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

REV	ZONE	ECN	DESCRIPTION OF CHANGE	CK APPD / DATE	ENG APPD / DATE

SCHEM,MLB,M96
EVT
08/01/2008

Schematic / PCB #'s

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
051-7631	1	SCHEM,MLB,M96	SCH	CRITICAL	
820-2375	1	PCBF,MLB,M96	PCB	CRITICAL	

DRAWING
TITLE=M96_MLB
ABBREV=DRAWING
LAST_MODIFIED=Fri Aug 1 09:54:13 2008

DIMENSIONS ARE IN MILLIMETERS
XX ±
X.XX ±
X.XXX ±
ANGLES ±
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

METRIC

DRAFTER		DESIGN CK	
ENG APPD		MFG APPD	
QA APPD		DESIGNER	
RELEASE		SCALE	NONE

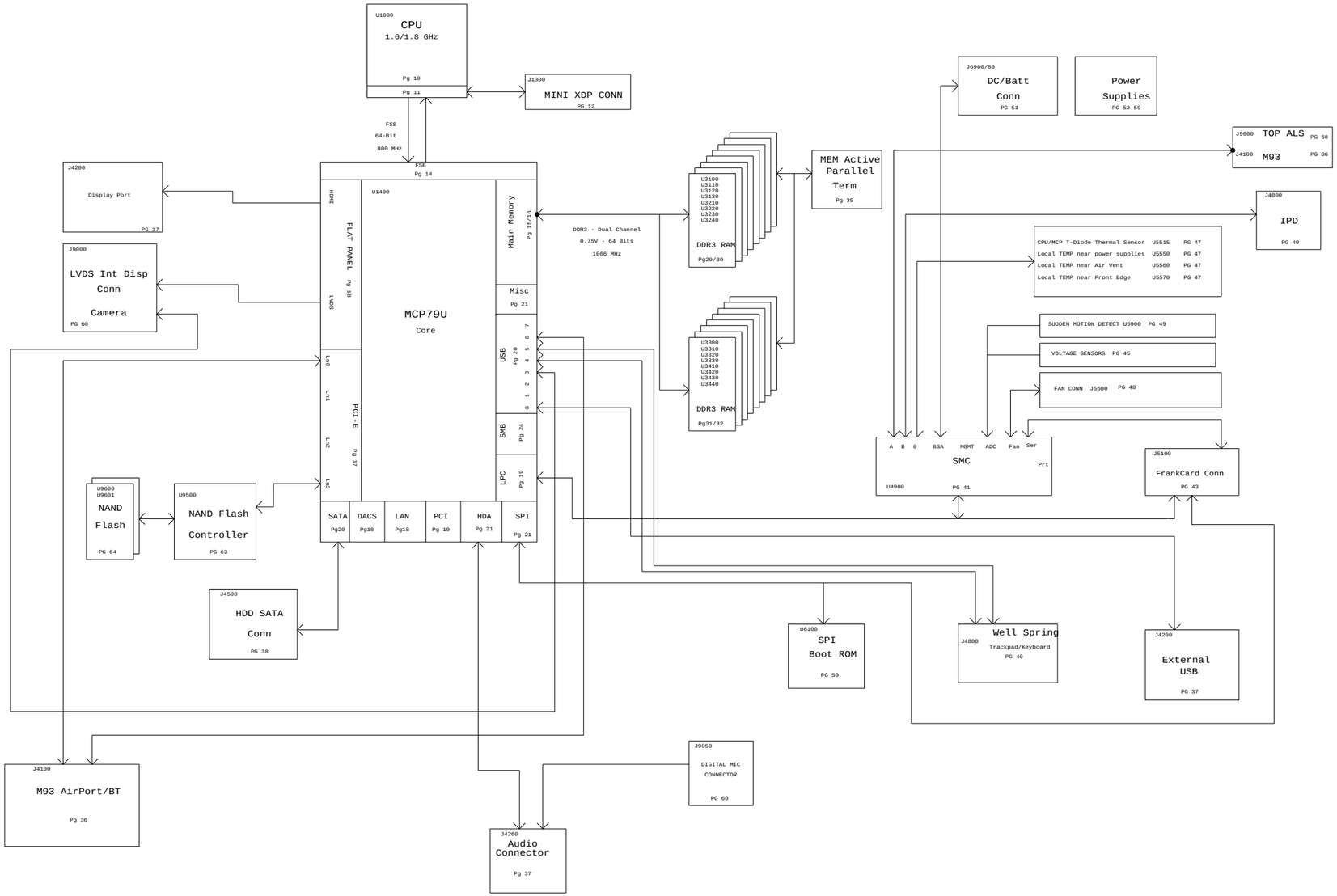
MATERIAL/FINISH NOTED AS APPLICABLE

SIZE D

APPLE INC.

TITLE
SCHEM,MLB,M96

DRAWING NUMBER 051-7631
REV. 2.3.0
SHT 1 OF 71



System Block Diagram

SYNC_MASTER=WFERRY-WF SYNC_DATE=05/11/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 2 OF 71	

M96 POWER SYSTEM ARCHITECTURE

DC-JACK J6980 — PP18V5_DCIN — 6A FUSE F6900 — PP18V5_G3H_CHGR

BATTERY 2S2P

SMBUS_SMC_BSA_SCL, SMBUS_SMC_BSA_SDA

PBUS Supply/ BATTERY CHARGER — ISL6258 U7900 (PAGE 59)

PPVBAT_G3H_CHGR_REG — 7A FUSE — PPBUSB_G3H — R7980 (0.002) — PBUSA_G3H

R7930 — Q7950 — CHGR_BGATE — BATT_POS_F

Q5315

PPDCIN_G3H_R, PPVBATT_G3H_R, PPBUSB_G3H, PPVIN_G3H_DCIN — D6901

PPDCIN_G3H — ENABLE — 3.425V G3HOT LTC3470A U6900 (PAGE 51) — PP3V42_G3H_REG (200 mA MAX CURRENT)

PP3V42_G3H_SMC — SMC PWRGD RN5VD30A-F U5000 (PAGE 42) — SMC_RESET_L

Q7853 — PP1V05_S0_FET — P1V05S0_EN

1.05V — PP1V05_S5_REG (7 A MAX CURRENT) — P1V05_S5_EN (S5)

MCPCORE — PPMCPCORE_S0_REG (25 A MAX CURRENT) — MCPCORES0_EN (S0)

ISL6236 U7200 (PAGE 53) — P1V05_S5_PGOOD — MCPCORES0_PGOOD

MCP79U U1400 — LPC_RESET*, PCIE_RESET*, PWRBTN*, RSMRST*, CPU_RESET*, CPU_PWRGD, PS_PWRGD — MCP_PS_PWRGD

DEBUG_RESET_L, SMC_LRESET_L, FC_RESET_L, PCA9557D_RESET_L, AIRPORT_RST_L, BKLT_PLT_RST_L

CPU U1000 (PAGE 10) — PWRGOOD, RESET* — FSB_CPURST_L, CPU_PWRGD

CPUVCORE — PPVCORE_S0_CPU_REG — PPVCORE_S0_CPU (30 A MAX CURRENT)

IMVP_VR_ON — ISL6261CRZ U7100 (PAGE 52) — VR_PWRGOOD_DELAY

U2850

SMC U4900 (PAGE 41) — IMVP_VR_ON, SMC_PM_G2_EN

PP3V42_G3H_PWRCTL — Q7700 — PM_G2_P3V3S5_EN_L — PP3V3S5_EN_L (S5)

SMC_PM_G2_EN — R-5.1K C-0.47uF — P1V05_S5_EN

U7770 LTC2909 (PAGE 57) — PP1V5_S0_VMON, PP1V05_S0_VMON — MCPCORES0_PGOOD, P5V3V3_PGOOD, S0PGOOD_PWROK — ALL_SYS_PWRGD

MCP79U — SLP_S5*, SLP_S3*, PCI_RESET0*, PM_SLP_S4_L

SMC_ADAPTER_PRESENT, WOW_EN — PM_WLAN_EN_L

PP3V3_S5_PWRCTL — Q7710 — P5VS3_EN_L; P3V3S3_EN; DDRREG_EN

P3V3S0_EN, P5VS0_EN, PBUSVSENS_EN

P1V05S0_EN (S0), P1V8S0_EN (S0), MCPDDR_EN (S0), CPUVTTS0_EN (S0), MCPCORES0_EN (S0)

Q7621 — PP5VS3_EN_L (S3), PP3V3S5_EN_L (S5) — 5V — PP5V_S3_REG (? A MAX CURRENT) — PP5V_S3

3.3V — PP3V3_S5_REG (? A MAX CURRENT) — PP3V3_S5

TPS51120 U7600 (PAGE 60) — P5V3V3_PGOOD

Q7840 — PP5V_S0_FET — P5VS0_EN_L

Q7810 — PP3V3_S3 — P3V3S3_EN_L

1.8V S0 TPS19918 U7360 (PAGE 54) — PP1V8_S0_EN — PPVIN_S0_P1V8S0 — PP1V8_S0_REG (200 mA MAX)

Q7830 — PP3V3_S0_FET — P3V3S0_EN_L

U7740 TPS19918 (PAGE 57) — P3V3_S5_PWRCTL, PP1V5_S5_PGOOD — RSMRST_PWRGD

SMC — ALL_SYS_PWRGD, PWRGD(P12), RSMRST_IN(P13), PWR_BUTTON(P90), P17(BTN_OUT), PLT_RST*, RST* — RSMRST_OUT(P15), IMVP_VR_ON(P16), PM_RSMRST_L, PM_PWRBTN_L, SMC_LRESET_L, SMC_RESET_L

SMC_ONOFF_L — BATTERY ONLY:

PM_SLP_S5_L, PM_SLP_S4_L, PM_SLP_S3_L — SLP_S5_L(P95), SLP_S4_L(P94), SLP_S3_L(P93) — U4900 (PAGE 41)

Q7801 — PP1V5_S3_P1V5S0FET — =PP1V5_S0_FET — MCPDDR_EN

PP0V75_S3_VTTREF

1.5V — PP1V5_S3_REG (11 A MAX CURRENT)

0.75V — PP0V75_S0_REG — DDRREG_PGOOD

TPS51116 U7500 (PAGE 55)

DDRREG_EN, DDRVTT_EN, MEM_VTT_EN_R, R2870

Power Block Diagram

SYNC_MASTER=POWER — SYNC_DATE=06/30/2005

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II NOT TO REPRODUCE OR COPY IT

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APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 3 OF 71	

BOMs

BOM NUMBER	BOM NAME	BOM OPTIONS
630-9734	PCBA,MLB,1.6GHZ,HY 2GB,SS CAP,M96	EEE_4DA,M96_COMMON,M96_HYNIX,M96_SS_CAP,CPU_1_6GHZ
630-9735	PCBA,MLB,1.6GHZ,HY 2GB,MU CAP,M96	EEE_4DB,M96_COMMON,M96_HYNIX,M96_MU_CAP,CPU_1_6GHZ
630-9514	PCBA,MLB,1.6GHZ,HY 2GB,TY CAP,M96	EEE_2AL,M96_COMMON,M96_HYNIX,M96_TY_CAP,CPU_1_6GHZ
630-9738	PCBA,MLB,1.8GHZ,HY 2GB,SS CAP,M96	EEE_4DC,M96_COMMON,M96_HYNIX,M96_SS_CAP,CPU_1_8GHZ
630-9516	PCBA,MLB,1.8GHZ,HY 2GB,MU CAP,M96	EEE_2AN,M96_COMMON,M96_HYNIX,M96_MU_CAP,CPU_1_8GHZ
630-9517	PCBA,MLB,1.8GHZ,HY 2GB,TY CAP,M96	EEE_2AP,M96_COMMON,M96_HYNIX,M96_TY_CAP,CPU_1_8GHZ

BOMOPTION Groups

BOM GROUP	BOM OPTIONS
M96_COMMON	ALTERNATE,COMMON,M96_COMMON1,M96_COMMON2,M96_COMMON3
M96_COMMON1	MCP_B02,BOOTROM_DEVEL,SMC_PRGRM,BOOT_MODE_USER,JTAG_ALLDEV,MEMRESET_HW,MEMRESET_MCP,VREFMRGN
M96_COMMON2	LPCPLUS,XDP,XDP_CONN
M96_COMMON3	MCP_CS1_NO
M96_HYNIX	DRAM_HYNIX
M96_MICRON	DRAM_MICRON,DRAM_SPD_2
M96_SS_CAP	SS_CAP_2_2UF,SS_CAP_10UF,SS_CAP_1UF
M96_MU_CAP	MU_CAP_2_2UF,MU_CAP_10UF,MU_CAP_1UF
M96_TY_CAP	TY_CAP_2_2UF,TY_CAP_10UF,TY_CAP_1UF

Bar Code Label / EEE #'s

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
826-4393	1	LBL,P/N LABEL,PCB,28MM X 6 MM	[EEE:4DA]	CRITICAL	EEE_4DA
826-4393	1	LBL,P/N LABEL,PCB,28MM X 6 MM	[EEE:4DB]	CRITICAL	EEE_4DB
826-4393	1	LBL,P/N LABEL,PCB,28MM X 6 MM	[EEE:2AL]	CRITICAL	EEE_2AL
826-4393	1	LBL,P/N LABEL,PCB,28MM X 6 MM	[EEE:4DC]	CRITICAL	EEE_4DC
826-4393	1	LBL,P/N LABEL,PCB,28MM X 6 MM	[EEE:2AN]	CRITICAL	EEE_2AN
826-4393	1	LBL,P/N LABEL,PCB,28MM X 6 MM	[EEE:2AP]	CRITICAL	EEE_2AP

Module Parts

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
337S3658	1	IC,PDC,QS,1.60GHZ,17W,1066,6M	U1000	CRITICAL	CPU_1_6GHZ
337S3659	1	IC,PDC,QS,1.80GHZ,17W,1066,6M	U1000	CRITICAL	CPU_1_8GHZ
338S0604	1	IC,GMCP,MCP79U-A01Q,27MMX27MM,BGA1588	U1400	CRITICAL	MCP_A01Q
338S0601	1	IC,GMCP,MCP79U-B01,27MMX27MM,BGA1588	U1400	CRITICAL	MCP_B01
338S0637	1	IC,GMCP,MCP79U-B02,27MMX27MM,BGA1588	U1400	CRITICAL	MCP_B02
335S0615	1	IC, 32MBIT 8-PIN SERIAL FLASH, WSON8	U6100	CRITICAL	BOOTROM_BLANK_4MB
341S2382	1	IC,EFI,BOOTROM DEVELOPMENT (UNLOCKED),M96	U6100	CRITICAL	BOOTROM_DEVEL
341S2326	1	IC,EFI,BOOTROM FINAL (LOCKED),M96	U6100	CRITICAL	BOOTROM_FINAL
338S0563	1	IC,SMC,HS8/2117	U4900	CRITICAL	SMC_BLANK
341S2327	1	IC,PRGRM,SMC (NEW),M96	U4900	CRITICAL	SMC_PRGRM
333S0476	4	HYNIX,DDR3,128M16,9x11.5	U3100,U3110,U3120,U3130	CRITICAL	DRAM_HYNIX
333S0476	4	HYNIX,DDR3,128M16,9x11.5	U3200,U3210,U3220,U3230	CRITICAL	DRAM_HYNIX
333S0476	4	HYNIX,DDR3,128M16,9x11.5	U3300,U3310,U3320,U3330	CRITICAL	DRAM_HYNIX
333S0476	4	HYNIX,DDR3,128M16,9x11.5	U3400,U3410,U3420,U3430	CRITICAL	DRAM_HYNIX
333S0475	4	MICRON,DDR3,128M16,9x11.5	U3100,U3110,U3120,U3130	CRITICAL	DRAM_MICRON
333S0475	4	MICRON,DDR3,128M16,9x11.5	U3200,U3210,U3220,U3230	CRITICAL	DRAM_MICRON
333S0475	4	MICRON,DDR3,128M16,9x11.5	U3300,U3310,U3320,U3330	CRITICAL	DRAM_MICRON
333S0475	4	MICRON,DDR3,128M16,9x11.5	U3400,U3410,U3420,U3430	CRITICAL	DRAM_MICRON
353S1938	1	IC,ISL6258,REV2,BAT CHGR, 28P QFN	U7900	CRITICAL	

Alternate Parts

PART NUMBER	ALTERNATE FOR PART NUMBER	REFERENCE DESIGNATOR(S)	DESCRIPTION	BOM OPTION
128S0093	128S0092	ALL	33UF 20% 16V DCASE	
376S0466	376S0410	ALL	Si4413 for Si4405	
740S0067	740S0028	ALL	0.5A OC FUSE	
104S0023	104S0018	ALL	1206 1/4W .002 OHM	
152S0684	152S0421	ALL	1.0UH,22A,10MOHM	
376S0627	376S0723	ALL	POWER NFET, 30V, 18A	
152S0905	152S0861	ALL	IND,IHLP4040CZ,0.68uH,18A	

CONFIGURATION OPTIONS

SYNC_MASTER=(N/A) SYNC_DATE=(N/A)

APPLE INC.

SIZE D | DRAWING NUMBER 051-7631 | REV. 2.3.0

SCALE NONE | SHT 4 OF 71

1UF 0402 CAPACITOR VENDOR TABLES FOR ACOUSTICS

SAMSUNG

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0629	4	CAP, 1UF, 6.3V, 10%, 0402	C7947,C7360,C2504,C2505	CRITICAL	SS_CAP_1UF
138S0629	7	CAP, 1UF, 6.3V, 10%, 0402	C2506,C2507,C2516,C2517,C7100,C7101,C7103	CRITICAL	SS_CAP_1UF
138S0629	9	CAP, 1UF, 6.3V, 10%, 0402	C2860,C7296,C7297,C7492,C7500,C7940,C7941,C9760,C7603	CRITICAL	SS_CAP_1UF

MURATA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0628	4	CAP, 1UF, 6.3V, 10%, 0402	C7947,C7360,C2504,C2505	CRITICAL	MU_CAP_1UF
138S0628	7	CAP, 1UF, 6.3V, 10%, 0402	C2506,C2507,C2516,C2517,C7100,C7101,C7103	CRITICAL	MU_CAP_1UF
138S0628	9	CAP, 1UF, 6.3V, 10%, 0402	C2860,C7296,C7297,C7492,C7500,C7940,C7941,C9760,C7603	CRITICAL	MU_CAP_1UF

TAIYO YUDEN

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0630	4	CAP, 1UF, 6.3V, 10%, 0402	C7947,C7360,C2504,C2505	CRITICAL	TY_CAP_1UF
138S0630	7	CAP, 1UF, 6.3V, 10%, 0402	C2506,C2507,C2516,C2517,C7100,C7101,C7103	CRITICAL	TY_CAP_1UF
138S0630	9	CAP, 1UF, 6.3V, 10%, 0402	C2860,C7296,C7297,C7492,C7500,C7940,C7941,C9760,C7603	CRITICAL	TY_CAP_1UF

2.2UF 0402 CAPACITOR VENDOR TABLES FOR ACOUSTICS

SAMSUNG

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C1240,C1241,C1242,C1243,C1244,C1245,C1246,C1247,C1248,C1249	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C1250,C1251,C1252,C1253,C1254,C1255,C1256,C1257,C1258,C1259	CRITICAL	SS_CAP_2_2UF
138S0632	8	CAP, 2.2UF, 6.3V, 20%, 0402	C1260,C1261,C1262,C1263,C1264,C1265,C1266,C1267	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9900,C9901,C9902,C9903,C9904,C9905,C9906,C9907,C9908,C9909	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9910,C9911,C9912,C9913,C9914,C9915,C9916,C9917,C9918,C9919	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9920,C9921,C9922,C9923,C9924,C9925,C9926,C9927,C9928,C9929	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9930,C9931,C9932,C9933,C9934,C9935,C9936,C9937,C9938,C9939	CRITICAL	SS_CAP_2_2UF
138S0632	12	CAP, 2.2UF, 6.3V, 20%, 0402	C1283,C1284,C1285,C1286,C1287,C1288,C1291,C1292,C1293,C1294,C1295,C1296	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3500,C3501,C3504,C3505,C3510,C3511,C3512,C3514,C3515,C3516	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3520,C3521,C3524,C3525,C3530,C3531,C3534,C3535,C3540,C3541	CRITICAL	SS_CAP_2_2UF
138S0632	8	CAP, 2.2UF, 6.3V, 20%, 0402	C3542,C3544,C3545,C3546,C3550,C3551,C3554,C3555	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3600,C3601,C3604,C3605,C3610,C3611,C3612,C3614,C3615,C3616	CRITICAL	SS_CAP_2_2UF
138S0632	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3620,C3621,C3624,C3625,C3630,C3631,C3634,C3635,C3640,C3641	CRITICAL	SS_CAP_2_2UF
138S0632	8	CAP, 2.2UF, 6.3V, 20%, 0402	C3642,C3644,C3645,C3646,C3650,C3651,C3654,C3655	CRITICAL	SS_CAP_2_2UF
138S0632	7	CAP, 2.2UF, 6.3V, 20%, 0402	C2530,C2531,C2532,C2533,C2534,C2535,C2536	CRITICAL	SS_CAP_2_2UF
138S0632	8	CAP, 2.2UF, 6.3V, 20%, 0402	C2550,C2551,C2552,C2553,C2555,C2560,C2562,C2564	CRITICAL	SS_CAP_2_2UF
138S0632	8	CAP, 2.2UF, 6.3V, 20%, 0402	C2570,C2571,C2572,C2573,C2574,C2575,C2576,C2610	CRITICAL	SS_CAP_2_2UF
138S0632	3	CAP, 2.2UF, 6.3V, 20%, 0402	C4800,C7362,C7511	CRITICAL	SS_CAP_2_2UF

MURATA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C1240,C1241,C1242,C1243,C1244,C1245,C1246,C1247,C1248,C1249	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C1250,C1251,C1252,C1253,C1254,C1255,C1256,C1257,C1258,C1259	CRITICAL	MU_CAP_2_2UF
138S0633	8	CAP, 2.2UF, 6.3V, 20%, 0402	C1260,C1261,C1262,C1263,C1264,C1265,C1266,C1267	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9900,C9901,C9902,C9903,C9904,C9905,C9906,C9907,C9908,C9909	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9910,C9911,C9912,C9913,C9914,C9915,C9916,C9917,C9918,C9919	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9920,C9921,C9922,C9923,C9924,C9925,C9926,C9927,C9928,C9929	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9930,C9931,C9932,C9933,C9934,C9935,C9936,C9937,C9938,C9939	CRITICAL	MU_CAP_2_2UF
138S0633	12	CAP, 2.2UF, 6.3V, 20%, 0402	C1283,C1284,C1285,C1286,C1287,C1288,C1291,C1292,C1293,C1294,C1295,C1296	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3500,C3501,C3504,C3505,C3510,C3511,C3512,C3514,C3515,C3516	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3520,C3521,C3524,C3525,C3530,C3531,C3534,C3535,C3540,C3541	CRITICAL	MU_CAP_2_2UF
138S0633	8	CAP, 2.2UF, 6.3V, 20%, 0402	C3542,C3544,C3545,C3546,C3550,C3551,C3554,C3555	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3600,C3601,C3604,C3605,C3610,C3611,C3612,C3614,C3615,C3616	CRITICAL	MU_CAP_2_2UF
138S0633	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3620,C3621,C3624,C3625,C3630,C3631,C3634,C3635,C3640,C3641	CRITICAL	MU_CAP_2_2UF
138S0633	8	CAP, 2.2UF, 6.3V, 20%, 0402	C3642,C3644,C3645,C3646,C3650,C3651,C3654,C3655	CRITICAL	MU_CAP_2_2UF
138S0633	7	CAP, 2.2UF, 6.3V, 20%, 0402	C2530,C2531,C2532,C2533,C2534,C2535,C2536	CRITICAL	MU_CAP_2_2UF
138S0633	8	CAP, 2.2UF, 6.3V, 20%, 0402	C2550,C2551,C2552,C2553,C2555,C2560,C2562,C2564	CRITICAL	MU_CAP_2_2UF
138S0633	8	CAP, 2.2UF, 6.3V, 20%, 0402	C2570,C2571,C2572,C2573,C2574,C2575,C2576,C2610	CRITICAL	MU_CAP_2_2UF
138S0633	3	CAP, 2.2UF, 6.3V, 20%, 0402	C4800,C7362,C7511	CRITICAL	MU_CAP_2_2UF

TAIYO YUDEN

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C1240,C1241,C1242,C1243,C1244,C1245,C1246,C1247,C1248,C1249	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C1250,C1251,C1252,C1253,C1254,C1255,C1256,C1257,C1258,C1259	CRITICAL	TY_CAP_2_2UF
138S0634	8	CAP, 2.2UF, 6.3V, 20%, 0402	C1260,C1261,C1262,C1263,C1264,C1265,C1266,C1267	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9900,C9901,C9902,C9903,C9904,C9905,C9906,C9907,C9908,C9909	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9910,C9911,C9912,C9913,C9914,C9915,C9916,C9917,C9918,C9919	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9920,C9921,C9922,C9923,C9924,C9925,C9926,C9927,C9928,C9929	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C9930,C9931,C9932,C9933,C9934,C9935,C9936,C9937,C9938,C9939	CRITICAL	TY_CAP_2_2UF
138S0634	12	CAP, 2.2UF, 6.3V, 20%, 0402	C1283,C1284,C1285,C1286,C1287,C1288,C1291,C1292,C1293,C1294,C1295,C1296	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3500,C3501,C3504,C3505,C3510,C3511,C3512,C3514,C3515,C3516	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3520,C3521,C3524,C3525,C3530,C3531,C3534,C3535,C3540,C3541	CRITICAL	TY_CAP_2_2UF
138S0634	8	CAP, 2.2UF, 6.3V, 20%, 0402	C3542,C3544,C3545,C3546,C3550,C3551,C3554,C3555	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3600,C3601,C3604,C3605,C3610,C3611,C3612,C3614,C3615,C3616	CRITICAL	TY_CAP_2_2UF
138S0634	10	CAP, 2.2UF, 6.3V, 20%, 0402	C3620,C3621,C3624,C3625,C3630,C3631,C3634,C3635,C3640,C3641	CRITICAL	TY_CAP_2_2UF
138S0634	8	CAP, 2.2UF, 6.3V, 20%, 0402	C3642,C3644,C3645,C3646,C3650,C3651,C3654,C3655	CRITICAL	TY_CAP_2_2UF
138S0634	7	CAP, 2.2UF, 6.3V, 20%, 0402	C2530,C2531,C2532,C2533,C2534,C2535,C2536	CRITICAL	TY_CAP_2_2UF
138S0634	8	CAP, 2.2UF, 6.3V, 20%, 0402	C2550,C2551,C2552,C2553,C2555,C2560,C2562,C2564	CRITICAL	TY_CAP_2_2UF
138S0634	8	CAP, 2.2UF, 6.3V, 20%, 0402	C2570,C2571,C2572,C2573,C2574,C2575,C2576,C2610	CRITICAL	TY_CAP_2_2UF
138S0634	3	CAP, 2.2UF, 6.3V, 20%, 0402	C4800,C7362,C7511	CRITICAL	TY_CAP_2_2UF

10UF 0603 CAPACITOR VENDOR TABLES FOR ACOUSTICS

SAMSUNG

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0626	10	CAP, 10UF, 6.3V, 20%, 0603	C1200,C1201,C1202,C1203,C1204,C1205,C1206,C1207,C1208,C1209	CRITICAL	SS_CAP_10UF
138S0626	10	CAP, 10UF, 6.3V, 20%, 0603	C1210,C1211,C1212,C1213,C1214,C1215,C1216,C1217,C1218,C1219	CRITICAL	SS_CAP_10UF
138S0626	10	CAP, 10UF, 6.3V, 20%, 0603	C1220,C1221,C1222,C1223,C1224,C1225,C1226,C1227,C1228,C1229	CRITICAL	SS_CAP_10UF
138S0626	3	CAP, 10UF, 6.3V, 20%, 0603	C1230,C1231,C1280	CRITICAL	SS_CAP_10UF
138S0626	8	CAP, 10UF, 6.3V, 20%, 0603	C4109,C4613,C5066,C7502,C7541,C7650,C7690,C9012	CRITICAL	SS_CAP_10UF
138S0626	5	CAP, 10UF, 6.3V, 20%, 0603	C7266,C7267,C7269,C7401,C7605	CRITICAL	SS_CAP_10UF

MURATA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0625	10	CAP, 10UF, 6.3V, 20%, 0603	C1200,C1201,C1202,C1203,C1204,C1205,C1206,C1207,C1208,C1209	CRITICAL	MU_CAP_10UF
138S0625	10	CAP, 10UF, 6.3V, 20%, 0603	C1210,C1211,C1212,C1213,C1214,C1215,C1216,C1217,C1218,C1219	CRITICAL	MU_CAP_10UF
138S0625	10	CAP, 10UF, 6.3V, 20%, 0603	C1220,C1221,C1222,C1223,C1224,C1225,C1226,C1227,C1228,C1229	CRITICAL	MU_CAP_10UF
138S0625	3	CAP, 10UF, 6.3V, 20%, 0603	C1230,C1231,C1280	CRITICAL	MU_CAP_10UF
138S0625	8	CAP, 10UF, 6.3V, 20%, 0603	C4109,C4613,C5066,C7502,C7541,C7650,C7690,C9012	CRITICAL	MU_CAP_10UF
138S0625	5	CAP, 10UF, 6.3V, 20%, 0603	C7266,C7267,C7269,C7401,C7605	CRITICAL	MU_CAP_10UF

TAIYO YUDEN

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
138S0627	10	CAP, 10UF, 6.3V, 20%, 0603	C1200,C1201,C1202,C1203,C1204,C1205,C1206,C1207,C1208,C1209	CRITICAL	TY_CAP_10UF
138S0627	10	CAP, 10UF, 6.3V, 20%, 0603	C1210,C1211,C1212,C1213,C1214,C1215,C1216,C1217,C1218,C1219	CRITICAL	TY_CAP_10UF
138S0627	10	CAP, 10UF, 6.3V, 20%, 0603	C1220,C1221,C1222,C1223,C1224,C1225,C1226,C1227,C1228,C1229	CRITICAL	TY_CAP_10UF
138S0627	3	CAP, 10UF, 6.3V, 20%, 0603	C1230,C1231,C1280	CRITICAL	TY_CAP_10UF
138S0627	8	CAP, 10UF, 6.3V, 20%, 0603	C4109,C4613,C5066,C7502,C7541,C7650,C7690,C9012	CRITICAL	TY_CAP_10UF
138S0627	5	CAP, 10UF, 6.3V, 20%, 0603	C7266,C7267,C7269,C7401,C7605	CRITICAL	TY_CAP_10UF

Acoustic Cap BOM Config Tables

SYNC_MASTER=N/A SYNC_DATE=N/A

APPLE INC.

SIZE D | DRAWING NUMBER 051-7631 | REV. 2.3.0

SCALE NONE | SHT 5 OF 71

Functional Test Points

NB NO_TESTS

These are normally testpoints but become NC

NO_TEST

Power Supply NO_TESTs

NO_TEST

CLOCK NO_TESTS

NO_TEST

LVDS NO_TESTS

NO_TEST

REQUIRED NETS

FUNC TEST - BATTERY CONNECTOR

x2	I647	TRUE	BATT_POS	49
x2	I649	TRUE	GND	
	I638	TRUE	SMC_BS_ALRT_L	39 40 49
	I644	TRUE	SMBUS_SMC_BSA_SCL	42 69
	I639	TRUE	SMBUS_SMC_BSA_SDA	42 69

FUNC TEST - DC-IN CONNECTOR

x6	I648	TRUE	PP18V5_DCIN	49 70
	I655	TRUE	ADAPTER_SENSE	49
x6	I706	TRUE	GND	

FUNC TEST - FAN CONNECTOR

	I666	TRUE	=PP5V_S0_FAN	7 46
	I667	TRUE	FAN_RT_PWM	46
	I669	TRUE	FAN_RT_TACH	46
	I714	TRUE	GND	

FUNC TEST - AIRPORT

	I741	TRUE	CK505_SRC_CLKREQ6_L	6
	I742	TRUE	PCIE_WAKE_L	6 16 34
	I743	TRUE	AIRPORT_RST_L	6 24 34
	I744	TRUE	=SMB_AIRPORT_CLK	6 34 42
	I745	TRUE	=SMB_AIRPORT_DATA	6 34 42
	I746	TRUE	GND	

FUNC TEST - MIC

	I747	TRUE	PP3V3_S0_MIC_F	59 70
	I748	TRUE	AUD_MIC_DATA_F	59
	I749	TRUE	AUD_MIC_CLK_F	59
	I750	TRUE	GND_MIC_F	59

FUNC TEST - AUDIO CONNECTOR

	I645	TRUE	HDA_SYNC	20 35 68
	I646	TRUE	HDA_BIT_CLK	20 35 68
	I735	TRUE	AUD_MIC_DATA	35 59
	I736	TRUE	HDA_SDOUT	20 35 68
	I737	TRUE	=PPVIN_S0_AUDIO	7 35
	I738	TRUE	HDA_SDIN0	20 35 68
	I740	TRUE	AUD_MIC_CLK	35 59
	I739	TRUE	PM_SLP_S3_L	20 34 35 39 56

FUNC TEST - IPD CONNECTOR

	I507	TRUE	SMC_LID	38 39 40
	I508	TRUE	PP3V42_G3H_IPD_F	38 70
	I509	TRUE	SMC_SYS_KBDLED	38 39
	I506	TRUE	SMC_SYS_LED	38 39
	I516	TRUE	=USB2_TPAD_N	8 38
	I512	TRUE	=USB2_TPAD_P	8 38
	I511	TRUE	SMC_ONOFF_L	6 38 39 40
	I513	TRUE	=USB2_IR_N	6 8 38
	I514	TRUE	=USB2_IR_P	6 8 38
	I515	TRUE	PP5V_S0_KBDLED_F	6 38 70
	I517	TRUE	PP5V_S3_TOPCASE_F	38 70
	I518	TRUE	=I2C_TPAD_SCL	38 42
	I519	TRUE	=I2C_TPAD_SDA	38 42
	I524	TRUE	SMC_ONOFF_L	6 38 39 40
	I510	TRUE	=USB2_IR_N	6 8 38
	I527	TRUE	=USB2_IR_P	6 8 38
	I674	TRUE	PP5V_S0_KBDLED_F	6 38 70
	I734	TRUE	LSOC_PRESS_H_R	38

FUNC TEST - M93 WIRELESS CONNECTOR

	I478	TRUE	AIRPORT_RST_L	6 24 34
	I475	TRUE	PCIE_WAKE_L	6 16 34
	I476	TRUE	CK505_SRC_CLKREQ6_L	6
	I479	TRUE	PCIE_CLK100M_MINI_N_F	34
	I478	TRUE	PCIE_CLK100M_MINI_P_F	34
	I477	TRUE	PCIE_E_D2R_N_F	34
	I480	TRUE	PCIE_E_D2R_P_F	34
	I483	TRUE	PCIE_E_R2D_C_N_F	6 34
	I484	TRUE	PCIE_E_R2D_C_P_F	6 34
	I482	TRUE	AIRPORT_RST_L	6 24 34
	I499	TRUE	=SMB_AIRPORT_DATA	6 34 42
	I500	TRUE	=SMB_AIRPORT_CLK	6 34 42
	I501	TRUE	PCIE_E_R2D_C_N_F	6 34
	I502	TRUE	PCIE_E_R2D_C_P_F	6 34
	I503	TRUE	PP3V3_S3_AP_AUX	34 70

NICE2HAVE NETS

FUNC TEST - Power Supplies

	I92	TRUE	PPVCORE_S0_CPU	7 70
	I454	TRUE	PP0V75_S0	7 70
	I455	TRUE	PP1V05_S0	7 70
	I457	TRUE	PP1V5_S0	7 70
	I460	TRUE	PP1V5_S3	7 70
	I459	TRUE	PP1V05_S5	7 70
	I458	TRUE	PPMCPCORE_S0	7 70
	I461	TRUE	PP5V_S0	7 70
	I466	TRUE	PP3V3_S0	7 70
	I463	TRUE	PP3V3_S3	7 70
	I462	TRUE	PP5V_S3	7 70
	I467	TRUE	PP3V3_S5	7 70
	I465	TRUE	PP3V42_G3H	7 70
	I474	TRUE	PP18V5_G3H	7 70
	I472	TRUE	PPDCIN_G3H	7 70
	I473	TRUE	PPBUS_G3H	7 70
	I471	TRUE	PPBUS_R_G3H	7 70
	I467	TRUE	PP1V8_S0	7 70

FUNC TEST - SATA HDD

	I751	TRUE	PP3V3_S0_HDD_F	36 70
	I752	TRUE	SATA_HDD_R2D_N	36 67
	I753	TRUE	SATA_HDD_R2D_P	36 67
	I754	TRUE	SATA_HDD_D2R_C_N	36 67
	I755	TRUE	SATA_HDD_D2R_C_P	36 67
	I756	TRUE	GND	

FUNC TEST - RIO HATCH CONNECTOR

	I716	TRUE	DP_ML_C_N<3..0>	61 67
	I717	TRUE	DP_ML_C_P<3..0>	61 67
	I718	TRUE	DP_AUX_CH_C_N	35 60 61 67
	I719	TRUE	DP_AUX_CH_C_P	35 60 61 67
	I720	TRUE	DP_CA_DET_Q	35 61
	I721	TRUE	HDMI_CEC	35 61
	I722	TRUE	DP_HPD_Q	35 61
	I723	TRUE	PP3V3_S0_DPPWR	35 61 70
	I725	TRUE	USB2_EXTA_F_P	35 37
	I726	TRUE	USB2_EXTA_F_N	35 37
	I727	TRUE	PP5V_S3_USB2_EXTA_F	35 37 70
	I728	TRUE	GND	

x13 I822 TRUE GND

FUNC TEST - XDP/ITP CONNECTOR

	I693	TRUE	XDP_BPM_L<0..5>	9 12 65
	I690	TRUE	TP_XDP_OBSFN_B0	12
	I688	TRUE	TP_XDP_OBSFN_B1	12
	I681	TRUE	TP_XDP_OBSDATA_B0	12
	I683	TRUE	TP_XDP_OBSDATA_B1	12
	I682	TRUE	TP_XDP_OBSDATA_B2	12
	I684	TRUE	TP_XDP_OBSDATA_B3	12
	I685	TRUE	XDP_PWRGD	12
	I687	TRUE	XDP_OBS20	12
	I686	TRUE	SMBUS_MCP_0_DATA	12 20 42 68
	I680	TRUE	SMBUS_MCP_0_CLK	12 20 42 68
	I689	TRUE	XDP_TCK	9 12 65
	I691	TRUE	JTAG_MCP_TDO_CONN	12
	I692	TRUE	JTAG_MCP_TRST_L	12 20
	I682	TRUE	MCP_DEBUG<7..0>	12 18 68
	I694	TRUE	JTAG_MCP_TDI	12 20
	I695	TRUE	JTAG_MCP_TMS	12 20
	I696	TRUE	FSB_CLK_ITP_P	12 13 65
	I697	TRUE	FSB_CLK_ITP_N	12 13 65
	I698	TRUE	XDP_CPURST_L	12 65
	I699	TRUE	XDP_DBRESET_L	9 12 24
	I701	TRUE	XDP_TDO_CONN	12
	I700	TRUE	XDP_TRST_L	9 12 65
	I702	TRUE	XDP_TDI	9 12 65
	I703	TRUE	XDP_TMS	9 12 65
	I704	TRUE	=PP3V3_S0_XDP	7 12
	I705	TRUE	=PP1V05_S0_CPU	7 9 10 11 12

FUNC TEST - CAMERA USB, LVDS, ALS

x2	I654	TRUE	PP5V_S3_CAMERA_F	59 70
	I655	TRUE	USB2_CAMERA_F_P	59
	I656	TRUE	USB2_CAMERA_F_N	59
	I657	TRUE	LCDBKLT_RTN<1..6>	59 62
	I658	TRUE	LVDS_IG_A_DATA_N<0..2>	17 59 67
	I659	TRUE	LVDS_IG_A_DATA_P<0..2>	17 59 67
	I660	TRUE	PPVOUT_S0_LCDBKLT	59 62 70
	I661	TRUE	LVDS_IG_A_CLK_F_N	59 67
	I662	TRUE	LVDS_IG_A_CLK_F_P	59 67
	I663	TRUE	LVDS_IG_DDC_CLK	17 59
	I664	TRUE	LVDS_IG_DDC_DATA	17 59
	I665	TRUE	PP3V3_S0_LCD_F	59 70
x2	I666	TRUE	PP3V3_LCDVDD_SW_F	59 70
	I711	TRUE	=I2C_ALS_SDA	42 59
	I712	TRUE	=I2C_ALS_SCL	42 59
x10	I713	TRUE	GND	

Functional Test and No-Tests

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 6 OF 71	

"S0" RAILS

50 =PPVCORE_S0_CPU_REG
27 A
PPVCORE_S0_CPU 6 70
MIN_LINE_WIDTH=0.25 MM
MIN_NECK_WIDTH=0.20 MM
VOLTAGE=0.9V
MAKE_BASE=TRUE
=PPVCORE_S0_CPU 10 11 64

51 =PPMCPCORE_S0_REG
11.551 A
PPMCPCORE_S0 6 70
MIN_LINE_WIDTH=0.25 MM
MIN_NECK_WIDTH=0.20 MM
VOLTAGE=0.9V
MAKE_BASE=TRUE
=PPVCORE_S0_MCP 21 22
=PPVCORE_S0_MCP_VSENSE 43

54 =PP0V75_S0_REG
1.075 A
PP0V75_S0 6 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=0.75V
MAKE_BASE=TRUE
=PPVTT_S0_VTTCLAMP 57
=PP0V75_S0_MEM_VTT_A 33
=PP0V75_S0_MEM_VTT_B 33

57 =PP1V05_S0_FET
7.047 A
PP1V05_S0 6 70
MIN_LINE_WIDTH=0.2 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.05V
MAKE_BASE=TRUE
=PP1V05_S0_CPU 6 9 10 11 12
=PP1V05_S0_MCP_AVDD_UF 22
=PP1V05_S0_MCP_FSB 8 13 21 22
=PP1V05_S0_MCP_HDMI_VDD 17 23
=PP1V05_S0_MCP_PEX_DVDD 7 22
=PP1V05_S0_MCP_PLL_UF 22
=PP1V05_S0_MCP_SATA_DVDD 19 22
=PP1V05_S0_SMC_LS 40
=PP1V05_S0_VMON 56

57 =PP1V5_S0_FET
5.027 A
PP1V5_S0 6 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.5V
MAKE_BASE=TRUE
=PP1V5_S0_CPU 10 11
=PP1V5_S0_VMON 56
=PP1V8R1V5_S0_MCP_MEM 15 22 66

52 =PP1V8_S0_REG
19 mA
PP1V8_S0 6 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.8V
MAKE_BASE=TRUE
=PP3V3R1V8_S0_MCP_IFP_VDD 17 23

57 =PP3V3_S0_FET
2.046 A
PP3V3_S0 6 70
MIN_LINE_WIDTH=0.2 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_S0_DPCONN 61
=PP3V3_S0_FAN 46
=PP3V3_S0_IMVP 50
=PP3V3_S0_LCD 59
=PP3V3_S0_LCDBKLT 62
=PP3V3_S0_MCP 20 21 22
=PP3V3_S0_MCP_GPIO 17 18 20
=PP3V3_S0_MCP_PLL_UF 22
=PP3V3_S0_MCP_VPLL_UF 23
=PP3V3_S0_PWRCTL 24 56
=PP3V3_S0_SMBUS_SMC_0_S0 42
=PP3V3_S0_THRM_SNR 45
=PP3V3_S0_VMON 56
=PP3V3_S0_XDP 6 12
=PPVIN_S0_P1V8S0 52
=PP3V3_S0_LPCPLUS 41
=PP3V3_S0_HDD 36
=PP3V3_S0_SMBUS_SMC_B_S0 42
=PP3V3_S0_SMBUS_MCP_0 42
=PP3V3R1V5_S0_MCP_HDA 20 22
=PP3V3_S0_SMC_LS 40
=PP3V3_S0_MIC 59

57 =PP5V_S0_FET
562 mA
PP5V_S0 6 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=5V
MAKE_BASE=TRUE
=PP5V_S0_CPU_IMVP 50
=PP5V_S0_DP_AUX_MUX 60
=PP5V_S0_FAN 6 46
=PP5V_S0_KBDLED 38
=PP5V_S0_LPCPLUS 41

"S3" RAILS

54 =PP0V75_S3_VTTREF
1.075 A
PP0V75_S3 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=0.75V
MAKE_BASE=TRUE
=PPVTT_S3_DDR_BUF 25

54 =PP1V5_S3_REG
12.984 A
PP1V5_S3 6 70
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.8V
MAKE_BASE=TRUE
=PP1V5_S3_MEM_A 27 28 31 33
=PP1V5_S3_MEM_B 29 30 32 33
=PP1V5_S3_P1V5S0FET 57
=PP1V5_S3_MEMRESET 26

57 =PP3V3_S3_FET
315 mA
PP3V3_S3 6 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_S3_BT 34
=PP3V3_S3_SMBUS_SMC_A_S3 42
=PP3V3_S3_SMC 40
=PP3V3_S3_SMS 47
=PP3V3_S3_VREFMRGN 25
=PP3V3_S3_SMBUS_SMC_MGMT 42
=PP3V3_S3_DDRREG 54
=PP3V3_S3_MCPREG 51
=PP3V3_S3_MCP_GPIO 20

55 =PP5V_S3_REG
3.134 A
PP5V_S3 6 70
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=5V
MAKE_BASE=TRUE
=PP5V_S3_CAMERA 59
=PP5V_S3_MCPDDRFET 57
=PP5V_S3_P1V05S0FET 57
=PP5V_S3_TOPCASE 38
=PP5V_S3_VTTCLAMP 57
=PP5V_S3_1V5S30V75S0 54
=PP5V_S3_EXTUSB 37
=PP5V_S3_P5VS0FET 57
=PP5V_S3_MCPREG 51

"RMGT" RAILS

57 =PP3V3_RMGT_FET
PP3V3_RMGT 70
MIN_LINE_WIDTH=0.2 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_ENET_MCP_RMGT 17 22

57 =PP1V05_RMGT_FET
PP1V05_RMGT 70
MIN_LINE_WIDTH=0.2 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.05V
MAKE_BASE=TRUE
=PP1V05_ENET_MCP_RMGT 17 22
=PP1V05_ENET_MCP_PLL_MAC 22

"S5" RAILS

53 =PP1V05_S5_REG
7.368 A
PP1V05_S5 6 70
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.05V
MAKE_BASE=TRUE
=PP1V05_S5_MCP_VDD_AUXC 21 22
=PP1V05_S5_P1V05S0FET 57
=PP1V05_RMGT_P1V05RMGTFET 57

55 =PP3V3_S5_REG
4.011 A
PP3V3_S5 6 70
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_S5_AIRPORT_AUX 34
=PP3V3_S5_LCD 59
=PP3V3_S5_MCP 21 22
=PP3V3_S5_MCPPWRGD 24
=PP3V3_S5_MCP_GPIO 17 19 20
=PP3V3_S5_P1V05FET 57
=PP3V3_S5_P3V3S0FET 57
=PP3V3_S5_P3V3S3FET 57
=PP3V3_S5_PWRCTL 56
=PP3V3_S5_ROM 41 48
=PP3V3_S5_SMBUS_MCP_1 42
=PP3V3_S5_MEMRESET 26
=PP3V3_S5_P3V3RMGTFET 57
=PP3V3_S5_P1V05RMGTFET 57

"G3H" RAILS

49 24 =PP3V42_G3H_REG
165 mA
PP3V42_G3H 6 70
MIN_LINE_WIDTH=0.3 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.42V
MAKE_BASE=TRUE
=PP3V42_G3H_SMC 39 40
=PP3V42_G3H_SMCVREF 40
=PP3V42_G3H_SMBUS_SMC_BSA 42
=PP3V42_G3H_IPD 38
=PP3V42_G3H_SMCUSBMUX 37
=PP3V42_G3H_CHGR 58
=PP3V42_G3H_LPCPLUS 41

58 49 =PP18V5_G3H_CHGR
PP18V5_G3H 6 70
MIN_LINE_WIDTH=0.3 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=18.5V
MAKE_BASE=TRUE

49 =PPDCIN_G3H
PPDCIN_G3H 6 70
MIN_LINE_WIDTH=0.5MM
MIN_NECK_WIDTH=0.25MM
VOLTAGE=18.5V
MAKE_BASE=TRUE
=PPVIN_G3H_P3V42G3H 49

58 44 =PPBUSA_G3H
13 A
PPBUS_R_G3H 6 70
MIN_LINE_WIDTH=0.5MM
MIN_NECK_WIDTH=0.25MM
VOLTAGE=12.6V
MAKE_BASE=TRUE
=PPVIN_S5_CPU_IMVP 50
=PPVIN_S5_1V5S30V75S0 54
=PPVIN_S0_MCPCORES0 51
=PPVIN_S5_1V05 53

58 44 =PPBUSB_G3H
6.207 A
PPBUS_G3H 6 70
MIN_LINE_WIDTH=0.4 mm
MIN_NECK_WIDTH=0.25 mm
VOLTAGE=12.6V
MAKE_BASE=TRUE
=PPVIN_S3_5VS3 55
=PPVIN_S5_3V3S5 55
=PPVIN_S0_AUDIO 6 35
=PPVIN_G3H_DCIN 49
=PPBUS_S0_LCDBKLT 63
=PPBUS_G3HRS5 43

PEX & SATA AVDD/DVDD aliases

70 22 PP1V05_S0_MCP_PEX_AVDD
MAKE_BASE=TRUE
206 mA (A01)
=PP1V05_S0_MCP_PEX_AVDD0 16
=PP1V05_S0_MCP_PEX_AVDD1 16
206 mA (A01)

22 7 =PP1V05_S0_MCP_PEX_DVDD
57 mA (A01)
=PP1V05_S0_MCP_PEX_DVDD0 16
=PP1V05_S0_MCP_PEX_DVDD1 16
57 mA (A01)

Power Aliases

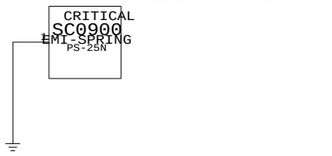
SYNC_MASTER=WFERRY SYNC_DATE=06/15/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 7 OF 71	

EMI SPRING CLIPS

PLACE CLIPS PER MCO ON TOPSIDE NEAR BATTERY CONNECTOR J6900



BOSSES

Z0900 4.5OD2.0H-M1.6X0.35
Z0901 4.5OD2.0H-M1.6X0.35
Z0902 4.5OD2.0H-M1.6X0.35
Z0903 4.5OD2.0H-M1.6X0.35
Z0904 4.5OD2.0H-M1.6X0.35

STANDOFFS

Z0910 STDOFF-4.0OD2.4H-0.5-THNP
Z0911 STDOFF-4.0OD2.4H-0.5-THNP
Z0912 STDOFF-4.0OD2.4H-0.5-THNP

SMC ALIASES

NO-CONNECT UNUSED SMC INTERFACE PORTS

		NO_TEST
SMC_PA0	NC_SMC_PA0	TRUE
SMC_PA1	NC_SMC_PA1	TRUE
ESTARLDO_EN	NC_ESTARLDO_EN	TRUE
SMC_P26	NC_SMC_P26	TRUE
SMC_P41	NC_SMC_P41	TRUE
SMC_BIL_BUTTON_L	NC_SMC_P67	TRUE
SMC_GFX_OVERTEMP_L	NC_SMC_GFX_OVERTEMP	TRUE
SMC_EXCARD_OC_L	NC_EXCARD_OC_L	TRUE
SMC_P24	NC_SMC_P24	TRUE
SMC_EXCARD_CP	NC_SMC_EXCARD_CP	TRUE
ALS_RIGHT	NC_ALS_RIGHT	TRUE
ALS_GAIN	NC_ALS_GAIN	TRUE
SMC_FAN_1_CTL	NC_SMC_FAN_1_CTL	TRUE
SMC_FAN_2_CTL	NC_SMC_FAN_2_CTL	TRUE
SMC_FAN_3_CTL	NC_SMC_FAN_3_CTL	TRUE
SMC_FAN_1_TACH	NC_SMC_FAN_1_TACH	TRUE
SMC_FAN_2_TACH	NC_SMC_FAN_2_TACH	TRUE
SMC_FAN_3_TACH	NC_SMC_FAN_3_TACH	TRUE
SMC_EXCARD_PWR_EN	NC_SMC_RSTGATE_L	TRUE
ISENSE_CAL_EN	NC_ISENSE_CAL_EN	TRUE
SMC_FWE	NC_SMC_FWE	TRUE
SMC_ANALOG_ID	NC_SMC_ANALOG_ID	TRUE
ALS_LEFT	NC_ALS_LEFT	TRUE
SMC_NB_DDR_ISENSE	NC_SMC_NB_DDR_ISENSE	TRUE
SMC_P10	NC_SMC_P10	TRUE
SMC_PA5	NC_SMC_PA5	TRUE
SMC_GPU_ISENSE	NC_SMC_GPU_ISENSE	TRUE

All: MAKE_BASE=TRUE

SMC_IG_THROTTLE_L (MAKE_BASE=TRUE) — SMC_GFX_THROTTLE_L
SMC_SMS_INT_L (MAKE_BASE=TRUE) — =SMC_SMS_INT
SMC_ADAPTER_EN (MAKE_BASE=TRUE) — SMC_ADAPTER_PRESENT

PCI-E ALIASES

UNUSED GPU LANES

=PEG_D2R_N<15:0>	NC_PEG_D2R_N<15:0>	NO_TEST=TRUE MAKE_BASE=TRUE
=PEG_D2R_P<15:0>	NC_PEG_D2R_P<15:0>	NO_TEST=TRUE MAKE_BASE=TRUE
=PEG_R2D_C_N<15:0>	NC_PEG_R2D_C_N<15:0>	NO_TEST=TRUE MAKE_BASE=TRUE
=PEG_R2D_C_P<15:0>	NC_PEG_R2D_C_P<15:0>	NO_TEST=TRUE MAKE_BASE=TRUE
PEG_PRSNT_L	TP_PEG_PRSNT_L	MAKE_BASE=TRUE
PEG_CLKREQ_L	TP_PEG_CLKREQ_L	MAKE_BASE=TRUE
PEG_CLK100M_P	TP_PEG_CLK100M_P	MAKE_BASE=TRUE
PEG_CLK100M_N	TP_PEG_CLK100M_N	MAKE_BASE=TRUE
EXTGPU_PWR_EN	TP_EXTGPU_PWR_EN	MAKE_BASE=TRUE
EXTGPU_RESET_L	TP_EXTGPU_RESET_L	MAKE_BASE=TRUE

AIRPORT CARD AND TURBOMEM PRESENT SIGNAL

PCIE_MINI_PRSNT_L, PCIE_FC_PRSNT_L — MAKE_BASE=TRUE

HDA PULL-DOWN

UNUSED IPHS SIGNAL(FOR IPHONE JACK)

AUD_IPHS_SWITCH_EN

AUD_I2C_INT_L IS PU ON MCP PAGE

R0920 100K 5% 1/20W MF 201

DP HOTPLUG PULL-DOWN

HPLUG_DET2 (MAKE_BASE=TRUE) — =DVI_HPD_GMUX_INT

R0940 20K 5% 1/20W MF 201

LAN ALIASES

UNUSED ETHERNET RG/MII INTERFACE

ENET_RXD<0>, ENET_RXD<1>, ENET_RXD<2>, ENET_RXD<3>
ENET_MDIO, ENET_RX_CTRL, ENET_CLK125M_TXCLK, MCP_MII_VREF
ENET_CLK125M_RXCLK, ENET_INTR_L

RP0930 10K 5% 1/32W 4X0201-HF (8 7 6 5 / 1 2 3 4)
RP0931 10K 5% 1/32W 4X0201-HF (8 7 6 5 / 1 2 3 4)
RP0932 10K 5% 1/32W 4X0201-HF (8 7 6 5 / 1 2 3 4)

ENET_RESET_L	NC_ENET_RESET_L	MAKE_BASE=TRUE
MCP_CLK25M_BUF0_R	NC_MCP_CLK25M_BUF0_R	MAKE_BASE=TRUE
ENET_PWRDWN_L	NC_ENET_PWRDWN_L	MAKE_BASE=TRUE
ENET_MDC	NC_ENET_MDC	MAKE_BASE=TRUE
ENET_TX_CTRL	NC_ENEX_TX_CTRL	MAKE_BASE=TRUE
ENET_TXD<3..0>	NC_ENET_TXD<3..0>	MAKE_BASE=TRUE

GND
VOLTAGE=0V
MIN_NECK_WIDTH=0.20 MM
MIN_LINE_WIDTH=0.30 MM

DACS ALIASES

UNUSED CRT & TV-OUT INTERFACE

MCP_TV_DAC_RSET	NC_MCP_TV_DAC_RSET	NO_TEST=TRUE MAKE_BASE=TRUE
MCP_TV_DAC_VREF	NC_MCP_TV_DAC_VREF	NO_TEST=TRUE MAKE_BASE=TRUE
MCP_CLK27M_XTALIN	NC_MCP_CLK27M_XTALIN	NO_TEST=TRUE MAKE_BASE=TRUE
MCP_CLK27M_XTALOUT	NC_MCP_CLK27M_XTALOUT	NO_TEST=TRUE MAKE_BASE=TRUE
CRT_IG_R_C_PR	NC_CRT_IG_R_C_PR	NO_TEST=TRUE MAKE_BASE=TRUE
CRT_IG_G_Y_Y	NC_CRT_IG_G_Y_Y	NO_TEST=TRUE MAKE_BASE=TRUE
CRT_IG_B_COMP_PB	NC_CRT_IG_B_COMP_PB	NO_TEST=TRUE MAKE_BASE=TRUE
CRT_IG_HSYNC	NC_CRT_IG_HSYNC	NO_TEST=TRUE MAKE_BASE=TRUE
CRT_IG_VSYNC	NC_CRT_IG_VSYNC	NO_TEST=TRUE MAKE_BASE=TRUE

LVDS ALIASES

UNUSED LVDS SIGNALS

LVDS_IG_A_DATA_P<3>	NC_LVDS_IG_A_DATA_P3	NO_TEST=TRUE MAKE_BASE=TRUE
LVDS_IG_A_DATA_N<3>	NC_LVDS_IG_A_DATA_N3	NO_TEST=TRUE MAKE_BASE=TRUE
LVDS_IG_B_CLK_P	NC_LVDS_IG_B_CLK_P	NO_TEST=TRUE MAKE_BASE=TRUE
LVDS_IG_B_CLK_N	NC_LVDS_IG_B_CLK_N	NO_TEST=TRUE MAKE_BASE=TRUE
LVDS_IG_B_DATA_P<3:0>	NC_LVDS_IG_B_DATA_P<3:0>	NO_TEST=TRUE MAKE_BASE=TRUE
LVDS_IG_B_DATA_N<3:0>	NC_LVDS_IG_B_DATA_N<3:0>	NO_TEST=TRUE MAKE_BASE=TRUE

MISC NC MCP79 ALIASES

CPU_PECI_MCP	TP_CPU_PECI_MCP	
FW_PME_L	TP_FW_PME_L	MAKE_BASE=TRUE
ODD_PWR_EN_L	TP_ODD_PWR_EN_L	MAKE_BASE=TRUE

SATA ALIASES

UNUSED SATA ODD SIGNALS

SATA_ODD_R2D_C_P	TP_SATA_ODD_R2D_C_P	
SATA_ODD_R2D_C_N	TP_SATA_ODD_R2D_C_N	MAKE_BASE=TRUE
SATA_ODD_D2R_P	TP_SATA_ODD_D2R_P	MAKE_BASE=TRUE
SATA_ODD_D2R_N	TP_SATA_ODD_D2R_N	MAKE_BASE=TRUE

USB ALIASES

UNUSED USB PORTS

USB_EXTB_P	TP_USB_EXTB_P	
USB_EXTB_N	TP_USB_EXTB_N	MAKE_BASE=TRUE
USB_EXTC_P	TP_USB_EXTC_P	MAKE_BASE=TRUE
USB_EXTC_N	TP_USB_EXTC_N	MAKE_BASE=TRUE
USB_EXTD_P	TP_USB_EXTD_P	MAKE_BASE=TRUE
USB_EXTD_N	TP_USB_EXTD_N	MAKE_BASE=TRUE
USB_EXCARD_P	TP_USB_EXCARD_P	MAKE_BASE=TRUE
USB_EXCARD_N	TP_USB_EXCARD_N	MAKE_BASE=TRUE
USB_MINI_P	TP_USB_MINI_P	MAKE_BASE=TRUE
USB_MINI_N	TP_USB_MINI_N	MAKE_BASE=TRUE

EXTERNAL PORT A

=USB2_EXTA_P	USB_EXTA_P	MAKE_BASE=TRUE
=USB2_EXTA_N	USB_EXTA_N	MAKE_BASE=TRUE
=EXTAUSB_OC_L	USB_EXTA_OC_L	MAKE_BASE=TRUE

CAMERA

=USB2_CAMERA_P	USB_CAMERA_P	MAKE_BASE=TRUE
=USB2_CAMERA_N	USB_CAMERA_N	MAKE_BASE=TRUE

TRACKPAD(WELLSPRING)

=USB2_TPAD_P	USB_TPAD_P	MAKE_BASE=TRUE
=USB2_TPAD_N	USB_TPAD_N	MAKE_BASE=TRUE

IR

=USB2_IR_P	USB_IR_P	MAKE_BASE=TRUE
=USB2_IR_N	USB_IR_N	MAKE_BASE=TRUE

BT (M93)

=USB2_BT_P	USB_BT_P	MAKE_BASE=TRUE
=USB2_BT_N	USB_BT_N	MAKE_BASE=TRUE

CPU FSB FREQUENCY STRAPS

BSEL<2..0>	FSB MHZ
0 0 0	266
0 0 1	133
0 1 0	(RSVD)
0 1 1	333
1 0 0	200
1 0 1	(166)
1 1 0	(100)
1 1 1	(RSVD)

CPU_BSEL<0:2> (IN, MAKE_BASE=TRUE) — =MCP_BSEL<0:2> (OUT)

Extra FSB Pull-ups

Exist in MRB but not Intel designs. Here for CYA.
If found to be necessary, will move to page14.csa

=PP1V05_S0_MCP_FSB

R0995 220 5% 1/20W MF 201 — NO STUFF
R0997 200 5% 1/20W MF 201 — NO STUFF
R0999 150 5% 1/20W MF 201 — NO STUFF
R0996 62 5% 1/20W MF 201 — NO STUFF
R0998 150 5% 1/20W MF 201 — NO STUFF

CPU_DPRSTP_L
FSB_BREQ0_L
FSB_CPURST_L
CPU_INTR
CPU_NMI

MEM ALIASES

		NO_TEST
TP_MEM_A_CLK4P	NC_MEM_A_CLK4P	TRUE
TP_MEM_A_CLK4N	NC_MEM_A_CLK4N	TRUE
TP_MEM_A_CLK3P	NC_MEM_A_CLK3P	TRUE
TP_MEM_A_CLK3N	NC_MEM_A_CLK3N	TRUE
TP_MEM_A_CS_L<2>	NC_MEM_A_CS_L<2>	TRUE
TP_MEM_A_CS_L<3>	NC_MEM_A_CS_L<3>	TRUE
TP_MEM_A_CKE<2>	NC_MEM_A_CKE<2>	TRUE
TP_MEM_A_CKE<3>	NC_MEM_A_CKE<3>	TRUE
TP_MEM_B_CLK4P	NC_MEM_B_CLK4P	TRUE
TP_MEM_B_CLK4N	NC_MEM_B_CLK4N	TRUE
TP_MEM_B_CLK3P	NC_MEM_B_CLK3P	TRUE
TP_MEM_B_CLK3N	NC_MEM_B_CLK3N	TRUE
TP_MEM_B_CS_L<2>	NC_MEM_B_CS_L<2>	TRUE
TP_MEM_B_CS_L<3>	NC_MEM_B_CS_L<3>	TRUE
TP_MEM_B_ODT<2>	NC_MEM_B_ODT<2>	TRUE
TP_MEM_B_ODT<3>	NC_MEM_B_ODT<3>	TRUE
TP_MEM_B_CKE<2>	NC_MEM_B_CKE<2>	TRUE
TP_MEM_B_CKE<3>	NC_MEM_B_CKE<3>	TRUE

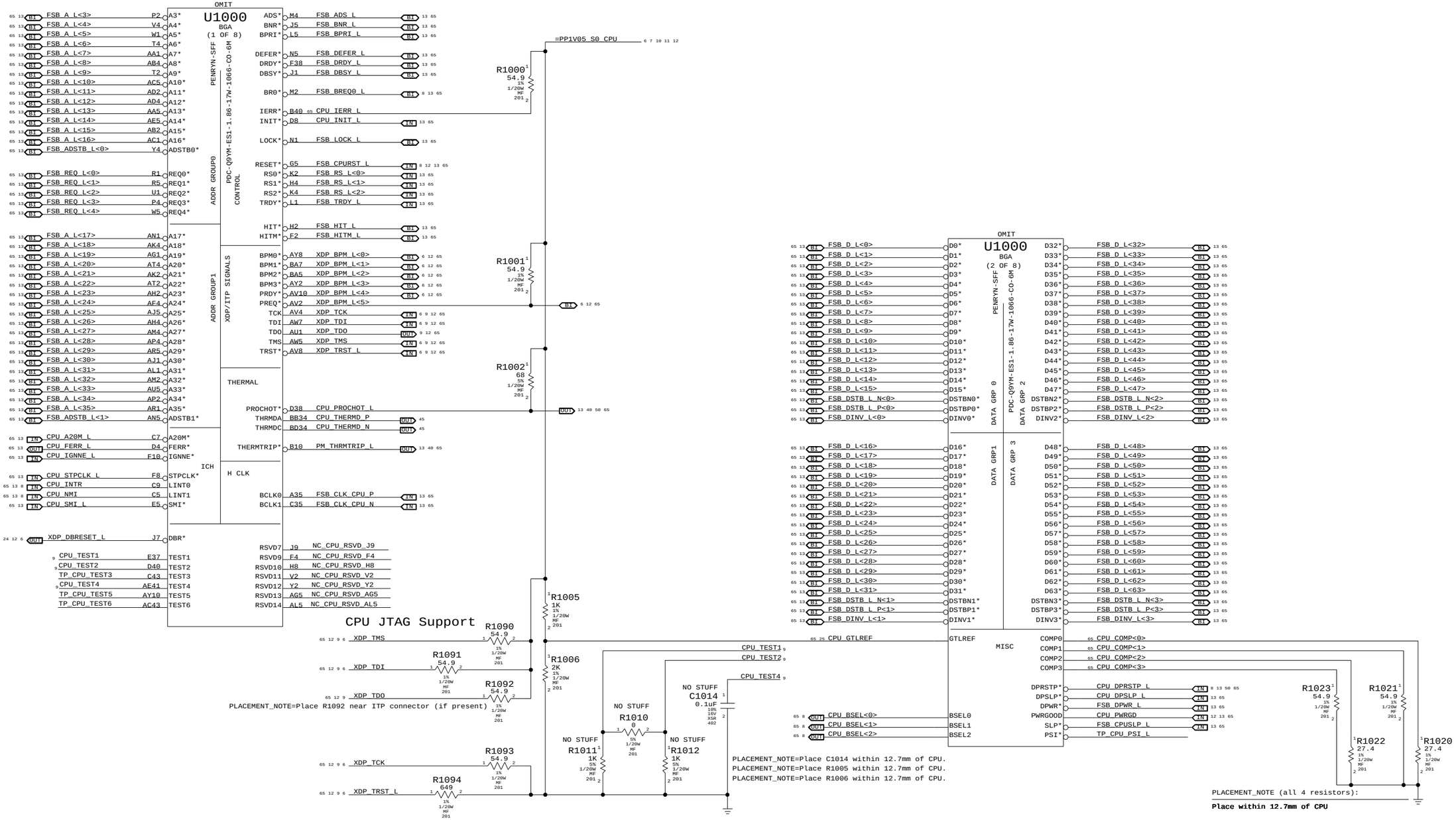
All: MAKE_BASE=TRUE

SIGNAL ALIAS /RESET

SYNC_MASTER=(MASTER) SYNC_DATE=(MASTER)

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 8 OF 71	



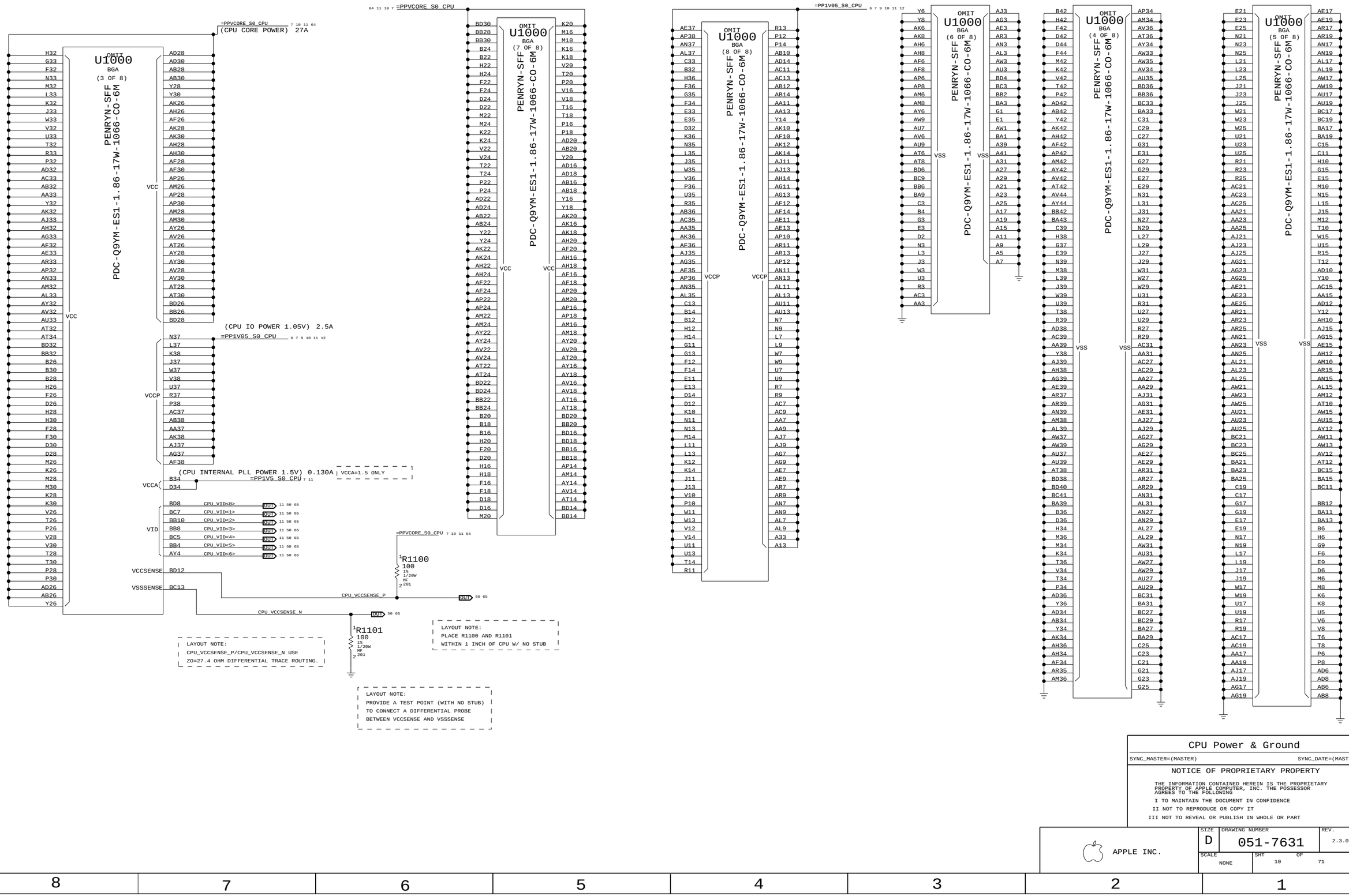
SYNC FROM M97

CPU FSB

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 9 OF 71	



CPU Power & Ground

SYNC_MASTER=(MASTER) SYNC_DATE=(MASTER)

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APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	10	71

CPU VCORE HF AND BULK DECOUPLING

3x 330uF. 32x 10uF 0603, 28x 2.2uF 0402 + 40x 2.2uF 0402

64 10 7 =PPVCORE_S0_CPU

10UF 0603 = APN:138S0568 = MURATA,TAIYO,TDK,SAMSUNG

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1200 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1201 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1202 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1203 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1204 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1205 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1206 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1207 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1208 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1209 10UF 20% 6.3V OMIT X5R 603

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1210 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1211 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1212 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1213 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1214 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1215 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1216 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1217 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1218 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1219 10UF 20% 6.3V OMIT X5R 603

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1220 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1221 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1222 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1223 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1224 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1225 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1226 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1227 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1228 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1229 10UF 20% 6.3V OMIT X5R 603

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1230 10UF 20% 6.3V OMIT X5R 603
CRITICAL C1231 10UF 20% 6.3V OMIT X5R 603

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1240 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1241 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1242 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1243 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1244 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1245 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1246 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1247 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1248 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1249 2.2UF 20% 6.3V CERM OMIT 402-LF

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1250 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1251 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1252 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1253 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1254 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1255 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1256 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1257 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1258 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1259 2.2UF 20% 6.3V CERM OMIT 402-LF

LAYOUT NOTE:
PLACE ON OPPOSITE SIDE OF CPU

CRITICAL C1260 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1261 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1262 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1263 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1264 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1265 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1266 2.2UF 20% 6.3V CERM OMIT 402-LF
CRITICAL C1267 2.2UF 20% 6.3V CERM OMIT 402-LF

LAYOUT NOTE:
PLACE ON SAME SIDE AS CPU

CRITICAL C1270 330UF 20% 2.0V POLY-TANT D2T-SM1
CRITICAL C1271 330UF 20% 2.0V POLY-TANT D2T-SM1

CRITICAL C1272 330UF 20% 2.0V POLY-TANT D2T-SM1

LAYOUT NOTE:
PLACE ON SAME SIDE AS CPU

Intel recommends 3x220UF @ 9mOHM

CPU VCORE VID CONNECTIONS

65 50 10 CPU_VID<0..6> — IMVP6_VID<0..6> 65
MAKE_BASE=TRUE

VCCA (CPU AVdd) DECOUPLING

10 7 =PP1V5_S0_CPU

1x 10uF, 1x 0.01uF

C1280 10UF 20% 6.3V X5R 603 OMIT
C1281 0.01UF 10% 10V X5R 201

LAYOUT NOTE:
PLACE C1281 NEAR PIN B34 OF U1000

VCCP (CPU I/O) DECOUPLING

12 10 9 7 6 =PP1V05_S0_CPU

1X 330UF, 12X 2.2UF

C1283 C1284 C1285 C1286 C1287 C1288 2.2UF 20% 6.3V CERM OMIT 402-LF

CRITICAL C1290 330UF 20% 2.5V POLY-TANT CASE-C2-SM

C1291 C1292 C1293 C1294 C1295 C1296 2.2UF 20% 6.3V CERM OMIT 402-LF

LAYOUT NOTE:
PLACE C1290 CLOSE TO CPU
PLACE C1283-C1288 CLOSE TO FSB ADDRESS PINS
PLACE C1291-C1296 CLOSE TO FSB DATA PINS

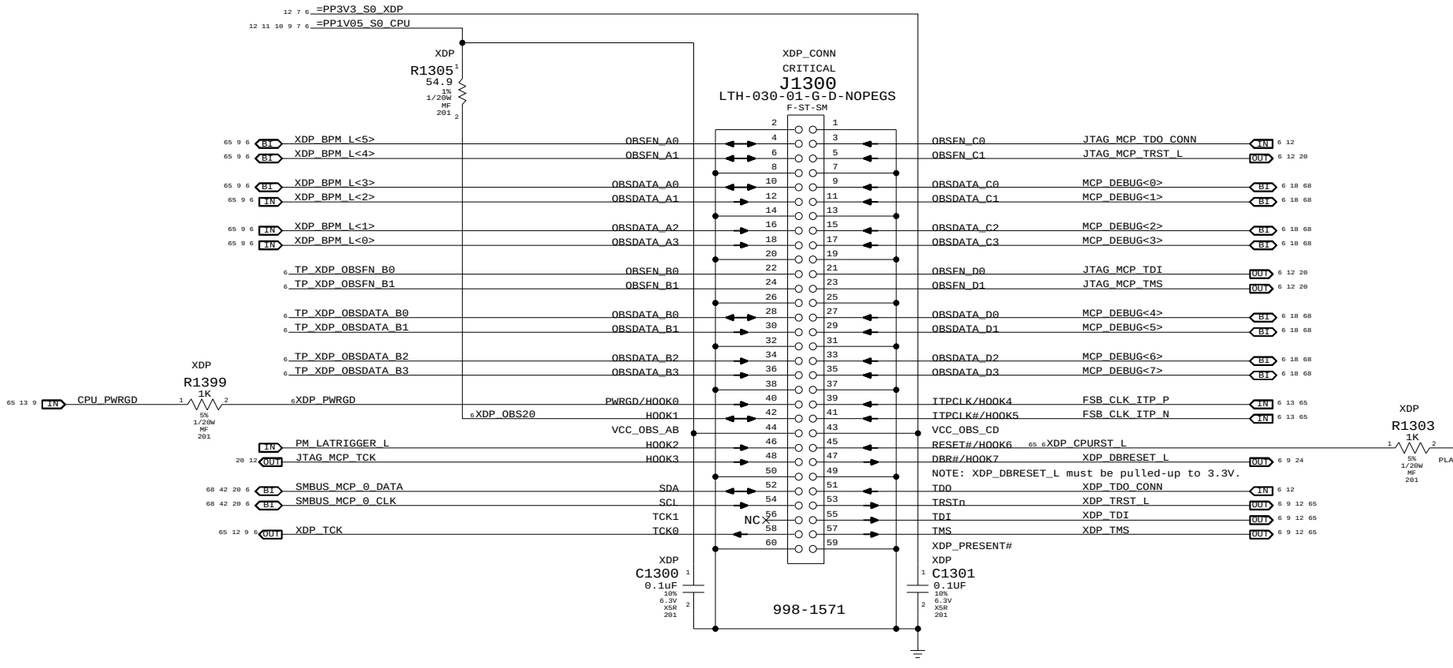
CPU Decoupling & VID

SYNC_MASTER=MSARWAR SYNC_DATE=04/26/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 11 OF 71	

MCP79-specific pinout



eXtended Debug Port (XDP)

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

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D	051-7631	2.3.0
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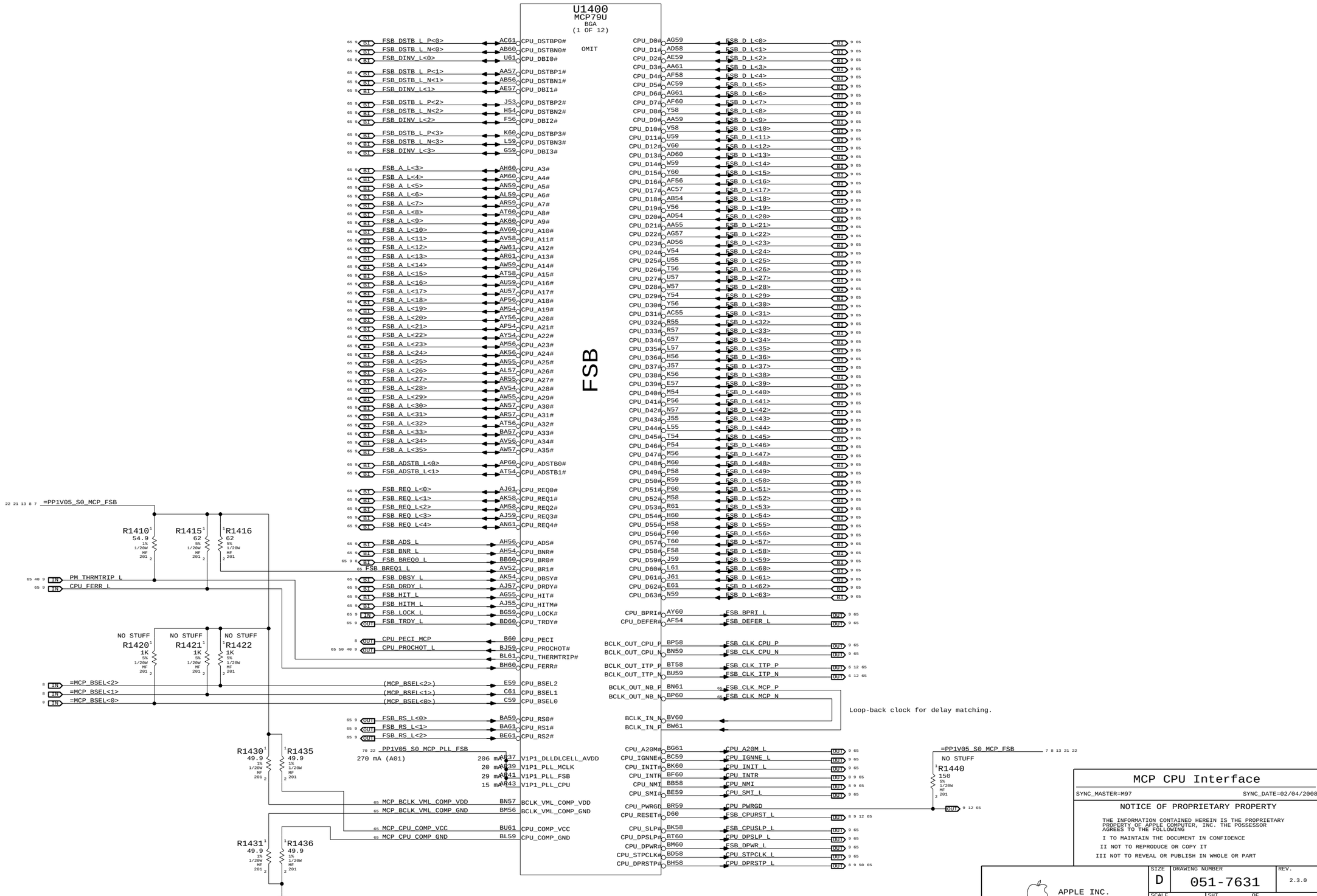
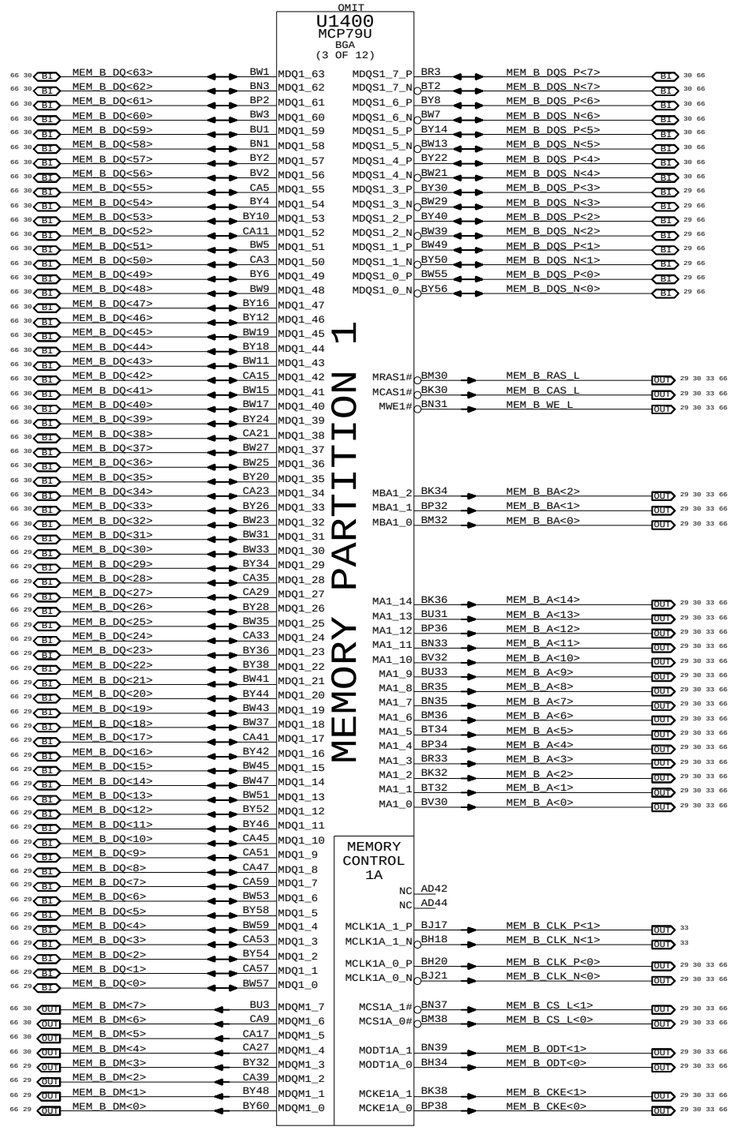


Current numbers from email Poonacha Kongetira provided 11/30/2007 4:04pm (no official document number).



MCP Memory Interface

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

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SIZE	DRAWING NUMBER	REV.
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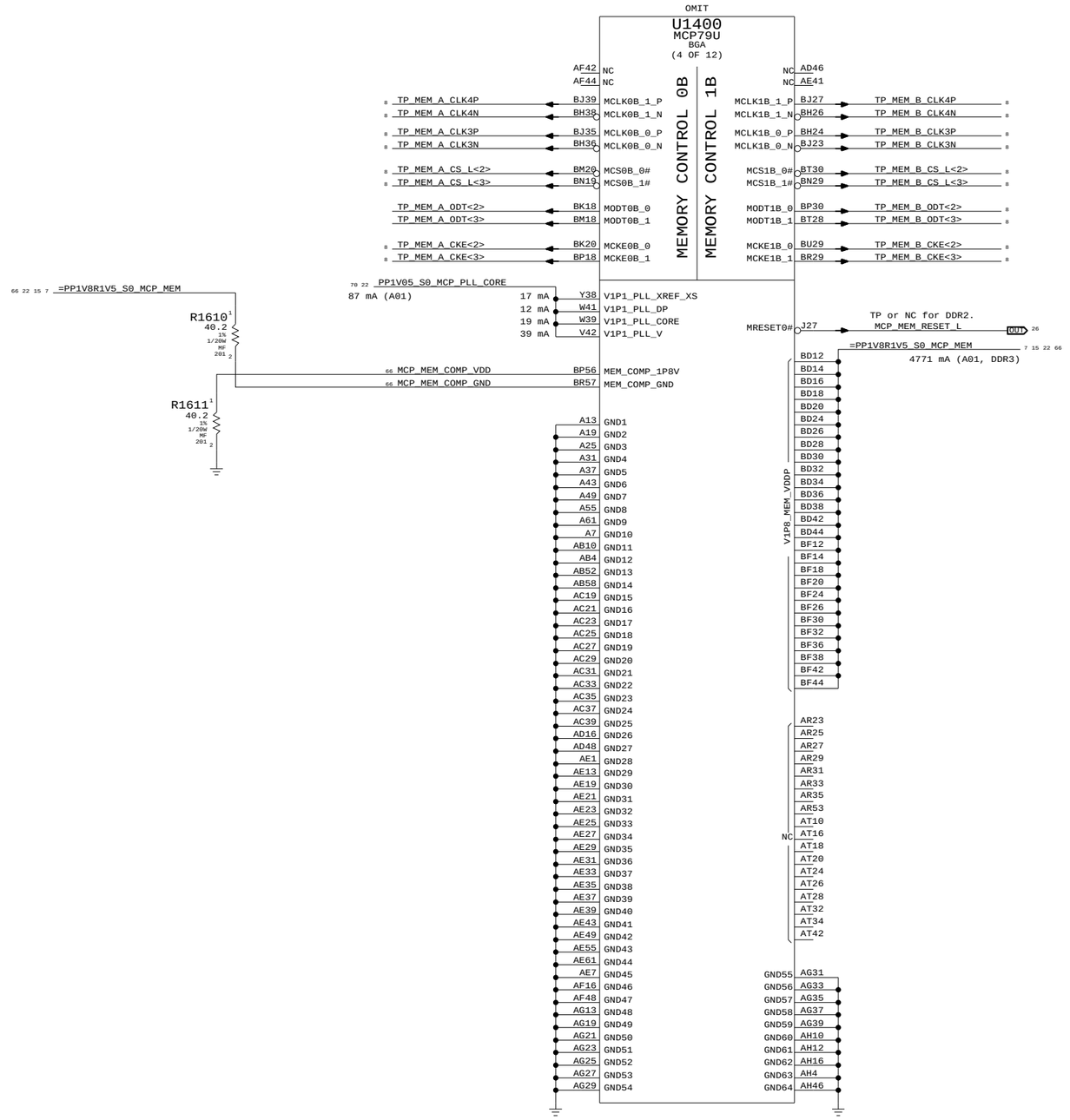
SCALE: NONE	SHT 14 OF 71	



MCP Memory Misc

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

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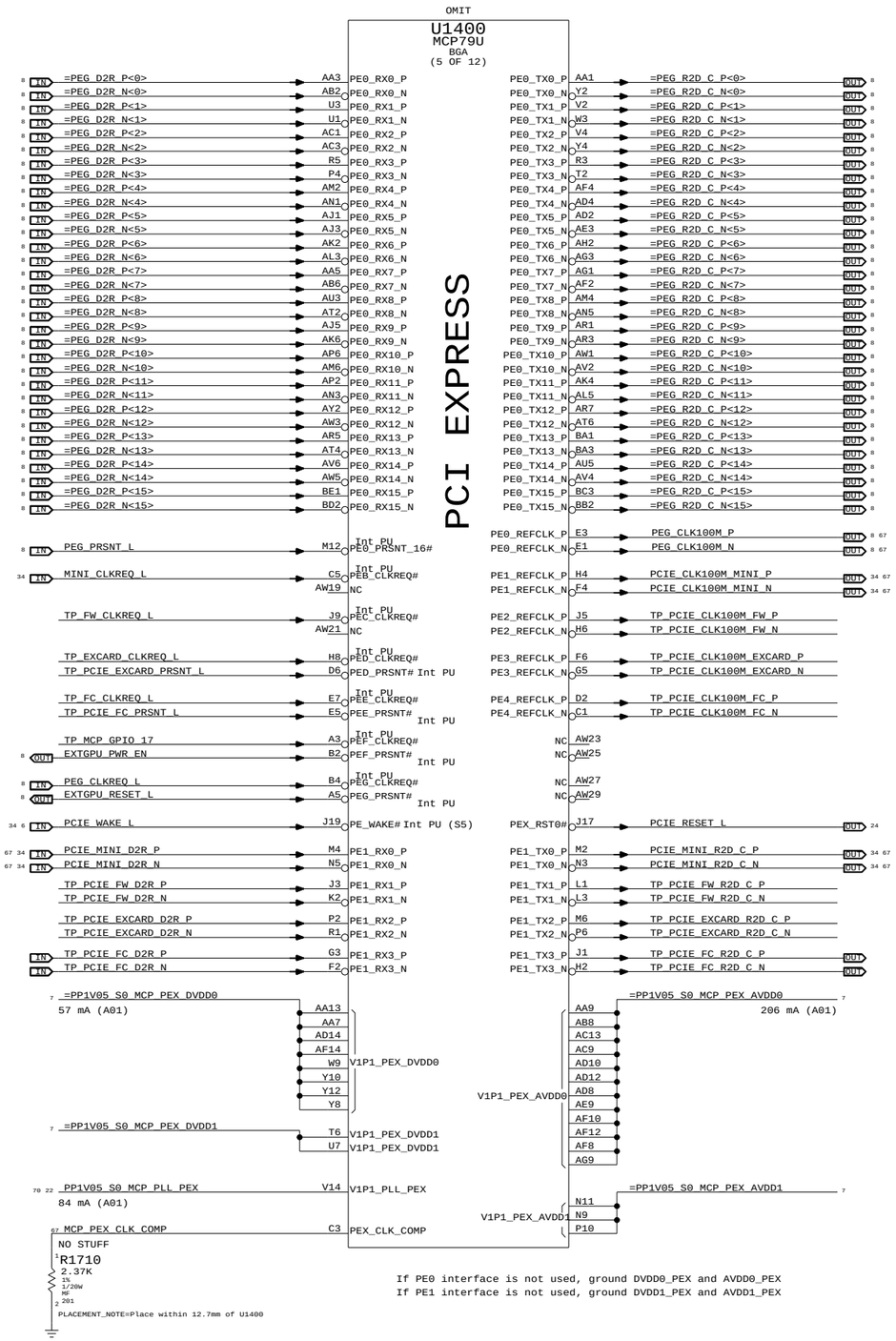

MCP PCIe Interfaces

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

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SCALE: NONE SHT 16 OF 71

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Network Interface Select

Interface	ENET_TXD<0>
RGMII	1
MII	0

NOTE: All Apple products set strap to MII, RGMII products will enable feature via software. This avoids a leakage issue since MCP79 requires a S5 pull-up.

RGB DAC Disable:

Okay to float all RGB_DAC signals.
DDC_CLK0/DDC_DATA0 pull-ups still required.

TV DAC Disable:

Okay to float all TV_DAC signals.
Okay to float XTALIN_TV and XTALOUT_TV.
DDC_CLK0/DDC_DATA0 pull-ups still required.

Interface Mode

MCP Signal	TMDS/HDMI	DisplayPort
=MCP_HDMI_TXC_P/N	TMDS_IG_TXC_P/N	DP_IG_ML_P/N<3>
=MCP_HDMI_TXD_P/N<0>	TMDS_IG_TXD_P/N<0>	DP_IG_ML_P/N<2>
=MCP_HDMI_TXD_P/N<1>	TMDS_IG_TXD_P/N<1>	DP_IG_ML_P/N<1>
=MCP_HDMI_TXD_P/N<2>	TMDS_IG_TXD_P/N<2>	DP_IG_ML_P/N<0>
=MCP_HDMI_DDC_CLK	TMDS_IG_DDC_CLK	DP_IG_DDC_CLK
=MCP_HDMI_DDC_DATA	TMDS_IG_DDC_DATA	DP_IG_DDC_DATA
=MCP_HDMI_HPD	TMDS_IG_HPD	DP_IG_HPD
DP_IG_AUX_CH_P/N	TP_DP_IG_AUX_CHP/N	DP_IG_AUX_CH_P/N

NOTE: 1M pull-down required on DP_IG_CA_DET if DP not used.
NOTE: 20K pull-down required on DP_HOTPLUG_DET.

NOTE: HDMI port requires level-shifting. IFP interface can be used to provide HDMI or dual-channel TMDS without level-shifters.

LVDS: Power +VDD_IFPx at 1.8V
Dual-channel TMDS: Power +VDD_IFPx at 3.3V

WF: IFP is capable of LVDS (1.8V) or TMDS (3.3V), need aliases

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MCP Ethernet & Graphics

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

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SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 17 OF 71	

OMIT

U1400
MCP79U
BGA
(7 OF 12)

PCI

LPC

GND

68 18	PCI_REQ0_L	AJ9	PCI_REQ0#		
68 18	PCI_REQ1_L	AD6	PCI_REQ1#		
18	OUT CRTMUX_SEL_TV_L	AH6	PCI_REQ2#		
8	OUT AUD_IPHS_SWITCH_EN	AP8	PCI_REQ3#		
18	IN MCP_RS232_SIN_L	AC5	PCI_REQ4#		
68 12 6	BI MCP_DEBUG<0>	BC5	PCI_AD0		
68 12 6	BI MCP_DEBUG<1>	BK4	PCI_AD1		
68 12 6	BI MCP_DEBUG<2>	BE5	PCI_AD2		
68 12 6	BI MCP_DEBUG<3>	BH4	PCI_AD3		
68 12 6	BI MCP_DEBUG<4>	BE3	PCI_AD4		
68 12 6	BI MCP_DEBUG<5>	BA5	PCI_AD5		
68 12 6	BI MCP_DEBUG<6>	BJ3	PCI_AD6		
68 12 6	BI MCP_DEBUG<7>	BJ5	PCI_AD7		
		BC53			
		BB8			
		BB6			
		BB56			
		BB54			
		BB52			
		BB50			
		BB48			
		BB46			
		BB44			
		BB42			
		BB38			
		BB36			
		BB34			
		BB32	NC		
		BB30			
		BB28			
		BB26			
		BB24			
		BB20			
		BB10			
		BA9			
		BA7			
		BA55			
		BA49			
		BA43			
		BA41			
		BA39			
41 39	IN PM_CLKRUN_L	AH8	PCI_CLKRUN#		
8	FW_PME_L	AN9	LPC_DRQ1#	Int PU	
	TP_LPC_DRQ0_L	AN7	LPC_DRQ0#	Int PU	
41 39	BI LPC_SERIRQ	AT8	LPC_SERIRQ	Int PU	
		AH48	GND65		
		AH52	GND66		
		AH58	GND67		
		AJ19	GND68		
		AJ21	GND69		
		AJ23	GND70		
		AJ25	GND71		
		AJ27	GND72		
		AJ29	GND73		
		AJ31	GND74		
		AJ33	GND75		
		AJ35	GND76		
		AJ37	GND77		
		AJ39	GND78		
		AK16	GND79		
		AK48	GND80		
		AL1	GND81		
		AL13	GND82		
		AL19	GND83		
		AL21	GND84		
		AL23	GND85		
		AL25	GND86		
		AL27	GND87		
		AL29	GND88		
		AL31	GND89		
		AL33	GND90		
		AL35	GND91		
		AL37	GND92		
		AL39	GND93		
		AL43	GND94		
		AL49	GND95		
		AL55	GND96		
		AL61	GND97		

		BE57	NC		
		BE9	NC		
PCI_GNT2#		AE5		TP_LVDSMUX_SEL_IG_L	OUT
PCI_GNT3#		AC7		TP_DPMUX_SEL_IG_L	OUT
PCI_GNT4#		AF6		MCP_RS232_SOUT_L	OUT 18
		BE53			
		BD8			
		BD56			
		BD52			
		BD48			
		BC57			
		BC9	NC		
		BD50			
		BD54			
		BD6			
		BE49			
		BE55			
		BA53		FIXME: USED TO BE PM_LATRIGGER_L	
Int PU (S5)					
PCI_RESET0#		G17		MEM_VTT_EN_R	OUT 24
PCI_RESET1#		G21		TP_PCI_RESET1_L	
PCI_CLK0		AM10		TP_PCI_CLK0	
		BE7	NC		
PCI_CLK2		AG5		68 PCI_CLK33M_MCP_R	
PCI_CLKIN		AG7		68 PCI_CLK33M_MCP	
LPC_FRAME#		AJ7		41 LPC_FRAME_R_L	R1960 22 1 2 5% 1/20W MF 201 LPC_FRAME_L OUT 39 41 68
LPC_PWRDWN#		AL9		LPC_PWRDWN_L	OUT 39 41
LPC_RESET0#		E17		LPC_RESET_L	OUT 24 68
LPC_AD0		AM8		LPC_AD_R<0>	R1961 22 1 2 5% 1/20W MF 201 LPC_AD<0> BI 39 41 68
LPC_AD1		AK8		LPC_AD_R<1>	R1962 22 1 2 5% 1/20W MF 201 LPC_AD<1> BI 39 41 68
LPC_AD2		AK10		LPC_AD_R<2>	R1963 22 1 2 5% 1/20W MF 201 LPC_AD<2> BI 39 41 68
LPC_AD3		AR9		LPC_AD_R<3>	R1964 22 1 2 5% 1/20W MF 201 LPC_AD<3> BI 39 41 68
LPC_CLK0		BB4		LPC_CLK33M_SMC_R	OUT 24 68

R1910
22
5% 1/20W MF 201
PLACEMENT_NOTE=Place close to pin R8

R1965
10K
5% 1/20W MF 201
Strap for Boot ROM Selection (See HDA_SDOUT)

20 17 7 =PP3V3_S0_MCP_GPIO

18	MCP_RS232_SOUT_L	RP1900	8.2K	3	6
68 18	PCI_REQ0_L	RP1900	8.2K	4	5
68 18	PCI_REQ1_L	RP1901	8.2K	1	8
18	CRTMUX_SEL_TV_L	RP1901	8.2K	2	7
18	MCP_RS232_SIN_L	RP1901	8.2K	4	5

5% 1/32W 4X0201-HF

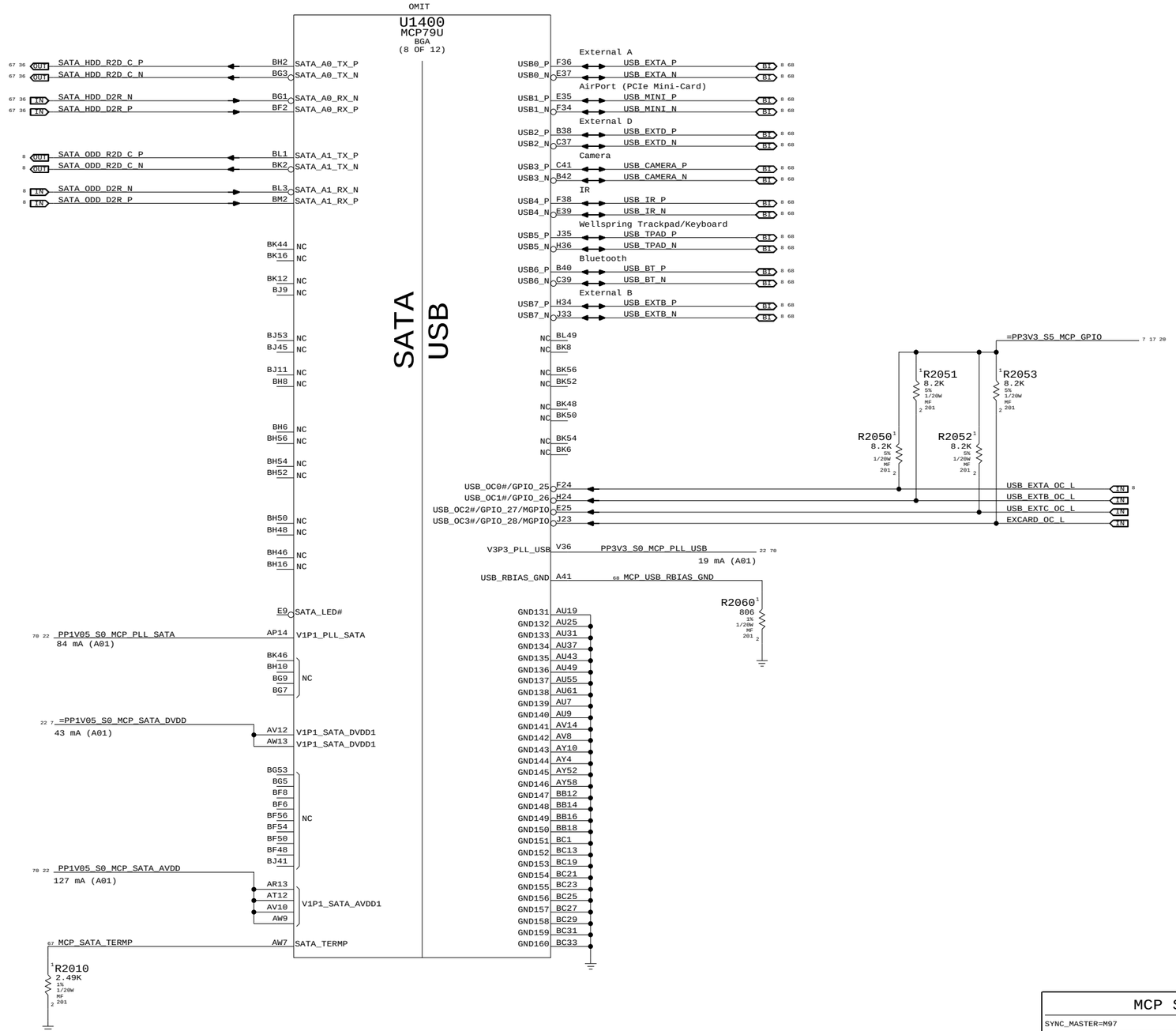
FIXME: ADJUST PINOUT PER LAYOUT

MCP PCI & LPC

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 18 OF 71	



MCP SATA & USB

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

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NONE	19	71

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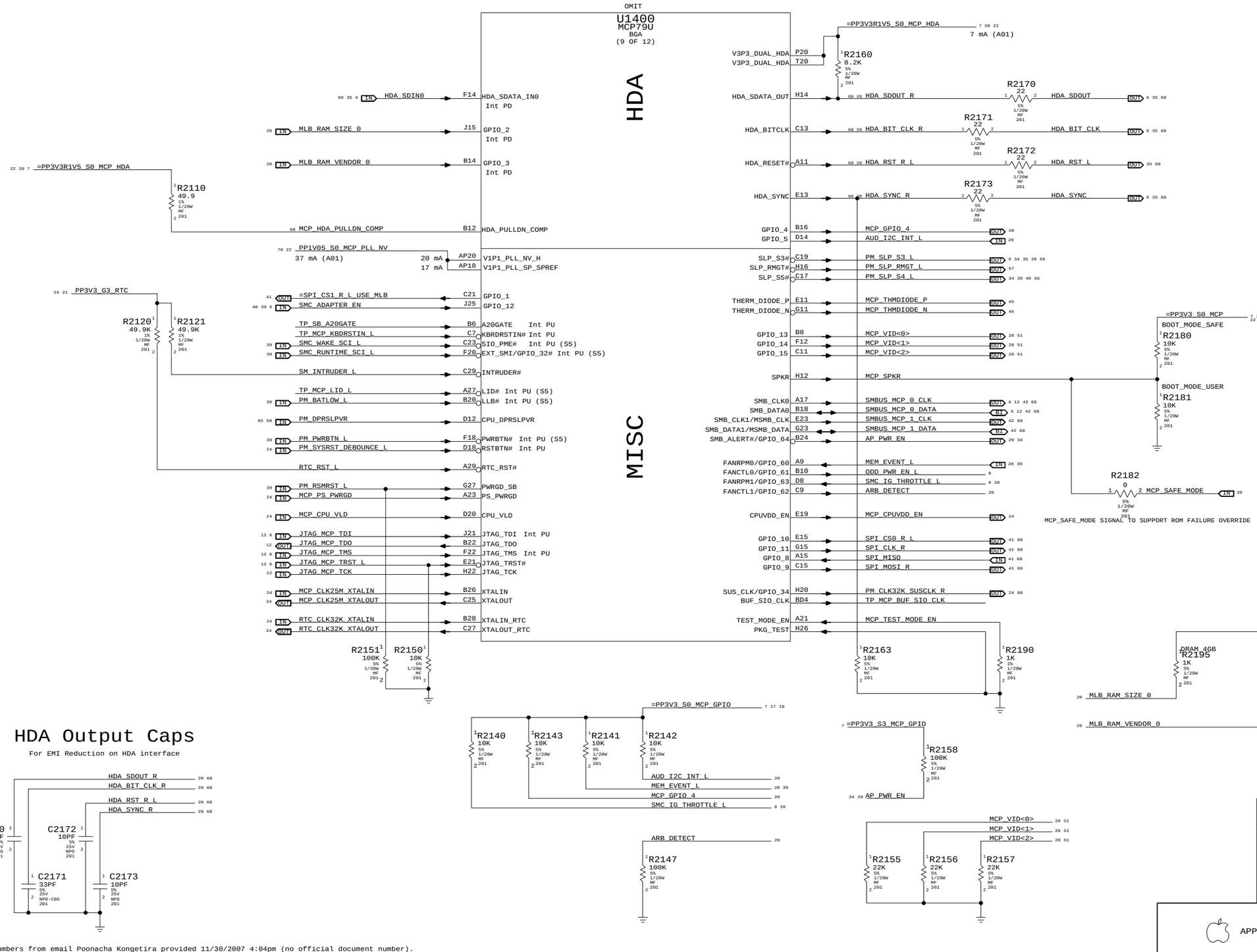
OMIT
U1400
MCP79U
BGA
(9 OF 12)
HDA
MISC
HDA_SDIN0
MLB_RAM_SIZE_0
MLB_RAM_VENDOR_0
=PP3V3R1V5_S0_MCP_HDA
R2110 49.9
MCP_HDA_PULLDN_COMP
PP1V05_S0_MCP_PLL_NV
37 mA (A01)
20 mA
17 mA
PP3V3_G3_RTC
R2120 49.9K
R2121 49.9K
=SPI_CS1_R_L_USE_MLB
SMC_ADAPTER_EN
TP_SB_A20GATE
TP_MCP_KBDRSTIN_L
SMC_WAKE_SCI_L
SMC_RUNTIME_SCI_L
SM_INTRUDER_L
TP_MCP_LID_L
PM_BATLOW_L
PM_DPRSLPVR
PM_PWRBTN_L
PM_SYSRST_DEBOUNCE_L
RTC_RST_L
PM_RSMRST_L
MCP_PS_PWRGD
MCP_CPU_VLD
JTAG_MCP_TDI
JTAG_MCP_TDO
JTAG_MCP_TMS
JTAG_MCP_TRST_L
JTAG_MCP_TCK
MCP_CLK25M_XTALIN
MCP_CLK25M_XTALOUT
RTC_CLK32K_XTALIN
RTC_CLK32K_XTALOUT
R2151 100K
R2150 10K
=PP3V3R1V5_S0_MCP_HDA
7 mA (A01)
R2160 8.2K
HDA_SDOUT_R
HDA_BIT_CLK_R
HDA_RST_R_L
HDA_SYNC_R
R2170 22
R2171 22
R2172 22
R2173 22
HDA_SDOUT
HDA_BIT_CLK
HDA_RST_L
HDA_SYNC
MCP_GPIO_4
AUD_I2C_INT_L
PM_SLP_S3_L
PM_SLP_RMGT_L
PM_SLP_S4_L
MCP_THMDIODE_P
MCP_THMDIODE_N
MCP_VID<0>
MCP_VID<1>
MCP_VID<2>
MCP_SPKR
SMBUS_MCP_0_CLK
SMBUS_MCP_0_DATA
SMBUS_MCP_1_CLK
SMBUS_MCP_1_DATA
AP_PWR_EN
MEM_EVENT_L
ODD_PWR_EN_L
SMC_IG_THROTTLE_L
ARB_DETECT
MCP_CPUVDD_EN
SPI_CS0_R_L
SPI_CLK_R
SPI_MISO
SPI_MOSI_R
PM_CLK32K_SUSCLK_R
TP_MCP_BUF_SIO_CLK
MCP_TEST_MODE_EN
R2163 10K
R2190 1K
=PP3V3_S0_MCP
BOOT_MODE_SAFE
R2180 10K
BOOT_MODE_USER
R2181 10K
R2182 0
MCP_SAFE_MODE
MCP_SAFE_MODE SIGNAL TO SUPPORT ROM FAILURE OVERRIDE
BIOS Boot Select
I/F | HDA_SDOUT | LPC_FRAME#
LPC | 0 | 0
PCI | 0 | 1
SPI0 | 1 | 0
SPI1 | 1 | 1
SPI0 = SPI_CS0_L, SPI1 = SPI_CS1_L
R1961 and R2160 selects SPI0 ROM by default, LPC+ debug card pulls LPC_FRAME# high for SPI1 ROM override.
NOTE: MCP79 does not support FWH, only LPC ROMs. So Apple designs will not use LPC for BootROM override.
NOTE: MCP79 rev A01 does not support SPI1 option.
BUF_SIO_CLK Frequency
Frequency | HDA_SYNC
24 MHz | 1
14.31818 MHz | 0
SPI Frequency Select
Frequency | SPI_DO | SPI_CLK
31 MHz | 0 | 0
42 MHz | 0 | 1
25 MHz | 1 | 0
1 MHz | 1 | 1
NOTE: Straps not provided on this page.
=PP3V3_S5_MCP_GPIO
DRAM_4GB
DRAM_SPD_2
R2195 1K
R2197 1K
MLB_RAM_SIZE_0
MLB_RAM_VENDOR_0
=PP3V3_S0_MCP_GPIO
R2140 10K
R2143 10K
R2141 10K
R2142 10K
AUD_I2C_INT_L
MEM_EVENT_L
MCP_GPIO_4
SMC_IG_THROTTLE_L
ARB_DETECT
R2147 100K
=PP3V3_S3_MCP_GPIO
R2158 100K
AP_PWR_EN
MCP_VID<0>
MCP_VID<1>
MCP_VID<2>
R2155 22K
R2156 22K
R2157 22K
HDA Output Caps
For EMI Reduction on HDA interface
HDA_SDOUT_R
HDA_BIT_CLK_R
HDA_RST_R_L
HDA_SYNC_R
C2170 33PF
C2172 10PF
C2171 33PF
C2173 10PF
MCP HDA & MISC
SYNC_MASTER=M97
SYNC_DATE=02/04/2008
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SIZE D
DRAWING NUMBER 051-7631
REV. 2.3.0
SCALE NONE
SHT 20 OF 71
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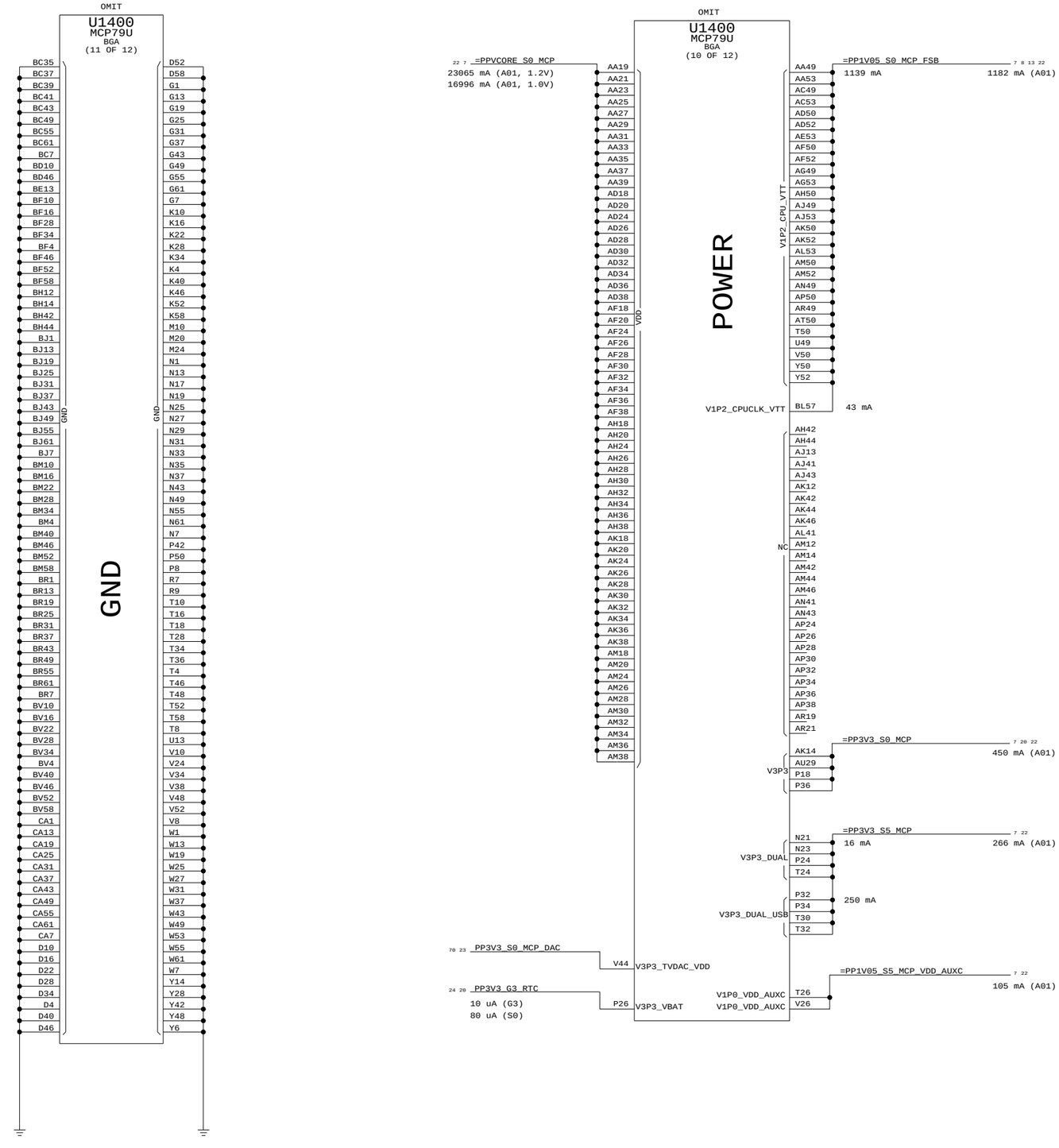

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MCP Power & Ground

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	21	71

MCP Core Power

=PPVCORE_S0_MCP
23065 mA (A01, 1.2V)
16996 mA (A01, 1.0V)
(No IG vs. EG data)

NV: 1x 10uF 0805, 2x 4.7uF 0402, 3x 1uF 0402, 9x 0.1uF 0402 (23.3 uF)
Apple: 4x 4.7uF 0402, 4x 1uF 0402, 6x 0.1uF 0402 (23.4 uF)

C2500 4.7UF 20% 4V X5R 402
C2501 4.7UF 20% 4V X5R 402
C2502 4.7UF 20% 4V X5R 402
C2503 4.7UF 20% 4V X5R 402
OMIT C2504 1UF 10% 6.3V X5R 402-1
OMIT C2505 1UF 10% 6.3V X5R 402-1
OMIT C2506 1UF 10% 6.3V X5R 402-1
OMIT C2507 1UF 10% 6.3V X5R 402-1
C2508 0.1UF 10% 6.3V X5R 201
C2509 0.1UF 10% 6.3V X5R 201
C2510 0.1UF 10% 6.3V X5R 201
C2511 0.1UF 10% 6.3V X5R 201
C2512 0.1UF 10% 6.3V X5R 201
C2513 0.1UF 10% 6.3V X5R 201

MCP PCIE (DVDD) Power

=PP1V05_S0_MCP_PEX_DVDD
57 mA (A01)

C2515 4.7UF 20% 4V X5R 402
OMIT C2516 1UF 10% 6.3V X5R 402-1
OMIT C2517 1UF 10% 6.3V X5R 402-1
C2518 0.1UF 10% 6.3V X5R 201
C2519 0.1UF 10% 6.3V X5R 201

MCP SATA (DVDD) Power

=PP1V05_S0_MCP_SATA_DVDD
43 mA (A01)

C2520 4.7UF 20% 4V X5R 402
C2521 0.1UF 10% 6.3V X5R 201

MCP 1.05V AUX Power

=PP1V05_S5_MCP_VDD_AUXC
105 mA (A01)

C2525 0.1UF 10% 6.3V X5R 201
C2526 0.1UF 10% 6.3V X5R 201

MCP 1.05V RMGT Power

=PP1V05_ENET_MCP_RMGT
131 mA (A01)

C2528 4.7UF 20% 4V X5R 402
C2529 0.1UF 10% 6.3V X5R 201

MCP FSB (VTT) Power

=PP1V05_S0_MCP_FSB
1182 mA (A01)

NV: 1x 10uF 0805, 1x 4.7uF 0402, 2x 0.1uF 0402 (14.9 uF)
Apple: 7x 2.2uF 0402 (15.4 uF)

OMIT C2530 2.2UF 20% 6.3V CERM 402-LF
OMIT C2531 2.2UF 20% 6.3V CERM 402-LF
OMIT C2532 2.2UF 20% 6.3V CERM 402-LF
OMIT C2533 2.2UF 20% 6.3V CERM 402-LF
OMIT C2534 2.2UF 20% 6.3V CERM 402-LF
OMIT C2535 2.2UF 20% 6.3V CERM 402-LF
OMIT C2536 2.2UF 20% 6.3V CERM 402-LF

MCP Memory Power

=PP1V8R1V5_S0_MCP_MEM
4771 mA (A01, DDR3)

C2540 4.7UF 20% 4V X5R 402
C2541 0.1UF 10% 6.3V X5R 201
C2542 0.1UF 10% 6.3V X5R 201
C2543 0.1UF 10% 6.3V X5R 201
C2544 0.1UF 10% 6.3V X5R 201
C2545 0.1UF 10% 6.3V X5R 201
C2546 0.1UF 10% 6.3V X5R 201
C2547 0.1UF 10% 6.3V X5R 201
C2548 0.1UF 10% 6.3V X5R 201
C2549 0.1UF 10% 6.3V X5R 201

MCP 3.3V Power

=PP3V3_S0_MCP
450 mA (A01)

NV: 1x 4.7uF 0603, 4x 0.1uF 0402 (5.1 uF)
Apple: 4x 2.2uF 0402 (8.8 uF)

OMIT C2550 2.2UF 20% 6.3V CERM 402-LF
OMIT C2551 2.2UF 20% 6.3V CERM 402-LF
OMIT C2552 2.2UF 20% 6.3V CERM 402-LF
OMIT C2553 2.2UF 20% 6.3V CERM 402-LF

MCP 3.3V AUX/USB Power

=PP3V3_S5_MCP
266 mA (A01)

NV: 1x 4.7uF 0603, 1x 0.1uF 0402 (4.8 uF)
Apple: 1x 2.2uF 0402 (2.2 uF)

OMIT C2560 2.2UF 20% 6.3V CERM 402-LF

MCP 3.3V/1.5V HDA Power

=PP3V3R1V5_S0_MCP_HDA
7 mA (A01)

NV: 1x 4.7uF 0603, 1x 0.1uF 0402 (4.8 uF)
Apple: 1x 2.2uF 0402 (2.2 uF)

OMIT C2562 2.2UF 20% 6.3V CERM 402-LF

MCP 3.3V Ethernet Power

=PP3V3_ENET_MCP_RMGT
83 mA (A01)

NV: 1x 4.7uF 0603, 1x 0.1uF 0402 (4.8 uF)
Apple: 1x 2.2uF 0402 (2.2 uF)

OMIT C2564 2.2UF 20% 6.3V CERM 402-LF

L2555

=PP3V3_S0_MCP_PLL_UF
19 mA (A01)
L2555 30-OHM-1.7A 0402
PP3V3_S0_MCP_PLL_USB
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=3.3V
19 mA (A01)

NV: 1x 4.7uF 0603, 1x 0.1uF 0402 (4.8 uF)
Apple: 1x 2.2uF 0402 (2.2 uF)

OMIT C2555 2.2UF 20% 6.3V CERM 402-LF

L2595

=PP1V05_ENET_MCP_PLL_MAC
5 mA (A01)
L2595 30-OHM-1.7A 0402
PP1V05_ENET_MCP_PLL_MAC
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
5 mA (A01)

C2595 4.7UF 20% 4V X5R 402
C2596 0.1UF 10% 6.3V X5R 201

L2570

=PP1V05_S0_MCP_AVDD_UF
333 mA (A01)
L2570 30-OHM-5A 0603
PP1V05_S0_MCP_PEX_AVDD
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
206 mA (A01)

NV: 1x 10uF 0805, 1x 4.7uF 0402, 2x 1uF 0402, 2x 0.1uF 0402 (16.9 uF)
Apple: 5x 2.2uF 0402 (11 uF)

OMIT C2570 2.2UF 20% 6.3V CERM 402-LF
OMIT C2571 2.2UF 20% 6.3V CERM 402-LF
OMIT C2572 2.2UF 20% 6.3V CERM 402-LF
OMIT C2573 2.2UF 20% 6.3V CERM 402-LF
OMIT C2574 2.2UF 20% 6.3V CERM 402-LF

L2575

L2575 30-OHM-5A 0603
PP1V05_S0_MCP_SATA_AVDD
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
127 mA (A01)

NV: 1x 10uF 0805, 1x 4.7uF 0402, 2x 0.1uF 0402 (14.9 uF)
Apple: 2x 2.2uF 0402 (4.4 uF)

OMIT C2575 2.2UF 20% 6.3V CERM 402-LF
OMIT C2576 2.2UF 20% 6.3V CERM 402-LF

L2580

=PP1V05_S0_MCP_PLL_UF
562 mA (A01)
L2580 30-OHM-1.7A 0402
PP1V05_S0_MCP_PLL_FSB
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
270 mA (A01)

C2580 4.7UF 20% 4V X5R 402
C2581 0.1UF 10% 6.3V X5R 201

L2582

L2582 30-OHM-1.7A 0402
PP1V05_S0_MCP_PLL_PEX
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
84 mA (A01)

C2582 4.7UF 20% 4V X5R 402
C2583 0.1UF 10% 6.3V X5R 201

L2584

L2584 30-OHM-1.7A 0402
PP1V05_S0_MCP_PLL_SATA
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
84 mA (A01)

C2584 4.7UF 20% 4V X5R 402
C2585 0.1UF 10% 6.3V X5R 201

L2586

L2586 30-OHM-1.7A 0402
PP1V05_S0_MCP_PLL_CORE
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
87 mA (A01)

C2586 4.7UF 20% 4V X5R 402
C2587 0.1UF 10% 6.3V X5R 201

L2588

L2588 30-OHM-1.7A 0402
PP1V05_S0_MCP_PLL_NV
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=1.05V
37 mA (A01)

C2588 4.7UF 20% 4V X5R 402
C2589 0.1UF 10% 6.3V X5R 201
C2590 0.1UF 10% 6.3V X5R 201

Current numbers from email Poonacha Kongetira provided 11/30/2007 4:04pm (no official document number).

MCP Standard Decoupling

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE D | DRAWING NUMBER 051-7631 | REV. 2.3.0

SCALE NONE | SHT 22 OF 71

WF: Checklist says 0-ohm resistor placeholder for ferrite bead.

NV: 1x 4.7uF 0603, 1x 0.1uF 0402 (4.8 uF)
Apple: 1x 2.2uF 0402 (2.2 uF)

17 7 =PP3V3R1V8_S0_MCP_IFP_VDD
190 mA (A01, 1.8V)

OMIT
C2610
2.2UF
20%
6.3V
CERM
402-LF

PP3V3_S0_MCP_DAC 21 70

R2650
0
5%
1/16W
MF-LF
402

17 7 =PP1V05_S0_MCP_HDMI_VDD
95 mA (A01)

C2615
4.7UF
20%
4V
X5R
402

C2616
0.1UF
10%
6.3V
X5R
201

67 17 MCP_HDMI_RSET
67 17 MCP_HDMI_VPROBE

NO STUFF
C2620
0.1UF
10%
6.3V
X5R
201

R2620
1K
1%
1/20W
MF
201

67 17 MCP_IFPAB_RSET
67 17 MCP_IFPAB_VPROBE

NO STUFF
C2630
0.1UF
10%
6.3V
X5R
201

NO STUFF
R2630
1K
1%
1/20W
MF
201

WF: Checklist says 0-ohm resistor placeholder for ferrite bead.
NV: 1x 4.7uF 0603, 1x 0.1uF 0402 (4.8 uF)
Apple: ???

7 =PP3V3_S0_MCP_VPLL_UF
16 mA (A01)

L2640
30-OHM-1.7A
0402

PP3V3_S0_MCP_VPLL
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 MM
VOLTAGE=3.3V

17 70
16 mA (A01)

C2640
4.7UF
20%
6.3V
CERM
603

C2641
0.1uF
10%
6.3V
X5R
201

SYNC FROM M97

Current numbers from email Poonacha Kongetira provided 11/30/2007 4:04pm (no official document number).

MCP Graphics Support

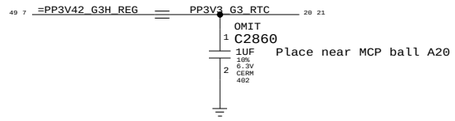
SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

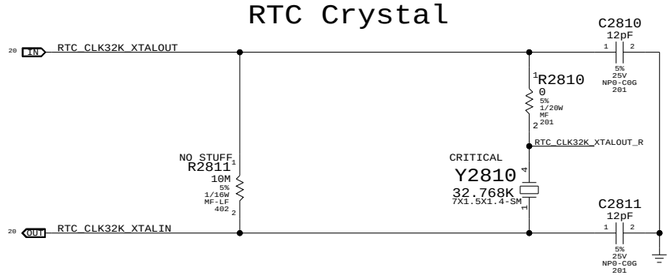
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	23	71

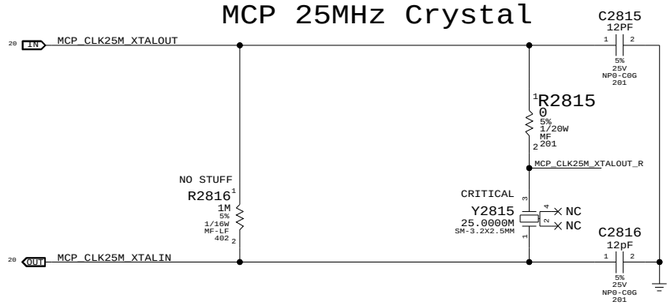
RTC Power Sources



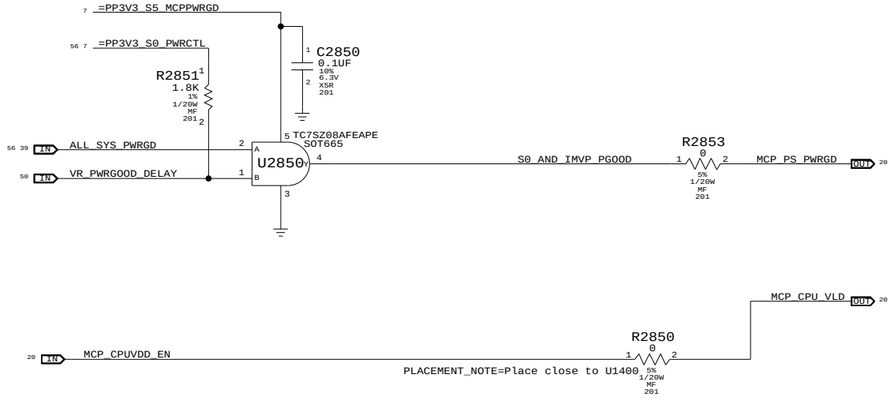
RTC Crystal



MCP 25MHz Crystal



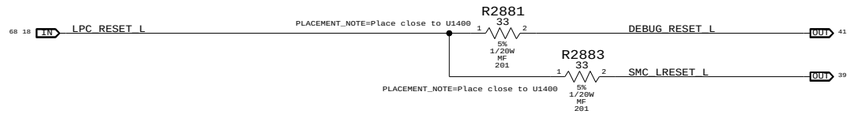
MCP S0 PWRGD & CPU_VLD



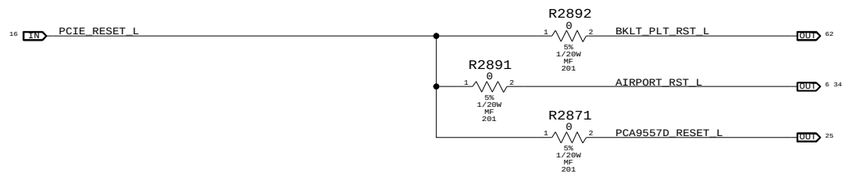
SYNC FROM M97
CHANGED RTC POWER SOURCE TO DIRECT CONNECTION
ADDED MCPSEQ_SMC LOGIC

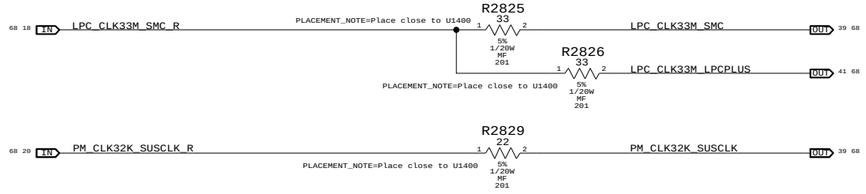
Platform Reset Connections

LPC Reset (Unbuffered)

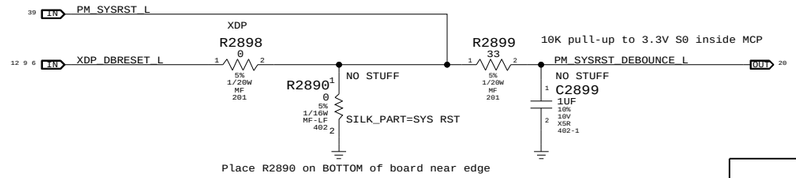


PCIE Reset (Unbuffered)





Reset Button



SB Misc

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

NOTICE OF PROPRIETARY PROPERTY

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 24 OF 71	

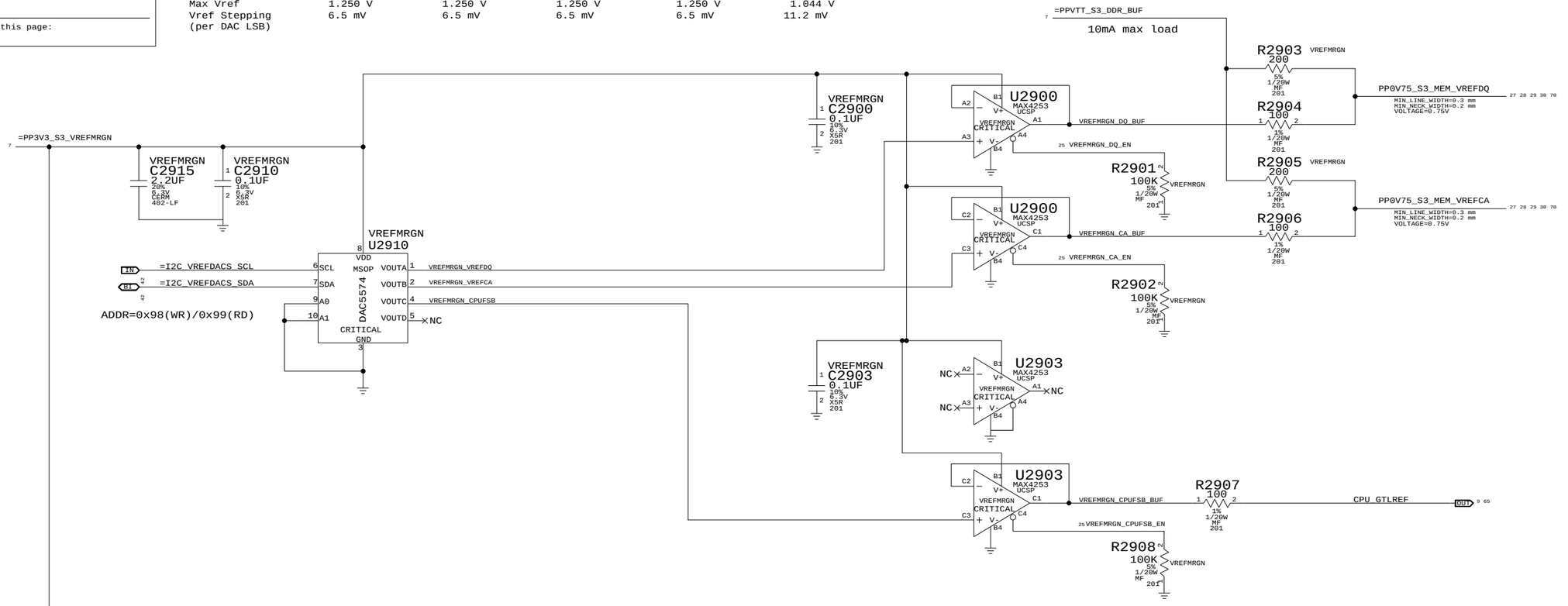
Page Notes

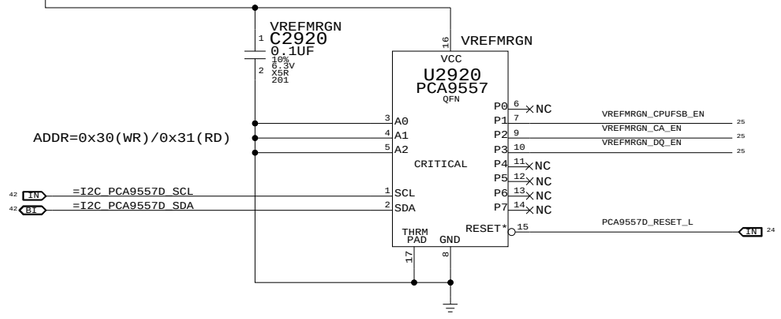
Power aliases required by this page:
- =PP3V3_S3_VREFMRGN
- =PP3V3_S5_VREFMRGN
- =PPVTT_S3_DDR_BUF

Signal aliases required by this page:
- =I2C_VREFDACS_SCL
- =I2C_VREFDACS_SDA
- =I2C_PCA9557D_SCL
- =I2C_PCA9557D_SDA

BOM options provided by this page:
VREFMRGN

	MEM A VREF DQ	MEM A VREF CA	MEM B VREF DQ	MEM B VREF CA	CPU FSB VREF
DAC channel	A	B	A	B	C
Min DAC code	0x00	0x00	0x00	0x00	0x00
Max DAC code	0x87	0x87	0x87	0x87	0x55
Max sink I	-3.75 mA	-3.75 mA	-3.75 mA	-3.75 mA	-0.91 mA
Max source I	5 mA	5 mA	5 mA	5 mA	0.52 mA
Nominal Vref	0.75 V	0.75 V	0.75 V	0.75 V	0.70 V
Min Vref	0.375 V	0.375 V	0.375 V	0.375 V	0.091 V
Max Vref	1.250 V	1.250 V	1.250 V	1.250 V	1.044 V
Vref Stepping (per DAC LSB)	6.5 mV	6.5 mV	6.5 mV	6.5 mV	11.2 mV





Required zero ohm resistors when no VREF margining circuit stuffed

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
116S0004	1	RES,MTL FILM,0,5%,0402,SM,LF	R2903	CRITICAL	NO_VREFMRGN
116S0004	1	RES,MTL FILM,0,5%,0402,SM,LF	R2905	CRITICAL	NO_VREFMRGN

FSB/DDR3 Vref Margining

SYNC_MASTER=BEN SYNC_DATE=01/15/2008

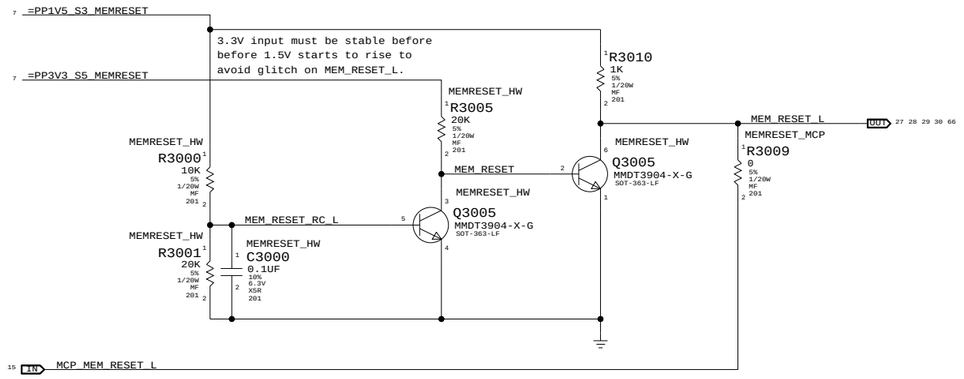
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE: NONE SHT 25 OF 71

DDR3 RESET Support

MCP79 cannot control this signal directly since it must be high in sleep and MCP MEM rails are not powered in sleep.



DDR3 Support			
SYNC_MASTER=T18_MLB	SYNC_DATE=01/30/2008		
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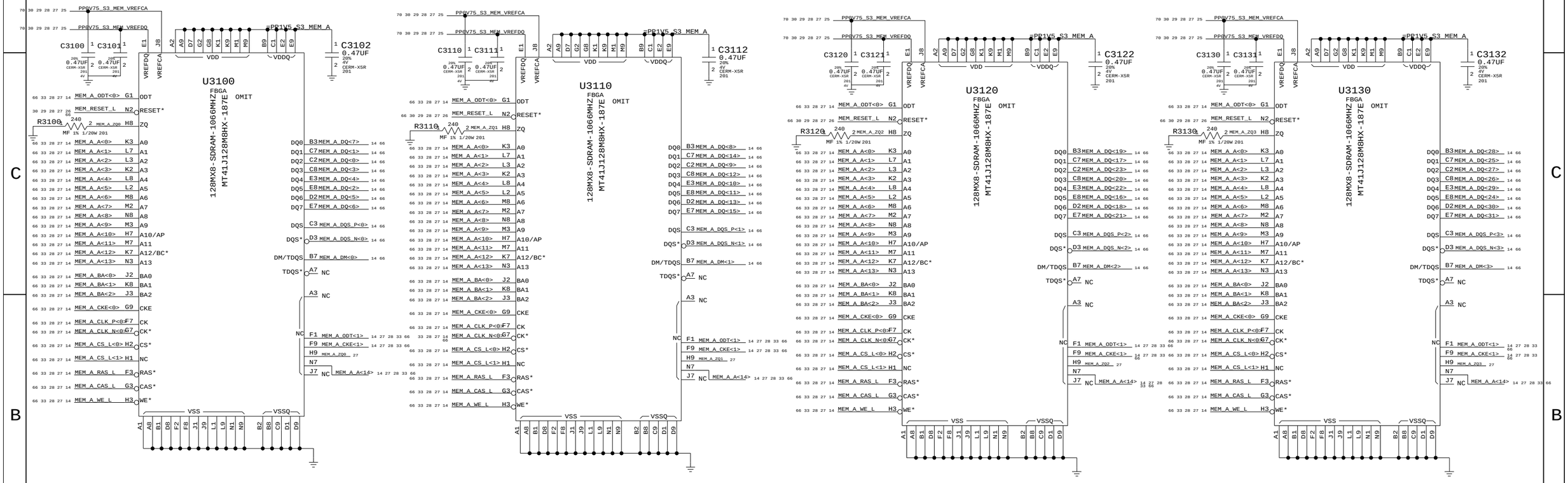
APPLE INC.	SIZE: D	DRAWING NUMBER: 051-7631	REV: 2.3.0
	SCALE: NONE	SHT 26 OF 71	



A14/A15 FOR 2G/4G MONO ONLY
CS1 IS FOR 2G DDP RANK CONTROL

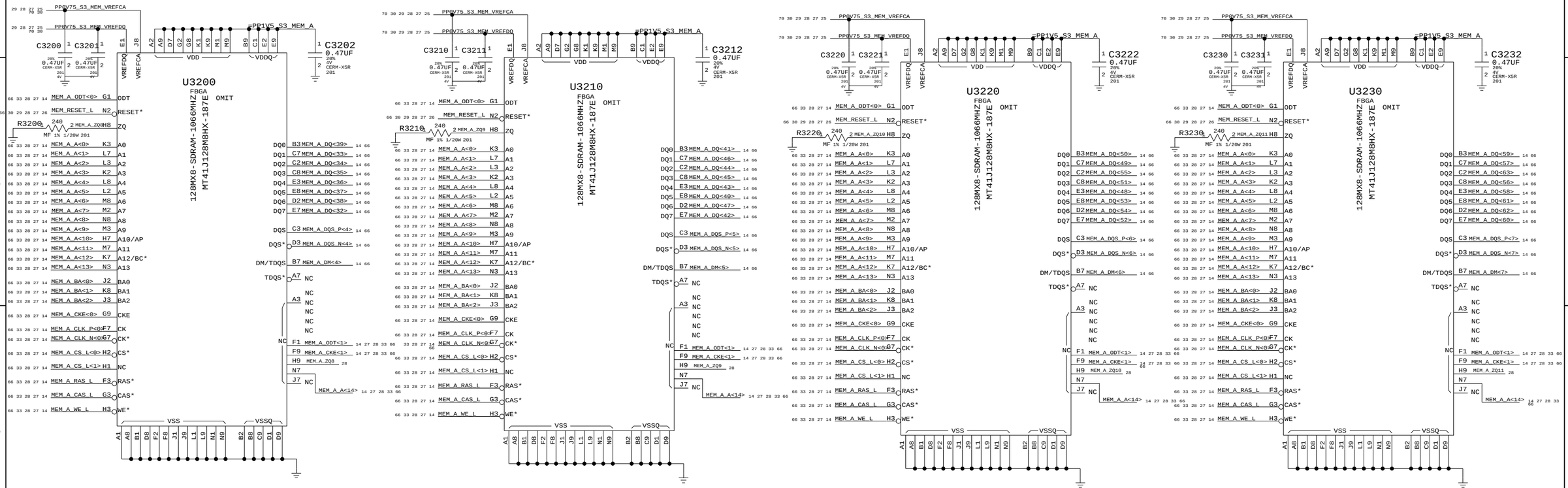
DDR3 DRAM Channel A (0-31)

SYNC_MASTER=(MASTER) SYNC_DATE=(MASTER)

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	27	71

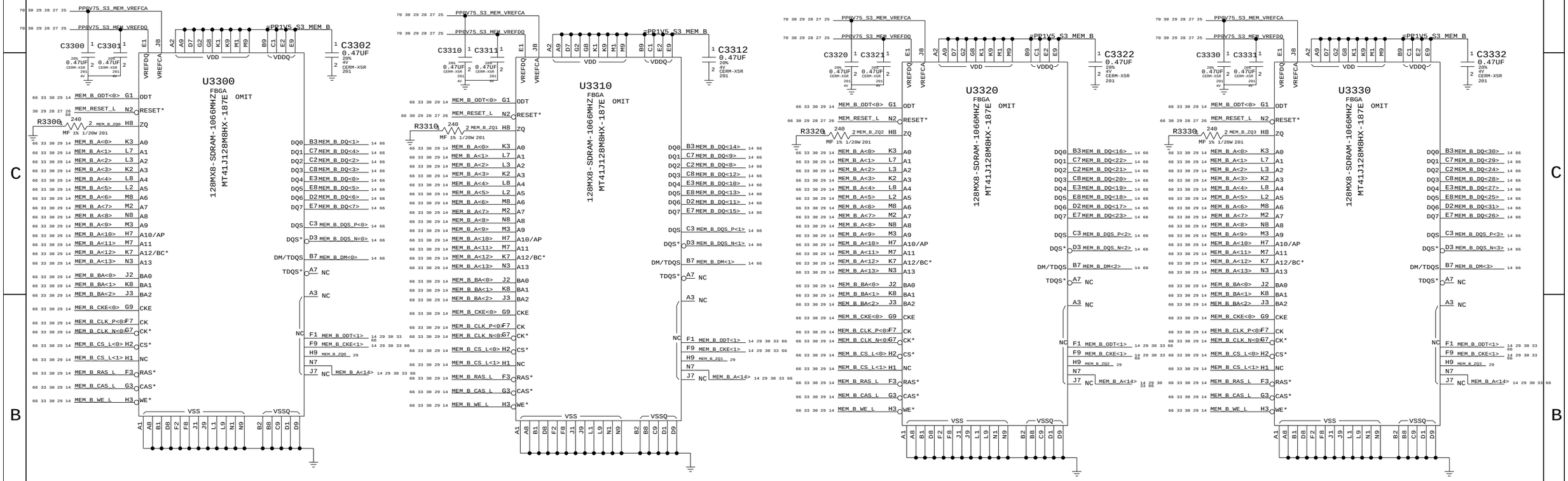


A14/A15 FOR 2G/4G MONO ONLY
CS1 IS FOR 2G DDP RANK CONTROL

DDR3 DRAM Channel A (32-63)

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 28 OF 71	



A14/A15 FOR 2G/4G MONO ONLY
CS1 IS FOR 2G DDP RANK CONTROL

DDR3 DRAM Channel B (0-31)

SYNC_MASTER=(MASTER) SYNC_DATE=(MASTER)

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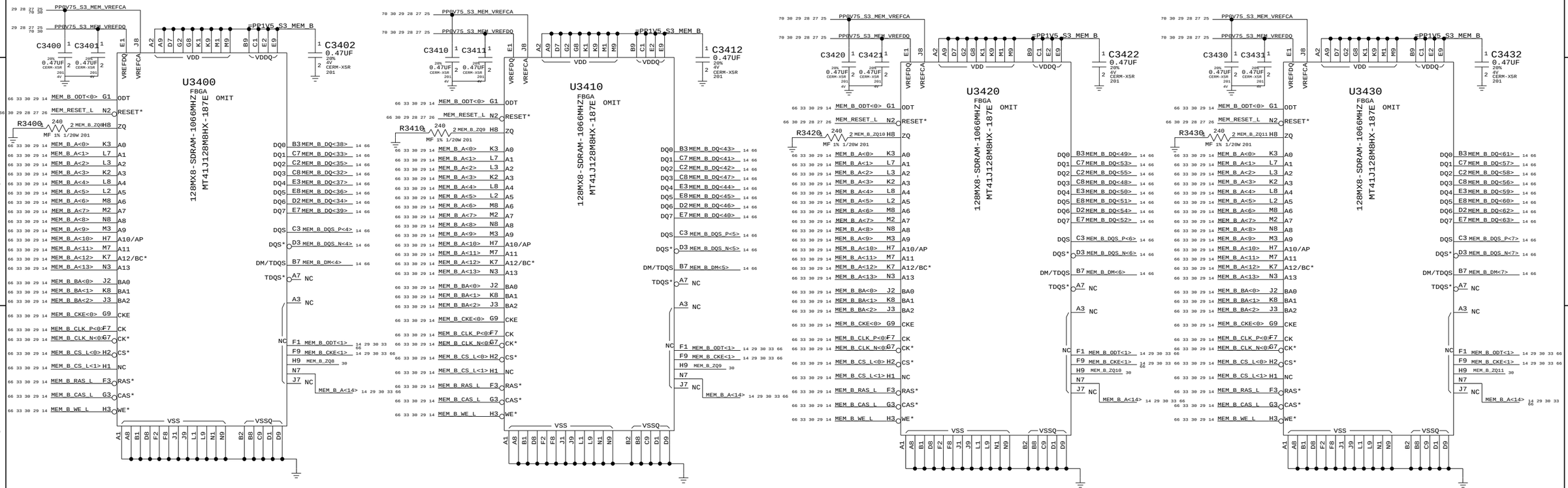
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	29	71



DDR3 DRAM Channel B (32-63)

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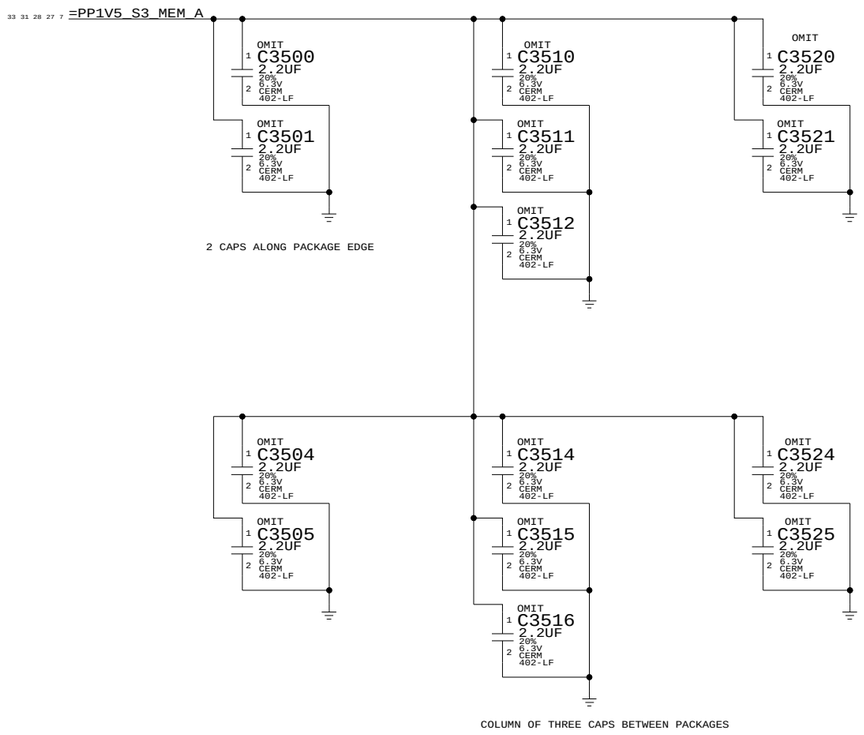
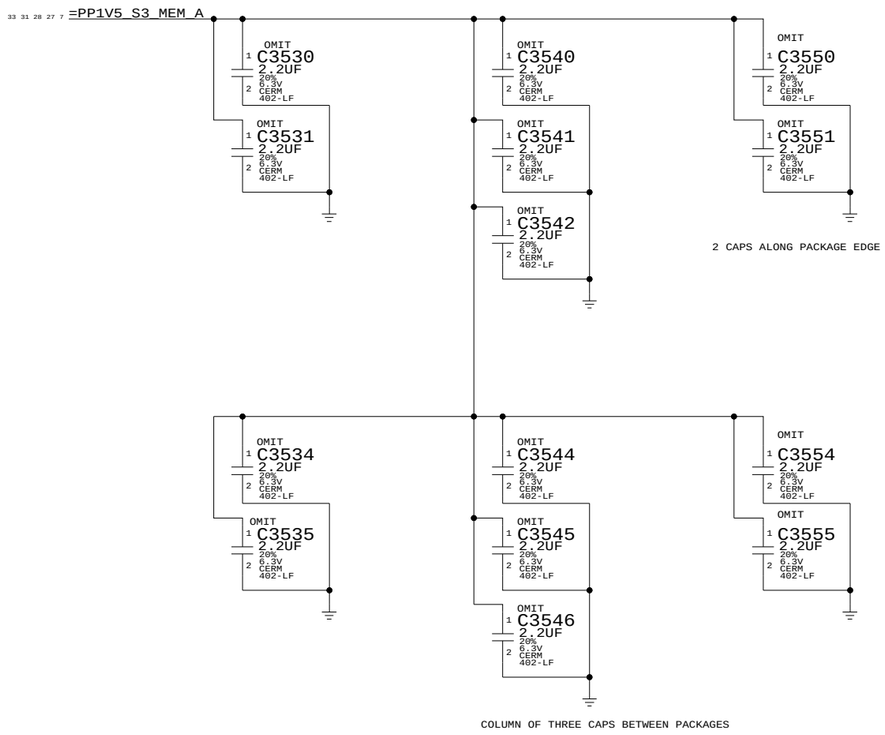
APPLE INC.

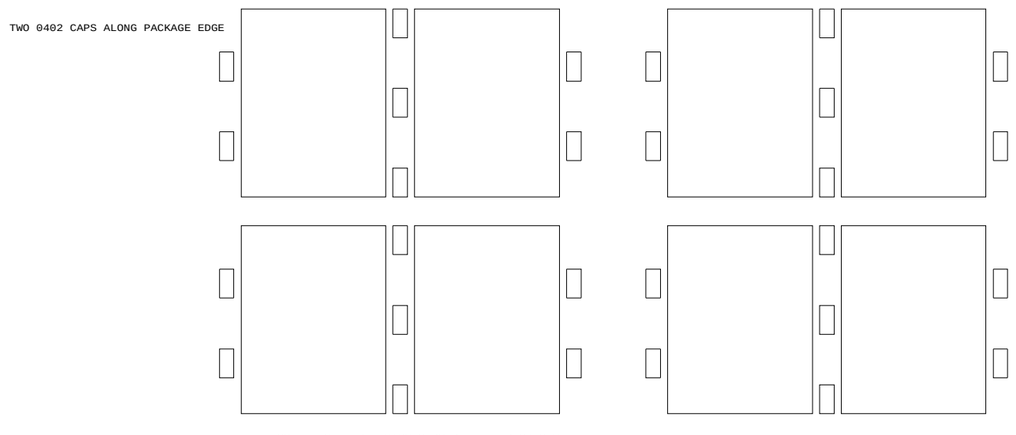
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	30	71





APPROXIMATE CAP ARRANGEMENT



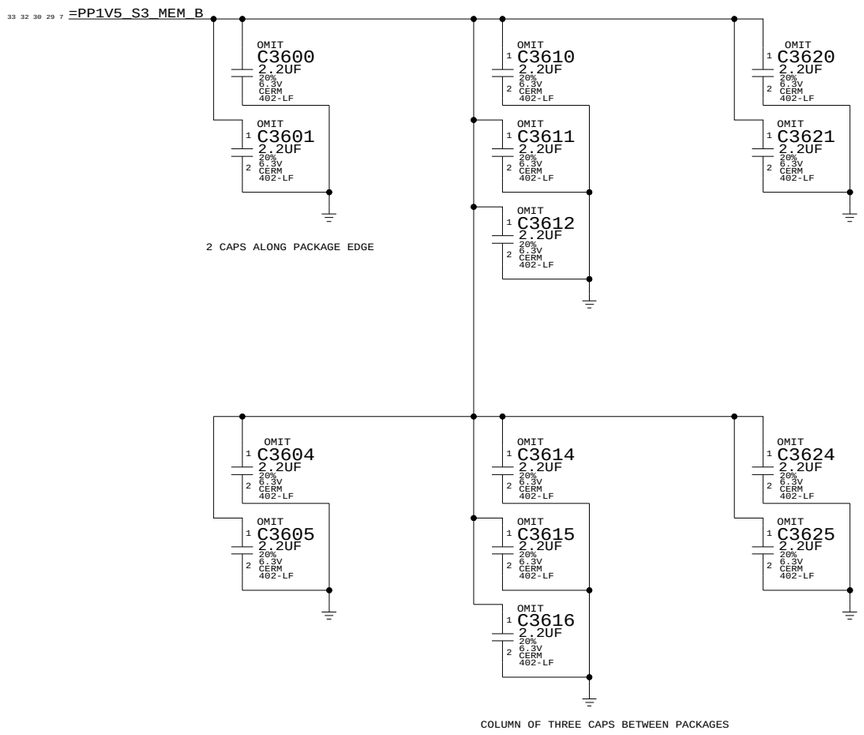
DDR BYPASSING 1

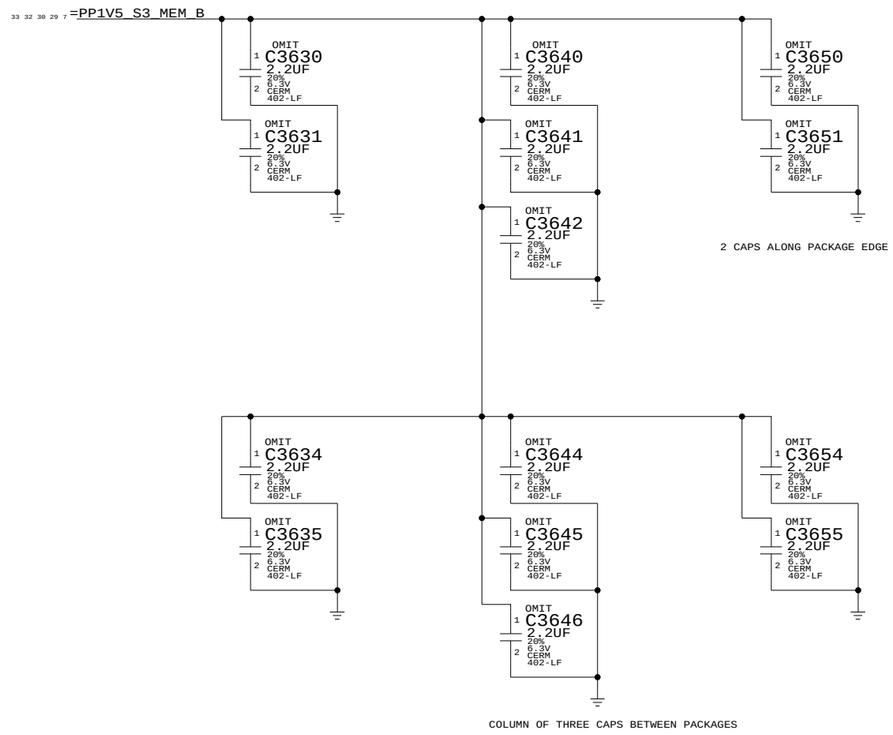
SYNC_MASTER=MEMORY SYNC_DATE=06/20/2005

APPLE INC.

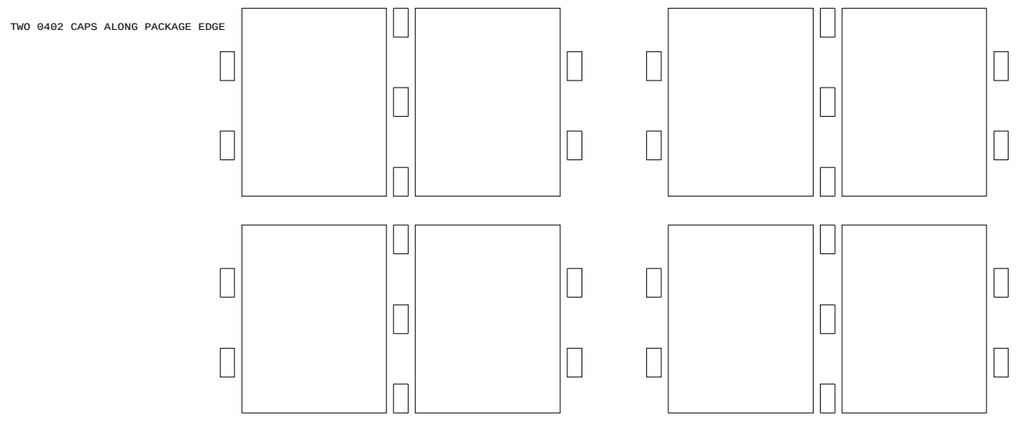
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	31	71





APPROXIMATE CAP ARRANGEMENT



DDR BYPASSING 2

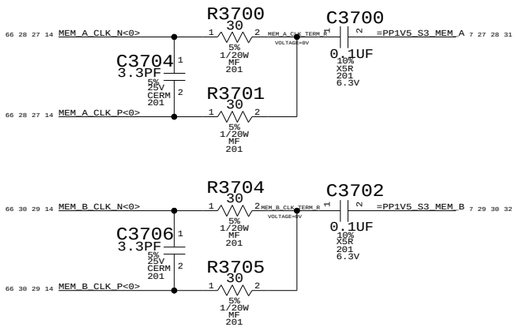
SYNC_MASTER=MEMORY SYNC_DATE=06/20/2005

APPLE INC.

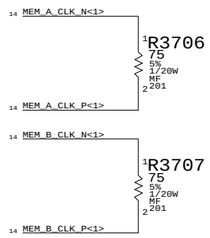
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 32 OF 71	

MEM CLOCK TERMINATION

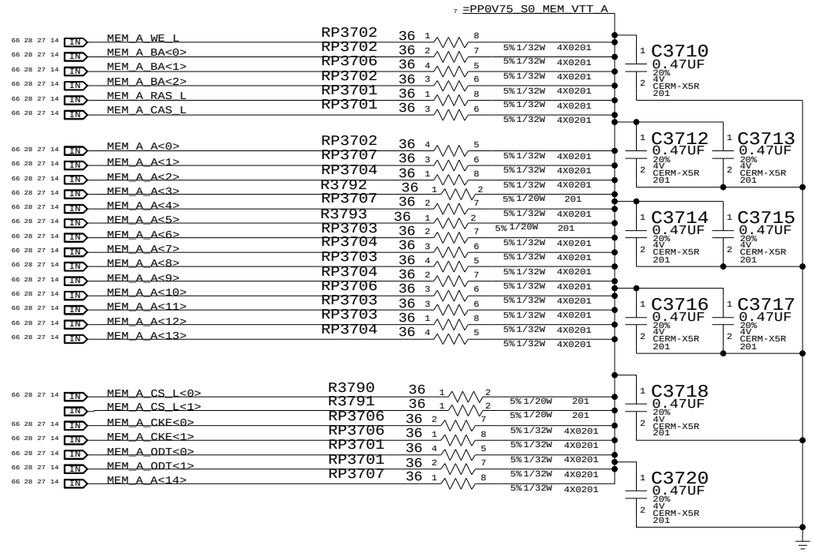
Place RC end termination after last DRAM
Place Source Cterm at neckdown at first DRAM

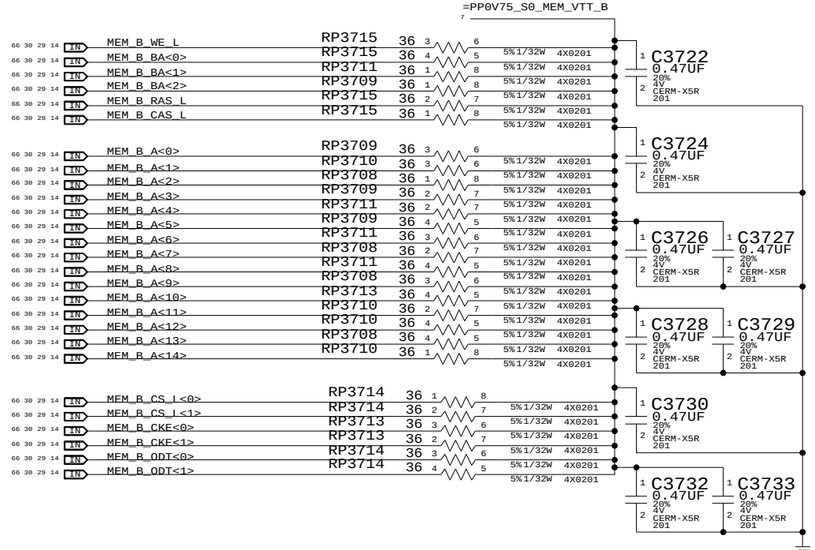


Unused Clock Termination



JEDEC recommends 30 Ohm term to VTT for CS,CKE,ODT and 36 Ohm for BA,A,RAS,CAS,WE



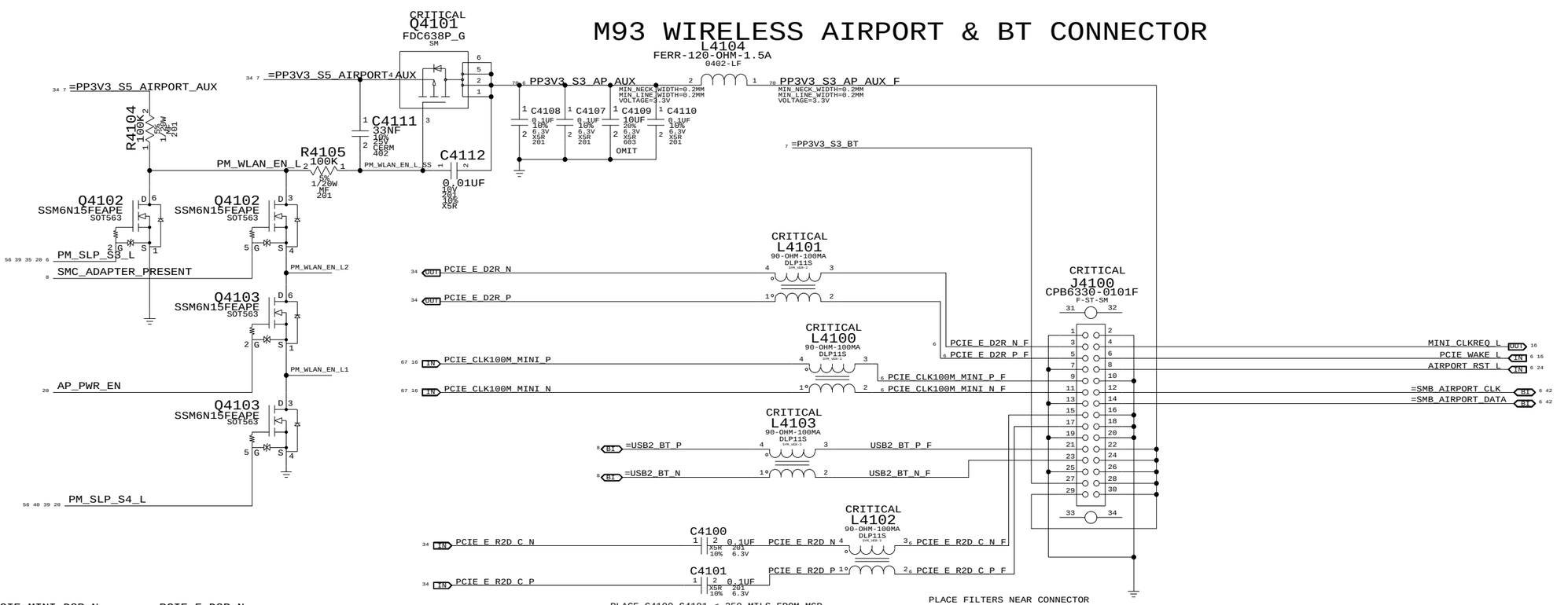


Memory Active Termination

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 33 OF 71	

M93 WIRELESS AIRPORT & BT CONNECTOR



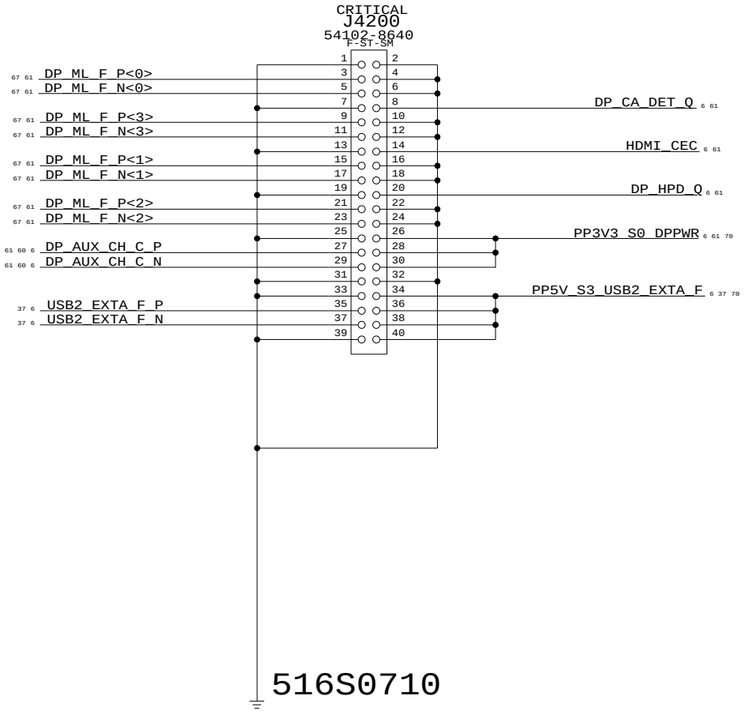
APN:516S0580

Wireless M93 Connector

APPLE INC.

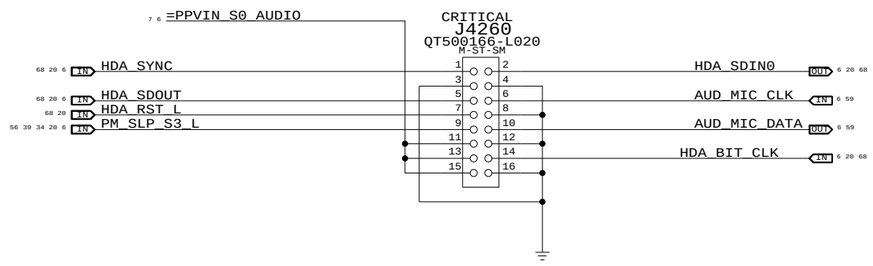
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 34 OF 71	

Micro-DisplayPort / USB to RIO Hatch Assembly



516S0710

Audio Connector



516S0350

Hatch and Audio Connectors

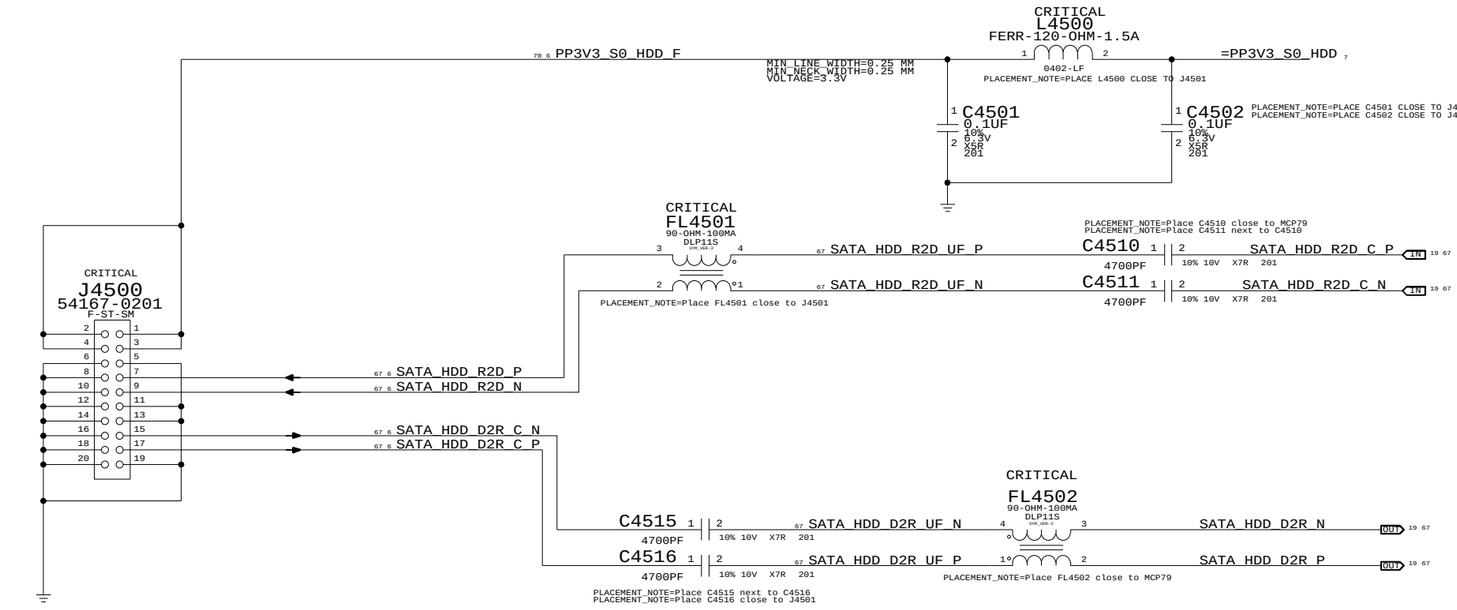
SYNC_MASTER=(MASTER) SYNC_DATE=(MASTER)

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	35	71

SATA HDD PORT



516S0678

SATA Connectors

SYNC_MASTER=CHANGZHANG SYNC_DATE=02/05/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 36 OF 71	

USB 2.0 CONNECTOR

CONNECT TO 5V S5 or S3 PER LAYOUT

CRITICAL
L4602
FERR-120-OHM-3A
0603
PP5V_S3_USB2_EXTA_F
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
VOLTAGE=5V

CRITICAL
C4610
100UF
20%
6.3V
POLY-TANT
CASE-B2-SM

ROUTE USB DATA LINES AS DIFFERENTIAL PAIRS

CRITICAL
L4600
90-OHM-100MA
DLP11S

PP5V_S3_USB2_EXTA_F
USB2_EXTA_F_N
USB2_EXTA_F_P
CONNECT TO RIO CONNECTOR J4200

=PP5V_S3_EXTUSB
OMIT
C4613
10uF
20%
6.3V
X5R
603
C4612
0.1UF
10%
6.3V
X5R
201

CRITICAL
U4600
TPS2052B
MSOP
IN
OUT1
OUT2
OC1*
EN1
OC2*
EN2
GND
TPAD

PP5V_S3_USB2_EXTA
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
VOLTAGE=5V

USB_EXTA_MUXED_N
USB_EXTA_MUXED_P

CRITICAL
D4600
SC-75
RCLAMP0502B

C4602
0.01UF
10%
10V
X5R
201

LAYOUT NOTE:C4602 IS AN EMC BY-PASS CAP FOR J4200

DUAL SWITCH HAS GANGED OUTPUT
BOTH SWITCHES WILL TRIP TOGETHER AT 1.5A-2.2A

=USBPWR_EN

R4650
1K
5%
1/16W
MF-LF
402

EXTAUSB_OC_F_L
=EXTAUSB_OC_L

C4650
0.47UF
10%
6.3V
CERM-X5R
402

USB/SMC MUX

=PP3V42_G3H_SMCUSBMUX

R4675
100
5%
1/20W
MF
201

PP3V42_G3H_SMCUSBMUX_R
MIN_LINE_WIDTH=0.2 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.42V

C4675
0.1UF
10%
6.3V
X5R
201

PLACE C4675 NEAR U4675

R4677
10K
5%
1/20W
MF
201

USB_EXTA_MUXED_P
USB_EXTA_MUXED_N

SMC_RX_L
SMC_TX_L

CRITICAL
U4675
PI3USB102ZLE
TQFN
VCC
GND
M+
M-
Y+
Y-
D+
D-
OE*
SEL

=USB2_EXTA_P
=USB2_EXTA_N

USB_DEBUGPRT_EN_L

SEL=0 CHOOSE SMC
SEL=1 CHOOSE USB

NOSTUFF
R4678
0
5%
1/20W
MF
201

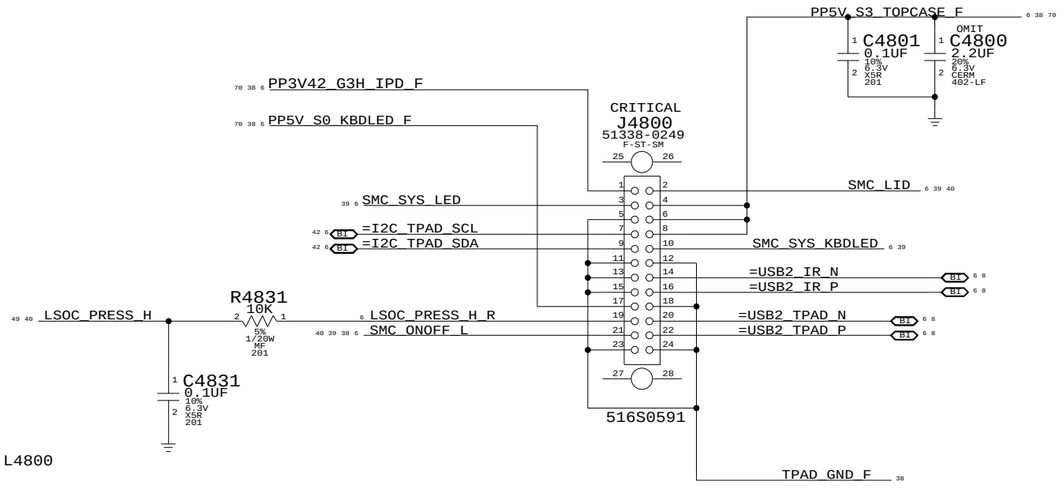
PLACE NEAR U4675

NOSTUFF
R4679
0
5%
1/20W
MF
201

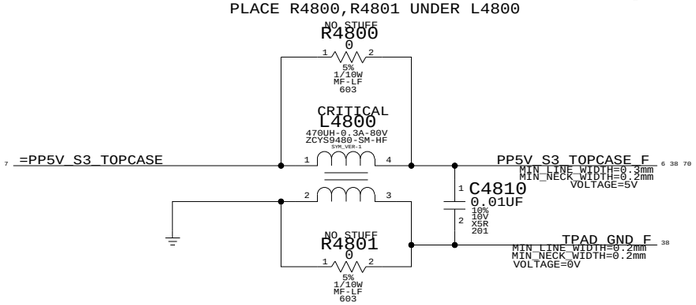
USB EXTERNAL CONNECTORS	
SYNC_MASTER=M70	SYNC_DATE=01/09/2007

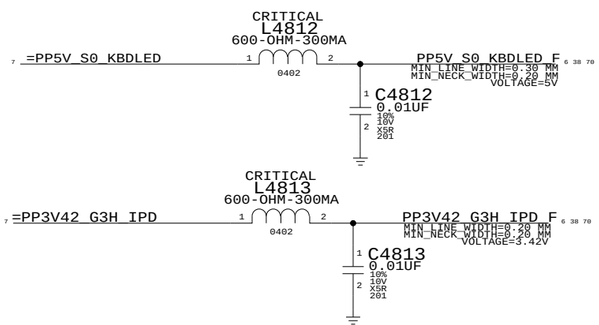
APPLE INC.	SIZE: D	DRAWING NUMBER: 051-7631	REV: 2.3.0
	SCALE: NONE	SHT 37 OF 71	

IPD Connector

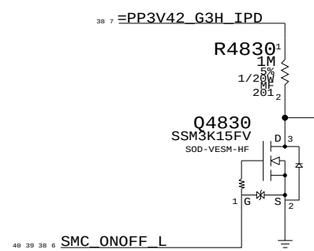


PLACE R4800,R4801 UNDER L4800





Power Button Inverter



Inverted to drive SMC_RESET logic

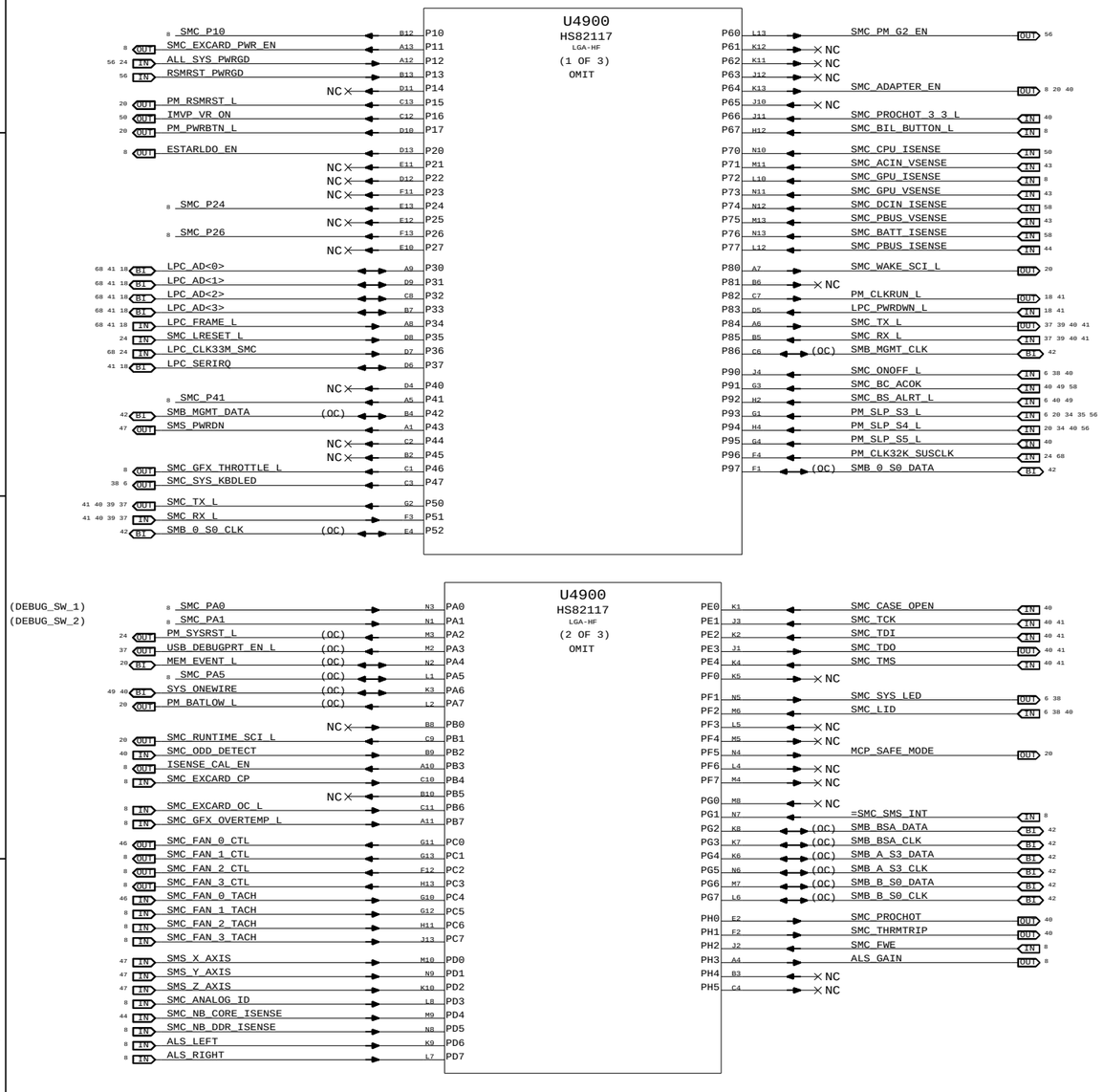
IPD Connector

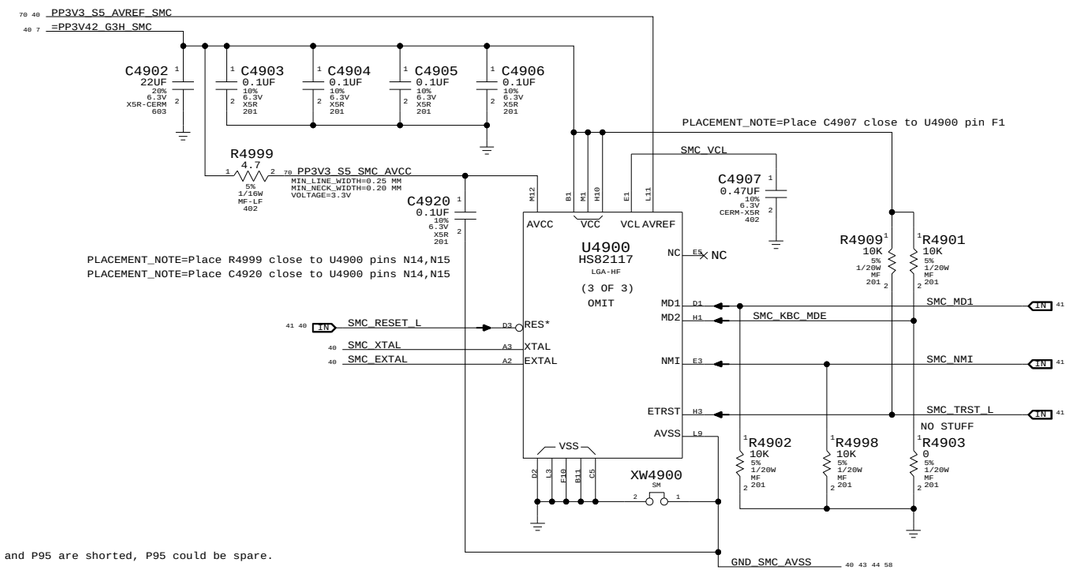
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	38	71

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





NOTE: P94 and P95 are shorted, P95 could be spare.

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

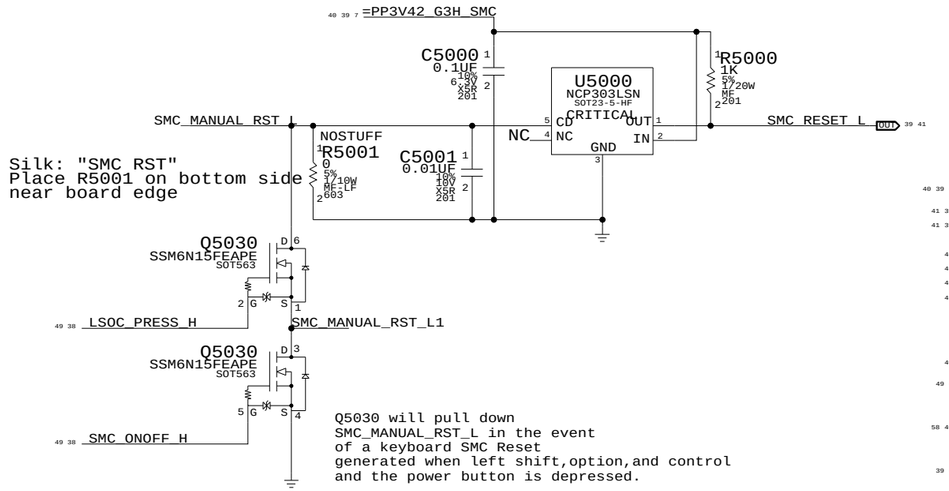
SMC

SYNC_MASTER=M97 SYNC_DATE=02/21/2008

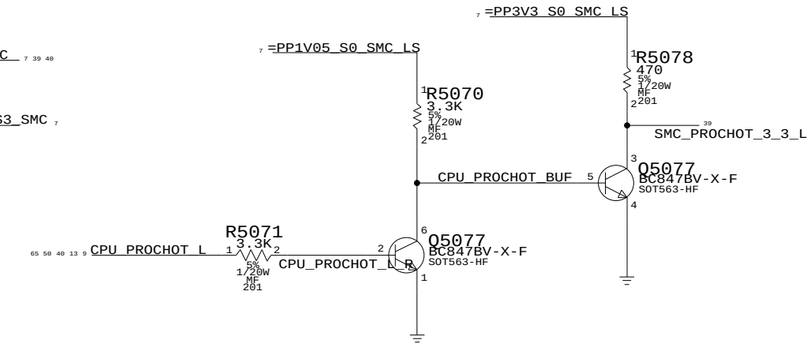
APPLE INC.

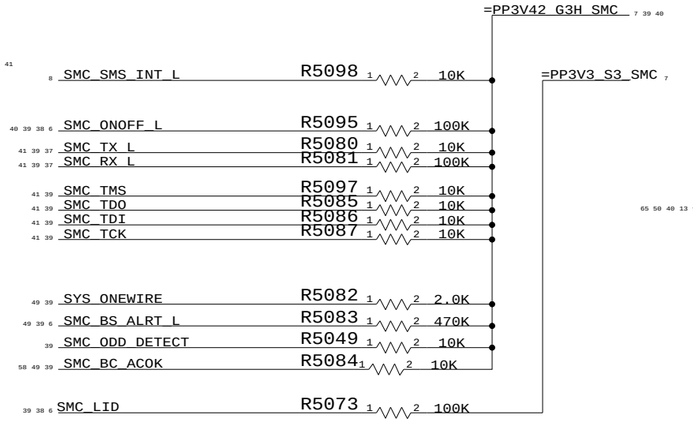
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 39 OF 71	

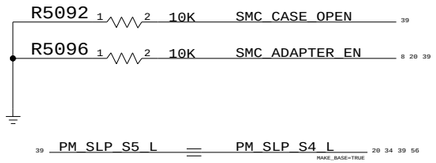
SMC Reset Button / Brownout Detect



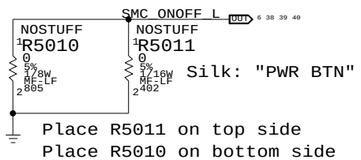
SMC 1.05V to 3.3V Level Shifting



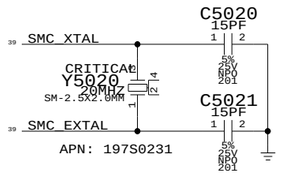




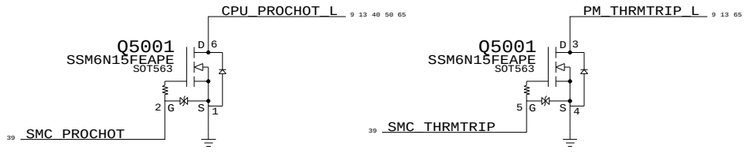
Debug Power Button



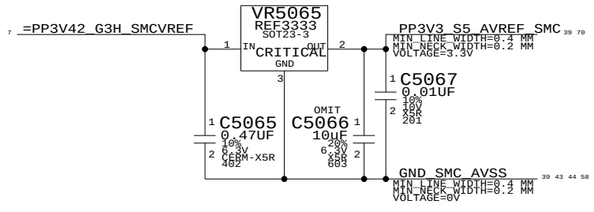
SMC Crystal Circuit



SMC 3.3V to 1.05V Level Shifting



SMC AVREF Supply



SMC SUPPORT

SYNC_MASTER=M70 SYNC_DATE=01/09/2007

APPLE INC.

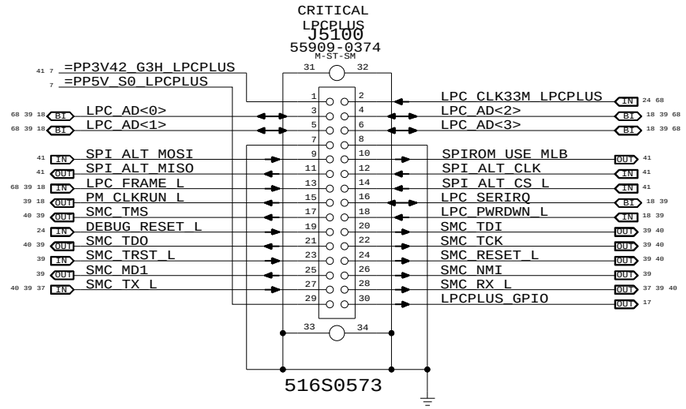
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

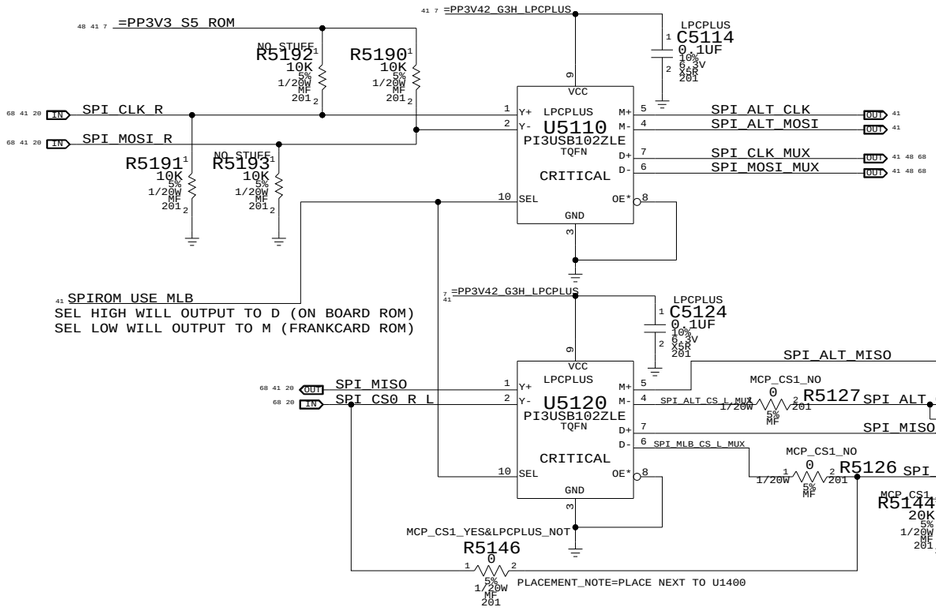
SCALE	SHT	OF
NONE	40	71

LPC+SPI Connector

MCP79 SPI Frequency Select		
Frequency	SPI_MOSI	SPI_CLK
31 MHz	0	0
42 MHz	0	1
25 MHz	1	0
1 MHz	1	1

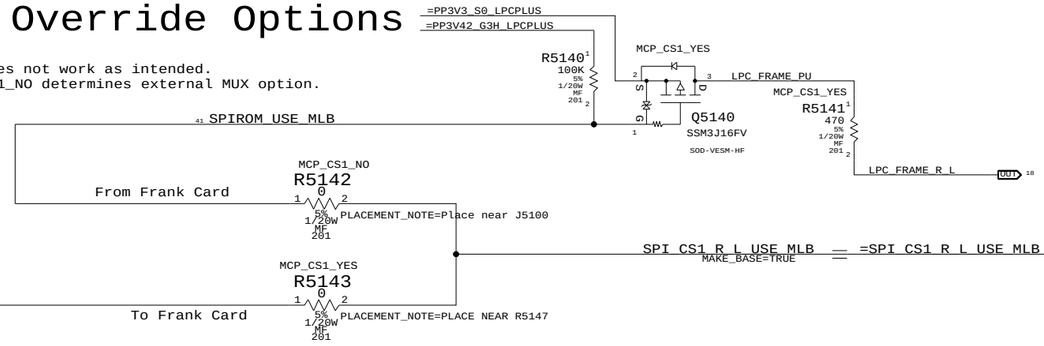
25MHz is selected with R5190 and R5191
Any of the 4 frequencies can be selected w/ R5190,R5191,R5192,R5193





MCP SPI Override Options

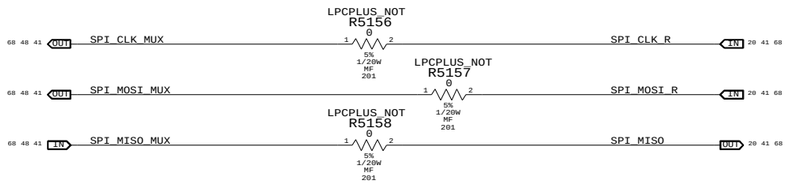
Internal MUX in rev B01 does not work as intended.
Now MCP_CS1_YES and MCP_CS1_NO determines external MUX option.



MCP79 Internal SPI MUX Support

Not supported in Rev A01 MCP79 silicon

SPI MUX BYPASS



LPC+SPI Debug Connector

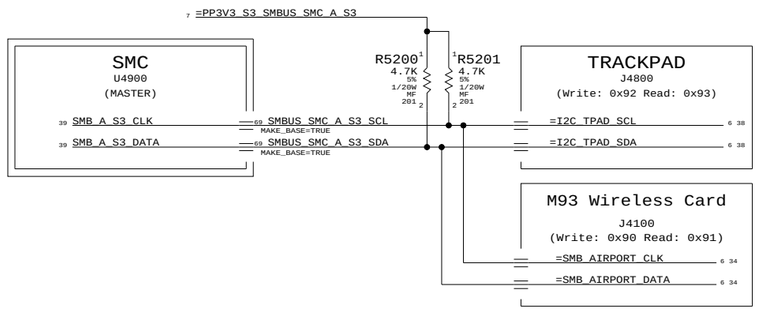
SYNC_MASTER=CHANGZHANG SYNC_DATE=01/24/2008

APPLE INC.

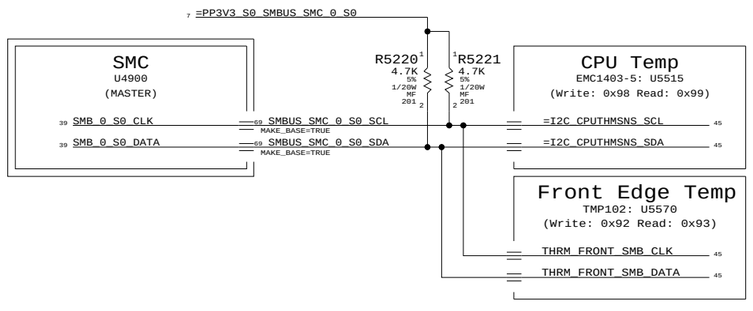
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 41 OF 71	

SMC "A" SMBus Connections

NOTE: SMC RMT bus remains powered and may be active in S3 state

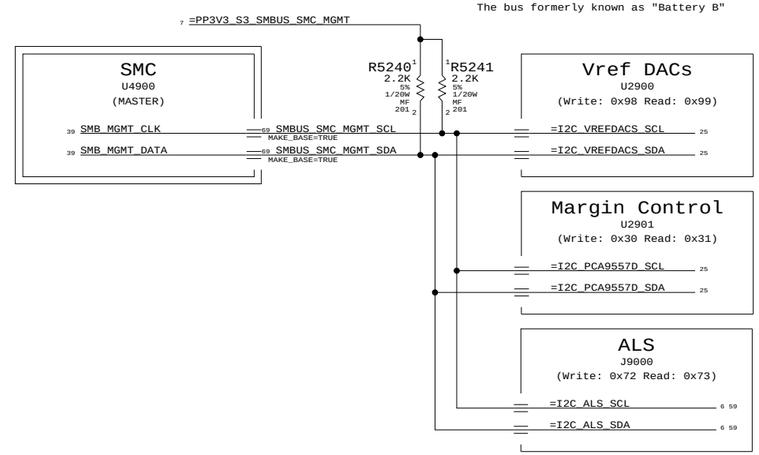


SMC "0" SMBus Connections

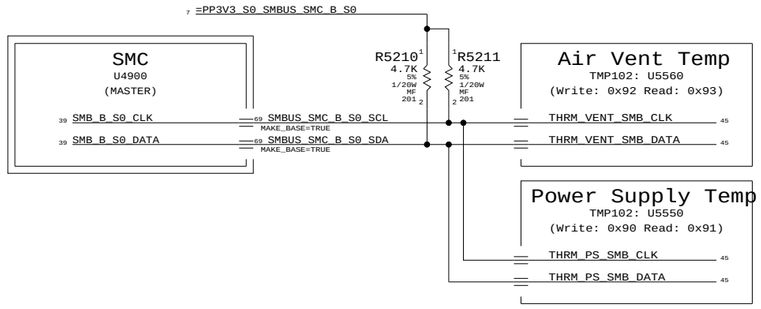


SMC "Management" SMBus Connections

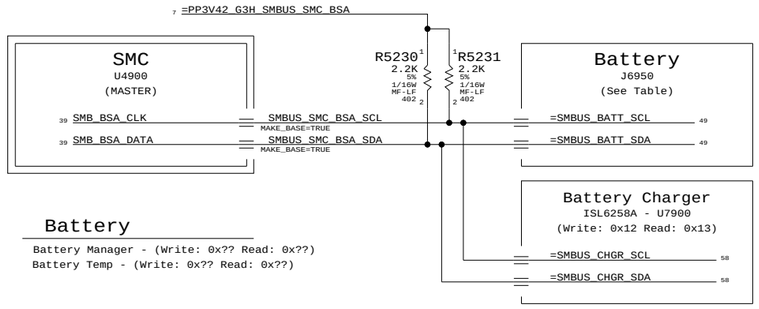
The bus formerly known as "Battery B"



SMC "B" SMBus Connections



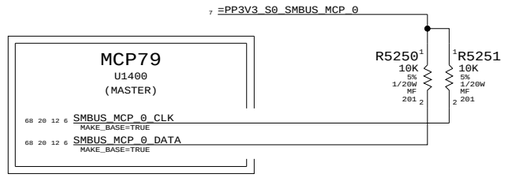
SMC "Battery A" SMBus Connections



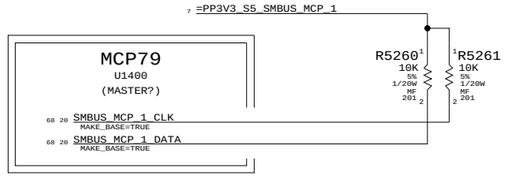
Battery

Battery Manager - (Write: 0x?? Read: 0x??)
Battery Temp - (Write: 0x?? Read: 0x??)

MCP79 SMBUS "0" CONNECTIONS



MCP79 SMBUS "1" CONNECTIONS



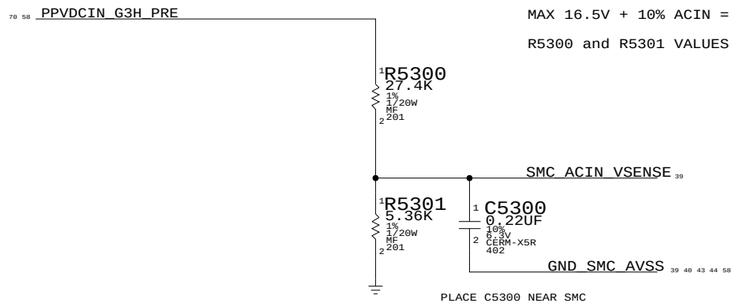
M97 SMBUS CONNECTIONS

SYNC_MASTER=BEN SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 42 OF 71	

ACIN VOLTAGE SENSE

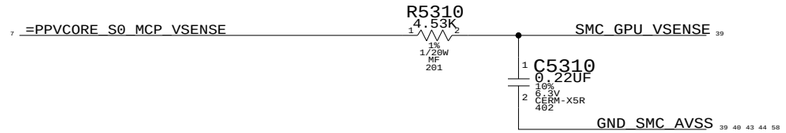


MAX 16.5V + 10% ACIN = 3.0V SMC_ACIN_VSENSE

R5300 and R5301 VALUES CHOSEN FOR RC FILTER @ 4.53KOHM THEVENIN RESISTANCE

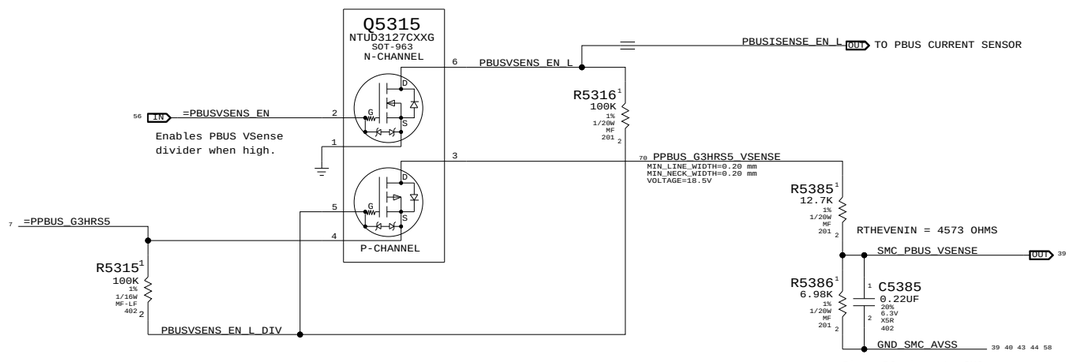
PLACE C5300 NEAR SMC

MCP VOLTAGE SENSE



PLACE R5310.C5310 NEAR SMC

PBUS VOLTAGE SENSE



Place RC close to SMC

Voltage Sensors

SYNC_MASTER=M70 SYNC_DATE=01/09/2007

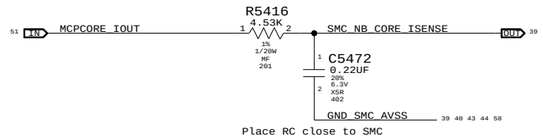
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	43	71

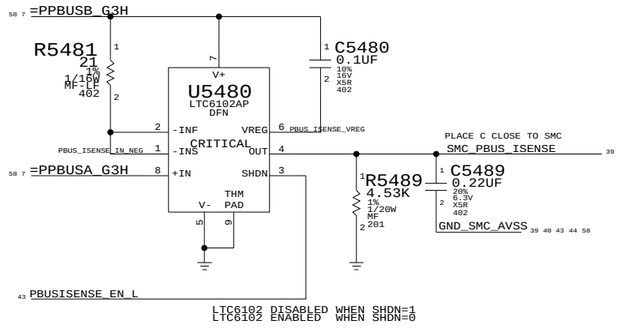
MCP VCore Current Sense

MCP VCore Current Sense Filter



Place RC close to SMC

PBUS Current Sense



LTC6102 DISABLED WHEN SHDN=1
LTC6102 ENABLED WHEN SHDN=0

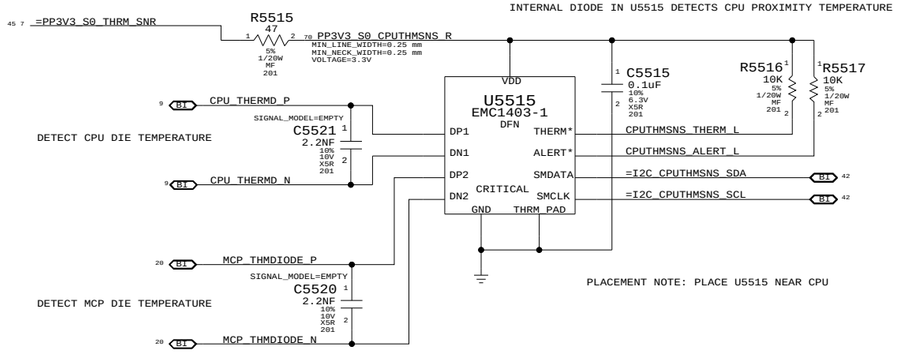
Current Sensing

SYNC_MASTER=YUNWU SYNC_DATE=02/04/2008

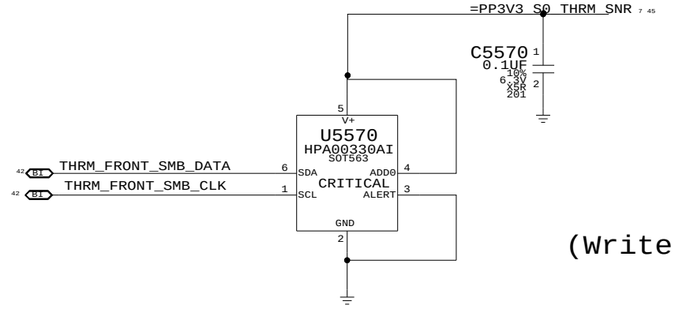
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 44 OF 71	

CPU/MCP T-Diode Thermal Sensor

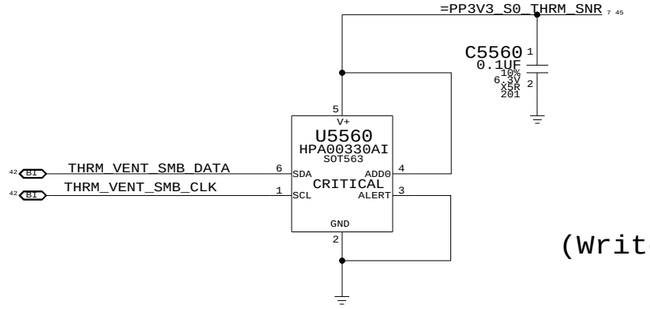


LOCAL TEMP NEAR FRONT EDGE



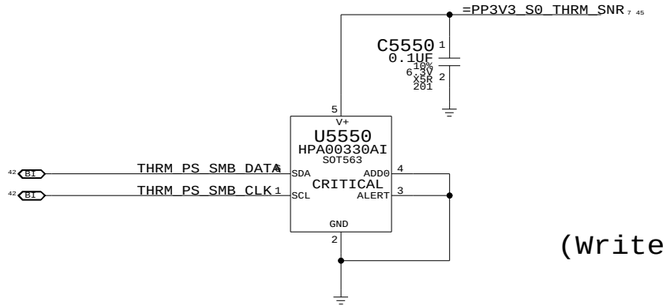
(Write: 0x92 Read: 0x93)

LOCAL TEMP NEAR AIR VENT



(Write: 0x92 Read: 0x93)

LOCAL TEMP NEAR POWER SUPPLIES



(Write: 0x90 Read: 0x91)

TEMPERATURE SENSORS

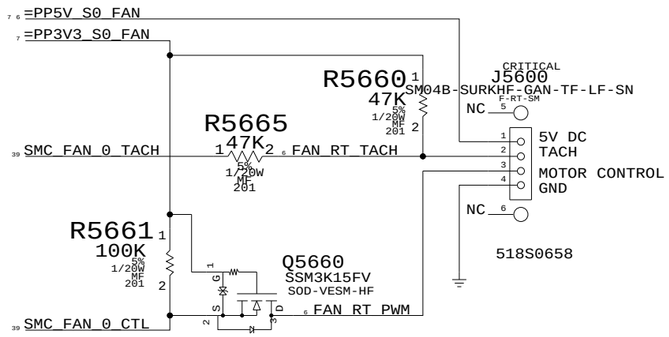
SYNC_MASTER=M70 SYNC_DATE=01/09/2007

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	45	71

FAN CONNECTOR



Fan

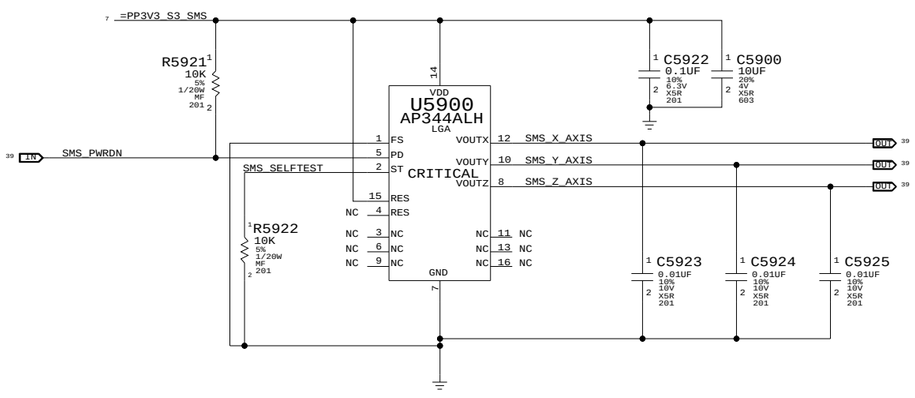
SYNC_MASTER=M70 SYNC_DATE=01/09/2007

APPLE INC.

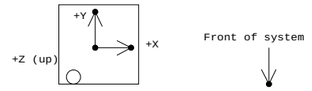
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	46	71

SUDDEN MOTION SENSOR



Desired orientation when placed on board top-side:



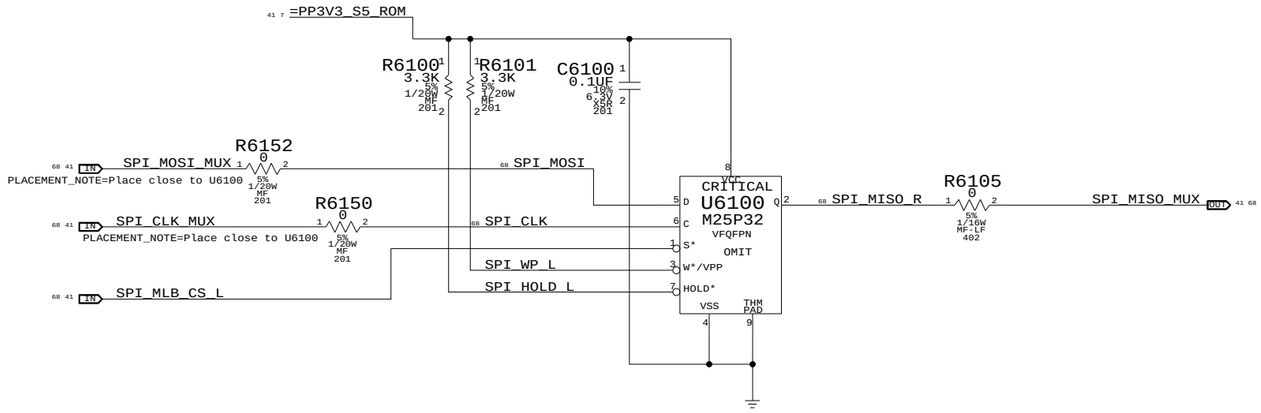
Circle indicates pin 1 location when placed in correct orientation

Sudden Motion Sensor (SMS)

SYNC_MASTER=M76_MLB SYNC_DATE=01/12/2007

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 47 OF 71	



SPI ROM

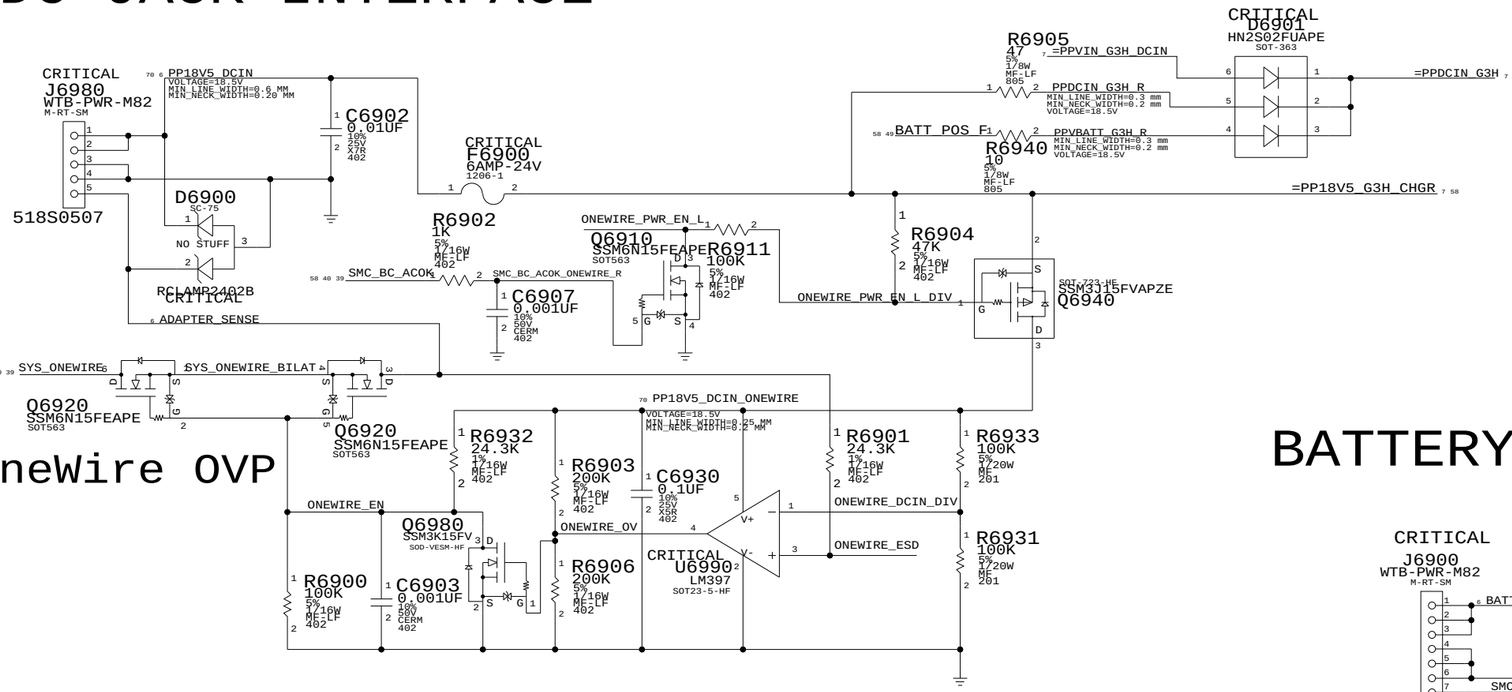
SYNC_MASTER=CHANGZHANG SYNC_DATE=02/15/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

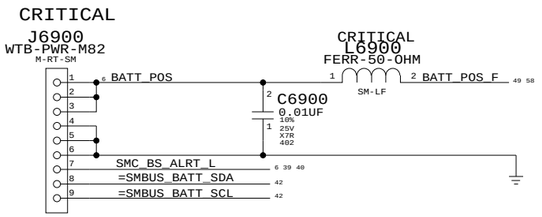
SCALE	SHT	OF
NONE	48	71

DC-JACK INTERFACE



OneWire OVP

BATTERY INTERFACE

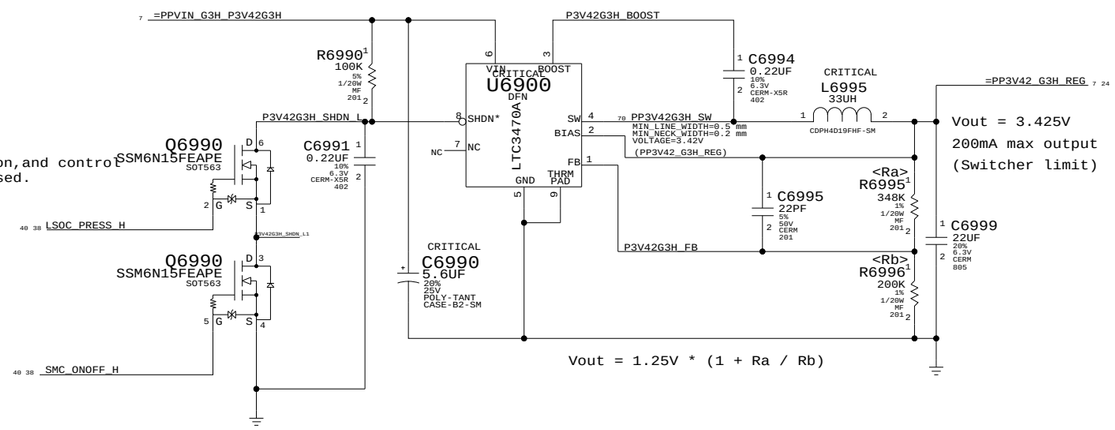


518S0540

3.425V "G3Hot" Supply

Supply needs to guarantee 3.31V delivered to SMC VRef generator

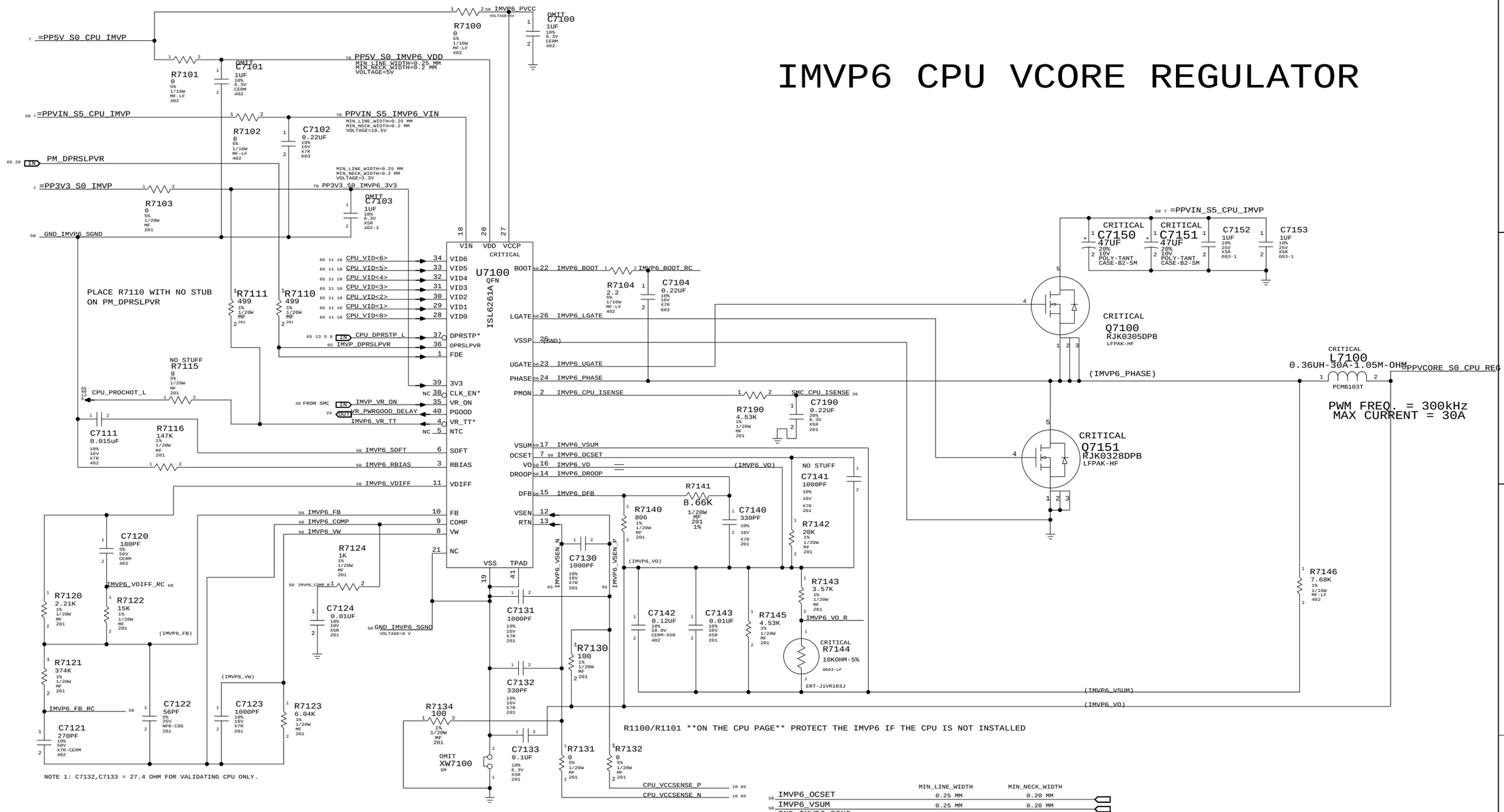
Q6990 will pull down
P3V42G3H_SHDN_L in the event
of a keyboard SMC Reset
generated when left shift,option,and control
and the power button is depressed.



DC-In & Battery Connectors		
SYNC_MASTER=M70	SYNC_DATE=01/09/2007	

APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	051-7631	2.3.0
	SCALE: NONE	SHT 49 OF 71	

IMVP6 CPU VCORE REGULATOR



	MIN_LINE_WIDTH	MIN_NECK_WIDTH
IMVP6_PHASE	1.5 MM	0.20 MM
IMVP6_BOOT	0.25 MM	0.20 MM
IMVP6_UGATE	1.5 MM	0.20 MM
IMVP6_LGATE	1.5 MM	0.20 MM

	MIN_LINE_WIDTH	MIN_NECK_WIDTH
IMVP6_OCSET	0.25 MM	0.20 MM
IMVP6_VSUM	0.25 MM	0.20 MM
GND_IMVP6_SGND	0.50 MM	0.20 MM
IMVP6_VO	0.25 MM	0.20 MM
IMVP6_DROOP	0.25 MM	0.20 MM
IMVP6_DFB	0.25 MM	0.20 MM
IMVP6_SOFT	0.25 MM	0.20 MM
IMVP6_RBIAS	0.25 MM	0.20 MM
IMVP6_VDIFF	0.25 MM	0.20 MM
IMVP6_FB	0.25 MM	0.20 MM
IMVP6_COMP	0.25 MM	0.20 MM
IMVP6_VW	0.25 MM	0.20 MM
IMVP6_PVCC	0.25 MM	0.20 MM
IMVP6_COMP_R	0.25 MM	0.20 MM
IMVP6_FB_RC	0.25 MM	0.20 MM
IMVP6_VDIFF_RC	0.25 MM	0.20 MM

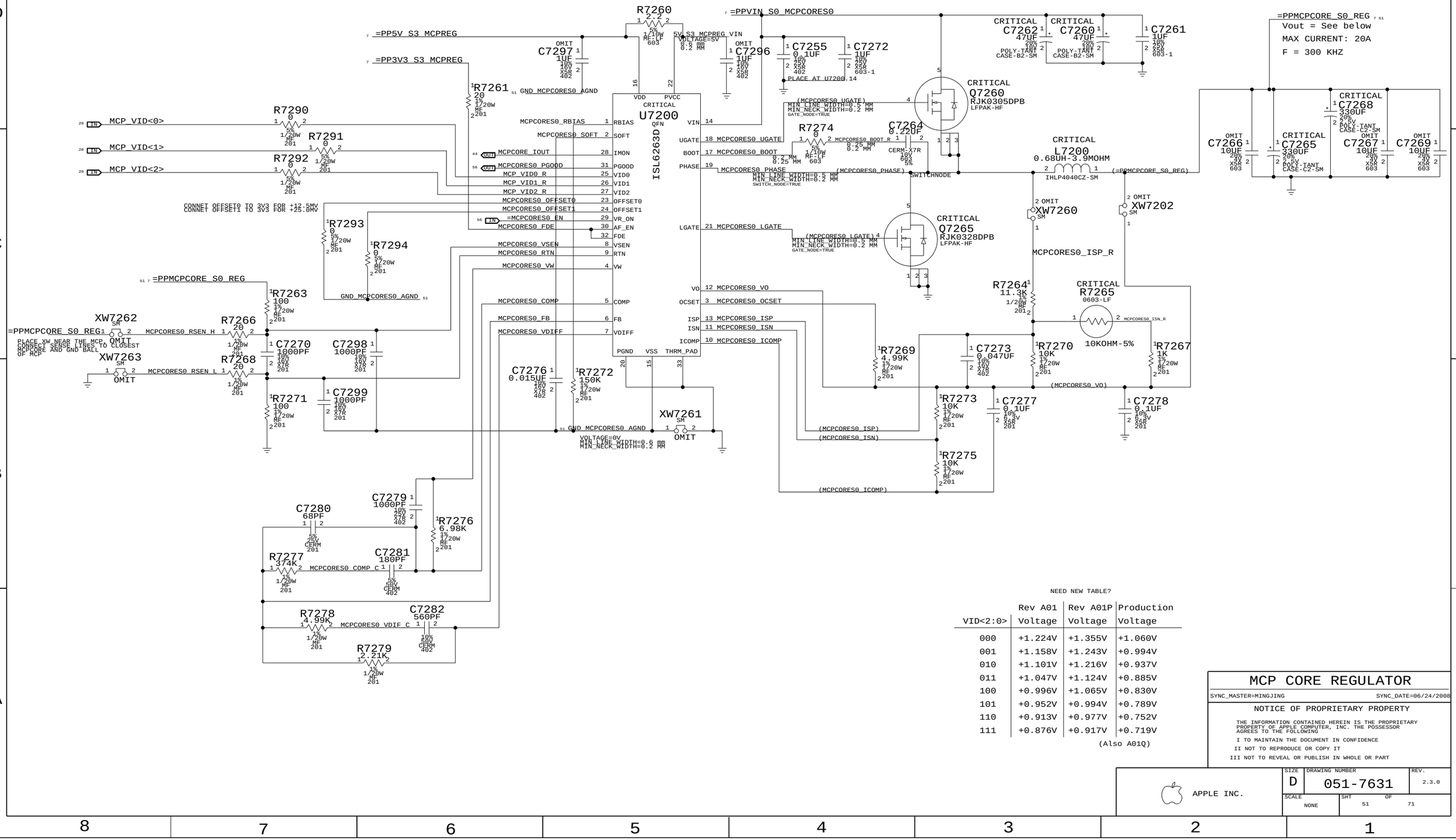
IMVP6 CPU VCore Regulator

SYNC_MASTER=POWER SYNC_DATE=07/13/2005

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 50 OF 71	

MCP CORE POWER SUPPLY



NEED NEW TABLE?

VID<2:0>	Rev A01 Voltage	Rev A01P Voltage	Production Voltage
000	+1.224V	+1.355V	+1.060V
001	+1.158V	+1.243V	+0.994V
010	+1.101V	+1.216V	+0.937V
011	+1.047V	+1.124V	+0.885V
100	+0.996V	+1.065V	+0.830V
101	+0.952V	+0.994V	+0.789V
110	+0.913V	+0.977V	+0.752V
111	+0.876V	+0.917V	+0.719V

(Also A01Q)

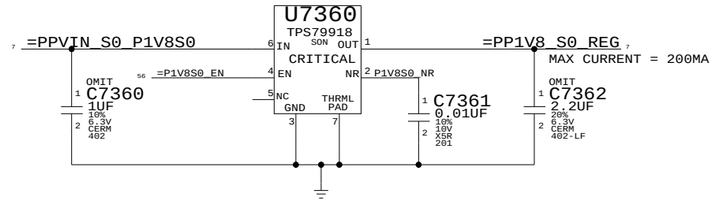
MCP CORE REGULATOR

SYNC_MASTER=MINGJING SYNC_DATE=06/24/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 51 OF 71	

1.8V S0 LDO



1.8V LDO Supply

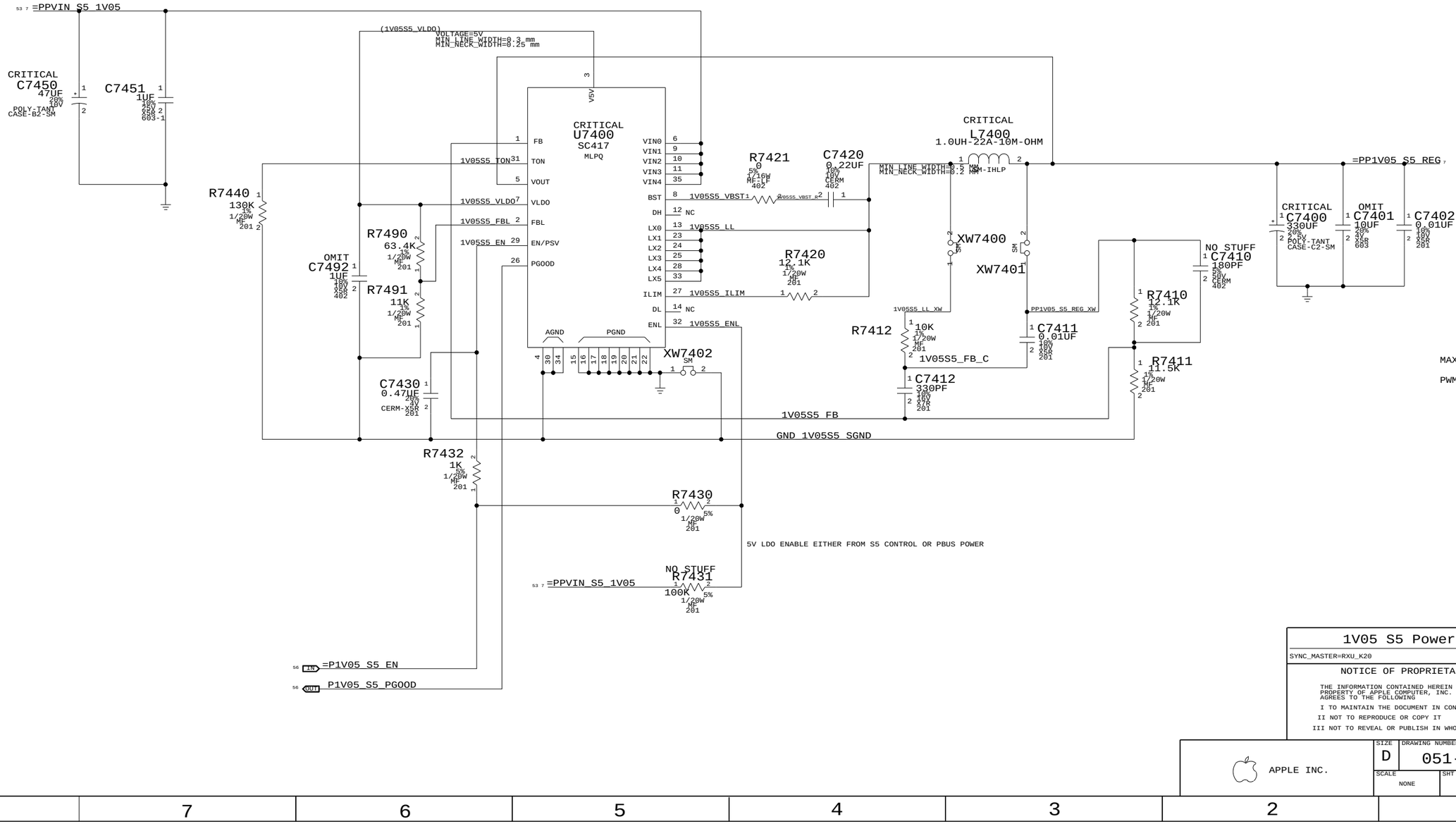
SYNC_MASTER= SYNC_DATE=

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 52 OF 71	

1V05 S5 POWER SUPPLY

supply for MCP1V05 AUX, FSB (CPU & MCP) VTT, 1V05 S0



1V05 S5 Power Supply

SYNC_MASTER=RXU_K20 SYNC_DATE=05/21/2008

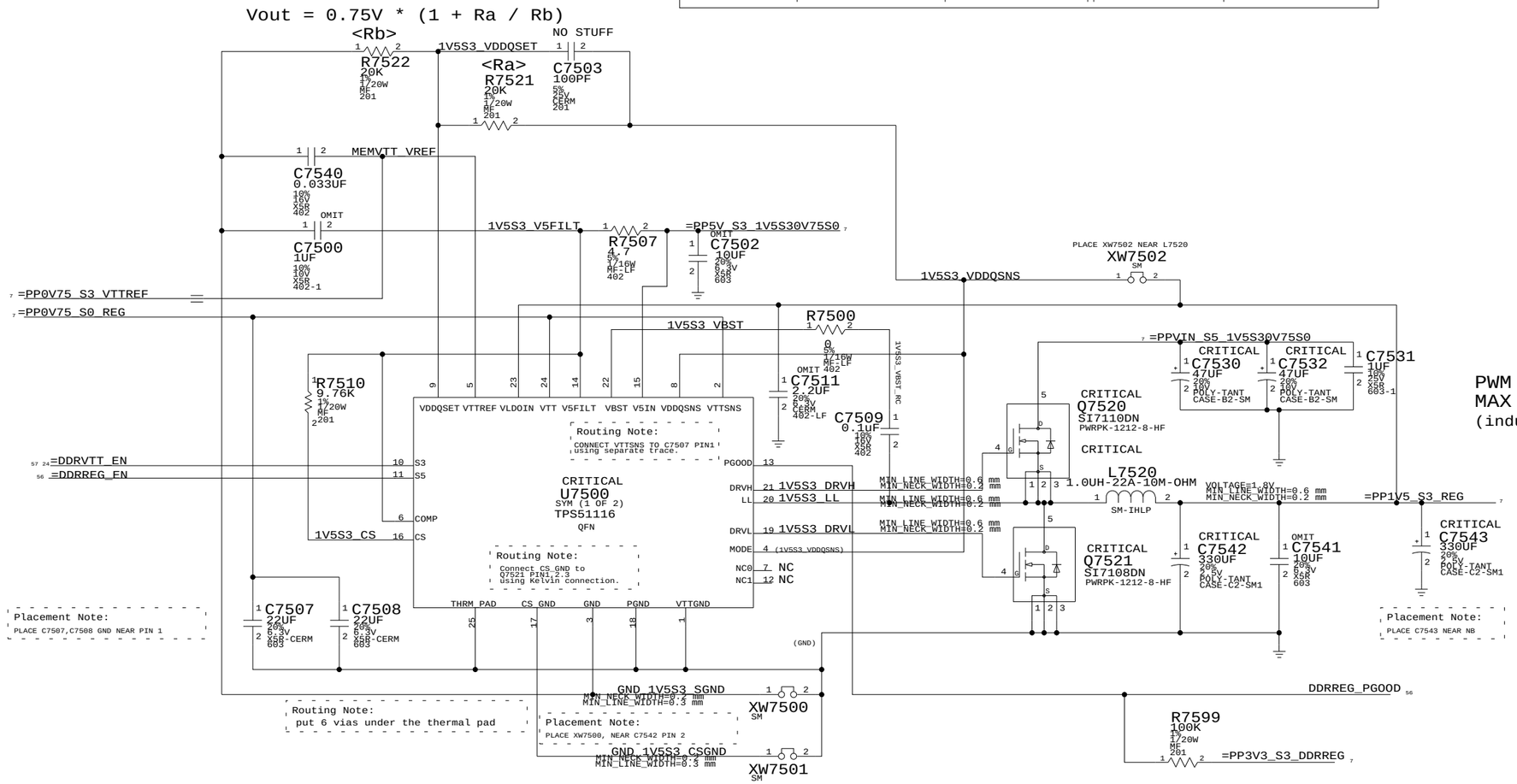
NOTICE OF PROPRIETARY PROPERTY

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 53 OF 71	

1.5V/0.75V POWER SUPPLY

State	PM_S4_STATE_L	PM_SLP_S3_L	PP1V5_S3	PP0V75_S0
S0	HIGH	HIGH	1.5V	0.75V
S3	HIGH	LOW	1.5V	0.0V
S5/G3Hot	LOW	LOW	0.0V	0.0V



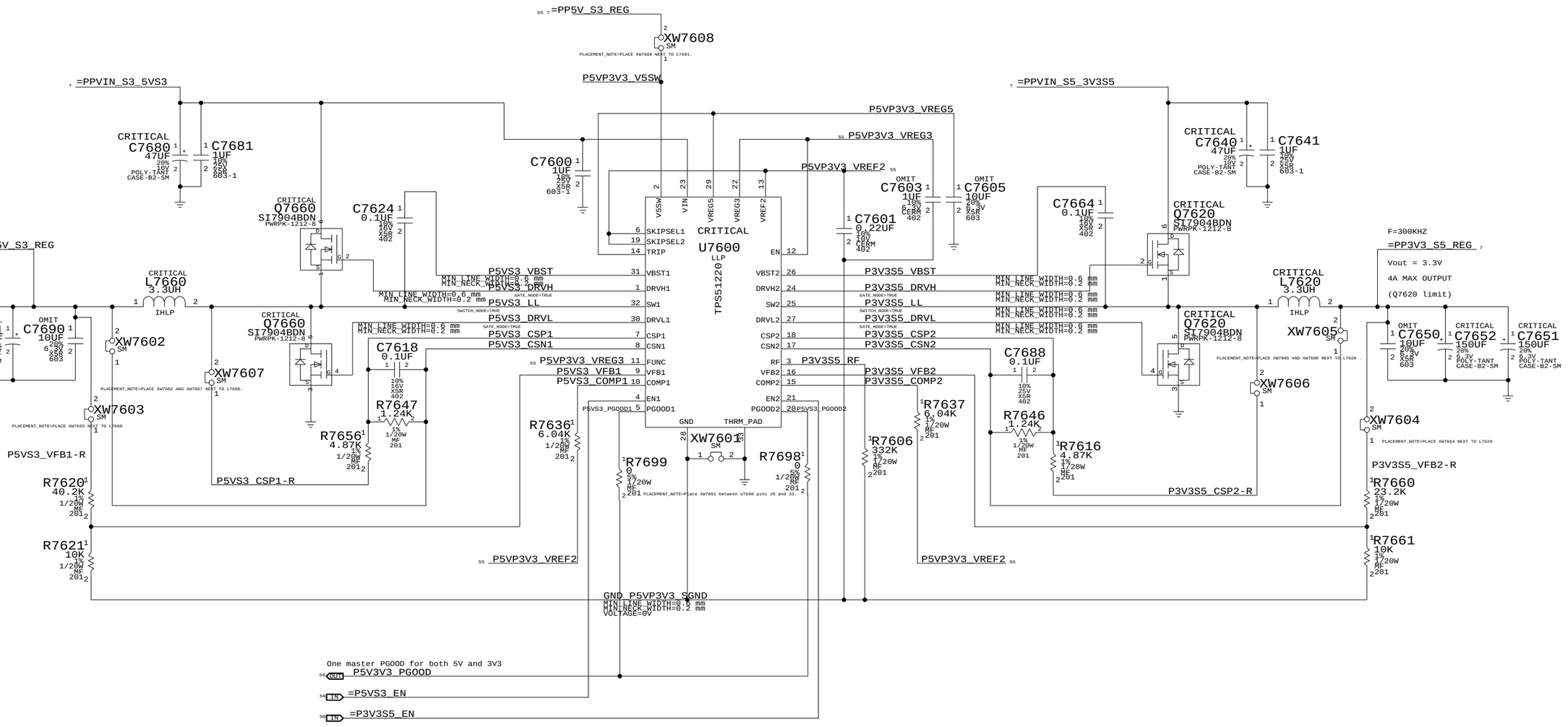
1.5V/0.75V Supplies

SYNC_MASTER=M70 SYNC_DATE=01/09/2007

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 54 OF 71	

5V_S3 / 3V3_S5 POWER SUPPLY



5V / 3.3V Power Supply

SYNC_MASTER=RXU_K20 SYNC_DATE=05/21/2008

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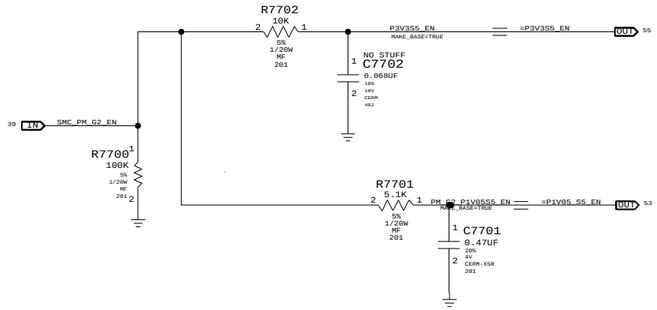
APPLE INC.

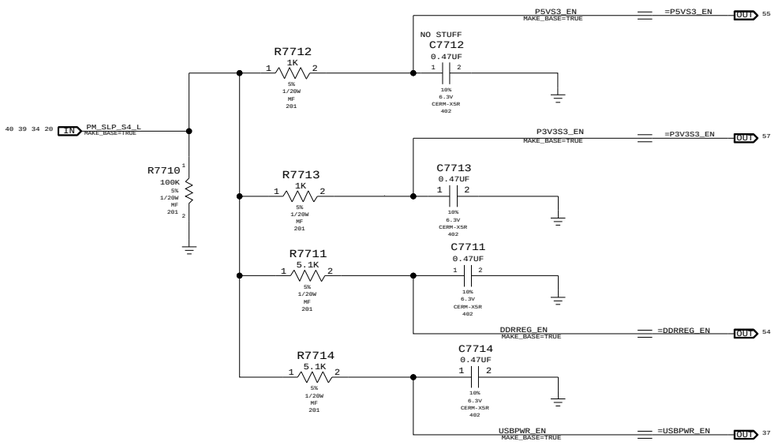
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 55 OF 71	

Power Control Signals

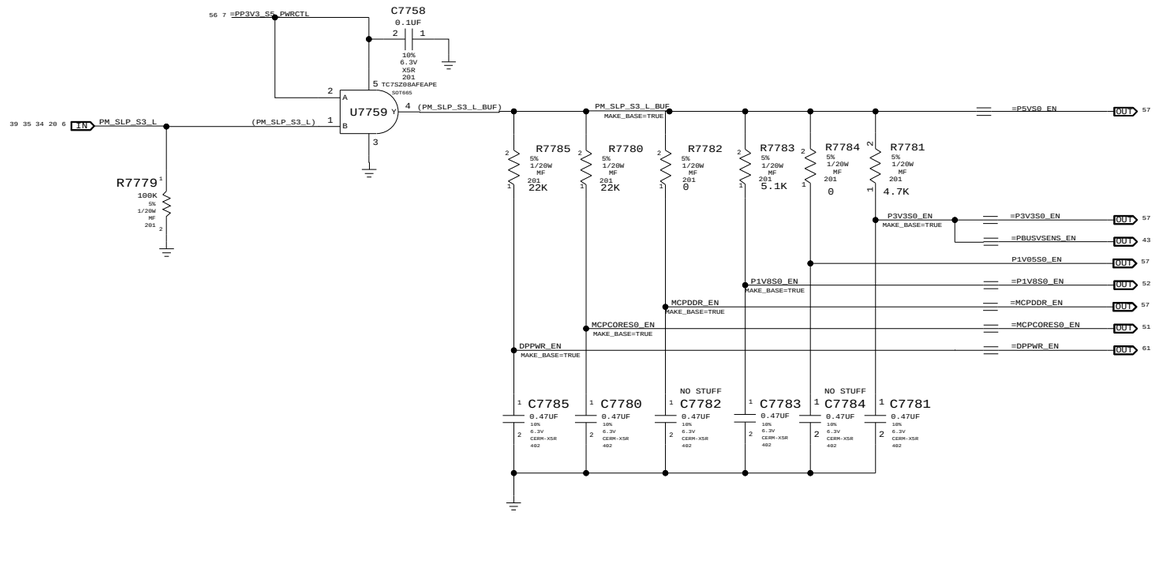
S5 ENABLE



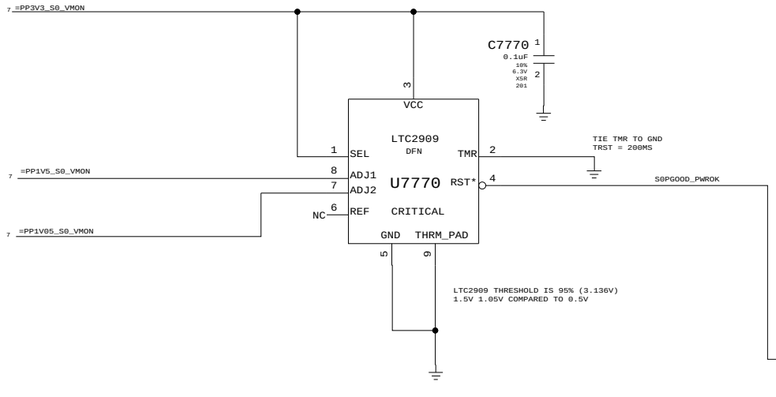
S3 ENABLE



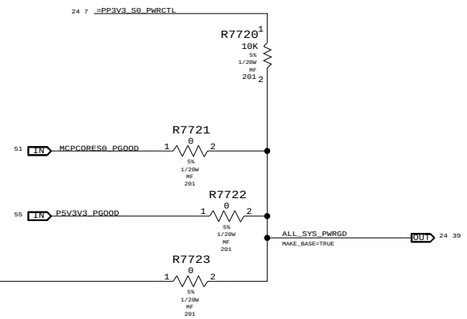
S0 ENABLE



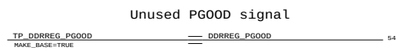
3.3V 1.05V AND 1.5V S0 RAILS MONITOR CIRCUIT

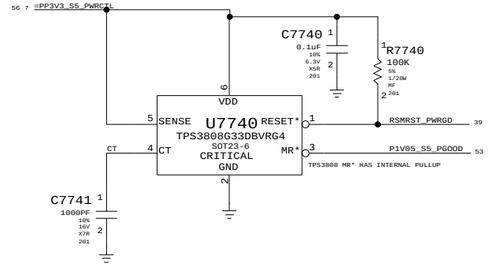


OTHER S0 RAILS PGOOD



Unused PGOOD signal





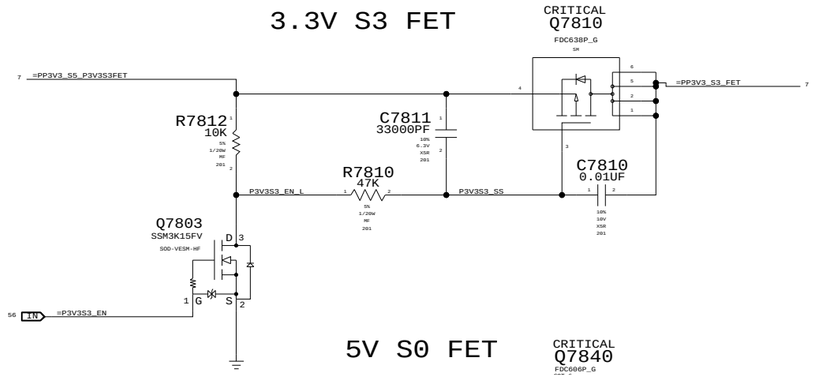
POWER SEQUENCING

SYNC_MASTER=YUAN.MA SYNC_DATE=02/04/2008

APPLE INC.

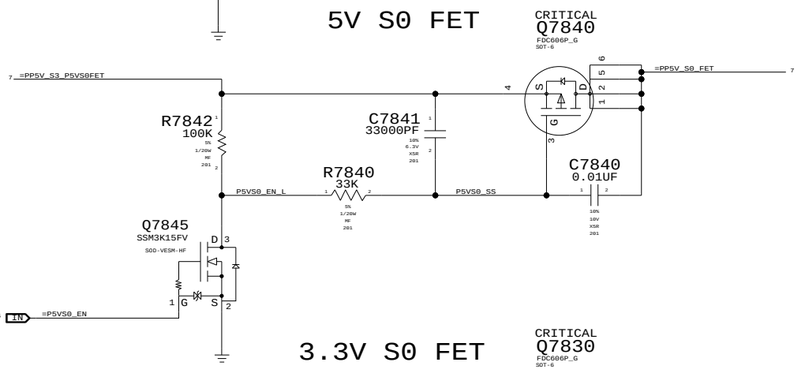
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 56 OF 71	

3.3V S3 FET



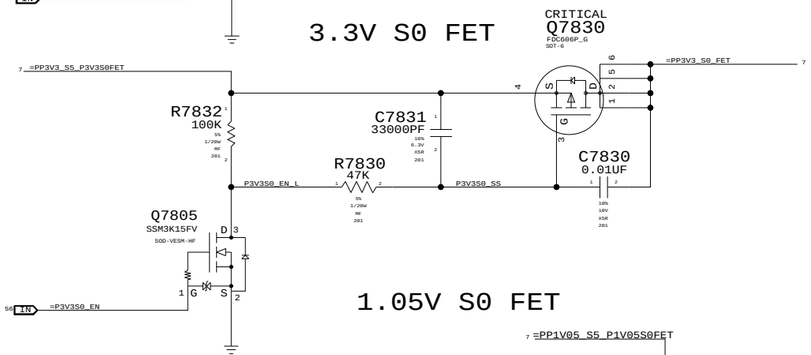
3.3V S3 FET	
MOSFET	FDC638P
CHANNEL	P-TYPE
RDS(ON)	48 mOhm @4.5V
LOADING	0.315 A (EDP)

5V S0 FET



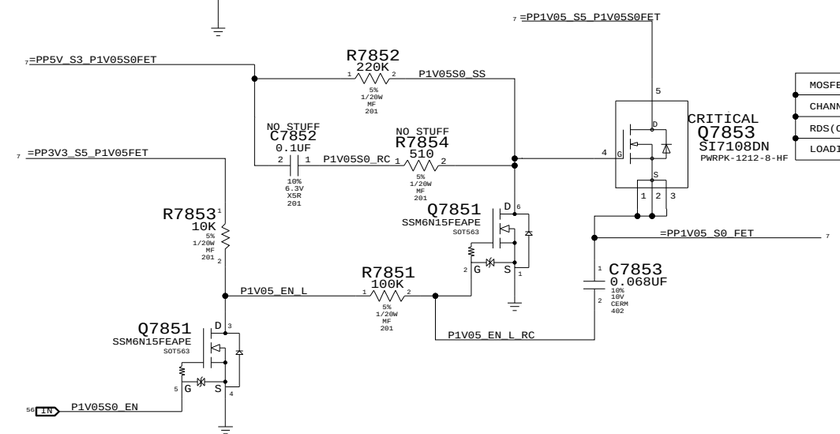
5V S0 FET	
MOSFET	FDC606P
CHANNEL	P-TYPE
RDS(ON)	26 MOHM @4.5V
LOADING	0.562 A (EDP)

3.3V S0 FET



3.3V S0 FET	
MOSFET	FDC606P
CHANNEL	P-TYPE
RDS(ON)	26 MOHM @4.5V
LOADING	2.046 A (EDP)

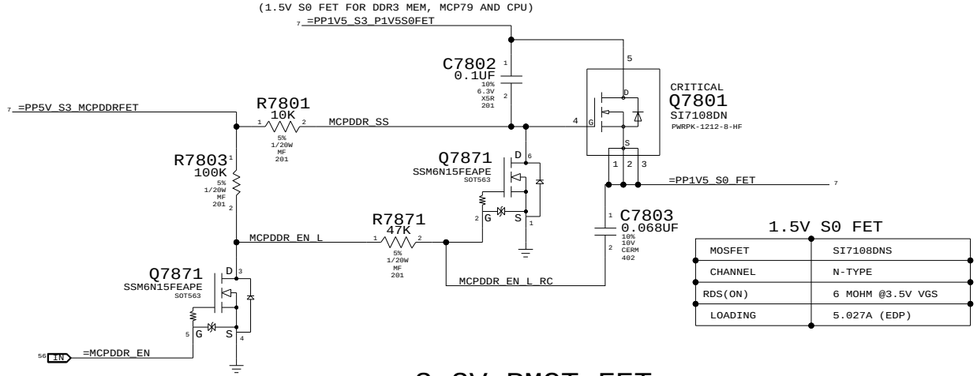
1.05V S0 FET



1.05V S0 FET	
MOSFET	SI7108DN
CHANNEL	N-TYPE
RDS(ON)	6.1 MOHM @4.5V VGS
LOADING	8.25A (EDP)

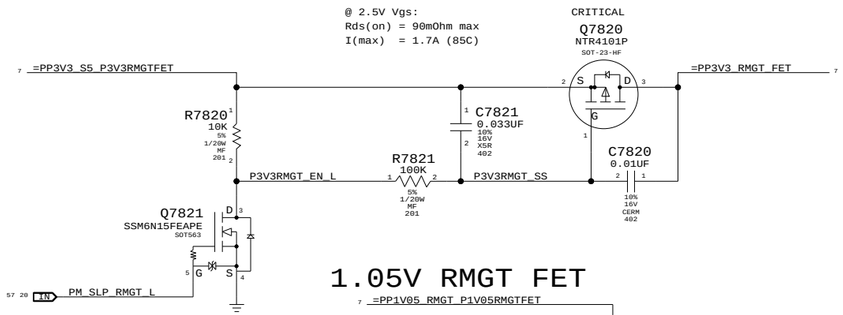
1.5V S0 FET

(1.5V S0 FET FOR DDR3 MEM, MCP79 AND CPU)

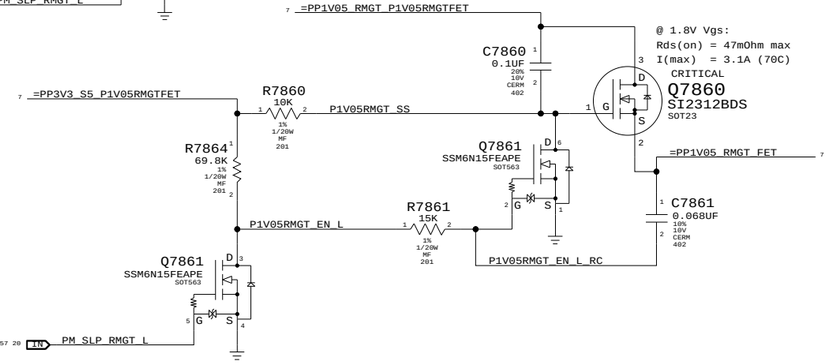


1.5V S0 FET	
MOSFET	SI7108DNS
CHANNEL	N-TYPE
RDS(ON)	6 MOHM @3.5V VGS
LOADING	5.027A (EDP)

3.3V RMGT FET

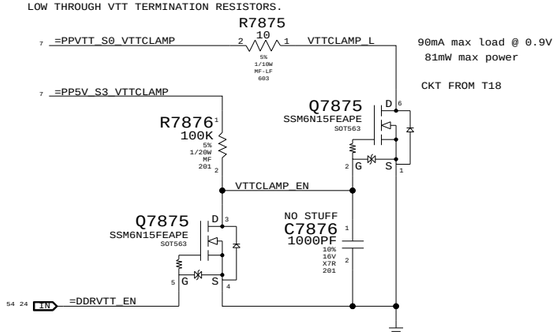


1.05V RMGT FET



MCP79 DDRVTT FET

MCP79 DDR PAD LEAKAGE IS HIGH ENOUGH THAT
NVIDIA RECOMMENDS UNPOWERING DURING SLEEP.
IN ORDER TO SUPPORT UNPOWERING RAIL, HARDWARE
MUST GUARANTEE MEM_CKE SIGNALS ARE LOW
BEFORE RAIL IS TURNED OFF, AND REMAINS LOW
UNTIL AFTER RAIL TURNS BACK ON OR DIMMS
WILL EXIT SELF-REFRESH PREMATURELY.
MEM_VTT_EN OUTPUT FROM MCP79 USED TO ENABLE CLAMP
ON VTT RAIL, WHICH PULLS ALL CKE SIGNALS
LOW THROUGH VTT TERMINATION RESISTORS.



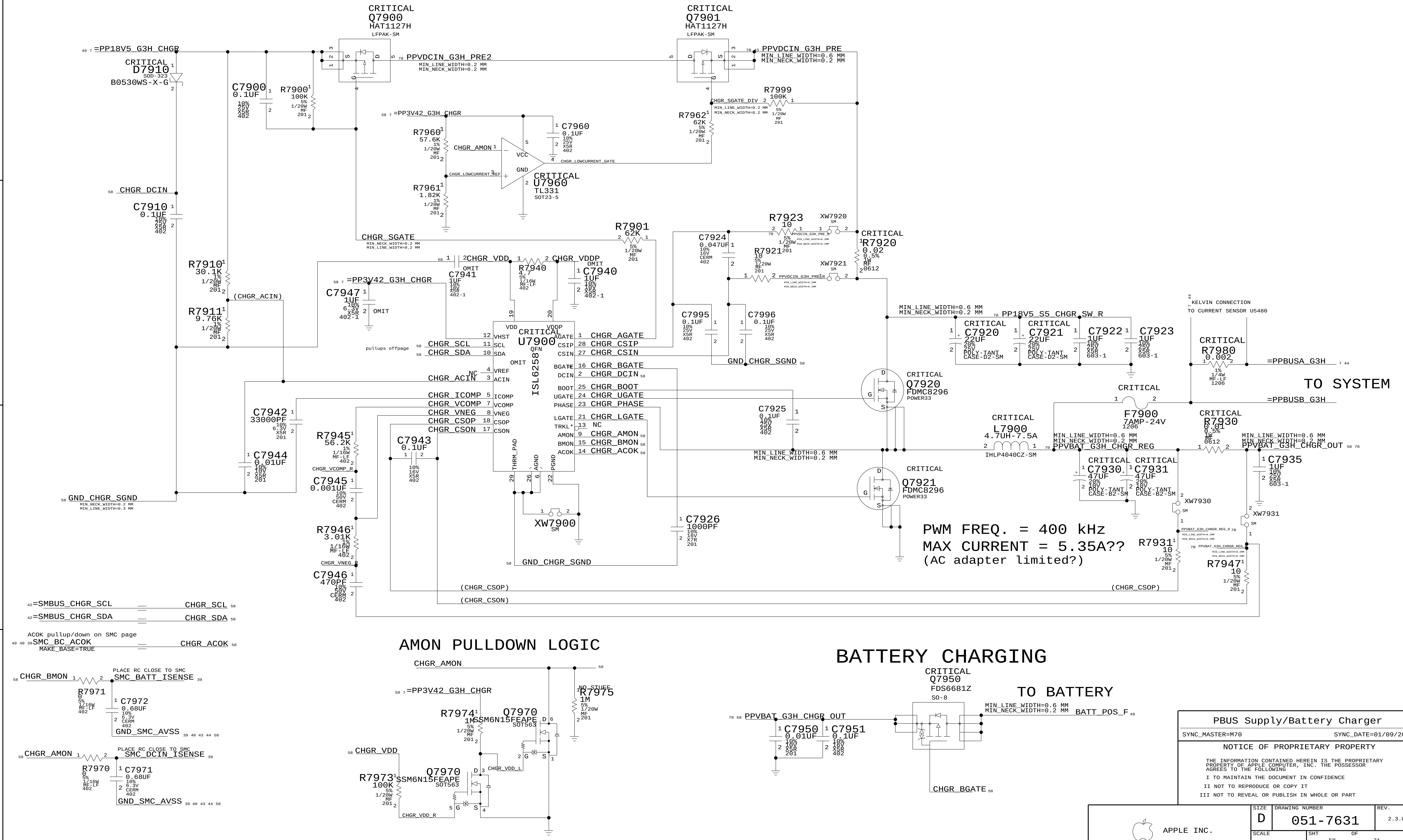
POWER FETS

SYNC_MASTER=YUAN.MA SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 57 OF 71	

PBUS SUPPLY / BATTERY CHARGER



CRITICAL Q7900 HAT1127H LFPAK-SM
CRITICAL Q7901 HAT1127H LFPAK-SM
=PP18V5_G3H_CHGR
PPVDCIN_G3H_PRE2
PPVDCIN_G3H_PRE
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
CRITICAL D7910 SOD-323 B0530WS-X-G
C7900 0.1UF 10% 25V X5R 402
R7900 100K 5% 1/20W MF 201
=PP3V42_G3H_CHGR
R7960 57.6K 1% 1/20W MF 201
R7961 1.82K 1% 1/20W MF 201
CHGR_AMON
CHGR_LOWCURRENT_REF
CHGR_LOWCURRENT_GATE
C7960 0.1UF 10% 25V X5R 402
CRITICAL U7960 TL331 SOT23-5
R7962 62K 5% 1/20W MF 201
R7999 100K 5% 1/20W MF 201
CHGR_SGATE_DIV
CHGR_DCIN
C7910 0.1UF 10% 25V X5R 402
CHGR_SGATE
R7901 62K 5% 1/20W MF 201
R7923 10 5% 1/20W MF 201
XW7920 SM
XW7921 SM
CRITICAL R7920 0.02 0.5% 1W MF 0612
R7921 10 5% 1/20W MF 201
C7924 0.047UF 10% 16V CERM 402
R7910 30.1K 1% 1/20W MF 201
R7911 9.76K 1% 1/20W MF 201
(CHGR_ACIN)
C7941 1UF 10% 10V X5R 402-1 OMIT
CHGR_VDD
R7940 4.7 5% 1/16W MF-LF 402
CHGR_VDDP
C7940 1UF 10% 10V X5R 402-1 OMIT
C7947 1UF 10% 6.3V X5R 402-1 OMIT
CRITICAL U7900 ISL6258 QFN OMIT
CHGR_SCL
CHGR_SDA
pullups offpage
CHGR_ACIN
CHGR_ICOMP
CHGR_VCOMP
CHGR_VNEG
CHGR_CSOP
CHGR_CSON
CHGR_AGATE
CHGR_CSIP
CHGR_CSIN
CHGR_BGATE
CHGR_DCIN
CHGR_BOOT
CHGR_UGATE
CHGR_PHASE
CHGR_LGATE
CHGR_AMON
CHGR_BMON
CHGR_ACOK
C7995 0.1UF 10% 25V X5R 402
C7996 0.1UF 10% 25V X5R 402
GND_CHGR_SGND
PP18V5_S5_CHGR_SW_R
CRITICAL C7920 22UF 20% 25V POLY-TANT CASE-D2-SM
CRITICAL C7921 22UF 20% 25V POLY-TANT CASE-D2-SM
C7922 1UF 10% 25V X5R 603-1
C7923 1UF 10% 25V X5R 603-1
KELVIN CONNECTION TO CURRENT SENSOR U5480
CRITICAL R7980 0.002 1% 1/4W MF-LF 1206
=PPBUSA_G3H
TO SYSTEM
=PPBUSB_G3H
CRITICAL Q7920 FDMC8296 POWER33
CRITICAL F7900 7AMP-24V 1206
CRITICAL L7900 4.7UH-7.5A IHLP4040CZ-SM
PPVBAT_G3H_CHGR_REG
CRITICAL R7930 0.01 0.5% 1W MF 0612
PPVBAT_G3H_CHGR_OUT
C7935 1UF 10% 25V X5R 603-1
C7942 33000PF 10% 6.3V X5R 201
C7944 0.01UF 10% 10V X5R 201
R7945 56.2K 1% 1/16W MF-LF 402
CHGR_VCOMP_R
C7945 0.001UF 10% 50V CERM 402
C7943 0.1UF 10% 16V X5R 402
C7925 0.1UF 10% 25V X5R 402
CRITICAL Q7921 FDMC8296 POWER33
CRITICAL C7930 47UF 20% 16V POLY-TANT CASE-B2-SM
CRITICAL C7931 47UF 20% 16V POLY-TANT CASE-B2-SM
XW7930 SM
XW7931 SM
GND_CHGR_SGND
R7946 3.01K 1% 1/16W MF-LF 402
CHGR_VNEG
XW7900 SM
C7926 1000PF 10% 16V X7R 201
PWM FREQ. = 400 kHz
MAX CURRENT = 5.35A??
(AC adapter limited?)
R7931 10 5% 1/20W MF 201
PPVBAT_G3H_CHGR_REG
R7947 10 5% 1/20W MF 201
C7946 470PF 10% 50V CERM 402
(CHGR_CSOP)
(CHGR_CSON)
=SMBUS_CHGR_SCL
CHGR_SCL
=SMBUS_CHGR_SDA
CHGR_SDA
ACOK pullup/down on SMC page
SMC_BC_ACOK
MAKE_BASE=TRUE
CHGR_ACOK
CHGR_BMON
PLACE RC CLOSE TO SMC
SMC_BATT_ISENSE
R7971 0 5% 1/16W MF-LF 402
C7972 0.68UF 10% 6.3V CERM 402
GND_SMC_AVSS
CHGR_AMON
PLACE RC CLOSE TO SMC
SMC_DCIN_ISENSE
R7970 0 5% 1/16W MF-LF 402
C7971 0.68UF 10% 6.3V CERM 402
GND_SMC_AVSS
AMON PULLDOWN LOGIC
CHGR_AMON
=PP3V42_G3H_CHGR
NO STUFF R7975 1M 5% 1/20W MF 201
R7974 1M 5% 1/20W MF 201
Q7970 SSM6N15FEAPE SOT563
CHGR_VDD_L
CHGR_VDD
R7973 100K 5% 1/20W MF 201
Q7970 SSM6N15FEAPE SOT563
CHGR_VDD_R
BATTERY CHARGING
CRITICAL Q7950 FDS6681Z SO-8
TO BATTERY
PPVBAT_G3H_CHGR_OUT
C7950 0.01UF 10% 16V X5R 201
C7951 0.1UF 10% 16V X5R 402
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
BATT_POS_F
CHGR_BGATE

PBUS Supply/Battery Charger

SYNC_MASTER=M70 SYNC_DATE=01/09/2007

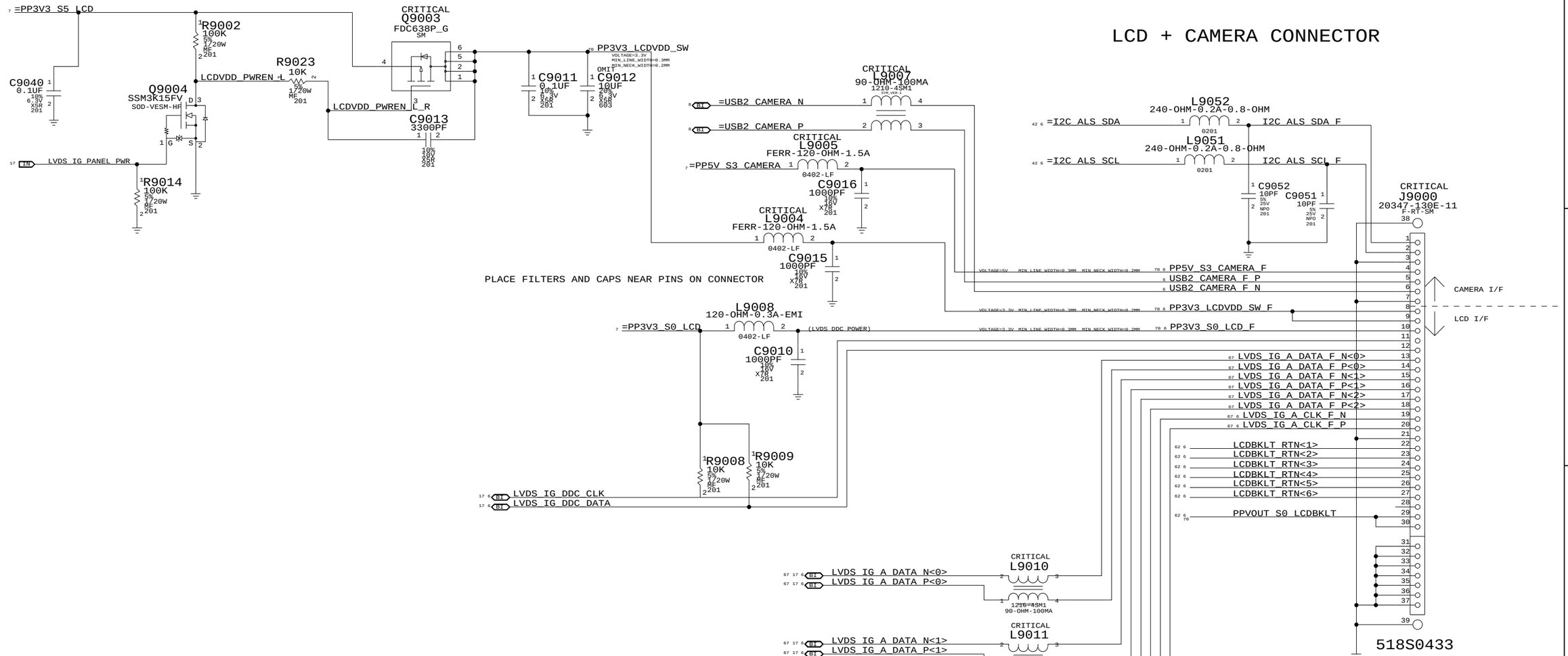
NOTICE OF PROPRIETARY PROPERTY

APPLE INC.

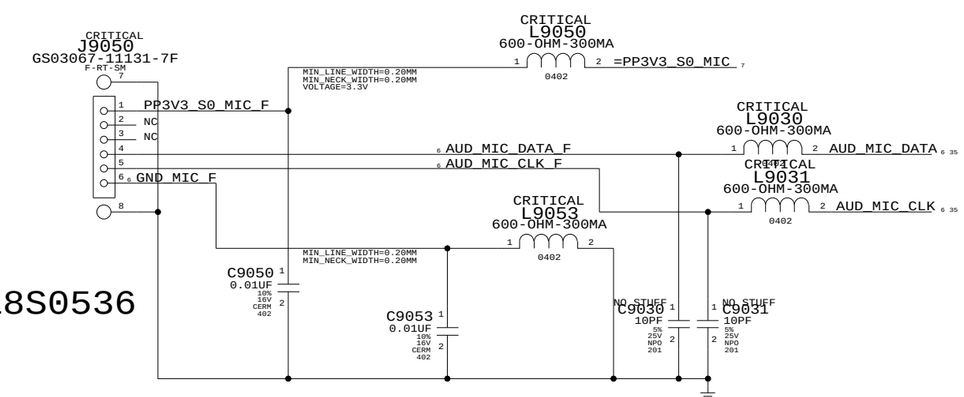
SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	58	71

LCD + CAMERA CONNECTOR



MIC CONNECTOR



APN:518S0536

LVDS,Camera Conn. and ALS Conn.			
SYNC_MASTER=GPU	SYNC_DATE=06/23/2006		
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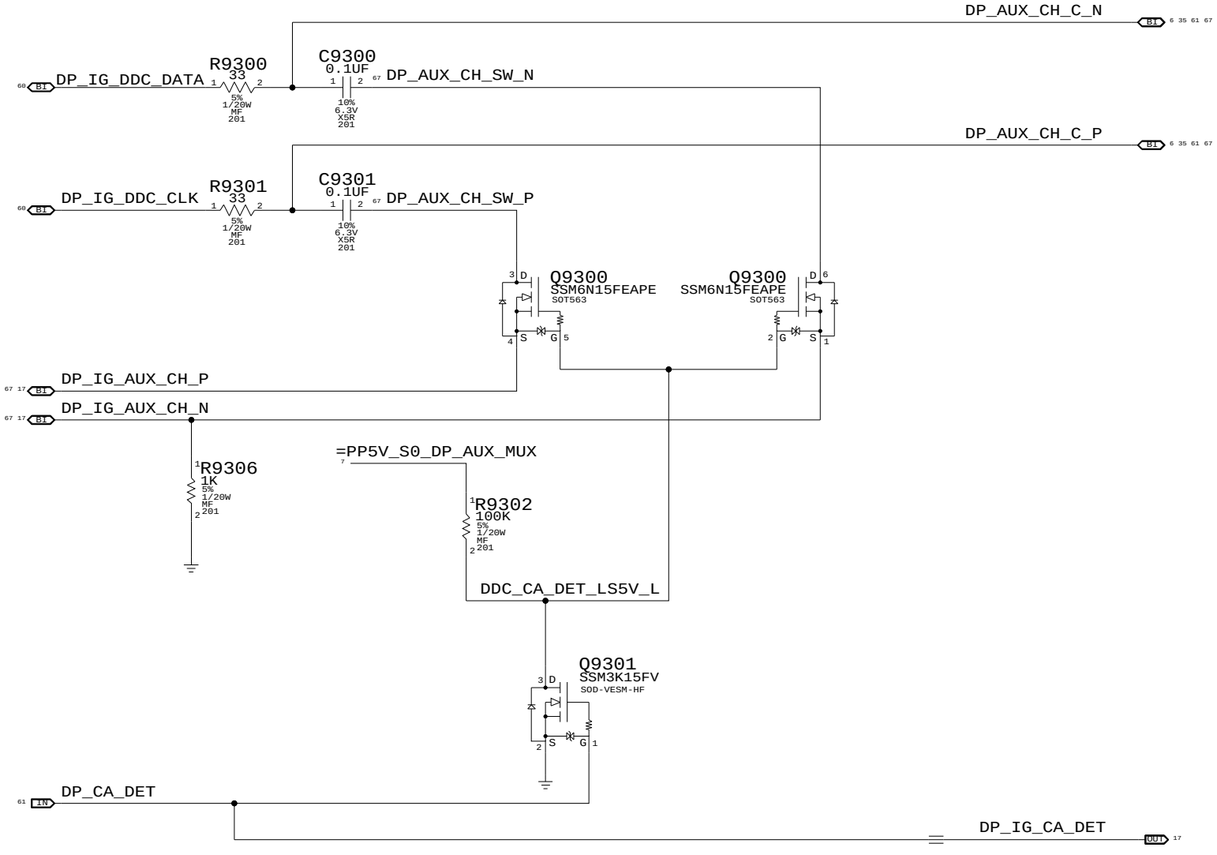
APPLE INC.	SIZE D	DRAWING NUMBER 051-7631	REV. 2.3.0
	SCALE NONE	SHT 59 OF 71	




```
=MCP_HDMI_TXC_P          DP_ML_P<3>          MAKE_BASE=TRUE
=MCP_HDMI_TXC_N          DP_ML_N<3>          MAKE_BASE=TRUE
=MCP_HDMI_TXD_P<0>       DP_ML_P<2>          MAKE_BASE=TRUE
=MCP_HDMI_TXD_N<0>       DP_ML_N<2>          MAKE_BASE=TRUE
=MCP_HDMI_TXD_P<1>       DP_ML_P<1>          MAKE_BASE=TRUE
=MCP_HDMI_TXD_N<1>       DP_ML_N<1>          MAKE_BASE=TRUE
=MCP_HDMI_TXD_P<2>       DP_ML_P<0>          MAKE_BASE=TRUE
=MCP_HDMI_TXD_N<2>       DP_ML_N<0>          MAKE_BASE=TRUE
=MCP_HDMI_HPD            DP_HPD              MAKE_BASE=TRUE
=MCP_HDMI_DDC_CLK        DP_IG_DDC_CLK       MAKE_BASE=TRUE
=MCP_HDMI_DDC_DATA       DP_IG_DDC_DATA      MAKE_BASE=TRUE
```

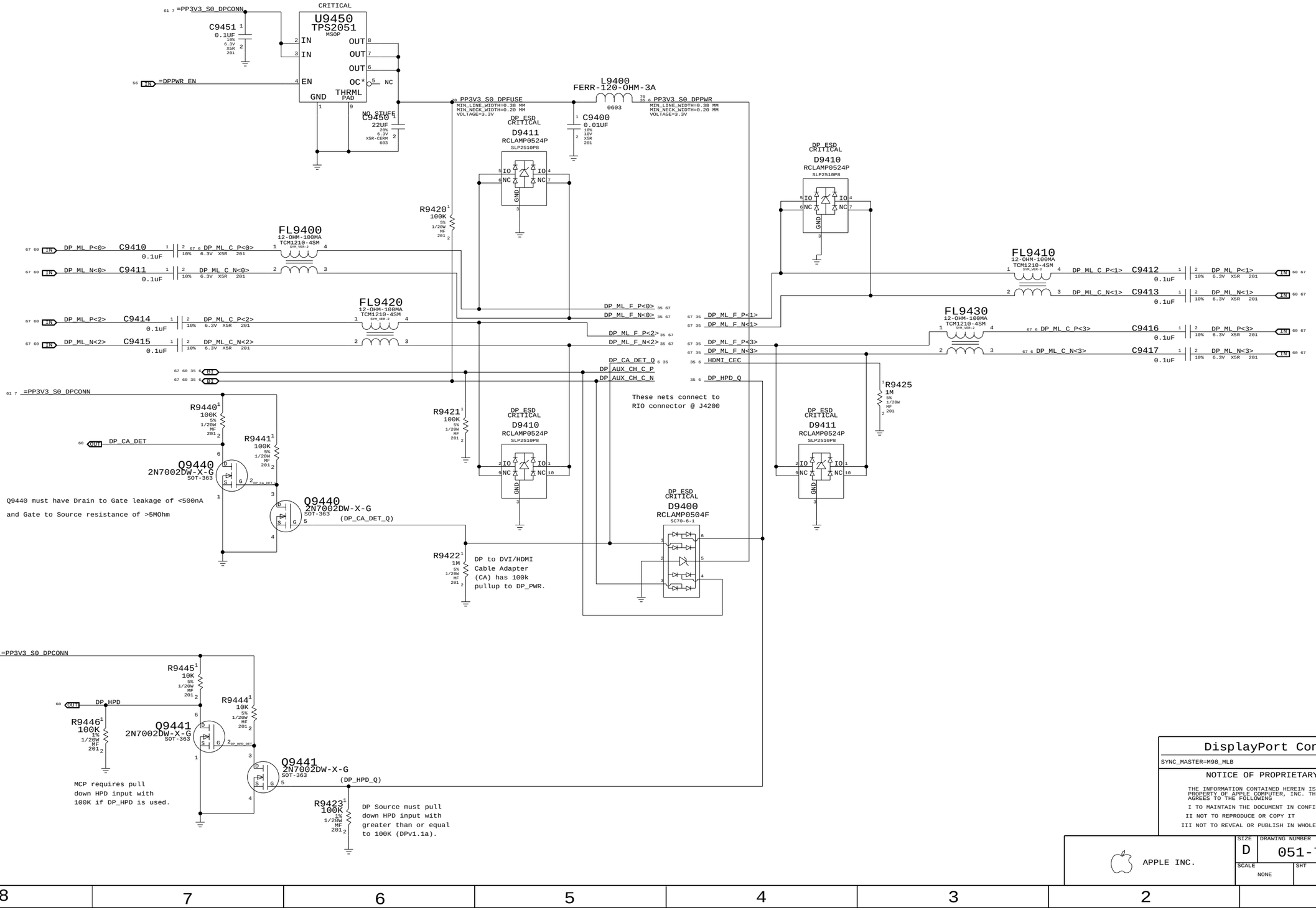
DISPLAYPORT SUPPORT

SYNC_MASTER=NMARTIN SYNC_DATE=12/18/2007

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	60	71



DisplayPort Connector

SYNC_MASTER=M98_MLB SYNC_DATE=01/17/2008

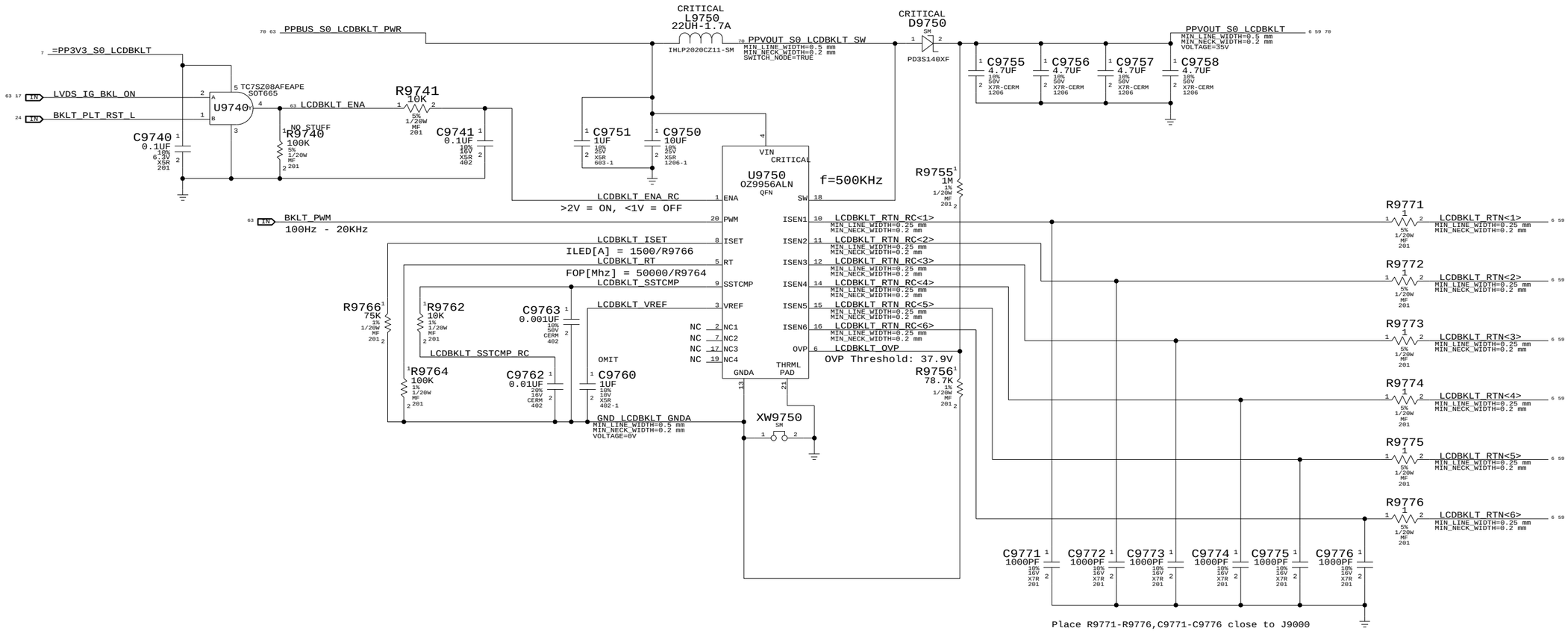
NOTICE OF PROPRIETARY PROPERTY

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	61	71

LED Backlight Driver



LED Backlight Driver		
SYNC_MASTER=(MASTER)	SYNC_DATE=(MASTER)	

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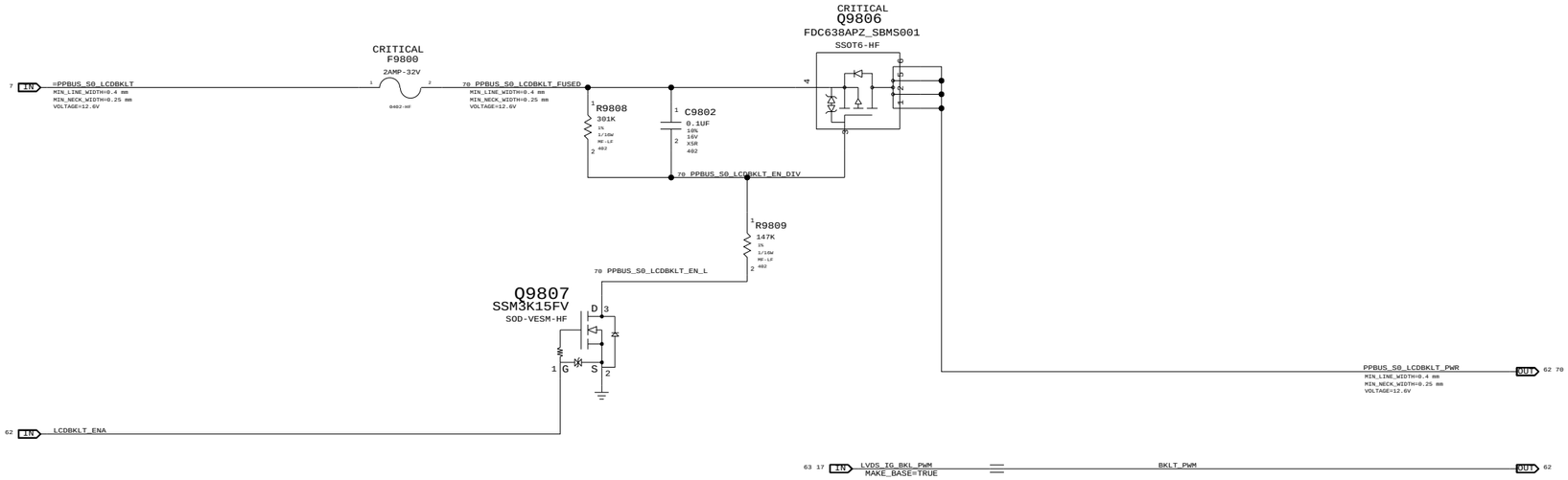
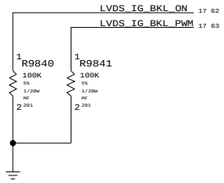
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 62 OF 71	





LCD Backlight Support

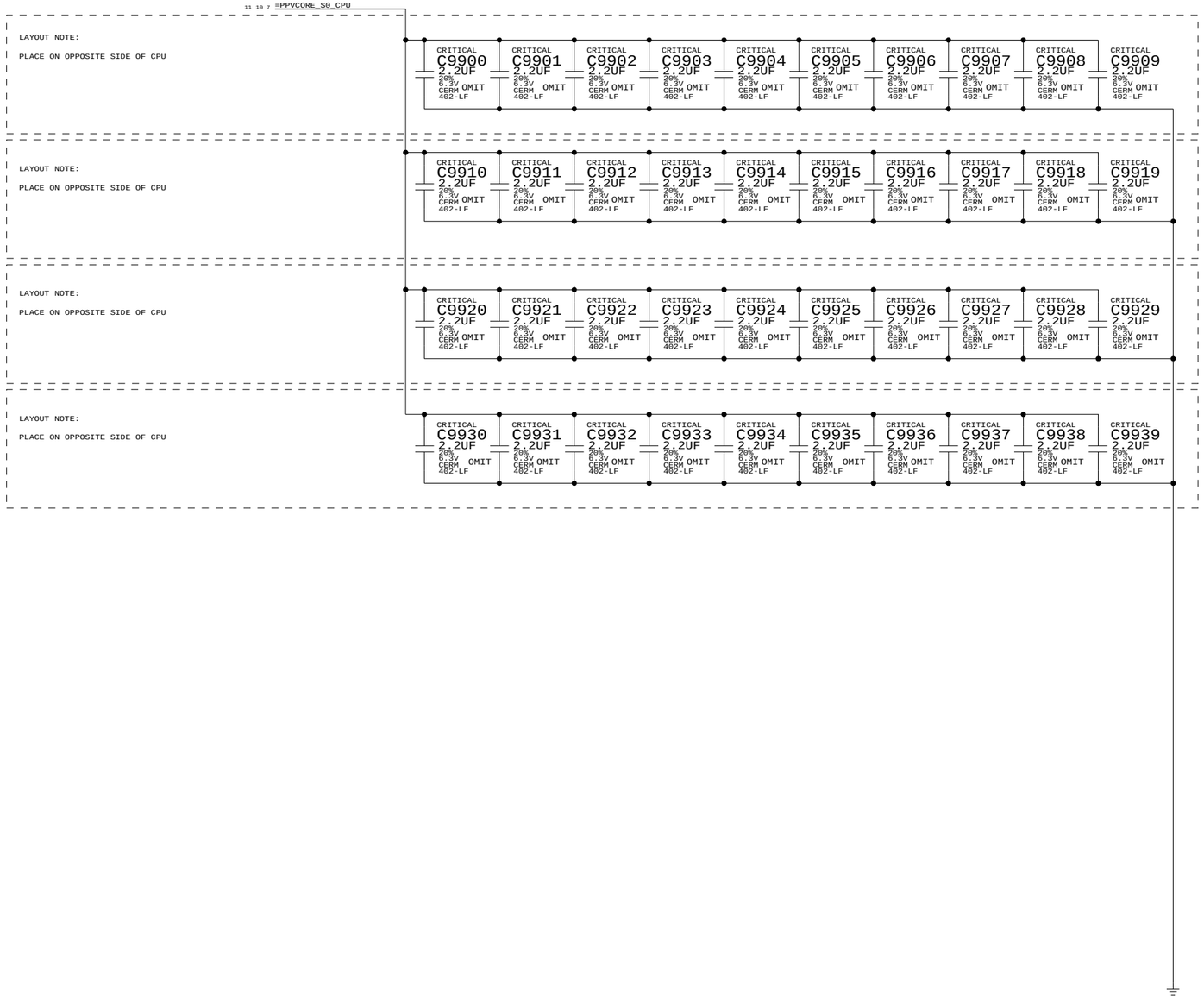
SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 63 OF 71	

ADDITIONAL CPU VCORE HF DECOUPLING

40x 2.2uF 0402



Additional CPU/GPU Decoupling

SYNC_MASTER= SYNC_DATE=

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 64 OF 71	

FSB (Front-Side Bus) Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
FSB_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD
FSB_DSTB_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=1:1_DIFFPAIR	=1:1_DIFFPAIR

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
FSB_DATA	*	=2x_DIELECTRIC	?
FSB_DSTB	*	=3x_DIELECTRIC	?
FSB_ADDR	*	=STANDARD	?
FSB_ADSTB	*	=2x_DIELECTRIC	?
FSB_1X	*	=STANDARD	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
FSB_DATA	TOP,BOTTOM	=4x_DIELECTRIC	?
FSB_DSTB	TOP,BOTTOM	=5x_DIELECTRIC	?
FSB_ADDR	TOP,BOTTOM	=3x_DIELECTRIC	?
FSB_ADSTB	TOP,BOTTOM	=4x_DIELECTRIC	?
FSB_1X	TOP,BOTTOM	=3x_DIELECTRIC	?

All 4x/2x/1x FSB signals with impedance requirements are 50-ohm single-ended.

FSB 4X signals / groups shown in signal table on right.
Signals within each 4x group should be matched within 5 ps of strobe.
DSTB# complementary pairs should be matched within 1 ps of each other, all DSTB#s matched to +/- 300 ps.
Spacing is 2x dielectric between DATA#, DINV# signals, with 3x dielectric spacing to the DSTB#s.
DSTB# complementary pairs are spaced normally and are NOT routed as differential pairs.

FSB 2X signals / groups shown in signal table on right.
Signals within each 2x group should be matched within 20 ps. ADTSB#s should be matched +/- 300 ps.
Spacing is 1x dielectric between ADDR#, REQ# signals, with 2x dielectric spacing to ADSTB#.

FSB 1X signals shown in signal table on right.
Signals within each 1x group should be matched to CPU clock, +0/-1000 mils.

Design Guide recommends each strobe/signal group is routed on the same layer.
Intel Design Guide recommends FSB signals be routed only on internal layers.

NOTE: Intel Design Guide allows closer spacing if signal lengths can be shortened.

SOURCE: MCP79 Interface DG (DG-03328-001_v01), Section 2.2
SOURCE: Santa Rosa Platform DG, Rev 1.5 (#22294), Sections 4.2 & 4.3

CPU Signal Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
CPU_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD
CPU_27P4S	*	=27P4_OHM_SE	=27P4_OHM_SE	=27P4_OHM_SE	=27P4_OHM_SE	7 MIL	7 MIL

NOTE: 7 mil gap is for VCCSense pair, which Intel says to route with 7 mil spacing without specifying a target impedance.

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CPU_AGTL	*	=STANDARD	?
CPU_8MIL	*	8 MIL	?
CPU_COMP	*	25 MIL	?
CPU_GTLREF	*	25 MIL	?
CPU_ITP	*	=2:1_SPACING	?
CPU_VCCSENSE	*	25 MIL	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CPU_AGTL	TOP,BOTTOM	=2x_DIELECTRIC	?

SR DG recommends at least 25 mils, >50 mils preferred

Most CPU signals with impedance requirements are 55-ohm single-ended.
Some signals require 27.4-ohm single-ended impedance.

SOURCE: MCP79 Interface DG (DG-03328-001_v01), Section 2.2
SOURCE: Santa Rosa Platform DG, Rev 0.9 (#20517), Sections 4.4 & 5.8.2.4

MCP FSB COMP Signal Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
MCP_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
MCP_FSB_COMP	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v01), Section 2.2.4

FSB Clock Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
CLK_FSB_100D	*	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CLK_FSB	*	=3x_DIELECTRIC	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CLK_FSB	TOP,BOTTOM	=4x_DIELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001_v01), Section 2.2.5

CPU / FSB Net Properties

	NET_TYPE		
	ELECTRICAL_CONSTRAINT_SET	PHYSICAL	SPACING	
FSB 4X Signal Groups	FSB_DATA_GROUP0	FSB_50S	FSB_DATA	FSB_D_L<15..0> 9 13
	FSB_DATA_GROUP0	FSB_50S	FSB_DATA	FSB_DINV_L<0> 9 13
	FSB_DSTB0	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_P<0> 9 13
	FSB_DSTB0	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_N<0> 9 13
	FSB_DATA_GROUP1	FSB_50S	FSB_DATA	FSB_D_L<31..16> 9 13
	FSB_DATA_GROUP1	FSB_50S	FSB_DATA	FSB_DINV_L<1> 9 13
	FSB_DSTB1	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_P<1> 9 13
	FSB_DSTB1	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_N<1> 9 13
	FSB_DATA_GROUP2	FSB_50S	FSB_DATA	FSB_D_L<47..32> 9 13
	FSB_DATA_GROUP2	FSB_50S	FSB_DATA	FSB_DINV_L<2> 9 13
	FSB_DSTB2	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_P<2> 9 13
	FSB_DSTB2	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_N<2> 9 13
	FSB_DATA_GROUP3	FSB_50S	FSB_DATA	FSB_D_L<63..48> 9 13
	FSB_DATA_GROUP3	FSB_50S	FSB_DATA	FSB_DINV_L<3> 9 13
	FSB_DSTB3	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_P<3> 9 13
	FSB_DSTB3	FSB_DSTB_50S	FSB_DSTB	FSB_DSTB_L_N<3> 9 13
FSB 2X Signals	FSB_ADDR_GROUP0	FSB_50S	FSB_ADDR	FSB_A_L<16..3> 9 13
	FSB_ADDR_GROUP0	FSB_50S	FSB_ADDR	FSB_REQ_L<4..0> 9 13
	FSB_ADSTB0	FSB_50S	FSB_ADSTB	FSB_ADSTB_L<0> 9 13
	FSB_ADDR_GROUP1	FSB_50S	FSB_ADDR	FSB_A_L<35..17> 9 13
	FSB_ADSTB1	FSB_50S	FSB_ADSTB	FSB_ADSTB_L<1> 9 13
FSB 1X Signals	FSB_1X	FSB_50S	FSB_1X	FSB_ADS_L 9 13
	FSB_BREQ0_L	FSB_50S	FSB_1X	FSB_BREQ0_L 8 9 13
	FSB_BREQ1_L	FSB_50S	FSB_1X	FSB_BREQ1_L 13
	FSB_1X	FSB_50S	FSB_1X	FSB_BNR_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_BPRI_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_DBSY_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_DEFER_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_DRDY_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_HIT_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_HITM_L 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_LOCK_L 9 13
	FSB_CPURST_L	FSB_50S	FSB_1X	FSB_CPURST_L 8 9 12 13
	FSB_1X	FSB_50S	FSB_1X	FSB_RS_L<2..0> 9 13
	FSB_1X	FSB_50S	FSB_1X	FSB_TRDY_L 9 13
	CPU_ASYNC	CPU_50S	CPU_AGTL	CPU_A20M_L 9 13
	CPU_BSEL	CPU_50S	CPU_AGTL	CPU_BSEL<2..0> 8 9
	CPU_FERR_L	CPU_50S	CPU_8MIL	CPU_FERR_L 9 13
	CPU_ASYNC	CPU_50S	CPU_AGTL	CPU_IGNNE_L 9 13
	CPU_INIT_L	CPU_50S	CPU_AGTL	CPU_INIT_L 9 13
	CPU_ASYNC_R	CPU_50S	CPU_AGTL	CPU_INTR 8 9 13
	CPU_ASYNC_R	CPU_50S	CPU_AGTL	CPU_NMI 8 9 13
	CPU_PROCHOT_L	CPU_50S	CPU_AGTL	CPU_PROCHOT_L 9 13 40 50
	CPU_PWRGD	CPU_50S	CPU_AGTL	CPU_PWRGD 9 12 13
	CPU_ASYNC	CPU_50S	CPU_AGTL	CPU_SMI_L 9 13
	CPU_ASYNC	CPU_50S	CPU_AGTL	CPU_STPCLK_L 9 13
	PM_THRMTRIP_L	CPU_50S	CPU_8MIL	PM_THRMTRIP_L 9 13 40
	FSB_CPUSLP_L	CPU_50S	CPU_AGTL	FSB_CPUSLP_L 9 13
	CPU_FROM_SB	CPU_50S	CPU_AGTL	CPU_DPSLP_L 9 13
	CPU_DPRSTP_L	CPU_50S	CPU_AGTL	CPU_DPRSTP_L 8 9 13 50
	CPU_ASYNC	CPU_50S	CPU_AGTL	FSB_DPWR_L 9 13
	MCP_CPU_COMP	MCP_50S	MCP_FSB_COMP	MCP_BCLK_VML_COMP_VDD 13
	MCP_CPU_COMP	MCP_50S	MCP_FSB_COMP	MCP_BCLK_VML_COMP_GND 13
	MCP_CPU_COMP	MCP_50S	MCP_FSB_COMP	MCP_CPU_COMP_VCC 13
	MCP_CPU_COMP	MCP_50S	MCP_FSB_COMP	MCP_CPU_COMP_GND 13
	FSB_CLK_CPU	CLK_FSB_100D	CLK_FSB	FSB_CLK_CPU_P 9 13
	FSB_CLK_CPU	CLK_FSB_100D	CLK_FSB	FSB_CLK_CPU_N 9 13
	FSB_CLK_ITP	CLK_FSB_100D	CLK_FSB	FSB_CLK_ITP_P 6 12 13
	FSB_CLK_ITP	CLK_FSB_100D	CLK_FSB	FSB_CLK_ITP_N 6 12 13
	FSB_CLK_MCP	CLK_FSB_100D	CLK_FSB	FSB_CLK_MCP_P 13
	FSB_CLK_MCP	CLK_FSB_100D	CLK_FSB	FSB_CLK_MCP_N 13
	CPU_IERR_L	CPU_50S		CPU_IERR_L 9
	PM_DPRSLPVR	CPU_50S	CPU_AGTL	PM_DPRSLPVR 20 50
	(See above)	CPU_50S	CPU_AGTL	IMVP_DPRSLPVR 50
	CPU_GTLREF	CPU_50S	CPU_GTLREF	CPU_GTLREF 9 25
	CPU_COMP	CPU_50S	CPU_COMP	CPU_COMP<3> 9
	CPU_COMP	CPU_27P4S	CPU_COMP	CPU_COMP<2> 9
	CPU_COMP	CPU_50S	CPU_COMP	CPU_COMP<1> 9
	CPU_COMP	CPU_27P4S	CPU_COMP	CPU_COMP<0> 9
	XDP_TDI	CPU_50S	CPU_ITP	XDP_TDI 6 9 12
	XDP_TDO	CPU_50S	CPU_ITP	XDP_TDO 9 12
	XDP_TMS	CPU_50S	CPU_ITP	XDP_TMS 6 9 12
	XDP_TCK	CPU_50S	CPU_ITP	XDP_TCK 6 9 12
	XDP_TRST_L	CPU_50S	CPU_ITP	XDP_TRST_L 6 9 12
	XDP_BPM_L	CPU_50S	CPU_ITP	XDP_BPM_L<4..0> 6 9 12
	XDP_BPM_L5	CPU_50S	CPU_ITP	XDP_BPM_L<5> 6 9 12
	(FSB_CPURST_L)	CPU_50S	CPU_ITP	XDP_CPURST_L 6 12
		CPU_50S	CPU_8MIL	CPU_VID<6..0> 10 11 50
		CPU_50S	CPU_8MIL	IMVP6_VID<6..0> 11
	CPU_VCCSENSE	CPU_27P4S	CPU_VCCSENSE	CPU_VCCSENSE_P 10 50
	CPU_VCCSENSE	CPU_27P4S	CPU_VCCSENSE	CPU_VCCSENSE_N 10 50
	(CPU_VCCSENSE)	CPU_27P4S	CPU_VCCSENSE	IMVP6_VSEN_P 50
	(CPU_VCCSENSE)	CPU_27P4S	CPU_VCCSENSE	IMVP6_VSEN_N 50

CPU/FSB Constraints

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0
SCALE: NONE	SHT 65 OF 71	

Memory Bus Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
MEM_50S	*	=50_OHM_SE	=50_OHM_SE	0.110 MM	=50_OHM_SE	=STANDARD	=STANDARD
MEM_50S_VDD	*	=50_OHM_SE	=50_OHM_SE	0.110 MM	=50_OHM_SE	=STANDARD	=STANDARD
MEM_90D	*	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF
MEM_90D_VDD	*	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
MEM_CLK2MEM	*	=2.28:1_SPACING	?
MEM_CTRL2CTRL	*	=1.1:1_SPACING	?
MEM_CTRL2MEM	*	=2.28:1_SPACING	?
MEM_CMD2CMD	*	=1.1:1_SPACING	?
MEM_CMD2MEM	*	=2.28:1_SPACING	?
MEM_DATA2DATA	*	=1.1:1_SPACING	?
MEM_DATA2MEM	*	=2.28:1_SPACING	?
MEM_DQS2MEM	*	=2.28:1_SPACING	?
MEM_2OTHER	*	25 MIL	?

Memory Bus Spacing Group Assignments

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_CLK	MEM_CLK	*	MEM_CLK2MEM
MEM_CLK	MEM_CTRL	*	MEM_CLK2MEM
MEM_CLK	MEM_CMD	*	MEM_CLK2MEM
MEM_CLK	MEM_DATA	*	MEM_CLK2MEM
MEM_CLK	MEM_DQS	*	MEM_CLK2MEM

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_CMD	MEM_CLK	*	MEM_CMD2MEM
MEM_CMD	MEM_CTRL	*	MEM_CMD2MEM
MEM_CMD	MEM_CMD	*	MEM_CMD2CMD
MEM_CMD	MEM_DATA	*	MEM_CMD2MEM
MEM_CMD	MEM_DQS	*	MEM_CMD2MEM

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_CTRL	MEM_CLK	*	MEM_CTRL2MEM
MEM_CTRL	MEM_CTRL	*	MEM_CTRL2CTRL
MEM_CTRL	MEM_CMD	*	MEM_CTRL2MEM
MEM_CTRL	MEM_DATA	*	MEM_CTRL2MEM
MEM_CTRL	MEM_DQS	*	MEM_CTRL2MEM

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_DATA	MEM_CLK	*	MEM_DATA2MEM
MEM_DATA	MEM_CTRL	*	MEM_DATA2MEM
MEM_DATA	MEM_CMD	*	MEM_DATA2MEM
MEM_DATA	MEM_DATA	*	MEM_DATA2DATA
MEM_DATA	MEM_DQS	*	MEM_DATA2MEM

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_DQS	MEM_CLK	*	MEM_DQS2MEM
MEM_DQS	MEM_CTRL	*	MEM_DQS2MEM
MEM_DQS	MEM_CMD	*	MEM_DQS2MEM
MEM_DQS	MEM_DATA	*	MEM_DQS2MEM
MEM_DQS	MEM_DQS	*	MEM_DQS2MEM

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_CLK	*	*	MEM_2OTHER
MEM_CTRL	*	*	MEM_2OTHER
MEM_CMD	*	*	MEM_2OTHER
MEM_DATA	*	*	MEM_2OTHER
MEM_DQS	*	*	MEM_2OTHER

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_CLK	GND	*	GND_P2MM
MEM_CMD	GND	*	GND_P2MM
MEM_CTRL	GND	*	GND_P2MM
MEM_DATA	GND	*	GND_P2MM
MEM_DQS	GND	*	GND_P2MM
MEM_CLK	PP1V5_MEM	*	PWR_P2MM
MEM_CTRL	PP1V5_MEM	*	PWR_P2MM
MEM_DATA	PP1V5_MEM	*	PWR_P2MM
MEM_DQS	PP1V5_MEM	*	PWR_P2MM
MEM_CMD	PP1V5_MEM	*	PWR_P2MM

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MEM_CLK	PWR	*	BUS2PWR_GND
MEM_CLK	GND	*	BUS2PWR_GND
MEM_CTRL	PWR	*	BUS2PWR_GND
MEM_CTRL	GND	*	BUS2PWR_GND
MEM_CMD	PWR	*	BUS2PWR_GND
MEM_CMD	GND	*	BUS2PWR_GND
MEM_DATA	PWR	*	BUS2PWR_GND
MEM_DATA	GND	*	BUS2PWR_GND
MEM_DQS	PWR	*	BUS2PWR_GND
MEM_DQS	GND	*	BUS2PWR_GND

DDR3:

DQ signals should be matched within 5 ps of associated DQS pair.
DQS intra-pair matching should be within 1 ps, inter-pair matching shoulw be within 180 ps
No DQS to clock matching requirement.
CLK intra-pair matching should be within 1 ps, inter-pair matching should be within 2 ps.
A/BA/cmd signals should be matched within 5 ps of CLK pairs.
All memory signals maximum length is 1.005 ps. CLK minimum length is 594 ps (lengths include substrate).
DQ/A/BA/cmd signal spacing is 3x dielectric, DQS/CLK is 4x dielectric.

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.3
SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Section 6.2

MCP MEM COMP Signal Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
MCP_MEM_COMP	*	Y	7 MIL	7 MIL	=STANDARD	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
MCP_MEM_COMP	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.3.4

Memory Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
MEM_A_CLK	MEM_90D	MEM_CLK	MEM_A_CLK_P<0>	14 27 28 33
MEM_A_CLK	MEM_90D	MEM_CLK	MEM_A_CLK_N<0>	14 27 28 33
MEM_A_CNTL	MEM_50S	MEM_CTRL	MEM_A_CKE<1..0>	14 27 28 33
MEM_A_CNTL	MEM_50S	MEM_CTRL	MEM_A_CS_L<1..0>	14 27 28 33
MEM_A_CNTL	MEM_50S	MEM_CTRL	MEM_A_ODT<1..0>	14 27 28 33
MEM_A_CMD	MEM_50S	MEM_CMD	MEM_A_A<14..0>	14 27 28 33
MEM_A_CMD	MEM_50S	MEM_CMD	MEM_A_BA<2..0>	14 27 28 33
MEM_A_CMD	MEM_50S	MEM_CMD	MEM_A_RAS_L	14 27 28 33
MEM_A_CMD	MEM_50S	MEM_CMD	MEM_A_CAS_L	14 27 28 33
MEM_A_CMD	MEM_50S	MEM_CMD	MEM_A_WE_L	14 27 28 33
MEM_A_DQ_BYTE0	MEM_50S	MEM_DATA	MEM_A_DQ<7..0>	14 27
MEM_A_DQ_BYTE1	MEM_50S	MEM_DATA	MEM_A_DQ<15..8>	14 27
MEM_A_DQ_BYTE2	MEM_50S	MEM_DATA	MEM_A_DQ<23..16>	14 27
MEM_A_DQ_BYTE3	MEM_50S	MEM_DATA	MEM_A_DQ<31..24>	14 27
MEM_A_DQ_BYTE4	MEM_50S	MEM_DATA	MEM_A_DQ<39..32>	14 28
MEM_A_DQ_BYTE5	MEM_50S	MEM_DATA	MEM_A_DQ<47..40>	14 28
MEM_A_DQ_BYTE6	MEM_50S	MEM_DATA	MEM_A_DQ<55..48>	14 28
MEM_A_DQ_BYTE7	MEM_50S	MEM_DATA	MEM_A_DQ<63..56>	14 28
MEM_A_DQ_BYTE0	MEM_50S	MEM_DATA	MEM_A_DM<0>	14 27
MEM_A_DQ_BYTE1	MEM_50S	MEM_DATA	MEM_A_DM<1>	14 27
MEM_A_DQ_BYTE2	MEM_50S	MEM_DATA	MEM_A_DM<2>	14 27
MEM_A_DQ_BYTE3	MEM_50S	MEM_DATA	MEM_A_DM<3>	14 27
MEM_A_DQ_BYTE4	MEM_50S	MEM_DATA	MEM_A_DM<4>	14 28
MEM_A_DQ_BYTE5	MEM_50S	MEM_DATA	MEM_A_DM<5>	14 28
MEM_A_DQ_BYTE6	MEM_50S	MEM_DATA	MEM_A_DM<6>	14 28
MEM_A_DQ_BYTE7	MEM_50S	MEM_DATA	MEM_A_DM<7>	14 28
MEM_A_DQS0	MEM_90D	MEM_DQS	MEM_A_DQS_P<0>	14 27
MEM_A_DQS0	MEM_90D	MEM_DQS	MEM_A_DQS_N<0>	14 27
MEM_A_DQS1	MEM_90D	MEM_DQS	MEM_A_DQS_P<1>	14 27
MEM_A_DQS1	MEM_90D	MEM_DQS	MEM_A_DQS_N<1>	14 27
MEM_A_DQS2	MEM_90D	MEM_DQS	MEM_A_DQS_P<2>	14 27
MEM_A_DQS2	MEM_90D	MEM_DQS	MEM_A_DQS_N<2>	14 27
MEM_A_DQS3	MEM_90D	MEM_DQS	MEM_A_DQS_P<3>	14 27
MEM_A_DQS3	MEM_90D	MEM_DQS	MEM_A_DQS_N<3>	14 27
MEM_A_DQS4	MEM_90D	MEM_DQS	MEM_A_DQS_P<4>	14 28
MEM_A_DQS4	MEM_90D	MEM_DQS	MEM_A_DQS_N<4>	14 28
MEM_A_DQS5	MEM_90D	MEM_DQS	MEM_A_DQS_P<5>	14 28
MEM_A_DQS5	MEM_90D	MEM_DQS	MEM_A_DQS_N<5>	14 28
MEM_A_DQS6	MEM_90D	MEM_DQS	MEM_A_DQS_P<6>	14 28
MEM_A_DQS6	MEM_90D	MEM_DQS	MEM_A_DQS_N<6>	14 28
MEM_A_DQS7	MEM_90D	MEM_DQS	MEM_A_DQS_P<7>	14 28
MEM_A_DQS7	MEM_90D	MEM_DQS	MEM_A_DQS_N<7>	14 28
MEM_B_CLK	MEM_90D	MEM_CLK	MEM_B_CLK_P<0>	14 29 30 33
MEM_B_CLK	MEM_90D	MEM_CLK	MEM_B_CLK_N<0>	14 29 30 33
MEM_B_CNTL	MEM_50S	MEM_CTRL	MEM_B_CKE<1..0>	14 29 30 33
MEM_B_CNTL	MEM_50S	MEM_CTRL	MEM_B_CS_L<1..0>	14 29 30 33
MEM_B_CNTL	MEM_50S	MEM_CTRL	MEM_B_ODT<1..0>	14 29 30 33
MEM_B_CMD	MEM_50S	MEM_CMD	MEM_B_A<14..0>	14 29 30 33
MEM_B_CMD	MEM_50S	MEM_CMD	MEM_B_BA<2..0>	14 29 30 33
MEM_B_CMD	MEM_50S	MEM_CMD	MEM_B_RAS_L	14 29 30 33
MEM_B_CMD	MEM_50S	MEM_CMD	MEM_B_CAS_L	14 29 30 33
MEM_B_CMD	MEM_50S	MEM_CMD	MEM_B_WE_L	14 29 30 33
MEM_B_DQ_BYTE0	MEM_50S	MEM_DATA	MEM_B_DQ<7..0>	14 29
MEM_B_DQ_BYTE1	MEM_50S	MEM_DATA	MEM_B_DQ<15..8>	14 29
MEM_B_DQ_BYTE2	MEM_50S	MEM_DATA	MEM_B_DQ<23..16>	14 29
MEM_B_DQ_BYTE3	MEM_50S	MEM_DATA	MEM_B_DQ<31..24>	14 29
MEM_B_DQ_BYTE4	MEM_50S	MEM_DATA	MEM_B_DQ<39..32>	14 30
MEM_B_DQ_BYTE5	MEM_50S	MEM_DATA	MEM_B_DQ<47..40>	14 30
MEM_B_DQ_BYTE6	MEM_50S	MEM_DATA	MEM_B_DQ<55..48>	14 30
MEM_B_DQ_BYTE7	MEM_50S	MEM_DATA	MEM_B_DQ<63..56>	14 30
MEM_B_DQ_BYTE0	MEM_50S	MEM_DATA	MEM_B_DM<0>	14 29
MEM_B_DQ_BYTE1	MEM_50S	MEM_DATA	MEM_B_DM<1>	14 29
MEM_B_DQ_BYTE2	MEM_50S	MEM_DATA	MEM_B_DM<2>	14 29
MEM_B_DQ_BYTE3	MEM_50S	MEM_DATA	MEM_B_DM<3>	14 29
MEM_B_DQ_BYTE4	MEM_50S	MEM_DATA	MEM_B_DM<4>	14 30
MEM_B_DQ_BYTE5	MEM_50S	MEM_DATA	MEM_B_DM<5>	14 30
MEM_B_DQ_BYTE6	MEM_50S	MEM_DATA	MEM_B_DM<6>	14 30
MEM_B_DQ_BYTE7	MEM_50S	MEM_DATA	MEM_B_DM<7>	14 30
MEM_B_DQS0	MEM_90D	MEM_DQS	MEM_B_DQS_P<0>	14 29
MEM_B_DQS0	MEM_90D	MEM_DQS	MEM_B_DQS_N<0>	14 29
MEM_B_DQS1	MEM_90D	MEM_DQS	MEM_B_DQS_P<1>	14 29
MEM_B_DQS1	MEM_90D	MEM_DQS	MEM_B_DQS_N<1>	14 29
MEM_B_DQS2	MEM_90D	MEM_DQS	MEM_B_DQS_P<2>	14 29
MEM_B_DQS2	MEM_90D	MEM_DQS	MEM_B_DQS_N<2>	14 29
MEM_B_DQS3	MEM_90D	MEM_DQS	MEM_B_DQS_P<3>	14 29
MEM_B_DQS3	MEM_90D	MEM_DQS	MEM_B_DQS_N<3>	14 29
MEM_B_DQS4	MEM_90D	MEM_DQS	MEM_B_DQS_P<4>	14 30
MEM_B_DQS4	MEM_90D	MEM_DQS	MEM_B_DQS_N<4>	14 30
MEM_B_DQS5	MEM_90D	MEM_DQS	MEM_B_DQS_P<5>	14 30
MEM_B_DQS5	MEM_90D	MEM_DQS	MEM_B_DQS_N<5>	14 30
MEM_B_DQS6	MEM_90D	MEM_DQS	MEM_B_DQS_P<6>	14 30
MEM_B_DQS6	MEM_90D	MEM_DQS	MEM_B_DQS_N<6>	14 30
MEM_B_DQS7	MEM_90D	MEM_DQS	MEM_B_DQS_P<7>	14 30
MEM_B_DQS7	MEM_90D	MEM_DQS	MEM_B_DQS_N<7>	14 30
MCP_MEM_COMP	MCP_MEM_COMP	MCP_MEM_COMP	MCP_MEM_COMP_VDD VOLTAGE=0V	15
MCP_MEM_COMP	MCP_MEM_COMP	MCP_MEM_COMP	MCP_MEM_COMP_GND VOLTAGE=1.5V	15
		MEM_CLK	MEM_RESET_L	30 26 27 28 29

=PP1V8R1V5_S0_MCP_MEM NET_SPACING_TYPE=PP1V5_MEM 22 15
GND NET_SPACING_TYPE=GND

Memory Constraints

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

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PCI-Express

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
PCIE_90D	*	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF
CLK_PCIE_100D	*	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PCIE	*	=3X_DIELECTRIC	?
CLK_PCIE	*	20 MIL	?
MCP_PEX_COMP	*	8 MIL	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PCIE	TOP,BOTTOM	=4X_DIELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.4

Analog Video Signal Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
CRT_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CRT	*	=4:1_SPACING	?
CRT_2CRT	*	=STANDARD	?
CRT_2CLK	*	50 MIL	?
CRT_2SWITCHER	*	250 MIL	?
CRT_SYNC	*	16 MIL	?
MCP_DAC_COMP	*	=2:1_SPACING	?

CRT signal single-ended impedence varies by location:
- 37.5-ohm from MCP to first termination resistor.
- 50-ohm from first to second termination resistor.
- 75-ohm from output of three-pole filter to connector (if possible).
R/G/B signals should be matched as close as possible and < 10 inches.
SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Sections 2.5.1 & 2.5.2.

Digital Video Signal Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
DP_100D	*	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
LVDS_100D	*	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
MCP_DV_COMP	*	Y	20 MIL	20 MIL	=STANDARD	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
DISPLAYPORT	*	=3x_DIELECTRIC	?
LVDS	*	=3x_DIELECTRIC	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
DISPLAYPORT	TOP,BOTTOM	=4x_DIELECTRIC	?
LVDS	TOP,BOTTOM	=4x_DIELECTRIC	?

LVDS intra-pair matching should be 5 mils. Pairs should be within 100 mils of clock length.
DisplayPort/TMDS intra-pair matching should be 5 ps. Inter-pair matching should be within 150 ps.
DIsplayPort AUX CH intra-pair matching should be 5 ps. No relationship to other signals.
Max length of LVDS/DisplayPort/TMDS traces: 12 inches.
SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Sections 2.5.3 & 2.5.4.

SATA Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
SATA_100D	*	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
SATA_100D_HDD	*	=100_OHM_DIFF_HDD	=100_OHM_DIFF_HDD	=100_OHM_DIFF_HDD	=100_OHM_DIFF_HDD	=100_OHM_DIFF_HDD	=100_OHM_DIFF_HDD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SATA	*	=4x_DIELECTRIC	?
SATA_TERMP	*	8 MIL	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SATA	TOP,BOTTOM	=3x_DIELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.7.1.

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
	PCIE_90D	PCIE	PEG_R2D_P<15..0>	
	PCIE_90D	PCIE	PEG_R2D_N<15..0>	
PEG_R2D	PCIE_90D	PCIE	PEG_R2D_C_P<15..0>	
	PCIE_90D	PCIE	PEG_R2D_C_N<15..0>	
PEG_D2R	PCIE_90D	PCIE	PEG_D2R_P<15..0>	
	PCIE_90D	PCIE	PEG_D2R_N<15..0>	
	PCIE_90D	PCIE	PEG_D2R_C_P<15..0>	
	PCIE_90D	PCIE	PEG_D2R_C_N<15..0>	
	PCIE_90D	PCIE	PCIE_MINI_R2D_P	
	PCIE_90D	PCIE	PCIE_MINI_R2D_N	
PCIE_MINI_R2D	PCIE_90D	PCIE	PCIE_MINI_R2D_C_P	16 34
	PCIE_90D	PCIE	PCIE_MINI_R2D_C_N	16 34
PCIE_MINI_D2R	PCIE_90D	PCIE	PCIE_MINI_D2R_P	16 34
	PCIE_90D	PCIE	PCIE_MINI_D2R_N	16 34
	PCIE_90D	PCIE	PCIE_FW_R2D_P	
	PCIE_90D	PCIE	PCIE_FW_R2D_N	
PCIE_FW_R2D	PCIE_90D	PCIE	PCIE_FW_R2D_C_P	
	PCIE_90D	PCIE	PCIE_FW_R2D_C_N	
PCIE_FW_D2R	PCIE_90D	PCIE	PCIE_FW_D2R_P	
	PCIE_90D	PCIE	PCIE_FW_D2R_N	
	PCIE_90D	PCIE	PCIE_FW_D2R_C_P	
	PCIE_90D	PCIE	PCIE_FW_D2R_C_N	
	PCIE_90D	PCIE	PCIE_EXCARD_R2D_P	
	PCIE_90D	PCIE	PCIE_EXCARD_R2D_N	
PCIE_EXCARD_R2D	PCIE_90D	PCIE	PCIE_EXCARD_R2D_C_P	
	PCIE_90D	PCIE	PCIE_EXCARD_R2D_C_N	
PCIE_EXCARD_D2R	PCIE_90D	PCIE	PCIE_EXCARD_D2R_P	
	PCIE_90D	PCIE	PCIE_EXCARD_D2R_N	
	PCIE_90D	PCIE	PCIE_FC_R2D_P	
	PCIE_90D	PCIE	PCIE_FC_R2D_N	
PCIE_FC_R2D	PCIE_90D	PCIE	PCIE_FC_R2D_C_P	
	PCIE_90D	PCIE	PCIE_FC_R2D_C_N	
PCIE_FC_D2R	PCIE_90D	PCIE	PCIE_FC_D2R_P	
	PCIE_90D	PCIE	PCIE_FC_D2R_N	
MCP_PE0_REFCLK	CLK_PCIE_100D	CLK_PCIE	PEG_CLK100M_P	8 16
	CLK_PCIE_100D	CLK_PCIE	PEG_CLK100M_N	8 16
MCP_PE1_REFCLK	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_MINI_P	16 34
	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_MINI_N	16 34
MCP_PE4_REFCLK	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_FC_P	
	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_FC_N	
MCP_PE2_REFCLK	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_FW_P	
	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_FW_N	
MCP_PE3_REFCLK	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_EXCARD_P	
	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_EXCARD_N	
MCP_PEX_CLK_COMP		MCP_PEX_COMP	MCP_PEX_CLK_COMP	16
TMDS_IG_TXC	DP_100D	DISPLAYPORT	TMDS_IG_TXC_P	
TMDS_IG_TXC	DP_100D	DISPLAYPORT	TMDS_IG_TXC_N	
TMDS_IG_TXD	DP_100D	DISPLAYPORT	TMDS_IG_TXD_P<2..0>	
TMDS_IG_TXD	DP_100D	DISPLAYPORT	TMDS_IG_TXD_N<2..0>	
DP_ML	DP_100D	DISPLAYPORT	DP_ML_C_P<3..0>	6 61
DP_ML	DP_100D	DISPLAYPORT	DP_ML_C_N<3..0>	6 61
DP_ML	DP_100D	DISPLAYPORT	DP_ML_F_P<3..0>	35 61
DP_ML	DP_100D	DISPLAYPORT	DP_ML_F_N<3..0>	35 61
DP_ML	DP_100D	DISPLAYPORT	DP_ML_P<3..0>	60 61
DP_ML	DP_100D	DISPLAYPORT	DP_ML_N<3..0>	60 61
DP_AUX_CH	DP_100D	DISPLAYPORT	DP_IG_AUX_CH_P	17 60
DP_AUX_CH	DP_100D	DISPLAYPORT	DP_IG_AUX_CH_N	17 60
DP_AUX_CH	DP_100D	DISPLAYPORT	DP_AUX_CH_C_P	6 35 60 61
DP_AUX_CH	DP_100D	DISPLAYPORT	DP_AUX_CH_C_N	6 35 60 61
DP_AUX_CH	DP_100D	DISPLAYPORT	DP_AUX_CH_SW_P	60
DP_AUX_CH	DP_100D	DISPLAYPORT	DP_AUX_CH_SW_N	60
MCP_HDMI_RSET	MCP_DV_COMP		MCP_HDMI_RSET	17 23
MCP_HDMI_VPROBE	MCP_DV_COMP		MCP_HDMI_VPROBE	17 23
LVDS_IG_A_CLK	LVDS_100D	LVDS	LVDS_IG_A_CLK_F_P	6 59
LVDS_IG_A_CLK	LVDS_100D	LVDS	LVDS_IG_A_CLK_F_N	6 59
LVDS_IG_A_CLK	LVDS_100D	LVDS	LVDS_IG_A_CLK_P	17 59
LVDS_IG_A_CLK	LVDS_100D	LVDS	LVDS_IG_A_CLK_N	17 59
LVDS_IG_A_DATA	LVDS_100D	LVDS	LVDS_IG_A_DATA_F_P<2..0>	59
LVDS_IG_A_DATA	LVDS_100D	LVDS	LVDS_IG_A_DATA_F_N<2..0>	59
LVDS_IG_A_DATA	LVDS_100D	LVDS	LVDS_IG_A_DATA_P<2..0>	6 17 59
LVDS_IG_A_DATA	LVDS_100D	LVDS	LVDS_IG_A_DATA_N<2..0>	6 17 59
LVDS_IG_A_DATA3	LVDS_100D	LVDS	LVDS_IG_A_DATA_P<3>	8 17
LVDS_IG_A_DATA3	LVDS_100D	LVDS	LVDS_IG_A_DATA_N<3>	8 17
LVDS_IG_B_CLK	LVDS_100D	LVDS	LVDS_IG_B_CLK_P	8 17
LVDS_IG_B_CLK	LVDS_100D	LVDS	LVDS_IG_B_CLK_N	8 17
LVDS_IG_B_DATA	LVDS_100D	LVDS	LVDS_IG_B_DATA_P<2..0>	8 17
LVDS_IG_B_DATA	LVDS_100D	LVDS	LVDS_IG_B_DATA_N<2..0>	8 17
LVDS_IG_B_DATA3	LVDS_100D	LVDS	LVDS_IG_B_DATA_P<3>	8 17
LVDS_IG_B_DATA3	LVDS_100D	LVDS	LVDS_IG_B_DATA_N<3>	8 17
MCP_IFPAB_RSET	MCP_DV_COMP		MCP_IFPAB_RSET	17 23
MCP_IFPAB_VPROBE			MCP_IFPAB_VPROBE	17 23
SATA_HDD_R2D	SATA_100D_HDD	SATA	SATA_HDD_R2D_C_P	19 36
	SATA_100D_HDD	SATA	SATA_HDD_R2D_C_N	19 36
	SATA_100D_HDD	SATA	SATA_HDD_R2D_P	6 36
	SATA_100D_HDD	SATA	SATA_HDD_R2D_N	6 36
	SATA_100D_HDD	SATA	SATA_HDD_R2D_UF_P	36
	SATA_100D_HDD	SATA	SATA_HDD_R2D_UF_N	36
SATA_HDD_D2R	SATA_100D_HDD	SATA	SATA_HDD_D2R_P	19 36
	SATA_100D_HDD	SATA	SATA_HDD_D2R_N	19 36
	SATA_100D_HDD	SATA	SATA_HDD_D2R_C_P	6 36
	SATA_100D_HDD	SATA	SATA_HDD_D2R_C_N	6 36
	SATA_100D_HDD	SATA	SATA_HDD_D2R_UF_P	36
	SATA_100D_HDD	SATA	SATA_HDD_D2R_UF_N	36
MCP_SATA_TERMP		SATA_TERMP	MCP_SATA_TERMP	19

MCP Constraints 1

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

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PCI Bus Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
PCI_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
CLK_PCI_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PCI	*	=STANDARD	?
CLK_PCI	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.8.

LPC Bus Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
LPC_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
CLK_LPC_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
LPC	*	6 MIL	?
CLK_LPC	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.9.1.

USB 2.0 Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
MCP_USB_RBIAS	*	=STANDARD	8 MIL	8 MIL	=STANDARD	=STANDARD	=STANDARD
USB_90D	*	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
USB	*	=2x_DIELECTRIC	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
USB	TOP,BOTTOM	=4x_DIELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.10.1.

SMBus Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
SMB_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SMB	*	=2x_DIELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.11.1.

HD Audio Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
HDA_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
HDA	*	=2x_DIELECTRIC	?
MCP_HDA_COMP	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.12.1.

SIO Signal Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
CLK_SLOW_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CLK_SLOW	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.13.

SPI Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
SPI_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SPI	*	8 MIL	?

SOURCE: MCP79 Interface DG (DG-03328-001_v0D), Section 2.14.

NET_TYPE			
ELECTRICAL_CONSTRAINT_SET	PHYSICAL	SPACING	
MCP_DEBUG	PCI_55S	PCI	MCP_DEBUG<7..0> 6 12 18
PCI_AD	PCI_55S	PCI	PCI_AD<23..8>
PCI_AD24	PCI_55S	PCI	PCI_AD<24>
PCI_AD	PCI_55S	PCI	PCI_AD<31..25>
PCI_AD	PCI_55S	PCI	PCI_PAR
PCI_C_BE_L	PCI_55S	PCI	PCI_C_BE_L<3..0>
PCI_CNTL	PCI_55S	PCI	PCI_IRDY_L
PCI_CNTL	PCI_55S	PCI	PCI_DEVSEL_L
PCI_CNTL	PCI_55S	PCI	PCI_PERR_L
PCI_CNTL	PCI_55S	PCI	PCI_SERR_L
PCI_CNTL	PCI_55S	PCI	PCI_STOP_L
PCI_CNTL	PCI_55S	PCI	PCI_TRDY_L
PCI_CNTL	PCI_55S	PCI	PCI_FRAME_L
PCI_REQ0_L	PCI_55S	PCI	PCI_REQ0_L 18
PCI_GNT0_L	PCI_55S	PCI	PCI_GNT0_L
PCI_REQ1_L	PCI_55S	PCI	PCI_REQ1_L 18
PCI_GNT1_L	PCI_55S	PCI	PCI_GNT1_L
PCI_INTW_L	PCI_55S	PCI	PCI_INTW_L
PCI_INTX_L	PCI_55S	PCI	PCI_INTX_L
PCI_INTY_L	PCI_55S	PCI	PCI_INTY_L
PCI_INTZ_L	PCI_55S	PCI	PCI_INTZ_L
MCP_PCI_CLK2	CLK_PCI_55S	CLK_PCI	PCI_CLK33M_MCP_R 18
	CLK_PCI_55S	CLK_PCI	PCI_CLK33M_MCP 18
LPC_AD	LPC_55S	LPC	LPC_AD<3..0> 18 39 41
LPC_FRAME_L	LPC_55S	LPC	LPC_FRAME_L 18 39 41
LPC_RESET_L	LPC_55S	LPC	LPC_RESET_L 18 24
MCP_LPC_CLK0	CLK_LPC_55S	CLK_LPC	LPC_CLK33M_SMC_R 18 24
	CLK_LPC_55S	CLK_LPC	LPC_CLK33M_SMC 24 39
	CLK_LPC_55S	CLK_LPC	LPC_CLK33M_LPCPLUS 24 41
USB_EXTA	USB_90D	USB	USB_EXTA_P 8 19
	USB_90D	USB	USB_EXTA_N 8 19
	USB_90D	USB	USB_EXTA_MUXED_P 37
	USB_90D	USB	USB_EXTA_MUXED_N 37
	USB_90D	USB	CONN_USB_EXTA_P
	USB_90D	USB	CONN_USB_EXTA_N
USB_MINI	USB_90D	USB	USB_MINI_P 8 19
	USB_90D	USB	USB_MINI_N 8 19
USB_EXTD	USB_90D	USB	USB_EXTD_P 8 19
	USB_90D	USB	USB_EXTD_N 8 19
USB_CAMERA	USB_90D	USB	USB_CAMERA_P 8 19
	USB_90D	USB	USB_CAMERA_N 8 19
	USB_90D	USB	USB_CAMERA_CONN_P
	USB_90D	USB	USB_CAMERA_CONN_N
USB_BT	USB_90D	USB	USB_BT_P 8 19
	USB_90D	USB	USB_BT_N 8 19
	USB_90D	USB	CONN_USB2_BT_P
	USB_90D	USB	CONN_USB2_BT_N
USB_TPAD	USB_90D	USB	USB_TPAD_P 8 19
	USB_90D	USB	USB_TPAD_N 8 19
	USB_90D	USB	CONN_TPAD_USB_P
	USB_90D	USB	CONN_TPAD_USB_N
USB_IR	USB_90D	USB	USB_IR_P 8 19
	USB_90D	USB	USB_IR_N 8 19
USB_EXTB	USB_90D	USB	USB_EXTB_P 8 19
	USB_90D	USB	USB_EXTB_N 8 19
	USB_90D	USB	CONN_USB_EXTB_P
	USB_90D	USB	CONN_USB_EXTB_N
USB_EXCARD	USB_90D	USB	USB_EXCARD_P 8
	USB_90D	USB	USB_EXCARD_N 8
USB_EXTC	USB_90D	USB	USB_EXTC_P 8
	USB_90D	USB	USB_EXTC_N 8
MCP_USB_RBIAS	MCP_USB_RBIAS		MCP_USB_RBIAS_GND 19
SMBUS_MCP_0_CLK	SMB_55S	SMB	SMBUS_MCP_0_CLK 6 12 20 42
SMBUS_MCP_0_DATA	SMB_55S	SMB	SMBUS_MCP_0_DATA 6 12 20 42
SMBUS_MCP_1_CLK	SMB_55S	SMB	SMBUS_MCP_1_CLK 20 42
SMBUS_MCP_1_DATA	SMB_55S	SMB	SMBUS_MCP_1_DATA 20 42
HDA_BIT_CLK	HDA_55S	HDA	HDA_BIT_CLK 6 20 35
	HDA_55S	HDA	HDA_BIT_CLK_R 20
HDA_SYNC	HDA_55S	HDA	HDA_SYNC 6 20 35
	HDA_55S	HDA	HDA_SYNC_R 20
HDA_RST_L	HDA_55S	HDA	HDA_RST_R_L 20
	HDA_55S	HDA	HDA_RST_L 20 35
HDA_SDIN0	HDA_55S	HDA	HDA_SDIN0 6 20 35
	HDA_55S	HDA	HDA_SDIN_CODEC
HDA_SDOUT	HDA_55S	HDA	HDA_SDOUT 6 20 35
	HDA_55S	HDA	HDA_SDOUT_R 20
MCP_HDA_PULLDN_COMP		MCP_HDA_COMP	MCP_HDA_PULLDN_COMP 20
MCP_SUS_CLK	CLK_SLOW_55S	CLK_SLOW	PM_CLK32K_SUSCLK_R 20 24
	CLK_SLOW_55S	CLK_SLOW	PM_CLK32K_SUSCLK 24 39
SPI_CLK	SPI_55S	SPI	SPI_CLK_R 20 41
	SPI_55S	SPI	SPI_CLK 48
SPI_MOSI	SPI_55S	SPI	SPI_MOSI_R 20 41
	SPI_55S	SPI	SPI_MOSI 48
SPI_MISO	SPI_55S	SPI	SPI_MISO 20 41
	SPI_55S	SPI	SPI_MISO_R 48
SPI_CS0	SPI_55S	SPI	SPI_CS0_R_L 20 41
	SPI_55S	SPI	SPI_CS0_L
SPI_CLK	SPI_55S	SPI	SPI_CLK_MUX 41 48
SPI_MOSI	SPI_55S	SPI	SPI_MOSI_MUX 41 48
SPI_MISO	SPI_55S	SPI	SPI_MISO_MUX 41 48
SPI_CS0	SPI_55S	SPI	SPI_MLB_CS_L 41 48

MCP Constraints 2

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE: NONE SHT 68 OF 71

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
1TO1_DIFFPAIR	*	=STANDARD	=STANDARD	=STANDARD	=STANDARD	0.1 MM	0.1 MM

SMC SMBus Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
SMBUS_SMC_A_S3_SCL	SMB_5SS	SMB	SMBUS_SMC_A_S3_SCL	42
SMBUS_SMC_A_S3_SDA	SMB_5SS	SMB	SMBUS_SMC_A_S3_SDA	42
SMBUS_SMC_B_S0_SCL	SMB_5SS	SMB	SMBUS_SMC_B_S0_SCL	42
SMBUS_SMC_B_S0_SDA	SMB_5SS	SMB	SMBUS_SMC_B_S0_SDA	42
SMBUS_SMC_0_S0_SCL	SMB_5SS	SMB	SMBUS_SMC_0_S0_SCL	42
SMBUS_SMC_0_S0_SDA	SMB_5SS	SMB	SMBUS_SMC_0_S0_SDA	42
SMBUS_SMC_BSA_SCL	SMB_5SS	SMB	SMBUS_SMC_BSA_SCL	6 42
SMBUS_SMC_BSA_SDA	SMB_5SS	SMB	SMBUS_SMC_BSA_SDA	6 42
SMBUS_SMC_MGMT_SCL	SMB_5SS	SMB	SMBUS_SMC_MGMT_SCL	42
SMBUS_SMC_MGMT_SDA	SMB_5SS	SMB	SMBUS_SMC_MGMT_SDA	42

SMBus Charger Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
CHGR_CSI	1TO1_DIFFPAIR		CHGR_CSI_P
	1TO1_DIFFPAIR		CHGR_CSI_N
CHGR_CSO	1TO1_DIFFPAIR		CHGR_CSO_P
	1TO1_DIFFPAIR		CHGR_CSO_N

SMC Constraints

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	69	71

#1	PP0V75_S0	NET_SPACING_TYPE=PWR	6 7
#2	PP0V75_S3	NET_SPACING_TYPE=PWR	7
#3	PP0V75_S3_MEM_VREFCA	NET_SPACING_TYPE=PWR	25 27 28 29 30
#4	PP0V75_S3_MEM_VREFDQ	NET_SPACING_TYPE=PWR	25 27 28 29 30
#5	PP18V5_DCIN	NET_SPACING_TYPE=PWR	6 49
#6	PP18V5_DCIN_ONEWIRE	NET_SPACING_TYPE=PWR	49
#7	PP18V5_G3H	NET_SPACING_TYPE=PWR	6 7
#8	PP18V5_S5_CHGR_SW_R	NET_SPACING_TYPE=PWR	58
#10	PP1V05_ENET_MCP_PLL_MAC	NET_SPACING_TYPE=PWR	17 22
#9	PP1V05_RMGT	NET_SPACING_TYPE=PWR	7
#12	PP1V05_S0	NET_SPACING_TYPE=PWR	6 7
#11	PP1V05_S0_MCP_PEX_AVDD	NET_SPACING_TYPE=PWR	7 22
#13	PP1V05_S0_MCP_PEX_AVDD_R	NET_SPACING_TYPE=PWR	
#14	PP1V05_S0_MCP_PEX_DVDD_R	NET_SPACING_TYPE=PWR	
#16	PP1V05_S0_MCP_PLL_CORE	NET_SPACING_TYPE=PWR	15 22
#15	PP1V05_S0_MCP_PLL_FSB	NET_SPACING_TYPE=PWR	13 22
#18	PP1V05_S0_MCP_PLL_NV	NET_SPACING_TYPE=PWR	20 22
#17	PP1V05_S0_MCP_PLL_PEX	NET_SPACING_TYPE=PWR	16 22
#19	PP1V05_S0_MCP_PLL_SATA	NET_SPACING_TYPE=PWR	19 22
#21	PP1V05_S0_MCP_SATA_AVDD	NET_SPACING_TYPE=PWR	19 22
#20	PP1V05_S5	NET_SPACING_TYPE=PWR	6 7
#23	PP1V2_S0_FC_VDD	NET_SPACING_TYPE=PWR	
#160	PP1V5_S0	NET_SPACING_TYPE=PP1V5_MEM	6 7
#161	PP1V5_S0_FC_AVDDL_F	NET_SPACING_TYPE=PWR	
#22	PP1V5_S0_FC_AVDDT_F	NET_SPACING_TYPE=PWR	
#24	PP1V5_S3	NET_SPACING_TYPE=PP1V5_MEM	6 7
#25	PP1V8_S0	NET_SPACING_TYPE=PWR	6 7
#26	PP2V_S0_MCPREG_REF	NET_SPACING_TYPE=PWR	
#28	PP3V3_LCDVDD_SW	NET_SPACING_TYPE=PWR	59
#27	PP3V3_LCDVDD_SW_F	NET_SPACING_TYPE=PWR	6 59
#30	PP3V3_RMGT	NET_SPACING_TYPE=PWR	7
#29	PP3V3_S0	NET_SPACING_TYPE=PWR	6 7
#31	PP3V3_S0_CPUTHMSNS_R	NET_SPACING_TYPE=PWR	45
#33	PP3V3_S0_DPFUSE	NET_SPACING_TYPE=PWR	61
#32	PP3V3_S0_DPPWR	NET_SPACING_TYPE=PWR	6 35 61
#35	PP3V3_S0_FC_AVDD_F	NET_SPACING_TYPE=PWR	
#34	PP3V3_S0_HDD_F	NET_SPACING_TYPE=PWR	6 36
#36	PP3V3_S0_IMVP6_3V3	NET_SPACING_TYPE=PWR	50
#38	PP3V3_S0_LCD_F	NET_SPACING_TYPE=PWR	6 59
#37	PP3V3_S0_MCPREG_VREF3	NET_SPACING_TYPE=PWR	
#39	PP3V3_S0_MCP_DAC	NET_SPACING_TYPE=GND	21 23
#41	PP3V3_S0_MCP_PLL_USB	NET_SPACING_TYPE=PWR	19 22
#40	PP3V3_S0_MCP_VPLL	NET_SPACING_TYPE=PWR	17 23
#43	PP3V3_S3	NET_SPACING_TYPE=PWR	6 7
#42	PP3V3_S3_AP_AUX	NET_SPACING_TYPE=PWR	6 34
#44	PP3V3_S3_AP_AUX_F	NET_SPACING_TYPE=PWR	34
#46	PP3V3_S0_MIC_F	NET_SPACING_TYPE=PWR	6 59
#45	PP3V3_S5	NET_SPACING_TYPE=PWR	6 7
#48	PP3V3_S5_AVREF_SMC	NET_SPACING_TYPE=PWR	39 40
#47	PP3V3_S5_MCP	NET_SPACING_TYPE=PWR	
#49	PP3V3_S5_SMC_AVCC	NET_SPACING_TYPE=PWR	39
#50	PP3V42G3H_SW	NET_SPACING_TYPE=PWR	49
#52	PP3V42_G3H	NET_SPACING_TYPE=PWR	6 7
#51	PP3V42_G3H_IPD_F	NET_SPACING_TYPE=PWR	6 38
#54	PP3V42_G3H_SMCUSBMUX_R	NET_SPACING_TYPE=PWR	37
#53	PP5V_S0	NET_SPACING_TYPE=PWR	6 7
#55	PP5V_S0_IMVP6_VDD	NET_SPACING_TYPE=PWR	50
#57	PP5V_S0_KBDLED_F	NET_SPACING_TYPE=PWR	6 38
#56	PP5V_S0_MCPREG_VCC	NET_SPACING_TYPE=PWR	
#59	PP5V_S3	NET_SPACING_TYPE=PWR	6 7
#58	PP5V_S3_CAMERA_F	NET_SPACING_TYPE=PWR	6 59
#72	PP5V_S3_MCPREG_LDO	NET_SPACING_TYPE=PWR	
#71	PP5V_S3_TOPCASE_F	NET_SPACING_TYPE=PWR	6 38
#73	PP5V_S3_USB2_EXTA	NET_SPACING_TYPE=PWR	37
#74	PP5V_S3_USB2_EXTA_F	NET_SPACING_TYPE=PWR	6 35 37
#76	PPBUS_G3H	NET_SPACING_TYPE=PWR	6 7
#75	PPBUS_G3HRS5_VSENSE	NET_SPACING_TYPE=PWR	43
#78	PPBUS_R_G3H	NET_SPACING_TYPE=PWR	6 7
#77	PPBUS_S0_LCDBKLT_EN_DIV	NET_SPACING_TYPE=PWR	63
#79	PPBUS_S0_LCDBKLT_EN_L	NET_SPACING_TYPE=PWR	63
#81	PPBUS_S0_LCDBKLT_FUSED	NET_SPACING_TYPE=PWR	63
#80	PPBUS_S0_LCDBKLT_PWR	NET_SPACING_TYPE=PWR	62 63
#83	PPDCIN_G3H	NET_SPACING_TYPE=PWR	6 7
#82	PPDCIN_G3H_R	NET_SPACING_TYPE=PWR	49
#84	PPMCPCORE_S0	NET_SPACING_TYPE=PWR	6 7
#86	PPVBATT_G3H_R	NET_SPACING_TYPE=PWR	49 70
#85	PPVBAT_G3H_CHGR_OUT	NET_SPACING_TYPE=PWR	58 70
#102	PPVBATT_G3H_R	NET_SPACING_TYPE=PWR	49 70
#103	PPVBAT_G3H_CHGR_OUT	NET_SPACING_TYPE=PWR	58 70
#104	PPVBAT_G3H_CHGR_REG	NET_SPACING_TYPE=PWR	58
#105	PPVBAT_G3H_CHRGR_REG_0	NET_SPACING_TYPE=PWR	58
#106	PPVBAT_G3H_CHRGR_REG_R	NET_SPACING_TYPE=PWR	58
#108	PPVCORE_S0_CPU	NET_SPACING_TYPE=PWR	6 7
#109	PPVDCIN_G3H_PRE	NET_SPACING_TYPE=PWR	43 58
#107	PPVDCIN_G3H_PRE2	NET_SPACING_TYPE=PWR	58
#110	PPVDCIN_G3H_PRE_0	NET_SPACING_TYPE=PWR	58
#112	PPVDCIN_G3H_PRE_R	NET_SPACING_TYPE=PWR	58
#113	PPVIN_S5_IMVP6_VIN	NET_SPACING_TYPE=PWR	50
#111	PPVOUT_S0_LCDBKLT	NET_SPACING_TYPE=PWR	6 59 62
#114	PPVOUT_S0_LCDBKLT_SW	NET_SPACING_TYPE=PWR	62

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PWR	*	=STANDARD	?
BUS2PWR_GND	*	0.228 MM	?

M96 Power and Ground Nets

SYNC_MASTER=(MASTER) SYNC_DATE=(MASTER)

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE: NONE

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M96 BOARD-SPECIFIC SPACING & PHYSICAL CONSTRAINTS

BOARD LAYERS	BOARD AREAS	BOARD UNITS (MIL or MM)	ALLEGRO VERSION
TOP,ISL2,ISL3,ISL4,ISL5,ISL6,ISL7,ISL8,ISL9,ISL10,ISL11,ISL12,ISL13,BOTTOM	NO_TYPE,BGA_P1MM	MM	15.2

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
DEFAULT	*	Y	=50_OHM_SE	0.200 MM	30 MM	0 MM	0 MM
STANDARD	*	Y	=DEFAULT	=DEFAULT	12.7 MM	=DEFAULT	=DEFAULT

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
55_OHM_SE	TOP,BOTTOM	Y	0.210 MM	0.200 MM			
55_OHM_SE	ISL2,ISL13	Y	0.075 MM	0.075 MM	=STANDARD	=STANDARD	=STANDARD
55_OHM_SE	*	Y	0.066 MM	0.066 MM	=STANDARD	=STANDARD	=STANDARD

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
50_OHM_SE	TOP,BOTTOM	Y	0.250 MM	0.200 MM			
50_OHM_SE	ISL2,ISL13	Y	0.085 MM	0.085 MM	=STANDARD	=STANDARD	=STANDARD
50_OHM_SE	*	Y	0.066 MM	0.066 MM	=STANDARD	=STANDARD	=STANDARD

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
40_OHM_SE	TOP,BOTTOM	Y	0.350 MM	0.200 MM			
40_OHM_SE	ISL2,ISL13	Y	0.122 MM	0.122 MM	=STANDARD	=STANDARD	=STANDARD
40_OHM_SE	*	Y	0.110 MM	0.110 MM	=STANDARD	=STANDARD	=STANDARD

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
27P4_OHM_SE	TOP,BOTTOM	Y	0.215 MM	0.200 MM			
27P4_OHM_SE	*	Y	0.215 MM	0.215 MM	=STANDARD	=STANDARD	=STANDARD

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
70_OHM_DIFF	*	N	=STANDARD	=STANDARD	=STANDARD	=STANDARD	=STANDARD
70_OHM_DIFF	ISL2,ISL4,ISL5,ISL10,ISL11,ISL13	Y	0.132 MM	0.132 MM		0.200 MM	0.200 MM
70_OHM_DIFF	TOP,BOTTOM	Y	0.180 MM	0.180 MM		0.150 MM	0.150 MM

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
90_OHM_DIFF	*	N	=STANDARD	=STANDARD	=STANDARD	=STANDARD	=STANDARD
90_OHM_DIFF	ISL2,ISL4,ISL5,ISL10,ISL11,ISL13	Y	0.085 MM	0.085 MM		0.250 MM	0.250 MM
90_OHM_DIFF	TOP,BOTTOM	Y	0.205 MM	0.200 MM		0.160 MM	0.160 MM

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
100_OHM_DIFF	*	N	=STANDARD	=STANDARD	=STANDARD	=STANDARD	=STANDARD
100_OHM_DIFF	ISL2,ISL4,ISL5,ISL10,ISL11,ISL13	Y	0.065 MM	0.065 MM		0.280 MM	0.280 MM
100_OHM_DIFF	TOP,BOTTOM	Y	0.179 MM	0.179 MM		0.200 MM	0.200 MM

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
100_OHM_DIFF_HDD	*	N	=STANDARD	=STANDARD	=STANDARD	=STANDARD	=STANDARD
100_OHM_DIFF_HDD	ISL2,ISL4,ISL5,ISL10,ISL11,ISL13	Y	0.065 MM	0.065 MM		0.280 MM	0.280 MM
100_OHM_DIFF_HDD	TOP,BOTTOM	Y	0.179 MM	0.179 MM		0.200 MM	0.200 MM

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
40_OHM_SE_MEM	TOP,BOTTOM	Y	0.170 MM	0.110 MM	10 MM		
40_OHM_SE_MEM	ISL2,ISL13	Y	0.122 MM	0.066 MM	170 MM	=STANDARD	=STANDARD
40_OHM_SE_MEM	*	Y	0.110 MM	0.066 MM	170 MM	=STANDARD	=STANDARD

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
1:1_DIFFPAIR	*	Y	=STANDARD	=STANDARD	=STANDARD	0.1 MM	0.1 MM

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
DEFAULT	*	0.1 MM	?
STANDARD	*	=DEFAULT	?
BGA_P1MM	*	=DEFAULT	?
BGA_P2MM	*	=DEFAULT	?
BGA_P3MM	*	=DEFAULT	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
1.5:1_SPACING	*	0.15 MM	?
2:1_SPACING	*	0.2 MM	?
2.5:1_SPACING	*	0.25 MM	?
3:1_SPACING	*	0.3 MM	?
4:1_SPACING	*	0.4 MM	?
4:1_SPACING	*	0.4 MM	?
2.28:1_SPACING	*	0.228 MM	?
1.1:1_SPACING	*	0.110 MM	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
2X_DIELECTRIC	TOP,BOTTOM	0.230 MM	?
3X_DIELECTRIC	TOP,BOTTOM	0.345 MM	?
4X_DIELECTRIC	TOP,BOTTOM	0.460 MM	?
5X_DIELECTRIC	TOP,BOTTOM	0.575 MM	?
2X_DIELECTRIC	ISL2,ISL13	0.110 MM	?
3X_DIELECTRIC	ISL2,ISL13	0.165 MM	?
4X_DIELECTRIC	ISL2,ISL13	0.220 MM	?
5X_DIELECTRIC	ISL2,ISL13	0.275 MM	?
2X_DIELECTRIC	*	0.120 MM	?
3X_DIELECTRIC	*	0.180 MM	?
4X_DIELECTRIC	*	0.240 MM	?
5X_DIELECTRIC	*	0.300 MM	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
GND	*	=STANDARD	?
PP1V5_MEM	*	=STANDARD	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
GND_P2MM	*	0.2 MM	1000
PWR_P2MM	*	0.2 MM	1000

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
MCP_STATIC		=STANDARD	?

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
*	*	BGA_P1MM	BGA_P1MM
MEM_CLK	*	BGA_P1MM	BGA_P2MM
CLK_FSB	*	BGA_P1MM	BGA_P2MM
CLK_LPC	*	BGA_P1MM	BGA_P2MM
CLK_PCI	*	BGA_P1MM	BGA_P2MM
CLK_PCIE	*	BGA_P1MM	BGA_P2MM
CLK_SLOW	*	BGA_P1MM	BGA_P2MM
FSB_DSTB	FSB_DSTB	BGA_P1MM	BGA_P3MM

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
MEM_50S	BGA_P1MM	STANDARD

M96 RULE DEFINITIONS

SYNC_MASTER=M97 SYNC_DATE=02/04/2008

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7631	2.3.0

SCALE	SHT	OF
NONE	71	71