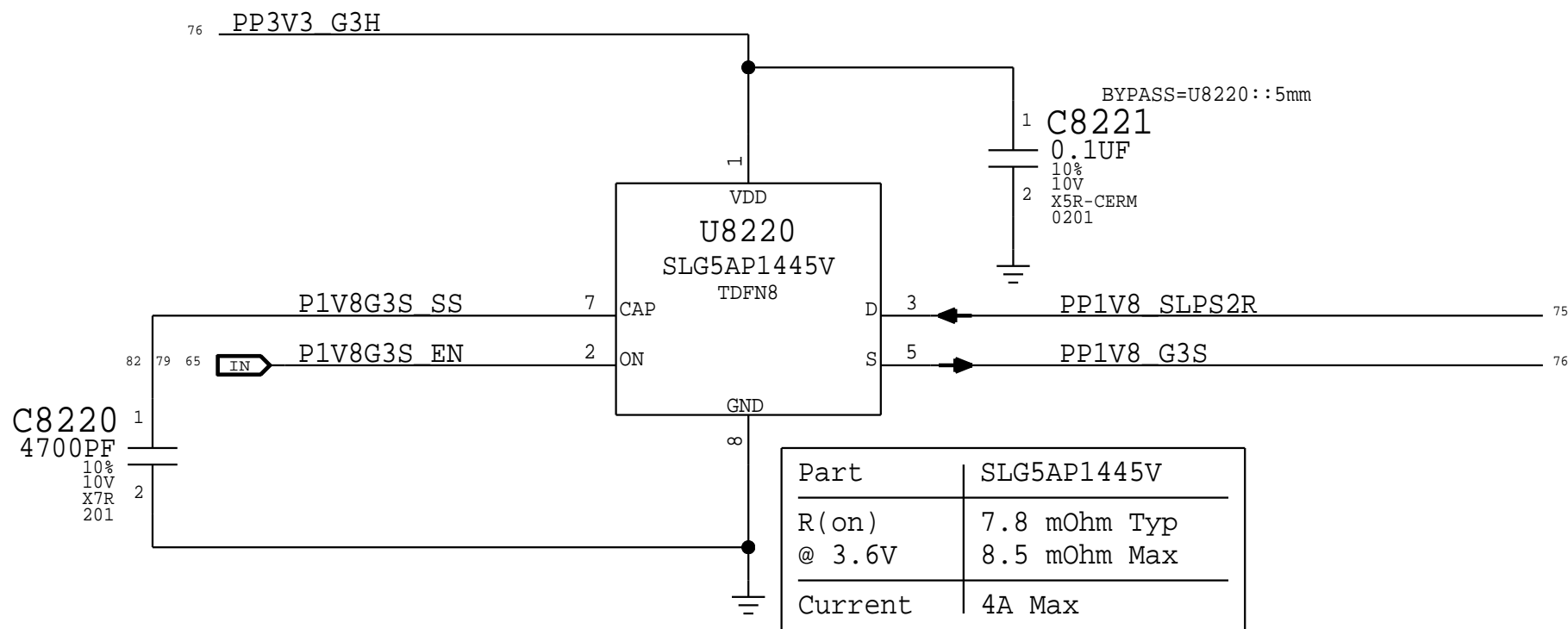


System Power States

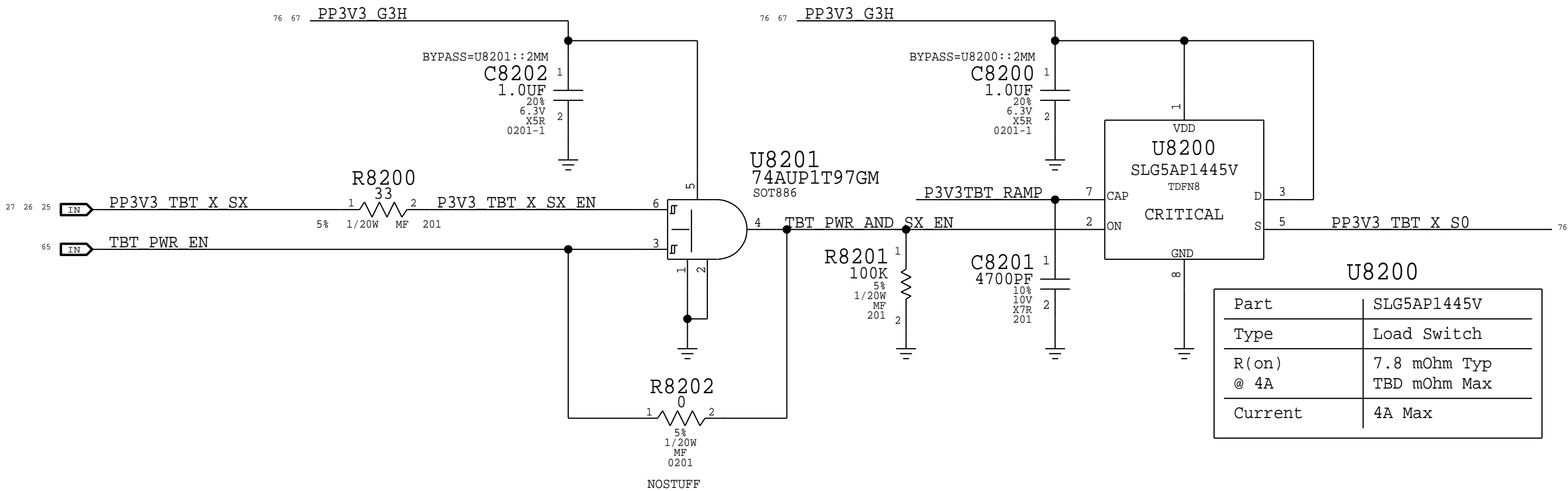
System State:	Shutdown (G3H)		Standby (G3S)		Standby (S4)		Sleep (S0i/S3)		Run (S0)	
	CPU/PCH State:		Off (RTC Only)		Standby		Sleep		Run	
Rails	SoC State:		S2R	Awake	S2R	Awake	S2R	Awake	S2R	Awake
PP*_S2R (0.8,1.1,1.8V)	On	On	On	On	On	On	On	On	On	On
PP*_DDR (0.8,0.9,1.1V)	Off	On	Off	On	Off	On	Off	On	On	On
PP*_AWAKE (CPU,SRAM,1.2,1.8,3.3V)	Off	On	Off	On	Off	On	Off	On	On	On
PP3V3_G3H (VR1)	On	On	On	On	On	On	On	On	On	On
PP1S_G3H	On	On	On	On	On	On	On	On	On	On
PP*_G3S (1.8,3.3,5V)	Off	On	On	On	On	On	On	On	On	On
PP*_S5 (1.8,3.3V)	Off	Off	Off	Off	On	On	On	On	On	On
CPU/PCH VRs	Off	Off	Off	Off	Off/On	Off/On	Off/On	Off/On	On	On


- \* System: Shutdown Awake is a transition state only.
- \* SoC: SLP\_DDR is a transition state only.
- \* CPU/PCH: S4 is only used by desktops for USB wakes.
- \* CPU/PCH: S5 is a transition state. May also be used for RTC wakes.

1.8V G3 Standby Switch




3.3V S0SW TBT Switch



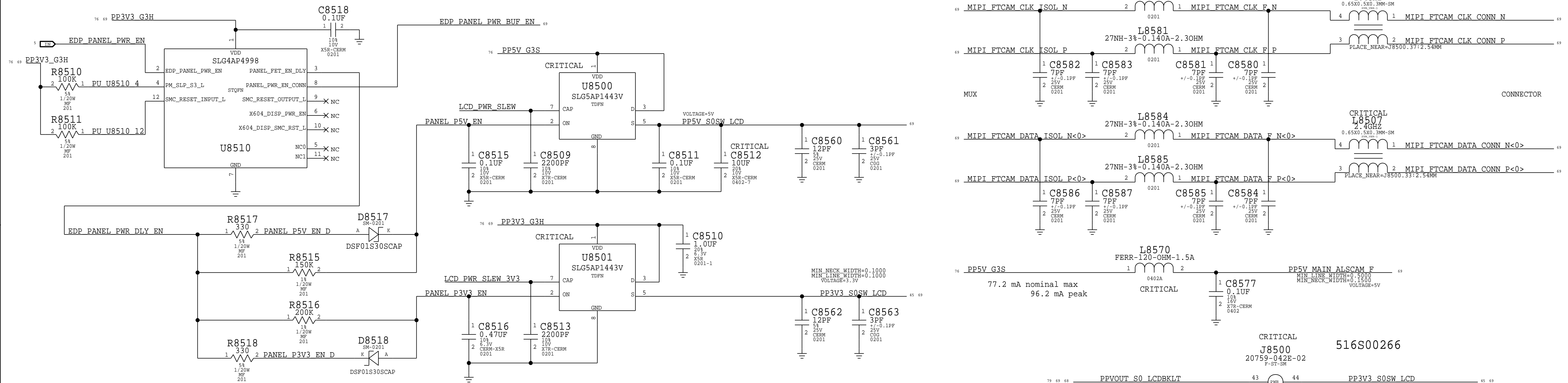
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	PAGE	82 OF 145
	SHEET	67 OF 85



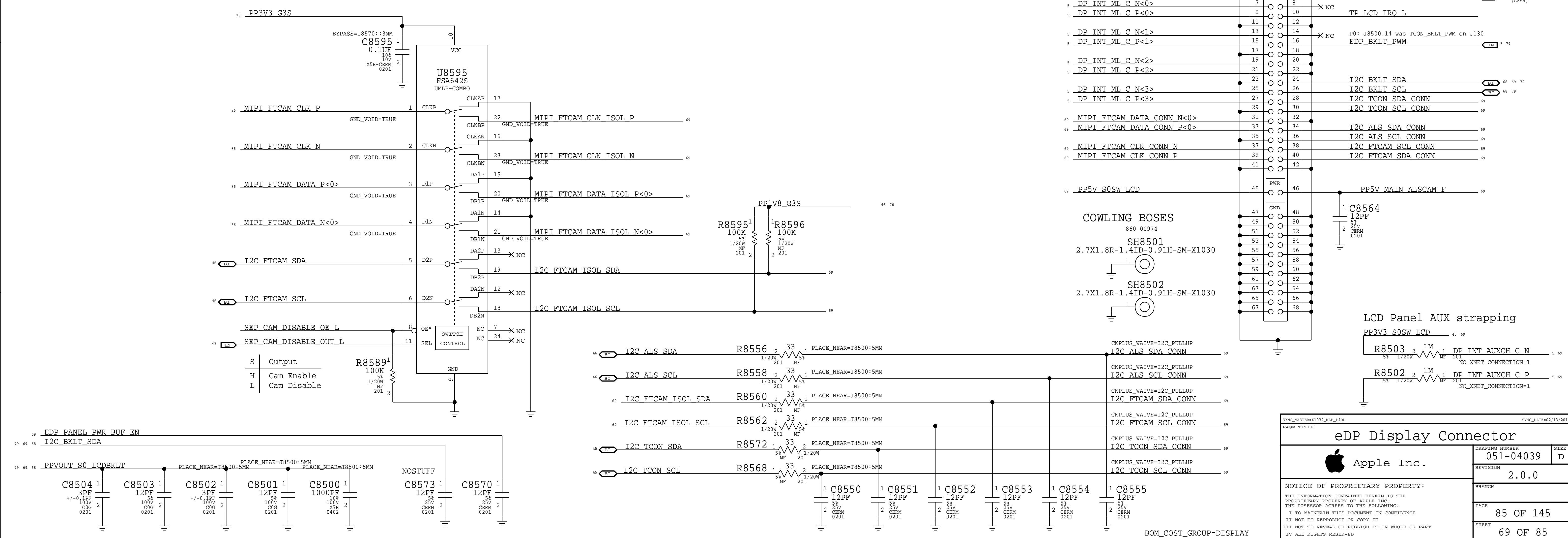
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				68 OF 85	



LCD PANEL INTERFACE (eDP) + Camera (MIPI)



FTCAM Secure Disable

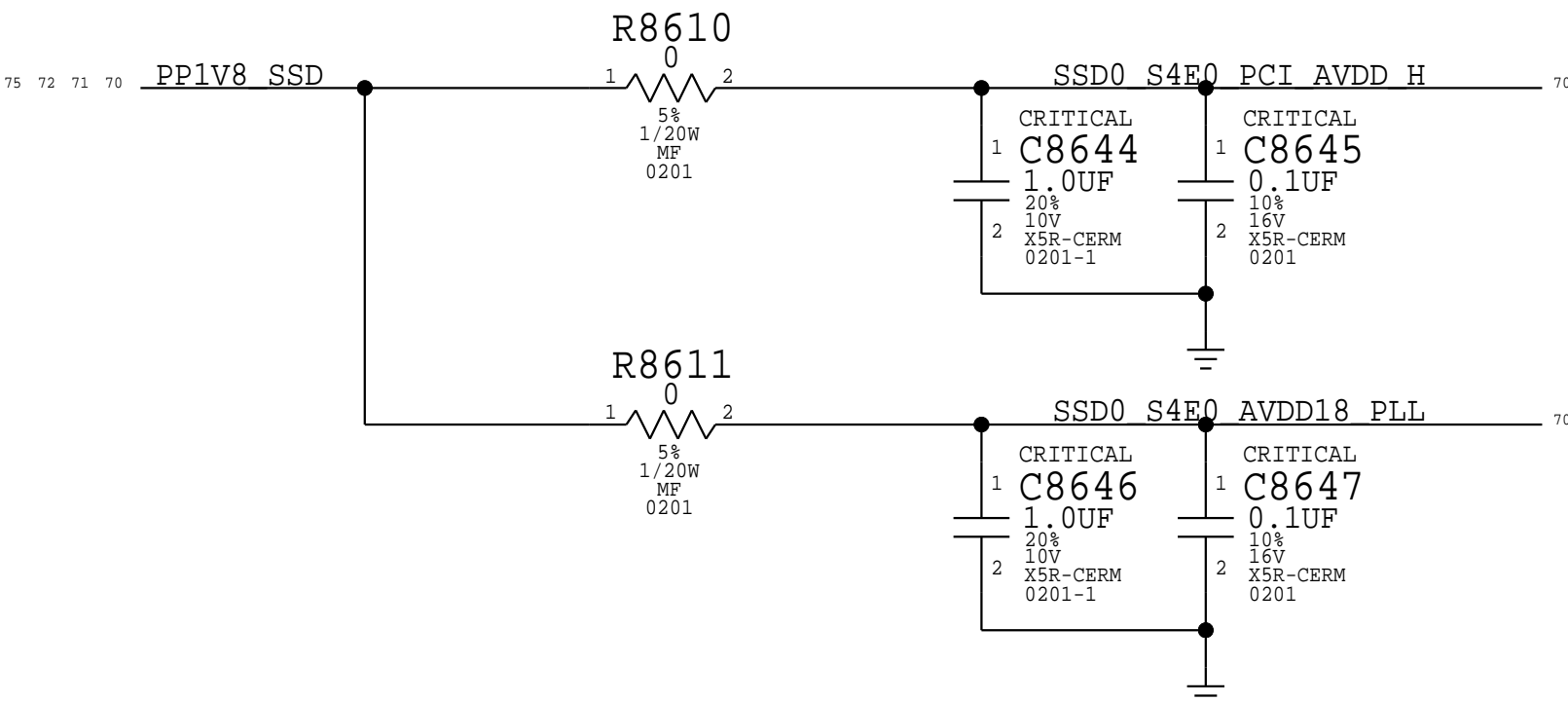
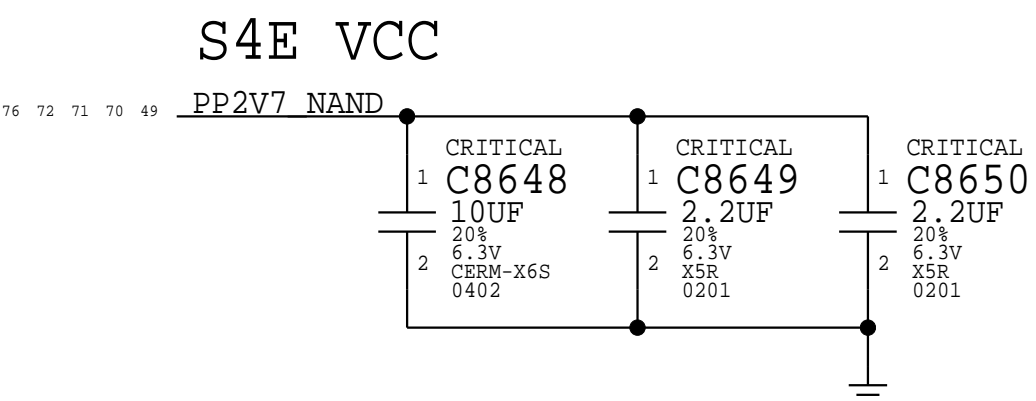
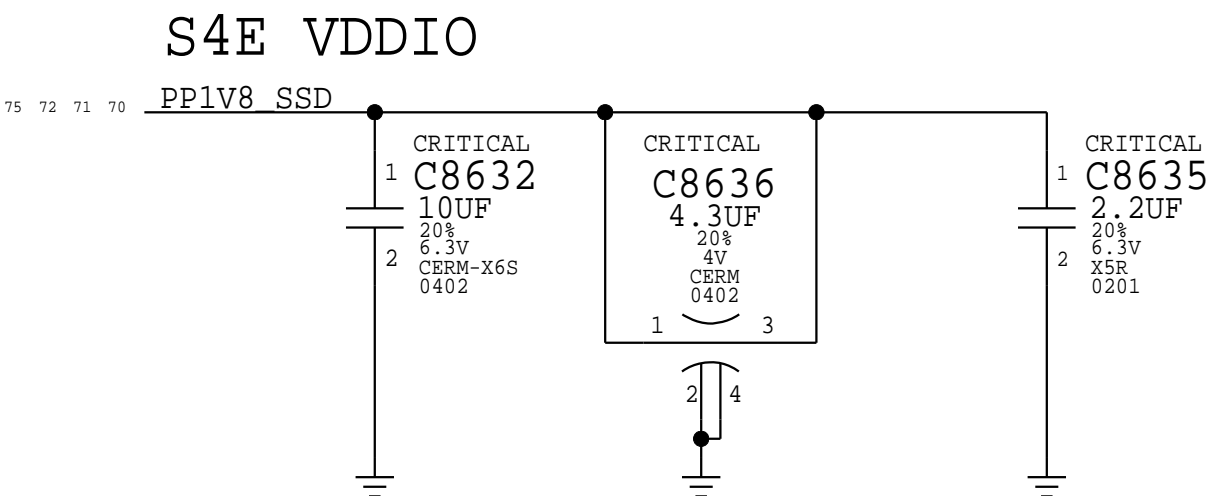
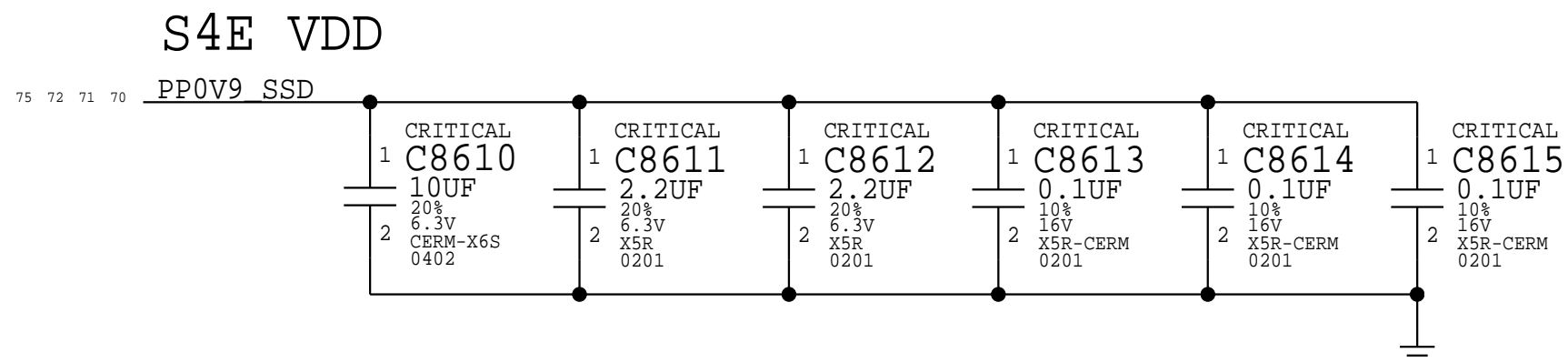
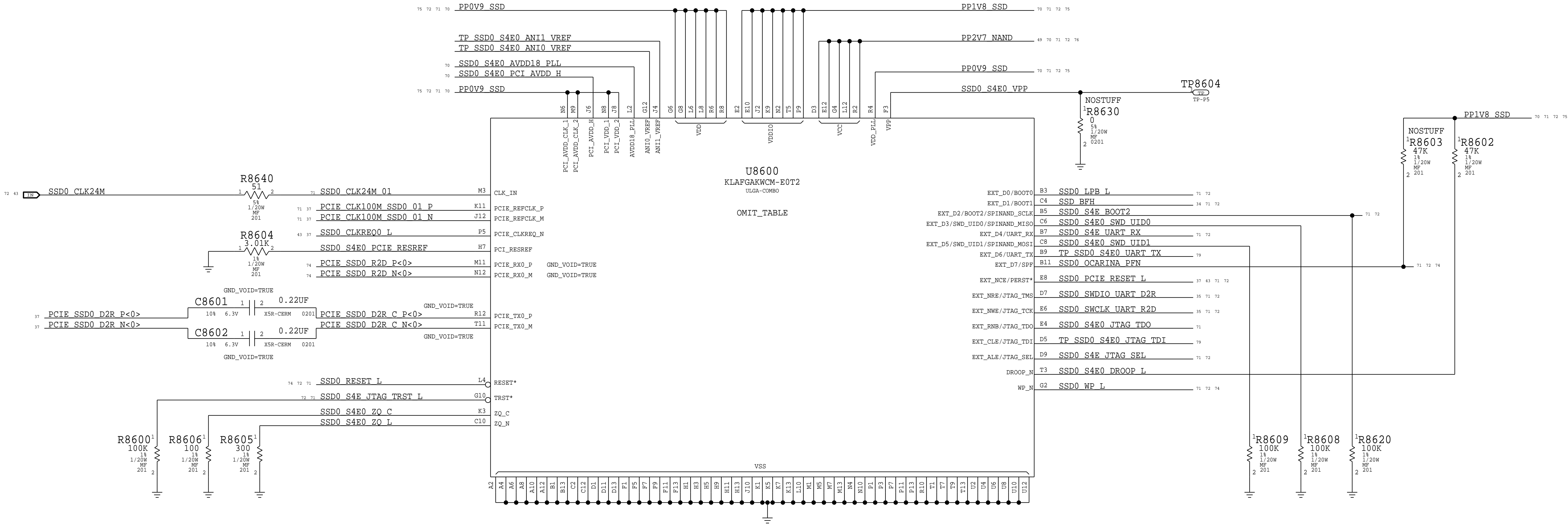


Apple Inc. eDP Display Connector


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PAGE: 85 OF 145  
SHEET: 69 OF 85

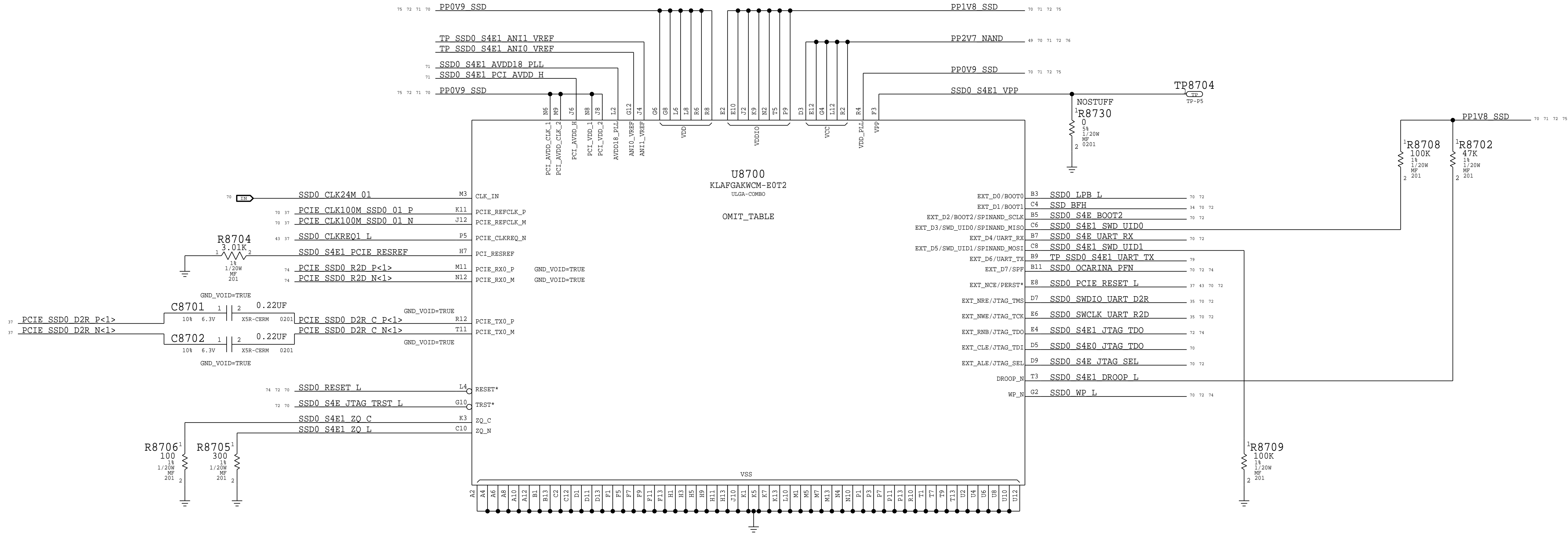
S4E0



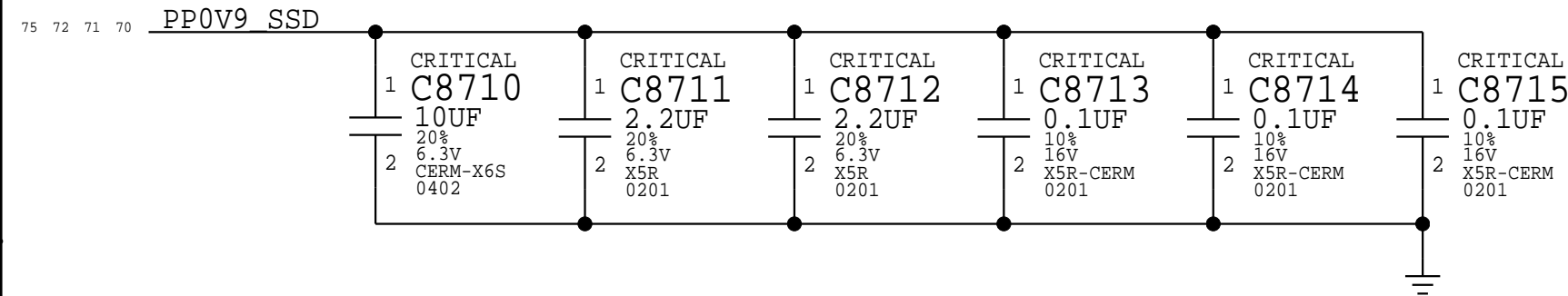
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			SHEET		

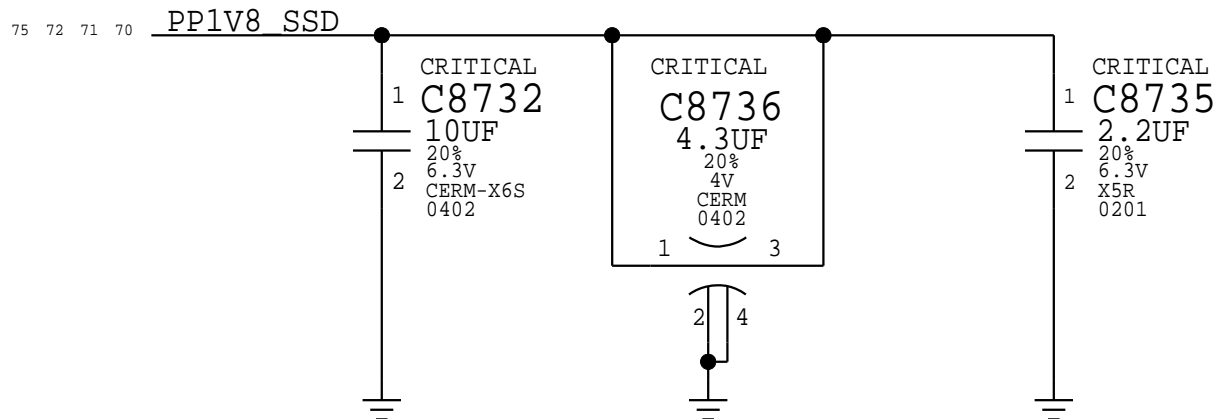
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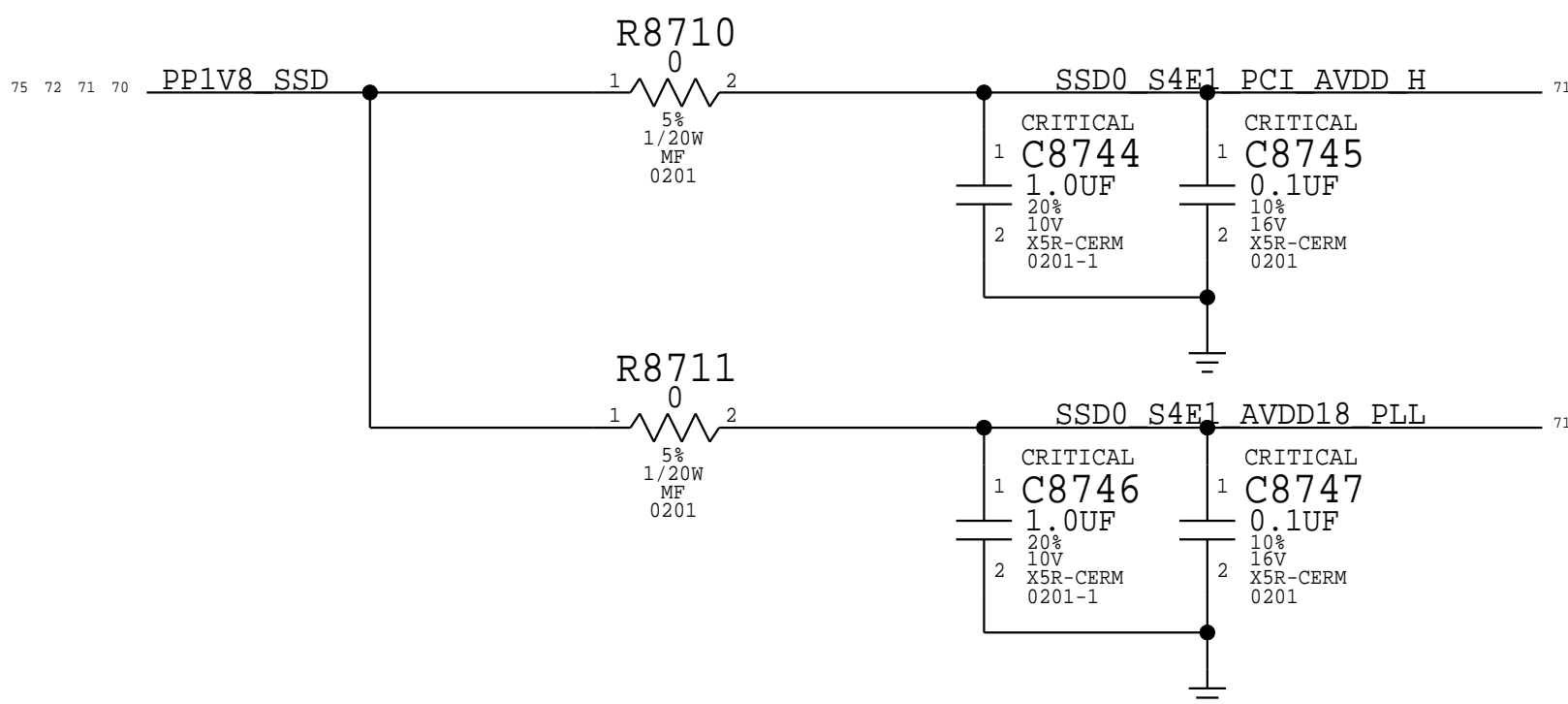
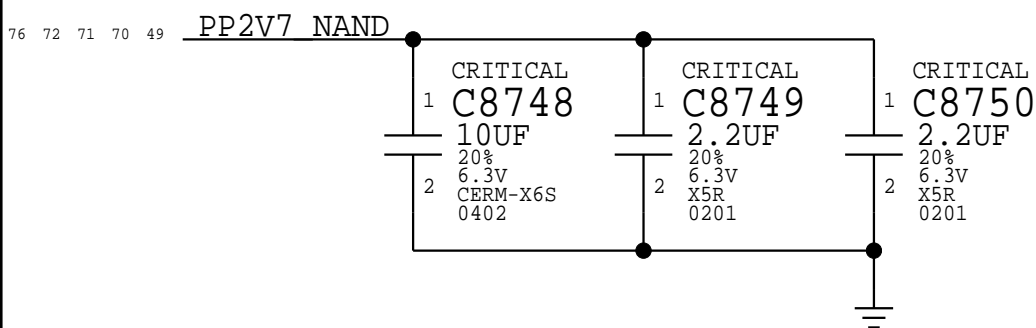
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## S4E VDDIO



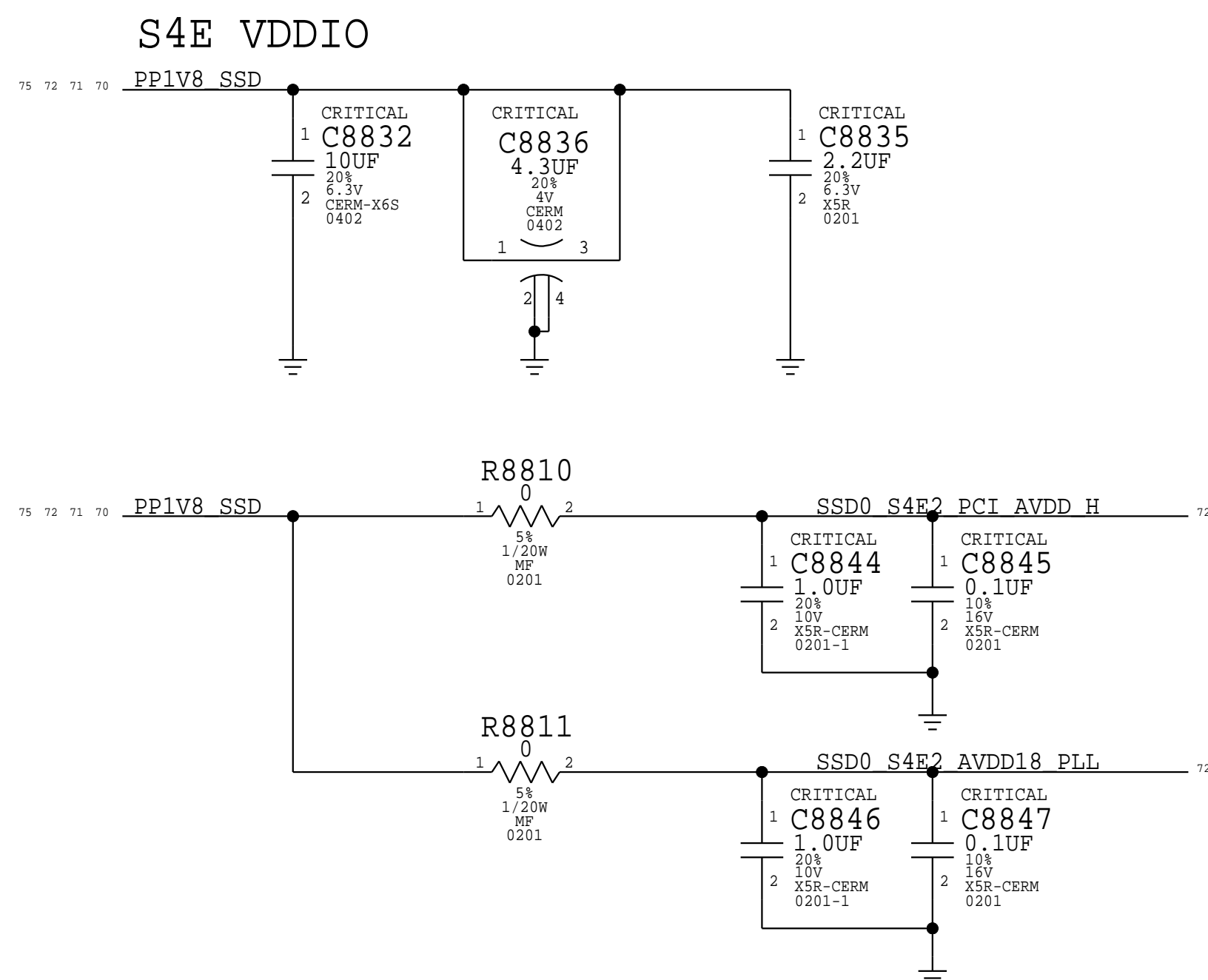
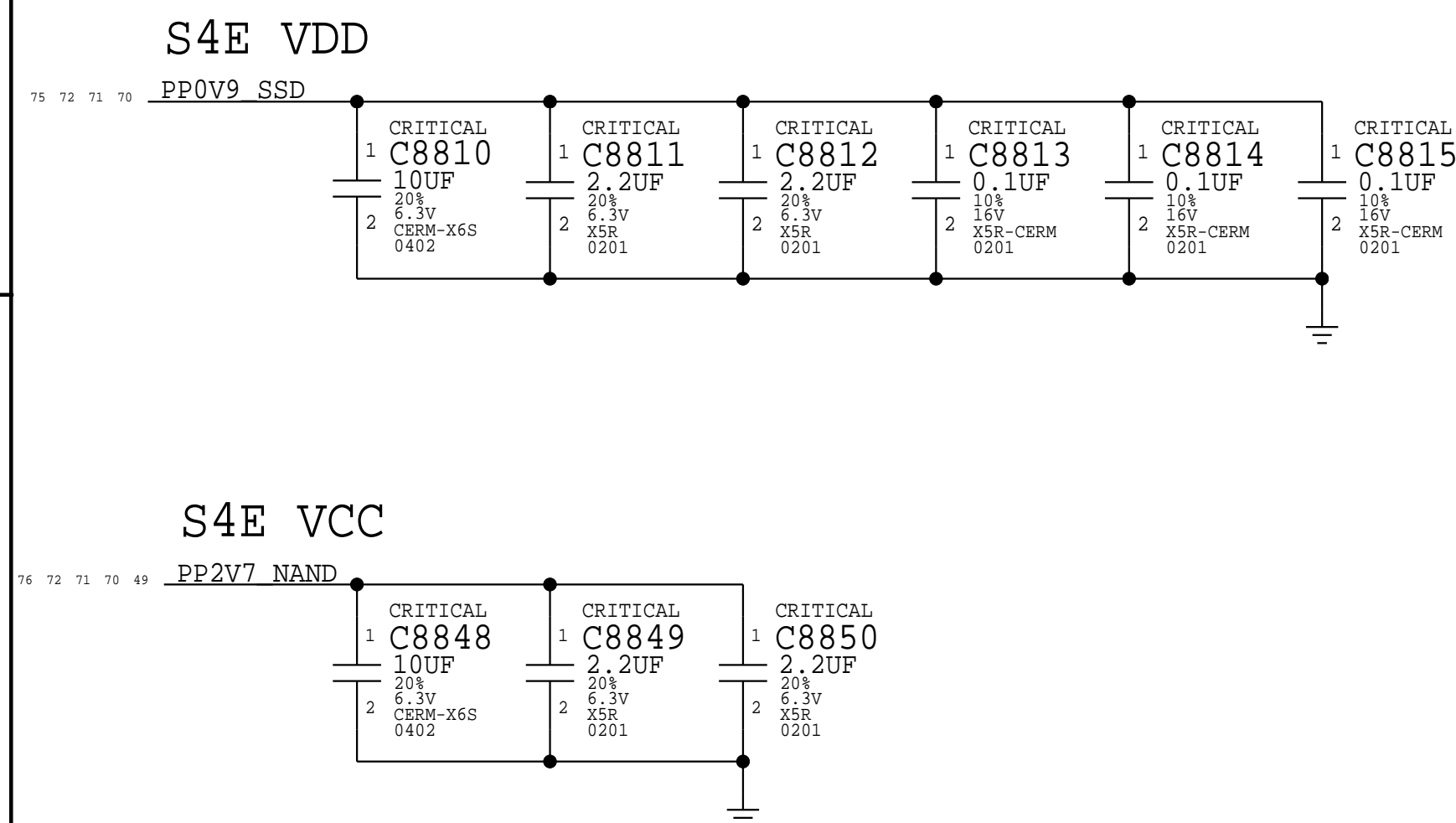
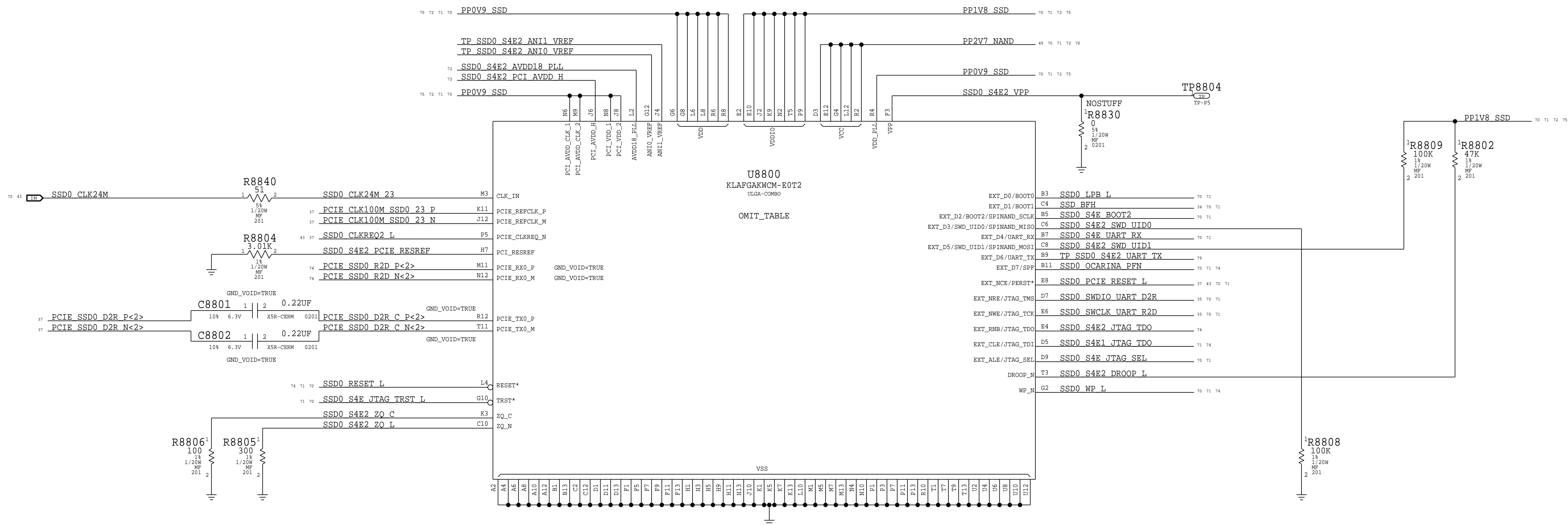
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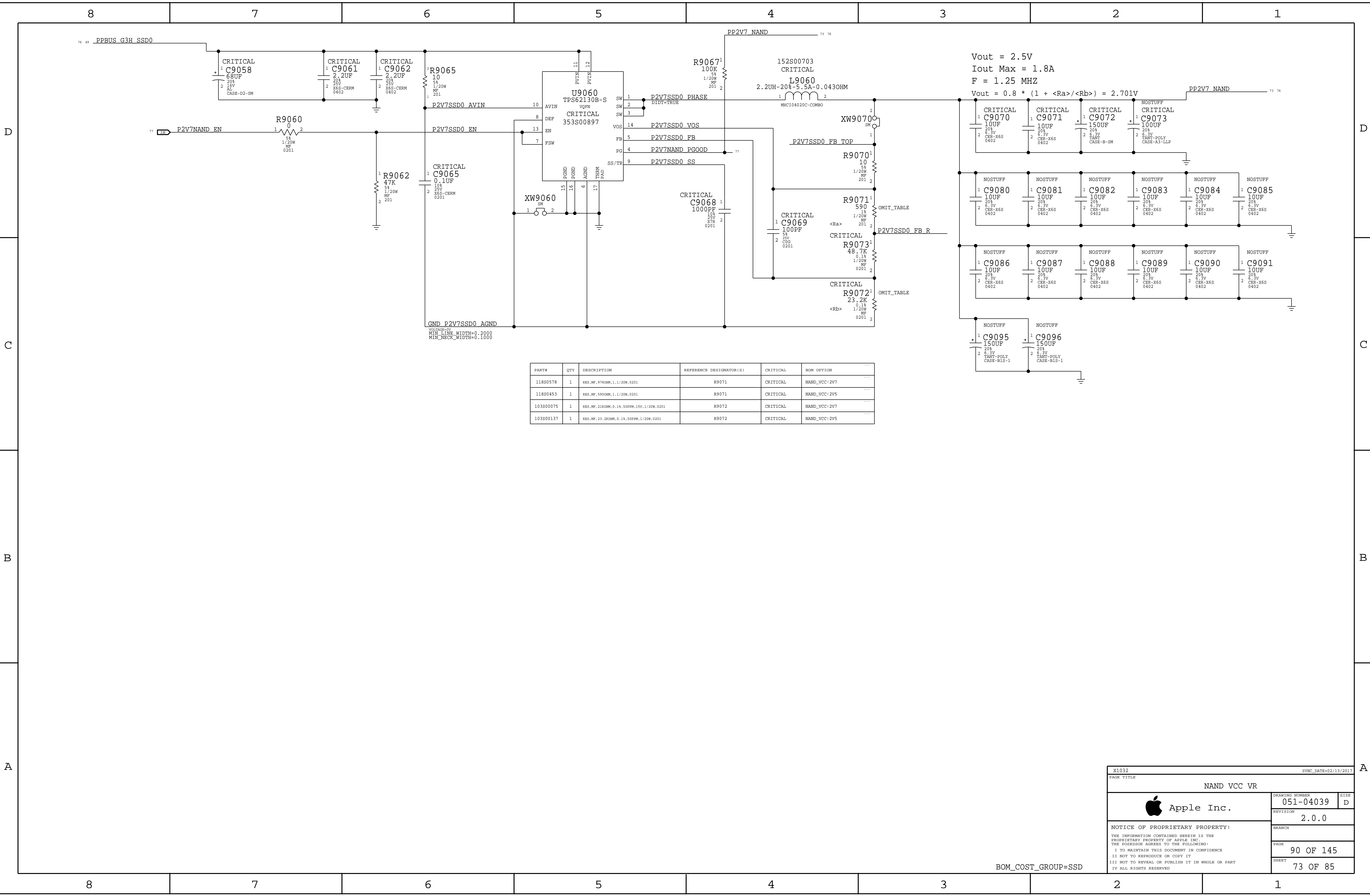
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		PAGE	87 OF 145
		SHEET	71 OF 85

BOM\_COST\_GROUP=SSD


# S4E2



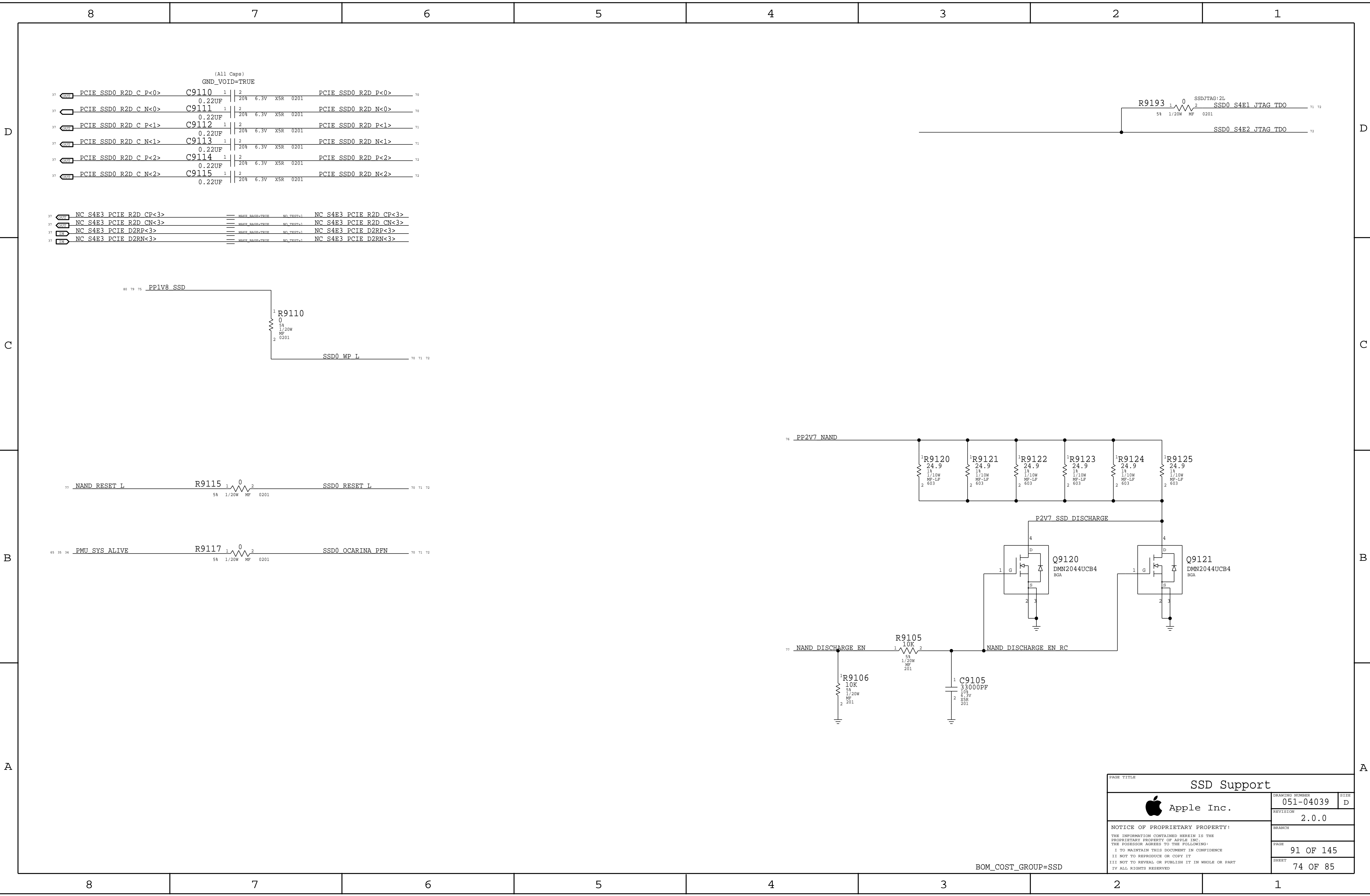
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		PAGE	
		88 OF 145	
		SHEET	
		72 OF 85	




PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0578	1	RES,MF,976OHM,1.1/20W,0201	R9071	CRITICAL	NAND_VCC:2V7
118S0453	1	RES,MF,590OHM,1.1/20W,0201	R9071	CRITICAL	NAND_VCC:2V5
103S00075	1	RES,MF,21KOHM,0.1%,50PPM,15V,1/20W,0201	R9072	CRITICAL	NAND_VCC:2V7
103S00137	1	RES,MF,23.2KOHM,0.1%,50PPM,1/20W,0201	R9072	CRITICAL	NAND_VCC:2V5

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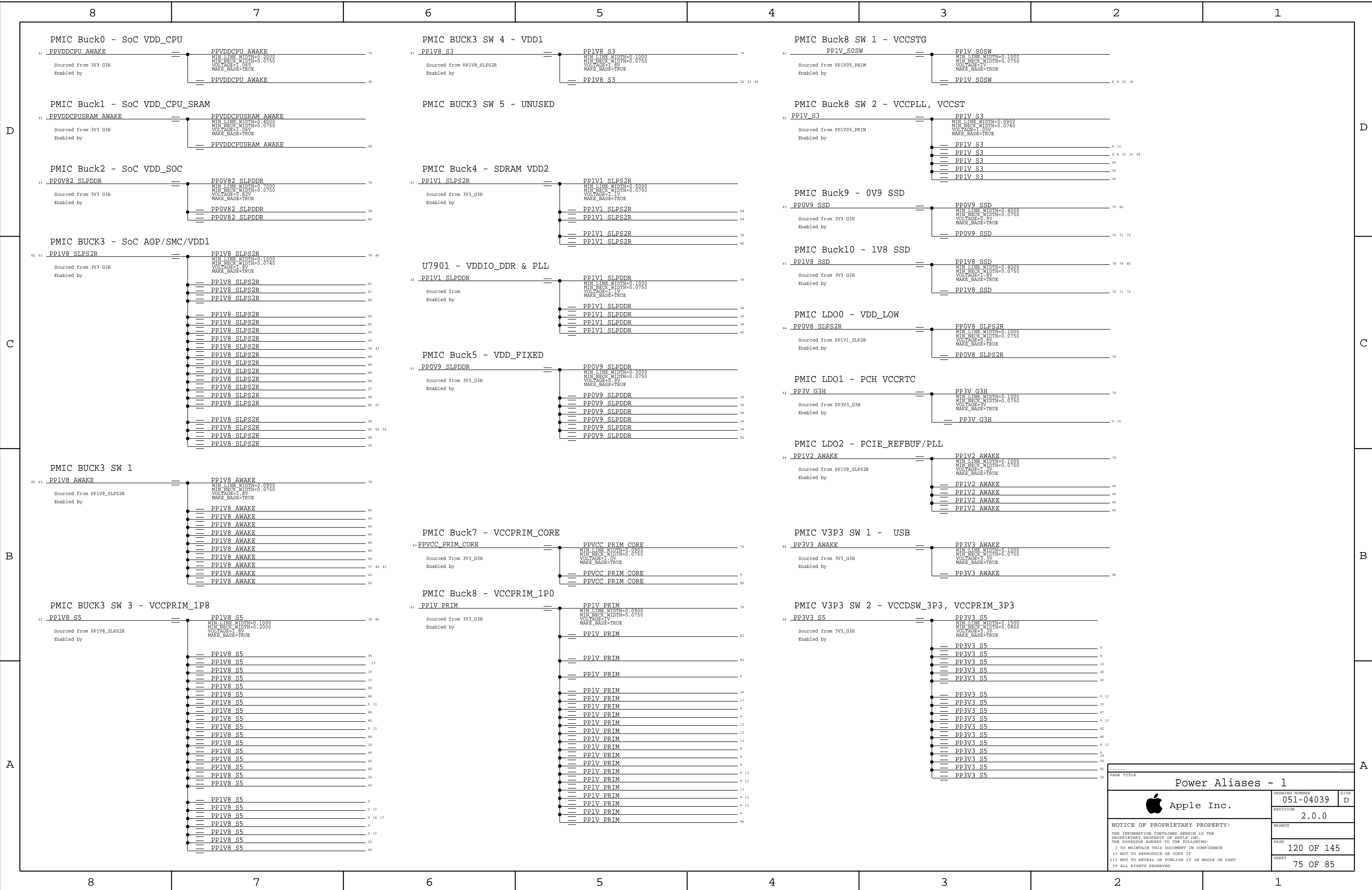
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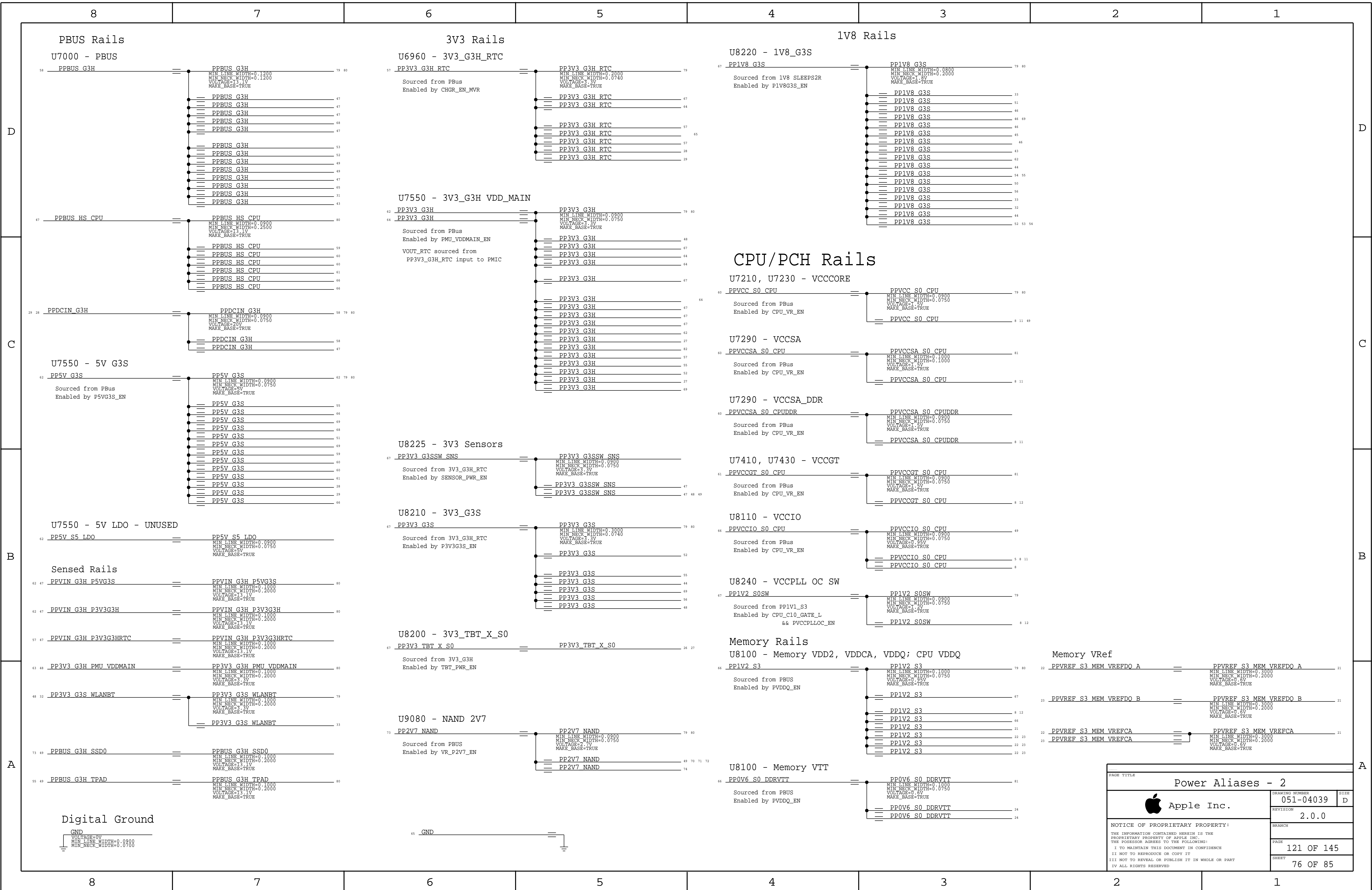


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	PAGE	91 OF 145
	SHEET	74 OF 85

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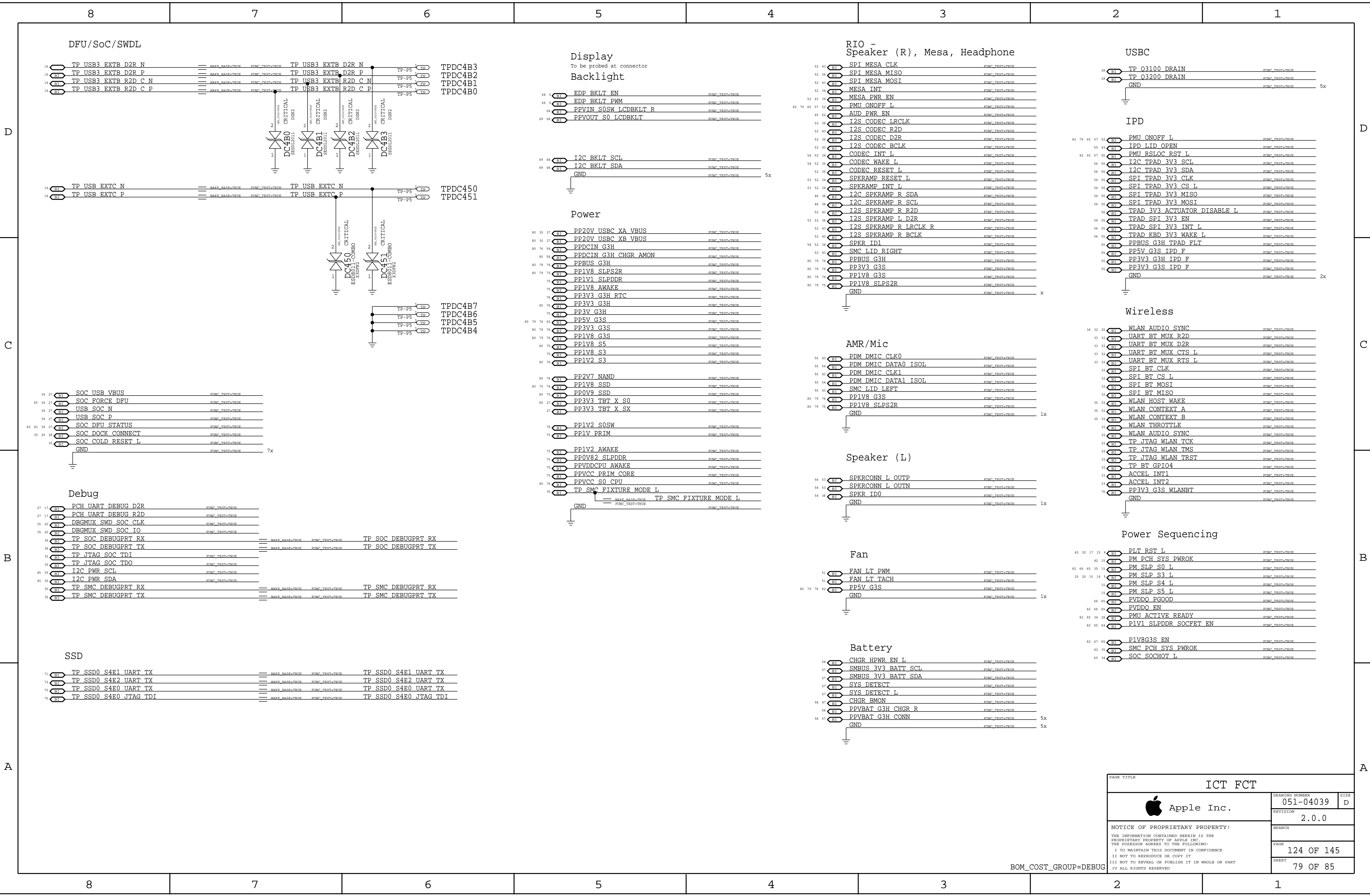


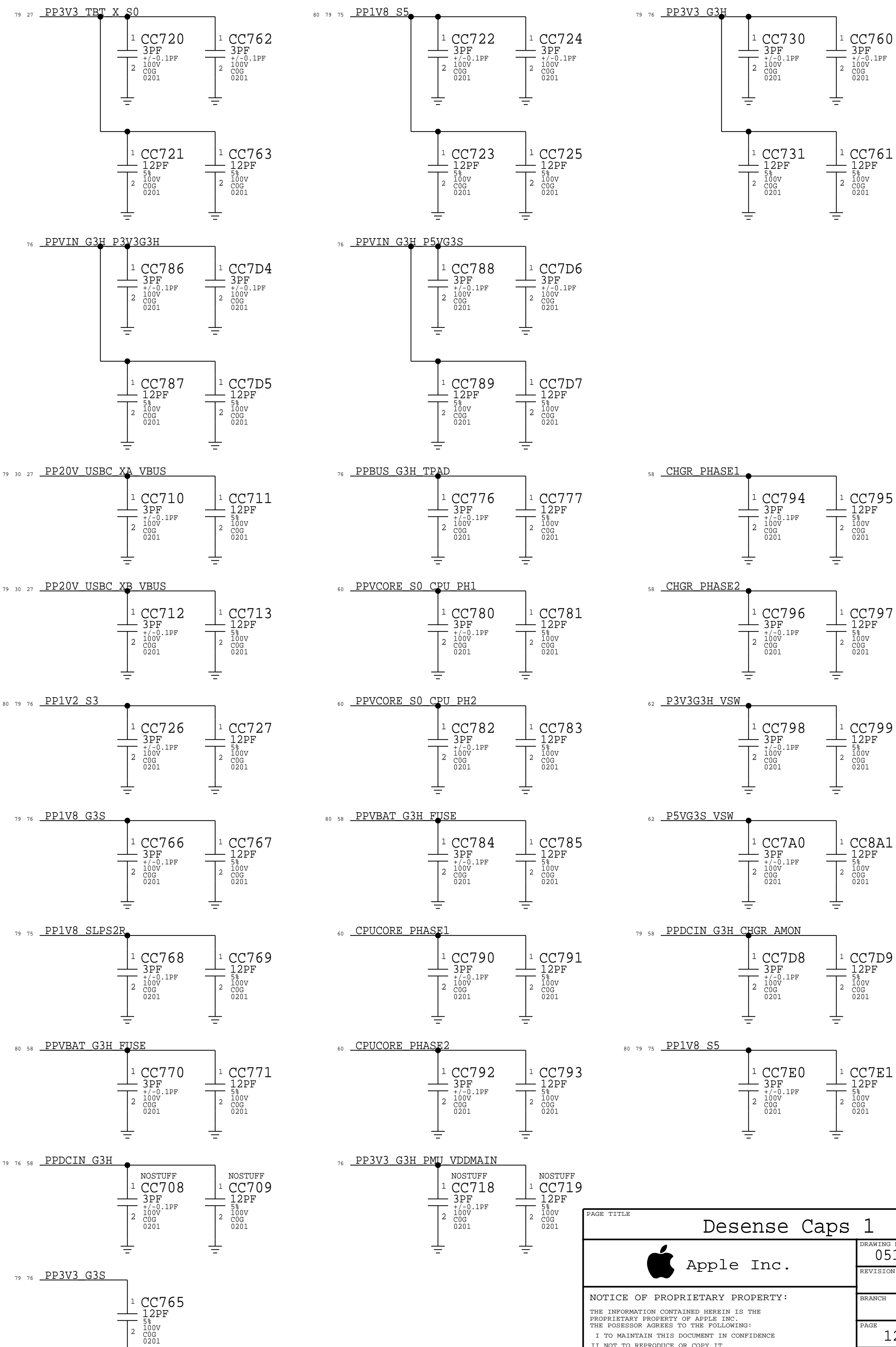
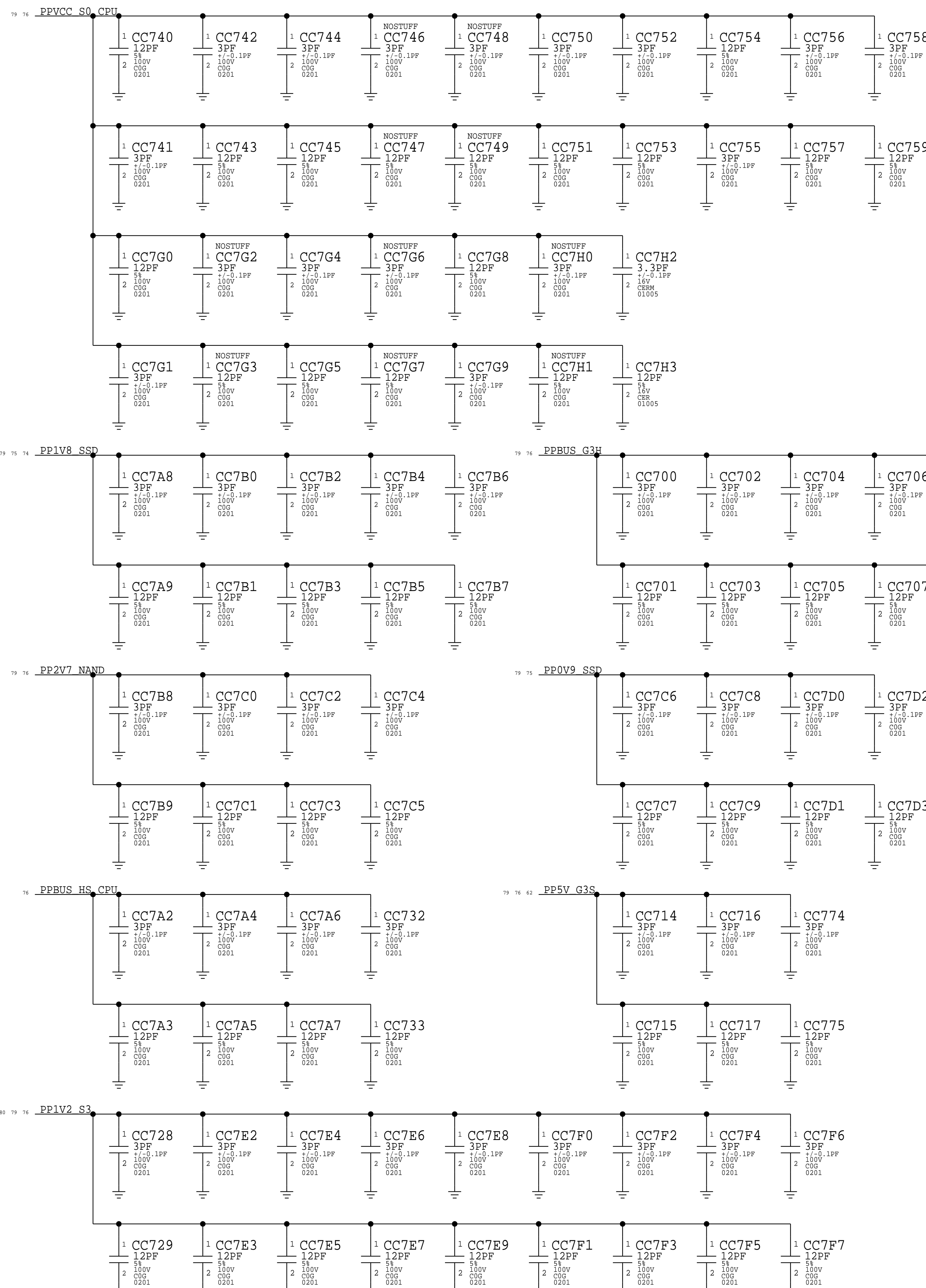



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PAGE		123 OF 145	
SHEET		78 OF 85	

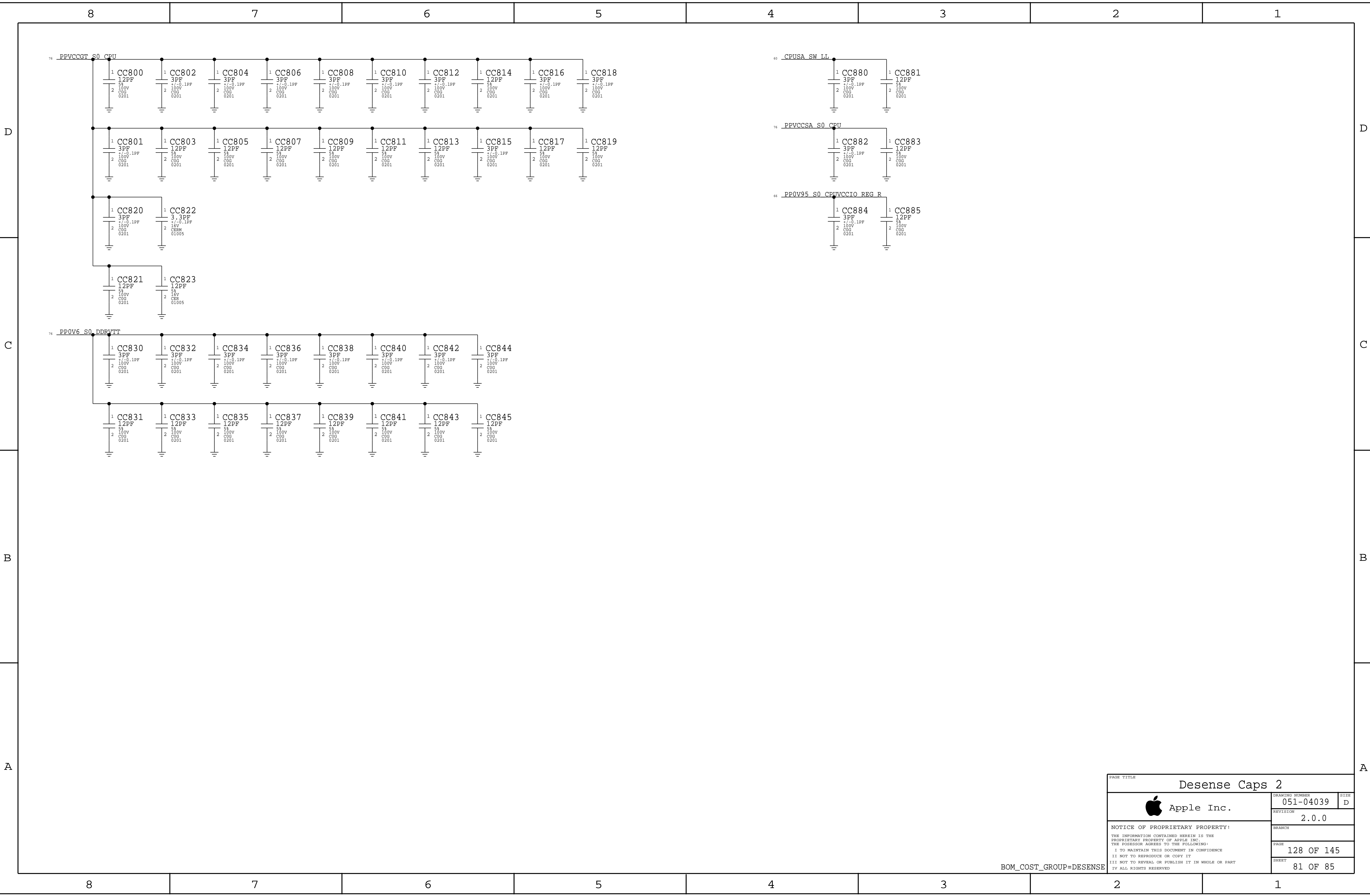







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		SHEET 80 OF 85	

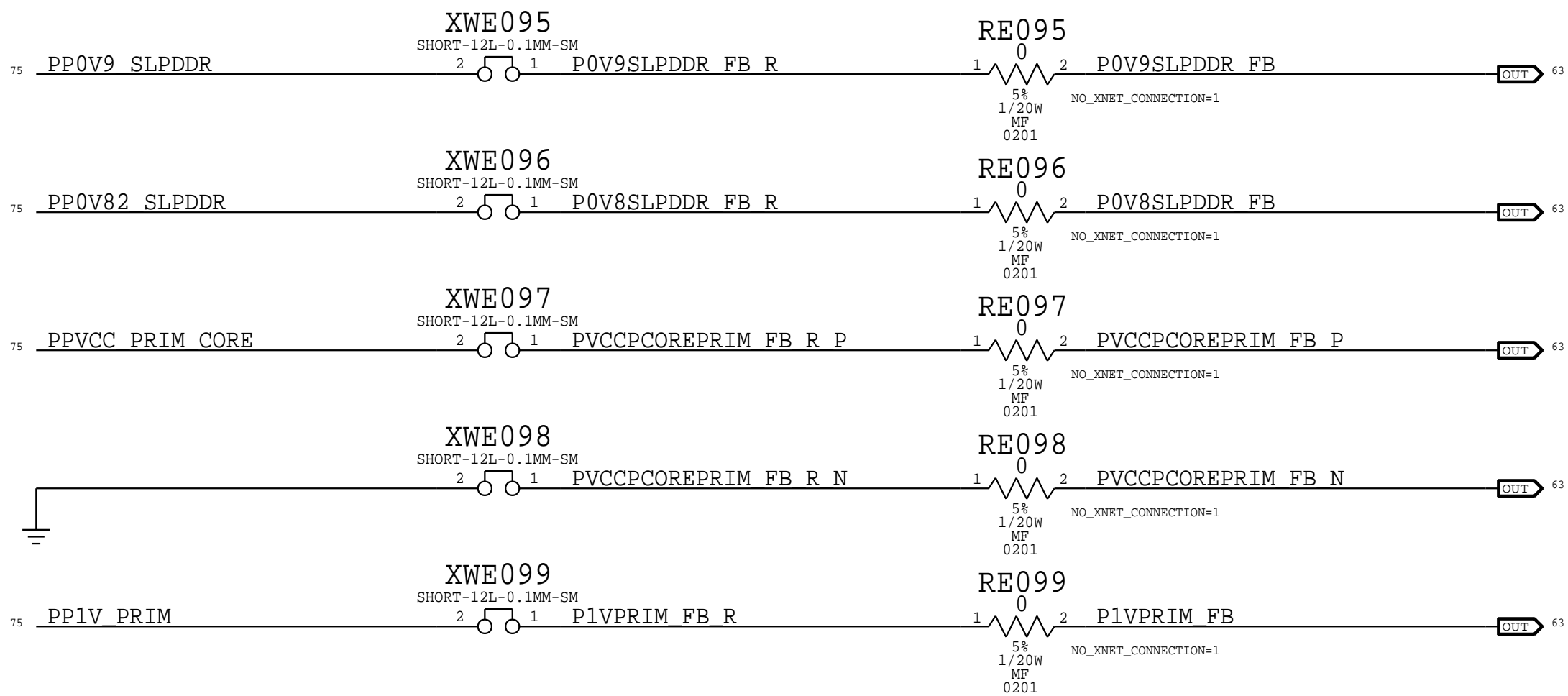




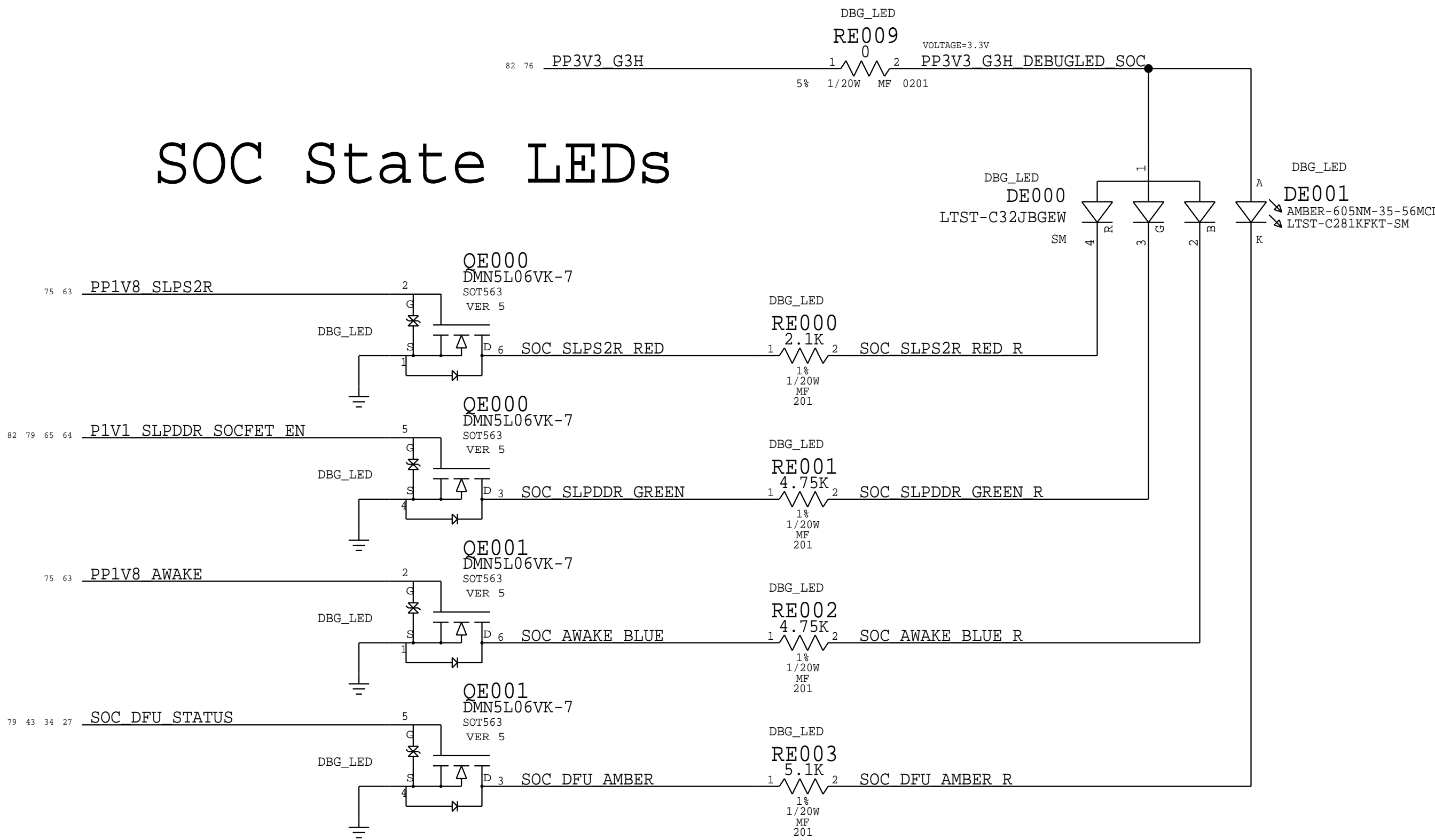
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		SHEET	81 OF 85		

BOM\_COST\_GROUP=DESENSE

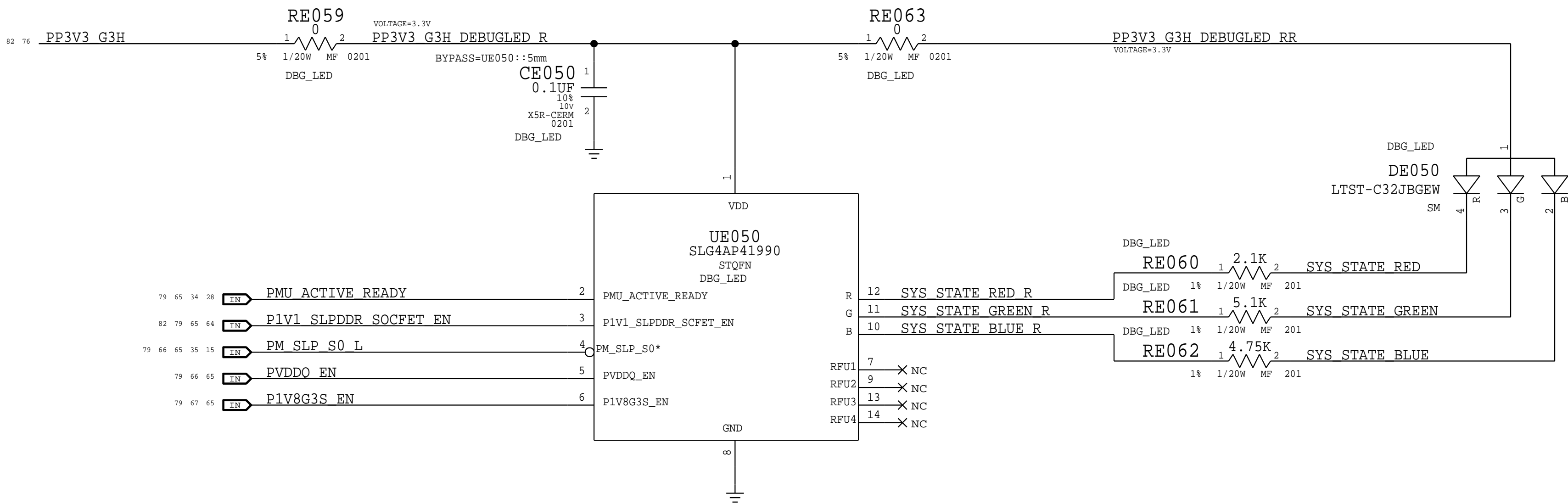
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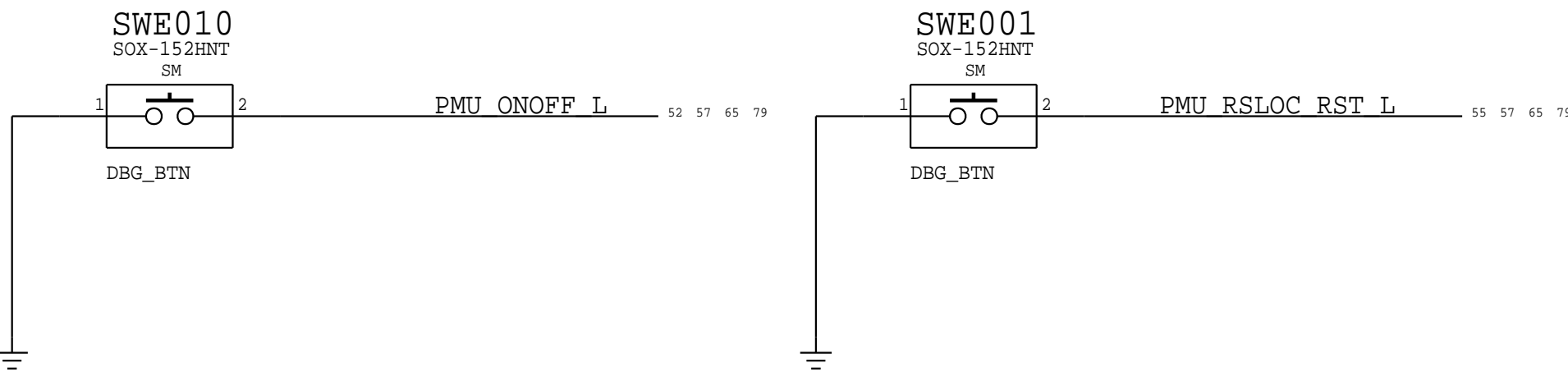
# SOC State LEDs



# System State LED




# Dev Buttons



Inputs					Outputs			Color		State		
PMU ACT RDY	PIV1_SLPDDR SOC FET EN	PM_SLP S0_L	PVDDQ EN	PIV8G3S EN	R	G	B			System	SoC	CPU
0	0	0	0	0	BLINK	OFF	OFF	Blinking	Red	Shutdown (G3H)	OFF	OFF
0	0	0	0	1	ON	OFF	OFF	Red		Standby (G3S)	SLPS2R	OFF
1	1	0	0	1	ON	ON	OFF	Yellow		Standby (G3S)	AWAKE	OFF
0	0	0	1	1	ON	ON	ON	White		Sleep	SLPS2R	S01
1	1	0	1	1	OFF	OFF	ON	Blue		Sleep	AWAKE	S01
1	1	1	1	1	OFF	ON	OFF	Green		Run	AWAKE	S0
1	1	0	0	0	BLINK	ON	OFF	Blinking	Yellow & Green			

All other states are magenta

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140 OF 145			
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82 OF 85			

BOM\_COST\_GROUP=DEBUG

## BOM Variants

BOM NUMBER	BOM NAME	BOM OPTIONS
685-00251	COMMON PARTS,MLB_BTTF,X1032	MLB_COMMON
985-00733	DEV PARTS,MLB_BTTF,X1032	DBG_BTN,DBG_LED,UPC_DBG_HDR
939-06596	PCBA,MLB-BTTF,DCDC,X1032	ALTERNATE_COMMON_DEV_PARTS_BOM,SCHEM_PCBF_CPU_AHLY:INTERPOSER,MLB_POKER,MLB_MISC,MLB_MECH1,FREETV2

D

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
K6GN	639-06259	PCBA,MLB,BEST,HY-8G,SD-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:PMLC_128G_SD
KLTM	639-06561	PCBA,MLB,BEST,HY-8G,TO-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:PMLC_128G_TO
KLVO	639-06562	PCBA,MLB,BEST,MI-8G,SD-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:PMLC_128G_SD
KLVD	639-06563	PCBA,MLB,BEST,MI-8G,TO-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:PMLC_128G_TO
KLVV	639-06564	PCBA,MLB,BEST,SS-8G,SD-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:PMLC_128G_SD
KLW7	639-06565	PCBA,MLB,BEST,SS-8G,TO-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:PMLC_128G_TO
KLWL	639-06566	PCBA,MLB,BEST,HY-16G,SD-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:PMLC_128G_SD
KLWY	639-06567	PCBA,MLB,BEST,HY-16G,TO-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:PMLC_128G_TO
KLX9	639-06568	PCBA,MLB,BEST,MI-16G,SD-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:PMLC_128G_SD
KLXN	639-06569	PCBA,MLB,BEST,MI-16G,TO-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:PMLC_128G_TO
KLY1	639-06570	PCBA,MLB,BEST,SS-16G,SD-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:PMLC_128G_SD
KLYD	639-06571	PCBA,MLB,BEST,SS-16G,TO-128G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:PMLC_128G_TO
KLYQ	639-06572	PCBA,MLB,BEST,HY-8G,SD-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:PMLC_256G_SD
KM04	639-06573	PCBA,MLB,BEST,HY-8G,TO-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:PMLC_256G_TO
KM0L	639-06574	PCBA,MLB,BEST,MI-8G,SD-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:PMLC_256G_SD
KM10	639-06575	PCBA,MLB,BEST,MI-8G,TO-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:PMLC_256G_TO
KM1F	639-06576	PCBA,MLB,BEST,SS-8G,SD-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:PMLC_256G_SD
KM1R	639-06577	PCBA,MLB,BEST,SS-8G,TO-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:PMLC_256G_TO
KM24	639-06578	PCBA,MLB,BEST,HY-16G,SD-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:PMLC_256G_SD
KM2H	639-06579	PCBA,MLB,BEST,HY-16G,TO-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:PMLC_256G_TO
KM2V	639-06580	PCBA,MLB,BEST,MI-16G,SD-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:PMLC_256G_SD
KM39	639-06581	PCBA,MLB,BEST,MI-16G,TO-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:PMLC_256G_TO
KM3Q	639-06582	PCBA,MLB,BEST,SS-16G,SD-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:PMLC_256G_SD
KM47	639-06583	PCBA,MLB,BEST,SS-16G,TO-256G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:PMLC_256G_TO
KM4Q	639-06584	PCBA,MLB,BEST,HY-8G,SD-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:PMLC_512G_SD
KM55	639-06585	PCBA,MLB,BEST,HY-8G,TO-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:PMLC_512G_TO
KM5J	639-06586	PCBA,MLB,BEST,MI-8G,SD-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:PMLC_512G_SD
KM5W	639-06587	PCBA,MLB,BEST,MI-8G,TO-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:PMLC_512G_TO
KM67	639-06588	PCBA,MLB,BEST,SS-8G,SD-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:PMLC_512G_SD
KM6L	639-06589	PCBA,MLB,BEST,SS-8G,TO-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:PMLC_512G_TO
KM6Y	639-06590	PCBA,MLB,BEST,HY-16G,SD-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:PMLC_512G_SD
KM79	639-06591	PCBA,MLB,BEST,HY-16G,TO-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:PMLC_512G_TO
KM7N	639-06592	PCBA,MLB,BEST,MI-16G,SD-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:PMLC_512G_SD
KM81	639-06593	PCBA,MLB,BEST,MI-16G,TO-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:PMLC_512G_TO
KM8D	639-06594	PCBA,MLB,BEST,SS-16G,SD-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:PMLC_512G_SD
KM8Q	639-06595	PCBA,MLB,BEST,SS-16G,TO-512G,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:PMLC_512G_TO
KM93	639-06596	PCBA,MLB,BEST,HY-8G,SS-1.5T,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X8B,NANDCFG:3DVA_1PST_SS
KM9G	639-06597	PCBA,MLB,BEST,MI-8G,SS-1.5T,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_8GB,NANDCFG:3DVA_1PST_SS
KM9T	639-06598	PCBA,MLB,BEST,SS-8G,SS-1.5T,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_8GB,NANDCFG:3DVA_1PST_SS
KMC5	639-06599	PCBA,MLB,BEST,HY-16G,SS-1.5T,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:HYTX_X16GB,NANDCFG:3DVA_1PST_SS
KMCJ	639-06600	PCBA,MLB,BEST,MI-16G,SS-1.5T,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:MIKRON_16GB,NANDCFG:3DVA_1PST_SS
KMCW	639-06601	PCBA,MLB,BEST,SS-16G,SS-1.5T,X1032	QML_PARTS_BOM_DEV_PARTS_BOM_ALTERNATE,CPU_AMLY:SEEXN,DRANCFG:SANSNG_16GB,NANDCFG:3DVA_1PST_SS

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KMD7	639-06602	PCBA,MLB,BTTR,HY-8G,SD-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:PMLC_128G_SD
KMDL	639-06603	PCBA,MLB,BTTR,HY-8G,TO-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:PMLC_128G_TO
KMDY	639-06604	PCBA,MLB,BTTR,MI-8G,SD-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:PMLC_128G_SD
KMF9	639-06605	PCBA,MLB,BTTR,MI-8G,TO-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:PMLC_128G_TO
KMPFN	639-06606	PCBA,MLB,BTTR,SS-8G,SD-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:PMLC_128G_SD
KMG1	639-06607	PCBA,MLB,BTTR,SS-8G,TO-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:PMLC_128G_TO
KMGD	639-06608	PCBA,MLB,BTTR,HY-16G,SD-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_16GB,NANDCFG:PMLC_128G_SD
KMGQ	639-06609	PCBA,MLB,BTTR,HY-16G,TO-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_16GB,NANDCFG:PMLC_128G_TO
KMH3	639-06610	PCBA,MLB,BTTR,MI-16G,SD-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_16GB,NANDCFG:PMLC_128G_SD
KMHG	639-06611	PCBA,MLB,BTTR,MI-16G,TO-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_16GB,NANDCFG:PMLC_128G_TO
KMHT	639-06612	PCBA,MLB,BTTR,SS-16G,SD-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_16GB,NANDCFG:PMLC_128G_SD
KMJ5	639-06613	PCBA,MLB,BTTR,SS-16G,TO-128G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_16GB,NANDCFG:PMLC_128G_TO
KMJK	639-06614	PCBA,MLB,BTTR,HY-8G,SD-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:PMLC_256G_SD
KMJX	639-06615	PCBA,MLB,BTTR,HY-8G,TO-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:PMLC_256G_TO
KMK8	639-06616	PCBA,MLB,BTTR,MI-8G,SD-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:PMLC_256G_SD
KMKM	639-06617	PCBA,MLB,BTTR,MI-8G,TO-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:PMLC_256G_TO
KML0	639-06618	PCBA,MLB,BTTR,SS-8G,SD-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:PMLC_256G_SD
KMLC	639-06619	PCBA,MLB,BTTR,SS-8G,TO-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:PMLC_256G_TO
KMLP	639-06620	PCBA,MLB,BTTR,HY-16G,SD-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_16GB,NANDCFG:PMLC_256G_SD
KMM2	639-06621	PCBA,MLB,BTTR,HY-16G,TO-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_16GB,NANDCFG:PMLC_256G_TO
KMMF	639-06622	PCBA,MLB,BTTR,MI-16G,SD-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_16GB,NANDCFG:PMLC_256G_SD
KMMR	639-06623	PCBA,MLB,BTTR,MI-16G,TO-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_16GB,NANDCFG:PMLC_256G_TO
KMN4	639-06624	PCBA,MLB,BTTR,SS-16G,SD-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_16GB,NANDCFG:PMLC_256G_SD
KMNH	639-06625	PCBA,MLB,BTTR,SS-16G,TO-256G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_16GB,NANDCFG:PMLC_256G_TO
KMNV	639-06626	PCBA,MLB,BTTR,HY-8G,SD-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:PMLC_512G_SD
KMP6	639-06627	PCBA,MLB,BTTR,HY-8G,TO-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:PMLC_512G_TO
KMPK	639-06628	PCBA,MLB,BTTR,MI-8G,SD-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:PMLC_512G_SD
KMPX	639-06629	PCBA,MLB,BTTR,MI-8G,TO-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:PMLC_512G_TO
KMQ8	639-06630	PCBA,MLB,BTTR,SS-8G,SD-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:PMLC_512G_SD
KMQM	639-06631	PCBA,MLB,BTTR,SS-8G,TO-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:PMLC_512G_TO
KMR0	639-06632	PCBA,MLB,BTTR,HY-16G,SD-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_16GB,NANDCFG:PMLC_512G_SD
KMRC	639-06633	PCBA,MLB,BTTR,HY-16G,TO-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_16GB,NANDCFG:PMLC_512G_TO
KMRP	639-06634	PCBA,MLB,BTTR,MI-16G,SD-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_16GB,NANDCFG:PMLC_512G_SD
KMT2	639-06635	PCBA,MLB,BTTR,MI-16G,TO-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_16GB,NANDCFG:PMLC_512G_TO
KMTF	639-06636	PCBA,MLB,BTTR,SS-16G,SD-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_16GB,NANDCFG:PMLC_512G_SD
KMTR	639-06637	PCBA,MLB,BTTR,SS-16G,TO-512G,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_16GB,NANDCFG:PMLC_512G_TO
KMV4	639-06638	PCBA,MLB,BTTR,HY-8G,SS-1.5T,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:HYNIX_8GB,NANDCFG:3DV4_1P5T_SS
KMVL	639-06639	PCBA,MLB,BTTR,MI-8G,SS-1.5T,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:MICRON_8GB,NANDCFG:3DV4_1P5T_SS
KMVY	639-06640	PCBA,MLB,BTTR,SS-8G,SS-1.5T,X1032	CML_PARTS_BOM.DEV_PARTS_BOM.ALTERNATE.CPU_AMLY:SREXK,DRAMCFG:SAMSUNG_8GB,NANDCFG:3DV4_1P5T

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PAGE TITLE			
BOM Variants 1			
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		SHEET	83 OF 85

D	8		7		6		5		4		3		2		1		
	BOM Variants																
C																	
	B																
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	PAGE	142 OF 145
	SHEET	84 OF 85

