

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.

X260 MLB - CBB

REV	ECN	DESCRIPTION OF REVISION	CK APPD	DATE
<REV>	<ECN>	<ECO_DESCRIPTION>		<ECODATE>

LAST_MODIFICATION=Thu Sep 10 15:22:41 2015

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ALIASES RESOLVED

PRODUCT SAFETY REQUIREMENTS:
 PCB, UL RECOGNIZED, MIN. 130-C TEMP. RATING AND V-0 FLAME RATING PER UL 796 & UL 94.
 PCB TO BE SILK-SCREENED WITH UL/CUL RECOGNITION MARK, MANUFACTURER'S UL FILE
 NUMBER, UL PCB MATERIAL DESIGNATION, 130-C TEMP. RATING AND V-0 FLAME RATING.

Schematic / PCB #'s

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
051-00532	1	SCHEM,MLB,X260	SCH	CRITICAL	
820-00244	1	PCBF,MLB,X260	PCB	CRITICAL	

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Apple Inc.		DRAWING NUMBER	SIZE
		<SCH_NUM>	D
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BOM Groups

BOM GROUP	BOM OPTIONS
MLB_COMMON	ALTERNATE,COMMON,MLB_MISC,MLB_DEBUG:ENG,MLB_PROGPARTS,BUILD:CBB
MLB_MISC	CAM_FREQ:24M,CAM_XTAL:NO,SSDRAM:4GBIT,S3X:B0,UPC:A1,PCH24M:SUS,EQ:4CH,PMIC:A0D,BSSB_GP10
MLB_DEBUG:ENG	DEBUGLED

CPU DRAM SPD Straps

BOM GROUP	BOM OPTIONS
DRAM:SAM_8GB	RAMCFG0_L,DRAM_TYPE:SAMSUNG_8GB
DRAM:HYN_8GB	RAMCFG0_L,RAMCFG1_L,DRAM_TYPE:HYNIX_8GB
DRAM:ELP_8GB	DRAM_TYPE:ELPIDA_8GB

Programmable Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00084	1	IC,SPI SERIAL FLASH,8MBIT,3.0V,CSP,8P	U3090	CRITICAL	UPCROM:BLANK
341S00466	1	IC,NVM (VXXX) CBB, X260	U3090	CRITICAL	UPCROM:PROG
338S1231	1	IC,SMC12-B1,40MB/S/500MIPS MCU,7X7,168BGA	U5000	CRITICAL	SMC:BLANK
341S00431	1	IC,SMC-B1,EXTERNAL (V2.33A2) PROTO 1,X260	U5000	CRITICAL	SMC:PROG
335S1009	1	64 MBIT SPI QUAD I/O FLASH,CSP,3.3V,QUAD IO	U6100	CRITICAL	BOOTROM_WIN:BLANK
335S1010	1	64 MBIT SPI QUAD I/O FLASH,CSP,3.3V,QUAD IO	U6100	CRITICAL	BOOTROM_MAC:BLANK
335S1029	1	64 MBIT SPI QUAD I/O FLASH,CSP,3.3V,QUAD IO	U6100	CRITICAL	BOOTROM_MIC:BLANK
341S00465	1	IC,EFI ROM (VXXX) CBB,X260	U6100	CRITICAL	BOOTROM:PROG

Module Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S00207	1	IC,CPU,SKY,SRZEN,FPQ,D1,2/2,1.1,5W,.85,B1515	U0500	CRITICAL	CPU:1.1GHZ
337S00208	1	IC,CPU,SKY,SRZEN,FPQ,D1,2/2,1.2,5W,.85,B1515	U0500	CRITICAL	CPU:1.2GHZ
337S00209	1	IC,CPU,SKY,SRZEN,FPQ,D1,2/2,1.3,5W,.85,B1515	U0500	CRITICAL	CPU:1.3GHZ
946-3892	1	J11/J13 MLB DYNAMIC ADHESIVE 29993-SC 0.4G	GLUE	CRITICAL	
825-00162	1	LABEL, BARCODE, 2D, 1D, CONFIG, MLB, X260	LABEL		

DRAM Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
333S00052	2	IC,SDRAM,LPDDR-1866,32GBIT,253B FBGA	U2300,U2500	CRITICAL	DRAM_TYPE:SAMSUNG_8GB
333S00053	2	IC,SDRAM,LPDDR-1866,32GBIT,253B FBGA	U2300,U2500	CRITICAL	DRAM_TYPE:HYNIX_8GB
333S00054	2	IC,SDRAM,LPDDR-1866,32GBIT,253B FBGA	U2300,U2500	CRITICAL	DRAM_TYPE:ELPIDA_8GB

Alternate Parts

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S00074	376S0855		ALL	Tohhiba alt for Diodes dual
376S1129	376S0855		ALL	SKP alt for Diodes dual
376S1089	376S1128		ALL	SKP alt for Diodes single
138S0703	138S0648		ALL	Murata alt to Taiyo Yuden
372S0186	372S0185		ALL	SKP alt to Diodes
376S1053	376S0604		ALL	Diodes alt to Fairchild
107S0249	107S0251		ALL	TPP alt to Cystec
128S00044	128S00041		ALL	Rubycon alt to Sanyo
740S00004	740S0134		ALL	Kemet alt to Sanyo
740S00005	740S0190		ALL	Polytronics alt to Wayon
128S0296	128S0487		ALL	Sanyo alt to NEC
128S00012	128S0487		ALL	ROHM alt to NEC
128S0397	128S0325		ALL	Kemet alt to Sanyo
107S00070	107S0085		ALL	TKX alt to Murata
376S00007	376S1179		ALL	AGS alt to Vishay
376S1080	376S0820		ALL	Diodes alt to Onsemi
152S00311	152S2037		ALL	Cystec new alt to Cystec
152S00098	152S00224		ALL	Vishay alt to Cystec
128S00021	128S00020		ALL	ROHM alt to NEC
138S0786	138S0705		ALL	Samsung alt to Murata

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S00007	128S00015		ALL	SKC alt to Sanyo
128S00009	128S00015		ALL	Kemet alt to Sanyo
128S00029	128S00015		ALL	ROHM alt to Sanyo
128S00011	128S00010		ALL	Kemet alt to Sanyo
128S00026	128S00010		ALL	SKC alt to Sanyo
128S00031	128S00010		ALL	ROHM alt to Sanyo
138S00073	138S00047		ALL	Murata alt to Taiyo
138S0772	138S00013		ALL	Taiyo alt to Murata
132S00012	132S0401		ALL	Multi alt to Taiyo
152S00028	152S1751		ALL	Murata alt to Taiyo Yuden
353S00712	353S2216		ALL	Onsemi alt to TI
353S00714	353S2208		ALL	Onsemi alt to TI
337S00174	337S00175	S3X:B0	ALL	S3X B0 alt to A8
138S00077	138S00035		ALL	Taiyo alt to Murata
152S00343	152S1682		ALL	Murata alt to Cystec
155S00155	155S0441		ALL	TKX alt to Murata
155S0741	155S0361		ALL	Murata alt to TKX
155S00165	155S0382		ALL	Taiyo alt to TKX
155S00166	155S0391		ALL	TKX alt to Murata
155S0706	155S0302		ALL	Taiyo alt to Murata
197S00053	197S00050		ALL	Eyocera alt to TKX
197S00055	197S00050		ALL	Murata alt to TKX
311S00004	311S0370		ALL	Onsemi alt to RXP
333S00030	333S00016		ALL	Hynix alt to Micron
338S00175	338S1264		ALL	Broadcom alt packaging
107S00020	107S0276		ALL	TPP alt to Cystec
107S00021	107S0284		ALL	TPP alt to Cystec
353S00773	353S4296		ALL	Semtech alt to TI
311S00057	311S0612		ALL	Diodes alt to RXP
155S00011	155S00008		ALL	Murata alt to TKX
138S0739	138S0706		ALL	Samsung alt to Murata
138S0945	138S0706		ALL	Eyocera alt to Murata
138S00090	138S0943		ALL	Taiyo alt to Murata
138S00087	138S1086		ALL	Taiyo alt to Murata
107S00086	107S00056		ALL	TPP alt to Cystec
152S00347	152S00220		ALL	Chilisin alt to Cystec
138S00032	138S0831		ALL	Taiyo alt to Murata
138S00049	138S0831		ALL	Eyocera alt to Murata
152S00362	152S1129		ALL	Cystec alt to Murata
128S00039	128S00038		ALL	SKC alt to Kemet

CPU DRAM CFG Chart

VENDOR	CFG 1	CFG 0
HYNIX	0	0
SAMSUNG	1	0
MICRON	0	1
ELPIDA	1	1

SIZE	CFG 3	CFG 2
2GB	0	0
4GB QDP	0	1
4GB DDP	1	0
8GB	1	1

SSD Configs

BOM GROUP	BOM OPTIONS
SSD:128GB	NAND:64GB,CAPACITY1
SSD:256GB	NAND:128GB,CAPACITY0,CAPACITY1
SSD:512GB	NAND:256GB,CAPACITY2
SSD:256GB_SAND	NAND:128GB_SAND,CAPACITY0,CAPACITY1,SANDISK_1Y
SSD:512GB_SAND	NAND:256GB_SAND,CAPACITY2,SANDISK_1Y

SSD Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S00175	1	IC,S3-X,B0	U8600	CRITICAL	S3X:B0
333S00017	1	IC,LPDDR3-1600,128MX8,1.8V,25NM,276 POP	U8600_POP_DRAM	CRITICAL	SSDRAM:4GBIT
335S1030	2	NAND,TOG DDR2,2CH,64GB,1YNM,3.3V,LGA60	U9100,U9120	CRITICAL	NAND:64GB
335S00050	2	NAND,TOG DDR2,2CH,128GB,1YNM,3.3V,LGA60	U9100,U9120	CRITICAL	NAND:128GB
335S00051	2	NAND,TOG DDR2,2CH,256GB,1YNM,3.3V,LGA60	U9100,U9120	CRITICAL	NAND:256GB
335S00121	2	NAND,TOG DDR2,2CH,128GB,1YNM,3.3V,LGA60	U9100,U9120	CRITICAL	NAND:128GB_SAND
335S00122	2	NAND,TOG DDR2,2CH,256GB,1YNM,3.3V,LGA60	U9100,U9120	CRITICAL	NAND:256GB_SAND


Module Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00660	1	IC,CD3215,USB PWR SWITCH,A1,6X6MM,BGA96	U3100	CRITICAL	UPC:A1
338S00168	1	IC,PMU,P650839A0D,7X7MM,BGA168	U7800	CRITICAL	PMIC:A0D

Board IDs

BOM GROUP	BOM OPTIONS
BUILD:PROTO1	BOARDID0_L
BUILD:CBB	BOARDID1_L

Board ID should start all-high (first build), and each new build increment stuffing in a binary fashion (ID0 is the LSB). IDX is high if not set low in the BOM table.

SYNC_MASTER=X260_ERIC		SYNC_DATE=06/09/2015	
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BOM Configuration [2]			
 Apple Inc.	DRAWING NUMBER	<SCH_NUM>	SIZE
	REVISION	<E4LABEL>	D
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Top level BOM Variants

BOM NUMBER	BOM NAME	BOM OPTIONS
639-6664	PCBA,MLB,1.3GHZ,EL 8GB,TOSH 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:ELP_8GB,SSD:256GB,WIFI:FCC
639-6665	PCBA,MLB,1.3GHZ,EL 8GB,TOSH 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:ELP_8GB,SSD:512GB,WIFI:FCC
639-6666	PCBA,MLB,1.3GHZ,HY 8GB,TOSH 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:HYN_8GB,SSD:256GB,WIFI:FCC
639-6667	PCBA,MLB,1.3GHZ,HY 8GB,TOSH 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:HYN_8GB,SSD:512GB,WIFI:FCC
639-6668	PCBA,MLB,1.3GHZ,SA 8GB,TOSH 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:SAM_8GB,SSD:256GB,WIFI:FCC
639-6669	PCBA,MLB,1.3GHZ,SA 8GB,TOSH 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:SAM_8GB,SSD:512GB,WIFI:FCC
639-6670	PCBA,MLB,1.1GHZ,HY 8GB,TOSH 128G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:HYN_8GB,SSD:128GB,WIFI:FCC
639-6671	PCBA,MLB,1.2GHZ,EL 8GB,TOSH 256G,WIFI ETSI,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:ELP_8GB,SSD:256GB,WIFI:ETSI
639-6672	PCBA,MLB,1.2GHZ,SA 8GB,TOSH 512G,WIFI APAC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:SAM_8GB,SSD:512GB,WIFI:APAC
639-6673	PCBA,MLB,1.2GHZ,EL 8GB,SAND 256G,WIFI ETSI,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:ELP_8GB,SSD:256GB_SAND,WIFI:ETSI
639-6674	PCBA,MLB,1.3GHZ,EL 8GB,SAND 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:ELP_8GB,SSD:256GB_SAND,WIFI:FCC
639-6675	PCBA,MLB,1.3GHZ,SA 8GB,SAND 512G,WIFI APAC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:SAM_8GB,SSD:512GB_SAND,WIFI:APAC
639-6676	PCBA,MLB,1.2GHZ,EL 8GB,SAND 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:ELP_8GB,SSD:256GB_SAND,WIFI:FCC
639-6677	PCBA,MLB,1.3GHZ,SA 8GB,SAND 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:SAM_8GB,SSD:512GB_SAND,WIFI:FCC
639-6678	PCBA,MLB,1.3GHZ,HY 8GB,SAND 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:HYN_8GB,SSD:512GB_SAND,WIFI:FCC
639-6679	PCBA,MLB,1.2GHZ,HY 8GB,SAND 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:HYN_8GB,SSD:512GB_SAND,WIFI:FCC
639-6680	PCBA,MLB,1.1GHZ,HY 8GB,TOSH 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:HYN_8GB,SSD:512GB,WIFI:FCC
639-6681	PCBA,MLB,1.2GHZ,HY 8GB,TOSH 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:HYN_8GB,SSD:256GB,WIFI:FCC
639-6682	PCBA,MLB,1.2GHZ,SA 8GB,SAND 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:SAM_8GB,SSD:256GB_SAND,WIFI:FCC
639-6683	PCBA,MLB,1.3GHZ,SA 8GB,SAND 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:SAM_8GB,SSD:256GB_SAND,WIFI:FCC
639-6684	PCBA,MLB,1.1GHZ,SA 8GB,SAND 512G,WIFI ETSI,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:SAM_8GB,SSD:512GB_SAND,WIFI:ETSI
639-6685	PCBA,MLB,1.2GHZ,SA 8GB,SAND 256G,WIFI IND,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:SAM_8GB,SSD:256GB_SAND,WIFI:IND
639-6686	PCBA,MLB,1.3GHZ,HY 8GB,TOSH 128G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:HYN_8GB,SSD:128GB,WIFI:FCC
639-6687	PCBA,MLB,1.1GHZ,SA 8GB,TOSH 128G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:SAM_8GB,SSD:128GB,WIFI:FCC
639-6688	PCBA,MLB,1.1GHZ,HY 8GB,TOSH 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:HYN_8GB,SSD:256GB,WIFI:FCC
639-6689	PCBA,MLB,1.1GHZ,SA 8GB,SAND 256G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:SAM_8GB,SSD:256GB_SAND,WIFI:FCC
639-6690	PCBA,MLB,1.1GHZ,SA 8GB,SAND 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.1GHZ,DRAM:SAM_8GB,SSD:512GB_SAND,WIFI:FCC
639-6691	PCBA,MLB,1.2GHZ,HY 8GB,TOSH 128G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:HYN_8GB,SSD:128GB,WIFI:FCC
639-6692	PCBA,MLB,1.2GHZ,SA 8GB,TOSH 128G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:SAM_8GB,SSD:128GB,WIFI:FCC
639-6693	PCBA,MLB,1.2GHZ,SA 8GB,TOSH 512G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.2GHZ,DRAM:SAM_8GB,SSD:512GB,WIFI:FCC
639-6694	PCBA,MLB,1.3GHZ,SA 8GB,TOSH 128G,WIFI FCC,X260	ALTERNATE,CMN,CPU:1.3GHZ,DRAM:SAM_8GB,SSD:128GB,WIFI:FCC

Partial & development BOMs

BOM NUMBER	BOM NAME	BOM OPTIONS
685-00073	CMN PTS,PCBA,MLB,X260	MLB_COMMON
939-01879	PCBA,MLB,NO CPU,SA 8GB,TOSH 512G,WIFI FCC,X260	ALTERNATE,CMN,DRAM:SAM_8GB,SSD:512GB,WIFI:FCC
939-01880	PCBA,MLB,NO CPU,SA 8GB,SAND 512G,WIFI FCC,X260	ALTERNATE,CMN,DRAM:SAM_8GB,SSD:512GB_SAND,WIFI:FCC

BOM Groups


BOM GROUP	BOM OPTIONS
MLB_PROGPARTS	BOOTROM:PROG,BT:PROG,SMC:PROG,UPCROM:PROG

Common BOM

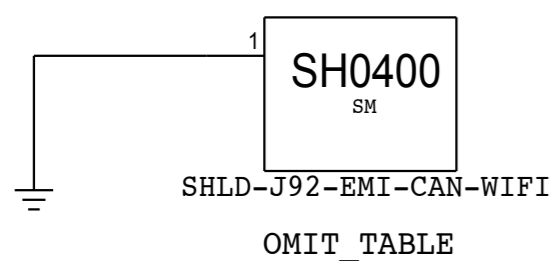
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
685-00073	1	CMN PTS,PCBA,MLB,X260	CMNPTS	CRITICAL	CMN

Programmable Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
341S00345	1	BT ROM (VXX) PROT00,X260	U3770	CRITICAL	BT:PROG
341S00346	1	WIFI ROM (FXXXX) PROT00,W1,X260	U3780	CRITICAL	WIFI:FCC
341S00347	1	WIFI ROM (FXXXX) PROT00,W2,X260	U3780	CRITICAL	WIFI:ETSI
341S00348	1	WIFI ROM (FXXXX) PROT00,W3,X260	U3780	CRITICAL	WIFI:APAC
341S00349	1	WIFI ROM (FXXXX) PROT00,IND,X260	U3780	CRITICAL	WIFI:IND

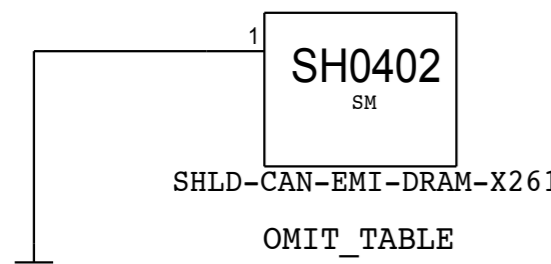
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		PAGE	3 OF 130
		SHEET	3 OF 67

WIFI EMI CAN



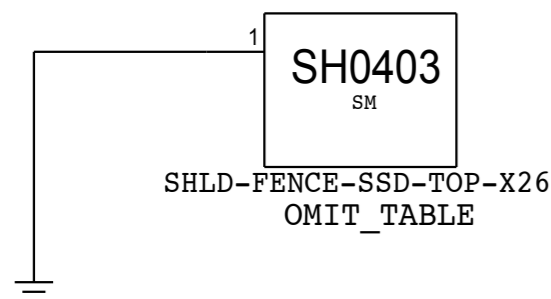
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
806-7064	1	CAN,EMI,WIFI,X261	SH0400	CRITICAL	

DRAM EMI CAN

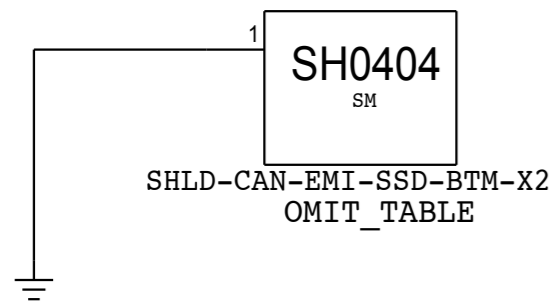


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806-04848	1	CAN,EMI,DRAM,X260	SH0402	CRITICAL	

SSD EMI CANS

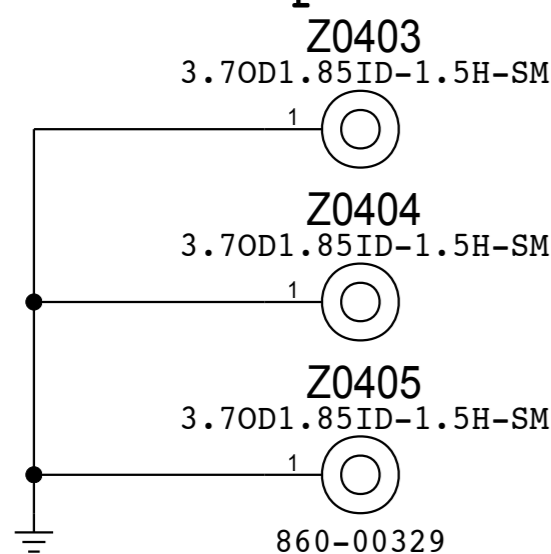


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
806-00889	1	FENCE,EMI,SSD,TOP,X261	SH0403	CRITICAL	
870-00878	1	TAPE,CONDUCTIVE,SSD,REEL,X261	SSD_TAPE_TOP	CRITICAL	

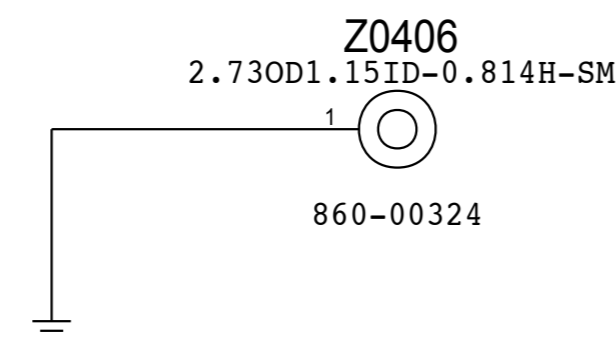


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
806-05622	1	FENCE,EMI,SSD,BTM,X260	SH0404	CRITICAL	
870-01557	1	TAPE,CONDUCTIVE,SSD,REEL,X260	SSD_TAPE_BTM	CRITICAL	

CPU Heat Spreader Bosses



USB-C BTB Connector Boss



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
870-00998	1	MYLAR,SHIM,MLB,X261	MYLAR_SHIM	CRITICAL	

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CRITICAL OMIT_TABLE

U0500 SKL-Y-ULX BGA SKL-Y SYM 1 OF 20 DISPLAY

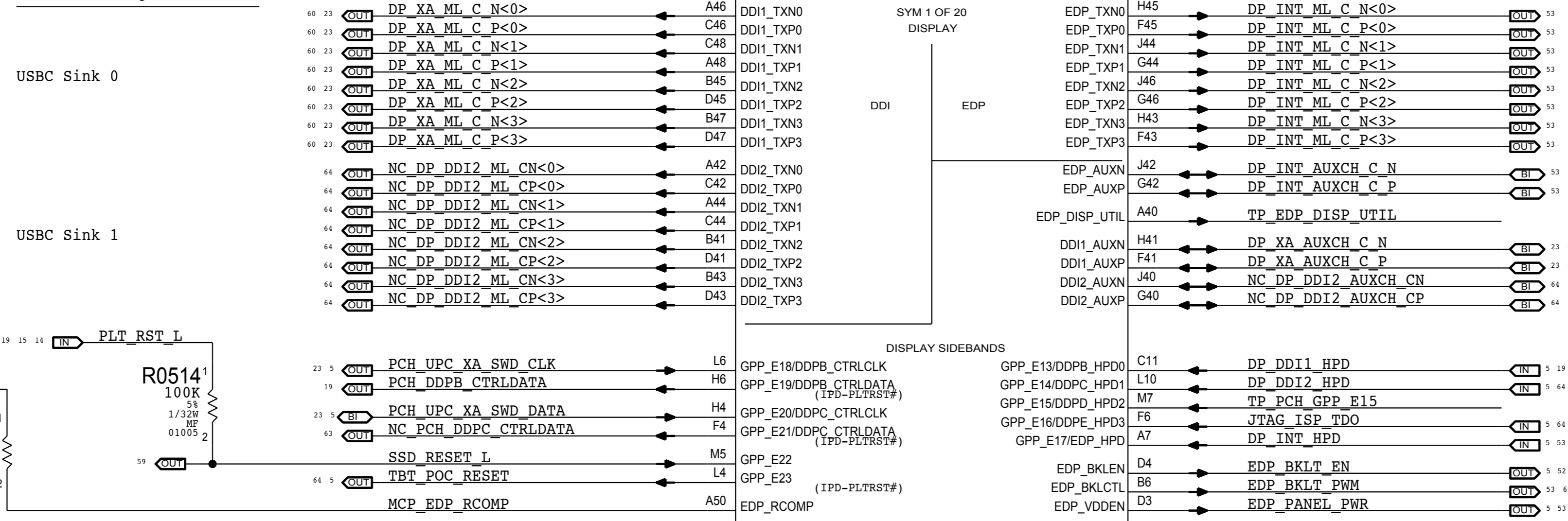
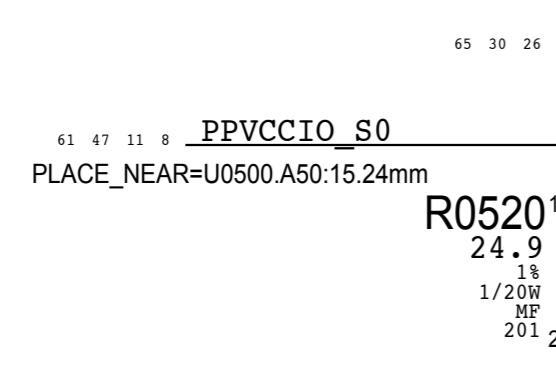
DDI Port Assignments:

USBC Sink 0

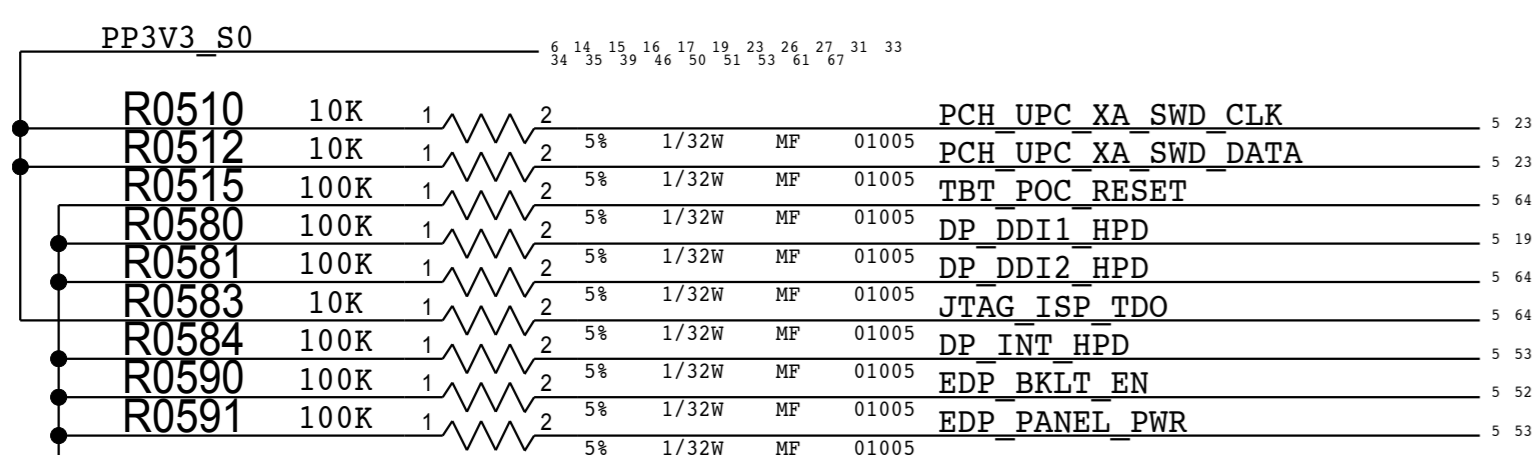
USBC Sink 1

EDP Port Assignment:

Internal panel

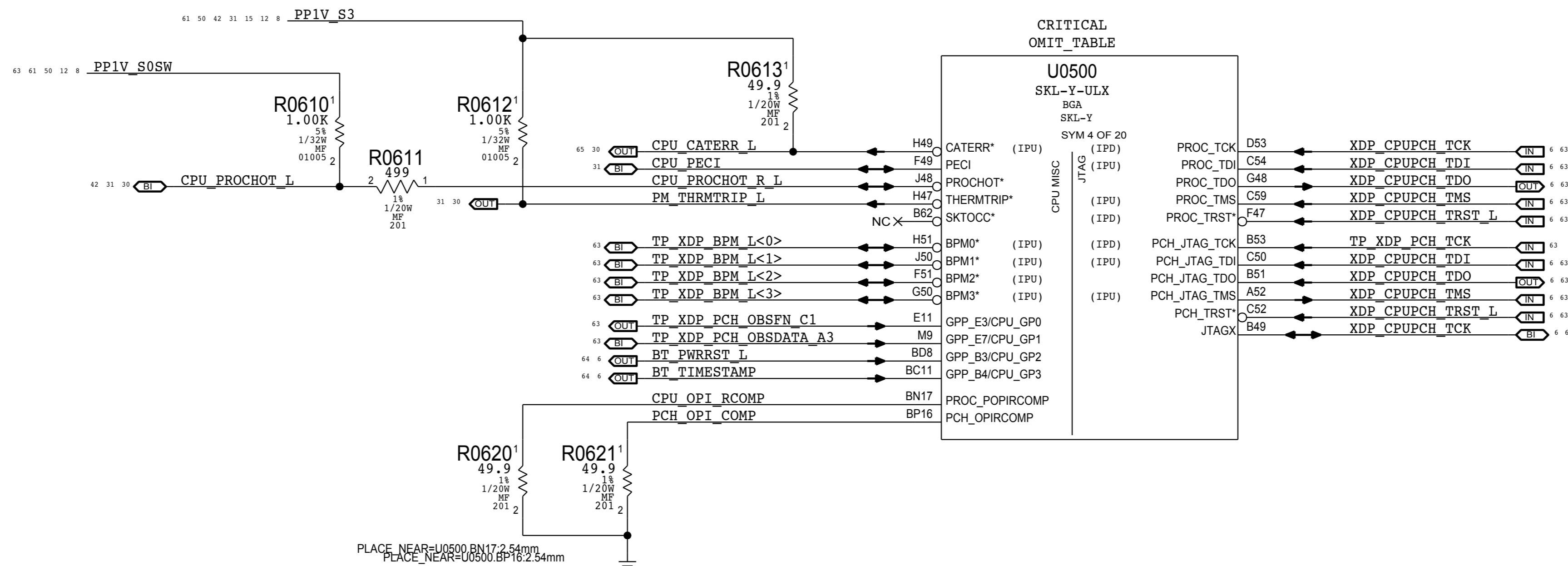


'Ridge systems: GPP_E18: JTAG_TBT_X_TMS GPP_E20: JTAG_TBT_T_TMS

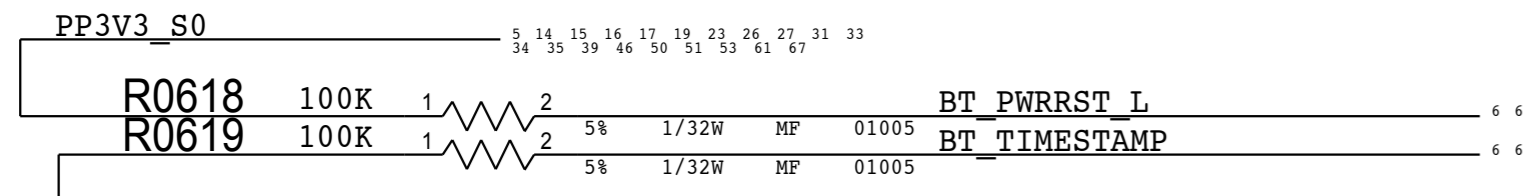
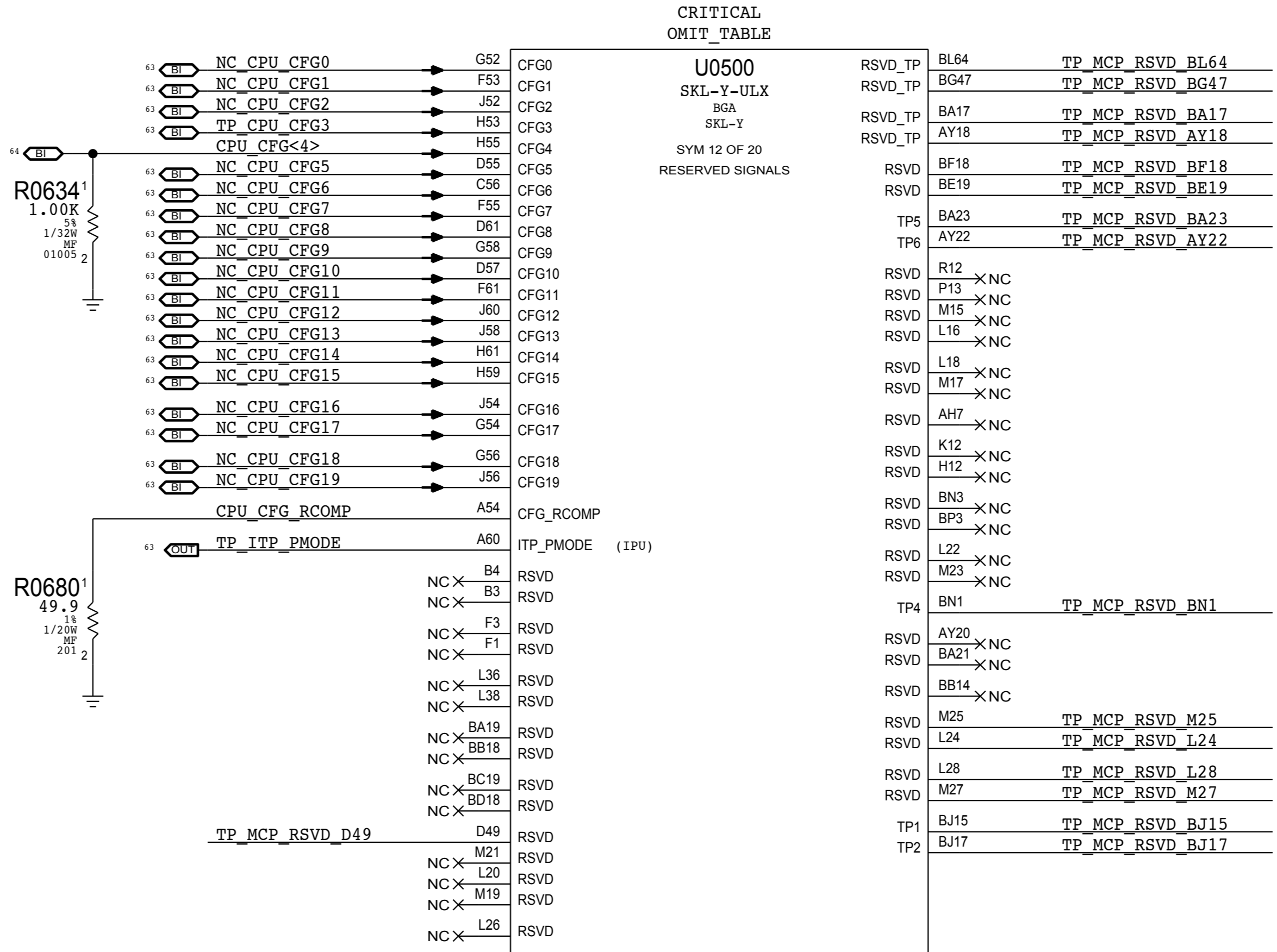


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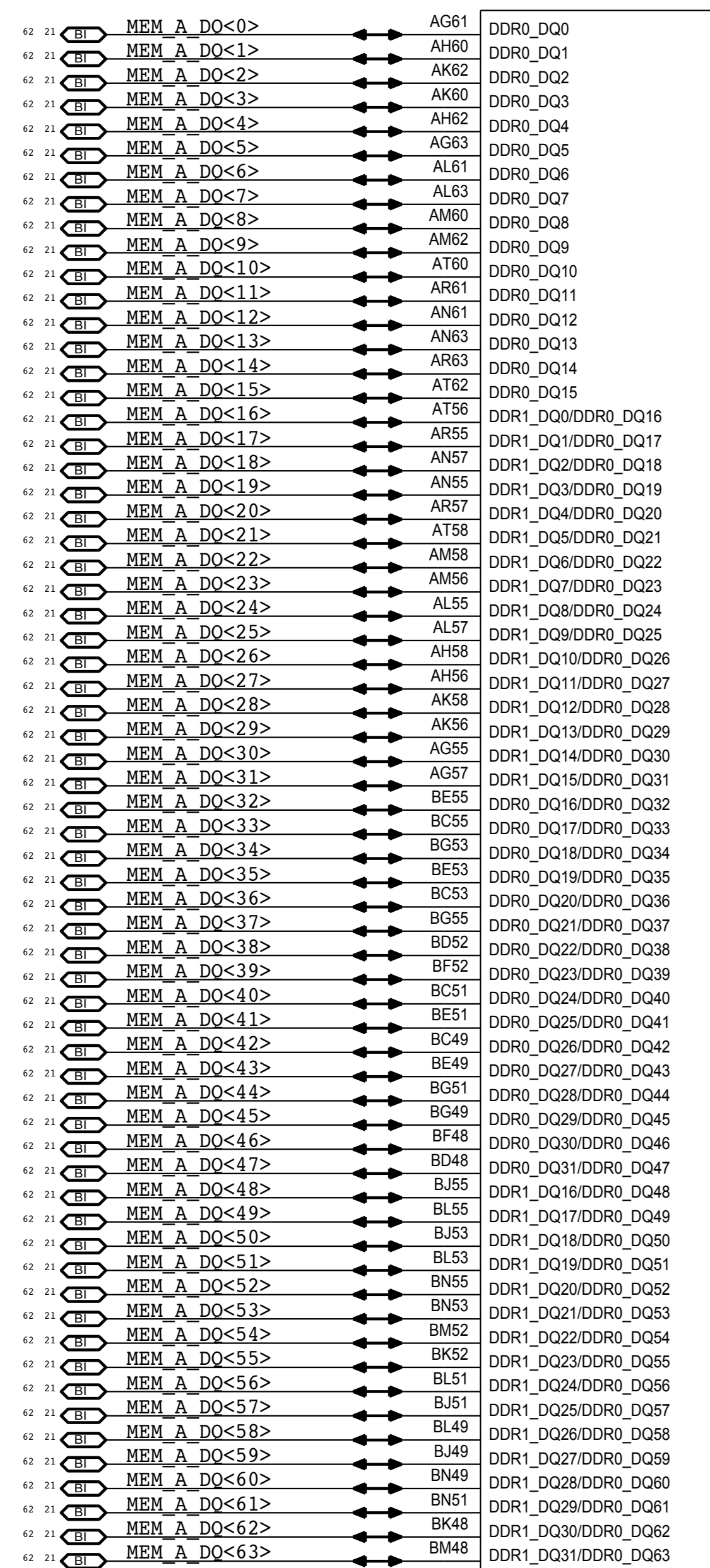


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PLACE_NEAR=U0500.BP16:2.54mm



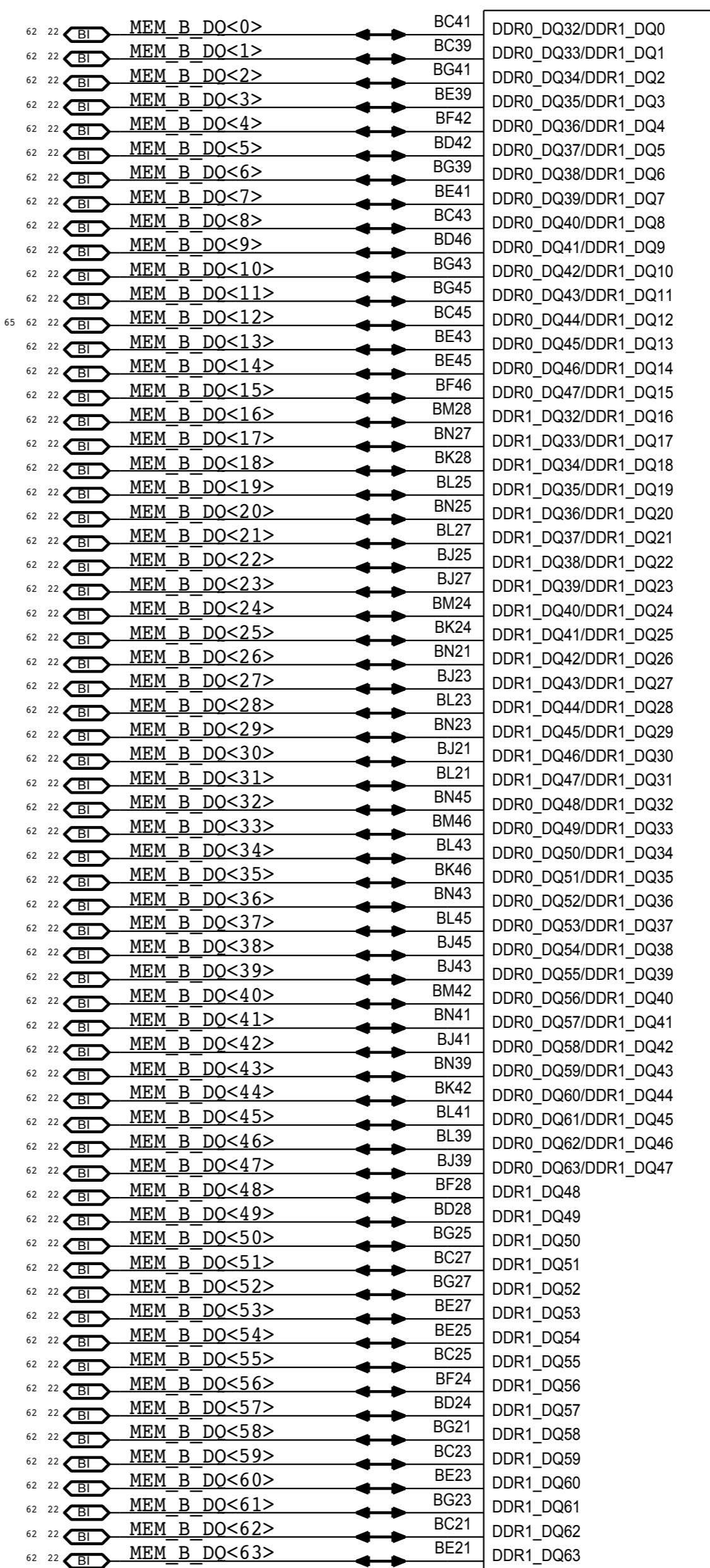
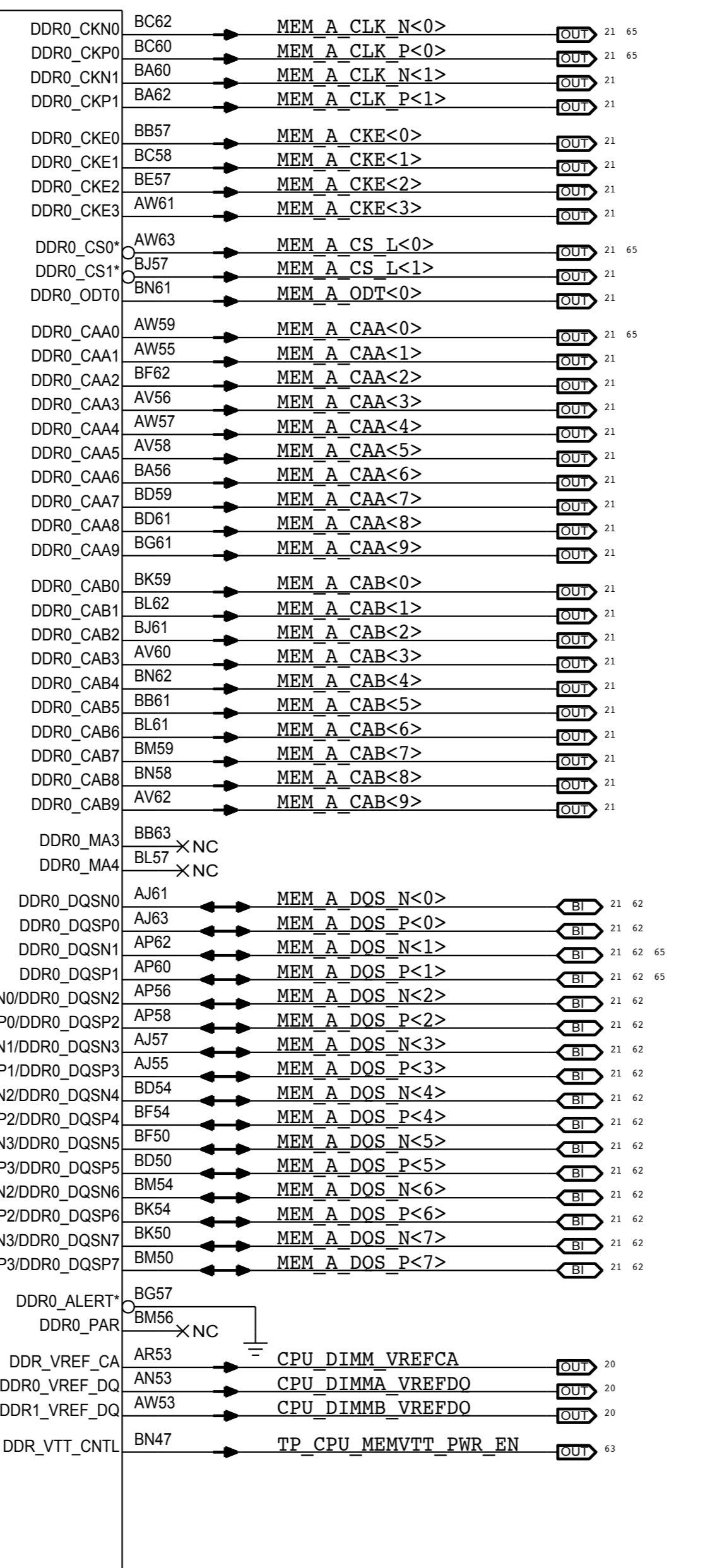
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Apple Inc.		<SCH_NUM>	D
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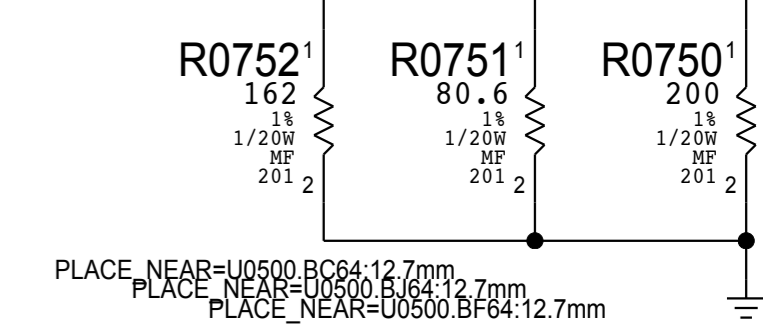
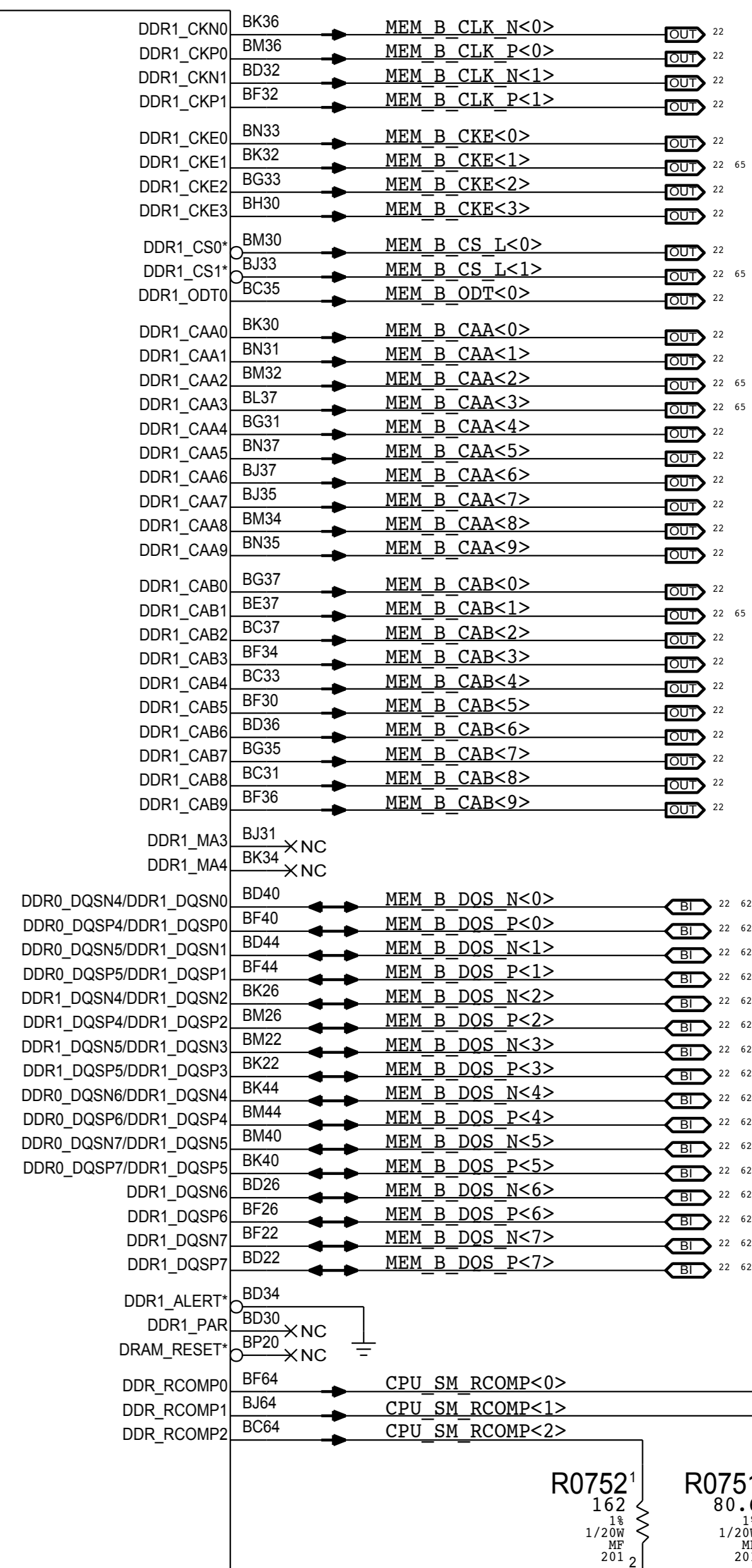
CRITICAL OMIT_TABLE

U0500 SKL-Y-ULX BGA SKL-Y SYM 2 OF 20 DDR CH - A



CRITICAL OMIT_TABLE

U0500 SKL-Y-ULX BGA SKL-Y SYM 3 OF 20 DDR CH - B



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 Apple Inc.
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 PAGE: 7 OF 130
 SHEET: 7 OF 67
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D

C

B

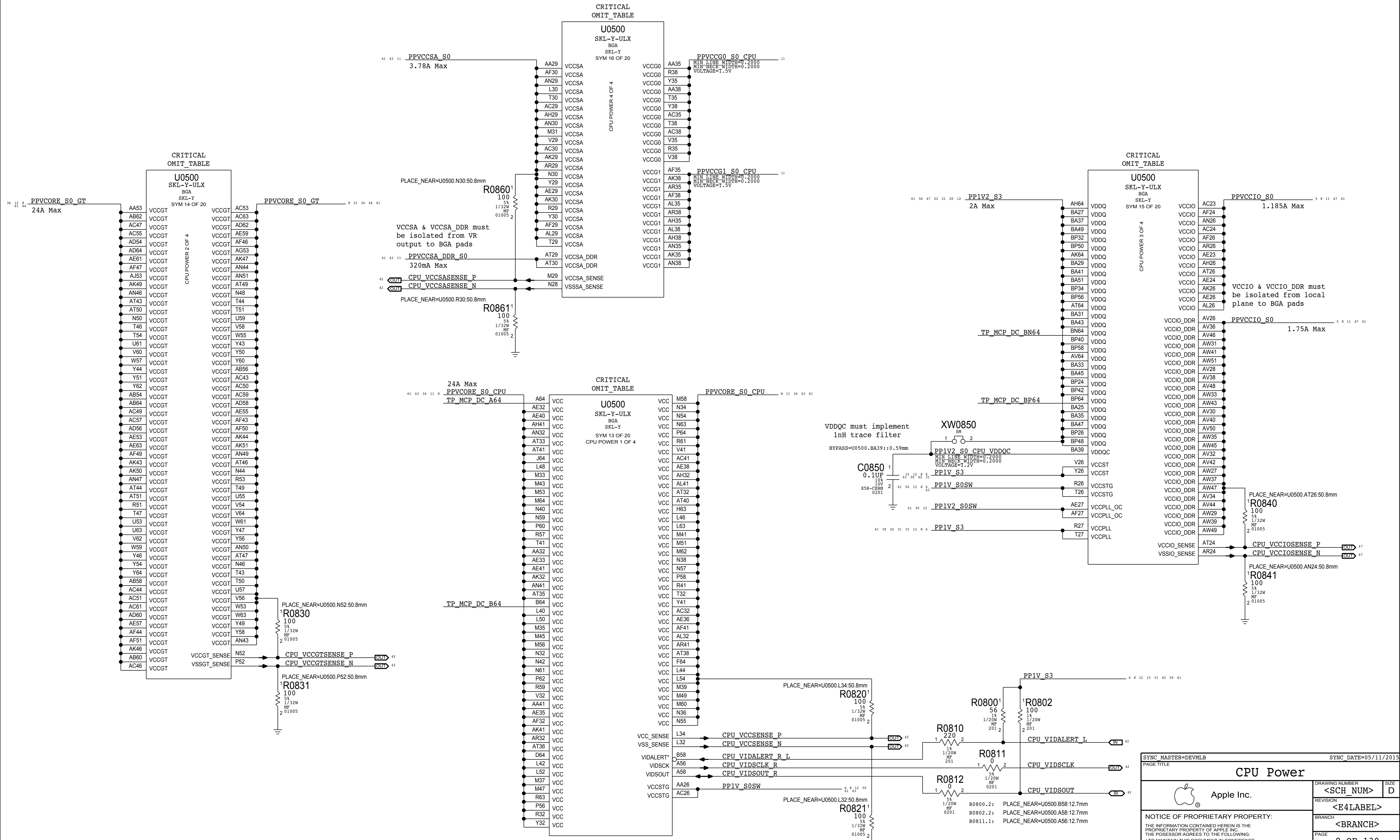
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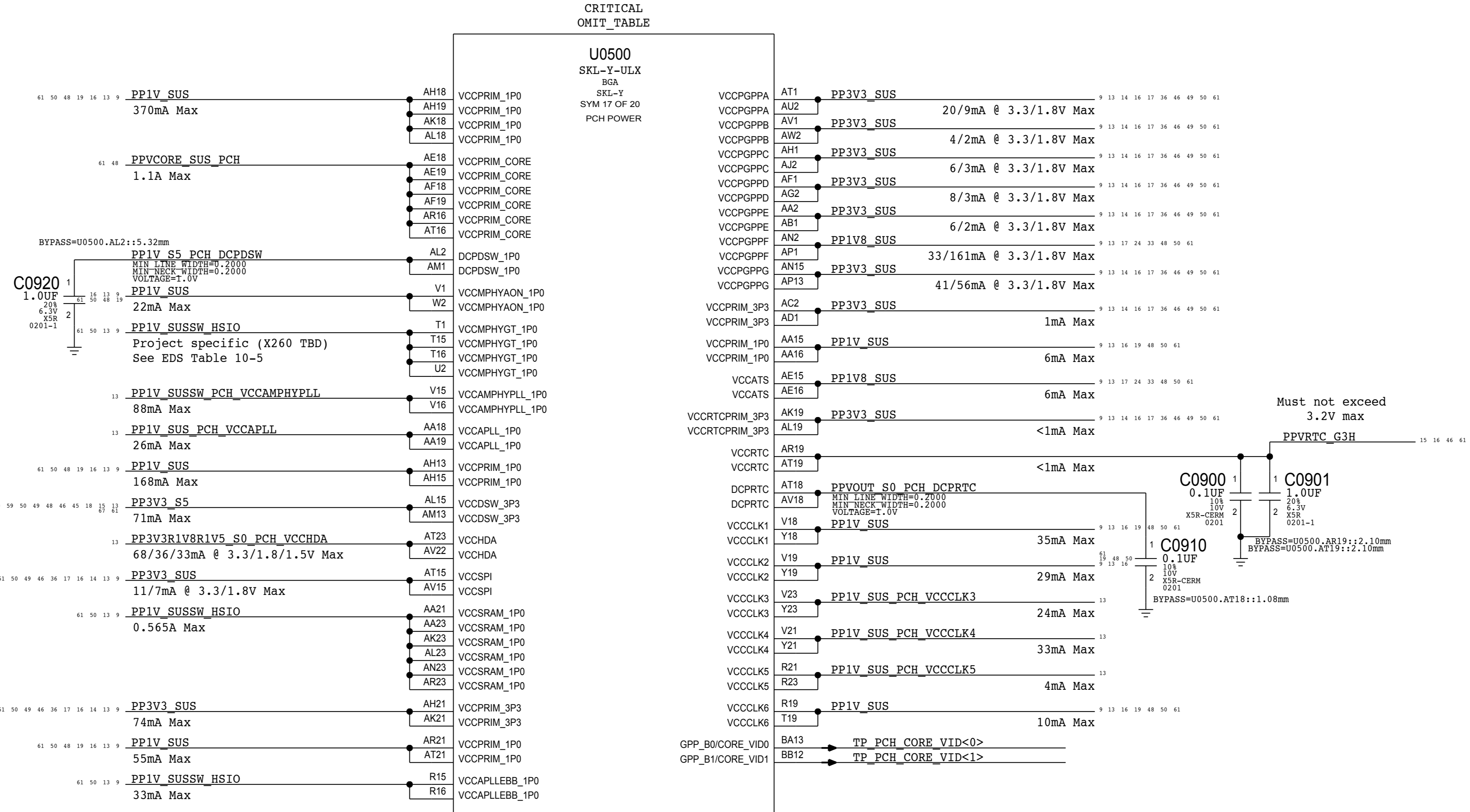
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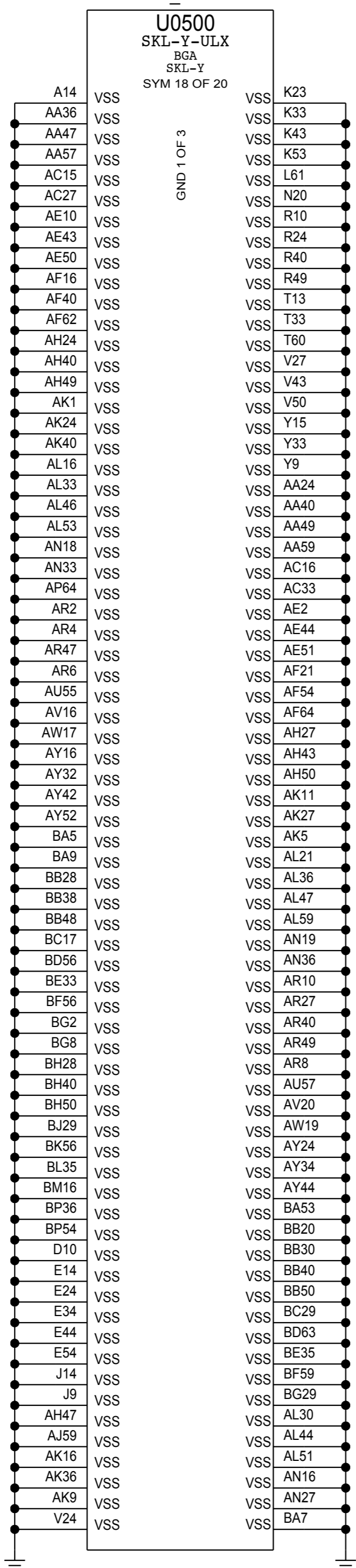


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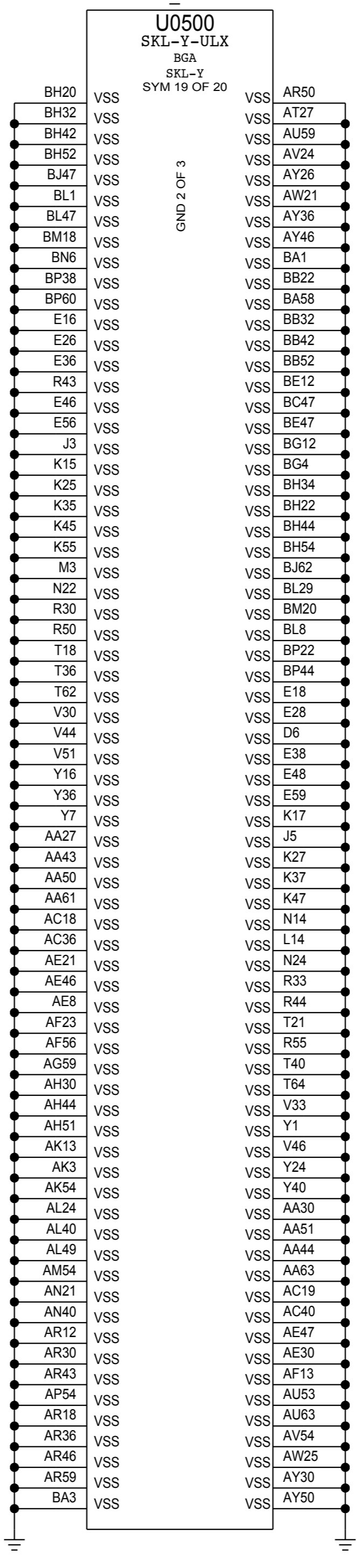


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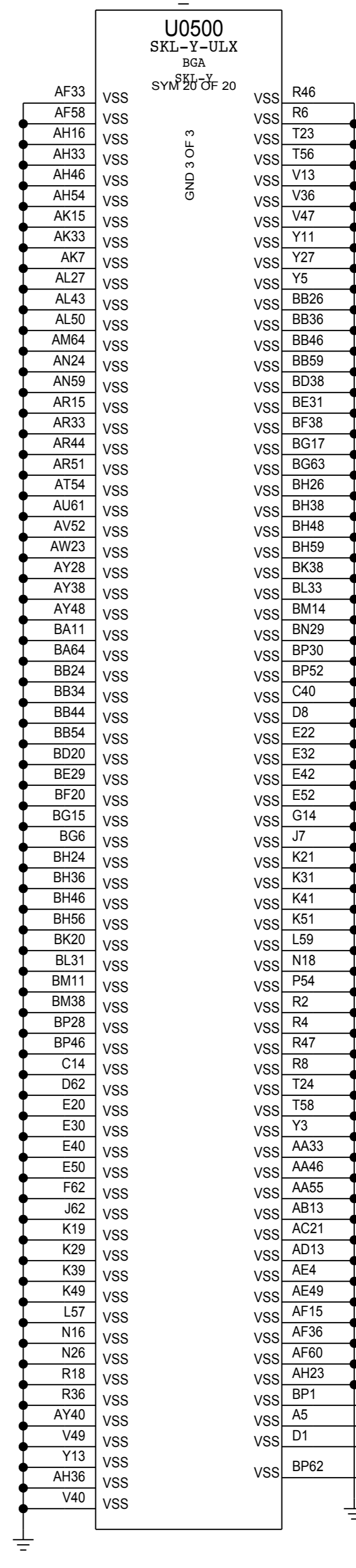
CRITICAL OMIT_TABLE



CRITICAL OMIT_TABLE



CRITICAL OMIT_TABLE



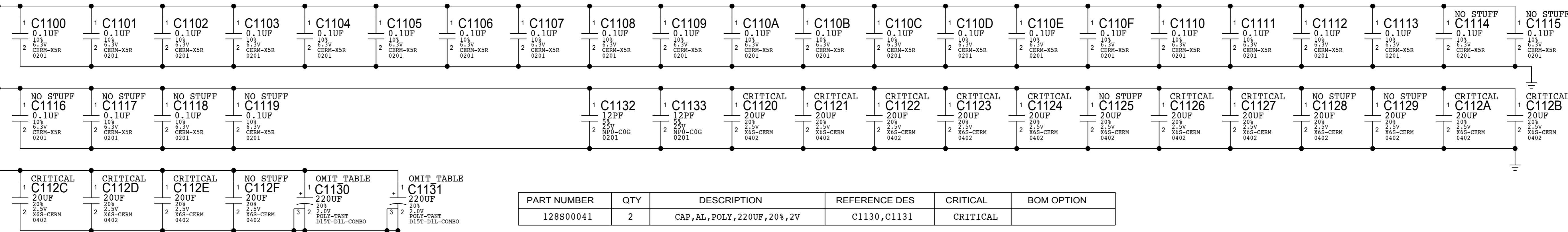
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All Intel recommendations from Intel doc #543016 Skylake U and Y Platform Design Guide Rev 1.3 unless stated otherwise
 Intel's placeholders are no longer required per 4/20/15 email from Srin

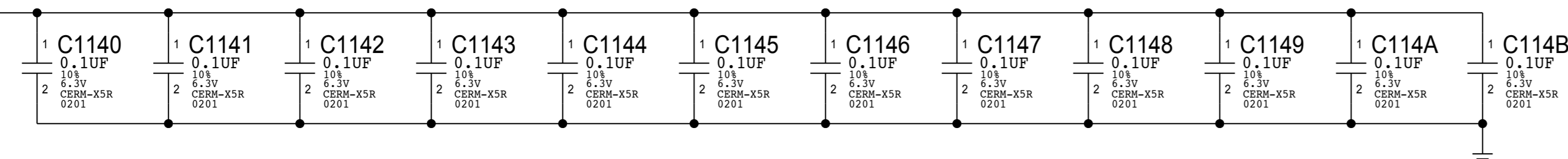
CPU VCORE Decoupling

Intel recommendation (Table 52-2): 20x 0.1uF 0201 STUFF, 8x 10uF 0402, 6x 47uF 6.3V 0805 STUFF (2x NO STUFF)
 Apple implementation : 20x 0.1uF 0201 STUFF (6x NO STUFF), 16x 20uF 0402, 3x 270uF 2V B2



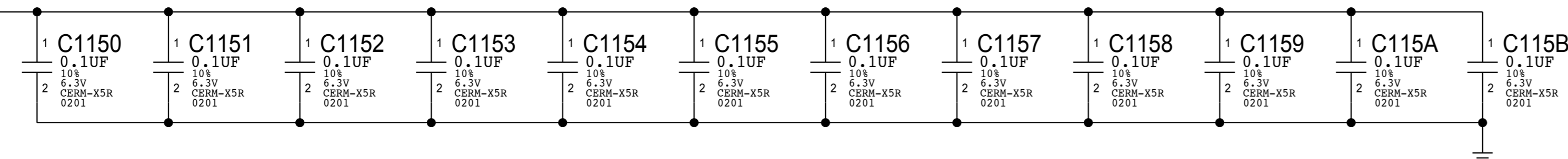
CPU VCORE G0 Decoupling

Intel recommendation (Table 52-2): 12x 0.1uF 0201
 Apple implementation : 12x 0.1uF 0201



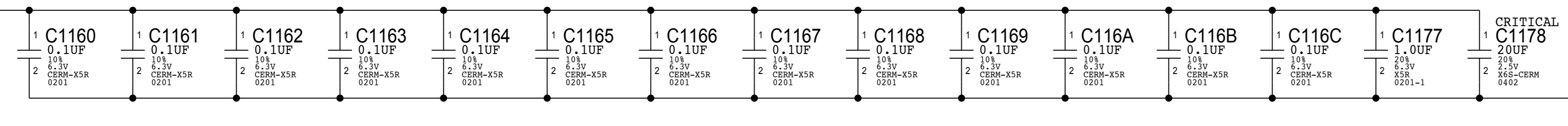
CPU VCORE G1 Decoupling

Intel recommendation (Table 52-2): 12x 0.1uF 0201
 Apple implementation : 12x 0.1uF 0201



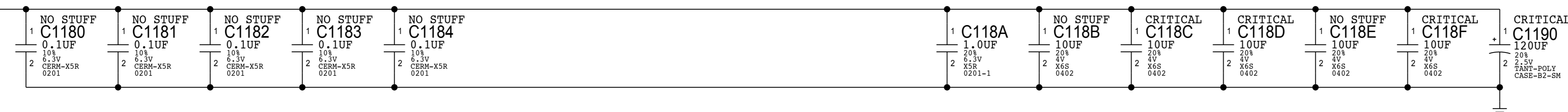
CPU VCCIO Decoupling

Intel recommendation (Table 52-2): 13x 0.1uF 0201 STUFF (10x NO STUFF), 1x 1uF 0402, 1x 22uF 0805
 Apple implementation : 13x 0.1uF 0201 STUFF (10x NO STUFF), 1x 1uF 0201, 1x 20uF 0402



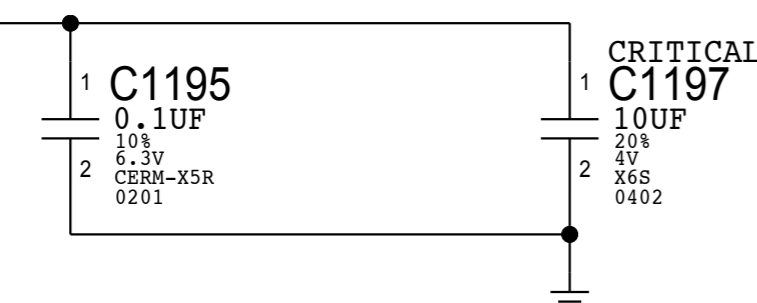
CPU VCCSA Decoupling

Intel recommendation (Table 52-2): 1x 1uF 0201, 4x 22uF 0603
 Apple implementation : 1x 1uF 0201, 5x 0.1uF NO STUFF, 5x 20uF 0402, 1x 270uF 2V B2



CPU VCCSA DDR Decoupling

Intel recommendation (Table 52-2): 1x 0.1uF 0201 STUFF, 1x 22uF 0603
 Apple implementation : 1x 0.1uF 0201 STUFF, 1x 20uF 0402



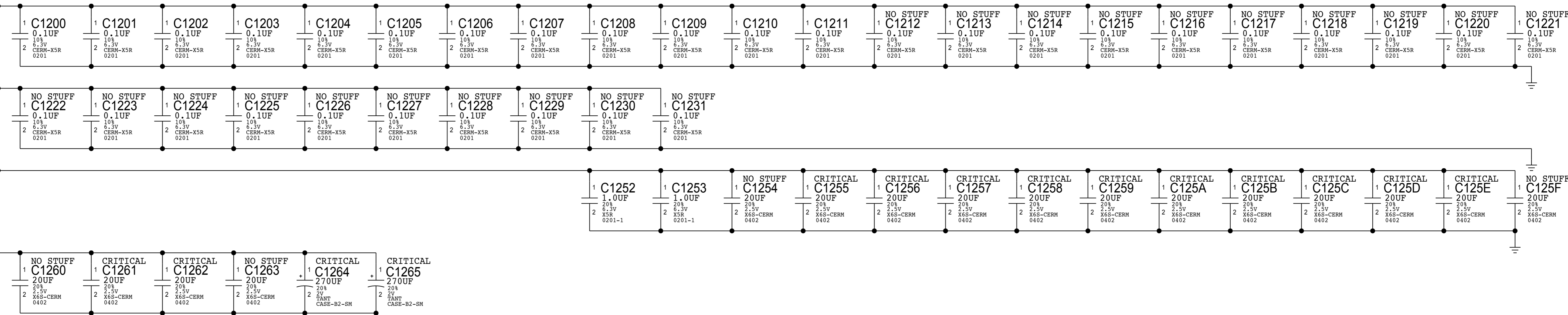
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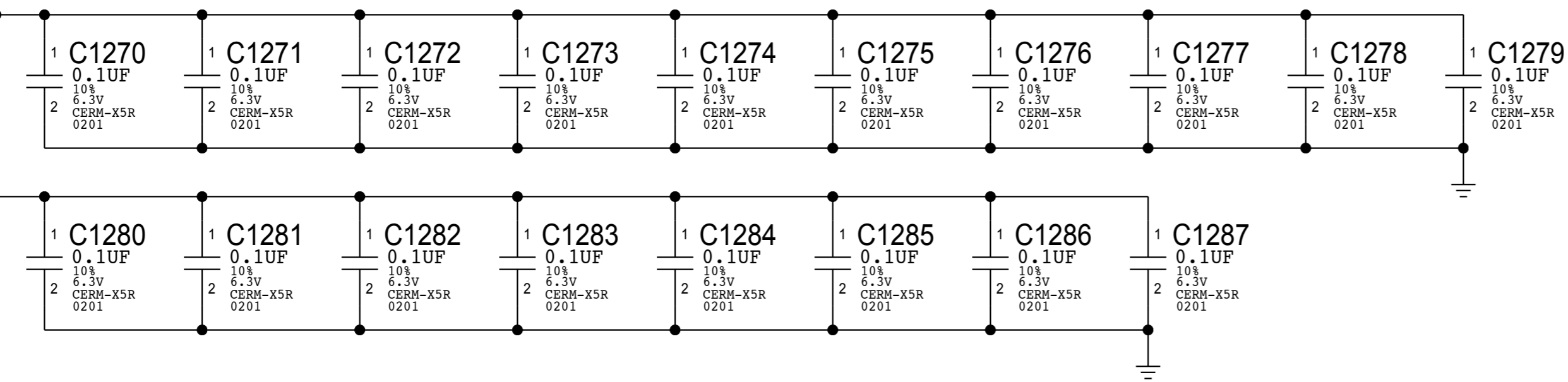
CPU GT Decoupling

Intel recommendation (Table 52-2): 12x 0.1uF 0201 STUFF, 2x 1uF 0402, 2x 10uF 0402 NO STUFF, 9x 47uF 6.3V 0805
 Apple implementation : 12x 0.1uF 0201 STUFF (20x NO STUFF), 2x 1uF 0201, 16x 20uF 0402, 2x 270uF 2V B2

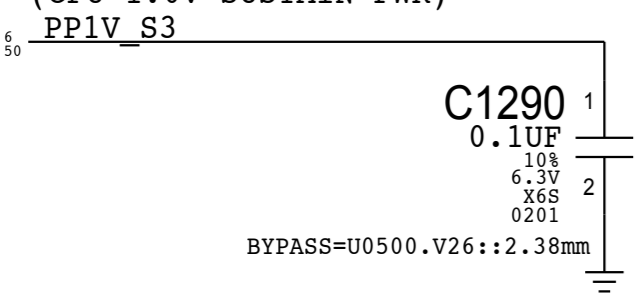


CPU VDDQ DECOUPLING

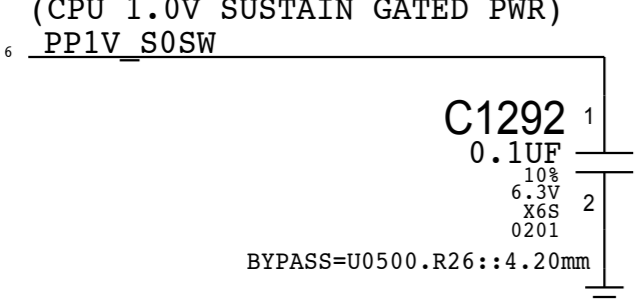
Intel recommendation (Table 52-2): 18x 0.1uF 0201
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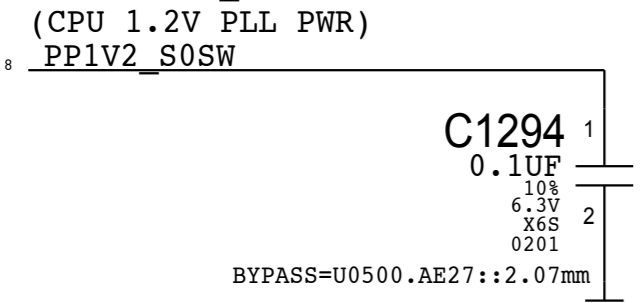
CPU VCCST BYPASS
 (CPU 1.0V SUSTAIN PWR)



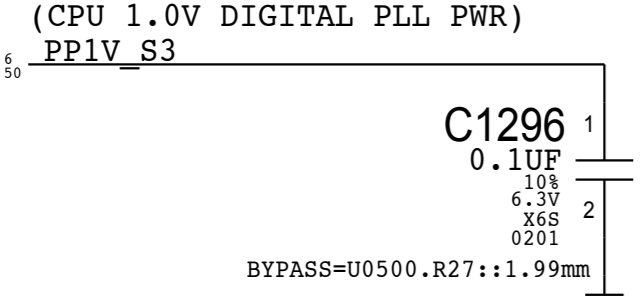
CPU VCCSTG BYPASS
 (CPU 1.0V SUSTAIN GATED PWR)



CPU VCCPLL_OC BYPASS
 (CPU 1.2V PLL PWR)



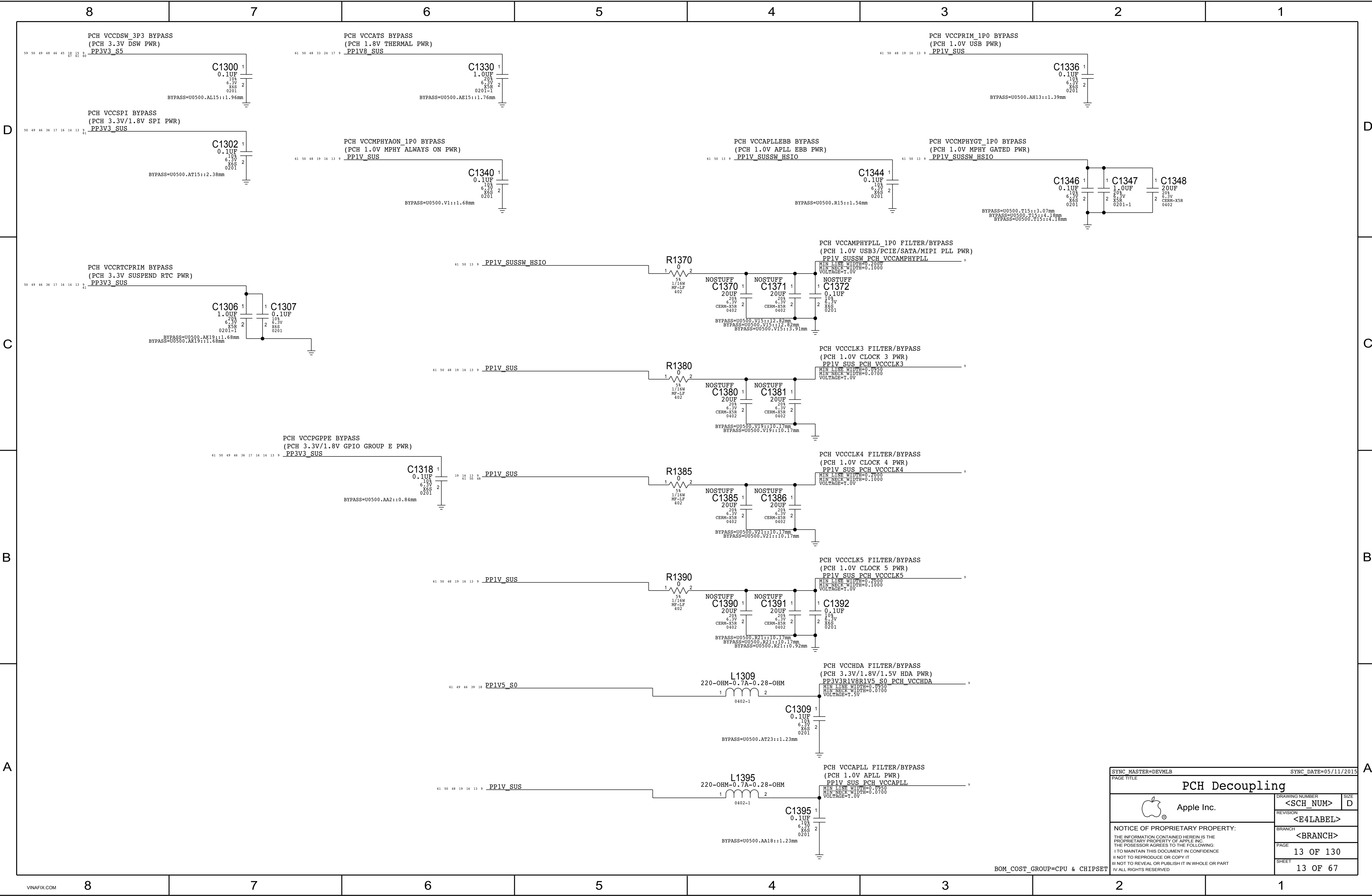
CPU VCCPLL BYPASS
 (CPU 1.0V DIGITAL PLL PWR)



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

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Apple Inc.		<SCH_NUM>	D
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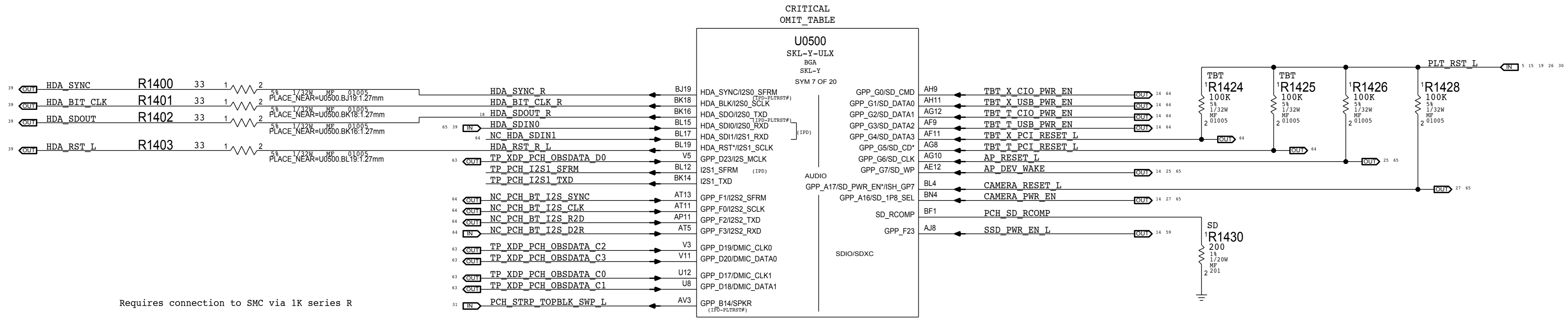
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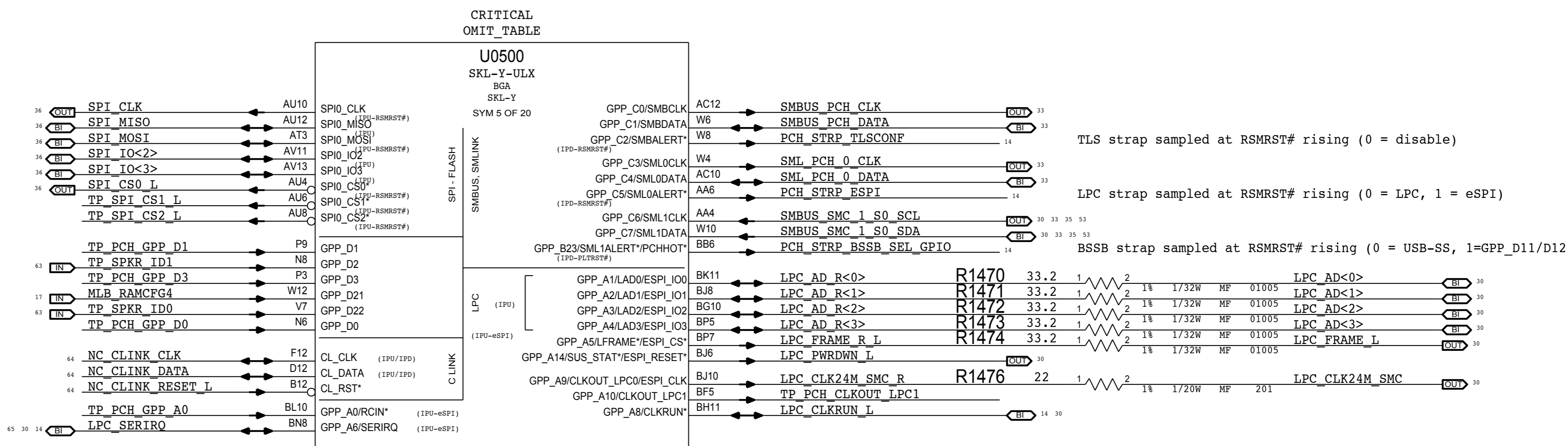
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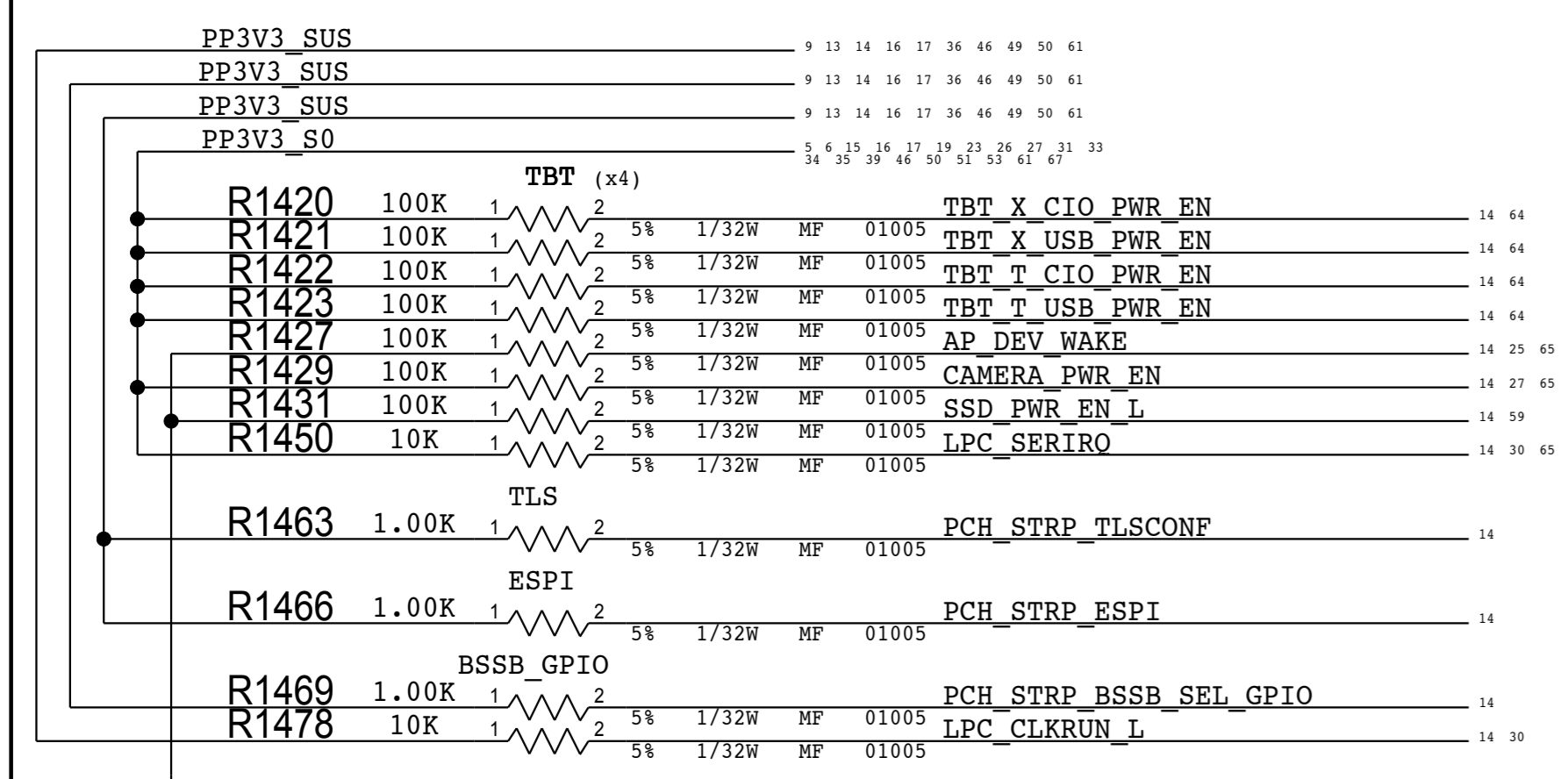
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PAGE TITLE **PCH Audio/LPC/SPI/SMBus**

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SHEET 14 OF 67

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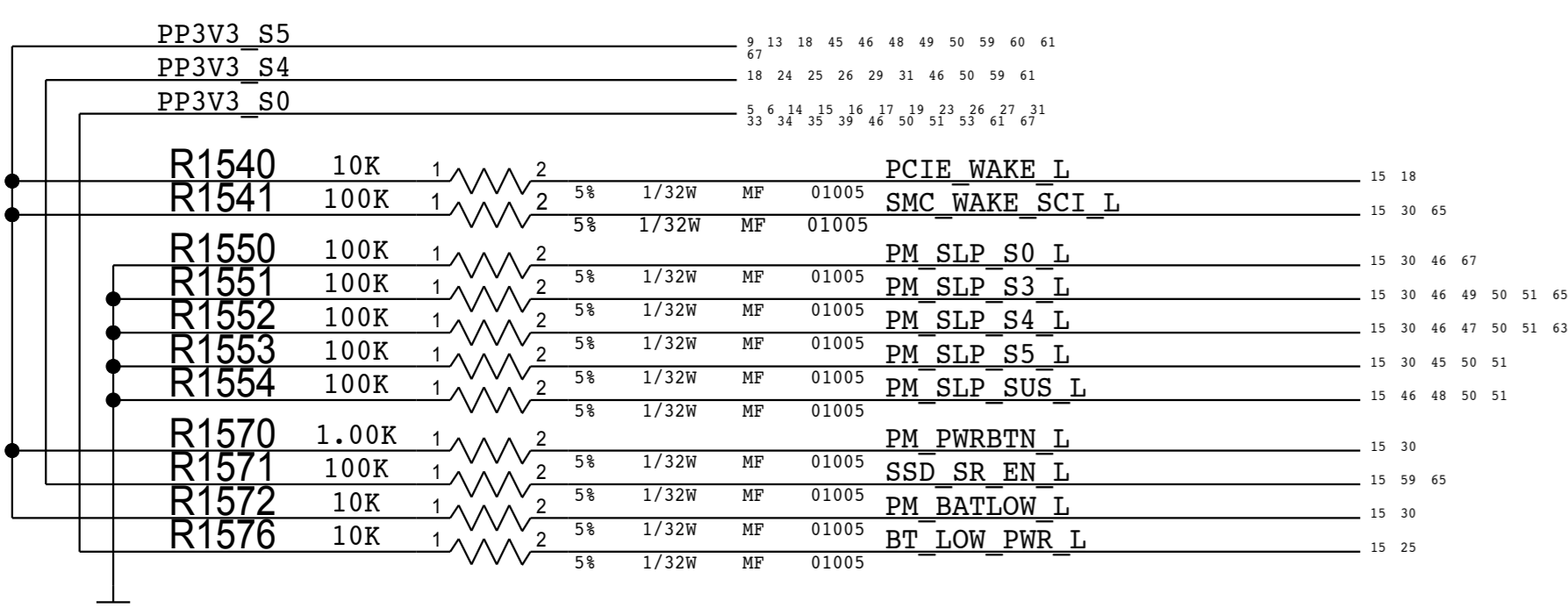
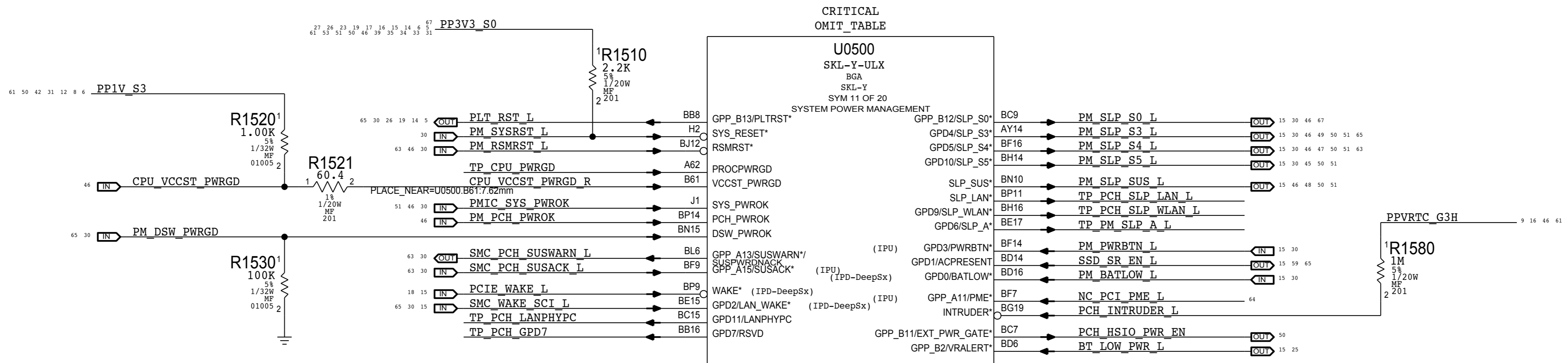
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B

B

A

A



CRITICAL OMIT_TABLE

U0500
SKL-Y-ULX
BGA
SKL-Y
SYM 11 OF 20

SYSTEM POWER MANAGEMENT

GPP_B13/PLTRST*	BB8	GPP_B12/SLP_S0*	BC9	PM_SLP_S0_L	15 30 46 67
SYS_RESET*	H2	GPD4/SLP_S3*	AY14	PM_SLP_S3_L	15 30 46 49 50 51 65
RSMRST*	BJ12	GPD5/SLP_S4*	BF16	PM_SLP_S4_L	15 30 46 47 50 51 63
PROC_PWRGD	A62	GPD10/SLP_S5*	BH14	PM_SLP_S5_L	15 30 45 50 51
VCCST_PWRGD	B61	SLP_SUS*	BN10	PM_SLP_SUS_L	15 46 48 50 51
SYS_PWROK	J1	SLP_LAN*	BP11	TP_PCH_SLP_LAN_L	
PCH_PWROK	BP14	GPD9/SLP_WLAN*	BH16	TP_PCH_SLP_WLAN_L	
DSW_PWROK	BN15	GPD6/SLP_A*	BE17	TP_PM_SLP_A_L	
GPP_A13/SUSWARN*/SUSPWROK	BL6	GPD3/PWRBTN*	BF14	PM_PWRBTN_L	15 30
GPP_A13/SUSACK*	BF9	GPD1/ACPRESENT	BD14	SSD_SR_EN_L	15 59 65
WAKE* (IPD-DeepSx)	BP9	GPD0/BATLOW*	BD16	PM_BATLOW_L	15 30
GPD2/LAN_WAKE* (IPD-DeepSx)	BE15	GPP_A11/PME*	BF7	NC_PCI_PME_L	64
GPD11/LANPHYPC	BC15	INTRUDER*	BG19	PCH_INTRUDER_L	
GPD7/RSVD	BB16	GPP_B11/EXT_PWR_GATE*	BC7	PCH_HSIO_PWR_EN	50
		GPP_B2/VRALERT*	BD6	BT_LOW_PWR_L	15 25

BOM_COST_GROUP=CPU & CHIPSET

SYNC_MASTER=X260_ERIC SYNC_DATE=06/04/2015

PAGE TITLE

PCH Power Management

Apple Inc.

DRAWING NUMBER	<SCH_NUM>	SIZE	D
REVISION	<E4LABEL>	BRANCH	<BRANCH>
PAGE	15 OF 130	SHEET	15 OF 67

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PCIe Port Assignments:

SSD lane 0

SSD lane 1

SSD lane 2

SSD lane 3

Reserved: Thunderbolt A lane 0

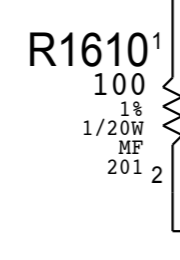
Reserved: Thunderbolt A lane 1

Reserved: Thunderbolt B lane 0

Reserved: Thunderbolt B lane 1

Airport

Camera

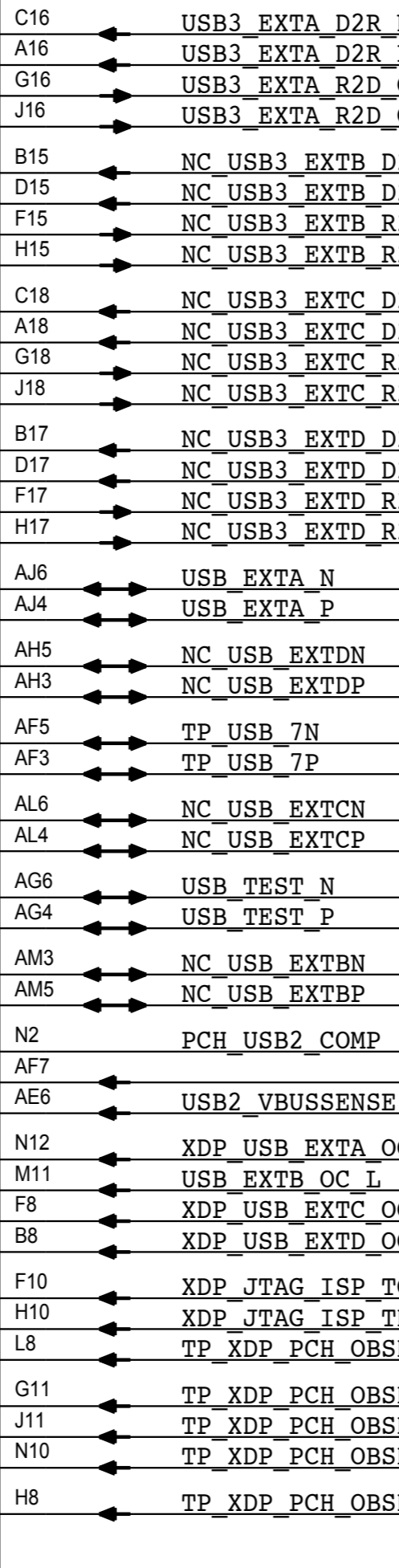
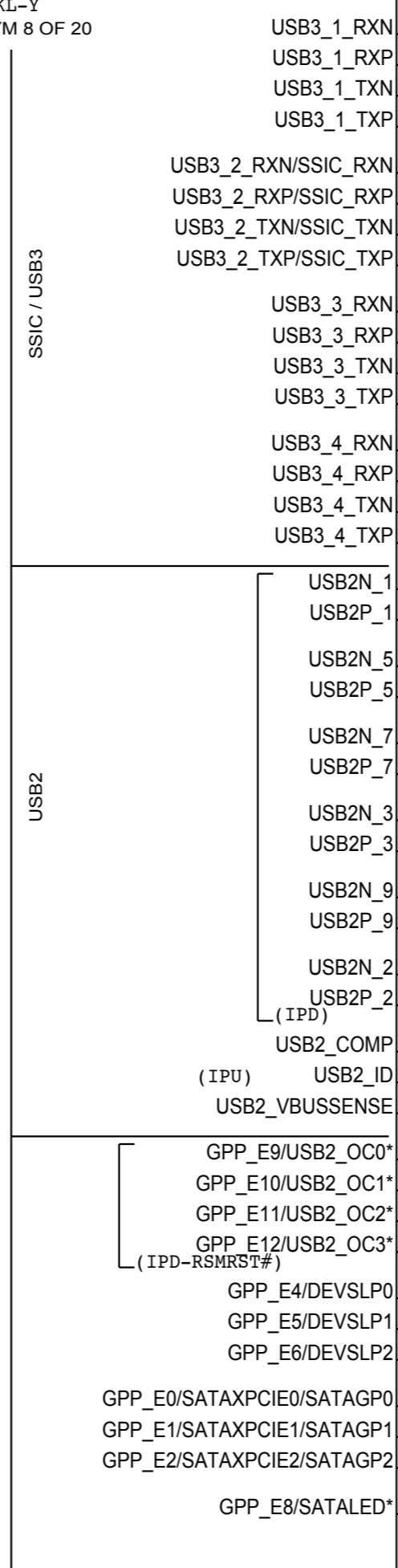
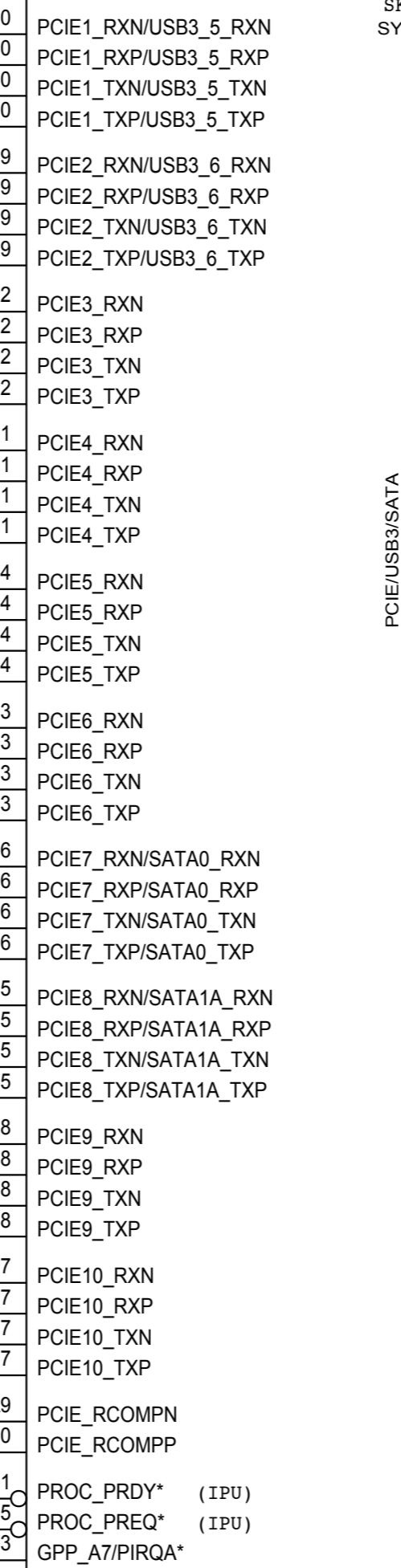
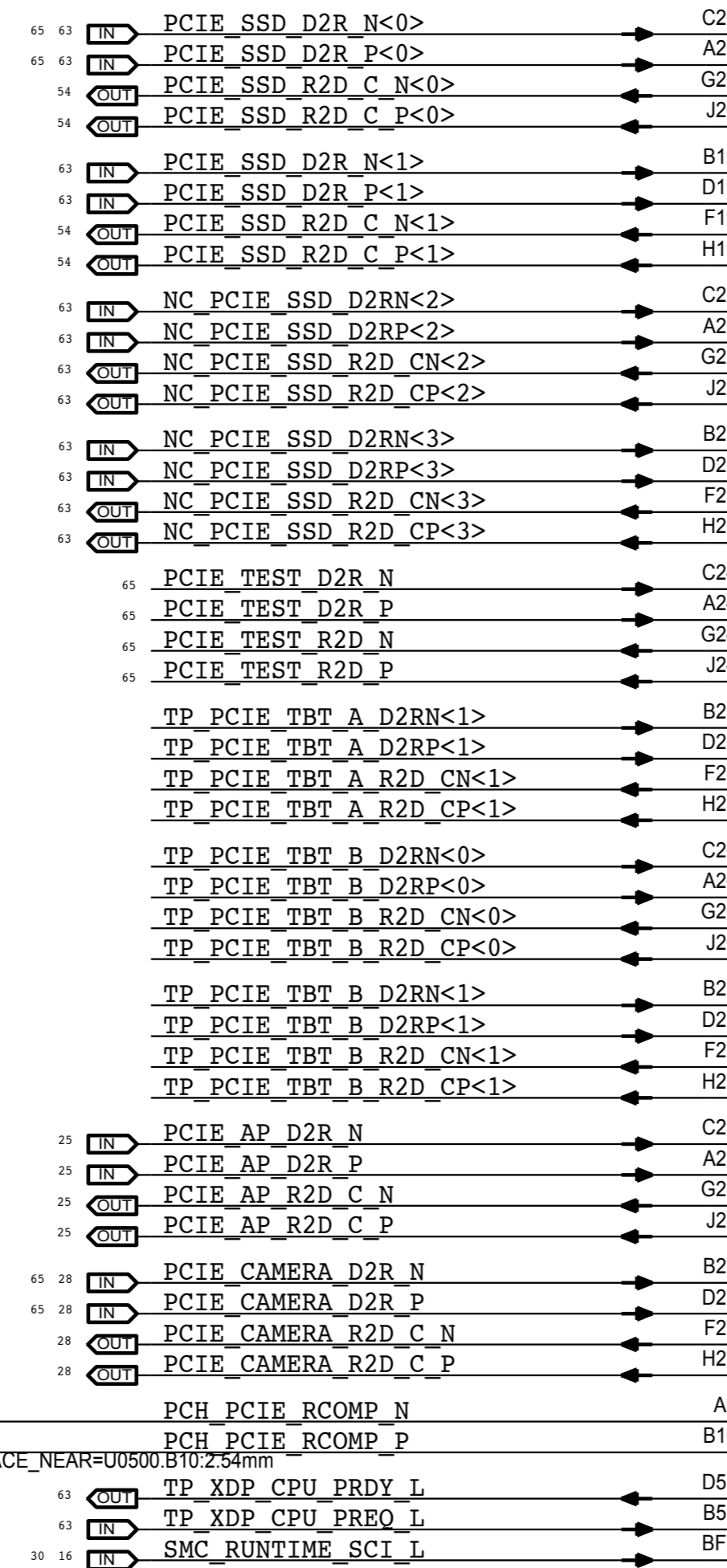


R1610 100k 1% 1/20W MF 201 2

PLACE_NEAR=U0500.B10:2.54mm

CRITICAL OMIT TABLE

U0500 SKL-Y-ULX BGA SKL-Y SYM 8 OF 20



USB3 Port Assignments:

Ext A (SS, DCI)

Ext B (SS)

Ext C (SS)

Ext D (SS)

USB Port Assignments:

Ext A (LS/FS/HS)

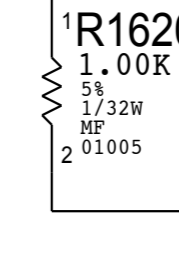
Ext D (LS/FS/HS)

Unused

Ext C (LS/FS/HS)

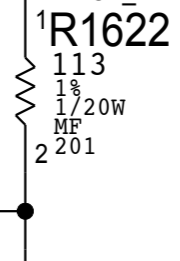
Unused

Ext B (LS/FS/HS)



R1620 1.00k 1% 1/32W MF 01005

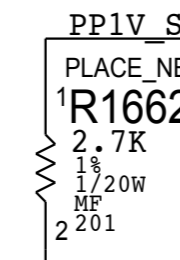
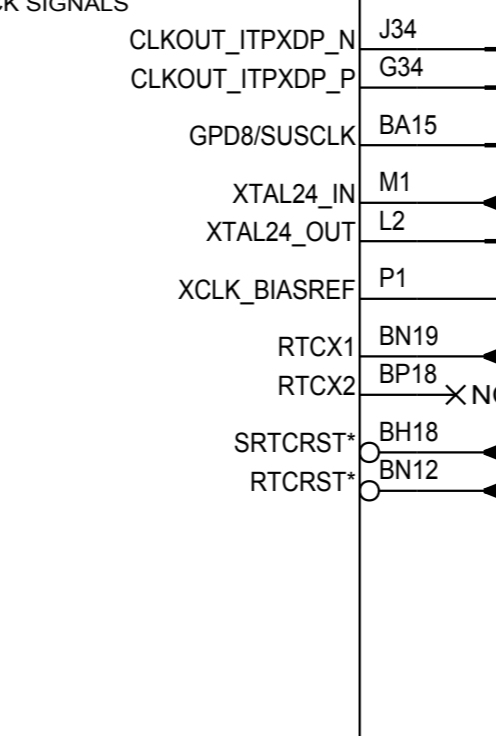
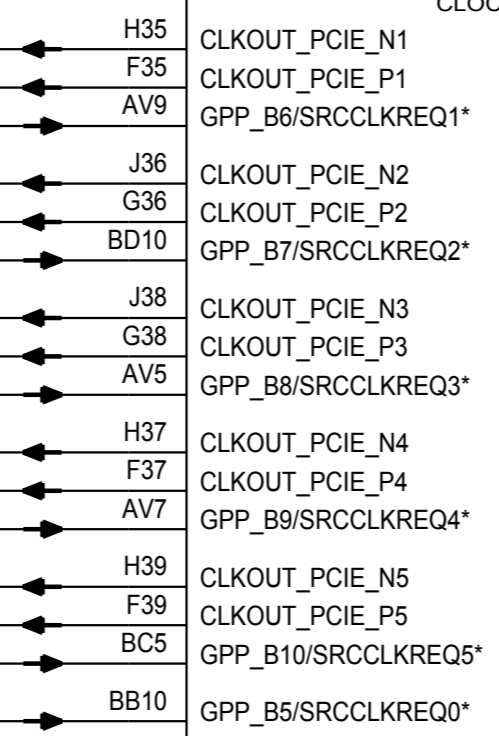
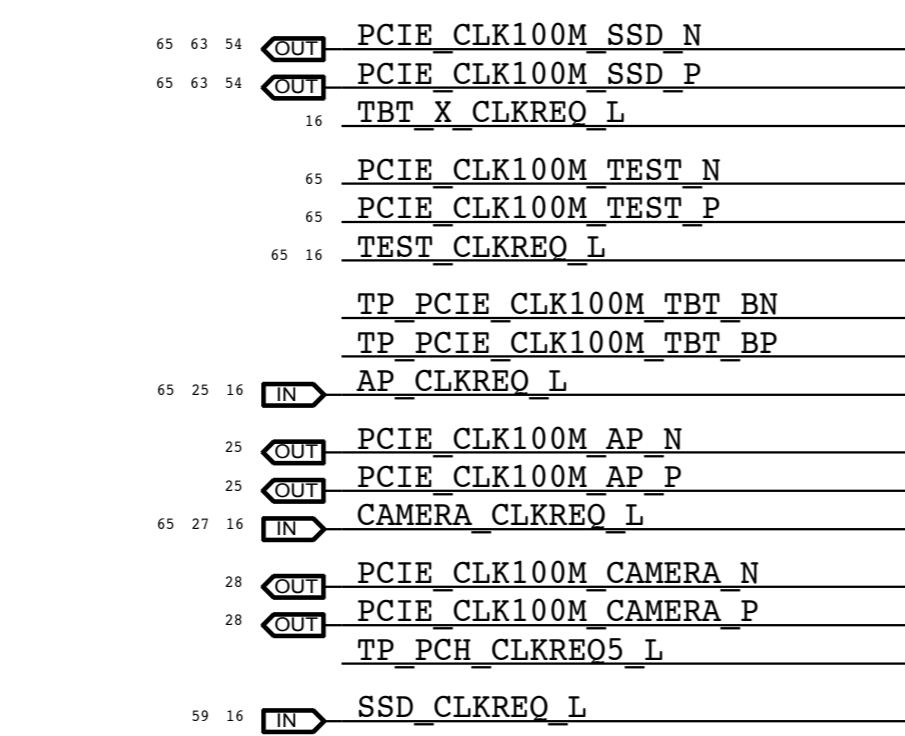
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R1622 1.13k 1% 1/20W MF 201 1

CRITICAL OMIT TABLE

U0500 SKL-Y-ULX BGA SKL-Y SYM 10 OF 20 CLOCK SIGNALS

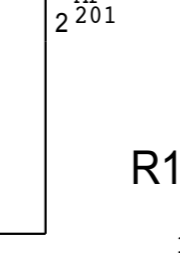


R1662 2.7k 1% 1/20W MF 201 1

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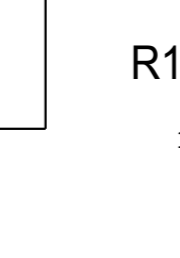
PP1V_SUS

PPVRTC_G3H



R1670 20k 1% 1/20W MF 201 2

PPVRTC_G3H



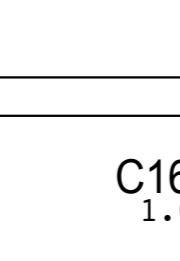
R1671 20k 1% 1/20W MF 201 1

PPVRTC_G3H

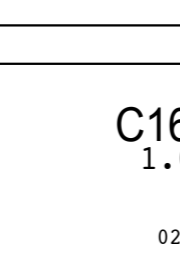


C1670 1.0uF 20% 6.3V X5R 0201-1

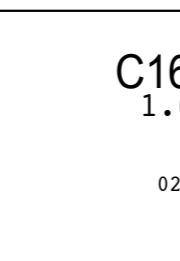
PPVRTC_G3H



C1671 1.0uF 20% 6.3V X5R 0201-1



C1670 1.0uF 20% 6.3V X5R 0201-1



C1671 1.0uF 20% 6.3V X5R 0201-1

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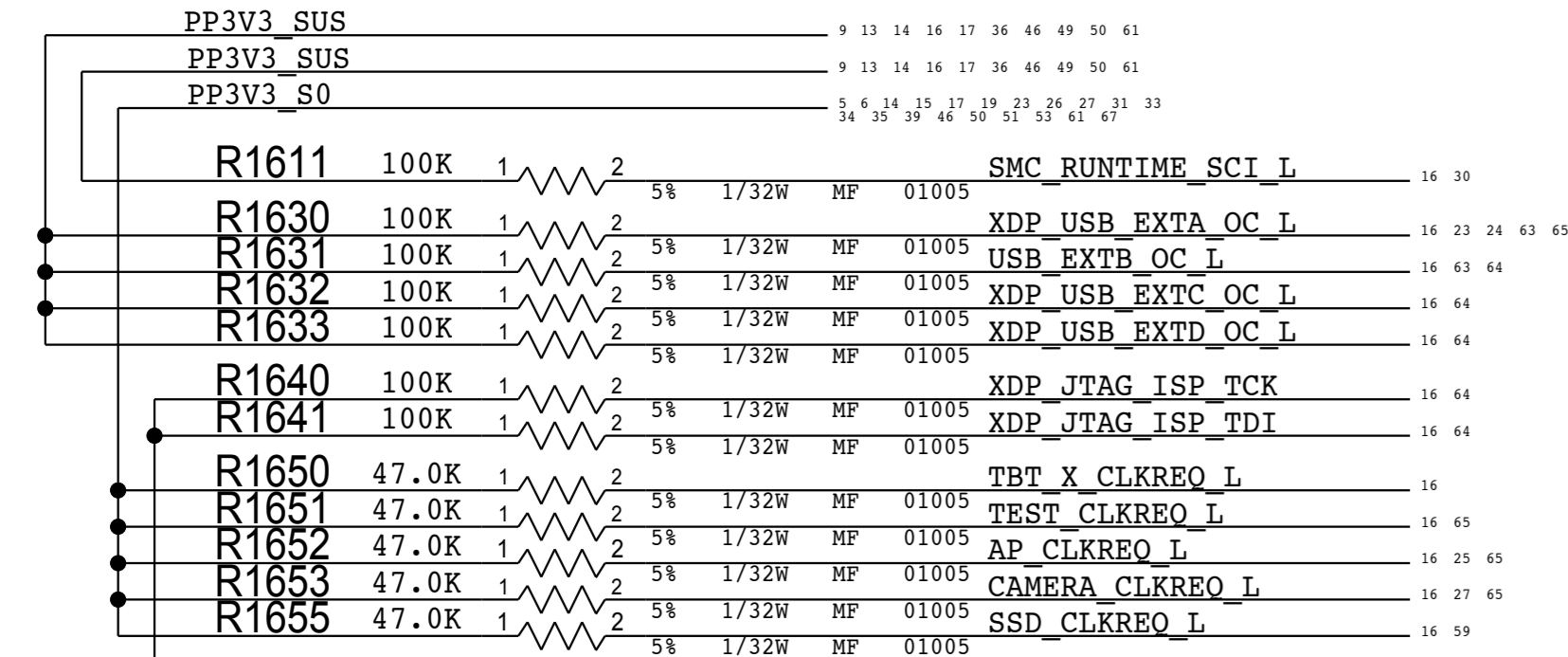
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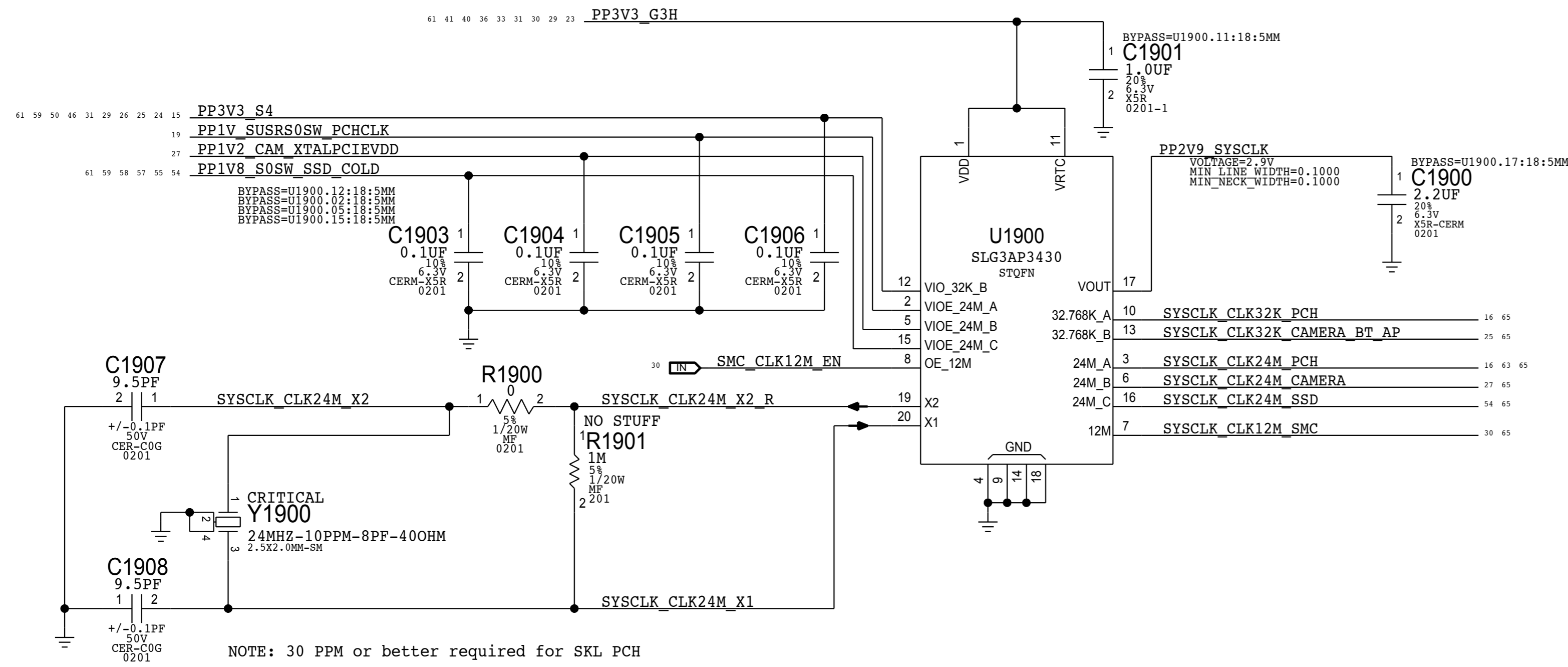
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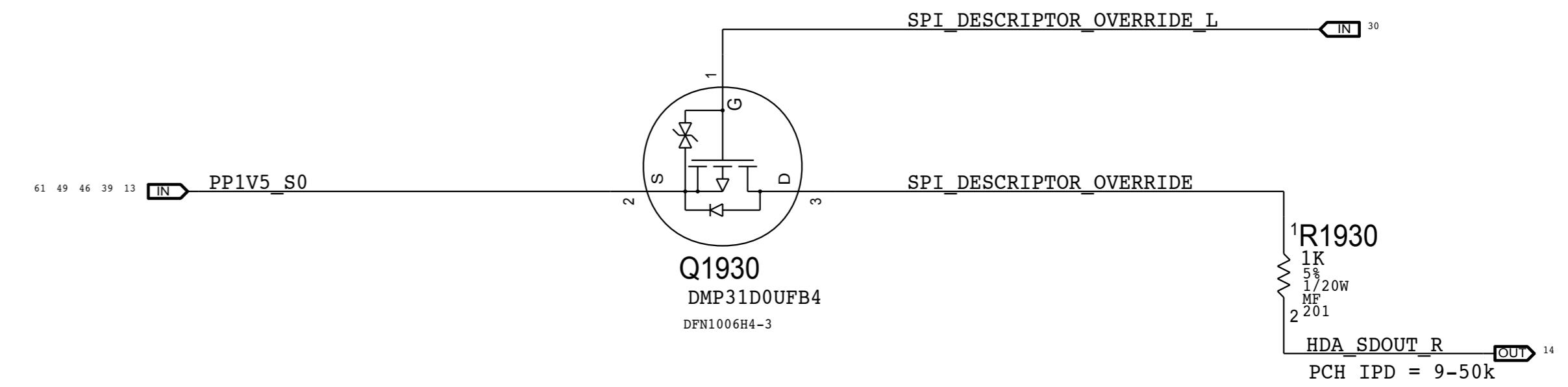
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BOM_COST_GROUP=CPU & CHIPSET

System 32kHz / 12MHz / 24MHz Clock Generator

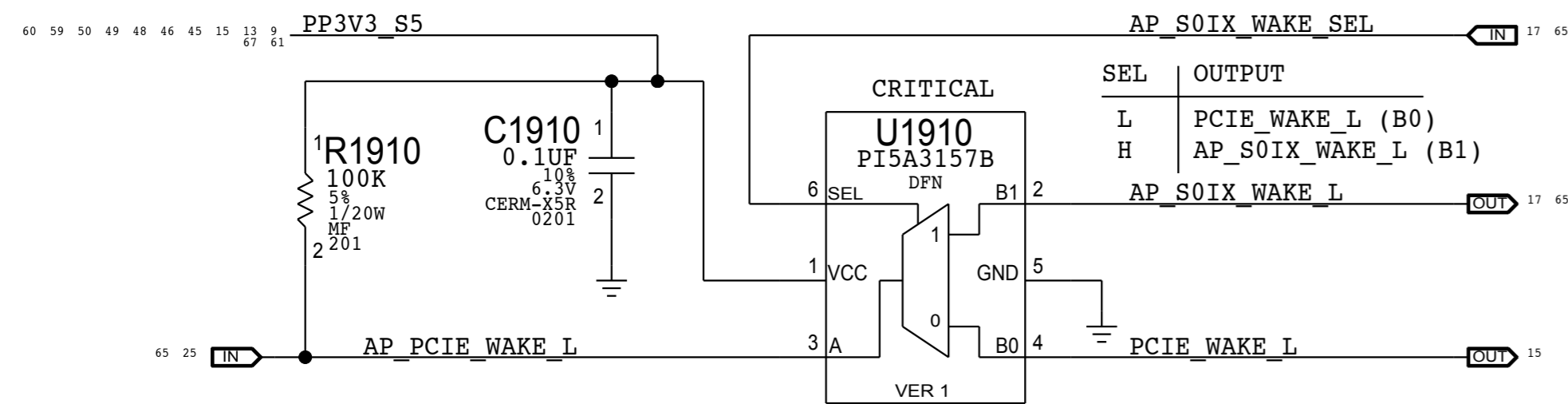


PCH ME Disable Strap



PCH uses HDA_SDO as a power-up strap. If low, ME functions normally. If high, ME is disabled. This allows for full re-flashing of SPI ROM. SMC controls strap enable to allow in-field control of strap setting. ***** Circuit does not support HDA voltage >3.3V.

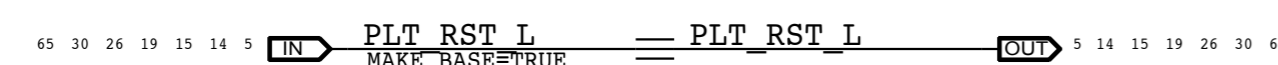
PCIe Wake Muxing



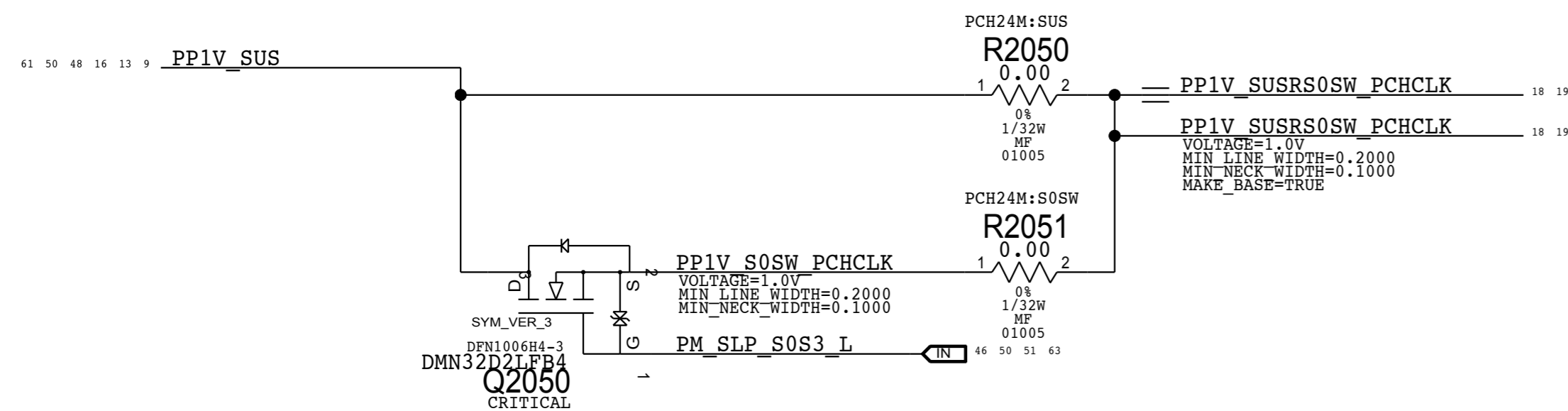
Chipset Support 1		DRAWING NUMBER	SIZE
Apple Inc.		<SCH_NUM>	D
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		SHEET	18 OF 67

Platform Reset Connections

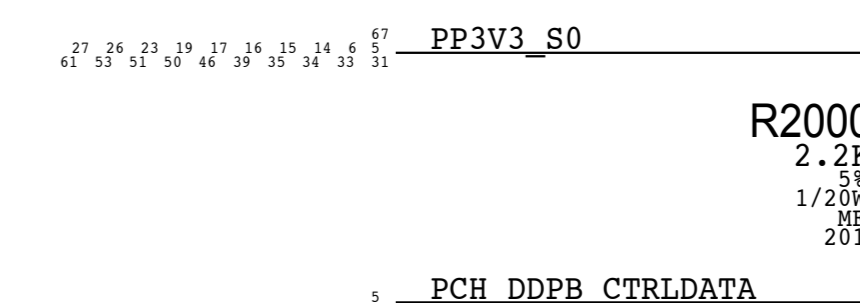
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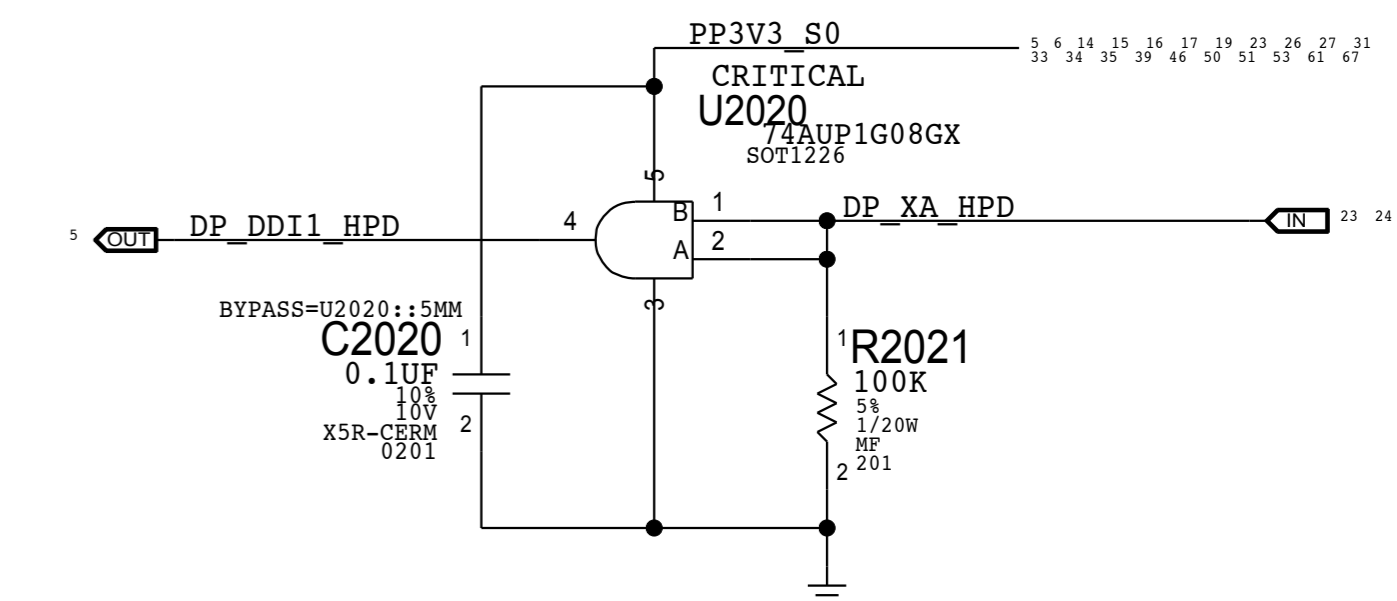
PCH 24MHz VIOE Options



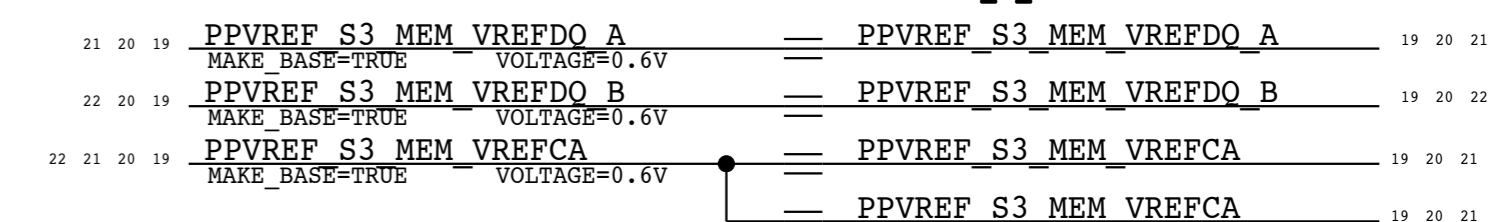
DP DDP Straps



HPD S0 Isolation

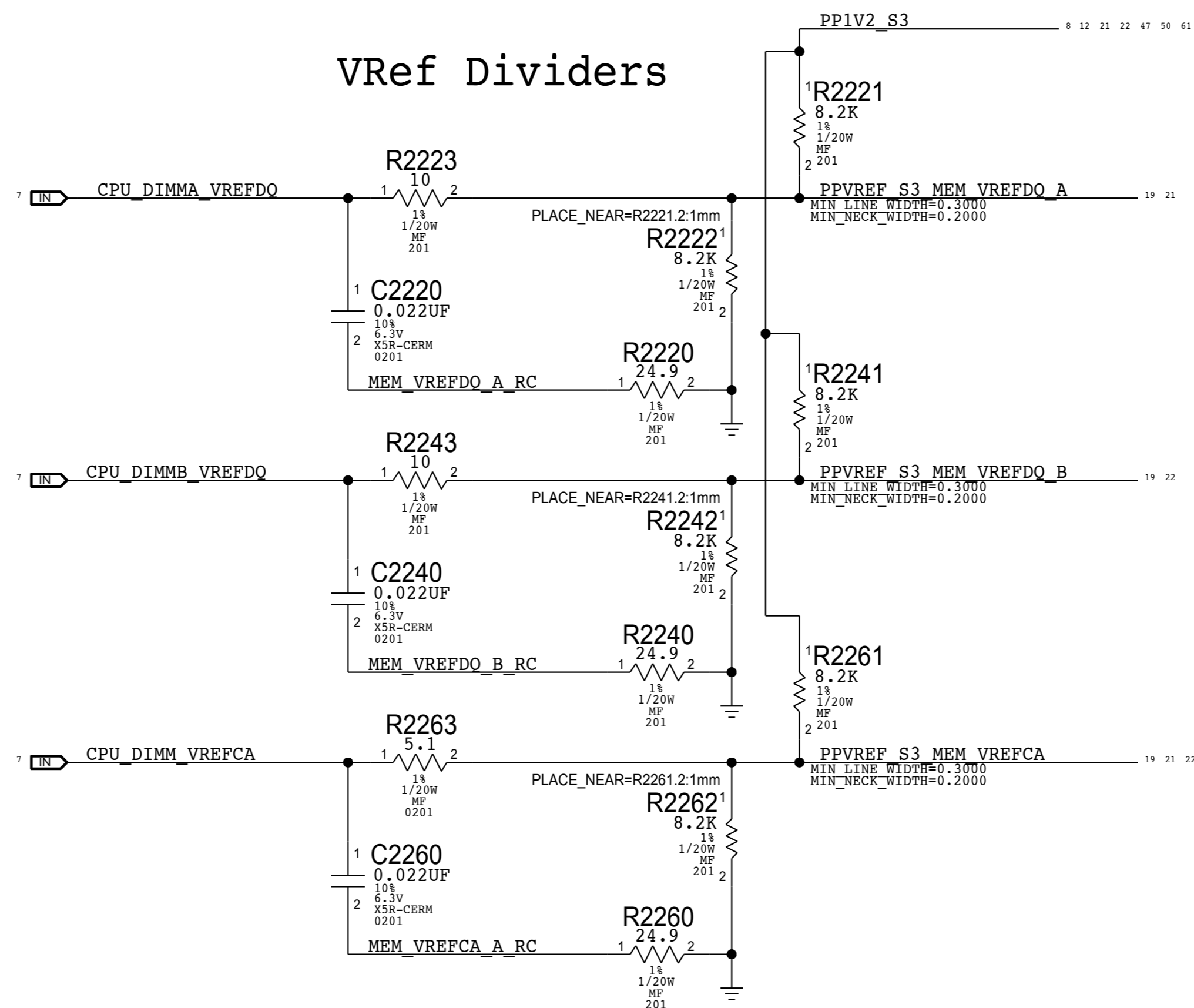


LPDDR3 Alias Support



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		SHEET	19 OF 67

CPU-Based Margining



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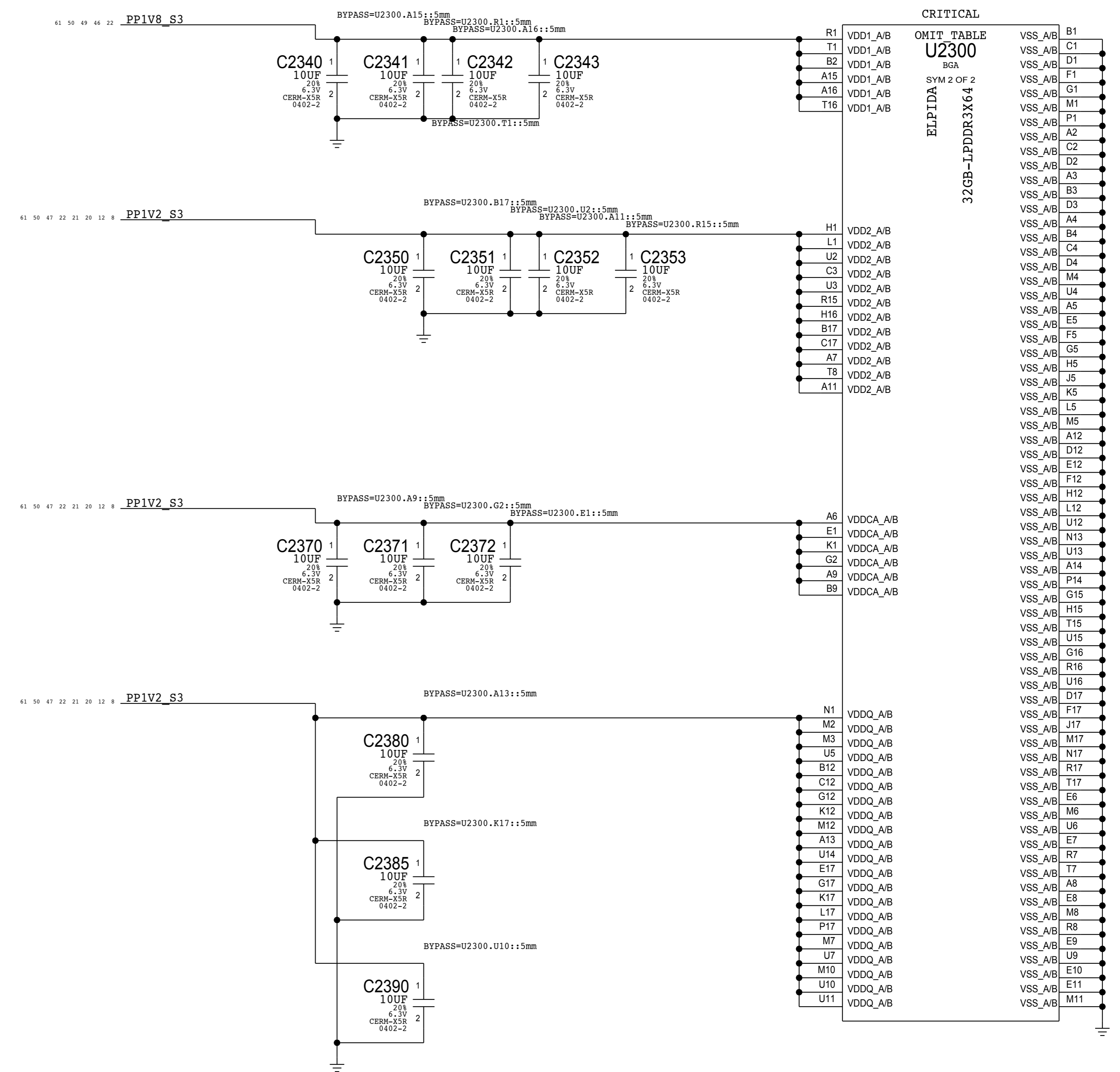
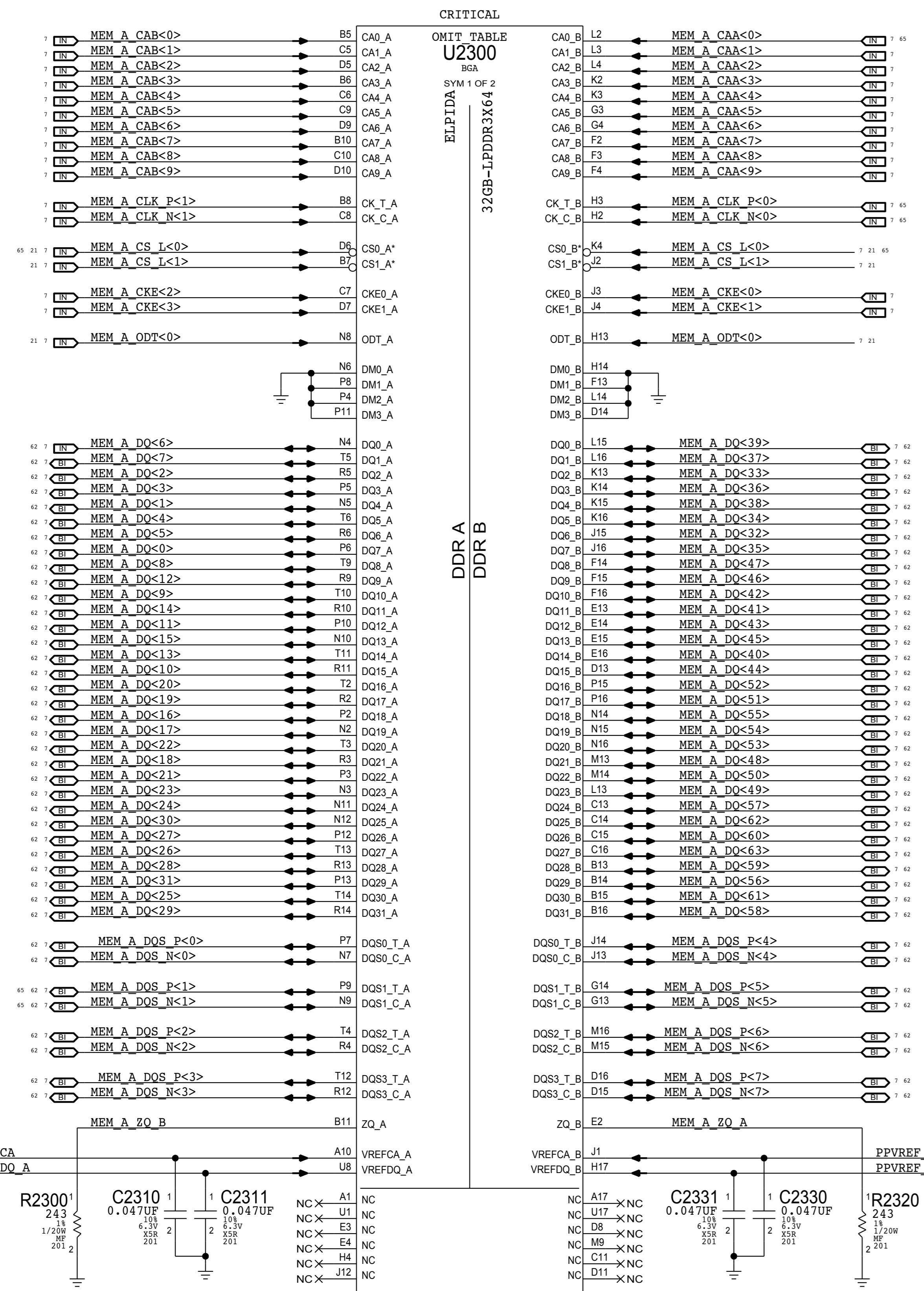
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Apple Inc.
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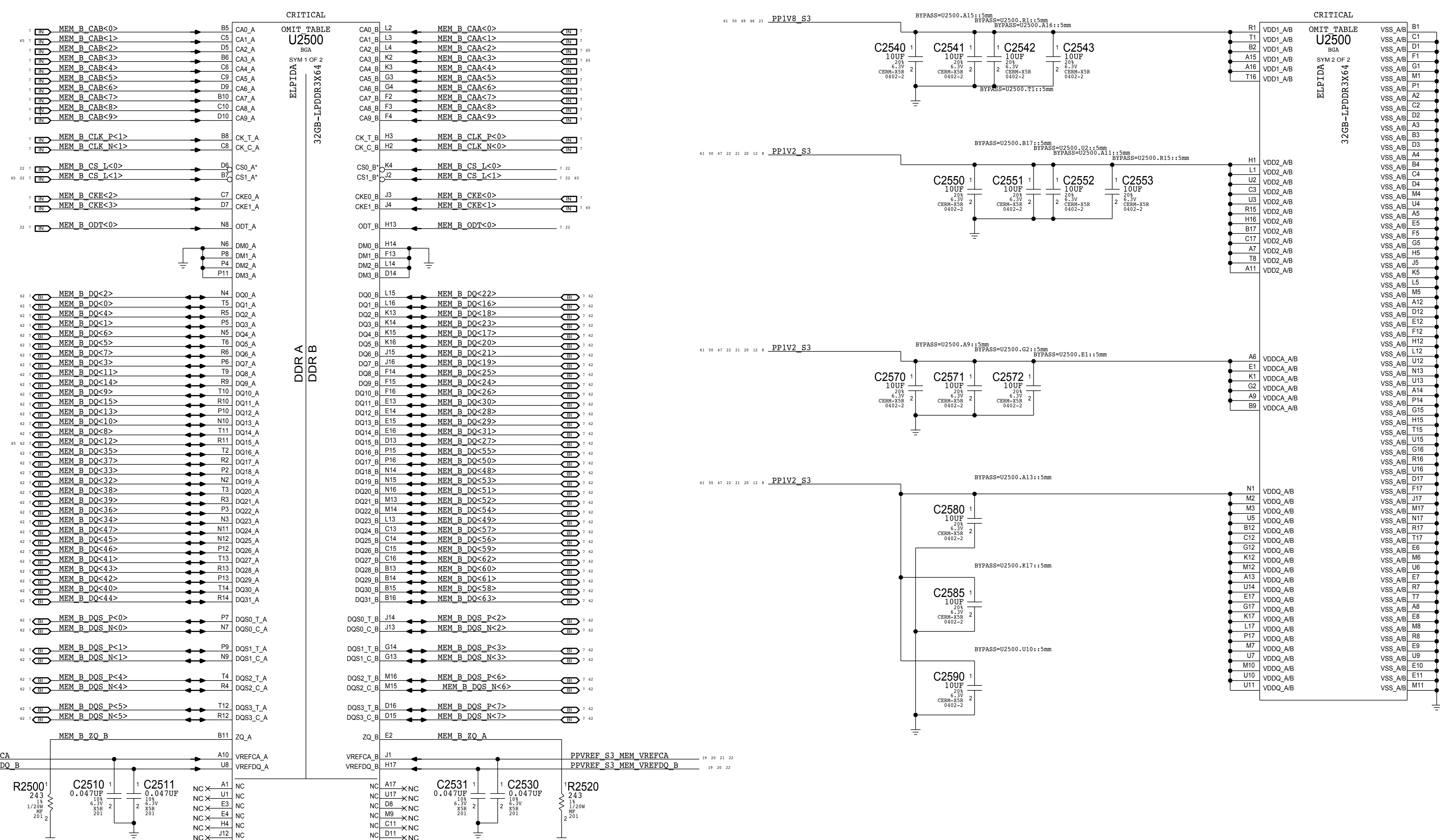
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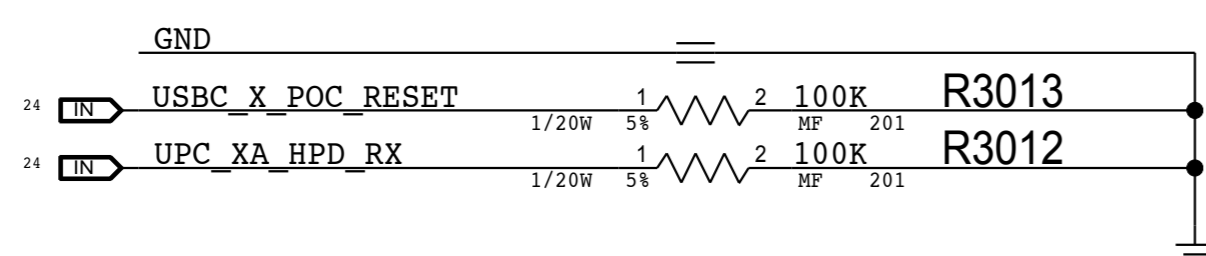
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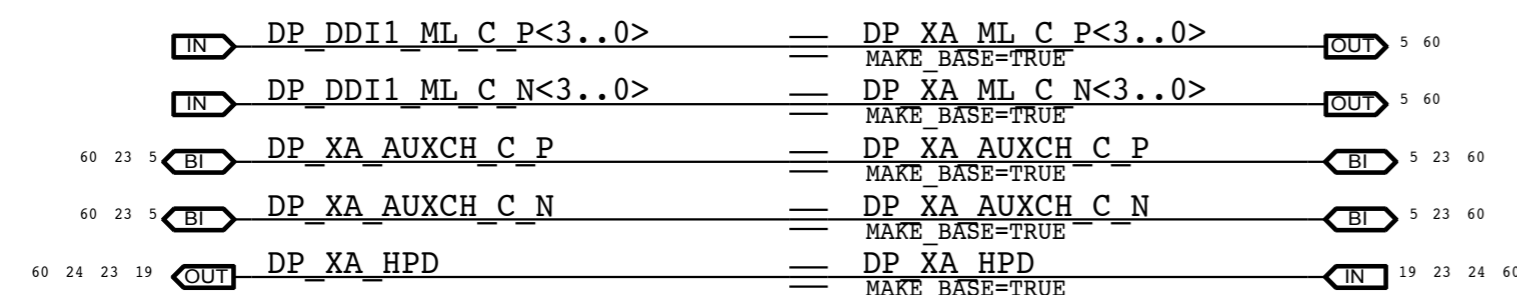
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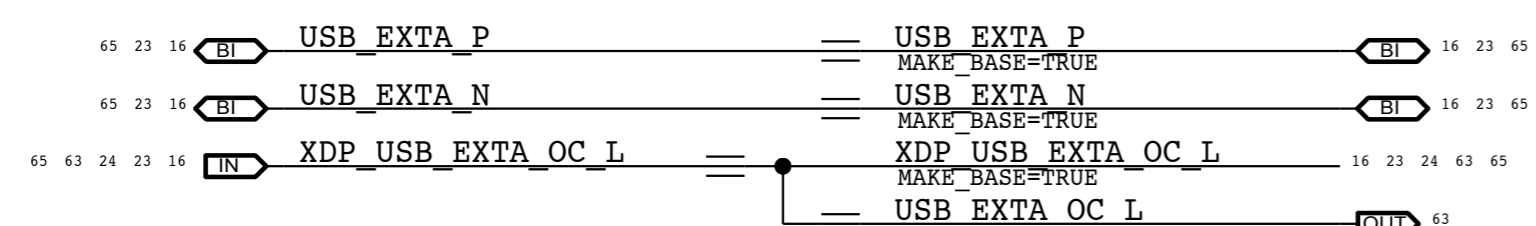
'Ridge-less Support



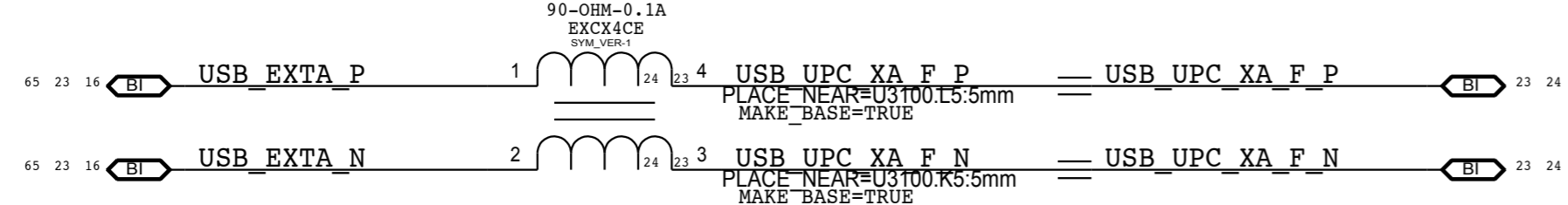
DP Support



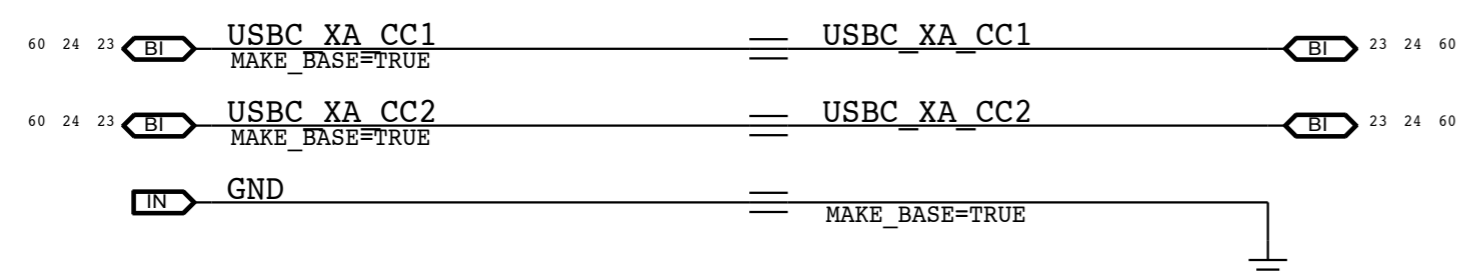
USB Support



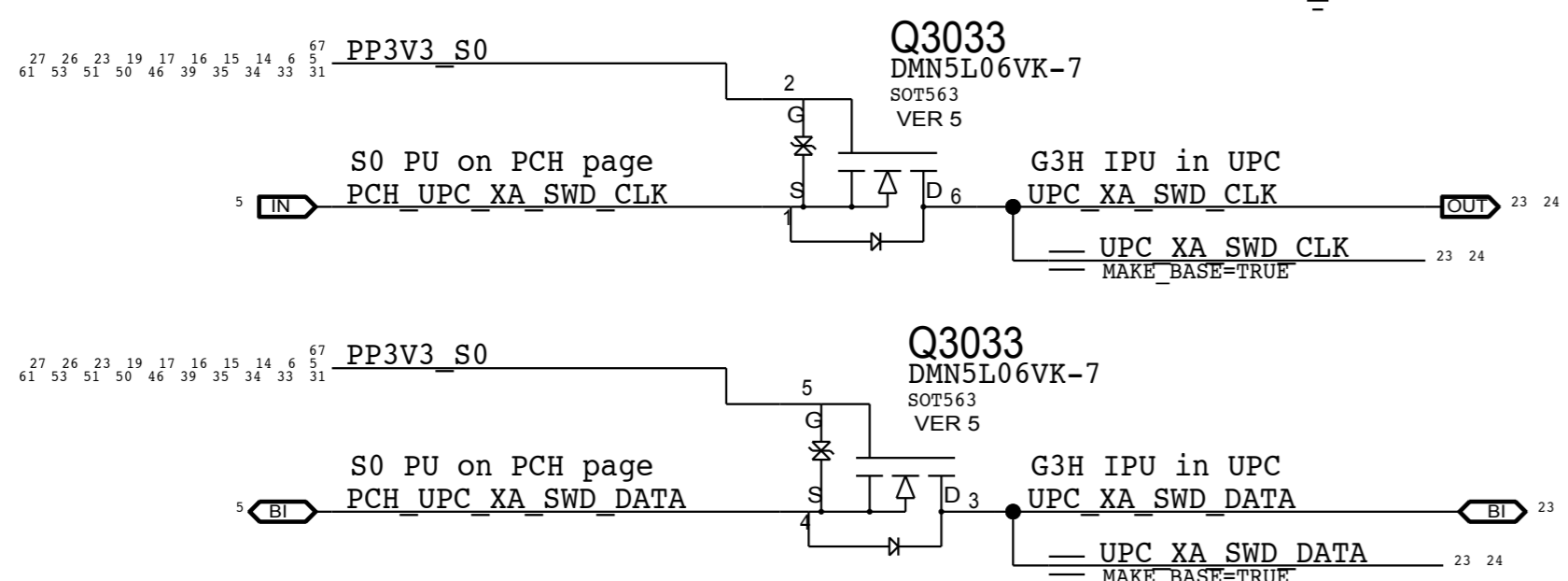
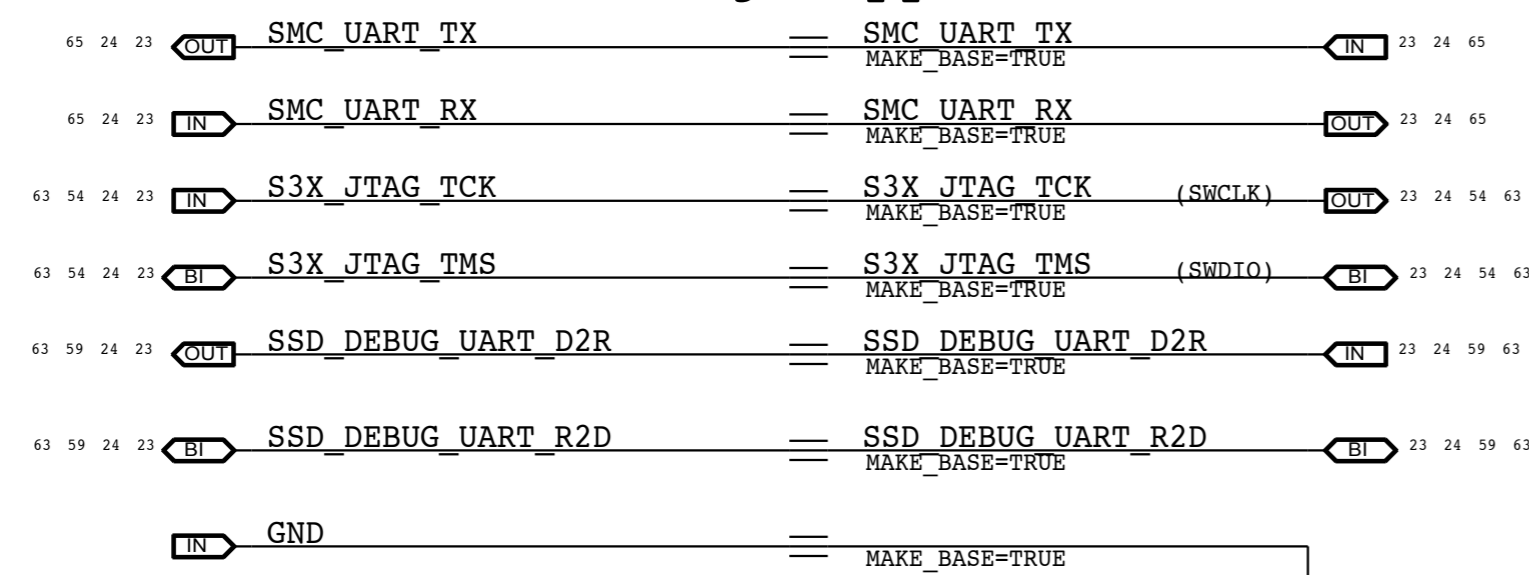
L3020



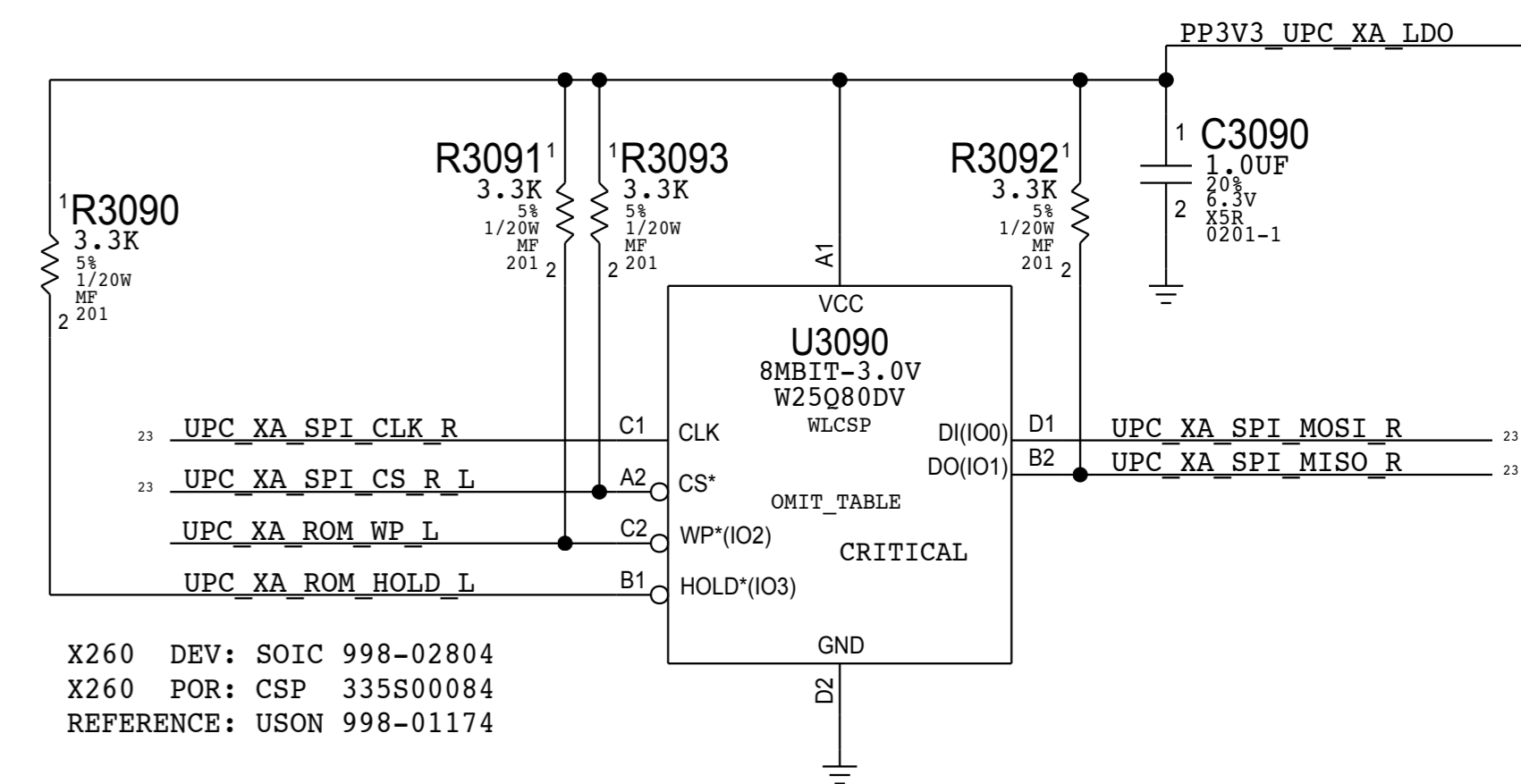
Dead Battery Support



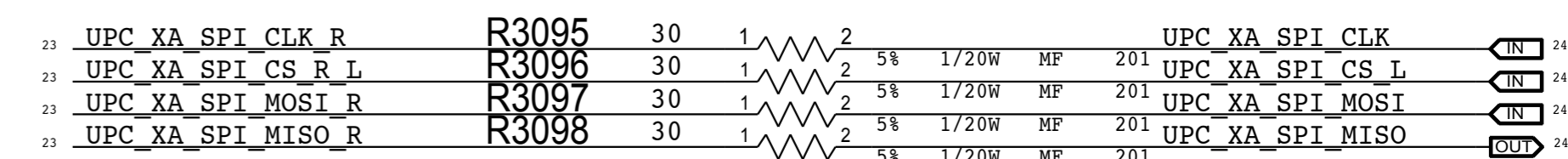
Debug Support



Port Controller ROM

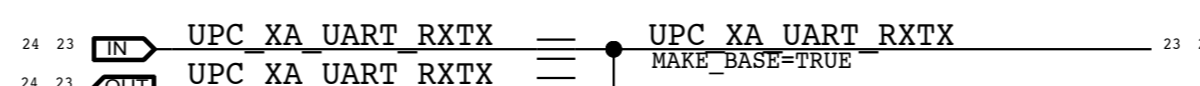


X260 DEV: SOIC 998-02804
 X260 POR: CSP 335S00084
 REFERENCE: USON 998-01174

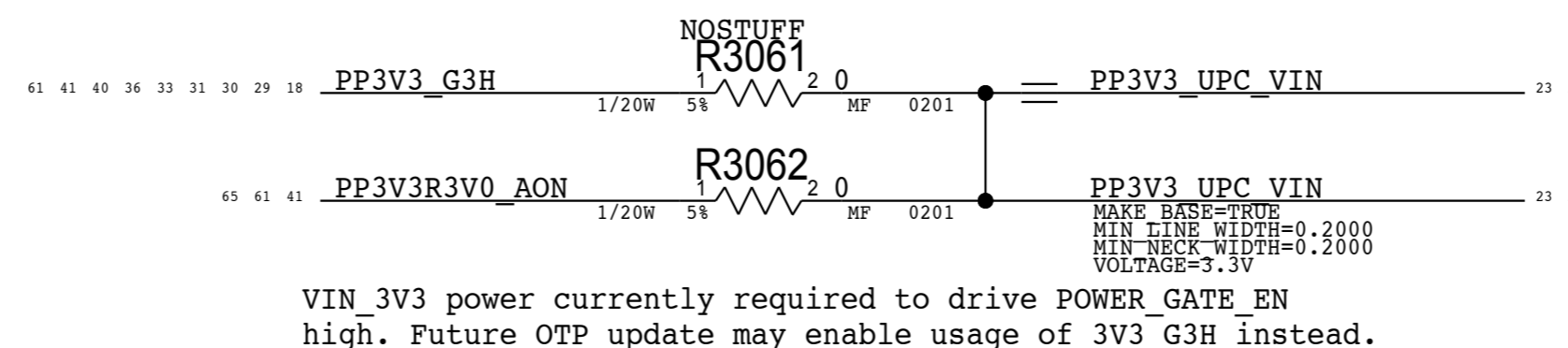


Place series R at T with dev debug header
 Characterize series R on P0 Dev, hopefully remove for P0 POR

Single Port Support

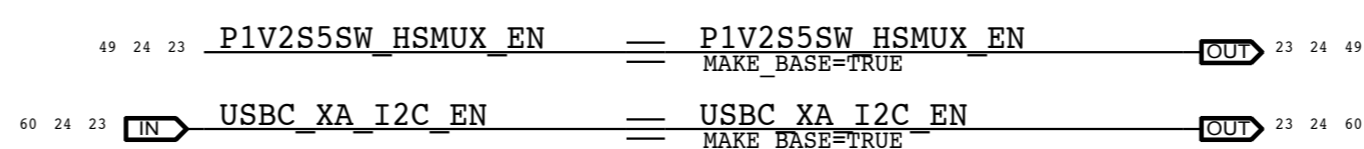


Bring Up Support

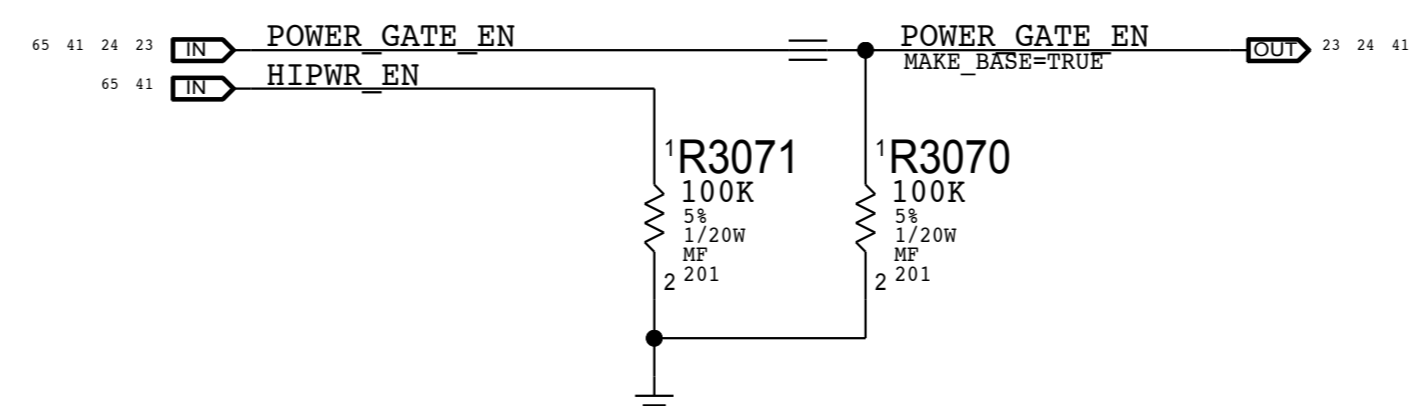


VIN_3V3 power currently required to drive POWER_GATE_EN high. Future OTP update may enable usage of 3V3_G3H instead.

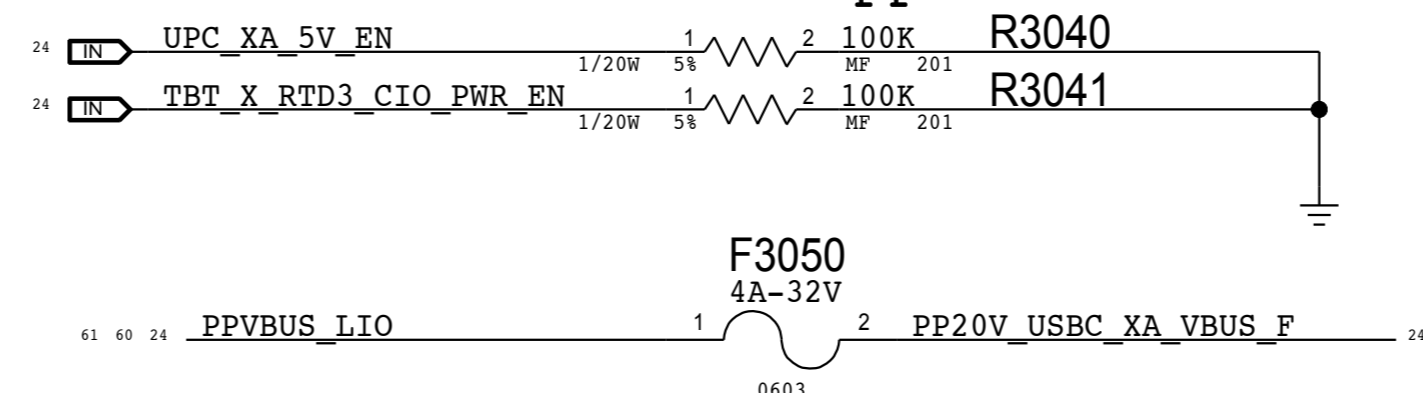
High Speed Mux Support



Bansuri Support

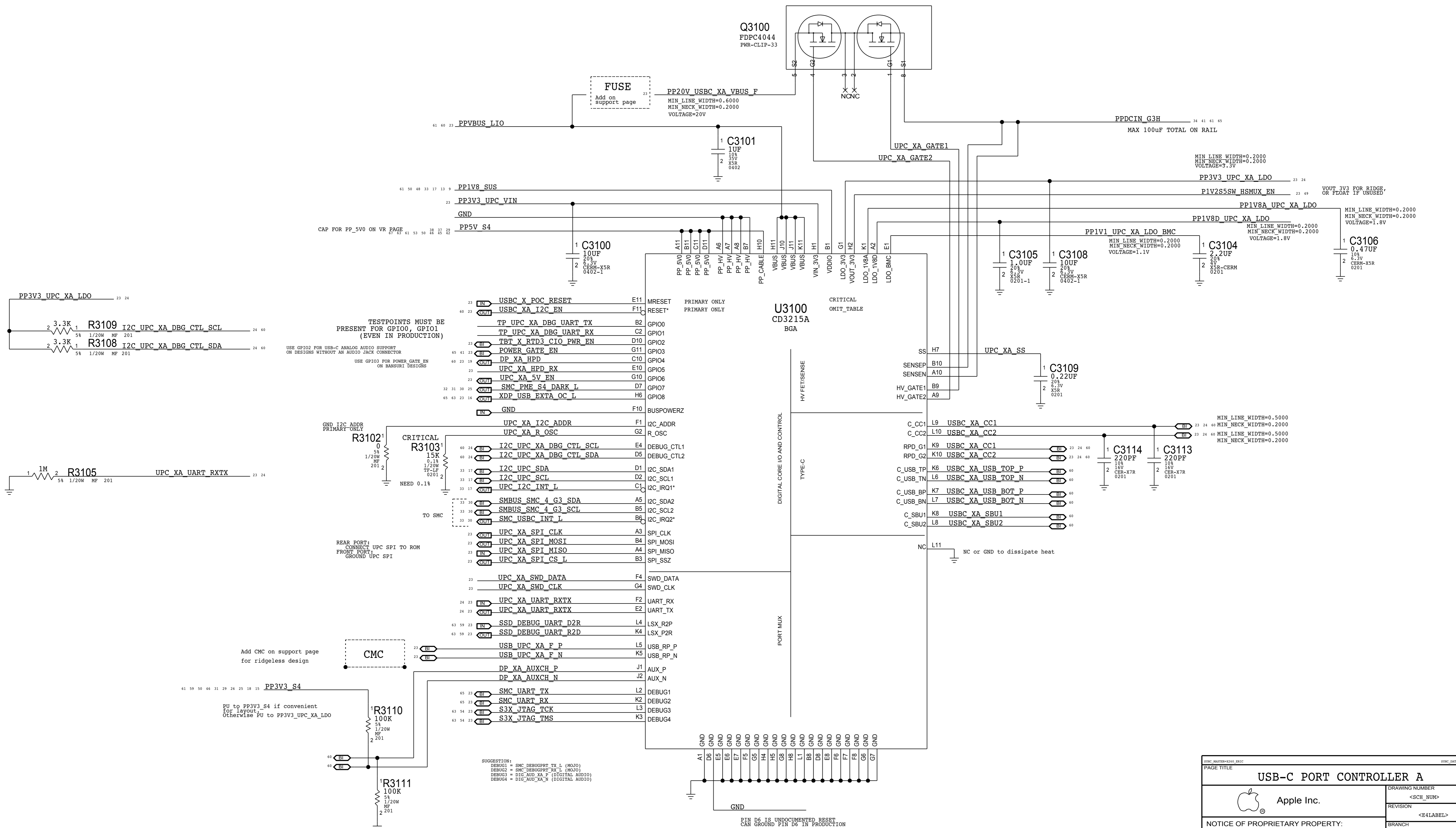


Other Support



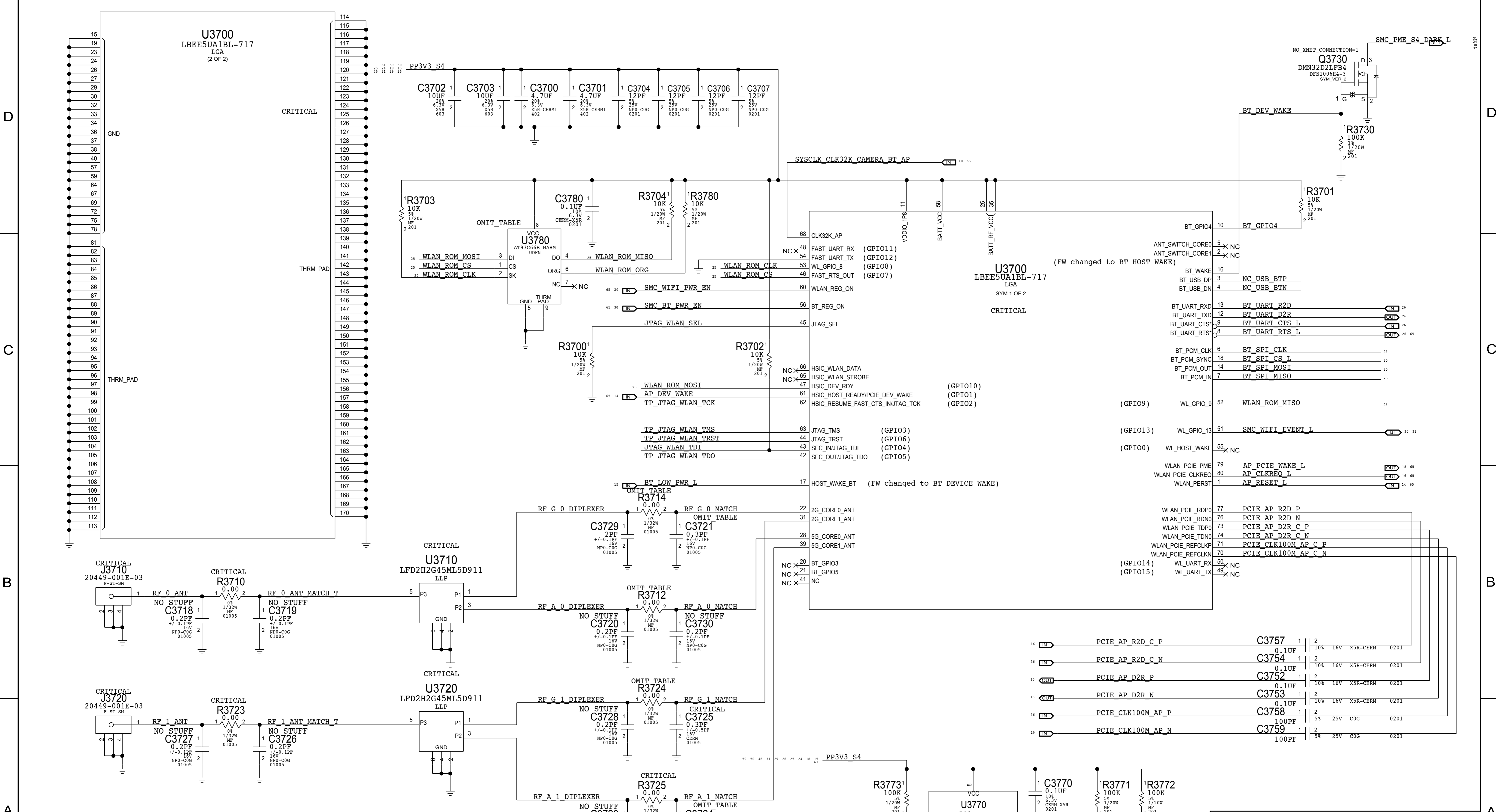
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		PAGE	30 OF 130
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PRIMARY ACE USB-C PORT CONTROLLER (UPC)



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PAGE 31 OF 130		SHEET 24 OF 67	
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BOM_COST_GROUP=USB-C



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
131S0259	1	CAP, 7PF, +/-0.1PF, 16V, 01005	R3714	CRITICAL	
152S1742	1	IND, FILM, 1.6NH, +/-0.1NH, 200MA, 01005	C3721	CRITICAL	
152S1544	1	IND, FILM, 0.4NH, +/-0.1NH, 270MA, 01005	R3712	CRITICAL	
152S1564	1	IND, FILM, 2.4NH, +/-0.1NH, 200MA, 01005	R3724	CRITICAL	
152S1720	1	IND, FILM, 1.8NH, +/-0.1NH, 270MA, 01005	C3724	CRITICAL	

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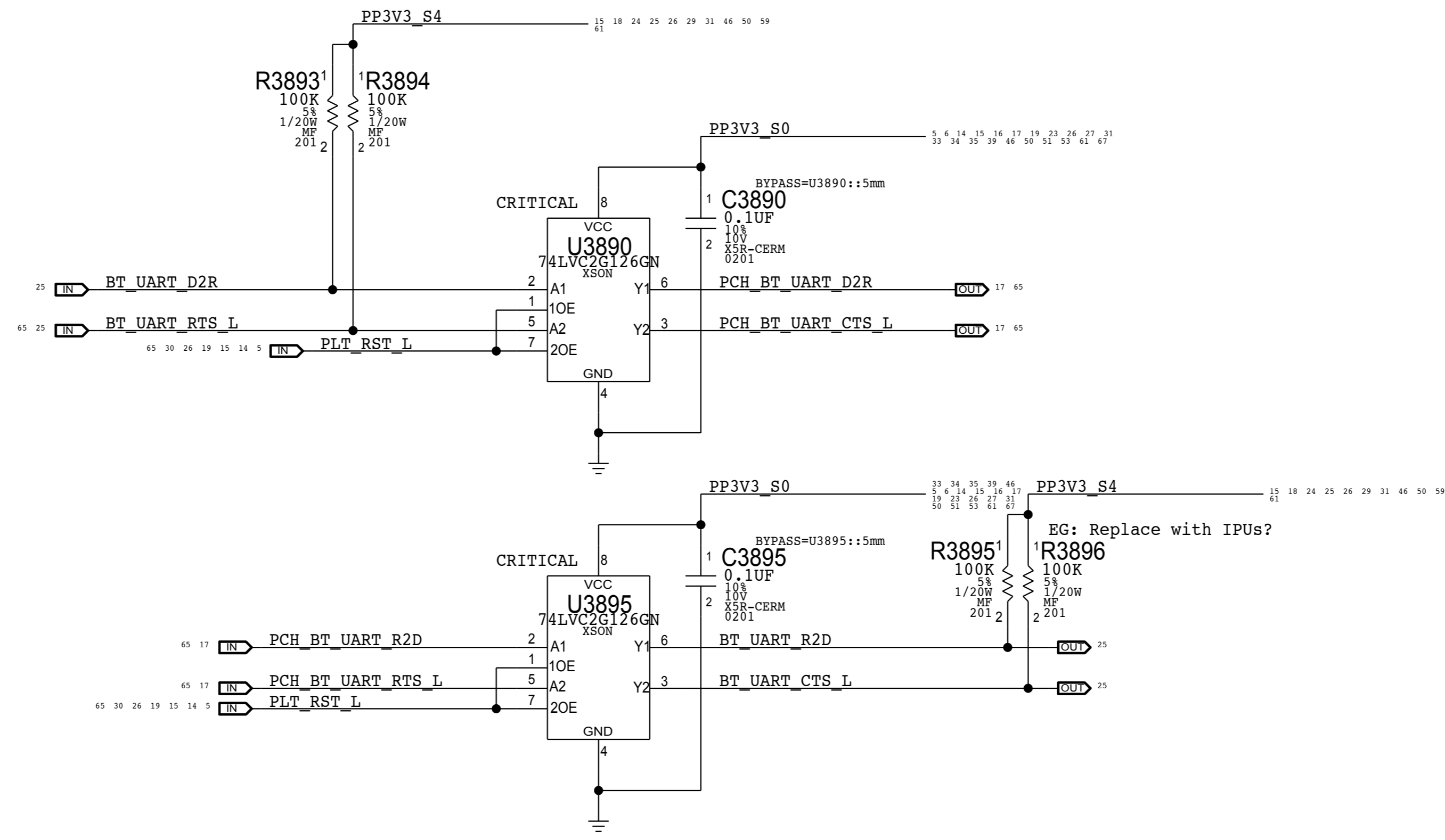
WIFI/BT MODULE [37]

Apple Inc.

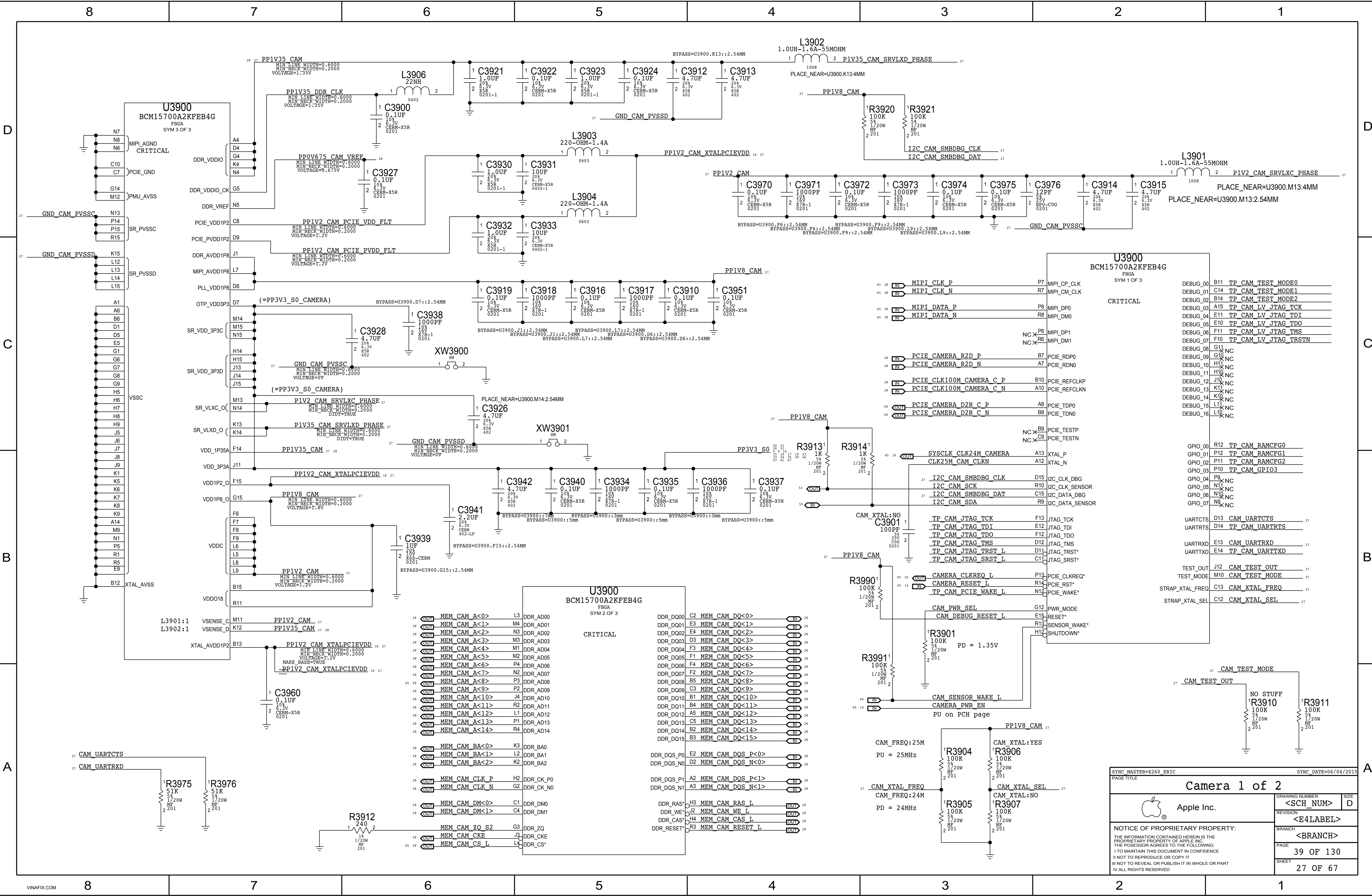
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BT UART Isolation



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SHEET		27 OF 67	

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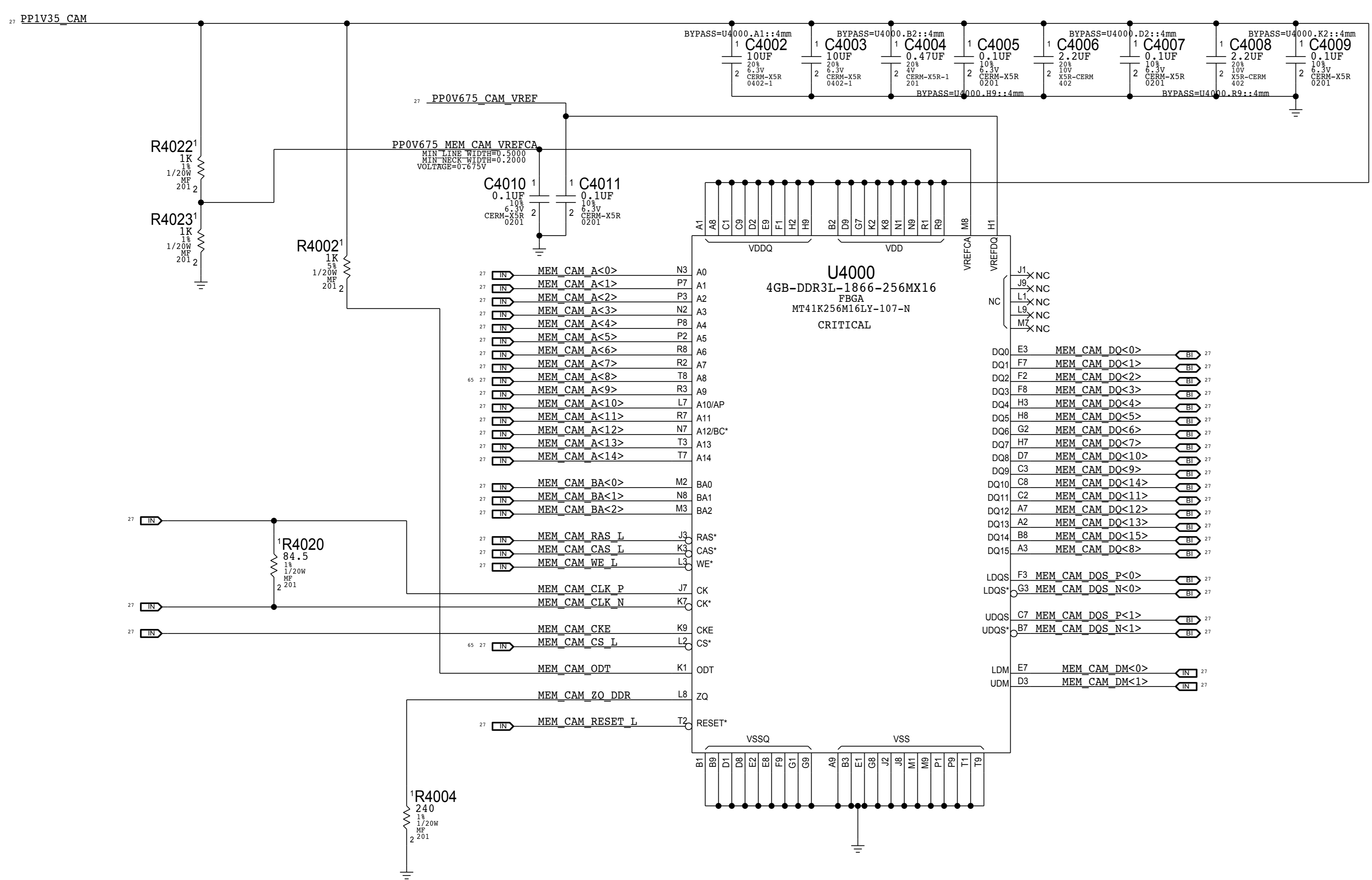
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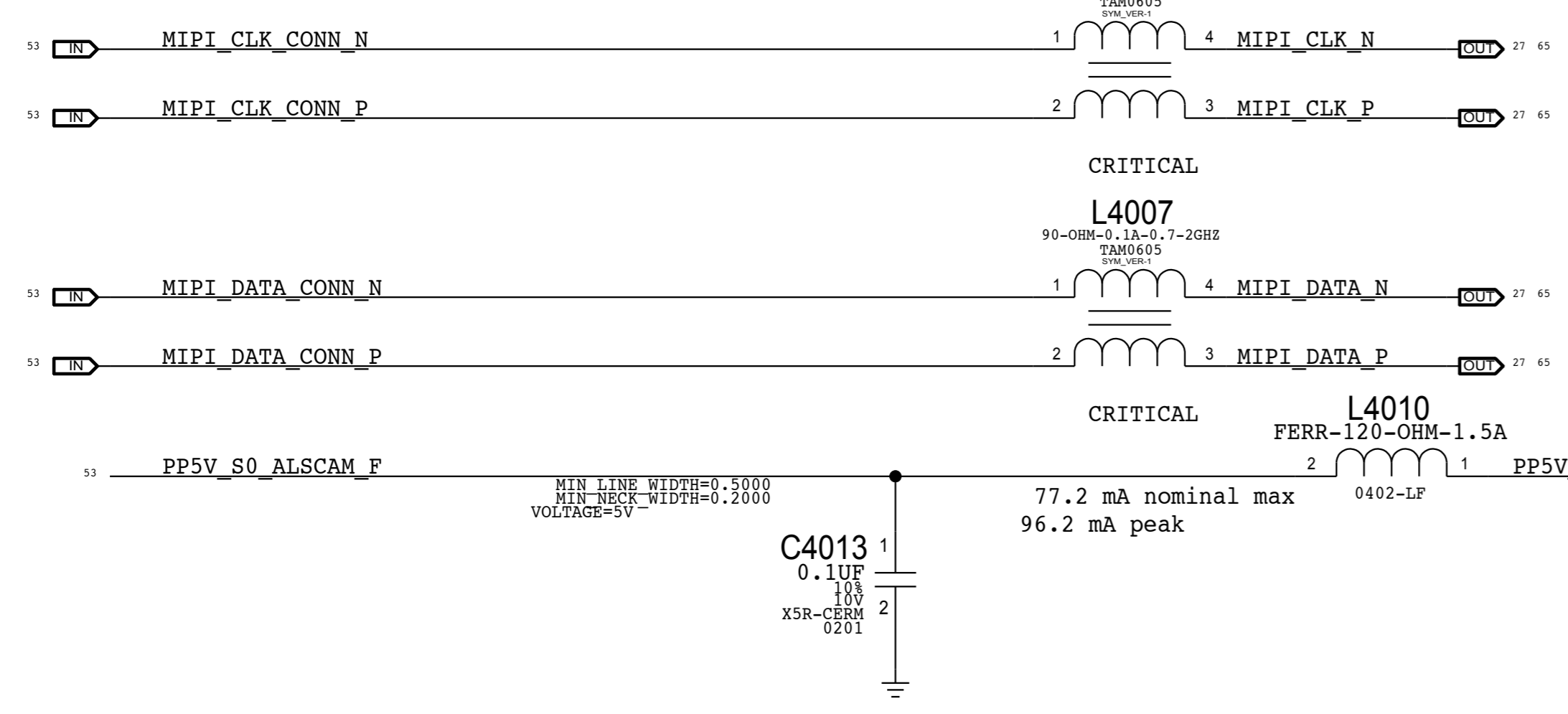
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IN	PCIE_CAMERA_R2D_C_P	C4033	1	2	PCIE_CAMERA_R2D_P	27
IN	PCIE_CAMERA_R2D_C_N	C4032	1	2	PCIE_CAMERA_R2D_N	27
IN	PCIE_CAMERA_D2R_C_P	C4031	1	2	PCIE_CAMERA_D2R_P	16 65
IN	PCIE_CAMERA_D2R_C_N	C4030	1	2	PCIE_CAMERA_D2R_N	16 65
IN	PCIE_CLK100M_CAMERA_P	C4061	1	2	PCIE_CLK100M_CAMERA_C_P	27
IN	PCIE_CLK100M_CAMERA_N	C4062	1	2	PCIE_CLK100M_CAMERA_C_N	27

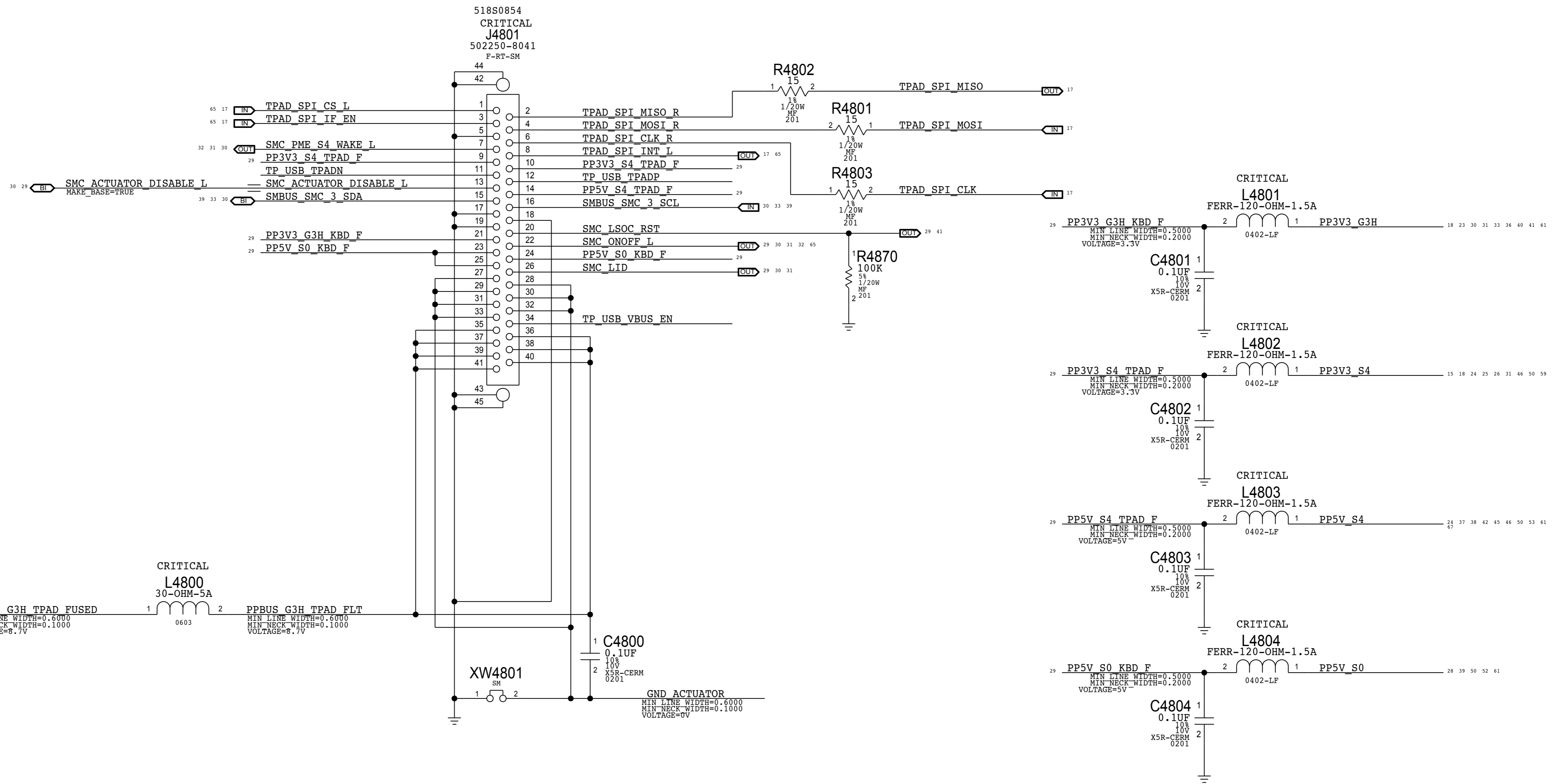
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	PAGE	40 OF 130	
	SHEET	28 OF 67	

IPD ZIF CONNECTOR

Bottom side contacts used
Pinout reversed from flex



D

D

C

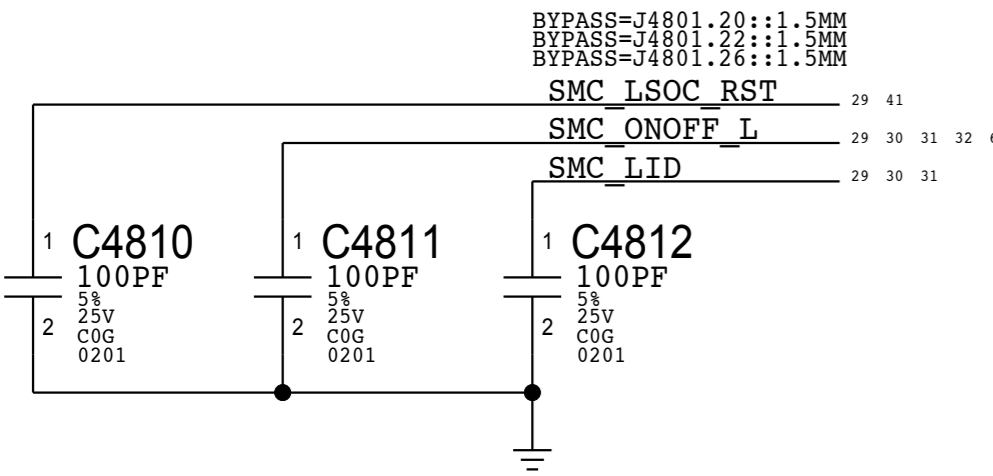
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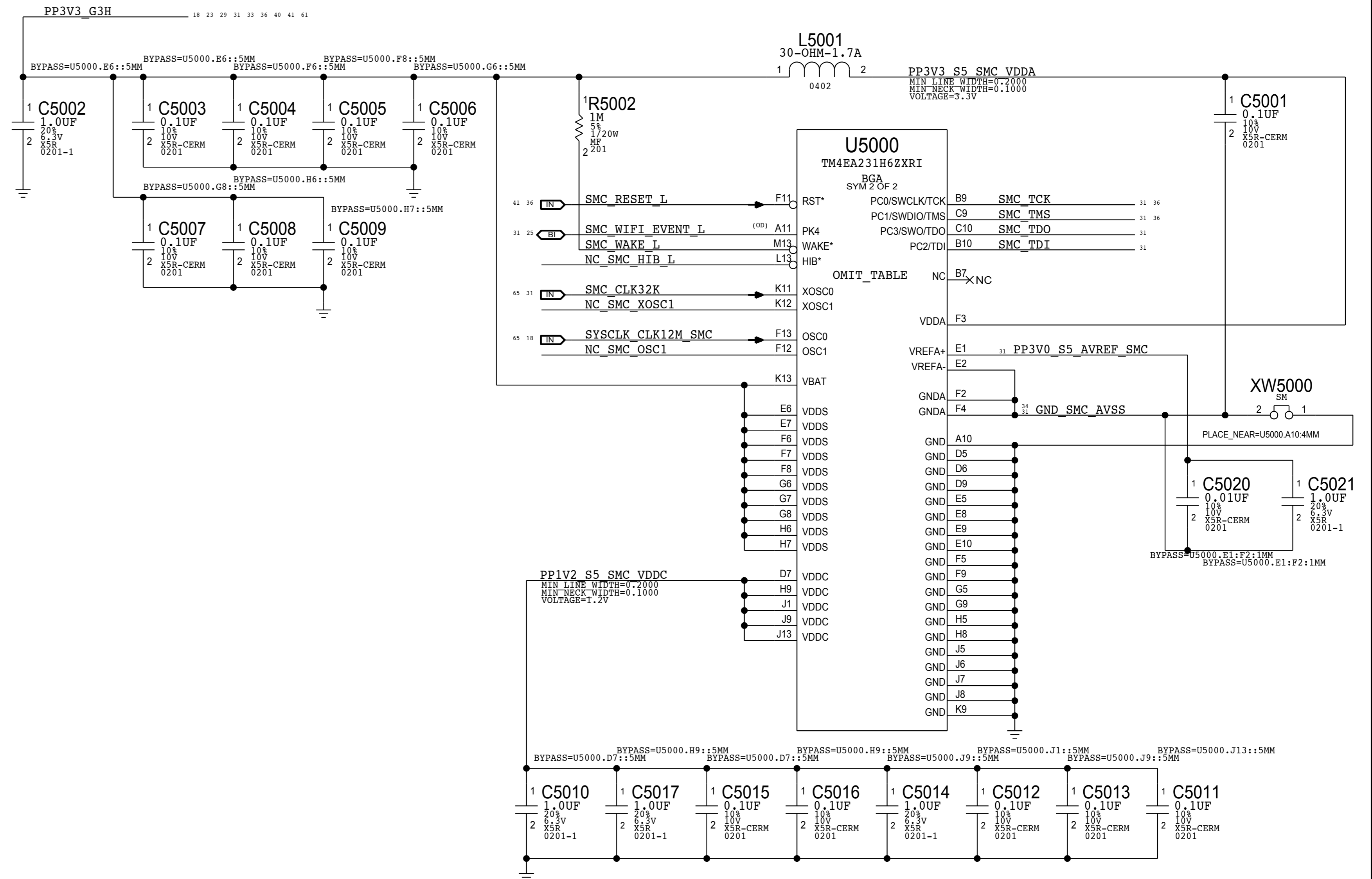
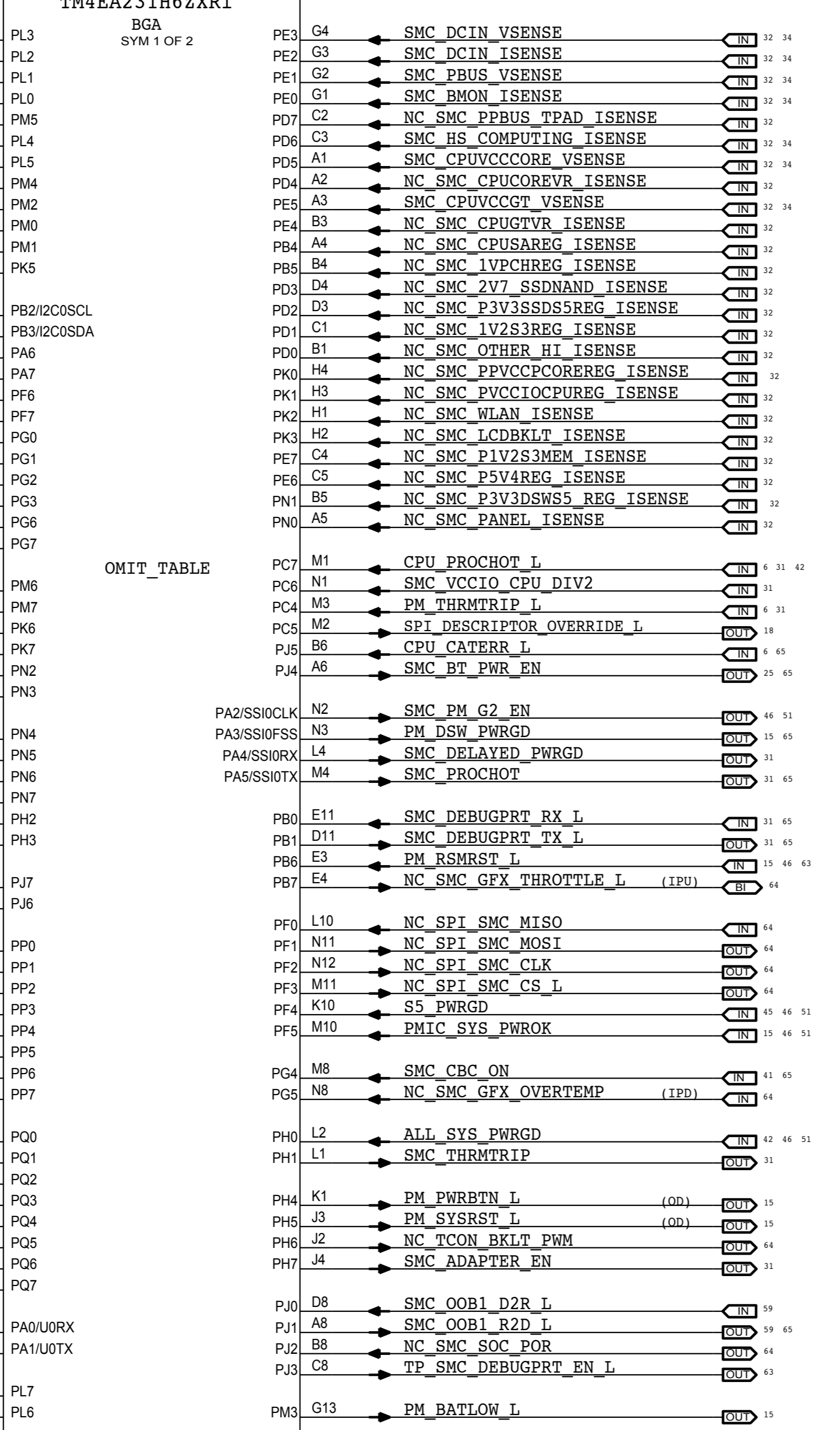
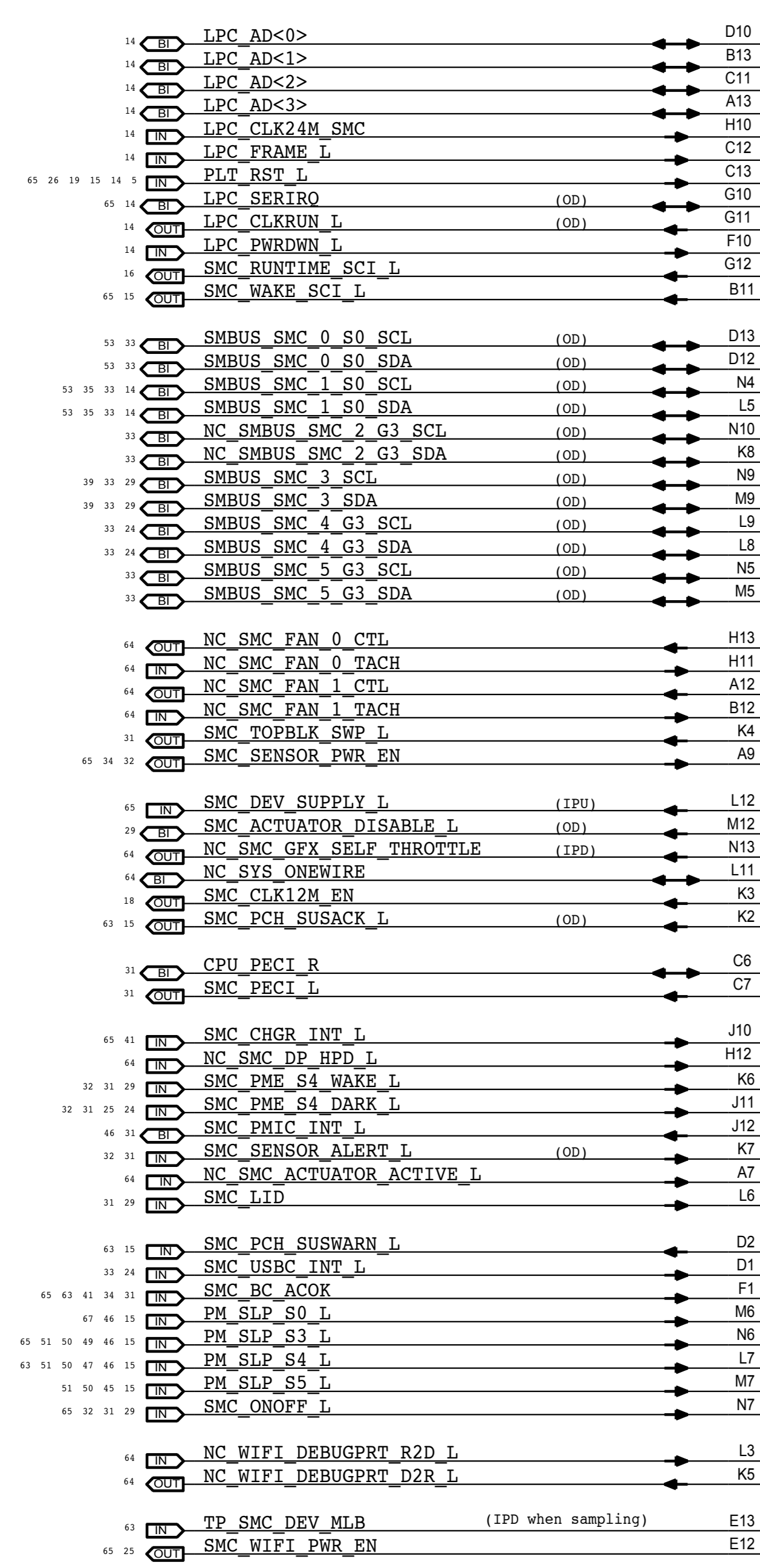
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U5000
TM4EA231H6ZXRI
BGA
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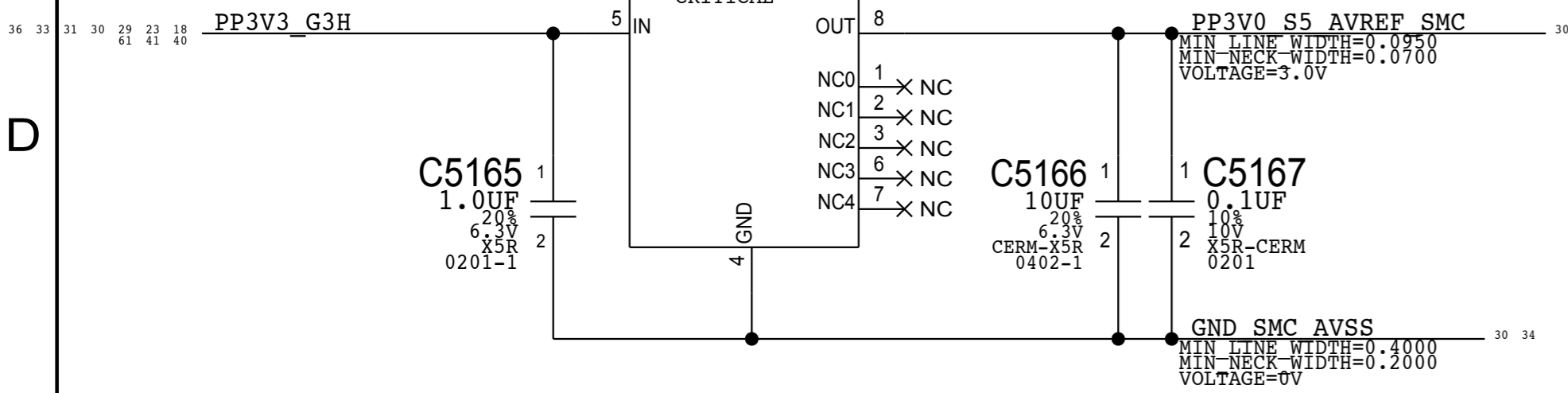


NOTE:
SMS Interrupt can be active high or low, rename net accordingly.
If SMS interrupt is not used, pull up to SMC rail.

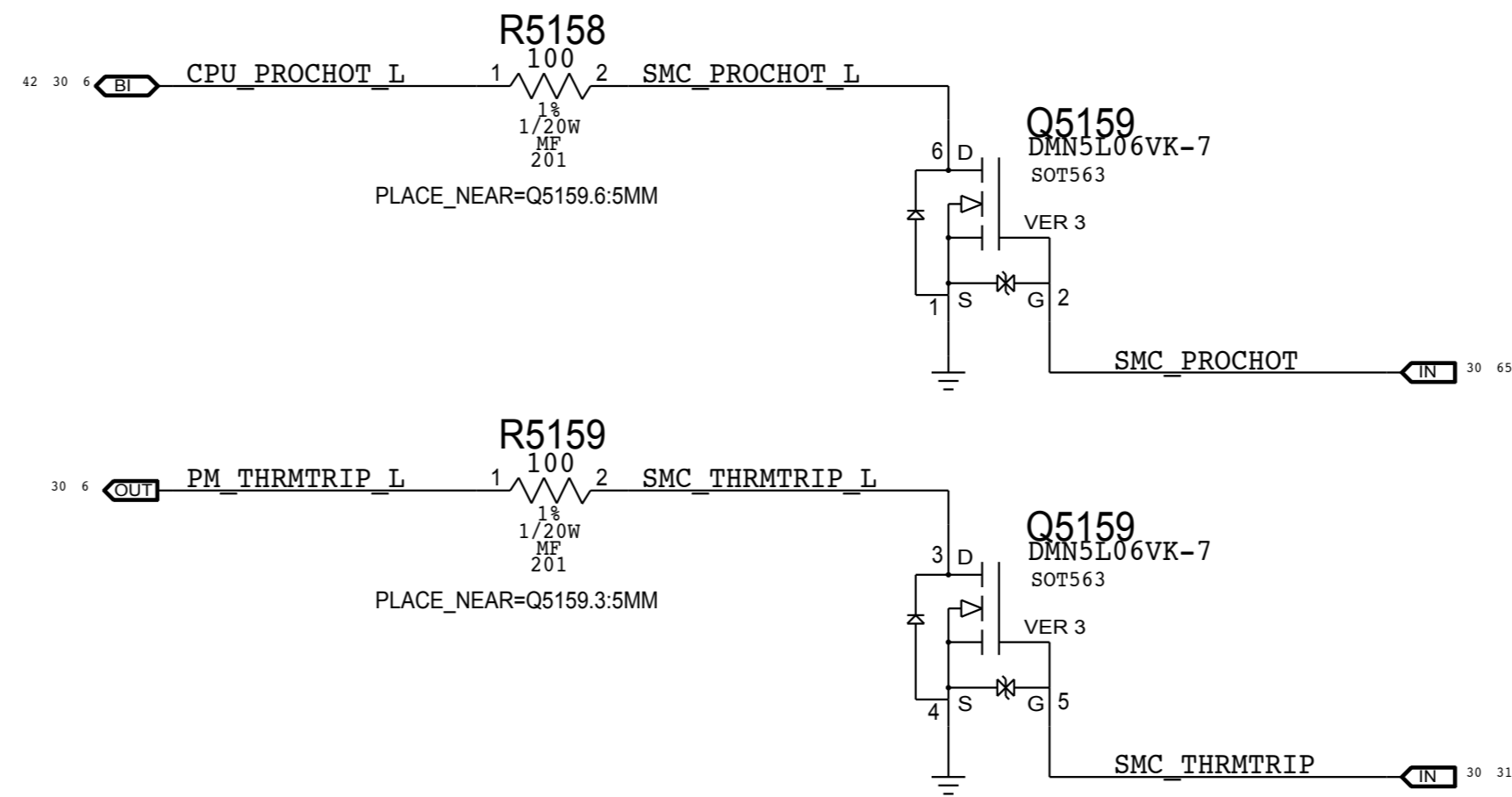
NOTE:
Unused pins have "SMC_Pxx" names. Unused pins designed as outputs can be left floating, those designated as inputs require pull-ups.

SMC
Apple Inc.
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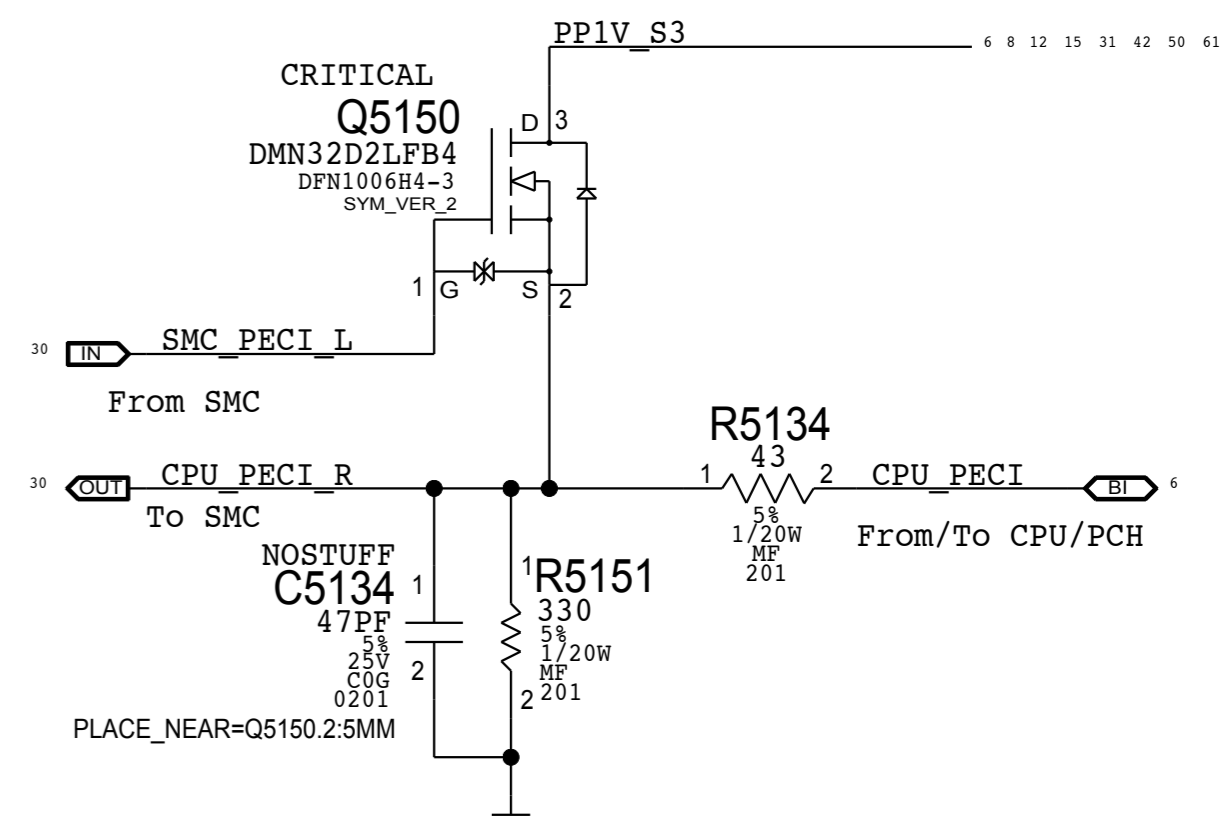
SMC AVREF Supply



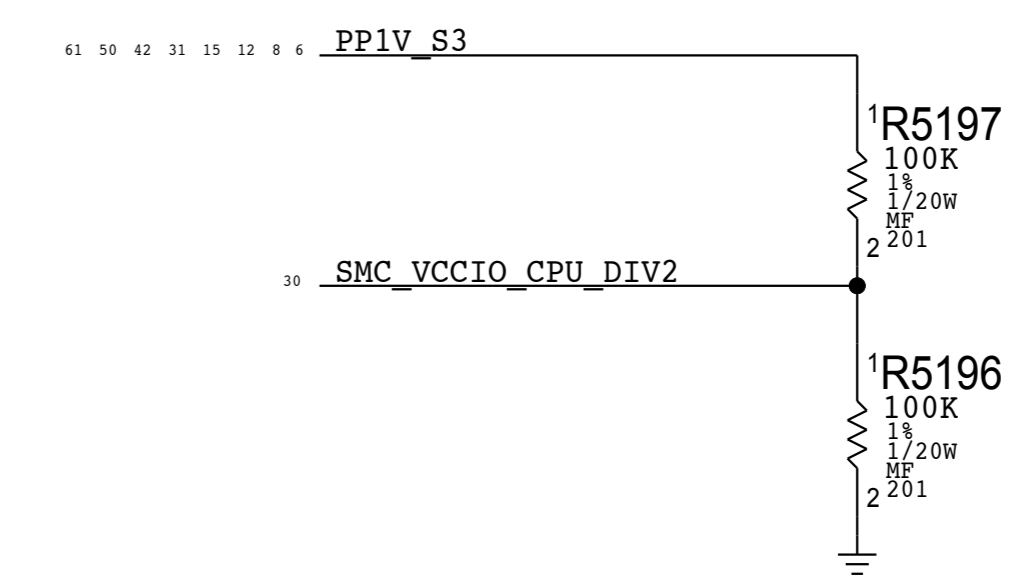
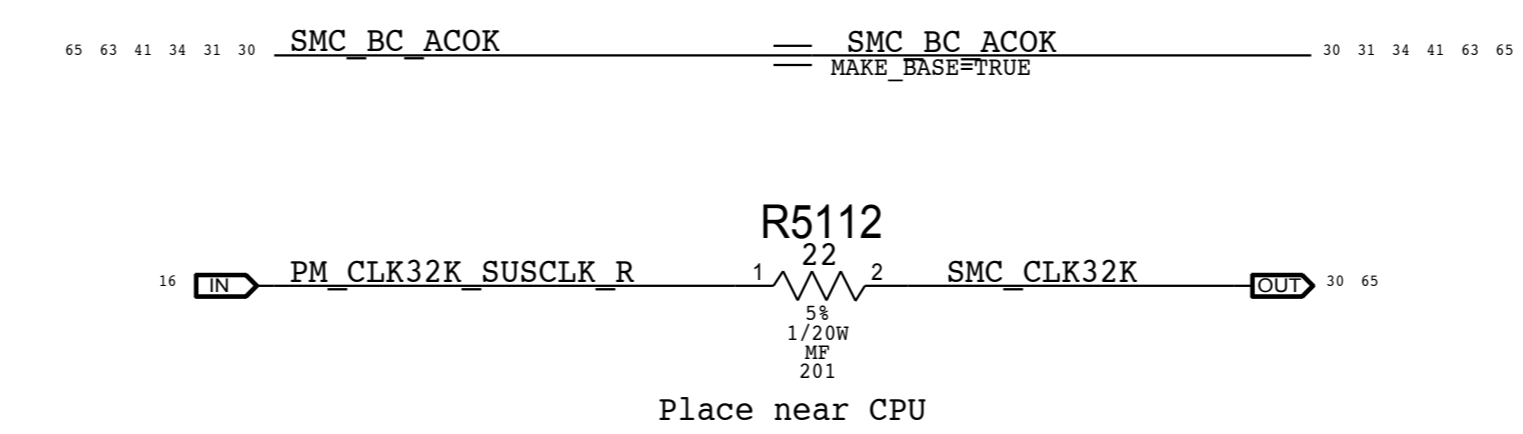
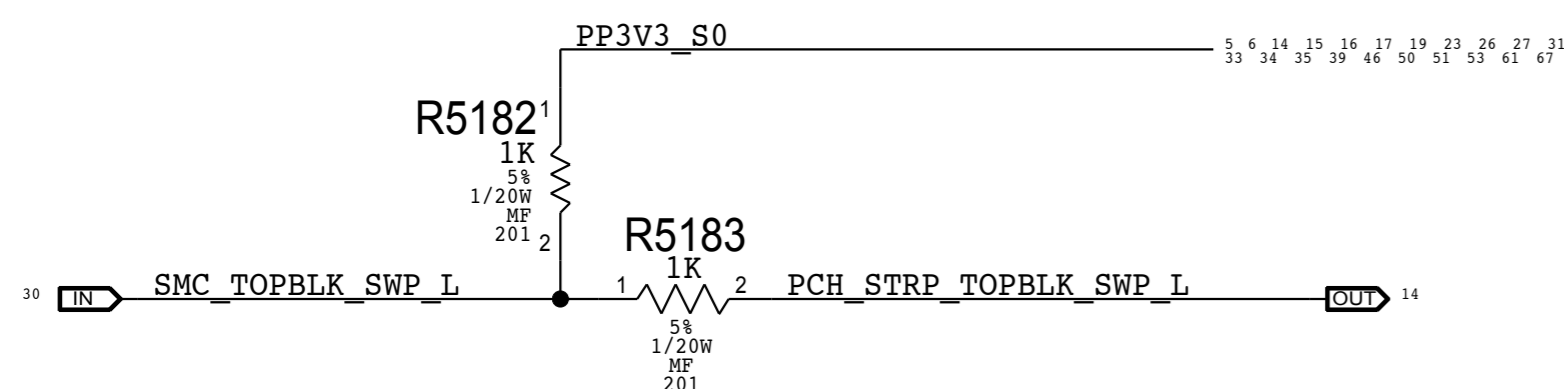
PROCHOT/THRMTRIP Support



PECI Support



Top-Block Swap



32	30	29	SMC_PME_S4_WAKE_L	R5166	100K	1	2				
32	30	24	SMC_PME_S4_DARK_L	R5167	100K	1	2	5%	17/20W	MF 201	
30	25	24	SMC_WPT_EVENT_L	R5168	100K	1	2	5%	17/20W	MF 201	
46	30		SMC_PMIC_INT_L	R5169	100K	1	2	5%	17/20W	MF 201	
65	32	29	SMC_ONOFF_L	R5170	10K	1	2	5%	17/20W	MF 201	
32	30	29	SMC_SENSOR_ALERT_L	R5172	10K	1	2	5%	17/20W	MF 201	
30	29		SMC_LID	R5171	330K	1	2	5%	17/20W	MF 201	
65	30		SMC_DEBUGPRT_TX_L	R5175	20K	1	2				
65	30		SMC_DEBUGPRT_RX_L	R5176	20K	1	2	5%	17/20W	MF 201	
36	30		SMC_TMS	R5177	10K	1	2	5%	17/20W	MF 201	
30			SMC_TDO	R5178	10K	1	2	5%	17/20W	MF 201	
30			SMC_TDI	R5179	10K	1	2	5%	17/20W	MF 201	
36	30		SMC_TCK	R5180	10K	1	2	5%	17/20W	MF 201	
65	63	41	31	SMC_BC_ACOK	R5187	100K	1	2	5%	17/20W	MF 201
30			SMC_ADAPTER_EN	R5185	100K	1	2	5%	17/20W	MF 201	
31	30		SMC_THRMTRIP	R5186	10K	1	2	5%	17/20W	MF 201	
30			SMC_DELAYED_PWRGD	R5191	100K	1	2	5%	17/20W	MF 201	

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PAGE TITLE

SMC Shared Support

Apple Inc.

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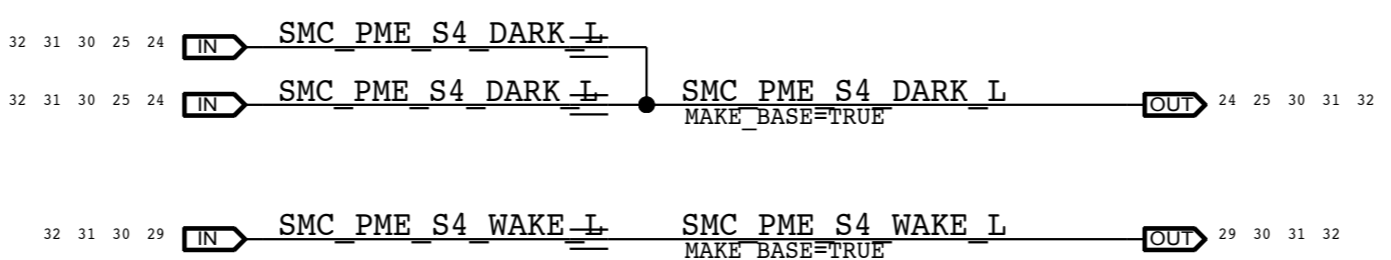
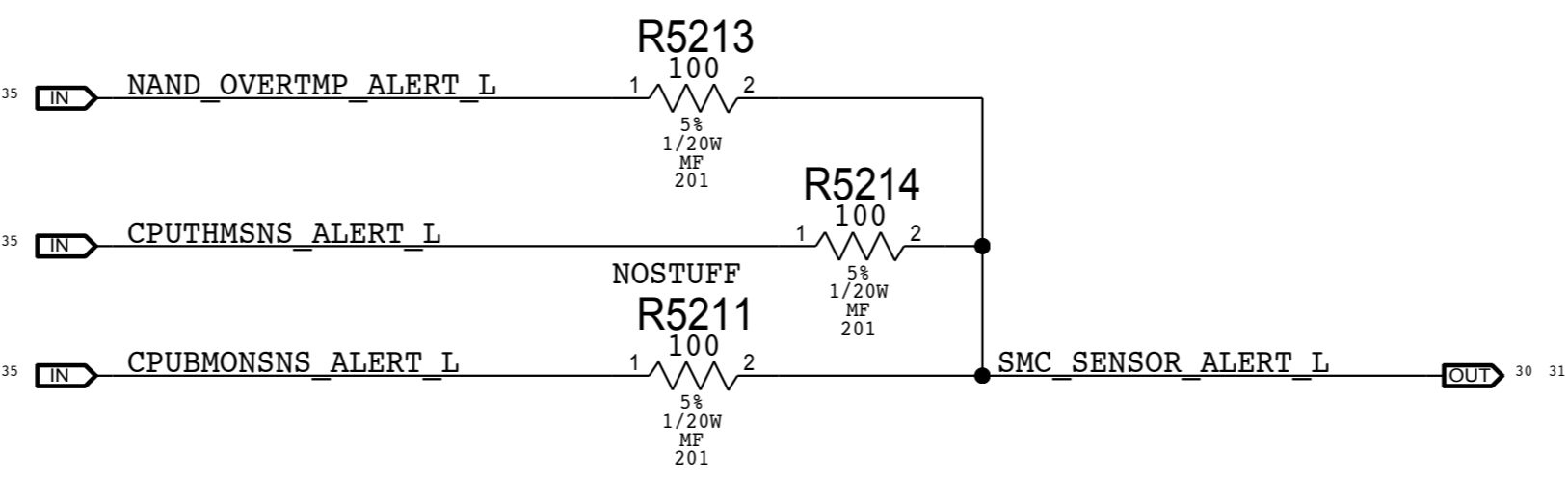
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MAKE_BASE=TRUE
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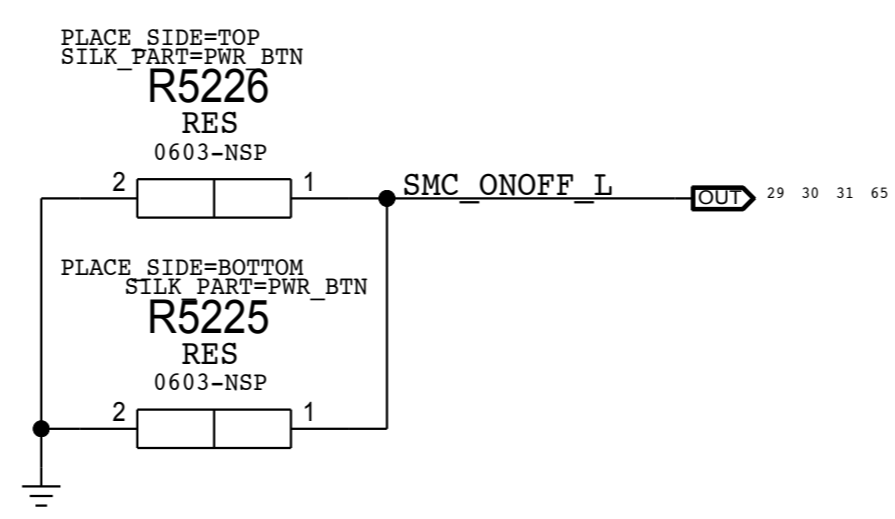
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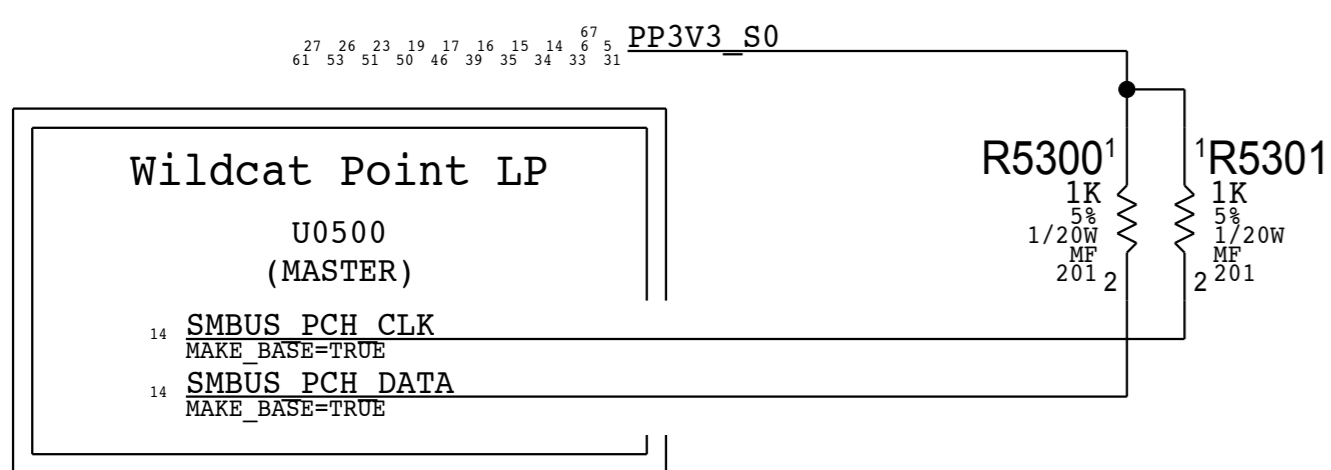


Debug Power "Buttons"

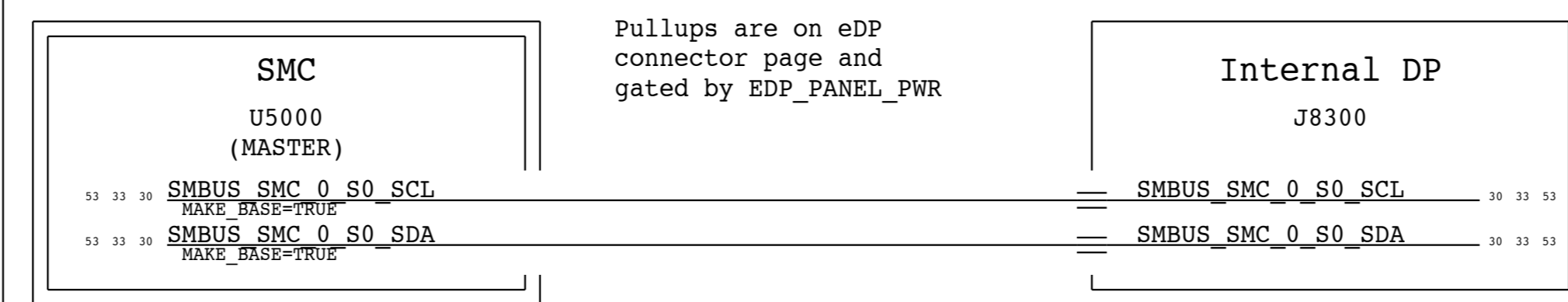


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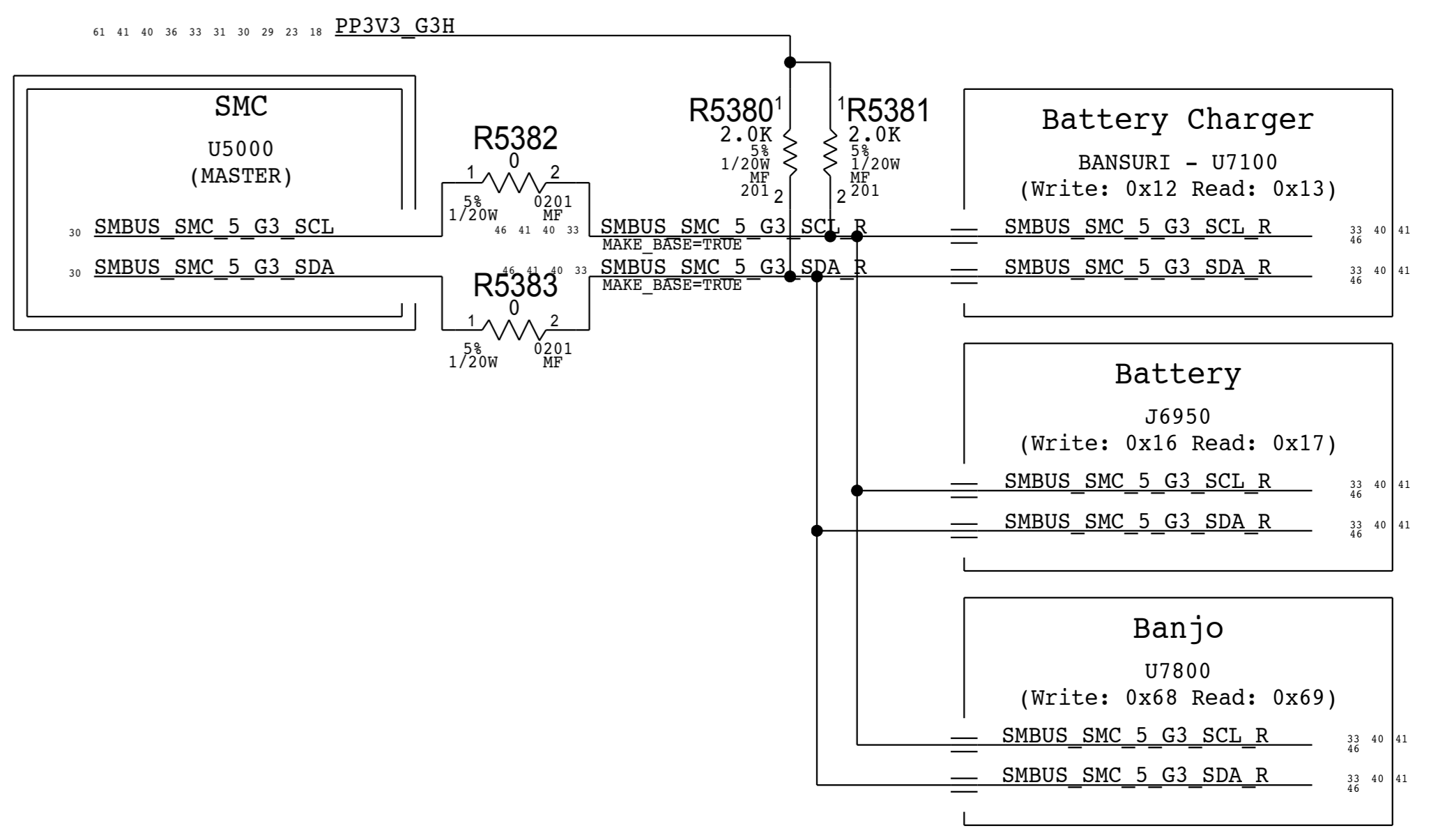
Sunrise Point LP S0 SMBus "0" Connections



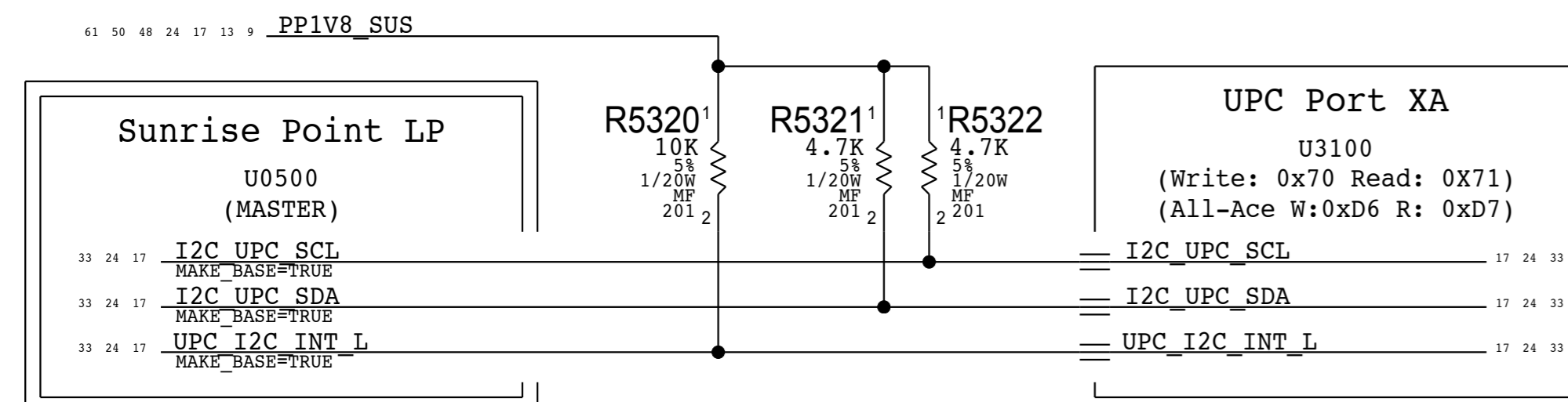
SMC "0" SMBus S0 Connections



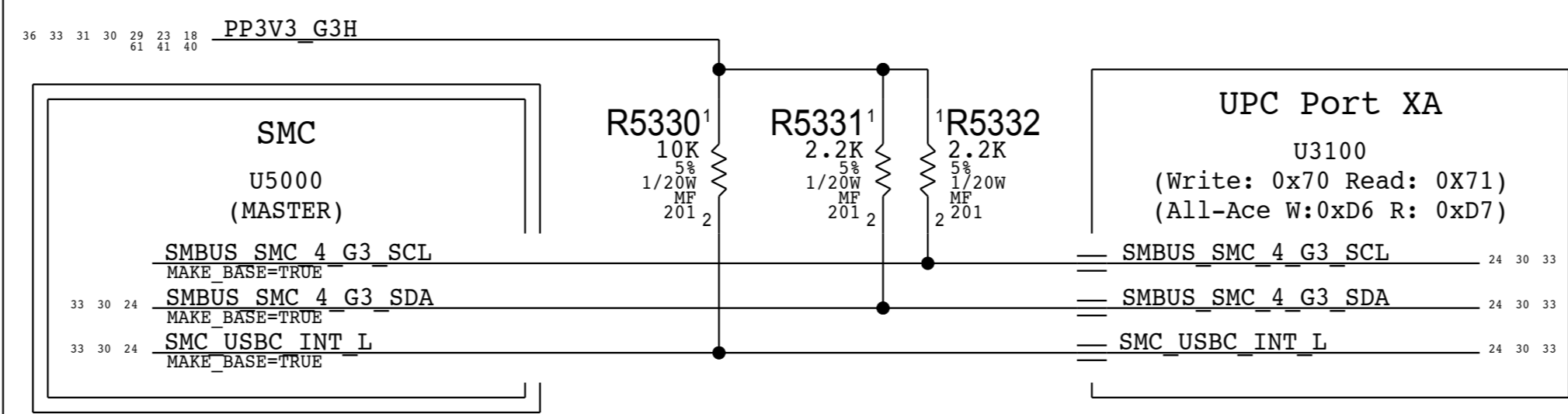
SMC "5" SMBus G3H Connections



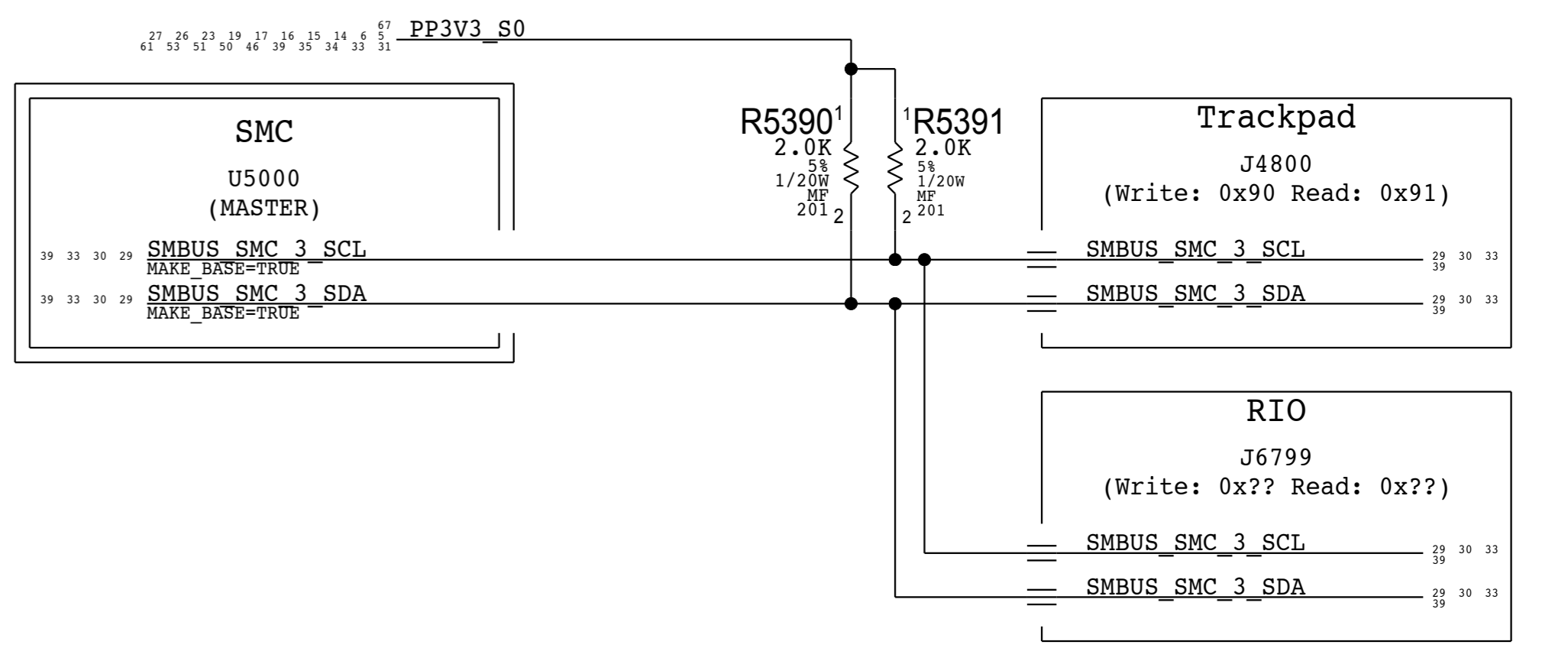
Sunrise Point LP S0 I2C "2" Connections



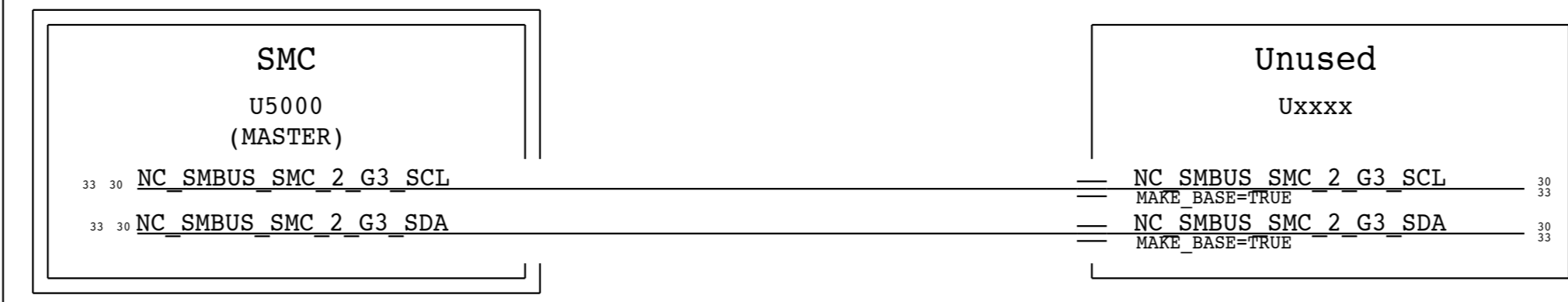
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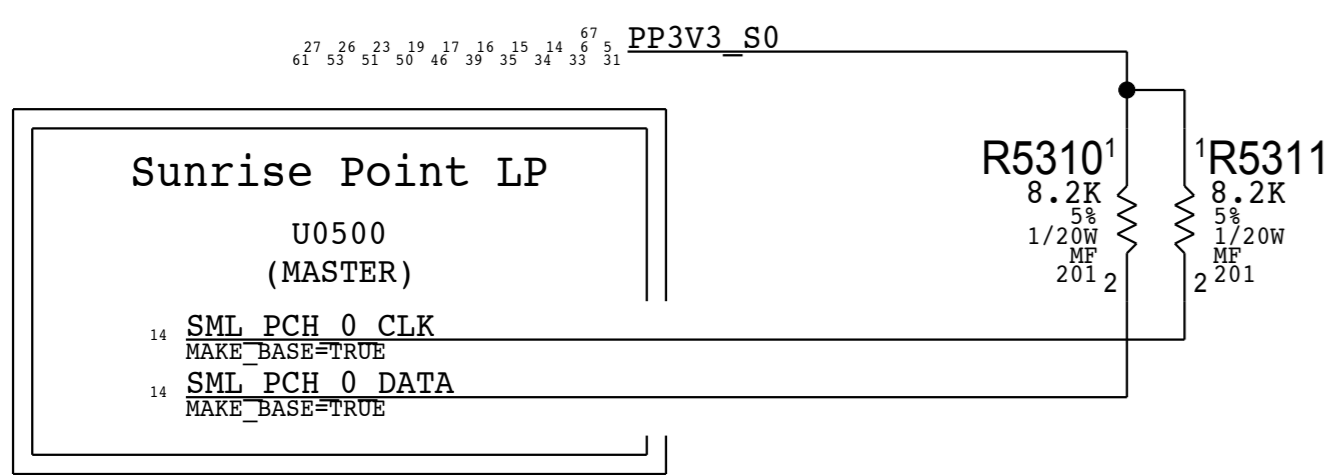
SMC "3" SMBus S0 Connections



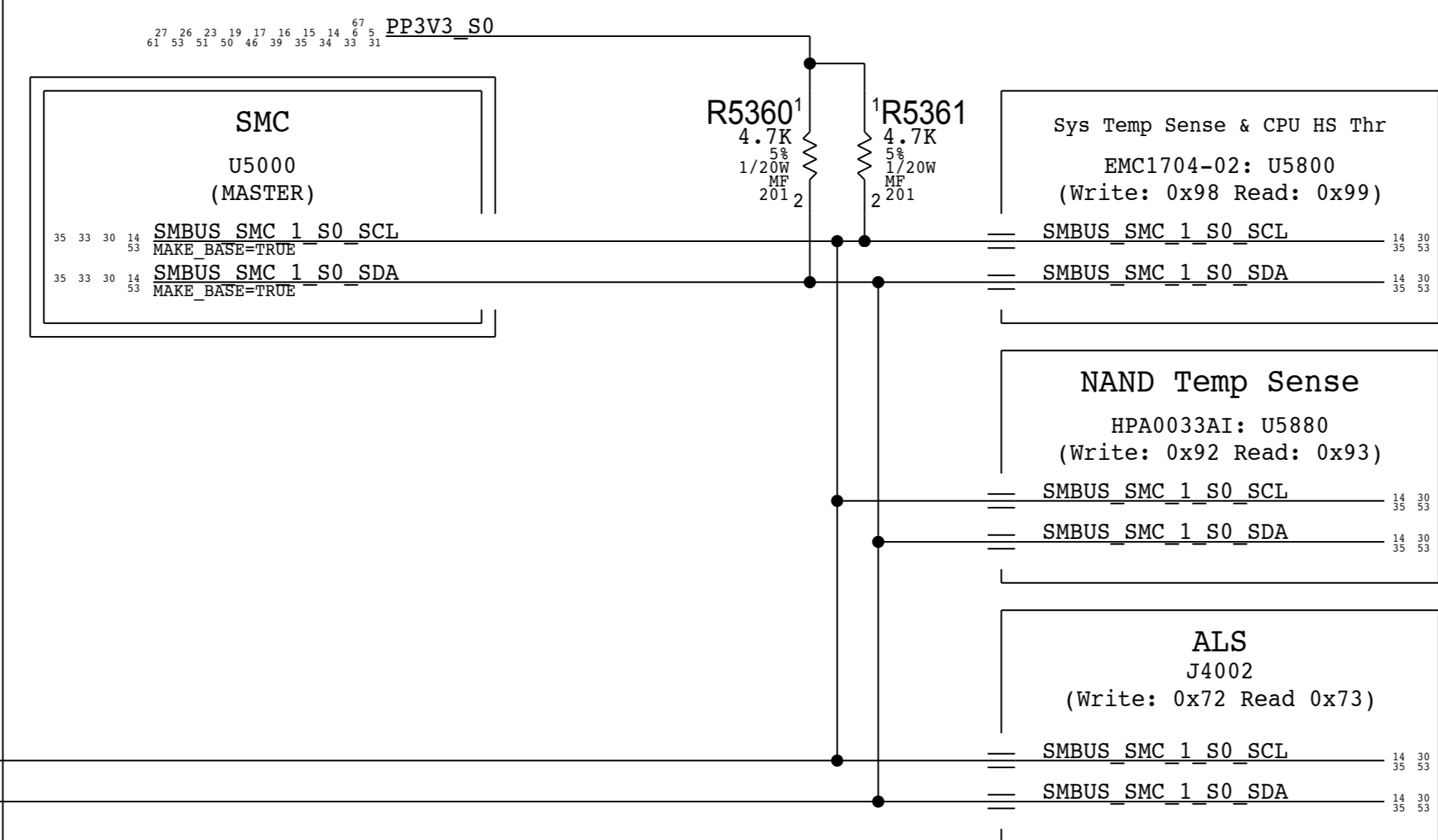
SMC "2" SMBus Connections



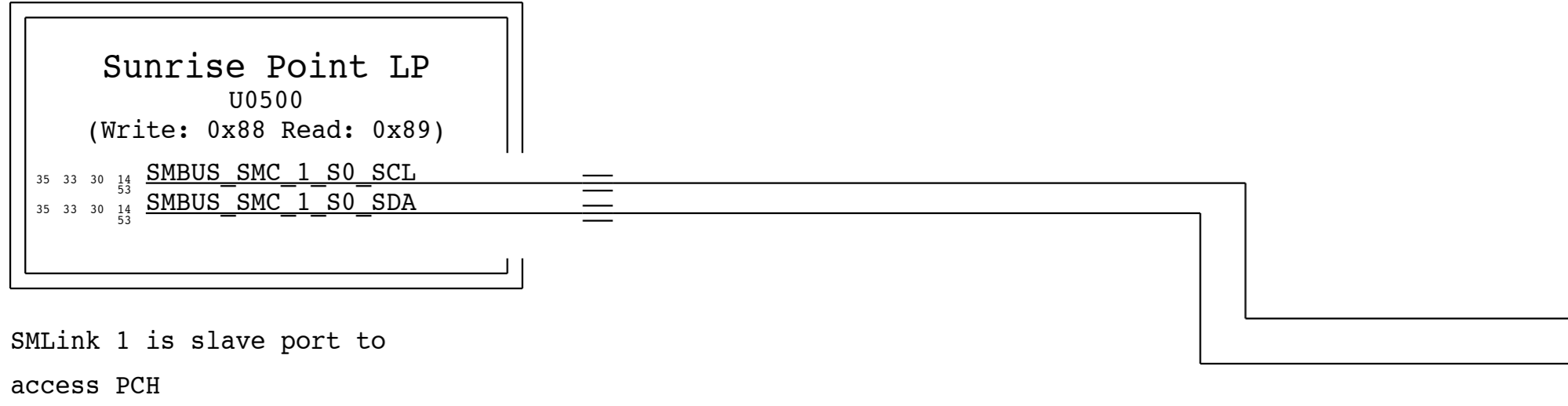
Sunrise Point LP S0 "SMLink 0" Connections



SMC S0 "1" SMBus Connections



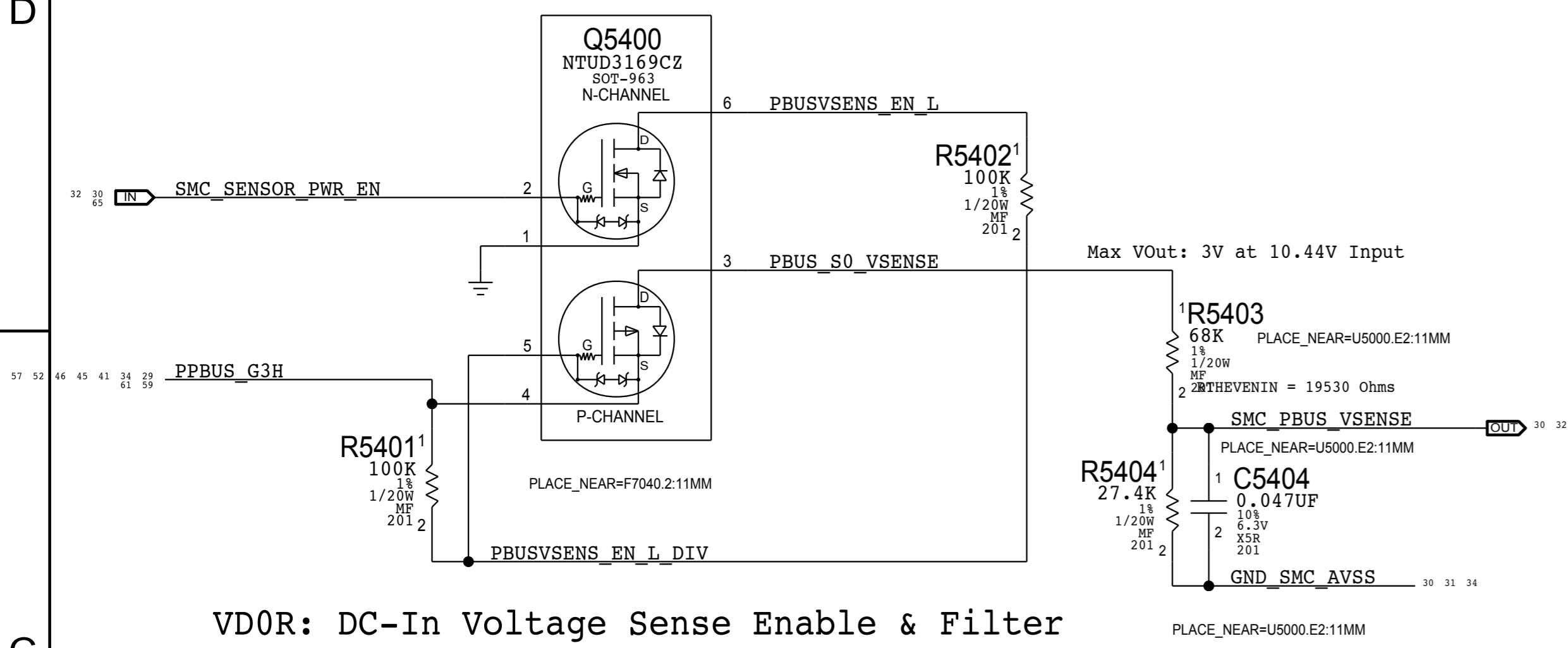
Sunrise Point LP S0 "SMLink 1" Connections



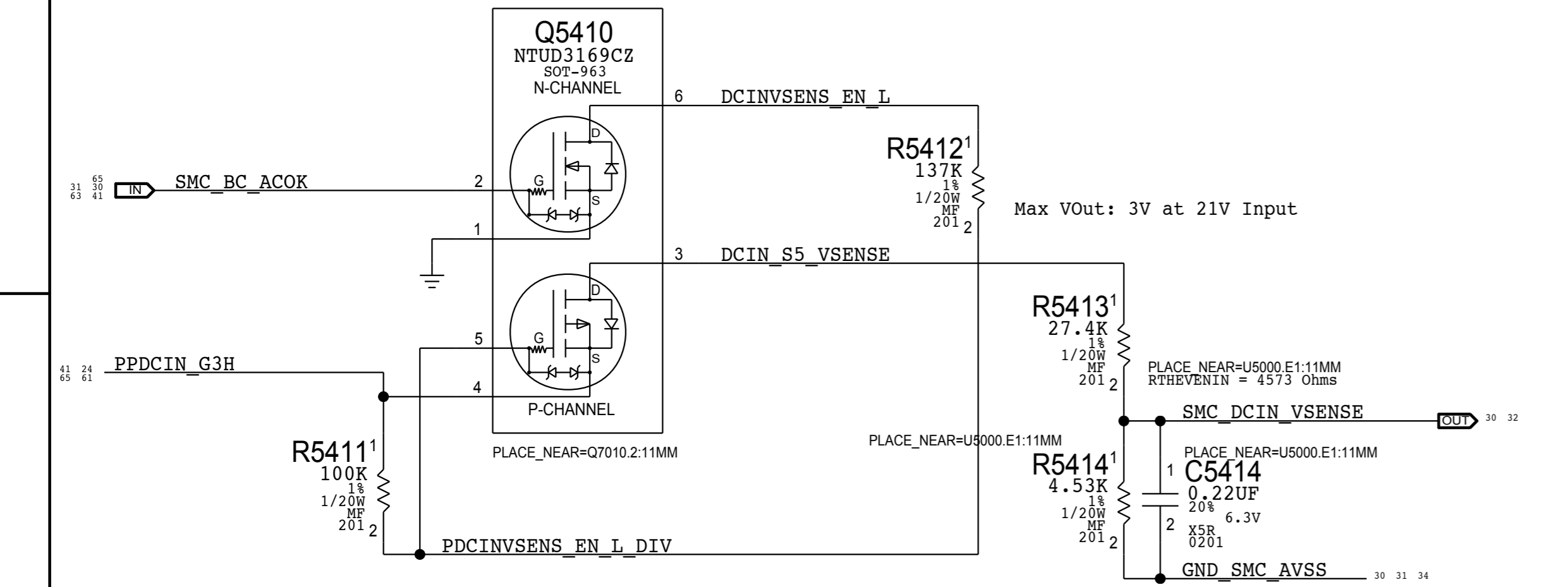
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POR VOLTAGE / CURRENT SENSORS : TO BE USED IN PRODUCTION

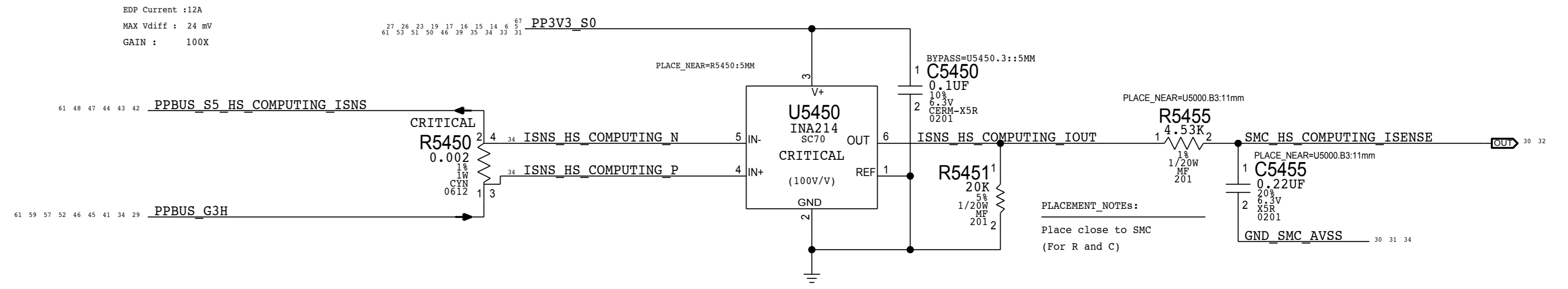
VPOR: PBUS Voltage Sense Enable & Filter



VD0R: DC-In Voltage Sense Enable & Filter

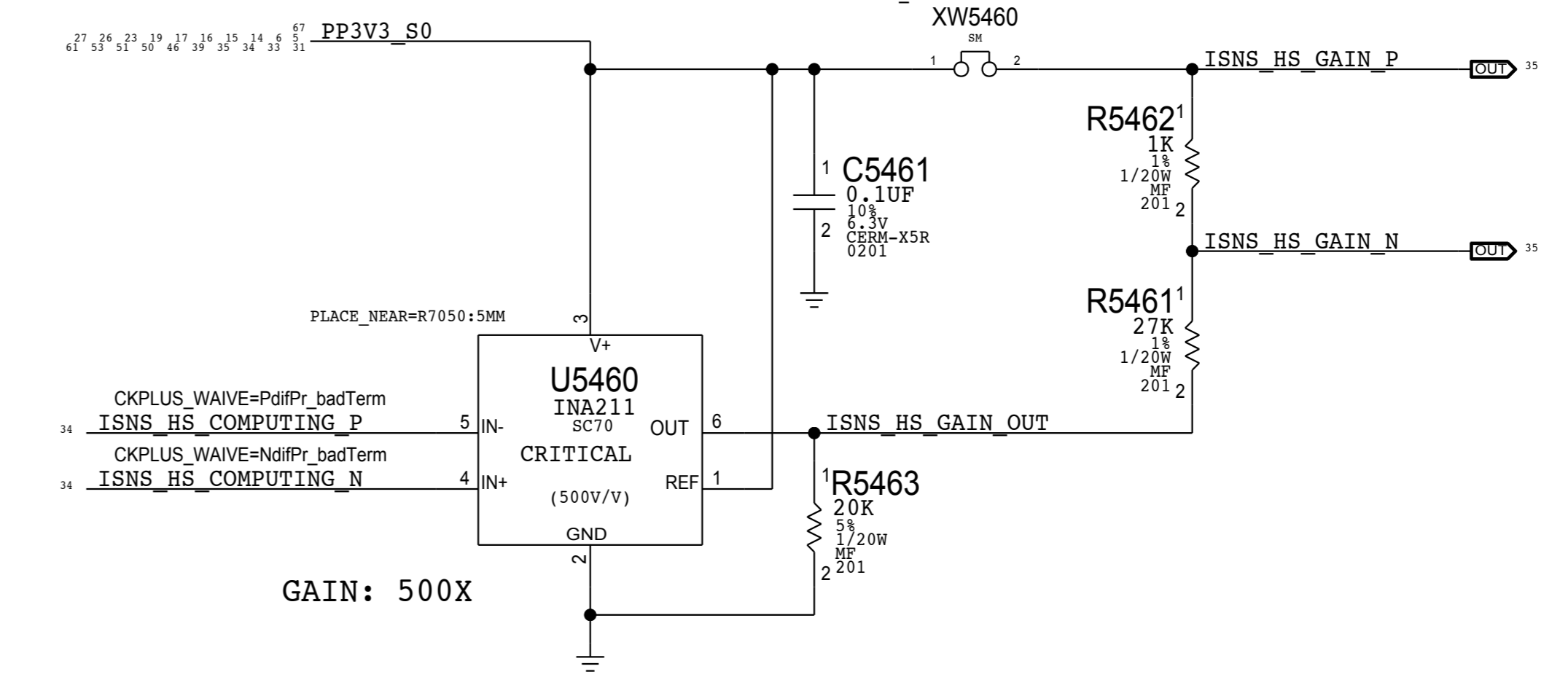


ICOR : COMPUTING High Side Current Sense

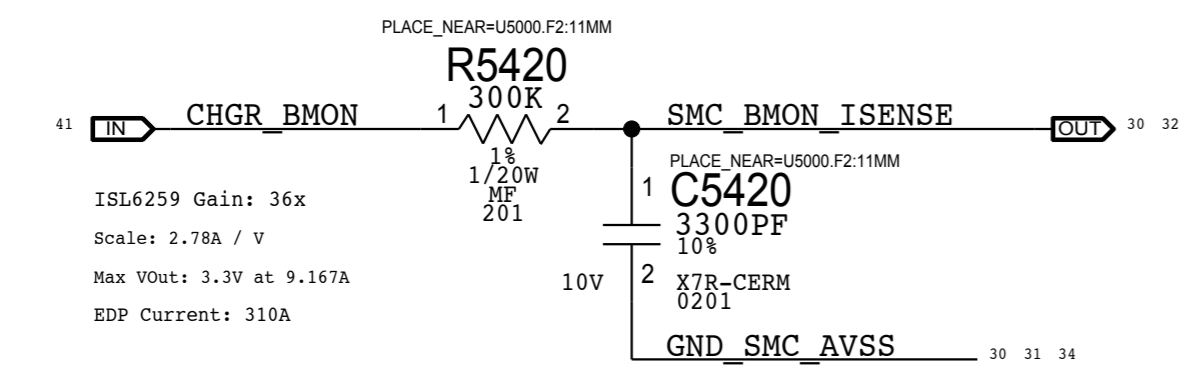


Need to set gains for ULX

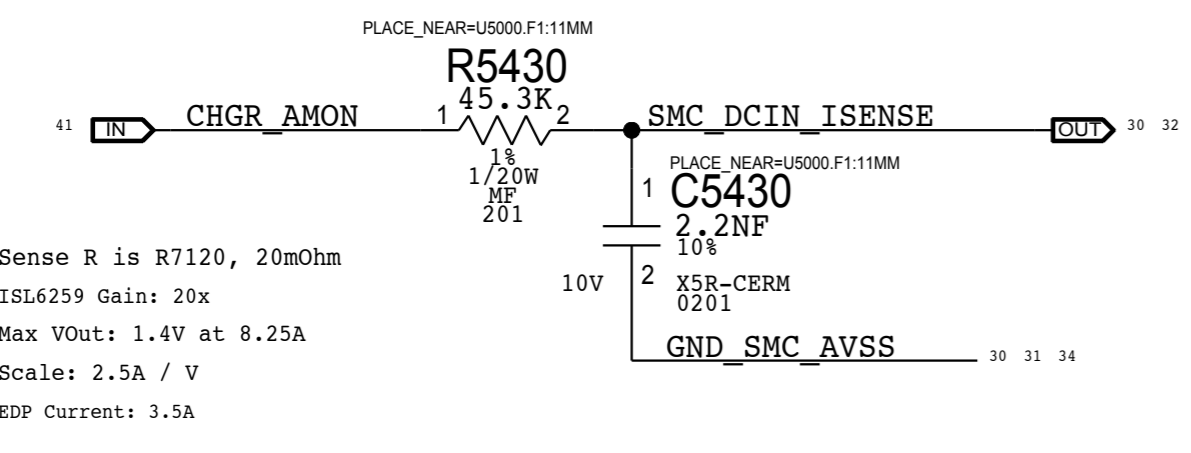
EMC1704 Computing High Side Gain Stage



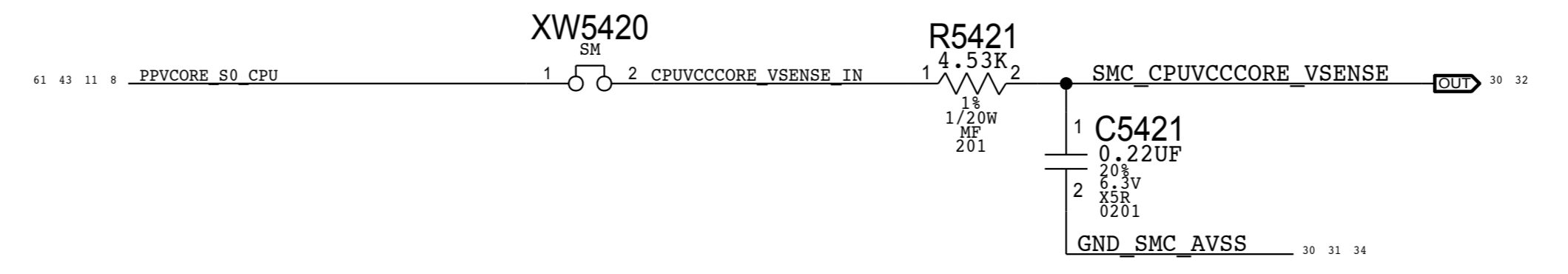
CHARGER BMON High Side Current Sense



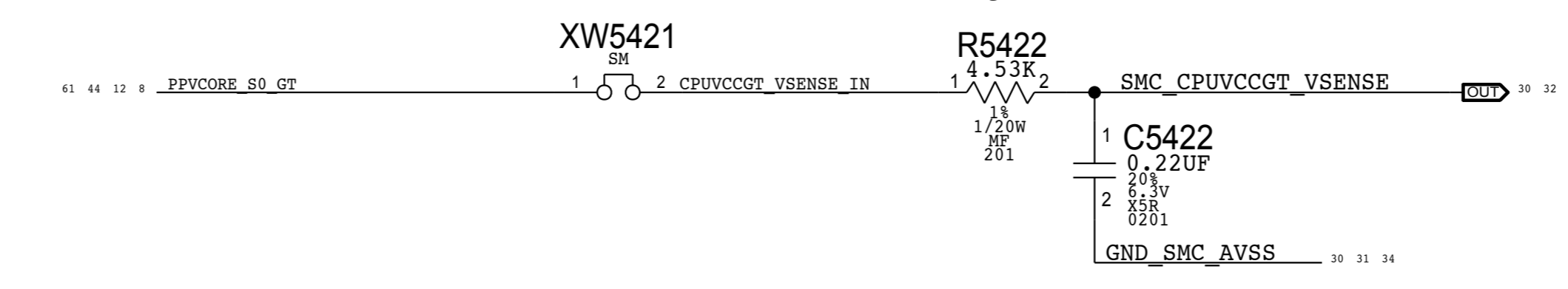
DC-IN (AMON) Current Sense



VC0C : CPU VCC CORE Voltage Sense



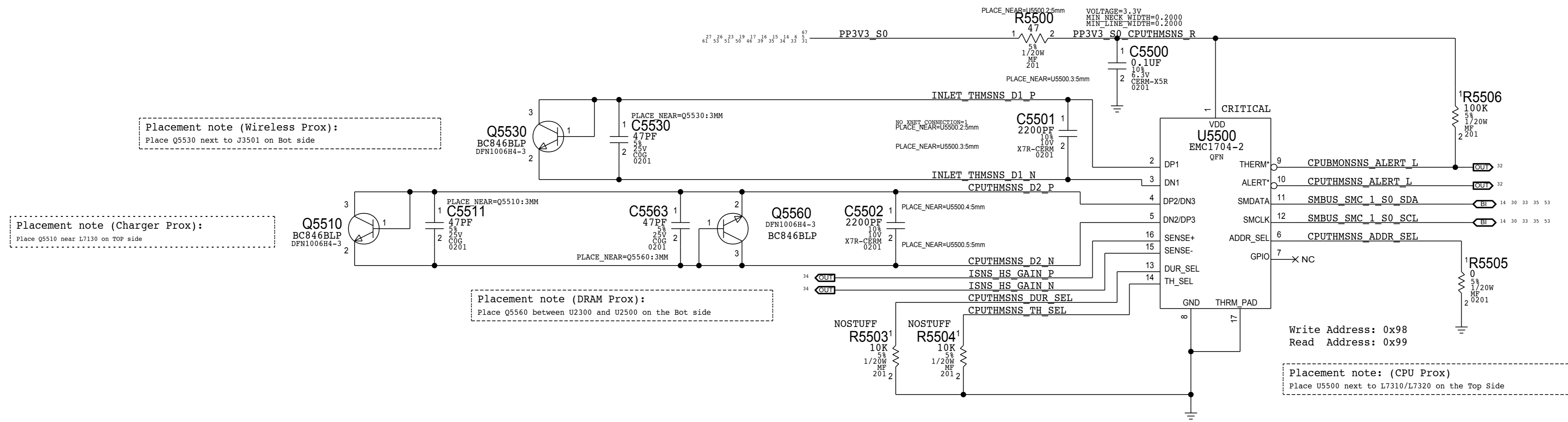
VCGC : CPU VCCGT Voltage Sense



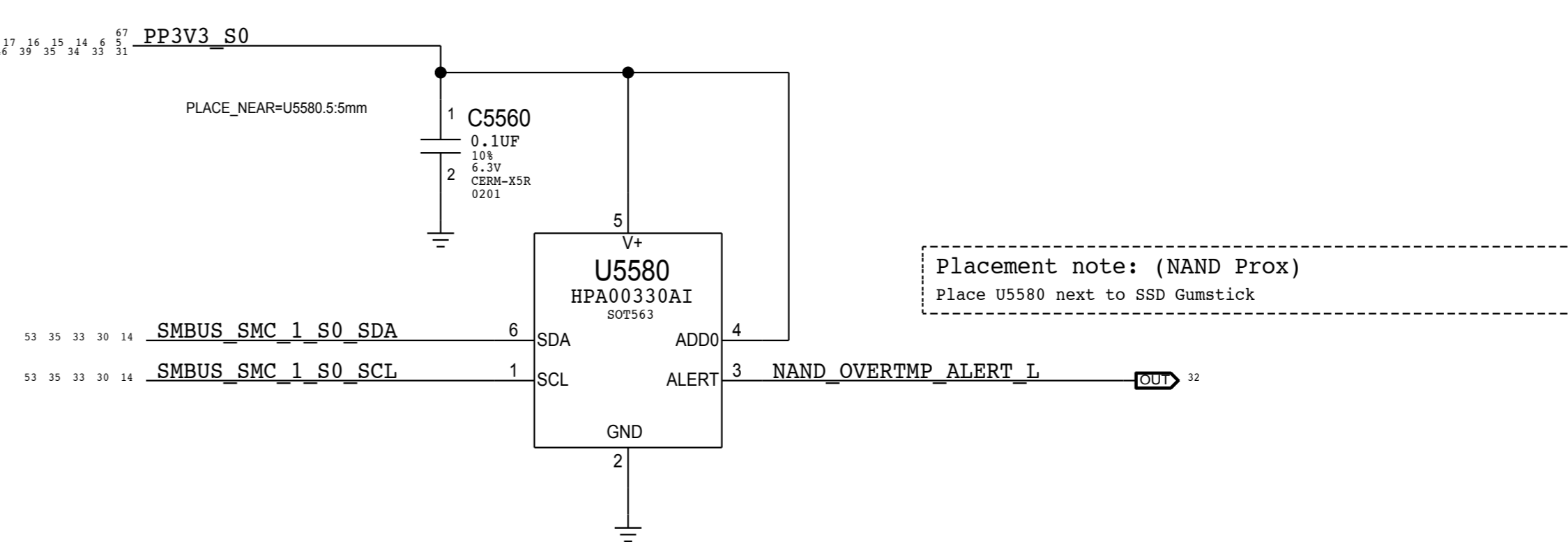
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POR THERMAL SENSORS : TO BE USED IN PRODUCTION

CPU Proximity, Inlet ,DDR and BMON THR Sensor



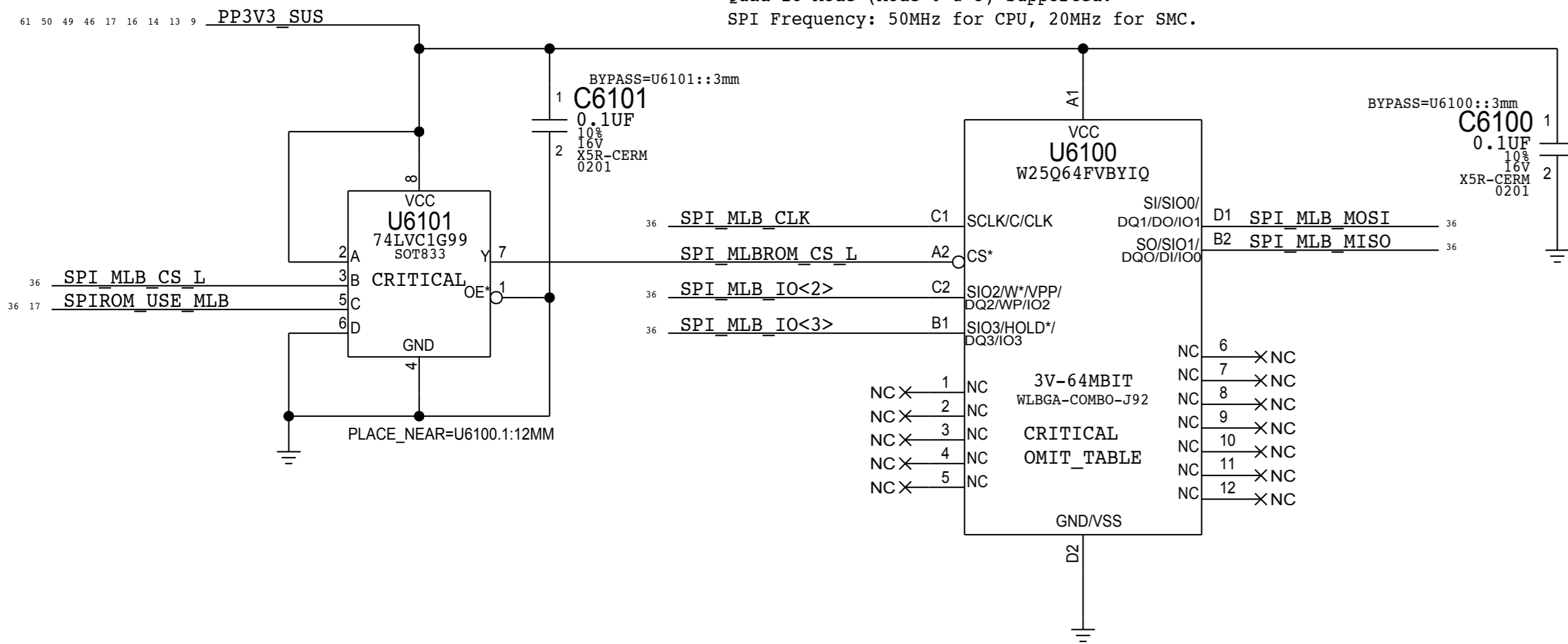
NAND Temp Sensor



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SPI ROM - Combo BGA Footprint (3 vendors)

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



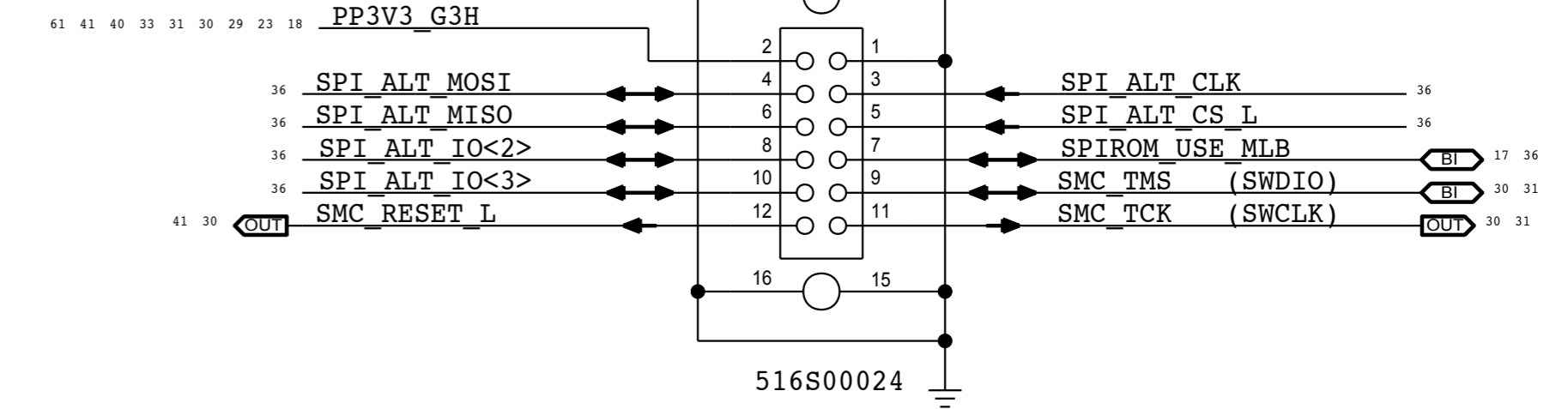
SPI+SWD SAM Connector

CRITICAL

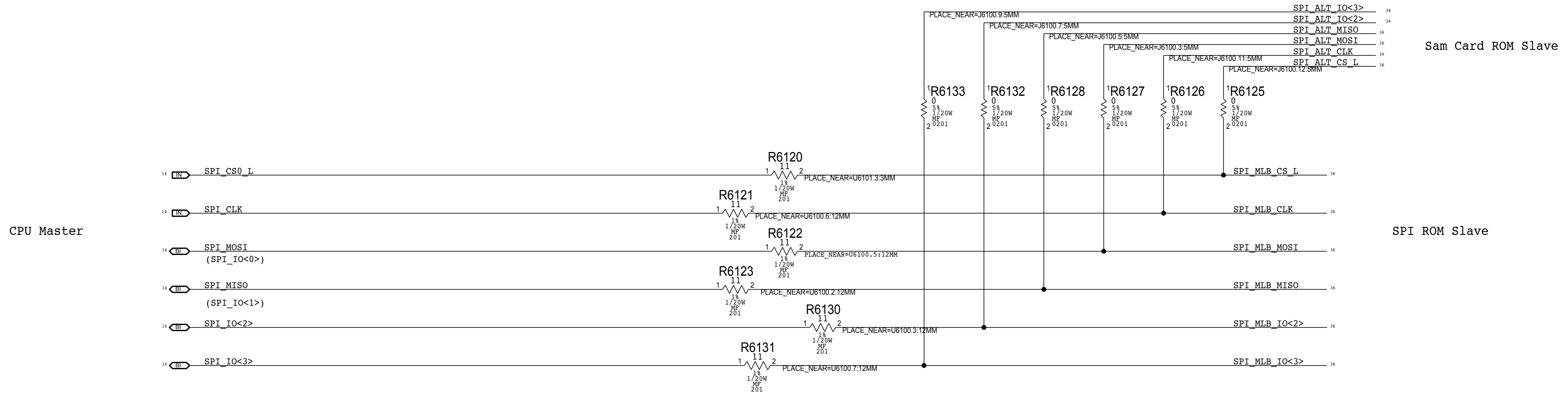
J6100

DF40PC-12DP-0.4V-51

H-87-SM



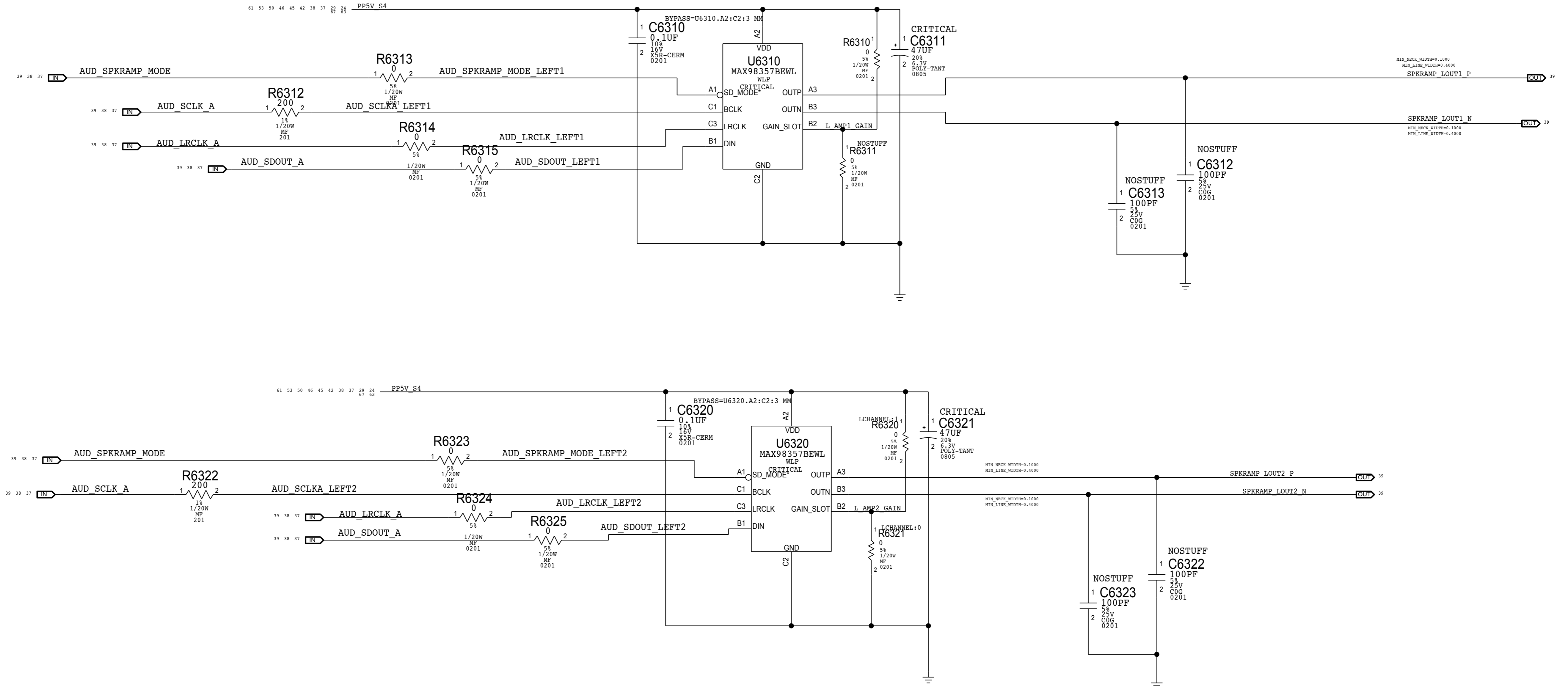
BootROM SPI Bus Series Termination



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Left Speaker Amps

APPLE P/N 353S4265



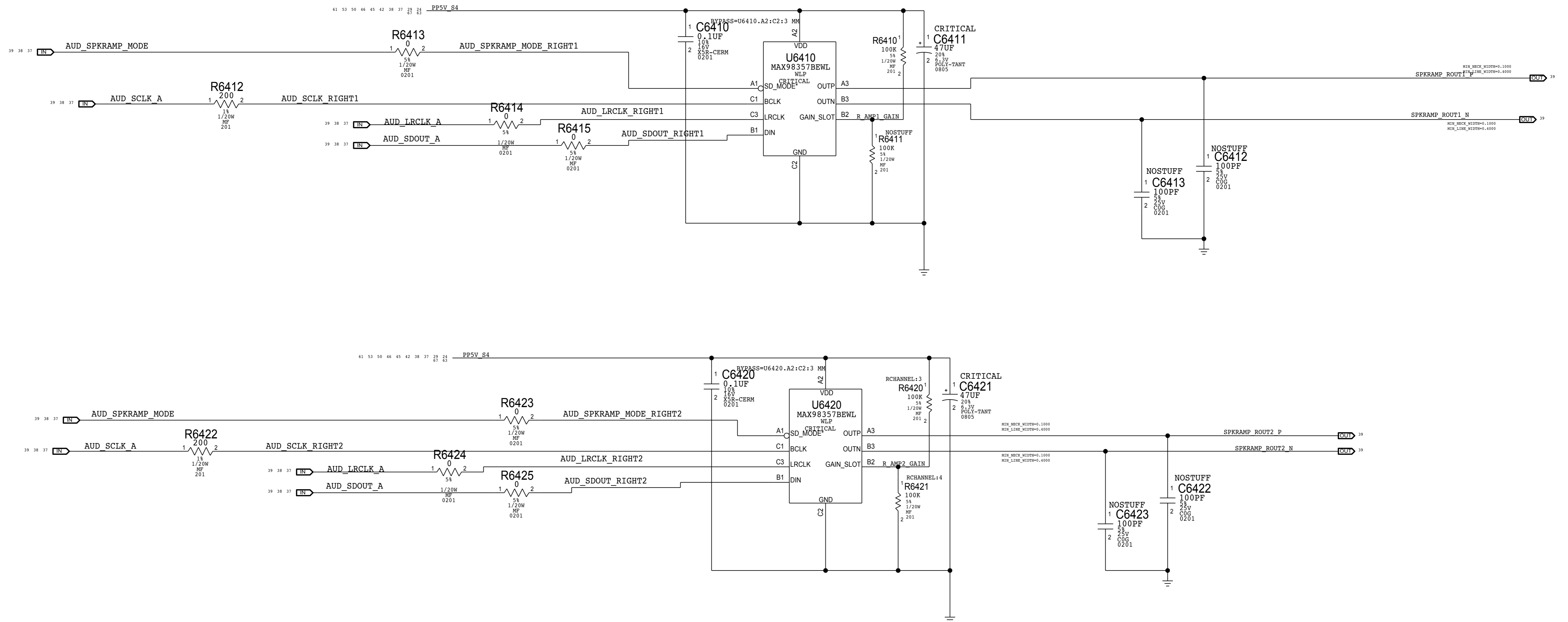
SPEAKER CONFIGS

BOM GROUP	BOM OPTIONS
EQ:2CH	LCHANNEL:1,RCHANNEL:3
EQ:4CH	LCHANNEL:0,RCHANNEL:4

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Right Speaker Amps

APPLE P/N 353S4265



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		SHEET	38 OF 67

CODEC OUTPUT SIGNAL PATHS

FUNCTION	VOLUME	CONVERTER	PIN COMPLEX	MUTE CONTROL	DET ASSIGNMENT
HP/LINE OUT	0X02 (2)	0X02 (2)	0X09 (9,A)		0X09 (A)
SPEAKERS	0X04 (4)	0X04 (4)	0X0B (11)	GPIO_3	N/A

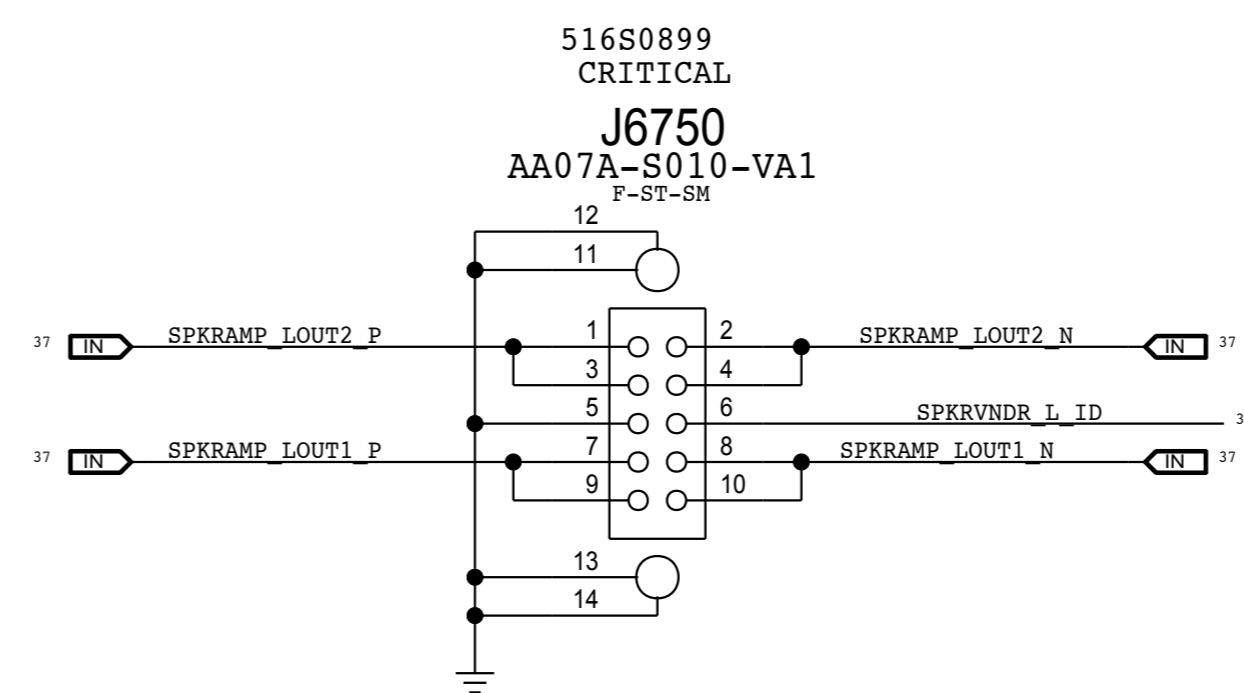
CODEC INPUT SIGNAL PATHS

FUNCTION	CONVERTER	PIN COMPLEX	VREF	DET ASSIGNMENT
BUILT-IN MIC	0X06 (6)	0X0D (13,B,RIGHT)	MIC_BIAS (80%)	N/A
HEADSET MIC	0X06 (6)	0X0D (13,V22,B,LEFT)	MIKEY	MIKEY

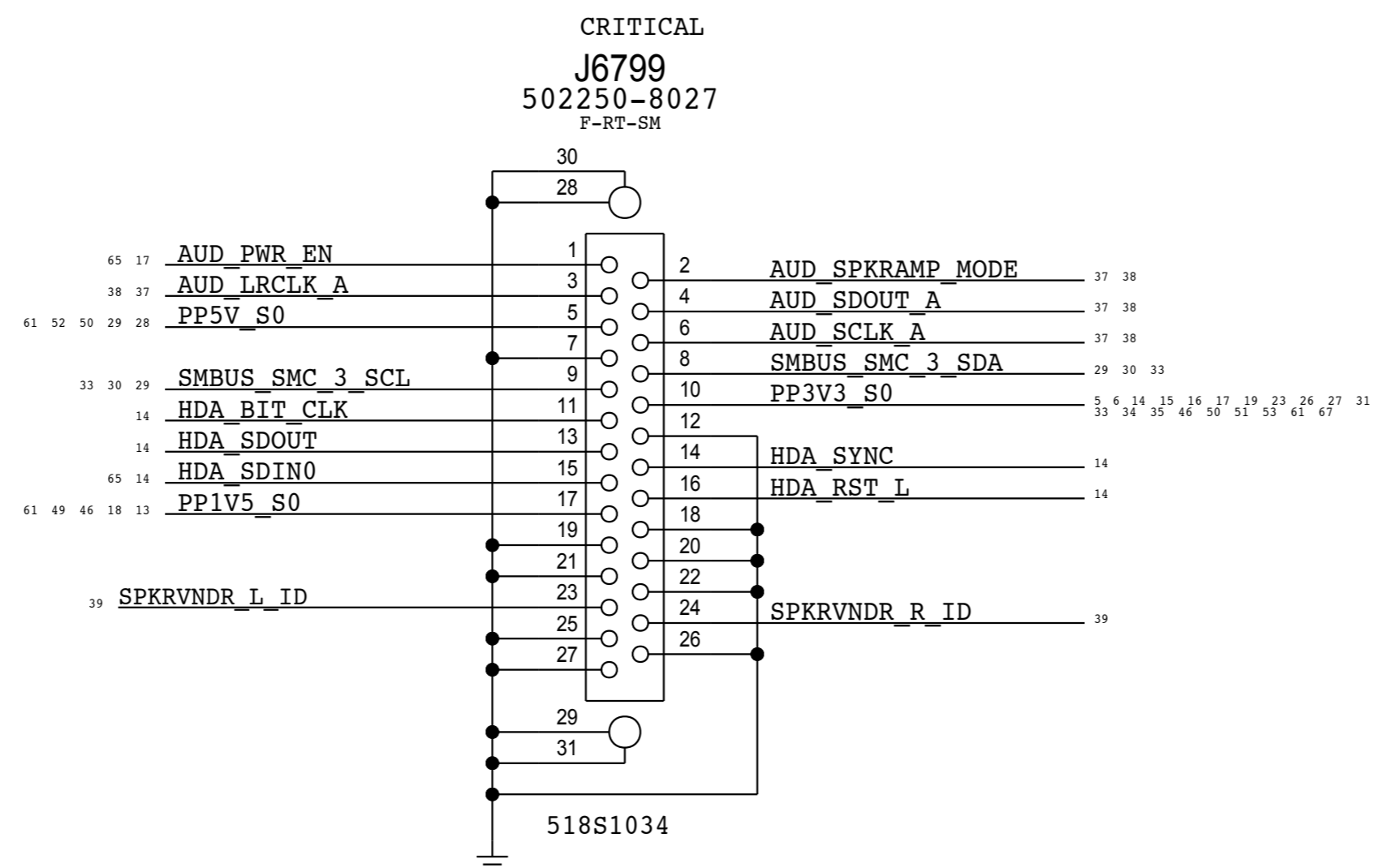
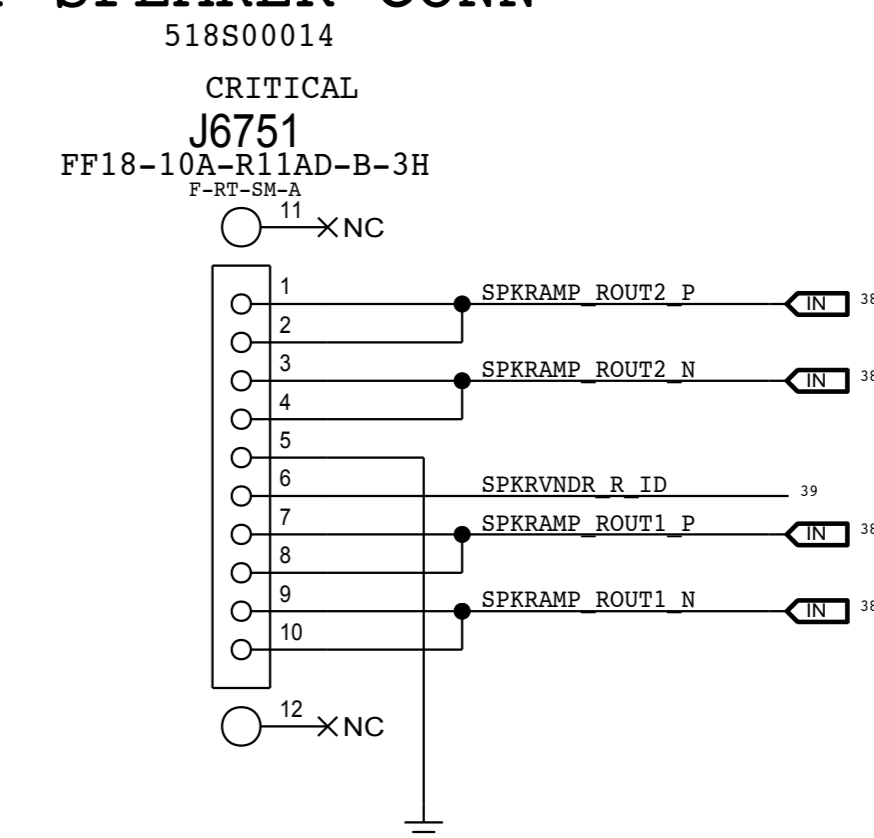
SOUTHBRIDGE RESOURCE/PIN ALLOCATIONS

FUNCTION	NET NAME	SB GPIO/INT
PERIPHERAL/EXTRACTION DETECT	AUD_IP_PERIPHERAL_DETECT	GPIO 3
MIKEY INTERRUPT	AUD_I2C_INT_L	GPIO 5
MIKEY ENABLE	AUD_IPHS_SWITCH_EN	GPIO 16
MIKEY I2C BUS	I2C_MIKEY_SDA/SCL	PCH SMBUS 0

LEFT SPEAKER CONN



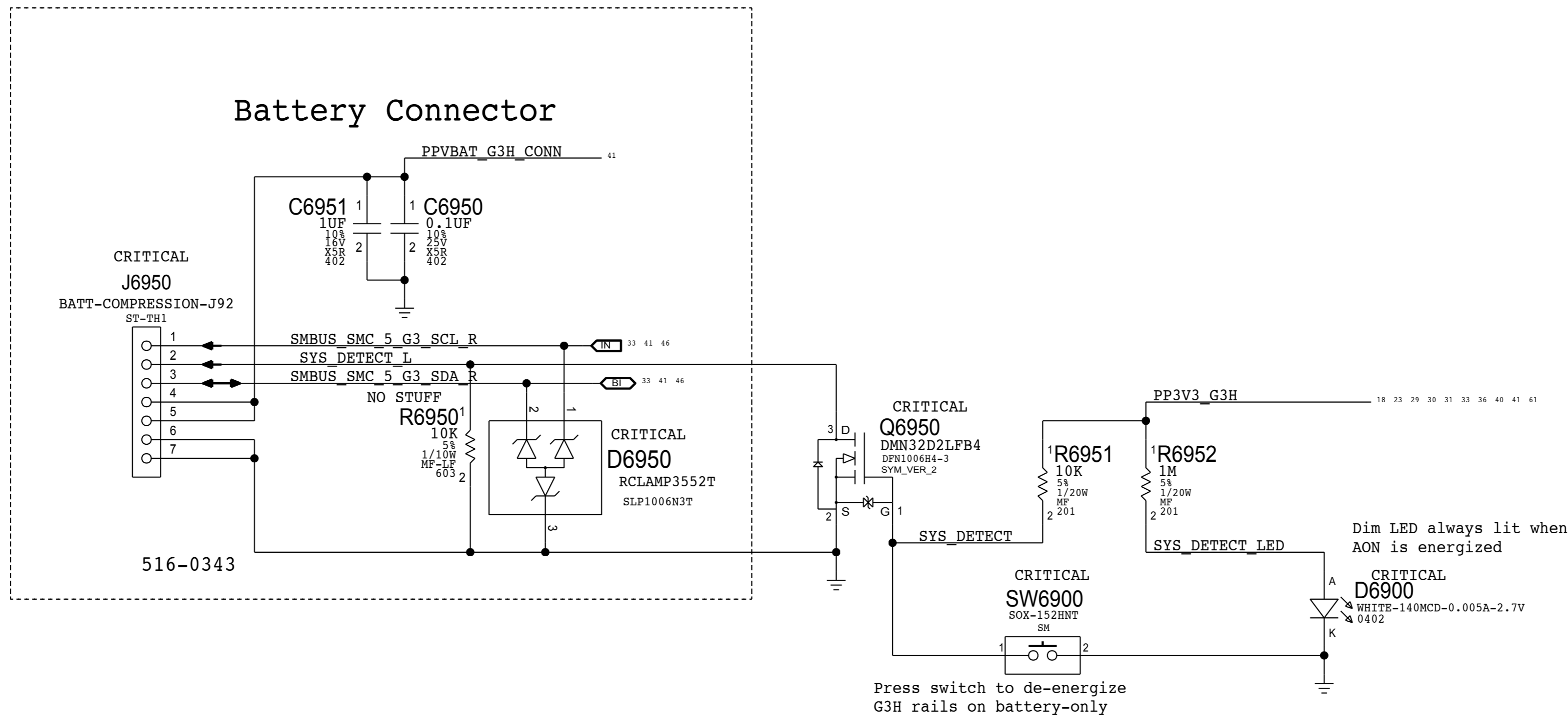
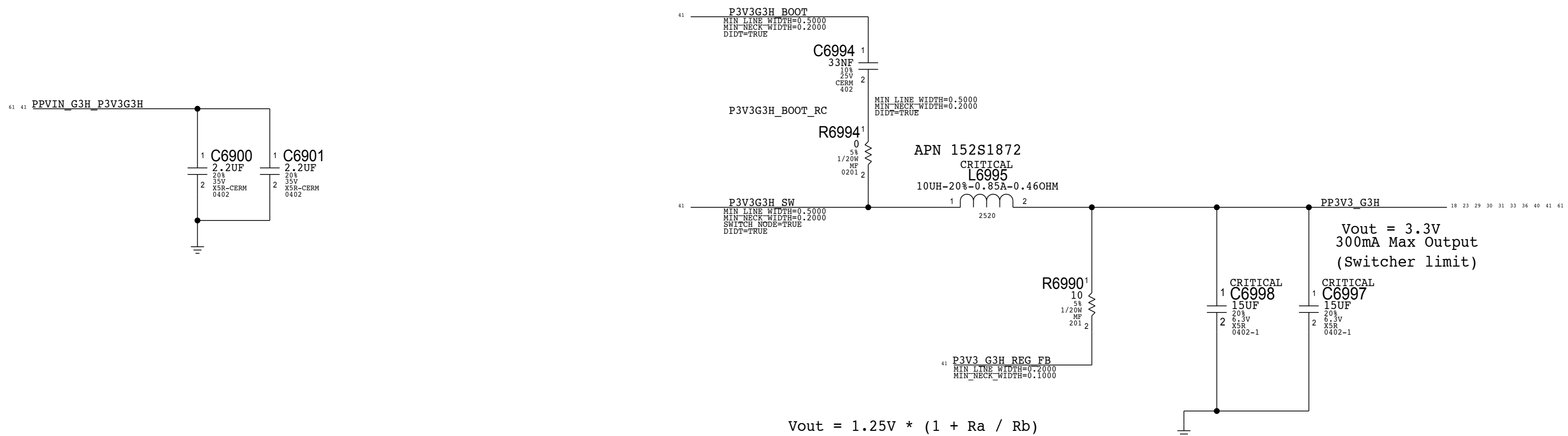
RIGHT SPEAKER CONN



RIO FLEX CONN

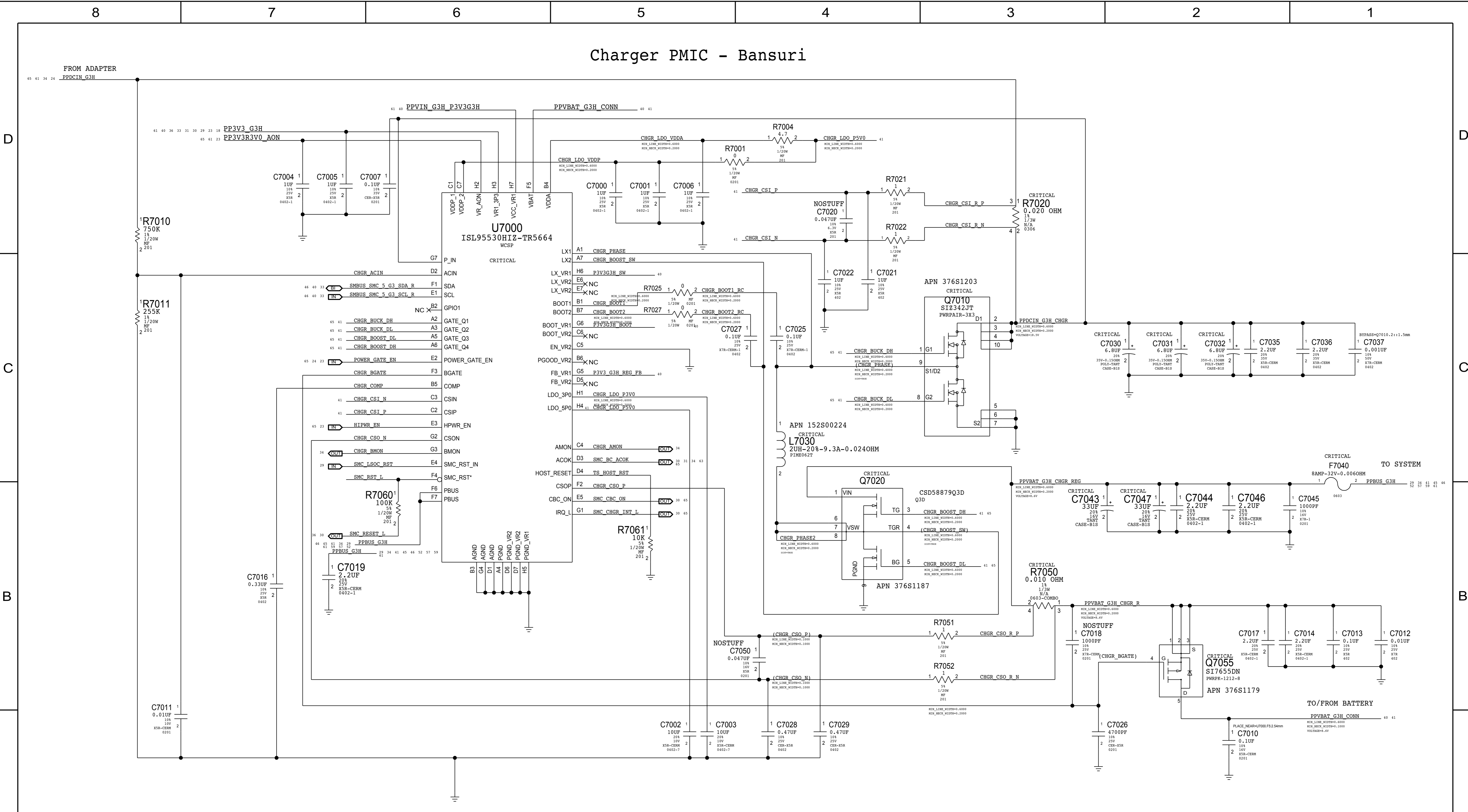
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AUDIO CONNECTORS			
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PAGE		67 OF 130	
SHEET		39 OF 67	

3.3V G3H VR - Bansuri

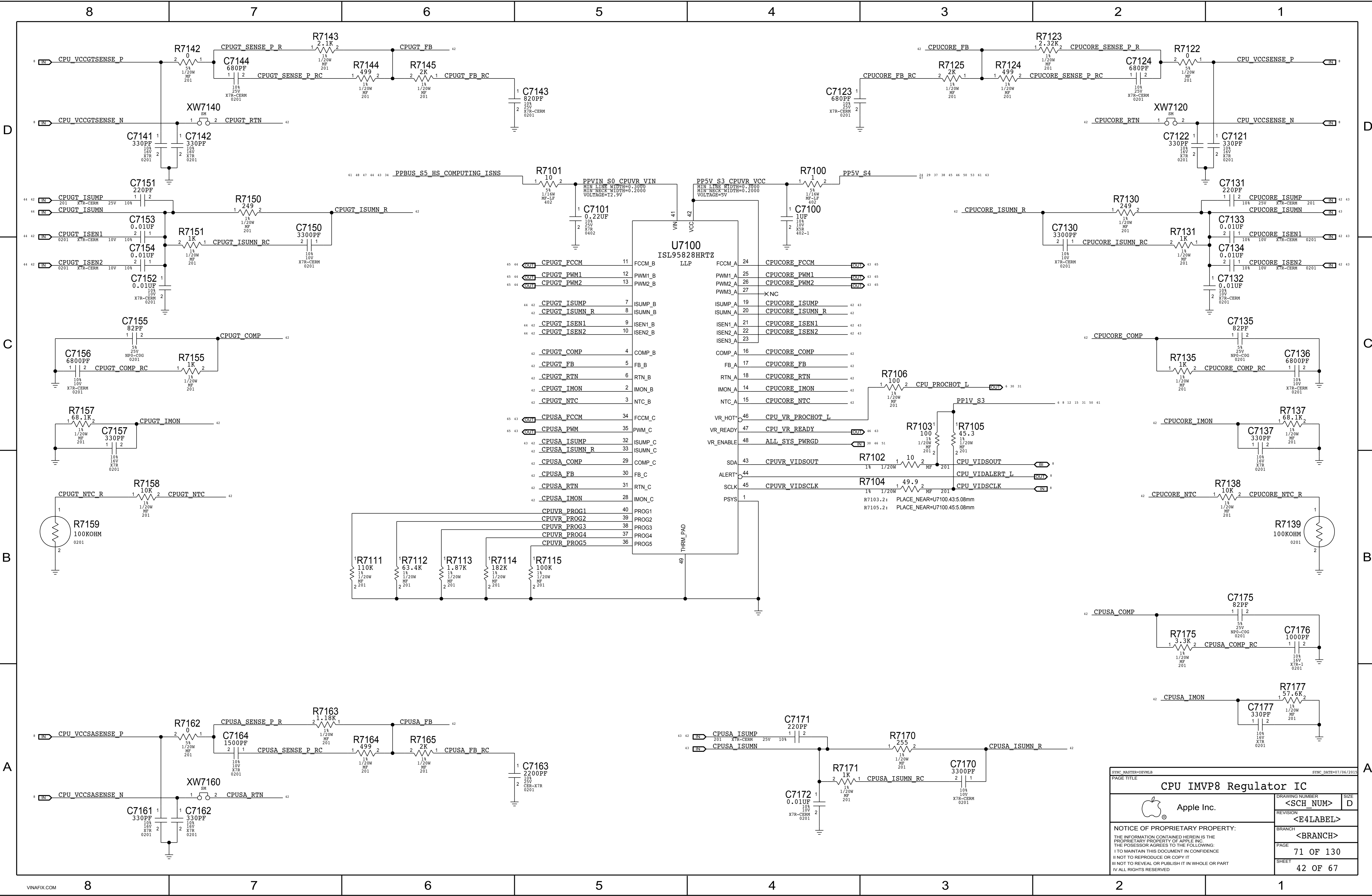


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Battery Connector & 3.3V G3Hot		DRAWING NUMBER	SIZE
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I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		PAGE	69 OF 130
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Charger PMIC - Bansuri



SYNC_MASTER=DEVMLB		SYNC_DATE=05/11/2015	
PBus Supply & Battery Charger			
Apple Inc.		DRAWING NUMBER	SIZE
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		REVISION	
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		PAGE	70 OF 130
		SHEET	41 OF 67



Apple Inc.

CPU IMVP8 Regulator IC

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DRAWING NUMBER <SCH_NUM>	SIZE D
REVISION <E4LABEL>	
BRANCH <BRANCH>	
PAGE 71 OF 130	
SHEET 42 OF 67	

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

Phase 1

CPU VCore

Phase 2

CPU VCore

CPU VCCSA

Vout = 1.50V max
24A max load
f = 750kHz

Vout = 1.05V max
4.1A max load
f = 750kHz

SYNC_MASTER=DEVMLB		SYNC_DATE=05/19/2015	
PAGE TITLE			
CPU VCore/VccSA Power Stage		DRAWING NUMBER	SIZE
Apple Inc.		<SCH_NUM>	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 I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IN ALL RIGHTS RESERVED		REVISION	<E4LABEL>
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		SHEET	43 OF 67

D

C

B

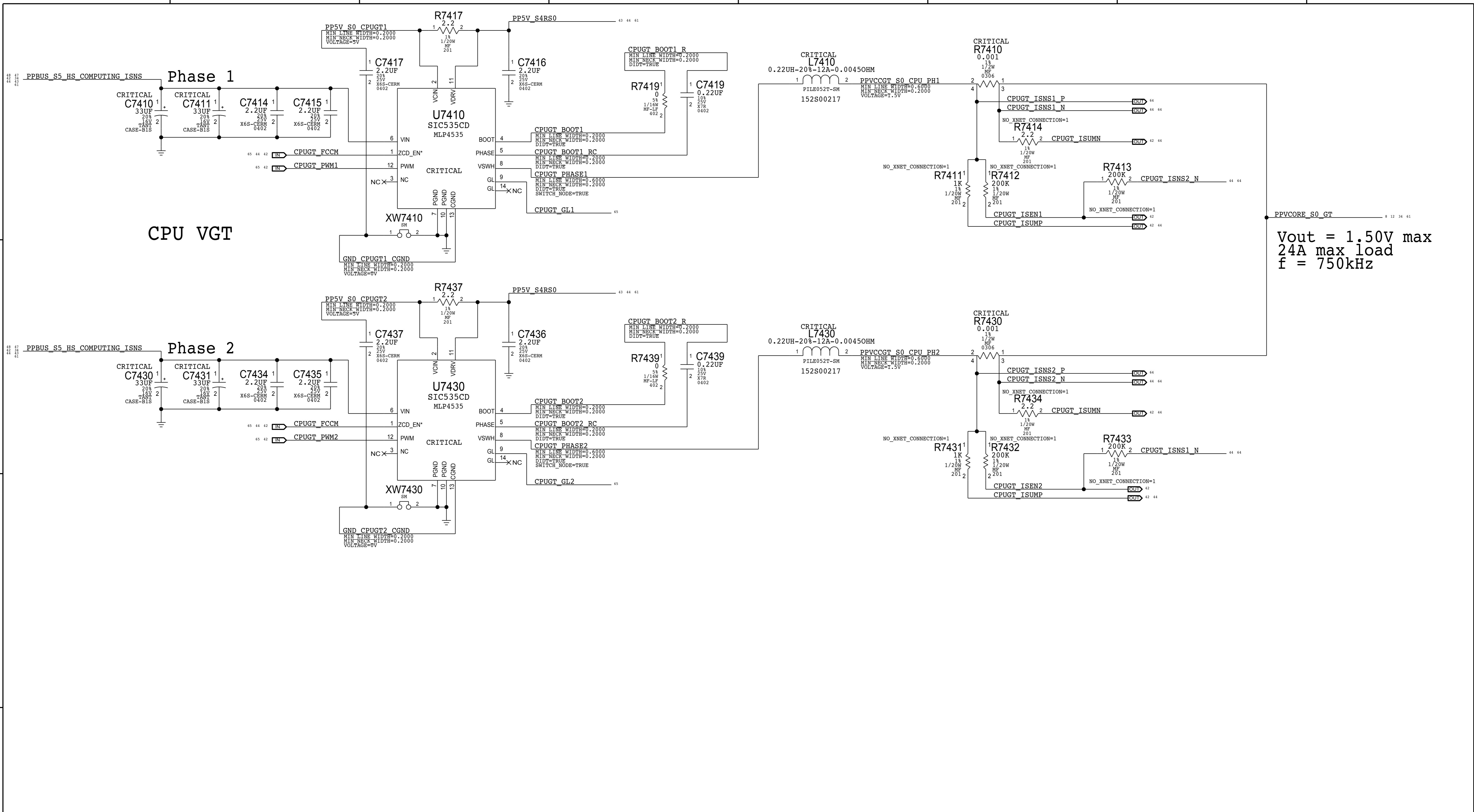
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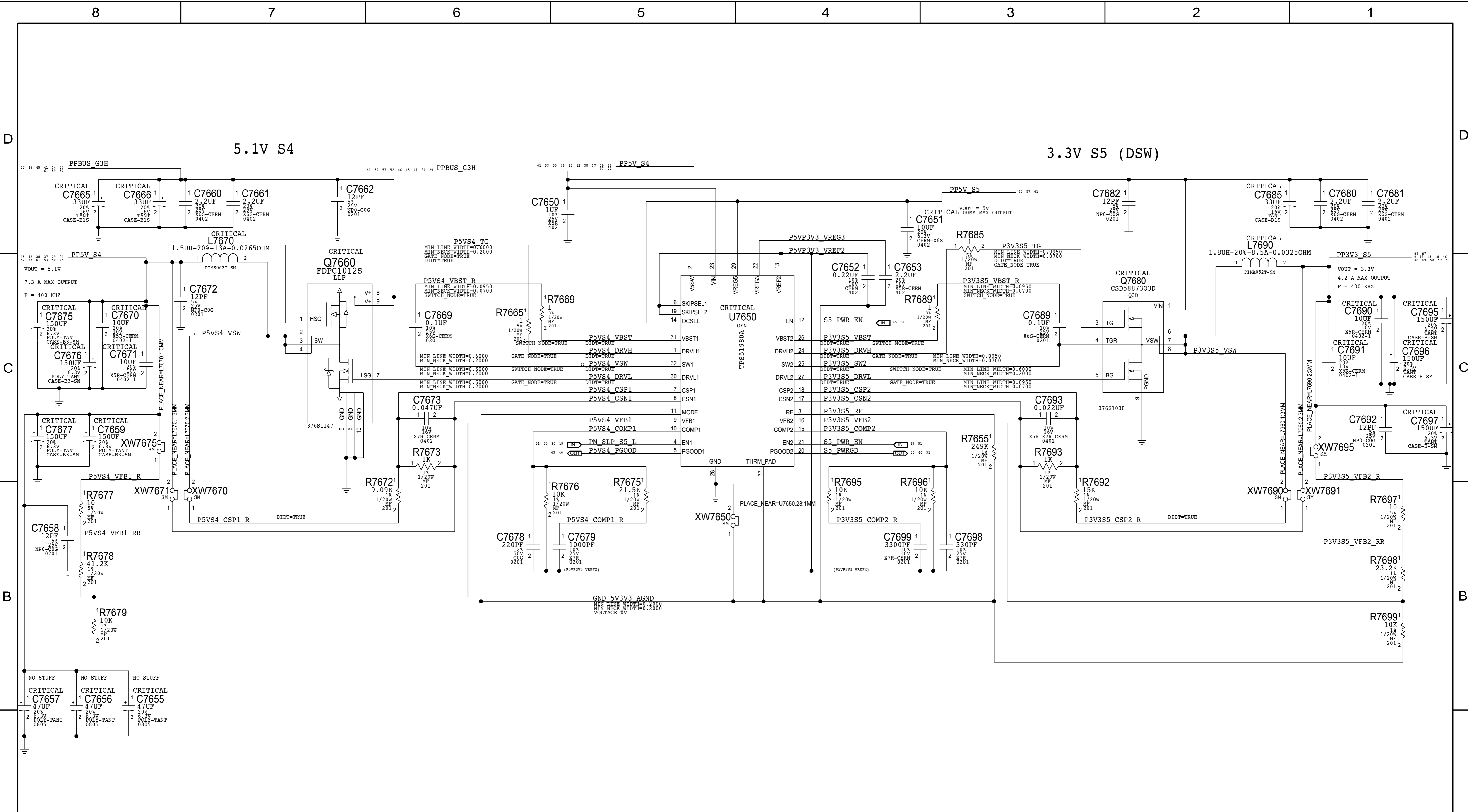
B

A



Vout = 1.50V max
24A max load
f = 750kHz

SYNC_MASTER=DEVMLB		SYNC_DATE=05/11/2015	
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CPU VccGT Power Stage			
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		PAGE	74 OF 130
		SHEET	44 OF 67



NO STUFF	NO STUFF	NO STUFF
CRITICAL C7657	CRITICAL C7656	CRITICAL C7655
47UF	47UF	47UF
20V	20V	20V
POLY-TANT	POLY-TANT	POLY-TANT
0805	0805	0805

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PAGE TITLE

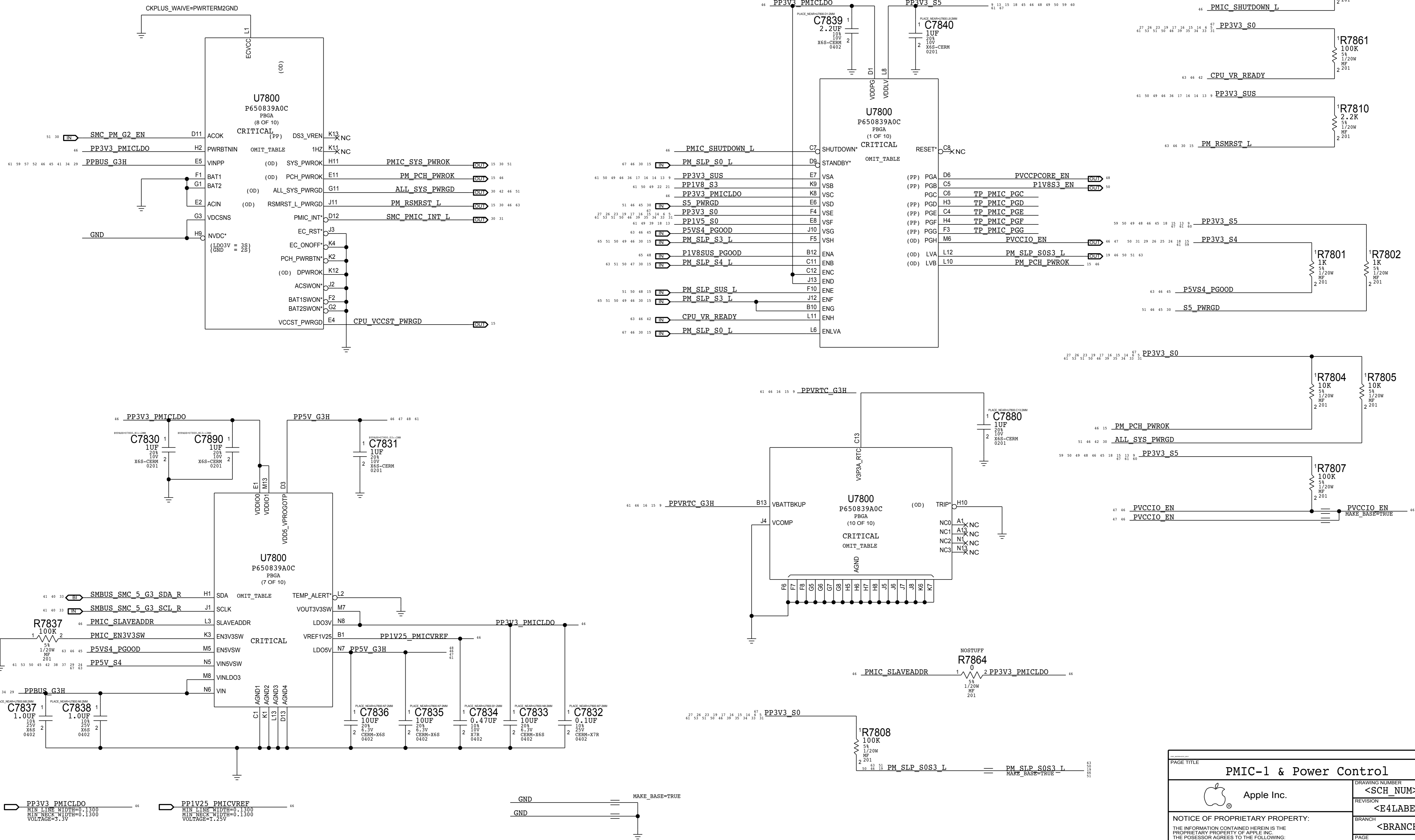
5V & 3.3V Power Supplies

Apple Inc.

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REVISION	
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PAGE	76 OF 130
SHEET	45 OF 67

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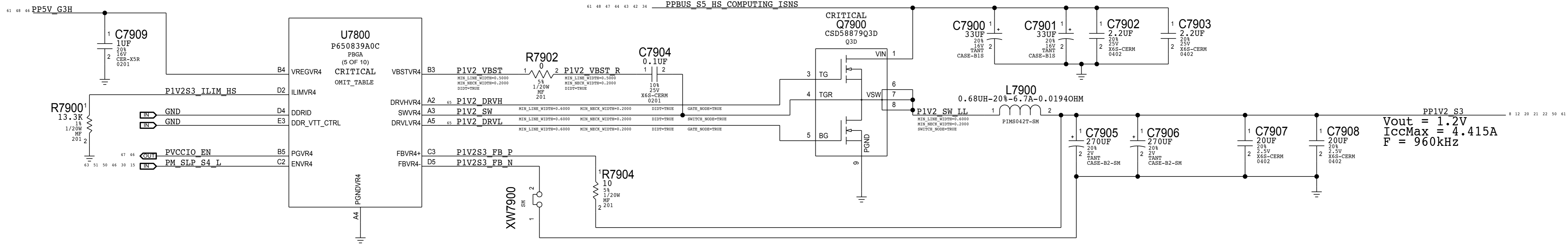
BANJO - PMIC Control



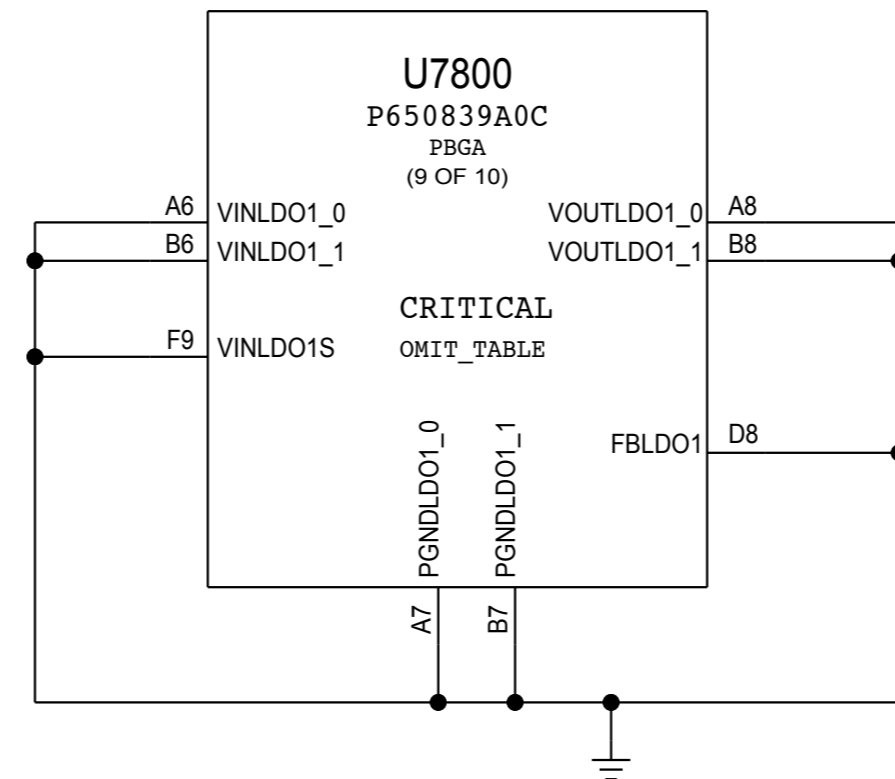
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DRAWING NUMBER		<SCH_NUM>	SIZE D
REVISION		<E4LABEL>	
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PAGE		78 OF 130	
SHEET		46 OF 67	

BOM_COST_GROUP=PLATFORM POWER

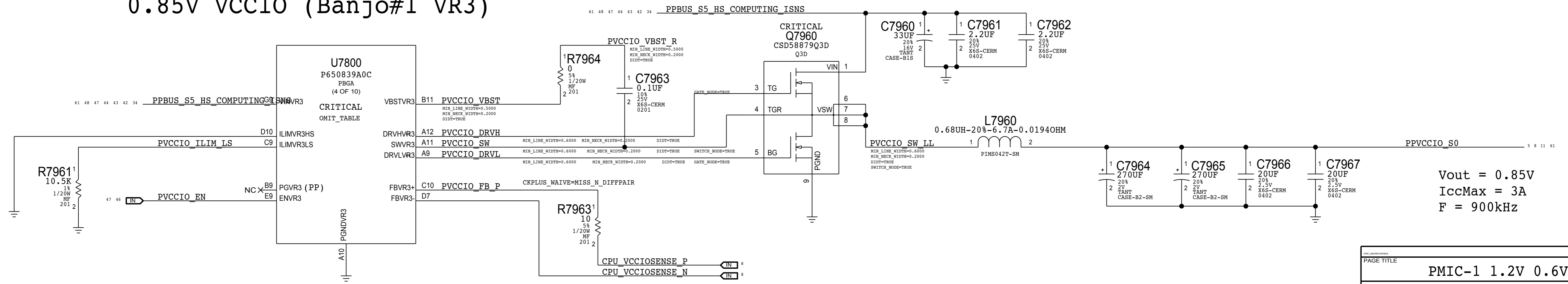
1.2V VDDQ (Banjo#1 VR4)



0.6V VTT (Banjo#1 LDO1)

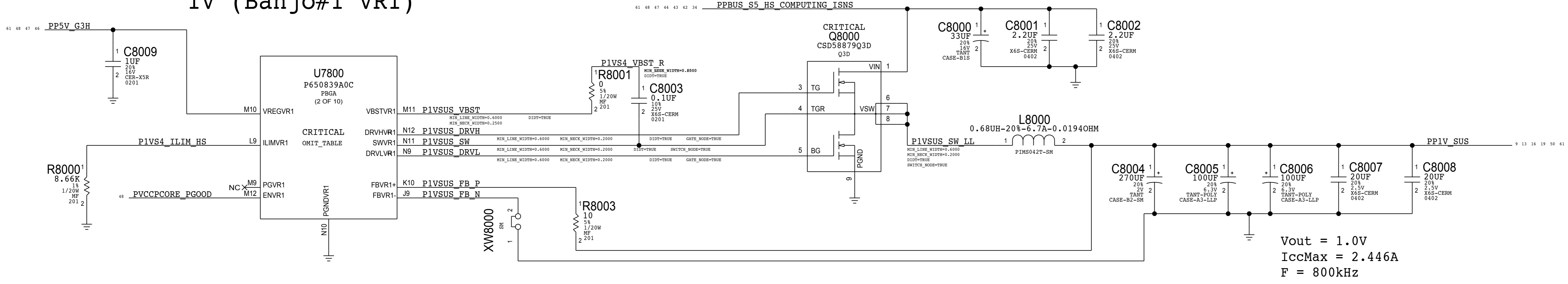


0.85V VCCIO (Banjo#1 VR3)

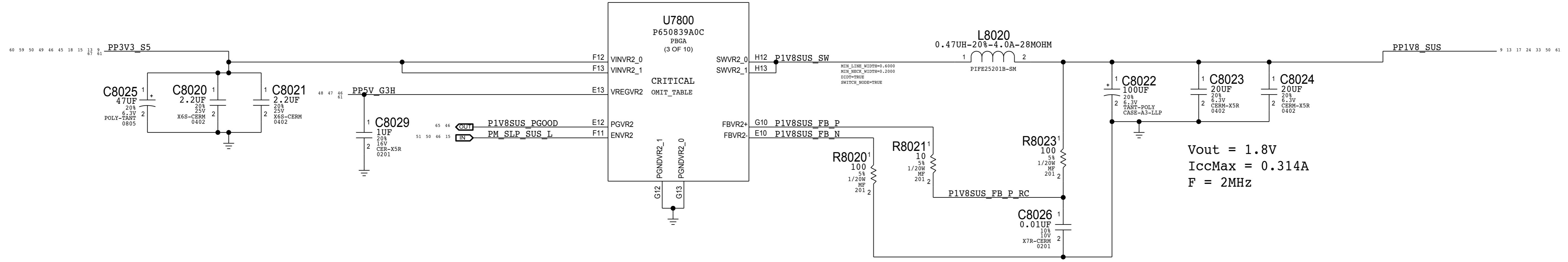


Apple Inc.		DRAWING NUMBER <SCH_NUM>	SIZE D
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PAGE 79 OF 130		SHEET 47 OF 67	
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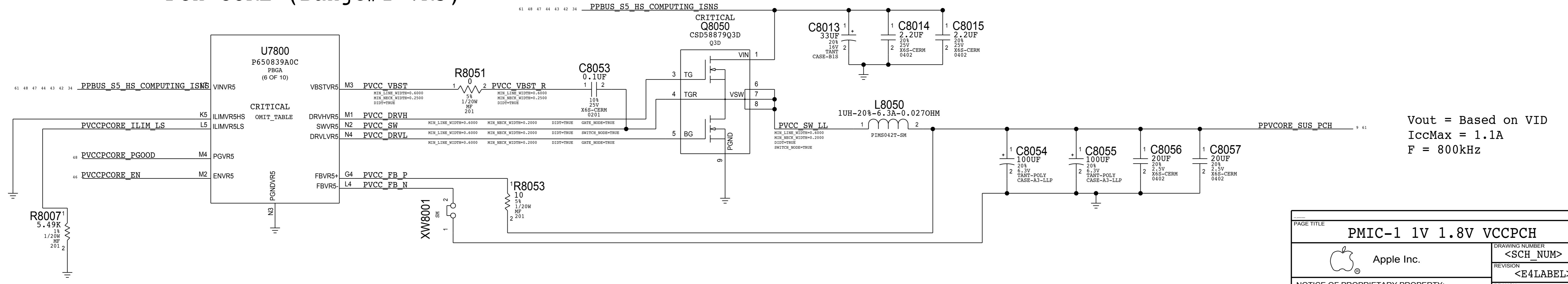
1V (Banjo#1 VR1)



1.8V (Banjo#1 VR2)



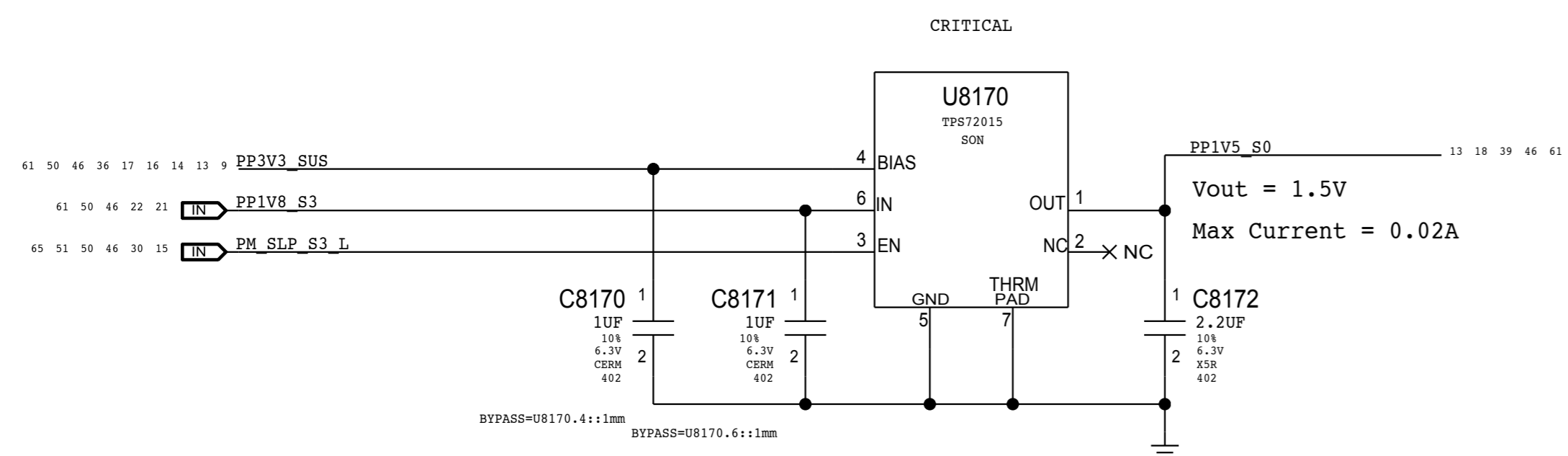
PCH CORE (Banjo#1 VR5)



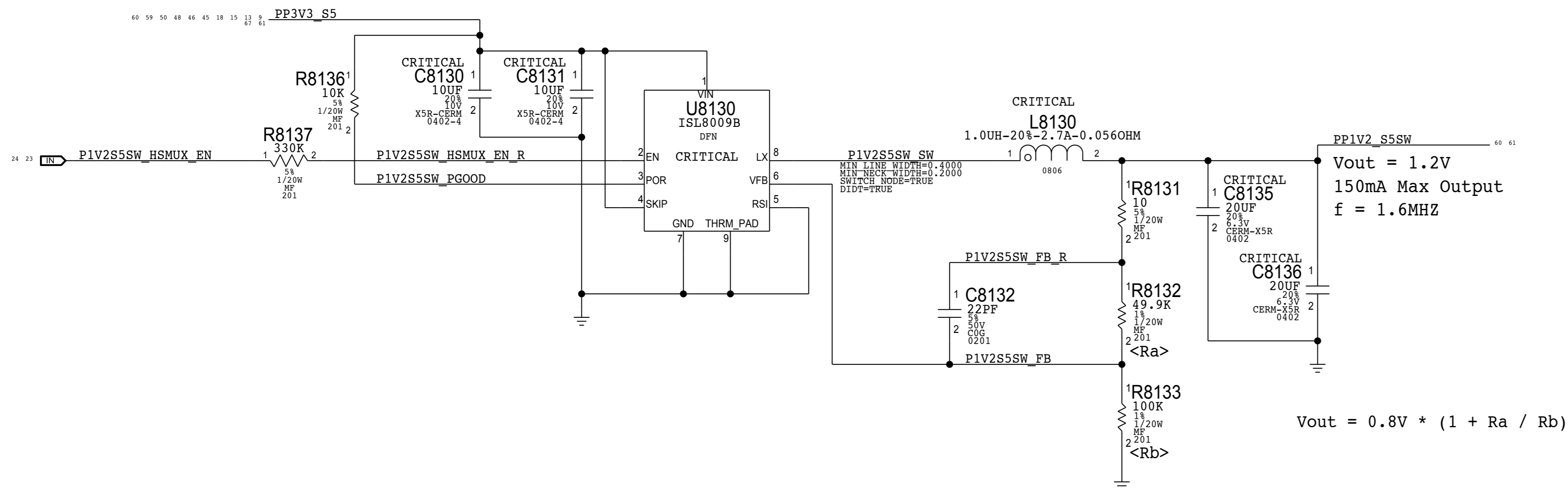
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PAGE		80 OF 130	
SHEET		48 OF 67	

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1.5V S0 LDO



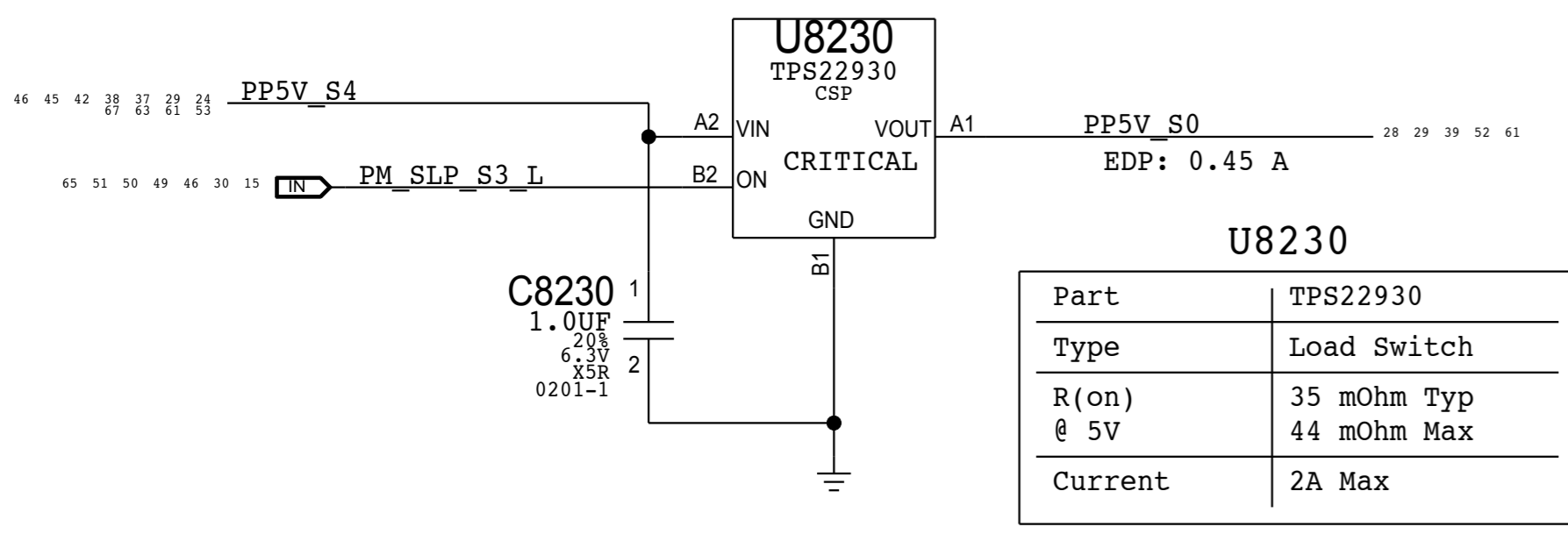
1.2V S5 USB-C HS Mux



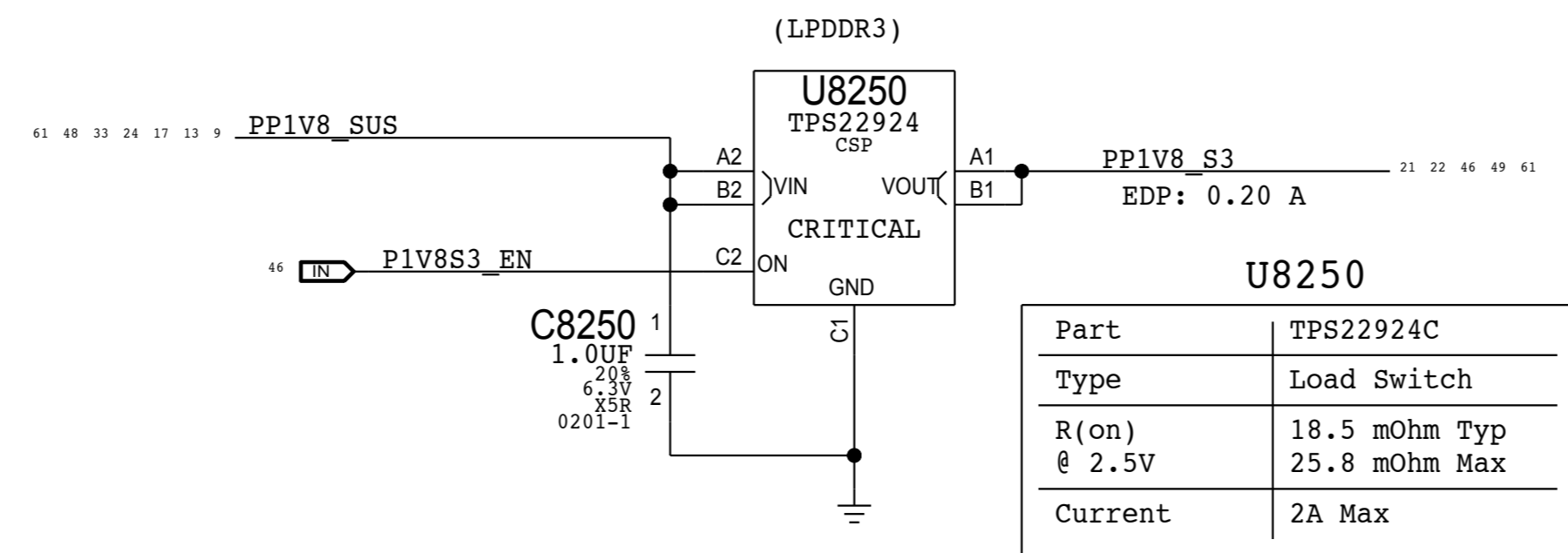
$$V_{out} = 0.8V * (1 + R_a / R_b)$$

SYNC_MASTER=X260_ERIC		SYNC_DATE=06/15/2015	
PAGE TITLE			
Misc Power Supplies			
	DRAWING NUMBER	<SCH_NUM>	SIZE
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		PAGE	81 OF 130
		SHEET	49 OF 67

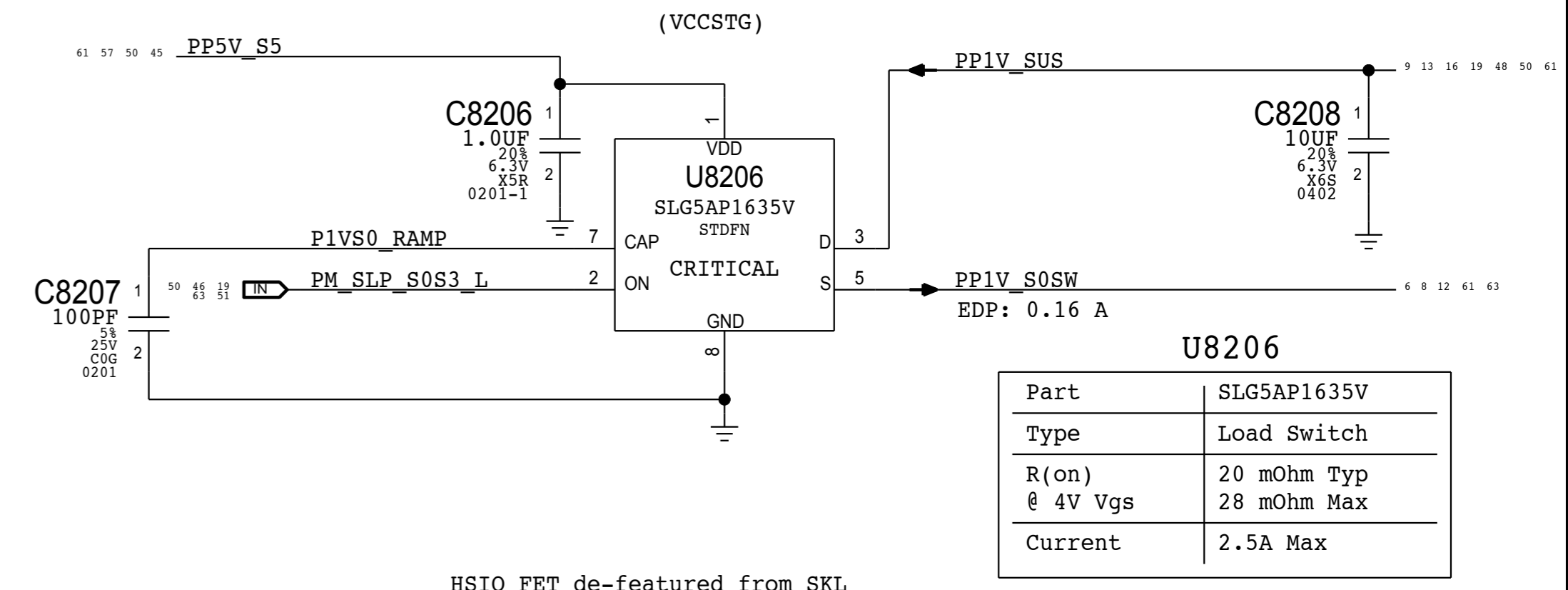
5V S0 Switch



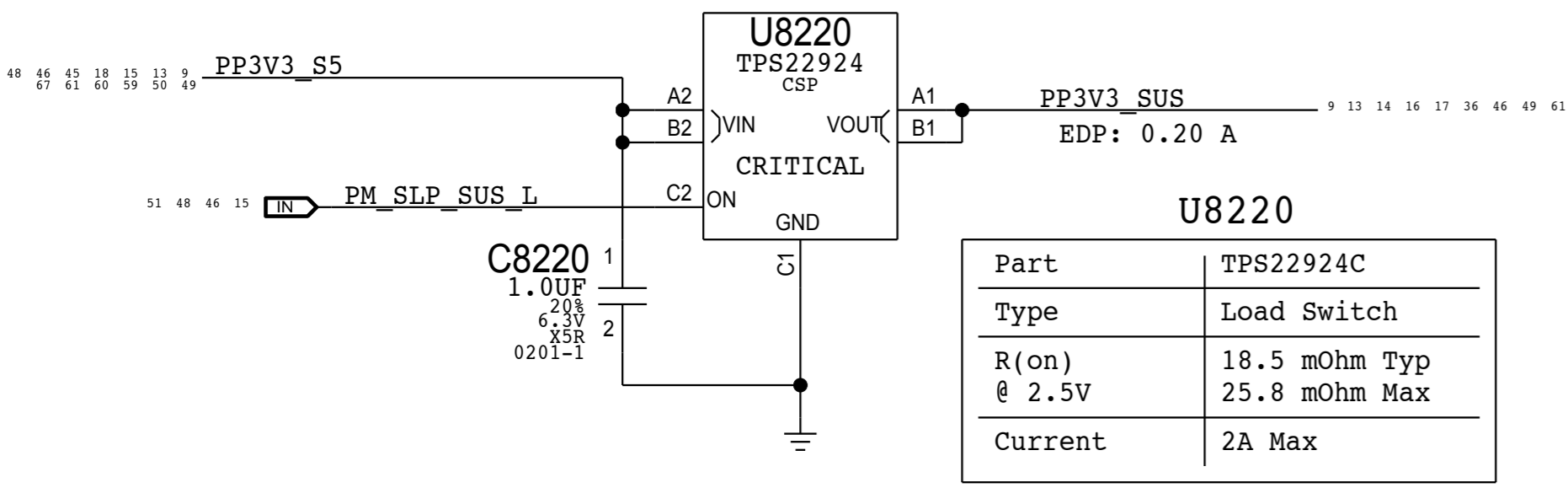
1.8V S3 Switch



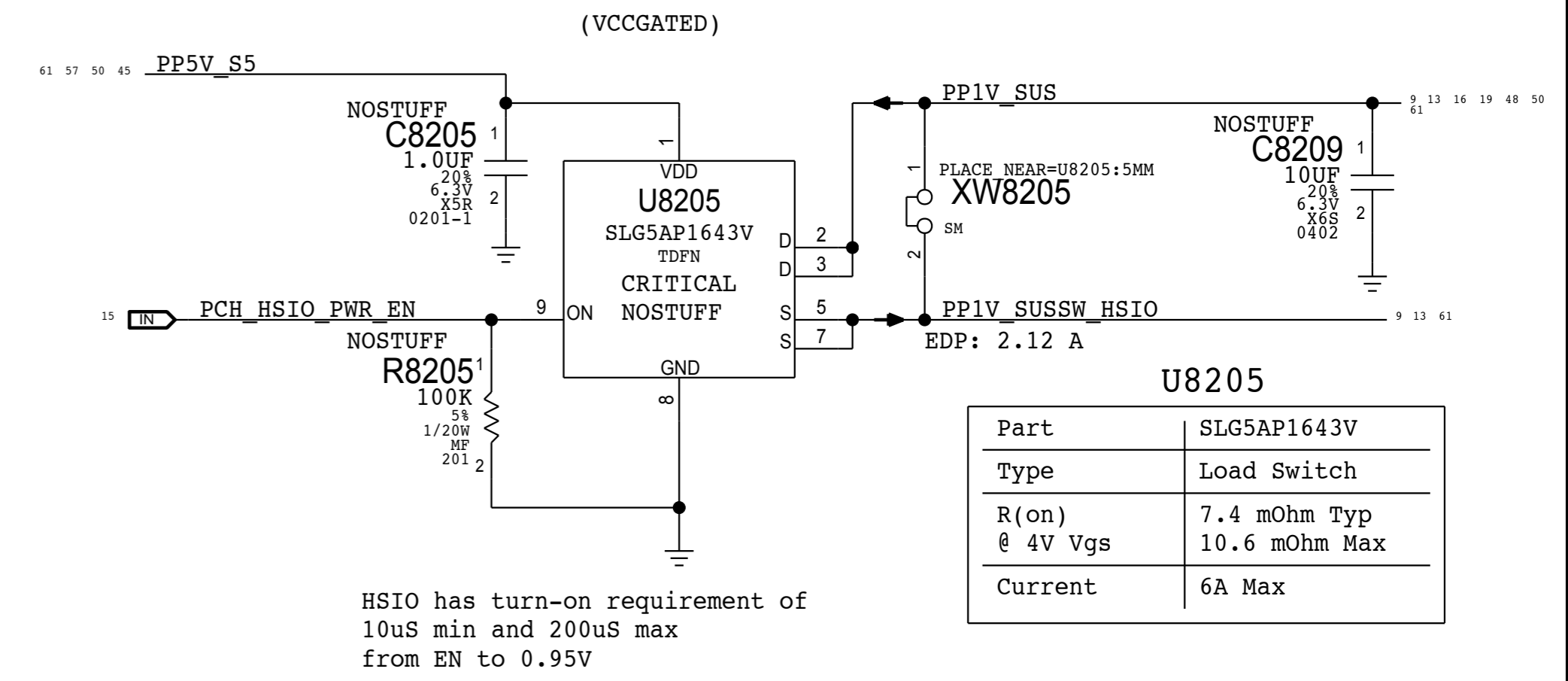
1.0V S0SW Switch



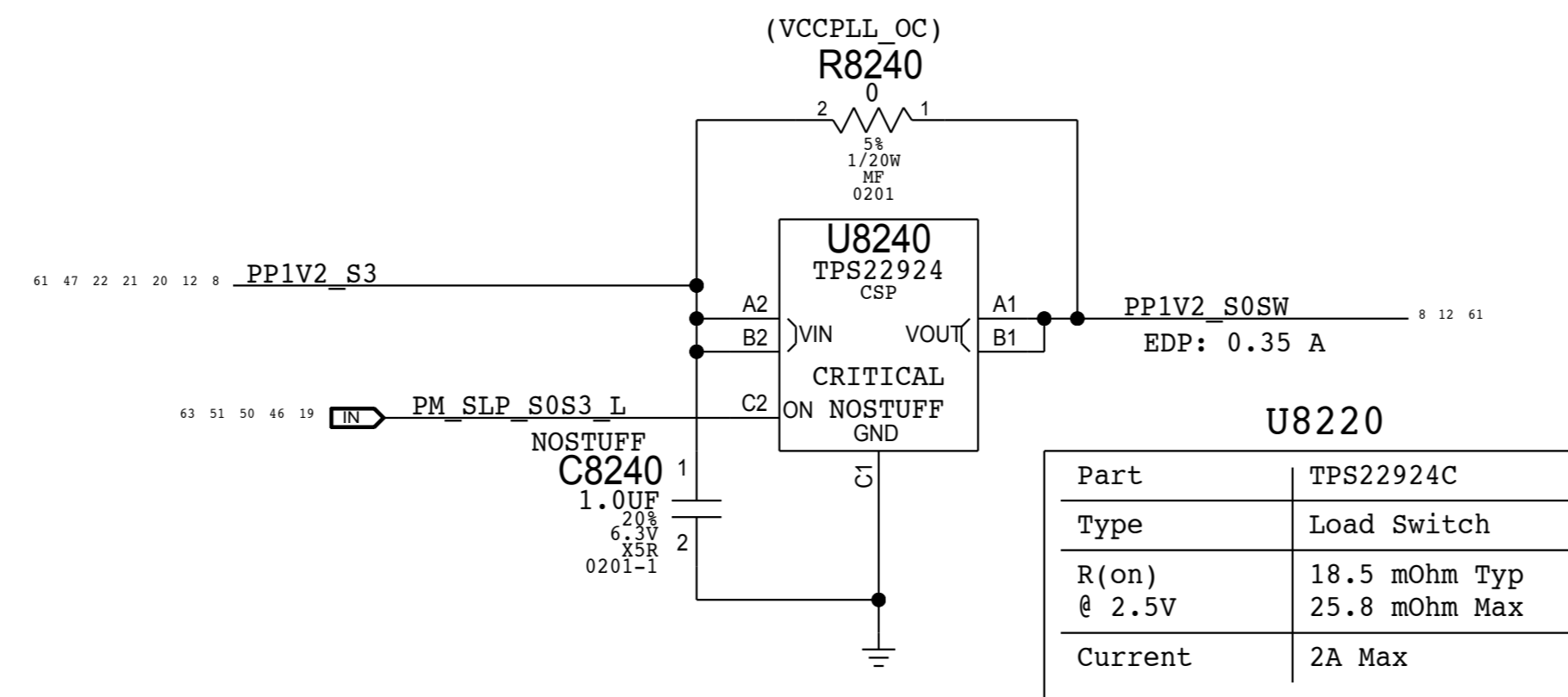
3.3V SUS Switch



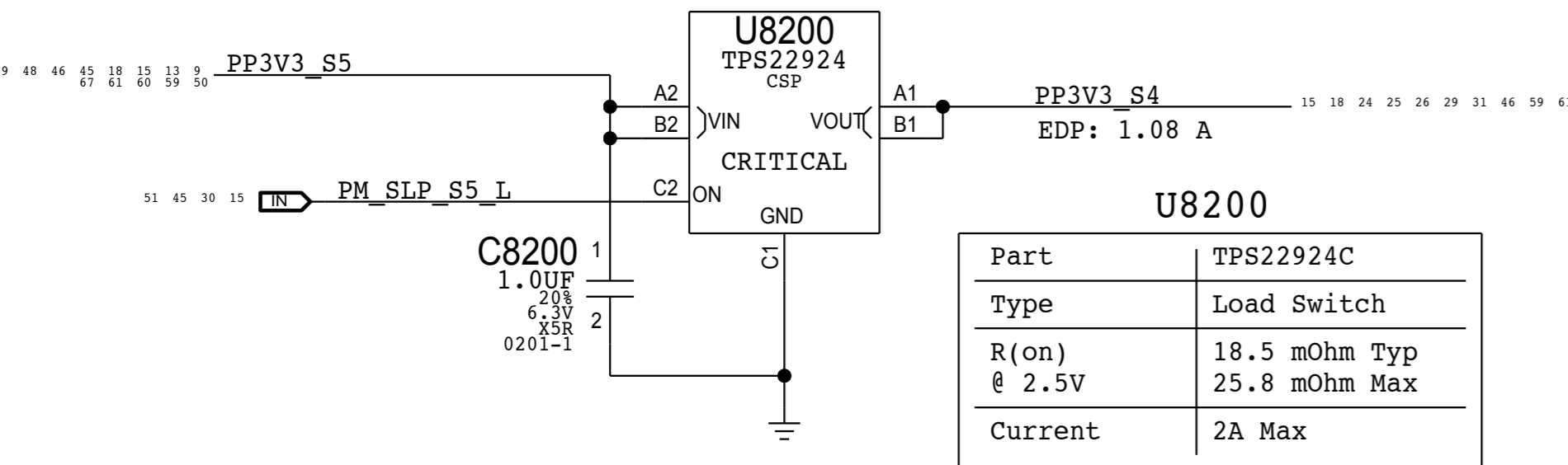
1.0V SUSSW HSIO Switch



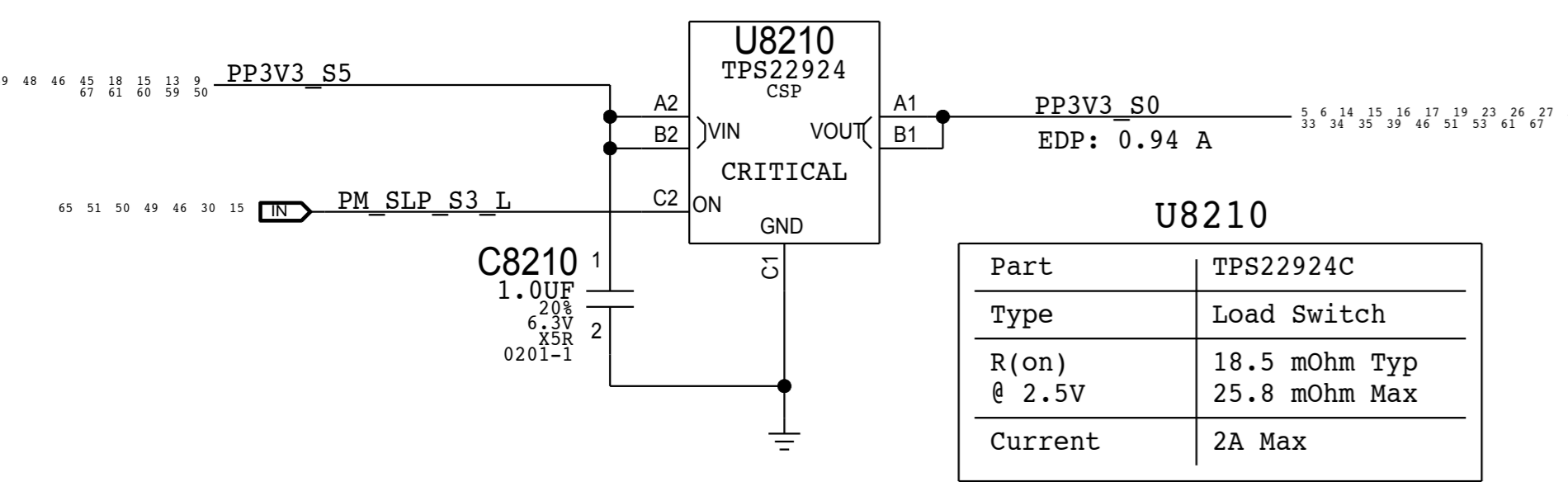
1.2V S0SW Switch



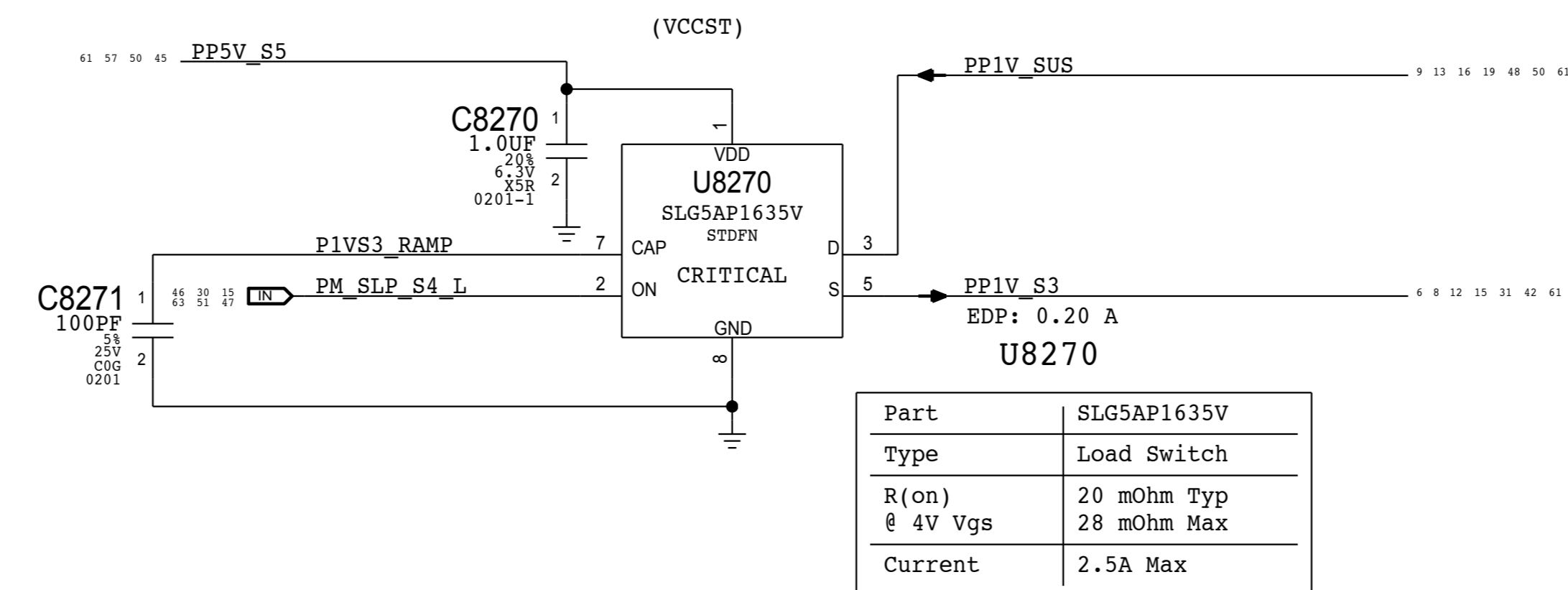
3.3V S4 Switch



3.3V S0 Switch



1.0V S3 Switch



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		PAGE	82 OF 130
		SHEET	50 OF 67

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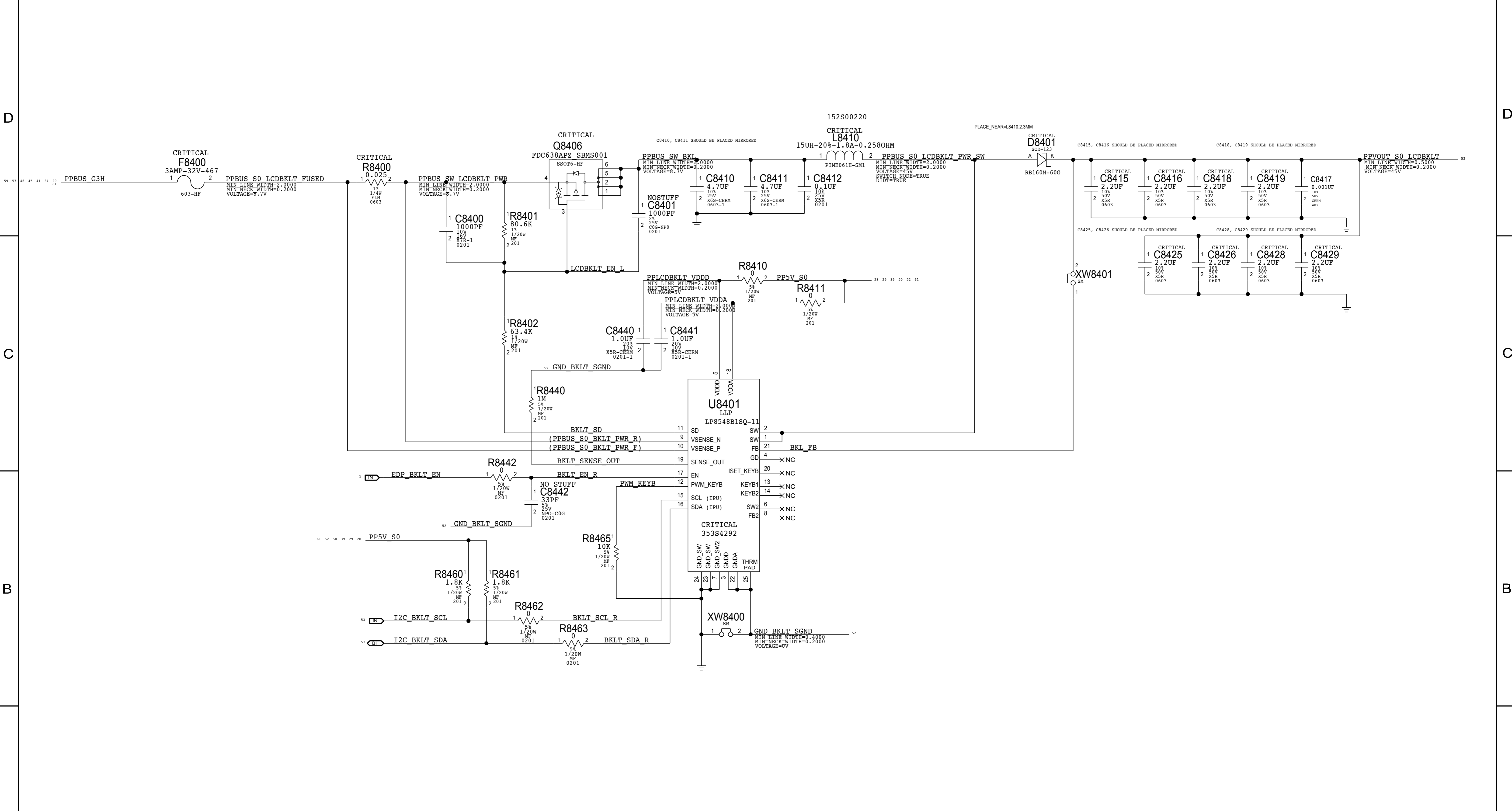
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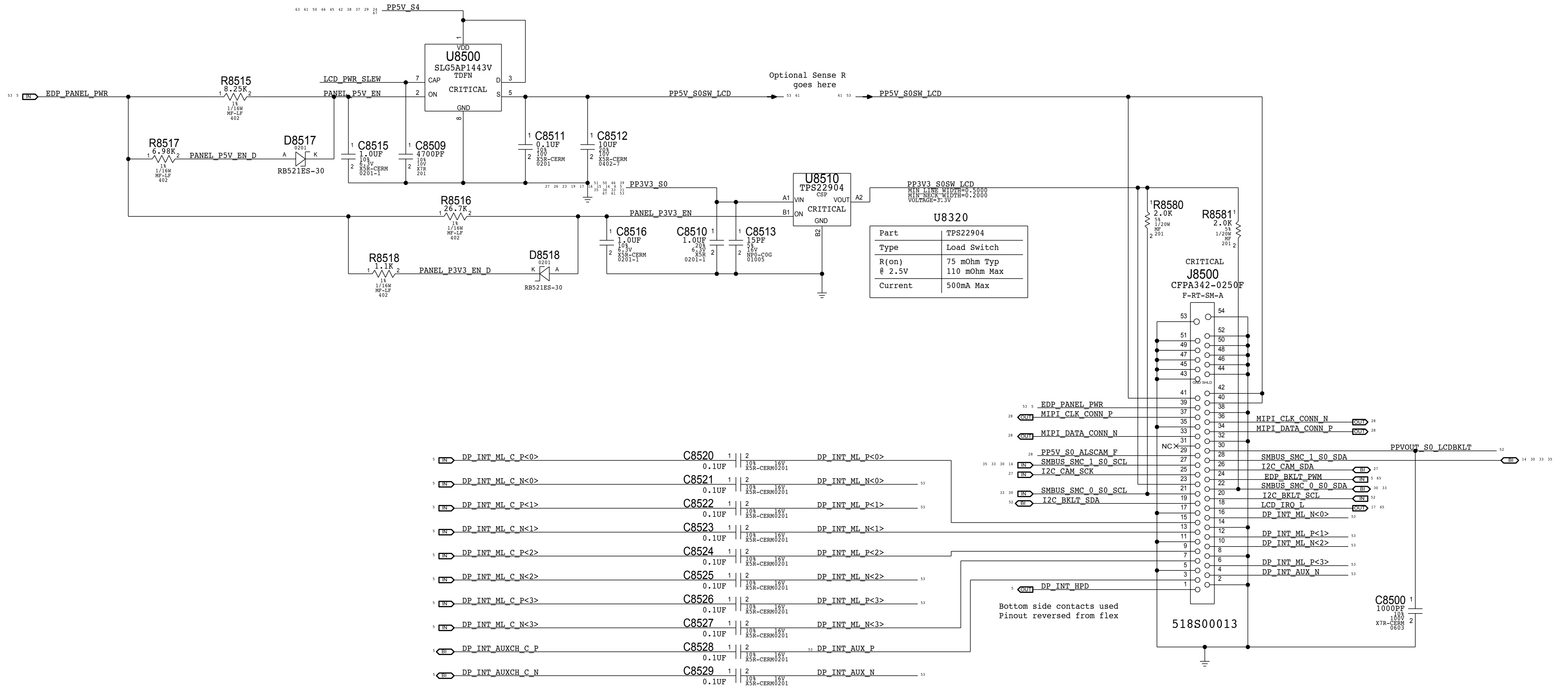
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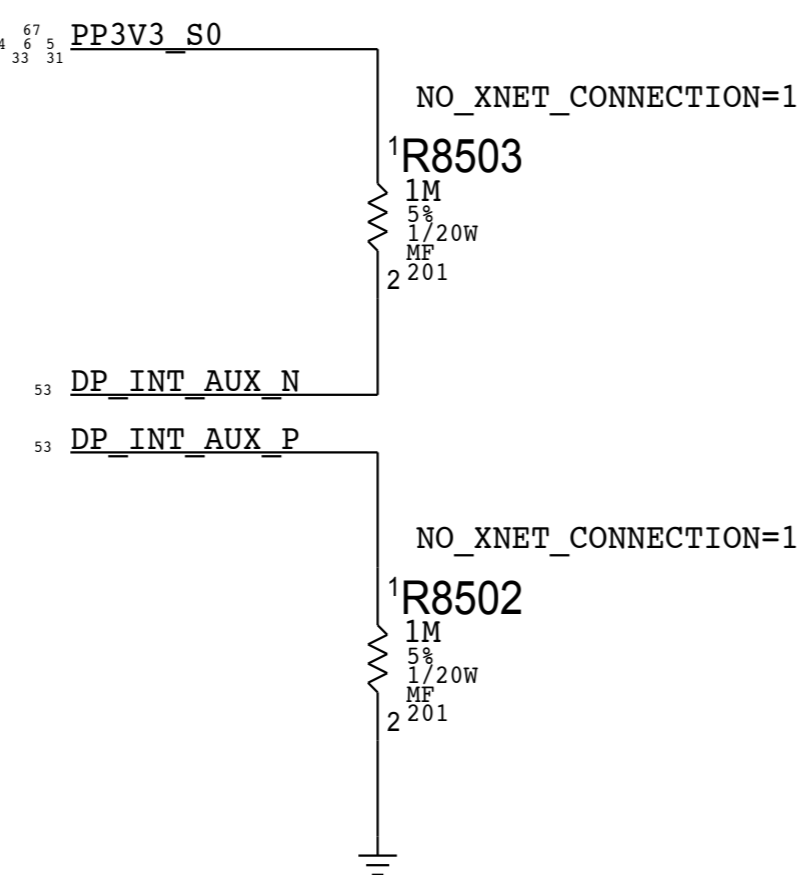


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LCD Backlight Driver			
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		<E4LABEL>	
		BRANCH	
		<BRANCH>	
		PAGE	84 OF 130
		SHEET	52 OF 67

LCD PANEL INTERFACE (eDP) + Camera (MIPI)



LCD Panel HPD & AUX strapping



Part	TPS22904
Type	Load Switch
R(on) @ 2.5V	75 mOhm Typ 110 mOhm Max
Current	500mA Max

SYNC_MASTER=DEVMLB SYNC_DATE=05/11/2015
PAGE TITLE

eDP Display Connector

Apple Inc.

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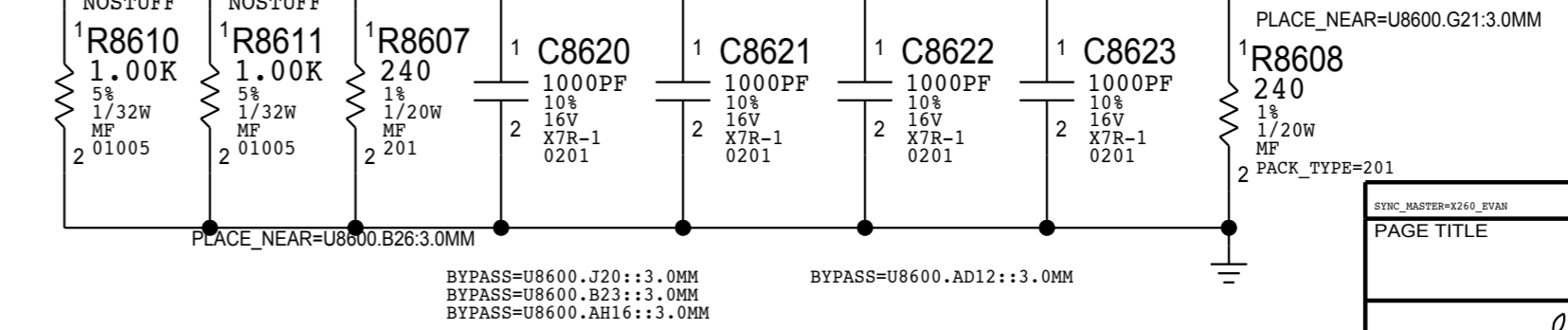
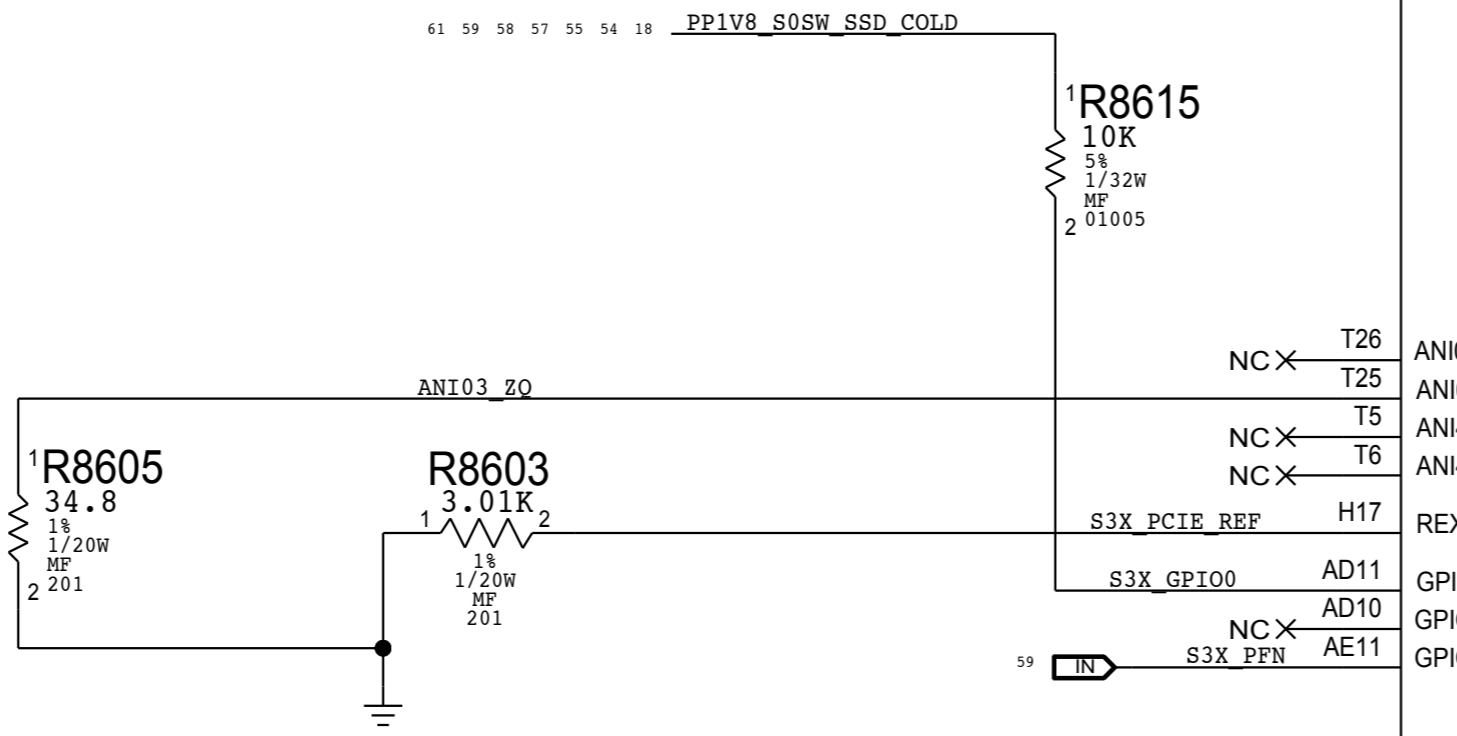
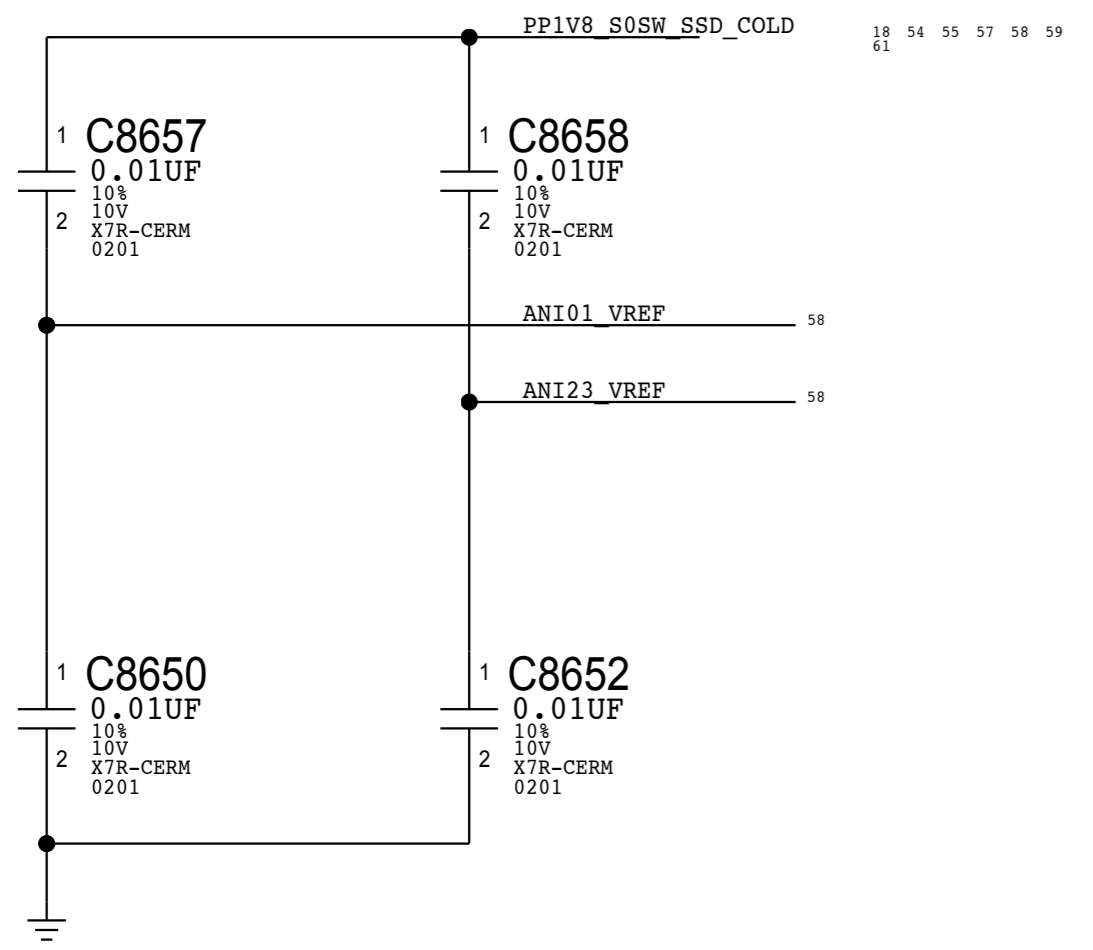
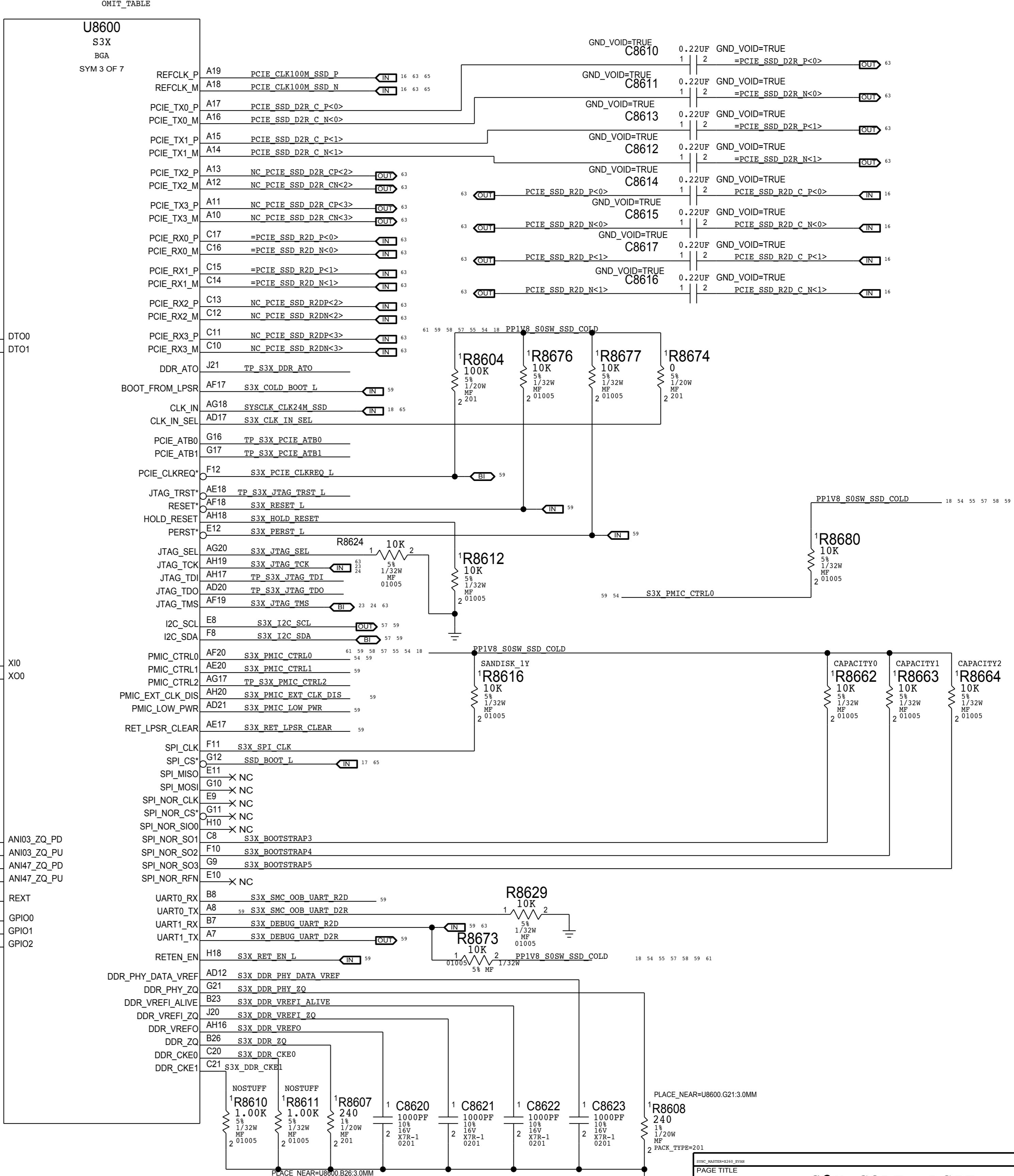
A

PRODUCT CAPACITY

CONFIG	CAPACITY2 R0864	CAPACITY1 R0863	CAPACITY0 R0862
000 - 32GB	NOSTUFF	NOSTUFF	NOSTUFF
001 - 64GB	NOSTUFF	NOSTUFF	ASSEMBLE
010 - 128GB	NOSTUFF	ASSEMBLE	NOSTUFF
011 - 256GB	NOSTUFF	ASSEMBLE	ASSEMBLE
100 - 512GB	ASSEMBLE	NOSTUFF	NOSTUFF
101 - 1024GB	ASSEMBLE	NOSTUFF	ASSEMBLE
110 - 2048GB	ASSEMBLE	ASSEMBLE	NOSTUFF
111 - RESERVED	ASSEMBLE	ASSEMBLE	ASSEMBLE

OPERATION MODE (ODT, CLK FREQ, ETC)

CONFIG	OP_MODE2 R8614	OP_MODE1 R8615	OP_MODE0 R8680
000 - TEABERRY	NOSTUFF	NOSTUFF	NOSTUFF
001 - XB58 GS	NOSTUFF	NOSTUFF	ASSEMBLE
010 - RESERVED	NOSTUFF	ASSEMBLE	NOSTUFF
011 - X260	NOSTUFF	ASSEMBLE	ASSEMBLE
100 - RESERVED	ASSEMBLE	NOSTUFF	NOSTUFF
101 - RESERVED	ASSEMBLE	NOSTUFF	ASSEMBLE
110 - RESERVED	ASSEMBLE	ASSEMBLE	NOSTUFF
111 - RESERVED	ASSEMBLE	ASSEMBLE	ASSEMBLE

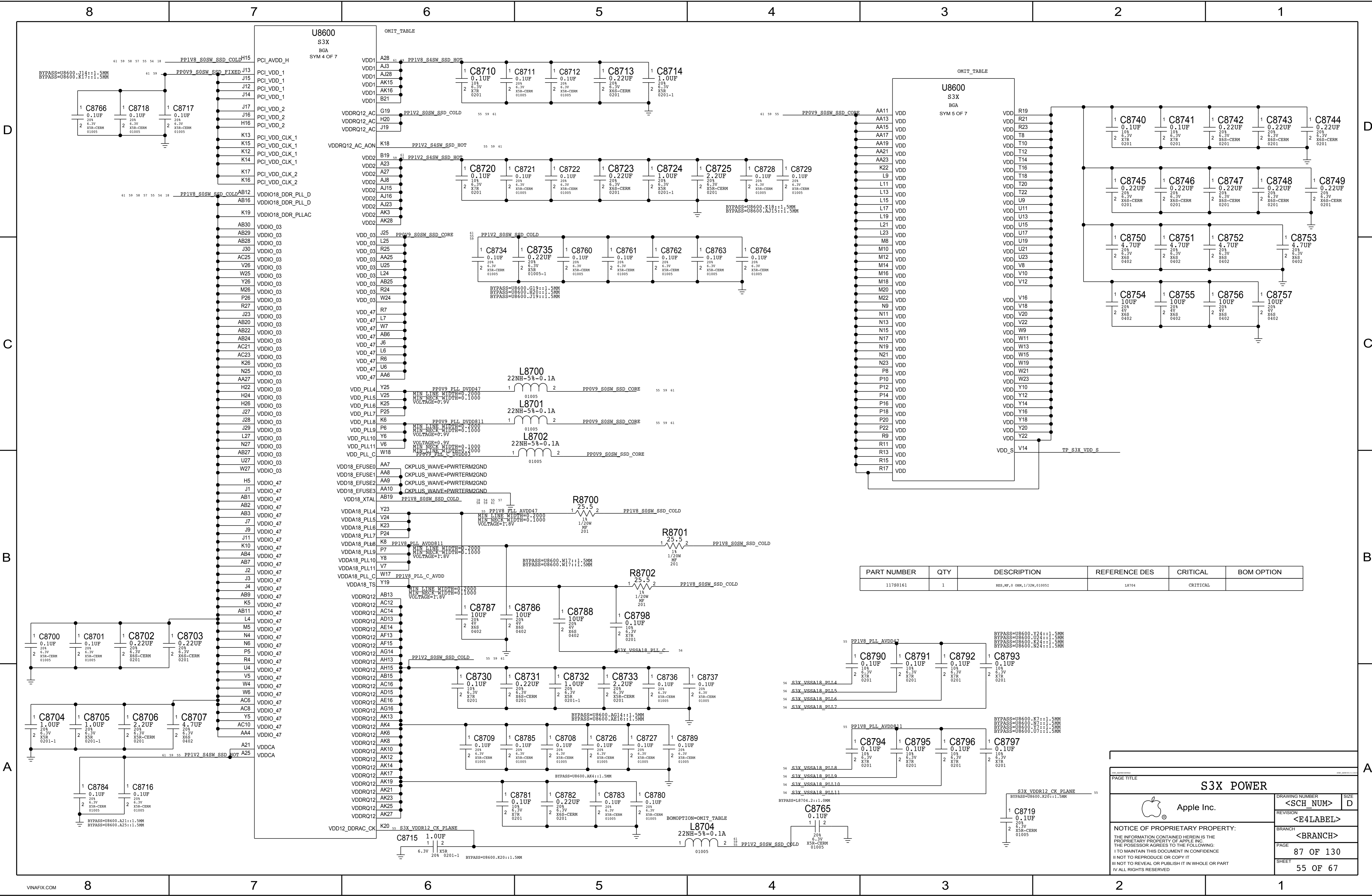


S3X CORE, PCIE

Apple Inc.

DRAWING NUMBER <SCH_NUM>	SIZE D
REVISION <E4 LABEL>	
BRANCH <BRANCH>	
PAGE 86 OF 130	SHEET 54 OF 67

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PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
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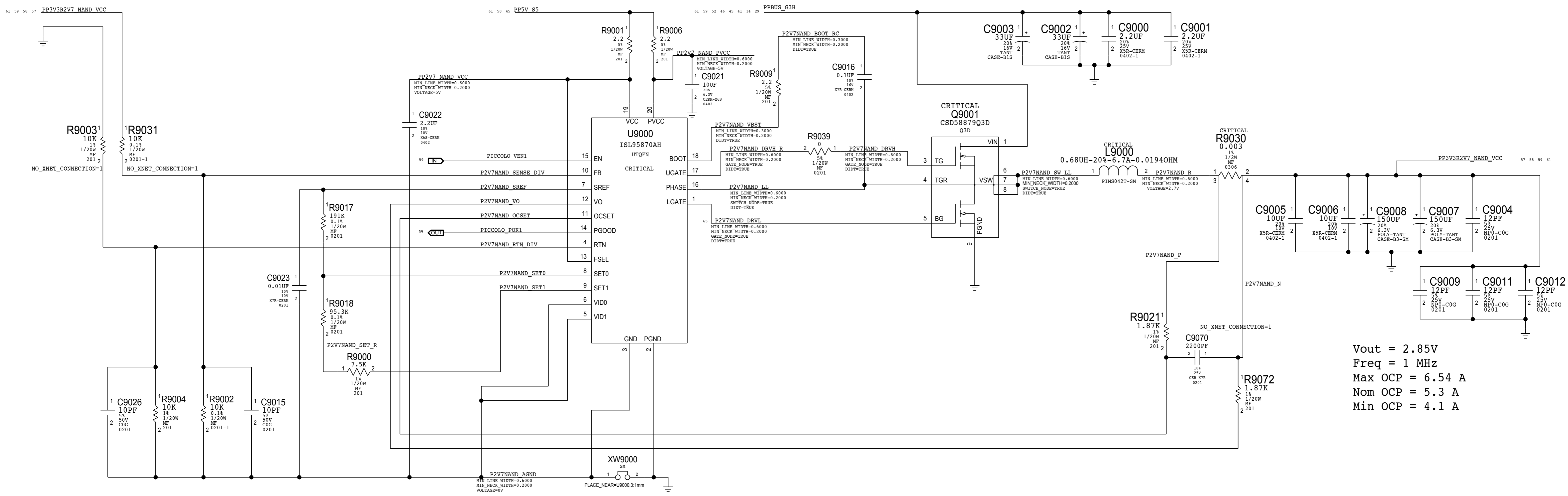
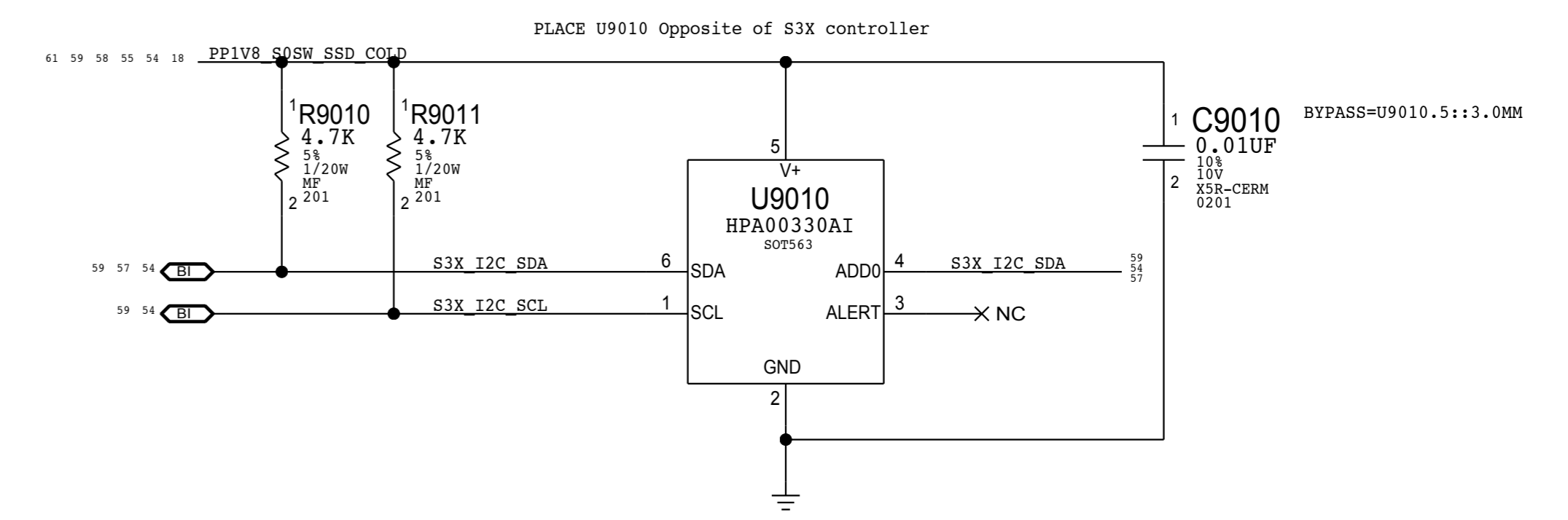
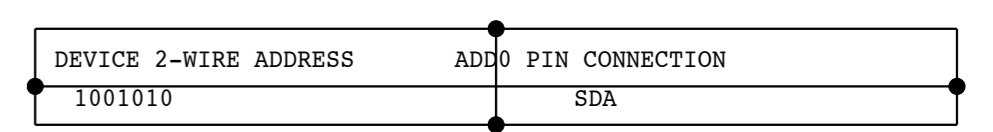
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87 OF 130		55 OF 67	

D

C

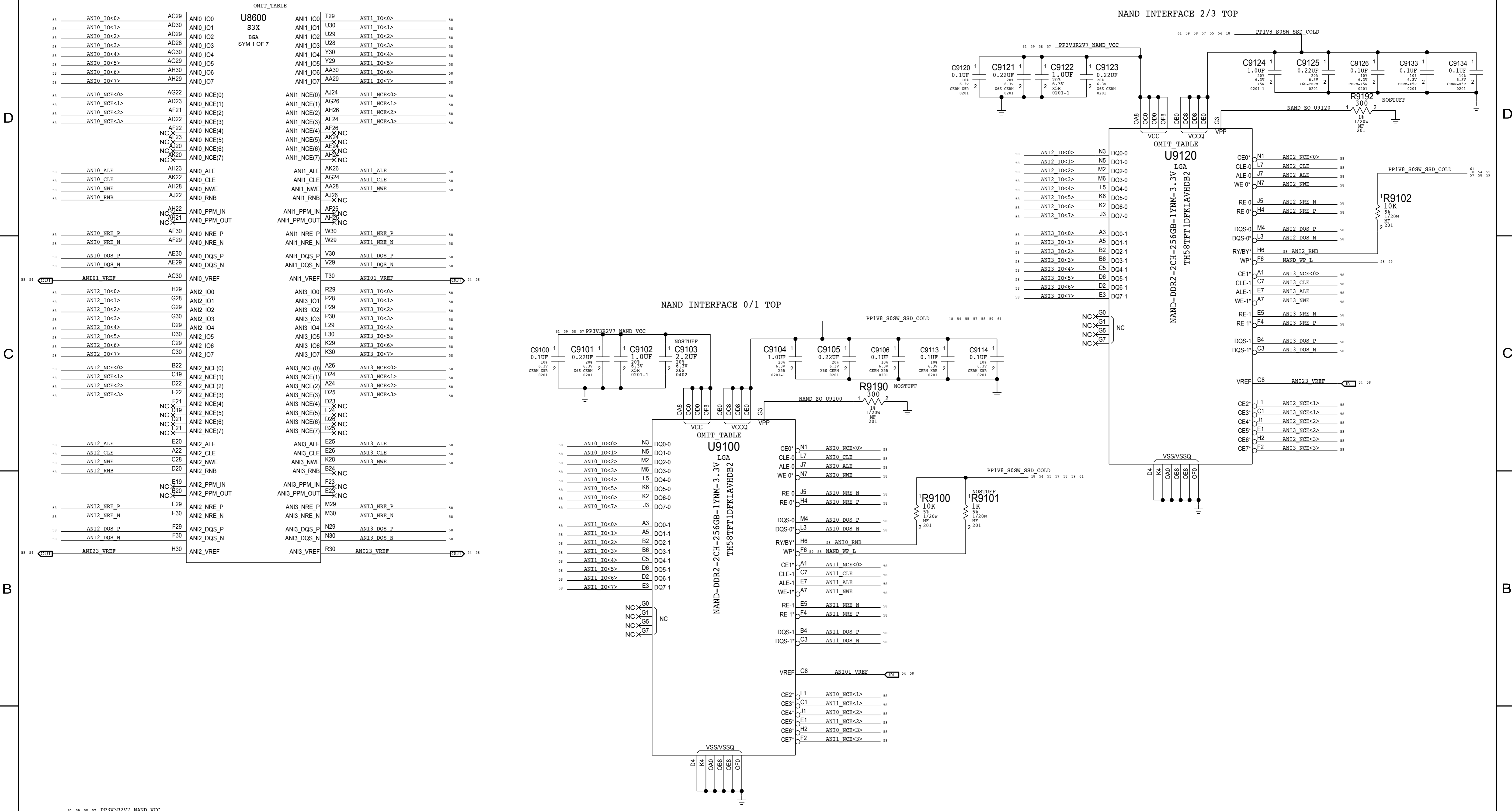
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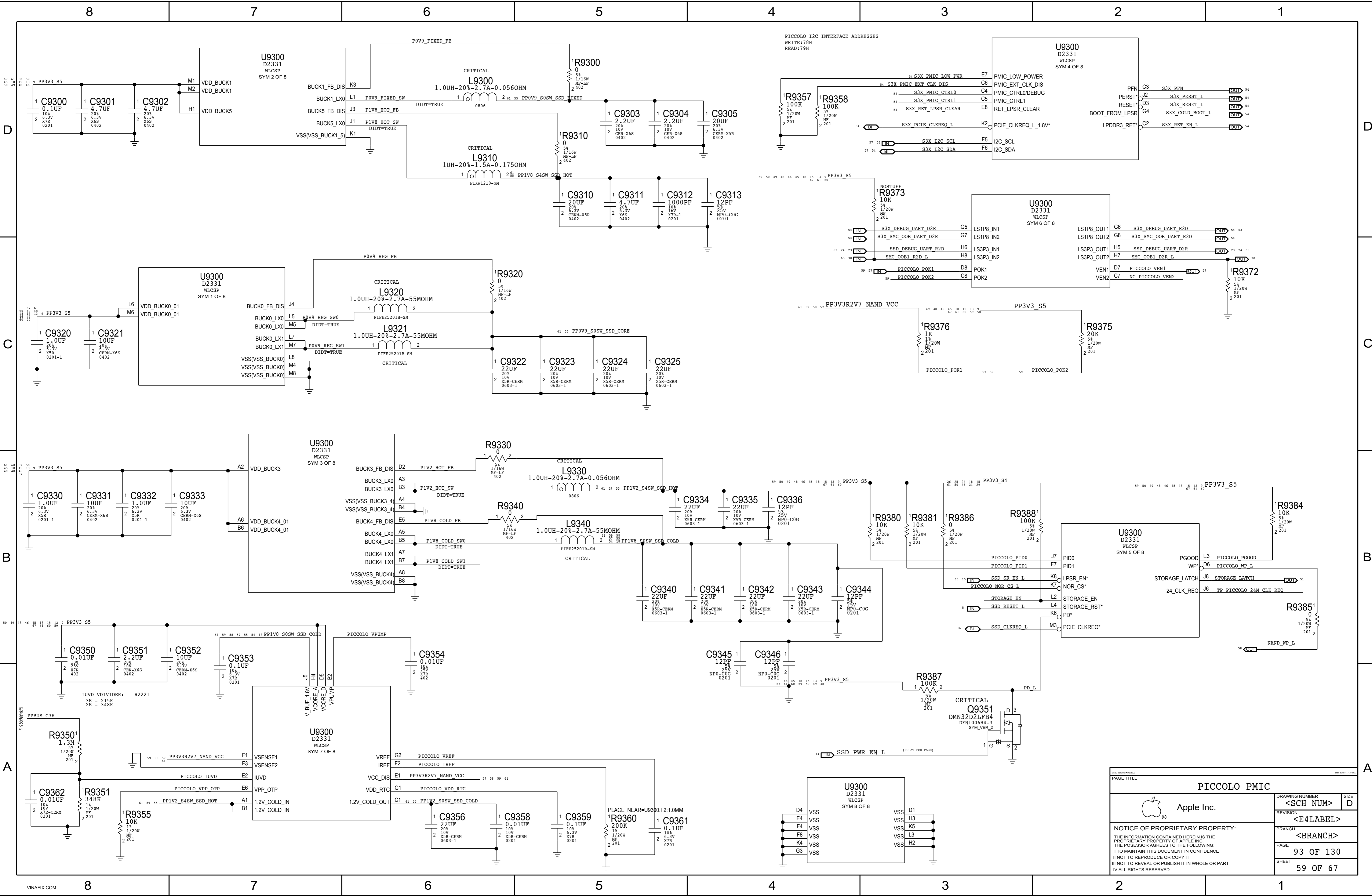
A



Vout = 2.85V
 Freq = 1 MHz
 Max OCP = 6.54 A
 Nom OCP = 5.3 A
 Min OCP = 4.1 A

SYNC_MASTER=X260_KUMAR		SYNC_DATE=06/16/2015	
PAGE TITLE			
NAND VR, I2C ROM, TEMP SENSORS		DRAWING NUMBER	SIZE
Apple Inc.		<SCH_NUM>	D
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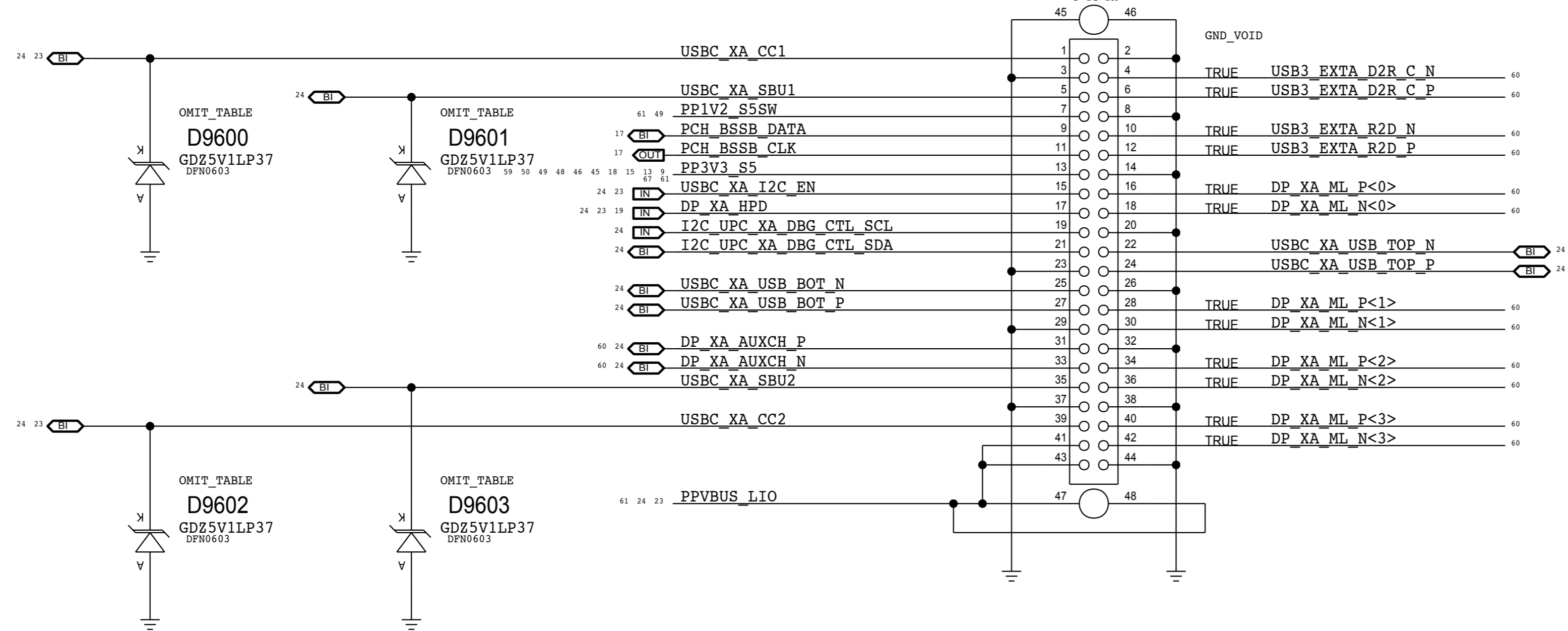
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PICCOLO PMIC

USB-C B2B RECEPTACLE 516S00038

CRITICAL
J9600
BM28P0.6-44DS-0.35V
F-ST-BM



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
371S00075	4	DIODE, ZENER, 6.2V, 250MW, DFN0603	D9600, D9601, D9602, D9603	CRITICAL	

USB3 AC COUPLING

GND_VOID=TRUE (ALL CAPS)

REF	DESCRIPTION	QTY	VALUE	REF	DESCRIPTION
65	OUT USB3_EXTA_D2R_P	1	0.1UF	2	USB3_EXTA_D2R_C_P
65	OUT USB3_EXTA_D2R_N	1	0.1UF	2	USB3_EXTA_D2R_C_N
16	IN USB3_EXTA_R2D_C_P	1	0.1UF	2	USB3_EXTA_R2D_P
16	IN USB3_EXTA_R2D_C_N	1	0.1UF	2	USB3_EXTA_R2D_N

DP SNK0 AC COUPLING

GND_VOID=TRUE (ALL CAPS)

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23	IN DP_XA_ML_C N<3>	1	0.1UF	2	DP_XA_ML_N<3>
23	BI DP_XA_AUXCH_C_P	1	0.1UF	2	DP_XA_AUXCH_P
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SYNC_MASTER=DEVMLB SYNC_DATE=03/16/2015

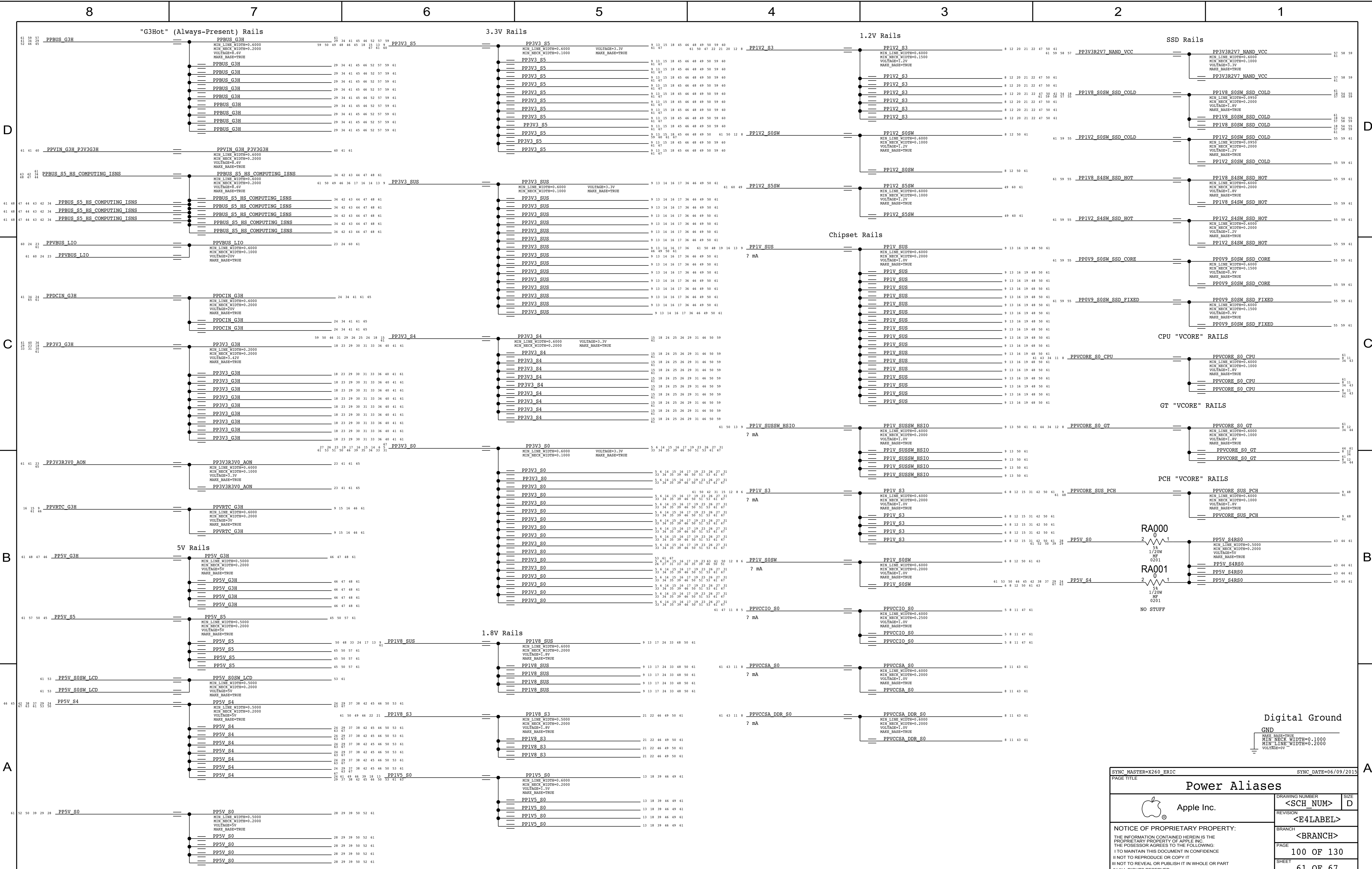
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LIO Flex Connector

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Memory Bit/Byte Swizzle

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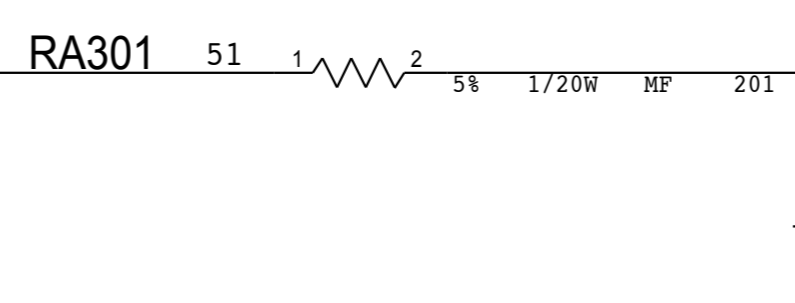
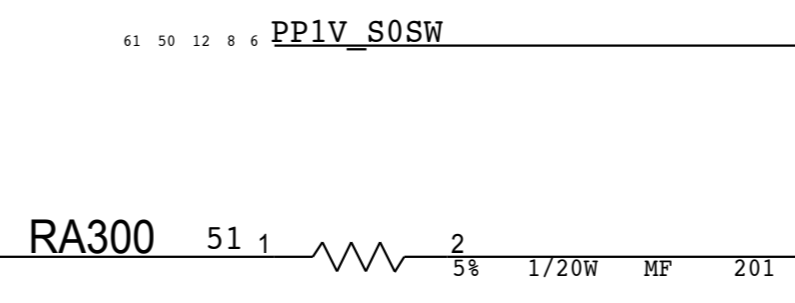
Memory Signal Swaps

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NO_TEST Nets

NO_TEST

64 14	NC_PCH_BT_I2S_CLK	==	TRUE	NC_PCH_BT_I2S_CLK	14 64
64 14	NC_PCH_BT_I2S_D2R	==	TRUE	NC_PCH_BT_I2S_D2R	14 64
64 14	NC_PCH_BT_I2S_R2D	==	TRUE	NC_PCH_BT_I2S_R2D	14 64
64 14	NC_PCH_BT_I2S_SYNC	==	TRUE	NC_PCH_BT_I2S_SYNC	14 64
64 14	NC_HDA_SDIN1	==	TRUE	NC_HDA_SDIN1	14 64
64 15	NC_PCI_PME_L	==	TRUE	NC_PCI_PME_L	15 64
64 14	NC_CLINK_CLK	==	TRUE	NC_CLINK_CLK	14 64
64 14	NC_CLINK_DATA	==	TRUE	NC_CLINK_DATA	14 64
64 14	NC_CLINK_RESET_L	==	TRUE	NC_CLINK_RESET_L	14 64
64 5	NC_DP_DDI2_AUXCH_CP	==	TRUE	NC_DP_DDI2_AUXCH_CP	5 64
64 5	NC_DP_DDI2_AUXCH_CN	==	TRUE	NC_DP_DDI2_AUXCH_CN	5 64
64 5	NC_DP_DDI2_ML_CP<0>	==	TRUE	NC_DP_DDI2_ML_CP<0>	5 64
64 5	NC_DP_DDI2_ML_CN<0>	==	TRUE	NC_DP_DDI2_ML_CN<0>	5 64
64 5	NC_DP_DDI2_ML_CP<1>	==	TRUE	NC_DP_DDI2_ML_CP<1>	5 64
64 5	NC_DP_DDI2_ML_CN<1>	==	TRUE	NC_DP_DDI2_ML_CN<1>	5 64
64 5	NC_DP_DDI2_ML_CP<2>	==	TRUE	NC_DP_DDI2_ML_CP<2>	5 64
64 5	NC_DP_DDI2_ML_CN<2>	==	TRUE	NC_DP_DDI2_ML_CN<2>	5 64
64 5	NC_DP_DDI2_ML_CP<3>	==	TRUE	NC_DP_DDI2_ML_CP<3>	5 64
64 5	NC_DP_DDI2_ML_CN<3>	==	TRUE	NC_DP_DDI2_ML_CN<3>	5 64
64 30	NC_TCON_BKLT_PWM	==	TRUE	NC_TCON_BKLT_PWM	30 64
64 30	NC_SMC_GFX_OVERTEMP	==	TRUE	NC_SMC_GFX_OVERTEMP	30 64
64 30	NC_SMC_GFX_THROTTLE_L	==	TRUE	NC_SMC_GFX_THROTTLE_L	30 64
64 30	NC_SMC_GFX_SELF_THROTTLE	==	TRUE	NC_SMC_GFX_SELF_THROTTLE	30 64
64 30	NC_SMC_FAN_0_CTL	==	TRUE	NC_SMC_FAN_0_CTL	30 64
64 30	NC_SMC_FAN_0_TACH	==	TRUE	NC_SMC_FAN_0_TACH	30 64
64 30	NC_SMC_FAN_1_CTL	==	TRUE	NC_SMC_FAN_1_CTL	30 64
64 30	NC_SMC_FAN_1_TACH	==	TRUE	NC_SMC_FAN_1_TACH	30 64
64 30	NC_SYS_ONEWIRE	==	TRUE	NC_SYS_ONEWIRE	30 64
64 30	NC_SMC_SOC_POR	==	TRUE	NC_SMC_SOC_POR	30 64
64 30	NC_SMC_DP_HPD_L	==	TRUE	NC_SMC_DP_HPD_L	30 64
64 30	NC_SPI_SMC_CLK	==	TRUE	NC_SPI_SMC_CLK	30 64
64 30	NC_SPI_SMC_CS_L	==	TRUE	NC_SPI_SMC_CS_L	30 64
64 30	NC_SPI_SMC_MISO	==	TRUE	NC_SPI_SMC_MISO	30 64
64 30	NC_SPI_SMC_MOSI	==	TRUE	NC_SPI_SMC_MOSI	30 64
64 30	NC_SMC_ACTUATOR_ACTIVE_L	==	TRUE	NC_SMC_ACTUATOR_ACTIVE_L	30 64
64 30	NC_WIFI_DEBUGPRT_R2D_L	==	TRUE	NC_WIFI_DEBUGPRT_R2D_L	30 64
64 30	NC_WIFI_DEBUGPRT_D2R_L	==	TRUE	NC_WIFI_DEBUGPRT_D2R_L	30 64

CPU/PCH

SMC

Unused nets with offpage

(Nets with offpages not used on this project)

27	CAM_SENSOR_WAKE_L	27	CPUCORE_ISNS1_P	43
5	JTAG_ISP_TDO	5	CPUCORE_ISNS1_N	43
5	TBT_POC_RESET	5	CPUCORE_ISNS2_P	43
17	LCD_PSR_EN	17	CPUCORE_ISNS2_N	43
17	TBT_X_PLUG_EVENT_L	17	CPUSA_ISNS_P	43
17	TBT_T_PLUG_EVENT_L	17	CPUSA_ISNS_N	43
14	TBT_X_PCI_RESET_L	14	CPUGT_ISNS1_P	44
14	TBT_T_PCI_RESET_L	14	CPUGT_ISNS1_N	44
14	TBT_X_CIO_PWR_EN	14	CPUGT_ISNS2_P	44
14	TBT_T_CIO_PWR_EN	14	CPUGT_ISNS2_N	44
14	TBT_X_USB_PWR_EN	14	SOC_UART_D2R	17
14	TBT_T_USB_PWR_EN	14	SOC_UART_R2D	17
6	BT_PWRST_L	6	SOC_UART_CTS_L	17
6	BT_TIMESTAMP	6	SOC_UART_RTS_L	17
17	PCH_SWD_IO	17	CPU_CFG<4>	6
17	PCH_SWD_MUX_SEL	17	DP_DDI2_HPD	5
17	SOC_WAKE_L	17	XDP_USB_EXTC_OC_L	16
17	PCH_SWD_CLK	17	XDP_USB_EXTD_OC_L	16
16 63	USB_EXTB_OC_L	16 63	XDP_JTAG_ISP_TCK	16
17	AUD_SPI_CS_L	17	XDP_JTAG_ISP_TDI	16
17	AUD_SPI_CLK	17		
17	AUD_SPI_MISO	17		
17	AUD_SPI_MOSI	17		

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EE Chaz Probe Points

SSD & WiFi Chamber Test Points

PPA504	SMC_CBC_ON	30 41
PPA505	SMC_CHGR_INT_L	30 41
PPA506	MEM_A_CAA<0>	7 21
PPA507	MEM_A_CLK_P<0>	7 21
PPA508	MEM_A_CLK_N<0>	7 21
PPA509	MEM_A_CS_L<0>	7 21
PPA510	MEM_B_DQ<12>	7 22 62
PPA511	MEM_A_DQS_P<1>	7 21 62
PPA512	MEM_A_DQS_N<1>	7 21 62
PPA513	AP_DEV_WAKE	14 25
PPA514	AP_S0IX_WAKE_L	17 18
PPA515	AP_S0IX_WAKE_SEL	17 18
PPA517	MIPI_CLK_P	27 28
PPA518	MIPI_DATA_P	27 28
PPA519	PCH_BT_UART_D2R	17 26
PPA520	PCH_BT_UART_RTS_L	17 26
PPA522	PCIE_CAMERA_D2R_P	16 28
PPA523	PCIE_CLK100M_SSD_P	16 54 63
PPA529	AUD_PWR_EN	17 39
PPA530	BT_UART_RTS_L	25 26
PPA531	CAMERA_PWR_EN	14 27
PPA533	EDP_BKLT_PWM	9 53
PPA534	HDA_SDINO	14 39
PPA537	LCD_IRO_L	17 53
PPA538	MEM_CAM_A<8>	27 28
PPA539	MEM_CAM_CS_L	27 28
PPA543	MIPI_CLK_N	27 28
PPA544	MIPI_DATA_N	27 28
PPA545	PCH_BT_UART_CTS_L	17 26
PPA546	PCH_BT_UART_R2D	17 26
PPA548	PCIE_CAMERA_D2R_N	16 28
PPA549	PCIE_CLK100M_SSD_N	16 54 63
PPA551	PCIE_SSD_D2R_N<0>	16 63
PPA552	PCIE_SSD_D2R_P<0>	16 63
PPA560	SMC_BT_PWR_EN	25 30
PPA562	SMC_OOB1_R2D_L	30 59
PPA563	SMC_PROCHOT	30 31
PPA564	SMC_SENSOR_PWR_EN	30 32 34
PPA565	SMC_WAKE_SCI_L	15 30
PPA566	SMC_WIFI_PWR_EN	25 30
PPA567	AP_PCIE_WAKE_L	18 25
PPA569	SSD_SR_EN_L	15 59
PPA570	SYSCLK_CLK12M_SMC	18 30
PPA571	SYSCLK_CLK24M_SSD	18 54
PPA572	SYSCLK_CLK24M_CAMERA	18 27 65
PPA575	TPAD_SPI_CS_L	17 29
PPA576	TPAD_SPI_INT_L	17 29

PPA577	USB3_EXT_A_D2R_N	16 60
PPA578	USB3_EXT_A_D2R_P	16 60
PPA579	CPU_CATERR_L	6 30
PPA581	MEM_B_CS_L<1>	7 22
PPA582	MEM_B_CKE<1>	7 22
PPA583	MEM_B_CAB<1>	7 22
PPA584	MEM_B_CAA<2>	7 22
PPA587	MEM_B_CAA<3>	7 22
PPA594	XDP_USB_EXT_A_OC_L	16 23 24 63
PPA596	USB_EXT_A_P	16 23
PPA597	USB_EXT_A_N	16 23
PPA598	PM_DS_W_PWRGD	15 30
PPA500	AP_CLKREQ_L	16 25
PPA501	AP_RESET_L	14 25
PPA502	CAMERA_CLKREQ_L	16 27
PPA503	CAMERA_RESET_L	14 27
PPA521	CHGR_BOOST_DH	41
PPA521	CHGR_BOOST_DL	41
PPA586	CHGR_BOOST_DL	41
PPA524	CHGR_BUCK_DH	41
PPA525	CHGR_BUCK_DL	41
PPA526	CPUCORE_FCCM	42 43
PPA527	CPUGT_FCCM	42 44
PPA528	CPUSA_FCCM	42 43
PPA532	CPUCORE_PWM1	42 43
PPA535	CPUCORE_PWM2	42 43
PPA536	CPUGT_PWM1	42 44
PPA540	CPUGT_PWM2	42 44
PPA541	CPUSA_PWM	42 43
PPA542	P1V2_DRVH	47
PPA547	P1V2_DRVL	47
PPA589	PVCCIO_DRVH	47
PPA588	PVCCIO_DRVL	47
PPA550	P1VSUS_DRVH	48
PPA590	P1VSUS_DRVL	48
PPA553	LPC_SERIRQ	14 30
PPA554	SMC_CLK32K	30 31
PPA555	SYSCLK_CLK32K_PCH	16 18
PPA556	SYSCLK_CLK32K_CAMERA_BT_AP	18 25
PPA557	SYSCLK_CLK24M_PCH	16 18 63
PPA558	TPAD_SPI_IF_EN	17 29
PPA559	CPUCORE_GL1	43
PPA561	CPUCORE_GL2	43
PPA568	CPUGT_GL1	44
PPA573	CPUGT_GL2	44
PPA574	SMC_BC_ACOK	30 31 34 41 63
PPA580	P2V7NAND_DRVL	57
PPA585	P1V8SUS_PGOOD	46 48

TPA500	PPDCIN_G3H	24 34 41 61 65
TPA501	PPDCIN_G3H	24 34 41 61 65
TPA502	PPDCIN_G3H	24 34 41 61 65
TPA503	PPDCIN_G3H	24 34 41 61 65
TPA504	GND	
TPA505	GND	
TPA506	SMC_ONOFF_L	29 30 31 32
TPA507	SSD_BOOT_L	17 54
TPA508	SMC_DEV_SUPPLY_L	30
TPA509	GND	
TPA510	SMC_DEBUGPRT_TX_L	30 31 65
TPA511	SMC_DEBUGPRT_RX_L	30 31 65
TPA512	SSD_UART_R2D	17 63
TPA513	SSD_UART_D2R	17 63
TPA514	PCIE_TEST_D2R_P	16 65
TPA515	PCIE_TEST_D2R_N	16 65
TPA516	PCIE_TEST_R2D_P	16 65
TPA517	PCIE_TEST_R2D_N	16 65
TPA518	PCIE_CLK100M_TEST_P	16 65
TPA519	PCIE_CLK100M_TEST_N	16 65
TPA520	TEST_CLKREQ_L	16 65
TPA521	PLT_RST_L	5 14 15 19 26 30
TPA522	USB_TEST_P	16 65
TPA523	USB_TEST_N	16 65
TPA524	GND	
TPA525	GND	
TPA526	POWER_GATE_EN	23 24 41
TPA527	PP3V3R3V0_AON	23 41 61
TPA528	HIPWR_EN	23 41
TPA529	PM_SLP_S3_L	15 30 46 49 50 51

65 27 18	SYSCLK_CLK24M_CAMERA	==	SYSCLK_CLK24M_CAMERA	18 27 65
			MAKE_BASE=TRUE	
24 23	SMC_UART_TX	==	TRUE	SMC_DEBUGPRT_TX_L 30 31 65
24 23	SMC_UART_RX	==	TRUE	SMC_DEBUGPRT_RX_L 30 31 65

NO_TEST Nets

	NO_TEST	MAKE_BASE		
65 16	NC_USB3_EXTB_D2RP	==	TRUE	NC_USB3_EXTB_D2RP 16 65
65 16	NC_USB3_EXTB_D2RN	==	TRUE	NC_USB3_EXTB_D2RN 16 65
65 16	NC_USB3_EXTB_R2D_CP	==	TRUE	NC_USB3_EXTB_R2D_CP 16 65
65 16	NC_USB3_EXTB_R2D_CN	==	TRUE	NC_USB3_EXTB_R2D_CN 16 65
65 16	NC_USB_EXTBP	==	TRUE	NC_USB_EXTBP 16 65
65 16	NC_USB_EXTBN	==	TRUE	NC_USB_EXTBN 16 65
65 16	NC_USB3_EXTC_D2RP	==	TRUE	NC_USB3_EXTC_D2RP 16 65
65 16	NC_USB3_EXTC_D2RN	==	TRUE	NC_USB3_EXTC_D2RN 16 65
65 16	NC_USB3_EXTC_R2D_CP	==	TRUE	NC_USB3_EXTC_R2D_CP 16 65
65 16	NC_USB3_EXTC_R2D_CN	==	TRUE	NC_USB3_EXTC_R2D_CN 16 65
65 16	NC_USB_EXTCP	==	TRUE	NC_USB_EXTCP 16 65
65 16	NC_USB_EXTCN	==	TRUE	NC_USB_EXTCN 16 65
65 16	NC_USB3_EXTD_D2RP	==	TRUE	NC_USB3_EXTD_D2RP 16 65
65 16	NC_USB3_EXTD_D2RN	==	TRUE	NC_USB3_EXTD_D2RN 16 65
65 16	NC_USB3_EXTD_R2D_CP	==	TRUE	NC_USB3_EXTD_R2D_CP 16 65
65 16	NC_USB3_EXTD_R2D_CN	==	TRUE	NC_USB3_EXTD_R2D_CN 16 65
65 16	NC_USB_EXTDP	==	TRUE	NC_USB_EXTDP 16 65
65 16	NC_USB_EXTDN	==	TRUE	NC_USB_EXTDN 16 65

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Change List:

<radar://component/633819> X260 HW EE Schematic | Proto 0
<radar://component/634034> X260 HW EE Schematic | Proto 1
<radar://component/634038> X260 HW EE Schematic | Proto 2
<radar://component/634042> X260 HW EE Schematic | EVT
<radar://component/634046> X260 HW EE Schematic | DVT

Kismet:


<afp://kismet.apple.com/Kismet-Projects/>

Useful Wiki Links:

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

Other Info:

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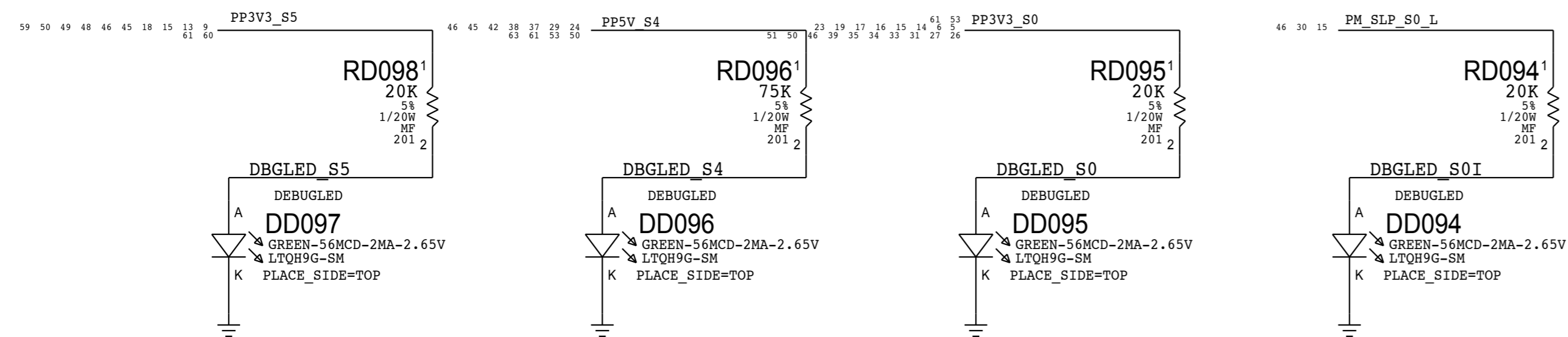
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Power State Debug LEDs



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