

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.


X1536 MLB_COFFEE SCHEMATIC

REV	RCN	DESCRIPTION OF REVISION	CK ADDD DATE
4	0015536938	ENGINEERING RELEASED	2018-12-20


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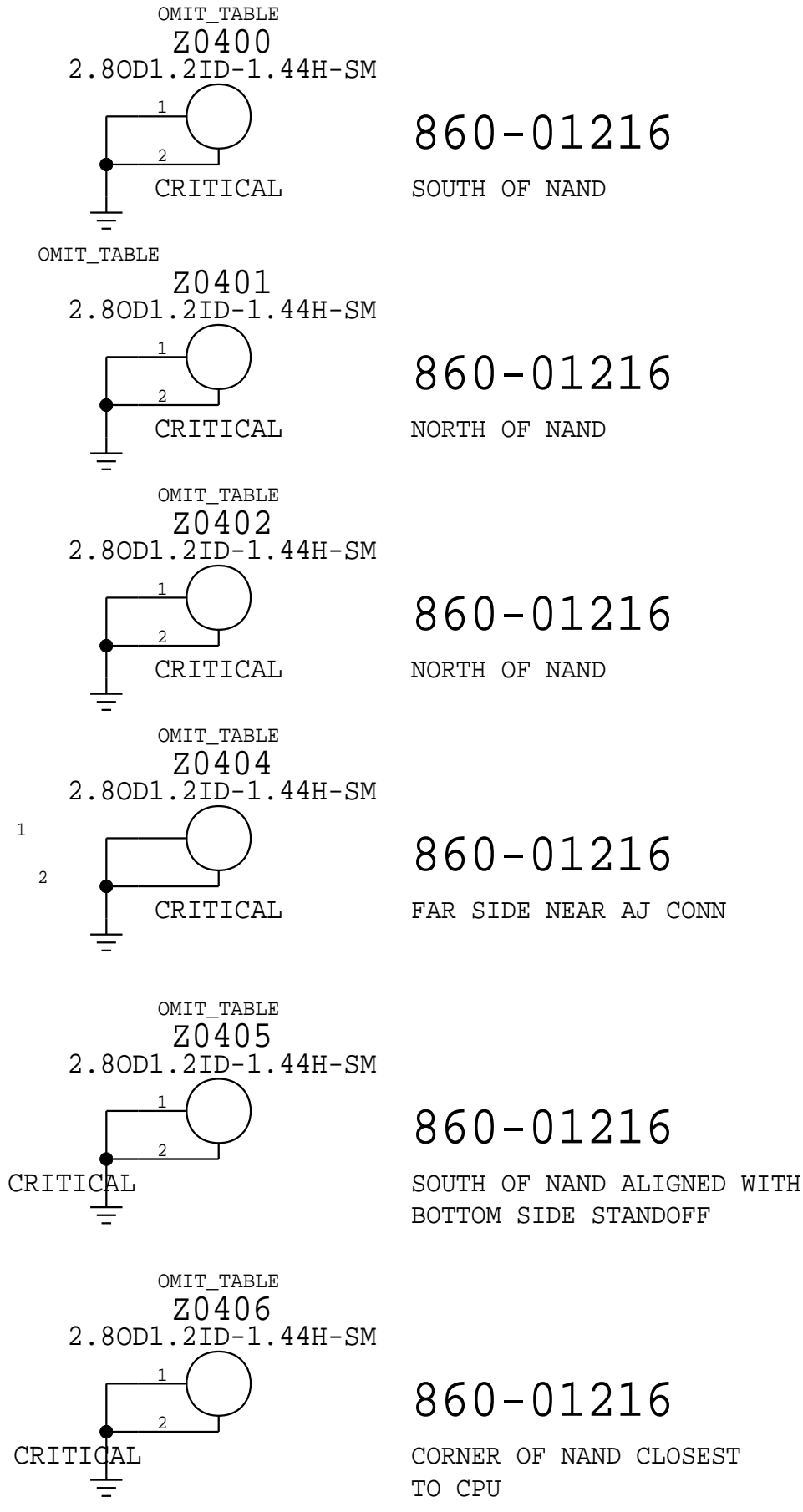
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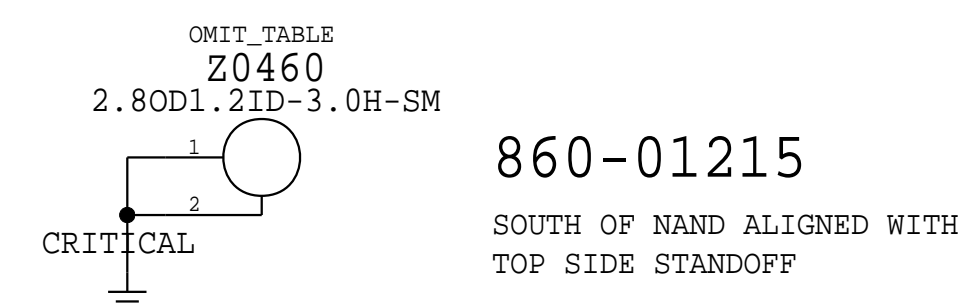
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J213/MLB_COFFEE	POR CFL MLB	051-04273	820-01598	056-07680-16	057-01595
J213/FLEX_AUDIOJACK	AUDIO JACK, AMR, AND MESA	051-04122	821-02091	056-07548-15	N/A
J680/FLEX_USBC	LEFT SIDE USB TONGUE FLEX	051-03140	821-01646	056-05483-A	N/A
J132/FLEX_BMU_SIGNAL	SIGNALS TO BMU	051-03342	821-01726	056-05589-A	N/A
J79/FLEX_BMU_PWR	POWER TO/FROM BMU	051-00927	821-00447	056-02301-A	N/A
J130/FLEX_TCON_MLB	DISPLAYPORT FROM MLB TO TCON	051-01199	821-00586	056-02785-07	N/A
J213/FLEX_TRACKPAD	MLB TO TRACKPAD	051-04335	821-02218	056-07655-05	N/A
J130/FLEX_KB_3D	KB FLEX FOR ALL 3 KB TYPES	051-02011	821-01046	056-03725-B	N/A
J213/FLEX_3MIC	MIC FLEX	051-04441	821-02265	056-07754-17	N/A
J79/GRAPE_FLEX	DFR TOUCH FLEX	051-01338	821-00681	056-02220-A	N/A
DFR DAUGHTER FLEX	DFR DAUGHTER FLEX	VENDOR	VENDOR	099-14398	N/A
J213/DEV_MLB_COUPON	IMPEDENCE COUPON	951-08932	920-06560	998-16565-01	057-01595

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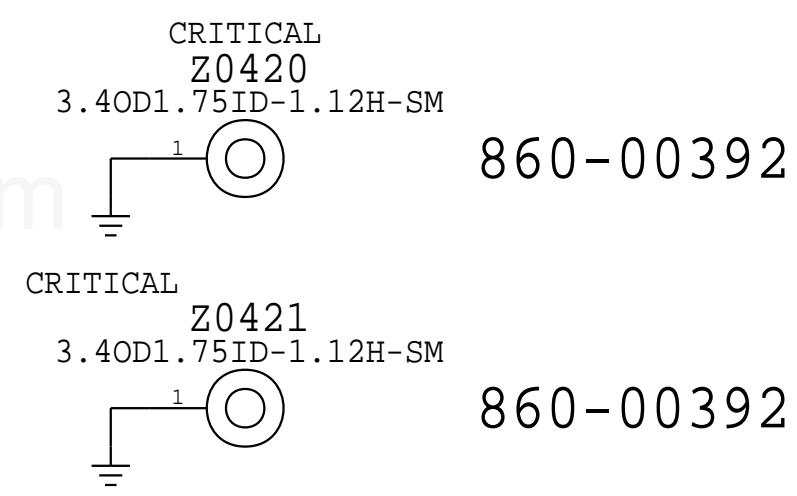
TOP SIDE STANDOFFS



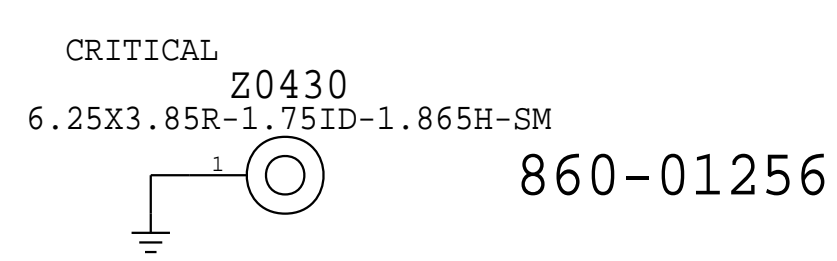
BOTTOM SIDE TALL STANDOFF



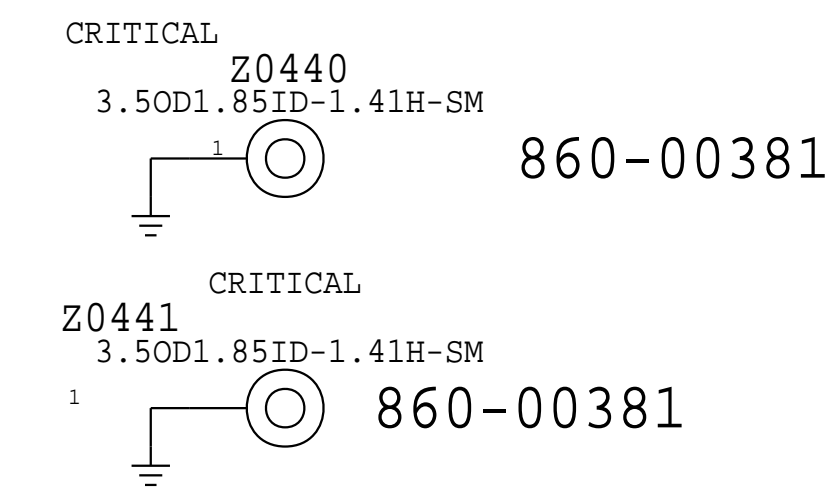
USB-C BOSS



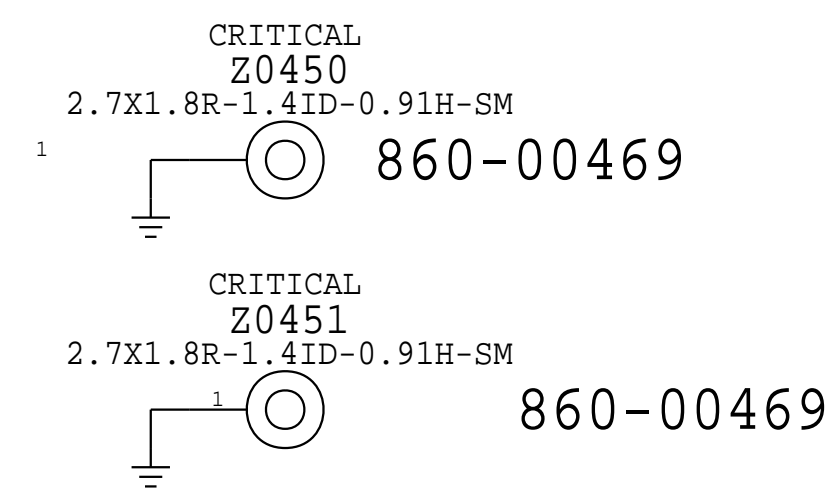
DFR BOSS



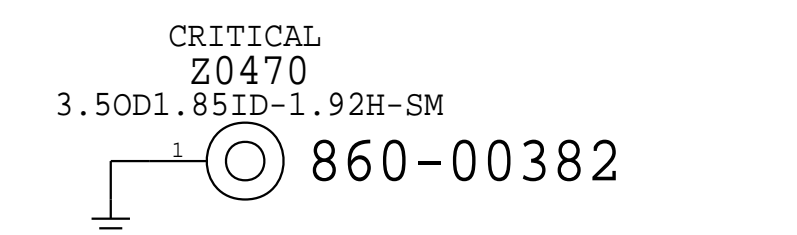
TRACKPAD BOSS



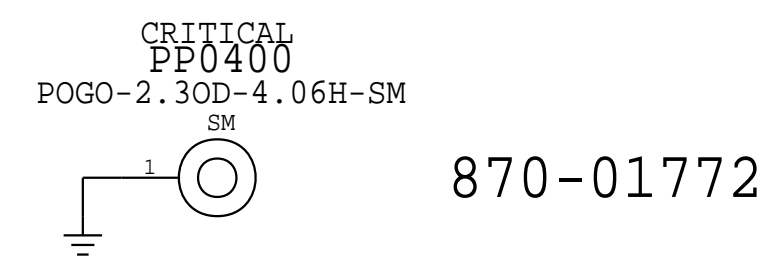
DISPLAY BOSS



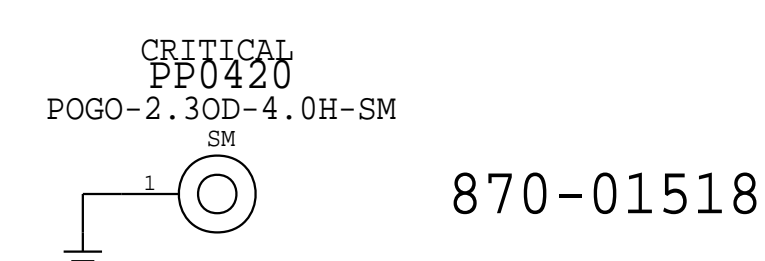
AJ FLEX COWLING BOSS



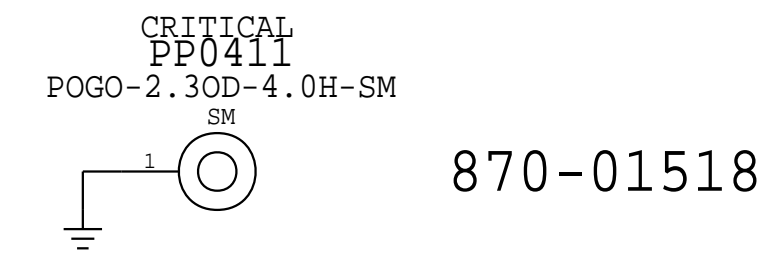
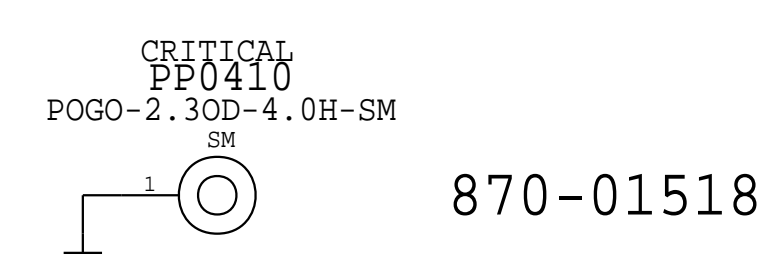
POGO PINS BACKLIGHT



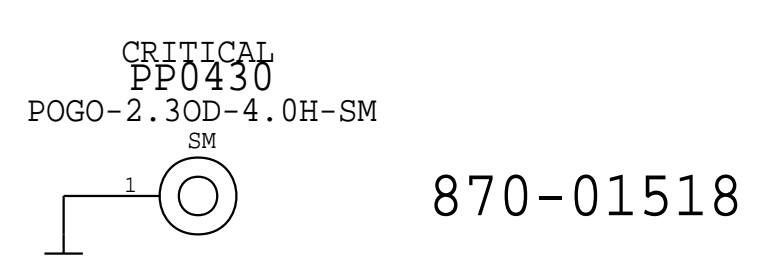
POGO PIN DISPLAY



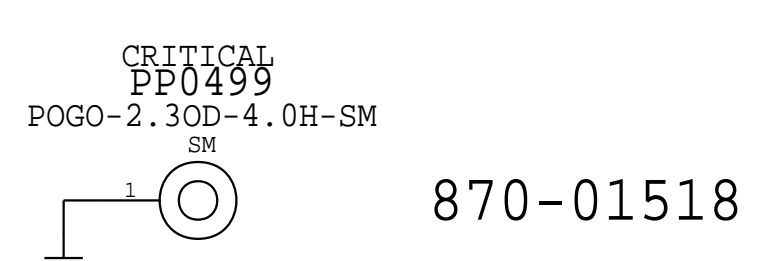
POGO PINS DRAM



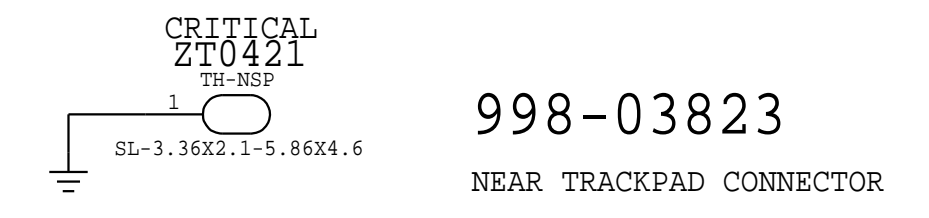
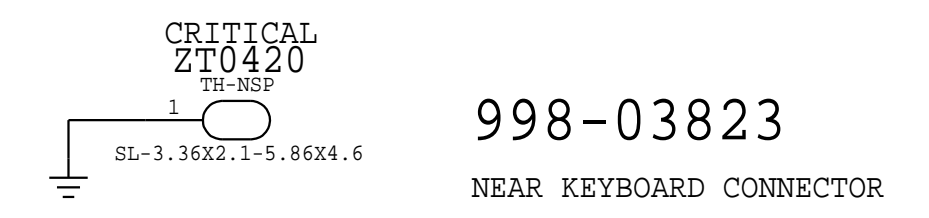
POGO PIN FAN



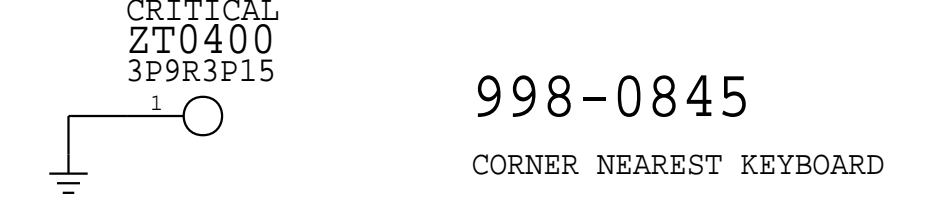
POGO PIN HEAT PIPE



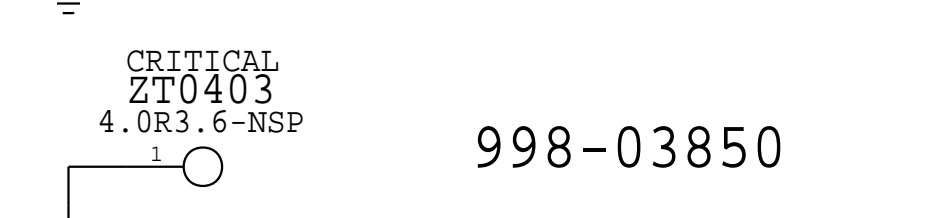
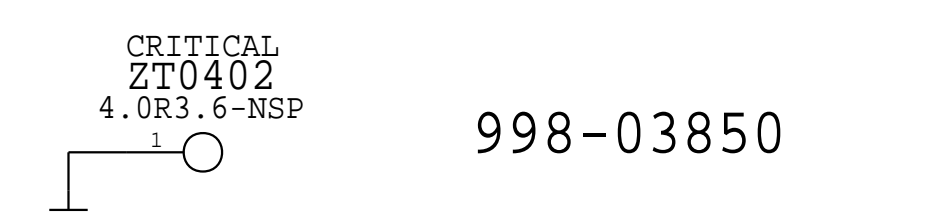
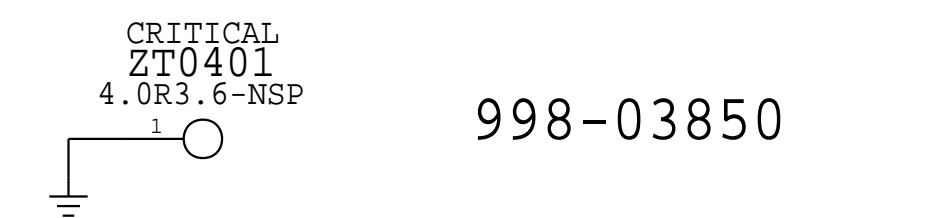
MLB MTG HOLES 2.1X3.36 MM



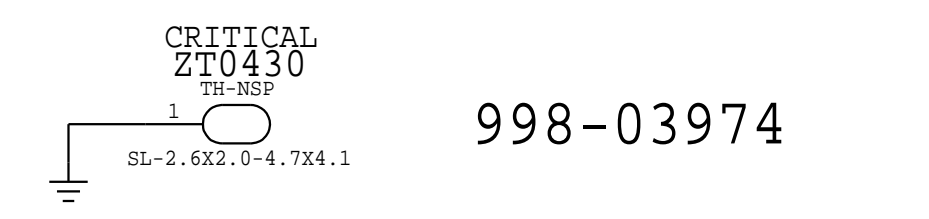
CPU THERM STAGE HOLES 3.15 MM



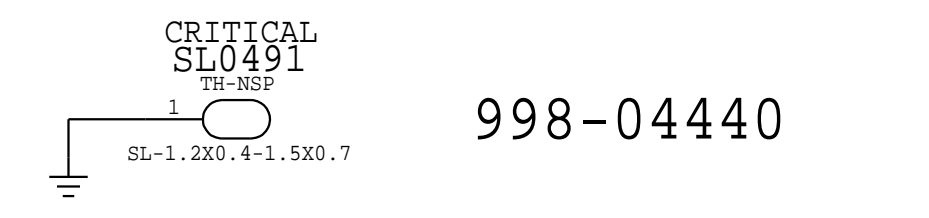
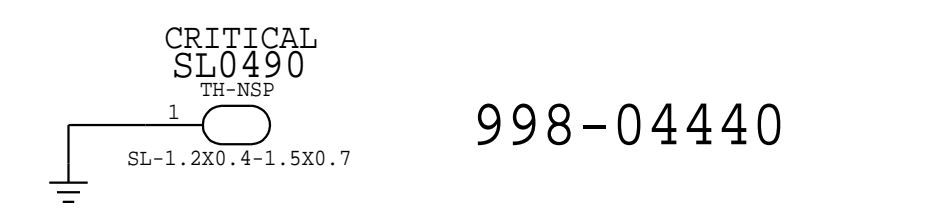
CPU THERM STAGE HOLES 3.6 MM



FAN MTG HOLE 2.0X2.6 MM



SHIELD CAN ALIGNMENT SLOTS DRAM



2X PLATED SLOTS IN MEM AREA DUE TO SPACE CONSTRAINTS (DIMS // 4432478). ALL OTHER SHIELD ALIGNMENT SLOTS ARE NPTH + GND RING FOR BETTER TOLERANCE

USB-C SHIELD

806-19049	1	SHIELD_CAN,HOLES,TITAN RIDGE,X1533	USBC_CAN	CRITICAL	USBC_CAN
870-07967	1	TAPE,COND,TITANRIDGE,CAN,X1533	USBC_CAN_TAPE	CRITICAL	USBC_CAN_TAPE
806-18559	1	FENCE,TITAN RIDGE,X1533	USBC_FENCE	CRITICAL	USBC_FENCE
870-07841	1	TAPE,COND,TITANRIDGE,MLB,BTM,X1533	USBC_FENCE_TAPE	CRITICAL	USBC_FENCE_TAPE

MEGA SHIELD

806-19050	1	SHIELD_CAN,HOLES,MEGA,X1533	MEGA_CAN	CRITICAL	MEGA_CAN
870-07968	1	TAPE,COND,MEGA,CAN,X1533	MEGA_CAN_TAPE	CRITICAL	MEGA_CAN_TAPE
806-18561	1	FENCE,MEGA,X1533	MEGA_FENCE	CRITICAL	MEGA_FENCE
870-07842	1	TAPE,COND,MEGA,MLB,BTM,X1533	MEGA_FENCE_TAPE	CRITICAL	MEGA_FENCE_TAPE

DRAM SHIELD TOP

806-19048	1	SHIELD_CAN,HOLES,DRAM,UNIV,X1533	DRAM_TOP_CAN	CRITICAL	DRAM_TOP_CAN
870-07966	1	TAPE,COND,DRAM,CAN,X1533	DRAM_TOP_CAN_TAPE	CRITICAL	DRAM_TOP_CAN_TAPE
806-18560	1	FENCE,DRAM,UNIV,X1533	DRAM_TOP_FENCE	CRITICAL	DRAM_TOP_FENCE
870-07840	1	TAPE,COND,DRAM,UNIV,X1533	DRAM_TOP_FENCE_TAPE	CRITICAL	DRAM_TOP_FENCE_TAPE

DRAM SHIELD BOTTOM

806-19048	1	SHIELD_CAN,HOLES,DRAM,UNIV,X1533	DRAM_BOT_CAN	CRITICAL	DRAM_BOT_CAN
870-07966	1	TAPE,COND,DRAM,CAN,X1533	DRAM_BOT_CAN_TAPE	CRITICAL	DRAM_BOT_CAN_TAPE
806-18560	1	FENCE,DRAM,UNIV,X1533	DRAM_BOT_FENCE	CRITICAL	DRAM_BOT_FENCE
870-07840	1	TAPE,COND,DRAM,UNIV,X1533	DRAM_BOT_TAPE	CRITICAL	DRAM_BOT_TAPE

TOP SIDE STANDOFFS

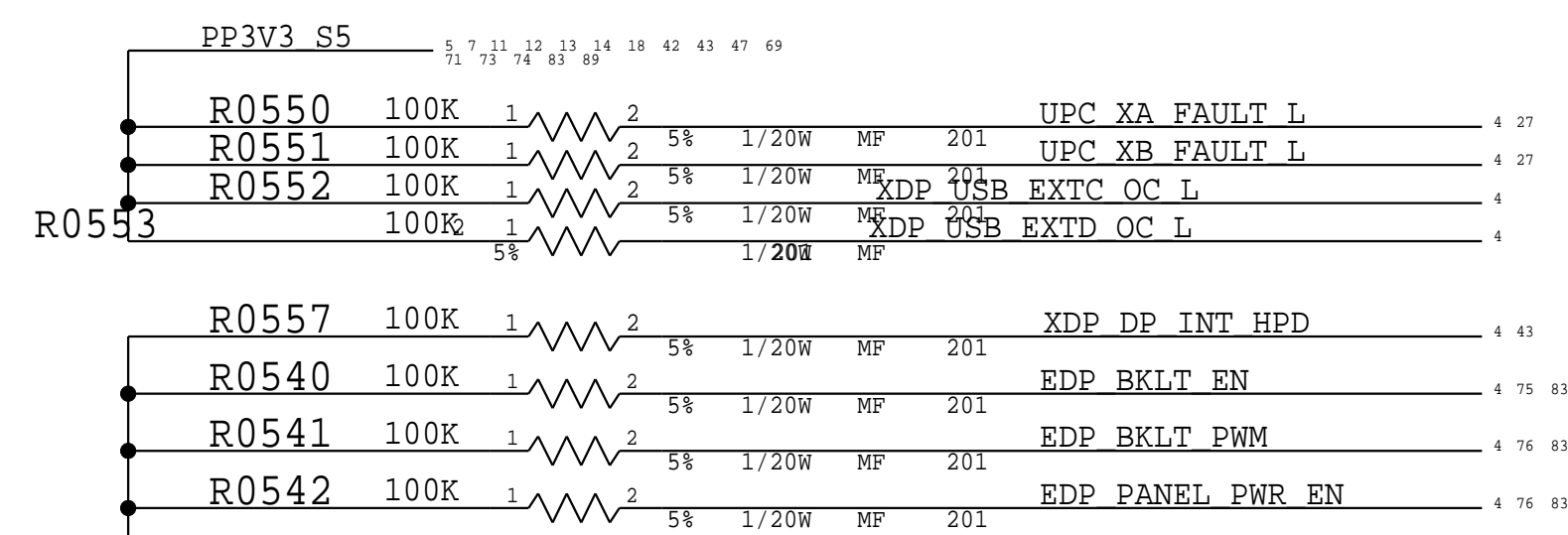
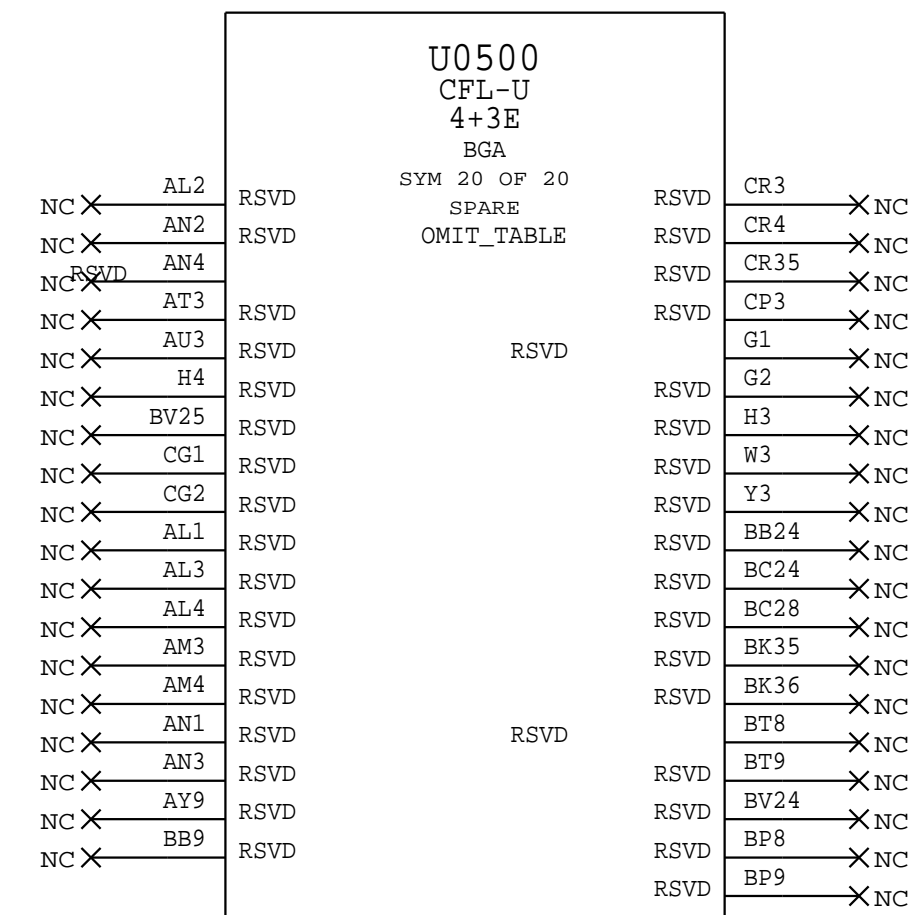
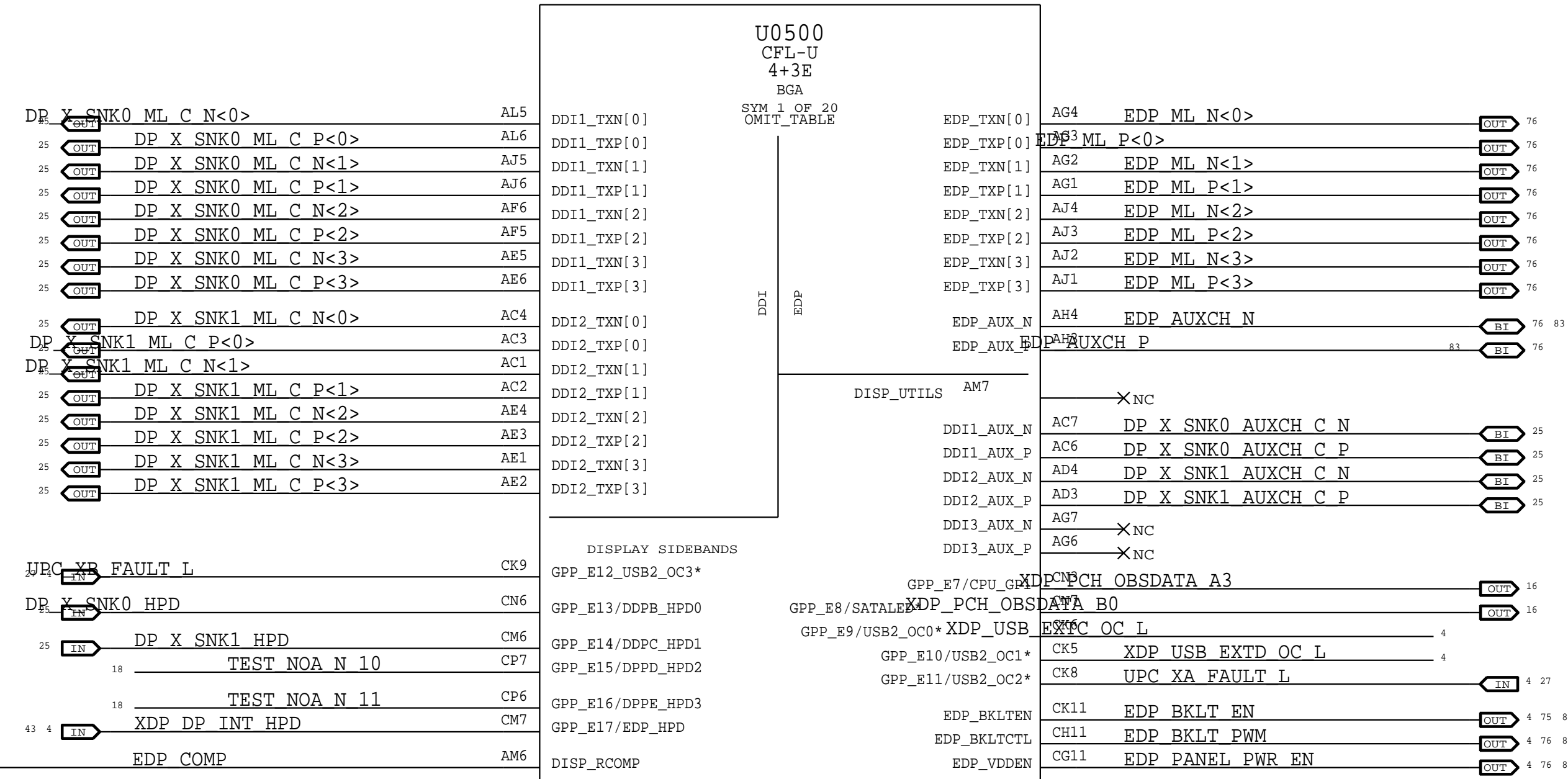
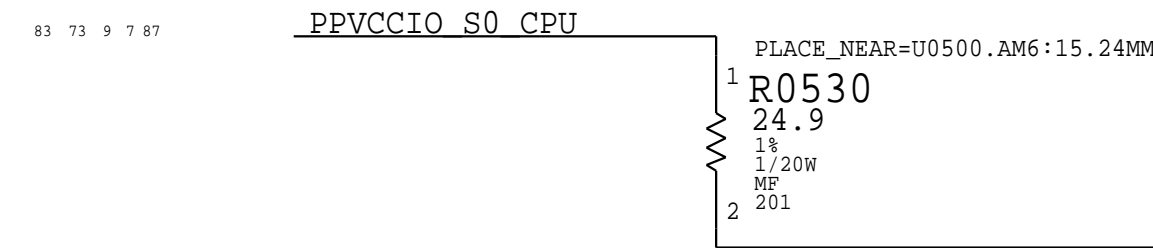
860-01216	1	BOSS,STANDOFF,MLB,X1533,Z0400-Z0402,Z0404-Z0406	860-01216	1	CRITICAL
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BOTTOM SIDE STANDOFFS

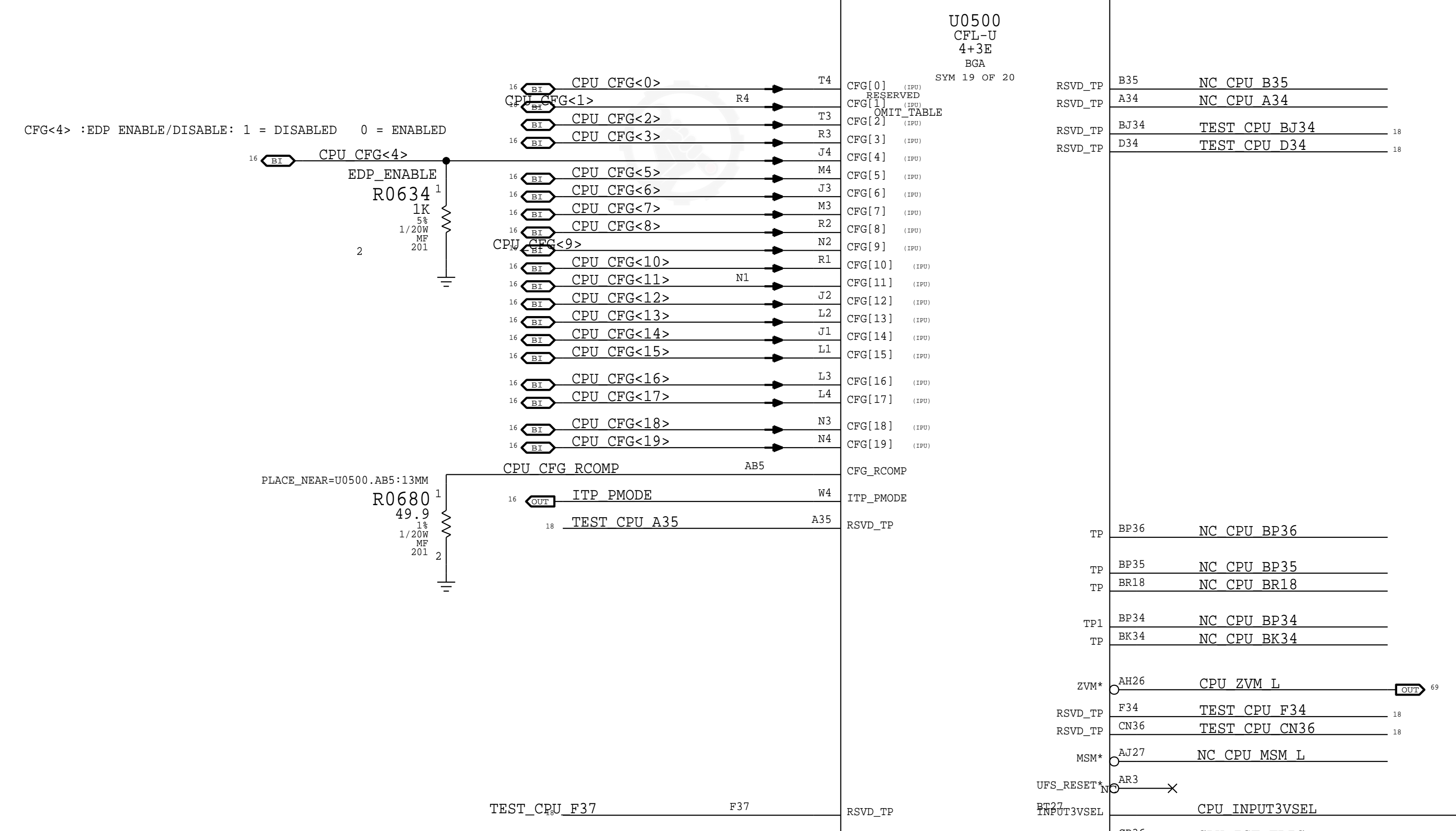
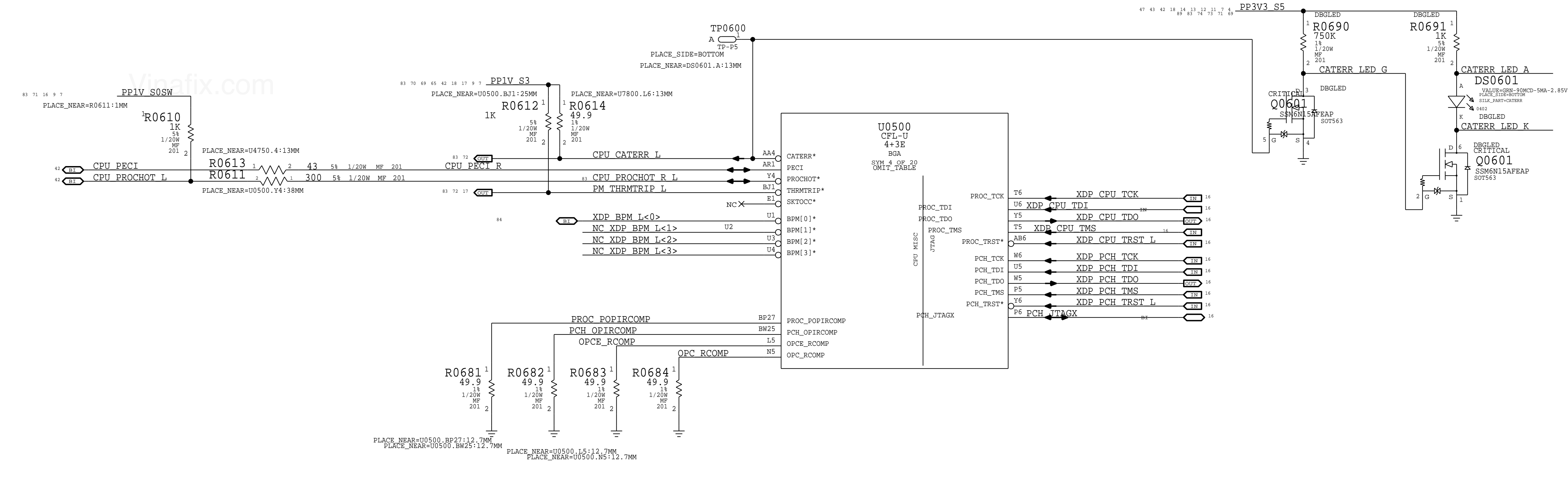
860-01215	1	BOSS,STANDOFF,MLB,TALL,X1533	860-01215	1	CRITICAL
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BOM_COST_GROUP=MECHANICALS

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CPU GFX		
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CPU MISC/JTAG/CFG/RSVD		
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BOM_COST_GROUP=CPU & CHIPSET

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D

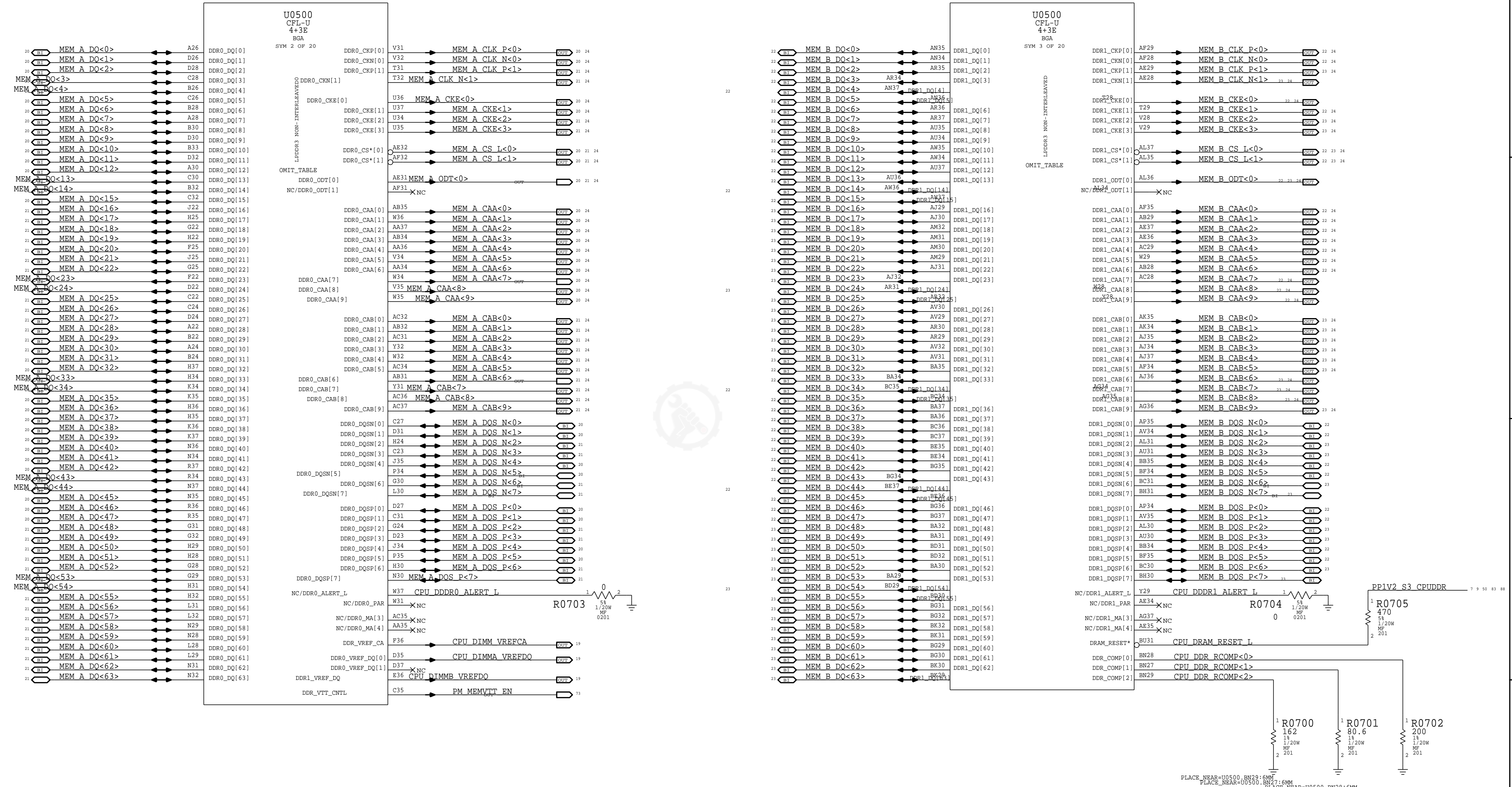
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B

B

A

A

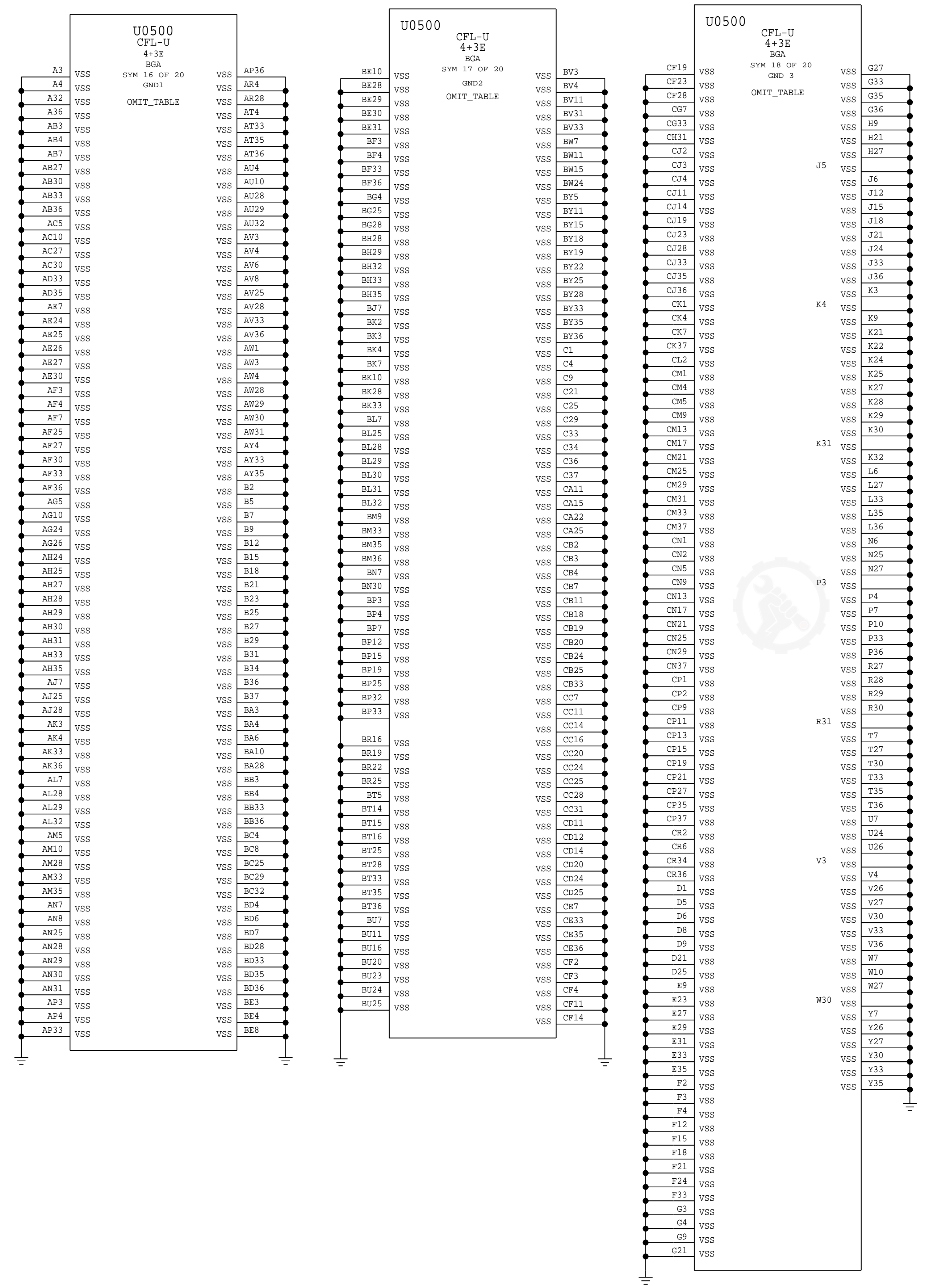


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 PLACE_NEAR=U0500.BN71:6MM
 PLACE_NEAR=U0500.BN28:6MM

PAGE TITLE		
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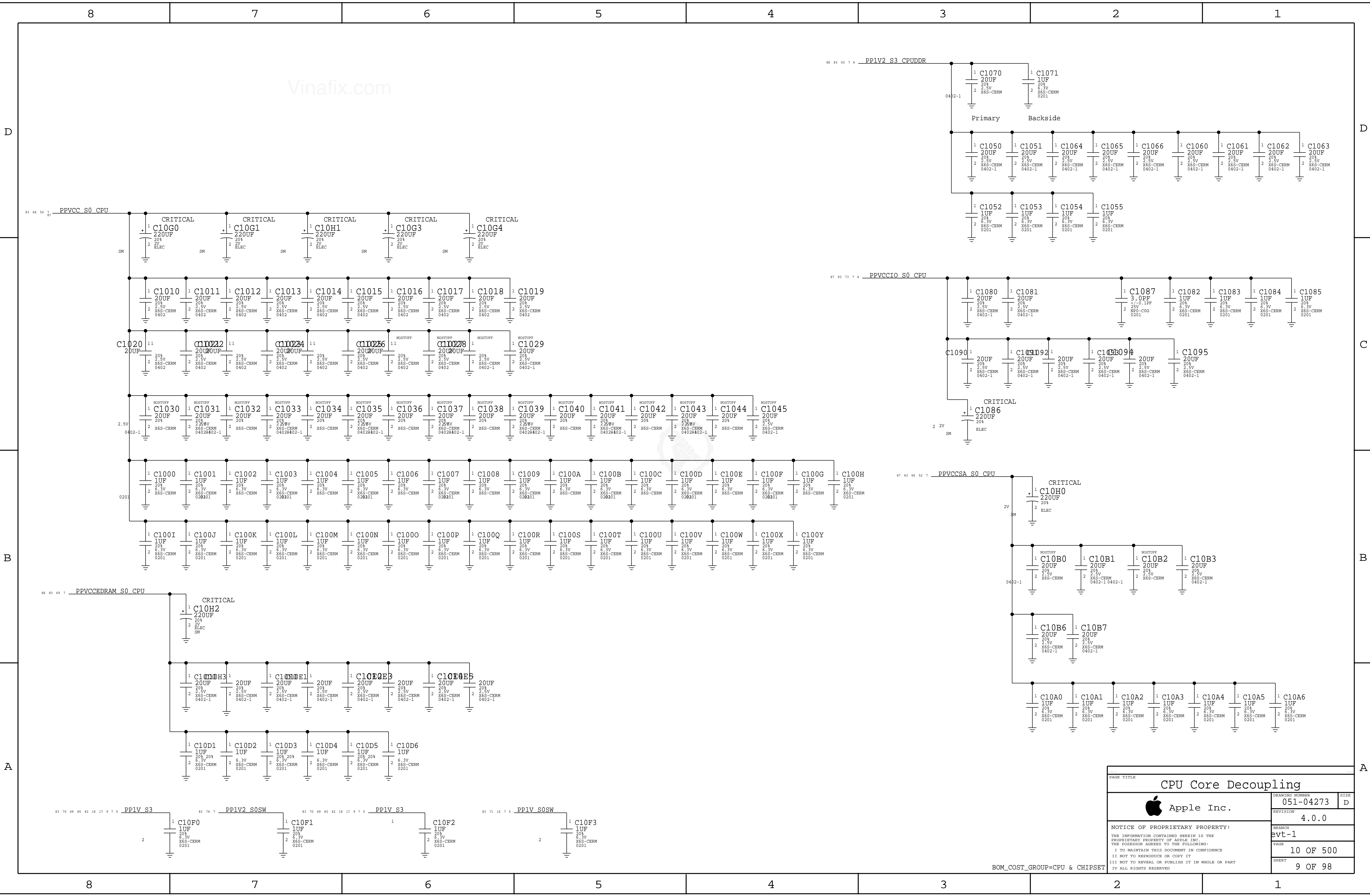
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BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE		
CPU & PCH Grounds		
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BOM_COST_GROUP=CPU & CHIPSET

87 83 67 50 7 PPVCCGT_S0_CPU



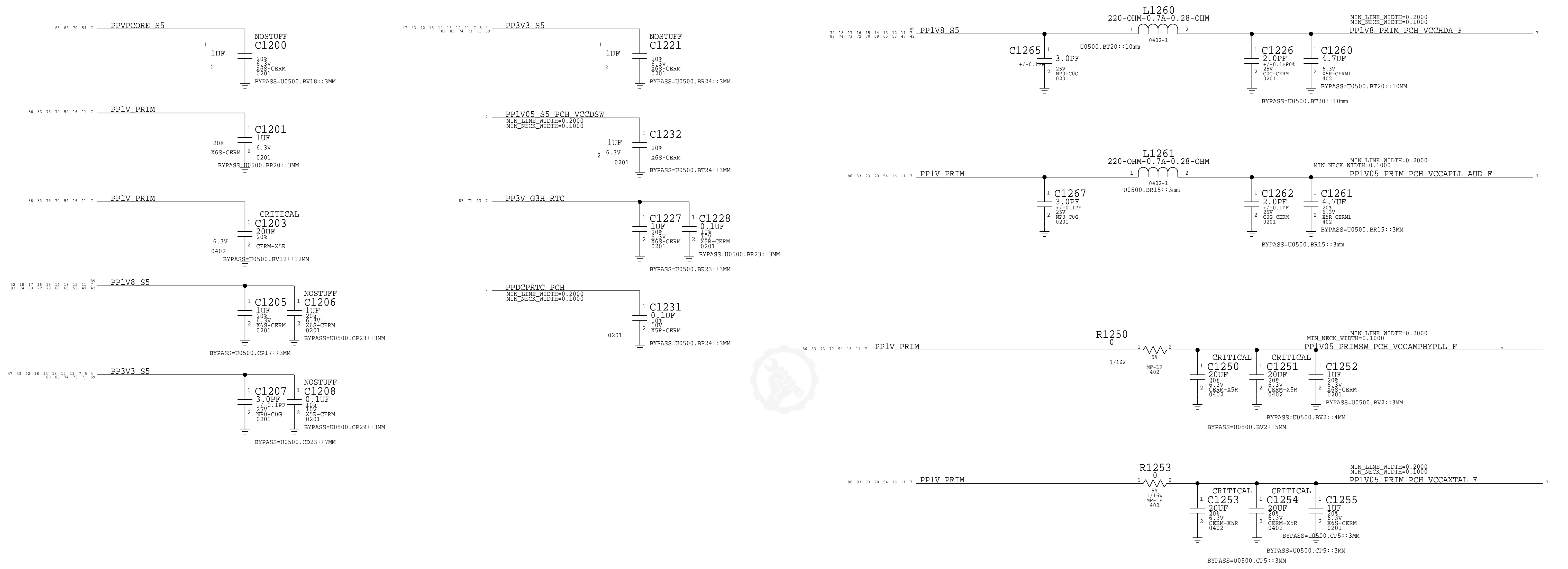
PAGE TITLE CPU GT Decoupling		
	DRAWING NUMBER 051-04273	SIZE D
	REVISION 4.0.0	
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BRANCH evt-1	PAGE 11 OF 500	
SHEET 10 OF 98		

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FILTERS

RAIL SIDE

PCH SIDE



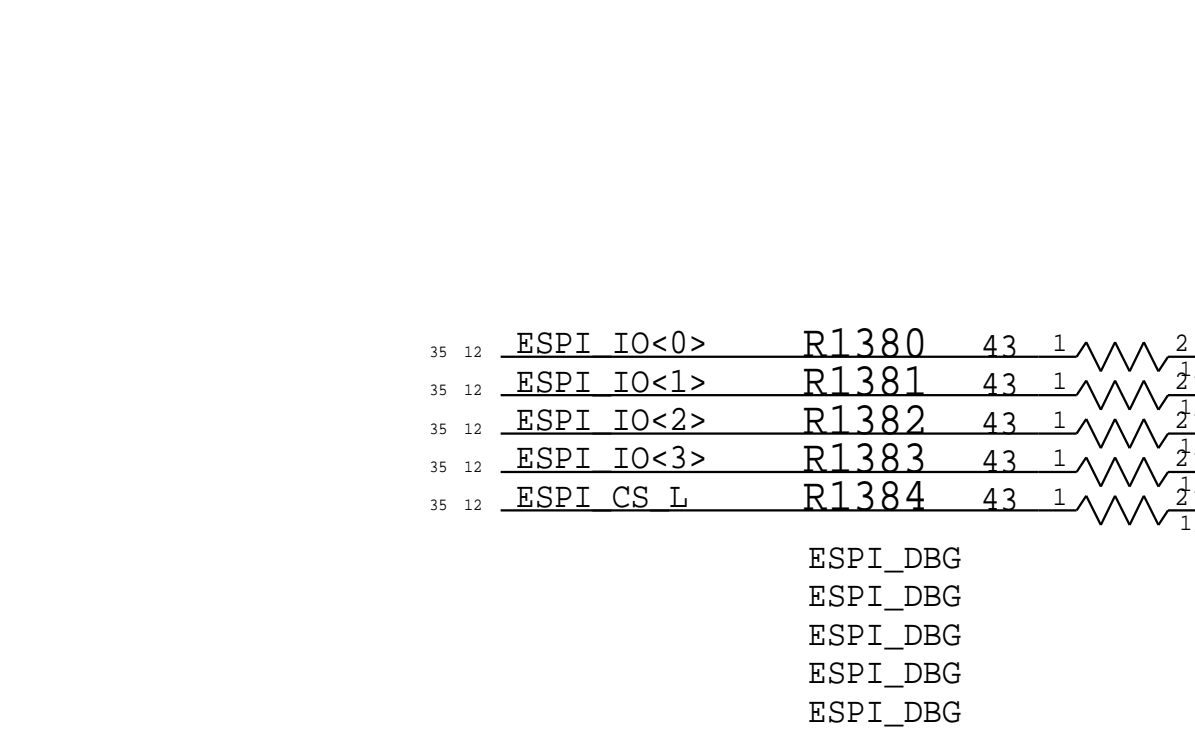
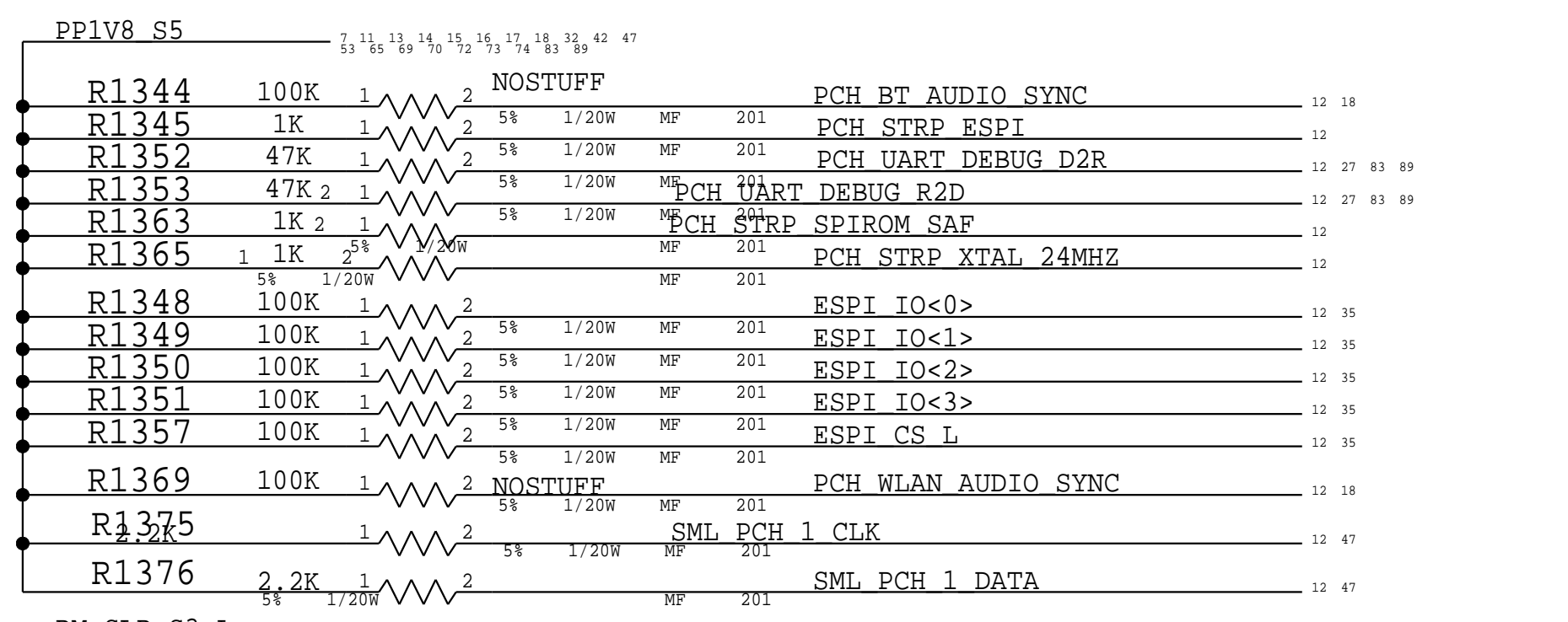
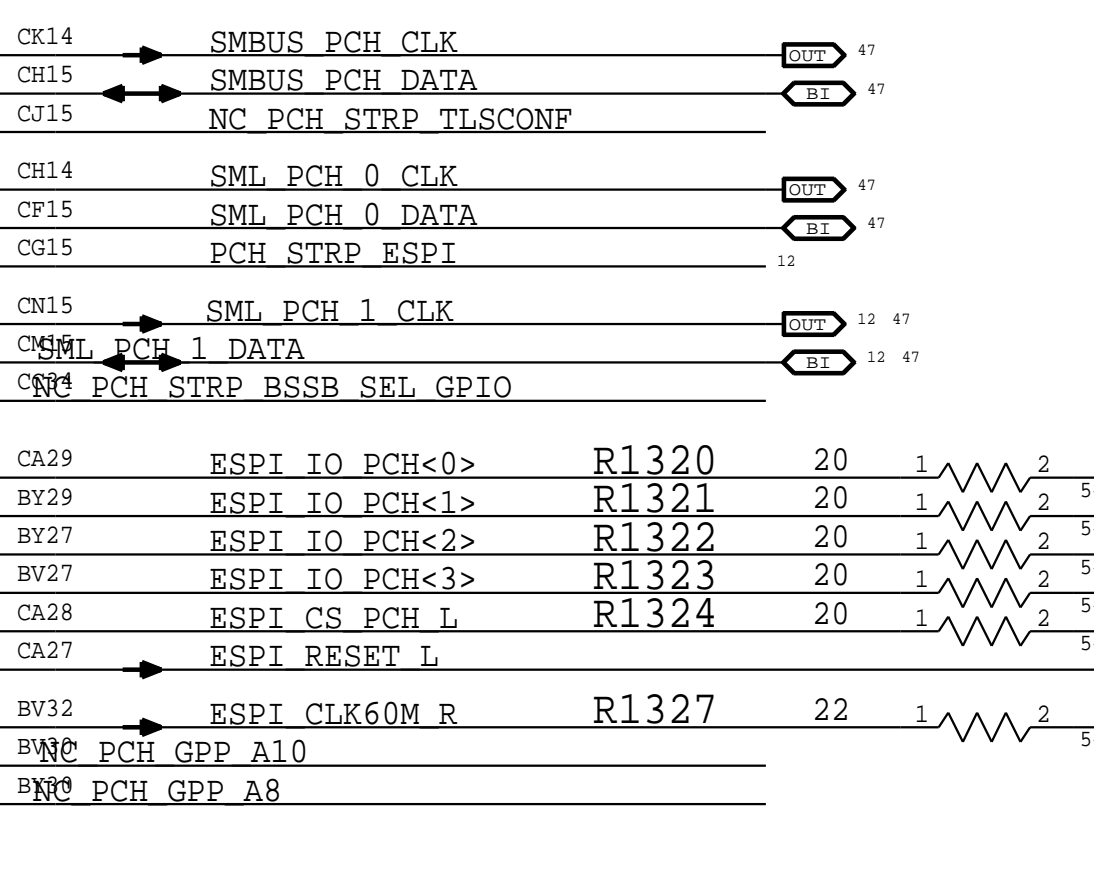
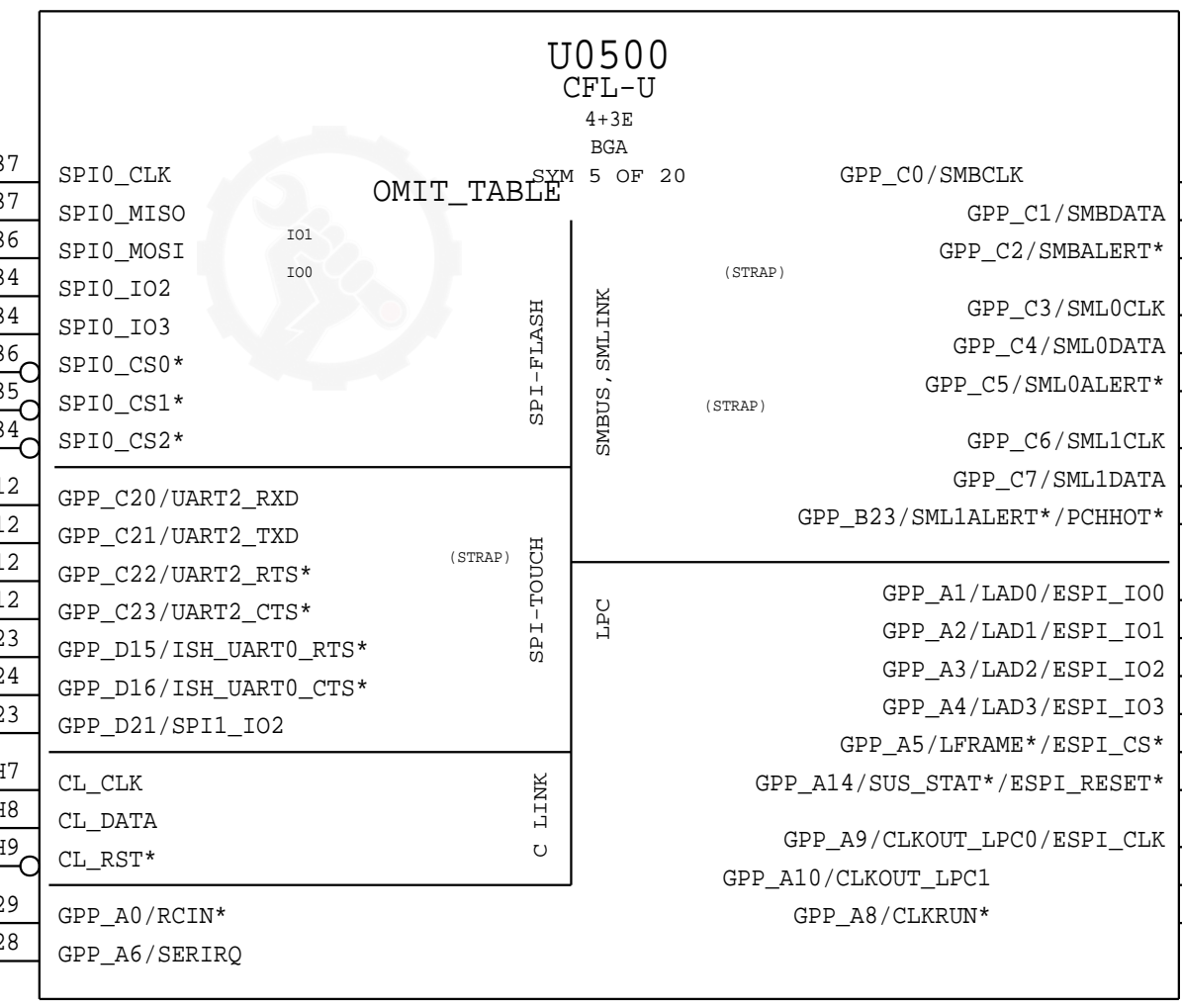
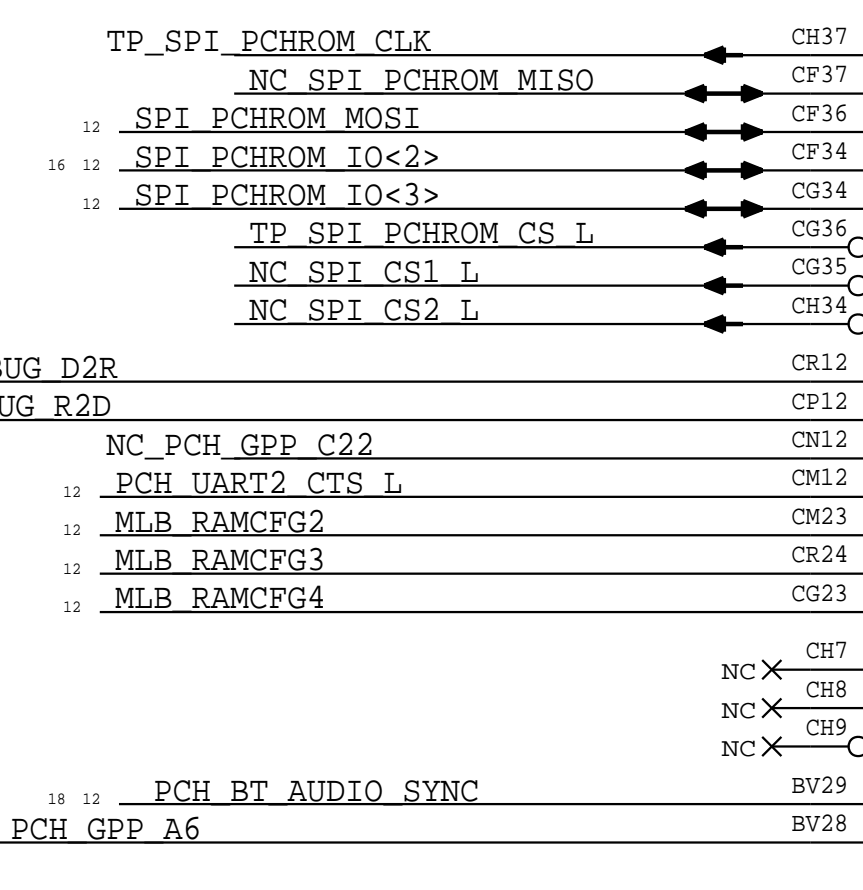
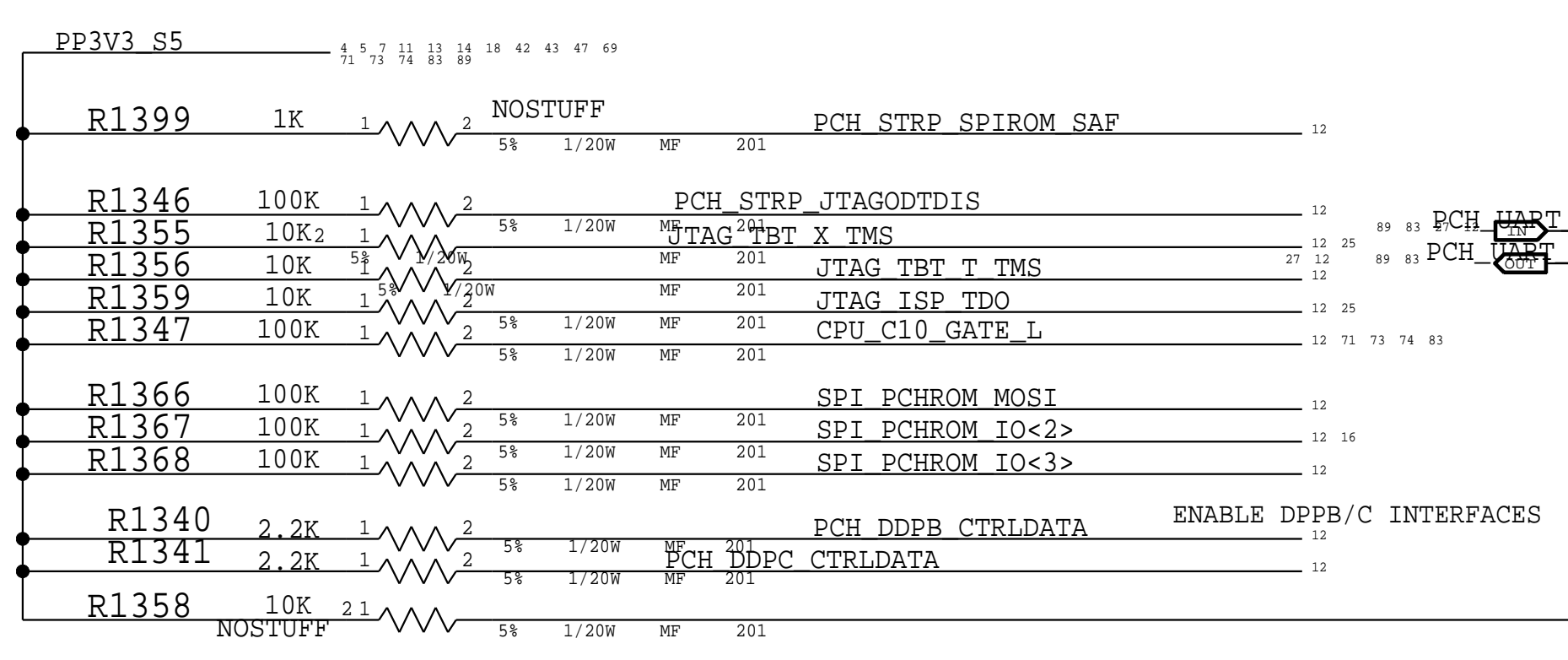
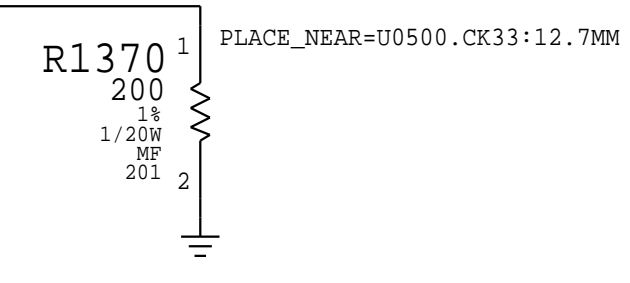
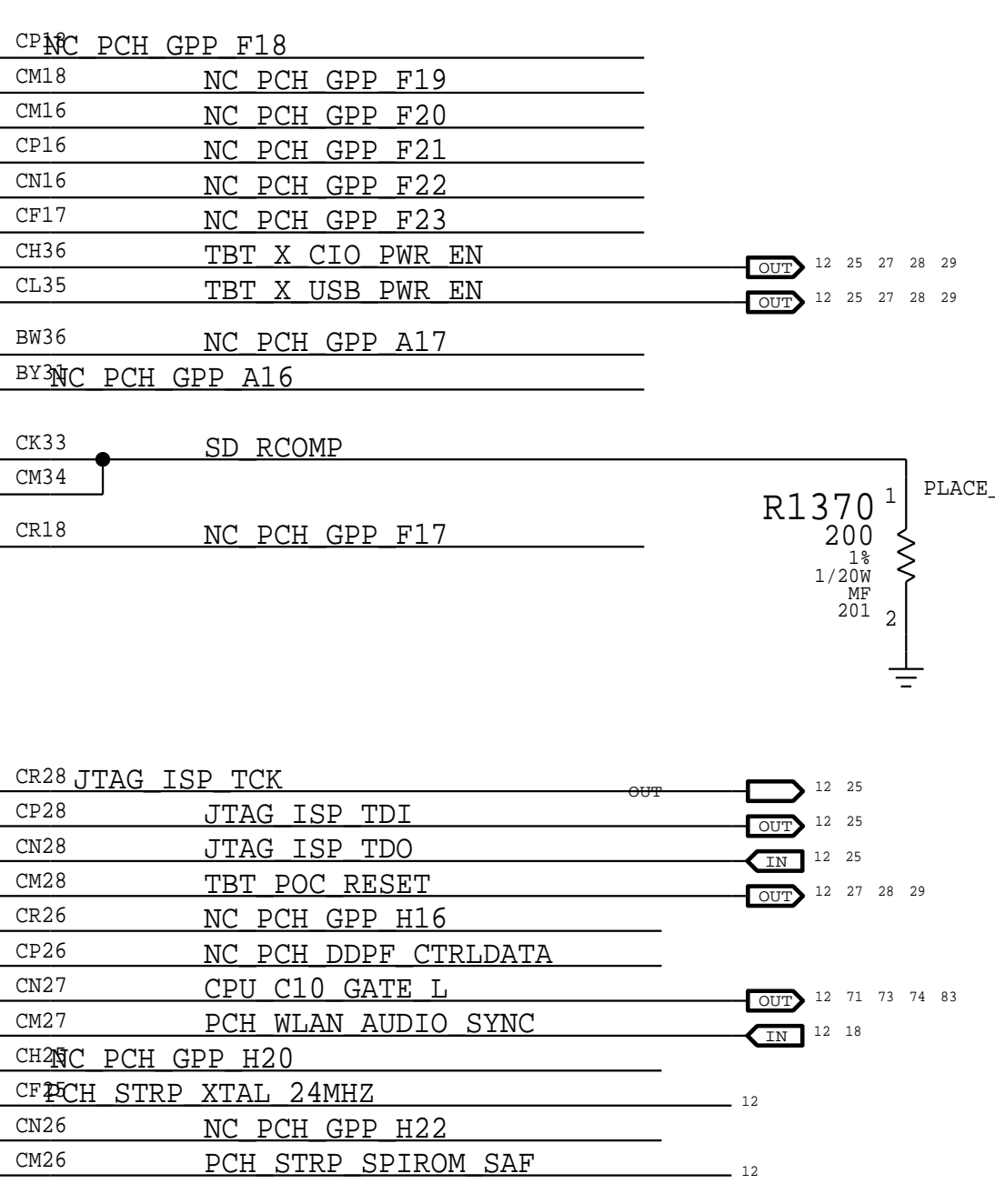
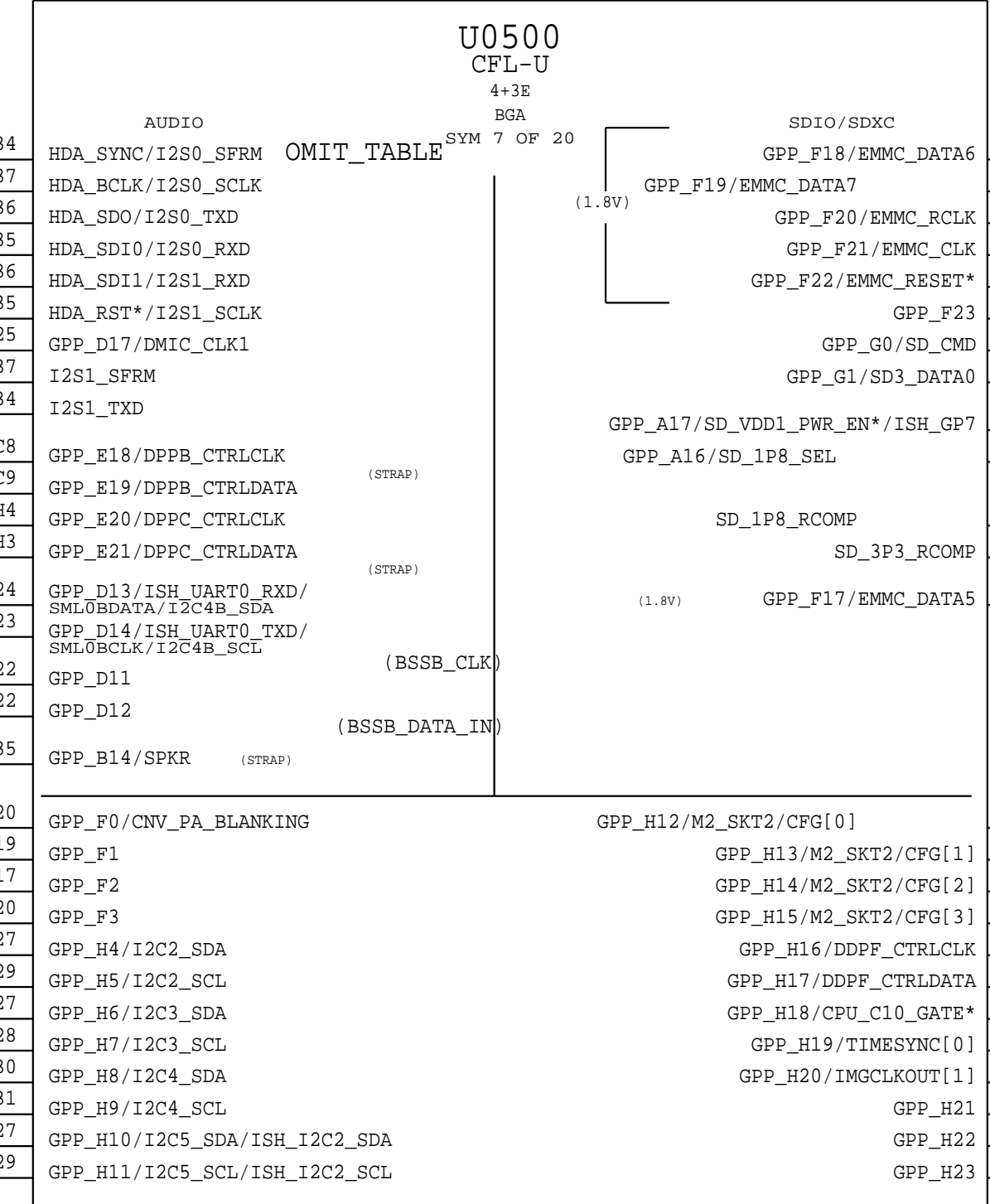
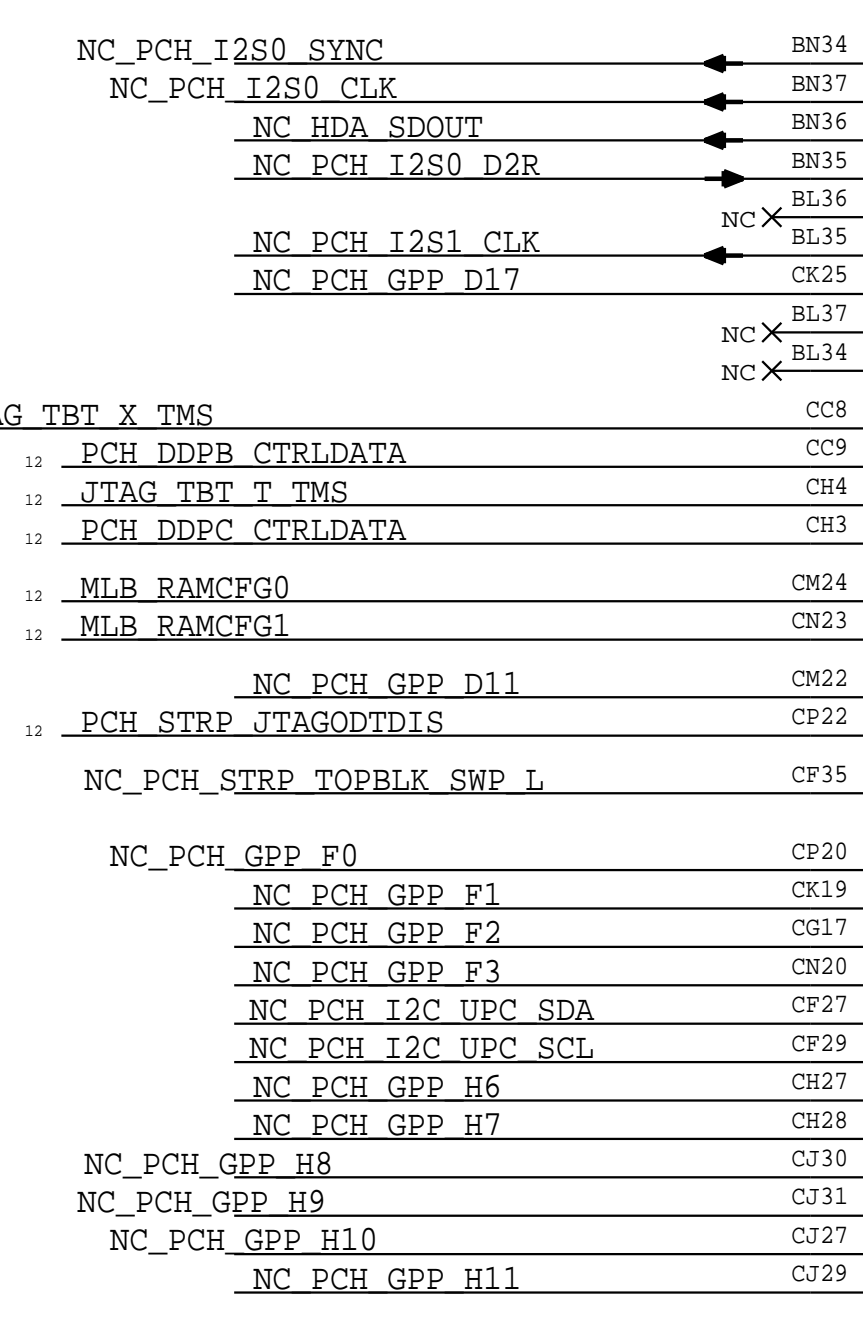
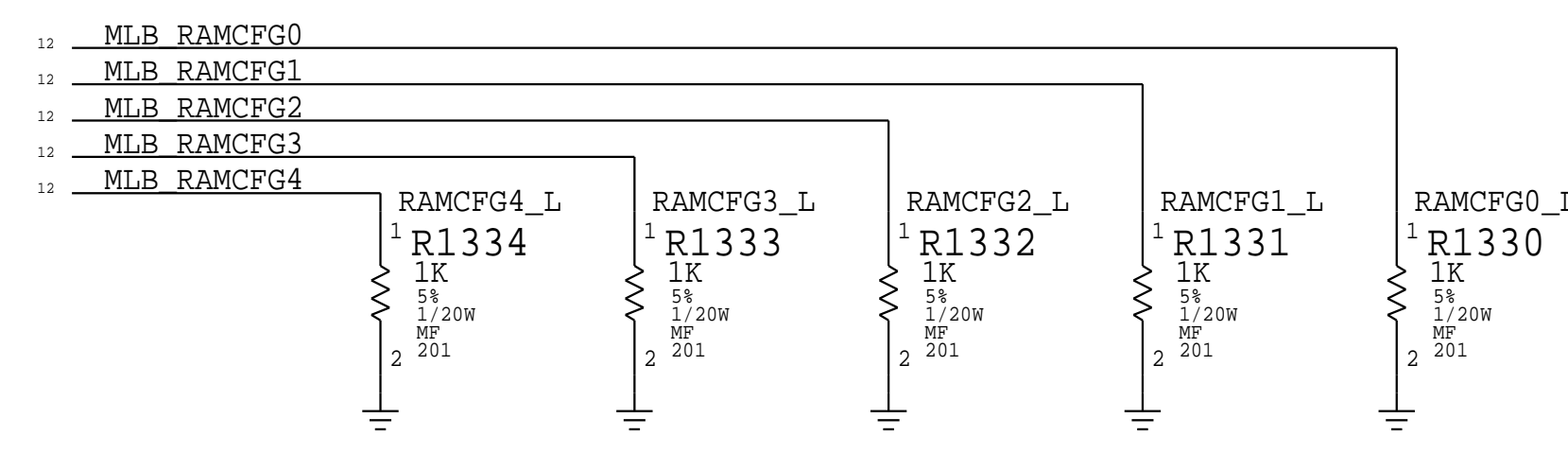
PAGE TITLE		
PCH Decoupling		
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	PAGE	12 OF 500
	SHEET	11 OF 98

BOM_COST_GROUP=CPU & CHIPSET

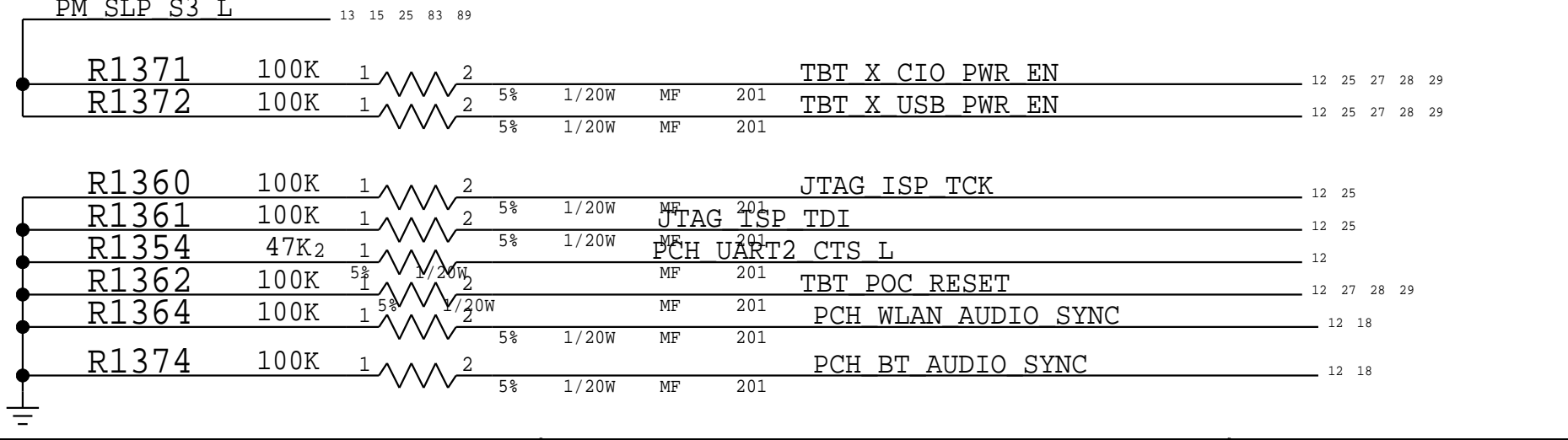
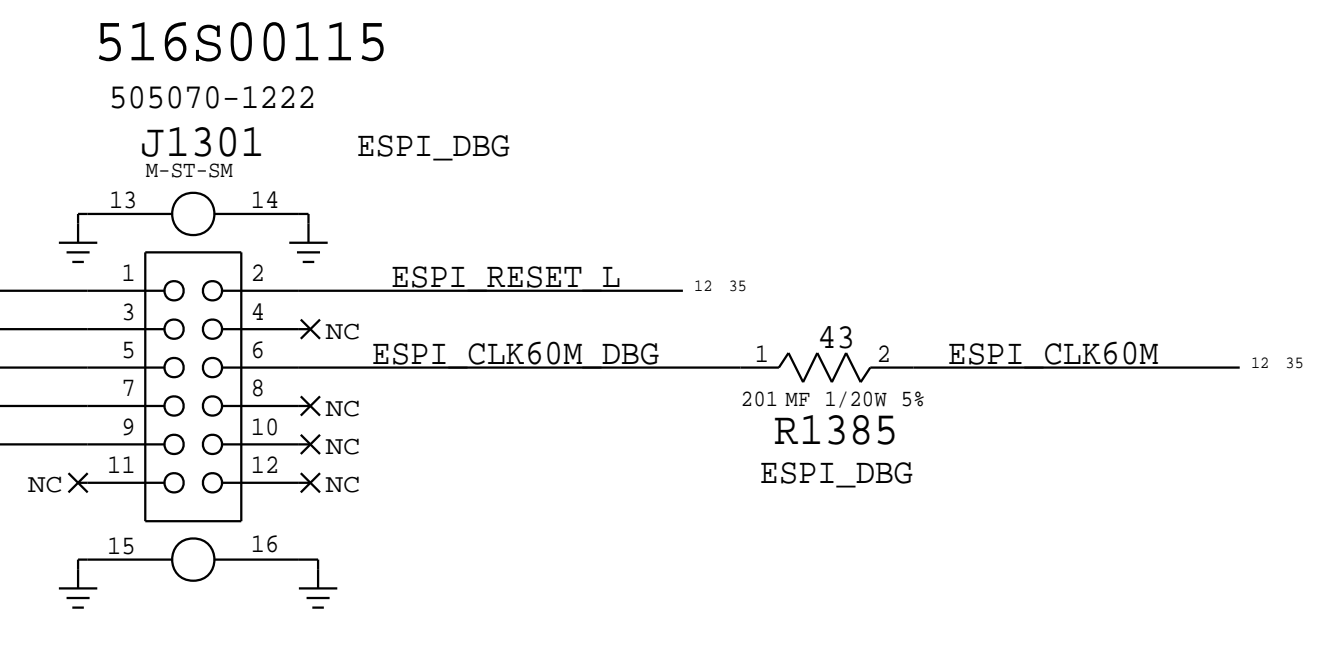
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ALL GPP_F* PINS ARE 1.8V ONLY!

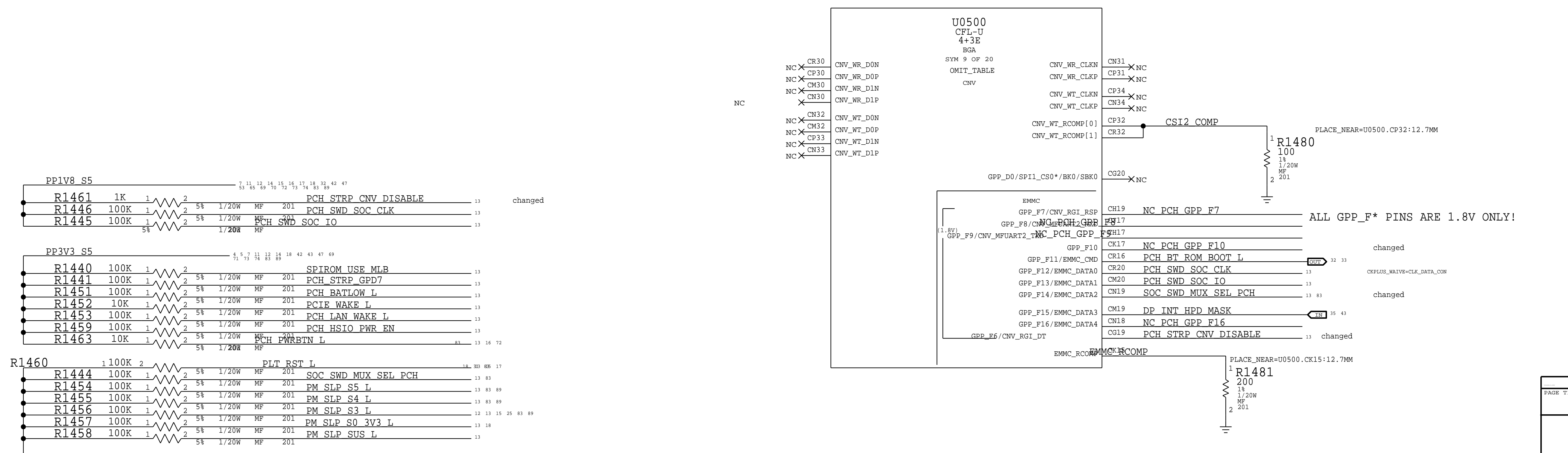
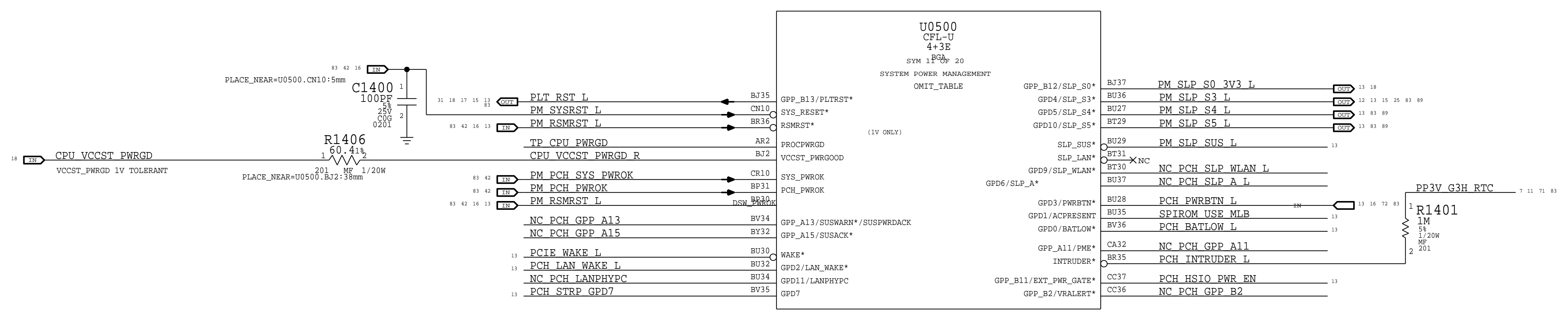
MEMORY CONFIGURATION STRAPS:
(PCH INTERNAL PULL-UPS ARE TO 1.8V)



ESPI ANALYZER CONNECTOR



Apple Inc. PCH AUDIO/LPC/SPI/SMBUS 051-04273 4.0.0 13 OF 500 12 OF 98



PP1V8 S5

R1461	1K	1	2	5%	1/20W	MF	201	PCH STRP CNV DISABLE	13
R1446	100K	1	2	5%	1/20W	MF	201	PCH SWD SOC CLK	13
R1445	100K	1	2	5%	1/20W	MF	201	PCH SWD SOC IO	13

PP3V3 S5

R1440	100K	1	2	5%	1/20W	MF	201	SPIROM USE MLB	13
R1441	100K	1	2	5%	1/20W	MF	201	PCH STRP GPD7	13
R1451	100K	1	2	5%	1/20W	MF	201	PCH BATLOW L	13
R1452	10K	1	2	5%	1/20W	MF	201	PCIE WAKE L	13
R1453	100K	1	2	5%	1/20W	MF	201	PCH LAN WAKE L	13
R1459	100K	1	2	5%	1/20W	MF	201	PCH HSI0 PWR EN	13
R1463	10K	1	2	5%	1/20W	MF	201	PCH_PWRBTN L	13

R1460

R1444	100K	1	2	5%	1/20W	MF	201	PLT RST L	13
R1454	100K	1	2	5%	1/20W	MF	201	SOC SWD MUX SEL PCH	13
R1454	100K	1	2	5%	1/20W	MF	201	PM_SLP_S5 L	13
R1455	100K	1	2	5%	1/20W	MF	201	PM_SLP_S4 L	13
R1456	100K	1	2	5%	1/20W	MF	201	PM_SLP_S3 L	13
R1457	100K	1	2	5%	1/20W	MF	201	PM_SLP_S0 3V3 L	13
R1458	100K	1	2	5%	1/20W	MF	201	PM_SLP_SUS L	13

NOTE: =PM_SLP_S0_L HAS INTERNAL PULL-UP BEFORE RSMRST_L IS RELEASED.
 THIS CAUSES A VOLTAGE DIVIDER WITH THE PULL-DOWN HERE.
 THE SIGNAL IS DRIVEN HI AFTER RSMRST_L IS RELEASED.

PAGE TITLE		
PCH POWER MANAGEMENT		
		DRAWING NUMBER 051-04273
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		BRANCH evt-1
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D

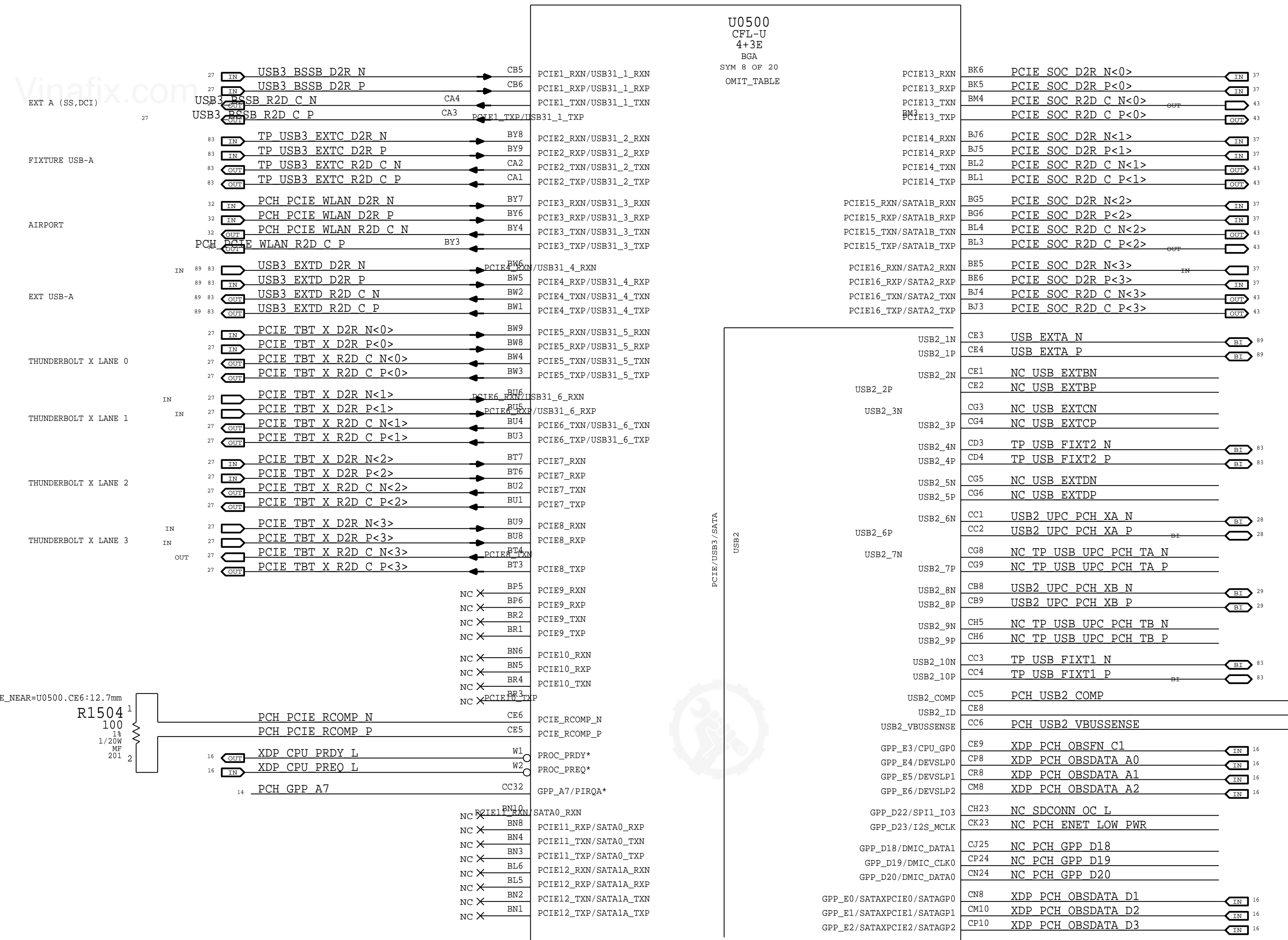
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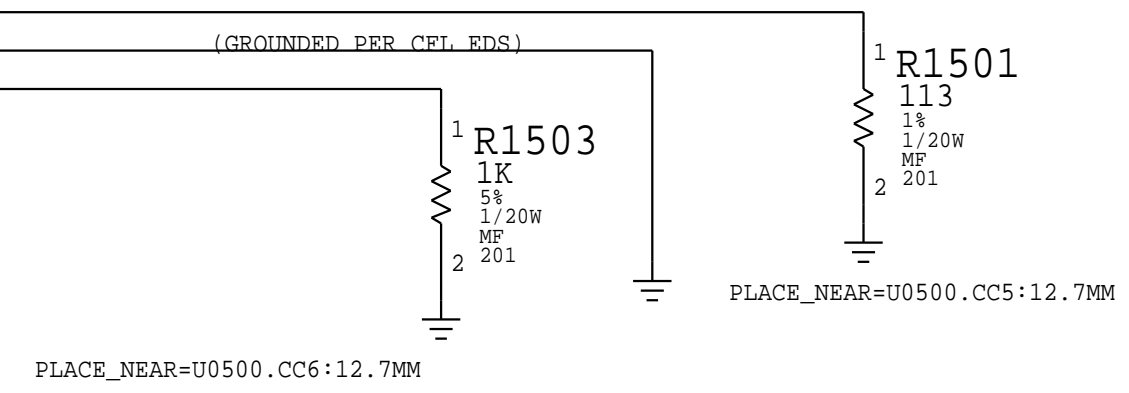
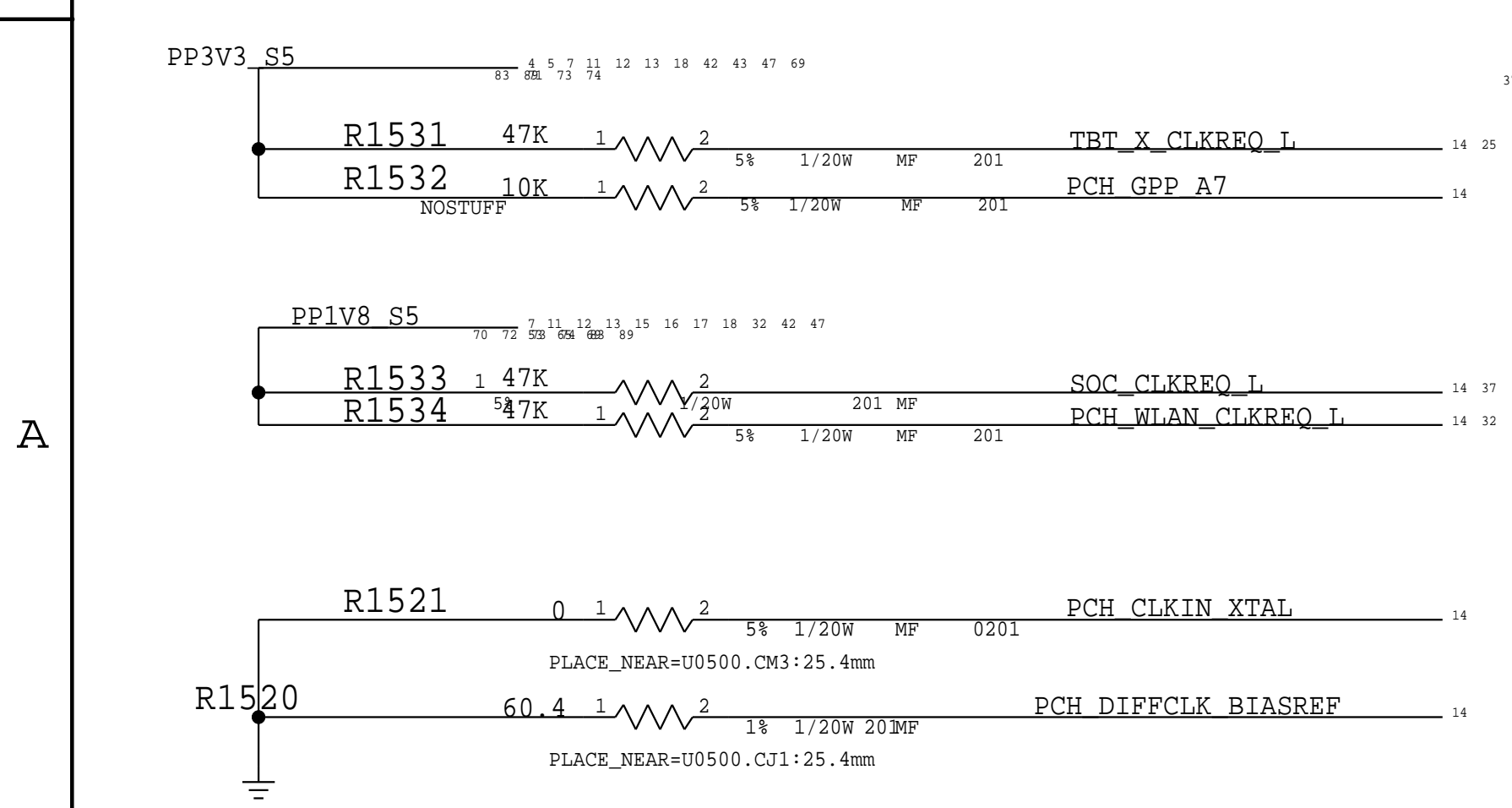
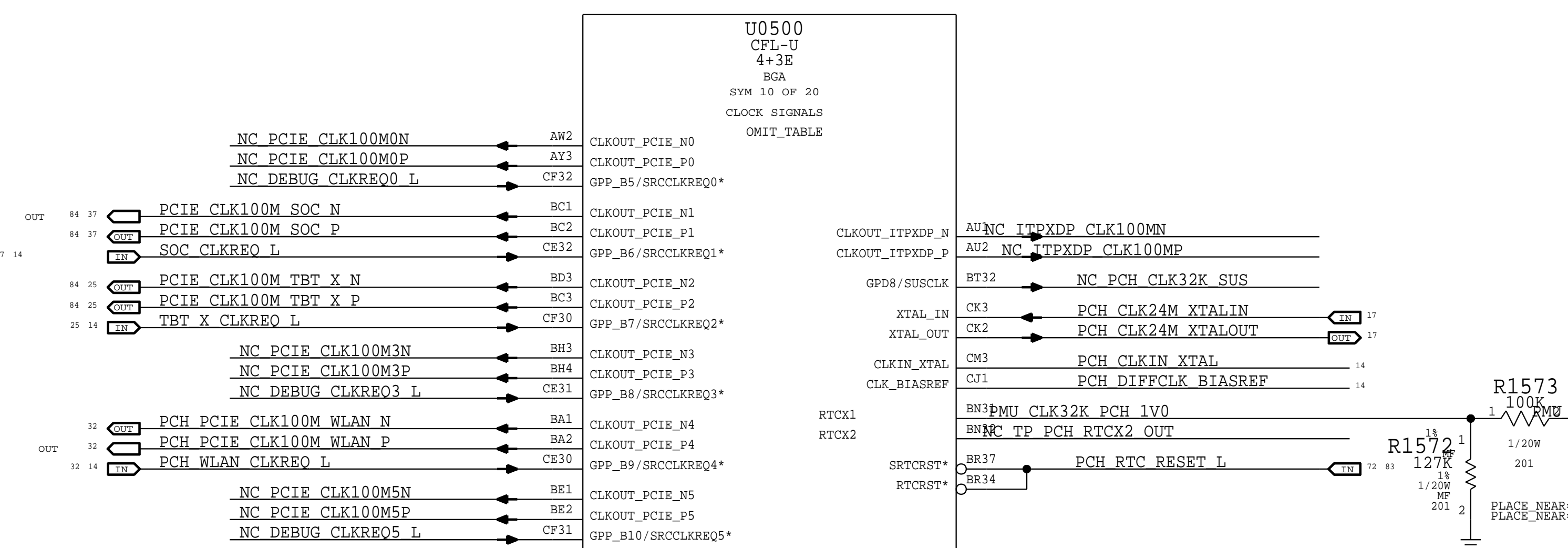
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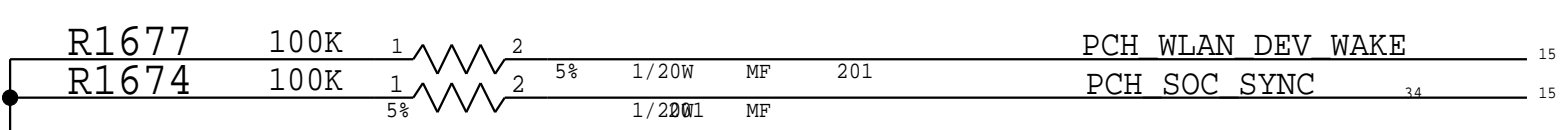
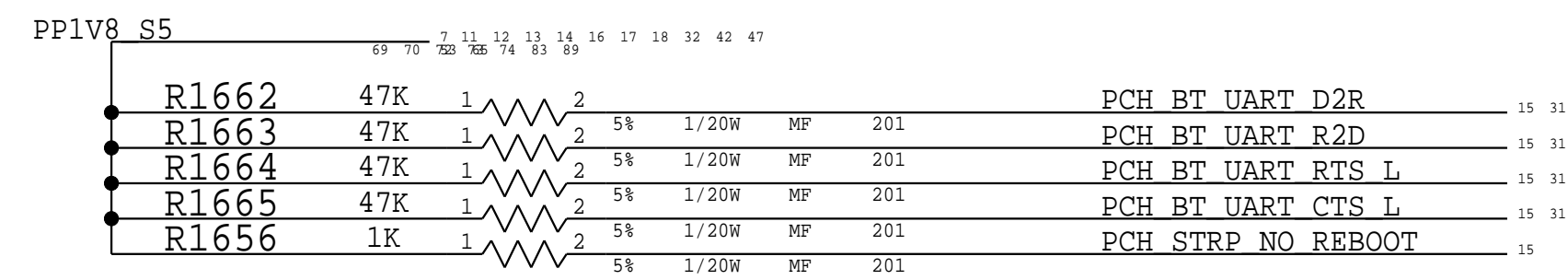
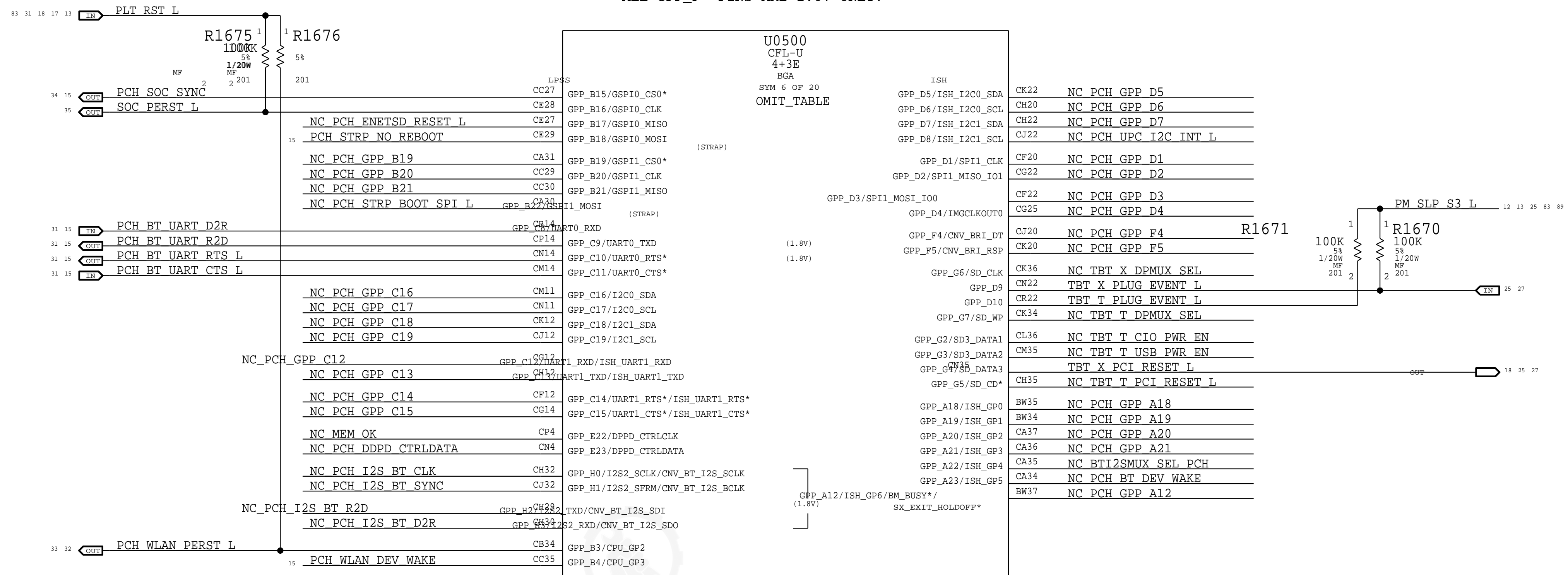
ANY CLKREQ CAN MAP TO ANY CLK.
ANY CLKREQ OR CLK CAN MAP TO ANY PCIE PORT.
UNUSED CLKREQS AND CLKS SHOULD BE DISABLED.
PER SKYLAKE PDG, SKYLAKE PCH EDS.



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PCH_PCIE/USB/CLKS		051-04273		D	
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		evt-1		15 OF 500	
		SHEET		14 OF 98	

BOM_COST_GROUP=CPU & CHIPSET

ALL GPP_F* PINS ARE 1.8V ONLY!



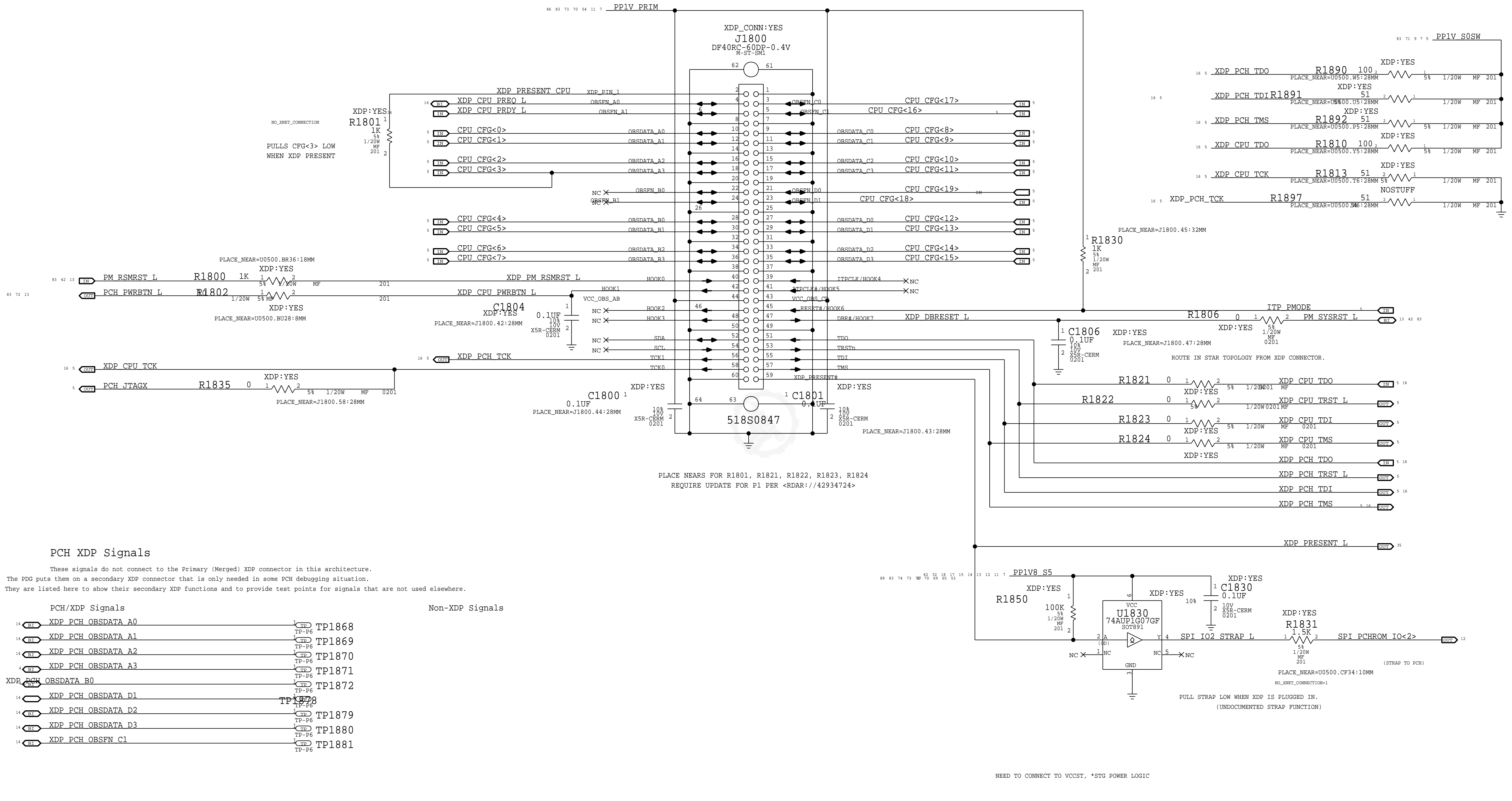
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PAGE TITLE		
PCH SPI/UART/GPIO		
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Primary / Merged (CPU/PCH) Micro2-XDP

NOTE: This is not the standard XDP pinout.
Use with 921-0133 Adapter Flex to support chipset debug.

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PLACE NEARS FOR R1801, R1821, R1822, R1823, R1824
REQUIRE UPDATE FOR P1 PER <RDAR://42934724>

PCH XDP Signals

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

PCH/XDP Signals	Non-XDP Signals
XDP_PCH_OBSDATA_A0	TP1868
XDP_PCH_OBSDATA_A1	TP1869
XDP_PCH_OBSDATA_A2	TP1870
XDP_PCH_OBSDATA_A3	TP1871
XDP_PCH_OBSDATA_B0	TP1872
XDP_PCH_OBSDATA_D1	TP1873
XDP_PCH_OBSDATA_D2	TP1878
XDP_PCH_OBSDATA_D3	TP1879
XDP_PCH_OBSFN_C1	TP1880
	TP1881

Unused GPIOs have TPs.

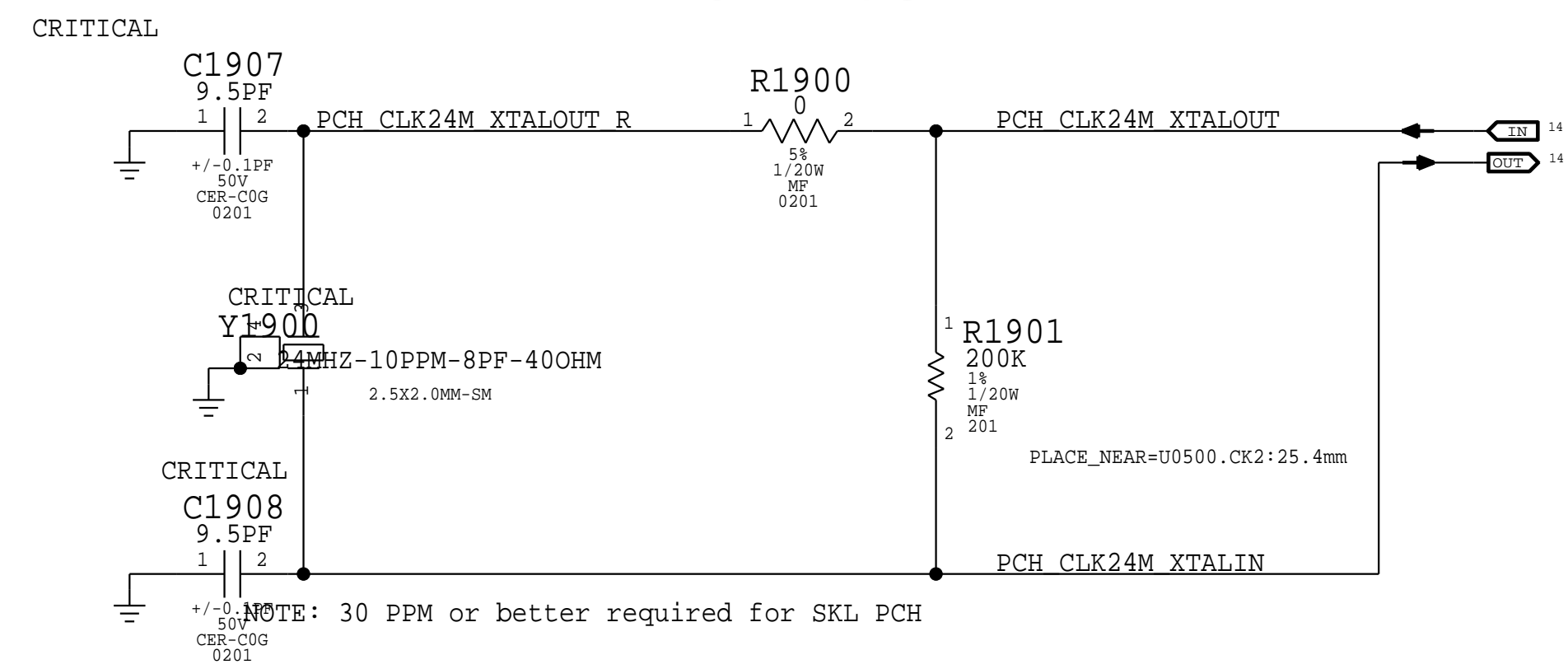
NEED TO CONNECT TO VCCST, *STG POWER LOGIC

PAGE TITLE CPU/PCH Merged XDP		
	DRAWING NUMBER 051-04273	SIZE D
	REVISION 4.0.0	
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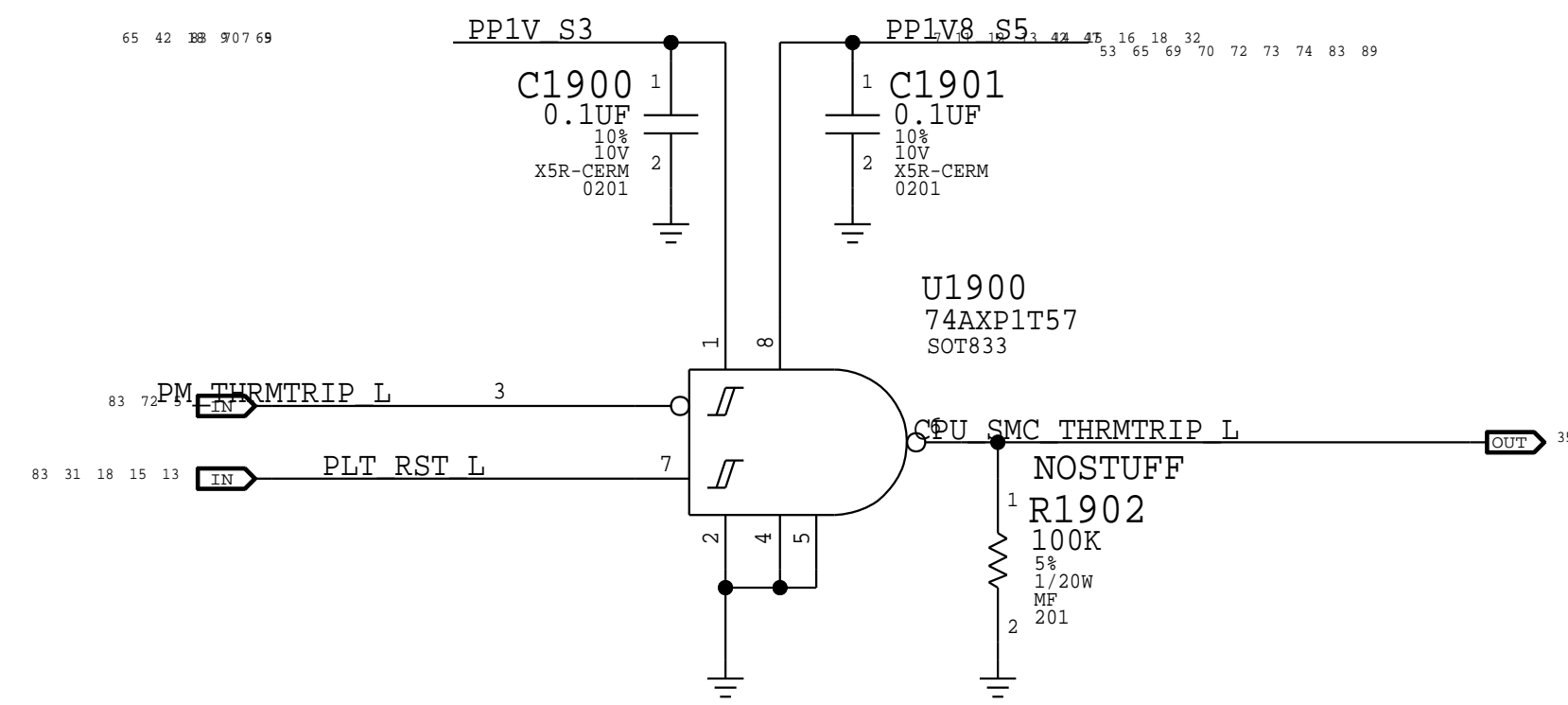
BOM_COST_GROUP=DEBUG

24MHz CLOCK

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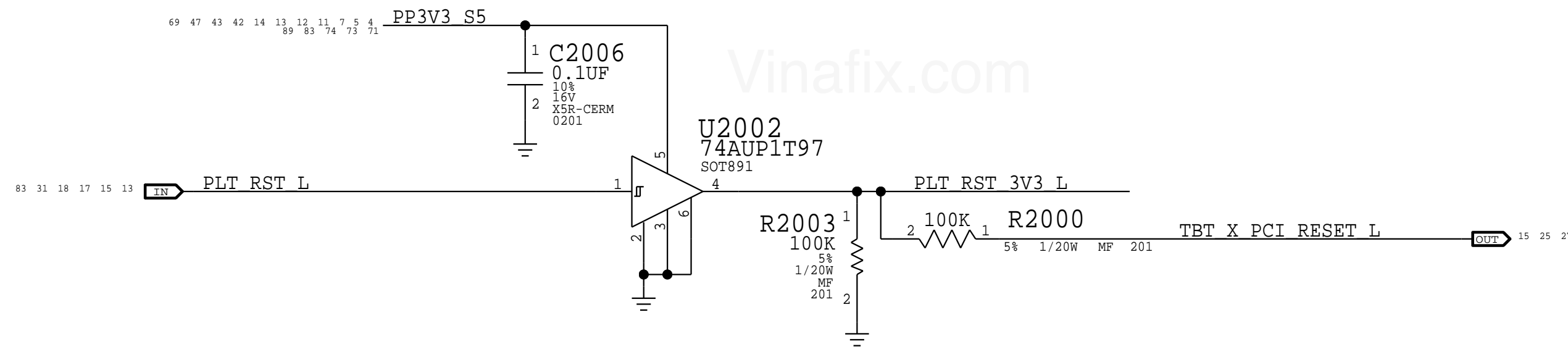


THRMTRIP# ISOLATION & LEVEL-SHIFT TO 1V8

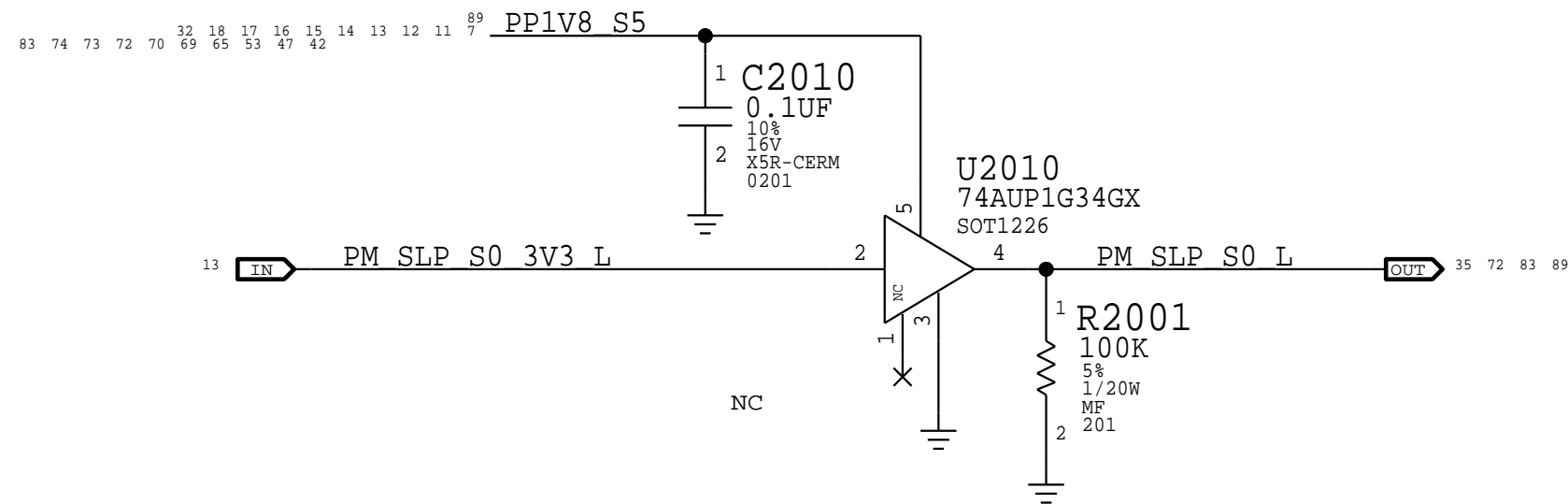


PAGE TITLE		
Chipset Support 1		
	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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		PAGE
		SHEET
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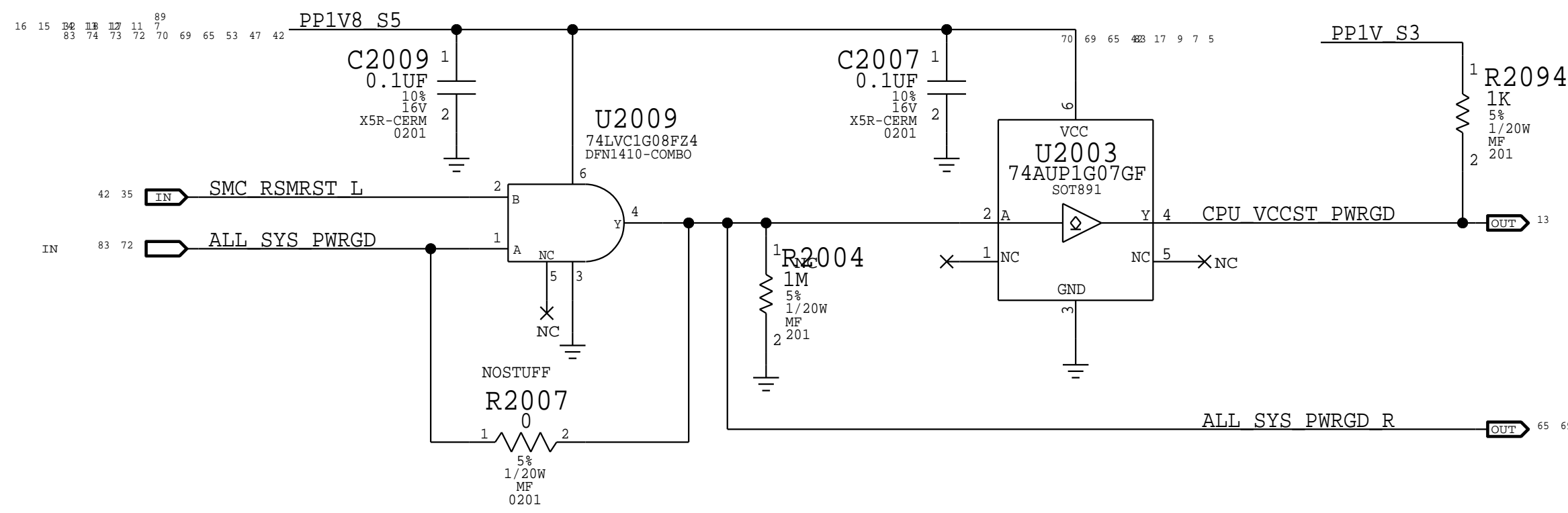
PLATFORM RESET LEVEL-SHIFTER TO 3V3



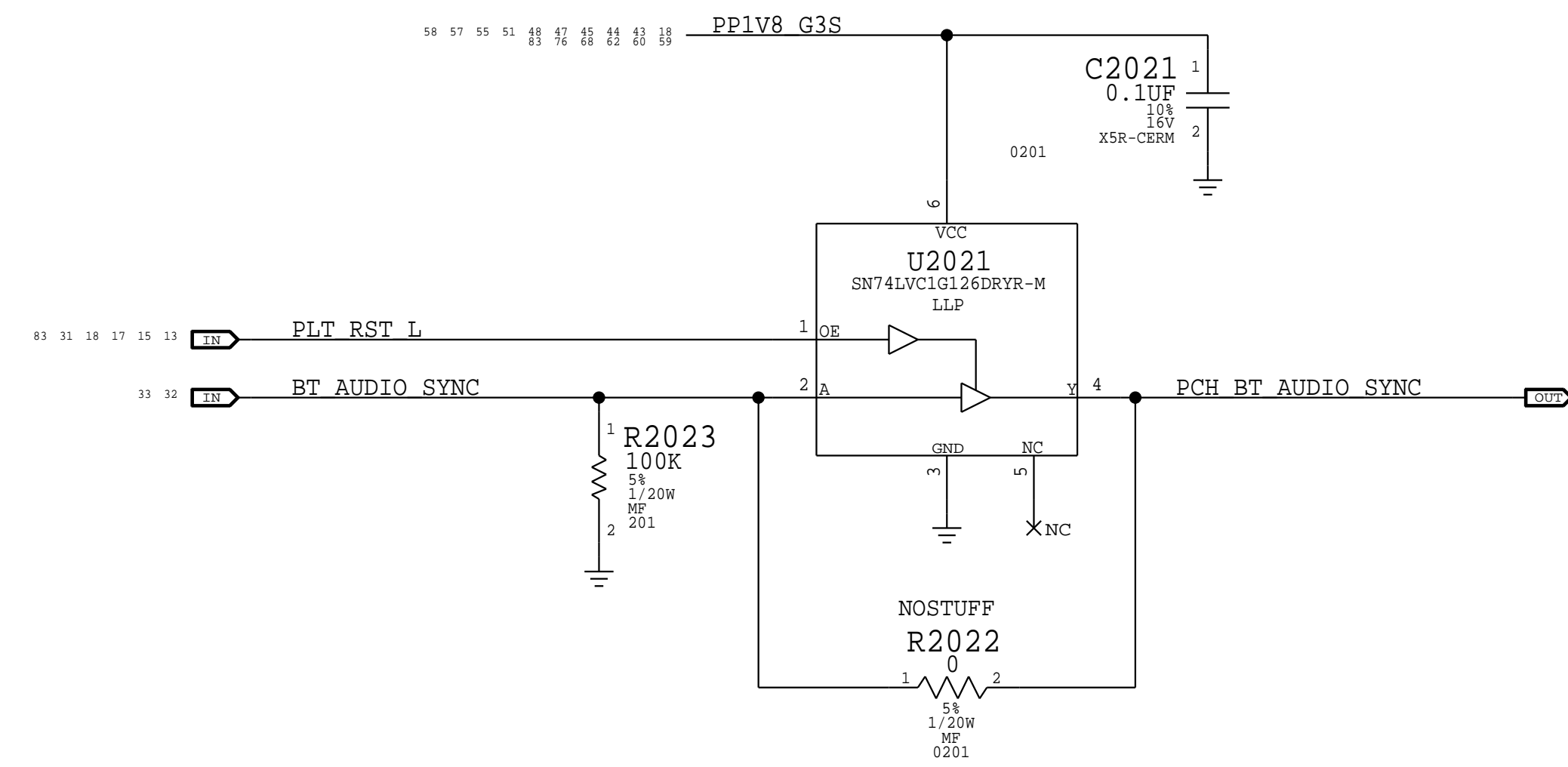
SLP_S0# LEVEL SHIFTER TO 1V8



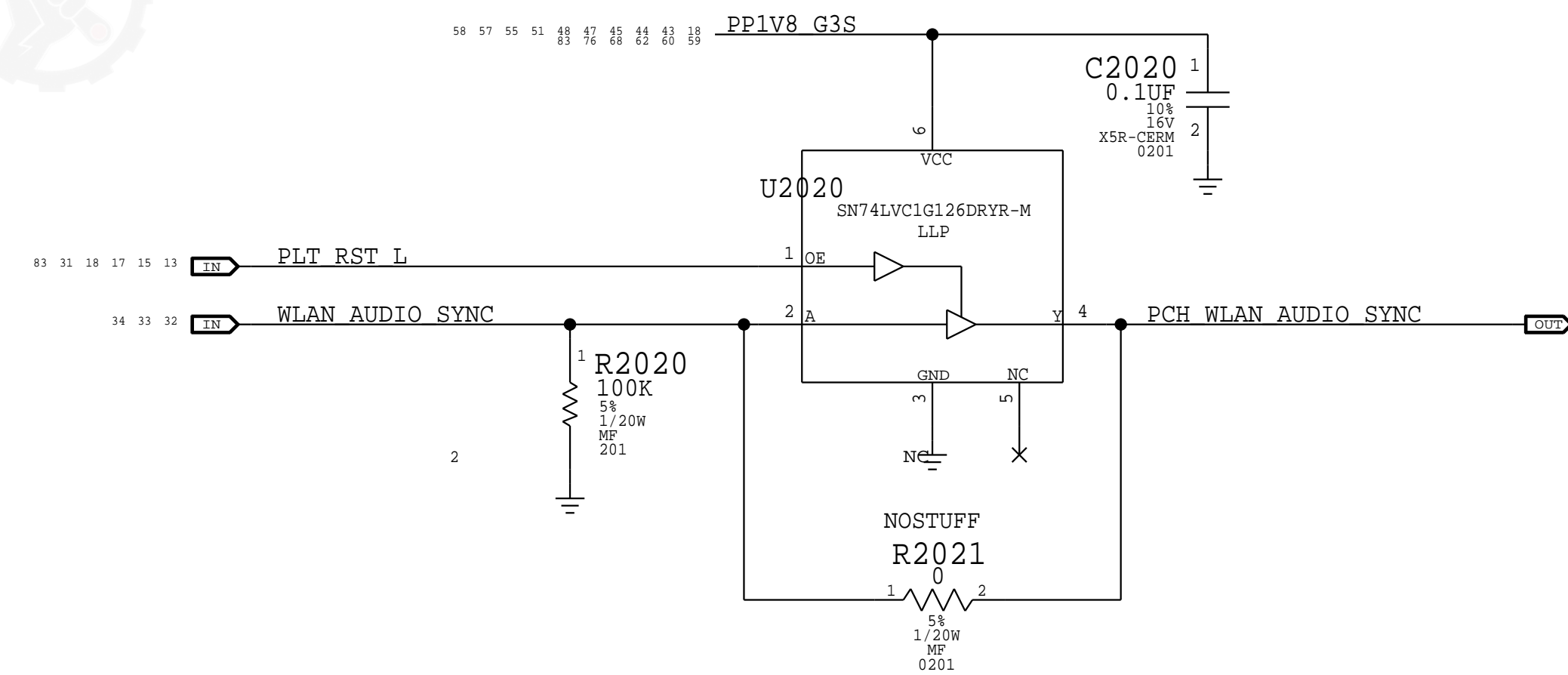
ALL_SYS_PWRGD QUALIFIER & VCCST_PWRGD LEVEL SHIFTER TO 1V



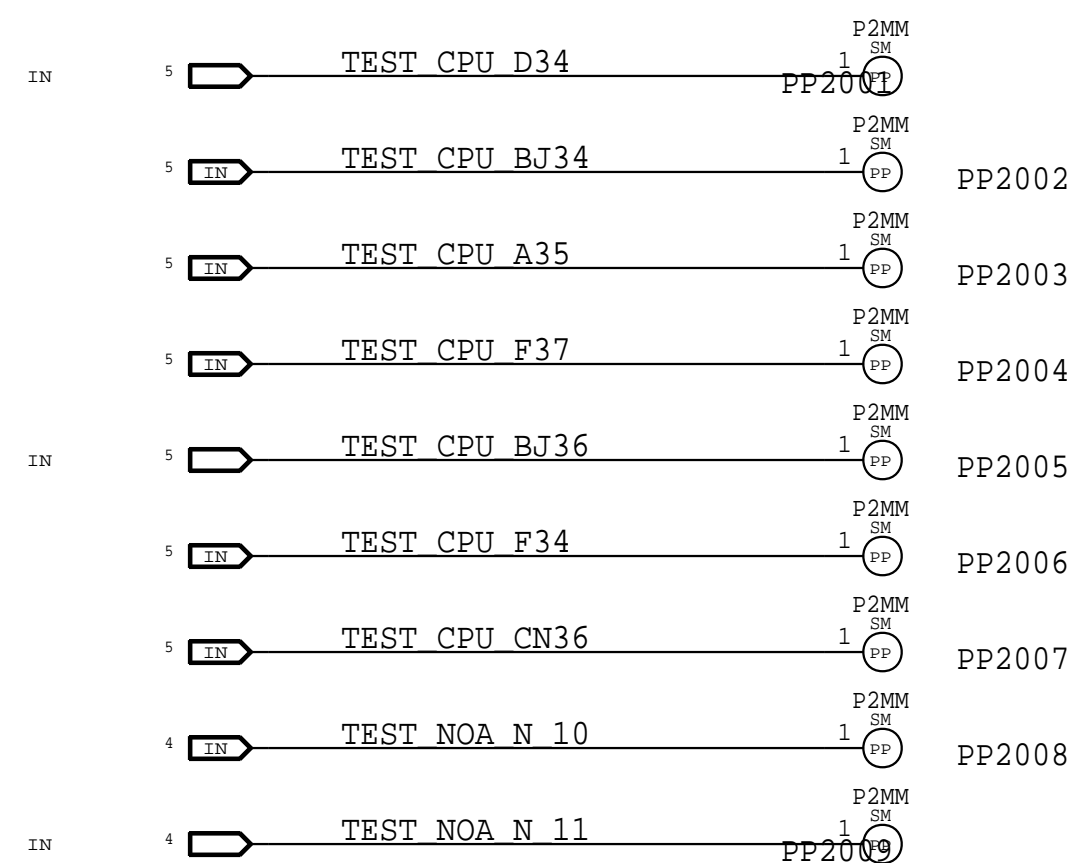
BT AUDIO SYNC BUFFER



WLAN AUDIO SYNC BUFFER

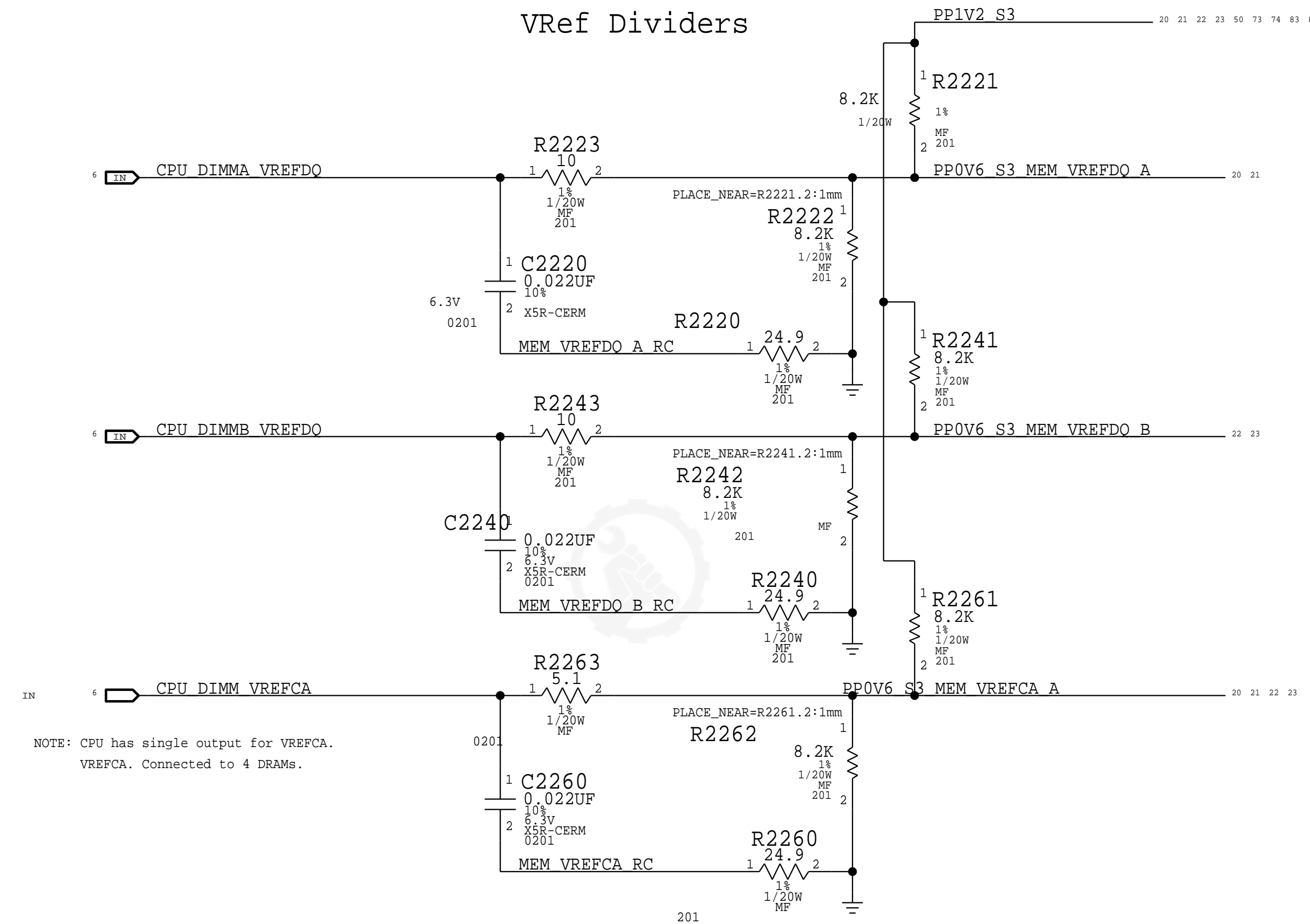


TPs for Chipset Debug Pins



PAGE TITLE		
CHIPSET SUPPORT 2		
	DRAWING NUMBER	051-04273
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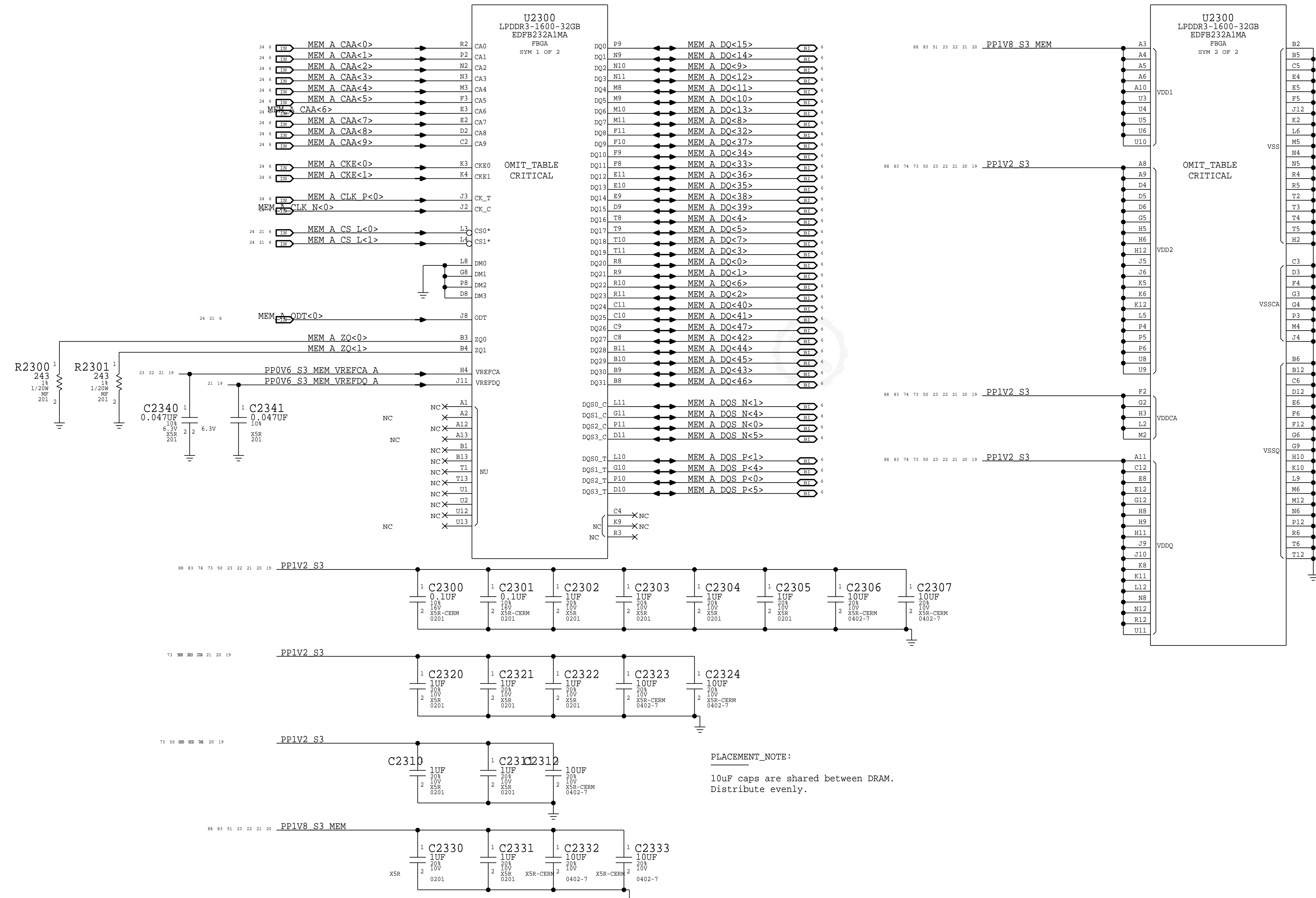
CPU-Based Margining



PAGE TITLE		LPDDR3 VREF MARGINING	
	DRAWING NUMBER	051-04273	SIZE
	REVISION	4.0.0	D
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		PAGE	22 OF 500
		SHEET	19 OF 98

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LPDDR3 CHANNEL A (0-31)



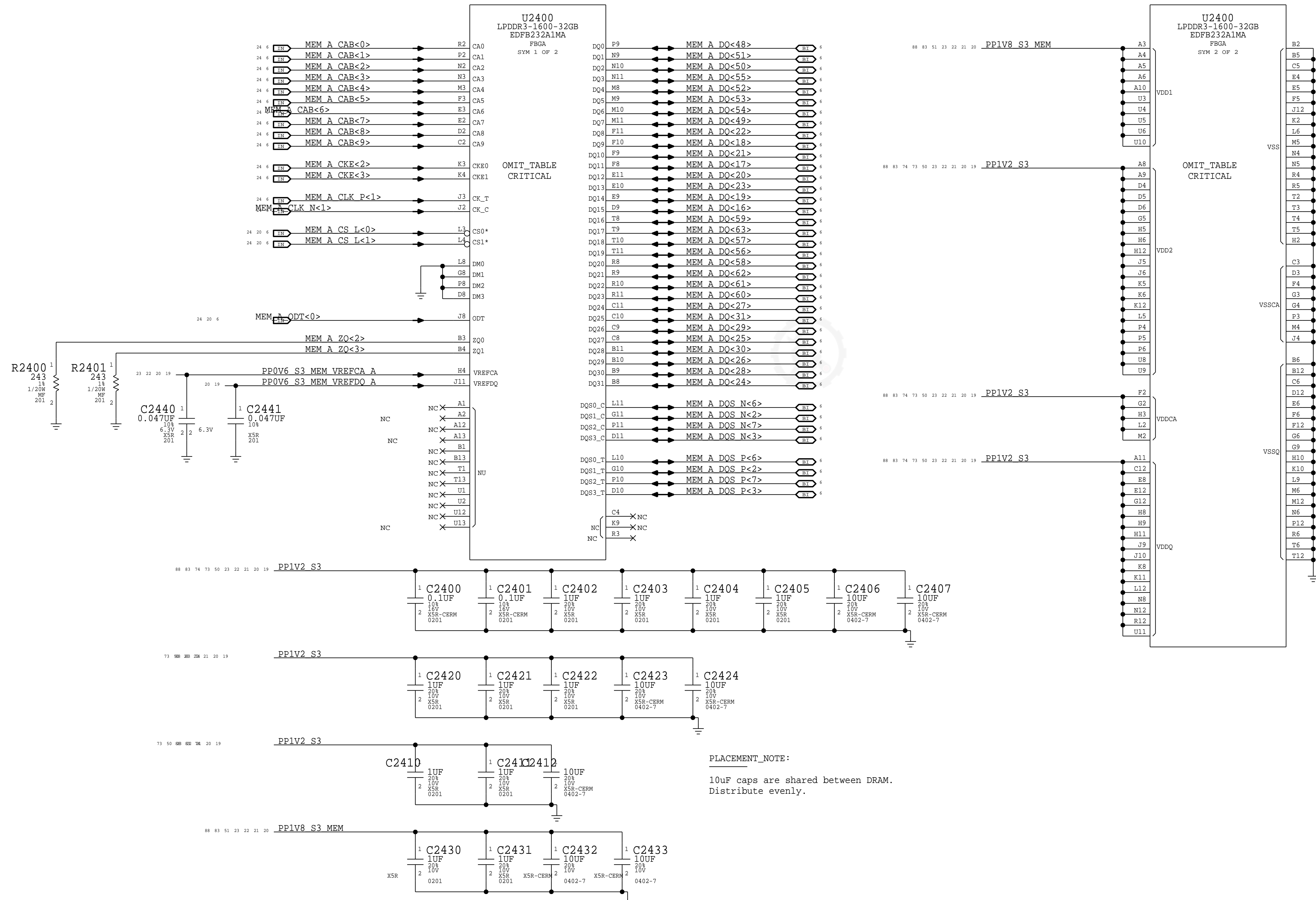
PLACEMENT_NOTE:
 10uF caps are shared between DRAM.
 Distribute evenly.

BOM_COST_GROUP=DRAM

PAGE TITLE		PAGE TITLE	
LPDDR3 DRAM Channel A (00-31)		LPDDR3 DRAM Channel A (00-31)	
DRAWING NUMBER		DRAWING NUMBER	
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evt-1		evt-1	
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SHEET		SHEET	
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LPDDR3 CHANNEL A (32-63)

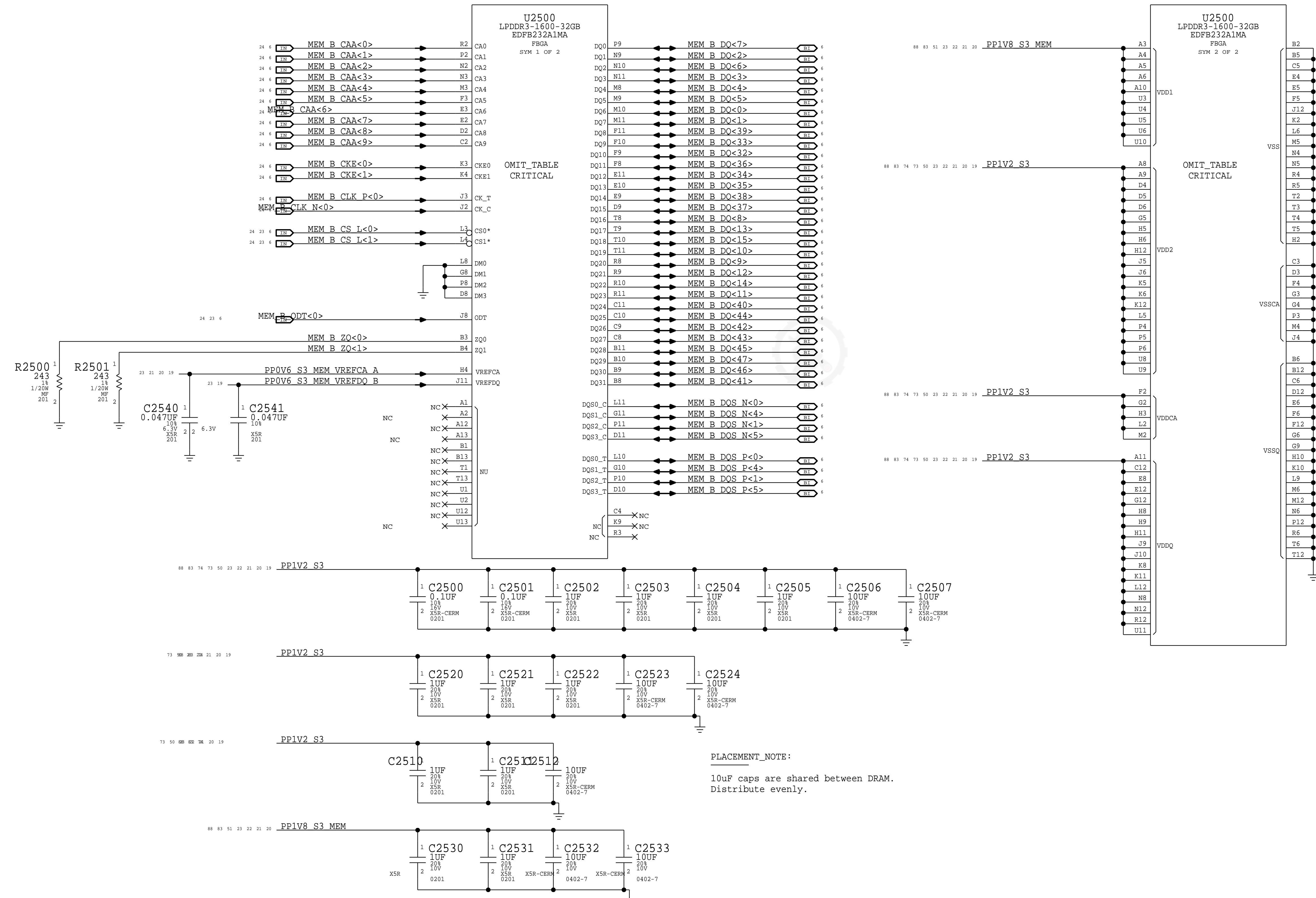


BOM_COST_GROUP=DRAM

PAGE TITLE		PAGE TITLE	
LPDDR3 DRAM Channel A (32-63)		LPDDR3 DRAM Channel A (32-63)	
DRAWING NUMBER		DRAWING NUMBER	
051-04273		051-04273	
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BRANCH		BRANCH	
evt-1		evt-1	
PAGE		PAGE	
24 OF 500		24 OF 500	
SHEET		SHEET	
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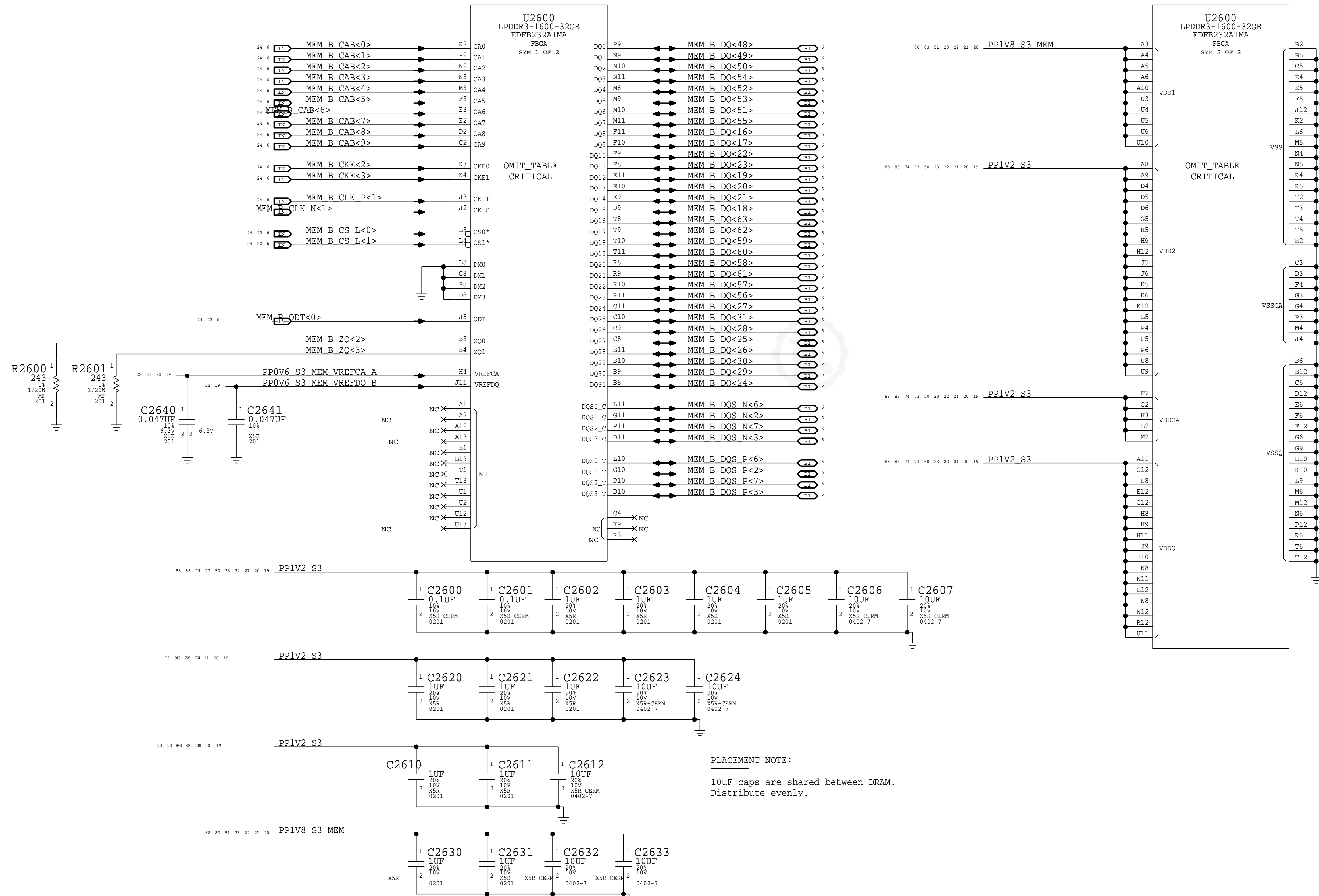
LPDDR3 CHANNEL B (0-31)



BOM_COST_GROUP=DRAM

PAGE TITLE		PAGE TITLE	
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DRAWING NUMBER		DRAWING NUMBER	
051-04273		051-04273	
REVISION		REVISION	
4.0.0		4.0.0	
BRANCH		BRANCH	
evt-1		evt-1	
PAGE		PAGE	
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LPDDR3 CHANNEL B (32-63)

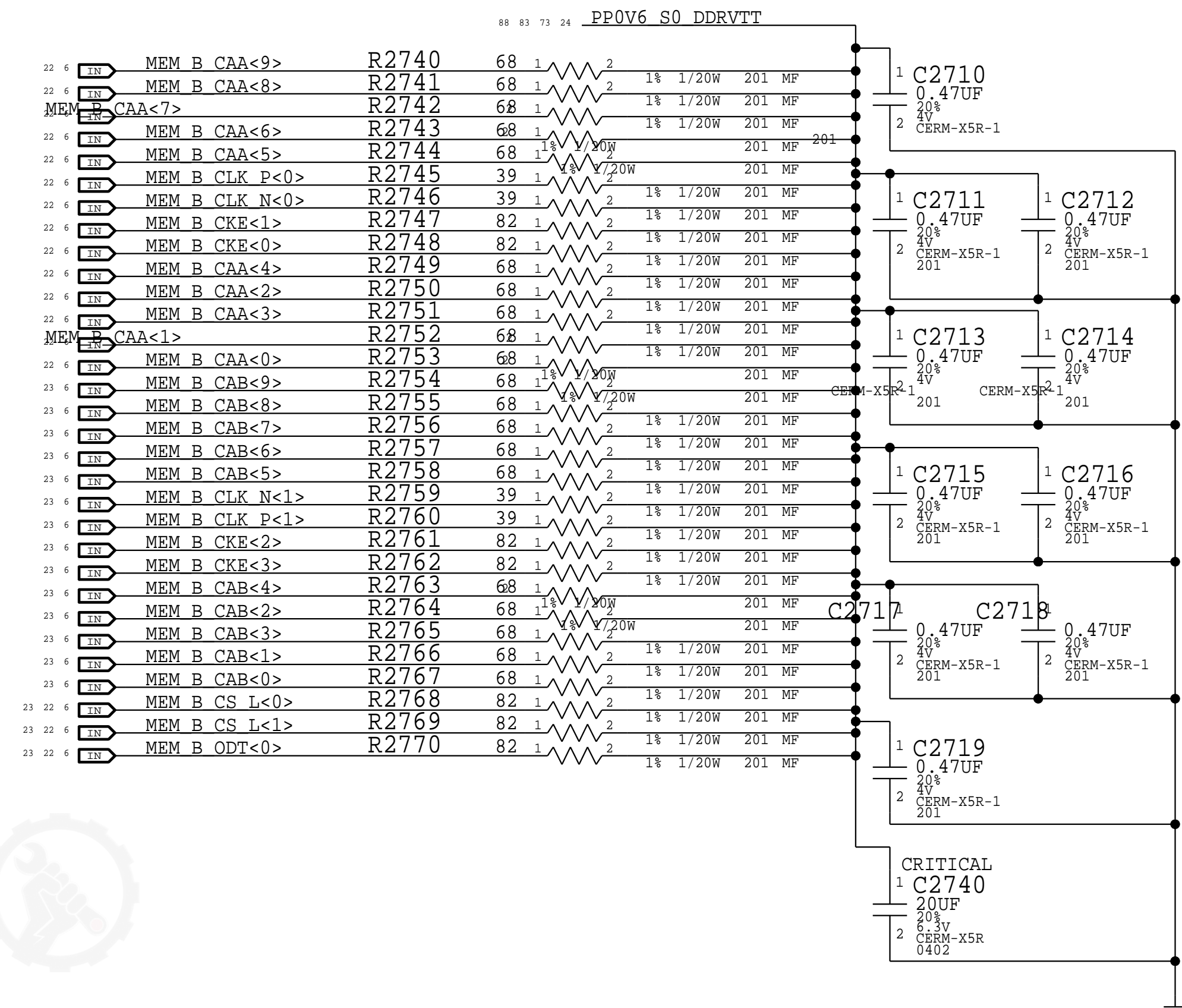
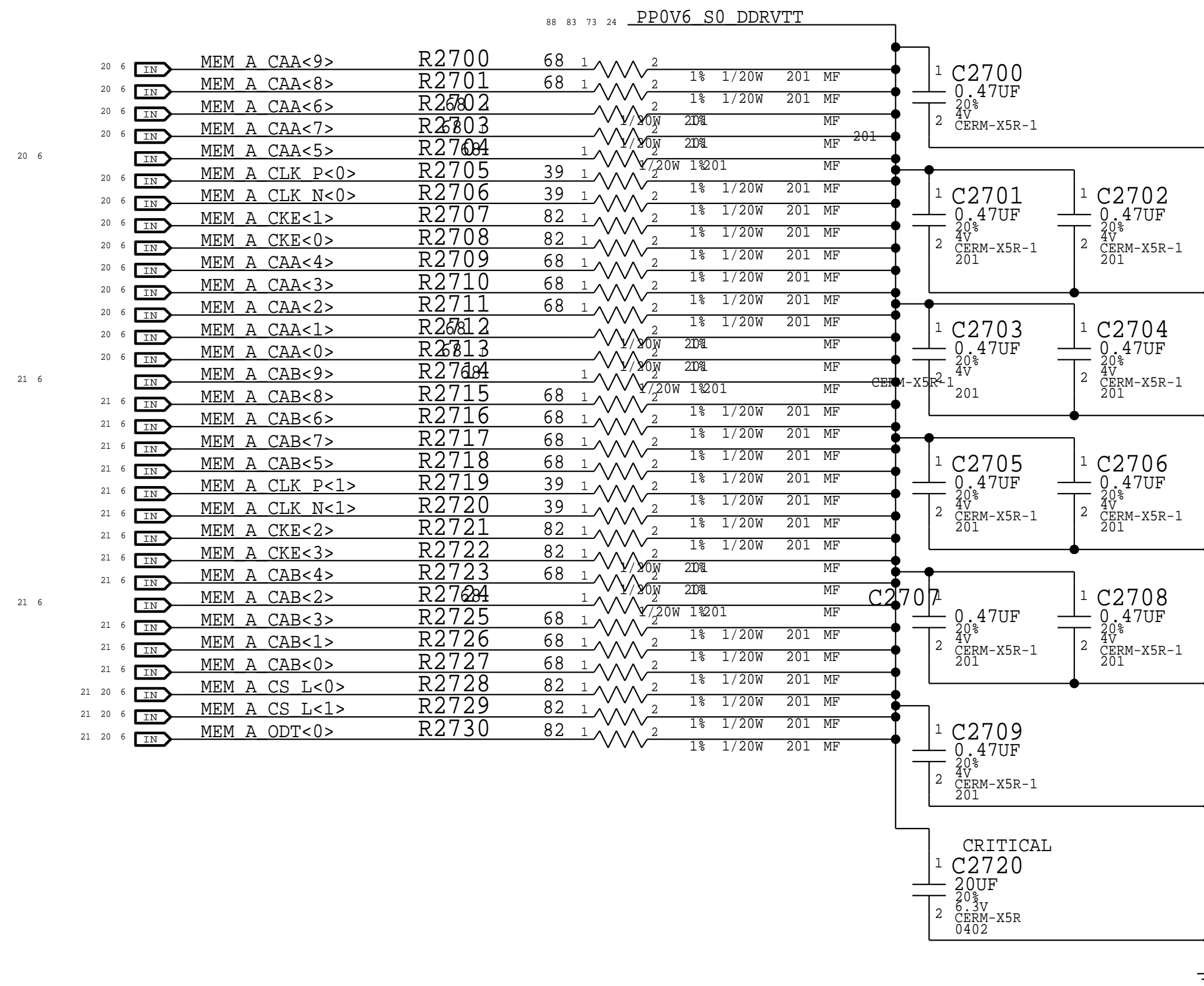


PLACEMENT_NOTE:
 10uF caps are shared between DRAM.
 Distribute evenly.

BOM_COST_GROUP=DRAM

PAGE TITLE		PAGE TITLE	
LPDDR3 DRAM Channel B (32-63)		DRAWING NUMBER	SIZE
		051-04273	D
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		SHEET	23 OF 98

Intel recommends 68 Ohm for CMD/ADDR, 80 Ohm for CTRL/CKE, 38 Ohm for CLK



PAGE TITLE		DRAWING NUMBER		SIZE
LPDDR3 DRAM Termination		051-04273		D
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		PAGE		27 OF 500
		SHEET		24 OF 98

BOM_COST_GROUP=DRAM

D

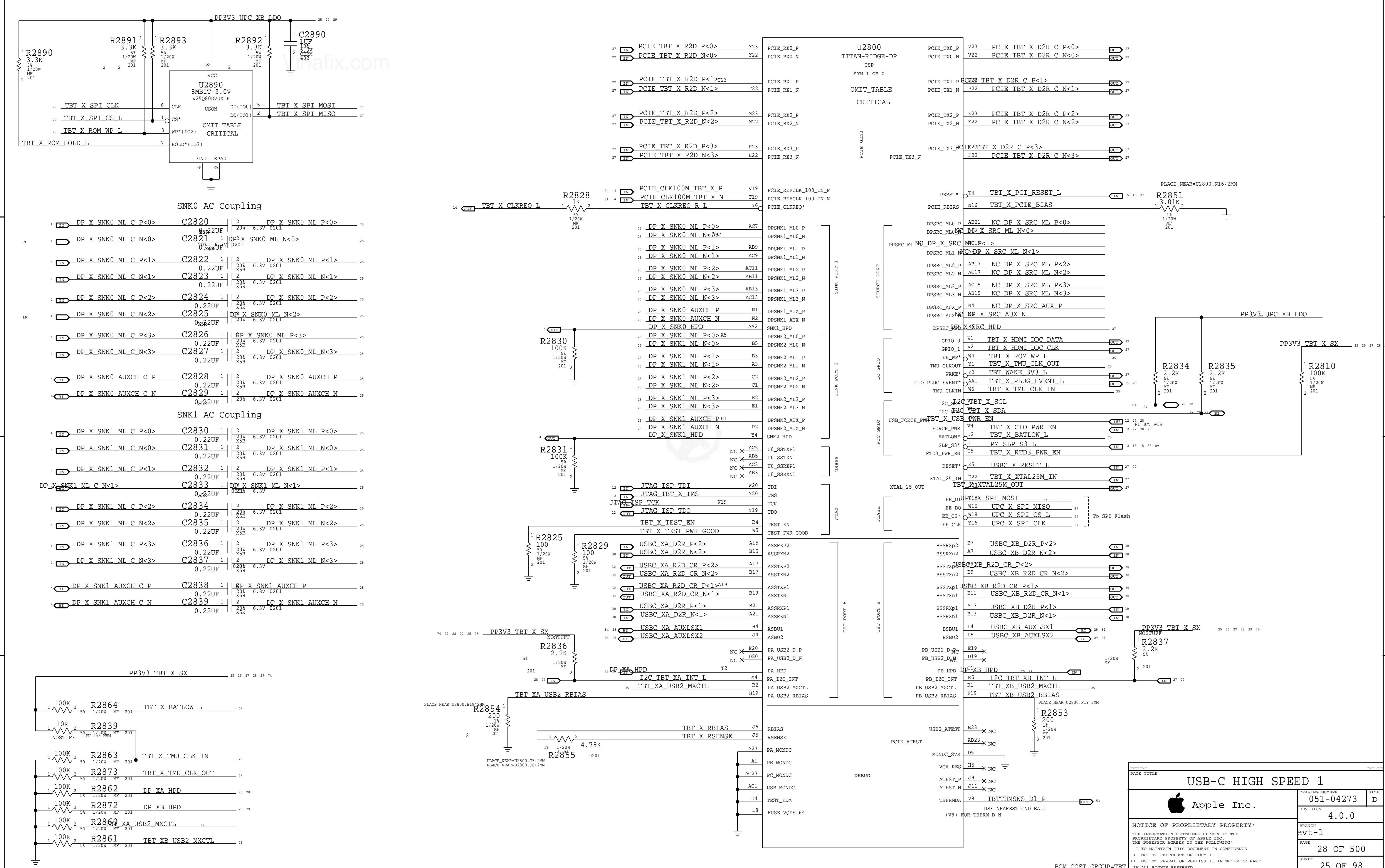
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A

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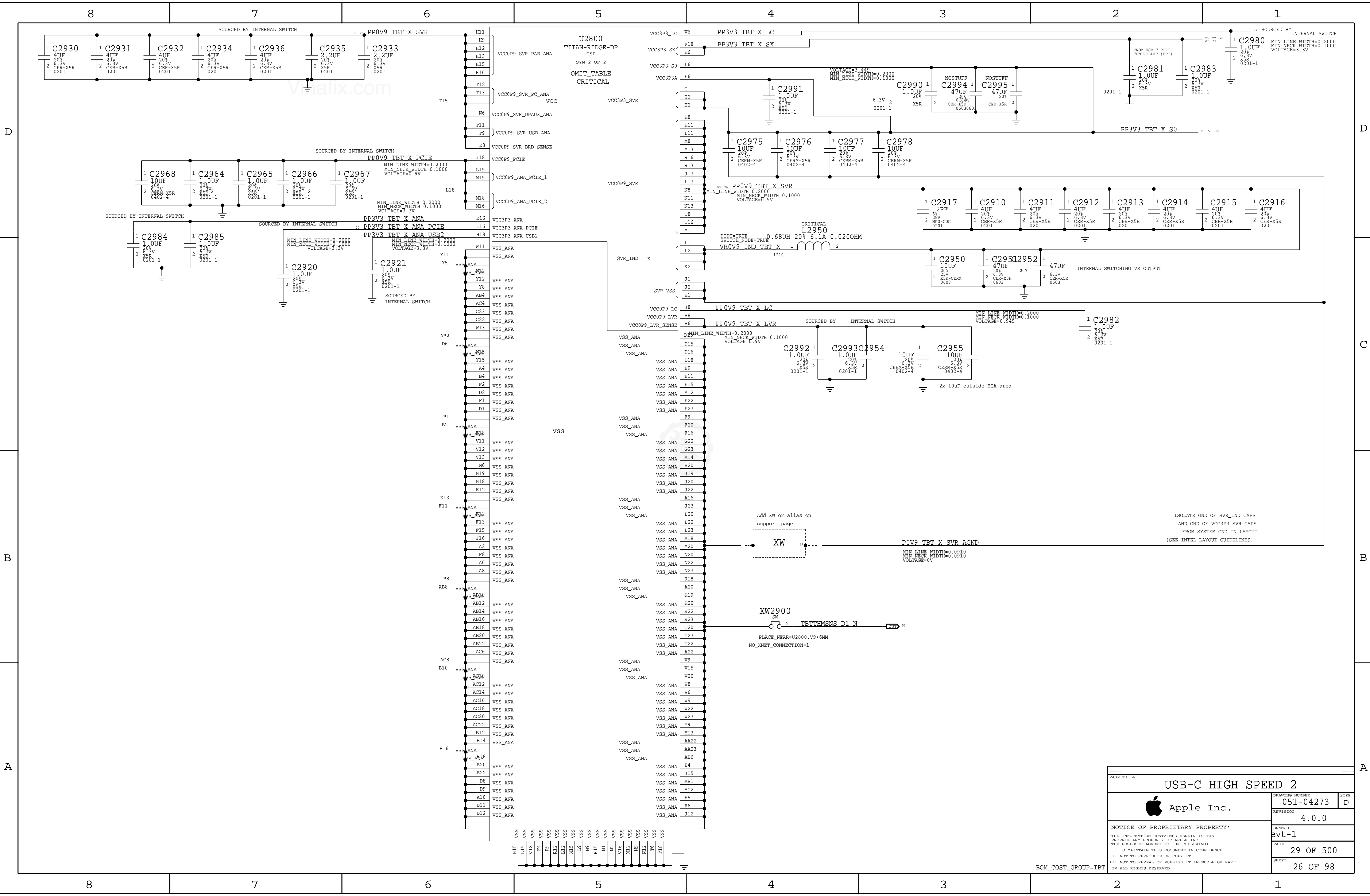
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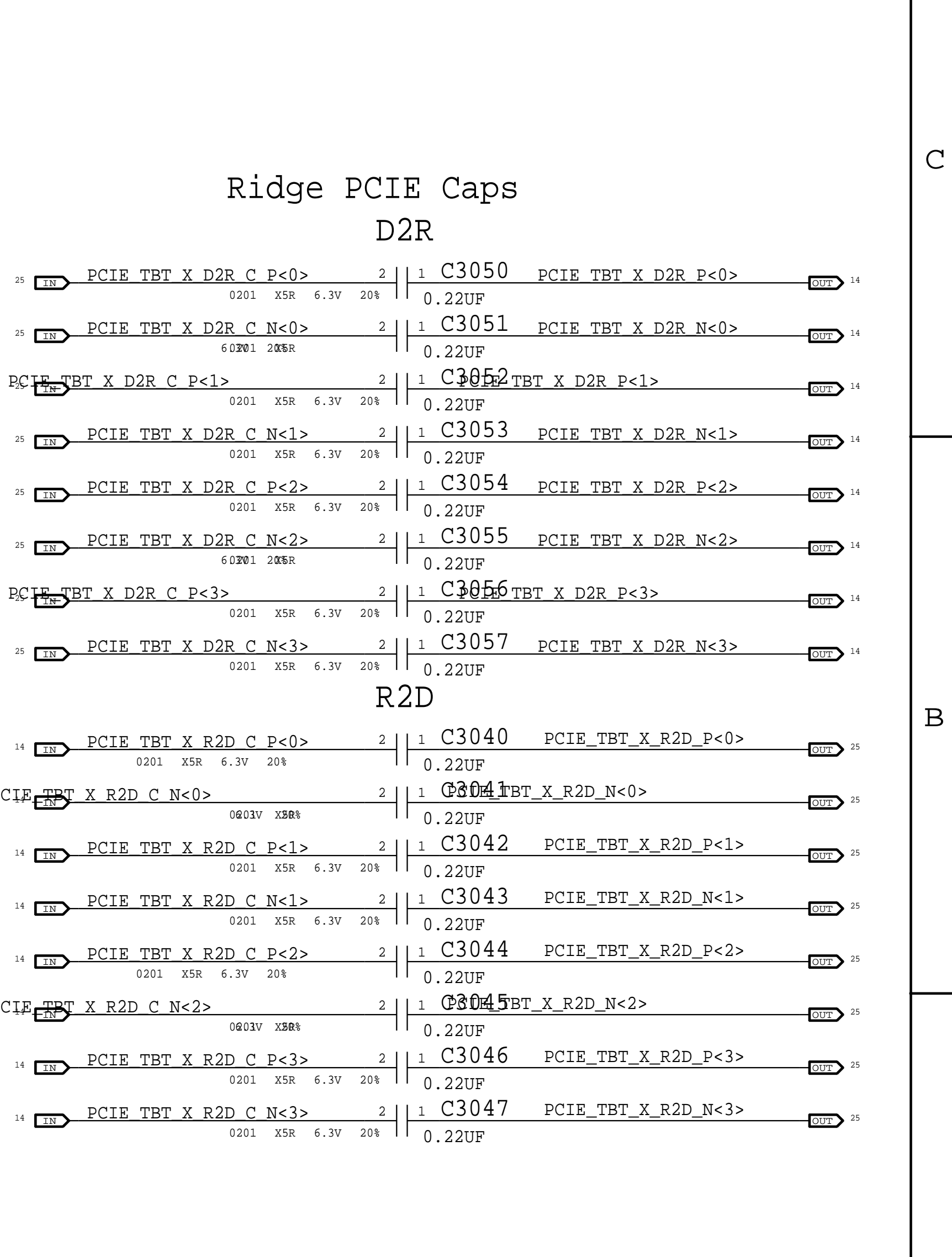
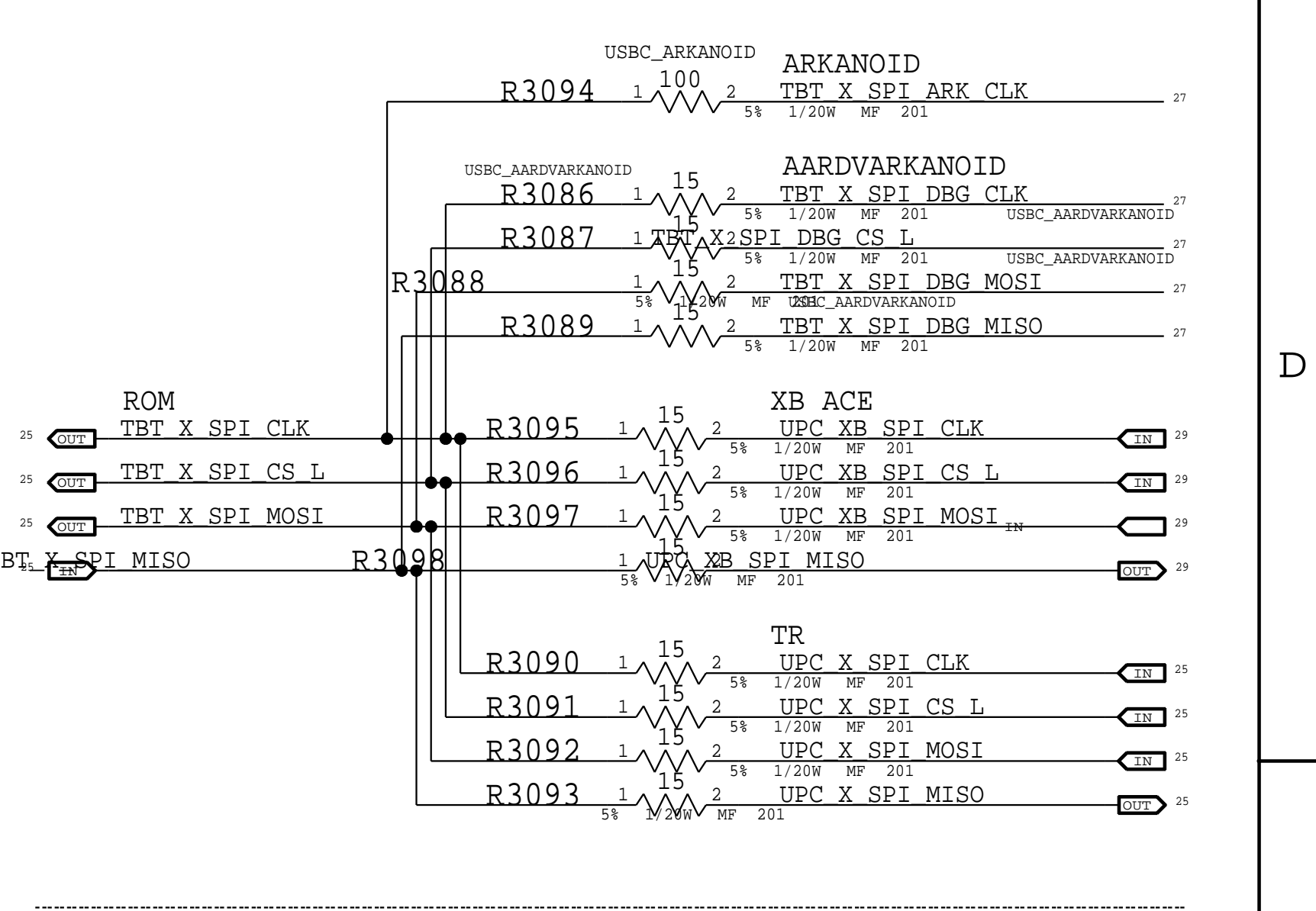
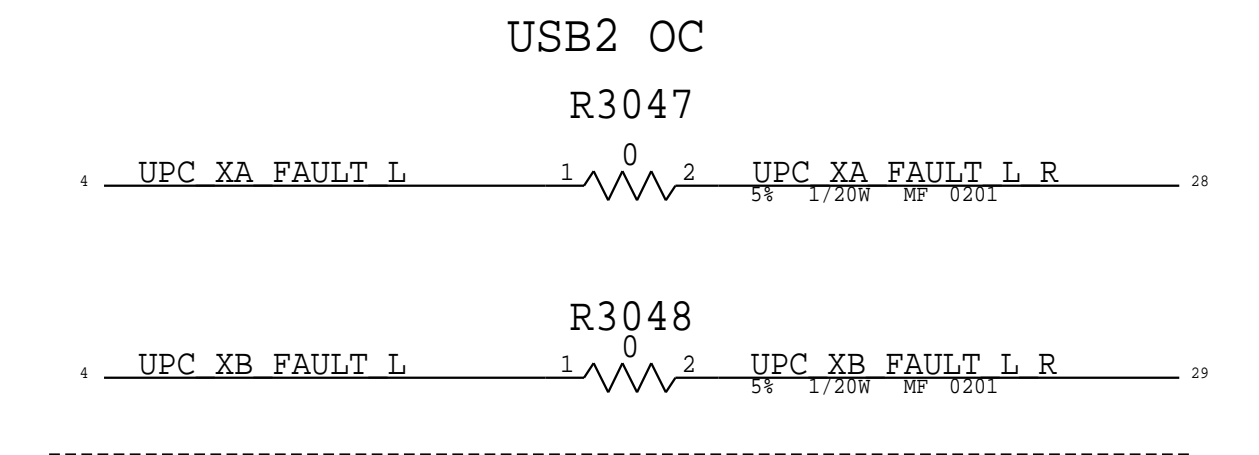
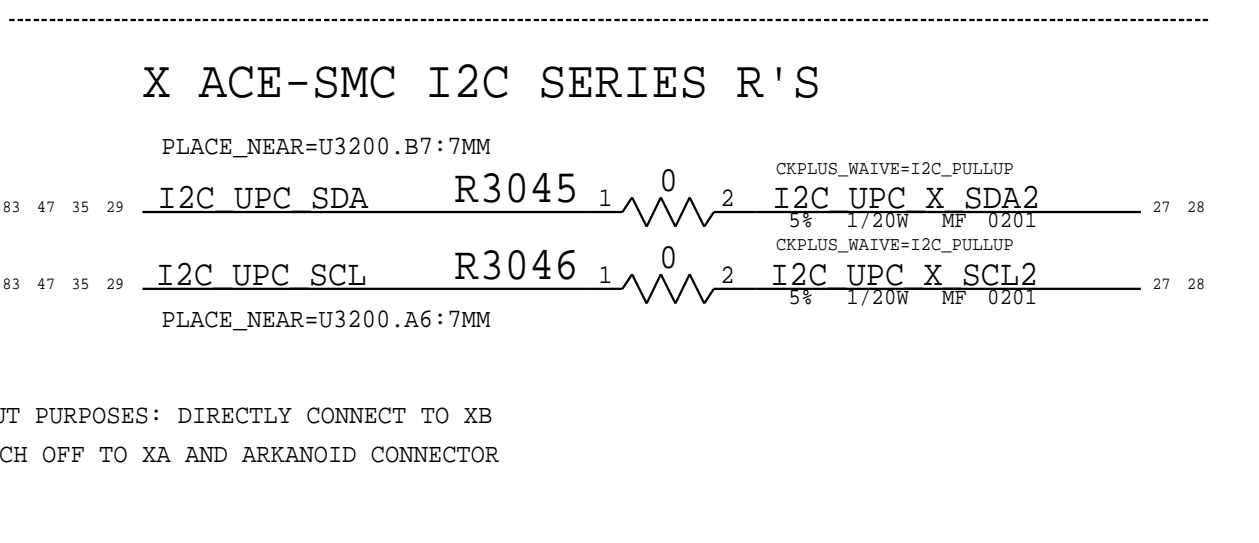
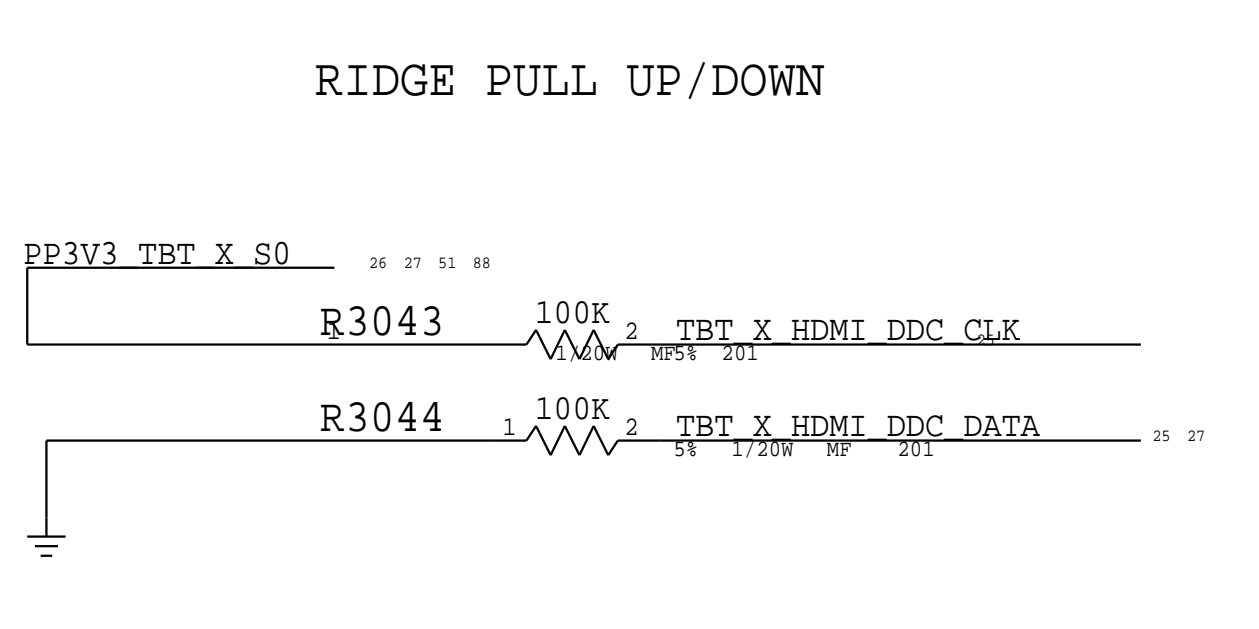
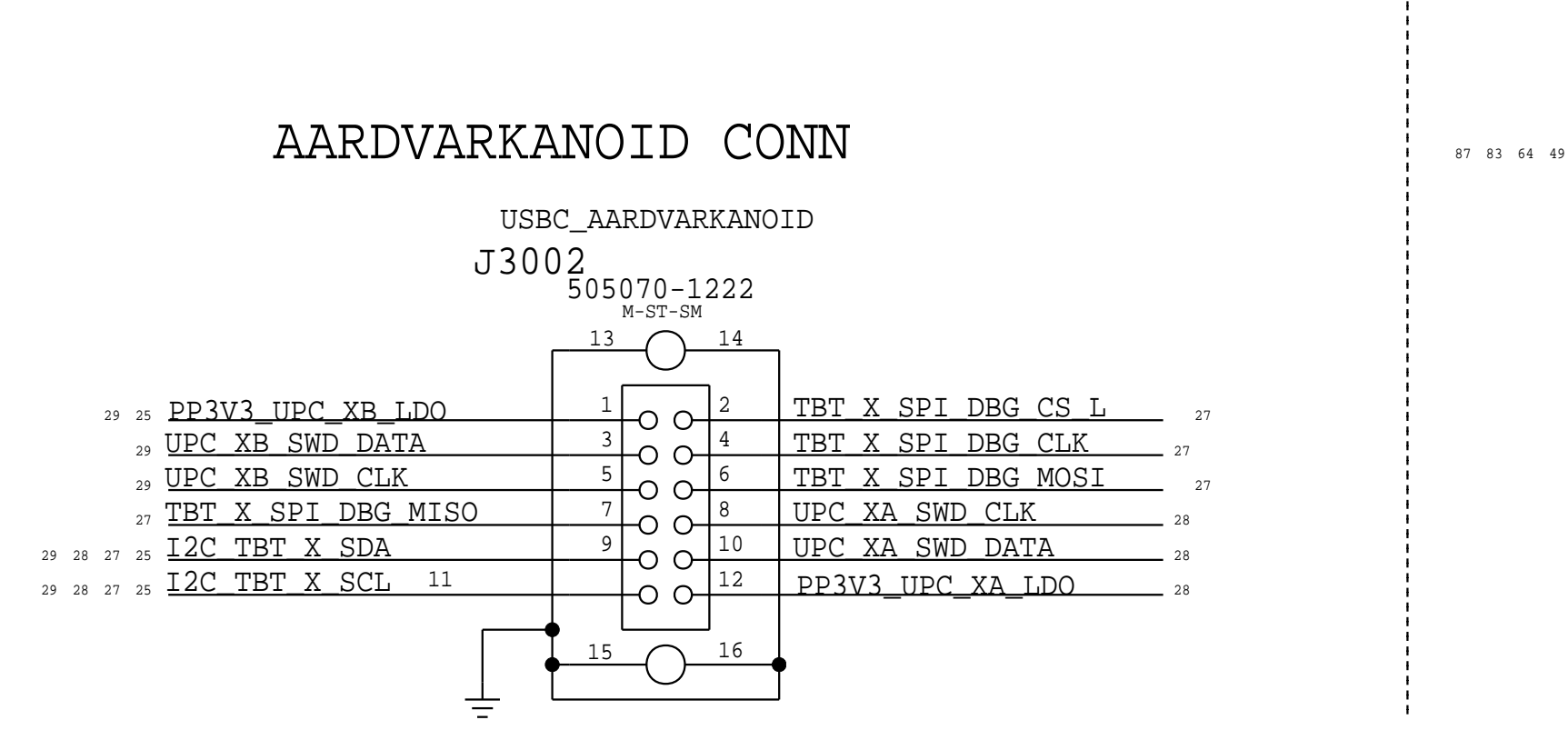
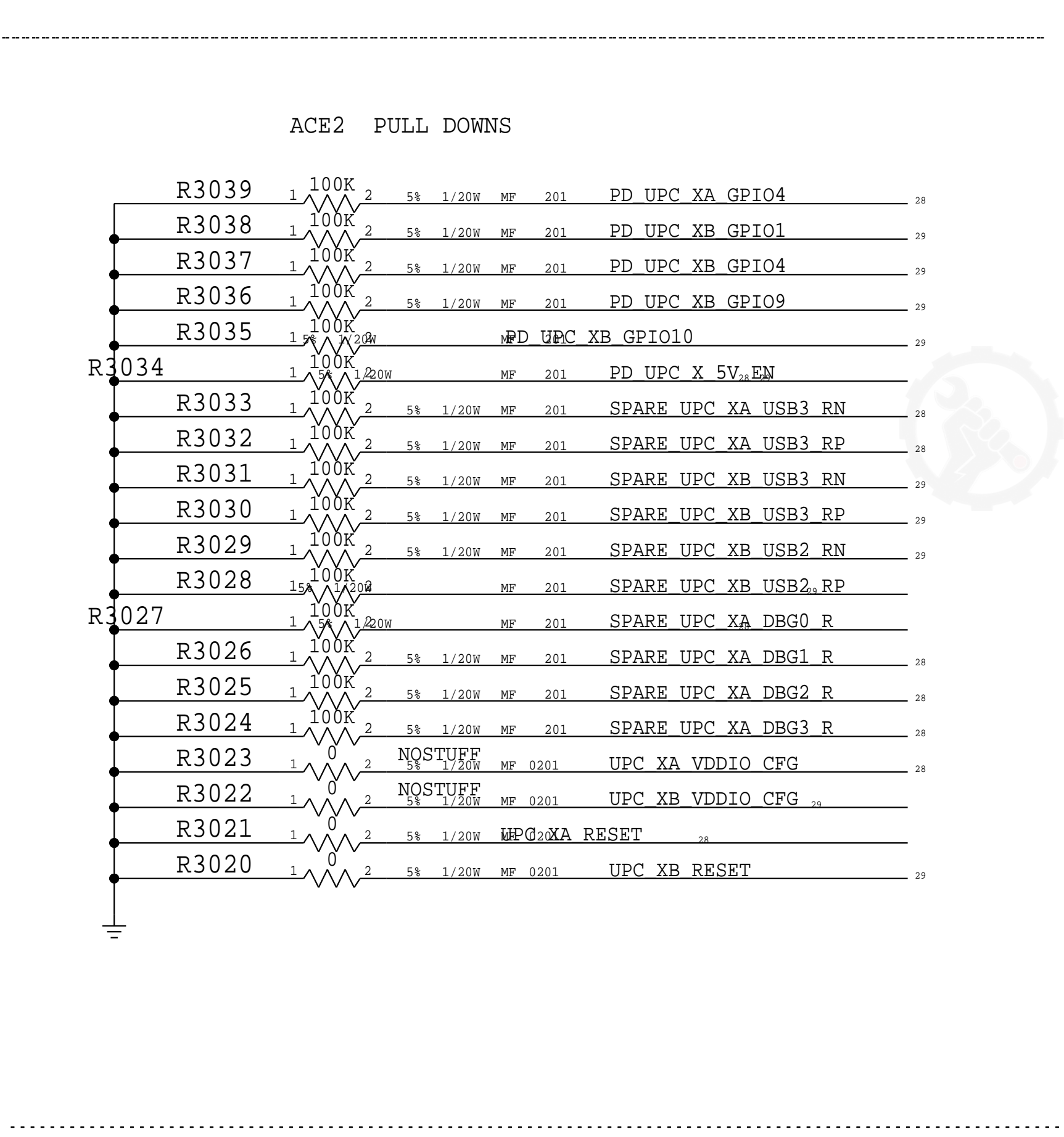
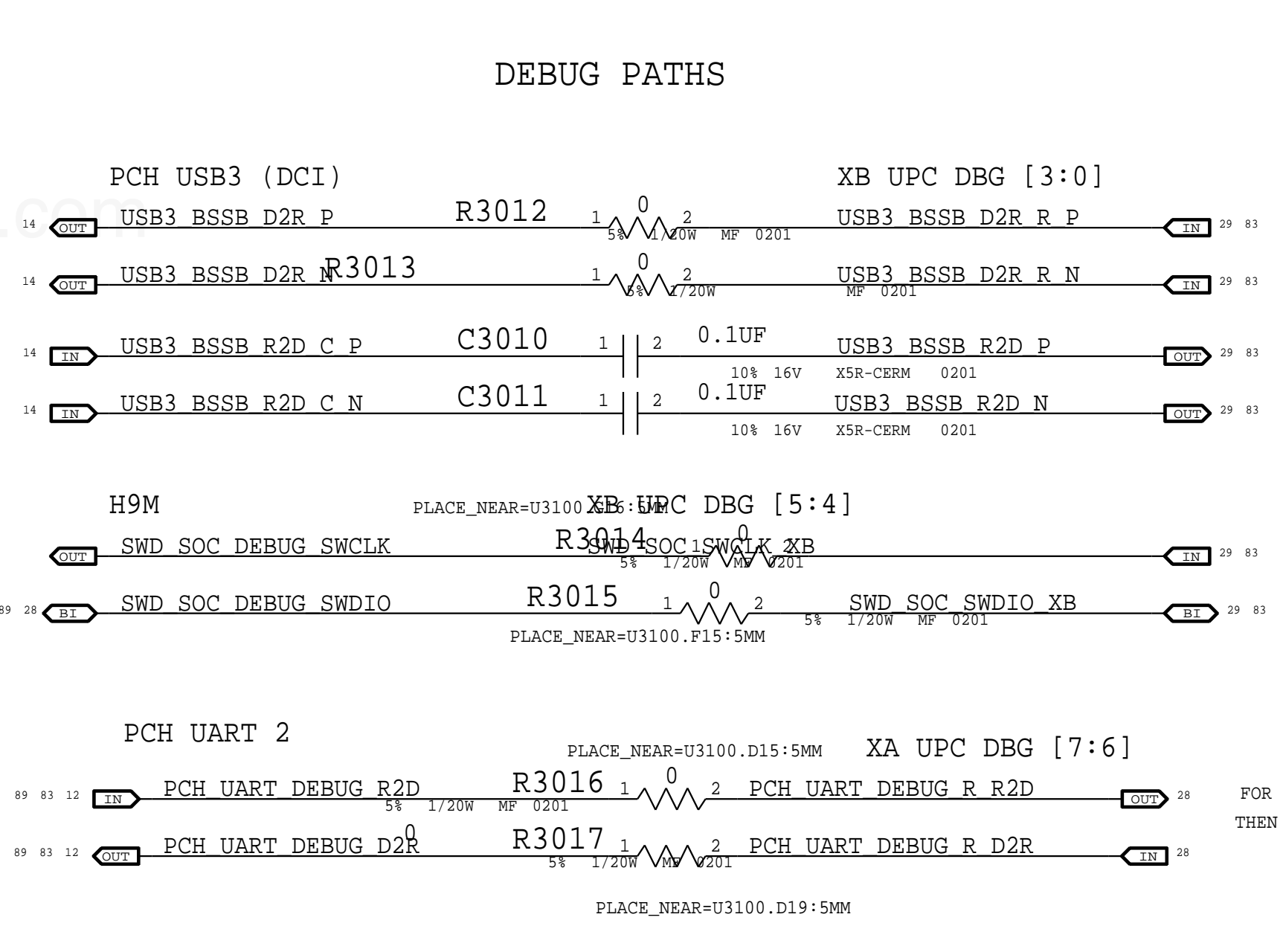
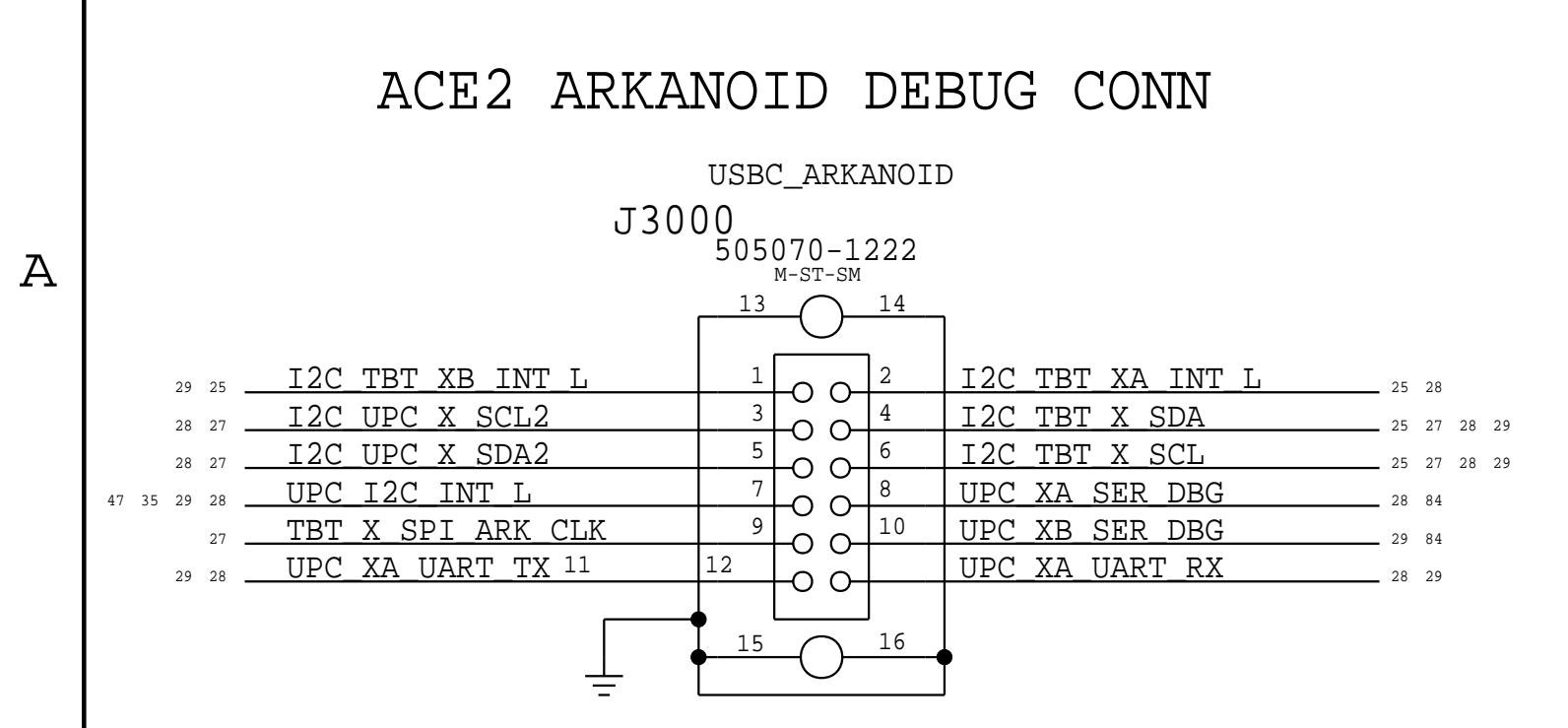
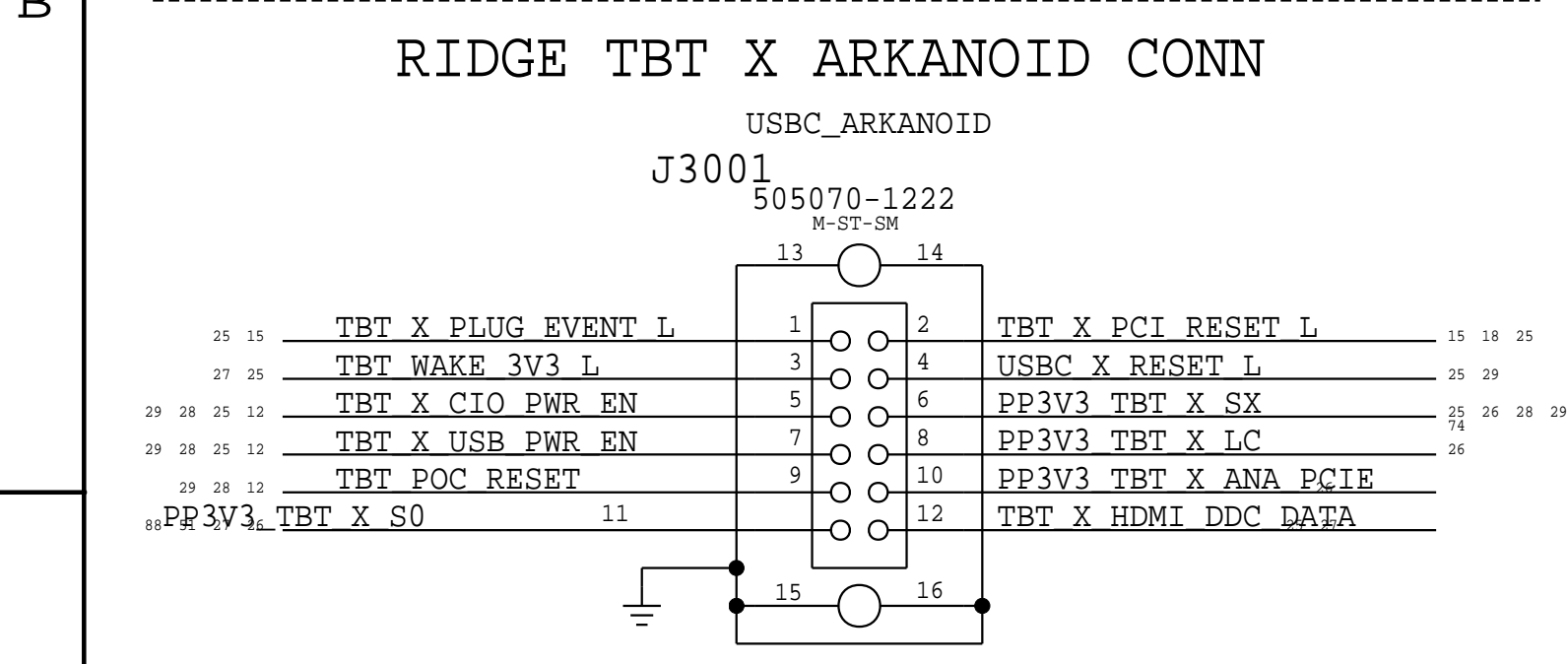
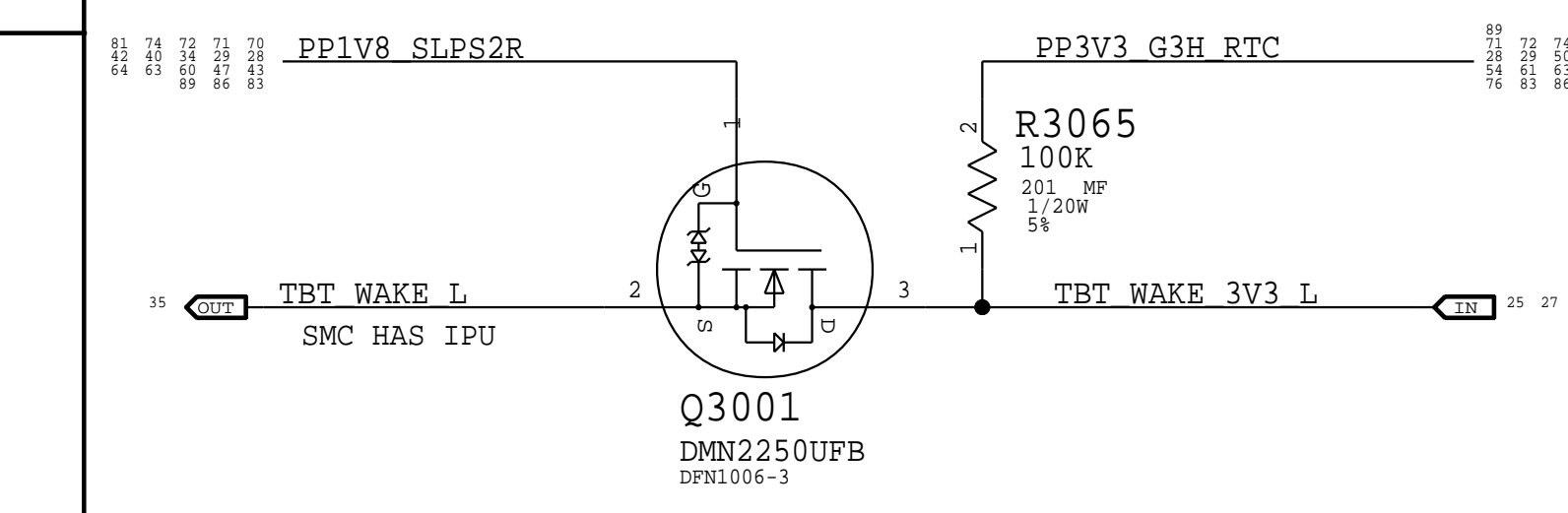
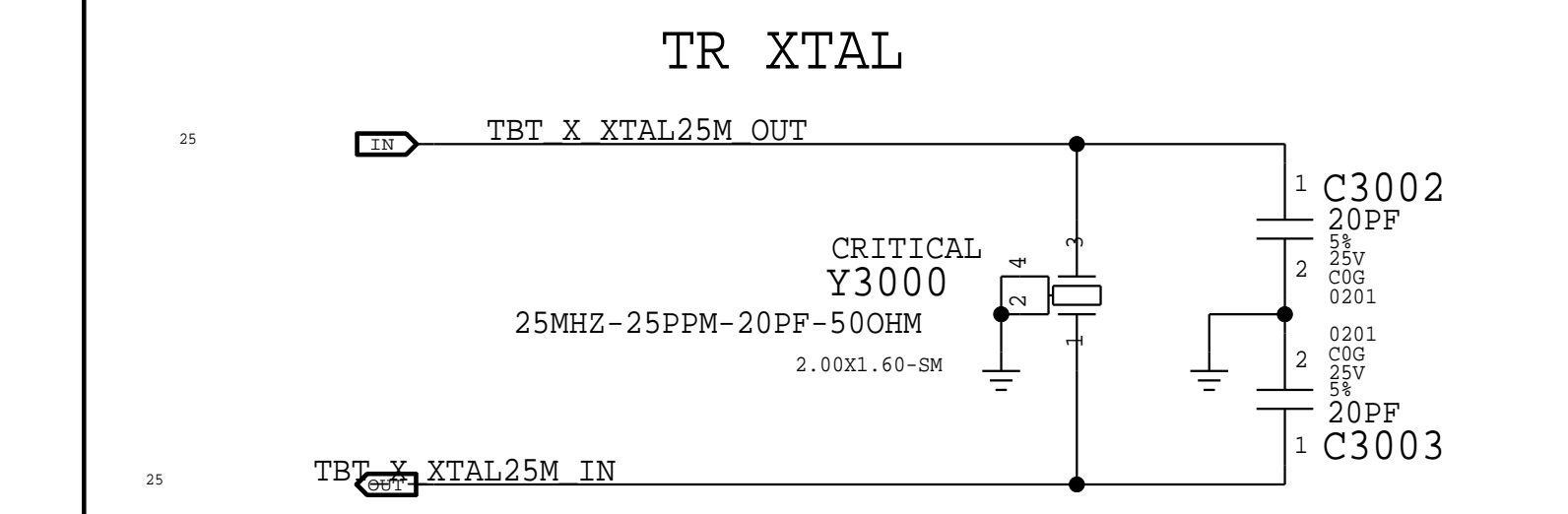
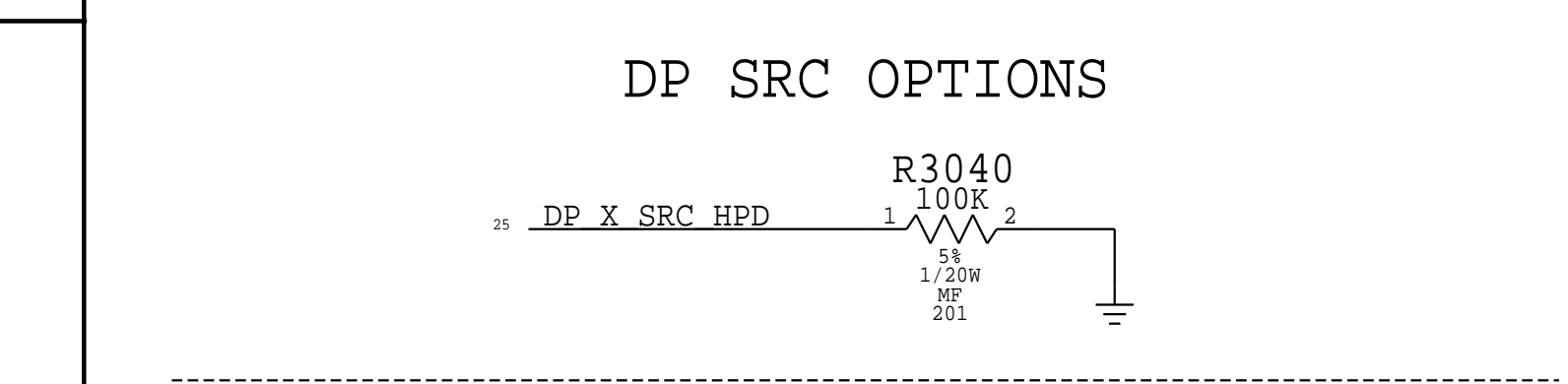
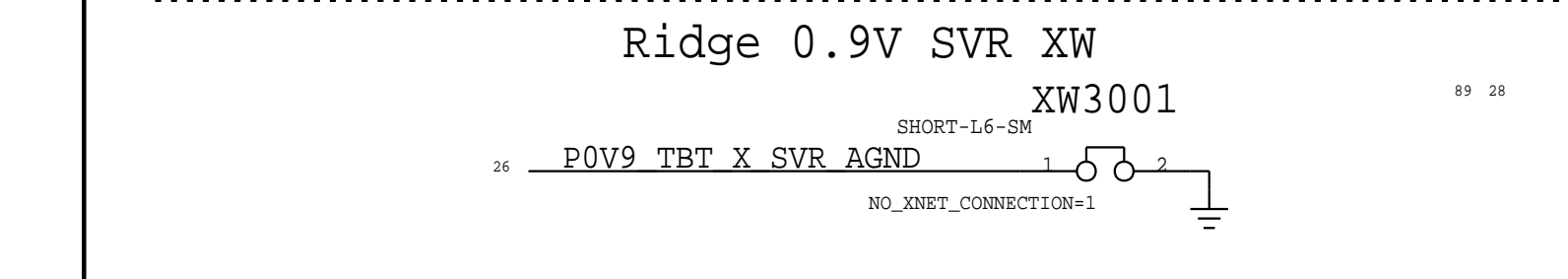
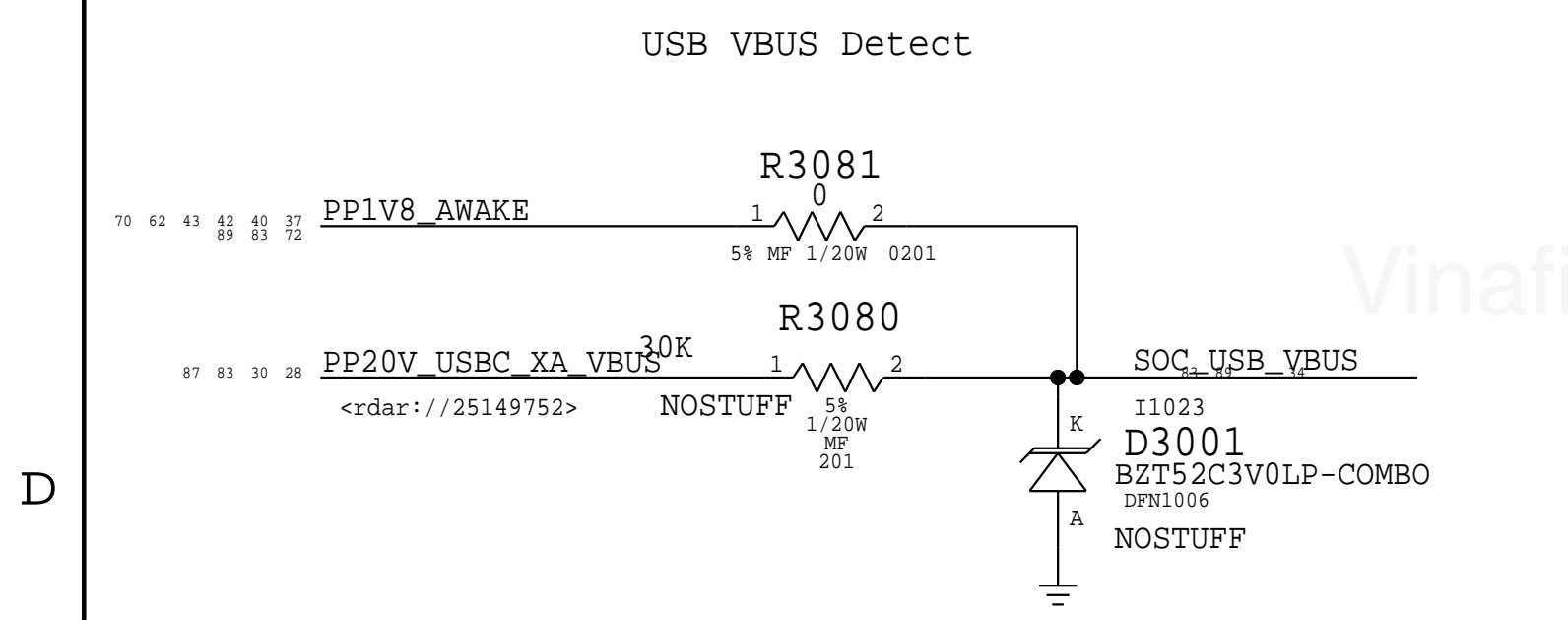
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		REVISION	4.0.0		
		BRANCH	evt-1		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	28 OF 500		
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I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		SHEET			
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BOM_COST_GROUP=TBT



PAGE TITLE		
USB-C HIGH SPEED 2		
	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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BRANCH	evt-1	
PAGE	29 OF 500	
SHEET	26 OF 98	

BOM_COST_GROUP=TBT



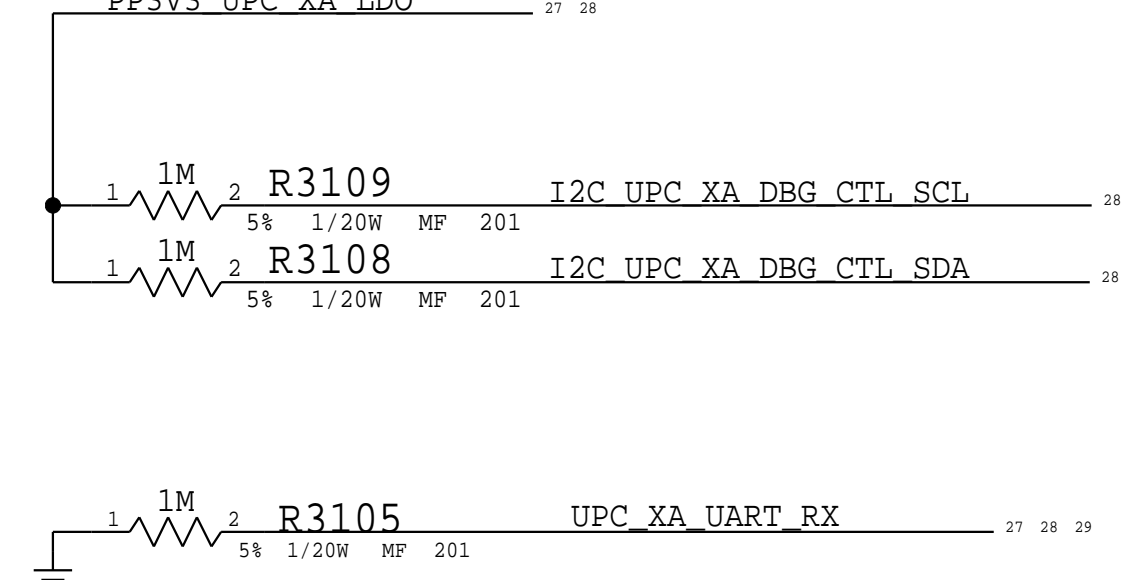
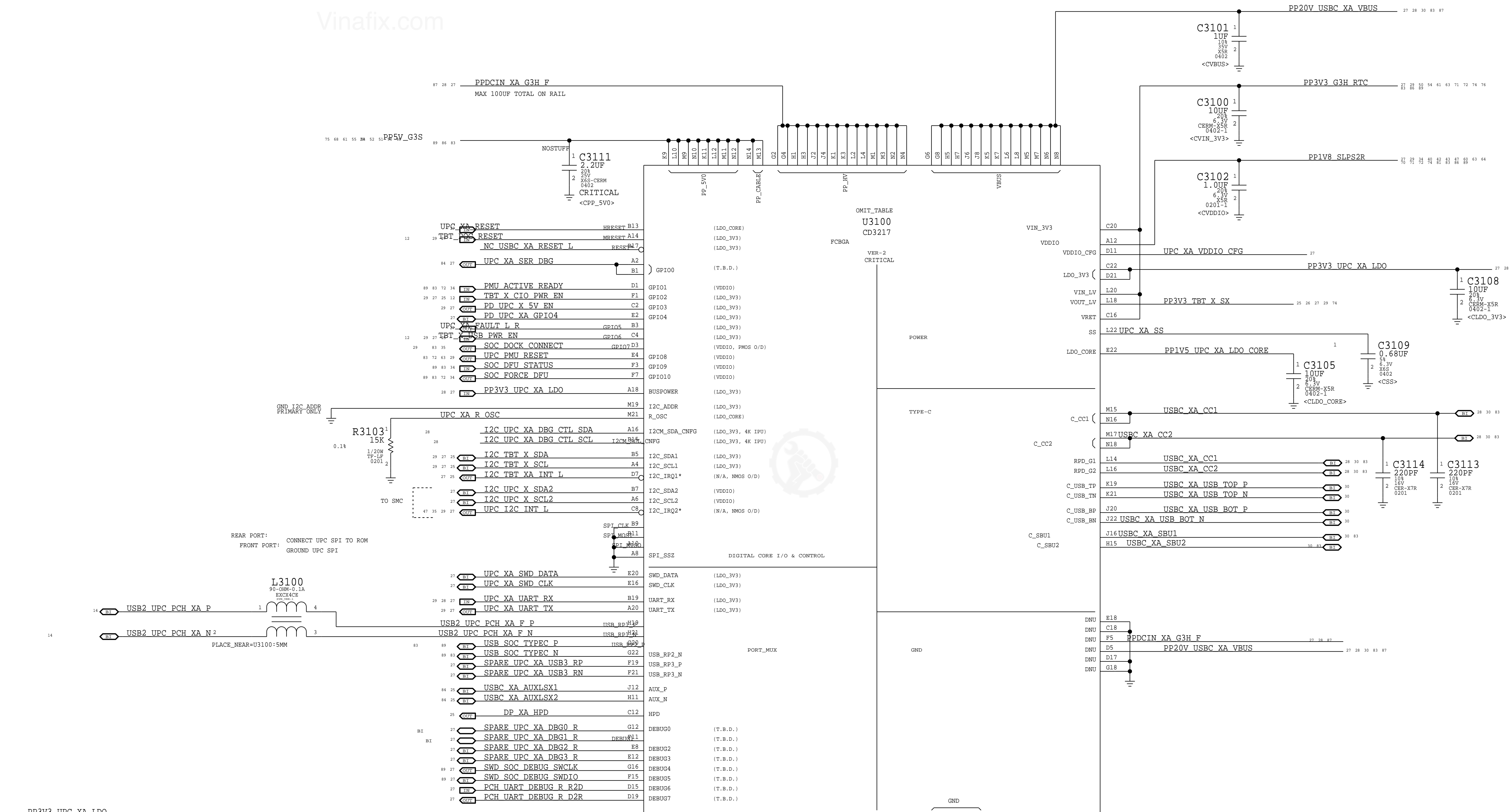
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DRAWING NUMBER		051-04273	
REVISION		4.0.0	
BRANCH		evt-1	
PAGE		30 OF 500	
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BOM_COST_GROUP=TBT

PRIMARY USB-C PORT CONTROLLER (UPC) [FRONT LEFT]

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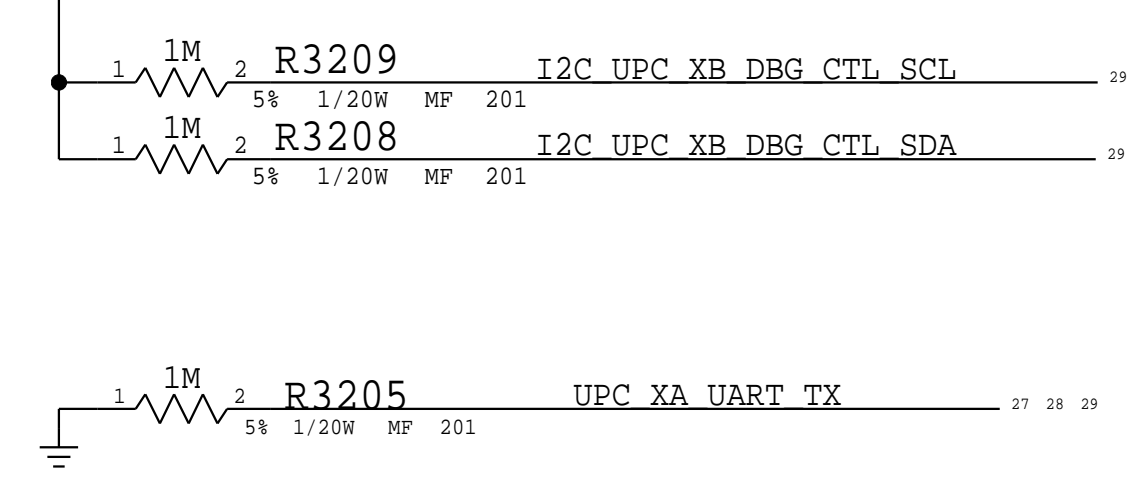
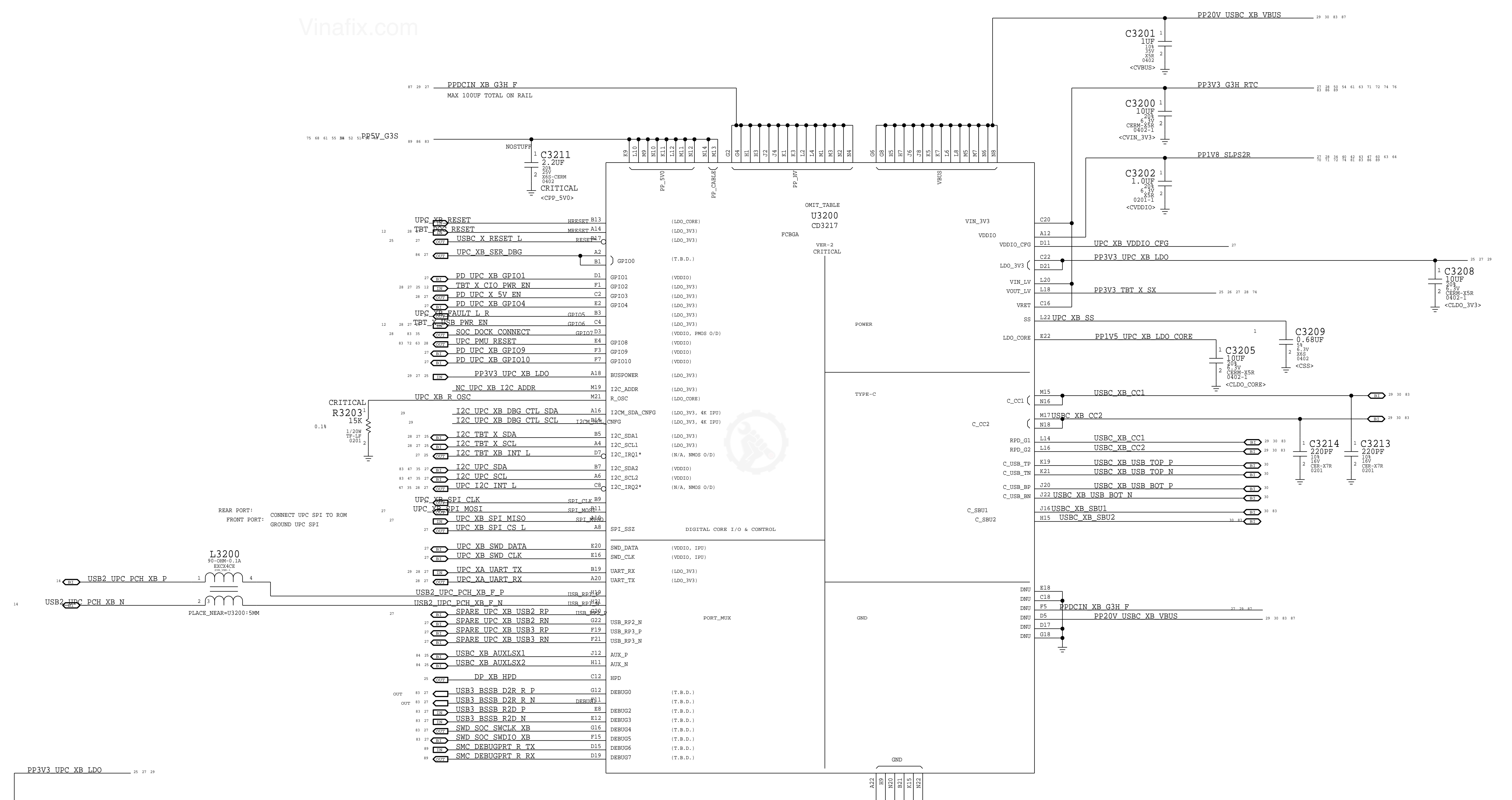


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Apple Inc.		DRAWING NUMBER	051-04273
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		PAGE	31 OF 500
		SHEET	28 OF 98

BOM_COST_GROUP=USB-C

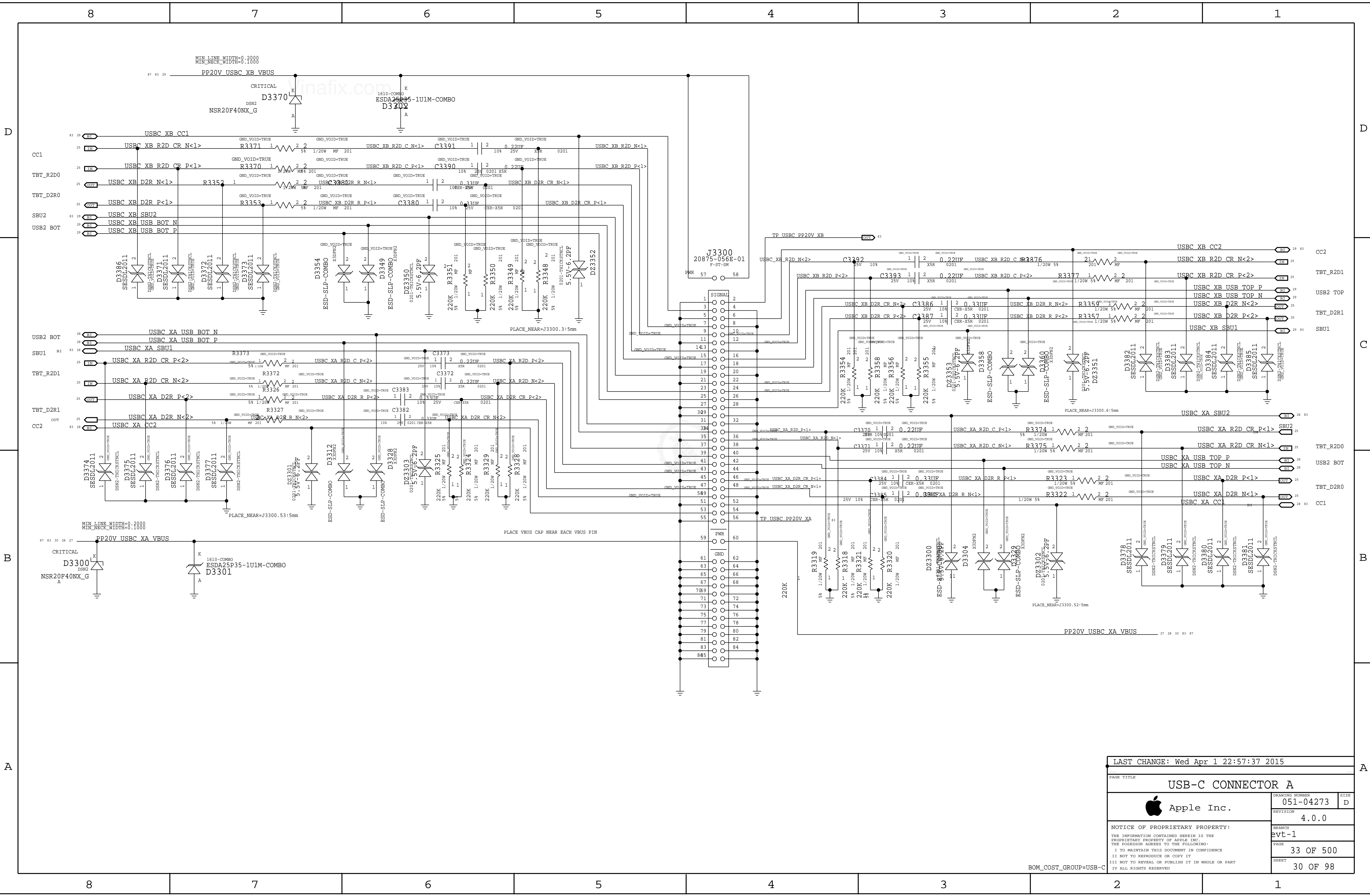
SECONDARY USB-C PORT CONTROLLER (UPC) [REAR LEFT]

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PAGE TITLE		DRAWING NUMBER		SIZE
		051-04273		D
		REVISION		4.0.0
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		SHEET		29 OF 98

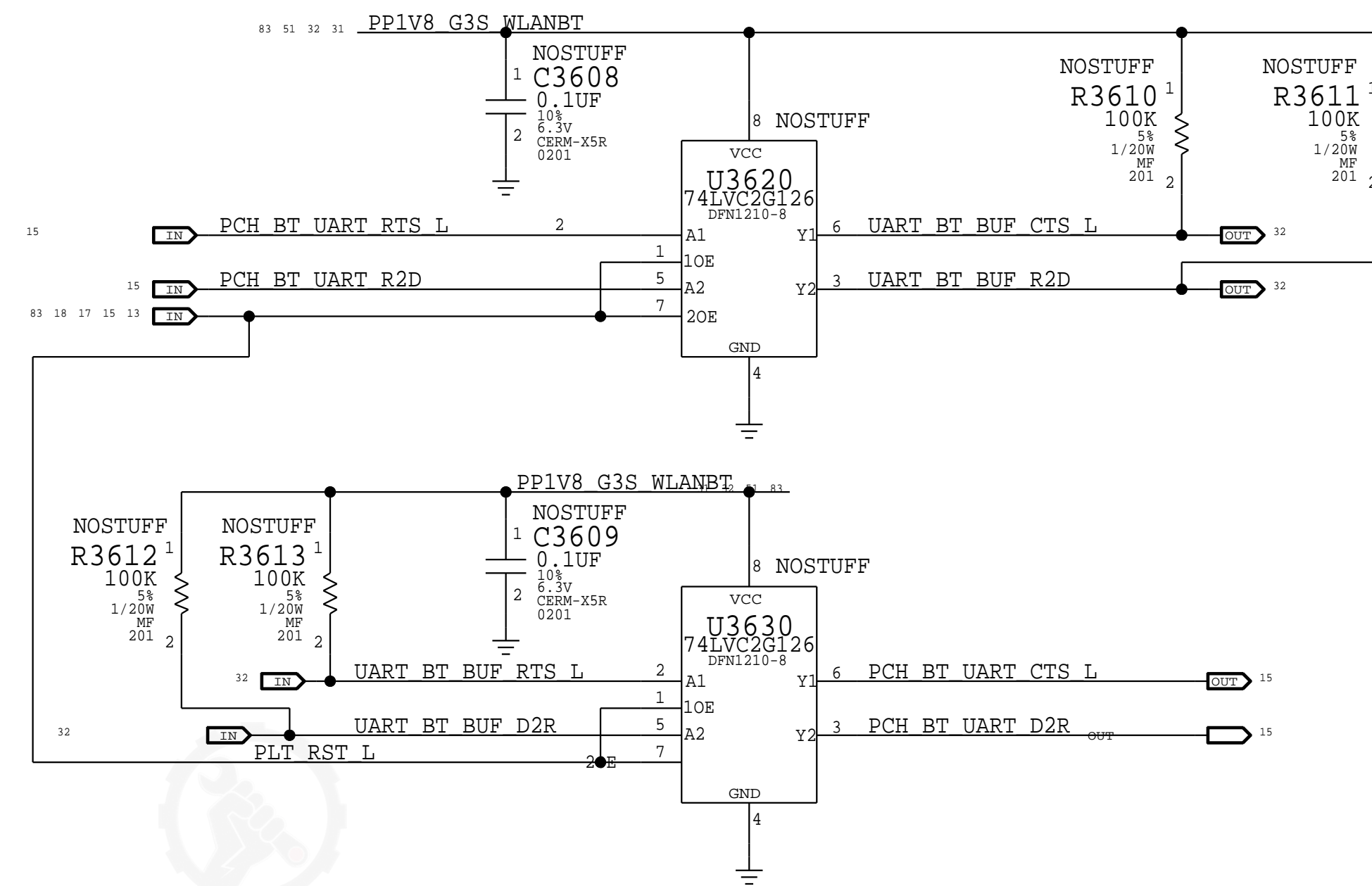
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	DRAWING NUMBER 051-04273	SIZE D
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BRANCH evt-1	PAGE 33 OF 500	
SHEET 30 OF 98		

BOM_COST_GROUP=USB-C

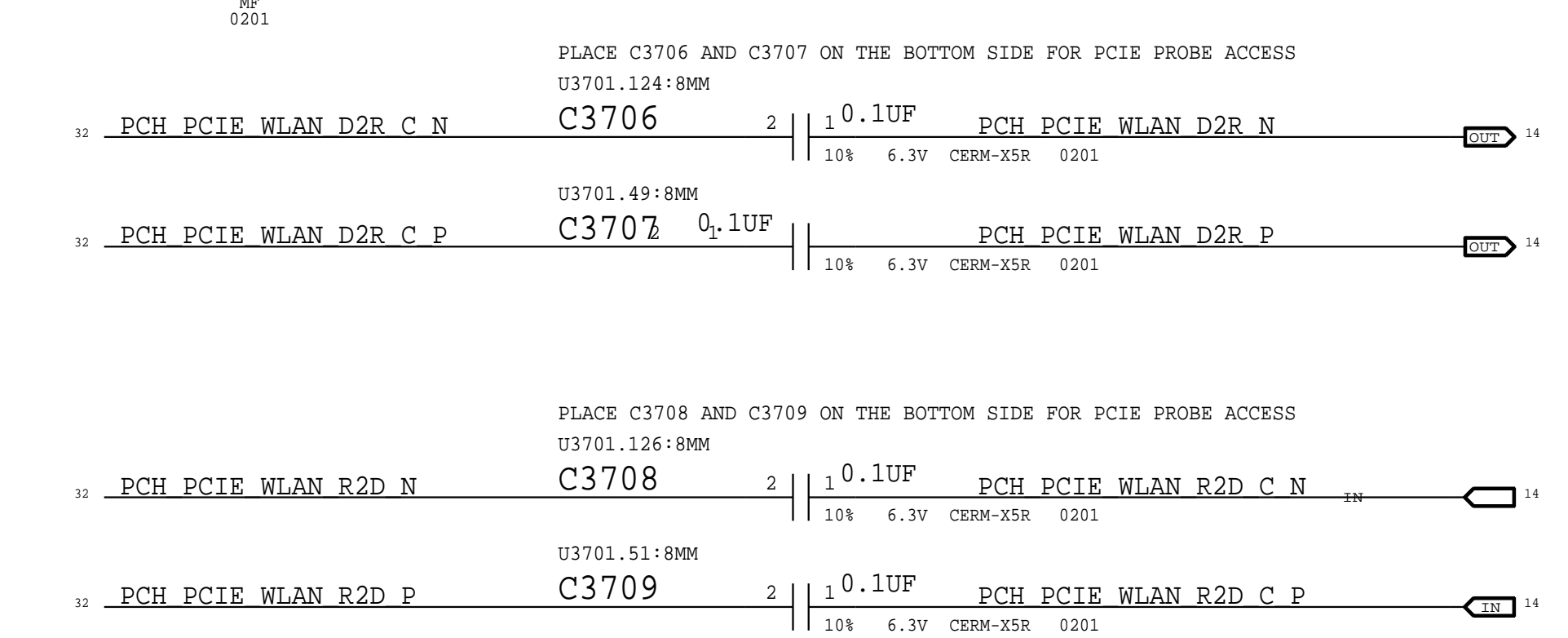
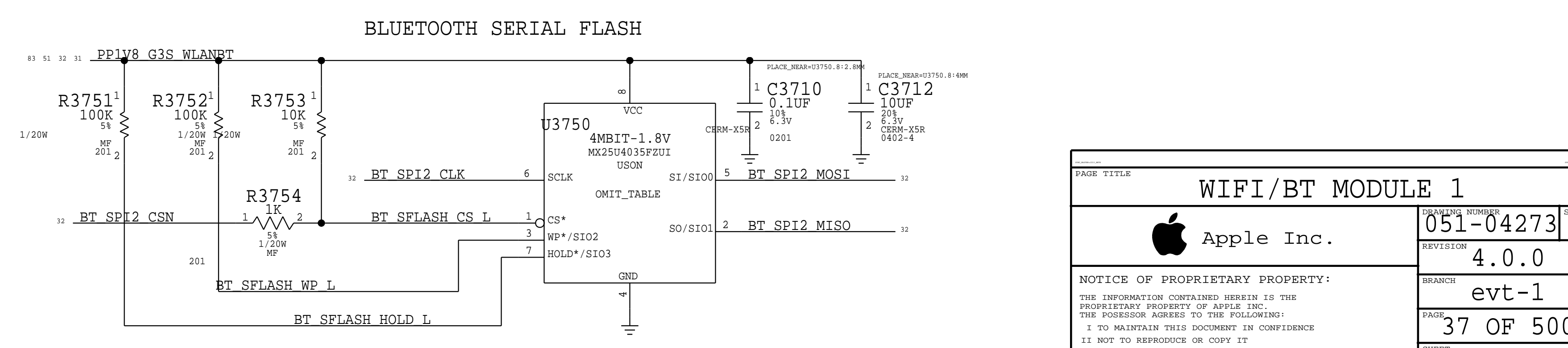
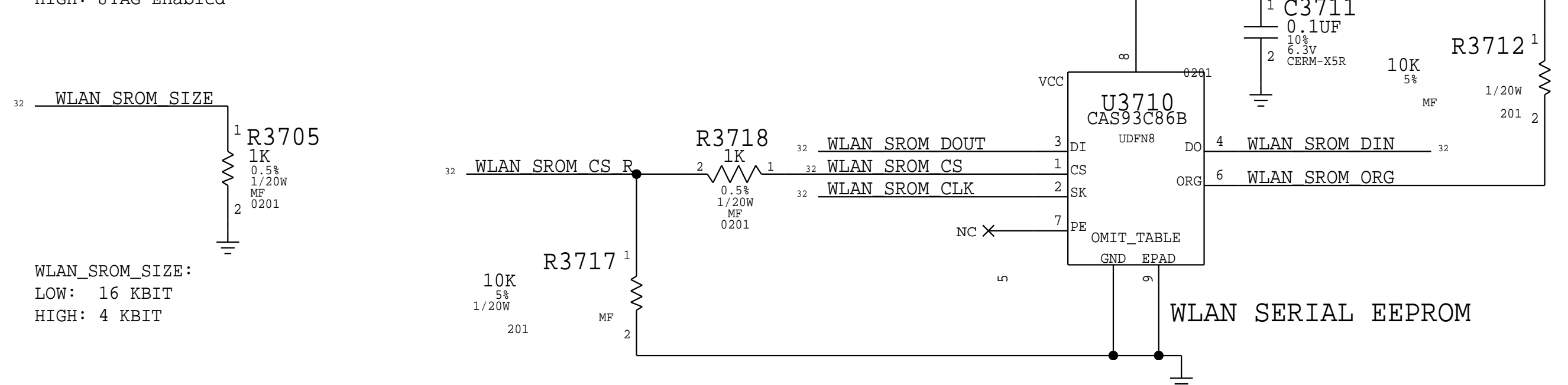
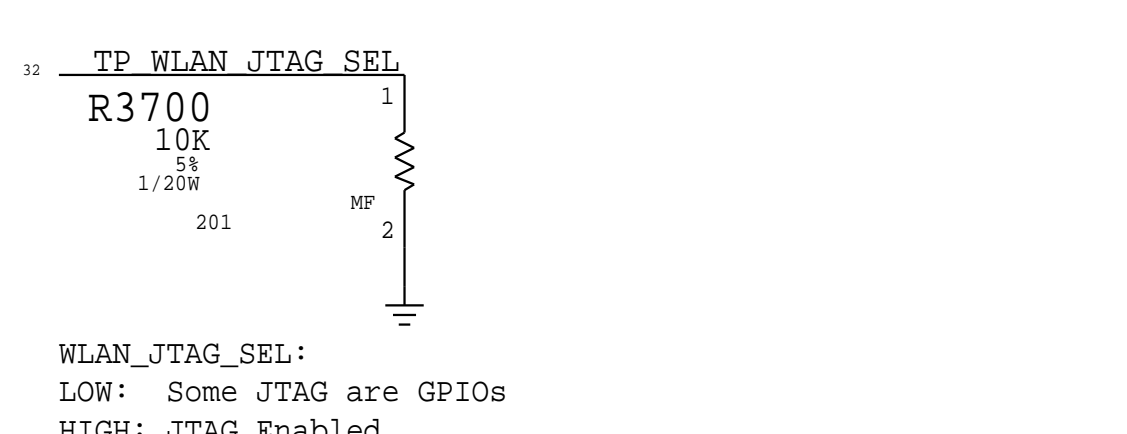
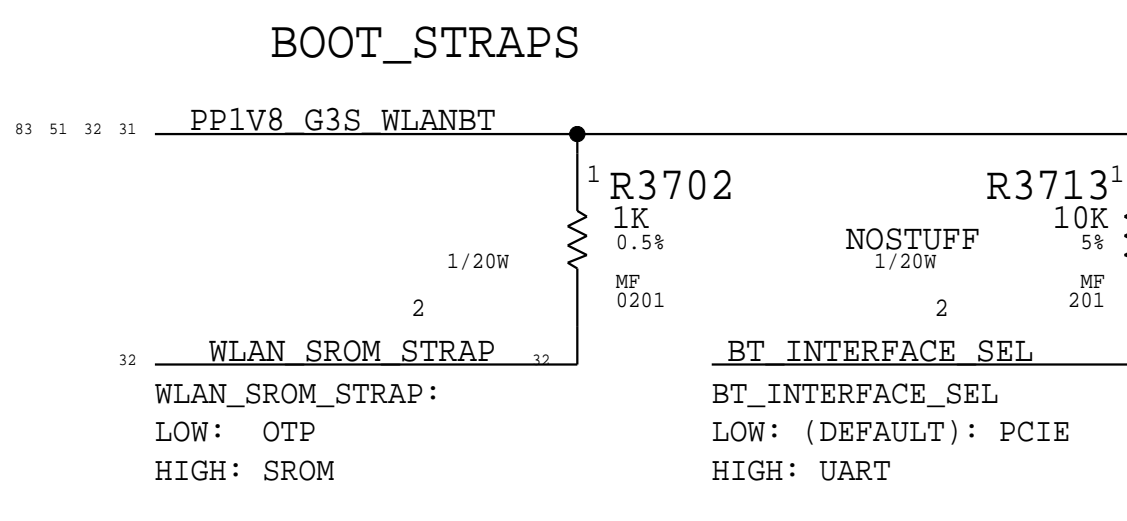
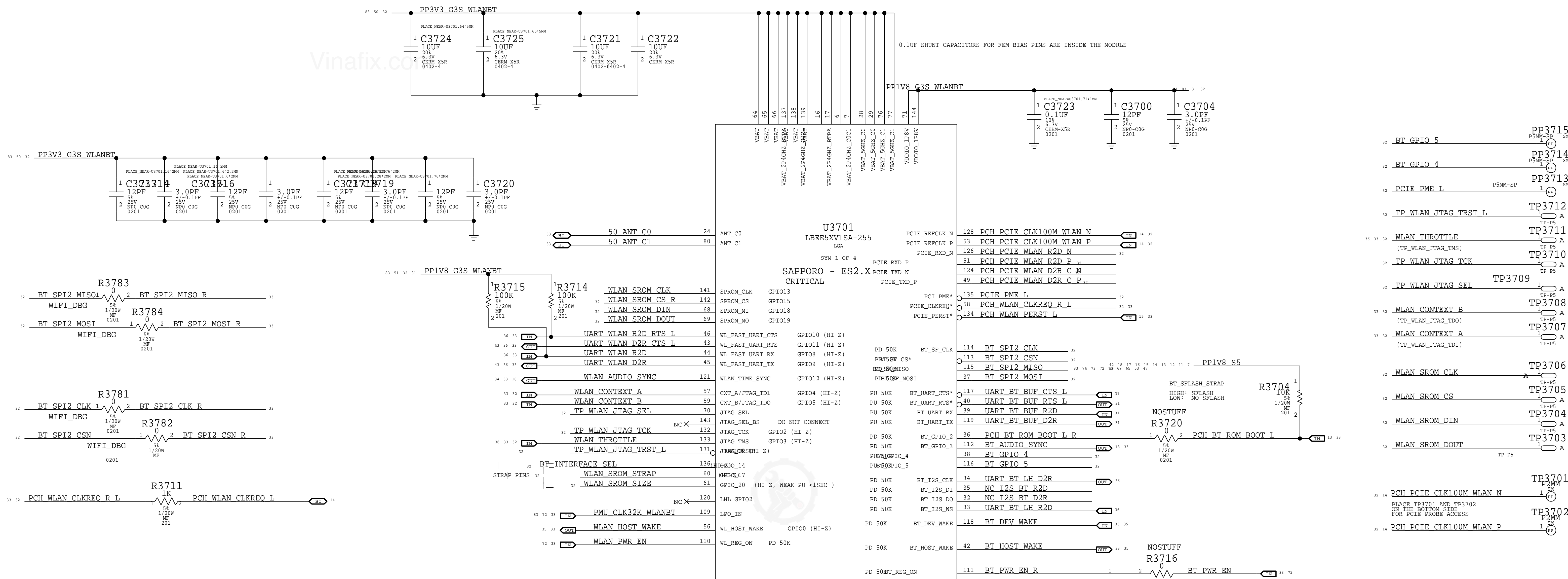
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PAGE TITLE		
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	PAGE	36 OF 500
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A

PAGE TITLE		WIFI/BT MODULE 1	
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BOM_COST_GROUP=WIRELESS

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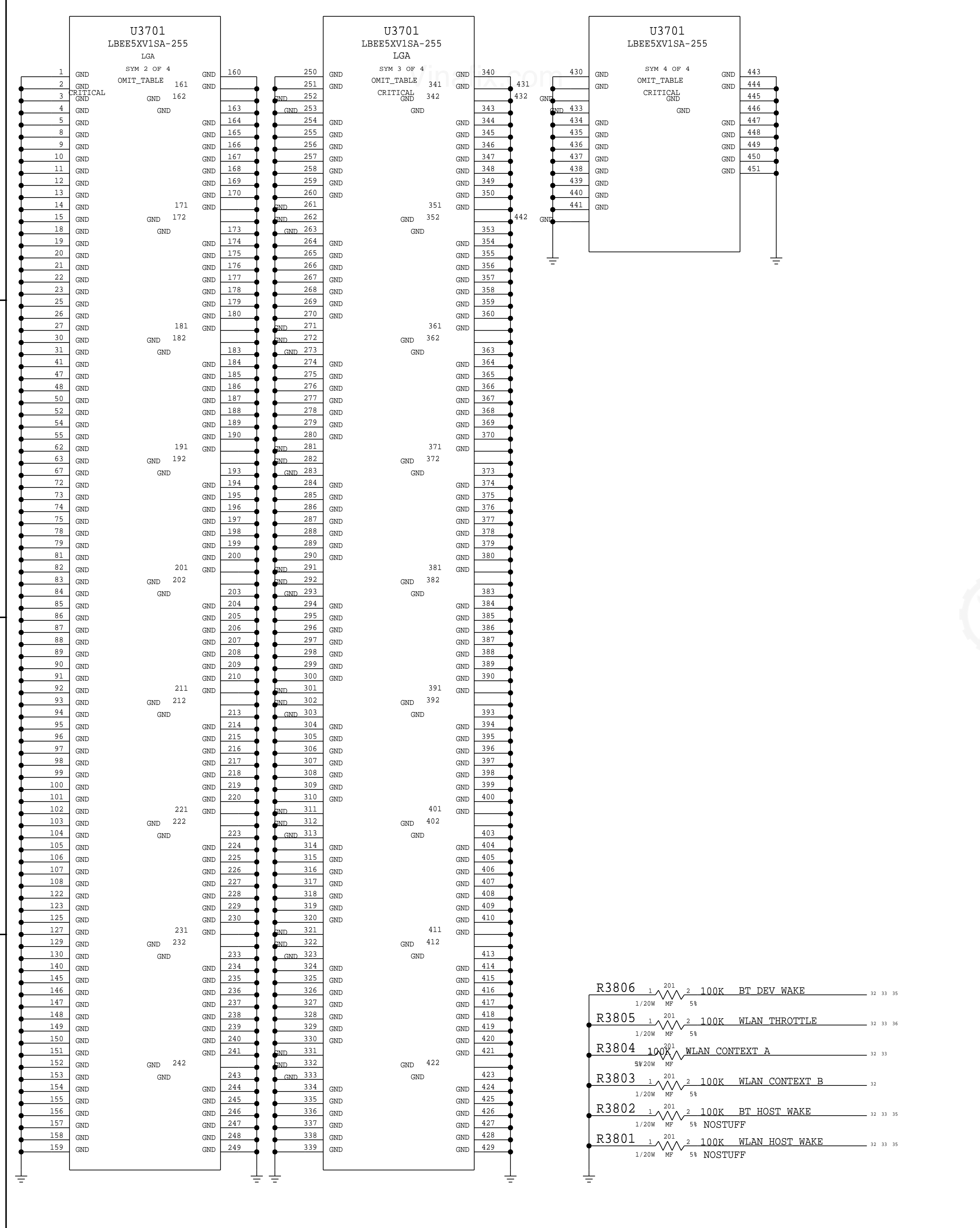
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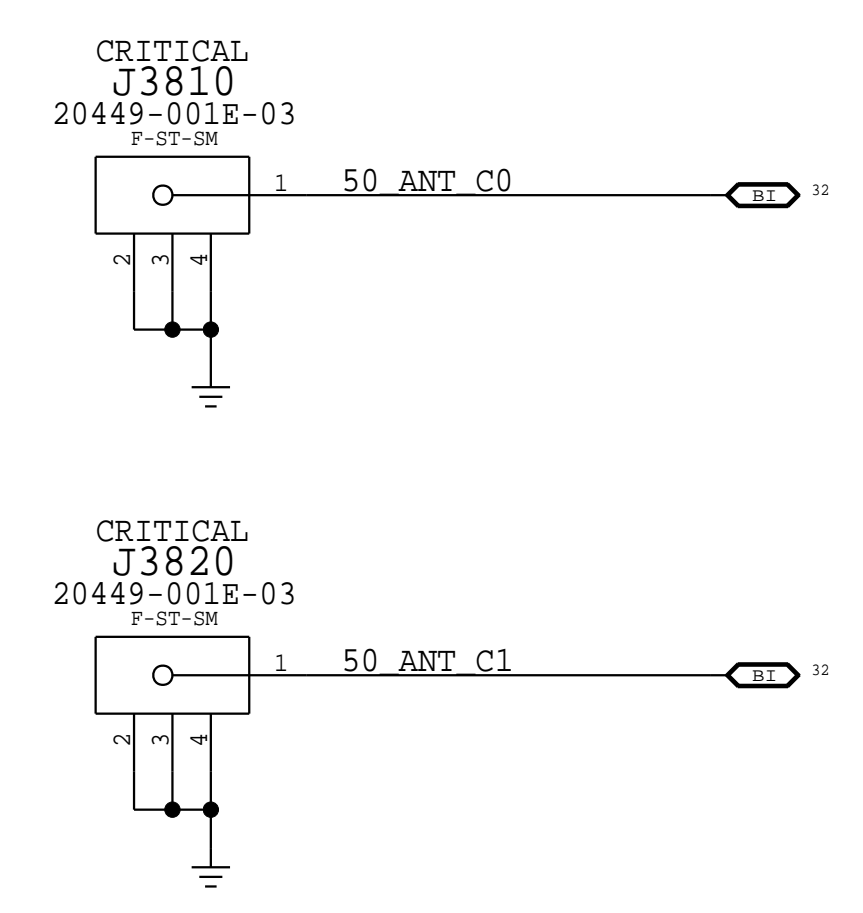
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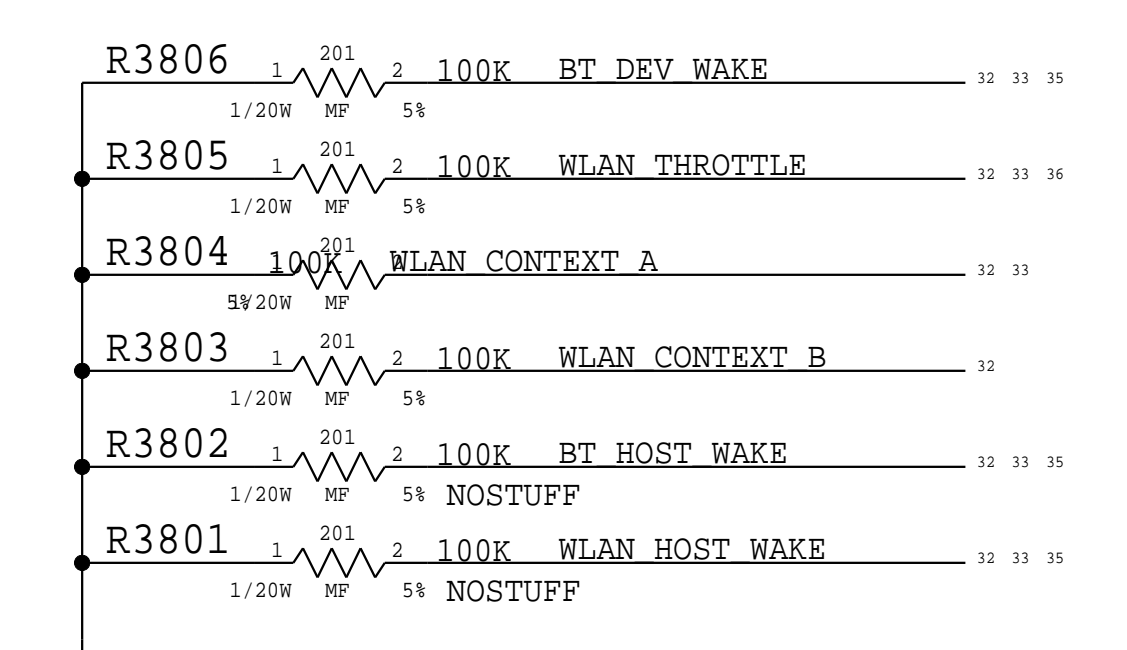
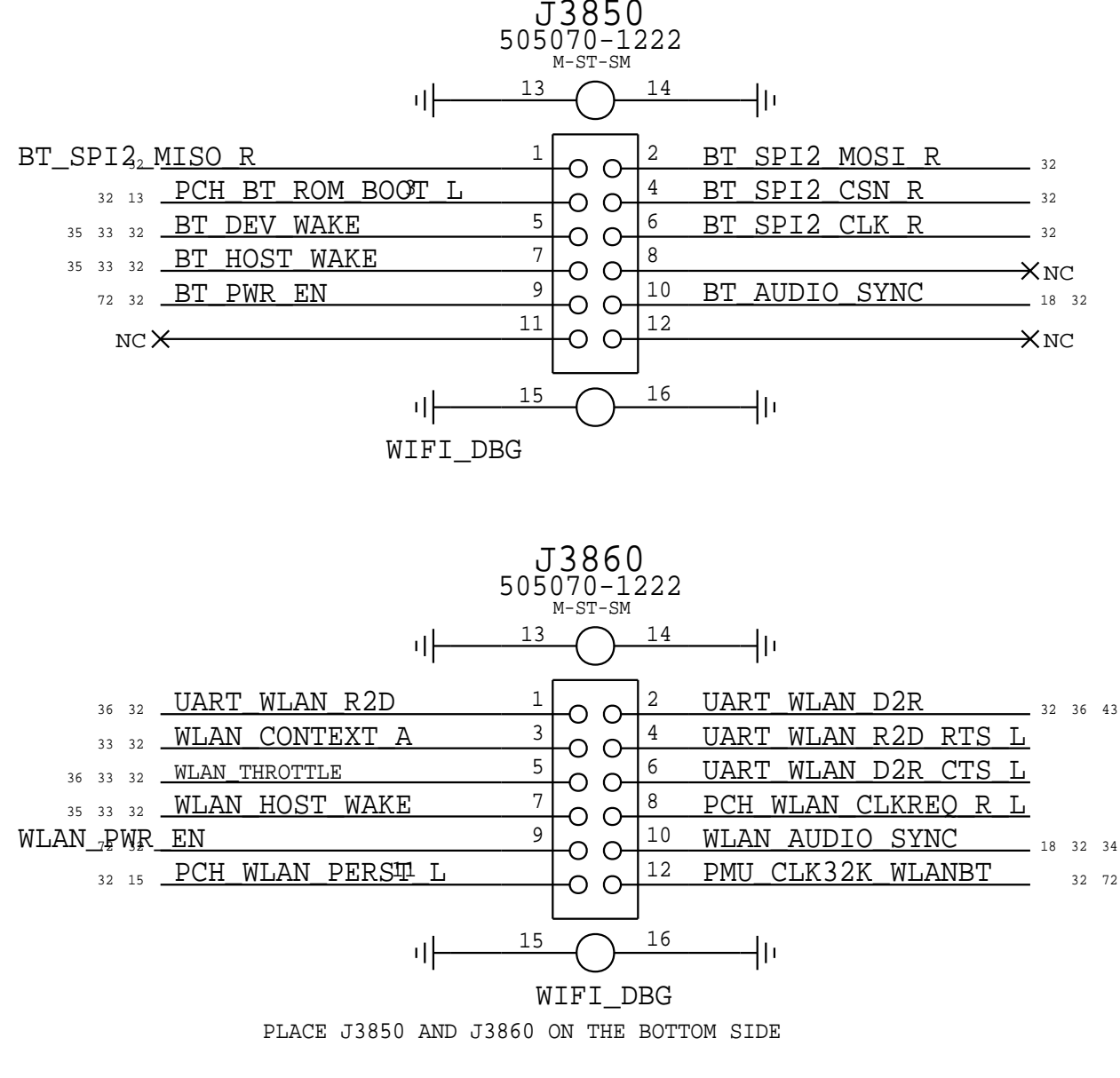
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RF CONNECTORS



WIFI BT DEBUG CONNECTORS

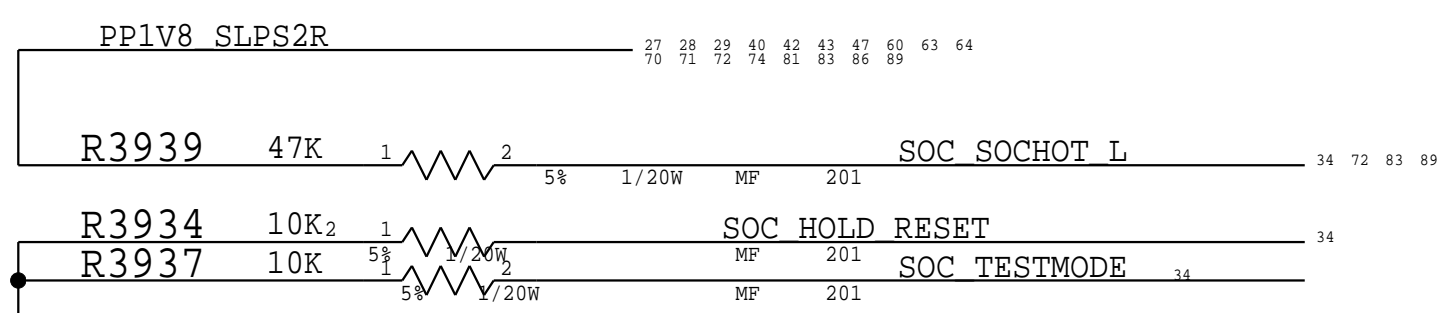
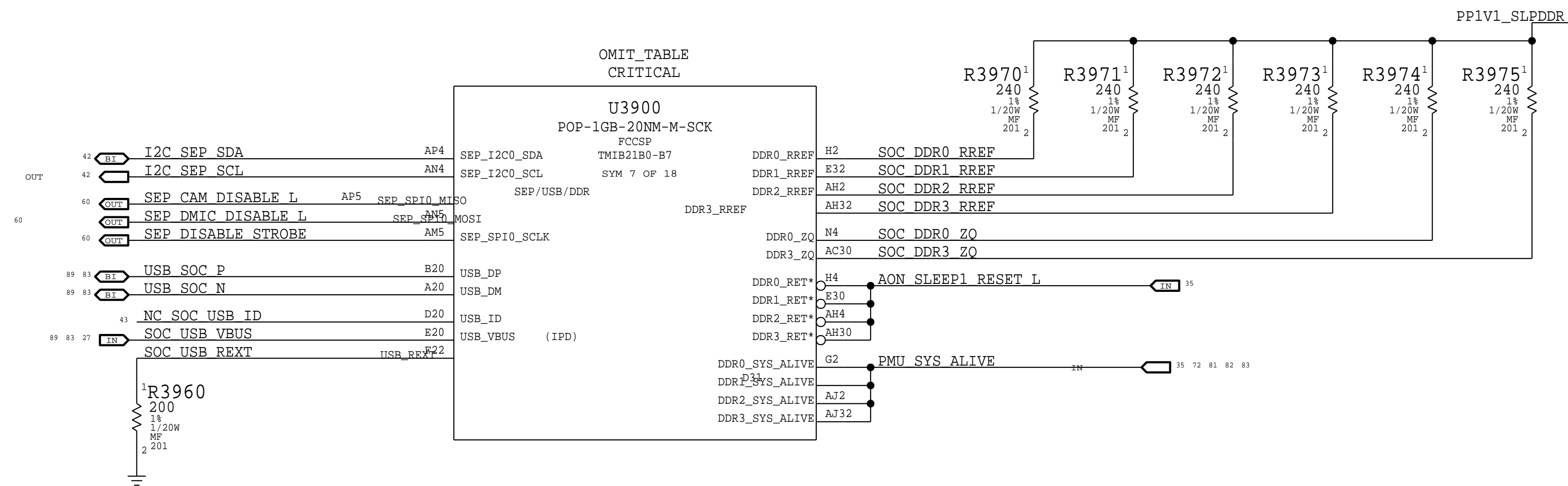
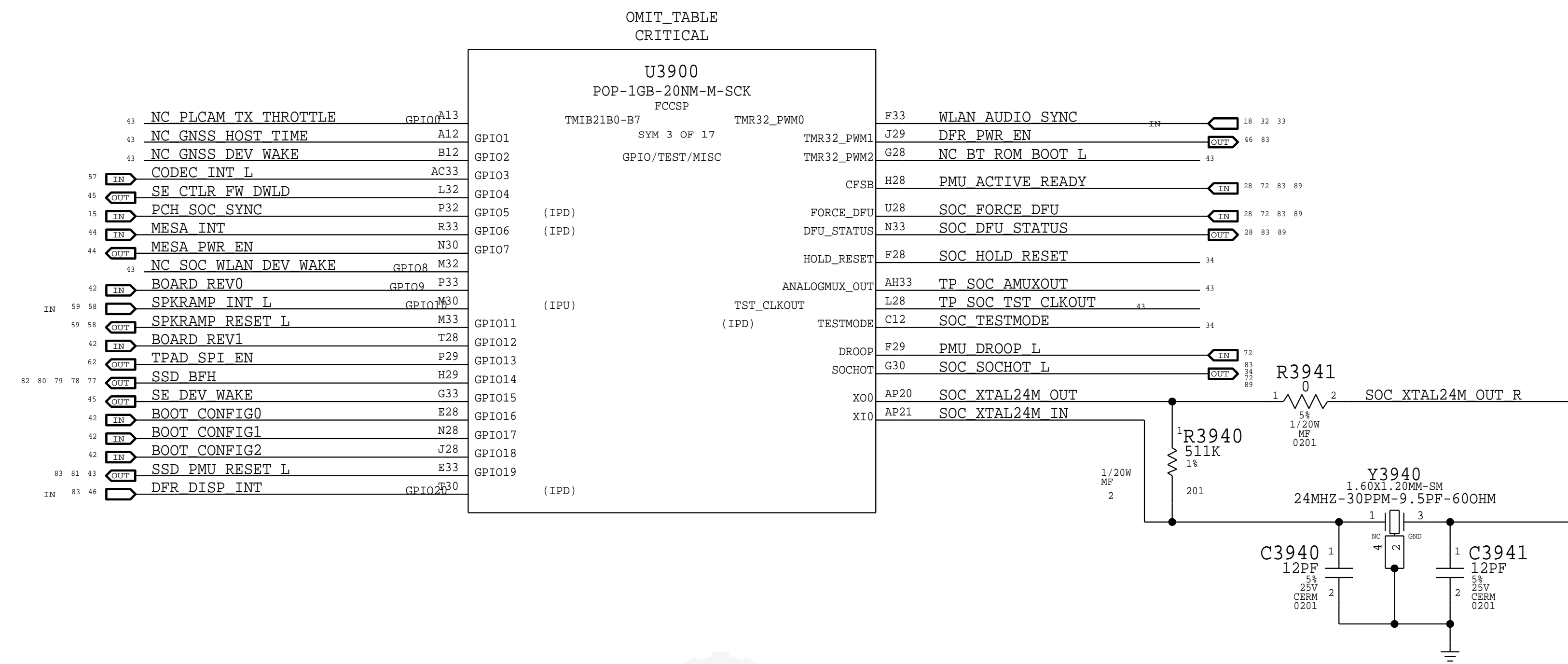


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		PAGE	38 OF 500
		SHEET	33 OF 98

Note IPU/IPD represents SW configured state, not HW default

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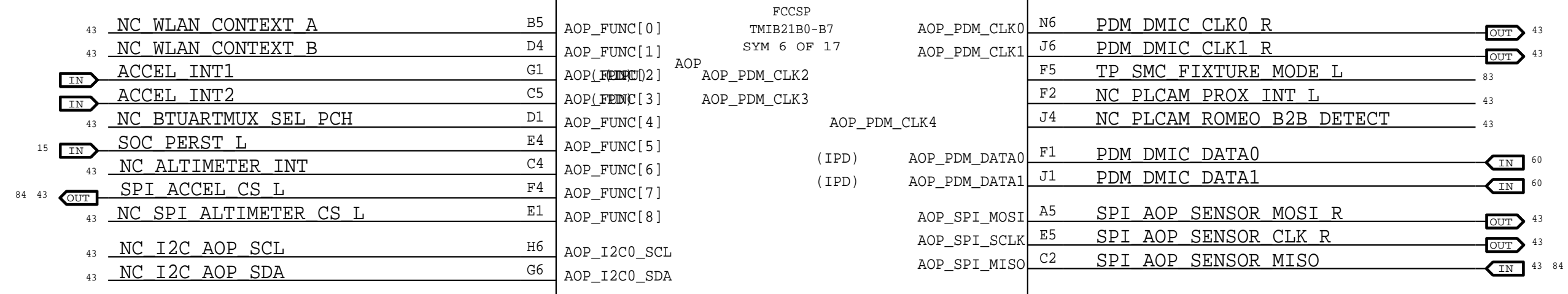


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Apple Inc.		DRAWING NUMBER	051-04273
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BOM_COST_GROUP=SOC

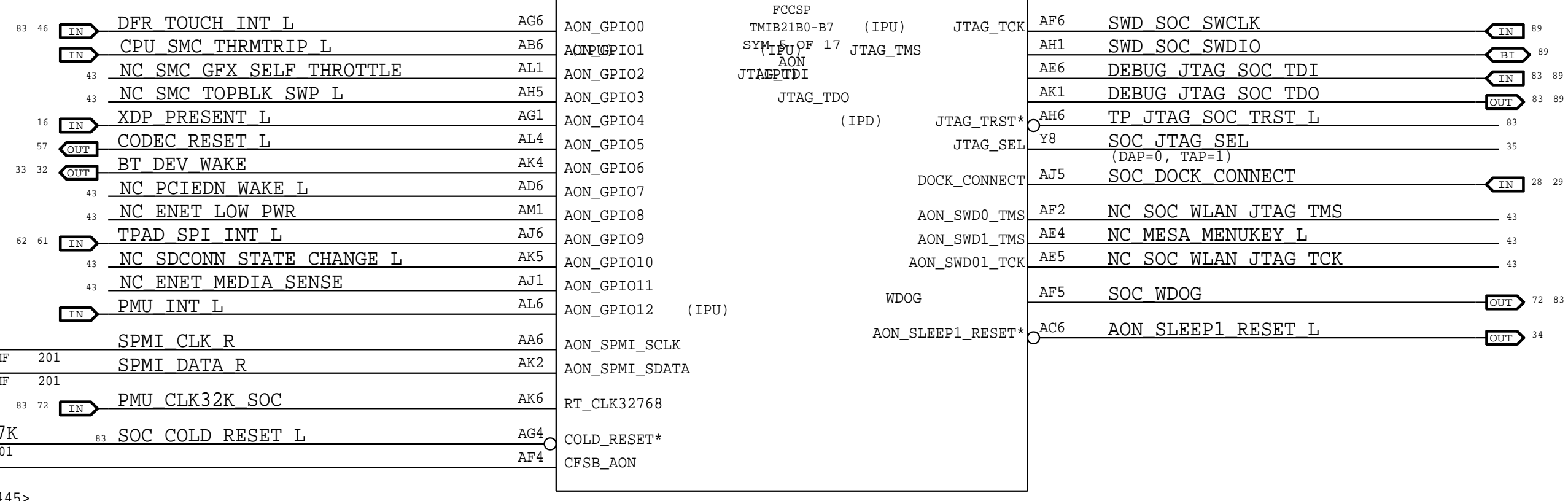
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U3900 POP-1GB-20NM-M-SCK



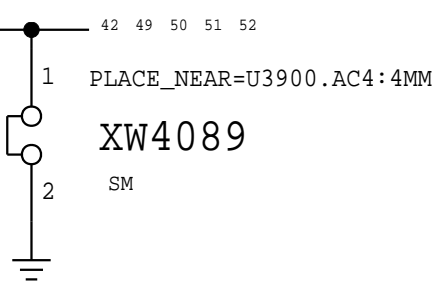
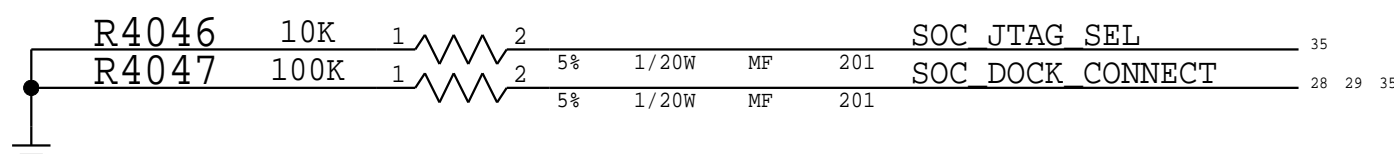
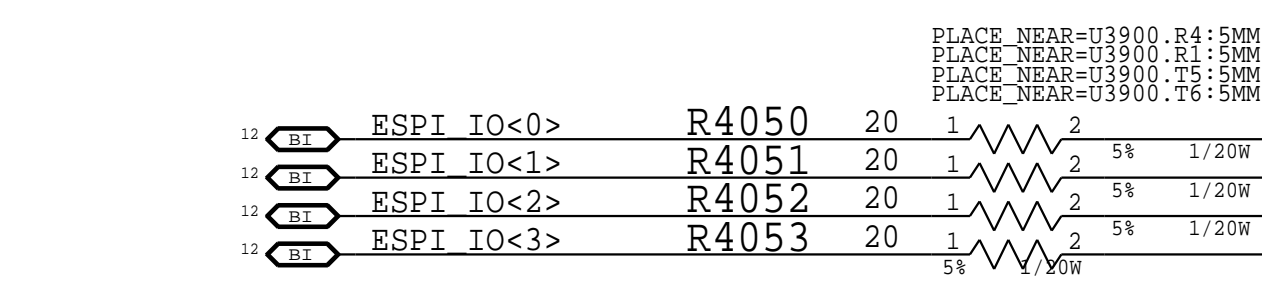
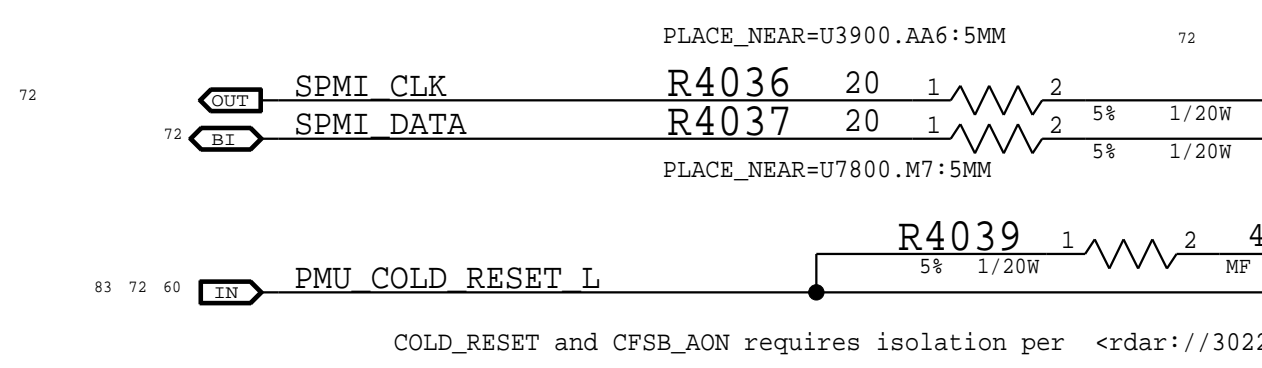
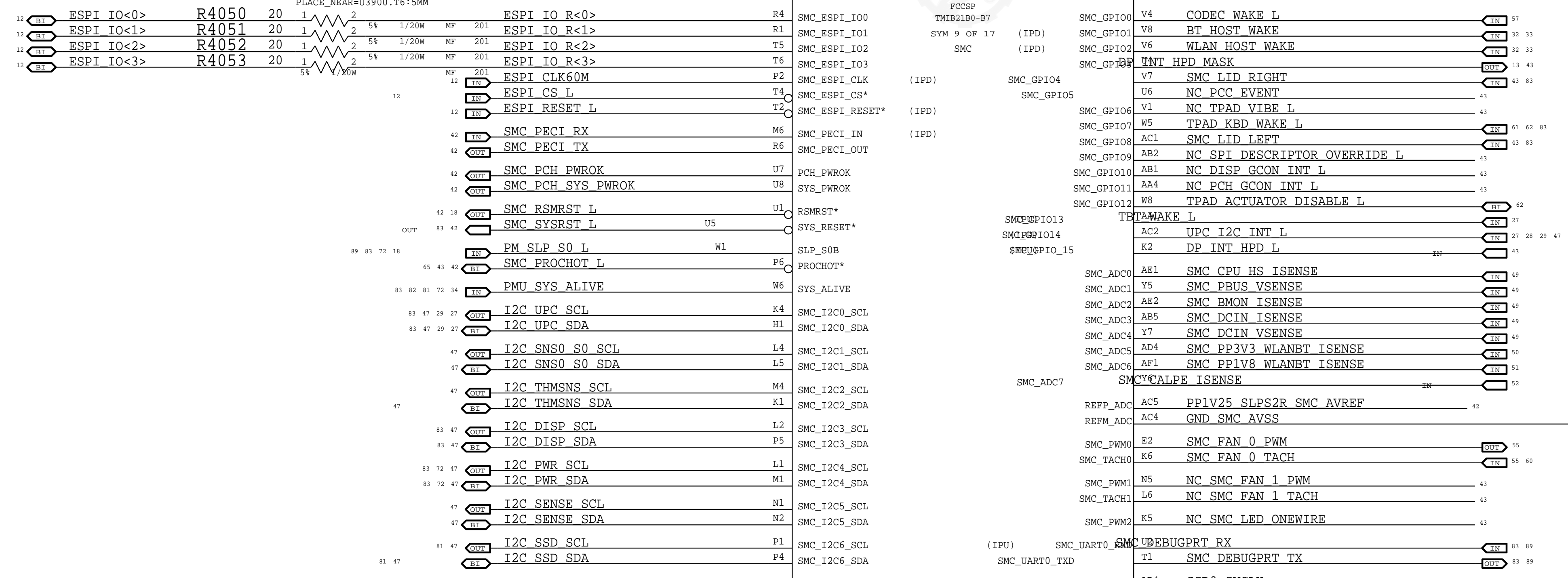
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U3900 POP-1GB-20NM-M-SCK



OMIT_TABLE CRITICAL

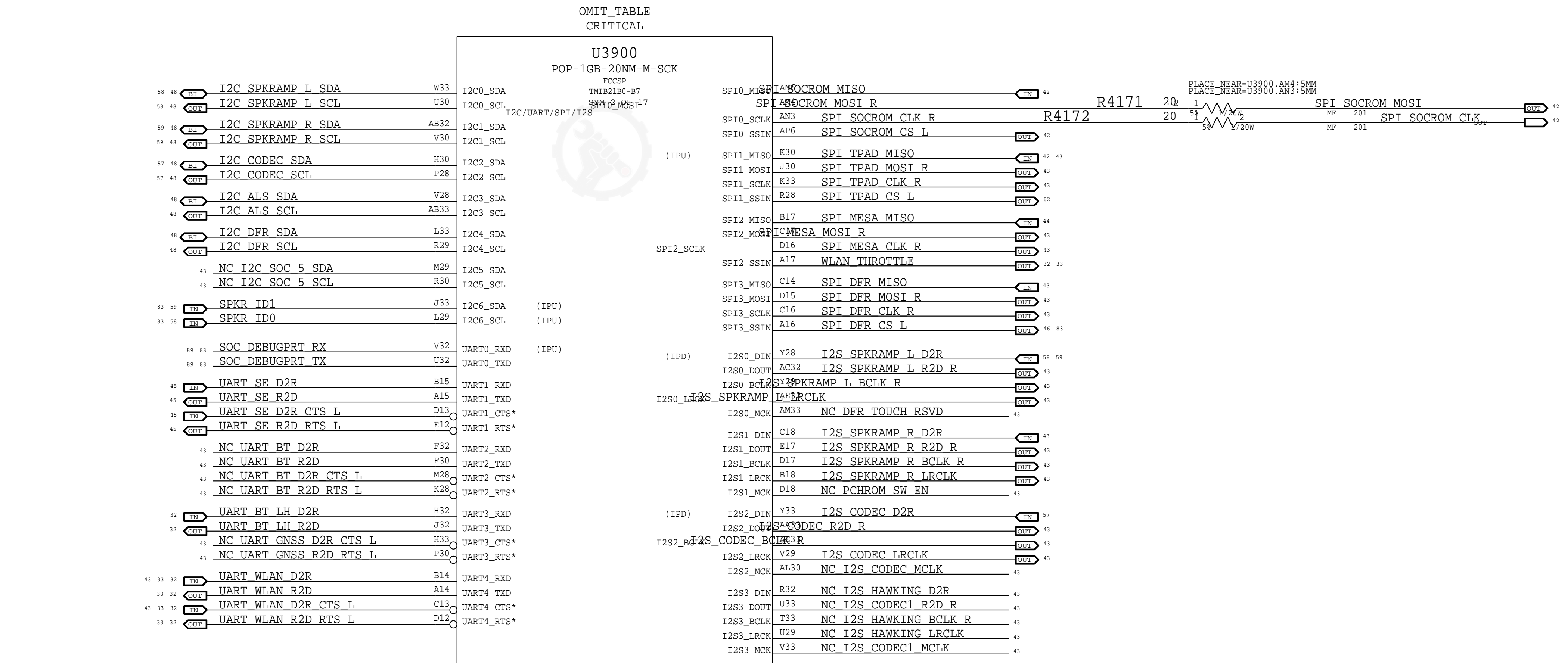
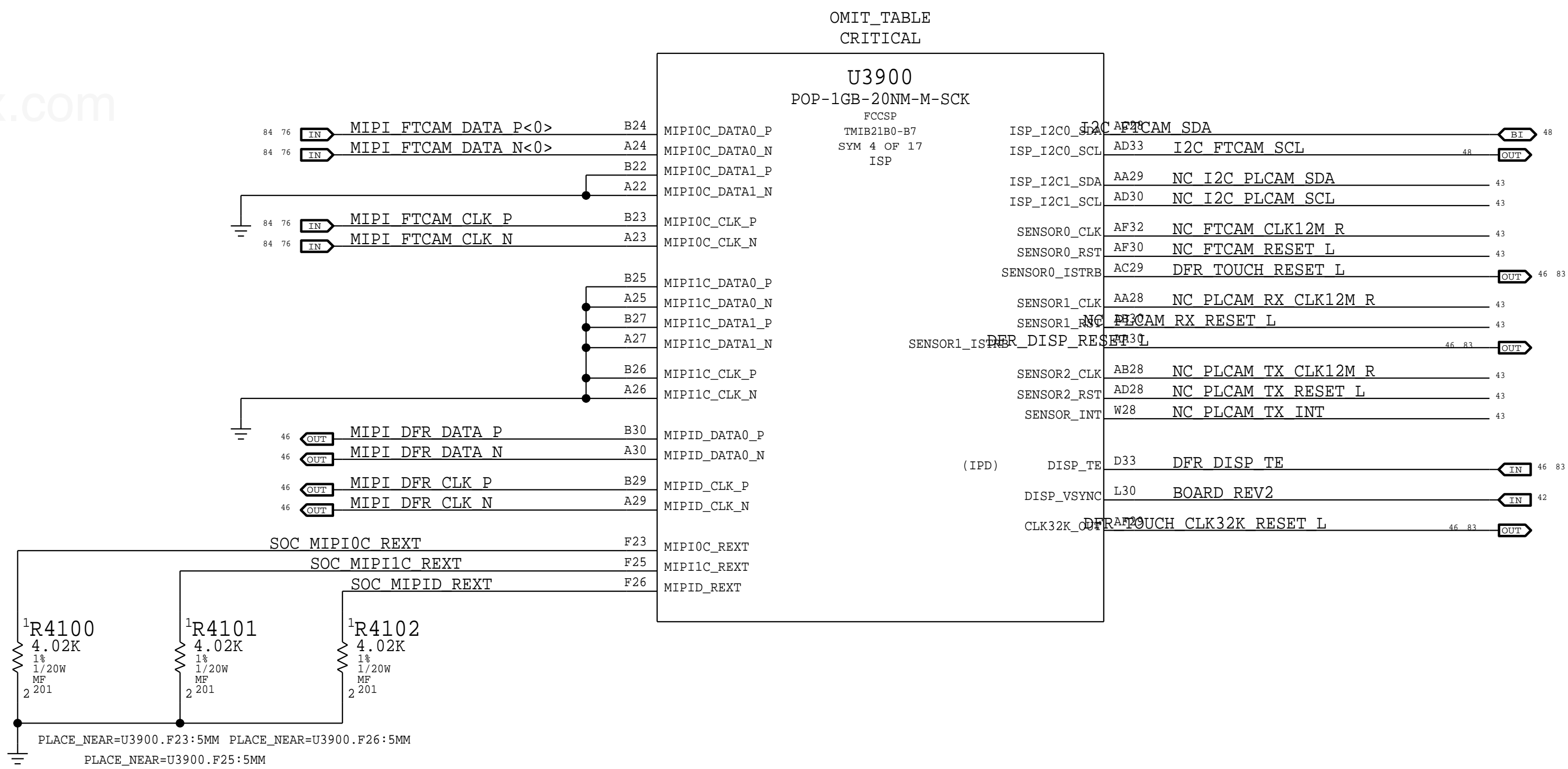
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		PAGE	40 OF 500
		SHEET	35 OF 98

BOM_COST_GROUP=SOC

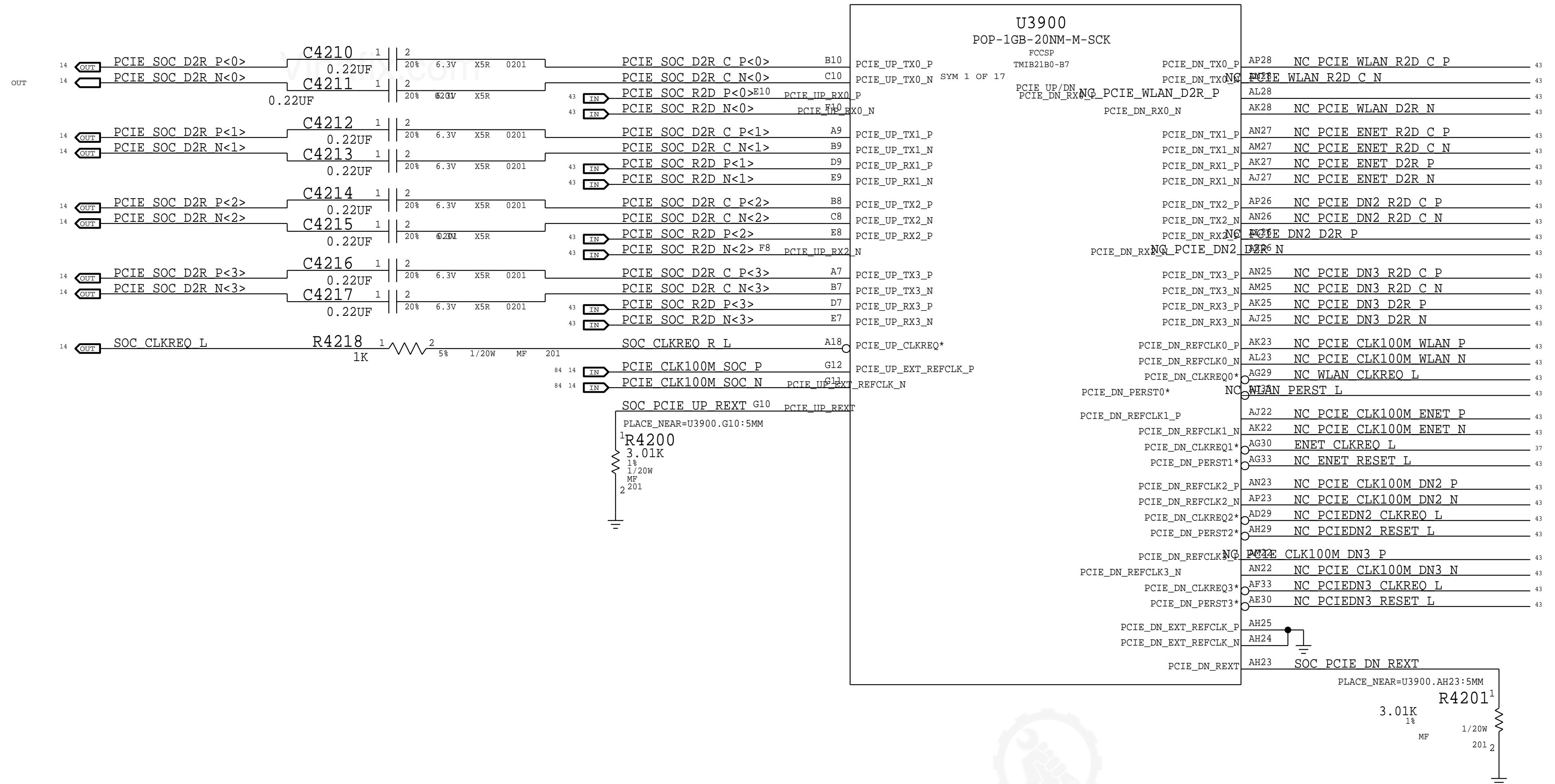
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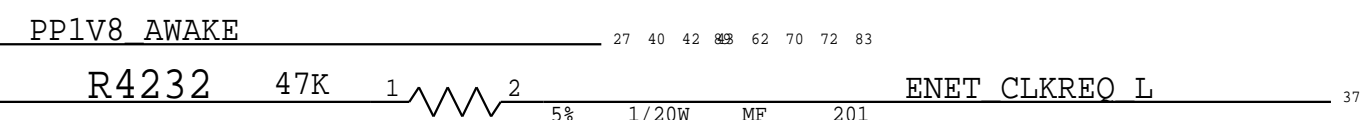
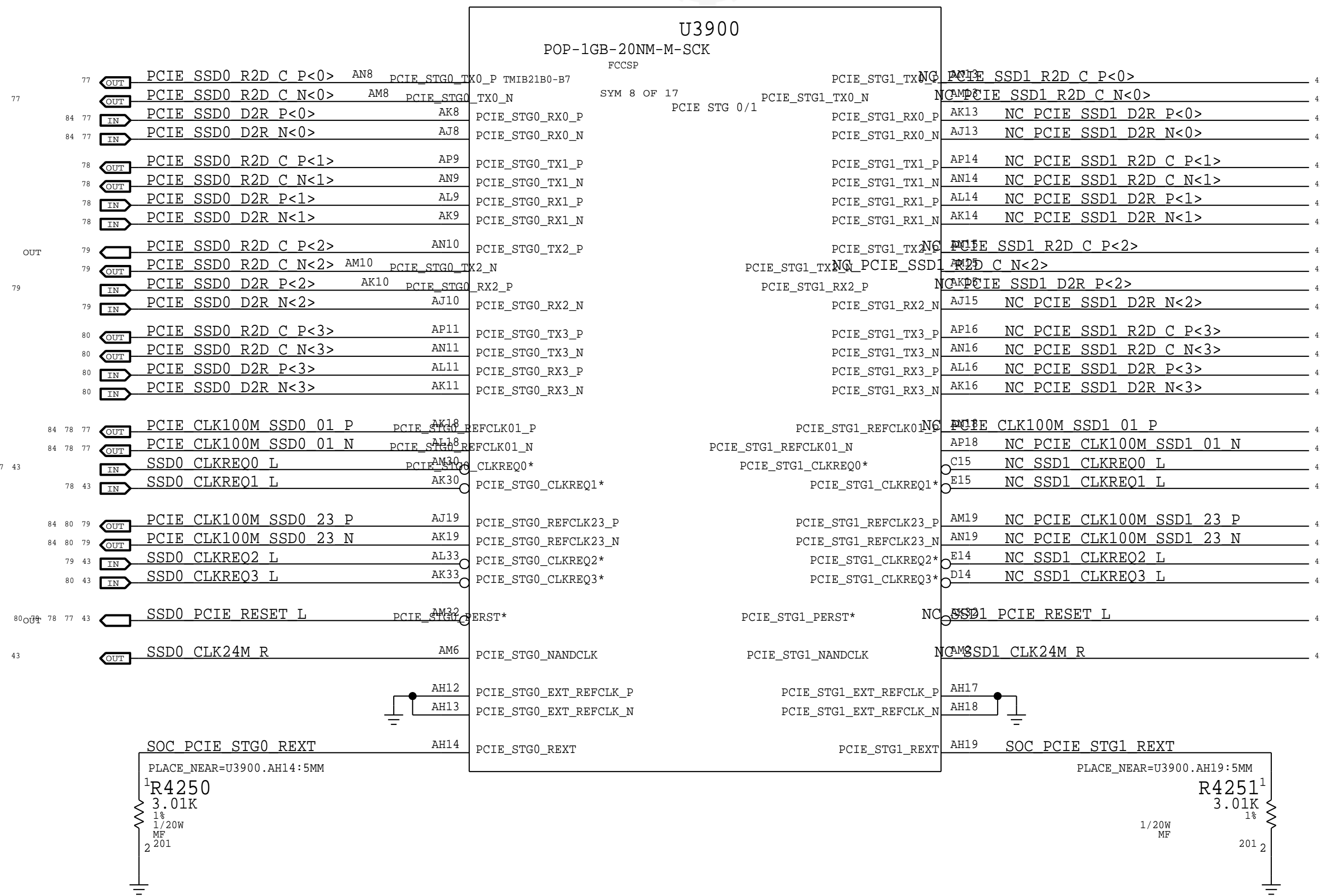
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Apple Inc.	DRAWING NUMBER 051-04273	SIZE D
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	SHEET 36 OF 98	

BOM_COST_GROUP=SOC

OMIT TABLE
CRITICAL



OMIT TABLE
CRITICAL

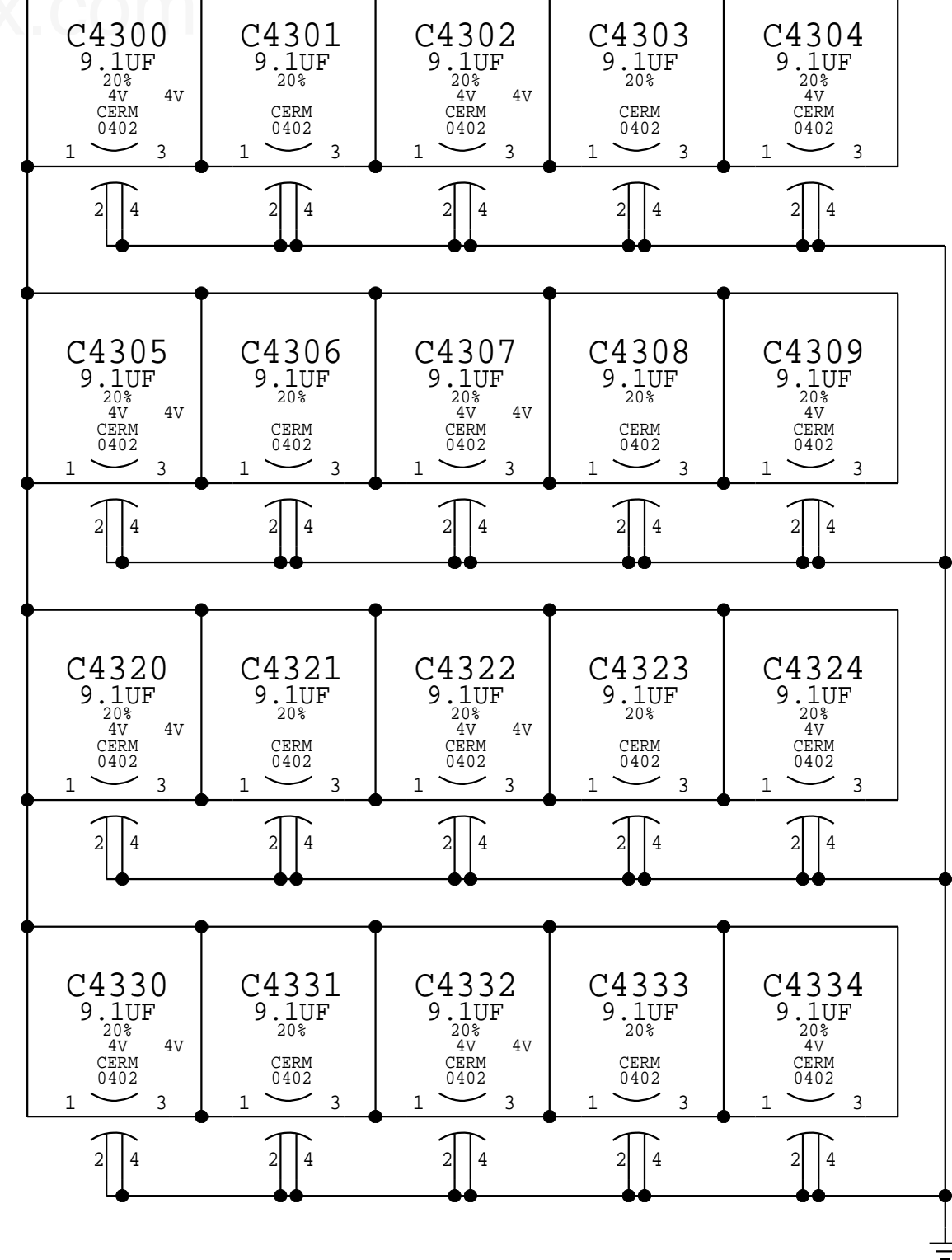


BOM_COST_GROUP=SOC

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	SHEET 37 OF 98	

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

PPVDDCPU AWAKE
0.625V - 1.06V
11.6A Max



OMIT_TABLE
CRITICAL

U3900
POP-1GB-20NM-M-SCK
FCCSP
TM1B21B0-B7
SYM 10 OF 17

- AA12
- AA14
- AA16
- AB11
- AB13
- AB15
- N12
- N14
- N16
- P11
- P13
- P15
- R10
- R12
- R14
- U12
- U14
- U16
- W10
- W12
- W14
- Y11
- Y13
- Y15

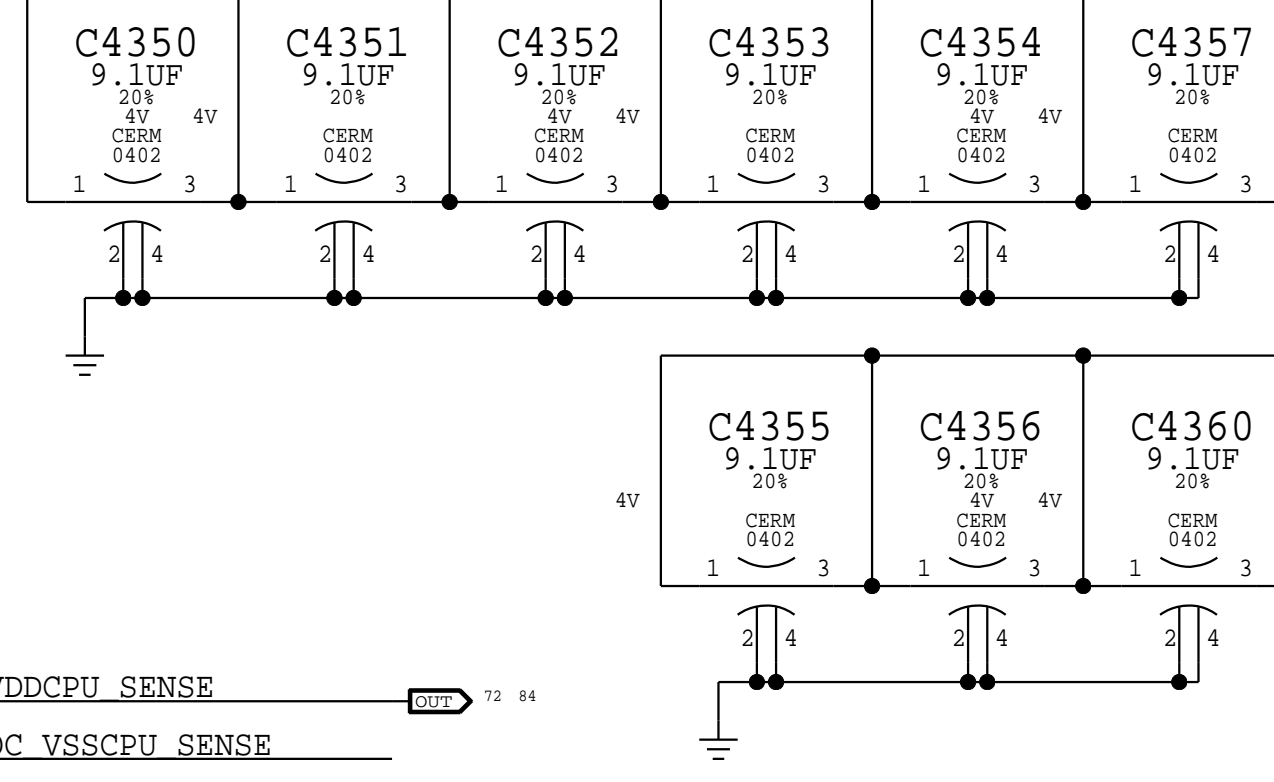
VDD_CPU_SRAM

VDD_CPU

VDD_CPU_SENSE

VSS_CPU_SENSE

- AA10
- N10
- R16
- T11
- T13
- T15
- U10
- V11
- V13
- V15
- W16



PPVDDCPUSRAM AWAKE
0.8V - 1.06V
0.9A Max

OMIT_TABLE
CRITICAL

U3900
POP-1GB-20NM-M-SCK
FCCSP
TM1B21B0-B7
SYM 11 OF 17

- AC10
- AC12
- AC14
- AC16
- AC18
- AC20
- AC22
- AC24
- AD11
- AD13
- AD15
- AD17
- AD19
- AD21
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- L10
- L12
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- L16
- L18
- L20
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VDD_SOC

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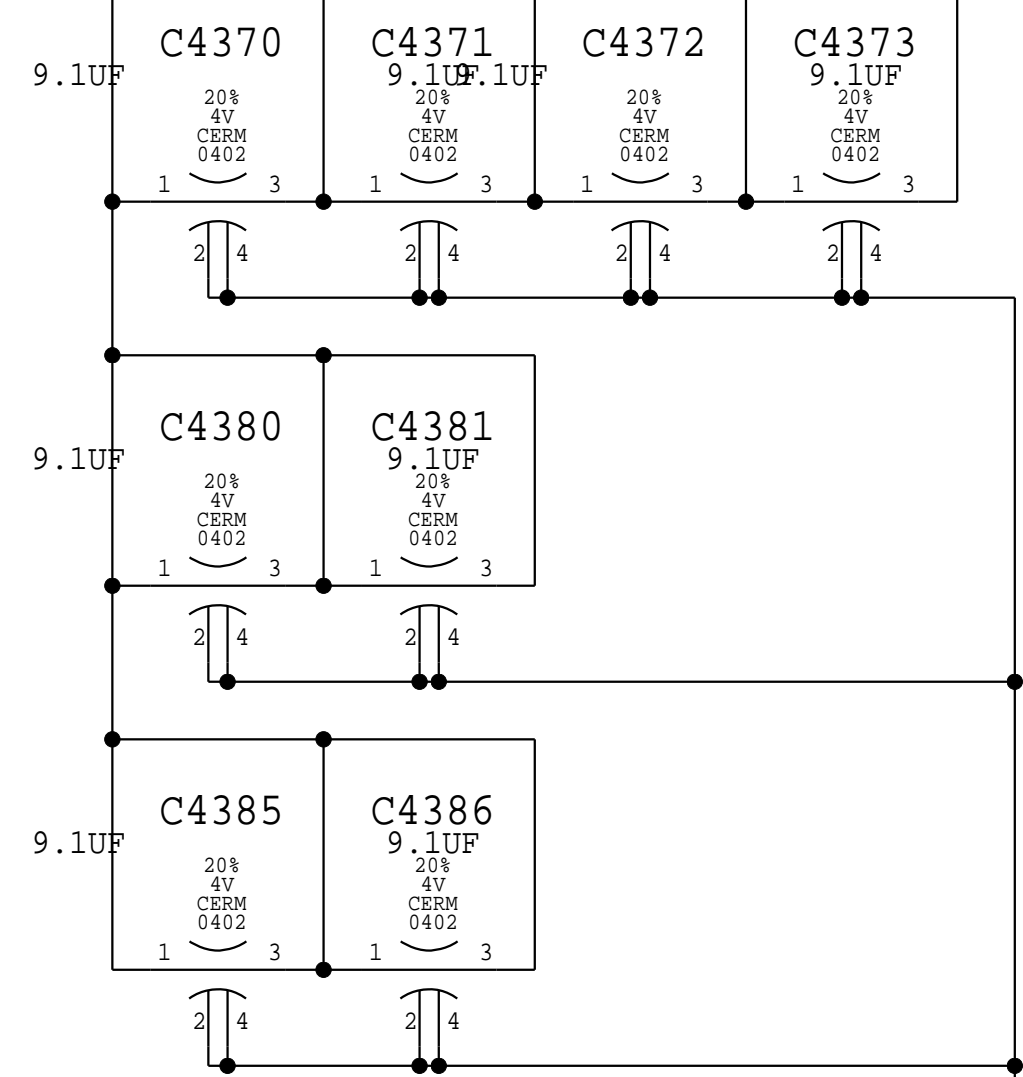
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- R18
- R20
- R22
- R24
- T19
- T21
- T23
- T25
- W18
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- W24
- Y17
- Y19
- Y21
- Y23

NC SOC VDDSOC_SENSE

NC SOC VSSSOC_SENSE

PP0V82_SLPDDR
5.6A Max



PAGE TITLE		
SOC POWER 1		
	DRAWING NUMBER	051-04273
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BRANCH	evt-1	
PAGE	43 OF 500	
SHEET	38 OF 98	

BOM_COST_GROUP=SOC

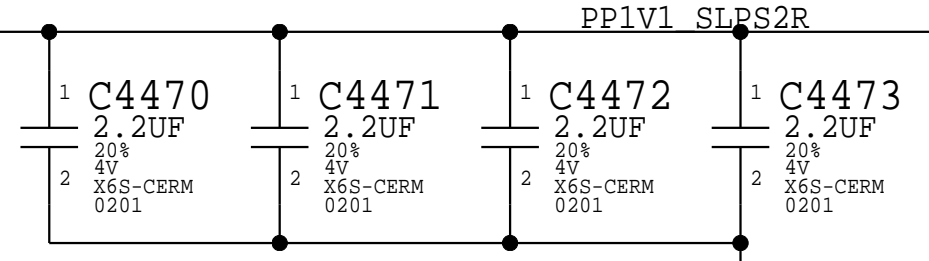
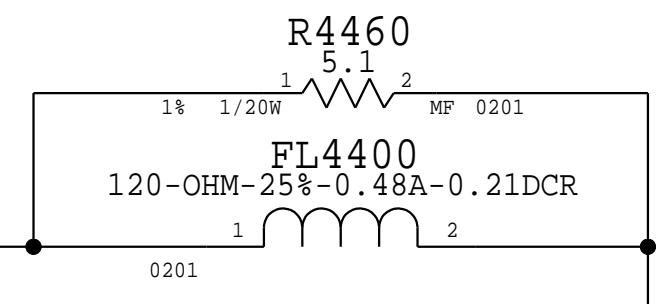
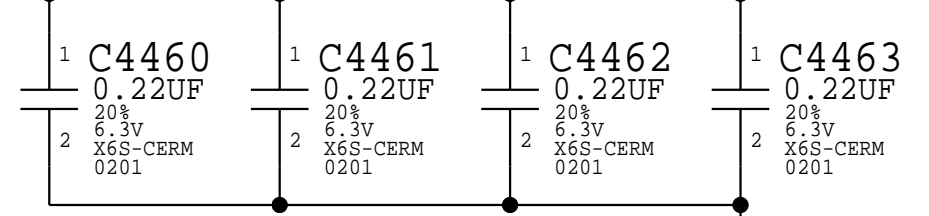
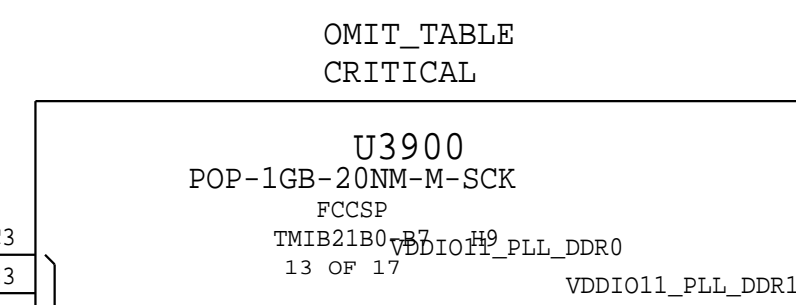
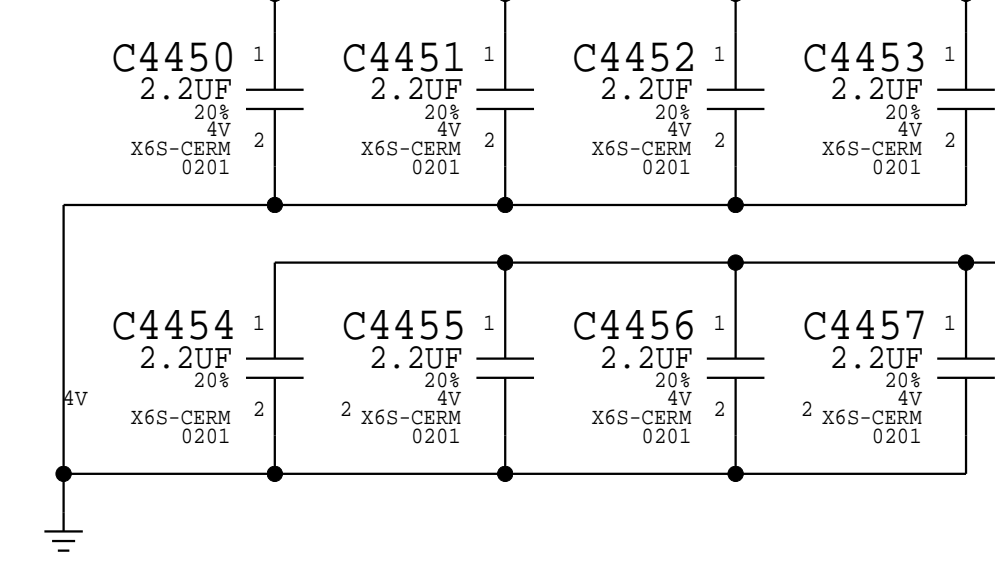
Current estimates @ 105C & 2GB from Gibraltar Power Specification Rev 0.5.3

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D

D

PP1V1_SLPDDR
0.86A Max

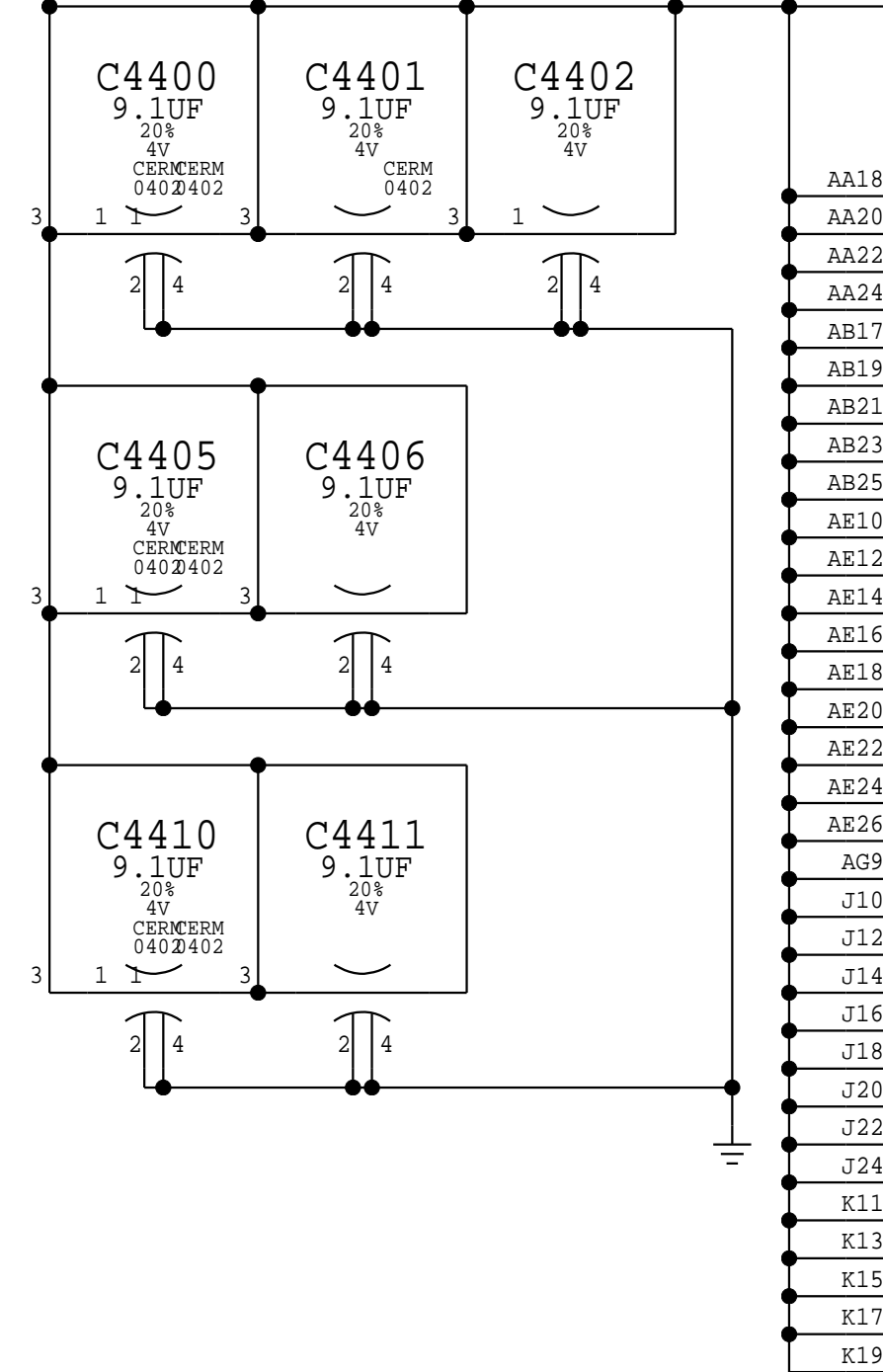


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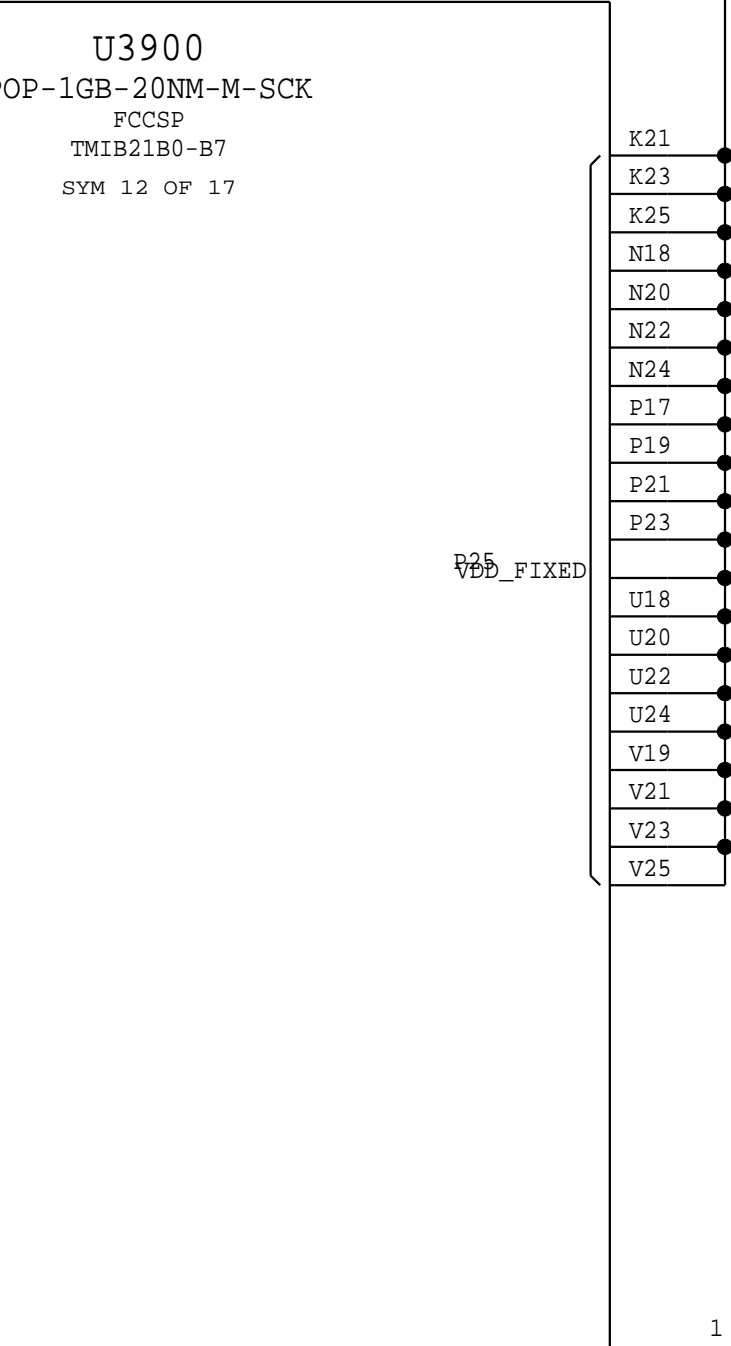
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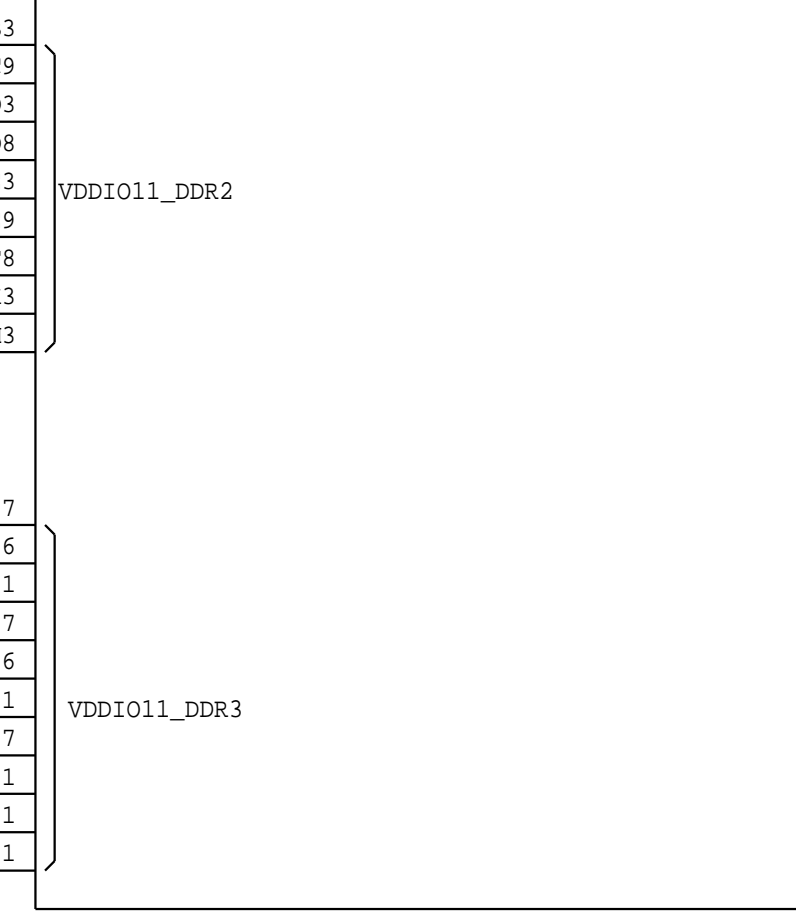
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1.9A Max



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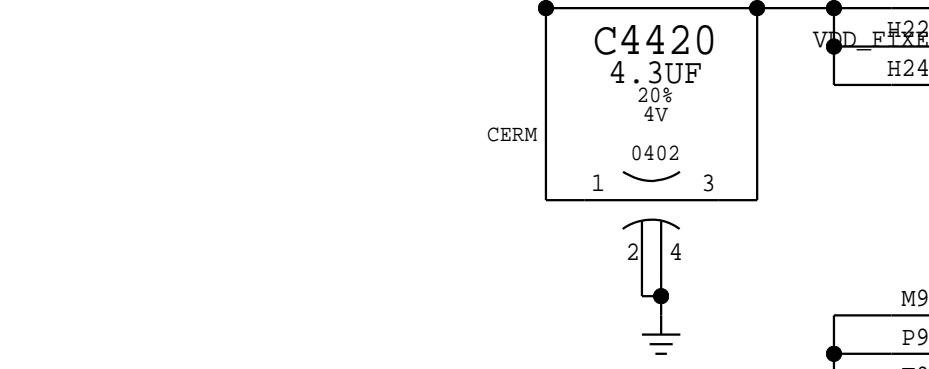
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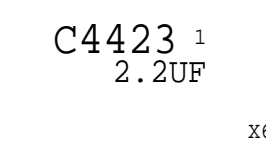
9mA Max
PP0V9_SLPDDR

5mA Max
PP0V9_SLPDDR

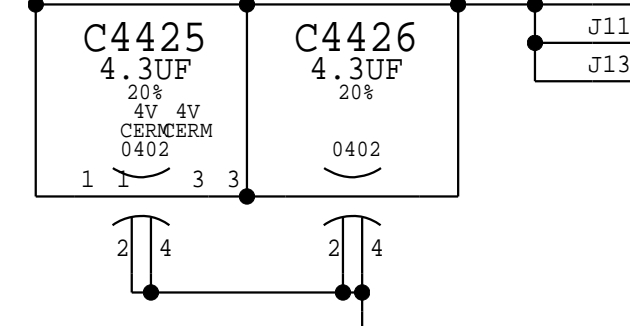
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PP0V9_SLPDDR



102mA Max
PP0V8_SLPDDR



330mA Max
PP0V9_SLPDDR

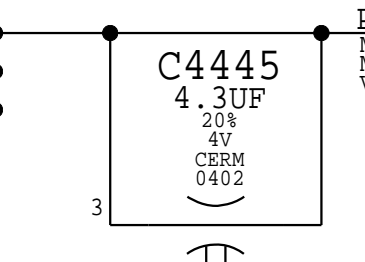


330mA Max
PP0V9_SLPDDR

330mA Max
PP0V9_SLPDDR

330mA Max
PP0V9_SLPDDR

45mA Max
PP0V9_SLPDDR



MIN LINE WIDTH=0.2000
MIN NECK WIDTH=0.1000
VOLTAGE=0.9V

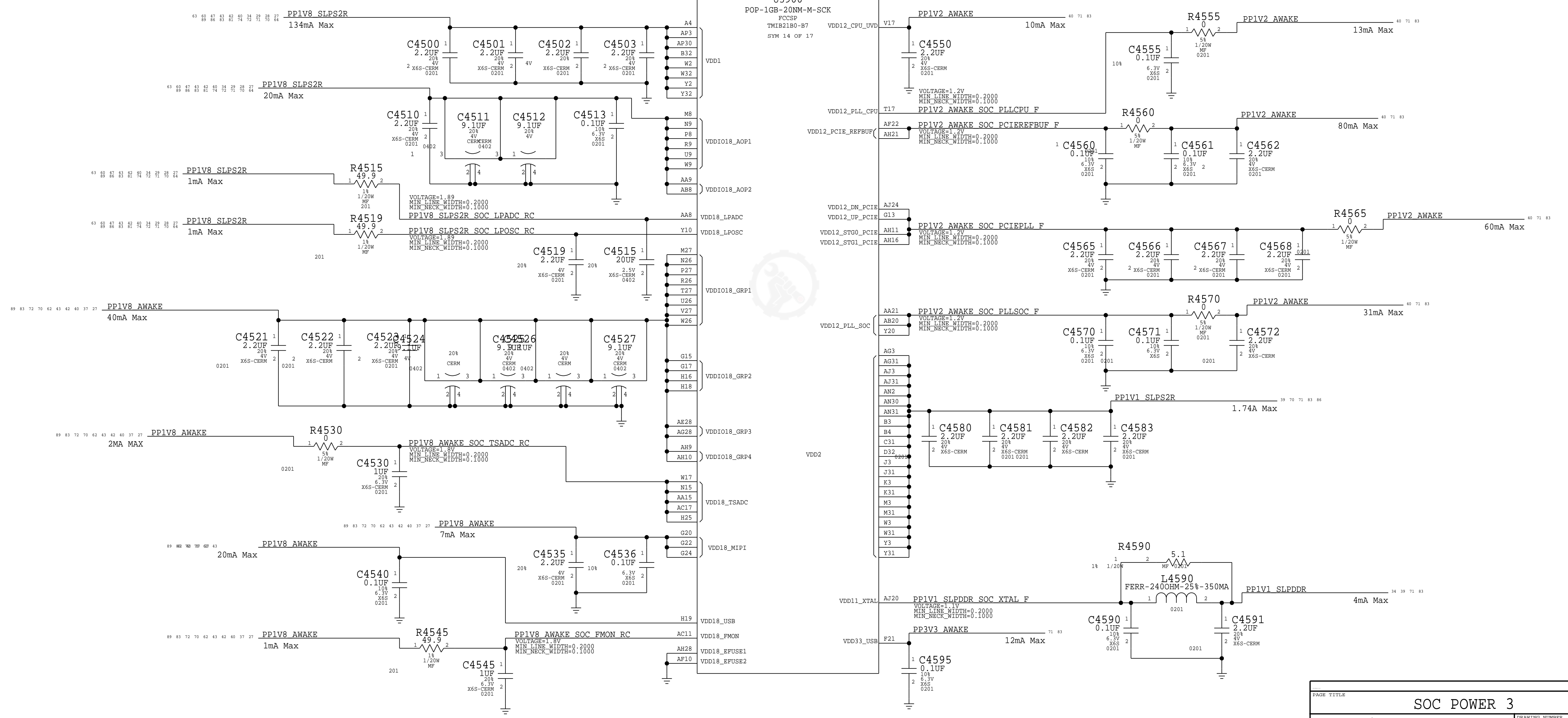
PAGE TITLE SOC POWER 2		DRAWING NUMBER 051-04273	SIZE D
		REVISION 4.0.0	
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BOM_COST_GROUP=SOC

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OMIT_TABLE
CRITICAL

U3900
POP-1GB-20NM-M-SCK
FCCSP
TMIB2180-B7
SYM 14 OF 17



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SOC POWER 3		
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	REVISION	4.0.0
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	PAGE	45 OF 500
	SHEET	40 OF 98

BOM_COST_GROUP=SOC

D

C

B

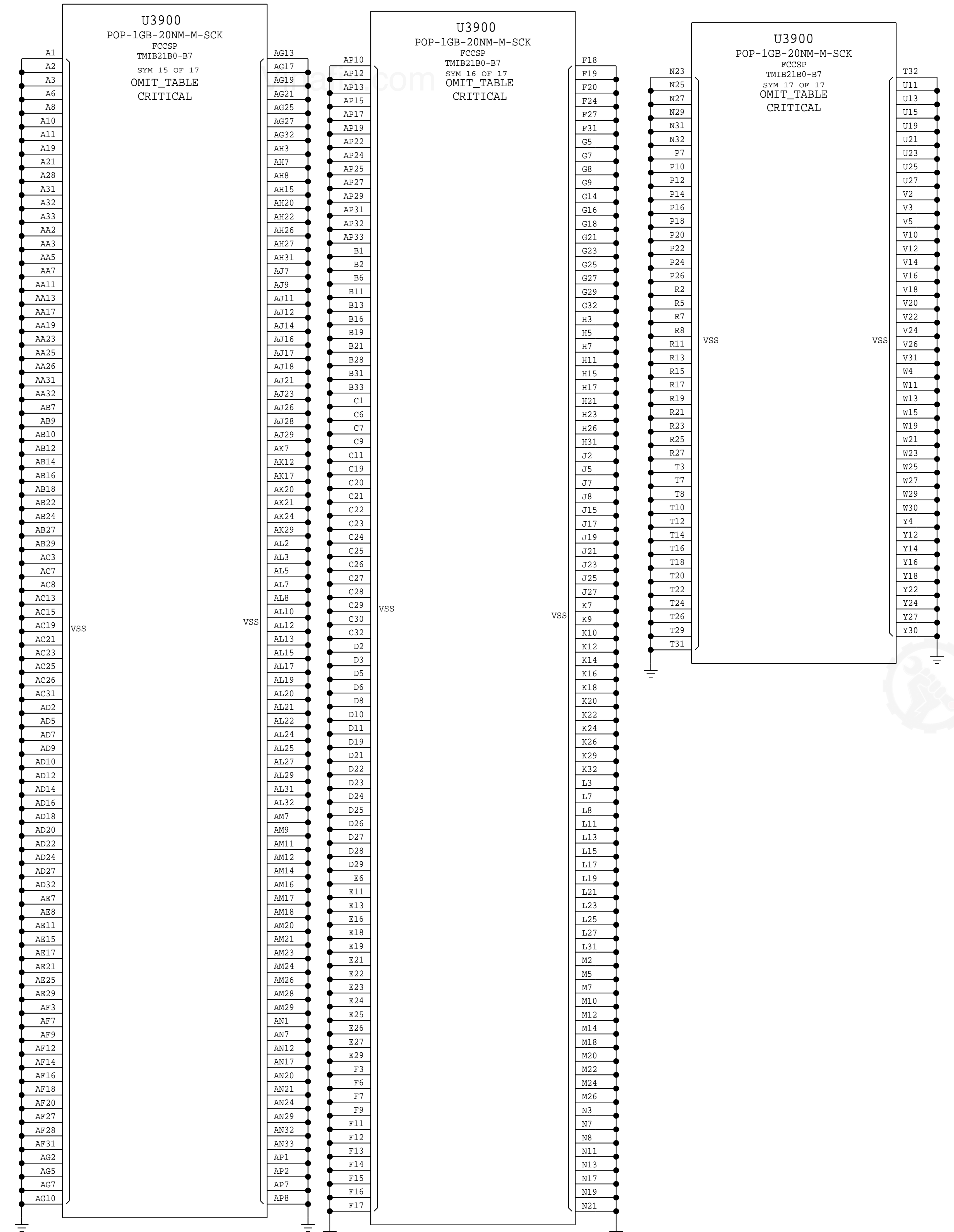
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D

C

B

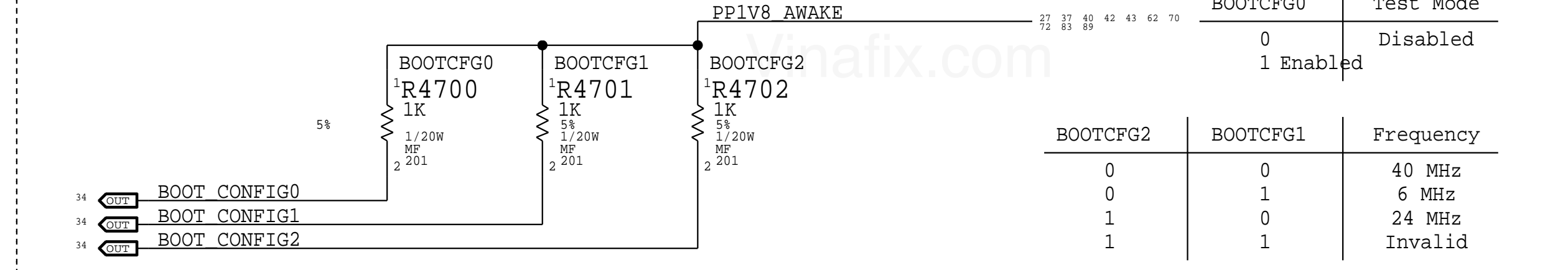
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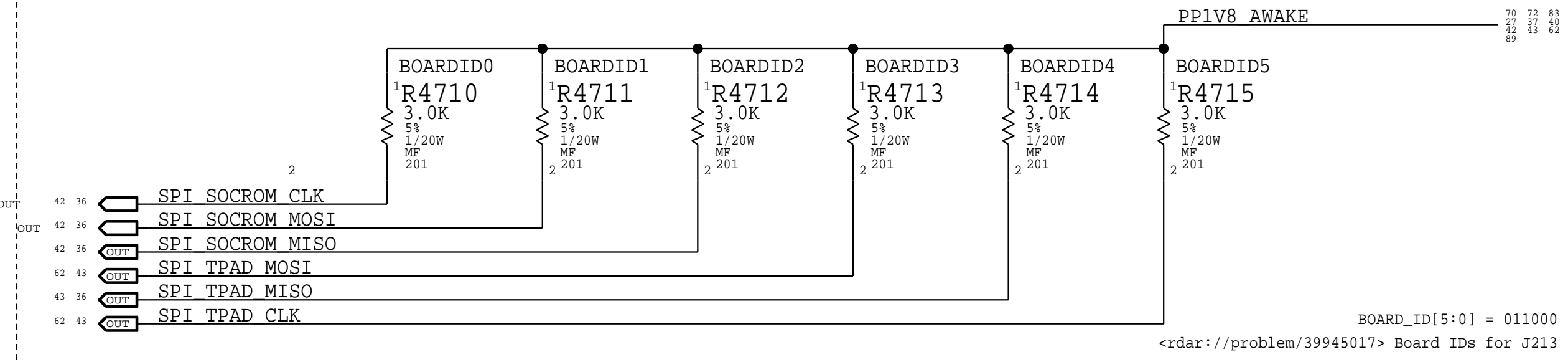
PAGE TITLE			SOC GROUND		
		DRAWING NUMBER	051-04273	SIZE	D
		REVISION	4.0.0		
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			PAGE	46 OF 500	
			SHEET	41 OF 98	

BOM_COST_GROUP=SOC

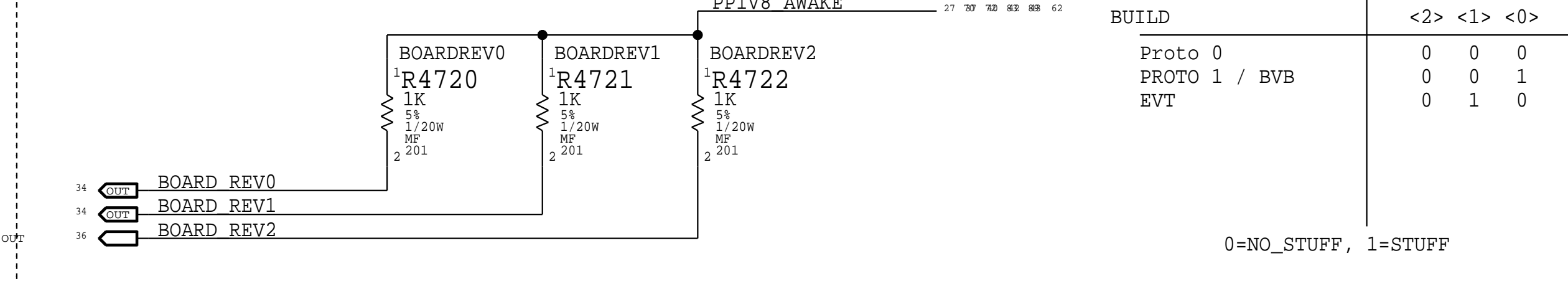
Boot Config



Board ID

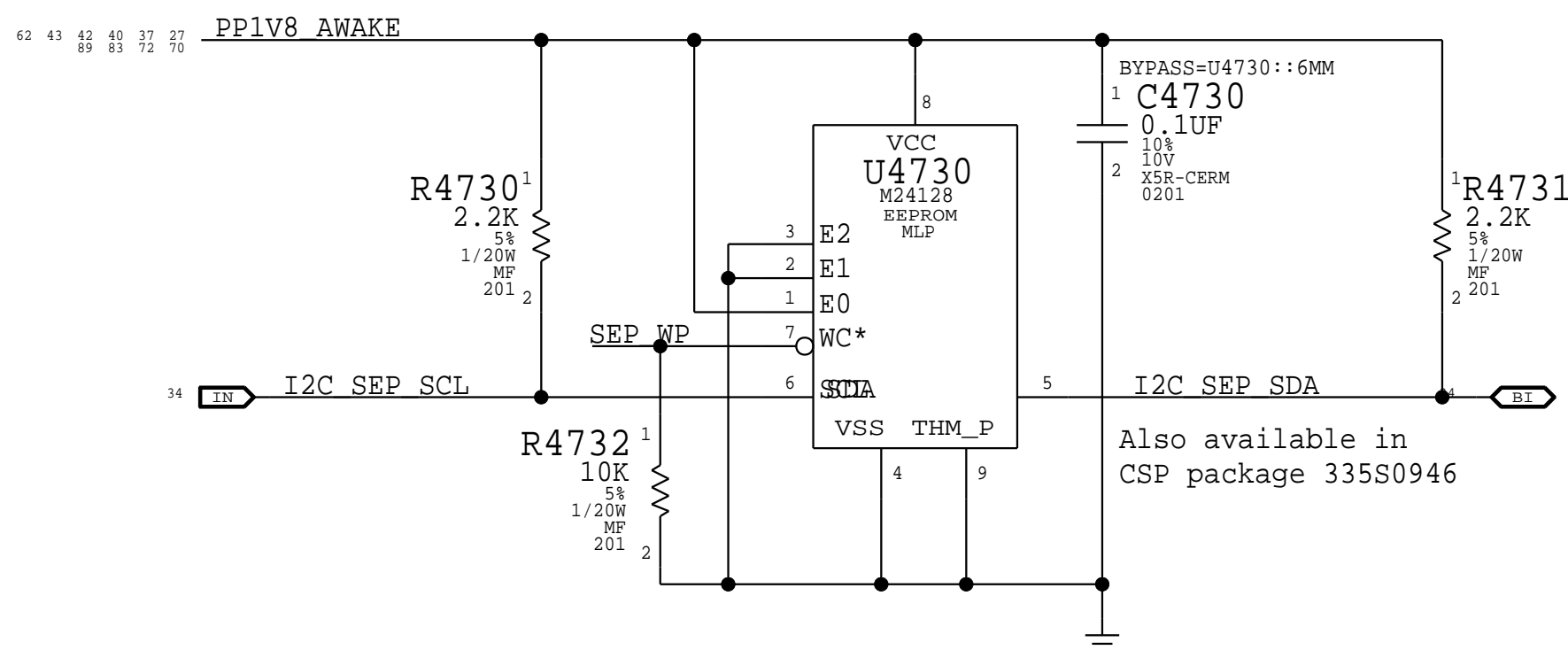


Board Revision

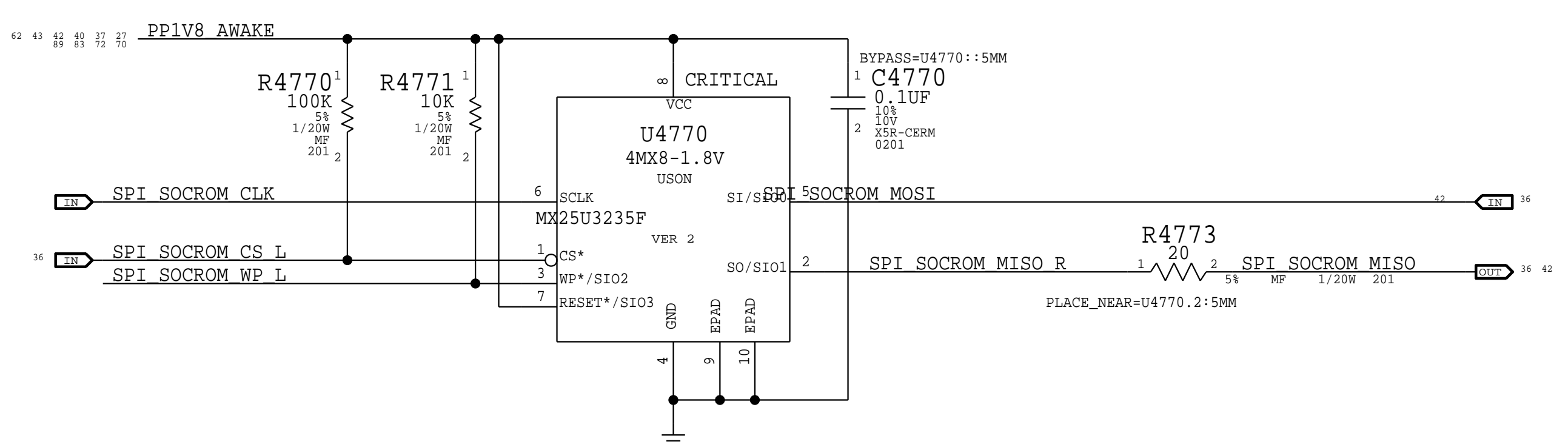


SEP EEPROM

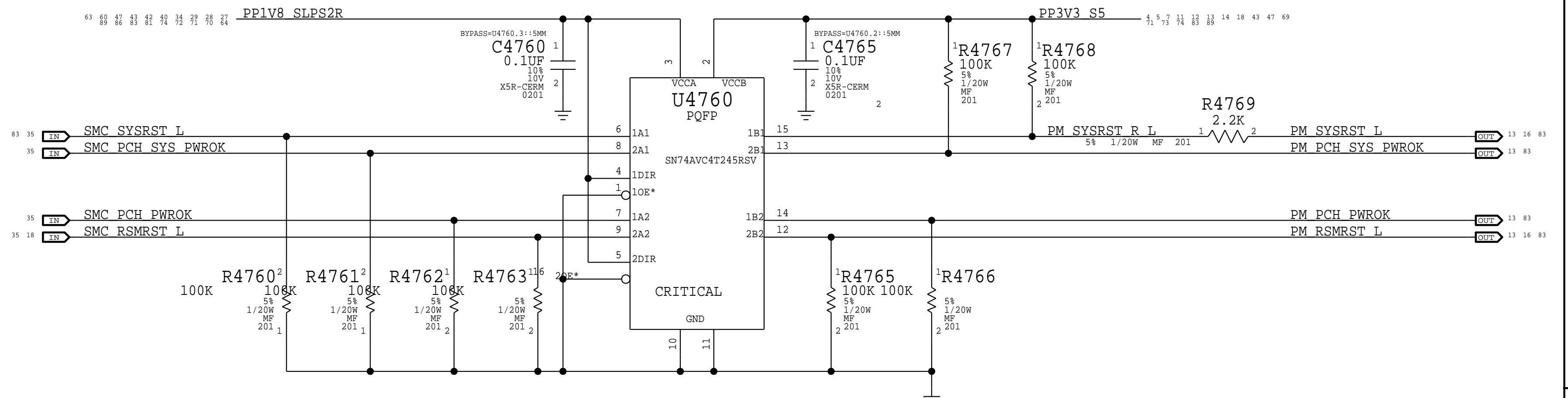
(Write: 0xA2, Read 0xA3)



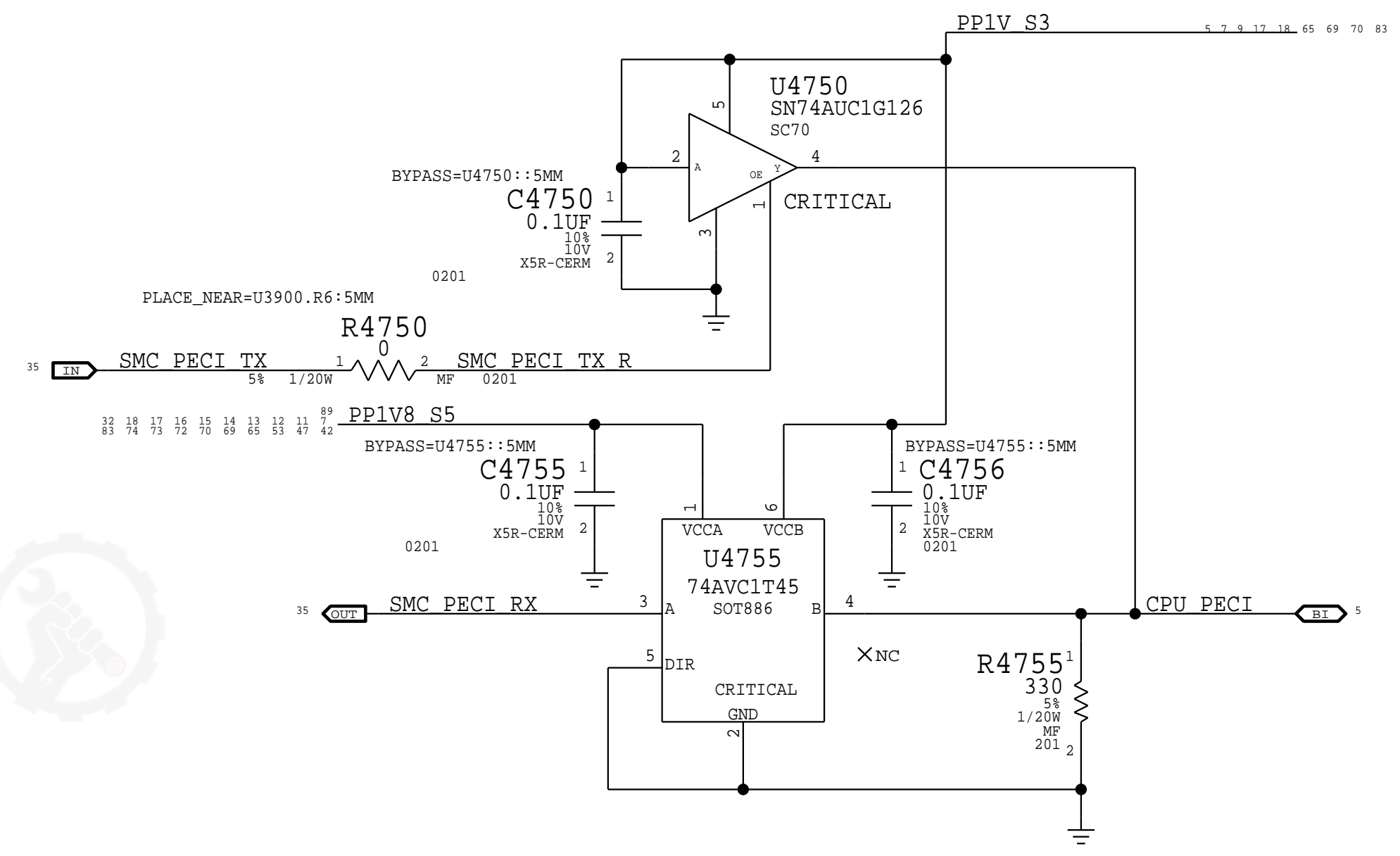
SoC ROM



PCH PM Level Shifting

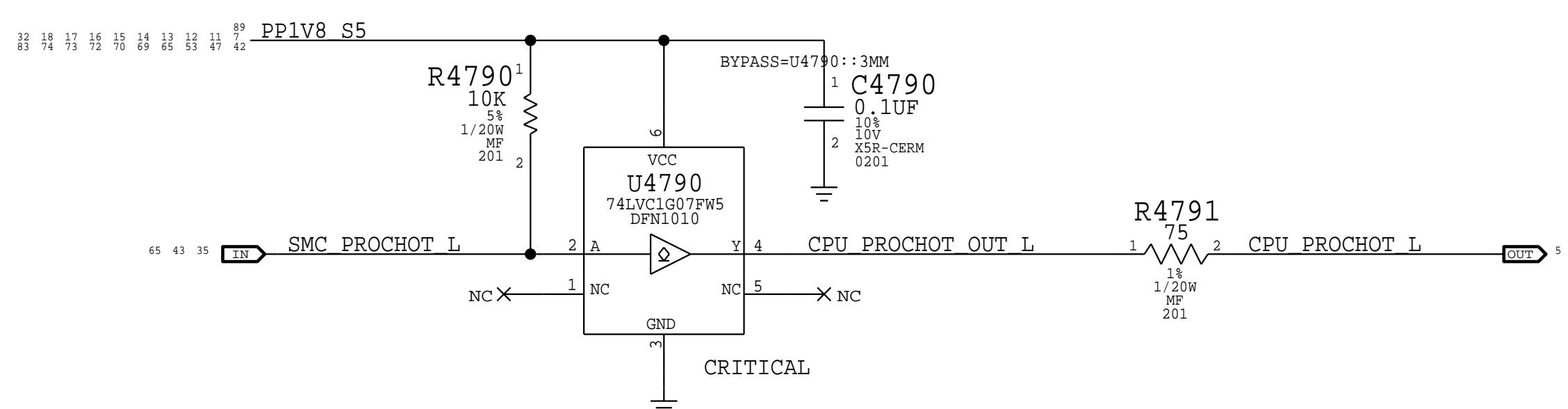


PECI Level Shifting



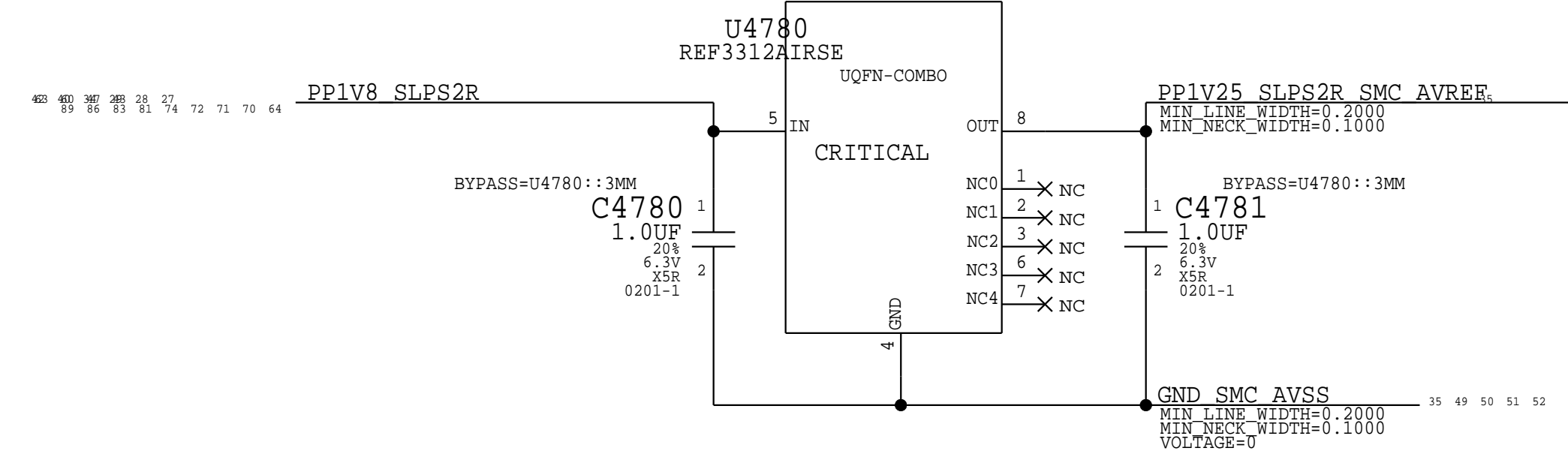
PROCHOT# Level Shifting

rdar://problem/34583713



SMC AVREF Supply

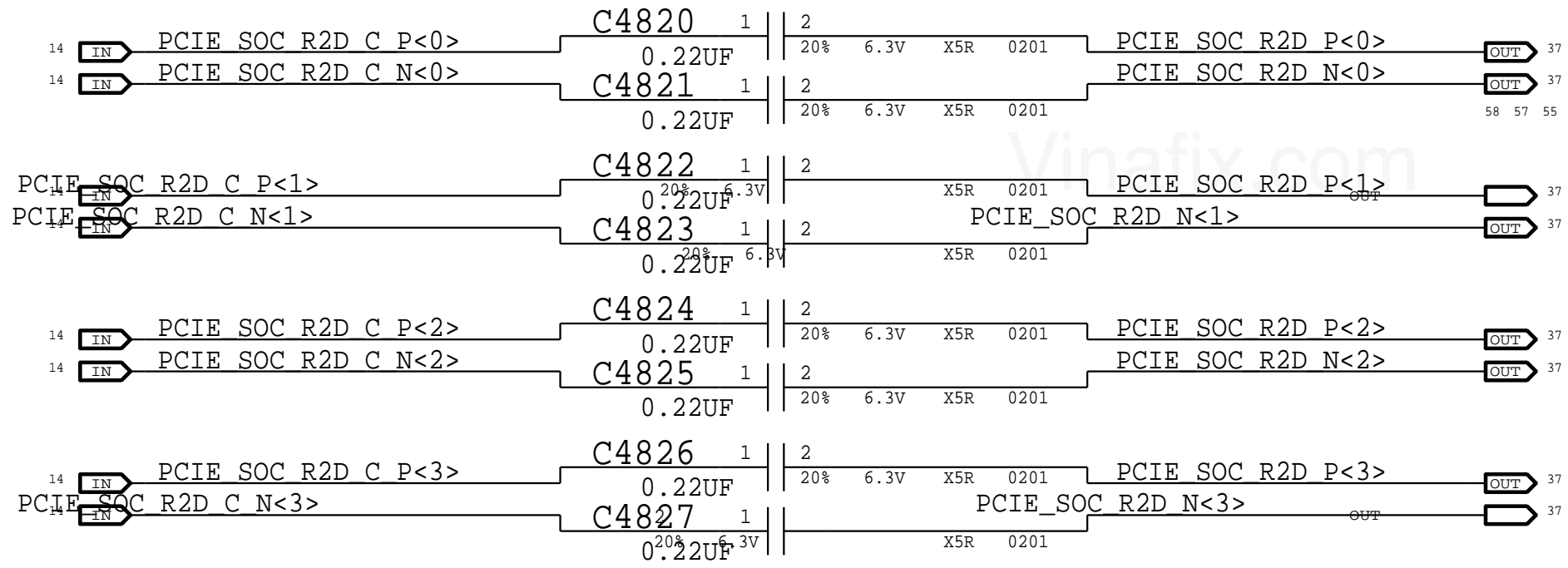
Footprint supports 353S01042 alternate



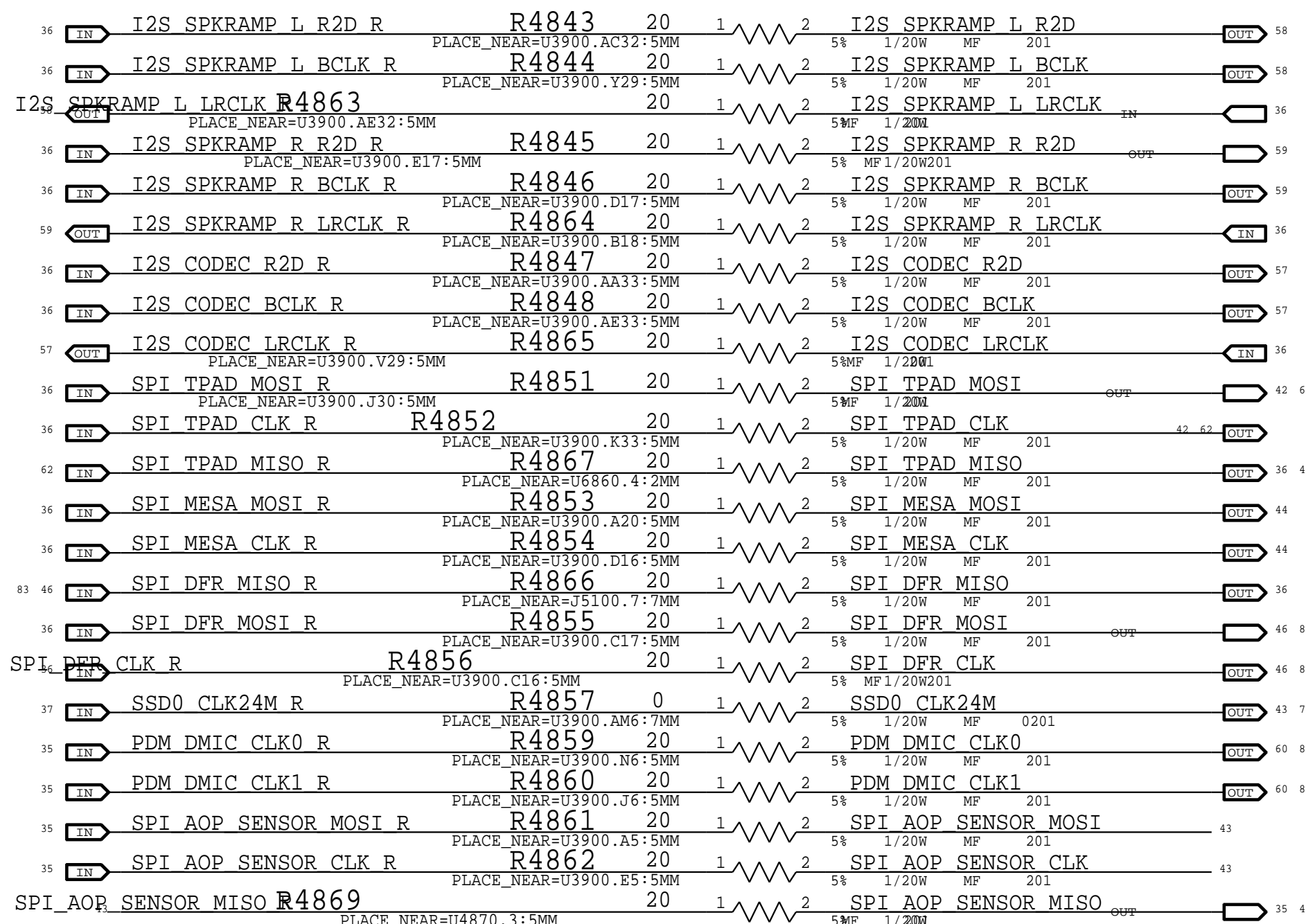
PAGE TITLE		SOC SHARED SUPPORT	
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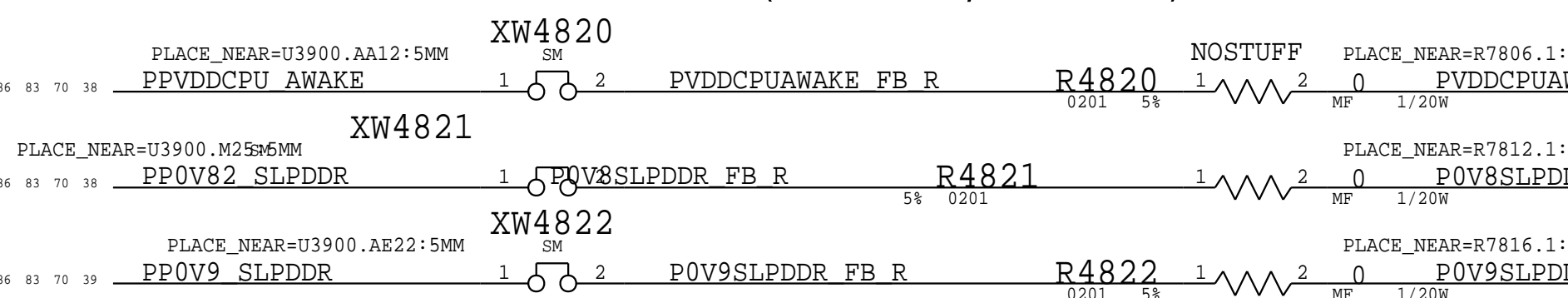
PCIE Up R2D AC Caps



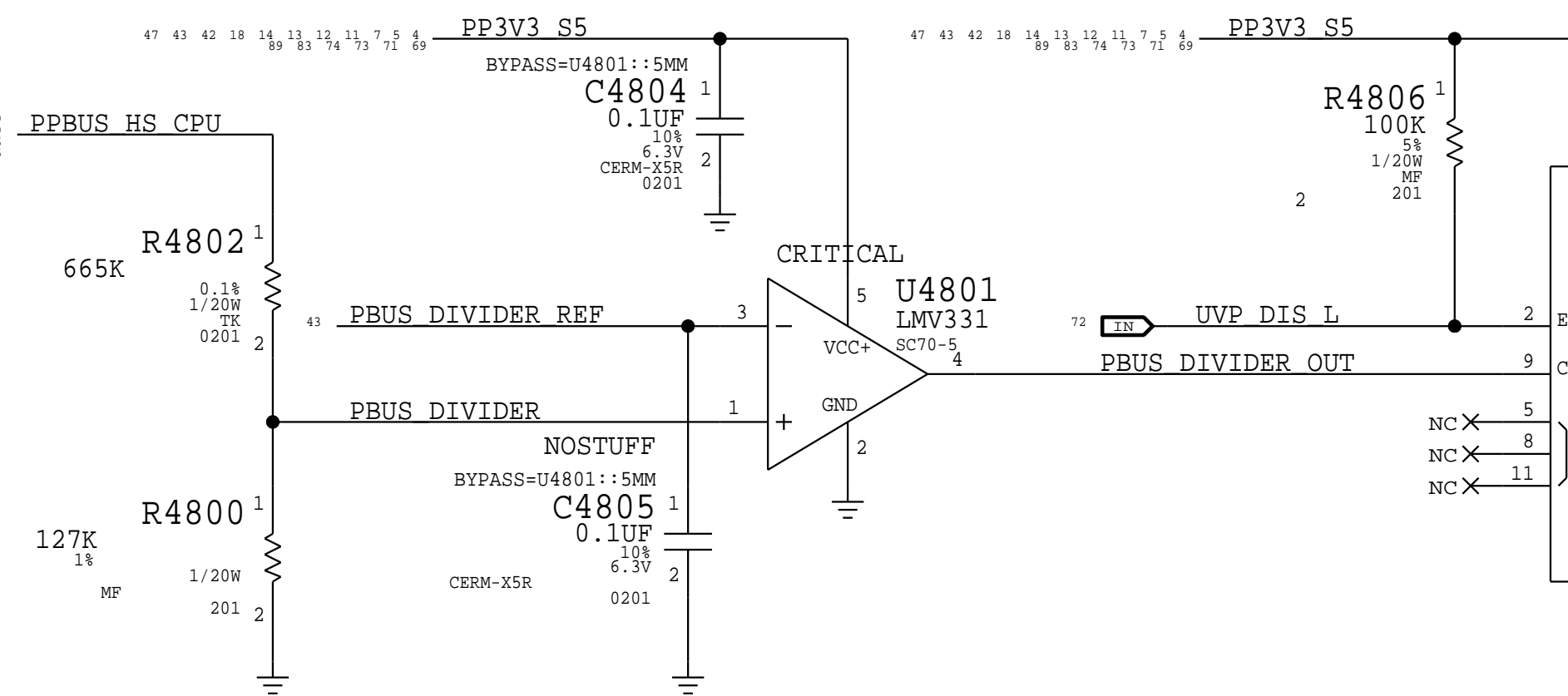
GPIO Source Termination



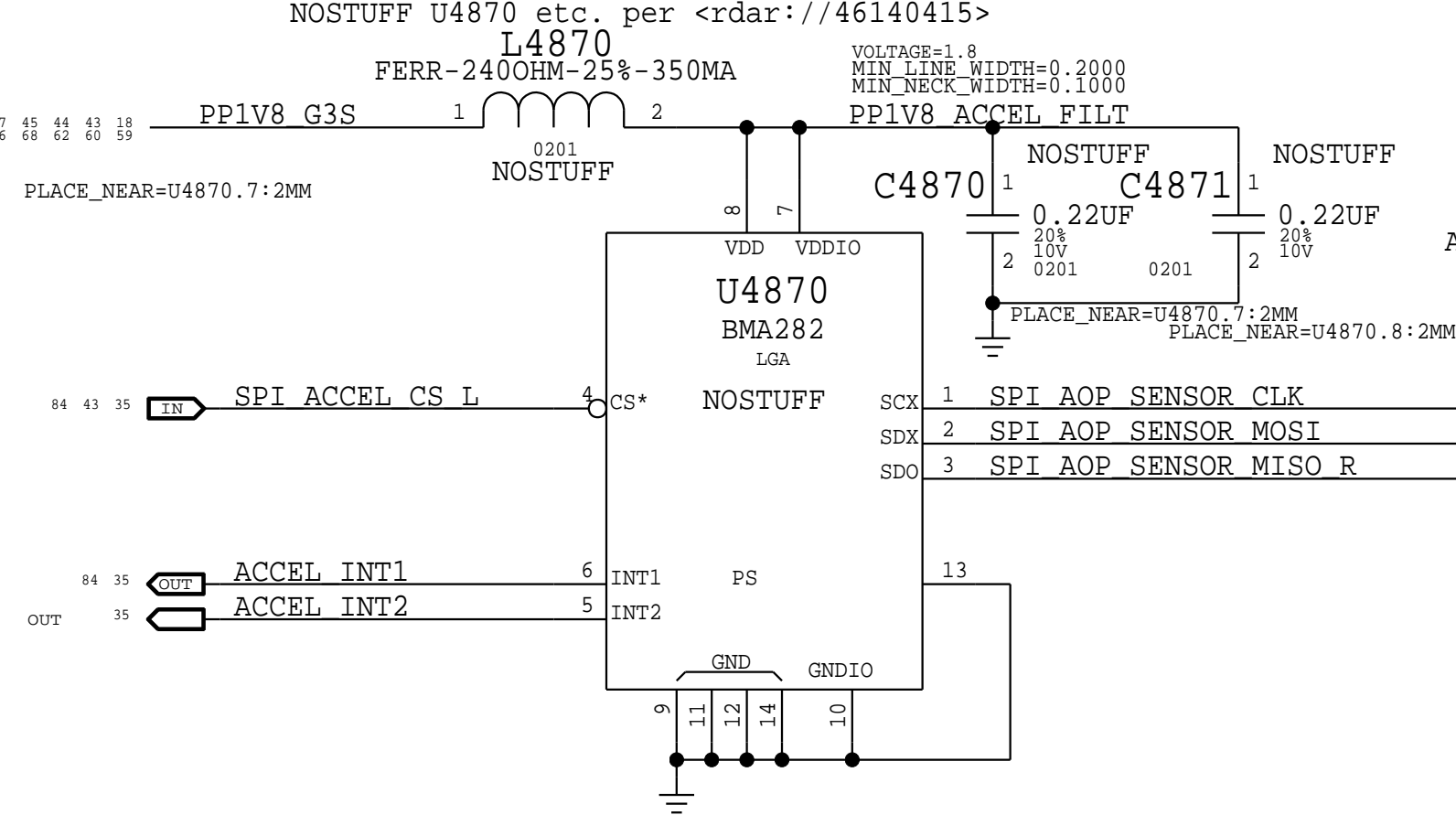
Remote Feedback Sense (Buck 0, 2 & 5)



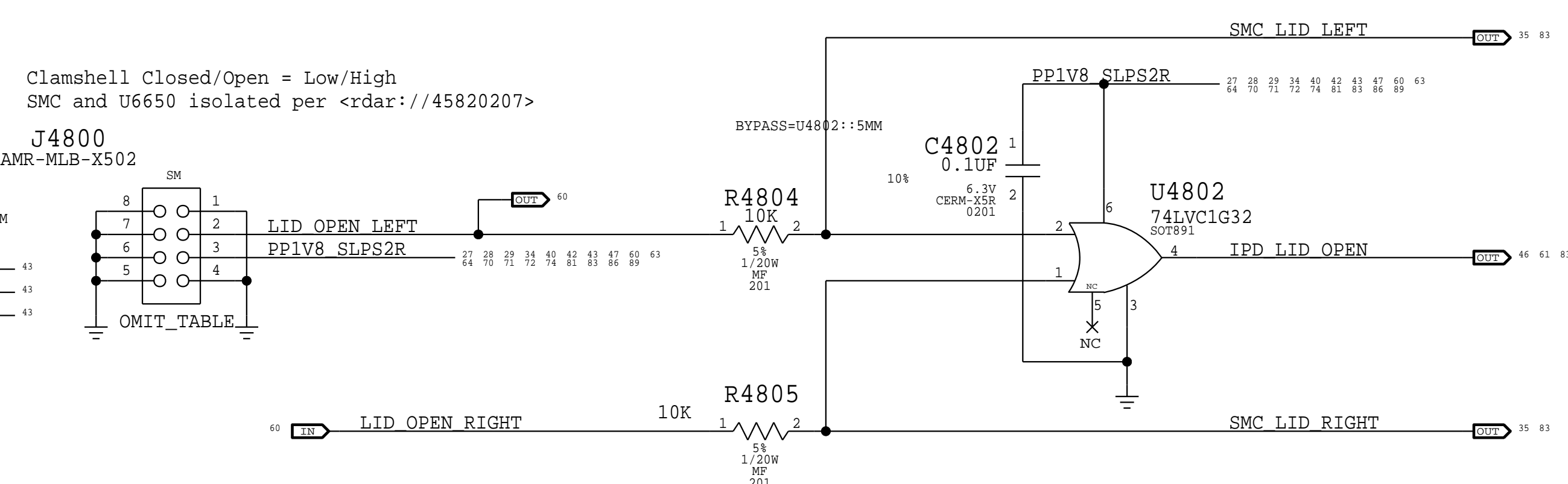
Droop Circuit



Triaxial acceleration sensor



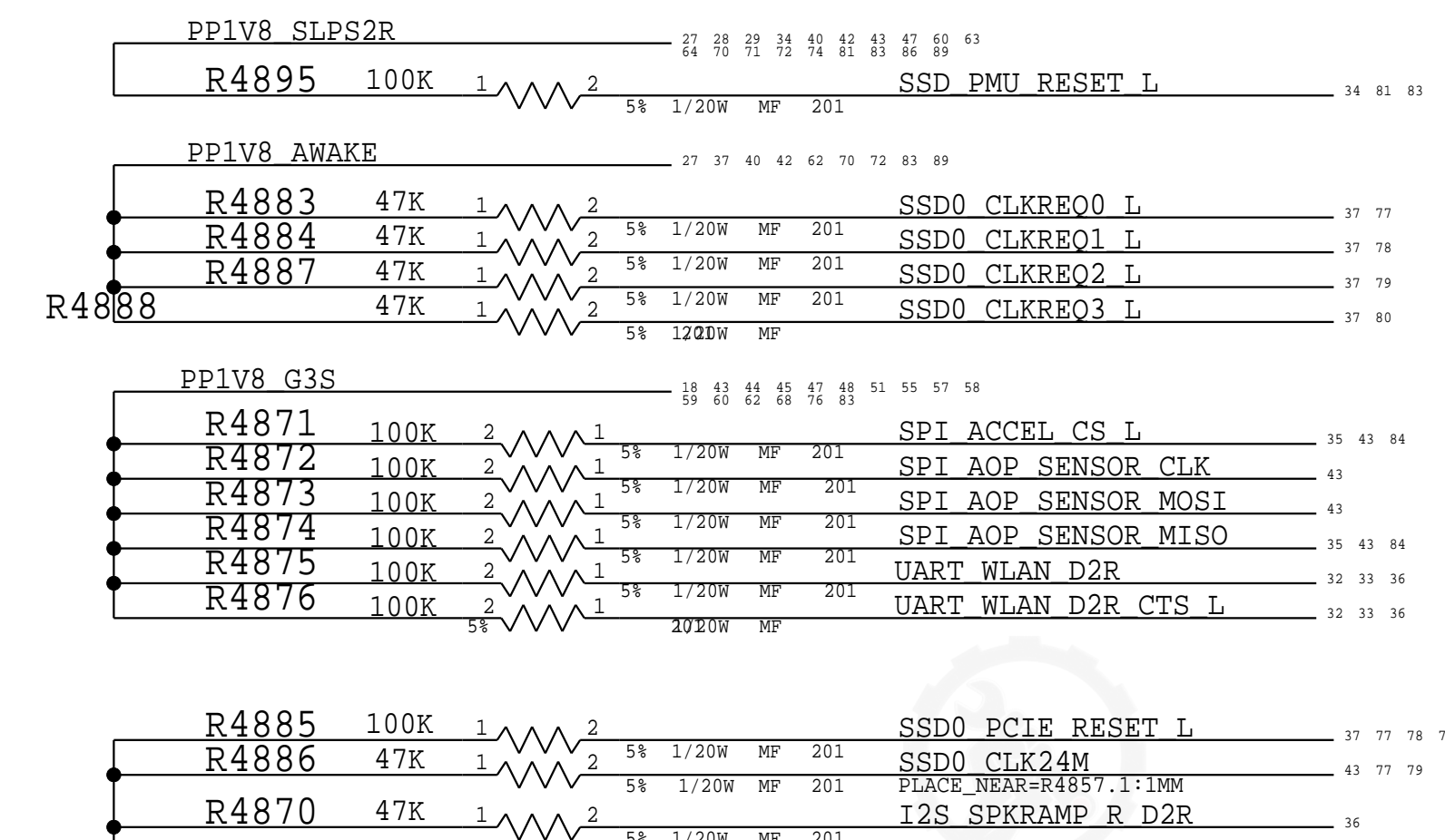
Lid Detect Sensors



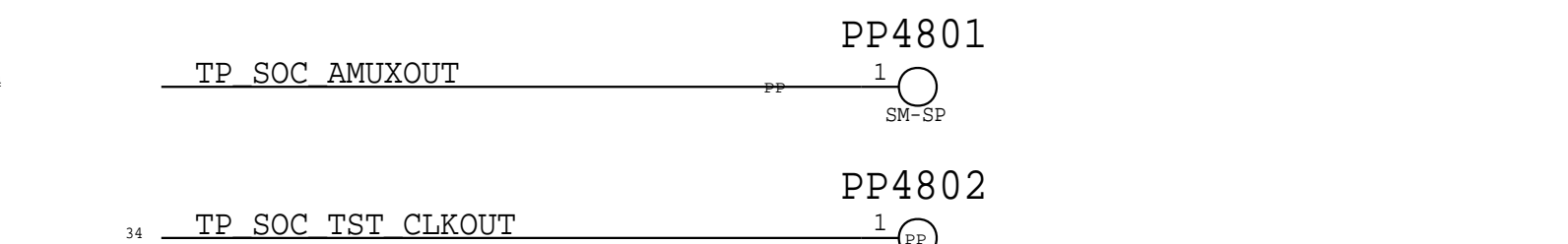
Unused SOC Signals

Table listing various unused SOC signals such as NC PLCAM TX THROTTLE, NC GSSS HOST TIME, NC SOC WLAN DEV WAKE, etc., with their respective test point locations.

Project Specific Pull-Ups

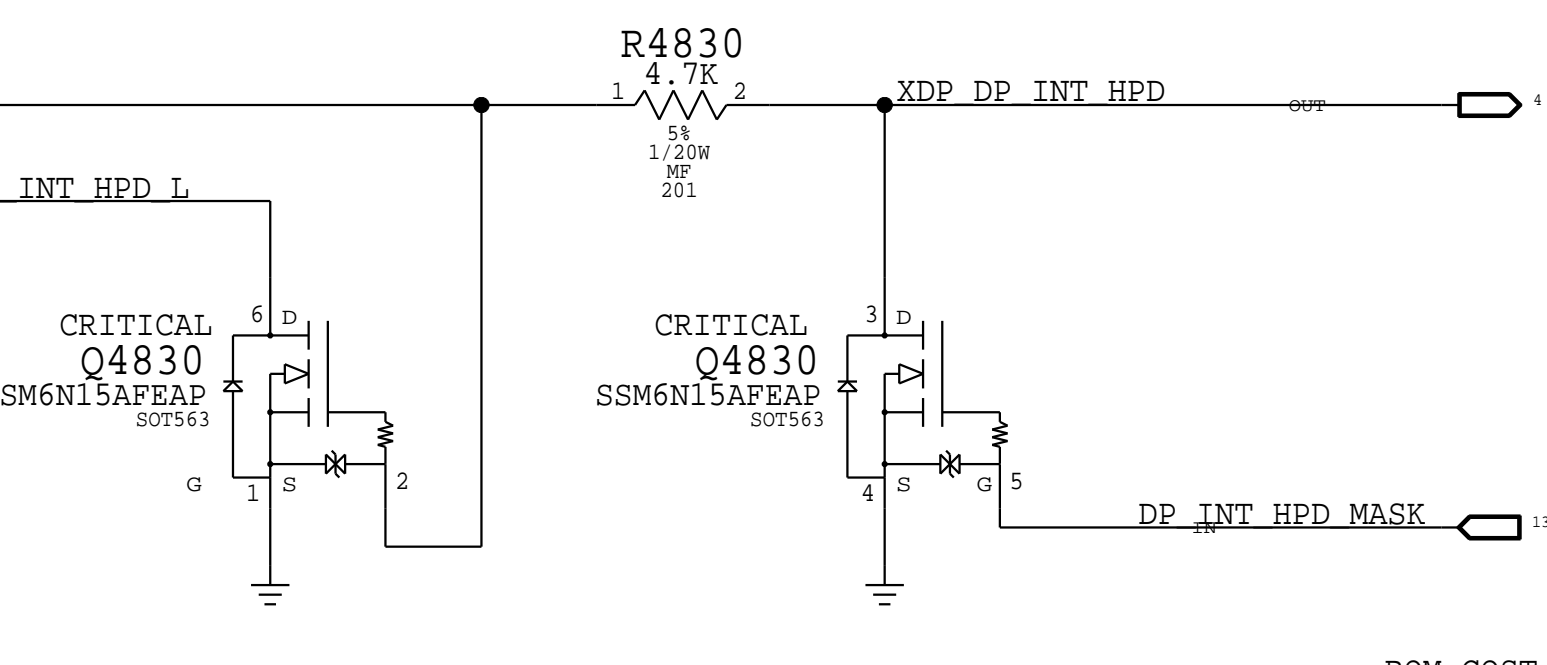


SoC Test Points



HPD KSF Comp Circuit

R4830 needs to be characterized and adjusted if necessary



SOC PROJECT SUPPORT header with Apple Inc. logo, drawing number 051-04273, revision 4.0.0, and page information (43 OF 98).

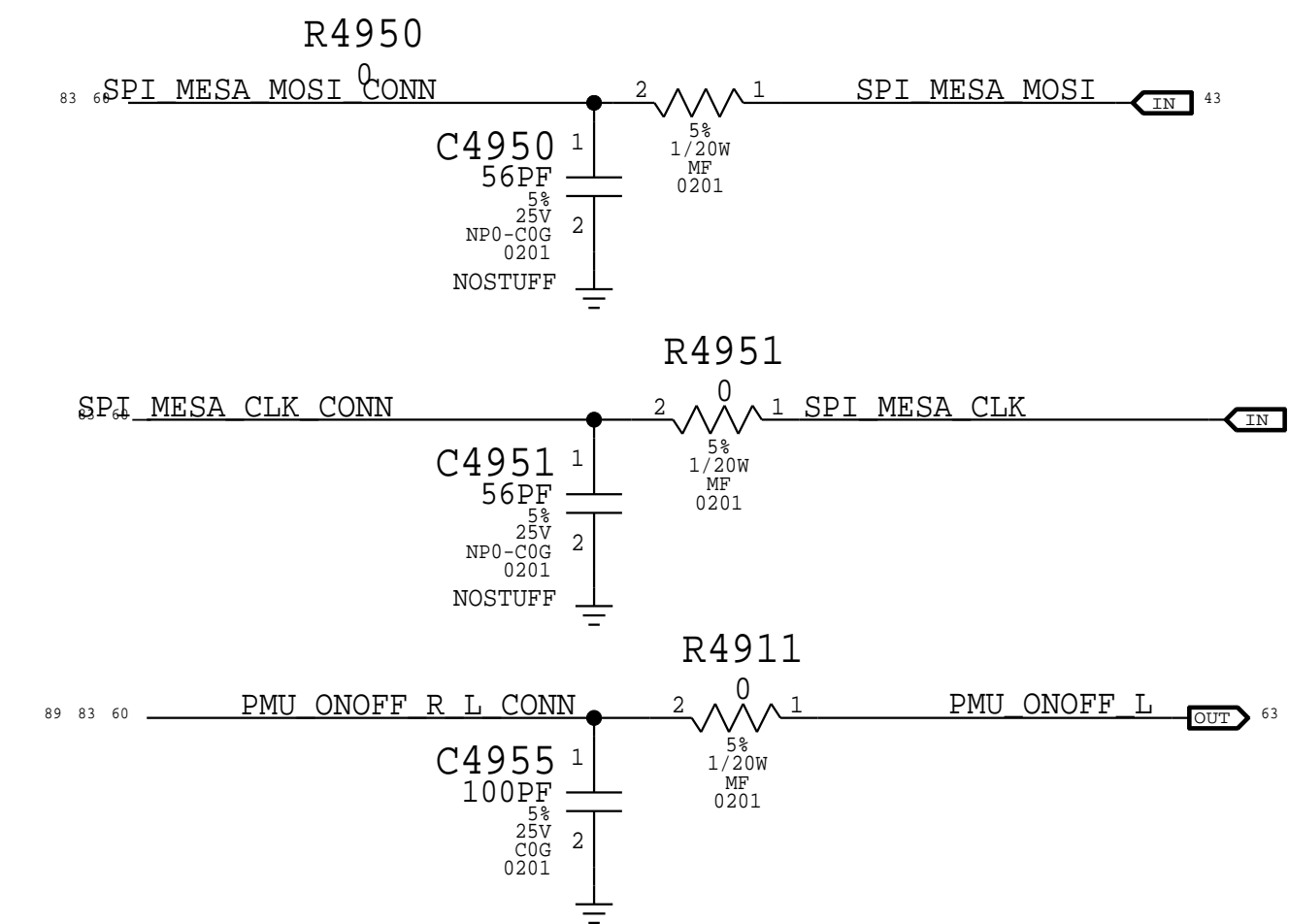
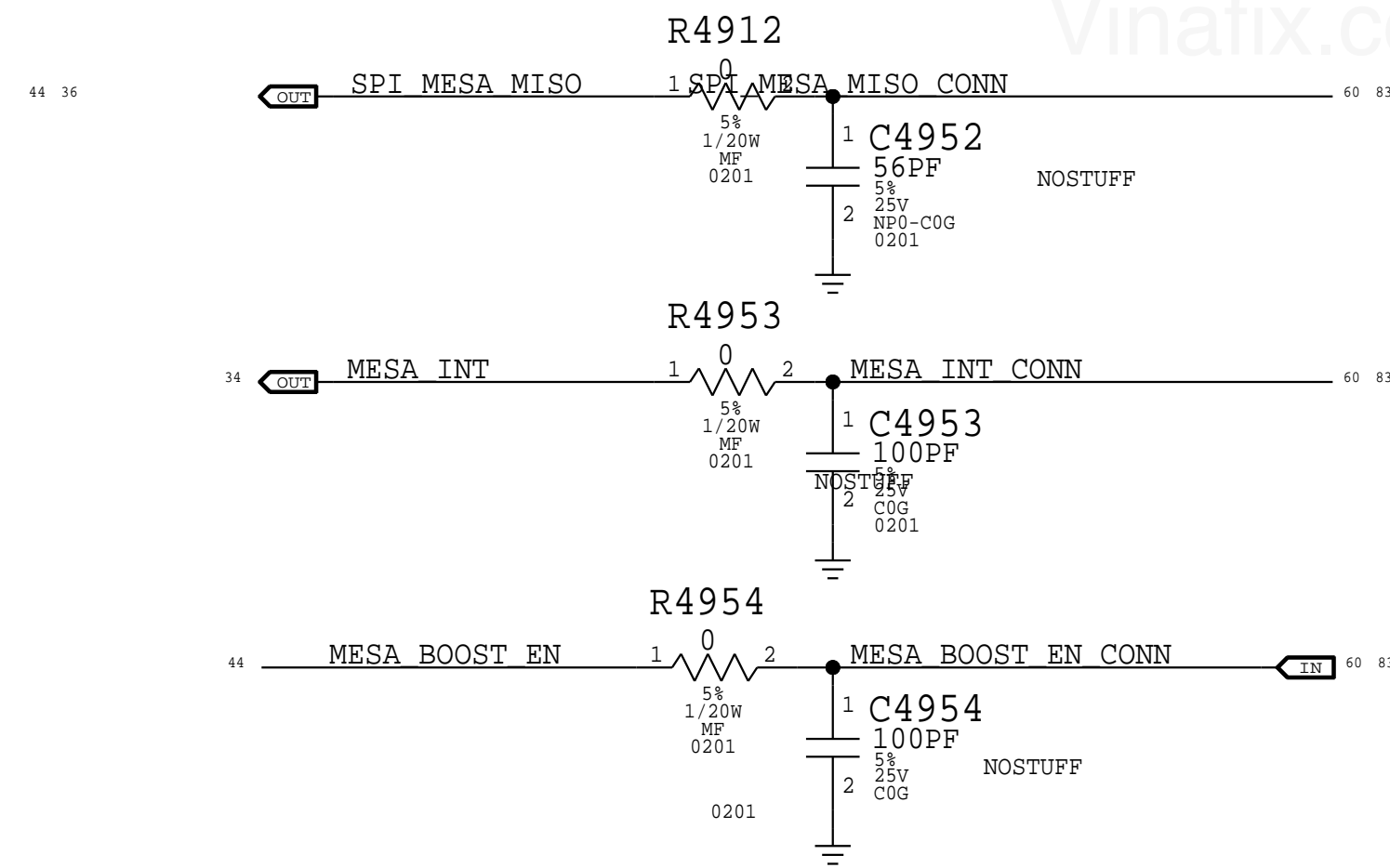
ISOLATE FROM OTHER COMPONENTS/NETS AS MUCH AS POSSIBLE

T151 FLEX CONNECTOR

ISOLATE FROM OTHER COMPONENTS/NETS AS MUCH AS POSSIBLE

ESD Filters

ESD Filters



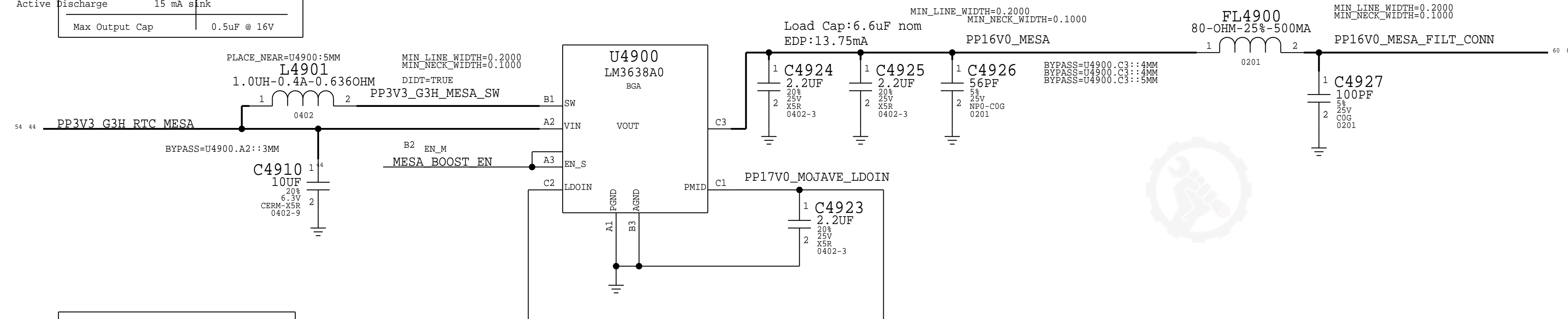
Output Voltage	16.0V +/- 2%
Iout (max avg)	6mA
OCP (min)	13 mA
Active Discharge	15 mA sink
Max Output Cap	0.5uF @ 16V

Mesa Power Sequencing Requirements

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

MOJAVE 16V BOOST

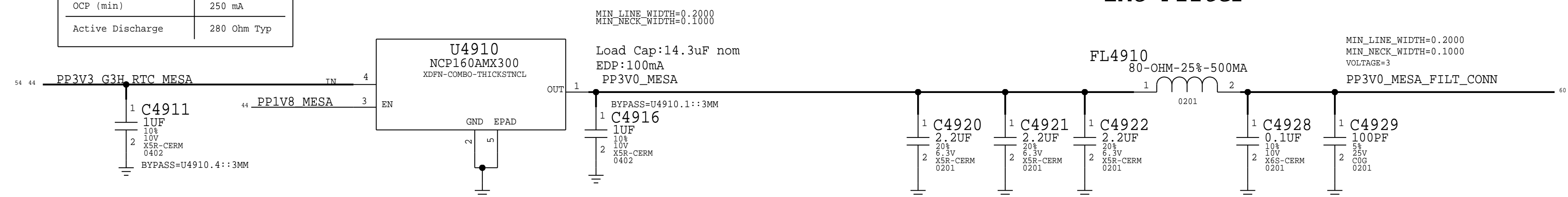
EMC Filter



Output Voltage	3.0V +/- 2%
Iout (max avg)	250mA
Dropout Voltage	155mV
OCP (min)	250 mA
Active Discharge	280 Ohm Typ

3.0V MESA

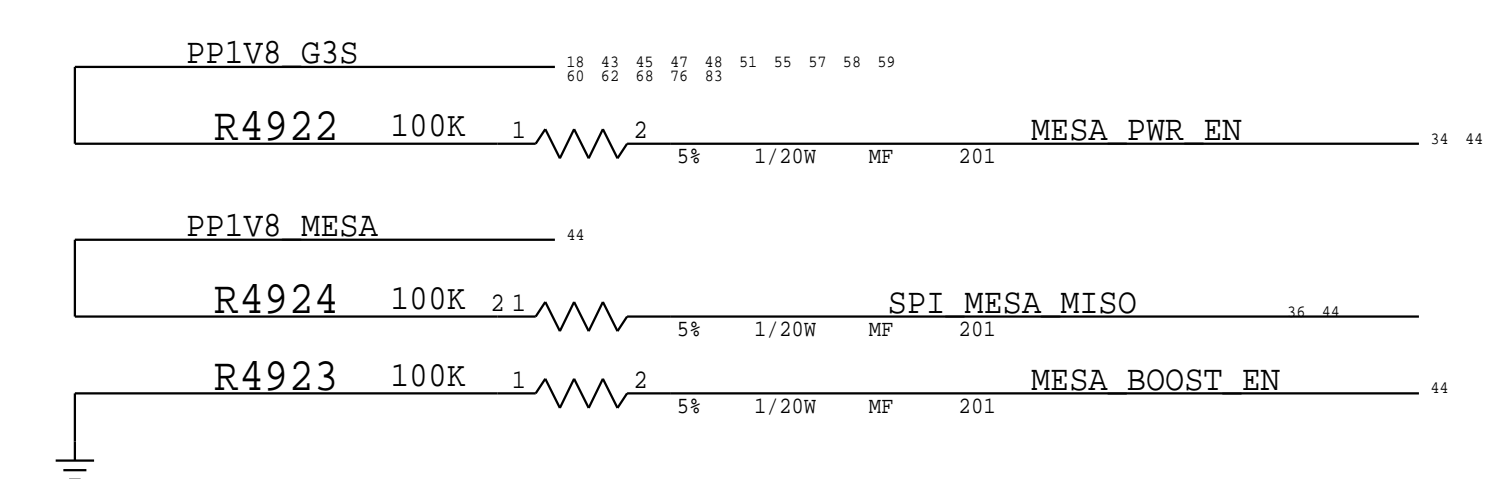
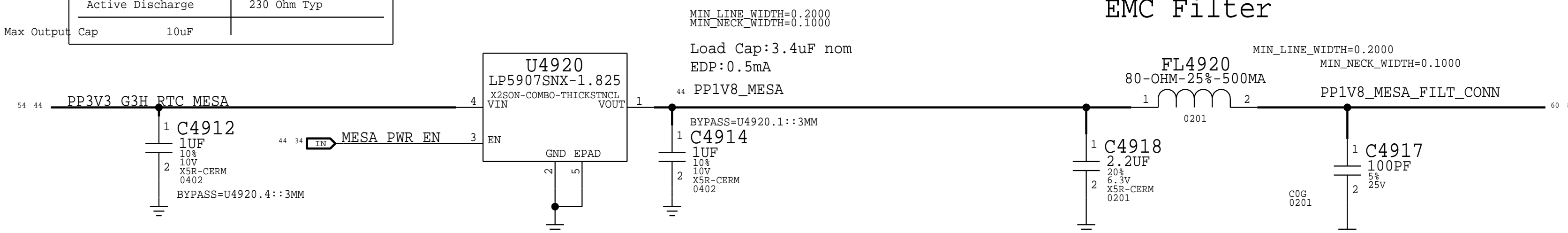
EMC Filter



Output Voltage	1.825V +/- 2%
Iout (max avg)	250mA
Dropout Voltage	50mV Typ @ 100mA
OCP (min)	250 mA
Active Discharge	230 Ohm Typ
Max Output Cap	10uF

1.8V MESA

EMC Filter

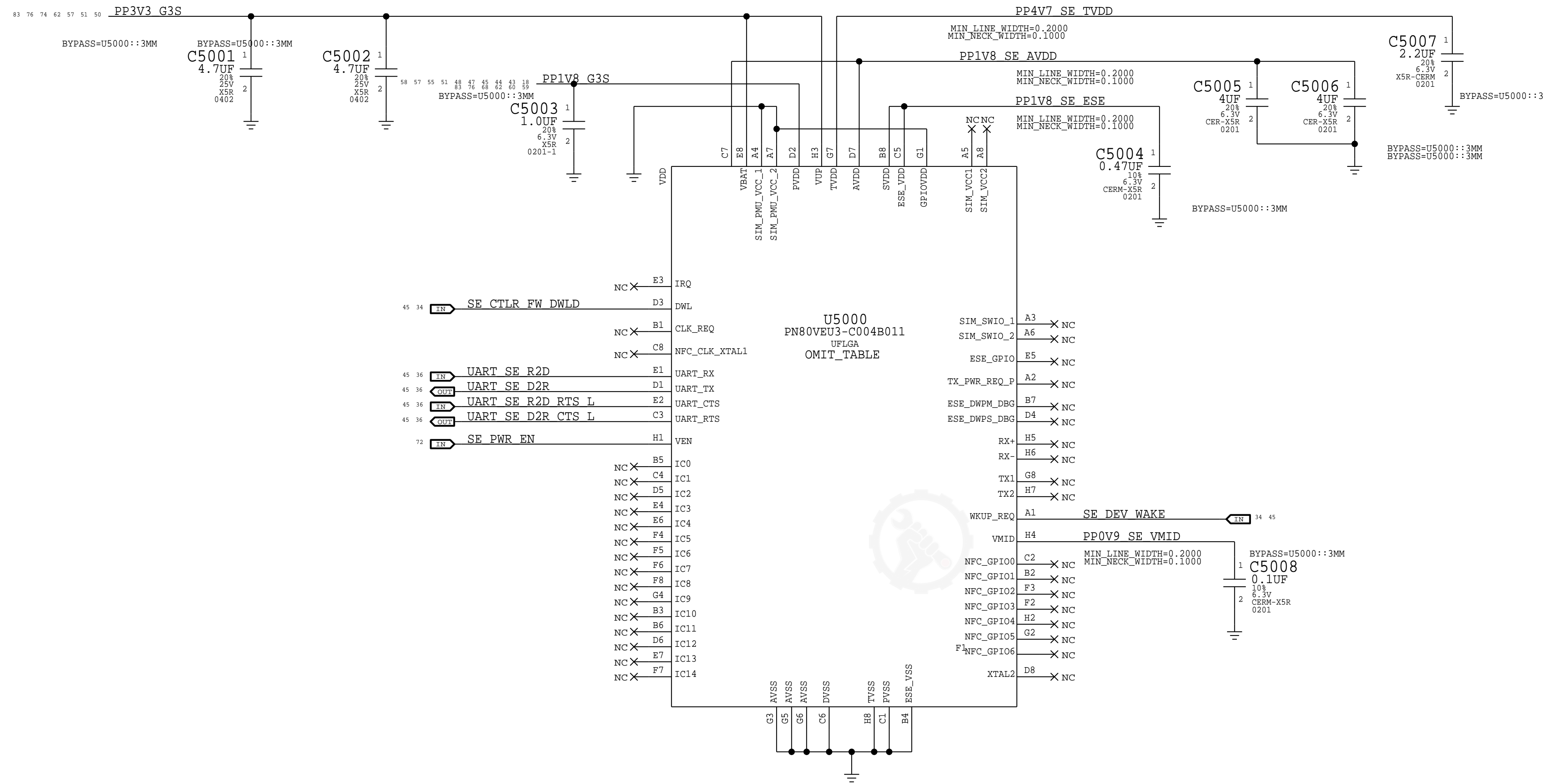


PAGE TITLE		
T151		
	DRAWING NUMBER	051-04273
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BOM_COST_GROUP=MESA

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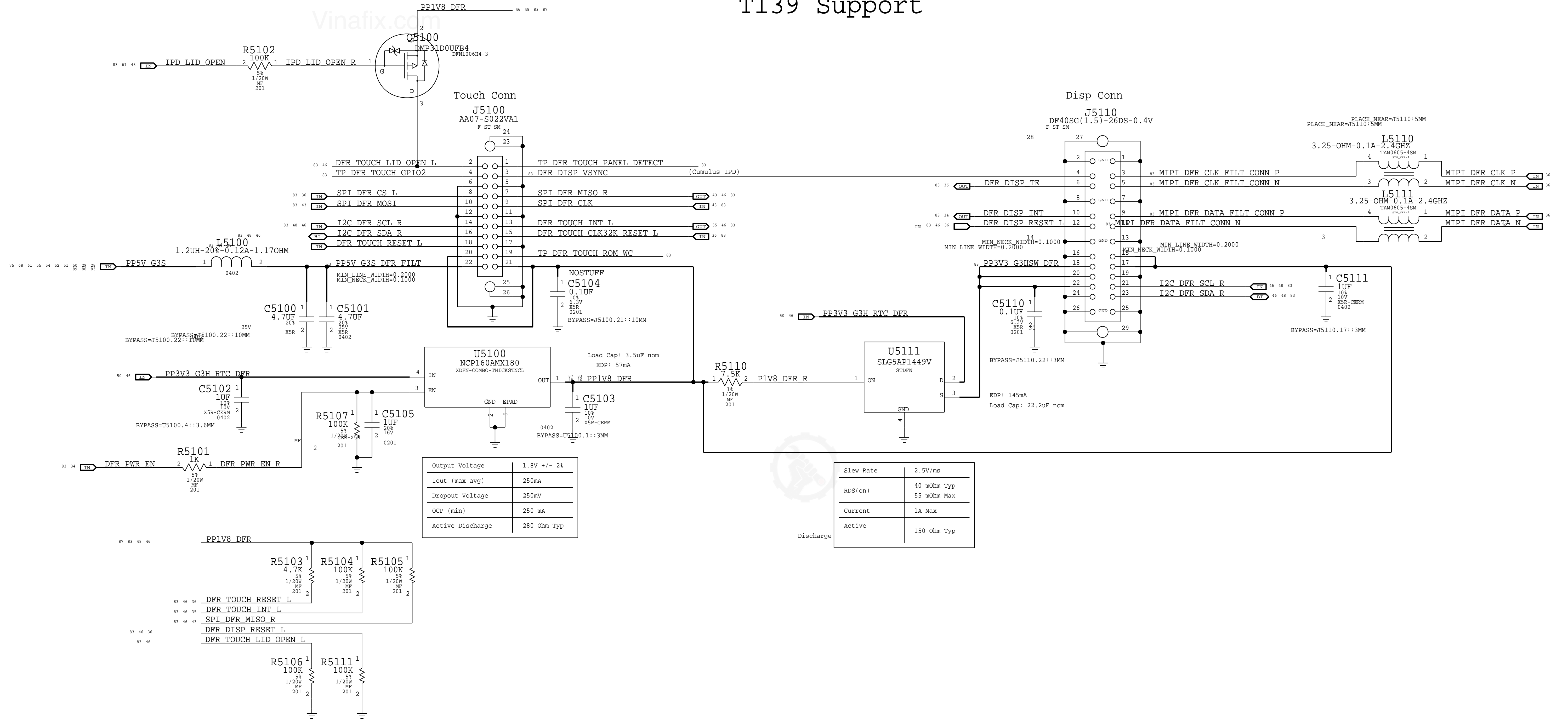


Ref	Value	Part	Pin	Notes
R5001	100K	1	36	UART SE R2D
R5002	100K	1	36	UART SE D2R
R5003	100K	1	36	UART SE R2D RTS L
R5004	100K	1	36	UART SE D2R CTS L
R5000	100K	1	45	SE CTLR FW DWLD
R5005	100K	2.1	34, 45	SE DEV WAKE

BOM_COST_GROUP=SOC

PAGE TITLE		Secure Element	
	DRAWING NUMBER	051-04273	SIZE
	REVISION	4.0.0	D
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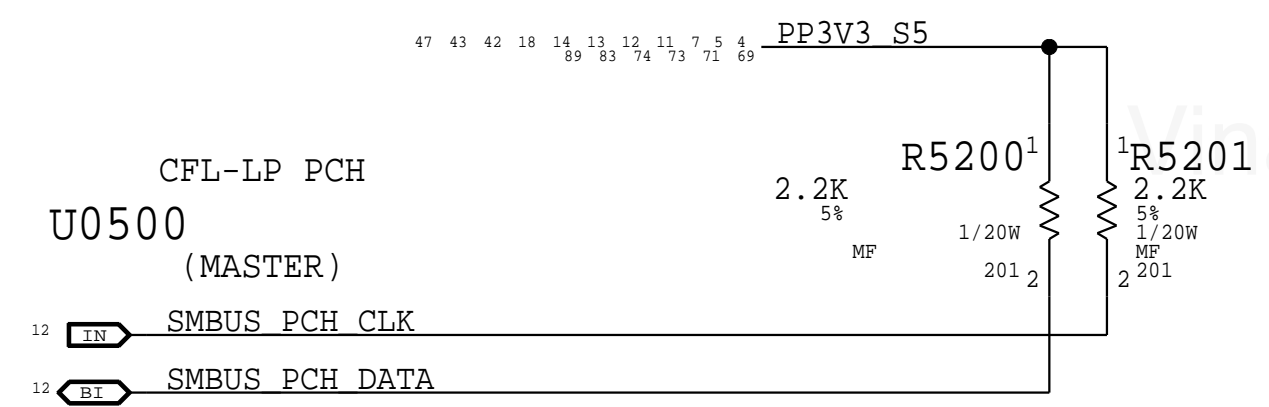
T139 Support



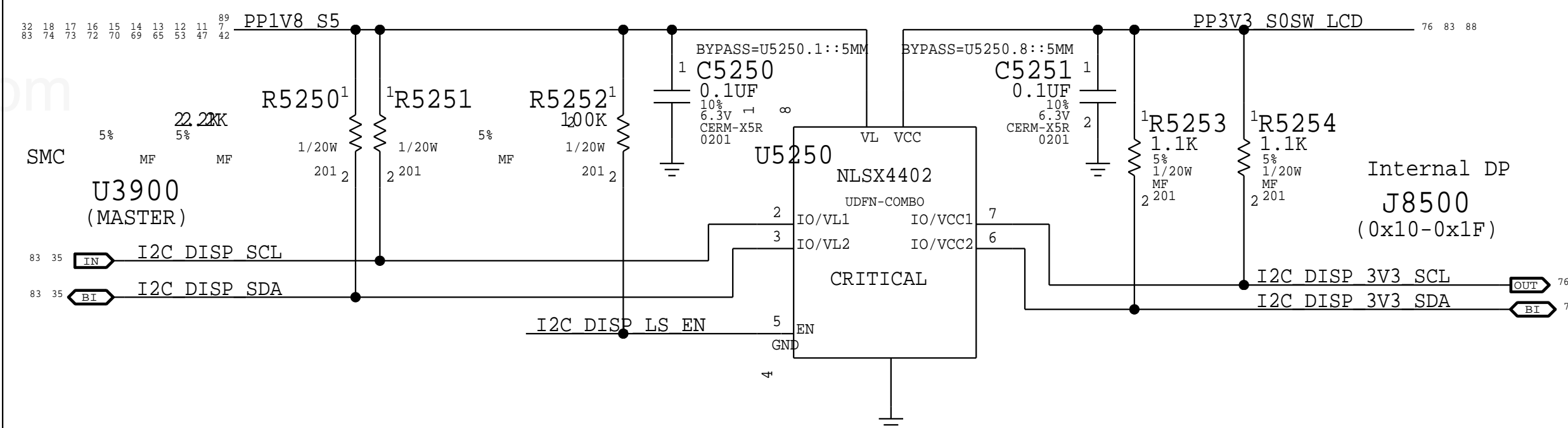
PAGE TITLE		
T139 SUPPORT		
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	REVISION	4.0.0
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BOM_COST_GROUP=DFR

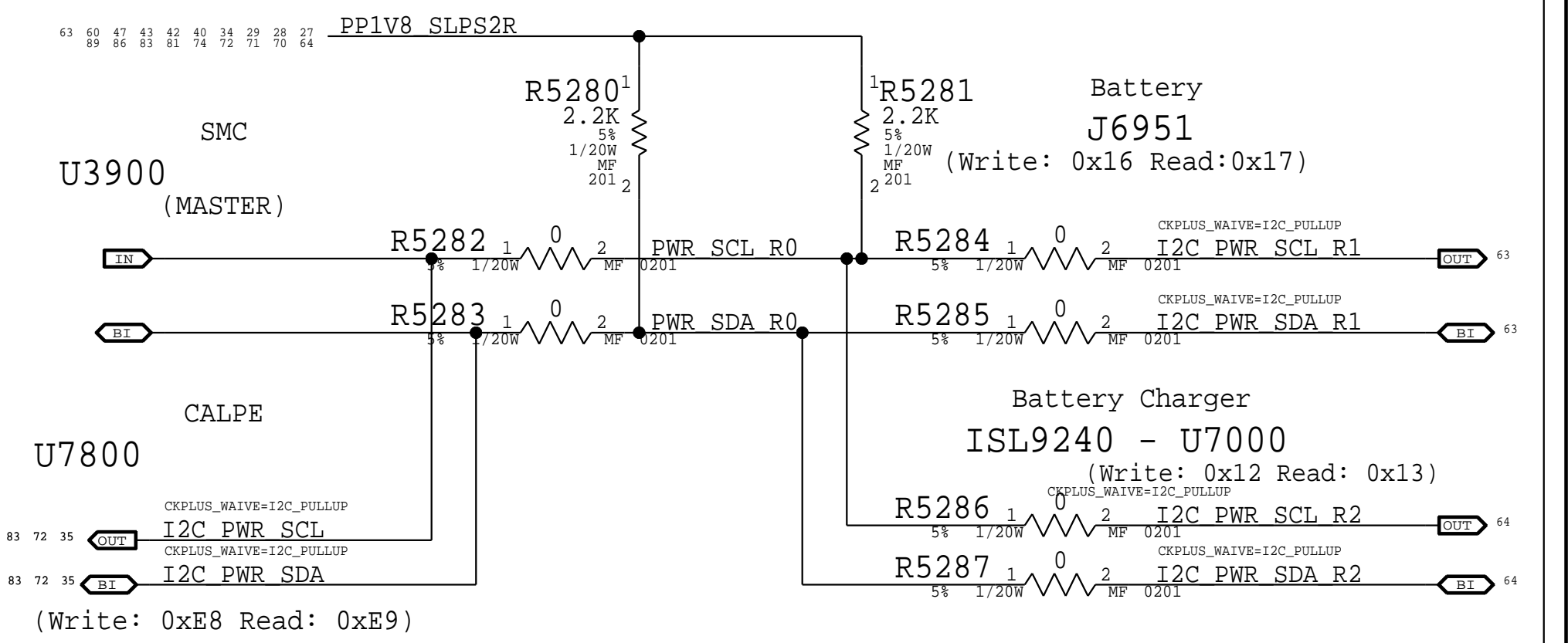
CFL PCH S0 "SMBUS 0" CONNECTIONS



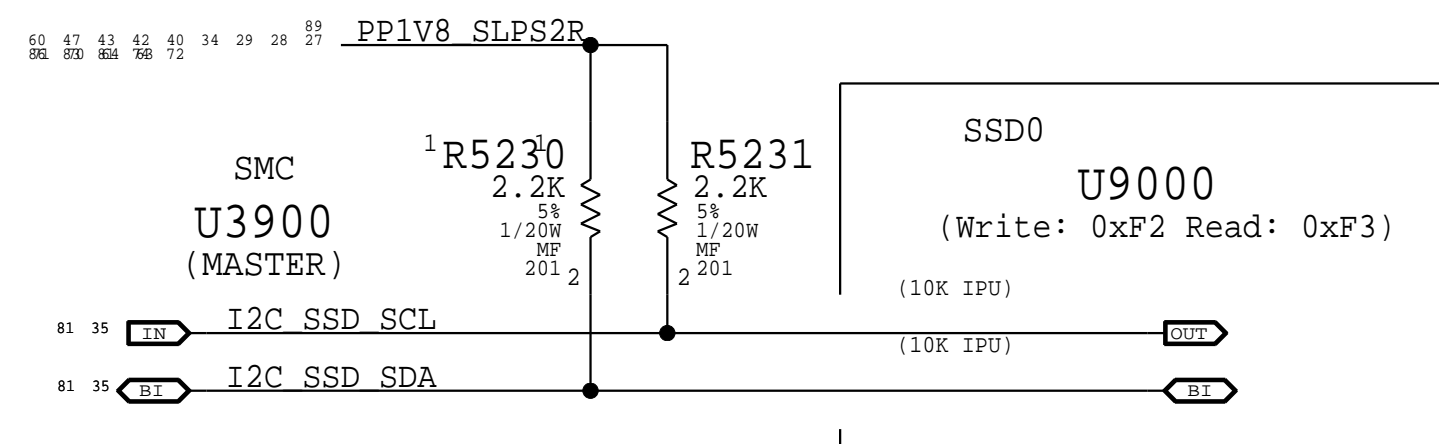
SMC I2C "3" S0 Connections



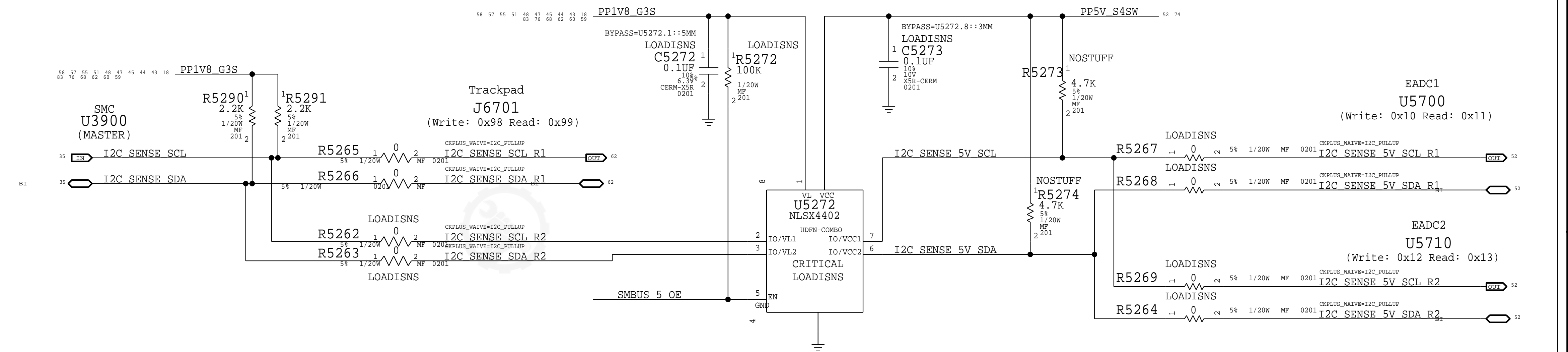
SMC I2C "4" G3H Connections



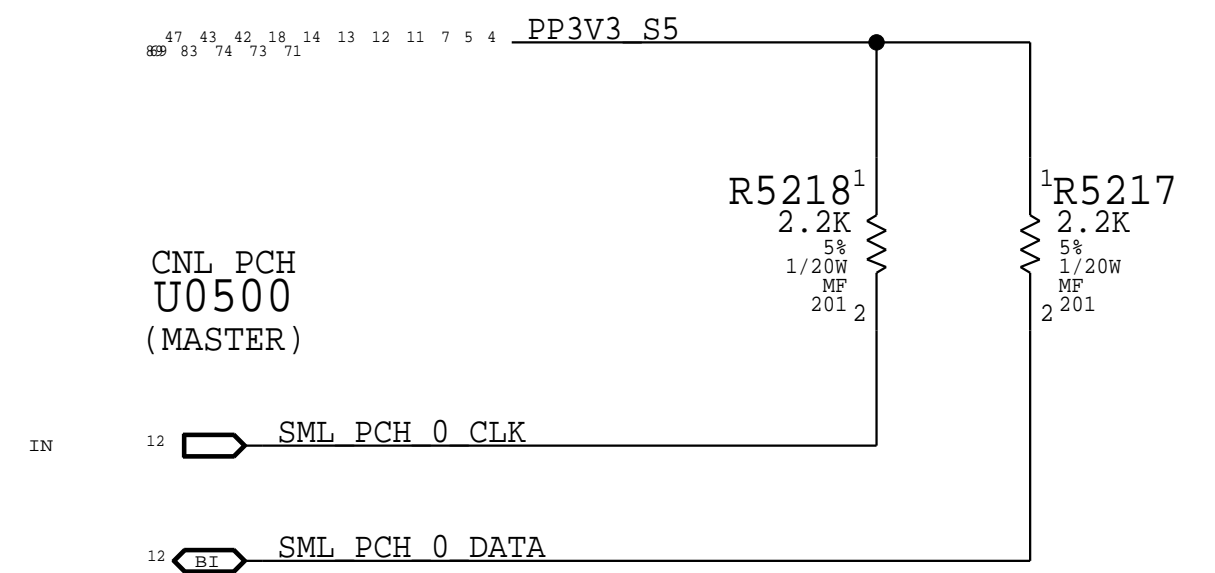
SMC I2C "6" G3H Connections



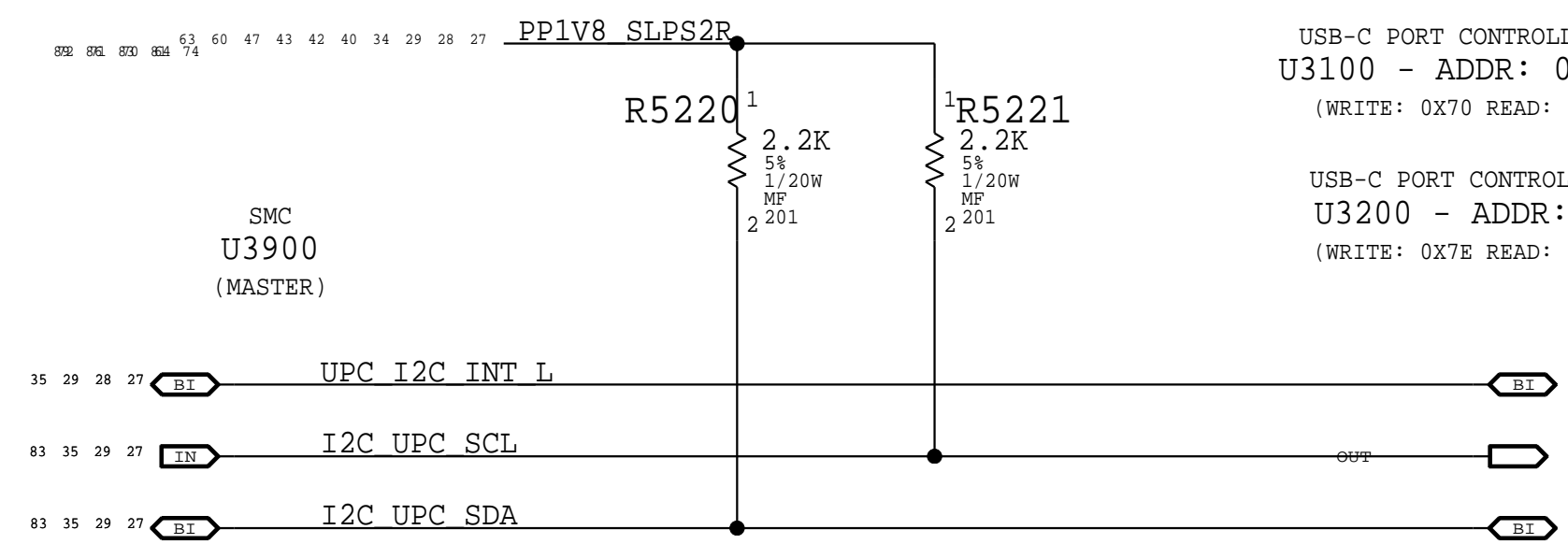
SMC I2C "5" G3S Connections



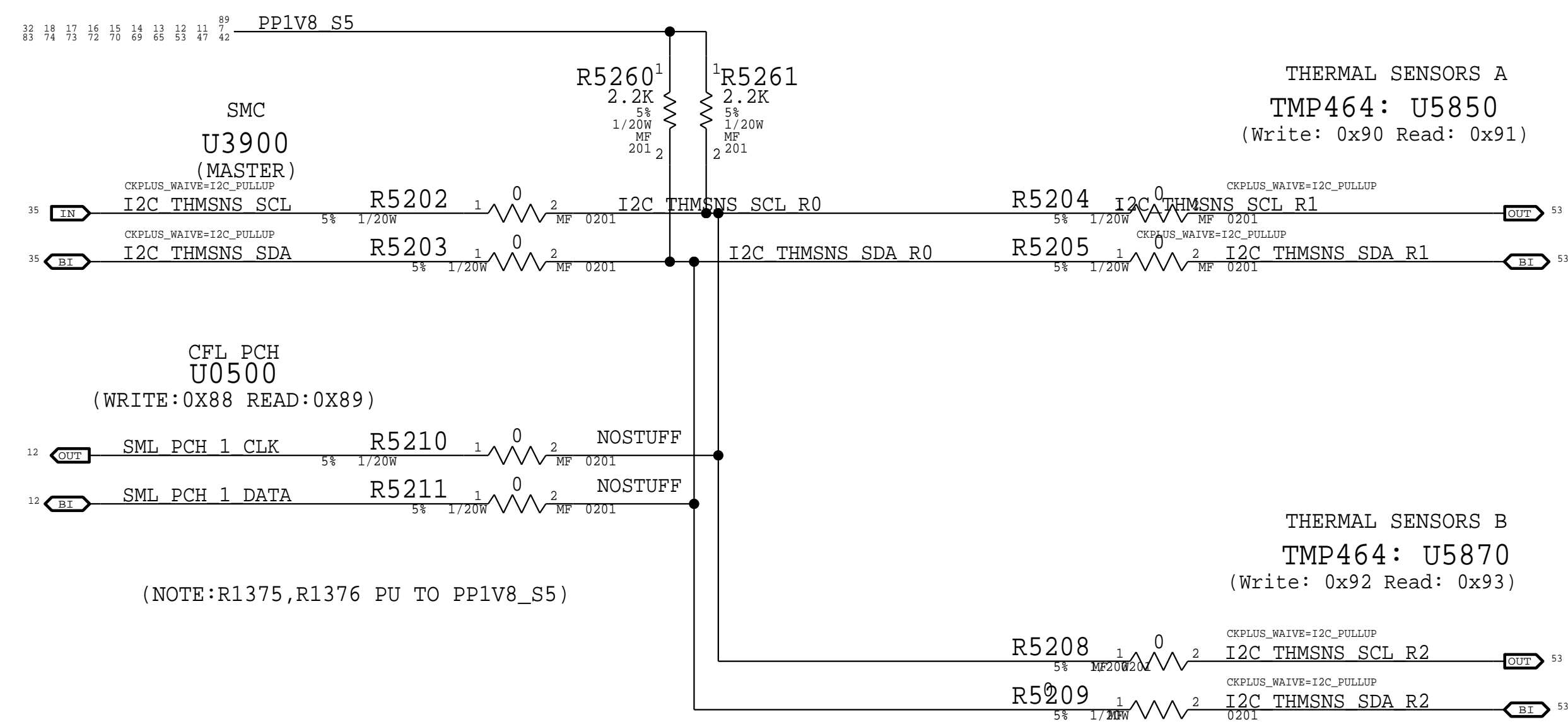
CFL I2C PCH "SML0" CONNECTIONS



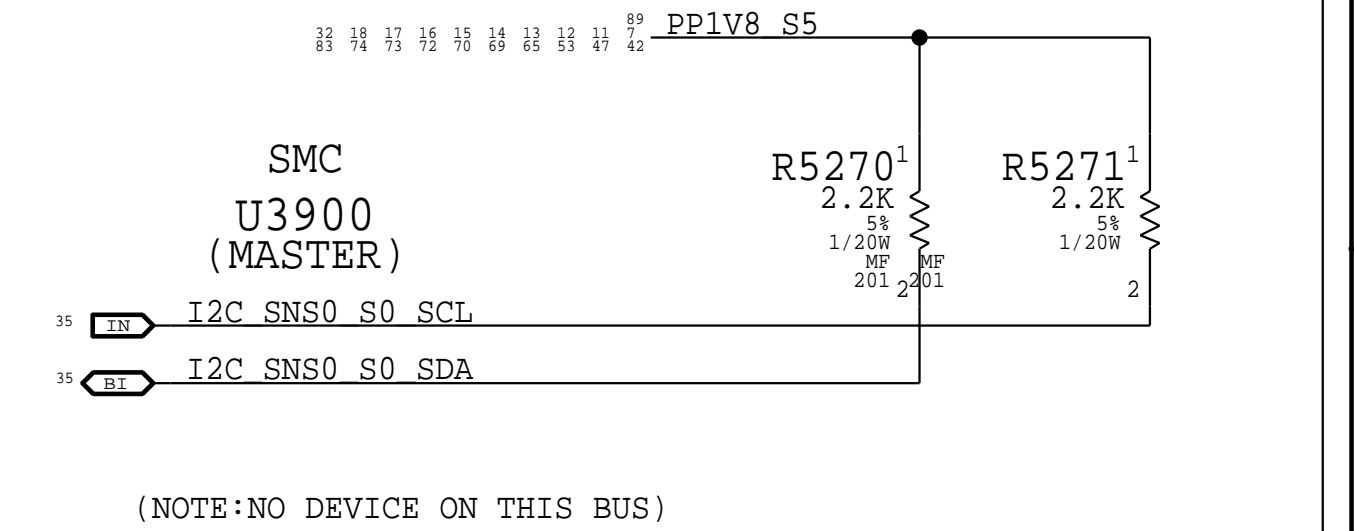
SMC I2C "0" G3H CONNECTIONS



SMC I2C "2" S0 Connections

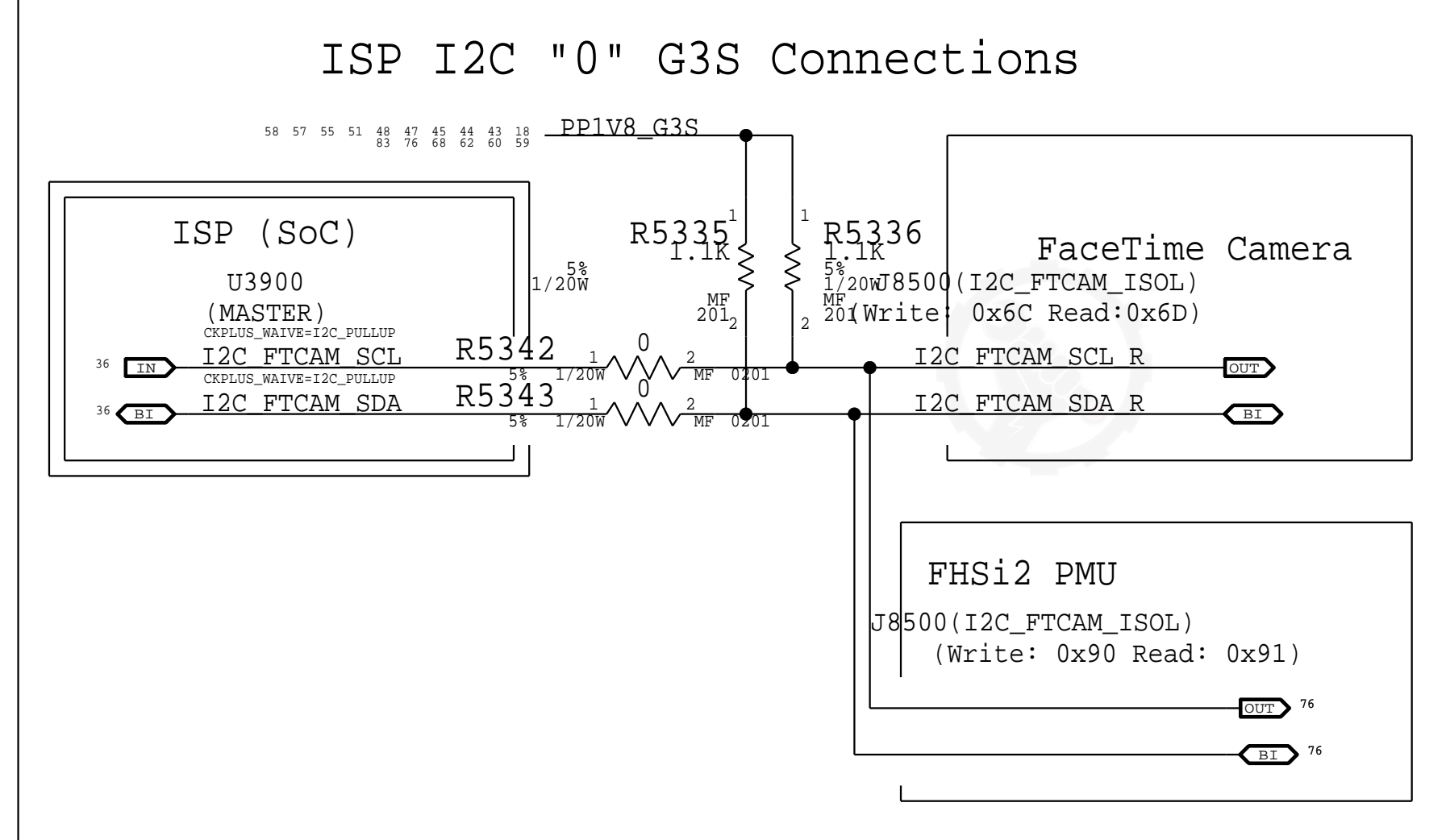
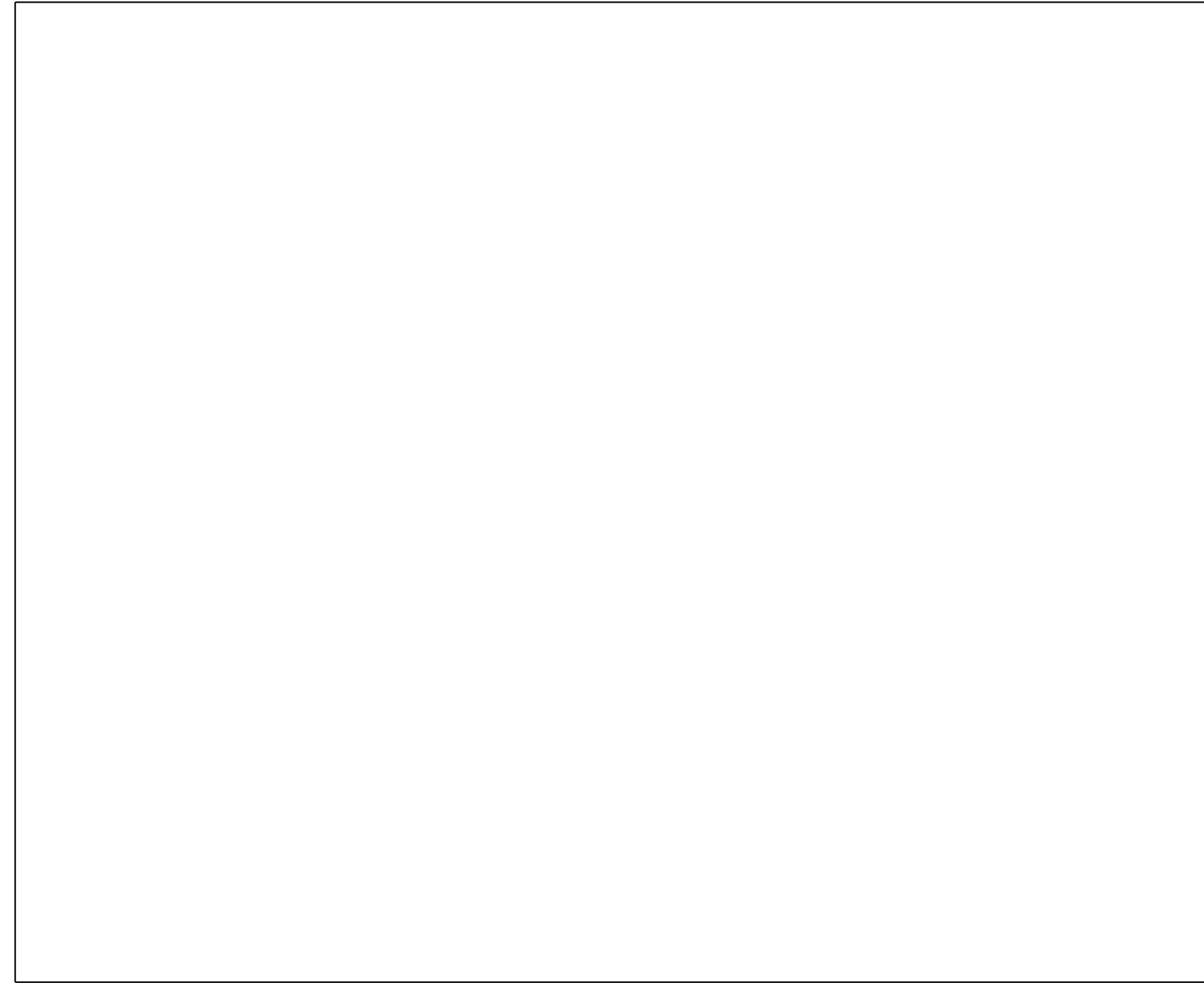
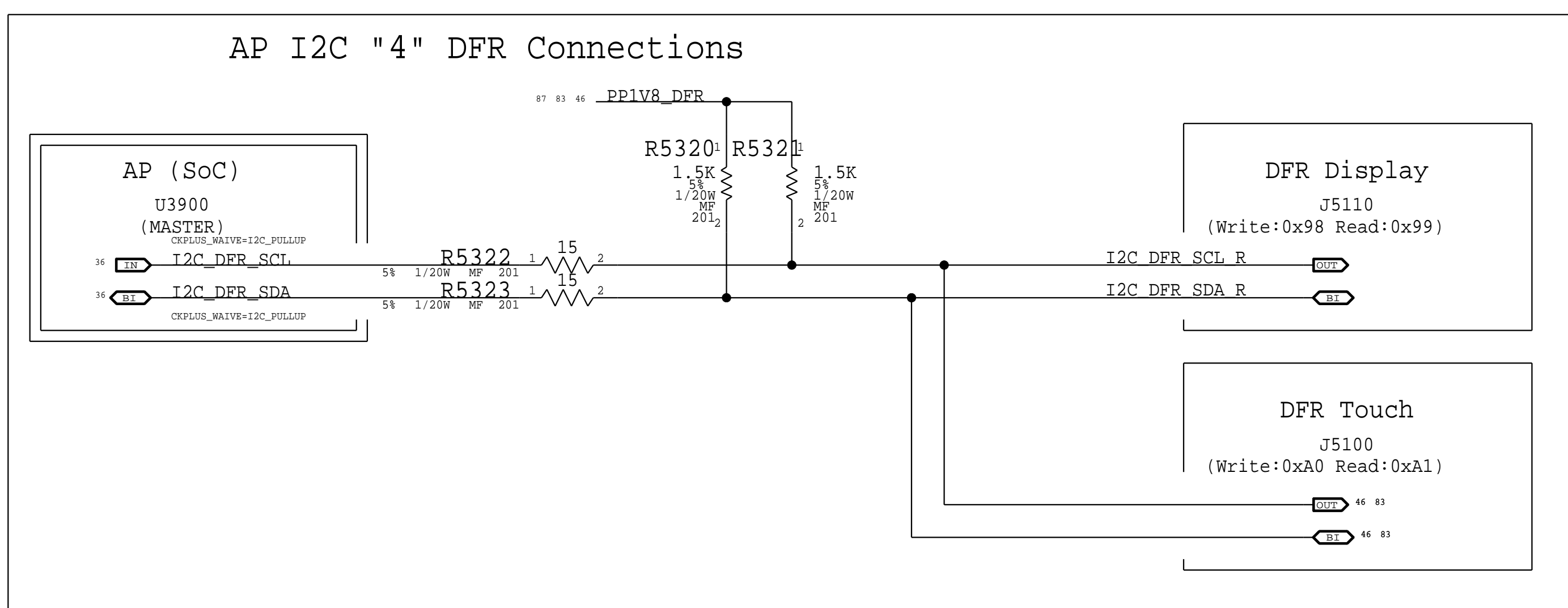
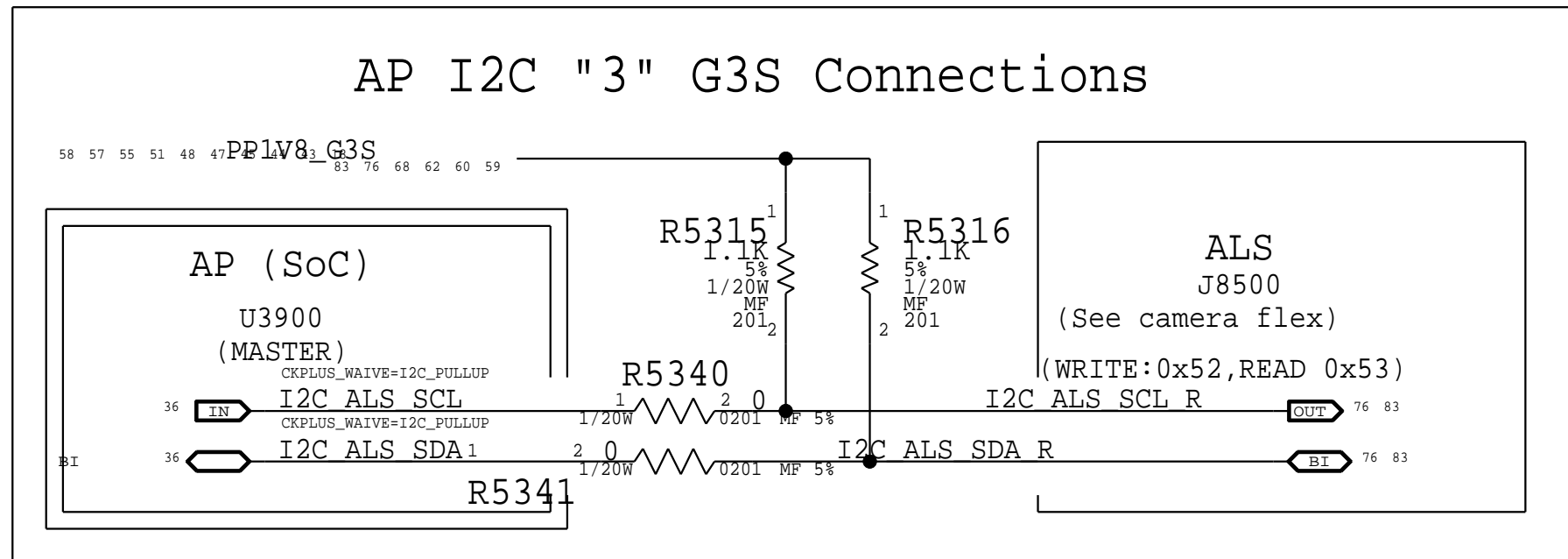
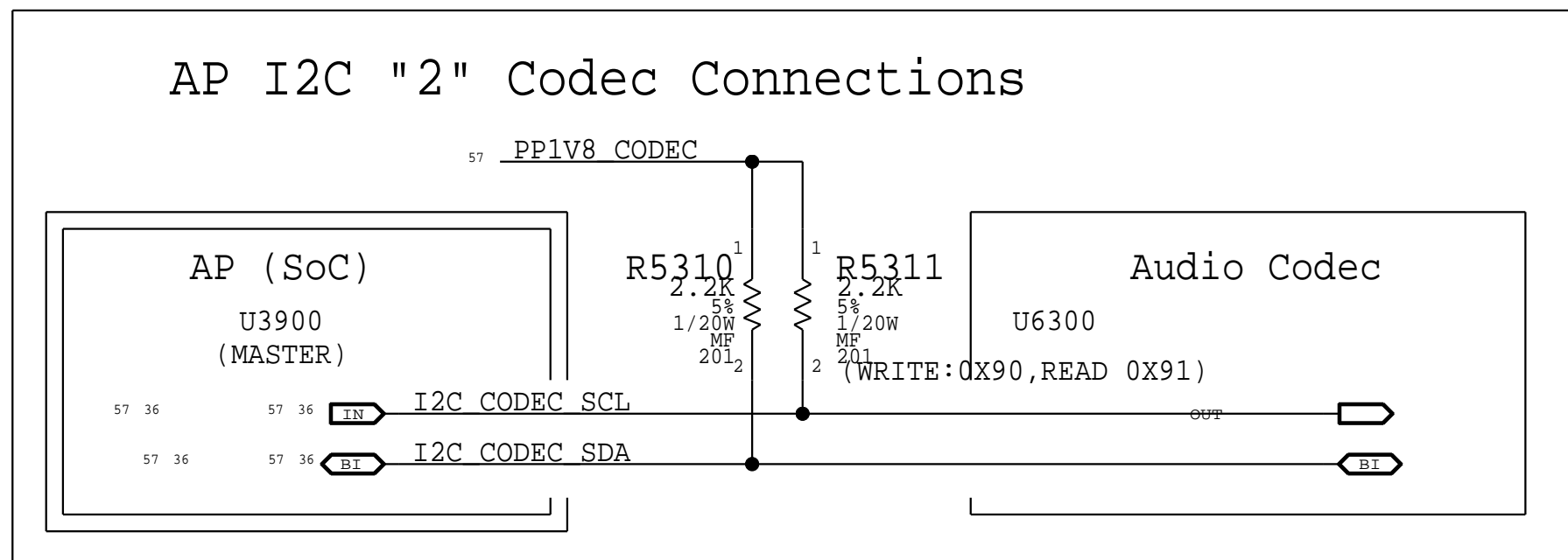
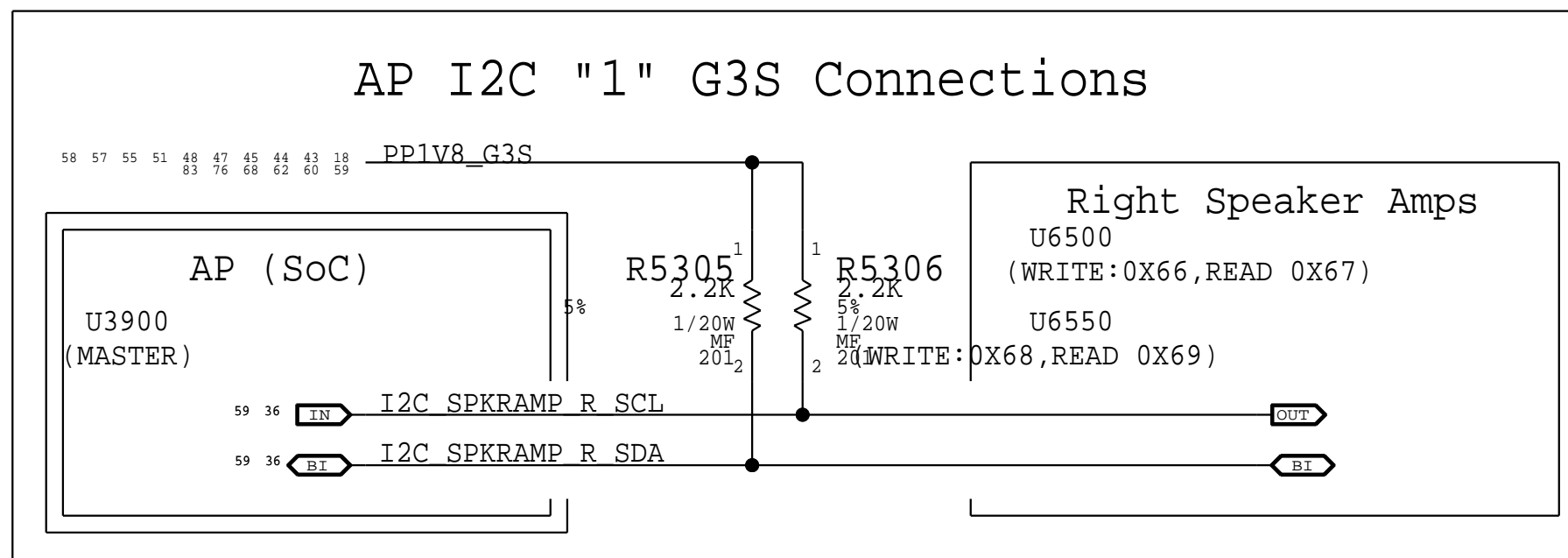
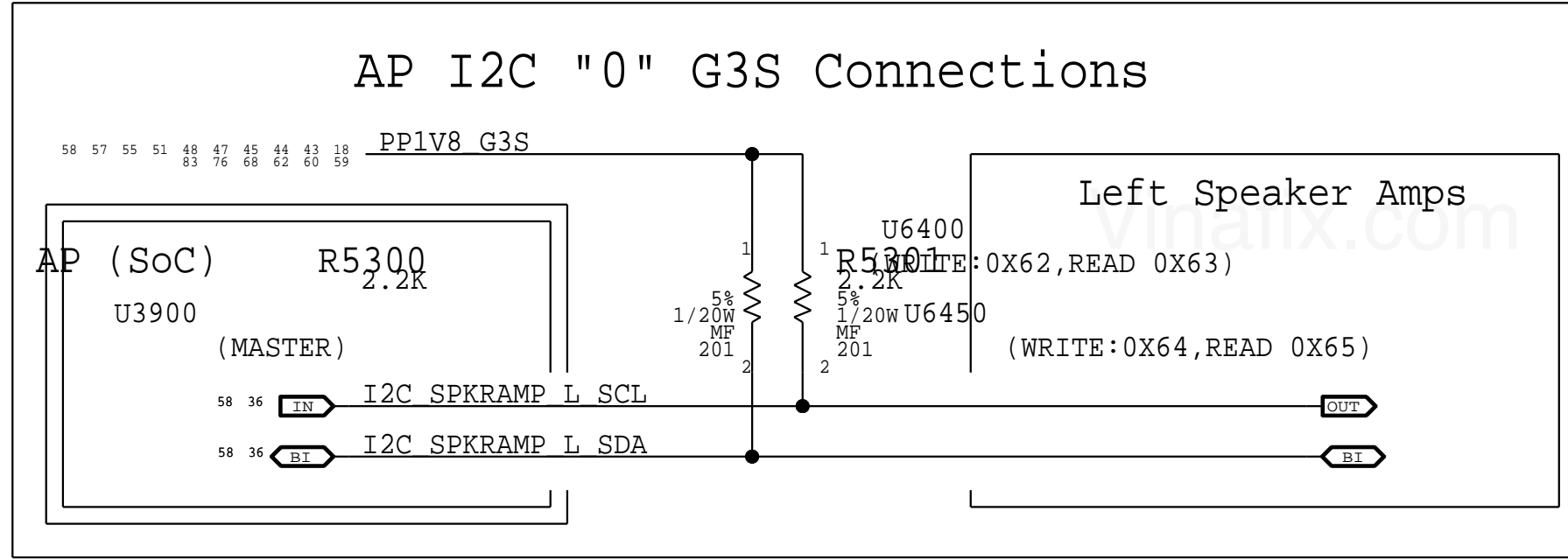


SMC I2C "1" S0 Connections



PAGE TITLE		I2C CONNECTIONS 1	
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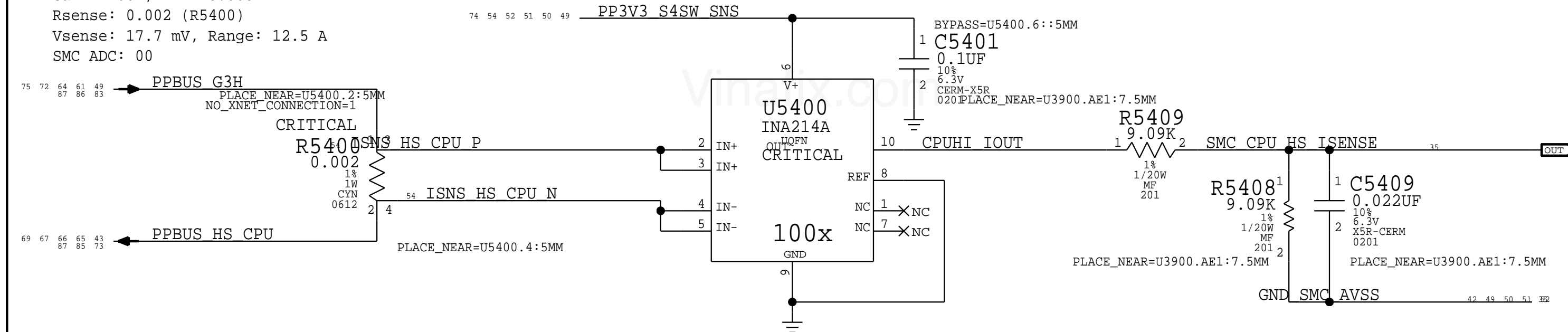
Device	SMC IF	ADDR. (8b)
ACE XA	I2C0	0X70/1
ACE XB	I2C0	0X7E/F
NC.	I2C1	
TEMP. SENSOR A	I2C2	0X90/1
TEMP. SENSOR B	I2C2	0X92/3
TCON	I2C3	0X10-1F
Charger	I2C4	0X12/3
Battery	I2C4	0X16/7
Calpe	I2C4	0XE8/9
Trackpad	I2C5	0X98/9
EADC1	I2C5	0X10/1
EADC2	I2C5	0X12/3
SSD	I2C6	0XF2/3
SOC IF (AP)		
Left Spkr Amp.(U6400)	I2C0	0X62/3
Left Spkr Amp.(U6450)	I2C0	0X64/5
Right Spkr Amp.(U6500)	I2C1	0X66/7
Right Spkr Amp.(U6550)	I2C1	0X68/9
Audio Codec	I2C2	0X90/1
ALS	I2C3	0X52/3
DFR Display	I2C4	0X98/9
DFR Touch	I2C4	0XA0/1
NC.	I2C5	
Spkr ID1	I2C6	
Spkr ID0	I2C6	
SIP IF (ISP)		
FT Camera	I2C0	0X6C/D
FHSi2	I2C0	0X90/1
NC.	I2C1	
AOP IF		
NC.	I2C0	

PAGE TITLE I2C CONNECTIONS 2		
	DRAWING NUMBER 051-04273	SIZE D
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BOM_COST_GROUP=SMC

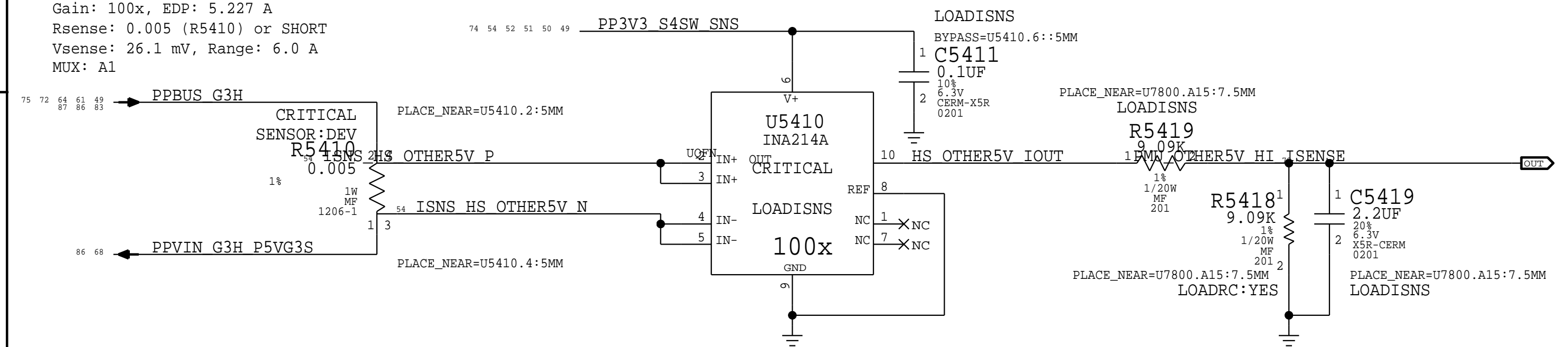
CPU High Side Current Sense (ICOR)

Gain: 100x, EDP: 8.868 A
 Rsense: 0.002 (R5400)
 Vsense: 17.7 mV, Range: 12.5 A
 SMC ADC: 00



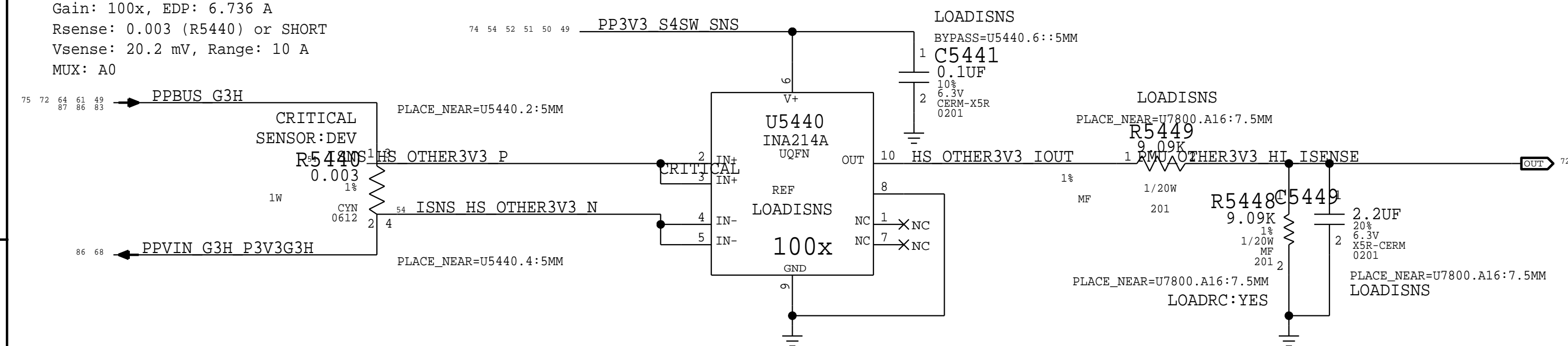
OTHER 5V High Side Current Sense (IO5R)

Gain: 100x, EDP: 5.227 A
 Rsense: 0.005 (R5410) or SHORT
 Vsense: 26.1 mV, Range: 6.0 A
 MUX: A1



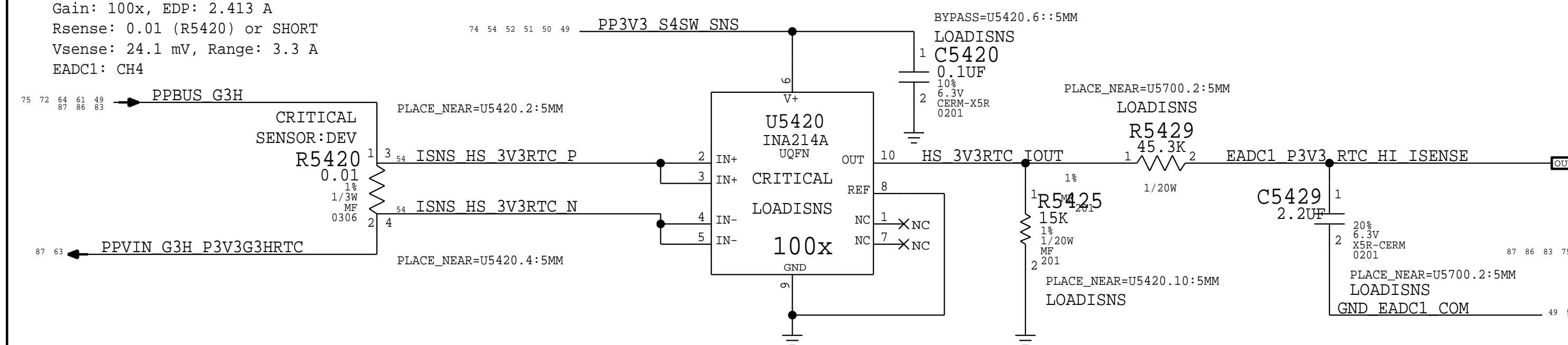
OTHER 3.3V High Side Current Sense (IO3R)

Gain: 100x, EDP: 6.736 A
 Rsense: 0.003 (R5440) or SHORT
 Vsense: 20.2 mV, Range: 10 A
 MUX: A0



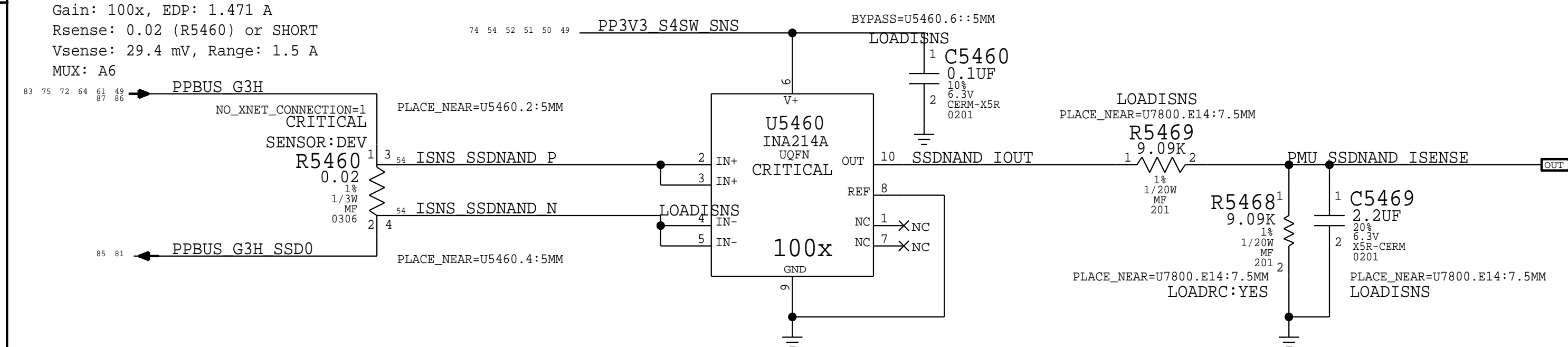
3.3V RTC High Side Current Sense (IR3R)

Gain: 100x, EDP: 2.413 A
 Rsense: 0.01 (R5420) or SHORT
 Vsense: 24.1 mV, Range: 3.3 A
 EADC1: CH4



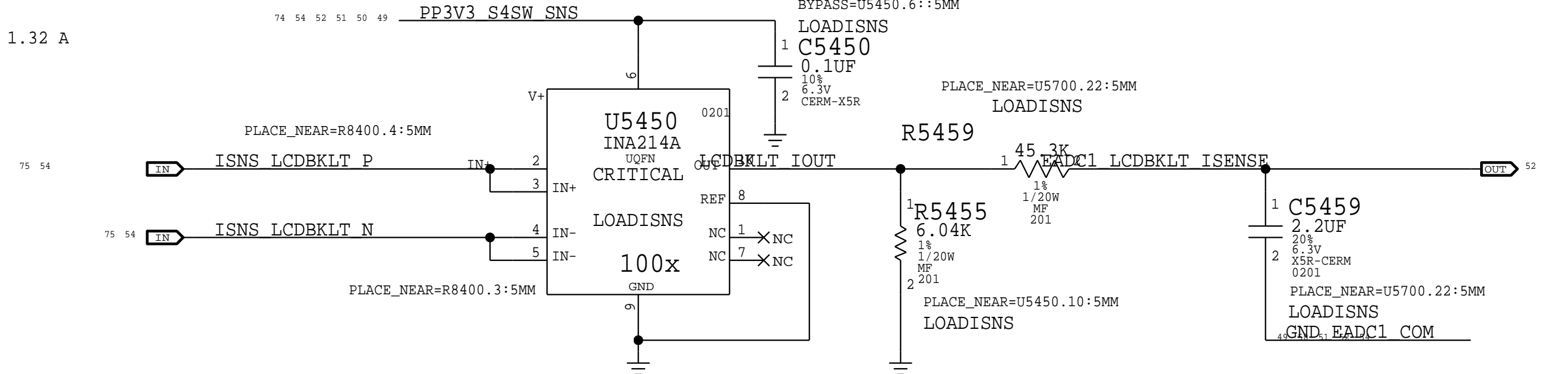
NAND Current Sense (IHNR)

Gain: 100x, EDP: 1.471 A
 Rsense: 0.02 (R5460) or SHORT
 Vsense: 29.4 mV, Range: 1.5 A
 MUX: A6



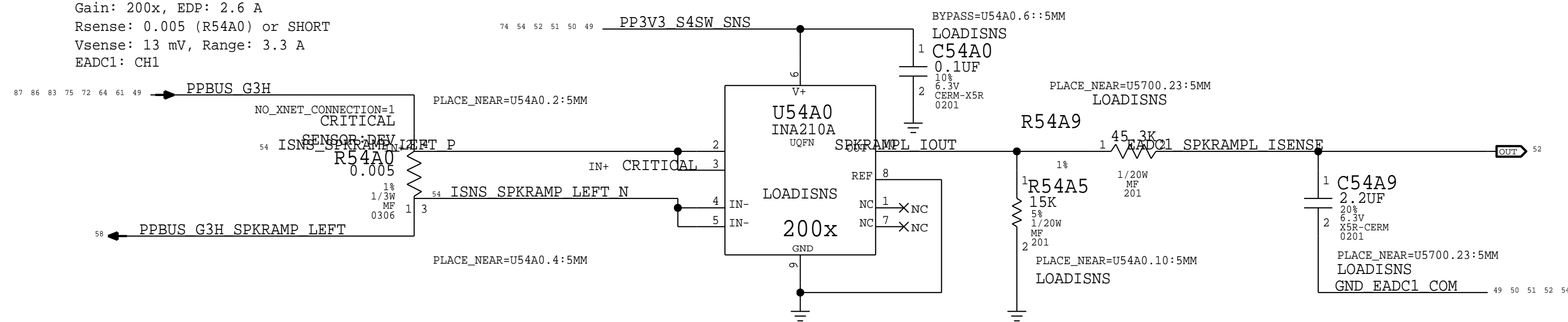
LCD Backlight Current Sense (IBLR)

Gain: 100x, EDP: 0.902 A
 Rsense: 0.025 (R8400)
 Vsense: 22.6 mV, Range: 1.32 A
 EADC1: CH0



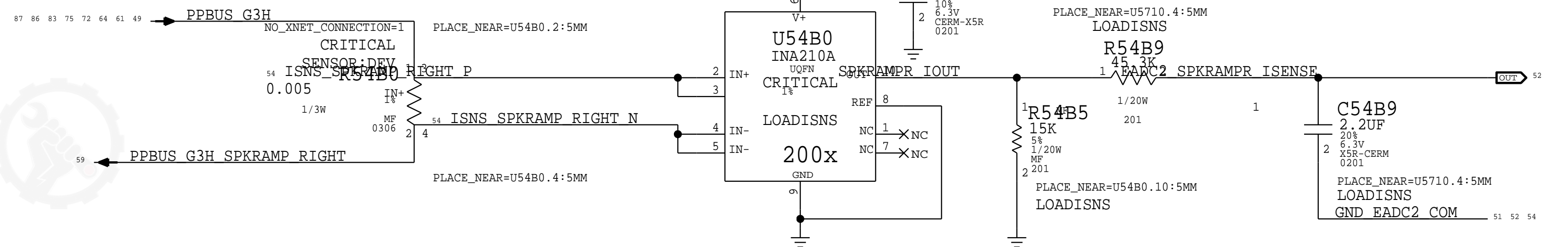
Left AMP Current Sense (IALR)

Gain: 200x, EDP: 2.6 A
 Rsense: 0.005 (R54A0) or SHORT
 Vsense: 13 mV, Range: 3.3 A
 EADC1: CH1



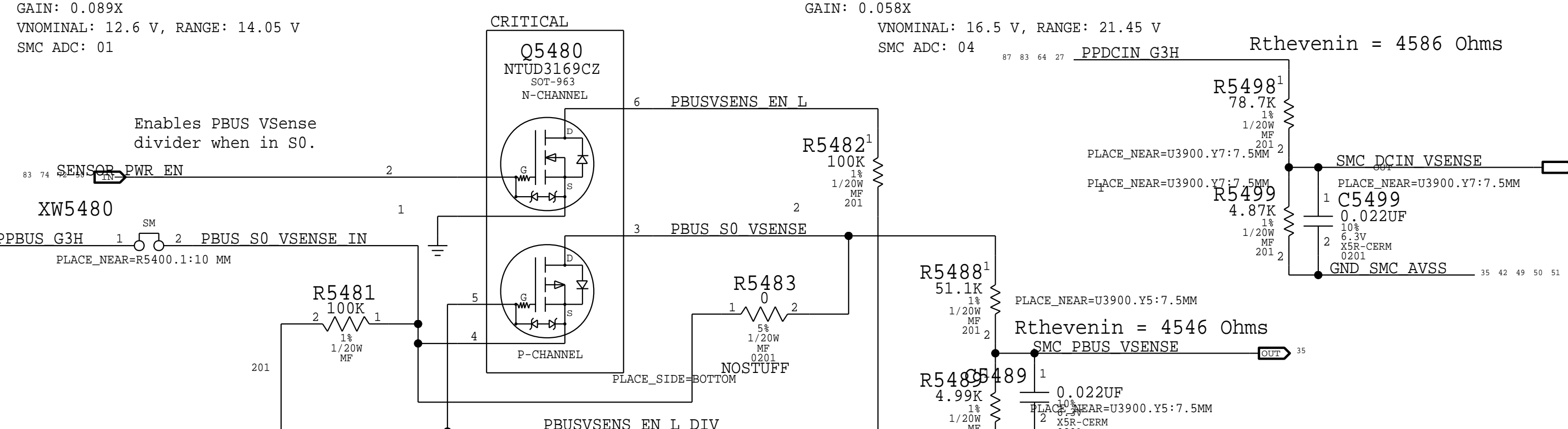
Right AMP Current Sense (IARR)

Gain: 200x, EDP: 2.6 A
 Rsense: 0.005 (R54B0) or SHORT
 Vsense: 13 mV, Range: 3.3 A
 EADC2: CH6



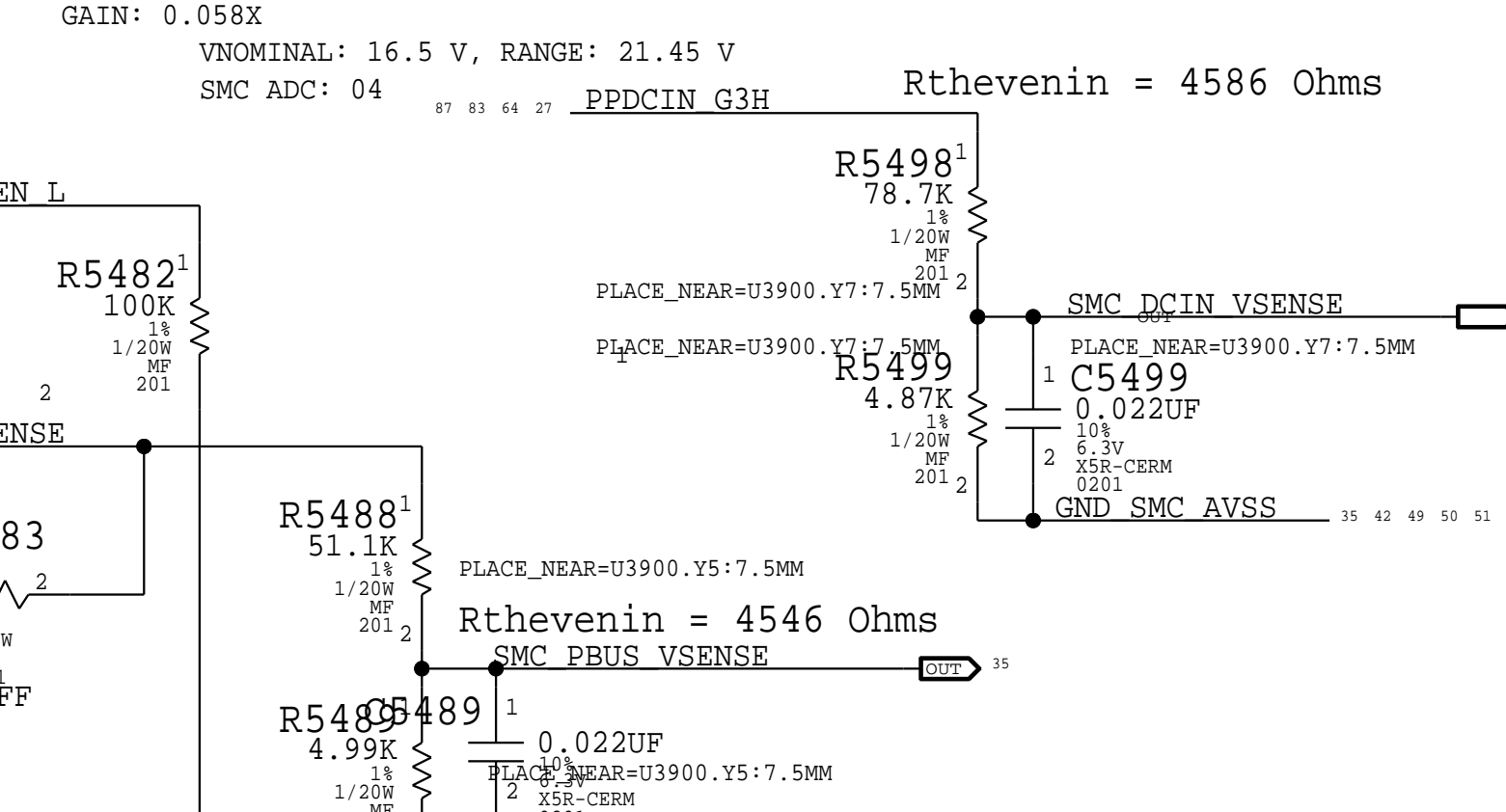
PBUS Voltage Sense & Enable (VPOR)

GAIN: 0.089X
 VNOMINAL: 12.6 V, RANGE: 14.05 V
 SMC ADC: 01



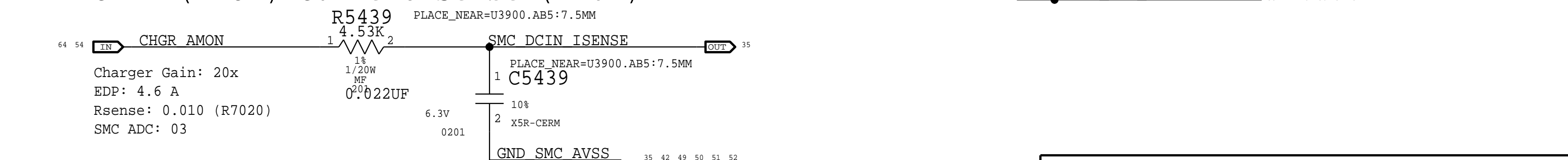
DC In Voltage Sense (VDOR)

GAIN: 0.058X
 VNOMINAL: 16.5 V, RANGE: 21.45 V
 SMC ADC: 04



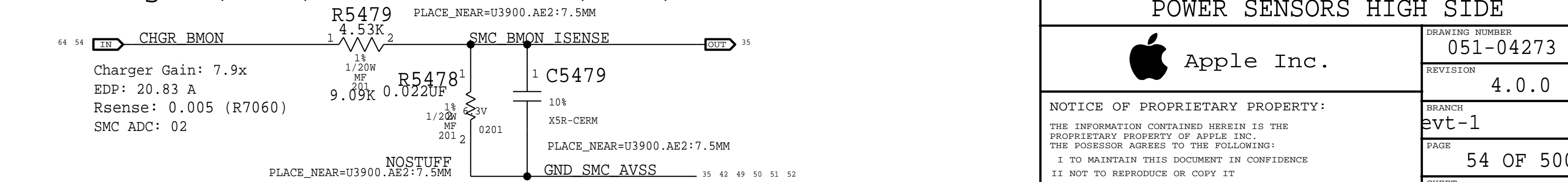
DC-IN (AMON) Current Sense (IDOR)

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



Charger (BMON) Current Sense (IPBR)

Charger Gain: 7.9x
 EDP: 20.83 A
 Rsense: 0.005 (R7060)
 SMC ADC: 02



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	3	RES,MTL,FLIM,100K,1/16W,0201,SMD,LF	R5418,R5449,R5478		LOADRC:NO

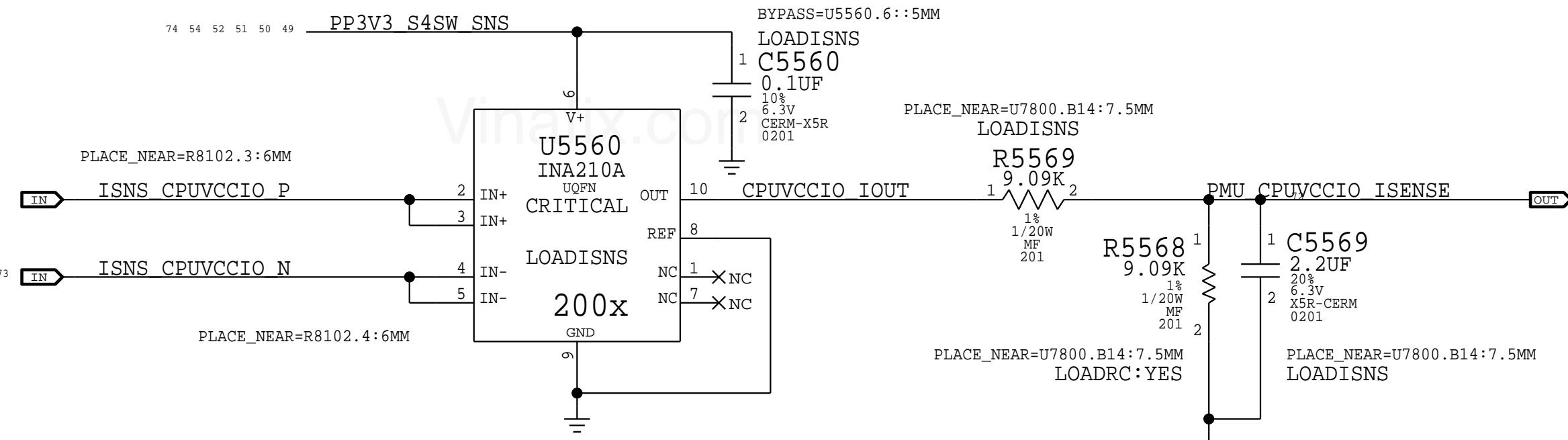
PAGE TITLE		POWER SENSORS HIGH SIDE	
DRAWING NUMBER		051-04273	SIZE D
REVISION		4.0.0	
BRANCH		evt-1	
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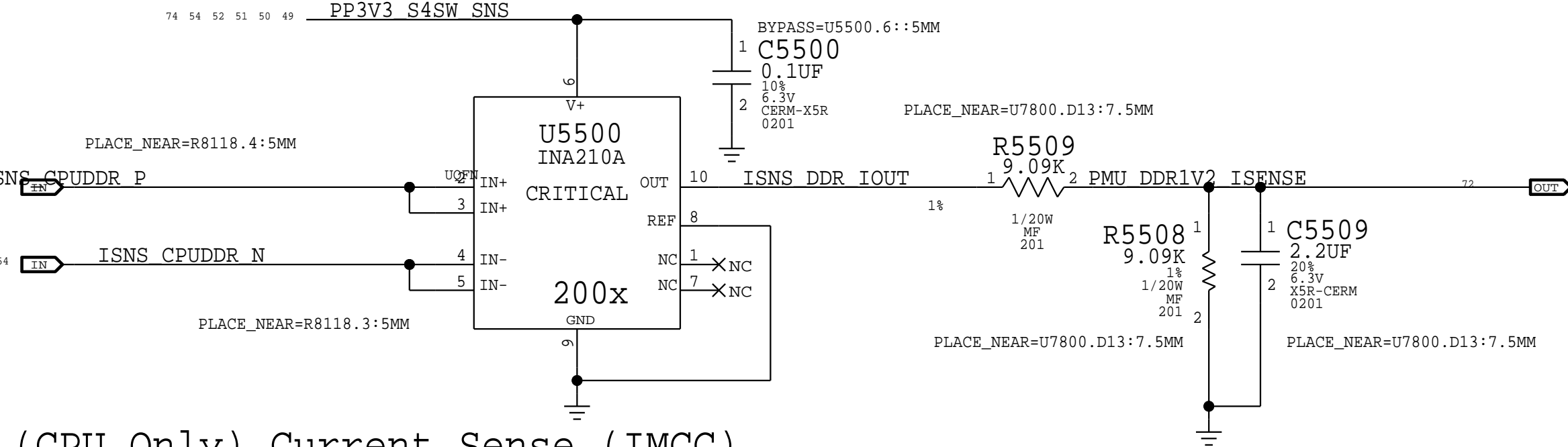
CPU VCCIO Current Sense (IC1C)

Gain: 200x, EDP: 3.6 A
 Rsense: 0.003 (R8102) or SHORT
 Vsense: 10.8 mV, Range: 5 A
 PMU AMUX: A3



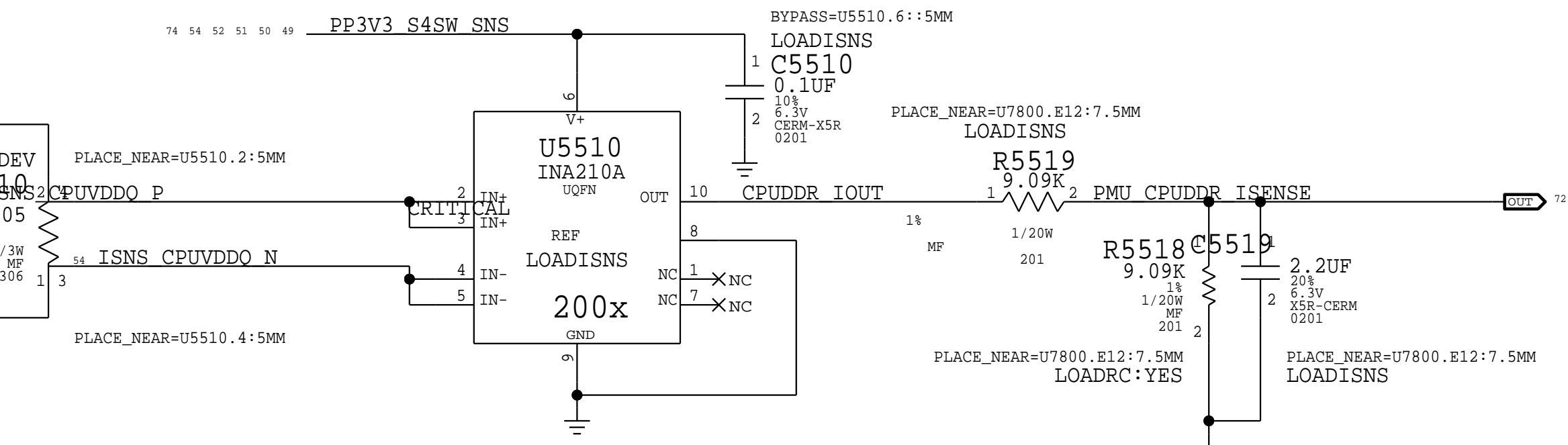
DDR 1.2V S3 (CPU & Memory) Current Sense (IM0C)

Gain: 200x, EDP: 6.9 A
 Rsense: 0.002 (R8118) or SHORT
 Vsense: 13.8 mV, Range: 7.5 A
 PMU AMUX: A4



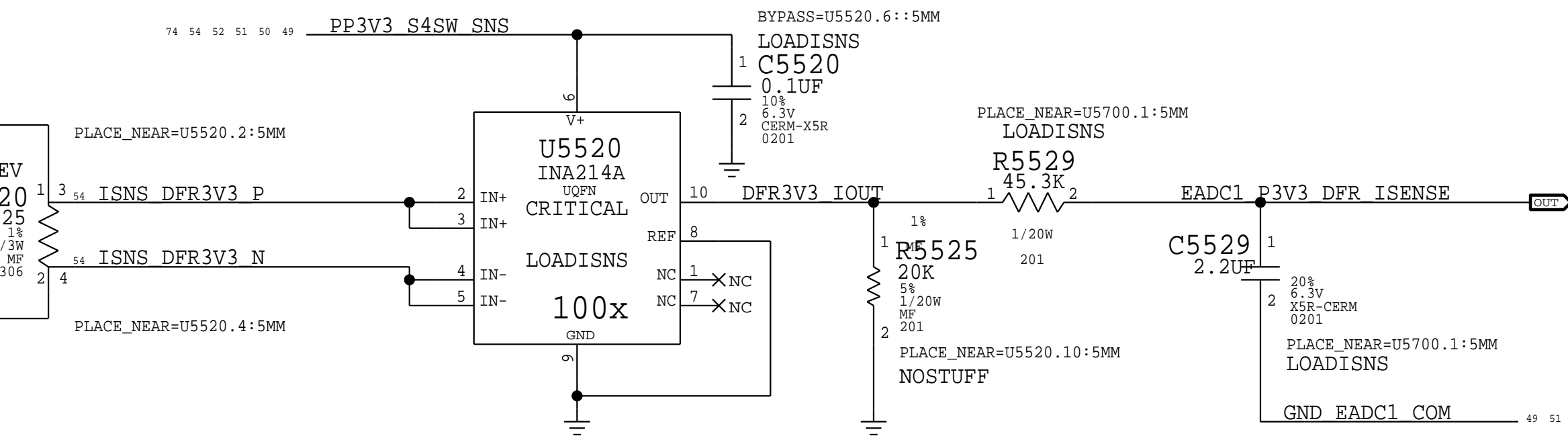
CPU DDR 1.2V S3 (CPU Only) Current Sense (IMCC)

Gain: 200x, EDP: 2.6 A
 Rsense: 0.005 (R5510) or SHORT
 Vsense: 13 mV, Range: 3 A
 PMU AMUX: B2



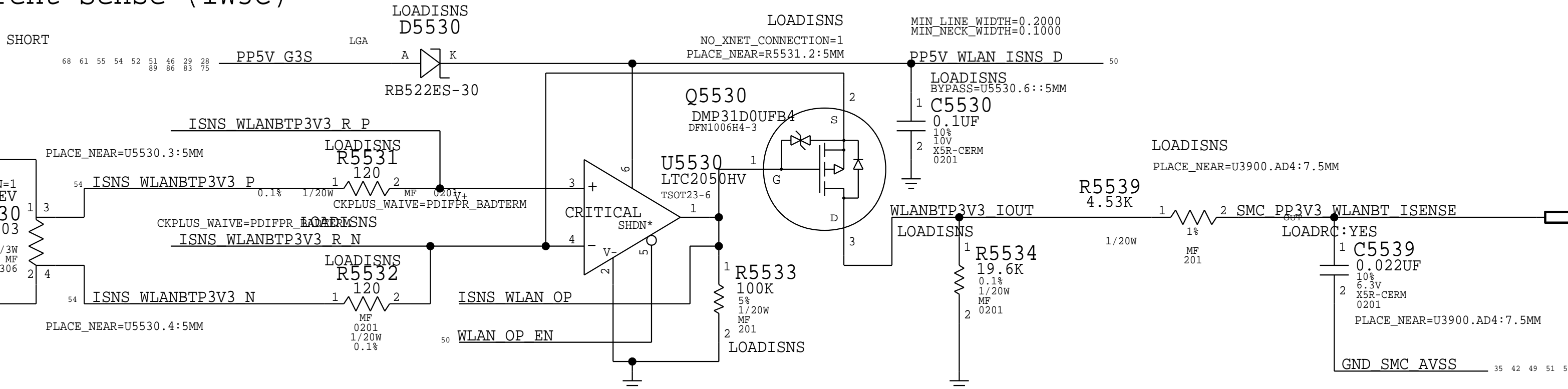
DFR Current Sense (IF3C)

Gain: 100x, EDP: 0.75 A
 Rsense: 0.025 (R5520) or SHORT
 Vsense: 18.8 mV, Range: 1.32 A
 EADC1: CH3



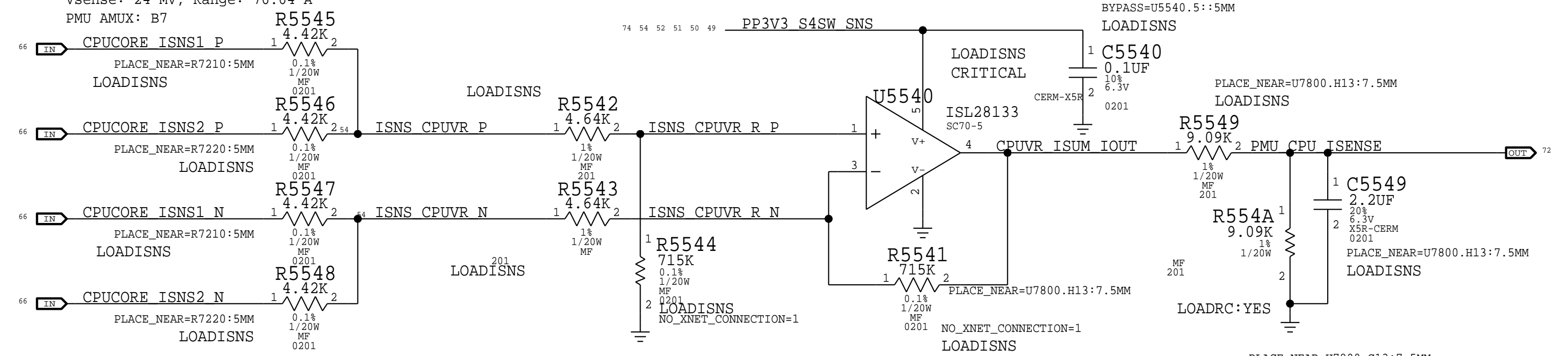
WLANBT 3.3V Current Sense (IW3C)

Gain: 163.3x, EDP: 1.698 A
 Rsense: 0.003 (R5530) or Rsense SHORT
 VSENSE: 5.09 mV, RANGE: 2.55 A
 SMC ADC: 05



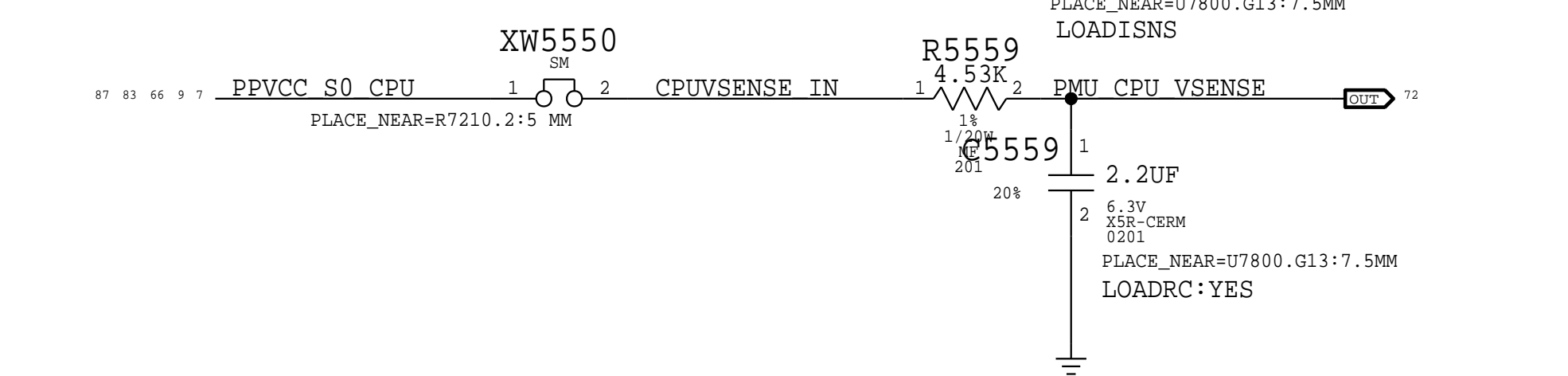
CPU Core Current Sense (ICAC)

Gain: 104.38x, EDP: 64 A
 Rsense: 2x of 0.00075 (R7310, R7320), Rsum: 0.000375
 Vsense: 24 mV, Range: 76.64 A
 PMU AMUX: B7



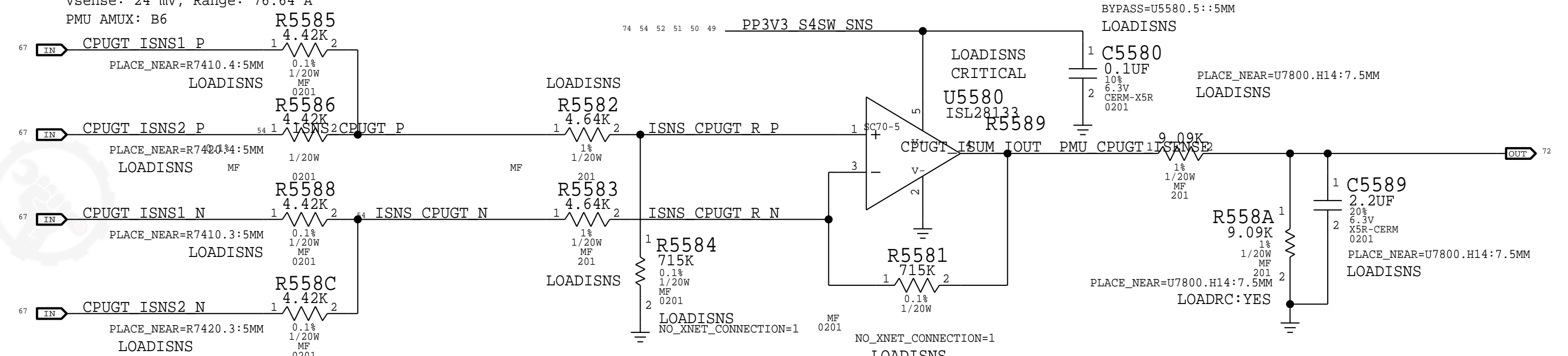
CPU Core Voltage Sense (VCAC)

PMU AMUX: B4



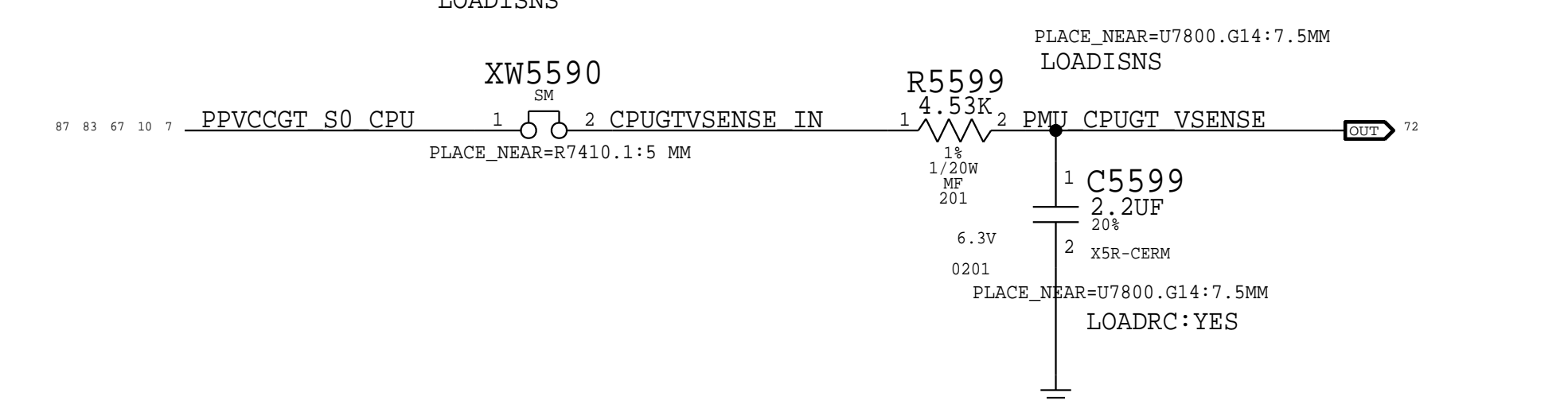
CPU GT+GTX Current Sense (ICGC)

Gain: 104.38x, EDP: 64 A
 Rsense: 2x of 0.00075 (R7410, R7420), Rsum: 0.000375
 Vsense: 24 mV, Range: 76.64 A
 PMU AMUX: B6



CPU GT Voltage Sense (VCGC)

PMU AMUX: B5



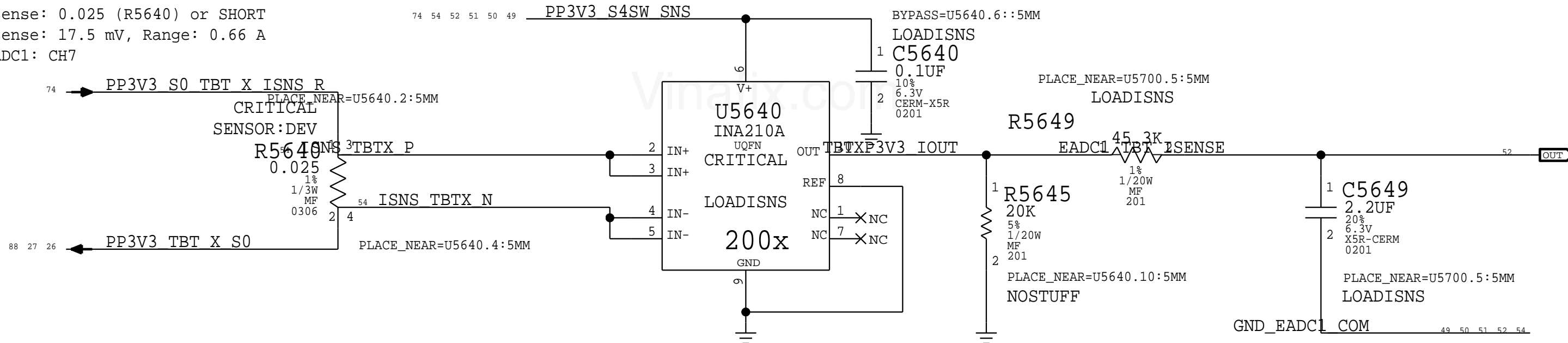
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
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PAGE TITLE		POWER SENSORS LOAD SIDE	
Apple Inc.		DRAWING NUMBER	051-04273
		REVISION	4.0.0
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		PAGE	55 OF 500
		SHEET	50 OF 98

BOM_COST_GROUP=SENSORS

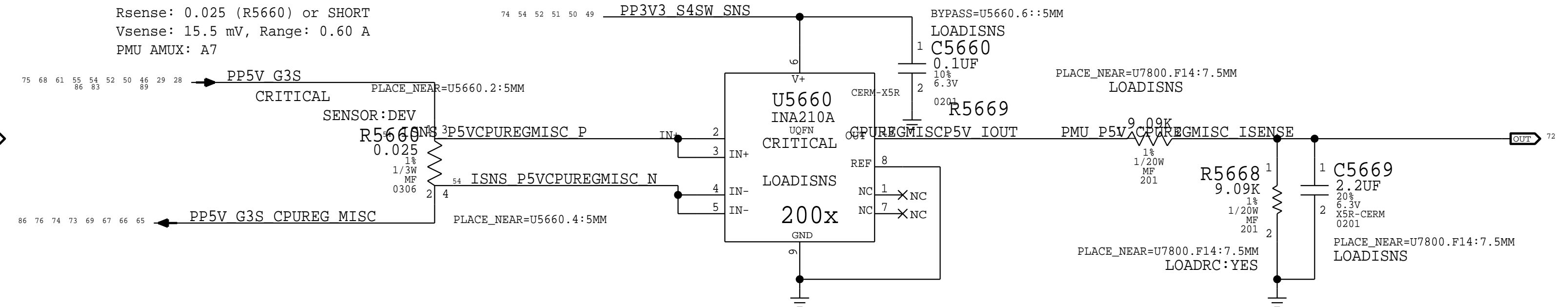
Thunderbolt TBD Left Current Sense (IULC)

Gain: 200x, EDP: 0.7 A
 Rsense: 0.025 (R5640) or SHORT
 Vsense: 17.5 mV, Range: 0.66 A
 EADC1: CH7



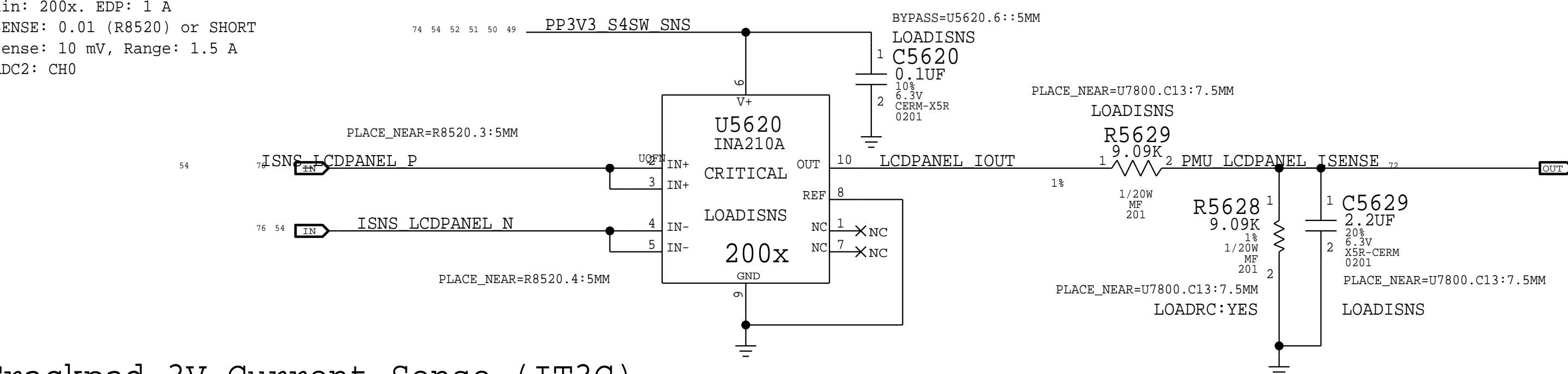
CPU Reg. ALSCAM, LCD 5V Current Sense (IC5C)

Gain: 200x, EDP: 0.42+0.1+0.1 A
 Rsense: 0.025 (R5660) or SHORT
 Vsense: 15.5 mV, Range: 0.60 A
 PMU AMUX: A7



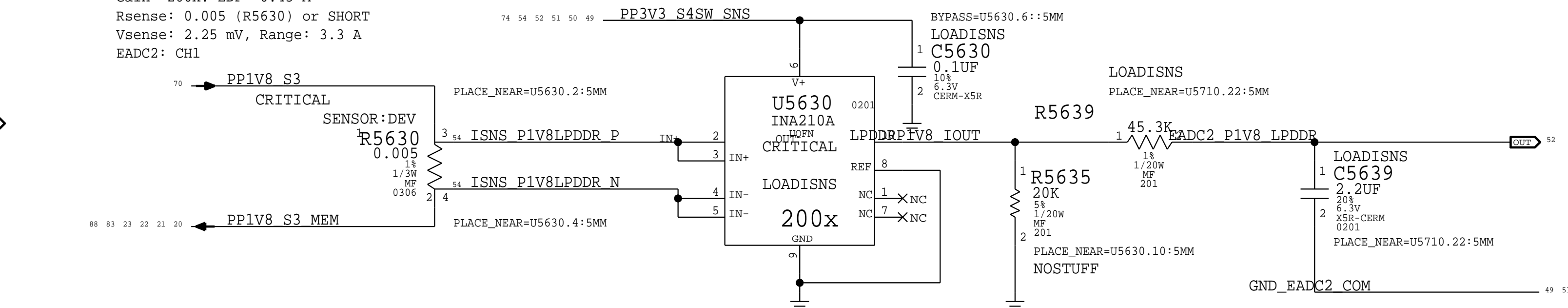
LCD Panel 3.3V Current Sense (ILDC)

Gain: 200x, EDP: 1 A
 Rsense: 0.01 (R5620) or SHORT
 Vsense: 10 mV, Range: 1.5 A
 EADC2: CH0



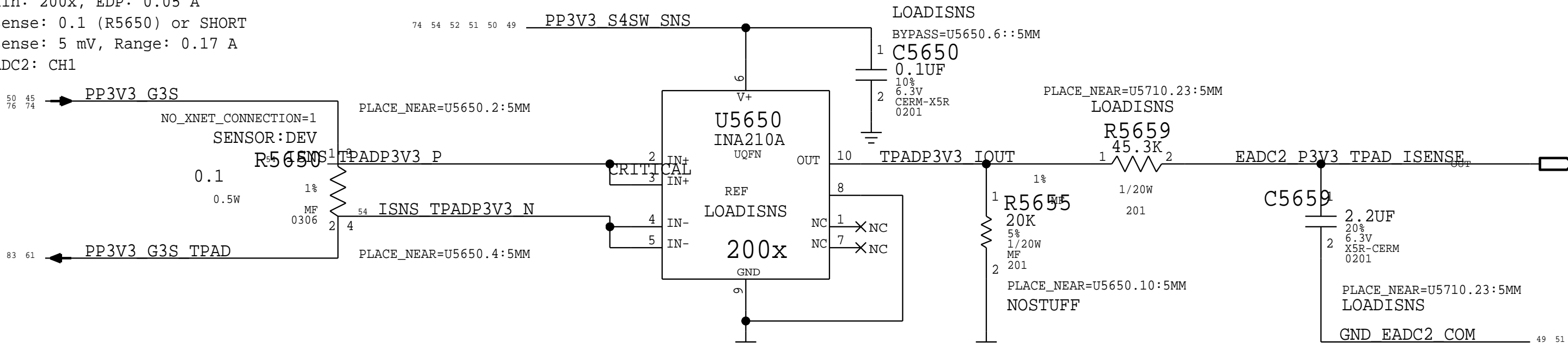
LPDDR 1.8V Current Sense (IM1C)

Gain: 200x, EDP: 0.45 A
 Rsense: 0.005 (R5630) or SHORT
 Vsense: 2.25 mV, Range: 3.3 A
 EADC2: CH1



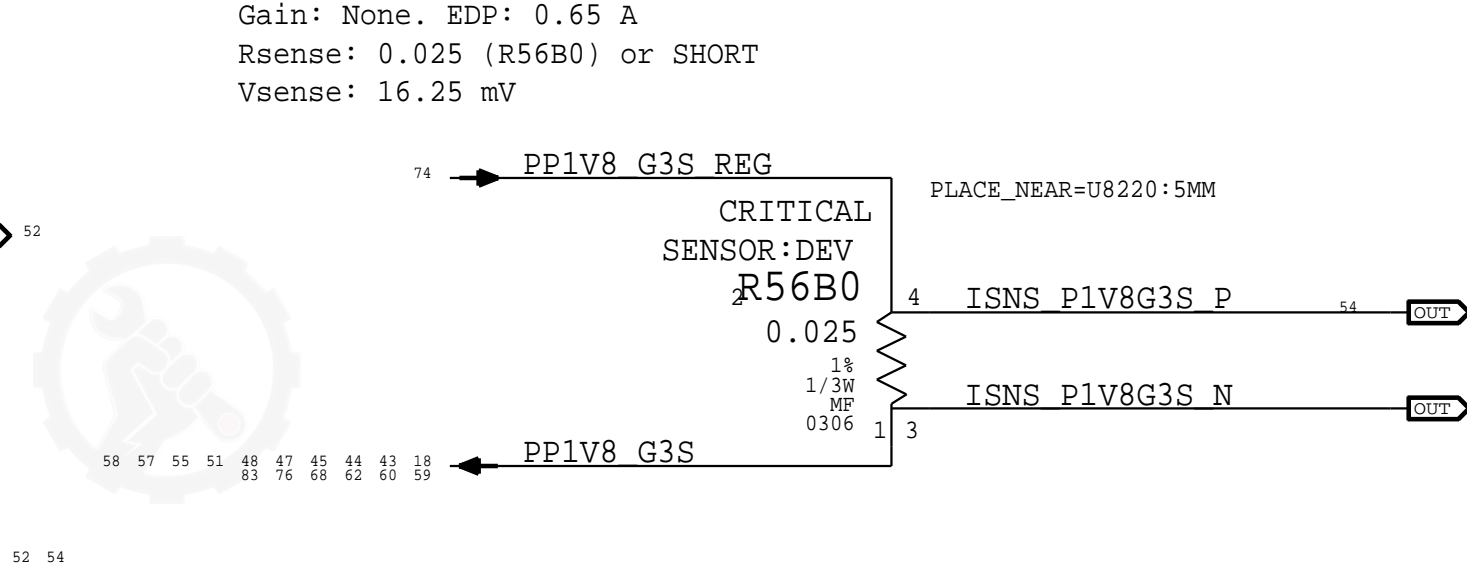
Trackpad 3V Current Sense (IT3C)

Gain: 200x, EDP: 0.05 A
 Rsense: 0.1 (R5650) or SHORT
 Vsense: 5 mV, Range: 0.17 A
 EADC2: CH1



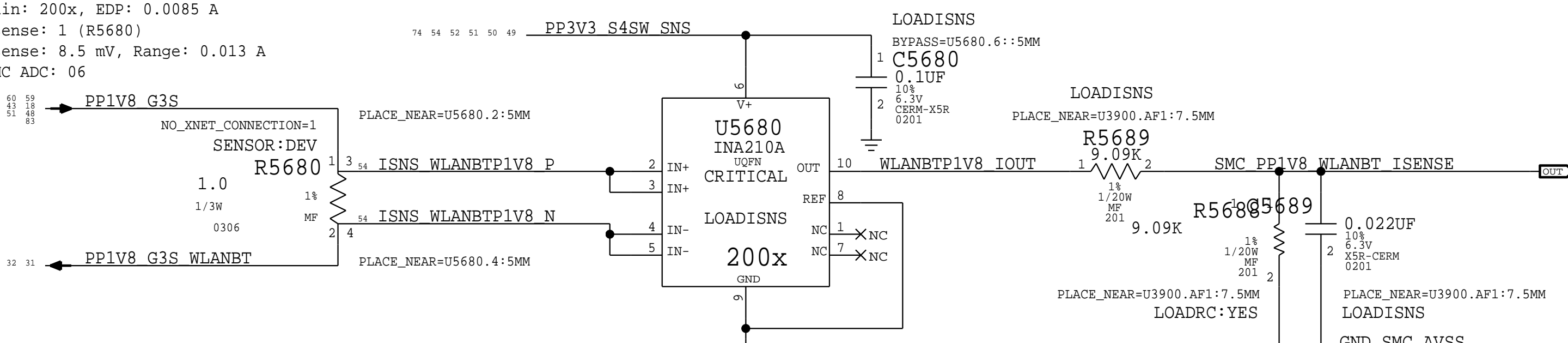
1.8V Standby Current Sense

Gain: None, EDP: 0.65 A
 Rsense: 0.025 (R56B0) or SHORT
 Vsense: 16.25 mV

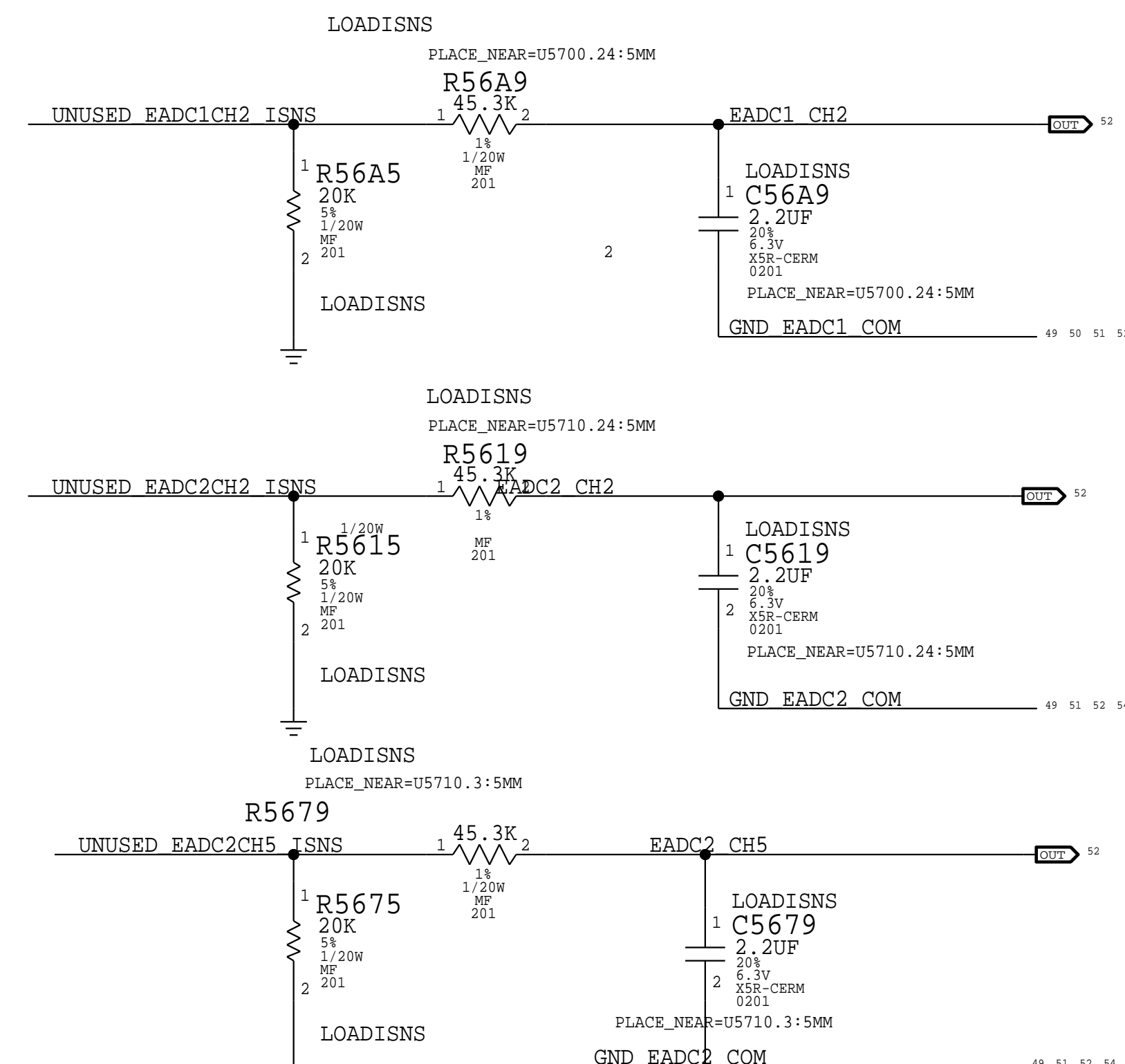


WLANBT 1.8V Current Sense (IW2C)

Gain: 200x, EDP: 0.0085 A
 Rsense: 1 (R5680)
 Vsense: 8.5 mV, Range: 0.013 A
 SMC ADC: 06

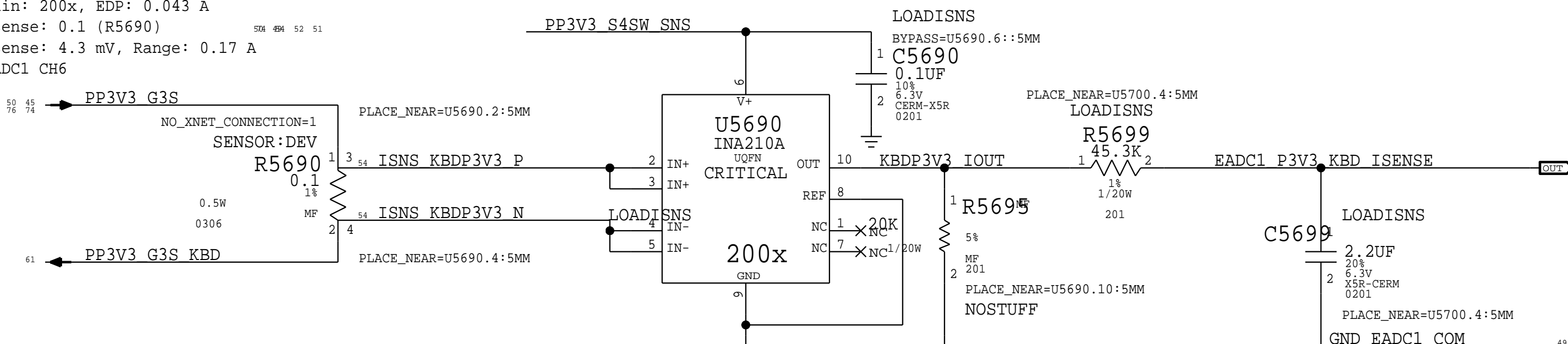


UNUSED ADC CHANNELS



Keyboard 3.3V Current Sense (IK3C)

Gain: 200x, EDP: 0.043 A
 Rsense: 0.1 (R5690)
 Vsense: 4.3 mV, Range: 0.17 A
 EADC1: CH6



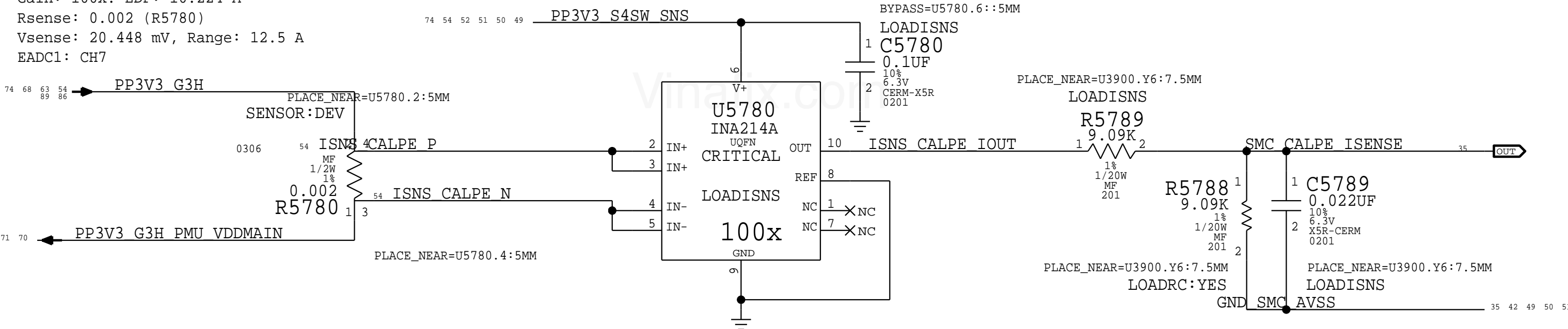
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	2	RES,MTL,FLIM,100K,1/16W,0201,SMD,LF	R5628,R5688		LOADRC:NO

BOM_COST_GROUP=SENSORS

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		DRAWING NUMBER	051-04273
		REVISION	4.0.0
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		SHEET	51 OF 98

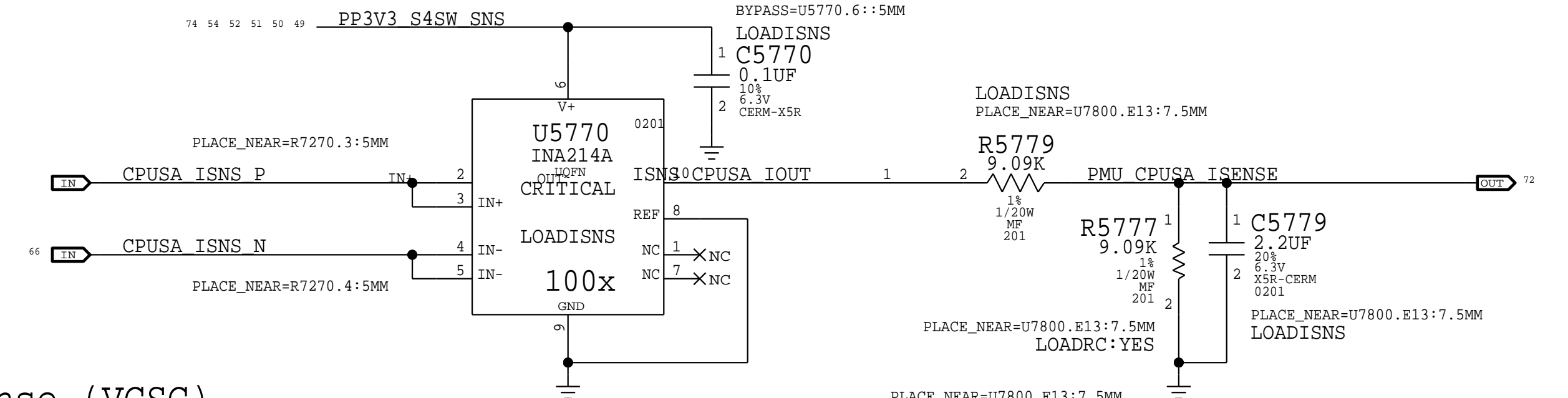
Calpe 3.3V Input Current Left (IP3C)

Gain: 100x, EDP: 10.224 A
 Rsense: 0.002 (R5780)
 Vsense: 20.448 mV, Range: 12.5 A
 EADC1: CH7



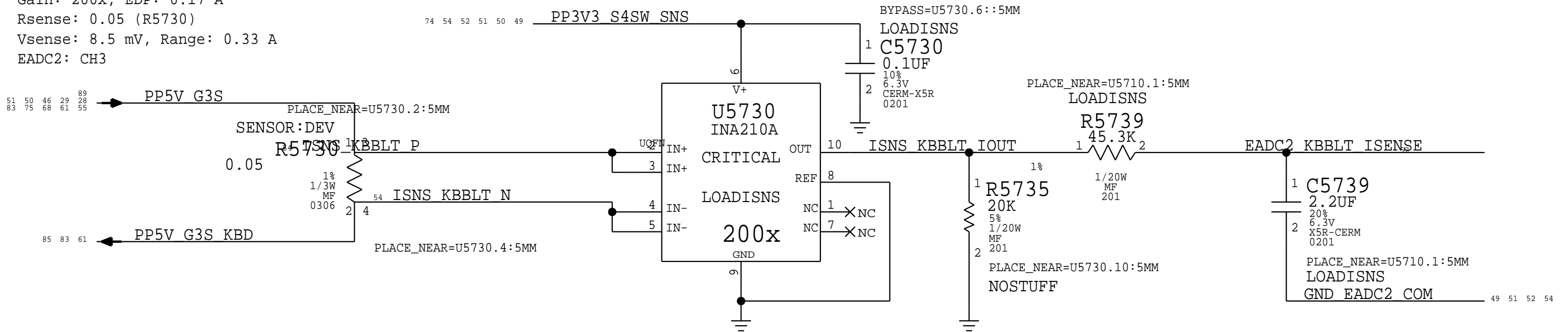
CPU SA Current Sense (ICSC)

Gain: 100X, EDP: 9.5 A
 Rsense: 0.002 (R7270)
 Vsense: 19 mV, Range: 15 A
 PMU AMUX: B1



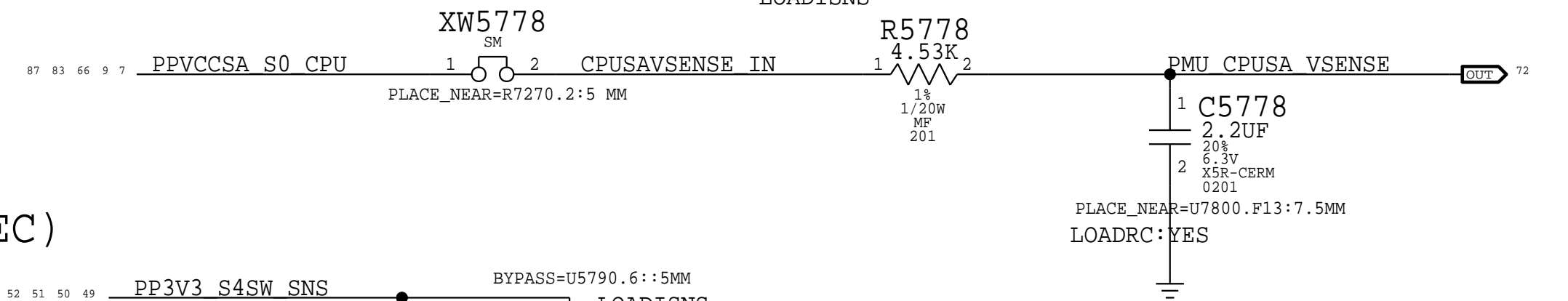
KB backlite Current Sense (IKBC)

Gain: 200x, EDP: 0.17 A
 Rsense: 0.05 (R5730)
 Vsense: 8.5 mV, Range: 0.33 A
 EADC2: CH3



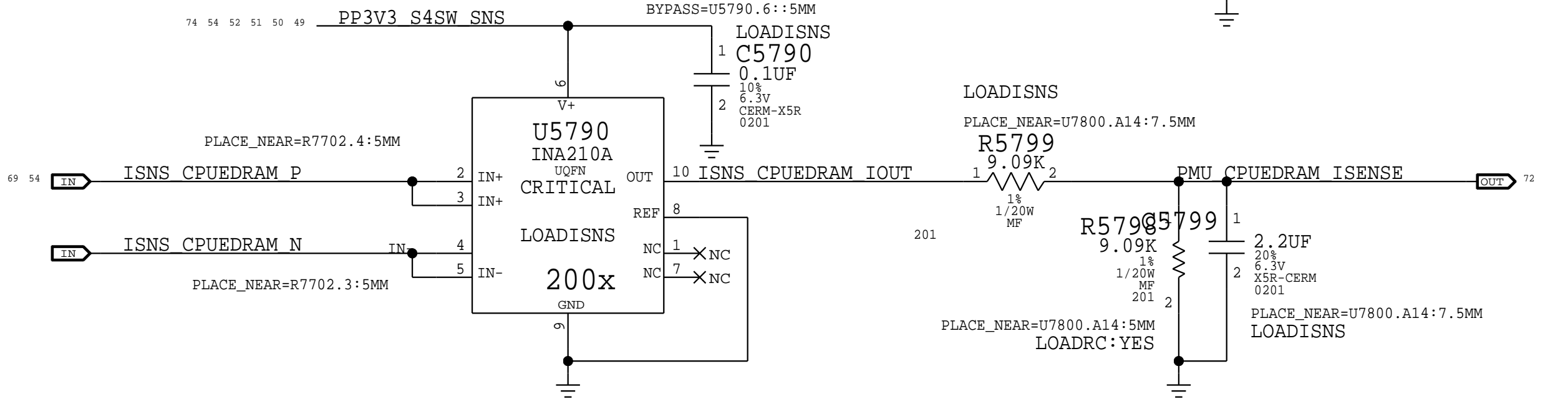
CPU SA Voltage Sense (VCSC)

PMU AMUX: B3



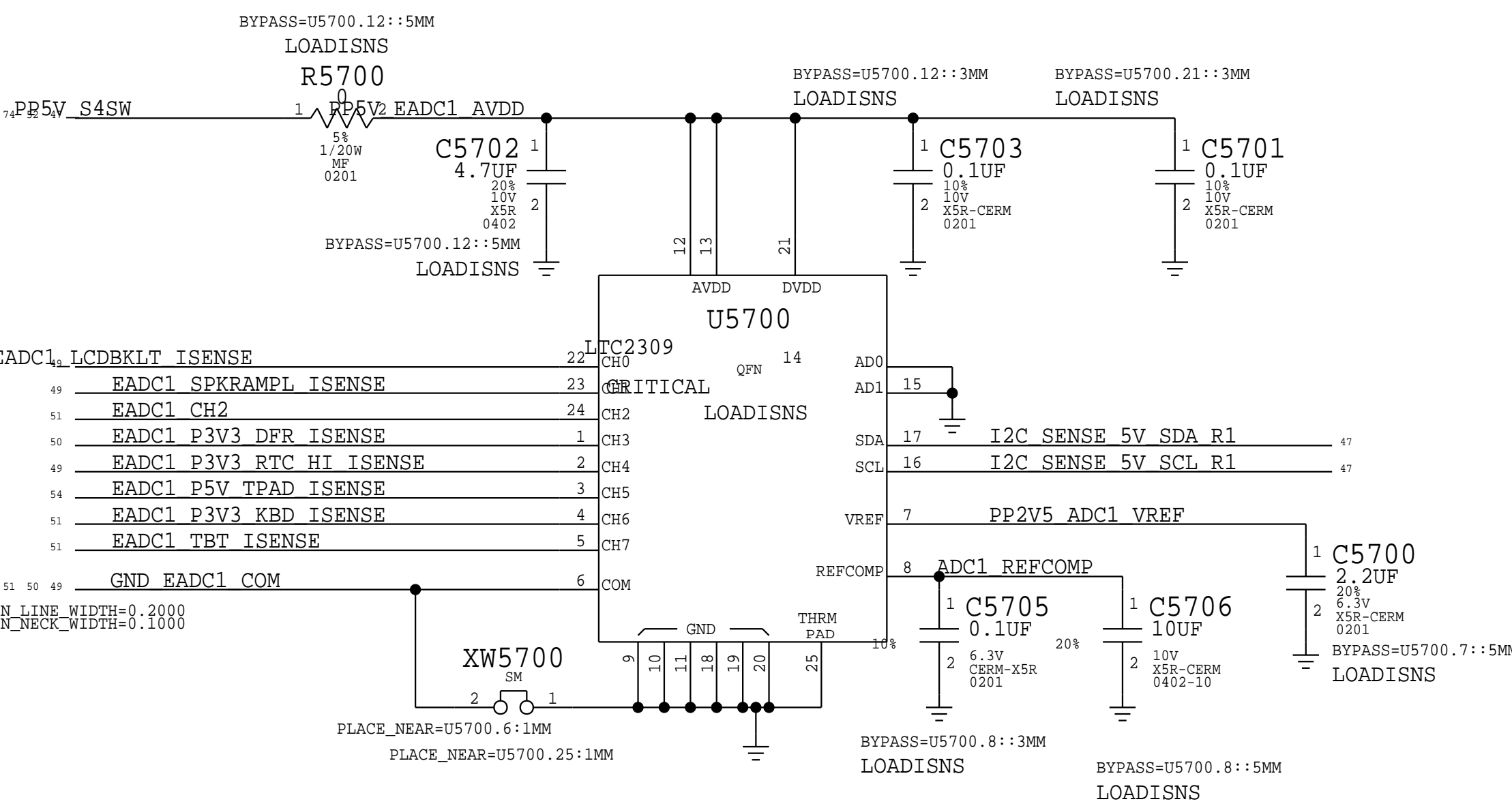
CPU EDRAM Current Sense (ICEC)

Gain: 200x, EDP: 6.2 A
 Rsense: 0.002 (R7702) or SHORT
 Vsense: 12.4 mV, Range: 7.5 A
 PMU AMUX: A2



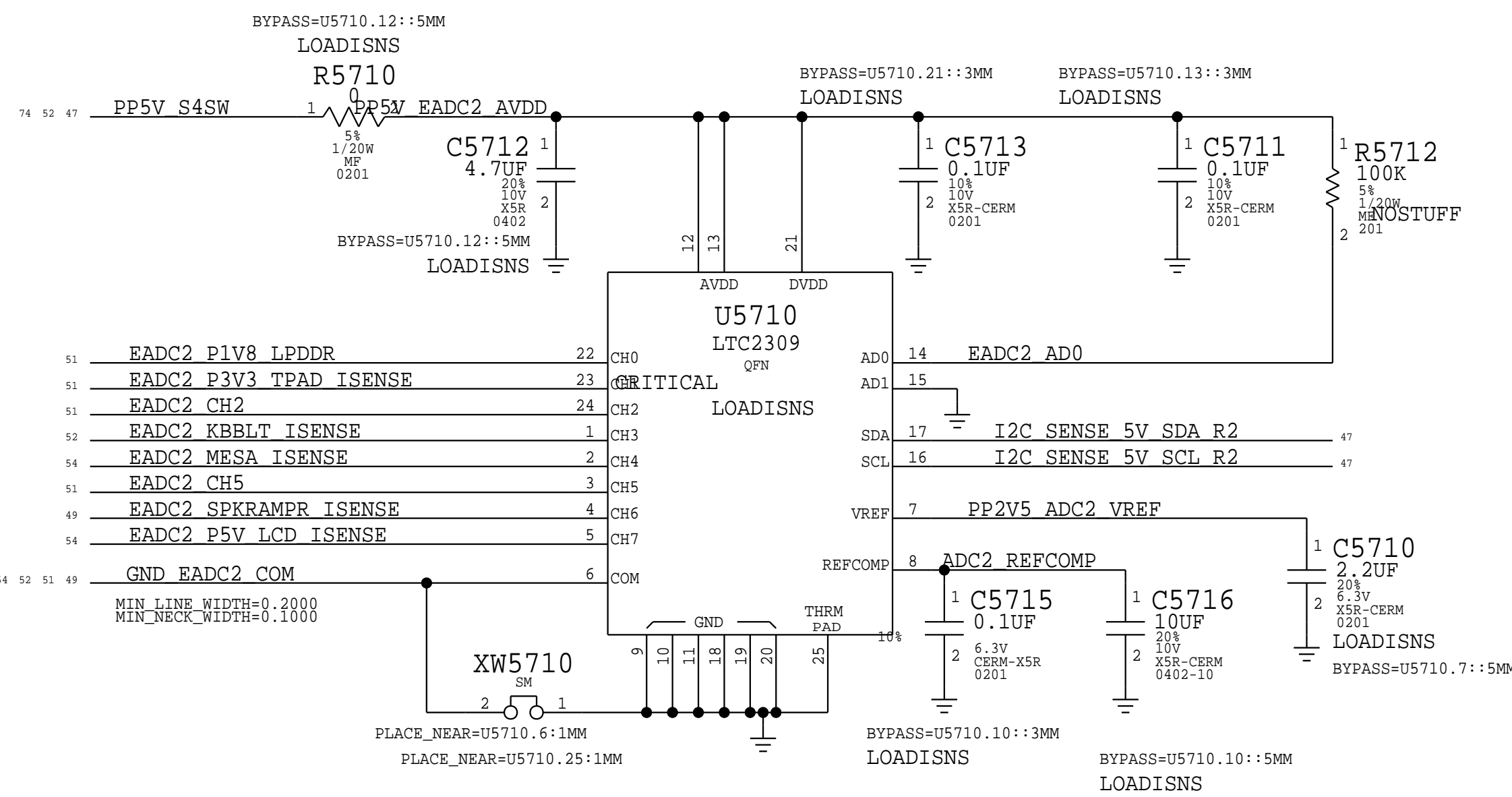
EADC1

(Write: 0x10 Read: 0x11)



EADC2

(Write: 0x12 Read: 0x13)



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
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BOM_COST_GROUP=SENSORS

PAGE TITLE		
POWER SENSORS EXTENDED 2		
Apple Inc.		DRAWING NUMBER 051-04273
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		PAGE 57 OF 500
		SHEET 52 OF 98

Thermal Sensor A:
TBT Die, NAND, WIFI, I/O proximity

I2C Write: 0x90, I2C Read: 0x91

TBT Die Thermal Diode (TBA)

Placement Note:
The P leg connects to THERMDA of TBT die.
The N leg connects to GND pin close to THERMDA.

WIFI Proximity (TWOP)

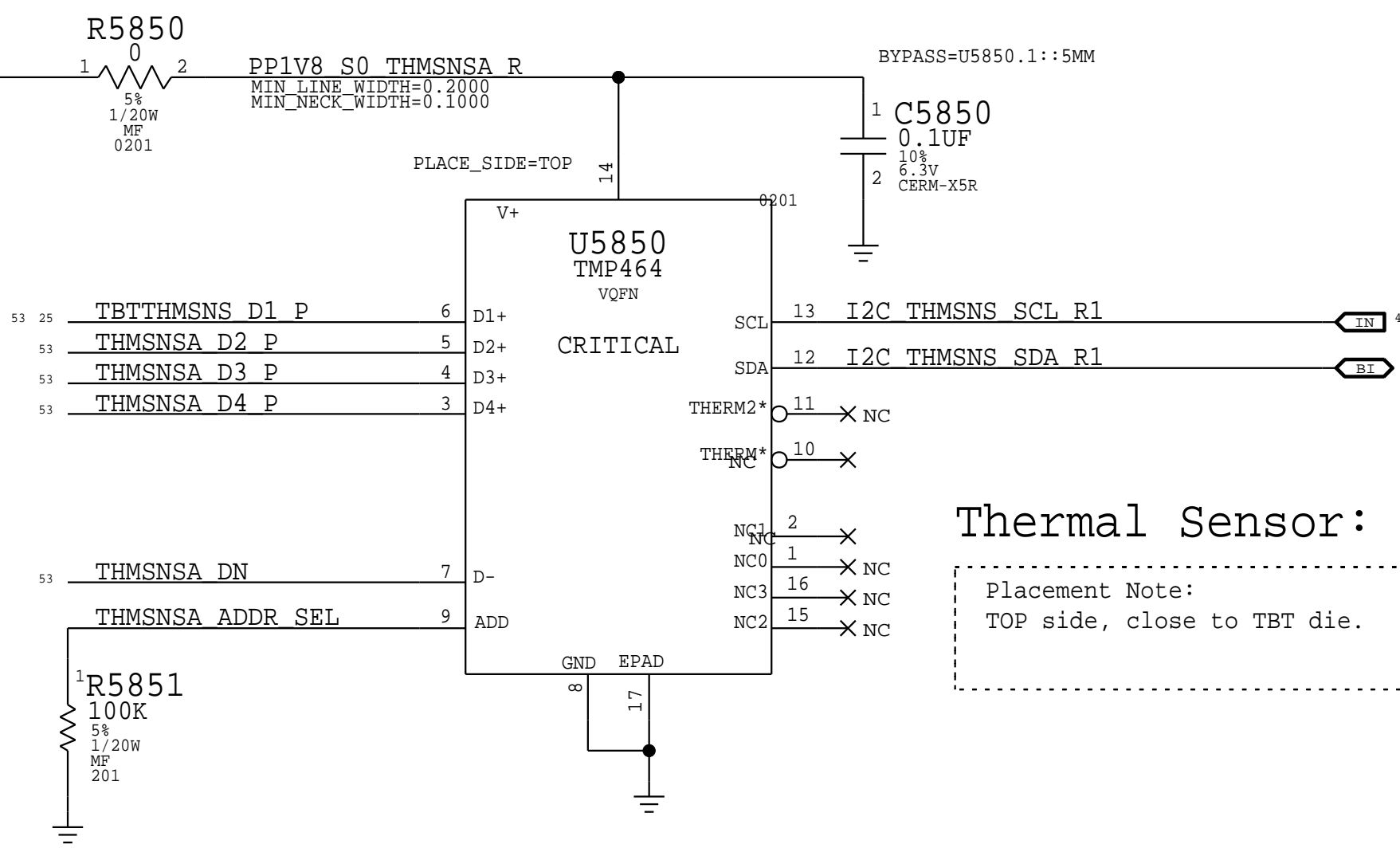
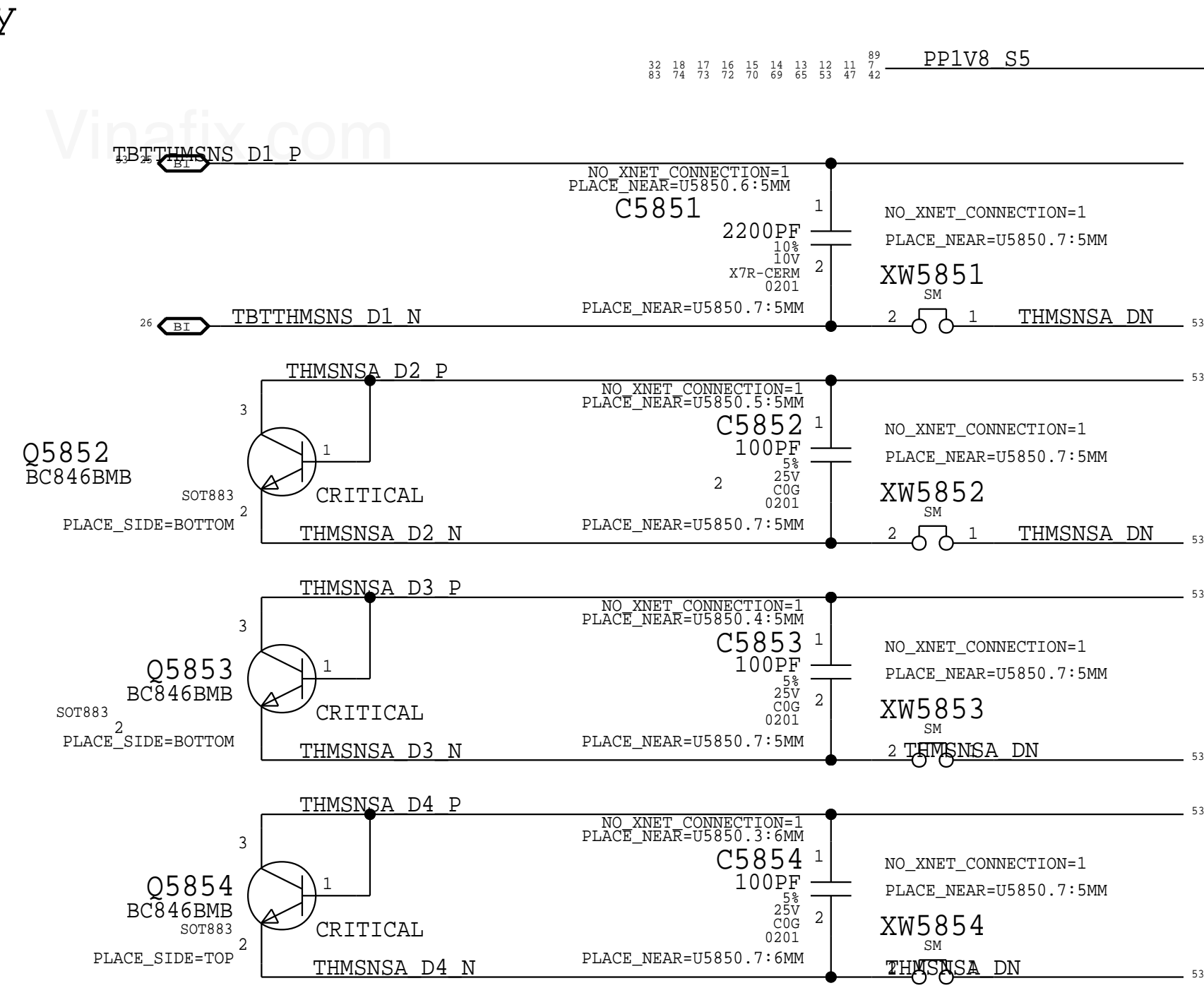
Placement Note:
BOTTOM side of WIFI/BT module

NAND Proximity #1 (TH0b)

Placement note:
BOTTOM side between NAND devices

NAND Proximity #2 (TH0a)

Placement note:
TOP side between NAND devices



Thermal Sensor: LEFT IO proximity (TI0p)

Placement Note:
TOP side, close to TBT die.

Thermal Sensor B
Fin Stack, CPU Proximity, Memory Proximity, and CPU VR

I2C Write: 0x92, I2C Read: 0x93

Thermal Diode: Ambient (TA0p)

Placement Note:
Airflow thermal indicator, TOP side.

CPU Proximity (TCOP)

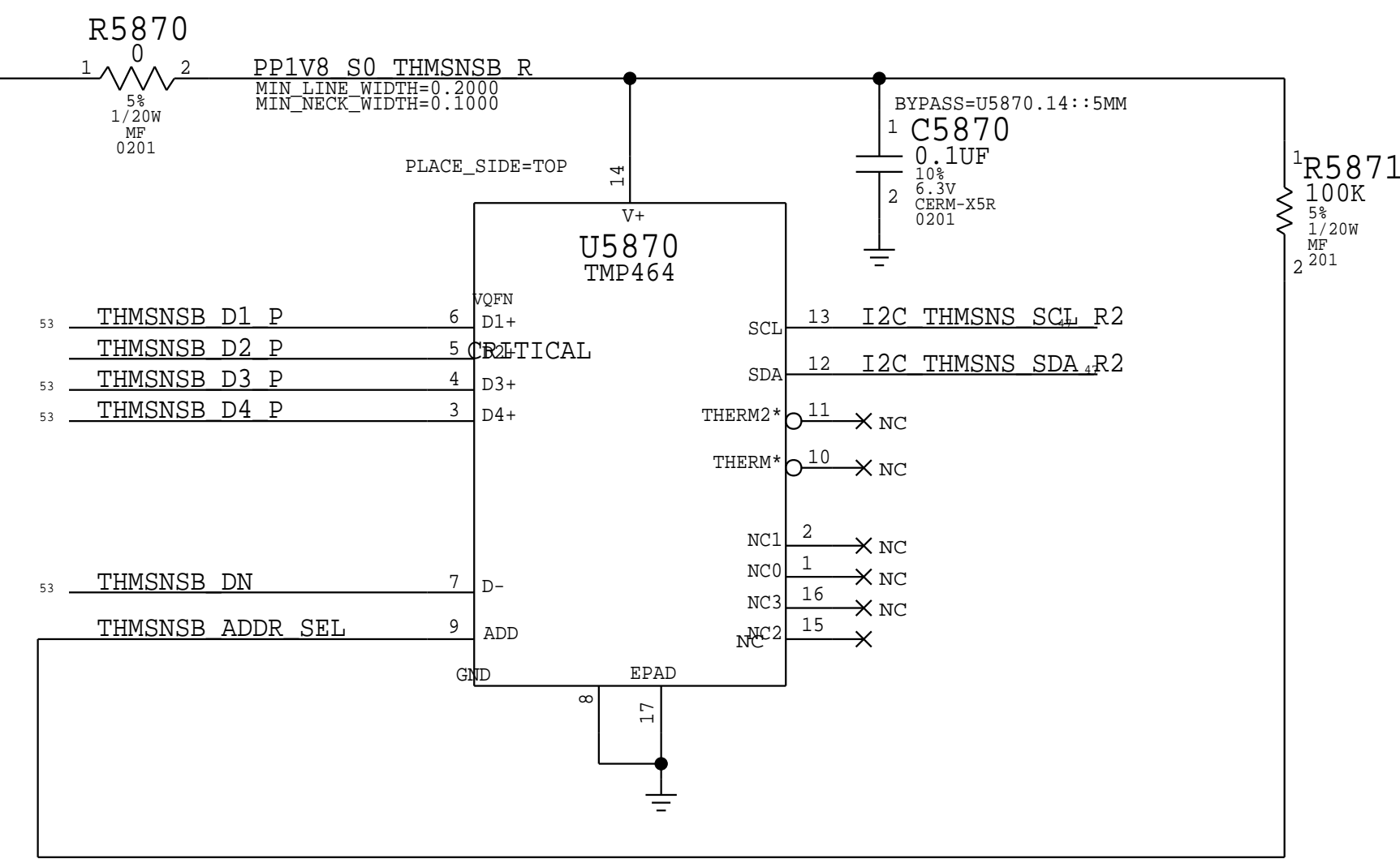
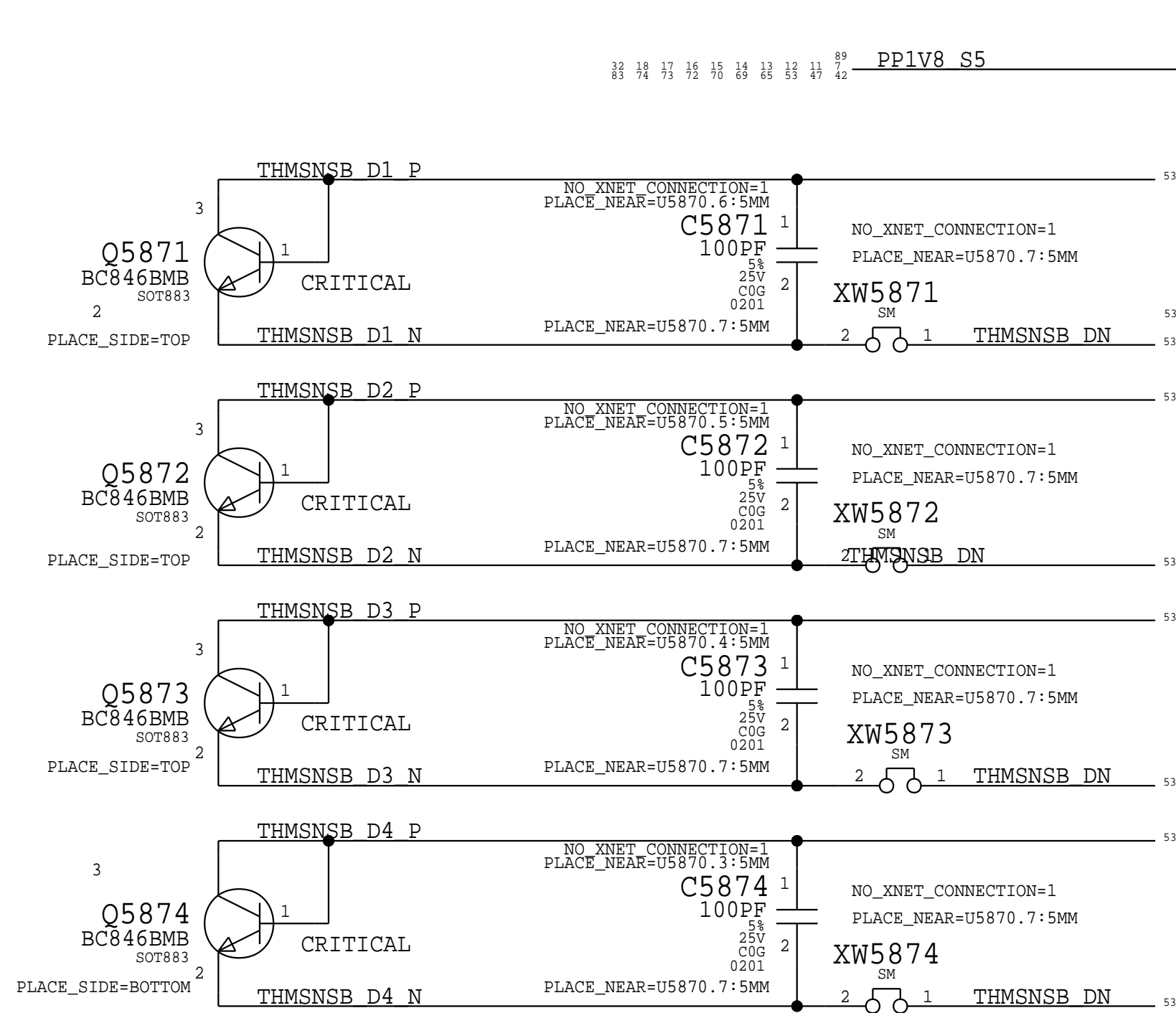
Placement Note:
TOP side of CPU.

Memory Proximity (TMOP)

Placement Note:
TOP side between main memory devices.

Memory Proximity (TM1P)

Placement Note:
BOTTOM side between main memory devices.



Thermal Sensor: Fin Stack (Th1H)

Placement Note:
TOP side, top right of MLB.

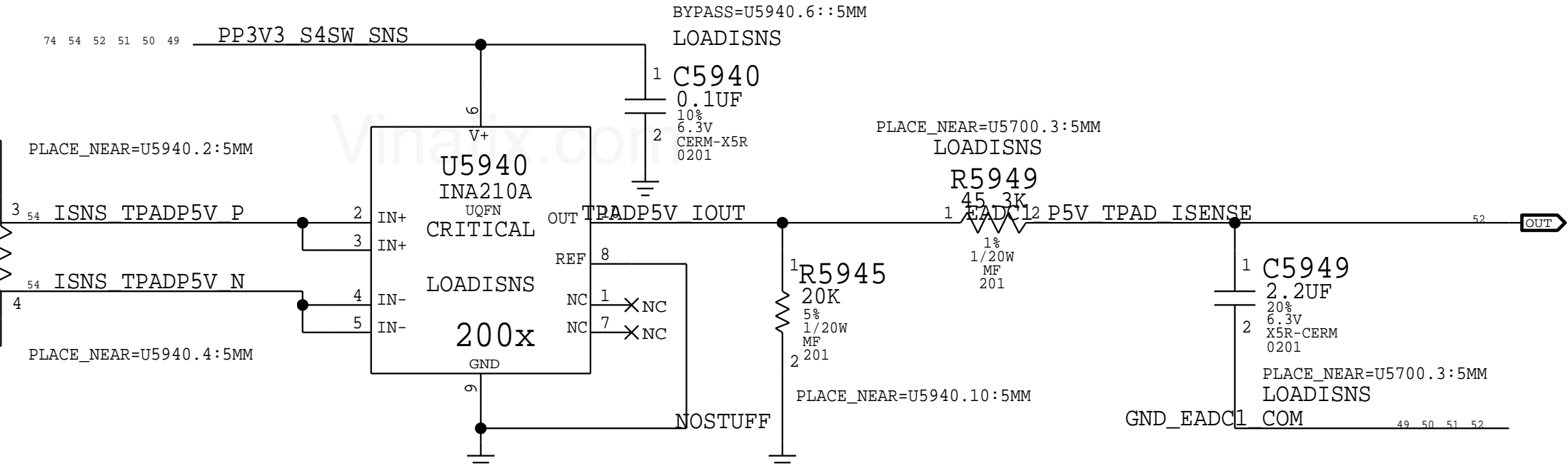
PAGE TITLE		
THERMAL SENSORS		
	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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	PAGE	58 OF 500
	SHEET	53 OF 98

BOM_COST_GROUP=SENSORS

Probe Points for Power Validation

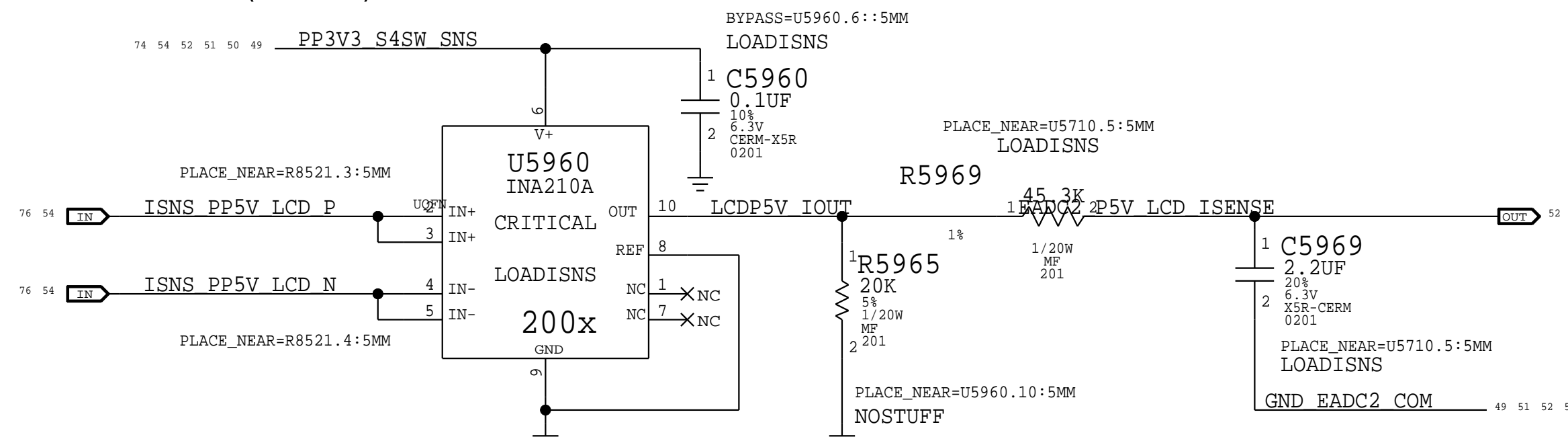
Trackpad 5V Current Sense (IT5C)

Gain: 200x, EDP: 0.0055 A
 Rsense: 0.1 (R5940) or SHORT
 Vsense: 0.55 mV, Range: 0.17 A
 EADC1: CH6



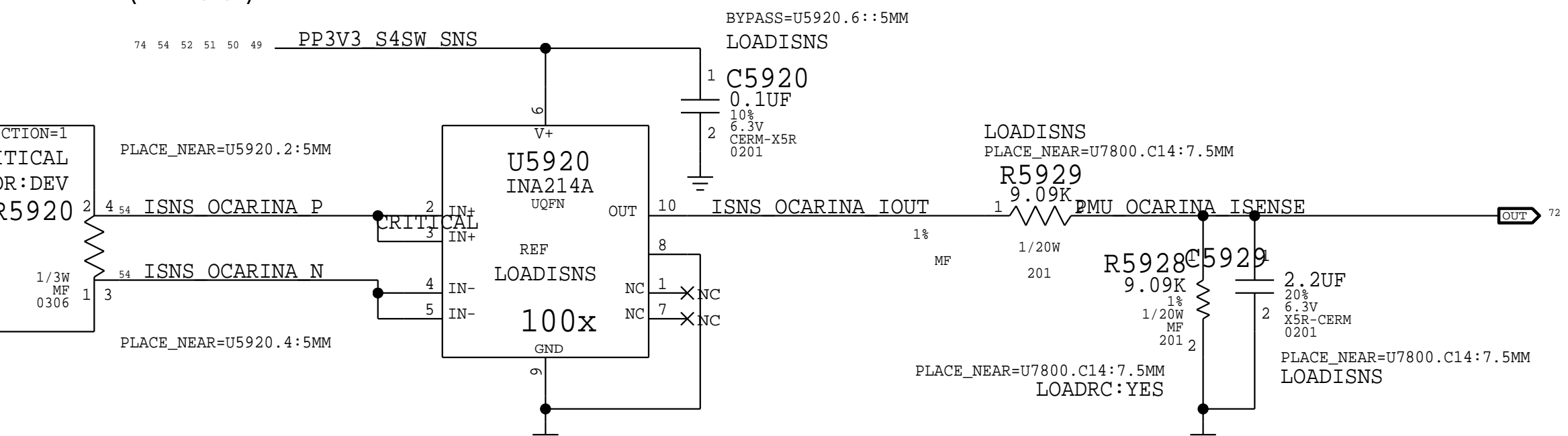
LCD Panel 5V Current Sense (IL5C)

Gain: 200x, EDP: 0.1 A
 Rsense: 0.1 (R5921) or SHORT
 Vsense: 10 mV, Range: 0.17 A
 EADC1: CH7



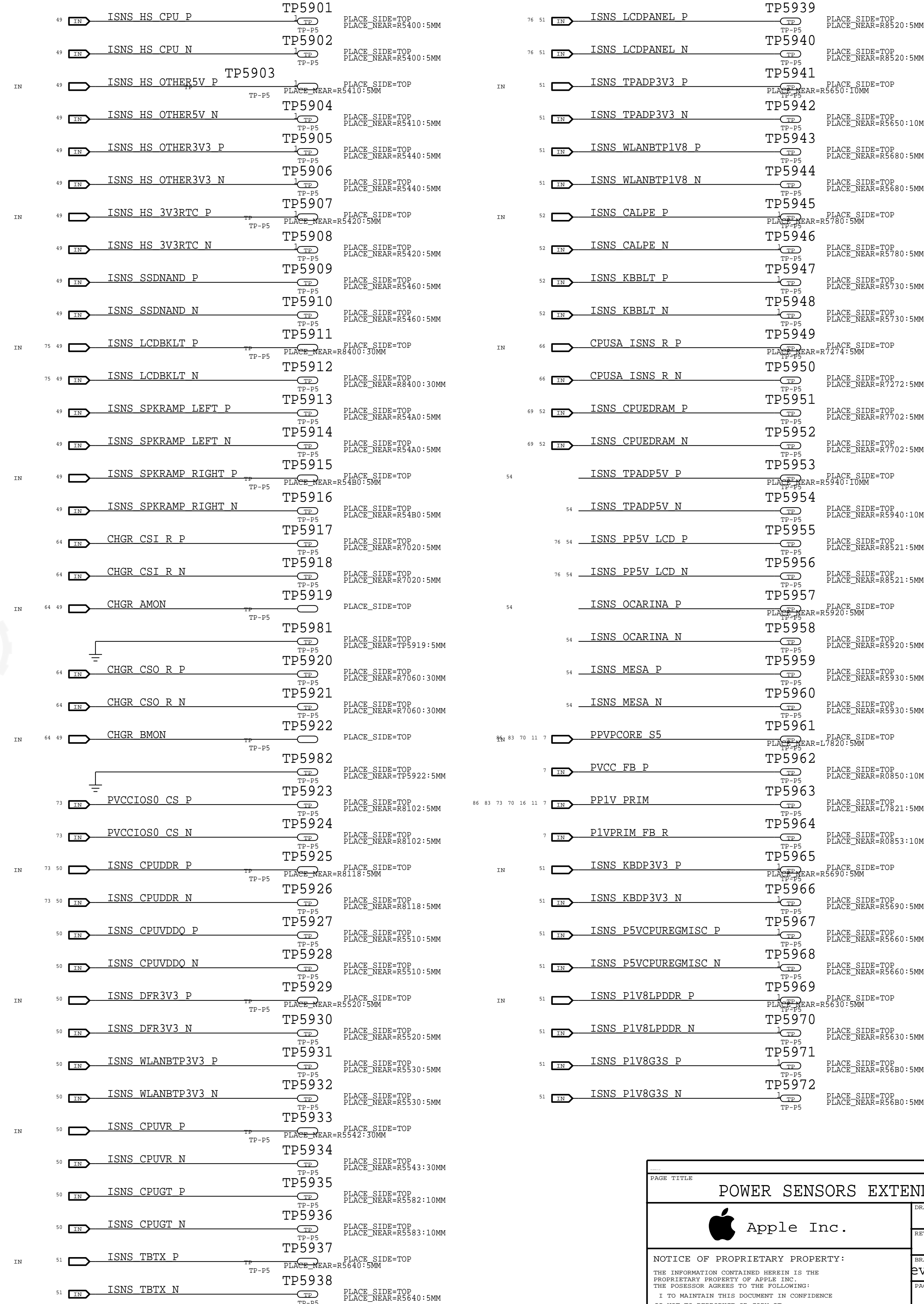
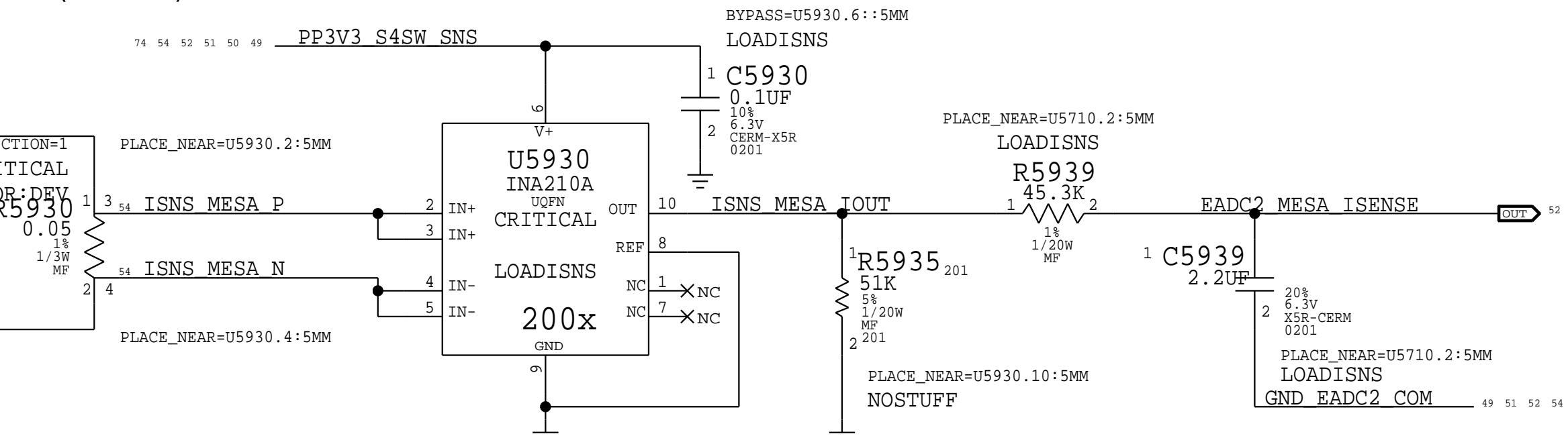
Ocarina Current Sense (IHCC)

Gain: 100x, EDP: 2.139 A
 Rsense: 0.01 (R5920) or SHORT
 Vsense: 21.4 mV, Range: 3.0 A
 MUX: A5



MESA Current Sense (IIDC)

Gain: 200x, EDP: 0.176 A
 Rsense: 0.050 (R5530) or SHORT
 Vsense: 8.8 mV, Range: 0.33 A
 EADC2: CH4



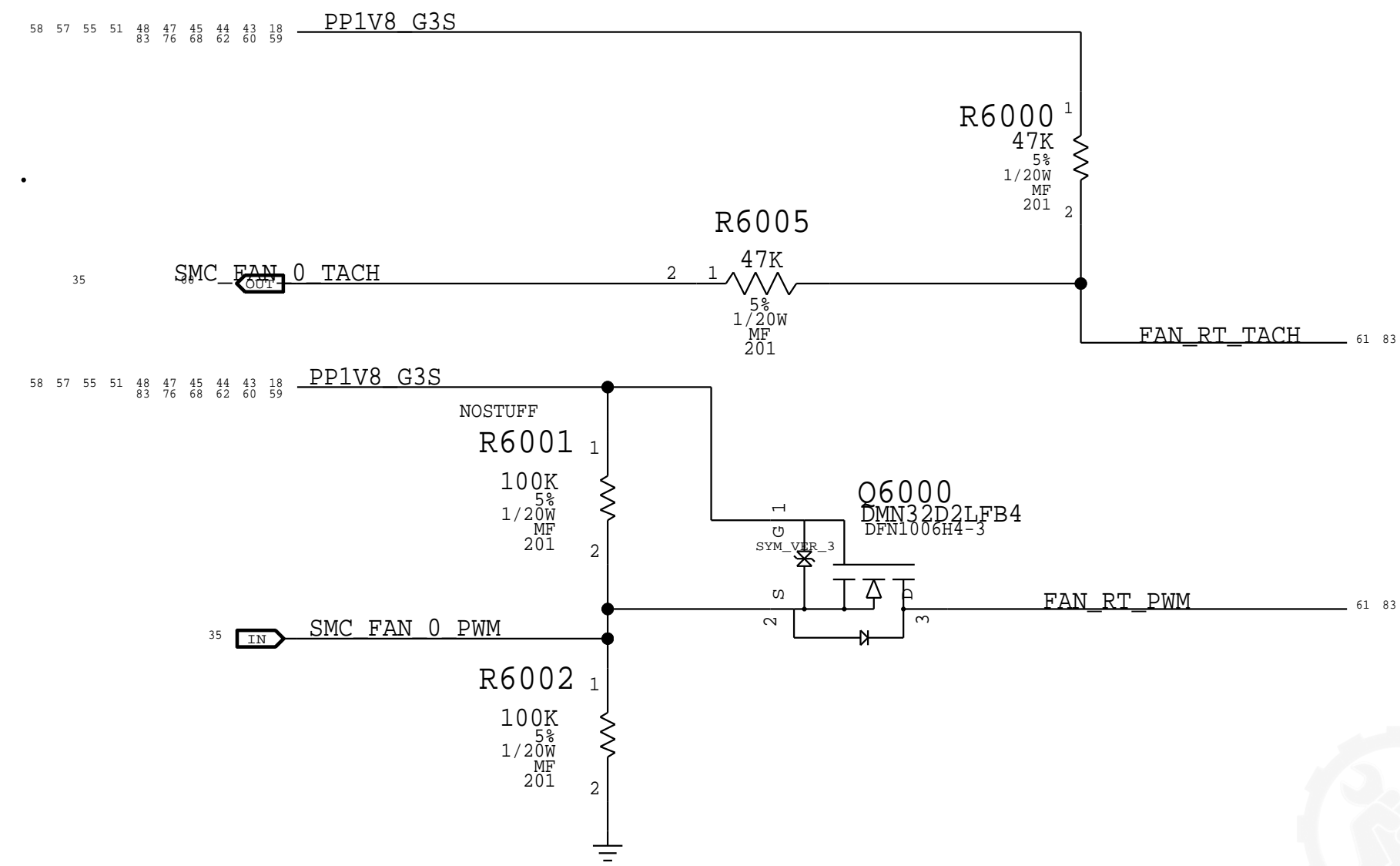
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PAGE TITLE POWER SENSORS EXTENDED 3		
	DRAWING NUMBER 051-04273	SIZE D
	REVISION 4.0.0	
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BRANCH evt-1		PAGE 59 OF 500
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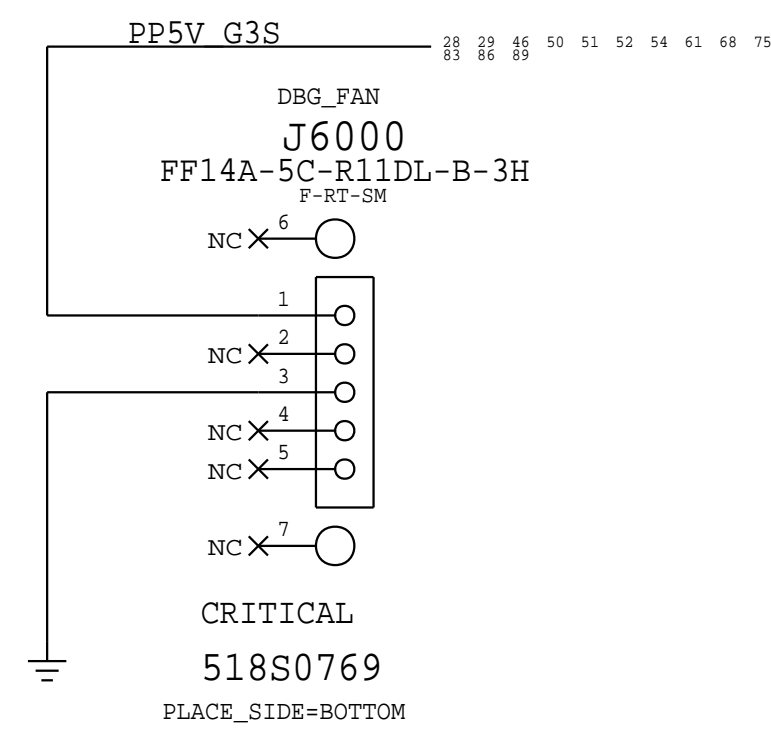
BOM_COST_GROUP=SENSORS

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FAN CONTROL



FOR DEBUG FAN POWER



PAGE TITLE		FANS/SMC/AMUX SUPPORT	
DRAWING NUMBER		051-04273	SIZE
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BOM_COST_GROUP=FAN

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SYNC_MASTER=J213_MLB_OP158		SYNC_DATE=05/29/2018	
PAGE TITLE			
AUDIO PLACEHOLDER			
 Apple Inc.	DRAWING NUMBER	051-04273	SIZE D
	REVISION	4.0.0	
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	PAGE	62 OF 500	
	SHEET	56 OF 98	
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8

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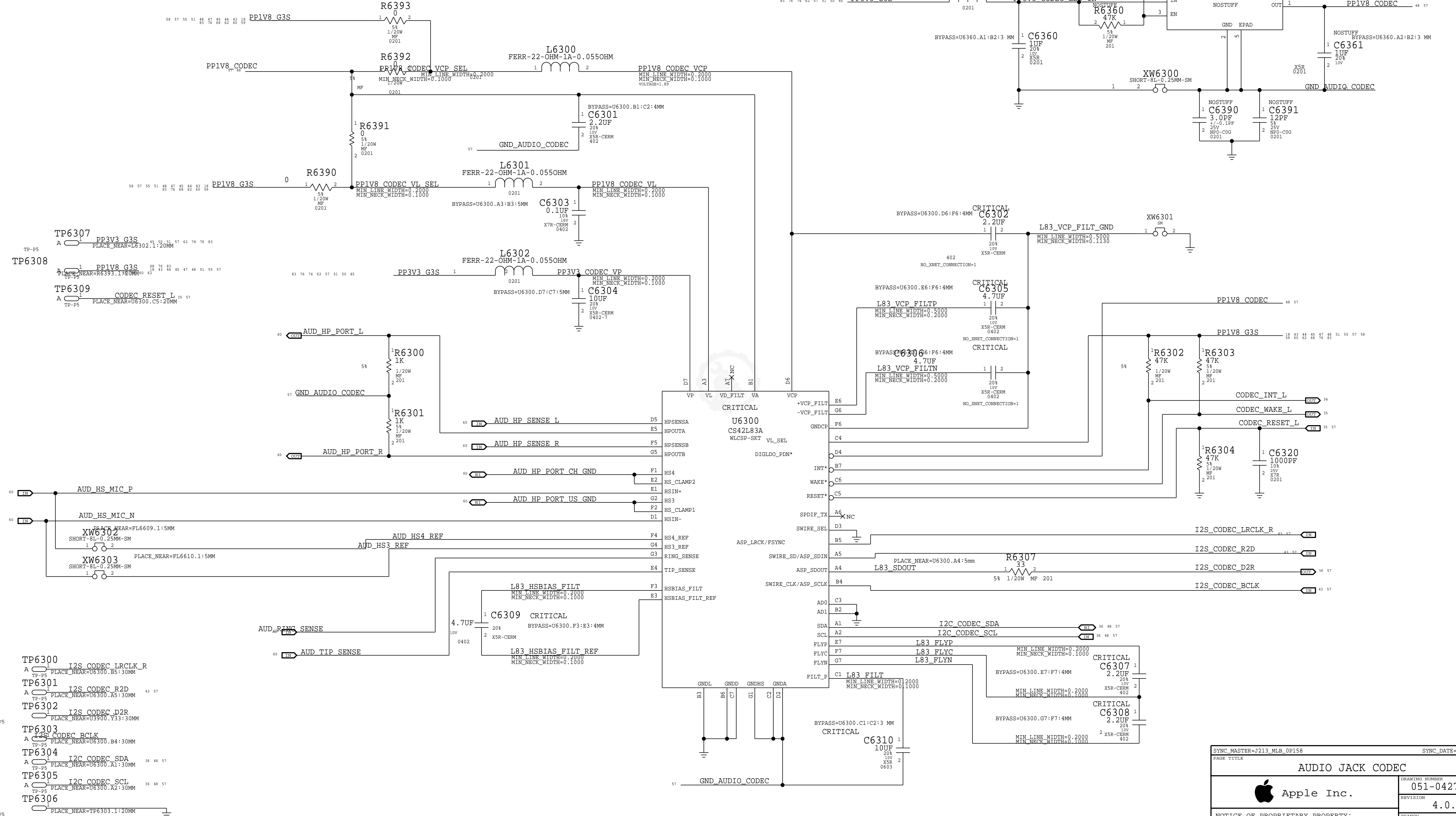
3

2

1

AUDIO JACK CODEC I2C ADDRESS		
AD1	AD0	ADDRESS
GND	GND	0x48 <--
GND	1.8V	0x49
1.8V	GND	0x4A
1189V	GND	0x4B

Vinafix.com



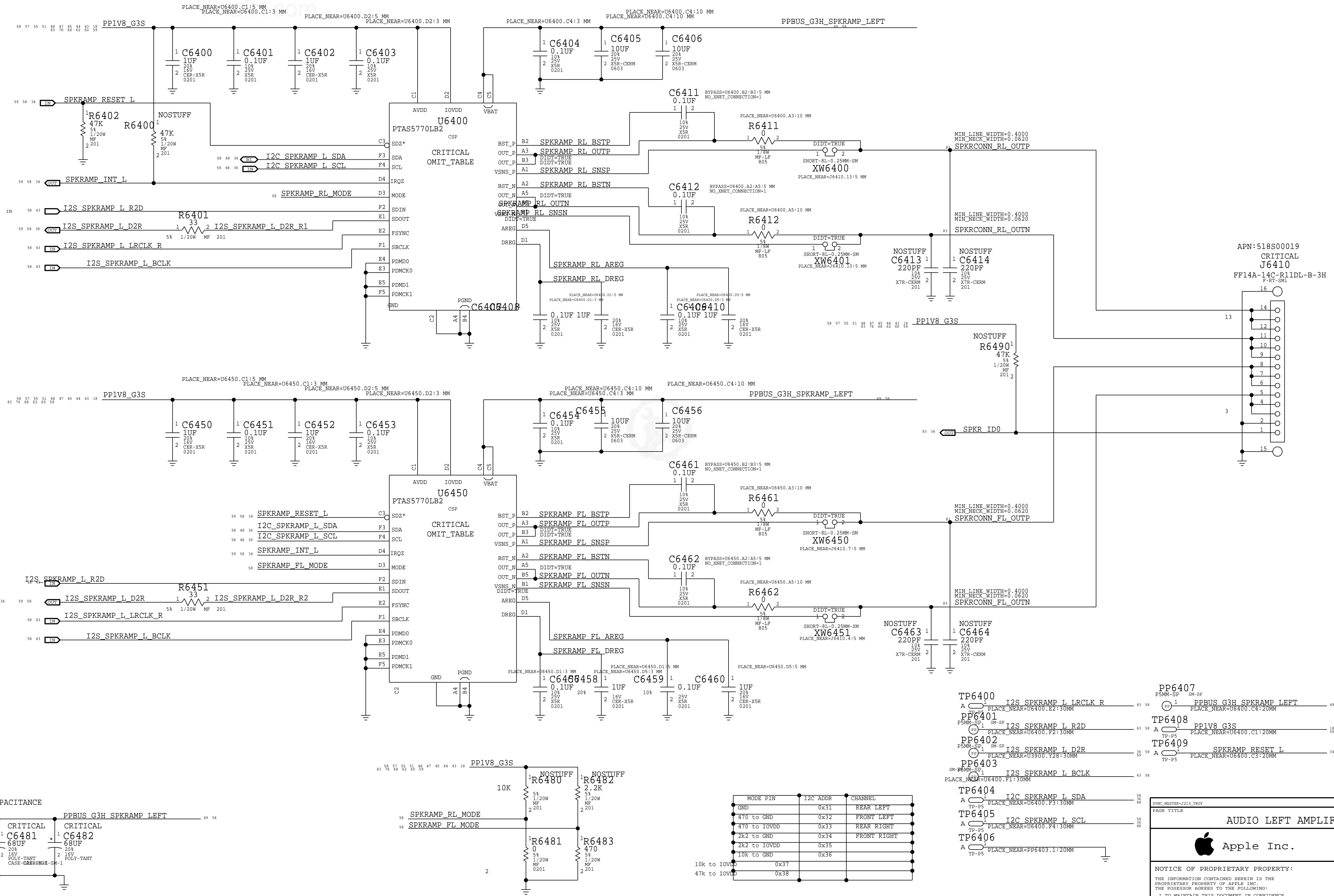
- TP6300 I2S CODEC LRCLK_R
- TP6301 I2S CODEC R2D
- TP6302 I2S CODEC D2R
- TP6303 I2S CODEC BCLK
- TP6304 I2C CODEC SDA
- TP6305 I2C CODEC SCL
- TP6306

SYNC_MASTER=J213_MLR_OP158		SYNC_DATE=05/29/2018	
PAGE TITLE			
AUDIO JACK CODEC			
		DRAWING NUMBER	051-04273
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		SHEET	57 OF 98

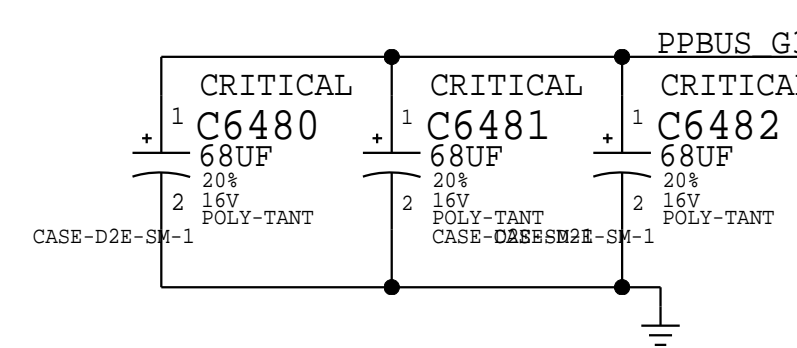
BOM_COST_GROUP=AUDIO

2X MONO SPEAKER LEFT AMPLIFIERS

APN: 353S01252
GAIN: 0DBFS = xxVRMS



LEFT BULK CAPACITANCE



MODE PIN	I2C ADDR	CHANNEL
GND	0x31	REAR LEFT
470 to GND	0x32	FRONT LEFT
470 to IOVDD	0x33	REAR RIGHT
2K2 to GND	0x34	FRONT RIGHT
2K2 to IOVDD	0x35	
10k to GND	0x36	
10k to IOVDD	0x37	
47k to IOVDD	0x38	

- TP6400 I2S_SPKRAMP_L_LRCLK_R
- TP6401 I2S_SPKRAMP_L_R2D
- TP6402 I2S_SPKRAMP_L_D2R
- TP6403 I2S_SPKRAMP_L_BCLK
- TP6404 I2C_SPKRAMP_L_SDA
- TP6405 I2C_SPKRAMP_L_SCL
- TP6406 I2S_SPKRAMP_L_LRCLK_R

Apple Inc. AUDIO LEFT AMPLIFIERS

051-04273

4.0.0

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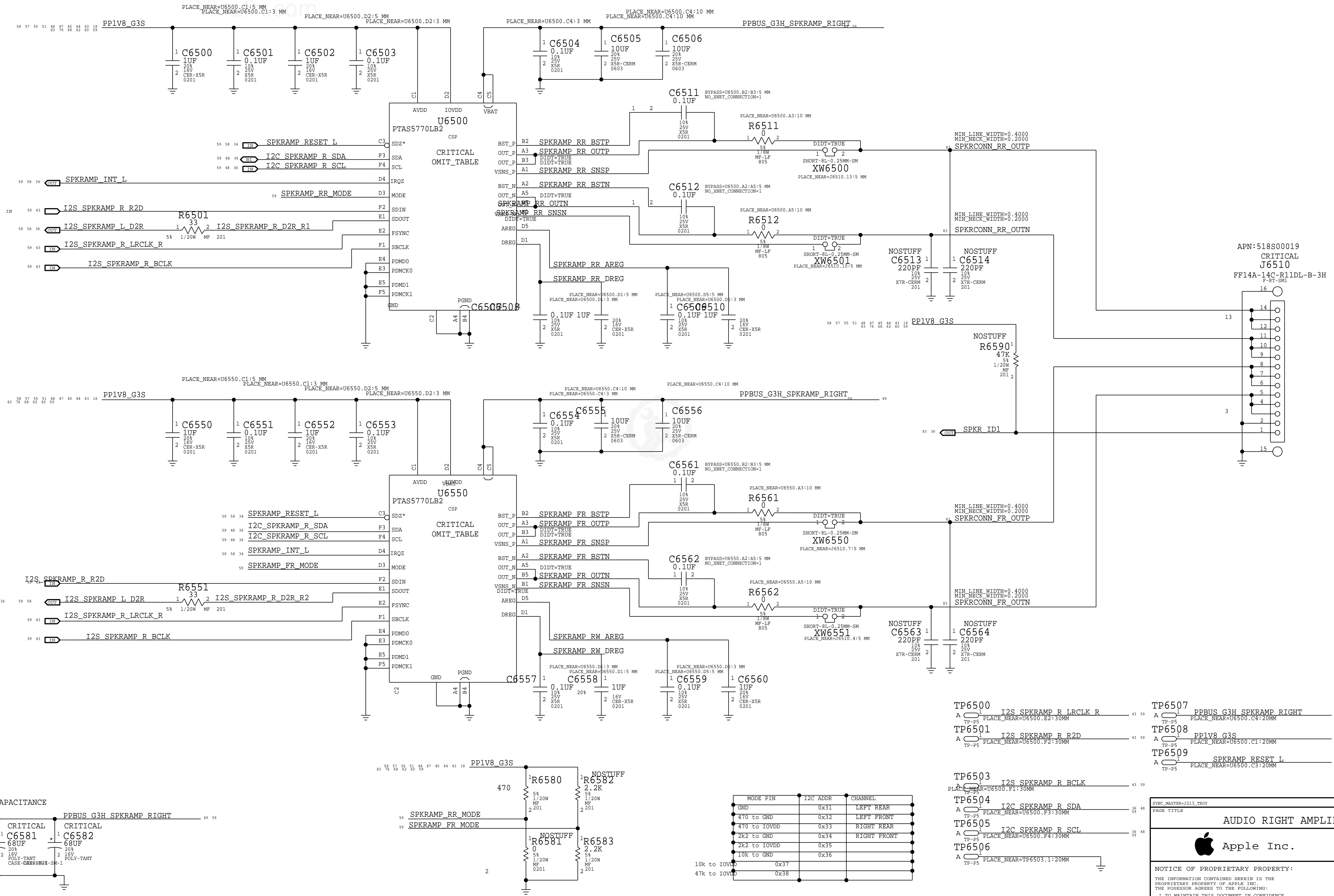
58 OF 98

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BOM_COST_GROUP=AUDIO

2X MONO SPEAKER RIGHT AMPLIFIERS

APN: 353S01252
GAIN: 0DBFS = xxVRMS



TP6500 I2S_SPKRAMP_R_LRCLK_R 43 59
TP6501 I2S_SPKRAMP_R_R2D 43 59
TP6503 I2S_SPKRAMP_R_BCLK 43 59
TP6504 I2C_SPKRAMP_R_SDA 36 48
TP6505 I2C_SPKRAMP_R_SCL 36 48
TP6506 PLACE_NEAR=TP6503.1:20MM

TP6507 PPBUS_G3H_SPKRAMP_RIGHT 49 59
TP6508 PP1V8_G3S 18 43 44 45 46 47 48 51 55 57 59
TP6509 SPKRAMP_RESET_L 34 58 59

RIGHT BULK CAPACITANCE
CRITICAL C6580 68UF 20% POLY-TANT CASE-D2E-SM-1
CRITICAL C6581 68UF 20% POLY-TANT CASE-D2E-SM-1
CRITICAL C6582 68UF 20% POLY-TANT CASE-D2E-SM-1

MODE PIN I2C ADDR CHANNEL
GND 0x31 LEFT REAR
470 to GND 0x32 LEFT FRONT
470 to IOVDD 0x33 RIGHT REAR
2K2 to GND 0x34 RIGHT FRONT
2K2 to IOVDD 0x35
10k to GND 0x37
47k to IOVDD 0x38

TP6500 A 1 PLACE_NEAR=U6500.E2:30MM
TP6501 A 1 PLACE_NEAR=U6500.F2:30MM
TP6503 A 1 PLACE_NEAR=U6500.F1:30MM
TP6504 A 1 PLACE_NEAR=U6500.F3:30MM
TP6505 A 1 PLACE_NEAR=U6500.F4:30MM
TP6506 A 1 PLACE_NEAR=TP6503.1:20MM

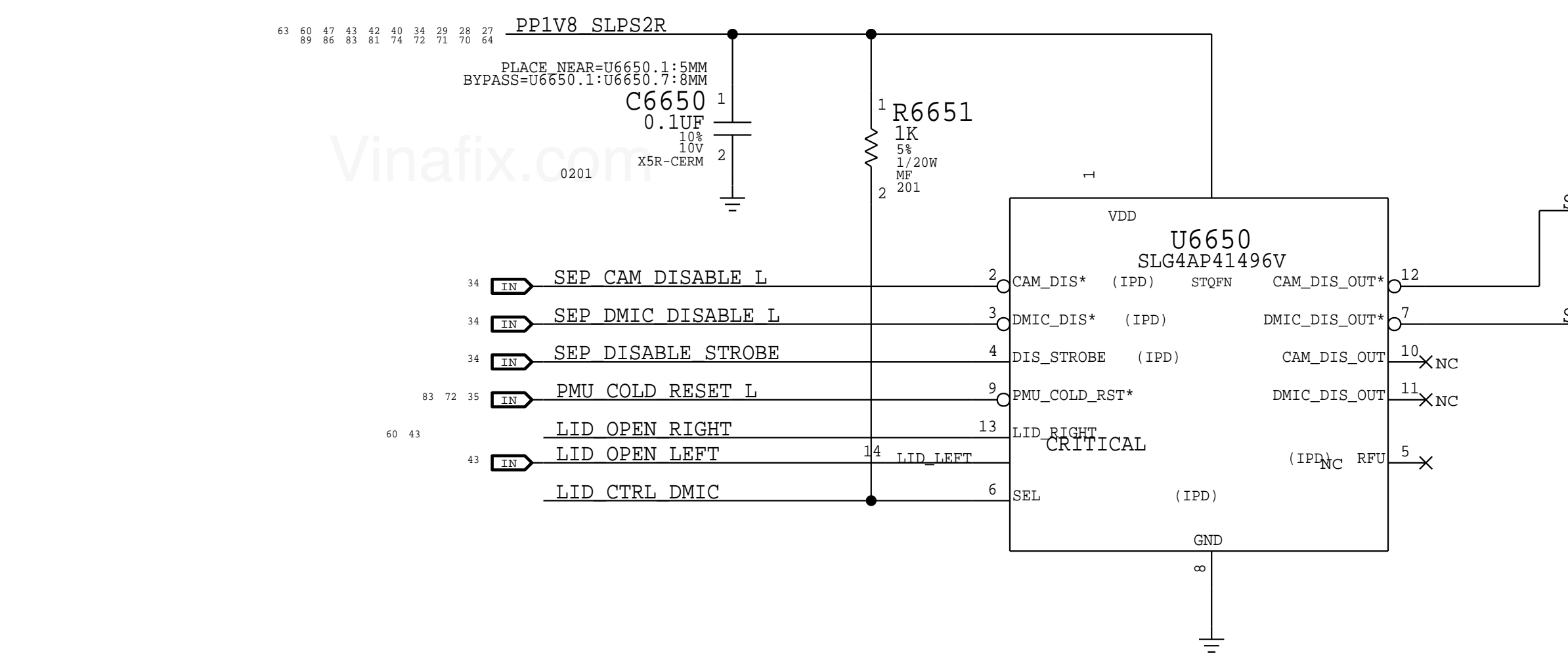
TP6507 A 1 PLACE_NEAR=U6500.C4:20MM
TP6508 A 1 PLACE_NEAR=U6500.C1:20MM
TP6509 A 1 PLACE_NEAR=U6500.C3:20MM

DRIVING NUMBER 051-04273
REVISION 4.0.0
PAGE 65 OF 500
SHEET 59 OF 98

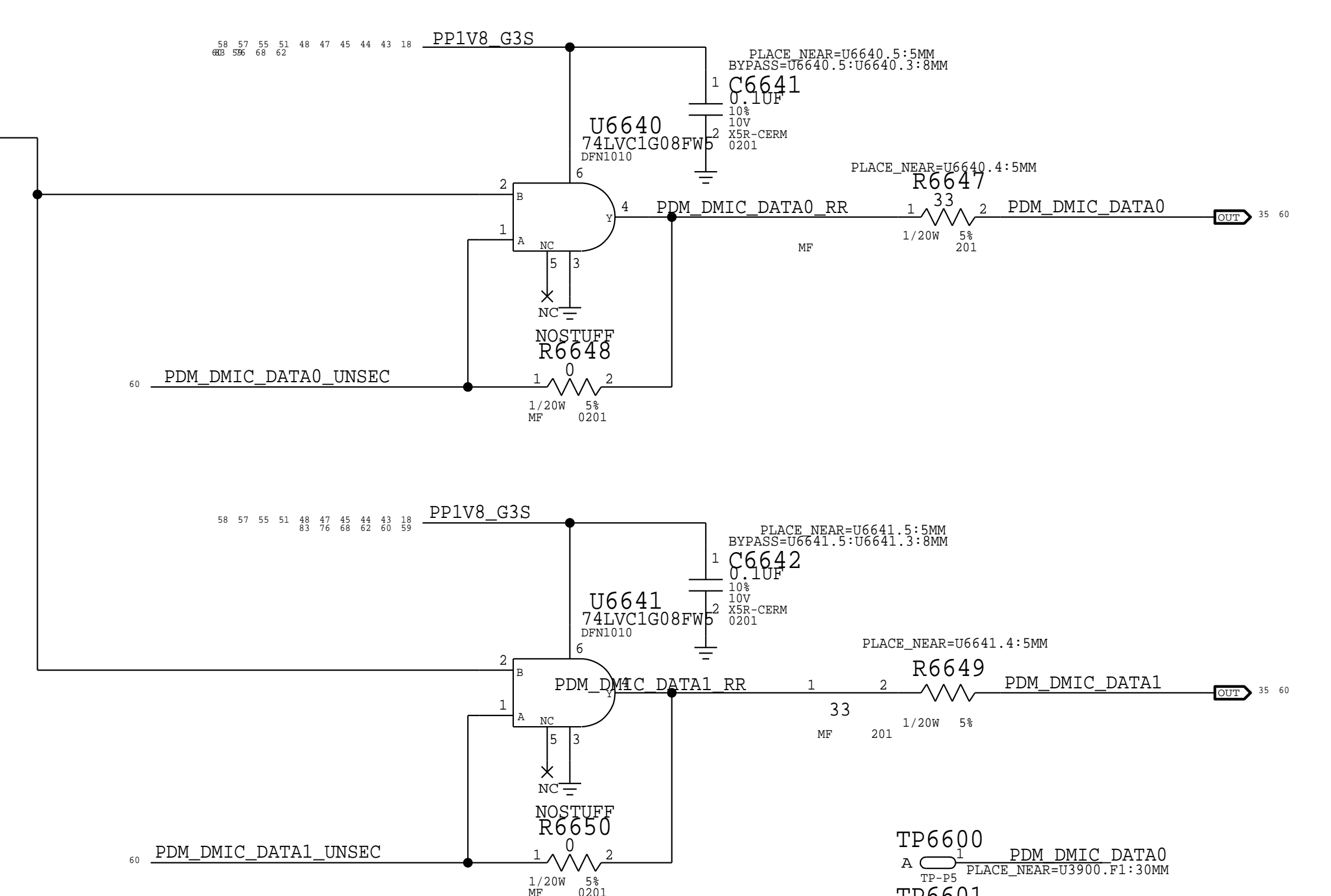
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BOM_COST_GROUP=AUDIO

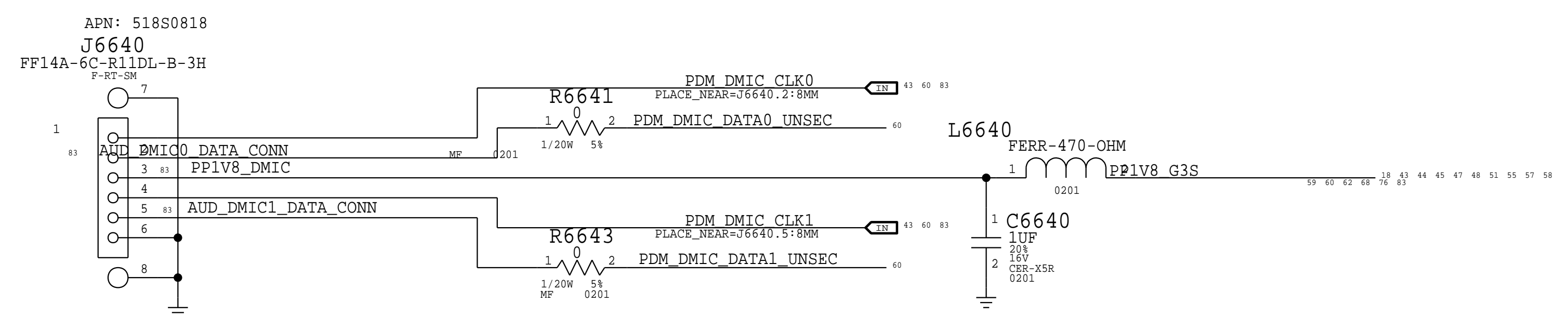
D



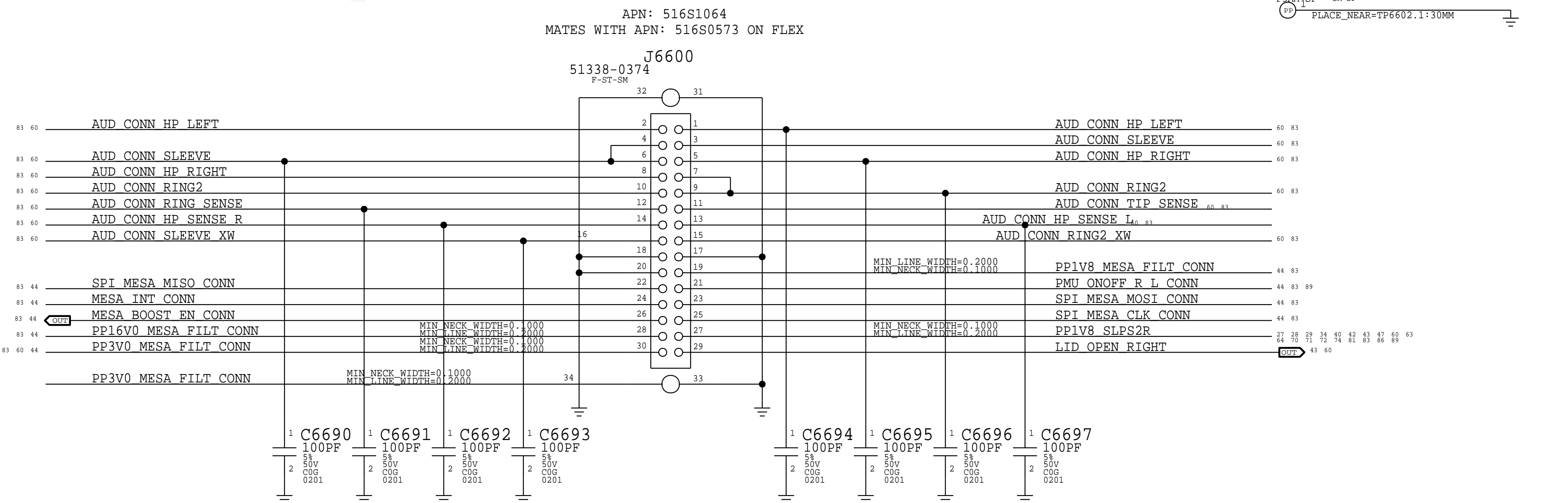
DMIC Secure Disable



Digital Mic Flex Connector



AUDIO JACK FLEX CONNECTOR

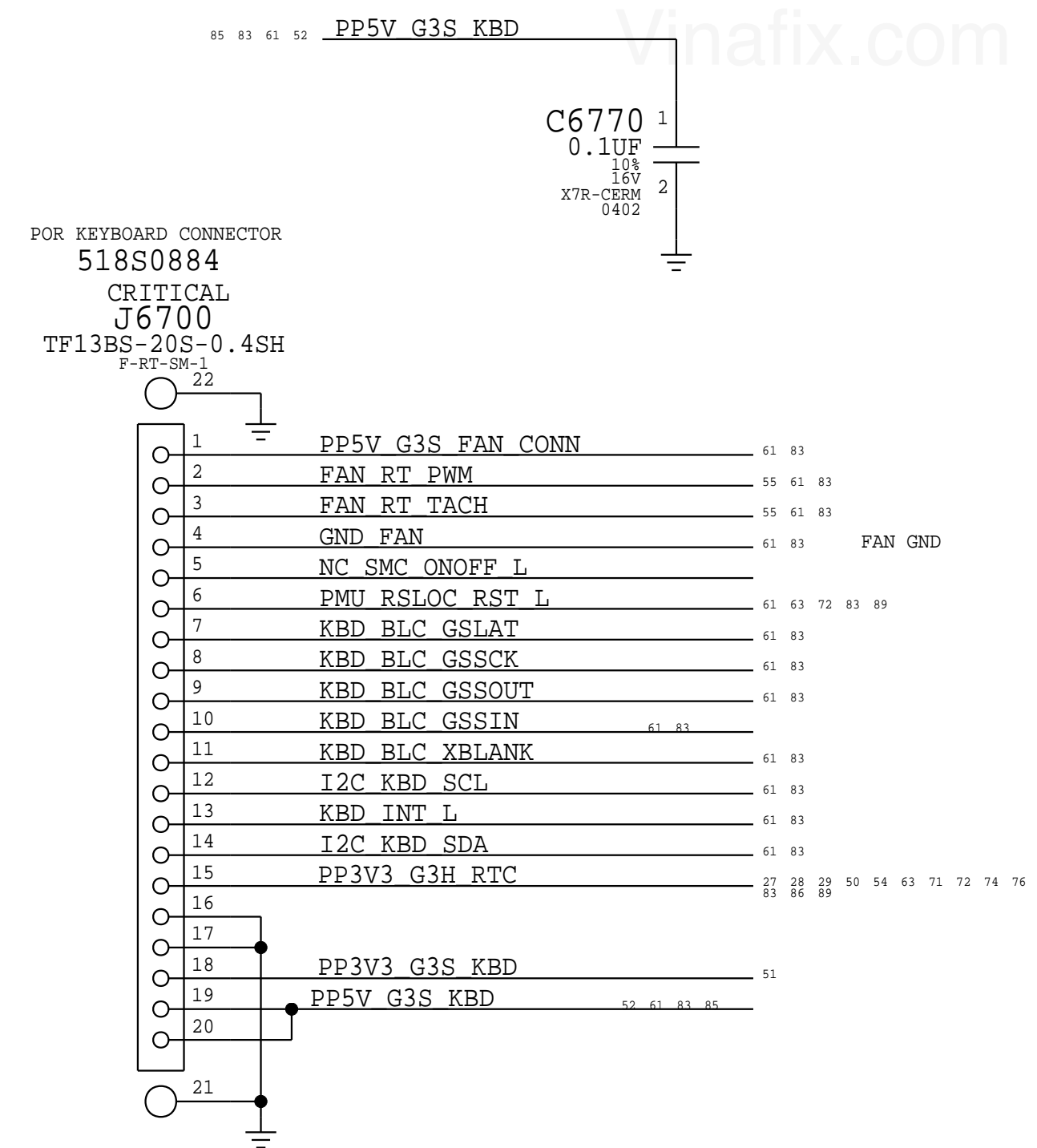


B

A

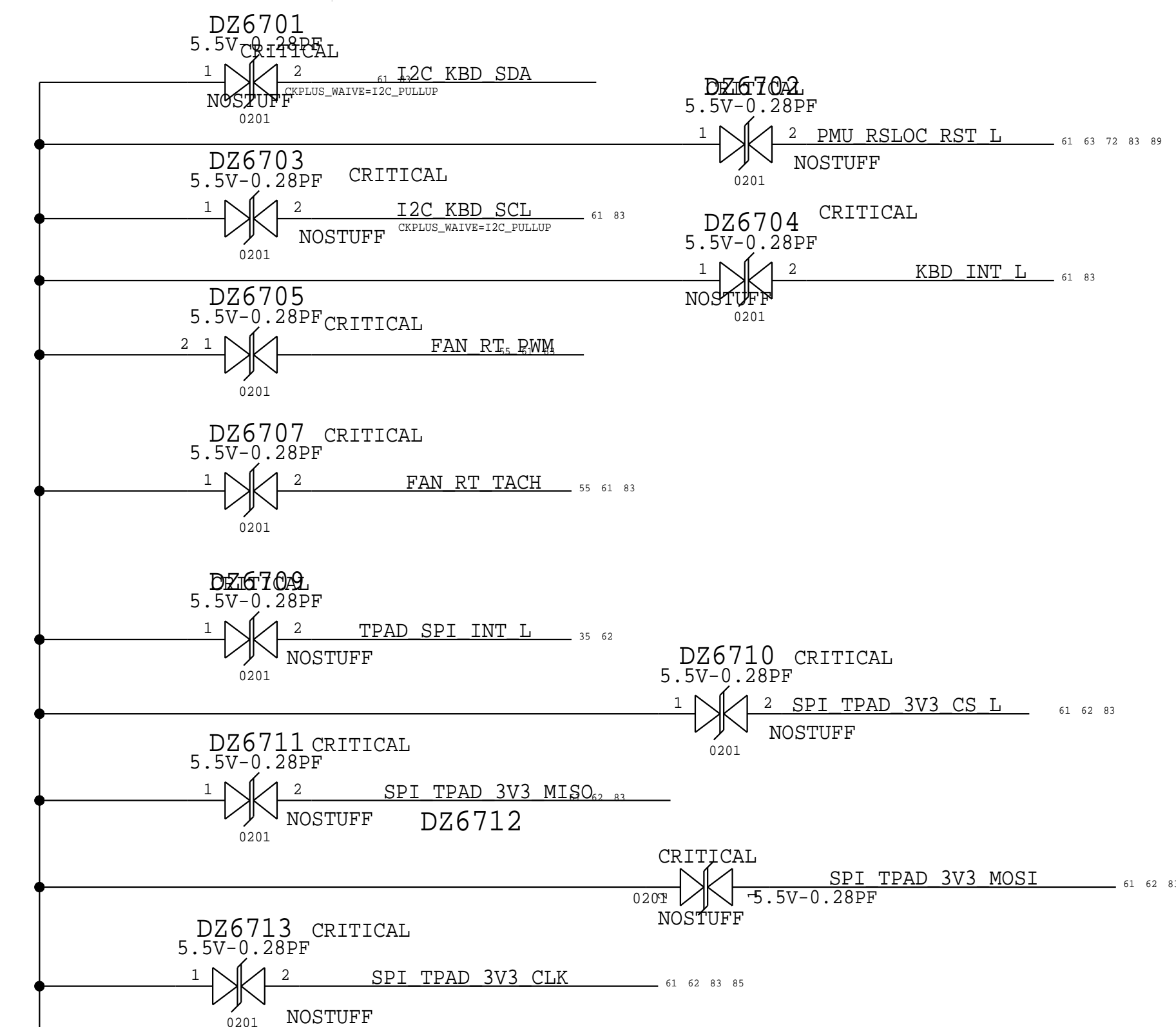
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AUDIO FLEX CONNECTORS		
	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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		PAGE 66 OF 500
		SHEET 60 OF 98

KEYBOARD CONNECTOR

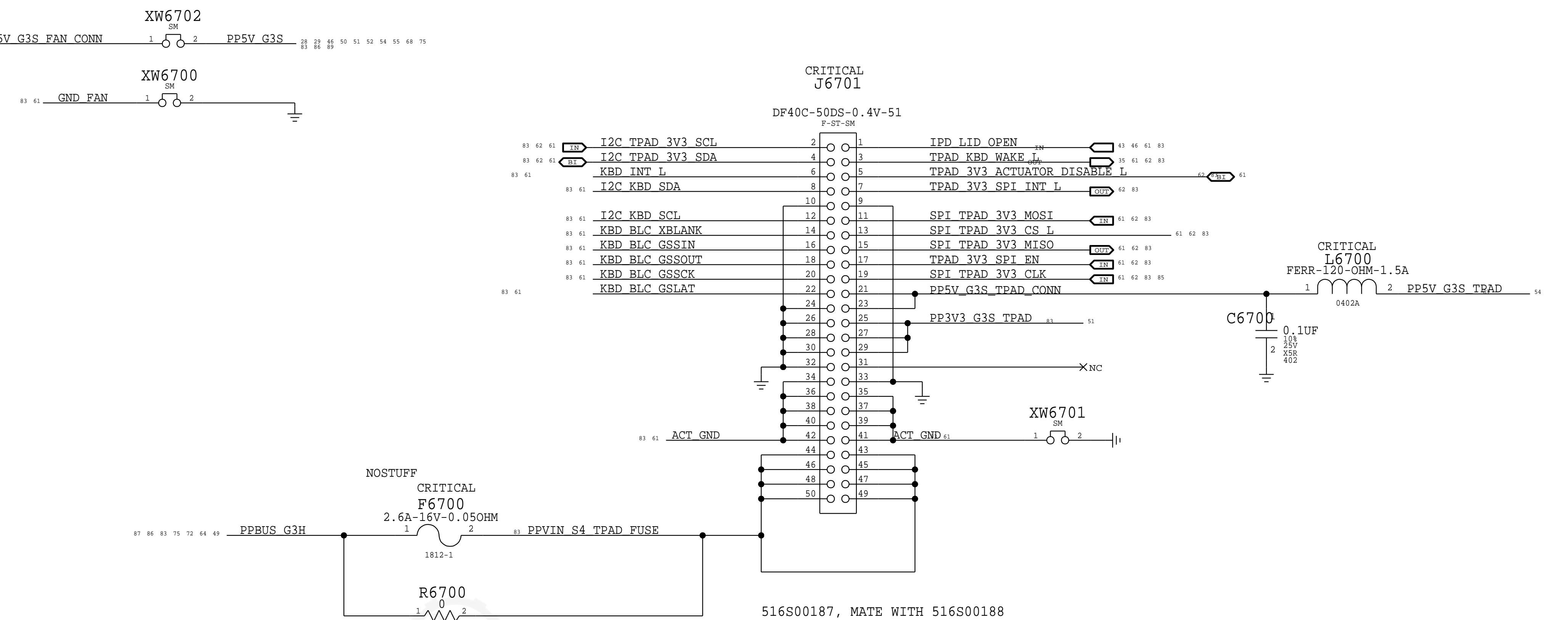


ESD DIODES

377S0184



TPAD CONNECTOR



516S00187, MATE WITH 516S00188

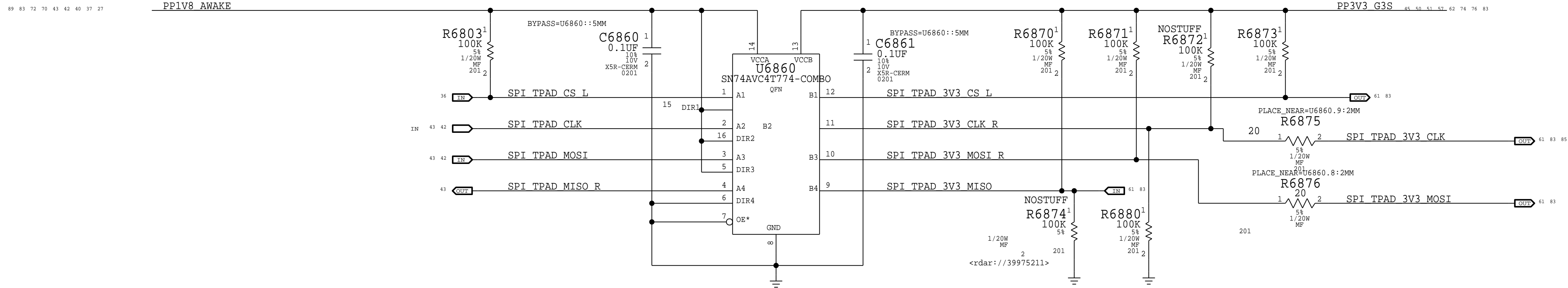
PAGE TITLE KEYBOARD & TRACKPAD 1		
	DRAWING NUMBER 051-04273	SIZE D
	REVISION 4.0.0	
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BRANCH evt-1	PAGE 67 OF 500	SHEET 61 OF 98

BOM_COST_GROUP=KEYBOARD

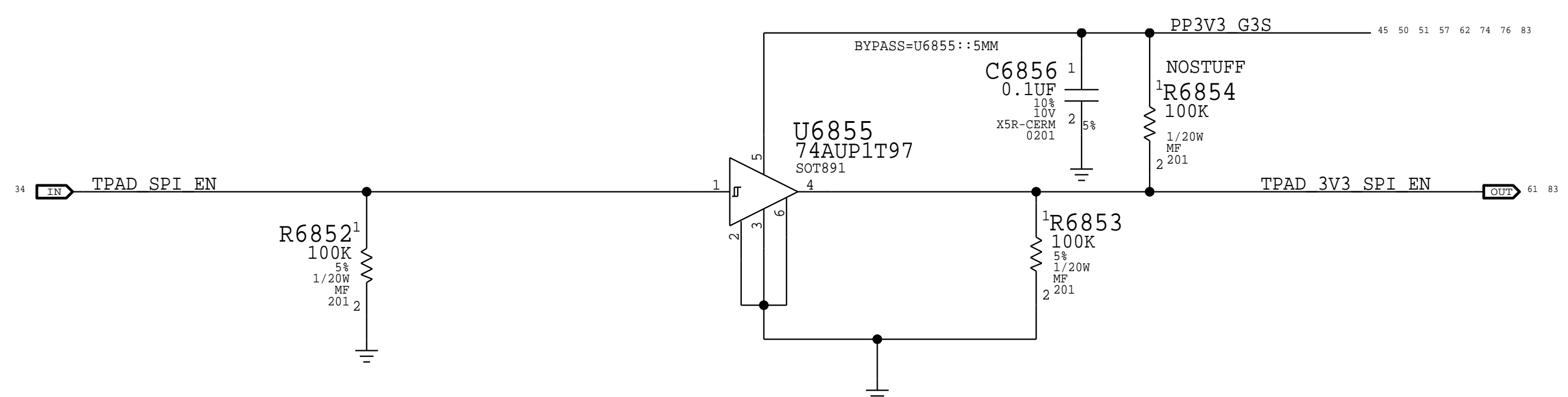
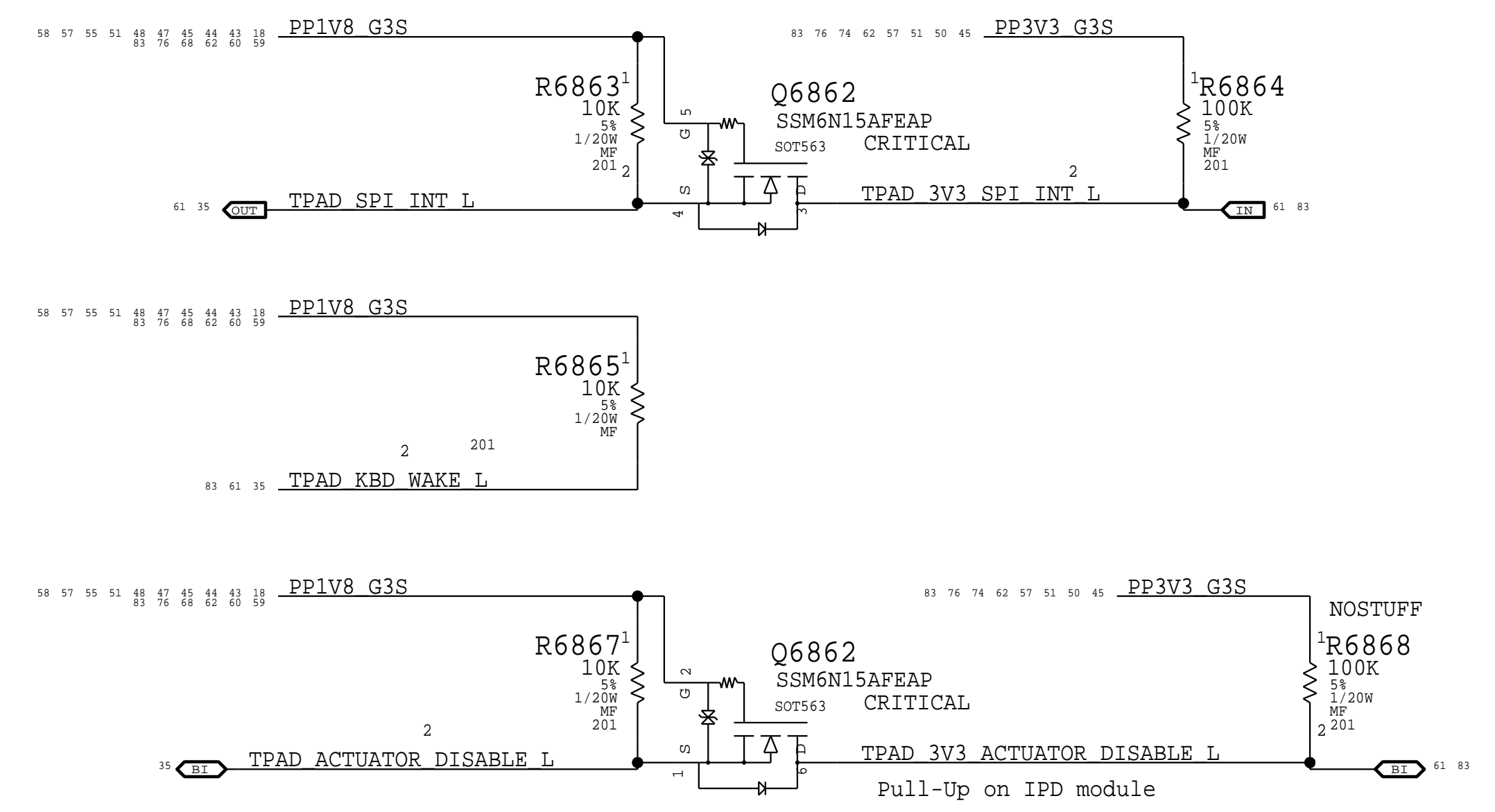
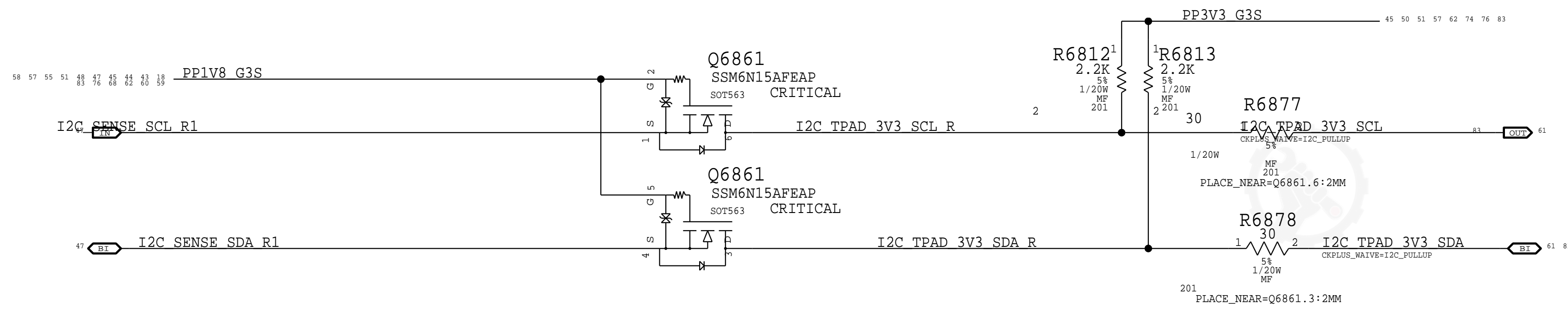
Trackpad Level Shifting

Vinafix.com

SIGNAL_MODEL=CUSTOM_SN74AVC4T774



I2C FOR TEMPERATURE SENSOR ON TPAD



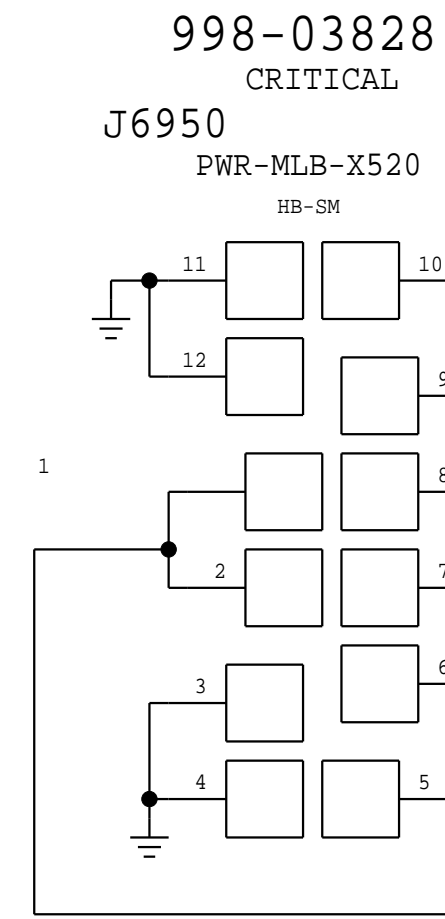
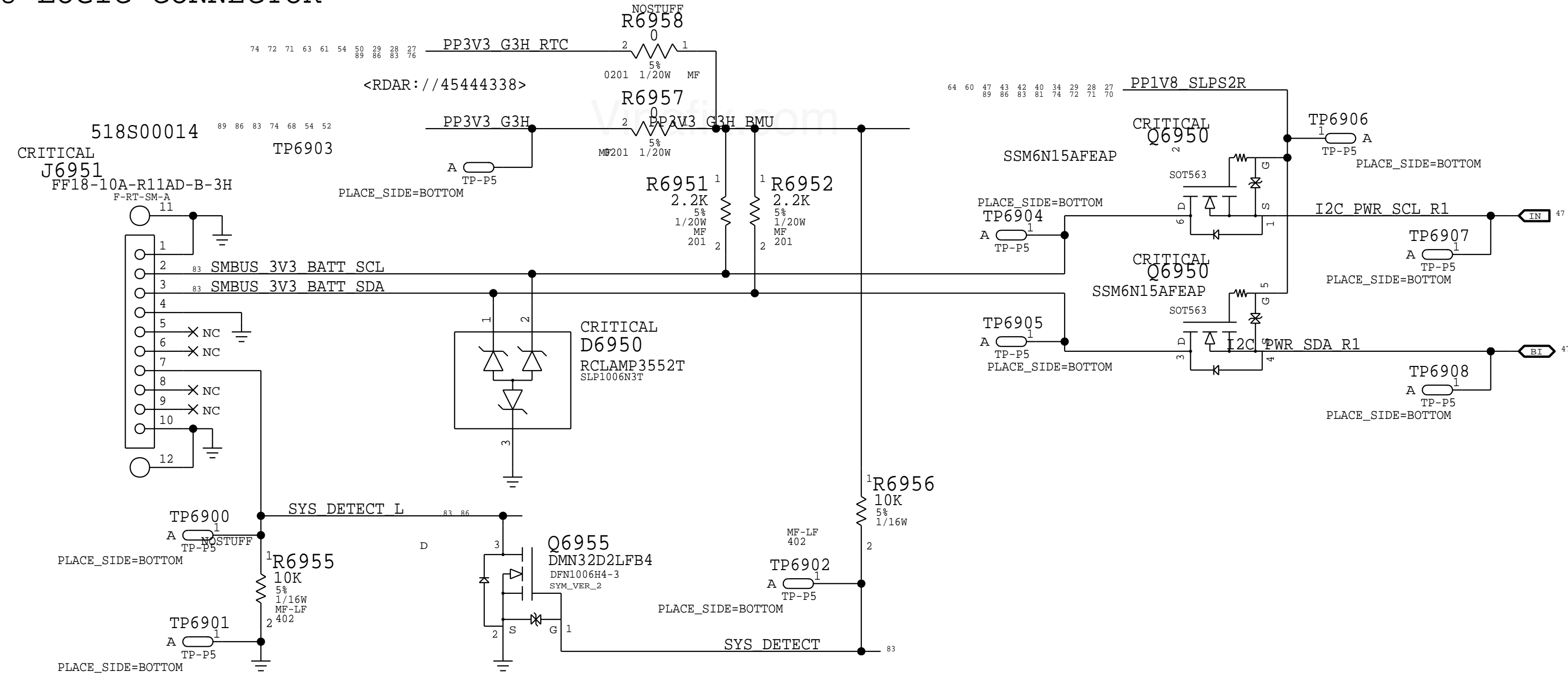
PAGE TITLE		
KEYBOARD & TRACKPAD 2		
	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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	PAGE	68 OF 500
	SHEET	62 OF 98

BOM_COST_GROUP=TRACKPAD

BMU LOGIC CONNECTOR

BATTERY (BMU) FLEX SOLDER PADS

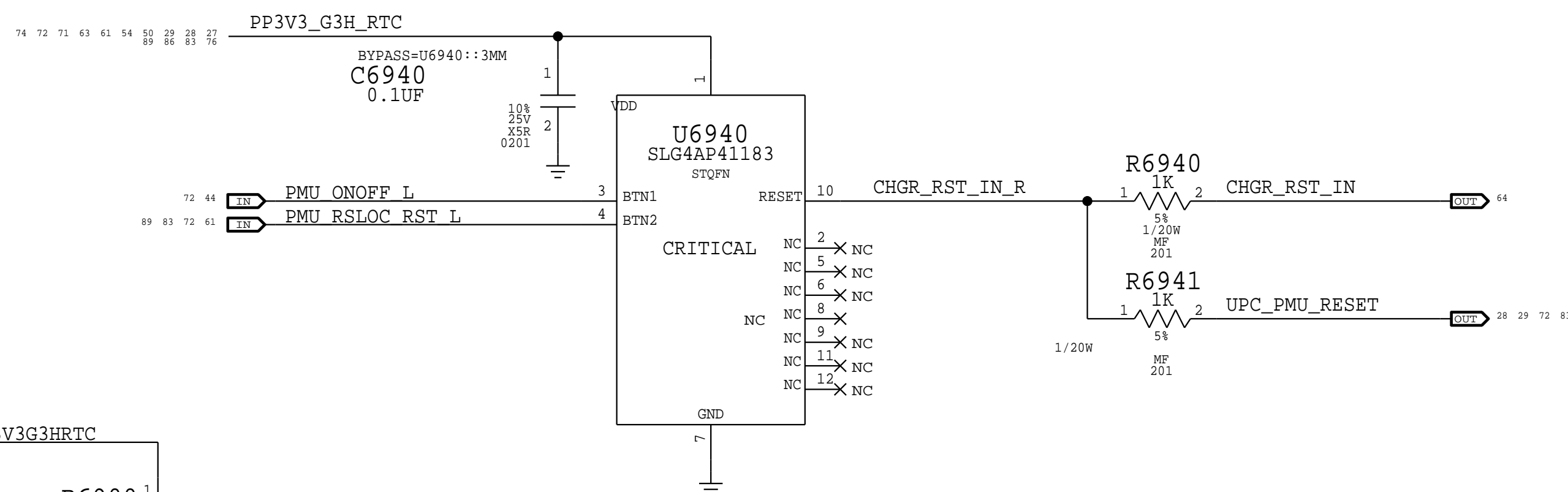
BMU POWER FLEX IS SOLDERED TO MLB.



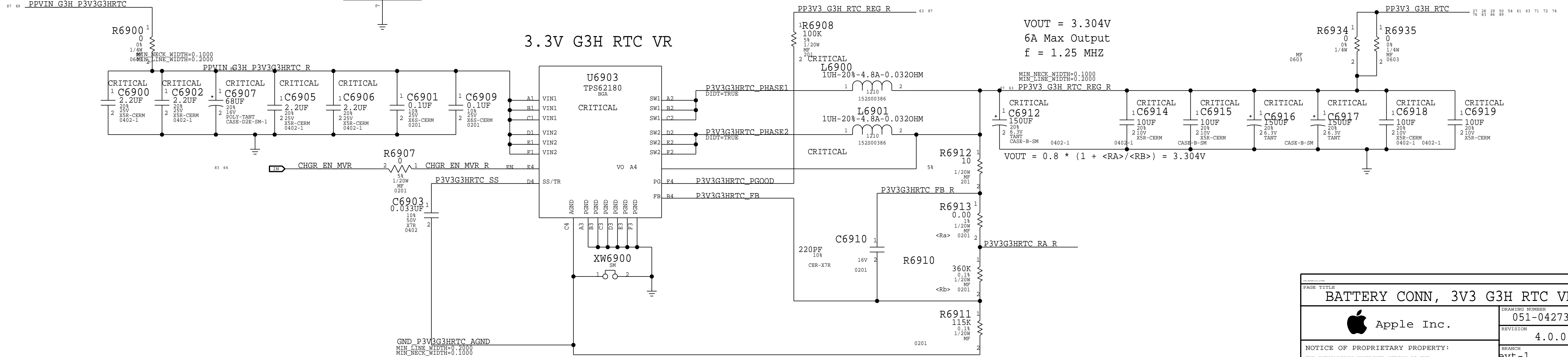
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
632-00731	1	PCBA, FLEX, BMU PWR, X502	J6950	CRITICAL	

SMC Reset Circuit

Right Shift & Left Option Control followed by ON OFF button press.



3.3V G3H RTC VR



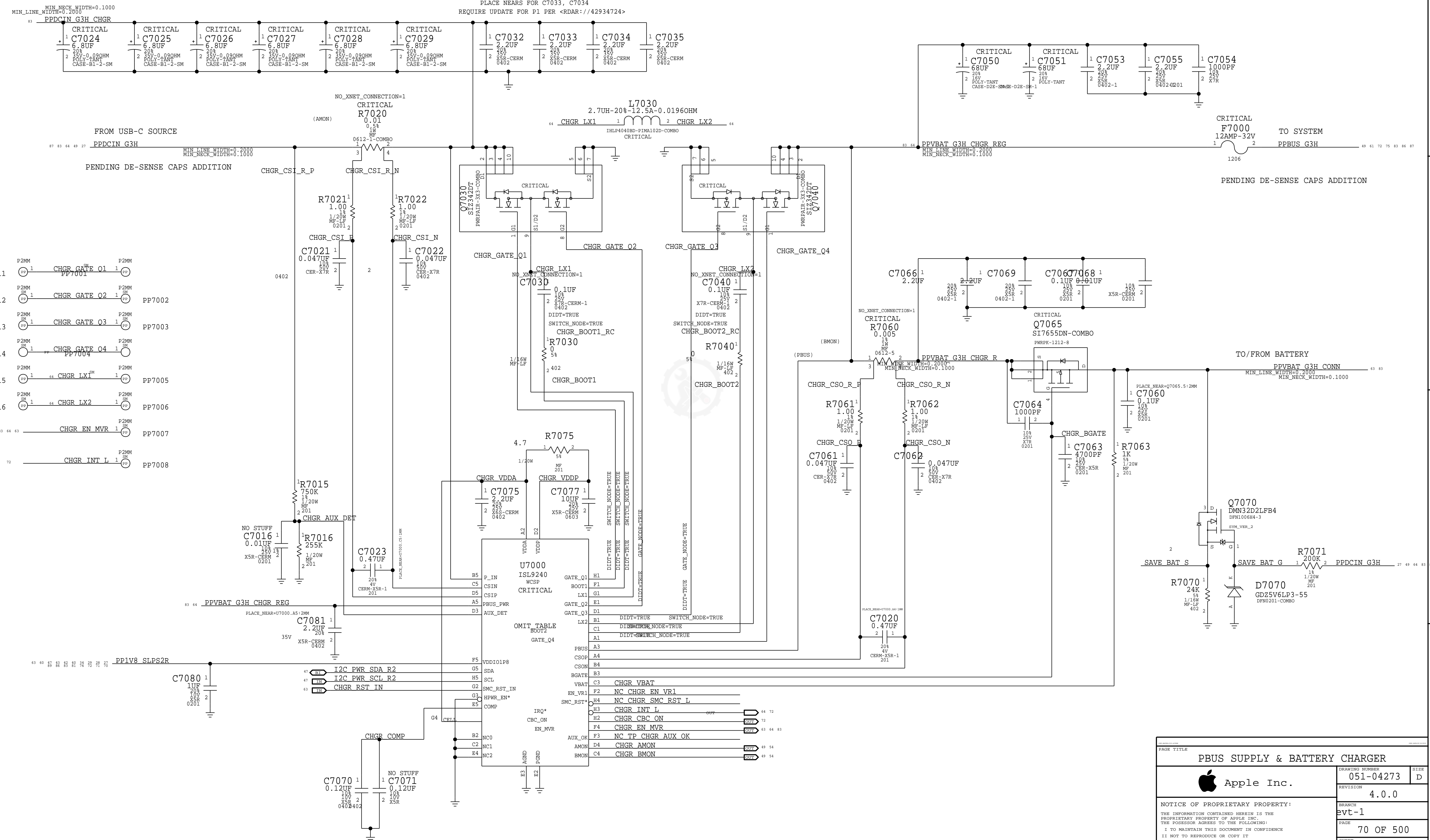
VOUT = 3.304V
6A Max Output
f = 1.25 MHz


$$V_{OUT} = 0.8 * (1 + \frac{R_A}{R_B}) = 3.304V$$

PAGE TITLE BATTERY CONN, 3V3 G3H RTC VR		
		DRAWING NUMBER 051-04273
REVISION 4.0.0		SIZE D
BRANCH evt-1		PAGE 69 OF 500
SHEET 63 OF 98		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 FURNISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED

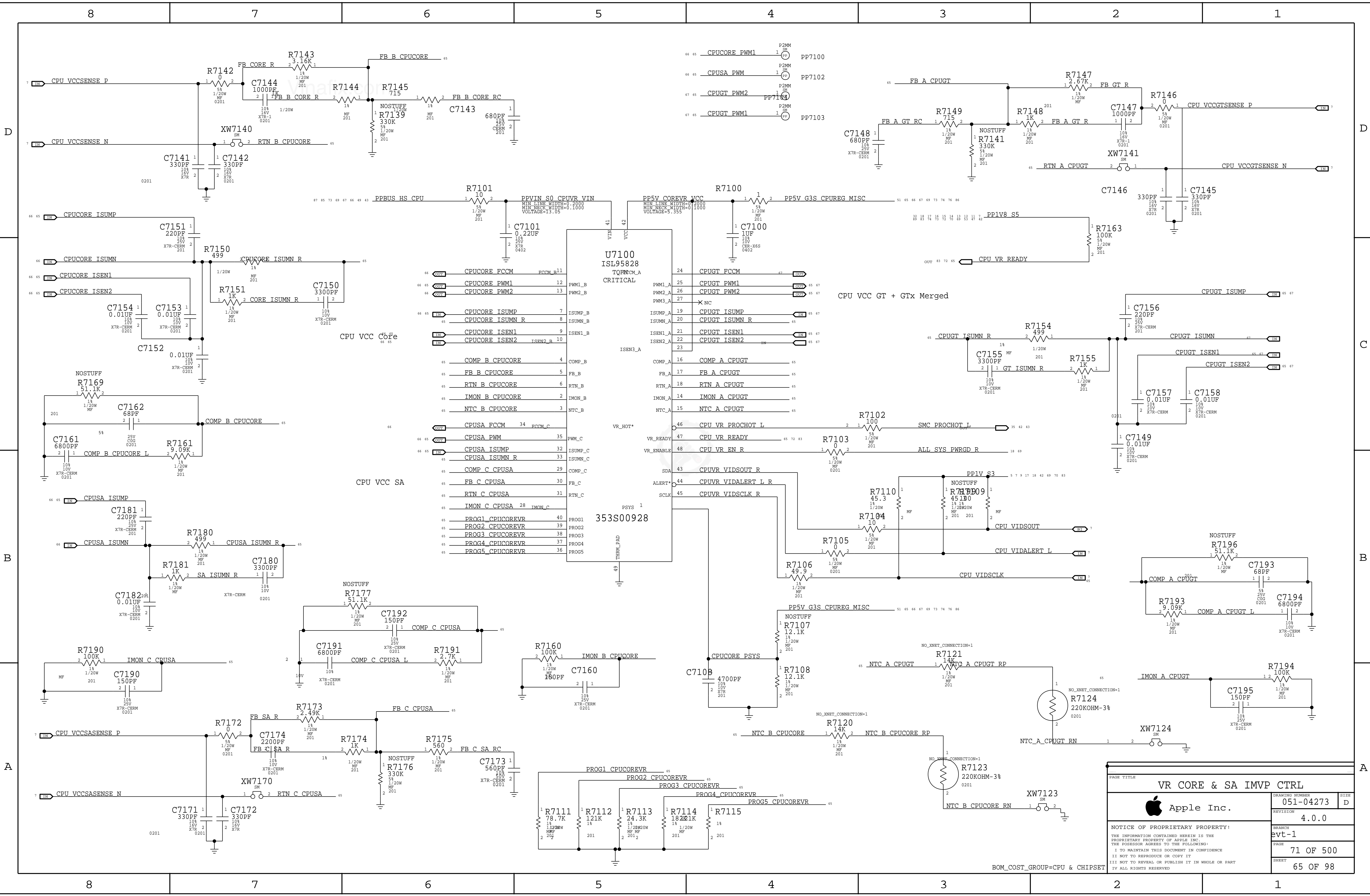
Vinafix.com

PLACE NEARS FOR C7033, C7034
REQUIRE UPDATE FOR P1 PER <RDAR://42934724>



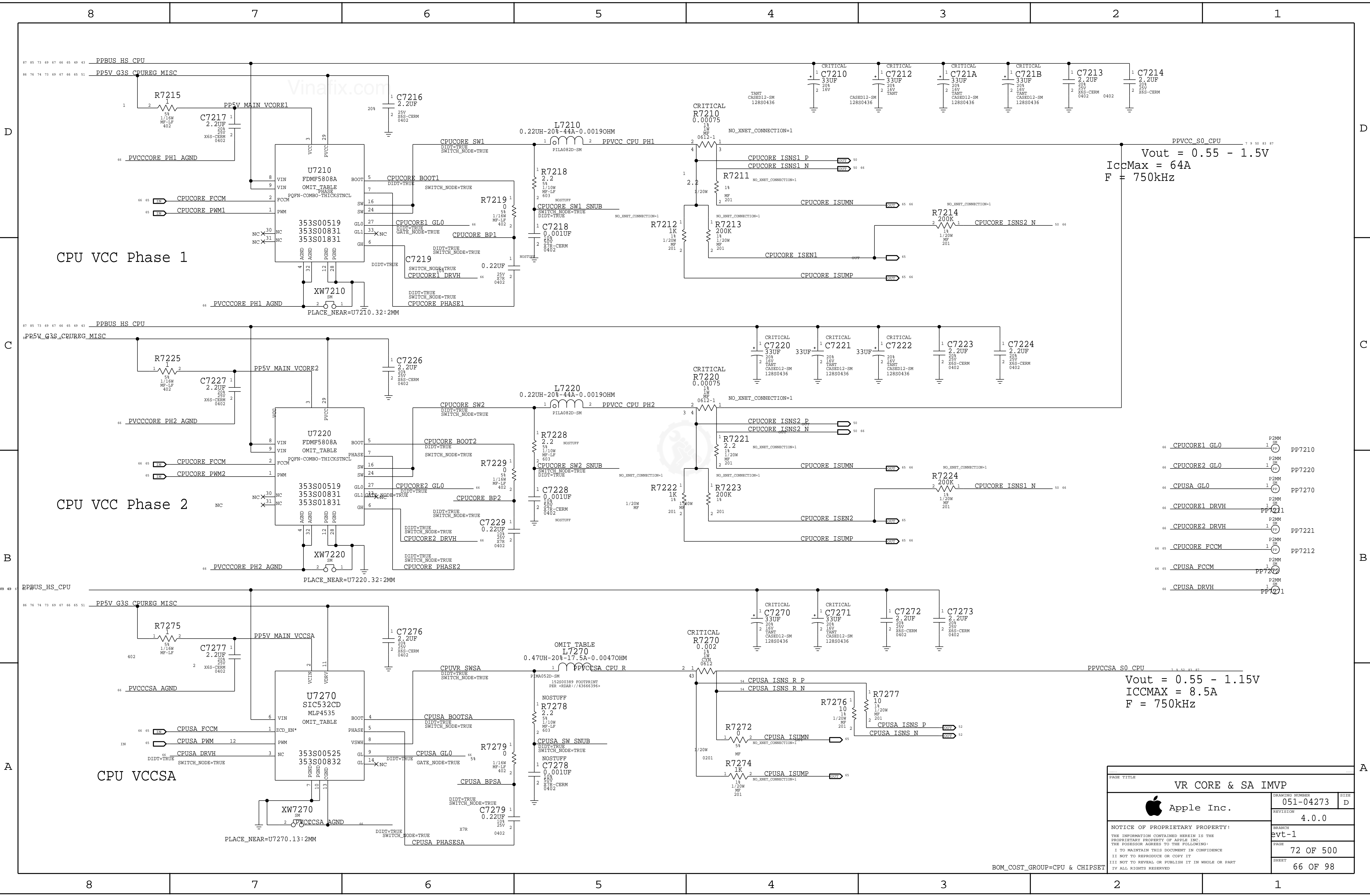
PAGE TITLE		
PBUS SUPPLY & BATTERY CHARGER		
 Apple Inc.	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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	PAGE	70 OF 500
	SHEET	64 OF 98

BOM_COST_GROUP=PLATFORM POWER



PAGE TITLE		VR CORE & SA IMVP CTRL	
		DRAWING NUMBER	051-04273
		REVISION	4.0.0
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		PAGE	71 OF 500
		SHEET	65 OF 98

BOM_COST_GROUP=CPU & CHIPSET



CPU VCC Phase 1

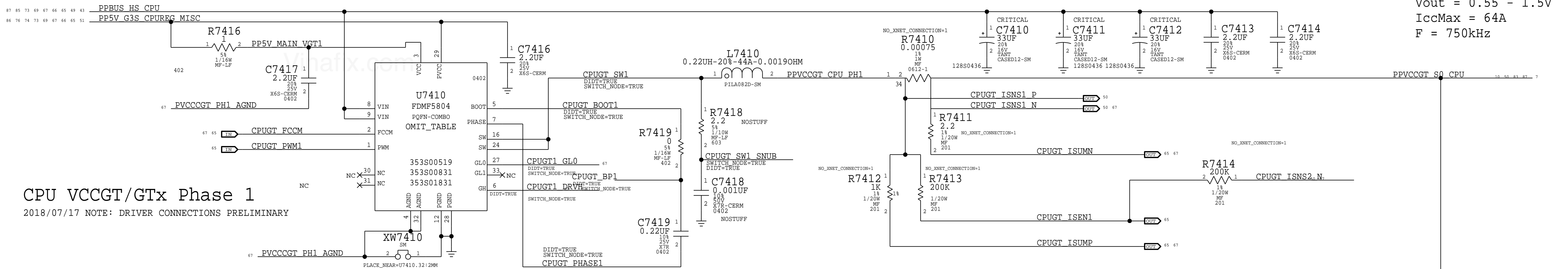
CPU VCC Phase 2

CPU VCCSA

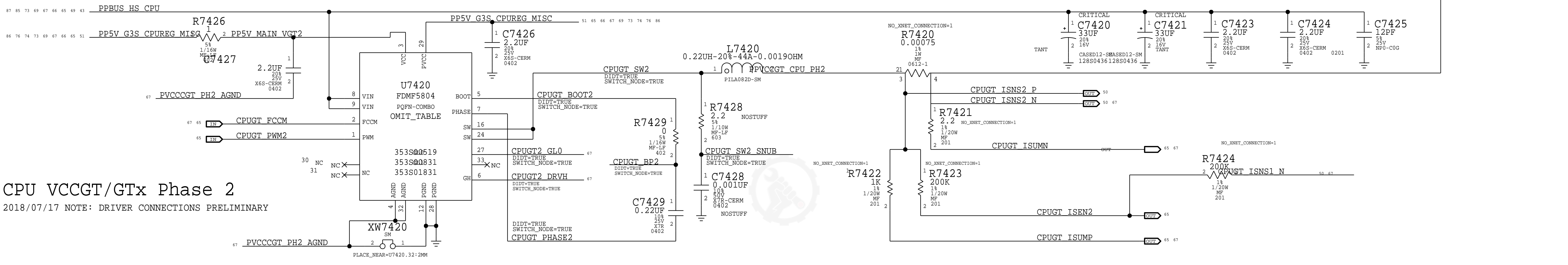
Vout = 0.55 - 1.5V
IccMax = 64A
F = 750kHz

Vout = 0.55 - 1.15V
ICCMAX = 8.5A
F = 750kHz

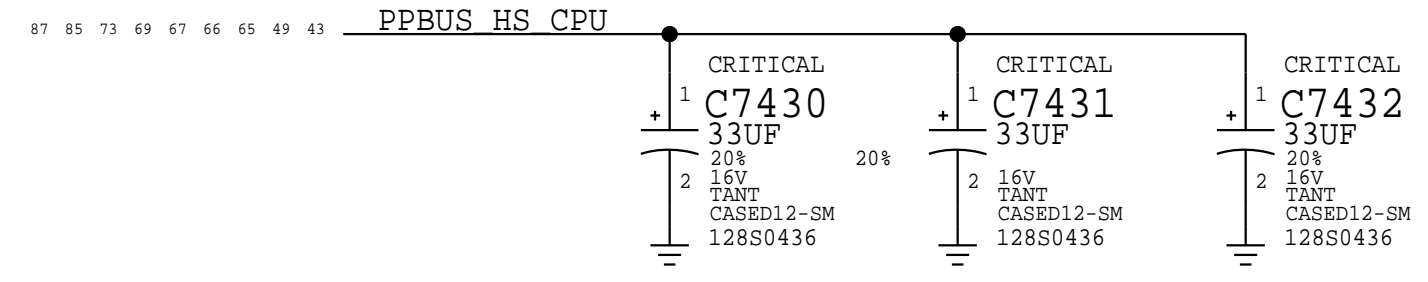
PAGE TITLE		
VR CORE & SA IMVP		
Apple Inc.		DRAWING NUMBER 051-04273
		REVISION 4.0.0
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		PAGE 72 OF 500
		SHEET 66 OF 98



CPU VCCGT/GTx Phase 1
2018/07/17 NOTE: DRIVER CONNECTIONS PRELIMINARY



CPU VCCGT/GTx Phase 2
2018/07/17 NOTE: DRIVER CONNECTIONS PRELIMINARY



- 67 CPUGT1_GLO P2MM SM 1 PP7433
- 67 CPUGT2_DRVH P2MM SM 1 PP7431
- 65 CPUGT_FCCM P2MM SM 1 PP7412
- 67 CPUGT1_DRVH P2MM SM 1 PP7411
- 67 CPUGT2_GLO SM 1 PP7430

BOM_COST_GROUP=CPU & CHIPSET

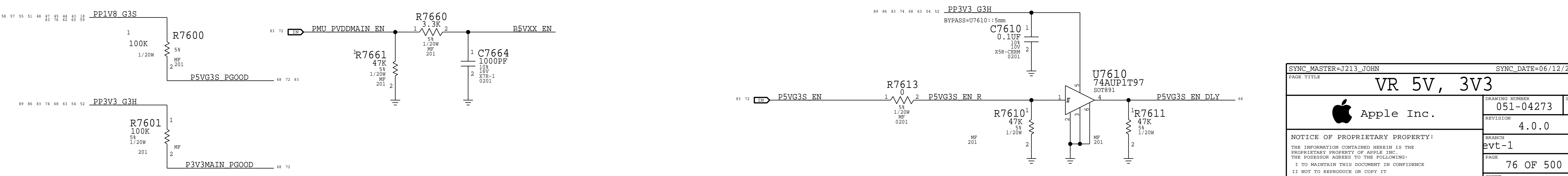
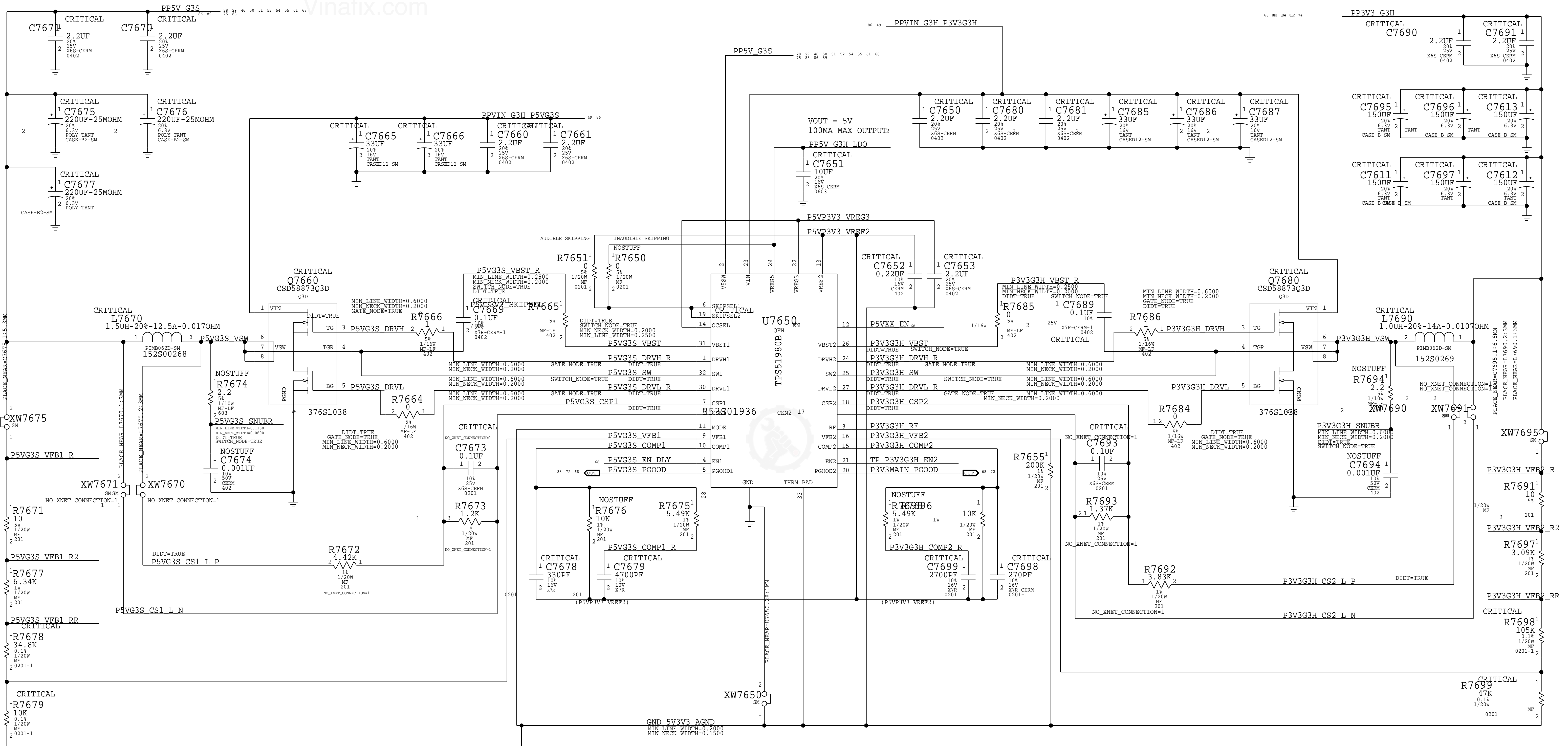
PAGE TITLE		VR GT & GTX IMVP	
Apple Inc.	DRAWING NUMBER	051-04273	SIZE
	REVISION	4.0.0	D
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		PAGE	74 OF 500
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5V G3S

Vout = 5.1V
 IOUT MAX = 7.997A
 F = 500 KHZ

3V3 G3H

Vout = 3.3V
 Iout Max = 10.9A
 F = 500 KHZ

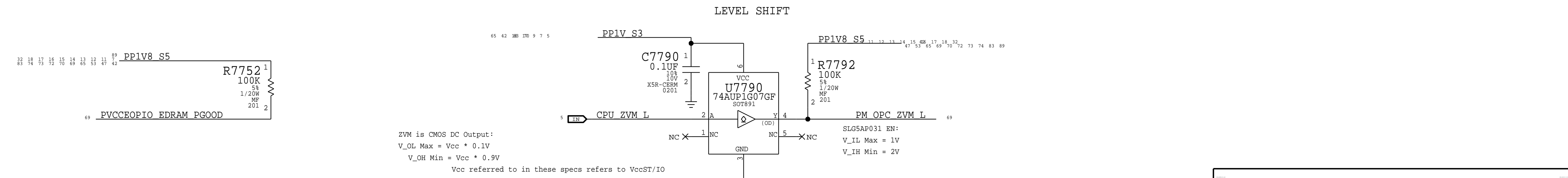
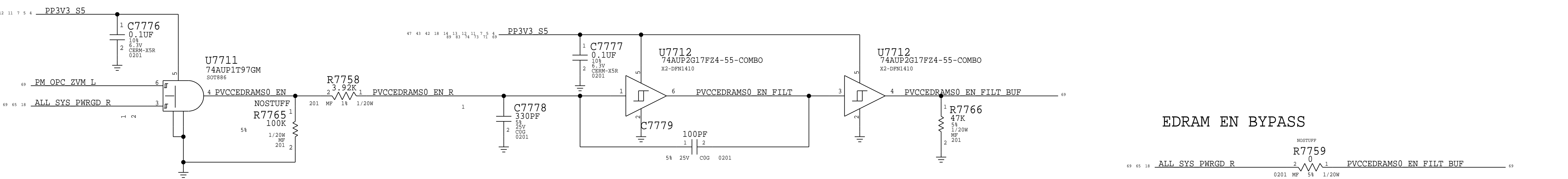
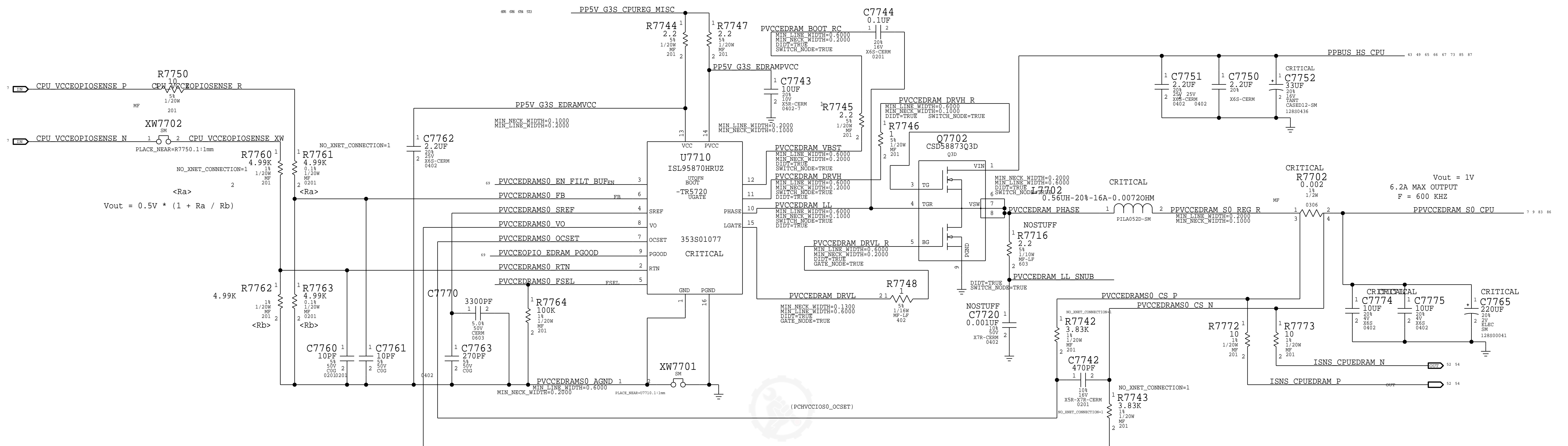


PAGE TITLE		DRAWING NUMBER		SIZE	
VR 5V, 3V3		051-04273		D	
REVISION		4.0.0		BRANCH	
evt-1				PAGE	
		76 OF 500		SHEET	
		68 OF 98			

BOM_COST_GROUP=PLATFORM POWER

1V EDRAM & EOPIO

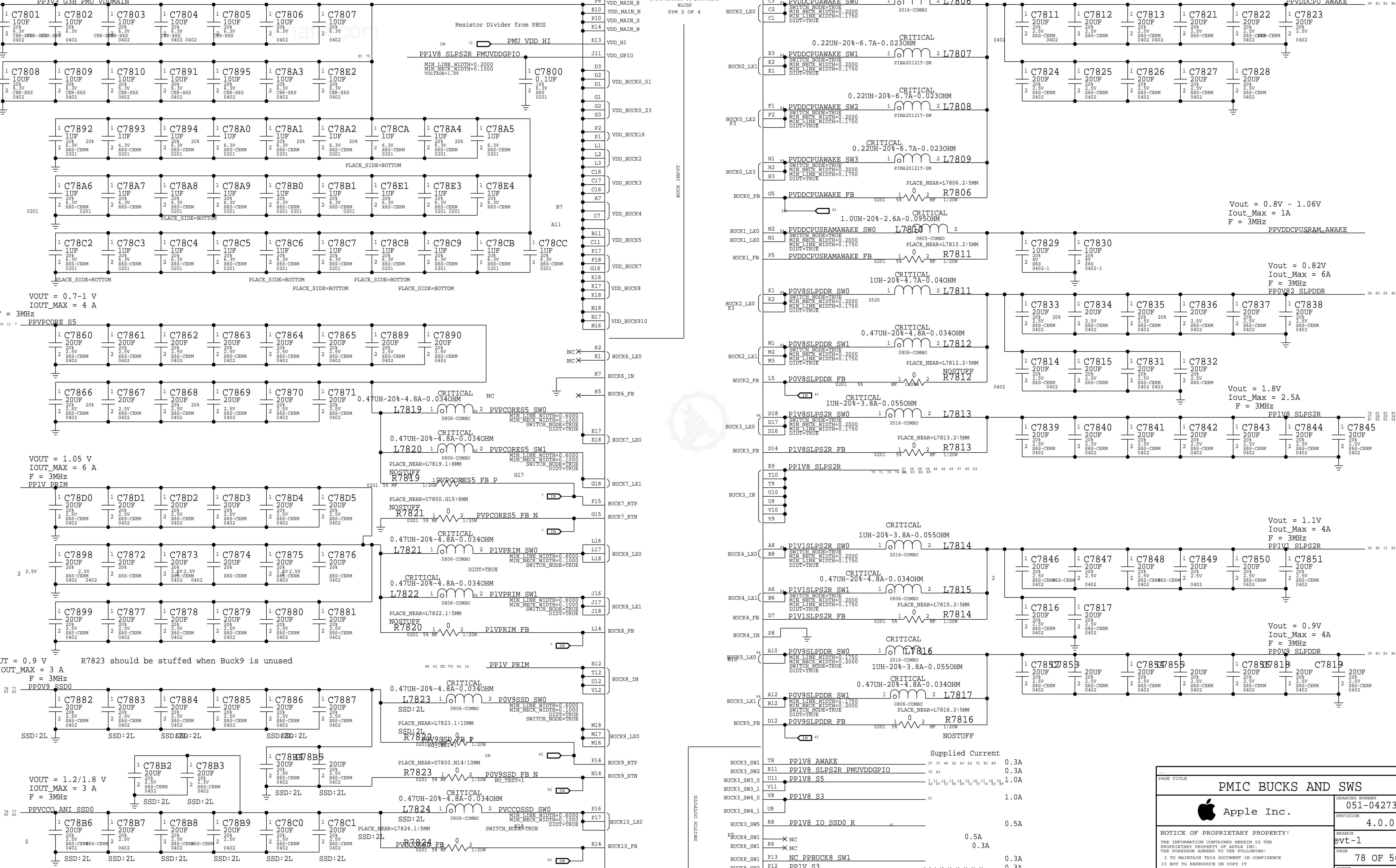
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PAGE TITLE		
VR EOPIO EDRAM		
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	PAGE	77 OF 500
	SHEET	69 OF 98

Note : Design based on Calpe ERS - D2449-A0-110-00_0v3.pdf (Radar# 24696002)
System Block Diagram - T290 Power System Architecture .v9
Optimize components for individual projects based on EDP(A)
Buck 0, 2, 5, 7, 8, 9 and 10 have option for Remote Sense.
PP3V3 G3H PMU VDDMAIN

CRITICAL
OMIT_TABLE



VOUT = 0.7-1 V
IOUT_MAX = 4 A
F = 3MHz
PPVPCORE S5

VOUT = 1.05 V
IOUT_MAX = 6 A
F = 3MHz
PPIV PRIM

VOUT = 0.9 V
IOUT_MAX = 3 A
F = 3MHz
PP0V9 SSD0

VOUT = 1.2/1.8 V
IOUT_MAX = 3 A
F = 3MHz
PPVCCO ANI SSD0

Vout = 0.625V - 1.06V
Iout_Max = 13.4A
F = 2MHz & 4MHz
PPVDDCPU AWAKE

Vout = 0.8V - 1.06V
Iout_Max = 1A
F = 3MHz
PPVDDCPUSRAM AWAKE

Vout = 0.82V
Iout_Max = 6A
F = 3MHz
PP0V8 SLPDDR

Vout = 1.8V
Iout_Max = 2.5A
F = 3MHz
PPIV8 SLPS2R

Vout = 1.1V
Iout_Max = 4A
F = 3MHz
PPIV1 SLPS2R

Vout = 0.9V
Iout_Max = 4A
F = 3MHz
PP0V9 SLPDDR

Supplied Current

BUCK3_SW1	PPIV8 AWAKE	27 37 40 42 43 62 72 83 89	0.3A
BUCK3_SW2	PPIV8 SLPS2R PMUVDGGPIO	70 83	0.3A
BUCK3_SW3_0	PPIV8 S5	12 11 13 13 14 15 16 17 18 33 39	1.0A
BUCK3_SW4_0	PPIV8 S3	61	1.0A
BUCK3_SW4_1	U8		
BUCK3_SW5	PPIV8 IO SSD0 R		0.5A
BUCK6_SW1	NC		0.5A
BUCK8_SW1	NC		0.3A
BUCK8_SW2	PPBUCK8 SW1		0.3A
	PPIV S3	5 7 9 17 18 42 65 69 83	0.3A

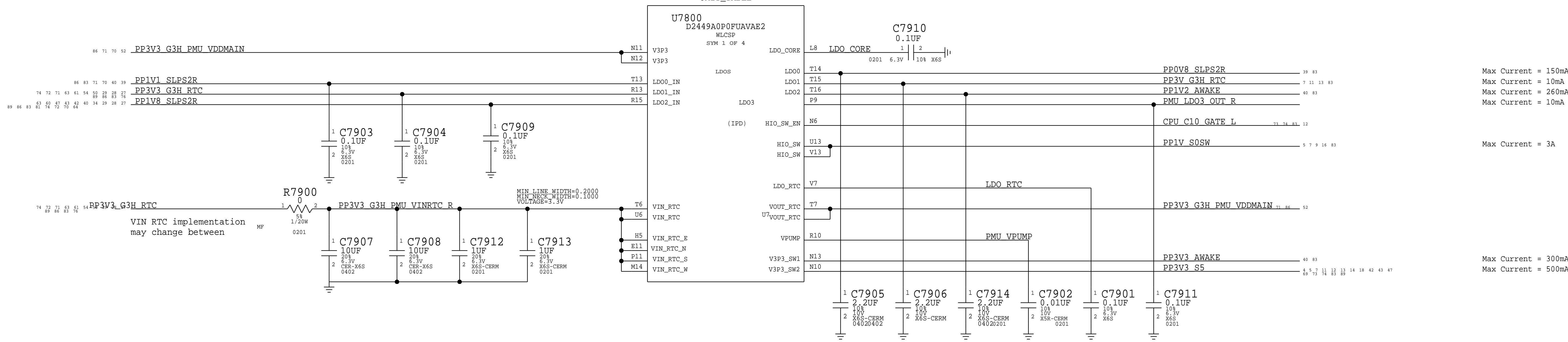
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PAGE TITLE		PMIC BUCKS AND SWS	
DRAWING NUMBER		051-04273	SIZE
REVISION		4.0.0	D
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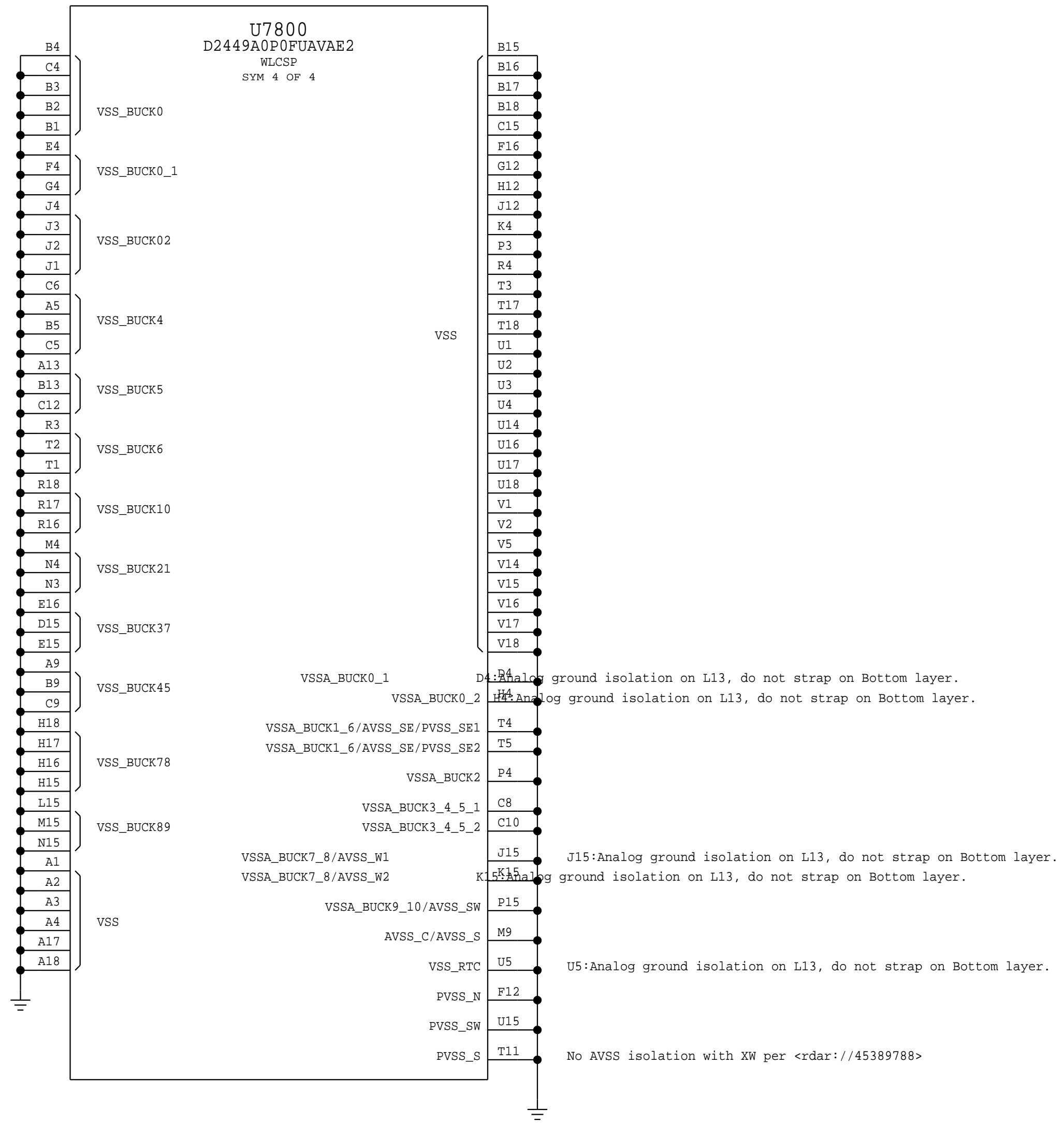
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CRITICAL OMIT_TABLE

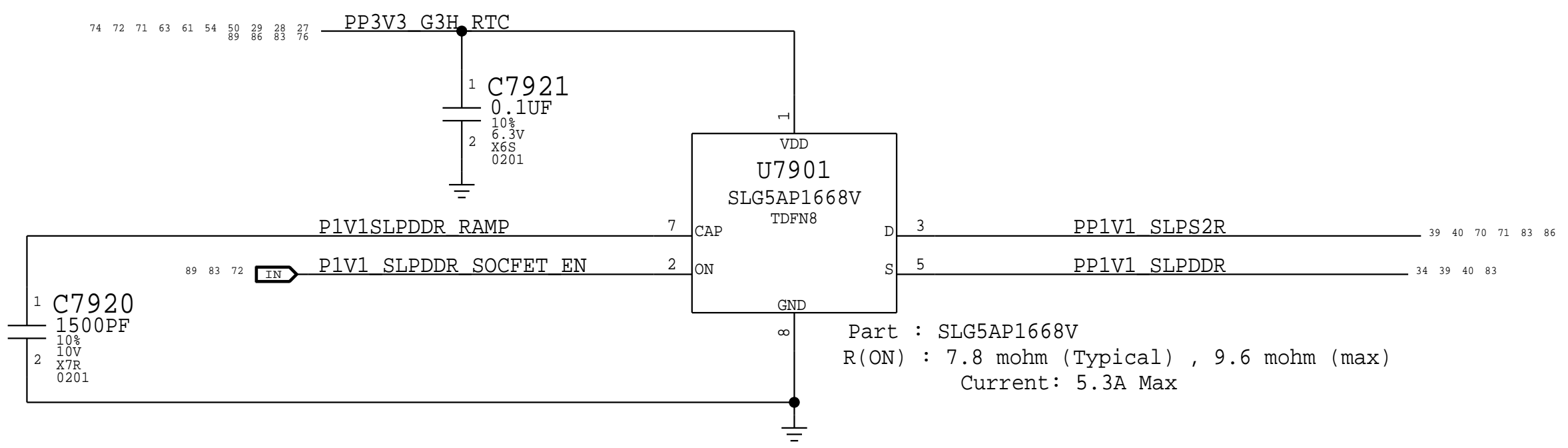


Max Current = 150mA
 Max Current = 10mA
 Max Current = 260mA
 Max Current = 10mA
 Max Current = 3A
 Max Current = 300mA
 Max Current = 500mA

CRITICAL OMIT_TABLE



1.1V SLPDDR SWITCH

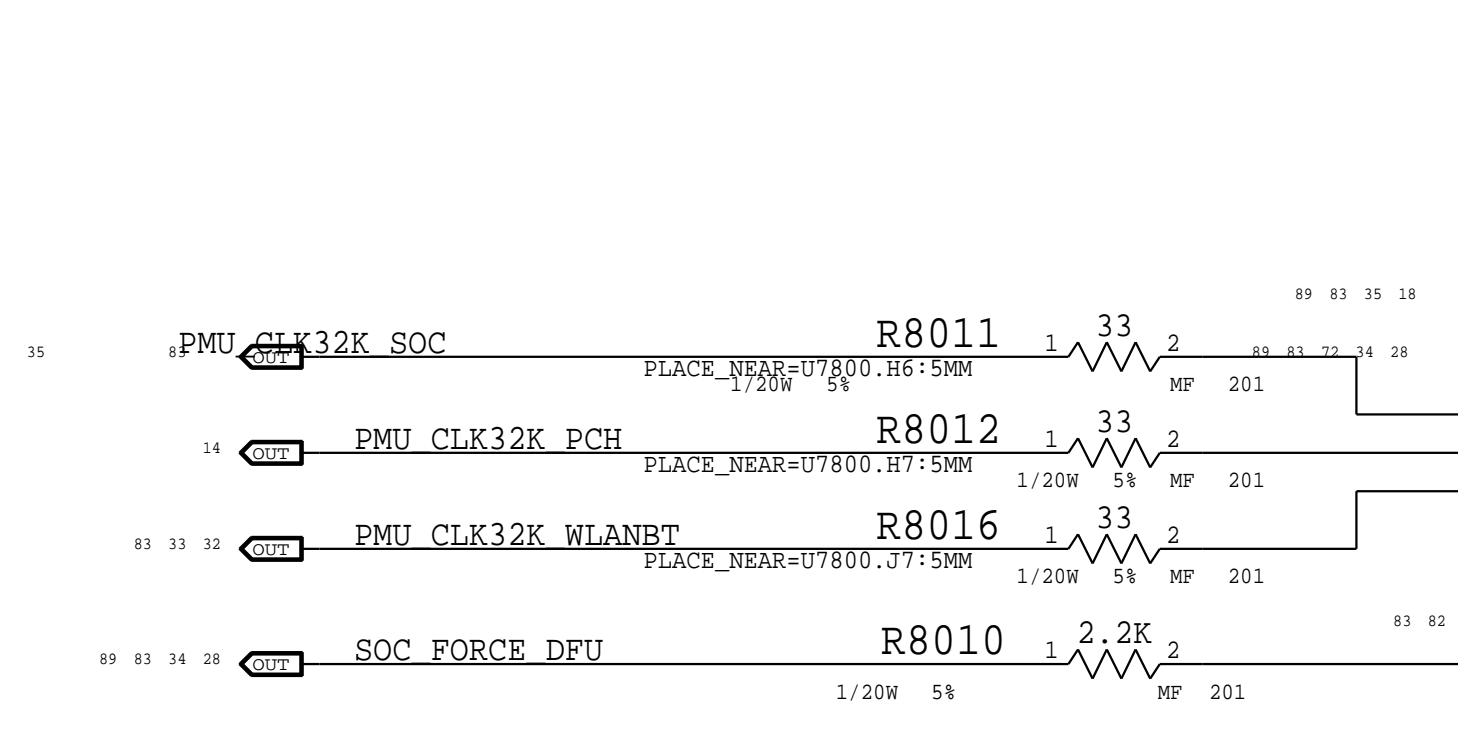
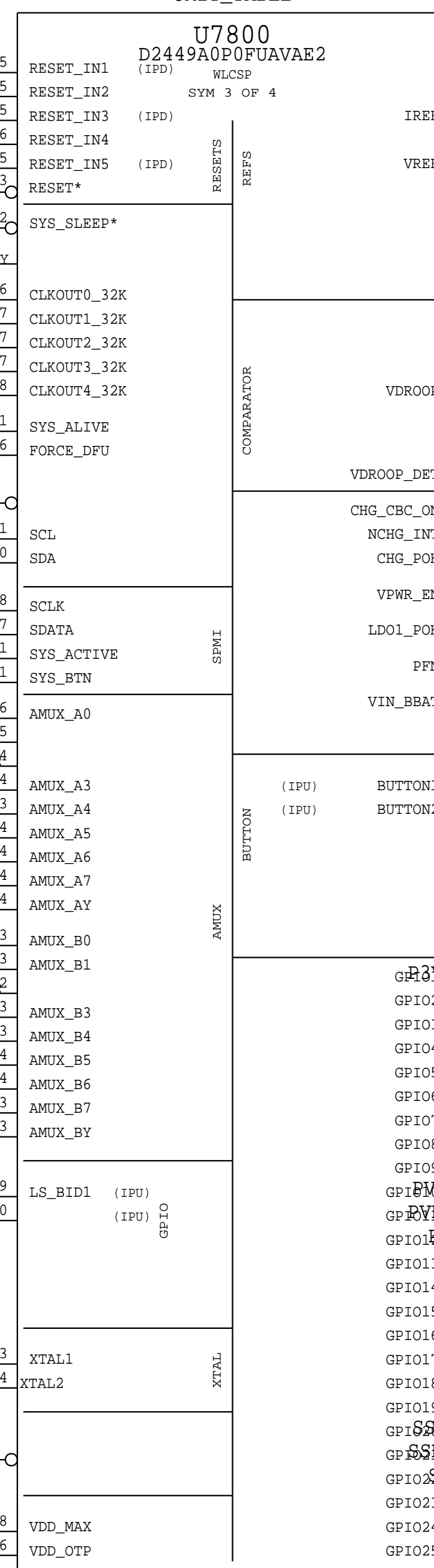


Part : SLG5AP1668V
 R(ON) : 7.8 mohm (Typical) , 9.6 mohm (max)
 Current: 5.3A Max

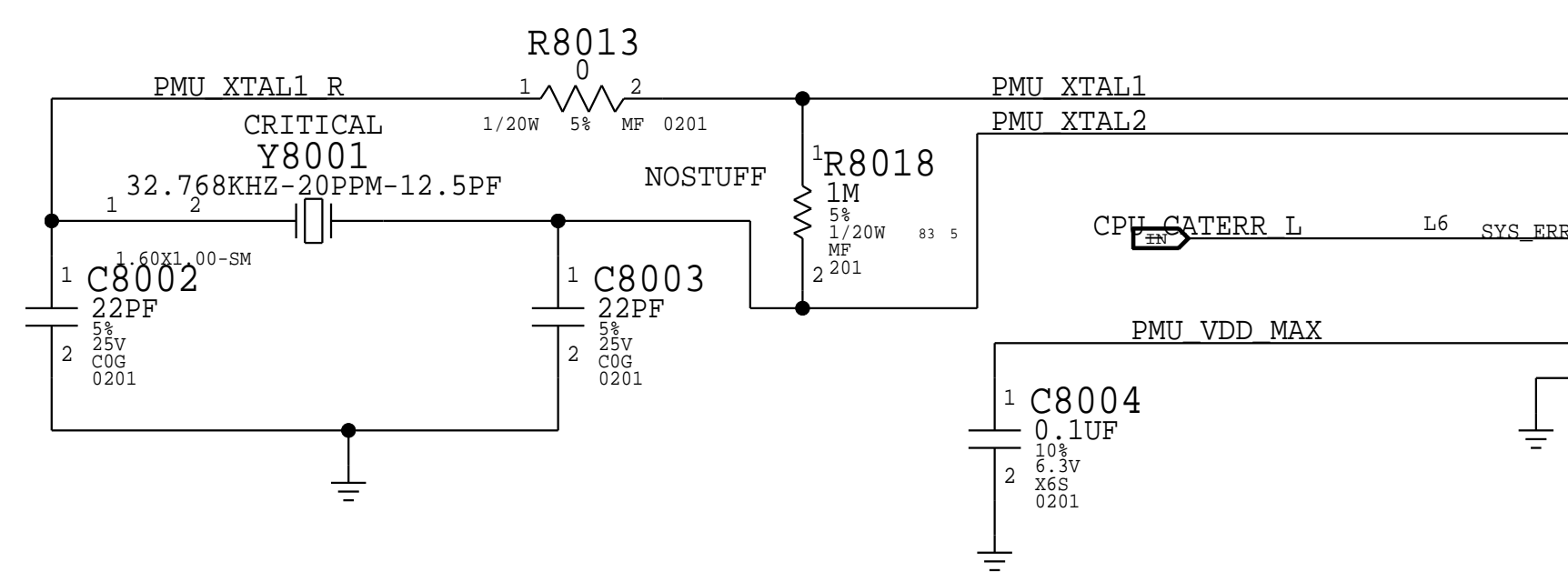
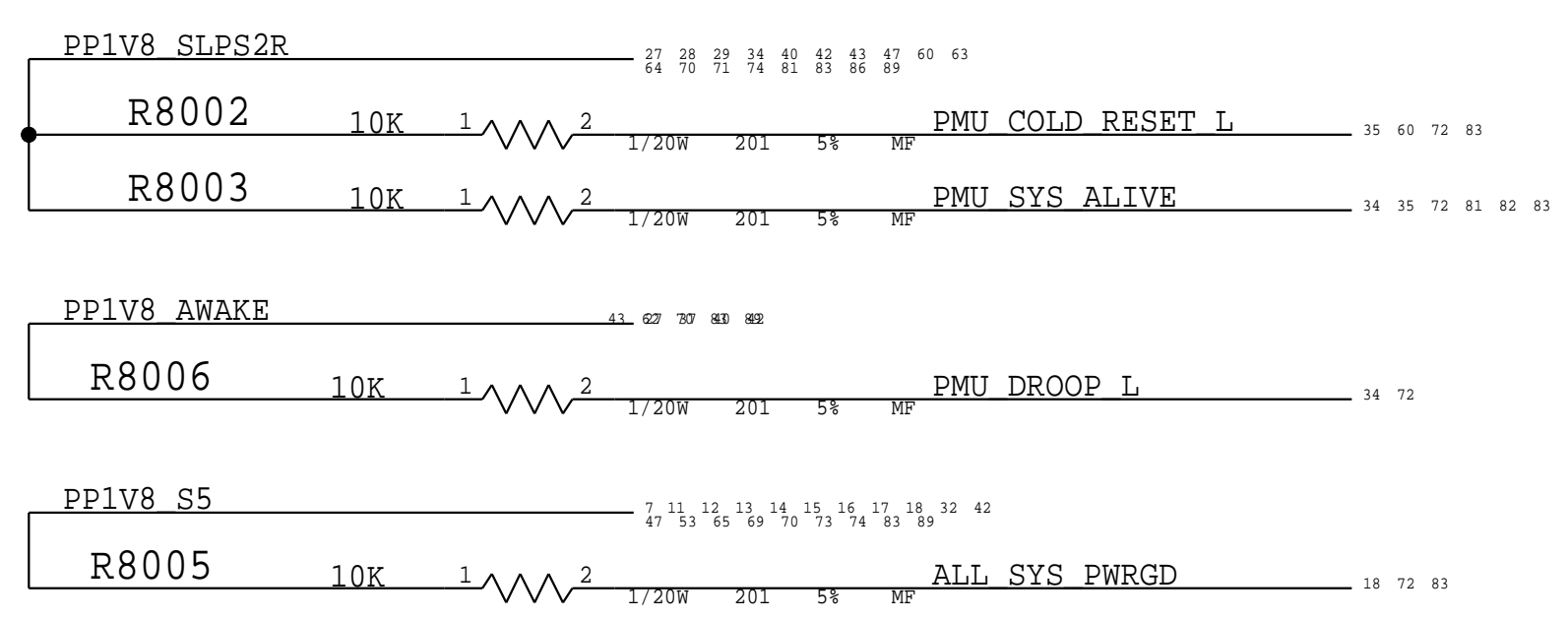
PAGE TITLE PMIC LDOS		
Apple Inc.	DRAWING NUMBER 051-04273	SIZE D
	REVISION 4.0.0	BRANCH evt-1
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		SHEET 71 OF 98

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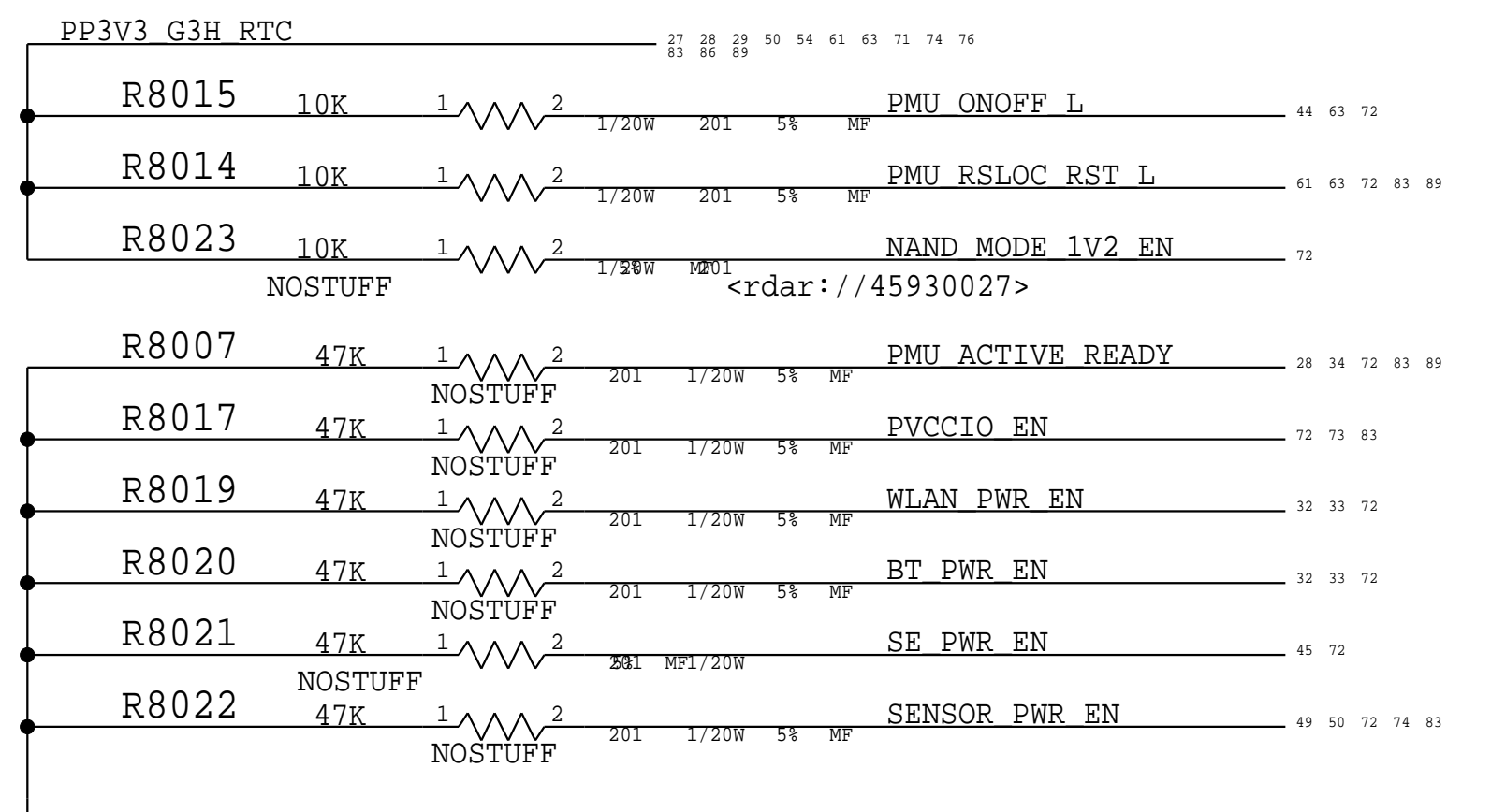
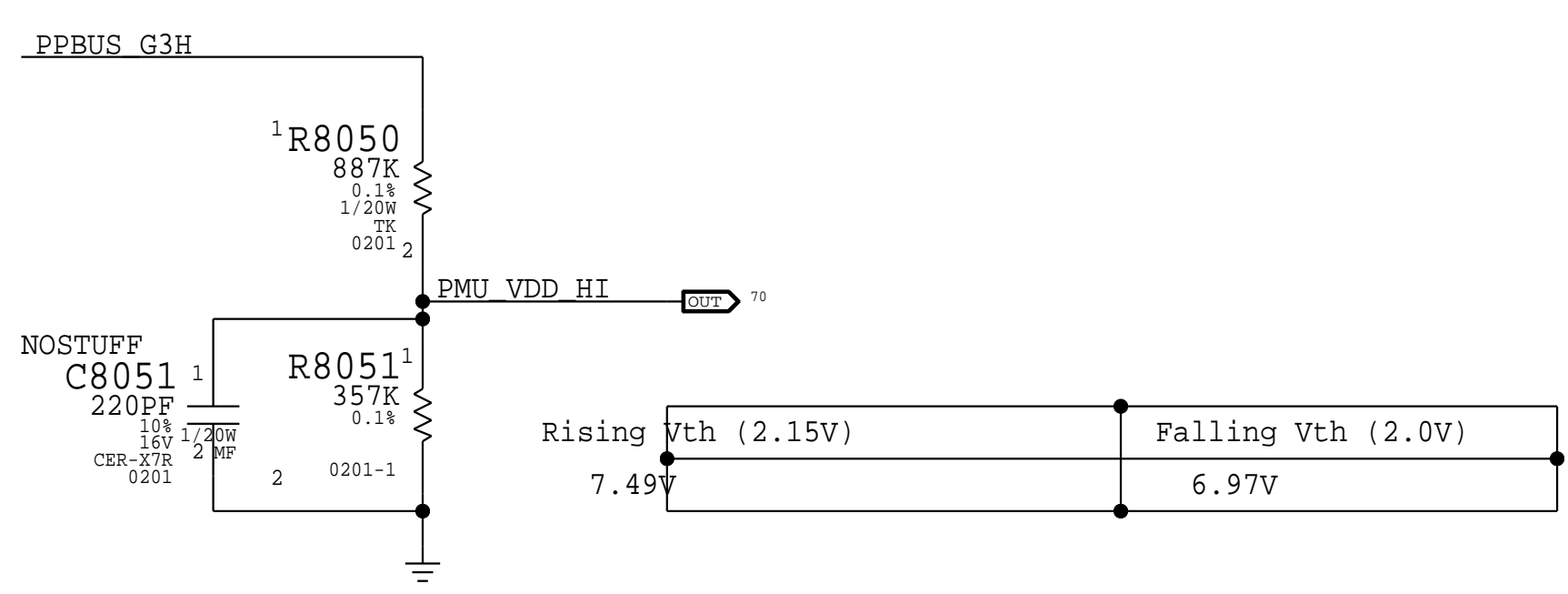
CRITICAL OMIT_TABLE



Caution : AMUX programmed with Gain 1 have inputs less than 1.5V



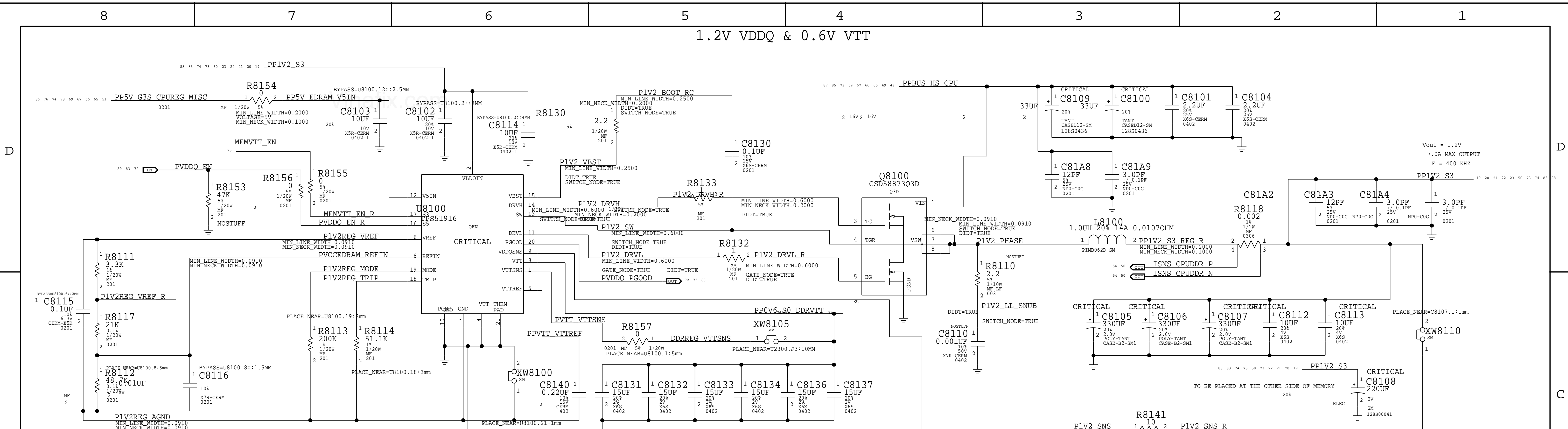
VDD_HI Threshold Select



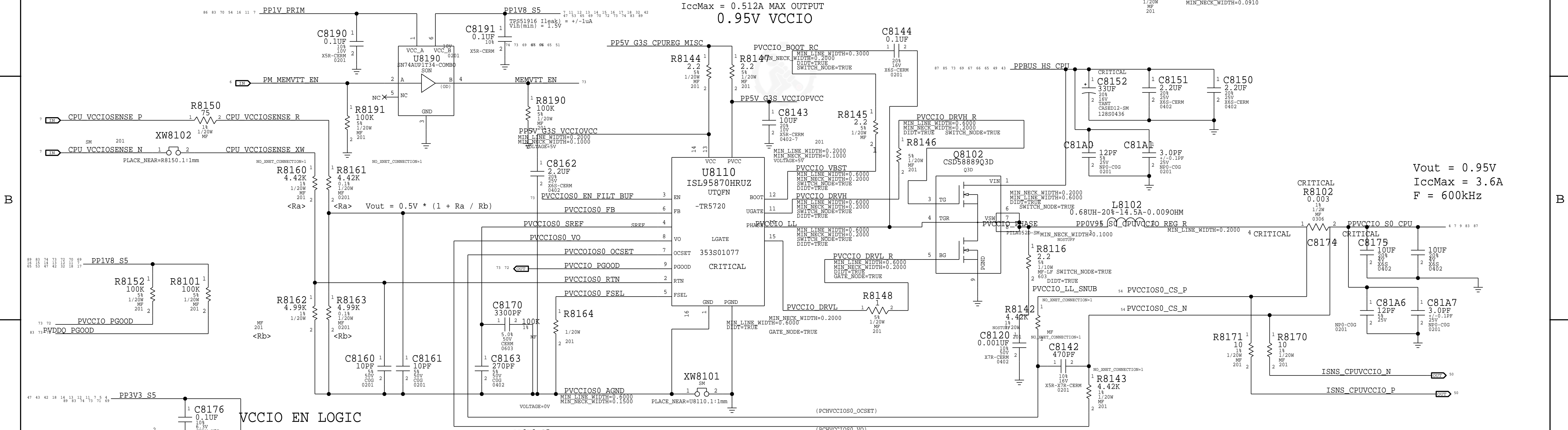
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PAGE TITLE		
PMIC GPIOs & CONTROL		
	DRAWING NUMBER	051-04273
	REVISION	4.0.0
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	PAGE	80 OF 500
	SHEET	72 OF 98

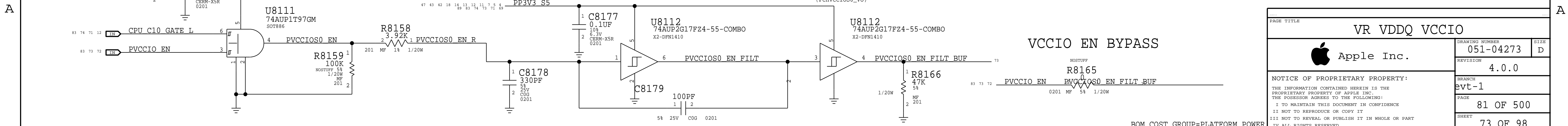
1.2V VDDQ & 0.6V VTT



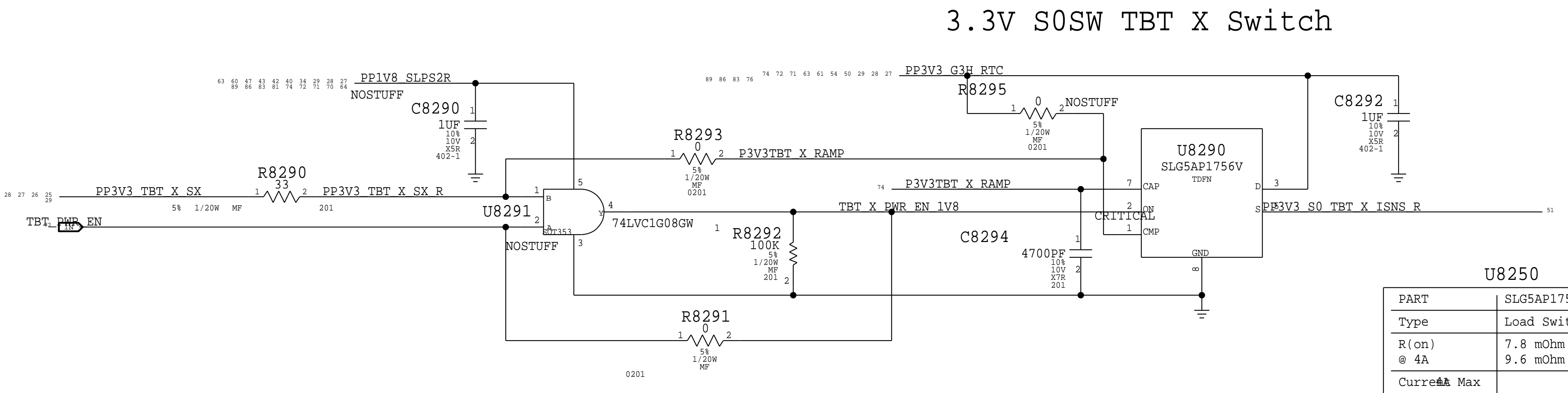
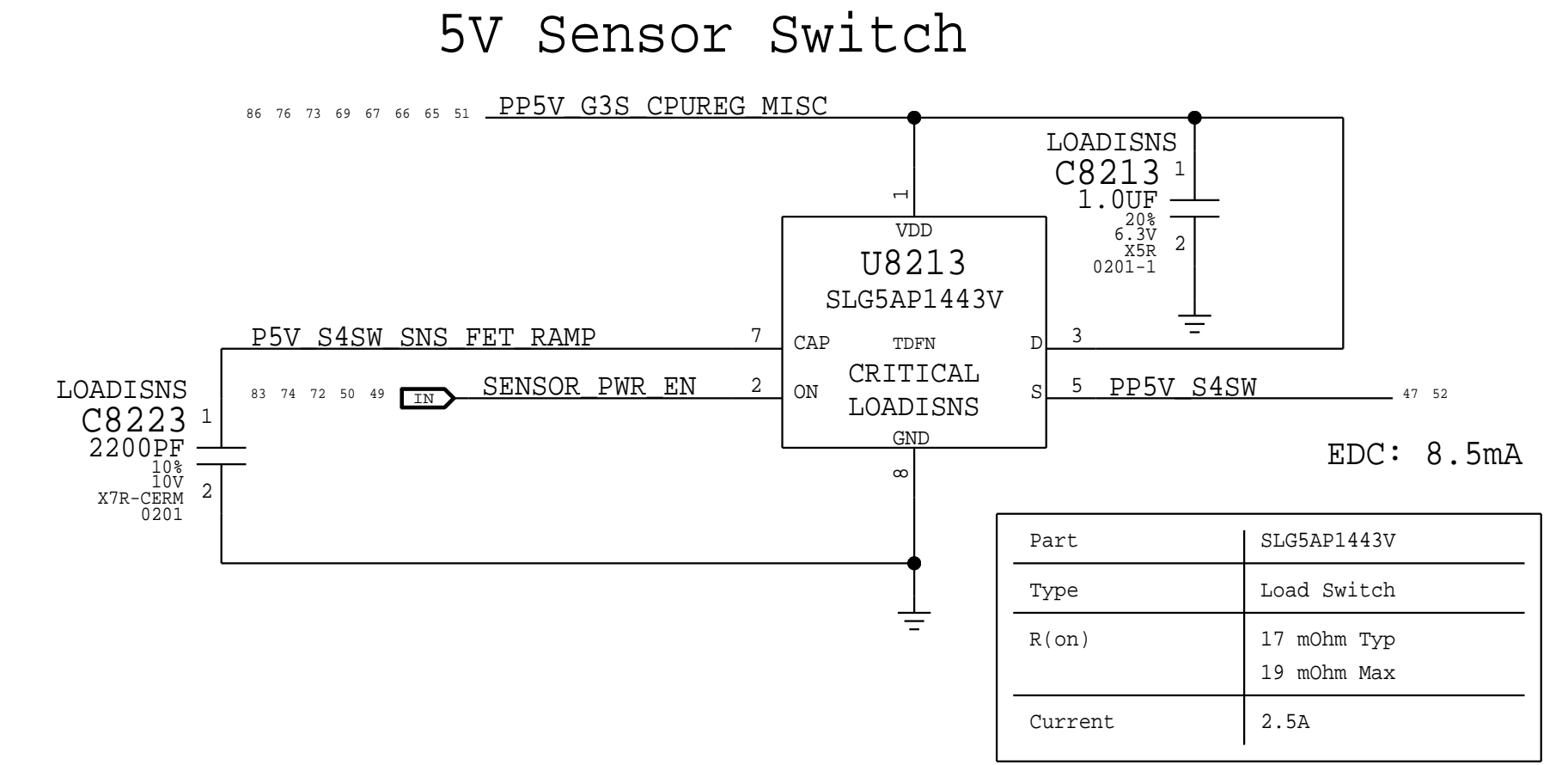
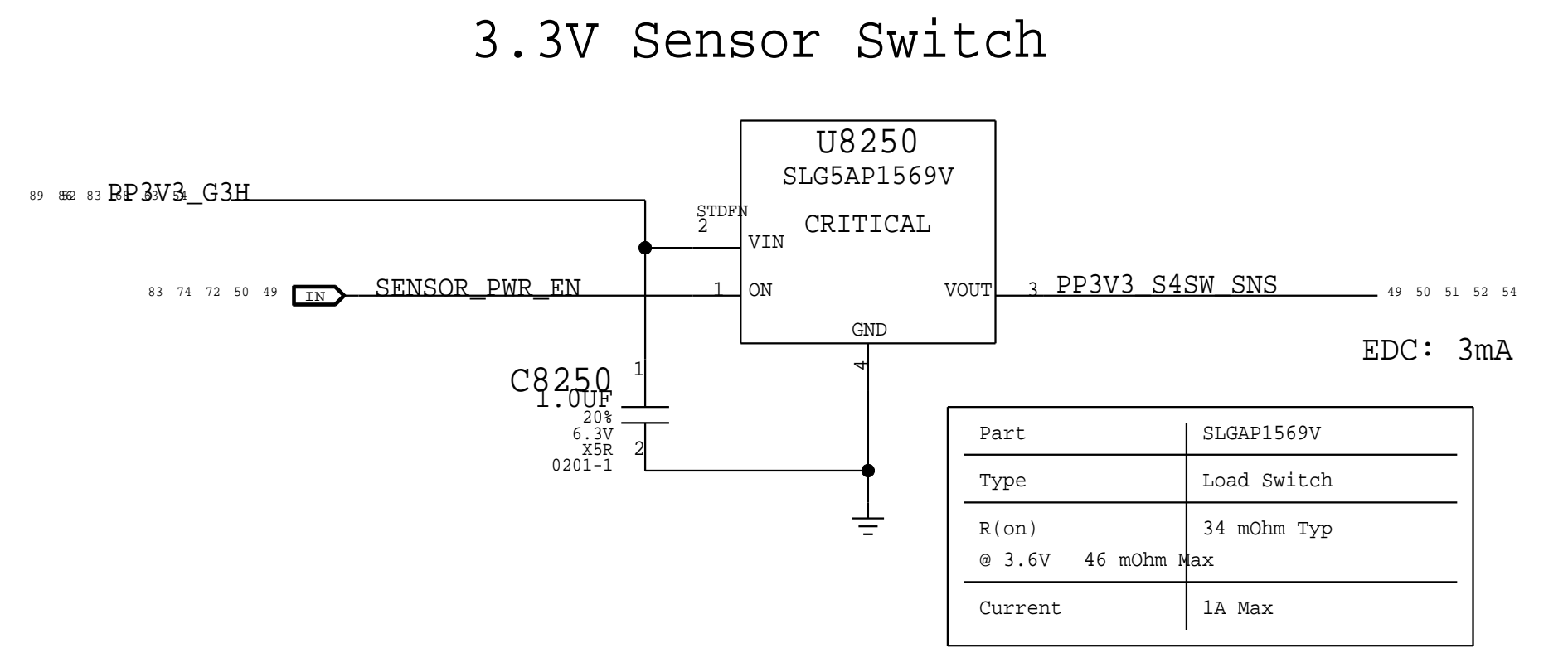
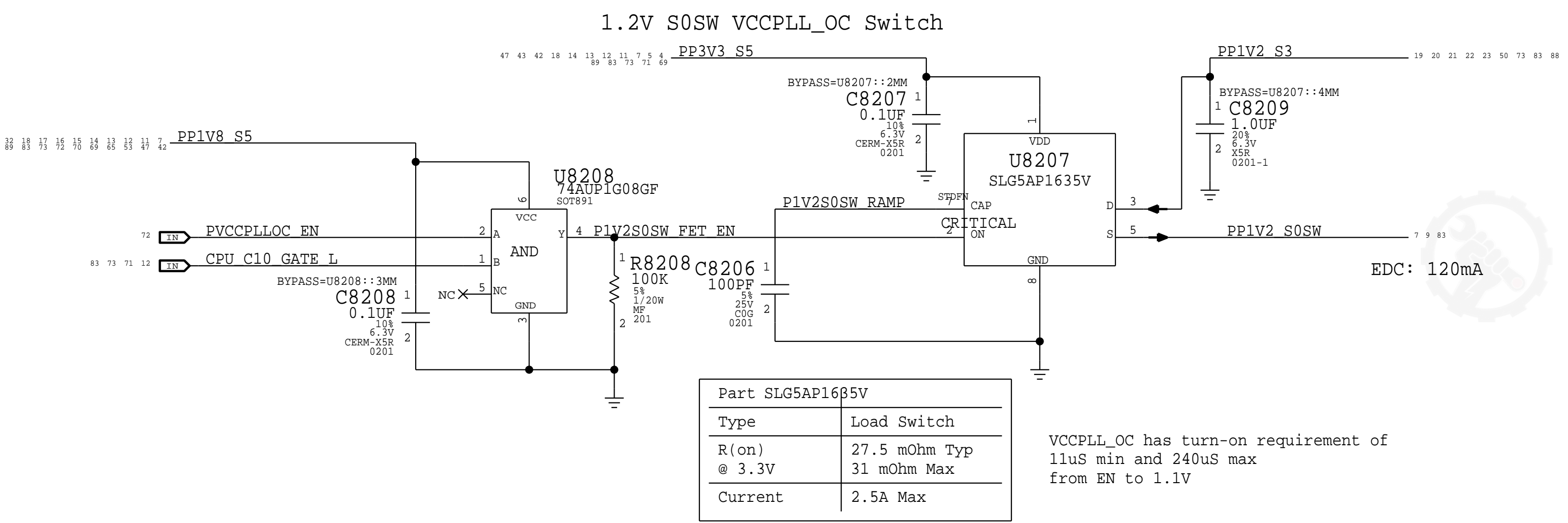
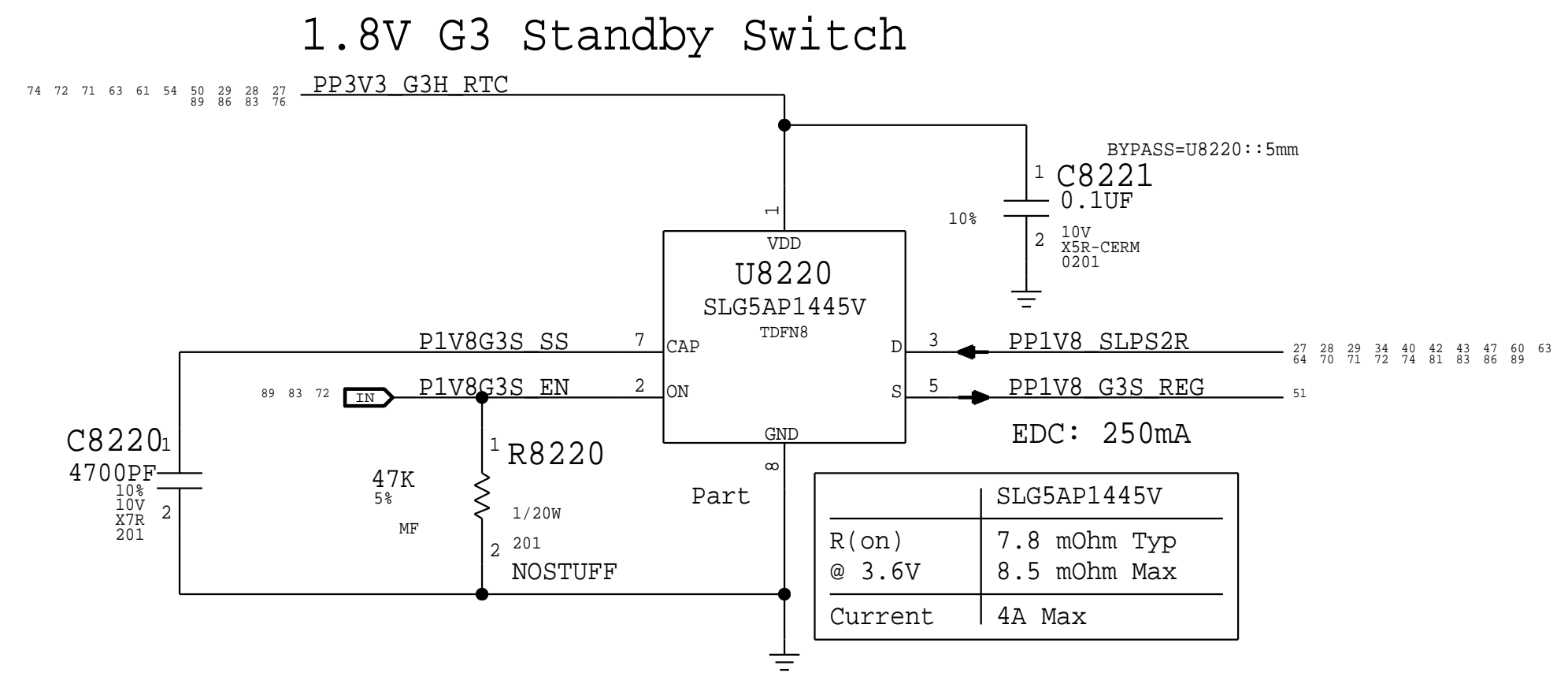
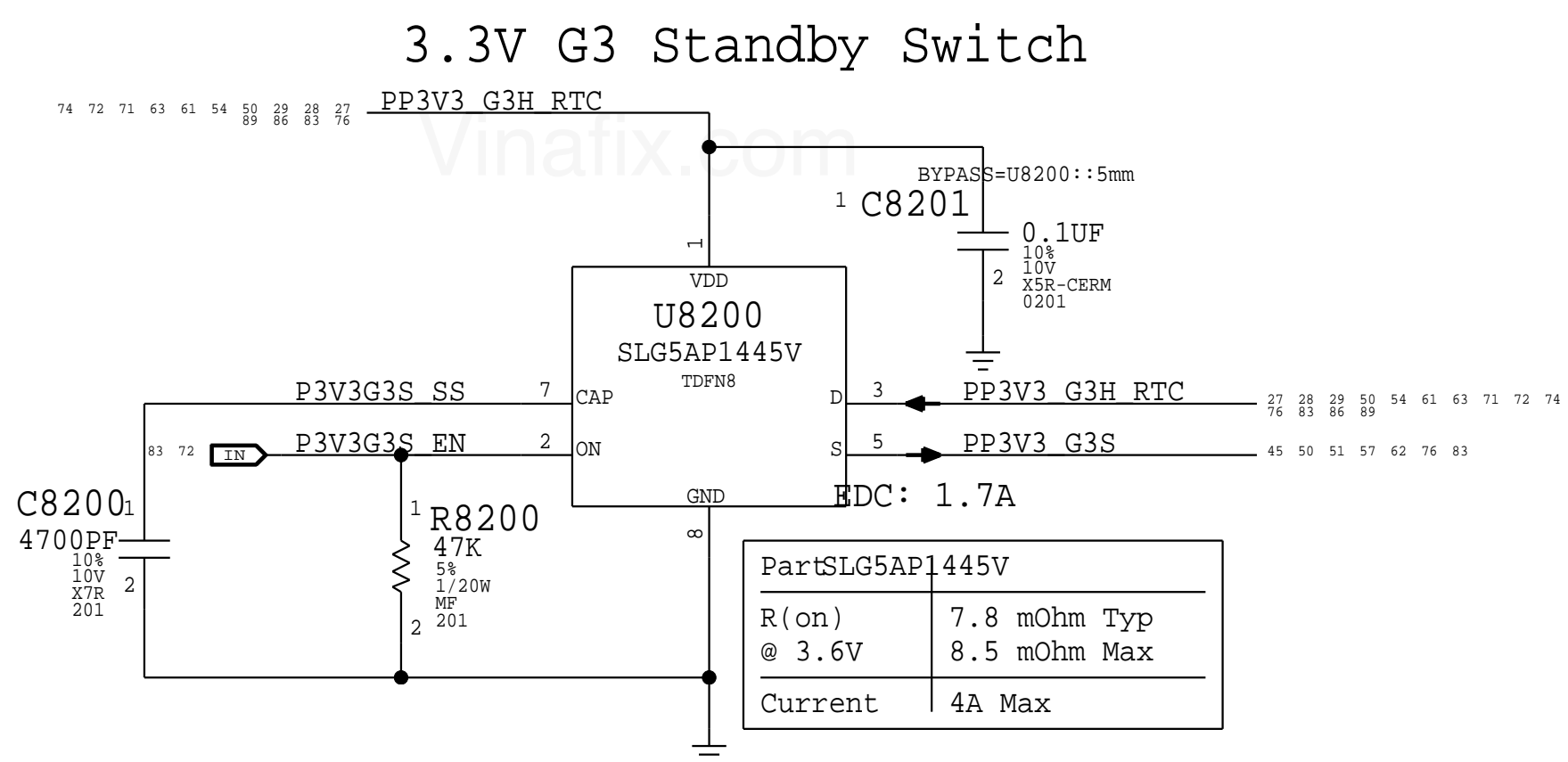
VTT Vout = 0.6V
IccMax = 0.512A MAX OUTPUT
0.95V VCCIO



VCCIO EN BYPASS

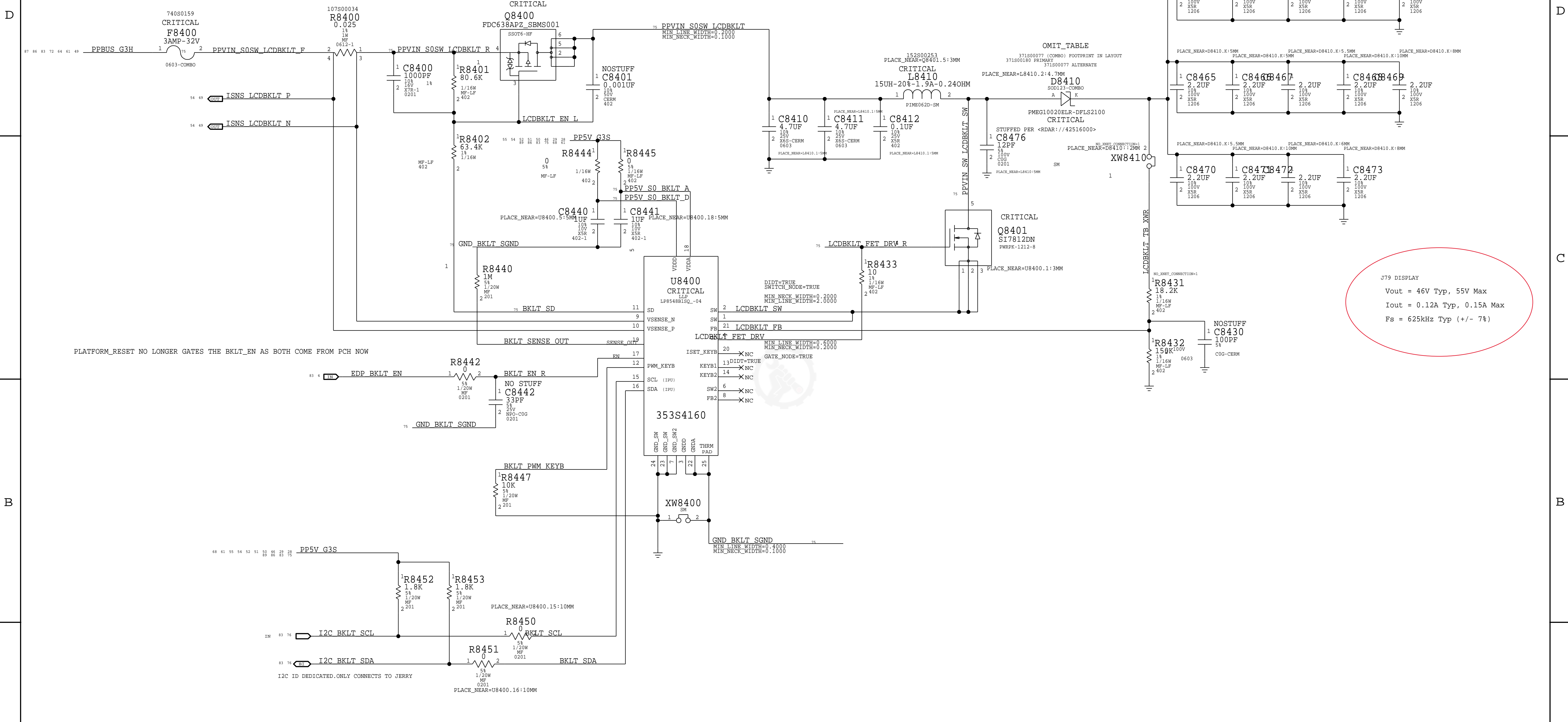


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VR VDDQ VCCIO		
Apple Inc.		DRAWING NUMBER 051-04273
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BOM_COST_GROUP=PLATFORM_POWER		BRANCH evt-1
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Power FETs		
	DRAWING NUMBER	051-04273
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	PAGE	82 OF 500
	SHEET	74 OF 98

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PLATFORM_RESET NO LONGER GATES THE BKLKT_EN AS BOTH COME FROM PCH NOW

J79 DISPLAY
 $V_{out} = 46V$ Typ, $55V$ Max
 $I_{out} = 0.12A$ Typ, $0.15A$ Max
 $F_s = 625kHz$ Typ (+/- 7%)

LINE WIDTHS	PBUS LINE WIDTHS	LCD BKLT LINE WIDTHS
PP5V_S0_BKLT_A	PPVIN_S0SW_LCDBKLT_F	LCDBKLT_FET_DRV_R
PP5V_S0_BKLT_D	PPVIN_S0SW_LCDBKLT_R	PPVIN_SW_LCDBKLT_SW
BKLT_SD	PPVIN_S0SW_LCDBKLT	PPVOUT_S0_LCDBKLT

DESCRIPTION	QTY	REFERENCE DESIGNATOR	DESCRIPTION	BOM OPTION
DIODE, SCHOTTKY, 100V, 2A, SOD123	1	D8410	CRITICAL	

ONLY THE ALTERNATE HAS THE COMBO FOOTPRINT, BOM TABLE NEEDED TO USE ALTERNATE FOOTPRINT
 BUT SET PRIMARY APN AS 371S00180

BOM_COST_GROUP=DISPLAY

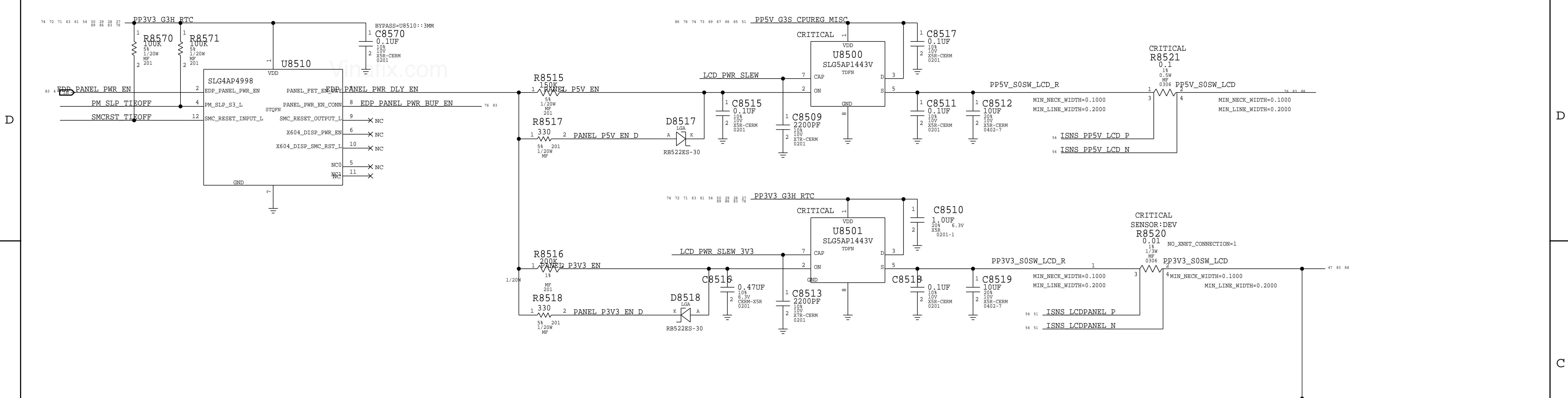
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PAGE TITLE: LCD BACKLIGHT DRIVER

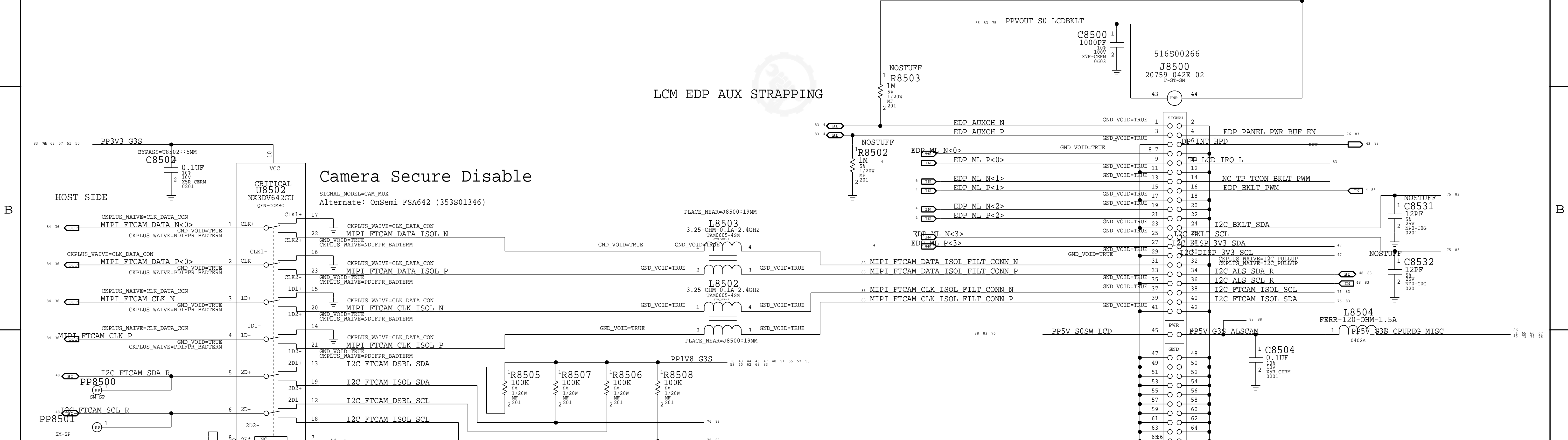
Apple Inc.

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SHEET: 75 OF 98	

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LCM EDP AUX STRAPPING



Camera Secure Disable

I2C PULL VALUES TO BE DETERMINED FROM CHARACTERIZATION

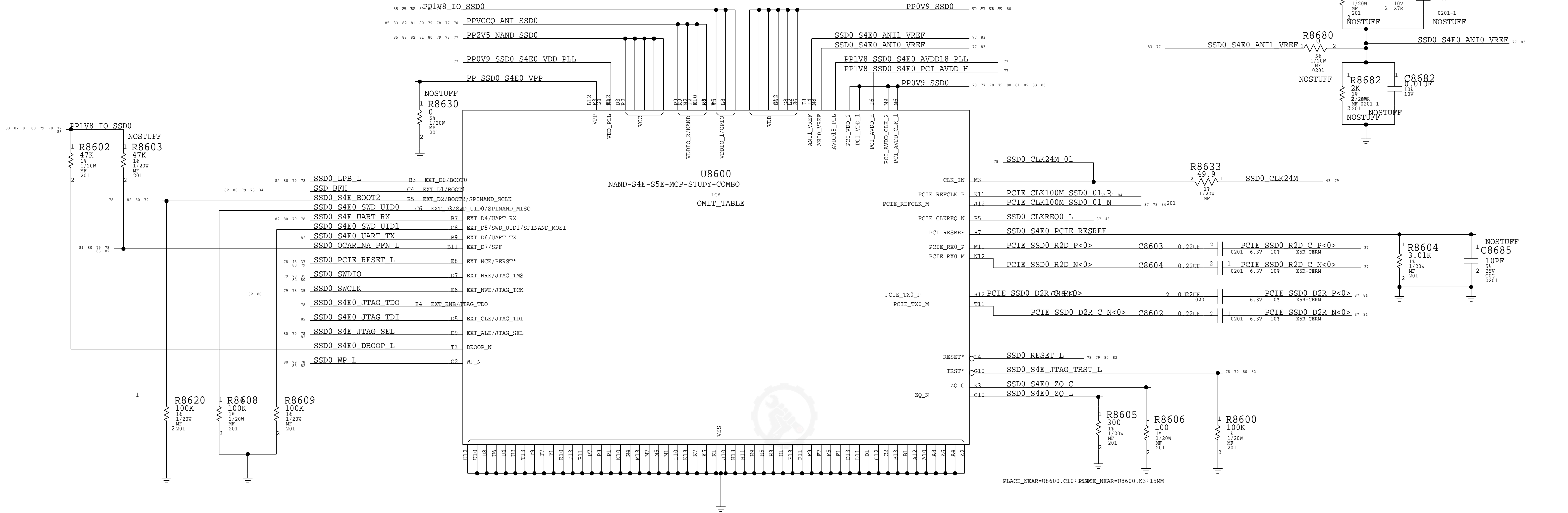
VALUE	STATE
L	Camera Disable
H	Camera Enable

LCM INTERFACE (EDP) + CAMERA (MIPI)

PAGE TITLE		
EDP DISPLAY CONNECTOR		
		DRAWING NUMBER 051-04273
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S4E0

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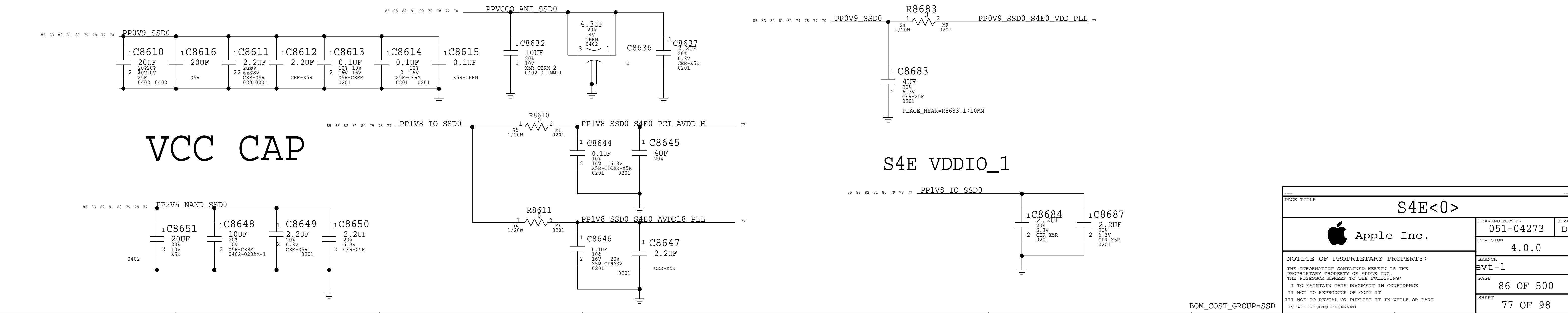


S4E VDD

S4E VDDIO_2

S4E VDDIO_1

VCC CAP



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051-04273		D
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BRANCH		
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77 OF 98		

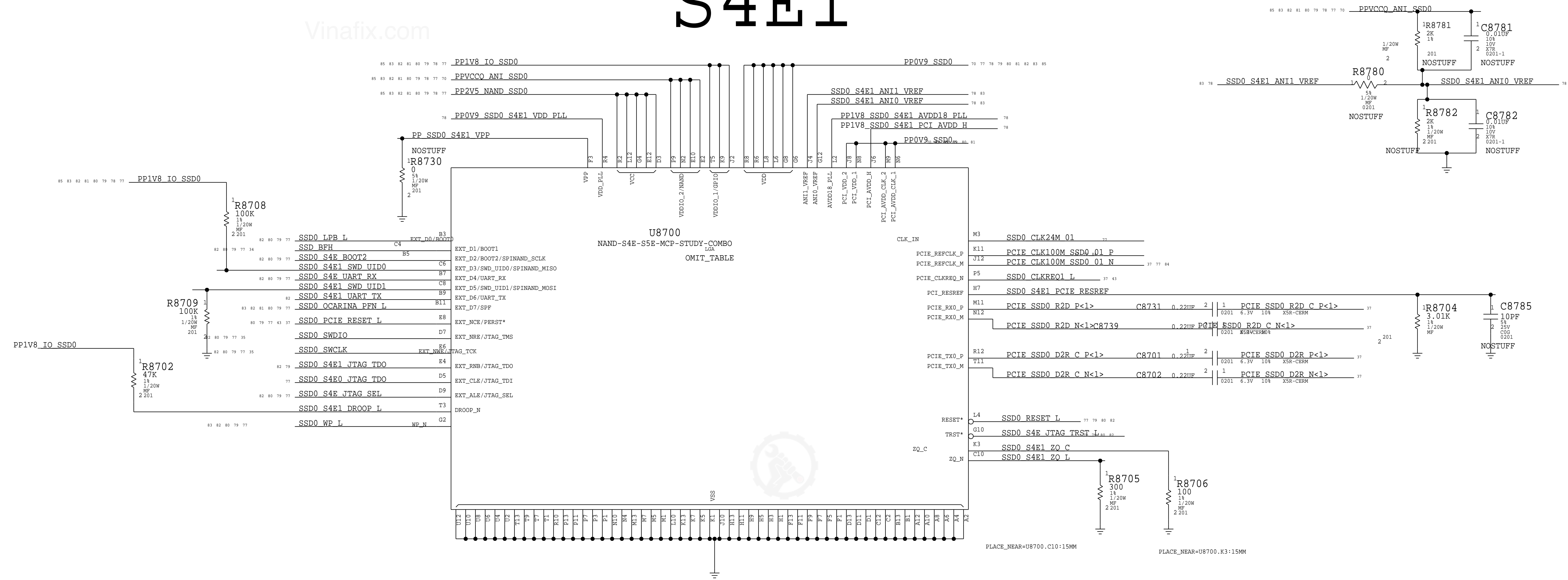
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S4E1

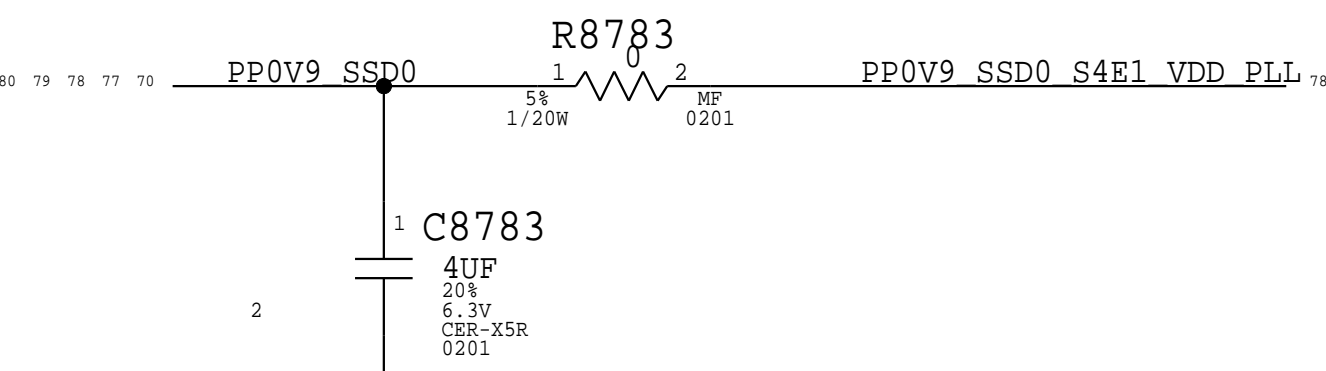
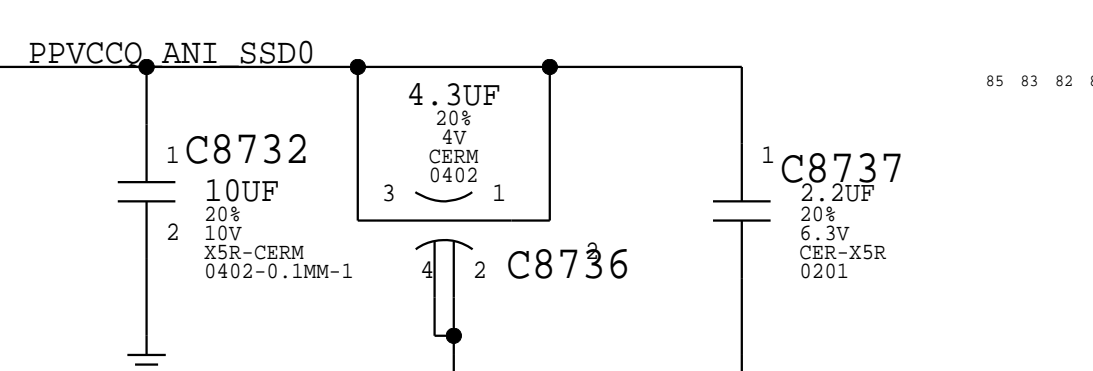
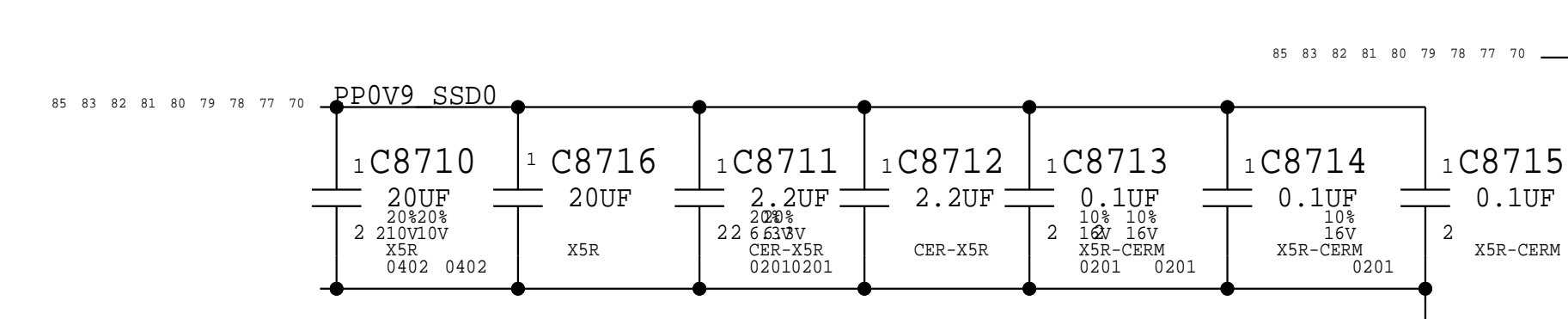
Vinafix.com

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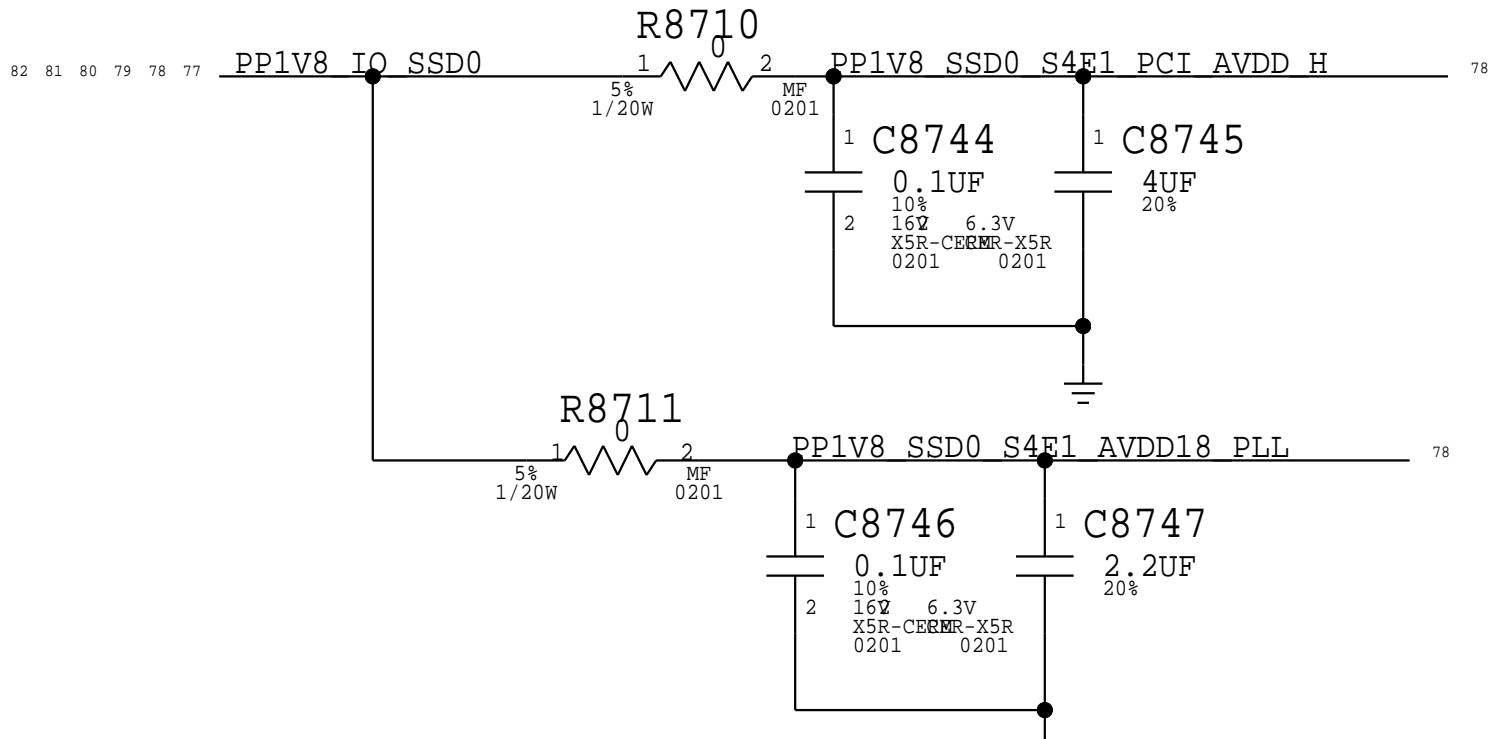
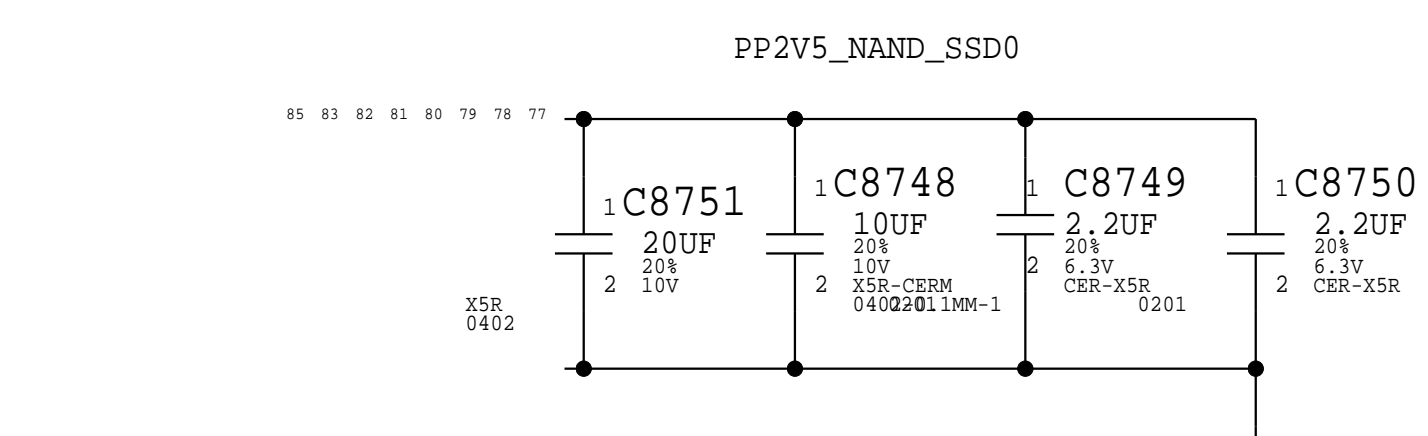


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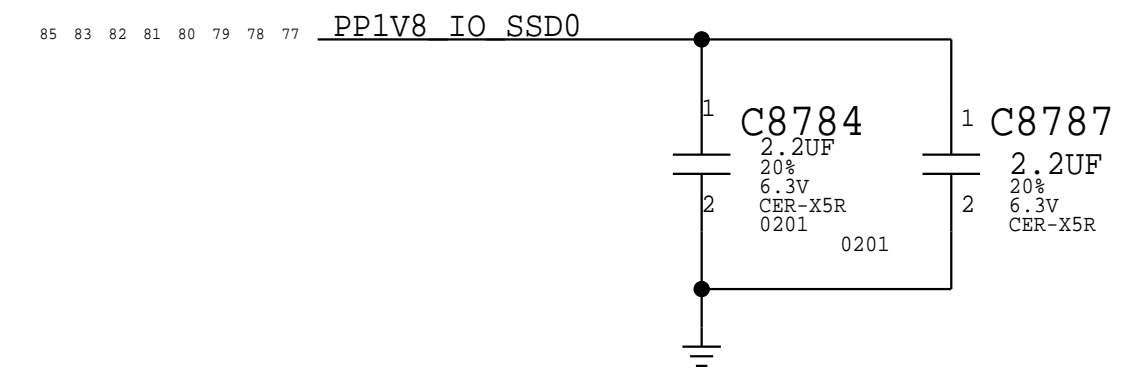
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VCC CAP



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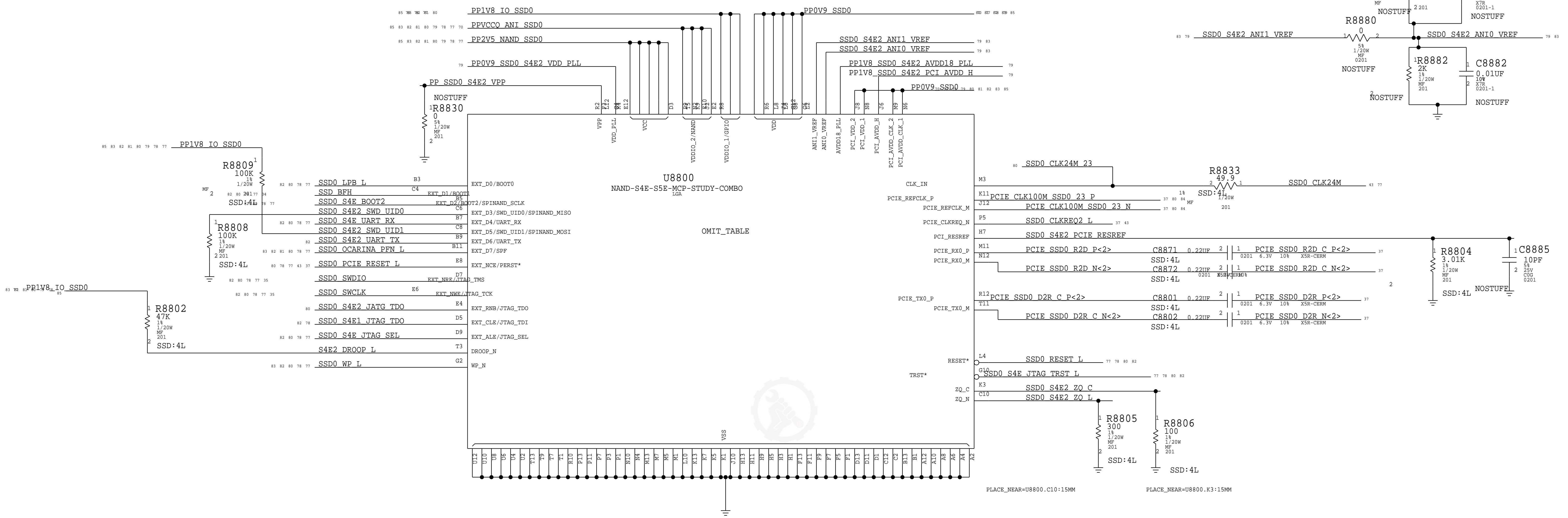
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	PAGE	87 OF 500
	SHEET	78 OF 98

BOM_COST_GROUP=SSD

S4E2

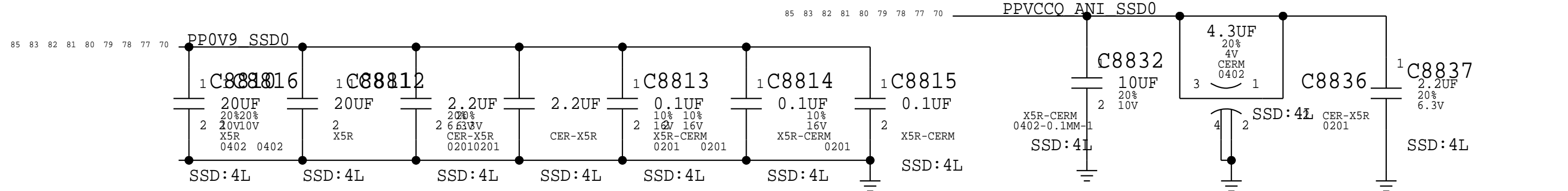
Vinafix.com

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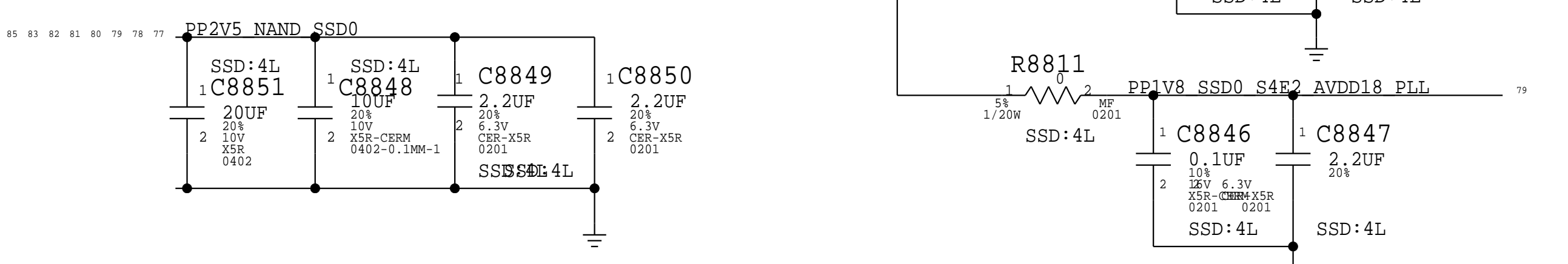
S4E VDDIO_2

S4E VDD



S4E VDDIO_1

VCC CAP

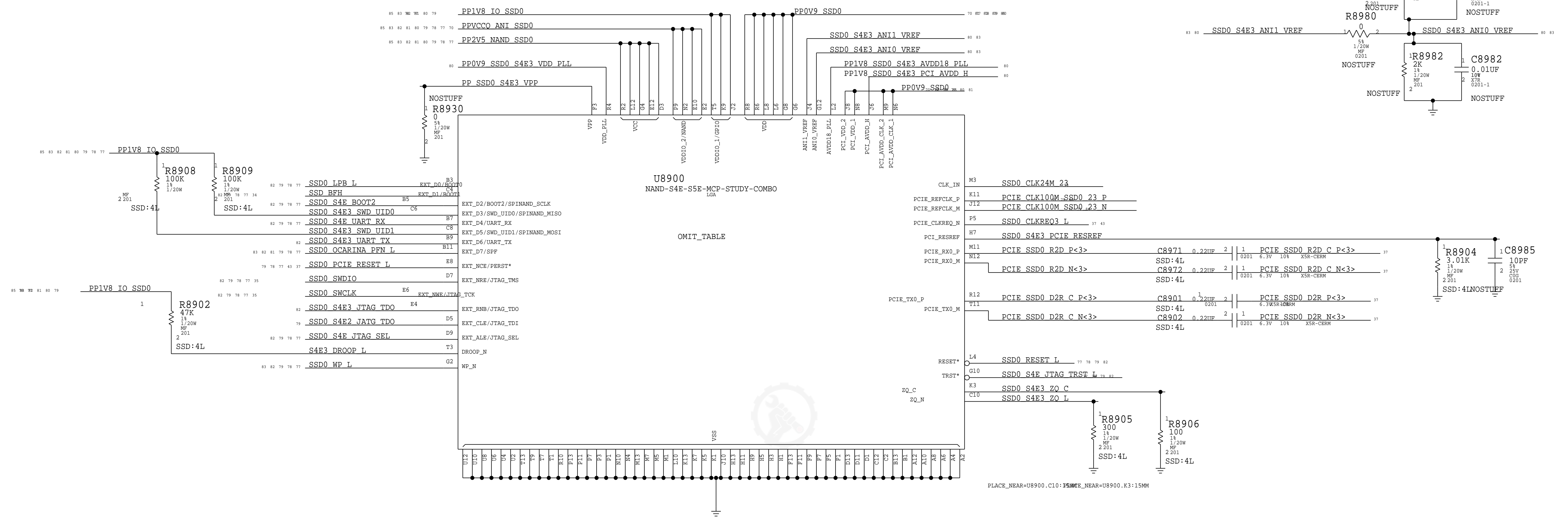


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BRANCH evt-1		PAGE 88 OF 500
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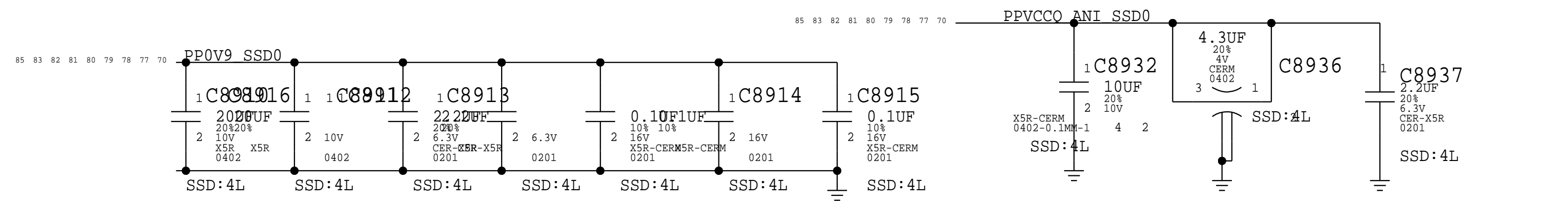
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Vinafix.com

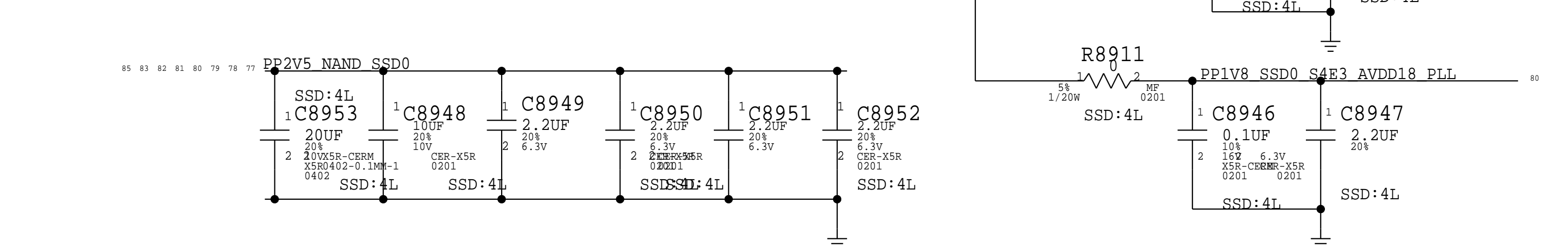
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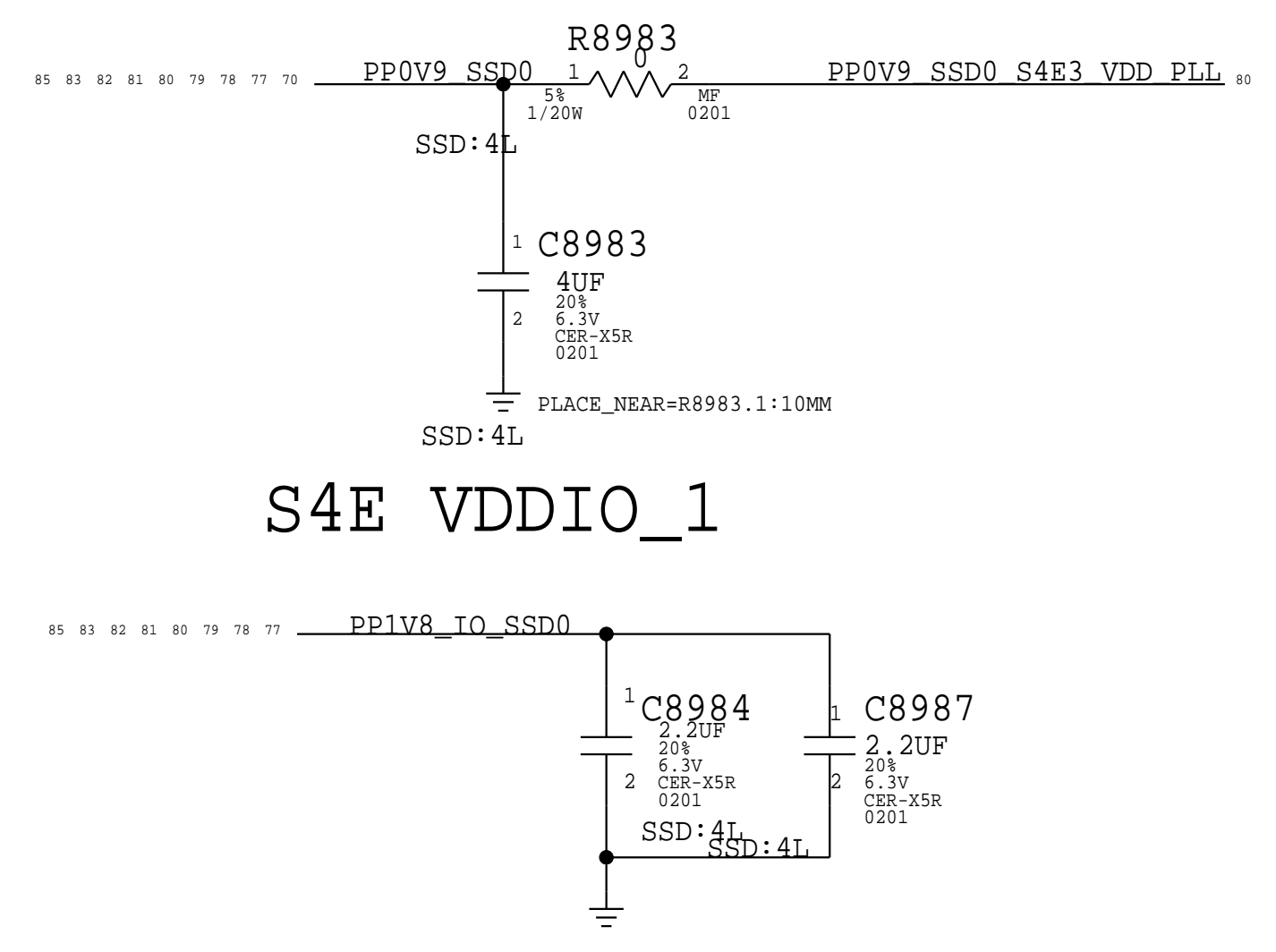
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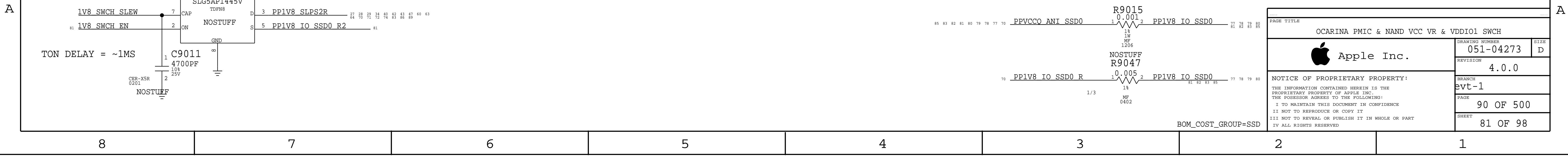
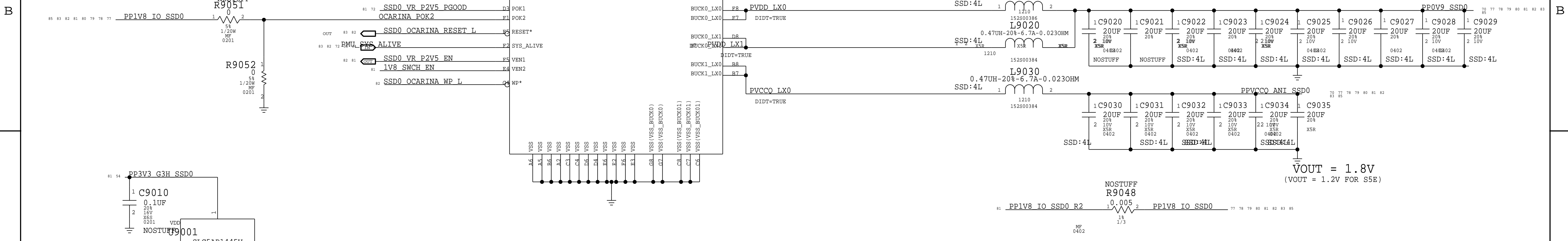
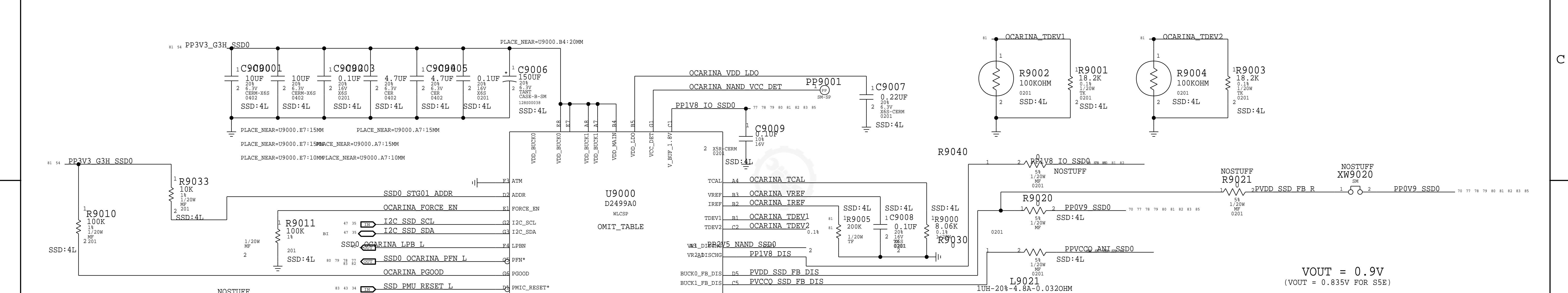
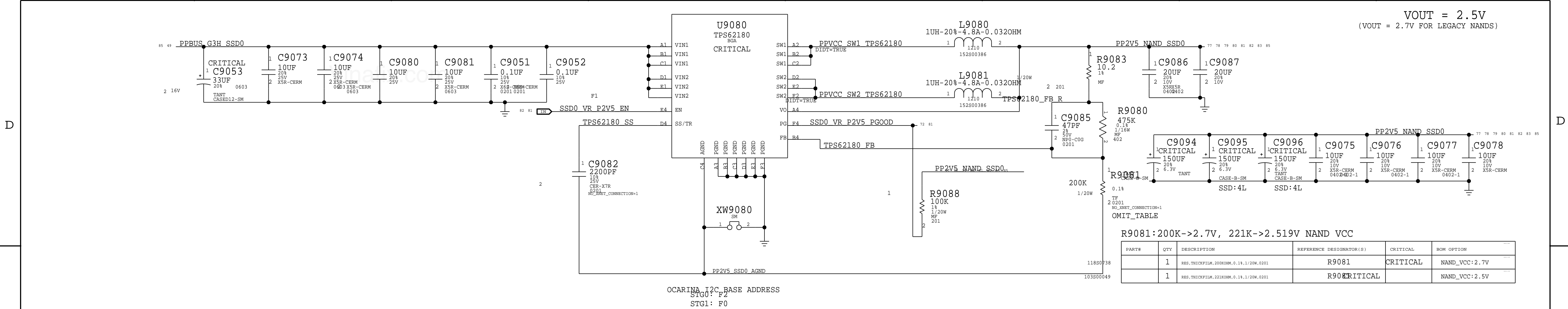
VCC CAP



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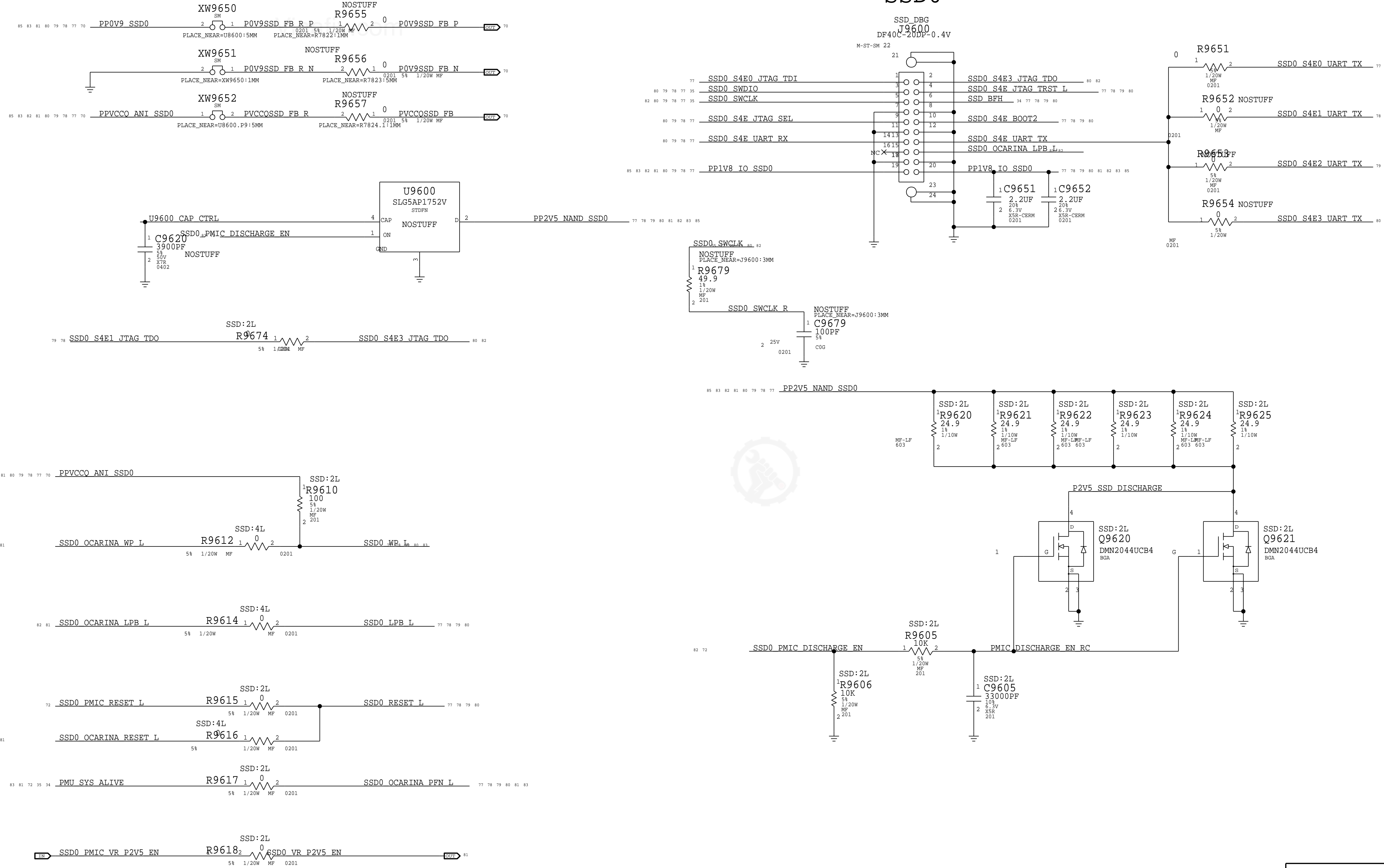
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BRANCH evt-1		PAGE 89 OF 500
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PAGE TITLE OCARINA PMIC & NAND VCC VR & VDDI01 SWCH	
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PMU BUCK 9 & 10 REMOTE SENSE OPTIONS

SSDO



PAGE TITLE		
SSD SUPPORT		
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Functional Test Points

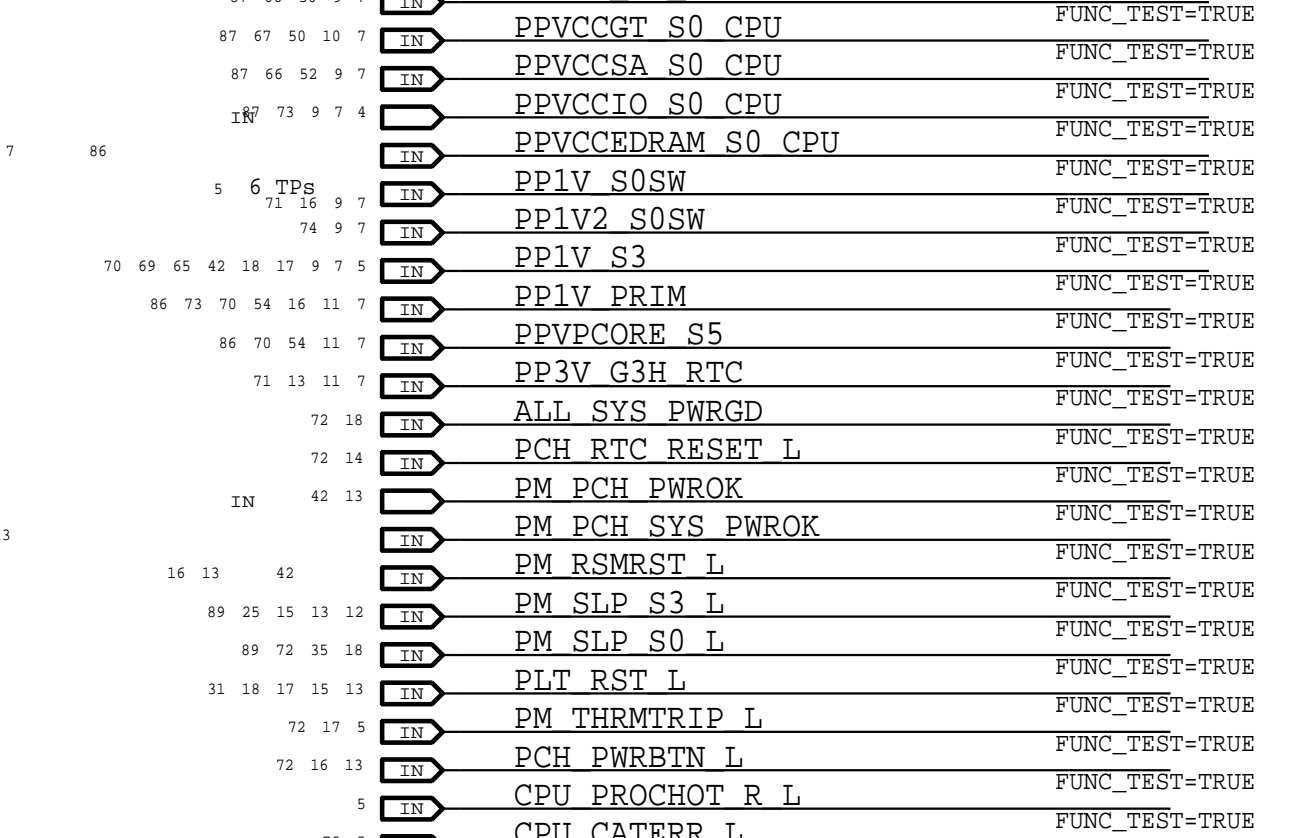
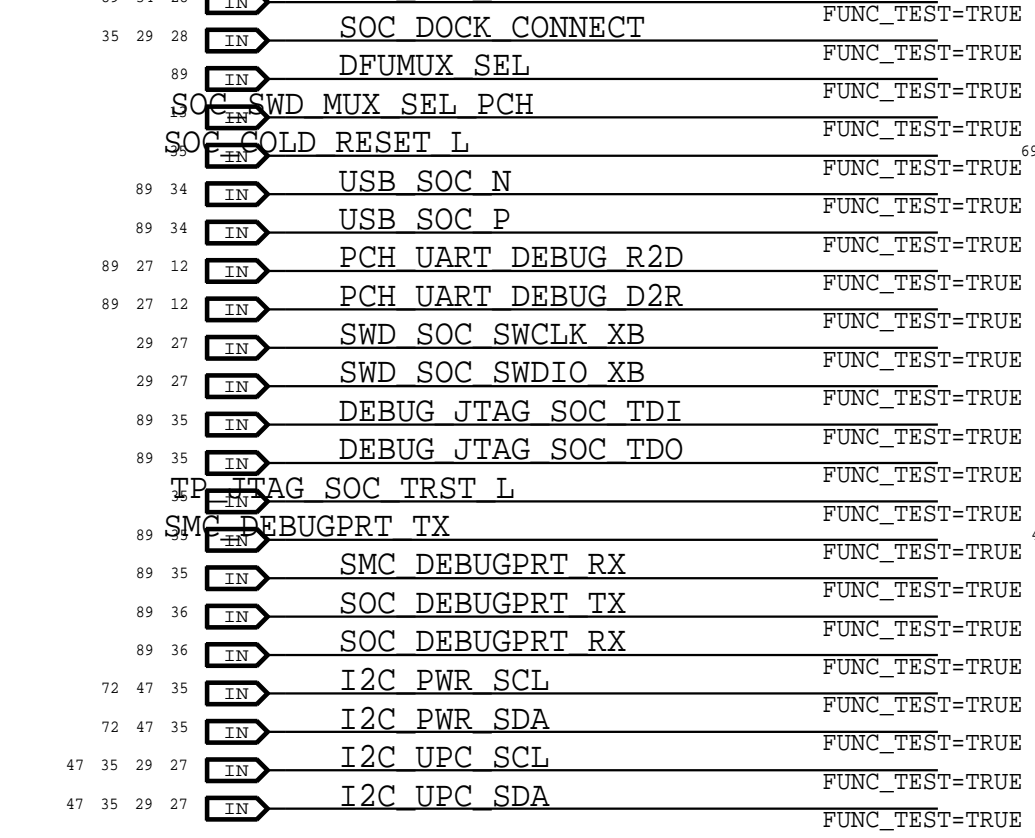
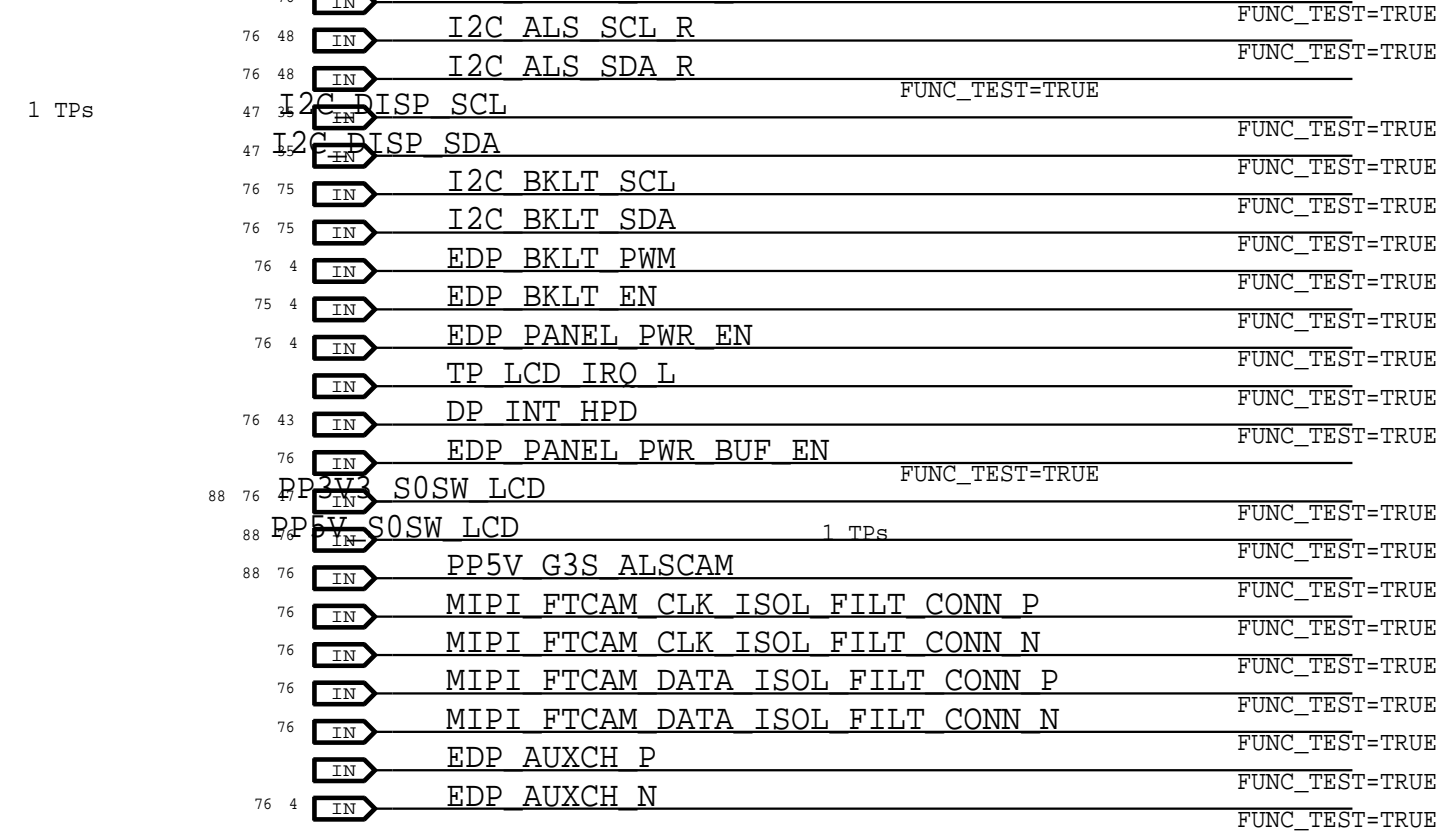
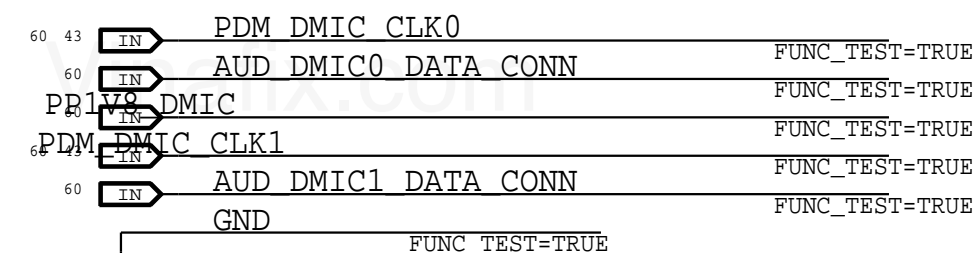
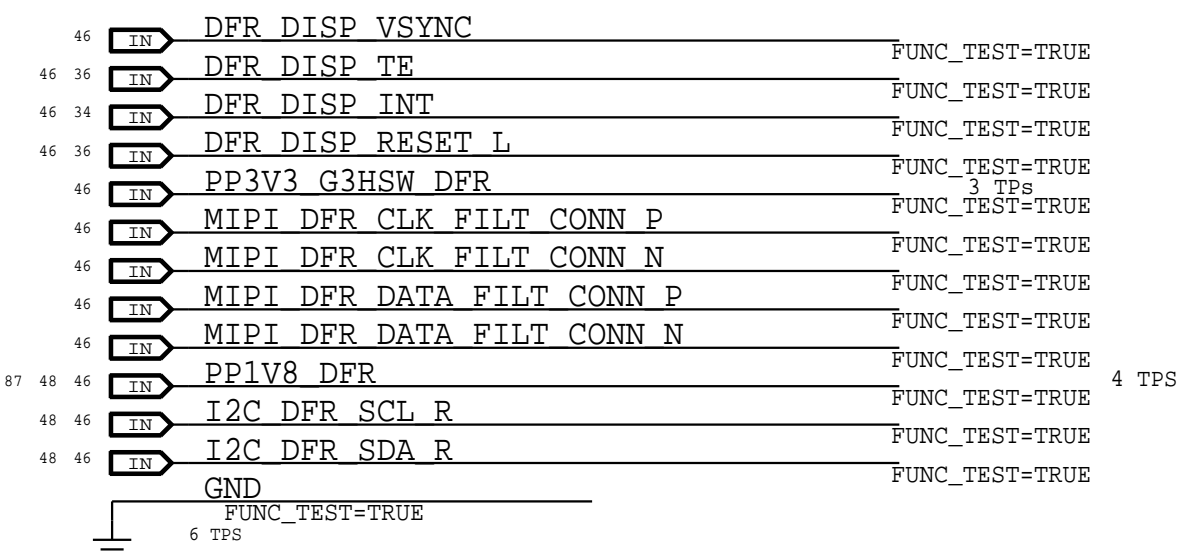
J8500 - eDP Connector

DFU/SOC/FCT DEBUG

DFU/SOC/FCT DMM/Power Sequence

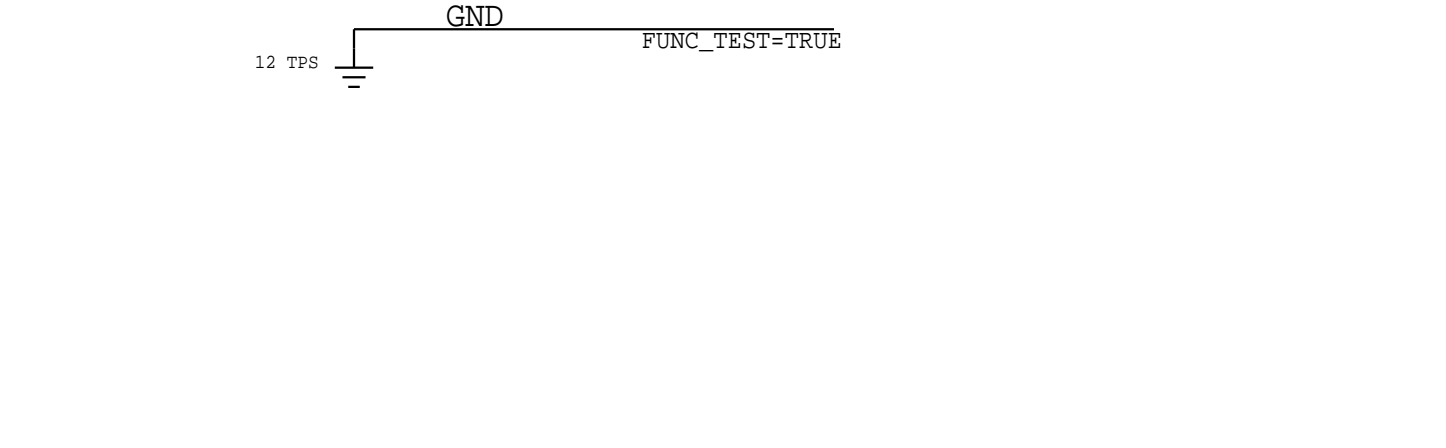
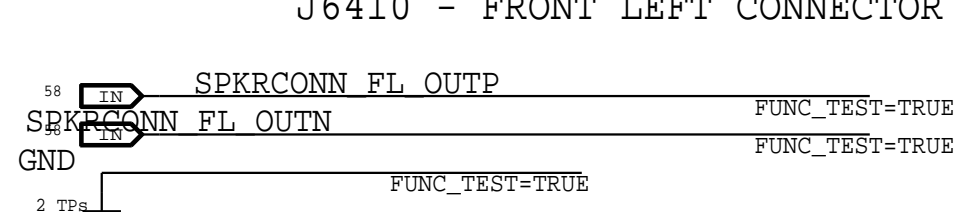
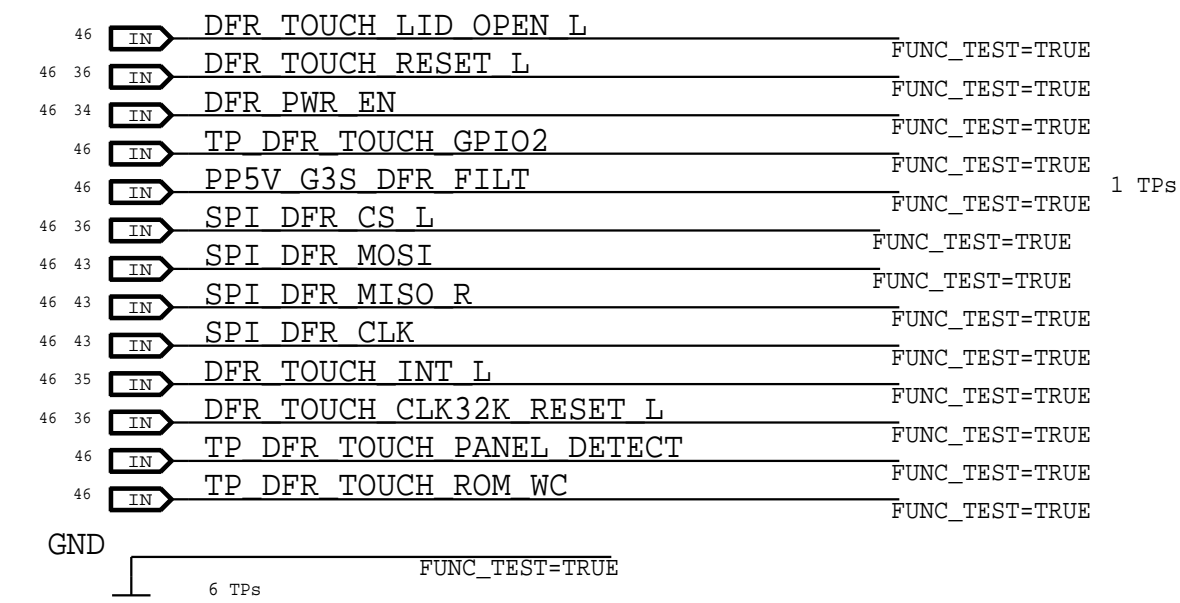
J5110 - DFR Display Connector

J6640 - MIC Connector

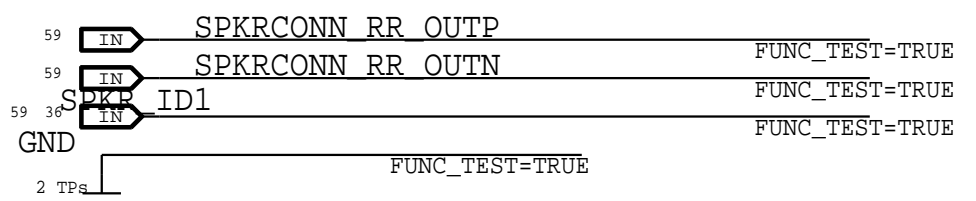


J5100 - DFR Touch Connector

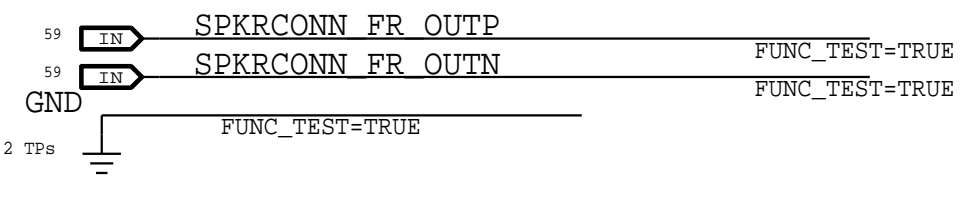
J6410 - REAR LEFT CONNECTOR



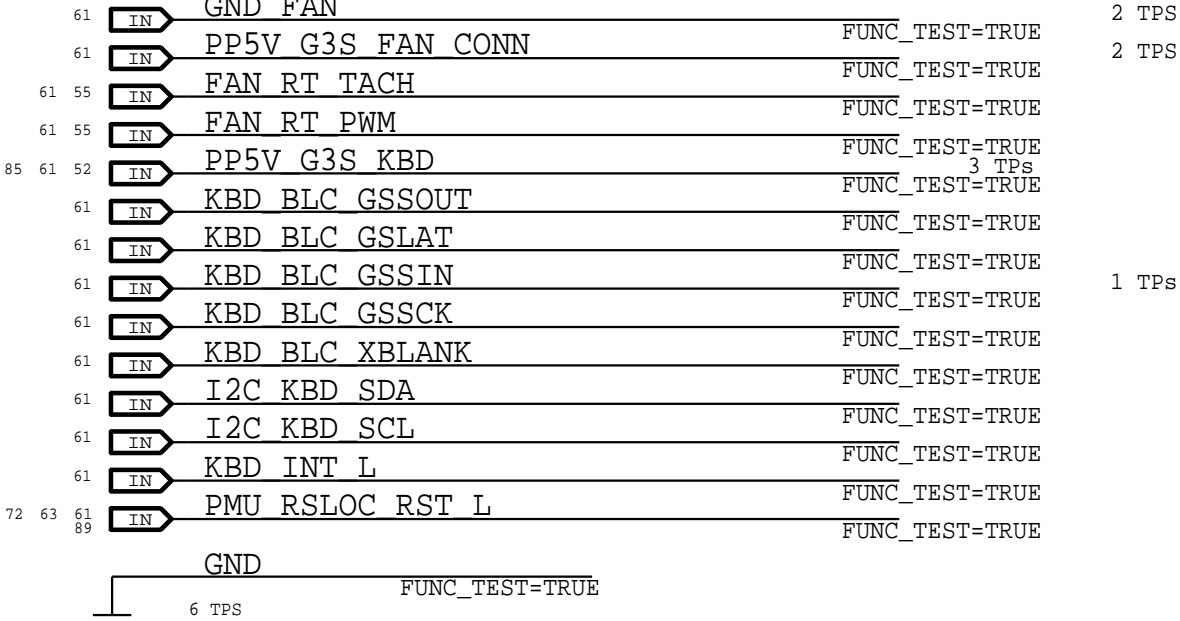
J6510 - REAR RIGHT CONNECTOR



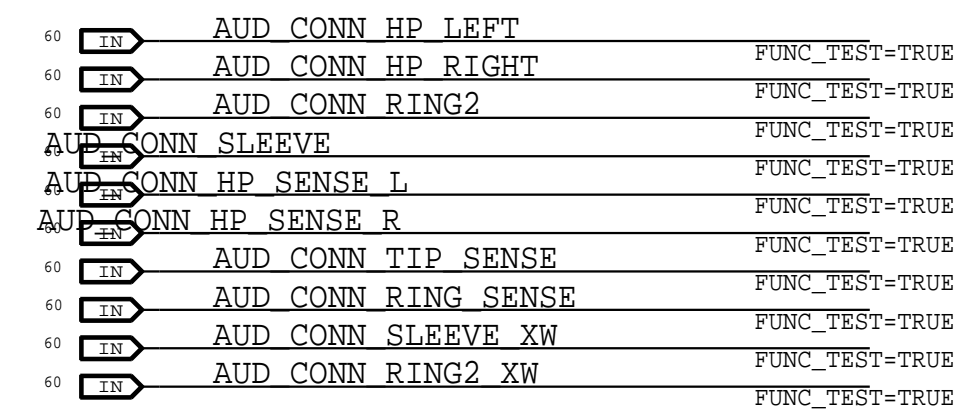
J6550 - FRONT RIGHT CONNECTOR



J6700 - Keyboard Connector



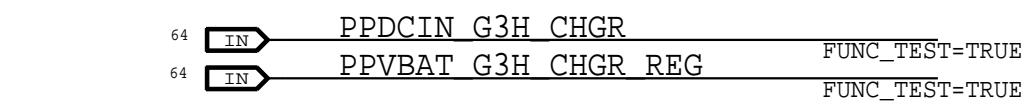
J6600 - Audio Jack Connector



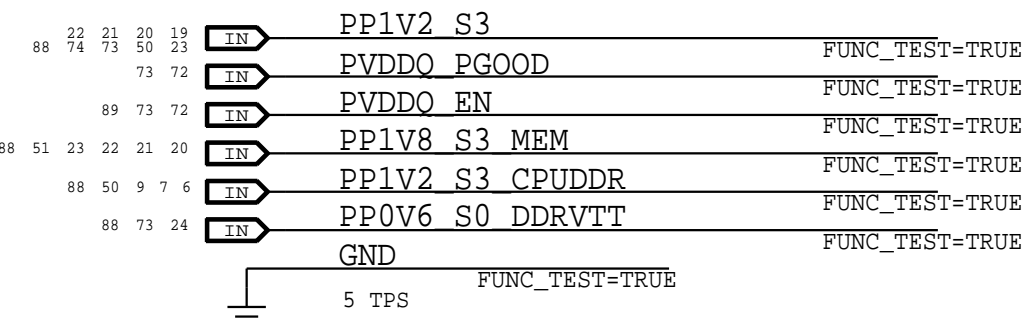
J3300 - Left USB-C Connector



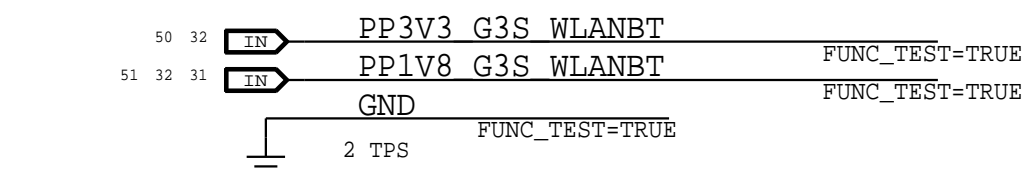
DFU/SOC/FCT DISCHARGE



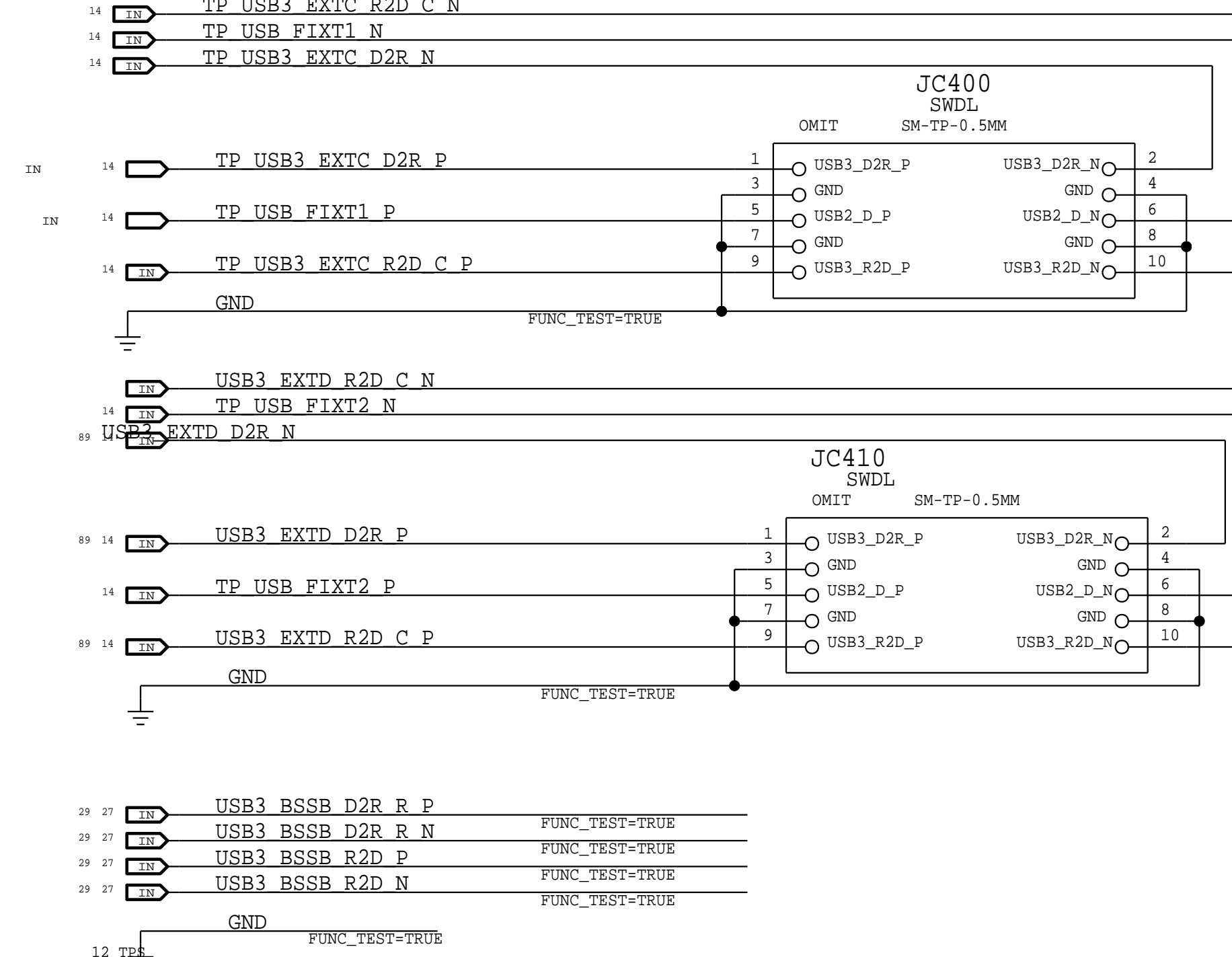
Memory Power



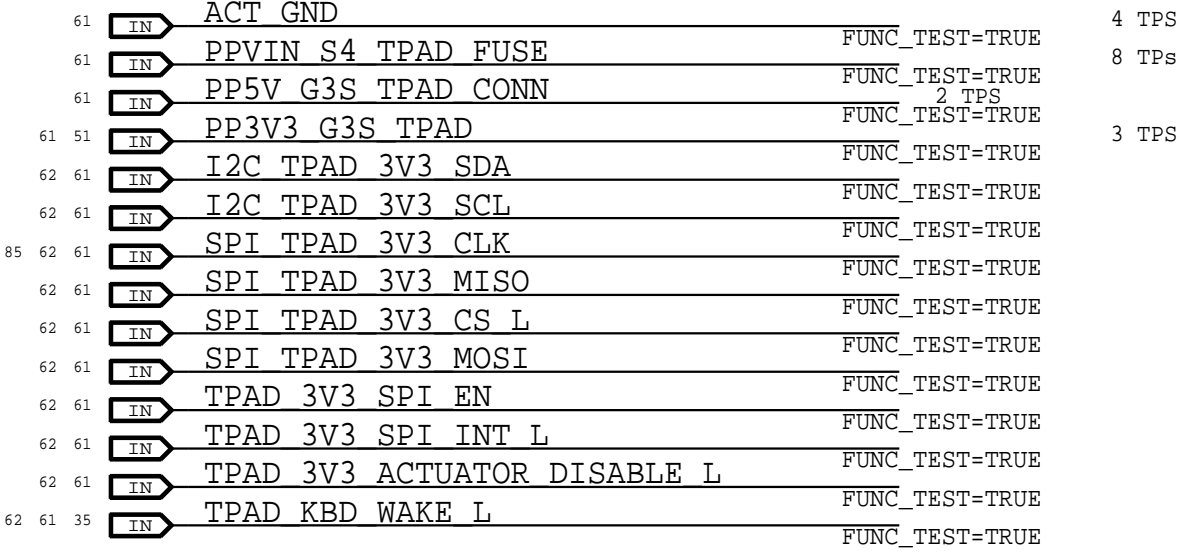
Wireless/BT Power



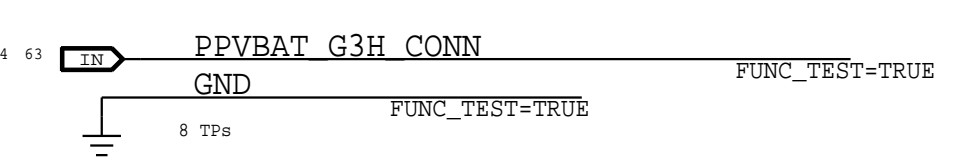
PROBE BLOCK GRID - DFU/SOC/DCI



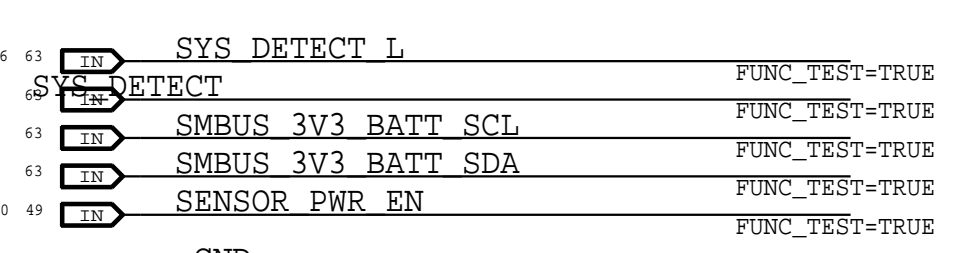
J6701 - Trackpad Connector



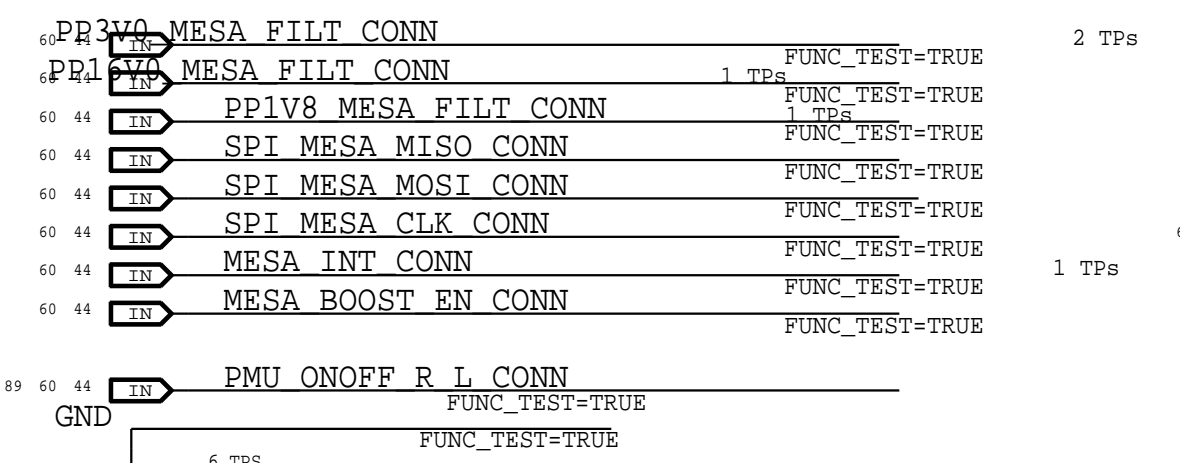
J6950 - Battery Connector



J6951 - BATTERY SENSE CONNECTOR



J4900 - Mesa Connector

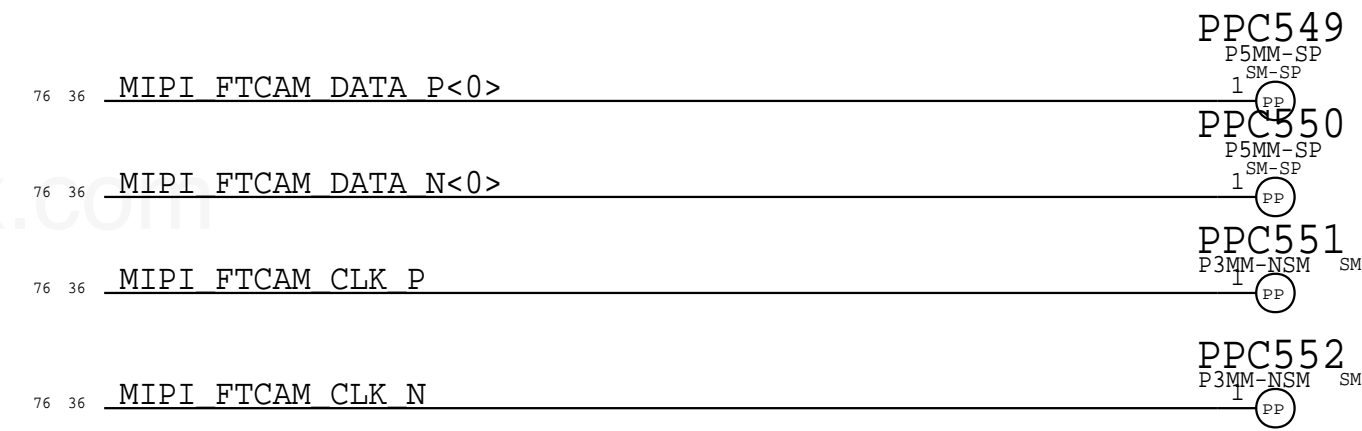


Hall Effect

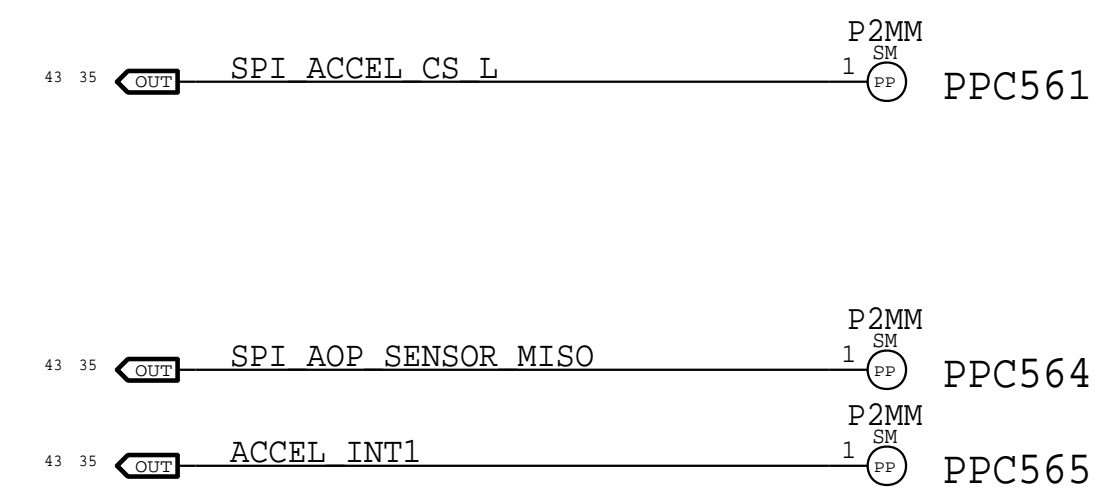


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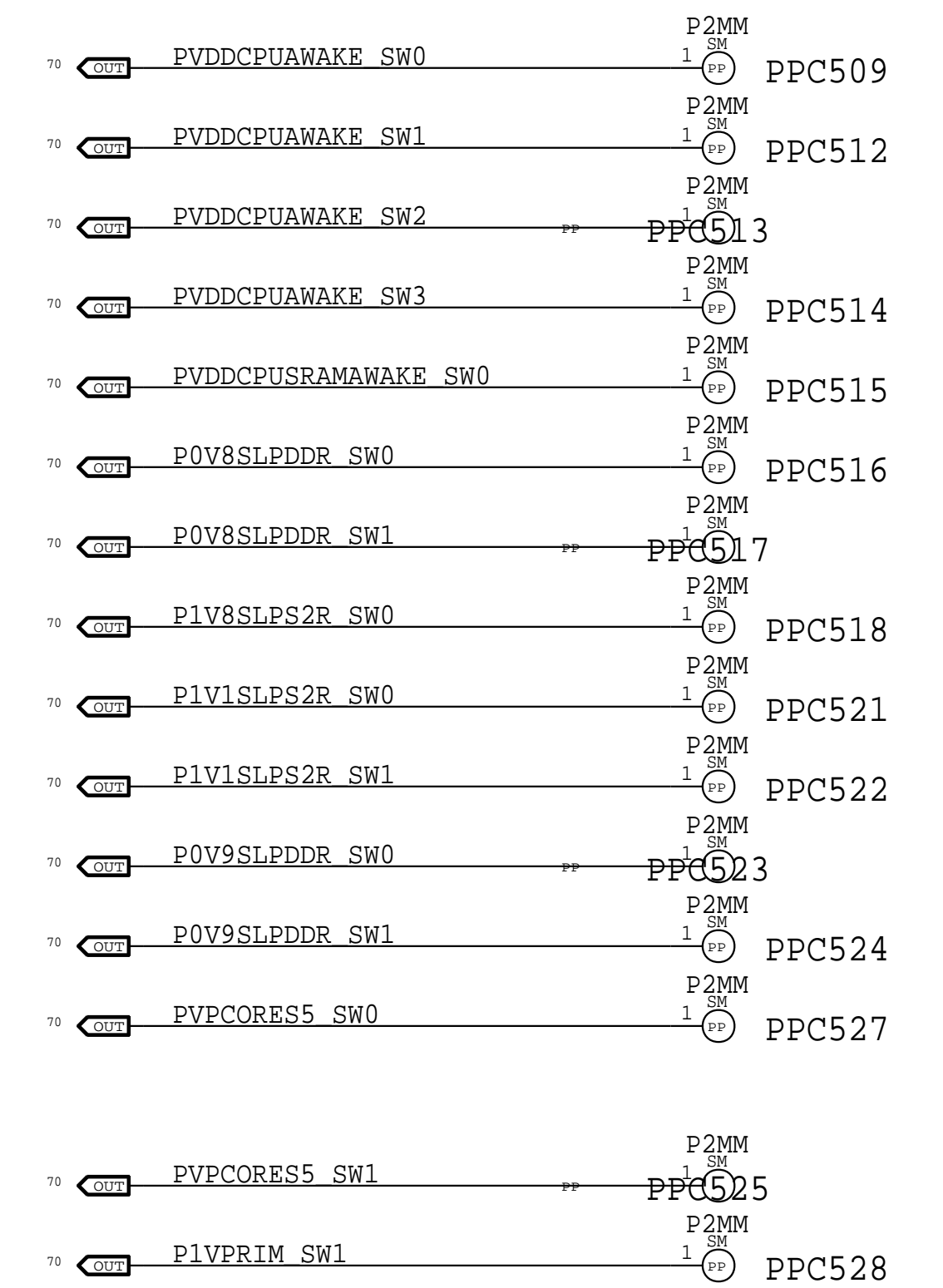
Vinafix.com



SAR Fusion Sensor Debug



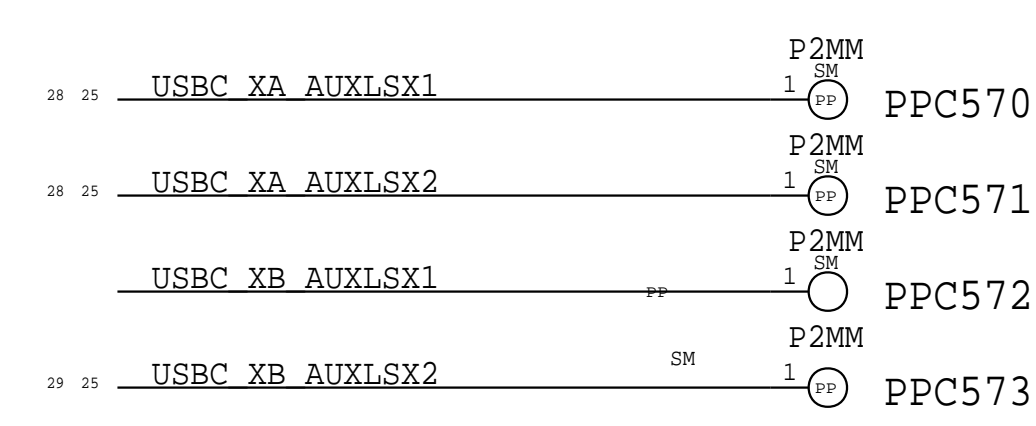
PMIC Switch Nodes



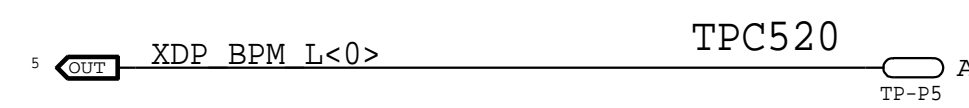
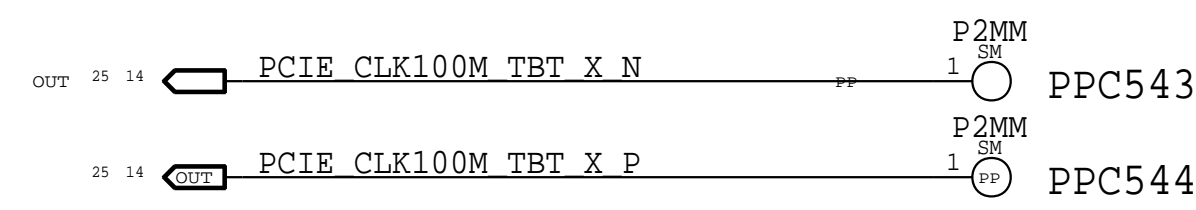
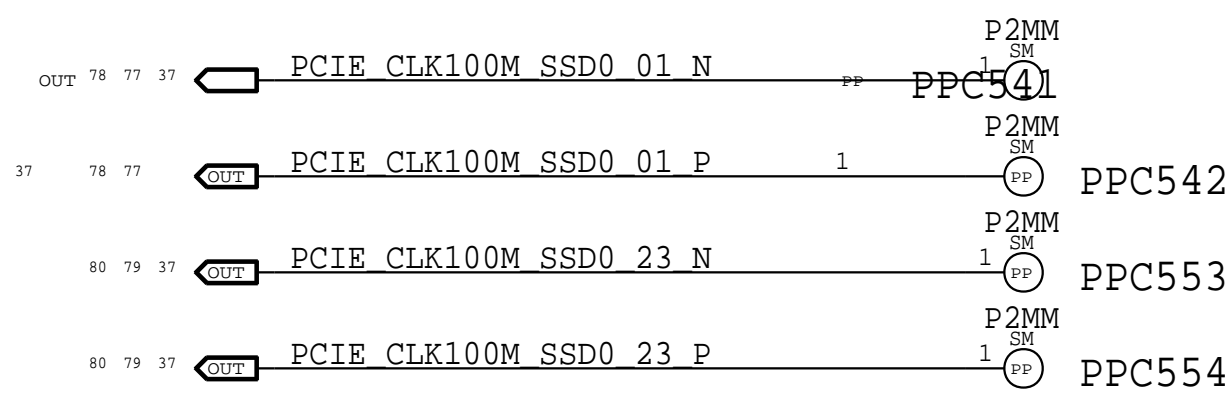
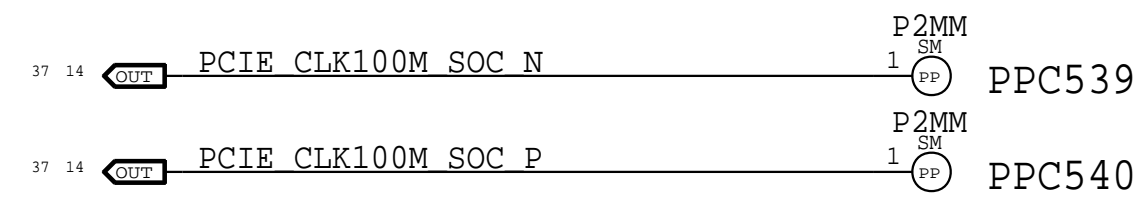
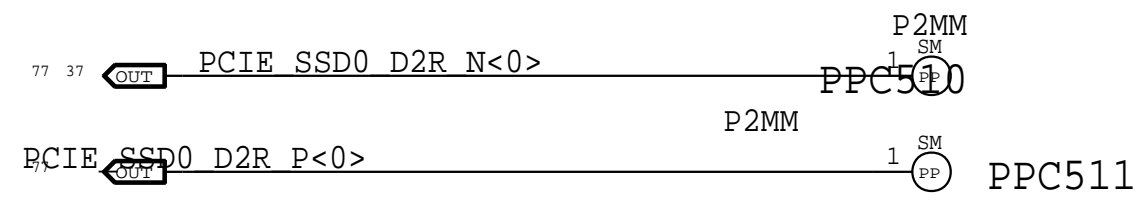
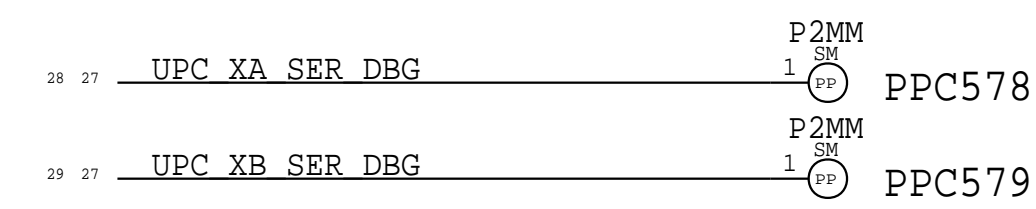
SOC SENSE



ACE-TR AUX/LS



ACE GPIO PPS



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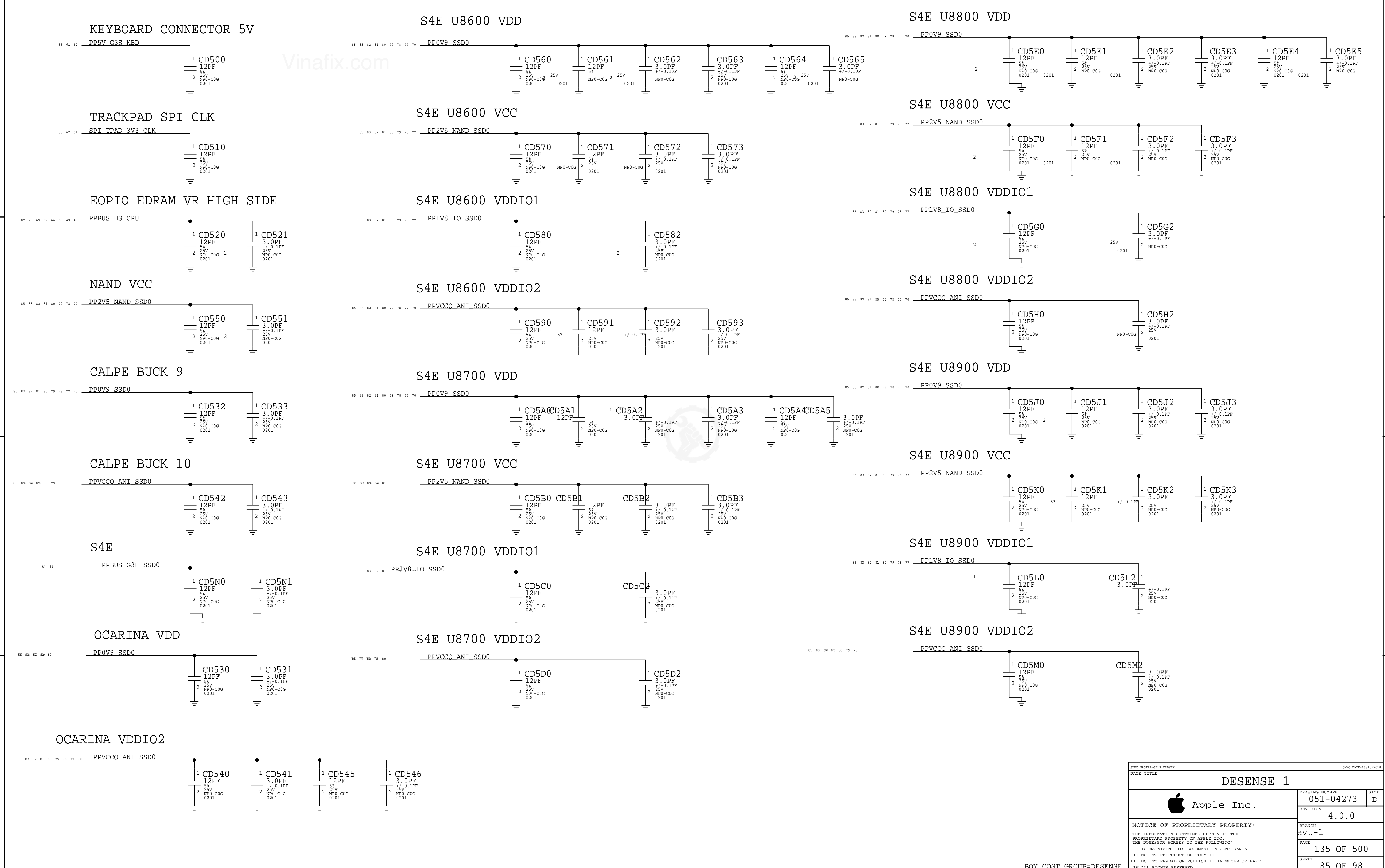
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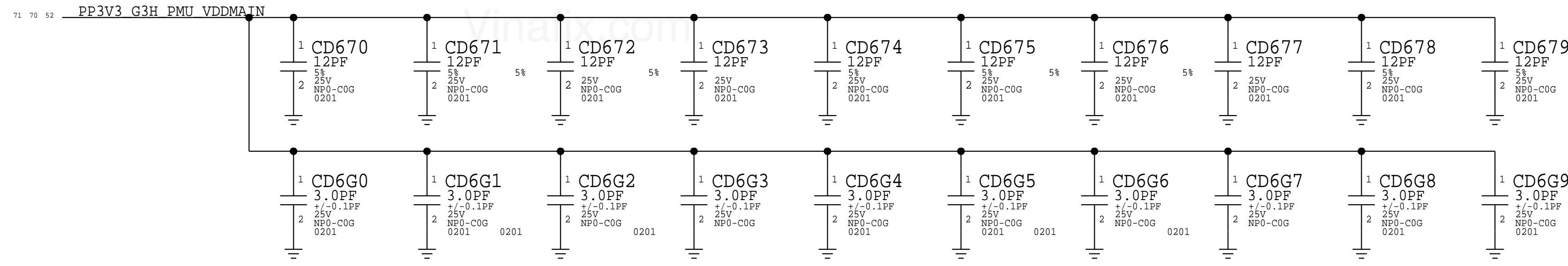


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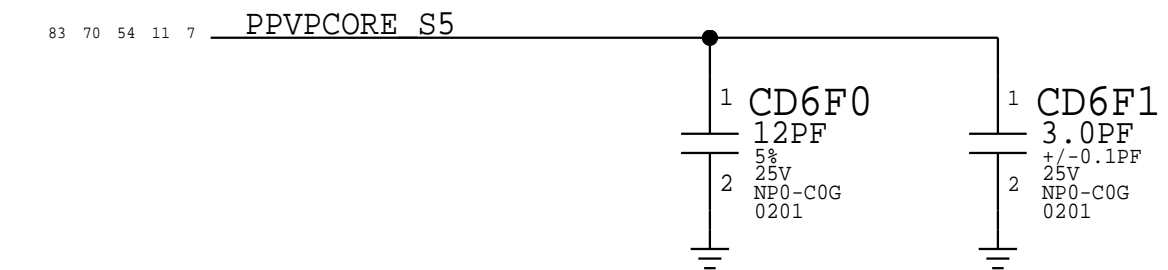
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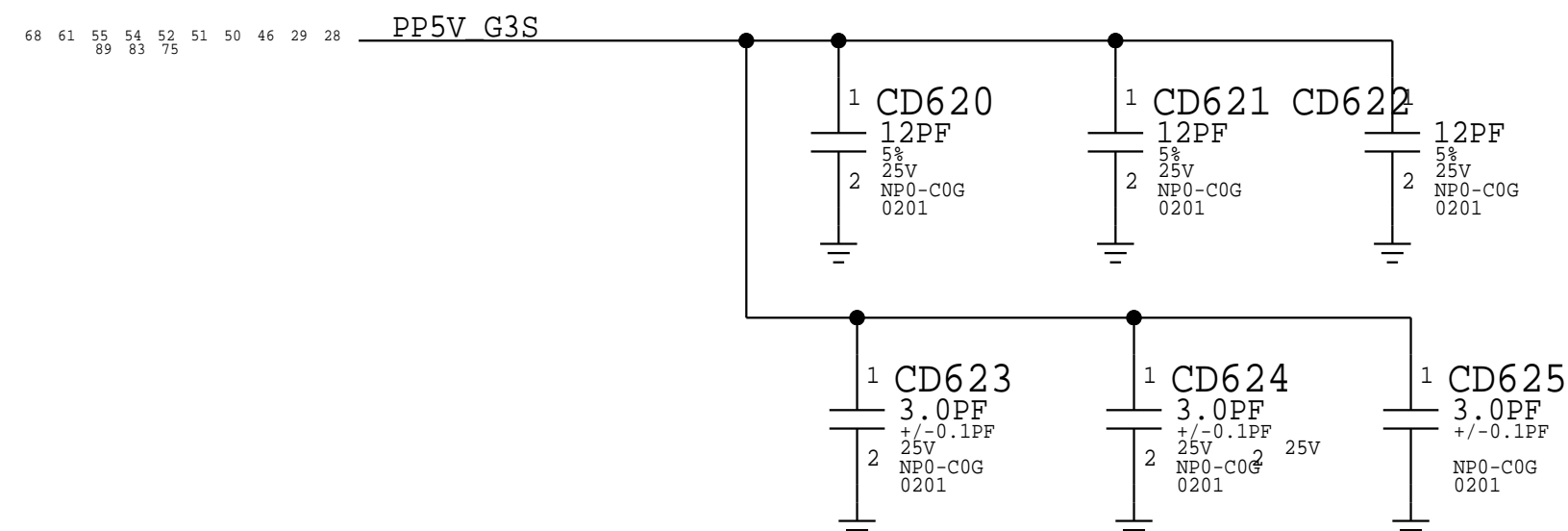
CALPE VDD MAIN HIGH SIDE INPUT



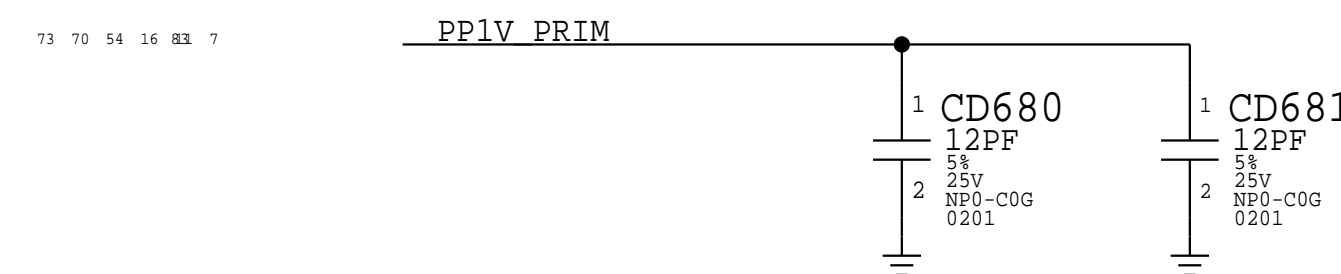
CALPE PCH VCORE



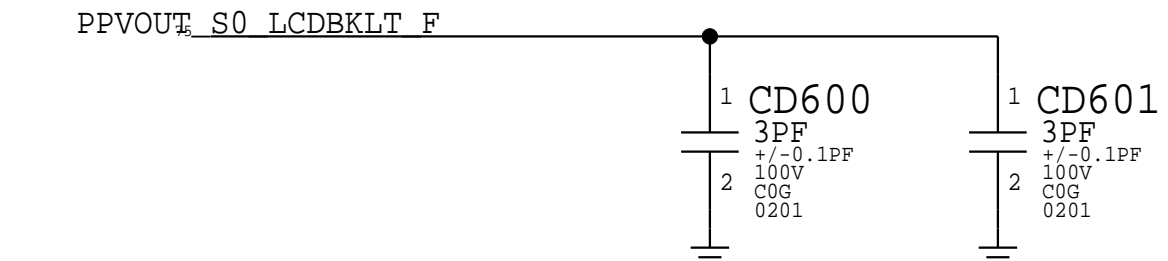
VR 5V G3S



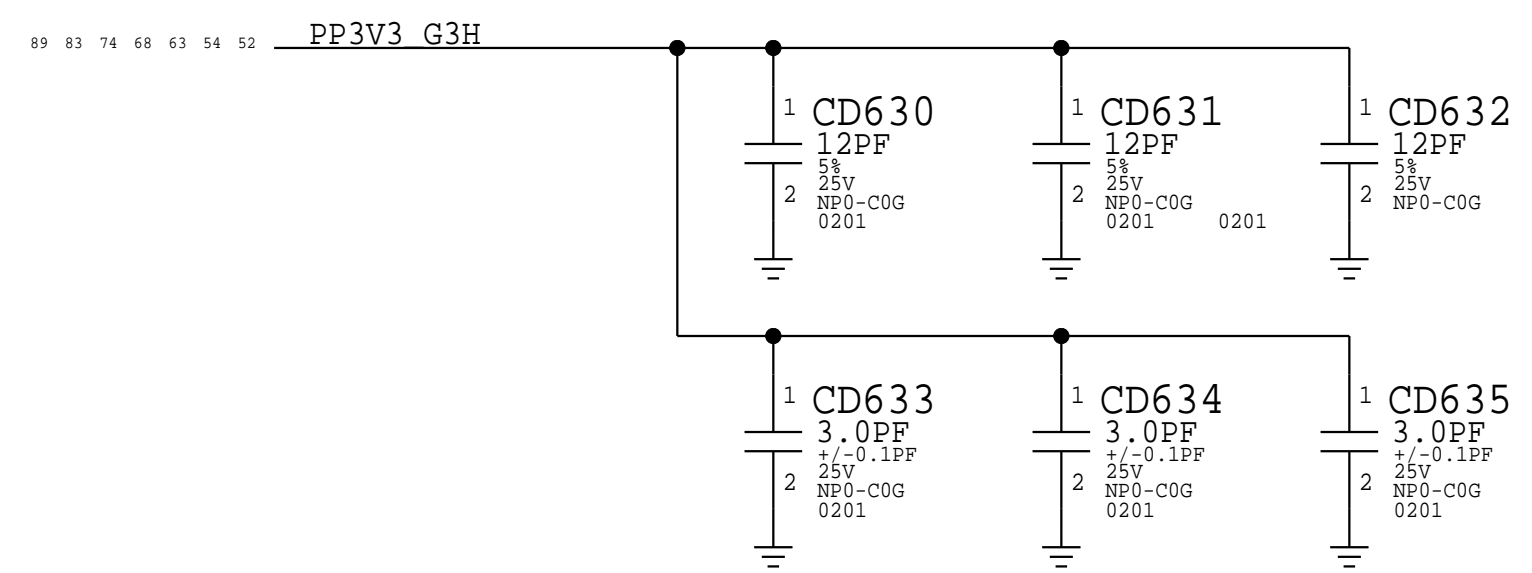
CALPE PCH 1V1 PRIM



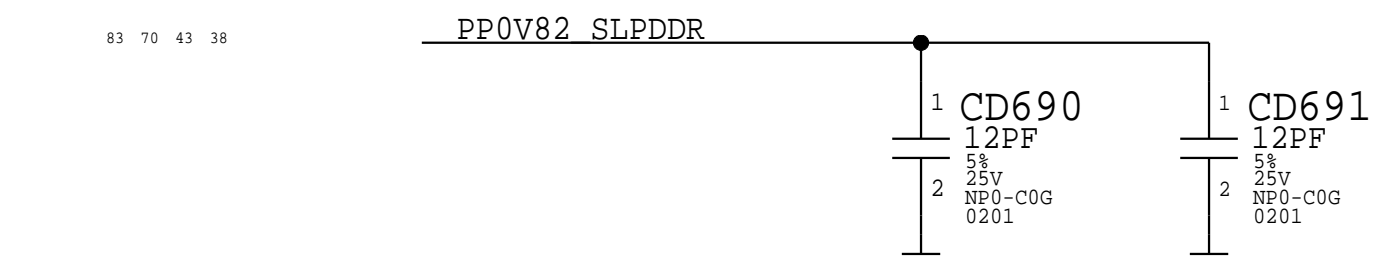
LCD BACKLIGHT DRIVER VOUT



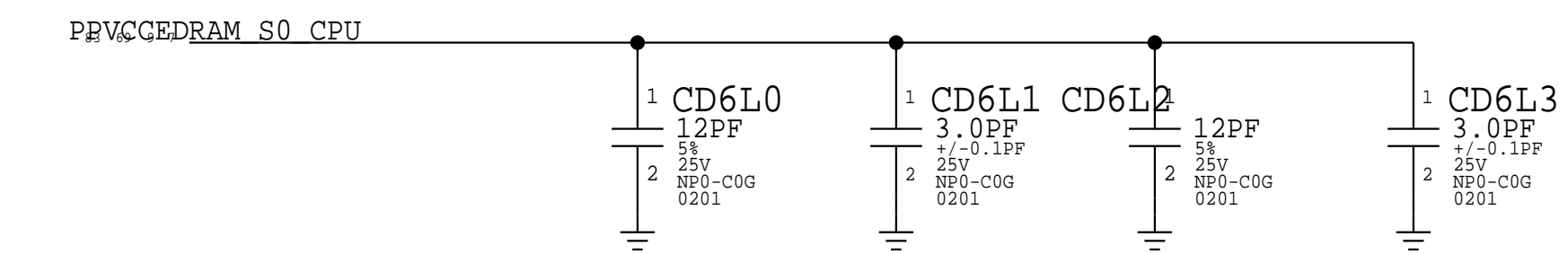
VR 3V3 G3H



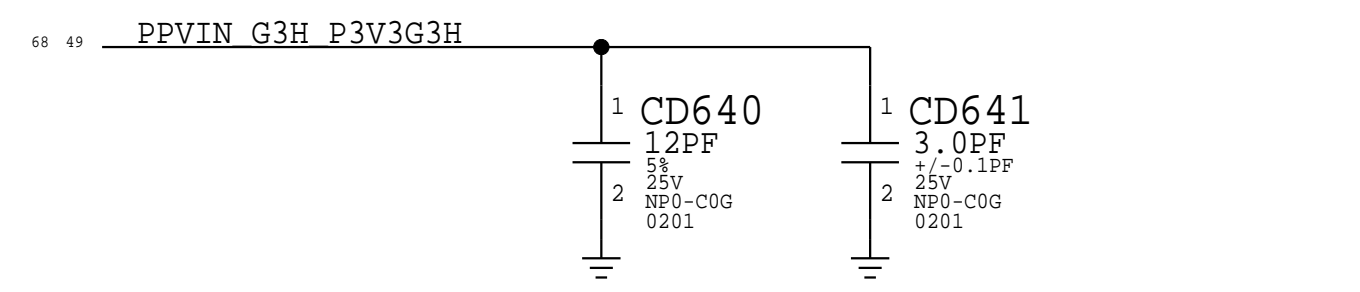
CALPE 0V82 SLPDDR



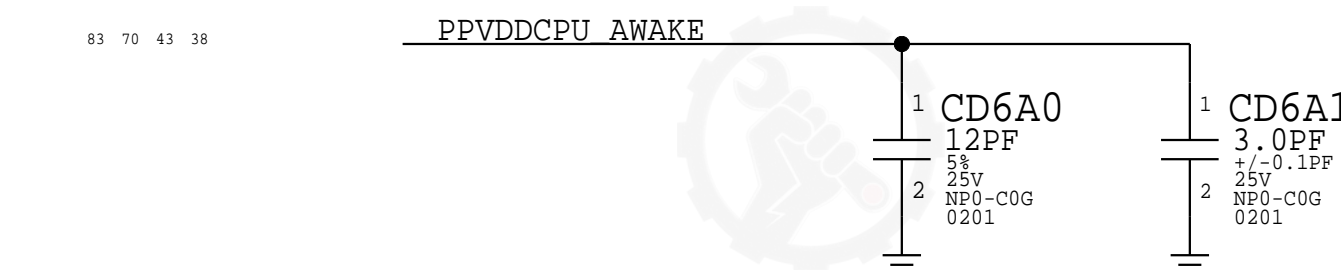
EDRAM



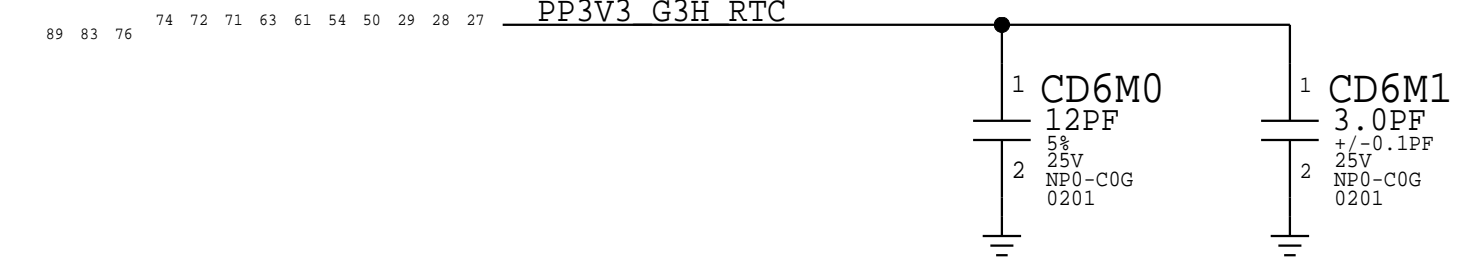
VR 3V3 G3H HIGH SIDE



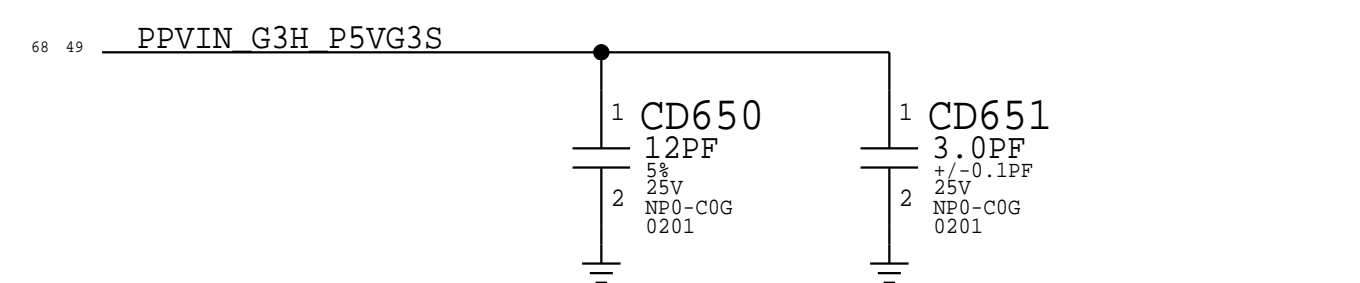
CALPE CPU AWAKE



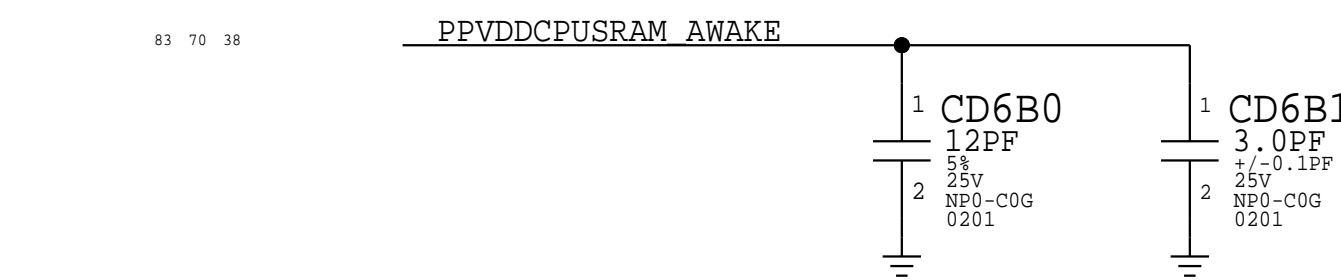
PP3V3 G3H_RTC



VR 5V G3S HIGH SIDE



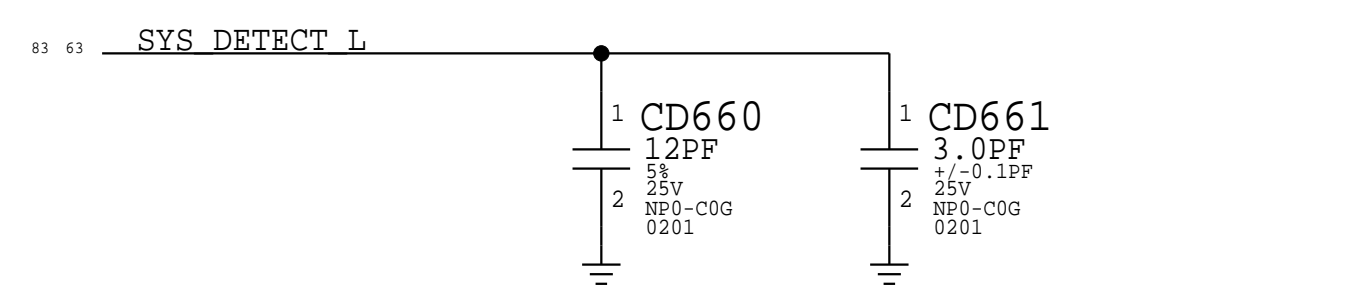
CALPE CPU SRAM AWAKE



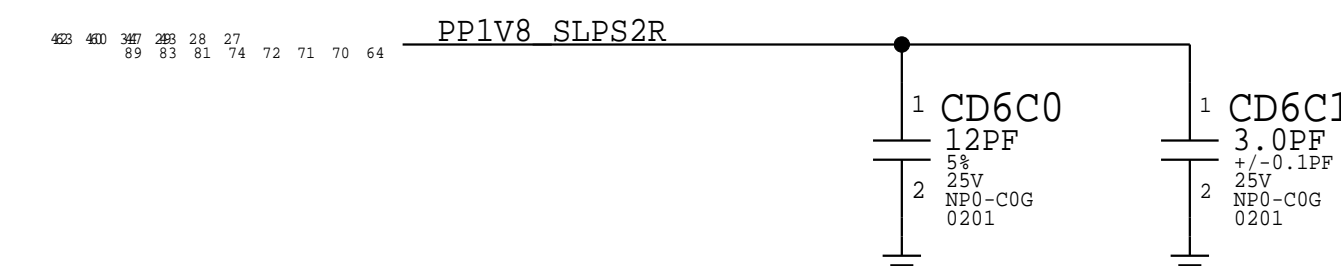
PPVIN_G3H_P3V3G3H_RTC_R



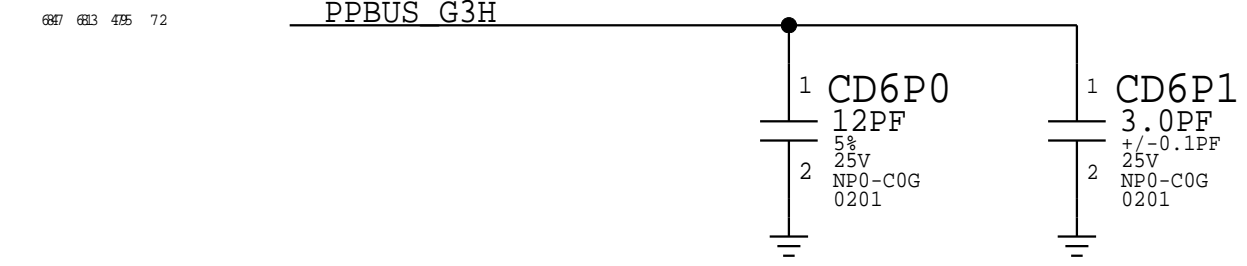
BATTERY CONNECTOR SYS DETECT



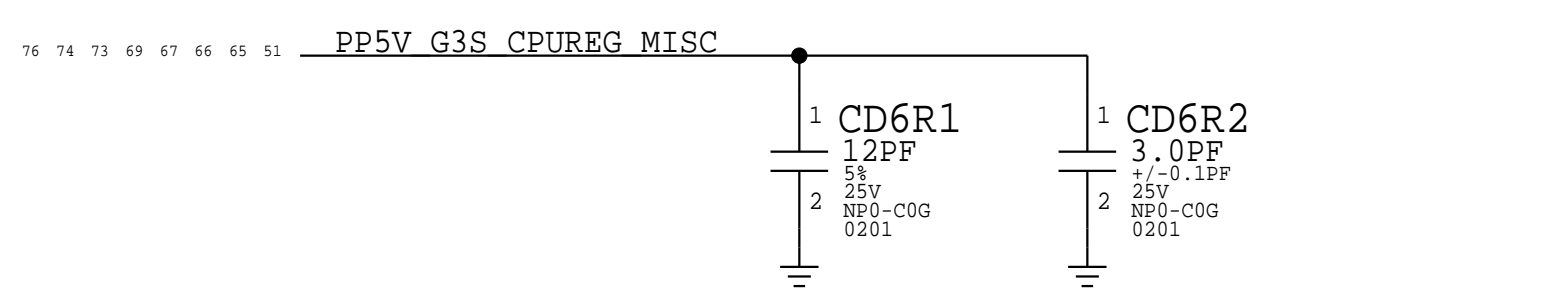
CALPE 1V8 SLPS2R



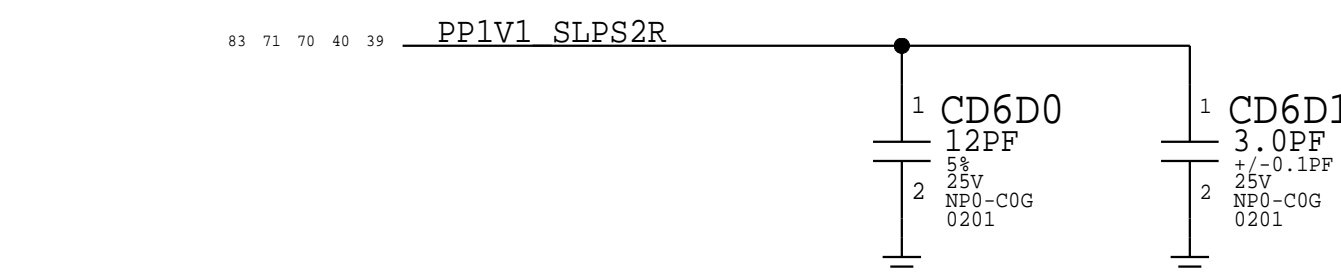
PPBUS_G3H



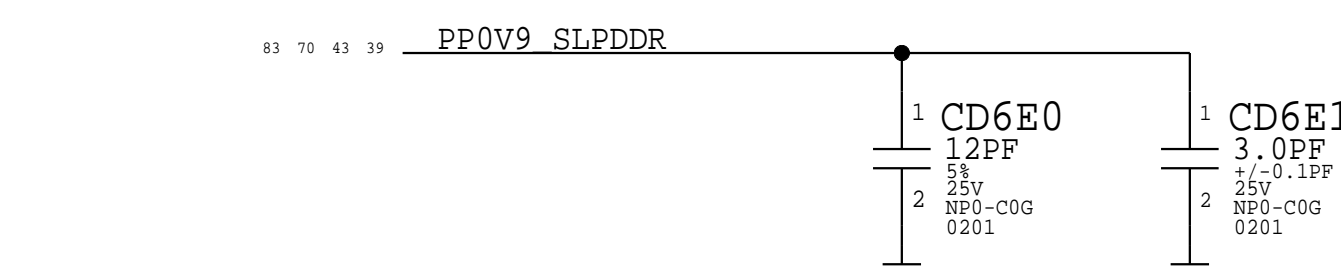
VR 5V ALS



CALPE 1V1 SLPS2R



CALPE 0V9 SLPDDR

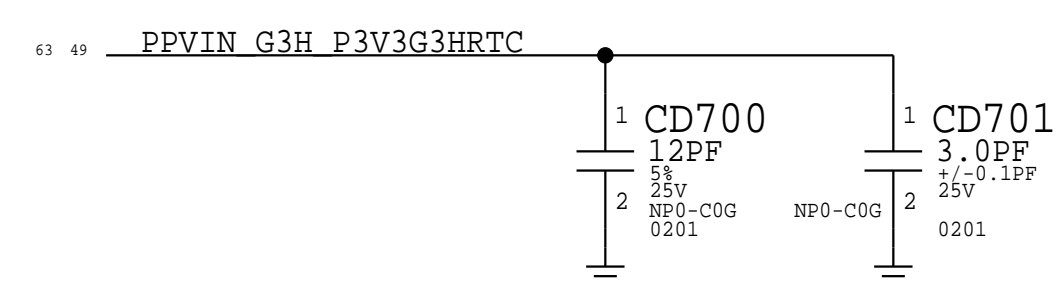


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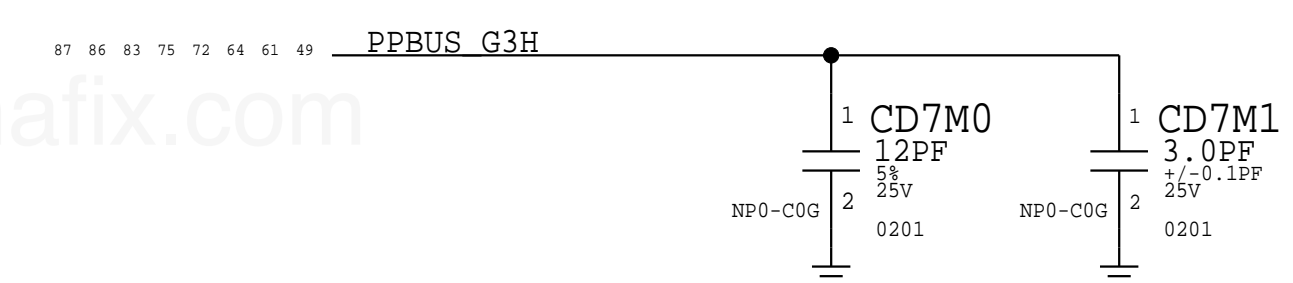
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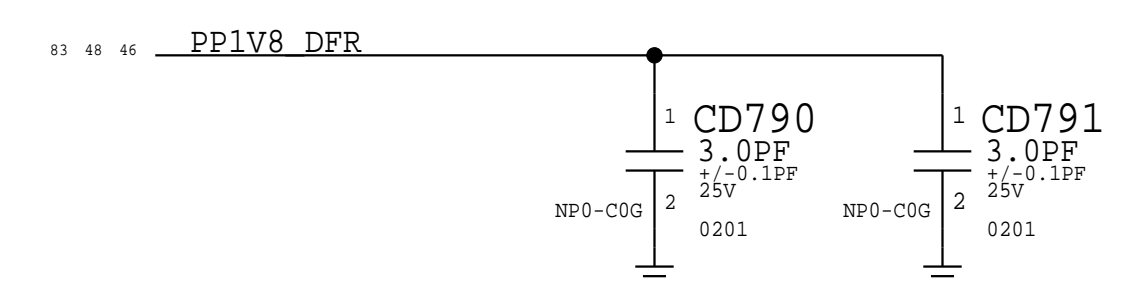
3V3 G3H RTC VR HIGH SIDE



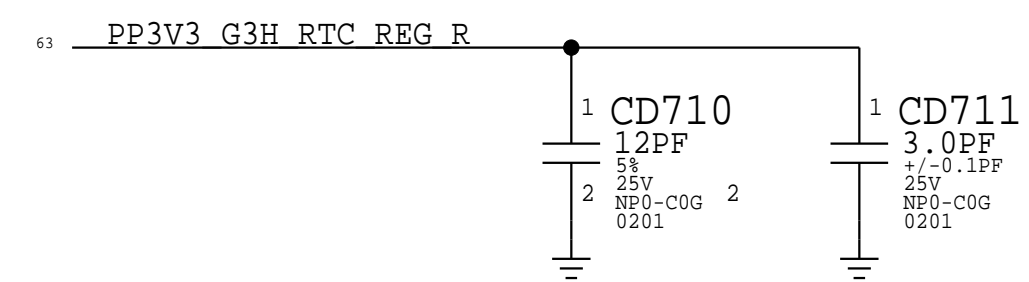
PBUS TRACKPAD



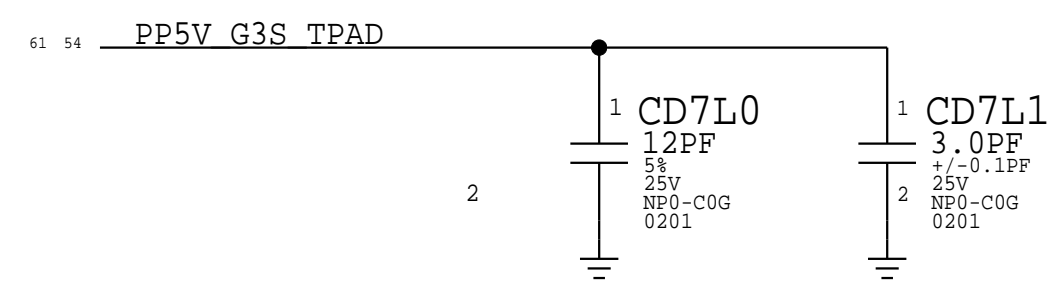
DFR 1V8 VR



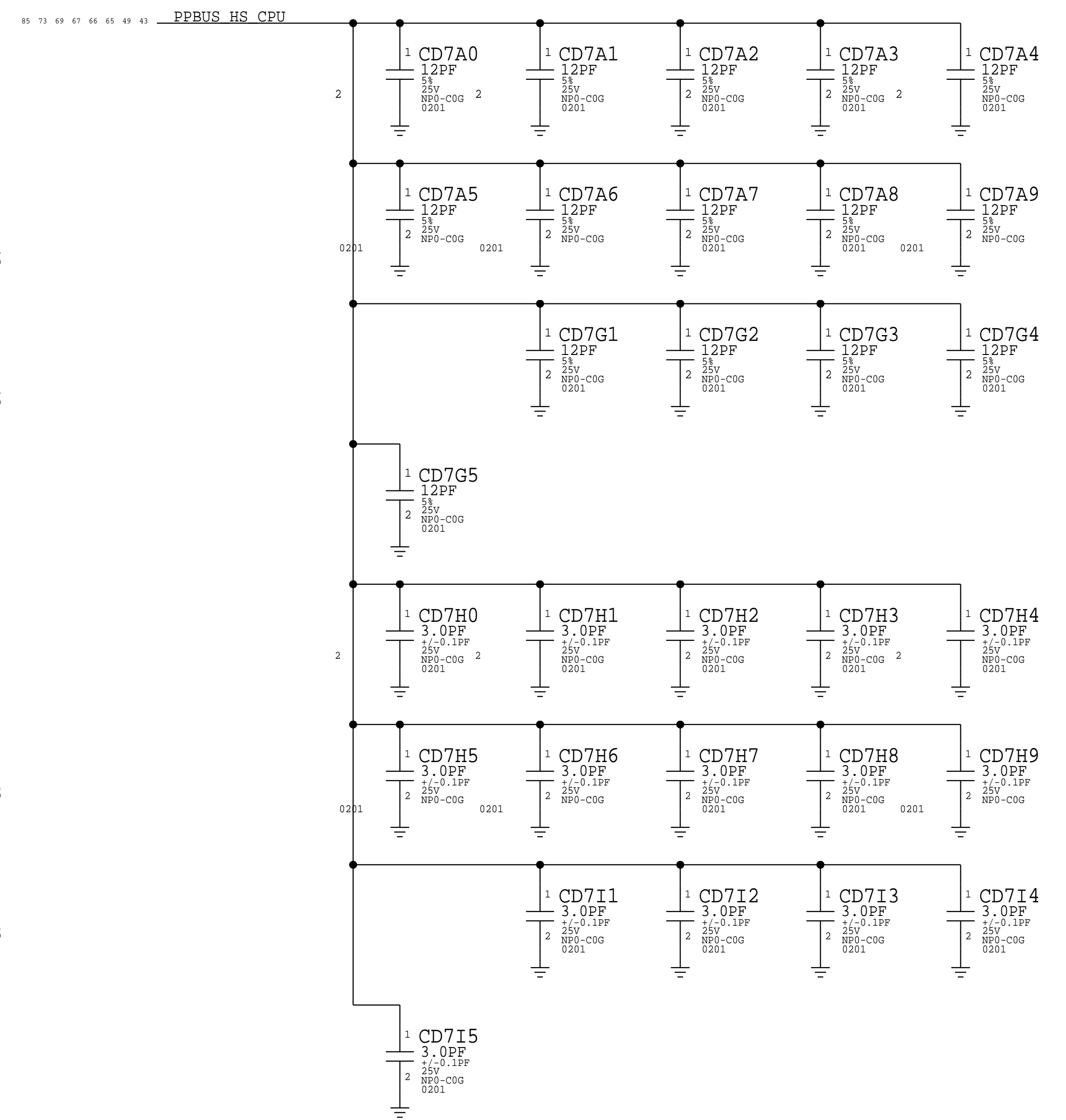
3V3 G3H RTC VR



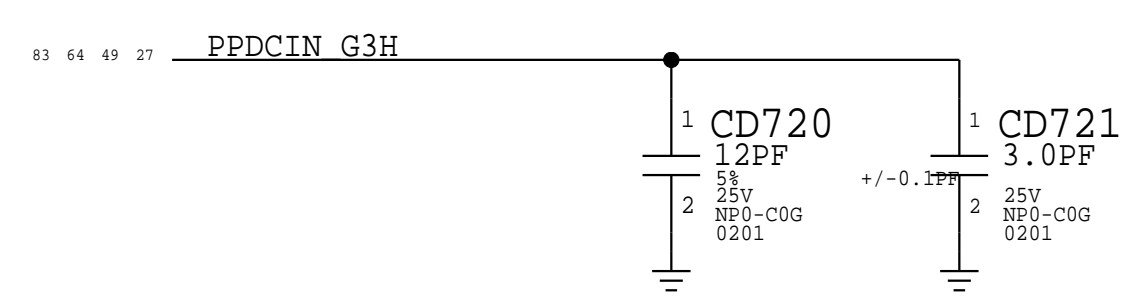
5V G3S TRACKPAD



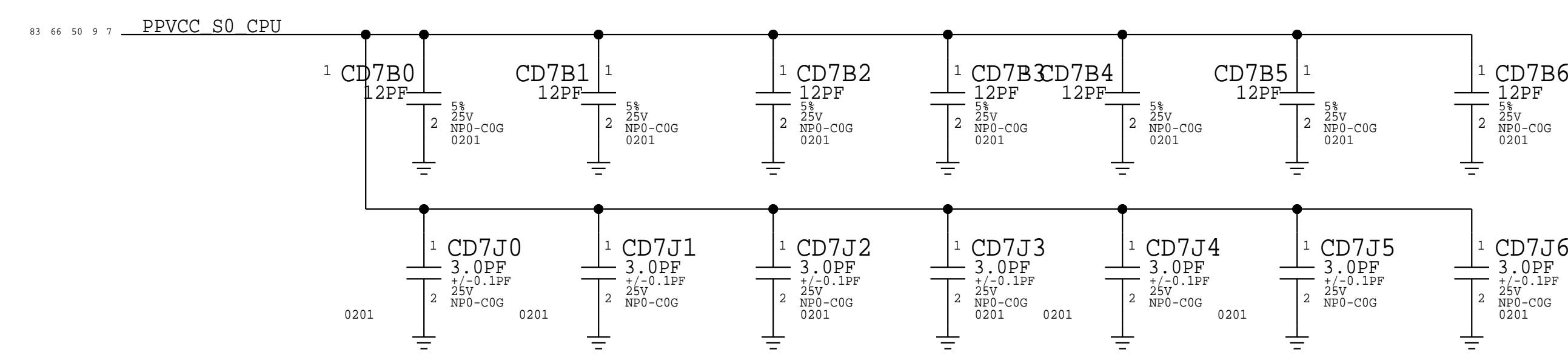
CPU CORE/VCCSA/GT VR HIGH SIDE



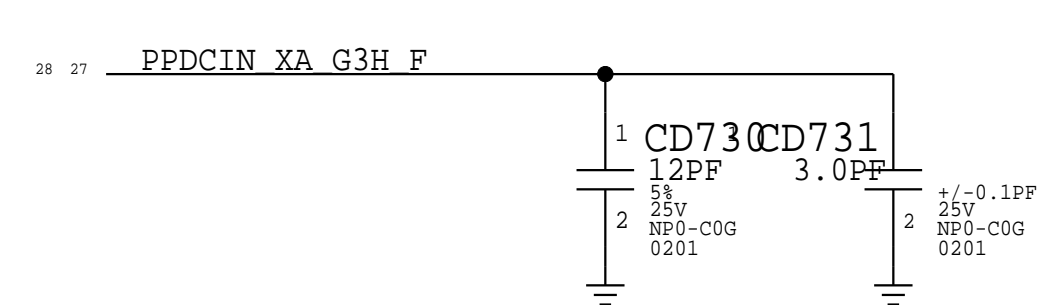
DCIN CHARGER



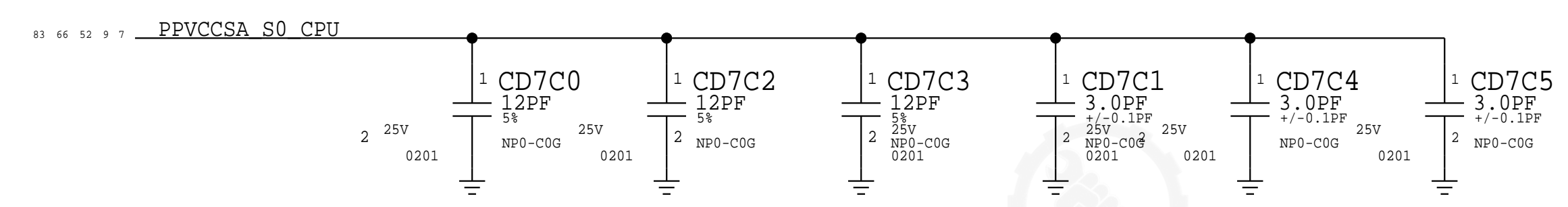
CPU CORE VR LOAD SIDE



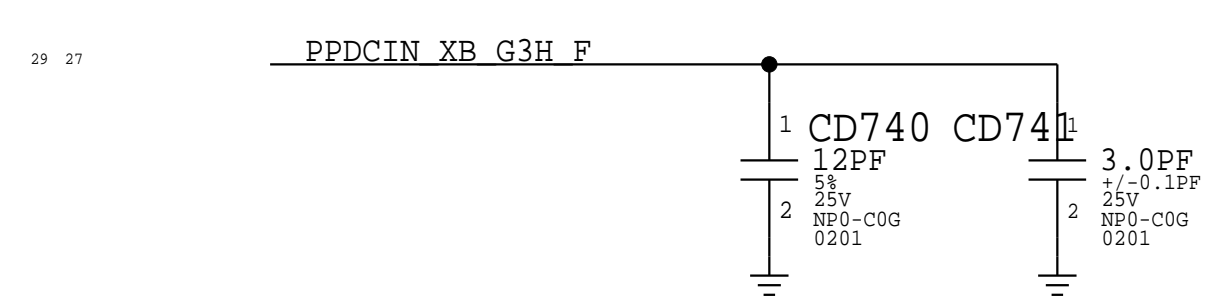
DCIN XA ACE2



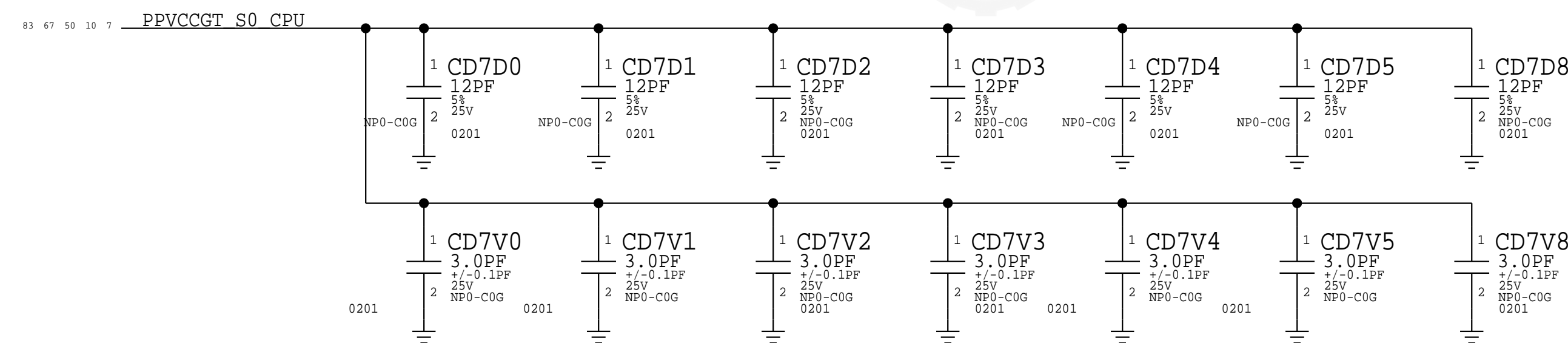
CPU VCCSA LOAD SIDE



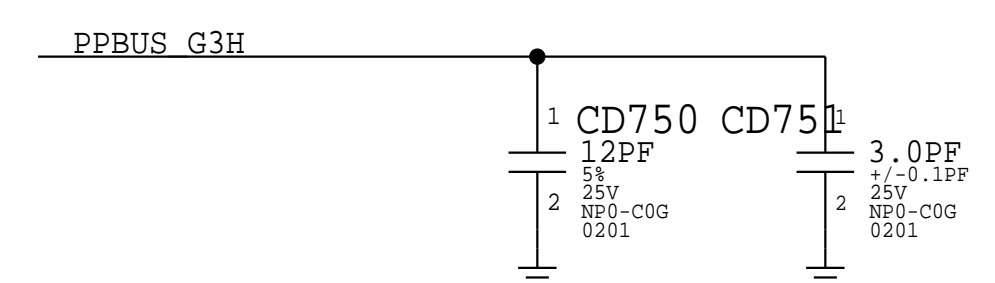
DCIN XB ACE2



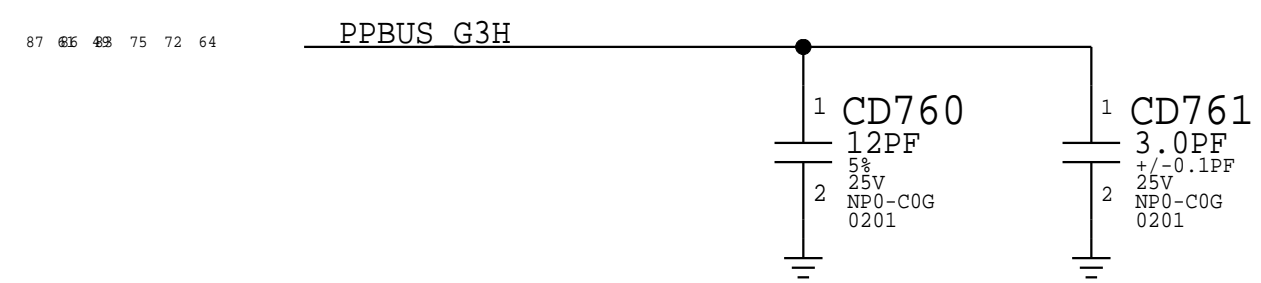
CPU VCCGT LOAD SIDE



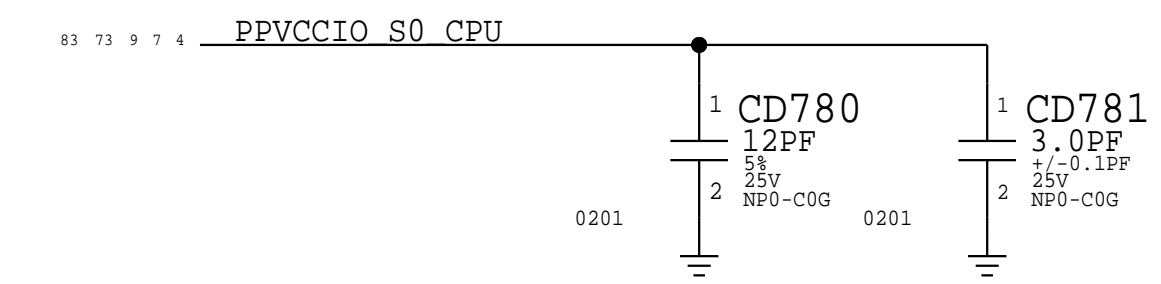
PBUS CHARGER



PBUS CPU HIGH SIDE SENSOR



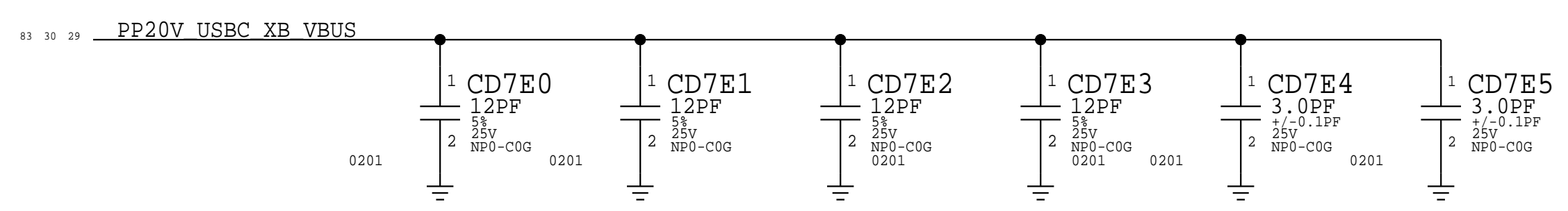
CPU VCCIO LOAD SIDE



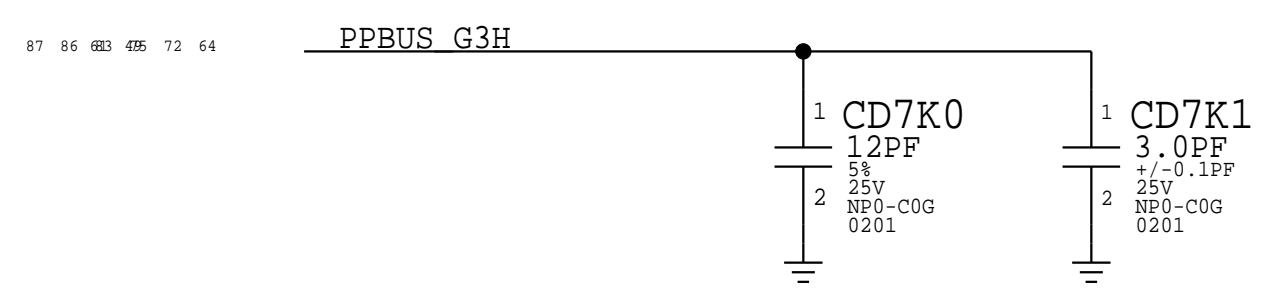
PBUS RIGHT AMP SENSOR



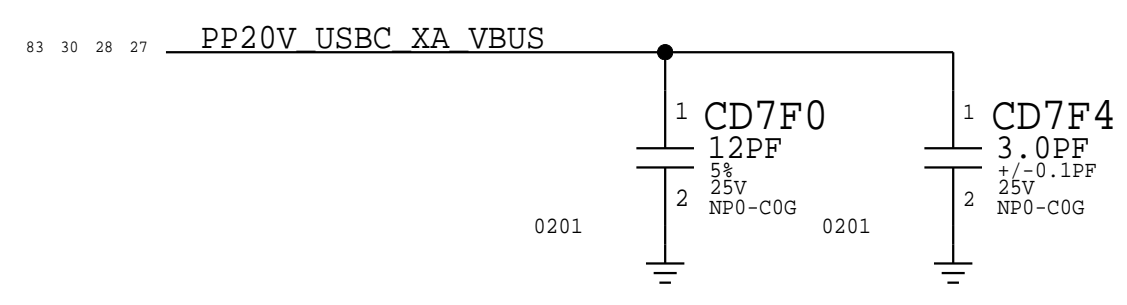
VBUS XB



PBUS LEFT AMP SENSOR



VBUS XA



A

A

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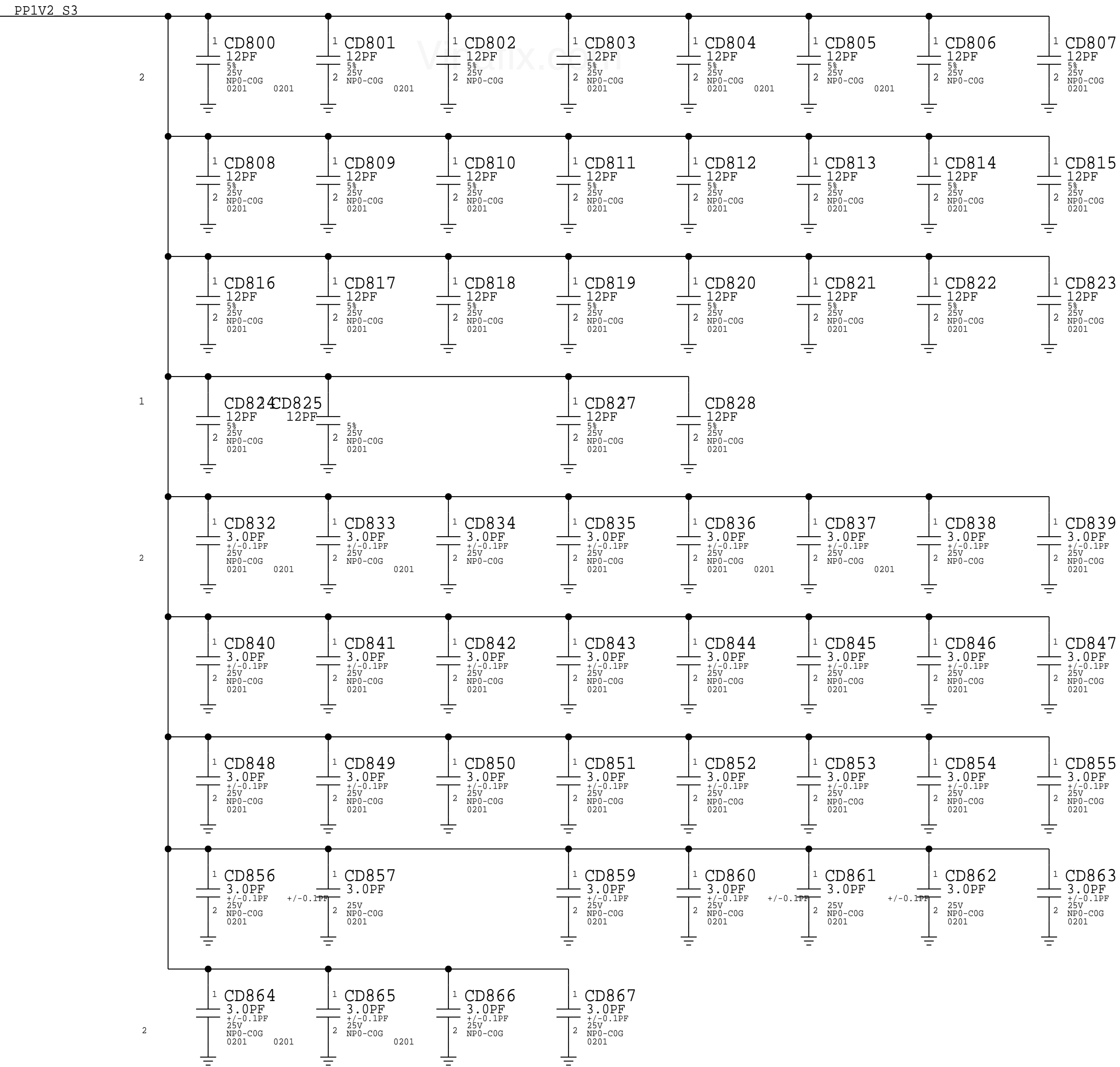
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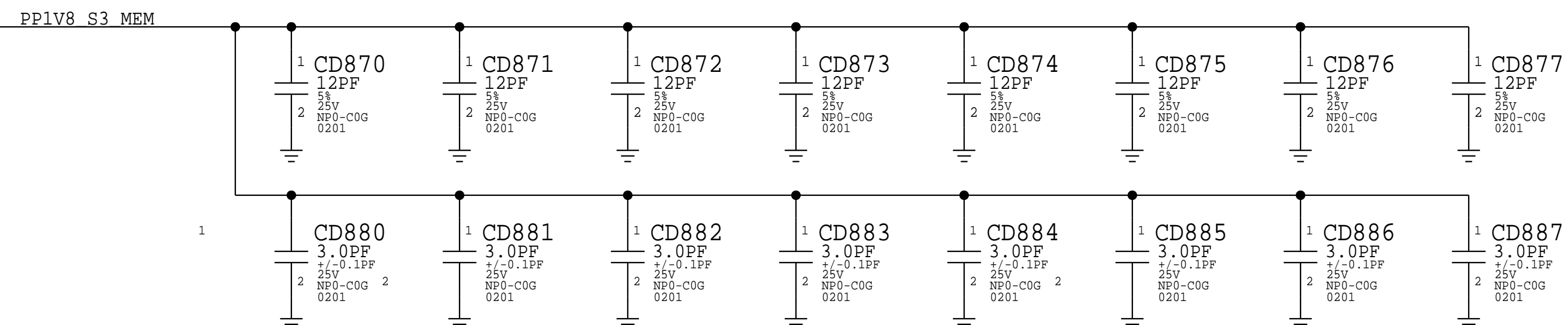
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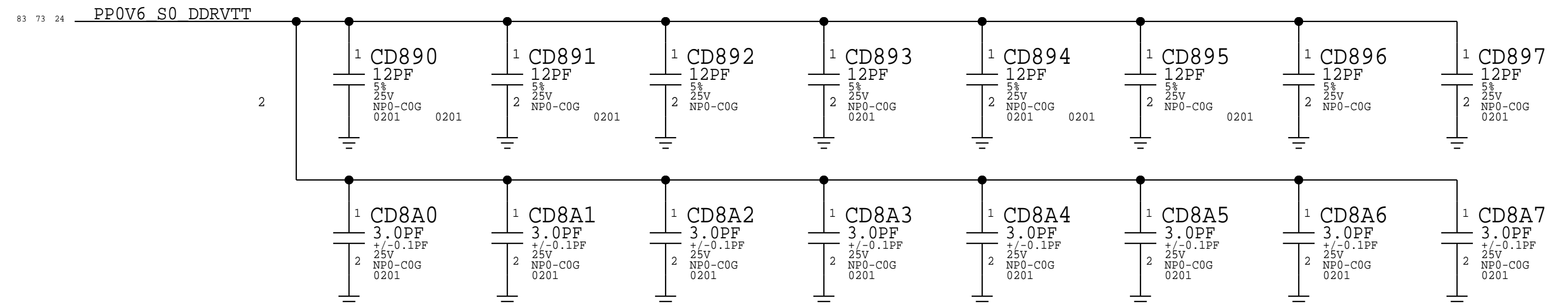
MEM 1V2 LOAD SIDE



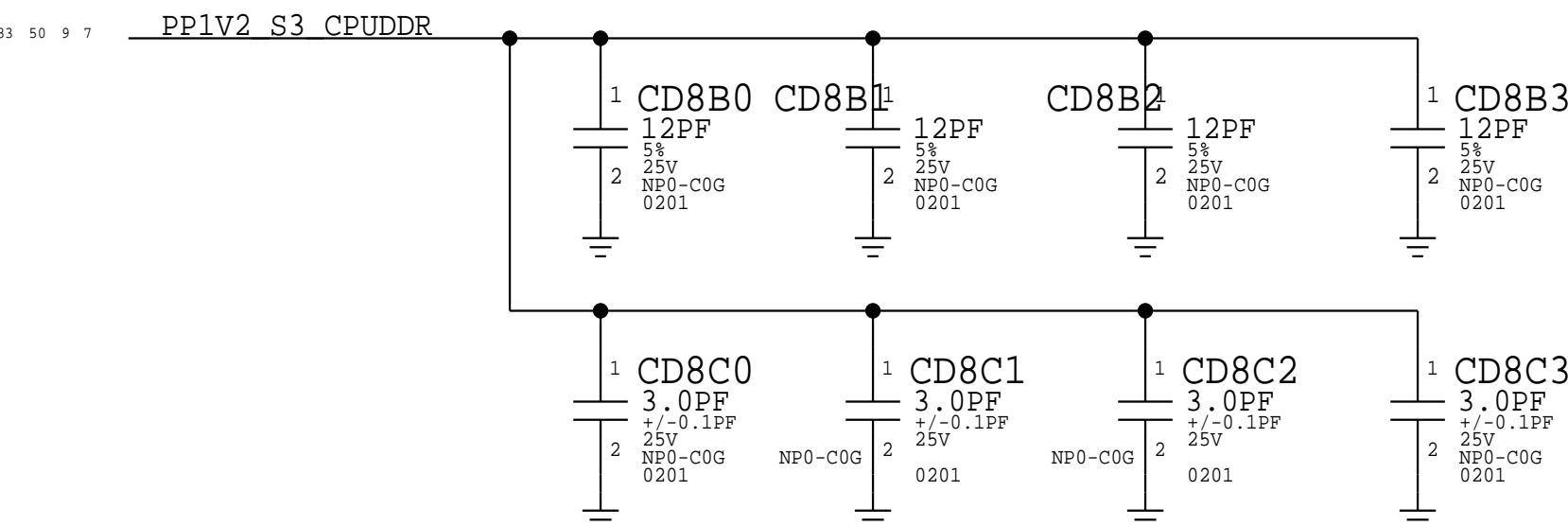
MEM 1V8 LOAD SIDE



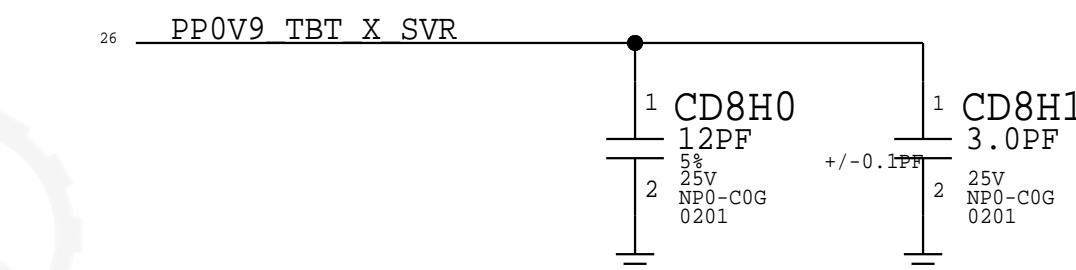
MEM 0V6 DDRVTT LOAD SIDE



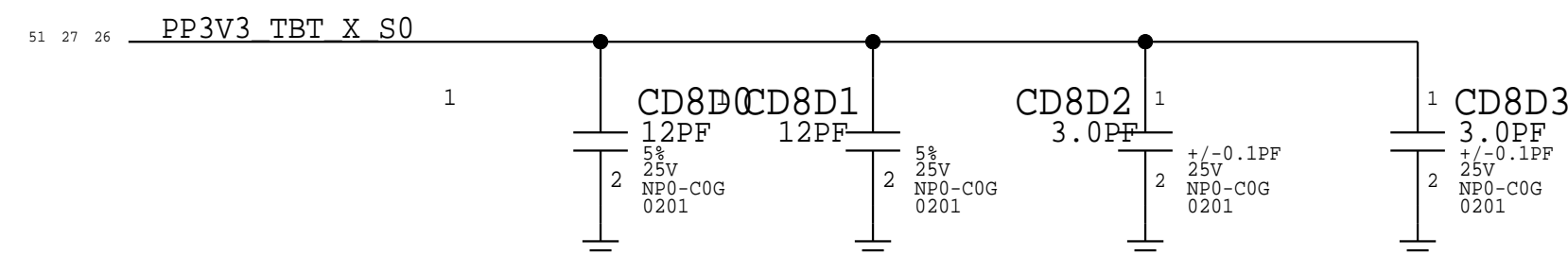
CPU 1V2 LOAD SIDE



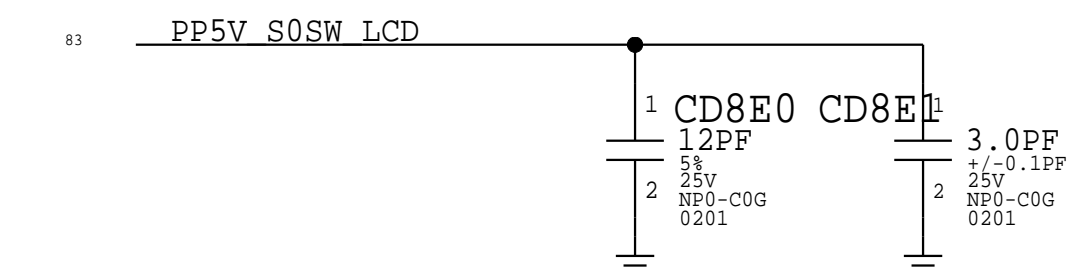
TBT X SVR



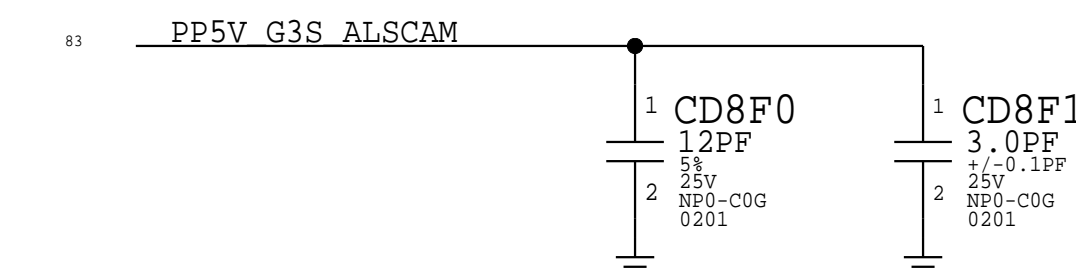
TBT X S0



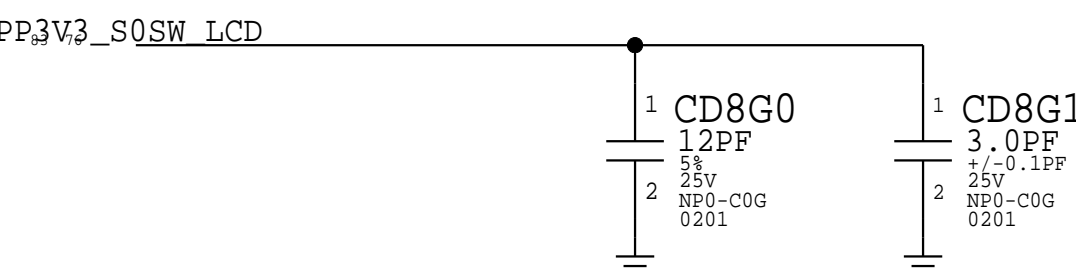
EDP CONNECTOR 5V LCD



EDP CONNECTOR 5V ALS



EDP CONNECTOR 3V3 LCD

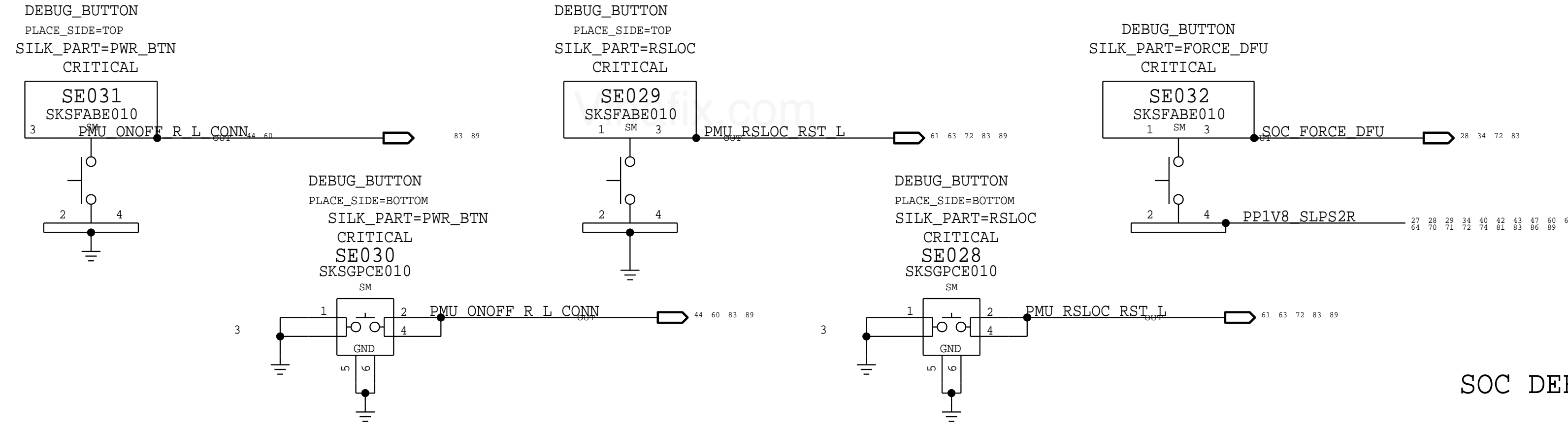


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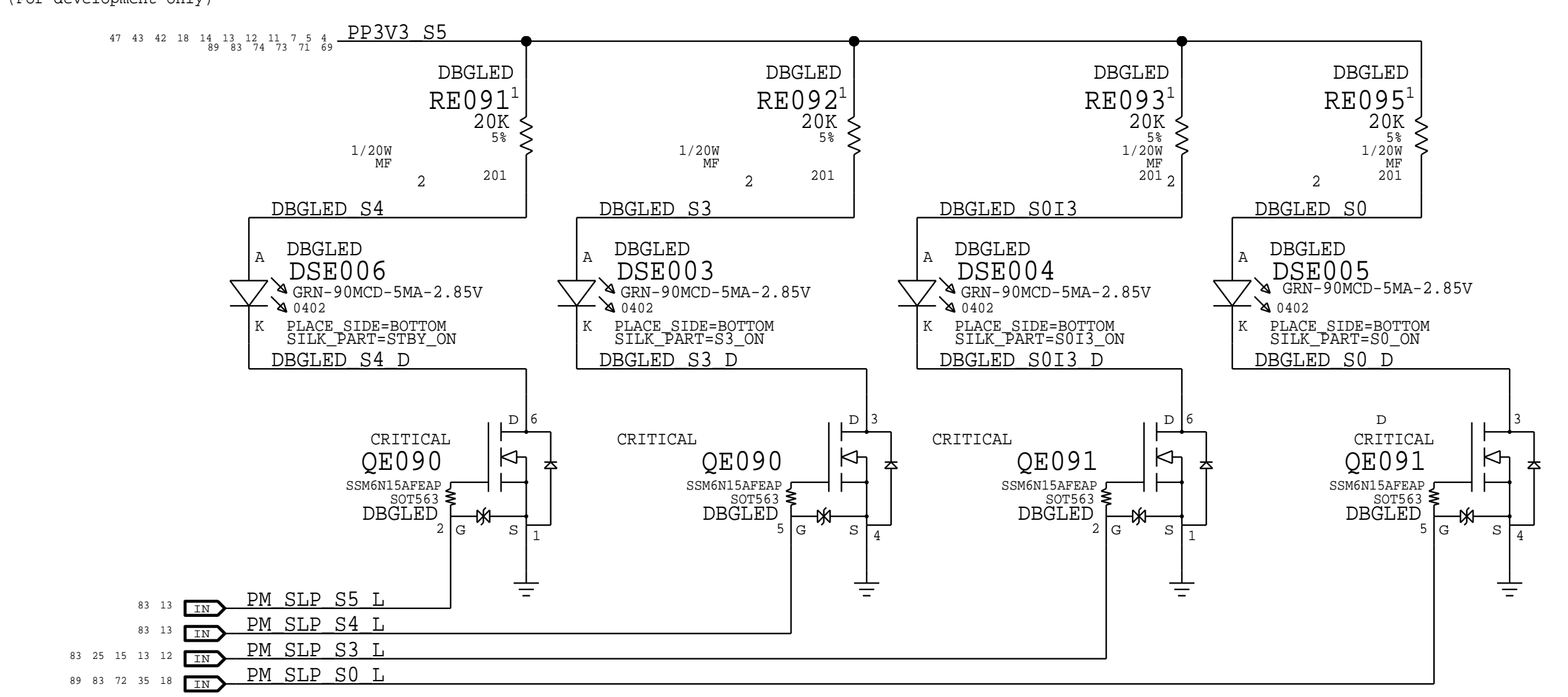
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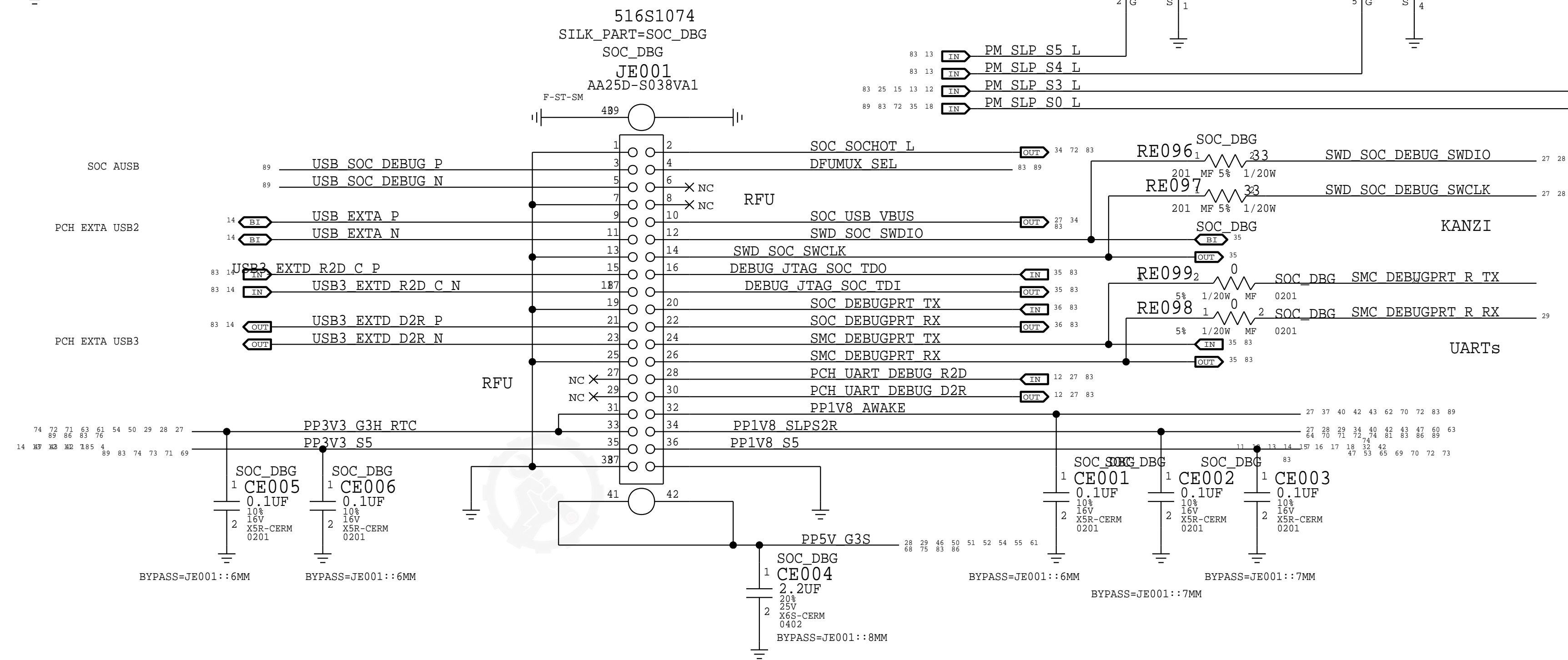
Debug Power "Buttons"



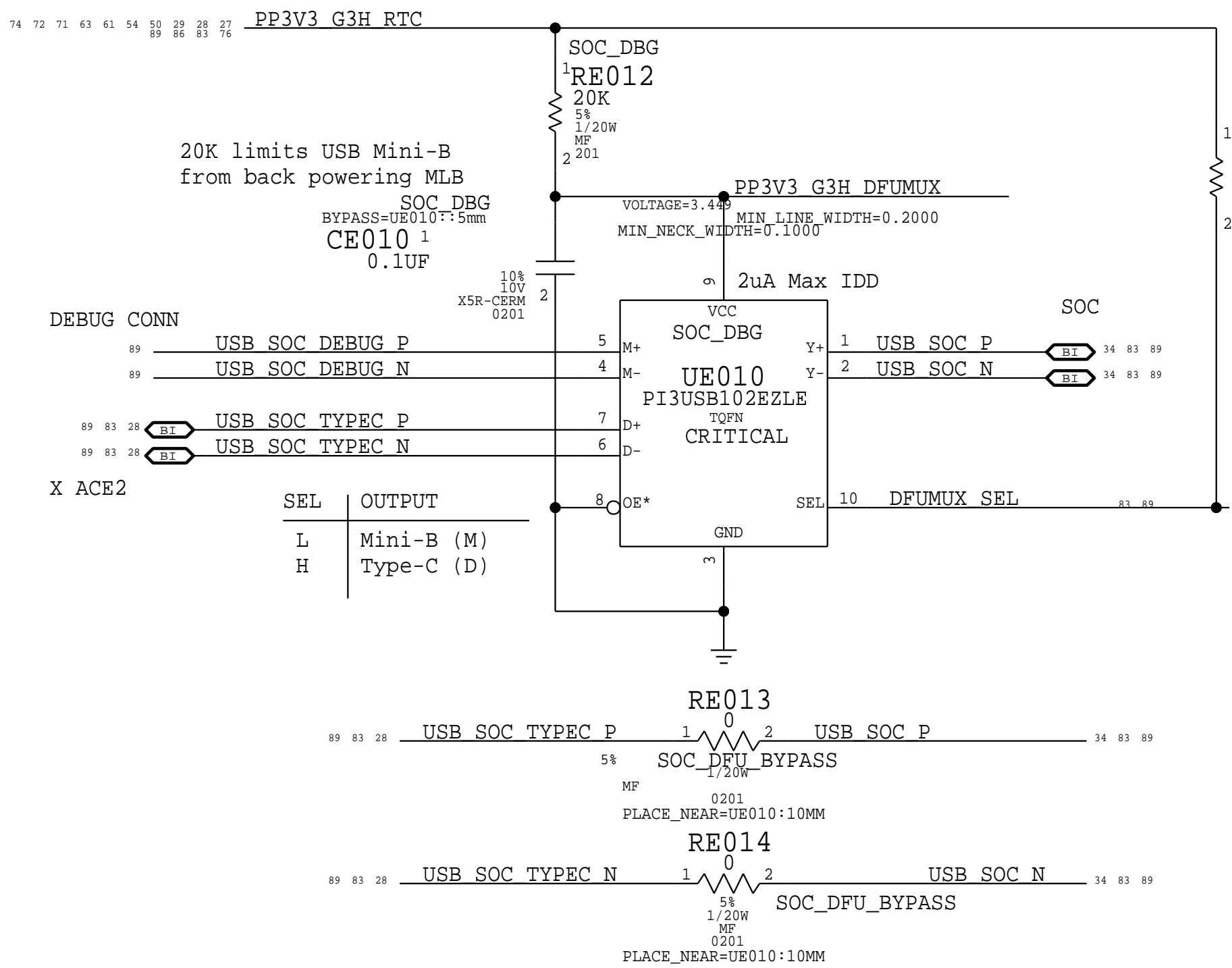
Power State Debug LEDs



SOC DEBUG Connector

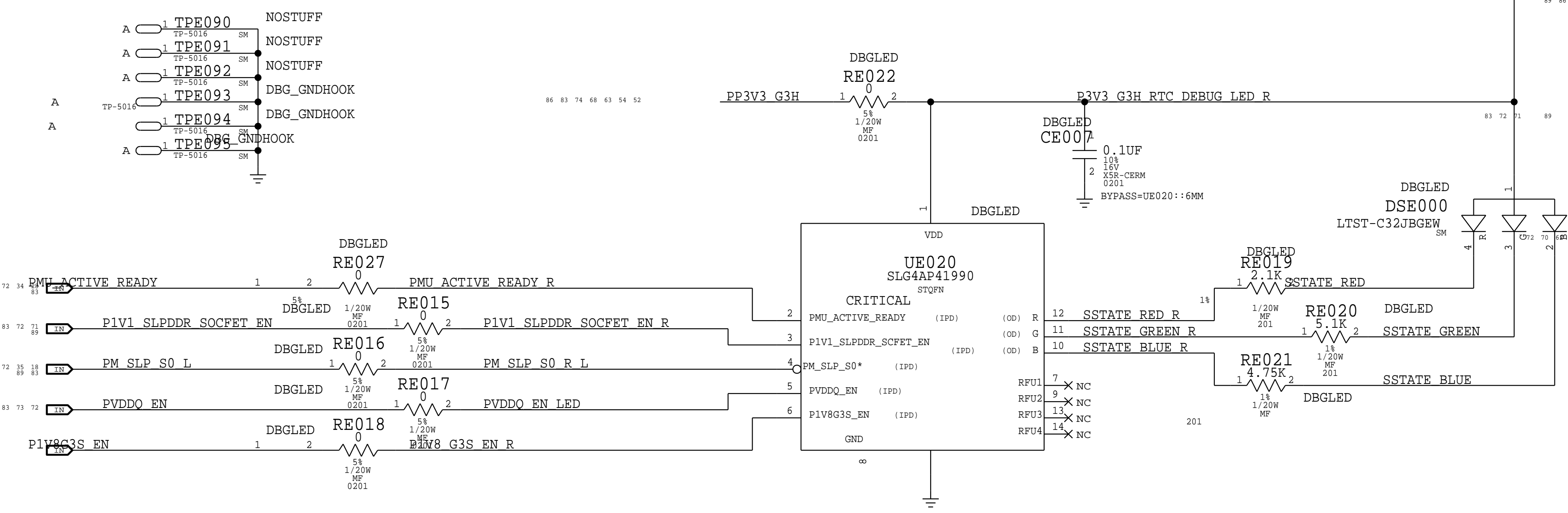


SoC USB DFU Mux

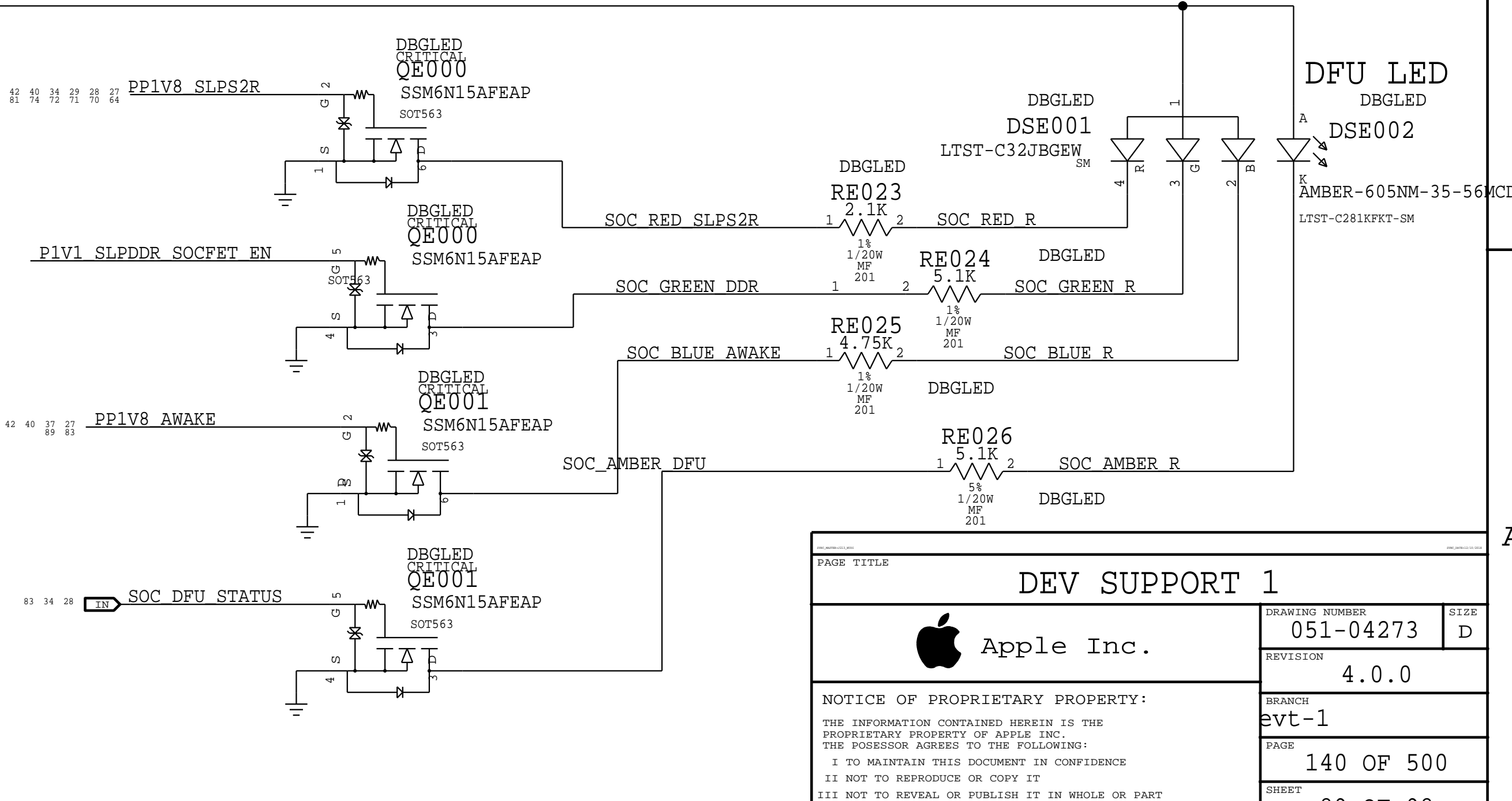


System State LEDs

See color table on next page



SOC State LEDs



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BOM_COST_GROUP=DEBUG

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UE020 SAK Truth Table:

	INPUTS					OUTPUTS (OD)		EOLOR
	PMU_ACT_RDY	SLP_SCFET_EN	SLP_SC_L	VDDQ_EN	1V8G3S_EN	R	G	
0	0	0	0	0	0	BLINK	1	Blinking Red
	0	0	0	1	0		1	1 Red
	0	0	0	1	1		0	0 Magenta
	0	0	1	1	1		0	0 White
	0	0	1	0	0		1	0 Magenta
	0	0	1	0	1		0	0 Magenta
	0	0	1	1	0		1	0 Magenta
	0	0	1	1	1		0	0 Magenta
0	1	0	0	0	0		0	1 Magenta
0	1	0	0	1	0		0	1 Magenta
	0	1	0	0	0		1	0 Magenta
	0	1	1	0	0		0	1 Magenta
	0	1	1	1	0		1	0 Magenta
	0	1	1	1	1		0	0 Magenta
	1	0	0	0	0		0	1 Magenta
	1	0	0	0	1		0	1 Magenta
	1	0	1	0	0		0	1 Magenta
	1	0	1	1	0		0	1 Magenta
	1	0	1	1	1		0	1 Magenta
	1	1	0	0	0		0	1 Magenta
	1	1	0	0	1		0	1 Magenta
	1	1	1	0	0		0	1 Magenta
	1	1	1	0	1		0	1 Magenta
	1	1	1	1	0		0	1 Magenta
	1	1	1	1	1		0	1 Magenta
1	0	0	0	1	0		0	1 Magenta
1	0	1	0	0	0		0	1 Magenta
	1	0	0	1	0		0	1 Magenta
	1	0	1	0	0		0	1 Magenta
	1	0	1	1	0		0	1 Magenta
	1	1	0	0	0		0	1 Magenta
	1	1	0	0	1		0	1 Magenta
	1	1	1	0	0		0	1 Magenta
	1	1	1	0	1		0	1 Magenta
	1	1	1	1	0		0	1 Magenta
	1	1	1	1	1		0	1 Magenta
1	1	1	1	0	0		0	1 Magenta
1	1	1	1	0	1		0	1 Magenta
1	1	1	1	1	0		0	1 Magenta
1	1	1	1	1	1		0	1 Green

PAGE TITLE		
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CPU

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S00574	1	CPU,CFLU,SRCUU,QS,DO,2.3,28W,1.05,BGA1528	U0500	CRITICAL	CPU:28W_2P3G_SRCUU
337S00572	1	CPU,CFLU,SRCK5,QS,DO,2.7,28W,1.2,BGA1528	U0500	CRITICAL	CPU:28W_2P7G_SRCK5
337S00693	1	CPU,CFLU,QRH7,QS,DO,1.4,1.05,BGA1528	U0500	CRITICAL	CPU:15W_1P4G_QRH7
337S00692	1	CPU,CFLU,QRH6,QS,DO,1.7,1.15,BGA1528	U0500	CRITICAL	CPU:15W_1P7G_QRH6

SOC

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
339S00386	1	POP,GIBRALTAR+1GB 20NM,M,DEV,SK,CSF1122	U3900	CRITICAL	SOC:DEV_1G
339S00388	1	POP,GIBRALTAR+2GB 20NM,M,DEV,SK,CSF1122	U3900	CRITICAL	SOC:DEV_2G
339S00601	1	POP,GIBRALTAR_L+1GB 16NM,M,B0,SK,C1122	U3900	CRITICAL	SOC:PROD_B0_1G
339S00605	1	POP,GIBRALTAR_L+2GB 16NM,M,B0,SK,C1122	U3900	CRITICAL	SOC:PROD_B0_2G

AMR ASSEMBLY

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
677-10581	1	SUBASSY (T&R) PCB,AMR INTERPOSER,X941	J4800	CRITICAL	AMR:POC

TBT

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
338S00441	1	IC,TBT,TITAN RIDGE DP,SLMGS,FRQ,C1,CSF337	U2800	CRITICAL	TBT:TR_C1_PRQ

UPC

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S01478	4	IC,CD3217,ACE2,A0,USB PWR SW W/HV,BGA123	U3100,U3200	CRITICAL	UPC:ACE2_A0
353S01826	4	IC,CD3217,ACE2,B1,USB PWR SW W/HV,BGA123	U3100,U3200	CRITICAL	UPC:ACE2_B1
353S01960	4	IC,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123	U3100,U3200	CRITICAL	UPC:ACE2_B2

WIRELESS

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
339S00586	1	MODULE,WIFI/BT,SAPORO,ES2.1,M,LGA451	U3701	CRITICAL	MODULE:MUR_ES_2P1
339S00599	1	MODULE,WIFI/BT,SAPORO,ES23,M,LGA451	U3701	CRITICAL	MODULE:MUR_ES_2P3
339S00616	1	MODULE,WIFI/BT,SAPORO,ES3.1,M,LGA451	U3701	CRITICAL	MODULE:MUR_ES_3P1
339S00628	1	MODULE,WIFI/BT,SAPORO,ES2.3,U,LGA451	U3701	CRITICAL	MODULE:MUR_ES_2P3

PMU

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
338S00466	1	IC,PMU,CALPE-L,D2249A0,OTP-BC,CSF324	U7800	CRITICAL	CALPE_L:OTP_BC

CHARGER IC

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S01525	1	IC,ISL9240HIB02,PMU,SUCNA,WCP40,2.1X3.3	U7000	CRITICAL	CHARGER_IC:POC

DRAM

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
333S00125	4	IC,SDRAM,LPDDR3-2133,16GBIT,21NM,H,BGA178	U2300,U2400,U2500,U2600	CRITICAL	DRAM:08GB_HY
333S00069	4	IC,SDRAM,LPDDR3-2133,16GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	DRAM:08GB_MI
333S00166	4	IC,SDRAM,LPDDR3-2133,16GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	DRAM:08GB_SS
333S00126	4	IC,SDRAM,LPDDR3-2133,32GBIT,21NM,H,BGA178	U2300,U2400,U2500,U2600	CRITICAL	DRAM:16GB_HY
333S00070	4	IC,SDRAM,LPDDR3-2133,32GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	DRAM:16GB_MI
333S00167	4	IC,SDRAM,LPDDR3-2133,32GBIT,20NM,BGA178	U2300,U2400,U2500,U2600	CRITICAL	DRAM:16GB_SS

SE

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-11132	1	IC,RTM4,ES2.1,PN80V,DEV,UFLGA64	U5000	CRITICAL	SE:ES2P1_DEV
338S00253	1	IC,RTM4,ES2.1,PN80V,PRD,UFLGA64	U5000	CRITICAL	SE:ES2P1_PROD

BMU FLEX

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
056-02919	1	MCO,FLEX,POWER,X502	BMU_FLEX	CRITICAL	BMU_FLEX:POC

OCARINA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
338S00410	1	IC,PMU,OCARINA,D2499A0,OTP-AG,WLCSF56	U9000	CRITICAL	SSD:4L

TBT ROM

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
341S01197	1	IC,TBT-X (V30.2) PROTO-0,X1536	U2890	CRITICAL	TBT_ROM:P0_ACE2A0
341S01228	1	IC,TBT-X (VXXXX) NEW PROTO-0,X1536	U2890	CRITICAL	TBT_ROM:P0_ACE2B1
341S01233	1	IC,TBT-X (VXXXX) PROTO-1,X1536	U2890	CRITICAL	TBT_ROM:P1
341S01338	1	IC,TBT-X (VXXXX) PROTO-1,X1536	U2890	CRITICAL	TBT_ROM:EVT

BT ROM

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00348	1	IC,SPI SERIAL FLASH,4M BIT,1.8V,US08	U3750	CRITICAL	BT_ROM:BLANK_WINBOND
335S00400	1	IC,SPI SERIAL FLASH,4M BIT,1.8V,US08	U3750	CRITICAL	BT_ROM:BLANK_MACRONIX
341S01184	1	BT FLASH ROM (V2) PROTO-0,X1536	U3750	CRITICAL	BT_ROM:P0
341S01260	1	ROM,BT FLASH (VXX) PROTO-1,X1536	U3750	CRITICAL	BT_ROM:P1

WIFI ROM

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00214	1	IC,EEPROM,SER,UWIRE,16K,1.8V,DFN8	U3710	CRITICAL	WIFI_ROM:BLANK_ON
335S00216	1	IC,EEPROM,SER,UWIRE,16K,1.8V,DFN8	U3710	CRITICAL	WIFI_ROM:BLANK_ROHM
341S01087	1	IC,WIFI ROM (V00) WW1,X1421	U3710	CRITICAL	WIFI_ROM:V00

SPEAKER AMP

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S01871	4	IC,TAS5770L,C0,CLASS D AMP,CSF30	U6400,U6450,U6500,U6550	CRITICAL	SPEAKER_AMP:C0

VR DRIVER CPU CORE

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00529	1	IC,SIC621,DR MOS,IMVP-8,60A,PQFN31,5X5MM U7220	U7220	CRITICAL	DR_MOS_CORE:VISHAY

VR DRIVER CPU VCCSA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00525	1	IC,SIC532,DR MOS,IMVP-8,30A,PQFN22,4X3X5	U7270	CRITICAL	DR_MOS_VCCSA:VISHAY

VR DRIVER CPU GT

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00519	1	IC,SIC621,DR MOS,IMVP-8,60A,PQFN31,5X5MM U7410,U7420	U7410,U7420	CRITICAL	DR_MOS_GT:VISHAY

VR INDUCTOR VCCSA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
152S00689	1	IND,MLO,0.47UH,4.7MO,17.5A,5.6X5.2X2.4MM	L7270	CRITICAL	IND_VCCSA:CYNTEC

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BOM CONFIGURATION

Apple Inc.

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NAND U8600

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00377	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:ZDP_HY
335S00393	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:ZDP_TS
335S00388	1	NAND, 3DV4, 64GBT, XXX, S4E, 256G, SD, SLGA110	U8600	CRITICAL	NAND_U8600:ZDP_MD
335S00416	1	NAND, 3DV5, 64GBT, S4E, 256G, SS, SLGA110	U8600	CRITICAL	NAND_U8600:ZDP_SS
335S00394	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:4DP_TS
335S00378	1	NAND, 3DV4, 128GBT, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:4DP_HY
335S00424	1	NAND, 3DV5, 128GBT, S4E, 256G, SS, SLGA110	U8600	CRITICAL	NAND_U8600:4DP_SS
335S00398	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:6DP_HY
335S00395	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, T, SLGA110	U8600	CRITICAL	NAND_U8600:6DP_TS
335S00379	1	NAND, 3DV4, 256GBT, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:8DP_HY
335S00327	1	NAND, 3DV3, 256GBP, 133, S4E, 170G, SD, ULGA110	U8600	CRITICAL	NAND_U8600:8DP_MD
335S00396	1	NAND, 3DV4, 256GBT, XXX, S4E, 256G, T, SLGA110	U8600	CRITICAL	NAND_U8600:8DP_TS
335S00399	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:10DP_HY
335S00397	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, T, SLGA110	U8600	CRITICAL	NAND_U8600:10DP_TS
335S00380	1	NAND, 3DV4, 512GBT, S4E, 256G, H, SLGA110	U8600	CRITICAL	NAND_U8600:16DP_HY
335S00391	1	NAND, 3DV4, 512GBT, XXX, S4E, 256G, SD, SLGA110	U8600	CRITICAL	NAND_U8600:16DP_MD

NAND U8700


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00377	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:ZDP_HY
335S00393	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:ZDP_TS
335S00388	1	NAND, 3DV4, 64GBT, XXX, S4E, 256G, SD, SLGA110	U8700	CRITICAL	NAND_U8700:ZDP_MD
335S00416	1	NAND, 3DV5, 64GBT, S4E, 256G, SS, SLGA110	U8700	CRITICAL	NAND_U8700:ZDP_SS
335S00394	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:4DP_TS
335S00378	1	NAND, 3DV4, 128GBT, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:4DP_HY
335S00424	1	NAND, 3DV5, 128GBT, S4E, 256G, SS, SLGA110	U8700	CRITICAL	NAND_U8700:4DP_SS
335S00398	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:6DP_HY
335S00395	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, T, SLGA110	U8700	CRITICAL	NAND_U8700:6DP_TS
335S00379	1	NAND, 3DV4, 256GBT, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:8DP_HY
335S00327	1	NAND, 3DV3, 256GBP, 133, S4E, 170G, SD, ULGA110	U8700	CRITICAL	NAND_U8700:8DP_MD
335S00396	1	NAND, 3DV4, 256GBT, XXX, S4E, 256G, T, SLGA110	U8700	CRITICAL	NAND_U8700:8DP_TS
335S00399	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:10DP_HY
335S00397	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, T, SLGA110	U8700	CRITICAL	NAND_U8700:10DP_TS
335S00380	1	NAND, 3DV4, 512GBT, S4E, 256G, H, SLGA110	U8700	CRITICAL	NAND_U8700:16DP_HY
335S00391	1	NAND, 3DV4, 512GBT, XXX, S4E, 256G, SD, SLGA110	U8700	CRITICAL	NAND_U8700:16DP_MD

NAND U8800

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00377	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:ZDP_HY
335S00393	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:ZDP_TS
335S00388	1	NAND, 3DV4, 64GBT, XXX, S4E, 256G, SD, SLGA110	U8800	CRITICAL	NAND_U8800:ZDP_MD
335S00416	1	NAND, 3DV5, 64GBT, S4E, 256G, SS, SLGA110	U8800	CRITICAL	NAND_U8800:ZDP_SS
335S00394	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:4DP_TS
335S00378	1	NAND, 3DV4, 128GBT, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:4DP_HY
335S00424	1	NAND, 3DV5, 128GBT, S4E, 256G, SS, SLGA110	U8800	CRITICAL	NAND_U8800:4DP_SS
335S00398	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:6DP_HY
335S00395	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, T, SLGA110	U8800	CRITICAL	NAND_U8800:6DP_TS
335S00379	1	NAND, 3DV4, 256GBT, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:8DP_HY
335S00327	1	NAND, 3DV3, 256GBP, 133, S4E, 170G, SD, ULGA110	U8800	CRITICAL	NAND_U8800:8DP_MD
335S00396	1	NAND, 3DV4, 256GBT, XXX, S4E, 256G, T, SLGA110	U8800	CRITICAL	NAND_U8800:8DP_TS
335S00399	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:10DP_HY
335S00397	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, T, SLGA110	U8800	CRITICAL	NAND_U8800:10DP_TS
335S00380	1	NAND, 3DV4, 512GBT, S4E, 256G, H, SLGA110	U8800	CRITICAL	NAND_U8800:16DP_HY
335S00391	1	NAND, 3DV4, 512GBT, XXX, S4E, 256G, SD, SLGA110	U8800	CRITICAL	NAND_U8800:16DP_MD

NAND U8900

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
335S00377	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:ZDP_HY
335S00393	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:ZDP_TS
335S00388	1	NAND, 3DV4, 64GBT, XXX, S4E, 256G, SD, SLGA110	U8900	CRITICAL	NAND_U8900:ZDP_MD
335S00416	1	NAND, 3DV5, 64GBT, S4E, 256G, SS, SLGA110	U8900	CRITICAL	NAND_U8900:ZDP_SS
335S00394	1	NAND, 3DV4, 64GBT, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:4DP_TS
335S00378	1	NAND, 3DV4, 128GBT, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:4DP_HY
335S00424	1	NAND, 3DV5, 128GBT, S4E, 256G, SS, SLGA110	U8900	CRITICAL	NAND_U8900:4DP_SS
335S00398	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:6DP_HY
335S00395	1	NAND, 3DV4, 192GBT, XXX, S4E, 256G, T, SLGA110	U8900	CRITICAL	NAND_U8900:6DP_TS
335S00379	1	NAND, 3DV4, 256GBT, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:8DP_HY
335S00327	1	NAND, 3DV3, 256GBP, 133, S4E, 170G, SD, ULGA110	U8900	CRITICAL	NAND_U8900:8DP_MD
335S00396	1	NAND, 3DV4, 256GBT, XXX, S4E, 256G, T, SLGA110	U8900	CRITICAL	NAND_U8900:8DP_TS
335S00399	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:10DP_HY
335S00397	1	NAND, 3DV4, 320GBT, XXX, S4E, 256G, T, SLGA110	U8900	CRITICAL	NAND_U8900:10DP_TS
335S00380	1	NAND, 3DV4, 512GBT, S4E, 256G, H, SLGA110	U8900	CRITICAL	NAND_U8900:16DP_HY
335S00391	1	NAND, 3DV4, 512GBT, XXX, S4E, 256G, SD, SLGA110	U8900	CRITICAL	NAND_U8900:16DP_MD

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COMMON BOM GROUPS

BOM GROUP	BOM OPTIONS
X1536_COMMON_PARTS	SCH,PCB,ALT_CMN,COMMON,ALTERNATE:PART,X1536_USB,X1536_WIRELESS,X1536_X86,X1536_MISC,X1536_T290
X1536_USB	TBT:TR_C1_PRQ,UPC:ACE2_B2,TBT_ROM:EVT
X1536_WIRELESS	MODULE:MUR_ES_3P1,WIFI_ROM:V00,BT_ROM:P1
X1536_X86	EDP_ENABLE,DR_MOS_CORE:VISHAY,DR_MOS_VCCSA:VISHAY,DR_MOS_GT:VISHAY,IND_VCCSA:CYNTEC
X1536_T290	BOARDID3,BOARDID4,BOOTCFG0,BOARDREV1,CALPE_L:OTP_BC,SE:ES2P1_PROD,NAND_VCC:2.5V
X1536_MISC	CHARGER_IC:POC,AMR:POC,BMU_FLEX:POC,SPEAKER_AMP:C0

DEBUG BOM PARTS

BOM GROUP	BOM OPTIONS
X1536_DEV_1	ALT_CMN,ALTERNATE:PART,DBGLD,DBG_FAN,DEBUG_BUTTON,ESPI_DBG,SENSOR:DEV,XDP:YES,XDP_CONN:YES
X1536_DEV_2	SSD_DBG,LOADISNS,LOADRC:YES,USBC_AARDVARKANOID,USBC_ARKANOID,SOC_DBG,DBG_GNDHOOK,WIFI_DBG

DRAM AND SPD 内存配置表

BOM GROUP	BOM OPTIONS
X1536_08GB_HY	DRAM:08GB_HY,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG1_L,RAMCFG0_L
X1536_08GB_MI	DRAM:08GB_MI,RAMCFG4_L,RAMCFG3_L,RAMCFG2_L,RAMCFG1_L
X1536_08GB_SS	DRAM:08GB_SS,RAMCFG3_L,RAMCFG2_L,RAMCFG0_L
X1536_16GB_HY	DRAM:16GB_HY,RAMCFG4_L,RAMCFG3_L,RAMCFG1_L,RAMCFG0_L
X1536_16GB_MI	DRAM:16GB_MI,RAMCFG4_L,RAMCFG3_L,RAMCFG1_L
X1536_16GB_SS	DRAM:16GB_SS,RAMCFG3_L,RAMCFG0_L
X1536_NO_DRAM	DRAM:OFF

CPU

BOM GROUP	BOM OPTIONS
X1536_CPU_1P4GHZ	CPU:15W_1P4G_QRH7
X1536_CPU_1P7GHZ	CPU:15W_1P7G_QRH6
X1536_CPU_NO_CPU	CPU:OFF

SOC AND NAND

BOM GROUP	BOM OPTIONS
X1536_TLC_128GB_HY	SOC:PROD_B0_1G,SSD:2L,NAND_U8600:2DP_HY,NAND_U8700:2DP_HY
X1536_TLC_128GB_TS	SOC:PROD_B0_1G,SSD:2L,NAND_U8600:2DP_TS,NAND_U8700:2DP_TS
X1536_TLC_256GB_HY	SOC:PROD_B0_1G,SSD:4L,NAND_U8600:4DP_HY,NAND_U8700:2DP_HY,NAND_U8800:2DP_HY,NAND_U8900:2DP_HY
X1536_TLC_256GB_TS	SOC:PROD_B0_1G,SSD:4L,NAND_U8600:4DP_TS,NAND_U8700:2DP_TS,NAND_U8800:2DP_TS,NAND_U8900:2DP_TS
X1536_TLC_256GB_SS	SOC:PROD_B0_1G,SSD:4L,NAND_U8600:4DP_SS,NAND_U8700:2DP_SS,NAND_U8800:2DP_SS,NAND_U8900:2DP_SS
X1536_TLC_512GB_HY	SOC:PROD_B0_1G,SSD:4L,NAND_U8600:6DP_HY,NAND_U8700:6DP_HY,NAND_U8800:4DP_HY,NAND_U8900:4DP_HY
X1536_TLC_512GB_TS	SOC:PROD_B0_1G,SSD:4L,NAND_U8600:6DP_TS,NAND_U8700:6DP_TS,NAND_U8800:4DP_TS,NAND_U8900:4DP_TS
X1536_TLC_001TB_HY	SOC:PROD_B0_2G,SSD:4L,NAND_U8600:10DP_HY,NAND_U8700:10DP_HY,NAND_U8800:8DP_HY,NAND_U8900:8DP_HY
X1536_TLC_001TB_TS	SOC:PROD_B0_2G,SSD:4L,NAND_U8600:10DP_TS,NAND_U8700:10DP_TS,NAND_U8800:8DP_TS,NAND_U8900:8DP_TS
X1536_TLC_002TB_HY	SOC:PROD_B0_2G,SSD:4L,NAND_U8600:16DP_HY,NAND_U8700:16DP_HY,NAND_U8800:16DP_HY,NAND_U8900:16DP_HY
X1536_TLC_002TB_WD	SOC:PROD_B0_2G,SSD:4L,NAND_U8600:16DP_WD,NAND_U8700:16DP_WD,NAND_U8800:16DP_WD,NAND_U8900:16DP_WD
X1536_NO_NAND_2_LD	SOC:PROD_B0_2G,SSD:2L,NAND_U8600:OFF,NAND_U8700:OFF,NAND_U8800:OFF,NAND_U8900:OFF
X1536_NO_NAND_4_LD	SOC:PROD_B0_2G,SSD:4L,NAND_U8600:OFF,NAND_U8700:OFF,NAND_U8800:OFF,NAND_U8900:OFF

CPU DRAM CFG[4:0] CHART

DIE REV	CFG 4	VENDOR	CFG 1	CFG 0
A	0	HYNIX	0	0
B	1	MICRON	0	
		SAMSUNG	1 0	
		N/A	1	1

SPEED	CFG 3
2133	0
1866	1

CAPACITY	CFG 2
8GB	0
16GB	1

SYSTEM PARTS

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
051-04273	1	SCHEM,MLB COFFEE,X1536	SCH	CRITICAL	SCH
820-01598	1	PCBF,MLB COFFEE,X1536	PCB	CRITICAL	PCB
685-00257	1	COMMON PARTS,MLB COFFEE,X1536	COMMON_PARTS	CRITICAL	X1536_COMMON_BOM
985-00796	1	DEV,COMMON PARTS,MLB COFFEE,X1536	DEV_PARTS	CRITICAL	X1536_DEV_BOM

TOP LEVEL BOM

639-XXXX (POR) OR 939-XXXX (DEV)

COMMON PARTS BOM

685-00257

DEBUG PARTS BOM

985-00796

COMMON PARTS BOM

BOM NUMBER	BOM NAME	BOM OPTIONS
685-00257	COMMON_PARTS,MLB COFFEE,X1536	X1536_COMMON_PARTS

DEBUG PARTS

BOM NUMBER	BOM NAME	BOM OPTIONS
985-00796	DEV,COMMON PARTS,MLB COFFEE,X1536	X1536_DEV_1,X1536_DEV_2

NOTES:

SENSOR:DEV IS FOR SENSE RESISTORS. WHEN CURRENT SENSING IS REMOVED AT DVT, THESE RESISTORS WILL BE REPLACED WITH A SPECIAL SYMBOL, A COPPER SHAPE SHORTING THE TWO TERMINALS
 LOADISNS ARE CIRCUITS ONLY REQUIRED UNTIL DVT TO MEASURE/SENSE CURRENT. SENSE CIRCUITS REQUIRED BY SMC WILL NOT HAVE THIS OPTION SINCE THEY WILL STAY TILL DVT
 LOADRC:YES/NO RC FILTERS INTO ADC WILL BE REPLACED BY 100K PD ONCE THE SENSE CIRCUITS GO AWAY

CPU DRAM CFG[4:0] CHART

DIE REV	CFG 4	VENDOR	CFG 1	CFG 0
A	0	HYNIX	0	0
B	1	MICRON	0	
		SAMSUNG	1 0	
		N/A	1	1

SPEED	CFG 3
2133	0
1866	1

CAPACITY	CFG 2
8GB	0
16GB	1

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		DRAWING NUMBER	051-04273
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DEV BOMS - NO CPU, NO DRAM, NO SSD

BOM NUMBER	BOM NAME	BOM OPTIONS
939-07159	DEV,MLB,NO-CPU-MEM-NAND,2-LAND,X1536	ALT_OBN,ALTERNATE:PART,X1536_COMMON_BOM,X1536_DEV_BOM,X1536_CPU_CPU,X1536_NO_DRAM,X1536_NO_NAND_2_LD
939-07160	DEV,MLB,NO-CPU-MEM-NAND,4-LAND,X1536	ALT_OBN,ALTERNATE:PART,X1536_COMMON_BOM,X1536_DEV_BOM,X1536_CPU_CPU,X1536_NO_DRAM,X1536_NO_NAND_4_LD

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SYNC_MASTER=J213_JOHN		SYNC_DATE=06/05/2018	
PAGE TITLE			
BOM VARIANT TABLES			
	DRAWING NUMBER	051-04273	SIZE
	REVISION	4.0.0	D
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DC-DC

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 152800403, 128800042, 128800041, etc.

SYSTEM EE

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 37681080, 353801505, 376800146, etc.

SYSTEM EE

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 311800121, 107800013, 107800033, etc.

H9M

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 339800387, 339800386, 339800390, etc.

BACKLIGHT

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 13880738, 13880846, 37681053, etc.

NAND

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 998-128800377, 998-17176, 998-16394, etc.

WIFI

Table with columns: PART NUMBER, ALTERNATE FOR PART NUMBER, BOM OPTION, REF DES, COMMENTS. Rows include parts like 33989808616.

Vertical text on the right side of the page, containing part numbers and descriptions for various components.

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BOM ALTERNATES section with Apple logo, revision number 4.0.0, and a notice of proprietary property.

RULER_RULE_SET=RIGID_2016				MANUFACTURING CONFIGURATION		TABLE_REV_NUMBER=1	
DIELECTRIC BASED SPACING RULES				DEFAULT SPACING MULTIPLES		VOID SPACE RATIO	
MULTIPLES	SMDPIN MAX(UM)	MVIA MAX(UM)	SMDPIN2SMDPIN MAX(UM)				
1,2,3,4,5,6,7,8,9,10,11,12,13,14	120	120	100	1	2		
LAYERS		MINIMUM CU WIDTH RATIO	MINIMUM CU SPACING RATIO	MINIMUM TO DEFAULT RATIO			
TOP,BOTTOM		2.0	2.36842	1.2			
ISL2,ISL13		2.25	2.5	1.2			
ISL3,ISL12		2.0	2.25806	1.2			
ISL4,ISL11		2.5	2.5	1.2			
ISL5,ISL10		2.5	2.5	1.2			
ISL6,ISL9		2.5	2.5	1.2			
ISL7,ISL8		2.0	2.25806	1.2			

SIGNAL
1/3 OZ, PLATED TO 0.031 MM
GND PLANE
1/3 OZ, PLATED TO 0.020 MM
SIGNAL
1/3 OZ, PLATED TO 0.030 MM
GND PLANE
1/2 OZ, 0.016 MM
SIGNAL
1/2 OZ, 0.016 MM
GND PLANE
1/2 OZ, 0.016 MM
POWER PLANE
1 OZ, 0.031 MM

MANUAL EDITS AFTER AUTOGENERATION:
 OVERWROTE THROUGH VIA, BB VIA, AND UVIA SPACINGS TO DEFAULT VALUE, THE AUTOGEN ONES ARE TOO HIGH
 UPDATE SAME NET SPACING FOR VIA TO HOLE, UVIA TO SMD PIN, FOR DEFAULT AND MIN, TO -1
 CHANGED LINE TO SMD SAME NET SPACING FROM 0.1 TO 0.07 ON TOP/BOTTOM LAYERS
 CHANGED MAX NECK LENGTH FOR THE DEFAULT PHYSICAL RULE TO 20MM
 CHANGED UVIA TO LINE SAME NET SPACING TO 0.05
 CHANGED BB VIA TO LINE, AND BB VIA TO BB VIA SAME NET SPACING TO 0.0
 CHANGED BB VIA TO UVIA SAME NET SPACING TO -1
 CHANGED LINE TO SHAPE SAME NET SPACING TO 0.05
 SET BB VIA STAGGER IN PHYSICAL RULES TO 0.2500 FOR MIN, 0.275 FOR ALL OTHER, FOR LAYERS 3 AND 12
 COPIED THE RULES FROM 85 OHM DIFF TO 85 MIN STAGGER
 SET ENABLE DRC BY LAYER IN SAME NET SPACING TO TRUE FOR ALL LAYERS
 KEEP DEFAULT AS DEFAULT, GENERIC DP AS GENERIC DP
 REPLACING ALL SPACINGS EXCEPT LINE TO LINE WITH DEFAULT VALUES
 DECREASED NECK GAP FOR DIFF PAIRS TO VALUE FOR GENERIC DP
 REASSIGN SPACING AND PHYSICAL REGION RULES AND NET CLASS ASSIGNMENTS
 SET UVIA TO SHAPE SAME NET SPACING TO 0.1MM ON TOP/BOTTOM

PAGE TITLE		SYNC_MASTER=J213_JOHN		SYNC_DATE=06/05/2018	
BOARD RULES					
		DRAWING NUMBER	051-04273	SIZE	D
		REVISION	4.0.0		
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