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.

X2203/MLB

REV	ECN	DESCRIPTION OF REVISION	CK APPD / DATE
6	0031723518	ENGINEERING RELEASED	2021-10-03

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24	51	BMU Connector		09/10/2021
25	52	PBUS SUPPLY & BATTERY CHARGER	Charger	09/10/2021
26	53	BATTERY CHARGER SUPPORT	Charger	09/10/2021
27	54	MAGSAFE: CONNECTOR		09/10/2021
28	55	MAGSAFE: PORT CONTROLLER		09/10/2021
29	56	MAGSAFE: CONTROLLER SUPPORT		09/10/2021
30	57	POWER: 3V8 AON (1/2)	MainVR	10/01/2021
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32	59	POWER: 3V8 AON SUPPORT	jwwebb	09/28/2021
33	77	SPMU: INPUT PWR, BULK, BSTLQ	MPMU_SPMU	10/01/2021
34	78	SPMU: LDO, SW	MPMU_SPMU	10/01/2021
35	79	SPMU: GPIO, VSS	MPMU_SPMU	10/01/2021
36	80	SPMU: ALIASES, SUPPORT		09/10/2021
37	81	MPMU: INPUT PWR, BUCK 0, 1, 2	MPMU_SPMU	10/01/2021
38	82	MPMU: BUCK 3, 4, 7, 9, 11, 13, SW	MPMU_SPMU	10/01/2021
39	83	MPMU: LDO	MPMU_SPMU	10/01/2021
40	84	MPMU: MISC CKT, VSS	MPMU_SPMU	10/01/2021
41	85	MPMU: GPIO		09/10/2021
42	86	MPMU: ALIAS, PULLS		09/10/2021
43	87	MPMU: SUPPORT	jwwebb	09/28/2021
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46	126	POWER: 5V, 3V3 Support		09/10/2021
47	127	POWER: 3V3 S2		09/10/2021
48	128	Power: Load Switches		09/10/2021
49	130	I2C: AP, DISP		09/10/2021
50	131	I2C: ISP, AOP, SEP		09/10/2021

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54	138	SENSORS: POWER LOW SIDE (1/2)	jwwebb	09/28/2021
55	140	SENSORS: POWER SUPPORT		09/10/2021
56	141	SENSORS: THERMAL		09/10/2021
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59	150	USB-C: High Speed ATC0	USBC	09/26/2021
60	151	USB-C: High Speed ATC1	USBC	09/26/2021
61	152	USB-C: Support 1 ATC01	USBC	09/26/2021
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63	154	USB-C: Port Controller ATC0	USBC	09/26/2021
64	155	USB-C: Port Controller ATC1	USBC	09/26/2021
65	156	USB-C: USB2 RPT	USBC	09/26/2021
66	157	USB-C: HS Level Shifters	USBC	09/26/2021
67	159	USB-C: ATC01 REGULATORS	USBC	09/26/2021
68	162	USB-C: PROJECT SUPPORT		09/10/2021
69	200	WIFI/BT: MODULE	Wireless	10/01/2021
70	201	WIFI/BT: ANTENNA and GND	Wireless	10/01/2021
71	220	STORAGE: SSD0 S5E <0>		09/10/2021
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76	237	DISPLAY POWER SEQUENCER		09/10/2021
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79	240	PMU: SAN DIEGO	DisplayPMIC	09/10/2021
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81	243	SECDIS: SAK	SecureDisable	09/10/2021
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92	400	POWER ALIASES 1		09/10/2021
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96	405	Signal Aliases 1		09/10/2021
97	406	Signal Aliases 2		09/10/2021
98	420	SOC: ALIASES GPIO	jwwebb	09/28/2021
99	421	SOC: ALIASES SPI, I2S		09/10/2021
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104	501	17.4 PHYSICAL CSETS		09/10/2021
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X2203GHUB = https://github.pie.apple.com/MobileMacIX/j413_hw/blob/master/j413/

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SCHEM,MLB,X2203

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System Block Diagram

System Power

- U5700 PP3V8_AON
- U8100 MPMU
- U7700 SPMU
- UC300 PP5V_S2
- UC710 PP3V3_S2

JP600 Display Connector

Display Power Sequencer

UR000 TI TPS65157 Display PMIC

UP950 TI TPS259461 e-Fuse/Load Switch

UP800 TI LP8548BL1LSPQ_-04 Display Backlight Controller

UR300 Silego SLG4AP44437 Secure Disable Logic

JT201 Keyboard Connector
KBD_INT_L
I2C_KBD_SCL/SDA

JT400 Trackpad Connector
LID_OPEN
KBD_INT_L
I2C_KBD_SCL/SDA

UC830 TI TPS259570 e-Fuse/Load Switch → PP3V3_S2

UC840 TI TPS259570 e-Fuse/Load Switch → PP5V_S2

UC850 TI TPS259570 e-Fuse/Load Switch → PPBUS_AON

JE700 USB-C Port 0 Connector

UF400 TI CD3217 Power Delivery MCU

UF600 Cypress CYUSB2402A0 USB2.0 Level Shifter

UF000 Apple Type-C Retimer

JE701 USB-C Port 1 Connector

UF100 Apple Type-C Retimer

UF500 TI CD3217 Power Delivery MCU

UF600 Cypress CYUSB2402A0 USB2.0 Level Shifter

J5401 MagSafe Connector

U5500 TI CD3217 Power Delivery MCU

USB-C Power Supply Regulation

U0600

SOC

M2

FAB#FO196

PP3V8_AON

Q5190 BMU SYS_DETECT Charger

U5200 Renesas RAA489900 Charger

J5150 Battery Connector

UN000 S5E NAND Landing 0

UN100 S5E NAND Landing 1

UL000 WIFI/BT Wireless Module

UE400 Bosch BMI286AA IMU

U5000 NXP SN210VUK/B101V7 Secure Element

JP400 Camera Connector

UR600 TI SN012776B0YBH Audio Speaker Amp

JR820 Left Speaker Connector

UR630 TI SN012776B0YBH Audio Speaker Amp

JR840 Microphone Connector

UR700 TI SN012776B0YBH Audio Speaker Amp

JR830 Right Speaker Connector

UR730 TI SN012776B0YBH Audio Speaker Amp

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A BOM Groups

BOM GROUP	BOM OPTIONS
MLB_COMMON	SCHEM,PCBF,COMMON,MLB_PROGPARTS,MLB_USBC,MLB_POWER,MLB_PMU,MLB_MECH,MLB_MISC,MLB_BLC,MLB_TCON,MLB_WIRELESS,EVT
MLB_USBC	ATCRTMR:B0,USBCPC:LAPTOP_B3,RT13_EFUSE:VDDIO,EUSB_LS:B0,ACE_WILL_BE_OTPED:YES,LFKA_TEST_MODE:YES
MLB_PROGPARTS	SOC_ROM:BLANK,RT13_ROM:BLANK,SE:DEV_SW_LN,UPC01_ROM:EVT,UPC5_ROM:EVT
MLB_POWER	P3V8AON_IC:A2_R170,P3V8AON_LPM,WHAMOLA:0A5-13V7,P5VS2PWREN_BYPASS:NO
MLB_PMU	MPMU_IC:A0_JPI,SPMU_IC:A0_JPI,PMU_BULK_VDDQL,PMU_32K_CLK:XOSC,PMU_FB:FF,BUCK6_BULK_REG
MLB_MECH	SHLD_CAN_MLB:EVT,BRKT_KBD:EVT
MLB_MISC	BOARD_ID,TPAD_32KCLK:NO,SYSDET:FET,BOOT_CFG_0,PMU_OUT32K:WLBT,SENSOR_IMU,MIPI_PWR:NO,REFIMU_IC:BMI284,QS360_DLY:YES,SOC_R9706:80HM,OCELOT_BYPASS:100NF
MLB_DEV	SENSORS:DEV,DEVELOPMENT,USBC_DBG,BTN_DBG
MLB_BLC	BLC_BEN_IC:V8,BLC_5V_CAP:4P7_UF,BLC_5V_SERIES:10_OHM,BLC_KBD_BOOST_USED:NO
MLB_TCON	PMIC_SDG_VBUCK1:NO,SDG_TI_PROG:X2203,SDG_TI
MLB_WIRELESS	RF-CONN

B Build Specific Groups

BOM GROUP	BOM OPTIONS
BOARD_ID	BOARD_ID_3
PROTO0	BOARD_REV_3,BOARD_REV_2,BOARD_REV_1,BOARD_REV_0
PROTO1	BOARD_REV_3,BOARD_REV_2,BOARD_REV_1
PROTO1B	BOARD_REV_3,BOARD_REV_2,BOARD_REV_0
PROTO2	BOARD_REV_3,BOARD_REV_2
PROTO2B	BOARD_REV_3,BOARD_REV_1,BOARD_REV_0
EVT	BOARD_REV_3,BOARD_REV_1
DVT	BOARD_REV_3,BOARD_REV_0
PVT	BOARD_REV_3

Pull-ups: BOARD_ID[7:0] = 8'b0010_1000
Pull-downs: 4'b0000
Pull-downs: 4'b0001
Pull-downs: 4'b0010
Pull-downs: 4'b0011
Pull-downs: 4'b0100
Pull-downs: 4'b0101
Pull-downs: 4'b0110
Pull-downs: 4'b0111

C DC/DC BOM Groups

BOM GROUP	BOM OPTIONS
DCDC_COMMON	SCHEM,PCBF,COMMON,MLB_POWER,MLB_PMU,MLB_MECH,MLB_MISC,MLB_BLC,EVT

D RF BOM Groups

BOM GROUP	BOM OPTIONS
RF_COMMON	SCHEM,PCBF,RF-CONN

E Top-Level APNs

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
051-07020	1	SCHEM,MLB,X2203	SCHEM	CRITICAL	SCHEM
820-02536	1	PCBF,MLB,X2203	PCBF	CRITICAL	PCBF
685-00426	1	COMMON PARTS,MLB,X2203	CBOM	CRITICAL	CMN_PARTS_BOM
685-00427	1	NAND1,MLB,X2203	P1BOM	CRITICAL	PARTS_SSDNAND1
985-01536	1	DEV PARTS,MLB,X2203	DEV1	CRITICAL	DEV_PARTS_BOM

F Reference Design Pack Options

USB-C

PACK_OPTIONS TO INCLUDE IN NETLIST
USBC_SPI_UPC0
USBC_DEBUG_UPC0
USBC01_VR5V_LOCAL_NO
USBC_LAPTOP
PKGS:SMALL_PITCH
USBC_LAPTOP_CC_PRT
ACE2_SS_CAP
USBC_SPI_NO_2ND_ROM
USBC_SPI_UPC0_AND_NO_2ND_ROM
ACTIVE_READY:SMALL_PITCH_CHECK_WITH_DPM
INV:DPW

Iceman VR

PACK_OPTIONS TO INCLUDE IN NETLIST
3V8_AON_PBUS-18V
3V8_AON_I2C-DEV
3V8_INDUCTOR:1P5MM
3V8_AON_MLCC-LN

Wireless

PACK_OPTIONS TO INCLUDE IN NETLIST
SUNWAY
WLBT_D2R_TP_STATEN
WLBT_TP_0P2

Audio

PACK_OPTIONS TO INCLUDE IN NETLIST
SPKRAMP_A
SPKRAMP_B
SPKRAMP_D
SPKRAMP_E
SPKRAMP_ICC_GB

PP3V3_S2 VR

PACK_OPTIONS TO INCLUDE IN NETLIST
3V3_S2_PBUS-18V
3V3_S2_MLCC-LN
3V3_S2_VOUT-B12

Charger

PACK_OPTIONS TO INCLUDE IN NETLIST
CHGR_72W
CHGR_PBUS18V
CHGR_MLCC-LN

PP5V_S2 VR

PACK_OPTIONS TO INCLUDE IN NETLIST
5V_S2_PBUS18V
5V_S2_VOUT-B12
5V_S2_IND-15
5V_S2_MLCC-LN
5V_S2_THINSTNCL

Display Backlight

PACK_OPTIONS TO INCLUDE IN NETLIST
BLC_CBULK:0603
BLC_FET:OFF
BLC_IND:10UH
PANELPWR_MINNIE
BLC_FERRITE:YES

SOC

PACK_OPTIONS TO INCLUDE IN NETLIST
SOC_MIPI_ENABLE
SOC_MIPI_1SIDE
ONE_SIDED
PCIE_GP0
LPDP_INT_RCAL
LPDPRX0_RCAL
OCELOT_BYPASS:10UF

NAND

PACK_OPTIONS TO INCLUDE IN NETLIST
SSD_4_3UF_0402THIN

PMU

PACK_OPTIONS TO INCLUDE IN NETLIST
TPAD32K:PMU
PMU_32K_MEMS
PMU_32K_XOSC

IMU

PACK_OPTIONS TO INCLUDE IN NETLIST
REFIMU_VDD:LCFILT
REFIMU_TEST:NO

This is on purpose

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BOM Configuration

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A Mounting Holes

SH0400
TH-NSP
SL-3.41X2.0-5.91X4.5
998-19374

SH0401
4.6R2.0-NSP
998-25030

SH0403
4.6X5.2R1.7X2.3-NSP
998-11114

SH0402
5.0R2.0-NSP
998-25031

B MDB Cowling Bosses

SH0440
2.7X1.8R-1.4ID-1.26H-SM
860-01964

C MagSafe/USB-C Cowling Bosses

SH0450
2.7X1.8R-1.4ID-1.16H-SM
860-01916

SH0451
2.7X1.8R-1.4ID-1.16H-SM
860-01916

SH0452
2.7X1.8R-1.4ID-1.16H-SM
860-01916

SH0453
2.7X1.8R-1.4ID-1.16H-SM
860-01916

D WiFi Module Cowling Boss

SH0470
1.8X2.7R-1.64H-SM
860-01957

E Right Speaker Cowling Boss

SH0480
6.12X1.8R-2HOLE-1.38H
860-01912

F MLB Shield Fence

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
806-32496	1	SHIELD,FENCE,THERMAL,MLB,P1,X2147	SHLD1	CRITICAL	SHLD_CAN_MLB:P2
806-35214	1	FENCE,MLB,EVT,X2147	SHLD1	CRITICAL	SHLD_CAN_MLB:EVT

SH0430
TH-NSP
SL-0.5X1.28-1.25X2.03
998-21458

SH0432
TH-NSP
SL-0.5X1.28-1.25X2.03
998-21458

SH0434
TH
SL-0.4X1.20
998-1681

SH0436
TH-NSP
SL-0.5X1.28-1.25X2.03
998-21458

SH0431
TH-NSP
SL-0.5X1.28-1.25X2.03
998-21458

SH0433
TH-NSP
SL-0.5X1.28-1.25X2.03
998-21458

SH0435
TH
SL-0.4X1.20
998-1681

SH0437
TH-NSP
SL-0.5X1.28-1.25X2.03
998-21458

G SOC Thermal Module Bosses

SH0490
STDOFF-3.8X2.5R-1.36H-SM
860-01913

SH0491
STDOFF-3.8X2.5R-1.36H-SM
860-01913

SH0492
STDOFF-3.8X2.5R-1.36H-SM
860-01913

SH0493
STDOFF-3.8X2.5R-1.36H-SM
860-01913

H Antenna Cowling Bosses

SH04A0
2.44X2.44SQ-1.15ID-1.044H-SM
860-02043

SH04A1
2.44X2.44SQ-1.15ID-1.044H-SM
860-02043

I Spacers

SH04B0
SPACER-MLB-X2147
SM
806-31591

SH04B2
SPACER-MLB-SMT-SML
SM
806-31120

SH04B1
SPACER-MLB-SMT
SM
806-31119

SH04B3
SPACER-MLB-SMT-LRG
SM
806-31121

J Keyboard Bracket

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
806-32523	1	BRKT,MLB,SMT,X2147	BRKT1	CRITICAL	BRKT_KBD:P2
806-35209	1	BRKT,MLB,EVT,X2147	BRKT1	CRITICAL	BRKT_KBD:EVT

BOM_COST_GROUP=MECHANICALS

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PD Parts

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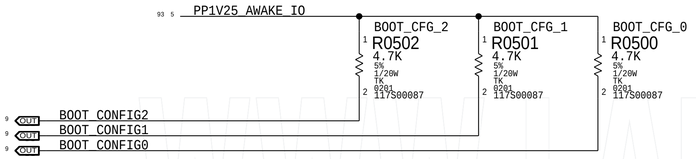
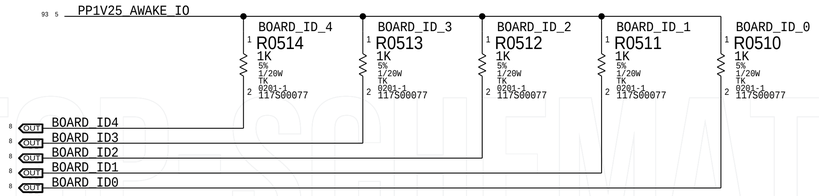
A BOOT CONFIG ID



STATEN BOOT AND POWER uARCH SPEC 2.1.5 (Section 2.2, Table 2.3):

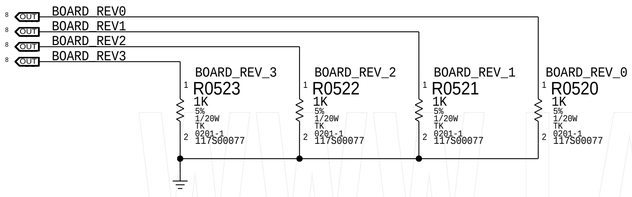
BOOT_CFG[2:0]	MODE
000	NAND, 1.2V SPI0, 12MHZ, TESTMODE
001	NOR, 1.2V SPI1, 40MHZ
010	NAND, 1.2V SPI0, 12MHZ
011	NAND, 1.2V SPI0, 40MHZ
100	NOR, 1.2V SPI1, 12MHZ, TESTMODE
101	NOR, 1.2V SPI1, 40MHZ, TESTMODE
110	NOR, 1.2V SPI1, 6MHZ, TESTMODE
111	NOR, 1.2V SPI1, 12MHZ

B BOARD ID



- BOARD_ID[7:0] assignments by product at link in QR Code.
- BOARD_ID[7:5] come from SOC
- BOARD_ID[4:0] are straps on MLB, sampled 100US after cold reset deassert.
- Staten Boot Power Micro Architecture Spec 2.1.3

C BOARD REV



- Stuffing the Resistor Results in a Logic Low (1'b0)

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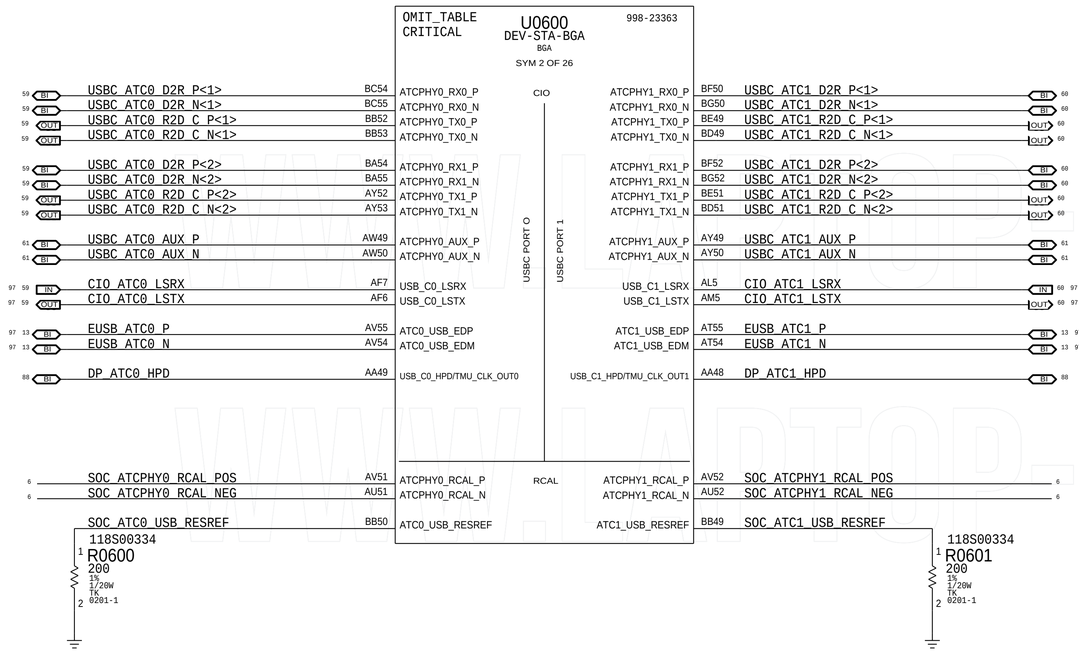
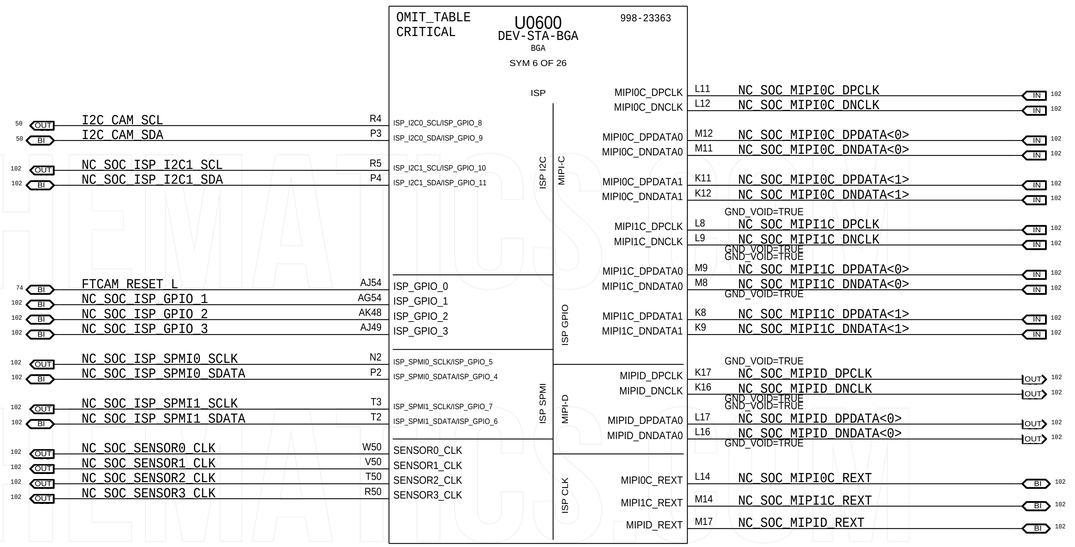
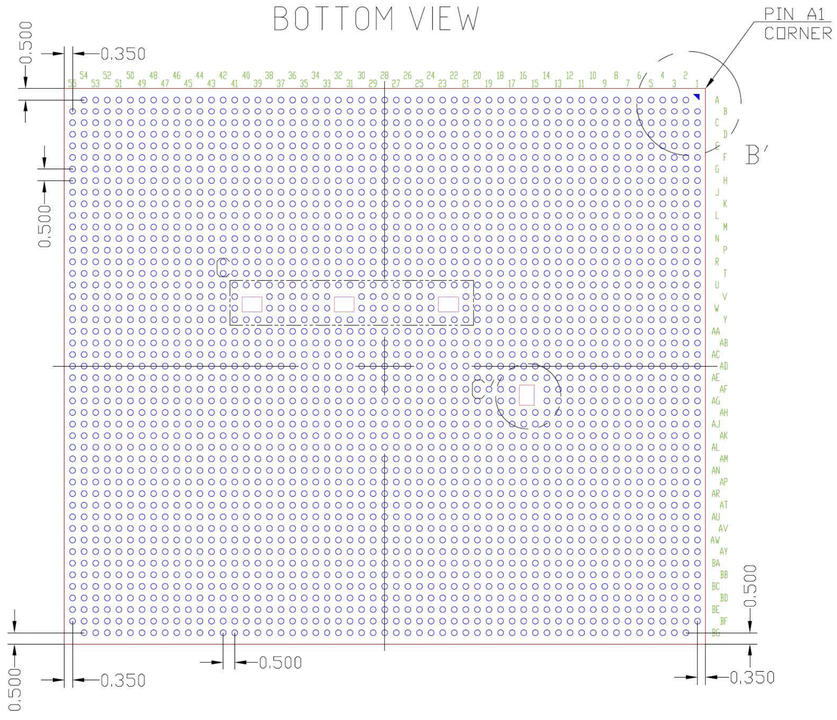
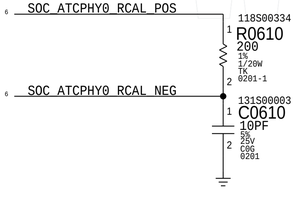
BOM_COST_GROUP=SOC

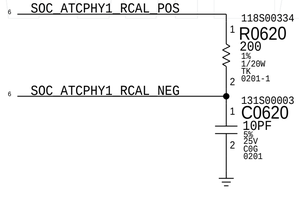






A Termination Resistance Calibration (RCAL)





Scan for RCAL Info:

SYNC_MASTER=SOC	SYNC_DATE=10/01/2021
PAGE TITLE	SOC: CIO, MIPI
Apple Inc.	DRAWING NUMBER 051-07020 SIZE D
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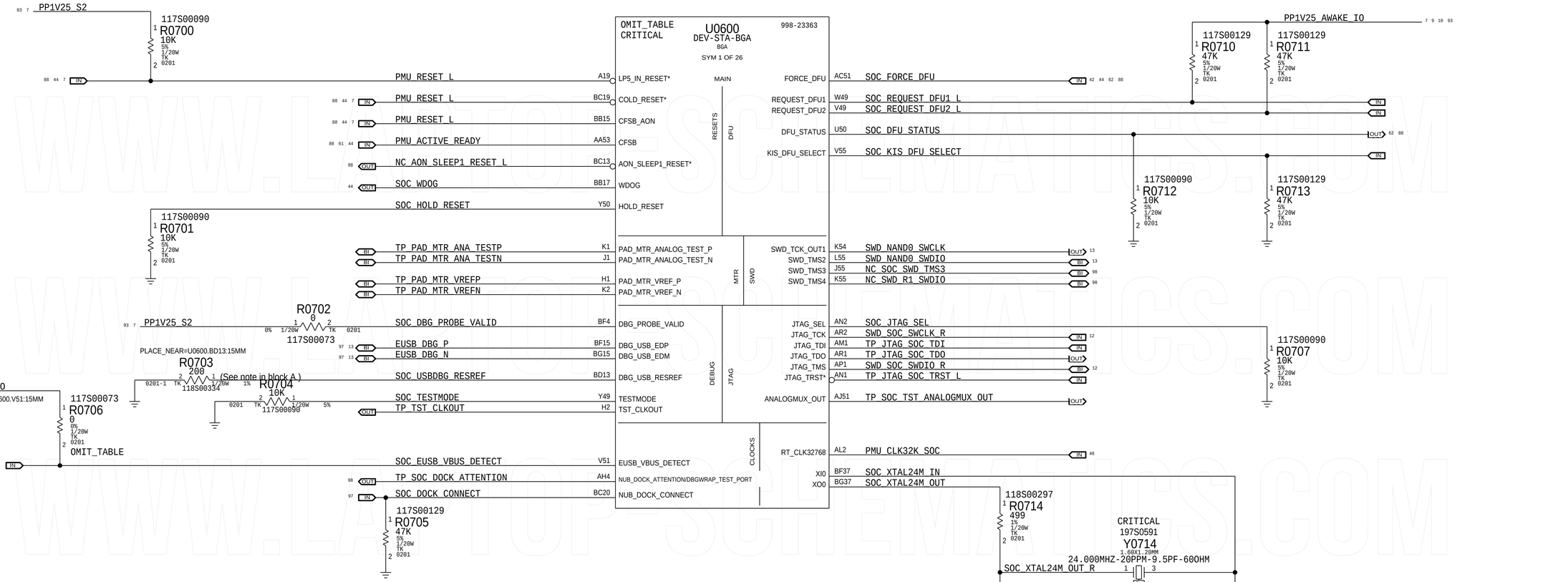
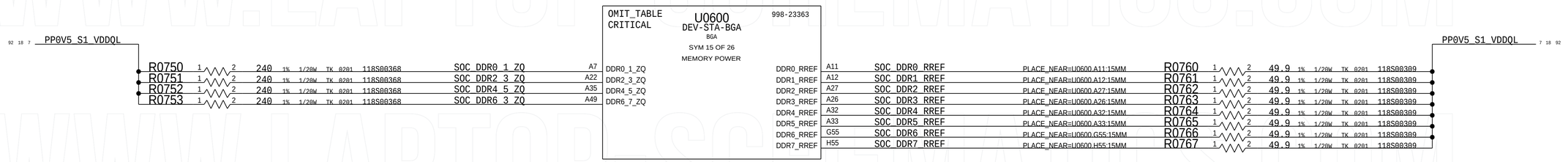
BOM_COST_GROUP=SOC





A RESREF Notes

- The RESREF node is sensitive to noise.
- 1-sided PCBs may be able to place R0703 less than 15mm from SOC pin on the perimeter of the SOC.
- 2-sided PCBs may be able to place R0703 less than 5mm from SOC pin.

B EUSB_VBUS_DETECT BOM Table

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
117S00090	1	RES,TK,10K OHM,5%,1/20W,0201	R0706	SOC_R0706:10KOHM
117S00073	1	RES,TK,0 OHM,1A MAX,1/20W,0201	R0706	SOC_R0706:0OHM

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

PAGE TITLE: SOC: RESETS, DEBUG, MISC

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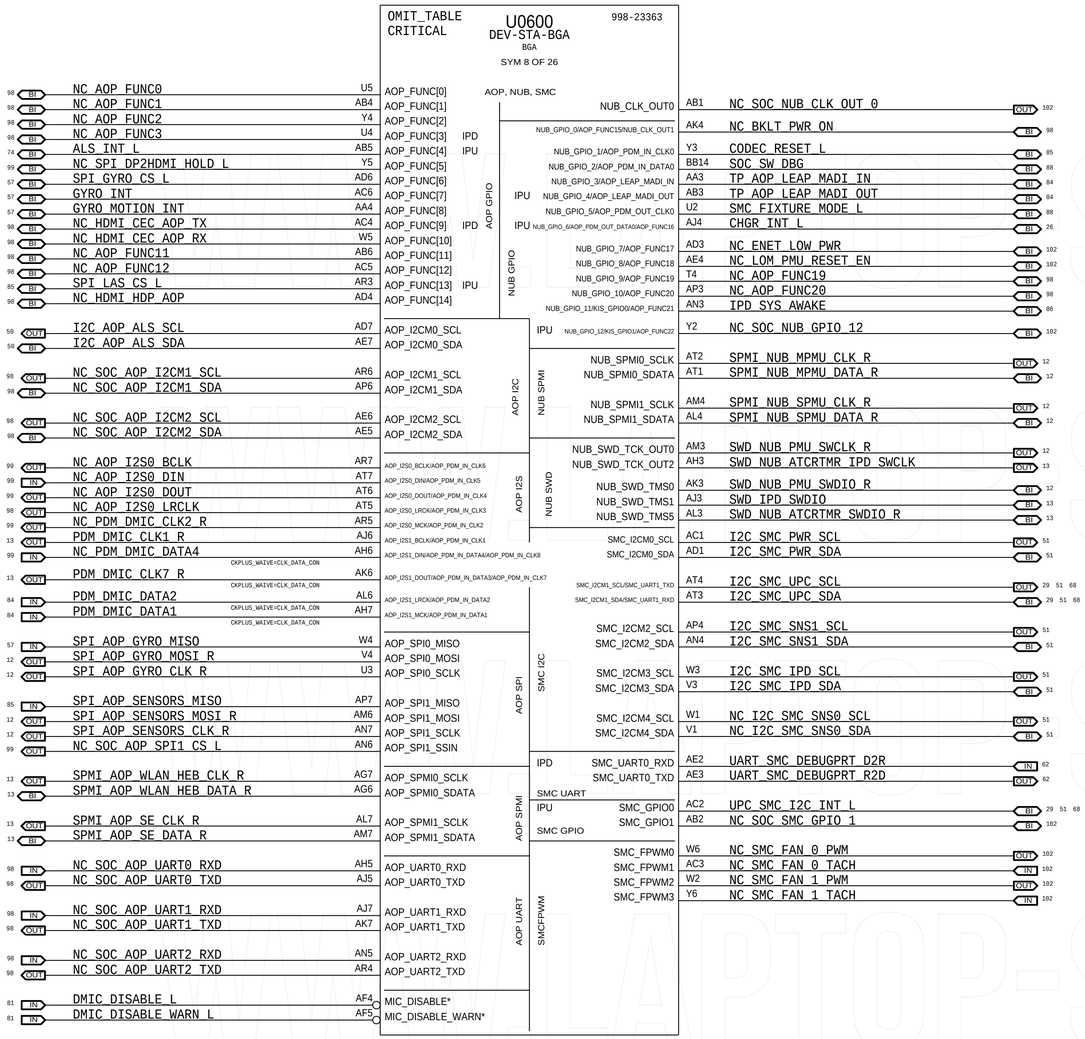

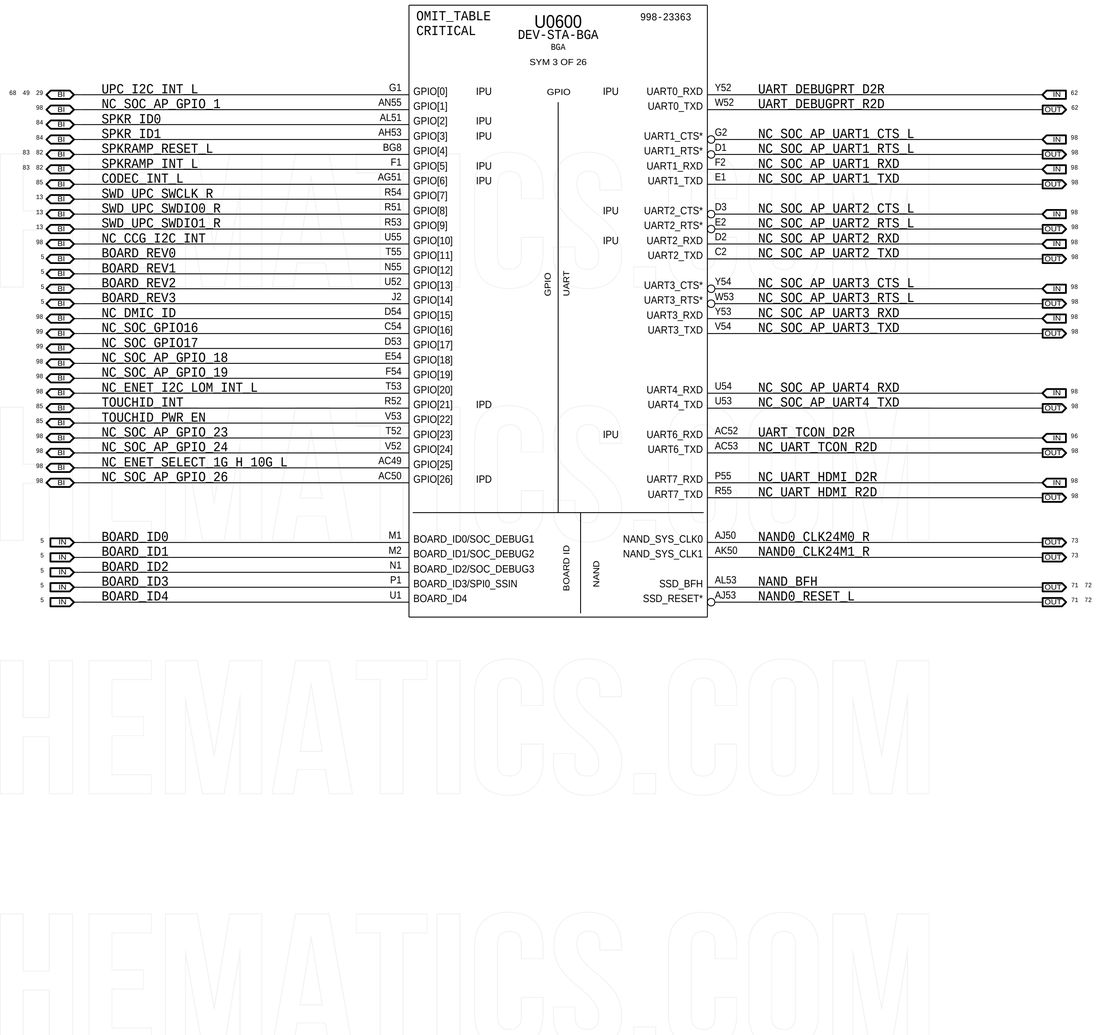

SYNC_MASTER=SOC	SYNC_DATE=10/01/2021
PAGE TITLE	SOC: GPIOS
Apple Inc.	DRAWING NUMBER 051-07020 · SIZE D
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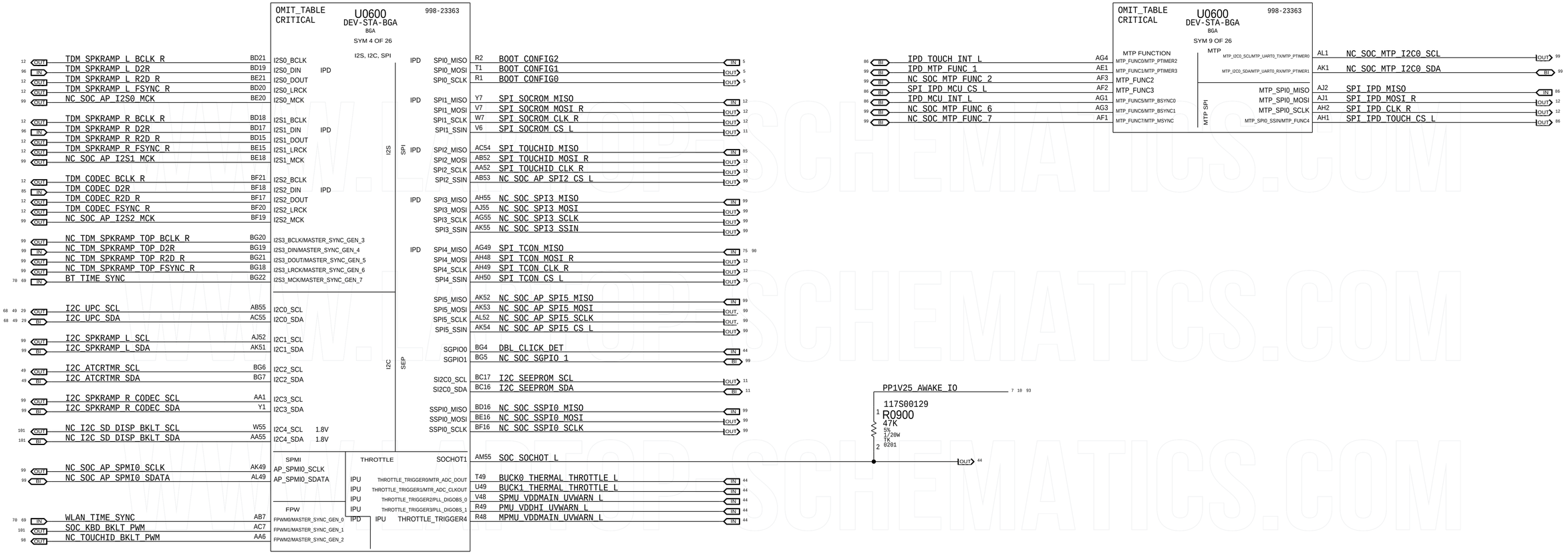
BOM_COST_GROUP=SOC



SYNC_MASTER=SOC SYNC_DATE=10/01/2021

PAGE TITLE

SOC: GPIOS

Apple Inc.

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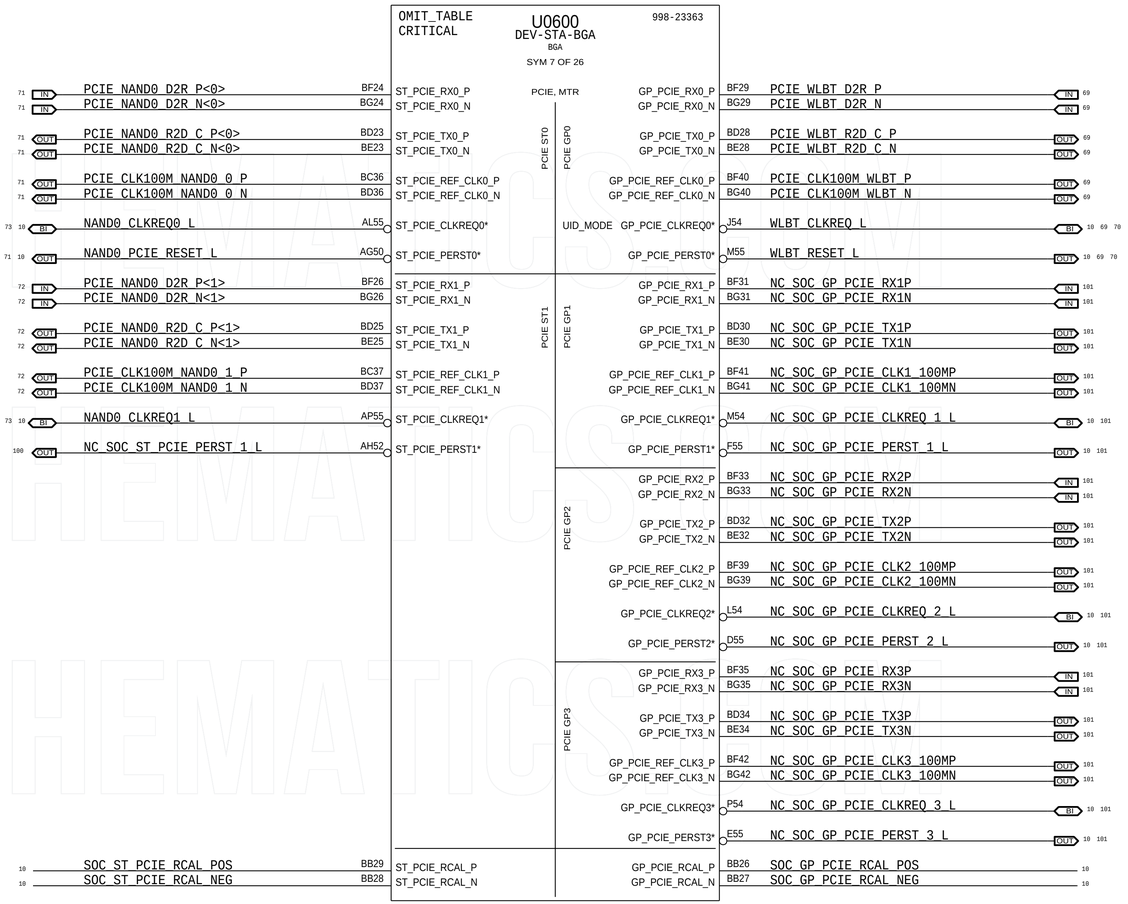
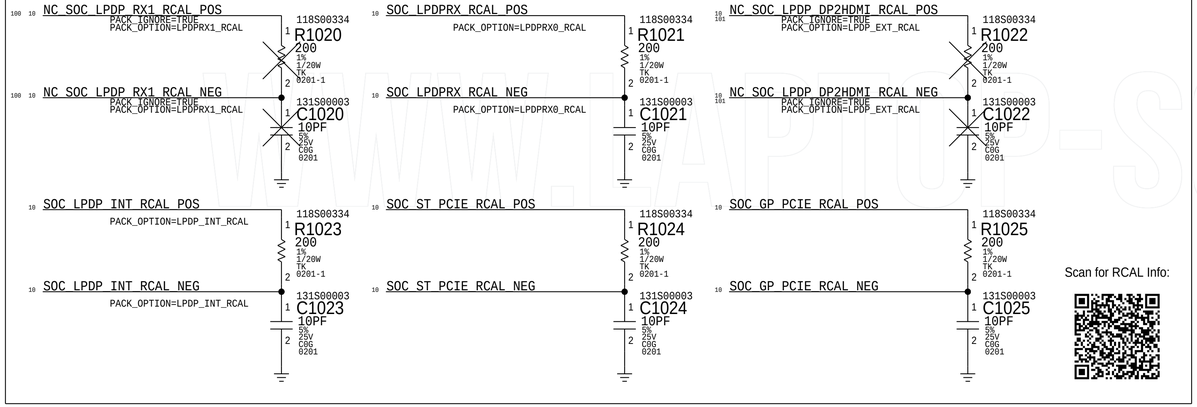
BOM_COST_GROUP=SOC

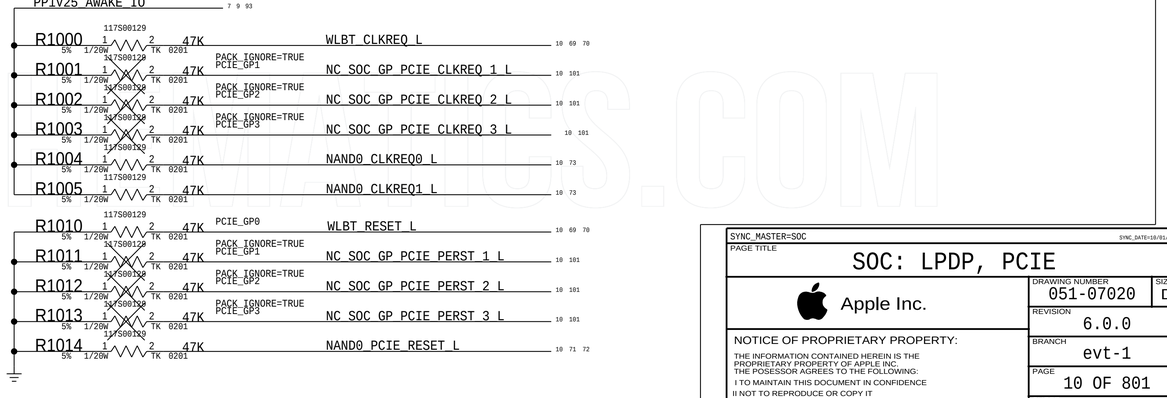


A Termination Resistance Calibration (RCAL)



Scan for RCAL Info:

B PCIe CLKREQ/PERST Pull-Ups/Downs



BOM_COST_GROUP=SOC

SYNC_MASTER=SOC
SYNC_DATE=10/01/2021

PAGE TITLE

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Apple Inc.

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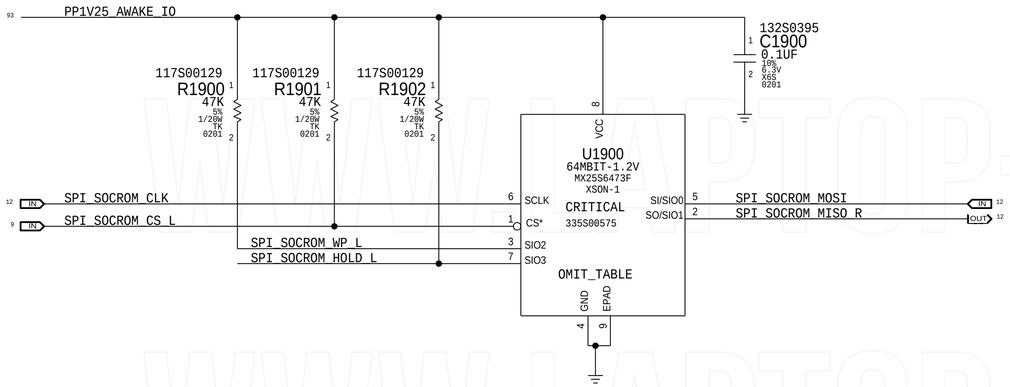
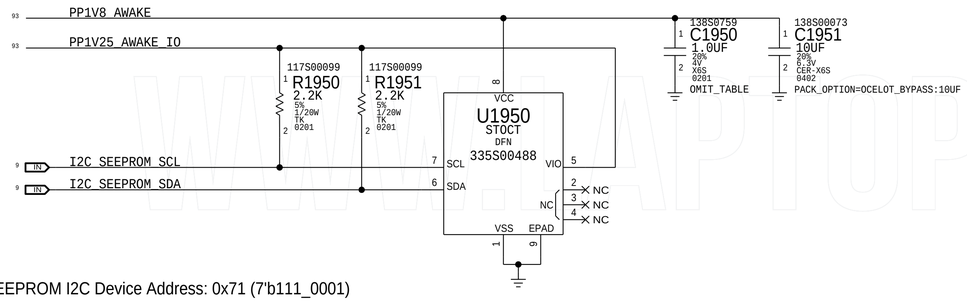
A SPI ROM



B SEP EEPROM



SEP EEPROM I2C Device Address: 0x71 (7'b111_0001)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
138S0759	1	CAP,CER,1UF,20%,4V,X6S,0201	C1950		OCELOT_BYPASS:1UF
132S0395	1	CAP,CER,0.1UF,10%,6.3V,X6S,0201	C1950		OCELOT_BYPASS:100NF

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

PAGE TITLE

SOC: SPI NOR, SEP ROM

Apple Inc.

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A SOC ROM Source Terminations

R2000 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.Y7:10MM
- 9 OUT SPI_SOCROM_MISO
- IN 11 SPI_SOCROM_MISO_R

R2001 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.V7:10MM
- 9 IN SPI_SOCROM_MOSI_R
- SPI_SOCROM_MOSI OUT 11

R2002 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.W7:10MM
- 8 IN SPI_SOCROM_CLK_R
- SPI_SOCROM_CLK OUT 11

B TOUCHID Source Terminations

R2004 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AB52:10MM
- 9 IN SPI_TOUCHID_MOSI_R
- SPI_TOUCHID_MOSI OUT 85

R2005 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AA52:10MM
- 9 IN SPI_TOUCHID_CLK_R
- SPI_TOUCHID_CLK OUT 85

C IPD Source Terminations

R2006 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AJ1:10MM
- 9 IN SPI_IPD_MOSI_R
- SPI_IPD_MOSI OUT 86

R2007 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AH2:10MM
- 9 IN SPI_IPD_CLK_R
- SPI_IPD_CLK OUT 86

D TCON Source Terminations

R2090 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AH48:10MM
- 9 IN SPI_TCON_MOSI_R
- SPI_TCON_MOSI OUT 75 90

R2091 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AH49:10MM
- 9 IN SPI_TCON_CLK_R
- SPI_TCON_CLK OUT 75 90

E IMU Source Terminations

SENSOR_IMU
R2008 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.V4:10MM
- 8 IN SPI_AOP_GYRO_MOSI_R
- SPI_AOP_GYRO_MOSI OUT 57

SENSOR_IMU
R2009 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.U3:10MM
- 8 IN SPI_AOP_GYRO_CLK_R
- SPI_AOP_GYRO_CLK OUT 57

F SOC SWD Source Terminations

R2084 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AR2:10MM
- 7 IN SWD_SOC_SWCLK_R
- SWD_SOC_SWCLK OUT 62

R2085 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AP1:10MM
- 7 IN SWD_SOC_SWDIO_R
- SWD_SOC_SWDIO OUT 62

G SOC SPMI MPMU Source Terminations

R2060 — 33 — 1% 1/20W TK 0201 — 118S00377 — PLACE_NEAR=U0600.AT2:10MM
- 8 IN SPMI_NUB_MPMU_CLK_R
- SPMI_NUB_MPMU_CLK OUT 41

R2061 — 33 — 1% 1/20W TK 0201 — 118S00377 — PLACE_NEAR=U0600.AT1:10MM
- 8 BI SPMI_NUB_MPMU_DATA_R
- SPMI_NUB_MPMU_DATA BI 41

H SOC SPMI SPMU Source Terminations

R2062 — 33 — 1% 1/20W TK 0201 — 118S00377 — PLACE_NEAR=U0600.AM4:10MM
- 8 IN SPMI_NUB_SPMU_CLK_R
- SPMI_NUB_SPMU_CLK OUT 35

R2063 — 33 — 1% 1/20W TK 0201 — 118S00377 — PLACE_NEAR=U0600.AL4:10MM
- 8 BI SPMI_NUB_SPMU_DATA_R
- SPMI_NUB_SPMU_DATA BI 35

I PMU SWD Series R

R2072 — 15 — 1% 1/20W TK 0201 — 118S00465 — PLACE_NEAR=U0600.AM3:10MM
- 8 IN SWD_NUB_PMU_SWCLK_R
- SWD_NUB_PMU_SWCLK

R2070 — 49.9 — 1% 1/20W TK 0201 — 118S00309 — PLACE_NEAR=R2071.1:10MM
- SWD_NUB_PMU_SWCLK
- SWD_NUB_SWCLK_SPMU OUT 96

R2071 — 49.9 — 1% 1/20W TK 0201 — 118S00309 — PLACE_NEAR=R2070.1:10MM
- SWD_NUB_SWCLK_MPMU OUT 96

R2075 — 15 — 1% 1/20W TK 0201 — 118S00465 — PLACE_NEAR=U0600.AK3:10MM
- 8 BI SWD_NUB_PMU_SWDIO_R
- SWD_NUB_PMU_SWDIO

R2073 — 49.9 — 1% 1/20W TK 0201 — 118S00309 — PLACE_NEAR=R2074.1:10MM
- SWD_NUB_SWDIO_SPMU BI 96

R2074 — 49.9 — 1% 1/20W TK 0201 — 118S00309 — PLACE_NEAR=R2073.1:10MM
- SWD_NUB_SWDIO_MPMU BI 96

J LAS Source Terminations

R2080 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AN7:10MM
- 8 IN SPI_AOP_SENSORS_CLK_R
- SPI_AOP_SENSORS_CLK OUT 85

R2081 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.AM6:10MM
- 8 IN SPI_AOP_SENSORS_MOSI_R
- SPI_AOP_SENSORS_MOSI OUT 85

L TDM Source Terminations

R2010 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BD21:10MM
- 9 IN TDM_SPKRAMP_L_BCLK_R
- TDM_SPKRAMP_L_BCLK MAKE_BASE=TRUE
- TDM_SPKRAMP_L_BCLK 82
- TDM_SPKRAMP_L_BCLK 82
- TDM_SPKRAMP_L_BCLK 82

R2011 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BE21:10MM
- 9 IN TDM_SPKRAMP_L_R2D_R
- TDM_SPKRAMP_L_R2D MAKE_BASE=TRUE
- TDM_SPKRAMP_L_R2D 82
- TDM_SPKRAMP_L_R2D 82
- TDM_SPKRAMP_L_R2D 82

R2012 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BD20:10MM
- 9 IN TDM_SPKRAMP_L_FSYNC_R
- TDM_SPKRAMP_L_FSYNC MAKE_BASE=TRUE
- TDM_SPKRAMP_L_FSYNC 82
- TDM_SPKRAMP_L_FSYNC 82
- TDM_SPKRAMP_L_FSYNC 82

R2020 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BD18:10MM
- 9 IN TDM_SPKRAMP_R_BCLK_R
- TDM_SPKRAMP_R_BCLK MAKE_BASE=TRUE
- TDM_SPKRAMP_R_BCLK 83
- TDM_SPKRAMP_R_BCLK 83
- TDM_SPKRAMP_R_BCLK 83

R2021 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BD15:10MM
- 9 IN TDM_SPKRAMP_R_R2D_R
- TDM_SPKRAMP_R_R2D MAKE_BASE=TRUE
- TDM_SPKRAMP_R_R2D 83
- TDM_SPKRAMP_R_R2D 83
- TDM_SPKRAMP_R_R2D 83

R2022 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BE15:10MM
- 9 IN TDM_SPKRAMP_R_FSYNC_R
- TDM_SPKRAMP_R_FSYNC MAKE_BASE=TRUE
- TDM_SPKRAMP_R_FSYNC 83
- TDM_SPKRAMP_R_FSYNC 83
- TDM_SPKRAMP_R_FSYNC 83

R2030 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BF21:10MM
- 9 IN TDM_CODEC_BCLK_R
- TDM_CODEC_BCLK OUT 85 90

R2031 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BF17:10MM
- 9 IN TDM_CODEC_R2D_R
- TDM_CODEC_R2D OUT 85

R2032 — 20 — 1% 1/20W TK 0201 — 118S00467 — PLACE_NEAR=U0600.BF20:10MM
- 9 IN TDM_CODEC_FSYNC_R
- TDM_CODEC_FSYNC OUT 85

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PAGE TITLE: PAGE_TITLE=SOC: SOURCE TERMS

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BOM_COST_GROUP=SOC

A EUSB Series Resistors & Test Points

EUSB_ATC0_P
PP2190 P4MM SM 998-0955 — PLACE_NEAR=U0600.AV55:10MM
PP2197 P4MM SM 998-0955 — PLACE_NEAR=UF600.A1:10MM

EUSB_ATC0_N
PP2191 P4MM SM 998-0955 — PLACE_NEAR=U0600.AV54:10MM
PP2198 P4MM SM 998-0955 — PLACE_NEAR=UF600.B1:10MM

EUSB_ATC1_P
PP2192 P4MM SM 998-0955 — PLACE_NEAR=U0600.AT55:10MM
PP2196 P4MM SM 998-0955 — PLACE_NEAR=UF650.A1:10MM

EUSB_ATC1_N
PP2194 P4MM SM 998-0955 — PLACE_NEAR=U0600.AT54:10MM
PP21A0 P4MM SM 998-0955 — PLACE_NEAR=UF650.B1:10MM

EUSB_DBG_P
PP2193 P4MM SM 998-0955 — PLACE_NEAR=U0600.BF15:10MM
PP2199 P4MM SM 998-0955 — PLACE_NEAR=UF600.A2:10MM

EUSB_DBG_N
PP2195 P4MM SM 998-0955 — PLACE_NEAR=U0600.BG15:10MM
PP21A1 P4MM SM 998-0955 — PLACE_NEAR=UF600.A3:10MM

B DMIC Source Term

PDM_DMIC_CLK1_R → R2180 20 5% 1/20W TK 0201 117S00113 → PDM_DMIC_CLK1
PLACE_NEAR=U0600.AJ6:25MM

PDM_DMIC_CLK7_R → R2181 20 5% 1/20W TK 0201 117S00113 → PDM_DMIC_CLK7
PLACE_NEAR=U0600.AK6:25MM

C UPC SWD Source Term

SWD_UPC_SWCLK_R → R2110 15 1% 1/20W TK 0201 118S00465 → SWD_UPC_SWCLK_RR
PLACE_NEAR=U0600.R54:25MM
SWD_UPC_SWCLK_RR → R2111 49.9 1% 1/20W TK 0201 118S00309 → SWD_UPC_SWCLK
PLACE_NEAR=UF400.E16:10MM
SWD_UPC_SWCLK_RR → R2112 49.9 1% 1/20W TK 0201 118S00309 → SWD_UPC_SWCLK1
PLACE_NEAR=U5500.E16:10MM

SWD_UPC_SWDIO0_R → R2113 33 5% 1/20W TK 0201 117S00122 → SWD_UPC_SWDIO0
PLACE_NEAR=U0600.R51:25MM

SWD_UPC_SWDIO1_R → R2114 33 5% 1/20W TK 0201 117S00122 → SWD_UPC_SWDIO2
PLACE_NEAR=U0600.R53:25MM

D MIPI PPVDD12 Supply Select

PP1V25_AWAKE_IO
BOMOPTION=MIPI_PWR:YES R2130 0 0% 1/20W TK 0201 117S00073
BOMOPTION=MIPI_PWR:NO R2131 0 0% 1/20W TK 0201 117S00073
PPVDD12_MIPI_SOC = PPVDD12_MIPI_SOC (MAKE_BASE=TRUE)

X2203 does not use the MIPI Interface on the SOC Interface
Per Moon Jung Kim (SEG Analog), VDD12_MIPIC and VDD12_MIPID can be tied to GND.

E Secure Element and WiFi SPMU Source Term

SPMI_AOP_SE_CLK_R → R2190 33 1% 1/20W TK 0201 118S00377 → SPMI_SE_CLK
PLACE_NEAR=U0600.AL7:25MM

SPMI_AOP_SE_DATA_R → R2193 33 1% 1/20W TK 0201 118S00377 → SPMI_SE_DATA
PLACE_NEAR=U0600.AM6:25MM

SPMI_AOP_WLAN_HEB_CLK_R → R2192 33 1% 1/20W TK 0201 118S00377 → SPMI_WLBT_CLK
PLACE_NEAR=U0600.AG7:25MM

SPMI_AOP_WLAN_HEB_DATA_R → R2195 33 1% 1/20W TK 0201 118S00377 → SPMI_WLBT_DATA
PLACE_NEAR=U0600.AG6:25MM

F NAND SWD Source Term

SWD_NAND0_SWCLK → R2140 15 1% 1/20W TK 0201 118S00465 → SWD_NAND0_SWCLK_RR
PLACE_NEAR=U0600.K54:25MM
SWD_NAND0_SWCLK_RR → R2141 49.9 1% 1/20W TK 0201 118S00309 → SWD_NAND0_S5E0_SWCLK
PLACE_NEAR=UN100.E6:15MM
SWD_NAND0_SWCLK_RR → R2142 49.9 1% 1/20W TK 0201 118S00309 → SWD_NAND0_S5E1_SWCLK
BOMOPTION=SSD_2L
PLACE_NEAR=UN100.E6:15MM

SWD_NAND0_SWDIO → R2143 15 1% 1/20W TK 0201 118S00465 → SWD_NAND0_SWDIO_RR
PLACE_NEAR=U0600.L55:25MM
SWD_NAND0_SWDIO_RR → R2144 49.9 1% 1/20W TK 0201 118S00309 → SWD_NAND0_S5E0_SWDIO
PLACE_NEAR=UN100.D7:15MM
SWD_NAND0_SWDIO_RR → R2145 49.9 1% 1/20W TK 0201 118S00309 → SWD_NAND0_S5E1_SWDIO
BOMOPTION=SSD_2L
PLACE_NEAR=UN100.D7:15MM

G IPD and ATC SWD Source Term

SWD_NUB_ATCRTMR_IPD_SWCLK → R2120 15 1% 1/20W TK 0201 118S00465 → SWD_NUB_USB_IPD_SWCLK
PLACE_NEAR=U0600.AH3:25MM
SWD_NUB_USB_IPD_SWCLK → R2121 49.9 1% 1/20W TK 0201 118S00309 → SWD_NUB_ATCRTMR_SWCLK
SWD_NUB_USB_IPD_SWCLK → R2122 49.9 1% 1/20W TK 0201 118S00309 → SWD_IPD_CLK_R

SWD_NUB_ATCRTMR_SWDIO_R → R2123 33 1% 1/20W TK 0201 118S00377 → SWD_NUB_ATCRTMR_SWDIO
PLACE_NEAR=U0600.AL3:25MM

SWD_IPD_SWDIO → R2124 33 1% 1/20W TK 0201 118S00377 → SWD_IPD_DATA_R
PLACE_NEAR=U0600.AJ3:25MM

H MIPI PPVDD_FIXED S1 Supply Select

PP0V78_S1_VDD_FIXED
BOMOPTION=MIPI_PWR:YES R2132 0 0% 1/20W TK 0201 117S00073
BOMOPTION=MIPI_PWR:NO R2133 0 0% 1/20W TK 0201 117S00073
PPVDD_FIXED_MIPI_S1_SOC = PPVDD_FIXED_MIPI_S1_SOC (MAKE_BASE=TRUE)

X2203 does not use the MIPI Interface on the SOC Interface
Per Moon Jung Kim (SEG Analog), VDD_FIXED_MIPIC_S1, VDD_FIXED_MIPID_PLL_S1, and VDD_FIXED_MIPID_S1 can be tied to GND.

I EFUSE Support

TP_VDD12_EFUSE1 → TP2160 (TP-P5) 998-4756
TP_VDD12_EFUSE2 → TP2161 (TP-P5) 998-4756
117S00073 R2160 0 0% 1/20W TK 0201
117S00073 R2161 0 0% 1/20W TK 0201

BOM_COST_GROUP=SOC

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92 PPVDD_AWAKE_PCPU

CRITICAL 138S00328 C2300 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2301 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2302 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2303 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2304 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2305 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2306 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2307 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2308 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2309 11UF 20% 2.5V X6T 0402

102 BI VSNS_VDD_PCPU
102 BI VSNS_ABSMIN_PCPU
102 BI VSNS_VSS_PCPU

OMIT_TABLE
CRITICAL

U0600
DEV-STA-BGA
BGA
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CPU POWER

AR34	VDD_PCPU	VDD_PCPU	AE37
AR39	VDD_PCPU	VDD_PCPU	AF35
AR45	VDD_PCPU	VDD_PCPU	AF36
AR47	VDD_PCPU	VDD_PCPU	AF37
AR49	VDD_PCPU	VDD_PCPU	AF39
AR51	VDD_PCPU	VDD_PCPU	AF41
AR53	VDD_PCPU	VDD_PCPU	AF43
AR55	VDD_PCPU	VDD_PCPU	AG35
AT32	VDD_PCPU	VDD_PCPU	AG38
AT33	VDD_PCPU	VDD_PCPU	AG40
AT38	VDD_PCPU	VDD_PCPU	AG43
AT40	VDD_PCPU	VDD_PCPU	AG45
AT41	VDD_PCPU	VDD_PCPU	AH39
AT45	VDD_PCPU	VDD_PCPU	AH41
AT47	VDD_PCPU	VDD_PCPU	AH45
AT49	VDD_PCPU	VDD_PCPU	AH47
AT51	VDD_PCPU	VDD_PCPU	AJ35
AU27	VDD_PCPU	VDD_PCPU	AJ40
AU28	VDD_PCPU	VDD_PCPU	AK33
AU29	VDD_PCPU	VDD_PCPU	AK35
AU36	VDD_PCPU	VDD_PCPU	AK36
AU37	VDD_PCPU	VDD_PCPU	AK38
AU38	VDD_PCPU	VDD_PCPU	AK40
AD36	VDD_PCPU_SENSE	VDD_PCPU	AK41
AL37	VDD_PCPU_ABSMIN	VDD_PCPU	AK42
		VDD_PCPU	AK43
		VDD_PCPU	AK44
		VDD_PCPU	AK45
		VDD_PCPU	AK46
		VDD_PCPU	AL33
		VDD_PCPU	AL39
		VDD_PCPU	AL41
		VDD_PCPU	AL42
		VDD_PCPU	AL44
		VDD_PCPU	AL45
		VDD_PCPU	AL46
		VDD_PCPU	AL47
		VDD_PCPU	AM33
		VDD_PCPU	AM38
		VDD_PCPU	AM40
		VDD_PCPU	AM41
		VDD_PCPU	AM42
		VDD_PCPU	AM43
		VDD_PCPU	AM44
		VDD_PCPU	AM45
		VDD_PCPU	AM46
		VDD_PCPU	AM47
		VDD_PCPU	AM48
		VDD_PCPU	AM49
		VDD_PCPU	AM50
		VDD_PCPU	AM51
		VDD_PCPU	AM52
		VDD_PCPU	AM53
		VDD_PCPU	AM54
		VDD_PCPU	AN32
		VDD_PCPU	AN33
		VDD_PCPU	AN34
		VDD_PCPU	AN38
		VDD_PCPU	AN39
		VDD_PCPU	AN43
		VDD_PCPU	AN45
		VDD_PCPU	AN47
		VDD_PCPU	AN49
		VDD_PCPU	AN51
		VDD_PCPU	AN53
		VDD_PCPU	AP30
		VDD_PCPU	AP33
		VDD_PCPU	AP35
		VDD_PCPU	AP38
		VDD_PCPU	AP40
		VDD_PCPU	AP41
		VDD_PCPU	AP43
		VDD_PCPU	AP44
		VDD_PCPU	AP45
		VDD_PCPU	AP46
		VDD_PCPU	AP47
		VDD_PCPU	AP48
		VDD_PCPU	AP49
		VDD_PCPU	AP50
		VDD_PCPU	AP51
		VDD_PCPU	AP52
		VDD_PCPU	AP53
		VDD_PCPU	AP54
		VDD_PCPU	AR27
		VDD_PCPU	AR29
AD37	VSS_PCPU_SENSE	VDD_PCPU	AR32

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

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SOC: POWER PCPU

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CRITICAL

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CPU POWER

92 PPVDD_AWAKE_ECPU

CRITICAL 138S00328 C2400 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2401 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2402 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2403 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2404 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2405 11UF 20% 2.5V X6T 0402

AJ26	VDD_ECPU
AK25	VDD_ECPU
AK26	VDD_ECPU
AK27	VDD_ECPU
AK28	VDD_ECPU
AK29	VDD_ECPU
AL29	VDD_ECPU
AM24	VDD_ECPU
AN26	VDD_ECPU
AN27	VDD_ECPU
AN29	VDD_ECPU
AM26	VDD_ECPU_SENSE

102 BI VSNS_VDD_ECPU

AA39	VDD_SOC_S1
AB24	VDD_SOC_S1
AB32	VDD_SOC_S1
AB36	VDD_SOC_S1
AC20	VDD_SOC_S1
AC27	VDD_SOC_S1
AD17	VDD_SOC_S1
AE20	VDD_SOC_S1
AE30	VDD_SOC_S1
AE31	VDD_SOC_S1
AE32	VDD_SOC_S1
AE35	VDD_SOC_S1
AE38	VDD_SOC_S1
AE40	VDD_SOC_S1
AF17	VDD_SOC_S1
AF28	VDD_SOC_S1
AF32	VDD_SOC_S1
AF33	VDD_SOC_S1
AG20	VDD_SOC_S1
AG31	VDD_SOC_S1
AG33	VDD_SOC_S1
AH27	VDD_SOC_S1
AJ20	VDD_SOC_S1
AJ22	VDD_SOC_S1
AJ24	VDD_SOC_S1
AJ30	VDD_SOC_S1
AJ32	VDD_SOC_S1
AK32	VDD_SOC_S1
AL22	VDD_SOC_S1
AL24	VDD_SOC_S1
AL31	VDD_SOC_S1
AM18	VDD_SOC_S1
AM30	VDD_SOC_S1
AN16	VDD_SOC_S1
AN18	VDD_SOC_S1
AN20	VDD_SOC_S1
AN22	VDD_SOC_S1
AN24	VDD_SOC_S1
AP16	VDD_SOC_S1
AP18	VDD_SOC_S1
AP28	VDD_SOC_S1
AR26	VDD_SOC_S1
AT18	VDD_SOC_S1
AT19	VDD_SOC_S1
AT20	VDD_SOC_S1
AT22	VDD_SOC_S1
AT24	VDD_SOC_S1
AT26	VDD_SOC_S1
AU19	VDD_SOC_S1
AU23	VDD_SOC_S1
AU32	VDD_SOC_S1
AV19	VDD_SOC_S1
AV21	VDD_SOC_S1
AV22	VDD_SOC_S1
AV24	VDD_SOC_S1
AV26	VDD_SOC_S1
AV28	VDD_SOC_S1
AV30	VDD_SOC_S1
AV31	VDD_SOC_S1
AV33	VDD_SOC_S1
AV35	VDD_SOC_S1
AV37	VDD_SOC_S1
AV39	VDD_SOC_S1
AW25	VDD_SOC_S1
AW27	VDD_SOC_S1
AW30	VDD_SOC_S1
AW33	VDD_SOC_S1
AW38	VDD_SOC_S1
AW40	VDD_SOC_S1
AY18	VDD_SOC_S1
AY24	VDD_SOC_S1
AY26	VDD_SOC_S1
BA27	VDD_SOC_S1
BB18	VDD_SOC_S1
W15	VDD_SOC_S1
W18	VDD_SOC_S1
W25	VDD_SOC_S1
W35	VDD_SOC_S1
W41	VDD_SOC_S1
AD31	VDD_SOC_S1_SENSE

VSNS_VDD_SOC BI 102

92 PPVDD_S1_SOC

CRITICAL 138S00328 C2430 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2431 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2432 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2433 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2434 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2435 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2436 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2437 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2438 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2439 11UF 20% 2.5V X6T 0402

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

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92 PPVDD_AWAKE_CPU_SRAM

CRITICAL 138S00328 C2530 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2531 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2532 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2533 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2534 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2535 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2536 11UF 20% 2.5V X6T 0402

92 PPVDD_S1_DCS

CRITICAL 138S00328 C2500 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2501 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2502 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2503 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2504 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2505 11UF 20% 2.5V X6T 0402

OMIT_TABLE
CRITICAL

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SRAM POWER

AE34	VDD_CPU_SRAM	VDD_SRAM_S1	AB17
AF38	VDD_CPU_SRAM	VDD_SRAM_S1	AB20
AF40	VDD_CPU_SRAM	VDD_SRAM_S1	AB26
AH34	VDD_CPU_SRAM	VDD_SRAM_S1	AB28
AH36	VDD_CPU_SRAM	VDD_SRAM_S1	AB30
AH40	VDD_CPU_SRAM	VDD_SRAM_S1	AB35
AJ36	VDD_CPU_SRAM	VDD_SRAM_S1	AC21
AJ38	VDD_CPU_SRAM	VDD_SRAM_S1	AC40
AK30	VDD_CPU_SRAM	VDD_SRAM_S1	AD20
AK37	VDD_CPU_SRAM	VDD_SRAM_S1	AD24
AK39	VDD_CPU_SRAM	VDD_SRAM_S1	AD28
AL25	VDD_CPU_SRAM	VDD_SRAM_S1	AD30
AL27	VDD_CPU_SRAM	VDD_SRAM_S1	AD35
AL35	VDD_CPU_SRAM	VDD_SRAM_S1	AD39
AL38	VDD_CPU_SRAM	VDD_SRAM_S1	AE33
AL40	VDD_CPU_SRAM	VDD_SRAM_S1	AF18
AM25	VDD_CPU_SRAM	VDD_SRAM_S1	AF20
AM28	VDD_CPU_SRAM	VDD_SRAM_S1	AF22
AM36	VDD_CPU_SRAM	VDD_SRAM_S1	AF26
AN35	VDD_CPU_SRAM	VDD_SRAM_S1	AF30
AN37	VDD_CPU_SRAM	VDD_SRAM_S1	AF34
AP26	VDD_CPU_SRAM	VDD_SRAM_S1	AG28
AP31	VDD_CPU_SRAM	VDD_SRAM_S1	AH17
AP36	VDD_CPU_SRAM	VDD_SRAM_S1	AH19
AR28	VDD_CPU_SRAM	VDD_SRAM_S1	AH21
AR30	VDD_CPU_SRAM	VDD_SRAM_S1	AH23
AR36	VDD_CPU_SRAM	VDD_SRAM_S1	AH25
AR38	VDD_CPU_SRAM	VDD_SRAM_S1	AH29
AR40	VDD_CPU_SRAM	VDD_SRAM_S1	AH31
AT28	VDD_CPU_SRAM	VDD_SRAM_S1	AJ33
AT31	VDD_CPU_SRAM	VDD_SRAM_S1	AK18
AT35	VDD_CPU_SRAM	VDD_SRAM_S1	AK21
AU34	VDD_CPU_SRAM	VDD_SRAM_S1	AK23
AU39	VDD_CPU_SRAM	VDD_SRAM_S1	AK31
AA40	VDD_DCS_S1	VDD_SRAM_S1	AL20
AD15	VDD_DCS_S1	VDD_SRAM_S1	AM16
AE15	VDD_DCS_S1	VDD_SRAM_S1	AM23
AH15	VDD_DCS_S1	VDD_SRAM_S1	AN17
AJ15	VDD_DCS_S1	VDD_SRAM_S1	AN30
U18	VDD_DCS_S1	VDD_SRAM_S1	AP21
U26	VDD_DCS_S1	VDD_SRAM_S1	AP23
U37	VDD_DCS_S1	VDD_SRAM_S1	AR19
V20	VDD_DCS_S1	VDD_SRAM_S1	AR21
V21	VDD_DCS_S1	VDD_SRAM_S1	AR23
V24	VDD_DCS_S1	VDD_SRAM_S1	AR25
V25	VDD_DCS_S1	VDD_SRAM_S1	AU18
V27	VDD_DCS_S1	VDD_SRAM_S1	AU21
V29	VDD_DCS_S1	VDD_SRAM_S1	AU25
V30	VDD_DCS_S1	VDD_SRAM_S1	AU31
V33	VDD_DCS_S1	VDD_SRAM_S1	AV29
V34	VDD_DCS_S1	VDD_SRAM_S1	AV38
V36	VDD_DCS_S1	VDD_SRAM_S1	AV40
V38	VDD_DCS_S1	VDD_SRAM_S1	AW26
Y41	VDD_DCS_S1	VDD_SRAM_S1	AW28
		VDD_SRAM_S1	AW32
		VDD_SRAM_S1	AW36
		VDD_SRAM_S1	AY25
AB40	VDD_DCS_S1/SENSE	VDD_SRAM_S1	Y17
		VDD_SRAM_S1	Y20
		VDD_SRAM_S1	Y25
		VDD_SRAM_S1	Y32
		VDD_SRAM_S1	Y35
		VDD_SRAM_S1	Y40

55 VDD_DCS_S1_SENSE

92 PP0V779_S1_SRAM

CRITICAL 138S00328 C2560 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2561 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2562 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2563 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2564 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2565 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2566 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2567 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2568 11UF 20% 2.5V X6T 0402

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC
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SOC: POWER SRAM

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92 PPVDD_AWAKE_GPU

CRITICAL 138S00328 C2600 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2601 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2602 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2603 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2604 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2605 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2606 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2607 11UF 20% 2.5V X6T 0402

OMIT_TABLE
CRITICAL
U0600
DEV-STA-BGA
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DISPLAY POWER

AA21	VDD_GPU
AA23	VDD_GPU
AA25	VDD_GPU
AA27	VDD_GPU
AA29	VDD_GPU
AA31	VDD_GPU
AA33	VDD_GPU
AA35	VDD_GPU
AA37	VDD_GPU
AB22	VDD_GPU
AB25	VDD_GPU
AB31	VDD_GPU
AB34	VDD_GPU
AB38	VDD_GPU
AC23	VDD_GPU
AC24	VDD_GPU
AC26	VDD_GPU
AC28	VDD_GPU
AC29	VDD_GPU
AC30	VDD_GPU
AC31	VDD_GPU
AC33	VDD_GPU
AC35	VDD_GPU
AC37	VDD_GPU
AC39	VDD_GPU
AC44	VDD_GPU
AC45	VDD_GPU
AC46	VDD_GPU
AC47	VDD_GPU
AD22	VDD_GPU
AD25	VDD_GPU
AD27	VDD_GPU
AD32	VDD_GPU
AD34	VDD_GPU
AD38	VDD_GPU
AD40	VDD_GPU
AD41	VDD_GPU
AD42	VDD_GPU
AD43	VDD_GPU
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AD51	VDD_GPU
AD52	VDD_GPU
AD53	VDD_GPU
AD54	VDD_GPU
AD55	VDD_GPU
AE21	VDD_GPU
AE23	VDD_GPU
AE24	VDD_GPU
AE26	VDD_GPU
AE27	VDD_GPU
AE41	VDD_GPU
AE42	VDD_GPU
AE43	VDD_GPU
AE44	VDD_GPU
AE45	VDD_GPU
AE46	VDD_GPU
AE47	VDD_GPU
AE48	VDD_GPU
AE50	VDD_GPU
AE52	VDD_GPU
AE54	VDD_GPU
AE55	VDD_GPU
AF24	VDD_GPU
AF48	VDD_GPU
AF49	VDD_GPU
AF50	VDD_GPU
AF51	VDD_GPU
AF52	VDD_GPU
AF53	VDD_GPU
AF54	VDD_GPU
AF55	VDD_GPU
AG21	VDD_GPU
AG23	VDD_GPU
AG25	VDD_GPU
AG27	VDD_GPU
Y21	VDD_GPU
Y26	VDD_GPU
Y28	VDD_GPU
Y30	VDD_GPU
Y31	VDD_GPU
Y34	VDD_GPU
Y37	VDD_GPU
Y39	VDD_GPU

AA17	VDD_DISP_S1
AA19	VDD_DISP_S1
AB18	VDD_DISP_S1
AC17	VDD_DISP_S1
AC18	VDD_DISP_S1
AC19	VDD_DISP_S1
AE17	VDD_DISP_S1
AE19	VDD_DISP_S1
AG17	VDD_DISP_S1
AH18	VDD_DISP_S1
AH20	VDD_DISP_S1
AJ17	VDD_DISP_S1
AJ19	VDD_DISP_S1
AK17	VDD_DISP_S1
AK20	VDD_DISP_S1
AL17	VDD_DISP_S1
AL19	VDD_DISP_S1
AL21	VDD_DISP_S1
AM20	VDD_DISP_S1
AM22	VDD_DISP_S1
W17	VDD_DISP_S1
Y16	VDD_DISP_S1
Y18	VDD_DISP_S1

VDD_DISP_S1_SENSE — AM19 — VSNS_VDD_DISP — 87 — 102

102 BI VSNS_VDD_GPU — AA22 — VDD_GPU_SENSE

92 PPVDD_S1_DISP

CRITICAL 138S00328 C2650 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2651 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2652 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2653 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2654 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2655 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2656 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2657 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2658 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2659 11UF 20% 2.5V X6T 0402

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC — SYNC_DATE=10/01/2021

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93 PP1V12_S2SW_AMPH

94 PP1V8_S2SW

92 PP1V05_S2SW_VDD2H

CRITICAL 138S00328 C2700 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2701 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2702 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2703 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2704 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2705 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2706 11UF 20% 2.5V X6T 0402

CRITICAL 138S00328 C2730 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2731 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2732 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2733 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2734 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2735 11UF 20% 2.5V X6T 0402

CRITICAL 138S0759 C2738 1.0UF 20% 4V X6S 0201
CRITICAL 138S0759 C2737 1.0UF 20% 4V X6S 0201
CRITICAL 138S0759 C2736 1.0UF 20% 4V X6S 0201

CRITICAL 138S00081 C2760 4.3UF 20% 2.5V X6T 0402
CRITICAL 138S00081 C2761 4.3UF 20% 2.5V X6T 0402
CRITICAL 138S00081 C2762 4.3UF 20% 2.5V X6T 0402
CRITICAL 138S00081 C2763 4.3UF 20% 2.5V X6T 0402
CRITICAL 138S00081 C2764 4.3UF 20% 2.5V X6T 0402
CRITICAL 138S00081 C2765 4.3UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2766 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2767 11UF 20% 2.5V X6T 0402

CRITICAL 138S00328 C2768 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2769 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2770 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2771 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2772 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2773 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2774 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2775 11UF 20% 2.5V X6T 0402

CRITICAL 138S00328 C2776 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2777 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2778 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2779 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2780 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2781 11UF 20% 2.5V X6T 0402

U0600
DEV-STA-BGA
BGA
14 OF 26
MEMORY POWER
998-23363
OMIT_TABLE
CRITICAL

AC16	VDD_AMPH_S2
AE16	VDD_AMPH_S2
AH16	VDD_AMPH_S2
AK16	VDD_AMPH_S2
V18	VDD_AMPH_S2
V41	VDD_AMPH_S2
W19	VDD_AMPH_S2
W21	VDD_AMPH_S2
W24	VDD_AMPH_S2
W27	VDD_AMPH_S2
W30	VDD_AMPH_S2
W33	VDD_AMPH_S2
W36	VDD_AMPH_S2
W38	VDD_AMPH_S2
W42	VDD_AMPH_S2
B5	VDD1
B51	VDD1
C8	VDD1
C24	VDD1
C31	VDD1
D7	VDD1
D8	VDD1
D22	VDD1
D23	VDD1
D35	VDD1
D36	VDD1
D48	VDD1
D49	VDD1
E22	VDD1
E36	VDD1
E48	VDD1
P5	VDD1
P24	VDD1
P32	VDD1
P51	VDD1
B3	VDD2H
B4	VDD2H
B26	VDD2H
B27	VDD2H
B31	VDD2H
B32	VDD2H
B52	VDD2H
B53	VDD2H
F4	VDD2H
F6	VDD2H
F7	VDD2H
F24	VDD2H
F26	VDD2H
F32	VDD2H
F34	VDD2H
F50	VDD2H
F52	VDD2H
G3	VDD2H
G5	VDD2H
G23	VDD2H
G25	VDD2H
G27	VDD2H
G31	VDD2H
G33	VDD2H
G35	VDD2H
G49	VDD2H
G51	VDD2H
G53	VDD2H
H4	VDD2H
H6	VDD2H
H7	VDD2H
H24	VDD2H
H26	VDD2H
H32	VDD2H
H34	VDD2H
H50	VDD2H
H52	VDD2H
J3	VDD2H
J5	VDD2H
J23	VDD2H
J25	VDD2H
J27	VDD2H
J31	VDD2H
J33	VDD2H
J35	VDD2H
J49	VDD2H
J51	VDD2H
J53	VDD2H
N5	VDD2H
N24	VDD2H
N51	VDD2H
P6	VDD2H
P25	VDD2H
P33	VDD2H
P34	VDD2H
P50	VDD2H

VDDQ_S1	AA42
VDDQ_S1	AB15
VDDQ_S1	AC14
VDDQ_S1	AD13
VDDQ_S1	AE12
VDDQ_S1	AF12
VDDQ_S1	AF14
VDDQ_S1	AG14
VDDQ_S1	AH13
VDDQ_S1	AK14
VDDQ_S1	AL15
VDDQ_S1	B6
VDDQ_S1	B24
VDDQ_S1	B34
VDDQ_S1	B36
VDDQ_S1	B50
VDDQ_S1	C3
VDDQ_S1	C5
VDDQ_S1	C7
VDDQ_S1	C23
VDDQ_S1	C25
VDDQ_S1	C27
VDDQ_S1	C33
VDDQ_S1	C35
VDDQ_S1	C49
VDDQ_S1	C51
VDDQ_S1	C53
VDDQ_S1	D4
VDDQ_S1	D6
VDDQ_S1	D24
VDDQ_S1	D26
VDDQ_S1	D32
VDDQ_S1	D34
VDDQ_S1	D50
VDDQ_S1	D52
VDDQ_S1	E3
VDDQ_S1	E25
VDDQ_S1	E27
VDDQ_S1	E31
VDDQ_S1	E33
VDDQ_S1	E51
VDDQ_S1	E53
VDDQ_S1	K3
VDDQ_S1	K5
VDDQ_S1	K25
VDDQ_S1	K27
VDDQ_S1	K31
VDDQ_S1	K33
VDDQ_S1	K51
VDDQ_S1	K53
VDDQ_S1	L4
VDDQ_S1	L6
VDDQ_S1	L24
VDDQ_S1	L26
VDDQ_S1	L32
VDDQ_S1	L34
VDDQ_S1	L50
VDDQ_S1	L52
VDDQ_S1	M3
VDDQ_S1	M5
VDDQ_S1	M25
VDDQ_S1	M27
VDDQ_S1	M31
VDDQ_S1	M33
VDDQ_S1	M51
VDDQ_S1	M53
VDDQ_S1	N4
VDDQ_S1	N26
VDDQ_S1	N32
VDDQ_S1	N52
VDDQ_S1	P20
VDDQ_S1	P22
VDDQ_S1	R19
VDDQ_S1	R21
VDDQ_S1	R22
VDDQ_S1	R30
VDDQ_S1	R32
VDDQ_S1	T20
VDDQ_S1	T26
VDDQ_S1	T27
VDDQ_S1	T33
VDDQ_S1	T34
VDDQ_S1	T36
VDDQ_S1	T37
VDDQ_S1	T41
VDDQ_S1	U22
VDDQ_S1	U23
VDDQ_S1	U28
VDDQ_S1	U31
VDDQ_S1	U32
VDDQ_S1	U35
VDDQ_S1	U39
VDDQ_S1	U40
VDDQ_S1	U42
VDDQ_S1	V43

102	VSNS_VDD2H_1	A5	VDD2H_SENSE_1
102	VSNS_VDD2H_2	A29	VDD2H_SENSE_2
102	VSNS_VSS_1	A4	VSS_SENSE_1
102	VSNS_VSS_2	A30	VSS_SENSE_2
55	VDD_AMPH_S2_SENSE	AC41	VDD_AMPH_S2/SENSE
		AB39	VSS_DDR_SENSE
		AB42	VDDQ_S1/SENSE

VSNS_VDDQ_S1 → 102
VDD_VDDQ_S1_SENSE → 55

7 92 PP0V5_S1_VDDQL

CRITICAL 138S00328 C2790 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2791 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2792 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2793 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2794 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2795 11UF 20% 2.5V X6T 0402

CRITICAL 138S00328 C2796 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2797 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2798 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C2799 11UF 20% 2.5V X6T 0402
CRITICAL 138S00328 C27A0 11UF 20% 2.5V X6T 0402

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

PAGE TITLE: SOC: POWER MEMORY

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D
REVISION 6.0.0
BRANCH evt-1
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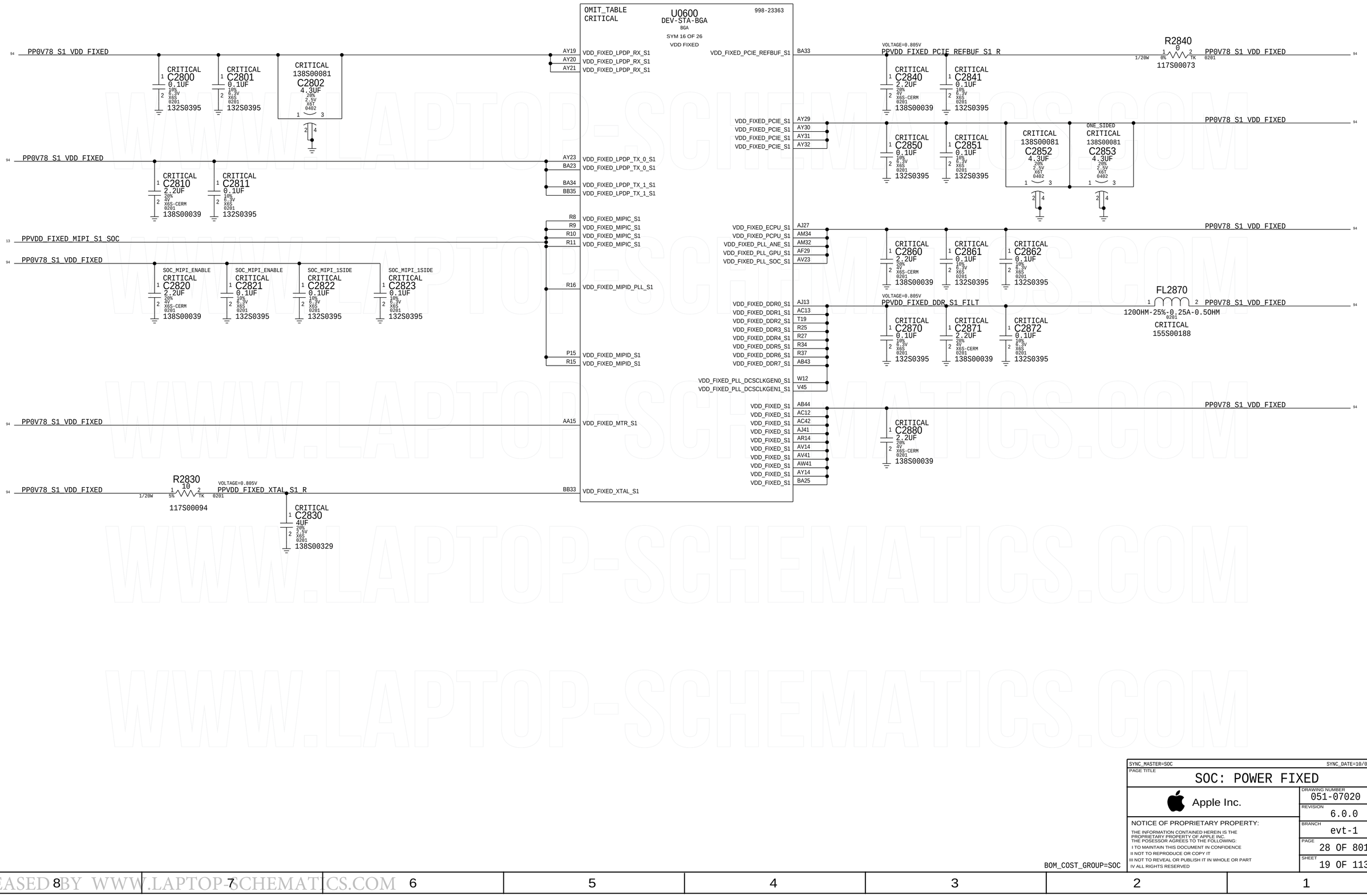

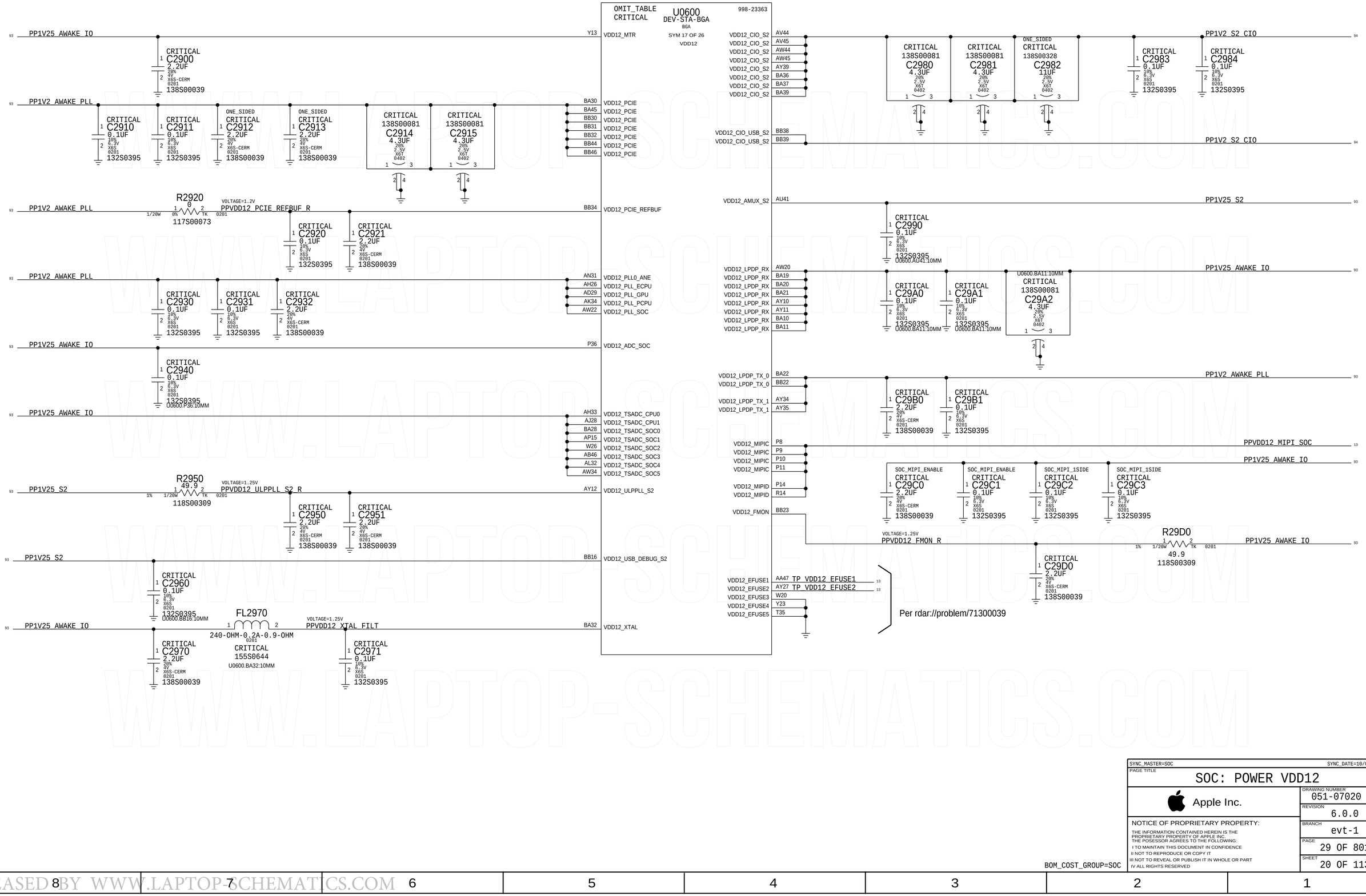

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

PAGE TITLE

SOC: POWER VDD12

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D

REVISION 6.0.0

BRANCH evt-1

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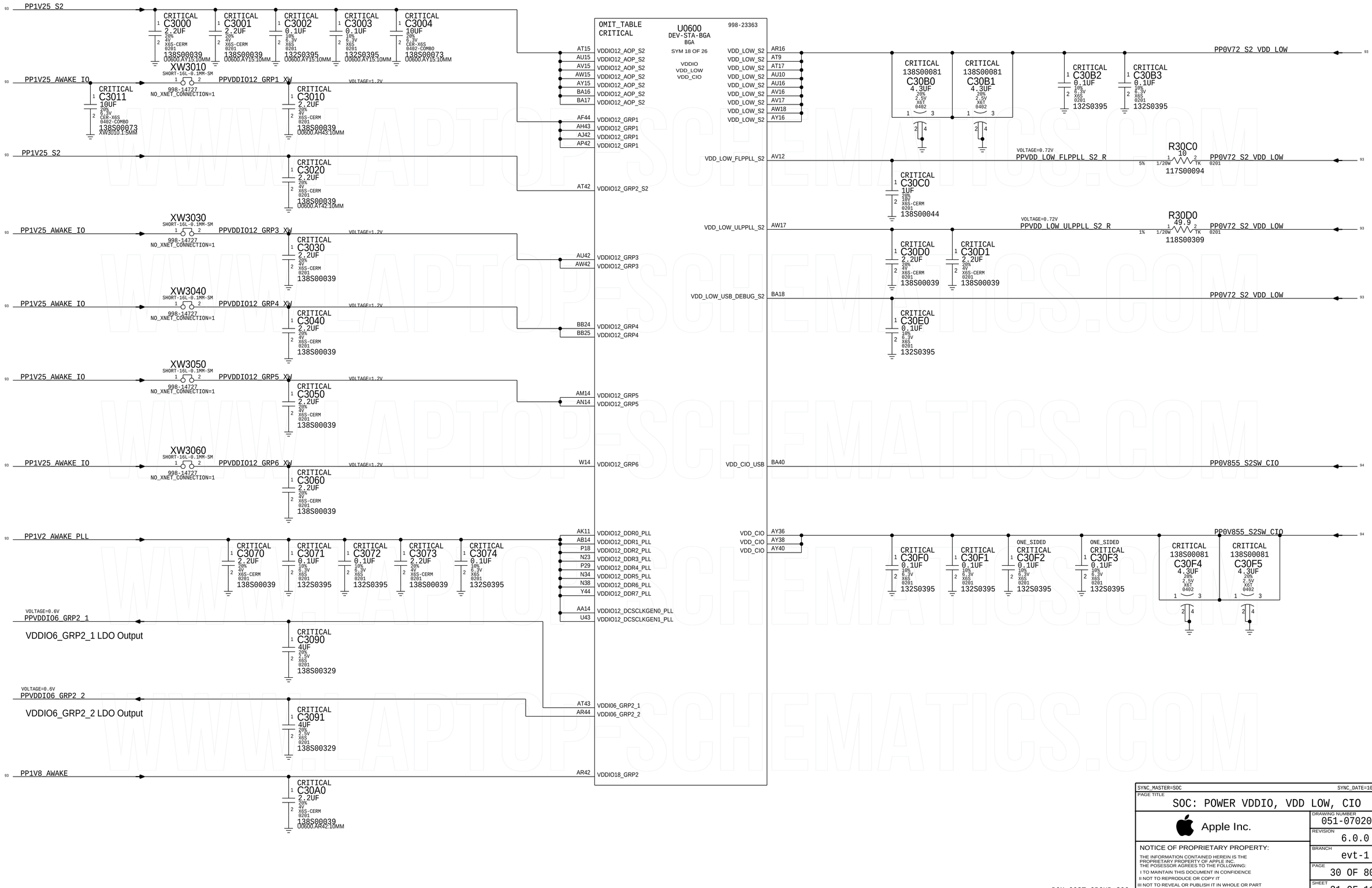

SYNC_MASTER=SOC SYNC_DATE=10/01/2021

PAGE TITLE

SOC: POWER VDDIO, VDD LOW, CIO

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D

REVISION 6.0.0

BRANCH evt-1

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SHEET 21 OF 113

BOM_COST_GROUP=SOC

SYNC_MASTER=SOC	SYNC_DATE=10/01/2021
PAGE TITLE	SOC: GND
Apple Inc.	DRAWING NUMBER 051-07020 · SIZE D
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Timing Requirements:
- VBAT supply ramp time: 20ms

Ceres - Secure Element

*** OK2INTEGRATE ***

Per TGA Power Block Diagram v0.3

92 PP1V8_S2
IccMax SE only: 125mA

U5000.F9:3mm
C5014 1.0UF 20% 6.3V X5R 0201-1

U5000.F8:3mm
C5002 0.22UF 20% 6.3V X5R 0201

U5000.E7:3mm
C5003 0.22UF 20% 6.3V X5R 0201

PP1V25_S2 93
IccMax SE only: 10mA
Based on SPMI only use case

VDDBOOST_SE
R5030 0 1/20W TK 0201 0% 1 2 VUP_SE

VDDPLL_SE
VDDNV_SE
VDDC_SE

U5000.B5:3mm
C5008 0.22UF 20% 6.3V X5R 0201

U5000.E8:3mm
C5009 0.22UF 20% 6.3V X5R 0201

U5000.E9:3mm
C5010 0.22UF 20% 6.3V X5R 0201

PP3V8_AON 23 92
IccMax: 100mA
As per NXP preliminary estimate, final pending

C5051 2.2UF 20% 10V X5R 0201

H9 PMUVCC1
J9 PMUVCC2
G8 SIMVCC1
H8 SIMVCC2
A8 VDDBOOST
A9 VDDBOOST
B4 VDDA
E9 VDDC
F9 VDDCIN
F8 VDDIO
E7 VDDIO_I2C
J1 VDDIO_SE
A5 VDDMIX
E8 VDDNV
B2 VDDPA
B5 VDDPLL
A2 VUP
A7 VBAT
D9 VBATPWR

U5000
SN210VUK/B101V7
WLCSP
OMIT_TABLE

D4 NFC_CLK_32K
H6 NFC_CLK_REQ
A6 NFC_CLK_XTAL1
G4 NFC_DWL_REQ
F6 NFC_GPIO0
J7 NFC_GPIO1
J5 NFC_GPIO2_AO
H4 NFC_GPIO3_AO
E6 NFC_HSU_CTS
F5 NFC_HSU_RTS
G5 NFC_HSU_RX
E5 NFC_HSU_TX
E4 NFC_I2C_SCL
F4 NFC_I2C_SDA
J6 NFC_IRQ
G9 NFC_SIM_SWIO1
J8 NFC_SIM_SWIO2
H7 NFC_SPMI_SCLK
G7 NFC_SPMI_SDATA
H5 NFC_WKUP_REQ
B6 NFC_XTAL2
G6 TM
A3 RXP
A4 RXN

23 SE_CTLR_FW_DWLD
96 NC_SE_GPIO0
50K internal pull-down

R5042 47K 1/20W TK 0201 5% UART_SE_R2D_RTS_L
NC_UART_SE_D2R_CTS_L
R5041 47K 1/20W TK 0201 5% UART_SE_R2D
NC_UART_SE_D2R

13 IN SPMI_SE_CLK
13 BI SPMI_SE_DATA
R5050 1M 5% 1/20W TK 0201
R5051 1M 5% 1/20W TK 0201
23 SE_DEV_WAKE

H3 SE_GPIO0 NC
F3 SE_GPIO1 NC
Pulls to be added in system, can be NC'd if unused
G1 SE_I2C_SCL NC_I2C_SE_SCL IN 96
H1 SE_I2C_SDA NC_I2C_SE_SDA BI 96
F2 SE_ISO_CLK NC
F1 SE_ISO_IO NC
G3 SE_ISO_RST NC
G2 SE_SPI_CLK NC
J2 SE_SPI_CS NC
H2 SE_SPI_MISO NC
E2 SE_SPI_MOSI NC
D2 TXVCASCP NC
D1 TXVCASCN NC
B3 RXVCM NC
C2 TXVCM NC
A1 TX1 NC
C1 TX2 NC
D7 VCASCHI NC
C7 VCASCLO NC
B8 BOOST_LX
B9 BOOST_LX
PP3V8_AON 23 92
B7 VHV VHV_SE
D3 VTUNE NC
D5 VEN SE_PWR_EN IN 42
C5 VREF VREF_SE

C5004 0.1UF 10% 6.3V CERM-X5R 0201
C5017 0.22UF 20% 6.3V X5R 0201

F7 VSS_DIG
J3 VSS_DIG
E1 VSS_DIG_2
J4 VSS_DIG_LN
C3 VSS_NFC
B1 VSS_PA
C4 VSS_PLL
D6 VSS_PMU
C8 VSS_PWR
C9 VSS_PWR
C6 VSS_REF
D8 VSS_SUB
E3 VSS_SUB

R5000 47K 1/20W TK 0201 5% SE_CTLR_FW_DWLD 23
R5006 47K 1/20W TK 0201 5% SE_DEV_WAKE 23

<rdar://problem/52067756> [SN200V] Wired Mode SE Only Reference Design Material
<rdar://problem/45108950> Mac - Venus Reference guide and De-coupling requirements

BOM_COST_GROUP=SECURE ELEMENT

SYNC_MASTER=
SYNC_DATE=09/10/2021

PAGE TITLE: Secure Element

Apple Inc.

DRAWING NUMBER: 051-07020
SIZE: D
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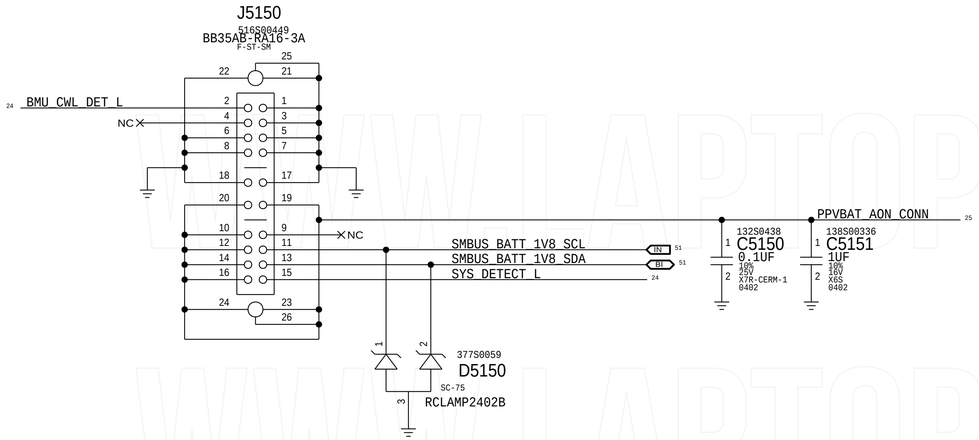
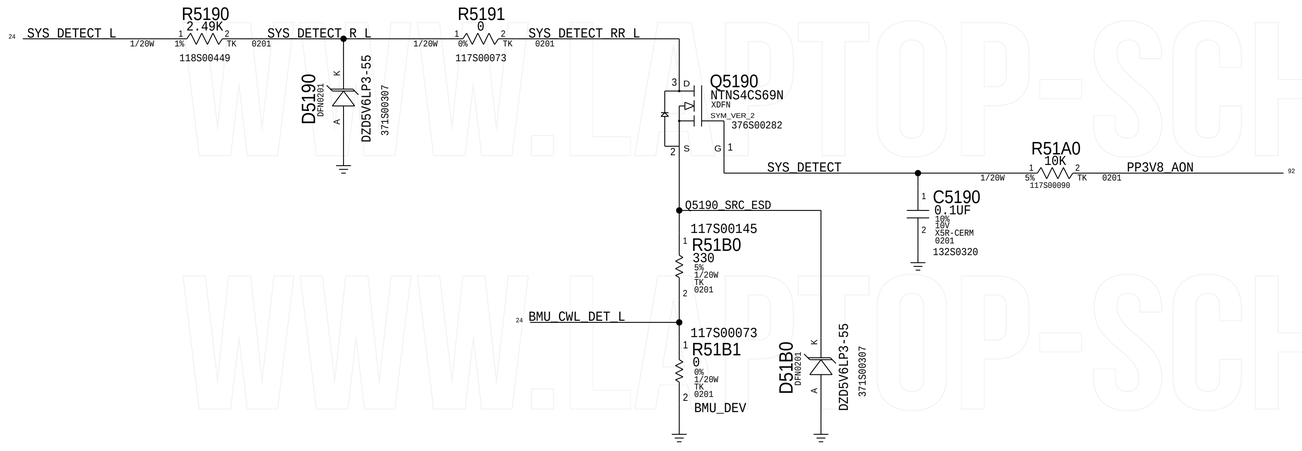
A BMU Connector



B BMU SYS_DETECT Circuit



C BMU SYS_DETECT NOTES

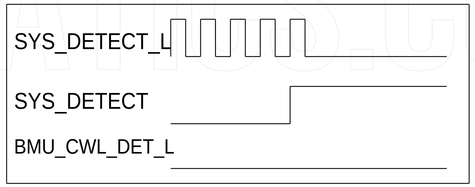
The BMU SYS_DETECT circuit relies on the system assembly in order to be properly enabled. During assembly, a metal gasket is placed between the cowling and the top-side of the BMU flex. The gasket is used to connect the BMU_CWL_DET_L signal, located between J5150.1 and Q5190.2, to GND. Once BMU_CWL_DET_L is tied to GND, then the SYS_DETECT circuit is ready to be enabled.

The BMU VBAT output will be enabled after the BMU flex and cowling are installed and power is supplied by connecting a power adapter to either the USB-C or MagSafe Connectors.

Thus the MLB remains in an unpowered state during system assembly.

Once the MLB is assembled into an enclosure, the BMU SYS_DETECT circuit output, SYS_DETECT_L, is continuously sampled by the Gas Gauge IC at a rate of once per second until it detects a logic low. During the once per second interval, an internal pull-up within the Gas Gauge IC is enabled for 4us to conserve battery charge. Once a logic low is detected, then the BMU enables the VBAT outptu voltage.

Below is an example waveform showing how the BMU SYS_DETECT circuit works.



In the event that the cowling needs to be removed while retaining power to the MLB, resistor R51B1 can be loaded.

BOM_COST_GROUP=BATTERY

PAGE TITLE: BMU Connector

Apple Inc.

DRAWING NUMBER: 051-07020 | SIZE: D
REVISION: 6.0.0
BRANCH: evt-1
PAGE: 51 OF 801
SHEET: 24 OF 113

*** OK2INTEGRATE ***

PPDCIN_AON_CHGR_R
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1800

C520A 2.2UF 20% 35V X5R-CERM 0402-0.1MM 138S00030
C520B 2.2UF 20% 35V X5R-CERM 0402-0.1MM 138S00030
C520C 2.2UF 20% 35V X5R-CERM 0402-0.1MM 138S00030
C520D 2.2UF 20% 35V X5R-CERM 0402-0.1MM 138S00030
PACK_IGNORE=TRUE
PACK_OPTION=CHGR_MLCC-STD

CRITICAL C520A 2.2UF 20% 35V X5R 0402-4 138S00409
CRITICAL C520B 2.2UF 20% 35V X5R 0402-4 138S00409
CRITICAL C520C 2.2UF 20% 35V X5R 0402-4 138S00409
CRITICAL C520D 2.2UF 20% 35V X5R 0402-4 138S00409
PACK_OPTION=CHGR_MLCC-LN

CRITICAL C5202 6.8UF 20% 35V-0.090OHM POLY-TANT CASE-B1-B3-COMBO CAPMAT=POLY-TANT
CRITICAL C5203 6.8UF 20% 35V-0.090OHM POLY-TANT CASE-B1-B3-COMBO CAPMAT=POLY-TANT
CRITICAL C5204 6.8UF 20% 35V-0.090OHM POLY-TANT CASE-B1-B3-COMBO CAPMAT=POLY-TANT
CRITICAL C5205 6.8UF 20% 35V-0.090OHM POLY-TANT CASE-B1-B3-COMBO CAPMAT=POLY-TANT
CRITICAL C5206 6.8UF 20% 35V-0.090OHM POLY-TANT CASE-B1-B3-COMBO CAPMAT=POLY-TANT
PACK_OPTION=CHGR_72W

FROM USB-C SOURCE

92 29 25 PPDCIN_AON_CHGR

CRITICAL C5201 6.8UF 20% 35V-0.090OHM POLY-TANT CASE-B1-B3-COMBO CAPMAT=POLY-TANT

CRITICAL R5220 0.01 0.5% 1W MF 0612-1-COMBO
107S00044 NO_XNET_CONNECTION=1 (AMON) 2-CELL: 0.02 OHM 3-CELL: 0.01 OHM

CHGR_CSI_P
PLACE_NEAR=U5200.D5:2MM
R5221 1 1% 1/20W TK 0201
CRITICAL C5221 0.1UF 10% 50V CERM-X7R 0402

CHGR_CSI_N
PLACE_NEAR=U5200.C5:2MM
R5222 1 1% 1/20W TK 0201
CRITICAL C5222 0.047UF 10% 50V CER-X7R 0402

CHGR_CSI_FILT_P
CHGR_CSI_FILT_N

CRITICAL C5220 0.47UF 20% 4V CERM-X5R-1 201
NO_XNET_CONNECTION=1

CHGR_PHASE1 25
NOSTUFF R5235 1.5 5% 1/16W TK 0402 116S00026
CHGR_SNB1 DIDT=TRUE SWITCH_NODE=TRUE
NOSTUFF C5235 150PF 5% 50V C0G-CERM 0402 131S0514

CHGR_PHASE2 25
NOSTUFF R5245 1.5 5% 1/16W TK 0402 116S00026
CHGR_SNB2 DIDT=TRUE SWITCH_NODE=TRUE
NOSTUFF C5245 150PF 5% 50V C0G-CERM 0402 131S0514

CRITICAL L5230 1.4UH-20%-12A-0.0108OHM PIRR071G-SM 152S01459
CHGR_PHASE1_1
CRITICAL L5240 1.4UH-20%-12A-0.0108OHM PIRR071G-SM 152S01459

CHGR_PHASE1 25 DIDT=TRUE SWITCH_NODE=TRUE
CHGR_PHASE2 25 DIDT=TRUE SWITCH_NODE=TRUE

Q5230 NTTFD4D1N03P1E WDFN8
CRITICAL
V+ 3 4 5
GND 1 11
HSG 7
SW 8
LSG 2

Q5240 NTTFD4D1N03P1E WDFN8
CRITICAL
GND 11 1
V+ 5 4 3
LSG 2
SW 8
HSG 7

CHGR_GATE_Q1_R DIDT=TRUE SWITCH_NODE=TRUE
R5251 0 5% 1/10W MF 0402-1 116S00044
CHGR_GATE_Q1 26 DIDT=TRUE SWITCH_NODE=TRUE

CHGR_GATE_Q2_R DIDT=TRUE GATE_NODE=TRUE
R5252 0 5% 1/16W MF 0402-1 116S00044
CHGR_GATE_Q2 GATE_NODE=TRUE

CHGR_GATE_Q3_R DIDT=TRUE GATE_NODE=TRUE
R5253 0 5% 1/16W MF 0402-1 116S00044
CHGR_GATE_Q3 DIDT=TRUE GATE_NODE=TRUE

CHGR_GATE_Q4_R DIDT=TRUE SWITCH_NODE=TRUE
R5254 0 5% 1/16W MF 0402-1 116S00044
CHGR_GATE_Q4 DIDT=TRUE SWITCH_NODE=TRUE

CHGR_LX1 DIDT=TRUE SWITCH_NODE=TRUE
XW5230 SM
CRITICAL C5230 0.1UF 10% 25V X7R-CERM-1 0402
CHGR_BOOT1_RC DIDT=TRUE SWITCH_NODE=TRUE
R5230 0 5% 1/16W MF 0402-1 116S00044
CHGR_BOOT1 DIDT=TRUE SWITCH_NODE=TRUE

CHGR_LX2 DIDT=TRUE SWITCH_NODE=TRUE
XW5240 SM
CRITICAL C5240 0.1UF 10% 25V X7R-CERM-1 0402
CHGR_BOOT2_RC DIDT=TRUE SWITCH_NODE=TRUE
R5240 0 5% 1/16W MF 0402-1 116S00044
CHGR_BOOT2 DIDT=TRUE SWITCH_NODE=TRUE

PP5V_CHGR_SW 26
R5275 1 5% 1/20W TK 0201
R5276 1 5% 1/20W TK 0201

PPCHGR_VDDA 26
CRITICAL C5275 2.2UF 20% 25V X5R-CERM 0402-1
PPCHGR_VDDP
CRITICAL C5277 10UF 20% 25V X5R-CERM 0603

U5200 RAA489900 WLCSP

B5	P_IN	GATE_Q1	H1
C5	CSIN	BOOT1	F1
D5	CSIP	LX1	G1
A5	PBUS_PWR	GATE_Q2	E1
D3	AUX_DET	GATE_Q3	D1
		LX2	B1
		BOOT2	C1
		GATE_Q4	A1
		PBUS_Q4SNS	A3
		CSOP	A4
		CSON	B4
		BGATE	B3
		VBAT	C3
		EN_VR1	F2
		SMC_RST*	H4
		IRQ_L	H3
		CBC_ON	H2
		(5V) EN_MVR	F4
		(OD) AUX_OK	F3
		AMON	D4
		BMON	C4
F5	VDDIO1P8		
G5	SDA		
H5	SCL		
G2	SMC_RST_IN		
G3	HPWR_EN*		
E5	COMP		
G4	CELL		
B2	NC0		
C2	NC1		
E4	NC2		
E3	AGND		
E2	PGND		

CRITICAL
SCH SYMBOL 353S02432
OMIT_TABLE
H:3-CELL L:2-CELL

CHGR_PBUS_SNS MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1000
CHGR_BGATE
CHGR_VBAT
NC_CHGR_EN_VR1 96
NC_CHGR_SMC_RST_L 96
CHGR_INT_1V8_L OUT 26
NC_CHGR_CBC_ON 96
CHGR_EN_MVR OUT 26
CHGR_AUX_OK OUT 26
CHGR_AMON OUT 52
CHGR_BMON OUT 52

ID REGISTER 0XFF => 0X000D

<RDAR://68945820>
MAGSAFE: ACE GPIO6
USBC: ACE GPIO5

CRITICAL 376S1112 Q5216 DMN5L06TK SOT523 SYM_VER_2

68 IN CHGR_AUX_DET_SHORT_3V3

R5217 10K 5% 1/20W TK 0201 117S00090

NOSTUFF C5216 0.01UF 10% 25V X5R-CERM 0201
R5216 158K 1% 1/20W TK 0201
CHGR_AUX_DET

92 26 C5280 1.0UF 20% 6.3V X5R 0201-1

51 BI SMBUS_CHGR_1V8_SDA
51 IN SMBUS_CHGR_1V8_SCL
43 IN CHGR_RST_IN

CHGR_COMP
CRITICAL C5270 0.12UF 10% 10V X5R 0402
CRITICAL C5271 0.12UF 10% 10V X5R 0402

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S02633	1	RAA489900,PMIC,WHAMOLA,OTP-2,WCSP40	U5200	CRITICAL	WHAMOLA:0A5
353S02990	1	RAA489900,PMIC,WHAMOLA,OTP-6,WCSP40	U5200	CRITICAL	WHAMOLA:0A5-13V7

CRITICAL C5256 2.2UF 20% 25V X6S-CERM 0402 138S00042
CRITICAL C5257 2.2UF 20% 25V X6S-CERM 0402 138S00042
CRITICAL C5256 2.2UF 20% 25V X6S 0402-1 138S00410
CRITICAL C5257 2.2UF 20% 25V X6S 0402-1 138S00410
C5258 1000PF 10% 25V X7R 0201
PACK_IGNORE=TRUE
PACK_OPTION=CHGR_MLCC-STD
PACK_OPTION=CHGR_MLCC-LN

CAPDERATE CRITICAL C5252 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5253 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5254 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5255 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5282 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5283 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5284 33UF 20% 16V TANT CASE-T 128S00009
CAPDERATE CRITICAL C5285 33UF 20% 16V TANT CASE-T 128S00009
PACK_IGNORE=TRUE
PACK_OPTION=CHGR_PBUS16V

CAPDERATE CRITICAL C5252 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5253 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5254 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5255 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5282 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5283 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5284 27UF 20% 18V TANT-POLY CASE-B12 128S00107
CAPDERATE CRITICAL C5285 27UF 20% 18V TANT-POLY CASE-B12 128S00107
PACK_OPTION=CHGR_PBUS18V

PPVBAT_AON_CHGR_REG 25
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000

CRITICAL F5200 12A-32V-0.00450HM 1206
TO SYSTEM
PPBUS_AON 92

PPVBAT_AON_CHGR_R
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1500

CRITICAL C5265 2.2UF 20% 25V X6S-CERM 0402 138S00042
CRITICAL C5266 2.2UF 20% 25V X6S-CERM 0402 138S00042
CRITICAL C5265 2.2UF 20% 25V X6S 0402-1 138S00410
CRITICAL C5266 2.2UF 20% 25V X6S 0402-1 138S00410
CRITICAL C5267 0.1UF 10% 25V X7R 0201
CRITICAL C5268 0.01UF 10% 25V X5R-CERM 0201
PACK_IGNORE=TRUE
PACK_OPTION=CHGR_MLCC-STD
PACK_OPTION=CHGR_MLCC-LN

NO_XNET_CONNECTION=1
CRITICAL R5260 0.005 (PMON) 1% 1W MF 0612-8 2-CELL: 0.010 OHM 3-CELL: 0.005 OHM 107S00087

CRITICAL Q5265 SI7655DN-COMBO PWRPK-1212-8 SYM-VER-2

TO/FROM BATTERY
PPVBAT_AON_CONN 24
MIN_LINE_WIDTH=0.6000
MIN_NECK_WIDTH=0.1500

C5264 1000PF 10% 25V X6S 0402-1
C5269 0.1UF 10% 25V X5R 0201
C5263 4700PF 10% 25V CER-X5R 0201

XW5260 SM
PLACE_NEAR=Q5240.3:2MM

CHGR_CSO_P
PLACE_NEAR=U5200.A4:2MM
R5261 1 1% 1/20W TK 0201
CRITICAL C5261 0.047UF 10% 50V CER-X7R 0402

CHGR_CSO_N
PLACE_NEAR=U5200.B4:2MM
R5262 1 1% 1/20W TK 0201
CRITICAL C5262 0.047UF 10% 50V CER-X7R 0402

CRITICAL C5260 0.47UF 20% 4V CERM-X5R-1 201
NO_XNET_CONNECTION=1

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000
XW5263 SM

CHGR_VBAT_XW
R5263 1K 5% 1/20W TK 0201-1

CRITICAL Q5270 <rdar://37259372&39763505>
NTNS4CS69N XDFN SYM_VER_1

SAVE_BAT_S
R5270 24K 5% 1/20W TK 0201

SAVE_BAT_G
CRITICAL D5270 DFN0201 ALLOW_APPLE_PREFIX=D DZD5V6LP3-55

PPDCIN_AON_CHGR 25 29 92
R5271 200K 1% 1/20W TK 0201

BOM_COST_GROUP=BATTERY

SYNC_MASTER=Charger SYNC_DATE=09/10/2021

PAGE TITLE
PBUS SUPPLY & BATTERY CHARGER

Apple Inc.

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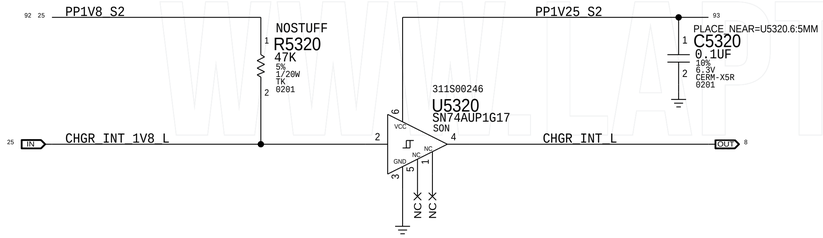
*** OK2INTEGRATE ***

CHGR I2C Level Translation

SMBUS_CHGR_1V8_[SCL/SDA]: Level translation circuit to be placed in project specific I2C page.

CHGR_INT_L Level Translation

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



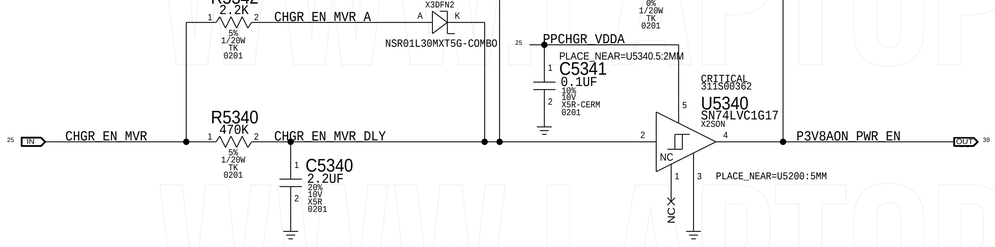
CHGR_AUX_OK Pull Up

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

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

Delay for 3.8V VR Enable

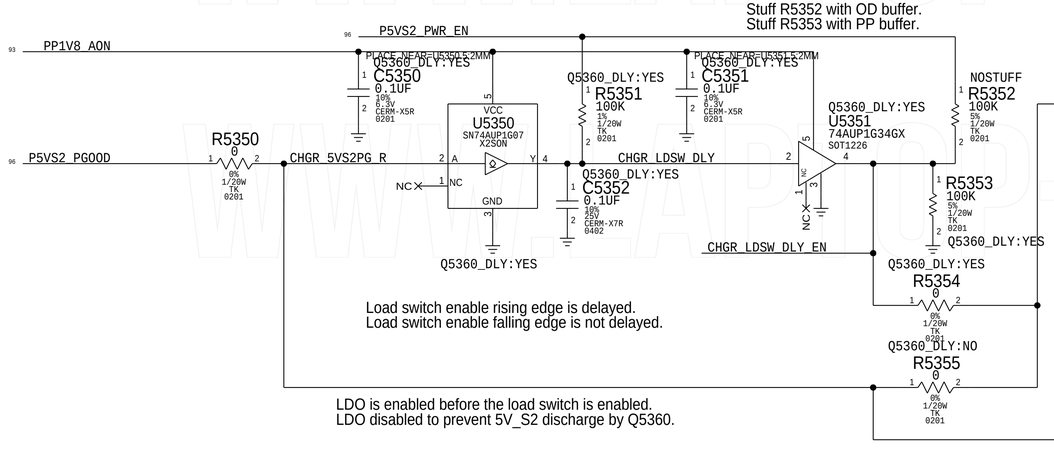
R5340 and C5340 updated per rdar://62686034



Probe points - bottom

SWITCHOVER TO EXTERNAL 5V

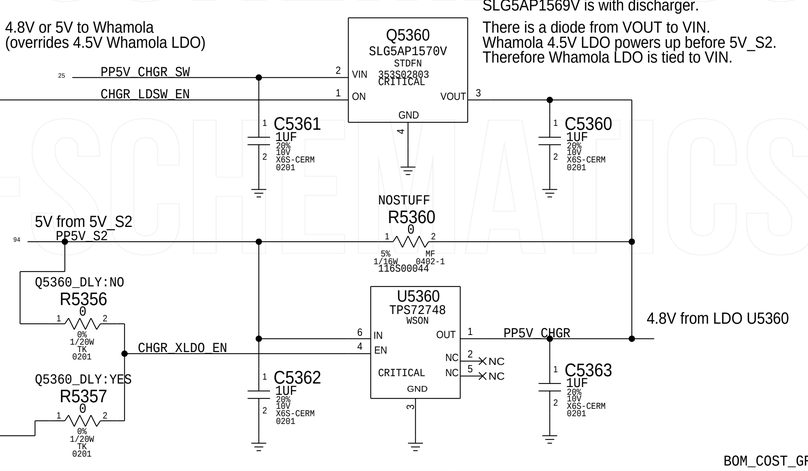
Stuff R5352 with OD buffer.
Stuff R5353 with PP buffer.



4.8V or 5V to Whamola
(overrides 4.5V Whamola LDO)

SLG5AP1570V is w/o discharger.
SLG5AP1569V is with discharger.

There is a diode from VOUT to VIN.
Whamola 4.5V LDO powers up before 5V_S2.
Therefore Whamola LDO is tied to VIN.



BOM_COST_GROUP=BATTERY

SYNC_MASTER=Charger SYNC_DATE=03/10/2021

PAGE TITLE

BATTERY CHARGER SUPPORT

Apple Inc.

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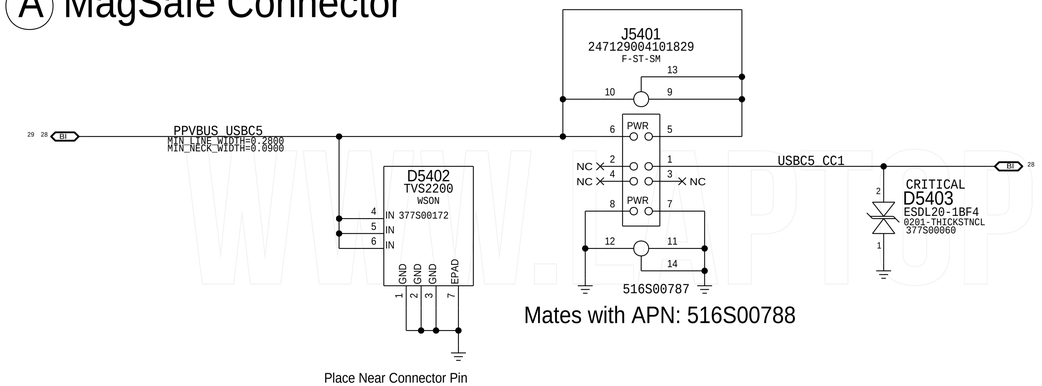
A MagSafe Connector



Mates with APN: 516S00788

Place Near Connector Pin

BOM_COST_GROUP=MAGSAFE

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Either a Testpoint or Arkanoid connector
must be present for GPIO0
(EVEN IN PRODUCTION)
PPHV_INT5_AONSW
MAX 100uF TOTAL ON RAIL
R5502 1K PD_ACE5_VCONN
PD_ACE5_VCONN
PPVBUS_USBC5
PP3V3_UPC5_LDO
U5500
CD3217B12GACER
FCBGA
CRITICAL
OMIT_TABLE
PP_5V0
PP_CABLE
PP_HV
VBUS
R5506 100K
R5507 10K UPC5_GPIO2
PD_UPC5_MRESET
NC_UPC5_RESET_L
R5534 100K
R5531 100K
UPC5_SER_DBG
UPC5_GPIO1
UPC5_GPIO2
UPC5_GPIO3
UPC5_GPIO4
UPC5_GPIO5
UPC5_GPIO6
UPC5_GPIO7
UPC5_GPIO8
UPC5_GPIO9
UPC5_GPIO10
R5573 100K
R5572 100K
R5574 100K
R5575 100K
ACE_WILL_BE_OTPED:NO
84.5K
R5550 UPC5_I2C_ADDR
UPC5_R_OSC
R5503 15K CRITICAL
I2C_UPC5_SDA
I2C_UPC5_SCL
R5510 1M I2C_UPC5_SDA
ACE_WILL_BE_OTPED:YES
R5508 1M I2C_UPC5_SDA
CKPLUS_WAIVE=I2C_PULLUP
R5509 1M I2C_UPC5_SCL
I2C_UPC_SDA
I2C_UPC_SCL
UPC_I2C_INT_L
I2C_SMC_UPC_SDA
I2C_SMC_UPC_SCL
UPC_SMC_I2C_INT_L
SPI_UPC5_R_CLK
SPI_UPC5_R_MOSI
SPI_UPC5_R_MISO
SPI_UPC5_R_CS_L
SWD_UPC_SWDIO2
SWD_UPC_SWCLK1
R5505 1M UART_UPC5
Configured as UPC5 (the 6th slot)
ACE_WILL_BE_OTPED:YES (POR)
If Ace can be OTPed
before installing bundle.
(ICT station is ready)
I2C_ADDR=Float
I2CM_SCL_CNFG=HIGH
I2CM_SDA_CNF=LOW
ACE_WILL_BE_OTPED:NO
Like in P0, Or EE bring up
Prevents I2C Conflict with
Other Aces before OTP
I2C_ADDR=84.5K PD
I2CM_SCL_CNFG=HIGH
I2CM_SDA_CNFG=HIGH
PD_UPC5_USB_RP
R5577 100K
PD_UPC5_PORT_MUX
ROM_UPC5_WP_L
PD_UPC5_DBG_R
R5576 100K
R5578 100K
DIGITAL CORE I/O & CONTROL
POWER
TYPE-C
PORT_MUX
GND
PP3V3_S2_LDO
PP1V25_S2
PP3V3_UPC5_LDO
R5501 1K
UPC5_LV
C5508 10UF
C5502 1.0UF
C5500 10UF
UPC5_SS
PP1V5_UPC5_LDO_CORE
C5505 10UF
C5509 0.68UF
PPVBUS_USBC5
PPHV_INT5_AONSW
USBC5_CC1
USBC5_CC2
NOSTUFF
C5514 220PF
PD_UPC5_USB2
R5579 100K
C5513 220PF
C5521 2200PF
C5522 2200PF
C5523 3300PF
C5524 3300PF
C5525 0.01UF
C5526 0.01UF
D5501 SDM2U40CSP
C5501 1UF
SPI ROM
R5560 3.3K
R5561 3.3K
R5563 3.3K
U5560
8MBIT-3.0V
W25Q80DVUXIE
OMIT_TABLE
CRITICAL
R5562 3.3K
C5560 1UF
SPI_UPC5_MOSI
SPI_UPC5_MISO
R5565 15 SPI_UPC5_R_MOSI
R5566 15 SPI_UPC5_R_MISO
DISABLING BOOTING FROM SPI
R5567 47K
ROM_UPC5_WP_L
ROM_UPC5_HOLD_L
R5564 3.3K
SPI_UPC5_CLK
R5568 15 SPI_UPC5_R_CLK
SPI_UPC5_CS_L
R5569 15 SPI_UPC5_R_CS_L
AARDVARKANOID CONN
APN 516S00115
USBC_DBG
J5502
505070-1222
PP1V25_S2
SWD_UPC_SWDIO2
SWD_UPC_SWCLK1
SPI_UPC5_MISO
I2C_UPC01_3V3_SDA
I2C_UPC01_3V3_SCL
SPI_UPC5_CS_L
SPI_UPC5_CLK
SPI_UPC5_MOSI
UPC5_SER_DBG
NC_MAGSAFE_ACE_DEB_CON_10
BOM_COST_GROUP=MAGSAFE

MAGSAFE: PORT CONTROLLER

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A 20V Aliases

POWER ALIASES

28 BI PPVBUS_USBC5 = PPVBUS_USBC5 BI 27 28
MAKE_BASE=TRUE

GPIOs

28 BI UPC5_GPIO1 — 100K 0201 1% 1/20W R5602 117S00095
28 BI UPC5_GPIO5 — 100K 0201 1% 1/20W R5603 117S00095

DEBUG PORT

28 BI NC_MAGSAFE_ACE_DEB_CON_10 = NC_MAGSAFE_ACE_DEB_CON_10
MAKE_BASE=TRUE

B Power/Fuse for UPC5

28 BI PPHV_INT5_AONSW
28 BI PPHV_INT5_AONSW
PPHV_INT5_AONSW MAKE_BASE=TRUE
MAX 100uF TOTAL ON RAIL
CRITICAL 6A-32V F5601 0603-1 740S00053
PPDCIN_AON_CHGR PLACE_NEAR=U5500:5MM BI 29

C I2C Aliases

68 51 8 IN I2C_SMC_UPC_SCL — CKPLUS_WAIVE=I2C_PULLUP — MAKE_BASE=TRUE — I2C_SMC_UPC_SCL OUT 28
68 51 8 BI I2C_SMC_UPC_SDA — CKPLUS_WAIVE=I2C_PULLUP — MAKE_BASE=TRUE — I2C_SMC_UPC_SDA BI 28

68 49 9 IN I2C_UPC_SCL — CKPLUS_WAIVE=I2C_PULLUP — MAKE_BASE=TRUE — I2C_UPC_SCL OUT 28
68 49 9 BI I2C_UPC_SDA — CKPLUS_WAIVE=I2C_PULLUP — MAKE_BASE=TRUE — I2C_UPC_SDA BI 28
68 49 8 OUT UPC_I2C_INT_L — CKPLUS_WAIVE=I2C_PULLUP — MAKE_BASE=TRUE — UPC_I2C_INT_L IN 28
68 51 8 OUT UPC_SMC_I2C_INT_L — CKPLUS_WAIVE=I2C_PULLUP — MAKE_BASE=TRUE — UPC_SMC_I2C_INT_L IN 28

D Charger Aliases

92 29 BI PPDCIN_AON_CHGR = PPDCIN_AON_CHGR BI 29
BI PPDCIN_AON_CHGR
MAKE_BASE=TRUE

BOM_COST_GROUP=MAGSAFE

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3V8 AON CONTROLLER
30A ICC MAX

PPBUS_AON
92 89 31
5.5 < VIN < 13.5 V
PACK_IGNORE=TRUE
3V8_AON_MLCC-STD
C5704
2.2UF
20%
25V
X6S-CERM
0402
138S00042
BYPASS=U5700.8::15MM
3V8_AON_MLCC-LN
C5704
2.2UF
20%
25V
X6S
0402-1
138S00410
BYPASS=U5700.8::15MM
8 VIN

PP5V_S2_P3V8AON_VDRV
32
4.75 < VDRV < 5.5 V
VDRV IS EXTERNAL OPTION TO
POWER IC INSTEAD OF VIN
TO SAVE POWER
C5700
10UF
20%
10V
X6S
0603-1
138S00248
BYPASS=U5700.6::15MM
0603 SIZE REQUESTED BY DCDC
CRITICAL
6 VDRV

PP5V_AON
92
4.75 < LDO5 < 5.25 V
MAX I_OUT TYP 160 MA
LDO5 NOT TO BE USED BY
SYSTEM IN 30A DESIGNS
C5702
10UF
20%
10V
X6S
0603-1
138S00248
BYPASS=U5700.7::15MM
0603 SIZE REQUESTED BY DCDC
CRITICAL
7 LDO5

P3V8AON_PVCC
31
ONLY FOR USE BY GATE
DRIVE CIRCUITRY
C5701
10UF
20%
10V
X6S
0603-1
138S00248
BYPASS=U5700.5::15MM
0603 SIZE REQUESTED BY DCDC
CRITICAL
5 PVCC

U5700
RAA225501A-B0M1
QFN
OMIT_TABLE
"BOM1" SCH SYMBOL
FOR 30A OTP
APN OF SYMBOL
353S02326

F_SW IS REGISTER CONTROLLED
ICC MAX 30A DESIGN: 1 MHZ

BOOT1 4 P3V8AON_BST1 IN 31
UGATE1 3 P3V8AON_DRVH1 OUT 31
PHASE1 2 P3V8AON_SW1 IN 31 89
LGATE1 1 P3V8AON_DRVL1 OUT 31

BOOT2 29 P3V8AON_BST2 IN 31
UGATE2 30 P3V8AON_DRVH2 OUT 31
PHASE2 31 P3V8AON_SW2 IN 31 89
LGATE2 32 P3V8AON_DRVL2 OUT 31

BOOT3 28 P3V8AON_BST3 IN 31
UGATE3 27 P3V8AON_DRVH3 OUT 31
PHASE3 26 P3V8AON_SW3 IN 31 89
LGATE3 25 P3V8AON_DRVL3 OUT 31

VSEN 15 P3V8AON_VSENSE IN 31
VRTN 16 P3V8AON_VRTN IN 31

CSP1 19 P3V8AON_ISEN1_P IN 31
CSN1 20 P3V8AON_ISEN1_N IN 31
CSP2 21 P3V8AON_ISEN2_P IN 31
CSN2 22 P3V8AON_ISEN2_N IN 31
CSP3 23 P3V8AON_ISEN3_P IN 31
CSN3 24 P3V8AON_ISEN3_N IN 31

26 IN P3V8AON_PWR_EN
R5710 0 0% 1/20W TK 0201 117S00073
P3V8AON_PWR_EN_R
VIH_MIN 1.07 V
VIL_MAX 0.63 V
12 ENABLE (9M PD)

42 IN P3V8AON_LPM
R5711 0 0% 1/20W TK 0201 117S00073
P3V8AON_LPM_R
VIH_MIN 1.1 V
VIL_MAX 0.5 V
13 LPM (9M PD)

92 PP5V_AON
117S00129 R5712 47K 5% 1/20W TK 0201
PU TO INT LDO5 OR OTHER RAIL
P3V8AON_FAULT_L
14 FAULT* (OD)
FAULT PULL DOWN CURRENT 1-2 MA TYPICAL

30 I2C_P3V8AON_SCL
30 I2C_P3V8AON_SDA
VIH_MIN 1.1 V
VIL_MAX 0.5 V
GND'ED FOR POR (DATASHEET TABLE 1.5)
10 SCL
9 SDA
I2C ADDRESS
7 BIT: 0X36
8 BIT WR: 0X6C

P3V8AON_IMON
IMON NOT TO BE USED SYSTEM SIDE
<RDAR://58648650>
IMON IS 2.52 V @ 30 A
VENDOR REQUIRES R > 1M, C < 50 PF
C5751 10PF 5% 50V C0G 0201 131S00003
NOSTUFF R5751 2.21K 1% 1/20W TK 0201 118S00367
R5750 1M 5% 1/20W TK 0201 117S00096
P3V8AON_IMON_P3V8AON
18 IMON (0-4.5V)

P3V8AON_GPIO
OPEN FOR PRODUCTION APPLICATION
PER DATASHEET REV 1.0
11 GPIO

P3V8AON_SS
LONG STARTUP TIME SO INRUSH
BELOW 0.5A USB LIMIT
NOSTUFF R5700 100K 5% 1/20W TK 0201 117S00095
C5703 0.22UF 10% 16V X5R 0201-1 132S00202 CRITICAL
17 SOFTSTART

EPAD
33

3V8_AON_I2C-DEV
998-0955
PP5700 P4MM SM
TPT_P3V8AON_PU_RAIL

PACK_OPTION=3V8_AON_I2C-DEV
NOSTUFF R5760 1K 5% 1/20W TK 0201-1 117S00077
PACK_OPTION=3V8_AON_I2C-DEV
NOSTUFF R5761 1K 5% 1/20W TK 0201-1 117S00077
CKPLUS_WAIVE=I2C_PULLUP
I2C_P3V8AON_SCL 30
CKPLUS_WAIVE=I2C_PULLUP
I2C_P3V8AON_SDA 30

PACK_OPTION=3V8_AON_I2C-DEV
R5762 0 0% 1/20W TK 0201 117S00073
PACK_OPTION=3V8_AON_I2C-DEV
R5763 0 0% 1/20W TK 0201 117S00073
3V8_AON_I2C-POR
GND MAKE_BASE=TRUE
3V8_AON_I2C-POR
GND MAKE_BASE=TRUE

BOM_COST_GROUP=SOC POWER

30A OTP CHANGES DOCUMENTED IN <RDAR://61519509>
BOM5 IS A CONTINUATION OF BOM1 SINCE BOM1 IS FROZEN FOR TGA PROGRAMS

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

<- 30A BOM1 OTP TGA PROGRAMS ARE GOING TO RAMP WITH
<- NEW BOM5 OTP FOR FUTURE PROGRAMS

SYNC_MASTER=MainVR SYNC_DATE=10/01/2021
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POWER: 3V8 AON (1/2)
Apple Inc.
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ICCMAX = 30 A

PPBUS_AON
P3V8AON_DRVH1
P3V8AON_BST1
P3V8AON_PVCC
P3V8AON_DRVL1
P3V8AON_ISEN1_P
P3V8AON_ISEN1_N
P3V8AON_DRVH2
P3V8AON_BST2
P3V8AON_PVCC
P3V8AON_DRVL2
P3V8AON_ISEN2_P
P3V8AON_ISEN2_N
P3V8AON_DRVH3
P3V8AON_BST3
P3V8AON_PVCC
P3V8AON_DRVL3
P3V8AON_ISEN3_P
P3V8AON_ISEN3_N
BOM_COST_GROUP=SOC POWER

SYNC_MASTER=MainVR	SYNC_DATE=10/01/2021
PAGE TITLE	POWER: 3V8 AON (2/2)
Apple Inc.	DRAWING NUMBER 051-07020 SIZE D
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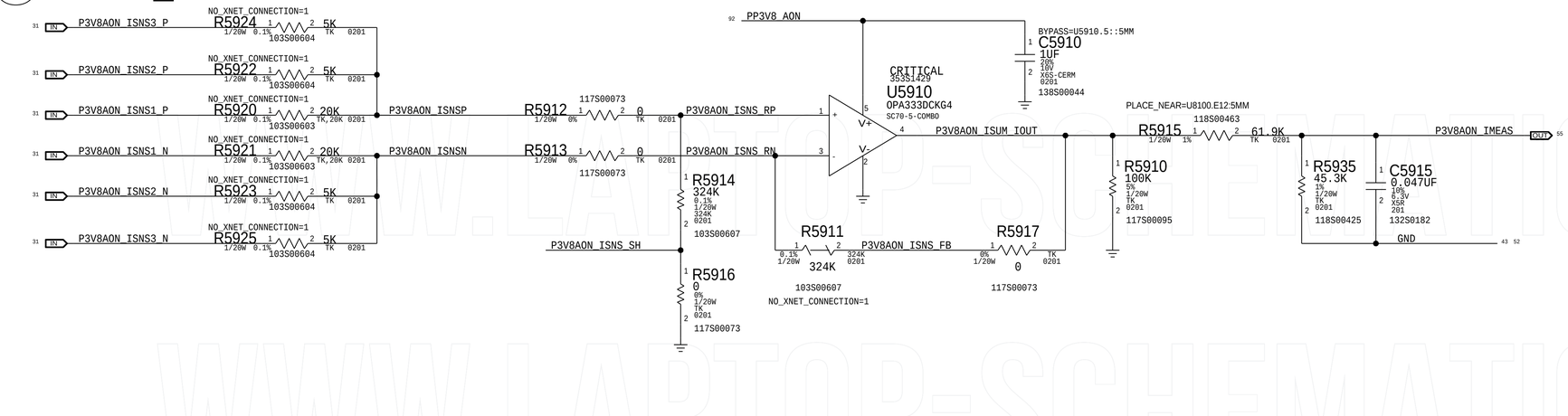
A PP3V8_AON Current Sense



B PP5V_S2 to PP3V8_AON VDRV Connection

BOM_COST_GROUP=SOC POWER

SYNC_MASTER=jweeb SYNC_DATE=09/28/2021

PAGE TITLE: POWER: 3V8 AON SUPPORT

Apple Inc.

DRAWING NUMBER: 051-07020 SIZE: D

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*** OK2INTEGRATE ***

PP3V8_AON

OMIT_TABLE
998-23585

U7700
VALE
CSP
SYM 1 OF 4

VOLTAGE INPUTS

VDD_BUCK10_8 A7, B7, A11, B11
VDD_BUCK14_5 G13, G14, L12, L13, L14
VDD_MAIN_BUCK6 L1
VDD_BUCK6 M2, N2, P2
VDD_BUCK12 N6, P6
VDD_MAIN H5
VDD_MAIN_NORTH C11
VDD_MAIN_SOUTH N10

SENSE

VDD_MAIN_SNS E4 ← PPVDD_SPMU_VDD_MAIN_SNS
VDD_BOOST_SNS F6 ← PPVDD_SPMU_VDD_BOOST_SNS

BUCK OUTPUTS

VDD_ANA C7, D4, D10, G5, G12, K3, M6, N12
VDD_DIG D11, E8, K5, L11
BSTLQ_LX C14
BSTLQ_VOUT D14 ← SPMU_BSTLQ_LX / PP5V_SPMU_BSTLQ_XW
VDD_HI_INT1 D5
VDD_HI_INT2 E5
VDD_HI_INT3 L4
VDD_HI_INT4 N11
VDD_HI_INT5 E11 ← PP5V_SPMU_BSTLQ
VDDIO_1V2 J10 ← PP1V25_S2
VDDIO_1V8 H10 ← PP1V8_S2
VDDIO_1V2_1V8 G10 ← PP1V2_AON_SPMU
VREF G4 ← PPVREF_SPMU
VREF_ADC H4 ← PP1V5_SPMU_VREFADC

PP1V5_LDOINT_SPMU
132S00030 C7720 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7721 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7722 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7723 0.1UF 10% 10V X6S-CERM 0201

PPVREF_SPMU
138S00041 CRITICAL C7711 2.2UF 10% 10V X6S-CERM 0402
PP1V5_SPMU_VREFADC
132S0406 CRITICAL C7710 0.22UF 20% 6.3V X6S-CERM 0201

GND_VREF_RTN_SPMU VOLTAGE=0V
GND_ADC_RTN_SPMU VOLTAGE=0V

SPMU_BSTLQ_LX
152S00874 L7700 0.47UH-20%-1.7A-0.175OHM PIJT1005FE-SM-COMBO
SWITCH_NODE=TRUE DIDT=TRUE
PP3V8_AON

XW7700 SHORT-12L-0.25MM-SM
PP5V_SPMU_BSTLQ_XW → PP5V_SPMU_BSTLQ
VOLTAGE=5
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000
138S00107 C7700 20UF 20% 10V X5R 0402
138S00107 C7701 20UF 20% 10V X5R 0402
132S00030 C7702 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7770 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7771 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7772 0.1UF 10% 10V X6S-CERM 0201
132S00030 C7773 0.1UF 10% 10V X6S-CERM 0201

BUCK5_LX0 H14 ← BUCK5_LX0
BUCK5_LX1 K12, K13, K14 ← BUCK5_LX1
BUCK5_FB H11 ← BUCK5_FB
BUCK5_VSS_FB H12 ← GND

CRITICAL L7750 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283
BUCK5_LX0 → PP0V779_S1_SRAM
CRITICAL L7751 0.22UH-20%-6.7A-0.023OHM PINA201617-SM 152S00204
BUCK5_LX1
R7750 0 0% 1/20W TK 0201
BUCK5_FB → BUCK5_FB_R
998-14727 XW7750 SHORT-16L-0.1MM-SM NO_XNET_CONNECTION=1
BOMOPTION=PMU_FB:FF

PP0V779_S1_SRAM
C7750 C7751 C7752 C7753 C7754 C7755 C7756 C7757 138S1058 15UF 20% 2V X6S 0402-2
C7758 C7759 15UF 20% 2V X6S 0402-2
C775A C775B 2.2UF 20% 4V X6S-CERM 0201
PACK_IGNORE=TRUE
PACK_OPTION=BUCK5_LOCAL_CAPS

BUCK6_VOUT M1, N1, P1 ← BUCK6_VOUT
BUCK6_LX M3, N3, P3 ← BUCK6_LX
BUCK6_FB L3 ← BUCK6_FB
BUCK6_VSS_FB K2 ← GND

CRITICAL L7760 0.47UH-20%-6.9A-0.022OHM MEMX2520-SM 152S01325
BUCK6_LX
R7760 0 0% 1/20W TK 0201
BUCK6_FB → BUCK6_FB_R
998-0313 XW7760 SHORT-16L-0.1MM-SM NO_XNET_CONNECTION=1
BOMOPTION=BUCK6_BULK_REG

PP2V58_AWAKE_NAND_VCC
C7760 C7761 C7762 C7763 C7764 C7765 C7768 C7769 138S00073 10UF 20% 6.3V CER-X6S 0402-COMBO
C776A C776B C7766 C7767 C776C C776D C776E C776F 138S00073 10UF 20% 6.3V CER-X6S 0402-COMBO
BOMOPTION=BUCK6_BULK_REG
BOMOPTION=BUCK6_BULK_REG

BUCK8_LX0 A12 ← BUCK8_LX0
BUCK8_LX1 A10, B10 ← BUCK8_LX1
BUCK8_LX2 A8, B8 ← BUCK8_LX2
BUCK8_FB D12 ← BUCK8_FB
BUCK8_VSS_FB C12 ← GND

CRITICAL L7780 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283
BUCK8_LX0 → PPVDD_S1_DISP
CRITICAL L7781 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK8_LX1 / BUCK8_LX2
R7780 0 0% 1/20W TK 0201
BUCK8_FB → BUCK8_FB_R
998-0313 XW7780 SHORT-16L-0.1MM-SM NO_XNET_CONNECTION=1
BOMOPTION=PMU_FB:FF

PPVDD_S1_DISP
C7780 C7781 C7782 C7783 C7784 C7785 C7786 C7787 138S1058 15UF 20% 2V X6S 0402-2
C7788 C7789 C778A C778B C778C C778D 138S00039 2.2UF 20% 4V X6S-CERM 0201
NOSTUFF
PACK_IGNORE=TRUE
PACK_OPTION=BUCK8_LOCAL_CAPS

BUCK10_LX A6, B6 ← BUCK10_LX
BUCK10_FB D6 ← BUCK10_FB
BUCK10_VSS_FB C6 ← GND

CRITICAL L77A0 0.47UH-20%-4A-0.024OHM PIKD20121B-SM 152S01263
BUCK10_LX → PP0V5_S1_VDDQL
R77A0 0 0% 1/20W TK 0201
BUCK10_FB → BUCK10_FB_R
998-0313 XW77A0 SHORT-16L-0.1MM-SM NO_XNET_CONNECTION=1
BOMOPTION=PMU_FB:FF

PP0V5_S1_VDDQL
C77A0 C77A1 C77A2 C77A3 C77A4 C77A5 C77A6 C77A7 138S1058 15UF 20% 2V X6S 0402-2
C77A6 C77A7 138S00039 2.2UF 20% 4V X6S-CERM 0201
BOMOPTION=PMU_BULK_VDDQL

BUCK12_LX N5, P5 ← BUCK12_LX
BUCK12_FB L5 ← BUCK12_FB
BUCK12_VSS_FB M5 ← GND

CRITICAL L77C0 0.47UH-20%-4A-0.024OHM PIKD20121B-SM 152S01263
BUCK12_LX → PP0V88_S1
R77C0 0 0% 1/20W TK 0201
BUCK12_FB → BUCK12_FB_R
998-0313 XW77C0 SHORT-16L-0.1MM-SM NO_XNET_CONNECTION=1

PP0V88_S1
C77C0 C77C1 C77C2 C77C3 C77C4 C77C5 C77C6 C77C7 138S1058 15UF 20% 2V X6S 0402-2
NOSTUFF NOSTUFF

BUCK14_LX F13, F14 ← BUCK14_LX
BUCK14_FB F11 ← BUCK14_FB
BUCK14_VSS_FB F12 ← GND

CRITICAL L77E0 0.47UH-20%-4A-0.024OHM PIKD20121B-SM 152S01263
BUCK14_LX → PP1V12_S2SW_AMPH
R77E0 0 0% 1/20W TK 0201
BUCK14_FB → BUCK14_FB_R
998-0313 XW77E0 SHORT-16L-0.1MM-SM NO_XNET_CONNECTION=1
BOMOPTION=PMU_FB:FF

PP1V12_S2SW_AMPH
C77E0 C77E1 C77E2 C77E3 C77E4 C77E5 C77E7 138S1058 15UF 20% 2V X6S 0402-2
C77E6 138S00039 2.2UF 20% 4V X6S-CERM 0201
PACK_IGNORE=TRUE
PACK_OPTION=BUCK14_LOCAL_CAPS

BOM_COST_GROUP=SOC POWER

SYNC_MASTER=MPMU_SPMU	SYNC_DATE=10/01/2021
PAGE TITLE	SPMU: INPUT PWR, BULK, BSTLQ
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LDO INPUTS

92	PP3V8_AON	M8	VDD_CTRL_LDOG	VLDO4	P7	PP0V72_S2_VDD_LOW	93
92	PP3V8_AON	A1, A2, A3	VDD_BOOST_LDO	VLDO6	D3	NC_SPMU_VLDO6	93
92	PP3V8_AON	C1, C2, C3	VDD_MAIN_LDO	VLDO9	D1	PP1V8_AON_SPMU	94
92	PP3V8_AON	A4	VDD_LDO15	VLDO9B	B1	PP1V2_AON_SPMU	94
93 34	PP1V25_S2	N7	VDD_LDO4	VLDO12	P8	PP0V78_S1_VDD_FIXED	94
92	PP0V88_S1	N8	VDD_LDO12	VLDO15	B4	NC_SPMU_VLDO15	94
				VLDO17	B2	NC_SPMU_VLDO17	94
				VLDO18	B3	NC_SPMU_VLDO18	94
				VLDOINT	D2	PP1V5_LDOINT_SPMU	94
92 34	PP1V8_S2	M13	VDD_SW4	VSW4	M14	PP1V8_AWAKE_SPMU_GPIO	34 93
93 34	PP1V25_S2	P13, P14	VDD_SW5	VSW5	N13, N14	PP1V25_AWAKE_NAND_VCCQ	34 93
92 34	PP0V88_S1	P12	VDD_SW6	VSW6	P11	PP0V88_AWAKE_NAND_VDD	34 93
92	PP0V88_S1	P10	VDD_SW7	VSW7	P9		

LOAD SWITCHES

LDO OUTPUTS

LDO4 300MA MAX
LDO6 50MA MAX
LDO9 10MA MAX
LDO9B 10MA MAX
LDO12 850MA MAX
LDO15 100MA MAX
LDO17 250MA MAX
LDO18 250MA MAX
LDOINT 150MA MAX
VSW4 200MA MAX, 125MOHM MAX
VSW5 890MA MAX, 23MOHM MAX
VSW6 150MA MAX, 23MOHM MAX
VSW7 820MA MAX, 23MOHM MAX

VDD_LDO4
DECOUPLNIG SHARED WITH J10 (VDDIO_1V2)

93 34 PP1V25_S2

CRITICAL 138S00073 C7820 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7821 10UF 20% 6.3V CER-X6S 0402-COMBO

VLDO4

93 PP0V72_S2_VDD_LOW

CRITICAL 138S00073 C7840 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7841 10UF 20% 6.3V CER-X6S 0402-COMBO

VLDO12

94 PP0V78_S1_VDD_FIXED

CRITICAL 138S00073 C78C0 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C78C1 10UF 20% 6.3V CER-X6S 0402-COMBO

VDD_SW4
DECOUPLNIG SHARED WITH H10 (VDDIO_1V8)

92 34 PP1V8_S2

CRITICAL 138S00073 C7830 10UF 20% 6.3V CER-X6S 0402-COMBO

VSW4

93 34 PP1V8_AWAKE_SPMU_GPIO

CRITICAL 138S00044 C7850 1UF 20% 10V X6S-CERM 0201

VLDO9

94 PP1V8_AON_SPMU

CRITICAL 138S00073 C7890 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7891 10UF 20% 6.3V CER-X6S 0402-COMBO

VLDOINT

94 PP1V5_LDOINT_SPMU

CRITICAL 138S00073 C7810 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7811 10UF 20% 6.3V CER-X6S 0402-COMBO

VDD_SW5
DECOUPLNIG SHARED WITH J10 (VDDIO_1V2)

93 34 PP1V25_S2

CRITICAL 138S00073 C7822 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7823 10UF 20% 6.3V CER-X6S 0402-COMBO

VSW5

93 34 PP1V25_AWAKE_NAND_VCCQ

CRITICAL 138S00073 C7860 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7861 10UF 20% 6.3V CER-X6S 0402-COMBO

VLDO9B

94 PP1V2_AON_SPMU

CRITICAL 138S00073 C78A0 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C78A1 10UF 20% 6.3V CER-X6S 0402-COMBO

UN-UNUSED LDOS

LDO 6, 15, 17, 18

VDD_SW6/7
DECOUPLNIG SHARED VDD_LDO12

92 34 PP0V88_S1

CRITICAL 138S00073 C7831 10UF 20% 6.3V CER-X6S 0402-COMBO

VSW6/7

93 34 PP0V88_AWAKE_NAND_VDD

CRITICAL 138S00073 C7870 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7871 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C7872 10UF 20% 6.3V CER-X6S 0402-COMBO

BOM_COST_GROUP=SOC POWER

PAGE TITLE: SPMU: LDO, SW

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56	IN	SPMU_AMUXTDEV_TERM	H1	TDEV1	GPIO0	D8	LCD_OCP_FLT
56	IN	SPMU_TDEV2	J1	TDEV2	GPIO1	J7	NC_SPMU_GPIO_1
56	IN	SPMU_AMUXTDEV_TERM	H2	TDEV3	GPIO2	K7	NC_SPMU_GPIO_2
56	IN	SPMU_TDEV4	G2	TDEV4	GPIO3	J8	NC_SPMU_GPIO_3
56	IN	SPMU_TDEV5	J2	TDEV5	GPIO4	G9	NC_SPMU_GPIO_4
		SPMU_TCAL	G1	TCAL	GPIO5	D9	NC_SPMU_GPIO_5
36	IN	SPMU_ADC_IN	G3	ADC_IN	GPIO6	K8	NC_SPMU_GPIO_6
55	IN	LCDBKLT_HS_ISENSE	E2	AMUX_A<0>	GPIO7	H7	NC_SPMU_GPIO_7
55	IN	KBDBKLT_5V_ISENSE	F2	AMUX_A<1>	GPIO8	L10	NC_SPMU_GPIO_8
55	IN	IMON_PBUS_AONSW_IPD	F1	AMUX_A<2>	GPIO9	K9	NC_SPMU_GPIO_9
55	IN	IMON_P3V3_S2SW_IPD	E1	AMUX_A<3>	GPIO10	H9	NC_SPMU_GPIO_10
36	BI	SPMU_AMUX_AY	H3	AMUX_AY	GPIO11	E10	NC_SPMU_GPIO_11
55	IN	IMON_PBUS_AONSW_LCD	F3	AMUX_B<0>	GPIO12	K6	NC_SPMU_GPIO_12
55	IN	IMON_P5V_S2SW_IPD	F4	AMUX_B<1>	GPIO13	K10	NC_SPMU_GPIO_13
55	IN	WLANBT_3V3_ISENSE	F5	AMUX_B<2>	GPIO14	H6	NC_SPMU_GPIO_14
55	IN	SPMU_AMUXTDEV_TERM	E3	AMUX_B<3>	GPIO15	E9	NC_SPMU_GPIO_15
36	BI	SPMU_AMUX_BY	J3	AMUX_BY			
					UVWARN*	G7	SPMU_VDDMAIN_UVWARN_L
12	IN	SPMI_NUB_SPMU_CLK	L9	SPMI_SCLK			
12	BI	SPMI_NUB_SPMU_DATA	L8	SPMI_SDATA	SCRASH*	F7	SPMU_SCRASH_L
41	IN	SGPIO_SCLK	L7	SGPIO_SCLK	SGPIO_READY_REQ	G8	PMU_SGPIO_READY_REQ
41	BI	SGPIO_SDATA	M7	SGPIO_SDATA			
36	IN	SPMU_RESET_IN	G6	RESET_IN			
36	IN	SPMU_FORCE_SYNC	F9	FORCE_SYNC			
96	BI	SWD_NUB_SWDIO_SPMU	F8	SWD_TMS			
36	IN	GND	H8	DFT_CTRL0			
96	IN	SWD_NUB_SWCLK_SPMU	J9	DFT_CTRL1			
36	IN	GND	J5	DFT_CTRL2			
44		GND	M10	VPP			

ADC | GPIO | THROTTLE | INTERFACE

103S00584
R7950
3.92K
0.1%
1/20W
TF
0201

131S0805
C7950
100PF
5%
25V
C0G
0201

56 36 GND_TCAL_SPMU
VOLTAGE=0V

OMIT_TABLE
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J12	VSS_BUCK5	VSS	B12
J13	VSS_BUCK5	VSS	C4
J14	VSS_BUCK5	VSS	C5
		VSS	C8
A9	VSS_BUCK8	VSS	C9
B9	VSS_BUCK8	VSS	C10
A13	VSS_BUCK8	VSS	C13
B13	VSS_BUCK8	VSS	D7
		VSS	D13
A5	VSS_BUCK10	VSS	E6
B5	VSS_BUCK10	VSS	E7
		VSS	E12
N4	VSS_BUCK12_6	VSS	F10
P4	VSS_BUCK12_6	VSS	G11
		VSS	H13
E13	VSS_BUCK14	VSS	J6
E14	VSS_BUCK14	VSS	J11
		VSS	K1
A14	VSS_BSTLQ	VSS	K4
B14	VSS_BSTLQ	VSS	K11
		VSS	L2
J4	VSS_REF	VSS	L6
		VSS	M4
		VSS	M9
		VSS	M11
		VSS	M12
		VSS	N9

33 GND_VREF_RTN_SPMU

998-14727
XW7910
SHORT-16L-0.1MM-SM

44 36 35 33 GND

GND 33 35 36 44

PLACEMENT NOTES

CONNECT VSS_REF THROUGH ALL GND LAYERS
PLACE XW AT VSS_REF PIN, ROUTE RTN SIGNAL BACK TO PASSIVES

BOM_COST_GROUP=SOC POWER

PAGE TITLE
PAGE_TITLE=SPMU: GPIO, VSS

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A SPMU GPIO

35	LCD_OCP_FLT	LCD_OCP_FLT MAKE_BASE=TRUE	78
35	NC_SPMU_GPIO_1	NC_SPMU_GPIO_1 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_2	NC_SPMU_GPIO_2 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_3	NC_SPMU_GPIO_3 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_4	NC_SPMU_GPIO_4 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_5	NC_SPMU_GPIO_5 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_6	NC_SPMU_GPIO_6 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_7	NC_SPMU_GPIO_7 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_8	NC_SPMU_GPIO_8 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_9	NC_SPMU_GPIO_9 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_10	NC_SPMU_GPIO_10 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_11	NC_SPMU_GPIO_11 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_12	NC_SPMU_GPIO_12 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_13	NC_SPMU_GPIO_13 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_14	NC_SPMU_GPIO_14 MAKE_BASE=TRUE	
35	NC_SPMU_GPIO_15	NC_SPMU_GPIO_15 MAKE_BASE=TRUE	
35	GND	GND MAKE_BASE=TRUE	33 35 36 44
35	GND	GND MAKE_BASE=TRUE	33 35 36 44

B Probe Points

35	BI SPMU_AMUX_AY	1 PP	PP8000 P4MM SM
35	BI SPMU_AMUX_BY	1 PP	PP8001 P4MM SM
33	IN BUCK5_LX0	1 PP	PP8050 P4MM SM
33	IN BUCK5_LX1	1 PP	PP8051 P4MM SM
33	IN BUCK6_LX	1 PP	PP8060 P4MM SM
33	IN BUCK8_LX0	1 PP	PP8080 P4MM SM
33	IN BUCK8_LX1	1 PP	PP8081 P4MM SM
33	IN BUCK8_LX2	1 PP	PP8082 P4MM SM
33	IN BUCK10_LX	1 PP	PP80A0 P4MM SM
33	IN BUCK12_LX	1 PP	PP80C0 P4MM SM
33	IN BUCK14_LX	1 PP	PP80E0 P4MM SM
33	IN SPMU_BSTLQ_LX	1 PP	PP80F0 P4MM SM

C SPMU Quiet GND Connections

44 36 35 33	GND	GND MAKE_BASE=TRUE	
55 54 53	GND	GND MAKE_BASE=TRUE	
56 35	GND_TCAL_SPMU	XW8030 SHORT-16L-0.1MM-SM 998-14727 GND MAKE_BASE=TRUE	
33	GND_ADC_RTN_SPMU	XW8031 SHORT-16L-0.1MM-SM 998-14727 GND MAKE_BASE=TRUE	

D SPMU Input Protection

35	SPMU_ADC_IN	R8010 1M 5% 1/20W TK 0201 117S00096	
35	SPMU_RESET_IN	R8011 100K 5% 1/20W TK 0201 117S00095	
35	SPMU_FORCE_SYNC	R8012 10K 5% 1/20W TK 0201 117S00090	

E SPMU/SOC Throttle Pull-Up

PP1V25_AWAKE_IO 42 93

117S00090

R8020
10K
5%
1/20W
TK
0201

SPMU_VDDMAIN_UVWARN_L

F SPMU Sense Connections

33	PPVDD_SPMU_VDD_MAIN_SNS	XW8020 SHORT-16L-0.1MM-SM 998-14727 PP3V8_AON NO_XNET_CONNECTION=1	OUT 33 36 92
	PPVDD_SPMU_VDD_MAIN_SNS MAKE_BASE=TRUE		
33	PPVDD_SPMU_VDD_BOOST_SNS	XW8021 SHORT-16L-0.1MM-SM 998-14727 PP3V8_AON NO_XNET_CONNECTION=1	OUT 33 36 92
	PPVDD_SPMU_VDD_BOOST_SNS MAKE_BASE=TRUE		

BOM_COST_GROUP=SOC POWER

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE

SPMU: ALIASES, SUPPORT

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D

REVISION 6.0.0

BRANCH evt-1

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SHEET 36 OF 113

*** OK2INTEGRATE ***

92 42 40 39 PP3V8_AON

138S00073 CRITICAL C81A0 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A1 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A2 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A3 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A4 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A5 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A6 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A7 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A8 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81A9 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AA 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AB 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AC 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AD 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AE 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AF 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AG 10UF 20% 6.3V X6S 0402-COMBO
138S00073 CRITICAL C81AH 10UF 20% 6.3V X6S 0402-COMBO
138S00377 CRITICAL C8140 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8141 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8142 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8143 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8144 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8145 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8146 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8147 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8148 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8149 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8150 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8151 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8152 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8153 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8154 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8155 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8156 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8157 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8158 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8159 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8160 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8161 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8162 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8163 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8164 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8165 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8166 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8167 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8168 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8169 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8170 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8171 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8172 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8173 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8174 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8175 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8176 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8177 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8178 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8179 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8180 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8181 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8182 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8183 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8184 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8185 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8186 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8187 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8188 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8189 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8190 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8191 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8192 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8193 1UF 20% 10V X6S-CERM 0201
138S00377 CRITICAL C8194 2.2UF 20% 6.3V X6S 0201
138S00044 CRITICAL C8195 1UF 20% 10V X6S-CERM 0201

PMU_VDDMAIN_EXTRA_CAPS
PACK_IGNORE=TRUE
PMU_VDDMAIN_EXTRA_CAPS
PMU_VDDMAIN_EXTRA_CAPS
PACK_IGNORE=TRUE
PMU_VDDMAIN_EXTRA_CAPS

OMIT_TABLE
998-23524

U8100
STOWE_00
CSP
SYM 1 OF 5

VOLTAGE INPUTS

B1 VDD_BUCK_MP
B2 VDD_BUCK_MP
B3 VDD_BUCK_MP
B4 VDD_BUCK_MP
F1 VDD_BUCK_MP
F2 VDD_BUCK_MP
F3 VDD_BUCK_MP
F4 VDD_BUCK_MP
K1 VDD_BUCK_MP
K2 VDD_BUCK_MP
K3 VDD_BUCK_MP
K4 VDD_BUCK_MP
P1 VDD_BUCK_MP
P2 VDD_BUCK_MP
P20 VDD_BUCK_MP
P21 VDD_BUCK_MP
V20 VDD_BUCK_MP
V21 VDD_BUCK_MP
A7 VDD_BUCK_MP
B7 VDD_BUCK_MP
A11 VDD_BUCK_MP
B11 VDD_BUCK_MP
C11 VDD_BUCK_MP
A15 VDD_BUCK_MP
B15 VDD_BUCK_MP
U2 VDD_BUCK_MP
V2 VDD_BUCK_MP
W2 VDD_BUCK_MP
Y2 VDD_BUCK_MP
U6 VDD_BUCK_MP
V6 VDD_BUCK_MP
W6 VDD_BUCK_MP
Y6 VDD_BUCK_MP
U10 VDD_BUCK_MP
V10 VDD_BUCK_MP
W10 VDD_BUCK_MP
Y10 VDD_BUCK_MP
W14 VDD_BUCK_MP
Y14 VDD_BUCK_MP
W18 VDD_BUCK_MP
Y18 VDD_BUCK_MP
A19 VDD_BUCK13_3
B19 VDD_BUCK13_3
C19 VDD_BUCK13_3
J9 VDD_MAIN
C15 VDD_MAIN1
V16 VDD_MAIN2
M16 VDD_MAIN3

42 PPVDD_MPMU_VDD_MAIN_SNS → J8 VDD_MAIN_SNS
40 IN PBUS_DIV_SNS → J6 VDD_BOOST_SNS

SENSE

94 PP1V5_LDOINT_MPMU
132S00030 C8130 0.1UF 10% 10V X6S-CERM 0201
132S00030 C8131 0.1UF 10% 10V X6S-CERM 0201
C7 VDD_ANA
D14 VDD_ANA
D19 VDD_ANA
H5 VDD_ANA
J10 VDD_ANA
M18 VDD_ANA
P3 VDD_ANA
T8 VDD_ANA
V14 VDD_ANA
V19 VDD_ANA

94 PP1V5_LDOINT_MPMU
132S00030 C8132 0.1UF 10% 10V X6S-CERM 0201
132S00030 C8133 0.1UF 10% 10V X6S-CERM 0201
E18 VDD_DIG
G12 VDD_DIG
H6 VDD_DIG
L15 VDD_DIG
N6 VDD_DIG

BUCK OUTPUTS

BUCK0_LX0 R1 R2 — BUCK0_LX0 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8100 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283 — PPVDD_AWAKE_PCPU
BUCK0_LX1 U3 V3 W3 Y3 — BUCK0_LX1 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8101 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK0_LX3 U5 V5 W5 Y5 — BUCK0_LX3 — SWITCH_NODE=TRUE DIDT=TRUE
BUCK0_LX2 U7 V7 W7 Y7 — BUCK0_LX2 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8102 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK0_LX4 U9 V9 W9 Y9 — BUCK0_LX4 — SWITCH_NODE=TRUE DIDT=TRUE
BUCK0_FB R4 — BUCK0_FB — R8100 0 0% 1/20W TK 0201 — BUCK0_FB_R — XW8100 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — BOMOPTION=PMU_FB:FF
BUCK0_VSS_FB R5 — GND

PPVDD_AWAKE_PCPU
CRITICAL 138S1058 C8100 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8101 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8102 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8103 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8104 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8105 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8106 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8107 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8108 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8109 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C810A 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C810B 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S00039 C810C 2.2UF 20% 6.3V X6S-CERM 0201
CRITICAL 138S00039 C810D 2.2UF 20% 6.3V X6S-CERM 0201

BUCK1_LX0 A6 B6 — BUCK1_LX0 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8110 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283 — PPVDD_AWAKE_GPU
BUCK1_LX1 C1 C2 C3 C4 — BUCK1_LX1 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8111 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK1_LX3 E1 E2 E3 E4 — BUCK1_LX3 — SWITCH_NODE=TRUE DIDT=TRUE
BUCK1_LX2 G1 G2 G3 G4 — BUCK1_LX2 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8112 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK1_LX4 J1 J2 J3 J4 — BUCK1_LX4 — SWITCH_NODE=TRUE DIDT=TRUE
BUCK1_FB D6 — BUCK1_FB — R8110 0 0% 1/20W TK 0201 — BUCK1_FB_R — XW8110 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — BOMOPTION=PMU_FB:FF
BUCK1_VSS_FB E6 — GND

PPVDD_AWAKE_GPU
CRITICAL 138S1058 C8110 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8111 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8112 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8113 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8114 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8115 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8116 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8117 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8118 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8119 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C811A 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C811B 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C811C 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C811D 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S00039 C811E 2.2UF 20% 6.3V X6S-CERM 0201
CRITICAL 138S00039 C811F 2.2UF 20% 6.3V X6S-CERM 0201

BUCK2_LX0 Y19 — BUCK2_LX0 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8120 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283 — PPVDD_S1_SOC
BUCK2_LX1 U20 U21 — BUCK2_LX1 — SWITCH_NODE=TRUE DIDT=TRUE
BUCK2_LX3 R20 R21 — BUCK2_LX3 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8121 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK2_LX2 W17 Y17 — BUCK2_LX2 — SWITCH_NODE=TRUE DIDT=TRUE
BUCK2_LX4 W15 Y15 — BUCK2_LX4 — SWITCH_NODE=TRUE DIDT=TRUE — CRITICAL L8122 0.1UH-20%-10.3A-0.010HM PCCE20161B-SM 152S01268
BUCK2_FB U18 T18 — BUCK2_FB — R8120 0 0% 1/20W TK 0201 — BUCK2_FB_R — XW8120 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — BOMOPTION=PMU_FB:FF
GND

PPVDD_S1_SOC
CRITICAL 138S1058 C8120 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8121 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8122 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8123 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8124 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8125 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8126 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8127 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8128 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S1058 C8129 15UF 20% 6.3V X6S 0402-2
CRITICAL 138S00039 C812A 2.2UF 20% 6.3V X6S-CERM 0201
CRITICAL 138S00039 C812B 2.2UF 20% 6.3V X6S-CERM 0201

BOM_COST_GROUP=SOC POWER

SYNC_MASTER=MPMU_SPMU SYNC_DATE=10/01/2021
PAGE TITLE: MPMU: INPUT PWR, BUCK 0, 1, 2
Apple Inc.
DRAWING NUMBER 051-07020 SIZE D
REVISION 6.0.0
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*** OK2INTEGRATE ***

OMIT_TABLE
998-23524

U8100
STOWE_00
CSP
SYM 2 OF 5

BUCK OUTPUTS

CLOCK

LOAD SWITCHES

MPMU_BSTLQ_LX — T15 BSTLQ_LX
PP5V_MPMU_BSTLQ_XW — T16 BSTLQ_VOUT
PP5V_MPMU_BSTLQ — D17 VDD_HI_INT1, G7 VDD_HI_INT2, E21 VDD_HI_INT3, M19 VDD_HI_INT4, J15 VDD_HI_INT5
PP1V25_S2 — N13 VDDIO_1V2
PP1V8_S2 — P15 VDDIO_1V8
PP1V2_AON_MPMU — M13 VDDIO_1V2_1V8
PPVREF_MPMU — H11 VREF
PP1V5_MPMU_VREFADC — H7 VREF_ADC
GND_VREF_RTN_MPMU VOLTAGE=0V — H9 VBAT
GND_ADC_RTN_MPMU VOLTAGE=0V — H8 IBAT
MPMU_VBAT — M21 XIN
MPMU_IBAT — L21 XOUT
NC_MPMU_XIN — SLEEP_32K
MPMU_XOUT — OUT_32K
PMU_CLK32K_SOC_R — VDD_SW1
PMU_CLK32K_WLBT_IPD_R — VDD_SW2
PP1V8_S2 — VDD_SW3
PP1V25_S2

138S00041 CRITICAL C8211 2.2UF 10% 10V X6S-CERM 0402
PP1V5_MPMU_VREFADC — 132S0406 CRITICAL C8210 0.22UF 20% 6.3V X6S-CERM 0201

BUCK3_LX — A18, B18
BUCK3_FB — D18
BUCK3_VSS_FB — C18
BUCK4_LX0 — A16
BUCK4_LX1 — A14, B14
BUCK4_LX2 — A12, B12
BUCK4_FB — D16
BUCK4_VSS_FB — C16
BUCK7_LX0 — N1
BUCK7_LX1 — L1, L2, L3
BUCK7_FB — N4
BUCK7_VSS_FB — N3
BUCK9_LX0 — A8
BUCK9_LX1 — A10, B10, C10
BUCK9_FB — D8
BUCK9_VSS_FB — C8
BUCK11_LX0 — Y13
BUCK11_LX1 — V11, W11, Y11
BUCK11_FB — U13
BUCK11_VSS_FB — V13
BUCK13_LX — A20, B20, C20
BUCK13_FB — E20
BUCK13_VSS_FB — D20
VSW1 — N21
VSW2 — N17
VSW3 — N19

GND — 37 38 40 42 43 44

BUCK3_LX — CRITICAL L8230 0.47UH-20%-4A-0.024OHM PIKD20121B-SM 152S01263 — R8230 0 0% 1/20W TK 0201 — BUCK3_FB_R — XW8230 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — PP1V8_S2 (43 92)

BUCK4_LX0 — CRITICAL L8240 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283
BUCK4_LX1 — L8241 0.1UH-20%-10.3A-0.01OHM PCEE20161B-SM — CRITICAL 152S01268
BUCK4_LX2
BUCK4_FB — R8240 0 0% 1/20W TK 0201 BOMOPTION=PMU_FB:FF — BUCK4_FB_R — XW8240 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — PP1V05_S2SW_VDD2H (92)

BUCK7_LX0 — CRITICAL L8270 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283
BUCK7_LX1 — L8271 0.22UH-20%-6.7A-0.023OHM PINA2012T-SM 152S00204
BUCK7_FB — R8270 0 0% 1/20W TK 0201 BOMOPTION=PMU_FB:FF — BUCK7_FB_R — XW8270 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — PPVDD_AWAKE_CPU_SRAM (92)

BUCK9_LX0 — CRITICAL L8290 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283 — PPVDD_S1_DCS (92)
BUCK9_LX1 — CRITICAL L8291 0.22UH-20%-6.7A-0.023OHM PINA2012T-SM 152S00204
BUCK9_FB — R8290 0 0% 1/20W TK 0201 BOMOPTION=PMU_FB:FF — BUCK9_FB_R — XW8290 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1

BUCK11_LX0 — CRITICAL L82B0 1.0UH-20%-4A-0.034OHM PIKD20161B 152S01283
BUCK11_LX1 — CRITICAL L82B1 0.22UH-20%-6.7A-0.023OHM PINA2012T-SM 152S00204
BUCK11_FB — R82B0 0 0% 1/20W TK 0201 BOMOPTION=PMU_FB:FF — BUCK11_FB_R — XW82B0 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1 — PPVDD_AWAKE_ECPU (92)

BUCK13_LX — CRITICAL L82D0 0.47UH-20%-6.9A-0.022OHM MEMK2520-SM 152S01325 — PP1V25_S2 (43 93)
BUCK13_FB — R82D0 0 0% 1/20W TK 0201 — BUCK13_FB_R — XW82D0 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1

PP1V8_AWAKE — 38 93
NC_PPVOUT_MPMU_SW2_REG — 93
PP1V25_AWAKE_IO — 38 93

VSW4 700MA MAX, 23MOHM MAX
VSW5 350MA MAX, 125MOHM MAX
VSW6 200MA MAX, 23MOHM MAX

PP1V8_S2 (92)
CRITICAL 138S00073 C8230 C8231 C8232 C8233 C8234 C8235 C8236 C8237 C8238 C8239 C823A C823B 10UF 20% 6.3V CER-X6S 0402-COMBO

PP1V05_S2SW_VDD2H (92)
CRITICAL 138S1058 C8240 C8241 C8242 C8243 C8244 C8245 C8246 C8247 C8248 C8249 C824A C824B 15UF 20% 2V X6S 0402-2
CRITICAL 138S00039 C824C C824D 2.2UF 20% 4V X6S-CERM 0201

PPVDD_AWAKE_CPU_SRAM (92)
CRITICAL 138S1058 C8270 C8271 C8272 C8273 C8274 C8275 C8276 C8277 15UF 20% 2V X6S 0402-2
CRITICAL 138S00039 C8278 C8279 2.2UF 20% 4V X6S-CERM 0201

PPVDD_S1_DCS (92)
CRITICAL 138S00039 C8298 C8299 2.2UF 20% 4V X6S-CERM 0201
CRITICAL 138S1058 C8290 C8291 C8292 C8293 C8294 C8295 C8296 C8297 15UF 20% 2V X6S 0402-2
NOSTUFF NOSTUFF

PPVDD_AWAKE_ECPU (92)
CRITICAL 138S1058 C82B0 C82B1 C82B2 C82B3 C82B4 C82B5 C82B6 C82B7 15UF 20% 2V X6S 0402-2
CRITICAL 138S00039 C82B8 C82B9 2.2UF 20% 4V X6S-CERM 0201

PP1V25_S2 (93)
CRITICAL 138S1058 C82D0 C82D1 C82D2 C82D3 C82D4 C82D5 15UF 20% 2V X6S 0402-2

VDD_SW1
PP1V8_S2 (92 38)
CRITICAL 138S00073 C8200 10UF 20% 6.3V CER-X6S 0402-COMBO
PLACE_NEAR=U8100.N20:5MM

VDD_SW3
PP1V25_S2 (93 38)
CRITICAL 138S00073 C8201 10UF 20% 6.3V CER-X6S 0402-COMBO
PLACE_NEAR=U8100.N18:5MM

VSW1
PP1V8_AWAKE (93 38)
CRITICAL 138S00073 C8202 C8203 10UF 20% 6.3V CER-X6S 0402-COMBO

VSW3
PP1V25_AWAKE_IO (93 38)
CRITICAL 138S00073 C8204 C8205 10UF 20% 6.3V CER-X6S 0402-COMBO
BOM_COST_GROUP=SOC POWER

SYNC_MASTER=MPMU_SPMU SYNC_DATE=10/01/2021

PAGE TITLE: MPMU: BUCK 3, 4, 7, 9, 11, 13, SW

Apple Inc.

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OMIT_TABLE
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U8100
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LDO INPUTS

VDDMAIN>>
92 PP3V8_AON — F15 VDD_CTRL_LDOG
92 42 40 39 37 PP3V8_AON — G17 VDD_BOOST_LDO; G18 VDD_BOOST_LDO; H17 VDD_BOOST_LDO; H18 VDD_BOOST_LDO; J18 VDD_BOOST_LDO
92 42 40 39 37 PP3V8_AON — J17 VDD_MAIN_LDO; K17 VDD_MAIN_LDO; K19 VDD_MAIN_LDO
92 PP3V8_AON — L18 VDD_RTC_ALT
BUCK3 OR BUCK13>>
43 39 PPVDD_LDO20_14_8_3 — F19 VDD_LDO20_14_8_3; F20 VDD_LDO20_14_8_3; G20 VDD_LDO20_14_8_3; H20 VDD_LDO20_14_8_3
BUCK4>>
92 39 PP1V05_S2SW_VDD2H — J20 VDD_LDO11
BUCK4>>
92 PP1V05_S2SW_VDD2H — F16 VDD_LDO16
42 IN NC_MPMU_LDO1_EN — R13 LDO1_EN

LDO OUTPUTS

VLDO1 G19 NC_MPMU_VLDO1 — 93 — LDO1 300MA MAX
VLDO2 J16 PP1V8_AON — 93 — LDO2 50MA MAX
VLDO3 F18 NC_MPMU_VLDO3 — 93 — LDO3 600MA MAX
VLDO5 G16 NC_MPMU_VLDO5 — 93 — LDO5 250MA MAX
VLDO7 H19 PP3V3_S2_LDO — 93 — LDO7 250MA MAX
VLDO8 H21 PP1V2_AWAKE_PLL — 93 — LDO8 730MA MAX
VLDO9 K16 PP1V8_AON_MPMU — 93 — LDO9 10MA MAX
VLDO9B K18 PP1V2_AON_MPMU — 93 — LDO9B 10MA MAX
VLDO10 H16 PP3V3_AON — 94 — LDO10 250MA MAX
VLDO11 J21 PP0V855_S2SW_CIO — 94 — LDO11 1000MA MAX
VLDO13 J19 PP3V3_S2SW_SNS — 94 — LDO13 250MA MAX
VLDO14 F21 NC_MPMU_VLDO14 — 94 — LDO14 300MA MAX
VLDO16 F17 NC_MPMU_VLDO16 — 94 — LDO16 1500MA MAX
VLDO20 G21 PP1V2_S2_CIO — 94 — LDO20 400MA MAX
VLDOINT K20 PP1V5_LDOINT_MPMU — 94 — LDOINT 150MA MAX
VLDORTC L19 PP1V5_LDOINT_MPMU — 94
VLDORTC2 L20 GND — 42

VDD LDO 3/8/14/20

43 39 PPVDD_LDO20_14_8_3
CRITICAL 138S00073 C8300 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8301 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO 2 DECOUPLING

93 PP1V8_AON
CRITICAL 138S0750 C8320 4.7UF 20% 6.3V X6S 0402

LDO 9 DECOUPLING

93 41 PP1V8_AON_MPMU
CRITICAL 138S00073 C8310 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8311 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO 11 DECOUPLING

94 PP0V855_S2SW_CIO
CRITICAL 138S00073 C83B5 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C83B6 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO INT DECOUPLING

94 PP1V5_LDOINT_MPMU
CRITICAL 138S00073 C8380 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8381 10UF 20% 6.3V CER-X6S 0402-COMBO

VDD LDO 11

92 39 PP1V05_S2SW_VDD2H
CRITICAL 138S00073 C83B0 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C83B1 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO 7 DECOUPLING

93 PP3V3_S2_LDO
CRITICAL 138S00073 C8330 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8331 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO 9B DECOUPLING

93 PP1V2_AON_MPMU
CRITICAL 138S00073 C8340 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8341 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO 13 DECOUPLING

94 PP3V3_S2SW_SNS
CRITICAL 138S00073 C83D0 10UF 20% 6.3V CER-X6S 0402-COMBO

UN-UNUSED LDOS

LDO 1, 3, 5, 14, 16

LDO RTC

(TIED TO LDOINT FOR PORTABLES)

LDO 8 DECOUPLING

93 PP1V2_AWAKE_PLL
CRITICAL 138S00073 C8360 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8361 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8362 10UF 20% 6.3V CER-X6S 0402-COMBO
NOSTUFF

LDO 10 DECOUPLING

94 PP3V3_AON
CRITICAL 138S00073 C83A0 10UF 20% 6.3V CER-X6S 0402-COMBO

LDO 20 DECOUPLING

94 PP1V2_S2_CIO
CRITICAL 138S00073 C8350 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL 138S00073 C8351 10UF 20% 6.3V CER-X6S 0402-COMBO

BOM_COST_GROUP=SOC POWER

SYNC_MASTER=MPMU_SPMU SYNC_DATE=10/01/2021

PAGE TITLE
MPMU: LDO

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BSTLQ INDUCTOR

CRITICAL
152S00874
L8430
0.47UH-20%-1.7A-0.175OHM
PIJT1005FE-SM-COMBO

43 38 MPMU_BSTLQ_LX
SWITCH_MODE=TRUE
DIDT=TRUE

PP3V8_AON 37 39 42 92

XW8430
SHORT-12L-0.25MM-SM

38 PP5V_MPMU_BSTLQ_XW
VOLTAGE=5
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP5V_MPMU_BSTLQ 94

CRITICAL	CRITICAL	CRITICAL	CRITICAL	CRITICAL	CRITICAL	CRITICAL	CRITICAL
138S00107	138S00107	132S00030	132S00030	132S00030	132S00030	132S00030	132S00030
C8430	C8431	C8432	C8440	C8441	C8442	C8443	
20UF	20UF	0.1UF	0.1UF	0.1UF	0.1UF	0.1UF	
20% 10V X5R 0402	20% 10V X5R 0402	10% 10V X6S-CERM 0201	10% 10V X6S-CERM 0201	10% 10V X6S-CERM 0201	10% 10V X6S-CERM 0201	10% 10V X6S-CERM 0201	10% 10V X6S-CERM 0201

PBUS SENSE

POSSIBLE TO USE SMALLER FOOTPRINT OPAMP (TLV9051IDPW)

92 PPBUS_AON
103S00609
R8450
887K
0.1% 1/20W TK 0201-1

92 PP3V8_AON
PLACE_NEAR=U8450.5:5MM
132S00030
C8450
0.1UF
10% 10V X6S-CERM 0201

353S1429
U8450
OPA333DCKG4
SC70-5-COMBO

PBUS_DIV

103S00610
R8451
453K
0.1% 1/20W TK 0201

PBUS_DIV_SNS OUT 37

32K CLOCK XO (PACK_OPTION PMU_32K_OSC)

<RDAR://73885575>

93 42 40 PP1V8_AON_MPMU

C84A0
0.1UF
10% 6.3V X6S 0201
132S0395
GND 37 38 40 42 43 44

BOMOPTION=PMU_32K_CLK:XOSC
PACK_OPTION=PMU_32K_XOSC
117S00073
R84A2
0
0% 1/20W TK 0201

Y84A1
32.768KHZ-20PPM-1.8V
2.5X2.0-SM
197S00323

PMU_OSC32K_EN
EN/DIS
VCC
OUT
GND
ALLOW_APPLE_PREFIX=Y
PACK_OPTION=PMU_32K_XOSC
BOMOPTION=PMU_32K_CLK:XOSC

PMU_OSC32K_OUT_R
BOMOPTION=PMU_32K_CLK:XOSC
PACK_OPTION=PMU_32K_XOSC
117S00073
R84A1
0
0% 1/20W TK 0201

PMU_MEMS32K_OUT 44
NO_TEST=1

44 43 42 40 38 37 GND

32K CLOCK MEMS (PACK_OPTION: PMU_32K_MEMS)

93 42 40 PP1V8_AON_MPMU

C8400
0.1UF
10% 6.3V X6S 0201
132S0395
GND 37 38 40 42 43 44

Y8401
32.768KHZ-20PPM
CSP
197S00322

NC_MEMS_CAL
CAL/NC
CLKOUT
GND
ALLOW_APPLE_PREFIX=Y
PACK_OPTION=PMU_32K_MEMS
BOMOPTION=PMU_32K_CLK:MEMS

PMU_MEMS32K_OUT
NO_TEST=1
PACK_OPTION=PMU_32K_MEMS
117S00073
R8401
0
0% 1/20W TK 0201

MPMU_XOUT OUT 38
NO_TEST=1

NOSTUFF
C8401
10PF
5% 25V C0G 0201
131S00003

44 43 42 40 38 37 GND

32K CLOCK SERIES R

PLACE_NEAR=U8100.M7:25MM
R8443
33
5% 1/20W TK 0201
117S00122

38 IN PMU_CLK32K_SOC_R
PMU_CLK32K_SOC OUT 7

OMIT_TABLE
R8442
15
1% 1/20W TK 0201
118S00465
PLACE_NEAR=U8100.M8:25MM

38 IN PMU_CLK32K_WLBT_IPD_R
PMU_CLK32K_WLBT_IPD_RR

OMIT_TABLE
118S00309
R8444
49.9
1% 1/20W TK 0201

PMU_CLK32K_WLBT OUT 69 70

118S00309
R8445
49.9
1% 1/20W TK 0201

PMU_CLK32K_IPD OUT 86

OMIT_TABLE

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T1	VSS_BUCK0	VSS	B8
T2	VSS_BUCK0	VSS	B16
U1	VSS_BUCK0	VSS	C5
V1	VSS_BUCK0	VSS	C6
W1	VSS_BUCK0	VSS	C12
Y1	VSS_BUCK0	VSS	C13
U4	VSS_BUCK0	VSS	C14
V4	VSS_BUCK0	VSS	C17
W4	VSS_BUCK0	VSS	D5
Y4	VSS_BUCK0	VSS	D7
U8	VSS_BUCK0	VSS	D9
V8	VSS_BUCK0	VSS	D10
W8	VSS_BUCK0	VSS	D11
Y8	VSS_BUCK0	VSS	D12
		VSS	D13
A1	VSS_BUCK1	VSS	D15
A2	VSS_BUCK1	VSS	D21
A3	VSS_BUCK1	VSS	E5
A4	VSS_BUCK1	VSS	E15
A5	VSS_BUCK1	VSS	E16
B5	VSS_BUCK1	VSS	E17
D1	VSS_BUCK1	VSS	E19
D2	VSS_BUCK1	VSS	F5
D3	VSS_BUCK1	VSS	F14
D4	VSS_BUCK1	VSS	G5
H1	VSS_BUCK1	VSS	G11
H2	VSS_BUCK1	VSS	G15
H3	VSS_BUCK1	VSS	H13
H4	VSS_BUCK1	VSS	H15
		VSS	J5
T20	VSS_BUCK2	VSS	J7
T21	VSS_BUCK2	VSS	J11
W16	VSS_BUCK2	VSS	J12
Y16	VSS_BUCK2	VSS	K9
W20	VSS_BUCK2	VSS	K10
Y20	VSS_BUCK2	VSS	K21
W21	VSS_BUCK2	VSS	L4
Y21	VSS_BUCK2	VSS	L16
		VSS	L17
A13	VSS_BUCK4_3		
B13	VSS_BUCK4_3	VSS	M4
A17	VSS_BUCK4_3	VSS	M17
B17	VSS_BUCK4_3	VSS	M20
		VSS	N2
M1	VSS_BUCK7	VSS	N11
M2	VSS_BUCK7	VSS	N15
M3	VSS_BUCK7	VSS	P4
		VSS	P16
A9	VSS_BUCK9	VSS	P17
B9	VSS_BUCK9	VSS	P18
C9	VSS_BUCK9	VSS	P19
		VSS	R3
V12	VSS_BUCK11	VSS	R18
W12	VSS_BUCK11	VSS	R19
Y12	VSS_BUCK11	VSS	T3
		VSS	T4
A21	VSS_BUCK13	VSS	T5
B21	VSS_BUCK13	VSS	T6
C21	VSS_BUCK13	VSS	T7
		VSS	T9
T14	VSS_BSTLQ	VSS	T19
		VSS	U11
H10	VSS_REF	VSS	U12
		VSS	U14
		VSS	U19
		VSS	V15
		VSS	V17
		VSS	V18
		VSS	W13
		VSS	W19

GND 37 38 40 42 43 44

38 GND_VREF_RTN_MPMU

998-14727
XW8410
SHORT-16L-0.1MM-SM

44 43 42 40 38 37 GND

PLACEMENT NOTES

CONNECT VSS_REF THROUGH ALL GND LAYERS
PLACE XW AT VSS_REF PIN, ROUTE RTN SIGNAL BACK TO PASSIVES

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S00465	1	RES,TK,15 OHM,1%,1/20W,0201	R8442		PMU_OUT32K:TEE
117S00122	1	RES,TK,33 OHM,5%,1/20W,0201	R8442		PMU_OUT32K:WLBT
118S00309	2	RES,TK,49.9 OHM,1%,1/20W,0201	R8444,R8445		PMU_OUT32K:TEE
117S00073	1	RES,TK,0 OHM,1A MAX,1/20W,0201	R8444		PMU_OUT32K:WLBT

BOM_COST_GROUP=SOC POWER

PAGE_TITLE=MPMU: MISC CKT, VSS

Apple Inc.

PAGE TITLE	PAGE_TITLE=MPMU: MISC CKT, VSS
DRAWING NUMBER	051-07020
SIZE	D
REVISION	6.0.0
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*** OK2INTEGRATE ***

OMIT_TABLE
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U8100
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SYM 4 OF 5

56	IN	MPMU_AMUXTDEV_TERM	F8	TDEV1			
56	IN	MPMU_TDEV2	F13	TDEV2			
56	IN	MPMU_TDEV3	F9	TDEV3			
56	IN	MPMU_TDEV4	F10	TDEV4			
56	IN	MPMU_TDEV5	F11	TDEV5			
56	IN	MPMU_TDEV6	F12	TDEV6			
56	IN	MPMU_TDEV7	G9	TDEV7			
56	IN	MPMU_TDEV8	G8	TDEV8			
		MPMU_TCAL	E14	TCAL			
42	IN	GND	E13	BRICK_ID1			
42	IN	GND	E9	BRICK_ID2			
42	IN	MPMU_ADC_IN	G14	ADC_IN			
55	IN	DCIN_VSENSE	E11	AMUX_A<0>			
55	IN	DCIN_ISENSE	E10	AMUX_A<1>			
55	IN	PBUS_VSENSE	E8	AMUX_A<2>			
55	IN	BMON_ISENSE	E7	AMUX_A<3>			
43	BI	MPMU_AMUX_AY	G13	AMUX_AY			
55	IN	P3V8AON_IMEAS	E12	AMUX_B<0>			
55	IN	P3V3S2_HS_ISENSE	F6	AMUX_B<1>			
55	IN	P5VS2_HS_ISENSE	F7	AMUX_B<2>			
55	IN	MPMU_AMUXTDEV_TERM	G6	AMUX_B<3>			
43	BI	MPMU_AMUX_BY	G10	AMUX_BY			
42	IN	PMU_ONOFF_L	N12	BUTTON1			
44	IN	PMU_RSLOC_RST_L	L13	BUTTON2			
42	IN	NC_MPMU_BUTTON3	K15	BUTTON3			
42	IN	NC_MPMU_BUTTON4	K13	BUTTON4			
42	IN	NC_MPMU_RESET_IN0	K7	RESET_IN0			
44	IN	SOC_WDOG	L9	RESET_IN1			
42	IN	UPC_PMU_RESET_1V8	K5	RESET_IN2			
44	IN	SOC_SOCHOT_L	M9	RESET_IN3			
42	IN	MPMU_SHDN	K11	SHDN			
42	IN	MPMU_REQUEST_DFU	L12	REQUEST_DFU			
44	IN	NC_MPMU_VBUS_DET	L11	VBUS_DETECT			
12	IN	SPMI_NUB_MPMU_CLK	M14	SPMI_SCLK			
12	BI	SPMI_NUB_MPMU_DATA	M15	SPMI_SDATA			
35	OUT	SGPIO_SCLK	P14	SGPIO_SCLK			
35	BI	SGPIO_SDATA	N14	SGPIO_SDATA			
35	OUT	PMU_SGPIO_READY_REQ	P13	SGPIO_READY_REQ			
96	IN	SWD_NUB_SWDIO_MPMU	K12	SWD_TMS			
42	IN	GND	J14	DFT_CTRL0			
96	IN	SWD_NUB_SWCLK_MPMU	J13	DFT_CTRL1			
42	BI	GND	H12	DFT_CTRL2			
42	IN	MPMU_OTP_SEL	N5	OTP_SEL			
44		GND	K8	VPP			

	HLD	GPIO0	R12	IPD_LID_OPEN_1V8	BI	42	
		GPIO1	R6	CODEC_WAKE_L	BI	42	
		GPIO2	M11	IPD_OCP_FLT	BI	42	
		GPIO3	P9	NC_MPMU_GPIO_3	BI	42	
	HLD	GPIO4	M10	CHGR_AUX_OK	BI	42	
		GPIO5	N9	WLBT_WAKE	BI	42	
	HLD	GPIO6	T10	IPD_PWR_EN	BI	42	
		GPIO7	N10	NC_MPMU_GPIO_7	BI	42	
	SEQ	GPIO8	T11	IPD_TOUCH_RESET_L	BI	42	
	SEQ	GPIO9	U15	NC_MPMU_GPIO_9	BI	42	
	SEQ	GPIO10	U16	LCD_PWR_EN	BI	42	
	SEQ	GPIO11	P11	P3V3S2_PWR_EN_MPMU	BI	42	
	SEQ	GPIO12	P12	PVDD1_PWR_EN	BI	42	
	SEQ	GPIO13	R15	WLBT_PWR_EN	BI	42	
	SEQ	GPIO14	P7	TPAD_KBD_WAKE_L	BI	42	
	SEQ	GPIO15	P6	SE_PWR_EN	BI	42	
	SEQ	GPIO16	P5	NC_MPMU_GPIO_16	BI	42	
	SEQ	GPIO17	R8	NAND0_LPB_L	BI	42	
	SEQ	GPIO18	R9	BL_PWR_EN	BI	42	
	SEQ,HLD	GPIO19	R7	P3V8AON_LPM	BI	42	
	SEQ,HLD	GPIO20	R10	P5VS2TPS_PWR_EN	BI	42	
	SEQ	GPIO21	P10	NC_MPMU_GPIO_21	BI	42	
	SEQ	GPIO22	R11	NC_MPMU_GPIO_22	BI	42	
	SEQ	GPIO23	T12	NC_MPMU_GPIO_23	BI	42	
	SEQ	GPIO24	T13	IPD_MCU_RESET_L	BI	42	
	SEQ	GPIO25	R16	NC_MPMU_GPIO_25	BI	42	
	SEQ,HV	GPIO26	R17	NC_MPMU_GPIO_26	BI	42	
		BUTTONO1	L14	NC_MPMU_BUTTONO1	OUT	42	
		BUTTONO2	K14	NC_MPMU_BUTTONO2	OUT	42	
		BUTTONO3	M12	NC_MPMU_BUTTONO3	OUT	42	
		DBLCLICK_DET	T17	DBL_CLICK_DET	OUT	44	
		RESET*	L6	PMU_RESET_L	OUT	44	
		FORCE_DFU	H14	MPMU_SOC_FORCE_DFU_R			
		WAKE2MS	R14	NC_MPMU_WAKE2MS	OUT	42	
		OFF_REQ	U17	NC_MPMU_OFF_REQ	OUT	42	
		SYS_ALIVE	K6	PMU_SYS_ALIVE	OUT	42 73 88 96	
		ACTIVE_READY	L10	PMU_ACTIVE_READY	OUT	44	
		CRASH*	L8	PMU_CRASH_L	OUT	42 46	
		FAULT_OUT*	L7	MPMU_FAULT_OUT_L	OUT	42	
		SCRASH*	M6	MPMU_SCRASH_L	BI	35	
		THROTTLE0*	L5	BUCK0_THERMAL_THROTTLE_L	OUT	42 44	
		THROTTLE1*	N7	BUCK1_THERMAL_THROTTLE_L	OUT	42 44	
		THROTTLE2*	P8	TPT_MPMU_THROTTLE2_L	OUT	42 44	
		THROTTLE3*	N8	PMU_VDDHI_UVWARN_L	OUT	42 44	
		UVWARN*	M5	MPMU_VDDMAIN_UVWARN_L	OUT	42 44	

ADC
GPIO
BUTTONS
STATE MACHINE
INTERFACE
THROTTLE

56 43 GND_TCAL_MPMU
VOLTAGE=0V

103S00584
R8550
3.92K
0.1% 1/20W TK 0201

131S00805
C8550
100PF
5% 25V C0G 0201

35 OUT SGPIO_SCLK — 117S00113 R8540 20 5% 1/20W TK 0201 — SGPIO_SCLK_R
35 BI SGPIO_SDATA — 117S00113 R8541 20 5% 1/20W TK 0201 — SGPIO_SDATA_R

117S00099
R8562
2.2K
5% 1/20W TK 0201
SOC_FORCE_DFU — OUT 44

NOSTUFF
117S00090
R8561
10K
5% 1/20W TK 0201
>> IPU: LDO9
117S00077
R8560
1K
5% 1/20W TK 0201-1
PP1V8_AON_MPMU — 39 93
SPMU_SCRASH_L — BI 35

BOM_COST_GROUP=SOC POWER

SYNC_MASTER=MPMU_SPMU	SYNC_DATE=10/01/2021
PAGE TITLE	MPMU: GPIO
Apple Inc.	DRAWING NUMBER 051-07020 SIZE D
	REVISION 6.0.0
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A MPMU GPIO Aliases

IO OTP SETTINGS (WIP), IF NOT OTP IT WILL BE CONFIGURED AS SW OVERRIDE..
SUPPLY:LDO9 (1.8V AON), BUCK13 (1.25V S2), BUCK3 (1.8V S2), SLDO9B (1.2V AON)
IO TYPE: INPUT, OUTPUT OPEN DRAIN, OR OUTPUT PUSH PULL
PULLS: IPU, IPD, NONE

GPIO0: LDO9 IN IPD
GPIO1: LDO9 IN IPU
GPIO2: LDO9 IN IPD
GPIO3: BUCK13 IN IPD
GPIO4: -WIP- IN IPU
GPIO5: BUCK13 IN IPD
GPIO6: LDO9 PP NONE
GPIO7: LDO9 IN IPD
> NEEDS OVERRIDE?
GPIO8: LDO9 OD NONE
GPIO9: LDO9 IN IPD
> NEEDS OVERRIDE?
GPIO10: LDO9 PP NONE
GPIO11: LDO9 PP NONE
GPIO12: LDO9 OD NONE
GPIO13: -WIP- PP NONE
GPIO14: LDO9 IN NONE
GPIO15: LDO9 PP NONE
GPIO16: LDO9 IN IPD
> NEEDS OVERRIDE?
GPIO17: BUCK13 PP NONE
GPIO18: LDO9 PP NONE
GPIO19: LDO9 PP IPD
GPIO20: LDO9 PP NONE
GPIO21: LDO9 IN IPD
> NEEDS OVERRIDE?
GPIO22: LDO9 IN IPD
> NEEDS OVERRIDE?
GPIO23: LDO9 IN IPD
> NEEDS OVERRIDE?
GPIO24: LDO9 OD NONE
GPIO25: WIP PP NONE
GPIO26: LDO9 IN IPD
> NEEDS OVERRIDE?

41 BI IPD_LID_OPEN_1V8 = IPD_LID_OPEN_1V8 MAKE_BASE=TRUE 81 87
41 BI CODEC_WAKE_L = CODEC_WAKE_L MAKE_BASE=TRUE 85
41 BI IPD_OCP_FLT = IPD_OCP_FLT MAKE_BASE=TRUE 48
41 BI NC_MPMU_GPIO_3 = NC_MPMU_GPIO_3 MAKE_BASE=TRUE
41 BI CHGR_AUX_OK = CHGR_AUX_OK MAKE_BASE=TRUE 26
41 BI WLBT_WAKE = WLBT_WAKE MAKE_BASE=TRUE 69 70
41 BI IPD_PWR_EN = IPD_PWR_EN MAKE_BASE=TRUE 42 48
41 BI NC_MPMU_GPIO_7 = NC_MPMU_GPIO_7 MAKE_BASE=TRUE
41 BI IPD_TOUCH_RESET_L = IPD_TOUCH_RESET_L MAKE_BASE=TRUE 42 86
41 BI NC_MPMU_GPIO_9 = NC_MPMU_GPIO_9 MAKE_BASE=TRUE
41 BI LCD_PWR_EN = LCD_PWR_EN MAKE_BASE=TRUE 76
41 BI P3V3S2_PWR_EN_MPMU = P3V3S2_PWR_EN_MPMU MAKE_BASE=TRUE 42 46
41 BI PVDD1_PWR_EN = PVDD1_PWR_EN MAKE_BASE=TRUE 48
41 BI WLBT_PWR_EN = WLBT_PWR_EN MAKE_BASE=TRUE 69 70
41 BI TPAD_KBD_WAKE_L = TPAD_KBD_WAKE_L MAKE_BASE=TRUE 86
41 BI SE_PWR_EN = SE_PWR_EN MAKE_BASE=TRUE 23
41 BI NC_MPMU_GPIO_16 = NC_MPMU_GPIO_16 MAKE_BASE=TRUE
41 BI NAND0_LPB_L = NAND0_LPB_L MAKE_BASE=TRUE 71 72
41 BI BL_PWR_EN = BL_PWR_EN MAKE_BASE=TRUE 77
41 BI P3V8AON_LPM = P3V8AON_LPM MAKE_BASE=TRUE 30 42
41 BI P5VS2TPS_PWR_EN = P5VS2TPS_PWR_EN MAKE_BASE=TRUE 42 46
41 BI NC_MPMU_GPIO_21 = NC_MPMU_GPIO_21 MAKE_BASE=TRUE
41 BI NC_MPMU_GPIO_22 = NC_MPMU_GPIO_22 MAKE_BASE=TRUE
41 BI NC_MPMU_GPIO_23 = NC_MPMU_GPIO_23 MAKE_BASE=TRUE
41 BI IPD_MCU_RESET_L = IPD_MCU_RESET_L MAKE_BASE=TRUE 42 86
41 BI NC_MPMU_GPIO_25 = NC_MPMU_GPIO_25 MAKE_BASE=TRUE
41 BI NC_MPMU_GPIO_26 = NC_MPMU_GPIO_26 MAKE_BASE=TRUE

B MPMU Input Protection & Pull-Downs

R8630 100K 5% 1/20W TK 0201 — 42 30 P3V8AON_LPM — 117S00095
R8631 100K 5% 1/20W TK 0201 — 46 42 P5VS2TPS_PWR_EN — 117S00095
R8632 100K 5% 1/20W TK 0201 — 46 42 P3V3S2_PWR_EN_MPMU — 117S00095
R8622 0 0% 1/20W TK 0201 — 42 41 MPMU_OTP_SEL — 117S00073
PD FOR PORTABLES
R8610 1M 5% 1/20W TK 0201 — 41 MPMU_ADC_IN — 117S00096
R8611 1M 5% 1/20W TK 0201 — 38 MPMU_IBAT — 117S00096
R8612 10K 5% 1/20W TK 0201 — 41 MPMU_REQUEST_DFU — 117S00090
R8613 10K 5% 1/20W TK 0201 — 41 MPMU_SHDN — 117S00090
R8614 1M 5% 1/20W TK 0201 — 38 MPMU_VBAT — 117S00096
R8615 47K 5% 1/20W TK 0201 — 88 62 44 7 SOC_FORCE_DFU — 117S00129
PMOS OD
R8616 100K 5% 1/20W TK 0201 — 48 42 IPD_PWR_EN — 117S00095

C MPMU Pull-Ups

PP1V8_AON_MPMU 40 93

R8620 117S00090 10K 5% 1/20W TK 0201 PMU_CRASH_L 41 46
R8621 117S00095 100K 5% 1/20W TK 0201 MPMU_FAULT_OUT_L 41
R8623 117S00090 10K 5% 1/20W TK 0201 PMU_ONOFF_L 42 43 85 88
R8624 117S00090 10K 5% 1/20W TK 0201 PMU_RSLOC_RST_L 43 44 85 88
R8625 117S00095 100K 5% 1/20W TK 0201 IPD_TOUCH_RESET_L 42 86
R8626 117S00095 100K 5% 1/20W TK 0201 IPD_MCU_RESET_L 42 86

PP1V25_S2 93

R8640 117S00090 10K 5% 1/20W TK 0201 PMU_SYS_ALIVE 41 73 88 96
NOSTUFF

PP1V25_AWAKE_IO 36 93

R8651 117S00090 10K 5% 1/20W TK 0201 BUCK0_THERMAL_THROTTLE_L 41 44
NOSTUFF
R8652 117S00090 10K 5% 1/20W TK 0201 BUCK1_THERMAL_THROTTLE_L 41 44
NOSTUFF
R8653 117S00090 10K 5% 1/20W TK 0201 TPT_MPMU_THROTTLE2_L 41 44
R8654 117S00090 10K 5% 1/20W TK 0201 PMU_VDDHI_UVWARN_L 41 44
NOSTUFF
R8650 117S00090 10K 5% 1/20W TK 0201 MPMU_VDDMAIN_UVWARN_L 41 44
NOSTUFF

D MPMU Misc Aliases

41 GND = GND MAKE_BASE=TRUE 37 38 40 42 43 44
41 GND = GND MAKE_BASE=TRUE 37 38 40 42 43 44
41 GND = GND MAKE_BASE=TRUE 37 38 40 42 43 44
41 GND = GND MAKE_BASE=TRUE 37 38 40 42 43 44

39 NC_MPMU_LDO1_EN = NC_MPMU_LDO1_EN MAKE_BASE=TRUE
41 NC_MPMU_OFF_REQ = NC_MPMU_OFF_REQ MAKE_BASE=TRUE
42 41 MPMU_OTP_SEL = MPMU_OTP_SEL MAKE_BASE=TRUE 41 42
41 NC_MPMU_WAKE2MS = NC_MPMU_WAKE2MS MAKE_BASE=TRUE

VLDORTC2 IS PLANNED FOR B0, AND CURRENTLY NOT IMPLEMENTED

39 GND = GND MAKE_BASE=TRUE 37 38 40 42 43 44

E MPMU VDD_MAIN Sense

XW8661 SHORT-16L-0.1MM-SM 998-14727 NO_XNET_CONNECTION=1
37 PPVDD_MPMU_VDD_MAIN_SNS — PP3V8_AON OUT 37 39 40 92
PPVDD_MPMU_VDD_MAIN_SNS MAKE_BASE=TRUE

F MPMU Button and Reset Aliases

41 OUT PMU_ONOFF_L = PMU_ONOFF_L MAKE_BASE=TRUE 42 43 85 88
41 NC_MPMU_BUTTON3 = NC_MPMU_BUTTON3 MAKE_BASE=TRUE
41 NC_MPMU_BUTTON4 = NC_MPMU_BUTTON4 MAKE_BASE=TRUE
41 NC_MPMU_BUTTONO1 = NC_MPMU_BUTTONO1 MAKE_BASE=TRUE
41 NC_MPMU_BUTTONO2 = NC_MPMU_BUTTONO2 MAKE_BASE=TRUE
41 NC_MPMU_BUTTONO3 = NC_MPMU_BUTTONO3 MAKE_BASE=TRUE
41 NC_MPMU_RESET_IN0 = NC_MPMU_RESET_IN0 MAKE_BASE=TRUE
41 UPC_PMU_RESET_1V8 = UPC_PMU_RESET_1V8 MAKE_BASE=TRUE 43

BOM_COST_GROUP=SOC POWER

PAGE TITLE: MPMU: ALIAS, PULLS
Apple Inc.
DRAWING NUMBER: 051-07020
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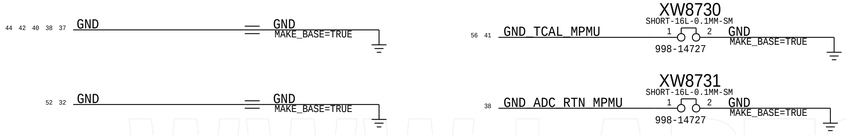
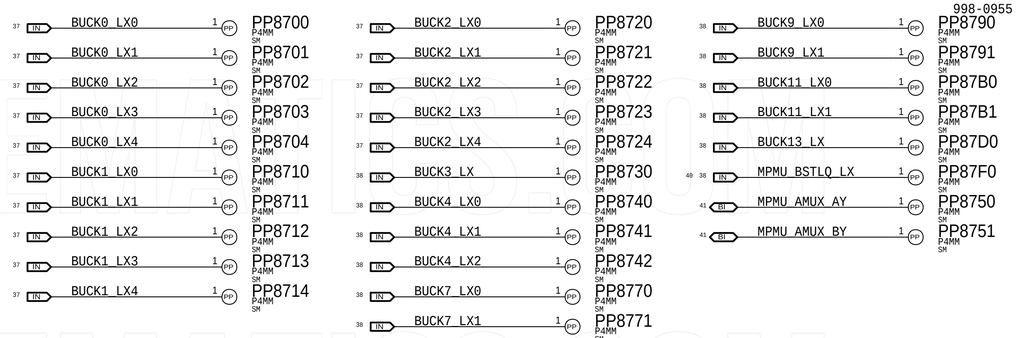
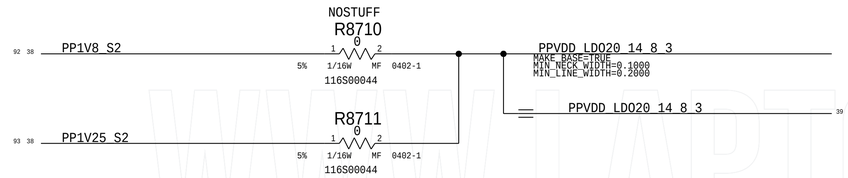
A MPMU Quiet GND Connections



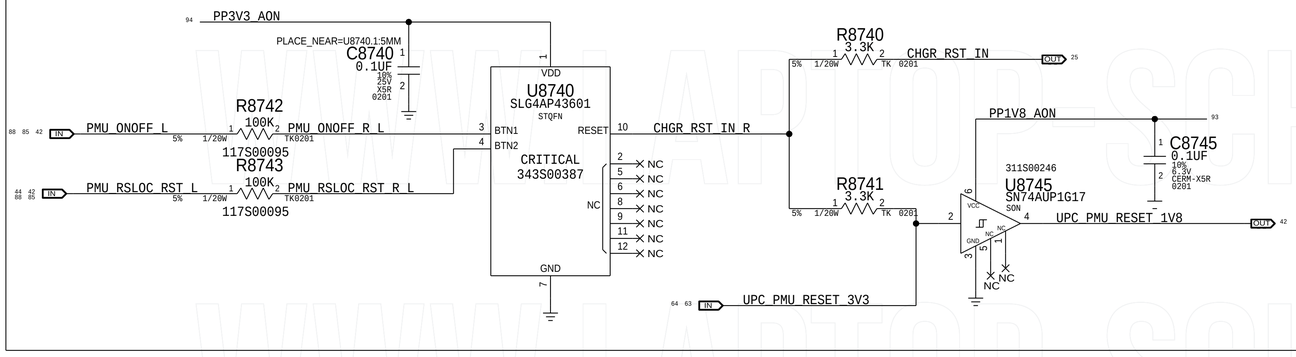
B MPMU Probe Points



C MPMU BUCK3/13 Option for LDO3/8/14/20 VDDIN



D MPMU Charger Reset Circuit



BOM_COST_GROUP=SOC POWER

SYNC_MASTER=jwebb SYNC_DATE=09/28/2021

PAGE TITLE: MPMU: SUPPORT

Apple Inc.

DRAWING NUMBER: 051-07020 SIZE: D

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A MPMU Misc Aliases

41	OUT	PMU_RSLOC_RST_L	PMU_RSLOC_RST_L MAKE_BASE=TRUE	42 43 85 88
38		NC_MPMU_XIN	NC_MPMU_XIN MAKE_BASE=TRUE	
41		SOC_WDOG	SOC_WDOG MAKE_BASE=TRUE	7
41		SOC_SOCHOT_L	SOC_SOCHOT_L MAKE_BASE=TRUE	9
41		PMU_RESET_L	PMU_RESET_L MAKE_BASE=TRUE	7 88
41		PMU_ACTIVE_READY	PMU_ACTIVE_READY MAKE_BASE=TRUE	7 61 88
41		DBL_CLICK_DET	DBL_CLICK_DET MAKE_BASE=TRUE	9
41		SOC_FORCE_DFU	SOC_FORCE_DFU MAKE_BASE=TRUE	7 42 62 88
42 41		BUCK0_THERMAL_THROTTLE_L	BUCK0_THERMAL_THROTTLE_L MAKE_BASE=TRUE	9
42 41		BUCK1_THERMAL_THROTTLE_L	BUCK1_THERMAL_THROTTLE_L MAKE_BASE=TRUE	9
42 41		TPT_MPMU_THROTTLE2_L	TPT_MPMU_THROTTLE2_L MAKE_BASE=TRUE	
42 41		PMU_VDDHI_UVWARN_L	PMU_VDDHI_UVWARN_L MAKE_BASE=TRUE	9
42 41		MPMU_VDDMAIN_UVWARN_L	MPMU_VDDMAIN_UVWARN_L MAKE_BASE=TRUE	9
41		NC_MPMU_VBUS_DET	NC_MPMU_VBUS_DET MAKE_BASE=TRUE	
41		GND	GND MAKE_BASE=TRUE	37 38 40 42 43

B SPMU Misc Aliases

9		SPMU_VDDMAIN_UVWARN_L	SPMU_VDDMAIN_UVWARN_L MAKE_BASE=TRUE	44
36 35		SPMU_VDDMAIN_UVWARN_L	SPMU_VDDMAIN_UVWARN_L MAKE_BASE=TRUE	44
35		GND	GND MAKE_BASE=TRUE	33 35 36

C 32.768kHz Clock Aliases

40		PMU_MEMS32K_OUT	PMU_MEMS32K_OUT MAKE_BASE=TRUE	40

BOM_COST_GROUP=SOC POWER

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE

PMU: SUPPORT - FF

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* OK2INTEGRATE *

5V_S2 Voltage Regulator

SET ONE OPTION FOR THE PBUS POLY CAPS
PACK_OPTION=5V_S2_PBUS-B12
PACK_OPTION=5V_S2_PBUS-D2
PACK_OPTION=5V_S2_PBUS-D12
PACK_OPTION=5V_S2_PBUS18V

SET ONE OPTION FOR THE OUTPUT CAPS
PACK_OPTION=5V_S2_VOUT-B2
PACK_OPTION=5V_S2_VOUT-B12

SET ONE OPTION FOR THE INDUCTOR
PACK_OPTION=5V_S2_IND-24
PACK_OPTION=5V_S2_IND-15

SET ONE OPTION FOR THE MLCC CAPS
PACK_OPTION=5V_S2_MLCC-STD
PACK_OPTION=5V_S2_MLCC-LN

SET ONE OPTION FOR UC300
PACK_OPTION=5V_S2_THINSTNCL
PACK_OPTION=5V_S2_THICKSTNCL

Startup time MIN/TYP/MAX 4.3/7.9/15.9 ms

Vout=5.15V
EDC=6.6A
F=1.5MHz

PPBUS_5VS2_VIN
CC320 27UF 20% 16V POLY-TANT CASE-B12 128S00107
CC321 27UF 20% 16V POLY-TANT CASE-B12 128S00107
CC322 27UF 20% 16V POLY-TANT CASE-B12 128S00107
PACK_OPTION=5V_S2_PBUS18V

CC320 33UF 20% 16V TANT CASE-T 128S00009
CC321 33UF 20% 16V TANT CASE-T 128S00009
CC322 33UF 20% 16V TANT CASE-T 128S00009
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_PBUS-B12

CC340 68UF 20% 16V POLY-TANT CASE-D2E-SM 128S0264
CC341 68UF 20% 16V POLY-TANT CASE-D2E-SM 128S0264
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_PBUS-D2

CC350 33UF 20% 16V TANT CASED12-SM 128S0436
CC351 33UF 20% 16V TANT CASED12-SM 128S0436
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_PBUS-D12

CC323 2.2UF 20% 25V X6S-CERM 0402 138S00042
CC324 2.2UF 20% 25V X6S-CERM 0402 138S00042
CC325 2.2UF 20% 25V X6S-CERM 0402 138S00042
CC326 2.2UF 20% 25V X6S-CERM 0402 138S00042
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_MLCC-STD

CC323 2.2UF 20% 25V X6S-CERM 0402-1 138S00410
CC324 2.2UF 20% 25V X6S-CERM 0402-1 138S00410
CC325 2.2UF 20% 25V X6S-CERM 0402-1 138S00410
CC326 2.2UF 20% 25V X6S-CERM 0402-1 138S00410
PACK_OPTION=5V_S2_MLCC-LN

PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_THICKSTNCL
UC300 LT8642-1 LQFN-THICKSTNCL 353S02631 CRITICAL
VIN (4,5,12,13) PPBUS_5VS2_VIN
EN/UV P5VS2_EN
VC P5VS2_VC
PG P5VS2_PGOOD
FB P5VS2_FB
SS P5VS2_SS
RT P5VS2_RT
SYNC/MODE P5VS2_AGND
BIAS P5VS2_BIAS
INTVCC P5VS2_INTVCC
BST P5VS2_BST
SW P5VS2_SW
SWITCH_NODE=TRUE DIDT=TRUE MIN_NECK_WIDTH=0.1000 MIN_LINE_WIDTH=0.2000
CLKOUT NC
GND (6,11,21)
NC (22,23,24,25)

RC328 100K 5% 1/20W TK 0201 117S00095
P5VS2_PGOOD — P5VS2_EN

PACK_OPTION=5V_S2_THINSTNCL
CC330 2.2UF 20% 25V X6S-CERM 0402 138S00042

PACK_OPTION=5V_S2_IND-15
LC320 1UH-20%-11A-0.01150HM PIRR061E-SM 152S01458

RC327 0 0% 1/20W TK 0201 117S00073
CC331 2.2UF 20% 25V X6S-CERM 0402 138S00042
CC331 2.2UF 20% 25V X6S-CERM 0402-1 138S00410
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_MLCC-STD
PACK_OPTION=5V_S2_MLCC-LN

RC333 0 0% 1/20W TK 0201 117S00073
P5VS2_PWR_EN (IN) → P5VS2_EN

RC332 1.5 5% 1/20W TK 0201 117S00110
P5VS2_BST_R
SWITCH_NODE=TRUE DIDT=TRUE

CC332 47NF 10% 10V X6S-CERM 0201 132S00028

PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_IND-24
LC320 1UH-20%-11A-0.0127OHM PIRM062Q-SM 152S00265

XWC321 SM
P5VS2_FB_XW

CC337 2.2UF 20% 25V X6S-CERM 0402 138S00042
CC338 2.2UF 20% 25V X6S-CERM 0402 138S00042
CC337 2.2UF 20% 25V X6S 0402-1 138S00410
CC338 2.2UF 20% 25V X6S 0402-1 138S00410
PP5V_S2
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_MLCC-STD
PACK_OPTION=5V_S2_MLCC-LN

CC334 150UF 20% 6.3V POLY-TANT CASE-B-SM 128S00038
CC335 150UF 20% 6.3V POLY-TANT CASE-B-SM 128S00038
CC334 150UF 20% 6.3V POLY-TANT CASE-BIS-1 128S00067
CC335 150UF 20% 6.3V POLY-TANT CASE-BIS-1 128S00067
CC336 150UF 20% 6.3V POLY-TANT CASE-BIS-1 128S00067
PACK_IGNORE=TRUE
PACK_OPTION=5V_S2_VOUT-B2
PACK_OPTION=5V_S2_VOUT-B12

RC321 20.5K 1% 1/20W TK 0201 118S00365
CC328 1000PF 10% 16V X7R-1 0201 132S0651
CC329 100PF 5% 25V C0G 0201 131S0805
CC327 0.015UF 10% 16V X7R-CERM 0402 132S0381
RC320 25.5K 1% 1/20W TK 0201 118S00369
XWC320 SM
P5VS2_VC_R
P5VS2_AGND

P5VS2_FB_RC
RC326 47K 1% 1/20W TK 0201 118S00286
P5VS2_FB_C
CC333 470PF 10% 16V X5R-X7R-CERM 0201 132S0361
P5VS2_FB_RC2
P5VS2_FB

RC322 10 5% 1/20W TK 0201 117S00094
RC323 9.31K 1% 1/20W TK 0201 118S00427
RC324 200K 0.1% 1/20W TK 0201 103S00560
RC325 27.4K 0.1% 1/20W TK 0201 103S00590

BOM_COST_GROUP=PLATFORM POWER

SYNC_MASTER=	SYNC_DATE=09/10/2021
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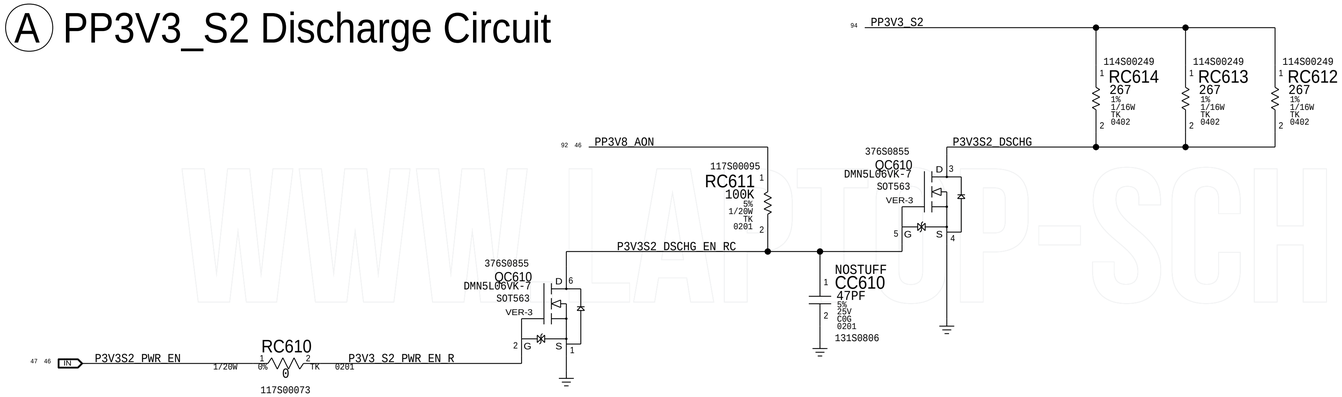
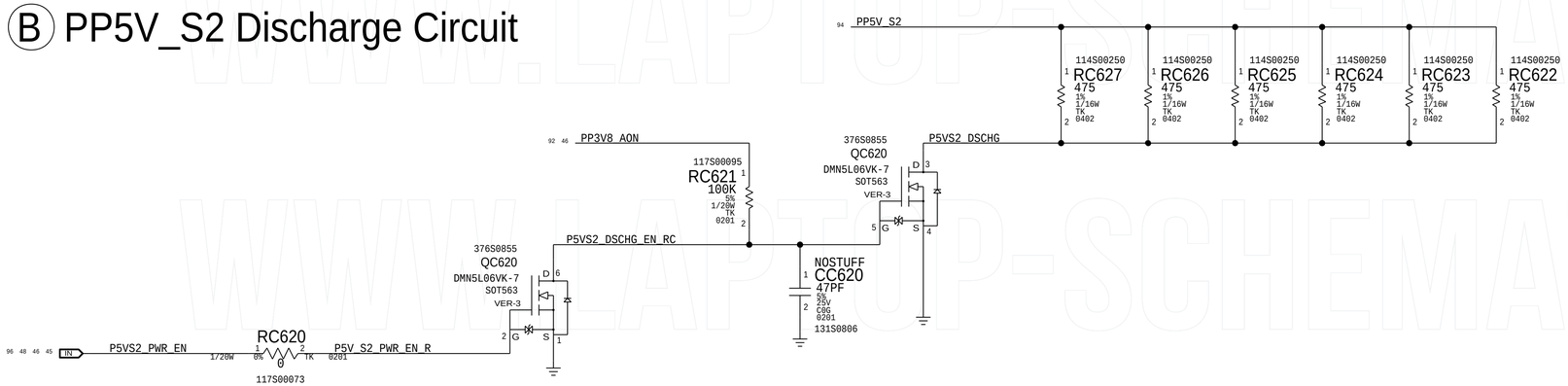
A PP3V3_S2 Discharge Circuit



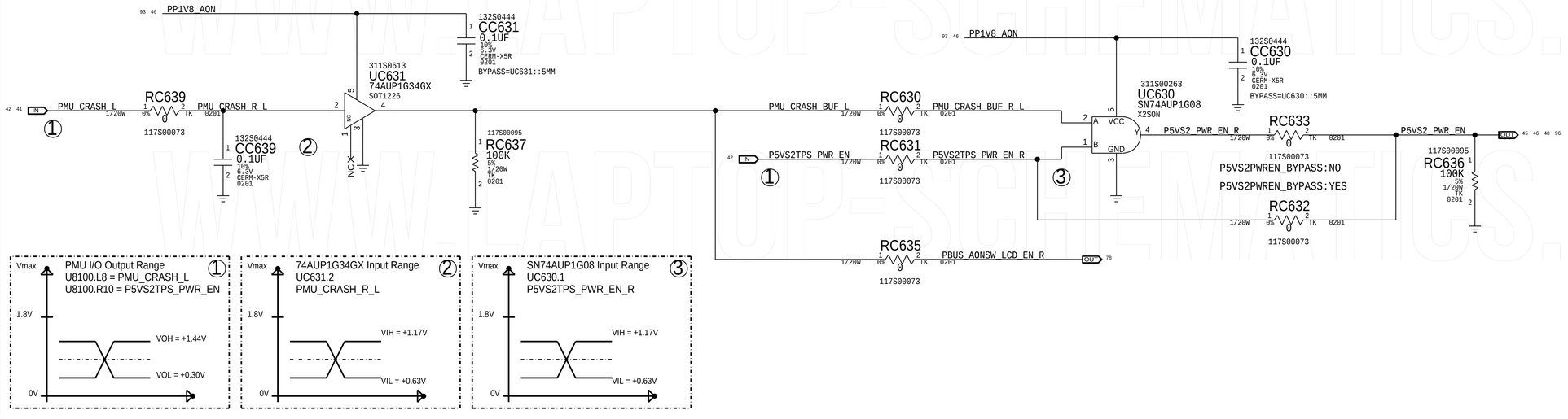
$X2203GHUB/mlb/sim/ltspice/pp3v3_s2_discharge/pp3v3_s2_discharge_diodes_inc.asc

B PP5V_S2 Discharge Circuit



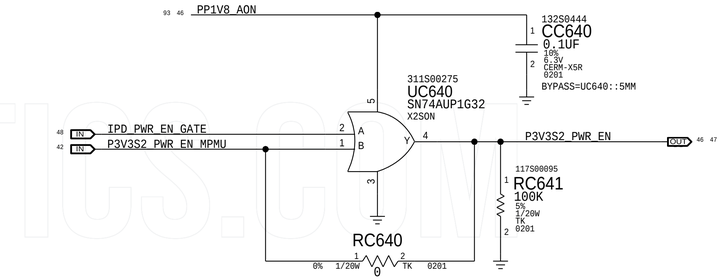
$X2203GHUB/mlb/sim/ltspice/pp5v_s2_discharge/pp5v_s2_discharge_diodes_inc.asc

C P5VS2_PWR_EN Control Logic



BOM_COST_GROUP=PLATFORM POWER

D P3V3S2_PWR_EN Control Logic



NOTE:
Per Stowe PMU OTP, GPIO11 is OFF when the System is OFF.
A side-effect is that during the SIP_SMC->AWAKE transition the rail goes from ON->OFF->ON, which means we lose trackpad power during the OFF transition.
IPD_PWR_EN and PP5VS2_PWR_EN were moved to GPIOs that Stowe PMU can hold off.

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE: POWER: 5V, 3V3 Support

Apple Inc.

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* OK2INTEGRATE *

3V3_S2 VR

SET ONE OPTION FOR PBUS CAPS

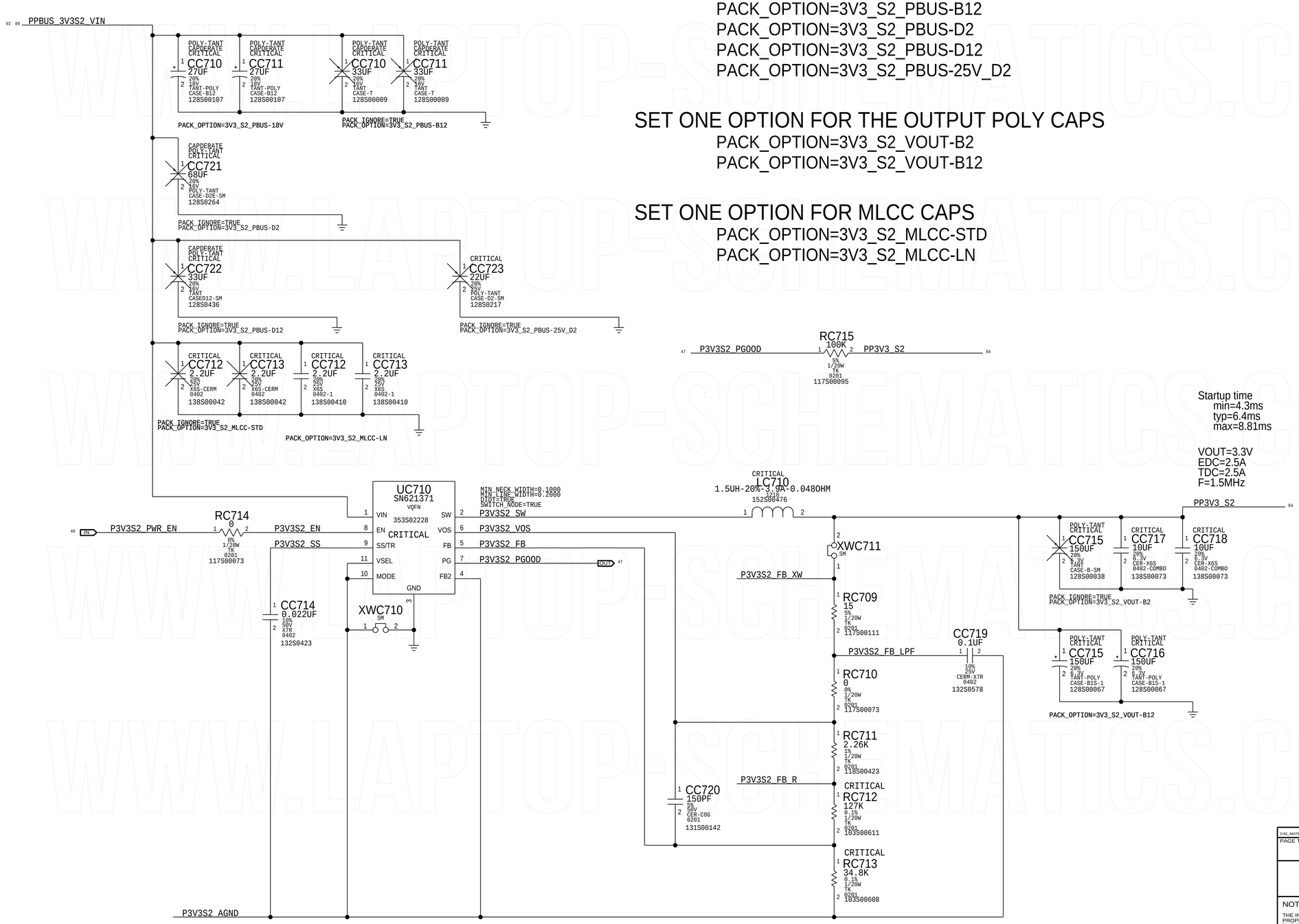
PACK_OPTION=3V3_S2_PBUS-18V
PACK_OPTION=3V3_S2_PBUS-B12
PACK_OPTION=3V3_S2_PBUS-D2
PACK_OPTION=3V3_S2_PBUS-D12
PACK_OPTION=3V3_S2_PBUS-25V_D2

SET ONE OPTION FOR THE OUTPUT POLY CAPS

PACK_OPTION=3V3_S2_VOUT-B2
PACK_OPTION=3V3_S2_VOUT-B12

SET ONE OPTION FOR MLCC CAPS

PACK_OPTION=3V3_S2_MLCC-STD
PACK_OPTION=3V3_S2_MLCC-LN



SYNC_MASTER: SYNC_DATE=09/18/2021

PAGE TITLE

POWER: 3V3 S2

Apple Inc.

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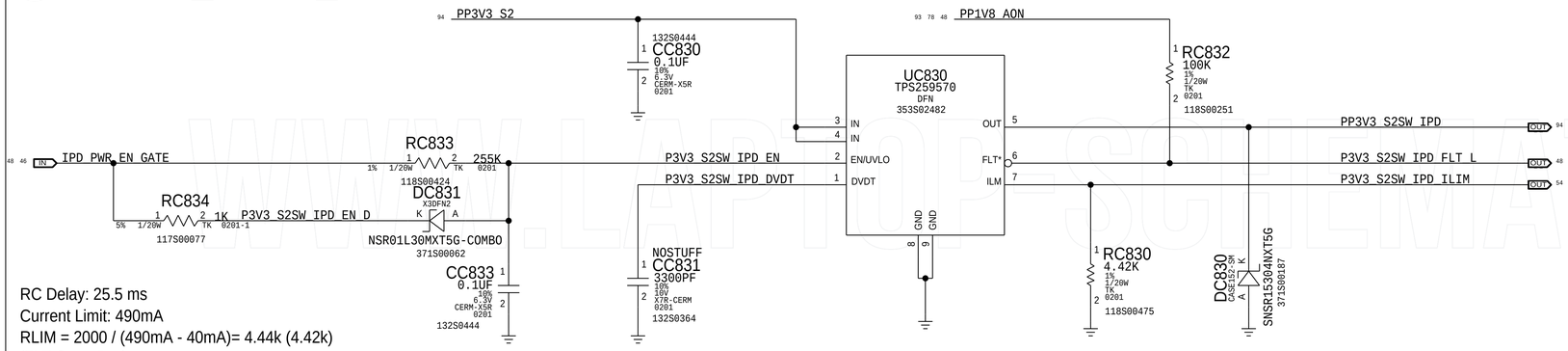
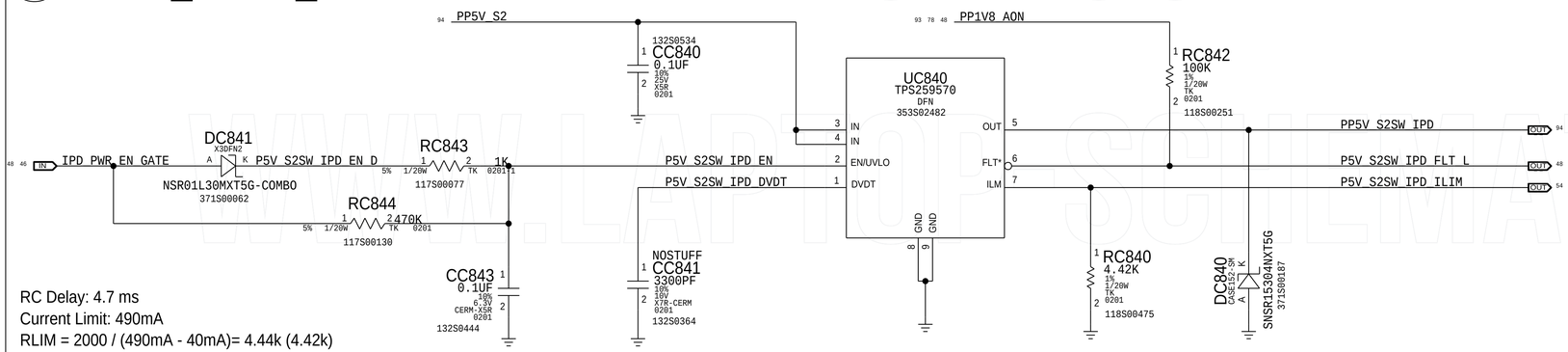
A PP3V3_S2SW_IPD Load Switch & e-Fuse



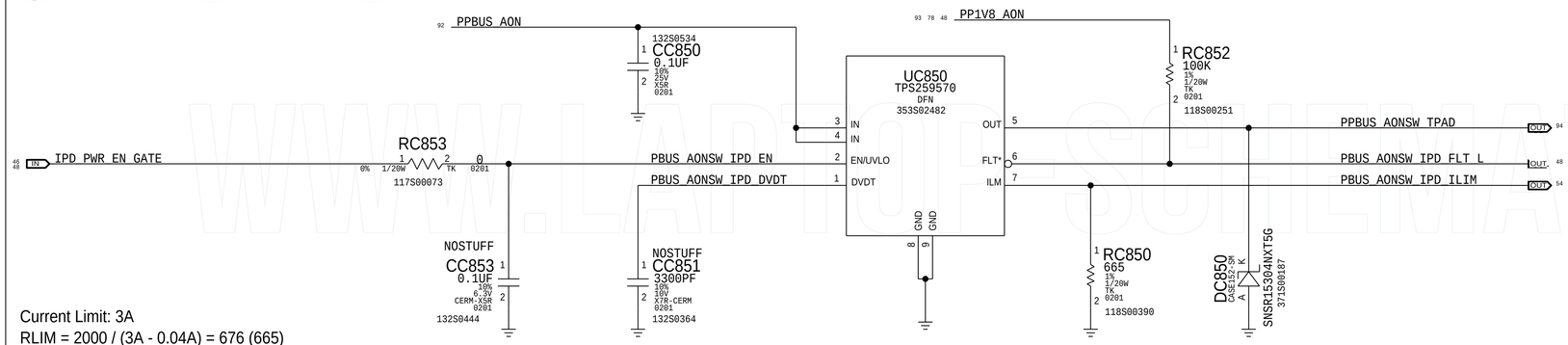
RC Delay: 25.5 ms
Current Limit: 490mA
RLIM = 2000 / (490mA - 40mA)= 4.44k (4.42k)
/FLT Open Drain
Host-Controlled (EN = MPMU GPIO6, 1.8V LVCMOS (PP1V8_AON))
$X2203GHUB/mlb/sim/ltspice/ocp_rc_filters/ocp_filters.asc

B PP5V_S2SW_IPD Load Switch & e-Fuse



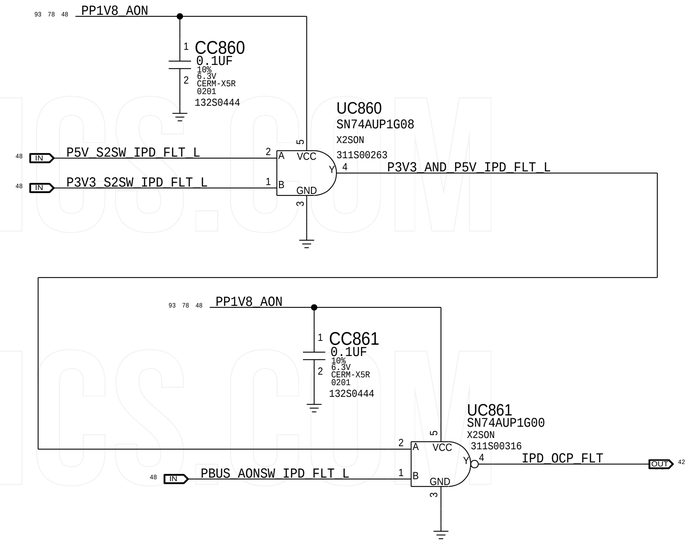
RC Delay: 4.7 ms
Current Limit: 490mA
RLIM = 2000 / (490mA - 40mA)= 4.44k (4.42k)
/FLT Open Drain
Host-Controlled (EN = MPMU GPIO6, 1.8V LVCMOS (PP1V8_AON))
$X2203GHUB/mlb/sim/ltspice/ocp_rc_filters/ocp_filters.asc

C PPBUS_AONSW_IPD Load Switch & e-Fuse

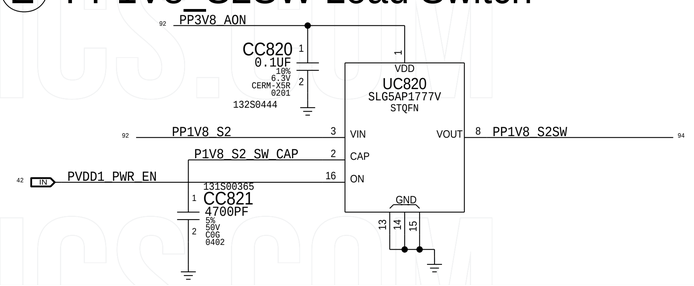


Current Limit: 3A
RLIM = 2000 / (3A - 0.04A) = 676 (665)
/FLT Open Drain
Host-Controlled (EN = MPMU GPIO6, 1.8V LVCMOS (PP1V8_AON))

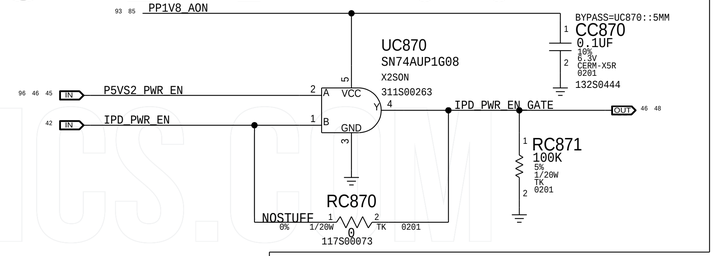
C IPD_OCP_FLT Control Logic



E PP1V8_S2SW Load Switch



F IPD_PWR_EN Gating Logic



BOM_COST_GROUP=PLATFORM POWER

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE

Power: Load Switches

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D
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BRANCH evt-1
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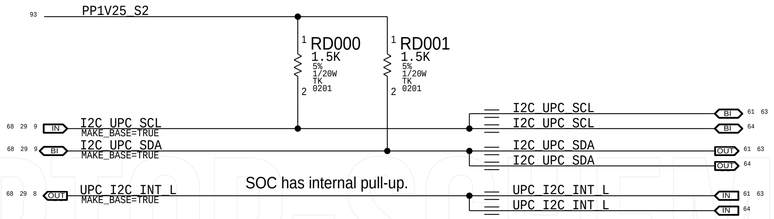
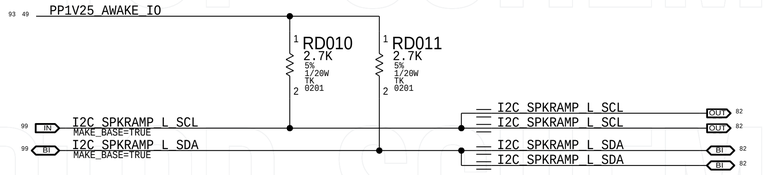
A AP_I2C0 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
AP	0	400 kHZ	0X38	0X71	ACE2 - 0
AP	0	400 kHZ	0X3F	0X7F	ACE2 - 1
AP	0	400 kHZ	0X3A	0X75	ACE2 - MagSafe



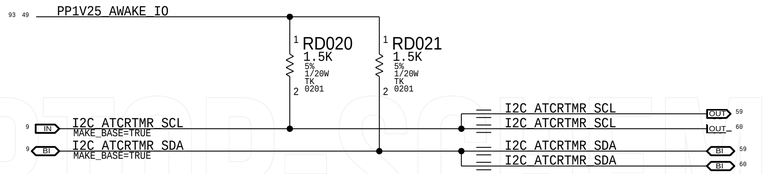
B AP_I2C1 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
AP	1	400 kHZ	0X38	0X71	Left SpkrAmp A
AP	1	400 kHZ	0X39	0X73	Left SpkrAmp B



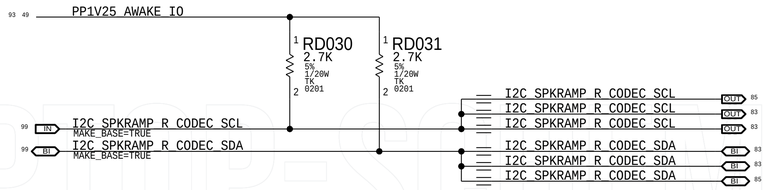
C AP_I2C2 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
AP	2	100 kHZ/400 kHz	0X18	0X31	RT13 Port 0
AP	2	100 kHZ/400 kHz	0X19	0X33	RT13 Port 1



D AP_I2C3 - I2C Interface

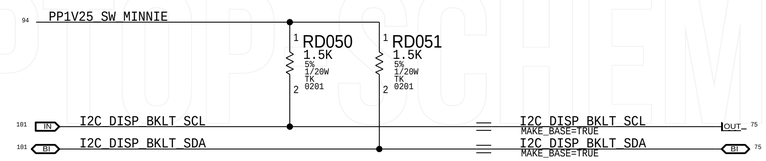
MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
AP	3	400 kHZ	0X3B	0X77	Right SpkrAmp D
AP	3	400 kHZ	0X3C	0X79	Right SpkrAmp E
AP	3	400 kHZ	0X4B	0X97	CODEC



E AP_I2C4 - I2C Interface (Unused)

F DISP_I2C - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
DISP	0	100 kHZ	0X2F	0X5F	Minnie Bklt Drvr



BOM_COST_GROUP=SENSORS

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE

I2C: AP, DISP

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D

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BRANCH evt-1

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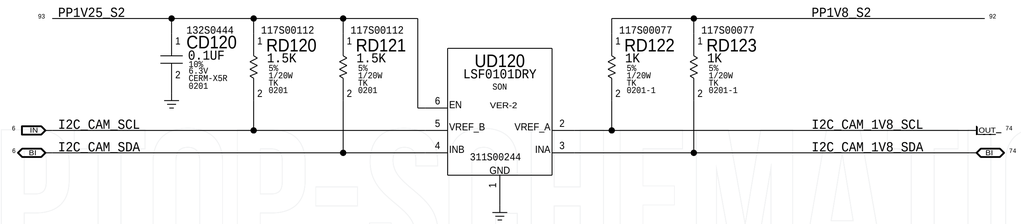
A ISP_I2C0 - I2C Interface

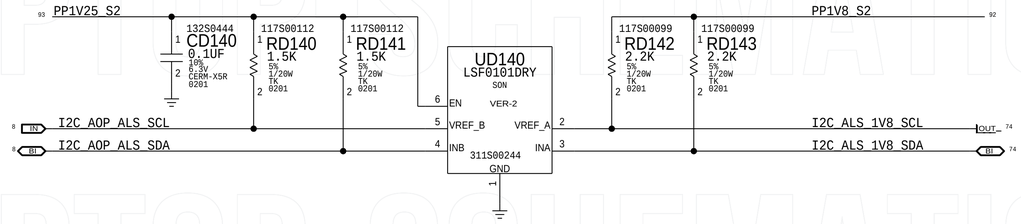
MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
ISP	0	400 kHz	0X10	0X21	Camera PMIC
ISP	0	400 kHz	0X36	0X6D	Image Sensor



B ISP_I2C1 - I2C Interface (Unused)

C AOP_I2CM0 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
AOP	0	400 kHz	0X48	0X91	TMP108
AOP	0	400 kHz	0X29	0X53	TETRA2 ALS



D AOP_I2CM1 - I2C Interface (Unused)

E AOP_I2CM2 - I2C Interface (Unused)

F SEP_I2C0 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
SEP	0	400 kHz/1 MHz	0X71	0XE3	SEP Custom App
SEP	0	400 kHz/1 MHz	0X51	0XA3	SEP EEPROM App

I2C Pull-Ups at EEPROM (U1950)

BOM_COST_GROUP=SENSORS

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE: I2C: ISP, AOP, SEP

Apple Inc.

DRAWING NUMBER: 051-07020 SIZE: D
REVISION: 6.0.0
BRANCH: evt-1
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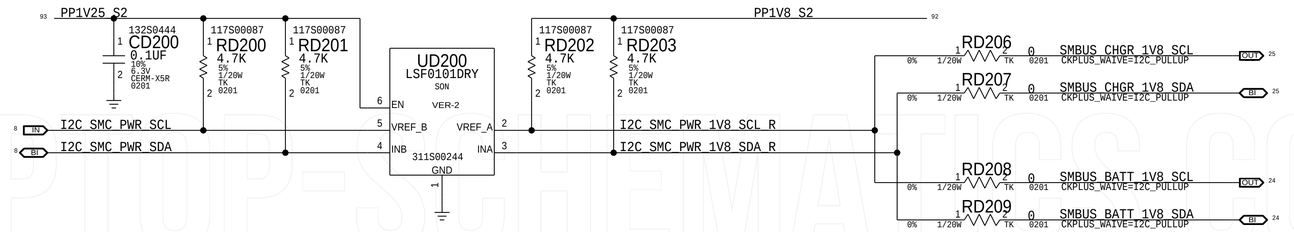
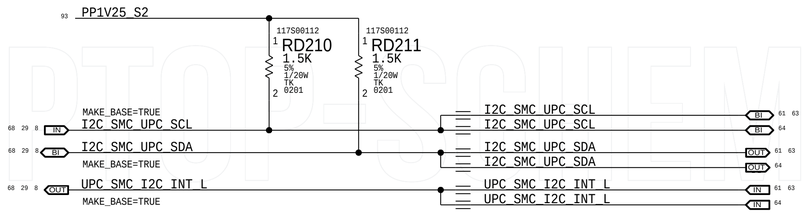
A SMC_I2C0 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
SMC	0	100 kHz	0X09	0X13	Whamola Charger
SMC	0	100 kHz	0X0B	0X16	Battery BMU
SMC	0	100 kHz	0X40	0X81	INA233 - U202
SMC	0	100 kHz	0X44	0X89	INA233 - U203
SMC	0	100 kHz	0X45	0X8B	INA233 - U201



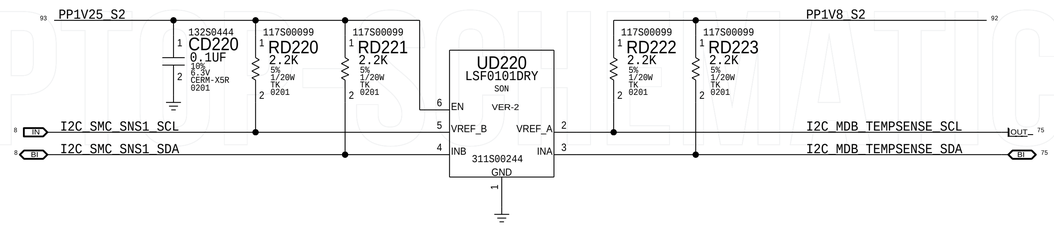
B SMC_I2C1 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
SMC	1	400 kHZ	0X38	0X71	ACE2 - 0
SMC	1	400 kHZ	0X3F	0X7F	ACE2 - 1
SMC	1	400 kHZ	0X3A	0X75	ACE2 - MagSafe



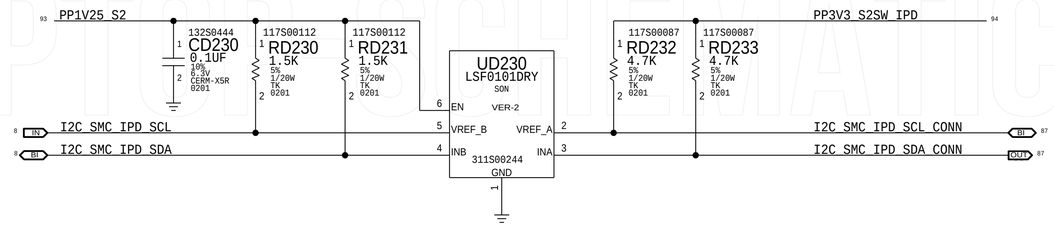
C SMC_I2C2 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
SMC	2	100 kHZ	0X48	0X91	MDB - TMP468



D SMC_I2C3 - I2C Interface

MASTER	NUMBER	SPEED	7-BIT ADDR	8-BIT ADDR (R)	DEVICE
SMC	3	100 kHZ	0X4C	0X99	PALM - TempSense



E SMC_I2C4 - I2C Interface (Unused)

BOM_COST_GROUP=SENSORS

$SYNC_MASTER=jweebb $SYNC_DATE=09/28/2021

PAGE TITLE: I2C: SMC

Apple Inc.

DRAWING NUMBER: 051-07020 SIZE: D

REVISION: 6.0.0

BRANCH: evt-1

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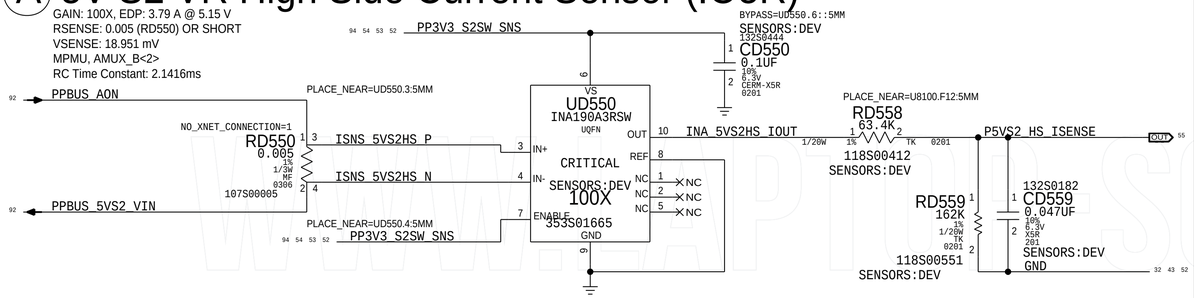
A 5V S2 VR High Side Current Sensor (IO5R)

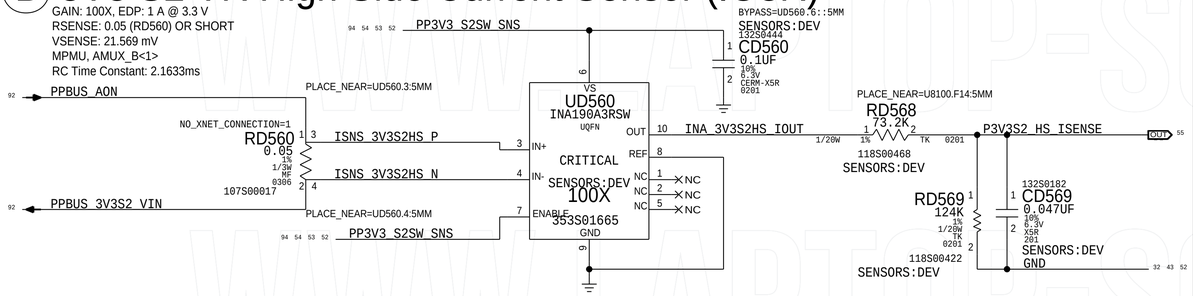
GAIN: 100X, EDP: 3.79 A @ 5.15 V
RSENSE: 0.005 (RD550) OR SHORT
VSENSE: 18.951 mV
MPMU, AMUX_B<2>
RC Time Constant: 2.1416ms



$X2203GHUB/mlb/sim/ltspice/io5r_p5vs2_hs_isense/io5r_p5vs2_hs_isense.asc

B 3V3 S2 VR High Side Current Sensor (IO3R)

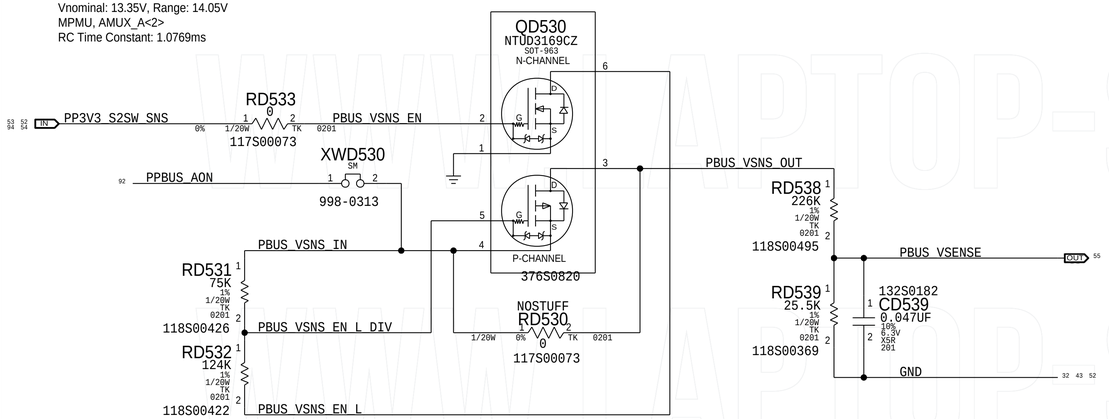
GAIN: 100X, EDP: 1 A @ 3.3 V
RSENSE: 0.05 (RD560) OR SHORT
VSENSE: 21.569 mV
MPMU, AMUX_B<1>
RC Time Constant: 2.1633ms



$X2203GHUB/mlb/sim/ltspice/io3r_p3v3s2_hs_isense/io3r_p3v3s2_hs_isense.asc

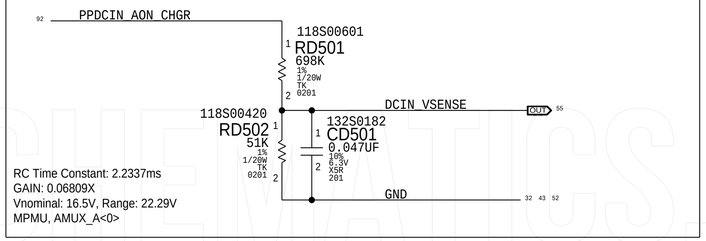
C PPBUS Voltage Sensor (VP0R)

GAIN: 0.1014X
Vnominal: 13.35V, Range: 14.05V
MPMU, AMUX_A<2>
RC Time Constant: 1.0769ms



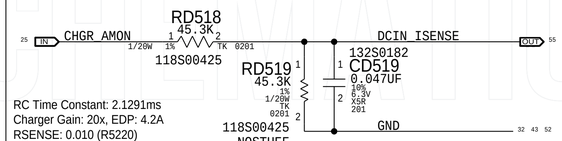
$X2203GHUB/mlb/sim/ltspice/vp0r_sense/vp0r_pbus_vsense_pulse_diodesinc.asc
$X2203GHUB/mlb/sim/ltspice/vp0r_sense/vp0r_pbus_vsense_pulse_onsemi.asc

D DCIN Voltage Sensor (VD0R)



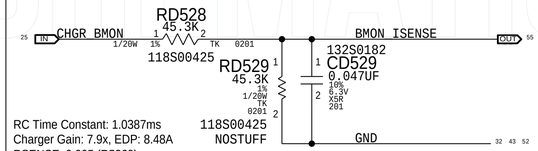
RC Time Constant: 2.2337ms
GAIN: 0.06809X
Vnominal: 16.5V, Range: 22.29V
MPMU, AMUX_A<0>

E DCIN Current Sensor (ID0R)



RC Time Constant: 2.1291ms
Charger Gain: 20x, EDP: 4.2A
RSENSE: 0.010 (R5220)
MPMU, AMUX_A<1>

F BMON Current Sensor (IPBR)



RC Time Constant: 1.0387ms
Charger Gain: 7.9x, EDP: 8.48A
RSENSE: 0.005 (R5260)
MPMU, AMUX_A<3>

G Production Sensor BOM Table

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S00095	1	RES,TK,100K OHM,5%,,1/20W,0201	RD559		SENSORS:PROD
117S00095	1	RES,TK,100K OHM,5%,,1/20W,0201	RD569		SENSORS:PROD

BOM_COST_GROUP=SENSORS

PAGE TITLE
SENSORS: POWER HIGH SIDE (1/2)

Apple Inc.

DRAWING NUMBER 051-07020
SIZE D
REVISION 6.0.0
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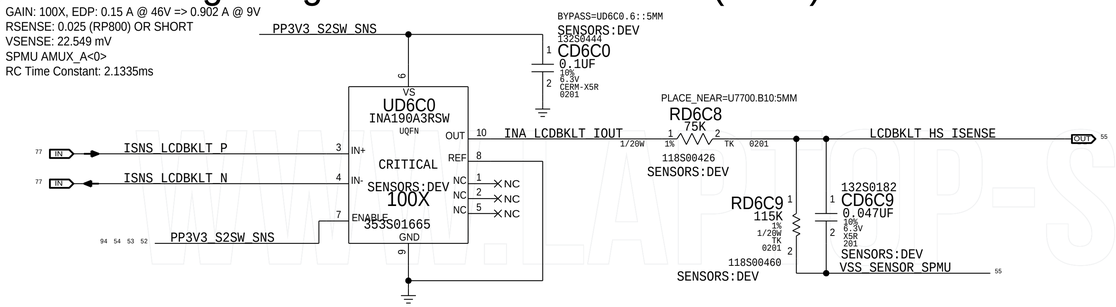
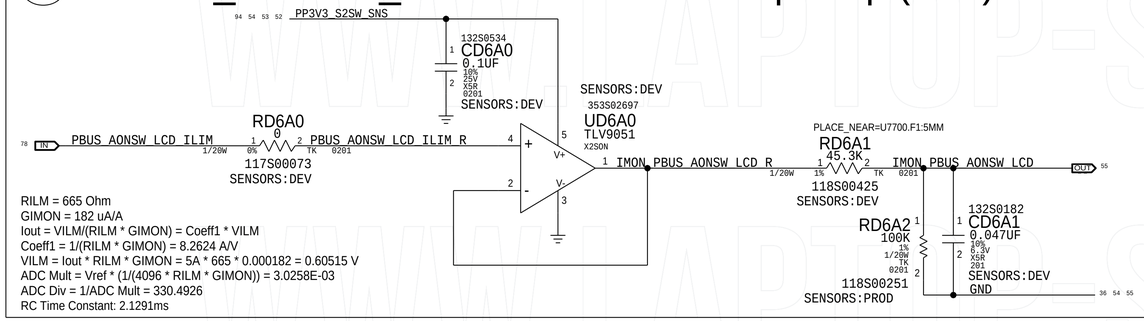
A LCD Backlight High Side Current Sensor (IBLR)

GAIN: 100X, EDP: 0.15 A @ 46V => 0.902 A @ 9V
RSENSE: 0.025 (RP800) OR SHORT
VSENSE: 22.549 mV
SPMU AMUX_A<0>
RC Time Constant: 2.1335ms



$X2203GHUB/mlb/sim/ltspice/iblr_lcdbklt_hs_isense/iblr_lcdbklt_hs_isense.asc

B PPBUS_AONSW_LCD Current Sense Op-Amp (IBlR)



RILM = 665 Ohm
GIMON = 182 uA/A
Iout = VILM/(RILM * GIMON) = Coeff1 * VILM
Coeff1 = 1/(RILM * GIMON) = 8.2624 A/V
VILM = Iout * RILM * GIMON = 5A * 665 * 0.000182 = 0.60515 V
ADC Mult = Vref * (1/(4096 * RILM * GIMON)) = 3.0258E-03
ADC Div = 1/ADC Mult = 330.4926
RC Time Constant: 2.1291ms

C Production Sensor BOM Table

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S00095	1	RES,TK,100K OHM,5%,,1/20W,0201	RD6C9		SENSORS:PROD

BOM_COST_GROUP=SENSORS

PAGE TITLE
SENSORS: POWER HIGH SIDE (2/2)

Apple Inc.

DRAWING NUMBER 051-07020
SIZE D
REVISION 6.0.0
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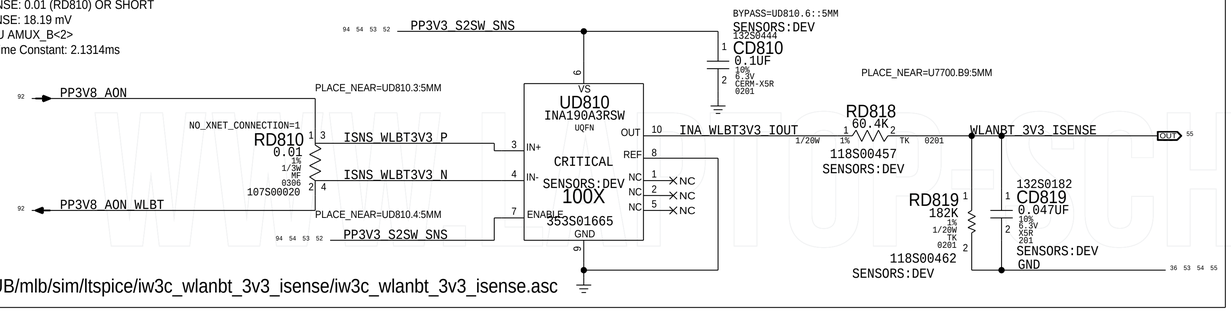
A WLAN BT 3V8 AON Current Sensor (IW3C)

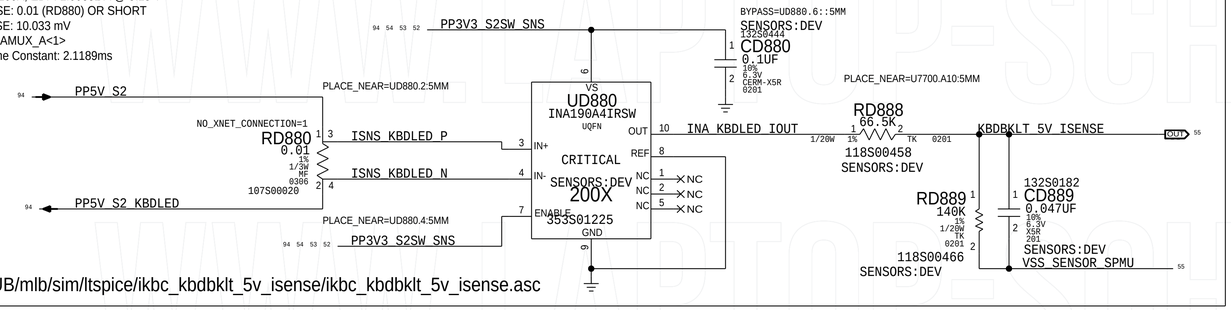
GAIN: 100X, EDP: 1.819 A @ 3.8 V
RSENSE: 0.01 (RD810) OR SHORT
VSENSE: 18.19 mV
SPMU AMUX_B<2>
RC Time Constant: 2.1314ms



$X2203GHUB/mlb/sim/ltspice/iw3c_wlanbt_3v3_isense/iw3c_wlanbt_3v3_isense.asc

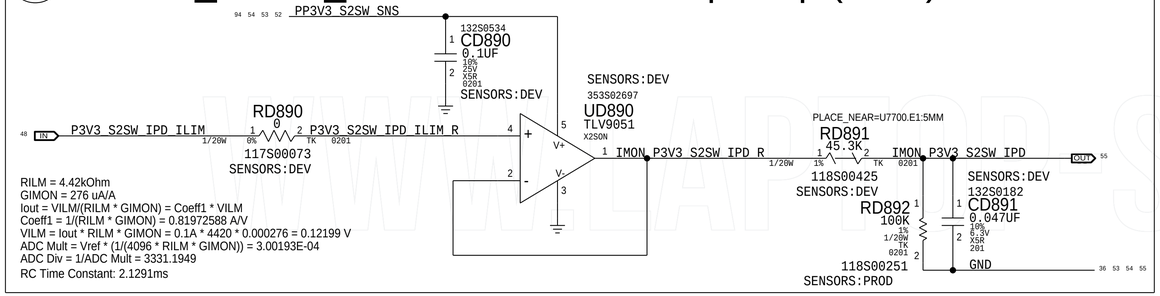
B Keyboard LED 5V Current Sensor (IKBC)

GAIN: 200X, EDP: 1.00331 A @ 5.15 V
RSENSE: 0.01 (RD880) OR SHORT
VSENSE: 10.033 mV
SPMU AMUX_A<1>
RC Time Constant: 2.1189ms



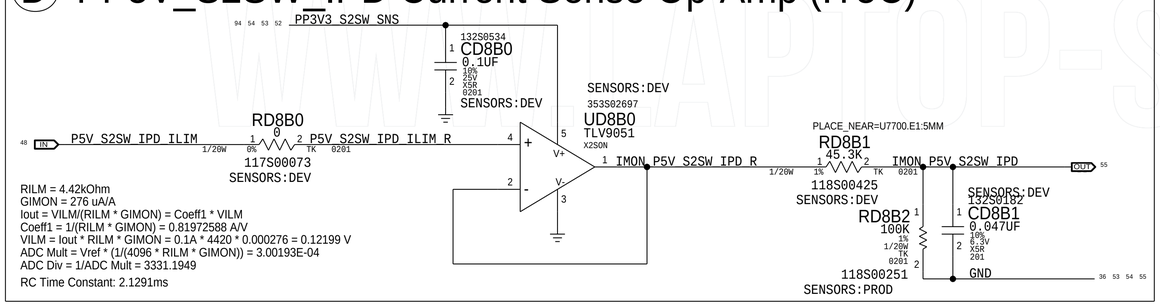
$X2203GHUB/mlb/sim/ltspice/ikbc_kbdbklt_5v_isense/ikbc_kbdbklt_5v_isense.asc

C PP3V3_S2SW_IPD Current Sense Op-Amp (IT3C)



RILM = 4.42kOhm
GIMON = 276 uA/A
Iout = VILM/(RILM * GIMON) = Coeff1 * VILM
Coeff1 = 1/(RILM * GIMON) = 0.81972588 A/V
VILM = Iout * RILM * GIMON = 0.1A * 4420 * 0.000276 = 0.12199 V
ADC Mult = Vref * (1/(4096 * RILM * GIMON)) = 3.00193E-04
ADC Div = 1/ADC Mult = 3331.1949
RC Time Constant: 2.1291ms

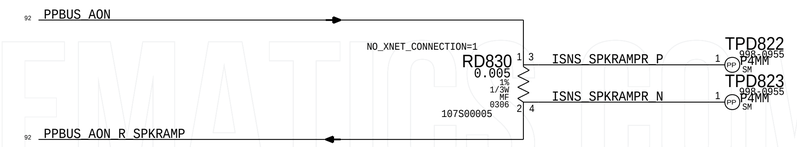
D PP5V_S2SW_IPD Current Sense Op-Amp (IT5C)



RILM = 4.42kOhm
GIMON = 276 uA/A
Iout = VILM/(RILM * GIMON) = Coeff1 * VILM
Coeff1 = 1/(RILM * GIMON) = 0.81972588 A/V
VILM = Iout * RILM * GIMON = 0.1A * 4420 * 0.000276 = 0.12199 V
ADC Mult = Vref * (1/(4096 * RILM * GIMON)) = 3.00193E-04
ADC Div = 1/ADC Mult = 3331.1949
RC Time Constant: 2.1291ms

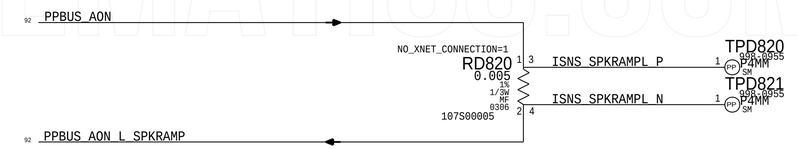
E Right Speaker Amplifier Current Sensor (Ixxx)

GAIN: 100X, EDP: 2.6 A
RSENSE: 0.005 (RD820) OR SHORT
VSENSE: 13 mV, RANGE: 3.3 A

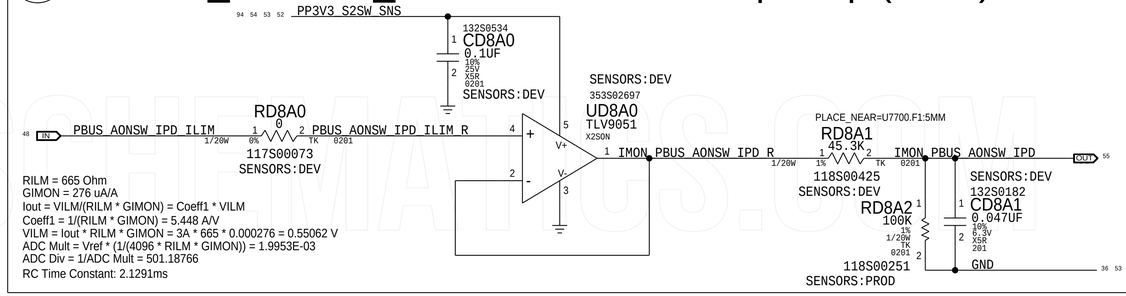


F Left Speaker Amplifier Current Sensor (Ixxx)

GAIN: 100X, EDP: 2.6 A
RSENSE: 0.005 (RD820) OR SHORT
VSENSE: 13 mV, RANGE: 3.3 A



G PPBUS_AONSW_IPD Current Sense Op-Amp (ITPR)



RILM = 665 Ohm
GIMON = 276 uA/A
Iout = VILM/(RILM * GIMON) = Coeff1 * VILM
Coeff1 = 1/(RILM * GIMON) = 5.448 A/V
VILM = Iout * RILM * GIMON = 3A * 665 * 0.000276 = 0.55062 V
ADC Mult = Vref * (1/(4096 * RILM * GIMON)) = 1.9953E-03
ADC Div = 1/ADC Mult = 501.18766
RC Time Constant: 2.1291ms

H Production Sensor BOM Table

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S00095	1	RES,TK,100K OHM,5%,,1/20W,0201	RD819		SENSORS:PROD
117S00095	1	RES,TK,100K OHM,5%,,1/20W,0201	RD889		SENSORS:PROD

BOM_COST_GROUP=SENSORS

PAGE TITLE
SENSORS: POWER LOW SIDE (1/2)

Apple Inc.

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A ADC Input Aliases

MASTER PMU AMUX ALIAS

52	IN	DCIN_VSENSE MAKE_BASE=TRUE	DCIN_VSENSE	OUT 41
52	IN	DCIN_ISENSE MAKE_BASE=TRUE	DCIN_ISENSE	OUT 41
52	IN	PBUS_VSENSE MAKE_BASE=TRUE	PBUS_VSENSE	OUT 41
52	IN	BMON_ISENSE MAKE_BASE=TRUE	BMON_ISENSE	OUT 41
32	IN	P3V8AON_IMEAS MAKE_BASE=TRUE	P3V8AON_IMEAS	OUT 41
52	IN	P3V3S2_HS_ISENSE MAKE_BASE=TRUE	P3V3S2_HS_ISENSE	OUT 41
52	IN	P5VS2_HS_ISENSE MAKE_BASE=TRUE	P5VS2_HS_ISENSE	OUT 41
55		MPMU_AMUXTDEV_TERM MAKE_BASE=TRUE	MPMU_AMUXTDEV_TERM	OUT 41

SLAVE PMU AMUX ALIAS

53	IN	LCDBKLT_HS_ISENSE MAKE_BASE=TRUE	LCDBKLT_HS_ISENSE	OUT 35
54	IN	KBDBKLT_5V_ISENSE MAKE_BASE=TRUE	KBDBKLT_5V_ISENSE	OUT 35
54	IN	IMON_PBUS_AONSW_IPD MAKE_BASE=TRUE	IMON_PBUS_AONSW_IPD	OUT 35
54	IN	IMON_P3V3_S2SW_IPD MAKE_BASE=TRUE	IMON_P3V3_S2SW_IPD	OUT 35
53	IN	IMON_PBUS_AONSW_LCD MAKE_BASE=TRUE	IMON_PBUS_AONSW_LCD	OUT 35
54	IN	IMON_P5V_S2SW_IPD MAKE_BASE=TRUE	IMON_P5V_S2SW_IPD	OUT 35
54	IN	WLANBT_3V3_ISENSE MAKE_BASE=TRUE	WLANBT_3V3_ISENSE	OUT 35
55		SPMU_AMUXTDEV_TERM MAKE_BASE=TRUE	SPMU_AMUXTDEV_TERM	OUT 35

B SOC Sense Lines

102	IN	VSNS_VDD_PCPU	PPE0A1 P4MM SM 1 PP	
102	IN	VSNS_VSS_PCPU	PPE0A2 P4MM SM 1 PP	
102	IN	VSNS_VDD_GPU	PPE0A3 P4MM SM 1 PP	
102	IN	VSNS_VDD_SOC	PPE0A4 P4MM SM 1 PP	
102	IN	VSNS_VDD_ECPU	PPE0A5 P4MM SM 1 PP	
102	IN	VSNS_VDD_DISP	PPE0A6 P4MM SM 1 PP	
102	IN	VSNS_ABSMIN_PCPU	PPE0A7 P4MM SM 1 PP	
102	IN	VSNS_VSS_1	PPE0A8 P4MM SM 1 PP	
102	IN	VSNS_VDD2H_1	PPE0A9 P4MM SM 1 PP	
102	IN	VSNS_VSS_2	PPE0AA P4MM SM 1 PP	
102	IN	VSNS_VDD2H_2	PPE0AB P4MM SM 1 PP	
102	IN	VSNS_VDDQ_S1	PPE0AC P4MM SM 1 PP	
16	IN	VDD_DCS_S1_SENSE	PPE0B0 P4MM SM 1 PP	
18	IN	VDD_AMPH_S2_SENSE	PPE0B1 P4MM SM 1 PP	
18	IN	VDD_VDDQ_S1_SENSE	PPE0B2 P4MM SM 1 PP	

PPE0AE P4MM SM 1 PP — PLACE_NEAR=PPE0A3:2MM

PPE0AF P4MM SM 1 PP

998-0955

C Unused MPMU AMUX/TDEV Termination

RECOMMENDED NOT TO LEAVE AMUX/TDEV FLOATING.

55 MPMU_AMUXTDEV_TERM
56 MPMU_AMUXTDEV_TERM
= MPMU_AMUXTDEV_TERM MAKE_BASE=TRUE

RE010 100K 5% 1/20W TK 0201 (1, 2) 117S00095

D Unused SPMU AMUX/TDEV Termination

RECOMMENDED NOT TO LEAVE AMUX/TDEV FLOATING.

55 SPMU_AMUXTDEV_TERM
56 SPMU_AMUXTDEV_TERM
56 SPMU_AMUXTDEV_TERM
= SPMU_AMUXTDEV_TERM MAKE_BASE=TRUE

RE020 100K 5% 1/20W TK 0201 (1, 2) 117S00095

E I/V Sensor Ground Reference Aliases

Slave PMU ADC Ground Alias

54 VSS_SENSOR_SPMU
53 VSS_SENSOR_SPMU
= VSS_SENSOR_SPMU MAKE_BASE=TRUE

XWE020 SM (1, 2) GND — 36 53 54

BOM_COST_GROUP=SENSORS

PAGE TITLE: SENSORS: POWER SUPPORT

Apple Inc.

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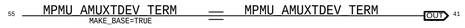
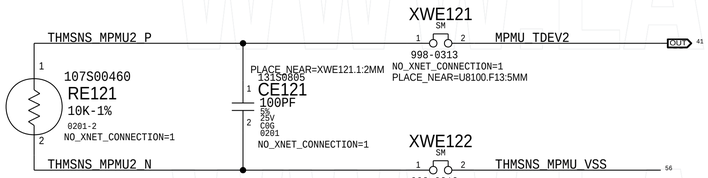
A Master PMU TDEV1 (Txxx)

Location: TBD



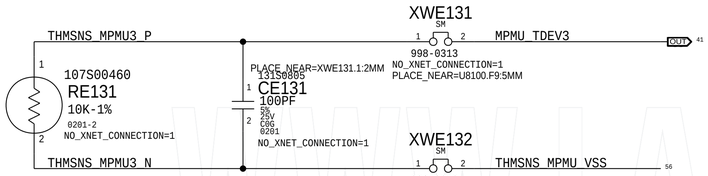
B Master PMU TDEV2 (Tm0B)

Location: Ambient



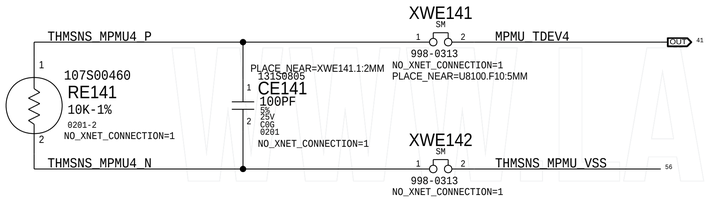
C Master PMU TDEV3 (TIOP)

Location: Thunderbolt Proximity

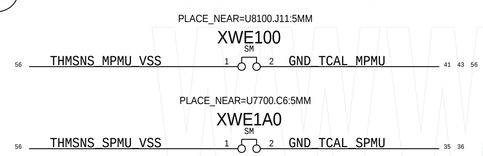


D Master PMU TDEV4 (TW0P)

Location: Wireless Proximity

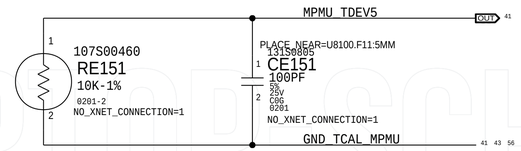


E Master/Slave PMU VSS Connection



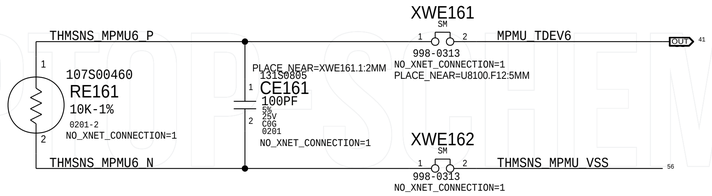
F Master PMU TDEV5 (TPMP)

Location: Master PMU Proximity



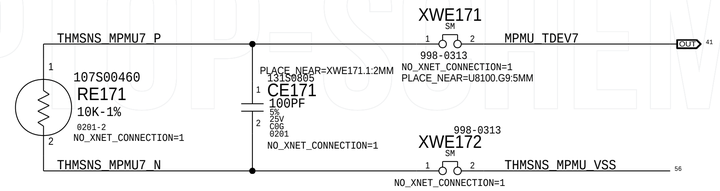
G Master PMU TDEV6 (T5SP)

Location: PP5V_S2 (UC300)



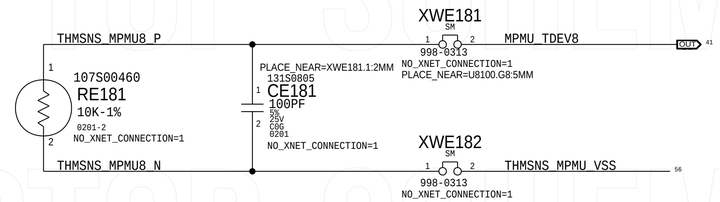
H Master PMU TDEV7 (TCHP)

Location: Charger Proximity



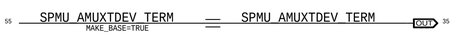
I Master PMU TDEV8 (TMVR)

Location: Main VR (PP3V8_AON_VDDMAIN)



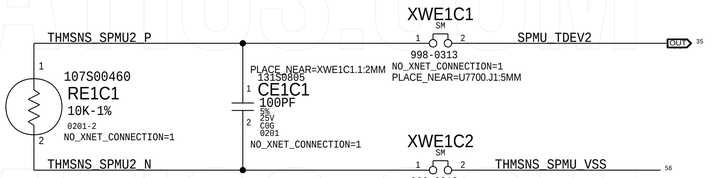
J Slave PMU TDEV1 (Txxx)

Location: TBD



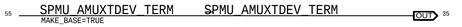
K Slave PMU TDEV2 (TH0T)

Location: NAND Proximity



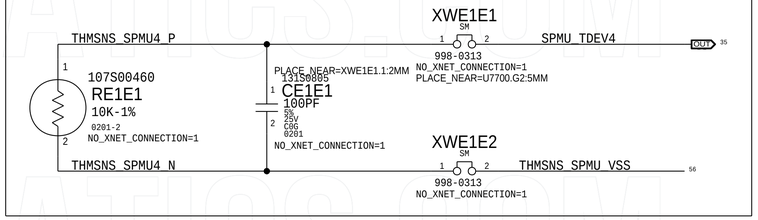
L Slave PMU TDEV3 (Txxx)

Location: TBD



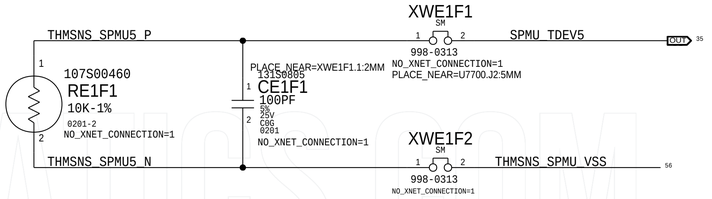
M Slave PMU TDEV4 (TSCD)

Location: SOC Proximity



N Slave PMU TDEV5 (TPSP)

Location: Slave PMU Proximity



BOM_COST_GROUP=SENSORS

SYNC_DATE=09/10/2021

PAGE TITLE: SENSORS: THERMAL

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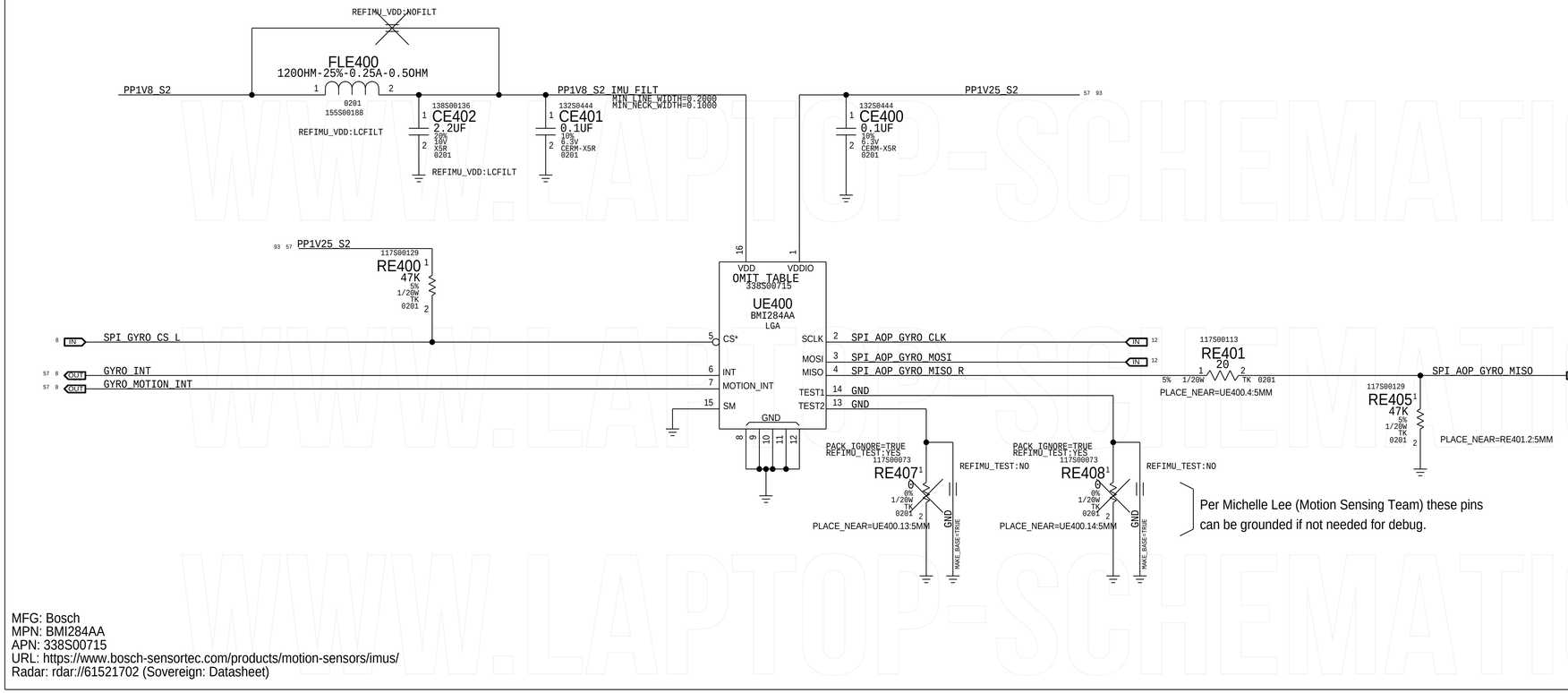
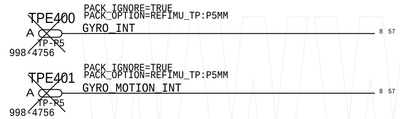
*** OK2INTEGRATE ***

A Sovereign Accelerometer and Gyroscope



MFG: Bosch
MPN: BMI284AA
APN: 338S00715
URL: https://www.bosch-sensortec.com/products/motion-sensors/imus/
Radar: rdar://61521702 (Sovereign: Datasheet)

B Test Points



C Sovereign BOM Options

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00715	1	IC,SOVEREIGN,BMI284,AA,LGA16	UE400	CRITICAL	REFIMU_IC:BMI284
338S00849	1	IC,SOVEREIGN2,BMI286,AA,LGA16	UE400	CRITICAL	REFIMU_IC:BMI286

BOM_COST_GROUP=SENSORS

PAGE TITLE
SENSORS: MOTION

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---- Reference only ----

Left Rear Port

FOR POR, VERIFY 20% TOLERANCE ON 0.22UF AC COUPLING CAP IS OK

PLACE VBUS CAP NEAR EACH VBUS PIN

BYPASS=JE700.29::10MM

PPVBUS_USBC0
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000

PLACE_NEAR=JE700.30:5MM

DE722
TVS2200
WSON

377S00172

ALLOW_APPLE_PREFIX=D

516S00686

JE700
20875-028E-01
F-ST-SMM

JE701
20875-028E-01
F-ST-SMM

516S00686

USBC0_CC1_CONN
USBC0_R2D_CR_N<1>
USBC0_R2D_CR_P<1>
USBC0_D2R_N<1>
USBC0_D2R_P<1>
USBC0_SBU2
USBC0_USB_BOT_N
USBC0_USB_BOT_P

RE761 RE760 RE763 RE762 — 2 2 USBC0_R2D_C_N<1> / USBC0_R2D_C_P<1> / USBC0_D2R_R_N<1> / USBC0_D2R_R_P<1>

CE761 CE760 CE763 CE762 — 0.22UF / 0.22UF / 0.33UF / 0.33UF

USBC0_R2D_N<1>
USBC0_R2D_P<1>
USBC0_D2R_CR_N<1>
USBC0_D2R_CR_P<1>

DZE762 DZE763 DZE760 DZE761 DZE764 DZE765 DZE767 DZE766

RE765 RE764 RE767 RE766 — 51K

USBC0_USB_TOP_P
USBC0_USB_TOP_N
USBC0_D2R_CR_N<2>
USBC0_D2R_CR_P<2>
TP_USBC0_PP20V
USBC0_SBU2
USBC0_CC1_CONN
USBC0_USB_BOT_N
USBC0_USB_BOT_P
USBC0_SBU1
USBC0_CC2_CONN
USBC0_R2D_N<2>
USBC0_R2D_P<2>

CE720 CE721 CE722 CE723 CE726 CE727 CE728 CE725 — CRITICAL 0.01UF 10% 25V X5R-CERM 0201

USBC0_CC2_CONN
USBC0_R2D_N<2>
USBC0_R2D_P<2>
USBC0_D2R_CR_N<2>
USBC0_D2R_CR_P<2>

CE791 CE790 CE793 CE792 — 0.22UF / 0.22UF / 0.33UF / 0.33UF

RE791 RE790 RE793 RE792 — 2 2 USBC0_R2D_C_N<2> / USBC0_R2D_C_P<2> / USBC0_D2R_R_N<2> / USBC0_D2R_R_P<2>

USBC0_R2D_CR_N<2>
USBC0_R2D_CR_P<2>
USBC0_USB_TOP_P
USBC0_USB_TOP_N
USBC0_D2R_N<2>
USBC0_D2R_P<2>
USBC0_SBU1

DZE796 DZE794 DZE795 DZE797 DZE791 DZE790 DZE793 DZE792

RE796 RE797 RE794 RE795 — 51K

USBC1_USB_BOT_N
USBC1_USB_BOT_P
USBC1_SBU1
USBC1_R2D_CR_P<2>
USBC1_R2D_CR_N<2>
USBC1_D2R_P<2>
USBC1_D2R_N<2>
USBC1_CC2_CONN

RE780 RE781 RE782 RE783 — 2 2 USBC1_R2D_C_P<2> / USBC1_R2D_C_N<2> / USBC1_D2R_R_P<2> / USBC1_D2R_R_N<2>

CE780 CE781 CE782 CE783 — 0.22UF / 0.22UF / 0.33UF / 0.33UF

USBC1_R2D_P<2>
USBC1_R2D_N<2>
USBC1_D2R_CR_P<2>
USBC1_D2R_CR_N<2>

DZE783 DZE782 DZE781 DZE780 DZE786 DZE787 DZE784 DZE785

RE784 RE785 RE786 RE787 — 51K

USBC1_USB_TOP_P
USBC1_USB_TOP_N
USBC1_D2R_CR_N<2>
USBC1_D2R_CR_P<2>
TP_USBC1_PP20V
USBC1_SBU2
USBC1_CC1_CONN
USBC1_USB_BOT_N
USBC1_USB_BOT_P
USBC1_SBU1
USBC1_CC2_CONN
USBC1_R2D_N<2>
USBC1_R2D_P<2>

CE700 CE701 CE702 CE703 CE706 CE707 CE708 CE705 — CRITICAL 0.01UF 10% 25V X5R-CERM 0201

USBC1_CC2_CONN
USBC1_R2D_P<2>
USBC1_R2D_N<2>
USBC1_D2R_CR_P<2>
USBC1_D2R_CR_N<2>
USBC1_SBU2

CE770 CE771 CE772 CE773 — 0.22UF / 0.22UF / 0.33UF / 0.33UF

RE770 RE771 RE772 RE773 — 2 2 USBC1_R2D_C_P<2> / USBC1_R2D_C_N<2> / USBC1_D2R_R_P<2> / USBC1_D2R_R_N<2>

USBC1_R2D_CR_P<2>
USBC1_R2D_CR_N<2>
USBC1_USB_TOP_P
USBC1_USB_TOP_N
USBC1_D2R_P<2>
USBC1_D2R_N<2>
USBC1_CC1_CONN

DZE777 DZE776 DZE775 DZE774 DZE770 DZE771 DZE772 DZE773

RE777 RE776 RE775 RE774 — 51K

Left Front Port

BOM_COST_GROUP=USB-C

SYNC_MASTER=
SYNC_DATE=09/10/2021

PAGE TITLE: USB-C: Connector(s)

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*** OK2INTEGRATE ***

No lane swapping is allowed
Re-timer to SOC connections are set

Re-timer to connector connections are set

USBC HIGH-SPEED AC COUPLING

USBC_ATC0_R2D_C_P<1>	CF020 0.22UF	USBC_ATC0_R2D_P<1>	USBC_ATC0_R2D_C_P<1>	CFP_PHY_RXTX_0_P	USBC0_R2D_CR_P<1>
USBC_ATC0_R2D_C_N<1>	CF021 0.22UF	USBC_ATC0_R2D_N<1>	USBC_ATC0_R2D_C_N<1>	CFP_PHY_RXTX_0_N	USBC0_R2D_CR_N<1>
USBC_ATC0_R2D_C_P<2>	CF024 0.22UF	USBC_ATC0_R2D_P<2>	USBC_ATC0_R2D_C_P<2>	CFP_PHY_RXTX_2_P	USBC0_R2D_CR_P<2>
USBC_ATC0_R2D_C_N<2>	CF025 0.22UF	USBC_ATC0_R2D_N<2>	USBC_ATC0_R2D_C_N<2>	CFP_PHY_RXTX_2_N	USBC0_R2D_CR_N<2>
USBC_ATC0_D2R_P<1>	CF022 0.22UF	USBC_ATC0_D2R_C_P<1>	USBC_ATC0_D2R_C_P<1>	CFP_PHY_RXTX_1_P	USBC0_D2R_P<1>
USBC_ATC0_D2R_N<1>	CF023 0.22UF	USBC_ATC0_D2R_C_N<1>	USBC_ATC0_D2R_C_N<1>	CFP_PHY_RXTX_1_N	USBC0_D2R_N<1>
USBC_ATC0_D2R_P<2>	CF026 0.22UF	USBC_ATC0_D2R_C_P<2>	USBC_ATC0_D2R_C_P<2>	CFP_PHY_RXTX_3_P	USBC0_D2R_P<2>
USBC_ATC0_D2R_N<2>	CF027 0.22UF	USBC_ATC0_D2R_C_N<2>	USBC_ATC0_D2R_C_N<2>	CFP_PHY_RXTX_3_N	USBC0_D2R_N<2>

All: 0.22UF, 20% 6.3V X5R 0201; GND_VOID=TRUE

PP1V2_USBC_VDDIO — 59 62 68 95

RF045 47K 5% 1/20W TK 0201 — ATCRTMR0_JTAG_TDO — 59

ATCRTMR0_XTAL24M_OUT — 59

RF060 499 1% 1/20W TK 0201

197S0591 CRITICAL YF000 1.60X1.20MM 24.000MHZ-20PPM-9.5PF-60OHM

ATC0_24M_O_R — ATCRTMR0_XTAL24M_IN — 59

CRITICAL CF060 15PF 5% 50V C0G 0201

CRITICAL 131S0831 CF061 15PF 5% 50V C0G 0201

PP0V855_USBC_CIO — 95

CF030 14UF 20% 4V X5R 0402-D2X-1 — 138S00149

CF031 14UF 20% 4V X5R 0402-D2X-1

CF032 0.1UF 10% 6.3V X6S 0201

CF033 0.1UF 10% 6.3V X6S 0201

PP0V805_USBC_FIXED — 95 59

CF040 0.1UF 10% 6.3V X6S 0201

CF041 0.1UF 10% 6.3V X6S 0201

CF042 2.2UF 20% 4V X6S-CERM 0201

CF043 2.2UF 20% 4V X6S-CERM 0201

CF044 2.2UF 20% 6.3V X6S-CERM 0201

CF045 14UF 20% 4V X5R 0402-D2X-1

CF046 14UF 20% 4V X5R 0402-D2X-1

PP0V805_USBC_FIXED — 95 59

CF050 0.1UF 10% 6.3V X6S 0201

PLACE_NEAR=UF000.G7:5MM

PPVDD_FIXED_ATCRTMR0_XTAL_R

PP0V805_USBC_FIXED — 95

RF051 10 5% 1/20W TK 0201 — VOLTAGE=0.805V

CF051 4UF 20% 2.5V X6S 0201 — 138S00329

117S00094

UF000 TMNB25B0-C1 FCCSP — 998-25504 SYM 2 OF 2

OMIT_TABLE CRITICAL

J4	VDD_CIO_0	VDDIO12_CIO_0	K5
J6	VDD_CIO_0	VDDIO12_CIO_0	K7
J8	VDD_CIO_0	VDDIO12_CIO_0	L6
F4	VDD_CIO_1	VDDIO12_CIO_1	D6
F6	VDD_CIO_1	VDDIO12_CIO_1	E5
F8	VDD_CIO_1	VDDIO12_CIO_1	E7
G4	VDD_FIXED	VDDIO12_PLL_SOC	K8
G5	VDD_FIXED	VDDIO12_PLL_SOC1	H8
H5	VDD_FIXED	VDDIO12_XTAL	H9
H6	VDD_FIXED	VDDIO12	E9
G7	VDD_FIXED_PLL	VDDIO12	H3
G9	VDD_FIXED_XTAL	VDDIO12	K9
		VDDIO12_EFUSE1	F3
		VDDIO12_AMUX	F7

VSS: A1, A2, A4, A6, A8, A10, A11, B2, B4, B6, B8, B10, C3, C5, C6, C7, C9, D1, D5, D7, D11, E3, E4, E6, E8, F2, F5, F10, G3, G6, G8 | H4, H7, J2, J3, J5, J7, J10, K4, K6, L1, L5, L7, L11, M3, M5, M6, M7, M9, N2, N4, N6, N8, N10, P1, P2, P4, P6, P8, P10, P11

132S0395 CF034 0.1UF 10% 6.3V X6S 0201

138S00039 CF035 2.2UF 20% 6.3V X6S-CERM 0201

CF036 14UF 20% 4V X5R 0402-D2X-1

CF037 14UF 20% 4V X5R 0402-D2X-1

PP1V2_USBC_VDDIO — 59 62 68 95

138S00039 CF052 2.2UF 20% 6.3V X6S-CERM 0201 — PLACE_NEAR=UF000.K8:5MM — PP1V2_USBC_VDDIO — 95

PP1V2_ATCRTMR0_VDDIO_XTAL_F — VOLTAGE=1.2V

155S0644 FLF000 240-OHM-0.2A-0.9-OHM 0201

CF062 0.1UF 10% 6.3V X6S 0201 — 132S0395

CF063 2.2UF 20% 6.3V X6S-CERM 0201 — 138S00039

PP1V2_USBC_VDDIO — 95

ATCRTMR0_VDDIO_EFUSE — 68 97

Connect to GND directly or via a resistor

132S0395 CF064 0.1UF 10% 6.3V X6S 0201 — PP1V2_USBC_VDDIO — 95

CF011 10PF 5% 25V C0G 0201 — RF011 200 1% 1/20W TK 0201-1 — ATCRTMR0_CFP_RCAL_NEG — ATCRTMR0_CFP_RCAL_POS — 59

CF010 10PF 5% 25V C0G 0201 — RF010 200 1% 1/20W TK 0201-1 — ATCRTMR0_SFP_RCAL_NEG — ATCRTMR0_SFP_RCAL_POS — 59

UF000 TMNB25B0-C1 FCCSP — 998-25504 SYM 1 OF 2

OMIT_TABLE CRITICAL

USBC_ATC0_D2R_C_P<1>	P9	SFP_PHY_RXTX_0_P	SFP PHY	CFP PHY	CFP_PHY_RXTX_0_P	USBC0_R2D_CR_P<1>
USBC_ATC0_D2R_C_N<1>	N9	SFP_PHY_RXTX_0_N			CFP_PHY_RXTX_0_N	USBC0_R2D_CR_N<1>
USBC_ATC0_D2R_C_P<2>	P5	SFP_PHY_RXTX_2_P			CFP_PHY_RXTX_2_P	USBC0_R2D_CR_P<2>
USBC_ATC0_D2R_C_N<2>	N5	SFP_PHY_RXTX_2_N			CFP_PHY_RXTX_2_N	USBC0_R2D_CR_N<2>
USBC_ATC0_R2D_P<1>	P7	SFP_PHY_RXTX_1_P			CFP_PHY_RXTX_1_P	USBC0_D2R_P<1>
USBC_ATC0_R2D_N<1>	N7	SFP_PHY_RXTX_1_N			CFP_PHY_RXTX_1_N	USBC0_D2R_N<1>
USBC_ATC0_R2D_P<2>	P3	SFP_PHY_RXTX_3_P			CFP_PHY_RXTX_3_P	USBC0_D2R_P<2>
USBC_ATC0_R2D_N<2>	N3	SFP_PHY_RXTX_3_N			CFP_PHY_RXTX_3_N	USBC0_D2R_N<2>
USBC_ATC0_AUX_C_P	L4	SFP_LPDP_AUX_P			CFP_LPDP_AUX_P	USBC0_AUX_P
USBC_ATC0_AUX_C_N	M4	SFP_LPDP_AUX_N			CFP_LPDP_AUX_N	USBC0_AUX_N
CIO_ATC0_LSTX	G1	USB4_SFP_SB_RX			USB4_CFP_SB_RX	USBC0_CIO_LSRX
CIO_ATC0_LSRX	G2	USB4_SFP_SB_TX			USB4_CFP_SB_TX	USBC0_CIO_LSTX
					USB4_CFP_SB_TX_DIR	ATCRTMR0_LSTX_DIR
ATCRTMR0_SFP_RCAL_POS	M8	SFP_PHY_RCAL_P			CFP_PHY_RCAL_P	ATCRTMR0_CFP_RCAL_POS
ATCRTMR0_SFP_RCAL_NEG	L8	SFP_PHY_RCAL_N			CFP_PHY_RCAL_N	ATCRTMR0_CFP_RCAL_NEG
ATCRTMR0_CHIPID_0	M1	CHIP_ID_0	GPIO	PERIPHERAL	QSPI_CS*	SPI_ATCRTMR0_CS_L
ATCRTMR0_CHIPID_1	N1	CHIP_ID_1			QSPI_SCLK	SPI_ATCRTMR0_CLK
ATCRTMR0_BOOT_CONFIG0	H2	BOOT_CONFIG0			QSPI_DQ0	SPI_ATCRTMR0_DIO<0>
ATCRTMR0_BOOT_CONFIG1	J1	BOOT_CONFIG1			QSPI_DQ1	SPI_ATCRTMR0_DIO<1>
ATCRTMR0_BOOT_CONFIG2	K1	BOOT_CONFIG2			QSPI_DQ2	SPI_ATCRTMR0_DIO<2>
ATCRTMR0_FORCE_DFU	C1	FORCE_DFU			QSPI_DQ3	SPI_ATCRTMR0_DIO<3>
TP_ATCRTMR0_GPIO_0	K2	GPIO0			I2C0_SCL	I2C_ATCRTMR_SCL
NC_ATCRTMR0_GPIO_1 (NO_TEST=1)	L3	GPIO1			I2C0_SDA	I2C_ATCRTMR_SDA
TP_ATCRTMR0_GPIO_2	K3	GPIO2			I2C1_SCL	I2C_UPC0_ATCRTMR0_SCL_1V2
TP_ATCRTMR0_GPIO_3	L10	GPIO3			I2C1_SDA	I2C_UPC0_ATCRTMR0_SDA_1V2
					I2C1_INT	INT_I2C_UPC0_ATCRTMR0_L
ATCRTMR0_COLD_RESET_L	L2	COLD_RESET*		TEST AND DEBUG	TESTMODE	ATCRTMR0_TESTMODE
ATCRTMR0_CFSB	M2	CFSB	CLOCKS AND RESET		JTAG_SEL	ATCRTMR0_JTAGL_SEL
ATCRTMR0_XTAL24M_IN	F11	XI0			JTAG_TCK	SWD_NUB_ATCRTMR_SWCLK
ATCRTMR0_XTAL24M_OUT	E11	XO0			JTAG_TMS	SWD_NUB_ATCRTMR_SWDIO
					JTAG_TDI	TP_ATCRTMR0_JTAG_TDI
					JTAG_TDO	ATCRTMR0_JTAG_TDO
					JTAG_TRST*	TP_ATCRTMR0_JTAG_TRESET
					ANALOGMUX_OUT	TP_ATCRTMR0_ANALOGMUX_OUT
					TST_CLKOUT	TP_ATCRTMR0_TST_CLKOUT
					TST_CLK_LVDS_0_P	NC_ATCRTMR0_CLK_LVDS_P<0> (NO_TEST=1)
					TST_CLK_LVDS_0_N	NC_ATCRTMR0_CLK_LVDS_N<0> (NO_TEST=1)
					TST_CLK_LVDS_1_P	NC_ATCRTMR0_CLK_LVDS_P<1> (NO_TEST=1)
					TST_CLK_LVDS_1_N	NC_ATCRTMR0_CLK_LVDS_N<1> (NO_TEST=1)

RF097 33 1/20W 5% TK 0201 — SPI_ATCRTMR0_DIO<0> — SPI_ATCRTMR0_R_DIO<0> — 59

RF098 33 1/20W 5% TK 0201 — SPI_ATCRTMR0_DIO<1> — SPI_ATCRTMR0_R_DIO<1> — 59

PP1V2_USBC_VDDIO — 95

RF090 3.3K 5% 1/20W TK 0201

NOSTUFF RF091 3.3K 5% 1/20W TK 0201

NOSTUFF RF092 3.3K 5% 1/20W TK 0201

NOSTUFF RF093 3.3K 5% 1/20W TK 0201

CF090 1.0UF 20% 6.3V X5R 0201-1

OMIT_TABLE CRITICAL 335S00574 UF090 64MBIT-1.2V W25Q64NE XSON-1

SPI_ATCRTMR0_CLK	RF094 33	SPI_ATCRTMR0_CLK_R	CLK
SPI_ATCRTMR0_CS_L			CS*
SPI_ATCRTMR0_DIO<2>	RF095 33	SPI_ATCRTMR0_R_DIO<2>	WP*(IO2)
SPI_ATCRTMR0_DIO<3>	RF096 33	SPI_ATCRTMR0_R_DIO<3>	HOLD*(IO3)

DI(IO0) — SPI_ATCRTMR0_R_DIO<0> — 59

DO(IO1) — SPI_ATCRTMR0_R_DIO<1> — 59

GND, EPAD

RF047 47K 1/20W 5% TK 0201 — ATCRTMR0_JTAGL_SEL — 59

RF040 10K 1/20W 5% TK 0201 — ATCRTMR0_TESTMODE — 59

RF043 47K 1/20W 5% TK 0201 — CIO_ATC0_LSTX — 6 59 97

RF044 47K 1/20W 5% TK 0201 — CIO_ATC0_LSRX — 6 59 97

BOM_COST_GROUP=TBT

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Apple Inc.

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*** OK2INTEGRATE ***

No lane swapping is allowed

Re-timer to SOC connections are set

Re-timer to connector connections are set

USBC HIGH-SPEED AC COUPLING

USBC_ATC1_R2D_C_P<1>	CF120	0.22UF	USBC_ATC1_R2D_P<1>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_R2D_C_N<1>	CF121	0.22UF	USBC_ATC1_R2D_N<1>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_R2D_C_P<2>	CF124	0.22UF	USBC_ATC1_R2D_P<2>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_R2D_C_N<2>	CF125	0.22UF	USBC_ATC1_R2D_N<2>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_D2R_P<1>	CF122	0.22UF	USBC_ATC1_D2R_C_P<1>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_D2R_N<1>	CF123	0.22UF	USBC_ATC1_D2R_C_N<1>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_D2R_P<2>	CF126	0.22UF	USBC_ATC1_D2R_C_P<2>	GND_VOID=TRUE	20% 6.3V X5R 0201
USBC_ATC1_D2R_N<2>	CF127	0.22UF	USBC_ATC1_D2R_C_N<2>	GND_VOID=TRUE	20% 6.3V X5R 0201

PP1V2_USBC_VDDIO — RF145 47K 5% 1/20W TK 0201 — ATCRTMR1_JTAG_TDO

ATCRTMR1_XTAL24M_OUT — RF160 499 1% 1/20W TK 0201 — ATCRTMR1_XTAL24M_IN

CRITICAL YF100 197S0591 1.6X1.2MM 24.000MHZ-20PPM-9.5PF-60OHM

ATC1_24M_O_R — CRITICAL CF160 15PF 5% 50V C0G 0201 — CRITICAL 131S0831 CF161 15PF 5% 50V C0G 0201

PP0V855_USBC_CIO — CF130 14UF 20% 4V X5R 0402-D2X-1 (138S00149) — CF131 14UF 20% 4V X5R 0402-D2X-1

CF132 0.1UF 10% 6.3V X6S 0201 — CF133 0.1UF 10% 6.3V X6S 0201

PP0V805_USBC_FIXED — CF140 0.1UF 10% 6.3V X6S 0201 — CF141 0.1UF 10% 6.3V X6S 0201 — CF142 2.2UF 20% 4V X6S-CERM 0201 — CF143 2.2UF 20% 4V X6S-CERM 0201 — CF144 2.2UF 20% 4V X6S-CERM 0201

CF145 14UF 20% 4V X5R 0402-D2X-1 — CF146 14UF 20% 4V X5R 0402-D2X-1

PP0V805_USBC_FIXED — CF150 0.1UF 10% 6.3V X6S 0201 — PLACE_NEAR=UF100.G7:5MM

PPVDD_FIXED_ATCRTMR1_XTAL_R — RF151 10 5% 1/20W TK 0201 (117S00094) VOLTAGE=0.805V — PP0V805_USBC_FIXED — CF151 4UF 20% 2.5V X6S 0201 (138S00329)

UF100 TMNB25B0-C1 FCCSP — 998-25504 SYM 2 OF 2

OMIT_TABLE CRITICAL

J4	VDD_CIO_0	VDDIO12_CIO_0	K5
J6	VDD_CIO_0	VDDIO12_CIO_0	K7
J8	VDD_CIO_0	VDDIO12_CIO_0	L6
F4	VDD_CIO_1	VDDIO12_CIO_1	D6
F6	VDD_CIO_1	VDDIO12_CIO_1	E5
F8	VDD_CIO_1	VDDIO12_CIO_1	E7
G4	VDD_FIXED	VDDIO12_PLL_SOC	K8
G5	VDD_FIXED	VDDIO12_PLL_SOC1	H8
H5	VDD_FIXED	VDDIO12_XTAL	H9
H6	VDD_FIXED	VDDIO12	E9
G7	VDD_FIXED_PLL	VDDIO12	H3
G9	VDD_FIXED_XTAL	VDDIO12	K9
		VDDIO12_EFUSE1	F3
		VDDIO12_AMUX	F7

VSS: A1, A2, A4, A6, A8, A10, A11, B2, B4, B6, B8, B10, C3, C5, C6, C7, C9, D1, D5, D7, D11, E3, E4, E6, E8, F2, F5, F10, G3, G6, G8, H4, H7, J2, J3, J5, J7, J10, K4, K6, L1, L5, L7, L11, M3, M5, M6, M7, M9, N2, N4, N6, N8, N10, P1, P2, P4, P6, P8, P10, P11

PP1V2_USBC_VDDIO — 132S0395 CF134 0.1UF 10% 6.3V X6S 0201 — 138S00039 CF135 2.2UF 20% 4V X6S-CERM 0201 — CF136 14UF 20% 4V X5R 0402-D2X-1 — CF137 14UF 20% 4V X5R 0402-D2X-1

138S00039 CF152 2.2UF 20% 4V X6S-CERM 0201 — PLACE_NEAR=UF100.K8:5MM — PP1V2_USBC_VDDIO

PP1V2_ATCRTMR1_VDDIO_XTAL_F VOLTAGE=1.2V — 155S0644 FLF100 240-OHM-0.2A-0.9-OHM 0201 — PP1V2_USBC_VDDIO

CF162 0.1UF 10% 6.3V X6S 0201 (132S0395) — CF163 2.2UF 20% 4V X6S-CERM 0201 (138S00039)

Connect to GND directly or via a resistor

ATCRTMR1_VDDIO_EFUSE

PP1V2_USBC_VDDIO — 132S0395 CF164 0.1UF 10% 6.3V X6S 0201

CF111 10PF 5% 25V C0G 0201 — RF111 200 1% 1/20W TK 0201-1 — ATCRTMR1_CFP_RCAL_NEG / ATCRTMR1_CFP_RCAL_POS

CF110 10PF 5% 25V C0G 0201 — RF110 200 1% 1/20W TK 0201-1 — ATCRTMR1_SFP_RCAL_NEG / ATCRTMR1_SFP_RCAL_POS

UF100 TMNB25B0-C1 FCCSP — 998-25504 SYM 1 OF 2

OMIT_TABLE CRITICAL

USBC_ATC1_D2R_C_P<1>	P9	SFP_PHY_RXTX_0_P	SFP PHY	CFP PHY	CFP_PHY_RXTX_0_P
USBC_ATC1_D2R_C_N<1>	N9	SFP_PHY_RXTX_0_N			CFP_PHY_RXTX_0_N
USBC_ATC1_D2R_C_P<2>	P5	SFP_PHY_RXTX_2_P			CFP_PHY_RXTX_2_P
USBC_ATC1_D2R_C_N<2>	N5	SFP_PHY_RXTX_2_N			CFP_PHY_RXTX_2_N
USBC_ATC1_R2D_P<1>	P7	SFP_PHY_RXTX_1_P			CFP_PHY_RXTX_1_P
USBC_ATC1_R2D_N<1>	N7	SFP_PHY_RXTX_1_N			CFP_PHY_RXTX_1_N
USBC_ATC1_R2D_P<2>	P3	SFP_PHY_RXTX_3_P			CFP_PHY_RXTX_3_P
USBC_ATC1_R2D_N<2>	N3	SFP_PHY_RXTX_3_N			CFP_PHY_RXTX_3_N
USBC_ATC1_AUX_C_P	L4	SFP_LPDP_AUX_P			CFP_LPDP_AUX_P
USBC_ATC1_AUX_C_N	M4	SFP_LPDP_AUX_N			CFP_LPDP_AUX_N
CIO_ATC1_LSTX	G1	USB4_SFP_SB_RX			USB4_CFP_SB_RX
CIO_ATC1_LSRX	G2	USB4_SFP_SB_TX			USB4_CFP_SB_TX
					USB4_CFP_SB_TX_DIR
ATCRTMR1_SFP_RCAL_POS	M8	SFP_PHY_RCAL_P			CFP_PHY_RCAL_P
ATCRTMR1_SFP_RCAL_NEG	L8	SFP_PHY_RCAL_N			CFP_PHY_RCAL_N
ATCRTMR1_CHIPID_0	M1	CHIP_ID_0	GPIO	PERIPHERAL	QSPI_CS*
ATCRTMR1_CHIPID_1	N1	CHIP_ID_1			QSPI_SCLK
ATCRTMR1_BOOT_CONFIG0	H2	BOOT_CONFIG0			QSPI_DQ0
ATCRTMR1_BOOT_CONFIG1	J1	BOOT_CONFIG1			QSPI_DQ1
ATCRTMR1_BOOT_CONFIG2	K1	BOOT_CONFIG2			QSPI_DQ2
ATCRTMR1_FORCE_DFU	C1	FORCE_DFU			QSPI_DQ3
TP_ATCRTMR1_GPIO_0	K2	GPIO0			I2C0_SCL
NC_ATCRTMR1_GPIO_1 (NO_TEST=1)	L3	GPIO1			I2C0_SDA
TP_ATCRTMR1_GPIO_2	K3	GPIO2			I2C1_SCL
TP_ATCRTMR1_GPIO_3	L10	GPIO3			I2C1_SDA
					I2C1_INT
ATCRTMR1_COLD_RESET_L	L2	COLD_RESET*	CLOCKS AND RESET	TEST AND DEBUG	TESTMODE
ATCRTMR1_CFSB	M2	CFSB			JTAG_SEL
ATCRTMR1_XTAL24M_IN	F11	XI0			JTAG_TCK
ATCRTMR1_XTAL24M_OUT	E11	XO0			JTAG_TMS
					JTAG_TDI
					JTAG_TDO
					JTAG_TRST*
					ANALOGMUX_OUT
					TST_CLKOUT
					TST_CLK_LVDS_0_P
					TST_CLK_LVDS_0_N
					TST_CLK_LVDS_1_P
					TST_CLK_LVDS_1_N

USBC1_R2D_CR_P<1>	A9	OUT
USBC1_R2D_CR_N<1>	B9	OUT
USBC1_R2D_CR_P<2>	A5	OUT
USBC1_R2D_CR_N<2>	B5	OUT
USBC1_D2R_P<1>	A7	BI
USBC1_D2R_N<1>	B7	BI
USBC1_D2R_P<2>	A3	BI
USBC1_D2R_N<2>	B3	BI
USBC1_AUX_P	D4	BI
USBC1_AUX_N	C4	BI
USBC1_CIO_LSRX	F1	IN
USBC1_CIO_LSTX	E1	BI
ATCRTMR1_LSTX_DIR	H1	OUT
ATCRTMR1_CFP_RCAL_POS	C8	
ATCRTMR1_CFP_RCAL_NEG	D8	
SPI_ATCRTMR1_CS_L	N11	
SPI_ATCRTMR1_CLK	M11	
SPI_ATCRTMR1_DIO<0>	K10	
SPI_ATCRTMR1_DIO<1>	K11	
SPI_ATCRTMR1_DIO<2>	J9	
SPI_ATCRTMR1_DIO<3>	J11	
I2C_ATCRTMR_SCL	C2	IN
I2C_ATCRTMR_SDA	D3	BI
I2C_UPC1_ATCRTMR1_SCL_1V2	E2	IN
I2C_UPC1_ATCRTMR1_SDA_1V2	D2	BI
INT_I2C_UPC1_ATCRTMR1_L	B1	OUT
ATCRTMR1_TESTMODE	L9	
ATCRTMR1_JTAGL_SEL	C11	
SWD_NUB_ATCRTMR_SWCLK	B11	BI
SWD_NUB_ATCRTMR_SWDIO	D10	BI
TP_ATCRTMR1_JTAG_TDI	D9	
ATCRTMR1_JTAG_TDO	C10	
TP_ATCRTMR1_JTAG_TRESET	E10	
TP_ATCRTMR1_ANALOGMUX_OUT	F9	
TP_ATCRTMR1_TST_CLKOUT	M10	
NC_ATCRTMR1_CLK_LVDS_P<0>	H10	NO_TEST=1
NC_ATCRTMR1_CLK_LVDS_N<0>	H11	NO_TEST=1
NC_ATCRTMR1_CLK_LVDS_P<1>	G11	NO_TEST=1
NC_ATCRTMR1_CLK_LVDS_N<1>	G10	NO_TEST=1

SPI_ATCRTMR1_CLK — RF194 33 1/20W 5% TK 0201 — SPI_ATCRTMR1_CLK_R

SPI_ATCRTMR1_CS_L

SPI_ATCRTMR1_DIO<2> — RF195 33 — SPI_ATCRTMR1_R_DIO<2>

SPI_ATCRTMR1_DIO<3> — RF196 33 — SPI_ATCRTMR1_R_DIO<3>

SPI_ATCRTMR1_DIO<0> — RF197 33 — SPI_ATCRTMR1_R_DIO<0>

SPI_ATCRTMR1_DIO<1> — RF198 33 — SPI_ATCRTMR1_R_DIO<1>

PP1V2_USBC_VDDIO — RF190 3.3K 5% 1/20W TK 0201 — NOSTUFF RF191 3.3K 5% 1/20W TK 0201 — NOSTUFF RF192 3.3K 5% 1/20W TK 0201 — NOSTUFF RF193 3.3K 5% 1/20W TK 0201 — CF190 1.0UF 20% 6.3V X5R 0201-1

VCC — OMIT_TABLE CRITICAL 335S00574 — UF190 64MBIT-1.2V W25Q64NE XSON-1

CLK	6	SPI_ATCRTMR1_CLK_R	
CS*	1	SPI_ATCRTMR1_CS_L	
WP*(IO2)	3	SPI_ATCRTMR1_R_DIO<2>	
HOLD*(IO3)	7	SPI_ATCRTMR1_R_DIO<3>	
DI(IO0)	5	SPI_ATCRTMR1_R_DIO<0>	
DO(IO1)	2	SPI_ATCRTMR1_R_DIO<1>	
GND	4		
EPAD	9		

ATCRTMR1_JTAGL_SEL — RF147 47K 1/20W 5% TK 0201

ATCRTMR1_TESTMODE — RF140 10K 1/20W 5% TK 0201

CIO_ATC1_LSTX — RF143 47K 1/20W 5% TK 0201

CIO_ATC1_LSRX — RF144 47K 1/20W 5% TK 0201

BOM_COST_GROUP=TBT

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Apple Inc.

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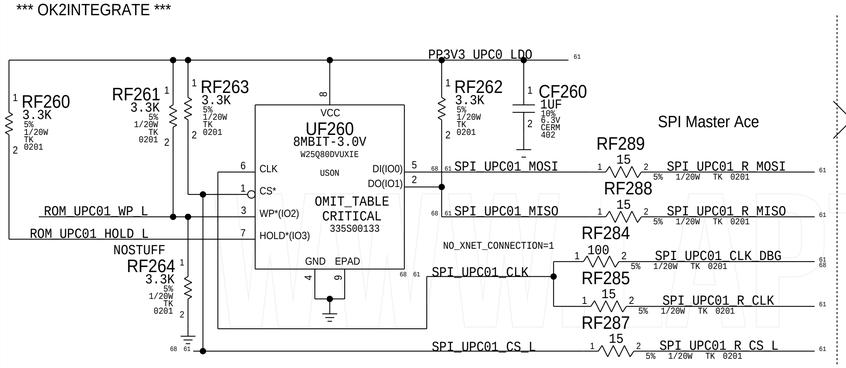
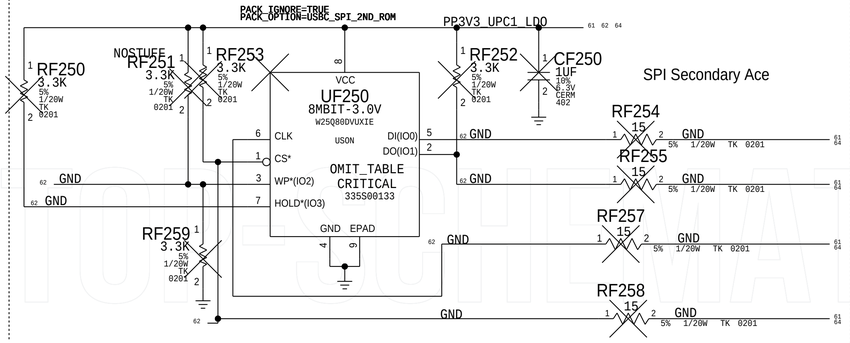
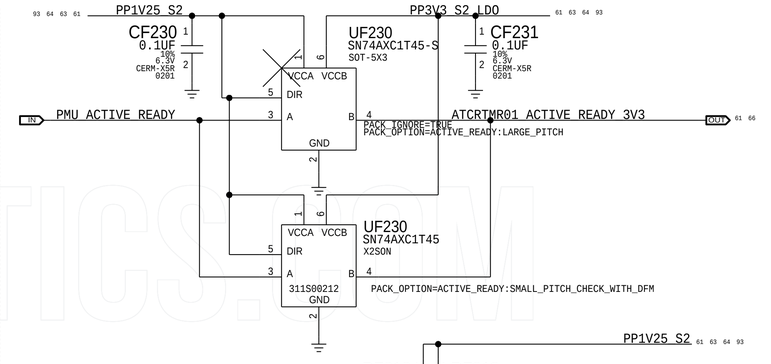
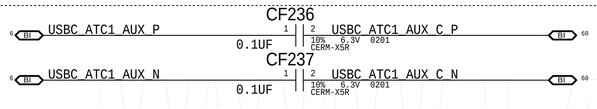
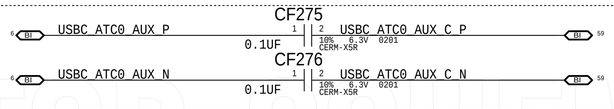
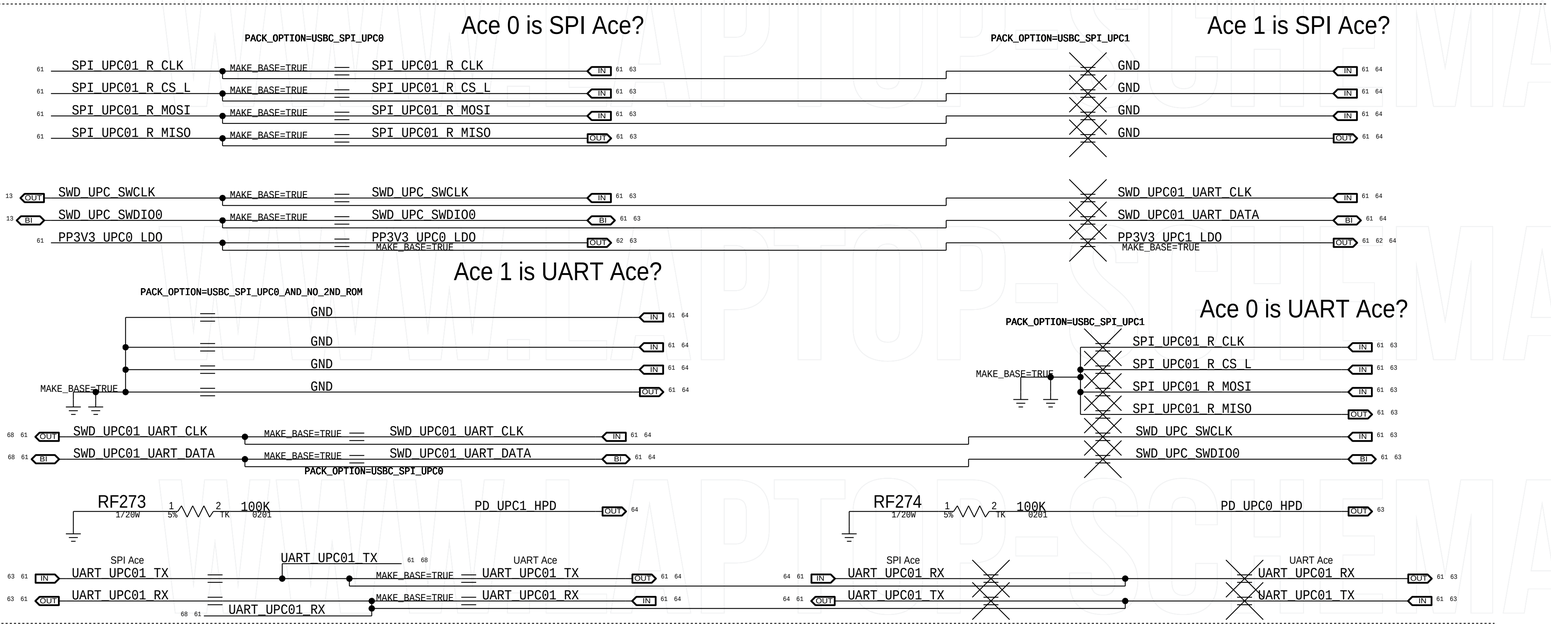


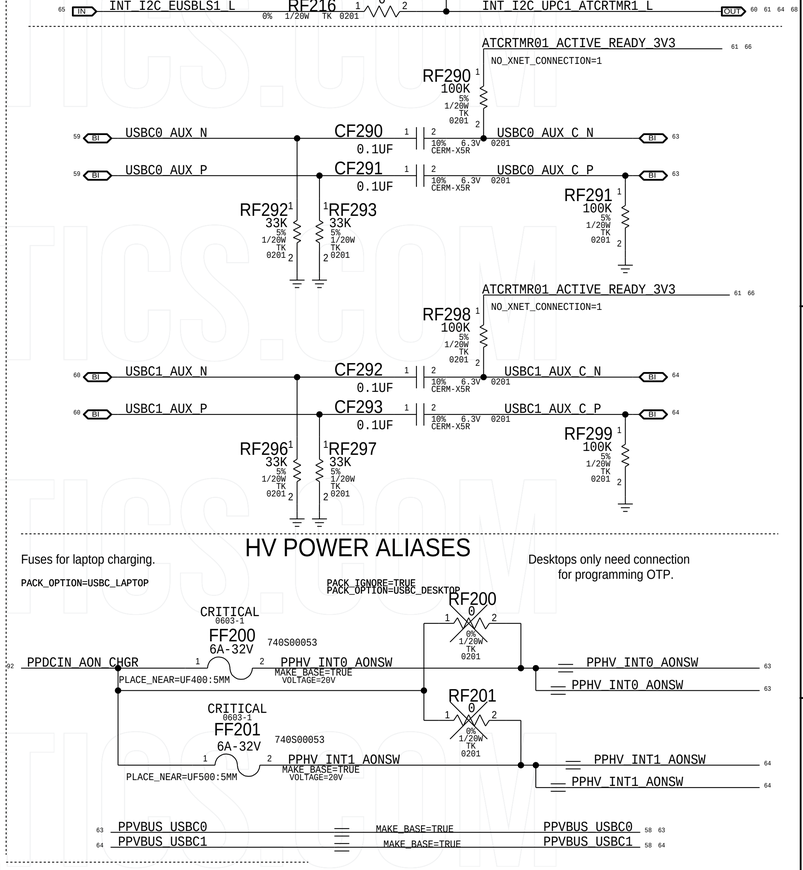












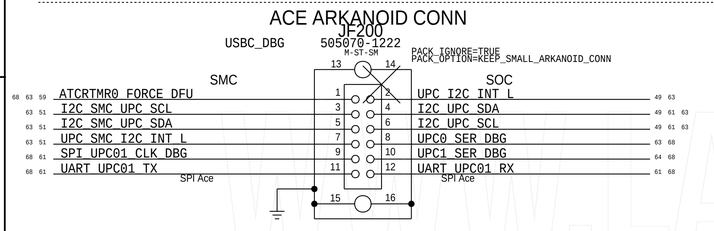
HV POWER ALIASES

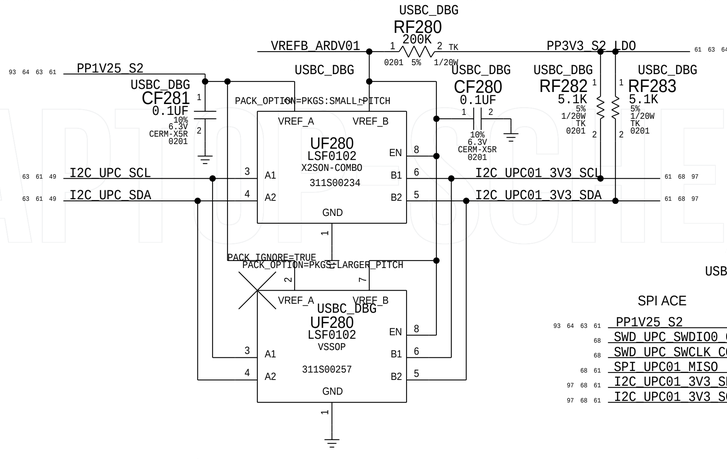
Fuses for laptop charging.

PACK_OPTION=USBC_LAPTOP

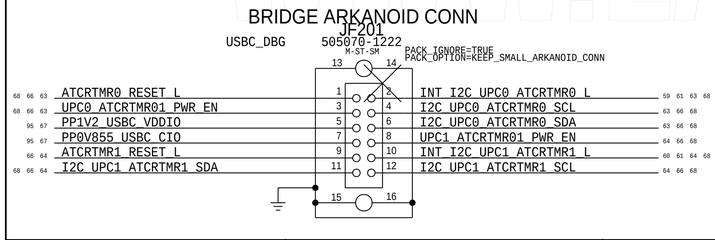
Desktops only need connection for programming OTP.

ACE ARKANOID CONN

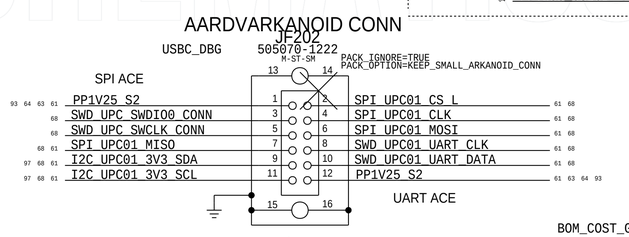




BRIDGE ARKANOID CONN



AARDVARKANOID CONN



BOM_COST_GROUP=USB-C

PAGE TITLE	USB-C: Support 1 ATC01
Apple Inc.	DRAWING NUMBER 051-07020 · SIZE D
	REVISION 6.0.0
	BRANCH evt-1
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*** OK2INTEGRATE ***

Ace 0 is Debug Port?

PACK_OPTION=USBC_DEBUG_UPC0 — ATC0 / UPC0 / RTMR0 — PACK_OPTION=USBC_DEBUG_UPC1

UART_DEBUGPRT_R2D (IN)	UART_DEBUGPRT_R2D	UART_DEBUGPRT_R2D (IN)
UART_DEBUGPRT_D2R (OUT)	UART_DEBUGPRT_D2R	UART_DEBUGPRT_D2R (IN)
SWD_SOC_SWCLK (BI)	SWD_SOC_SWCLK	SWD_SOC_SWCLK (OUT)
SWD_SOC_SWDIO (BI)	SWD_SOC_SWDIO	SWD_SOC_SWDIO (OUT)
UART_SMC_DEBUGPRT_R2D (IN)	UART_SMC_DEBUGPRT_R2D	UART_SMC_DEBUGPRT_R2D (OUT)
UART_SMC_DEBUGPRT_D2R (OUT)	UART_SMC_DEBUGPRT_D2R	UART_SMC_DEBUGPRT_D2R (IN)
USB_DBG_LS_P (BI)	USB_DBG_LS_P	USB_DBG_LS_P (BI)
USB_DBG_LS_N (BI)	USB_DBG_LS_N	USB_DBG_LS_N (BI)

Ace 1 is Debug Port?

ATC1 / UPC1 / RTMR1

PD_UPC1_DBG0_R (OUT) … PD_UPC1_DBG5_R (IN), PD_UPC1_USBP2_RP (BI), PD_UPC1_USBP2_RN (BI)

Main Debug Port

Ace2 GPIOs

SOC_DOCK_CONNECT (OUT)	SOC_DOCK_CONNECT	SOC_DOCK_CONNECT (IN)
SOC_DFU_STATUS (IN)	SOC_DFU_STATUS	SOC_DFU_STATUS (OUT)
SOC_FORCE_DFU (OUT)	SOC_FORCE_DFU	SOC_FORCE_DFU (IN)

PACK_OPTION=USBC_DEBUG_UPC0

PD_UPC1_GPIO7 (OUT), PD_UPC1_GPIO9 (OUT), PD_UPC1_GPIO10 (OUT)

Ace 1 is non-debug Port?

ATC1 / UPC1 / RTMR1

RF320–RF325: 100K PD_UPC1_DBG0_R … PD_UPC1_DBG5_R

RF328: PD_UPC1_USBP2_RP — RF329: PD_UPC1_USBP2_RN

Ace2 GPIOs

RF373: PD_UPC1_GPIO7 — RF374: PD_UPC1_GPIO9 — RF375: PD_UPC1_GPIO10

CKPLUS_WAIVE=SINGLE_NODENET on all nets above.

Ace 0 is non-debug Port?

PACK_IGNORE=TRUE
PACK_OPTION=USBC_DEBUG_UPC1

ATC0 / UPC0 / RTMR0

RF310–RF315: PD_UPC0_DBG0_R … PD_UPC0_DBG5_R

UART_DEBUGPRT_R2D	
UART_DEBUGPRT_D2R	
SWD_SOC_SWCLK	
SWD_SOC_SWDIO	
UART_SMC_DEBUGPRT_R2D	
UART_SMC_DEBUGPRT_D2R	

RF318: PD_UPC0_USBP2_RP — USB_DBG_LS_P; RF319: PD_UPC0_USBP2_RN — USB_DBG_LS_N

Ace2 GPIOs

RF363: PD_UPC0_GPIO7 — SOC_DOCK_CONNECT; RF364: PD_UPC0_GPIO9 — SOC_DFU_STATUS; RF365: PD_UPC0_GPIO10 — SOC_FORCE_DFU

CKPLUS_WAIVE=SINGLE_NODENET on all nets above.

Non-debug Port

Unused ports

RF397: PD_UPC0_GPIO1; RF398: PD_UPC0_GPIO6; RF31A: PD_UPC0_USBP3_RP; RF31B: PD_UPC0_USBP3_RN

Secondary ACE ROM Options

RF396: PD_UPC1_GPIO1; RF399: PD_UPC1_GPIO6; RF32A: PD_UPC1_USBP3_RP; RF32B: PD_UPC1_USBP3_RN

PACK_OPTION=USBC_SPI_NO_2ND_ROM

GND (BI) ×3 — MAKE_BASE=TRUE — GND (BI) ×3

Connections for Laptops (USBC power in)

PACK_OPTION=USBC_LAPTOP

PP3V3_UPC0_LDO (OUT) — PP3V3_UPC0_LDO (IN); USBC0_CC1 (BI); USBC0_CC2 (BI)

Connections for Desktops (No USBC power in)

PACK_OPTION=USBC_DESKTOP — MAKE_BASE=TRUE

Connections for Laptops (USBC power in)

PACK_OPTION=USBC_LAPTOP

PP3V3_UPC1_LDO (OUT) — PP3V3_UPC1_LDO (IN); USBC1_CC1 (BI); USBC1_CC2 (BI)

Connections for Desktops (No USBC power in)

PACK_OPTION=USBC_DESKTOP — MAKE_BASE=TRUE

USBC0 PP_CABLE Protection

PP3V3_UPC0_LDO — CF300 1UF 10% 6.3V CERM 402

USBC0_VBIAS_PRT — CF301 0.1UF 10% 25V CERM-X7R 0402

UF300 TPD4S311A BGA (VPWR, VBIAS)

NC_USBC0_CC_FLT_L (NO_TEST=1) — FLT*; SBU1; SBU2; USBC0_CC1; USBC0_CC2; RPD_G1; RPD_G2

C_SBU1, C_SBU2, C_CC1, C_CC2 — USBC0_CC1_CONN, USBC0_CC2_CONN

338S00753 (GND, GND, GND)

PACK_OPTION=USBC_LAPTOP_CC_PRT pack option for all component

PACK_OPTION=USBC_DESKTOP — MAKE_BASE=TRUE

USBC1 PP_CABLE Protection

PP3V3_UPC1_LDO — CF350 1UF 10% 6.3V CERM 402

USBC1_VBIAS_PRT — CF351 0.1UF 10% 25V CERM-X7R 0402

UF350 TPD4S311A BGA (VPWR, VBIAS)

NC_USBC1_CC_FLT_L (NO_TEST=1) — FLT*; SBU1; SBU2; USBC1_CC1; USBC1_CC2; RPD_G1; RPD_G2

C_SBU1, C_SBU2, C_CC1, C_CC2 — USBC1_CC1_CONN, USBC1_CC2_CONN

338S00753 (GND, GND, GND)

PACK_OPTION=USBC_LAPTOP_CC_PRT pack option for all component

PACK_OPTION=USBC_DESKTOP — MAKE_BASE=TRUE

ATC0: I2C_ADDR=GND, I2CM_*_CNFG=1M\u03a9 3V3_LDO_X pull-ups
ATC1: I2C_ADDR=Float, I2CM_*_CNFG=1M\u03a9 3V3_LDO_X pull-ups
ATC2: I2C_ADDR=GND, I2CM_*_CNFG=1M\u03a9 pull-downs
ATC3: I2C_ADDR=Float, I2CM_*_CNFG=1M\u03a9 pull-downs

GND — NC_UPC1_I2C_ADDR — NC_UPC1_I2C_ADDR (NO_TEST=1)

Configure to enable VDDIO and use it for SWD.

GND — GND

Is UPCx_5V_EN being used?

UPC0_5V_EN — RF350 100K; UPC1_5V_EN — RF351 100K

PACK_OPTION=USBC01_VRSV_LOCAL_NO

BOM_COST_GROUP=USB-C

ATCRTMR Boot Config

[2:0] = [011] 30Mhz QSPI and Test Mode Enabled
POR config should be [010] Test Mode Disabled

RF380: 10K ATCRTMR0_BOOT_CONFIG2 (OUT)
RF381: 10K ATCRTMR0_BOOT_CONFIG1 (OUT)
RF382: 10K ATCRTMR0_BOOT_CONFIG0 (OUT)
NOSTUFF
LFKA_TEST_MODE:NO

RF383: 10K ATCRTMR1_BOOT_CONFIG2 (OUT)
RF384: 10K ATCRTMR1_BOOT_CONFIG1 (OUT)
RF385: 10K ATCRTMR1_BOOT_CONFIG0 (OUT)
NOSTUFF
LFKA_TEST_MODE:NO

LFKA_TEST_MODE:YES — RF386 10K — PP1V2_USBC_VDDIO — RF388 10K NOSTUFF
ATCRTMR0_BOOT_CONFIG2 (OUT)
ATCRTMR0_BOOT_CONFIG1 (OUT)
ATCRTMR0_BOOT_CONFIG0 (OUT)

LFKA_TEST_MODE:YES — RF389 10K — RF390 10K — PP1V2_USBC_VDDIO — RF391 10K NOSTUFF
ATCRTMR1_BOOT_CONFIG2 (OUT)
ATCRTMR1_BOOT_CONFIG1 (OUT)
ATCRTMR1_BOOT_CONFIG0 (OUT)

ATCRTMR0 CHIP 0X00

RF392: 10K ATCRTMR0_CHIPID_0 (OUT)
RF393: 10K ATCRTMR0_CHIPID_1 (OUT)

ATCRTMR1 CHIP 0X01

PP1V2_USBC_VDDIO — RF395 47K — ATCRTMR1_CHIPID_0 (OUT)

RF394: 10K ATCRTMR1_CHIPID_1 (OUT)

ATCRTMR0_RESET_1V2_L (IN) — RF330 0 — ATCRTMR0_COLD_RESET_L (OUT)
RF331 0 — ATCRTMR0_CFSB (OUT)
RF332 0 NOSTUFF — P1V2_ATC01_PGOOD (IN)

ATCRTMR1_RESET_1V2_L (IN) — RF333 0 — ATCRTMR1_COLD_RESET_L (OUT)
RF334 0 — ATCRTMR1_CFSB (OUT)
RF335 0 NOSTUFF — P1V2_ATC01_PGOOD (IN)

SYNC_MASTER=USBC — SYNC_DATE=09/26/2022

PAGE TITLE

USB-C: Support 2 ATC01

Apple Inc.

DRAWING NUMBER	051-07020
SIZE	D
REVISION	6.0.0
BRANCH	evt-1
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*** OK2INTEGRATE ***

PPVBUS_USBC0 58 61

CF401 1UF 20% 35V X5R 0402

CRITICAL DF400 X3-WLB1608-1 SDM2U40CSP

PP3V3_S2_LDO 61 64 93

CF400 10UF 20% 6.3V CERM 0402

PP1V25_S2 61 64 93

CF402 1.0UF 20% 6.3V X5R 0201-1

MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.0750
VOLTAGE=3.3V

PP3V3_UPC0_LDO 61 62 63

138S0801 CF408 10UF 20% 6.3V CERM 0402

132S0444 CF403 0.1UF 10% 6.3V CERM-X5R 0201

PP1V8_S2 92

PP3V3_UPC0_LDO 61 62 63

Internal Pull-ups
Enabled after reading straps

470K RF409 5% 1/20W TK 0201 — I2C_UPC0_ATCRTMR0_SCL — CKPLUS_WAIVE=I2C_PULLUP — 61 63 66 68

470K RF408 5% 1/20W TK 0201 — I2C_UPC0_ATCRTMR0_SDA — CKPLUS_WAIVE=I2C_PULLUP — 61 63 66 68

1M RF405 5% 1/20W TK 0201 — UART_UPC01_RX — 61 63

100K RF406 5% 1/20W TK 0201 — PD_UPC0_MRESET — 63

Either a Testpoint or Arkanoid connector
must be present for GPIO0
(EVEN IN PRODUCTION)

61 PPHV_INT0_AONSW

MAX 100uF TOTAL ON RAIL

94 64 PP5V_S2

94 64 PP5V_S2

138S00070 CF406 4.7UF 20% 25V X5R 0402

PACK_IGNORE=TRUE
PACK_OPTION=ACE2_5V_INPUT_CAP

K9 L10 M9 N10 K11 L12 M11 N12 — PP_5V0

N14 M13 — PP_CABLE

G2 G4 H1 H3 J2 J4 K1 K3 L2 L4 M1 M3 N2 N4 — PP_HV

G6 G8 H5 H7 J6 J8 K5 K7 L6 L8 M5 M7 N6 N8 — VBUS

353S02993
CRITICAL
OMIT_TABLE

UF400
CD3217B13HACE
FCBGA

		B13	HRESET	
		A14	MRESET	
63	PD_UPC0_MRESET			
68 66 61	ATCRTMR0_RESET_L	B17	RESET*	3V3
68 61	UPC0_SER_DBG	A2		
		B1	GPIO0	OUT,PP
62	PD_UPC0_GPIO1	D1	GPIO1	BI,N_OD
68 61 59	INT_I2C_UPC0_ATCRTMR0_L	F1	GPIO2	1V2 IN
62	UPC0_5V_EN	C2	GPIO3	3V3 OUT,P_OD
68 61 59	ATCRTMR0_FORCE_DFU	E2	GPIO4	1V2 OUT,PP
68	UPC0_CHGR_AUX_DET_SHORT	B3	GPIO5	3V3 OUT,P_OD
62	PD_UPC0_GPIO6	C4	GPIO6	IN DIGITAL CORE I/O & CONTROL
62	SOC_DOCK_CONNECT	D3	GPIO7	OUT,P_OD
64 43	UPC_PMU_RESET_3V3	E4	GPIO8	3V3 OUT,P_OD
62	SOC_DFU_STATUS	F3	GPIO9	IN
62	SOC_FORCE_DFU	F7	GPIO10	OUT,P_OD
62	PP3V3_UPC0_LDO	A18	BUSPOWER	
62	GND	M19	I2C_ADDR	IPU-BOOT
	UPC0_R_OSC	M21	R_OSC	
68 66 63 61	I2C_UPC0_ATCRTMR0_SDA	A16	I2CM_SDA_CNFG	IPU-AFTER-BOOT
68 66 63 61	I2C_UPC0_ATCRTMR0_SCL	B15	I2CM_SCL_CNFG	IPU-AFTER-BOOT
61 49	I2C_UPC_SDA	B5	I2C_SDA1	
61 49	I2C_UPC_SCL	A4	I2C_SCL1	
61 49	UPC_I2C_INT_L	D7	I2C_IRQ1*	
61 51	I2C_SMC_UPC_SDA	B7	I2C_SDA2	
61 51	I2C_SMC_UPC_SCL	A6	I2C_SCL2	
61 51	UPC_SMC_I2C_INT_L	C8	I2C_IRQ2*	
61	SPI_UPC01_R_CLK	B9	SPI_CLK	
61	SPI_UPC01_R_MOSI	B11	SPI_MOSI	
61	SPI_UPC01_R_MISO	A10	SPI_MISO	
61	SPI_UPC01_R_CS_L	A8	SPI_SSZ	
61	SWD_UPC_SWDIO0	E20	SWD_DATA	IPU
61	SWD_UPC_SWCLK	E16	SWD_CLK	IPU
63 61	UART_UPC01_RX	B19	UART_RX	
61	UART_UPC01_TX	A20	UART_TX	
68	USB2_UPC0_P1_P	H19	USB_RP1_P	
68	USB2_UPC0_P1_N	H21	USB_RP1_N	
62	USB_DBG_LS_P	G20	USB_RP2_P	
62	USB_DBG_LS_N	G22	USB_RP2_N	
62	PD_UPC0_USBP3_RP	F19	USB_RP3_P	
62	PD_UPC0_USBP3_RN	F21	USB_RP3_N	
61	USBC0_AUX_C_P	J12	AUX_P	
61	USBC0_AUX_C_N	H11	AUX_N	
61	PD_UPC0_HPD	C12	HPD	
62	UART_DEBUGPRT_R2D	G12	DEBUG0	
62	UART_DEBUGPRT_D2R	F11	DEBUG1	
62	SWD_SOC_SWCLK	E8	DEBUG2	
62	SWD_SOC_SWDIO	E12	DEBUG3	
62	UART_SMC_DEBUGPRT_R2D	G16	DEBUG4	
62	UART_SMC_DEBUGPRT_D2R	F15	DEBUG5	
66	USBC0_CIO_LSTX_3V3	D15	DEBUG6	
66	USBC0_CIO_LSRX_3V3	D19	DEBUG7	

PORT_MUX

GND I2C_ADDR PRIMARY ONLY

CRITICAL RF403 15K 0.1% 1/20W TK 0201

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

POWER

VIN_3V3	C20		
VDDIO	A12		
VDDIO_CFG	D11	GND	62
LDO_3V3	C22		
	D21		
VIN_LV	L20		
VOUT_LV	L18	UPC0_ATCRTMR01_PWR_EN	61 66 68
		(cap needed when used as power source)	
VRET	C16		
SS	L22	UPC0_SS	
LDO_CORE	E22	PP1V5_UPC0_LDO_CORE	
VBUS_OPT	D5	PPVBUS_USBC0	61
PP_HV_OPT	F5	PPHV_INT0_AONSW	61

VOLTAGE=1.5V
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.0750

138S0801 CF405 10UF 20% 6.3V CERM 0402

CF409 0.68UF 5% 6.3V X6S 0402

PACK_OPTION=ACE2_SS_CAP

PACK_OPTION=ACE2_SS_GND
GND
MAKE_BASE=TRUE

TYPE-C

C_CC1	M15	USBC0_CC1	BI 62
	N16		
C_CC2	M17	USBC0_CC2	BI 62
	N18		
RPD_G1	L14	USBC0_CC1	BI 62
RPD_G2	L16	USBC0_CC2	BI 62
C_USB_TP	K19	USBC0_USB_TOP_P	BI 58
C_USB_TN	K21	USBC0_USB_TOP_N	BI 58
C_USB_BP	J20	USBC0_USB_BOT_P	BI 58
C_USB_BN	J22	USBC0_USB_BOT_N	BI 58
C_SBU1	J16	USBC0_SBU1	BI 58
C_SBU2	H15	USBC0_SBU2	BI 58

MIN_LINE_WIDTH=0.4000
MIN_NECK_WIDTH=0.1500

131S00464 CF414 220PF 5% 50V C0G 0201-1

131S00464 CF413 220PF 5% 50V C0G 0201-1

GND

GND_OPT	C18		
GND_OPT	E18		
GND_OPT	D17		
GND_OPT	G18		

GND

A22 H9 N20 B21 K15 N22

BOM_COST_GROUP=USB-C

SYNC_MASTER=I2BC — SYNC_DATE=09/26/2021

PAGE TITLE

USB-C: Port Controller ATC0

Apple Inc.

DRAWING NUMBER 051-07020 — SIZE D
REVISION 6.0.0
BRANCH evt-1
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*** OK2INTEGRATE ***

PPVBUS_USBC1 58 61

CF501 1UF 20% 35V X5R 0402

CRITICAL DF500 X3-WLB1608-1 SDM2U40CSP

PP3V3_S2_LDO 61 63 93

138S0801 CF500 10UF 20% 6.3V CERM 0402

PP1V25_S2 61 63 93

CF502 1.0UF 20% 6.3V X5R 0201-1

MIN_LINE_WIDTH=0.2800 MIN_NECK_WIDTH=0.0750 VOLTAGE=3.3V

PP3V3_UPC1_LDO 61 62 64

138S0801 CF508 10UF 20% 6.3V CERM 0402

PP1V8_S2 92

132S0444 CF503 0.1UF 10% 6.3V CERM-X5R 0201

(cap needed when used as power source)

UPC1_ATCRTMR01_PWR_EN 61 66 68

PACK_OPTION=ACE2_SS_CAP

PACK_OPTION=ACE2_SS_GND GND MAKE_BASE=TRUE

VOLTAGE=1.5V MIN_LINE_WIDTH=0.2800 MIN_NECK_WIDTH=0.0750

138S0801 CF505 10UF 20% 6.3V CERM 0402

CF509 0.68UF 10% 6.3V X6S 0402

MIN_LINE_WIDTH=0.4000 MIN_NECK_WIDTH=0.1500

131S00464 CF514 220PF 5% 50V C0G 0201-1

131S00464 CF513 220PF 5% 50V C0G 0201-1

PPHV_INT1_AONSW 61

MAX 100uF TOTAL ON RAIL

PP5V_S2 94 63

PP5V_S2 94 63

138S00070 CF506 4.7UF 20% 25V X5R 0402

PACK_IGNORE=TRUE PACK_OPTION=ACE2_5V_INPUT_CAP

PP_5V0 PP_CABLE PP_HV VBUS

353S02993 CRITICAL OMIT_TABLE

PP3V3_UPC1_LDO 61 62 64

470K RF509 5% 1/20W TK 0201 I2C_UPC1_ATCRTMR1_SCL CKPLUS_WAIVE=I2C_PULLUP 61 64 66 68

470K RF508 5% 1/20W TK 0201 I2C_UPC1_ATCRTMR1_SDA CKPLUS_WAIVE=I2C_PULLUP 61 64 66 68

1M RF505 5% 1/20W TK 0201 UART_UPC01_TX 61 64

100K RF506 5% 1/20W TK 0201 PD_UPC1_MRESET 64

Either a Testpoint or Arkanoid connector must be present for GPIO0 (EVEN IN PRODUCTION)

GND_I2C_ADDR PRIMARY ONLY

CRITICAL RF503 15K 0.1% 1/20W TK 0201

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

UF500 CD3217B13HACE FCBGA

	B13	HRESET		
64 PD_UPC1_MRESET	A14	MRESET		
66 61 OUT ATCRTMR1_RESET_L	B17	RESET*	3V3	
68 61 OUT UPC1_SER_DBG	A2			
	B1	GPIO0		OUT,PP
62 OUT PD_UPC1_GPIO1	D1	GPIO1		BI,N_OD
68 61 68 IN INT_I2C_UPC1_ATCRTMR1_L	F1	GPIO2	1V2	IN
62 OUT UPC1_5V_EN	C2	GPIO3	3V3	OUT,P_OD
60 OUT ATCRTMR1_FORCE_DFU	E2	GPIO4	1V2	OUT,PP
68 OUT UPC1_CHGR_AUX_DET_SHORT	B3	GPIO5	3v3	OUT,P_OD
62 IN PD_UPC1_GPIO6	C4	GPIO6		IN DIGITAL CORE I/O & CONTROL
62 OUT PD_UPC1_GPIO7	D3	GPIO7		OUT,P_OD
63 43 OUT UPC_PMU_RESET_3V3	E4	GPIO8	3V3	OUT,P_OD
62 IN PD_UPC1_GPIO9	F3	GPIO9		IN
62 OUT PD_UPC1_GPIO10	F7	GPIO10		OUT,P_OD
62 PP3V3_UPC1_LDO	A18	BUSPOWER		
62 NC_UPC1_I2C_ADDR	M19	I2C_ADDR		IPU-BOOT
UPC1_R_OSC	M21	R_OSC		
68 66 64 61 BI I2C_UPC1_ATCRTMR1_SDA	A16	I2CM_SDA_CNFG		IPU-AFTER-BOOT
68 66 64 61 BI I2C_UPC1_ATCRTMR1_SCL	B15	I2CM_SCL_CNFG		IPU-AFTER-BOOT
49 BI I2C_UPC_SDA	B5	I2C_SDA1		
49 BI I2C_UPC_SCL	A4	I2C_SCL1		
49 OUT UPC_I2C_INT_L	D7	I2C_IRQ1*		
51 BI I2C_SMC_UPC_SDA	B7	I2C_SDA2		
51 BI I2C_SMC_UPC_SCL	A6	I2C_SCL2		
51 OUT UPC_SMC_I2C_INT_L	C8	I2C_IRQ2*		
61 OUT GND	B9	SPI_CLK		
61 OUT GND	B11	SPI_MOSI		
64 IN GND	A10	SPI_MISO		
61 OUT GND	A8	SPI_SSZ		
61 BI SWD_UPC01_UART_DATA	E20	SWD_DATA	IPU	
61 BI SWD_UPC01_UART_CLK	E16	SWD_CLK	IPU	
64 61 IN UART_UPC01_TX	B19	UART_RX		
61 OUT UART_UPC01_RX	A20	UART_TX		
68 BI USB2_UPC1_P1_P	H19	USB_RP1_P		
68 BI USB2_UPC1_P1_N	H21	USB_RP1_N		
62 BI PD_UPC1_USBP2_RP	G20	USB_RP2_P		
62 BI PD_UPC1_USBP2_RN	G22	USB_RP2_N		
62 BI PD_UPC1_USBP3_RP	F19	USB_RP3_P		
62 BI PD_UPC1_USBP3_RN	F21	USB_RP3_N		
61 BI USBC1_AUX_C_P	J12	AUX_P		
61 BI USBC1_AUX_C_N	H11	AUX_N		
61 OUT PD_UPC1_HPD	C12	HPD		
62 BI PD_UPC1_DBG0_R	G12	DEBUG0		
62 BI PD_UPC1_DBG1_R	F11	DEBUG1		
62 OUT PD_UPC1_DBG2_R	E8	DEBUG2		
62 BI PD_UPC1_DBG3_R	E12	DEBUG3		
62 BI PD_UPC1_DBG4_R	G16	DEBUG4		
62 BI PD_UPC1_DBG5_R	F15	DEBUG5		
66 BI USBC1_CIO_LSTX_3V3	D15	DEBUG6		
66 OUT USBC1_CIO_LSRX_3V3	D19	DEBUG7		

PORT_MUX

POWER

VIN_3V3	C20		
VDDIO	A12		
VDDIO_CFG	D11	GND	62
LDO_3V3	C22 / D21		
VIN_LV	L20		
VOUT_LV	L18		
VRET	C16		
SS	L22	UPC1_SS	
LDO_CORE	E22	PP1V5_UPC1_LDO_CORE	
VBUS_OPT	D5	PPVBUS_USBC1	61
PP_HV_OPT	F5	PPHV_INT1_AONSW	61

TYPE-C

C_CC1	M15 / N16	USBC1_CC1	BI 62
C_CC2	M17 / N18	USBC1_CC2	BI 62
RPD_G1	L14	USBC1_CC1	BI 62
RPD_G2	L16	USBC1_CC2	BI 62
C_USB_TP	K19	USBC1_USB_TOP_P	BI 58
C_USB_TN	K21	USBC1_USB_TOP_N	BI 58
C_USB_BP	J20	USBC1_USB_BOT_P	BI 58
C_USB_BN	J22	USBC1_USB_BOT_N	BI 58
C_SBU1	J16	USBC1_SBU1	BI 58
C_SBU2	H15	USBC1_SBU2	BI 58

GND

GND_OPT	C18	
GND_OPT	E18	
GND_OPT	D17	
GND_OPT	G18	

GND

A22 H9 N20 B21 K15 N22

BOM_COST_GROUP=USB-C

SYNC_MASTER=USBC SYNC_DATE=09/26/2022

PAGE TITLE: USB-C: Port Controller ATC1

Apple Inc.

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REVISION 6.0.0

BRANCH evt-1

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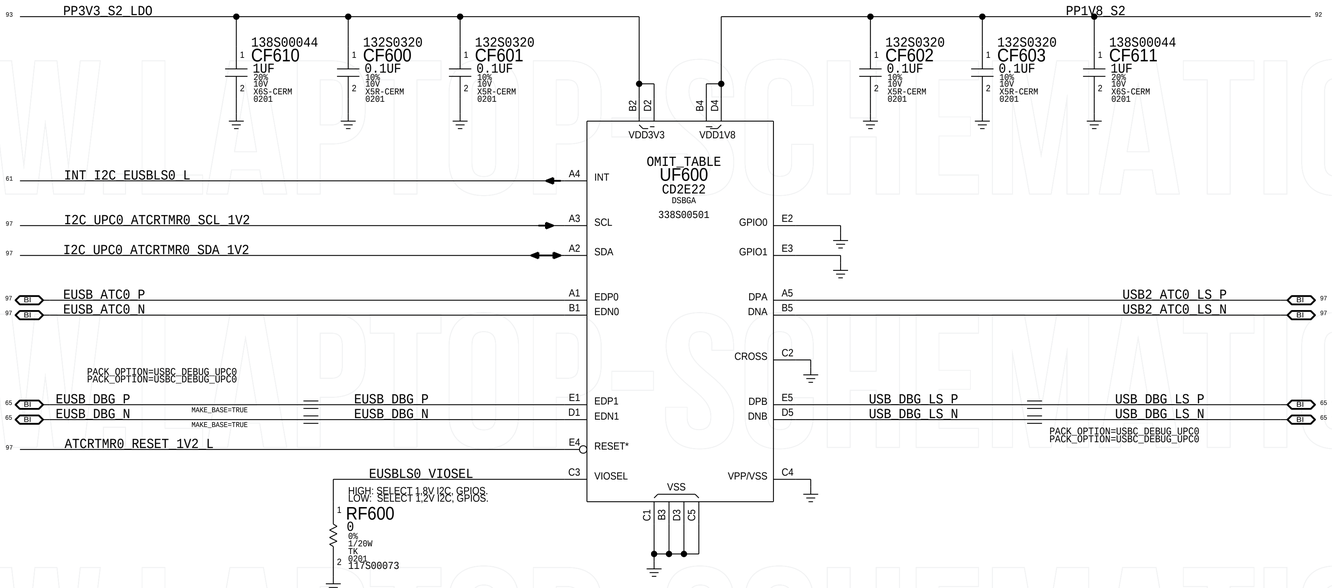
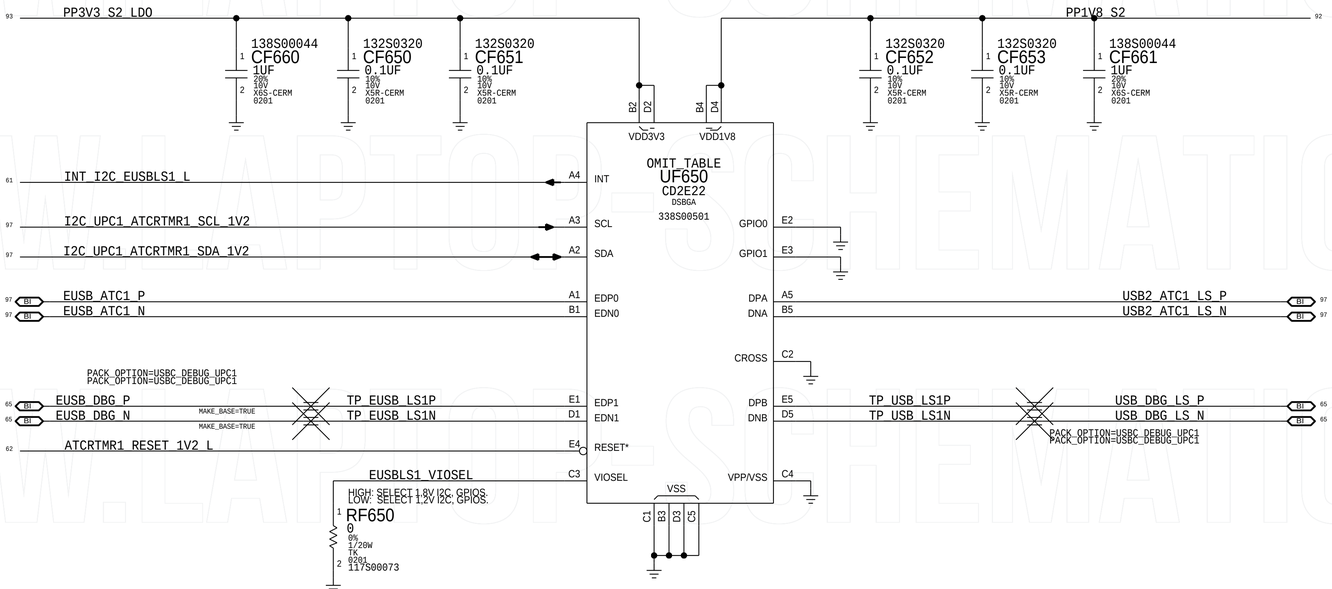
*** OK2INTEGRATE ***





BOM_COST_GROUP=USB-C

SYNC_MASTER=USBC SYNC_DATE=09/26/2021

PAGE TITLE

USB-C: USB2 RPT

Apple Inc.

DRAWING NUMBER 051-07020 SIZE D

REVISION 6.0.0

BRANCH evt-1

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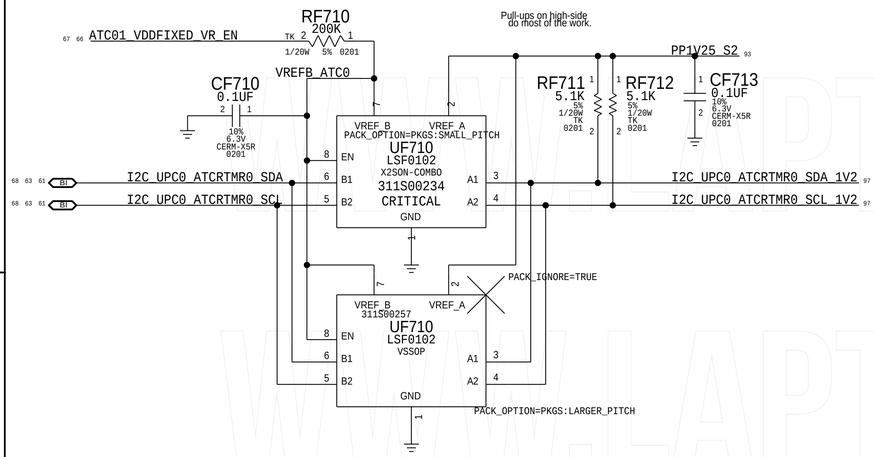
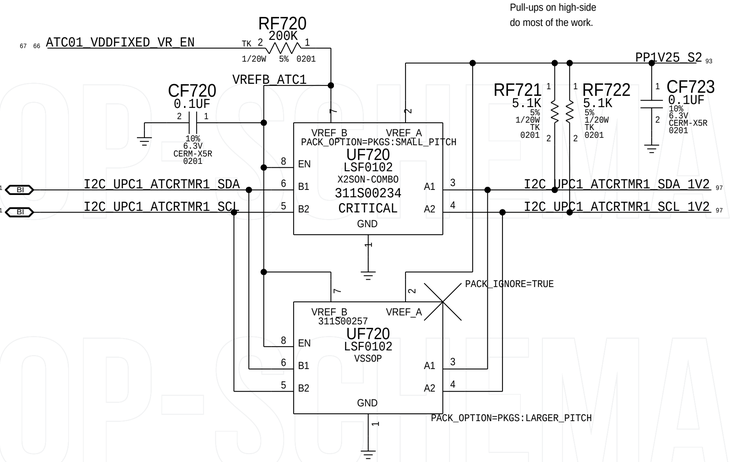
*** OK2INTEGRATE ***

Sequencing Requirements: 3.3V to UF790 --> system 1.2V (UF710,UF720) same time or before system 1.8V (UF400&UF500 VIN_LV pin)

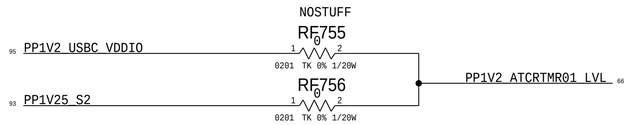
ATC0 RE-TIMER I2C LEVEL SHIFTERS



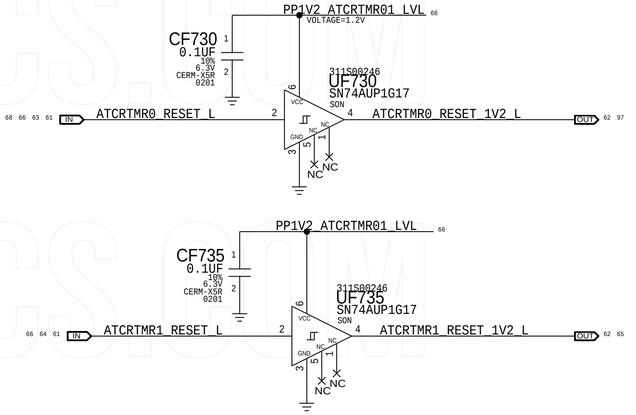
ATC1 RE-TIMER I2C LEVEL SHIFTERS



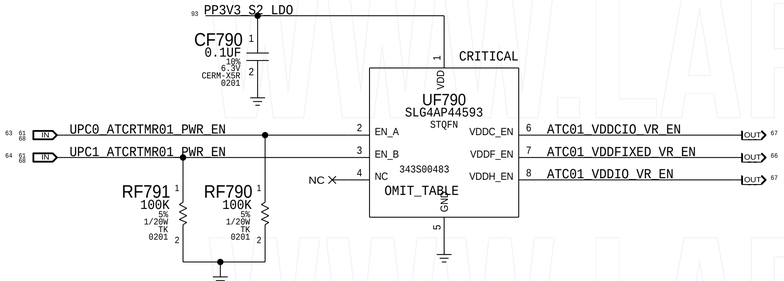
NOSTUFF



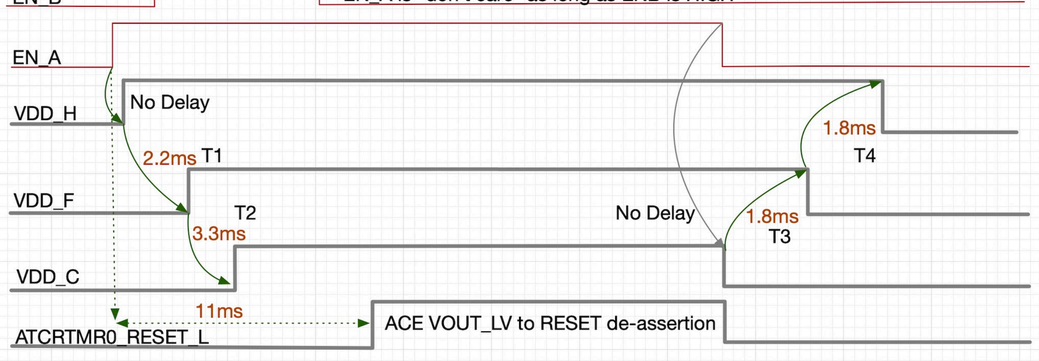
ATC0/1 AND eUSB0/1 RESET LEVEL SHIFTERS

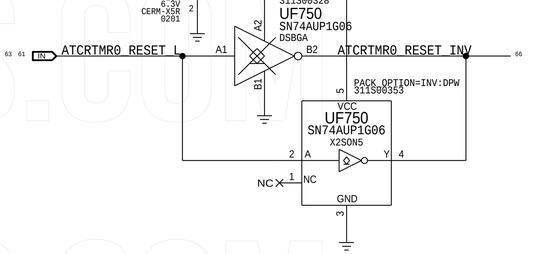


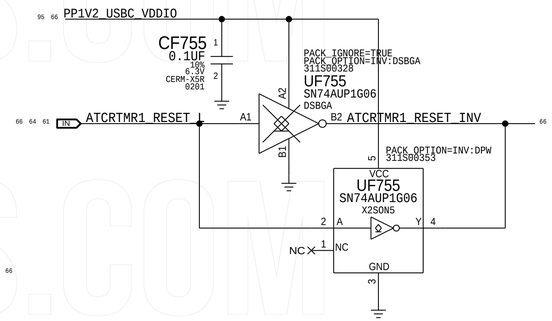
The 3.3V needs to be HIGH before VIN_LV of ACEs

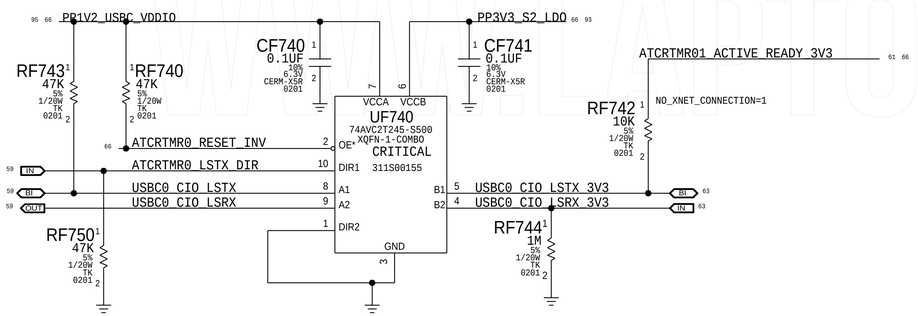


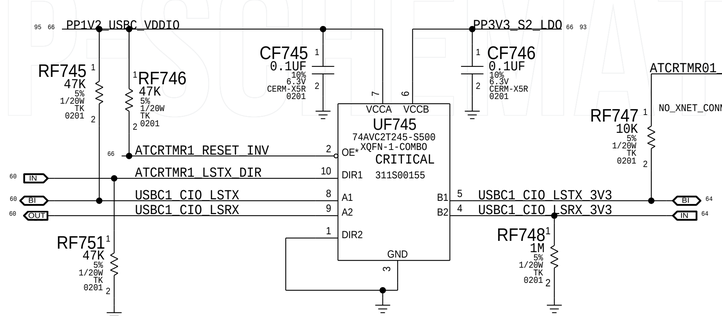
Note1: As long as EN_A or EN_B are HIGH, the outputs stay HIGH
Note2: Outputs are an ORed and delayed version of EN_A or EN_B











BOM_COST_GROUP=USB-C

PAGE TITLE: USB-C: HS Level Shifters

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*** OK2INTEGRATE ***

PP1V2_USBC_VDDIO

PP1V2_USBC_VDDIO — 61 67 95
NOSTUFF
RF904 4.7K 5% 1/20W TK 0201
P1V2_ATC01_PGOOD — 62 67

XWF901

PP3V8_AON — 92
XWF901 SM
NO_XNET_CONNECTION=1
VOLTAGE=3.8V
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

CRITICAL CF902 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF903 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF904 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF905 10UF 20% 6.3V CER-X6S 0402-COMBO
PP3V8_ACT01_VDDIO_REG

XWF902

XWF902 SM
P1V2_ATC01_SVR_PGND
VOLTAGE=0V
NO_XNET_CONNECTION=1
PLACE_NEAR=UF900:8.2MM
MIN_LINE_WIDTH=0.0990
MIN_NECK_WIDTH=0.0990

UF900

UF900 TPS628502 SOT583 353S02660
VIN
EN
MODE_SYNC
PG
COMP_FSET
FB
SW
GND

LF900

152S00984
CRITICAL LF900 0.47UH-3.7A-0.034OHM
DIDT=TRUE
SWITCH_NODE=TRUE
PJD16140H-SM
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.1000
P1V2_ATC01_SW
PP1V2_ATC01_REG_XW
VOLTAGE=1.23V

XWF904

XWF904 SM
NO_XNET_CONNECTION=1

XWF903

XWF903 SM
NO_XNET_CONNECTION=1

ATC01_VDDIO_VR_EN

67 66 IN ATC01_VDDIO_VR_EN
RF909 0 TK 1/20W 0% 0201
ATC01_VDDIO_VR_EN_R
RF901 100K 5% 1/20W TK 0201

P1V2_ATC01_PGOOD

67 62 P1V2_ATC01_PGOOD
RF900 100K 1% 1/20W TK 0201
P1V2_ATC01_COMP_FSET

XWF900

XWF900 SM
VOLTAGE=0V
NO_XNET_CONNECTION=1
PLACE_NEAR=UF900:8.2MM
67 P1V2_ATC01_AGND

P1V2_ATC01_FB

<Rb> RF908 15K 0.1% 1/20W TK 0201
P1V2_ATC01_FB
<Ra> RF907 15K 0.1% 1/20W TK 0201
P1V2_ATC01_FB_R
RF906 316 TK 1% 1/20W 0201
CF901 3300PF 10% 10V X7R-CERM 0201
P1V2_ATC01_FB_TOP

RF910 / CF906

RF910 3.16K 1% 1/20W TK 0201
CF906 100PF 5% 50V C0G 0201
P1V2_ATC01_AGND — 67

RF905

RF905 10 5% 1/20W TK 0201
P1V2_ATC01_FB_TOP_R

P1V2_ATC01_SVR_PGND

Vout = 1.213V
Iout Max = 0.96A
F = 1.8 MHZ

CRITICAL CF908 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF909 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF910 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF911 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF912 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF913 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF914 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF915 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF916 10UF 20% 6.3V CER-X6S 0402-COMBO
138S00073
CRITICAL CF917 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF918 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF919 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF920 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF921 10UF 20% 6.3V CER-X6S 0402-COMBO
PP1V2_USBC_VDDIO — 61 67 95

PP1V2_USBC_VDDIO

95 67 61 PP1V2_USBC_VDDIO
RF911 10 5% 1/5W TK 0402
RF912 10 5% 1/5W TK 0402
RF913 10 5% 1/5W TK 0402
P1V2_ATC01_DSCHG

PP3V8_AON

92 67 PP3V8_AON
117S00095
RF914 100K 5% 1/20W TK 0201
QF910 DMN5L06VK-7 SOT563 VER-5 376S0855

ATC01_P1V2_DSCHG_EN_RC

67 66 IN ATC01_VDDIO_VR_EN
RF915 0 TK 1/20W 0% 0201
ATC01_P1V2_VR_EN_R
376S0855
QF910 DMN5L06VK-7 SOT563 VER-5
6 ATC01_P1V2_DSCHG_EN_RC
CF929 47PF 5% 25V C0G 0201
NOSTUFF 131S00806

PP1V2_USBC_VDDIO

NOSTUFF
RF934 4.7K 5% 1/20W TK 0201
P0V855_ATC01_PGOOD — 67

XWF931

XWF931 SM
PP3V8_AON — 92
NO_XNET_CONNECTION=1
VOLTAGE=3.8V
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

CRITICAL CF932 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF933 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF934 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF935 10UF 20% 6.3V CER-X6S 0402-COMBO
PP3V8_ACT01_VDDCIO_REG

XWF932

XWF932 SM
P0V855_ATC01_SVR_PGND
VOLTAGE=0V
NO_XNET_CONNECTION=1
PLACE_NEAR=UF930:8.2MM
MIN_LINE_WIDTH=0.0990
MIN_NECK_WIDTH=0.0990

UF930

UF930 TPS628502 SOT583 353S02660
VIN
EN
MODE_SYNC
PG
COMP_FSET
FB
SW
GND

LF930

152S00984
CRITICAL LF930 0.47UH-3.7A-0.034OHM
DIDT=TRUE
SWITCH_NODE=TRUE
PJD16140H-SM
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.1000
P0V855_ATC01_SW
PP0V855_ATC01_REG_XW
VOLTAGE=0.880V

XWF934

XWF934 SM
NO_XNET_CONNECTION=1

XWF933

XWF933 SM
NO_XNET_CONNECTION=1

ATC01_VDDCIO_VR_EN

67 66 IN ATC01_VDDCIO_VR_EN
RF939 0 TK 1/20W 0% 0201
ATC01_VDDCIO_VR_EN_R
RF931 100K 5% 1/20W TK 0201

P0V855_ATC01_PGOOD

67 P0V855_ATC01_PGOOD
RF930 100K 1% 1/20W TK 0201
P0V855_ATC01_COMP_FSET

XWF930

XWF930 SM
VOLTAGE=0V
NO_XNET_CONNECTION=1
PLACE_NEAR=UF930:8.2MM
67 P0V855_ATC01_AGND

P0V855_ATC01_FB

<Rb> RF938 27.4K 0.1% 1/20W TK 0201
P0V855_ATC01_FB
<Ra> RF937 10K 0.1% 1/20W TK 0201
P0V855_ATC01_FB_R
RF936 1.96K 1% 1/20W TK 0201
CF931 3300PF 10% 10V X7R-CERM 0201
P0V855_ATC01_FB_TOP

RF940 / CF936

RF940 3.16K 1% 1/20W TK 0201
CF936 100PF 5% 50V C0G 0201
P0V855_ATC01_AGND — 67

RF935

RF935 10 5% 1/20W TK 0201
P0V855_ATC01_FB_TOP_R

P0V855_ATC01_SVR_PGND

Vout = 0.8621V
Iout Max = 0.5A
F = 1.8 MHZ

CRITICAL CF938 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF939 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF940 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF941 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF942 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF943 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF944 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF945 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF946 10UF 20% 6.3V CER-X6S 0402-COMBO
PP0V855_USBC_CIO — 61 67 95
CRITICAL CF947 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF948 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF949 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF950 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF951 10UF 20% 6.3V CER-X6S 0402-COMBO

PP0V855_USBC_CIO

95 67 61 PP0V855_USBC_CIO
RF941 10 5% 1/5W TK 0402
RF942 10 5% 1/5W TK 0402
RF943 10 5% 1/5W TK 0402
P0V855_ATC01_DSCHG

PP3V8_AON

92 67 PP3V8_AON
117S00095
RF944 100K 5% 1/20W TK 0201
QF940 DMN5L06VK-7 SOT563 VER-5 376S0855

ATC01_P0V855_DSCHG_EN_RC

67 66 IN ATC01_VDDCIO_VR_EN
RF945 0 TK 1/20W 0% 0201
ATC01_P0V855_VR_EN_R
376S0855
QF940 DMN5L06VK-7 SOT563 VER-5
6 ATC01_P0V855_DSCHG_EN_RC
CF959 47PF 5% 25V C0G 0201
NOSTUFF 131S00806

PP1V2_USBC_VDDIO

NOSTUFF
RF964 4.7K 5% 1/20W TK 0201
P0V805_ATC01_PGOOD — 67

XWF961

XWF961 SM
PP3V8_AON — 92
NO_XNET_CONNECTION=1
VOLTAGE=3.8V
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

CRITICAL CF962 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF963 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF964 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF965 10UF 20% 6.3V CER-X6S 0402-COMBO
PP3V8_ACT01_VDDFIXED_REG

XWF962

XWF962 SM
P0V805_ATC01_SVR_PGND
VOLTAGE=0V
NO_XNET_CONNECTION=1
PLACE_NEAR=UF960:8.2MM
MIN_LINE_WIDTH=0.0990
MIN_NECK_WIDTH=0.0990

UF960

UF960 TPS628502 SOT583 353S02660
VIN
EN
MODE_SYNC
PG
COMP_FSET
FB
SW
GND

LF960

152S00984
CRITICAL LF960 0.47UH-3.7A-0.034OHM
DIDT=TRUE
SWITCH_NODE=TRUE
PJD16140H-SM
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.1000
P0V805_ATC01_SW
PP0V805_ATC01_REG_XW
VOLTAGE=0.805V

XWF964

XWF964 SM
NO_XNET_CONNECTION=1

XWF963

XWF963 SM
NO_XNET_CONNECTION=1

ATC01_VDDFIXED_VR_EN

67 66 IN ATC01_VDDFIXED_VR_EN
RF969 0 TK 1/20W 0% 0201
ATC01_VDDFIXED_VR_EN_R
RF961 100K 5% 1/20W TK 0201

P0V805_ATC01_PGOOD

67 P0V805_ATC01_PGOOD
RF960 100K 1% 1/20W TK 0201
P0V805_ATC01_COMP_FSET

XWF960

XWF960 SM
VOLTAGE=0V
NO_XNET_CONNECTION=1
PLACE_NEAR=UF960:8.2MM
67 P0V805_ATC01_AGND

P0V805_ATC01_FB

<Rb> RF968 30.9K 0.1% 1/20W TK 0201
P0V805_ATC01_FB
<Ra> RF967 10K 0.1% 1/20W TK 0201
P0V805_ATC01_FB_R
RF966 665 TK 1% 1/20W 0201
CF961 3300PF 10% 10V X7R-CERM 0201
P0V805_ATC01_FB_TOP

RF970 / CF966

RF970 3.16K 1% 1/20W TK 0201
CF966 100PF 5% 50V C0G 0201
P0V805_ATC01_AGND — 67

RF965

RF965 10 5% 1/20W TK 0201
P0V805_ATC01_FB_TOP_R

P0V805_ATC01_SVR_PGND

Vout = 0.8073V
Iout Max =0.7A
F = 1.8 MHZ

CRITICAL CF968 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF969 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF970 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF971 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF972 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF973 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF974 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF975 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF976 10UF 20% 6.3V CER-X6S 0402-COMBO
PP0V805_USBC_FIXED — 67 95
CRITICAL CF977 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF978 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF979 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF980 10UF 20% 6.3V CER-X6S 0402-COMBO
CRITICAL CF981 10UF 20% 6.3V CER-X6S 0402-COMBO

PP0V805_USBC_FIXED

95 67 PP0V805_USBC_FIXED
RF971 10 5% 1/5W TK 0402
RF972 10 5% 1/5W TK 0402
RF973 10 5% 1/5W TK 0402
P0V805_ATC01_DSCHG

PP3V8_AON

92 67 PP3V8_AON
376S0855
QF960 DMN5L06VK-7 SOT563 VER-5
117S00095
RF974 100K 5% 1/20W TK 0201
QF960 DMN5L06VK-7 SOT563 376S0855

ATC01_P0V805_DSCHG_EN_RC

ATC01_P0V805_VR_EN_R
6 ATC01_P0V805_DSCHG_EN_RC
CF989 47PF 5% 25V C0G 0201
NOSTUFF 131S00806

ATC01_VDDFIXED_VR_EN

67 66 IN ATC01_VDDFIXED_VR_EN
RF975 0 TK 1/20W 0% 0201

BOM_COST_GROUP=TBT

09/26/2021
USBC

PAGE TITLE
$PAGETITLE=USB-C: ATC01 REGULATORS

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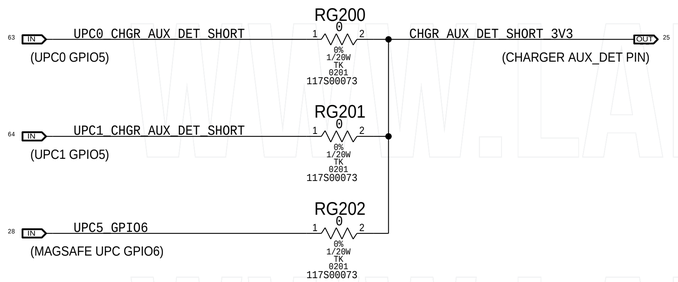
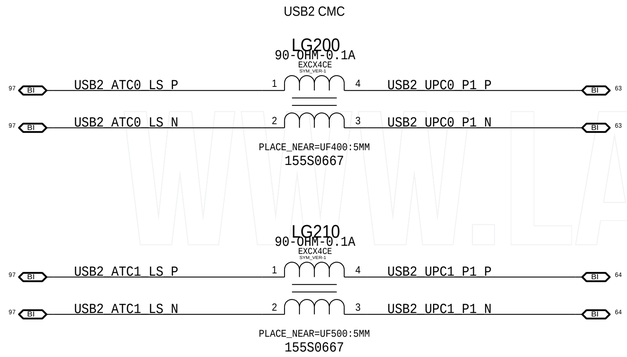
A Charger AUX_DET Connections

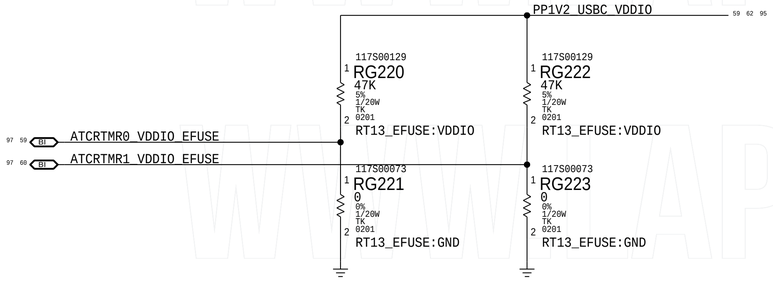
CHARGER AUX DET CONNECTIONS
<RDAR://70072178>
ALLOW ACE TO SEND A SIGNAL TO CHARGER
TO BLOCK SYSTEM CURRENT THROUGH ACE2 FETS DURING ACE2 SOFT START



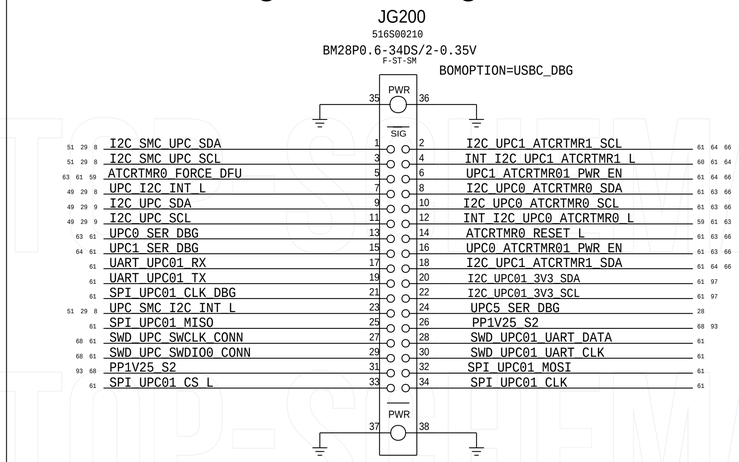
B USB 2.0 Common Mode Choke



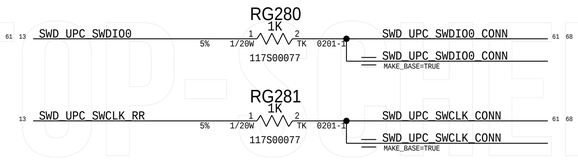
C RT13 VDDIO_EFUSE Selection



D USB-C/MagSafe Debug Connector



E USB-C SWDIO Aliases



BOM_COST_GROUP=USB-C

PAGE TITLE
USB-C: PROJECT SUPPORT

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

TYPHOON WIFI/BT MODULE

PLACE_NEAR=UL000.48:4MM
PLACE_NEAR=UL000.48:3MM
PLACE_NEAR=UL000.48:3MM PP3V8_AON_WLBT 69 92
CL005 10UF 20% 10V X5R-CERM 0402-8
CRITICAL CL030 3.0PF +/-0.1PF 25V NP0-C0G 0201
CRITICAL CL020 12PF 5% 25V NP0-C0G 0201
VBAT

PLACE_NEAR=UL000.14:4MM
PLACE_NEAR=UL000.14:3MM
PLACE_NEAR=UL000.14:3MM PP3V8_AON_WLBT 69 92
CL006 10UF 20% 10V X5R-CERM 0402-8
CRITICAL CL031 3.0PF +/-0.1PF 25V NP0-C0G 0201
CRITICAL CL021 12PF 5% 25V NP0-C0G 0201
2GFEM

PLACE_NEAR=UL000.38:4MM
PLACE_NEAR=UL000.38:3MM
PLACE_NEAR=UL000.38:3MM PP3V8_AON_WLBT 69 92
CL007 10UF 20% 10V X5R-CERM 0402-8
CRITICAL CL032 3.0PF +/-0.1PF 25V NP0-C0G 0201
CRITICAL CL022 12PF 5% 25V NP0-C0G 0201
5GFEM_C0

PLACE_NEAR=UL000.76:4MM
PLACE_NEAR=UL000.76:3MM
PLACE_NEAR=UL000.76:3MM PP3V8_AON_WLBT 69 92
CL008 10UF 20% 10V X5R-CERM 0402-8
CRITICAL CL033 3.0PF +/-0.1PF 25V NP0-C0G 0201
CRITICAL CL023 12PF 5% 25V NP0-C0G 0201
5GFEM_C1

PLACE_NEAR=UL000.23:4MM
PLACE_NEAR=UL000.23:3MM PP1V8_S2 69 92
CL010 0.1UF 10% 6.3V CERM-X5R 0201
CRITICAL CL024 12PF 5% 25V NP0-C0G 0201
2GFEM_C0

PLACE_NEAR=UL000.4:4MM
PLACE_NEAR=UL000.4:3MM PP1V8_S2 69 92
CL011 10UF 20% 10V X5R-CERM 0402-8
CRITICAL CL025 12PF 5% 25V NP0-C0G 0201
2GFEM_C1

PLACE_NEAR=UL000.33:4MM
PLACE_NEAR=UL000.33:3MM PP1V8_S2 69 92
CL012 0.1UF 10% 6.3V CERM-X5R 0201
CRITICAL CL034 3.0PF +/-0.1PF 25V NP0-C0G 0201
5GFEM_C0

PLACE_NEAR=UL000.82:4MM
PLACE_NEAR=UL000.82:3MM PP1V8_S2 69 92
CL013 0.1UF 10% 6.3V CERM-X5R 0201
CRITICAL CL035 3.0PF +/-0.1PF 25V NP0-C0G 0201
5GFEM_C1

PP1V8_S2 92 69
PP3V8_AON_WLBT 92 69
PP1V25_S2 92
PLACE_NEAR=UL000.51:4MM
CL014 0.1UF 10% 6.3V CERM-X5R 0201

UL000
2103-601908-80
LGA
SYM 1 OF 4
OMIT_TABLE

VDD_2G_COC1	12			
VDD_2G_COC1	13			
VDD_2G_COC1	14			
VDD_2G_COC1	15			
VDD_5G_C0	38			
VDD_5G_C0	39			
VDD_5G_C1	76			
VDD_5G_C1	77			
VDD_BT	74			
VBAT	47			
VBAT	48			
VBAT	49			
VBAT	130			
VBAT	131			
VBAT	132			
VDD1V8_2G_C0	23			
VDD1V8_2G_C1	4			
VDD1V8_5G_C0	33			
VDD1V8_5G_C1	82			
VDDIO_RF	65			
VDDIO1P8	66			
VDDIO1P2	51			
RF_ANT_0	NO_TEST=1	28	ANT_X	
RF_ANT_1	NO_TEST=1	87	ANT_Y	
NC_RF_BT_DED	NO_TEST=1	72	BT_DEDICATED	
NC_BT_GPIO_2	NO_TEST=1	431	BT_GPIO_2	
BT_TIME_SYNC		36	BT_GPIO_3	
NC_BT_GPIO_4	NO_TEST=1	43	BT_GPIO_4	
NC_BT_GPIO_5	NO_TEST=1	128	BT_GPIO_5	
SPMI_WLBT_CLK		119	SPMI_HEB_CLK	
SPMI_WLBT_DATA		321	SPMI_HEB_DAT	
BT_LHL_GPIO2		136	LHL_GPIO2	
NC_SPMI_IDC_CLK		120	SPMI_IDC_CLK	
NC_SPMI_IDC_DATA		343	SPMI_IDC_DAT	
WLBT_PWR_EN		41	WLBT_REG_ON	
PMU_CLK32K_WLBT		515	WLBT_CLK_32K	
WLAN_JTAG_SEL		54	JTAG_SEL	
		497	SFLASH_OPTION_2	
WL_GPIO_0		126	WLBT_WAKE	
WL_GPIO_2		388	TPT_WLAN_JTAG_TCK	
WL_GPIO_3		410	TPT_WLAN_JTAG_TMS	
WL_GPIO_4		500	TPT_WLAN_JTAG_TDI	
WL_GPIO_5		501	WLAN_TIME_SYNC	
WL_GPIO_6		366	TPT_WLAN_JTAG_TRSTN	
WL_GPIO_7		137	WL_GPIO_7	
WL_GPIO_8		151	UART_WLAN_R2D_R	
WL_GPIO_9		150	UART_WLAN_D2R_R	
WL_GPIO_10		498	UART_WLAN_R2D_RTS_L_R	
WL_GPIO_11		499	UART_WLAN_D2R_CTS_L_R	
WL_GPIO_12	NO_TEST=1	453	NC_WL_GPIO_12	
WL_GPIO_13	NO_TEST=1	160	NC_WL_GPIO_13	
WL_GPIO_14	NO_TEST=1	159	NC_WL_GPIO_14	
WL_GPIO_15	NO_TEST=1	475	NC_WL_GPIO_15	
WL_GPIO_16	NO_TEST=1	513	NC_WL_GPIO_16	
WL_GPIO_18	NO_TEST=1	512	NC_WL_GPIO_18	
WL_GPIO_19	NO_TEST=1	476	NC_WL_GPIO_19	
WLBT_PCIE_PERST_L		505	WLBT_RESET_L	
WLBT_PCIE_CLKREQ_L		508	WLBT_CLKREQ_R_L	
WLBT_PCIE_RXD_P		145	PCIE_WLBT_R2D_P	
WLBT_PCIE_RXD_N		146	PCIE_WLBT_R2D_N	
WLBT_PCIE_TXD_P		142	PCIE_WLBT_D2R_C_P	
WLBT_PCIE_TXD_N		143	PCIE_WLBT_D2R_C_N	
WLBT_PCIE_REFCLK_P		139	PCIE_CLK100M_WLBT_P	
WLBT_PCIE_REFCLK_N		140	PCIE_CLK100M_WLBT_N	

RL002 10K 5% 1/20W TK 0201

TYPHOON ES2.X

GND_VOID=TRUE
PLACE_NEAR=UL000.145:4MM
CL001 0.1UF 10% 6.3V CERM-X5R 0201
PCIE_WLBT_R2D_C_P → PCIE_WLBT_R2D_P
CL002 0.1UF 10% 6.3V CERM-X5R 0201
PCIE_WLBT_R2D_C_N → PCIE_WLBT_R2D_N
PLACE_NEAR=UL000.146:4MM
GND_VOID=TRUE
RL003 51K 5% 1/20W 0201 JK
SPMI_WLBT_CLK
RL004 51K 5% 1/20W 0201 JK
SPMI_WLBT_DATA

PACK_IGNORE=TRUE
PACK_OPTION=WLBT_D2R_TP_JADE
PLACE_NEAR=UL000.142:4MM
GND_VOID=TRUE
CL003 0.1UF 10% 6.3V CERM-X5R 0201
PCIE_WLBT_D2R_C_P → PCIE_WLBT_D2R_P
CL004 0.1UF 10% 6.3V CERM-X5R 0201
PCIE_WLBT_D2R_C_N → PCIE_WLBT_D2R_N
PLACE_NEAR=UL000.143:4MM
PACK_IGNORE=TRUE
PACK_OPTION=WLBT_D2R_TP_JADE
GND_VOID=TRUE
PACK_OPTION=WLBT_D2R_TP_STATEN
PLACE_NEAR=U0600.BF29:10MM
CL043 0.1UF 10% 6.3V CERM-X5R 0201
PCIE_WLBT_D2R_C_P → PCIE_WLBT_D2R_P
CL044 0.1UF 10% 6.3V CERM-X5R 0201
PCIE_WLBT_D2R_C_N → PCIE_WLBT_D2R_N
GND_VOID=TRUE
PLACE_NEAR=U0600.BG29:10MM
PACK_OPTION=WLBT_D2R_TP_STATEN

WLBT_CLKREQ_R_L → RL001 1K 5% 1/20W 0201-1 TK → WLBT_CLKREQ_L

BOM_COST_GROUP=WIRELESS

TPL001 A TP-P5 PMU_CLK32K_WLBT 40 69 70
TPL002 A TP-P5 WLBT_PWR_EN 42 69 70
TPL003 A TP-P5 WLBT_WAKE 42 69 70
TPL004 A TP-P5 TPT_WLAN_JTAG_TCK 69 70 96
TPL005 A TP-P5 TPT_WLAN_JTAG_TMS 69 70 96
TPL006 A TP-P5 TPT_WLAN_JTAG_TDI 69 96
TPL007 A TP-P5 WLAN_TIME_SYNC 9 69 70
WLAN_JTAG_TDO
TPL008 A TP-P5 TPT_WLAN_JTAG_TRSTN 69 96
TPL009 A TP-P5 WLAN_JTAG_SEL 69
TPL010 A TP-P5 BT_TIME_SYNC 9 69 70
TPL011 A TP-P5 UART_WLAN_R2D_R 69
TPL012 A TP-P5 UART_WLAN_D2R_R 69
TPL013 A TP-P5 UART_WLAN_R2D_RTS_L_R 69
TPL014 A TP-P5 UART_WLAN_D2R_CTS_L_R 69

TPL018 A TP-P5 SPMI_WLBT_CLK 13 69
TPL019 A TP-P5 SPMI_WLBT_DATA 13 69
TPL020 A TP-P5 BT_LHL_GPIO2 69
TPL023 A TP-P5 WLBT_RESET_L 10 69 70
TPL024 A TP-P5 WLBT_CLKREQ_L 10 69 70
TPL025 A TP-P5 WL_GPIO_7 69

PACK_IGNORE=TRUE
PACK_OPTION=WLBT_TP_0P4
TPL028 A TP-R4
PACK_IGNORE=TRUE
PACK_OPTION=WLBT_TP_0P4
TPL029 A TP-R4
PPL021 P2MM SM PP PACK_OPTION=WLBT_TP_0P2 PCIE_CLK100M_WLBT_P 10 69
PLACE_SIDE=BOTTOM
PPL022 P2MM SM PP PACK_OPTION=WLBT_TP_0P2 PCIE_CLK100M_WLBT_N 10 69
PLACE_SIDE=BOTTOM

PPL026 P2MM SM PACK_IGNORE=TRUE PACK_OPTION=WLBT_D2R_TP_JADE PLACE_NEAR=U0600.A41:10MM PCIE_WLBT_D2R_P 10 69
PLACE_SIDE=BOTTOM
PPL027 P2MM SM PACK_IGNORE=TRUE PACK_OPTION=WLBT_D2R_TP_JADE PLACE_NEAR=U0600.B41:10MM PCIE_WLBT_D2R_N 10 69
PLACE_SIDE=BOTTOM

TYPHOON BOM TABLE:

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00912	1	MODULE,WLAN/BT,TYPHOON, ES4.7	UL000	CRITICAL	

PAGE TITLE: WIFI/BT: MODULE

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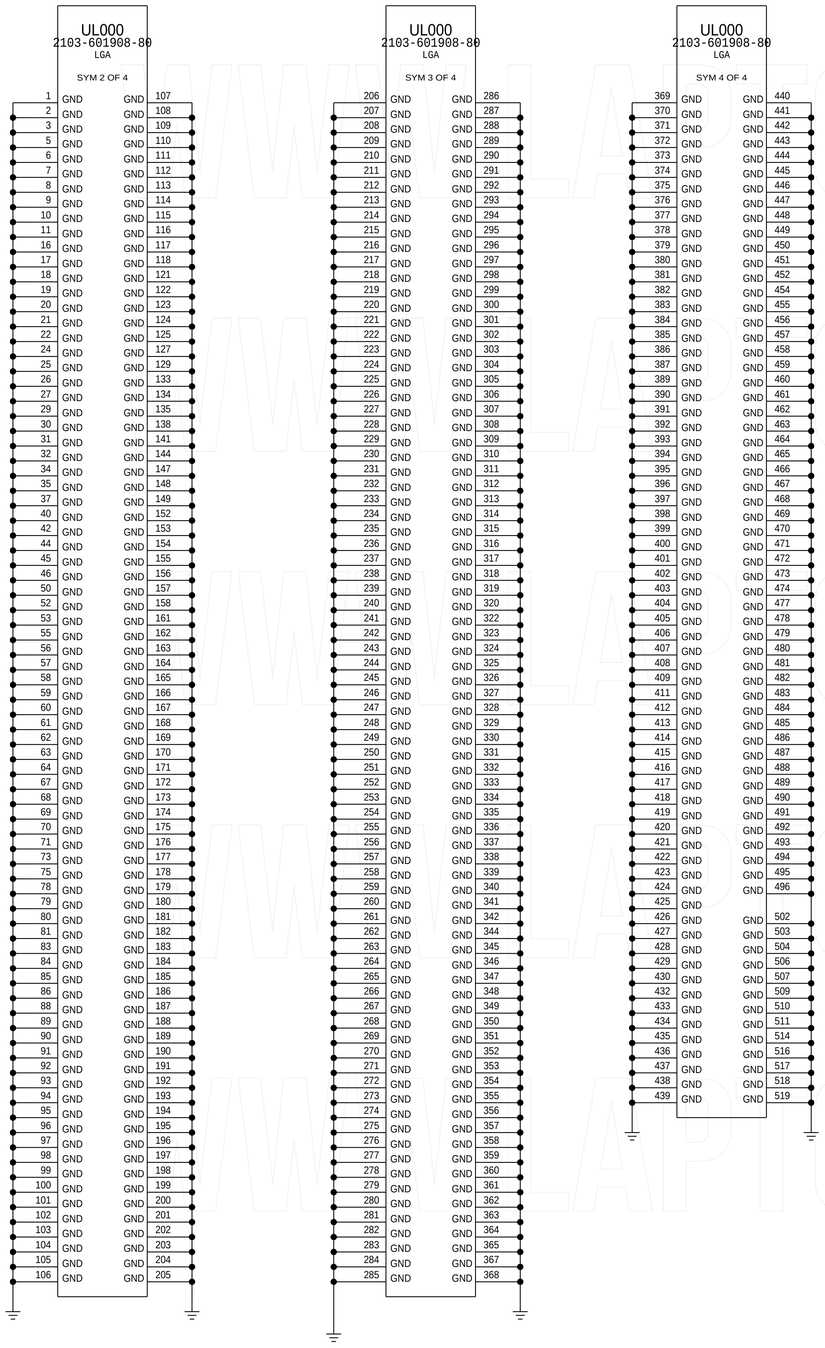
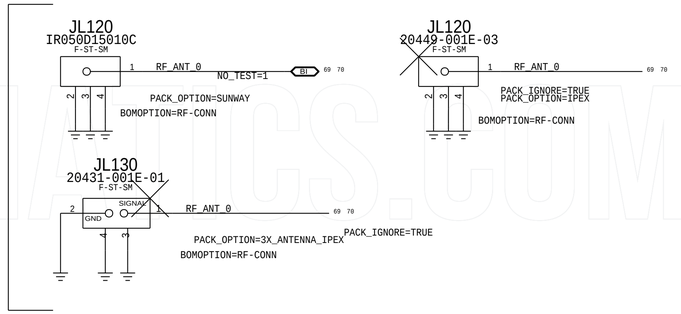
TYPHOON WIFI/BT MODULE GND

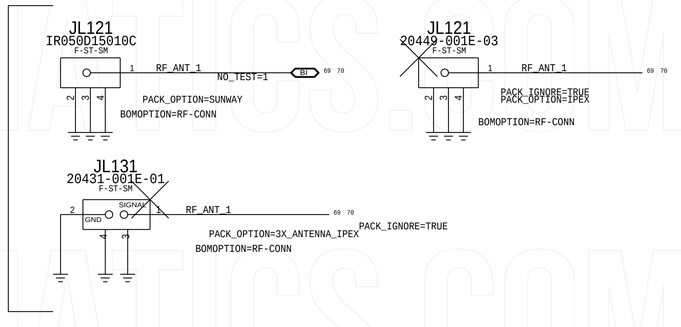


ANTENNA CONNECTORS

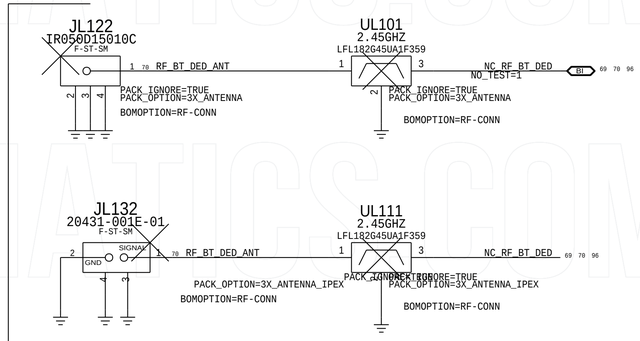
2G_C0
5G_C0
BT_C0



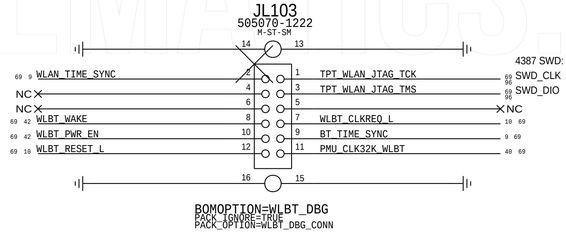
2G_C1
5G_C1
BT_C1



BT_C1_DED



WLBT DEBUG CONNECTOR



BOM_COST_GROUP=WIRELESS

PAGE TITLE
WIFI/BT: ANTENNA and GND

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*** OK2INTEGRATE ***

NAND0 S5E0

PP1V25_AWAKE_NAND_VCCQ
CN030 4.3UF 20% 4V CERM 0402-THICK&THCNCL
PACK_OPTION=SSD_4_3UF_0402THICK
PACK_IGNORE=TRUE
PACK_OPTION=SSD_4_3UF_0402THIN
PP1V25_AWAKE_NAND_VCCQ 71 72 93
CN032 20UF 20% 10V X5R 0402
CN030 4.3UF 20% 4V CERM 0402
CN034 2.2UF 20% 10V X5R 0201
CN035 2.2UF 20% 10V X5R 0201
CN036 2.2UF 20% 10V X5R 0201
CN037 2.2UF 20% 10V X5R 0201
CN038 2.2UF 20% 10V X5R 0201
CN039 2.2UF 20% 10V X5R 0201
CN03A 2.2UF 20% 10V X5R 0201

93 71 PP0V88_AWAKE_NAND_VDD
CN010 20UF 20% 10V X5R 0402
CN011 20UF 20% 10V X5R 0402
CN012 2.2UF 20% 10V X5R 0201
CN013 2.2UF 20% 10V X5R 0201
CN014 2.2UF 20% 10V X5R 0201
CN015 0.1UF 10% 6.3V CERM-X5R 0201
CN016 0.1UF 10% 6.3V CERM-X5R 0201
CN017 0.1UF 10% 6.3V CERM-X5R 0201

73 TPT_NAND0_S5E0_ANI1_VREF
73 TPT_NAND0_S5E0_ANI0_VREF
PP2V58_AWAKE_NAND_VCC 72 92
CN020 20UF 20% 10V X5R 0402
CN022 2.2UF 20% 10V X5R 0201
CN023 2.2UF 20% 10V X5R 0201
CN024 2.2UF 20% 10V X5R 0201
CN025 2.2UF 20% 10V X5R 0201

PP1V25_AWAKE_NAND_VCCQ
RN010 2 1% 1/20W TK 0201 PLACE_NEAR=UN000.L2:10MM
CN047 2.2UF 20% 10V X5R 0201
CN046 0.1UF 10% 6.3V CERM-X5R 0201
MIN_LINE_WIDTH=0.1000 MIN_NECK_WIDTH=0.1000
PP1V2_NAND0_S5E0_AVDD1X_PLL
FLN000 100HM-50%-1A-0.050HM 0201 PLACE_NEAR=UN000.J6:10MM
CN045 4.7UF 20% 4V CER-X5R 0201
CN044 0.1UF 10% 6.3V CERM-X5R 0201
MIN_LINE_WIDTH=0.1000 MIN_NECK_WIDTH=0.1000
PP1V2_NAND0_S5E0_PCI_AVDD_H
The inductance from CN047, CN046, CN045, CN044 to their S5E pins shall be less than 1100pH

MIN_LINE_WIDTH=0.1000 MIN_NECK_WIDTH=0.1000
PP0V9_NAND0_S5E0_VDD_PLL
NC_NAND0_S5E0_VPP 96
FLN001 100HM-50%-1A-0.050HM 0201 PLACE_NEAR=UN000.R4:10MM
PP0V88_AWAKE_NAND_VDD 71 93
PLACE_NEAR=FLN001.2:5MM
CN083 4.7UF 20% 4V CER-X5R 0201

J6 PCIE_AVDD_H
J8 M9 N6 N8 PCIE_VDD
L2 AVDD1X_PLL
G12 ANI0_VREF
J4 ANI1_VREF
G6 G8 L6 L8 R6 R8 VDD
J2 VDDIO_1
K9 T5 E10 VDDIO_2
D3 E12 G4 L12 R2 VCC
R4 VDD_PLL
F3 VPP
F5 VDPS

CN085 10PF 5% 25V C0G 0201
RN004 200 0.1% 1/20W TK 0201-2
GND_VOID=TRUE
10 IN PCIE_NAND0_R2D_C_P<0> CN003 0.22UF 10% 6.3V X5R-CERM 0201 PCIE_NAND0_R2D_P<0> M11 GND_VOID=TRUE
10 IN PCIE_NAND0_R2D_C_N<0> CN004 0.22UF 10% 6.3V X5R-CERM 0201 PCIE_NAND0_R2D_N<0> N12 GND_VOID=TRUE
10 OUT PCIE_NAND0_D2R_P<0> CN001 0.22UF 10% 6.3V X5R-CERM 0201 PCIE_NAND0_D2R_C_P<0> R12 GND_VOID=TRUE
10 OUT PCIE_NAND0_D2R_N<0> CN002 0.22UF 10% 6.3V X5R-CERM 0201 PCIE_NAND0_D2R_C_N<0> T11 GND_VOID=TRUE

73 IN NAND0_CLK24M_0 M3 CLK_IN
10 IN PCIE_CLK100M_NAND0_0_P K11 PCIE_REFCLK_P
10 IN PCIE_CLK100M_NAND0_0_N J12 PCIE_REFCLK_N
73 OUT NAND0_CLKREQ0_R_L P5 PCIE_CLKREQ*
NAND0_S5E0_PCIE_RESREF H7 PCIE_RESREF
PCIE_RX0_P
PCIE_RX0_N
PCIE_TX0_P
PCIE_TX0_N

72 8 IN NAND0_RESET_L L4 RESET*
72 71 IN NAND0_JTAG_TRST_L G10 TRST*
NAND0_S5E0_ZQ_0 C10 ZQ_0
NAND0_S5E0_ZQ_1 K3 ZQ_1
PLACE_NEAR=UN000.C10:15MM
RN006 300 1% 1/20W TK 0201
PLACE_NEAR=UN000.K3:15MM
RN005 300 1% 1/20W TK 0201

OMIT_TABLE
UN000
S5E-MCP-STUDY
LGA

EXT_D0/BOOT0 B3 NAND0_LPB_L IN 42 72
EXT_D1/BOOT1 C4 NAND_BFH IN 8 72
EXT_D2/BOOT2/SPINAND_SCLK B5 NAND0_BOOT2 71 72
EXT_D3/SWD_UID0/SPINAND_MISO C6 NAND0_S5E0_SWD_UID0 71
EXT_D4/SPI_CS B7
EXT_D5/SWD_UID1/SPINAND_MOSI C8 NAND0_S5E0_SWD_UID1 71
EXT_D6/BOOT3 B9
EXT_D7/SPF B11 NAND0_PFN_L IN 72 73
EXT_DQS/BCM* D11 NAND0_BCM_L IN 71 72
EXT_NCE/PERST* E8 NAND0_PCIE_RESET_L IN 10 72
EXT_NRE/JTAG_TMS D7 SWD_NAND0_S5E0_SWDIO IN 13
EXT_NWE/JTAG_TCK E6 SWD_NAND0_S5E0_SWCLK IN 13
EXT_RNB/JTAG_TDO E4 NAND0_S5E0_JTAG_TDO OUT 72
EXT_CLE/JTAG_TDI D5 TPT_NAND0_S5E0_JTAG_TDI IN 73
EXT_ALE/JTAG_SEL D9 NAND0_JTAG_SEL IN 71 72
DROOP* T3 TPT_NAND0_S5E0_DROOP_L 73
WP* G2 NAND0_WP_L IN 71 72

VSS: A12 A2 B1 B13 C12 C2 D1 D13 F1 F11 F13 F7 F9 H1 H11 H13 H3 H5 H9 J10 K1 K13 K5 K7 L10 M1 M13 M5 M7 N10 N4 P1 P11 P13 P3 P7 R10 T1 T13 T7 T9 U12 U2
VSS_R: A10 A4 A6 A8 U10 U4 U6 U8

72 71 NAND0_BOOT2
72 71 NAND0_JTAG_SEL
72 71 NAND0_JTAG_TRST_L
RN000 47K 1% 1/20W TK 0201
RN002 47K 1% 1/20W TK 0201
RN021 0 0% 1/20W TK 0201
Spec recommends to tie Boot2 directly to Gnd

PP1V25_AWAKE_NAND_VCCQ 71 72 93
RN001 0 0% 1/20W TK 0201
RN007 0 0% 1/20W TK 0201
72 71 NAND0_BCM_L
72 71 NAND0_WP_L
Spec recommends to tie BCM, WP directly to 1.2V rail

71 NAND0_S5E0_SWD_UID0
71 NAND0_S5E0_SWD_UID1
RN009 47K 1% 1/20W TK 0201
RN008 47K 1% 1/20W TK 0201
BOM_COST_GROUP=SSD

SYNC_MASTER=
SYNC_DATE=09/10/2021
PAGE TITLE
STORAGE: SSD0 S5E <0>
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*** OK2INTEGRATE ***

NAND0 S5E1

PP1V25_AWAKE_NAND_VCCQ
SSD_2L CN130 4.3UF 20% 4V CERM 0402-THICK&TNCL
PACK_OPTION=SSD_4_3UF_0402THICK
PACK_IGNORE=TRUE
PACK_OPTION=SSD_4_3UF_0402THIN
SSD_2L CN130 4.3UF 20% 4V CERM 0402
SSD_2L CN132 20UF 20% 10V X5R 0402
SSD_2L CN134 2.2UF 20% 10V X5R 0201
SSD_2L CN135 2.2UF 20% 10V X5R 0201
SSD_2L CN136 2.2UF 20% 10V X5R 0201
SSD_2L CN137 2.2UF 20% 10V X5R 0201
SSD_2L CN138 2.2UF 20% 10V X5R 0201
SSD_2L CN139 2.2UF 20% 10V X5R 0201
SSD_2L CN13A 2.2UF 20% 10V X5R 0201
PP1V25_AWAKE_NAND_VCCQ 71 72 93

93 72 PP0V88_AWAKE_NAND_VDD
SSD_2L CN110 20UF 20% 10V X5R 0402
SSD_2L CN111 20UF 20% 10V X5R 0402
SSD_2L CN112 2.2UF 20% 10V X5R 0201
SSD_2L CN113 2.2UF 20% 10V X5R 0201
SSD_2L CN114 2.2UF 20% 10V X5R 0201
SSD_2L CN115 0.1UF 10% 6.3V CERM-X5R 0201
SSD_2L CN116 0.1UF 10% 6.3V CERM-X5R 0201
SSD_2L CN117 0.1UF 10% 6.3V CERM-X5R 0201

73 TPT_NAND0_S5E1_ANI1_VREF
73 TPT_NAND0_S5E1_ANI0_VREF

PP2V58_AWAKE_NAND_VCC 71 92
SSD_2L CN120 20UF 20% 10V X5R 0402
SSD_2L CN122 2.2UF 20% 10V X5R 0201
SSD_2L CN123 2.2UF 20% 10V X5R 0201
SSD_2L CN124 2.2UF 20% 10V X5R 0201
SSD_2L CN125 2.2UF 20% 10V X5R 0201

PP1V25_AWAKE_NAND_VCCQ
SSD_2L RN110 2 1% 1/20W TK 0201
PLACE_NEAR=UN100.L2:10MM
SSD_2L CN147 2.2UF 20% 10V X5R 0201
SSD_2L CN146 0.1UF 10% 6.3V CERM-X5R 0201
MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.1000
PP1V2_NAND0_S5E1_AVDD1X_PLL

SSD_2L FLN100 10OHM-50%-1A-0.050OHM 0201
PLACE_NEAR=UN100.J6:10MM
SSD_2L CN145 4.7UF 20% 6.3V CER-X5R 0201
SSD_2L CN144 0.1UF 10% 6.3V CERM-X5R 0201
MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.1000
PP1V2_NAND0_S5E1_PCI_AVDD_H

The inductance from CN147, CN146, CN145, CN144 to their S5E pins shall be less than 1100pH

MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.1000
PP0V9_NAND0_S5E1_VDD_PLL
SSD_2L FLN101 10OHM-50%-1A-0.050OHM 0201
PLACE_NEAR=UN100.R4:10MM
PP0V88_AWAKE_NAND_VDD 72 93
PLACE_NEAR=FLN101.2:5MM
SSD_2L CN183 4.7UF 20% 4V CER-X5R 0201
NC_NAND0_S5E1_VPP 96

J6 PCIE_AVDD_H
J8 M9 N6 N8 PCIE_VDD
L2 AVDD1X_PLL
G12 ANI0_VREF
J4 ANI1_VREF
G6 G8 L6 L8 R6 R8 VDD
J2 K9 T5 E10 E2 N2 P9 VDDIO_1 VDDIO_2
D3 E12 G4 L12 R2 VCC
R4 VDD_PLL
F3 VPP
F5 VDPS

OMIT_TABLE
UN100
S5E-MCP-STUDY
LGA

SSD_2L CN185 10PF 5% 25V C0G 0201
SSD_2L RN104 200 0.1% 1/20W TK 0201-2
SSD_2L CN103 0.22UF 10% 6.3V X5R-CERM 0201 GND_VOID=TRUE
SSD_2L CN104 0.22UF 10% 6.3V X5R-CERM 0201 GND_VOID=TRUE
SSD_2L CN101 0.22UF 10% 6.3V X5R-CERM 0201 GND_VOID=TRUE
SSD_2L CN102 0.22UF 10% 6.3V X5R-CERM 0201 GND_VOID=TRUE

10 IN PCIE_NAND0_R2D_C_P<1>
10 IN PCIE_NAND0_R2D_C_N<1>
10 OUT PCIE_NAND0_D2R_P<1>
10 OUT PCIE_NAND0_D2R_N<1>

73 IN NAND0_CLK24M_1 M3 CLK_IN
10 IN PCIE_CLK100M_NAND0_1_P K11 PCIE_REFCLK_P
10 IN PCIE_CLK100M_NAND0_1_N J12 PCIE_REFCLK_N
73 OUT NAND0_CLKREQ1_R_L P5 PCIE_CLKREQ*
NAND0_S5E1_PCIE_RESREF H7 PCIE_RESREF
PCIE_NAND0_R2D_P<1> M11 PCIE_RX0_P
PCIE_NAND0_R2D_N<1> N12 PCIE_RX0_N
PCIE_NAND0_D2R_C_P<1> R12 PCIE_TX0_P
PCIE_NAND0_D2R_C_N<1> T11 PCIE_TX0_N

71 8 IN NAND0_RESET_L L4 RESET*
71 IN NAND0_JTAG_TRST_L G10 TRST*
NAND0_S5E1_ZQ_0 C10 ZQ_0
NAND0_S5E1_ZQ_1 K3 ZQ_1

PLACE_NEAR=UN100.C10:15MM
SSD_2L RN106 300 1% 1/20W TK 0201
PLACE_NEAR=UN100.K3:15MM
SSD_2L RN105 300 1% 1/20W TK 0201

VSS
A12 A2 B1 B13 C12 C2 D1 D13 F1 F11 F13 F7 F9 H1 H11 H13 H3 H5 H9 J10 K1 K13 K5 K7 L10 M1 M13 M5 M7 N10 N4 P1 P11 P13 P3 P7 R10 T1 T13 T7 T9 U12 U2
VSS_R
A10 A4 A6 A8 U10 U4 U6 U8

EXT_D0/BOOT0 B3 NAND0_LPB_L 42 71
EXT_D1/BOOT1 C4 NAND_BFH 8 71
EXT_D2/BOOT2/SPINAND_SCLK B5 NAND0_BOOT2 71
EXT_D3/SWD_UID0/SPINAND_MISO C6 NAND0_S5E1_SWD_UID0 72
EXT_D4/SPI_CS B7
EXT_D5/SWD_UID1/SPINAND_MOSI C8 NAND0_S5E1_SWD_UID1 72
EXT_D6/BOOT3 B9
EXT_D7/SPF B11 NAND0_PFN_L 71 73
EXT_DQS/BCM* D11 NAND0_BCM_L 71
EXT_NCE/PERST* E8 NAND0_PCIE_RESET_L 10 71
EXT_NRE/JTAG_TMS D7 SWD_NAND0_S5E1_SWDIO 13
EXT_NWE/JTAG_TCK E6 SWD_NAND0_S5E1_SWCLK 13
EXT_RNB/JTAG_TDO E4 TPT_NAND0_S5E1_JTAG_TDO 73
EXT_CLE/JTAG_TDI D5 NAND0_S5E0_JTAG_TDO 71
EXT_ALE/JTAG_SEL D9 NAND0_JTAG_SEL 71
DROOP* T3 TPT_NAND0_S5E1_DROOP_L 73
WP* G2 NAND0_WP_L 71

PP1V25_AWAKE_NAND_VCCQ 71 72 93
SSD_2L RN108 47K 1% 1/20W TK 0201
72 NAND0_S5E1_SWD_UID0
72 NAND0_S5E1_SWD_UID1
SSD_2L RN109 47K 1% 1/20W TK 0201

BOM_COST_GROUP=SSD

SYNC_MASTER=
SYNC_DATE=09/10/2021
PAGE TITLE
STORAGE: SSD0 S5E <1>

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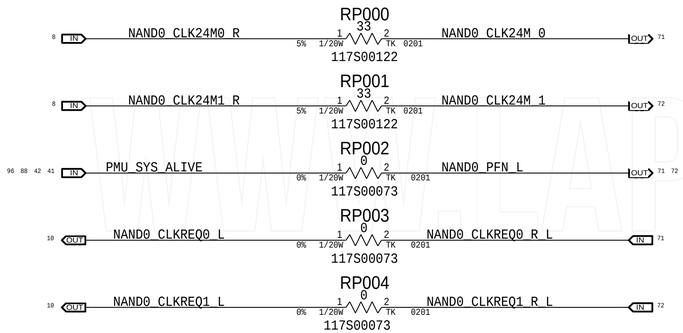
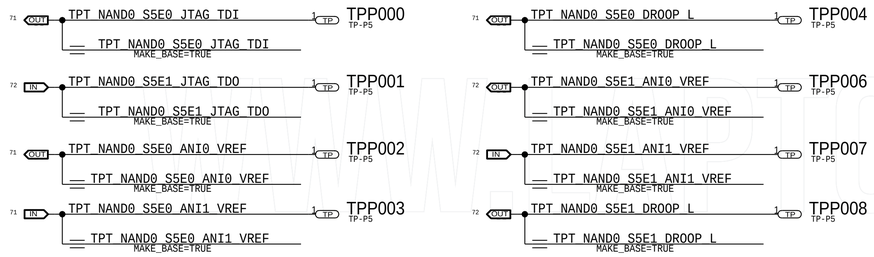
A SSD Termination Resistors



B S5E Test Points



BOM_COST_GROUP=SSD

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE

STORAGE: SSD Support

Apple Inc.

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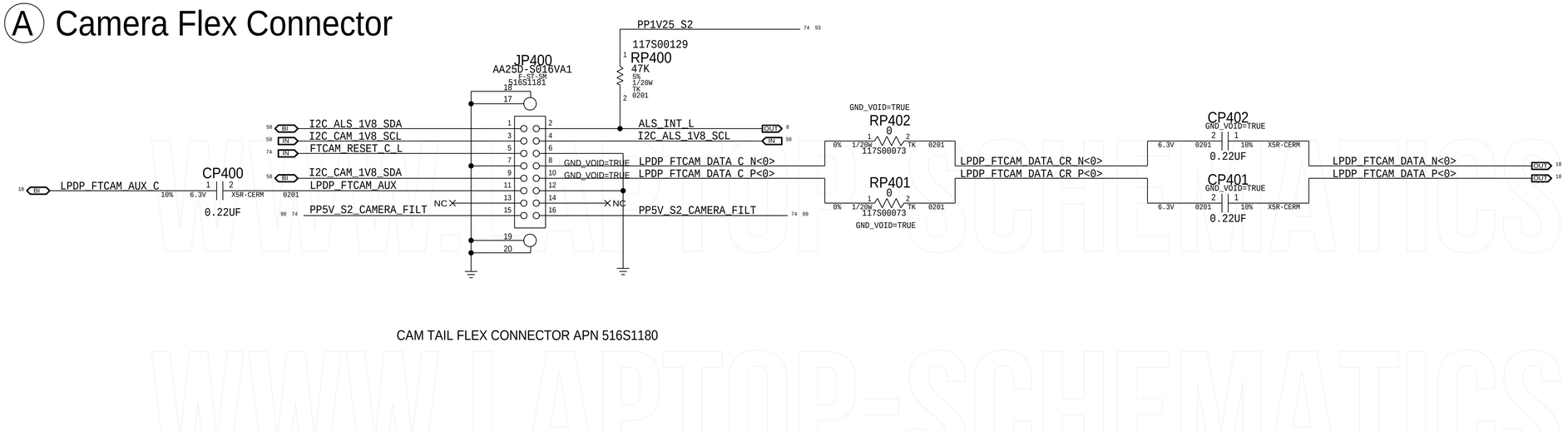
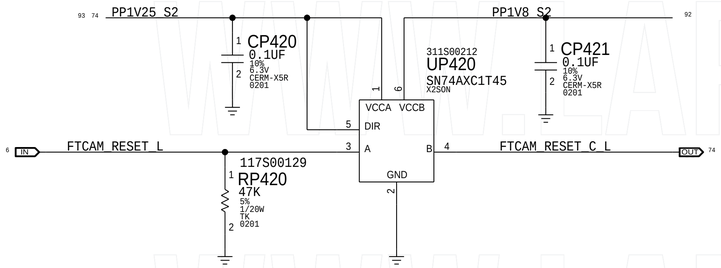
A Camera Flex Connector

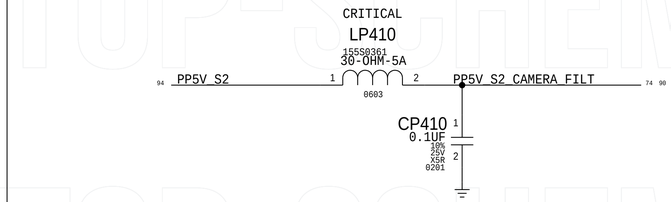


CAM TAIL FLEX CONNECTOR APN 516S1180

B Camera Reset Level Shifter



C Camera Power Filter(s)



BOM_COST_GROUP=CAMERA

SYNC_MASTER= SYNC_DATE=09/10/2021

PAGE TITLE: CAMERA: FLEX CONNECTOR

Apple Inc.

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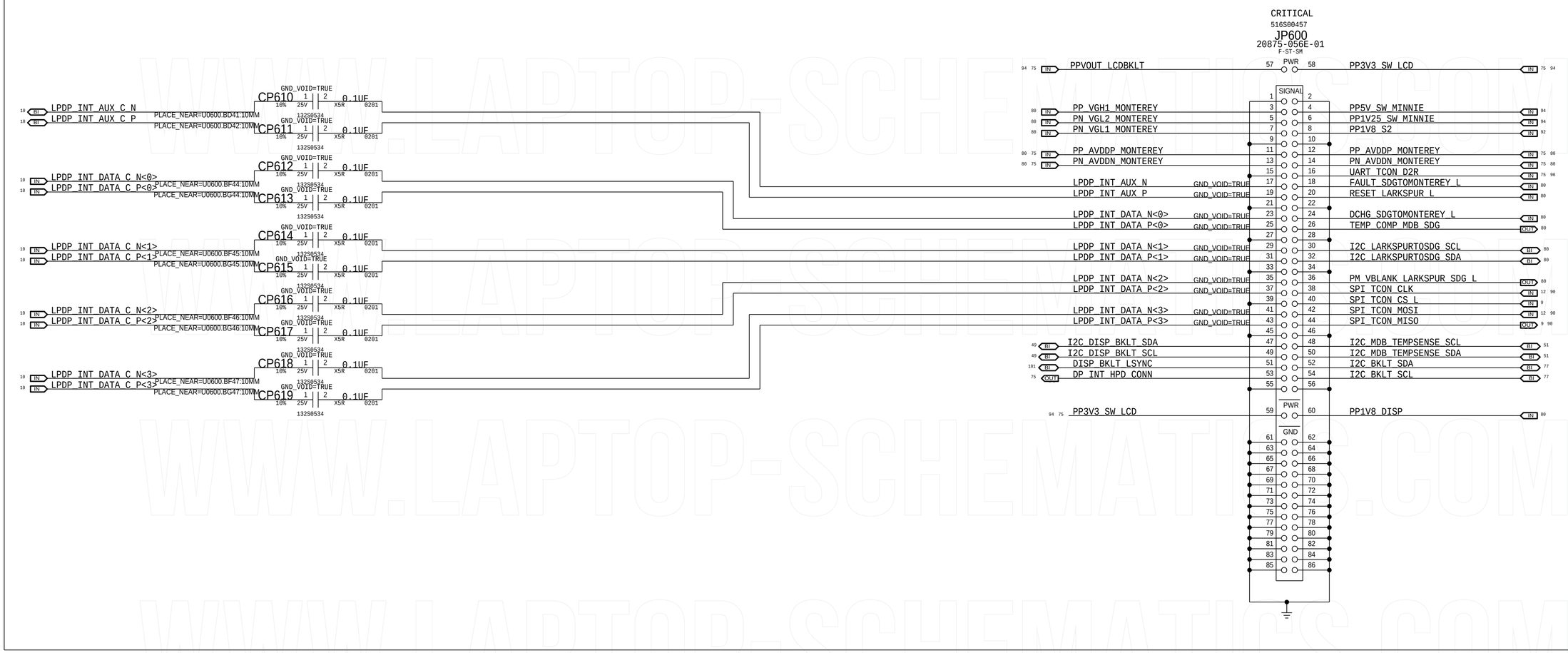
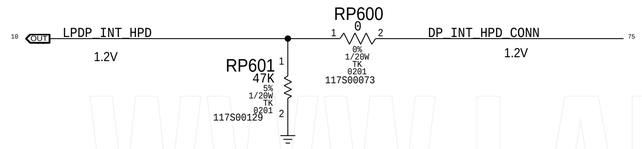
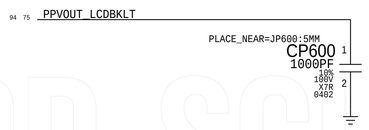
A LCD Panel Interface



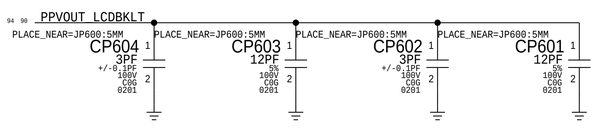
B LCD Panel Support



D LCD Panel Bypass



C LCD Panel Desense



E UART PULLDOWN

BOM_COST_GROUP=DISPLAY

SYNC_MASTER=
SYNC_DATE=09/10/2021

PAGE TITLE: eDP Display Connector

Apple Inc.

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*** OK2INTEGRATE ***

93 PP1V25_S2

CAN BE EITHER 1.2V OR 1.8V

94 PP5V_S2

CONSULT YOUR DISPLAY DRI FOR DETAILS
GENERAL GUIDELINE IS
3V3 FOR 2020 SYSTEMS
3V8 FOR 2021 SYSTEMS

94 PP3V3_S2

92 PP1V8_S2

PACK_OPTION=PANELPWR_MINNIE
CP720 0.1UF 10% 10V X5R-CERM 0201

PACK_OPTION=PANELPWR_MINNIE
CP717 0.1UF 10% 10V X5R-CERM 0201

PACK_OPTION=PANELPWR_MINNIE
PP1V25_SW_MINNIE
CP713 0.1UF 10% 10V X5R-CERM 0201
CP714 10UF 20% 10V X5R-CERM 0402-7

PACK_OPTION=PANELPWR_MINNIE
PP5V_SW_MINNIE
CP711 0.1UF 10% 10V X5R-CERM 0201
CP712 10UF 20% 10V X5R-CERM 0402-7

CRITICAL
UP700 SLG5AP1451V DFN
VDD 6
ON1 3
ON2 2
GND 7
D1 4
S1 5
D2 1
S2 8

CRITICAL
UP701 SLG5AP1564V STDFN
VDD 1
ON 2
GND 8
D 3
S 5
PG 7 NC

CP710 1.0UF 20% 6.3V X5R 0201-1

PP3V3_SW_LCD
CP718 0.1UF 10% 10V X5R-CERM 0201
CP719 10UF 20% 10V X5R-CERM 0402-7

BYPASS=UP710::3MM
CP770 0.1UF 10% 10V X5R-CERM 0201

UP710 SLG4AP43605V STQFN
VDD 1
GND 9

42 IN LCD_PWR_EN → PANEL_EN_IN 2
96 IN PMU_SYS_ALIVE → SYS_ALIVE 3
NC 5 6 7 8 12 NC

PANEL_EN_OUT 11 → EDP_PANEL_1V8_EN → OUT 80
PANEL_PWR_EN 4 → EDP_PANEL_PWR_EN
BLC_VDDIO_EN 13 → EDP_BLC_VDDIO_EN
BLC_5V_EN 14 → EDP_BLC_5V_EN
PANEL_DISCHARGE 10 → EDP_PANEL_DISCHARGE

116S00029
RP700 300 5% 1/16W TK 0402

PPPANEL_PANEL_DISCHARGE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

376S1140
QP700 DMN2300UFB4 X2-DFN1006-3-COMBO SYM_VER_1
D 3
G 1
S 2

117S00095
RP701 100K 5% 1/20W TK 0201

BOM_COST_GROUP=DISPLAY

PAGE TITLE: DISPLAY POWER SEQUENCER

Apple Inc.

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*** OK2INTEGRATE ***

BEN IC: DISPLAY/KBD BACKLIGHT BOOST CONVERTER

371S00077/371S00180 (COMBO) FOOTPRINT IN LAYOUT

PPVIN_LCDBKLT
740S0159 CRITICAL FP800 3AMP-32V 0603-COMBO
VOLTAGE=13V MIN_NECK_WIDTH=0.1000 MIN_LINE_WIDTH=0.2000
PPVIN_LCDBKLT_F
107S00034 RP800 0.025 1% 1W MF 0612-1
VOLTAGE=13V MIN_NECK_WIDTH=0.1000 MIN_LINE_WIDTH=0.2000
PPVIN_LCDBKLT_R
ALLOW_APPLE_PREFIX=Q
376S0604 CRITICAL QP800 FDC638APZ_SBMS001 SSOT6-HF-COMBO
NOSTUFF CP801 0.001UF 10% 50V CERM 402 132S0045
CKPLUS_WAIVE=LIFECYCLE_STATUS
VOLTAGE=13V MIN_NECK_WIDTH=0.2000 MIN_LINE_WIDTH=0.1000
PPVIN_LCDBKLT_Q
PLACE_NEAR=LP800.1:5MM CP810 4.7UF 10% 25V X6S-CERM 0603 138S0811
PLACE_NEAR=LP800.1:5MM CP811 4.7UF 10% 25V X6S-CERM 0603 138S0811
PLACE_NEAR=LP800.1:5MM CP812 0.1UF 10% 25V X5R 402 132S0183
PACK_OPTION=BLC_IND:10UH
152S00136 CRITICAL LP800 10UH-20%-2.6A-0.24OHM
PIEA051D-SM-COMBO
PACK_IGNORE=TRUE
PACK_OPTION=BLC_IND:15UH
152S00253 CRITICAL LP800 15UH-20%-1.9A-0.24OHM PIEB062L-SM
VOLTAGE=45V MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1000 SWITCH_NODE=TRUE DIDT=TRUE
PPVOUT_LCDBKLT_SW
CRITICAL PMEG10020ELR-DFLS2100 PLACE_NEAR=LP800.2:4.7MM DP800 SOD123-COMBO
VOLTAGE=45V
PPVOUT_LCDBKLT_D
PACK_OPTION=BLC_FERRITE:NO
RP890 0 1% 1/16W TK 0402-1 116S00021
PPVOUT_LCDBKLT
VOLTAGE=45V
PPVOUT_LCDBKLT
PACK_OPTION=BLC_FERRITE:YES
PACK_OPTION=BLC_FERRITE:YES
OMIT_TABLE PLACE_NEAR=LP800.5MM CP876 12PF 5% 100V C0G 0201 131S00141
371S00077
NO_XNET_CONNECTION=1 PLACE_NEAR=DP800:2MM XWP801 SM
LCDBKLT_FB
PACK_IGNORE=TRUE PACK_OPTION=BLC_CBULK:1206
CP860 CP861 CP862 CP863 CP864 CP865 CP866 CP867 CP868 CP869 CP870 CP871 CP872 CP873 2.2UF 10% 100V X5R 1206 138S1101
PACK_OPTION=BLC_CBULK:0603
CP860 CP861 CP862 CP863 CP864 CP865 CP866 CP867 CP868 CP869 CP870 CP871 CP872 CP873 2.2UF 10% 100V X5R 0603 138S1086
CP872 CP873 CP874 CP875 CP877 CP878 CP879 CP880 CP881 CP882 CP883 CP884 2.2UF 10% 100V X5R 0603 138S1086
PP5V_S2
OMIT_TABLE RP844 0 0% 1/16W TK 0402 116S00022
OMIT_TABLE RP845 0 0% 1/16W TK 0402 116S00022
VOLTAGE=5V MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1000
PP5V_BKLT_D
VOLTAGE=5V MIN_LINE_WIDTH=0.2000 MIN_NECK_WIDTH=0.1000
PP5V_BKLT_A
OMIT_TABLE PLACE_NEAR=UP800.5:5MM CP840 1UF 10% 16V X5R 402-1 138S0614
OMIT_TABLE PLACE_NEAR=UP800.10:5MM CP841 1UF 10% 16V X5R 402-1
UP TO 22V ALLOWED ON UP800.11 WITH VDDD/VDDA AT 3V
MIN_NECK_WIDTH=0.2000 MIN_LINE_WIDTH=0.2500
BKLT_SD
UP800 CRITICAL LP8548B1SQ-04
SD OMIT_TABLE
VSENSE_N
VSENSE_P
SENSE_OUT
EN
PWM_KEYB
SCL (5K IPU VDDD)
SDA (5K IPU VDDD)
ISET_KEYB
KEYB1
KEYB2
SW2
FB2
SW SW SW FB GD VDDD VDDA
MAKE_BASE=TRUE
BLC_FET:OFF
CRITICAL QP801 SI7812DN PWRPK-1212-8 376S0678
PACK_IGNORE=TRUE BLC_FET:ON
PLACE_NEAR=LP800.2:3MM
MIN_LINE_WIDTH=0.0990 MIN_NECK_WIDTH=0.0990 GATE_NODE=TRUE DIDT=TRUE
LCDBKLT_FET_DRV_R
PLACE_NEAR=UP800.1:4MM
VOLTAGE=45V QUIET=TRUE GATE_NODE=TRUE MIN_LINE_WIDTH=0.1000 MIN_NECK_WIDTH=0.2000
PPVOUT_LCDBKLT_SW
LCDBKLT_FB
NC_LCDBKLT_FET_DRV
NC_BKLT_ISET_KEYB
NC_BKLT_KEYB1
NC_BKLT_KEYB2
NC_KBDBKLT_SW2
NC_VOUT_KEYBDLED_FB2
PACK_IGNORE=TRUE BLC_FET:ON RP833 10 1% 1/16W 0402 114S00167
BLC_FET:OFF
MAKE_BASE=TRUE
BLC_FET:ON OMIT_TABLE NO_XNET_CONNECTION=1 RP831 18.2K 1% 1/16W 0402 114S00197
PACK_IGNORE=TRUE
BLC_FET:ON RP832 150K 1% 1/16W 0402 114S00199
BLC_FET:ON NOSTUFF CP830 100PF 5% 100V C0G CERG 0603 131S0335
IF KEYBOARD BACKLIGHT NOT USED, ALIAS TO NC
IF KEYBOARD BACKLIGHT USED, CONNECT TO CSA 239
ISNS_LCDBKLT_N
ISNS_LCDBKLT_P
BL_PWR_EN
UP800.17 VIH_MIN 1.2V
VIL_MAX 0.4V
RP842 0 1/20W TK 0201 117S00073
BKLT_SENSE_OUT
BKLT_EN_R
BKLT_SCL
BKLT_SDA
RP852 1.8K 5% 1/20W TK 0201 117S00139
RP853 1.8K 5% 1/20W TK 0201 117S00139
PLACE_NEAR=UP800.15:10MM
TO DISP SIDE LED DRIVER IC ONLY
I2C_BKLT_SCL
I2C_BKLT_SDA
UP800.15 VIH_MIN 1.7V VIL_MAX 0.4V
RP850 0 1/20W TK 0201 117S00073
RP851 0 1/20W TK 0201 117S00073
UP800.16 VIH_MIN 1.7V VIL_MAX 0.4V R_ON(TYP) 11.5S OHMS R_ON(MAX) 12.8S OHMS
PLACE_NEAR=UP800.16:10MM
NOSTUFF CP842 33PF 5% 25V NPO-C0G 0201 131S0442
CKPLUS_WAIVE=LIFECYCLE_STATUS
RP840 1M 5% 1/20W TK 0201 117S00096
OMIT_TABLE RP847 10K 5% 1/20W TK 0201 117S00090
353S4160 GND_SW GND_SW GND_SW2 GNDD GNDA THRM PAD
UNUSED_LP8548_PWM
GND_BKLT_SGND
XWP800 SM 998-0313
MIN_LINE_WIDTH=0.4000 MIN_NECK_WIDTH=0.1000 VOLTAGE=0
UP800.12 VIH_MIN 1.7V VIL_MAX 0.4V

BEN IC VERSION TO MATCH VERSION OF JERRY/MINNIE IC IS ON THE PANEL

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S4160	1	IC,LP8548B1-04,DC/DC CVTR,BOOST,QFN-24	UP800		BLC_BEN_IC:V4
353S02256	1	IC,LP8548B1A-07,DC/DC BOOST CVTR,QFN24	UP800		BLC_BEN_IC:V7
353S02616	1	IC,LP8548B1A-08,DC/DC BOOST CVTR,QFN24	UP800		BLC_BEN_IC:V8

BACKLIGHT SWITCH NODE DESENSE OPTION

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
131S00141	1	CAP,C0G,12PF,5%,100V,0201	CP876		BLC_SW_NODE_DESENSE

10K IF KEYBOARD PWM INPUT IS NOT PRESENT (X941, X1536)
100K IF KEYBOARD PWM INPUT IS PRESENT (X1536)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
117S00090	1	RES,TK,10K OHM,5%,1/20W,0201	RP847		BLC_KBD_BOOST_USED:NO
118S00251	1	RES,TK,100K OHM,1%,1/20W,0201	RP847		BLC_KBD_BOOST_USED:YES

BACKLIGHT BOOST VOLTAGE LEVEL BASED ON NUMBER OF LEDS PER STRING

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
114S00197	1	RES,TK,18.2KOHM,1%,1/16W,0402	RP831		BLC_LEDS_PER_STRING:16
114S00198	1	RES,TK,28.7KOHM,1%,1/16W,0402	RP831		BLC_LEDS_PER_STRING:18

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

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
116S00022	2	RES,TK,0 OHM,2A MAX,1/16W,0402	RP844,RP845		BLC_5V_SERIES:0_OHM
114S00167	2	RES,TK,10 OHM,1%,1/16W,0402	RP844,RP845		BLC_5V_SERIES:10_OHM
138S0614	2	CAP,CER,X5R,1UF,10%,10V,0402	CP840,CP841		BLC_5V_CAP:1_UF
138S00070	2	CAP,CER,X5R,4.7UF,20%,25V,0402	CP840,CP841		BLC_5V_CAP:4P7_UF

BOM_COST_GROUP=DISPLAY

SYNC_MASTER=DisplayBacklight SYNC_DATE=09/26/2021

PAGE TITLE: BEN: CONTROLLER

Apple Inc.

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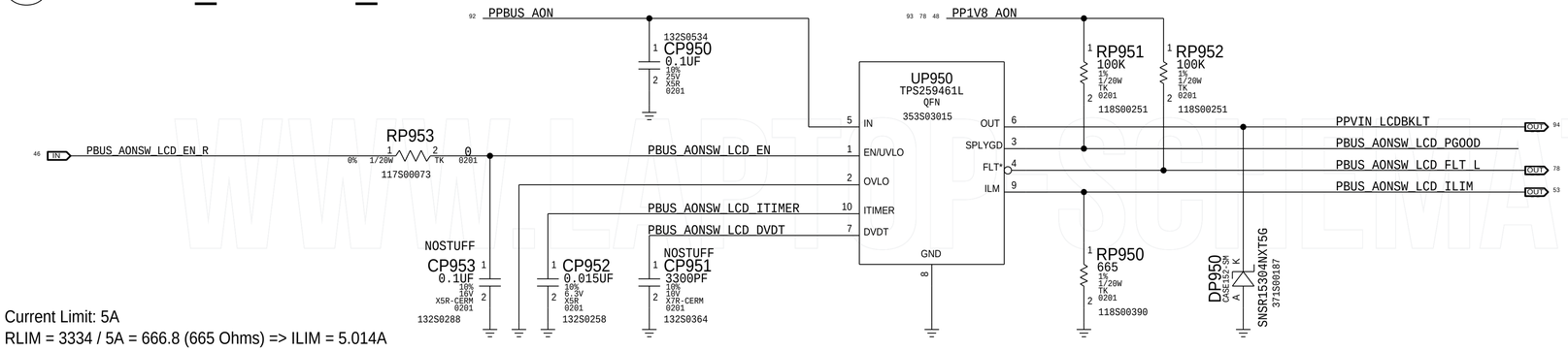
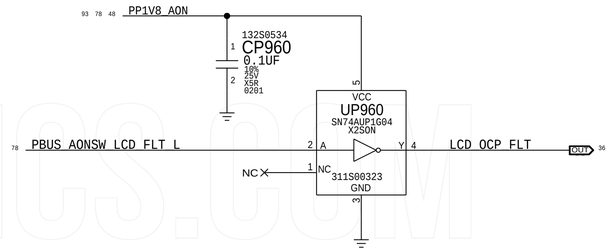
A PPBUS_AONSW_LCD Load Switch & e-Fuse



Current Limit: 5A
RLIM = 3334 / 5A = 666.8 (665 Ohms) => ILIM = 5.014A
/FLT Open Drain
Host-Controlled (EN = MPMU GPIO6, 1.8V LVCMOS (PP1V8_AON))

B LCD_OCP_FLT Control Logic



BOM_COST_GROUP=PLATFORM POWER

SYNC_MASTER=	SYNC_DATE=09/10/2021
PAGE TITLE	BEN: PBUS E-Fuse
Apple Inc.	DRAWING NUMBER 051-07020 SIZE D
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*** OK2INTEGRATE ***

A Display PMU IC

PLACE_NEAR=UR000.E1:5MM
NOTE: PLACE CAP NEAR IC

94 79 PP3V3_SW_LCD
CR006 10UF 20% X5R-CERM 0402-8 138S0979
CR007 10UF 20% X5R-CERM 0402-8 138S0979

94 79 PP3V3_SW_LCD
PLACE_NEAR=UR000.A:2MM
CR008 10UF 20% X5R-CERM 0402-8 138S0979

DEFAULT PP1V05 = 1.05V
88 PP1V05_DISP
PLACE_NEAR=LR000.1:2MM
CR011 47UF 20% CER-X5R 0603 138S00060
PMIC_SDG_VBUCK1:YES
PACK_IGNORE=TRUE
PACK_OPTION=PMIC_SDG_VBUCK1
LR000 2.2UH-20%-3.2A-0.081OHM PIFE25201T-SM 152S01602
PMIC_SDG_VBUCK1:NO
RR009 0 0% 1/20W TK 0201
117S00073

94 79 PP3V3_SW_LCD
CR012 10UF 20% X5R-CERM 0402-8 138S0979
DEFAULT PP1V8 = 1.8V
90 80 79 PP1V8_DISP
CR014 22UF 20% X5R-CERM 0603-1 138S0758
PLACE_NEAR=LR001.1:2MM
OMIT_TABLE
LR001 2.2UH-20%-1.5A-0.1600HM MAKK2016-SM 152S1648
OMIT_TABLE
RR001 0 0% 1/20W TK 0201
117S00073

OMIT_TABLE
CR009 2.2UF 20% X5R-CERM 0402 138S00030
PAVDDN_SDG_R
RR000 0 0% 1/20W TK 0201
NOSTUFF
117S00073

I2C Pull-Ups @ Larkspur
80 IN I2C_LARKSPURTOSDG_SDA
80 IN I2C_LARKSPURTOSDG_SCL
80 IN EDP_PANEL_1V8_EN
80 IN PM_VBLANK_LARKSPUR_SDG_L
INT_CAP_SDG
VSUB_SDG

INTERNAL 2M PULLUP TO 3.3V

UR000 ISL98669AEIZ CSP SANDIEGO-PMU
OMIT_TABLE
CRITICAL

E1	VIN	
E2	VID1 (IPU)	NC
E5	VID2 (IPU)	NC
B5	SDA	
C3	SCL	
B2	PWDN*	
C2	VBLANK*	
E3	DNC	
F3	VSUB	
F1	AGND	
F2	AGND	
A3	PVIN1	
A2	LX1	80 NC_P1V05_SDG_SW DIDT=TRUE
B3	VBUCK1	
A1	PGND	
A4	PVIN2	
A5	LX2	NC
B4	VBUCK2	
A6	PGND	
D1	PVIN3	
C1	LX3	90 P1V8_SDG_SW DIDT=TRUE
D2	VBUCK3	
B1	PGND	
D3	RST*	RESET_LARKSPUR_L OUT 80
E4	DCHG*	DCHG_SDGTOMONTEREY_L OUT 79 80
F5	FLT*	FAULT_SDGTOMONTEREY_L OUT 80
G4	AVDDP	90 PAVDDP_SDG_R
G5	LXP	90 PAVDDP_SDG_SW
G6	PGND	DIDT=TRUE
G1	PVIN4	
G2	LXN	90 PAVDDN_SDG_SW
G3	AVDDN	PAVDDN_SDG_R
D6	VGHB	90 PVGH_BOOST_SDG
E6	LXVGH	90 PVGH_BOOST_SDG_SW
C5	PGND	DIDT=TRUE
D5	VGH	PVGH1_SDG_R
F4	TCOMP	TEMP_COMP_MDB_SDG IN 80
C6	SWVGL1	PVGL1_SDG_SW
D4	VGL1	DIDT=TRUE PVGL1_SDG_R
F6	PGND	
B6	SWVGL2	PVGL2_SDG_SW
C4	VGL2	DIDT=TRUE PVGL2_SDG_R

PMIC WP I2C ADDRESS:0X74 (0XE8/0XE9)
PMIC I2C ADDRESS: 0X4F (0X9E/0X9F)

PP3V3_SW_LCD 79 94
RR002 4.7K 1% 1/20W TK 0201 118S00285
PP1V8_DISP 79 80 90
RR003 4.7K 1% 1/20W TK 0201 118S00285

LR002 2520 4.7UH-1.3A-0.30HM OMIT_TABLE 152S00287
PP3V3_SW_LCD 79 94
PLACE_NEAR=LR002.2:2MM
CR015 10UF 20% X5R-CERM 0402-8 138S0979

RR004 0 0% 1/16W TK 0402 116S00022
PP_AVDDP_MONTEREY 80
DEFAULT AVDDP = 4.65V
CR016 22UF 20% X5R-CERM 0603-1 138S0758
CR017 22UF 20% X5R-CERM 0603-1 138S0758

PP3V3_SW_LCD 79 94
PLACE_NEAR=LR003.2:2MM
CR019 10UF 20% X5R-CERM 0402-8 138S0979
LR003 PIFE25201T-SM 4.7UH-20%-2A-0.213OHM 152S01601
CR020 22UF 20% X5R-CERM 0603-1 138S0758
CR021 22UF 20% X5R-CERM 0603-1 138S0758

RR005 0 0% 1/16W TK 0402
PN_AVDDN_MONTEREY 80
116S00022
DEFAULT AVDDN = -4.65V
79 90
OMIT_TABLE
CR024 10UF 20% CERM-X5R 0603 138S0861
OMIT_TABLE
CR025 10UF 20% CERM-X5R 0603 138S0861

RR006 0 0% 1/20W TK 0201
117S00073
PP_VGH1_MONTEREY OUT 80
DEFAULT VGH1 = 15V
CR023 10UF 20% CERM-X5R 0603 138S0861
CR027 2.2UF 20% X5R-CERM 0402 138S00030
PVGL1_SDG_SW_C
UR001 BAT54SDWN SOT363 371S00364
LR004 2016 6.8UH-20%-1.05A-0.639OHM OMIT_TABLE 152S00332
PP3V3_SW_LCD 79 94
PLACE_NEAR=LR004.2:2MM
CR028 10UF 20% X5R-CERM 0402-8 138S0979

RR007 0 0% 1/20W TK 0201
117S00073
PN_VGL1_MONTEREY 79 80 90
DEFAULT VGL1 = -12V
CR029 10UF 20% CERM-X5R 0603 OMIT_TABLE
CR033 2.2UF 20% X5R-CERM 0402 138S00030
PVGL2_SDG_SW_C
OMIT_TABLE
RR008 4.7 5% 1/20W TK 0201
117S00062
PN_VGL2_MONTEREY 79 80 90
DEFAULT VGL2 = -12V
CR031 10UF 20% CERM-X5R 0603 138S0861 OMIT_TABLE

B BOMOPTIONs: TI vs. Intersil

Texas Instruments Option Table

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
338S00844	1	IC,TPS65157B0E2,PMU,SAN DIEGO,BGA42	UR000	SDG_TI_PROG:X2203
338S00185	1	IC,TPS65157,SAN DIEGO,A1,DSBGA42	UR000	SDG_TI_PROG:BLANK
152S00289	2	IND,4.7UH,2016,PIYA2016T-4R7MDR	LR001	SDG_TI
152S01601	1	IND,MLD,4.7UH,20%,2A,0.213OHM,2520	LR002	SDG_TI
152S00332	1	IND,6.8UH,2016,PISA20161T6R8-013	LR004	SDG_TI
138S0861	2	CAP,CER,10UF,20%,35V,X5R,0603	CR029,CR031	SDG_TI
138S0861	2	CAP,CER,10UF.20%,35V,X5R,0603	CR024,CR025	SDG_TI
138S00030	1	CAP,CER,2.2UF.20%,35V,X5R,0402	CR009	SDG_TI
117S00073	1	RES,TK,0 OHM,1A MAX,1/20W,0201	RR008	SDG_TI

Intersil Option Table

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
338S00183	1	IC,ISL98669,SAN DIEGO,A1,CSP42	UR000	SDG_ISL
152S1648	2	IND,2.2UH,2016,MAKK2016T2R2M	LR001	SDG_ISL
152S00286	1	IND,2.2UH,2520,VLS252010HBX-2R2M	LR002	SDG_ISL
152S00483	1	IND,10UH,2016,LQE2MEN00MG0	LR004	SDG_ISL
138S0709	2	CAP,CER,4.7UF.10%,35V,X5R,0603	CR029,CR031	SDG_ISL
138S0709	2	CAP,CER,4.7UF.10%,35V,X5R,0603	CR024,CR025	SDG_ISL
116S00022	1	RES,0 OHM,1A,0402	CR009	SDG_ISL
117S00062	1	RES,TK,4.7 OHM,5%,1/20W,0201	RR008	SDG_ISL
117S00073	1	RES,TK,0 OHM,1A MAX,1/20W,0201	RR001	SDG_ISL

C PN_VGL1 & PN_VGL2 Discharge Circuit

90 80 79 PN_VGL1_MONTEREY
90 80 79 PN_VGL2_MONTEREY
RR053 1K 1% 1/20W TK 0201 118S00282
RR050 1K 1% 1/20W TK 0201 118S00282
VGL1_DCHG
VGL2_DCHG
79 DCHG_SDG_VGL_R_L
DCHG_SDG_VGL2_C_L
79 DCHG_SDG_VGL_R_L
376S00003 QR051 CSD68822F4 PACK_TYPE=0402
CR050 2.2UF 10V 20% X5R 0201 138S00130
RR051 10K 1% 1/20W TK 0201 118S00283
376S00003 QR050 CSD68822F4 0402
RR052 91K 1% 1/20W TK 0201 118S00396
79 80 DCHG_SDGTOMONTEREY_L
PACK IGNORE=TRUE
PACK_OPTION=PMIC_SDG_DCHG

BOM_COST_GROUP=DISPLAY

SYNC_MASTER=DisplayPMIC	SYNC_DATE=09/10/2021
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A Power Connections Alias

75	PP1V8_DISP MAKE_BASE=TRUE	—	PP1V8_DISP	79	90
	PP1V05_DISP MAKE_BASE=TRUE	—	PP1V05_DISP	79	
75	PN_VGL1_MONTEREY MAKE_BASE=TRUE	—	PN_VGL1_MONTEREY	79	90
75	PN_VGL2_MONTEREY MAKE_BASE=TRUE	—	PN_VGL2_MONTEREY	79	90
75	PP_AVDDP_MONTEREY MAKE_BASE=TRUE	—	PP_AVDDP_MONTEREY	79	
75	PN_AVDDN_MONTEREY MAKE_BASE=TRUE	—	PN_AVDDN_MONTEREY	79	
75	PP_VGH1_MONTEREY MAKE_BASE=TRUE	—	PP_VGH1_MONTEREY	79	
	NC_P1V05_SDG_SW MAKE_BASE=TRUE	—	NC_P1V05_SDG_SW	79	

B Signal Connections Alias

75	I2C_LARKSPURTOSDG_SDA MAKE_BASE=TRUE CKPLUS_WAIVE=I2C_PULLUP	—	I2C_LARKSPURTOSDG_SDA	79	
	I2C Pull-Up @ Larkspur				
75	I2C_LARKSPURTOSDG_SCL MAKE_BASE=TRUE CKPLUS_WAIVE=I2C_PULLUP	—	I2C_LARKSPURTOSDG_SCL	79	
	I2C Pull-Up @ Larkspur				
76	EDP_PANEL_1V8_EN MAKE_BASE=TRUE	—	EDP_PANEL_1V8_EN	79	
75	PM_VBLANK_LARKSPUR_SDG_L MAKE_BASE=TRUE	—	PM_VBLANK_LARKSPUR_SDG_L	79	
75	RESET_LARKSPUR_L MAKE_BASE=TRUE	—	RESET_LARKSPUR_L	79	
75	DCHG_SDGTOMONTEREY_L MAKE_BASE=TRUE	—	DCHG_SDGTOMONTEREY_L	79	
75	FAULT_SDGTOMONTEREY_L MAKE_BASE=TRUE	—	FAULT_SDGTOMONTEREY_L	79	
75	TEMP_COMP_MDB_SDG MAKE_BASE=TRUE	—	TEMP_COMP_MDB_SDG	79	

SYNC_DATE=09/10/2021

PAGE TITLE

PMU: SAN DIEGO SUPPORT

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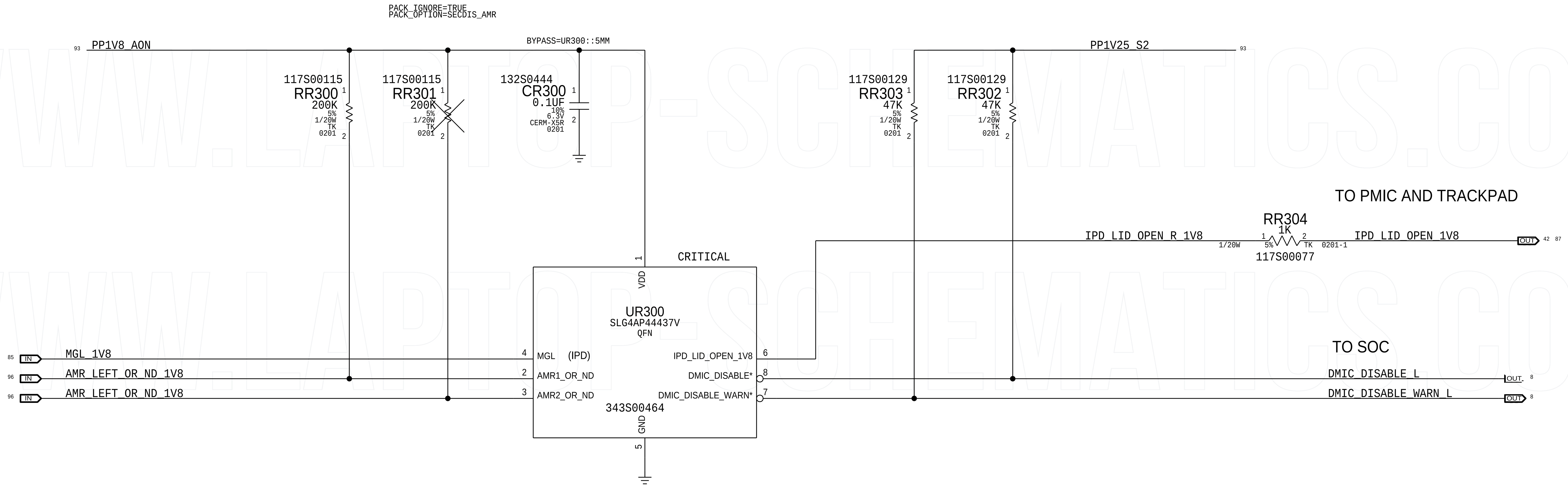
*** OK2INTEGRATE ***

LID SECDIS LOGIC



BOM_COST_GROUP=SOC

PAGE TITLE

SECDIS: SAK

Apple Inc.

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*** OK2INTEGRATE ***

AMP A

PP1V8_AWAKE
PP1V25_AWAKE_IO
PP3V8_AON
MAX CURRENT EDC = 1A (PER AMP)
PPBUS_AON_L_SPKRAMP
MAX CURRENT EDC = 4A (PER AMP)

SPKRAMP_A_DREG
CR600 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR600.E5:5MM)
CR601 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR600.F3:5MM)
CR602 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR600.C2:5MM)

CR603 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR600.C5:5MM)
CR604 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR600.C5:10MM)
CR605 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR600.C5:10MM)
CR606 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR600.D5:5MM)
CR607 10UF 20% 10V X5R-CERM 0402-7 (PLACE_NEAR=UR600.D5:10MM)

XWR600 SHORT-16L-0.1MM-SM * SEE NOTE

UR600 SN012776B0YBH DSBGA SPKRAMP_A
TAWANG B0

I2C_SPKRAMP_L_SCL	F2	SCL
I2C_SPKRAMP_L_SDA	F1	SDA
SPKRAMP_A_ADDR	D4	ADDR
TDM_SPKRAMP_L_BCLK	E1	SBCLK
TDM_SPKRAMP_L_FSYNC	D2	FSYNC
TDM_SPKRAMP_L_R2D	E2	SDIN
TDM_SPKRAMP_L_D2R	D1	SDOUT
SPKRAMP_ABC_ICC	F5	ICC
TP_SPKRAMP_A_LV_EN	D3	BYP_EN
SPKRAMP_INT_L	E3	IRQ*
SPKRAMP_RESET_L	F4	SD*
PVDD_SNS	C3	
VSNS_P	B1	
VSNS_N	A1	
BST_P	B2	
OUT_P	B3	
OUT_P	A3	
OUT_N	B5	
OUT_N	A5	
BST_N	A2	
AVDD E5, PVDD C4, PVDD C5, VBAT1S D5, IOVDD F3, DREG C2, GND E4, GND C1, PGND B4, PGND A4		

RR600 33 5% 1/20W 1K 0201 (SPKRAMP_A, PLACE_NEAR=UR600.D1:10MM, TDM_SPKRAMP_A_D2R_R)
RR601 33 5% 1/20W 1K 0201 (SPKRAMP_A, SPKRAMP_A_ICC_R, PLACE_NEAR=UR600.E5:10MM)

SPKRAMP_A_VSENSEP
SPKRAMP_A_VSENSEN
SPKRAMP_A_PVDD_SNS
SPKRAMP_A_BOOTP
SPKRAMP_A_OUTP_R
SPKRAMP_A_OUTN_R
SPKRAMP_A_BOOTN
SPKRAMP_A_OUTP
SPKRAMP_A_OUTN
* SEE NOTE

SPKRAMP_A BYPASS=UR600.B2:B3:10MM NO_XNET_CONNECTION=1
SPKRAMP_A BYPASS=UR600.A2:A5:10MM NO_XNET_CONNECTION=1

CR608 0.1UF 10% 25V X5R 0201
CR609 0.1UF 10% 25V X5R 0201

RR602 0 1% 1K 0603 1/5W
RR603 0 1% 1K 0603 1/5W

CR610 220PF 10% 25V X7R-CERM 201 NOSTUFF
CR611 220PF 10% 25V X7R-CERM 201 NOSTUFF

RR605 0 5% 1/20W TK 0201 (SPKRAMP_A_ADDR 0x70)
RR635 470 5% 1/20W TK 0201 (SPKRAMP_B_ADDR 0x72)
RR664 470 5% 1/20W TK 0201 (SPKRAMP_C_ADDR 0x74, PACK_IGNORE=TRUE)

AMP B

PP1V8_AWAKE
PP1V25_AWAKE_IO
PP3V8_AON
PPBUS_AON_L_SPKRAMP

SPKRAMP_B_DREG
CR630 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR630.E5:5MM)
CR631 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR630.F5:5MM)
CR632 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR630.C2:5MM)

CR633 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR630.C5:5MM)
CR634 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR630.C5:10MM)
CR635 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR630.C5:10MM)
CR636 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR630.D5:5MM)
CR637 10UF 20% 10V X5R-CERM 0402-7 (PLACE_NEAR=UR630.D5:10MM)

XWR601 SHORT-16L-0.1MM-SM * SEE NOTE

UR630 SN012776B0YBH DSBGA SPKRAMP_B
TAWANG B0

I2C_SPKRAMP_L_SCL	F2	SCL
I2C_SPKRAMP_L_SDA	F1	SDA
SPKRAMP_B_ADDR	D4	ADDR
TDM_SPKRAMP_L_BCLK	E1	SBCLK
TDM_SPKRAMP_L_FSYNC	D2	FSYNC
TDM_SPKRAMP_L_R2D	E2	SDIN
TDM_SPKRAMP_L_D2R	D1	SDOUT
SPKRAMP_ABC_ICC	F5	ICC
TP_SPKRAMP_B_LV_EN	D3	BYP_EN
SPKRAMP_INT_L	E3	IRQ*
SPKRAMP_RESET_L	F4	SD*
PVDD_SNS	C3	
VSNS_P	B1	
VSNS_N	A1	
BST_P	B2	
OUT_P	B3	
OUT_P	A3	
OUT_N	B5	
OUT_N	A5	
BST_N	A2	
AVDD E5, PVDD C4, PVDD C5, VBAT1S D5, IOVDD F3, DREG C2, GND E4, GND C1, PGND B4, PGND A4		

RR660 33 5% 1/20W 1K 0201 (SPKRAMP_B, PLACE_NEAR=UR630.D1:10MM, TDM_SPKRAMP_B_D2R_R)
RR661 33 5% 1/20W 1K 0201 (SPKRAMP_B, SPKRAMP_B_ICC_R, PLACE_NEAR=UR630.E5:10MM)

SPKRAMP_B_VSENSEP
SPKRAMP_B_VSENSEN
SPKRAMP_B_PVDD_SNS
SPKRAMP_B_BOOTP
SPKRAMP_B_OUTP_R
SPKRAMP_B_OUTN_R
SPKRAMP_B_BOOTN
SPKRAMP_B_OUTP
SPKRAMP_B_OUTN
* SEE NOTE

SPKRAMP_B BYPASS=UR630.B2:B3:10MM NO_XNET_CONNECTION=1
SPKRAMP_B BYPASS=UR630.A2:A5:10MM NO_XNET_CONNECTION=1

CR638 0.1UF 10% 25V X5R 0201
CR639 0.1UF 10% 25V X5R 0201

RR632 0 1% 1K 0603 1/5W
RR633 0 1% 1K 0603 1/5W

CR640 220PF 10% 25V X7R-CERM 201 NOSTUFF
CR641 220PF 10% 25V X7R-CERM 201 NOSTUFF

RR693 0 5% 1/20W TK 0201 (SPKRAMP_ABC_ICC ↔ SPKRAMP_DEF_ICC, SPKRAMP_ICC_GB)

THIS RESISTOR TIES ICC SIGNAL
BETWEEN AMPS A,B,C AND AMPS D,E,F:
0R --> GLOBAL ICC (ABCDEF)
DNE --> LOCAL ICC (ABC, DEF)

AMP C

PP1V8_AWAKE
PP1V25_AWAKE_IO
=PP3V8_AON_C_SPKRAMP
=PPBUS_AON_C_SPKRAMP

SPKRAMP_C_DREG
CR660 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR600.E5:5MM)
CR661 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR600.F5:5MM)
CR662 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR600.C2:5MM)

CR663 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR660.C5:5MM)
CR664 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR660.C5:10MM)
CR665 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR660.C5:10MM)
CR666 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR660.D5:5MM)
CR667 10UF 20% 10V X5R-CERM 0402-7 (PLACE_NEAR=UR660.D5:10MM)

XWR602 SHORT-16L-0.1MM-SM * SEE NOTE

UR660 SN012776B0YBH DSBGA SPKRAMP_C
TAWANG B0

=I2C_SPKRAMP_C_SCL	F2	SCL
=I2C_SPKRAMP_C_SDA	F1	SDA
SPKRAMP_C_ADDR	D4	ADDR
TDM_SPKRAMP_L_BCLK	E1	SBCLK
TDM_SPKRAMP_L_FSYNC	D2	FSYNC
TDM_SPKRAMP_L_R2D	E2	SDIN
=TDM_SPKRAMP_C_D2R	D1	SDOUT
SPKRAMP_ABC_ICC	F5	ICC
TP_SPKRAMP_C_LV_EN	D3	BYP_EN
SPKRAMP_INT_L	E3	IRQ*
SPKRAMP_RESET_L	F4	SD*
PVDD_SNS	C3	
VSNS_P	B1	
VSNS_N	A1	
BST_P	B2	
OUT_P	B3	
OUT_P	A3	
OUT_N	B5	
OUT_N	A5	
BST_N	A2	
AVDD E5, PVDD C4, PVDD C5, VBAT1S D5, IOVDD F3, DREG C2, GND E4, GND C1, PGND B4, PGND A4		

RR660 33 5% 1/20W 1K 0201 (SPKRAMP_C, PLACE_NEAR=UR660.D1:10MM, TDM_SPKRAMP_C_D2R_R)
RR661 33 5% 1/20W 1K 0201 (SPKRAMP_C, SPKRAMP_C_ICC_R, PLACE_NEAR=UR660.E5:10MM)

SPKRAMP_C_VSENSEP
SPKRAMP_C_VSENSEN
SPKRAMP_C_PVDD_SNS
SPKRAMP_C_BOOTP
SPKRAMP_C_OUTP_R
SPKRAMP_C_OUTN_R
SPKRAMP_C_BOOTN
SPKRAMP_C_OUTP
SPKRAMP_C_OUTN
* SEE NOTE

SPKRAMP_C BYPASS=UR660.B2:B3:10MM NO_XNET_CONNECTION=1
SPKRAMP_C BYPASS=UR660.A2:A5:10MM NO_XNET_CONNECTION=1

CR668 0.1UF 10% 25V X5R 0201
CR669 0.1UF 10% 25V X5R 0201

RR662 0 1% 1K 0603 1/5W
RR663 0 1% 1K 0603 1/5W

CR670 220PF 10% 25V X7R-CERM 201 NOSTUFF
CR671 220PF 10% 25V X7R-CERM 201 NOSTUFF

PP1V25_AWAKE_IO
NOSTUFF RR691 47K 5% 1/20W TK 0201
SPKRAMP_INT_L
SPKRAMP_RESET_L
RR692 47K 5% 1/20W TK 0201

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

BOM_COST_GROUP=AUDIO

SYNC_MASTER=SpeakerAmp
SYNC_DATE=09/10/2021
PAGE TITLE: AUDIO AMPLIFIERS (1/2)
Apple Inc.
DRAWING NUMBER: 051-07020
SIZE: D
REVISION: 6.0.0
BRANCH: evt-1
PAGE: 246 OF 801
SHEET: 82 OF 113

*** OK2INTEGRATE ***

AMP D

PP1V8_AWAKE
PP1V25_AWAKE_IO
SPKRAMP_D_DREG
CR700 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR700.E5:5MM)
CR701 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR700.F3:5MM)
CR702 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR700.C2:5MM)

UR700
SN012776B0YBH
DSBGA
TAWANG B0
SPKRAMP_D

C2	DREG	
F2	SCL	I2C_SPKRAMP_R_CODEC_SCL
F1	SDA	I2C_SPKRAMP_R_CODEC_SDA
D4	ADDR	SPKRAMP_D_ADDR
E1	SBCLK	TDM_SPKRAMP_R_BCLK
D2	FSYNC	TDM_SPKRAMP_R_FSYNC
E2	SDIN	TDM_SPKRAMP_R_R2D
D1	SDOUT	TDM_SPKRAMP_R_D2R
F5	ICC	SPKRAMP_DEF_ICC_R
D3	BYP_EN	TP_SPKRAMP_D_LV_EN
E3	IRQ*	SPKRAMP_INT_L
F4	SD*	SPKRAMP_RESET_L
C3	PVDD_SNS	SPKRAMP_D_PVDD_SNS
B1	VSNS_P	SPKRAMP_D_VSENSEP
A1	VSNS_N	SPKRAMP_D_VSENSEN
B2	BST_P	SPKRAMP_D_BOOTP
B3	OUT_P	SPKRAMP_D_OUTP_R
A3	OUT_P	
B5	OUT_N	SPKRAMP_D_OUTN_R
A5	OUT_N	
A2	BST_N	SPKRAMP_D_BOOTN
E5	AVDD	
C4	PVDD	
C5	PVDD	
D5	VBAT1S	
F3	IOVDD	
E4	GND	
C1	GND	
B4	PGND	
A4	PGND	

* SEE NOTE

SPKRAMP_D_BOOTP: CR708 0.1UF 10% 25V X5R 0201 (MIN_LINE_WIDTH=0.1000)
SPKRAMP_D_OUTP_R: MIN_LINE_WIDTH=0.2000, MIN_NECK_WIDTH=0.1000, SWITCH_NODE=TRUE
SPKRAMP_D_OUTN_R: MIN_LINE_WIDTH=0.2000, MIN_NECK_WIDTH=0.1000, SWITCH_NODE=TRUE
SPKRAMP_D_BOOTN: CR709 0.1UF 10% 25V X5R 0201 (MIN_LINE_WIDTH=0.1000)
SPKRAMP_D BYPASS=UR700.B2:B3:10MM NO_XNET_CONNECTION=1
SPKRAMP_D BYPASS=UR700.A2:A5:10MM NO_XNET_CONNECTION=1

RR700 33 5% 1/20W TK 0201 (SPKRAMP_D, PLACE_NEAR=UR700.D1:10MM, TDM_SPKRAMP_D_D2R_R)
RR701 33 5% 1/20W TK 0201 (SPKRAMP_D, PLACE_NEAR=UR700.F5:10MM, SPKRAMP_D_ICC_R)

CR703 0.1UF 10% 25V X5R 0201 (SPKRAMP_D PLACE_NEAR=UR700.C5:5MM)
CR704 10UF 20% 25V X5R-CERM 0603 (SPKRAMP_D PLACE_NEAR=UR700.C5:10MM)
CR705 10UF 20% 25V X5R-CERM 0603 (SPKRAMP_D PLACE_NEAR=UR700.C5:10MM)
CR706 0.1UF 10% 25V X5R 0201 (SPKRAMP_D PLACE_NEAR=UR700.D5:5MM)
CR707 10UF 20% 10V X5R-CERM 0402-7 (SPKRAMP_D PLACE_NEAR=UR700.D5:10MM)

PP3V8_AON — MAX CURRENT EDC = 1A (PER AMP)
PPBUS_AON_R_SPKRAMP — MAX CURRENT EDC = 4A (PER AMP)
XWR700 SHORT-16L-0.1MM-SM * SEE NOTE

RR702 0 1% 1K 0603 1/5W (MIN_NECK_WIDTH=0.1000, MIN_LINE_WIDTH=0.2000, SWITCH_NODE=TRUE) → SPKRAMP_D_OUTP * SEE NOTE
RR703 0 1% 1K 0603 1/5W (MIN_NECK_WIDTH=0.1000, MIN_LINE_WIDTH=0.2000, SWITCH_NODE=TRUE) → SPKRAMP_D_OUTN * SEE NOTE

CR710 220PF 10% 25V X7R-CERM 201 NOSTUFF
CR711 220PF 10% 25V X7R-CERM 201 NOSTUFF

PP1V8_AWAKE
RR705 2.2K 5% 1/20W TK 0201 (SPKRAMP_D_ADDR 0X76)
RR734 2.2K 5% 1/20W TK 0201 (SPKRAMP_E_ADDR 0X78)
RR765 10K 1% 1/20W MF 201 (SPKRAMP_F_ADDR 0X7A, PACK_IGNORE=TRUE)

SPKRAMP_DEF_ICC
RR706 0 0% 1/20W TK 0201 → SPKRAMP_DEF_ICC_R
RR707 0 0% 1/20W TK 0201 NOSTUFF

RR706 TO REDUCE STUB LENGTH FOR LOCAL ICC OPERATION. RR707 PROVIDES THE OPTION TO GND FLOATING SPKRAMP_DEF_ICC TRACE

AMP E

PP1V8_AWAKE
PP1V25_AWAKE_IO
SPKRAMP_E_DREG
CR730 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR730.E5:5MM)
CR731 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR730.F3:5MM)
CR732 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR730.C2:5MM)

UR730
SN012776B0YBH
DSBGA
TAWANG B0
SPKRAMP_E

C2	DREG	
F2	SCL	I2C_SPKRAMP_R_CODEC_SCL
F1	SDA	I2C_SPKRAMP_R_CODEC_SDA
D4	ADDR	SPKRAMP_E_ADDR
E1	SBCLK	TDM_SPKRAMP_R_BCLK
D2	FSYNC	TDM_SPKRAMP_R_FSYNC
E2	SDIN	TDM_SPKRAMP_R_R2D
D1	SDOUT	TDM_SPKRAMP_R_D2R
F5	ICC	SPKRAMP_DEF_ICC_R
D3	BYP_EN	TP_SPKRAMP_E_LV_EN
E3	IRQ*	SPKRAMP_INT_L
F4	SD*	SPKRAMP_RESET_L
C3	PVDD_SNS	SPKRAMP_E_PVDD_SNS
B1	VSNS_P	SPKRAMP_E_VSENSEP
A1	VSNS_N	SPKRAMP_E_VSENSEN
B2	BST_P	SPKRAMP_E_BOOTP
B3	OUT_P	SPKRAMP_E_OUTP_R
A3	OUT_P	
B5	OUT_N	SPKRAMP_E_OUTN_R
A5	OUT_N	
A2	BST_N	SPKRAMP_E_BOOTN
E5	AVDD	
C4	PVDD	
C5	PVDD	
D5	VBAT1S	
F3	IOVDD	
E4	GND	
C1	GND	
B4	PGND	
A4	PGND	

* SEE NOTE

SPKRAMP_E_BOOTP: CR738 0.1UF 10% 25V X5R 0201 (MIN_LINE_WIDTH=0.1000)
SPKRAMP_E_OUTP_R: MIN_LINE_WIDTH=0.2000, MIN_NECK_WIDTH=0.1000, SWITCH_NODE=TRUE
SPKRAMP_E_OUTN_R: MIN_LINE_WIDTH=0.2000, MIN_NECK_WIDTH=0.1000, SWITCH_NODE=TRUE
SPKRAMP_E_BOOTN: CR739 0.1UF 10% 25V X5R 0201 (MIN_LINE_WIDTH=0.1000)
SPKRAMP_E BYPASS=UR730.B2:B3:10MM NO_XNET_CONNECTION=1
SPKRAMP_E BYPASS=UR730.A2:A5:10MM NO_XNET_CONNECTION=1

RR730 33 5% 1/20W TK 0201 (SPKRAMP_E, PLACE_NEAR=UR730.D1:10MM, TDM_SPKRAMP_E_D2R_R)
RR731 33 5% 1/20W TK 0201 (SPKRAMP_E, PLACE_NEAR=UR730.F5:10MM, SPKRAMP_E_ICC_R)

CR733 0.1UF 10% 25V X5R 0201 (SPKRAMP_E PLACE_NEAR=UR730.C5:5MM)
CR734 10UF 20% 25V X5R-CERM 0603 (SPKRAMP_E PLACE_NEAR=UR730.C5:10MM)
CR735 10UF 20% 25V X5R-CERM 0603 (SPKRAMP_E PLACE_NEAR=UR730.C5:10MM)
CR736 0.1UF 10% 25V X5R 0201 (SPKRAMP_E PLACE_NEAR=UR730.D5:5MM)
CR737 10UF 20% 10V X5R-CERM 0402-7 (SPKRAMP_E PLACE_NEAR=UR730.D5:10MM)

PP3V8_AON
PPBUS_AON_R_SPKRAMP
XWR701 SHORT-16L-0.1MM-SM * SEE NOTE

RR732 0 1% 1K 0603 1/5W (MIN_NECK_WIDTH=0.1000, MIN_LINE_WIDTH=0.2000, SWITCH_NODE=TRUE) → SPKRAMP_E_OUTP * SEE NOTE
RR733 0 1% 1K 0603 1/5W (MIN_NECK_WIDTH=0.1000, MIN_LINE_WIDTH=0.2000, SWITCH_NODE=TRUE) → SPKRAMP_E_OUTN * SEE NOTE

CR740 220PF 10% 25V X7R-CERM 201 NOSTUFF
CR741 220PF 10% 25V X7R-CERM 201 NOSTUFF

AMP F

PP1V8_AWAKE
PP1V25_AWAKE_IO
SPKRAMP_F_DREG
CR760 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR760.E5:5MM)
CR761 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR760.F3:5MM)
CR762 1.0UF 20% 6.3V X5R 0201-1 (PLACE_NEAR=UR760.C2:5MM)

UR760
SN012776B0YBH
DSBGA
TAWANG B0
SPKRAMP_F

C2	DREG	
F2	SCL	=I2C_SPKRAMP_F_SCL
F1	SDA	=I2C_SPKRAMP_F_SDA
D4	ADDR	SPKRAMP_F_ADDR
E1	SBCLK	TDM_SPKRAMP_R_BCLK
D2	FSYNC	TDM_SPKRAMP_R_FSYNC
E2	SDIN	TDM_SPKRAMP_R_R2D
D1	SDOUT	=TDM_SPKRAMP_F_D2R
F5	ICC	SPKRAMP_DEF_ICC_R
D3	BYP_EN	TP_SPKRAMP_F_LV_EN
E3	IRQ*	SPKRAMP_INT_L
F4	SD*	SPKRAMP_RESET_L
C3	PVDD_SNS	=PP3V8_AON_F_SPKRAMP
B1	VSNS_P	=PPBUS_AON_F_SPKRAMP
A1	VSNS_N	SPKRAMP_F_VSENSEN
B2	BST_P	SPKRAMP_F_BOOTP
B3	OUT_P	SPKRAMP_F_OUTP_R
A3	OUT_P	
B5	OUT_N	SPKRAMP_F_OUTN_R
A5	OUT_N	
A2	BST_N	SPKRAMP_F_BOOTN
E5	AVDD	
C4	PVDD	
C5	PVDD	
D5	VBAT1S	
F3	IOVDD	
E4	GND	
C1	GND	
B4	PGND	
A4	PGND	

* SEE NOTE

SPKRAMP_F_BOOTP: CR768 0.1UF 10% 25V X5R 0201 (MIN_LINE_WIDTH=0.0990)
SPKRAMP_F_OUTP_R: MIN_LINE_WIDTH=0.1990, MIN_NECK_WIDTH=0.0990, SWITCH_NODE=TRUE
SPKRAMP_F_OUTN_R: MIN_LINE_WIDTH=0.1990, MIN_NECK_WIDTH=0.0990, SWITCH_NODE=TRUE
SPKRAMP_F_BOOTN: CR769 0.1UF 10% 25V X5R 0201 (MIN_LINE_WIDTH=0.0990)
SPKRAMP_F BYPASS=UR760.B2:B3:10MM NO_XNET_CONNECTION=1
SPKRAMP_F BYPASS=UR760.A2:A5:10MM NO_XNET_CONNECTION=1

RR760 33 5% 1/20W TK 0201 (SPKRAMP_F, PLACE_NEAR=UR760.D1:10MM, TDM_SPKRAMP_F_D2R_R)
RR761 33 5% 1/20W TK 0201 (SPKRAMP_F, PLACE_NEAR=UR760.F5:10MM, SPKRAMP_F_ICC_R)

CR763 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR760.C5:5MM)
CR764 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR760.C5:10MM)
CR765 10UF 20% 25V X5R-CERM 0603 (PLACE_NEAR=UR760.C5:10MM)
CR766 0.1UF 10% 25V X5R 0201 (PLACE_NEAR=UR760.D5:5MM)
CR767 10UF 20% 10V X5R-CERM 0402-7 (PLACE_NEAR=UR760.D5:10MM)

=PP3V8_AON_F_SPKRAMP
=PPBUS_AON_F_SPKRAMP
XWR702 SHORT-16L-0.1MM-SM * SEE NOTE

RR762 0 1% 1K 0603 1/5W (MIN_NECK_WIDTH=0.0990, MIN_LINE_WIDTH=0.1990, SWITCH_NODE=TRUE) → SPKRAMP_F_OUTP * SEE NOTE
RR763 0 1% 1K 0603 1/5W (MIN_NECK_WIDTH=0.0990, MIN_LINE_WIDTH=0.1990, SWITCH_NODE=TRUE) → SPKRAMP_F_OUTN * SEE NOTE

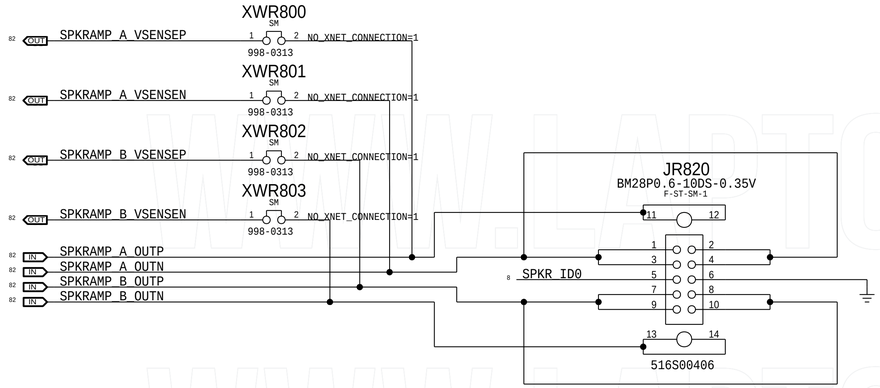
CR770 220PF 10% 25V X7R-CERM 201 NOSTUFF
CR771 220PF 10% 25V X7R-CERM 201 NOSTUFF

BOM_COST_GROUP=AUDIO

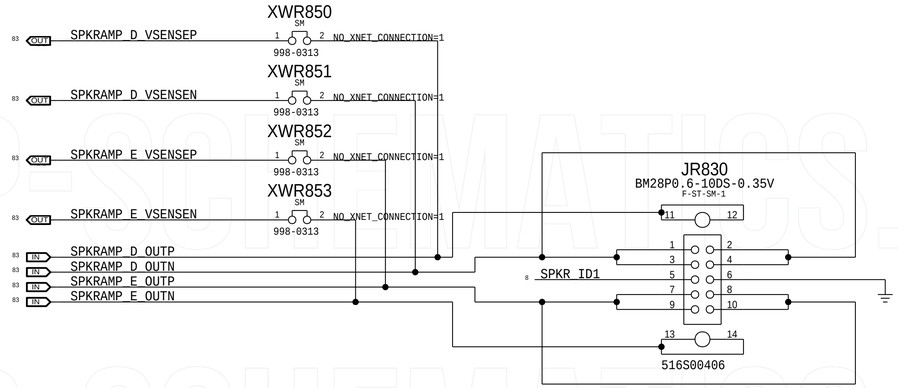
NOTES:
- SEE TEST POINTS SIGNALS AND LOCATIONS ON REF DESIGN PAGE 1.
- VSENSEP/N SIGNALS CONNECT TO OUTP/N SIGNALS AT THE SPEAKER CONNECTOR PINS.
- PVDD_SNS XW SHOULD BE LOCATED BY MAIN PBUS SHAPE.
- THE FOLLOWING SIGNALS SHOULD HAVE A VERY LOW DCR PATH:
  - SPKRAMP_XX_OUTP/N_R
  - SPKRAMP_XX_OUTP/N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

SYNC_MASTER=SpeakerAmp
SYNC_DATE=09/10/2021
PAGE TITLE: AUDIO AMPLIFIERS (2/2)
Apple Inc.
DRAWING NUMBER: 051-07020
SIZE: D
REVISION: 6.0.0
BRANCH: evt-1
PAGE: 247 OF 801
SHEET: 83 OF 113

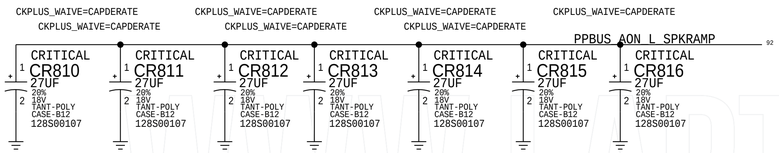
A LEFT SPEAKER CONNECTOR



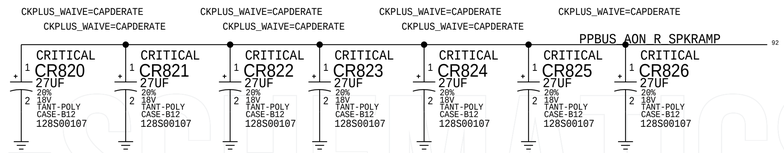
B RIGHT SPEAKER CONNECTOR



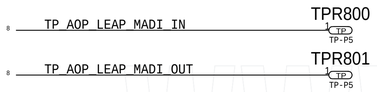
C LEFT SPEAKER AMP BULK CAP



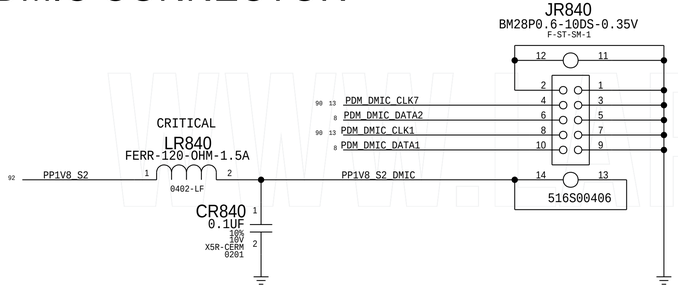
D RIGHT SPEAKER AMP BULK CAP



E MADI TEST POINT



F DMIC CONNECTOR



BOM_COST_GROUP=AUDIO

DESIGN: T651/MLB
LAST CHANGE: Fri Oct 11 18:06:02 2019

PAGE TITLE
Audio Connectors

Apple Inc.

DRAWING NUMBER 051-07020
SIZE D
REVISION 6.0.0
BRANCH evt-1
PAGE 248 OF 801
SHEET 84 OF 113

A KBD B2B CONNECTOR

516S00270
JT201
20758-056E-02
M-ST-SM

85	PP5V_S2_KBDLED_F	57	PWR	58	PP5V_S2_KBDLED_F	85	
		1	SIGNAL	2			
87	PP3V3_S2SW_IPD_F	3		4	PP1V2_S2_IPD_F	85	
85	PP1V8_AON_IPD_F	5		6	PP1V25_AWAKE_IO_F	85	
85	PP1V8_S2_IPD_F	7		8	PMU_RSLOC_RST_L	42 43 44 85 88	
85	PP3V3_AON_IPD_F	9		10	KBD_INT_L	87	
		11		12			
101	SOC_KBD_BKLT_PWM	13		14	TOUCHID_INT	8	
CKPLUS_WAIVE=I2C_PULLUP 87	I2C_KBD_SCL	15		16	TOUCHID_PWR_EN	8	
		17		18			
CKPLUS_WAIVE=I2C_PULLUP 87	I2C_KBD_SDA	19		20	PMU_ONOFF_L	42 43 88	
81	MGL_1V8	21		22	I2C_SPKRAMP_R_CODEC_SDA	49	CKPLUS_WAIVE=I2C_PULLUP
		23		24			
8	SPI_LAS_CS_L	25		26	I2C_SPKRAMP_R_CODEC_SCL	49	CKPLUS_WAIVE=I2C_PULLUP
96	AMR_LEFT_OR_ND_1V8	27		28	CODEC_RESET_L	8	
8	CODEC_INT_L	29		30	PP1V8_AWAKE_F	85	
42	CODEC_WAKE_L	31		32	PP1V8_AWAKE_F	85	
		33		34	PP1V8_AWAKE_F	85	
		35		36			
		37		38			
12	SPI_AOP_SENSORS_MOSI	39		40	SPI_TOUCHID_MOSI	12	
8	SPI_AOP_SENSORS_MISO	41		42	SPI_TOUCHID_MISO	9	
		43		44			
12	SPI_AOP_SENSORS_CLK	45		46	SPI_TOUCHID_CLK	12	
		47		48			
		49		50			
12	TDM_CODEC_FSYNC	51		52	TDM_CODEC_R2D	12	
90 12	TDM_CODEC_BCLK	53		54	TDM_CODEC_D2R	9	
		55		56			
			PWR				
85	PP3V8_AON_IPD_F	59		60	PP3V8_AON_IPD_F	85	
			GND				
		61		62			
		63		64			
		65		66			
		67		68			
		69		70			
		71		72			
		73		74			
		75		76			
		77		78			
		79		80			
		81		82			
		83		84			

KBD Flex Receptacle APN 516S00457

B KBD PWR FILTER

CRITICAL
LT204
FERR-120-OHM-1.5A
85 PP3V3_AON_IPD_F — 2 — 1 — PP3V3_AON 94
0402-LF
155S0302
CT204 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT202
FERR-120-OHM-1.5A
85 PP5V_S2_KBDLED_F — 2 — 1 — PP5V_S2_KBDLED 94
0402-LF
155S0302
CT202 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT205
FERR-120-OHM-1.5A
85 PP1V8_S2_IPD_F — 2 — 1 — PP1V8_S2 92
0402-LF
155S0302
CT205 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT203
FERR-120-OHM-1.5A
85 PP3V8_AON_IPD_F — 2 — 1 — PP3V8_AON 92
0402-LF
155S0302
CT203 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT200
FERR-120-OHM-1.5A
85 PP1V8_AON_IPD_F — 2 — 1 — PP1V8_AON 48 93
0402-LF
155S0302
CT200 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT201
FERR-120-OHM-1.5A
85 PP1V2_S2_IPD_F — 2 — 1 — PP1V25_S2 93
0402-LF
155S0302
CT201 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT206
FERR-120-OHM-1.5A
85 PP1V8_AWAKE_F — 2 — 1 — PP1V8_AWAKE 93
0402-LF
155S0302
CT206 0.1UF 10% 10V X5R-CERM 0201 132S0320

CRITICAL
LT207
FERR-120-OHM-1.5A
85 PP1V25_AWAKE_IO_F — 2 — 1 — PP1V25_AWAKE_IO 93
0402-LF
155S0302
CT207 0.1UF 10% 10V X5R-CERM 0201 132S0320

C Keyboard Control

PMU_RSLOC_RST_L 42 43 44 85 88

CT210 100PF 5% 25V C0G 0201 131S0805

BOM_COST_GROUP=KEYBOARD

SYNC_MASTER: SYNC_DATE=09/10/2021

PAGE TITLE: Keyboard Connector

Apple Inc.

DRAWING NUMBER: 051-07020 SIZE: D
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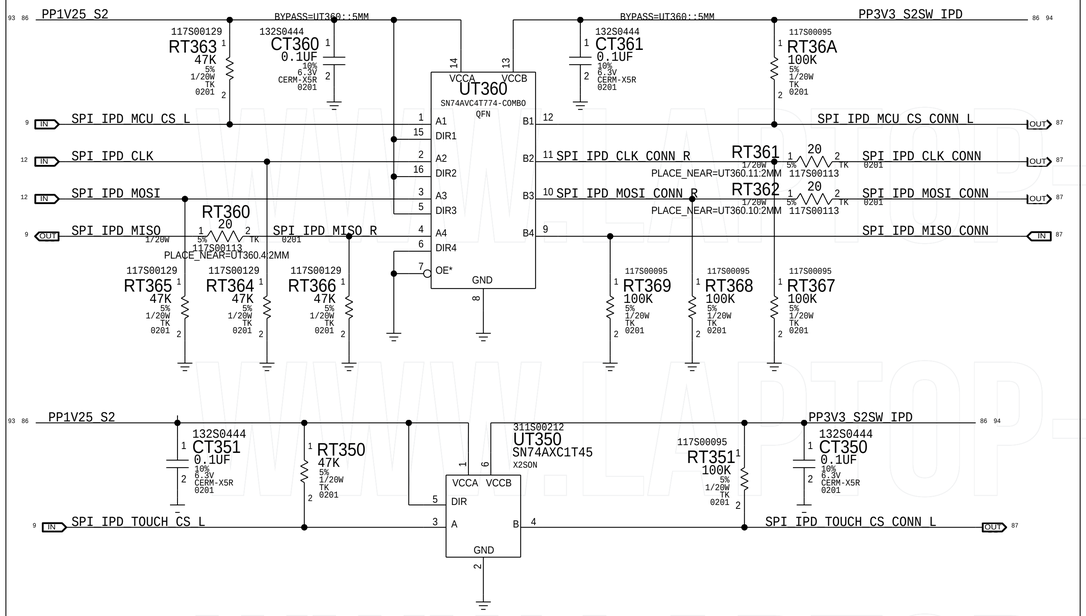
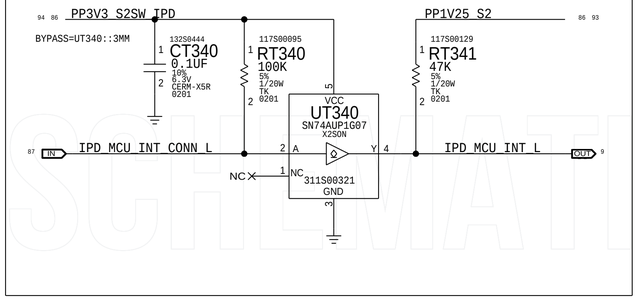
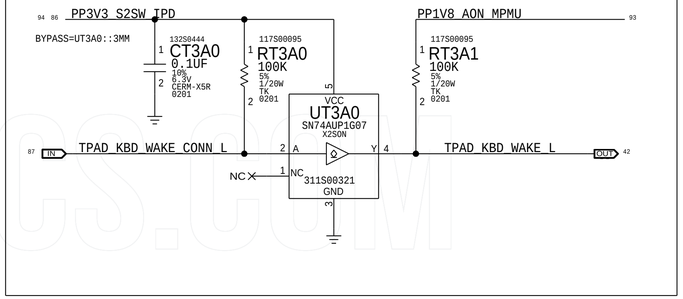
A Trackpad SPI Bus Level Shifter



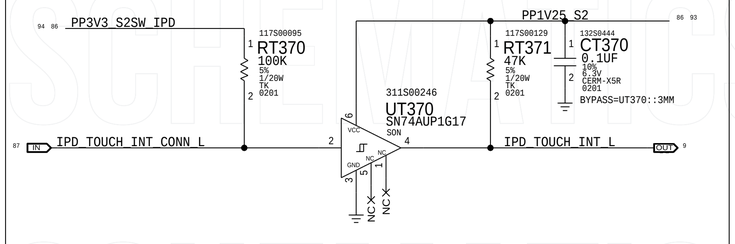
B Trackpad MCU_INT_L LS



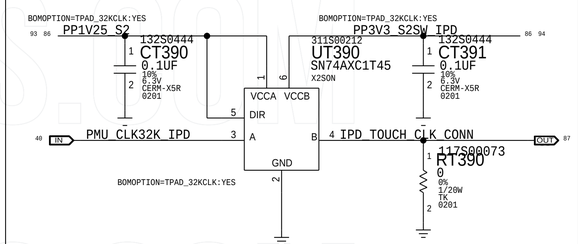
C Trackpad WAKE_L LS



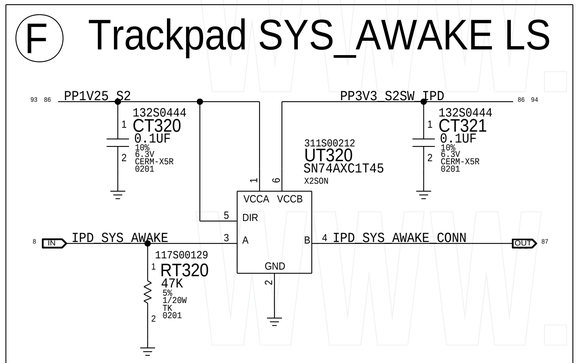
D Trackpad TOUCH_INT_L LS



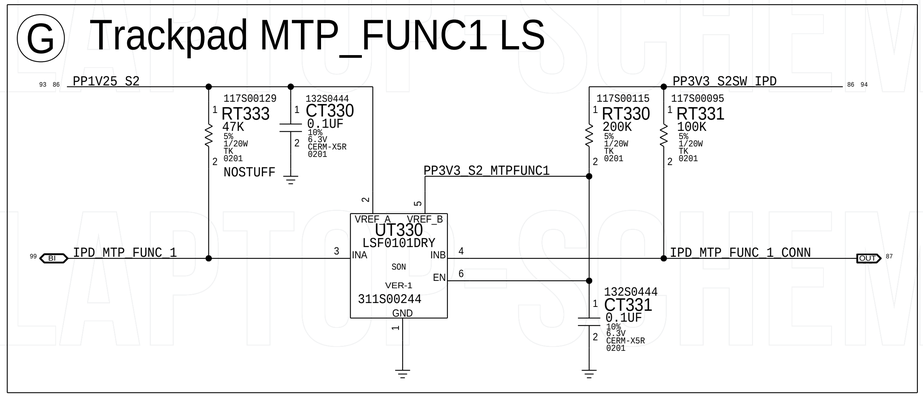
E Trackpad 32kHz Clock LS



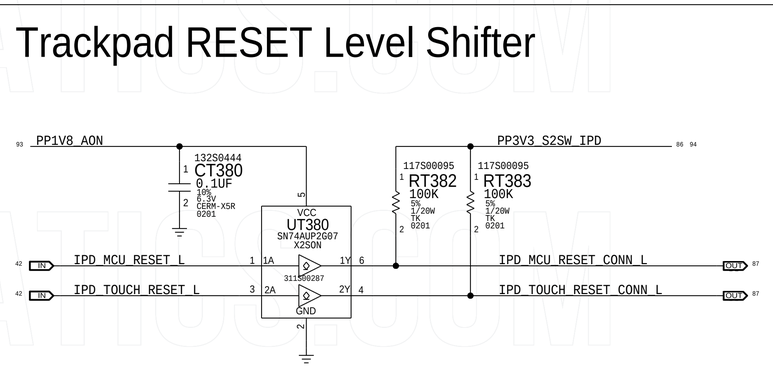
F Trackpad SYS_AWAKE LS



G Trackpad MTP_FUNC1 LS

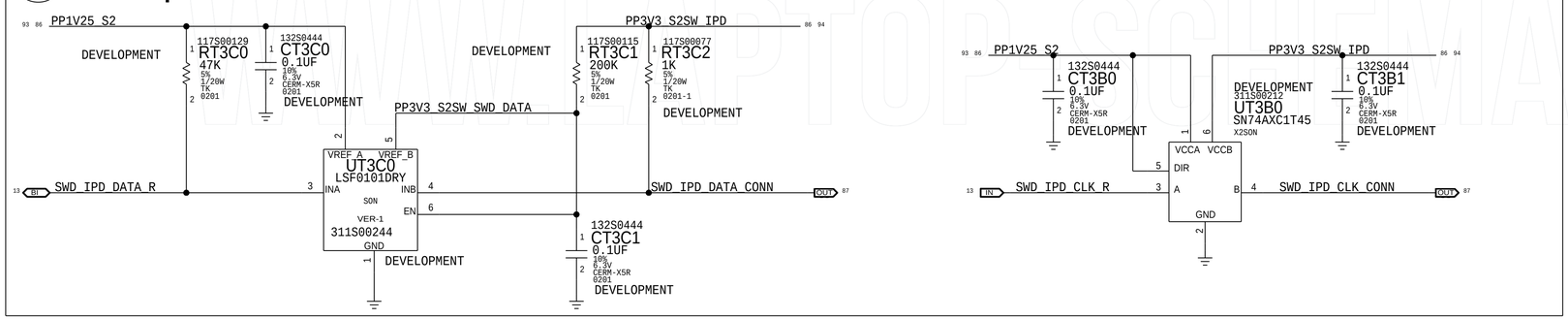


H Trackpad RESET Level Shifter



See Trackpad IPD design for RESET Pull-Up Info.

I Trackpad SWD Level Shifter



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SYNC_MASTER=	SYNC_DATE=09/16/2021
PAGE TITLE	Trackpad Support
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	REVISION 6.0.0
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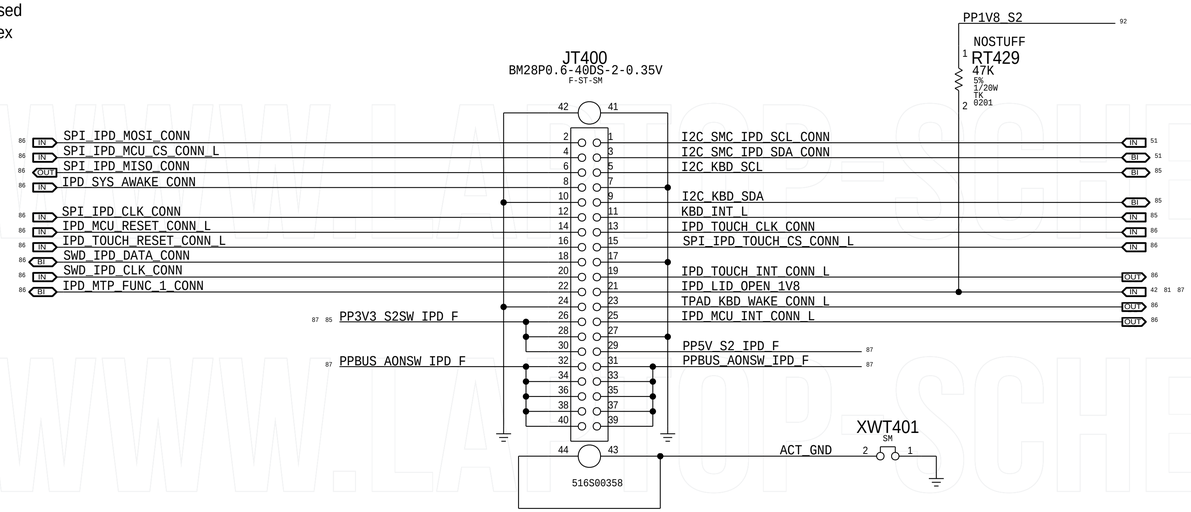
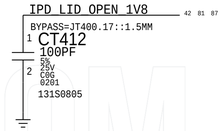
A Trackpad Connector

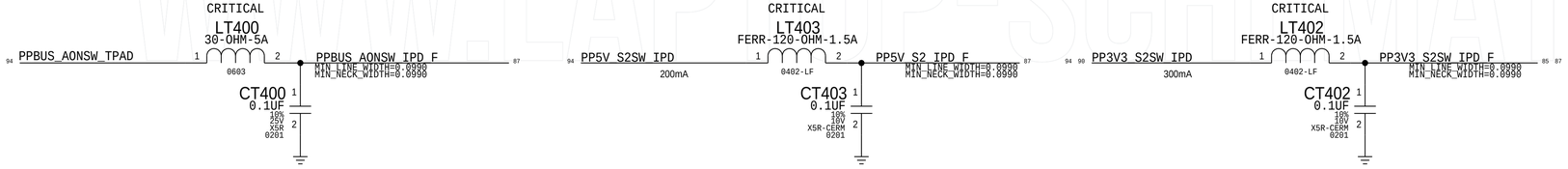
Bottom side contacts used
Pinout reversed from flex



C Trackpad Control



B Trackpad Power Supply Filters



BOM_COST_GROUP=TRACKPAD

SYNC_MASTER=
SYNC_DATE=09/10/2021

PAGE TITLE: Trackpad Connector

Apple Inc.

DRAWING NUMBER	051-07020
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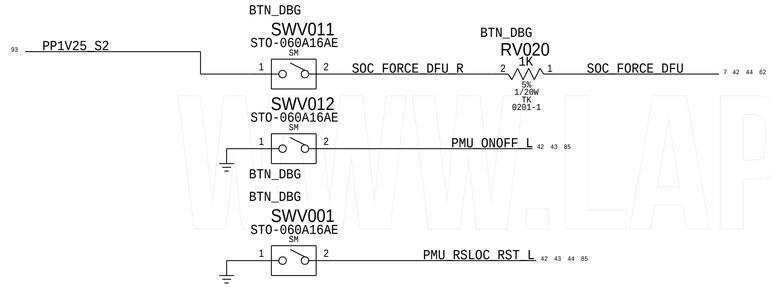
A Debug Push-Buttons



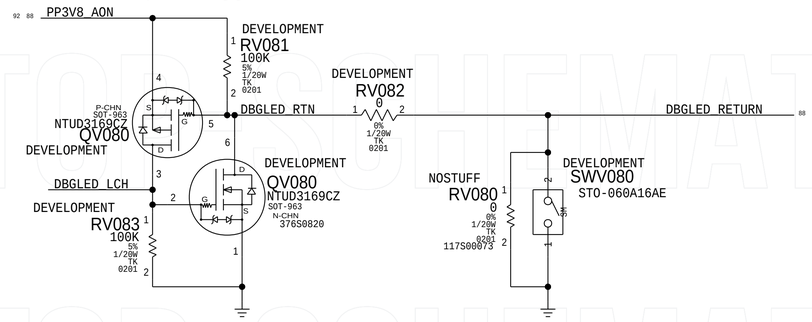
B Debug LED Control

Debug LED Latch

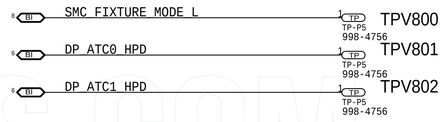
Press button once to engage.

Remove power to disengage.

Debug LED Enable

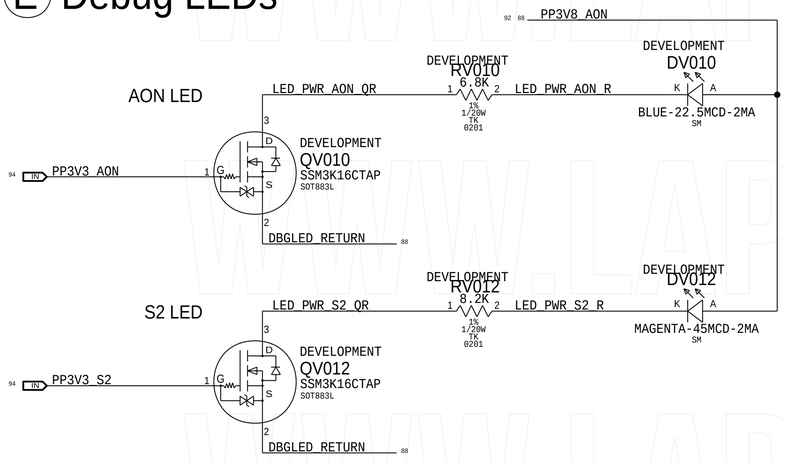


D Debug Test Points



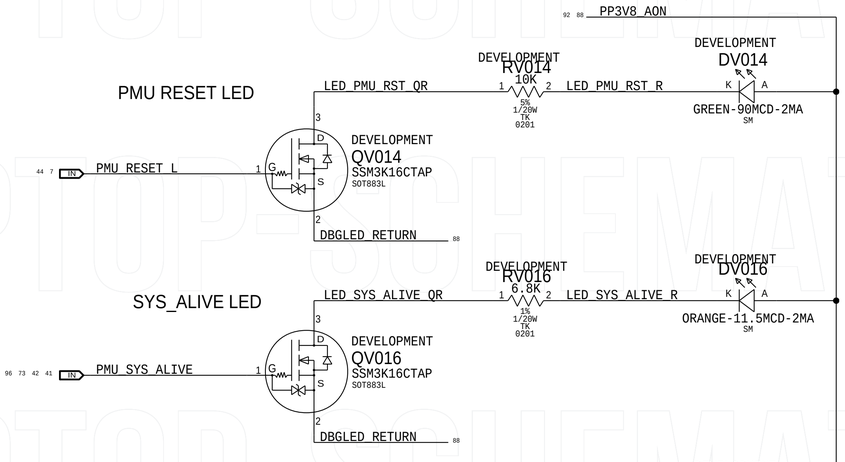
E Debug LEDs

AON LED



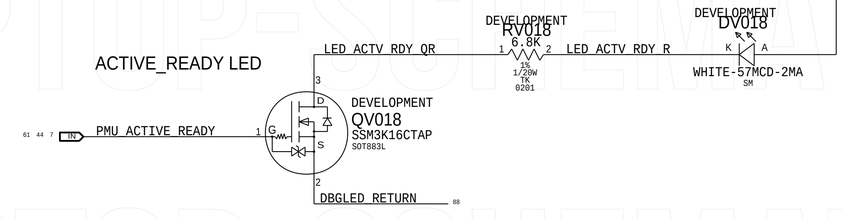
S2 LED

PMU RESET LED

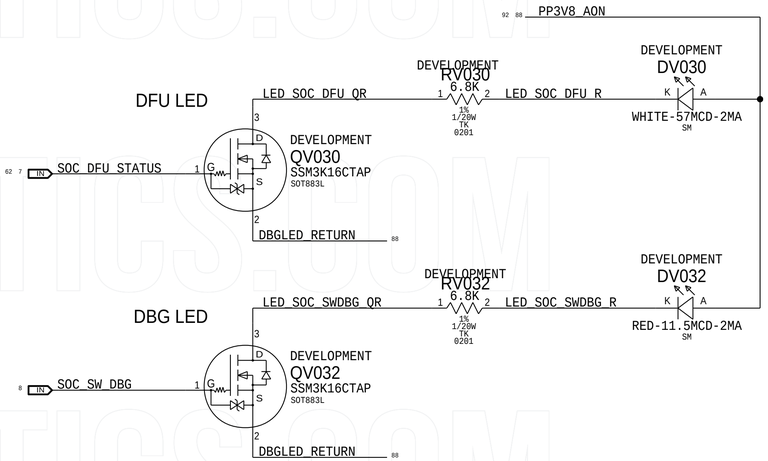


SYS_ALIVE LED

ACTIVE_READY LED



DFU LED



DBG LED

BOM_COST_GROUP=DEBUG

SYNC_MASTER=jawebb	SYNC_DATE=09/28/2021
PAGE TITLE	DEBUG
Apple Inc.	DRAWING NUMBER 051-07020 · SIZE D
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A ICEMAN Desense

92 PP3V8_AON

131S0852 CW100 12PF 5% 25V CERM 0201 — 131S00093 CW101 3PF +/-0.1PF 25V C0G 0201
131S0852 CW102 12PF 5% 25V CERM 0201 — 131S00093 CW103 3PF +/-0.1PF 25V C0G 0201
131S0852 CW104 12PF 5% 25V CERM 0201 — 131S00093 CW105 3PF +/-0.1PF 25V C0G 0201
131S0852 CW106 12PF 5% 25V CERM 0201 — 131S00093 CW107 3PF +/-0.1PF 25V C0G 0201
131S0852 CW108 12PF 5% 25V CERM 0201 — 131S00093 CW109 3PF +/-0.1PF 25V C0G 0201
131S0852 CW116 12PF 5% 25V CERM 0201 — 131S00093 CW10B 3PF +/-0.1PF 25V C0G 0201
131S0852 CW10C 12PF 5% 25V CERM 0201 — 131S00093 CW10D 3PF +/-0.1PF 25V C0G 0201
131S0852 CW10E 12PF 5% 25V CERM 0201 — 131S00093 CW10F 3PF +/-0.1PF 25V C0G 0201
131S0852 CW11A 12PF 5% 25V CERM 0201 — 131S00093 CW11B 3PF +/-0.1PF 25V C0G 0201
131S0852 CW11E 12PF 5% 25V CERM 0201 — 131S00093 CW11F 3PF +/-0.1PF 25V C0G 0201
131S0852 CW122 12PF 5% 25V CERM 0201 — 131S00093 CW123 3PF +/-0.1PF 25V C0G 0201
131S0852 CW124 12PF 5% 25V CERM 0201 — 131S00093 CW125 3PF +/-0.1PF 25V C0G 0201
131S0852 CW1E8 12PF 5% 25V CERM 0201 — 131S0852 CW1E9 12PF 5% 25V CERM 0201
131S0852 CW1EA 12PF 5% 25V CERM 0201 — 131S0852 CW1EB 12PF 5% 25V CERM 0201
131S0852 CW1EC 12PF 5% 25V CERM 0201 — 131S0852 CW1ED 12PF 5% 25V CERM 0201
131S0852 CW11C 12PF 5% 25V CERM 0201

92 PPBUS_AON

131S0852 CW136 12PF 5% 25V CERM 0201 — 131S00093 CW137 3PF +/-0.1PF 25V C0G 0201
131S0852 CW138 12PF 5% 25V CERM 0201 — 131S00093 CW139 3PF +/-0.1PF 25V C0G 0201
131S0852 CW13A 12PF 5% 25V CERM 0201 — 131S00093 CW13B 3PF +/-0.1PF 25V C0G 0201
131S0852 CW13C 12PF 5% 25V CERM 0201 — 131S00093 CW13D 3PF +/-0.1PF 25V C0G 0201
131S0852 CW13E 12PF 5% 25V CERM 0201 — 131S00093 CW13F 3PF +/-0.1PF 25V C0G 0201
131S0852 CW117 12PF 5% 25V CERM 0201
131S0852 CW118 12PF 5% 25V CERM 0201
131S0852 CW119 12PF 5% 25V CERM 0201

31 P3V8AON_VSW1

131S0852 CW162 12PF 5% 25V CERM 0201 — 131S00093 CW163 3PF +/-0.1PF 25V C0G 0201

31 PP3V8AON_PH1

131S0852 CW164 12PF 5% 25V CERM 0201

31 PP3V8AON_PH2

131S00093 CW16B 3PF +/-0.1PF 25V C0G 0201 — 131S0852 CW16C 12PF 5% 25V CERM 0201

31 PP3V8AON_PH3

131S0852 CW17C 12PF 5% 25V CERM 0201 — 131S00093 CW17D 3PF +/-0.1PF 25V C0G 0201 — 131S0852 CW17E 12PF 5% 25V CERM 0201

31 P3V8AON_DRVL1_R

131S0852 CW190 12PF 5% 25V CERM 0201

31 P3V8AON_DRVH1_R

131S0852 CW191 12PF 5% 25V CERM 0201

31 30 P3V8AON_SW1

31 30 P3V8AON_SW2

131S0852 CW166 12PF 5% 25V CERM 0201 — 131S00093 CW167 3PF +/-0.1PF 25V C0G 0201
131S0852 CW168 12PF 5% 25V CERM 0201 — 131S00093 CW169 3PF +/-0.1PF 25V C0G 0201

31 30 P3V8AON_SW3

131S0852 CW16E 12PF 5% 25V CERM 0201 — 131S00093 CW16F 3PF +/-0.1PF 25V C0G 0201
131S0852 CW17A 12PF 5% 25V CERM 0201 — 131S00093 CW17B 3PF +/-0.1PF 25V C0G 0201

92 31 30 PPBUS_AON

131S0852 CW1E0 12PF 5% 25V CERM 0201 — 131S0852 CW1E1 12PF 5% 25V CERM 0201
131S0852 CW1E2 12PF 5% 25V CERM 0201 — 131S0852 CW1E3 12PF 5% 25V CERM 0201
131S0852 CW1E4 12PF 5% 25V CERM 0201 — 131S0852 CW1E5 12PF 5% 25V CERM 0201
131S0852 CW1E6 12PF 5% 25V CERM 0201 — 131S0852 CW1E7 12PF 5% 25V CERM 0201

B BUCK POWER Desense

94 PP5V_S2

131S0852 CW1C3 12PF 5% 25V CERM 0201 — 131S00093 CW1C4 3PF +/-0.1PF 25V C0G 0201
131S0852 CW1C5 12PF 5% 25V CERM 0201 — 131S00093 CW1C6 3PF +/-0.1PF 25V C0G 0201

92 45 PPBUS_5VS2_VIN

131S0852 CW1FB 12PF 5% 25V CERM 0201 — 131S00093 CW1FC 3PF +/-0.1PF 25V C0G 0201

94 PP3V3_S2

131S0852 CW1F2 12PF 5% 25V CERM 0201 — 131S00093 CW1F4 3PF +/-0.1PF 25V C0G 0201
131S0852 CW1F5 12PF 5% 25V CERM 0201 — 131S00093 CW1F6 3PF +/-0.1PF 25V C0G 0201

93 PP1V25_S2

131S0852 CW1D4 12PF 5% 25V CERM 0201 — 131S00093 CW1D5 3PF +/-0.1PF 25V C0G 0201
131S0852 CW1D6 12PF 5% 25V CERM 0201 — 131S00093 CW1D7 3PF +/-0.1PF 25V C0G 0201

92 PP1V8_S2

131S0852 CW1D0 12PF 5% 25V CERM 0201 — 131S00093 CW1D1 3PF +/-0.1PF 25V C0G 0201

92 47 PPBUS_3V3S2_VIN

131S0852 CW1F0 12PF 5% 25V CERM 0201 — 131S00093 CW1F1 3PF +/-0.1PF 25V C0G 0201

92 PP0V88_S1

131S0852 CW1D2 12PF 5% 25V CERM 0201 — 131S00093 CW1D3 3PF +/-0.1PF 25V C0G 0201

BOM_COST_GROUP=DESENSE

09/10/2021

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Apple Inc.

DRAWING NUMBER: 051-07020 SIZE: D
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A Display PMIC Desense

94 PP3V3_SW_LCD
131S0852 CW200 1 12PF 5% 25V CERM 0201 2
131S00093 CW201 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW202 1 12PF 5% 25V CERM 0201 2
131S00093 CW203 1 3PF +/-0.1PF 25V C0G 0201 2

79 PAVDDP_SDG_SW
131S0852 CW218 1 12PF 5% 25V CERM 0201 2 NOSTUFF

79 PAVDDN_SDG_SW
131S0852 CW219 1 12PF 5% 25V CERM 0201 2 NOSTUFF

80 79 PP1V8_DISP
131S0852 CW206 1 12PF 5% 25V CERM 0201 2
131S00093 CW207 1 3PF +/-0.1PF 25V C0G 0201 2

80 79 PN_VGL2_MONTEREY
131S0852 CW208 1 12PF 5% 25V CERM 0201 2
131S00093 CW209 1 3PF +/-0.1PF 25V C0G 0201 2

80 79 PN_VGL1_MONTEREY
131S0852 CW210 1 12PF 5% 25V CERM 0201 2
131S00093 CW211 1 3PF +/-0.1PF 25V C0G 0201 2

79 PVGH_BOOST_SDG_SW
131S0852 CW21A 1 12PF 5% 25V CERM 0201 2 NOSTUFF

79 P1V8_SDG_SW
131S0852 CW21B 1 12PF 5% 25V CERM 0201 2 NOSTUFF

79 PVGH_BOOST_SDG
131S0852 CW212 1 12PF 5% 25V CERM 0201 2
131S00093 CW213 1 3PF +/-0.1PF 25V C0G 0201 2

79 PAVDDN_SDG_R
131S0852 CW214 1 12PF 5% 25V CERM 0201 2
131S00093 CW215 1 3PF +/-0.1PF 25V C0G 0201 2

79 PAVDDP_SDG_R
131S0852 CW216 1 12PF 5% 25V CERM 0201 2
131S00093 CW217 1 3PF +/-0.1PF 25V C0G 0201 2

B Audio Desense

92 PPBUS_AON_L_SPKRAMP
131S0852 CW220 1 12PF 5% 25V CERM 0201 2
131S00093 CW221 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW222 1 12PF 5% 25V CERM 0201 2
131S00093 CW223 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW224 1 12PF 5% 25V CERM 0201 2
131S00093 CW225 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW226 1 12PF 5% 25V CERM 0201 2
131S00093 CW227 1 3PF +/-0.1PF 25V C0G 0201 2

84 13 PDM_DMIC_CLK1
131S0852 CW228 1 12PF 5% 25V CERM 0201 2

84 13 PDM_DMIC_CLK7
131S0852 CW229 1 12PF 5% 25V CERM 0201 2

92 PPBUS_AON_R_SPKRAMP
131S0852 CW230 1 12PF 5% 25V CERM 0201 2
131S00093 CW231 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW232 1 12PF 5% 25V CERM 0201 2
131S00093 CW233 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW234 1 12PF 5% 25V CERM 0201 2
131S00093 CW235 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW236 1 12PF 5% 25V CERM 0201 2
131S00093 CW237 1 3PF +/-0.1PF 25V C0G 0201 2

13 8 PDM_DMIC_CLK1_R
131S0852 CW238 1 12PF 5% 25V CERM 0201 2

13 8 PDM_DMIC_CLK7_R
131S0852 CW239 1 12PF 5% 25V CERM 0201 2

85 12 TDM_CODEC_BCLK
131S0852 CW23A 1 12PF 5% 25V CERM 0201 2

C Display and Keyboard Backlight Desense

94 75 PPVOUT_LCDBKLT
131S00141 CW240 1 12PF 5% 100V C0G 0201 2
131S00140 CW241 1 3PF +/-0.1PF 100V C0G 0201 2
131S00141 CW242 1 12PF 5% 100V C0G 0201 2
131S00140 CW243 1 3PF +/-0.1PF 100V C0G 0201 2

94 PP5V_S2_KBDLED
131S0852 CW254 1 12PF 5% 25V CERM 0201 2
131S00093 CW255 1 3PF +/-0.1PF 25V C0G 0201 2

77 PPVOUT_LCDBKLT_SW
131S00141 CW244 1 12PF 5% 100V C0G 0201 2 NOSTUFF
131S00140 CW245 1 3PF +/-0.1PF 100V C0G 0201 2 NOSTUFF

77 PPVIN_LCDBKLT_Q
131S00141 CW246 1 12PF 5% 100V C0G 0201 2
131S00140 CW247 1 3PF +/-0.1PF 100V C0G 0201 2
131S00141 CW248 1 12PF 5% 100V C0G 0201 2
131S00140 CW249 1 3PF +/-0.1PF 100V C0G 0201 2
131S00141 CW24A 1 12PF 5% 100V C0G 0201 2
131S00140 CW24B 1 3PF +/-0.1PF 100V C0G 0201 2
131S00141 CW24C 1 12PF 5% 100V C0G 0201 2
131S00140 CW24D 1 3PF +/-0.1PF 100V C0G 0201 2

94 PPVOUT_LCDBKLT_D
131S00141 CW24E 1 12PF 5% 100V C0G 0201 2
131S00140 CW24F 1 3PF +/-0.1PF 100V C0G 0201 2
131S00141 CW250 1 12PF 5% 100V C0G 0201 2
131S00140 CW251 1 3PF +/-0.1PF 100V C0G 0201 2
131S00141 CW252 1 12PF 5% 100V C0G 0201 2
131S00140 CW253 1 3PF +/-0.1PF 100V C0G 0201 2

D NAND Desense

92 PP2V58_AWAKE_NAND_VCC
131S0852 CW270 1 12PF 5% 25V CERM 0201 2
131S00093 CW271 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW272 1 12PF 5% 25V CERM 0201 2
131S00093 CW273 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW274 1 12PF 5% 25V CERM 0201 2
131S00093 CW275 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW276 1 12PF 5% 25V CERM 0201 2
131S00093 CW277 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW278 1 12PF 5% 25V CERM 0201 2
131S00093 CW279 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW27A 1 12PF 5% 25V CERM 0201 2
131S00093 CW27B 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW27C 1 12PF 5% 25V CERM 0201 2
131S00093 CW27D 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW27E 1 12PF 5% 25V CERM 0201 2
131S00093 CW27F 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW280 1 12PF 5% 25V CERM 0201 2
131S00093 CW281 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW282 1 12PF 5% 25V CERM 0201 2
131S00093 CW283 1 3PF +/-0.1PF 25V C0G 0201 2

93 PP1V25_AWAKE_NAND_VCCQ
131S0852 CW284 1 12PF 5% 25V CERM 0201 2
131S00093 CW285 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW286 1 12PF 5% 25V CERM 0201 2
131S00093 CW287 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW288 1 12PF 5% 25V CERM 0201 2
131S00093 CW289 1 3PF +/-0.1PF 25V C0G 0201 2

93 PP0V88_AWAKE_NAND_VDD
131S0852 CW28A 1 12PF 5% 25V CERM 0201 2
131S00093 CW28B 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW28C 1 12PF 5% 25V CERM 0201 2
131S00093 CW28D 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW28E 1 12PF 5% 25V CERM 0201 2
131S00093 CW28F 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW290 1 12PF 5% 25V CERM 0201 2
131S00093 CW291 1 3PF +/-0.1PF 25V C0G 0201 2

E Camera Desense

74 PP5V_S2_CAMERA_FILT
131S0852 CW2A0 1 12PF 5% 25V CERM 0201 2

F Trackpad Desense

94 87 PP3V3_S2SW_IPD
131S0852 CW2B0 1 12PF 5% 25V CERM 0201 2 PLACE_NEAR=LT402.1:5MM
131S00093 CW2B1 1 3PF +/-0.1PF 25V C0G 0201 2 PLACE_NEAR=LT402.1:5MM

G Display TCON Desense

75 12 SPI_TCON_CLK
131S0852 CW2C0 1 12PF 5% 25V CERM 0201 2

75 9 SPI_TCON_MISO
131S0852 CW2C1 1 12PF 5% 25V CERM 0201 2

75 12 SPI_TCON_MOSI
131S0852 CW2C2 1 12PF 5% 25V CERM 0201 2

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A SOC Desense

92 91 PPVDD_AWAKE_PCPU
131S0852 CW300 1 12PF 5% 25V CERM 0201 2
131S00093 CW301 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_PCPU
131S0852 CW302 1 12PF 5% 25V CERM 0201 2
131S00093 CW303 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_CPU_SRAM
131S0852 CW304 1 12PF 5% 25V CERM 0201 2
131S00093 CW305 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_CPU_SRAM
131S0852 CW306 1 12PF 5% 25V CERM 0201 2
131S00093 CW307 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_S1_SOC
131S0852 CW308 1 12PF 5% 25V CERM 0201 2
131S00093 CW309 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_S1_SOC
131S0852 CW310 1 12PF 5% 25V CERM 0201 2
131S00093 CW311 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_S1_DCS
131S0852 CW312 1 12PF 5% 25V CERM 0201 2
131S00093 CW313 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_S1_DCS
131S0852 CW314 1 12PF 5% 25V CERM 0201 2
131S00093 CW315 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PP0V779_S1_SRAM
131S0852 CW316 1 12PF 5% 25V CERM 0201 2
131S00093 CW317 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PP0V779_S1_SRAM
131S0852 CW318 1 12PF 5% 25V CERM 0201 2
131S00093 CW319 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_S1_DISP
131S0852 CW320 1 12PF 5% 25V CERM 0201 2
131S00093 CW321 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_S1_DISP
131S0852 CW322 1 12PF 5% 25V CERM 0201 2
131S00093 CW323 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_GPU
131S0852 CW324 1 12PF 5% 25V CERM 0201 2
131S00093 CW325 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_GPU
131S0852 CW326 1 12PF 5% 25V CERM 0201 2
131S00093 CW327 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PP1V05_S2SW_VDD2H
131S0852 CW328 1 12PF 5% 25V CERM 0201 2
131S00093 CW329 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PP1V05_S2SW_VDD2H
131S0852 CW330 1 12PF 5% 25V CERM 0201 2
131S00093 CW331 1 3PF +/-0.1PF 25V C0G 0201 2

93 91 PP1V12_S2SW_AMPH
131S0852 CW332 1 12PF 5% 25V CERM 0201 2
131S00093 CW333 1 3PF +/-0.1PF 25V C0G 0201 2

93 91 PP1V12_S2SW_AMPH
131S0852 CW334 1 12PF 5% 25V CERM 0201 2
131S00093 CW335 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_ECPU
131S0852 CW336 1 12PF 5% 25V CERM 0201 2
131S00093 CW337 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_ECPU
131S0852 CW338 1 12PF 5% 25V CERM 0201 2
131S00093 CW339 1 3PF +/-0.1PF 25V C0G 0201 2

93 PP1V2_AWAKE_PLL
131S0852 CW33A 1 12PF 5% 25V CERM 0201 2
131S00093 CW33B 1 3PF +/-0.1PF 25V C0G 0201 2

93 PP0V72_S2_VDD_LOW
131S0852 CW33C 1 12PF 5% 25V CERM 0201 2
131S00093 CW33D 1 3PF +/-0.1PF 25V C0G 0201 2

94 PP0V78_S1_VDD_FIXED
131S0852 CW33E 1 12PF 5% 25V CERM 0201 2
131S00093 CW33F 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PP1V05_S2SW_VDD2H
131S0852 CW35B 1 12PF 5% 25V CERM 0201 2
131S00093 CW35C 1 3PF +/-0.1PF 25V C0G 0201 2

94 PP1V2_S2_CIO
131S0852 CW340 1 12PF 5% 25V CERM 0201 2
131S00093 CW341 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW342 1 12PF 5% 25V CERM 0201 2
131S00093 CW343 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW344 1 12PF 5% 25V CERM 0201 2
131S00093 CW345 1 3PF +/-0.1PF 25V C0G 0201 2

92 91 PPVDD_AWAKE_GPU
131S00093 CW35D 1 3PF +/-0.1PF 25V C0G 0201 2

94 PP1V8_S2SW
131S0852 CW346 1 12PF 5% 25V CERM 0201 2
131S00093 CW347 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW348 1 12PF 5% 25V CERM 0201 2
131S0852 CW349 1 12PF 5% 25V CERM 0201 2
131S00093 CW34A 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW34B 1 12PF 5% 25V CERM 0201 2
131S00093 CW34C 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW34D 1 12PF 5% 25V CERM 0201 2
131S00093 CW34E 1 3PF +/-0.1PF 25V C0G 0201 2

92 PP0V5_S1_VDDQL
131S0852 CW34F 1 12PF 5% 25V CERM 0201 2
131S00093 CW350 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW351 1 12PF 5% 25V CERM 0201 2
131S00093 CW352 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW353 1 12PF 5% 25V CERM 0201 2
131S00093 CW354 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW355 1 12PF 5% 25V CERM 0201 2
131S00093 CW356 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW357 1 12PF 5% 25V CERM 0201 2
131S00093 CW358 1 3PF +/-0.1PF 25V C0G 0201 2
131S0852 CW359 1 12PF 5% 25V CERM 0201 2
131S00093 CW35A 1 3PF +/-0.1PF 25V C0G 0201 2

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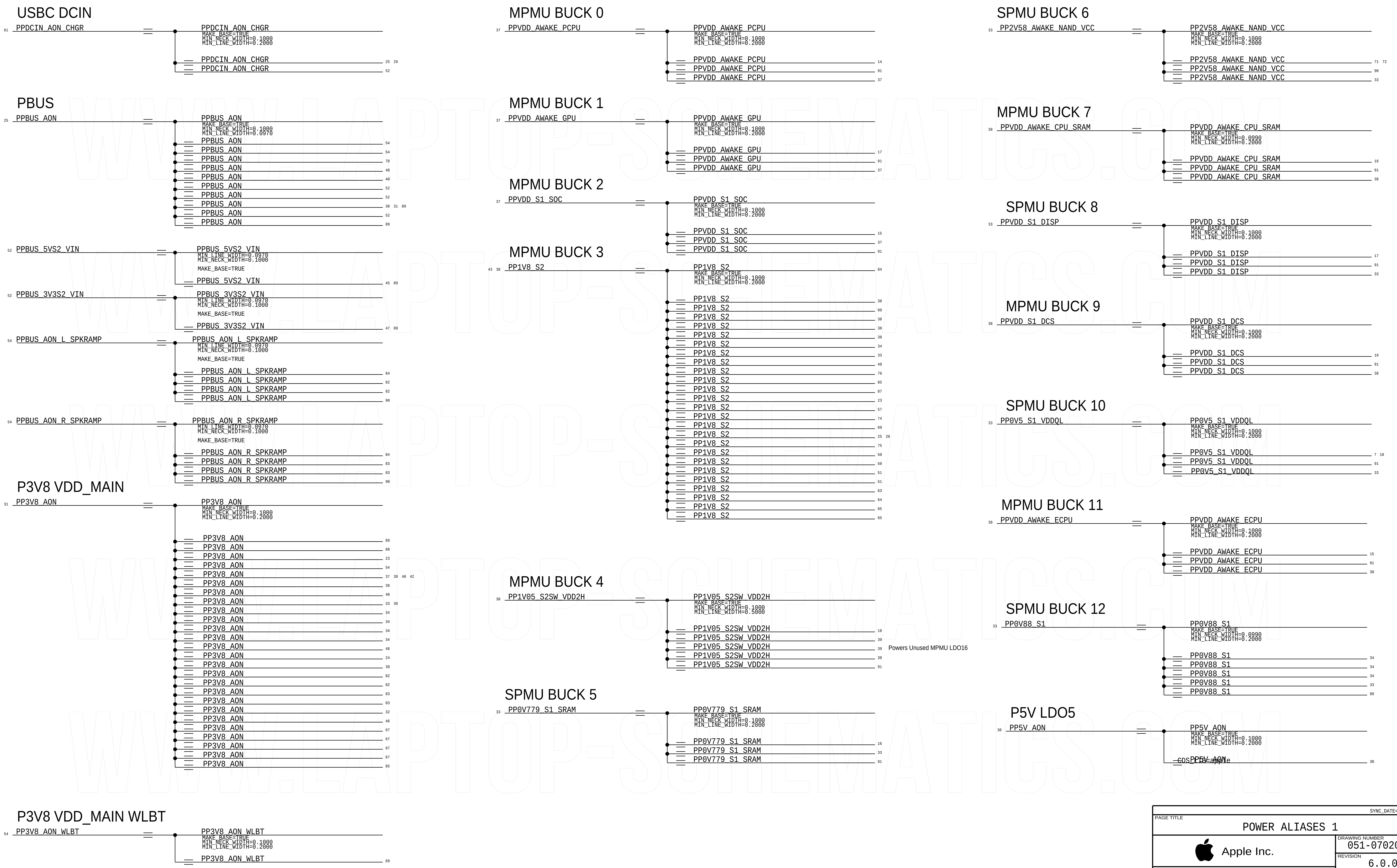

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MPMU BUCK 13

43 38 PP1V25_S2

PP1V25_S2
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000 — 88

PP1V25_S2 — 38
PP1V25_S2 — 89
PP1V25_S2 — 38
PP1V25_S2 — 38
PP1V25_S2 — 33
PP1V25_S2 — 34
PP1V25_S2 — 34
PP1V25_S2 — 42
PP1V25_S2 — 20
PP1V25_S2 — 21
PP1V25_S2 — 21
PP1V25_S2 — 20
PP1V25_S2 — 20
PP1V25_S2 — 7
PP1V25_S2 — 50
PP1V25_S2 — 51
PP1V25_S2 — 51
PP1V25_S2 — 51
PP1V25_S2 — 51
PP1V25_S2 — 50
PP1V25_S2 — 49
PP1V25_S2 — 81
PP1V25_S2 — 23
PP1V25_S2 — 69
PP1V25_S2 — 57
PP1V25_S2 — 26
PP1V25_S2 — 28
PP1V25_S2 — 61 63 64
PP1V25_S2 — 74
PP1V25_S2 — 85
PP1V25_S2 — 66
PP1V25_S2 — 66
PP1V25_S2 — 66
PP1V25_S2 — 68
PP1V25_S2 — 76
PP1V25_S2 — 86

SPMU BUCK 14

33 PP1V12_S2SW_AMPH

PP1V12_S2SW_AMPH
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V12_S2SW_AMPH — 18
PP1V12_S2SW_AMPH — 33
PP1V12_S2SW_AMPH — 91

MPMU BUCK 3 SW 1

38 PP1V8_AWAKE

PP1V8_AWAKE
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V8_AWAKE — 21
PP1V8_AWAKE — 11
PP1V8_AWAKE — 85
PP1V8_AWAKE — 82 83

MPMU BUCK 3 SW 2

38 NC_PPVOUT_MPMU_SW2_REG

NC_PPVOUT_MPMU_SW2_REG
MAKE_BASE=TRUE

MPMU BUCK 13 SW 3

38 PP1V25_AWAKE_IO

PP1V25_AWAKE_IO
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V25_AWAKE_IO — 21
PP1V25_AWAKE_IO — 21
PP1V25_AWAKE_IO — 21
PP1V25_AWAKE_IO — 21
PP1V25_AWAKE_IO — 21
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 20
PP1V25_AWAKE_IO — 13
PP1V25_AWAKE_IO — 11
PP1V25_AWAKE_IO — 11
PP1V25_AWAKE_IO — 5
PP1V25_AWAKE_IO — 7 9 10
PP1V25_AWAKE_IO — 49
PP1V25_AWAKE_IO — 36 42
PP1V25_AWAKE_IO — 82
PP1V25_AWAKE_IO — 85
PP1V25_AWAKE_IO — 82 83

SPMU BUCK 3 SW 4

34 PP1V8_AWAKE_SPMU_GPIO

PP1V8_AWAKE_SPMU_GPIO
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

SPMU BUCK 13 SW 5

34 PP1V25_AWAKE_NAND_VCCQ

PP1V25_AWAKE_NAND_VCCQ
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V25_AWAKE_NAND_VCCQ — 71 72
PP1V25_AWAKE_NAND_VCCQ — 90

SPMU BUCK 12 SW 6/7

34 PP0V88_AWAKE_NAND_VDD

PP0V88_AWAKE_NAND_VDD
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP0V88_AWAKE_NAND_VDD — 71
PP0V88_AWAKE_NAND_VDD — 72
PP0V88_AWAKE_NAND_VDD — 90

SPMU BUCK 12 SW 7

TIED TO SW6

MPMU LDO 1

39 NC_MPMU_VLDO1

NC_MPMU_VLDO1
MAKE_BASE=TRUE

MPMU LDO 2

39 PP1V8_AON

PP1V8_AON
MAKE_BASE=TRUE

PP1V8_AON — 39
PP1V8_AON — 43
PP1V8_AON — 81
PP1V8_AON — 48 78
PP1V8_AON — 48 85
PP1V8_AON — 86
PP1V8_AON — 46
PP1V8_AON — 26

MPMU LDO 3

39 NC_MPMU_VLDO3

NC_MPMU_VLDO3
MAKE_BASE=TRUE

SPMU LDO 4

34 PP0V72_S2_VDD_LOW

PP0V72_S2_VDD_LOW
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP0V72_S2_VDD_LOW — 34
PP0V72_S2_VDD_LOW — 21
PP0V72_S2_VDD_LOW — 21
PP0V72_S2_VDD_LOW — 21
PP0V72_S2_VDD_LOW — 21
PP0V72_S2_VDD_LOW — 91

MPMU LDO 5

39 NC_MPMU_VLDO5

NC_MPMU_VLDO5
MAKE_BASE=TRUE

SPMU LDO 6

34 NC_SPMU_VLDO6

NC_SPMU_VLDO6
MAKE_BASE=TRUE

MPMU LDO 7

39 PP3V3_S2_LDO

PP3V3_S2_LDO
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP3V3_S2_LDO — 39
PP3V3_S2_LDO — 61 63 64
PP3V3_S2_LDO — 28
PP3V3_S2_LDO — 66
PP3V3_S2_LDO — 65
PP3V3_S2_LDO — 65
PP3V3_S2_LDO — 66

MPMU LDO 8

39 PP1V2_AWAKE_PLL

PP1V2_AWAKE_PLL
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.5000

PP1V2_AWAKE_PLL — 39
PP1V2_AWAKE_PLL — 20
PP1V2_AWAKE_PLL — 20
PP1V2_AWAKE_PLL — 20
PP1V2_AWAKE_PLL — 20
PP1V2_AWAKE_PLL — 21
PP1V2_AWAKE_PLL — 91

MPMU LDO 9

39 PP1V8_AON_MPMU

PP1V8_AON_MPMU
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.0990
MIN_LINE_WIDTH=0.2000

PP1V8_AON_MPMU — 39 41
PP1V8_AON_MPMU — 40 42
PP1V8_AON_MPMU — 26
PP1V8_AON_MPMU — 86

MPMU LDO 9B

39 PP1V2_AON_MPMU

PP1V2_AON_MPMU
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.0990
MIN_LINE_WIDTH=0.0990

PP1V2_AON_MPMU — 39
PP1V2_AON_MPMU — 38

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SPMU LDO 9

34 PP1V8_AON_SPMU

PP1V8_AON_SPMU
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V8_AON_SPMU 34

SPMU LDO 9B

34 PP1V2_AON_SPMU

PP1V2_AON_SPMU
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V2_AON_SPMU 34
PP1V2_AON_SPMU 33

MPMU LDO 10

39 PP3V3_AON

PP3V3_AON
MAKE_BASE=TRUE

PP3V3_AON 39
PP3V3_AON 43
PP3V3_AON 85
PP3V3_AON 88

MPMU LDO 11

39 PP0V855_S2SW_CIO

PP0V855_S2SW_CIO
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.5000

PP0V855_S2SW_CIO 21
PP0V855_S2SW_CIO 21
PP0V855_S2SW_CIO 39

SPMU LDO12

34 PP0V78_S1_VDD_FIXED

PP0V78_S1_VDD_FIXED
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP0V78_S1_VDD_FIXED 34
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 13
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 19
PP0V78_S1_VDD_FIXED 91

UC710 - 3V3_S2

47 PP3V3_S2

Sourced from PBus
Enabled by P3V3S2_PWR_EN

PP3V3_S2
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000
MAKE_BASE=TRUE

PP3V3_S2 47
PP3V3_S2 46
PP3V3_S2 89
PP3V3_S2 48
PP3V3_S2 76
PP3V3_S2 88

UC300 - 5V S2

45 PP5V_S2

Sourced from PBus
Enabled by P5VS2_PWR_EN

PP5V_S2
MIN_LINE_WIDTH=0.0990
MIN_NECK_WIDTH=0.0990
MAKE_BASE=TRUE

PP5V_S2 46
PP5V_S2 32
PP5V_S2 77
PP5V_S2 76
PP5V_S2 54
PP5V_S2 48
PP5V_S2 74
PP5V_S2 63 64
PP5V_S2 63 64
PP5V_S2 26

Trackpad - 5V S2

48 PP5V_S2SW_IPD

PP5V_S2SW_IPD
MIN_LINE_WIDTH=0.0970
MIN_NECK_WIDTH=0.1000
MAKE_BASE=TRUE

PP5V_S2SW_IPD 87

MPMU LDO13

39 PP3V3_S2SW_SNS

PP3V3_S2SW_SNS
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.0970
MIN_NECK_WIDTH=0.1000

PP3V3_S2SW_SNS 39
PP3V3_S2SW_SNS 52 53 54

MPMU LDO14

39 NC_MPMU_VLDO14

NC_MPMU_VLDO14
MAKE_BASE=TRUE

SPMU LDO15

34 NC_SPMU_VLDO15

NC_SPMU_VLDO15
MAKE_BASE=TRUE

MPMU LDO16

39 NC_MPMU_VLDO16

NC_MPMU_VLDO16
MAKE_BASE=TRUE

SPMU LDO17

34 NC_SPMU_VLDO17

NC_SPMU_VLDO17
MAKE_BASE=TRUE

SPMU LDO18

34 NC_SPMU_VLDO18

NC_SPMU_VLDO18
MAKE_BASE=TRUE

48 PP3V3_S2SW_IPD

PP3V3_S2SW_IPD
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.0970
MIN_NECK_WIDTH=0.1000

PP3V3_S2SW_IPD 87 90
PP3V3_S2SW_IPD 86
PP3V3_S2SW_IPD 51

76 PP3V3_SW_LCD

PP3V3_SW_LCD
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000

PP3V3_SW_LCD 75
PP3V3_SW_LCD 90
PP3V3_SW_LCD 79

76 PP5V_SW_MINNIE

PP5V_SW_MINNIE
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.2000
MIN_NECK_WIDTH=0.1000

PP5V_SW_MINNIE 75

76 PP1V25_SW_MINNIE

PP1V25_SW_MINNIE
MAKE_BASE=TRUE

PP1V25_SW_MINNIE 75
PP1V25_SW_MINNIE 49

48 PP1V8_S2SW

PP1V8_S2SW
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000

PP1V8_S2SW 18
PP1V8_S2SW 91

Keyboard Backlight - 5V S2

54 PP5V_S2_KBDLED

PP5V_S2_KBDLED
MIN_LINE_WIDTH=0.0970
MIN_NECK_WIDTH=0.1000
MAKE_BASE=TRUE

PP5V_S2_KBDLED 85
PP5V_S2_KBDLED 90

48 PPBUS_AONSW_TPAD

PPBUS_AONSW_TPAD
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.0990
MIN_NECK_WIDTH=0.0990

PPBUS_AONSW_TPAD 87

Digital Ground

GND

MIN_LINE_WIDTH=0.1000
MIN_NECK_WIDTH=0.0900

MPMU LDO19

(NOT USED)

MPMU LDO20

39 PP1V2_S2_CIO

PP1V2_S2_CIO
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.5000

PP1V2_S2_CIO 39
PP1V2_S2_CIO 20
PP1V2_S2_CIO 20
PP1V2_S2_CIO 91

MPMU LDOINT

39 PP1V5_LDOINT_MPMU

PP1V5_LDOINT_MPMU
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V5_LDOINT_MPMU 39
PP1V5_LDOINT_MPMU 37
PP1V5_LDOINT_MPMU 37
PP1V5_LDOINT_MPMU 39

SPMU LDOINT

34 PP1V5_LDOINT_SPMU

PP1V5_LDOINT_SPMU
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP1V5_LDOINT_SPMU 34
PP1V5_LDOINT_SPMU 33
PP1V5_LDOINT_SPMU 33

MPMU VDD BOOST

40 PP5V_MPMU_BSTLQ

PP5V_MPMU_BSTLQ
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP5V_MPMU_BSTLQ 38

SPMU VDD BOOST

33 PP5V_SPMU_BSTLQ

PP5V_SPMU_BSTLQ
MAKE_BASE=TRUE
MIN_NECK_WIDTH=0.1000
MIN_LINE_WIDTH=0.2000

PP5V_SPMU_BSTLQ 33

MPMU LDO RTC

SHORTED TO MPMU LDOINT FOR PORTABLES

Display Backlight Rails

77 PPVOUT_LCDBKLT

PPVOUT_LCDBKLT
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.5000
MIN_NECK_WIDTH=0.1000

PPVOUT_LCDBKLT 75
PPVOUT_LCDBKLT 75 90

78 PPVIN_LCDBKLT

PPVIN_LCDBKLT
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.5000
MIN_NECK_WIDTH=0.1000

PPVIN_LCDBKLT 77

90 PPVOUT_LCDBKLT_D

PPVOUT_LCDBKLT_D
MAKE_BASE=TRUE
MIN_LINE_WIDTH=0.5000
MIN_NECK_WIDTH=0.1000

PPVOUT_LCDBKLT_D 77

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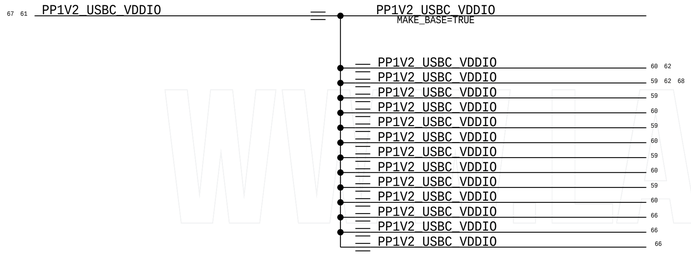
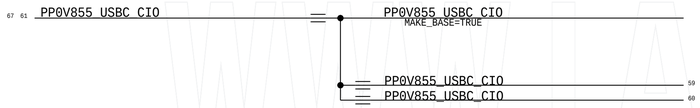
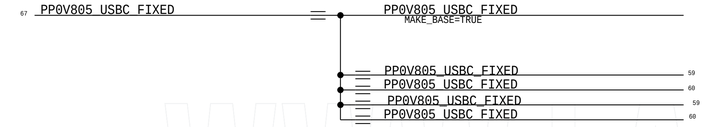
USB 1V2 VDDIO



USB 0V855 CIO



USB 0V805 Fixed



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A Lid Angle Sensor Aliases

85 AMR_LEFT_OR_ND_1V8 — MAKE_BASE=TRUE — AMR_LEFT_OR_ND_1V8 81
AMR_LEFT_OR_ND_1V8 81

B Speaker Amplifier Aliases

9 IN TDM_SPKRAMP_L_D2R — MAKE_BASE=TRUE — TDM_SPKRAMP_L_D2R 82
TDM_SPKRAMP_L_D2R 82

9 IN TDM_SPKRAMP_R_D2R — MAKE_BASE=TRUE — TDM_SPKRAMP_R_D2R 83
TDM_SPKRAMP_R_D2R 83

C PMU Aliases

35 SWD_NUB_SWCLK_SPMU — MAKE_BASE=TRUE — SWD_NUB_SWCLK_SPMU 12
35 SWD_NUB_SWDIO_SPMU — MAKE_BASE=TRUE — SWD_NUB_SWDIO_SPMU 12
41 SWD_NUB_SWCLK_MPMU — MAKE_BASE=TRUE — SWD_NUB_SWCLK_MPMU 12
41 SWD_NUB_SWDIO_MPMU — MAKE_BASE=TRUE — SWD_NUB_SWDIO_MPMU 12
76 PMU_SYS_ALIVE — MAKE_BASE=TRUE — PMU_SYS_ALIVE 41 42 73 88

D Charger Aliases

26 P5VS2_PGOOD — MAKE_BASE=TRUE — P5VS2_PGOOD 45
25 NC_CHGR_CBC_ON — MAKE_BASE=TRUE — NC_CHGR_CBC_ON
25 NC_CHGR_EN_VR1 — MAKE_BASE=TRUE — NC_CHGR_EN_VR1
25 NC_CHGR_SMC_RST_L — MAKE_BASE=TRUE — NC_CHGR_SMC_RST_L

E PP5V_S2 Aliases

26 P5VS2_PWR_EN — MAKE_BASE=TRUE — P5VS2_PWR_EN 45 46 48
45 P5VS2_EN — MAKE_BASE=TRUE — P5VS2_EN 45

F Display Aliases

75 UART_TCON_D2R — MAKE_BASE=TRUE — UART_TCON_D2R 8
77 NC_BKLT_ISET_KEYB — MAKE_BASE=TRUE — NC_BKLT_ISET_KEYB
77 NC_BKLT_KEYB1 — MAKE_BASE=TRUE — NC_BKLT_KEYB1
77 NC_BKLT_KEYB2 — MAKE_BASE=TRUE — NC_BKLT_KEYB2
77 NC_KBDBKLT_SW2 — MAKE_BASE=TRUE — NC_KBDBKLT_SW2
77 NC_VOUT_KEYBDLED_FB2 — MAKE_BASE=TRUE — NC_VOUT_KEYBDLED_FB2
77 UNUSED_LP8548_PWM — MAKE_BASE=TRUE — UNUSED_LP8548_PWM

G Secure Element Aliases

23 NC_SE_GPIO0 — MAKE_BASE=TRUE — NC_SE_GPIO0
23 NC_I2C_SE_SCL — MAKE_BASE=TRUE — NC_I2C_SE_SCL
23 NC_I2C_SE_SDA — MAKE_BASE=TRUE — NC_I2C_SE_SDA

H NAND Aliases

71 NC_NAND0_S5E0_VPP — MAKE_BASE=TRUE — NC_NAND0_S5E0_VPP
72 NC_NAND0_S5E1_VPP — MAKE_BASE=TRUE — NC_NAND0_S5E1_VPP

I Wireless Module Aliases

70 69 NC_RF_BT_DED — MAKE_BASE=TRUE — NC_RF_BT_DED
TPT_WLAN_JTAG_TCK — MAKE_BASE=TRUE — TPT_WLAN_JTAG_TCK 69 70
TPT_WLAN_JTAG_TMS — MAKE_BASE=TRUE — TPT_WLAN_JTAG_TMS 69 70
TPT_WLAN_JTAG_TRSTN — MAKE_BASE=TRUE — TPT_WLAN_JTAG_TRSTN 69
TPT_WLAN_JTAG_TDI — MAKE_BASE=TRUE — TPT_WLAN_JTAG_TDI 69

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A USB-C Aliases: USB 2.0 I/F

65	USB2_ATC0_LS_P	MAKE_BASE=TRUE	USB2_ATC0_LS_P	68
65	USB2_ATC0_LS_N	MAKE_BASE=TRUE	USB2_ATC0_LS_N	68
65	USB2_ATC1_LS_P	MAKE_BASE=TRUE	USB2_ATC1_LS_P	68
65	USB2_ATC1_LS_N	MAKE_BASE=TRUE	USB2_ATC1_LS_N	68
65	USB_DBG_LS_P	MAKE_BASE=TRUE	USB_DBG_LS_P	62
65	USB_DBG_LS_N	MAKE_BASE=TRUE	USB_DBG_LS_N	62

B USB-C Aliases: CIO Debug I/F

	CIO_ATC0_LSRX	MAKE_BASE=TRUE	CIO_ATC0_LSRX	6 59
	CIO_ATC0_LSTX	MAKE_BASE=TRUE	CIO_ATC0_LSTX	6 59
	CIO_ATC1_LSRX	MAKE_BASE=TRUE	CIO_ATC1_LSRX	6 60
	CIO_ATC1_LSTX	MAKE_BASE=TRUE	CIO_ATC1_LSTX	6 60

C USB-C Aliases: EUSB I/F

65	EUSB_ATC0_P	MAKE_BASE=TRUE	EUSB_ATC0_P	6 13
65	EUSB_ATC0_N	MAKE_BASE=TRUE	EUSB_ATC0_N	6 13
65	EUSB_ATC1_P	MAKE_BASE=TRUE	EUSB_ATC1_P	6 13
65	EUSB_ATC1_N	MAKE_BASE=TRUE	EUSB_ATC1_N	6 13
13 7	EUSB_DBG_P	MAKE_BASE=TRUE	EUSB_DBG_P	65
13 7	EUSB_DBG_N	MAKE_BASE=TRUE	EUSB_DBG_N	65
65	ATCRTMR0_RESET_1V2_L	MAKE_BASE=TRUE	ATCRTMR0_RESET_1V2_L	62 66

D USB-C Aliases: I2C I/F

59	I2C_UPC0_ATCRTMR0_SDA_1V2	MAKE_BASE=TRUE	I2C_UPC0_ATCRTMR0_SDA_1V2	66
65	I2C_UPC0_ATCRTMR0_SDA_1V2			
59	I2C_UPC0_ATCRTMR0_SCL_1V2	MAKE_BASE=TRUE	I2C_UPC0_ATCRTMR0_SCL_1V2	66
65	I2C_UPC0_ATCRTMR0_SCL_1V2			
60	I2C_UPC1_ATCRTMR1_SDA_1V2	MAKE_BASE=TRUE	I2C_UPC1_ATCRTMR1_SDA_1V2	66
65	I2C_UPC1_ATCRTMR1_SDA_1V2			
60	I2C_UPC1_ATCRTMR1_SCL_1V2	MAKE_BASE=TRUE	I2C_UPC1_ATCRTMR1_SCL_1V2	66
65	I2C_UPC1_ATCRTMR1_SCL_1V2			

E USB-C Aliases: SWD I/F

59	SWD_NUB_ATCRTMR_SWCLK	MAKE_BASE=TRUE	SWD_NUB_ATCRTMR_SWCLK	13
60	SWD_NUB_ATCRTMR_SWCLK			
59	SWD_NUB_ATCRTMR_SWDIO	MAKE_BASE=TRUE	SWD_NUB_ATCRTMR_SWDIO	13
60	SWD_NUB_ATCRTMR_SWDIO			

F USB-C Aliases: CC I/F

97 62	NC_USBC0_CC_FLT_L	MAKE_BASE=TRUE	NC_USBC0_CC_FLT_L	62 97
97 62	NC_USBC1_CC_FLT_L	MAKE_BASE=TRUE	NC_USBC1_CC_FLT_L	62 97

G USB-C Aliases: GPIO

59	TP_ATCRTMR0_GPIO_0	MAKE_BASE=TRUE	TP_ATCRTMR0_GPIO_0	
59	NC_ATCRTMR0_GPIO_1	MAKE_BASE=TRUE	NC_ATCRTMR0_GPIO_1	
59	TP_ATCRTMR0_GPIO_2	MAKE_BASE=TRUE	TP_ATCRTMR0_GPIO_2	
59	TP_ATCRTMR0_GPIO_3	MAKE_BASE=TRUE	TP_ATCRTMR0_GPIO_3	
60	TP_ATCRTMR1_GPIO_0	MAKE_BASE=TRUE	TP_ATCRTMR1_GPIO_0	
60	NC_ATCRTMR1_GPIO_1	MAKE_BASE=TRUE	NC_ATCRTMR1_GPIO_1	
60	TP_ATCRTMR1_GPIO_2	MAKE_BASE=TRUE	TP_ATCRTMR1_GPIO_2	
60	TP_ATCRTMR1_GPIO_3	MAKE_BASE=TRUE	TP_ATCRTMR1_GPIO_3	

Leave these as TP, so that RT13 debug modes can be enabled.

H USB-C Aliases: VDD I/O Fuse I/F

68 59	ATCRTMR0_VDDIO_EFUSE	MAKE_BASE=TRUE	ATCRTMR0_VDDIO_EFUSE	
68 60	ATCRTMR1_VDDIO_EFUSE	MAKE_BASE=TRUE	ATCRTMR1_VDDIO_EFUSE	

I USB-C Aliases: SOC Dock Connect

62	SOC_DOCK_CONNECT	MAKE_BASE=TRUE	SOC_DOCK_CONNECT	7

J USB-C Aliases: UPC I2C

28	I2C_UPC01_3V3_SDA	MAKE_BASE=TRUE	I2C_UPC01_3V3_SDA	61 68
28	I2C_UPC01_3V3_SCL	MAKE_BASE=TRUE	I2C_UPC01_3V3_SCL	61 68

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A GPIO AOP ALIAS

8	NC_SOC_AOP_I2CM1_SCL	NC_SOC_AOP_I2CM1_SCL	
8	NC_SOC_AOP_I2CM1_SDA	NC_SOC_AOP_I2CM1_SDA	
8	NC_SOC_AOP_I2CM2_SCL	NC_SOC_AOP_I2CM2_SCL	
8	NC_SOC_AOP_I2CM2_SDA	NC_SOC_AOP_I2CM2_SDA	
98 8	NC_AOP_I2S0_LRCLK	NC_AOP_I2S0_LRCLK	98
98 8	NC_AOP_I2S0_LRCLK	NC_AOP_I2S0_LRCLK	98
8	NC_SOC_AOP_UART0_RXD	NC_SOC_AOP_UART0_RXD	
8	NC_SOC_AOP_UART0_TXD	NC_SOC_AOP_UART0_TXD	
8	NC_SOC_AOP_UART1_RXD	NC_SOC_AOP_UART1_RXD	
8	NC_SOC_AOP_UART1_TXD	NC_SOC_AOP_UART1_TXD	
8	NC_SOC_AOP_UART2_RXD	NC_SOC_AOP_UART2_RXD	
8	NC_SOC_AOP_UART2_TXD	NC_SOC_AOP_UART2_TXD	
8	NC_AOP_FUNC0	NC_AOP_FUNC0	
8	NC_AOP_FUNC1	NC_AOP_FUNC1	
8	NC_AOP_FUNC2	NC_AOP_FUNC2	
8	NC_AOP_FUNC3	NC_AOP_FUNC3	
8	NC_AOP_FUNC11	NC_AOP_FUNC11	
8	NC_AOP_FUNC12	NC_AOP_FUNC12	
8	NC_AOP_FUNC20	NC_AOP_FUNC20	
8	NC_HDMI_CEC_AOP_TX	NC_HDMI_CEC_AOP_TX	
8	NC_HDMI_CEC_AOP_RX	NC_HDMI_CEC_AOP_RX	
8	NC_HDMI_HDP_AOP	NC_HDMI_HDP_AOP	
7	TP_SOC_DOCK_ATTENTION	TP_SOC_DOCK_ATTENTION	
8	NC_AOP_FUNC19	NC_AOP_FUNC19	
9	NC_TOUCHID_BKLT_PWM	NC_TOUCHID_BKLT_PWM	

B GPIO AP ALIAS

8	NC_BKLT_PWR_ON	NC_BKLT_PWR_ON
8	NC_SOC_AP_GPIO_1	NC_SOC_AP_GPIO_1
8	NC_CCG_I2C_INT	NC_CCG_I2C_INT
8	NC_DMIC_ID	NC_DMIC_ID
8	NC_SOC_AP_GPIO_18	NC_SOC_AP_GPIO_18
8	NC_SOC_AP_GPIO_19	NC_SOC_AP_GPIO_19
8	NC_ENET_I2C_LOM_INT_L	NC_ENET_I2C_LOM_INT_L
8	NC_SOC_AP_GPIO_23	NC_SOC_AP_GPIO_23
8	NC_SOC_AP_GPIO_24	NC_SOC_AP_GPIO_24
8	NC_ENET_SELECT_1G_H_10G_L	NC_ENET_SELECT_1G_H_10G_L
8	NC_SOC_AP_GPIO_26	NC_SOC_AP_GPIO_26
8	NC_SOC_AP_UART1_CTS_L	NC_SOC_AP_UART1_CTS_L
8	NC_SOC_AP_UART1_RTS_L	NC_SOC_AP_UART1_RTS_L
8	NC_SOC_AP_UART1_RXD	NC_SOC_AP_UART1_RXD
8	NC_SOC_AP_UART1_TXD	NC_SOC_AP_UART1_TXD
8	NC_SOC_AP_UART3_CTS_L	NC_SOC_AP_UART3_CTS_L
8	NC_SOC_AP_UART3_RTS_L	NC_SOC_AP_UART3_RTS_L
8	NC_SOC_AP_UART3_RXD	NC_SOC_AP_UART3_RXD
8	NC_SOC_AP_UART3_TXD	NC_SOC_AP_UART3_TXD
8	NC_SOC_AP_UART4_RXD	NC_SOC_AP_UART4_RXD
8	NC_SOC_AP_UART4_TXD	NC_SOC_AP_UART4_TXD
8	NC_UART_TCON_R2D	NC_UART_TCON_R2D
8	NC_UART_HDMI_D2R	NC_UART_HDMI_D2R
8	NC_UART_HDMI_R2D	NC_UART_HDMI_R2D
8	NC_SOC_AP_UART2_RXD	NC_SOC_AP_UART2_RXD
8	NC_SOC_AP_UART2_TXD	NC_SOC_AP_UART2_TXD
8	NC_SOC_AP_UART2_CTS_L	NC_SOC_AP_UART2_CTS_L
8	NC_SOC_AP_UART2_RTS_L	NC_SOC_AP_UART2_RTS_L

C DEBUG ALIAS

7	NC_AON_SLEEP1_RESET_L	NC_AON_SLEEP1_RESET_L
7	NC_SOC_SWD_TMS3	NC_SOC_SWD_TMS3
7	NC_SWD_R1_SWDIO	NC_SWD_R1_SWDIO

D GND ALIAS

The DUT_GND_DETECT signal is for dev only,
and should be tied to GND.

GND — GND — IN 22

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A SPI & I2S ALIAS

9	NC_TDM_SPKRAMP_TOP_BCLK_R	=	NC_TDM_SPKRAMP_TOP_BCLK_R MAKE_BASE=TRUE	
9	NC_TDM_SPKRAMP_TOP_D2R	=	NC_TDM_SPKRAMP_TOP_D2R MAKE_BASE=TRUE	
9	NC_TDM_SPKRAMP_TOP_R2D_R	=	NC_TDM_SPKRAMP_TOP_R2D_R MAKE_BASE=TRUE	
9	NC_TDM_SPKRAMP_TOP_FSYNC_R	=	NC_TDM_SPKRAMP_TOP_FSYNC_R MAKE_BASE=TRUE	
9	NC_SOC_AP_SPMI0_SCLK	=	NC_SOC_AP_SPMI0_SCLK MAKE_BASE=TRUE	
9	NC_SOC_AP_SPMI0_SDATA	=	NC_SOC_AP_SPMI0_SDATA MAKE_BASE=TRUE	
9	NC_SOC_AP_SPI5_MISO	=	NC_SOC_AP_SPI5_MISO MAKE_BASE=TRUE	
9	NC_SOC_AP_SPI5_MOSI	=	NC_SOC_AP_SPI5_MOSI MAKE_BASE=TRUE	
9	NC_SOC_AP_SPI5_SCLK	=	NC_SOC_AP_SPI5_SCLK MAKE_BASE=TRUE	
9	NC_SOC_AP_SPI5_CS_L	=	NC_SOC_AP_SPI5_CS_L MAKE_BASE=TRUE	
9	NC_SOC_SSPI0_MISO	=	NC_SOC_SSPI0_MISO MAKE_BASE=TRUE	
9	NC_SOC_SSPI0_MOSI	=	NC_SOC_SSPI0_MOSI MAKE_BASE=TRUE	
9	NC_SOC_SSPI0_SCLK	=	NC_SOC_SSPI0_SCLK MAKE_BASE=TRUE	
9	NC_SOC_SGPIO_1	=	NC_SOC_SGPIO_1 MAKE_BASE=TRUE	
9	NC_SOC_AP_SPI2_CS_L	=	NC_SOC_AP_SPI2_CS_L MAKE_BASE=TRUE	
99 9	NC_SOC_AP_I2S0_MCK	=	NC_SOC_AP_I2S0_MCK MAKE_BASE=TRUE	99
99 9	NC_SOC_AP_I2S1_MCK	=	NC_SOC_AP_I2S1_MCK MAKE_BASE=TRUE	99
99 9	NC_SOC_AP_I2S2_MCK	=	NC_SOC_AP_I2S2_MCK MAKE_BASE=TRUE	99
8	NC_PDM_DMIC_DATA4	=	NC_PDM_DMIC_DATA4 MAKE_BASE=TRUE	
8	NC_PDM_DMIC_CLK2_R	=	NC_PDM_DMIC_CLK2_R MAKE_BASE=TRUE	
8	NC_AOP_I2S0_BCLK	=	NC_AOP_I2S0_BCLK MAKE_BASE=TRUE	
8	NC_AOP_I2S0_DIN	=	NC_AOP_I2S0_DIN MAKE_BASE=TRUE	
8	NC_AOP_I2S0_DOUT	=	NC_AOP_I2S0_DOUT MAKE_BASE=TRUE	
8	NC_SOC_AOP_SPI1_CS_L	=	NC_SOC_AOP_SPI1_CS_L MAKE_BASE=TRUE	
99 8	NC_SPI_DP2HDMI_HOLD_L	=	NC_SPI_DP2HDMI_HOLD_L MAKE_BASE=TRUE	99
99 9	NC_SOC_AP_I2S0_MCK	=	NC_SOC_AP_I2S0_MCK MAKE_BASE=TRUE	99
99 9	NC_SOC_AP_I2S1_MCK	=	NC_SOC_AP_I2S1_MCK MAKE_BASE=TRUE	99
99 9	NC_SOC_AP_I2S2_MCK	=	NC_SOC_AP_I2S2_MCK MAKE_BASE=TRUE	99
99 8	NC_SPI_DP2HDMI_HOLD_L	=	NC_SPI_DP2HDMI_HOLD_L MAKE_BASE=TRUE	99
9	NC_SOC_SPI3_MOSI	=	NC_SOC_SPI3_MOSI MAKE_BASE=TRUE	
9	NC_SOC_SPI3_MISO	=	NC_SOC_SPI3_MISO MAKE_BASE=TRUE	
9	NC_SOC_SPI3_SCLK	=	NC_SOC_SPI3_SCLK MAKE_BASE=TRUE	
9	NC_SOC_SPI3_SSIN	=	NC_SOC_SPI3_SSIN MAKE_BASE=TRUE	
8	NC_SOC_GPIO16	=	NC_SOC_GPIO16 MAKE_BASE=TRUE	
8	NC_SOC_GPIO17	=	NC_SOC_GPIO17 MAKE_BASE=TRUE	

B GPIO MTP ALIAS

9	NC_SOC_MTP_I2C0_SCL	=	NC_SOC_MTP_I2C0_SCL MAKE_BASE=TRUE	
9	NC_SOC_MTP_I2C0_SDA	=	NC_SOC_MTP_I2C0_SDA MAKE_BASE=TRUE	
9	NC_SOC_MTP_FUNC_6	=	NC_SOC_MTP_FUNC_6 MAKE_BASE=TRUE	
9	NC_SOC_MTP_FUNC_7	=	NC_SOC_MTP_FUNC_7 MAKE_BASE=TRUE	
9	IPD_MTP_FUNC_1	=	IPD_MTP_FUNC_1 MAKE_BASE=TRUE	86
9	NC_SOC_MTP_FUNC_2	=	NC_SOC_MTP_FUNC_2 MAKE_BASE=TRUE	

C AUDIO I2C

9	I2C_SPKRAMP_L_SDA	=	I2C_SPKRAMP_L_SDA MAKE_BASE=TRUE	49
9	I2C_SPKRAMP_L_SCL	=	I2C_SPKRAMP_L_SCL MAKE_BASE=TRUE	49
9	I2C_SPKRAMP_R_CODEC_SDA	=	I2C_SPKRAMP_R_CODEC_SDA MAKE_BASE=TRUE	49
9	I2C_SPKRAMP_R_CODEC_SCL	=	I2C_SPKRAMP_R_CODEC_SCL MAKE_BASE=TRUE	49

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A LPDP ALIAS

10	NC_SOC_LPDP_RX_AUX_D1	=	NC_SOC_LPDP_RX_AUX_D1
10	NC_SOC_LPDP_RX_AUX_D2	=	NC_SOC_LPDP_RX_AUX_D2
10	NC_SOC_LPDP_RX_AUX_D3	=	NC_SOC_LPDP_RX_AUX_D3
10	NC_SOC_LPDP_RX_AUX_D4	=	NC_SOC_LPDP_RX_AUX_D4
10	NC_SOC_LPDP_RX_AUX_D5	=	NC_SOC_LPDP_RX_AUX_D5
10	NC_SOC_LPDP_RX_AUX_D6	=	NC_SOC_LPDP_RX_AUX_D6
10	NC_SOC_LPDP_RX_AUX_D7	=	NC_SOC_LPDP_RX_AUX_D7
10	NC_SOC_LPDP_RX_AUX_D8	=	NC_SOC_LPDP_RX_AUX_D8
10	NC_SOC_LPDP_RX_AUX_D9	=	NC_SOC_LPDP_RX_AUX_D9
10	NC_SOC_LPDP_RX_AUX_D10	=	NC_SOC_LPDP_RX_AUX_D10
10	NC_SOC_LPDP_RX_AUX_D11	=	NC_SOC_LPDP_RX_AUX_D11
10	NC_SOC_ST_PCIE_PERST_1_L	=	NC_SOC_ST_PCIE_PERST_1_L
10	NC_SOC_LPDP_RX_D1P	=	NC_SOC_LPDP_RX_D1P
10	NC_SOC_LPDP_RX_D1N	=	NC_SOC_LPDP_RX_D1N
10	NC_SOC_LPDP_RX_D2P	=	NC_SOC_LPDP_RX_D2P
10	NC_SOC_LPDP_RX_D2N	=	NC_SOC_LPDP_RX_D2N
10	NC_SOC_LPDP_RX_D3P	=	NC_SOC_LPDP_RX_D3P
10	NC_SOC_LPDP_RX_D3N	=	NC_SOC_LPDP_RX_D3N
10	NC_SOC_LPDP_RX_D4P	=	NC_SOC_LPDP_RX_D4P
10	NC_SOC_LPDP_RX_D4N	=	NC_SOC_LPDP_RX_D4N
10	NC_SOC_LPDP_RX_D5P	=	NC_SOC_LPDP_RX_D5P
10	NC_SOC_LPDP_RX_D5N	=	NC_SOC_LPDP_RX_D5N
10	NC_SOC_LPDP_RX_D6P	=	NC_SOC_LPDP_RX_D6P
10	NC_SOC_LPDP_RX_D6N	=	NC_SOC_LPDP_RX_D6N
10	NC_SOC_LPDP_RX_D7P	=	NC_SOC_LPDP_RX_D7P
10	NC_SOC_LPDP_RX_D7N	=	NC_SOC_LPDP_RX_D7N
10	NC_SOC_LPDP_RX_D8P	=	NC_SOC_LPDP_RX_D8P
10	NC_SOC_LPDP_RX_D8N	=	NC_SOC_LPDP_RX_D8N
10	NC_SOC_LPDP_RX_D9P	=	NC_SOC_LPDP_RX_D9P
10	NC_SOC_LPDP_RX_D9N	=	NC_SOC_LPDP_RX_D9N
10	NC_SOC_LPDP_RX_D10P	=	NC_SOC_LPDP_RX_D10P
10	NC_SOC_LPDP_RX_D10N	=	NC_SOC_LPDP_RX_D10N
10	NC_SOC_LPDP_RX_D11P	=	NC_SOC_LPDP_RX_D11P
10	NC_SOC_LPDP_RX_D11N	=	NC_SOC_LPDP_RX_D11N
10	NC_LPDP_EXT_DATA_CP<0>	=	NC_LPDP_EXT_DATA_CP<0>
10	NC_LPDP_EXT_DATA_CN<0>	=	NC_LPDP_EXT_DATA_CN<0>
10	NC_LPDP_EXT_DATA_CP<1>	=	NC_LPDP_EXT_DATA_CP<1>
10	NC_LPDP_EXT_DATA_CN<1>	=	NC_LPDP_EXT_DATA_CN<1>
10	NC_LPDP_EXT_DATA_CP<2>	=	NC_LPDP_EXT_DATA_CP<2>
10	NC_LPDP_EXT_DATA_CN<2>	=	NC_LPDP_EXT_DATA_CN<2>
10	NC_LPDP_EXT_DATA_CP<3>	=	NC_LPDP_EXT_DATA_CP<3>
10	NC_LPDP_EXT_DATA_CN<3>	=	NC_LPDP_EXT_DATA_CN<3>
10	NC_LPDP_EXT_AUX_CP	=	NC_LPDP_EXT_AUX_CP
10	NC_LPDP_EXT_AUX_CN	=	NC_LPDP_EXT_AUX_CN
10	NC_LPDP_EXT_HPD	=	NC_LPDP_EXT_HPD
10	NC_SOC_LPDP_RX1_RCAL_POS	=	NC_SOC_LPDP_RX1_RCAL_POS
10	NC_SOC_LPDP_RX1_RCAL_NEG	=	NC_SOC_LPDP_RX1_RCAL_NEG

MAKE_BASE=TRUE

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SOC: ALIASES LPDP RX

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A PCIe ALIAS

10	NC_SOC_GP_PCIE_RX1P	=	NC_SOC_GP_PCIE_RX1P MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_RX1N	=	NC_SOC_GP_PCIE_RX1N MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_TX1P	=	NC_SOC_GP_PCIE_TX1P MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_TX1N	=	NC_SOC_GP_PCIE_TX1N MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLK1_100MP	=	NC_SOC_GP_PCIE_CLK1_100MP MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLK1_100MN	=	NC_SOC_GP_PCIE_CLK1_100MN MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLKREQ_1_L	=	NC_SOC_GP_PCIE_CLKREQ_1_L MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_PERST_1_L	=	NC_SOC_GP_PCIE_PERST_1_L MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_RX2P	=	NC_SOC_GP_PCIE_RX2P MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_RX2N	=	NC_SOC_GP_PCIE_RX2N MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_TX2P	=	NC_SOC_GP_PCIE_TX2P MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_TX2N	=	NC_SOC_GP_PCIE_TX2N MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLK2_100MP	=	NC_SOC_GP_PCIE_CLK2_100MP MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLK2_100MN	=	NC_SOC_GP_PCIE_CLK2_100MN MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLKREQ_2_L	=	NC_SOC_GP_PCIE_CLKREQ_2_L MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_PERST_2_L	=	NC_SOC_GP_PCIE_PERST_2_L MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_RX3P	=	NC_SOC_GP_PCIE_RX3P MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_RX3N	=	NC_SOC_GP_PCIE_RX3N MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_TX3P	=	NC_SOC_GP_PCIE_TX3P MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_TX3N	=	NC_SOC_GP_PCIE_TX3N MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLK3_100MP	=	NC_SOC_GP_PCIE_CLK3_100MP MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLK3_100MN	=	NC_SOC_GP_PCIE_CLK3_100MN MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_CLKREQ_3_L	=	NC_SOC_GP_PCIE_CLKREQ_3_L MAKE_BASE=TRUE
10	NC_SOC_GP_PCIE_PERST_3_L	=	NC_SOC_GP_PCIE_PERST_3_L MAKE_BASE=TRUE

B DISP ALIAS

9	NC_I2C_SD_DISP_BKLT_SCL	=	NC_I2C_SD_DISP_BKLT_SCL MAKE_BASE=TRUE
9	NC_I2C_SD_DISP_BKLT_SDA	=	NC_I2C_SD_DISP_BKLT_SDA MAKE_BASE=TRUE
10	I2C_DISP_BKLT_SCL	=	I2C_DISP_BKLT_SCL MAKE_BASE=TRUE
10	I2C_DISP_BKLT_SDA	=	I2C_DISP_BKLT_SDA MAKE_BASE=TRUE
10	NC_SPI_DISP_BKLT_CLK_R	=	NC_SPI_DISP_BKLT_CLK_R MAKE_BASE=TRUE
10	NC_SPI_DISP_BKLT_CS_L	=	NC_SPI_DISP_BKLT_CS_L MAKE_BASE=TRUE
10	NC_SPMI_DISP_BKLT_CLK	=	NC_SPMI_DISP_BKLT_CLK MAKE_BASE=TRUE
10	NC_SPMI_DISP_BKLT_DATA	=	NC_SPMI_DISP_BKLT_DATA MAKE_BASE=TRUE
10	NC_SOC_DISP_POL	=	NC_SOC_DISP_POL MAKE_BASE=TRUE
10	NC_DISP_BKLT_FSYNC	=	NC_DISP_BKLT_FSYNC MAKE_BASE=TRUE
75	DISP_BKLT_LSYNC	=	DISP_BKLT_LSYNC MAKE_BASE=TRUE
10	NC_SOC_DISP_TOUCH_BSYNC_0	=	NC_SOC_DISP_TOUCH_BSYNC_0 MAKE_BASE=TRUE
10	NC_SOC_DISP_TOUCH_BSYNC_1	=	NC_SOC_DISP_TOUCH_BSYNC_1 MAKE_BASE=TRUE
10	NC_SOC_DISP_TOUCH_EB	=	NC_SOC_DISP_TOUCH_EB MAKE_BASE=TRUE
10	NC_BKLT_BOOST_THROTTLE_L	=	NC_BKLT_BOOST_THROTTLE_L MAKE_BASE=TRUE
10	NC_SOC_DFR_DISP_TE	=	NC_SOC_DFR_DISP_TE MAKE_BASE=TRUE
77	NC_LCDBKLT_FET_DRV	=	NC_LCDBKLT_FET_DRV MAKE_BASE=TRUE

49 (I2C_DISP_BKLT_SCL)
49 (I2C_DISP_BKLT_SDA)
10 (DISP_BKLT_LSYNC)

D LPDP Aliases

10	NC_SOC_LPDP_DP2HDMI_RCAL_POS	=	NC_SOC_LPDP_DP2HDMI_RCAL_POS MAKE_BASE=TRUE
10	NC_SOC_LPDP_DP2HDMI_RCAL_NEG	=	NC_SOC_LPDP_DP2HDMI_RCAL_NEG MAKE_BASE=TRUE

C Keyboard Backlight

9	SOC_KBD_BKLT_PWM	=	SOC_KBD_BKLT_PWM MAKE_BASE=TRUE
85	SOC_KBD_BKLT_PWM	=	

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SOC: ALIASES PCIE, LPDP TX

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A SMC & NUB ALIAS

8	NC_SOC_SMC_GPIO_1	NC_SOC_SMC_GPIO_1	MAKE_BASE=TRUE
8	NC_SMC_FAN_0_PWM	NC_SMC_FAN_0_PWM	MAKE_BASE=TRUE
8	NC_SMC_FAN_0_TACH	NC_SMC_FAN_0_TACH	MAKE_BASE=TRUE
8	NC_SMC_FAN_1_PWM	NC_SMC_FAN_1_PWM	MAKE_BASE=TRUE
8	NC_SMC_FAN_1_TACH	NC_SMC_FAN_1_TACH	MAKE_BASE=TRUE
8	NC_SOC_NUB_CLK_OUT_0	NC_SOC_NUB_CLK_OUT_0	MAKE_BASE=TRUE
8	NC_SOC_NUB_GPIO_12	NC_SOC_NUB_GPIO_12	MAKE_BASE=TRUE
8	NC_ENET_LOW_PWR	NC_ENET_LOW_PWR	MAKE_BASE=TRUE
8	NC_LOM_PMU_RESET_EN	NC_LOM_PMU_RESET_EN	MAKE_BASE=TRUE

B SENSE ALIAS

14	VSNS_VDD_PCPU	VSNS_VDD_PCPU	MAKE_BASE=TRUE	55
14	VSNS_VSS_PCPU	VSNS_VSS_PCPU	MAKE_BASE=TRUE	55
14	VSNS_ABSMIN_PCPU	VSNS_ABSMIN_PCPU	MAKE_BASE=TRUE	55
15	VSNS_VDD_ECPU	VSNS_VDD_ECPU	MAKE_BASE=TRUE	55
17	VSNS_VDD_GPU	VSNS_VDD_GPU	MAKE_BASE=TRUE	55
15	VSNS_VDD_SOC	VSNS_VDD_SOC	MAKE_BASE=TRUE	55
17	VSNS_VDD_DISP	VSNS_VDD_DISP	MAKE_BASE=TRUE	55
18	VSNS_VDD2H_1	VSNS_VDD2H_1	MAKE_BASE=TRUE	55
18	VSNS_VSS_1	VSNS_VSS_1	MAKE_BASE=TRUE	55
18	VSNS_VDD2H_2	VSNS_VDD2H_2	MAKE_BASE=TRUE	55
18	VSNS_VSS_2	VSNS_VSS_2	MAKE_BASE=TRUE	55
18	VSNS_VDDQ_S1	VSNS_VDDQ_S1	MAKE_BASE=TRUE	55

C ISP ALIAS

6	NC_SOC_ISP_GPIO_1	NC_SOC_ISP_GPIO_1	MAKE_BASE=TRUE
6	NC_SOC_ISP_GPIO_2	NC_SOC_ISP_GPIO_2	MAKE_BASE=TRUE
6	NC_SOC_ISP_GPIO_3	NC_SOC_ISP_GPIO_3	MAKE_BASE=TRUE
6	NC_SOC_ISP_SPMI0_SCLK	NC_SOC_ISP_SPMI0_SCLK	MAKE_BASE=TRUE
6	NC_SOC_ISP_SPMI0_SDATA	NC_SOC_ISP_SPMI0_SDATA	MAKE_BASE=TRUE
6	NC_SOC_ISP_SPMI1_SCLK	NC_SOC_ISP_SPMI1_SCLK	MAKE_BASE=TRUE
6	NC_SOC_ISP_SPMI1_SDATA	NC_SOC_ISP_SPMI1_SDATA	MAKE_BASE=TRUE
6	NC_SOC_ISP_I2C1_SCL	NC_SOC_ISP_I2C1_SCL	MAKE_BASE=TRUE
6	NC_SOC_ISP_I2C1_SDA	NC_SOC_ISP_I2C1_SDA	MAKE_BASE=TRUE
6	NC_SOC_SENSOR0_CLK	NC_SOC_SENSOR0_CLK	MAKE_BASE=TRUE
6	NC_SOC_SENSOR1_CLK	NC_SOC_SENSOR1_CLK	MAKE_BASE=TRUE
6	NC_SOC_SENSOR2_CLK	NC_SOC_SENSOR2_CLK	MAKE_BASE=TRUE
6	NC_SOC_SENSOR3_CLK	NC_SOC_SENSOR3_CLK	MAKE_BASE=TRUE

D MIPI Aliases

6	NC_SOC_MIPI0C_DPCLK	NC_SOC_MIPI0C_DPCLK	MAKE_BASE=TRUE
6	NC_SOC_MIPI0C_DNCLK	NC_SOC_MIPI0C_DNCLK	MAKE_BASE=TRUE
6	NC_SOC_MIPI0C_DPDATA<0>	NC_SOC_MIPI0C_DPDATA<0>	MAKE_BASE=TRUE
6	NC_SOC_MIPI0C_DNDATA<0>	NC_SOC_MIPI0C_DNDATA<0>	MAKE_BASE=TRUE
6	NC_SOC_MIPI0C_DPDATA<1>	NC_SOC_MIPI0C_DPDATA<1>	MAKE_BASE=TRUE
6	NC_SOC_MIPI0C_DNDATA<1>	NC_SOC_MIPI0C_DNDATA<1>	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_DPCLK	NC_SOC_MIPI1C_DPCLK	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_DNCLK	NC_SOC_MIPI1C_DNCLK	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_DPDATA<0>	NC_SOC_MIPI1C_DPDATA<0>	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_DNDATA<0>	NC_SOC_MIPI1C_DNDATA<0>	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_DPDATA<1>	NC_SOC_MIPI1C_DPDATA<1>	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_DNDATA<1>	NC_SOC_MIPI1C_DNDATA<1>	MAKE_BASE=TRUE
6	NC_SOC_MIPID_DPCLK	NC_SOC_MIPID_DPCLK	MAKE_BASE=TRUE
6	NC_SOC_MIPID_DNCLK	NC_SOC_MIPID_DNCLK	MAKE_BASE=TRUE
6	NC_SOC_MIPID_DPDATA<0>	NC_SOC_MIPID_DPDATA<0>	MAKE_BASE=TRUE
6	NC_SOC_MIPID_DNDATA<0>	NC_SOC_MIPID_DNDATA<0>	MAKE_BASE=TRUE
6	NC_SOC_MIPI0C_REXT	NC_SOC_MIPI0C_REXT	MAKE_BASE=TRUE
6	NC_SOC_MIPI1C_REXT	NC_SOC_MIPI1C_REXT	MAKE_BASE=TRUE
6	NC_SOC_MIPID_REXT	NC_SOC_MIPID_REXT	MAKE_BASE=TRUE

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SOC: ALIASES CAMERA, USB, MISC

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SCSET RULES

DIELECTRIC BASED SPACING RULES	
RULE DEFINITION	LIST OF VALUES
A_DIELECTRIC_(N)X Calculates dielectric distance from stackup, shortest distance is used unless 'L'is defined	EXAMPLE: 1,3-5,7L,8L-10L 2-10
A_DIELECTRIC_(N)XD XV,XVL,X Calculates dielectric distance from Hybrid Table and stackup, shortest distance is used unless 'L' defined	EXAMPLE: 2,1DL,3D-5D,7V,8VL-10VL PLEASE USE HYBRID TABLE
A_DIELECTRIC_(N)XIN_(N)XOUT Calculates dielectric distance from stackup, shortest distance is used unless 'L' is defined	EXAMPLE: 2_4,3L_5L

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PHYSICAL CONSTRAINT SET, CLASS ASSIGNMENT

CLASS DEFINITIONS			COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*	CLEAR FLAGGED
CLASS NAME	DIFF P P N	CONSTRAINT SET	DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)	Y/N
I2C	P	A_45_OHM_SE	*SMB*SCL*,*SMB*SDA*,*I2C*SCL*,*I2C*SDA*,*I2C*INT*	Y
SPI	P	A_45_OHM_SE	*SPI*MISO*,*SPI*MOSI*,*SPI*CLK*,*SPI*CS*	Y
SPMI	P	A_45_OHM_SE	*SPMI*	Y
SWD	P	A_45_OHM_SE	SWD_NAND*,SWD_NUB*	Y
JTAG	P	A_45_OHM_SE	*JTAG*SEL,*JTAG*TCK,*JTAG*TDI,*JTAG*TDO,*JTAG*TMS	Y
CLOCK_24M	P	A_45_OHM_SE	SOC_XTAL24M*,SOC_24M_O_R,NAND0_CLK24M*	Y
CLOCK_32K	P	A_45_OHM_SE	PMU_CLK32K*	Y
TDM_LEFT	P	A_45_OHM_SE	TDM_SPKRAMP_L*	Y
TDM_RIGHT	P	A_45_OHM_SE	TDM_SPKRAMP_R*	Y
TDM_CODEC	P	A_45_OHM_SE	TDM_CODEC*	Y
SPKR_ICC	P	A_45_OHM_SE	SPKRAMP_ICC,SPKRAMP_*_ICC_R	Y
UART	P	A_45_OHM_SE	UART_*	Y
RESETS	P	A_45_OHM_SE	*RST*,*RESET*,*PERST*	Y
WDOG	P	A_45_OHM_SE	SOC_WDOG	Y
SOCHOT	P	A_45_OHM_SE	SOC_SOCHOT_L	Y
POWER_BUTTON	P	A_45_OHM_SE	*PMU_ONOFF*	Y
FAULT	P	A_45_OHM_SE	*FAULT*	Y
DMIC_PDM	P	A_45_OHM_SE	PDM_DMIC_DATA*,DMIC_DATA*,PDM_DMIC_CLK*,DMIC_CLK*	Y
CIO_D2R	P	A_85_OHM_DIFF	DP:DP_USBC*_D2R*	Y
CIO_R2D	P	A_85_OHM_DIFF	DP:DP_USBC*_R2D*	Y
PCIE_NAND_D2R	P	A_85_OHM_DIFF	DP:DP_PCIE_NAND*_D2R*	Y
PCIE_NAND_R2D	P	A_85_OHM_DIFF	DP:DP_PCIE_NAND*_R2D*	Y
PCIE_WLBT_D2R	P	A_85_OHM_DIFF	DP:DP_PCIE_WLBT*_R2D*	Y
PCIE_WLBT_R2D	P	A_85_OHM_DIFF	DP:DP_PCIE_WLBT*_D2R*	Y
LPDP	P	A_85_OHM_DIFF	DP:DP_LPDP_INT_DATA*	Y
LPDP_FTCAM	P	A_85_OHM_DIFF	DP:DP_LPDP_FTCAM_DATA*	Y
PCIE_CLK	P	A_85_OHM_DIFF	DP:DP_PCIE_CLK100M*	Y
PCIE_CLKREQ	P	A_45_OHM_SE	*CLKREQ*	Y
EUSB	P	A_85_OHM_DIFF	DP:DP_EUSB*	Y
GROUND	P	DEFAULT	GND	Y
POWER	P	POWER	PP*,PN*	Y

PHYSICAL CONSTRAINT SET, NET ASSIGNMENT

DOMAIN DP P N	NET RULE ASSIGNMENT	
	CONSTRAINT SET	COMMA SEPARATED NET NAMES (WILDCARD SUPPORT EX: DDR*)

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17.4 PHYSICAL CSETS

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SPACING CONSTRAINT SET, CLASS ASSIGNMENT

CLASS DEFINITIONS			COMMA SEPARATED WITH WILDCARD SUPPORT: NET NAMES EX: DDR*	CLEAR OVERRIDE
CLASS NAME	DOMAIN E,P,S	CONSTRAINT SET	DP NAMES EX: DP:DP_AA*,DP_BB* (LINE STARTS WITH FLAG DP:)	Y/N
CLOCK_24M	S	A_DIELECTRIC_3X	=	Y
CLOCK_32K	S	A_DIELECTRIC_3X	=	Y
CIO_D2R	S	A_DIELECTRIC_9X	=	Y
CIO_R2D	S	A_DIELECTRIC_9X	=	Y
PCIE_NAND_D2R	S	A_DIELECTRIC_9X	=	Y
PCIE_NAND_R2D	S	A_DIELECTRIC_9X	=	Y
PCIE_WLBT_D2R	S	A_DIELECTRIC_7X	=	Y
PCIE_WLBT_R2D	S	A_DIELECTRIC_7X	=	Y
PCIE_CLK	S	A_DIELECTRIC_6X	=	Y
LPDP	S	A_DIELECTRIC_6X	=	Y
LPDP_FTCAM	S	A_DIELECTRIC_5X	=	Y
EUSB	S	A_DIELECTRIC_5X	=	Y
GROUND	S	DEFAULT	=	Y
POWER	S	DEFAULT	=	Y

RF	S	RF	RF_ANT*	Y

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SPACING CONSTRAINT SET ASSIGNMENT, CLASS-CLASS

CLASS TO CLASS SPACING		
CLASS NAME	CLASS NAME	CONSTRAINT SET
CIO_D2R	GROUND	DEFAULT_WITH_4X_TO_SHAPE
CIO_R2D	GROUND	DEFAULT_WITH_4X_TO_SHAPE
LPDP	GROUND	DEFAULT_WITH_4X_TO_SHAPE
LPDP_FTCAM	GROUND	DEFAULT_WITH_4X_TO_SHAPE
PCIE_CLK	GROUND	DEFAULT_WITH_4X_TO_SHAPE
PCIE_NAND_D2R	GROUND	DEFAULT_WITH_4X_TO_SHAPE
PCIE_NAND_R2D	GROUND	DEFAULT_WITH_4X_TO_SHAPE
PCIE_WLBT_D2R	GROUND	DEFAULT_WITH_4X_TO_SHAPE
PCIE_WLBT_R2D	GROUND	DEFAULT_WITH_4X_TO_SHAPE
CIO_D2R	POWER	DEFAULT_WITH_4X_TO_SHAPE
CIO_R2D	POWER	DEFAULT_WITH_4X_TO_SHAPE
LPDP	POWER	DEFAULT_WITH_4X_TO_SHAPE
LPDP_FTCAM	POWER	DEFAULT_WITH_4X_TO_SHAPE
PCIE_CLK	POWER	DEFAULT_WITH_4X_TO_SHAPE
PCIE_NAND_D2R	POWER	DEFAULT_WITH_4X_TO_SHAPE
PCIE_NAND_R2D	POWER	DEFAULT_WITH_4X_TO_SHAPE
PCIE_WLBT_D2R	POWER	DEFAULT_WITH_4X_TO_SHAPE
PCIE_WLBT_R2D	POWER	DEFAULT_WITH_4X_TO_SHAPE
CIO_D2R	CIO_D2R	A_DIELECTRIC_4X
CIO_D2R	PCIE_NAND_D2R	A_DIELECTRIC_4X
CIO_D2R	PCIE_WLBT_D2R	A_DIELECTRIC_4X
CIO_D2R	LPDP_FTCAM	A_DIELECTRIC_4X
CIO_D2R	CIO_R2D	A_DIELECTRIC_7X
PCIE_NAND_D2R	PCIE_NAND_D2R	A_DIELECTRIC_4X
PCIE_NAND_D2R	PCIE_WLBT_D2R	A_DIELECTRIC_4X
PCIE_NAND_D2R	LPDP_FTCAM	A_DIELECTRIC_4X
PCIE_NAND_D2R	PCIE_NAND_R2D	A_DIELECTRIC_7X
PCIE_WLBT_D2R	PCIE_WLBT_R2D	A_DIELECTRIC_4X
PCIE_WLBT_D2R	LPDP_FTCAM	A_DIELECTRIC_4X
CIO_R2D	CIO_R2D	A_DIELECTRIC_4X
CIO_R2D	PCIE_NAND_R2D	A_DIELECTRIC_4X
CIO_R2D	PCIE_WLBT_R2D	A_DIELECTRIC_4X
CIO_R2D	PCIE_CLK	A_DIELECTRIC_4X
CIO_R2D	LPDP	A_DIELECTRIC_4X
PCIE_NAND_R2D	PCIE_NAND_R2D	A_DIELECTRIC_4X
PCIE_NAND_R2D	PCIE_WLBT_R2D	A_DIELECTRIC_4X
PCIE_NAND_R2D	PCIE_CLK	A_DIELECTRIC_4X
PCIE_NAND_R2D	LPDP	A_DIELECTRIC_4X
PCIE_WLBT_R2D	PCIE_CLK	A_DIELECTRIC_4X
PCIE_WLBT_R2D	LPDP	A_DIELECTRIC_4X
PCIE_CLK	PCIE_CLK	A_DIELECTRIC_4X
PCIE_CLK	LPDP	A_DIELECTRIC_4X
LPDP	LPDP	A_DIELECTRIC_3X
LPDP_FTCAM	LPDP_FTCAM	A_DIELECTRIC_3X

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17.4 SPACING CSETS, CLASS-CLASS

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SOC

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
939-11077	1	PCBA,CORBETT,X2203	U0600	CRITICAL	CPU:INTERPOSER
998-23363	1	IC,DEV,STA,BGA	U0600	CRITICAL	CPU:DEV

B0 BEST

998-26981	1	SOC,STA B0+8G,1Y,10FSTP,LP,BX,H,M2565	U0600	CRITICAL	CPU:SOC_8GB_BEST
998-26978	998-26981	ALT_CMN	ALL	Micron ATK/SCK/ASE	
998-26982	1	SOC,STA B0+16G,1Y,10FSTP,LP,BX,H,M2565	U0600	CRITICAL	CPU: SOC_16GB_BEST
998-26979	998-26982	ALT_CMN	ALL	Micron ATK/SCK/ASE	
998-26984	1	SOC,STA B0+24G,1Z,10FSTP,LP,BX,H,M2565	U0600	CRITICAL	CPU: SOC_24GB_BEST
998-26980	998-26984	ALT_CMN	ALL	Micron ATK/SCK/ASE	

B0 GOOD

998-26988	1	SOC,STA B0+8G,1Y,9FSTP,AP,BX,H,M2565	U0600	CRITICAL	CPU: SOC_8GB_GOOD
998-26985	998-26988	ALT_CMN	ALL	Micron ATK/SCK/ASE	
998-26981	998-26988	ALT_CMN	ALL	Hynix ATK/SCK/ASE - BEST	
998-26978	998-26988	ALT_CMN	ALL	Micron ATK/SCK/ASE - BEST	
998-26989	1	SOC,STA B0+16G,1Y,9FSTP,AP,BX,H,M2565	U0600	CRITICAL	CPU:SOC_16GB_GOOD
998-26986	998-26989	ALT_CMN	ALL	Micron ATK/SCK/ASE	
998-26982	998-26989	ALT_CMN	ALL	Hynix ATK/SCK/ASE - BEST	
998-26979	998-26989	ALT_CMN	ALL	Micron ATK/SCK/ASE - BEST	
998-26990	1	SOC,STA B0+24G,1Z,9FSTP,AP,BX,H,M2565	U0600	CRITICAL	CPU:SOC_24GB_GOOD
998-26987	998-26990	ALT_CMN	ALL	Micron ATK/SCK/ASE	

A1 BEST

998-25075	1	SOC,STA A0+8G,1Y,10C,DEV,BX,H,ATK,M2565	U0600	CRITICAL	CPU:SOC_8GB_BEST_A1
998-25074	998-25075	ALT_CMN	ALL	Hynix SCK	
998-25076	998-25075	ALT_CMN	ALL	Hynix ASE	
998-25077	998-25075	ALT_CMN	ALL	Micron SCK	
998-25078	998-25075	ALT_CMN	ALL	Micron ATK	
998-25079	998-25075	ALT_CMN	ALL	Micron ASE	
998-25081	1	SOC,STA A0+16G,1Y,10C,DEV,BX,H,ATK,M2565	U0600	CRITICAL	CPU: SOC_16GB_BEST_A1
998-25080	998-25081	ALT_CMN	ALL	Hynix SCK	
998-25082	998-25081	ALT_CMN	ALL	Hynix ASE	
998-25083	998-25081	ALT_CMN	ALL	Micron SCK	
998-25084	998-25081	ALT_CMN	ALL	Micron ATK	
998-25085	998-25081	ALT_CMN	ALL	Micron ASE	

A1 GOOD

998-25087	1	SOC,STA A0+8G,1Y,9C,DEV,BX,H,ATK,M2565	U0600	CRITICAL	CPU: SOC_8GB_GOOD_A1
998-25086	998-25087	ALT_CMN	ALL	Hynix SCK	
998-25088	998-25087	ALT_CMN	ALL	Hynix ASE	
998-25089	998-25087	ALT_CMN	ALL	Micron SCK	
998-25090	998-25087	ALT_CMN	ALL	Micron ATK	
998-25091	998-25087	ALT_CMN	ALL	Micron ASE	
998-25075	998-25087	ALT_CMN	ALL	Hynix ATK - BEST	
998-25074	998-25087	ALT_CMN	ALL	Hynix SCK - BEST	
998-25076	998-25087	ALT_CMN	ALL	Hynix ASE - BEST	
998-25077	998-25087	ALT_CMN	ALL	Micron SCK - BEST	
998-25078	998-25087	ALT_CMN	ALL	Micron ATK - BEST	
998-25079	998-25087	ALT_CMN	ALL	Micron ASE - BEST	
998-25093	1	SOC,STA A0+16G,1Y,9C,DEV,BX,H,ATK,M2565	U0600	CRITICAL	CPU:SOC_16GB_GOOD_A1
998-25092	998-25093	ALT_CMN	ALL	Hynix SCK	
998-25094	998-25093	ALT_CMN	ALL	Hynix ASE	
998-25095	998-25093	ALT_CMN	ALL	Micron SCK	
998-25096	998-25093	ALT_CMN	ALL	Micron ATK	
998-25097	998-25093	ALT_CMN	ALL	Micron ASE	
998-25081	998-25093	ALT_CMN	ALL	Hynix ATK - BEST	
998-25080	998-25093	ALT_CMN	ALL	Hynix SCK - BEST	
998-25082	998-25093	ALT_CMN	ALL	Hynix ASE - BEST	
998-25083	998-25093	ALT_CMN	ALL	Micron SCK - BEST	
998-25084	998-25093	ALT_CMN	ALL	Micron ATK - BEST	
998-25085	998-25093	ALT_CMN	ALL	Micron ASE - BEST	

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NAND BOM GROUPS

BOM GROUP	BOM OPTIONS
NANDCFG:ITLC_S5E_128G_TO	NAND_L0:ITLC_128G_TO
NANDCFG:ITLC_S5E_128G_SD	NAND_L0:ITLC_128G_SD
NANDCFG:ITLC_S5E_256G_HY	NAND_L0:ITLC_256G_HY
NANDCFG:ITLC_S5E_256G_SD	NAND_L0:ITLC_256G_SD
NANDCFG:ITLC_S5E_256G_TO	NAND_L0:ITLC_256G_TO
NANDCFG:ITLC_S5E_512G_SD	NAND_L0:ITLC_512G_SD,NAND_L1:ITLC_512G_SD,PARTS_SSDNAND1
NANDCFG:ITLC_S5E_512G_TO	NAND_L0:ITLC_512G_TO,NAND_L1:ITLC_512G_TO,PARTS_SSDNAND1
NANDCFG:ITLC_S5E_512G_HY	NAND_L0:ITLC_512G_HY,NAND_L1:ITLC_512G_HY,PARTS_SSDNAND1
NANDCFG:ITLC_S5E_1P0T_HY	NAND_L0:ITLC_1P0T_HY,NAND_L1:ITLC_1P0T_HY,PARTS_SSDNAND1
NANDCFG:ITLC_S5E_1P0T_TO	NAND_L0:ITLC_1P0T_TO,NAND_L1:ITLC_1P0T_TO,PARTS_SSDNAND1
NANDCFG:ITLC_S5E_2P0T_TO	NAND_L0:ITLC_2P0T_TO,NAND_L1:ITLC_2P0T_TO,PARTS_SSDNAND1
NANDCFG:ITLC_S5E_2P0T_HY	NAND_L0:ITLC_2P0T_HY,NAND_L1:ITLC_2P0T_HY,PARTS_SSDNAND1
NANDCFG:INTERPOSER	NAND_L0:INTERPOSER,NAND_L1:INTERPOSER,PARTS_SSDNAND1
NANDCFG:NONE	NAND_L0:OFF,NAND_L1:OFF,PARTS_SSDNAND1

NAND Landing 0

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-18368	1	IC,NAND,S5E MCP ROUTING STUDY,LGA110	UN000	CRITICAL	NAND_L0:S5E_STUDY
335S00462	1	NAND,3DV4,128GBT,XXX,S5E,256G,T,SLGA110	UN000	CRITICAL	NAND_L0:ITLC_128G_TO
335S00470	1	NAND,3DV4,128GBT,XXX,S5E,256G,SD,SLGA110	UN000	CRITICAL	NAND_L0:ITLC_128G_SD
335S00504	1	NAND,3DV6T,256GB,S5E,XX.X,512G,H,LGA110	UN000	CRITICAL	NAND_L0:ITLC_256G_HY
335S00531	1	NAND,BICS5T,256GB,S5E,XX.X,512G,W,LGA110	UN000	CRITICAL	NAND_L0:ITLC_256G_SD
335S00517	1	NAND,BICS5T,256GB,S5E,XX.X,512G,K,LGA110	UN000	CRITICAL	NAND_L0:ITLC_256G_TO
335S00532	1	NAND,BICS5T,320GB,S5E,XX.X,512G,W,LGA110	UN000	CRITICAL	NAND_L0:ITLC_512G_SD
335S00518	1	NAND,BICS5T,320GB,S5E,XX.X,512G,K,LGA110	UN000	CRITICAL	NAND_L0:ITLC_512G_TO
335S00504	1	NAND,3D6T,256GB,S5E,XX.X,512G,H,LGA110	UN000	CRITICAL	NAND_L0:ITLC_512G_HY
335S00506	1	NAND,3DV6T,512GB,S5E,XX.X,512G,H,LGA110	UN000	CRITICAL	NAND_L0:ITLC_1P0T_HY
335S00519	1	NAND,BICS5T,512GB,S5E,XX.X,512G,K,LGA110	UN000	CRITICAL	NAND_L0:ITLC_1P0T_TO
335S00521	1	NAND,BICS5T,1TB,S5E,XX.X,512G,K,LGA110	UN000	CRITICAL	NAND_L0:ITLC_2P0T_TO
335S00508	1	NAND,3DV6T,1TB,S5E,XX.X,512G,H,LGA110	UN000	CRITICAL	NAND_L0:ITLC_2P0T_HY
939-08815	1	PCBA,BANDIPUR,X1711	UN000	CRITICAL	NAND_L0:INTERPOSER

NAND Landing 1

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-18368	1	IC,NAND,S5E MCP ROUTING STUDY,LGA110	UN100	CRITICAL	NAND_L1:S5E_STUDY
335S00531	1	NAND,BICS5T,256GB,S5E,XX.X,512G,W,LGA110	UN100	CRITICAL	NAND_L1:ITLC_512G_SD
335S00517	1	NAND,BICS5T,256GB,S5E,XX.X,512G,K,LGA110	UN100	CRITICAL	NAND_L1:ITLC_512G_TO
335S00504	1	NAND,3D6T,256GB,S5E,XX.X,512G,H,LGA110	UN100	CRITICAL	NAND_L1:ITLC_512G_HY
335S00506	1	NAND,3DV6T,512GB,S5E,XX.X,512G,H,LGA110	UN100	CRITICAL	NAND_L1:ITLC_1P0T_HY
335S00519	1	NAND,BICS5T,512GB,S5E,XX.X,512G,K,LGA110	UN100	CRITICAL	NAND_L1:ITLC_1P0T_TO
335S00521	1	NAND,BICS5T,1TB,S5E,XX.X,512G,K,LGA110	UN100	CRITICAL	NAND_L1:ITLC_2P0T_TO
335S00508	1	NAND,3DV6T,1TB,S5E,XX.X,512G,H,LGA110	UN100	CRITICAL	NAND_L1:ITLC_2P0T_HY
939-08815	1	PCBA,BANDIPUR,X1711	UN100	CRITICAL	NAND_L1:INTERPOSER

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A Module Parts

RT13 Retimer

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-21959	2	IC,LIFUKA,A0,USB-C RETIMER,FCCSP154	UF000,UF100	CRITICAL	ATCRTMR:A0
998-25504	2	IC,LIFUKA,B0,USB-C RETIMER,DEV,CSP154	UF000,UF100	CRITICAL	ATCRTMR:B0

Ace2

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S02158	3	IC,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123	UF400,UF500,U5500	CRITICAL	USBCPC:LAPTOP_B2_PPO
353S02742	3	IC,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123	UF400,UF500,U5500	CRITICAL	USBCPC:LAPTOP_B2
353S02993	3	IC,ACE2,B3,USB PWR SW W/HV,ROM3,BGA123	UF400,UF500,U5500	CRITICAL	USBCPC:LAPTOP_B3

eUSB Level Shifter

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00628	2	IC,PARROT,CD2E226B,B0 LSB1,OTP-6,CSP25	UF600,UF650	CRITICAL	EUSB_LS:B0

Re-timer Sequencer

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S00483	2	IC,SLG4AP44593,PWR RAIL SEQUENCER,QFN8	UF790	CRITICAL	

SECURE ELEMENT

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00629	1	IC,SN210V,B1,CERES,DEV,VER=LN,WLCSP81	U5000	CRITICAL	SE:DEV_SW_LN
338S00630	1	IC,SN210V,B1,CERES,PROD,VER=MU,WLCSP81	U5000	CRITICAL	SE:PROD_SW_MU

B Programmable Parts

USBC ACE2 ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00133	1	IC,SPI SERIAL FLASH,8MBITS,3.0V,USON8	UF260	CRITICAL	UPC01_ROM:BLANK

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S00537	335S00133	UPC01_ROM:BLANK	UF260	rdar://80303180
335S00570	335S00133	UPC01_ROM:BLANK	UF260	rdar://80303180
335S00571	335S00133	UPC01_ROM:BLANK	UF260	rdar://80303180

341S01912	1	ROM,ACE-P01 (V2.112.0.5) PROTO-0,X2203	UF260	CRITICAL	UPC01_ROM:P0
341S01998	1	ROM,ACE-P01 (V2.116.0.5) PROTO-2,X2203	UF260	CRITICAL	UPC01_ROM:P2
341S02052	1	Description: ROM,ACE-P01 (V2.131.3.6) EVT,X2203	UF260	CRITICAL	UPC01_ROM:EVT

MagSafe ACE2 ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S00133	1	IC,SPI SERIAL FLASH,8MBITS,3.0V,USON8	U5560	CRITICAL	UPC5_ROM:BLANK

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S00537	335S00133	UPC5_ROM:BLANK	U5560	rdar://80303078
335S00570	335S00133	UPC5_ROM:BLANK	U5560	rdar://80303078
335S00571	335S00133	UPC5_ROM:BLANK	U5560	rdar://80303078

341S01913	1	ROM,ACE-P5 (V2.112.0.3) PROTO-0,X2203	U5560	CRITICAL	UPC5_ROM:P0
341S01999	1	ROM,ACE-P5 (V2.116.0.3) PROTO-2,X2203	U5560	CRITICAL	UPC5_ROM:P2
341S02053	1	ROM,ACE-P5 (V2.131.3.6) EVT,X2203	U5560	CRITICAL	UPC5_ROM:EVT

SOC ROM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-22994	1	IC,FLASH,64MBIT,1.2V,QE=1,M,4X4MM,SON8	U1900	CRITICAL	SOC_ROM:BLANK_P1
335S00575	1	IC,FLASH,64MBIT,1.2V,QE=1,M,4X4MM,SON8	U1900	CRITICAL	SOC_ROM:BLANK

RT13 ROM(s)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-22993	2	IC,FLASH,64MBIT,1.2V,QE=1,M,4X4MM,SON8	UF090,UF190	CRITICAL	RT13_ROM:BLANK_P1
335S00574	2	IC,FLASH,64MBIT,1.2V,QE=1,M,4X4MM,SON8	UF090,UF190	CRITICAL	RT13_ROM:BLANK

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S00575	335S00574	RT13_ROM:BLANK	UF090,UF190	rdar://76779010

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SPMU

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-23585	1	IC,PMU,VALE,CSP196	U7700	CRITICAL	SPMU_IC:DEV
998-24583	1	IC,PMU,VALE,A0,OTP-JPC,CSP196	U7700	CRITICAL	SPMU_IC:A0_JPC
998-25434	1	IC,PMU,VALE,A0,OTP-JPD,WLCSP196	U7700	CRITICAL	SPMU_IC:A0_JPD
998-26179	1	IC,PMU,VALE,A0,OTP-JPE,WLCSP196	U7700	CRITICAL	SPMU_IC:A0_JPE
998-26198	1	IC,PMU,VALE,A0,OTP-JPF,WLCSP196	U7700	CRITICAL	SPMU_IC:A0_JPF
998-26683	1	IC,PMU,VALE,A0,OTP-JPG,WLCSP196	U7700	CRITICAL	SPMU_IC:A0_JPG
998-26878	1	IC,PMU,VALE,A0,OTP-JPH,WLCSP196	U7700	CRITICAL	SPMU_IC:A0_JPH
998-27502	1	IC,PMU,VALE,A0,OTP-JPI,WLCSP196	U7700	CRITICAL	SPMU_IC:A0_JPI

MPMU

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-23524	1	IC,PMU,STOWE,CSP420	U8100	CRITICAL	MPMU_IC:DEV
998-24581	1	IC,PMU,STOWE,A0,OTP-JPC,CSP420	U8100	CRITICAL	MPMU_IC:A0_JPC
998-25433	1	IC,PMU,STOWE,A0,OTP-JPD,WLCSP420	U8100	CRITICAL	MPMU_IC:A0_JPD
998-26178	1	IC,PMU,STOWE,A0,OTP-JPE,WLCSP420	U8100	CRITICAL	MPMU_IC:A0_JPE
998-26197	1	IC,PMU,STOWE,A0,OTP-JPF,WLCSP420	U8100	CRITICAL	MPMU_IC:A0_JPF
998-26682	1	IC,PMU,STOWE,A0,OTP-JPG,WLCSP420	U8100	CRITICAL	MPMU_IC:A0_JPG
998-26877	1	IC,PMU,STOWE,A0,OTP-JPH,WLCSP420	U8100	CRITICAL	MPMU_IC:A0_JPH
998-27501	1	IC,PMU,STOWE,A0,OTP-JPI,WLCSP420	U8100	CRITICAL	MPMU_IC:A0_JPI

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Alternates

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	Alternate Vendor	Primary Vendor
138S0846	138S0811	ALT_CMN	ALL	rdar://problem/59474499	Samsung	Murata
376S1053	376S0604	ALT_CMN	ALL	rdar://problem/59475163	Diodes Inc	Fairchild
740S00041	740S0159	ALT_CMN	ALL	rdar://problem/59438907	Bourns	LittelFuse
107S00033	107S00034	ALT_CMN	ALL	rdar://problem/59471007	TFT	Cyntec
376S0948	376S00076	ALT_CMN	ALL	rdar://problem/59134310	Diodes Inc	Toshiba
128S00031	128S0011	ALT_CMN	ALL	rdar://problem/73938832	ROHM CORP	Kemet
128S00026	128S00011	ALT_CMN	ALL	rdar://problem/73938832	NEC	Kemet
128S00087	128S0011	ALT_CMN	ALL	rdar://problem/73938832	Panasonic	Kemet
376S00228	376S1179	ALT_CMN	ALL	rdar://problem/73939839	Fairchild	Vishay
376S00007	376S1179	ALT_CMN	ALL	rdar://problem/73939839	AOS	Vishay
376S1147	376S00281	ALT_CMN	ALL	rdar://problem/73940207	On Semi	AOS
107S00029	107S00087	ALT_CMN	ALL	rdar://problem/73982640	TFT	Yageo
138S00332	138S00328	ALT_CMN	ALL	rdar://problem/74145755	Kyocera	Murata
138S0863	138S1058	ALT_CMN	ALL	rdar://problem/74148337	Taiyo	Murata
138S00229	138S00107	ALT_CMN	ALL	rdar://problem/74148104	Kyocera	Murata
138S00022	138S0801	ALT_CMN	ALL	rdar://problem/74146716	Taiyo	Murata/Samsung
152S00398	152S00204	ALT_CMN	ALL	rdar://problem/73959393	Taiyo	Cyntec
152S01317	152S01268	ALT_CMN	ALL	rdar://problem/73958701	Taiyo	Cyntec
152S00997	152S00476	ALT_CMN	ALL	rdar://problem/73957803	Chilisin	Murata
107S00055	107S00090	ALT_CMN	ALL	rdar://problem/73982769	Cyntec	TFT
138S00181	138S0835	ALT_CMN	ALL	rdar://problem/74150148	Samsung	Murata
138S00291	138S0835	ALT_CMN	ALL	rdar://problem/74150148	Kyocera	Murata
377S00166	377S00160	ALT_CMN	ALL	rdar://problem/59407974	Semtech	On Semi
138S00330	138S00081	ALT_CMN	ALL	rdar://problem/74146122	SEMCO	Murata
377S00123	377S00031	ALT_CMN	ALL	rdar://problem/59407768	Semtech	On Semi
377S00186	377S00060	ALT_CMN	ALL	rdar://problem/59407847	Semtech	ST Micro
311S00230	311S00212	ALT_CMN	ALL	rdar://problem/71866385	Nexperia	TI
138S0771	138S00336	ALT_CMN	ALL	rdar://problem/71832350	Taiyo	Murata
138S00343	138S00329	ALT_CMN	ALL	rdar://problem/71832255	Kyocera	Murata
107S00076	107S00044	ALT_CMN	ALL	rdar://problem/71831138	Yageo	Cyntec
138S00151	138S00149	ALT_CMN	ALL	rdar://problem/71832189	Taiyo	Murata
138S00150	138S00149	ALT_CMN	ALL	rdar://problem/71832189	SEMCO	Murata
138S00148	138S00149	ALT_CMN	ALL	rdar://problem/71832189	Kyocera	Murata
107S00365	107S00373	ALT_CMN	ALL	rdar://problem/71831414	Cyntec	TFT
132S00176	132S0640	ALT_CMN	ALL	rdar://problem/71831575	Yageo	Murata
138S00164	138S00138	ALT_CMN	ALL	rdar://problem/71831667	Taiyo	Kyocera
138S00280	138S00138	ALT_CMN	ALL	rdar://problem/71831667	Samsung	Kyocera
138S00139	138S00138	ALT_CMN	ALL	rdar://problem/71831667	Murata	Kyocera
138S00047	138S00073	ALT_CMN	ALL	rdar://problem/71831776	Taiyo	Murata
138S00097	138S0750	ALT_CMN	ALL	rdar://problem/74149037	Taiyo Yuden	Murata
155S00007	155S0667	ALT_CMN	ALL	rdar://problem/73218092	Taiyo	Pansonic
740S00081	740S00053	ALT_CMN	ALL	rdar://problem/73218321	Bourns	AEM
377S00210	377S00172	ALT_CMN	ALL	rdar://problem/73218476	Semtech	TI
376S00292	376S1140	ALT_CMN	ALL	rdar://problem/73218568	Nexperia	Diodes Inc
376S00303	376S00012	ALT_CMN	ALL	rdar://problem/73219339	Diodes Inc	TI
128S00106	128S00107	ALT_CMN	ALL	rdar://problem/73938270	Tokin	Kemet
128S00110	128S00107	ALT_CMN	ALL	rdar://problem/73938270	Samsung	Kemet
371S00220	371S00307	ALT_CMN	ALL	rdar://problem/73940785	On Semi	Diodes Inc
152S00991	152S00984	ALT_CMN	ALL	rdar://problem/73958066	Taiyo	Cyntec
152S01378	152S01283	ALT_CMN	ALL	rdar://problem/80602206	Microgate	Cyntec
152S01494	152S01263	ALT_CMN	ALL	rdar://problem/73957626	Taiyo	Cyntec
152S00979	152S00874	ALT_CMN	ALL	rdar://problem/73960389	Taiyo	Cyntec
311S00322	311S00321	ALT_CMN	ALL	rdar://problem/72334560	Nexperia	TI
335S00232	335S00133	ALT_CMN	ALL	rdar://problem/73953460	Macronix	Winbond
138S00197	138S00409	ALT_CMN	ALL	rdar://problem/75264457	Murata	Taiyo
138S00413	138S00410	ALT_CMN	ALL	rdar://problem/75264676	Murata	Taiyo
376S00521	376S00519	ALT_CMN	ALL	rdar://problem/74496873	Vishay	On Semi
197S00318	197S00323	ALT_CMN	ALL	rdar://problem/75588335	NDK	TXC
197S00335	197S00323	ALT_CMN	ALL	rdar://problem/75588335	Kyocera	TXC

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	Alternate Vendor	Primary Vendor
371S00085	371S00190	ALT_CMN	ALL	rdar://problem/59404601	On Semi	Diodes Inc
311S00156	311S00129	ALT_CMN	ALL	rdar://problem/59489090	Nexperia	TI
376S1080	376S0820	ALT_CMN	ALL	rdar://problem/59489026	Diodes Inc	On Semi
311S00269	311S00234	ALT_CMN	ALL	rdar://problem/59489341	Nexperia	TI
376S1128	376S00282	ALT_CMN	ALL	rdar://problem/73941008	Diodes Inc	On Semi
376S00224	376S00282	ALT_CMN	ALL	rdar://problem/73941008	Nexperia	On Semi
107S00101	107S00005	ALT_CMN	ALL	TBD	Yageo	Cyntec
107S00102	107S00017	ALT_CMN	ALL	TBD	Yageo	Cyntec
107S0276	107S00020	ALT_CMN	ALL	TBD	Cyntec	TFT
107S00370	107S00371	ALT_CMN	ALL	TBD	Yageo	Cyntec/Yageo
107S00372	107S00371	ALT_CMN	ALL	TBD	Vishay	Cyntec/Yageo
107S00298	107S00460	ALT_CMN	ALL	TBD	TDK	Murata
107S0150	107S00460	ALT_CMN	ALL	TBD	Panasonic	Murata
138S00284	138S00136	ALT_CMN	ALL	rdar://problem/74149755	Kyocera	Murata
138S0852	138S0818	ALT_CMN	ALL	TBD	Samsung	Murata
155S0275	155S00188	ALT_CMN	ALL	TBD	Taiyo Yuden	Murata
155S0706	155S0302	ALT_CMN	ALL	TBD	Taiyo Yuden	Murata
155S0741	155S0361	ALT_CMN	ALL	TBD	Murata	TDK
155S0823	155S0644	ALT_CMN	ALL	TBD	TDK/Taiyo	Murata
311S00267	311S00244	ALT_CMN	ALL	TBD	Nexperia	TI
311S00268	311S00246	ALT_CMN	ALL	TBD	Nexperia	TI
152S01163	152S00136	ALT_CMN	ALL	Per Louisa Zhang	Chilisin	Cyntec
138S00031	138S0861	ALT_CMN	ALL	rdar://73954319	Murata/Taiyo	Murata
152S00810	152S01601	ALT_CMN	ALL	TBD	Taiyo Yuden	Cyntec
152S00809	152S00332	ALT_CMN	ALL	TBD	Taiyo Yuden	Cyntec
740S0118	740S00028	ALT_CMN	ALL	rdar://problem/74350704	Polytronics	Bussmann
740S0144	740S00028	ALT_CMN	ALL	rdar://problem/74350704	LittelFuse	Bussman
128S00094	128S00067	ALT_CMN	ALL	rdar://problem/73939352	Tokin/Kemet	Panasonic
128S00069	128S00067	ALT_CMN	ALL	rdar://problem/73939352	Rohm	Panasonic
138S00385	138S00377	ALT_CMN	ALL	rdar://problem/73954116	Kyocera	Murata
152S01521	152S01459	ALT_CMN	ALL	rdar://problem/74521339	Chilisin	Cyntec
152S01520	152S01458	ALT_CMN	ALL	rdar://problem/74521392	Chilisin	Cyntec
152S01519	152S01457	ALT_CMN	ALL	rdar://problem/74521425	Chilisin	Cyntec
311S00317	311S00316	ALT_CMN	ALL	TBD	Nexperia	TI
311S00272	311S00287	ALT_CMN	ALL	TBD	Nexperia	TI
311S00336	311S0613	ALT_CMN	ALL	TBD	TI	NXP/Diodes
138S00416	138S00328	ALT_CMN	ALL	rdar://problem/74145755	Taiyo Yuden	Murata
138S00087	138S1086	ALT_CMN	ALL	TBD	Taiyo Yuden	Murata
376S00332	376S0855	ALT_CMN	ALL	rdar://problem/75089079	Nexperia	Diodes Inc
376S00074	376S0855	ALT_CMN	ALL	rdar://problem/75089079	Toshiba	Diodes Inc
197S0590	197S0591	ALT_CMN	ALL	rdar://problem/73953315	EPSON	NDK
197S0588	197S0591	ALT_CMN	ALL	rdar://problem/73953315	TXC	NDK
311S0612	311S00263	ALT_CMN	ALL	rdar://problem/76165274	NXP	TI
311S00057	311S00263	ALT_CMN	ALL	rdar://problem/76165274	Diodes Inc	TI
152S01548	152S00289	ALT_CMN	ALL	rdar://problem/76165749	Murata	Cyntec
353S02402	353S1429	ALT_CMN	ALL	rdar://problem/76165876	On Semi	TI
371S00284	371S00187	ALT_CMN	ALL	rdar://problem/76171510	NXP	On Semi
371S00240	371S00364	ALT_CMN	ALL	rdar://problem/76171942	NXP	Diodes Inc.
376S00516	376S1112	ALT_CMN	ALL	rdar://problem/74046107	On Semi	Diodes Inc.
152S00343	152S01325	ALT_CMN	ALL	rdar://problem/78474169	Murata	Taiyo Yuden
107S00479	107S00478	ALT_CMN	ALL	rdar://problem/80035462	Yageo	Cyntec
311S00352	311S00353	ALT_CMN	ALL	rdar://problem/80101244	Nexperia	TI
138S1065	138S1058	ALT_CMN	ALL	rdar://problem/80325043	Taiyo Yuden	Murata
371S00205	371S00077	ALT_CMN	ALL	rdar://problem/80305372	Vishay	Nexperia
107S00474	107S00017	ALT_CMN	ALL	rdar://problem/80289091	TFT	Cyntec
107S00475	107S00044	ALT_CMN	ALL	rdar://problem/71831138	Yageo	Cyntec
107S00443	107S00005	ALT_CMN	ALL	rdar://80470921	TFT	Cyntec

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:	Alternate Vendor	Primary Vendor
311S00078	311S00275	ALT_CMN	ALL	rdar://80479617	Nexperia	Ti
311S00006	311S00323	ALT_CMN	ALL	rdar://72334608	Nexperia	Ti
152S01461	152S01283	ALT_CMN	ALL	rdar://80602206	Sunlord	Cyntec
104S00138	104S00135	ALT_CMN	ALL	rdar://80471945	TFT	Cyntec/Yageo
371S00370	371S00062	ALT_CMN	ALL	rdar://80501286	Diodes	On Semi
311S00361	311S00362	ALT_CMN	ALL	rdar://81349317	Diodes	Ti
311S00360	311S00362	ALT_CMN	ALL	rdar://81349317	Nexperia	Ti
116S00014	116S00044	ALT_CMN	ALL	rdar://80606250	Cyntec/ROHM	TFT
311S00335	311S00155	ALT_CMN	ALL	rdar://82988239	Ti	Nexperia
376S0725	376S0604	ALT_CMN	ALL	rdar://82961072	Vishay	Fairchild

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Apple Inc.

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EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
	685-00426	COMMON PARTS,MLB,X2203	MLB_COMMON,ALTERNATE:PART,ALT_CMN
	685-00427	PARTS,SSD NAND1,MLB,X2203	SSD_2L,ALTERNATE:PART,ALT_CMN
0VRW	939-10926	PCBA,MLB,DCDC,X2203	MLB_COMMON,DEV_PARTS_BOM,NANDCFG:INTERPOSER,CPU:INTERPOSER,ALTERNATE:PART,ALT_CMN
1620	939-11657	PCBA,MLB,RF-CHAR,X2203	RF_COMMON
	985-01536	DEV PARTS,MLB,X2203	MLB_DEV,ALTERNATE:PART,ALT_CMN

SOC (BEST), Hynix and Micron 8GB

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
0W89	639-15199	PCBA,MLB,BEST,SOC,M-8G,SD-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_128G_SD
0W8C	639-15200	PCBA,MLB,BEST,SOC,M-8G,TO-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_128G_TO
0W8H	639-15203	PCBA,MLB,BEST,SOC,M-8G,HY-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_256G_HY
0W8J	639-15204	PCBA,MLB,BEST,SOC,M-8G,SD-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_256G_SD
0W8K	639-15205	PCBA,MLB,BEST,SOC,M-8G,TO-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_256G_TO
0W8P	639-15209	PCBA,MLB,BEST,SOC,M-8G,SD-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_512G_SD
0W8Q	639-15210	PCBA,MLB,BEST,SOC,M-8G,TO-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_512G_TO
1JQJ	639-16109	PCBA,MLB,BEST,SOC,M-8G,HY-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_512G_HY
0W8V	639-15213	PCBA,MLB,BEST,SOC,M-8G,HY-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_1P0T_HY
0W8W	639-15214	PCBA,MLB,BEST,SOC,M-8G,TO-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_1P0T_TO
0W90	639-15217	PCBA,MLB,BEST,SOC,M-8G,HY-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_2P0T_HY
0W91	639-15218	PCBA,MLB,BEST,SOC,M-8G,TO-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_BEST,NANDCFG:ITLC_S5E_2P0T_TO

SOC (GOOD), Hynix and Micron 8GB

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
Q2D9	639-15221	PCBA,MLB,GOOD,SOC,M-8G,SD-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_128G_SD
Q2DC	639-15222	PCBA,MLB,GOOD,SOC,M-8G,TO-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_128G_TO
Q2DD	639-15225	PCBA,MLB,GOOD,SOC,M-8G,HY-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_256G_HY
Q2DF	639-15226	PCBA,MLB,GOOD,SOC,M-8G,SD-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_256G_SD
Q2DG	639-15227	PCBA,MLB,GOOD,SOC,M-8G,TO-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_256G_TO
Q2DH	639-15231	PCBA,MLB,GOOD,SOC,M-8G,SD-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_512G_SD
Q2DJ	639-15232	PCBA,MLB,GOOD,SOC,M-8G,TO-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_512G_TO
1JQK	639-16110	PCBA,MLB,GOOD,SOC,M-8G,HY-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_512G_HY
Q2DK	639-15235	PCBA,MLB,GOOD,SOC,M-8G,HY-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_1P0T_HY
Q2DL	639-15236	PCBA,MLB,GOOD,SOC,M-8G,TO-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_1P0T_TO
Q2DM	639-15239	PCBA,MLB,GOOD,SOC,M-8G,HY-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_2P0T_HY
Q2DN	639-15240	PCBA,MLB,GOOD,SOC,M-8G,TO-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_8GB_GOOD,NANDCFG:ITLC_S5E_2P0T_TO

SOC (BEST), Hynix and Micron 16GB

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
0W8F	639-15201	PCBA,MLB,BEST,SOC,M-16G,SD-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_128G_SD
0W8G	639-15202	PCBA,MLB,BEST,SOC,M-16G,TO-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_128G_TO
0W8L	639-15206	PCBA,MLB,BEST,SOC,M-16G,HY-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_256G_HY
0W8M	639-15207	PCBA,MLB,BEST,SOC,M-16G,SD-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_256G_SD
0W8N	639-15208	PCBA,MLB,BEST,SOC,M-16G,TO-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_256G_TO
0W8R	639-15211	PCBA,MLB,BEST,SOC,M-16G,SD-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_512G_SD
0W8T	639-15212	PCBA,MLB,BEST,SOC,M-16G,TO-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_512G_TO
1JQL	639-16111	PCBA,MLB,BEST,SOC,M-16G,HY-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_512G_HY
0W8X	639-15215	PCBA,MLB,BEST,SOC,M-16G,HY-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_1P0T_HY
0W8Y	639-15216	PCBA,MLB,BEST,SOC,M-16G,TO-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_1P0T_TO
0W92	639-15219	PCBA,MLB,BEST,SOC,M-16G,HY-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_2P0T_HY
0W93	639-15220	PCBA,MLB,BEST,SOC,M-16G,TO-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_BEST,NANDCFG:ITLC_S5E_2P0T_TO

SOC (GOOD), Hynix and Micron 16GB

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
0W96	639-15223	PCBA,MLB,GOOD,SOC,M-16G,SD-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_128G_SD
0W97	639-15224	PCBA,MLB,GOOD,SOC,M-16G,TO-128G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_128G_TO
0W9D	639-15228	PCBA,MLB,GOOD,SOC,M-16G,HY-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_256G_HY
0W9F	639-15229	PCBA,MLB,GOOD,SOC,M-16G,SD-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_256G_SD
0W9G	639-15230	PCBA,MLB,GOOD,SOC,M-16G,TO-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_256G_TO
0W9K	639-15233	PCBA,MLB,GOOD,SOC,M-16G,SD-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_512G_SD
0W9L	639-15234	PCBA,MLB,GOOD,SOC,M-16G,TO-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_512G_TO
1JQM	639-16112	PCBA,MLB,GOOD,SOC,M-16G,HY-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_512G_HY
0W9P	639-15237	PCBA,MLB,GOOD,SOC,M-16G,HY-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_1P0T_HY
0W9Q	639-15238	PCBA,MLB,GOOD,SOC,M-16G,TO-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_1P0T_TO
0W9V	639-15241	PCBA,MLB,GOOD,SOC,M-16G,HY-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_2P0T_HY
0W9W	639-15242	PCBA,MLB,GOOD,SOC,M-16G,TO-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_16GB_GOOD,NANDCFG:ITLC_S5E_2P0T_TO

SOC (BEST), Hynix and Micron 24GB

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
1MNQ	639-16519	PCBA,MLB,BEST,SOC,M-24G,HY-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_256G_HY
1MNP	639-16518	PCBA,MLB,BEST,SOC,M-24G,SD-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_256G_SD
1MPJ	639-16537	PCBA,MLB,BEST,SOC,M-24G,TO-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_256G_TO
1MNT	639-16521	PCBA,MLB,BEST,SOC,M-24G,SD-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_512G_SD
1MNV	639-16522	PCBA,MLB,BEST,SOC,M-24G,TO-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_512G_TO
1MNR	639-16520	PCBA,MLB,BEST,SOC,M-24G,HY-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_512G_HY
1MNW	639-16523	PCBA,MLB,BEST,SOC,M-24G,HY-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_1P0T_HY
1MNX	639-16524	PCBA,MLB,BEST,SOC,M-24G,TO-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_1P0T_TO
1MNY	639-16525	PCBA,MLB,BEST,SOC,M-24G,HY-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_2P0T_HY
1MP0	639-16526	PCBA,MLB,BEST,SOC,M-24G,TO-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_BEST,NANDCFG:ITLC_S5E_2P0T_TO

SOC (GOOD), Hynix and Micron 24GB

EEEE	BOM NUMBER	BOM NAME	BOM OPTIONS
1MP1	639-16527	PCBA,MLB,GOOD,SOC,M-24G,HY-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_256G_HY
1MP2	639-16528	PCBA,MLB,GOOD,SOC,M-24G,SD-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_256G_SD
1MP3	639-16529	PCBA,MLB,GOOD,SOC,M-24G,TO-256G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_256G_TO
1MP4	639-16530	PCBA,MLB,GOOD,SOC,M-24G,SD-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_512G_SD
1MP5	639-16531	PCBA,MLB,GOOD,SOC,M-24G,TO-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_512G_TO
1MP6	639-16532	PCBA,MLB,GOOD,SOC,M-24G,HY-512G,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_512G_HY
1MP7	639-16533	PCBA,MLB,GOOD,SOC,M-24G,HY-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_1P0T_HY
1MP8	639-16534	PCBA,MLB,GOOD,SOC,M-24G,TO-1P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_1P0T_TO
1MP9	639-16535	PCBA,MLB,GOOD,SOC,M-24G,HY-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_2P0T_HY
1MPC	639-16536	PCBA,MLB,GOOD,SOC,M-24G,TO-2P0T,X2203	CMN_PARTS_BOM,DEV_PARTS_BOM,ALTERNATE:PART,ALT_CMN,CPU:SOC_24GB_GOOD,NANDCFG:ITLC_S5E_2P0T_TO

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