1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.

REV	ECN	DESCRIPTION OF REVISION	CK APPD / DATE
4	0011084069	ENGINEERING RELEASED	2018-01-26

SCHEM,MLB,X1190

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46	47	SoC Shared Support	SILU	08/09/2017
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58	59	Power Sensor Extended 3	RAYMOND	10/13/2017
59	60	Fans/SMC/AMUX Support	RAYMOND	06/13/2017
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69	71	IMVP IC	SILU	05/24/2017
70	72	IMVP VCC Block	SILU	05/24/2017
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88	91	SSD1 S4E 0	j137_gs5_redhead	01/26/2017
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94	99	GPU PCC	SEAN	11/09/2017
95	100	GPU Baffin PCIe	SEAN	11/09/2017
96	101	GPU Baffin Core/FB Power	SEAN	06/21/2017
97	102	GPU Baffin FB	SEAN	04/19/2017
98	103	VR 1.05V GPU & 1.35V FB	SILU	04/27/2017
99	104	GDDR5 VRAM FB 1 [104]	SEAN	04/19/2017
100	105	GDDR5 VRAM FB 2	SEAN	04/19/2017
101	106	VR GPU Core	SILU	05/24/2017
102	107	GPU Baffin GPIO/CLK/Straps	SEAN	04/19/2017
103	108	GPU Baffin DP/GPIO	SILU	07/27/2017
104	109	GPU Baffin VSS/Misc	SEAN	11/09/2017
105	110	USB-C HIGH SPEED 1	J132	05/11/2017
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108	113	USB-C PORT CONTROLLER A	ZIFENG	05/26/2017
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110	115	USB-C CONNECTOR A	SILU_J680	08/09/2017
111	116	USBC T Connector Support	ADITYA	04/05/2017
112	117	USB-C T 5V VR	SILU	05/11/2017
113	118	GDDR5 VRAM FB 3	j680_copy	02/01/2017
114	119	GDDR5 VRAM FB 4	j680_copy	02/01/2017
115	120	Power Alias 1	SILU	05/01/2017
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122	127	Desense Caps 1	SEAN	06/27/2017
123	128	Desense Caps 2	j380_mlb	02/09/2017
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125	130	Memory Bite/Byte Swizzle	j380_mlb	02/09/2017
126	140	Dev Support	Debug	05/03/2017
127	141	BOM-639 2.2GHz	SEAN	11/29/2017
128	143	BOM-639 2.6GHz	j380_mlb	02/09/2017
129	144	BOM-639 2.9GHz	j380_mlb	02/09/2017
130	147	BOM Alt Table	SEAN	11/29/2017
131	200	Dev Support	ADITYA	03/22/2017

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DRAWING

TITLE=MLB
ABBREV=ABBREV
LAST_MODIFIED=Fri Jan 26 13:24:05 2018

Schematic / PCB #'s

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION

DRAWING TITLE: SCHEM,MLB,X1190

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X1190 BOM Groups

BOM GROUP	BOM OPTIONS
X1190_8L	ALTERNATE,S4E_L5,S4E_L6,S4E_L7,S4E_L8,OCARINA_2,S4E_X4PLUS,S4E_X8
X1190_6L	ALTERNATE,S4E_L5,S4E_L6,OCARINA_2,S4E_X4PLUS,S4E_X6
X1190_COMMON	SCH,PCB,COMMON,ALTERNATE,X1190_COMMON1,X1190_COMMON2,X1190_PROGPARTS,VRAM_ALTS
X1190_COMMON1	CPUPEG:X8X4X4,EDP:YES,BOARD_ID,BOARD_REV:011,SE:PROD_2017,EN_VP0R_LPS:YES
X1190_COMMON2	SKIP_5V3V3:AUDIBLE,XDP:YES,SYSDET:FET,VCCSPI:3V3,OCARINA_I2C:1K,SVID_PU:CORE,RF_TUNING,PBUS:3S
X1190_PROGPARTS	UPCROM_PROG:P1,WIFI_ROM:P0,BT_ROM:P2
X1190_SNS	LOADISNS,LOADRC:YES,SENSOR:DEV
X1190_DEVEL:ENG	ALTERNATE,X1190_SNS,DBGLED,XDP_CONN,USBC_DBG,DBG_BTN,WIFI_DBG,DBG_FAN,GPUROM:BLANK,VITAMIN-C:YES,PCC:YES,GPU_ROM:YES,BOOTCFG0
X1190_DEVEL:DVT	ALTERNATE,LOADRC:NO
X1190_DEVEL:PVT	ALTERNATE,LOADRC:NO

BOM Variants

BOM NUMBER	BOM NAME	BOM OPTIONS
685-00179	COMMON PARTS,MLB,X1190	X1190_COMMON
685-00193	S4E 8L Parts,MLB,X1190	X1190_8L
685-00198	S4E 6L Parts,MLB,X1190	X1190_6L
985-00362	DEV,MLB,X1190	X1190_DEVEL:ENG

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
685-00179	1	COMMON PARTS, MLB, X1190	BASE	CRITICAL	BASE_BOM
685-00193	1	S4E 8L PARTS (8L),MLB,X1190	8L	CRITICAL	BOM_8L
985-00362	1	DEV PARTS,MLB,X1190	DEVEL	CRITICAL	DEVEL_BOM
685-00198	1	S4E 6L PARTS (6L),MLB,X1190	6L	CRITICAL	BOM_6L

DRAM Options

BOM GROUP	BOM OPTIONS
MC_32G	32G_MICRON_2400,RAMCFG4:L,RAMCFG3:L,RAMCFG2:L,RAMCFG1:L
HY_32G	32G_HYNIX_2400,RAMCFG4:L,RAMCFG3:L,RAMCFG2:L,RAMCFG1:L,RAMCFG0:L
HY_16G	16G_HYNIX_2400,RAMCFG4:L,RAMCFG3:L,RAMCFG1:L,RAMCFG0:L
MC_16G	16G_MICRON_2400,RAMCFG4:L,RAMCFG3:L,RAMCFG1:L

S4E Options

BOM GROUP	BOM OPTIONS
TS_256_PMLC	S4E_256_TB,SOC:1GB,SSD0_NAND_VCC:2.5V
WD_256_PMLC	S4E_256_WD,SOC:1GB,SSD0_NAND_VCC:2.5V
TS_512_PMLC	S4E_512_TB,SOC:1GB,SSD0_NAND_VCC:2.5V
WD_512_PMLC	S4E_512_WD,SOC:1GB,SSD0_NAND_VCC:2.5V
TS_1TB_PMLC	S4E_1TB_TB,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
WD_1TB_PMLC	S4E_1TB_WD,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
TS_2TB_PMLC	S4E_2TB_TB,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
WD_2TB_PMLC	S4E_2TB_WD,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
SM_2TB_3DV4	S4E_2TB_SM,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
SM_4TB_3DV4	S4E_4TB_SM,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
TS_2TB_TLC	TLC_2TB_TB,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V
WD_2TB_TLC	TLC_2TB_WD,SOC:2GB,SSD0_NAND_VCC:2.5V,SSD1_NAND_VCC:2.5V

BOARD ID

BOM GROUP	BOM OPTIONS
BOARD_ID	BOARDID0,BOARDID1,BOARDID3

VRAM ALT BOM GROUPS

BOM NUMBER	BOM NAME	BOM OPTIONS
685-00221	VRAM PARTS,HYNIX,2X,MLB,X1190	FB_4GB_HYNIX
685-00222	VRAM PARTS,MICRON,2X,MLB,X1190	FB_4GB_MICRON
685-00223	VRAM PARTS,SAMSUNG,2X,MLB,X1190	FB_4GB_SAMSUNG
685-00224	VRAM PARTS,HYNIX,1Z,MLB,X1190	FB_4GB_HYNIX_1Z
685-00225	VRAM PARTS,MICRON,1Z,MLB,X1190	FB_4GB_MICRON_1Z

VRAM SUB-BOM

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
685-00221	1	VRAM PARTS,HYNIX,2X,MLB,X1190	VRAMSSSS	CRITICAL	VRAM_ALTS

SYNC_MASTER=SEAN SYNC_DATE=11/29/2017

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BOM Configuration 1

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GPU Baffin

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S00493	1	GPU,AMD,BAFFIN,ULX,A3,0.83,QS,BGA769	UA000	CRITICAL	BAFFIN_ULX
337S00494	1	GPU,AMD,BAFFIN,PROX,A3,0.83,QS,BGA769	UA000	CRITICAL	BAFFIN_PROX
998-04866	1	INTERPOSER,AMD,C989,BGA769,VDDCI/MVDD	UA000	CRITICAL	STARDUST:VDDCI_MVDD
998-04867	1	INTERPOSER,AMD,C988,BGA769,VDDC	UA000	CRITICAL	STARDUST:VDDC

FB VDRAM Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
333S00074	4	IC,GDDR5,8Gb,7Gbps,1.5V,25NM,B,170 BGA	UA400,UA450,UA500,UA550	CRITICAL	FB_4GB_SAMSUNG
333S00075	4	IC,GDDR5,8Gb,7Gbps,1.5V,25NM,A,170 BGA	UA400,UA450,UA500,UA550	CRITICAL	FB_4GB_MICRON
333S00100	4	IC,GDDR5,8Gb,7Gbps,1.5V,25NM,A,170 BGA	UA400,UA450,UA500,UA550	CRITICAL	FB_4GB_HYNIX
333S00173	4	IC,GDDR5,8Gb,7Gbps,1.5V,1ZNM,A,170 BGA	UA400,UA450,UA500,UA550	CRITICAL	FB_4GB_MICRON_1Z
333S00175	4	IC,GDDR5,8Gb,7Gbps,1.5V,1ZNM,A,170 BGA	UA400,UA450,UA500,UA550	CRITICAL	FB_4GB_HYNIX_1Z

CPU Parts CFL (Needs to be updated)

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S00509	1	CPU,CFLH,QP87,QS,U0,2.2,45W,1.1,LGA1440	U0500	CRITICAL	CPU_CFL:2.2
337S00510	1	CPU,CFL-H,QP86,QS,U0,2.6,6C,45W,1.15,BGA1440	U0500	CRITICAL	CPU_CFL:2.6
337S00513	1	CPU,CFL-H,QPQG,QS,U0,2.9,6C,45W,1.2,BGA1440	U0500	CRITICAL	CPU_CFL:2.9
998-12472	1	INTERPOSER,CFH-H,BGA1440	U0500	CRITICAL	CPU_SKL:SOCKET

Main DRAM Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
333S00131	16	IC,SDRAM,DDR4-2400,16GBIT,20NM,BGA78	———————————	CRITICAL	32G_MICRON_2400
333S00134	16	IC,SDRAM,DDR4-2400,16GBIT,20NM,BGA78	———————————	CRITICAL	32G_HYNIX_2400
333S00147	16	IC,SDRAM,DDR4-2400,8GBIT,20NM,BGA78	———————————	CRITICAL	16G_HYNIX_2400
333S00163	16	IC,SDRAM,DDR4-2400,8GBIT,20NM,BGA78	———————————	CRITICAL	16G_MICRON_2400

PCH CNL-H (Needs to be updated)

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S00523	1	IC,CNL,PCH-H,USFF,QNYP,QS,B0,BGA499	U1200	CRITICAL	

ACE & Ridges (Needs to Be Updated)

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S01442	4	IC,CD3215,ACE,C0,USB PWR SW,BLNK,BGA96	U3100,U3200,UB300,UB400	CRITICAL	
338S00408	2	IC,TBT,TITAN RIDGE DP,QUJK,QS,C1,CSP337	U2800,UB000	CRITICAL	

Hall Effect AMR

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
677-10608	2	SUBASSY T600 PCBA, AMR, INTERPOSER, X1190	J4800,J4801	CRITICAL	

Power Controllers

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S01525	1	IC,ISL9240HIB1Z,PMU,SOUNA,WCSP40,2.1X3.3MM	U7000	CRITICAL	
338S00267	1	IC,PMU,P650839,7X7MM.BGA168	U7800	CRITICAL	
353S01229	1	IC,SUPPLY,INTERSIL,ISL6277AHRZ,SVI2.0,QFN48	UA600	CRITICAL	
353S00928	1	IC,ISL95828A,IMVP8 CPU REG,QFN48,6X6MM	U7100	CRITICAL	

Harpoon

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
339S00458	1	IC,MODULE,WIFI/BT,MURATA,HARPOON,M,ES7.7,LGA385	U3730	CRITICAL	

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00428	339S00458		ALL	IC,MODULE,WIFI/BT,HARPOON,US2,ES7.5,LGA385

USB-C Connector

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-12556	2	CONN,RCPT,56+4,P=0.35,H=0.7,SHLD,THKR	J3300,JB500	CRITICAL	

Ocarina

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
338S00410	1	IC,PMU,OCARINA,D2499A0,OTP-AG,WLCSP56	U9000	CRITICAL	
338S00410	1	IC,PMU,OCARINA,D2499A0,OTP-AG,WLCSP56	U9500	CRITICAL	OCARINA_2

Programmable Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	
335S00199	1	IC,1Mbit SERIAL FLASH 2X3X0.6MM UFDFPN8 PKG	UA701	CRITICAL	GPUROM:BLANK	
341S01017	1	T29,TR1(V2.1),NEW-PROTO-2,X1190	U2890	CRITICAL	UPCROM_PROG:P1	Updated-P1
341S01018	1	T29,TR2(V2.1),NEW-PROTO-2,X1190	UB090	CRITICAL	UPCROM_PROG:P1	Updated-P1
341S01025	1	IC, BT ROM, EVT,VXX, X1190	U3750	CRITICAL	BT_ROM:P2	Updated
341S00725	1	IC, WIFI ROM, PROTO0, X1190	U3710	CRITICAL	WIFI_ROM:P0	Updated

H9M

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
339S00373	1	POP,GIBRALTAR+2GB 21NM,H,B0,SCK,CSP1406	U3900	CRITICAL	SOC:2GB

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00373	339S00372		ALL	2GB,20NM,M,B0,SCK,CSP1406
339S00378	339S00372		ALL	2GB,21NM,H,B0,ATK,CSP1406
339S00377	339S00372		ALL	2GB,20NM,M,B0,ATK,CSP1406

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
339S00376	1	POP,GIBRALTAR+1GB 21NM,H,B0,ATK,CSP1406	U3900	CRITICAL	SOC:1GB

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00375	339S00376		ALL	1GB,20NM,M,B0,ATK,CSP1406
339S00371	339S00376		ALL	1GB,21NM,H,B0,SCK,CSP1406
339S00370	339S00376		ALL	1GB,21NM,M,B0,SCK,CSP1406

S4E Parts

256GB

335S00324	4	NAND,3DV3,85GBP,XXX,S4E,170G,SD,ULGA110	U8600,U8700,U8800,U8900	CRITICAL	S4E_256_WD
998-12418	4	NAND,3DV3,85GBP,S4E,170G,T,SUBX,ULGA110	U8600,U8700,U8800,U8900	CRITICAL	S4E_256_TB

998-12419	998-12418		ALL	SUBW

512GB

335S00325	4	NAND,3DV3,128GBP,XXX,S4E,170G,SD,ULGA110	U8600,U8700,U8800,U8900	CRITICAL	S4E_512_WD
998-12420	4	NAND,3DV3,128GBP,S4E,170G,T,SUBX,ULGA110	U8600,U8700,U8800,U8900	CRITICAL	S4E_512_TB

998-12421	998-12420		ALL	SUBW

1TB

335S00326	6	NAND,3DV3,170GBP,XXX,S4E,170G,SD,ULGA110	U8600,U8700,U8800,U8900,U9100,U9200	CRITICAL	S4E_1TB_WD
998-12422	6	NAND,3DV3,170GBP,S4E,170G,T,SUBX,ULGA110	U8600,U8700,U8800,U8900,U9100,U9200	CRITICAL	S4E_1TB_TB

998-12423	998-12422		ALL	SUBW

2TB

335S00327	8	NAND,3DV3,256GBP,XXX,S4E,170G,SD,ULGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9400	CRITICAL	S4E_2TB_WD
335S00321	8	NAND,3DV4,256GBP,XXX,S4E,256G,SS,ULGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9400	CRITICAL	S4E_2TB_SM
998-12424	8	NAND,3DV3,256GBP,S4E,170G,T,SUBX,ULGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9400	CRITICAL	S4E_2TB_TB

998-12426	998-12424		ALL	SUBW

4TB

335S00322	8	NAND,3DV4,512GBP,S4E,256G,SS,ULGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9300,U9400	CRITICAL	S4E_4TB_SM

2TB TLC

335S00228	8	NAND,3DV3,256GBT,S4E,256G,T,SLGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9300,U9400	CRITICAL	TLC_2TB_TB
335S00247	8	NAND,3DV3,256GBT,S4E,256G,SD,SLGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9300,U9400	CRITICAL	TLC_2TB_WD

PAGE TITLE

BOM Configuration 2

Apple Inc.

DRAWING NUMBER 051-02643

SIZE D

REVISION 4.0.0

BRANCH evt-0

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Pogo Pins

APN 870-01771

PG0410
POGO-2.30D-4.63H-SM
SM

PG0411
POGO-2.30D-4.63H-SM
SM

PG0420
POGO-2.30D-4.63H-SM
SM

PG0421
POGO-2.30D-4.63H-SM
SM

PG0430
POGO-2.30D-4.63H-SM
SM

PG0471
POGO-2.30D-4.63H-SM
SM

PG0470
POGO-2.30D-4.63H-SM
SM

APN 870-01772

PG0400
POGO-2.30D-4.06H-SM
SM

PG0401
POGO-2.30D-4.63H-SM
SM

Dummy Parts to act as bumpers

C0402
1UF
10% 6.3V CERM 402
OMIT_TABLE:FORPARTS

C0403
1UF
10% 6.3V CERM 402
OMIT_TABLE:FORPARTS

C0404
1UF
10% 6.3V CERM 402
OMIT_TABLE:FORPARTS

C0405
1UF
10% 6.3V CERM 402
OMIT_TABLE:FORPARTS

C0406
1UF
10% 6.3V CERM 402
OMIT_TABLE:FORPARTS

SMT Bosses

APN 860-00392

BS0400
3.40D1.75ID-1.12H-SM
USB-C Left
BOT side - North

BS0410
3.40D1.75ID-1.12H-SM
USB-C Right
BOT side - North

APN 806-06520

BS0420
3.40D1.75ID-1.45H-SM
DFR Touch
BOT side

APN 806-06521

BS0430
3.40D1.75ID-1.9H-SM
DFR Display
BOT side - Left

BS0450
3.40D1.75ID-1.9H-SM
Trackpad
BOT side - Left

APN 860-00469

BS0470
2.7X1.8R-1.4ID-0.91H-SM
eDP
TOP side - Left

BS0471
2.7X1.8R-1.4ID-0.91H-SM
eDP
TOP side - Right

APN 806-07958
TOUCH-COWLING-HOOK-X378

BS0472
SM

DFR Touch - TOP side

BS0401
3.40D1.75ID-1.12H-SM
USB-C Left
BOT side - South

BS0411
3.40D1.75ID-1.12H-SM
USB-C Right
BOT side - South

APN 806-06600

BS0480
3.40D1.75ID-2.12H-SM
USB-C Right
BOT side - Left

BS0431
3.40D1.75ID-1.9H-SM
DFR Display
BOT side - Right

BS0441
3.40D1.75ID-1.9H-SM
Keyboard
BOT side - Right

Rubber Mount

Standoffs

APN 860-00452

BM0400
3.090D1.4ID-3.25H-SM
OMIT_TABLE

APN 860-00435

BM0401
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0402
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0403
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0404
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0405
2.80D1.2ID-1.55H-SM

BM0483
2.80D1.2ID-1.55H-SM
OMIT_TABLE

APN 860-00500

BM0488
2.80D1.2ID-3.5H-SM
OMIT_TABLE

APN 860-00500

BM0484
2.80D1.2ID-3.5H-SM
OMIT_TABLE

BM0411
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0406
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0407
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0408
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0409
2.80D1.2ID-1.55H-SM
OMIT_TABLE

BM0410
2.80D1.2ID-1.55H-SM
OMIT_TABLE

APN 860-00500

BM0485
2.80D1.2ID-3.5H-SM
OMIT_TABLE

BM0486
2.80D1.2ID-3.5H-SM
OMIT_TABLE

BM0487
2.80D1.2ID-3.5H-SM
OMIT_TABLE

Diplexer Can

SH0400
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099

NAND L5/L6

SH0402
SM
OMIT_TABLE

SH0401
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099
SHIELD-DIPLEX-BLACK-X378A-X1099

NAND L7/L8

SH0404
SM
OMIT_TABLE

SH0403
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099
SHIELD-DIPLEX-BLACK-X378A-X1099

H9M

SH0405
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099

VRAM

SH0406
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099

TR RT

SH0407
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099

NAND Right

SH0408
SM
OMIT_TABLE

SH0409
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099
SHIELD-DIPLEX-BLACK-X378A-X1099

TR LT

SH0410
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099

DRAM

SH0411
SM
OMIT_TABLE

SH0412
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099
SHIELD-DIPLEX-BLACK-X378A-X1099

CPU/GPU Sleds

SH0413
SM
OMIT_TABLE

SH0414
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099
SHIELD-DIPLEX-BLACK-X378A-X1099

Shield Can TH
APN 998-2691

DRAM

TH0402
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0400
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0403
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0401
TH-NSP
SL-1.2X0.4-1.5X0.7

VRAM

TH0460
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0461
TH-NSP
SL-1.2X0.4-1.5X0.7

SSD Right

TH0450
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0440
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0451
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0441
TH-NSP
SL-1.2X0.4-1.5X0.7

SSD Left

TH0413
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0407
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0412
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0416
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0417
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0415
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0414
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0406
TH-NSP
SL-1.2X0.4-1.5X0.7

H9M

TH0409
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0408
TH-NSP
SL-1.2X0.4-1.5X0.7

TBT Left

TH0410
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0411
TH-NSP
SL-1.2X0.4-1.5X0.7

TBT Right

TH0420
TH-NSP
SL-1.2X0.4-1.5X0.7

TH0421
TH-NSP
SL-1.2X0.4-1.5X0.7

SH0415
SM
OMIT_TABLE

SH0416
SM
OMIT_TABLE
SHIELD-DIPLEX-BLACK-X378A-X1099
SHIELD-DIPLEX-BLACK-X378A-X1099

Bumpers

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
860-00986	1	bumper 1	BM0411	CRITICAL	
860-00948	1	bumper 2	BM0400	CRITICAL	
860-00954	5	bumper 3	BM0484,BM0485,BM0486,BM0487,BM0488	CRITICAL	
860-00949	11	bumper 4	BM0401,BM0402,BM0403,BM0404,BM0405,BM0407,BM0408,BM0409,BM0410,BM0483	CRITICAL	

Shield Cans

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
806-11170	1	SHIELD,FENCE,DIPLEX,X1181	SH0400	CRITICAL	
806-13323	2	SHIELD,FENCE,NAND_L5_L6,X1181	SH0401,SH0402	CRITICAL	S4E_X6
806-13323	4	SHIELD,FENCE,NAND_L5_L6_L7_L8,X1181	SH0401,SH0402,SH0403,SH0404	CRITICAL	S4E_X8
806-13325	1	SHIELD,FENCE,H9M,X1181	SH0405	CRITICAL	
806-13326	1	SHIELD,FENCE,VRAM,X1181	SH0406	CRITICAL	
806-13327	1	SHIELD,FENCE,TR,RT,X1181	SH0407	CRITICAL	
806-13328	2	SHIELD,FENCE,NAND_L1_L2_L3_L4,X1181	SH0408,SH0409	CRITICAL	
806-13329	1	SHIELD,FENCE,TR,LT,X1181	SH0410	CRITICAL	
806-13324	2	SHIELD,FENCE,DRAM,X1181	SH0411,SH0412	CRITICAL	
806-13996	2	SHIELD,SLED,GPU,X1181	SH0413,SH0415	CRITICAL	
806-13997	2	SHIELD,SLED,CPU,X1181	SH0414,SH0416	CRITICAL	

BOM_COST_GROUP=MECHANICALS

SYNC_MASTER=ZIFENG_CONSTRAINTS SYNC_DATE=03/03/2017

PAGE TITLE
PD Parts

Apple Inc.

DRAWING NUMBER 051-02643
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REVISION 4.0.0
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From Intel EDS
PEG RCOMP Range = 24.76,25.25
Voltage = VCCIO (Page 121, Note 3)

PPVCCIO_S0_CPU 5 8 10 115

R0510 24.9 1% 1/16W MF-LF 402 PLACE_NEAR=U0500.G2:5mm

U0500 CFL-H_DDR4-IL BGA 45W SYM 1 OF 13 CRITICAL OMIT_TABLE

DMI_S2N_N<0>	IN	E8	DMI_RXN0	PEG_RCOMP	G2	CPU_PEG_RCOMP	
DMI_S2N_N<1>	IN	F6	DMI_RXN1				
DMI_S2N_N<2>	IN	E5	DMI_RXN2	PEG_RXN0	D25	PEG_GPU_D2R_N<0>	IN 117
DMI_S2N_N<3>	IN	J9	DMI_RXN3	PEG_RXN1	F24	PEG_GPU_D2R_N<1>	IN 117
DMI_S2N_P<0>	IN	D8	DMI_RXP0	PEG_RXN2	D23	PEG_GPU_D2R_N<2>	IN 117
DMI_S2N_P<1>	IN	E6	DMI_RXP1	PEG_RXN3	F22	PEG_GPU_D2R_N<3>	IN 117
DMI_S2N_P<2>	IN	D5	DMI_RXP2	PEG_RXN4	D21	PEG_GPU_D2R_N<4>	IN 117
DMI_S2N_P<3>	IN	J8	DMI_RXP3	PEG_RXN5	F20	PEG_GPU_D2R_N<5>	IN 117
DMI_N2S_N<0>	OUT	A8	DMI_TXN0	PEG_RXN6	D19	PEG_GPU_D2R_N<6>	IN 117
DMI_N2S_N<1>	OUT	B6	DMI_TXN1	PEG_RXN7	F18	PEG_GPU_D2R_N<7>	IN 117
DMI_N2S_N<2>	OUT	A5	DMI_TXN2	PEG_RXN8	E17	PCIE_TBT_X_D2R_N<0>	IN 117
DMI_N2S_N<3>	OUT	B4	DMI_TXN3	PEG_RXN9	E16	PCIE_TBT_X_D2R_N<1>	IN 117
DMI_N2S_P<0>	OUT	B8	DMI_TXP0	PEG_RXN10	E15	PCIE_TBT_X_D2R_N<2>	IN 117
DMI_N2S_P<1>	OUT	C6	DMI_TXP1	PEG_RXN11	E14	PCIE_TBT_X_D2R_N<3>	IN 117
DMI_N2S_P<2>	OUT	B5	DMI_TXP2	PEG_RXN12	E13	PCIE_TBT_T_D2R_N<0>	IN 117
DMI_N2S_P<3>	OUT	D4	DMI_TXP3	PEG_RXN13	E12	PCIE_TBT_T_D2R_N<1>	IN 117
				PEG_RXN14	E11	PCIE_TBT_T_D2R_N<2>	IN 117
				PEG_RXN15	E10	PCIE_TBT_T_D2R_N<3>	IN 117
				PEG_RXP0	E25	PEG_GPU_D2R_P<0>	IN 117
				PEG_RXP1	E24	PEG_GPU_D2R_P<1>	IN 117
				PEG_RXP2	E23	PEG_GPU_D2R_P<2>	IN 117
				PEG_RXP3	E22	PEG_GPU_D2R_P<3>	IN 117
				PEG_RXP4	E21	PEG_GPU_D2R_P<4>	IN 117
				PEG_RXP5	E20	PEG_GPU_D2R_P<5>	IN 117
				PEG_RXP6	E19	PEG_GPU_D2R_P<6>	IN 117
				PEG_RXP7	E18	PEG_GPU_D2R_P<7>	IN 117
				PEG_RXP8	D17	PCIE_TBT_X_D2R_P<0>	IN 117
				PEG_RXP9	F16	PCIE_TBT_X_D2R_P<1>	IN 117
				PEG_RXP10	D15	PCIE_TBT_X_D2R_P<2>	IN 117
				PEG_RXP11	F14	PCIE_TBT_X_D2R_P<3>	IN 117
				PEG_RXP12	D13	PCIE_TBT_T_D2R_P<0>	IN 117
				PEG_RXP13	F12	PCIE_TBT_T_D2R_P<1>	IN 117
				PEG_RXP14	D11	PCIE_TBT_T_D2R_P<2>	IN 117
				PEG_RXP15	F10	PCIE_TBT_T_D2R_P<3>	IN 117
				PEG_TXN0	A25	PEG_GPU_R2D_C_N<0>	OUT 117
				PEG_TXN1	C24	PEG_GPU_R2D_C_N<1>	OUT 117
				PEG_TXN2	A23	PEG_GPU_R2D_C_N<2>	OUT 117
				PEG_TXN3	C22	PEG_GPU_R2D_C_N<3>	OUT 117
				PEG_TXN4	A21	PEG_GPU_R2D_C_N<4>	OUT 117
				PEG_TXN5	C20	PEG_GPU_R2D_C_N<5>	OUT 117
				PEG_TXN6	A19	PEG_GPU_R2D_C_N<6>	OUT 117
				PEG_TXN7	C18	PEG_GPU_R2D_C_N<7>	OUT 117
				PEG_TXN8	B17	PCIE_TBT_X_R2D_C_N<0>	OUT 117
				PEG_TXN9	B16	PCIE_TBT_X_R2D_C_N<1>	OUT 117
				PEG_TXN10	B15	PCIE_TBT_X_R2D_C_N<2>	OUT 117
				PEG_TXN11	B14	PCIE_TBT_X_R2D_C_N<3>	OUT 117
				PEG_TXN12	B13	PCIE_TBT_T_R2D_C_N<0>	OUT 117
				PEG_TXN13	B12	PCIE_TBT_T_R2D_C_N<1>	OUT 117
				PEG_TXN14	B11	PCIE_TBT_T_R2D_C_N<2>	OUT 117
				PEG_TXN15	B10	PCIE_TBT_T_R2D_C_N<3>	OUT 117
				PEG_TXP0	B25	PEG_GPU_R2D_C_P<0>	OUT 117
				PEG_TXP1	B24	PEG_GPU_R2D_C_P<1>	OUT 117
				PEG_TXP2	B23	PEG_GPU_R2D_C_P<2>	OUT 117
				PEG_TXP3	B22	PEG_GPU_R2D_C_P<3>	OUT 117
				PEG_TXP4	B21	PEG_GPU_R2D_C_P<4>	OUT 117
				PEG_TXP5	B20	PEG_GPU_R2D_C_P<5>	OUT 117
				PEG_TXP6	B19	PEG_GPU_R2D_C_P<6>	OUT 117
				PEG_TXP7	B18	PEG_GPU_R2D_C_P<7>	OUT 117
				PEG_TXP8	A17	PCIE_TBT_X_R2D_C_P<0>	OUT 117
				PEG_TXP9	C16	PCIE_TBT_X_R2D_C_P<1>	OUT 117
				PEG_TXP10	A15	PCIE_TBT_X_R2D_C_P<2>	OUT 117
				PEG_TXP11	C14	PCIE_TBT_X_R2D_C_P<3>	OUT 117
				PEG_TXP12	A13	PCIE_TBT_T_R2D_C_P<0>	OUT 117
				PEG_TXP13	C12	PCIE_TBT_T_R2D_C_P<1>	OUT 117
				PEG_TXP14	A11	PCIE_TBT_T_R2D_C_P<2>	OUT 117
				PEG_TXP15	C10	PCIE_TBT_T_R2D_C_P<3>	OUT 117

DMI
PCI EXPRESS BASED INTERFACE SIGNALS

U0500 CFL-H_DDR4-IL BGA 45W SYM 11 OF 13 CRITICAL OMIT_TABLE

DIGITAL DISPLAY INTERFACES | EDP

NC_DDI1_ML_C_N<0>	117	K37	DDI1_TXN0	EDP_AUXN	B26	DP_INT_IG_AUX_N	93 118
NC_DDI1_ML_C_P<0>	117	K36	DDI1_TXP0	EDP_AUXP	C26	DP_INT_IG_AUX_P	93 118
NC_DDI1_ML_C_N<1>	117	J34	DDI1_TXN1				
NC_DDI1_ML_C_P<1>	117	J35	DDI1_TXP1				
NC_DDI1_ML_C_N<2>	117	H36	DDI1_TXN2	EDP_TXN0	E29	DP_INT_IG_ML_N<0>	93 118
NC_DDI1_ML_C_P<2>	117	H37	DDI1_TXP2	EDP_TXN1	E28	DP_INT_IG_ML_N<1>	93 118
NC_DDI1_ML_C_N<3>	117	J38	DDI1_TXN3	EDP_TXN2	B29	DP_INT_IG_ML_N<2>	93 118
NC_DDI1_ML_C_P<3>	117	J37	DDI1_TXP3	EDP_TXN3	B28	DP_INT_IG_ML_N<3>	93 118
NC_DDI2_ML_C_N<0>	117	H33	DDI2_TXN0	EDP_TXP0	D29	DP_INT_IG_ML_P<0>	93 118
NC_DDI2_ML_C_P<0>	117	H34	DDI2_TXP0	EDP_TXP1	F28	DP_INT_IG_ML_P<1>	93 118
NC_DDI2_ML_C_N<1>	117	G38	DDI2_TXN1	EDP_TXP2	A29	DP_INT_IG_ML_P<2>	93 118
NC_DDI2_ML_C_P<1>	117	F37	DDI2_TXP1	EDP_TXP3	C28	DP_INT_IG_ML_P<3>	93 118
NC_DDI2_ML_C_N<2>	117	F35	DDI2_TXN2				
NC_DDI2_ML_C_P<2>	117	F34	DDI2_TXP2				
NC_DDI2_ML_C_N<3>	117	E36	DDI2_TXN3	DISP_RCOMP	D37	CPU_EDP_RCOMP	
NC_DDI2_ML_C_P<3>	117	E37	DDI2_TXP3	EDP_DISP_UTIL	A33	NC	
NC_DDI3_ML_N<2>	117	E33	DDI3_TXN2				
NC_DDI3_ML_P<2>	117	F33	DDI3_TXP2				
NC_DDI3_ML_N<3>	117	B33	DDI3_TXN3				
NC_DDI3_ML_P<3>	117	C33	DDI3_TXP3				
NC_DDI3_ML_N<0>	117	D34	DDI3_TXN0	DDI1_AUXN	F27	NC_DDI1_AUXCH_C_N	117
NC_DDI3_ML_P<0>	117	C34	DDI3_TXP0	DDI1_AUXP	D27	NC_DDI1_AUXCH_C_P	117
NC_DDI3_ML_N<1>	117	B34	DDI3_TXN1	DDI2_AUXN	F26	NC_DDI2_AUXCH_C_N	117
NC_DDI3_ML_P<1>	117	B36	DDI3_TXP1	DDI2_AUXP	F26	NC_DDI2_AUXCH_C_P	117
				DDI3_AUXN	B27	NC_DDI3_AUXCH_N	117
				DDI3_AUXP	A27	NC_DDI3_AUXCH_P	117

Port D pins out of order to match Intel symbol.

PPVCCIO_S0_CPU 5 8 10 115

R0530 24.9 1% 1/16W MF-LF 402 PLACE_NEAR=U0500.D37:5mm

U0500 CFL-H-DDR4-IL BGA 45W SYM 13 OF 13

TP-P5 TP0501	TP	1	CPU_DC_B2_C1	B2	RSVD		
TP-P5 TP0502	TP	1	CPU_DC_B38_C38	B38	RSVD		
				NC	BP1	RSVD	
TP-P5 TP0503	TP	1	CPU_DC_BR2_BR1	BR2	RSVD		
TP-P5 TP0504	TP	1	CPU_DC_C1_B2	C1	RSVD		
TP-P5 TP0505	TP	1	CPU_DC_C38_B38	C38	RSVD		
				NC	BR33	SKTOCC*	
				NC	AT13	ZVM*	
				NC	AW13	MSM*	
IST_TRIG		F3	CPU_IST_TRIG				
PROC_TRIGIN		H23	PCH_CPU_TRIGGER				IN 13
PROC_TRIGOUT		J23	CPU_PCH_TRIGGER_R				5
PROC_AUDIO_CLK		G27	PCH_DISPA_BCLK				IN 20
PROC_AUDIO_SDI		G25	PCH_DISPA_SDO				IN 20
PROC_AUDIO_SDO		G29	CPU_PROC_AUD_SDO_R				5
DDR_VTT_CNTL		BT13	PM_MEMVTT_EN				OUT 74 119
PM_DOWN		BP31	CPU_PCH_PM_DOWN_R				5

Impedance Spectrum Tool

CPU_IST_TRIG 1 A TP0506 TP-P6 1 A TP0507 TP-P6 PLACE_NEAR=TP0506.1:5mm

Each corner of CPU has two testpoints. Other corner test signals connected in daisy-chain fashion. Continuity should exist between both TP's on each corner.

R0524 30 5% 1/20W MF 201
5 CPU_PCH_TRIGGER_R 1 2 CPU_PCH_TRIGGER OUT 13

R0525 20 5% 1/20W MF 201
5 CPU_PCH_PM_DOWN_R 1 2 CPU_PCH_PM_DOWN OUT 13

R0526 20 5% 1/20W MF 201
5 CPU_PROC_AUD_SDO_R 1 2 PCH_DISPA_SDI OUT 20

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE: CPU DMI/PEG/FDI/RSVD

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DRAWING NUMBER: 051-02643 SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
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SHEET: 5 OF 131

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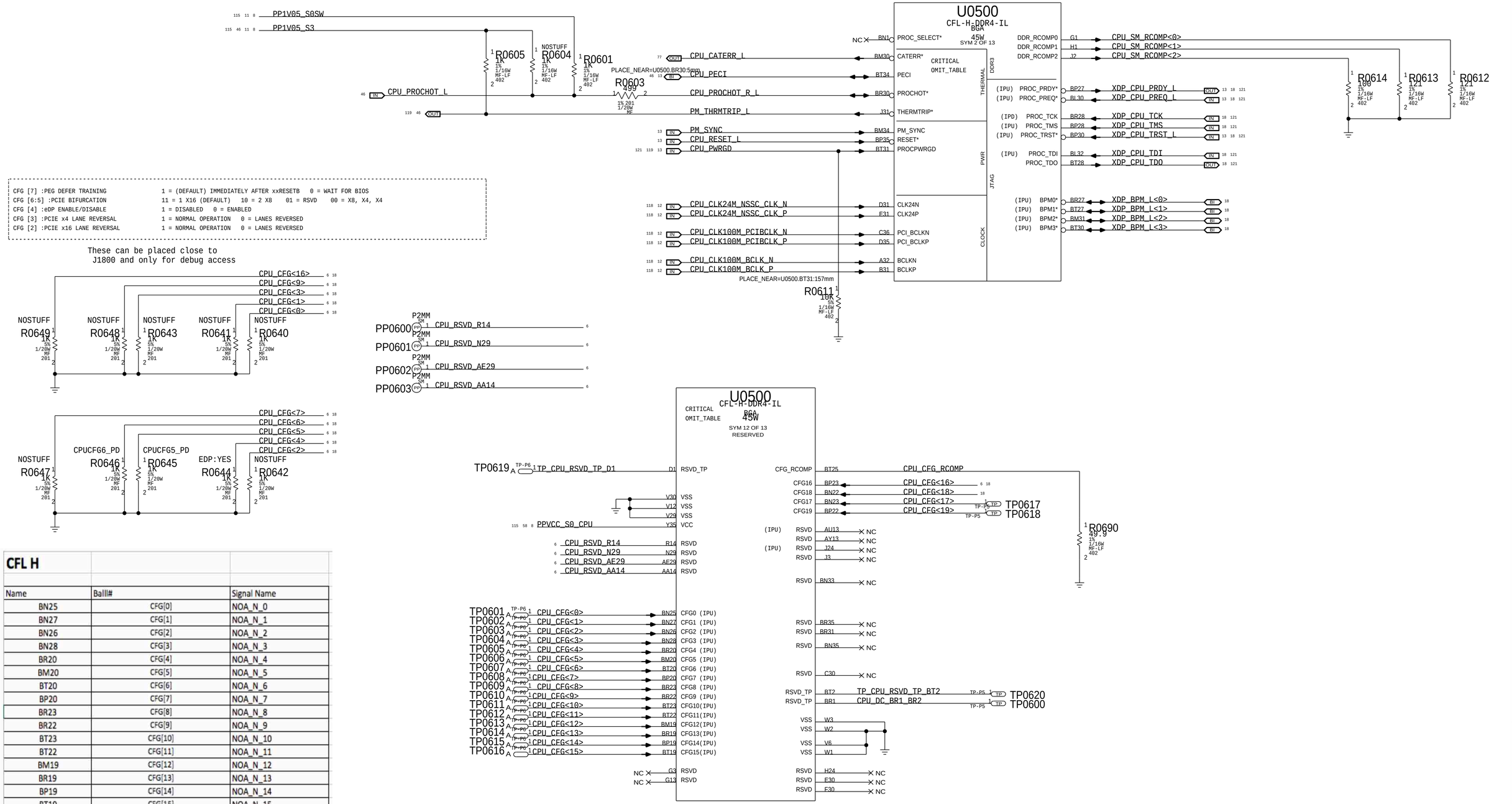

CFL H

Name	Ball#	Signal Name
BN25	CFG[0]	NOA_N_0
BN27	CFG[1]	NOA_N_1
BN26	CFG[2]	NOA_N_2
BN28	CFG[3]	NOA_N_3
BR20	CFG[4]	NOA_N_4
BM20	CFG[5]	NOA_N_5
BT20	CFG[6]	NOA_N_6
BP20	CFG[7]	NOA_N_7
BR23	CFG[8]	NOA_N_8
BR22	CFG[9]	NOA_N_9
BT23	CFG[10]	NOA_N_10
BT22	CFG[11]	NOA_N_11
BM19	CFG[12]	NOA_N_12
BR19	CFG[13]	NOA_N_13
BP19	CFG[14]	NOA_N_14
BT19	CFG[15]	NOA_N_15
BN23	CFG[17]	NOA_STB_P_0
BP22	CFG[19]	NOA_STB_P_1
D1	RSVD_TP	PEG_VIEW0
E1	RSVD_TP	PEG_VIEW1
E2	RSVD_TP	PEG_VIEW3
E3	IST_TRIG	PEG_VIEW2
BT2	RSVD_TP	DDR_VIEW1
BR1	RSVD_TP	DDR_VIEW0

BOM GROUP	BOM OPTIONS
CPUPEG:X8X8	CPUCFG5_PD
CPUPEG:X8X4X4	CPUCFG6_PD,CPUCFG5_PD

To use PEG X16 configuration, simply remove CPUPEG:X8X8 and CPUPEG:X8X4X4 from BOMs.

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE
CPU Clock/Misc/JTAG/CFG

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REVISION 4.0.0
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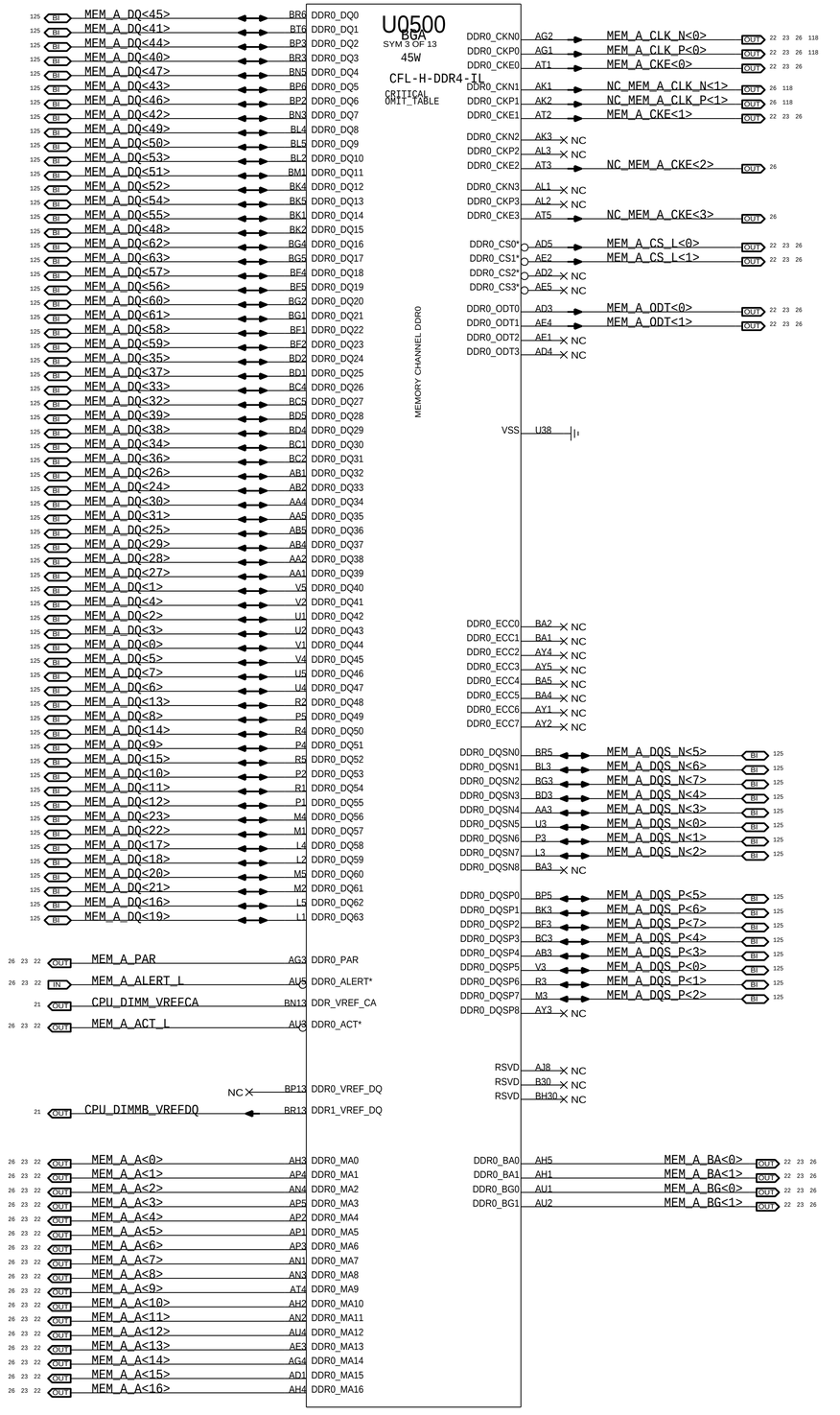

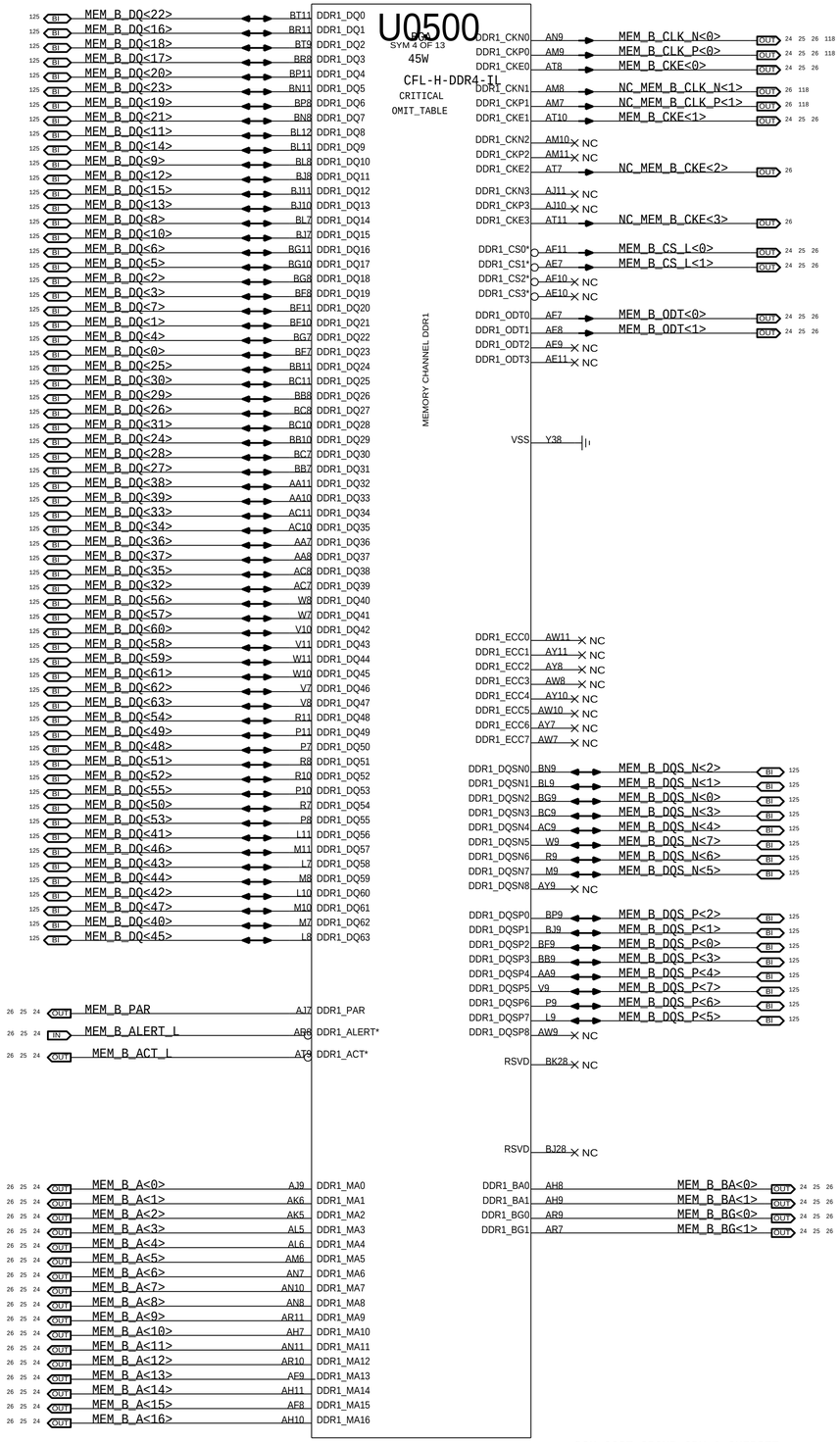

BOM_COST_GROUP=CPU & CHIPSET

SYNC_MASTER=J280_KTA SYNC_DATE=02/06/2017

PAGE TITLE

CPU DDR4 Interfaces

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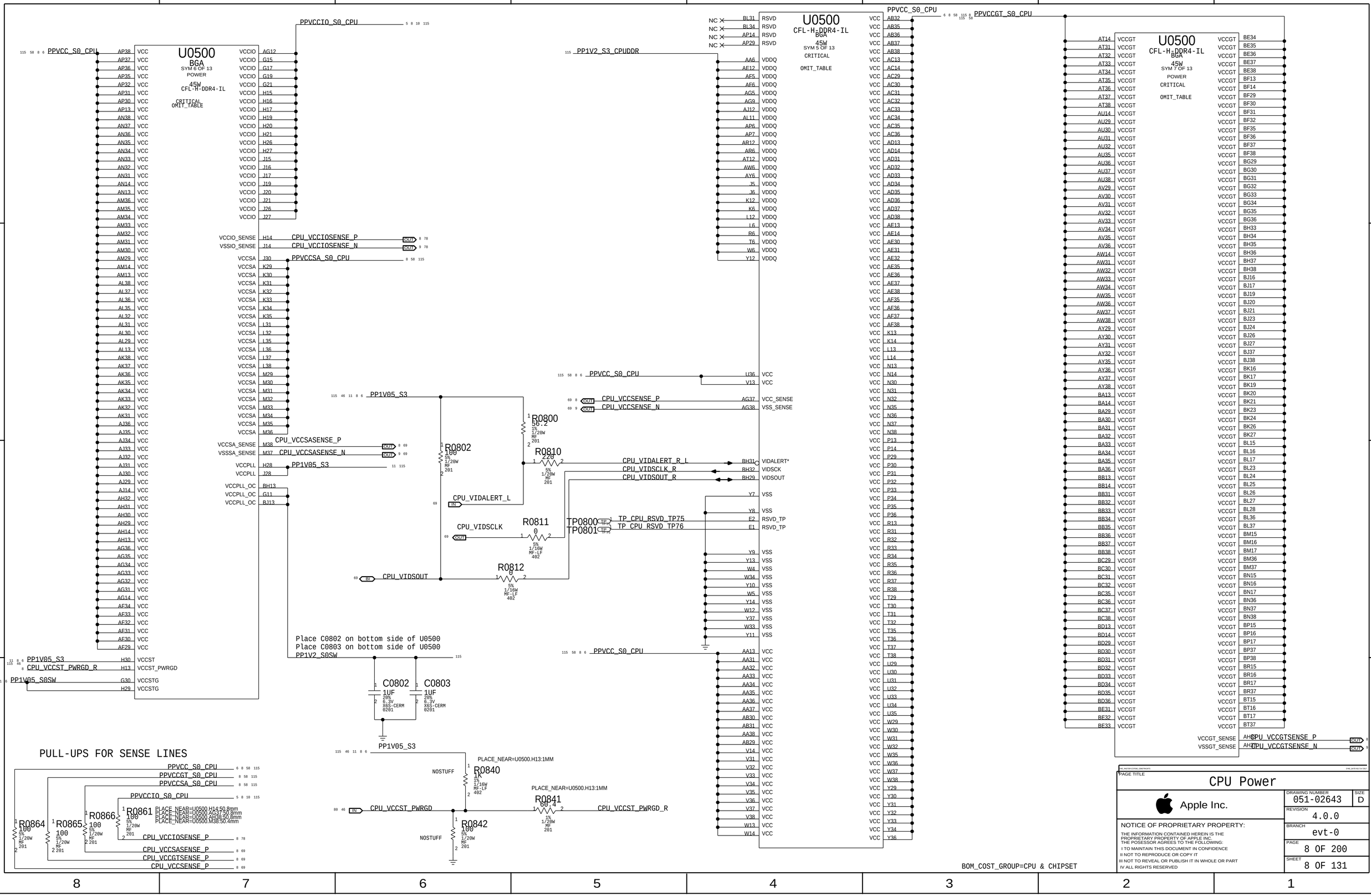
U0500
BGA
SYM 6 OF 13
POWER
45W
CFL-H-DDR4-IL
CRITICAL
OMIT_TABLE
U0500
CFL-H-DDR4-IL
BGA
45W
SYM 5 OF 13
CRITICAL
OMIT_TABLE
U0500
CFL-H-DDR4-IL
BGA
45W
SYM 7 OF 13
POWER
CRITICAL
OMIT_TABLE
PPVCC_S0_CPU
PPVCCIO_S0_CPU
PPVCCSA_S0_CPU
PPVCCGT_S0_CPU
PP1V2_S3_CPUDDR
PP1V05_S3
PP1V05_S0SW
CPU_VCCIOSENSE_P
CPU_VCCIOSENSE_N
CPU_VCCSASENSE_P
CPU_VCCSASENSE_N
CPU_VCCSENSE_P
CPU_VCCSENSE_N
CPU_VCCGTSENSE_P
CPU_VCCGTSENSE_N
CPU_VIDALERT_L
CPU_VIDSCLK
CPU_VIDSOUT
CPU_VIDALERT_R_L
CPU_VIDSCLK_R
CPU_VIDSOUT_R
TP_CPU_RSVD_TP75
TP_CPU_RSVD_TP76
CPU_VCCST_PWRGD
CPU_VCCST_PWRGD_R
R0800 56.2
R0802 100
R0810 220
R0811 0
R0812 0
R0840 1K
R0841 60.4
R0842 100
C0802 1UF
C0803 1UF
Place C0802 on bottom side of U0500
Place C0803 on bottom side of U0500
PP1V2_S0SW
PULL-UPS FOR SENSE LINES
R0861 100
R0864 100
R0865 100
R0866 100
PLACE_NEAR=U0500.H14:50.8mm
PLACE_NEAR=U0500.AG37:50.8mm
PLACE_NEAR=U0500.AB36:50.8mm
PLACE_NEAR=U0500.M38:50.4mm
PLACE_NEAR=U0500.H13:1MM
NOSTUFF
BOM_COST_GROUP=CPU & CHIPSET
PAGE TITLE
CPU Power
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SYNC_MASTER=J300_A1S SYNC_DATE=02/09/2017

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CPU Ground

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Vcc CPU Core Decoupling from 20140905 BOM

CPU VCORE Decoupling

Intel recommendation: 5x 220uF ESR 5m ohms ESL 1.9nH each,4x 47uF 0805 8x22uF 0603, 28x 10uF 0402, 3x 10uF 0402, 69x 1uF 0201
Apple Implementation:

Board Edge: 2x 220uF, 4x 47uF rest on the back side

115 PPVCC_S0_CPU

Place on bottom side of U0500

C1000 C1001 C1002 C1003 C1004 C1005 C1006 C1007 C1008 C1009 C1010 C1011 C1012 C1013 C1014 C1015 C1016 C1017 C1018 C1019 C1020 C1021 C1022
1UF 20% 4V CERM-X6S 0201

Place on bottom side of U0500

C1023 C1024 C1025 C1026 C1027 C1028 C1029 C1030 C1031 C1032 C1033 C1034 C1035 C1036 C1037 C1038 C1039 C1040 C1041 C1042 C1043 C1044 C1045
1UF 20% 4V CERM-X6S 0201

Place on bottom side of U0500

C1046 C1047 C1048 C1049 C1050 C1051 C1052 C1053 C1054 C1055 C1056 C1057 C1058 C1059 C1060 C1061 C1062
1UF 20% 4V CERM-X6S 0201

Place near inductors on bottom side.

C10A0 C10A3 C10A4 C10Z4 C10A6 C10A7 C10A8 C10ZB C10B0 C10B1 C10B4 C10C0 C10C1 C10C4 C10C5 C10C6 C10C7
20UF 20% 2.5V X6S-CERM 0402-1

Noise Floor caps

C10D1 C10D2 C10D3 C10D4 C10D5 C10D6 C10E2 C10E3 C10N1 C10N2 C10N3 C10N4 C10N5 C10N6 C10N7
20UF 20% 2.5V X6S-CERM 0402-1
12PF 5% 25V NP0-C0G 0201

C10F0 C10F1 C10F2 C10F3 C10F4 C10F5 C10F6 C10F7 C10F8 C10F9 C10G0
20UF 20% 2.5V X6S-CERM 0402-1

C1068 C1069 C1070 C1072 C1073
220UF 20% 2V ELEC SM-COMBO

122 115 PP1V2_S3_CPUDDR

Place on bottom side of U0500.

C1080 C1081 C1082 C1083 C1084 C1085
20UF 20% 2.5V X6S-CERM 0402-1

Place on bottom side of U0500

C1090 C1091 C1092 C1093 C1094 C1095 C1096
20UF 20% 2.5V X6S-CERM 0402-1
220UF 20% 2V ELEC SM-COMBO

CPU VDDQ Decoupling

Intel recommendation: 10x 10uF 0402, 4x 22uF 0602
Apple Implementation:

CPU VCCIO Decoupling

Intel recommendation: 3x 10uF 0402 (opposite CPU)
Apple Implementation:

Place near U0500 on bottom side

115 8 5 PPVCCIO_S0_CPU

C1086 C1087 C1088 C1089 C108A C108B C108C C108D
20UF 20% 2.5V X6S-CERM 0402-1

NOTE: Intel decoupling recommendations from CBR schematics for Skylake H doc#557227 and PDG section 48.1 (document# 546884)

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE
CPU Decoupling 1

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Vcc GT Slice Core Decoupling from 20140905 BOM

CPU VGTSlice Decoupling

Intel recommendation: 7x 220uF, 6x 47uF 0805, 6x 22uF 0603, 35x 10uF 0402, 68 1uF 0201
Apple Implementation:

Board Edge: 4x220uF, 7x 47uF rest on back side

122 116 PPVCCGT_S0_CPU

Place on bottom side of U0500

C1100 1UF 20% 4V CERM-X6S 0201
C1101 1UF 20% 4V CERM-X6S 0201
C1102 1UF 20% 4V CERM-X6S 0201
C1103 1UF 20% 4V CERM-X6S 0201
C1104 1UF 20% 4V CERM-X6S 0201
C1105 1UF 20% 4V CERM-X6S 0201
C1106 1UF 20% 4V CERM-X6S 0201
C1107 1UF 20% 4V CERM-X6S 0201
C1108 1UF 20% 4V CERM-X6S 0201
C1109 1UF 20% 4V CERM-X6S 0201
C1110 1UF 20% 4V CERM-X6S 0201
C1111 1UF 20% 4V CERM-X6S 0201
C1112 1UF 20% 4V CERM-X6S 0201
C1113 1UF 20% 4V CERM-X6S 0201
C1114 1UF 20% 4V CERM-X6S 0201
C1115 1UF 20% 4V CERM-X6S 0201
C1116 1UF 20% 4V CERM-X6S 0201
C1117 1UF 20% 4V CERM-X6S 0201
C1118 1UF 20% 4V CERM-X6S 0201
C1119 1UF 20% 4V CERM-X6S 0201
C1120 1UF 20% 4V CERM-X6S 0201
C1121 1UF 20% 4V CERM-X6S 0201
C1122 1UF 20% 4V CERM-X6S 0201
C1123 1UF 20% 4V CERM-X6S 0201

Place on bottom side of U0500

C1124 1UF 20% 4V CERM-X6S 0201
C1125 1UF 20% 4V CERM-X6S 0201
C1126 1UF 20% 4V CERM-X6S 0201
C1127 1UF 20% 4V CERM-X6S 0201
C1128 1UF 20% 4V CERM-X6S 0201
C1129 1UF 20% 4V CERM-X6S 0201
C1130 1UF 20% 4V CERM-X6S 0201
C1131 1UF 20% 4V CERM-X6S 0201
C1132 1UF 20% 4V CERM-X6S 0201
C1133 1UF 20% 4V CERM-X6S 0201
C1134 1UF 20% 4V CERM-X6S 0201
C1135 1UF 20% 4V CERM-X6S 0201
C1136 1UF 20% 4V CERM-X6S 0201
C1137 1UF 20% 4V CERM-X6S 0201
C1138 1UF 20% 4V CERM-X6S 0201
C1139 1UF 20% 4V CERM-X6S 0201
C1140 1UF 20% 4V CERM-X6S 0201
C1141 1UF 20% 4V CERM-X6S 0201
C1142 1UF 20% 4V CERM-X6S 0201
C1143 1UF 20% 4V CERM-X6S 0201
C1144 1UF 20% 4V CERM-X6S 0201
C1145 1UF 20% 4V CERM-X6S 0201
C1146 1UF 20% 4V CERM-X6S 0201
C1147 1UF 20% 4V CERM-X6S 0201

Place on bottom side of U0500

C1148 1UF 20% 4V CERM-X6S 0201
C1149 1UF 20% 4V CERM-X6S 0201
C1150 1UF 20% 4V CERM-X6S 0201
C1151 1UF 20% 4V CERM-X6S 0201
C1152 1UF 20% 4V CERM-X6S 0201
C1153 1UF 20% 4V CERM-X6S 0201
C1154 1UF 20% 4V CERM-X6S 0201
C1155 1UF 20% 4V CERM-X6S 0201
C1156 1UF 20% 4V CERM-X6S 0201
C1157 1UF 20% 4V CERM-X6S 0201
C1158 1UF 20% 4V CERM-X6S 0201
C1159 1UF 20% 4V CERM-X6S 0201
C1160 1UF 20% 4V CERM-X6S 0201
C1161 1UF 20% 4V CERM-X6S 0201
C1162 1UF 20% 4V CERM-X6S 0201
C1163 1UF 20% 4V CERM-X6S 0201
C1164 1UF 20% 4V CERM-X6S 0201
C1165 1UF 20% 4V CERM-X6S 0201
C1166 1UF 20% 4V CERM-X6S 0201
C1167 1UF 20% 4V CERM-X6S 0201

NOSTUFF
C11A0 20UF 20% 2.5V X6S-CERM 0402-1
C11A1 20UF 20% 2.5V X6S-CERM 0402-1
C11A2 20UF 20% 2.5V X6S-CERM 0402-1
C11A3 20UF 20% 2.5V X6S-CERM 0402-1
C11A4 20UF 20% 2.5V X6S-CERM 0402-1
C11A5 20UF 20% 2.5V X6S-CERM 0402-1
C11A6 20UF 20% 2.5V X6S-CERM 0402-1
C11A7 20UF 20% 2.5V X6S-CERM 0402-1
C11A8 20UF 20% 2.5V X6S-CERM 0402-1
C11A9 20UF 20% 2.5V X6S-CERM 0402-1
C11B0 20UF 20% 2.5V X6S-CERM 0402-1
C11B1 20UF 20% 2.5V X6S-CERM 0402-1
C11B2 20UF 20% 2.5V X6S-CERM 0402-1
C11B3 20UF 20% 2.5V X6S-CERM 0402-1
C11B4 20UF 20% 2.5V X6S-CERM 0402-1
C11B5 20UF 20% 2.5V X6S-CERM 0402-1
C11B6 20UF 20% 2.5V X6S-CERM 0402-1
C11B7 20UF 20% 2.5V X6S-CERM 0402-1
C11B8 20UF 20% 2.5V X6S-CERM 0402-1
C11B9 20UF 20% 2.5V X6S-CERM 0402-1
C11C0 20UF 20% 2.5V X6S-CERM 0402-1
C11C1 20UF 20% 2.5V X6S-CERM 0402-1
C11C2 20UF 20% 2.5V X6S-CERM 0402-1
C11C3 20UF 20% 2.5V X6S-CERM 0402-1
C11C4 20UF 20% 2.5V X6S-CERM 0402-1
C11C5 20UF 20% 2.5V X6S-CERM 0402-1
C11C6 20UF 20% 2.5V X6S-CERM 0402-1
C11C7 20UF 20% 2.5V X6S-CERM 0402-1
C11C8 20UF 20% 2.5V X6S-CERM 0402-1
C11C9 20UF 20% 2.5V X6S-CERM 0402-1
C11D0 20UF 20% 2.5V X6S-CERM 0402-1

NOSTUFF
C11F0 20UF 20% 2.5V X6S-CERM 0402-1
C11F1 20UF 20% 2.5V X6S-CERM 0402-1
C11F2 20UF 20% 2.5V X6S-CERM 0402-1
C11F3 20UF 20% 2.5V X6S-CERM 0402-1
C11F4 20UF 20% 2.5V X6S-CERM 0402-1
C11F5 20UF 20% 2.5V X6S-CERM 0402-1
C11F6 20UF 20% 2.5V X6S-CERM 0402-1
C11F7 20UF 20% 2.5V X6S-CERM 0402-1
C11E0 20UF 20% 2.5V X6S-CERM 0402-1
C11E1 20UF 20% 2.5V X6S-CERM 0402-1
C11E2 20UF 20% 2.5V X6S-CERM 0402-1
C11E3 20UF 20% 2.5V X6S-CERM 0402-1
C11E4 20UF 20% 2.5V X6S-CERM 0402-1
C11E5 20UF 20% 2.5V X6S-CERM 0402-1

NOSTUFF
C11D4 20UF 20% 2.5V X6S-CERM 0402-1
C11D3 20UF 20% 2.5V X6S-CERM 0402-1
C11D2 20UF 20% 2.5V X6S-CERM 0402-1
C11D1 20UF 20% 2.5V X6S-CERM 0402-1

C1168 220UF 20% 2V ELEC SM-COMBO
C1170 220UF 20% 2V ELEC SM-COMBO
C1171 220UF 20% 2V ELEC SM-COMBO
C1172 220UF 20% 2V ELEC SM-COMBO

115 PPVCCSA_S0_CPU

Place on bottom side of U0500

C11H0 1UF 20% 4V CERM-X6S 0201
C11H1 1UF 20% 4V CERM-X6S 0201
C11H2 1UF 20% 4V CERM-X6S 0201

NOSTUFF
C11I0 20UF 20% 2.5V X6S-CERM 0402-1
C11I1 20UF 20% 2.5V X6S-CERM 0402-1
C11I2 20UF 20% 2.5V X6S-CERM 0402-1
C11I3 20UF 20% 2.5V X6S-CERM 0402-1
C11I4 20UF 20% 2.5V X6S-CERM 0402-1
C11I5 20UF 20% 2.5V X6S-CERM 0402-1
C11I6 20UF 20% 2.5V X6S-CERM 0402-1
C11I7 20UF 20% 2.5V X6S-CERM 0402-1

C11K9 2200UF 20% 2V ELEC SM-COMBO

CPU VCCSTG Decoupling

115 8 6 PP1V05_S0SW

Place near U0500 on bottom side

C11L1 1UF 20% 4V CERM-X6S 0201
C11L2 1UF 20% 4V CERM-X6S 0201

CPU VCCPLL and VCCST Decoupling

115 8 PP1V05_S3
46 8 115 PP1V05_S3

C11M1 1UF 20% 4V CERM-X6S 0201
C11M2 1UF 20% 4V CERM-X6S 0201

Place near U0500 on bottom side

CPU VCCSA Decoupling

Intel recommendation: 2x 220uF, 1x 47uF 0805. 1x 22uF. 7x 10uF 0402, 3x 1uF 0201_
2x 220uF, 1x 22uF on board edge, everything else on back side
Apple Implementation:

NOTE: Intel decoupling recommendations from CBR schematics for Skylake H doc#557227 and PDG section 48.1 (document# 546884)

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE
CPU Decoupling 2

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DRAWING NUMBER 051-02643
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OMIT_TABLE

U1200
CNL-PCH-H-USFF-QNYP
961822
BGA
SYM 4 OF 11
SYSTEM POWER MANAGEMENT
(IPU)

121 119 46 18 12 IN	PM_SYSRST_L	AL17	SYS_RESET*	DRAM_RESET*	K25	PCH_DRAM_RESET_L OUT 26
119 46 IN	PM_PCH_SYS_PWROK	AK16	SYS_PWROK	(OD) DSW_PWROK	H25	PM_RSMRST_L 12 18 34 46 112 119
121 119 46 35 IN	PM_PCH_PWROK	H23	PCH_PWROK	(IPD-DeepSx) WAKE*	K23	PCIE_WAKE_L IN 12 19
				GPP_A14/SUS_STAT*/ESPI_RESET*	P23	ESPI_RESET_L OUT 20 39 119
119 46 20 OUT	PLT_RST_L	U25	GPP_B13/PLTRST*	(IPU-RSMRST#)		
119 112 46 34 18 12 IN	PM_RSMRST_L	J24	RSMRST*	GPD10/SLP_S5*	H22	PM_SLP_S5_L OUT 12 119
				GPD5/SLP_S4*	J21	PM_SLP_S4_L OUT 12 119
80 77 12 IN	PM_PWRBTN_L	K22	GPD3/PWRBTN*	GPD4/SLP_S3*	K20	PM_SLP_S3_L OUT 12 14 27 105 119 131
12	SPIROM_USE_MLB	L22	GPD1/ACPRESENT			
12	PCH_BATLOW_L	L24	GPD0/BATLOW*	SLP_SUS*	J25	TP_PCH_SLP_SUS_L
131 119 77 39 12 OUT	PM_SLP_S0_L	U23	GPP_B12/SLP_S0*			

RTC
ESPI/LPC

PCH_CLK32K_RTCX1	G24	RTCX1	GPP_A0/RCIN*/ESPI_ALERT1*	R24
NC_PCH_CLK32K_RTCX2	G22	RTCX2	GPP_A1/LAD0/ESPI_IO0	N20
PCH_INTRUDER_L	H20	INTRUDER*	GPP_A2/LAD1/ESPI_IO1	N21
	F25	SRTCRST*	GPP_A3/LAD2/ESPI_IO2	M20
PCH_RTC_RESET_L	F23	RTCRST*	GPP_A4/LAD3/ESPI_IO3	M22
			GPP_A5/LFRAME*/ESPI_CS0*	M25
			GPP_A6/SERIRQ/ESPI_CS1*	N25
			GPP_A7/PIRQA*/ESPI_ALERT0*	N24
			GPD7	J20

PCH_GPP_A0_PU	12		
ESPI_IO_PCH<0>	1	22 1% 1/20W MF 201	R1260 ESPI_IO<0> BI 20 39 118
ESPI_IO_PCH<1>	1	22 1% 1/20W MF 201	R1261 ESPI_IO<1> BI 20 39 118
ESPI_IO_PCH<2>	1	22 1% 1/20W MF 201	R1262 ESPI_IO<2> BI 20 39 118
ESPI_IO_PCH<3>	1	22 1% 1/20W MF 201	R1263 ESPI_IO<3> BI 20 39 118
ESPI_CS_L	BI 20 39		
PCH_SOC_SYNC	OUT 12 38		
PCH_ESPI_ALERT0_L	12		
PCH_STRP_GPD7	12		

80 17 16 PP3V3_S5
80 52 20 19 16 15 13 PP1V8_S5
80 16 PP1V8_S5
80 17 16 PP3V3_S5

12 PCH_STRP_GPD7	R1204	100K	1 2	5% 1/20W MF 201
12 SPIROM_USE_MLB	R1205	100K	1 2	NOSTUFF 5% 1/20W MF 201
19 12 PCIE_WAKE_L	R1206	100K	1 2	5% 1/20W MF 201
12 PCH_BATLOW_L	R1208	10K	1 2	5% 1/20W MF 201
12 PCH_ESPI_ALERT0_L	R1209	100K	1 2	5% 1/20W MF 201
12 PCH_GPP_A0_PU	R1210	100K	1 2	5% 1/20W MF 201
41 12 SOC_CLKREQ_L	R1211	47K	1 2	201
12 DEBUG_CLKREQ_L	R1213	47K	1 2	201
121 119 46 18 12 PM_SYSRST_L	R1214	3.0K	1 2	5% 1/20W MF 201

77 IN PMU_CLK32K_PCH — R1220 100K 1/20W 201 MF 5% — 1 2

R1221 127K 1% 1/20W MF 201 — 1 2

PP3V0_G3H_RTC — 16 17 80

R1201 1M 5% 1/20W MF 201 — 1 2

PCH_INTRUDER_L — 12

119 77 IN PCH_RTC_RESET_L

NEED TO CHANGE PER INTEL SPEC

CRITICAL
C1250 10PF 5% 50V C0G 0201 — 1 2

R1251 200K 1% 1/20W MF 201 — 1 2

Y1250 24MHZ_10PPM-8PF-300HM 2.5X2.0-SM — 1 2 3 4

R1250 0 5% 1/20W MF 0201 — 1 2

CRITICAL
C1251 10PF 5% 50V C0G 0201 — 1 2

PCH_CLK24M_XTALOUT_R

Ce1=Ce2=2*(C_L - C_S - C_I) = 2*(8-0.7)=14.6pF
C_L = Load Capacitance = 8pF
C_S = Trace Capacitance + XTAL Pad Capacitance = 0.7pF
C_I= PCH Pin Capacitance = 0

OMIT_TABLE

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CNL-PCH-H-USFF-QNYP
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CLOCK SIGNALS

121 41 OUT	PCIE_CLK100M_SOC_N	AR10	CLKOUT_PCIE_N0	XTAL_IN	AN3	PCH_CLK24M_XTALIN
121 41 OUT	PCIE_CLK100M_SOC_P	AN10	CLKOUT_PCIE_P0	XTAL_OUT	AN1	PCH_CLK24M_XTALOUT 118
121 36 OUT	PCH_PCIE_CLK100M_WLAN_N	AP9	CLKOUT_PCIE_N1	CLKIN_XTAL	AR4	PCH_CLKIN_XTAL 12
121 36 OUT	PCH_PCIE_CLK100M_WLAN_P	AM9	CLKOUT_PCIE_P1			
121 117 OUT	EG_PEG_CLK100M_N	AR8	CLKOUT_PCIE_N2			
121 117 OUT	EG_PEG_CLK100M_P	AN8	CLKOUT_PCIE_P2			
121 OUT	PCIE_CLK100M_DEBUG_N	AM6	CLKOUT_PCIE_N3			
121 OUT	PCIE_CLK100M_DEBUG_P	AK6	CLKOUT_PCIE_P3			
NC		AM8	CLKOUT_PCIE_N4			
NC		AK8	CLKOUT_PCIE_P4			
NC		AL7	CLKOUT_PCIE_N5			
NC		AJ7	CLKOUT_PCIE_P5			
121 27 OUT	PCIE_CLK100M_TBT_X_N	AK1	CLKOUT_PCIE_N6			
121 27 OUT	PCIE_CLK100M_TBT_X_P	AK3	CLKOUT_PCIE_P6			
121 105 OUT	PCIE_CLK100M_TBT_T_N	AJ5	CLKOUT_PCIE_N7			
121 105 OUT	PCIE_CLK100M_TBT_T_P	AK4	CLKOUT_PCIE_P7			

XCLK_BIASREF	AP2	PCH_XCLK_BIASREF	12
GPP_A9/CLKOUT_LPC0 /ESPI_CLK	M23	ESPI_CLK60M_PCH_R	22 1 2 1% 1/20W MF 201 — R1237 — ESPI_CLK60M_PCH OUT 20

PLACE_NEAR=U1200.M23:4mm

80 77 36 PP1V8_S5

131 119 77 39 12 PM_SLP_S0_L — R1236 100K — 1 2 — NOSTUFF 5% 1/20W MF 201

119 12 PM_SLP_S5_L	R1230	100K	1 2	5% 1/20W MF 201
119 12 PM_SLP_S4_L	R1231	100K	1 2	5% 1/20W MF 201
131 119 105 27 14 12 PM_SLP_S3_L	R1232	100K	1 2	5% 1/20W MF 201
131 119 77 39 12 PM_SLP_S0_L	R1233	100K	1 2	5% 1/20W MF 201
38 12 PCH_SOC_SYNC	R1215	100K	1 2	5% 1/20W MF 201
12 PCH_CLKIN_XTAL	R1235	10K	1 2	5% 1/20W MF 201
12 PCH_XCLK_BIASREF	R1234	60.4	1 2	1% 1/20W MF 201

PLACE_NEAR=U1200.AP2:2.54mm

CLKOUT_CPUBCLK_N	AR7	CPU_CLK100M_BCLK_N	OUT 6 118
CLKOUT_CPUBCLK_P	AP7	CPU_CLK100M_BCLK_P	OUT 6 118
CLKOUT_CPUNSSC_N	AR6	CPU_CLK24M_NSSC_CLK_N	OUT 6 118
CLKOUT_CPUNSSC_P	AN6	CPU_CLK24M_NSSC_CLK_P	OUT 6 118
CLKOUT_CPUPCIBCLK_N	AP5	CPU_CLK100M_PCIBCLK_N	OUT 6 118
CLKOUT_CPUPCIBCLK_P	AM5	CPU_CLK100M_PCIBCLK_P	OUT 6 118

PCI EXPRESS
CLOCKS & CONTROL

GPP_B5/SRCCLKREQ0*	W22	SOC_CLKREQ_L	BI 12 41
GPP_B6/SRCCLKREQ1*	AB22	PCH_WLAN_CLKREQ_L	BI 19 37
GPP_B7/SRCCLKREQ2*	U20	PCH_GPU_CLKREQ_L	BI 19
GPP_B8/SRCCLKREQ3*	V20	DEBUG_CLKREQ_L	12
GPP_B9/SRCCLKREQ4*	W20	NC	
GPP_B10/SRCCLKREQ5*	V21	NC	
GPP_H0/SRCCLKREQ6*	D12	TBT_X_CLKREQ_L	IN 19 27
GPP_H1/SRCCLKREQ7*	A10	TBT_T_CLKREQ_L	IN 19 105

PP3V3_S5 — 80

R1207 10K 1/20W 201 5% MF — 1 2 — PM_PWRBTN_L — 12 77 80

BOM_COST_GROUP=CPU & CHIPSET

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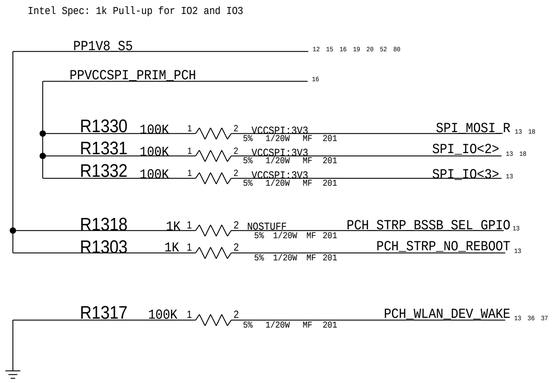
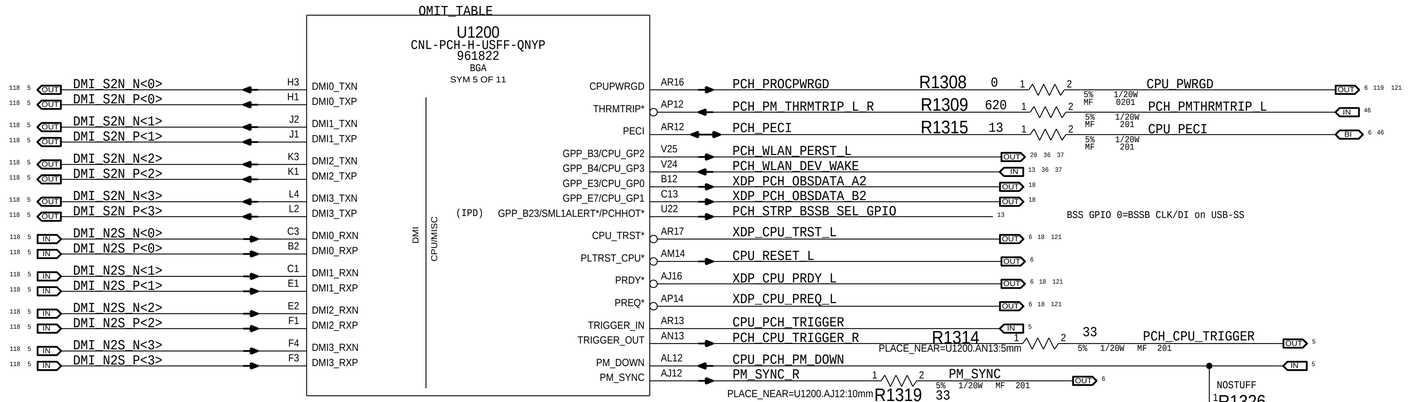
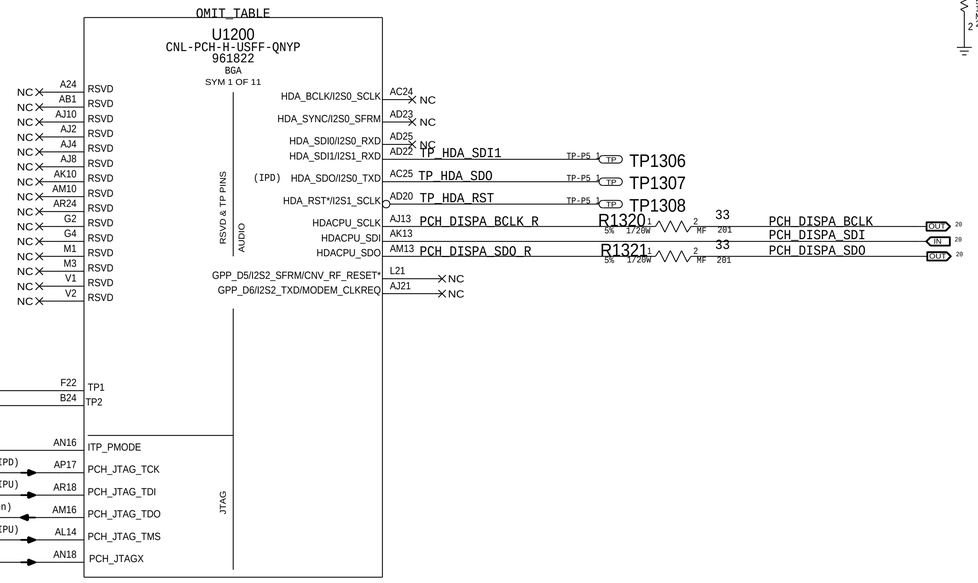
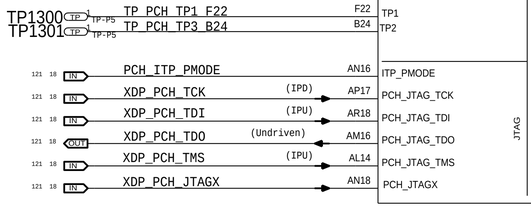
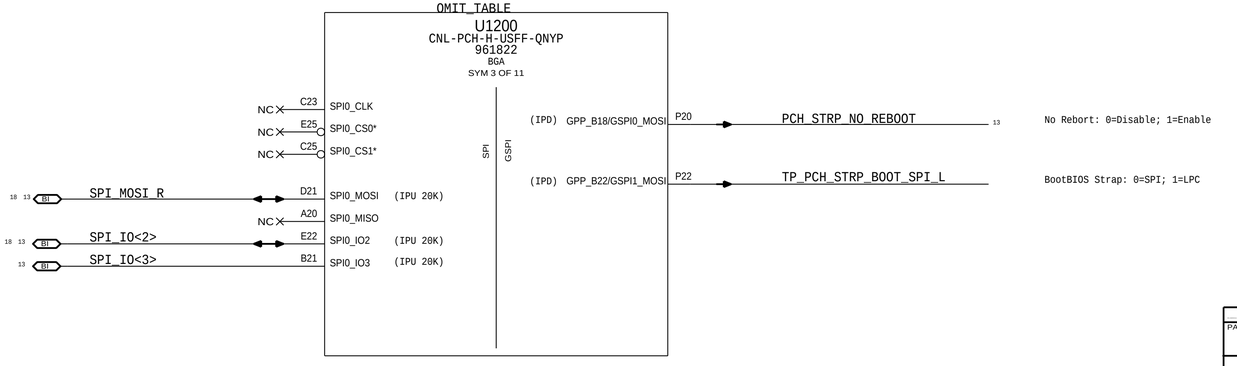


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0134	3	RES,MF,5%,1/20W,201,75K	R1330,R1331,R1332		VCCSPI:1V8









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PAGE TITLE
PCH DMI/JTAG/SPI/HDA

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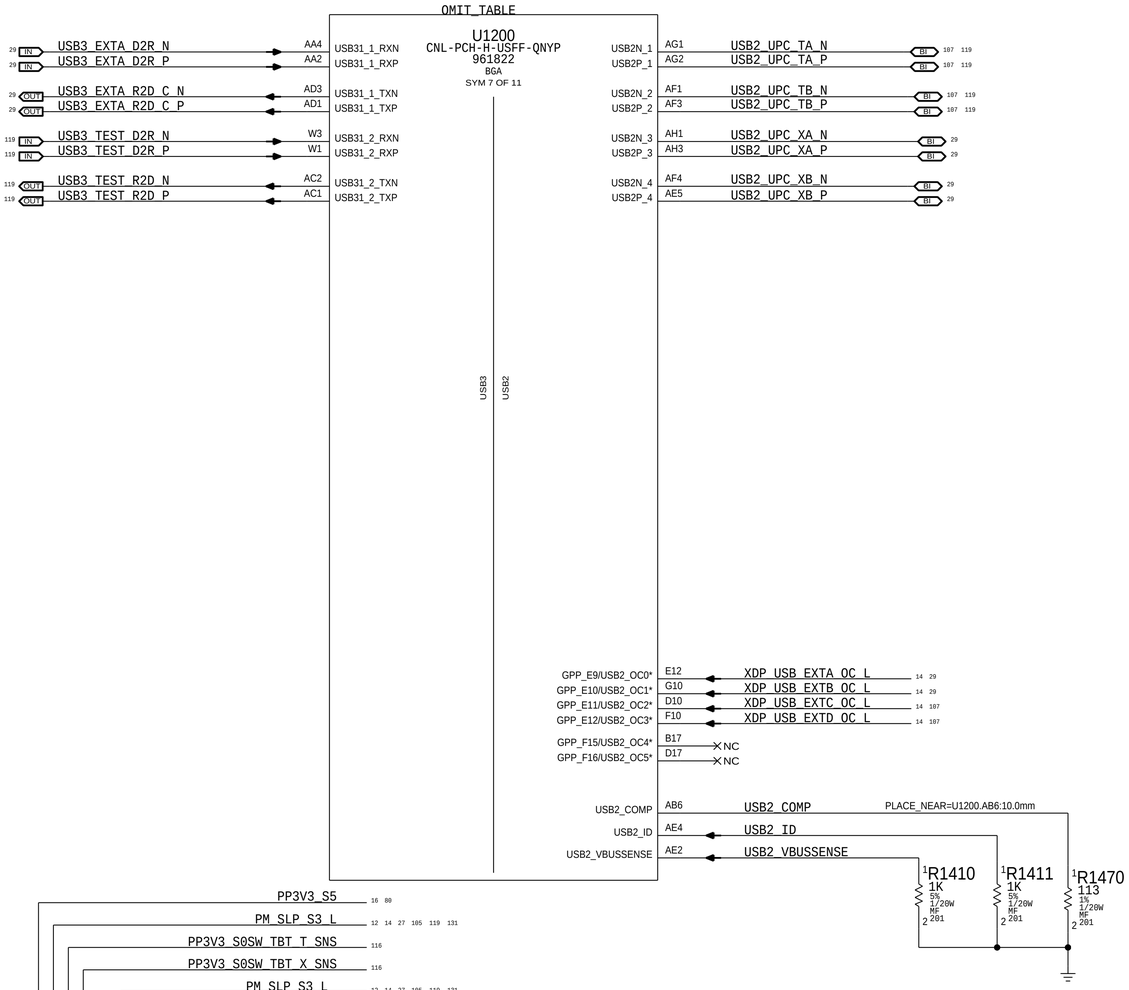

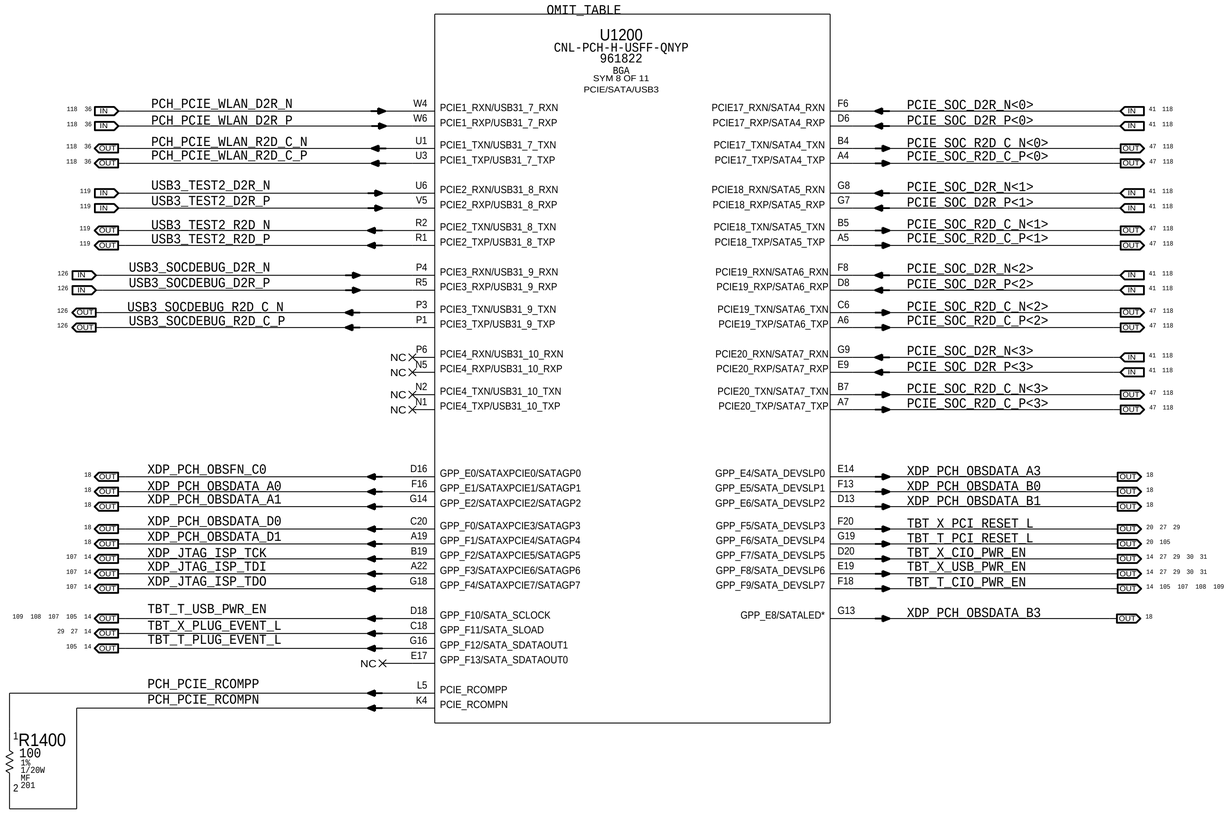

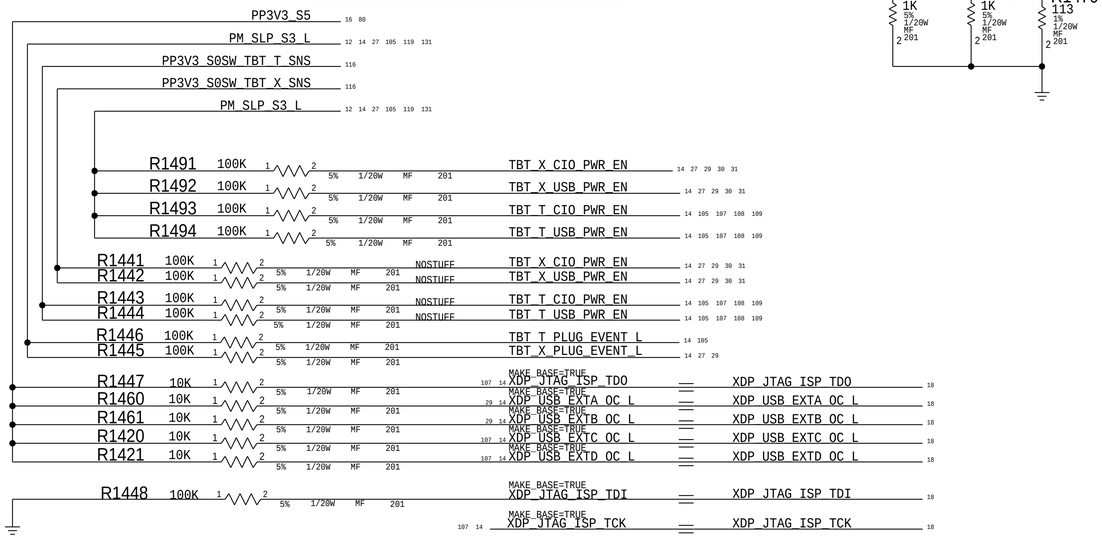

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PAGE TITLE
PCH PCI-E/USB

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SPEED	CONGIF3
2400MHZ	0
2133MHZ	1

STORAGE	CONGIF2
16GB	1
32GB	0

VENDOR	CONGIF1	CONGIF0
SAMSUNG	1	0
MICRON	0	1
HYNIX	0	0

RAMCFG0:L R1530 1K 5% 1/20W MF 201
RAMCFG1:L R1531 1K 5% 1/20W MF 201
RAMCFG2:L R1532 1K 5% 1/20W MF 201
RAMCFG3:L R1533 1K 5% 1/20W MF 201
R1534 1K 5% 1/20W MF 201 RAMCFG4:L

MLB_RAMCFG0 15
MLB_RAMCFG1 15
MLB_RAMCFG2 15
MLB_RAMCFG3 15
MLB_RAMCFG4 15

OMIT_TABLE

U1200
CNL-PCH-H-USFF-QNYP
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J680 Display Port DDPF Disabled

PDG recommends to NC the HPD lines not being used

J680 Display Port DDPB/C/D Disabled

eSPI Flash Mode: 0=MAF; 1=SAF

	NC	A18	GPP_F14/PS_ON*	
93 15 OUT	EDP_IG_PANEL_PWR	A16	GPP_F19/EDP_VDDEN	
93 15 OUT	EDP_IG_BKLT_EN	C16	GPP_F20/EDP_BKLTEN	
	NC	A14	GPP_F21/EDP_BKLTCTL	GPPF/ BACKLIGHT
	NC	B14	GPP_F22/DDPF_CTRLCLK	
	NC	A13	GPP_F23/DDPF_CTRLDATA	
	NC	AN23	GPP_I0/DDPB_HPD0/DISP_MISC0	
	NC	AN25	GPP_I1/DDPC_HPD1/DISP_MISC1	
	NC	AP24	GPP_I2/DDPD_HPD2_DISP_MISC2	
	NC	AP22	GPP_I3/DDPF_HPD3_DISP_MISC3	
93 15 IN	DP_INT_IG_HPD	AR22	GPP_I4/EDP_HPD/DISP_MISC4	GPPI/DISPLAY
	NC	AP19	GPP_I5/DDPB_CTRLCLK	GPPG
	NC	AM19	GPP_I6/DDPB_CTRLDATA	
	NC	AR20	GPP_I7/DDPC_CTRLCLK	
	NC	AN20	GPP_I8/DDPC_CTRLDATA	
	NC	AP21	GPP_I9/DDPD_CTRLCLK	
	NC	AR21	GPP_I10/DDPD_CTRLDATA	
	NC	AL24	GPP_I11/M2_SKT2_CFG0	
	NC	AL25	GPP_I12/M2_SKT2_CFG1	
107 29 15 OUT	TBT_POC_RESET	AK25	GPP_I13/M2_SKT2_CFG2	
15	PCH_STRP_SPIROM_SAF	A9	GPP_H12/SML2ALERT* (IPD)	GPPH/I2C/INTEGRATED SENSOR /SMLINK
15	PCH_STRP_GPP_H15	B9	GPP_H15/SML3ALERT*	
19 15 IN	WLAN_AUDIO_SYNC_LS3V3	C10	GPP_H23/TIME_SYNC0	

	GPP_J0/CNV_PA_BLANKING	AM18	SOC_SWD_MUX_SEL_PCH 15
	GPP_J1/CPU_C10_GATE*	AK18	CPU_C10_GATE_L OUT 15 76 78 79 131
	GPP_J2	AL19	PCH_SWD_SOC_CLK 15
	GPP_J3	AJ18	PCH_SWD_SOC_IO 15
(IPD)	GPP_J4/CNV_BRI_DT/UART0B_RTS*	AJ22	PCH_STRP_XTAL_24MHZ 15
	GPP_J5/CNV_BRI_RSP/UART0B_RXD	AH23	MLB_RAMCFG2 15
	GPP_J6/CNV_RGI_DT/UART0B_TXD	AJ25	PCH_STRP_CNV_L 15
	GPP_J7/CNV_RGI_RSP/UART0B_CTS*	AH25	MLB_RAMCFG3 15
	GPP_J8/CNV_MFUART2_RXD	AK22	MLB_RAMCFG4 15
(IPD)	GPP_J9/CNV_MFUART2_TXD	AK23	PCH_STRP_VCCPSPI_1V8 15
	GPP_J10	AM20	PCH_BT_ROM_BOOT_L 15 36
	GPP_J11/A4WP_PRESENT	AK20	PCH_BT_DEV_WAKE 15 36
	GPP_K20	A8	MLB_RAMCFG0 15
	GPP_K21	C8	MLB_RAMCFG1 15
	GPPJ_RCOMP_1P8	AJ17	PCH_GPPJ_RCOMP_1P8 15
	CNV_WR_CLKP	AG24	NC
	CNV_WR_CLKN	AG25	NC
	CNV_WR_D0P	AF23	NC
	CNV_WR_D0N	AF25	NC
	CNV_WR_D1P	AE22	NC
	CNV_WR_D1N	AE24	NC
	CNV_WT_CLKP	AH22	NC
	CNV_WT_CLKN	AH20	NC
	CNV_WT_D0P	AG21	NC
	CNV_WT_D0N	AG20	NC
	CNV_WT_D1P	AF22	NC
	CNV_WT_D1N	AF20	NC
	CNV_WT_RCOMP	AE21	NC

GPP_J2:Unused
GPP_J3:Unused
GPP_J4: 0=38.4MHz 1=24MHz XTAL
GPP_J6: 0=ENABLE 1=DISABLE
GPP_J9: 0=3.3V; 1=1.8V

PP1V8_S5 80
PP3V3_S5 16 19 80
PP1V8_S5 12 13 16 19 20 52 80
PP3V3_S5 16 80

R1501	10K	5% 1/20W MF 201	JTAG_TBT_X_TMS	15 27 121
R1502	10K	5% 1/20W MF 201	JTAG_TBT_T_TMS	15 105 121
R1503	1K	5% 1/20W MF 201	PCH_STRP_ESPI	15
R1505	47K	5% 1/20W MF 201	PCH_UART_BT_D2R	15 35
R1506	47K	5% 1/20W MF 201	PCH_UART_BT_R2D	15 35
R1507	47K	5% 1/20W MF 201	PCH_UART_BT_RTS_L	15 35
R1508	47K	5% 1/20W MF 201	PCH_UART_BT_CTS_L	15 35
R1509	47K	5% 1/20W MF 201	PCH_UART_DEBUG_D2R	15 29 119 126
R1510	47K	5% 1/20W MF 201	PCH_UART_DEBUG_R2D	15 29 119 126
R1511	1K	5% 1/20W MF 201	PCH_STRP_SPIROM_SAF	15
R1512	100K	5% 1/20W MF 201	PCH_STRP_GPP_H15	15
R1526	20K	1% 1/20W MF 201	PCH_STRP_CNV_L	15
R1543	1K	5% 1/20W MF 201	PCH_STRP_XTAL_24MHZ	15
R1514	100K	5% 1/20W MF 201	PCH_SWD_SOC_CLK	15
R1515	100K	5% 1/20W MF 201	PCH_SWD_SOC_IO	15
R1516	100K	5% 1/20W MF 201	CPU_C10_GATE_L	15 76 78 79 131
R1517	1K	VCCSPI:1V8 5% 1/20W MF 201	PCH_STRP_VCCPSPI_1V8	15
R1518	1K	VCCSPI:3V3 5% 1/20W MF 201		

OMIT_TABLE

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39 29 OUT	SOC_PERST_L	R22	GPP_A20/ISH_GP2	GPPA/ INTEGRATED SENSOR
39 IN	PCH_GCON_INT_L	P25	GPP_A21/ISH_GP3	
TP1501 TP TP-P5	TP_PCH_STRP_TOPBLK_SWP_L PLACE_SIDE=BOTTOM	R21	GPP_B14/SPKR (IPD)	GPPB
121 27 15 OUT	JTAG_TBT_X_TMS	AC20	GPP_D0/SPI1_CS*/SBK0/BK0	GPPC/SMLINK0/I2C/UART
121 105 15 OUT	JTAG_TBT_T_TMS	AC21	GPP_D1/SPI1_CLK/SBK1/BK1	
NC		AB20	GPP_D12/ISH_SPI_MOSI/GP_BSSB_DI/GSPI2_MOSI	GPPD/INTEGRATED SENSOR/UART/I2C

	GPP_C0/SMBCLK	W23	SMBUS_PCH_CLK OUT 52	PROJ-SPECIFIC PULLUP
	GPP_C1/SMBDATA	W25	SMBUS_PCH_DATA IN 52	
(IPD)	GPP_C2/SMBALERT*	AA22	TP_PCH_STRP_TLSCONF	TLS: 0=Disbale; 1=Enable
(IPD)	GPP_C5/SML0ALERT*	AB19	PCH_STRP_ESPI 15	GPP_C5: 0=LPC; 1=eSPI
	GPP_C8/UART0A_RXD	AA24	PCH_UART_BT_D2R IN 15 35	
	GPP_C9/UART0A_TXD	AA21	PCH_UART_BT_R2D OUT 15 35	
	GPP_C10/UART0A_RTS*	AA18	PCH_UART_BT_RTS_L OUT 15 35	
	GPP_C11/UART0A_CTS*	Y19	PCH_UART_BT_CTS_L IN 15 35	
	GPP_C20/UART2_RXD	AB25	PCH_UART_DEBUG_D2R IN 15 29 119 126	
	GPP_C21/UART2_TXD	AB23	PCH_UART_DEBUG_R2D OUT 15 29 119 126	

R1522 100K 5% 1/20W MF 201 DP_INT_IG_HPD 15 93
R1523 100K 5% 1/20W MF 201 TBT_POC_RESET 15 29 107
R1524 100K 5% 1/20W MF 201 WLAN_AUDIO_SYNC_LS3V3 15 19
R1525 100K NOSTUFF 5% 1/20W MF 201 PCH_BT_DEV_WAKE 15 36
R1527 100K 5% 1/20W MF 201 EDP_IG_PANEL_PWR 15 93
R1528 100K 5% 1/20W MF 201 EDP_IG_BKLT_EN 15 93
R1529 100K 5% 1/20W MF 201 SOC_SWD_MUX_SEL_PCH 15
R1540 100K NOSTUFF 5% 1/20W MF 201 PCH_BT_ROM_BOOT_L 15 36
R1542 200 1% 1/20W MF 201 PCH_GPPJ_RCOMP_1P8 15

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE
PCH GPIO/MISC/NCTF

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DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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SHEET 15 OF 131

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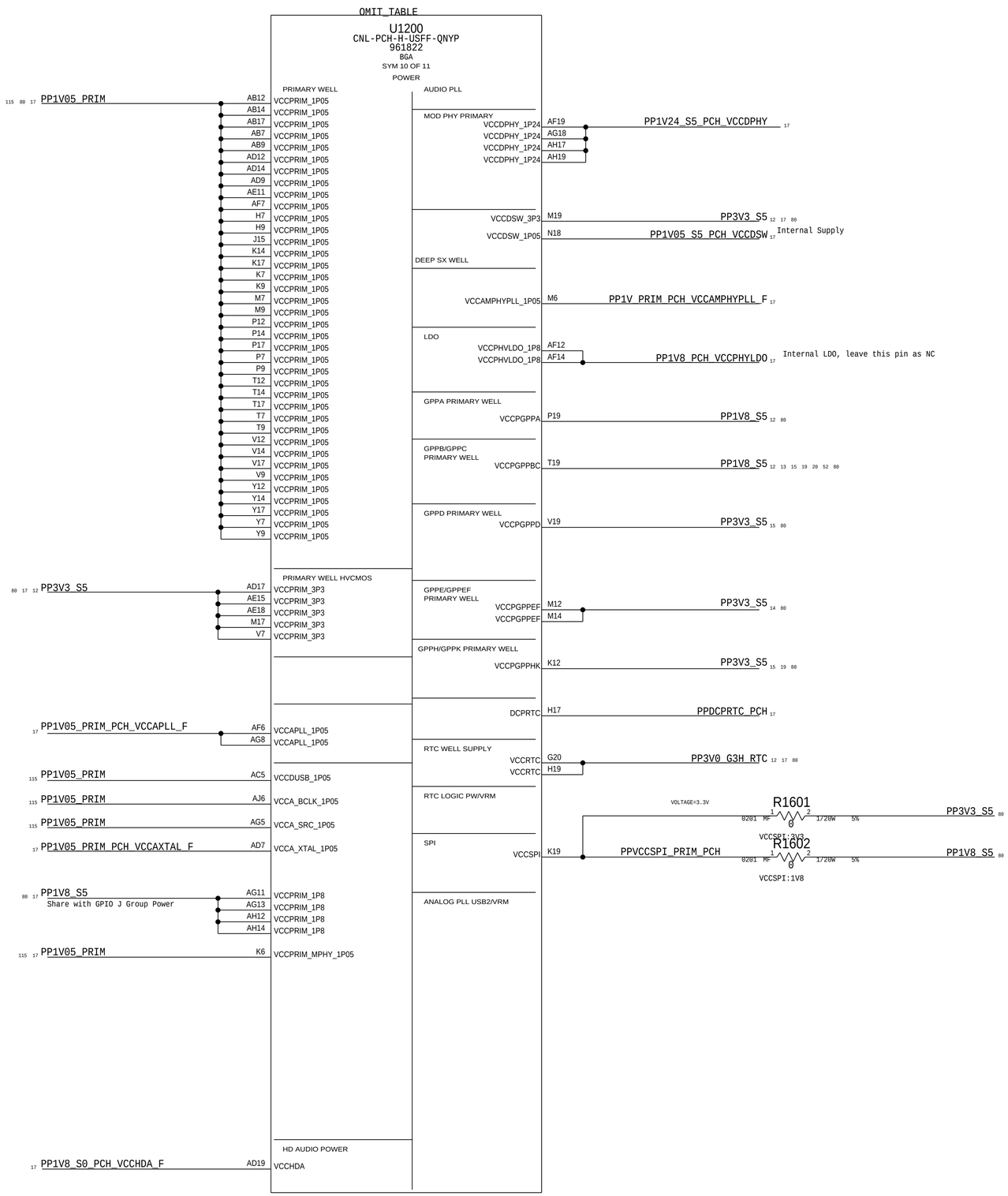

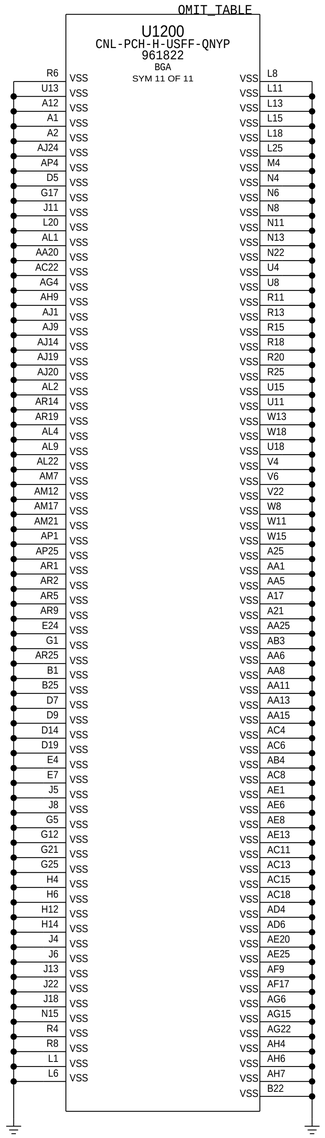

Current data from LPT EDS (doc #486708, Rev 1.0).

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE
PCH Power

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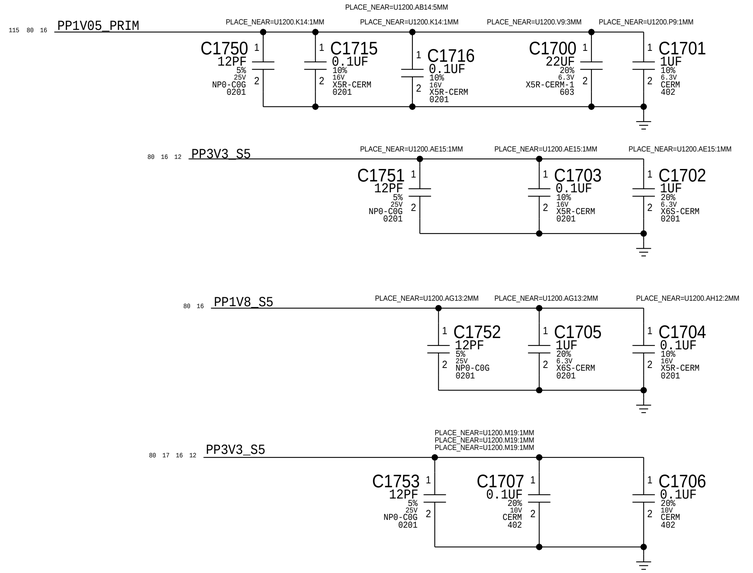

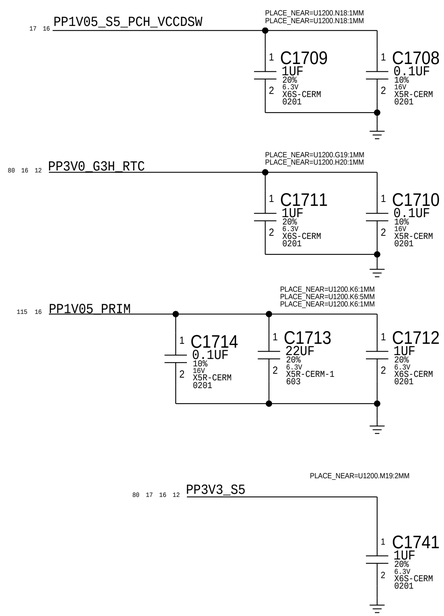

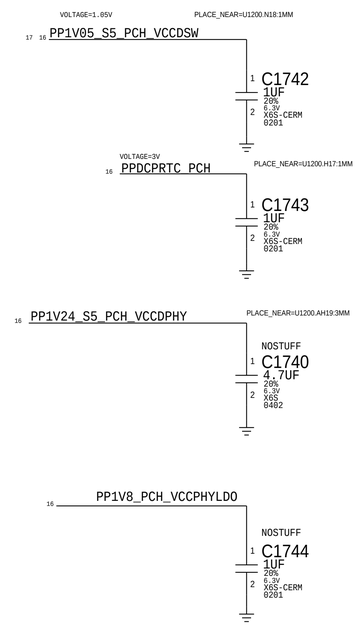

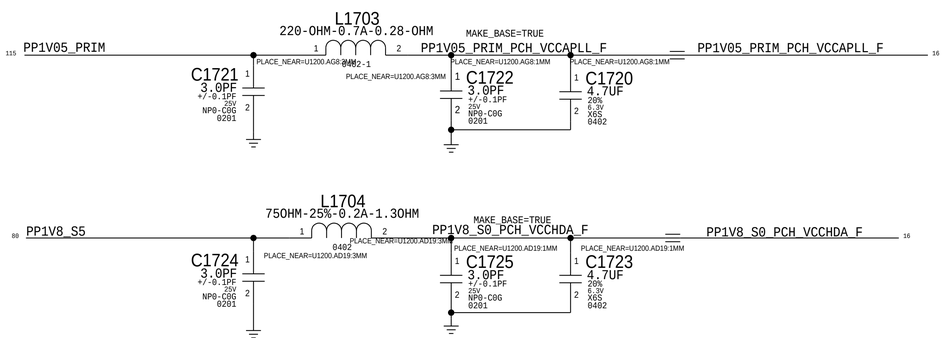

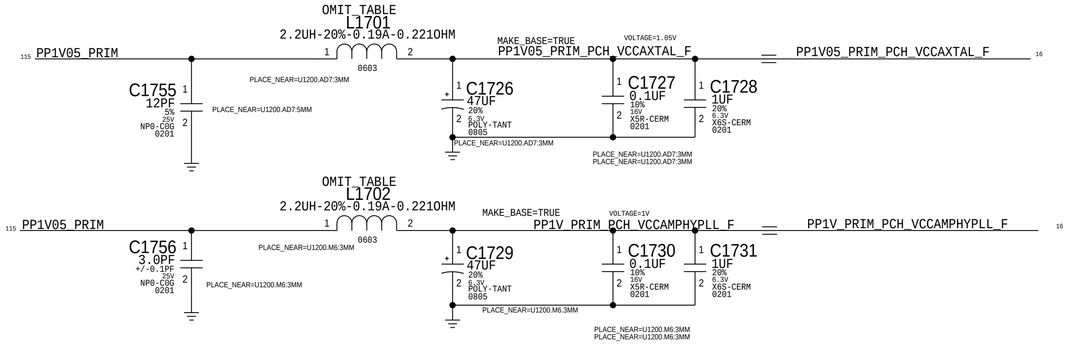

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
113S0022	2	RES,MF,1A MAX,00HM,5%,0603	L1701,L1702		

Current data from LPT EDS (doc #486708, Rev 1.0).

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE

PCH Decoupling

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Primary / Merged (CPU/PCH) Micro2-XDP

Extra BPM Testpoints

XDP_BPM_L<0> → TP1800
XDP_BPM_L<1> → TP1801
XDP_BPM_L<2> → TP1802
XDP_BPM_L<3> → TP1803
(TP-P6)

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

XDP_PCH_OBSDATA_A0	TP1810
XDP_PCH_OBSDATA_A1	TP1811
XDP_PCH_OBSDATA_A2	TP1812
XDP_PCH_OBSDATA_A3	TP1813
XDP_PCH_OBSDATA_B0	TP1814
XDP_PCH_OBSDATA_B1	TP1815
XDP_PCH_OBSDATA_B2	TP1816
XDP_PCH_OBSDATA_B3	TP1817
XDP_PCH_OBSFN_C0	TP1818
XDP_USB_EXTA_OC_L	TP1820
XDP_USB_EXTB_OC_L	TP1821
XDP_USB_EXTC_OC_L	TP1822
XDP_USB_EXTD_OC_L	TP1823
XDP_PCH_OBSDATA_D0	TP1824
XDP_PCH_OBSDATA_D1	TP1825

(all TP-P5, PLACE_SIDE=BOTTOM)

Non-XDP Signals

XDP_JTAG_ISP_TDO	TP1819
XDP_JTAG_ISP_TCK	TP1826
XDP_JTAG_ISP_TDI	TP1827

(all TP-P5, PLACE_SIDE=BOTTOM)

Unused GPIOs have TPs.

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

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

XDP_CONN J1800 DF40RC-60DP-0.4V M-ST-SM1

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

PP1V05_PRIM

PULL CFG<3> LOW WHEN XDP PRESENT
R1801 1.5K 5% 1/20W MF 201 — XDP:YES NO_XNET_CONNECTION
PLACE_NEAR=J1800.2:5MM

XDP_PRESENT_CPU

XDP_CONN		
XDP_PIN_1		
OBSFN_A0	XDP_CPU_PREQ_L	
OBSFN_A1	XDP_CPU_PRDY_L	
OBSDATA_A0	CPU_CFG<0>	
OBSDATA_A1	CPU_CFG<1>	
OBSDATA_A2	CPU_CFG<2>	
OBSDATA_A3	CPU_CFG<3>	
OBSFN_B0	NC	
OBSFN_B1	NC	
OBSDATA_B0	CPU_CFG<4>	
OBSDATA_B1	CPU_CFG<5>	
OBSDATA_B2	CPU_CFG<6>	
OBSDATA_B3	CPU_CFG<7>	
HOOK0	XDP_PM_RSMRST_L	
HOOK1	XDP_CPU_PWRBTN_L	
VCC_OBS_AB		
HOOK2	NC	
HOOK3		
SDA	NC	
SCL	NC	
TCK1		
TCK0	XDP_PCH_TCK	
OBSFN_C0	CPU_CFG<17>	
OBSFN_C1	CPU_CFG<16>	
OBSDATA_C0	CPU_CFG<8>	
OBSDATA_C1	CPU_CFG<9>	
OBSDATA_C2	CPU_CFG<10>	
OBSDATA_C3	CPU_CFG<11>	
OBSFN_D0	CPU_CFG<19>	
OBSFN_D1	CPU_CFG<18>	
OBSDATA_D0	CPU_CFG<12>	
OBSDATA_D1	CPU_CFG<13>	
OBSDATA_D2	CPU_CFG<14>	
OBSDATA_D3	CPU_CFG<15>	
ITPCLK/HOOK4	NC_ITPXDP_CLK100MP	
ITPCLK#/HOOK5	NC_ITPXDP_CLK100MN	
VCC_OBS_CD		
RESET#/HOOK6	PCH_ITP_PMODE	
DBR#/HOOK7	XDP_DBRESET_L	
TDO		
TRSTn		
TDI		
TMS		
XDP_PRESENT#		

518S0847

PP3V3_S5 — PLACE_NEAR=J1800.48:2.54MM
R1804 1K 5% 1/20W MF 201 — XDP:YES

PM_RSMRST_L → R1800 1K XDP:YES — PLACE_NEAR=U1200.H25:2.54MM
PM_PWRBTN_L → R1802 10 XDP:YES — PLACE_NEAR=U1200.K22:5MM
SPI_MOSI_R → R1803 1.5K XDP:YES — PLACE_NEAR=U1200.D21:10MM
XDP_CPU_TCK
XDP_PCH_JTAGX → R1835 0 XDP:YES — PLACE_NEAR=J1800.58:28MM

C1804 0.1UF 10% 6.3V CERM-X5R 0201 — XDP:YES — PLACE_NEAR=J1800.42:28MM
C1800 0.1UF 10% 6.3V CERM-X5R 0201 — XDP:YES — PLACE_NEAR=J1800.44:28MM
C1801 0.1UF 10% 6.3V CERM-X5R 0201 — XDP:YES — PLACE_NEAR=J1800.43:28MM
C1806 0.1UF 10% 6.3V CERM-X5R 0201 — XDP:YES — PLACE_NEAR=J1800.47:28MM

PP1V05_S0SW

XDP_PCH_TDO	R1890 100	PLACE_NEAR=U1200.AM16:28MM
XDP_PCH_TDI	R1891 51	PLACE_NEAR=U1200.AR18:28MM
XDP_PCH_TMS	R1892 51	PLACE_NEAR=U1200.AL14:28MM
XDP_CPU_TDO	R1810 100	PLACE_NEAR=U0500.BT28:28MM
XDP_CPU_TCK	R1813 51	PLACE_NEAR=U0500.BR28:28MM
XDP_PCH_TCK	R1897 51	PLACE_NEAR=U1200.AP17:28MM
XDP_PCH_TRST_L	R1898 51	PROPER WAY TO TERMINATE?

(all XDP:YES, 5% 1/20W MF 201; R1897 NOSTUFF)

R1830 1K 5% 1/20W MF 201 — PLACE_NEAR=U0500.E8:2.54MM
R1806 0 5% 1/20W MF 0201 — XDP:YES — PM_SYSRST_L

ROUTE IN STAR TOPOLOGY FROM XDP CONNECTOR.

R1821	0	XDP_CPU_TDO
R1822	0	XDP_CPU_TRST_L
R1823	0	XDP_CPU_TDI
R1824	0	XDP_CPU_TMS

(PLACE_NEAR=J1800.51:2.54MM / 53:2.54MM / 55:2.54MM / 57:2.54MM; XDP:YES; 5% 1/20W MF 0201)

XDP_PCH_TDO
XDP_PCH_TRST_L
XDP_PCH_TDI
XDP_PCH_TMS

PP1V8_S5 — PLACE_NEAR=U1830.4:7.54MM
R1850 100K 5% 1/20W MF 201 — XDP:YES
C1830 0.1UF 10% 10V X5R-CERM 0201 — XDP:YES
U1830 74AUP1G07GF SOT891 (VCC, GND, OD)
R1831 1.5K 5% 1/20W MF 201 — XDP:YES NO_XNET_CONNECTION — SPI_IO2_STRAP_L → SPI_IO2<2> (STRAP TO PCH)
R1832 49.9 1% 1/20W MF 201 — NOSTUFF NO_XNET_CONNECTION — PLACE_NEAR=U1830.4:2.54MM
XDP_PRESENT_L

NEED TO CONNECT TO VCCST, *STG POWER LOGIC

BOM_COST_GROUP=DEBUG

DESIGN	X502/MLB
LAST CHANGE	Mon Jun 15 22:04:28 2015
PAGE TITLE	CPU/PCH Merged XDP
Apple Inc.	
DRAWING NUMBER	051-02643
SIZE	D
REVISION	4.0.0
BRANCH	evt-0
PAGE	18 OF 200
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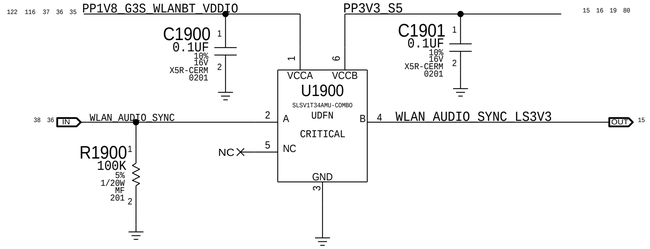

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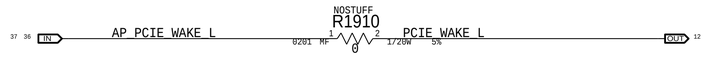
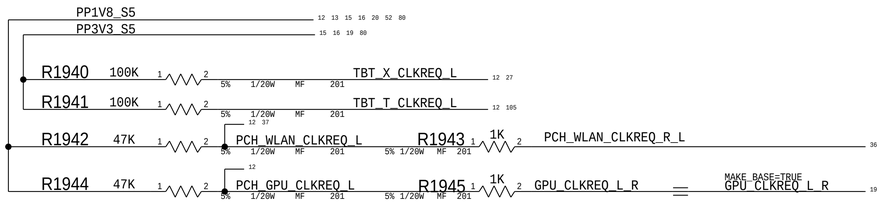
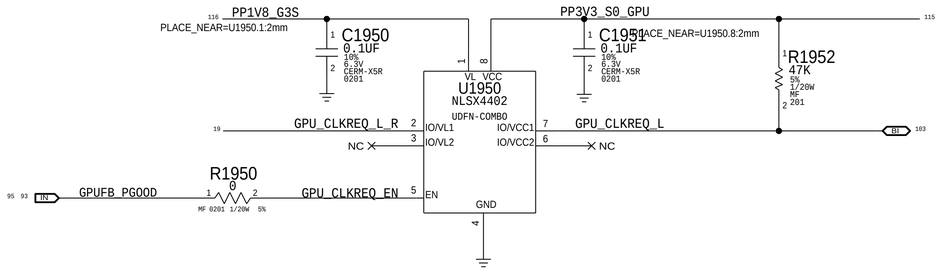


PCIE CLKREQS





BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE: Chipset Support 1

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DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
PAGE: 19 OF 200
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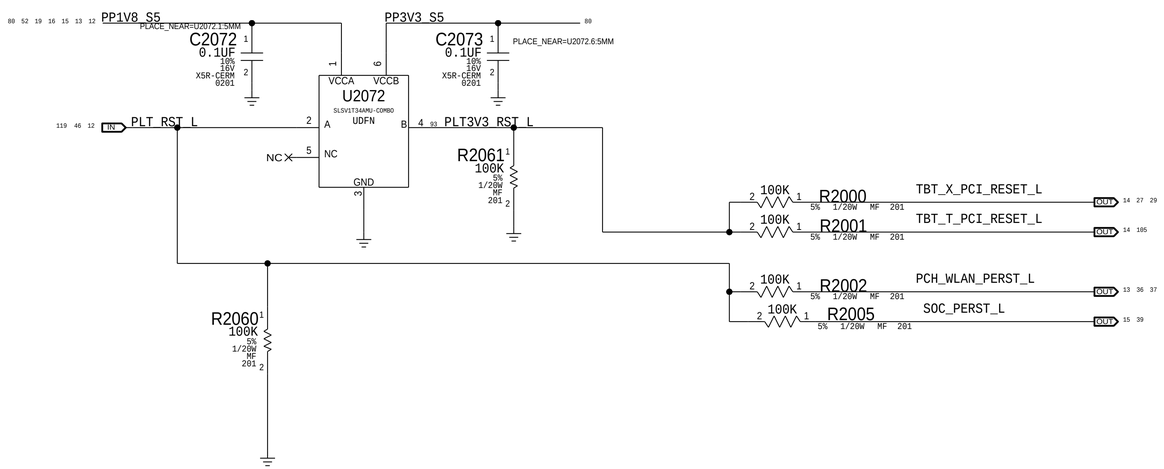
Platform Reset Connections



NC ALIASES 3

12 NC_PCH_CLK32K_RTCX2 — MAKE_BASE=TRUE — NC_PCH_CLK32K_RTCX2

SIGNAL ALIASES

13 PCH_DISPA_BCLK — MAKE_BASE=TRUE — PCH_DISPA_BCLK 5

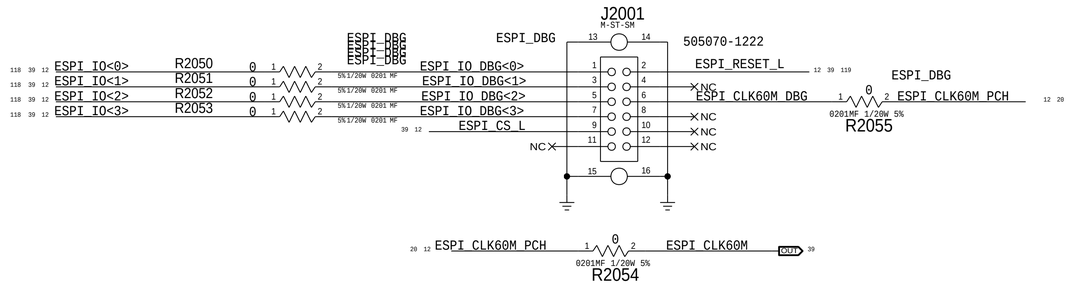
13 PCH_DISPA_SDI — MAKE_BASE=TRUE — PCH_DISPA_SDI 5

13 PCH_DISPA_SDO — MAKE_BASE=TRUE — PCH_DISPA_SDO 5

118 18 NC_ITPXDP_CLK100MN — TRUE — NC_ITPXDP_CLK100MN

118 18 NC_ITPXDP_CLK100MP — TRUE — NC_ITPXDP_CLK100MP

eSPI Analyzer
Placement study first



BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE: Chipset Support 2

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DRAWING NUMBER: 051-02643 | SIZE: D

REVISION: 4.0.0

BRANCH: evt-0

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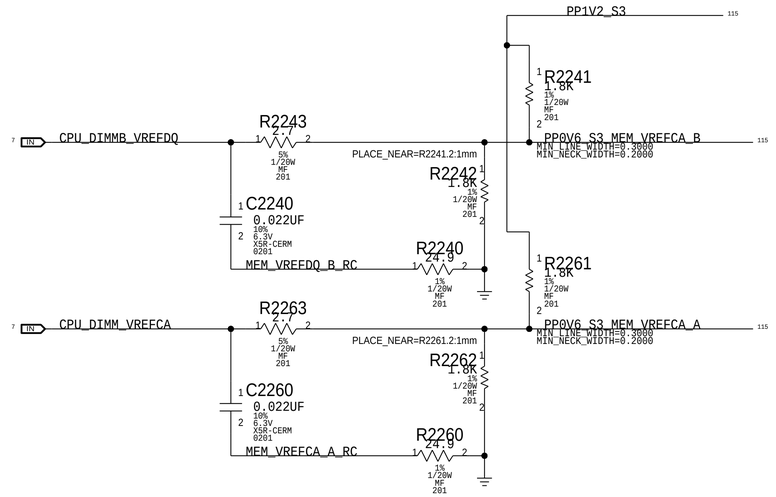
CPU-Based Margining
VRef Dividers

DDR4 VDDQ = 1.2V

MINIMUM Step Size = 0.50% * VDDQ = 6.0mV per step
TYPICAL Step Size = 0.65% * VDDQ = 7.8mV per step
MAXIMUM Step Size = 0.80% * VDDQ = 9.6mV per step

KBL PLATFORM GUIDE Page.102 FOR DDR4 X8 MEMORY DOWN

DDR0_VREF_DQ = Not Used
DDR1_VREF_DQ = Reference For Channel B
DDR_VREF_CA = Reference For Channel A



BOM_COST_GROUP=DRAM

SYNC_MASTER=J30K_K15 SYNC_DATE=02/08/2017

PAGE TITLE
DDR4 VREF Margining

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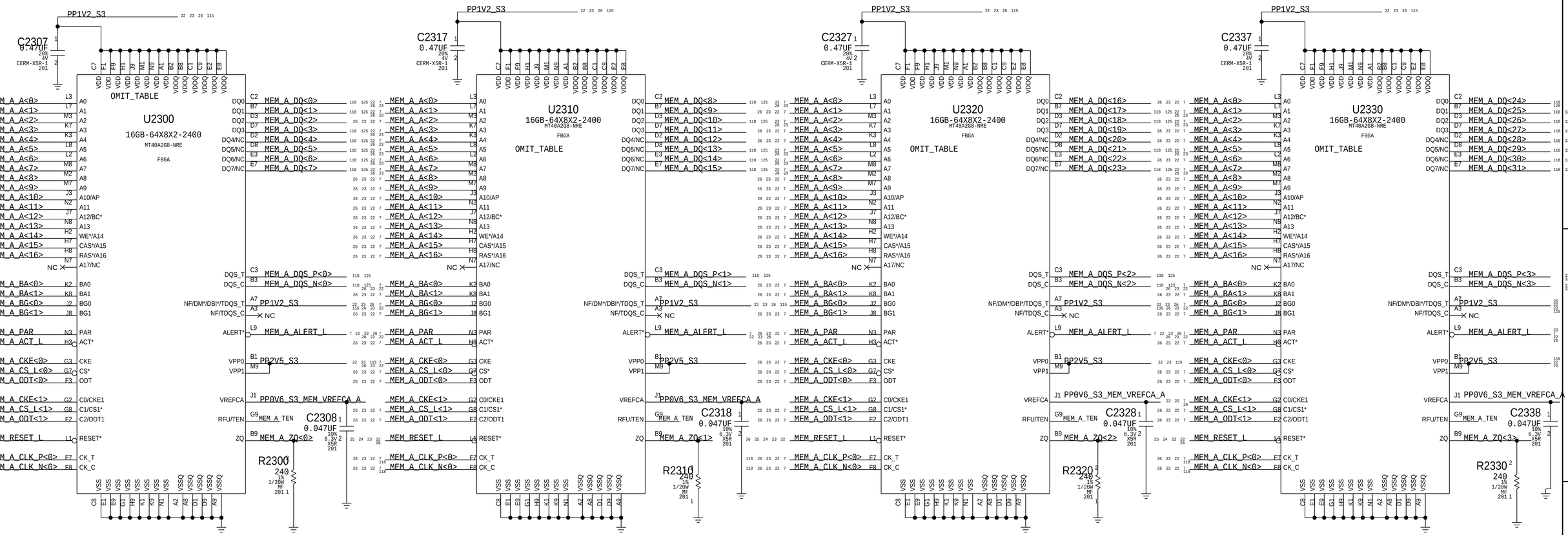

PAGE TITLE

DDR4 SDRAM Channel A 1

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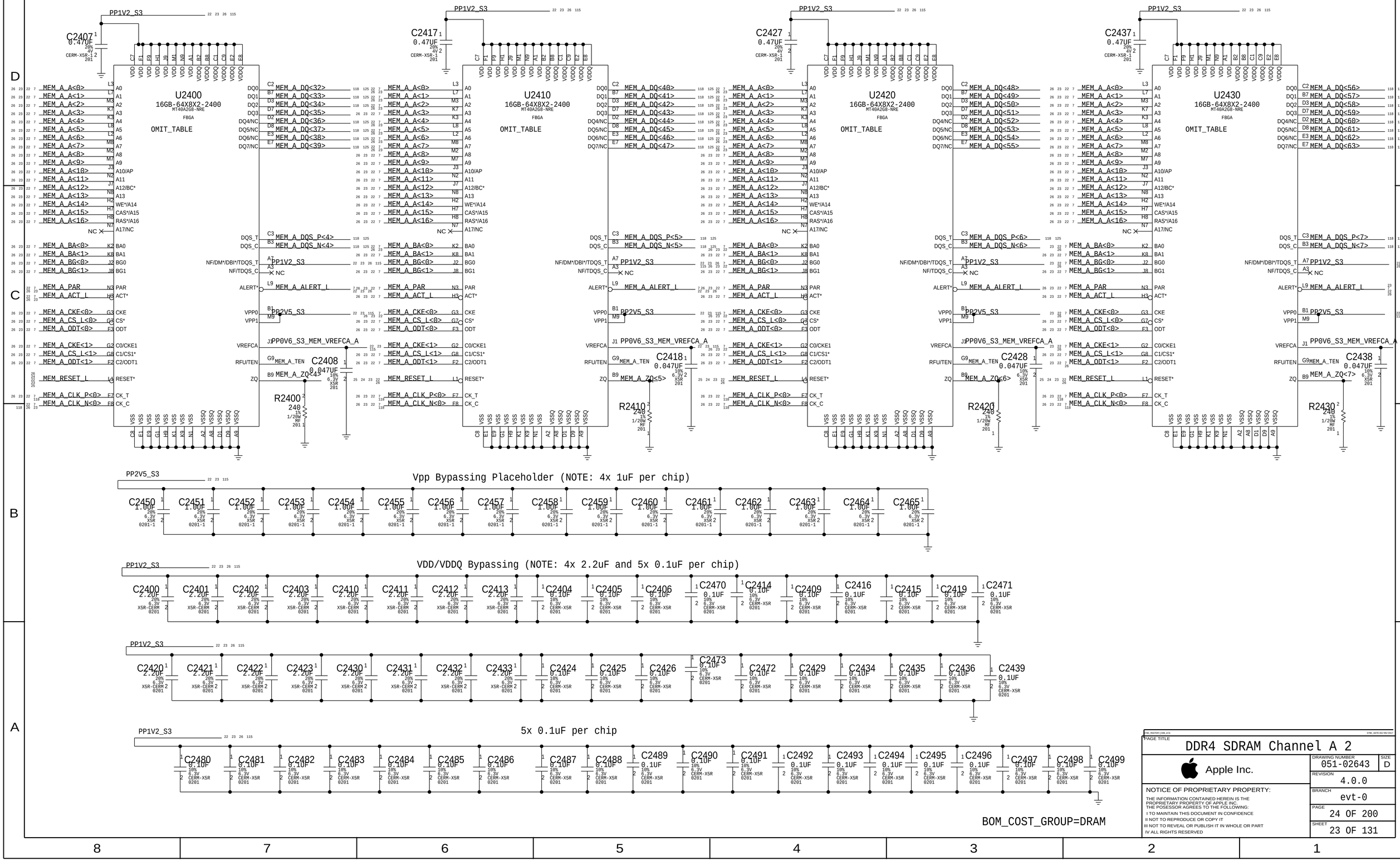
U2400
16GB-64X8X2-2400
MT40A2G8-NRE
FBGA
OMIT_TABLE
U2410
16GB-64X8X2-2400
MT40A2G8-NRE
FBGA
OMIT_TABLE
U2420
16GB-64X8X2-2400
MT40A2G8-NRE
FBGA
OMIT_TABLE
U2430
16GB-64X8X2-2400
MT40A2G8-NRE
FBGA
OMIT_TABLE
PP1V2_S3
C2407 0.47UF
C2417 0.47UF
C2427 0.47UF
C2437 0.47UF
R2400 240
R2410 240
R2420 240
R2430 240
C2408 0.047UF
C2418 0.047UF
C2428 0.047UF
C2438 0.047UF
PP2V5_S3
Vpp Bypassing Placeholder (NOTE: 4x 1uF per chip)
C2450 1.00UF
C2451 1.00UF
C2452 1.00UF
C2453 1.00UF
C2454 1.00UF
C2455 1.00UF
C2456 1.00UF
C2457 1.00UF
C2458 1.00UF
C2459 1.00UF
C2460 1.00UF
C2461 1.00UF
C2462 1.00UF
C2463 1.00UF
C2464 1.00UF
C2465 1.00UF
PP1V2_S3
VDD/VDDQ Bypassing (NOTE: 4x 2.2uF and 5x 0.1uF per chip)
C2400 2.20UF
C2401 2.20UF
C2402 2.20UF
C2403 2.20UF
C2410 2.20UF
C2411 2.20UF
C2412 2.20UF
C2413 2.20UF
C2404 0.10UF
C2405 0.10UF
C2406 0.10UF
C2470 0.1UF
C2414 0.1UF
C2409 0.1UF
C2416 0.1UF
C2415 0.1UF
C2419 0.1UF
C2471 0.1UF
PP1V2_S3
C2420 2.20UF
C2421 2.20UF
C2422 2.20UF
C2423 2.20UF
C2430 2.20UF
C2431 2.20UF
C2432 2.20UF
C2433 2.20UF
C2424 0.10UF
C2425 0.10UF
C2426 0.10UF
C2473 0.1UF
C2472 0.1UF
C2429 0.1UF
C2434 0.1UF
C2435 0.1UF
C2436 0.1UF
C2439 0.1UF
PP1V2_S3
5x 0.1uF per chip
C2480 0.1UF
C2481 0.1UF
C2482 0.1UF
C2483 0.1UF
C2484 0.1UF
C2485 0.1UF
C2486 0.1UF
C2487 0.1UF
C2488 0.1UF
C2489 0.1UF
C2490 0.1UF
C2491 0.1UF
C2492 0.1UF
C2493 0.1UF
C2494 0.1UF
C2495 0.1UF
C2496 0.1UF
C2497 0.1UF
C2498 0.1UF
C2499 0.1UF
BOM_COST_GROUP=DRAM
PAGE TITLE
DDR4 SDRAM Channel A 2
Apple Inc.
DRAWING NUMBER
051-02643
SIZE
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REVISION
4.0.0
BRANCH
evt-0
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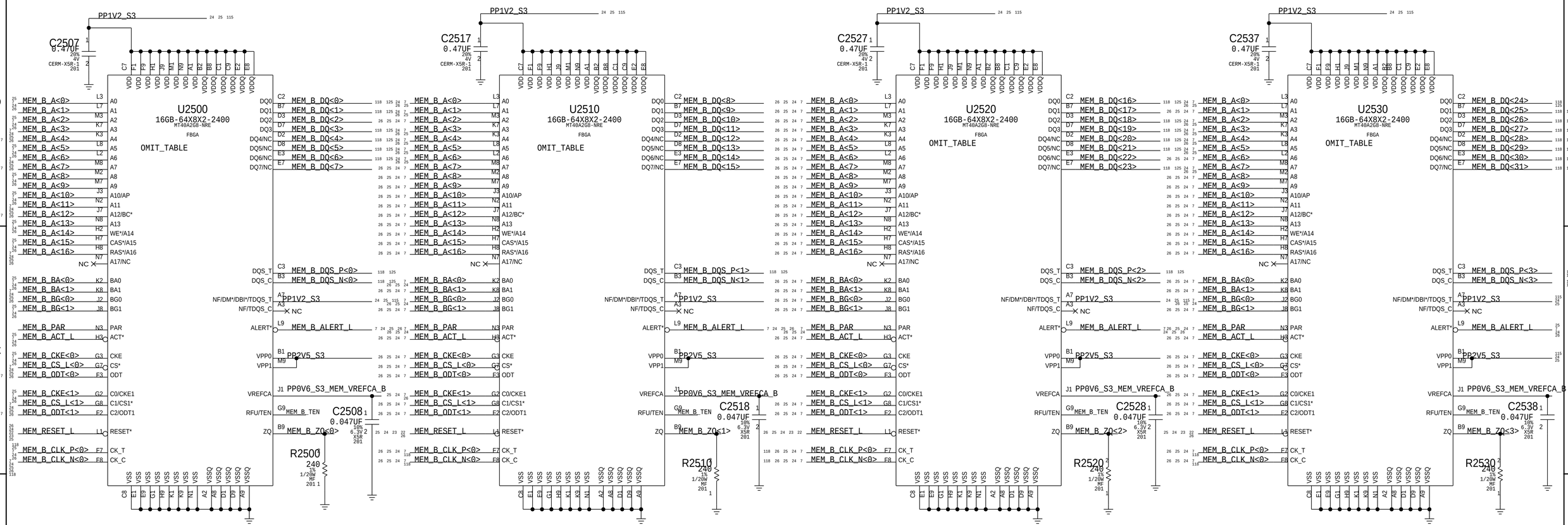

PAGE TITLE

DDR4 SDRAM Channel B 1

Apple Inc.

DRAWING NUMBER	051-02643
SIZE	D
REVISION	4.0.0
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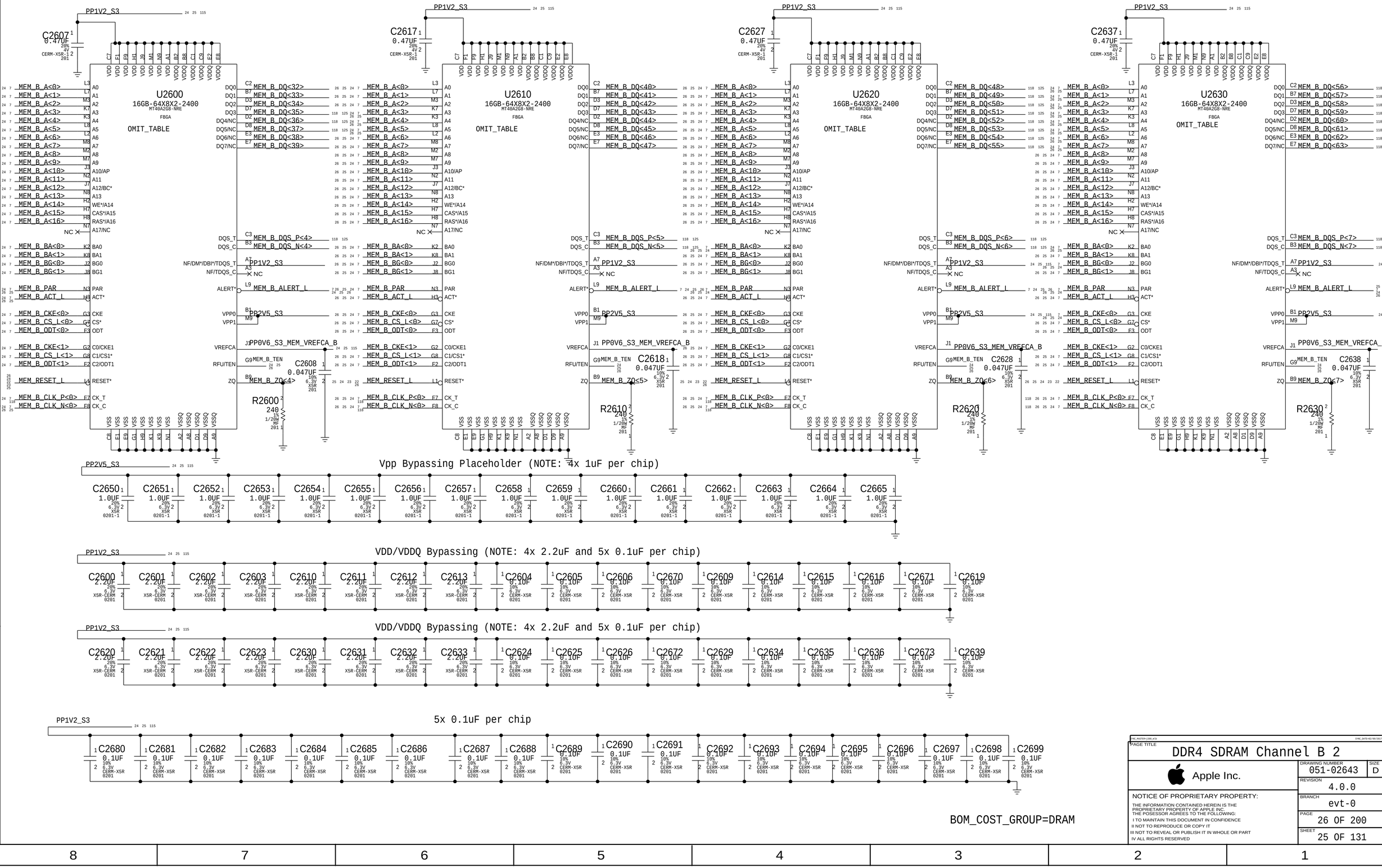

PAGE TITLE

DDR4 SDRAM Channel B 2

Apple Inc.

DRAWING NUMBER 051-02643

SIZE D

REVISION 4.0.0

BRANCH evt-0

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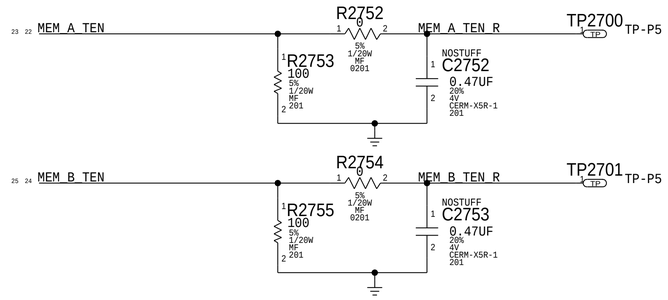
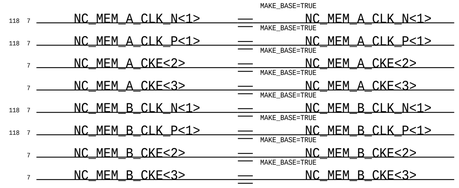
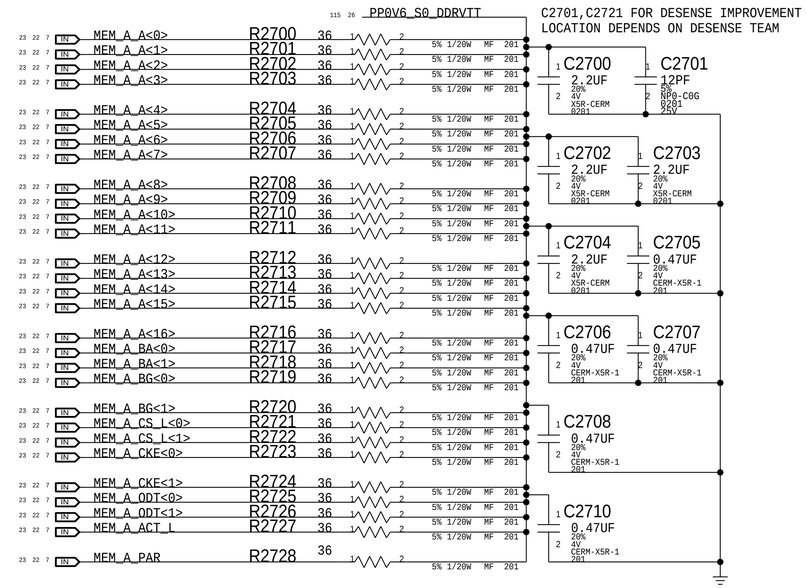
JEDEC 4.20.18 Unbuffered SODIMM Raw Card F spec recommends 36 Ohm term to VTT for CS,CKE,ODT and 36 Ohm for BA,A,RAS,CAS,WE

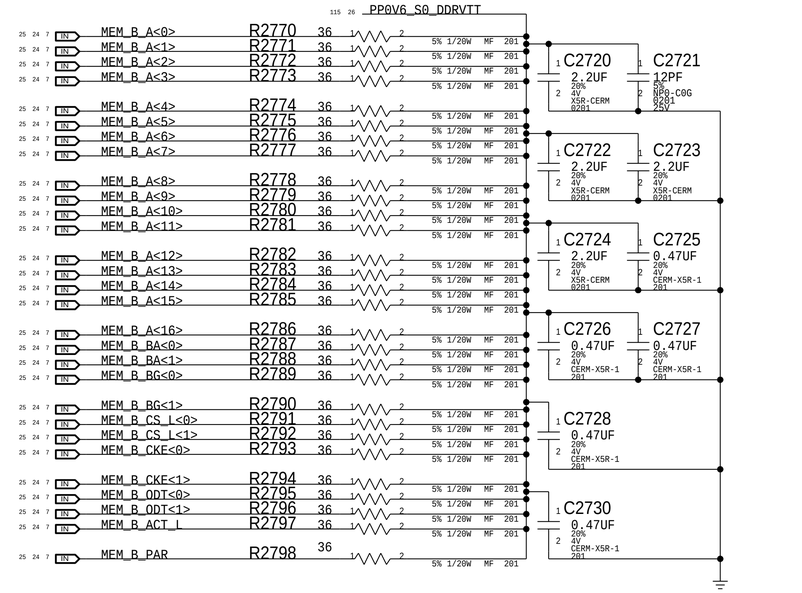


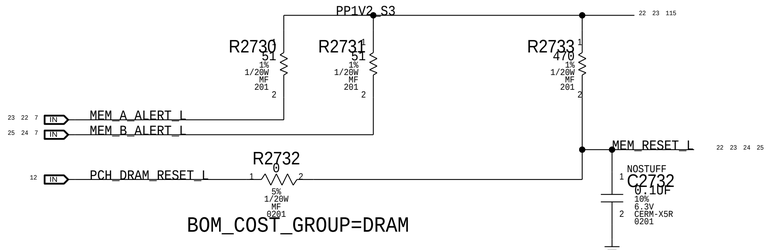
MEM Clock Termination

Place RC end termination after last DRAM
Place Source Cterm at neckdown at first DRAM









BOM_COST_GROUP=DRAM

PAGE TITLE

DDR4 Termination

Apple Inc.

DRAWING NUMBER	051-02643
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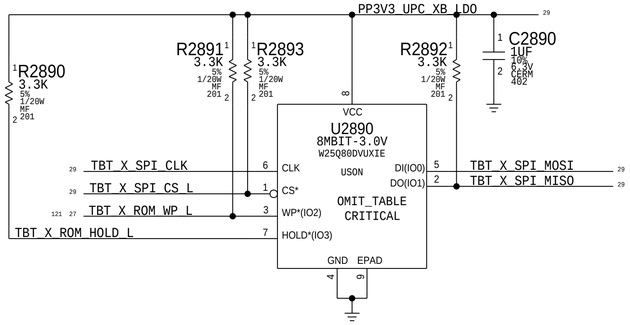
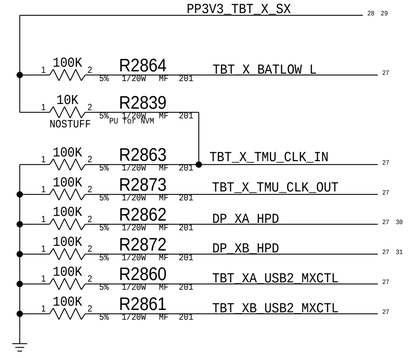


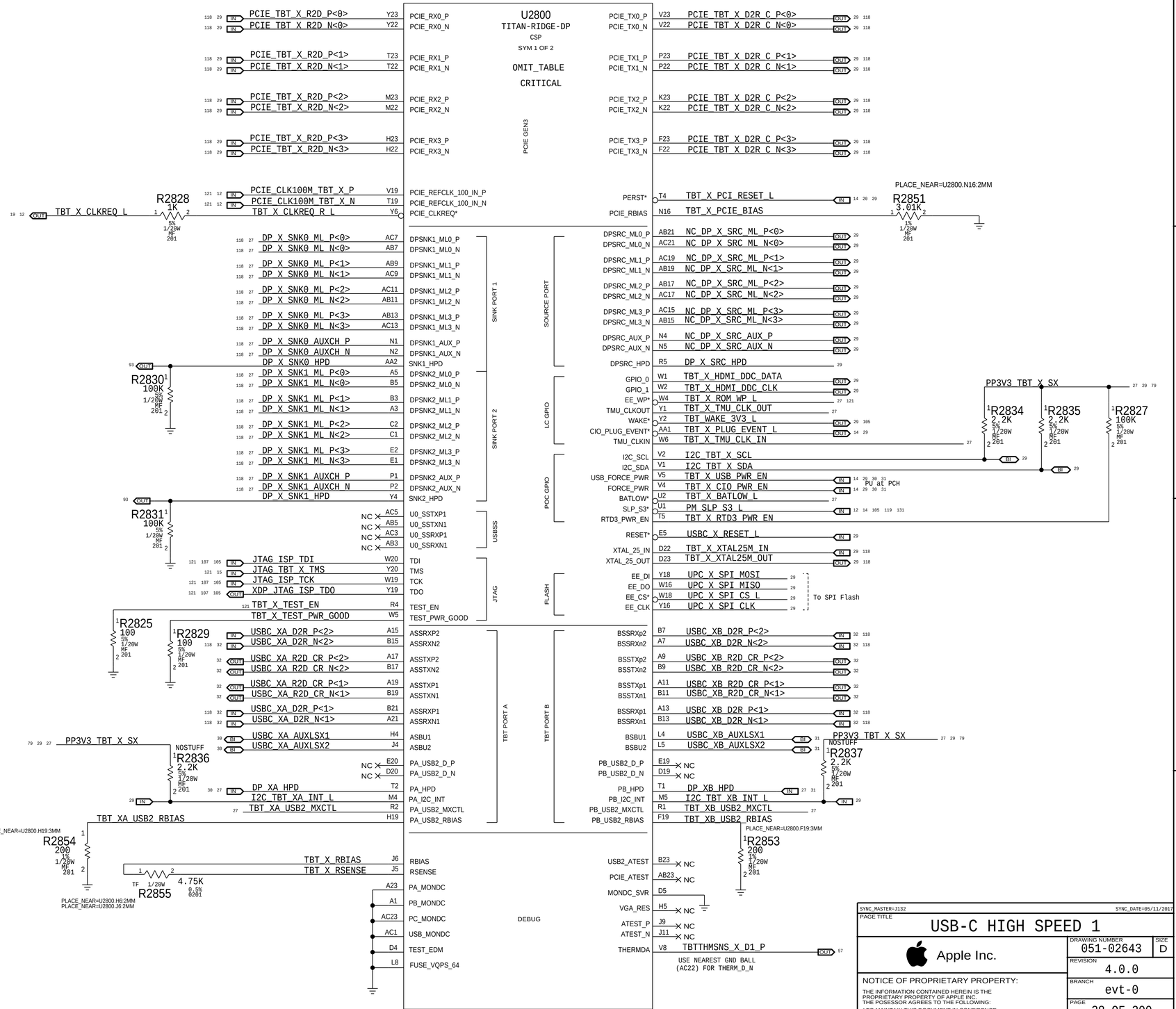
SNK0 AC Coupling

DP_X_SNK0_ML_C_P<0>	C2820 0.22UF	DP_X_SNK0_ML_P<0>	GND_VOID=TRUE
DP_X_SNK0_ML_C_N<0>	C2821 0.22UF	DP_X_SNK0_ML_N<0>	GND_VOID=TRUE
DP_X_SNK0_ML_C_P<1>	C2822 0.22UF	DP_X_SNK0_ML_P<1>	GND_VOID=TRUE
DP_X_SNK0_ML_C_N<1>	C2823 0.22UF	DP_X_SNK0_ML_N<1>	GND_VOID=TRUE
DP_X_SNK0_ML_C_P<2>	C2824 0.22UF	DP_X_SNK0_ML_P<2>	GND_VOID=TRUE
DP_X_SNK0_ML_C_N<2>	C2825 0.22UF	DP_X_SNK0_ML_N<2>	GND_VOID=TRUE
DP_X_SNK0_ML_C_P<3>	C2826 0.22UF	DP_X_SNK0_ML_P<3>	GND_VOID=TRUE
DP_X_SNK0_ML_C_N<3>	C2827 0.22UF	DP_X_SNK0_ML_N<3>	GND_VOID=TRUE
DP_X_SNK0_AUXCH_C_P	C2828 0.1UF	DP_X_SNK0_AUXCH_P	GND_VOID=TRUE
DP_X_SNK0_AUXCH_C_N	C2829 0.1UF	DP_X_SNK0_AUXCH_N	GND_VOID=TRUE

SNK1 AC Coupling

DP_X_SNK1_ML_C_P<0>	C2830 0.22UF	DP_X_SNK1_ML_P<0>	GND_VOID=TRUE
DP_X_SNK1_ML_C_N<0>	C2831 0.22UF	DP_X_SNK1_ML_N<0>	GND_VOID=TRUE
DP_X_SNK1_ML_C_P<1>	C2832 0.22UF	DP_X_SNK1_ML_P<1>	GND_VOID=TRUE
DP_X_SNK1_ML_C_N<1>	C2833 0.22UF	DP_X_SNK1_ML_N<1>	GND_VOID=TRUE
DP_X_SNK1_ML_C_P<2>	C2834 0.22UF	DP_X_SNK1_ML_P<2>	GND_VOID=TRUE
DP_X_SNK1_ML_C_N<2>	C2835 0.22UF	DP_X_SNK1_ML_N<2>	GND_VOID=TRUE
DP_X_SNK1_ML_C_P<3>	C2836 0.22UF	DP_X_SNK1_ML_P<3>	GND_VOID=TRUE
DP_X_SNK1_ML_C_N<3>	C2837 0.22UF	DP_X_SNK1_ML_N<3>	GND_VOID=TRUE
DP_X_SNK1_AUXCH_C_P	C2838 0.1UF	DP_X_SNK1_AUXCH_P	GND_VOID=TRUE
DP_X_SNK1_AUXCH_C_N	C2839 0.1UF	DP_X_SNK1_AUXCH_N	GND_VOID=TRUE





BOM_COST_GROUP=TBT

SYNC_MASTER=J132	SYNC_DATE=05/11/2017
PAGE TITLE	USB-C HIGH SPEED 1
Apple Inc.	
DRAWING NUMBER	051-02643
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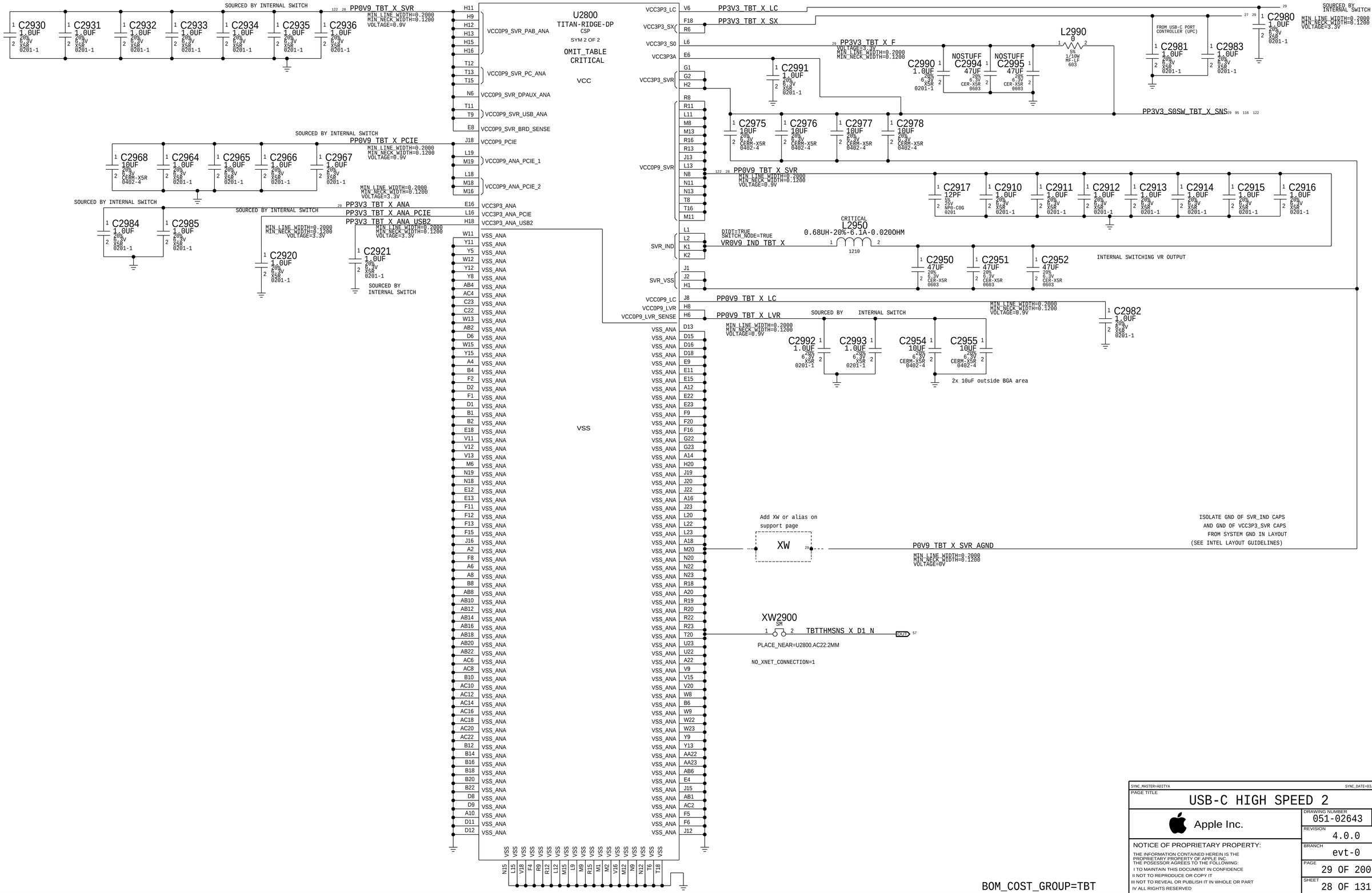

SYNC_MASTER=ADITYA	SYNC_DATE=03/30/2017
PAGE TITLE	USB-C HIGH SPEED 2
Apple Inc.	DRAWING NUMBER 051-02643 · SIZE D · REVISION 4.0.0 · BRANCH evt-0 · PAGE 29 OF 200 · SHEET 28 OF 131

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TBT WAKE LEVEL SHIFTER

PP3V3_G3H_RTC_X
R3065 100K 5% 1/20W MF 201
Q3001 DMN32D2LFB4 PDFN1006H4-3
PP1V8_SLPS2R
SMC HAS IPU
TBT_WAKE_L → TBT_WAKE_3V3_L

DP SRC OPTIONS

IF DP SRC NOT USED

R3040 100K 1/20W 5% MF 201
DP_X_SRC_HPD

=DP_X_SRC_ML_P<3..0>	NC_DP_X_SRC_ML_P<3..0>	MAKE_BASE=TRUE NO_TEST=1
=DP_X_SRC_ML_N<3..0>	NC_DP_X_SRC_ML_N<3..0>	MAKE_BASE=TRUE NO_TEST=1
NC_DP_X_SRC_AUX_P	NC_DP_X_SRC_AUX_P	MAKE_BASE=TRUE NO_TEST=1
NC_DP_X_SRC_AUX_N	NC_DP_X_SRC_AUX_N	MAKE_BASE=TRUE NO_TEST=1

FUSES FOR UPC

PLACE_NEAR=Q3100:5MM
CRITICAL
F3000 0603 6AMP-32V-0.00950HM
PP20V_USBC_XA_VBUS → PP20V_USBC_XA_VBUS_F

PLACE_NEAR=Q3200:5MM
CRITICAL
F3001 0603 740S0135 6AMP-32V-0.00950HM
PP20V_USBC_XB_VBUS → PP20V_USBC_XB_VBUS_F

25MHz xtal

C3002 20PF 5% 25V C0G 0201
TBT_X_XTAL25M_OUT
CRITICAL
Y3000 25MHZ-25PPM-20PF-500HM 2.00X1.60-SM
to/from Ridge
C3003 20PF 5% 25V C0G 0201
TBT_X_XTAL25M_IN

TR/ACE SPI BUS SERIES R'S

TBT_X_SPI_CLK	R3094 100	TBT_X_SPI_CLK_DBG	
TBT_X_SPI_CS_L	R3095 15	UPC_XB_SPI_CLK	IN
TBT_X_SPI_MOSI	R3096 15	UPC_XB_SPI_CS_L	IN
TBT_X_SPI_MISO	R3097 15	UPC_XB_SPI_MOSI	IN
	R3098 15	UPC_XB_SPI_MISO	OUT
ROM	R3090 15	UPC_X_SPI_CLK	IN
	R3091 15	UPC_X_SPI_CS_L	IN
	R3092 15	UPC_X_SPI_MOSI	IN
	R3093 15	UPC_X_SPI_MISO	OUT

Ace
AR

All: 5% 1/20W MF 201

USBC DEBUG CONN

Ridge and ACE PDs

UPC_X_5V_EN	R3032 100K	
TBT_XA_LSTX	R3020 1M	
TBT_XA_LSRX	R3021 1M	
TBT_XB_LSTX	R3022 1M	
TBT_XB_LSRX	R3023 1M	
USB_UPC_XA_P	R3024 1M	
USB_UPC_XA_N	R3025 1M	

5% 1/20W MF 201

RIDGE ARKANOID CONN

Place on bottom
J3001 M-ST-SM 505070-1222
USBC_DBG

TBT_X_PLUG_EVENT_L	1	2	TBT_X_PCI_RESET_L
TBT_WAKE_3V3_L	3	4	USBC_X_RESET_L
TBT_X_CIO_PWR_EN	5	6	PP3V3_TBT_X_SX
TBT_X_USB_PWR_EN	7	8	PP3V3_TBT_T_ANA_PCIE
TBT_POC_RESET	9	10	PP3V3_TBT_X_ANA
PP3V3_TBT_X_F	11	12	PP3V3_TBT_X_LC
	15	16	

ACE ARKANOID CONN

Place on bottom
USBC_DBG
J3000 M-ST-SM 505070-1222

CKPLUS_WAIVE=I2C_PULLUP	I2C_TBT_XB_INT_L	1	2 I2C_TBT_XA_INT_L
CKPLUS_WAIVE=I2C_PULLUP	I2C_UPC_X_SCL2	3	4 I2C_TBT_X_SDA
	I2C_UPC_X_SDA2	5	6 I2C_TBT_X_SCL
	UPC_I2C_INT_L	7	8 I2C_UPC_XA_DBG_CTL_SDA
	TBT_X_SPI_CLK_DBG	9	10 I2C_UPC_XA_DBG_CTL_SCL
	UPC_XA_UART_TX	11	12 UPC_XA_UART_RX
		15	16

NC ALIASES / NO TEST

NO_TEST=1
NC_UPC_XB_I2C_ADDR
NC_USBC_XA_USB_BOTP
NC_USBC_XA_USB_BOTN

ACE A RPD STRAPPING

USBC_XA_CC1 = USBC_XA_CC1 (MAKE_BASE=TRUE)
USBC_XA_CC2 = USBC_XA_CC2 (MAKE_BASE=TRUE)

ACE B RPD STRAPPING

USBC_XB_CC1 = USBC_XB_CC1 (MAKE_BASE=TRUE)
USBC_XB_CC2 = USBC_XB_CC2 (MAKE_BASE=TRUE)

GND ALIASES

MAKE_BASE=TRUE
GND ×10

RIDGE 0.9V SVR XW

XW3000 SM
P0V9_TBT_X_SVR_AGND
NO_XNET_CONNECTION=1

SIGNAL ALIASES

UPC_X_5V_EN	UPC_X_5V_EN
USB2_UPC_XB_P	USB2_UPC_XB_P
USB2_UPC_XB_N	USB2_UPC_XB_N
USB2_UPC_XA_P	USB2_UPC_XA_P
USB2_UPC_XA_N	USB2_UPC_XA_N
UPC_PMU_RESET	UPC_PMU_RESET
USBC_X_RESET_L	USBC_X_RESET_L
UPC_X_SPI_CLK	UPC_X_SPI_CLK
UPC_X_SPI_CS_L	UPC_X_SPI_CS_L
UPC_X_SPI_MOSI	UPC_X_SPI_MOSI
UPC_X_SPI_MISO	UPC_X_SPI_MISO
UPC_T_SPI_CLK	UPC_T_SPI_CLK
UPC_T_SPI_CS_L	UPC_T_SPI_CS_L
UPC_T_SPI_MOSI	UPC_T_SPI_MOSI
UPC_T_SPI_MISO	UPC_T_SPI_MISO

MAKE_BASE=TRUE

POWER ALIASES

PP3V3_UPC_XB_LDO	PP3V3_UPC_XB_LDO
PP3V3_UPC_XA_LDO	PP3V3_UPC_XA_LDO
PP20V_USBC_XA_VBUS	PP20V_USBC_XA_VBUS
PP20V_USBC_XB_VBUS	PP20V_USBC_XB_VBUS
PPDCIN_G3H	PPDCIN_G3H (MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200 VOLTAGE=25V)
PP5V_S4_X_USBC	PP5V_S4_X_USBC (MIN_LINE_WIDTH=0.6000 MIN_NECK_WIDTH=0.1200 VOLTAGE=5V)
PP5V_S4_X_USBC	
PP3V3_S0SW_TBT_X_SNS	PP3V3_S0SW_TBT_X_SNS (MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200 VOLTAGE=3.3V)
PP3V3_TBT_X_SX	PP3V3_TBT_X_SX (MIN_NECK_WIDTH=0.1200 MIN_LINE_WIDTH=0.2000)
PP3V3_TBT_X_SX	
PP1V8_SLPS2R	PP1V8_SLPS2R

MAKE_BASE=TRUE

DEBUG ALIASES

PCH_UART_DEBUG_R2D	PCH_UART_DEBUG_R2D
PCH_UART_DEBUG_D2R	PCH_UART_DEBUG_D2R
SOC_DFU_STATUS	SOC_DFU_STATUS
SOC_FORCE_DFU	SOC_FORCE_DFU

MAKE_BASE=TRUE

R3076 0 5% MF 1/20W 0201
SWD_SOC_SWCLK → UPC_XB_DBG3 (BI)
PLACE_NEAR=U3000.24:5mm

R3077 0 5% MF 1/20W 0201
SWD_SOC_SWDIO → UPC_XB_DBG4 (BI)
PLACE_NEAR=U3000.23:5mm

Diodes for USB2

USBC_XA_USB_DBG_BOT_P
USBC_XA_USB_DBG_BOT_N
USBC_XA_USB_DBG_TOP_N
USBC_XA_USB_DBG_TOP_P

PLACE_NEAR=U3000.19:10mm
PLACE_NEAR=U3000.18:10mm
PLACE_NEAR=U3000.15:10mm
PLACE_NEAR=U3000.16:10mm

D3001 BAS70LP DFN1006-2
D3002 BAS70LP DFN1006-2
D3003 BAS70LP DFN1006-2
D3004 BAS70LP DFN1006-2

DCI / PCH USB3

C3020 0.1UF 10% 16V X5R-CERM 0201
USB3_EXTA_R2D_C_P
C3021 0.1UF 10% 16V X5R-CERM 0201
USB3_EXTA_R2D_C_N

C3022 0.1UF 10% 16V X5R-CERM 0201
PP3V3_G3H_RTC_X

L3000 90-OHM-0.1A EXC4X4E_SMD-SCM-1
USB2_UPC_XA_P
USB2_UPC_XA_N
PLACE_NEAR=U3000:5mm

U3000 PI3USB32324 QFN-41

USB3_EXTA_D2R_P	PCH_USB3_RX_P	USB2_RP_P	USB_DBG_PCH_XA_F_P
USB3_EXTA_D2R_N	PCH_USB3_RX_N	USB2_RP_N	USB_DBG_PCH_XA_F_N
USB3_EXTA_R2D_P	PCH_USB3_TX_P	USB2_B_P	USBC_XA_USB_DBG_BOT_P
USB3_EXTA_R2D_N	PCH_USB3_TX_N	USB2_B_N	USBC_XA_USB_DBG_BOT_N
USB_SOC_TYPEC_P	USB2_EP_P	USB2_T_N	USBC_XA_USB_DBG_TOP_N
USB_SOC_TYPEC_N	USB2_EP_N	USB2_T_P	USBC_XA_USB_DBG_TOP_P
SWD_SOC_SWCLK	SWCLK	SDA	I2C_UPC_XA_DBG_CTL_SDA
SWD_SOC_SWDIO	SWDIO	SCL	I2C_UPC_XA_DBG_CTL_SCL
USBC_XA_USB_TOP_P	ANALOG1	DEBUG1	UPC_XA_DBG1
USBC_XA_USB_TOP_N	ANALOG2	DEBUG2	UPC_XA_DBG2
	GND	EPAD	

TBT_POC_RESET

R3078 0 5% MF 1/20W 0201
UPC_XA_FAULT_L → XDP_USB_EXTA_OC_L

R3079 0 5% MF 1/20W 0201
UPC_XB_FAULT_L → XDP_USB_EXTB_OC_L

TP_USBC_XA_RESET_L = TP_USBC_XA_RESET_L (MAKE_BASE=TRUE)
TBT_X_HDMI_DDC_DATA = TBT_X_HDMI_DDC_DATA (MAKE_BASE=TRUE)
TBT_X_HDMI_DDC_CLK = TBT_X_HDMI_DDC_CLK (MAKE_BASE=TRUE)

I2C SERIES R'S

R3041 33 5% 1/20W MF 201
I2C_UPC_X_SDA2 → I2C_UPC_SDA (PLACE_NEAR=U3900.J4:5mm)

R3042 33 5% 1/20W MF 201
I2C_UPC_X_SCL2 → I2C_UPC_SCL (PLACE_NEAR=U3900.M3:10mm)

MAKE_BASE=TRUE

R3080 30K 5% 1/20W MF 201
PP20V_USBC_XA_VBUS_F → SOC_USB_VBUS
D3080 DFN1006 BZT52C3V0LP

TBT to ACE

TBT — Alpine Ridge U2800 (MASTER)

I2C_TBT_X_SCL	I2C_TBT_X_SCL
I2C_TBT_X_SDA	I2C_TBT_X_SDA
I2C_TBT_XA_INT_L	I2C_TBT_XA_INT_L
I2C_TBT_XB_INT_L	

Pri ACE — U3100 (Write: 0x70 Read: 0x71)

I2C_TBT_X_SCL	I2C_TBT_X_SCL
I2C_TBT_X_SDA	I2C_TBT_X_SDA
I2C_TBT_XA_INT_L	I2C_TBT_XA_INT_L

Sec ACE — U3200 (Write: 0x7E Read: 0x7F)

I2C_TBT_X_SCL	I2C_TBT_X_SCL
I2C_TBT_X_SDA	I2C_TBT_X_SDA
I2C_TBT_XB_INT_L	I2C_TBT_XB_INT_L

Ridge PCIE Caps

PCIE_TBT_X_R2D_C_P<0>	C3040 0.22UF	PCIE_TBT_X_R2D_P<0>
PCIE_TBT_X_R2D_C_N<0>	C3041 0.22UF	PCIE_TBT_X_R2D_N<0>
PCIE_TBT_X_R2D_C_P<1>	C3042 0.22UF	PCIE_TBT_X_R2D_P<1>
PCIE_TBT_X_R2D_C_N<1>	C3043 0.22UF	PCIE_TBT_X_R2D_N<1>
PCIE_TBT_X_R2D_C_P<2>	C3044 0.22UF	PCIE_TBT_X_R2D_P<2>
PCIE_TBT_X_R2D_C_N<2>	C3045 0.22UF	PCIE_TBT_X_R2D_N<2>
PCIE_TBT_X_R2D_C_P<3>	C3046 0.22UF	PCIE_TBT_X_R2D_P<3>
PCIE_TBT_X_R2D_C_N<3>	C3047 0.22UF	PCIE_TBT_X_R2D_N<3>
PCIE_TBT_X_D2R_C_P<0>	C3050 0.22UF	PCIE_TBT_X_D2R_P<0>
PCIE_TBT_X_D2R_C_N<0>	C3051 0.22UF	PCIE_TBT_X_D2R_N<0>
PCIE_TBT_X_D2R_C_P<1>	C3052 0.22UF	PCIE_TBT_X_D2R_P<1>
PCIE_TBT_X_D2R_C_N<1>	C3053 0.22UF	PCIE_TBT_X_D2R_N<1>
PCIE_TBT_X_D2R_C_P<2>	C3054 0.22UF	PCIE_TBT_X_D2R_P<2>
PCIE_TBT_X_D2R_C_N<2>	C3055 0.22UF	PCIE_TBT_X_D2R_N<2>
PCIE_TBT_X_D2R_C_P<3>	C3056 0.22UF	PCIE_TBT_X_D2R_P<3>
PCIE_TBT_X_D2R_C_N<3>	C3057 0.22UF	PCIE_TBT_X_D2R_N<3>

GND_VOID=TRUE; 0201 X5R 6.3V 20%

BOM_COST_GROUP=TBT

PAGE TITLE: USB-C X Support

Apple Inc.

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DRAWING NUMBER	051-02643
SIZE	D
REVISION	4.0.0
BRANCH	evt-0
PAGE	30 OF 200
SHEET	29 OF 131

PRIMARY ACE USB-C PORT CONTROLLER (UPC)

CRITICAL
Q3100
FDPC4044
PWR-CLIP-33

FUSE
Add on support page

PP20V_USBC_XA_VBUS_F
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=20V

PP20V_USBC_XA_VBUS

C3101 1UF 10% 50V X5R 0402

PPDCIN_G3H
MAX 100uF TOTAL ON RAIL

UPC_XA_GATE1
TP_Q3100_DRAIN
UPC_XA_GATE2

PP1V8_SLPS2R
C3115 1.0UF 20% 6.3V X5R 0201-1

PP3V3_G3H_RTC_X
R3169 100K 5% 1/20W MF 201
PHV_INT_XA_G3H

PP5V_S4_X_USBC
CAP FOR PP_5V0 ON VR PAGE

C3100 10UF 20% 6.3V CERM-X5R 0402-1

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.3V
PP3V3_UPC_XA_LDO

PP3V3_TBT_X_SX

PP1V8_UPC_XA_LDOA

PP1V8_UPC_XA_LDOD

PP1V1_UPC_XA_LDO_BMC
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V

C3104 2.2UF 20% 4V X5R-CERM 0201
C3105 1.0UF 20% 6.3V X5R 0201-1
C3106 0.47UF 10% 6.3V CERM-X5R 0201
C3108 10UF 20% 6.3V CERM-X5R 0402-1

PULL R3109 AND R3108 UP TO ACEs LDOs FOR 1ST BRIDGE'S ACES
PULL R3109 AND R3108 DOWN TO GND FOR 2ND RIDGE'S ACES

PP3V3_UPC_XA_LDO
R3109 1M 5% 1/20W MF 201 — I2C_UPC_XA_DBG_CTL_SCL
R3108 1M 5% 1/20W MF 201 — I2C_UPC_XA_DBG_CTL_SDA

TESTPOINTS MUST BE PRESENT FOR GPIO0, GPIO1 (EVEN IN PRODUCTION)

USE GPIO2 FOR USB-C ANALOG AUDIO SUPPORT ON DESIGNS WITHOUT AN AUDIO JACK CONNECTOR

USE GPIO3 FOR POWER_GATE_EN ON BANSURI DESIGNS

R3105 1M 5% 1/20W MF 201 — UPC_XA_UART_RX

CRITICAL
R3103 15K 0.1% 1/20W TF-LF 0201

TO SMC

REAR PORT: CONNECT UPC SPI TO ROM
FRONT PORT: GROUND UPC SPI

U3100
CD3215A
BGA
CRITICAL
OMIT_TABLE

TBT_POC_RESET	E11	MRESET	PRIMARY ONLY
TP_USBC_XA_RESET_L	F11	RESET*	PRIMARY ONLY
UPC_XA_GPIO0	B2	GPIO0	
PMU_ACTIVE_READY	C2	GPIO1	
TBT_X_CIO_PWR_EN	D10	GPIO2	
TBT_X_USB_PWR_EN	G11	GPIO3	
DP_XA_HPD	C10	GPIO4	
UPC_PMU_RESET	E10	GPIO5	
UPC_X_5V_EN	G10	GPIO6	
SOC_DOCK_CONNECT	D7	GPIO7	
UPC_XA_FAULT_L	H6	GPIO8	
GND	F10	BUSPOWERZ	
GND	F1	I2C_ADDR	GND I2C ADDR PRIMARY ONLY
UPC_XA_R_OSC	G2	R_OSC	
I2C_UPC_XA_DBG_CTL_SCL	E4	DEBUG_CTL1	
I2C_UPC_XA_DBG_CTL_SDA	D5	DEBUG_CTL2	
I2C_TBT_X_SDA	D1	I2C_SDA1	
I2C_TBT_X_SCL	D2	I2C_SCL1	
I2C_TBT_XA_INT_L	C1	I2C_IRQ1*	
I2C_UPC_X_SDA2	A5	I2C_SDA2	
I2C_UPC_X_SCL2	B5	I2C_SCL2	
UPC_I2C_INT_L	B6	I2C_IRQ2*	
GND	A3	SPI_CLK	
GND	B4	SPI_MOSI	
GND	A4	SPI_MISO	
GND	B3	SPI_SSZ	
TP_UPC_XA_SWD_DATA	F4	SWD_DATA	
TP_UPC_XA_SWD_CLK	G4	SWD_CLK	
UPC_XA_UART_RX	F2	UART_RX	
UPC_XA_UART_TX	E2	UART_TX	
TBT_XA_LSTX	L4	LSX_R2P	
TBT_XA_LSRX	K4	LSX_P2R	
USB_UPC_XA_P	L5	USB_RP_P	
USB_UPC_XA_N	K5	USB_RP_N	
USBC_XA_AUXLSX1	J1	AUX_P	
USBC_XA_AUXLSX2	J2	AUX_N	
UPC_XA_DBG1	L2	DEBUG1	
UPC_XA_DBG2	K2	DEBUG2	
SOC_DFU_STATUS	L3	DEBUG3	
SOC_FORCE_DFU	K3	DEBUG4	

DIGITAL CORE I/O AND CONTROL
HV FET/SENSE
TYPE-C
PORT MUX

SS	H7	UPC_XA_SS
SENSEP	B10	
SENSEN	A10	
HV_GATE1	B9	
HV_GATE2	A9	
C_CC1	L9	USBC_XA_CC1
C_CC2	L10	USBC_XA_CC2
RPD_G1	K9	USBC_XA_CC1
RPD_G2	K10	USBC_XA_CC2
C_USB_TP	K6	USBC_XA_USB_TOP_P
C_USB_TN	L6	USBC_XA_USB_TOP_N
C_USB_BP	K7	NC_USBC_XA_USB_BOTP
C_USB_BN	L7	NC_USBC_XA_USB_BOTN
C_SBU1	K8	USBC_XA_SBU1
C_SBU2	L8	USBC_XA_SBU2
NC	L11	GROUND

C3109 0.47UF 10% 6.3V CERM-X5R 0201
C3114 220PF 10% 16V CER-X7R 0201
C3113 220PF 10% 16V CER-X7R 0201

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

NC or GND to dissipate heat

A1 D6 E5 E6 E7 F5 G5 H4 H5 G8 H8 L1 B8 D8 E8 F6 F7 F8 G6 G7 — GND

PIN D6 IS UNDOCUMENTED RESET
CAN GROUND PIN D6 IN PRODUCTION

BOM_COST_GROUP=USB-C

SYNC_MASTER=ZIFENG
SYNC_DATE=05/26/2017
PAGE TITLE
USB-C PORT CONTROLLER A

Apple Inc.

DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
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SHEET 30 OF 131

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SECONDARY ACE USB-C PORT CONTROLLER (UPC)

PULL R3209 AND R3208 UP TO ACEs LDOs FOR 1ST BRIDGE'S ACES
PULL R3209 AND R3208 DOWN TO GND FOR 2ND RIDGE'S ACES

PP3V3_UPC_XB_LDO 29

1M R3209 I2C_UPC_XB_DBG_CTL_SCL 31
5% 1/20W MF 201

1M R3208 I2C_UPC_XB_DBG_CTL_SDA 31
5% 1/20W MF 201

1M R3212 UPC_XB_GPIO1 31 121
5% 1/20W MF 201

1M R3205 UPC_XA_UART_TX 29 30 31
5% 1/20W MF 201

CRITICAL
Q3200
FDPC4044
PWR-CLIP-33

FUSE
Add on support page

29 PP20V_USBC_XB_VBUS_F
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=20V

29 PP20V_USBC_XB_VBUS

C3201 1UF 10% 16V X5R 0402

PP1V8_SLPS2R 29

C3219 1.0UF 20% 6.3V X5R 0201-1

116 PP3V3_G3H_RTC_X

R3269 100K 5% 1/20W MF 201

29 PP5V_S4_X_USBC
CAP FOR PP_5V0 ON VR PAGE

C3200 10UF 20% 6.3V CERM-X5R 0402-1

TESTPOINTS MUST BE PRESENT FOR GPIO0, GPIO1 (EVEN IN PRODUCTION)

30 29 IN	TBT_POC_RESET	E11	MRESET
29 OUT	USBC_X_RESET_L	F11	RESET*
121 IN	UPC_XB_GPIO0	B2	GPIO0
121 31	UPC_XB_GPIO1	C2	GPIO1
30 29 27 14 IN	TBT_X_CIO_PWR_EN	D10	GPIO2
30 29 27 14 IN	TBT_X_USB_PWR_EN	G11	GPIO3
27 OUT	DP_XB_HPD	C10	GPIO4
29 OUT	UPC_PMU_RESET	E10	GPIO5
29 OUT	UPC_X_5V_EN	G10	GPIO6
119 39 30 OUT	SOC_DOCK_CONNECT	D7	GPIO7
29 OUT	UPC_XB_FAULT_L	H6	GPIO8
29 IN	GND	F10	BUSPOWERZ
29	NC_UPC_XB_I2C_ADDR	F1	I2C_ADDR
	UPC_XB_R_OSC	G2	R_OSC
31	I2C_UPC_XB_DBG_CTL_SCL	E4	DEBUG_CTL1
31	I2C_UPC_XB_DBG_CTL_SDA	D5	DEBUG_CTL2
29 BI	I2C_TBT_X_SDA	D1	I2C_SDA1
29 BI	I2C_TBT_X_SCL	D2	I2C_SCL1
29 OUT	I2C_TBT_XB_INT_L	C1	I2C_IRQ1*
29 BI	I2C_UPC_X_SDA2	A5	I2C_SDA2
29 BI	I2C_UPC_X_SCL2	B5	I2C_SCL2
51 OUT	UPC_I2C_INT_L	B6	I2C_IRQ2*
29 OUT	UPC_XB_SPI_CLK	A3	SPI_CLK
29 OUT	UPC_XB_SPI_MOSI	B4	SPI_MOSI
29 IN	UPC_XB_SPI_MISO	A4	SPI_MISO
29 OUT	UPC_XB_SPI_CS_L	B3	SPI_SSZ
	TP_UPC_XB_SWD_DATA	F4	SWD_DATA
	TP_UPC_XB_SWD_CLK	G4	SWD_CLK
31 30 29 IN	UPC_XA_UART_TX	F2	UART_RX
30 29 OUT	UPC_XA_UART_RX	E2	UART_TX
29	TBT_XB_LSTX	L4	LSX_R2P
29	TBT_XB_LSRX	K4	LSX_P2R
	USB_UPC_XB_F_P	L5	USB_RP_P
	USB_UPC_XB_F_N	K5	USB_RP_N
27 BI	USBC_XB_AUXLSX1	J1	AUX_P
27 BI	USBC_XB_AUXLSX2	J2	AUX_N
29 BI	PCH_UART_DEBUG_R2D	L2	DEBUG1
29 BI	PCH_UART_DEBUG_D2R	K2	DEBUG2
119 29 BI	UPC_XB_DBG3	L3	DEBUG3
119 29 BI	UPC_XB_DBG4	K3	DEBUG4

CRITICAL
R3203 15K 0.1% 1/20W TF-LF 0201
NEED 0.1%

TO SMC

REAR PORT:
CONNECT UPC SPI TO ROM
FRONT PORT:
GROUND UPC SPI

L3200
90-OHM-0.1A
EXCX4CE

29 BI USB2_UPC_XB_P — PLACE_NEAR=U3200.L5:5mm
29 BI USB2_UPC_XB_N — PLACE_NEAR=U3200.K5:5mm

U3200
CD3215A
BGA

CRITICAL
OMIT_TABLE

DIGITAL CORE I/O AND CONTROL
HV FET/SENSE
TYPE-C
PORT MUX

A11	PP_5V0	
B11	PP_5V0	
C11	PP_5V0	
D11	PP_5V0	
A6	PP_HV	
A7	PP_HV	
A8	PP_HV	
B7	PP_HV	
H10	PP_CABLE	
H11	VBUS	
J10	VBUS	
J11	VBUS	
K11	VBUS	
H1	VIN_3V3	
B1	VDDIO	
G1	LDO_3V3	
H2	VOUT_3V3	
K1	LDO_1V8A	
A2	LDO_1V8D	
E1	LDO_BMC	
H7	SS	UPC_XB_SS
B10	SENSEP	
A10	SENSEN	
B9	HV_GATE1	
A9	HV_GATE2	
L9	C_CC1	USBC_XB_CC1
L10	C_CC2	USBC_XB_CC2
K9	RPD_G1	USBC_XB_CC1
K10	RPD_G2	USBC_XB_CC2
K6	C_USB_TP	USBC_XB_USB_TOP_P
L6	C_USB_TN	USBC_XB_USB_TOP_N
K7	C_USB_BP	USBC_XB_USB_BOT_P
L7	C_USB_BN	USBC_XB_USB_BOT_N
K8	C_SBU1	USBC_XB_SBU1
L8	C_SBU2	USBC_XB_SBU2
L11	NC	GROUND

TP_Q3200_DRAIN
UPC_XB_GATE1
UPC_XB_GATE2

PPDCIN_G3H 29 30 107 108 109
MAX 100uF TOTAL ON RAIL

PP3V3_UPC_XB_LDO 29
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.3V

PP3V3_TBT_X_SX 29

PP1V8_UPC_XB_LDOA
PP1V8_UPC_XB_LDOD
PP1V1_UPC_XB_LDO_BMC

C3204 2.2UF 20% 4V X5R-CERM 0201
C3205 1.0UF 20% 6.3V X5R 0201-1
C3206 0.47UF 10% 6.3V CERM-X5R 0201
C3208 10UF 20% 6.3V CERM-X5R 0402-1
MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200 VOLTAGE=1.1V
MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200 VOLTAGE=1.8V

C3209 0.47UF 10% 6.3V CERM-X5R 0201

C3214 220PF 10% 16V CER-X7R 0201
C3213 220PF 10% 16V CER-X7R 0201
MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200

GROUND
NC L11 — NC or GND to dissipate heat

GND 29
PIN D6 IS UNDOCUMENTED RESET
CAN GROUND PIN D6 IN PRODUCTION

BOM_COST_GROUP=USB-C

SYNC_MASTER=ZIFENG SYNC_DATE=05/26/2017

PAGE TITLE
USB-C PORT CONTROLLER B

Apple Inc.

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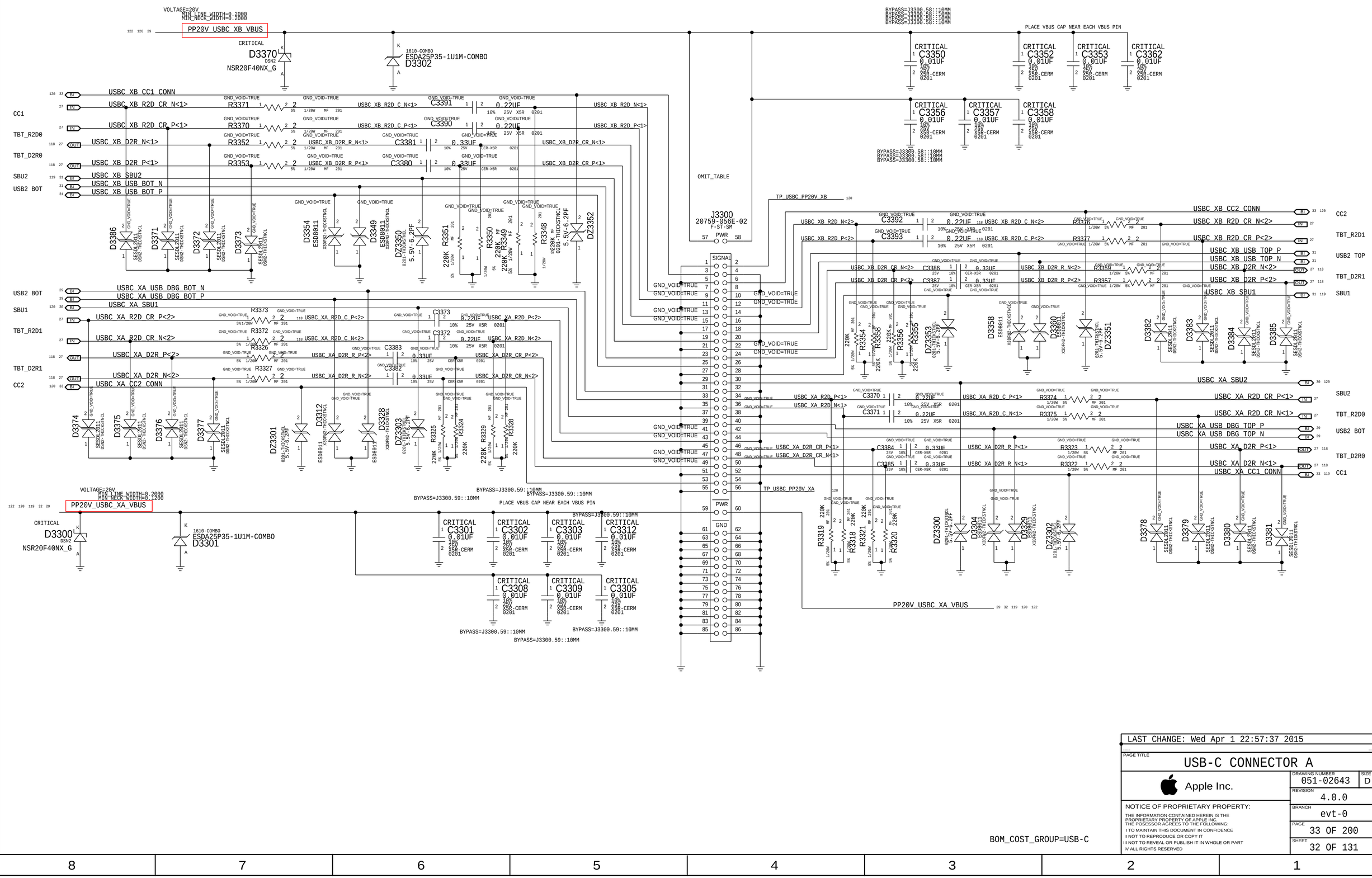

LAST CHANGE: Wed Apr 1 22:57:37 2015

PAGE TITLE

USB-C CONNECTOR A

Apple Inc.

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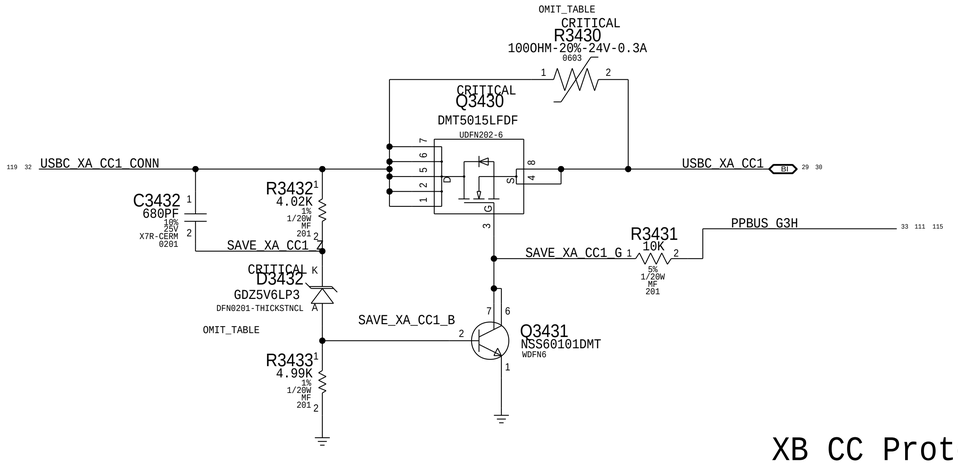
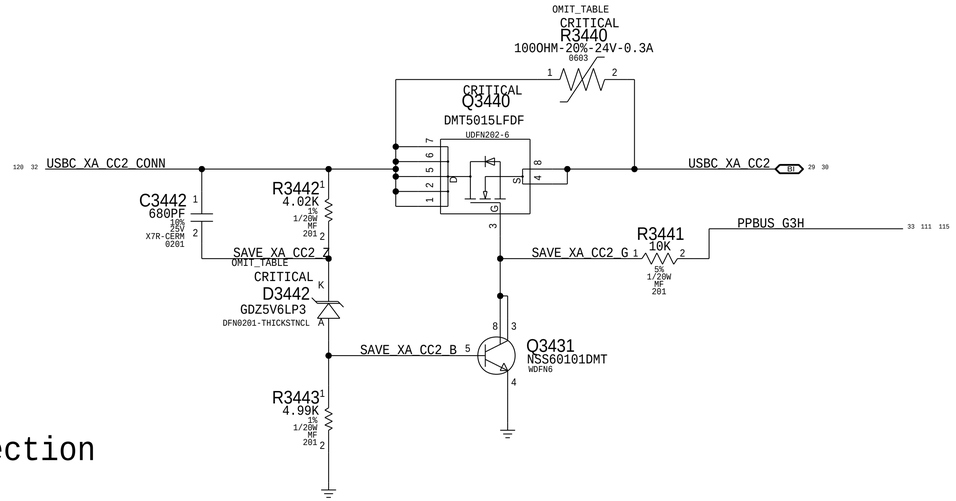
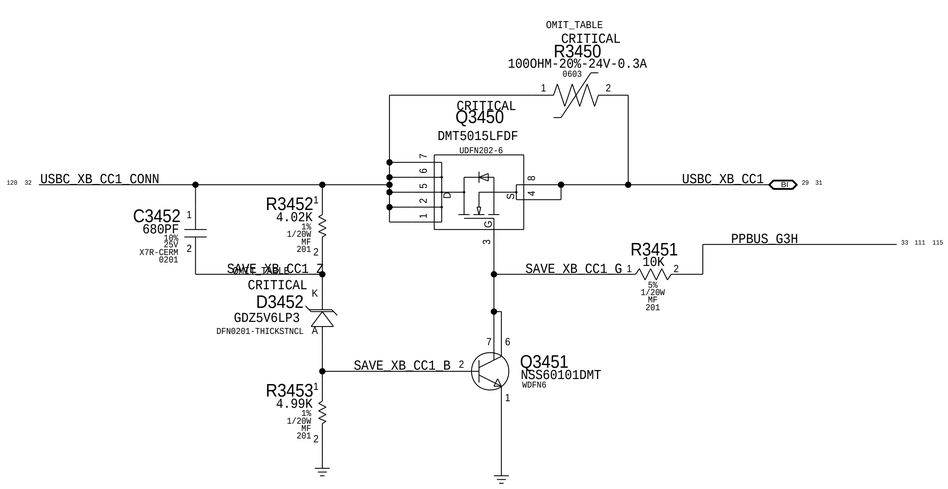
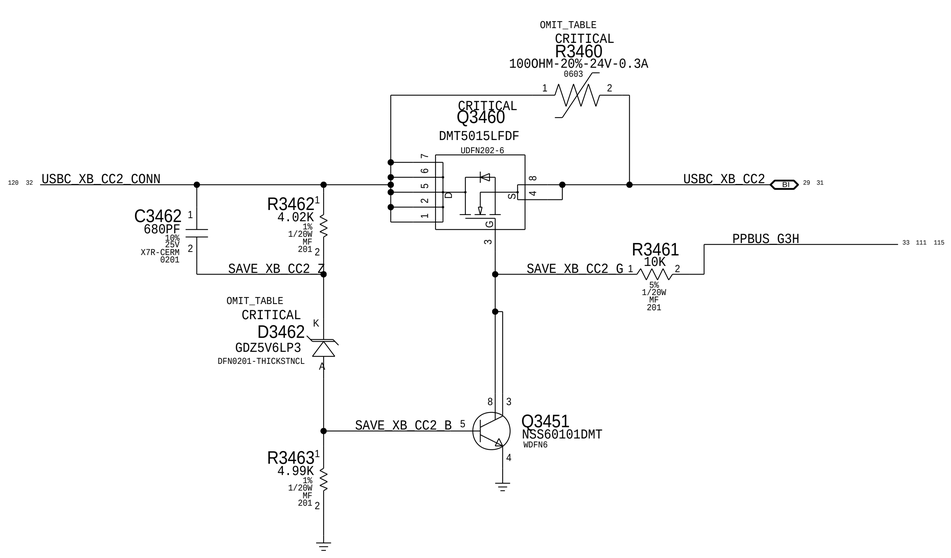
XA CC Protection





XB CC Protection





PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
371S00181	4	DIODE,ZENER,5.6V,250MW,DFN0201	D3432,D3442,D3452,D3462	CRITICAL	
740S00050	4	FUSE,THRMSTR,PTC,470OHM,24V,60MA,0603	R3430,R3440,R3450,R3460	CRITICAL	

BOM_COST_GROUP=USB-C

DESIGN: X1032/MLB_P4BP
LAST CHANGE: Fri Jan 6 16:01:21 2017

PAGE TITLE
USBC X Connector Support

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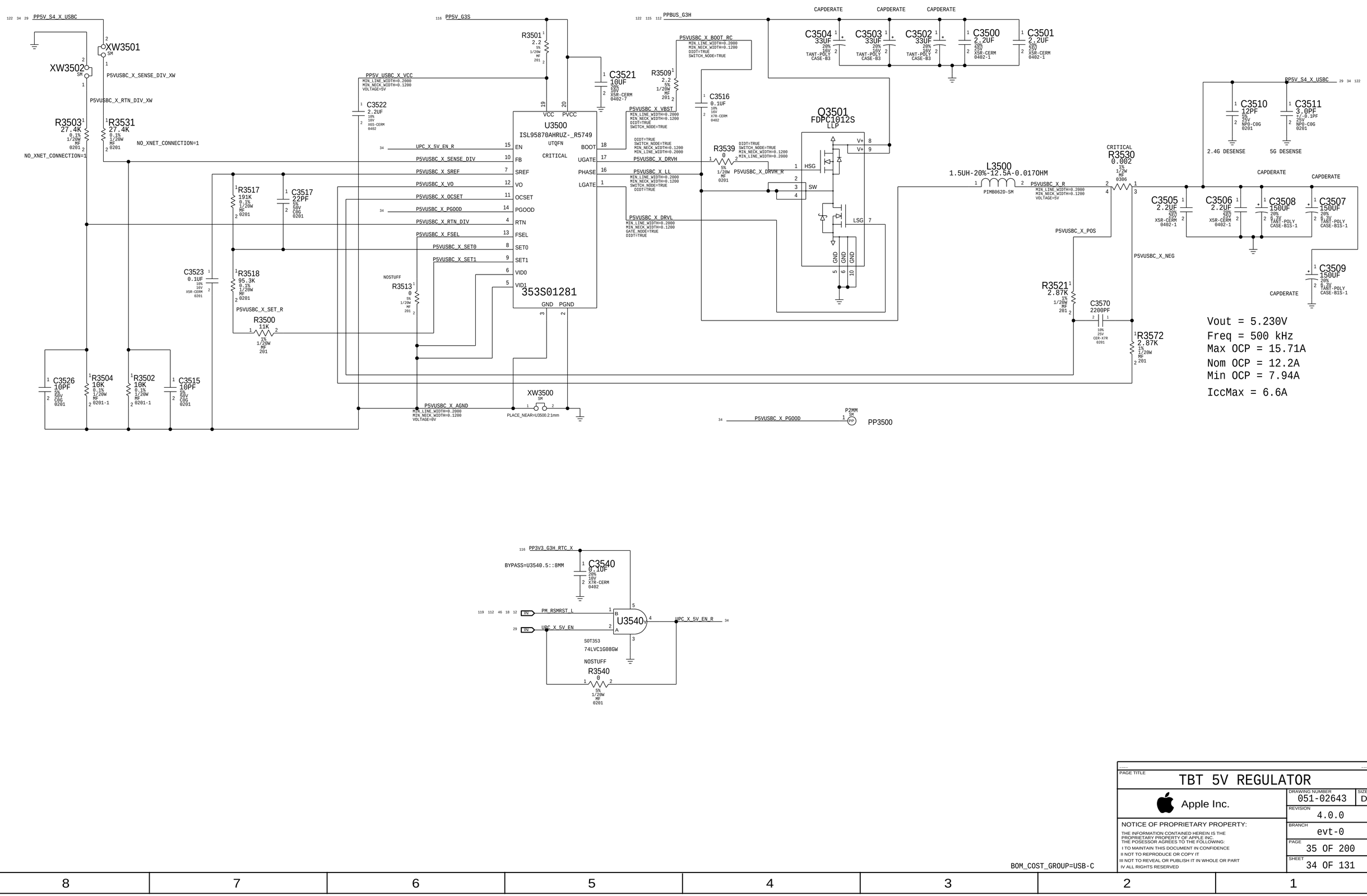

BOM_COST_GROUP=USB-C

PAGE TITLE: TBT 5V REGULATOR

Apple Inc.

DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
PAGE: 35 OF 200
SHEET: 34 OF 131

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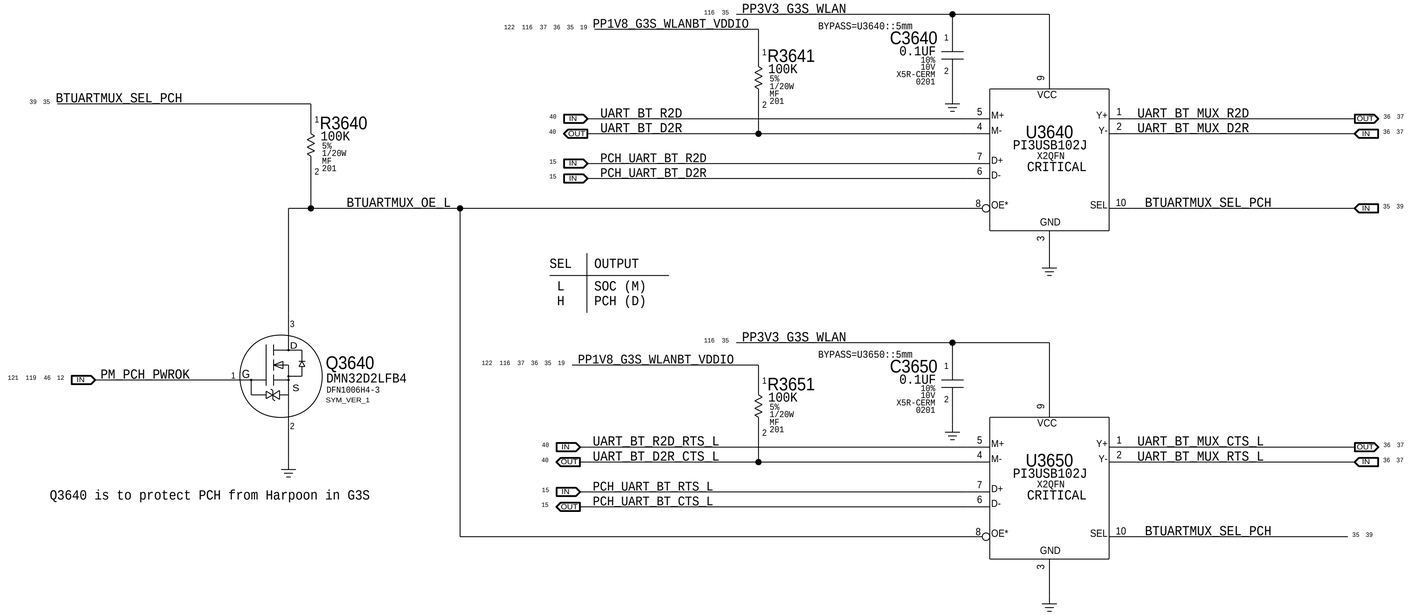

BOM_COST_GROUP=WIRELESS

SYNC_MASTER=J132	SYNC_DATE=03/29/2017
PAGE TITLE	WIFI/BT: Support
Apple Inc.	DRAWING NUMBER 051-02643 SIZE D
	REVISION 4.0.0
	BRANCH evt-0
	PAGE 36 OF 200
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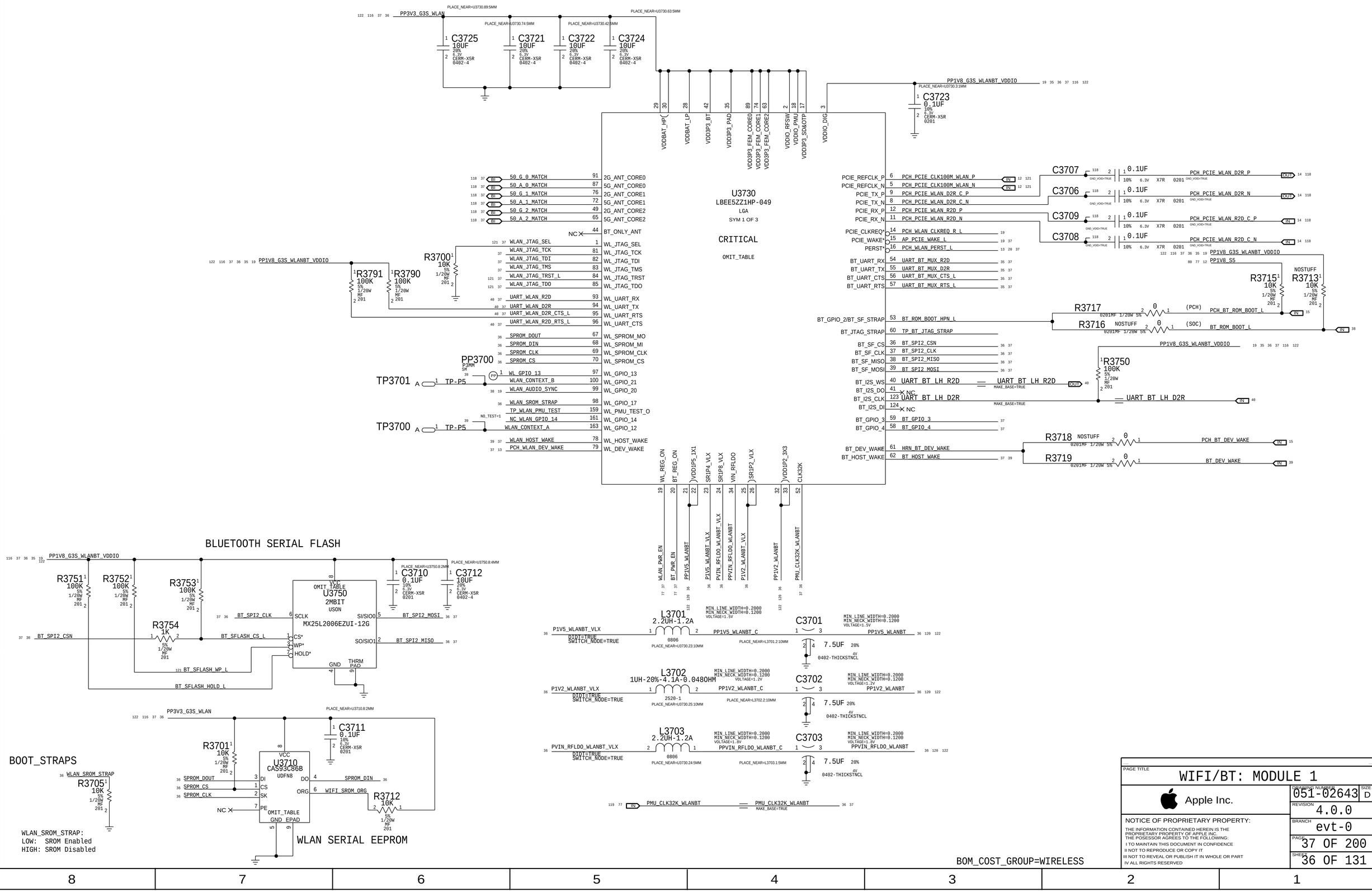
PP3V3_G3S_WLAN
PLACE_NEAR=U3730.89:5MM
PLACE_NEAR=U3730.74:5MM
PLACE_NEAR=U3730.42:5MM
PLACE_NEAR=U3730.63:5MM
C3725 10UF 20% 6.3V CERM-X5R 0402-4
C3721 10UF 20% 6.3V CERM-X5R 0402-4
C3722 10UF 20% 6.3V CERM-X5R 0402-4
C3724 10UF 20% 6.3V CERM-X5R 0402-4
PP1V8_G3S_WLANBT_VDDIO
PLACE_NEAR=U3730.3:1MM
C3723 0.1UF 10% 6.3V CERM-X5R 0201
VDDBAT_HP
VDDBAT_LP
VDD3P3_BT
VDD3P3_PAD
VDD3P3_FEM_CORE0
VDD3P3_FEM_CORE1
VDD3P3_FEM_CORE2
VDDIO_RFSW
VDDIO_PMU
VDDIO_DIG
U3730
LBEE5ZZ1HP-049
LGA
SYM 1 OF 3
CRITICAL
OMIT_TABLE
50_G_0_MATCH
50_A_0_MATCH
50_G_1_MATCH
50_A_1_MATCH
50_G_2_MATCH
50_A_2_MATCH
2G_ANT_CORE0
5G_ANT_CORE0
2G_ANT_CORE1
5G_ANT_CORE1
2G_ANT_CORE2
5G_ANT_CORE2
BT_ONLY_ANT
WL_JTAG_SEL
WL_JTAG_TCK
WL_JTAG_TDI
WL_JTAG_TMS
WL_JTAG_TRST
WL_JTAG_TDO
WL_UART_RX
WL_UART_TX
WL_UART_RTS
WL_UART_CTS
WL_SPROM_MO
WL_SPROM_MI
WL_SPROM_CLK
WL_SPROM_CS
WL_GPIO_13
WL_GPIO_21
WL_GPIO_20
WL_GPIO_17
WL_PMU_TEST_O
WL_GPIO_14
WL_GPIO_12
WL_HOST_WAKE
WL_DEV_WAKE
R3700 10K 5% 1/20W MF 201
R3791 100K 5% 1/20W MF 201
R3790 100K 5% 1/20W MF 201
PP3700
TP3701
TP3700
TP-P5
WLAN_JTAG_SEL
WLAN_JTAG_TCK
WLAN_JTAG_TDI
WLAN_JTAG_TMS
WLAN_JTAG_TRST_L
WLAN_JTAG_TDO
UART_WLAN_R2D
UART_WLAN_D2R
UART_WLAN_D2R_CTS_L
UART_WLAN_R2D_RTS_L
SPROM_DOUT
SPROM_DIN
SPROM_CLK
SPROM_CS
WL_GPIO 13
WLAN_CONTEXT_B
WLAN_AUDIO_SYNC
WLAN_SROM_STRAP
TP_WLAN_PMU_TEST
NC_WLAN_GPIO_14
WLAN_CONTEXT_A
WLAN_HOST_WAKE
PCH_WLAN_DEV_WAKE
NO_TEST=1
PCIE_REFCLK_P
PCIE_REFCLK_N
PCIE_TX_P
PCIE_TX_N
PCIE_RX_P
PCIE_RX_N
PCIE_CLKREQ*
PCIE_WAKE*
PERST*
PCH_PCIE_CLK100M_WLAN_P
PCH_PCIE_CLK100M_WLAN_N
PCH_PCIE_WLAN_D2R_C_P
PCH_PCIE_WLAN_D2R_C_N
PCH_PCIE_WLAN_R2D_P
PCH_PCIE_WLAN_R2D_N
PCH_WLAN_CLKREQ_R_L
AP_PCIE_WAKE_L
PCH_WLAN_PERST_L
C3707 0.1UF 10% 6.3V X7R 0201
C3706 0.1UF 10% 6.3V X7R 0201
C3709 0.1UF 10% 6.3V X7R 0201
C3708 0.1UF 10% 6.3V X7R 0201
PCH_PCIE_WLAN_D2R_P
PCH_PCIE_WLAN_D2R_N
PCH_PCIE_WLAN_R2D_C_P
PCH_PCIE_WLAN_R2D_C_N
PP1V8_S5
R3715 10K 5% 1/20W MF 201
R3713 NOSTUFF 10K 5% 1/20W MF 201
BT_UART_RX
BT_UART_TX
BT_UART_CTS
BT_UART_RTS
UART_BT_MUX_R2D
UART_BT_MUX_D2R
UART_BT_MUX_CTS_L
UART_BT_MUX_RTS_L
BT_GPIO_2/BT_SF_STRAP
BT_JTAG_STRAP
BT_ROM_BOOT_HPN_L
TP_BT_JTAG_STRAP
R3717 0 0201MF 1/20W 5% (PCH) PCH_BT_ROM_BOOT_L
R3716 NOSTUFF 0 0201MF 1/20W 5% (SOC) BT_ROM_BOOT_L
BT_SF_CS
BT_SF_CLK
BT_SF_MISO
BT_SF_MOSI
BT_SPI2_CSN
BT_SPI2_CLK
BT_SPI2_MISO
BT_SPI2_MOSI
BT_I2S_WS
BT_I2S_DO
BT_I2S_CLK
BT_I2S_DI
UART_BT_LH_R2D
UART_BT_LH_D2R
MAKE_BASE=TRUE
R3750 100K 5% 1/20W MF 201
BT_GPIO_3
BT_GPIO_4
BT_GPIO_3
BT_GPIO_4
BT_DEV_WAKE
BT_HOST_WAKE
HRN_BT_DEV_WAKE
BT_HOST_WAKE
R3718 NOSTUFF 0 0201MF 1/20W 5% PCH_BT_DEV_WAKE
R3719 0 0201MF 1/20W 5% BT_DEV_WAKE
BLUETOOTH SERIAL FLASH
R3751 100K 5% 1/20W MF 201
R3752 100K 5% 1/20W MF 201
R3753 100K 5% 1/20W MF 201
R3754 1K 5% 1/20W MF 201
U3750 2MBIT USON MX25L2006EZUI-12G
VCC
SCLK
SI/SIO0
SO/SIO1
CS*
WP*
HOLD*
GND
THRM PAD
OMIT_TABLE
C3710 0.1UF 10% 6.3V CERM-X5R 0201
C3712 10UF 20% 6.3V CERM-X5R 0402-4
BT_SFLASH_CS_L
BT_SFLASH_WP_L
BT_SFLASH_HOLD_L
BOOT_STRAPS
R3705 10K 5% 1/20W MF 201
WLAN_SROM_STRAP:
LOW: SROM Enabled
HIGH: SROM Disabled
WLAN SERIAL EEPROM
R3701 10K 5% 1/20W MF 201
U3710 CAS93C86B UDFN8
DI
CS
SK
PE
DO
ORG
GND_EPAD
R3712 10K 5% 1/20W MF 201
C3711 0.1UF 10% 6.3V CERM-X5R 0201
L3701 2.2UH-1.2A 0806
L3702 1UH-20%-4.1A-0.048OHM 2520-1
L3703 2.2UH-1.2A 0806
C3701 7.5UF 20% 4V 0402-THICKSTNCL
C3702 7.5UF 20% 4V 0402-THICKSTNCL
C3703 7.5UF 20% 4V 0402-THICKSTNCL
P1V5_WLANBT_VLX
PP1V5_WLANBT_C
PP1V5_WLANBT
P1V2_WLANBT_VLX
PP1V2_WLANBT_C
PP1V2_WLANBT
PVIN_RFLDO_WLANBT_VLX
PPVIN_RFLDO_WLANBT_C
PPVIN_RFLDO_WLANBT
DIDT=TRUE
SWITCH_NODE=TRUE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
PMU_CLK32K_WLANBT
BOM_COST_GROUP=WIRELESS
PAGE TITLE
WIFI/BT: MODULE 1
Apple Inc.
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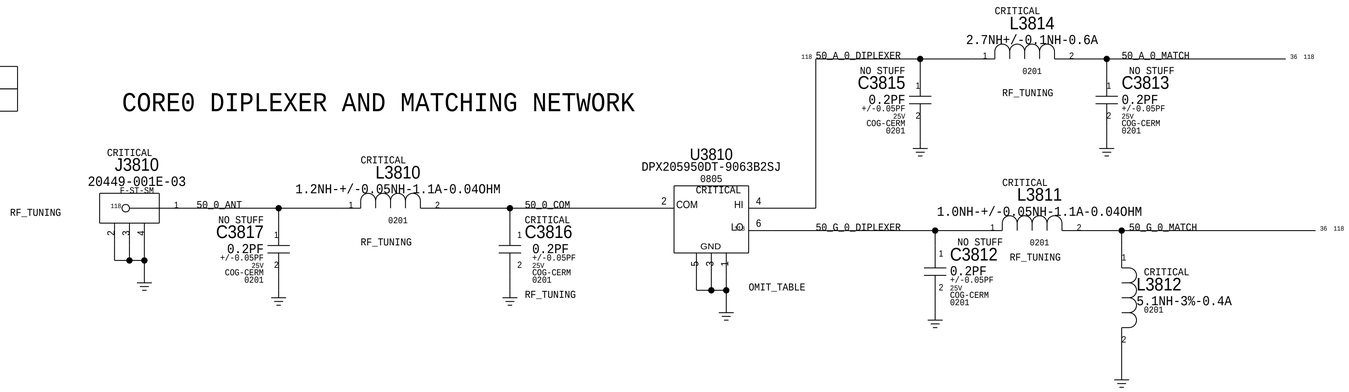
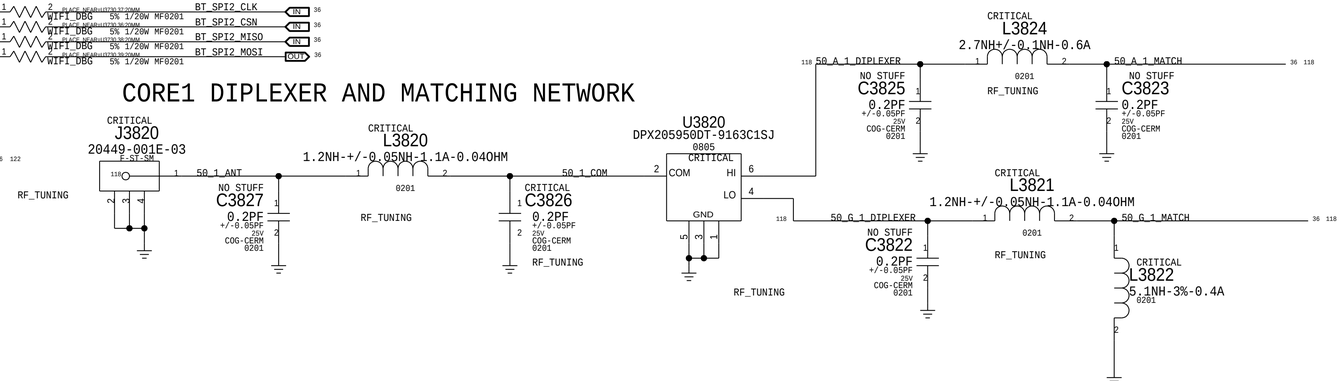
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
155S00196	2	FILTER,DIPLEXER,LB/HB,LGA6	U3810,U3830	CRITICAL	RF_TUNING

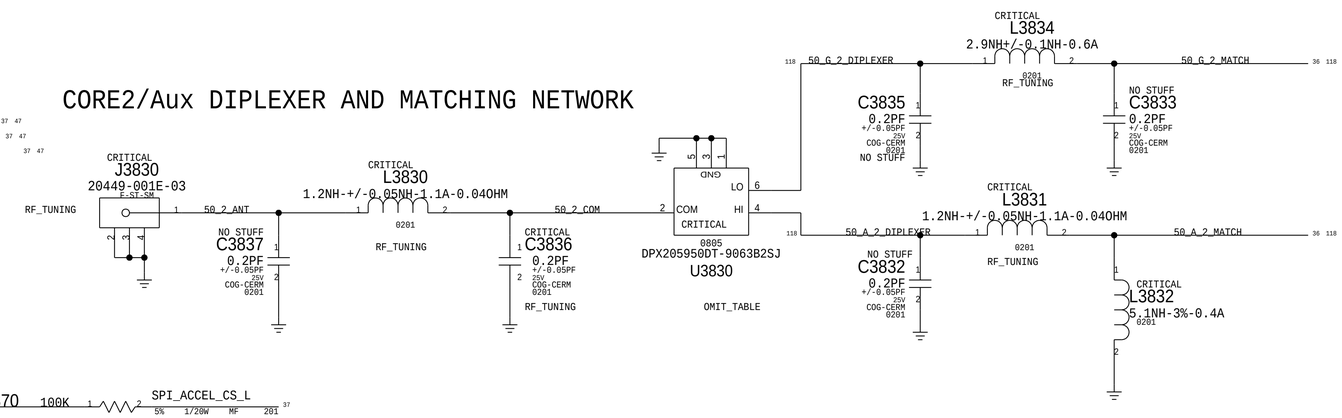
CORE0 DIPLEXER AND MATCHING NETWORK



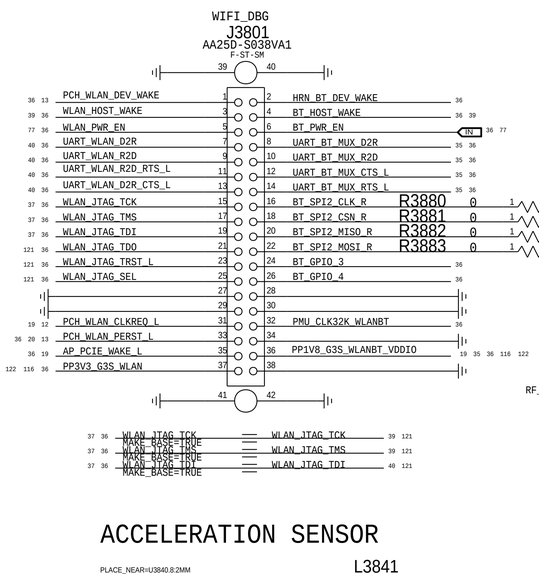
CORE1 DIPLEXER AND MATCHING NETWORK



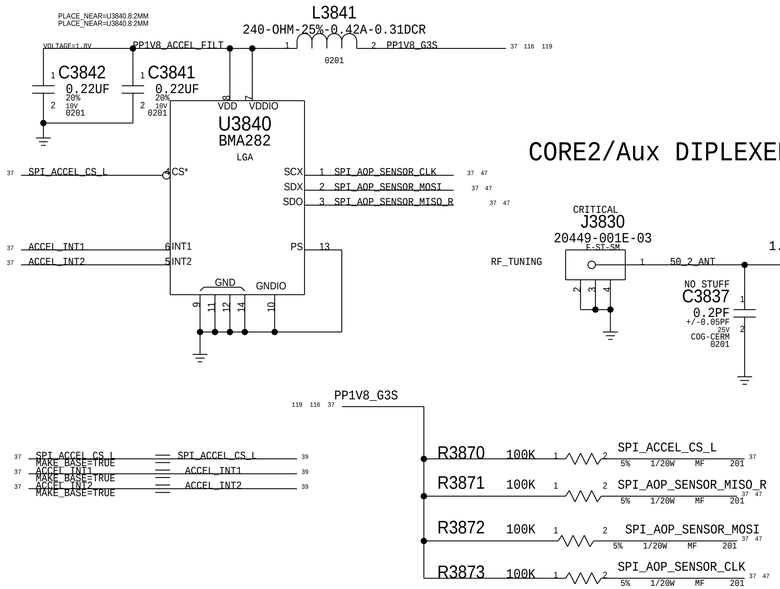
CORE2/Aux DIPLEXER AND MATCHING NETWORK

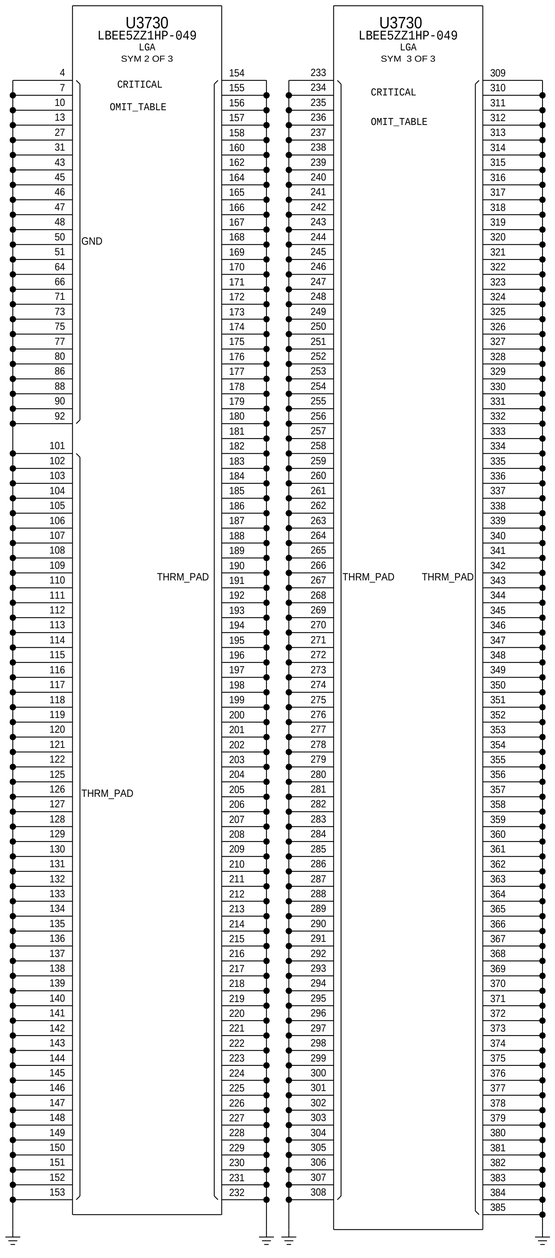


DEBUG CONNECTOR



ACCELERATION SENSOR





BOM_COST_GROUP=WIRELESS

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Note 1) IPU represents SW configured state, not HW default

OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 3 OF 18
GPIO/TEST/MISC

47	OUT	NC_PLCAM_TX_THROTTLE	A13	GPIO0		TMR32_PWM0	L33	WLAN_AUDIO_SYNC
47	OUT	NC_GNSS_HOST_TIME	A12	GPIO1		TMR32_PWM1	L35	DFR_PWR_EN
47	OUT	NC_GNSS_DEV_WAKE	B12	GPIO2		TMR32_PWM2	K36	BT_ROM_BOOT_L
61	IN	CODEC_INT_L	AJ36	GPIO3		CFSB	K34	PMU_ACTIVE_READY
49	OUT	SE_CTLR_FW_DWLD	R36	GPIO4				
12	IN	PCH_SOC_SYNC	AB36	GPIO5	(IPD)	FORCE_DFU	W32	SOC_FORCE_DFU
48	IN	MESA_INT	AC36	GPIO6	(IPD)	DFU_STATUS	V33	SOC_DFU_STATUS
48	OUT	MESA_PWR_EN	V34	GPIO7				
47	OUT	NC_WLAN_DEV_WAKE	V36	GPIO8		(IPD) HOLD_RESET	J34	SOC_HOLD_RESET
46	IN	BOARD_REV0	AA36	GPIO9		ANALOGMUX_OUT	AN36	NC_SOC_AMUXOUT
63 62	IN	SPKRAMP_INT_L	U36	GPIO10	(IPU)	TST_CLKOUT	P32	NC_SOC_TST_CLKOUT
63 62	OUT	SPKRAMP_RESET_L	U35	GPIO11		(IPD) TESTMODE	C12	SOC_TESTMODE
46	IN	BOARD_REV1	V32	GPIO12		DROOP	L32	PMU_DROOP_L
66	OUT	TPAD_SPI_EN	R32	GPIO13		SOCHOT	L34	SOC_SOCHOT_L
91 90 89 88 86 85 84 83	OUT	SSD_BFH	L36	GPIO14				
49	OUT	SE_DEV_WAKE	M33	GPIO15		XO0	AV23	SOC_XTAL24M_OUT
46	IN	BOOT_CONFIG0	J33	GPIO16		XI0	AV24	SOC_XTAL24M_IN
46	IN	BOOT_CONFIG1	P33	GPIO17				
46	IN	BOOT_CONFIG2	K32	GPIO18				
119 92 87 47	OUT	SSD_PMU_RESET_L	J32	GPIO19				
120 50	IN	DFR_DISP_INT	AA34	GPIO20	(IPD)			

R3940 51K 1% 1/20W MF 201

R3941 0 5% 1/20W MF 0201 — SOC_XTAL24M_OUT_R

CRITICAL
Y3940
1.60X1.20MM-SM
24MHZ-30PPM-9.5PF-60OHM

C3940 12PF 5% 25V CERM 0201 CRITICAL

C3941 12PF 5% 25V CERM 0201 CRITICAL

OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 7 OF 18
SEP/USB/DDR

46	BI	I2C_SEP_SDA	AV8	SEP_I2C0_SDA		DDR0_RREF	H3	SOC_DDR0_RREF
46	OUT	I2C_SEP_SCL	AT7	SEP_I2C0_SCL		DDR1_RREF	H35	SOC_DDR1_RREF
64	OUT	SEP_CAM_DISABLE_L	AU9	SEP_SPI0_MISO		DDR2_RREF	AL3	SOC_DDR2_RREF
64	OUT	SEP_DMIC_DISABLE_L	AV9	SEP_SPI0_MOSI		DDR3_RREF	AL35	SOC_DDR3_RREF
64	OUT	SEP_DISABLE_STROBE	AT8	SEP_SPI0_SCLK		DDR0_ZQ	N2	SOC_DDR0_ZQ
						DDR3_ZQ	AF36	SOC_DDR3_ZQ
126	BI	USB_SOC_P	B23	USB_DP		DDR0_RET*	H4	AON_SLEEP1_RESET_L
126	BI	USB_SOC_N	A23	USB_DM		DDR1_RET*	H34	
						DDR2_RET*	AL4	
47		NC_SOC_USB_ID	D23	USB_ID		DDR3_RET*	AL34	
126 119 29	IN	SOC_USB_VBUS	E23	USB_VBUS	(IPD)			
		SOC_USB_REXT	F22	USB_REXT		DDR0_SYS_ALIVE	G3	PMU_SYS_ALIVE
						DDR1_SYS_ALIVE	G35	
						DDR2_SYS_ALIVE	AM3	
						DDR3_SYS_ALIVE	AM35	

R3960 200 1% 1/20W MF 201

R3970 240 1% 1/20W MF 201
R3971 240 1% 1/20W MF 201
R3972 240 1% 1/20W MF 201
R3973 240 1% 1/20W MF 201
R3974 240 1% 1/20W MF 201
R3975 240 1% 1/20W MF 201

PP1V1_SLPDDR 80

PP1V8_SLPS2R 47 80

R3939	47K	5%	1/20W	MF	201	SOC_SOCHOT_L	38 77 119 126
R3976	10K	5%	1/20W	MF	201	SOC_TESTMODE	38 121
R3977	10K	5%	1/20W	MF	201	SOC_HOLD_RESET	38

BOM_COST_GROUP=SOC

SYNC_MASTER=SILU SYNC_DATE=05/26/2017

PAGE TITLE
SoC GPIO/SEP/USB/DDR/Test

Apple Inc.

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OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 6 OF 18
AOP

36	OUT	WLAN_CONTEXT_A	D3	AOP_FUNC[0]		AOP_PDM_CLK0	P6	PDM_DMIC_CLK0_R	OUT 47
36	OUT	WLAN_CONTEXT_B	F4	AOP_FUNC[1]		AOP_PDM_CLK1	K2	PDM_DMIC_CLK1_R	OUT 47
37	IN	ACCEL_INT1	M6	AOP_FUNC[2]	(IPD)	AOP_PDM_CLK2	J6	SMC_FIXTURE_MODE_L	IN 47 119
37	IN	ACCEL_INT2	D4	AOP_FUNC[3]	(IPD)	AOP_PDM_CLK3	L6	NC_PLCAM_PROX_INT_L	IN 47
35	OUT	BTUARTMUX_SEL_PCH	F3	AOP_FUNC[4]		AOP_PDM_CLK4	L5	NC_PLCAM_ROMEO_B2B_DETECT	IN 47
20 15	IN	SOC_PERST_L	K6	AOP_FUNC[5]					
47	IN	NC_ALTIMETER_INT	E4	AOP_FUNC[6]	(IPD)	AOP_PDM_DATA0	J5	PDM_DMIC_DATA0	IN 64
37	OUT	SPI_ACCEL_CS_L	J3	AOP_FUNC[7]		AOP_PDM_DATA1	K4	PDM_DMIC_DATA1	IN 64
47	OUT	NC_SPI_ALTIMETER_CS_L	H6	AOP_FUNC[8]		AOP_SPI_MOSI	D2	SPI_AOP_SENSOR_MOSI_R	OUT 47
						AOP_SPI_SCLK	F2	SPI_AOP_SENSOR_CLK_R	OUT 47
47	OUT	NC_I2C_AOP_SCL	N6	AOP_I2C0_SCL					
47	BI	NC_I2C_AOP_SDA	G5	AOP_I2C0_SDA		AOP_SPI_MISO	E2	SPI_AOP_SENSOR_MISO	IN 47

OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 5 OF 18
AON

120 50	IN	DFR_TOUCH_INT_L	AL6	AON_GPIO0		JTAG_TCK	AK6	SWD_SOC_SWCLK	IN 47 126
46	IN	CPU_SMC_THRMTRIP_L	AE6	AON_GPIO1	(IPU)	JTAG_TMS	AN5	SWD_SOC_SWDIO	BI 47 126
117	IN	GFX_SELF_THROTTLE_1V8	AT5	AON_GPIO2	(IPD)	JTAG_TDI	AH6	DEBUG_JTAG_SOC_TDI	119 126
47	OUT	SMC_GPU_THRMTRIP	AN4	AON_GPIO3		JTAG_TDO	AP4	DEBUG_JTAG_SOC_TDO	119 126
18	IN	XDP_PRESENT_L	AK4	AON_GPIO4		JTAG_TRST*	AJ6	TP_JTAG_SOC_TRST_L	121
61	OUT	CODEC_RESET_L	AV5	AON_GPIO5		JTAG_SEL	AC6	SOC_JTAG_SEL (DAP=0, TAP=1)	39 121
36	OUT	BT_DEV_WAKE	AR3	AON_GPIO6					
47	IN	NC_PCIEDN_WAKE_L	AG6	AON_GPIO7	(IPU)	DOCK_CONNECT	AN2	SOC_DOCK_CONNECT	IN 30 31 39 119
47	OUT	NC_ENET_LOW_PWR	AU5	AON_GPIO8		AON_SWD0_TMS	AJ4	WLAN_JTAG_TMS	BI 37 121
47	IN	TPAD_SPI_INT_L	AP2	AON_GPIO9		AON_SWD1_TMS	AH4	NC_MESA_MENUKEY_L	IN 47
47	IN	NC_SDCONN_STATE_CHANGE_L	AR4	AON_GPIO10	(IPU)	AON_SWD01_TCK	AJ2	WLAN_JTAG_TCK	OUT 37 121
47	IN	NC_ENET_MEDIA_SENSE	AN3	AON_GPIO11	(IPD)				
77	IN	PMU_INT_L	AT6	AON_GPIO12	(IPU)	WDOG	AJ5	SOC_WDOG	OUT 77 119
						AON_SLEEP1_RESET*	AF6	AON_SLEEP1_RESET_L	OUT 38

PLACE_NEAR=U3900.AD6:5MM
PLACE_NEAR=U7800.M7:5MM

77	OUT	SPMI_CLK	R4036	20	1/20W	MF	201	SPMI_CLK_R	AD6	AON_SPMI_SCLK	
77	BI	SPMI_DATA	R4037	20	1/20W	MF	201	SPMI_DATA_R	AR2	AON_SPMI_SDATA	
119	77	IN						PMU_CLK32K_SOC	AR5	RT_CLK32768	
			R4039	4.7K	1/20W	MF	201	SOC_COLD_RESET_L	AK2	COLD_RESET*	
									AK3	CFSB_AON	
121	119	77	64	IN				PMU_COLD_RESET_L			

OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 9 OF 18
SMC

PLACE_NEAR=U3900.U2:5MM
PLACE_NEAR=U3900.V2:5MM
PLACE_NEAR=U3900.U3:5MM
PLACE_NEAR=U3900.V4:5MM

118 39 20 12	BI	ESPI_IO<0>	R4050	20	1/20W	MF	201	ESPI_IO_R<0>	V2	SMC_ESPI_IO0	
118 39 20 12	BI	ESPI_IO<1>	R4051	20	1/20W	MF	201	ESPI_IO_R<1>	U3	SMC_ESPI_IO1	
118 39 20 12	BI	ESPI_IO<2>	R4052	20	1/20W	MF	201	ESPI_IO_R<2>	U4	SMC_ESPI_IO2	
118 39 20 12	BI	ESPI_IO<3>	R4053	20	1/20W	MF	201	ESPI_IO_R<3>	V3	SMC_ESPI_IO3	
20	IN							ESPI_CLK60M	U2	SMC_ESPI_CLK	(IPD)
39 20 12	IN							ESPI_CS_L	V5	SMC_ESPI_CS*	(IPD)
119 20 12	IN							ESPI_RESET_L	V6	SMC_ESPI_RESET*	(IPD)
46	IN							SMC_PECI_RX	M5	SMC_PECI_IN	(IPD)
46	OUT							SMC_PECI_TX	T6	SMC_PECI_OUT	
121 46	OUT							SMC_PCH_PWROK	W7	PCH_PWROK	(IPU)
121 46	OUT							SMC_PCH_SYS_PWROK	W8	SYS_PWROK	
46	OUT							SMC_RSMRST_L	W6	RSMRST*	
121 119 46	OUT							SMC_SYSRST_L	W4	SYS_RESET*	
131 119 77 12	IN							PM_SLP_S0_L	AA4	SLP_S0B	
69 47 46	BI							SMC_PROCHOT_L	R5	PROCHOT*	
119 93 92 87 77 38	IN							PMU_SYS_ALIVE	AA6	SYS_ALIVE	
119 51	OUT							I2C_UPC_SCL	M3	SMC_I2C0_SCL	
119 51	BI							I2C_UPC_SDA	J4	SMC_I2C0_SDA	
51	OUT							I2C_SNS0_S0_SCL	N4	SMC_I2C1_SCL	
51	BI							I2C_SNS0_S0_SDA	P4	SMC_I2C1_SDA	
51	OUT							I2C_SNS1_S0_SCL	U5	SMC_I2C2_SCL	
51	BI							I2C_SNS1_S0_SDA	M2	SMC_I2C2_SDA	
51	OUT							I2C_DISP_SCL	U6	SMC_I2C3_SCL	
51	BI							I2C_DISP_SDA	R4	SMC_I2C3_SDA	
119 51	OUT							I2C_PWR_SCL	P3	SMC_I2C4_SCL	
119 51	BI							I2C_PWR_SDA	T4	SMC_I2C4_SDA	
51	OUT							I2C_SNS_G3S_SCL	R2	SMC_I2C5_SCL	
51	BI							I2C_SNS_G3S_SDA	P2	SMC_I2C5_SDA	
51	OUT							I2C_SSD_SCL	R3	SMC_I2C6_SCL	(IPU)
51	BI							I2C_SSD_SDA	T2	SMC_I2C6_SDA	

SMC_GPIO0	Y4	CODEC_WAKE_L	IN 61						
SMC_GPIO1	Y8	BT_HOST_WAKE	IN 36 37						
SMC_GPIO2	Y5	WLAN_HOST_WAKE	IN 36 37						
SMC_GPIO3	AA2	GFX_THROTTLE_1V8_L	OUT 117						
SMC_GPIO4	Y7	LID_OPEN_RIGHT	IN 47						
SMC_GPIO5	Y6	PCC_EVENT	IN 94						
SMC_GPIO6	AB2	NC_TPAD_VIBE_L	OUT 47						
SMC_GPIO7	AD5	TPAD_KBD_WAKE_L	IN 47						
SMC_GPIO8	AD2	LID_OPEN_LEFT	BI 47						
SMC_GPIO9	AB4	NC_SPI_DSCRPTR_OVERRIDE_L	OUT 47						
SMC_GPIO10	AC2	DISP_GCON_INT_L	IN 93						
SMC_GPIO11	AC3	PCH_GCON_INT_L	OUT 15						
SMC_GPIO12	AA8	TPAD_ACTUATOR_DISABLE_L	BI 47						
SMC_GPIO13	AB3	TBT_WAKE_L	IN 29						
SMC_GPIO14	AE2	UPC_I2C_INT_L	IN 29 51 107						
SMC_GPIO15	L4	NC_GNSS_HOST_WAKE	IN 47						
SMC_ADC0	AG2	SMC_DCIN_VSENSE	IN 59						
SMC_ADC1	AC4	SMC_DCIN_ISENSE	IN 59						
SMC_ADC2	AH3	SMC_PBUS_VSENSE	IN 59						
SMC_ADC3	AD4	SMC_BMON_ISENSE	IN 59						
SMC_ADC4	AB6	SMC_CPU_HI_ISENSE	IN 59						
SMC_ADC5	AH2	SMC_GPU_HS_ISENSE	IN 59						
SMC_ADC6	AG4	SMC_P3V3_WLAN_ISENSE	IN 59						
SMC_ADC7	AC5	SMC_P3V3_CAPLE_ISENSE	IN 59						
REFP_ADC	AF4	PP1V25_SLPS2R_SMC_AVREF	46						
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SMC_PWM0	J2	SMC_FAN_0_PWM	OUT 59 119						
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SMC_UART0_RXD	V4	SMC_DEBUGPRT_RX	IN 47 119 126						
SMC_UART0_TXD	V5	SMC_DEBUGPRT_TX	OUT 47 119 126						
SWD_OUT0_TCK	AE3	SSD0_SWCLK_UART_R2D	OUT 83 84 85 86 121						
SWD_OUT0_TMS	AA5	SSD0_SWDIO_UART_D2R	BI 83 84 85 86 121						
SWD_OUT1_TCK	AF2	SSD1_SWCLK_UART_R2D	OUT 88 89 90 91 121						
SWD_OUT1_TMS	AA7	SSD1_SWDIO_UART_D2R	BI 88 89 90 91 121						

XW4089
SM
PLACE_NEAR=U3900.AF3:4MM

PP1V8_S5 80

R4046	10K	1/20W	MF	201	SOC_JTAG_SEL	39 121
R4047	100K	1/20W	MF	201	SOC_DOCK_CONNECT	30 31 39 119
R4054	100K	1/20W	MF	201	ESPI_IO<0>	12 20 39 118
R4055	100K	1/20W	MF	201	ESPI_IO<1>	12 20 39 118
R4056	100K	1/20W	MF	201	ESPI_IO<2>	12 20 39 118
R4057	100K	1/20W	MF	201	ESPI_IO<3>	12 20 39 118
R4059	100K	1/20W	MF	201	ESPI_CS_L	12 20 39

BOM_COST_GROUP=SOC

SYNC_MASTER=SILU SYNC_DATE=03/22/2017

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OMIT_TABLE
CRITICAL

U3900
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ISP

82 47	IN	MIPI_FTCAM_DATA_P<0>	B27	MIPI0C_DATA0_P	ISP_I2C0_SDA	AF32	I2C_FTCAM_SDA	BI 52
82 47	IN	MIPI_FTCAM_DATA_N<0>	A27	MIPI0C_DATA0_N	ISP_I2C0_SCL	AH36	I2C_FTCAM_SCL	OUT 52
47	IN	GND	B25	MIPI0C_DATA1_P	ISP_I2C1_SDA	AB32	NC_I2C_PLCAM_SDA	BI 52
47	IN	GND	A25	MIPI0C_DATA1_N	ISP_I2C1_SCL	AG32	NC_I2C_PLCAM_SCL	OUT 52
82 47	IN	MIPI_FTCAM_CLK_P	B26	MIPI0C_CLK_P	SENSOR0_CLK	AK35	NC_FTCAM_CLK12M_R	OUT 47
82 47	IN	MIPI_FTCAM_CLK_N	A26	MIPI0C_CLK_N	SENSOR0_RST	AK34	NC_FTCAM_RESET_L	OUT 47
					SENSOR0_ISTRB	AJ33	DFR_TOUCH_RESET_L	OUT 50 120
47	IN	GND	B28	MIPI1C_DATA0_P	SENSOR1_CLK	AD33	NC_PLCAM_RX_CLK12M_R	OUT 47
47	IN	GND	A28	MIPI1C_DATA0_N	SENSOR1_RST	AC32	NC_PLCAM_RX_RESET_L	OUT 47
47	IN	GND	B30	MIPI1C_DATA1_P	SENSOR1_ISTRB	AC34	DFR_DISP_RESET_L	OUT 50 120
47	IN	GND	A30	MIPI1C_DATA1_N	SENSOR2_CLK	AD32	NC_PLCAM_TX_CLK12M_R	OUT 47
47	IN	GND	B29	MIPI1C_CLK_P	SENSOR2_RST	AJ32	NC_PLCAM_TX_RESET_L	OUT 47
47	IN	GND	A29	MIPI1C_CLK_N	(IPD) SENSOR_INT	AA33	NC_PLCAM_TX_INT	IN 47
50	OUT	MIPI_DFR_DATA_P	B33	MIPID_DATA0_P	(IPD) DISP_TE	H32	DFR_DISP_TE	IN 50 120
50	OUT	MIPI_DFR_DATA_N	A33	MIPID_DATA0_N	DISP_VSYNC	T36	BOARD_REV2	IN 46
50	OUT	MIPI_DFR_CLK_P	B32	MIPID_CLK_P	CLK32K_OUT	AK33	DFR_TOUCH_CLK32K_RESET_L	OUT 50 120
50	OUT	MIPI_DFR_CLK_N	A32	MIPID_CLK_N				
		SOC_MIPI0C_REXT	F23	MIPI0C_REXT				
		SOC_MIPI1C_REXT	F26	MIPI1C_REXT				
		SOC_MIPID_REXT	F27	MIPID_REXT				

R4100 4.02K 1% 1/20W MF 201
R4101 4.02K 1% 1/20W MF 201
R4102 4.02K 1% 1/20W MF 201

OMIT_TABLE
CRITICAL

U3900
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I2C/UART/SPI/I2S

52	BI	I2C_SPKRAMP_L_SDA	AE35	I2C0_SDA	SPI0_MISO	AR9	SPI_SOCROM_MISO	IN 46
52	OUT	I2C_SPKRAMP_L_SCL	AD35	I2C0_SCL	SPI0_MOSI	AR7	SPI_SOCROM_MOSI_R	R4171 20 1% 1/20W MF 201 SPI_SOCROM_MOSI OUT 46
52	BI	I2C_SPKRAMP_R_SDA	AE34	I2C1_SDA	SPI0_SCLK	AU7	SPI_SOCROM_CLK_R	R4172 20 1% 1/20W MF 201 SPI_SOCROM_CLK OUT 46
52	OUT	I2C_SPKRAMP_R_SCL	AG35	I2C1_SCL	SPI0_SSIN	AT9	SPI_SOCROM_CS_L	OUT 46
52	BI	I2C_CODEC_SDA	M34	I2C2_SDA	(IPU) SPI1_MISO	P36	SPI_TPAD_MISO	IN 46 47
52	OUT	I2C_CODEC_SCL	R33	I2C2_SCL	SPI1_MOSI	N34	SPI_TPAD_MOSI_R	OUT 47
120 52	BI	I2C_ALS_SDA	Y32	I2C3_SDA	SPI1_SCLK	P35	SPI_TPAD_CLK_R	OUT 47
120 52	OUT	I2C_ALS_SCL	AE34	I2C3_SCL	SPI1_SSIN	T32	SPI_TPAD_CS_L	OUT 66
52	BI	I2C_DFR_SDA	T34	I2C4_SDA	SPI2_MISO	A19	SPI_MESA_MISO	IN 48
52	OUT	I2C_DFR_SCL	U32	I2C4_SCL	SPI2_MOSI	A20	SPI_MESA_MOSI_R	OUT 47
52	BI	NC_I2C_SOC_5_SDA	R35	I2C5_SDA	SPI2_SCLK	C19	SPI_MESA_CLK_R	OUT 47
52	OUT	NC_I2C_SOC_5_SCL	U33	I2C5_SCL	SPI2_SSIN	A18	WLAN_JTAG_TDI	OUT 37 121
47	IN	NC_SPKR_ID1	P34	I2C6_SDA (IPU)	SPI3_MISO	C17	SPI_DFR_MISO	IN 47
120 63	IN	SPKR_ID0	R34	I2C6_SCL (IPU)	SPI3_MOSI	C18	SPI_DFR_MOSI_R	OUT 47
					SPI3_SCLK	B18	SPI_DFR_CLK_R	OUT 47
126 119	IN	SOC_DEBUGPRT_RX	Y33	UART0_RXD (IPU)	SPI3_SSIN	A17	SPI_DFR_CS_L	OUT 50 120
126 119	OUT	SOC_DEBUGPRT_TX	Y34	UART0_TXD				
49	IN	UART_SE_D2R	B15	UART1_RXD	(IPD) I2S0_DIN	AC33	I2S_SPKRAMP_L_D2R	IN 62 63
49	OUT	UART_SE_R2D	A15	UART1_TXD	I2S0_DOUT	AG34	I2S_SPKRAMP_L_R2D_R	OUT 47
49	IN	UART_SE_D2R_CTS_L	C15	UART1_CTS*	I2S0_BCLK	AA32	I2S_SPKRAMP_L_BCLK_R	OUT 47
49	OUT	UART_SE_R2D_RTS_L	D15	UART1_RTS*	I2S0_LRCK	AG33	I2S_SPKRAMP_L_LRCLK	OUT 47
35	IN	UART_BT_D2R	J36	UART2_RXD	I2S0_MCK	AR35	NC_DFR_TOUCH_RSVD	BI 47
35	OUT	UART_BT_R2D	J35	UART2_TXD	(IPD) I2S1_DIN	B20	I2S_SPKRAMP_R_D2R	IN 47
35	IN	UART_BT_D2R_CTS_L	N38	UART2_CTS*	I2S1_DOUT	C20	I2S_SPKRAMP_R_R2D_R	OUT 47
35	OUT	UART_BT_R2D_RTS_L	M38	UART2_RTS*	I2S1_BCLK	C21	I2S_SPKRAMP_R_BCLK_R	OUT 47
36	IN	UART_BT_LH_D2R	M36	UART3_RXD	I2S1_LRCK	A21	I2S_SPKRAMP_R_LRCLK	OUT 47
36	OUT	UART_BT_LH_R2D	N36	UART3_TXD	I2S1_MCK	D21	NC_PCHROM_SW_EN	OUT 47
47	IN	NC_UART_GNSS_D2R_CTS_L	M35	UART3_CTS*	(IPD) I2S2_DIN	AH34	I2S_CODEC_D2R	IN 61
47	OUT	NC_UART_GNSS_R2D_RTS_L	U34	UART3_RTS*	I2S2_DOUT	AB34	I2S_CODEC_R2D_R	OUT 47
37 36	IN	UART_WLAN_D2R	B14	UART4_RXD	I2S2_BCLK	AF33	I2S_CODEC_BCLK_R	OUT 47
37 36	OUT	UART_WLAN_R2D	A14	UART4_TXD	I2S2_LRCK	AH35	I2S_CODEC_LRCLK	OUT 47
37 36	IN	UART_WLAN_D2R_CTS_L	C14	UART4_CTS*	I2S2_MCK	AR33	NC_I2S_CODEC_MCLK	OUT 47
37 36	OUT	UART_WLAN_R2D_RTS_L	C13	UART4_RTS*	(IPD) I2S3_DIN	AD36	NC_I2S_HAWKING_D2R	IN 47
					I2S3_DOUT	AB35	NC_I2S_CODEC1_R2D_R	OUT 47
					I2S3_BCLK	AE36	NC_I2S_HAWKING_BCLK	OUT 47
					I2S3_LRCK	W34	NC_I2S_HAWKING_LRCLK	OUT 47
					I2S3_MCK	AG36	NC_I2S_CODEC1_MCLK	OUT 47

PLACE_NEAR=U3900.AR7:5MM
PLACE_NEAR=U3900.AU7:5MM

BOM_COST_GROUP=SOC

SYNC_MASTER=H9M and PMIC SYNC_DATE=03/07/2017

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SoC ISP/I2C/UART/SPI/I2S

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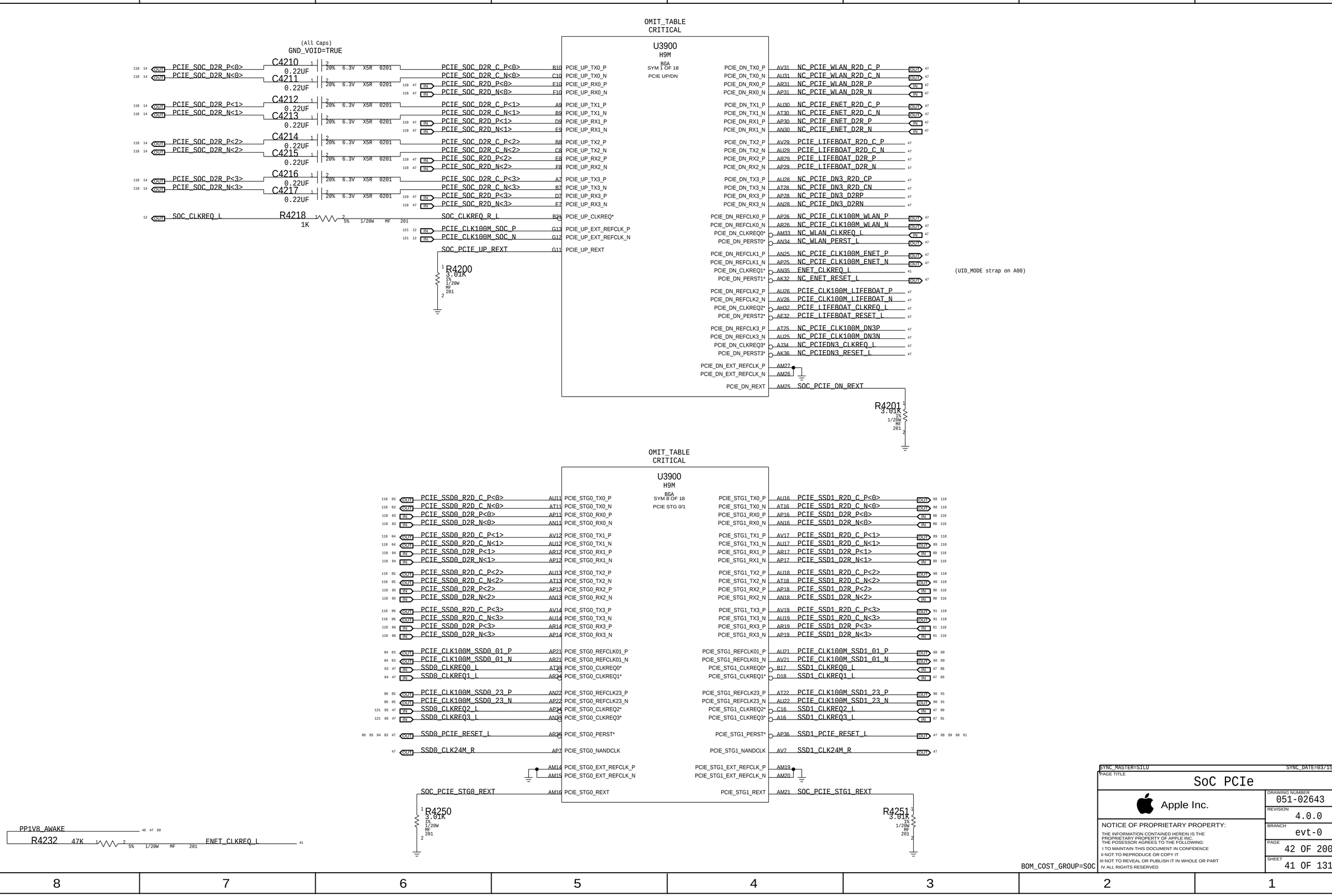
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C4215 0.22UF
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R4218 1K
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SOC_PCIE_UP_REXT
R4200 3.01K
PCIE_UP_TX0_P B10
PCIE_UP_TX0_N C10
PCIE_UP_RX0_P E10
PCIE_UP_RX0_N F10
PCIE_UP_TX1_P A9
PCIE_UP_TX1_N B9
PCIE_UP_RX1_P D9
PCIE_UP_RX1_N E9
PCIE_UP_TX2_P B8
PCIE_UP_TX2_N C8
PCIE_UP_RX2_P E8
PCIE_UP_RX2_N F8
PCIE_UP_TX3_P A7
PCIE_UP_TX3_N B7
PCIE_UP_RX3_P D7
PCIE_UP_RX3_N E7
PCIE_UP_CLKREQ* B21
PCIE_UP_EXT_REFCLK_P G13
PCIE_UP_EXT_REFCLK_N G12
PCIE_UP_REXT G11
PCIE_DN_TX0_P AV31 NC_PCIE_WLAN_R2D_C_P
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PCIE_DN_RX3_N AN28 NC_PCIE_DN3_D2RN
PCIE_DN_REFCLK0_P AP26 NC_PCIE_CLK100M_WLAN_P
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PCIE_DN_CLKREQ0* AM33 NC_WLAN_CLKREQ_L
PCIE_DN_PERST0* AN34 NC_WLAN_PERST_L
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PCIE_DN_CLKREQ3* AJ34 NC_PCIEDN3_CLKREQ_L
PCIE_DN_PERST3* AK36 NC_PCIEDN3_RESET_L
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(UID_MODE strap on A00)
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PCIE_CLK100M_SSD0_23_N
SSD0_CLKREQ2_L
SSD0_CLKREQ3_L
SSD0_PCIE_RESET_L
SSD0_CLK24M_R
SOC_PCIE_STG0_REXT
R4250 3.01K
PCIE_STG0_TX0_P AU11
PCIE_STG0_TX0_N AT11
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PCIE_STG0_TX3_N AU14
PCIE_STG0_RX3_P AR14
PCIE_STG0_RX3_N AP14
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PCIE_STG0_CLKREQ0* AT33
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PCIE_STG0_CLKREQ2* AP34
PCIE_STG0_CLKREQ3* AN33
PCIE_STG0_PERST* AR36
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PCIE_STG1_REFCLK01_N AV21 PCIE_CLK100M_SSD1_01_N
PCIE_STG1_CLKREQ0* B17 SSD1_CLKREQ0_L
PCIE_STG1_CLKREQ1* D18 SSD1_CLKREQ1_L
PCIE_STG1_REFCLK23_P AT22 PCIE_CLK100M_SSD1_23_P
PCIE_STG1_REFCLK23_N AU22 PCIE_CLK100M_SSD1_23_N
PCIE_STG1_CLKREQ2* C16 SSD1_CLKREQ2_L
PCIE_STG1_CLKREQ3* A16 SSD1_CLKREQ3_L
PCIE_STG1_PERST* AP36 SSD1_PCIE_RESET_L
PCIE_STG1_NANDCLK AV7 SSD1_CLK24M_R
PCIE_STG1_EXT_REFCLK_P AM19
PCIE_STG1_EXT_REFCLK_N AM20
PCIE_STG1_REXT AM21 SOC_PCIE_STG1_REXT
R4251 3.01K
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R4232 47K
ENET_CLKREQ_L
BOM_COST_GROUP=SOC
SYNC_MASTER=SILU
SYNC_DATE=03/15/2017
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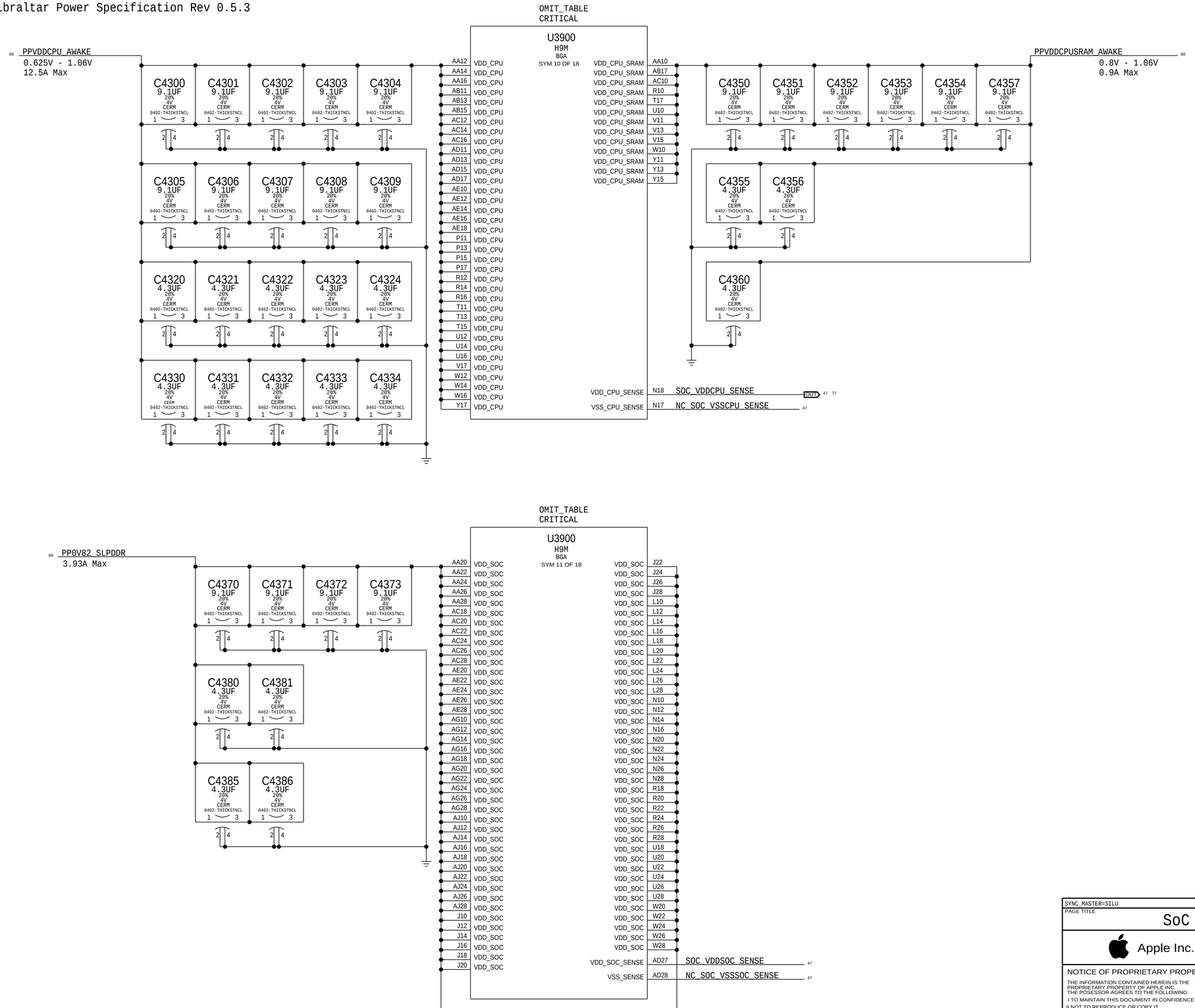
Current estimates @ 105C & 2GB from Gibraltar Power Specification Rev 0.5.3



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

OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 13 OF 18

PP1V1_SLPDDR
0.86A Max

C4450 2.2UF 20% 4V X6S-CERM 0201
C4451 2.2UF 20% 4V X6S-CERM 0201
C4452 2.2UF 20% 4V X6S-CERM 0201
C4453 2.2UF 20% 4V X6S-CERM 0201
C4454 2.2UF 20% 4V X6S-CERM 0201
C4455 2.2UF 20% 4V X6S-CERM 0201
C4456 2.2UF 20% 4V X6S-CERM 0201
C4457 2.2UF 20% 4V X6S-CERM 0201

C2 VDDIO11_DDR0
E1 VDDIO11_DDR0
G1 VDDIO11_DDR0
H8 VDDIO11_DDR0
J9 VDDIO11_DDR0
K8 VDDIO11_DDR0
L9 VDDIO11_DDR0
M8 VDDIO11_DDR0
N9 VDDIO11_DDR0
P1 VDDIO11_DDR0
R1 VDDIO11_DDR0
U1 VDDIO11_DDR0
C36 VDDIO11_DDR1
E37 VDDIO11_DDR1
G37 VDDIO11_DDR1
H30 VDDIO11_DDR1
J29 VDDIO11_DDR1
K30 VDDIO11_DDR1
L29 VDDIO11_DDR1
M30 VDDIO11_DDR1
N29 VDDIO11_DDR1
P37 VDDIO11_DDR1
R37 VDDIO11_DDR1
U37 VDDIO11_DDR1
AB1 VDDIO11_DDR2
AD1 VDDIO11_DDR2
AE1 VDDIO11_DDR2
AF9 VDDIO11_DDR2
AG8 VDDIO11_DDR2
AH9 VDDIO11_DDR2
AJ8 VDDIO11_DDR2
AK9 VDDIO11_DDR2
AL8 VDDIO11_DDR2
AM1 VDDIO11_DDR2
AP1 VDDIO11_DDR2
AT2 VDDIO11_DDR2
AB37 VDDIO11_DDR3
AD30 VDDIO11_DDR3
AD37 VDDIO11_DDR3
AE29 VDDIO11_DDR3
AE37 VDDIO11_DDR3
AF30 VDDIO11_DDR3
AG29 VDDIO11_DDR3
AH30 VDDIO11_DDR3
AJ29 VDDIO11_DDR3
AM37 VDDIO11_DDR3
AP37 VDDIO11_DDR3
AT36 VDDIO11_DDR3

VDDIO11_PLL_DDR G9
VDDIO11_PLL_DDR G29
VDDIO11_PLL_DDR AM9
VDDIO11_PLL_DDR AK30

R4460 5.1 1% 1/20W MF 0201
L4460 120-OHM-25%-0.48A-0.21DCR 0201

PP1V1_SLPDDR
8mA Max

C4460 0.22UF 20% 6.3V X6S-CERM 0201
C4461 0.22UF 20% 6.3V X6S-CERM 0201
C4462 0.22UF 20% 6.3V X6S-CERM 0201
C4463 0.22UF 20% 6.3V X6S-CERM 0201

PP1V1_SLPDDR_SOC_VDDIOPLLDDR_F
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V

VDDIO11_RET_DDR G4
VDDIO11_RET_DDR G34
VDDIO11_RET_DDR AM4
VDDIO11_RET_DDR AM34

C4470 2.2UF 20% 4V X6S-CERM 0201
C4471 2.2UF 20% 4V X6S-CERM 0201
C4472 2.2UF 20% 4V X6S-CERM 0201
C4473 2.2UF 20% 4V X6S-CERM 0201

PP1V1_SLPS2R
Current included in VDD2

PP0V9_SLPDDR
1.9A Max

C4400 9.1UF 20% 4V CERM 0402-THICKSTNCL
C4401 9.1UF 20% 4V CERM 0402-THICKSTNCL
C4402 9.1UF 20% 4V CERM 0402-THICKSTNCL
C4405 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4406 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4410 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4411 4.3UF 20% 4V CERM 0402-THICKSTNCL

U3900
H9M
BGA
SYM 12 OF 18
OMIT_TABLE
CRITICAL

AB19 VDD_FIXED
AB21 VDD_FIXED
AB23 VDD_FIXED
AB25 VDD_FIXED
AB27 VDD_FIXED
AD19 VDD_FIXED
AD21 VDD_FIXED
AD23 VDD_FIXED
AD25 VDD_FIXED
AE11 VDD_FIXED
AE13 VDD_FIXED
AE15 VDD_FIXED
AE17 VDD_FIXED
AE19 VDD_FIXED
AE21 VDD_FIXED
AE23 VDD_FIXED
AE25 VDD_FIXED
AE27 VDD_FIXED
AH11 VDD_FIXED
AH13 VDD_FIXED
AH15 VDD_FIXED
AH17 VDD_FIXED
AH19 VDD_FIXED
AH21 VDD_FIXED
AH23 VDD_FIXED
AH25 VDD_FIXED
AH27 VDD_FIXED
AK11 VDD_FIXED
K11 VDD_FIXED
K13 VDD_FIXED
K15 VDD_FIXED
K17 VDD_FIXED

VDD_FIXED K19
VDD_FIXED K21
VDD_FIXED K23
VDD_FIXED K25
VDD_FIXED K27
VDD_FIXED M11
VDD_FIXED M13
VDD_FIXED M15
VDD_FIXED M17
VDD_FIXED M19
VDD_FIXED M21
VDD_FIXED M23
VDD_FIXED M25
VDD_FIXED M27
VDD_FIXED P19
VDD_FIXED P21
VDD_FIXED P23
VDD_FIXED P25
VDD_FIXED P27
VDD_FIXED T19
VDD_FIXED T21
VDD_FIXED T23
VDD_FIXED T25
VDD_FIXED T27
VDD_FIXED V19
VDD_FIXED V21
VDD_FIXED V23
VDD_FIXED V25
VDD_FIXED V27
VDD_FIXED Y19
VDD_FIXED Y21
VDD_FIXED Y23
VDD_FIXED Y25
VDD_FIXED Y27

9mA Max
PP0V9_SLPDDR → W18 VDD_FIXED_CPU
PP0V9_SLPDDR → G22 VDD_FIXED_USB
5mA Max

PP0V9_SLPDDR
25mA Max

C4420 4.3UF 20% 4V CERM 0402-THICKSTNCL

H23 VDD_FIXED_MIPI
H25 VDD_FIXED_MIPI
H27 VDD_FIXED_MIPI

AB9 VDD_LOW
AD9 VDD_LOW
P9 VDD_LOW
T9 VDD_LOW
V9 VDD_LOW
Y9 VDD_LOW

PP0V8_SLPS2R
102mA Max

C4423 2.2UF 20% 4V X6S-CERM 0201

H11 VDD_FIXED_UP_PCIE_ANA
H13 VDD_FIXED_UP_PCIE_ANA
H15 VDD_FIXED_UP_PCIE_ANA
J15 VDD_FIXED_UP_PCIE_CLK
J11 VDD_FIXED_UP_PCIE_CLK
J13 VDD_FIXED_UP_PCIE_CLK

PP0V9_SLPDDR
330mA Max

C4425 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4426 4.3UF 20% 4V CERM 0402-THICKSTNCL

VDD_FIXED_STG0_PCIE_ANA AL14
VDD_FIXED_STG0_PCIE_ANA AL16
VDD_FIXED_STG0_PCIE_ANA AL12
VDD_FIXED_STG0_PCIE_CLK AK13
VDD_FIXED_STG0_PCIE_CLK AK15
VDD_FIXED_STG0_PCIE_CLK AK17
VDD_FIXED_STG1_PCIE_ANA AL18
VDD_FIXED_STG1_PCIE_ANA AL20
VDD_FIXED_STG1_PCIE_ANA AL22
VDD_FIXED_STG1_PCIE_CLK AK19
VDD_FIXED_STG1_PCIE_CLK AK21
VDD_FIXED_STG1_PCIE_CLK AL17
VDD_FIXED_DN_PCIE_ANA AL26
VDD_FIXED_DN_PCIE_ANA AL28
VDD_FIXED_DN_PCIE_ANA AL30
VDD_FIXED_DN_PCIE_CLK AK25
VDD_FIXED_DN_PCIE_CLK AK27
VDD_FIXED_DN_PCIE_CLK AK29
VDD_FIXED_PCIE_REFBUF AK23
VDD_FIXED_PCIE_REFBUF AJ15
VDD_FIXED_PCIE_REFBUF AL24
VDD_FIXED_PCIE_REFBUF AJ21
VDD_FIXED_PCIE_REFBUF AJ27

PP0V9_SLPDDR
330mA Max

C4430 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4431 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4435 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4436 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4440 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4441 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4445 4.3UF 20% 4V CERM 0402-THICKSTNCL

PP0V9_SLPDDR_SOC_PCIEREFBUF
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0.9V

R4445 0 5% 1/20W MF 0201

PP0V9_SLPDDR
45mA Max

BOM_COST_GROUP=SOC

SYNC_MASTER=H9M and PMIC
SYNC_DATE=03/02/2017

PAGE TITLE
SoC Power 2

Apple Inc.

DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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Current estimates @ 105C & 2GB from Gibraltar Power Specification Rev 0.5.3

OMIT_TABLE
CRITICAL

U3900
H9M
BGA
SYM 14 OF 18

PP1V8_SLPS2R
134mA Max

C4500 2.2UF 20% 4V X6S-CERM 0201
C4501 2.2UF 20% 4V X6S-CERM 0201
C4502 2.2UF 20% 4V X6S-CERM 0201
C4503 2.2UF 20% 4V X6S-CERM 0201

A4 VDD1
AV34 VDD1
AV4 VDD1
B35 VDD1
W1 VDD1
W37 VDD1
Y1 VDD1
Y37 VDD1

PP1V8_SLPS2R
20mA Max

C4510 2.2UF 20% 4V X6S-CERM 0201
C4511 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4512 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4513 0.1UF 10% 6.3V X6S 0201

AA9 VDDIO18_AOP1
P8 VDDIO18_AOP1
R9 VDDIO18_AOP1
T8 VDDIO18_AOP1
U9 VDDIO18_AOP1
W9 VDDIO18_AOP1
AC9 VDDIO18_AOP2
AD8 VDDIO18_AOP2
AE9 VDDIO18_AOP2

PP1V8_SLPS2R
1mA Max

R4546 49.9 1% 1/20W MF 201

MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
VOLTAGE=1.8V

PP1V8_SLPS2R_SOC_LPADC_RC

AB8 VDD18_LPADC

PP1V8_SLPS2R
1mA Max

R4519 49.9 1% 1/20W MF 201

PP1V8_SLPS2R_SOC_LPOSC_RC
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

AB10 VDD18_LPOSC

C4519 2.2UF 20% 4V X6S-CERM 0201
C4515 20UF 20% 2.5V X6S-CERM 0402

AA29 VDDIO18_GRP1
AB30 VDDIO18_GRP1
AC29 VDDIO18_GRP1
P30 VDDIO18_GRP1
R29 VDDIO18_GRP1
T30 VDDIO18_GRP1
U29 VDDIO18_GRP1
V30 VDDIO18_GRP1
W29 VDDIO18_GRP1
Y30 VDDIO18_GRP1

PP1V8_AWAKE
40mA Max

C4521 2.2UF 20% 4V X6S-CERM 0201
C4522 2.2UF 20% 4V X6S-CERM 0201
C4523 2.2UF 20% 4V X6S-CERM 0201
C4524 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4525 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4526 4.3UF 20% 4V CERM 0402-THICKSTNCL
C4527 4.3UF 20% 4V CERM 0402-THICKSTNCL

G16 VDDIO18_GRP2
G18 VDDIO18_GRP2
G20 VDDIO18_GRP2
H17 VDDIO18_GRP2
H19 VDDIO18_GRP2
H21 VDDIO18_GRP2

AK31 VDDIO18_GRP3
AM31 VDDIO18_GRP3

AL11 VDDIO18_GRP4
AM10 VDDIO18_GRP4

PP1V8_AWAKE
2mA Max

R4530 0 5% 1/20W MF 0201

MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000
VOLTAGE=1.8V

PP1V8_AWAKE_SOC_TSADC_RC

C4530 1UF 20% 16V CER-XSR 0201

AA18 VDD18_TSADC
P16 VDD18_TSADC
AD16 VDD18_TSADC
AF18 VDD18_TSADC
H28 VDD18_TSADC

PP1V8_AWAKE
7mA Max

C4535 2.2UF 20% 4V X6S-CERM 0201
C4536 0.1UF 10% 6.3V X6S 0201

G23 VDD18_MIPI
G25 VDD18_MIPI
G27 VDD18_MIPI

PP1V8_AWAKE
20mA Max

C4540 0.1UF 10% 6.3V X6S 0201

H22 VDD18_USB

PP1V8_AWAKE_SOC_FMON_RC
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000

AF12 VDD18_FMON

AM30 VDD18_EFUSE1
AK12 VDD18_EFUSE2

PP1V8_AWAKE
1mA Max

R4545 49.9 1% 1/20W MF 201

C4545 1UF 20% 16V CER-XSR 0201

VDD12_CPU_UVD Y18
PP1V2_AWAKE
10mA Max

C4550 2.2UF 20% 4V X6S-CERM 0201

VOLTAGE=1.2V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

R4555 0 5% 1/20W MF 0201
PP1V2_AWAKE
13mA Max

C4555 0.1UF 10% 6.3V X6S 0201

VDD12_PLL_CPU V18
PP1V2_AWAKE_SOC_PLLCPU_F

R4560 0 5% 1/20W MF 0201
PP1V2_AWAKE
80mA Max

VDD12_PCIE_REFBUF AK24
VDD12_PCIE_REFBUF AM23
PP1V2_AWAKE_SOC_PCIEREFBUF_F

VOLTAGE=1.2V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

C4560 0.1UF 10% 6.3V X6S 0201
C4561 0.1UF 10% 6.3V X6S 0201
C4562 2.2UF 20% 4V X6S-CERM 0201

VDD12_DN_PCIE AM29
VDD12_UP_PCIE G14
VDD12_STG0_PCIE AM13
VDD12_STG1_PCIE AM18
PP1V2_AWAKE_SOC_PCIEPLL_F

VOLTAGE=1.2V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

R4565 0 5% 1/20W MF 0201
PP1V2_AWAKE
60mA Max

C4565 2.2UF 20% 4V X6S-CERM 0201
C4566 2.2UF 20% 4V X6S-CERM 0201
C4567 2.2UF 20% 4V X6S-CERM 0201
C4568 2.2UF 20% 4V X6S-CERM 0201

R4570 0 5% 1/20W MF 0201
PP1V2_AWAKE
31mA Max

VDD12_PLL_SOC AC23
VDD12_PLL_SOC AD24
VDD12_PLL_SOC AE23
PP1V2_AWAKE_SOC_PLLSOC_F

VOLTAGE=1.2V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

C4570 0.1UF 10% 6.3V X6S 0201
C4571 0.1UF 10% 6.3V X6S 0201
C4572 2.2UF 20% 4V X6S-CERM 0201

VDD2 AG1
VDD2 AG37
VDD2 AJ1
VDD2 AJ37
VDD2 AK1
VDD2 AK37
VDD2 AU3
VDD2 AU34
VDD2 AU35
VDD2 AU4
VDD2 B3
VDD2 B4
VDD2 C34
VDD2 D34
VDD2 J1
VDD2 J37
VDD2 K1
VDD2 K37
VDD2 M1
VDD2 M37
VDD2 W3
VDD2 W35
VDD2 Y3
VDD2 Y35

PP1V1_SLPS2R
1.74A Max

C4580 2.2UF 20% 4V X6S-CERM 0201
C4581 2.2UF 20% 4V X6S-CERM 0201
C4582 2.2UF 20% 4V X6S-CERM 0201
C4583 2.2UF 20% 4V X6S-CERM 0201

R4590 5.1 1% 1/20W MF 0201

L4590 240-OHM-25%-0.42A-0.31DCR_PP1V1_SLPDDR 0201

VDD11_XTAL AN23
PP1V1_SLPDDR_SOC_XTAL_F
VOLTAGE=1.1V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

4mA Max

C4590 0.1UF 10% 6.3V X6S 0201
C4591 2.2UF 20% 4V X6S-CERM 0201

VDD33_USB F21
PP3V3_AWAKE
12mA Max

C4595 0.1UF 10% 6.3V X6S 0201

BOM_COST_GROUP=SOC

SYNC_MASTER=SILU SYNC_DATE=05/26/2017

PAGE TITLE
SoC Power 3

Apple Inc.

DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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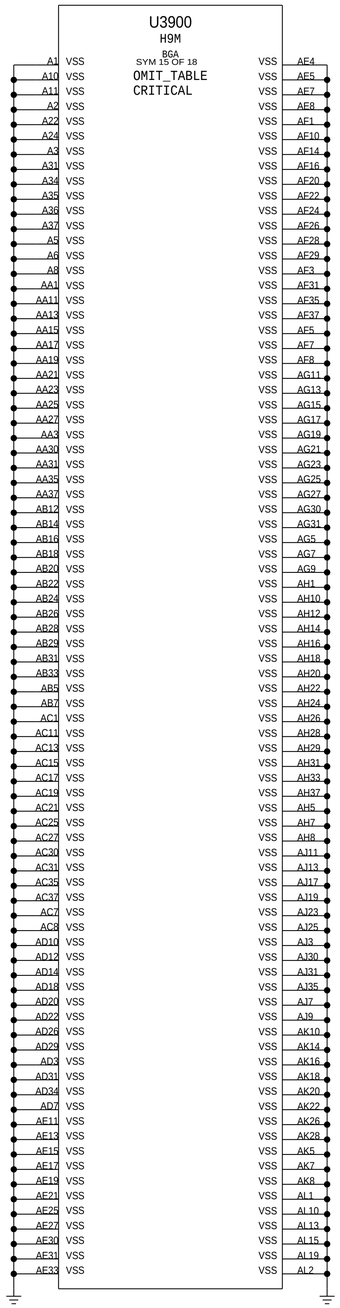

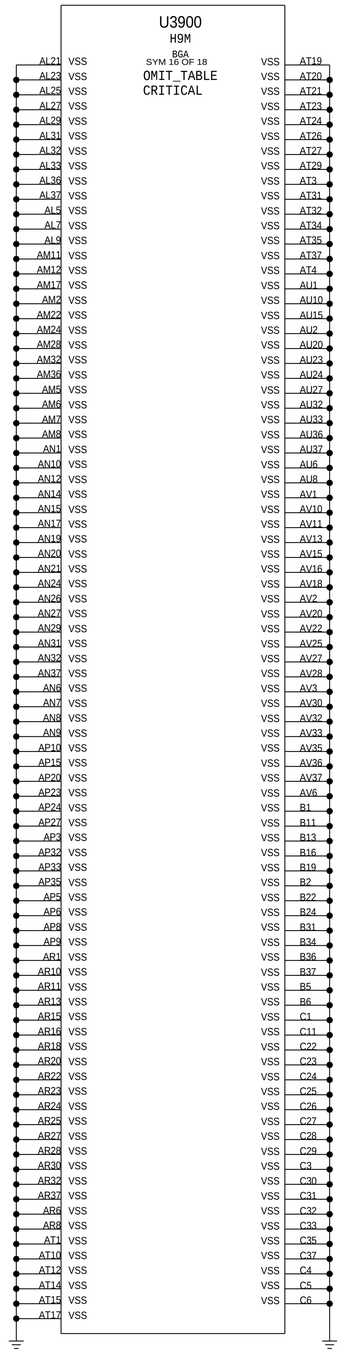

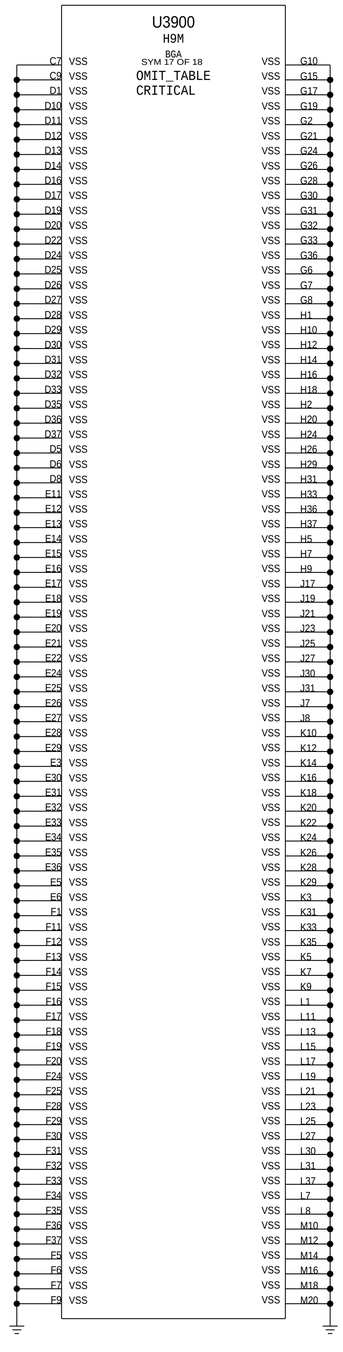

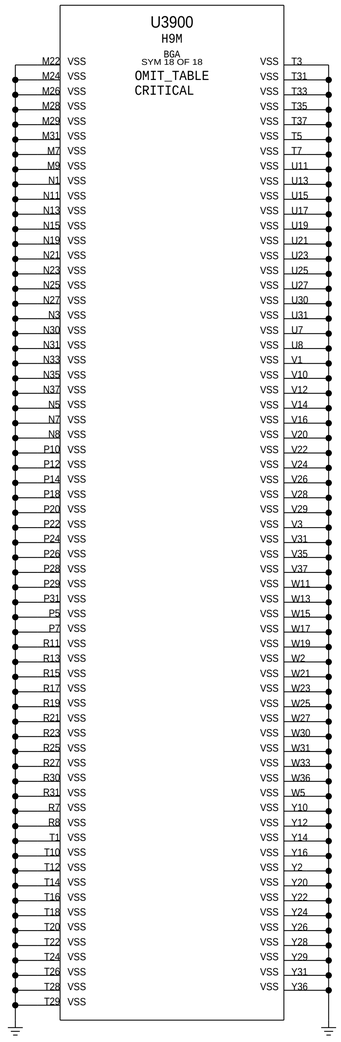

SYNC_MASTER=H9M and PMIC SYNC_DATE=03/02/2017

PAGE TITLE

SoC Ground

Apple Inc.

DRAWING NUMBER 051-02643 SIZE D

REVISION 4.0.0

BRANCH evt-0

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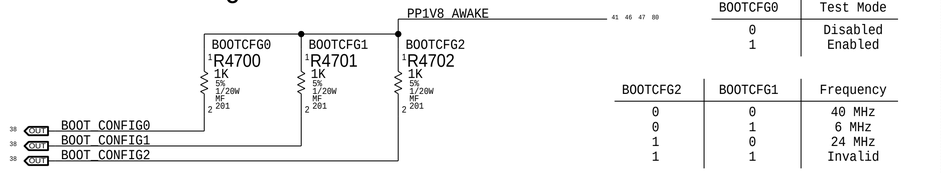
BOM_COST_GROUP=SOC

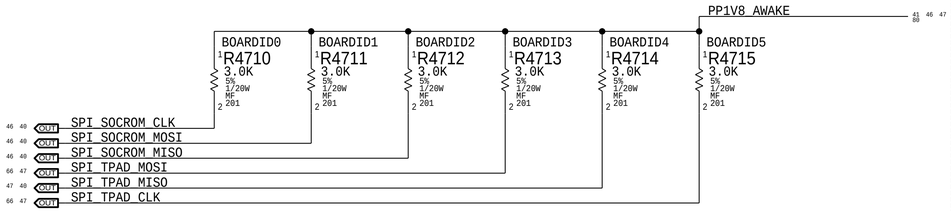
Boot Config



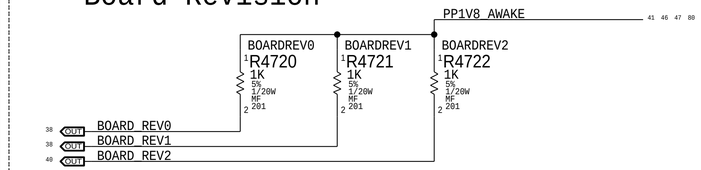
BOOTCFG0	Test Mode
0	Disabled
1	Enabled

BOOTCFG2	BOOTCFG1	Frequency
0	0	40 MHz
0	1	6 MHz
1	0	24 MHz
1	1	Invalid

Board ID

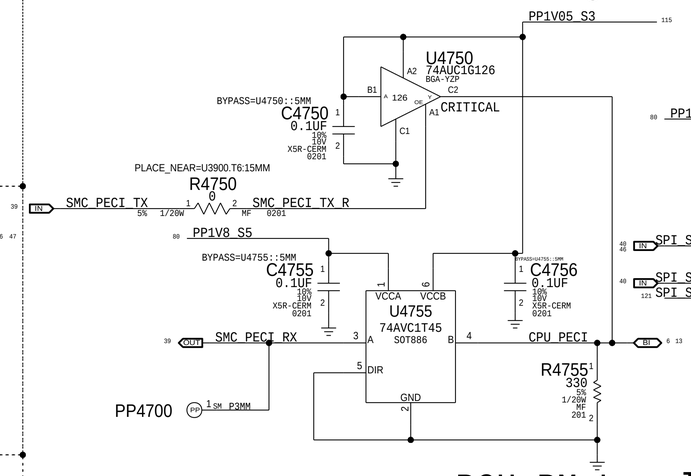


Board Revision

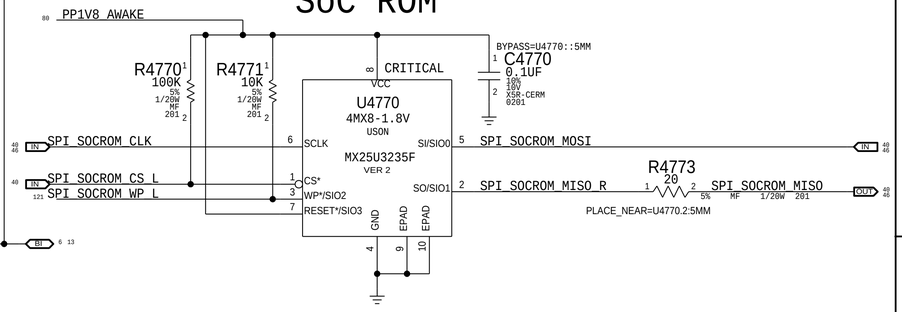


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
343S00234	1	IC,SLG4AP41484,THERMTRIP,STQFN14	U4740	CRITICAL	

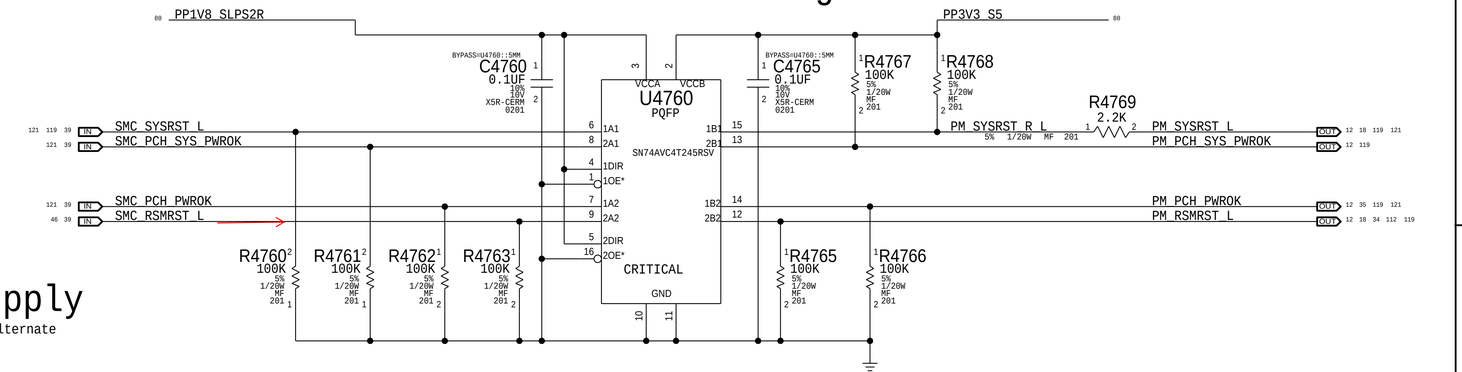
PECI Level Shifting



SoC ROM

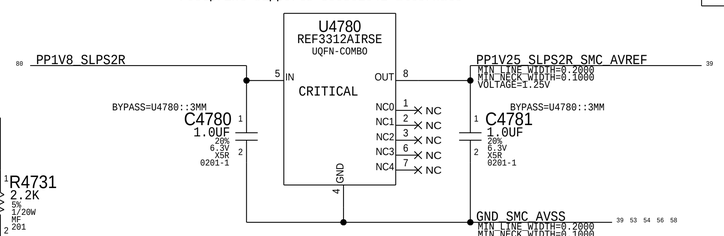


PCH PM Level Shifting



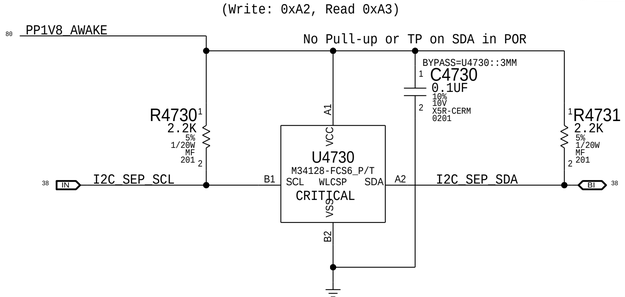
SMC AVREF Supply

Footprint supports 353S01042 alternate

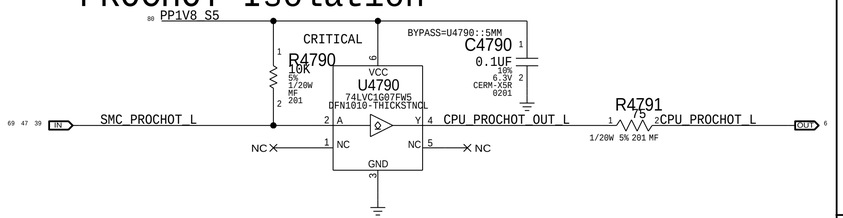


SEP EEPROM

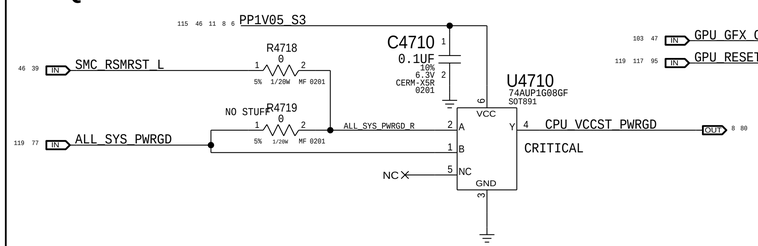
(Write: 0xA2, Read 0xA3)



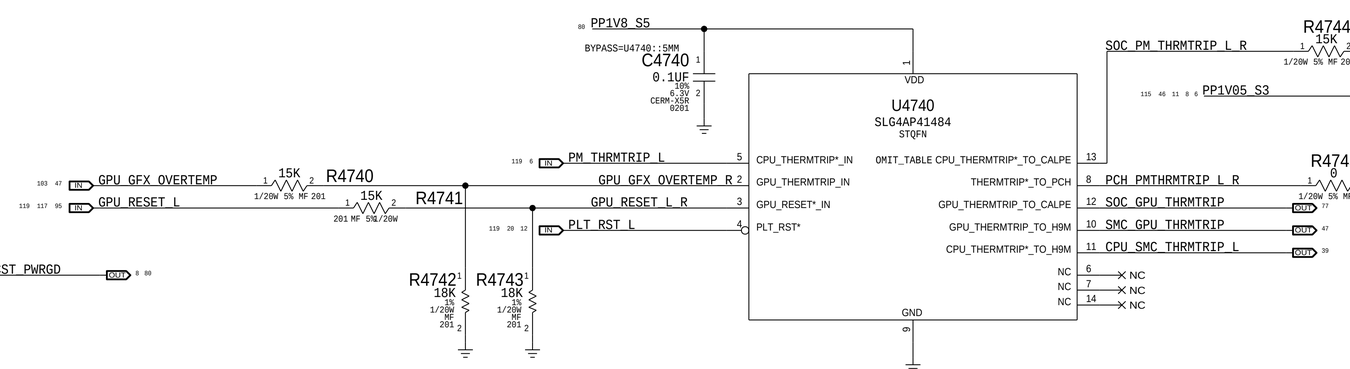
PROCHOT Isolation



Qualifier with RSMRST#



THRMTRIP# Isolation



BOM_COST_GROUP=SOC

SYNC_MASTER=S1LU SYNC_DATE=08/09/2017

PAGE TITLE

SoC Shared Support

Apple Inc.

DRAWING NUMBER 051-02643 SIZE D

REVISION 4.0.0

BRANCH evt-0

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PCIe Up R2D AC Caps

(All Caps)

118 14	IN	PCIE_SOC_R2D_C_P<0>	C4820	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_P<0>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_N<0>	C4821	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_N<0>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_P<1>	C4822	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_P<1>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_N<1>	C4823	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_N<1>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_P<2>	C4824	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_P<2>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_N<2>	C4825	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_N<2>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_P<3>	C4826	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_P<3>	OUT	41 118
118 14	IN	PCIE_SOC_R2D_C_N<3>	C4827	0.22UF	20%	6.3V	X5R	0201	PCIE_SOC_R2D_N<3>	OUT	41 118

GPIO Source Termination

40	IN	I2S_SPKRAMP_L_R2D_R	R4843	20	5% 1/20W MF 201	I2S_SPKRAMP_L_R2D	OUT	62	PLACE_NEAR=U3900.AG34:5MM
40	IN	I2S_SPKRAMP_L_BCLK_R	R4844	20	5% 1/20W MF 201	I2S_SPKRAMP_L_BCLK	OUT	62	PLACE_NEAR=U3900.AA32:5MM
62	IN	I2S_SPKRAMP_L_LRCLK_R	R4863	20	5% 1/20W MF 201	I2S_SPKRAMP_L_LRCLK	OUT	40	PLACE_NEAR=U3900.AA32:10MM
40	IN	I2S_SPKRAMP_R_R2D_R	R4845	20	5% 1/20W MF 201	I2S_SPKRAMP_R_R2D	OUT	63	PLACE_NEAR=U3900.C20:5MM
40	IN	I2S_SPKRAMP_R_BCLK_R	R4846	20	5% 1/20W MF 201	I2S_SPKRAMP_R_BCLK	OUT	63	PLACE_NEAR=U3900.C21:5MM
63	IN	I2S_SPKRAMP_R_LRCLK_R	R4864	20	5% 1/20W MF 201	I2S_SPKRAMP_R_LRCLK	OUT	40	PLACE_NEAR=U3900.C21:10MM
40	IN	I2S_CODEC_R2D_R	R4847	20	5% 1/20W MF 201	I2S_CODEC_R2D	OUT	61	PLACE_NEAR=U3900.AB34:5MM
40	IN	I2S_CODEC_BCLK_R	R4848	20	5% 1/20W MF 201	I2S_CODEC_BCLK	OUT	61	PLACE_NEAR=U3900.AF33:5MM
61	IN	I2S_CODEC_LRCLK_R	R4865	20	5% 1/20W MF 201	I2S_CODEC_LRCLK	OUT	40	PLACE_NEAR=U3900.AF33:10MM
40	IN	SPI_TPAD_MOSI_R	R4851	20	5% 1/20W MF 201	SPI_TPAD_MOSI	OUT	46 66	PLACE_NEAR=U3900.N34:5MM
40	IN	SPI_TPAD_CLK_R	R4852	20	5% 1/20W MF 201	SPI_TPAD_CLK	OUT	46 66	PLACE_NEAR=U3900.P35:5MM
40	IN	SPI_MESA_MOSI_R	R4853	20	5% 1/20W MF 201	SPI_MESA_MOSI	OUT	48	PLACE_NEAR=U3900.A20:5MM
40	IN	SPI_MESA_CLK_R	R4854	20	5% 1/20W MF 201	SPI_MESA_CLK	OUT	48	PLACE_NEAR=U3900.C19:5MM
120 50	OUT	SPI_DFR_MISO_R	R4866	20	5% 1/20W MF 201	SPI_DFR_MISO	IN	40	PLACE_NEAR=J6100.7:5MM
40	IN	SPI_DFR_MOSI_R	R4855	20	5% 1/20W MF 201	SPI_DFR_MOSI	OUT	50 120	PLACE_NEAR=U3900.C18:5MM
40	IN	SPI_DFR_CLK_R	R4856	20	5% 1/20W MF 201	SPI_DFR_CLK	OUT	50 120	PLACE_NEAR=U3900.B18:5MM
41	IN	SSD0_CLK24M_R	R4857	20	5% 1/20W MF 201	SSD0_CLK24M	OUT	47 83 85	PLACE_NEAR=U3900.AP7:5MM
41	IN	SSD1_CLK24M_R	R4858	20	5% 1/20W MF 201	SSD1_CLK24M	OUT	47 88 90	PLACE_NEAR=U3900.AV7:5MM
39	IN	PDM_DMIC_CLK0_R	R4859	20	5% 1/20W MF 201	PDM_DMIC_CLK0	OUT	64	PLACE_NEAR=U3900.P6:15MM
39	IN	PDM_DMIC_CLK1_R	R4860	20	5% 1/20W MF 201	PDM_DMIC_CLK1	OUT	64	PLACE_NEAR=U3900.K2:15MM
39	IN	SPI_AOP_SENSOR_MOSI_R	R4861	20	5% 1/20W MF 201	SPI_AOP_SENSOR_MOSI	OUT	37	PLACE_NEAR=U3900.D2:10MM
39	IN	SPI_AOP_SENSOR_CLK_R	R4862	20	5% 1/20W MF 201	SPI_AOP_SENSOR_CLK	OUT	37	PLACE_NEAR=U3900.F2:15MM
37	OUT	SPI_AOP_SENSOR_MISO_R	R4869	20	5% 1/20W MF 201	SPI_AOP_SENSOR_MISO	IN	39	PLACE_NEAR=U3900.E2:15MM
46 40	OUT	SPI_TPAD_MISO	R4809	20	5% 1/20W MF 201	SPI_TPAD_MISO_R	IN	66	PLACE_NEAR=U3900.P36:20MM

S4E_X4PLUS

Lifeboat

41	PCIE_LIFEBOAT_R2D_C_P	PCIE_LIFEBOAT_R2D_C_P	TP4800
41	PCIE_LIFEBOAT_R2D_C_N	PCIE_LIFEBOAT_R2D_C_N	TP4801
41	PCIE_LIFEBOAT_D2R_P	PCIE_LIFEBOAT_D2R_P	TP4802
41	PCIE_LIFEBOAT_D2R_N	PCIE_LIFEBOAT_D2R_N	TP4803
41	PCIE_CLK100M_LIFEBOAT_P	PCIE_CLK100M_LIFEBOAT_P	TP4804
41	PCIE_CLK100M_LIFEBOAT_N	PCIE_CLK100M_LIFEBOAT_N	TP4805
41	PCIE_LIFEBOAT_CLKREQ_L	PCIE_LIFEBOAT_CLKREQ_L	TP4806
41	PCIE_LIFEBOAT_RESET_L	PCIE_LIFEBOAT_RESET_L	TP4807

MAKE_BASE

TP-P5

SMC_FIXTURE_MODE_L

119 39 SMC_FIXTURE_MODE_L — MAKE_BASE — SMC_FIXTURE_MODE_L

R4801 100K 5% 1/20W MF 201 — FIXMODE_NO

PP1V8_SLPS2R / PP1V8_AWAKE

R4883	47K	5%	1/20W	MF	201	SSD0_CLKREQ0_L	41 83
R4884	47K	5%	1/20W	MF	201	SSD0_CLKREQ1_L	41 84
R4887	47K	5%	1/20W	MF	201	SSD0_CLKREQ2_L	41 85 121
R4888	47K	5%	1/20W	MF	201	SSD0_CLKREQ3_L	41 86 121
R4889	47K	5%	1/20W	MF	201	SSD1_CLKREQ0_L	41 88
R4890	47K	5%	1/20W	MF	201	SSD1_CLKREQ1_L	41 89
R4891	47K	5%	1/20W	MF	201	SSD1_CLKREQ2_L	41 90
R4892	47K	5%	1/20W	MF	201	SSD1_CLKREQ3_L	41 91
R4895	100K	5%	1/20W	MF	201	SSD_PMU_RESET_L	38 87 92 119
R4885	100K	5%	1/20W	MF	201	SSD0_PCIE_RESET_L	41 83 84 85 86
R4886	47K	5%	1/20W	MF	201	SSD0_CLK24M	47 83 85
R4893	100K	5%	1/20W	MF	201	SSD1_PCIE_RESET_L	41 88 89 90 91
R4894	47K	5%	1/20W	MF	201	SSD1_CLK24M	47 88 90
R4870	0	5%	1/20W	MF	0201	I2S_SPKRAMP_R_D2R	40

S4E_X4PLUS

BOM GROUP	BOM OPTIONS
BOARD_REV:111	BOARDREV2,BOARDREV1,BOARDREV0
BOARD_REV:110	BOARDREV2,BOARDREV1
BOARD_REV:101	BOARDREV2,BOARDREV0
BOARD_REV:100	BOARDREV2
BOARD_REV:011	BOARDREV1,BOARDREV0
BOARD_REV:010	BOARDREV1
BOARD_REV:001	BOARDREV0
BOARD_REV:000	

Proto 0 / Proto 1 / Proto 2 / Pre-EVT / EVT / DVT / PVT

BOM_COST_GROUP=SOC

Lid Detect Sensors

Clamshell Open = High
Clamshell Closed = Low

80 47 PP1V8_SLPS2R

OMIT_TABLE
J4800
AMR-MLB-X502
SM

AMR_PU R4807 330K 5% 1/20W MF 201

SMC_LID_LEFT — R4804 10K 5% 1/20W MF 201 — LID_OPEN_LEFT — OUT 39
LID_OPEN_LEFT — MAKE_BASE — 64 120

OMIT_TABLE
J4801
AMR-MLB-X502
SM

AMR_PU R4808 330K 5% 1/20W MF 201

SMC_LID_RIGHT — R4805 10K 5% 1/20W MF 201 — LID_OPEN_RIGHT — OUT 39
LID_OPEN_RIGHT — MAKE_BASE — 64 120

PP1V8_SLPS2R
BYPASS=U4802::5MM
C4802 0.1UF 10% 6.3V CERM-X5R 0201

U4802 74LVC1G32 SOT891
IPD_LID_OPEN — OUT 50 65 120
NC

No Connects

39	NC_SPI_ALTIMETER_CS_L	MAKE_BASE=TRUE NO_TEST=1	NC_SPI_ALTIMETER_CS_L
39	NC_ALTIMETER_INT	MAKE_BASE=TRUE NO_TEST=1	NC_ALTIMETER_INT
77	NC_PMU_CLK32K_GNSS_R	MAKE_BASE=TRUE NO_TEST=1	NC_PMU_CLK32K_GNSS_R
40	NC_UART_GNSS_D2R_CTS_L	MAKE_BASE=TRUE NO_TEST=1	NC_UART_GNSS_D2R_CTS_L
40	NC_UART_GNSS_R2D_RTS_L	MAKE_BASE=TRUE NO_TEST=1	NC_UART_GNSS_R2D_RTS_L
38	NC_GNSS_HOST_TIME	MAKE_BASE=TRUE NO_TEST=1	NC_GNSS_HOST_TIME
39	NC_GNSS_HOST_WAKE	MAKE_BASE=TRUE NO_TEST=1	NC_GNSS_HOST_WAKE
38	NC_GNSS_DEV_WAKE	MAKE_BASE=TRUE NO_TEST=1	NC_GNSS_DEV_WAKE
39	NC_ENET_MEDIA_SENSE	MAKE_BASE=TRUE NO_TEST=1	NC_ENET_MEDIA_SENSE
39	NC_ENET_LOW_PWR	MAKE_BASE=TRUE NO_TEST=1	NC_ENET_LOW_PWR
40	NC_I2S_HAWKING_D2R	MAKE_BASE=TRUE NO_TEST=1	NC_I2S_HAWKING_D2R
40	NC_I2S_HAWKING_LRCLK	MAKE_BASE=TRUE NO_TEST=1	NC_I2S_HAWKING_LRCLK
40	NC_I2S_HAWKING_BCLK	MAKE_BASE=TRUE NO_TEST=1	NC_I2S_HAWKING_BCLK
40	NC_I2S_CODEC1_R2D_R	MAKE_BASE=TRUE NO_TEST=1	NC_I2S_CODEC1_R2D_R
40	NC_PLCAM_RX_CLK12M_R	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_RX_CLK12M_R
40	NC_PLCAM_RX_RESET_L	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_RX_RESET_L
40	NC_PLCAM_TX_CLK12M_R	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_TX_CLK12M_R
40	NC_PLCAM_TX_RESET_L	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_TX_RESET_L
40	NC_PLCAM_TX_INT	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_TX_INT
38	NC_PLCAM_TX_THROTTLE	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_TX_THROTTLE
39	NC_PLCAM_PROX_INT_L	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_PROX_INT_L
39	NC_PLCAM_ROMEO_B2B_DETECT	MAKE_BASE=TRUE NO_TEST=1	NC_PLCAM_ROMEO_B2B_DETECT
40	NC_PCHROM_SW_EN	MAKE_BASE=TRUE NO_TEST=1	NC_PCHROM_SW_EN
39	NC_SDCONN_STATE_CHANGE_L	MAKE_BASE=TRUE NO_TEST=1	NC_SDCONN_STATE_CHANGE_L
40	NC_FTCAM_RESET_L	MAKE_BASE=TRUE NO_TEST=1	NC_FTCAM_RESET_L
40	NC_FTCAM_CLK12M_R	MAKE_BASE=TRUE NO_TEST=1	NC_FTCAM_CLK12M_R
40	NC_I2S_CODEC_MCLK	MAKE_BASE=TRUE NO_TEST=1	NC_I2S_CODEC_MCLK
40	NC_I2S_CODEC1_MCLK	MAKE_BASE=TRUE NO_TEST=1	NC_I2S_CODEC1_MCLK
39	NC_SPI_DSCRPTR_OVERRIDE_L	MAKE_BASE=TRUE NO_TEST=1	NC_SPI_DSCRPTR_OVERRIDE_L
39	NC_I2C_AOP_SCL	MAKE_BASE=TRUE NO_TEST=1	NC_I2C_AOP_SCL
39	NC_I2C_AOP_SDA	MAKE_BASE=TRUE NO_TEST=1	NC_I2C_AOP_SDA
38	NC_SOC_USB_ID	MAKE_BASE=TRUE NO_TEST=1	NC_SOC_USB_ID
38	NC_SOC_TST_CLKOUT	MAKE_BASE=TRUE NO_TEST=1	NC_SOC_TST_CLKOUT
38	NC_SOC_AMUXOUT	MAKE_BASE=TRUE NO_TEST=1	NC_SOC_AMUXOUT

40	NC_SPKR_ID1	MAKE_BASE=TRUE NO_TEST=1	NC_SPKR_ID1
39	NC_SMC_LED_ONEWIRE	MAKE_BASE=TRUE NO_TEST=1	NC_SMC_LED_ONEWIRE
39	NC_PCIEDN_WAKE_L	MAKE_BASE=TRUE NO_TEST=1	NC_PCIEDN_WAKE_L
39	NC_MESA_MENUKEY_L	MAKE_BASE=TRUE NO_TEST=1	NC_MESA_MENUKEY_L
39	NC_TPAD_VIBE_L	MAKE_BASE=TRUE NO_TEST=1	NC_TPAD_VIBE_L
41	NC_ENET_RESET_L	MAKE_BASE=TRUE NO_TEST=1	NC_ENET_RESET_L
38	NC_WLAN_DEV_WAKE	MAKE_BASE=TRUE NO_TEST=1	NC_WLAN_DEV_WAKE
42	NC_SOC_VSSCPU_SENSE	MAKE_BASE=TRUE NO_TEST=1	NC_SOC_VSSCPU_SENSE
42	NC_SOC_VSSSOC_SENSE	MAKE_BASE=TRUE NO_TEST=1	NC_SOC_VSSSOC_SENSE
40	NC_DFR_TOUCH_RSVD	MAKE_BASE=TRUE NO_TEST=1	NC_DFR_TOUCH_RSVD
41	NC_PCIE_DN3_R2D_CP	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_DN3_R2D_CP
41	NC_PCIE_DN3_R2D_CN	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_DN3_R2D_CN
41	NC_PCIE_DN3_D2RP	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_DN3_D2RP
41	NC_PCIE_DN3_D2RN	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_DN3_D2RN
41	NC_PCIE_CLK100M_DN3P	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_CLK100M_DN3P
41	NC_PCIE_CLK100M_DN3N	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_CLK100M_DN3N
41	NC_PCIEDN3_CLKREQ_L	MAKE_BASE=TRUE NO_TEST=1	NC_PCIEDN3_CLKREQ_L
41	NC_PCIEDN3_RESET_L	MAKE_BASE=TRUE NO_TEST=1	NC_PCIEDN3_RESET_L
41	NC_PCIE_WLAN_R2D_C_P	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_WLAN_R2D_C_P
41	NC_PCIE_WLAN_R2D_C_N	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_WLAN_R2D_C_N
41	NC_PCIE_WLAN_D2R_P	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_WLAN_D2R_P
41	NC_PCIE_WLAN_D2R_N	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_WLAN_D2R_N
41	NC_WLAN_CLKREQ_L	MAKE_BASE=TRUE NO_TEST=1	NC_WLAN_CLKREQ_L
41	NC_WLAN_PERST_L	MAKE_BASE=TRUE NO_TEST=1	NC_WLAN_PERST_L
41	NC_PCIE_ENET_R2D_C_P	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_ENET_R2D_C_P
41	NC_PCIE_ENET_R2D_C_N	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_ENET_R2D_C_N
41	NC_PCIE_ENET_D2R_P	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_ENET_D2R_P
41	NC_PCIE_ENET_D2R_N	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_ENET_D2R_N
41	NC_PCIE_CLK100M_ENET_P	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_CLK100M_ENET_P
41	NC_PCIE_CLK100M_ENET_N	MAKE_BASE=TRUE NO_TEST=1	NC_PCIE_CLK100M_ENET_N
41	NC_PCIE_CLK100M_WLAN_P	MAKE_BASE NO_TEST=1	NC_PCIE_CLK100M_WLAN_P
41	NC_PCIE_CLK100M_WLAN_N	MAKE_BASE NO_TEST=1	NC_PCIE_CLK100M_WLAN_N

Signal Aliases

39	TPAD_KBD_WAKE_L	MAKE_BASE	TPAD_KBD_WAKE_L — 65 66 120
39	TPAD_SPI_INT_L	MAKE_BASE	TPAD_SPI_INT_L — 66
39	TPAD_ACTUATOR_DISABLE_L	MAKE_BASE	TPAD_ACTUATOR_DISABLE_L — 66
	GPU_GFX_OVERTEMP	MAKE_BASE	GPU_GFX_OVERTEMP — 46 103
126 119 39	SMC_DEBUGPRT_RX	MAKE_BASE	SMC_DEBUGPRT_RX — 107 108
126 119 39	SMC_DEBUGPRT_TX	MAKE_BASE	SMC_DEBUGPRT_TX — 107 108
39	SMC_GPU_THRMTRIP	MAKE_BASE	SMC_GPU_THRMTRIP — 46
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	
40	GND	MAKE_BASE	

Power Rails

42	SOC_VDDSOC_SENSE	P3MM_SM	PP4800
77 42	SOC_VDDCPU_SENSE	P3MM_SM	PP4801
87 86 85 84 83	SSD0_OCARINA_WP_L	P5MM-SP_SM-SP	PP4802
92 91 90 89 88	SSD1_OCARINA_WP_L	P5MM-SP_SM-SP	PP4803
69 46 39	SMC_PROCHOT_L	P3MM_SM	PP4808

SWD

126 39 OUT SWD_SOC_SWCLK — MAKE_BASE=TRUE — SWD_SOC_SWCLK — IN 29
126 39 BI SWD_SOC_SWDIO — MAKE_BASE=TRUE — SWD_SOC_SWDIO — BI 29

INT PU SOC 50k

77 68	CHGR_INT_L	PLACE_SIDE=BOTTOM SM P2MM	PP4809
82 40	MIPI_FTCAM_DATA_P<0>	PLACE_NEAR=U3900.B27:10MM SM P2MM	PP4804
82 40	MIPI_FTCAM_DATA_N<0>	PLACE_NEAR=U3900.A26:10MM SM P2MM	PP4805
82 40	MIPI_FTCAM_CLK_P	PLACE_NEAR=U3900.B26:10MM SM P2MM	PP4806
82 40	MIPI_FTCAM_CLK_N	PLACE_NEAR=U3900.A26:10MM SM P2MM	PP4807

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SoC Project Support

Apple Inc.

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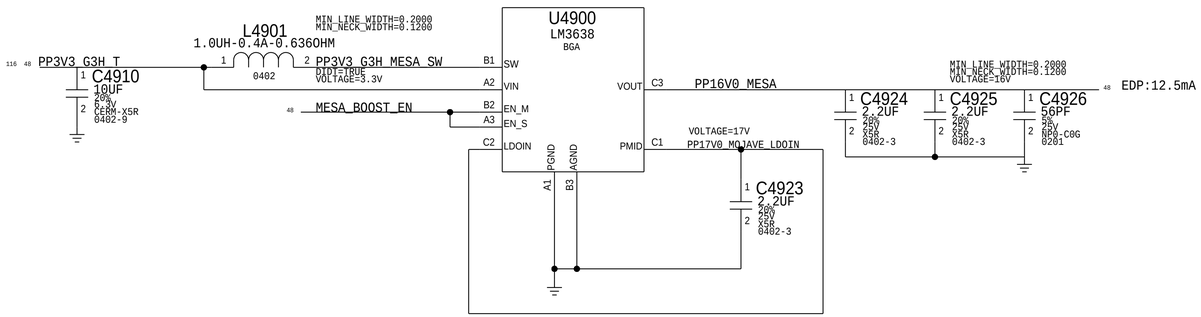
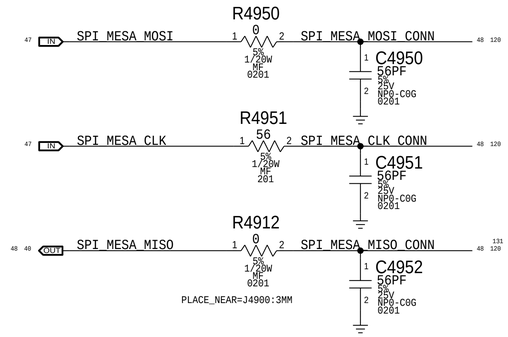
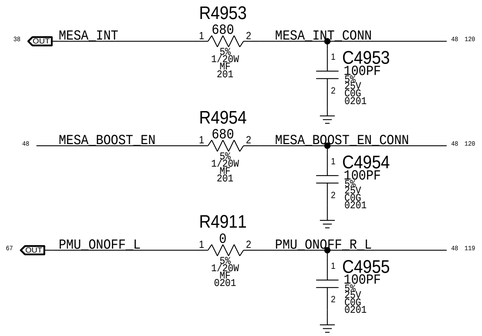
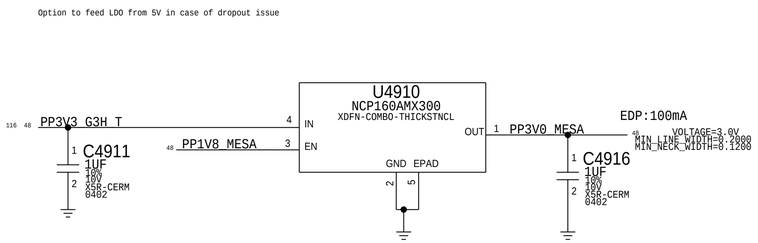
MOJAVE 16V BOOST

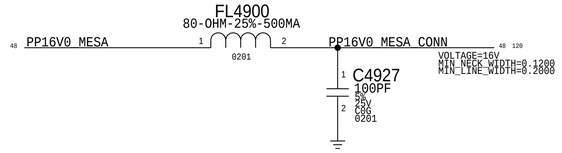






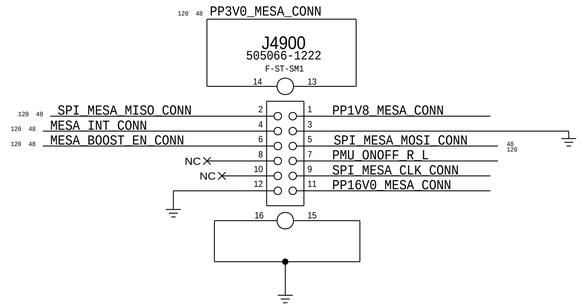
3.0V MESA





MESA FLEX CONNECTOR

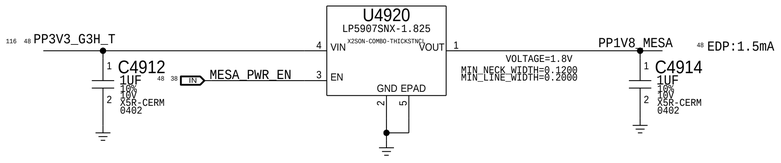
Proto1 Connector for X434/X435 Support
PLUG (516S00115) - X434/ X435 Jumper
Recptacle (516S00203) - X362/X363 MLB

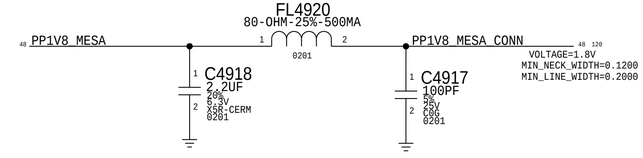


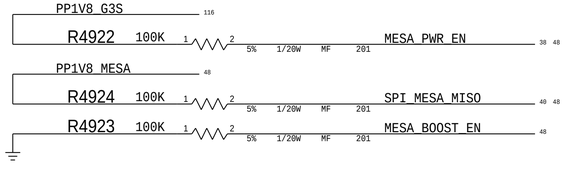
Mesa Power Sequencing Requirements

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

1.8V MESA







BOM_COST_GROUP=T151

PAGE TITLE: MESA

Apple Inc.

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SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
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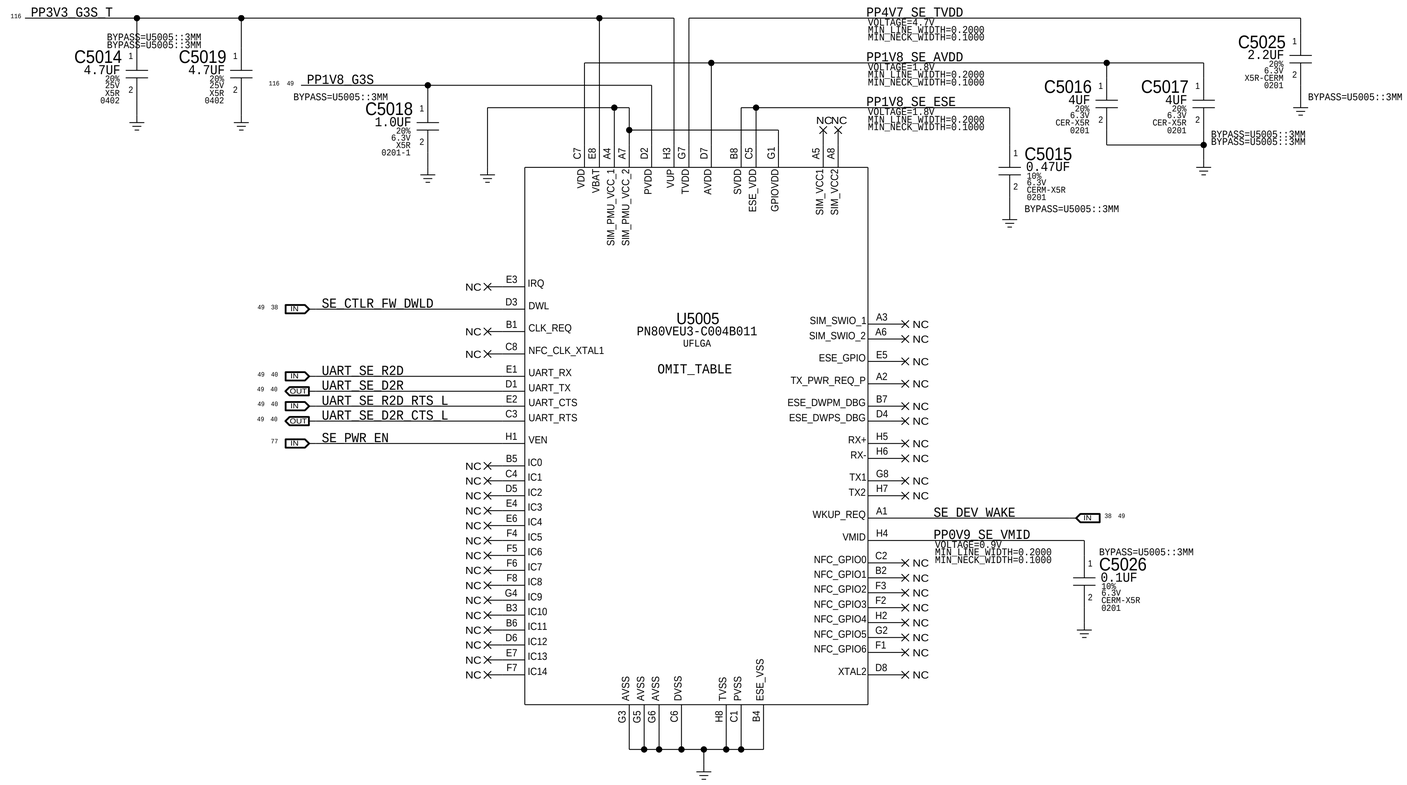
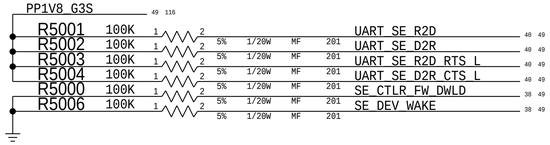


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-11132	1	IC,RTM4,ES2.1,PN80V,DEV,UFLGA64	U5005	CRITICAL	SE:DEV_2017
338S00253	1	IC,RTM4,ES2.1,PN80V,PRD,UFLGA64	U5005	CRITICAL	SE:PROD_2017



BOM_COST_GROUP=T151

SYNC_MASTER=SILU SYNC_DATE=05/05/2017

PAGE TITLE: Secure Element

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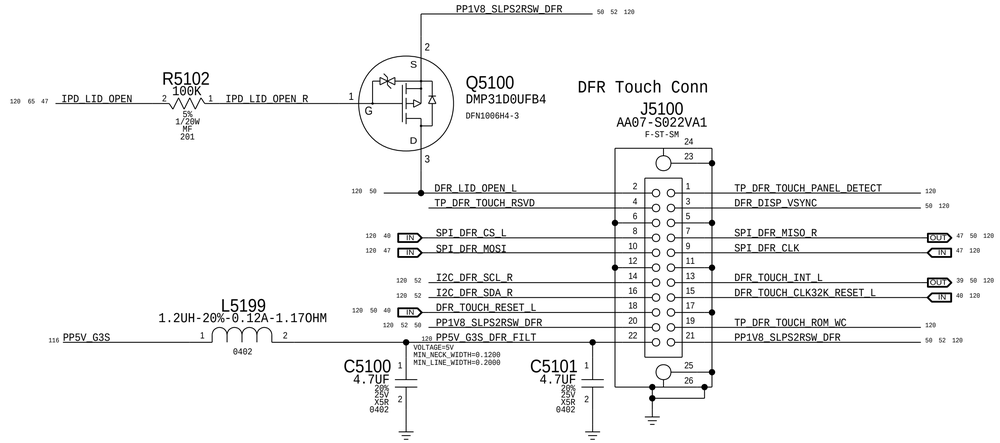
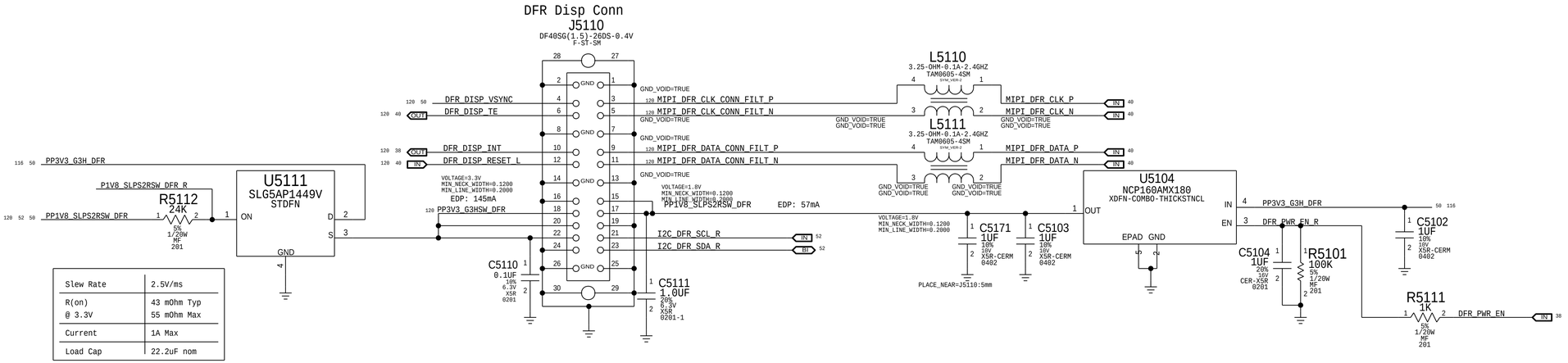
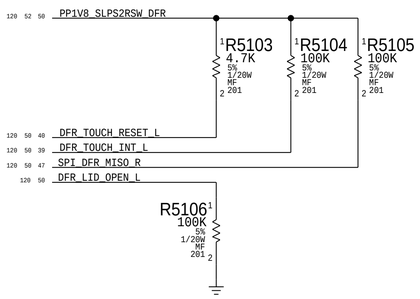
T208 Support





Slew Rate	2.5V/ms
R(on) @ 3.3V	43 mOhm Typ 55 mOhm Max
Current	1A Max
Load Cap	22.2uF nom



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PAGE TITLE: DFR & T208 Support

Apple Inc.

DRAWING NUMBER: 051-02643 SIZE: D

REVISION: 4.0.0

BRANCH: evt-0

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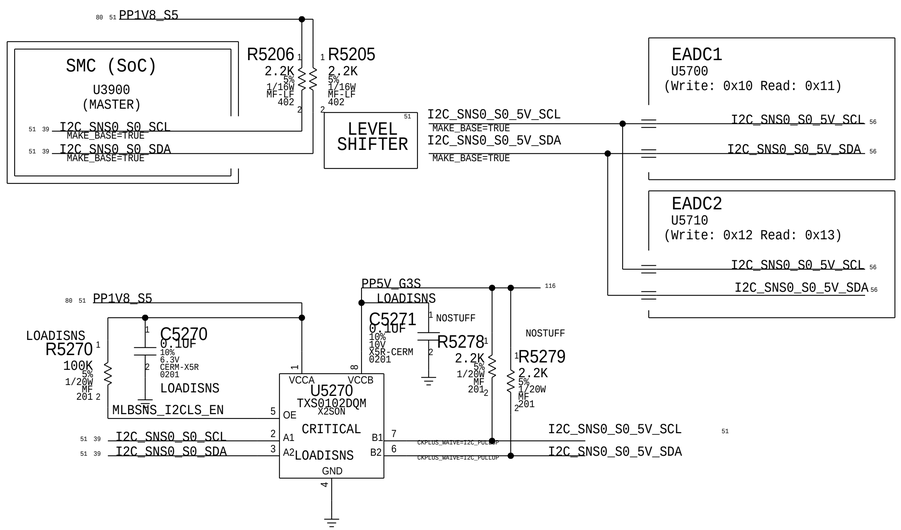
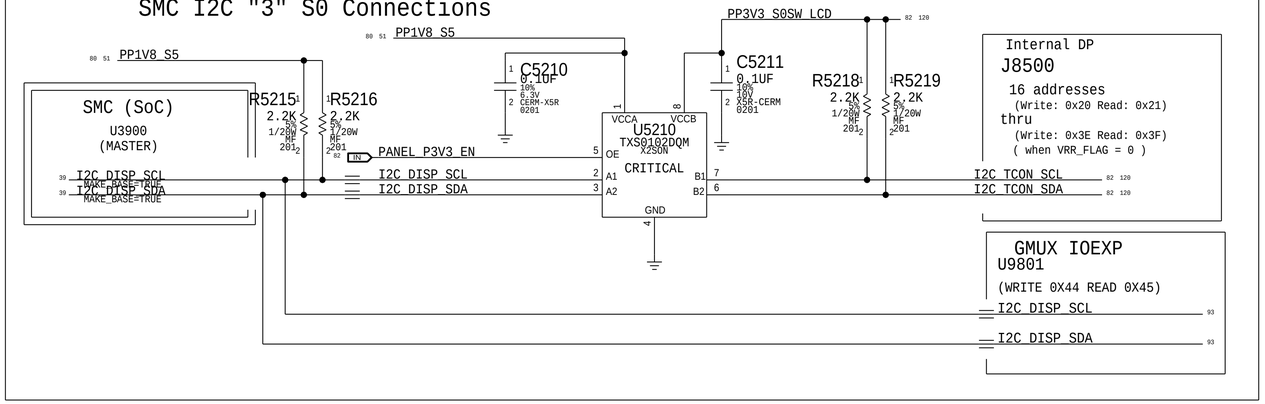
SMC I2C "1" S0 Connections



SMC I2C "3" S0 Connections



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
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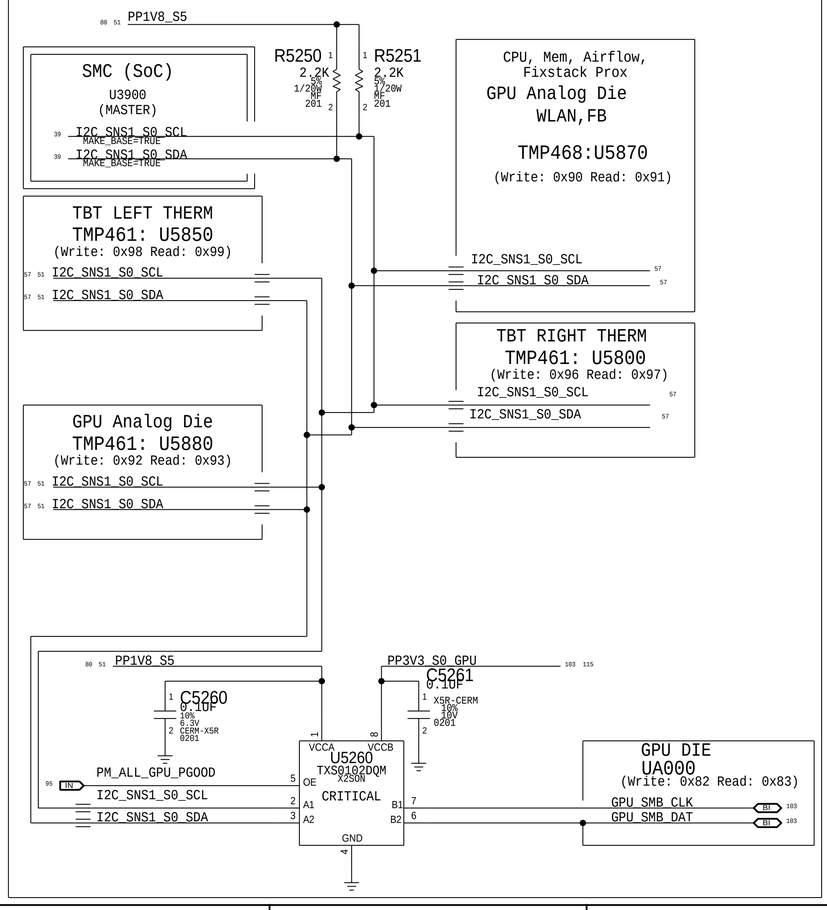
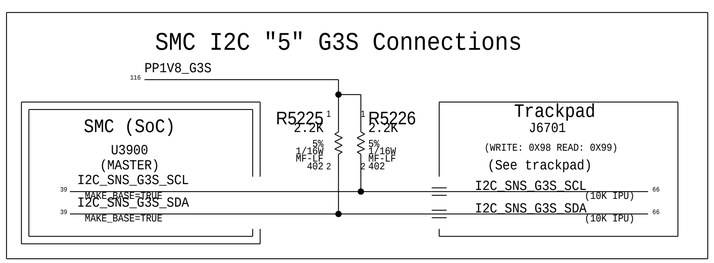
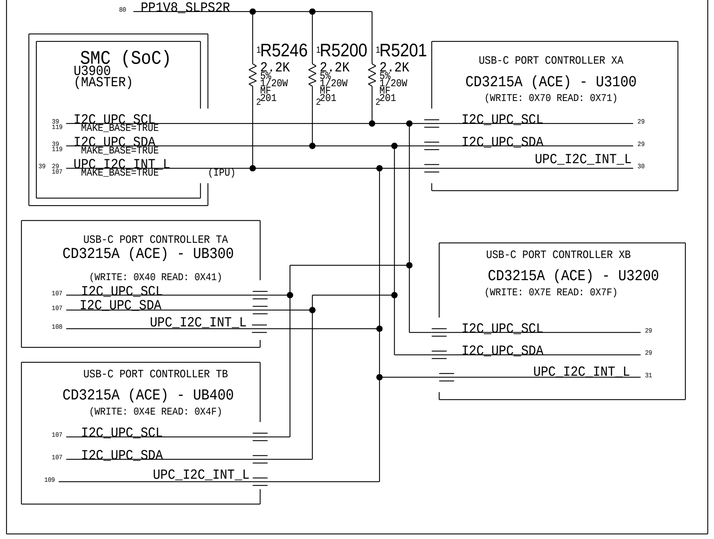
SMC I2C "2" S0 Connections



SMC I2C "5" G3S Connections



SMC I2C "0" G3H Connections



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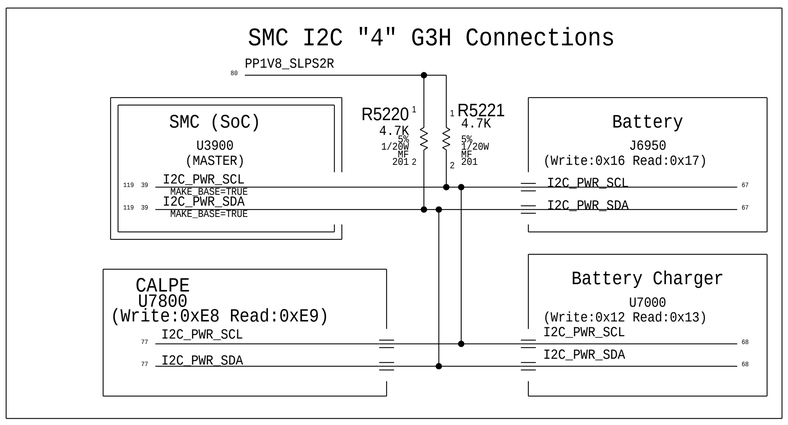

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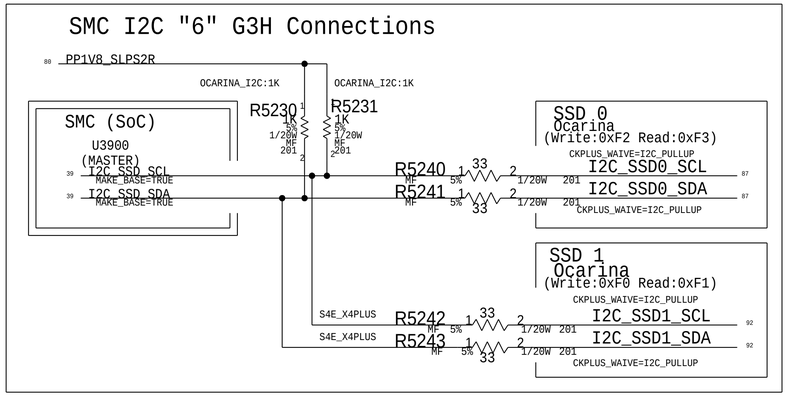

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I2C Connections 1

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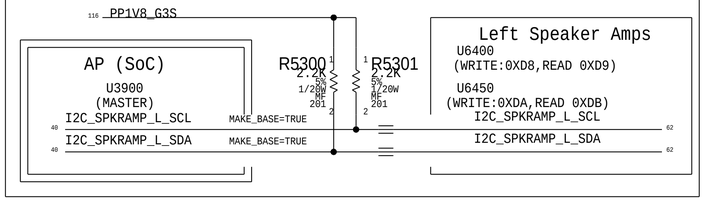
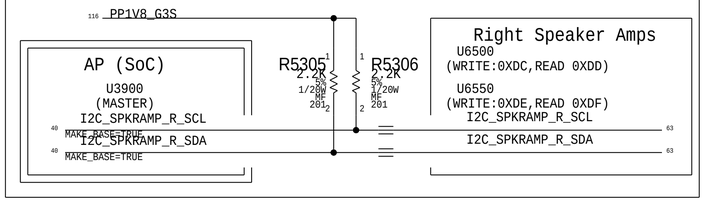
AP I2C "0" G3S Connections



AP I2C "1" G3S Connections



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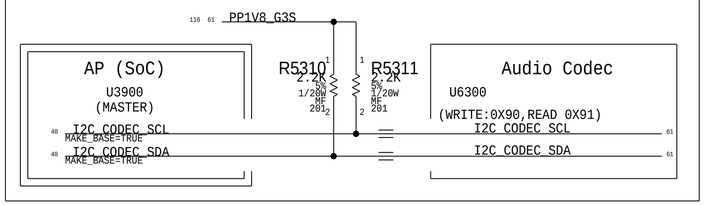

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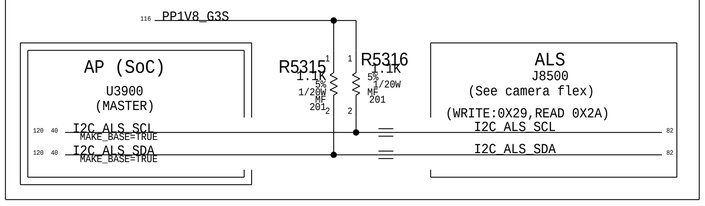

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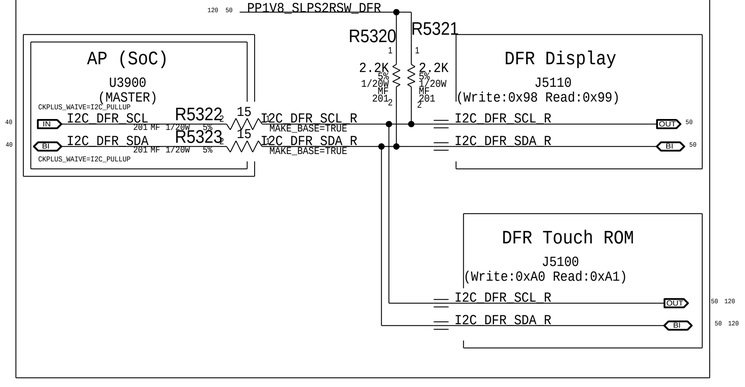

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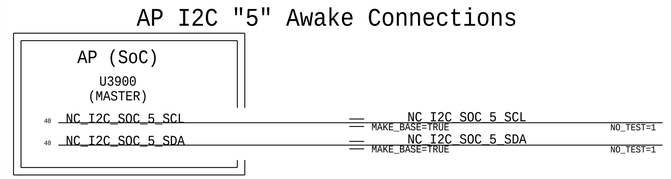
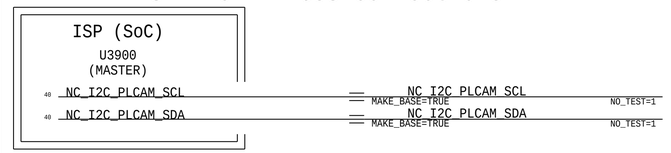
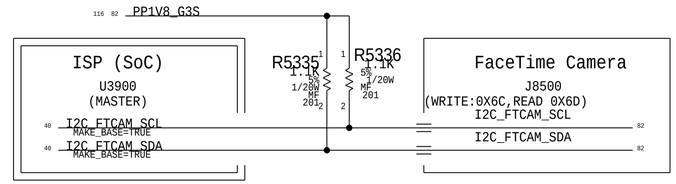


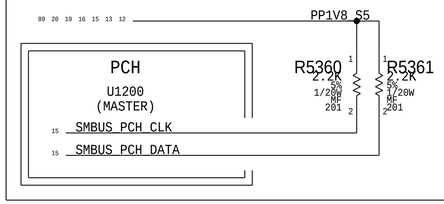
ISP I2C "1" G3S Connections



ISP I2C "0" G3S Connections



CNL-H uSFF SMBUS Connections



I2C Device Address

Device	SMC IF	ADDR. (8b)
ACE XA	I2C0	0X70/1
ACE XB	I2C0	0X7E/F
ACE TA	I2C0	0X40/1
ACE TB	I2C0	0X4E/F
EADC1	I2C1	0X10/1
EADC2	I2C1	0X12/3
Temp. Sensor Left	I2C2	0X98/9
Temp. Sensor Right	I2C2	0X96/7
CPU,MEM,WLAN Thermal	I2C2	0X90/1
GPU Analog Die Thermal	I2C2	0X92/3
GPU Digital Die Thermal	I2C2	0X82/3
TCON	I2C3	0X20-3F
GMUX IOEXP	I2C3	0X44/5
Charger	I2C4	0X12/3
Battery	I2C4	0X16/7
Calpe	I2C4	0XE8/9
Trackpad	I2C5	0X98/9
SSD0	I2C6	0XF2/3
SSD1	I2C6	0XF0/1
SoC IF		
Left Spkr Amp.(U6400)	I2C0	0XD8/9
Left Spkr Amp.(U6450)	I2C0	0XDA/B
Right Spkr Amp.(U6500)	I2C1	0XDC/D
Right Spkr Amp.(U6550)	I2C1	0XDE/F
Audio Codec	I2C2	0X90/1
ALS	I2C3	0X29/A
DFR Display	I2C4	0X98/9
DFR Touch	I2C4	0XA0/1
NC.	I2C5	
NC. Spkr ID1	I2C6_SDA	
Spkr ID0	I2C6_SCL	
ISP IF		
FT Camera	I2C0	0X6C/D
NC.	I2C1	
AOP IF		
NC.	I2C0	
PCH IF		
NC.	PULL-UP	

BOM_COST_GROUP=SMC

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I2C Connections 2

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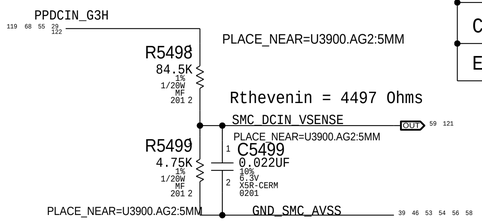
DC-IN Voltage Sense (VD0R)

Gain: 0.05322x
Vnominal: 20 V, Range: 23.49 V
SMC ADC: 00
Enables DC-In VSense
divider when AC present.
2.2KHz

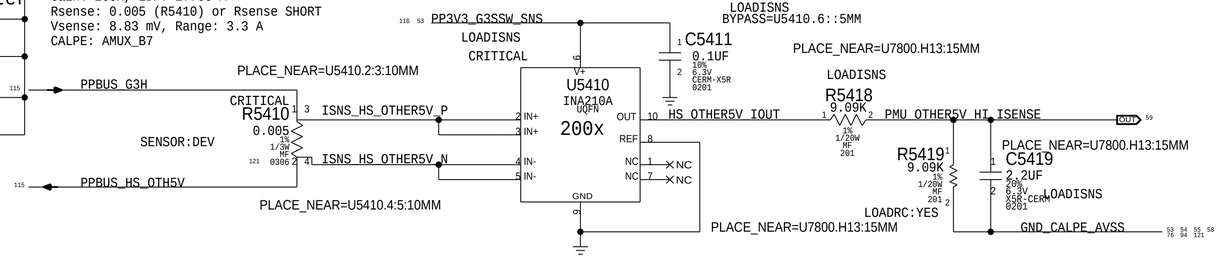


J680 SENSOR SETTINGS

CHIP	Vref(V)	Vmax	SMC sample Freq.	ADR RC filter
H9M	1.25	1.8	10khz	0.1ms
CALPE	1.5	5	100hz	10ms
EADC	2.5	5	1-2hz(10hz)	100ms

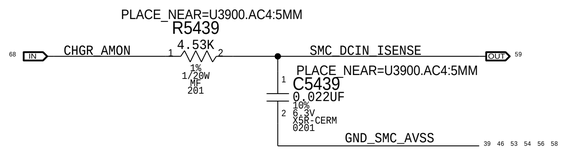
OTHER 5V High Side Current Sense (IO5R)

Gain: 200x, EDP: 1.766 A
Rsense: 0.005 (R5410) or Rsense SHORT
Vsense: 8.83 mV, Range: 3.3 A
CALPE: AMUX_B7



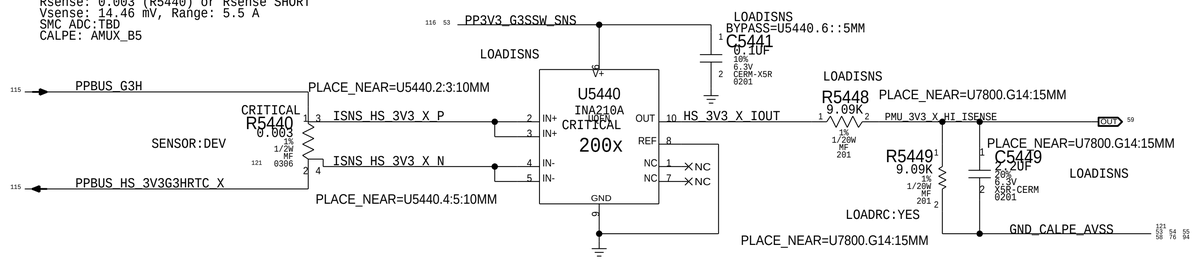
DC-IN Current Sense (ID0R)

DISCharger Gain: 20x, EDP: 4.6 A
Rsense: 0.010 (R7020)
SMC ADC: 01



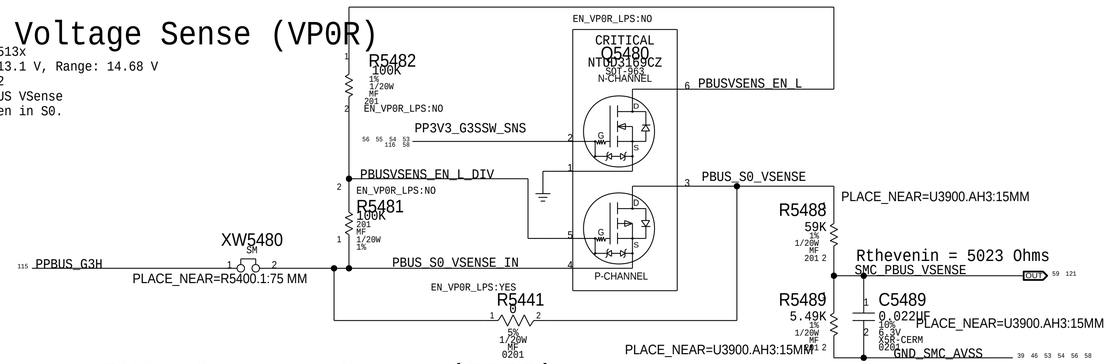
LEFT SIDE 3.3V High Side Current Sense (IOLR)

Gain: 200x, EDP: 4.82 A
Rsense: 0.003 (R5440) or Rsense SHORT
Vsense: 14.46 mV, Range: 5.5 A
SMC ADC:TBD
CALPE: AMUX_B5



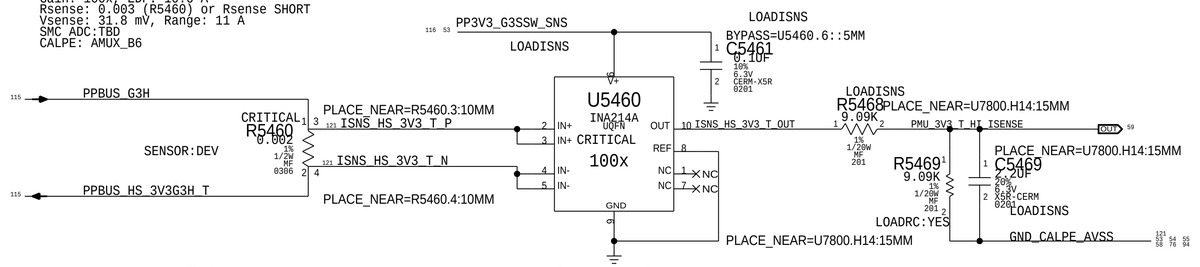
PBUS Voltage Sense (VP0R)

Gain: 0.08513x
Vnominal: 13.1 V, Range: 14.68 V
SMC ADC: 02
Enables PBUS VSense
divider when in S0.



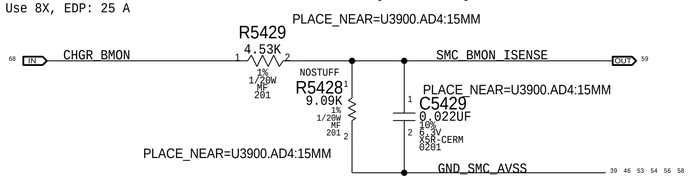
RIGHT SIDE 3.3V High Side Current Sense (IORR)

Gain: 100x, EDP: 10.6 A
Rsense: 0.003 (R5460) or Rsense SHORT
Vsense: 31.8 mV, Range: 11 A
SMC ADC:TBD
CALPE: AMUX_B6



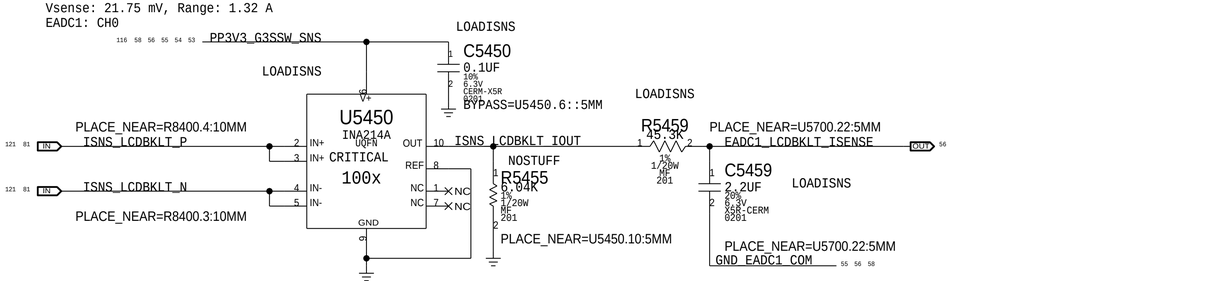
Discharger BMON Current Sense (IPBR)

Charger Gain: 8X OR 64x, Use 8X, EDP: 25 A
Rsense: 0.005 (R7060)
SMC ADC: 03



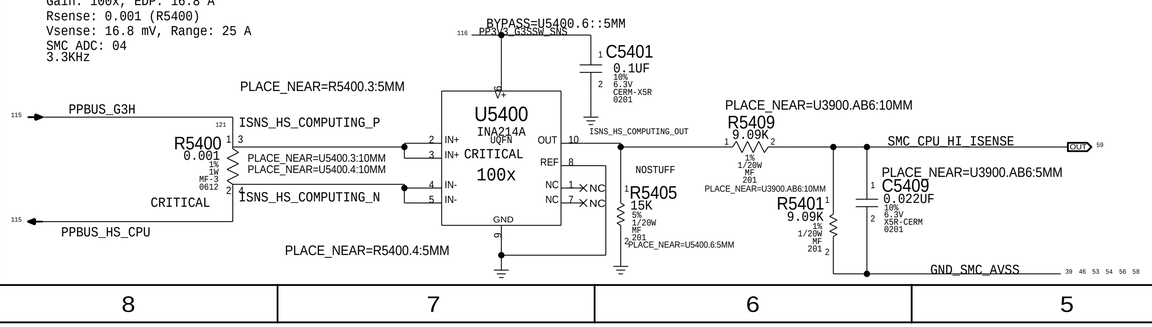
LCD Backlight Current Sense (IBLR)

Gain: 100x. EDP: 0.87 A
Rsense: 0.025 (R8400)
Vsense: 21.75 mV, Range: 1.32 A
EADC1: CH0



CPU High Side Curent Sense (IC0R)

Gain: 100x, EDP: 16.8 A
Rsense: 0.001 (R5400)
Vsense: 16.8 mV, Range: 25 A
SMC ADC: 04
3.3KHz



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	3	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	R5449,R5469,R5419		LOADRC:NO

BOM_COST_GROUP=SENSORS

PAGE TITLE
Power Sensors High Side

Apple Inc.

DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
PAGE 54 OF 200
SHEET 53 OF 131

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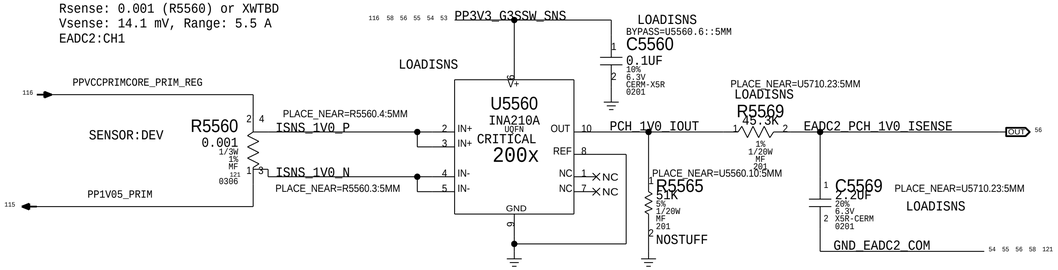
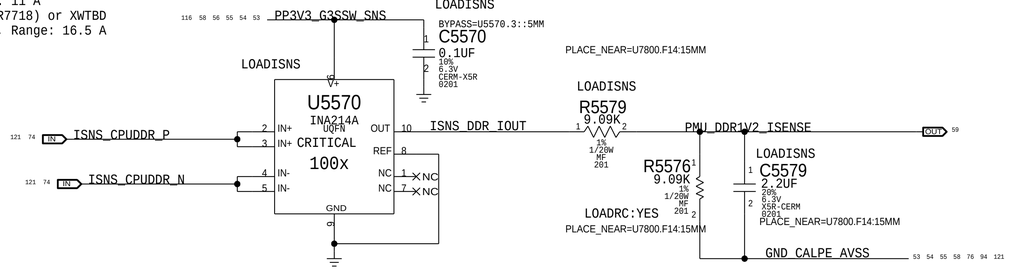
PCH 1.0V Current Sense (IS1C)

Gain: 200x, EDP: 4.7 A
Rsense: 0.001 (R5560) or XWTBD
Vsense: 14.1 mV, Range: 5.5 A
EADC2:CH1



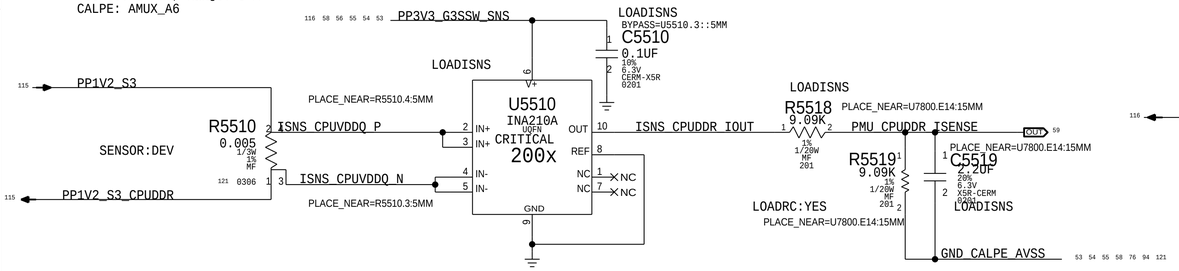
DDR4 1.2V Current Sense (IM0C)

Gain: 100x, EDP: 11 A
Rsense: 0.002 (R7718) or XWTBD
Vsense: 22.2 mV, Range: 16.5 A
CALPE: AMUX_A7



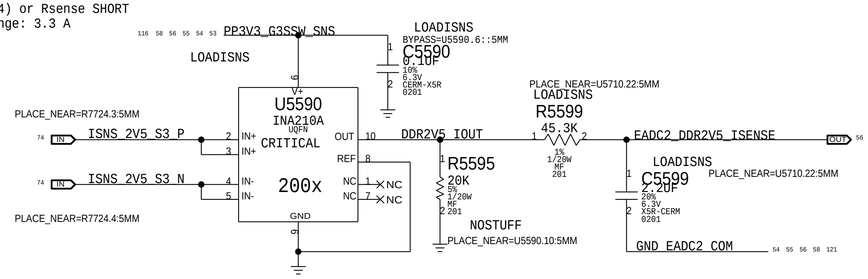
CPUDDR 1.2V Curent Sense (IMCC)

Gain: 200x, EDP: 2.8 A
Rsense: 0.005 (R5510)
Vsense: 14 mV, Range: 3 A
CALPE: AMUX_A6



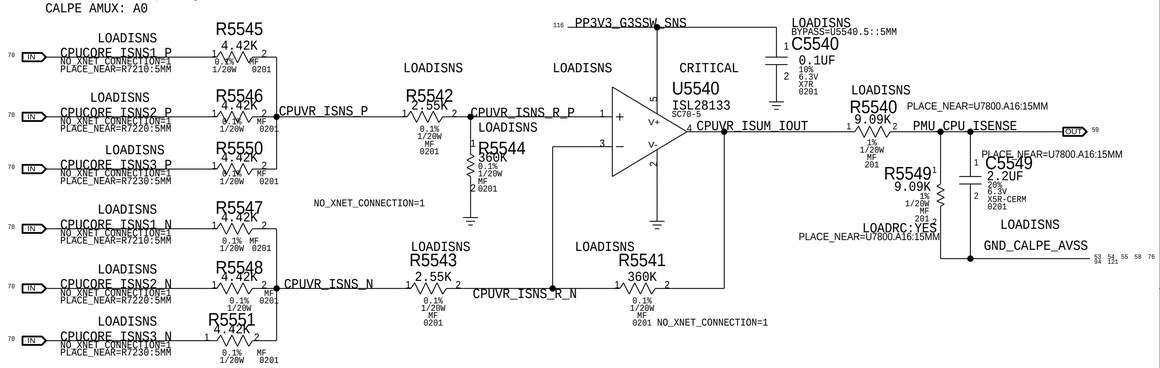
2.5V Current Sense (IM1C)

Gain: 200x, EDP: 2.24 A
Rsense: 0.005 (R7724) or Rsense SHORT
Vsense: 11.2 mV, Range: 3.3 A
EADC2: CH0



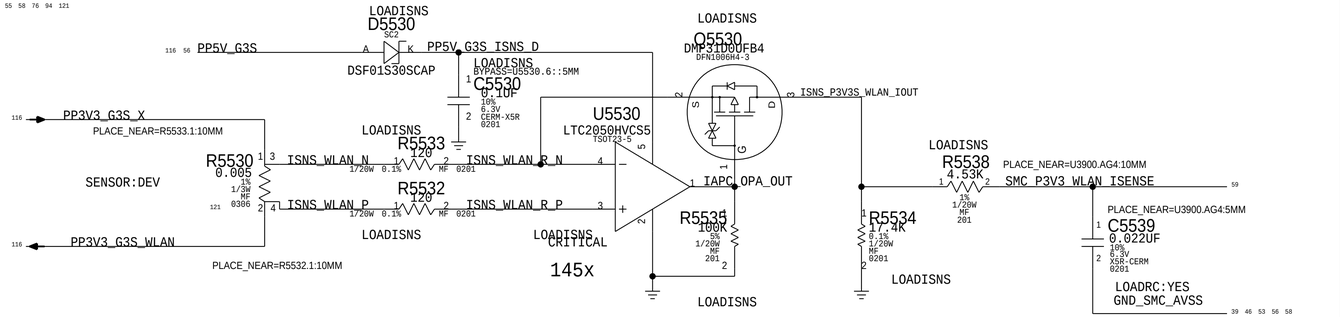
CPU Core Curent Sense (ICAC)

Gain: 89.48x, EDP: 128 A
Rsense: 3x of 0.00075
R7210,R7220,R7230),Rsum: 0.00025
Vsense:16.75 mV, Range: 134.11 A
CALPE AMUX: A0



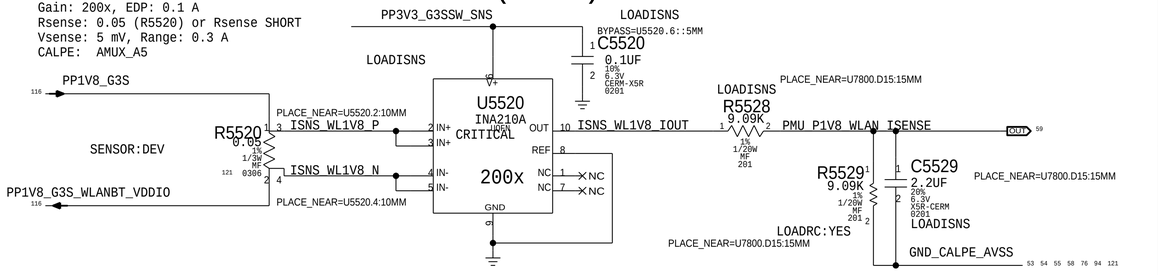
WLANBT 3V3 Current Sense (IAPC)

Gain: 200x, EDP: 1.5 A
Rsense: 0.005 (R5530) or Rsense SHORT
Vsense: 7.5 mV, Range: 1.72 A
SMC: ADC 06



WLANBT 1V8 Current Sense (IA8C)

Gain: 200x, EDP: 0.1 A
Rsense: 0.05 (R5520) or Rsense SHORT
Vsense: 5 mV, Range: 0.3 A
CALPE: AMUX_A5



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	5	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	R5576,R5519,R5549,C5539,R5529		LOADRC:NO

BOM_COST_GROUP=SENSORS

PAGE TITLE: Power Sensors Load Side

Apple Inc.

DRAWING NUMBER: 051-02643
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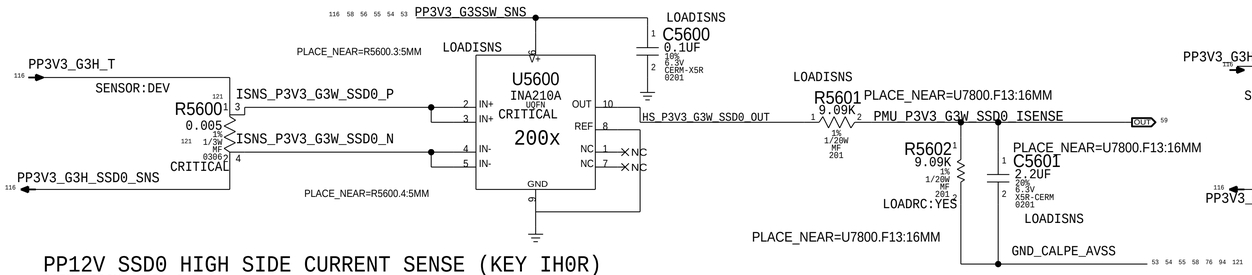
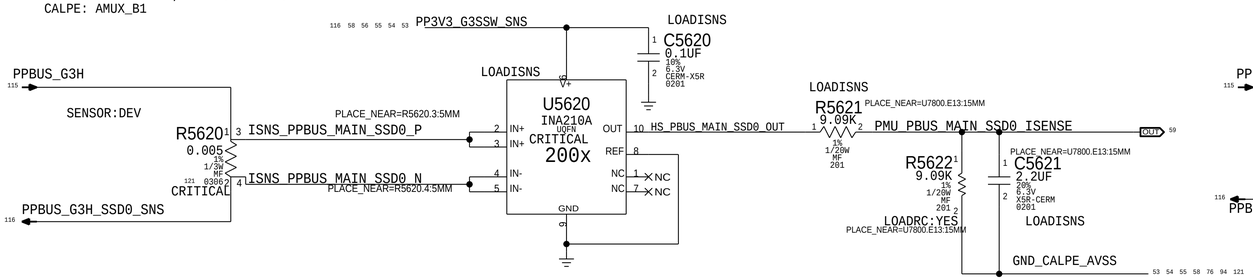
PP3V3_G3W_SSD0 HIGH SIDE CURRENT SENSE (KEY IH0C)

GAIN: 200X, EDP: 1.48 A
RSENSE: 0.005 (RK710) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B3



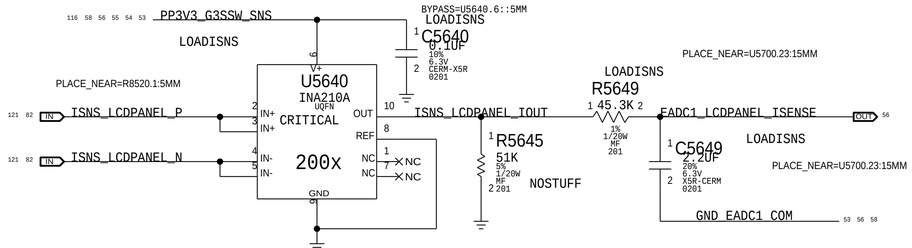
PP12V_SSD0 HIGH SIDE CURRENT SENSE (KEY IH0R)

GAIN: 200X, EDP: 0.5 A
RSENSE: 0.005 (RK610) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B1



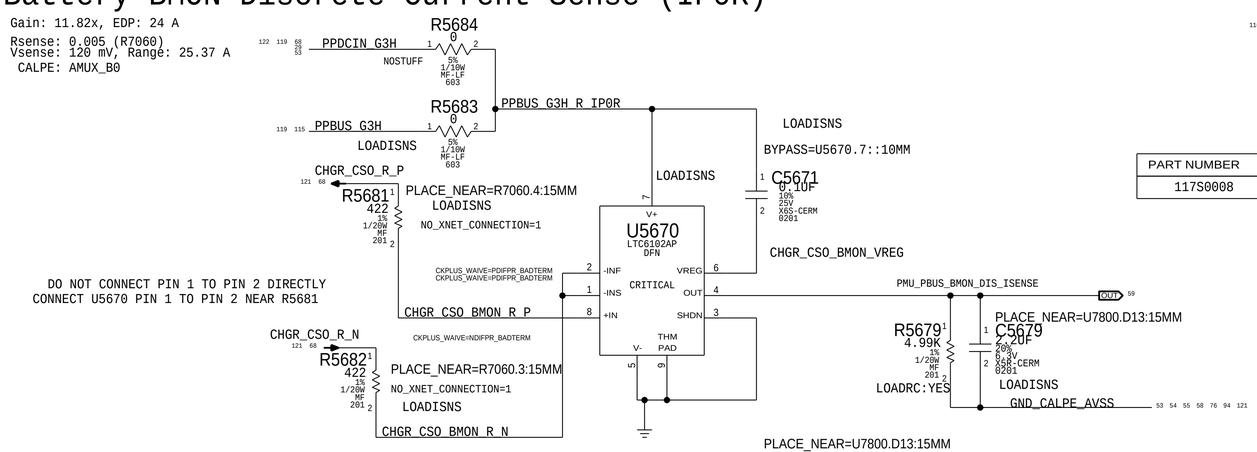
LCD Panel Current Sense (ILDC)

Gain: 200x. EDP: 1 A
RSENSE: 0.01 (R8520) or Rsense SHORT
Vsense: 5 mV, Range: 1.25 A
EADC1: CH1



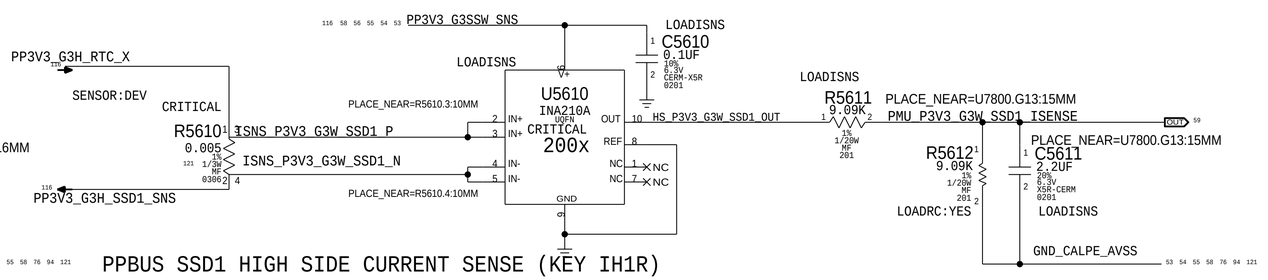
Battery BMON Discrete Current Sense (IP0R)

Gain: 11.82x, EDP: 24 A
Rsense: 0.005 (R7060)
Vsense: 120 mV, Range: 25.37 A
CALPE: AMUX_B0



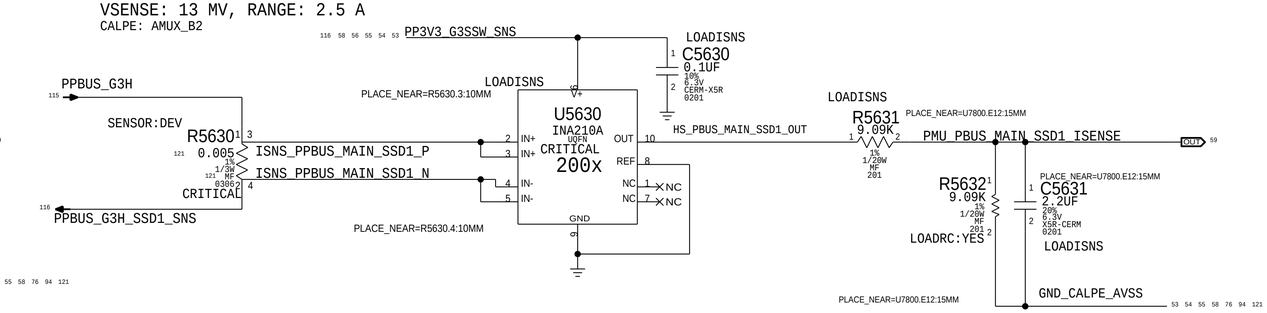
PP3V3_G3W_SSD1 HIGH SIDE CURRENT SENSE (KEY IH1C)

GAIN: 200X, EDP: 1.48 A
RSENSE: 0.005 (RK760) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B4



PPBUS SSD1 HIGH SIDE CURRENT SENSE (KEY IH1R)

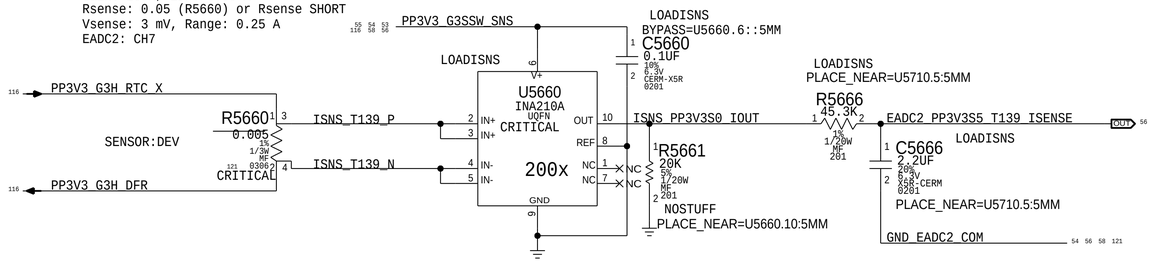
GAIN: 200X, EDP: 0.5 A
RSENSE: 0.005 (R5607) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B2



PLACE_NEAR=U7800.G13:15MM

T139 Current Sense (IF3C)

Gain: 200x, EDP: 0.06 A
Rsense: 0.05 (R5660) or Rsense SHORT
Vsense: 3 mV, Range: 0.25 A
EADC2: CH7



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	5	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	R5602,R5612,R5622,R5632,R5679		LOADRC:NO

BOM_COST_GROUP=SENSORS

PAGE TITLE: Power Sensors Extended 1

Apple Inc.

DRAWING NUMBER: 051-02643
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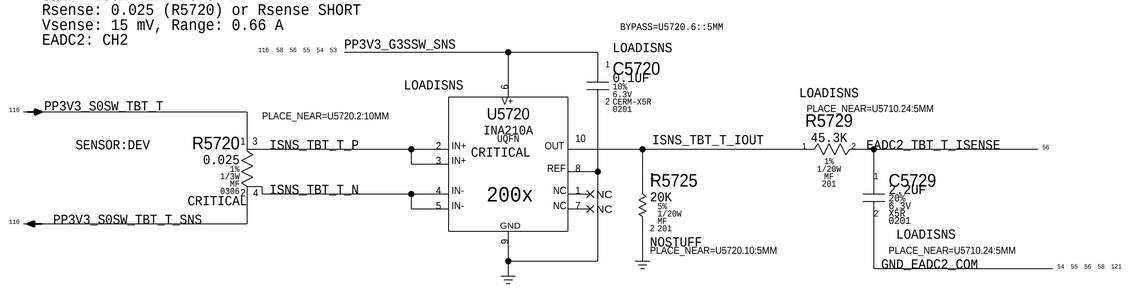
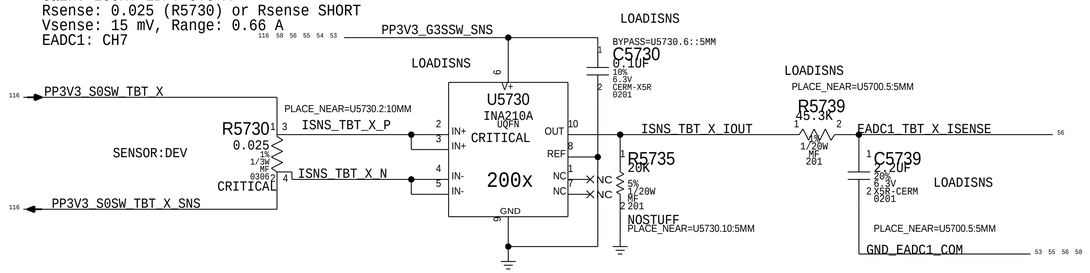
Thunderbolt TBT RIGHT Current Sense (IURC)

Gain: 200x. EDP: 0.6 A
Rsense: 0.025 (R5720) or Rsense SHORT
Vsense: 15 mV, Range: 0.66 A
EADC2: CH2



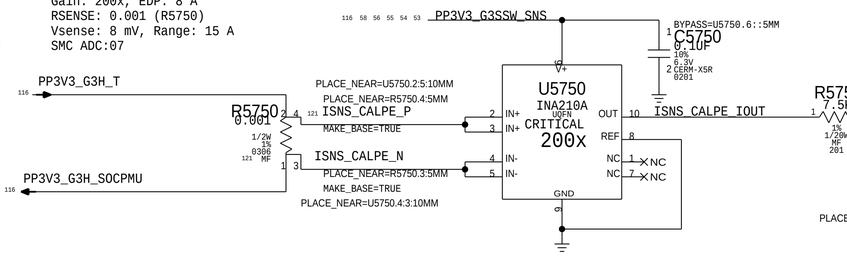
Thunderbolt TBT LEFT Current Sense (IULC)

Gain: 200x. EDP: 0.6 A
Rsense: 0.025 (R5730) or Rsense SHORT
Vsense: 15 mV, Range: 0.66 A
EADC1: CH7



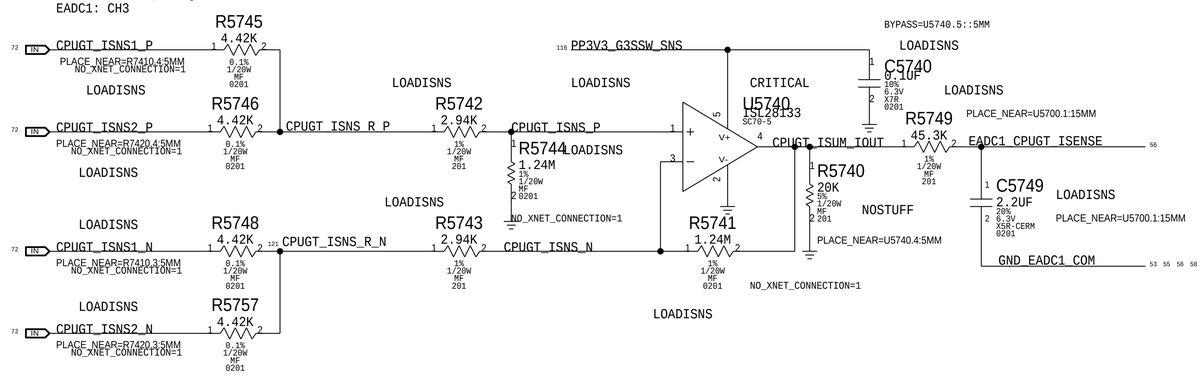
Calpe 3V3 Current Sense (ISLC)

Gain: 200x, EDP: 8 A
RSENSE: 0.001 (R5750)
Vsense: 8 mV, Range: 15 A
SMC ADC:07



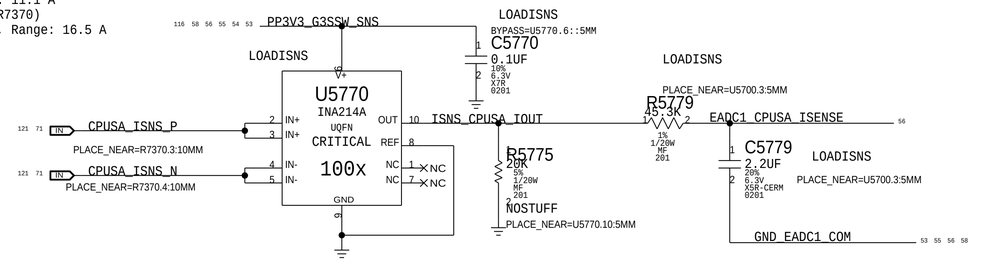
CPU GT Current Sense (ICTC)

Gain: 240.78x, EDP: 32 A
Rsense: 2x of 0.00075 (R7410, R7420), Rsum: 0.000375
Vsense: 12 mV, Range:36.55 A
EADC1: CH3



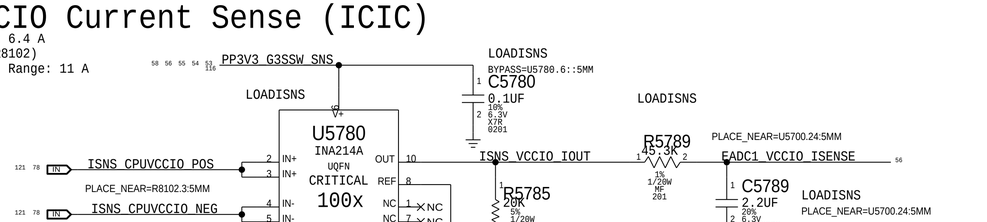
CPU SA Current Sense (ICSC)

Gain: 100x, EDP: 11.1 A
Rsense: 0.002 (R7370)
Vsense: 22.2 mV, Range: 16.5 A
EADC1: CH5

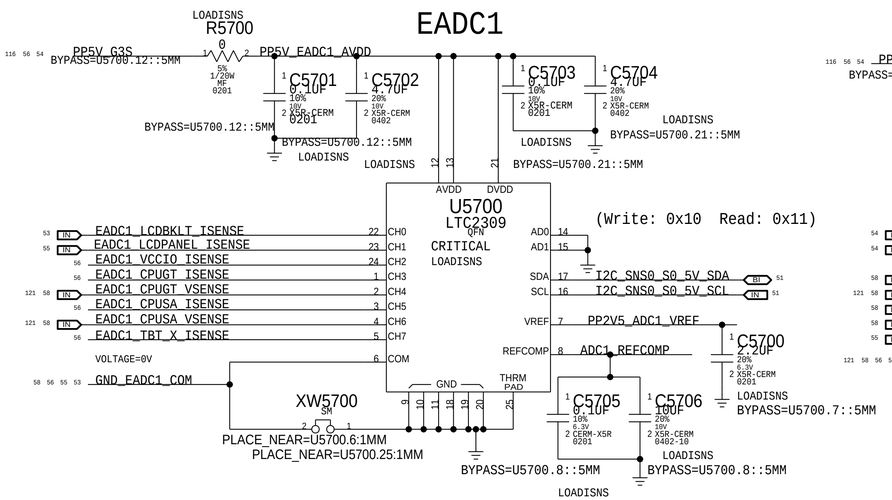


CPU VCCIO Current Sense (ICIC)

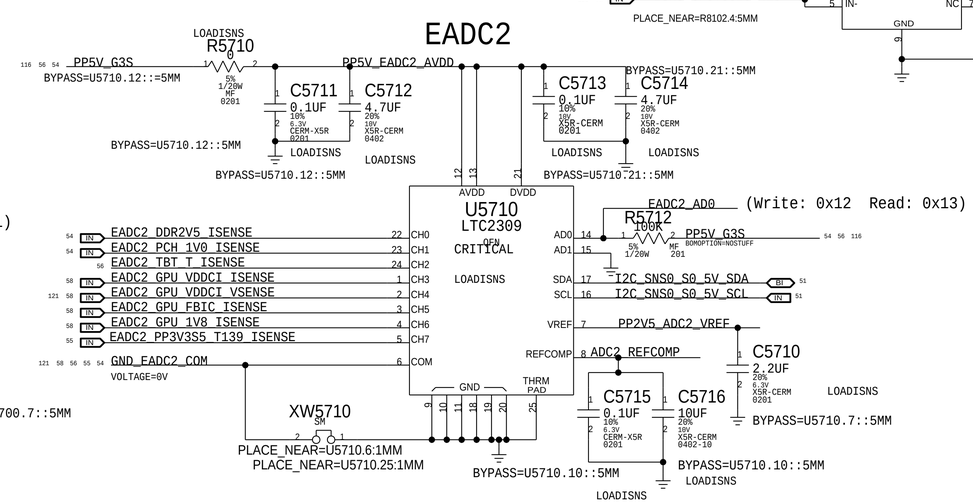
Gain: 100x, EDP: 6.4 A
Rsense: 0.003 (R8102)
Vsense: 19.2 mV, Range: 11 A
EADC1: CH2



EADC1



EADC2



BOM_COST_GROUP=SENSORS

PAGE TITLE: Power Sensors Extended 2

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DRAWING NUMBER: 051-02643
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BRANCH: evt-0
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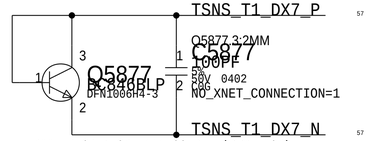
THERMAL DIODE: VRAM PROXIMITY (KEY)

Place Q5877 Bottom,underVRAM shiled can, but not within 2mm of any IC



THERMAL DIODE: GPU ANALOG DIE (KEY TA0P)

Connect GPU Analog Die to U5870 channel 8

GPU Digital DIE TG0D:

U5880 I2C Address:TMP461 A0->Floating A1->GND 0X92/0X93

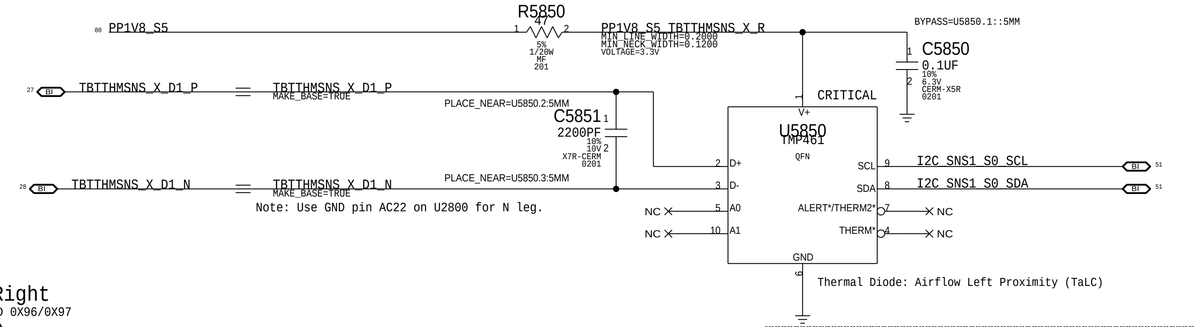
Thermal Sensor A:

Thunderbolt Die, Airflow Left

U5850 I2C Address:TMP461 A1->Floating A0->Floating 0X98/0X99

Thermal Diode: TBT Die (TTLD)

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



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

Thermal Diode: Airflow Left Proximity (TaLC)

Placement Note:
Place U5850 on the TOP side, on the left portion of the board, 1" to the right of USB connector.

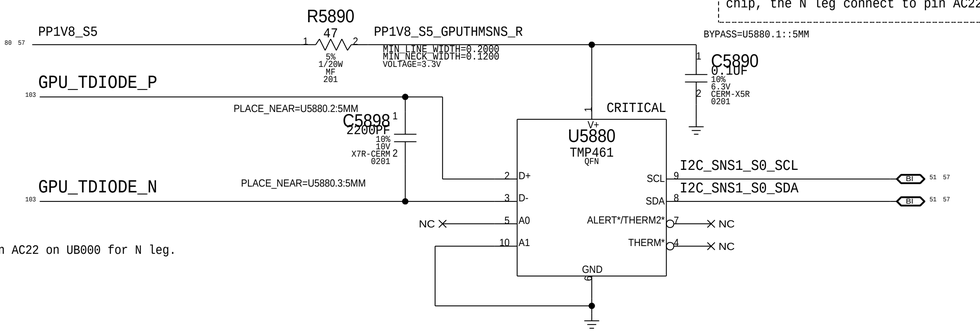
Thermal Sensor C:

Thunderbolt Die, Air Flow Right

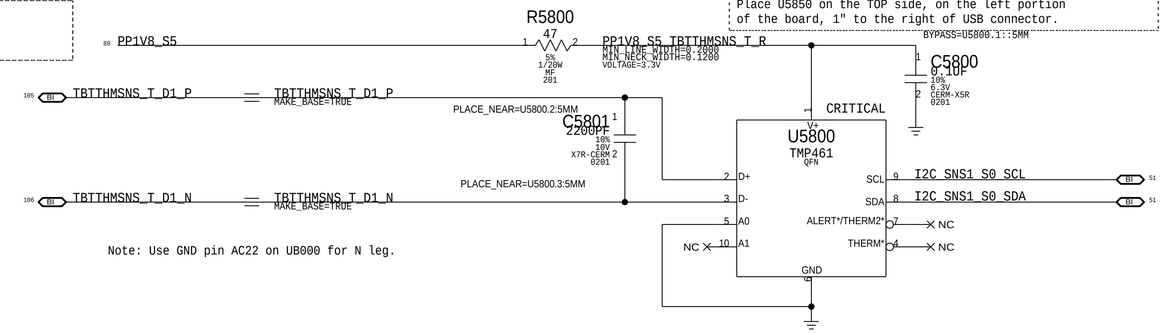
U5800 I2C Address:TMP461 A1->Floating A0->GND 0X96/0X97

Thermal Diode: TBT Die (TTRD)

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



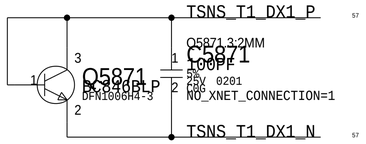
Note: Use GND pin AC22 on UB000 for N leg.



Note: Use GND pin AC22 on UB000 for N leg.

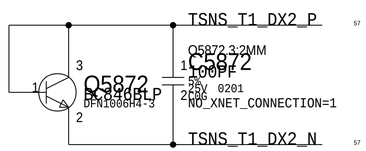
THERMAL DIODE: CPU PROX (KEY TC0P)

Placement Note:
Place Q5871 under the CPU ON BOTTOM SIDE



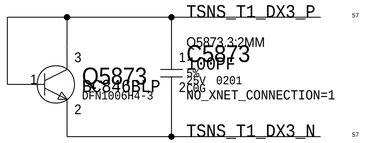
THERMAL DIODE: FIN STACK LEFT (KEY TH2H)

Placement Note:
Place Q5872,AIRFLOW THERMAL INDICATOR,ABOVETHE X100, ON THE TOP SIDE



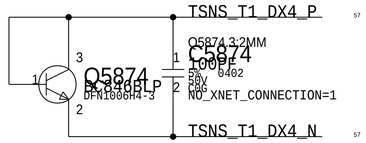
THERMAL DIODE: FIN STACK RIGHT (KEY TH1H)

Placement Note:
Place Q5873 AT THE CORNER NEAR RIGHT FAN, ON THE TOP SIDE



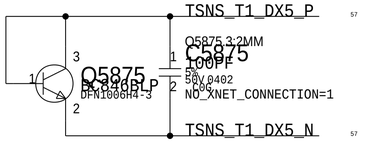
THERMAL DIODE: Memory Proximity (KEY TM0P)

Place Q5874 between two rows of Memory devices, between channel A and CHANNEHL b PN BOTTOM SIDES



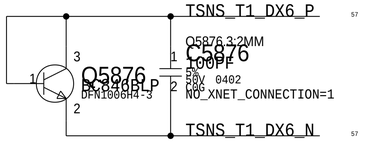
THERMAL DIODE: X100 PROXIMITY (KEY TW0P)

Place Q5875 near X100 on bottom



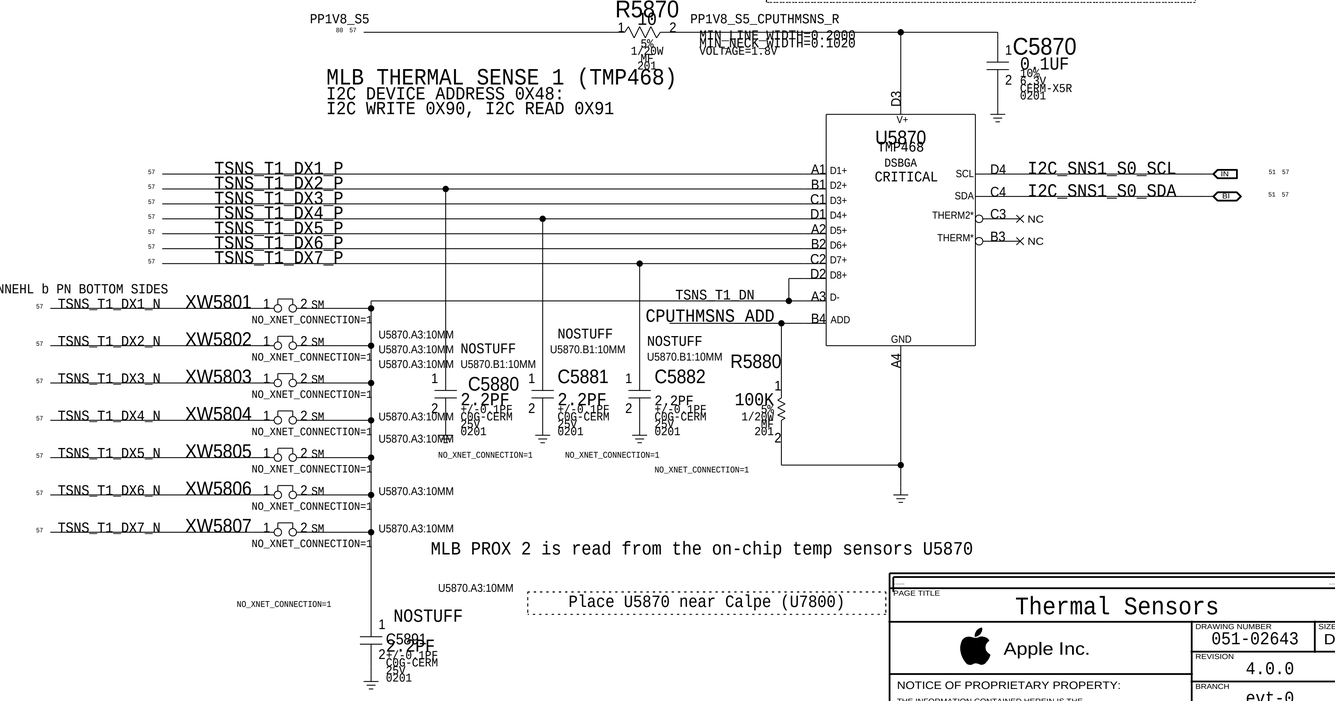
THERMAL DIODE: GPU PROXIMITY(KEY)

Place Q5876 near GPU, Top side



Thermal Diode: Airflow Right Proximity (TaRC)

Placement Note:
Place U5800 on the TOP side, on the left portion of the board, 1" to the right of USB connector.



MLB PROX 2 is read from the on-chip temp sensors U5870

Place U5870 near Calpe (U7800)

BOM_COST_GROUP=SENSORS

PAGE TITLE: Thermal Sensors

Apple Inc.

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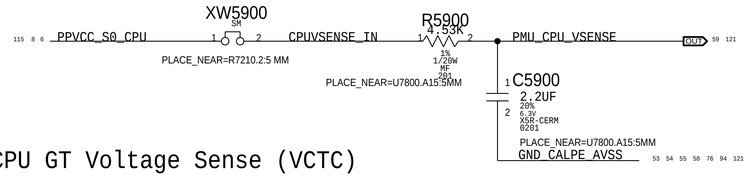
GPU SENSORS

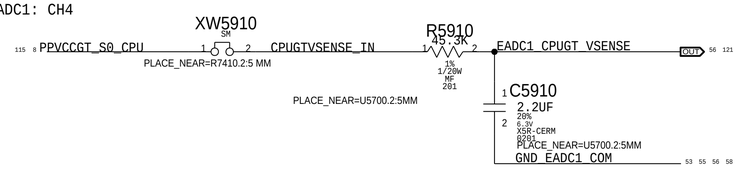
CPU Core Voltage Sense (VCAC)

CALPE : AMUX-A1



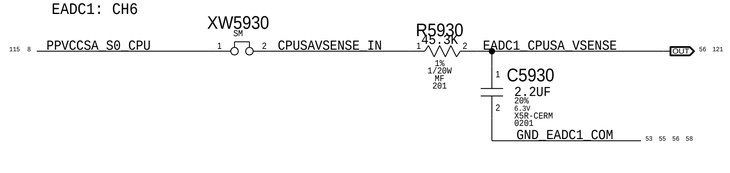
CPU GT Voltage Sense (VCTC)

EADC1: CH4



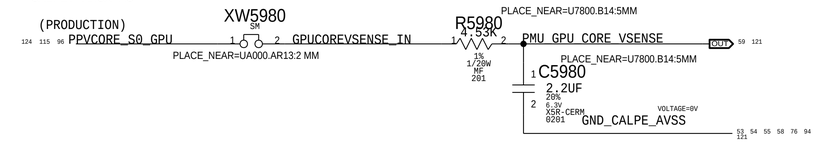
CPU SA Voltage Sense (VCSC)

EADC1: CH6



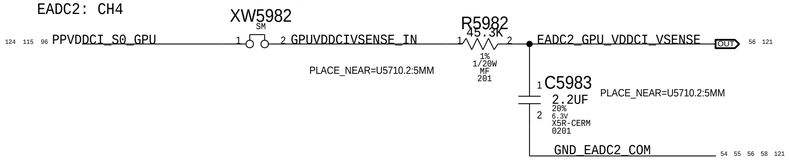
GPU CORE Voltage Sense (VG0C)

CALPE: AMUX-A3



GPU VDDCI Voltage Sense (VG2C)

EADC2: CH4

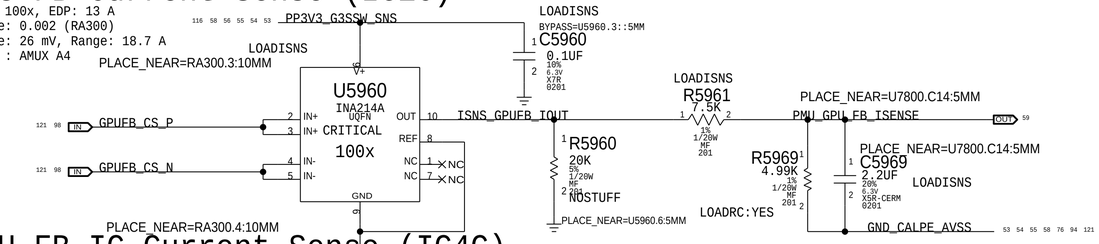


GPU CORE Current Sense (IG0C)
no longer lives on this page
it's merged with the PCC circuit
on CSA 99

Gain: 154.87x, EDP: 78 A
Rsense: 3X OF 0.00075 (RA651,RA641,RA346)
Vsense: 19.5 mV, Range: 109 A
CALPE : AMUX A2

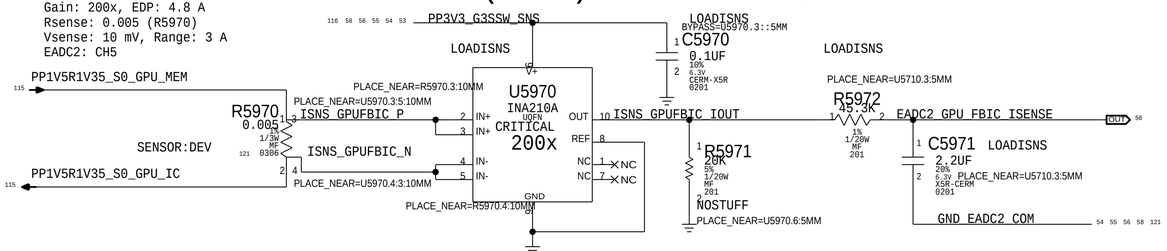
GPU FB Current Sense (IG1C)

Gain: 100x, EDP: 13 A
Rsense: 0.002 (RA300)
Vsense: 26 mV, Range: 18.7 A
CALPE : AMUX A4



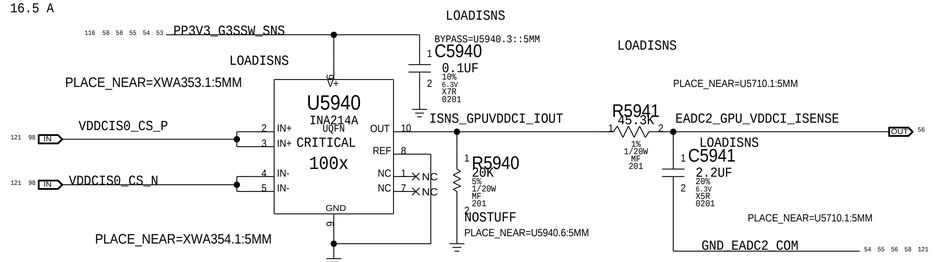
GPU FB IC Current Sense (IG4C)

Gain: 200x, EDP: 4.8 A
Rsense: 0.005 (R5970)
Vsense: 10 mV, Range: 3 A
EADC2: CH5



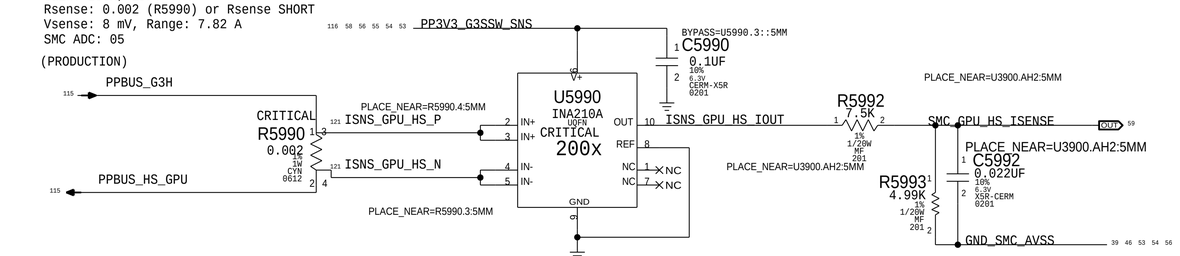
GPU VDDCI Current Sense (IG2C)

Gain: 100x, EDP: 10 A
Rsense: 0.003 (RA368)
Vsense: 20 mV, Range: 16.5 A
EADC2: CH3



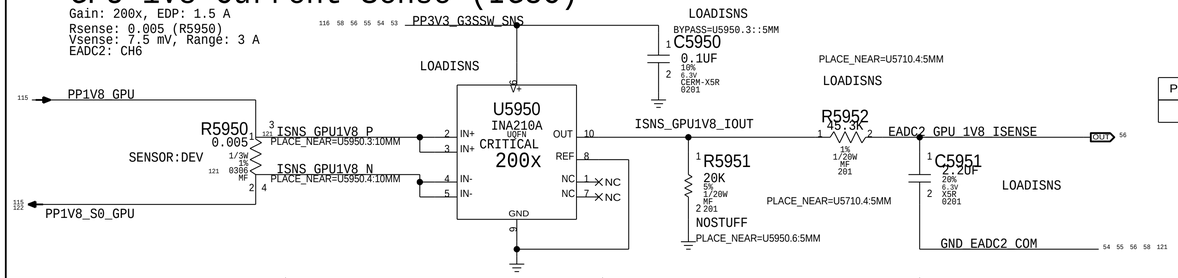
GPU HIGH SIDE Current Sense (IG0R)

Gain: 200x, EDP: 4 A
Rsense: 0.002 (R5990) or Rsense SHORT
Vsense: 8 mV, Range: 7.82 A
SMC ADC: 05



GPU 1V8 Current Sense (IG3C)

Gain: 200x, EDP: 1.5 A
Rsense: 0.005 (R5950)
Vsense: 7.5 mV, Range: 3 A
EADC2: CH6



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	1	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	R5969		LOADRC:NO

BOM_COST_GROUP=SENSORS

PAGE TITLE
Power Sensor Extended 3

Apple Inc.

DRAWING NUMBER 051-02643 SIZE D
REVISION 4.0.0
BRANCH evt-0
PAGE 59 OF 200
SHEET 58 OF 131

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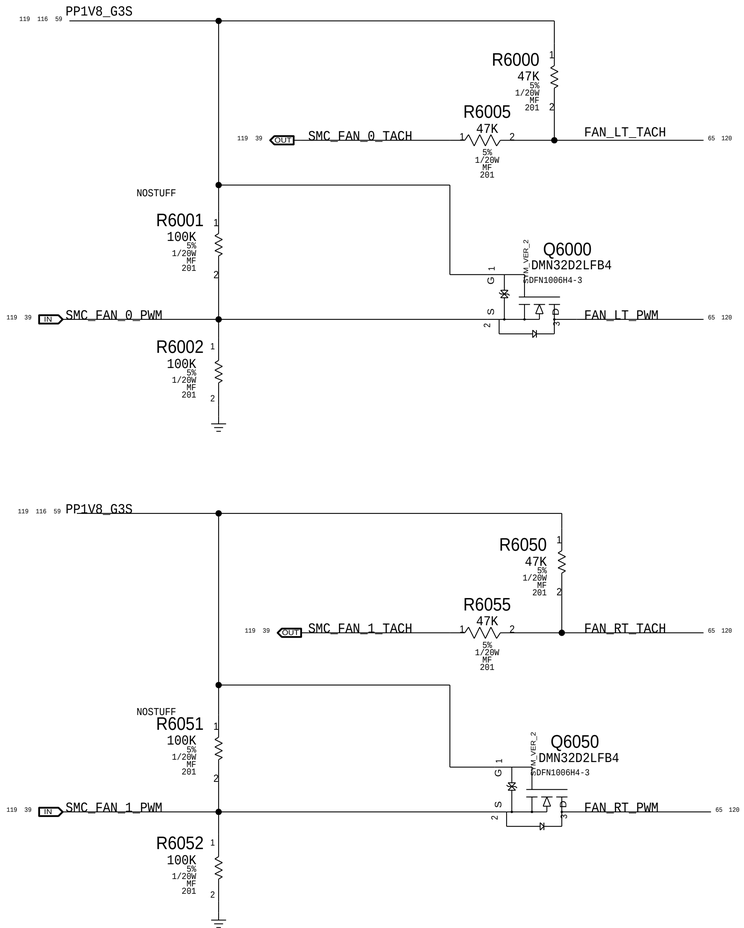
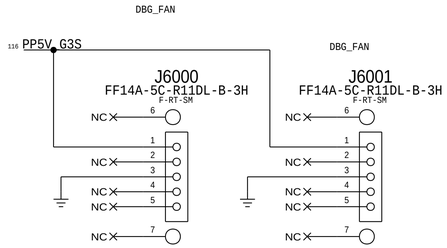
FAN CONNECTOR





H9M SMC ADC Assignments

SMC_DCIN_VSENSE	=	SMC_DCIN_VSENSE
SMC_DCIN_ISENSE	=	SMC_DCIN_ISENSE
SMC_PBUS_VSENSE	=	SMC_PBUS_VSENSE
SMC_BMON_ISENSE	=	SMC_BMON_ISENSE
SMC_CPU_HI_ISENSE	=	SMC_CPU_HI_ISENSE
SMC_GPU_HS_ISENSE	=	SMC_GPU_HS_ISENSE
SMC_P3V3_WLAN_ISENSE	=	SMC_P3V3_WLAN_ISENSE
SMC_P3V3_CAPLE_ISENSE	=	SMC_P3V3_CAPLE_ISENSE

CALPE AMUX Assignments

PMU_CPU_ISENSE	=	PMU_CPU_ISENSE
PMU_CPU_VSENSE	=	PMU_CPU_VSENSE
PMU_GPU_CORE_ISENSE	=	PMU_GPU_CORE_ISENSE
PMU_GPU_CORE_VSENSE	=	PMU_GPU_CORE_VSENSE
PMU_GPU_FB_ISENSE	=	PMU_GPU_FB_ISENSE
PMU_P1V8_WLAN_ISENSE	=	PMU_P1V8_WLAN_ISENSE
PMU_CPUDDR_ISENSE	=	PMU_CPUDDR_ISENSE
PMU_DDR1V2_ISENSE	=	PMU_DDR1V2_ISENSE
PMU_PBUS_BMON_DIS_ISENSE	=	PMU_PBUS_BMON_DIS_ISENSE
PMU_PBUS_MAIN_SSD0_ISENSE	=	PMU_PBUS_MAIN_SSD0_ISENSE
PMU_PBUS_MAIN_SSD1_ISENSE	=	PMU_PBUS_MAIN_SSD1_ISENSE
PMU_P3V3_G3W_SSD0_ISENSE	=	PMU_P3V3_G3W_SSD0_ISENSE
PMU_P3V3_G3W_SSD1_ISENSE	=	PMU_P3V3_G3W_SSD1_ISENSE
PMU_3V3_X_HI_ISENSE	=	PMU_3V3_X_HI_ISENSE
PMU_3V3_T_HI_ISENSE	=	PMU_3V3_T_HI_ISENSE
PMU_OTHER5V_HI_ISENSE	=	PMU_OTHER5V_HI_ISENSE

BOM_COST_GROUP=FAN

PAGE TITLE
Fans/SMC/AMUX Support

Apple Inc.

DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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DESIGN: X502/DEV_MLB_U
LAST CHANGE: Wed Feb 18 17.12.24 2015

PAGE TITLE

Audio Placeholder

Apple Inc.

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SIZE D
REVISION 4.0.0
BRANCH evt-0
PAGE 62 OF 200
SHEET 60 OF 131

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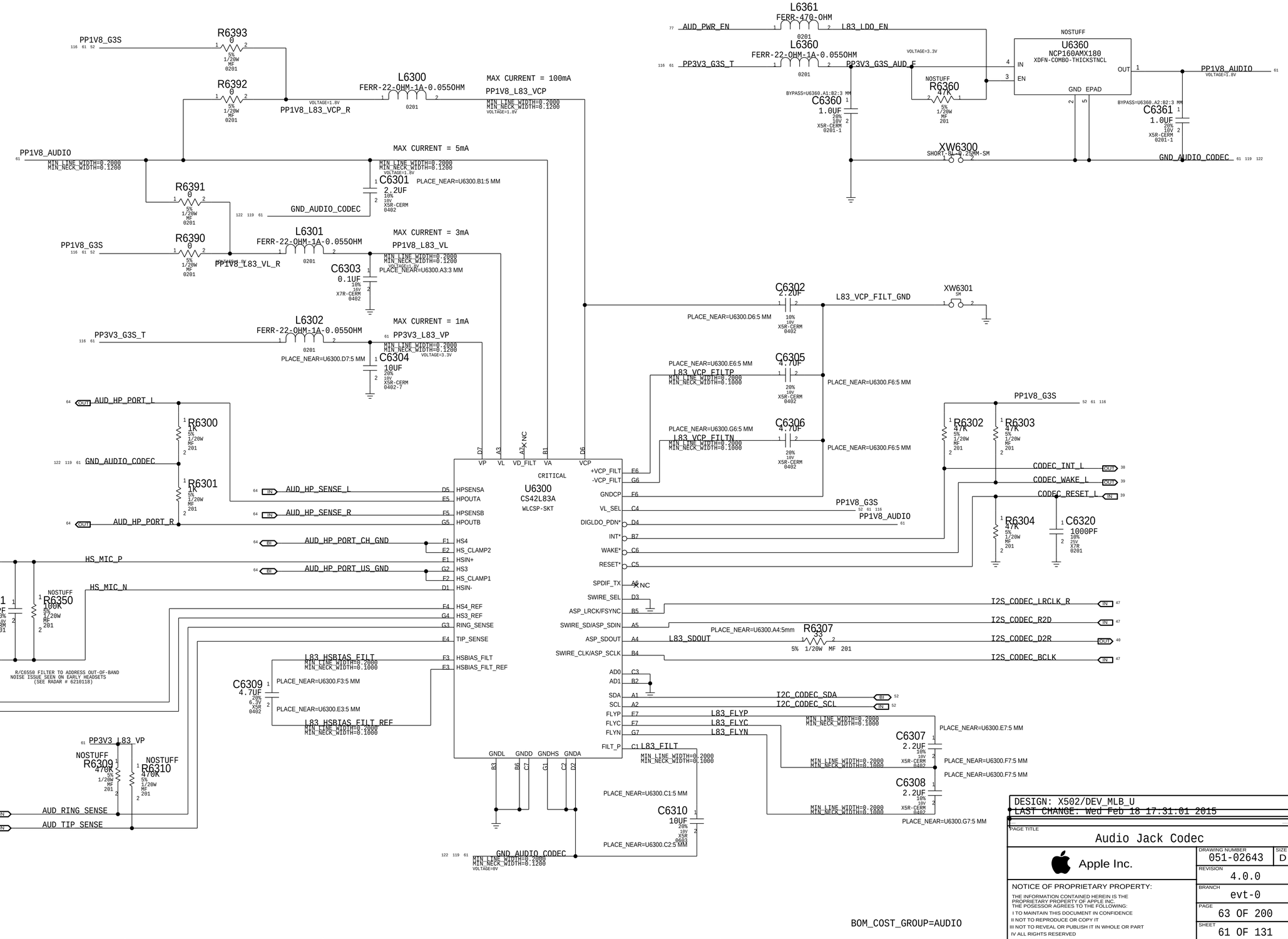
BOM_COST_GROUP=AUDIO

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



DESIGN: X502/DEV_MLB_U
LAST CHANGE: Wed Feb 18 17:31.01 2015

PAGE TITLE

Audio Jack Codec

Apple Inc.

DRAWING NUMBER 051-02643 | SIZE D
REVISION 4.0.0
BRANCH evt-0
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2X MONO SPEAKER LEFT AMPLIFIERS

APN: 353S01252
GAIN: 0DBFS = xxVRMS

MAX CURRENT = 15mA PER AMPLIFIER

PLACE_NEAR=U6400.C1:5 MM
PLACE_NEAR=U6400.C2:3 MM
PLACE_NEAR=U6400.C3:5 MM
PLACE_NEAR=U6400.C1:3 MM

PP1V8_G3S

R6400 47K 5% 1/20W MF 201 2
C6400 1UF 10% 10V X5R 402-1
C6401 0.1UF 10% 25V X7R-CERM-1 0402
C6402 1UF 10% 10V X5R 402-1
C6403 0.1UF 10% 25V X7R-CERM-1 0402

U6400
PTAS5770LB2
CSP
CRITICAL

SPKRAMP_RESET_L	C3	SDZ*
I2C_SPKRAMP_L_SDA	F3	SDA
I2C_SPKRAMP_L_SCL	F4	SCL
SPKRAMP_INT_L	D4	IRQZ
SPKRAMP_LW_MODE	D3	MODE
I2S_SPKRAMP_L_R2D	F2	SDIN
I2S_SPKRAMP_L_D2R	E1	SDOUT
I2S_SPKRAMP_L_LRCLK_R	E2	FSYNC
I2S_SPKRAMP_L_BCLK	F1	SBCLK
	E4	PDMD0
	E3	PDMCK0
	E5	PDMD1
	F5	PDMCK1
	C1	AVDD
	D2	IOVDD
	C4	VBAT
	C2	GND
	A4	PGND
	B4	PGND
SPKRAMP_LW_BSTP	B2	BST_P
SPKRAMP_LW_OUTP	A3	OUT_P
	B3	OUT_P
SPKRAMP_LW_SNSP	A1	VSNS_P
SPKRAMP_LW_BSTN	A2	BST_N
	A5	OUT_N
SPKRAMP_LW_OUTN	B5	OUT_N
SPKRAMP_LW_SNSN	B1	VSNS_N
SPKRAMP_LW_AREG	D5	AREG
SPKRAMP_LW_DREG	D1	DREG

R6401 47K 5% 1/20W MF 201
R6410 33 5% 1/20W MF 201
PLACE_NEAR=U6400.E1:5 MM

PLACE_NEAR=U6400.C4:3 MM
PLACE_NEAR=U6400.C4:10 MM
PLACE_NEAR=U6400.C4:10 MM

MAX CURRENT = 2A PER AMPLIFIER

PPBUS_G3H_SPKRAMPL

C6404 0.1UF 10% 25V X7R-CERM-1 0402
C6405 22UF 20% 25V X5R-CERM 0805-1
C6406 22UF 20% 25V X5R-CERM 0805-1
C6470 3.0PF +/-0.1PF 25V NP0-C0G 0201

SENSOR:DEV
NO_XNET_CONNECTION=1
CRITICAL
R6470 0.01 0.5% 1W MF 0612-6

PPBUS_G3H
TP_ISNS_SKPRLP
TP_ISNS_SKPRLN

C6411 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6400.B2:B3:5 MM
NO_XNET_CONNECTION=1

L6400 1800HM-3.4A 0806
PLACE_NEAR=U6400.A3:10 MM
CRITICAL

DIDT=TRUE
SHORT-8L-0.25MM-SM
XW6400
PLACE_NEAR=J6410.2:3 MM

BYPASS=U6400.A2:A5:5 MM
NO_XNET_CONNECTION=1

C6412 0.1UF 10% 25V X7R-CERM-1 0402

L6401 1800HM-3.4A 0806
PLACE_NEAR=U6400.A5:10 MM
CRITICAL

DIDT=TRUE
SHORT-8L-0.25MM-SM
XW6401
PLACE_NEAR=J6410.1:3 MM

LEFT WOOFER

SPKRCONN_LW_OUTP
SPKRCONN_LW_OUTN

APN: 518S0521
J6410 78171-0004 M-RT-SM

CRITICAL C6413 220PF 5% 25V C0G-CERM 0402
CRITICAL C6414 220PF 5% 25V C0G-CERM 0402

C6407 0.1UF 10% 25V X7R-CERM-1 0402
C6408 1UF 10% 10V X5R 402-1
C6409 0.1UF 10% 25V X7R-CERM-1 0402
C6410 1UF 10% 10V X5R 402-1

PLACE_NEAR=U6400.D1:3 MM
PLACE_NEAR=U6400.D1:5 MM
PLACE_NEAR=U6400.D2:3 MM
PLACE_NEAR=U6400.D5:5 MM

PLACE_NEAR=U6450.C1:5 MM
PLACE_NEAR=U6450.D2:5 MM
PLACE_NEAR=U6450.D2:3 MM
PLACE_NEAR=U6450.C1:3 MM

MAX CURRENT = 15mA PER AMPLIFIER

PP1V8_G3S

C6450 1UF 10% 10V X5R 402-1
C6451 0.1UF 10% 25V X7R-CERM-1 0402
C6452 1UF 10% 10V X5R 402-1
C6453 0.1UF 10% 25V X7R-CERM-1 0402

U6450
PTAS5770LB2
CSP
CRITICAL

SPKRAMP_RESET_L	C3	SDZ*
I2C_SPKRAMP_L_SDA	F3	SDA
I2C_SPKRAMP_L_SCL	F4	SCL
SPKRAMP_INT_L	D4	IRQZ
SPKRAMP_LT_MODE	D3	MODE
I2S_SPKRAMP_L_R2D	F2	SDIN
I2S_SPKRAMP_L_D2R	E1	SDOUT
I2S_SPKRAMP_L_LRCLK_R	E2	FSYNC
I2S_SPKRAMP_L_BCLK	F1	SBCLK
	E4	PDMD0
	E3	PDMCK0
	E5	PDMD1
	F5	PDMCK1
	C1	AVDD
	D2	IOVDD
	C4	VBAT
	C2	GND
	A4	PGND
	B4	PGND
SPKRAMP_LT_BSTP	B2	BST_P
SPKRAMP_LT_OUTP	A3	OUT_P
	B3	OUT_P
SPKRAMP_LT_SNSP	A1	VSNS_P
SPKRAMP_LT_BSTN	A2	BST_N
	A5	OUT_N
SPKRAMP_LT_OUTN	B5	OUT_N
SPKRAMP_LT_SNSN	B1	VSNS_N
SPKRAMP_LT_AREG	D5	AREG
SPKRAMP_LT_DREG	D1	DREG

R6460 33 5% 1/20W MF 201
PLACE_NEAR=U6450.E1:5 MM

PLACE_NEAR=U6450.C4:10 MM
PLACE_NEAR=U6450.C4:10 MM
PLACE_NEAR=U6450.C4:3 MM

MAX CURRENT = 2A PER AMPLIFIER

PPBUS_G3H_SPKRAMPL

C6454 0.1UF 10% 25V X7R-CERM-1 0402
C6455 22UF 20% 25V X5R-CERM 0805-1
C6456 22UF 20% 25V X5R-CERM 0805-1

C6461 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6450.B2:B3:5 MM
NO_XNET_CONNECTION=1

L6450 1800HM-3.4A 0806
PLACE_NEAR=U6450.A3:10 MM
CRITICAL

SHORT-8L-0.25MM-SM
XW6450
PLACE_NEAR=J6410.3:3 MM

C6462 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6450.A2:A5:5 MM
NO_XNET_CONNECTION=1

L6451 1800HM-3.4A 0806
PLACE_NEAR=U6450.A5:10 MM
CRITICAL

SHORT-8L-0.25MM-SM
XW6451
PLACE_NEAR=J6410.4:3 MM

LEFT TWEETER

SPKRCONN_LT_OUTP
SPKRCONN_LT_OUTN

CRITICAL C6463 220PF 5% 25V C0G-CERM 0402
CRITICAL C6464 220PF 5% 25V C0G-CERM 0402

C6457 0.1UF 10% 25V X7R-CERM-1 0402
C6458 1UF 10% 10V X5R 402-1
C6459 0.1UF 10% 25V X7R-CERM-1 0402
C6460 1UF 10% 10V X5R 402-1

PLACE_NEAR=U6450.D1:3 MM
PLACE_NEAR=U6450.D1:5 MM
PLACE_NEAR=U6450.D2:3 MM
PLACE_NEAR=U6450.D5:5 MM

LEFT BULK CAPACITANCE

CAPDERATE C6480 330UF 20% 16V TANT-POLY CASE-B3
CAPDERATE C6481 330UF 20% 16V TANT-POLY CASE-B3
CAPDERATE C6482 330UF 20% 16V TANT-POLY CASE-B3
CAPDERATE C6483 330UF 20% 16V TANT-POLY CASE-B3
CAPDERATE C6484 330UF 20% 16V TANT-POLY CASE-B3
CAPDERATE C6485 330UF 20% 16V TANT-POLY CASE-B3
CAPDERATE
CAPDERATE

PPBUS_G3H_SPKRAMPL

PP1V8_G3S

NOSTUFF R6480 10K 5% 1/20W MF 201
NOSTUFF R6482 2.2K 5% 1/20W MF 201
R6481 470 5% 1/20W MF 201
R6483 0 5% 1/20W MF 0201

SPKRAMP_LW_MODE
SPKRAMP_LT_MODE

I2C ADDRESS

MODE PIN	7-BIT	CHANNEL
GND	0x31	L TW
470 to GND	0x32	L WF
470 to IOVDD	0x33	R TW
2K2 to GND	0x34	R WF
2K2 to IOVDD	0x35	
10K to GND	0x36	
10K to IOVDD	0x37	
47K to IOVDD	0x38	

BOM_COST_GROUP=AUDIO

SYNC_MASTER=TROY
SYNC_DATE=12/11/2017

PAGE TITLE: Audio Left Amplifiers

Apple Inc.

DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
PAGE: 64 OF 200
SHEET: 62 OF 131

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2X MONO SPEAKER RIGHT AMPLIFIERS

APN: 353S01252
GAIN: 0DBFS = xxVRMS

MAX CURRENT = 15mA PER AMPLIFIER

PP1V8_G3S

C6508 1UF 10% 10V X5R 402-1
C6500 0.1UF 10% 25V X7R-CERM-1 0402
C6509 1UF 10% 10V X5R 402-1
C6505 0.1UF 10% 10V X5R-CERM 0201

PLACE_NEAR=U6500.D2:3 MM
PLACE_NEAR=U6500.C4:3 MM
PLACE_NEAR=U6500.C1:5 MM

MAX CURRENT = 2A PER AMPLIFIER

PPBUS_G3H

C6501 0.1UF 10% 25V X7R-CERM-1 0402
C6503 22UF 20% 25V X5R-CERM 0805-1
C6504 22UF 20% 25V X5R-CERM 0805-1

PLACE_NEAR=U6500.C4:10 MM
PLACE_NEAR=U6500.C4:10 MM
PLACE_NEAR=U6500.C4:3 MM

U6500
PTAS5770LB2
CSP
CRITICAL

AVDD, IOVDD, VBAT, GND, PGND

SPKRAMP_RESET_L
I2C_SPKRAMP_R_SDA
I2C_SPKRAMP_R_SCL
SPKRAMP_INT_L
SPKRAMP_RW_MODE
I2S_SPKRAMP_R_R2D
I2S_SPKRAMP_L_D2R
I2S_SPKRAMP_R_LRCLK_R
I2S_SPKRAMP_R_BCLK

R6510 33 5% 1/20W MF 201
PLACE_NEAR=U6500.E1:5 MM
I2S_SPKRAMP_R_D2R_R1

SDZ*, SDA, SCL, IRQZ, MODE, SDIN, SDOUT, FSYNC, SBCLK, PDMD0, PDMCK0, PDMD1, PDMCK1

BST_P, OUT_P, OUT_P, VSNS_P, BST_N, OUT_N, OUT_N, VSNS_N, AREG, DREG

SPKRAMP_RT_BSTP
SPKRAMP_RT_OUTP
SPKRAMP_RT_SNSP
SPKRAMP_RT_BSTN
SPKRAMP_RT_OUTN
SPKRAMP_RT_SNSN
SPKRAMP_RT_AREG
SPKRAMP_RT_DREG

DIDT=TRUE

C6511 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6500.B2:B3:5 MM
NO_XNET_CONNECTION=1

C6512 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6500.A2:A5:5 MM
NO_XNET_CONNECTION=1

L6500 1800HM-3.4A 0806
L6501 1800HM-3.4A 0806
CRITICAL
PLACE_NEAR=U6500.A3:10 MM
PLACE_NEAR=U6500.A5:10 MM

XW6500 SHORT-8L-0.25MM-SM
PLACE_NEAR=J6500.2:3 MM
XW6501
PLACE_NEAR=J6500.1:3 MM

C6513 0.1UF 10% 25V X7R-CERM-1 0402
C6514 1UF 10% 10V X5R 402-1
C6515 0.1UF 10% 25V X7R-CERM-1 0402
C6516 1UF 10% 10V X5R 402-1
PLACE_NEAR=U6500.D1:3 MM
PLACE_NEAR=U6500.D4:5 MM
PLACE_NEAR=U6500.D3:3 MM
PLACE_NEAR=U6500.D5:5 MM

RIGHT TWEETER

SPKRCONN_RT_OUTP
SPKRCONN_RT_OUTN

C6506 220PF 5% 25V C0G-CERM 0402
C6507 220PF 5% 25V C0G-CERM 0402
CRITICAL

PP1V8_G3S
R6590 47K 5% 1/20W MF 201
SPKR_ID0
APN: 518S0672
J6500 781T1-6006 M-RT-SM

MAX CURRENT = 15mA PER AMPLIFIER

PP1V8_G3S

C6558 1UF 10% 10V X5R 402-1
C6550 0.1UF 10% 25V X7R-CERM-1 0402
C6559 1UF 10% 10V X5R 402-1
C6555 0.1UF 10% 25V X7R-CERM-1 0402

PLACE_NEAR=U6550.D2:3 MM
PLACE_NEAR=U6550.C4:3 MM
PLACE_NEAR=U6550.C1:5 MM

MAX CURRENT = 2A PER AMPLIFIER

PPBUS_G3H

C6551 0.1UF 10% 25V X7R-CERM-1 0402
C6553 22UF 20% 25V X5R-CERM 0805-1
C6554 22UF 20% 25V X5R-CERM 0805-1

PLACE_NEAR=U6550.C4:10 MM
PLACE_NEAR=U6550.C4:10 MM
PLACE_NEAR=U6550.C4:3 MM

U6550
PTAS5770LB2
CSP
CRITICAL

AVDD, IOVDD, VBAT, GND, PGND

SPKRAMP_RESET_L
I2C_SPKRAMP_R_SDA
I2C_SPKRAMP_R_SCL
SPKRAMP_INT_L
SPKRAMP_RW_MODE
I2S_SPKRAMP_R_R2D
I2S_SPKRAMP_L_D2R
I2S_SPKRAMP_R_LRCLK_R
I2S_SPKRAMP_R_BCLK

R6560 33 5% 1/20W MF 201
PLACE_NEAR=U6550.E1:5 MM
I2S_SPKRAMP_R_D2R_R2

SDZ*, SDA, SCL, IRQZ, MODE, SDIN, SDOUT, FSYNC, SBCLK, PDMD0, PDMCK0, PDMD1, PDMCK1

BST_P, OUT_P, OUT_P, VSNS_P, BST_N, OUT_N, OUT_N, VSNS_N, AREG, DREG

SPKRAMP_RW_BSTP
SPKRAMP_RW_OUTP
SPKRAMP_RW_SNSP
SPKRAMP_RW_BSTN
SPKRAMP_RW_OUTN
SPKRAMP_RW_SNSN
SPKRAMP_RW_AREG
SPKRAMP_RW_DREG

DIDT=TRUE

C6561 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6550.B2:B3:5 MM
NO_XNET_CONNECTION=1

C6562 0.1UF 10% 25V X7R-CERM-1 0402
BYPASS=U6550.A2:A5:5 MM
NO_XNET_CONNECTION=1

L6550 1800HM-3.4A 0806
L6551 1800HM-3.4A 0806
CRITICAL
PLACE_NEAR=U6550.A3:10 MM
PLACE_NEAR=U6550.A5:10 MM

XW6550 SHORT-8L-0.25MM-SM
PLACE_NEAR=J6500.5:3 MM
XW6551
PLACE_NEAR=J6500.6:3 MM

C6563 0.1UF 10% 25V X7R-CERM-1 0402
C6564 1UF 10% 10V X5R 402-1
C6565 0.1UF 10% 25V X7R-CERM-1 0402
C6566 1UF 10% 10V X5R 402-1
PLACE_NEAR=U6550.D5:5 MM
PLACE_NEAR=U6550.D4:5 MM
PLACE_NEAR=U6550.D3:3 MM
PLACE_NEAR=U6550.D1:3 MM

RIGHT WOOFER

SPKRCONN_RW_OUTP
SPKRCONN_RW_OUTN

C6556 220PF 5% 25V C0G-CERM 0402
C6557 220PF 5% 25V C0G-CERM 0402
CRITICAL

CAPDERATE
PPBUS_G3H
C6580 33UF 20% 16V TANT-POLY CASE-B3
C6581 33UF 20% 16V TANT-POLY CASE-B3
C6582 33UF 20% 16V TANT-POLY CASE-B3
C6583 33UF 20% 16V TANT-POLY CASE-B3
C6584 33UF 20% 16V TANT-POLY CASE-B3
C6585 33UF 20% 16V TANT-POLY CASE-B3

PP1V8_G3S
R6580 470 5% 1/20W MF 201
NOSTUFF R6582 2.2K 5% 1/20W MF 201
SPKRAMP_RT_MODE
SPKRAMP_RW_MODE
NOSTUFF R6581 0 5% 1/20W MF 0201
R6583 2.2K 5% 1/20W MF 201

I2C ADDRESS

MODE PIN	7-BIT	CHANNEL
GND	0x31	L TW
470 to GND	0x32	L WF
470 to IOVDD	0x33	R TW
2K2 to GND	0x34	R WF
2K2 to IOVDD	0x35	
10k to GND	0x36	
10k to IOVDD	0x37	
47k to IOVDD	0x38	

BOM_COST_GROUP=AUDIO

PAGE TITLE: Audio Right Amplifiers

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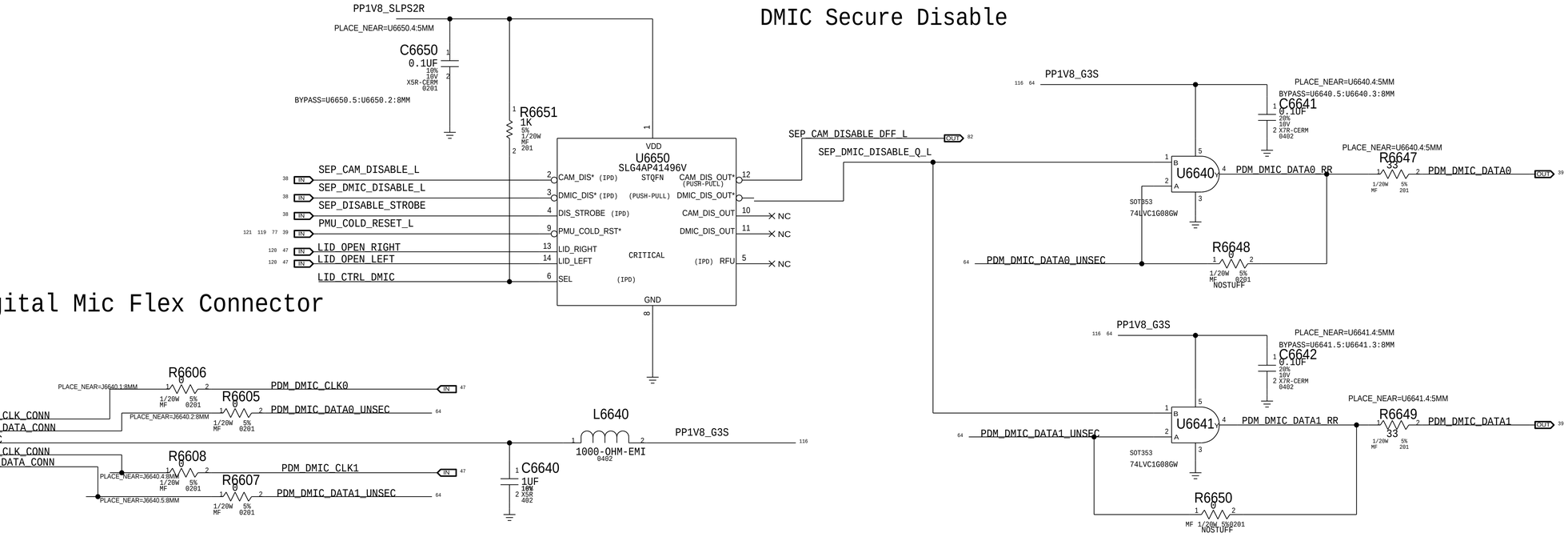
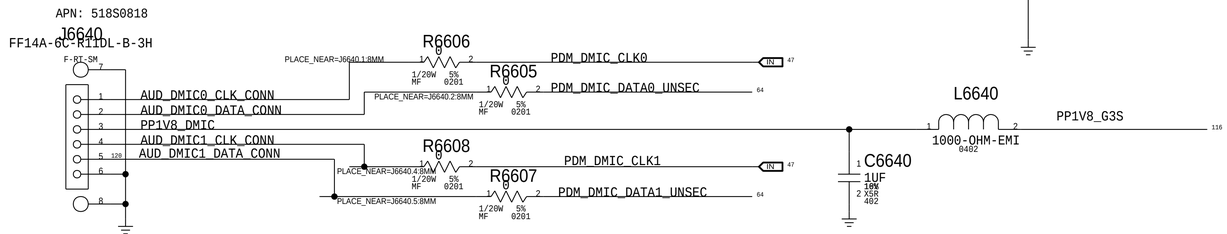
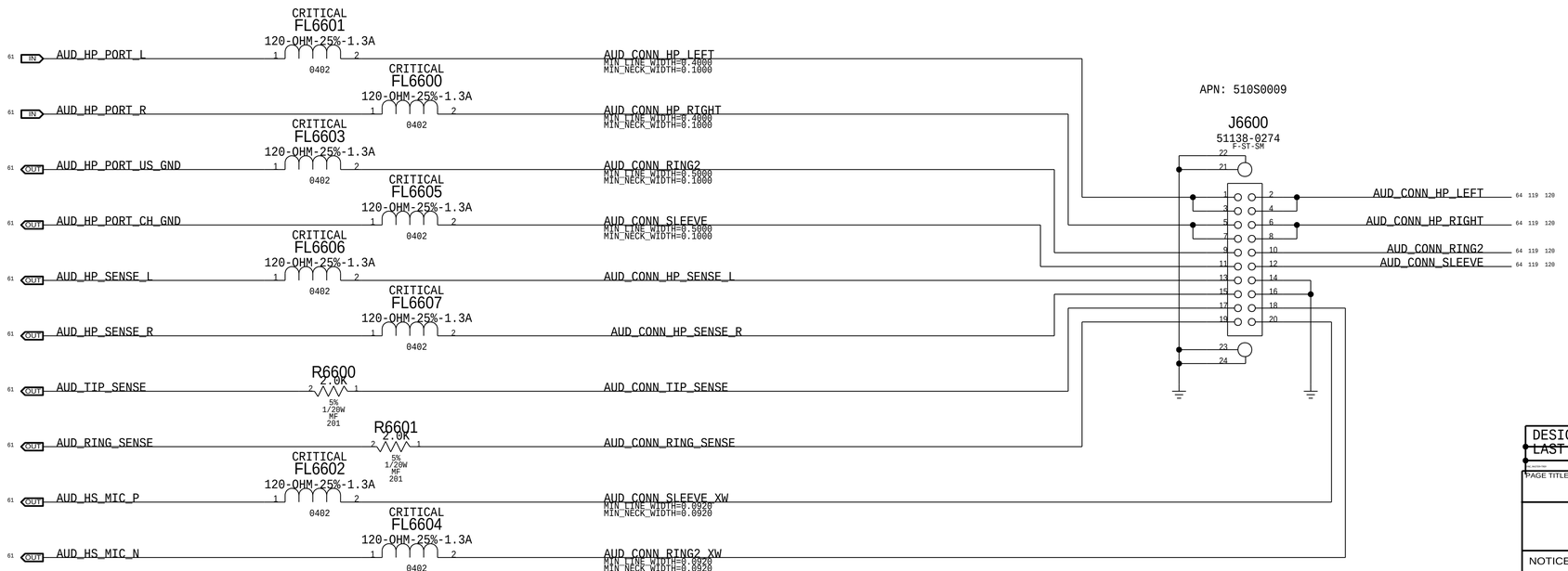
DMIC Secure Disable



Digital Mic Flex Connector



Audio Jack Flex Connector



DESIGN: X502/DEV_MLB_U
LAST CHANGE: Wed Feb 18 17:12:24 2015

PAGE TITLE

Audio Flex Connectors

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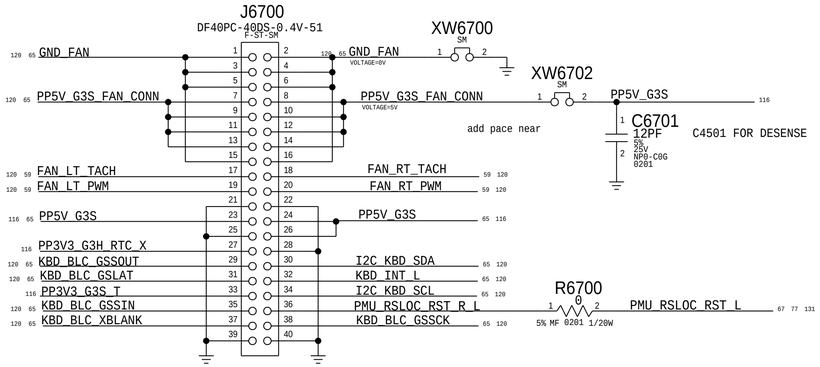
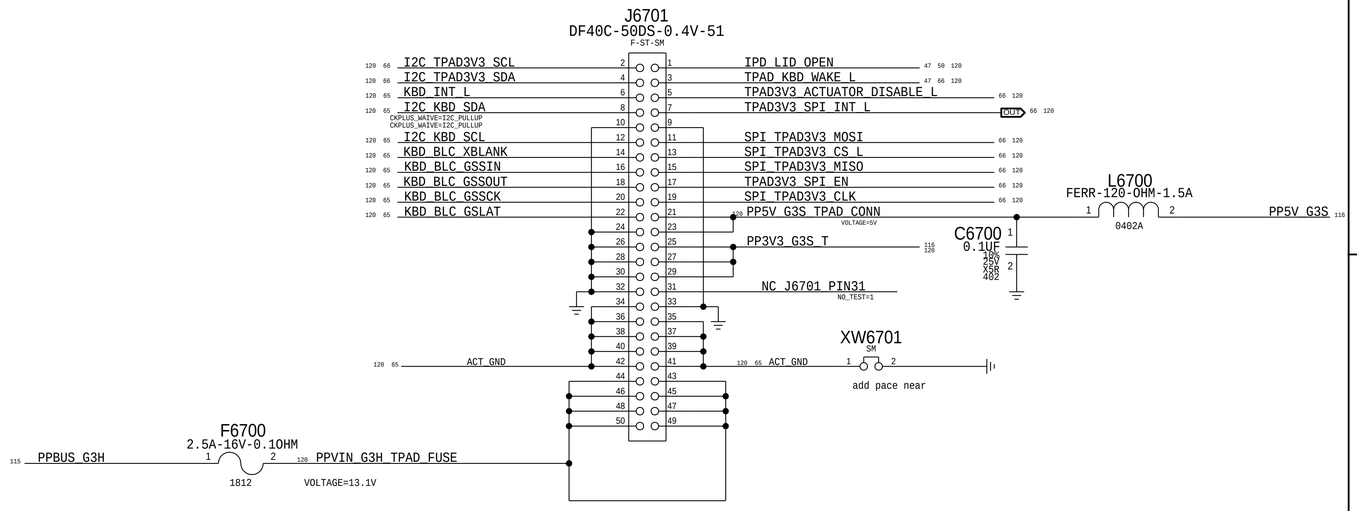
KBD CONNECTOR



516S00177 (RCPT, 0.3A per pin)
MATE WITH PLUG 516S00054

TPAD CONNECTOR



516S00187, MATE WITH 516S00188

BOM_COST_GROUP=KEYBOARD

SYNC_MASTER=1332 SYNC_DATE=03/23/2017

PAGE TITLE: Keyboard & Trackpad 1

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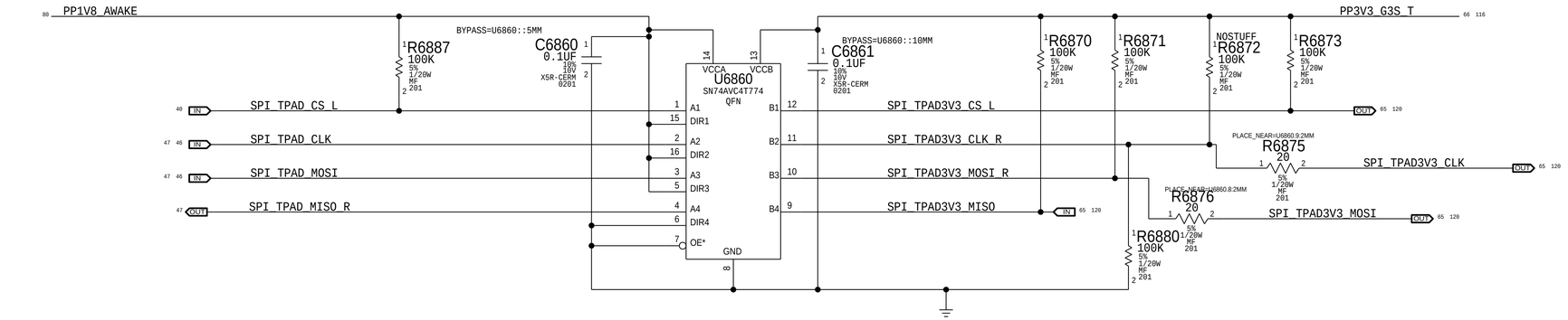
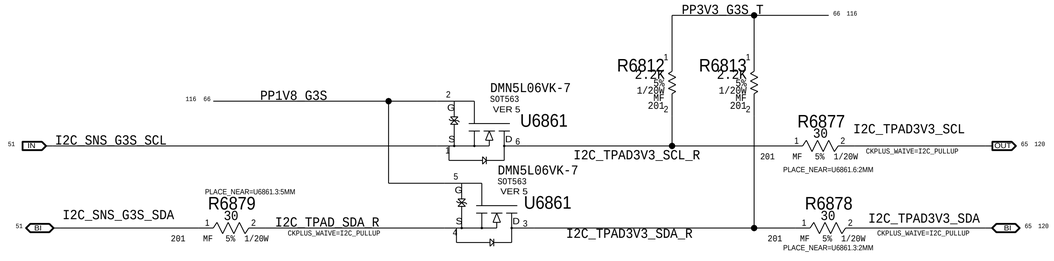
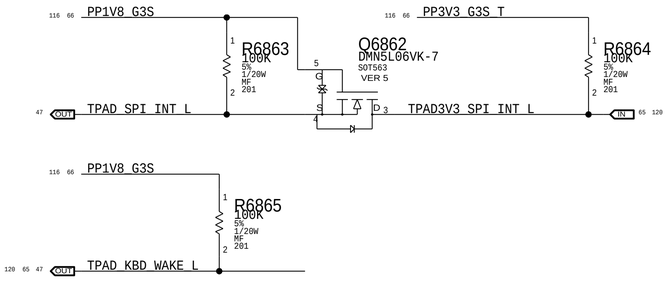
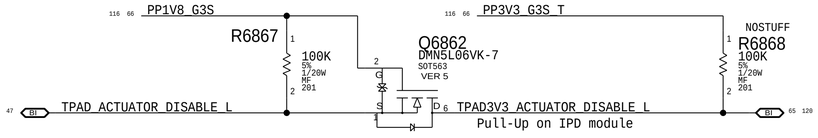
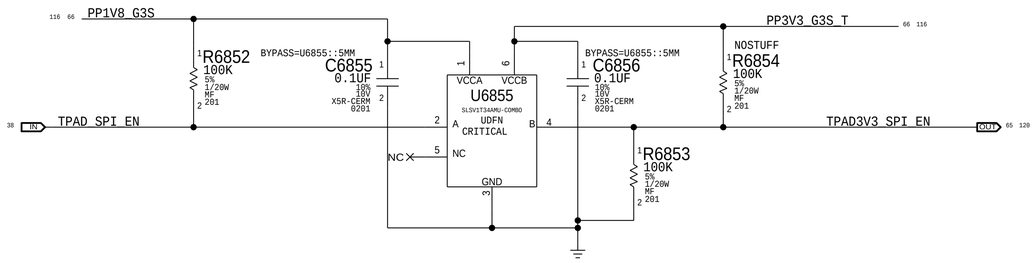
Trackpad Level Shifting











BOM_COST_GROUP=KEYBOARD

SYNC_MASTER=j132 SYNC_DATE=03/23/2017

PAGE TITLE: Keyboard & Trackpad 2

Apple Inc.

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BRANCH: evt-0

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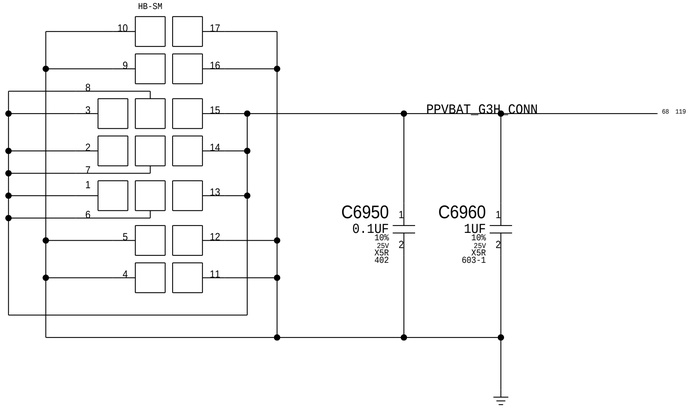
J80 Battery Hotbar Flex Pads 998-03902
Flex Pad TO MLB 998-03780.

CRITICAL
OMIT_TABLE

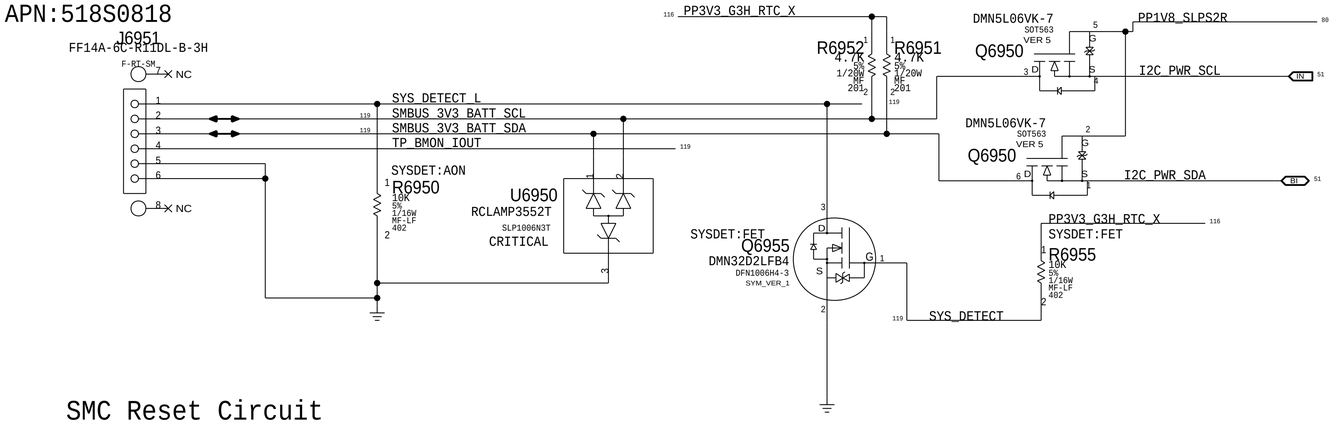
J6950
PWR-MLB-X363
HB-SM



BMU POWER FLEX HOTBAR'd TO THE MLB:

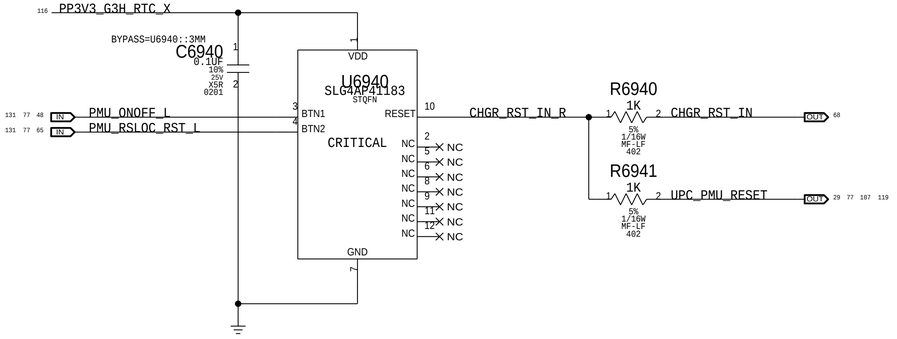
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
632-00862	1	PCBA,FLEX,BMU PWR,X363	J6950	CRITICAL	

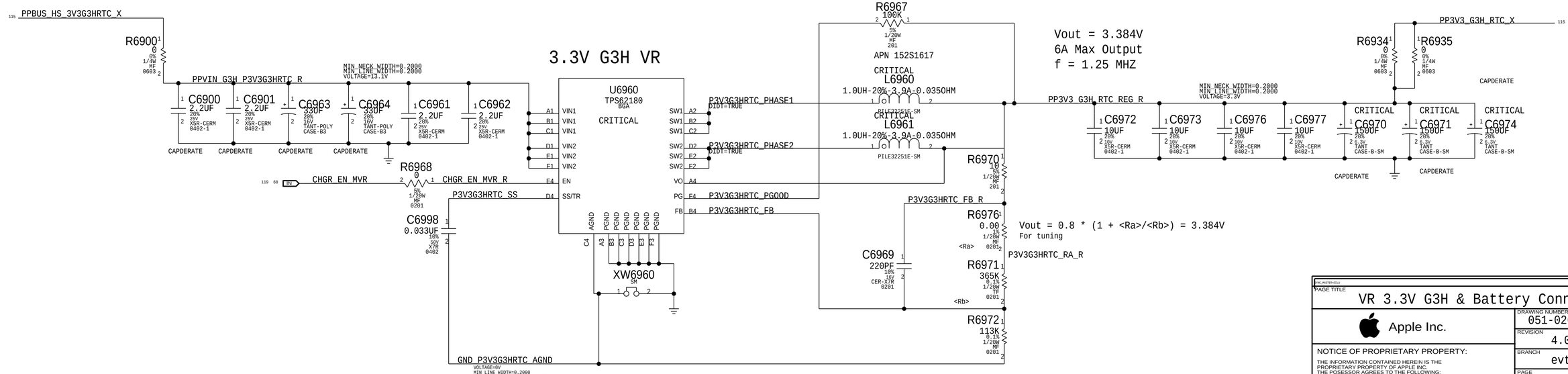
APN:518S0818



SMC Reset Circuit

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





BOM_COST_GROUP=PLATFORM POWER

PAGE TITLE

VR 3.3V G3H & Battery Conn

Apple Inc.

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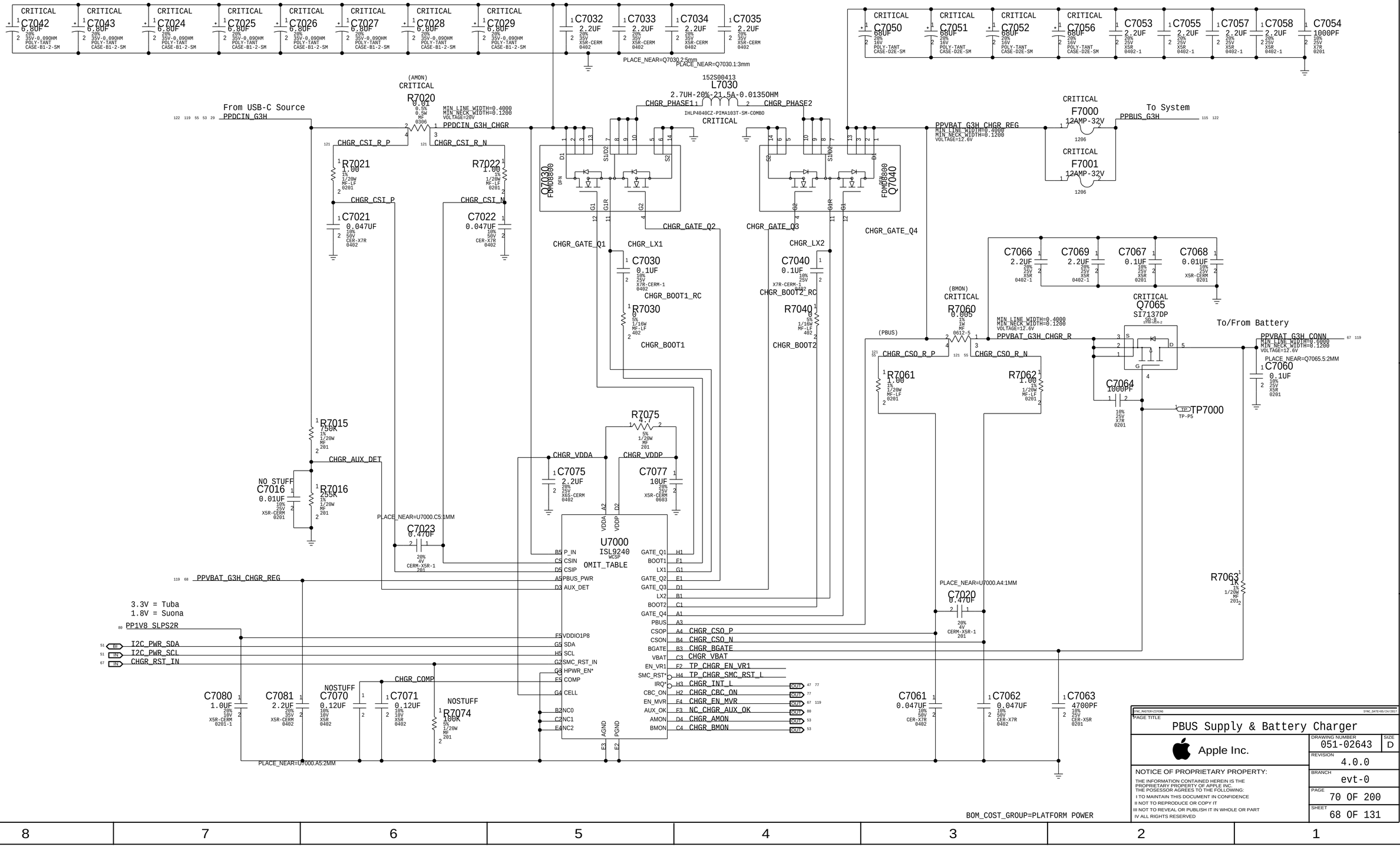
C7042 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7043 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7024 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7025 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7026 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7027 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7028 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7029 6.80UF 20% 35V-0.090HM POLY-TANT CASE-B1-2-SM
C7032 2.2UF 20% 25V X5R-CERM 0402
C7033 2.2UF 20% 25V X5R-CERM 0402
C7034 2.2UF 20% 25V X5R-CERM 0402
C7035 2.2UF 20% 25V X5R-CERM 0402
PLACE_NEAR=Q7030.2:5mm
PLACE_NEAR=Q7030.1:3mm
C7050 68UF 20% 16V POLY-TANT CASE-D2E-SM
C7051 68UF 20% 16V POLY-TANT CASE-D2E-SM
C7052 68UF 20% 16V POLY-TANT CASE-D2E-SM
C7056 68UF 20% 16V POLY-TANT CASE-D2E-SM
C7053 2.2UF 20% 25V X5R 0402-1
C7055 2.2UF 20% 25V X5R 0402-1
C7057 2.2UF 20% 25V X5R 0402-1
C7058 2.2UF 20% 25V X5R 0402-1
C7054 1000PF 10% 25V X7R 0201
(AMON)
CRITICAL
R7020 0.01 0.5% 0.5W MF 0306
MIN_LINE_WIDTH=0.4000
MIN_NECK_WIDTH=0.1200
VOLTAGE=20V
From USB-C Source
PPDCIN_G3H
PPDCIN_G3H_CHGR
CHGR_CSI_R_P
CHGR_CSI_R_N
R7021 1.00 1% 1/20W MF-LF 0201
R7022 1.00 1% 1/20W MF-LF 0201
CHGR_CSI_P
CHGR_CSI_N
C7021 0.047UF 10% 50V CER-X7R 0402
C7022 0.047UF 10% 50V CER-X7R 0402
152S00413
L7030
2.7UH-20%-21.5A-0.01350HM
IHLP4040CZ-PIMA103T-SM-COMBO
CHGR_PHASE1
CHGR_PHASE2
CRITICAL
Q7030 FDMD8800 DFN
Q7040 FDMD8800 DFN
CHGR_GATE_Q1
CHGR_GATE_Q2
CHGR_GATE_Q3
CHGR_GATE_Q4
CHGR_LX1
CHGR_LX2
C7030 0.1UF 10% 25V X7R-CERM-1 0402
C7040 0.1UF 10% 25V X7R-CERM-1 0402
CHGR_BOOT1_RC
CHGR_BOOT2_RC
R7030 0 5% 1/16W MF-LF 402
R7040 0 5% 1/16W MF-LF 402
CHGR_BOOT1
CHGR_BOOT2
PPVBAT_G3H_CHGR_REG
MIN_LINE_WIDTH=0.4000
MIN_NECK_WIDTH=0.1200
VOLTAGE=12.6V
CRITICAL
F7000 12AMP-32V 1206
F7001 12AMP-32V 1206
To System
PPBUS_G3H
C7066 2.2UF 20% 25V X5R 0402-1
C7069 2.2UF 20% 25V X5R 0402-1
C7067 0.1UF 10% 25V X5R 0201
C7068 0.01UF 10% 25V X5R-CERM 0201
(BMON)
CRITICAL
R7060 0.005 1% 1W MF 0612-5
MIN_LINE_WIDTH=0.4000
MIN_NECK_WIDTH=0.1200
VOLTAGE=12.6V
PPVBAT_G3H_CHGR_R
CRITICAL
Q7065 SI7137DP SO-8
To/From Battery
PPVBAT_G3H_CONN
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1200
VOLTAGE=12.6V
PLACE_NEAR=Q7065.5:2MM
C7060 0.1UF 10% 25V X5R 0201
C7064 1000PF 10% 25V X7R 0201
TP7000 TP-P5
(PBUS)
CHGR_CSO_R_P
CHGR_CSO_R_N
R7061 1.00 1% 1/20W MF-LF 0201
R7062 1.00 1% 1/20W MF-LF 0201
R7015 750K 1% 1/20W MF 201
CHGR_AUX_DET
NO_STUFF
C7016 0.01UF 10% 25V X5R-CERM 0201
R7016 255K 1% 1/20W MF 201
R7075 4.7 5% 1/20W MF 201
CHGR_VDDA
CHGR_VDDP
C7075 2.2UF 20% 25V X6S-CERM 0402
C7077 10UF 20% 25V X5R-CERM 0603
PLACE_NEAR=U7000.C5:1MM
C7023 0.47UF 20% 4V CERM-X5R-1 201
U7000
ISL9240
WCSP
OMIT_TABLE
PPVBAT_G3H_CHGR_REG
PLACE_NEAR=U7000.A4:1MM
C7020 0.47UF 20% 4V CERM-X5R-1 201
R7063 1K 1% 1/20W MF 201
3.3V = Tuba
1.8V = Suona
PP1V8_SLPS2R
I2C_PWR_SDA
I2C_PWR_SCL
CHGR_RST_IN
CHGR_COMP
C7080 1.0UF 20% 10V X5R-CERM 0201-1
C7081 2.2UF 20% 35V X5R-CERM 0402
NOSTUFF
C7070 0.12UF 10% 10V X5R 0402
C7071 0.12UF 10% 10V X5R 0402
NOSTUFF
R7074 100K 5% 1/20W MF 201
PLACE_NEAR=U7000.A5:2MM
C7061 0.047UF 10% 50V CER-X7R 0402
C7062 0.047UF 10% 50V CER-X7R 0402
C7063 4700PF 10% 25V CER-X5R 0201
BOM_COST_GROUP=PLATFORM POWER
PBUS Supply & Battery Charger
Apple Inc.
DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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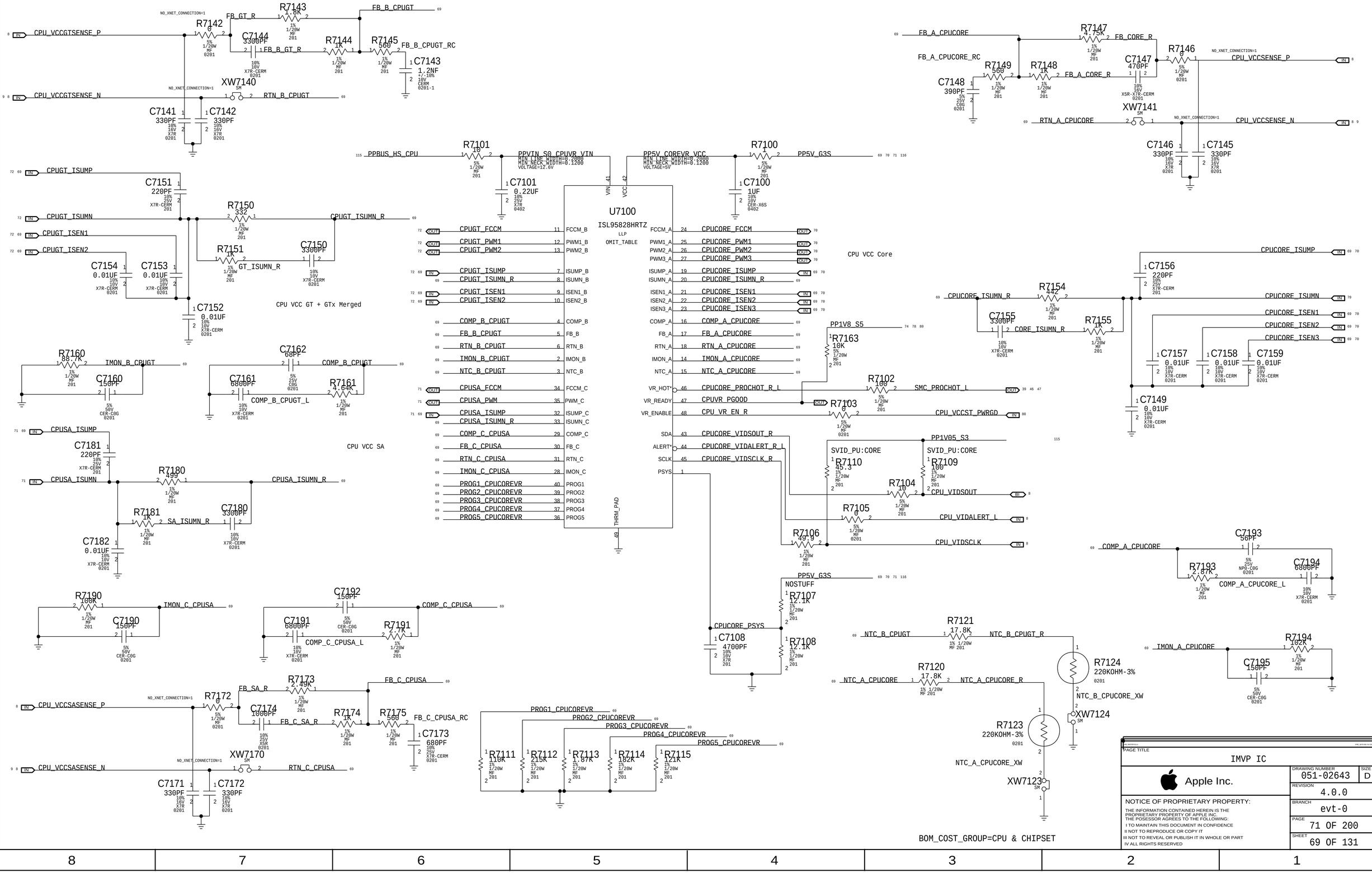
CPU_VCCGTSENSE_P
CPU_VCCGTSENSE_N
R7142
C7144
3300PF
R7143
1.8K
FB_GT_R
FB_B_CPUGT
R7144
1K
R7145
560
FB_B_CPUGT_RC
C7143
1.2NF
XW7140
RTN_B_CPUGT
C7141
330PF
C7142
330PF
CPUGT_ISUMP
C7151
220PF
CPUGT_ISUMN
R7150
332
CPUGT_ISUMN_R
CPUGT_ISEN1
CPUGT_ISEN2
C7154
0.01UF
C7153
0.01UF
R7151
1K
GT_ISUMN_R
C7150
3300PF
C7152
0.01UF
CPU VCC GT + GTx Merged
R7160
88.7K
IMON_B_CPUGT
C7160
150PF
C7162
68PF
COMP_B_CPUGT
C7161
6800PF
COMP_B_CPUGT_L
R7161
4.64K
CPUSA_ISUMP
C7181
220PF
CPUSA_ISUMN
R7180
499
CPUSA_ISUMN_R
R7181
1K
SA_ISUMN_R
C7180
3300PF
C7182
0.01UF
CPU VCC SA
R7190
100K
IMON_C_CPUSA
C7190
150PF
C7192
150PF
COMP_C_CPUSA
C7191
6800PF
COMP_C_CPUSA_L
R7191
2.7K
CPU_VCCSASENSE_P
CPU_VCCSASENSE_N
R7172
0
FB_SA_R
R7173
2.49K
FB_C_CPUSA
C7174
1000PF
FB_SA_R
R7174
1K
R7175
560
FB_C_CPUSA_RC
C7173
680PF
XW7170
RTN_C_CPUSA
C7171
330PF
C7172
330PF
R7101
10
PPVBUS_HS_CPU
PPVIN_S0_CPUVR_VIN
C7101
0.22UF
R7100
1
PP5V_G3S
PP5V_COREVR_VCC
C7100
1UF
U7100
ISL95828HRTZ
LLP
OMIT_TABLE
VIN_41
VCC_42
THRM_PAD
49
CPUGT_FCCM
CPUGT_PWM1
CPUGT_PWM2
CPUGT_ISUMP
CPUGT_ISUMN_R
CPUGT_ISEN1
CPUGT_ISEN2
COMP_B_CPUGT
FB_B_CPUGT
RTN_B_CPUGT
IMON_B_CPUGT
NTC_B_CPUGT
CPUSA_FCCM
CPUSA_PWM
CPUSA_ISUMP
CPUSA_ISUMN_R
COMP_C_CPUSA
FB_C_CPUSA
RTN_C_CPUSA
IMON_C_CPUSA
PROG1_CPUCOREVR
PROG2_CPUCOREVR
PROG3_CPUCOREVR
PROG4_CPUCOREVR
PROG5_CPUCOREVR
CPUCORE_FCCM
CPUCORE_PWM1
CPUCORE_PWM2
CPUCORE_PWM3
CPUCORE_ISUMP
CPUCORE_ISUMN_R
CPUCORE_ISEN1
CPUCORE_ISEN2
CPUCORE_ISEN3
COMP_A_CPUCORE
FB_A_CPUCORE
RTN_A_CPUCORE
IMON_A_CPUCORE
NTC_A_CPUCORE
CPUCORE_PROCHOT_R_L
CPUVR_PGOOD
CPU_VR_EN_R
CPUCORE_VIDSOUT_R
CPUCORE_VIDALERT_R_L
CPUCORE_VIDSCLK_R
CPUCORE_PSYS
CPU VCC Core
PP1V8_S5
R7163
10K
R7102
100
SMC_PROCHOT_L
R7103
0
CPU_VCCST_PWRGD
PP1V05_S3
SVID_PU:CORE
R7110
45.3
R7109
100
R7104
10
CPU_VIDSOUT
R7105
0
CPU_VIDALERT_L
R7106
49.9
CPU_VIDSCLK
PP5V_G3S
NOSTUFF
R7107
12.1K
R7108
12.1K
C7108
4700PF
R7111
110K
R7112
215K
R7113
1.87K
R7114
182K
R7115
121K
R7121
17.8K
NTC_B_CPUGT_R
R7124
220KOHM-3%
NTC_B_CPUCORE_XW
XW7124
R7120
17.8K
NTC_A_CPUCORE_R
R7123
220KOHM-3%
NTC_A_CPUCORE_XW
XW7123
FB_A_CPUCORE
FB_A_CPUCORE_RC
R7147
4.75K
FB_CORE_R
R7149
560
R7148
1K
FB_A_CORE_R
C7147
470PF
C7148
390PF
R7146
0
CPU_VCCSENSE_P
XW7141
RTN_A_CPUCORE
CPU_VCCSENSE_N
C7146
330PF
C7145
330PF
CPUCORE_ISUMP
CPUCORE_ISUMN_R
R7154
442
CPUCORE_ISUMN
CPUCORE_ISEN1
CPUCORE_ISEN2
CPUCORE_ISEN3
C7155
3300PF
CORE_ISUMN_R
R7155
1K
C7156
220PF
C7157
0.01UF
C7158
0.01UF
C7159
0.01UF
C7149
0.01UF
C7193
56PF
R7193
2.87K
COMP_A_CPUCORE_L
C7194
6800PF
R7194
102K
C7195
150PF
BOM_COST_GROUP=CPU & CHIPSET
PAGE TITLE
IMVP IC
Apple Inc.
DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
PAGE 71 OF 200
SHEET 69 OF 131
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PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00519	3	IC,SIC635,DRMOS,IMVP-8,40A,PQFN31,5X5	U7210,U7220,U7230	CRITICAL	

SYNC_MASTER=ELU SYNC_DATE=05/24/2017

PAGE TITLE

IMVP VCC Block

Apple Inc.

DRAWING NUMBER 051-02643

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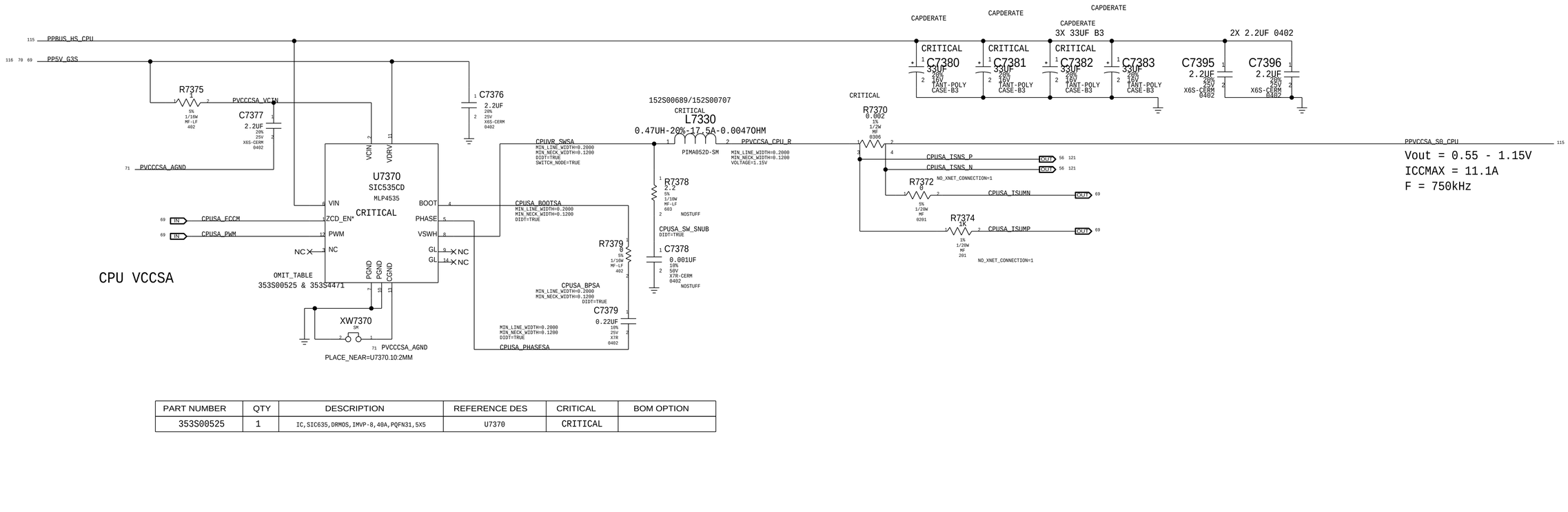

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00525	1	IC,SIC635,DRMOS,IMVP-8,40A,PQFN31,5X5	U7370	CRITICAL	

BOM_COST_GROUP=CPU & CHIPSET

SYNC_MASTER=S11U SYNC_DATE=05/19/2017

PAGE TITLE

IMVP SA Block

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DRAWING NUMBER 051-02643 SIZE D

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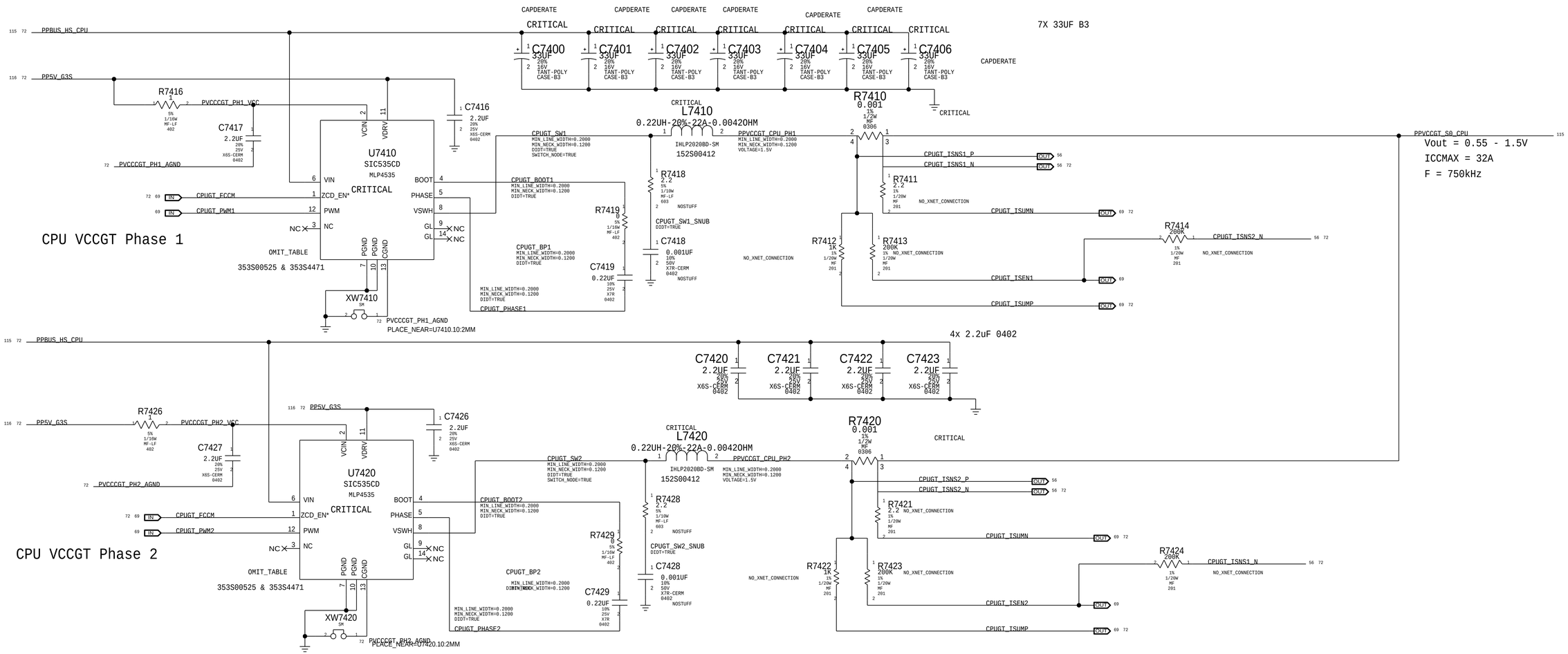

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00525	2	IC,SIC635,DRMOS,IMVP-8,40A,PQFN31,5X5	U7410,U7420	CRITICAL	

BOM_COST_GROUP=CPU & CHIPSET

PAGE TITLE

IMVP GT Block

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5V S0 - V5

3.3V DSW - V6

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
152S00703	1	IND,MLD,2.2UH,20%,43mOHM,5.5A,4.2x4x2MM	L7600	CRITICAL	

BOM_COST_GROUP=PLATFORM POWER

PAGE TITLE	Power - 5V 3.3V Supply
	Apple Inc.
DRAWING NUMBER	051-02643
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REVISION	4.0.0
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2.5V VPP

PPBUS_HS_CPU

CAPDERATE

CRITICAL C7700 12PF 5% 25V NP0-C0G 0201

CRITICAL C7701 3.0PF +/-0.1PF 25V NP0-C0G 0201

CRITICAL C7702 33UF 20% 16V TANT-POLY CASE-B3

CRITICAL C7703 2.2UF 20% 25V X6S-CERM 0402

CRITICAL C7704 2.2UF 20% 25V X6S-CERM 0402

R7700 10 5% 1/20W MF 201

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=2.5V

PPVIN_S3_DDR2V5_RC

PVDDQ_EN

R7709 0 5% 1/20W MF 0201

PVPP_EN_R

R8153 47K 5% 1/20W MF 201

U7700
TPS62130B-S
VQFN

AVIN, DEF, EN, FSW, PVIN, PGND, AGND, THRM PAD

SW: REG_PHASE_2V5S3
DIDT=TRUE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

CRITICAL L7700 1.5UH-20%-2.61A-0.068OHM
PIFE32251B-SM
MIN_LINE_WIDTH=0.6020
MIN_NECK_WIDTH=0.0850
VOLTAGE=2.5V

P2V5S3_REG

SENSOR:DEV
R7724 0.005 1% 1W CYN 0612

ISNS_2V5_S3_N
ISNS_2V5_S3_P

R7701 10 5% 1/20W MF 201

VOS: REG_VOS_P2V5S3

FB: REG_FB_P2V5S3

PG: P2V5_VPP_PGOOD

SS/TR: REG_SSTR_P2V5S3

C7705 0.1UF 10% 25V X6S 0402

C7706 4700PF 10% 10V X7R 201

R7702 162K 0.1% 1/16W TK 0402 <Ra>

R7703 76.8K 0.1% 1/16W MF 0402 <Rb>

XW7700 SM

XW7701 SM

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
AGND_P2V5S3
P2V5S3_FSW

Output voltage: 2.5 V
Max peak current: 2.24 A
Switching freq: 1250 kHz

NOSTUFF D7700 SOD523 PMEG3010EB/S500

NOSTUFF D7701 SOD523 PMEG3010EB/S500

PP1V2_S3

PP2V5_S3

CRITICAL C7707 100UF 20% 6.3V TANT-POLY CASE-A3-LLP

CRITICAL C7708 100UF 20% 6.3V TANT-POLY CASE-A3-LLP

CRITICAL C7709 100UF 20% 6.3V TANT-POLY CASE-A3-LLP

C7764 10UF 20% 4V X6S 0402

C7765 10UF 20% 4V X6S 0402

1.2V VDDQ & 0.6V VTT

PP1V2_S3

PP5V_G3S

R7754 0 5% 1/20W MF 0201
VOLTAGE=5V
PP5V_EDRAM_V5IN
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

BYPASS=U7701.12::10mm

BYPASS=U7701.2::10mm

C7714 10UF 20% 10V X5R-CERM 0402-1

C7711 10UF 20% 10V X5R-CERM 0402-1

C7710 10UF 20% 10V X5R-CERM 0402-1

MEMVTT_EN

P2V5_VPP_PGOOD

R7756 0 5% 1/20W MF 0201

R7755 0 5% 1/20W MF 0201

MEMVTT_EN_R

PVDDQ_EN_R

P1V2REG_VREF

P1V2REG_MODE

P1V2REG_TRIP

P1V2REG_AGND
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0V

VLDOIN

U7701
TPS51916
QFN
CRITICAL

V5IN, S3, S5, VREF, REFIN, MODE, TRIP, VBST, DRVH, SW, DRVL, PGOOD, VDDQSNS, VTT, VTTSNS, VTTREF, PGND, GND, VTT THRM PAD

R7730 2.2 5% 1/20W MF 201
DIDT=TRUE
SWITCH_NODE=TRUE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

P1V2_VBST

P1V2_BOOT_RC

C7730 0.1UF 10% 25V X6S-CERM 0201

SWITCH_NODE=TRUE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
DIDT=TRUE

P1V2_DRVH

R7733 5% 1/20W MF 201

P1V2_DRVH_R
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
SWITCH_NODE=TRUE
DIDT=TRUE

P1V2_SW
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
DIDT=TRUE

P1V2_DRVL
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
GATE_NODE=TRUE

R7732 5% 1/20W MF 201

P1V2_DRVL_R
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
GATE_NODE=TRUE
DIDT=TRUE

PVDDQ_PGOOD

Q7700
CSD58873Q3D
Q3D

VIN, TG, TGR, VSW, BG, PGND

MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
SWITCH_NODE=TRUE
DIDT=TRUE
P1V2_PHASE

152S00140
L7701
0.68UH-20%-14A
P1LE063T-SM

R7718 0.002 1% 1W CYN 0612

PP1V2_S3_REG_R
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.2V

ISNS_CPUDDR_P
ISNS_CPUDDR_N

R7710 2.2 5% 1/10W MF-LF 603

DIDT=TRUE
SWITCH_NODE=TRUE
P1V2_LL_SNUB

C7712 0.001UF 10% 50V X7R-CERM 0402

CRITICAL C7713 330UF 20% 2.0V POLY-TANT CASE-B2-SM1

CRITICAL C7717 330UF 20% 2.0V POLY-TANT CASE-B2-SM1

CRITICAL C7718 330UF 20% 2.0V POLY-TANT CASE-B2-SM1

CRITICAL C7719 10UF 20% 4V X6S 0402

CRITICAL C7720 10UF 20% 4V X6S 0402

CRITICAL C7727 220UF 20% 2V ELEC SM-COMBO

CRITICAL C7728 220UF 20% 2V ELEC SM-COMBO

PP1V2_S3
Vout = 1.2V
8.2A MAX OUTPUT
F = 400 KHZ

PLACE_NEAR=C7713.1:5mm

XW7710 SM

R7741 10 5% 1/20W MF 201

P1V2_SNS

P1V2_SNS_R
MIN_LINE_WIDTH=0.0920
MIN_NECK_WIDTH=0.0850

PP0V6_S0_DDRVTT

C7731 15UF 20% 2V X6S 0402

C7732 15UF 20% 2V X6S 0402

C7733 15UF 20% 2V X6S 0402

C7734 15UF 20% 2V X6S 0402

C7736 15UF 20% 2V X6S 0402

C7737 15UF 20% 2V X6S 0402

CAPDERATE

C7721 33UF 20% 16V TANT-POLY CASE-B3

C7722 33UF 20% 16V TANT-POLY CASE-B3

C7725 33UF 20% 16V TANT-POLY CASE-B3

C7723 2.2UF 20% 25V X6S-CERM 0402

C7724 2.2UF 20% 25V X6S-CERM 0402

C7715 0.1UF 10% 6.3V X7R 0201

R7711 3.3K 1% 1/20W MF 201

P1V2REG_VREF_R

R7717 21K 0.1% 1/20W MF 0201

R7712 49.7K 0.1% 1/20W MF 0201

C7716 0.01UF 10% 10V X7R-CERM 0201

R7713 47K 1% 1/20W MF 201

R7714 57.6K 1% 1/20W MF 201

R7757 0 5% 1/20W

PVTT_VTTSNS

DDRREG_VTTSNS

XW7705 SM

PPVTT_VTTREF
VOLTAGE=0.6V

C7740 0.22UF 10% 16V CERM 402

XW7702 SM

PLACE_NEAR=U7701.6::5mm
PLACE_NEAR=U7701.19:5mm
PLACE_NEAR=U7701.8:5mm
PLACE_NEAR=U7701.19:3mm
PLACE_NEAR=U7701.18:3mm
PLACE_NEAR=U7701.21:1mm
PLACE_NEAR=U7701.1:5mm
PLACE_NEAR=C7737.1:5mm
BYPASS=U7701.8::5mm
BYPASS=U7701.6::5mm

LEVEL SHIFT

PP1V05_PRIM

PP1V8_S5

C7790 0.1UF 10% 10V X5R-CERM 0201

C7791 0.1UF 10% 10V X5R-CERM 0201

U7790
SLSV1T34AMU-COMBO
UDFN
CRITICAL
VCCA, VCCB, A, B, NC, GND

TPS51916 Ileak) = +/-1uA
Vih(min) = 1.5V
33uW when driven-low

PM_MEMVTT_EN

MEMVTT_EN

R7791 100K 5% 1/20W MF 201

PP2V5_S3

R7758 1.5K 1% 1/20W MF 201

P2V5_VPP_PGOOD

PP1V8_S5

R7716 100K 5% 1/20W MF 201

PVDDQ_PGOOD

BOM_COST_GROUP=PLATFORM POWER

PAGE TITLE: VR 2.5V & 1.2V/VTT

Apple Inc.

DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
PAGE: 77 OF 200
SHEET: 74 OF 131

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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)

PP3V3_G3H_SOCPMU

C7801 C7802 C7803 C7804 C7805 C7810 C7809 C7808 C7807 C7806 — 10UF 20% 6.3V CER-X6S 0402

C7891 C7892 C7893 C7894 — 1UF 20% 4V CERM-X6S 0201

PLACE_NEAR=U7800.R1:5MM
PLACE_NEAR=U7800.L1:5MM PLACE_NEAR=U7800.G1:5MM PLACE_NEAR=U7800.A7:5MM
PLACE_NEAR=U7800.C1:5MM

C7860 C7861 C7862 C7863 C7864 C7865 C7866 C7867 C7868 C7869 — 1UF 20% 4V CERM-X6S 0201

PLACE_NEAR=U7800.A11:5MM PLACE_NEAR=U7800.K18:5MM PLACE_NEAR=U7800.F18:5MM
PLACE_NEAR=U7800.B18:5MM PLACE_NEAR=U7800.P18:5MM

Note : All Bucks are default Local Sense

Buck 0,2, and 8 have option for Remote Sense for Future Use.

Resistor Divider from PBUS
VDD_HI < 3.1V

77 IN PMU_VDD_HI

119 75 PP1V8_SLPS2R_PMUVDDGPIO

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V

C7800 0.1UF 10% 6.3V X6S 0201

CRITICAL
OMIT_TABLE

U7800
CALPE-PMU
BGA
SYM 2 OF 4
338S00267-A0

P5	VDD_MAIN_E	
D10	VDD_MAIN_N	
P9	VDD_MAIN_S	
K14	VDD_MAIN_W	
K13	VDD_HI	
J11	VDD_GPIO	
C1 C2 C3	VDD_BUCK0_01	
G1 G2 G3	VDD_BUCK0_23	
R1 R2	VDD_BUCK16	
L1 L2 L3	VDD_BUCK2	
B16 B17 B18	VDD_BUCK3	
A7 B7	VDD_BUCK4	
A11 B11	VDD_BUCK5	
F17 F18	VDD_BUCK7	
K16 K17 K18	VDD_BUCK8	
P16 P17 P18	VDD_BUCK910	
NC T1	BUCK6_LX0	
NC T2		
R7	BUCK6_IN	
NC T4	BUCK6_FB	
NC E17	BUCK7_LX0	
NC E18		
NC G17	BUCK7_LX1	
NC G18		
NC F15	BUCK7_RTP	
G15	BUCK7_RTN	
L16 L17 L18	BUCK8_LX0	
J16 J17 J18	BUCK8_LX1	
L14	BUCK8_FB	
P12 R12 T12 U12 V12	BUCK8_IN	
NC N16 NC N17 NC N18	BUCK9_LX0	
NC P14	BUCK9_RTP	
N14	BUCK9_RTN	
NC R16 NC R17 NC R18	BUCK10_LX0	
NC R14	BUCK10_FB	

PPVCCPRIMCORE_PRIM_REG
Vout = 1.05V
Iout_Max = 6A
F = 3MHz

C7872 C7873 C7874 C7875 C7876 C7899 C7898 C7877 C7878 C7879 C7880 C7881 C7882 C7883 C7884 C7885 C7886 — 20UF 20% 2.5V X6S-CERM 0402

CRITICAL
L7821
0806-COMBO
0.47UH-20%-4.8A-0.034OHM
SWITCH_NODE=TRUE
DIDT=TRUE
MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.6000
PVCCPRIMCORE_SW0

CRITICAL
L7822
0.47UH-20%-4.8A-0.034OHM
0806-COMBO
MIN_LINE_WIDTH=0.6000
DIDT=TRUE
SWITCH_NODE=TRUE
PVCCPRIMCORE_SW1

NOSTUFF R7820 0 PLACE_NEAR=L7822.1:5MM 0201 5% MF 1/20W PVCCPRIMCORE_FB

R7821 0 80 IN 0201 5% MF 1/20W PPVCCPRIM_FETIN

Supplied Current

BUCK3_SW1	T8	PP1V8_AWAKE	80 131	0.3A
BUCK3_SW2	T11	PP1V8_SLPS2R_PMUVDDGPIO	75 119	0.3A
BUCK3_SW3	V11	PP1V8_S5	80	1.0A
BUCK3_SW4	V8	NC_PP1V8_S3	80	1.0A
BUCK3_SW5	R8	NC_PP1V8_S0	80	0.5A
BUCK4_SW1	P6	NC		0.5A
BUCK6_SW1	R6	NC		0.3A
BUCK8_SW1	P13	NC		0.3A
BUCK8_SW2	R13	PP1V05_S3	115	0.3A

BOM_COST_GROUP=SOC

BUCK0_LX0 — PVDDCPUAWAKE_SW0 — CRITICAL L7806 1UH-20%-3.8A-0.055OHM 2016-COMBO — PPVDDCPU_AWAKE
BUCK0_LX1 — PVDDCPUAWAKE_SW1 — CRITICAL L7807 0.22UH-20%-6.7A-0.023OHM PINA20121T-SM
BUCK0_LX2 — PVDDCPUAWAKE_SW2 — CRITICAL L7808 0.22UH-20%-6.7A-0.023OHM PINA20121T-SM
BUCK0_LX3 — PVDDCPUAWAKE_SW3 — CRITICAL L7809 0.22UH-20%-6.7A-0.023OHM PINA20121T-SM
SWITCH_NODE=TRUE MIN_NECK_WIDTH=0.1200 MIN_LINE_WIDTH=0.6000 DIDT=TRUE

C7821 C7822 C7823 C7824 C7825 C7812 C7811 C7826 C7827 C7828 C7813 — 20UF 20% 2.5V X6S-CERM 0402

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

BUCK0_FB — PVDDCPUAWAKE_FB — R7806 0 0201 1/20W 5% MF — PLACE_NEAR=L7806.2:5MM

BUCK1_LX0 — PVDDCPUSRAMAWAKE_SW0 — CRITICAL L7810 1.0UH-20%-2.6A-0.095OHM 0805-COMBO — PPVDDCPUSRAM_AWAKE
BUCK1_FB — PVDDCPUSRAMAWAKE_FB — R7811 0 5% MF 0201 1/20W — PLACE_NEAR=L7810.2:5MM

C7829 C7830 — 10UF 20% 4V X6S 0402-1

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

BUCK2_LX0 — P0V8SLPDDR_SW0 — CRITICAL L7811 1UH-20%-4.7A-0.040HM 2520 — PP0V8_SLPDDR
BUCK2_LX1 — P0V8SLPDDR_SW1 — CRITICAL L7812 0.47UH-20%-4.8A-0.034OHM 0806
SWITCH_NODE=TRUE MIN_NECK_WIDTH=0.1200 MIN_LINE_WIDTH=0.6000 DIDT=TRUE

C7833 C7834 C7835 C7836 C7837 C7838 C7814 C7815 — 20UF 20% 2.5V X6S-CERM 0402

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

BUCK2_FB — P0V8SLPDDR_FB — R7812 0 MF 5% 0201 1/20W — PLACE_NEAR=L7812.2:5MM

BUCK3_LX0 — P1V8SLPS2R_SW0 — CRITICAL L7813 1UH-20%-3.8A-0.055OHM 2016-COMBO — PP1V8_SLPS2R
BUCK3_FB — P1V8SLPS2R_FB — R7813 0 5% MF 1/20W 0201 — PLACE_NEAR=L7813.2:5MM
SWITCH_NODE=TRUE MIN_NECK_WIDTH=0.1200 MIN_LINE_WIDTH=0.6000 DIDT=TRUE

C7839 C7840 C7841 C7842 C7843 C7844 C7845 — 20UF 20% 2.5V X6S-CERM 0402

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

BUCK3_IN — PP1V8_SLPS2R

BUCK4_LX0 — P1V1SLPS2R_SW0 — CRITICAL L7814 1UH-20%-3.8A-0.055OHM 2016-COMBO — PP1V1_SLPS2R
BUCK4_LX1 — P1V1SLPS2R_SW1 — CRITICAL L7815 0.47UH-20%-4.8A-0.034OHM 0806-COMBO
SWITCH_NODE=TRUE MIN_NECK_WIDTH=0.1200 MIN_LINE_WIDTH=0.6000 DIDT=TRUE

C7846 C7847 C7848 C7849 C7850 C7851 C7816 C7817 — 20UF 20% 2.5V X6S-CERM 0402

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

BUCK4_FB — P1V1SLPS2R_FB — R7814 0 1/20W 0201 MF 5% — PLACE_NEAR=L7815.2:5MM

BUCK4_IN — P7

BUCK5_LX0 — P0V9SLPDDR_SW0 — CRITICAL L7816 1UH-20%-3.8A-0.055OHM 2016-COMBO — PP0V9_SLPDDR
BUCK5_LX1 — P0V9SLPDDR_SW1 — CRITICAL L7817 0.47UH-20%-4.8A-0.034OHM 0806-COMBO
MIN_LINE_WIDTH=0.6000 MIN_NECK_WIDTH=0.1200 SWITCH_NODE=TRUE DIDT=TRUE

C7852 C7853 C7854 C7855 C7856 C7818 C7819 — 20UF 20% 2.5V X6S-CERM 0402

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

BUCK5_FB — P0V9SLPDDR_FB — R7816 0 1/20W 0201 MF 5% — PLACE_NEAR=L7816.2:5MM

PAGE TITLE
PMIC BUCKS AND SWs

Apple Inc.

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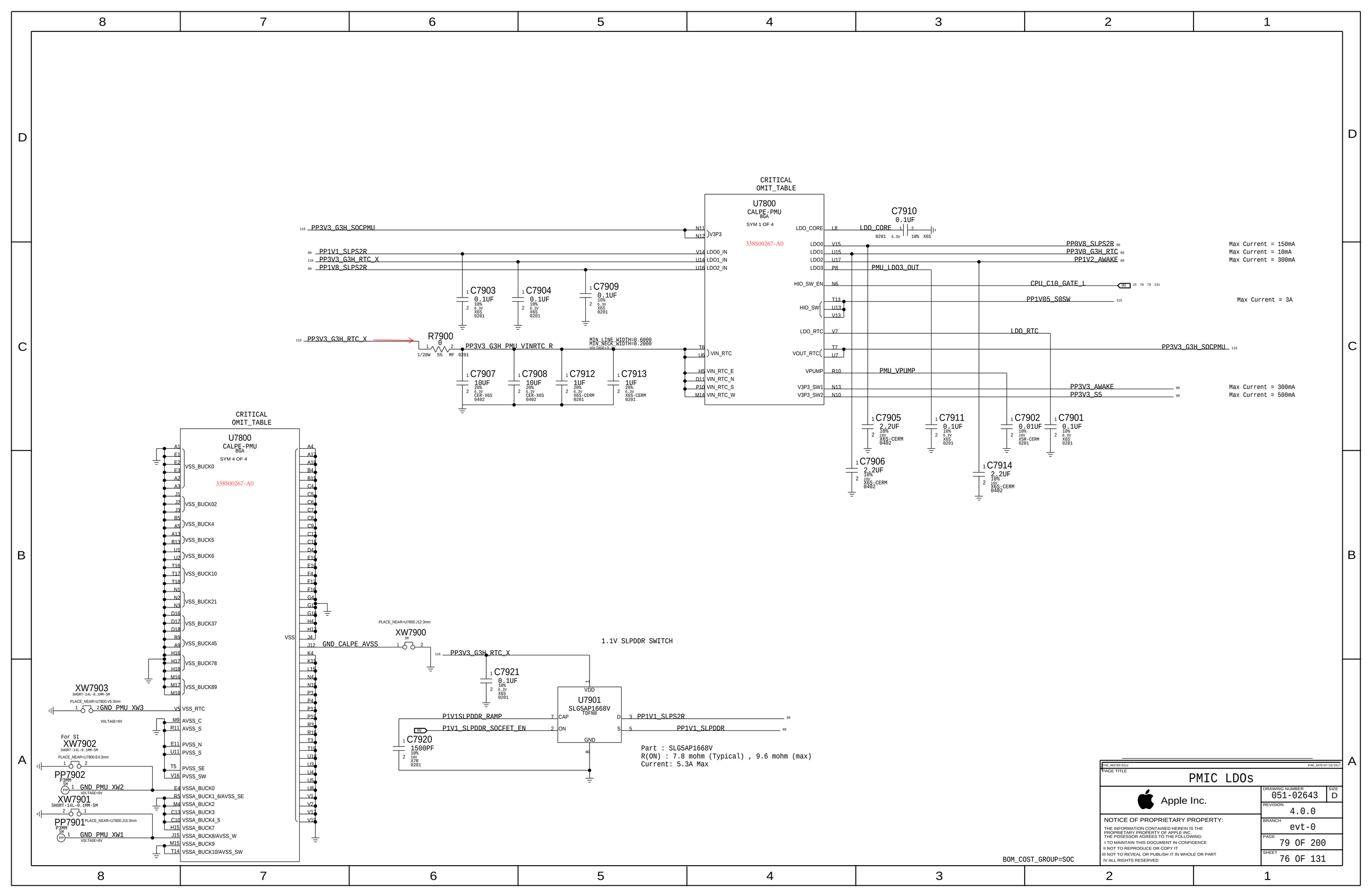
CRITICAL
OMIT_TABLE
U7800
CALPE-PMU
BGA
SYM 1 OF 4
338S00267-A0
PP3V3_G3H_SOCPMU
PP1V1_SLPS2R
PP3V3_G3H_RTC_X
PP1V8_SLPS2R
V3P3
LDO0_IN
LDO1_IN
LDO2_IN
C7903 0.1UF
C7904 0.1UF
C7909 0.1UF
R7900 0
PP3V3_G3H_PMU_VINRTC_R
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.2000
VOLTAGE=3
VIN_RTC
VIN_RTC_E
VIN_RTC_N
VIN_RTC_S
VIN_RTC_W
C7907 10UF
C7908 10UF
C7912 1UF
C7913 1UF
LDO_CORE
C7910 0.1UF
LDO0
LDO1
LDO2
LDO3
PP0V8_SLPS2R
PP3V0_G3H_RTC
PP1V2_AWAKE
PMU_LDO3_OUT
HIO_SW_EN
CPU_C10_GATE_L
HIO_SW
PP1V05_S0SW
LDO_RTC
VOUT_RTC
PP3V3_G3H_SOCPMU
VPUMP
PMU_VPUMP
V3P3_SW1
V3P3_SW2
PP3V3_AWAKE
PP3V3_S5
C7905 2.2UF
C7906 2.2UF
C7911 0.1UF
C7914 2.2UF
C7902 0.01UF
C7901 0.1UF
Max Current = 150mA
Max Current = 10mA
Max Current = 300mA
Max Current = 3A
Max Current = 300mA
Max Current = 500mA
CRITICAL
OMIT_TABLE
U7800
CALPE-PMU
BGA
SYM 4 OF 4
338S00267-A0
VSS_BUCK0
VSS_BUCK02
VSS_BUCK4
VSS_BUCK5
VSS_BUCK6
VSS_BUCK10
VSS_BUCK21
VSS_BUCK37
VSS_BUCK45
VSS_BUCK78
VSS_BUCK89
VSS_RTC
AVSS_C
AVSS_S
PVSS_N
PVSS_S
PVSS_SE
PVSS_SW
VSSA_BUCK0
VSSA_BUCK1_6/AVSS_SE
VSSA_BUCK2
VSSA_BUCK3
VSSA_BUCK4_5
VSSA_BUCK7
VSSA_BUCK8/AVSS_W
VSSA_BUCK9
VSSA_BUCK10/AVSS_SW
VSS
XW7903
SHORT-14L-0.1MM-SM
GND_PMU_XW3
XW7902
SHORT-14L-0.1MM-SM
PP7902
GND_PMU_XW2
XW7901
SHORT-14L-0.1MM-SM
PP7901
GND_PMU_XW1
XW7900
GND_CALPE_AVSS
PP3V3_G3H_RTC_X
C7921 0.1UF
1.1V SLPDDR SWITCH
U7901
SLG5AP1668V
TDFN8
VDD
CAP
ON
GND
D
S
P1V1SLPDDR_RAMP
P1V1_SLPDDR_SOCFET_EN
PP1V1_SLPS2R
PP1V1_SLPDDR
C7920 1500PF
Part : SLG5AP1668V
R(ON) : 7.8 mohm (Typical) , 9.6 mohm (max)
Current: 5.3A Max
BOM_COST_GROUP=SOC
PAGE TITLE
PMIC LDOs
Apple Inc.
DRAWING NUMBER
051-02643
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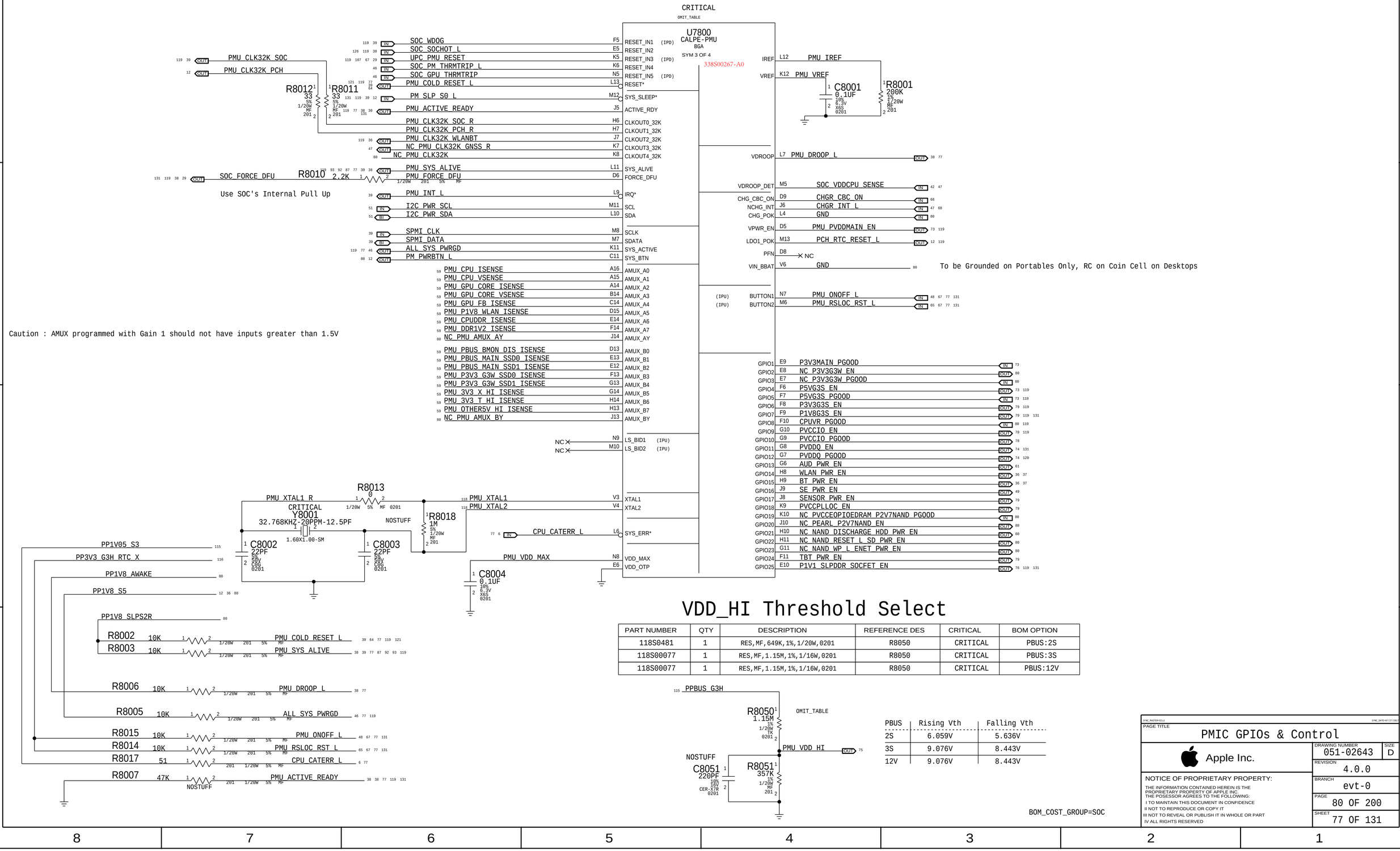

VDD_HI Threshold Select

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
118S0481	1	RES,MF,649K,1%,1/20W,0201	R8050	CRITICAL	PBUS:2S
118S00077	1	RES,MF,1.15M,1%,1/16W,0201	R8050	CRITICAL	PBUS:3S
118S00077	1	RES,MF,1.15M,1%,1/16W,0201	R8050	CRITICAL	PBUS:12V

PBUS	Rising Vth	Falling Vth
2S	6.059V	5.636V
3S	9.076V	8.443V
12V	9.076V	8.443V

PAGE TITLE
PMIC GPIOs & Control

Apple Inc.

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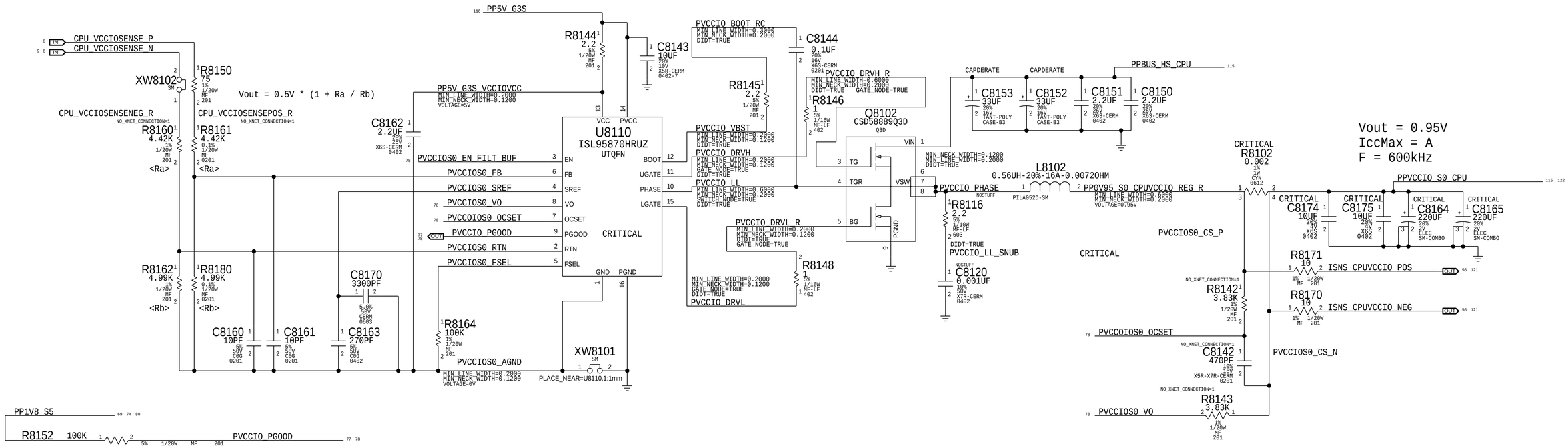
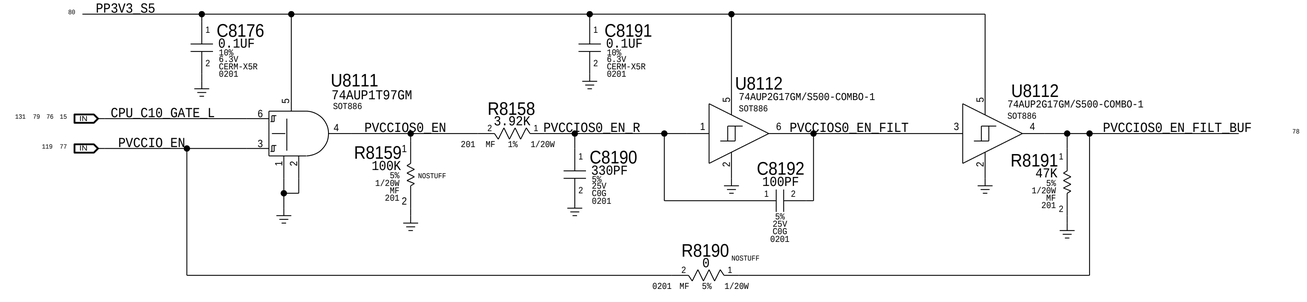
0.95V VCCIO



VCCIO ENABLE LOGIC



BOM_COST_GROUP=PLATFORM POWER

PAGE TITLE: VR VCCIO

Apple Inc.

DRAWING NUMBER: 051-02643 SIZE: D

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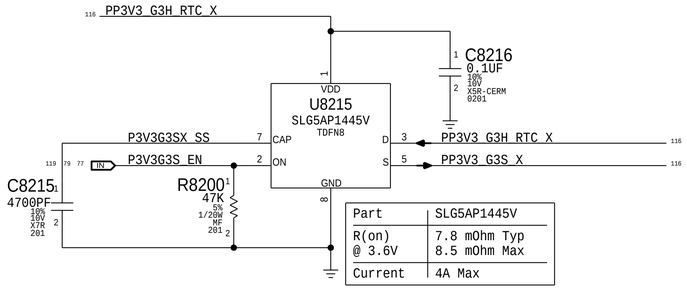
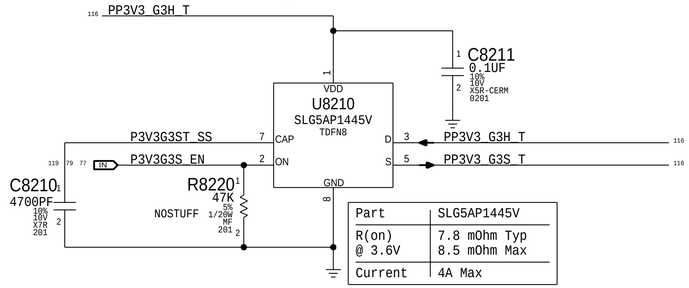
3.3V G3 Standby Switch X



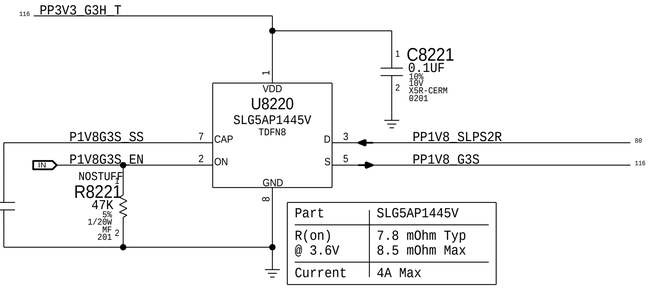
Part	SLG5AP1445V
R(on) @ 3.6V	7.8 mOhm Typ 8.5 mOhm Max
Current	4A Max

3.3V G3 Standby Switch T



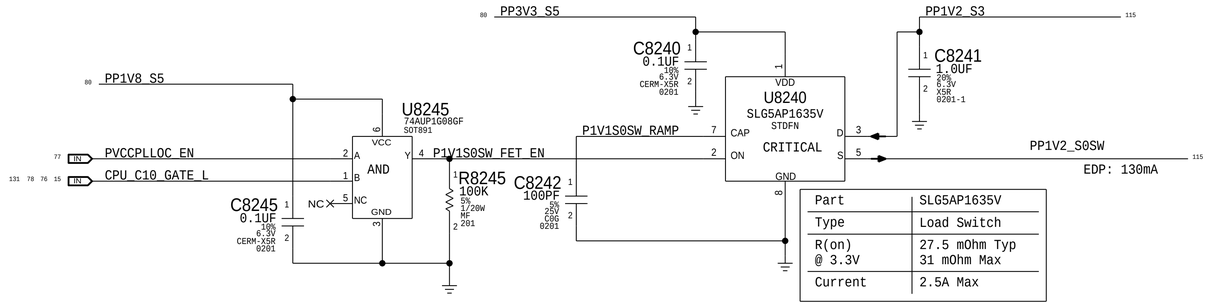
Part	SLG5AP1445V
R(on) @ 3.6V	7.8 mOhm Typ 8.5 mOhm Max
Current	4A Max

1.8V G3 Standby Switch



Part	SLG5AP1445V
R(on) @ 3.6V	7.8 mOhm Typ 8.5 mOhm Max
Current	4A Max

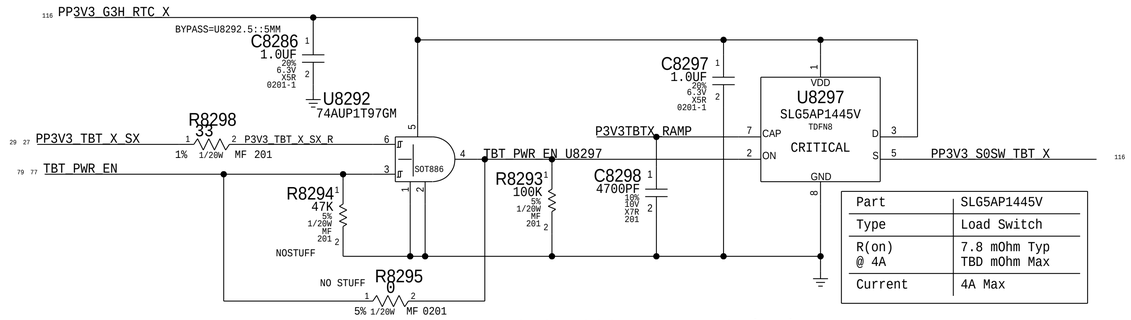
1.1V S0SW VCCPLL_OC Switch



Part	SLG5AP1635V
Type	Load Switch
R(on) @ 3.3V	27.5 mOhm Typ 31 mOhm Max
Current	2.5A Max

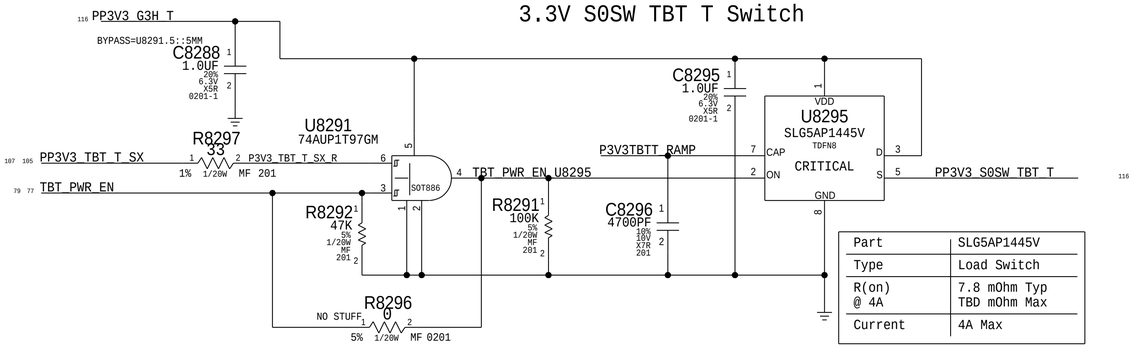
VCCPLL_OC has turn-on requirement of
11uS min and 240uS max
from EN to 1.1V

3.3V S0SW TBT X Switch



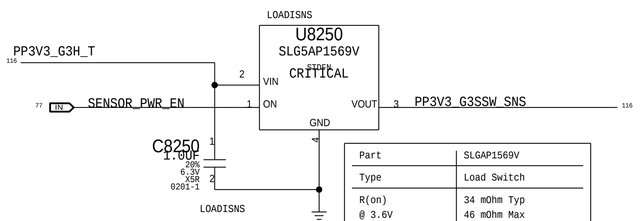
Part	SLG5AP1445V
Type	Load Switch
R(on) @ 4A	7.8 mOhm Typ TBD mOhm Max
Current	4A Max

3.3V S0SW TBT T Switch



Part	SLG5AP1445V
Type	Load Switch
R(on) @ 4A	7.8 mOhm Typ TBD mOhm Max
Current	4A Max

3.3V Sensor Switch



Part	SLGAP1569V
Type	Load Switch
R(on) @ 3.6V	34 mOhm Typ 46 mOhm Max
Current	1A Max

BOM_COST_GROUP=PLATFORM POWER

SYNC_MASTER=SILU

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Power FETs

Apple Inc.

DRAWING NUMBER 051-02643 | SIZE D

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BRANCH evt-0

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PMIC Buck0 - SoC VDD_CPU

122 75 PPVDDCPU_AWAKE
MIN_LINE_WIDTH=0.4000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.06V
MAKE_BASE=TRUE
119
PPVDDCPU_AWAKE
42 80

PMIC Buck1 - SoC VDD_CPU_SRAM

122 75 PPVDDCPUSRAM_AWAKE
MIN_LINE_WIDTH=0.4000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.06V
MAKE_BASE=TRUE
119
PPVDDCPUSRAM_AWAKE
42

PMIC Buck2 - SoC VDD_SOC

75 PP0V82_SLPDDR
MIN_LINE_WIDTH=0.7000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0.82V
MAKE_BASE=TRUE
119
PP0V82_SLPDDR
42 80

PMIC BUCK3 - SoC AOP/SMC/VDD1

131 122 75 PP1V8_SLPS2R
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V
MAKE_BASE=TRUE
119
PP1V8_SLPS2R
75
PP1V8_SLPS2R
79
PP1V8_SLPS2R
76
PP1V8_SLPS2R
46
PP1V8_SLPS2R
77
PP1V8_SLPS2R
64
PP1V8_SLPS2R
46
PP1V8_SLPS2R
38 47
PP1V8_SLPS2R
44
PP1V8_SLPS2R
44
PP1V8_SLPS2R
44
PP1V8_SLPS2R
44
PP1V8_SLPS2R
68
PP1V8_SLPS2R
51
PP1V8_SLPS2R
51
PP1V8_SLPS2R
51
PP1V8_SLPS2R
47
PP1V8_SLPS2R
29 107
PP1V8_SLPS2R
67
PP1V8_SLPS2R
126 131
PP1V8_SLPS2R
107

PMIC BUCK3 SW 1

131 75 PP1V8_AWAKE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V
MAKE_BASE=TRUE
119
PP1V8_AWAKE
77
PP1V8_AWAKE
46
PP1V8_AWAKE
44
PP1V8_AWAKE
44
PP1V8_AWAKE
44
PP1V8_AWAKE
44
PP1V8_AWAKE
44
PP1V8_AWAKE
41 46 47
PP1V8_AWAKE
46
PP1V8_AWAKE
66
PP1V8_AWAKE
126

PMIC BUCK3 SW 3

75 PP1V8_S5
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V
MAKE_BASE=TRUE
119
PP1V8_S5
46
PP1V8_S5
16 17
PP1V8_S5
39
PP1V8_S5
12 16
PP1V8_S5
12 13 15 16 19 20 52
PP1V8_S5
15
PP1V8_S5
126
PP1V8_S5
17
PP1V8_S5
PP1V8_S5
12 36 77
PP1V8_S5
51
PP1V8_S5
51
PP1V8_S5
46
PP1V8_S5
94
PP1V8_S5
PP1V8_S5
69 74 78
PP1V8_S5
93
PP1V8_S5
79
PP1V8_S5
74
PP1V8_S5
16
PP1V8_S5
57
PP1V8_S5
57
PP1V8_S5
57
PP1V8_S5
46
PP1V8_S5
18

PMIC BUCK3 SW 4/5

75 NC_PP1V8_S3
NC_PP1V8_S3
MAKE_BASE=TRUE
NO_TEST=1
75 NC_PP1V8_S0
NC_PP1V8_S0
MAKE_BASE=TRUE
NO_TEST=1

PMIC Buck4 - SDRAM VDD2

122 75 PP1V1_SLPS2R
MIN_LINE_WIDTH=0.5000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V
MAKE_BASE=TRUE
119
PP1V1_SLPS2R
76
PP1V1_SLPS2R
76
PP1V1_SLPS2R
43
PP1V1_SLPS2R
44

Buck 4 Ext. SW U7901 - VDDIO_DDR & PLL

76 PP1V1_SLPDDR
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V
MAKE_BASE=TRUE
119
PP1V1_SLPDDR
38
PP1V1_SLPDDR
43
PP1V1_SLPDDR
43
PP1V1_SLPDDR
44

PMIC Buck5 - VDD_FIXED

122 75 PP0V9_SLPDDR
MIN_LINE_WIDTH=0.3000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0.9V
MAKE_BASE=TRUE
119
PP0V9_SLPDDR
43
PP0V9_SLPDDR
43
PP0V9_SLPDDR
43
PP0V9_SLPDDR
43
PP0V9_SLPDDR
43

PMIC LDO0 - VDD_LOW

76 PP0V8_SLPS2R
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0.8V
MAKE_BASE=TRUE
119
PP0V8_SLPS2R
43

PMIC LDO2 - PCIE_REFBUF/PLL

76 PP1V2_AWAKE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.2V
MAKE_BASE=TRUE
119
PP1V2_AWAKE
44
PP1V2_AWAKE
44
PP1V2_AWAKE
44
PP1V2_AWAKE
44

PMIC V3P3 SW 1 - USB

76 PP3V3_AWAKE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.3V
MAKE_BASE=TRUE
PP3V3_AWAKE
44

PMIC V3P3 SW 2 (Internal) -

76 PP3V3_S5
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1750
VOLTAGE=3.3V
MAKE_BASE=TRUE
119
PP3V3_S5
12 16 17
PP3V3_S5
46
PP3V3_S5
78
PP3V3_S5
15 16 19
PP3V3_S5
14 16
PP3V3_S5
15 16
PP3V3_S5
18
PP3V3_S5
20
PP3V3_S5
12 16 17
PP3V3_S5
79
PP3V3_S5
12
PP3V3_S5
93 124
PP3V3_S5
126 131
PP3V3_S5
16
PP3V3_S5

PMIC LDO 1 - PCH VCCRTC

76 PP3V0_G3H_RTC
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.0V
MAKE_BASE=TRUE
119
PP3V0_G3H_RTC
12 16 17

NC Aliases

77 NC_PVCCEOPIOEDRAM_P2V7NAND_PGOOD
MAKE_BASE
NO_TEST
NC_PVCCEOPIOEDRAM_P2V7NAND_PGOOD
77 NC_PEARL_P2V7NAND_EN
MAKE_BASE
NO_TEST
NC_PEARL_P2V7NAND_EN
77 NC_NAND_DISCHARGE_HDD_PWR_EN
MAKE_BASE
NO_TEST
NC_NAND_DISCHARGE_HDD_PWR_EN
77 NC_NAND_RESET_L_SD_PWR_EN
MAKE_BASE
NO_TEST
NC_NAND_RESET_L_SD_PWR_EN
77 NC_NAND_WP_L_ENET_PWR_EN
MAKE_BASE
NO_TEST
NC_NAND_WP_L_ENET_PWR_EN
77 NC_P3V3G3W_PGOOD
MAKE_BASE
NO_TEST
NC_P3V3G3W_PGOOD
77 NC_P3V3G3W_EN
MAKE_BASE
NO_TEST
NC_P3V3G3W_EN

Alternate Feedback Sesne

75 OUT PVDDCPUAWAKE_FB
Buck0 - Remote
NOSTUFF
R8320
0
5%
1/16W
MF-LF
402
PLACE_NEAR=R7806.1:5MM
PVDDCPUAWAKE_FB_R
XW8320
SM
PVPVDDCPU_AWAKE
42 80
PLACE_NEAR=U3900.AA12:4MM

75 OUT P0V8SLPDDR_FB
Buck2 - Remote
NOSTUFF
R8321
0
5%
1/16W
MF-LF
402
PLACE_NEAR=R7812.1:5MM
P0V8SLPDDR_FB_R
XW8321
SM
PP0V82_SLPDDR
42 80
PLACE_NEAR=U3900.AA20:6MM

75 OUT PVCCPRIMCORE_FB
Buck8 - Remote
R8322
0
5%
1/16W
MF-LF
402
PLACE_NEAR=R7820.2:5MM
PVCCPRIMCORE_FB_R
XW8322
SM
PP1V05_PRIM
16 17 115
PLACE_NEAR=U1200.AB12:4MM

NC_CHGR_AUX_OK
NO_TEST=1
MAKE_BASE
NC_CHGR_AUX_OK
68
119 18 PM_PWRBTN_L
MAKE_BASE
PM_PWRBTN_L
12 77
119 77 CPUVR_PGOOD
MAKE_BASE
CPUVR_PGOOD
69
46 8 CPU_VCCST_PWRGD
MAKE_BASE
CPU_VCCST_PWRGD
69
NC_PMU_CLK32K
NO_TEST=1
MAKE_BASE
NC_PMU_CLK32K
77
NC_PMU_AMUX_BY
NO_TEST=1
MAKE_BASE
NC_PMU_AMUX_BY
77
NC_PMU_AMUX_AY
NO_TEST=1
MAKE_BASE
NC_PMU_AMUX_AY
77

77 GND
MAKE_BASE
77 GND
MAKE_BASE

PAGE TITLE
SOC/PMIC Aliases

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Page Notes

Power aliases required by this page:

- +PPVIN_S0SW_LCDBKLTFET (9-12.6V LCD BACKLIGHT INPUT)
- +PP5V_G3S_BKLT (5V BACKLIGHT DRIVER INPUT)

PBUS LINE WIDTHS

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

LCD BKLT LINE WIDTHS

BOM_COST_GROUP=DISPLAY

VOUT = 52V TYP, 59V MAX
IOUT = 0.135A TYP, 0.15A MAX
FS = 625KHZ TYP (+/- 7%)

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LCD PANEL INTERFACE (eDP) + Camera (MIPI)

MIPIC FILTERING

PP5V_G3S
CRITICAL
U8500
SLG5AP1443V
TDFN
VDD
CAP
ON
GND
D
S
LCD_PWR_SLEW
PANEL_P5V_EN
R8515 150K 5% 1/20W MF 201
VOLTAGE=5V
PP5V_S0SW_LCD
R8517 330 5% 1/20W MF 201
PANEL_P5V_EN_D
D8517 SC2 DSF01S30SCAP
C8515 0.1UF 10% 10V X5R-CERM 0201
C8509 4700PF 10% 10V X7R 201
C8511 0.1UF 10% 10V X5R-CERM 0201
C8512 10UF 20% 10V X5R-CERM 0402-7
PP3V3_G3H_RTC_X
U8501
SLG5AP1443V
TDFN
LCD_PWR_SLEW_3V3
R8516 200K 1% 1/20W MF 201
PANEL_P3V3_EN
VOLTAGE=3.3V
PP3V3_S0SW_LCD_R
SENSOR:DEV
R8520 0.01 1% 1/3W MF 0306
NO_XNET_CONNECTION=1
PP3V3_S0SW_LCD
MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
VOLTAGE=3.3V
C8513 4700PF 10% 10V X7R 201
C8516 0.47UF 10% 6.3V CERM-X5R 0201
C8510 1.0UF 20% 6.3V X6S 0201-1
ISNS_LCDPANEL_P
ISNS_LCDPANEL_N
R8518 330 5% 1/20W MF 201
PANEL_P3V3_EN_D
D8518 SC2 DSF01S30SCAP

L8502 3.25-OHM-0.1A-2.4GHZ TAM0605-4SM PLACE_NEAR=J8500.33:5mm
MIPI_FTCAM_DATA_ISOL_P<0>
MIPI_FTCAM_DATA_CONN_P<0>
MIPI_FTCAM_DATA_ISOL_N<0>
MIPI_FTCAM_DATA_CONN_N<0>
L8503 3.25-OHM-0.1A-2.4GHZ TAM0605-4SM PLACE_NEAR=J8500.39:5mm
MIPI_FTCAM_CLK_ISOL_P
MIPI_FTCAM_CLK_CONN_P
MIPI_FTCAM_CLK_ISOL_N
MIPI_FTCAM_CLK_CONN_N
L8504 FERR-120-OHM-1.5A 0402A
PP5V_G3S
PP5V_S0_ALSCAM_F
VOLTAGE=5V
C8504 0.1UF 10% 10V X5R-CERM 0201
PPVOUT_S0_LCDBKLT
C8500 1000PF 10% 100V X7R-CERM 0603
LCD Panel HPD & AUX strapping
PP3V3_G3H_RTC_X
NO_XNET_CONNECTION=1
R8503 1M 5% 1/20W MF 201 NOSTUFF
EDP_INT_AUX_N
EDP_INT_AUX_P
NO_XNET_CONNECTION=1
R8502 1M 5% 1/20W MF 201 NOSTUFF
PP3V3_S0SW_LCD
R8508 10K 5% 1/20W MF 201 NOSTUFF
BKLT_PWM_MLB2TCON
R8507 10K 5% 1/20W MF 201

J8500
20759-042E-02
F-ST-SM
PPVOUT_S0_LCDBKLT
PP3V3_S0SW_LCD
SIGNAL
EDP_INT_AUX_N
EDP_INT_AUX_P
EDP_PANEL_PWR_BUF_EN
DP_INT_HPD
LCD_FSS
EDP_INT_ML_N<0>
EDP_INT_ML_P<0>
TP_LCD_IRQ_L
EDP_INT_ML_N<1>
EDP_INT_ML_P<1>
NC
TCON PWM is NCed
BKLT_PWM_MLB2TCON
EDP_INT_ML_N<2>
EDP_INT_ML_P<2>
I2C_BKLT_SDA
I2C_BKLT_SCL
EDP_INT_ML_N<3>
EDP_INT_ML_P<3>
I2C_TCON_SDA
I2C_TCON_SCL
CKPLUS_WAIVE=I2C_PULLUP
MIPI_FTCAM_DATA_CONN_N<0>
MIPI_FTCAM_DATA_CONN_P<0>
I2C_ALS_SDA
I2C_ALS_SCL
MIPI_FTCAM_CLK_CONN_N
MIPI_FTCAM_CLK_CONN_P
I2C_CAM_ISOL_SDA
I2C_CAM_ISOL_SCL
PWR
PP5V_S0SW_LCD
PP5V_S0_ALSCAM_F
GND

EDP_PANEL_PWR_DLY_EN
PP3V3_G3H_RTC_X
R8570 100K 5% 1/20W MF 201
R8571 100K 5% 1/20W MF 201
C8570 0.1UF 10% 10V X5R-CERM 0201
BYPASS=U8510::2mm
PM_SLP_TIEOFF
U8510
SLG4AP4998
STQFN
VDD
EDP_PANEL_PWR_EN
PANEL_FET_EN_DLY
PM_SLP_S3_L
PANEL_PWR_EN_CONN
SMC_RESET_INPUT_L
SMC_RESET_OUTPUT_L
X604_DISP_PWR_EN
X604_DISP_SMC_RST_L
NC0
NC1
GND
EDP_PANEL_PWR_EN
EDP_PANEL_PWR_BUF_EN
SMCRST_TIEOFF
NC

PP3V3_G3S_X
C8502 0.1UF 10% 10V X5R-CERM 0201
BYPASS=U8502::2mm
U8502
NX3DV642GU
QFN-COMBO
VCC
CRITICAL
CONTROL LOGIC
GND
Resistor needed?
MIPI_FTCAM_CLK_P
MIPI_FTCAM_CLK_N
MIPI_FTCAM_DATA_P<0>
MIPI_FTCAM_DATA_N<0>
I2C_FTCAM_SDA
I2C_FTCAM_SCL
CLK1+
CLK2+
CLK1-
CLK2-
1D1+
1D2+
1D1-
1D2-
2D1+
2D2+
2D1-
2D2-
OE*
S
MIPI_FTCAM_CLK_ISOL_P
MIPI_FTCAM_CLK_ISOL_N
MIPI_FTCAM_DATA_ISOL_P<0>
MIPI_FTCAM_DATA_ISOL_N<0>
I2C_CAM_ISOL_SDA
I2C_CAM_ISOL_SCL
HOST SIDE
Alternate: OnSemi FSA642 (353S01346)

PP1V8_G3S
R8510 100K 5% 1/20W MF 201
R8511 100K 5% 1/20W MF 201

PP3V3_G3S_X
R8505 100K 5% 1/20W MF 201 NOSTUFF
R8544 0 5% 1/20W MF 0201
SEP_CAM_DISABLE_DFF_L
SEP_CAM_DISABLE_DFF_R_L

S	OUTPUT
L	Camera Disable
H	Camera Enable

DP_INT_HPD
R8551 100K 5% 1/20W MF 201

I2C pulls needed on both sides???
PP3V3_S0SW_LCD
PP5V_S0SW_LCD
PP5V_S0_ALSCAM_F
I2C_BKLT_SDA
I2C_BKLT_SCL
C8550 12PF 5% 25V NP0-C0G 0201
C8551 12PF 5% 25V NP0-C0G 0201
C8552 12PF 5% 25V NP0-C0G 0201
C8553 12PF 5% 25V NP0-C0G 0201 NOSTUFF
C8554 12PF 5% 25V NP0-C0G 0201 NOSTUFF

BOM_COST_GROUP=DISPLAY

PAGE TITLE: eDP Display Connector

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PP1V8_SSD0
C8632 10UF 20% 6.3V CERM-X6S 0402 CRITICAL
C8636 4.3UF 20% 4V CERM 0402-THICKSTNCL CRITICAL
C8637 2.2UF 20% 6.3V X5R-CERM 0201
PP2V5_NAND_SSD0
C8648 10UF 20% 6.3V CERM-X6S 0402 CRITICAL
C8649 2.2UF 20% 6.3V X5R-CERM 0201
C8650 2.2UF 20% 6.3V X5R-CERM 0201
PP0V9_SSD0
SSD0_S4E0_VPP
NOSTUFF R8630 0 5% 1/20W MF 201
U8600
KLAFGAKWCM-E0T2
ULGA-COMBO
OMIT_TABLE
CRITICAL
TP_SSD0_S4E0_ANI1_VREF
TP_SSD0_S4E0_ANI0_VREF
PP1V8_SSD0_S4E0_AVDD18_PLL
PP1V8_SSD0_S4E0_PCI_AVDD_H
PP0V9_SSD0
C8610 10UF 20% 6.3V CERM-X6S 0402 CRITICAL
C8611 2.2UF 20% 6.3V X5R-CERM 0201
C8612 2.2UF 20% 6.3V X5R-CERM 0201
C8613 0.1UF 10% 16V X5R-CERM 0201
C8614 0.1UF 10% 16V X5R-CERM 0201
C8615 0.1UF 10% 16V X5R-CERM 0201
PP0V9_SSD0
R8601 0 5% 1/20W MF 0201
PP1V8_SSD0
C8646 1.0UF 20% 10V X5R-CERM 0201-1
C8647 0.1UF 10% 16V X5R-CERM 0201
R8699 0 5% 1/20W MF 0201
C8644 1.0UF 20% 10V X5R-CERM 0201-1
C8645 0.1UF 10% 16V X5R-CERM 0201
R8640 100 1% 1/20W MF 201
SSD0_CLK24M
SSD0_OCARINA_LPB_L
SSD_BFH
SSD0_S4E_BOOT2
SSD0_S4E0_SWD_UID0
SSD0_S4E_UART_RX
SSD0_S4E0_SWD_UID1
SSD0_S4E0_UART_TX
SSD0_OCARINA_PFN
SSD0_PCIE_RESET_L
SSD0_SWDIO_UART_D2R
SSD0_SWCLK_UART_R2D
SSD0_S4E0_JTAG_TDO
SSD0_S4E0_JTAG_TDI
TPA8601 TP-P6
SSD0_S4E_JTAG_SEL
SSD0_S4E0_DROOP_L
SSD0_OCARINA_WP_L
EXT_D0/BOOT0
EXT_D1/BOOT1
EXT_D2/BOOT2/SPINAND_SCLK
EXT_D3/SWD_UID0/SPINAND_MISO
EXT_D4/UART_RX
EXT_D5/SWD_UID1/SPINAND_MOSI
EXT_D6/UART_TX
EXT_D7/SPF
EXT_NCE/PERST*
EXT_NRE/JTAG_TMS
EXT_NWE/JTAG_TCK
EXT_RNB/JTAG_TDO
EXT_CLE/JTAG_TDI
EXT_ALE/JTAG_SEL
DROOP_N
WP_N
VSS
CLK_IN M3 SSD0_CLK24M_01
PCIE_REFCLK_P K11 PCIE_CLK100M_SSD0_01_P
PCIE_REFCLK_M J12 PCIE_CLK100M_SSD0_01_N
PCIE_CLKREQ_N P5 SSD0_CLKREQ0_L
PCI_RESREF H7 SSD0_S4E0_PCIE_RESREF
PCIE_RX0_P M11 PCIE_SSD0_R2D_P<0>
PCIE_RX0_M N12 PCIE_SSD0_R2D_N<0>
PCIE_TX0_P R12 PCIE_SSD0_D2R_C_P<0>
PCIE_TX0_M T11 PCIE_SSD0_D2R_C_N<0>
RESET* L4 SSD0_OCARINA_RESET_L
TRST* G10 SSD0_S4E_JTAG_TRST_L
ZQ_C K3 SSD0_S4E0_ZQ_C
ZQ_N C10 SSD0_S4E0_ZQ_L
C8603 0.22UF PCIE_SSD0_R2D_C_P<0> PCIE_SSD0_R2D_C_P<0>
C8604 0.22UF PCIE_SSD0_R2D_C_N<0> PCIE_SSD0_R2D_C_N<0>
C8601 0.22UF PCIE_SSD0_D2R_C_P<0> PCIE_SSD0_D2R_P<0>
C8602 0.22UF PCIE_SSD0_D2R_C_N<0> PCIE_SSD0_D2R_N<0>
R8604 3.01K 1% 1/20W MF 201
R8605 300 1% 1/20W MF 201
R8606 100 1% 1/20W MF 201
R8600 100K 1% 1/20W MF 201
PLACE_NEAR=U8600.C10:5mm
R8602 4.7K 1% 1/20W MF 201 NOSTUFF
R8603 4.7K 1% 1/20W MF 201
R8620 100K 1% 1/20W MF 201
R8608 100K 1% 1/20W MF 201
R8609 100K 1% 1/20W MF 201
BOM_COST_GROUP=SDD

SYNC_MASTER=J137_gs5_redhead SYNC_DATE=01/26/2017

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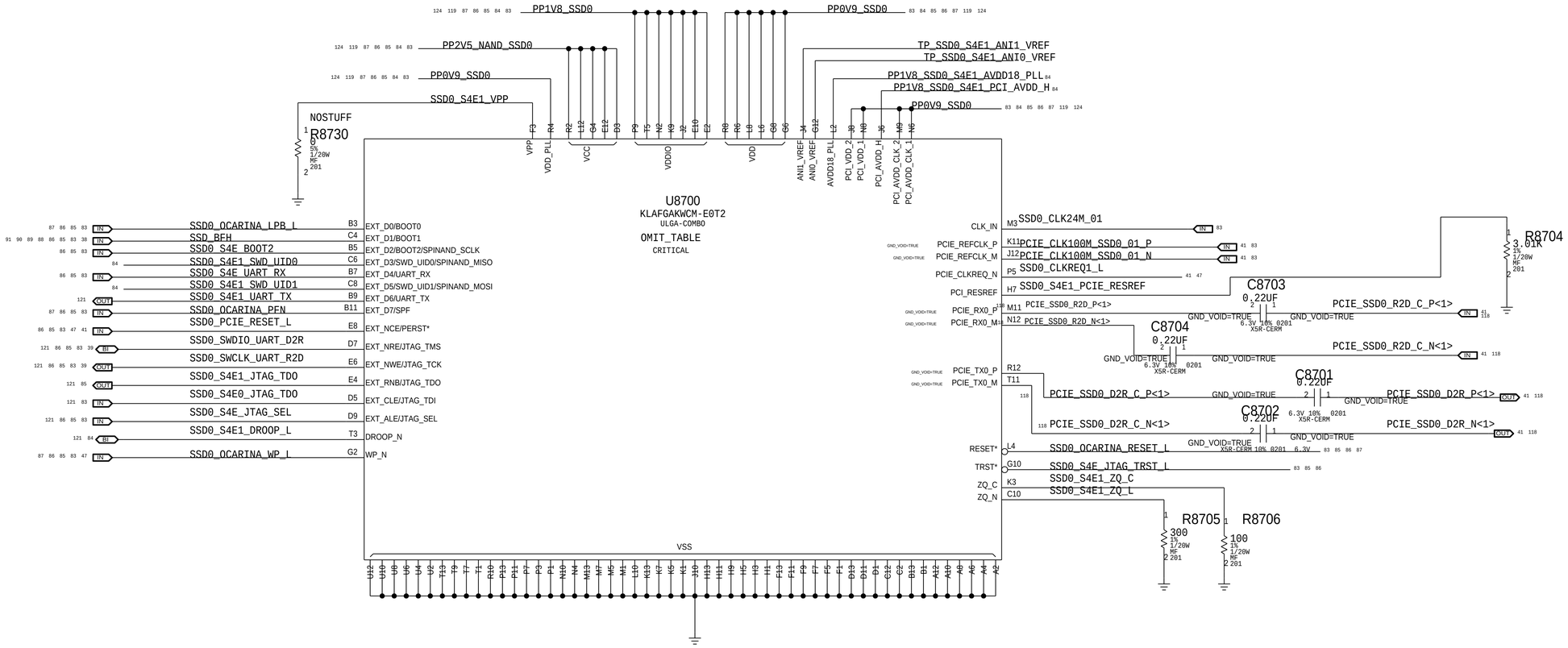
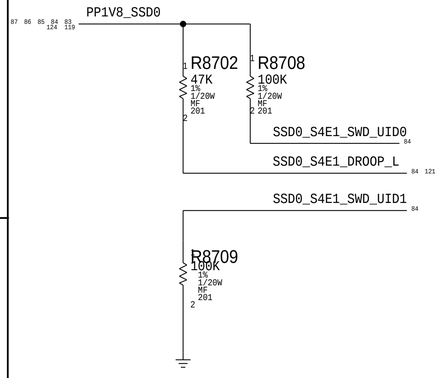
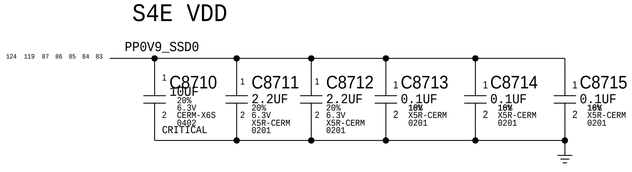
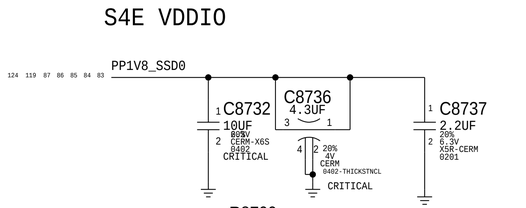
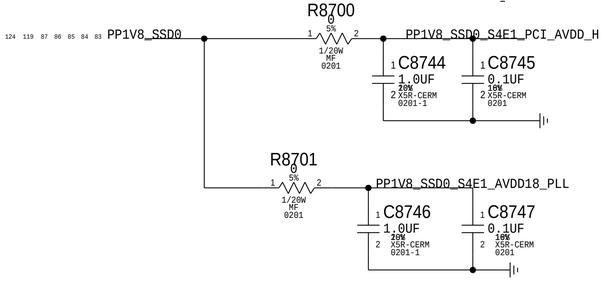
S4E1

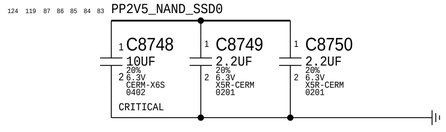












BOM_COST_GROUP=SDD

SYNC_MASTER=j137_gs5_redhead SYNC_DATE=01/26/2017

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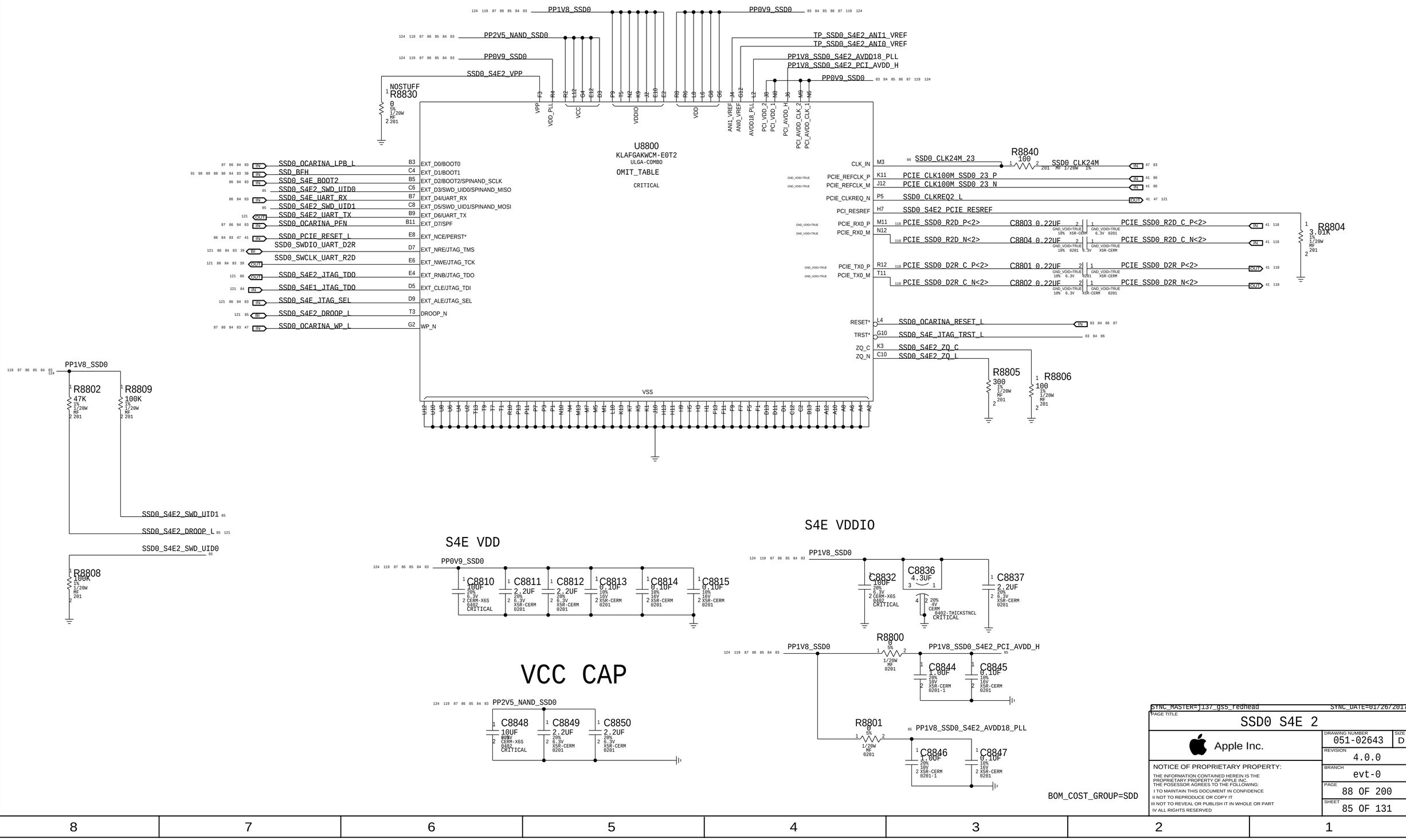

BOM_COST_GROUP=SDD

SYNC_MASTER=j137_gs5_redhead SYNC_DATE=01/26/2017

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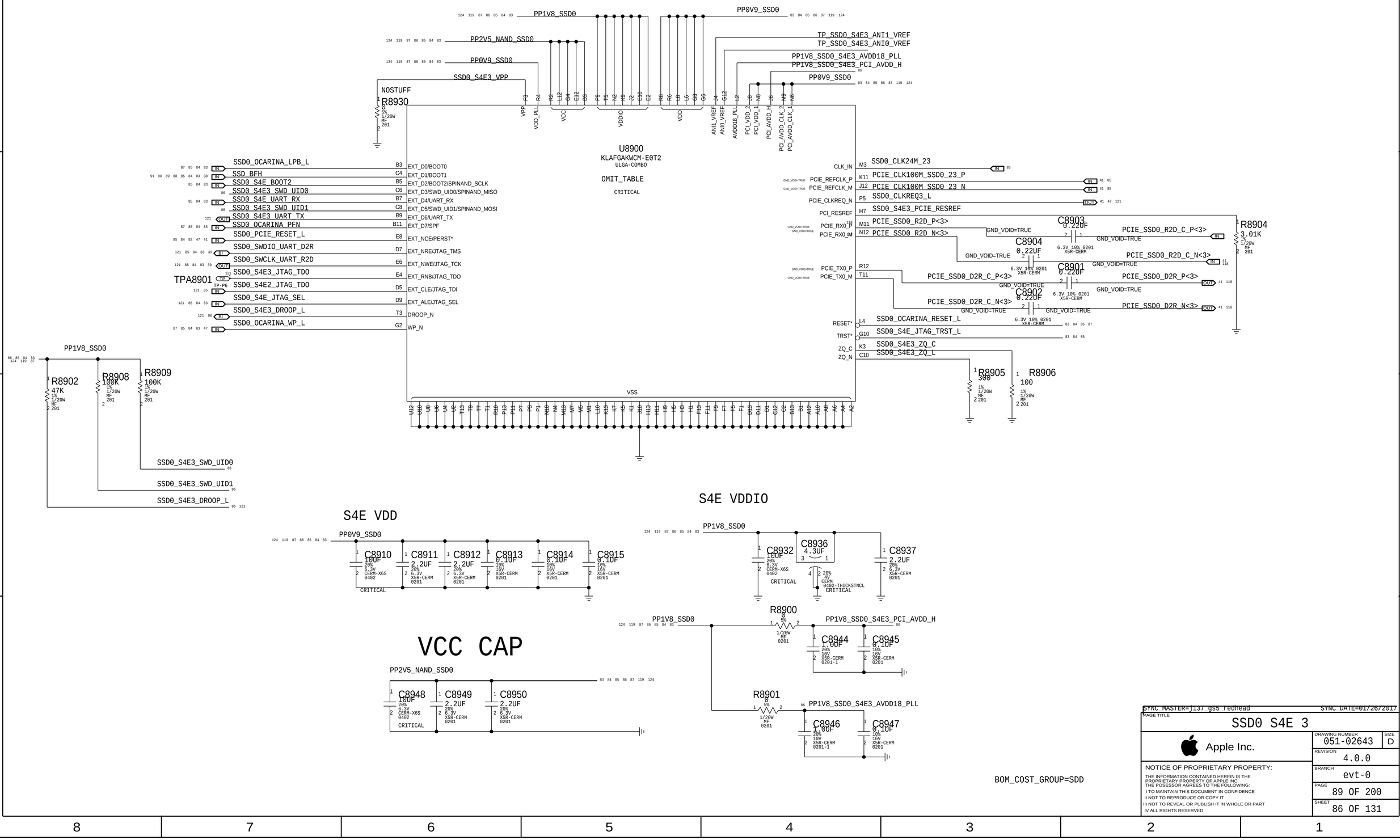

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PAGE TITLE

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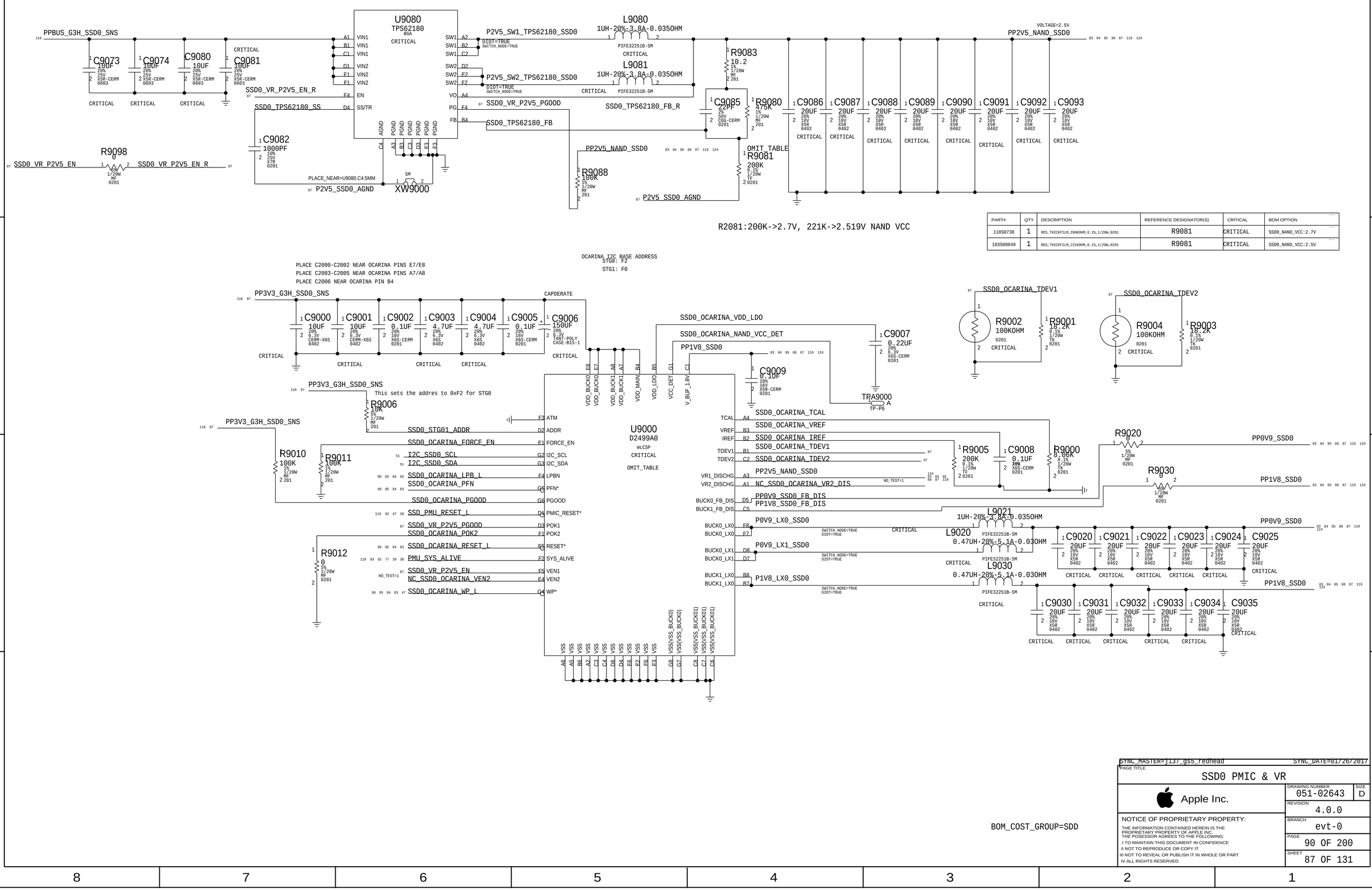

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0738	1	RES,THICKFILM,200KOHM,0.1%,1/20W,0201	R9081	CRITICAL	SSD0_NAND_VCC:2.7V
103S00049	1	RES,THICKFILM,221KOHM,0.1%,1/20W,0201	R9081	CRITICAL	SSD0_NAND_VCC:2.5V

SYNC_MASTER=J137_GS5_redhead SYNC_DATE=01/26/2017

PAGE TITLE: SSD0 PMIC & VR

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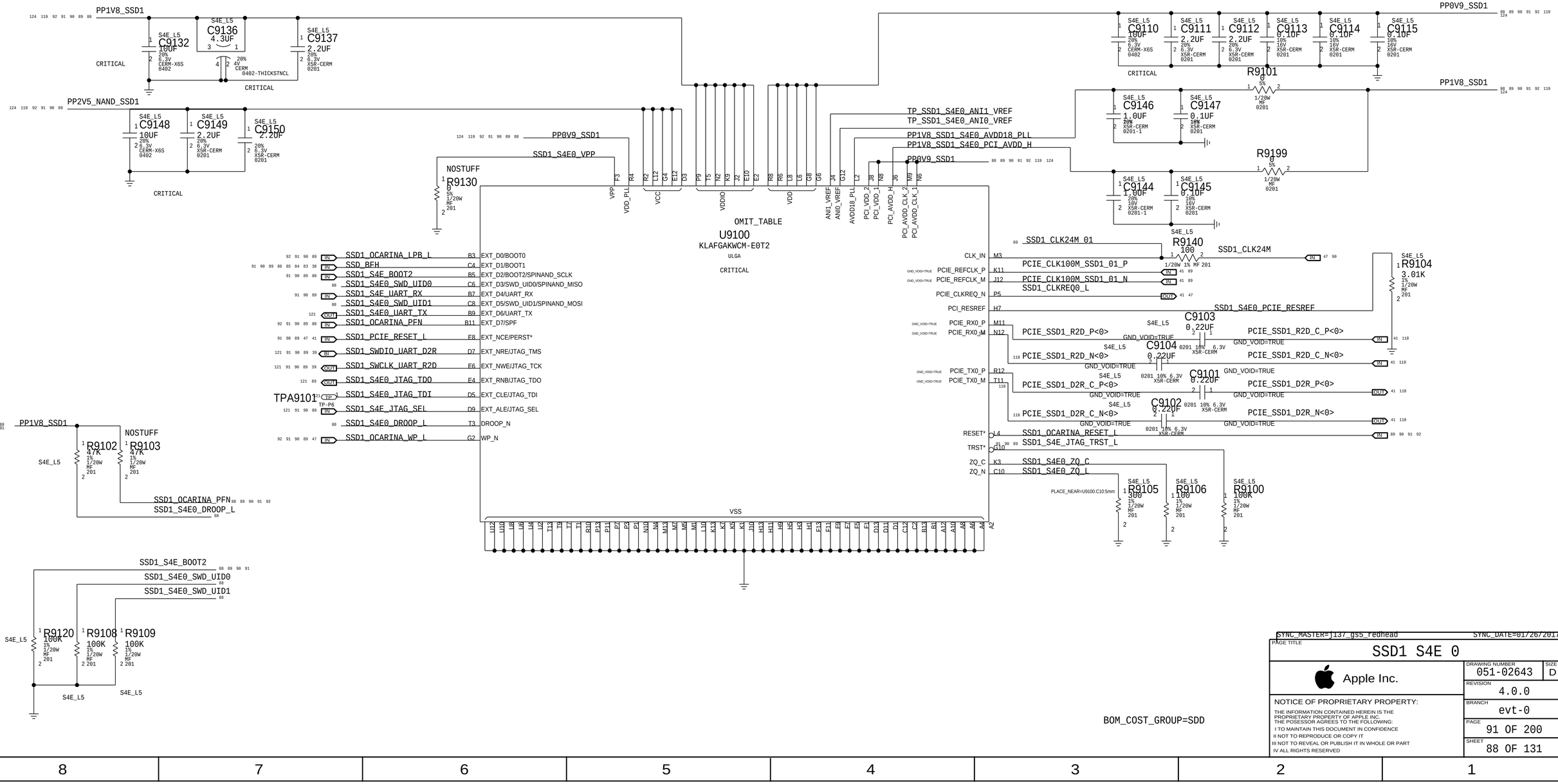
VCC CAP



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S4E1

PP1V8_SSD1
PP2V5_NAND_SSD1
PP0V9_SSD1
SSD1_S4E1_VPP
NOSTUFF
R9230 0 5% 1/20W MF 201
VPP VDD_PLL VCC VDDIO VDD ANI_VREF ANIO_VREF AVDD18_PLL PCI_VDD_2 PCI_VDD_1 PCI_AVDD_H PCI_AVDD_CLK_2 PCI_AVDD_CLK_1
TP_SSD1_S4E1_ANI1_VREF
TP_SSD1_S4E1_ANI0_VREF
PP1V8_SSD1_S4E1_AVDD18_PLL
PP1V8_SSD1_S4E1_PCI_AVDD_H
PP0V9_SSD1

OMIT_TABLE
U9200
KLAFGAKWCM-E0T2
ULGA
CRITICAL

SSD1_OCARINA_LPB_L → EXT_D0/BOOT0
SSD_BFH → EXT_D1/BOOT1
SSD1_S4E_BOOT2 → EXT_D2/BOOT2/SPINAND_SCLK
SSD1_S4E1_SWD_UID0 → EXT_D3/SWD_UID0/SPINAND_MISO
SSD1_S4E_UART_RX → EXT_D4/UART_RX
SSD1_S4E1_SWD_UID1 → EXT_D5/SWD_UID1/SPINAND_MOSI
SSD1_S4E1_UART_TX → EXT_D6/UART_TX
SSD1_OCARINA_PFN → EXT_D7/SPF
SSD1_PCIE_RESET_L → EXT_NCE/PERST*
SSD1_SWDIO_UART_D2R → EXT_NRE/JTAG_TMS
SSD1_SWCLK_UART_R2D → EXT_NWE/JTAG_TCK
SSD1_S4E1_JTAG_TDO → EXT_RNB/JTAG_TDO
SSD1_S4E0_JTAG_TDO → EXT_CLE/JTAG_TDI
SSD1_S4E_JTAG_SEL → EXT_ALE/JTAG_SEL
SSD1_S4E1_DROOP_L → DROOP_N
SSD1_OCARINA_WP_L → WP_N

CLK_IN ← SSD1_CLK24M_01
PCIE_REFCLK_P ← PCIE_CLK100M_SSD1_01_P
PCIE_REFCLK_M ← PCIE_CLK100M_SSD1_01_N
PCIE_CLKREQ_N ← SSD1_CLKREQ1_L
PCI_RESREF ← SSD1_S4E1_PCIE_RESREF
PCIE_RX0_P ← PCIE_SSD1_R2D_P<1> → C9203 0.22UF → PCIE_SSD1_R2D_C_P<1>
PCIE_RX0_M ← PCIE_SSD1_R2D_N<1> → C9204 0.22UF → PCIE_SSD1_R2D_C_N<1>
PCIE_TX0_P ← PCIE_SSD1_D2R_C_P<1> → C9201 0.22UF → PCIE_SSD1_D2R_P<1>
PCIE_TX0_M ← PCIE_SSD1_D2R_C_N<1> → C9202 0.22UF → PCIE_SSD1_D2R_N<1>
RESET* ← SSD1_OCARINA_RESET_L
TRST* ← SSD1_S4E_JTAG_TRST_L
ZQ_C ← SSD1_S4E1_ZQ_C
ZQ_N ← SSD1_S4E1_ZQ_L

R9204 3.01K 1% 1/20W MF 201
R9205 300 1% 1/20W MF 201
R9206 100 1% 1/20W MF 201

VSS

SSD1_S4E1_JTAG_TDO → R9231 0 5% 1/20W MF 0201 → SSD1_S4E3_JTAG_TDO

PP1V8_SSD1
R9202 47K 1% 1/20W MF 201 → SSD1_S4E1_SWD_UID0
R9208 100K 1% 1/20W MF 201 → SSD1_S4E1_DROOP_L
SSD1_S4E1_SWD_UID1
R9209 100K 1% 1/20W MF 201

S4E VDD

PP0V9_SSD1
C9210 10UF 20% 6.3V CERM-X6S 0402 CRITICAL
C9211 2.2UF 20% 6.3V X5R-CERM 0201
C9212 2.2UF 20% 6.3V X5R-CERM 0201
C9213 0.1UF 10% 16V X5R-CERM 0201
C9214 0.1UF 10% 16V X5R-CERM 0201
C9215 0.1UF 10% 16V X5R-CERM 0201

S4E VDDIO

PP1V8_SSD1
C9232 10UF 20% 6.3V CERM-X6S 0402 CRITICAL
C9236 4.3UF
C9237 2.2UF 20% 6.3V X5R-CERM 0201
4 20% 4V CERM 0402-THICKSTNCL CRITICAL

VCC CAP

PP2V5_NAND_SSD1
C9248 10UF 20% 6.3V CERM-X6S 0402 CRITICAL
C9249 2.2UF 20% 6.3V X5R-CERM 0201
C9250 2.2UF 20% 6.3V X5R-CERM 0201

R9200 0 5% 1/20W MF 0201 ← PP1V8_SSD1 → PP1V8_SSD1_S4E1_PCI_AVDD_H
C9244 1.0UF 20% 6.3V X5R-CERM 0201-1
C9245 0.1UF 10% 16V X5R-CERM 0201

R9201 0 5% 1/20W MF 0201 → PP1V8_SSD1_S4E1_AVDD18_PLL
C9246 1.0UF 20% 16V X5R-CERM 0201-1
C9247 0.1UF 10% 16V X5R-CERM 0201

BOM_COST_GROUP=SDD

SYNC_MASTER=j137_gs5_redhead SYNC_DATE=01/26/2017

PAGE TITLE: SSD1 S4E 1

Apple Inc.

DRAWING NUMBER: 051-02643 SIZE: D
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BRANCH: evt-0
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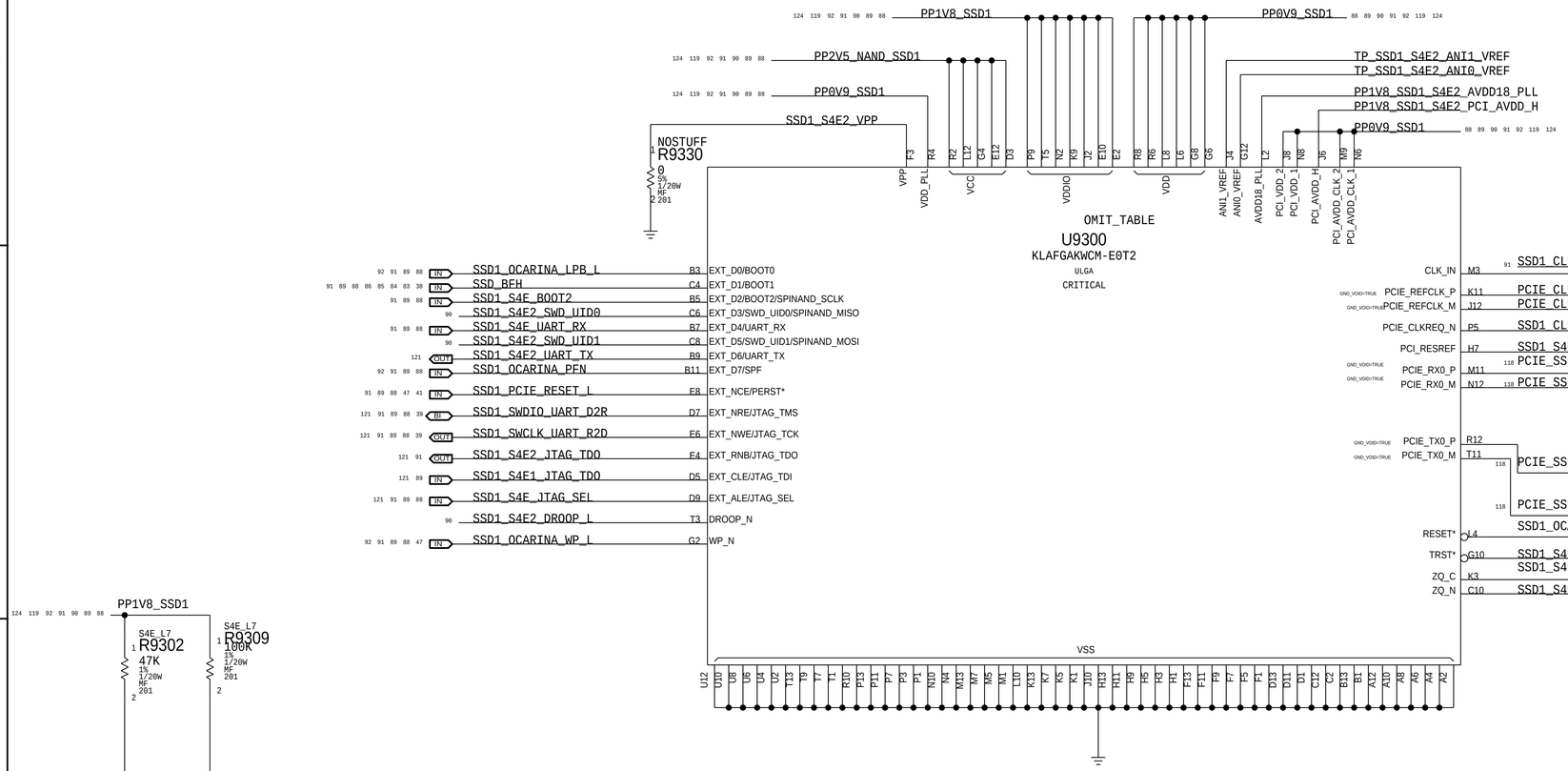
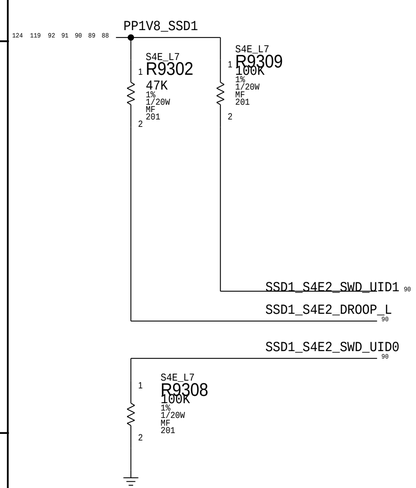
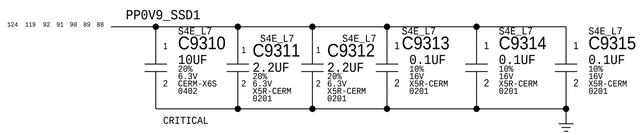
S4E2

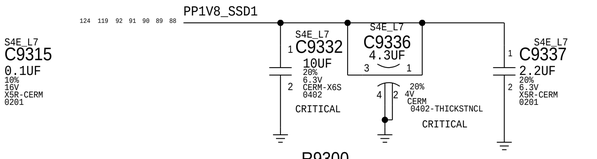




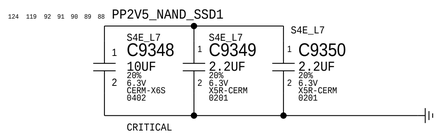
S4E VDD

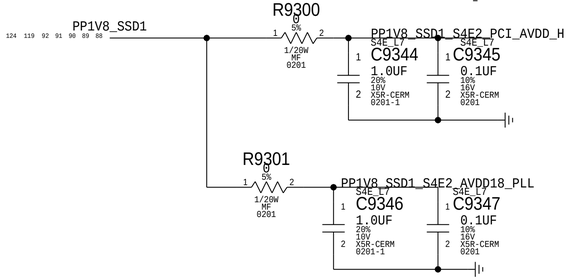


S4E VDDIO



VCC CAP





BOM_COST_GROUP=SDD

SYNC_MASTER=j137_gs5_redhead SYNC_DATE=01/26/2017

PAGE TITLE: SSD1 S4E 2

Apple Inc.

DRAWING NUMBER: 051-02643 SIZE: D
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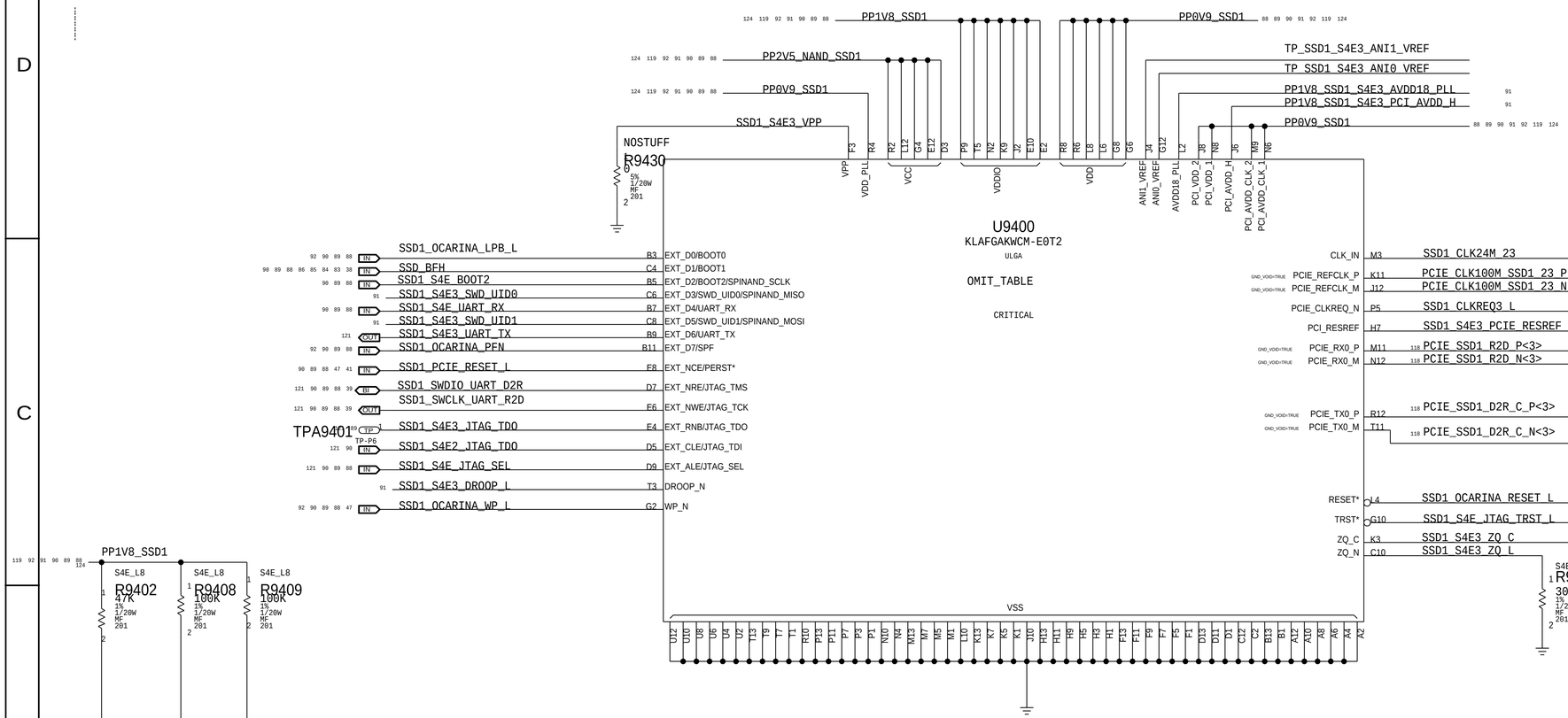
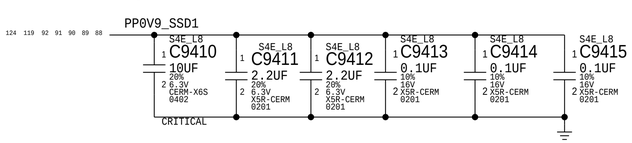
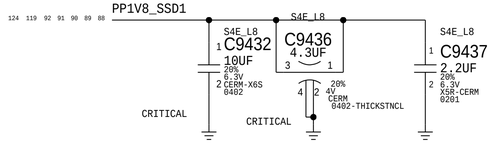
S4E3



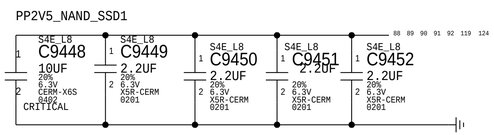
S4E VDD

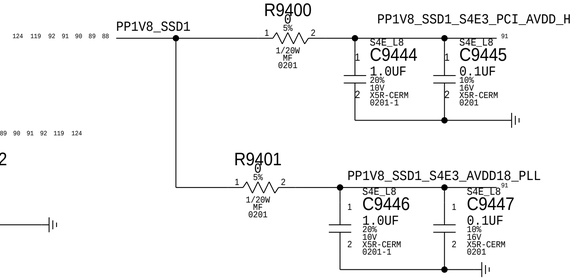


S4E VDDIO



VCC CAP





BOM_COST_GROUP=SDD

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	Apple Inc.
DRAWING NUMBER	051-02643
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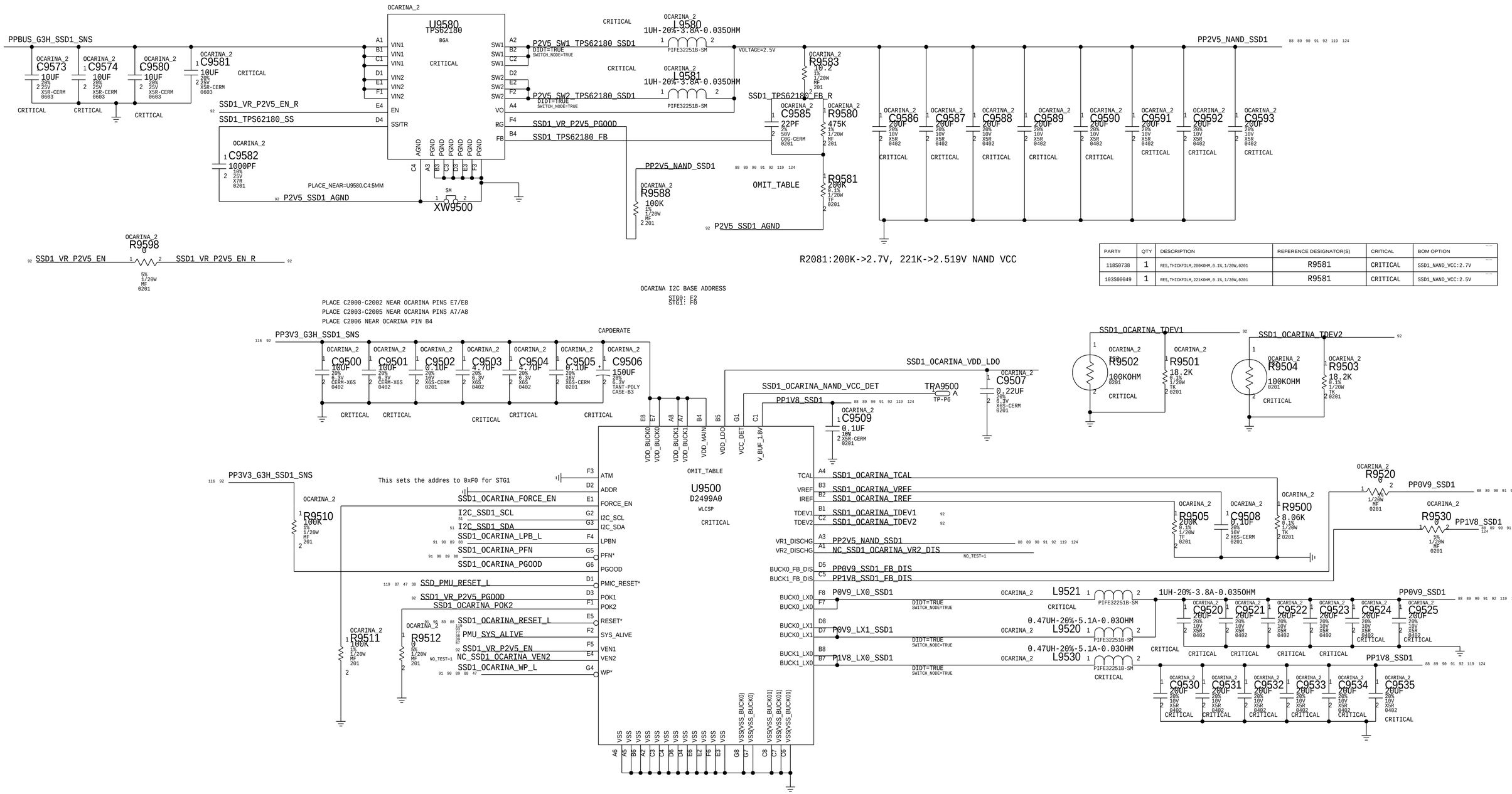

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0738	1	RES,THICKFILM,200KOHM,0.1%,1/20W,0201	R9581	CRITICAL	SSD1_NAND_VCC:2.7V
103S00049	1	RES,THICKFILM,221KOHM,0.1%,1/20W,0201	R9581	CRITICAL	SSD1_NAND_VCC:2.5V

PAGE TITLE: SSD1 PMIC & VR

Apple Inc.

DRAWING NUMBER: 051-02643 SIZE: D
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GMUX GPIO Expander

R9802 0 5% 1/16W MF-LF 402
PP3V3_S5 → PP3V3_S5_GPIOX_R (VOLTAGE=3.3V)

R9803 0 5% 1/16W MF-LF 402
PP1V8_S5 → PP1V8_S5_GPIOX_R (VOLTAGE=1.8V)

C9801 0.1UF 10% 6.3V CERM-X5R 0201
C9802 0.1UF 10% 6.3V CERM-X5R 0201

R9801 NOSTUFF 10K 5% 1/20W MF 201

R9804 NOSTUFF 10K 5% 1/20W MF 201
R9805 0 5% 1/20W MF 201

GMUX_IOEXP_ADDR_SEL

U9801 PCAL6524 VFBGA

INT*	C4	DISP_GCON_INT_L
ADDR	A5	
SCL	A3	I2C_DISP_SCL
SDA	A2	I2C_DISP_SDA
RESET*	B4	DISP_GCON_RESET_L
VDD(I2C-BUS)	A1	
VDD(P)	A4	
VSS	A6	
NC	B2, B3, C2, C3	
P0_0	B1	EG_VR0_PGOOD
P0_1	D4	P1V8GPU_PGOOD
P0_2	C1	PVDDCI_PGOOD
P0_3	D2	GPUVCORE_PGOOD
P0_4	D1	GPUFB_PGOOD
P0_5	E1	DP_INT_HPD_R
P0_6	D3	USBC_HPD_DET
P0_7	F1	TP_BKLT_FAULT_L
P1_0	E2	DP_INT_EG_HPD
P1_1	F2	DP_INT_IG_HPD
P1_2	E3	EDP_MUXSEL_OVR
P1_3	F3	EDP_IG_PANEL_PWR
P1_4	F4	EDP_IG_BKLT_EN
P1_5	E4	EG_LCD_PWR_EN
P1_6	F5	EG_BKLT_EN
P1_7	E5	TP_BKLT_BOOST_EN
P2_0	F6	EG_VR0_EN
P2_1	E6	EG_VR1_EN
P2_2	D5	EG_VR2_EN
P2_3	D6	EG_VR3_EN
P2_4	C5	EG_VR4_EN
P2_5	C6	EG_RESET_L_BUFF
P2_6	B5	EDP_PANEL_PWR_EN
P2_7	B6	EDP_BKLT_EN

I2C Addr:
Read: 45h
Write: 44h

LAST RAIL PGOOD HAS TO BE VR4_PGOOD

R9806 200 1% 1/10W MF-LF 402
DP_INT_HPD

R9820 47K 1/20W MF 201 5% EG_VR0_EN
R9821 47K 1/20W MF 201 5% EG_VR1_EN
R9822 47K 1/20W MF 201 5% EG_VR2_EN
R9823 47K 1/20W MF 201 5% EG_VR3_EN
R9824 47K 1/20W MF 201 5% EG_VR4_EN
R9825 100K 1/20W MF 201 5% DP_INT_EG_HPD
R9826 100K 1/20W MF 201 5% DP_X_SNK0_HPD_EG
R9827 100K 1/20W MF 201 5% DP_X_SNK1_HPD_EG
R9828 100K 1/20W MF 201 5% DP_T_SNK0_HPD_EG
R9830 100K 1/20W MF 201 5% DP_T_SNK1_HPD_EG
R9832 47K 1/20W MF 201 5% EDP_PANEL_PWR_EN
R9833 47K 1/20W MF 201 5% EDP_BKLT_EN

C9860 0.1UF 10% 6.3V CERM-X5R 0201

U9860 74LVC1G11GW-S500 SOT363

A	1	EG_RESET_L_BUFF
B	3	EG_VR0_PGOOD
C	6	PLT3V3_RST_L
VCC	5	
GND	2	
Y	4	GPU_RESET_L

R9860 100K 5% 1/20W MF 201

C9840 0.1UF 10% 6.3V CERM-X5R 0201

U9840 SLG4AP41422 STQFN

VDD	1	
GND	7	
HPD_X_SNK0	2	DP_X_SNK0_HPD
HPD_X_SNK1	3	DP_X_SNK1_HPD
HPD_T_SNK0	4	DP_T_SNK0_HPD
HPD_T_SNK1	5	DP_T_SNK1_HPD
GPU_RESET_L	6	GPUFB_PGOOD
HPD_X_SNK0_ISO	12	DP_X_SNK0_HPD_EG
HPD_X_SNK1_ISO	11	DP_X_SNK1_HPD_EG
HPD_T_SNK0_ISO	10	DP_T_SNK0_HPD_EG
HPD_T_SNK1_ISO	9	DP_T_SNK1_HPD_EG
HPD_DET_ANY	8	USBC_HPD_DET

DP 2:1 ANALOG MUX

PP3V3_S5

C9850 0.1UF 20% 10V X7R-CERM 0402
C9851 0.1UF 20% 10V X7R-CERM 0402

U9850 CBTL06142EEE TFBGA CRITICAL

VDD	A2, J4	
DIN1_0+	B4	DP_INT_EG_ML_P<0>
DIN1_0-	A4	DP_INT_EG_ML_N<0>
DIN1_1+	B5	DP_INT_EG_ML_P<1>
DIN1_1-	A5	DP_INT_EG_ML_N<1>
DIN1_2+	B6	DP_INT_EG_ML_P<2>
DIN1_2-	A6	DP_INT_EG_ML_N<2>
DIN1_3+	A8	DP_INT_EG_ML_P<3>
DIN1_3-	A9	DP_INT_EG_ML_N<3>
DAUX1+	H9	DP_INT_EG_AUX_P
DAUX1-	J9	DP_INT_EG_AUX_N
DDC_CLK1	H8	NC
DDC_DAT1	J8	NC
HPD_1	J2	DP_INT_EG_HPD_R
DIN2_0+	B8	DP_INT_IG_ML_P<0>
DIN2_0-	B9	DP_INT_IG_ML_N<0>
DIN2_1+	D8	DP_INT_IG_ML_P<1>
DIN2_1-	D9	DP_INT_IG_ML_N<1>
DIN2_2+	F8	DP_INT_IG_ML_P<2>
DIN2_2-	F9	DP_INT_IG_ML_N<2>
DIN2_3+	F8	DP_INT_IG_ML_P<3>
DIN2_3-	F9	DP_INT_IG_ML_N<3>
DAUX2+	H6	DP_INT_IG_AUX_P
DAUX2-	J6	DP_INT_IG_AUX_N
DDC_CLK2	H5	NC
DDC_DAT2	J5	NC
HPD_2	H3	DP_INT_IG_HPD_R
GPU_SEL	A1	EDP_MUXSEL_OVR
XSD*	B7	LCD_MUX_EN
DDC_AUX_SEL	C2	
GND	B3, C8, G8, H4, H7, G2	
DOUT_0+	B2	EDP_INT_ML_P<0>
DOUT_0-	B1	EDP_INT_ML_N<0>
DOUT_1+	D2	EDP_INT_ML_P<1>
DOUT_1-	D1	EDP_INT_ML_N<1>
DOUT_2+	E2	EDP_INT_ML_P<2>
DOUT_2-	E1	EDP_INT_ML_N<2>
DOUT_3+	F2	EDP_INT_ML_P<3>
DOUT_3-	F1	EDP_INT_ML_N<3>
AUX+	H2	EDP_INT_AUX_P
AUX-	H1	EDP_INT_AUX_N
HPDIN	J1	DP_INT_HPD

Pull down on eDP connector page

R9850 4.7K 1% 1/16W MF-LF 402
DP_INT_EG_HPD → DP_INT_EG_HPD_R

R9851 4.7K 1% 1/16W MF-LF 402
DP_INT_IG_HPD → DP_INT_IG_HPD_R

R9819 2.26K 1% 1/16W MF-LF 402
LCD_FSS → EDP_MUXSEL_OVR

R9807 100K 5% 1/20W MF 201

R9852 100K 5% 1/20W MF 201
PP3V3_S5

MUXSEL is default low.
EG is the default option

PP1V8_S5

C9810 0.1UF 10% 6.3V CERM-X5R 0201
R9810 100K 5% 1/20W MF 201

U9810 SOT353 74LVC1G08GW

P1V8S5_VALID	1	
PMU_SYS_ALIVE	2	
GND	3	
DISP_GCON_RESET_L_R	4	
VDD	5	

R9811 0 5% NOSTUFF 1/10W MF-LF 402
R9812 0 5% 1/10W MF-LF 402
DISP_GCON_RESET_L_R → DISP_GCON_RESET_L

BOM_COST_GROUP=GRAPHICS

PAGE TITLE	EDP Mux
Apple Inc.	
DRAWING NUMBER	051-02643
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PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	1	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	R9961		LOADRC:NO

High Speed Summing AMP

VOLTAGE=5V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

PP5V_S0_GPUFET → R9900 1 5% 1/16W MF-LF 402 → PP5V_S0_PCCAMP
C9900 10UF 20% 10V X6S-CERM 0603
C9901 0.1UF 10% 6.3V X6S 0201

GFXIMVP_ISNS1_N → R9940 2.43K 0.1% 1/20W TK 0201
GFXIMVP_ISNS2_N → R9941 2.43K 0.1% 1/20W TK 0201
GFXIMVP_ISNS3_N → R9942 2.43K 0.1% 1/20W TK 0201
NO_XNET_CONNECTION=1

GFXIMVP_ISNS1_P → R9943 2.43K 0.1% 1/20W TK 0201
GFXIMVP_ISNS2_P → R9944 2.43K 0.1% 1/20W TK 0201
GFXIMVP_ISNS3_P → R9945 2.43K 0.1% 1/20W TK 0201
NO_XNET_CONNECTION=1

GFXIMVP_ISNS_R_N → R9946 3.09K 0.1% 1/20W TK 0201 → GFXIMVP_ISNS_N
GFXIMVP_ISNS_R_P → R9947 3.09K 0.1% 1/20W TK 0201 → GFXIMVP_ISNS_P

NOSTUFF C9902 0.01UF 10% 10V X7R-CERM 0201
PLACE_NEAR=U9900.3:2.54MM
PLACE_NEAR=U9900.1:2.54MM
NO_XNET_CONNECTION=1

R9903 604K 0.1% 1/20W TK 0201

R9904 604K 0.1% 1/20W TK 0201
NO_XNET_CONNECTION=1
GPUVR_ISUM_IOUT

U9900 LMV693 UQFN

R9905 0 1/20W 5% 0201 MF
GPUVR_ISUM_IOUT_R
C9903 0.1UF 10% 6.3V X6S 0201
NOSTUFF

GPU_VCORE_IOUT_REF_R

TP9900

IG0C to Calpe

PLACE_NEAR=U7800.A14:5MM
R9960 10K 0.1% 1/20W MF 0201-1
PMU_GPU_CORE_ISENSE
PLACE_NEAR=U7800.A14:5MM
R9961 5.49K 0.1% 1/20W TK 0201 LOADRC:YES
C9960 2.2UF 20% 6.3V X5R-CERM 0201
PLACE_NEAR=U7800.A14:5MM
GND_CALPE_AVSS

Comparator

PCC:YES
R9906 1M 1/20W 1% 201 MF

PLACE_NEAR=U9901.5:2.54MM
PP5V_S0_GPUFET
C9904 0.1UF 10% 6.3V X6S 0201

U9901 LMV331 SC70-5
GPUVDDC_PCC_ALERT_R_L

R9907 0 1/20W 5% 0201 MF

PP3V3_S0_GPU
ALWAYS STUFF ME
R9908 10K 5% 1/20W MF 201

GPUVDDC_PCC_ALERT_L
NOSTUFF C9905 0.22UF 20% 6.3V X6S-CERM 0201

PCC flag to GPU

Active LOW

TP9902

TP9901

Trip Point Voltage Gen

PP5V_S0_GPUFET → R9909 2.2 5% 1/20W MF 201 → PP5V_VREF_PCC
C9906 1UF 20% 6.3V X6S-CERM 0201

U9902 SC4437 SOT23-3

VOLTAGE=5V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

PP3V3_VREF_PCC
C9907 1UF 20% 6.3V X6S-CERM 0201

VOLTAGE=3.3V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

R9910 1K 1/20W 0.1% 0201 TK

R9911 10K 0.1% 1/20W MF 0201-1
R9912 11.8K 0.1% 1/20W TK 0201
GPU_VCORE_IOUT_REF

Pulse Stretcher

PP3V3_S0_GPU
R9913 0 5% 1/20W MF 0201
R9914 0 5% 1/20W MF 0201
C9908 0.1UF 10% 6.3V X6S 0201
C9909 0.1UF 10% 6.3V X6S 0201

GPUVDDC_PCC_ALERT_L
PCC_B
PCC_CLR_L

U9903 SN74LVC1G123 BGA
PCC_EVENT_3V3
PCC_CEXT
R9915 200K 1% 1/20W MF 201
C9910 1UF 20% 6.3V X6S-CERM 0201

PP1V8_S5
C9911 0.1UF 10% 6.3V X6S 0201

U9904 74LVC1G17DRL SOT-553
PCC_EVENT_R

R9916 33 1/20W 5% 201 MF
R9917 100K 5% 1/20W MF 201

PCC_EVENT → to H9M

TP9903

PCC flag to H9M

Active HIGH

BOM_COST_GROUP=GRAPHICS

PAGE TITLE: GPU PCC

Apple Inc.

DRAWING NUMBER: 051-02643
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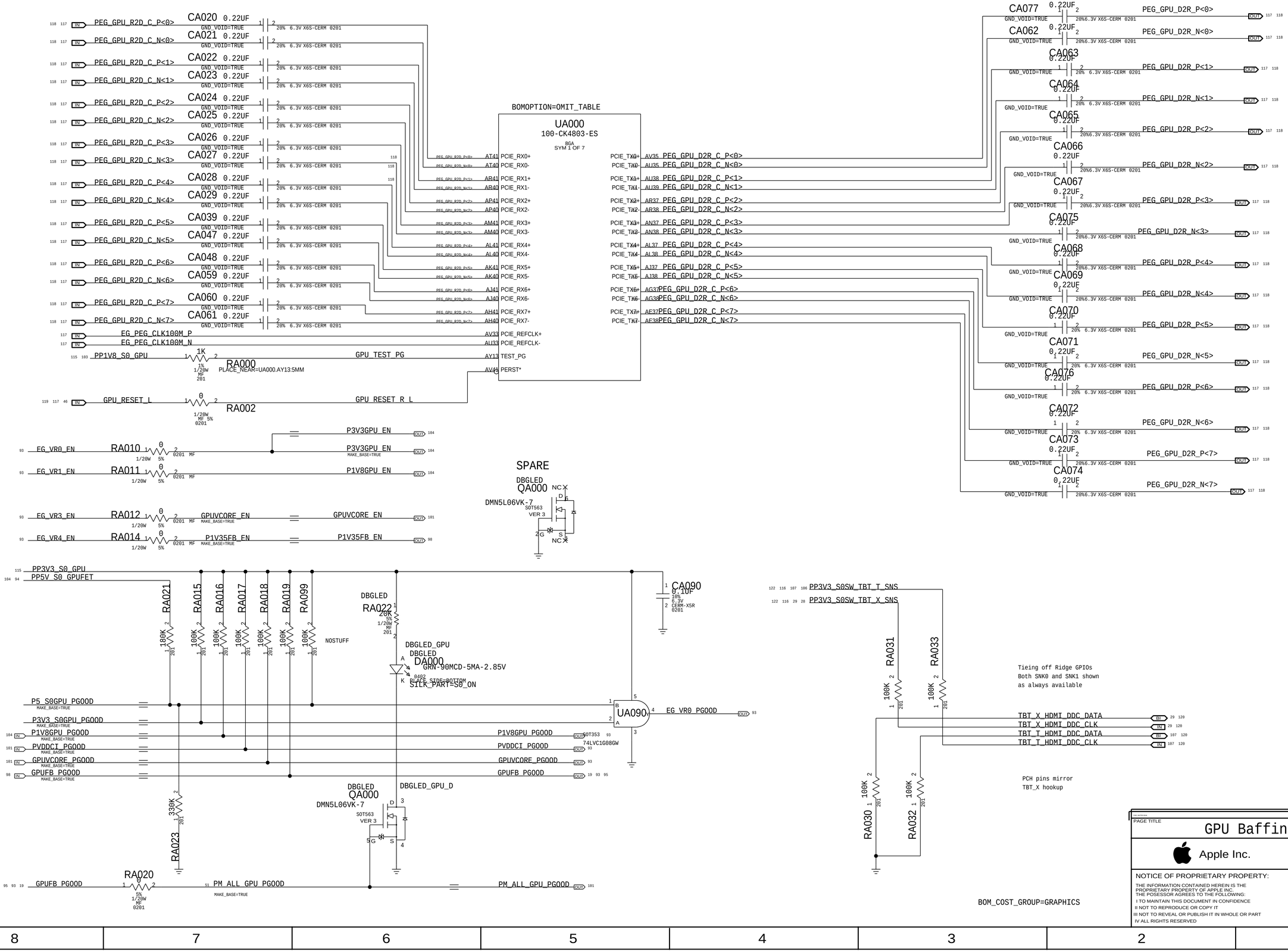
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AT40 PCIE_RX0-
AR41 PCIE_RX1+
AR40 PCIE_RX1-
AP41 PCIE_RX2+
AP40 PCIE_RX2-
AM41 PCIE_RX3+
AM40 PCIE_RX3-
AL41 PCIE_RX4+
AL40 PCIE_RX4-
AK41 PCIE_RX5+
AK40 PCIE_RX5-
AJ41 PCIE_RX6+
AJ40 PCIE_RX6-
AH41 PCIE_RX7+
AH40 PCIE_RX7-
AV33 PCIE_REFCLK+
AU33 PCIE_REFCLK-
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AV43 PERST*
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1% 1/20W MF 201
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1/20W MF 5% 0201
RA002
GPU_RESET_R_L
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QA000
DMN5L06VK-7
SOT563
VER 3
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PP5V_S0_GPUFET
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RA015 100K
RA016 100K
RA017 100K
RA018 100K
RA019 100K
RA099 100K
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RA022 20K 5% 1/20W MF 201
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PP3V3_S0SW_TBT_T_SNS
PP3V3_S0SW_TBT_X_SNS
RA031 100K
RA033 100K
RA030 100K
RA032 100K
Tieing off Ridge GPIOs
Both SNK0 and SNK1 shown
as always available
TBT_X_HDMI_DDC_DATA
TBT_X_HDMI_DDC_CLK
TBT_T_HDMI_DDC_DATA
TBT_T_HDMI_DDC_CLK
PCH pins mirror
TBT_X hookup
BOM_COST_GROUP=GRAPHICS
PAGE TITLE
GPU Baffin PCIe
Apple Inc.
DRAWING NUMBER
051-02643
SIZE
D
REVISION
4.0.0
BRANCH
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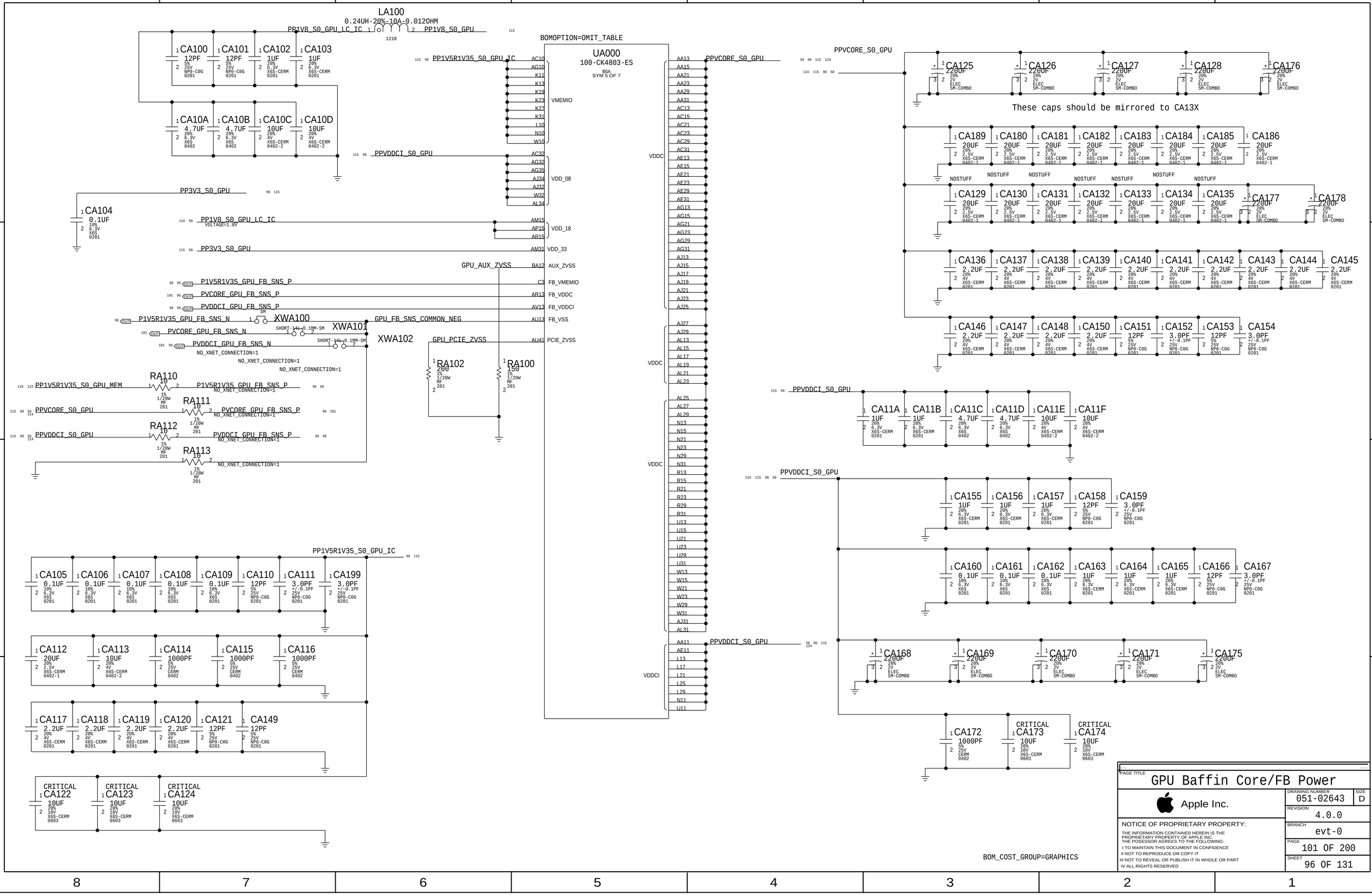

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	Apple Inc.
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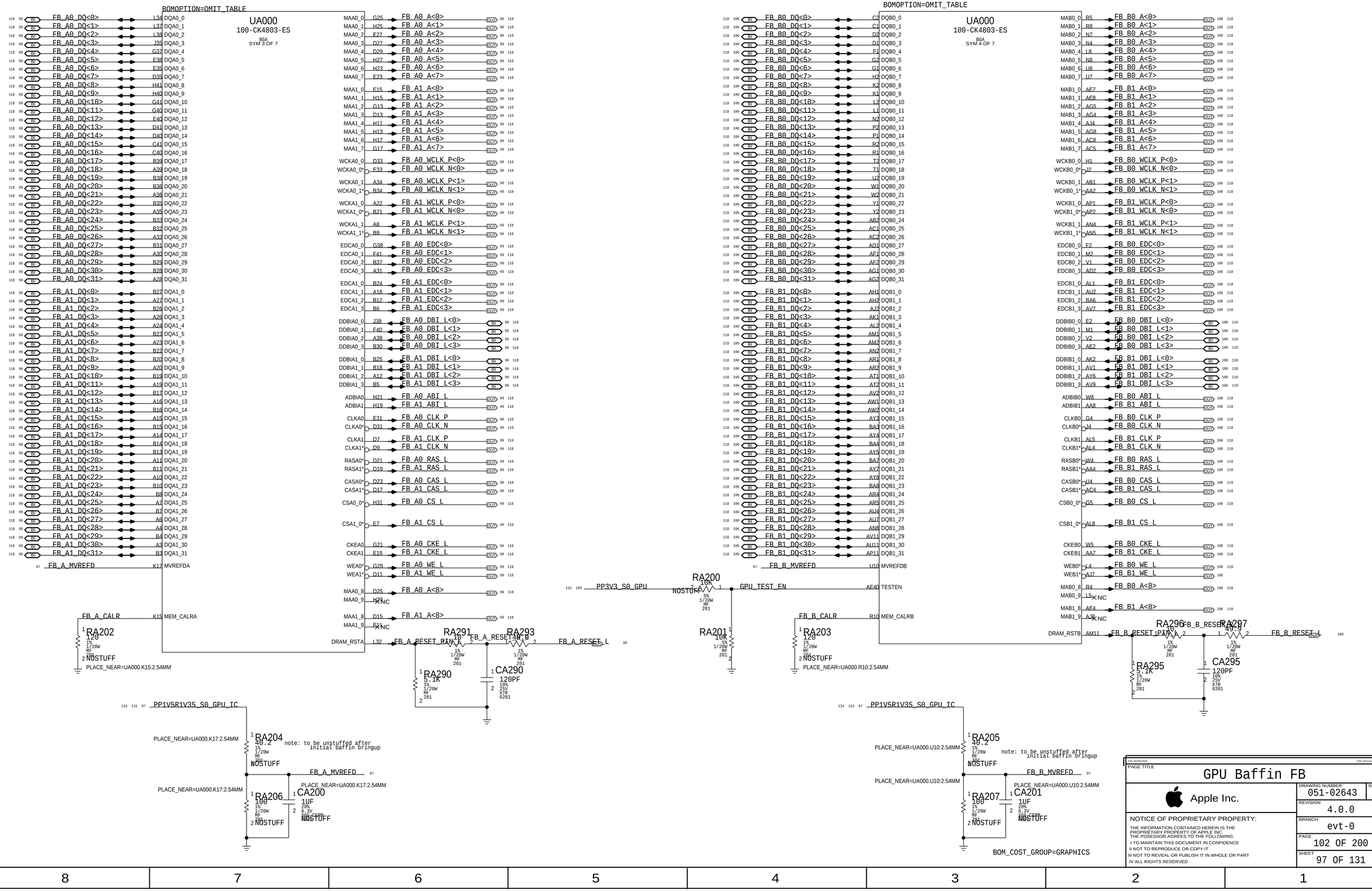
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CA290 120PF 10% 25V X7R 0201
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CA295 120PF 10% 25V X7R 0201
RA204 40.2 1% 1/20W MF 201 NOSTUFF
note: to be unstuffed after initial baffin bringup
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PAGE TITLE
GPU Baffin FB
Apple Inc.
DRAWING NUMBER 051-02643
SIZE D
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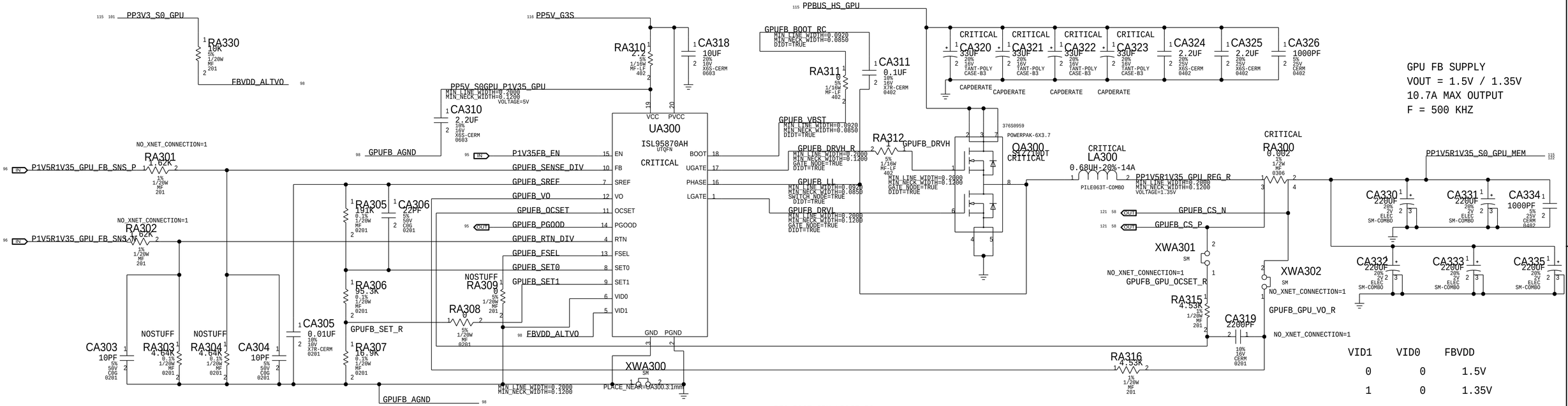

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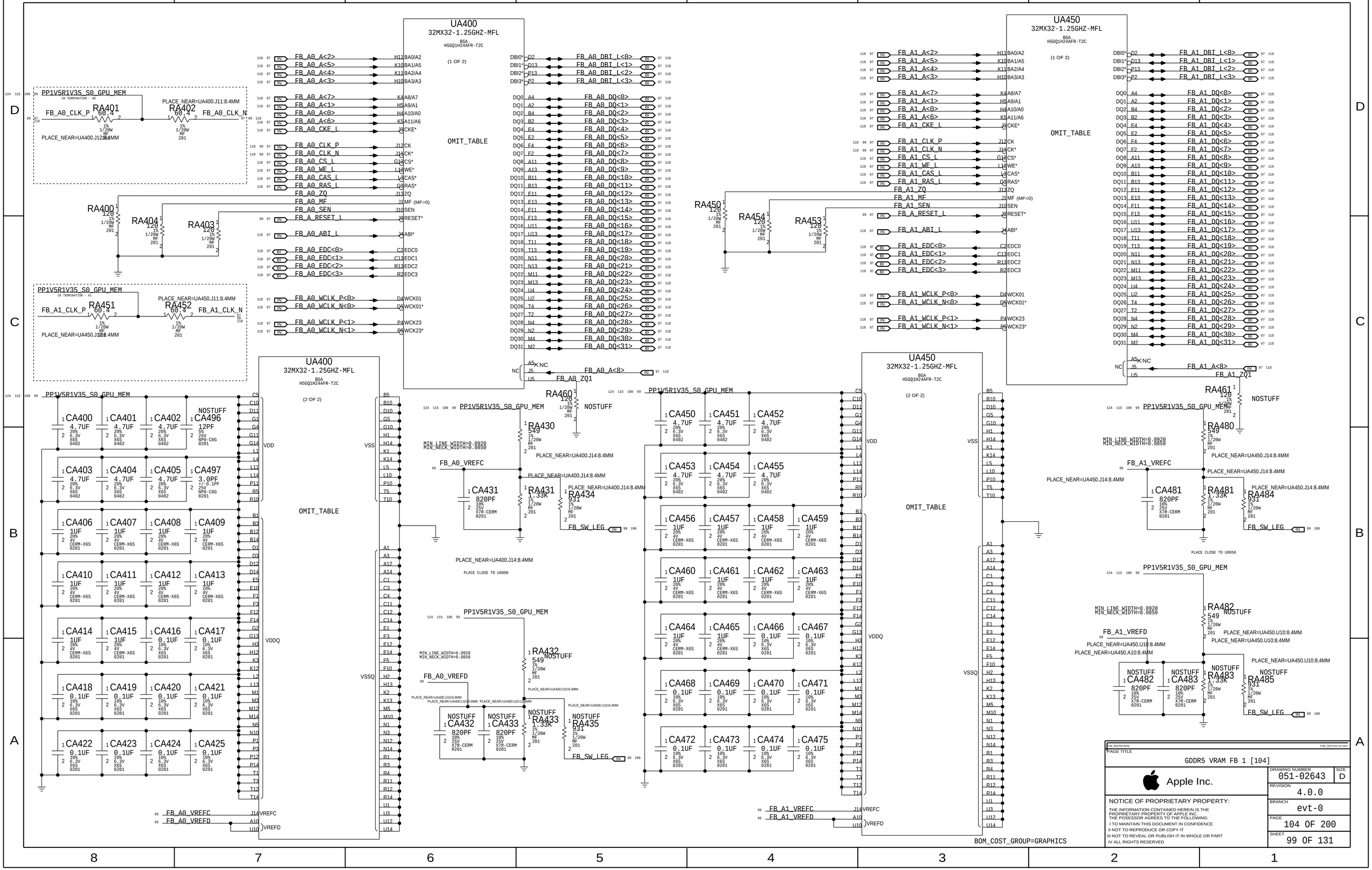
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(2 OF 2)
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Apple Inc.
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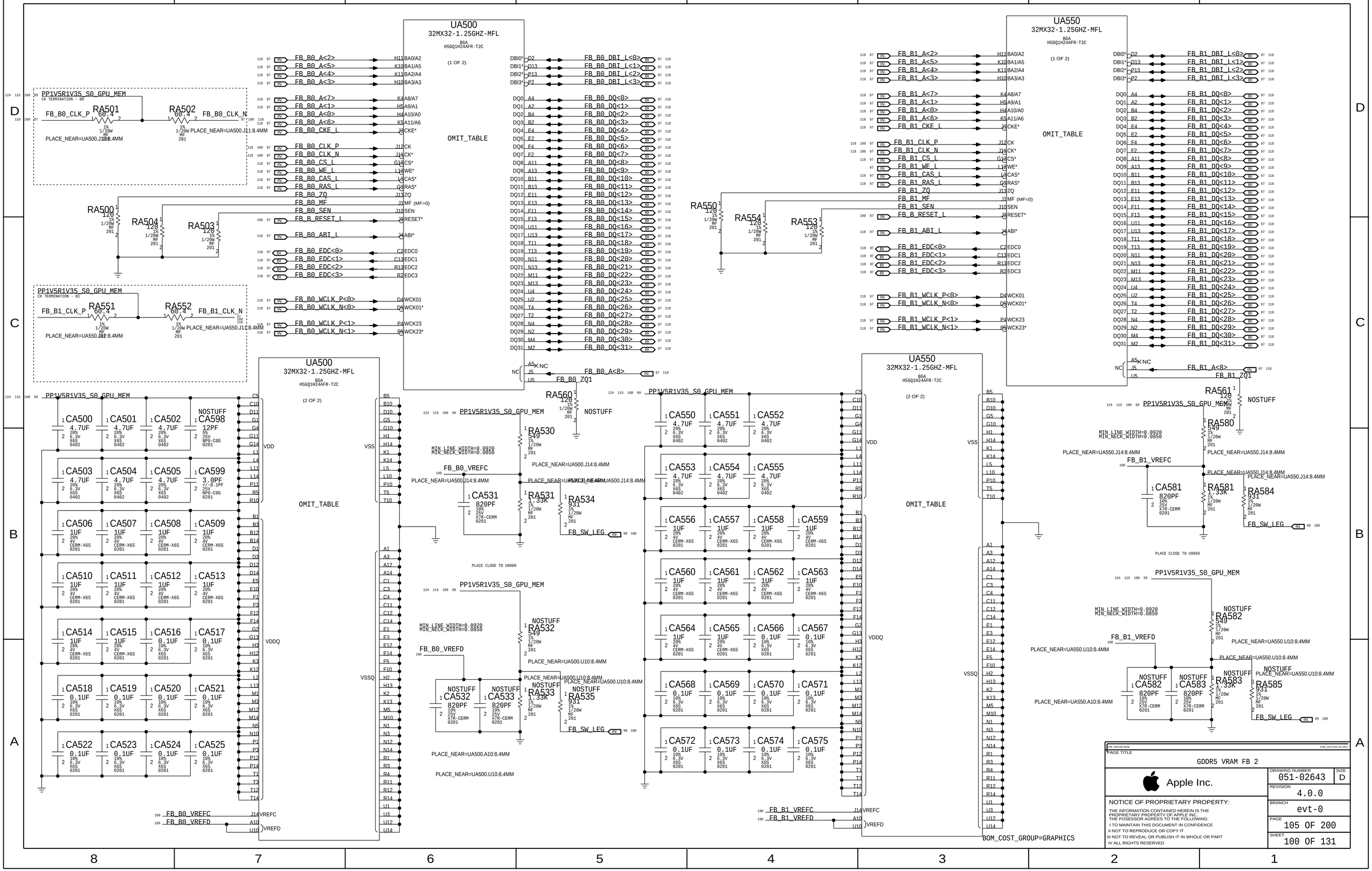
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RA504
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FB_B1_DBI_L<1>
FB_B1_DBI_L<2>
FB_B1_DBI_L<3>
FB_B1_DQ<0>
FB_B1_DQ<1>
FB_B1_DQ<2>
FB_B1_DQ<3>
FB_B1_DQ<4>
FB_B1_DQ<5>
FB_B1_DQ<6>
FB_B1_DQ<7>
FB_B1_DQ<8>
FB_B1_DQ<9>
FB_B1_DQ<10>
FB_B1_DQ<11>
FB_B1_DQ<12>
FB_B1_DQ<13>
FB_B1_DQ<14>
FB_B1_DQ<15>
FB_B1_DQ<16>
FB_B1_DQ<17>
FB_B1_DQ<18>
FB_B1_DQ<19>
FB_B1_DQ<20>
FB_B1_DQ<21>
FB_B1_DQ<22>
FB_B1_DQ<23>
FB_B1_DQ<24>
FB_B1_DQ<25>
FB_B1_DQ<26>
FB_B1_DQ<27>
FB_B1_DQ<28>
FB_B1_DQ<29>
FB_B1_DQ<30>
FB_B1_DQ<31>
FB_B1_A<8>
FB_B1_ZQ1
RA550
RA553
RA554
RA560
RA561
PLACE_NEAR=UA550.J14:8.4MM
UA500
32MX32-1.25GHZ-MFL
(2 OF 2)
VDD
VSS
VDDQ
VSSQ
VREFC
VREFD
FB_B0_VREFC
FB_B0_VREFD
CA500
CA501
CA502
CA503
CA504
CA505
CA506
CA507
CA508
CA509
CA510
CA511
CA512
CA513
CA514
CA515
CA516
CA517
CA518
CA519
CA520
CA521
CA522
CA523
CA524
CA525
CA598
CA599
4.7UF
1UF
0.1UF
12PF
3.0PF
NOSTUFF
PLACE CLOSE TO U9000
RA530
RA531
RA532
RA533
RA534
RA535
CA531
CA532
CA533
549
1.33K
931
820PF
MIN_LINE_WIDTH=0.0920
MIN_NECK_WIDTH=0.0850
PLACE_NEAR=UA500.A10:8.4MM
PLACE_NEAR=UA500.U10:8.4MM
UA550
32MX32-1.25GHZ-MFL
(2 OF 2)
CA550
CA551
CA552
CA553
CA554
CA555
CA556
CA557
CA558
CA559
CA560
CA561
CA562
CA563
CA564
CA565
CA566
CA567
CA568
CA569
CA570
CA571
CA572
CA573
CA574
CA575
RA580
RA581
RA582
RA583
RA584
RA585
CA581
CA582
CA583
PLACE_NEAR=UA550.U10:8.4MM
PLACE_NEAR=UA550.A10:8.4MM
PLACE CLOSE TO U9050
BOM_COST_GROUP=GRAPHICS
PAGE TITLE
GDDR5 VRAM FB 2
Apple Inc.
DRAWING NUMBER
051-02643
SIZE
D
REVISION
4.0.0
BRANCH
evt-0
PAGE
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SHEET
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PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
376S00174	2	MOSFET,CTRL+SYNC,25V,4.1/1.4MΩ,QFN32,6x6	QA640,QA650	CRITICAL	

GPU CORE SUPPLY

VOUT = 0.75-1.00V
64.2A MAX OUTPUT
F = 450 KHZ

UA600 ISL6277AHRZ-TR5740 QFN
BOMOPTION=OMIT_TABLE
CRITICAL
VDDIO = 1.14V ~ 1.95V

QA640 IRF3575 PQFN CRITICAL
QA650 IRF3575 PQFN CRITICAL
376S1136

LA640 0.2UH-20%-28A-0.0011OHM CRITICAL
LA650 0.2UH-20%-28A-0.0011OHM CRITICAL
PILA63T-SM

RA641 0.00075 CRITICAL
RA651 0.00075 CRITICAL

CA600 330UF 20% 16V TANT-POLY CASE-B3
CA601 330UF 20% 16V TANT-POLY CASE-B3
CA602 330UF 20% 16V TANT-POLY CASE-B3
CA603 330UF 20% 16V TANT-POLY CASE-B3
CA604 330UF 20% 16V TANT-POLY CASE-B3
CA605 330UF 20% 16V TANT-POLY CASE-B3
CA606 330UF 20% 16V TANT-POLY CASE-B3
CA607 12PF 5% NP0-C0G 0201 25V CRITICAL
CA608 3.0PF +/-0.1PF 25V NP0-C0G 0201 CRITICAL
CA609 2.2UF 20% 25V X6S-CERM 0402
CA610 2.2UF 20% 25V X6S-CERM 0402
CA611 2.2UF 20% 25V X6S-CERM 0402
CA612 2.2UF 20% 25V X6S-CERM 0402
CA613 330UF 20% 16V TANT-POLY CASE-B3
CA614 2.2UF 20% 25V X6S-CERM 0402
CA615 2.2UF 20% 25V X6S-CERM 0402
CA616 330UF 20% 16V TANT-POLY CASE-B3
CA617 330UF 20% 16V TANT-POLY CASE-B3
For 80A EDP
CAPDERATE

CA637 1.0UF 10% 25V X6S 0402
CA638 1.0UF 10% 25V X6S 0402
CA639 0.22UF 10% 25V X7R 0402
CA640 0.22UF 10% 16V CERM 402
CA641 0.22UF 20% 6.3V X6S-CERM 0201
CA650 0.22UF 10% 16V CERM 402
CA660 1000PF 5% 25V C0G 0201
CA661 2200PF 10% 16V CERM 0201
CA662 220PF 10% 16V CER-X7R 0402
CA663 82PF 5% 25V NP0-C0G 0201
CA664 2.0PF +/-0.1PF 25V NP0-C0G-CERM 0201
CA666 5600PF 10% 10V CERM 201
CA667 0.1UF 10% 6.3V X6S 0201
CA668 2.0PF +/-0.1PF 25V NP0-C0G-CERM 0201
CA669 0.01UF 10% 25V X5R-CERM 0201
CA680 22 5% 1/20W MF 201
CA681 22 5% 1/20W MF 201
CA682 22 5% 1/20W MF 201
CA690 12PF 5% NP0-C0G 0201
CA691 3.0PF +/-0.1PF 25V NP0-C0G 0201
CA692 12PF 5% NP0-C0G 0201
CA693 3.0PF +/-0.1PF 25V NP0-C0G 0201
CA694 12PF 5% NP0-C0G 0201
CA695 3.0PF +/-0.1PF 25V NP0-C0G 0201
CA696 12PF 5% NP0-C0G 0201
CA697 3.0PF +/-0.1PF 25V NP0-C0G 0201

RA600 127K 1% 1/20W MF 201
RA601 0 5% 1/20W MF 0201
RA602 0 5% 1/20W MF 201
RA603 0 5% 1/20W MF 0201
RA640 0 5% 1/16W MF-LF 402
RA642 10K 1% 1/20W MF 201
RA643 1K 1% 1/20W MF 201
RA644 1.00 1% 1/20W MF-LF 0201
RA645 10K 1% 1/20W MF 201
RA646 10K 1% 1/20W MF 201
RA650 0 5% 1/16W MF-LF 402
RA652 10K 1% 1/20W MF 201
RA653 1K 1% 1/20W MF 201
RA654 1.00 1% 1/20W MF-LF 0201
RA655 10K 1% 1/20W MF 201
RA656 10K 1% 1/20W MF 201
RA662 9.09K 1% 1/20W MF 201
RA663 100 1% 1/20W MF 201
RA664 1.07K 1% 1/20W MF 201
RA665 10 5% 1/20W MF 201
RA666 560 1% 1/20W MF 201
RA667 0 5% 1/20W MF 0201
RA668 0 5% 1/20W MF 0201
RA669 0 5% 1/20W MF 0201
RA680 22 5% 1/20W MF 201
RA681 22 5% 1/20W MF 201
RA682 22 5% 1/20W MF 201
RA683 10K 1% 1/20W MF 201
RA684 47K 5% 1/20W MF 201
RA685 47K 5% 1/20W MF 201
RA686 10K 5% 1/20W MF 201
RA687 47K 5% 1/20W MF 201
RA688 10K 5% 1/20W MF 201
RA690 100K 1% 1/20W MF 201

PP1V8_S0_GPU
PP5V_G3S
PP5V_G3S_GFXIMVP_VDD
PP5V_G3S_GFXIMVP_VDDP
PPBUS_HS_GPU
PPVIN_S0_GFXIMVP_VIN
PPVCORE_S0_GFX_PH1
PPVCORE_S0_GFX_PH2
PPVCORE_S0_GPU
PP3V3_S0_GPU

REG_GPU_VDDCI_VSEN
REG_GPU_VDDCI_COMP
REG_GPU_VDDCI_FB
REG_GPU_VDDCI_ISUMP
REG_GPU_VDDCI_ISUMN
REG_GPU_VDDCI_ISEN1
PP5V_G3S
REG_GPU_VDDCI_IMON
PVDDCI_PGOOD
REG_BOOT_GPU_VDDCI
REG_UGATE_GPU_VDDCI_R
REG_PHASE_GPU_VDDCI
REG_LGATE_GPU_VDDCI
GFXIMVP_PWM3
REG_GPU_VDDCI_FCCM
GFXIMVP_ISEN3
GFXIMVP_ISEN2
GFXIMVP_ISEN1
GFXIMVP_BOOT2
GFXIMVP_UGATE2
GFXIMVP_LGATE2
GFXIMVP_BOOT1
GFXIMVP_UGATE1
GFXIMVP_Q1S1
GFXIMVP_LGATE1
GFXIMVP_BOOT2_R
GFXIMVP_BOOT1_R
GFXIMVP_PHASE2
GFXIMVP_PHASE1
GFXIMVP_ISUMP
GFXIMVP_ISUMP_C
GFXIMVP_ISUMN
GFXIMVP_ISUMN_R
GFXIMVP_ISEN2
GFXIMVP_ISNS2_P
GFXIMVP_ISNS2_N
GFXIMVP_ISEN1
GFXIMVP_ISNS1_P
GFXIMVP_ISNS1_N
GFXIMVP_ISUMN
GFXIMVP_ISUMP
GFXIMVP_ISNS1_N
GFXIMVP_ISNS2_N
GFXIMVP_ISNS3_N
GPUVCORE_NTC
GPUVCORE_VR_HOT_L
GPUVCORE_EN
PM_ALL_GPU_PGOOD
GPUVCORE_SVC
GPUVCORE_SVD
GPUVCORE_SVT_R
GPUVCORE_COMP
GPUVCORE_SENSE_P
GPUVCORE_SENSE_N
GPUVCORE_SENSE_P
GPUVCORE_SENSE_N
GPUVCORE_FB
GPUVCORE_FB2
GPUVCORE_SVC_R
GPUVCORE_SVD_R
GPUVCORE_SVT
GPUVCORE_PGOOD
PVDDCI_GPU_FB_SNS_N
PVCORE_GPU_FB_SNS_P
PVCORE_GPU_FB_SNS_N
TP_GPUVCORE_IMON

VIN
VDDP
VDDIO
VDD
IMON
IMON_NB
PWM2_NB
PGOOD_NB
BOOTX
UGATEX
PHASEX
LGATEX
PWM_Y
BOOT2
UGATE2
PHASE2
LGATE2
BOOT1
UGATE1
PHASE1
LGATE1
PGOOD
FCCM_NB
ISEN3
ISEN2
ISEN1
VSEN_NB
COMP_NB
FB_NB
ISUMP_NB
ISUMN_NB
ISEN1_NB
ISEN2_NB
NTC_NB
NTC 27-33uA
VR_HOT*11Rdwn,1uA-leak
ENABLE Vil<1V,Vih>1.6V Ileak<35uA
PWROK Vthres=750mV, 1uA-leak
SVC {Vih>0.7*VDDIO
SVD {Vil<0.3*VDDIO
SVT 50R
COMP Vol<0.4V@4mA Ioh|<1uA
VSEN
RTN
FB
FB2
ISUMP
ISUMN
THRM PAD
OMIT_TABLE
Line Width & DIDT on all DIDT nets
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
DIDT=TRUE
SWITCH_NODE=TRUE
GATE_NODE=TRUE
NO_XNET_CONNECTION
CKPLUS_WAIVE=PDIFPR_BADTERM

TABLE 6. PRE-PWROK METAL VID CODES

SVC	SVD	OUTPUT VOLTAGE (V)
0	0	1.1
0	1	1.0
1	0	0.9
1	1	0.8

ISL6277A datasheet (December 19,2012)

BOM_COST_GROUP=GRAPHICS

PAGE TITLE: VR GPU Core
Apple Inc.
DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
PAGE: 106 OF 200
SHEET: 101 OF 131

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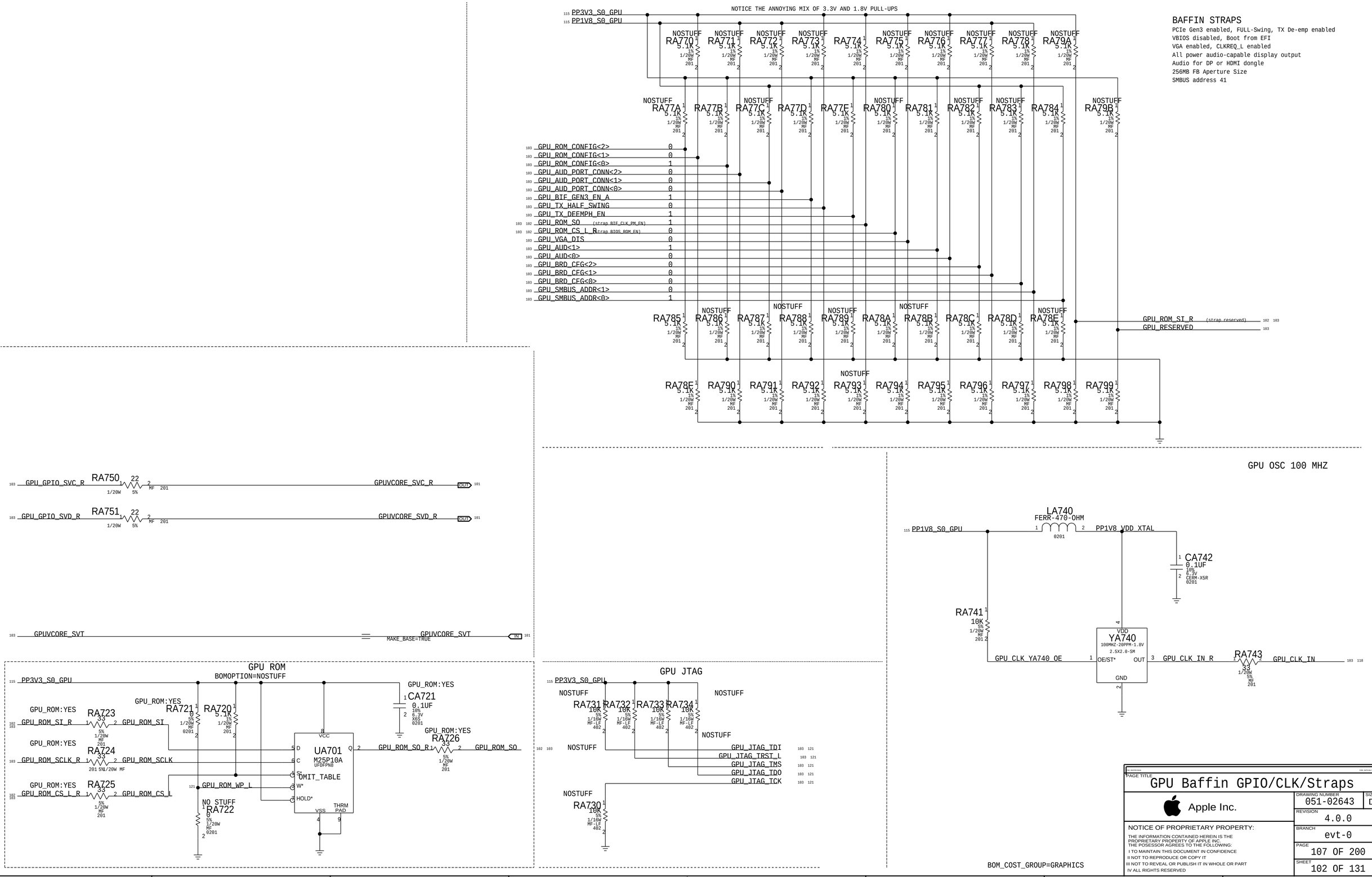
NOTICE THE ANNOYING MIX OF 3.3V AND 1.0V PULL-UPS
PP3V3_S0_GPU
PP1V8_S0_GPU
BAFFIN STRAPS
PCIe Gen3 enabled, FULL-Swing, TX De-emp enabled
VBIOS disabled, Boot from EFI
VGA enabled, CLKREQ_L enabled
All power audio-capable display output
Audio for DP or HDMI dongle
256MB FB Aperture Size
SMBUS address 41
GPU_ROM_CONFIG<2> 0
GPU_ROM_CONFIG<1> 0
GPU_ROM_CONFIG<0> 1
GPU_AUD_PORT_CONN<2> 0
GPU_AUD_PORT_CONN<1> 0
GPU_AUD_PORT_CONN<0> 0
GPU_BIF_GEN3_EN_A 1
GPU_TX_HALF_SWING 0
GPU_TX_DEEMPH_EN 1
GPU_ROM_SO (strap BIF_CLK_PM_EN) 1
GPU_ROM_CS_L_R (strap BIOS_ROM_EN) 0
GPU_VGA_DIS 0
GPU_AUD<1> 1
GPU_AUD<0> 0
GPU_BRD_CFG<2> 0
GPU_BRD_CFG<1> 0
GPU_BRD_CFG<0> 0
GPU_SMBUS_ADDR<1> 0
GPU_SMBUS_ADDR<0> 1
GPU_ROM_SI_R (strap reserved)
GPU_RESERVED
GPU_GPIO_SVC_R
GPUVCORE_SVC_R
GPU_GPIO_SVD_R
GPUVCORE_SVD_R
GPUVCORE_SVT
GPUVCORE_SVT
MAKE_BASE=TRUE
GPU ROM
BOMOPTION=NOSTUFF
GPU_ROM_SI_R
GPU_ROM_SCLK_R
GPU_ROM_CS_L_R
GPU_ROM_WP_L
GPU_ROM_SO_R
GPU_ROM_SI
GPU_ROM_SCLK
GPU_ROM_CS_L
GPU_ROM_SO
UA701
M25P10A
UFDFPN8
OMIT_TABLE
NO STUFF
GPU JTAG
GPU_JTAG_TDI
GPU_JTAG_TRST_L
GPU_JTAG_TMS
GPU_JTAG_TDO
GPU_JTAG_TCK
GPU OSC 100 MHZ
LA740
FERR-470-OHM
PP1V8_VDD_XTAL
CA742
0.1UF
RA741
10K
YA740
100MHZ-20PPM-1.8V
2.5X2.0-SM
VDD
OE/ST*
OUT
GND
GPU_CLK_YA740_OE
GPU_CLK_IN_R
GPU_CLK_IN
BOM_COST_GROUP=GRAPHICS
PAGE TITLE
GPU Baffin GPIO/CLK/Straps
Apple Inc.
DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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SHEET 102 OF 131
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BOMOPTION=OMIT_TABLE

PP1V8_S0_GPU
RA800 10K 5% 1/20W MF 201
GPU_BP_0
PP1V8_S0_GPU
RA802 10K 5% 1/20W MF 201
GPU_BP_1
PP3V3_S0_GPU
RA805 4.7K 5% 1/20W MF 201
RA806 4.7K 5% 1/20W MF 201
I2C isolation now on CSA 52 level shifting and isolation done by U5200
GPU_SMB_CLK
GPU_SMB_DAT
PP1V8_S0_GPU
PP3V3_S0_GPU
RA816 100K 5% 1/20W MF 201
GFX_THROTTLE_1V8_L
from H9M
UA802 SLSV1T344MU-COMBO UDFN CRITICAL
VCCA VCCB A B NC GND
GFX_THROTTLE_L
GPUVCORE_VR_HOT_L
GFX_SELF_THROTTLE_1V8
to H9M
RA813 1.5K 201 MF 5% 1/20W
RA833 1.8K 5% 1/20W MF 201
GFX_SELF_THROTTLE
GPU_VRAM_STRAP
RA823 10K 5% 1/20W MF 201
PLACE_NEAR=LA800.1:2.54MM
LA800 1200HM-25%-1.8A-0.06DCR 0402
VOLTAGE=1.8V MIN_LINE_WIDTH=0.4000 MIN_NECK_WIDTH=0.2000
PP1V8_S0_GPU
PP1V8_GPU_TSVDD
PLACE_NEAR=UA000.AM13:2.54MM
CA850 0.1UF 10% 6.3V X6S 0201
CA851 10UF 20% 6.3V CERM-X6S 0402
CA852 1UF 20% 6.3V X6S-CERM 0201
CA853 0.1UF 10% 6.3V X6S 0201
PLACE_NEAR=UA000.AM13:2.54MM
PLACE_NEAR=UA000.AM13:2.54MM
PLACE_NEAR=UA000.AM13:2.54MM

TPA802 TPA803 TPA804 TPA805 TPA807 TPA808 TPA809 TPA810 TP_P6

GPU_PLLCHARZ_H	AU15	PLLCHARZ_H
GPU_PLLCHARZ_L	AV15	PLLCHARZ_L
EG_BKLT_EN	AC37	BL_ENABLE
NC_EG_BKLT_PWM (NO_TEST=1)	AC38	BL_PWM_DIM
GPU_BP_0	AA38	BP_0
GPU_BP_1	AA37	BP_1
GPU_AUD_PORT_CONN<0>	L40	DBGDATA_0
GPU_AUD_PORT_CONN<1>	L41	DBGDATA_1
GPU_AUD_PORT_CONN<2>	M40	DBGDATA_2
GPU_BRD_CFG<0>	M41	DBGDATA_3
GPU_BRD_CFG<1>	N40	DBGDATA_4
GPU_BRD_CFG<2>	N41	DBGDATA_5
GPU_SMBUS_ADDR<0>	P40	DBGDATA_6
GPU_SMBUS_ADDR<1>	P41	DBGDATA_7
GPU_DBG_8	R40	DBGDATA_8
GPU_DBG_9	R41	DBGDATA_9
GPU_DBG_10	T40	DBGDATA_10
GPU_DBG_11	T41	DBGDATA_11
GPU_MPLS_PS_0	U40	DBGDATA_12
GPU_MPLS_PS_1	U41	DBGDATA_13
GPU_MPLS_PS_2	V40	DBGDATA_14
GPU_MPLS_PS_3	V41	DBGDATA_15
NC	AU46	WAKE*
NC	AY38	ANALOGIO
GPU_GPIO_SVC_R	AU17	GPIO_SVC
GPU_GPIO_SVD_R	AV17	GPIO_SVD
GPUVCORE_SVT	AR17	GPIO_SVT
NC	AG34	SWAPLOCKA
NC	AE34	SWAPLOCKB
NC_I2C_GPU_PCC_SCL (NO_TEST=1)	AC35	SCL
NC_I2C_GPU_PCC_SDA (NO_TEST=1)	AC34	SDA
GPU_TX_HALF_SWING	W40	GPIO_0
NC_GFX_VDDCI_ALTV_ZERO (NO_TEST=1)	AA40	GPIO_1
GPU_BIF_GEN3_EN_A	AA35	GPIO_2
	AW40	SMBCLK
	AW41	SMBDAT
GFX_THROTTLE_L	AA34	GPIO_5_REG_HOT_AC_BATT
GPUVCORE_VR_HOT_L	U35	GPIO_6_TACH
GPU_ROM_SO (strap BIFCLK_PM_EN)	AP25	GPIO_8_ROMSO
GPU_ROM_SI_R (strap reserved)	AM25	GPIO_9_ROMSI
GPU_ROM_SCLK_R	AM27	GPIO_10_ROMSCK
GPU_ROM_CONFIG<0>	W41	GPIO_11
GPU_ROM_CONFIG<1>	Y40	GPIO_12
GPU_ROM_CONFIG<2>	Y41	GPIO_13
DP_X_SNK0_HPD_EG	AU21	GPIO_14_HPD2
GPU_RESERVED	AA41	GPIO_15
GFX_VDDCI_ALTV_ONE	U34	GPIO_16_8P_DETECT
GFX_SELF_THROTTLE	R37	GPIO_17_THERMAL_INT
DP_X_SNK1_HPD_EG	AV25	GPIO_18_HPD3
GPU_GFX_OVERTEMP	R38	GPIO_19_CTF
GPU_TX_DEEMPH_EN	AB40	GPIO_20
GPU_VRAM_STRAP	AB41	GPIO_21
GPU_ROM_CS_L (strap BIOS_ROM_EN)	AP27	GPIO_22_ROMCS*
NC	U38	GPIO_28_FDO
GPU_VGA_DIS	W37	GPIO_29
GPUVDDC_PCC_ALERT_L	W38	GPIO_30
GPU_JTAG_TRST_L	AF40	JTAG_TRST*
GPU_JTAG_TDI	AD40	JTAG_TDI
GPU_JTAG_TCK	AF41	JTAG_TCK
GPU_JTAG_TMS	AD41	JTAG_TMS
GPU_JTAG_TDO	AF41	JTAG_TDO
NC	BA38	GENERICA
NC	AV29	GENERICB
NC	AU31	GENERICC
NC	AV31	GENERICD
DP_T_SNK0_HPD_EG	AU25	GENERICE_HPD4
DP_T_SNK1_HPD_EG	AV23	GENERICF_HPD5
NC	AM29	GENERICG
DP_INT_EG_HPD	AV21	HPD1
GPU_CLK_IN	BA39	XTALIN
NC_GPU_XTAL_OUT (NO_TEST=1)	AY39	XTALOUT
GPU_TDIODE_P	N35	DPLUS
GPU_TDIODE_N	N34	DMINUS
NC	N38	TS_A
PP1V8_GPU_TSVDD	AM13	TSVDD

UA000 100-CK4803-ES BGA SYM 2 OF 7

TXCAP_DPA3+	AY33	DP_INT_EG_ML_P<3>
TXCAM_DPA3-	BA33	DP_INT_EG_ML_N<3>
TX3P_DPA2+	AY34	DP_INT_EG_ML_P<2>
TX3M_DPA2-	BA34	DP_INT_EG_ML_N<2>
TX4P_DPA1+	AY35	DP_INT_EG_ML_P<1>
TX4M_DPA1-	BA35	DP_INT_EG_ML_N<1>
TX5P_DPA0+	AY36	DP_INT_EG_ML_P<0>
TX5M_DPA0-	BA36	DP_INT_EG_ML_N<0>
TXCBP_DPB3+	AY28	DP_X_SNK0_ML_C_P<3>
TXCBM_DPB3-	BA28	DP_X_SNK0_ML_C_N<3>
TX0P_DPB2+	AY30	DP_X_SNK0_ML_C_P<2>
TX0M_DPB2-	BA30	DP_X_SNK0_ML_C_N<2>
TX1P_DPB1+	AY31	DP_X_SNK0_ML_C_P<1>
TX1M_DPB1-	BA31	DP_X_SNK0_ML_C_N<1>
TX2P_DPB0+	AY32	DP_X_SNK0_ML_C_P<0>
TX2M_DPB0-	BA32	DP_X_SNK0_ML_C_N<0>
TXCCP_DPC3+	AY24	DP_X_SNK1_ML_C_P<3>
TXCCM_DPC3-	BA24	DP_X_SNK1_ML_C_N<3>
TX3P_DPC2+	AY25	DP_X_SNK1_ML_C_P<2>
TX3M_DPC2-	BA25	DP_X_SNK1_ML_C_N<2>
TX4P_DPC1+	AY26	DP_X_SNK1_ML_C_P<1>
TX4M_DPC1-	BA26	DP_X_SNK1_ML_C_N<1>
TX5P_DPC0+	AY27	DP_X_SNK1_ML_C_P<0>
TX5M_DPC0-	BA27	DP_X_SNK1_ML_C_N<0>
TXCDP_DPD3+	AY19	DP_T_SNK0_ML_C_P<3>
TXCDM_DPD3-	BA19	DP_T_SNK0_ML_C_N<3>
TX2P_DPD0+	AY22	DP_T_SNK0_ML_C_P<0>
TX2M_DPD0-	BA22	DP_T_SNK0_ML_C_N<0>
TX1P_DPD1+	AY21	DP_T_SNK0_ML_C_P<1>
TX1M_DPD1-	BA21	DP_T_SNK0_ML_C_N<1>
TX0P_DPD2+	AY20	DP_T_SNK0_ML_C_P<2>
TX0M_DPD2-	BA20	DP_T_SNK0_ML_C_N<2>
TXCEP_DPE3+	AY14	DP_T_SNK1_ML_C_P<3>
TXCEM_DPE3-	BA14	DP_T_SNK1_ML_C_N<3>
TX0P_DPE2+	AY15	DP_T_SNK1_ML_C_P<2>
TX0M_DPE2-	BA15	DP_T_SNK1_ML_C_N<2>
TX1P_DPE1+	AY16	DP_T_SNK1_ML_C_P<1>
TX1M_DPE1-	BA16	DP_T_SNK1_ML_C_N<1>
TX2P_DPE0+	AY18	DP_T_SNK1_ML_C_P<0>
TX2M_DPE0-	BA18	DP_T_SNK1_ML_C_N<0>

librarian reordered pins to follow tx

HSYNC	W34	GPU_AUD<1>
VSYNC	W35	GPU_AUD<0>
DIGON	AC40	EG_LCD_PWR_EN
TEMPINP0	J8	NC
TEMPINRETURN	J7	NC
TEST6	B2	GPU_DIECRACKMON
TEST_PG_BACO	BA13	GPU_TEST_PG_BACON
GENLK_CLK	AP28	NC
GENLK_VSYNC	AP29	NC
CLKREQ*	AV40	GPU_CLKREQ_L
DDC1CLK	AY10	NC
DDC1DATA	BA10	NC
AUX1+	AY11	DP_INT_EG_AUX_P
AUX1-	BA11	DP_INT_EG_AUX_N
DDC2CLK	AY12	NC
DDC2DATA	AY13	NC
AUX2+	AP19	DP_X_SNK0_AUXCH_C_P
AUX2-	AM19	DP_X_SNK0_AUXCH_C_N
DDCAUX3+	AM21	DP_X_SNK1_AUXCH_C_P
DDCAUX3-	AP21	DP_X_SNK1_AUXCH_C_N
DDCAUX4+	AR23	DP_T_SNK0_AUXCH_C_P
DDCAUX4-	AP23	DP_T_SNK0_AUXCH_C_N
DDCAUX5+	AU27	DP_T_SNK1_AUXCH_C_P
DDCAUX5-	AV27	DP_T_SNK1_AUXCH_C_N
DDCVGACLK	AM24	NC
DDCVGADATA	AP24	NC
RSVD	K41	NC
RSVD	B34	NC

RA811 0 5% 1/20W MF 0201
RA815 10K 5% 1/20W MF 201
RA810 1K 5% 1/20W MF 201
PP1V8_S0_GPU

GPU_PLLCHARZ_H
GPU_PLLCHARZ_L
GPU_PLLCHARZ_RC_H
NOSTUFF CA880 0.1UF 10% 6.3V X6S 0201
NOSTUFF CA881 0.1UF 10% 6.3V X6S 0201
GPU_PLLCHARZ_RC_L
NOSTUFF RA880 51.1 1% 1/20W MF 201
NOSTUFF RA881 51.1 1% 1/20W MF 201

BOM_COST_GROUP=GRAPHICS

PAGE TITLE: GPU Baffin DP/GPIO

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DRAWING NUMBER: 051-02643
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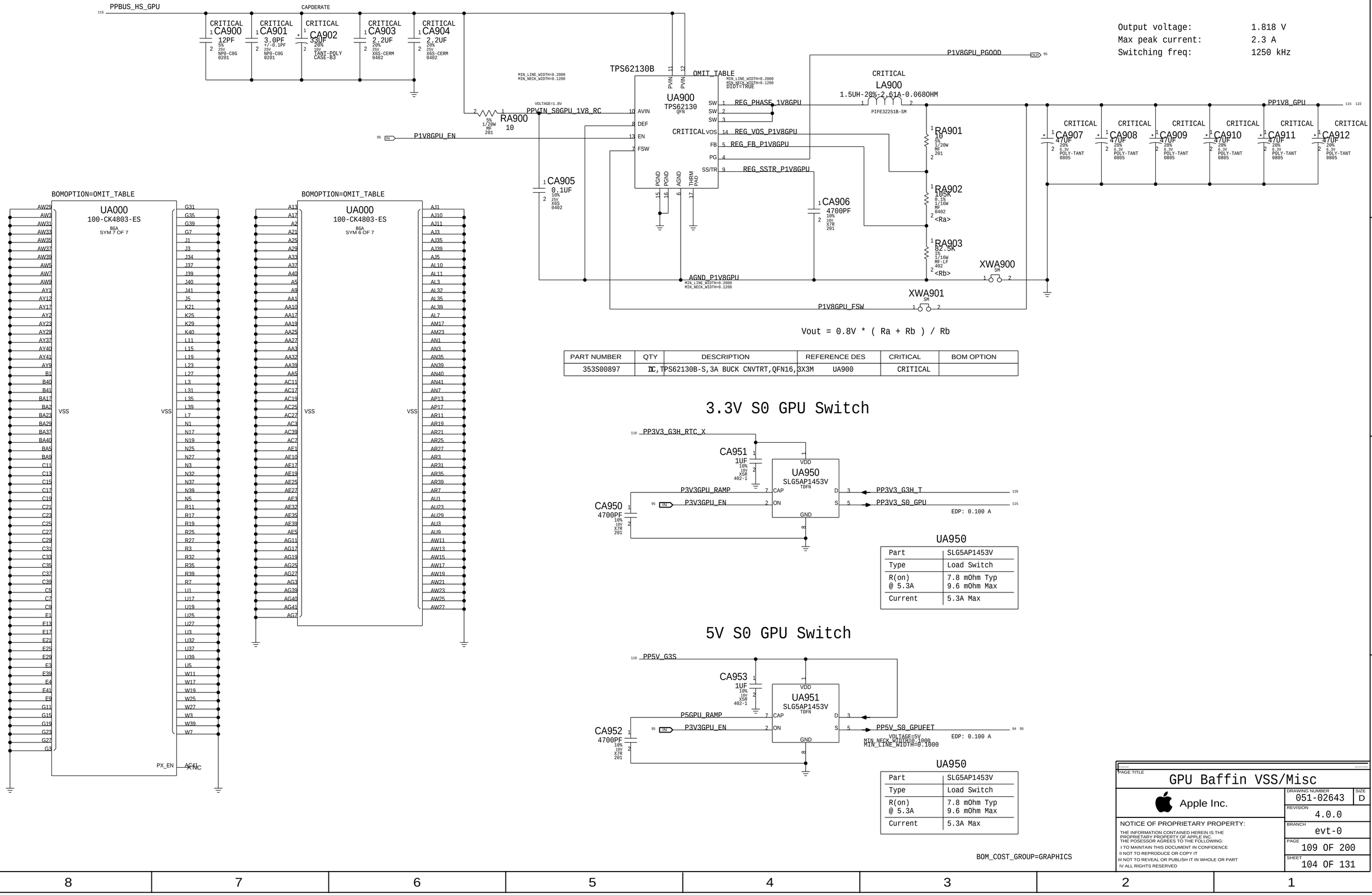

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00897	1	IC,TPS62130B-S,3A BUCK CNVTRT,QFN16,3X3M	UA900	CRITICAL	

3.3V S0 GPU Switch

UA950

Part	SLG5AP1453V
Type	Load Switch
R(on) @ 5.3A	7.8 mOhm Typ 9.6 mOhm Max
Current	5.3A Max

5V S0 GPU Switch

UA950

Part	SLG5AP1453V
Type	Load Switch
R(on) @ 5.3A	7.8 mOhm Typ 9.6 mOhm Max
Current	5.3A Max

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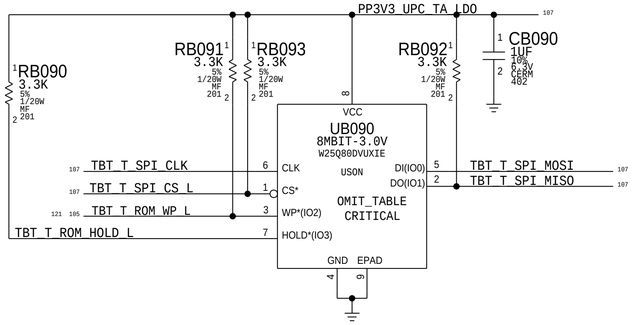

SNK0 AC Coupling

DP_T_SNK0_ML_C_P<0>	CB020	0.22UF	DP_T_SNK0_ML_P<0>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_N<0>	CB021	0.22UF	DP_T_SNK0_ML_N<0>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_P<1>	CB022	0.22UF	DP_T_SNK0_ML_P<1>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_N<1>	CB023	0.22UF	DP_T_SNK0_ML_N<1>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_P<2>	CB024	0.22UF	DP_T_SNK0_ML_P<2>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_N<2>	CB025	0.22UF	DP_T_SNK0_ML_N<2>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_P<3>	CB026	0.22UF	DP_T_SNK0_ML_P<3>	GND_VOID=TRUE	
DP_T_SNK0_ML_C_N<3>	CB027	0.22UF	DP_T_SNK0_ML_N<3>	GND_VOID=TRUE	
DP_T_SNK0_AUXCH_C_P	CB028	0.1UF	DP_T_SNK0_AUXCH_P	GND_VOID=TRUE	
DP_T_SNK0_AUXCH_C_N	CB029	0.1UF	DP_T_SNK0_AUXCH_N	GND_VOID=TRUE	

SNK1 AC Coupling

DP_T_SNK1_ML_C_P<0>	CB030	0.22UF	DP_T_SNK1_ML_P<0>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_N<0>	CB031	0.22UF	DP_T_SNK1_ML_N<0>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_P<1>	CB032	0.22UF	DP_T_SNK1_ML_P<1>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_N<1>	CB033	0.22UF	DP_T_SNK1_ML_N<1>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_P<2>	CB034	0.22UF	DP_T_SNK1_ML_P<2>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_N<2>	CB035	0.22UF	DP_T_SNK1_ML_N<2>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_P<3>	CB036	0.22UF	DP_T_SNK1_ML_P<3>	GND_VOID=TRUE	
DP_T_SNK1_ML_C_N<3>	CB037	0.22UF	DP_T_SNK1_ML_N<3>	GND_VOID=TRUE	
DP_T_SNK1_AUXCH_C_P	CB038	0.1UF	DP_T_SNK1_AUXCH_P	GND_VOID=TRUE	
DP_T_SNK1_AUXCH_C_N	CB039	0.1UF	DP_T_SNK1_AUXCH_N	GND_VOID=TRUE	

PP3V3_TBT_T_SX

RB064	100K	TBT_T_BATLOW_L	
RB039	10K NOSTUFF		
RB063	100K	TBT_T_TMU_CLK_IN	
RB073	100K	TBT_T_TMU_CLK_OUT	
RB062	100K	DP_TA_HPD	
RB072	100K	DP_TB_HPD	
RB074	100K	TBT_TA_USB2_MXCTL	
RB075	100K	TBT_TB_USB2_MXCTL	

All: 5% 1/20W MF 201

PP3V3_TBT_T_SX → RB036 2.2K 5% 1/20W MF 201 NOSTUFF → DP_TA_HPD

PLACE_NEAR=UB000.H19:2MM
RB054 200 1% 1/20W MF 201
PLACE_NEAR=UB000.H6:2MM
PLACE_NEAR=UB000.J6:2MM
RB055 4.75K TF 1/20W 0.5% 0201

RB030 100K 5% 1/20W MF 201 ← SNK1_HPD
RB031 100K 5% 1/20W MF 201 ← SNK2_HPD

RB025 100 5% 1/20W MF 201
RB029 100 5% 1/20W MF 201

10K PU ON CLOCKS PAGE
RB028 1K 5% 1/20W MF 201 ← TBT_T_CLKREQ_L

PLACE_NEAR=UB000.N16:5MM
RB051 3.01K 1% 1/20W MF 201

PP3V3_TBT_T_SX
RB034 2.2K 5% 1/20W MF 201 → I2C_TBT_T_SCL
RB035 2.2K 5% 1/20W MF 201 → I2C_TBT_T_SDA
RB027 100K 5% 1/20W MF 201 → PU at PCH

NOSTUFF
RB037 2.2K 5% 1/20W MF 201 → PP3V3_TBT_T_SX

PLACE_NEAR=UB000.F19:2MM
RB053 200 1% 1/20W MF 201

UB000 TITAN-RIDGE-DP

CSP
SYM 1 OF 2
OMIT_TABLE
CRITICAL

PCIE GEN3

PCIE_RX0_P	Y23	PCIE_TBT_T_R2D_P<0>		
PCIE_RX0_N	Y22	PCIE_TBT_T_R2D_N<0>		
PCIE_RX1_P	T23	PCIE_TBT_T_R2D_P<1>		
PCIE_RX1_N	T22	PCIE_TBT_T_R2D_N<1>		
PCIE_RX2_P	M23	PCIE_TBT_T_R2D_P<2>		
PCIE_RX2_N	M22	PCIE_TBT_T_R2D_N<2>		
PCIE_RX3_P	H23	PCIE_TBT_T_R2D_P<3>		
PCIE_RX3_N	H22	PCIE_TBT_T_R2D_N<3>		
PCIE_REFCLK_100_IN_P	V19	PCIE_CLK100M_TBT_T_P		
PCIE_REFCLK_100_IN_N	T19	PCIE_CLK100M_TBT_T_N		
PCIE_CLKREQ*	Y6	TBT_T_CLKREQ_R_L		
PCIE_TX0_P	V23	PCIE_TBT_T_D2R_C_P<0>		
PCIE_TX0_N	V22	PCIE_TBT_T_D2R_C_N<0>		
PCIE_TX1_P	P23	PCIE_TBT_T_D2R_C_P<1>		
PCIE_TX1_N	P22	PCIE_TBT_T_D2R_C_N<1>		
PCIE_TX2_P	K23	PCIE_TBT_T_D2R_C_P<2>		
PCIE_TX2_N	K22	PCIE_TBT_T_D2R_C_N<2>		
PCIE_TX3_P	F23	PCIE_TBT_T_D2R_C_P<3>		
PCIE_TX3_N	F22	PCIE_TBT_T_D2R_C_N<3>		
PERST*	T4	TBT_T_PCI_RESET_L		
PCIE_RBIAS	N16	TBT_T_PCIE_BIAS		

SINK PORT 1

DPSNK1_ML0_P	AC7	DP_T_SNK0_ML_P<0>	
DPSNK1_ML0_N	AB7	DP_T_SNK0_ML_N<0>	
DPSNK1_ML1_P	AB9	DP_T_SNK0_ML_P<1>	
DPSNK1_ML1_N	AC9	DP_T_SNK0_ML_N<1>	
DPSNK1_ML2_P	AC11	DP_T_SNK0_ML_P<2>	
DPSNK1_ML2_N	AB11	DP_T_SNK0_ML_N<2>	
DPSNK1_ML3_P	AB13	DP_T_SNK0_ML_P<3>	
DPSNK1_ML3_N	AC13	DP_T_SNK0_ML_N<3>	
DPSNK1_AUX_P	N1	DP_T_SNK0_AUXCH_P	
DPSNK1_AUX_N	N2	DP_T_SNK0_AUXCH_N	
SNK1_HPD	AA2	DP_T_SNK0_HPD	

SINK PORT 2

DPSNK2_ML0_P	A5	DP_T_SNK1_ML_P<0>	
DPSNK2_ML0_N	B5	DP_T_SNK1_ML_N<0>	
DPSNK2_ML1_P	B3	DP_T_SNK1_ML_P<1>	
DPSNK2_ML1_N	A3	DP_T_SNK1_ML_N<1>	
DPSNK2_ML2_P	C2	DP_T_SNK1_ML_P<2>	
DPSNK2_ML2_N	C1	DP_T_SNK1_ML_N<2>	
DPSNK2_ML3_P	E2	DP_T_SNK1_ML_P<3>	
DPSNK2_ML3_N	E1	DP_T_SNK1_ML_N<3>	
DPSNK2_AUX_P	P1	DP_T_SNK1_AUXCH_P	
DPSNK2_AUX_N	P2	DP_T_SNK1_AUXCH_N	
SNK2_HPD	Y4	DP_T_SNK1_HPD	

USBSS

U0_SSTXP1	AC5	NC
U0_SSTXN1	AB5	NC
U0_SSRXP1	AC3	NC
U0_SSRXN1	AB3	NC

JTAG

TDI	W20	JTAG_ISP_TDI	
TMS	Y20	JTAG_TBT_T_TMS	
TCK	W19	JTAG_ISP_TCK	
TDO	Y19	XDP_JTAG_ISP_TDO	
TEST_EN	R4	TBT_T_TEST_EN	
TEST_PWR_GOOD	W5	TBT_T_TEST_PWR_GOOD	

TBT PORT A

ASSRXP2	A15	USBC_TA_D2R_P<2>	
ASSRXN2	B15	USBC_TA_D2R_N<2>	
ASSTXP2	A17	USBC_TA_R2D_CR_P<2>	
ASSTXN2	B17	USBC_TA_R2D_CR_N<2>	
ASSTXP1	A19	USBC_TA_R2D_CR_P<1>	
ASSTXN1	B19	USBC_TA_R2D_CR_N<1>	
ASSRXP1	B21	USBC_TA_D2R_P<1>	
ASSRXN1	A21	USBC_TA_D2R_N<1>	
ASBU1	H4	USBC_TA_AUXLSX1	
ASBU2	J4	USBC_TA_AUXLSX2	
PA_USB2_D_P	E20	NC	
PA_USB2_D_N	D20	NC	
PA_HPD	T2	DP_TA_HPD	
PA_I2C_INT	M4	I2C_TBT_TA_INT_L	
PA_USB2_MXCTL	R2	TBT_TA_USB2_MXCTL	
PA_USB2_RBIAS	H19	TBT_TA_USB2_RBIAS	

TBT PORT B

BSSRXp2	B7	USBC_TB_D2R_P<2>	
BSSRXn2	A7	USBC_TB_D2R_N<2>	
BSSTXp2	A9	USBC_TB_R2D_CR_P<2>	
BSSTXn2	B9	USBC_TB_R2D_CR_N<2>	
BSSTXp1	A11	USBC_TB_R2D_CR_P<1>	
BSSTXn1	B11	USBC_TB_R2D_CR_N<1>	
BSSRXp1	A13	USBC_TB_D2R_P<1>	
BSSRXn1	B13	USBC_TB_D2R_N<1>	
BSBU1	L4	USBC_TB_AUXLSX1	
BSBU2	L5	USBC_TB_AUXLSX2	
PB_USB2_D_P	E19	NC	
PB_USB2_D_N	D19	NC	
PB_HPD	T1	DP_TB_HPD	
PB_I2C_INT	M5	I2C_TBT_TB_INT_L	
PB_USB2_MXCTL	R1	TBT_TB_USB2_MXCTL	
PB_USB2_RBIAS	F19	TBT_TB_USB2_RBIAS	

SOURCE PORT

DPSRC_ML0_P	AB21	NC_DP_T_SRC_ML_P<0>	
DPSRC_ML0_N	AC21	NC_DP_T_SRC_ML_N<0>	
DPSRC_ML1_P	AC19	NC_DP_T_SRC_ML_P<1>	
DPSRC_ML1_N	AB19	NC_DP_T_SRC_ML_N<1>	
DPSRC_ML2_P	AB17	NC_DP_T_SRC_ML_P<2>	
DPSRC_ML2_N	AC17	NC_DP_T_SRC_ML_N<2>	
DPSRC_ML3_P	AC15	NC_DP_T_SRC_ML_P<3>	
DPSRC_ML3_N	AB15	NC_DP_T_SRC_ML_N<3>	
DPSRC_AUX_P	N4	NC_DP_T_SRC_AUX_P	
DPSRC_AUX_N	N5	NC_DP_T_SRC_AUX_N	
DPSRC_HPD	R5	DP_T_SRC_HPD	

LC GPIO

GPIO_0	W1	TBT_T_HDMI_DDC_DATA	
GPIO_1	W2	TBT_T_HDMI_DDC_CLK	
EE_WP*	W4	TBT_T_ROM_WP_L	
TMU_CLKOUT	Y1	TBT_T_TMU_CLK_OUT	
WAKE*	Y2	TBT_WAKE_3V3_L	
CIO_PLUG_EVENT*	AA1	TBT_T_PLUG_EVENT_L	
TMU_CLKIN	W6	TBT_T_TMU_CLK_IN	

POC GPIO

I2C_SCL	V2	I2C_TBT_T_SCL	
I2C_SDA	V1	I2C_TBT_T_SDA	
USB_FORCE_PWR	V5	TBT_T_USB_PWR_EN	
FORCE_PWR	V4	TBT_T_CIO_PWR_EN	
BATLOW*	U2	TBT_T_BATLOW_L	
SLP_S3*	U1	PM_SLP_S3_L	
RTD3_PWR_EN	T5	TBT_T_RTD3_PWR_EN	

FLASH

EE_DI	Y18	UPC_T_SPI_MOSI	
EE_DO	W16	UPC_T_SPI_MISO	
EE_CS*	W18	UPC_T_SPI_CS_L	
EE_CLK	Y16	UPC_T_SPI_CLK	

To SPI Flash

RBIAS	J6	TBT_T_RBIAS	
RSENSE	J5	TBT_T_RSENSE	
PA_MONDC	A23		
PB_MONDC	A1		
PC_MONDC	AC23		
USB_MONDC	AC1		
TEST_EDM	D4		
FUSE_VQPS_64	L8		

DEBUG

USB2_ATEST	B23	NC	
PCIE_ATEST	AB23	NC	
MONDC_SVR	D5		
VGA_RES	H5	NC	
ATEST_P	J9	NC	
ATEST_N	J11	NC	
THERMDA	V8	TBTTHMSNS_T_D1_P	

USE NEAREST GND BALL (AC22) FOR THERM_D_N

BOM_COST_GROUP=TBT

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PAGE TITLE: USB-C HIGH SPEED 1

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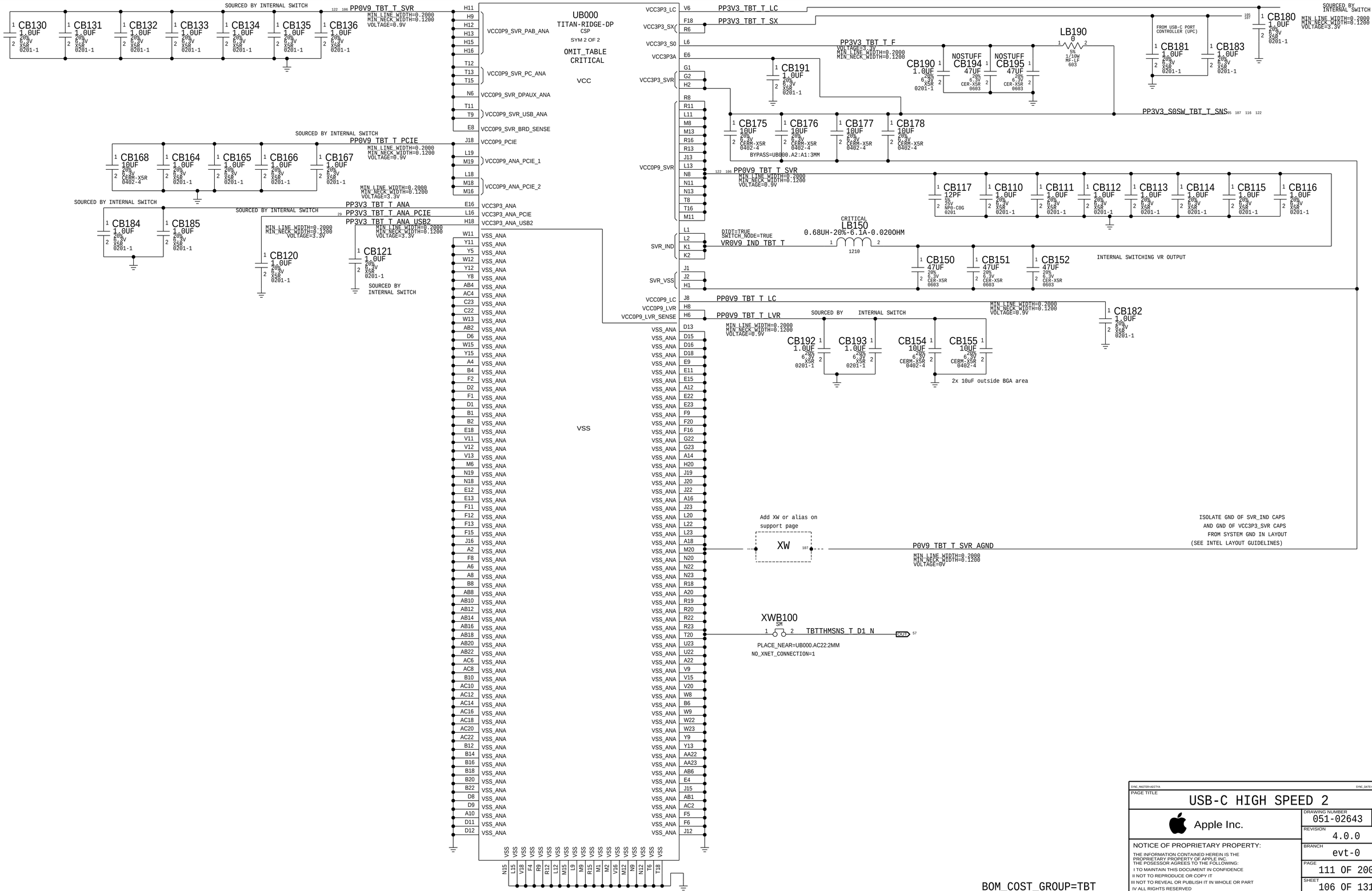

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PAGE TITLE

USB-C HIGH SPEED 2

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DP SRC OPTIONS
IF DP SRC NOT USED

DP_T_SRC_HPD — RB240 100K 5% 1/20W MF 201

=DP_T_SRC_ML_P<3..0> — NC_DP_T_SRC_ML_P<3..0> — MAKE_BASE=TRUE, NO_TEST=1
=DP_T_SRC_ML_N<3..0> — NC_DP_T_SRC_ML_N<3..0> — MAKE_BASE=TRUE, NO_TEST=1
NC_DP_T_SRC_AUX_P — NC_DP_T_SRC_AUX_P — MAKE_BASE=TRUE, NO_TEST=1
NC_DP_T_SRC_AUX_N — NC_DP_T_SRC_AUX_N — MAKE_BASE=TRUE, NO_TEST=1

FUSES FOR UPC

PLACE_NEAR=QB300:5MM
CRITICAL
FB200 0603 740S0135
6AMP-32V-0.00950HM
PP20V_USBC_TA_VBUS — PP20V_USBC_TA_VBUS_F

PLACE_NEAR=QB400:5MM
CRITICAL
FB201 0603 740S0135
6AMP-32V-0.00950HM
PP20V_USBC_TB_VBUS — PP20V_USBC_TB_VBUS_F

25MHz xtal

TBT_T_XTAL25M_OUT (IN) — CB202 20PF 5% 25V C0G 0201 — CRITICAL YB200 25MHZ-25PPM-20PF-50OHM 2.00X1.60-SM — CB203 20PF 5% 25V C0G 0201 — TBT_T_XTAL25M_IN (OUT)

to/from Ridge

AR/ACE SPI BUS SERIES R'S

ROM: TBT_T_SPI_CLK, TBT_T_SPI_CS_L, TBT_T_SPI_MOSI, TBT_T_SPI_MISO

RB290 100	TBT_T_SPI_CLK_DBG		
RB280 15	UPC_TA_SPI_CLK	IN	Ace
RB281 15	UPC_TA_SPI_CS_L	IN	Ace
RB282 15	UPC_TA_SPI_MOSI	IN	Ace
RB283 15	UPC_TA_SPI_MISO	OUT	Ace
RB284 15	UPC_T_SPI_CLK	IN	AR
RB285 15	UPC_T_SPI_CS_L	IN	AR
RB286 15	UPC_T_SPI_MOSI	IN	AR
RB287 15	UPC_T_SPI_MISO	OUT	AR

5% 1/20W MF 201

TBT to ACE

TBT — Alpine Ridge U2800 (MASTER)
Pri ACE — U3100 (Write: 0x70 Read: 0x71)
Sec ACE — U3200 (Write: 0x7E Read: 0x7F)

	TBT	Pri ACE	Sec ACE
I2C_TBT_T_SCL	MAKE_BASE=TRUE	108	109
I2C_TBT_T_SDA	MAKE_BASE=TRUE	108	109
I2C_TBT_TA_INT_L	MAKE_BASE=TRUE	108	
I2C_TBT_TB_INT_L	MAKE_BASE=TRUE		109

USBC 5V EN PD

UPC_T_5V_EN — RB232 100K 5% 1/20W MF 201

ACE A/B RPD STRAPPING

USBC_TA_CC1	USBC_TA_CC1	MAKE_BASE=TRUE
USBC_TB_CC1	USBC_TB_CC1	MAKE_BASE=TRUE
USBC_TA_CC2	USBC_TA_CC2	MAKE_BASE=TRUE
USBC_TB_CC2	USBC_TB_CC2	MAKE_BASE=TRUE

ACE FET DCIN Bypass Caps

PPDCIN_G3H — CB211 / CB212 / CB213 / CB214 0.10F 10% 35V CER-X5R 0201

ACE PDs

PP1V8_SLPS2R — NOSTUFF RB268 47K 5% 1/20W MF 201 — NOSTUFF RB267 47K 5% 1/20W MF 201

UPC_TA_DBG3	RB260 100K	
UPC_TA_DBG4	RB261 100K	
UPC_TB_DBG3	RB262 100K	
UPC_TB_DBG4	RB263 100K	
SMC_DEBUGPRT_TX	RB264 100K	NOSTUFF
SMC_DEBUGPRT_RX	RB265 100K	NOSTUFF
TBT_TA_LSTX	RB235 100K	
TBT_TA_LSRX	RB236 100K	
TBT_TB_LSTX	RB237 100K	
TBT_TB_LSRX	RB238 100K	
UPC_TB_DBG1	RB266 100K	
UPC_TB_DBG2	RB239 100K	
UPC_TA_GPIO7	RB243 100K	
UPC_TB_GPIO7	RB249 100K	

5% 1/20W MF 201

I2C SERIES R'S

I2C_UPC_T_SDA2	RB241 33	I2C_UPC_SDA
I2C_UPC_T_SCL2	RB242 33	I2C_UPC_SCL

PLACE_NEAR=U3900.J4:5mm
PLACE_NEAR=U3900.M3:5mm
5% 1/20W MF 201
MAKE_BASE=TRUE

ACE ARKANOID CONN

Place on bottom
USBC_DBG
JB200 505070-1222 M-ST-SM

I2C_TBT_TB_INT_L	1	2	I2C_TBT_TA_INT_L
I2C_UPC_T_SCL2	3	4	I2C_TBT_T_SDA
I2C_UPC_T_SDA2	5	6	I2C_TBT_T_SCL
UPC_I2C_INT_L	7	8	TBT_T_CIO_PWR_EN
TBT_T_SPI_CLK_DBG	9	10	TBT_T_USB_PWR_EN
UPC_TA_UART_TX	11	12	UPC_TA_UART_RX
	13	14	
	15	16	

CKPLUS_WAIVE=I2C_PULLUP

SIGNAL ALIASES

USB2_UPC_TB_P	USB2_UPC_TB_P
USB2_UPC_TB_N	USB2_UPC_TB_N
USB2_UPC_TA_P	USB2_UPC_TA_P
USB2_UPC_TA_N	USB2_UPC_TA_N

MAKE_BASE=TRUE

USBC_T_RESET_L	USBC_T_RESET_L
UPC_T_5V_EN	UPC_T_5V_EN
TP_USBC_TB_RESET_L	TP_USBC_TB_RESET_L
TBT_POC_RESET (IN)	TBT_POC_RESET (OUT)
UPC_PMU_RESET	UPC_PMU_RESET
XDP_JTAG_ISP_TDO	XDP_JTAG_ISP_TDO
TBT_T_HDMI_DDC_DATA	TBT_T_HDMI_DDC_DATA
TBT_T_HDMI_DDC_CLK	TBT_T_HDMI_DDC_CLK

JTAG_ISP_TDI	RB256 0	XDP_JTAG_ISP_TDI
JTAG_ISP_TCK	RB257 0	XDP_JTAG_ISP_TCK
UPC_TA_FAULT_L (IN)	RB258 0	XDP_USB_EXTC_OC_L
UPC_TB_FAULT_L (IN)	RB259 0	XDP_USB_EXTD_OC_L

5% 1/20W MF 0201

Ridge PCIE Caps

R2D		D2R	
PCIE_TBT_T_R2D_C_P<0>	CB240 0.22UF	PCIE_TBT_T_D2R_C_P<0>	CB250 0.22UF
PCIE_TBT_T_R2D_C_N<0>	CB241 0.22UF	PCIE_TBT_T_D2R_C_N<0>	CB251 0.22UF
PCIE_TBT_T_R2D_C_P<1>	CB242 0.22UF	PCIE_TBT_T_D2R_C_P<1>	CB252 0.22UF
PCIE_TBT_T_R2D_C_N<1>	CB243 0.22UF	PCIE_TBT_T_D2R_C_N<1>	CB253 0.22UF
PCIE_TBT_T_R2D_C_P<2>	CB244 0.22UF	PCIE_TBT_T_D2R_C_P<2>	CB254 0.22UF
PCIE_TBT_T_R2D_C_N<2>	CB245 0.22UF	PCIE_TBT_T_D2R_C_N<2>	CB255 0.22UF
PCIE_TBT_T_R2D_C_P<3>	CB246 0.22UF	PCIE_TBT_T_D2R_C_P<3>	CB256 0.22UF
PCIE_TBT_T_R2D_C_N<3>	CB247 0.22UF	PCIE_TBT_T_D2R_C_N<3>	CB257 0.22UF

GND_VOID=TRUE
0201 X5R 6.3V 20%

GND ALIASES

GND — MAKE_BASE=TRUE

POWER ALIASES

PP3V3_UPC_TA_LDO	PP3V3_UPC_TA_LDO
PP20V_USBC_TA_VBUS	PP20V_USBC_TA_VBUS
PP20V_USBC_TB_VBUS	PP20V_USBC_TB_VBUS
PP5V_S4_T_USBC	PP5V_S4_T_USBC
PP3V3_S0SW_TBT_T_SNS	PP3V3_S0SW_TBT_T_SNS
PP3V3_TBT_T_SX	PP3V3_TBT_T_SX
PP1V8_SLPS2R	PP1V8_SLPS2R

MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.6000 MIN_NECK_WIDTH=0.1200 VOLTAGE=5V
MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200 VOLTAGE=3.3V
MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1200

NO TEST

NC_UPC_TB_I2C_ADDR (IN)

RIDGE 0.9V SVR XW

P0V9_TBT_T_SVR_AGND — XWB200 SM — NO_XNET_CONNECTION=1

BOM_COST_GROUP=TBT

PAGE TITLE	USB-C T Support
Apple Inc.	
DRAWING NUMBER	051-02643
SIZE	D
REVISION	4.0.0
BRANCH	evt-0
PAGE	112 OF 200
SHEET	107 OF 131

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PRIMARY ACE USB-C PORT CONTROLLER (UPC)

QB300
FDPC4044
PWR-CLIP-33

FUSE
Add on support page

107 PP20V_USBC_TA_VBUS_F
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=20V

107 PP20V_USBC_TA_VBUS

CB301 1UF 10% 50V X5R 0402

PPDCIN_G3H 29 30 31 107 109
MAX 100uF TOTAL ON RAIL

UPC_TA_GATE1
UPC_TA_GATE2

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.3V
PP3V3_UPC_TA_LDO 107

PP3V3_TBT_T_SX 107

PP1V8_UPC_TA_LDOA

PP1V8_UPC_TA_LDOD

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V

PP1V1_UPC_TA_LDO_BMC
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V

CB304 2.2UF 20% 6.3V X5R-CERM 0201
CB305 1.0UF 20% 6.3V X5R 0201-1
CB306 0.47UF 10% 6.3V CERM-X5R 0201
CB308 10UF 20% 6.3V CERM-X5R 0402-1

107 PP1V8_SLPS2R
116 PP3V3_G3H_RTC_X
107 PP5V_S4_T_USBC

RB369 100K 5% 1/20W MF 201

PHV_INT_TA_G3H

CAP FOR PP_5V0 ON VR PAGE

CB302 1.0UF 20% 6.3V X5R 0201-1
CB300 10UF 20% 6.3V CERM-X5R 0402-1

PULL R3109 AND R3108 UP TO ACE's LDOs FOR 1ST BRIDGE'S ACES
PULL R3109 AND R3108 DOWN TO GND FOR 2ND RIDGE'S ACES

GND 107

RB309 1M 5% 1/20W MF 201 I2C_UPC_TA_DBG_CTL_SCL 108
CKPLUS_WAIVE=I2C_PULLUP

RB308 1M 5% 1/20W MF 201 I2C_UPC_TA_DBG_CTL_SDA 108
CKPLUS_WAIVE=I2C_PULLUP

TESTPOINTS MUST BE PRESENT FOR GPIO0, GPIO1 (EVEN IN PRODUCTION)

UB300
CD3215A
BGA

CRITICAL
OMIT_TABLE

	TBT_POC_RESET	E11	MRESET	PRIMARY ONLY
	USBC_T_RESET_L	F11	RESET*	PRIMARY ONLY
	UPC_TA_GPIO0	B2	GPIO0	
	UPC_TA_GPIO1	C2	GPIO1	
	TBT_T_CIO_PWR_EN	D10	GPIO2	
	TBT_T_USB_PWR_EN	G11	GPIO3	
	DP_TA_HPD	C10	GPIO4	
	UPC_PMU_RESET	E10	GPIO5	
	UPC_T_5V_EN	G10	GPIO6	
	UPC_TA_GPIO7	D7	GPIO7	
	UPC_TA_FAULT_L	H6	GPIO8	
	GND	F10	BUSPOWERZ	
GND_I2C_ADDR PRIMARY ONLY	GND	F1	I2C_ADDR	
	UPC_TA_R_OSC	G2	R_OSC	
	I2C_UPC_TA_DBG_CTL_SCL	E4	DEBUG_CTL1	
	I2C_UPC_TA_DBG_CTL_SDA	D5	DEBUG_CTL2	
	I2C_TBT_T_SDA	D1	I2C_SDA1	
	I2C_TBT_T_SCL	D2	I2C_SCL1	
	I2C_TBT_TA_INT_L	C1	I2C_IRQ1*	
	I2C_UPC_T_SDA2	A5	I2C_SDA2	
	I2C_UPC_T_SCL2	B5	I2C_SCL2	
	UPC_I2C_INT_L	B6	I2C_IRQ2*	
	UPC_TA_SPI_CLK	A3	SPI_CLK	
	UPC_TA_SPI_MOSI	B4	SPI_MOSI	
	UPC_TA_SPI_MISO	A4	SPI_MISO	
	UPC_TA_SPI_CS_L	B3	SPI_SSZ	
	TP_UPC_TA_SWD_DATA	F4	SWD_DATA	
	TP_UPC_TA_SWD_CLK	G4	SWD_CLK	
	UPC_TA_UART_RX	F2	UART_RX	
	UPC_TA_UART_TX	E2	UART_TX	
	TBT_TA_LSTX	L4	LSX_R2P	
	TBT_TA_LSRX	K4	LSX_P2R	
	USB_UPC_TA_F_P	L5	USB_RP_P	
	USB_UPC_TA_F_N	K5	USB_RP_N	
	USBC_TA_AUXLSX1	J1	AUX_P	
	USBC_TA_AUXLSX2	J2	AUX_N	
	SMC_DEBUGPRT_TX	L2	DEBUG1	
	SMC_DEBUGPRT_RX	K2	DEBUG2	
	UPC_TA_DBG3	L3	DEBUG3	
	UPC_TA_DBG4	K3	DEBUG4	

CRITICAL
RB303 15K 0.1% 1/20W TF-LF 0201 NEED 0.1%

TO SMC

REAR PORT: CONNECT UPC SPI TO ROM
FRONT PORT: GROUND UPC SPI

RB305 1M 5% 1/20W MF 201 UPC_TA_UART_RX 107 108 109

LB300
90-GNM-0.1A
EXCX4CE

USB2_UPC_TA_P
USB2_UPC_TA_N
PLACE_NEAR=UB300.L5:5mm
PLACE_NEAR=UB300.K5:5mm

PU to PP3V3_S4 if convenient for layout.
Otherwise PU to PP3V3_UPC_TA_LDO

HV FET/SENSE

SS	H7	UPC_TA_SS
SENSEP	B10	
SENSEN	A10	
HV_GATE1	B9	
HV_GATE2	A9	

CB309 0.47UF 10% 6.3V CERM-X5R 0201

DIGITAL CORE I/O AND CONTROL

TYPE-C

C_CC1	L9	USBC_TA_CC1
C_CC2	L10	USBC_TA_CC2
RPD_G1	K9	USBC_TA_CC1
RPD_G2	K10	USBC_TA_CC2
C_USB_TP	K6	USBC_TA_USB_TOP_P
C_USB_TN	L6	USBC_TA_USB_TOP_N
C_USB_BP	K7	USBC_TA_USB_BOT_P
C_USB_BN	L7	USBC_TA_USB_BOT_N
C_SBU1	K8	USBC_TA_SBU1
C_SBU2	L8	USBC_TA_SBU2

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

CB314 220PF 10% 16V CER-X7R 0201
CB313 220PF 10% 16V CER-X7R 0201

NC L11 GROUND
NC or GND to dissipate heat

PORT MUX

GND pins: A1 D6 E5 E6 E7 F5 G5 H4 H5 G8 H8 L1 B8 D8 E8 F6 F7 F8 G6 G7

GND 107
PIN D6 IS UNDOCUMENTED RESET
CAN GROUND PIN D6 IN PRODUCTION

BOM_COST_GROUP=USB-C

PAGE TITLE
USB-C PORT CONTROLLER A

Apple Inc.

DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
PAGE 113 OF 200
SHEET 108 OF 131

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SECONDARY ACE USB-C PORT CONTROLLER (UPC)

QB400
FDPC4044
PWR-CLIP-33

FUSE
Add on support page

PP20V_USBC_TB_VBUS_F
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=20V

PP20V_USBC_TB_VBUS

CB401 1UF 10% 16V X5R 0402

PPDCIN_G3H
MAX 100uF TOTAL ON RAIL

UPC_TB_GATE1
UPC_TB_GATE2

PP3V3_UPC_TB_LDO
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.3V

PP3V3_TBT_T_SX

PP1V8_UPC_TB_LDOA

PP1V8_UPC_TB_LDOD

PP1V1_UPC_TB_LDO_BMC
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V

PP1V8_SLPS2R
PP3V3_G3H_RTC_X
RB469 100K 5% 1/20W MF 201
PHV_INT_TB_G3H
PP5V_S4_T_USBC
CAP FOR PP_5V0 ON VR PAGE

CB402 1.0UF 20% 6.3V X5R 0201-1
CB400 10UF 20% 6.3V CERM-X5R 0402-1
CB404 2.2UF 20% 6.3V X5R-CERM 0201
CB405 1.0UF 20% 6.3V X5R 0201-1
CB406 0.47UF 10% 6.3V CERM-X5R 0201
CB408 10UF 20% 6.3V CERM-X5R 0402-1

PP_5V0 A11, B11, C11, D11
PP_HV A6, A7, A8, B7
PP_HV_PP_CABLE H10
VBUS H11, J10, J11, K11
VIN_3V3 H1
VDDIO B1
LDO_3V3 G1
VOUT_3V3 H2
LDO_1V8A K1
LDO_1V8D A2
LDO_BMC E1

UB400
CD3215A
BGA

CRITICAL
OMIT_TABLE

TESTPOINTS MUST BE PRESENT FOR GPIO0, GPIO1 (EVEN IN PRODUCTION)

TBT_POC_RESET	E11	MRESET
TP_USBC_TB_RESET_L	F11	RESET*
UPC_TB_GPIO0	B2	GPIO0
UPC_TB_GPIO1	C2	GPIO1
TBT_T_CIO_PWR_EN	D10	GPIO2
TBT_T_USB_PWR_EN	G11	GPIO3
DP_TB_HPD	C10	GPIO4
UPC_PMU_RESET	E10	GPIO5
UPC_T_5V_EN	G10	GPIO6
UPC_TB_GPIO7	D7	GPIO7
UPC_TB_FAULT_L	H6	GPIO8
GND	F10	BUSPOWERZ
NC_UPC_TB_I2C_ADDR	F1	I2C_ADDR
UPC_TB_R_OSC	G2	R_OSC
I2C_UPC_TB_DBG_CTL_SCL	E4	DEBUG_CTL1
I2C_UPC_TB_DBG_CTL_SDA	D5	DEBUG_CTL2
I2C_TBT_T_SDA	D1	I2C_SDA1
I2C_TBT_T_SCL	D2	I2C_SCL1
I2C_TBT_TB_INT_L	C1	I2C_IRQ1*
I2C_UPC_T_SDA2	A5	I2C_SDA2
I2C_UPC_T_SCL2	B5	I2C_SCL2
UPC_I2C_INT_L	B6	I2C_IRQ2*
GND	A3	SPI_CLK
GND	B4	SPI_MOSI
GND	A4	SPI_MISO
GND	B3	SPI_SSZ
TP_UPC_TB_SWD_DATA	F4	SWD_DATA
TP_UPC_TB_SWD_CLK	G4	SWD_CLK
UPC_TA_UART_TX	F2	UART_RX
UPC_TA_UART_RX	E2	UART_TX
TBT_TB_LSTX	L4	LSX_R2P
TBT_TB_LSRX	K4	LSX_P2R
USB_UPC_TB_F_P	L5	USB_RP_P
USB_UPC_TB_F_N	K5	USB_RP_N
USBC_TB_AUXLSX1	J1	AUX_P
USBC_TB_AUXLSX2	J2	AUX_N
UPC_TB_DBG1	L2	DEBUG1
UPC_TB_DBG2	K2	DEBUG2
UPC_TB_DBG3	L3	DEBUG3
UPC_TB_DBG4	K3	DEBUG4

PULL B3200 AND B3208 UP TO ACEs LDOs FOR 1ST BRIDGE'S ACES
PULL R3209 AND R3208 DOWN TO GND FOR 2ND RIDGE'S ACES

GND
1M RB409 I2C_UPC_TB_DBG_CTL_SCL 5% 1/20W MF 201 CKPLUS_WAIVE=I2C_PULLUP
1M RB408 I2C_UPC_TB_DBG_CTL_SDA 5% 1/20W MF 201 CKPLUS_WAIVE=I2C_PULLUP

1M RB405 UPC_TA_UART_TX 5% 1/20W MF 201

CRITICAL
RB403 15K 0.1% 1/20W TF-LF 0201
NEED 0.1%

TO SMC

REAR PORT:
CONNECT UPC SPI TO ROM
FRONT PORT:
GROUND UPC SPI

LB400
90-OHM-0.1A
EXCX4CE
SYM_VER_1

USB2_UPC_TB_P
USB2_UPC_TB_N
PLACE_NEAR=UB400.L5:5mm
PLACE_NEAR=UB400.K5:5mm

HV FET/SENSE

DIGITAL CORE I/O AND CONTROL

TYPE-C

PORT MUX

SS H7 UPC_TB_SS
SENSEP B10
SENSEN A10
HV_GATE1 B9
HV_GATE2 A9

CB409 0.47UF 10% 6.3V CERM-X5R 0201

C_CC1 L9 USBC_TB_CC1
C_CC2 L10 USBC_TB_CC2
RPD_G1 K9 USBC_TB_CC1
RPD_G2 K10 USBC_TB_CC2
C_USB_TP K6 USBC_TB_USB_TOP_P
C_USB_TN L6 USBC_TB_USB_TOP_N
C_USB_BP K7 USBC_TB_USB_BOT_P
C_USB_BN L7 USBC_TB_USB_BOT_N
C_SBU1 K8 USBC_TB_SBU1
C_SBU2 L8 USBC_TB_SBU2
NC L11 GROUND
NC or GND to dissipate heat

CB414 220PF 10% 16V C0G-X7R 0201
CB413 220PF 10% 16V C0G-X7R 0201

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200

GND A1, D6, E5, E6, E7, F5, G5, H4, H5, G6, H6, L1, B8, D8, E8, F6, F7, F8, G6, G7

GND
PIN D6 IS UNDOCUMENTED RESET
CAN GROUND PIN D6 IN PRODUCTION

BOM_COST_GROUP=USB-C

PAGE TITLE: USB-C PORT CONTROLLER B

Apple Inc.

DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
BRANCH: evt-0
PAGE: 114 OF 200
SHEET: 109 OF 131

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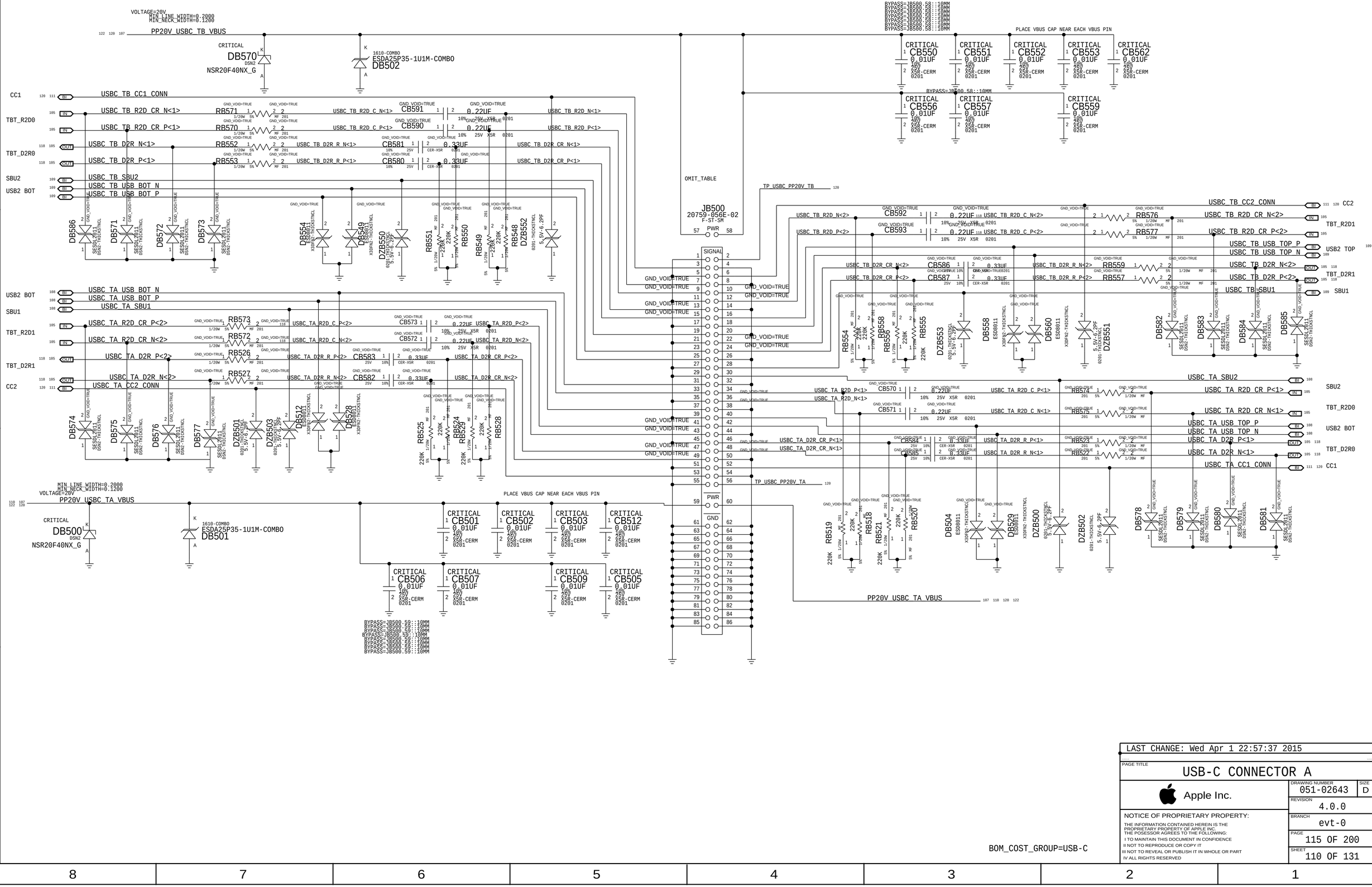
VOLTAGE=20V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
PP20V_USBC_TB_VBUS
CRITICAL
DB570
DSN2
NSR20F40NX_G
1610-COMBO
ESDA25P35-1U1M-COMBO
DB502
CC1
USBC_TB_CC1_CONN
TBT_R2D0
USBC_TB_R2D_CR_N<1>
USBC_TB_R2D_CR_P<1>
TBT_D2R0
USBC_TB_D2R_N<1>
USBC_TB_D2R_P<1>
SBU2
USBC_TB_SBU2
USB2 BOT
USBC_TB_USB_BOT_N
USBC_TB_USB_BOT_P
RB571
RB570
RB552
RB553
CB591
CB590
CB581
CB580
0.22UF
0.33UF
USBC_TB_R2D_C_N<1>
USBC_TB_R2D_C_P<1>
USBC_TB_D2R_R_N<1>
USBC_TB_D2R_R_P<1>
USBC_TB_R2D_N<1>
USBC_TB_R2D_P<1>
USBC_TB_D2R_CR_N<1>
USBC_TB_D2R_CR_P<1>
DB586
DB571
DB572
DB573
DB554
DB549
DZB550
DB551
RB550
RB549
DB548
DZB552
OMIT_TABLE
JB500
20759-056E-02
F-ST-SM
PWR
SIGNAL
GND
TP_USBC_PP20V_TB
USBC_TA_USB_BOT_N
USBC_TA_USB_BOT_P
USBC_TA_SBU1
SBU1
TBT_R2D1
TBT_D2R1
CC2
USBC_TA_R2D_CR_P<2>
USBC_TA_R2D_CR_N<2>
USBC_TA_D2R_P<2>
USBC_TA_D2R_N<2>
USBC_TA_CC2_CONN
RB573
RB572
RB526
RB527
CB573
CB572
CB583
CB582
0.22UF
0.33UF
USBC_TA_R2D_C_P<2>
USBC_TA_R2D_C_N<2>
USBC_TA_D2R_R_P<2>
USBC_TA_D2R_R_N<2>
USBC_TA_R2D_P<2>
USBC_TA_R2D_N<2>
USBC_TA_D2R_CR_P<2>
USBC_TA_D2R_CR_N<2>
DB574
DB575
DB576
DB577
DZB501
DZB503
DB512
DB528
RB525
RB524
RB529
RB528
220K
TP_USBC_PP20V_TA
PP20V_USBC_TA_VBUS
PLACE VBUS CAP NEAR EACH VBUS PIN
CB550
CB551
CB552
CB553
CB562
CB556
CB557
CB559
0.01UF
BYPASS=JB500.58::10MM
CB592
CB593
CB586
CB587
CB570
CB571
CB584
CB585
RB576
RB577
RB559
RB557
RB574
RB575
RB523
RB522
DB582
DB583
DB584
DB585
DB560
DB558
DB553
DZB551
RB554
RB558
RB555
DB500
DZB502
DB504
DB529
RB519
RB521
RB518
RB520
DB578
DB579
DB580
DB581
USBC_TB_CC2_CONN
USBC_TB_R2D_CR_N<2>
USBC_TB_R2D_CR_P<2>
USBC_TB_USB_TOP_P
USBC_TB_USB_TOP_N
USBC_TB_D2R_N<2>
USBC_TB_D2R_P<2>
USBC_TB_SBU1
USBC_TA_SBU2
USBC_TA_R2D_CR_P<1>
USBC_TA_R2D_CR_N<1>
USBC_TA_USB_TOP_P
USBC_TA_USB_TOP_N
USBC_TA_D2R_P<1>
USBC_TA_D2R_N<1>
USBC_TA_CC1_CONN
TBT_R2D1
USB2 TOP
TBT_D2R1
SBU1
TBT_R2D0
USB2 BOT
CC1
BOM_COST_GROUP=USB-C
LAST CHANGE: Wed Apr 1 22:57:37 2015
PAGE TITLE
USB-C CONNECTOR A
Apple Inc.
DRAWING NUMBER
051-02643
SIZE
D
REVISION
4.0.0
BRANCH
evt-0
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110 OF 131
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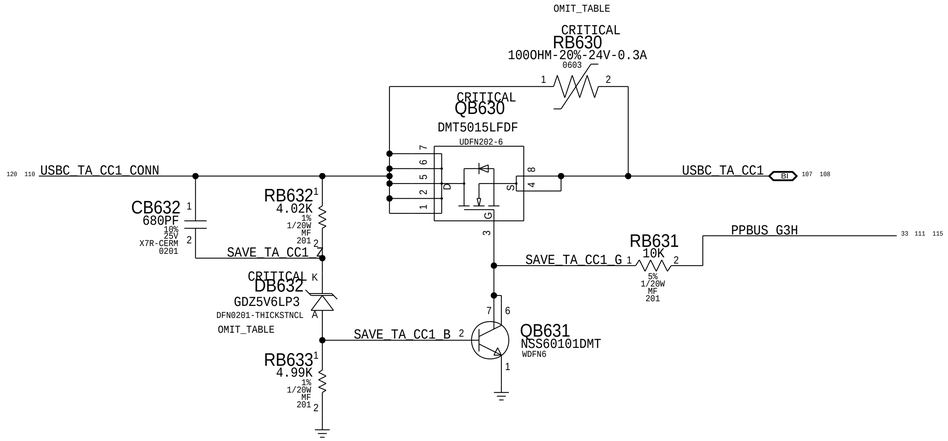
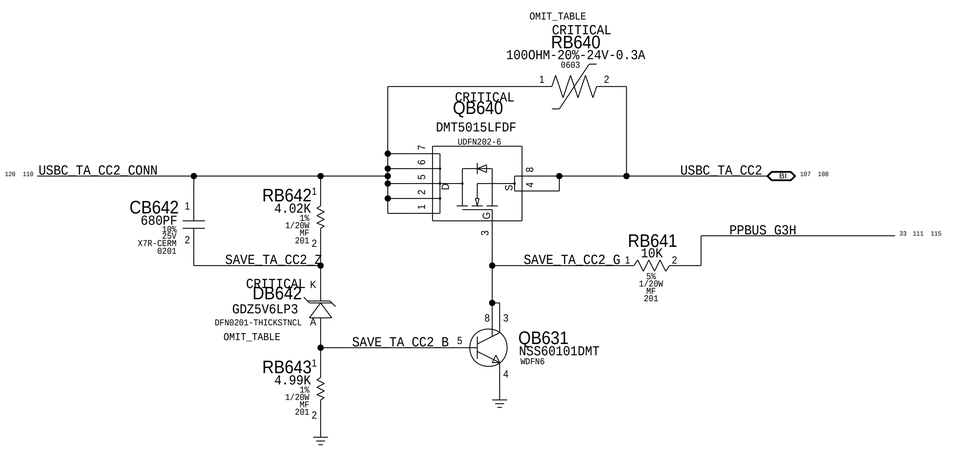
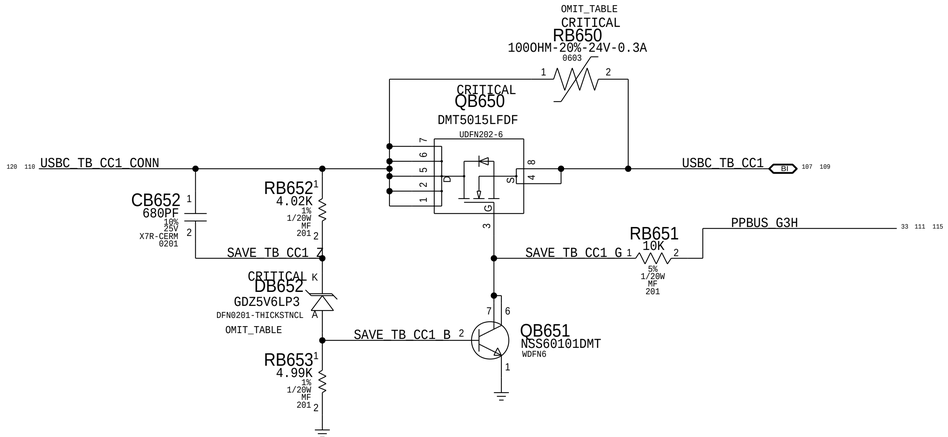
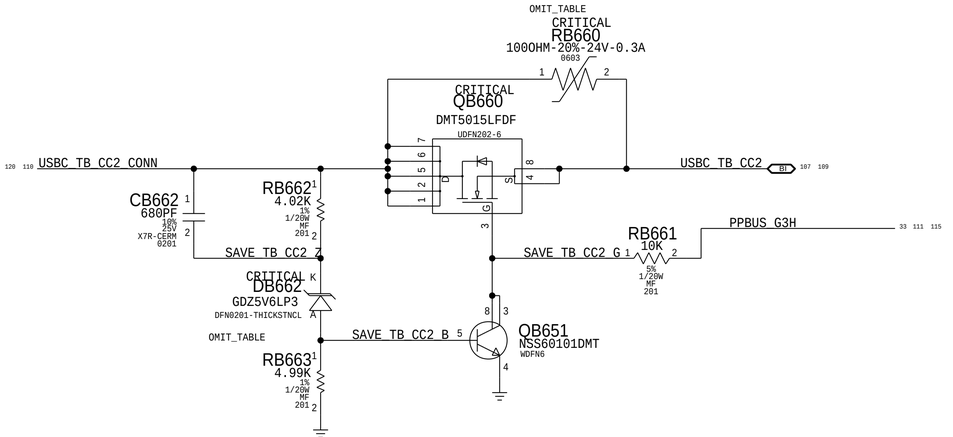
TA CC Protection





TB CC Protection





PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
371S00181	4	DIODE,ZENER,5.6V,250MW,DFN0201	DB632,DB642,DB652,DB662	CRITICAL	
740S00050	4	FUSE,THRMSTR,PTC,470OHM,24V,60MA,0603	RB630,RB640,RB650,RB660	CRITICAL	

BOM_COST_GROUP=USB-C

DESIGN: X1032/MLB_P4BP

LAST CHANGE: Fri Jan 6 16:01:21 2017

PAGE TITLE

USBC T Connector Support

Apple Inc.

DRAWING NUMBER 051-02643 SIZE D

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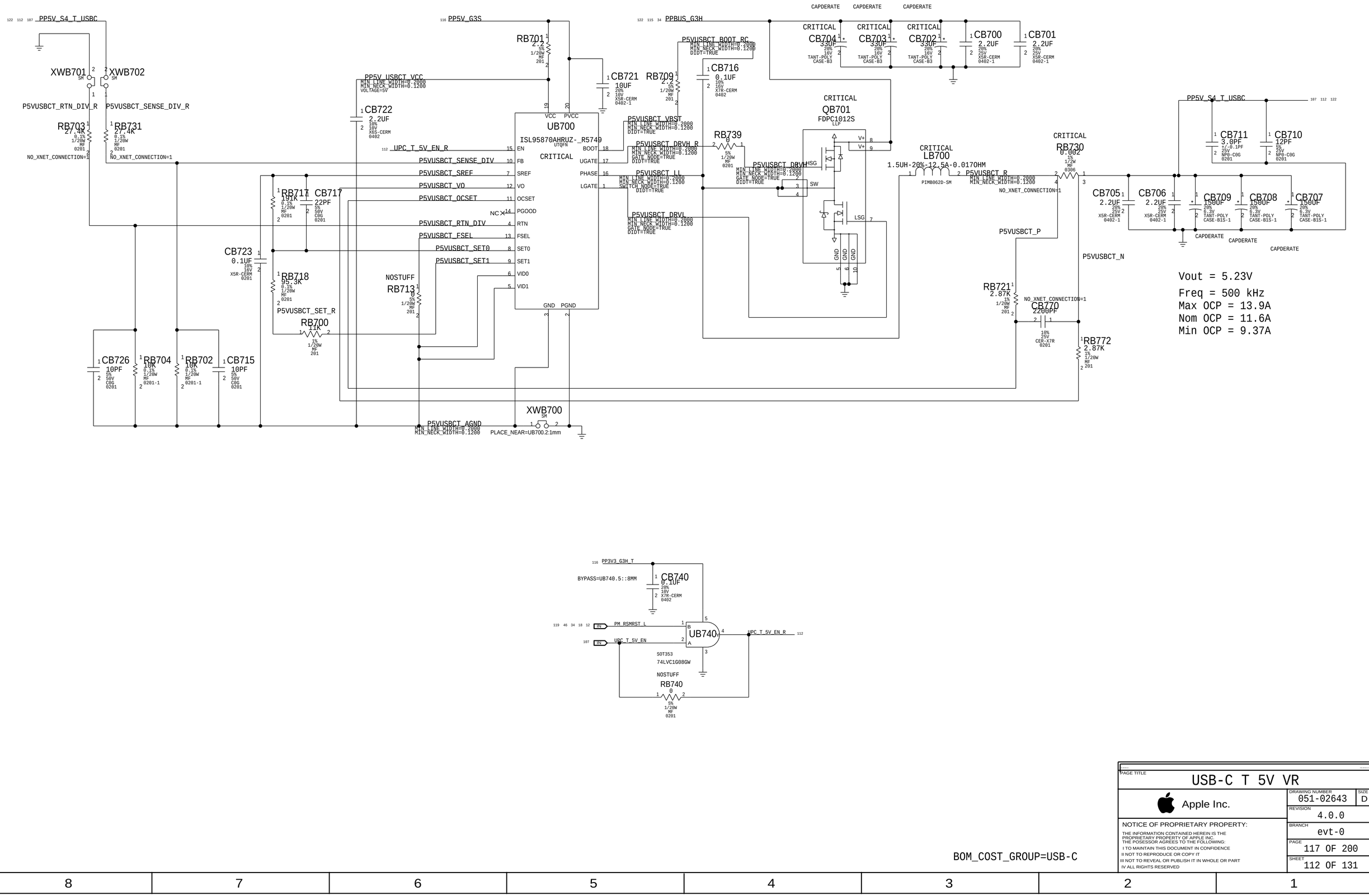

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USB-C T 5V VR

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8 7 6 5 4 3 2 1

D C B A

BOM_COST_GROUP=GRAPHICS

SYNC_MASTER=j998_copy SYNC_DATE=02/01/2017

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GDDR5 VRAM FB 3

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8 7 6 5 4 3 2 1

BOM_COST_GROUP=GRAPHICS

SYNC_MASTER=j666_copy SYNC_DATE=02/01/2017

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GDDR5 VRAM FB 4

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PBUS & High Side

122 68 PPBUS_G3H
PPBUS_G3H
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1200
VOLTAGE=13.1V
MAKE_BASE=TRUE
55 119 122 74
PPBUS_G3H 53
PPBUS_G3H 53
PPBUS_G3H 53
PPBUS_G3H 53
PPBUS_G3H 58
PPBUS_G3H 53
PPBUS_G3H 34 112 122
PPBUS_G3H 65
PPBUS_G3H 62 63
PPBUS_G3H 33 111
PPBUS_G3H 77
PPBUS_G3H 55
PPBUS_G3H 55
PPBUS_G3H 81

53 PPBUS_HS_CPU
PPBUS_HS_CPU
MIN_LINE_WIDTH=0.0000
MIN_NECK_WIDTH=0.1200
VOLTAGE=13.1V
MAKE_BASE=TRUE
122 124
PPBUS_HS_CPU 70
PPBUS_HS_CPU 71
PPBUS_HS_CPU 72
PPBUS_HS_CPU 74
PPBUS_HS_CPU 78
PPBUS_HS_CPU 74
PPBUS_HS_CPU 69

58 PPBUS_HS_GPU
PPBUS_HS_GPU
MIN_LINE_WIDTH=0.0000
MIN_NECK_WIDTH=0.1200
VOLTAGE=13.1V
MAKE_BASE=TRUE
101 119 124
PPBUS_HS_GPU 98
PPBUS_HS_GPU 104
PPBUS_HS_GPU 98 101
PPBUS_HS_GPU 98

53 PPBUS_HS_OTH5V
PPBUS_HS_OTH5V
MIN_LINE_WIDTH=0.0000
MIN_NECK_WIDTH=0.1200
VOLTAGE=13.1V
MAKE_BASE=TRUE
PPBUS_HS_OTH5V 73

53 PPBUS_HS_3V3G3H_T
PPBUS_HS_3V3G3H_T
MIN_LINE_WIDTH=0.0000
MIN_NECK_WIDTH=0.1200
VOLTAGE=13.1V
MAKE_BASE=TRUE
PPBUS_HS_3V3G3H_T 73

53 PPBUS_HS_3V3G3HRTC_X
PPBUS_HS_3V3G3HRTC_X
MIN_LINE_WIDTH=0.0000
MIN_NECK_WIDTH=0.1200
VOLTAGE=13.1V
MAKE_BASE=TRUE
PPBUS_HS_3V3G3HRTC_X 67

CPU Rails

70 PPVCC_S0_CPU
PPVCC_S0_CPU
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.02V
MAKE_BASE=TRUE
119
PPVCC_S0_CPU 6 8 58
PPVCC_S0_CPU 10

71 PPVCCSA_S0_CPU
PPVCCSA_S0_CPU
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.02V
MAKE_BASE=TRUE
119
PPVCCSA_S0_CPU 8 58
PPVCCSA_S0_CPU 11

72 PPVCCGT_S0_CPU
PPVCCGT_S0_CPU
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.02V
MAKE_BASE=TRUE
119
PPVCCGT_S0_CPU 8 58
PPVCCGT_S0_CPU 11 122

122 78 PPVCCIO_S0_CPU
PPVCCIO_S0_CPU
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0.95V
MAKE_BASE=TRUE
119
PPVCCIO_S0_CPU 5 8 10

DDR4 1.2V

74 PP1V2_S3
PP1V2_S3
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.2V
MAKE_BASE=TRUE
119 122 123
PP1V2_S3 24 25
PP1V2_S3 21
PP1V2_S3 22 23 26
PP1V2_S3 54
PP1V2_S3 79

54 PP1V2_S3_CPUDDR
PP1V2_S3_CPUDDR
MIN_NECK_WIDTH=0.1200
MIN_LINE_WIDTH=0.2000
MAKE_BASE=TRUE
VOLTAGE=1.2V
120
PP1V2_S3_CPUDDR 8
PP1V2_S3_CPUDDR 10 122

79 PP1V2_S0SW
PP1V2_S0SW
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.2V
MAKE_BASE=TRUE
119
PP1V2_S0SW 8

21 PP0V6_S3_MEM_VREFCA_A
PP0V6_S3_MEM_VREFCA_A
MAKE_BASE=TRUE
VOLTAGE=0.6V
22 23

21 PP0V6_S3_MEM_VREFCA_B
PP0V6_S3_MEM_VREFCA_B
MAKE_BASE=TRUE
VOLTAGE=0.6V
24 25

DDR4 0.6V VTT

74 PP0V6_S0_DDRVTT
PP0V6_S0_DDRVTT
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=0.6V
MAKE_BASE=TRUE
119
PP0V6_S0_DDRVTT 122
PP0V6_S0_DDRVTT 122
PP0V6_S0_DDRVTT 26
PP0V6_S0_DDRVTT 26

DDR4 2.5V

74 PP2V5_S3
PP2V5_S3
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=2.5V
MAKE_BASE=TRUE
119 122 123
PP2V5_S3 22 23
PP2V5_S3 24 25
PP2V5_S3 74

PMIC Buck 8 - PCH 1.05V Prime

54 PP1V05_PRIM
PP1V05_PRIM
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.05V
MAKE_BASE=TRUE
119
PP1V05_PRIM 16 17 80
PP1V05_PRIM 17
PP1V05_PRIM 16
PP1V05_PRIM 16
PP1V05_PRIM 16
PP1V05_PRIM 17
PP1V05_PRIM 16 17
PP1V05_PRIM 17
PP1V05_PRIM 18
PP1V05_PRIM 74

PMIC Buck8 SW2

78 PP1V05_S3
PP1V05_S3
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.05V
MAKE_BASE=TRUE
119
PP1V05_S3 6 8 11 46
PP1V05_S3 69
PP1V05_S3 8 11
PP1V05_S3 46
PP1V05_S3 77

PMIC HIO SW

76 PP1V05_S0SW
PP1V05_S0SW
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.05V
MAKE_BASE=TRUE
119
PP1V05_S0SW 6 8 11
PP1V05_S0SW 18

GPU Rails

101 98 PPVCORE_S0_GPU
PPVCORE_S0_GPU
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V
MAKE_BASE=TRUE
119 124
PPVCORE_S0_GPU 58 96 124

98 PPVDDCI_S0_GPU
PPVDDCI_S0_GPU
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.1V
MAKE_BASE=TRUE
119
PPVDDCI_S0_GPU 58 96 124
PPVDDCI_S0_GPU 96

122 98 PP1V5R1V35_S0_GPU_MEM
PP1V5R1V35_S0_GPU_MEM
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.35V
MAKE_BASE=TRUE
96 119
PP1V5R1V35_S0_GPU_MEM 99 100 124
PP1V5R1V35_S0_GPU_MEM 58

58 PP1V5R1V35_S0_GPU_IC
PP1V5R1V35_S0_GPU_IC
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.35V
MAKE_BASE=TRUE
97 124
PP1V5R1V35_S0_GPU_IC 96

122 104 PP1V8_GPU
PP1V8_GPU
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V
MAKE_BASE=TRUE
PP1V8_GPU 58

122 58 PP1V8_S0_GPU
PP1V8_S0_GPU
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=1.8V
MAKE_BASE=TRUE
95 103
PP1V8_S0_GPU 96
PP1V8_S0_GPU 103
PP1V8_S0_GPU 102
PP1V8_S0_GPU 102
PP1V8_S0_GPU 101

104 PP3V3_S0_GPU
PP3V3_S0_GPU
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1200
VOLTAGE=3.3V
MAKE_BASE=TRUE
97 103
PP3V3_S0_GPU 96
PP3V3_S0_GPU 19
PP3V3_S0_GPU 95
PP3V3_S0_GPU 102
PP3V3_S0_GPU 102
PP3V3_S0_GPU 51 103
PP3V3_S0_GPU 98 101
PP3V3_S0_GPU 102
PP3V3_S0_GPU 94

Digital Ground

GND
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PAGE TITLE
Power Alias 1

Apple Inc.

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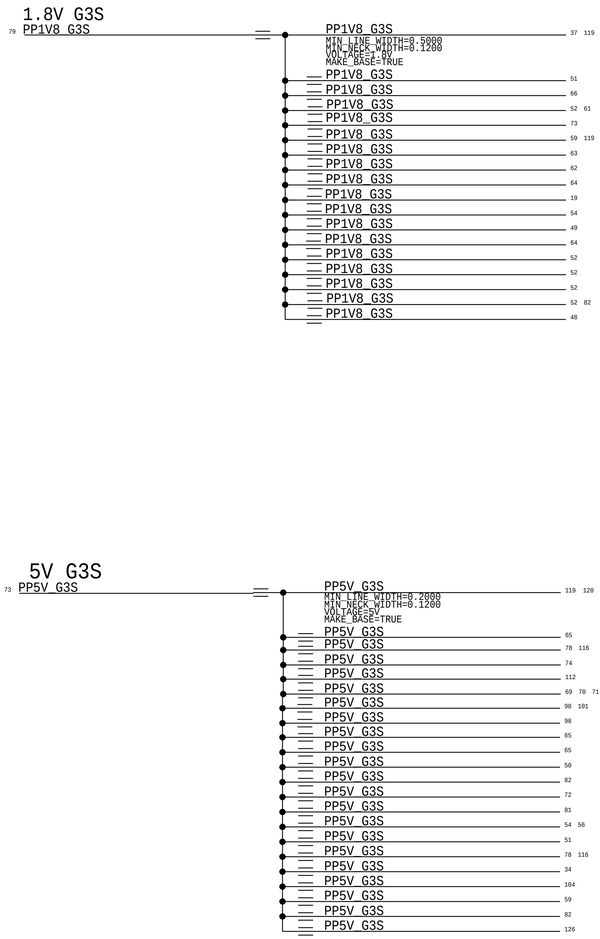

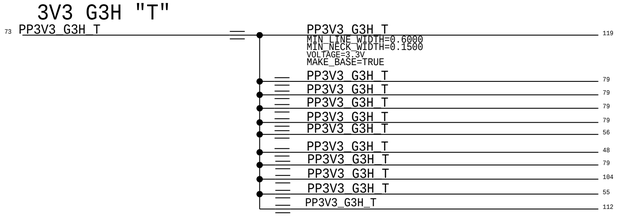

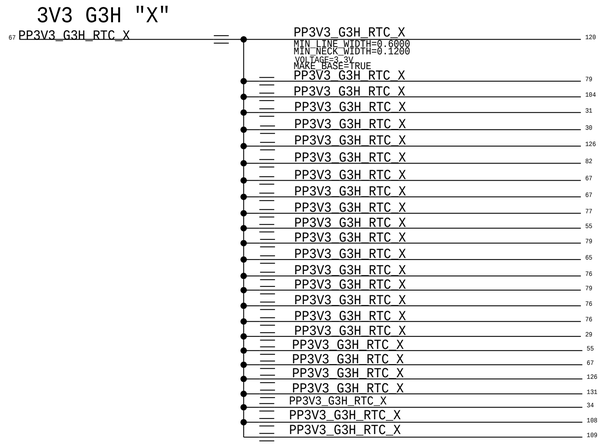

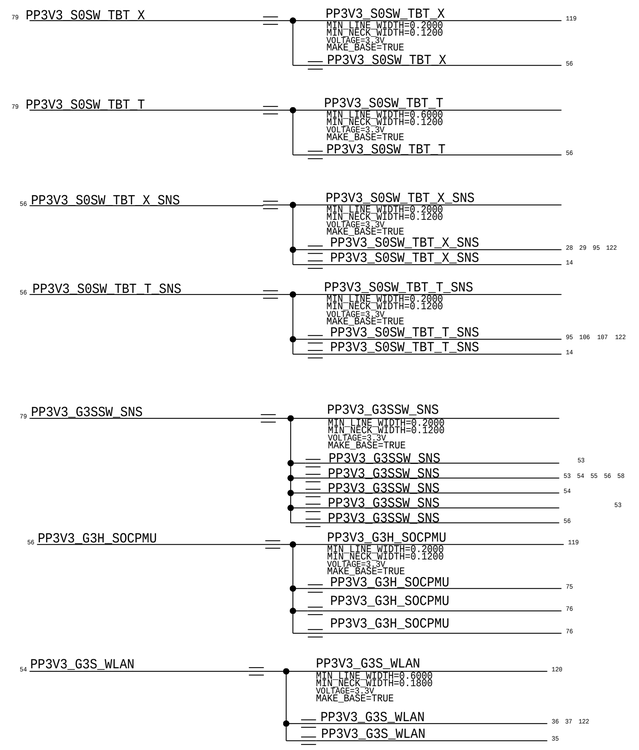

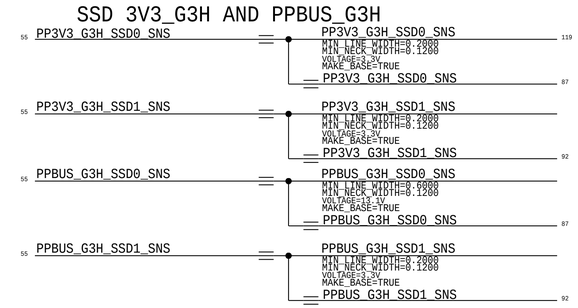

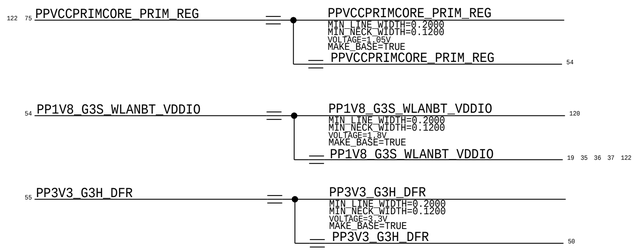

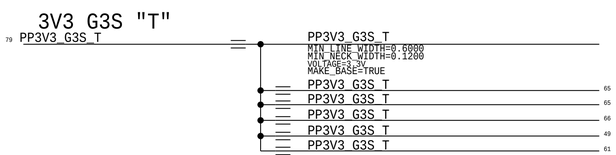

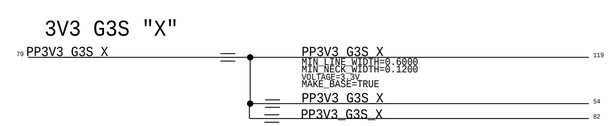

PAGE TITLE
Power Alias 2

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PEG X16 CPU-GPU

118 95	IN	PEG_GPU_D2R_P<7..0>	MAKE_BASE=TRUE	=PEG_D2R_P<7..0>	OUT	5
118 95	IN	PEG_GPU_D2R_N<7..0>	MAKE_BASE=TRUE	=PEG_D2R_N<7..0>	OUT	5
118 95	OUT	PEG_GPU_R2D_C_P<7..0>	MAKE_BASE=TRUE	=PEG_R2D_C_P<7..0>	IN	5
118 95	OUT	PEG_GPU_R2D_C_N<7..0>	MAKE_BASE=TRUE	=PEG_R2D_C_N<7..0>	IN	5

GPU Throttle

H9M Side (After LS)			GPU Side	
103 GFX_SELF_THROTTLE_1V8	MAKE_BASE=TRUE	=	GFX_SELF_THROTTLE_1V8	39
103 GFX_THROTTLE_1V8_L	MAKE_BASE=TRUE	=	GFX_THROTTLE_1V8_L	39

CPU Display Aliases

NC_DDI1_ML_C_P<3..0>	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI1_ML_C_P<3..0>	IN 5
NC_DDI1_ML_C_N<3..0>	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI1_ML_C_N<3..0>	IN 5
NC_DDI1_AUXCH_C_P	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI1_AUXCH_C_P	IN 5
NC_DDI1_AUXCH_C_N	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI1_AUXCH_C_N	IN 5
NC_DDI2_ML_C_P<3..0>	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI2_ML_C_P<3..0>	IN 5
NC_DDI2_ML_C_N<3..0>	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI2_ML_C_N<3..0>	IN 5
NC_DDI2_AUXCH_C_P	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI2_AUXCH_C_P	IN 5
NC_DDI2_AUXCH_C_N	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI2_AUXCH_C_N	IN 5
NC_DDI3_ML_P<3..0>	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI3_ML_P<3..0>	IN 5
NC_DDI3_ML_N<3..0>	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI3_ML_N<3..0>	IN 5
NC_DDI3_AUXCH_P	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI3_AUXCH_P	IN 5
NC_DDI3_AUXCH_N	MAKE_BASE=TRUE	NO_TEST=1	=	NC_DDI3_AUXCH_N	IN 5

Thunderbolt Signals Through PEG

118 29	IN	PCIE_TBT_X_D2R_P<3..0>	MAKE_BASE=TRUE	=PEG_D2R_P<11..8>	OUT	5
118 29	IN	PCIE_TBT_X_D2R_N<3..0>	MAKE_BASE=TRUE	=PEG_D2R_N<11..8>	OUT	5
118 29	OUT	PCIE_TBT_X_R2D_C_P<3..0>	MAKE_BASE=TRUE	=PEG_R2D_C_P<11..8>	IN	5
118 29	OUT	PCIE_TBT_X_R2D_C_N<3..0>	MAKE_BASE=TRUE	=PEG_R2D_C_N<11..8>	IN	5
118 107	IN	PCIE_TBT_T_D2R_P<3..0>	MAKE_BASE=TRUE	=PEG_D2R_P<15..12>	OUT	5
118 107	IN	PCIE_TBT_T_D2R_N<3..0>	MAKE_BASE=TRUE	=PEG_D2R_N<15..12>	OUT	5
118 107	OUT	PCIE_TBT_T_R2D_C_P<3..0>	MAKE_BASE=TRUE	=PEG_R2D_C_P<15..12>	IN	5
118 107	OUT	PCIE_TBT_T_R2D_C_N<3..0>	MAKE_BASE=TRUE	=PEG_R2D_C_N<15..12>	IN	5

GPU ALIAS

93	IN	GPU_RESET_L	MAKE_BASE=TRUE	GPU_RESET_L	OUT	46 95 119
121 12	IN	EG_PEG_CLK100M_N	MAKE_BASE=TRUE	EG_PEG_CLK100M_N	OUT	95
121 12	IN	EG_PEG_CLK100M_P	MAKE_BASE=TRUE	EG_PEG_CLK100M_P	OUT	95

PAGE TITLE

Signal Alias

Apple Inc.

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ICT TESTPOINTS , High Speed NO_TEST

PEG

- PEG_GPU_D2R_N<7..0> NO_TEST=1
- PEG_GPU_D2R_P<7..0> NO_TEST=1
- PEG_GPU_R2D_C_N<7..0> NO_TEST=1
- PEG_GPU_R2D_C_P<7..0> NO_TEST=1
- PCIE_TBT_X_D2R_P<3..0> NO_TEST=1
- PCIE_TBT_X_D2R_N<3..0> NO_TEST=1
- PCIE_TBT_X_R2D_C_P<3..0> NO_TEST=1
- PCIE_TBT_X_R2D_C_N<3..0> NO_TEST=1
- PCIE_TBT_T_D2R_P<3..0> NO_TEST=1
- PCIE_TBT_T_D2R_N<3..0> NO_TEST=1
- PCIE_TBT_T_D2R_C_P<3..0> NO_TEST=1
- PCIE_TBT_T_D2R_C_N<3..0> NO_TEST=1
- PCIE_TBT_X_D2R_C_P<3..0> NO_TEST=1
- PCIE_TBT_X_D2R_C_N<3..0> NO_TEST=1
- PCIE_TBT_X_R2D_P<3..0> NO_TEST=1
- PCIE_TBT_X_R2D_N<3..0> NO_TEST=1
- PCIE_TBT_T_R2D_P<3..0> NO_TEST=1
- PCIE_TBT_T_R2D_N<3..0> NO_TEST=1
- PCIE_TBT_T_R2D_C_P<3..0> NO_TEST=1
- PCIE_TBT_T_R2D_C_N<3..0> NO_TEST=1
- PEG_GPU_D2R_C_N<7..0> NO_TEST=1
- PEG_GPU_D2R_C_P<7..0> NO_TEST=1
- PEG_GPU_R2D_N<7..0> NO_TEST=1
- PEG_GPU_R2D_P<7..0> NO_TEST=1

BAFFIN FRAME BUFFER

- FB_A1_CS_L NO_TEST=1
- FB_A0_CKE_L NO_TEST=1
- FB_A1_CKE_L NO_TEST=1
- FB_A0_WE_L NO_TEST=1
- FB_A1_WE_L NO_TEST=1
- FB_B1_CS_L NO_TEST=1
- FB_B0_CKE_L NO_TEST=1
- FB_B1_CKE_L NO_TEST=1
- FB_B0_WE_L NO_TEST=1
- FB_B0_WE_L NO_TEST=1
- FB_B0_CLK_P NO_TEST=1
- FB_B1_CLK_N NO_TEST=1
- FB_B1_CLK_P NO_TEST=1
- FB_B0_RAS_L NO_TEST=1
- FB_B1_RAS_L NO_TEST=1
- FB_B0_CAS_L NO_TEST=1
- FB_B1_CAS_L NO_TEST=1
- FB_B0_CS_L NO_TEST=1
- FB_A0_DQ<31..0> NO_TEST=1
- FB_A1_DQ<31..0> NO_TEST=1
- FB_A0_A<8..0> NO_TEST=1
- FB_A1_A<8..0> NO_TEST=1
- FB_A0_WCLK_N<1..0> NO_TEST=1
- FB_A0_WCLK_P<1..0> NO_TEST=1
- FB_A1_WCLK_N<1..0> NO_TEST=1
- FB_A1_WCLK_P<1..0> NO_TEST=1
- FB_A0_EDC<3..0> NO_TEST=1
- FB_A1_EDC<3..0> NO_TEST=1
- FB_A0_DBI_L<3..0> NO_TEST=1
- FB_A1_DBI_L<3..0> NO_TEST=1
- FB_A0_ABI_L NO_TEST=1
- FB_A1_ABI_L NO_TEST=1
- FB_A0_CLK_N NO_TEST=1
- FB_A0_CLK_P NO_TEST=1
- FB_A1_CLK_N NO_TEST=1
- FB_A1_CLK_P NO_TEST=1
- FB_A0_RAS_L NO_TEST=1
- FB_A1_RAS_L NO_TEST=1
- FB_A0_CAS_L NO_TEST=1
- FB_A1_CAS_L NO_TEST=1
- FB_A0_CS_L NO_TEST=1
- FB_B0_CLK_N NO_TEST=1
- FB_B0_DQ<31..0> NO_TEST=1
- FB_B1_DQ<31..0> NO_TEST=1
- FB_B0_A<8..0> NO_TEST=1
- FB_B1_A<8..0> NO_TEST=1
- FB_B0_WCLK_N<1..0> NO_TEST=1
- FB_B0_WCLK_P<1..0> NO_TEST=1
- FB_B1_WCLK_N<1..0> NO_TEST=1
- FB_B1_WCLK_P<1..0> NO_TEST=1
- FB_B0_EDC<3..0> NO_TEST=1
- FB_B1_EDC<3..0> NO_TEST=1
- FB_B0_DBI_L<3..0> NO_TEST=1
- FB_B1_DBI_L<3..0> NO_TEST=1
- FB_B0_ABI_L NO_TEST=1
- FB_B1_ABI_L NO_TEST=1

CPU/PCH CLK

- CPU_CLK24M_NSSC_CLK_N NO_TEST=1
- CPU_CLK24M_NSSC_CLK_P NO_TEST=1
- CPU_CLK100M_PCIBCLK_N NO_TEST=1
- CPU_CLK100M_PCIBCLK_P NO_TEST=1
- CPU_CLK100M_BCLK_N NO_TEST=1
- CPU_CLK100M_BCLK_P NO_TEST=1
- NC_ITPXDP_CLK100MN
- NC_ITPXDP_CLK100MP

MUX

- DP_INT_IG_ML_N<3..0> NO_TEST=1
- DP_INT_IG_ML_P<3..0> NO_TEST=1
- DP_INT_IG_AUX_N NO_TEST=1
- DP_INT_IG_AUX_P NO_TEST=1
- DP_INT_EG_ML_N<3..0> NO_TEST=1
- DP_INT_EG_ML_P<3..0> NO_TEST=1
- DP_INT_EG_AUX_N NO_TEST=1
- DP_INT_EG_AUX_P NO_TEST=1

USB-C X

- USBC_XB_D2R_N<2..1> NO_TEST=1
- USBC_XB_D2R_P<2..1> NO_TEST=1
- USBC_XA_D2R_P<2..1> NO_TEST=1
- USBC_XB_R2D_C_P<2..1> NO_TEST=1
- USBC_XA_D2R_N<2..1> NO_TEST=1
- USBC_XB_R2D_C_N<2..1> NO_TEST=1
- USBC_XA_R2D_C_P<2..1> NO_TEST=1
- USBC_XA_R2D_C_N<2..1> NO_TEST=1

DMI

- DMI_S2N_P<3..0> NO_TEST=1
- DMI_S2N_N<3..0> NO_TEST=1
- DMI_N2S_P<3..0> NO_TEST=1
- DMI_N2S_N<3..0> NO_TEST=1

DP - CPU/ACE

- DP_X_SNK0_ML_C_N<3..0> NO_TEST=1
- DP_X_SNK0_ML_C_P<3..0> NO_TEST=1
- DP_X_SNK0_ML_N<3..0> NO_TEST=1
- DP_X_SNK0_ML_P<3..0> NO_TEST=1
- DP_X_SNK1_ML_C_N<3..0> NO_TEST=1
- DP_X_SNK1_ML_C_P<3..0> NO_TEST=1
- DP_X_SNK1_ML_N<3..0> NO_TEST=1
- DP_X_SNK1_ML_P<3..0> NO_TEST=1
- DP_T_SNK0_ML_C_N<3..0> NO_TEST=1
- DP_T_SNK0_ML_C_P<3..0> NO_TEST=1
- DP_T_SNK0_ML_N<3..0> NO_TEST=1
- DP_T_SNK0_ML_P<3..0> NO_TEST=1
- DP_T_SNK1_ML_C_N<3..0> NO_TEST=1
- DP_T_SNK1_ML_C_P<3..0> NO_TEST=1
- DP_T_SNK1_ML_N<3..0> NO_TEST=1
- DP_T_SNK1_ML_P<3..0> NO_TEST=1
- DP_X_SNK0_AUXCH_C_P NO_TEST=1
- DP_X_SNK0_AUXCH_C_N NO_TEST=1
- DP_T_SNK0_AUXCH_C_P NO_TEST=1
- DP_T_SNK0_AUXCH_C_N NO_TEST=1
- DP_X_SNK0_AUXCH_P NO_TEST=1
- DP_X_SNK0_AUXCH_N NO_TEST=1
- DP_T_SNK0_AUXCH_P
- DP_T_SNK0_AUXCH_N
- DP_X_SNK1_AUXCH_C_P NO_TEST=1
- DP_X_SNK1_AUXCH_C_N NO_TEST=1
- DP_T_SNK1_AUXCH_C_P NO_TEST=1
- DP_T_SNK1_AUXCH_C_N NO_TEST=1
- DP_X_SNK1_AUXCH_P NO_TEST=1
- DP_X_SNK1_AUXCH_N NO_TEST=1
- DP_T_SNK1_AUXCH_P
- DP_T_SNK1_AUXCH_N

CPU/EDP

H9M ESPI

- ESPI_IO<0> NO_TEST=1
- ESPI_IO<1> NO_TEST=1
- ESPI_IO<2> NO_TEST=1
- ESPI_IO<3> NO_TEST=1
- ESPI_IO_R<0> NO_TEST=1
- ESPI_IO_R<1> NO_TEST=1
- ESPI_IO_R<3> NO_TEST=1
- ESPI_IO_R<3> NO_TEST=1

- TBT_X_XTAL25M_OUT NO_TEST=1
- TBT_X_XTAL25M_IN NO_TEST=1
- TBT_T_XTAL25M_OUT NO_TEST=1
- TBT_T_XTAL25M_IN NO_TEST=1
- GPU_CLK_IN NO_TEST=1

MEM

- MEM_A_CLK_P<1..0> NO_TEST=1
- MEM_A_CLK_N<1..0> NO_TEST=1
- MEM_A_DQ<63..0> NO_TEST=1
- MEM_B_DQ<63..0> NO_TEST=1
- MEM_A_DQS_P<7..0> NO_TEST=1
- MEM_A_DQS_N<7..0> NO_TEST=1
- MEM_B_DQS_P<7..0> NO_TEST=1
- MEM_B_DQS_N<7..0> NO_TEST=1

- MEM_B_CLK_P<1..0> NO_TEST=1
- MEM_B_CLK_N<1..0> NO_TEST=1

WIFI

- 50_0_ANT NO_TEST=1
- 50_1_ANT NO_TEST=1
- 50_2_ANT NO_TEST=1
- 50_0_COM NO_TEST=1
- 50_1_COM NO_TEST=1
- 50_2_COM NO_TEST=1
- 50_A_0_DIPLEXER NO_TEST=1
- 50_A_0_MATCH NO_TEST=1
- 50_G_0_DIPLEXER NO_TEST=1
- 50_G_0_MATCH NO_TEST=1
- 50_A_1_DIPLEXER NO_TEST=1
- 50_A_1_MATCH NO_TEST=1
- 50_G_1_DIPLEXER NO_TEST=1
- 50_G_1_MATCH NO_TEST=1
- 50_A_2_DIPLEXER NO_TEST=1
- 50_A_2_MATCH NO_TEST=1
- 50_G_2_DIPLEXER NO_TEST=1
- 50_G_2_MATCH NO_TEST=1

USB-C T

- USBC_TA_D2R_P<2..1> NO_TEST=1
- USBC_TA_D2R_N<2..1> NO_TEST=1
- USBC_TA_R2D_C_P<2..1> NO_TEST=1
- USBC_TA_R2D_C_N<2..1> NO_TEST=1

- USBC_TB_D2R_P<2..1> NO_TEST=1
- USBC_TB_D2R_N<2..1> NO_TEST=1
- USBC_TB_R2D_C_P<2..1> NO_TEST=1
- USBC_TB_R2D_C_N<2..1> NO_TEST=1

H9M SSD NAND

- PCIE_SSD0_R2D_P<3..0> NO_TEST=1
- PCIE_SSD0_R2D_N<3..0> NO_TEST=1
- PCIE_SSD0_D2R_P<3..0> NO_TEST=1
- PCIE_SSD0_D2R_N<3..0> NO_TEST=1
- PCIE_SSD0_R2D_C_P<3..0> NO_TEST=1
- PCIE_SSD0_R2D_C_N<3..0> NO_TEST=1
- PCIE_SSD0_D2R_C_P<3..0> NO_TEST=1
- PCIE_SSD0_D2R_C_N<3..0> NO_TEST=1

- PCIE_SSD1_R2D_P<3..0> NO_TEST=1
- PCIE_SSD1_R2D_N<3..0> NO_TEST=1
- PCIE_SSD1_D2R_P<3..0> NO_TEST=1
- PCIE_SSD1_D2R_N<3..0> NO_TEST=1
- PCIE_SSD1_R2D_C_P<3..0> NO_TEST=1
- PCIE_SSD1_R2D_C_N<3..0> NO_TEST=1
- PCIE_SSD1_D2R_C_P<3..0> NO_TEST=1
- PCIE_SSD1_D2R_C_N<3..0> NO_TEST=1

XTAL

- TBT_X_XTAL25M_OUT NO_TEST=1
- PCH_CLK24M_XTALOUT NO_TEST=1
- PMU_XTAL1 NO_TEST=1
- PMU_XTAL2 NO_TEST=1

PCH/AR

- PCH_PCIE_WLAN_D2R_N NO_TEST=1
- PCH_PCIE_WLAN_D2R_P NO_TEST=1
- PCH_PCIE_WLAN_R2D_C_N NO_TEST=1
- PCH_PCIE_WLAN_R2D_C_P NO_TEST=1
- PCH_PCIE_WLAN_D2R_C_P NO_TEST=1
- PCH_PCIE_WLAN_D2R_C_N NO_TEST=1
- PCH_PCIE_WLAN_R2D_P NO_TEST=1
- PCH_PCIE_WLAN_R2D_N NO_TEST=1

PCH/SOC

- PCIE_SOC_R2D_P<3..0> NO_TEST=1
- PCIE_SOC_R2D_N<3..0> NO_TEST=1
- PCIE_SOC_D2R_P<3..0> NO_TEST=1
- PCIE_SOC_D2R_N<3..0> NO_TEST=1
- PCIE_SOC_R2D_C_P<3..0> NO_TEST=1
- PCIE_SOC_R2D_C_N<3..0> NO_TEST=1
- PCIE_SOC_D2R_C_P<3..0> NO_TEST=1
- PCIE_SOC_D2R_C_N<3..0> NO_TEST=1

PAGE TITLE

High speed No Testpoints

Apple Inc.

DRAWING NUMBER 051-02643

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DFU AND FCT TESTPOINTS placed on top side of MLB, oppsite from CPU.

DFU TEST POINTS <RDAR://31619312>

Possibly useful panda signals

TPC4H8	TP-P5	SOC_DEBUGPRT_RX	40 126
TPC4H9	TP-P5	SOC_DEBUGPRT_TX	40 126
TPC402	TP-P5	DEBUG_JTAG_SOC_TDO	39 126
TPC403	TP-P5	DEBUG_JTAG_SOC_TDI	39 126
TPC404	TP-P5	PP1V8_SLPS2R	80
TPC405	TP-P5	SOC_SOCHOT_L	38 77 126
TPC406	TP-P5	I2C_PWR_SDA	39 51
TPC407	TP-P5	I2C_UPC_SCL	39 51
TPC4E9	TP-P5	I2C_UPC_SDA	39 51
TPC4Z5	TP-P5	I2C_PWR_SCL	39 51

PSU Power input

TPC441	TP-P5	PPBUS_HS_GPU	101 115 124
TPC442	TP-P5	PP2V5_S3	115 122 123
TPC443	TP-P5	PP0V6_S0_DDRVTT	115 119
TPC444	TP-P5	PP3V3_S5	80
TPC4Z6	TP-P5	PPVBAT_G3H_CHGR_REG	68
TPC4Z7	TP-P5	PPDCIN_G3H_CHGR	68 122
TPC448	TP-P5		
TPC449	TP-P5		
TPC450	TP-P5		

DFU NON-CUSTOMER-FACING USB PORTS

PLACE IN ACCESSIBLE BOARD AREA

SWDL

TPC408	TP-P5	USB3_TEST_D2R_N	OUT 14
TPC409	TP-P5	USB3_TEST_D2R_P	OUT 14
TPC410	TP-P5	USB3_TEST_R2D_N	IN 14
TPC411	TP-P5	USB3_TEST_R2D_P	IN 14
TPC412	TP-P5		
TPC413	TP-P5		
TPC414	TP-P5		
TPC415	TP-P5		
TPC416	TP-P5	USB2_UPC_TA_N	BI 14 107
TPC417	TP-P5	USB2_UPC_TA_P	BI 14 107
TPC418	TP-P5		

DZC400, DZC401, DZC402, DZC403 — 5.5V-0.28PF, 0201-THICKSTNCL

DZC408, DZC409 — 5.5V-0.28PF, 0201-THICKSTNCL

NON-CUSTOMER-FACING USB PORTS FOR ETHERNET DONGLE(Bristol OS Testing)

PLACE IN ACCESSIBLE BOARD AREA

Ethenet

TPC422	TP-P5	USB3_TEST2_D2R_N	OUT 14
TPC423	TP-P5	USB3_TEST2_D2R_P	OUT 14
TPC424	TP-P5	USB3_TEST2_R2D_N	IN 14
TPC425	TP-P5	USB3_TEST2_R2D_P	IN 14
TPC426	TP-P5		
TPC427	TP-P5		
TPC428	TP-P5		
TPC429	TP-P5		
TPC419	TP-P5	USB2_UPC_TB_N	BI 14 107
TPC420	TP-P5	USB2_UPC_TB_P	BI 14 107
TPC421	TP-P5		
TPC430	TP-P5	PP5V_G3S	116 119 120

DZC410, DZC411, DZC412, DZC413 — 5.5V-0.28PF, 0201-THICKSTNCL

DZC406, DZC407 — 5.5V-0.28PF, 0201-THICKSTNCL

Battery

TPC431	1 TP-P5	SYS_DETECT_L	67
TPC432	1 TP-P5	SMBUS_3V3_BATT_SCL	67
TPC433	1 TP-P5	SMBUS_3V3_BATT_SDA	67
TPC434	1 TP-P5	TP_BMON_IOUT	67
TPC435	1 TP-P5	PPVBAT_G3H_CONN	67 68
TPC436	1 TP-P5	PPVBAT_G3H_CONN	67 68 119
TPC437	1 TP-P5	PPVBAT_G3H_CONN	67 68 119
TPC4D5	1 TP-P5	PPVBAT_G3H_CONN	67 68 119
TPC4D6	1 TP-P5	PPVBAT_G3H_CONN	67 68 119
TPC4D7	1 TP-P5	PPVBAT_G3H_CONN	67 68 119
TPC4I7	1 TP-P5	PPVBAT_G3H_CONN	67 68 119
TPC4Z8	TP-P5	SYS_DETECT	67
TPC4D8	1 TP-P5		
TPC4D9	1 TP-P5		
TPC4E0	1 TP-P5		
TPC4E1	1 TP-P5		
TPC4E2	1 TP-P5		
TPC440	1 TP-P5		
TPC4I6	1 TP-P5		

AUDIO_JACK

	IN	AUD_CONN_HP_LEFT	FUNC_TEST=TRUE
	IN	AUD_CONN_HP_RIGHT	FUNC_TEST=TRUE
	IN	AUD_CONN_RING2	FUNC_TEST=TRUE
	IN	AUD_CONN_SLEEVE	FUNC_TEST=TRUE
	IN	AUD_CONN_HP_SENSE_L	FUNC_TEST=TRUE
	IN	AUD_CONN_HP_SENSE_R	FUNC_TEST=TRUE
	IN	AUD_CONN_TIP_SENSE	FUNC_TEST=TRUE
	IN	AUD_CONN_SLEEVE_XW	FUNC_TEST=TRUE
	IN	AUD_CONN_RING2_XW	FUNC_TEST=TRUE
		GND X2	
TPC4Z9	TP-P5	GND_AUDIO_CODEC	61 122

FAN

TPC4N0	1 TP-P5	SMC_FAN_0_PWM	39 59
TPC4N1	1 TP-P5	SMC_FAN_0_TACH	39 59
TPC4N2	1 TP-P5	SMC_FAN_1_PWM	39 59
TPC4N3	1 TP-P5	SMC_FAN_1_TACH	39 59
TPC4N4	1 TP-P5	PP1V8_G3S	59 116 119
TPC4N5	1 TP-P5	PP1V8_G3S	59 116 119
TPC4N6	1 TP-P5		
TPC4N7	1 TP-P5		

DEBUG MOJO

TPC451	1 TP-P5	PCH_UART_DEBUG_R2D	15 29 126
TPC452	1 TP-P5	PCH_UART_DEBUG_D2R	15 29 126
TPC4F1	1 TP-P5	SMC_DEBUGPRT_TX	39 47 126
TPC4F2	1 TP-P5	SMC_DEBUGPRT_RX	39 47 126
TPC453	1 TP-P5		

Soc Access w/o Potassium

TPC454	1 TP-P5	SOC_USB_VBUS	29 38 126
TPC455	1 TP-P5	USB_SOC_TYPEC_P	29 126
TPC456	1 TP-P5	USB_SOC_TYPEC_N	29 126
TPC457	1 TP-P5	PMU_ACTIVE_READY	30 38 77 131
TPC458	1 TP-P5	SOC_FORCE_DFU	29 38 77 131
TPC459	1 TP-P5	SOC_DFU_STATUS	29 38 131
TPC460	1 TP-P5	UPC_XB_DBG3	29 31
TPC461	1 TP-P5	UPC_XB_DBG4	29 31
TPC462	1 TP-P5	SOC_DOCK_CONNECT	30 31 39
TPC464	1 TP-P5		

Power Sequence,status,charging

TPC466	TP-P5	PP3V3_G3H_SOCPMU	116 119
TPC468	TP-P5	PPBUS_G3H	55 115
TPC469	TP-P5	PP1V2_S3	115 122 123
TPC470	TP-P5	PPVCC_S0_CPU	115
TPC471	TP-P5	PP5V_G3S	120
TPC472	TP-P5	PP1V5R1V35_S0_GPU_MEM	96 115
TPC473	TP-P5	PPVCORE_S0_GPU	115 124
TPC4L6	TP-P5	CPU_PWRGD	6 13 121
TPC474	TP-P5	PMU_ONOFF_R_L	48
TPC475	TP-P5	PM_SLP_S3_L	12 14 27 105 131
TPC476	TP-P5	PM_SLP_S4_L	12
TPC477	TP-P5	PM_SLP_S5_L	12
TPC479	TP-P5	PP0V6_S0_DDRVTT	115 119
TPC481	TP-P5	PP1V05_S3	115
TPC482	TP-P5	PM_SYSRST_L	12 18 46 121
TPC483	TP-P5	PM_PCH_SYS_PWROK	12 46
TPC484	TP-P5	PM_PCH_PWROK	12 35 46 121
TPC485	TP-P5	PLT_RST_L	12 20 46
TPC486	TP-P5	PM_RSMRST_L	12 18 34 46 112
TPC487	TP-P5	PM_SLP_S0_L	13 39 77 131
TPC488	TP-P5	SMC_FIXTURE_MODE_L	39 47
TPC489	TP-P5	PP1V8_G3S	37 116
TPC490	TP-P5	PP5V_G3S	116 119 120
TPC491	TP-P5	PP3V3_G3H_T	116
TPC492	TP-P5	PP3V3_G3H_SSD0_SNS	116
TPC493	TP-P5	PP3V3_S0SW_TBT_X	116
TPC495	TP-P5	PP3V3_G3H_SOCPMU	116 119
TPC4B4	TP-P5	PPVDDCPU_AWAKE	80
TPC4B6	1 TP-P5	PVDDQ_EN_R	74
TPC4B7	1 TP-P5	PVCCIO_EN	77 78
TPC4B8	1 TP-P5	PP0V9_SLPDDR	80
TPC4B9	1 TP-P5	PP1V1_SLPDDR	80
TPC4C0	1 TP-P5	PP1V1_SLPS2R	80
TPC4C1	1 TP-P5	PP1V8_AWAKE	80
TPC4J1	1 TP-P5	SMC_SYSRST_L	39 46 121
TPC4C4	1 TP-P5	PP1V8_SLPS2R_PMUVDDGPIO	75
TPC4C5	1 TP-P5	P1V1_SLPDDR_SOCFET_EN	76 77 131
TPC4C6	1 TP-P5	PMU_CLK32K_WLANBT	36 77
TPC4C7	1 TP-P5	SOC_WDOG	39 77
TPC4C8	1 TP-P5	PMU_CLK32K_SOC	39 77
TPC4C9	1 TP-P5	PMU_SYS_ALIVE	38 39 77 87 92 93
TPC496	TP-P5		

BOM_COST_GROUP=DEBUG

Power Sequence,status,charging

TPC4D0	1 TP-P5	P5VG3S_EN	73 77
TPC4D1	1 TP-P5	PP0V8_SLPS2R	80
TPC4D2	1 TP-P5	PPVDDCPUSRAM_AWAKE	80
TPC4D3	1 TP-P5	P5VG3S_PGOOD	73 77
TPC4D4	1 TP-P5	CPUVR_PGOOD	77 80
TPC4L7	TP-P5	PPVCCGT_S0_CPU	115
TPC4F3	TP-P5	PPVCCSA_S0_CPU	115
TPC4L0	TP-P5	PPVCCIO_S0_CPU	115
TPC4F4	TP-P5	PP1V05_S0SW	115
TPC4F5	TP-P5	PP1V2_S0SW	115
TPC4F6	TP-P5	PP1V05_PRIM	115
TPC4F7	TP-P5	PP1V8_S5	80
TPC4F8	TP-P5	PP3V0_G3H_RTC	80
TPC4F9	TP-P5	ALL_SYS_PWRGD	46 77
TPC4G0	TP-P5	PCH_RTC_RESET_L	12 77
TPC4G1	TP-P5	PM_THRMTRIP_L	6 46
TPC4G2	TP-P5	PM_PWRBTN_L	18 80
TPC4G3	TP-P5	CPU_PROCHOT_R_L	6
TPC4G4	TP-P5	PPVDDCI_S0_GPU	115
TPC4G5	TP-P5	DISP_GCON_RESET_L	93
TPC4G6	TP-P5	GPU_RESET_L	46 95 117
TPC4G7	TP-P5	PM_MEMVTT_EN	5 74
TPC4G8	TP-P5	ESPI_RESET_L	12 20 39
TPC4G9	TP-P5	GFX_THROTTLE_L	103
TPC4H0	TP-P5	PMU_COLD_RESET_L	39 64 77 121
TPC4H1	TP-P5	PP0V82_SLPDDR	80
TPC4H2	TP-P5	CHGR_EN_MVR	67 68
TPC4H3	TP-P5	PMU_PVDDMAIN_EN	73 77
TPC4H4	TP-P5	UPC_PMU_RESET	39 67 77 107
TPC4H5	TP-P5	P3V3G3S_EN	77 79
TPC4H6	TP-P5	PP3V3_G3S_X	116
TPC4H7	TP-P5	P1V8G3S_EN	77 79 131
TPC4L1	TP-P5	SSD_PMU_RESET_L	38 47 87 92
TPC4L2	TP-P5	PP2V5_NAND_SSD0	83 84 85 86 87 124
TPC4I0	TP-P5	PP2V5_NAND_SSD1	88 89 90 91 92 124
TPC4I1	TP-P5	PP0V9_SSD0	83 84 85 86 87 124
TPC4I2	TP-P5	PP0V9_SSD1	88 89 90 91 92 124
TPC4I3	TP-P5	PP1V8_SSD1	88 89 90 91 92 124
TPC4I4	TP-P5	PP1V8_SSD0	83 84 85 86 87 124
TPC4I5	TP-P5	PP1V2_AWAKE	80

Soc Access with Potassium

TPC499	1 TP-P5	USBC_XB_SBU1	31 32
TPC4A0	1 TP-P5	USBC_XB_SBU2	31 32
TPC4A1	1 TP-P5	USBC_XA_CC1_CONN	32 33
TPC4A2	1 TP-P5	PP20V_USBC_XA_VBUS	29 32 120 122
TPC4A3	1 TP-P5		

Left Side - Top Layer

PPDCIN_G3H	1 TP-P5	A	TPC4AB
PPDCIN_G3H	1 TP-P5	A	TPC4AA
PPDCIN_G3H	1 TP-P5	A	TPC4A5
PPDCIN_G3H	1 TP-P5	A	TPC4A6
PPDCIN_G3H	1 TP-P5	A	TPC4A7
PPDCIN_G3H	1 TP-P5	A	TPC4A8
PPDCIN_G3H	1 TP-P5	A	TPC4E5
PPDCIN_G3H	1 TP-P5	A	TPC4E6
	1 TP-P5	A	TPC4A9
	1 TP-P5	A	TPC4B0
	1 TP-P5	A	TPC4B1
	1 TP-P5	A	TPC4B2
	1 TP-P5	A	TPC4B3
	1 TP-P5	A	TPC4E7
	1 TP-P5	A	TPC4E8

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FCT TEST POINTS (TOP SIDE OF MLB)

DFR/MESA (FCT)

TPC500	A	1	TP-P5	
TPC501	A	1	TP-P5	
TPC502	A	1	TP-P5	MIPI_DFR_CLK_CONN_FILT_P
TPC503	A	1	TP-P5	DFR_DISP_VSYNC
TPC505	A	1	TP-P5	DFR_DISP_TE
TPC504	A	1	TP-P5	MIPI_DFR_CLK_CONN_FILT_N
TPC506	A	1	TP-P5	
TPC507	A	1	TP-P5	MIPI_DFR_DATA_CONN_FILT_P
TPC524	A	1	TP-P5	MIPI_DFR_DATA_CONN_FILT_N
TPC510	A	1	TP-P5	DFR_DISP_RESET_L
TPC516	A	1	TP-P5	PP3V3_G3HSW_DFR
TPC508	A	1	TP-P5	DFR_DISP_INT
TPC518	A	1	TP-P5	PP3V3_G3HSW_DFR
TPC511	A	1	TP-P5	
TPC512	A	1	TP-P5	
TPC521	A	1	TP-P5	TP_DFR_TOUCH_PANEL_DETECT
TPC522	A	1	TP-P5	DFR_LID_OPEN_L
TPC515	A	1	TP-P5	
TPC520	A	1	TP-P5	
TPC527	A	1	TP-P5	SPI_DFR_MISO_R
TPC528	A	1	TP-P5	SPI_DFR_CS_L
TPC533	A	1	TP-P5	DFR_TOUCH_INT_L
TPC535	A	1	TP-P5	DFR_TOUCH_CLK32K_RESET_L
TPC534	A	1	TP-P5	I2C_DFR_SCL_R
TPC536	A	1	TP-P5	I2C_DFR_SDA_R
TPC538	A	1	TP-P5	DFR_TOUCH_RESET_L
TPC530	A	1	TP-P5	SPI_DFR_MOSI
TPC525	A	1	TP-P5	
TPC526	A	1	TP-P5	
TPC529	A	1	TP-P5	SPI_DFR_CLK
TPC539	A	1	TP-P5	TP_DFR_TOUCH_ROM_WC
TPC540	A	1	TP-P5	PP1V8_SLPS2RSW_DFR
TPC542	A	1	TP-P5	PP5V_G3S_DFR_FILT
TPC541	A	1	TP-P5	PP1V8_SLPS2RSW_DFR
TPC544	A	1	TP-P5	SPI_MESA_MISO_CONN
TPC543	A	1	TP-P5	PP1V8_MESA_CONN
TPC550	A	1	TP-P5	SPI_MESA_CLK_CONN
TPC531	A	1	TP-P5	
TPC532	A	1	TP-P5	
TPC546	A	1	TP-P5	MESA_INT_CONN
TPC547	A	1	TP-P5	SPI_MESA_MOSI_CONN
TPC548	A	1	TP-P5	MESA_BOOST_EN_CONN
TPC552	A	1	TP-P5	PP16V0_MESA_CONN
TPC537	A	1	TP-P5	
TPC554	A	1	TP-P5	PP3V0_MESA_CONN
TPC555	A	1	TP-P5	PP3V0_MESA_CONN
TPC545	A	1	TP-P5	
TPC553	A	1	TP-P5	

TBT/DP

TPC5L7	A	1	TP-P5	TBT_X_HDMI_DDC_DATA
TPC5L8	A	1	TP-P5	TBT_X_HDMI_DDC_CLK
TPC5L9	A	1	TP-P5	TBT_T_HDMI_DDC_DATA
TPC5N0	A	1	TP-P5	TBT_T_HDMI_DDC_CLK

FAN , Keyboard,Trackpad Test Points

TPC556	A	1	TP-P5	GND_FAN
TPC557	A	1	TP-P5	GND_FAN
TPC558	A	1	TP-P5	PP5V_G3S_FAN_CONN
TPC559	A	1	TP-P5	PP5V_G3S_FAN_CONN
TPC560	A	1	TP-P5	FAN_LT_TACH
TPC561	A	1	TP-P5	FAN_RT_TACH
TPC562	A	1	TP-P5	FAN_LT_PWM
TPC563	A	1	TP-P5	FAN_RT_PWM
TPC564	A	1	TP-P5	
TPC565	A	1	TP-P5	
TPC5Z1	A	1	TP-P5	GND_FAN
TPC5Z2	A	1	TP-P5	GND_FAN
TPC5Z9	A	1	TP-P5	I2C_TPAD3V3_SCL
TPC5Y0	A	1	TP-P5	TPAD_KBD_WAKE_L
TPC566	A	1	TP-P5	I2C_TPAD3V3_SDA
TPC567	A	1	TP-P5	TPAD3V3_ACTUATOR_DISABLE_L
TPC568	A	1	TP-P5	I2C_KBD_SDA
TPC569	A	1	TP-P5	TPAD3V3_SPI_INT_L
TPC5Z8	A	1	TP-P5	IPD_LID_OPEN
TPC5Z3	A	1	TP-P5	PP5V_G3S
TPC5Z4	A	1	TP-P5	PP5V_G3S
TPC5Z7	A	1	TP-P5	PMU_RSLOC_RST_R_L
TPC5Z5	A	1	TP-P5	PP3V3_G3H_RTC_X
TPC571	A	1	TP-P5	
TPC588	A	1	TP-P5	ACT_GND
TPC586	A	1	TP-P5	ACT_GND
TPC579	A	1	TP-P5	KBD_BLC_GSSOUT
TPC578	A	1	TP-P5	TPAD3V3_SPI_EN
TPC585	A	1	TP-P5	PP3V3_G3S_T
TPC584	A	1	TP-P5	PP3V3_G3S_T
TPC583	A	1	TP-P5	KBD_BLC_GSLAT
TPC582	A	1	TP-P5	PP5V_G3S_TPAD_CONN
TPC581	A	1	TP-P5	KBD_BLC_GSSCK
TPC580	A	1	TP-P5	SPI_TPAD3V3_CLK
TPC591	A	1	TP-P5	PPVIN_G3H_TPAD_FUSE
TPC590	A	1	TP-P5	PPVIN_G3H_TPAD_FUSE
TPC589	A	1	TP-P5	PPVIN_G3H_TPAD_FUSE
TPC577	A	1	TP-P5	KBD_BLC_GSSIN
TPC576	A	1	TP-P5	SPI_TPAD3V3_MISO
TPC575	A	1	TP-P5	KBD_BLC_XBLANK
TPC574	A	1	TP-P5	SPI_TPAD3V3_CS_L
TPC572	A	1	TP-P5	SPI_TPAD3V3_MOSI
TPC573	A	1	TP-P5	I2C_KBD_SCL
TPC587	A	1	TP-P5	
TPC5M0	A	1	TP-P5	KBD_INT_L

WIRELESS

TPC5H9	A	1	TP-P5	PP3V3_G3S_WLAN
TPC5I0	A	1	TP-P5	PP1V8_G3S_WLANBT_VDDIO
TPC5L0	A	1	TP-P5	PPVIN_RFLDO_WLANBT
TPC5L1	A	1	TP-P5	PP1V2_WLANBT
TPC5L2	A	1	TP-P5	PP1V5_WLANBT

HALL EFFECT

TPC5I1	A	1	TP-P5	LID_OPEN_LEFT
TPC5I2	A	1	TP-P5	LID_OPEN_RIGHT

MEMORY

TPC5I3	A	1	TP-P5	PVDDQ_PGOOD
TPC5I7	A	1	TP-P5	PP1V2_S3_CPUDDR

AUDIO

TPC592	A	1	TP-P5	AUD_DMIC0_CLK_CONN
TPC593	A	1	TP-P5	AUD_DMIC0_DATA_CONN
TPC594	A	1	TP-P5	PP1V8_DMIC
TPC595	A	1	TP-P5	AUD_DMIC1_CLK_CONN
TPC596	A	1	TP-P5	AUD_DMIC1_DATA_CONN
TPC597	A	1	TP-P5	
TPC5A1	A	1	TP-P5	SPKRCONN_LW_OUTN
TPC5B1	A	1	TP-P5	SPKRCONN_LW_OUTN
TPC5B4	A	1	TP-P5	SPKRCONN_LW_OUTN
TPC5A0	A	1	TP-P5	SPKRCONN_LW_OUTP
TPC5G0	A	1	TP-P5	SPKRCONN_LW_OUTP
TPC5G1	A	1	TP-P5	SPKRCONN_LW_OUTP
TPC598	A	1	TP-P5	SPKRCONN_LT_OUTN
TPC5G2	A	1	TP-P5	SPKRCONN_LT_OUTN
TPC5M3	A	1	TP-P5	SPKRCONN_LT_OUTN
TPC599	A	1	TP-P5	SPKRCONN_LT_OUTP
TPC5M4	A	1	TP-P5	SPKRCONN_LT_OUTP
TPC5M5	A	1	TP-P5	SPKRCONN_LT_OUTP
TPC5A6	A	1	TP-P5	SPKRCONN_RW_OUTP
TPC5G6	A	1	TP-P5	SPKRCONN_RW_OUTP
TPC5M7	A	1	TP-P5	SPKRCONN_RW_OUTP
TPC5Y9	A	1	TP-P5	SPKRCONN_RW_OUTN
TPC5G8	A	1	TP-P5	SPKRCONN_RW_OUTN
TPC5M9	A	1	TP-P5	SPKRCONN_RW_OUTN
TPC5A3	A	1	TP-P5	SPKRCONN_RT_OUTN
TPC5L3	A	1	TP-P5	SPKRCONN_RT_OUTN
TPC5L4	A	1	TP-P5	SPKRCONN_RT_OUTN
TPC5A4	A	1	TP-P5	SPKRCONN_RT_OUTP
TPC5L5	A	1	TP-P5	SPKRCONN_RT_OUTP
TPC5L6	A	1	TP-P5	SPKRCONN_RT_OUTP
TPC5B8	A	1	TP-P5	AUD_CONN_RING_SENSE
TPC5B7	A	1	TP-P5	AUD_CONN_RING2_XW
TPC5B6	A	1	TP-P5	AUD_CONN_TIP_SENSE
TPC5B5	A	1	TP-P5	AUD_CONN_HP_SENSE_R
TPC5A7	A	1	TP-P5	
TPC5B3	A	1	TP-P5	AUD_CONN_HP_SENSE_L
TPC5A8	A	1	TP-P5	AUD_CONN_HP_LEFT
TPC5A9	A	1	TP-P5	AUD_CONN_HP_RIGHT
TPC5B0	A	1	TP-P5	AUD_CONN_RING2
TPC5B2	A	1	TP-P5	AUD_CONN_SLEEVE
TPC5K0	A	1	TP-P5	
TPC5K1	A	1	TP-P5	AUD_CONN_SLEEVE_XW
TPC5A5	A	1	TP-P5	SPKR_ID0
TPC5A2	A	1	TP-P5	

EDP , CAMERA,ALS

TPC5C0	A	1	TP-P5	EDP_INT_AUX_N
TPC5C1	A	1	TP-P5	
TPC5C2	A	1	TP-P5	EDP_INT_AUX_P
TPC5C3	A	1	TP-P5	EDP_PANEL_PWR_BUF_EN
TPC5C4	A	1	TP-P5	
TPC5C9	A	1	TP-P5	TP_LCD_IRQ_L
TPC5C8	A	1	TP-P5	EDP_INT_ML_P<0>
TPC5C5	A	1	TP-P5	DP_INT_HPD
TPC5C6	A	1	TP-P5	EDP_INT_ML_N<0>
TPC5C7	A	1	TP-P5	LCD_FSS
TPC5D5	A	1	TP-P5	EDP_INT_ML_P<2>
TPC5D3	A	1	TP-P5	EDP_INT_ML_N<2>
TPC5D1	A	1	TP-P5	EDP_INT_ML_N<1>
TPC5D2	A	1	TP-P5	EDP_INT_ML_P<1>
TPC5D0	A	1	TP-P5	
TPC5D7	A	1	TP-P5	I2C_BKLT_SDA
TPC5E0	A	1	TP-P5	EDP_INT_ML_P<3>
TPC5D9	A	1	TP-P5	I2C_BKLT_SCL
TPC5D8	A	1	TP-P5	EDP_INT_ML_N<3>
TPC5D4	A	1	TP-P5	
TPC5E1	A	1	TP-P5	I2C_TCON_SDA
TPC5E4	A	1	TP-P5	MIPI_FTCAM_DATA_CONN_N<0>
TPC5D6	A	1	TP-P5	
TPC5E3	A	1	TP-P5	I2C_TCON_SCL
TPC5F2	A	1	TP-P5	I2C_CAM_ISOL_SDA
TPC5F1	A	1	TP-P5	MIPI_FTCAM_CLK_CONN_P
TPC5F0	A	1	TP-P5	I2C_CAM_ISOL_SCL
TPC5E9	A	1	TP-P5	MIPI_FTCAM_CLK_CONN_N
TPC5E8	A	1	TP-P5	I2C_ALS_SCL
TPC5E2	A	1	TP-P5	
TPC5E6	A	1	TP-P5	MIPI_FTCAM_DATA_CONN_P<0>
TPC5E7	A	1	TP-P5	I2C_ALS_SDA
TPC5F7	A	1	TP-P5	PP5V_S0_ALSCAM_F
TPC5E5	A	1	TP-P5	
TPC5F9	A	1	TP-P6	PPVIN_S0SW_LCDBKLT_R
TPC5F3	A	1	TP-P5	PPVOUT_S0_LCDBKLT
TPC5F4	A	1	TP-P5	PP3V3_S0SW_LCD
TPC5F6	A	1	TP-P5	PP5V_S0SW_LCD
TPC5F5	A	1	TP-P5	PP3V3_S0SW_LCD
TPC5F8	A	1	TP-P5	
TPC5M1	A	1	TP-P5	BKLT_PWM_MLB2TCON

USBC (PLACE NEAR CONNECTOR)

TPC5G3	A	1	TP-P5	TP_USBC_PP20V_XB
TPC5N3	A	1	TP-P5	TP_USBC_PP20V_XA
TPC5G4	A	1	TP-P5	USBC_XA_SBU1
TPC5G5	A	1	TP-P5	USBC_XA_SBU2
TPC5G7	A	1	TP-P5	USBC_XA_CC2_CONN
TPC5G9	A	1	TP-P5	PP20V_USBC_XB_VBUS
TPC5H0	A	1	TP-P5	PP20V_USBC_XA_VBUS
TPC5H1	A	1	TP-P5	TP_USBC_PP20V_TB
TPC5H2	A	1	TP-P5	TP_USBC_PP20V_TA
TPC5H3	A	1	TP-P5	PP20V_USBC_TB_VBUS
TPC5H4	A	1	TP-P5	PP20V_USBC_TA_VBUS
TPC5I8	A	1	TP-P5	PP20V_USBC_XA_VBUS
TPC5I9	A	1	TP-P5	PP20V_USBC_XA_VBUS
TPC5J1	A	1	TP-P5	PP20V_USBC_XB_VBUS
TPC5J0	A	1	TP-P5	PP20V_USBC_XA_VBUS
TPC5J2	A	1	TP-P5	PP20V_USBC_XB_VBUS
TPC5J3	A	1	TP-P5	PP20V_USBC_XB_VBUS
TPC5J4	A	1	TP-P5	PP20V_USBC_TA_VBUS
TPC5H5	A	1	TP-P5	
TPC5H6	A	1	TP-P5	
TPC5H7	A	1	TP-P5	
TPC5H8	A	1	TP-P5	
TPC5M2	A	1	TP-P5	
TPC5K2	A	1	TP-P5	
TPC5K3	A	1	TP-P5	
TPC5K4	A	1	TP-P5	
TPC5J5	A	1	TP-P5	PP20V_USBC_TA_VBUS
TPC5J6	A	1	TP-P5	PP20V_USBC_TA_VBUS
TPC5J7	A	1	TP-P5	PP20V_USBC_TB_VBUS
TPC5J8	A	1	TP-P5	PP20V_USBC_TB_VBUS
TPC5J9	A	1	TP-P5	PP20V_USBC_TB_VBUS
TPC5N9	A	1	TP-P5	USBC_XB_CC1_CONN
TPC5N8	A	1	TP-P5	USBC_XB_CC2_CONN
TPC5O1	A	1	TP-P5	USBC_TA_CC1_CONN
TPC5O2	A	1	TP-P5	USBC_TA_CC2_CONN
TPC5O3	A	1	TP-P5	USBC_TB_CC1_CONN
TPC5O4	A	1	TP-P5	USBC_TB_CC2_CONN

CORE OS DESBUG

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FCT TESTPOINTS 2

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ICT TEST POINTS, ICT BOUNDARY SCAN TESTPOINTS

CPU XDP and PCH Test-Points

18 6	IN	TRUE	XDP_CPU_TCK
18 13	IN	TRUE	XDP_PCH_TCK
18 6	IN	TRUE	XDP_CPU_TDI
18 6	IN	TRUE	XDP_CPU_TDO
18 13 6	IN	TRUE	XDP_CPU_TRST_L
18 6	IN	TRUE	XDP_CPU_TMS
18 13	IN	TRUE	XDP_PCH_TMS
18 13	IN	TRUE	XDP_PCH_TDI
18 13	IN	TRUE	XDP_PCH_TDO
18 13 6	IN	TRUE	XDP_CPU_PREQ_L
18 13 6	IN	TRUE	XDP_CPU_PRDY_L
119 46 35 12	IN	TRUE	PM_PCH_PWROK
119 46 18 12	IN	TRUE	PM_SYSRST_L
18 13	IN	TRUE	XDP_PCH_JTAGX
18 13	BI		PCH_ITP_PMODE FUNC_TEST=TRUE

H9M BOUNDARY SCAN TESTPOINTS ON FCT TESTPOINT PAGE

TP Debug ACE Nets (EE tests)

30	UPC_XA_GPIO0	TPC622
31	UPC_XB_GPIO0	TPC624
31	UPC_XB_GPIO1	TPC625
108	UPC_TA_GPIO0	TPC626
108	UPC_TA_GPIO1	TPC627
109	UPC_TB_GPIO0	TPC628
109	UPC_TB_GPIO1	TPC629

GPU ICT TESTPONTS

ACE

27 15	BI	JTAG_TBT_X_TMS FUNC_TEST=TRUE
107 105 27	BI	JTAG_ISP_TDI FUNC_TEST=TRUE
107 105 27	BI	JTAG_ISP_TCK FUNC_TEST=TRUE
107 105 27	BI	XDP_JTAG_ISP_TDO FUNC_TEST=TRUE
121 27	BI	TBT_X_TEST_EN FUNC_TEST=TRUE

WLAN

39 37	BI	WLAN_JTAG_TMS FUNC_TEST=TRUE
39 37	BI	WLAN_JTAG_TCK FUNC_TEST=TRUE
40 37	BI	WLAN_JTAG_TDI FUNC_TEST=TRUE
37 36	BI	WLAN_JTAG_TDO FUNC_TEST=TRUE
37 36	BI	WLAN_JTAG_TRST_L FUNC_TEST=TRUE
105 15	BI	JTAG_TBT_T_TMS FUNC_TEST=TRUE
39	BI	TP_JTAG_SOC_TRST_L FUNC_TEST=TRUE

GPU

103 102	BI	GPU_JTAG_TCK FUNC_TEST=TRUE
103 102	BI	GPU_JTAG_TDI FUNC_TEST=TRUE
103 102	BI	GPU_JTAG_TDO FUNC_TEST=TRUE
103 102	BI	GPU_JTAG_TMS FUNC_TEST=TRUE
103 102	BI	GPU_JTAG_TRST_L FUNC_TEST=TRUE
46 39	BI	SMC_PCH_SYS_PWROK FUNC_TEST=TRUE
46 39	BI	SMC_PCH_PWROK FUNC_TEST=TRUE
119 46 39	BI	SMC_SYSRST_L FUNC_TEST=TRUE
119 13 6	BI	CPU_PWRGD FUNC_TEST=TRUE
77 64 39 110	BI	PMU_COLD_RESET_L FUNC_TEST=TRUE
39	BI	SOC_JTAG_SEL FUNC_TEST=TRUE
38	BI	SOC_TESTMODE FUNC_TEST=TRUE
37 36	BI	WLAN_JTAG_SEL FUNC_TEST=TRUE
105	BI	TBT_T_TEST_EN FUNC_TEST=TRUE
121 27	BI	TBT_X_TEST_EN FUNC_TEST=TRUE

SSD BOUNDARY SCAN Test-Points

85 84 83 39 86	IN	TRUE	SSD0_SWDIO_UART_D2R
85 84 83 39 86	IN	TRUE	SSD0_SWCLK_UART_R2D
84 83	IN	TRUE	SSD0_S4E0_JTAG_TDO
83	IN	TRUE	SSD0_S4E0_JTAG_TDI
86 85 84 83	IN	TRUE	SSD0_S4E_JTAG_SEL
85 84	IN	TRUE	SSD0_S4E1_JTAG_TDO
121 86 85	IN	TRUE	SSD0_S4E2_JTAG_TDO
86	IN		SSD0_S4E3_JTAG_TDO
121 86 85	IN	TRUE	SSD0_S4E2_JTAG_TDO
90 89 88 39 91	IN	TRUE	SSD1_SWDIO_UART_D2R
90 89 88 39 91	IN	TRUE	SSD1_SWCLK_UART_R2D
89 88	IN	TRUE	SSD1_S4E0_JTAG_TDO
88	IN	TRUE	SSD1_S4E0_JTAG_TDI
91 90 89 88	IN	TRUE	SSD1_S4E_JTAG_SEL
90 89	IN	TRUE	SSD1_S4E1_JTAG_TDO
91 90	IN	TRUE	SSD1_S4E2_JTAG_TDO
91 89	IN	TRUE	SSD1_S4E3_JTAG_TDO

S4E

PPC603	PVDDCPUAWAKE_SW0
PPC604	PVDDCPUAWAKE_SW1
PPC605	PVDDCPUAWAKE_SW2
PPC606	PVDDCPUAWAKE_SW3
PPC607	PVCCPRIMCORE_SW0
PPC608	PVCCPRIMCORE_SW1
PPC609	P0V85LPDDR_SW0
PPC610	P0V85LPDDR_SW1
PPC611	P1V85LPS2R_SW0
PPC612	P1V1SLPS2R_SW0
PPC613	P1V1SLPS2R_SW1
PPC614	P0V9SLPDDR_SW0
PPC615	P0V9SLPDDR_SW1
PPC616	PVDDCPUSRAMAWAKE_SW0

All: 1 TP-P5 P3MM_SM, 75

EE TESTS SWE

53	ISNS_HS_COMPUTING_P TPC650
53	ISNS_HS_COMPUTING_N TPC651
53	ISNS_HS_OTHER5V_P TPC652
53	ISNS_HS_OTHER5V_N TPC653
53	ISNS_HS_3V3_X_P TPC654
53	ISNS_HS_3V3_X_N TPC655
53	ISNS_HS_3V3_T_P TPC656
53	ISNS_HS_3V3_T_N TPC657
81 53	ISNS_LCDBKLT_P TPC658
81 53	ISNS_LCDBKLT_N TPC659
54	ISNS_1V0_P TPC660
54	ISNS_1V0_N TPC661
74 54	ISNS_CPUDDR_P TPC662
74 54	ISNS_CPUDDR_N TPC663
54	ISNS_CPUVDDQ_P TPC664
54	ISNS_CPUVDDQ_N TPC665
54	CPUVR_ISNS_P TPC666
54	CPUVR_ISNS_N TPC667
54	ISNS_WLAN_N TPC668
54	ISNS_WLAN_P TPC669
54	ISNS_WL1V8_P TPC670
54	ISNS_WL1V8_N TPC671
82 55	ISNS_LCDPANEL_P TPC672
82 55	ISNS_LCDPANEL_N TPC673
56	ISNS_CALPE_P TPC674
56	ISNS_CALPE_N TPC675
56	CPUGT_ISNS_R_P TPC676
56	CPUGT_ISNS_R_N TPC677
71 56	CPUSA_ISNS_P TPC678
71 56	CPUSA_ISNS_N TPC679
78 56	ISNS_CPUVCCIO_POS TPC680
78 56	ISNS_CPUVCCIO_NEG TPC681
94	GFXIMVP_ISNS_R_N TPC682
94	GFXIMVP_ISNS_R_P TPC683
98 58	VDDCIS0_CS_P TPC684
98 58	VDDCIS0_CS_N TPC685
58	ISNS_GPU1V8_P TPC686
58	ISNS_GPU1V8_N TPC687
98 58	GPUFB_CS_P TPC688
98 58	GPUFB_CS_N TPC689
58	ISNS_GPUFBIC_P TPC6A0
58	ISNS_GPUFBIC_N TPC6A1
58	ISNS_GPU_HS_P TPC6A2
58	ISNS_GPU_HS_N TPC6A3
59 53	SMC_PBUS_VSENSE TPC6A4
59 58	PMU_CPU_VSENSE TPC6A5
59 58	PMU_GPU_CORE_VSENSE TPC6A6
58 56	EADC1_CPUGT_VSENSE TPC6A7
176 53 64 58 84	GND_CALPE_AVSS TPC6A8
58 56	EADC1_CPUSA_VSENSE TPC6A9
58 56	EADC2_GPU_VDDCI_VSENSE TPC6B0
55 54 58 56	GND_EADC2_COM TPC6B1
59 53	SMC_DCIN_VSENSE TPC6B2
68	CHGR_CSI_R_P TPC6B3
68	CHGR_CSI_R_N TPC6B4
68 55	CHGR_CSO_R_P TPC6B5
68 55	CHGR_CSO_R_N TPC6B6
55	ISNS_PPBUS_MAIN_SSD0_P TPC6B7
55	ISNS_PPBUS_MAIN_SSD0_N TPC6B8
55	ISNS_PPBUS_MAIN_SSD1_P TPC6B9

All: 1 TP-P5 TP

EE TESTS SWE -2

55	ISNS_PPBUS_MAIN_SSD1_N TPC6C0
55	ISNS_P3V3_G3W_SSD0_P TPC6C1
55	ISNS_P3V3_G3W_SSD0_N TPC6C2
55	ISNS_P3V3_G3W_SSD1_P TPC6C3
55	ISNS_P3V3_G3W_SSD1_N TPC6C4
55	ISNS_T139_P TPC6C7
55	ISNS_T139_N TPC6C8

All: 1 TP-P5 TP

WP pins of ROMs

36	BT_SFLASH_WP_L	TPC6D0
27	TBT_X_ROM_WP_L	TPC6D1
105	TBT_T_ROM_WP_L	TPC6D2
102	GPU_ROM_WP_L	TPC6D3
46	SPI_SOCROM_WP_L	TPC6D4

All: 1 TP-P5 TP, PLACE_SIDE=TOP

EE TESTS PCH

12	PCIE_CLK100M_DEBUG_N	TPC620
12	PCIE_CLK100M_DEBUG_P	TPC621
36 12	PCH_PCIE_CLK100M_WLAN_N	TPC631
36 12	PCH_PCIE_CLK100M_WLAN_P	TPC632
41 12	PCIE_CLK100M_SOC_N	PPC633
41 12	PCIE_CLK100M_SOC_P	PPC634

TPC620/621: PLACE_NEAR=U1200.AK6:25MM
PPC633/634: PLACE_NEAR=U3900.G12:25MM, P3MM_SM

S4E

TPC690A	SSD0_S4E0_UART_TX	83
TPC691A	SSD1_S4E0_UART_TX	88
TPC692A	SSD0_S4E1_UART_TX	84
TPC693A	SSD1_S4E1_UART_TX	89
TPC694A	SSD0_S4E2_UART_TX	85
TPC695A	SSD0_S4E3_UART_TX	86
TPC696A	SSD1_S4E3_UART_TX	91
TPC697A	SSD0_S4E1_DROOP_L	84
TPC698A	SSD1_S4E2_UART_TX	90
TPC699A	SSD0_CLKREQ2_L	41 47 85
TPC69AA	SSD0_S4E3_DROOP_L	86
TPC69BA	SSD1_S4E2_DROOP_L	85
TPC69CA	SSD0_CLKREQ3_L	41 47 86
TPC69DA	SSD0_S4E0_DROOP_L	83

All: TP-P5 1 TP-P5

PAGE TITLE
ICT, MAC-1 ,EE Testpoints

Apple Inc.

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REVISION 4.0.0
BRANCH evt-0
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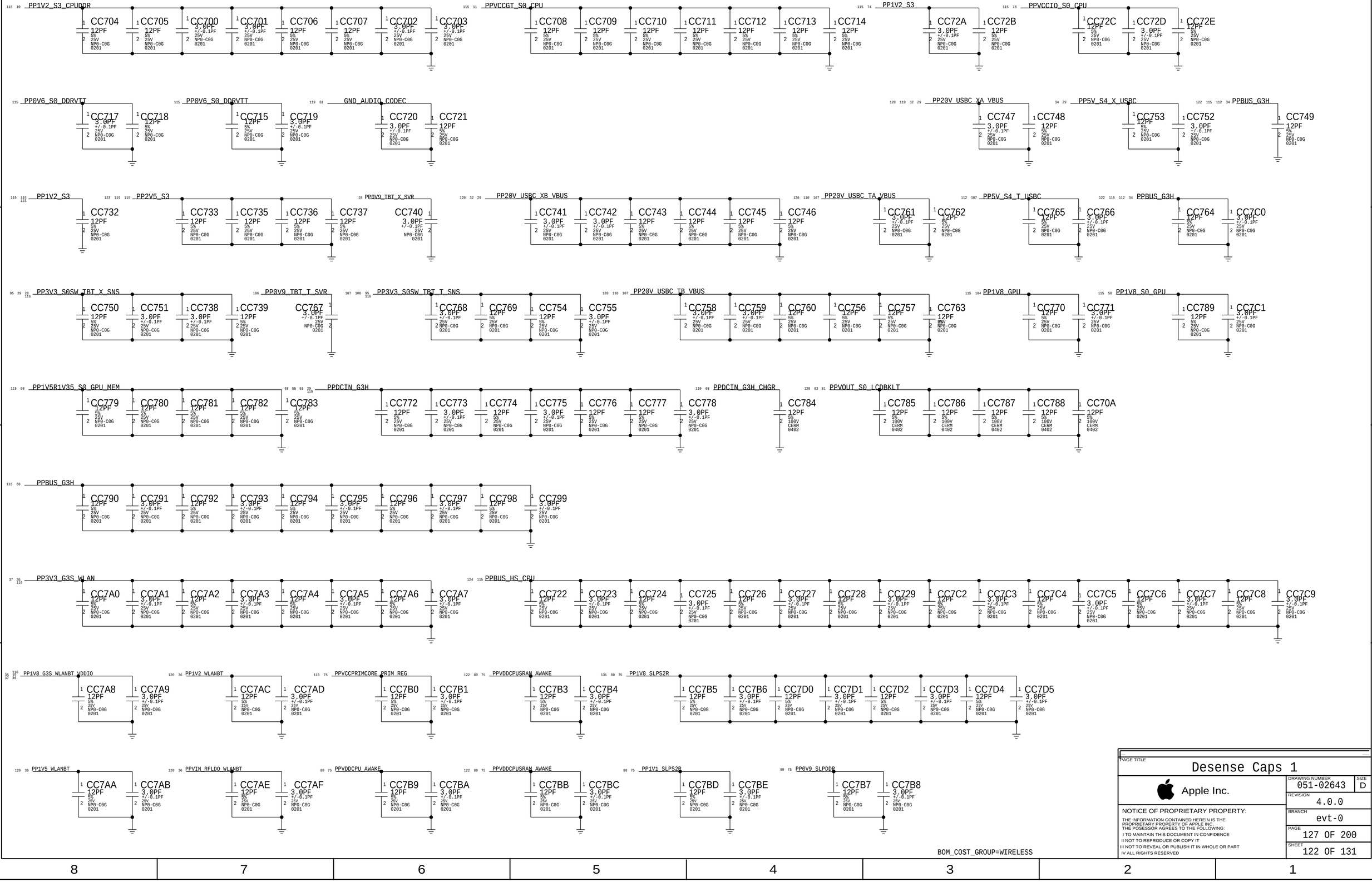
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CC704 12PF 5% 25V NP0-C0G 0201
CC705 12PF 5% 25V NP0-C0G 0201
CC700 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC701 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC706 12PF 5% 25V NP0-C0G 0201
CC707 12PF 5% 25V NP0-C0G 0201
CC702 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC703 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPVCCGT_S0_CPU
CC708 12PF 5% 25V NP0-C0G 0201
CC709 12PF 5% 25V NP0-C0G 0201
CC710 12PF 5% 25V NP0-C0G 0201
CC711 12PF 5% 25V NP0-C0G 0201
CC712 12PF 5% 25V NP0-C0G 0201
CC713 12PF 5% 25V NP0-C0G 0201
CC714 12PF 5% 25V NP0-C0G 0201
PP1V2_S3
CC72A 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC72B 12PF 5% 25V NP0-C0G 0201
PPVCCIO_S0_CPU
CC72C 12PF 5% 25V NP0-C0G 0201
CC72D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC72E 12PF 5% 25V NP0-C0G 0201
PP0V6_S0_DDRVTT
CC717 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC718 12PF 5% 25V NP0-C0G 0201
PP0V6_S0_DDRVTT
CC715 12PF 5% 25V NP0-C0G 0201
CC719 3.0PF +/-0.1PF 25V NP0-C0G 0201
GND_AUDIO_CODEC
CC720 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC721 12PF 5% 25V NP0-C0G 0201
PP20V_USBC_XA_VBUS
CC747 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC748 12PF 5% 25V NP0-C0G 0201
PP5V_S4_X_USBC
CC753 12PF 5% 25V NP0-C0G 0201
CC752 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPBUS_G3H
CC749 12PF 5% 25V NP0-C0G 0201
PP1V2_S3
CC732 12PF 5% 25V NP0-C0G 0201
PP2V5_S3
CC733 12PF 5% 25V NP0-C0G 0201
CC735 12PF 5% 25V NP0-C0G 0201
CC736 12PF 5% 25V NP0-C0G 0201
CC737 12PF 5% 25V NP0-C0G 0201
PP0V9_TBT_X_SVR
CC740 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP20V_USBC_XB_VBUS
CC741 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC742 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC743 12PF 5% 25V NP0-C0G 0201
CC744 12PF 5% 25V NP0-C0G 0201
CC745 12PF 5% 25V NP0-C0G 0201
CC746 12PF 5% 25V NP0-C0G 0201
PP20V_USBC_TA_VBUS
CC761 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC762 12PF 5% 25V NP0-C0G 0201
PP5V_S4_T_USBC
CC765 12PF 5% 25V NP0-C0G 0201
CC766 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPBUS_G3H
CC764 12PF 5% 25V NP0-C0G 0201
CC7C0 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP3V3_S0SW_TBT_X_SNS
CC750 12PF 5% 25V NP0-C0G 0201
CC751 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC738 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC739 12PF 5% 25V NP0-C0G 0201
PP0V9_TBT_T_SVR
CC767 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP3V3_S0SW_TBT_T_SNS
CC768 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC769 12PF 5% 25V NP0-C0G 0201
CC754 12PF 5% 25V NP0-C0G 0201
CC755 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP20V_USBC_TB_VBUS
CC758 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC759 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC760 12PF 5% 25V NP0-C0G 0201
CC756 12PF 5% 25V NP0-C0G 0201
CC757 12PF 5% 25V NP0-C0G 0201
CC763 12PF 5% 25V NP0-C0G 0201
PP1V8_GPU
CC770 12PF 5% 25V NP0-C0G 0201
CC771 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP1V8_S0_GPU
CC789 12PF 5% 25V NP0-C0G 0201
CC7C1 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP1V5R1V35_S0_GPU_MEM
CC779 12PF 5% 25V NP0-C0G 0201
CC780 12PF 5% 25V NP0-C0G 0201
CC781 12PF 5% 25V NP0-C0G 0201
CC782 12PF 5% 25V NP0-C0G 0201
CC783 12PF 5% 25V NP0-C0G 0201
PPDCIN_G3H
CC772 12PF 5% 25V NP0-C0G 0201
CC773 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC774 12PF 5% 25V NP0-C0G 0201
CC775 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC776 12PF 5% 25V NP0-C0G 0201
CC777 12PF 5% 25V NP0-C0G 0201
CC778 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPDCIN_G3H_CHGR
CC784 12PF 5% 100V CERM 0402
PPVOUT_S0_LCDBKLT
CC785 12PF 5% 100V CERM 0402
CC786 12PF 5% 100V CERM 0402
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CC788 12PF 5% 100V CERM 0402
CC70A 12PF 5% 100V CERM 0402
PPBUS_G3H
CC790 12PF 5% 25V NP0-C0G 0201
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CC792 12PF 5% 25V NP0-C0G 0201
CC793 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC794 12PF 5% 25V NP0-C0G 0201
CC795 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC796 12PF 5% 25V NP0-C0G 0201
CC797 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC798 12PF 5% 25V NP0-C0G 0201
CC799 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP3V3_G3S_WLAN
CC7A0 12PF 5% 25V NP0-C0G 0201
CC7A1 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7A2 12PF 5% 25V NP0-C0G 0201
CC7A3 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7A4 12PF 5% 25V NP0-C0G 0201
CC7A5 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7A6 12PF 5% 25V NP0-C0G 0201
CC7A7 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPBUS_HS_CPU
CC722 12PF 5% 25V NP0-C0G 0201
CC723 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC724 12PF 5% 25V NP0-C0G 0201
CC725 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC726 12PF 5% 25V NP0-C0G 0201
CC727 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC728 12PF 5% 25V NP0-C0G 0201
CC729 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7C2 12PF 5% 25V NP0-C0G 0201
CC7C3 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7C4 12PF 5% 25V NP0-C0G 0201
CC7C5 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7C6 12PF 5% 25V NP0-C0G 0201
CC7C7 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7C8 12PF 5% 25V NP0-C0G 0201
CC7C9 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP1V8_G3S_WLANBT_VDDIO
CC7A8 12PF 5% 25V NP0-C0G 0201
CC7A9 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP1V2_WLANBT
CC7AC 12PF 5% 25V NP0-C0G 0201
CC7AD 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPVCCPRIMCORE_PRIM_REG
CC7B0 12PF 5% 25V NP0-C0G 0201
CC7B1 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPVDDCPUSRAM_AWAKE
CC7B3 12PF 5% 25V NP0-C0G 0201
CC7B4 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP1V8_SLPS2R
CC7B5 12PF 5% 25V NP0-C0G 0201
CC7B6 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7D0 12PF 5% 25V NP0-C0G 0201
CC7D1 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7D2 12PF 5% 25V NP0-C0G 0201
CC7D3 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC7D4 12PF 5% 25V NP0-C0G 0201
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PP1V5_WLANBT
CC7AA 12PF 5% 25V NP0-C0G 0201
CC7AB 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPVIN_RFLDO_WLANBT
CC7AE 12PF 5% 25V NP0-C0G 0201
CC7AF 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPVDDCPU_AWAKE
CC7B9 12PF 5% 25V NP0-C0G 0201
CC7BA 3.0PF +/-0.1PF 25V NP0-C0G 0201
PPVDDCPUSRAM_AWAKE
CC7BB 12PF 5% 25V NP0-C0G 0201
CC7BC 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP1V1_SLPS2R
CC7BD 12PF 5% 25V NP0-C0G 0201
CC7BE 3.0PF +/-0.1PF 25V NP0-C0G 0201
PP0V9_SLPDDR
CC7B7 12PF 5% 25V NP0-C0G 0201
CC7B8 3.0PF +/-0.1PF 25V NP0-C0G 0201
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PAGE TITLE
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Apple Inc.
DRAWING NUMBER 051-02643
SIZE D
REVISION 4.0.0
BRANCH evt-0
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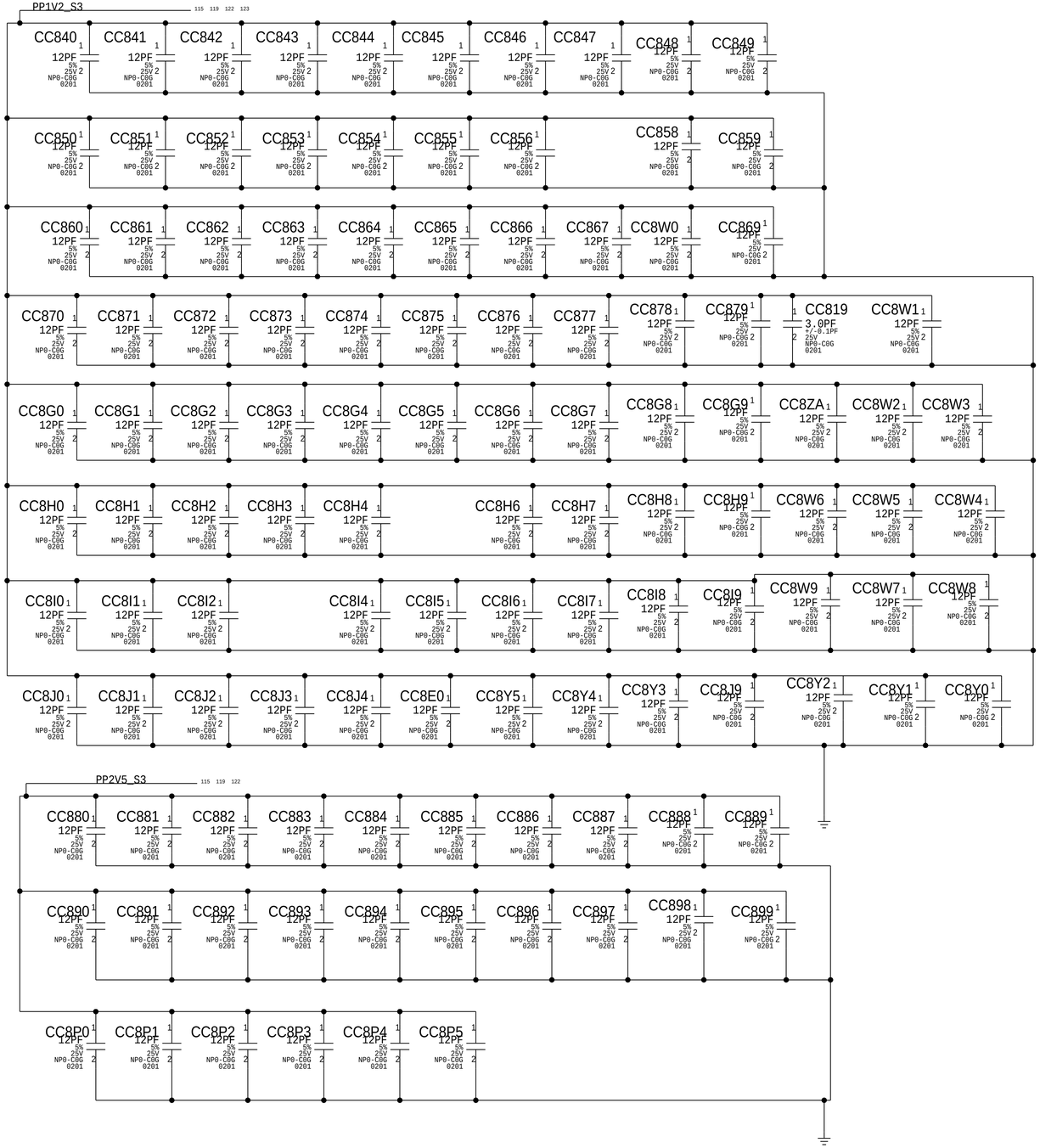
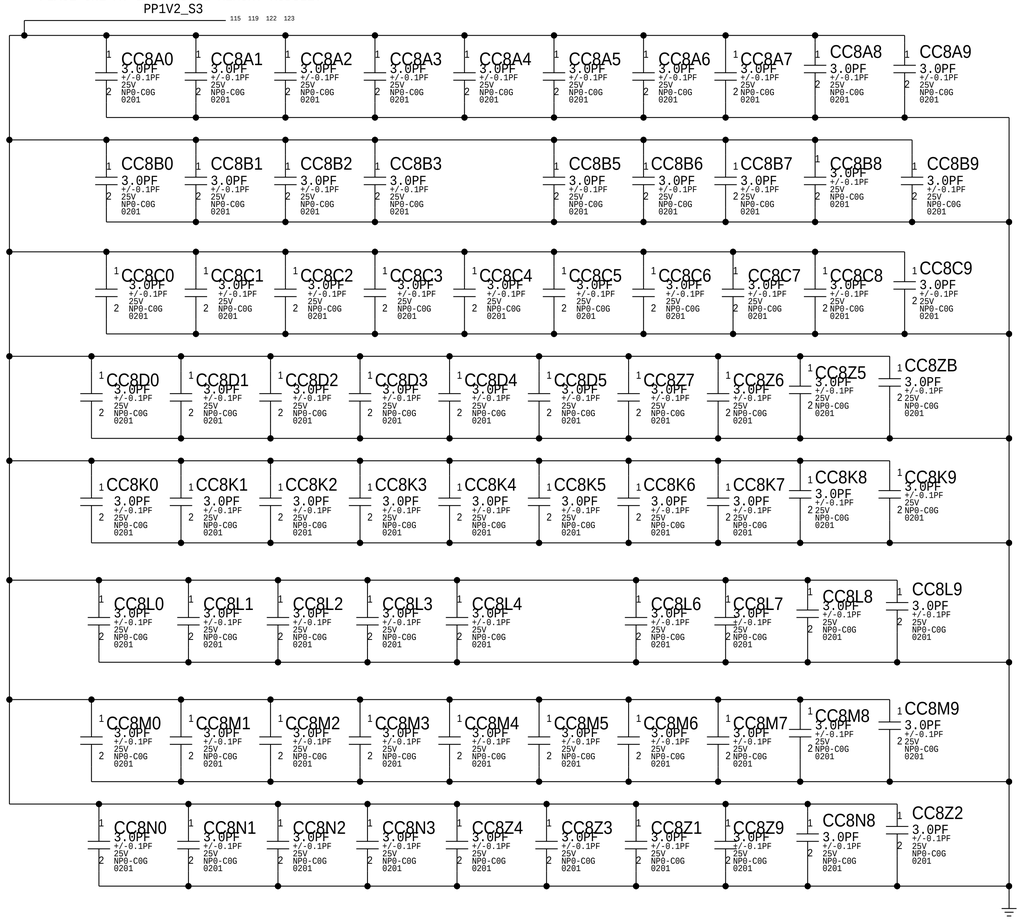


FOR DESENSE IMPROVEMENT
PLACE ONE AT EACH DDR3L MEMORY MODULE.



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PAGE TITLE	Desense Caps 2
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DRAWING NUMBER	051-02643
SIZE	D
REVISION	4.0.0
BRANCH	evt-0
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Near NAND IC's

PP1V8_SSD0

CC900 12PF 5% 25V NP0-C0G 0201
CC901 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC902 12PF 5% 25V NP0-C0G 0201
CC903 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC904 12PF 5% 25V NP0-C0G 0201
CC905 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC906 12PF 5% 25V NP0-C0G 0201
CC907 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP0V9_SSD0

CC908 12PF 5% 25V NP0-C0G 0201
CC909 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC90A 12PF 5% 25V NP0-C0G 0201
CC90B 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC90C 12PF 5% 25V NP0-C0G 0201
CC90D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC90E 12PF 5% 25V NP0-C0G 0201
CC90F 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP2V5_NAND_SSD0

CC910 12PF 5% 25V NP0-C0G 0201
CC911 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC912 12PF 5% 25V NP0-C0G 0201
CC913 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC914 12PF 5% 25V NP0-C0G 0201
CC915 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC916 12PF 5% 25V NP0-C0G 0201
CC917 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near NAND IC's

PP1V8_SSD1

CC918 12PF 5% 25V NP0-C0G 0201
CC919 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC91A 12PF 5% 25V NP0-C0G 0201
CC91B 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC91C 12PF 5% 25V NP0-C0G 0201
CC91D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC91E 12PF 5% 25V NP0-C0G 0201
CC91F 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP0V9_SSD1

CC920 12PF 5% 25V NP0-C0G 0201
CC921 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC922 12PF 5% 25V NP0-C0G 0201
CC923 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC924 12PF 5% 25V NP0-C0G 0201
CC925 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC926 12PF 5% 25V NP0-C0G 0201
CC927 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP2V5_NAND_SSD1

CC928 12PF 5% 25V NP0-C0G 0201
CC929 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC92A 12PF 5% 25V NP0-C0G 0201
CC92B 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC92C 12PF 5% 25V NP0-C0G 0201
CC92D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC92E 12PF 5% 25V NP0-C0G 0201
CC92F 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near NAND VR's

PP1V8_SSD0

CC930 12PF 5% 25V NP0-C0G 0201
CC931 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP1V8_SSD1

CC932 12PF 5% 25V NP0-C0G 0201
CC933 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP0V9_SSD0

CC934 12PF 5% 25V NP0-C0G 0201
CC935 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP0V9_SSD1

CC936 12PF 5% 25V NP0-C0G 0201
CC937 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP2V5_NAND_SSD0

CC938 12PF 5% 25V NP0-C0G 0201
CC939 3.0PF +/-0.1PF 25V NP0-C0G 0201

PP2V5_NAND_SSD1

CC93A 12PF 5% 25V NP0-C0G 0201
CC93B 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near GMUX

PP3V3_S5

CC93C 12PF 5% 25V NP0-C0G 0201
CC93D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC93E 12PF 5% 25V NP0-C0G 0201
CC93F 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near VRAMS

PP1V5R1V35_S0_GPU_MEM

CC940 12PF 5% 25V NP0-C0G 0201
CC941 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC942 12PF 5% 25V NP0-C0G 0201
CC943 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC944 12PF 5% 25V NP0-C0G 0201
CC945 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC946 12PF 5% 25V NP0-C0G 0201
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CC948 12PF 5% 25V NP0-C0G 0201
CC949 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC94A 12PF 5% 25V NP0-C0G 0201
CC94B 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC94C 12PF 5% 25V NP0-C0G 0201
CC94D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC94E 12PF 5% 25V NP0-C0G 0201
CC94F 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near GPU

PP1V5R1V35_S0_GPU_IC

CC950 12PF 5% 25V NP0-C0G 0201
CC951 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC952 12PF 5% 25V NP0-C0G 0201
CC953 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near GPU

PPVCORE_S0_GPU

CC954 12PF 5% 25V NP0-C0G 0201
CC955 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC956 12PF 5% 25V NP0-C0G 0201
CC957 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC958 12PF 5% 25V NP0-C0G 0201
CC959 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC95A 12PF 5% 25V NP0-C0G 0201
CC95B 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC95C 12PF 5% 25V NP0-C0G 0201
CC95D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC95E 12PF 5% 25V NP0-C0G 0201
CC95F 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near GPU

PP1V8_S0_GPU_LC_IC

CC960 12PF 5% 25V NP0-C0G 0201
CC961 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC962 12PF 5% 25V NP0-C0G 0201
CC963 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near GPU

PPVDDCI_S0_GPU

CC964 12PF 5% 25V NP0-C0G 0201
CC965 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC966 12PF 5% 25V NP0-C0G 0201
CC967 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC968 12PF 5% 25V NP0-C0G 0201
CC969 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC96A 12PF 5% 25V NP0-C0G 0201
CC96B 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC96C 12PF 5% 25V NP0-C0G 0201
CC96D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC96E 12PF 5% 25V NP0-C0G 0201
CC96F 3.0PF +/-0.1PF 25V NP0-C0G 0201

Near Power Shape Top Side

PPBUS_HS_CPU

CC970 12PF 5% 25V NP0-C0G 0201
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CC975 3.0PF +/-0.1PF 25V NP0-C0G 0201
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CC978 12PF 5% 25V NP0-C0G 0201
CC979 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC97A 12PF 5% 25V NP0-C0G 0201
CC97B 3.0PF +/-0.1PF 25V NP0-C0G 0201

PPBUS_HS_GPU

CC97C 12PF 5% 25V NP0-C0G 0201
CC97D 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC97E 12PF 5% 25V NP0-C0G 0201
CC97F 3.0PF +/-0.1PF 25V NP0-C0G 0201
CC980 12PF 5% 25V NP0-C0G 0201
CC981 3.0PF +/-0.1PF 25V NP0-C0G 0201

GFXIMVP_LGATE1

CC987 3.0PF +/-0.1PF 25V NP0-C0G 0201

GFXIMVP_PHASE2

CC988 3.0PF +/-0.1PF 25V NP0-C0G 0201

GFXIMVP_PHASE3

CC98B 3.0PF +/-0.1PF 25V NP0-C0G 0201

PPVCORE_S0_GPU

CC98C 3.0PF +/-0.1PF 25V NP0-C0G 0201

GFXIMVP_PHASE1

CC989 3.0PF +/-0.1PF 25V NP0-C0G 0201

PPVCORE_S0_GFX_PH1

CC98D 3.0PF +/-0.1PF 25V NP0-C0G 0201

PPVCORE_S0_GFX_PH2

CC98E 3.0PF +/-0.1PF 25V NP0-C0G 0201

PPVCORE_S0_GFX_PH3

CC98F 3.0PF +/-0.1PF 25V NP0-C0G 0201

BOM_COST_GROUP=WIRELESS

PAGE TITLE: Desense Caps 3

Apple Inc.

DRAWING NUMBER: 051-02643
SIZE: D
REVISION: 4.0.0
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DDR4 COMMAND/ADDRESS

Memory Bit/Byte Swizzle

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SYNC_MASTER=j380_mlb SYNC_DATE=02/09/2017

PAGE TITLE

Memory Bite/Byte Swizzle

Apple Inc.

DRAWING NUMBER 051-02643

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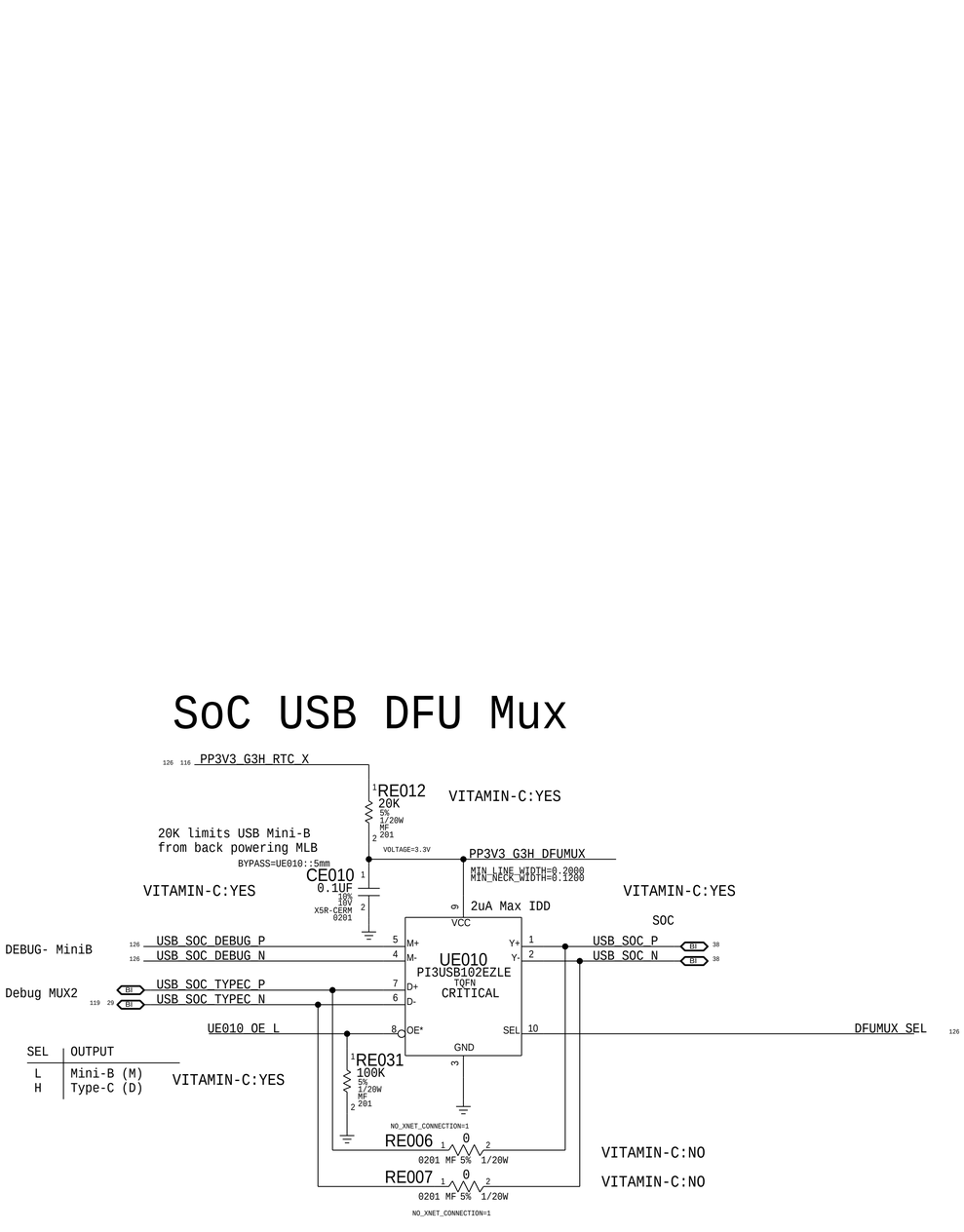

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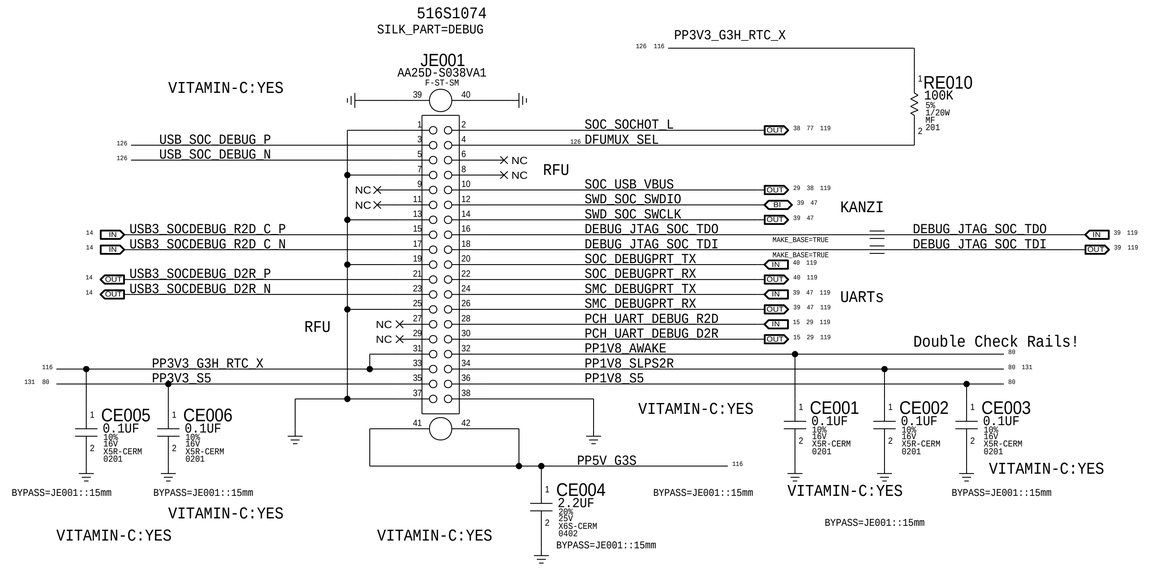

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SYNC_MASTER=Debug SYNC_DATE=05/03/2017

PAGE TITLE

Dev Support

Apple Inc.

DRAWING NUMBER 051-02643 SIZE D

REVISION 4.0.0

BRANCH evt-0

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2.2GHZ CPU, 16GB DRAM, PRX GPU, 256GB S4E

EEEE

BOM NUMBER	BOM NAME	BOM OPTIONS
JP4D	639-05681	MLB,2.2GHZ,MC-16,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4F	639-05682	MLB,2.2GHZ,MC-16,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4G	639-05683	MLB,2.2GHZ,HY-16,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4H	639-05684	MLB,2.2GHZ,HY-16,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, PRX GPU, 512GB S4E

EEEE

BOM NUMBER	BOM NAME	BOM OPTIONS
JP4J	639-05685	MLB,2.2GHZ,MC-16,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4L	639-05686	MLB,2.2GHZ,MC-16,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4M	639-05687	MLB,2.2GHZ,HY-16,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4P	639-05688	MLB,2.2GHZ,HY-16,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, PRX GPU, 1TB S4E

EEEE

BOM NUMBER	BOM NAME	BOM OPTIONS
JP4R	639-05689	MLB,2.2GHZ,MC-16,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4Q	639-05690	MLB,2.2GHZ,MC-16,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4W	639-05691	MLB,2.2GHZ,HY-16,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2
JP4X	639-05692	MLB,2.2GHZ,HY-16,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, PRX GPU, 2TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP4Y	639-05693	MLB,2.2GHZ,MC-16,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP50	639-05694	MLB,2.2GHZ,MC-16,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP51	639-05695	MLB,2.2GHZ,MC-16,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP52	639-05696	MLB,2.2GHZ,HY-16,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2
JP53	639-05697	MLB,2.2GHZ,HY-16,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.2
JP54	639-05698	MLB,2.2GHZ,HY-16,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_16G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, PRX GPU, 4TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP55	639-05699	MLB,2.2GHZ,MC-16,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
JP56	639-05700	MLB,2.2GHZ,HY-16,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_16G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, PRX GPU, 256GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP5Y	639-05721	MLB,2.2GHZ,MC-32,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP60	639-05722	MLB,2.2GHZ,MC-32,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP61	639-05723	MLB,2.2GHZ,HY-32,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2
JP62	639-05724	MLB,2.2GHZ,HY-32,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, PRX GPU, 512GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP63	639-05725	MLB,2.2GHZ,MC-32,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP64	639-05726	MLB,2.2GHZ,MC-32,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP65	639-05727	MLB,2.2GHZ,HY-32,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2
JP66	639-05728	MLB,2.2GHZ,HY-32,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, PRX GPU, 1TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP67	639-05729	MLB,2.2GHZ,MC-32,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP68	639-05730	MLB,2.2GHZ,MC-32,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP69	639-05731	MLB,2.2GHZ,HY-32,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6C	639-05732	MLB,2.2GHZ,HY-32,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, PRX GPU, 2TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP6D	639-05733	MLB,2.2GHZ,MC-32,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6F	639-05734	MLB,2.2GHZ,MC-32,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6G	639-05735	MLB,2.2GHZ,MC-32,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6H	639-05736	MLB,2.2GHZ,HY-32,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6J	639-05737	MLB,2.2GHZ,HY-32,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6K	639-05738	MLB,2.2GHZ,HY-32,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_32G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, PRX GPU, 4TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP6L	639-05739	MLB,2.2GHZ,MC-32,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_32G,BAFFIN_PROX,CPU_CFL:2.2
JP6M	639-05740	MLB,2.2GHZ,HY-32,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_32G,BAFFIN_PROX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, ULX GPU, 4TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP79	639-05759	MLB,2.2GHZ,MC-32,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP7C	639-05760	MLB,2.2GHZ,HY-32,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_32G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, ULX GPU, 256GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP57	639-05701	MLB,2.2GHZ,MC-16,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP58	639-05702	MLB,2.2GHZ,MC-16,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP59	639-05703	MLB,2.2GHZ,HY-16,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5C	639-05704	MLB,2.2GHZ,HY-16,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, ULX GPU, 512GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP5D	639-05705	MLB,2.2GHZ,MC-16,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5F	639-05706	MLB,2.2GHZ,MC-16,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5G	639-05707	MLB,2.2GHZ,HY-16,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5H	639-05708	MLB,2.2GHZ,HY-16,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, ULX GPU, 1TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP5J	639-05709	MLB,2.2GHZ,MC-16,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5K	639-05710	MLB,2.2GHZ,MC-16,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5L	639-05711	MLB,2.2GHZ,HY-16,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5M	639-05712	MLB,2.2GHZ,HY-16,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, ULX GPU, 2TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP5N	639-05713	MLB,2.2GHZ,MC-16,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5P	639-05714	MLB,2.2GHZ,MC-16,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5Q	639-05715	MLB,2.2GHZ,MC-16,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5R	639-05716	MLB,2.2GHZ,HY-16,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5T	639-05717	MLB,2.2GHZ,HY-16,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5V	639-05718	MLB,2.2GHZ,HY-16,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_16G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 16GB DRAM, ULX GPU, 4TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP5W	639-05719	MLB,2.2GHZ,MC-16,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_16G,BAFFIN_ULX,CPU_CFL:2.2
JP5X	639-05720	MLB,2.2GHZ,HY-16,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_16G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, ULX GPU, 256GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP6N	639-05741	MLB,2.2GHZ,MC-32,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP6P	639-05742	MLB,2.2GHZ,MC-32,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP6Q	639-05743	MLB,2.2GHZ,HY-32,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2
JP6R	639-05744	MLB,2.2GHZ,HY-32,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, ULX GPU, 512GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP6T	639-05745	MLB,2.2GHZ,MC-32,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP6V	639-05746	MLB,2.2GHZ,MC-32,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP6W	639-05747	MLB,2.2GHZ,HY-32,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2
JP6X	639-05748	MLB,2.2GHZ,HY-32,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, ULX GPU, 1TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP6Y	639-05749	MLB,2.2GHZ,MC-32,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP70	639-05750	MLB,2.2GHZ,MC-32,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP71	639-05751	MLB,2.2GHZ,HY-32,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2
JP72	639-05752	MLB,2.2GHZ,HY-32,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2

2.2GHZ CPU, 32GB DRAM, ULX GPU, 2TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
JP73	639-05753	MLB,2.2GHZ,MC-32,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP74	639-05754	MLB,2.2GHZ,MC-32,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP75	639-05755	MLB,2.2GHZ,MC-32,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_32G,BAFFIN_ULX,CPU_CFL:2.2
JP76	639-05756	MLB,2.2GHZ,HY-32,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2
JP77	639-05757	MLB,2.2GHZ,HY-32,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.2
JP78	639-05758	MLB,2.2GHZ,HY-32,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_32G,BAFFIN_ULX,CPU_CFL:2.2

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BOM-639 2.2GHz

Apple Inc.

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2.6GHZ CPU, 16GB DRAM, ULX GPU, 512GB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05761	MLB,2.6GHZ,MC-16,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05762	MLB,2.6GHZ,MC-16,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05763	MLB,2.6GHZ,HY-16,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05764	MLB,2.6GHZ,HY-16,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.6

JP7D
JP7F
JP7G
JP7H

2.6GHZ CPU, 16GB DRAM, ULX GPU, 1TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05765	MLB,2.6GHZ,MC-16,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05766	MLB,2.6GHZ,MC-16,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05767	MLB,2.6GHZ,HY-16,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05768	MLB,2.6GHZ,HY-16,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.6

JP7J
JP7K
JP7L
JP7M

2.6GHZ CPU, 16GB DRAM, ULX GPU, 2TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05769	MLB,2.6GHZ,MC-16,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05770	MLB,2.6GHZ,MC-16,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05771	MLB,2.6GHZ,MC-16,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05772	MLB,2.6GHZ,HY-16,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05773	MLB,2.6GHZ,HY-16,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05774	MLB,2.6GHZ,HY-16,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_16G,BAFFIN_ULX,CPU_CFL:2.6

JP7N
JP7P
JP7Q
JP7R
JP7T
JP7V

2.6GHZ CPU, 16GB DRAM, ULX GPU, 4TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05775	MLB,2.6GHZ,MC-16,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_16G,BAFFIN_ULX,CPU_CFL:2.6
639-05776	MLB,2.6GHZ,HY-16,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_16G,BAFFIN_ULX,CPU_CFL:2.6

JP7W
JP7X

2.6GHZ CPU, 32GB DRAM, ULX GPU, 512GB S4E

EEEE

BOM NUMBER	BOM NAME	BOM OPTIONS
639-05777	MLB,2.6GHZ,MC-32,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05778	MLB,2.6GHZ,MC-32,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05779	MLB,2.6GHZ,HY-32,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05780	MLB,2.6GHZ,HY-32,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.6

JP7Y
JP80
JP81
JP82

2.6GHZ CPU, 32GB DRAM, ULX GPU, 1TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05781	MLB,2.6GHZ,MC-32,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05782	MLB,2.6GHZ,MC-32,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05783	MLB,2.6GHZ,HY-32,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05784	MLB,2.6GHZ,HY-32,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.6

JP83
JP84
JP85
JP86

2.6GHZ CPU, 32GB DRAM, ULX GPU, 2TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05785	MLB,2.6GHZ,MC-32,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05786	MLB,2.6GHZ,MC-32,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05787	MLB,2.6GHZ,MC-32,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05788	MLB,2.6GHZ,HY-32,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05789	MLB,2.6GHZ,HY-32,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05790	MLB,2.6GHZ,HY-32,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_32G,BAFFIN_ULX,CPU_CFL:2.6

JP87
JP88
JP89
JP8C
JP8D
JP8F

2.6GHZ CPU, 32GB DRAM, ULX GPU, 4TB S4E

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BOM NUMBER	BOM NAME	BOM OPTIONS
639-05791	MLB,2.6GHZ,MC-32,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_32G,BAFFIN_ULX,CPU_CFL:2.6
639-05792	MLB,2.6GHZ,HY-32,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_32G,BAFFIN_ULX,CPU_CFL:2.6

JP8G
JP8H

2.2GHZ CPU, 16GB DRAM, PRX GPU, 2TB S4E TLC

BOM NUMBER	BOM NAME	BOM OPTIONS
939-05880	MLB,2.2GHZ,MC-16,PRX,TLC-WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_TLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2
939-05879	MLB,2.2GHZ,MC-16,PRX,TLC-TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_TLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.2

DC-DC BOMs

BOM NUMBER	BOM NAME	BOM OPTIONS
939-04900	MLB,CPU-SK-S,NO_GPU,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,BOM_8L,CPU_SKL:SOCKET
939-04901	MLB,NO_CPU,GPU-SK-S,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,BOM_8L,STARDUST:VDDC
939-04904	MLB,NO_CPU,GPU-SK-M,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,BOM_8L,STARDUST:VDDCI_MVDD
939-04902	MLB,NO_CPU,NO_GPU,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,BOM_8L

SYNC_MASTER=j380_mlb SYNC_DATE=02/09/2017

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BOM-639 2.6GHz

Apple Inc.

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2.9GHZ CPU, 16GB DRAM, PRX GPU, 256GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP8J	639-05793	MLB,2.9GHZ,MC-16,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8K	639-05794	MLB,2.9GHZ,MC-16,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8L	639-05795	MLB,2.9GHZ,HY-16,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8M	639-05796	MLB,2.9GHZ,HY-16,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, PRX GPU, 512GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP8N	639-05797	MLB,2.9GHZ,MC-16,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8P	639-05798	MLB,2.9GHZ,MC-16,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8Q	639-05799	MLB,2.9GHZ,HY-16,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8R	639-05800	MLB,2.9GHZ,HY-16,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, PRX GPU, 1TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP8T	639-05801	MLB,2.9GHZ,MC-16,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8V	639-05802	MLB,2.9GHZ,MC-16,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8X	639-05803	MLB,2.9GHZ,HY-16,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9
JP8Y	639-05804	MLB,2.9GHZ,HY-16,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, PRX GPU, 2TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP90	639-05805	MLB,2.9GHZ,MC-16,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP91	639-05806	MLB,2.9GHZ,MC-16,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP92	639-05807	MLB,2.9GHZ,MC-16,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP93	639-05808	MLB,2.9GHZ,HY-16,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9
JP94	639-05809	MLB,2.9GHZ,HY-16,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_16G,BAFFIN_PROX,CPU_CFL:2.9
JP95	639-05810	MLB,2.9GHZ,HY-16,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_16G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, PRX GPU, 4TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP96	639-05811	MLB,2.9GHZ,MC-16,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_16G,BAFFIN_PROX,CPU_CFL:2.9
JP97	639-05812	MLB,2.9GHZ,HY-16,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_16G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, PRX GPU, 256GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP9Y	639-05833	MLB,2.9GHZ,MC-32,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC0	639-05834	MLB,2.9GHZ,MC-32,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC1	639-05835	MLB,2.9GHZ,HY-32,PRX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC2	639-05836	MLB,2.9GHZ,HY-32,PRX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, PRX GPU, 512GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPC3	639-05837	MLB,2.9GHZ,MC-32,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC4	639-05838	MLB,2.9GHZ,MC-32,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC5	639-05839	MLB,2.9GHZ,HY-32,PRX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC6	639-05840	MLB,2.9GHZ,HY-32,PRX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, PRX GPU, 1TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPC7	639-05841	MLB,2.9GHZ,MC-32,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC8	639-05842	MLB,2.9GHZ,MC-32,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPC9	639-05843	MLB,2.9GHZ,HY-32,PRX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCD	639-05844	MLB,2.9GHZ,HY-32,PRX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, PRX GPU, 2TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPCF	639-05845	MLB,2.9GHZ,MC-32,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCG	639-05846	MLB,2.9GHZ,MC-32,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCH	639-05847	MLB,2.9GHZ,MC-32,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCJ	639-05848	MLB,2.9GHZ,HY-32,PRX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCL	639-05849	MLB,2.9GHZ,HY-32,PRX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCM	639-05850	MLB,2.9GHZ,HY-32,PRX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_32G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, PRX GPU, 4TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPCN	639-05851	MLB,2.9GHZ,MC-32,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_32G,BAFFIN_PROX,CPU_CFL:2.9
JPCQ	639-05852	MLB,2.9GHZ,HY-32,PRX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_32G,BAFFIN_PROX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, ULX GPU, 4TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPDF	639-05871	MLB,2.9GHZ,MC-32,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPDG	639-05872	MLB,2.9GHZ,HY-32,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_32G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, ULX GPU, 256GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP97	639-05813	MLB,2.9GHZ,MC-16,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP98	639-05814	MLB,2.9GHZ,MC-16,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP99	639-05815	MLB,2.9GHZ,HY-16,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9C	639-05816	MLB,2.9GHZ,HY-16,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, ULX GPU, 512GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP9D	639-05817	MLB,2.9GHZ,MC-16,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9F	639-05818	MLB,2.9GHZ,MC-16,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9G	639-05819	MLB,2.9GHZ,HY-16,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9H	639-05820	MLB,2.9GHZ,HY-16,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, ULX GPU, 1TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP9J	639-05821	MLB,2.9GHZ,MC-16,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9K	639-05822	MLB,2.9GHZ,MC-16,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9L	639-05823	MLB,2.9GHZ,HY-16,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9M	639-05824	MLB,2.9GHZ,HY-16,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, ULX GPU, 2TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP9N	639-05825	MLB,2.9GHZ,MC-16,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9P	639-05826	MLB,2.9GHZ,MC-16,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9Q	639-05827	MLB,2.9GHZ,MC-16,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9R	639-05828	MLB,2.9GHZ,HY-16,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9T	639-05829	MLB,2.9GHZ,HY-16,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9V	639-05830	MLB,2.9GHZ,HY-16,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_16G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 16GB DRAM, ULX GPU, 4TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JP9W	639-05831	MLB,2.9GHZ,MC-16,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,MC_16G,BAFFIN_ULX,CPU_CFL:2.9
JP9X	639-05832	MLB,2.9GHZ,HY-16,ULX,SM-4TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_4TB_3DV4,HY_16G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, ULX GPU, 256GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPCR	639-05853	MLB,2.9GHZ,MC-32,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPCT	639-05854	MLB,2.9GHZ,MC-32,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPCV	639-05855	MLB,2.9GHZ,HY-32,ULX,WD-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_256_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9
JPCW	639-05856	MLB,2.9GHZ,HY-32,ULX,TS-256,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_256_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, ULX GPU, 512GB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPCX	639-05857	MLB,2.9GHZ,MC-32,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPCY	639-05858	MLB,2.9GHZ,MC-32,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD0	639-05859	MLB,2.9GHZ,HY-32,ULX,WD-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,WD_512_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD1	639-05860	MLB,2.9GHZ,HY-32,ULX,TS-512,X1190	ALTERNATE,BASE_BOM,DEVEL_BOM,TS_512_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, ULX GPU, 1TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPD2	639-05861	MLB,2.9GHZ,MC-32,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD3	639-05862	MLB,2.9GHZ,MC-32,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD4	639-05863	MLB,2.9GHZ,HY-32,ULX,WD-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,WD_1TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD5	639-05864	MLB,2.9GHZ,HY-32,ULX,TS-1TB,X1190	ALTERNATE,BASE_BOM,BOM_6L,DEVEL_BOM,TS_1TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9

2.9GHZ CPU, 32GB DRAM, ULX GPU, 2TB S4E

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
JPD6	639-05865	MLB,2.9GHZ,MC-32,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD7	639-05866	MLB,2.9GHZ,MC-32,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD8	639-05867	MLB,2.9GHZ,MC-32,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,MC_32G,BAFFIN_ULX,CPU_CFL:2.9
JPD9	639-05868	MLB,2.9GHZ,HY-32,ULX,WD-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,WD_2TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9
JPDC	639-05869	MLB,2.9GHZ,HY-32,ULX,TS-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,TS_2TB_PMLC,HY_32G,BAFFIN_ULX,CPU_CFL:2.9
JPDD	639-05870	MLB,2.9GHZ,HY-32,ULX,SM-2TB,X1190	ALTERNATE,BASE_BOM,BOM_8L,DEVEL_BOM,SM_2TB_3DV4,HY_32G,BAFFIN_ULX,CPU_CFL:2.9

PAGE_NAME=J380_BTO SYNC_DATE=02/09/2017

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BOM-639 2.9GHz

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Alternate Parts

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S00046	197S00036		ALL	Epson w/ TXC
197S00047	197S00036		ALL	Kyocera w/ TXC
197S00048	197S00036		ALL	Murata w/ TXC
376S1080	376S0820		ALL	
152S00726	152S00592		ALL	
376S1053	376S0604		ALL	Diodes alt to Fairchild
353S00636	353S4037		ALL	
155S00007	155S0667		ALL	
376S1106	376S0678		ALL	Fairchild alt to Vishay
371S00127	371S00182		ALL	
152S00769	152S00659		ALL	
372S00016	372S00015		ALL	
107S00041	107S00039		ALL	
740S00041	740S0159		ALL	
311S00138	311S0436		ALL	
152S00725	152S00590		ALL	
152S00841	152S00238		ALL	
376S00219	376S00079		ALL	TI for Fairchild
311S00121	311S0398		ALL	
311S0596	311S0593		ALL	
353S3526	353S3528		ALL	
353S3527	353S3528		ALL	
197S00131	197S00116		ALL	
197S00117	197S00116		ALL	
197S00115	197S00116		ALL	
152S00398	152S00204		ALL	
152S00786	152S00344		ALL	
311S00165	311S00164		ALL	
128S00050	128S0351		ALL	
138S00047	138S00073		ALL	
353S01041	353S01042		ALL	
155S0665	155S00232		ALL	
740S00051	740S00050		ALL	
152S00724	152S00311		ALL	
155S0694	155S0387		ALL	
103S0321	103S0276		ALL	
740S0144	740S0118		ALL	
740S00028	740S0118		ALL	
138S00077	138S00035		ALL	
138S00093	138S00035		ALL	
138S00056	138S1100		ALL	
107S00015	107S00011		ALL	
152S00543	152S00484		ALL	
155S00018	155S0664		ALL	Murata w/ Taiyo
152S00359	152S00253		ALL	Chillisin alt to Cyntec
311S00118	311S0489		ALL	
155S00365	155S00191		ALL	
107S00070	107S0085		ALL	
138S0660	138S0684		ALL	
138S0846	138S0811		ALL	
155S0914	155S0897		ALL	
155S00190	155S0897		ALL	
138S00117	138S00071		ALL	
353S01346	353S01320		ALL	
376S00281	376S1147		ALL	
376S00230	376S00174		ALL	
128S00022	128S00018		ALL	
376S00304	376S1187		ALL	

311S0426	311S00007		ALL	
138S00229	138S00107		ALL	
353S01614	353S4159		ALL	
132S00202	132S00175		ALL	

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S00878	353S00599		ALL	
371S00089	371S00085		ALL	
107S0248	107S0250		ALL	
107S00033	107S00034		ALL	
107S00103	107S00058		ALL	Cyntec w/ Yageo
311S00013	311S0508		ALL	Part wi
132S00064	132S0409		ALL	
128S0364	128S0264		ALL	Kemet w/ Panasonic
128S00058	128S00018		ALL	NEC w/ Rohm
107S00071	107S00053		ALL	
376S00014	376S0761		ALL	
376S00086	376S0761		ALL	
107S00044	107S00076		ALL	
740S00003	740S0135		ALL	
128S00070	128S00007		ALL	
740S00019	740S00007		ALL	Bourns w/ Polytronics
353S00852	353S4262		ALL	TI w/ OnSemi
138S0775	138S0860		ALL	
138S0789	138S0941		ALL	Murata w/ SS
152S00363	152S00048		ALL	
152S00415	152S00140		ALL	
155S00204	155S0731		ALL	
311S00060	311S0273		ALL	
128S00009	128S00007		ALL	
138S0738	138S1101		ALL	Samsung alt to Murata
107S00234	107S00235		ALL	
311S00156	311S00129		ALL	
155S0660	155S0513		ALL	
197S00120	197S00118		ALL	
152S00368	152S00269		ALL	
311S0271	311S00008		ALL	NXP w/ Diodes
311S00104	311S00091		ALL	

128S00039	128S00038		ALL	
128S0302	128S00038		ALL	
138S1103	138S0719		ALL	
376S00074	376S0855		ALL	
311S00180	311S00181		ALL	
152S00770	152S0857		ALL	
740S00033	740S00002		ALL	
155S00166	155S0391		ALL	
107S0249	107S0251		ALL	
155S00401	155S00067		ALL	
152S00369	152S00268		ALL	Cyntec w/ NEC
371S00074	371S0602		ALL	
138S0689	138S0701		ALL	
128S00087	128S00011		ALL	
128S00031	128S00011		ALL	
128S00026	128S00011		ALL	
152S00182	152S00703		ALL	
152S00705	152S00412		ALL	
376S00303	376S00012		ALL	
152S00864	152S00851		ALL	
311S00179	311S00166		ALL	
353S01505	353S01389		ALL	
353S01506	353S01404		ALL	
311S00057	311S0612		ALL	
377S0155	377S0184		ALL	
152S00403	152S00322		ALL	

311S00193	311S00192		ALL	
371S00170	371S00125		ALL	
376S00302	376S1038		ALL	

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
103S00248	103S00247		ALL	8.06K 0.1% RESISTOR
103S00250	103S00249		ALL	18.2K 0.1% RESISTOR
116S00006	116S0175		ALL	0OHM RESISTOR
128S00062	128S00067		ALL	150UF POLY CAP
128S00069	128S00067		ALL	150UF POLY CAP
128S00065	128S00067		ALL	150UF POLY CAP
138S00097	138S0750		ALL	4.7UF CAP
131S00134	131S00041		ALL	12pF Desense:31561601
107S00101	107S00005		ALL	5mOhm :31560708
107S00087	107S00029		ALL	5mOhm :31560843
107S00086	107S00056		ALL	3mOhm : 31560937
107S00100	107S00057		ALL	2mOhm : 31561063
107S0240	107S0255		ALL	1mOhm : 31561401
107S00139	107S0178		ALL	220KOhm :31561213
128S0296	128S0487		ALL	47uF-PT : 31561532
128S00012	128S0487		ALL	47uF-PT : 31561532
138S0786	138S0705		ALL	Murata w/ Samsung
353S00832	353S00525		ALL	IMVP SA
353S00831	353S00519		ALL	IMVP VCORE
152S00782	152SS00772		ALL	IMVP CORE INDUCTOR
138S00105	138S00037		ALL	10uF CER : 31563978
138S0714	138S0713		ALL	10UF : 31564912
138S0648	138S0703		ALL	4.7uF CER : 31564224
138S0715	138S0732		ALL	1UF CER : 31565015
152S00845	152S00815		ALL	
138S00111	138S00036		ALL	20uF CER : 31563894
132S00012	132S0401		ALL	0.22uF : 31563715
138S00084	138S00060		ALL	47uF CER : 31564055
138S0739	138S0706		ALL	NEC w/ Vishay
138S0945	138S0706		ALL	NEC w/ Rohm
138S0641	138S0700		ALL	Murata w/ SS&Taiyo
138S0759	138S0762		ALL	
138S00049	138S0831		ALL	
107S00090	107S00055		ALL	
138S0863	138S0853		ALL	
138S00006	138S0835		ALL	
377S0077	377S0183		ALL	
371S00180	371S00077		ALL	NXP alt to Diodes
138S00104	138S0978		ALL	
138S00024	138S0986		ALL	
152S00434	152S1829		ALL	
197S00053	197S00050		ALL	Kyocera w/ TXC
197S00054	197S00050		ALL	NDK w/ TXC
197S00055	197S00050		ALL	Murata w/ TXC
335S00270	335S00203		ALL	Adesto for Micronix
155S00034	155S0706		ALL	Taiyo w/ Murata
353S00879	353S00754		ALL	
155S00203	155S0894		ALL	
152S00461	152S00112		ALL	
376S00146	376S1061		ALL	
152S00704	152S00413		ALL	
152S00199	152S00413		ALL	
335S00066	335S0946		ALL	
372S0186	372S0185		ALL	
311S00177	311S00178		ALL	
353S00750	353S00877		ALL	
152S00707	152S00689		ALL	
376S00282	376S1128		ALL	

VRAM ALT SUB-BOMS

685-00222	685-00221		ALL	
685-00223	685-00221		ALL	
685-00224	685-00221		ALL	
685-00225	685-00221		ALL	

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BOM Alt Table

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Power Button

PLACE_SIDE=TOP

DBG_BTN SWK000 SOX-152HNT SM

PMU_ONOFF_L

RSLOC Button

DBG_BTN SWK001 SOX-152HNT SM

PMU_RSLOC_RST_L

Power Button

PLACE_SIDE=BOTTOM

DBG_BTN SWK002 SOX-152HNT SM

PMU_ONOFF_L

Button for Force DFU

PLACE_SIDE=BOTTOM

DBG_BTN SWK003 SOX-152HNT SM

SOC_FORCE_DFU

PP1V8_SLPS2R

Power State Debug LEDs

(For development only)

PP3V3_S5

DBGLED RK090 20K 5% 1/20W MF 201

DBGLED_S5

DBGLED DK090 GRN-90MCD-5MA-2.85V 0402

PLACE_SIDE=BOTTOM

SILK_PART=S5_ON

DBGLED RK093 20K 5% 1/20W MF 201

DBGLED_S0I3

DBGLED DK093 GRN-90MCD-5MA-2.85V 0402

PLACE_SIDE=BOTTOM

SILK_PART=S0I3_ON

DBGLED_S0I3_D

DBGLED QK092 DMN5L06VK-7 SOT563 VER 3

PM_SLP_S0_L

CPU_C10_GATE_L

DBGLED RK096 51K 5% 1/20W MF 201

DBGLED_C10

DBGLED QK092 DMN5L06VK-7 SOT563 VER 3

DBGLED DK096 GRN-90MCD-5MA-2.85V 0402

PLACE_SIDE=BOTTOM

SILK_PART=S0_ON

System State LEDs

INPUT					OUTPUT		
PMU_ACT_RDY	SLP_SCFET_EN	SLP_S0_L	VDDQ_EN	1V8G3S_EN	R	G	B
0	0	0	0	0	B	1	1
0	0	0	0	1	0	1	1
1	1	0	0	1	0	0	1
0	0	0	1	1	0	1	0
1	1	0	1	1	1	1	0
1	1	1	1	1	1	0	1

PP3V3_G3H_RTC_X

DBGLED RK022 0 5% 1/20W MF 0201

P3V3_G3H_RTC_DEBUG_LED_R

DBGLED CK007 0.1UF 10% 10V X5R-CERM 0201

BYPASS=UK020::10mm

DBGLED UK020 SLG4AP41990 STQFN

PMU_ACTIVE_READY DBGLED RK027 0 5% 1/20W MF 0201 PMU_ACTIVE_READY_R

P1V1_SLPDDR_SOCFET_EN DBGLED RK015 0 5% 1/20W MF 0201 P1V1_SLPDDR_SOCFET_EN_R

PM_SLP_S3_L DBGLED RK016 0 5% 1/20W MF 0201 PM_SLP_S0_R_L

PVDDQ_EN DBGLED RK017 0 5% 1/20W MF 0201 PVDDQ_EN_LED

P1V8G3S_EN DBGLED RK018 0 5% 1/20W MF 0201 P1V8_G3S_EN_R

PMU_ACTIVE_READY (IPD)

P1V1_SLPDDR_SCFET_EN (IPD)

PM_SLP_S0* (IPD)

PVDDQ_EN (IPD)

P1V8G3S_EN (IPD)

CRITICAL

GND

(OD) R SSTATE_RED_R

(OD) G SSTATE_GREEN_R

(OD) B SSTATE_BLUE_R

RFU1 NC

RFU2 NC

RFU3 NC

RFU4 NC

DBGLED RK019 2.1K 1% 1/20W MF 201 SSTATE_RED

DBGLED RK020 5.1K 1% 1/20W MF 201 SSTATE_GREEN

DBGLED RK021 4.75K 1% 1/20W MF 201 SSTATE_BLUE

DBGLED DK000 LTST-C32JBGEW SM

SOC State LEDs

PP1V8_SLPS2R

DBGLED QK000 DMN5L06VK-7 SOT563 VER 5

P1V1_SLPDDR_SOCFET_EN

DBGLED QK000 DMN5L06VK-7 SOT563 VER 5

PP1V8_AWAKE

DBGLED QK001 DMN5L06VK-7 SOT563 VER 5

SOC_DFU_STATUS

DBGLED QK001 DMN5L06VK-7 SOT563 VER 5

SOC_RED_SLPS2R

SOC_GREEN_DDR

SOC_BLUE_AWAKE

SOC_AMBER_DFU

DBGLED RK023 2.1K 1% 1/20W MF 201 SOC_RED_R

DBGLED RK024 5.1K 1% 1/20W MF 201 SOC_GREEN_R

DBGLED RK025 4.75K 1% 1/20W MF 201 SOC_BLUE_R

DBGLED RK026 5.1K 1% 1/20W MF 201 SOC_AMBER_R

DBGLED DK001 LTST-C32JBGEW SM

DFU LED

DBGLED DK002 AMBER-605NM-35-56MCD LTST-C281KFKT-SM

BOM_COST_GROUP=PLATFORM POWER

SYNC_MASTER=ADITYA

SYNC_DATE=03/22/2017

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