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.

K36 MLB SCHEMATIC

REFERENCED FROM M70
8/9/2007

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

K36 EE DRIS:
RX-RAYMOND XU
DK-DINESH KUMAR
RC-RAY CHANG
MK-MARC KLINGELHOFER
LT-LAWRENCE TAN
LD-LINDA DUNN
MM-MARY(YUAN) MA

DVT BUILD

Schematic / PCB #'s

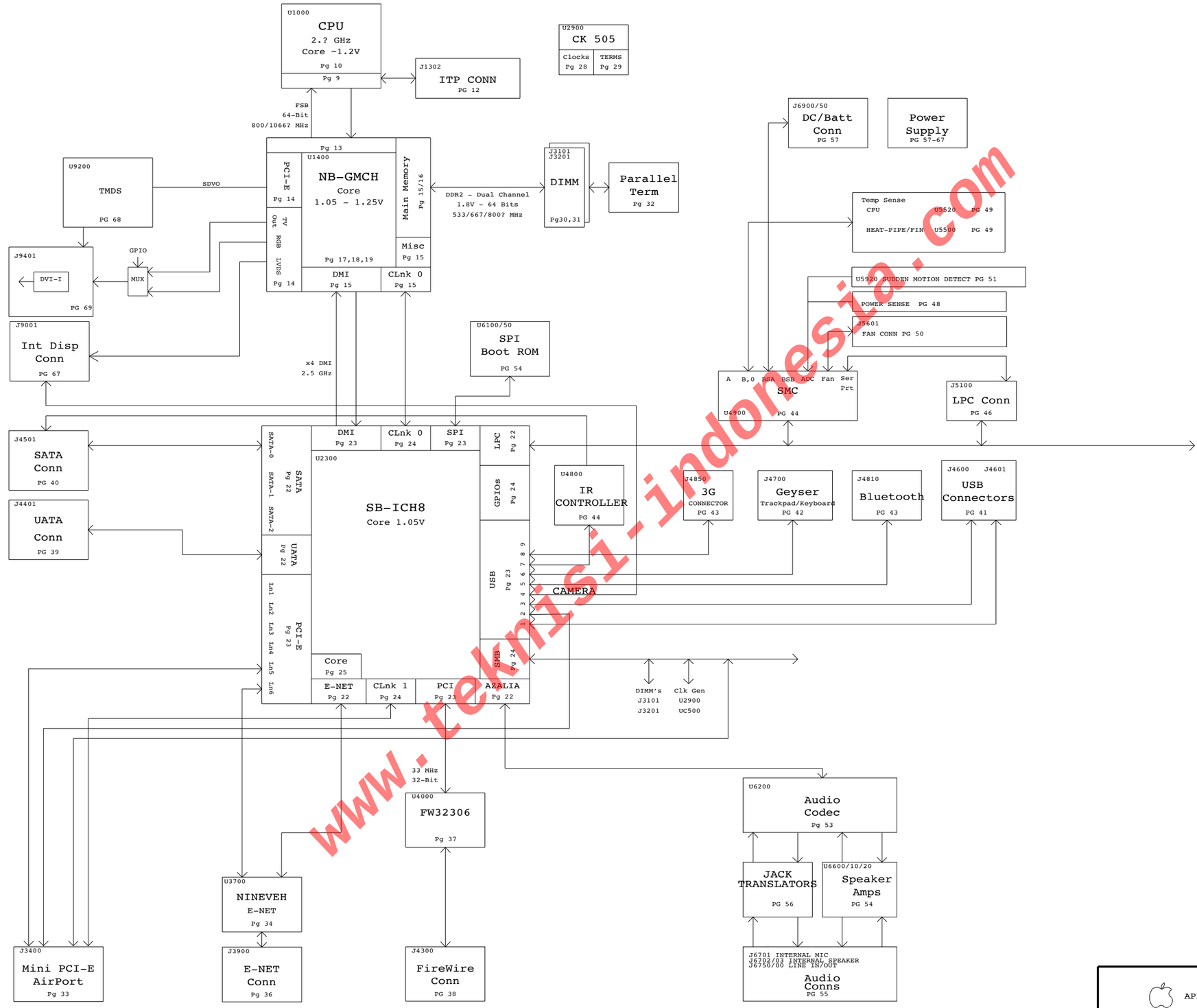
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
051-7455	1	SCHEM,MLB,K36	SCH	CRITICAL	
820-2279	1	PCBF,MLB,K36	PCB	CRITICAL	

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,K36
DRAWING NUMBER: 051-7455
REV: 01
SHT 1 OF 76



System Block Diagram

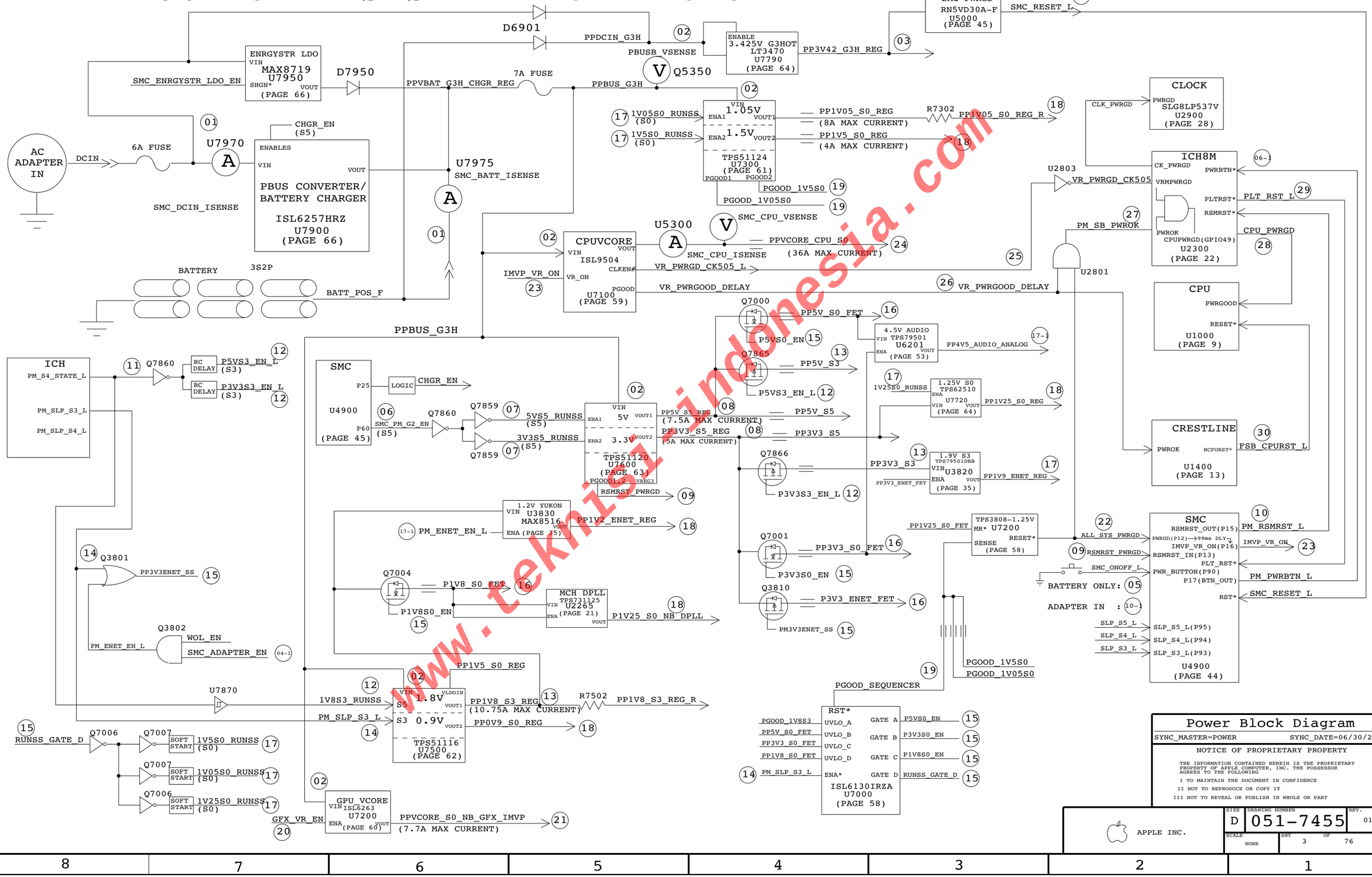
SYNC_MASTER=WFERRY-WF SYNC_DATE=05/11/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 2 OF 76

K36 POWER SYSTEM ARCHITECTURE



Power Block Diagram

SYNC_MASTER=POWER SYNC_DATE=06/30/2005

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 3 OF 76

Page Notes

Power aliases required by this page:
(NONE)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

BOARD STACK-UP AND CONSTRUCTION

Top		SIGNAL
2		GROUND
3		SIGNAL(High Speed)
4		SIGNAL(High Speed)
5		GROUND
6		POWER
7		POWER
8		GROUND
9		SIGNAL(High Speed)
10		SIGNAL(High Speed)
11		GROUND
BOTTOM		SIGNAL

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S3463	1	IC,MDC,SR,E1,2.0G,800FSB,4M,BGA	U1000	CRITICAL	GOOD
337S3500	1	IC,MDC,SR,GO,2.2G,800FSB,4M,BGA	U1000	CRITICAL	BETTER
337S3500	1	IC,MDC,SR,GO,2.2G,800FSB,4M,BGA	U1000	CRITICAL	BEST

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S0448	1	IC,CRESTLINE,GM965,667	U1400	CRITICAL	K36
338S0434	1	IC,ICH8,BGA	U2300	CRITICAL	K36
516-0162	2	IN-LINE SODIMM CONNECTOR	J3101,J3201	CRITICAL	K36

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S2196	1	IC,16MBIT SPIN SPI SERIAL FLASH,SOIC8	U6100	CRITICAL	K36_PGM
341S2060	1	IC,EEPROM,SERIAL IIC,8KBIT,SO8	U3780	CRITICAL	K36_PGM
341S2198	1	IC,SMC,HS8/2116	U4900	CRITICAL	K36_PGM
341S2093	1	IC,CYPRESS,CY7C63833,ENCORE_II,USB_CONTR	U4800	CRITICAL	K36_PGM

LOCKED BOOTROM PN 341S2197

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
826-4393	1	LBL,P/N LABEL,PCB,28MMX6MM	EEE:Z55	CRITICAL	GOOD
826-4393	1	LBL,P/N LABEL,PCB,28MMX6MM	EEE:Z56	CRITICAL	BETTER
826-4393	1	LBL,P/N LABEL,PCB,28MMX6MM	EEE:Z57	CRITICAL	BEST

MLB STACKUP

LAYER	THICKNESS (MM)	TRACE WIDTH (MM)
CONFORMAL_COAT	0.018	
L1 SIGNAL(TOP)	0.047	0.1
L1-L2	0.07	
L2 GROUND	0.014	---
L2-L3	0.076	
L3 SIGNAL	0.014	0.079
L3-L4	0.156	
L4 SIGNAL	0.014	0.079
L4-L5	0.076	
L5 GND	0.014	---
L5-L6	0.07	
L6 POWER	0.031	---
L6-L7	0.076	
L7 POWER	0.031	---
L7-L8	0.07	
L8 GROUND	0.014	---
L8-L9	0.076	
L9 SIGNAL	0.014	0.1
L9-L10	0.156	
L10 SIGNAL	0.014	0.1
L10-L11	0.076	
L11 GROUND	0.014	0.1
L11-L12	0.07	
L12 SIGNAL(BOTTOM)	0.047	0.1
CONFORMAL_COAT	0.018	
TOTAL	1.276	---

BOM OPTION

BOMOPTION	K36 GOOD 630-9104 EVT	K36 BETTER 630-9105 EVT	K36 BEST 630-9106 EVT	M70 GOOD 630-7935 CONCEPT
COMMON	V	V	V	V
ALTERNATE	V	V	V	V
ARB_ONLY				
K36	V	V	V	V
LPCPLUS	V	V	V	V
INVERTER_BUF	BOM OPTION REMOVED	BOM OPTION REMOVED	BOM OPTION REMOVED	V
INVERTER_UNBUF	BOM OPTION REMOVED	BOM OPTION REMOVED	BOM OPTION REMOVED	
ITP	V	V	V	V
NO_REBOOT_MODE				
NBCFG_DMI_REVERSE				
NBCFG_DMI_X2				
NBCFG_DYN_ODT_DISABLE				
NBCFG_PEG_REVERSE				
NBCFG_SDVO_AND_PCIE				
GOOD	V			V
BETTER		V		
BEST			V	
K36_PGM	V	V	V	V
YUKON_EC				
YUKON_ULTRA	V	V	V	V
NORMAL	V	V		V
FANCY			V	
STANDOFF	V	V	V	V
ODD_PWR_CORE	V	V	V	V
ODD_PWR_RESUME				
ISL6126	BOM OPTION REMOVED	BOM OPTION REMOVED	BOM OPTION REMOVED	
ISL6130	BOM OPTION REMOVED	BOM OPTION REMOVED	BOM OPTION REMOVED	V

BOM TABLE FOR HF POSCAPS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
128S0147	4	HF VERSION OF 128S0057	C4610,C4611,C6830,C6831	CRITICAL	K36
128S0164	3	HF VERSION OF 128S0073	C2130,C2716,C7543	CRITICAL	K36
128S0148	1	HF VERSION OF 128S0085	C6605	CRITICAL	K36
128S0169	3	HF VERSION OF 128S0111	C7220,C7352,C7542	CRITICAL	K36
128S0160	2	HF VERSION OF 128S0113	C2173,C2700	CRITICAL	K36
128S0150	6	HF VERSION OF 128S0115	C6204,C6205,C7651,C7652,C7691,C7692	CRITICAL	K36
128S0157	1	HF VERSION OF 128S0122	C2220	CRITICAL	K36
128S0162	1	HF VERSION OF 128S0123	C2140	CRITICAL	K36
128S0135	2	HF VERSION OF 128S0129	C6601,C6603	CRITICAL	K36

CONFIGURATION OPTIONS

SYNC_MASTER=SMC SYNC_DATE=07/18/2005

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE | SHT 4 OF 76

Revision History

M70 PROTO TO EVT CHANGES

- WAKE-ON-WIRELESS SUPPORT - RADAR: 4954357
- ADD ISOLATION BUFFER FOR ODD_RESET_L SIGNAL, ADD 100K PULL-DOWN TO ODD_PWR_EN_L, ADD 'DRAG' CIRCUIT TO PROPERLY DISCHARGE ODD POWER WHEN IT'S TURNED OFF - RADAR: 4923903
- ADD 270K PULL-DOWN RESISTOR ON HTPLG - RADAR: 4888755
- LOWER RDS(ON) MOSFET (FDC606P - APN: 376S0552) FOR ODD AND LCD POWER - RADAR: TBD
- HIGH-PRECISION 0.1% RESISTORS TO INCREASE OUTPUT VOLTAGE REGULATION (5V, 3.3V, PBUS_LDO) ACCURACY - RADAR:4972500
- FIX LINDA CARD POWER ALIAS (NEED TO CONNECT TO PP3V42_G3HOT INSTEAD OF PP3V3_S5) - RADAR: 4927858
- FIX MOJO-CARD SMC TX, RX REVERSAL - RADAR: 4910888
- NO STUFF 3G CONNECTOR CIRCUITRY
- CHANGE BOM STUFFING TO SPEED UP PORT POWER SHUT-OFF RESPONSE TIME DURING ACTIVE LATE-VG EVENT (RADAR: 4985252)
- CHANGE BOM STUFFING TO ENABLE ON-BOARD MICROPHONE CONNECTOR (M42/M42A SOLUTION) INSTEAD OF ROUTING MICROPHONE THROUGH LVDS CABLE
- CHANGE LOAD CAP STUFFING OPTION FOR RTC AND ETHERNET CRYSTALS TO MEET 5XESR (-R) REQUIREMENT
- CHANGE 10UF, 16V CPU VCORE CAPS TO 10UF, 6.3V CAPS - RADAR: 4952553
- MOVE SMC RESET BUTTON PAD TO TOP SIDE OF MLB - RADAR: 4920913
- MODIFY FIREWIRE CONNECTOR SYMBOL TO SUPPORT MINI-DVI CONNECTOR WITH TAB
- TEST POINT MOVEMENTS REQUESTED BY ICT AND MAC-1 GROUPS - RADAR: 4924481

M70 EVT TO DVT CHANGES

3/5/2007

CSA PAGE 8:
- 4954357 ADD =PP3V3_S3_AIRPORT_AUX BACK TO PP3V3_S3 ALIAS.
CSA PAGE 34:
- 4954357 BREAK OUT =PP3V3_S3_AIRPORT_AUX{J3400,PIN 24} FROM PP3V3_S3_AP_AUX_AGAIN.
- 4954357 MOVE C3409 AND C3410 FROM PP3V3_S3_AP_AUX RAIL TO =PP3V3_S3_AIRPORT_AUX RAIL.
CSA PAGE 49:
- 5040728 STUFF C9421 FOR EMI.
CSA PAGE 62,66,67,68:
- SYNC FROM AUDIO TEAM.
CSA PAGE 67:
- 4999233 SWAP PIN 2 AND PIN 3 OF MIC CONNECTOR, BACK TO M42 PIN OUT.
CSA PAGE 78:
- 5029811 CHANGE Q7940 FROM 376S0326 TO 376S0558.

3/8/2007

CSA PAGE 22:
- 4986074 CHANGE L2205 TO R2205(100OHM,5%,1/10W,0603).
CSA PAGE 25:
- 4924443 CHANGE R2514 FROM 100K PULL-DOWN TO 10K PULL-UP TO 3.3V_S5.
CSA PAGE 77:
- 5018617 SYNC 1P25V REGULATOR CIRCUIT FROM M82. CHANGE R AND C TO 0402. CHANGE =PP3V3_S5_P1V25S0 TO =PP3V3_S5_1V25S0, C7723 FROM 2.2NF TO 10000PF, C7724 FROM 22PF TO 100PF, C7728 FROM 2.2NF TO 10000PF, AND REVERT REFERENCE DESIGNATORS. (CHANGE FROM TPS62510 TO LTC3412A)

3/12/2007

CSA PAGE 25:
- 4924443 CHANGE R2514 FROM 100K PULL-UP TO 47K PULL-UP.
CSA PAGE 45:
- UPDATE SYMBOL FOR J4501.
CSA PAGE 62,66,67,68:
- SYNC FROM AUDIO TEAM.
CSA PAGE 94:
- 4986074 CHANGE R9469 FOR CRT_TVO_IREF FROM 1.3K TO 1.21K.

3/14/2007

CSA PAGE 47:
- ADD TEXT NOTE TO UPDATE J4700 FROM 516S0251 TO 516S0588 WHEN SYMBOL IS READY.
CSA PAGE 69:
- ADD TEXT NOTE TO UPDATE J6900 FROM 518S0287 TO 518S0526 WHEN SYMBOL IS READY.
CSA PAGE 90:
- DELETE LVDS_VREFH AND LVDS_VREFL TO GROUND TO FIX LVDS GLITCH.
CSA PAGE 94:
- ADD TEXT NOTE TO CHANGE L9404 FROM 155S0303 TO 155S0348 WHEN SYMBOL IS READY.

M70 DVT TO K36 CHANGES

6/29/2007

CSA PAGE 4:
- CHANGE GOOD CPU FROM 337S3471(1.8G) TO 337S3463(2.0G).
- CHANGE BETTER CPU FROM 337S3456(2.0G) TO 337S3464(2.2G).
- CHANGE BEST CPU FROM 337S3457(2.2G) TO 337S3465(2.4G).
- CHANGE NB FROM 338S0426(500M) TO 343S0448(667M).
- CHANGE SB FROM 338S0427 TO 338S0434.
CSA PAGE 16:
- DISCONNECT GFX_VID<0> TO GND.
- CONNECT GFX_VID<1:3> TO GFX_VID0:3 ON NB.
- ADD R1600 (700HM, 0402) TO CONNECT GFX_VID<4> TO GND.
CSA PAGE 22:
- 5282756 ADD C2207 (0.1UF, 0402).
- SIZING DOWN R2205 FROM 0603 TO 0402 FOR PLACEMENT.
- CHANGE GFX_VID<1:4> TO GFX_VID<0:3>.
- CHANGE STRAPPING FROM 0010 ON GFX_VID<1:4> TO 0001 ON GFX_VID<0:3>.
CSA PAGE 39:
- CHANGE J3900 FROM 514S0143 TO 514-0443.
- EDIT BOM OPTION TABLE.
CSA PAGE 46:
- CHANGE U4600 FROM 353S1245 TO 353S1728.
- REMOVE MIN_NECK_WIDTH=0.3MM FROM PP5V_S3_USB2_EXTA/B.
- ADD NOSTUFF R4660 AND R4661.
CSA PAGE 47:
- CHANGE J4700 FROM 516S0251 TO 516S0588.
CSA PAGE 69:
- CHANGE J6900 FROM 518S0287 TO 518S0526.
- REPLACE BATTERY INTERFACE CIRCUIT WITH THE ONE ON M42B ESTAR.
CSA PAGE 94:
- 5040728 CHANGE L9404 FROM 155S0303 TO 155S0348.

7/5/2006

CSA PAGE 4:
- REPLACE ALL M70 WITH K36 (TEXT, BOM OPTIONS, 630 NUMBERS).
CSA PAGE 21:
- CHANGE C2173 FROM 128S0051 TO 128S0113 PER CE.
CSA PAGE 27:
- CHANGE C2700 FROM 128S0051 TO 128S0113 PER CE.
CSA PAGE 28:
- CHANGE J2800 FROM 518S0487 TO 518S0519.
CSA PAGE 46:
- REMOVE R4660 AND R4601 (U4675 BYPASS RESISTORS).
CSA PAGE 48:
- CHANGE J4810 FROM 518S0369 TO 518S0521.
CSA PAGE 55:
- CHANGE U5500 FROM M70 EMC1033 CIRCUIT TO M71 EMC1043 CIRCUIT.
- J5550 CHANGES FROM 2PIN TO 4PIN.
CSA PAGE 56:
- CHANGE J5601 FROM 518S0369 TO 518S0521.
CSA PAGE 67:
- CHANGE J6702 FROM 518S0487 TO 518S0519.
- CHANGE J6703 FROM 518S0369 TO 518S0521.
CSA PAGE 90:
- CHANGE J9000 FROM 518S0369 TO 518S0521.

7/6/2006

CSA PAGE 8:
- REMOVE NO_TEST=TRUE FOR 1V8S3_COMP, 1V8S3_FSET, 3V3S5_COMP, 3V3S5_FSET, 1V05S0_COMP, 1V05S0_FSET, 1MVREF_GNA5, 1MVP6_COMP, 5VS5_RUNSS, 1V5S0_RUNSS.
- REMOVE NO_TEST=TRUE FOR CK505_PCI4_CLK_SPN, CK505_SRC1_N/P_SPN, CK505_SRC3_N/P_SPN, CK505_SRC7_N/P_SPN, CK505_SRC_CLKREQ1/3_L/SPN.
- ADD FUNC_TEST=TRUE FOR THRM_FINSTACK_P/N.
- ADD FUNC_TEST=TRUE FOR PP1V05_S0_R.
CSA PAGE 9:
- REMOVE ALIASES FOR GND_CHASSIS_AUDIO_SPKRCONN,GND_CHASSIS_AUDIO_SHIELD1,GND_CHASSIS_AUDIO_SHIELD2,GND_CHASSIS_AUDIO_SHIELD3,MIC_SHIELD_LVDS_R,MIC_SHLD_CONN.
- REMOVE ALIAS FOR =FWPWR_FWRQN.
- ADD SPN ALIASES FOR TP_CK505_SRC7_N/P.
- ADD SPN ALIASES FOR CK505_PCI274_CLK.
CSA PAGE 12:
- REMOVE R1290 TO R1296 ON CPU_VID<0:6>.
CSA PAGE 13:
- DELETE TEXT NOTE AND WITH RESET BUTTON.
CSA PAGE 15:
- RENAME LVDS_VREFH/L TO TP_LVDS_VREFH/L.
CSA PAGE 25:
- ADD R2597 AND R2596 FOR 10K PU ON GPIO6 AND GPIO17(EXTGPU_RST_L).
- CHANGE R2514 TO 100K.
CSA PAGE 29:
- CHANGE L2902 AND L2903 FROM 155S0302 TO 0OHM R2906 AND R2907.
- NOSTUFF C2907, C2910, C2916, C2911, C2914.
- CHANGE R2900, R2901 FROM 2.2OHM TO 0OHM.
- CHANGE R2902 FROM 10HM TO 0OHM.
CSA PAGE 44:
- REMOVE TEXT NOTE WILL CHANGE TO 606P.
CSA PAGE 57:
- RE-DRAW CPU VOLTAGE SENSE RC FILTERING.
CSA PAGE 67:
- RE-CONNECTED /SHDN INPUT OF U6801 SO THAT IT'S CONTROLLED BY U6200 PORTA VREF. - DISCONNECTED GPIO1 AND TERMINATED IT WITH A 10K PULL DOWN.
- ADDED A NO STUFF PULL-UP TO CODEC DVDD_AT GPIO1.
- ADDED 56PF 15PF COMPENSATION CAP. TO U6201 FEEDBACK NETWORK (C6224).
CSA PAGE 67:
- CHANGED ALL TRANSIENT SUPPRESSORS TO 6.8V/100PF DEVICES (WERE ORIGINALLY 8V/100PF DEVICES).
- ADDED L6771 AND L6773 TO MIC INPUT EMI FILTER.
- REMOVED D26772.
- ADDED R6740 NO STUFF.
CSA PAGE 68:
- CONNECTED MIC_SHLD_CONN TO GND_CHASSIS_AUDIO_MIC THROUGH R6854.
- ADDED R6856 NO STUFF.
CSA PAGE 71:
- RENAME CPU_VID_R<6:0> TO CPU_VID<6:0>.

7/10/2007

CSA PAGE 4:
- BOOTROM PART NUMBER CHANGES FROM 341S2085 TO 341S2196.
- SMC PART NUMBER CHANGES FROM 341S2088 TO 341S2198.
- UPDATE EEE CODES, Z55 FOR GOOD, Z56 FOR BETTER, Z57 FOR BEST.
CSA PAGE 8:
- ADD ALIAS =PP3V3_S3_SMBUS_SMC_MGMT TO PP3V3_S3.
CSA PAGE 29:
- ADD CRITICAL TO U2900.
CSA PAGE 44:
- ADD CRITICAL TO U4401.
CSA PAGE 46:
- CHANGE U4675 FROM APN 353S1505 TO APN 353S1742. (SMALL PACKAGE)
- ADD R4670 & R4671. (USB BYPASS ROUTING).
CSA PAGE 49:
- REMOVE ALIAS FOR =SMC_SMS_INT TO SMC_PG1 - SIGNAL SHOULD JUST BE CALLED SMC_SMS_INT.
CSA PAGE 50:
- CHANGE R5077 FROM PULL-UP TO A PULL-DOWN RESISTOR AND NAME IT SMC_SMS_INT.
CSA PAGE 52:
- I2C8_M_ME_SMBUS:
- SMB_ME_CLK AND SMB_ME_DATA ON SOUTHBRIDGE DISCONNECTED FROM SMB_MGMT_CLK AND SMB_MGMT_DATA FROM SMC.B
- THE 10K PULL-UP RESISTORS (R5230 AND R5231), AND STILL REMAIN CONNECTED TO PP3V3_S5_SMBUS_SB_ME AND STAY ON THE SB SIDE.
- SMC MANAGEMENT SMBUS CONNECTION:
- ADD TWO NEW 10K PULL-UP RESISTOR (R5232 & R5233) TO =PP3V3_S3_SMBUS_SMC_MGMT.B
- THE PULL-UP RESISTORS SHOULD BE CONNECTED BETWEEN SMB_MGMT_CLK AND SMB_MGMT_DATA TO =I2C_SMS_SCL AND =I2C_SMS_SDA OF THE NEW ACCELEROMETER.
CSA PAGE 59:
- ADD 2ND SMS (U5930).
CSA PAGE 62:
- CHANGED C6210 FROM A CASE-R 10UF TANT. CAP. TO A SMA-LF 3.3UF TANT. CAP.
- MADE NO TEST ATTRIBUTE VISIBLE FOR NET NC_VRP CONNECTED TO PIN 37 OF U6200.
CSA PAGE 67:
- REMOVED NO STUFF RESISTORS R6730, R6731, AND R6732. ALSO REMOVED L6774.
- STUFFED R6740
- MADE D26702, DZ6703, DZ6704, DZ6705, DZ6752, DZ6753, DZ6754, DZ6755, DZ6770, DZ6771B CRITICAL.
CSA PAGE 68:
- NO STUFFED R6854
CSA PAGE 72:
- CHANGE R7208 FROM 8.66K TO 15.8K.

7/11/2007

CSA PAGE 9:
- CHANGE Z0901 AND Z0906 FROM 998-1178 TO 998-1186 (NON-PLATED).
CSA PAGE 31:
- STUFF C3110 AND C3111.
CSA PAGE 32:
- STUFF C3210 AND C3211.
CSA PAGE 39:
- UPDATE PN FOR FANCY RJ45 CONNECTOR, 514-0475.
CSA PAGE 50:
- REMOVE R5077 (BECOMES R5931).
CSA PAGE 59:
- ADD R5930, 10K PU ON SMC_SMS_INT.
- ADD R5931 (WAS R5077 BEFORE), 10K PD ON SMC_SMS_INIT.
- STUFF U5930 (DIGITAL ACCELEROMETER) CIRCUIT.

7/12/2007

CSA PAGE 43:
- CHANGE J4300 FROM 514-0289 TO 514-0456 (SAME JEDEC).
- UPDATE BOM OPTION TABLE FOR J4300.
- NORMAL CHANGES FROM 514-0359 TO 514-0456, FANCY CHANGES FROM 514-0316 TO 514-0476.
CSA PAGE 45:
- CHANGE J4500 AND J4601 FROM 514-0288 TO 514-0457 (DIFFERENT JEDEC, SAME LANDPATTERN).
- UPDATE BOM OPTION TABLE FOR J4500 AND J4601.
- NORMAL CHANGES FROM 514-0288 TO 514-0457, FANCY CHANGES FROM 514-0315 TO 514-0477.
CSA PAGE 62:
- ADD PAGE TITLE AUDIO: CODEC.
CSA PAGE 67:
- CHANGE J6700 FROM 514-0409 TO 514-0459 (DIFFERENT JEDEC, SAME LANDPATTERN).
- UPDATE BOM OPTION TABLE FOR J6700.
- NORMAL CHANGES FROM 514-0409 TO 514-0459, FANCY CHANGES FROM 514-0411 TO 514-0479.
- CHANGE J6750 FROM 514-0408 TO 514-0458 (DIFFERENT JEDEC, SAME LANDPATTERN).
- UPDATE BOM OPTION TABLE FOR J6750.
- NORMAL CHANGES FROM 514-0408 TO 514-0458, FANCY CHANGES FROM 514-0410 TO 514-0478.
CSA PAGE 72:
- CHANGE L7900 FROM 152S0302 TO 152S0670 FOR CORRECT AVL.
CSA PAGE 94:
- UPDATE BOM OPTION TABLE FOR J9401.
- NORMAL CHANGES FROM 514-0375 TO 514-0480, FANCY CHANGES FROM 514-0376 TO 514-0481.

7/13/2007

CSA PAGE 4:
- CHANGE BEST CPU FROM 337S3465(2.4GHZ) TO 337S3464(2.2GHZ).
CSA PAGE 38:
- CHANGE C3831 AND C3832 FROM 138S0582 TO 138S0554 (DON'T NEED LOW-PROFILE PARTS).

7/17/2007

CSA PAGE 59:
- UPDATE SYMBOL FOR U5930, VENDOR PART NUMBER CHANGES FROM SMB380 TO BMA150.

7/24/2007

CSA PAGE 4:
- CHANGE BETTER AND BEST CPU TO G0 STEPPING PARTS (FROM 337S3464 TO 337S3500).
CSA PAGE 22:
- STUFF R2242 AND NOSTUFF R2247.
CSA PAGE 92:
- CHANGE R9201 AND R9202 FROM 5.23K TO 2.94K.
- CHANGE R9211 AND R9212 FROM 16.5K TO 9.09K.

M70 EVT TO DVT CHANGES

8/9/2007

PER CE, ALL SANYO POSCAPS HAVE NEW HF PART NUMBERS.
- ALL 128S0057 BECOME 128S0147.
- ALL 128S0073 BECOME 128S0164.
- ALL 128S0085 BECOME 128S0148.
- ALL 128S0111 BECOME 128S0169.
- ALL 128S0113 BECOME 128S0160.
- ALL 128S0115 BECOME 128S0150.
- ALL 128S0122 BECOME 128S0152.
- ALL 128S0123 BECOME 128S0162.
- ALL 128S0129 BECOME 128S0135.
- ADD OMIT TO ALL ABOVE PARTS SO THE HF PARTS IN BOM TABLE TAKE OVER.
CSA PAGE 4:
- ADD BOM OPTION TABLE FOR ALL SANYO POSCAP TO USE HF PARTS.

Revision History

SYNC_MASTER=N/A SYNC_DATE=N/A

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	5	76

Functional Test Points

Power Supply NO_TESTs

NO_TEST

I93		IMVP6_RBIAS	59A4 59B7
I94		IMVP6_COMP	59A4 59B7
I95		5VS5_RUNSS	63B5 65C5
I96		1V5S0_RUNSS	58B1 61B5

CLOCK NO_TESTS

NO_TEST

I11	TRUE	CK505_CPU0_N	28C4 29D6 75D3
I11	TRUE	CK505_CPU0_P	28C4 29D6 75D3
I11	TRUE	CK505_CPU1_N	28C4 29D6 75D3
I11	TRUE	CK505_CPU1_P	28C4 29D6 75D3
I11	TRUE	CK505_CPU2_ITP_SRC10_N	28C4 29D6 75D3
I11	TRUE	CK505_CPU2_ITP_SRC10_P	28C4 29D6 75D3
I11	TRUE	CK505_DOT96_27M_N	28A4 29B6 75D3
I11	TRUE	CK505_DOT96_27M_P	28A4 29B6 75D3
I11	TRUE	CK505_LVDS_N	28B4 29C6 75C3
I11	TRUE	CK505_LVDS_P	28B4 29C6 75D3
I12	TRUE	CK505_PCIF1_CLK	28B6 29B6 75D3
I12	TRUE	CK505_SRC2_N	28B4 29C6 75C3
I12	TRUE	CK505_SRC2_P	28B4 29C6 75C3
I18	TRUE	CK505_SRC4_N	28B4 29C6 75C3
I18	TRUE	CK505_SRC4_P	28B4 29C6 75C3
I18	TRUE	CK505_SRC5_N	28B4 29C6 75C3
I18	TRUE	CK505_SRC5_P	28B4 29C6 75C3
I19	TRUE	CK505_SRC6_N	28B4 29B6 75C3
I19	TRUE	CK505_SRC6_P	28B4 29C6 75C3
I19	TRUE	CK505_SRC8_N	28A4 29B6 75C3
I19	TRUE	CK505_SRC8_P	28A4 29B6 75C3

FIREWARE NO_TESTS

NO_TEST

I19	TRUE	FW_B_TPA_N_SPN	8D1
I20	TRUE	FW_B_TPA_P_SPN	8D1
I20	TRUE	FW_B_TPBIAS_SPN	8D1
I20	TRUE	FW_B_TPB_N_SPN	8D1
I20	TRUE	FW_B_TPB_P_SPN	8D1
I20	TRUE	FW_C_TPA_N_SPN	8D1
I20	TRUE	FW_C_TPA_P_SPN	8D1
I20	TRUE	FW_C_TPBIAS_SPN	8D1
I20	TRUE	FW_C_TPB_N_SPN	8D1
I20	TRUE	FW_C_TPB_P_SPN	8D1

LVDS NO_TESTS

NO_TEST

I20	TRUE	LVDS_B_CLK_N_SPN	8D5
I21	TRUE	LVDS_B_CLK_P_SPN	8D5
I21	TRUE	LVDS_B_DATA_N0_SPN	8D5
I21	TRUE	LVDS_B_DATA_N1_SPN	8D5
I21	TRUE	LVDS_B_DATA_N2_SPN	8D5
I21	TRUE	LVDS_B_DATA_P1_SPN	8D5
I21	TRUE	LVDS_B_DATA_P2_SPN	8D5

NO_TEST

I21	TRUE	SMC_FAN_3_TACH	44A4 44A8

Fan Connectors

FUNC_TEST

I12	TRUE	=PP5V_S0_FAN_RT	7A7 50C4
I15	TRUE	FAN_RT_PWM	50B3
I16	TRUE	FAN_RT_TACH	50C3
I15	TRUE	=PP3V3_S0_FAN_RT	7C4 50C4
I16	TRUE	SMC_FAN_1_CTL	44A8 50B4
I16	TRUE	SMC_FAN_1_TACH	44A8 50C4

LPC+ Debug Connector

FUNC_TEST

I20	TRUE	=PP3V42_G3H_LPCPLUS	7B1 46C6
I19	TRUE	=PP5V_S0_LPCPLUS	7A7 46C6
I18	TRUE	LPC_AD<0>	22D4 44C8 46C6
I17	TRUE	LPC_AD<1>	22D4 44C8 46C6
I71	TRUE	LPC_FRAME_L	22D4 44C8 46B6
I72	TRUE	PM_CLKRUN_L	24C8 37A5 44C5 46B6
I74	TRUE	BOOT_LPC_SPI_L	23B5 46B6
I74	TRUE	SMC_TMS	44B5 45C5 46B6
I75	TRUE	DEBUG_RESET_L	27D1 46B6
I75	TRUE	SMC_TRST_L	44C1 46B6
I77	TRUE	SMC_TDO	44B5 45C5 46B6
I78	TRUE	SMC_MD1	44D1 46B6
I79	TRUE	SMC_TX_L	41A8 44B8 44C5 45D5 46B6
I80	TRUE	FWH_INIT_L	46C5
I81	TRUE	PCI_CLK33M_LPCPLUS	29B3 46C4 75C3
I82	TRUE	LPC_AD<2>	22D4 44C8 46C4
I83	TRUE	LPC_AD<3>	22D4 44C8 46C4
I84	TRUE	INT_SERIRQ	24C8 44C8 46B4
I85	TRUE	PM_SUS_STAT_L	24D5 44C5 46B4
I86	TRUE	SMC_TDI	44B5 45C5 46B4
I87	TRUE	SMC_TCK	44B5 45C5 46B4
I88	TRUE	SMC_RESET_L	44C3 45D7 46B4
I89	TRUE	SMC_NMI	44C1 46B4
I91	TRUE	SMC_RX_L	41A8 44B8 44C5 45D5 46B4
I92	TRUE	LINDACARD_GPIO	24A7 24D5 46B4

Other Func Test Points

FUNC_TEST

I97	TRUE	=PP1V05_S0_REG	7D8 61B8

SMBus FUNC_TEST

I182	TRUE	SMBUS_SMC_B_S0_SCL	47C5 76C3
I45	TRUE	SMBUS_SMC_B_S0_SDA	47C5 76C3

FIREWIRE FUNC_TEST

I15	TRUE	PPFW_SWITCH	38D3

SLEEP LED FUNC_TEST

I15	TRUE	SYS_LED_ANODE	40C5 45A3

SMC FUNC_TEST

I15	TRUE	SMC_LID	42C3 44B5 45C5 57A8
I16	TRUE	SMC_MANUAL_RST_L	45D8
I16	TRUE	SMC_CPU_VSENSE	44C5 48B1

Power Supply FUNC_TEST

I16	TRUE	ALL_SYS_PWRGD	27A5 44D8 58A3
I16	TRUE	PPVCORE_S0_CPU	7D7
I20	TRUE	PP1V05_S0_R	7D7
I16	TRUE	PP1V05_S0	7D7 45D2
I16	TRUE	PP1V5_S0	7C7
I16	TRUE	PP1V8_S0	7B7
I16	TRUE	PP3V3_S0	7D4 45D1
I16	TRUE	PP5V_S0	7A7
I16	TRUE	PP1V2_ENET_S0	7B5
I16	TRUE	PP1V8_S3	7B4
I17	TRUE	PP3V3_S3	7A4
I17	TRUE	PP5V_S3	7A4
I17	TRUE	PP3V3_S5	7D1
I17	TRUE	PP5V_S5	7C1
I17	TRUE	PP3V42_G3H	7C1
I17	TRUE	PPBUS_G3H	7B1
I17	TRUE	PP18V5_G3H	7B1
I18	TRUE	PP0V9_S0	7D7
I22	TRUE	PP3V3_S3_BT_F	43D2
I230	TRUE	GND_BT_F	43C2

Battery Digital Connector

FUNC_TEST

I1	TRUE	SMC_BS_ALRT_L	44C5 45C5 57A2
I3	TRUE	SMBUS_BATT_SCL_F	57A5
I4	TRUE	SMBUS_BATT_SDA_F	57A5
I17	TRUE	BATT_POS	57B5
I18	TRUE	BATT_NEG	57A5

Audio FUNC_TEST

I9	TRUE	=PP5V_S0_AUDIO_AMP	7A7 54B8 54C8 54D8
I11	TRUE	=PP5V_S0_AUDIO	7A7 53A7 56C4
I10	TRUE	GND_AUDIO_AMP	8A4
I21	TRUE	GND_AUDIO_CODEC	8B4
I22	TRUE	ACZ_SDATAIN<0>	8A5 53C7
I24	TRUE	ACZ_SDATAOUT	8A5 53C7
I23	TRUE	ACZ_BITCLK	8A5 53C7
I25	TRUE	ACZ_RST_L	8A5 53B7
I45	TRUE	ACZ_SYNC	8A5 53C7

Battery FUNC_TEST

I29	TRUE	SMC_BATT_ISET	44B5 66A8
I32	TRUE	SMC_BATT_CHG_EN	44C8 45B6 66A4
I31	TRUE	SMC_BC_ACOK	66A6 44C5 45B6 57C3 57C7
I33	TRUE	SMC_ADAPTER_EN	45B3 57C4 57C7 38C6 44D5
I36	TRUE	SMC_BATT_TRICKLE_EN_L	44C8 45B6 66A3
I38	TRUE	SYS_ONEWIRE	44B8 45D5 57C8

USB FUNC_TEST

I44	TRUE	TP_USB_EXCARD_P	8B2
I47	TRUE	TP_USB_EXCARD_N	8B2
I46	TRUE	TP_USB_EXTC_P	8B2
I48	TRUE	TP_USB_EXTC_N	8B2
I22	TRUE	USB2_BT_F_P	43C2
I22	TRUE	USB2_BT_F_N	43C2
I240	TRUE	USB2_3G_F_N	43A4
I241	TRUE	USB2_3G_F_P	43A4

DC-JACK FUNC_TEST

I57	TRUE	ACIN_ENABLE_GATE	57C3 66A6

Battery charger FUNC_TEST

I58	TRUE	PPVBAT_G3H_CHGR_OUT	66B5 66C2

INVERTER CONNECTOR FUNC_TEST

I60	TRUE	PPBUS_ALL_INV_CONN	67D3
I59	TRUE	INV_GND	67D2
I61	TRUE	PP5V_INV_F	67D3
I62	TRUE	INV_BKLIGHT_PWM_L	67D2

MIC FUNC_TEST

I22	TRUE	MIC_HI	55B3 56A6
I22	TRUE	MIC_LO	55B3 56A6
I22	TRUE	MIC_SHIELD	
I23	TRUE	MIC_HI_CONN	55B1 55D3
I23	TRUE	MIC_LO_CONN	55B1 55D3
I23	TRUE	MIC_SHLD_CONN	55A1 55D3 56A6

SPEAKER FUNC_TEST

I22	TRUE	SPKRCONN_L_N_OUT	54C1 55C2
I24	TRUE	SPKRCONN_L_P_OUT	54C1 55C2
I24	TRUE	SPKRCONN_R_N_OUT	54C1 55C2
I24	TRUE	SPKRCONN_R_P_OUT	54D1 55C2
I24	TRUE	SPKRCONN_SUB_N_OUT	54B1 55C2
I24	TRUE	SPKRCONN_SUB_P_OUT	54B1 55C2

THERMAL FUNC_TEST

I24	TRUE	THRM_HEATPIPE_P	49D6
I24	TRUE	THRM_HEATPIPE_N	49D6
I24	TRUE	THRM_DIMM_DX_F_N	49B6
I24	TRUE	THRM_DIMM_DX_F_P	49B6
I24	TRUE	THRM_FINSTACK_P	49C6
I24	TRUE	THRM_FINSTACK_N	49C6

FUNC TEST 1 OF 2

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE | SHT 6 OF 76

"S0,S0M" RAILS

(REGULATOR OUTPUT CPU VCORE PWR)

59D1 =PPVORE_S0_CPU_REG → PPVCORE_S0_CPU 6B2
MIN_LINE_WIDTH=0.3 mm
MIN_NECK_WIDTH=0.3 MM
VOLTAGE=0.9V
MAKE_BASE=TRUE

(CPU VCOR PWRR) → =PPVCORE_S0_CPU 10B5 10D7 11D7 48B3 48B5

(REGULATOR OUTPUT CPU 0.90V PWR)

62B8 =PP0V9_S0_REG → PP0V9_S0 6A2
MIN_LINE_WIDTH=0.4 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=0.9V
MAKE_BASE=TRUE

(DDR2 TERMINATION 0.9V PWR) → =PP0V9_S3M_MEM_TERM 32D4

61B8 6B2 =PP1V05_S0_REG → PP1V05_S0 6B2 45D2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.05V
MAKE_BASE=TRUE
=PP1V05_S0_SB_CPU_IO 22D2 25C3 26C4
=PPVCORE_S0_SB 25D3 26D2

61C7 =PP1V05_S0_REG_R → PP1V05_S0_R 6B2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.05V
MAKE_BASE=TRUE
=PP1V05_S0_CPU 9B5 9B6 9C5 9D5 10C7 11A3 12B3 12C5
=PP1V05_S0_NB_PCIE 20D5
=PPVCORE_S0_NB 17D3 17D7 20B4 20D8
=PP1V25R1V05_S0_FSB_NB 13B7 29B6 29C6
=PP1V25R1V05_S0_NB_VTT 18D3 20C8
=PP1V05_S0M_NB_VCCAXM 17B3 17C1 20D8

64B2 =PP1V25_S0_REG → PP1V25_S0
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.25V
MAKE_BASE=TRUE
=PP1V25_S0_NB_PLL 7C7 20B4 20D3
=PP1V25_S0_NB_VCCDMI 18C3 20A8
=PP1V25_S0_SB_DMI 25C3 26A6
=PP1V25_S0_NB_VCCAXF 20D4
=PP1V25_S0_NB_PLL 7C7 20B4 20D3
=PP1V25_S0_NB_VCC 20A8
=PP1V25_S0_NB_VCCA 20B8
=PP1V25_S0_FET 58A3

62C5 61B1 =PP1V5_S0_REG → PP1V5_S0 6B2
MIN_LINE_WIDTH=0.5 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.5V
MAKE_BASE=TRUE
=PP1V5_S0_CPU 10B7 11B3
=PP1V5_S0_NB_TVDAC 21D8
=PP1V5_S0_SB 26A8 26C8 26D6
=PP1V5_S0_SB_VCC1_5_A_ARX 25B6 26D5
=PP1V5_S0_SB_VCC1_5_A_ATX 25B6 26C6
=PP1V5_S0_SB_VCC1_5_A 25B6 26C2
=PP1V5_S0_SB_VCCUSBPLL 25A6 26B6
=PP1V5_S0_SB_VCC1_5_A_USB_CORE 25B6 26C2
=PP1V5_S0_AIRPORT 33D2
=PP1V5_S0_NB_FOLLOW 21D5

58C4 58B8 =PP1V8_S0_FET → PP1V8_S0 6B2
MIN_LINE_WIDTH=0.4 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.8V
MAKE_BASE=TRUE
=PP1V8_S0_NB_LVDS 21C5
=PP1V8_S0_NB_DPLL 21A7
=PP1V8_S0_TMDS 68D6

60C2 =PPVCORE_S0_NB_GFX_IMVP → PPVCORE_S0_NB_GFX
MIN_LINE_WIDTH=0.5 mm
MIN_NECK_WIDTH=0.25 mm
VOLTAGE=1.25V
MAKE_BASE=TRUE
=PPVCORE_S0_NB_GFX 17B7 17D5 21C5 48B3

58D4 58C8 =PP5V_S0_FET → PP5V_S0 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=5V
MAKE_BASE=TRUE
=PP5V_S0_SB 26D8
=PP5V_S0_SATA 40C6
=PP5V_S0_3G 43B5
=PP5V_S0_LPCPLUS 6D2 46C6
=PP5V_S0_ISENSECAL 48B8
=PP5V_S0_FAN_RT 6D2 50C4
=PP5V_S0_AUDIO 6D1 53A7 56C4
=PP5V_S0_AUDIO_AMP 6D1 54B8 54C8 54D8
=PP5V_S0_CPU_IMVP 59D8
=PP5V_S0_NB_GFX_IMVP 60D2
=PP5V_S0_LCD 67D7
=PP5V_S0_TMDS 69D7
=PP5V_S0_NB_TVDAC 21D6
=PP5V_S0_IDE_RESET 39B7

58D3 58C4 58C3 58B8 58B3 58A3 =PP3V3_S0_FET → PP3V3_S0 6A2 45D1
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_S0_NB_VCCHV 15B7 15C7 18B3 20A8 21B7
=PP3V3_S0_NB_FOLLOW 20B2
=PP3V3_S0_SB_GPIO 22D2 22D7 24B3 24D8
=PP3V3_S0_SB_VCCGLAN3_3 25A6
=PP3V3_S0_SB_VCC3_3_PCI 25B3 26B4
=PP3V3_S0_SB_VCC3_3_IDE 25C3 26B4
=PP3V3_S0_SB_VCC3_3_VCCPCORE 25C3 26A6 26C6
=PP3V3_S0_SB_VCC3_3_SATA 25C3 26B8
=PP3V3_S0_SB_VCC3_3_DMI 25C3 26A8
=PP3V3_S0_SB 26D8 39C8
=PP3V3_S0_SB_PM 27B6 27B8
=PP3V3_S0_RSTBUF 27D4
=PP3V3_S0_AIRPORT 33C6
=PP3V3_S0_FW 38C6
=PP3V3_S0_PATA 39C2
=PP3V3_S0_SMC_LS 45D4
=PP3V3_S0_LPCPLUS 46C4
=PP3V3_S0_SMBUS_SB 47D8
=PP3V3_S0_SMBUS_SMC_0_S0 47D5
=PP3V3_S0_SMBUS_SMC_B_S0 47C5
=PP3V3_S0_THRM_SNR 49C2 49D2
=PP3V3_S0_FAN_RT 6D2 50C4
=PP3V3_S0_ENET 8A4
=PP3V3_S0_AUDIO 53A7 53D7 55D8 56B5
=PP3V3_S0_IMVP 59D8
=PP3V3_S0_NB_GFX_IMVP 60C7
=PP3V3_S0_PDCISENS 60C2 61C5 66C3
=PP3V3_S0_LCD 67B5 67B7 67C7
=PP3V3_S0_TMDS 7C4 68B1 68B2 68B7 68C8 68D8 69B7 69C2 69C8
=PP3V3_S0_CPUPOWER 48D2
=PP3V3_S0_PBATTISENS 66B3
=PP3V3R1V5_S0_SB_VCCHDA 25B3 26C4
=PP3V3_S0_SB_PCI 23A7
=PP3V3_S0_NB_VCCA_PEG_BG 18C5 20A6
=PPSPD_S0_MEM 30A7 31A3 31A7
=PP3V3_S0MWOL_SB_VCCCL3_3 25A6 26B2
=PP3V3_S0MWOL_SB_VCCLAN3_3 25A3 26D3
=PP3V3_S0MWOL_SB_CLINK0 24C1
=PP3V3_S0_CK505 28C8 28D3 28D8 29B2 29D2
=PP3V3_S0_NB_VCCSYNC 18D6 21B5
=PP3V3_S0_NB 69C8
=PP3V3_S0_TMDS 7C4 68B1 68B2 68B7 68C8 68D8 69B7 69C2 69C8

35C1 =PP1V2_ENET_REG → PP1V2_ENET_S0 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.2V
MAKE_BASE=TRUE
=PP1V2_ENET_PHY 34D6

35D4 PP3V3_ENET_FET → =PP3V3_ENET_PHY 34D6
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
MAKE_BASE=TRUE

35D1 35B2 =PP1V9_ENET_REG → PP1V9_ENET_S0
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=2.5V
MAKE_BASE=TRUE
=PP1V8_S0_YUKON 36D8
=PP1V8R2V5_ENET_PHY 34C7

"S3" RAILS

62B2 =PP1V8_S3_REG → PP1V8_S3 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=1.8V
MAKE_BASE=TRUE
=PP1V8_S3_FET 58C5
=PP1V8_S3_MEMVREF 20A5 20A6
=PP1V8_S3_MEM 30B2 30D4 30D6 31B2 31D4 31D6
=PP1V8_ENET_P1V8ENETFET 35C3

62C4 =PP1V8_S3_REG_R → PP1V8_S3_MEM_NB
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.4 mm
VOLTAGE=1.8V
MAKE_BASE=TRUE
=PP1V8_S3M_MEM_NB 15D2 17D7 20C8 30D2 31D2
=PP1V8_S3_NB_VCC 20A4

65C3 65A4 =PP3V3_S3_FET → PP3V3_S3 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_S3_AIRPORT_AUX 33C2
=PP3V3_S3_FW 37D5
=PP3V3_S3_PCI 37C5
=PP3V3_S3_BT 43D3
=PP3V3_S3_SMS 51C7
=PP3V3_S3_SMBUS_SMC_A_S3 47D3
=PP3V3_S3_PDCISENS 62A2 62C2
=PP3V3_S3_ENETPWRCTL 35D7
=PP3V3_S3_SMBUS_SMC_MGMT 47C3 51B6
=PP3V3_ENET_P3V3ENETFET 35D3

65B4 =PP5V_S3_FET → PP5V_S3 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=5V
MAKE_BASE=TRUE
=PP5V_S3_SYSLED 40B6 45A4
=PP5V_S3_GEYSER 42D6
=PP5V_S3_IR 43D8
=PP5V_S3_CAMERA 67A5

"S5" RAILS

63B1 =PP3V3_S5_REG → PP3V3_S5 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.3V
MAKE_BASE=TRUE
=PP3V3_S5_SB_PM 27C5
=PP3V3_S5_SB_USB 23C8
=PP3V3_S5_SB_GPIO 24D8
=PP3V3_S5_SB 24A3 24A8 26D8 35C7
=PP3V3_S5_FET 58C5 65A5 65C4
=PP3V3_S5_SB_VCCSUS3_3_USB 25A3 26D2
=PP3V3_S5_SB_VCCSUS3_3 25A3 26B6 26D2
=PP3V3_S5_SB_3V3_VCCSUSHDA 25B3 26B2
=PP3V3_S5_FWLATEVG 38A6 38A8
=PP3V3_S5_SMBUS_SB_ME 47A7
=PP3V3_S5_ROM 52C6
=PP3V3_S5_LCD 67C7
=PP3V3_S5_SB_CLINK1 24B1
=PP3V3_S5_1V25S0 64B6
=PP3V3_S5_AIRPORT_AUX 33C7 33D6 33D7

63B8 =PP5V_S5_REG → PP5V_S5 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=5V
MAKE_BASE=TRUE
=PP5V_S5_SB 26D8
=PP5V_S5_PATA 39D6
=PP5V_S5_USB 41C8
=PP5V_S5_1V51V05S0 61C4
=PP5V_S5_1V8S30V9S0 62C5
=PP5V_S5_PWRCTL 65B6
=PP5V_S5_FET 58B3 58C6 58D5 65B5

"G3H" RAILS

64C4 =PP3V42_G3H_REG → PP3V42_G3H 6A2
MIN_LINE_WIDTH=0.3 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=3.42V
MAKE_BASE=TRUE
=PP3V42_G3H_SMC 44D4 45C1 45D4 45D8 51B8
=PP3V42_G3H_SMCVREF 45C8
=PP3V42_G3H_SMBUS_SMC_BSA 47C3
=PP3V42_G3H_ACIN 57C4 66A5 66A8 66B8
=PP3V42_G3H_LIDSWITCH 57A8
=PP3V42_G3H_PWRCTL 65C7
=PP3V42_G3H_SB_RTC 27D7
=PP3V42_G3H_SMCUSBMUX 41A6
=PP3V42_G3H_LPCPLUS 6D2 46C6

57D1 =PP18V5_G3H_INRUSH → PP18V5_G3H 6A2
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.20 MM
VOLTAGE=18.5V
MAKE_BASE=TRUE
=PP18V5_G3H_CHGR 66D8

57D3 =PPDCIN_G3H → PPDCIN_G3H
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=18.5V
MAKE_BASE=TRUE
=PPVIN_G3H_P3V42G3H 64C6

66C2 =PPBUSA_G3H → PPBUS_G3H 6A2
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
VOLTAGE=18.5V
MAKE_BASE=TRUE
=PPVIN_S0_NB_DPLL
=PPBUS_S5_FWPWRSW 38D5
=PPVIN_S5_CPU_IMVP 48D7 59C2 59D4 59D8
=PPVIN_S5_NB_GFX_IMVP 60C2
=PPBUS_S5_INV 67D4
=PPVIN_S5_1V8S30V9S0 62B3
=PPVIN_S5_5VS5 63A6 63B6
=PPVIN_S5_3V3S5 63B3
=PPVIN_S5_1V5S0 61B3
=PPVIN_S5_1V05S0 61B5
=PPVIN_S5_IMVP 45A6

66C2 =PPBUSB_G3H →

Power Aliases

SYNC_MASTER=WFERRY SYNC_DATE=06/15/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 7 OF 76	

(EMI PAD FOR INVERTER GONNECTOR)

INVT_CHGND — VOLTAGE=0V, MAKE_BASE=TRUE — ZS0920 EMI-SPRING CLIP-SM-M42
=GND_CHASSIS_3GPOWER

CHASSIS GND
BATTERY,AUDIO,DIP DIMM CONNECTOR CHASSIS GND

GND_CHASSIS_IO — OMIT Z0906 5R2P3-7SQBNP
=GND_BATT_CHGND
=GND_CHASSIS_AUDIO_JACK
=GND_CHASSIS_AUDIO_MIC
=GND_CHASSIS_DIPDIMM_LEFT

SATA,LVDS CONNECTOR CHASSIS GND
GND_CHASSIS_SATA — VOLTAGE=0V, MAKE_BASE=TRUE — OMIT Z0907 6P5R2P6-7SQB
=GND_CHASSIS_LVDS
C0907 0.1UF 10% 16V X5R 402
C0908 0.01UF 10% 16V CERM 402

DCIN CONNECTOR CHASSIS GND
GND_CHASSIS_DCIN — VOLTAGE=0V, MAKE_BASE=TRUE — OMIT Z0902 7X7R2P3-5B
=GND_DCIN_CHGND
=GND_CHASSIS_RJ45
=GND_CHASSIS_TMDS_UPPER
C0930 0.1UF 10% 16V X5R 402

I/O CONNECTOR CHASSIS GND
GND_CHASSIS_IO — VOLTAGE=0V, MAKE_BASE=TRUE — OMIT Z0908 5P0R2P3-7BLB
=GND_CHASSIS_FW_DOWN
=GND_CHASSIS_USB
C0910 0.1UF 10% 16V X5R 402
C0911 0.01UF 10% 16V CERM 402

DIP DIMM CONNECTOR CHASSIS GND
GND_CHASSIS_CENTER — VOLTAGE=0V, MAKE_BASE=TRUE — OMIT Z0910 5R2P3-7SQB
=GND_CHASSIS_DIPDIMM_CENTER
C0916 0.1UF 10% 16V X5R 402
C0917 0.01UF 10% 16V CERM 402

DIP DIMM CONNECTOR CHASSIS GND
GND_CHASSIS_RIGHT — VOLTAGE=0V, MAKE_BASE=TRUE — OMIT Z0909 5R2P3-7SQB
=GND_CHASSIS_DIPDIMM_RIGHT
C0914 0.1UF 10% 16V X5R 402
C0915 0.01UF 10% 16V CERM 402

GND_CHASSIS_CPU — OMIT Z0901 5R2P3-7SQBNP
C0912 0.1UF 10% 16V X5R 402
C0913 0.01UF 10% 16V CERM 402

GND_CHASSIS_FANSCREW — OMIT Z0911 5R2P3-7B
C0918 0.1UF 10% 16V X5R 402
C0919 0.01UF 10% 16V CERM 402

CPU HEATSINK STANDOFF SCREW HOLE
NB_RIGHT_DOWN_SCREW — OMIT Z0903 STDOFF-4.2OD3.95H-5.52R3.37-6B
R0912 0 5% 1/16W MF-LF 402
Z0903 USE SAME Z0913 NON SHAPE OF A HOOF SYMBOL FOR LAYOUT PLACEMENT BUT, NEED CHANGE TO HIGH STANDOFF SYMBOL

CPU_THERMAL_SCREW_UP — OMIT Z0904 STDOFF-4.2OD3.95H-5.52R3.37-7SQB
R0910 0 5% 1/16W MF-LF 402

CPU_THERMAL_SCREW_DOWN — OMIT Z0905 STDOFF-4.5OD3.95H-1.1-3.2-TH
R0911 0 5% 1/16W MF-LF 402

CPU_THERMAL_SCREW_RIGHT — OMIT Z0921 STDOFF-4.5OD3.95H-1.1-3.2-TH
R0921 0 5% 1/16W MF-LF 402

LVDS ALIASES
NO-CONNECT UNUSED LVDS INTERFACE PORTS

LVDS_B_CLK_N — LVDS_B_CLK_N_SPN
LVDS_B_CLK_P — LVDS_B_CLK_P_SPN
LVDS_B_DATA_N<0> — LVDS_B_DATA_N0_SPN
LVDS_B_DATA_N<1> — LVDS_B_DATA_N1_SPN
LVDS_B_DATA_N<2> — LVDS_B_DATA_N2_SPN
TP_LVDS_B_DATAN3 — LVDS_B_DATA_N3_SPN
LVDS_B_DATA_P<0> — LVDS_B_DATA_P0_SPN
LVDS_B_DATA_P<1> — LVDS_B_DATA_P1_SPN
LVDS_B_DATA_P<2> — LVDS_B_DATA_P2_SPN
TP_LVDS_B_DATAP3 — LVDS_B_DATA_P3_SPN
TP_LVDS_A_DATAP3 — LVDS_A_DATA_P3_SPN
TP_LVDS_A_DATAN3 — LVDS_A_DATA_N3_SPN
(MAKE_BASE=TRUE)

PCI_EXPRESS GRAPHICS ALIASES
NO-CONNECT UNUSED SDVO INTERFACE PORTS

PEG_D2R_N<0> — PEG_D2R_N0_SPN
PEG_D2R_N<2> — PEG_D2R_N2_SPN
PEG_D2R_N<3> — PEG_D2R_N3_SPN
PEG_D2R_N<4> — PEG_D2R_N4_SPN
PEG_D2R_N<5> — PEG_D2R_N5_SPN
PEG_D2R_N<6> — PEG_D2R_N6_SPN
PEG_D2R_N<7> — PEG_D2R_N7_SPN
PEG_D2R_N<8> — PEG_D2R_N8_SPN
PEG_D2R_N<9> — PEG_D2R_N9_SPN
PEG_D2R_N<10> — PEG_D2R_N10_SPN
PEG_D2R_N<11> — PEG_D2R_N11_SPN
PEG_D2R_N<12> — PEG_D2R_N12_SPN
PEG_D2R_N<13> — PEG_D2R_N13_SPN
PEG_D2R_N<14> — PEG_D2R_N14_SPN
PEG_D2R_N<15> — PEG_D2R_N15_SPN
PEG_D2R_P<0> — PEG_D2R_P0_SPN
PEG_D2R_P<2> — PEG_D2R_P2_SPN
PEG_D2R_P<3> — PEG_D2R_P3_SPN
PEG_D2R_P<4> — PEG_D2R_P4_SPN
PEG_D2R_P<5> — PEG_D2R_P5_SPN
PEG_D2R_P<6> — PEG_D2R_P6_SPN
PEG_D2R_P<7> — PEG_D2R_P7_SPN
PEG_D2R_P<8> — PEG_D2R_P8_SPN
PEG_D2R_P<9> — PEG_D2R_P9_SPN
PEG_D2R_P<10> — PEG_D2R_P10_SPN
PEG_D2R_P<11> — PEG_D2R_P11_SPN
PEG_D2R_P<12> — PEG_D2R_P12_SPN
PEG_D2R_P<13> — PEG_D2R_P13_SPN
PEG_D2R_P<14> — PEG_D2R_P14_SPN
PEG_D2R_P<15> — PEG_D2R_P15_SPN
PEG_R2D_C_N<4> — PEG_R2D_C_N4_SPN
PEG_R2D_C_N<5> — PEG_R2D_C_N5_SPN
PEG_R2D_C_N<6> — PEG_R2D_C_N6_SPN
PEG_R2D_C_N<7> — PEG_R2D_C_N7_SPN
PEG_R2D_C_N<8> — PEG_R2D_C_N8_SPN
PEG_R2D_C_N<9> — PEG_R2D_C_N9_SPN
PEG_R2D_C_N<10> — PEG_R2D_C_N10_SPN
PEG_R2D_C_N<11> — PEG_R2D_C_N11_SPN
PEG_R2D_C_N<12> — PEG_R2D_C_N12_SPN
PEG_R2D_C_N<13> — PEG_R2D_C_N13_SPN
PEG_R2D_C_N<14> — PEG_R2D_C_N14_SPN
PEG_R2D_C_N<15> — PEG_R2D_C_N15_SPN
PEG_R2D_C_P<4> — PEG_R2D_C_P4_SPN
PEG_R2D_C_P<5> — PEG_R2D_C_P5_SPN
PEG_R2D_C_P<6> — PEG_R2D_C_P6_SPN
PEG_R2D_C_P<7> — PEG_R2D_C_P7_SPN
PEG_R2D_C_P<8> — PEG_R2D_C_P8_SPN
PEG_R2D_C_P<9> — PEG_R2D_C_P9_SPN
PEG_R2D_C_P<10> — PEG_R2D_C_P10_SPN
PEG_R2D_C_P<11> — PEG_R2D_C_P11_SPN
PEG_R2D_C_P<12> — PEG_R2D_C_P12_SPN
PEG_R2D_C_P<13> — PEG_R2D_C_P13_SPN
PEG_R2D_C_P<14> — PEG_R2D_C_P14_SPN
PEG_R2D_C_P<15> — PEG_R2D_C_P15_SPN
(MAKE_BASE=TRUE)

HDA_BIT_CLK — ACZ_BITCLK
HDA_SYNC — ACZ_SYNC
HDA_RST_L — ACZ_RST_L
HDA_SDIN0 — ACZ_SDATAIN<0>
HDA_SDOUT — ACZ_SDATAOUT
TP_HDA_SDIN1 — HDN_SDIN1_SPN
TP_HDA_SDIN2 — HDN_SPIN2_SPN
TP_HDA_SDIN3 — HDN_SPIN3_SPN
(MAKE_BASE=TRUE)

NB CFG ALIASES
NB_CFG<3> — TP_NB_CFG<3>
NB_CFG<4> — TP_NB_CFG<4>
NB_CFG<6> — TP_NB_CFG<6>
NB_CFG<7> — TP_NB_CFG<7>
NB_CFG<8> — TP_NB_CFG<8>
(MAKE_BASE=TRUE)

GND_CHASSIS_IO1 — VOLTAGE=0V, MAKE_BASE=TRUE
=GND_CHASSIS_TMDS_DOWN
=GND_CHASSIS_FW_UPPER

SATA ALIASES
NO-CONNECT UNUSED SATA INTERFACE PORTS

SATA_B_D2R_N — SATA_B_D2R_N_SPN
SATA_B_D2R_P — SATA_B_D2R_P_SPN
SATA_B_R2D_C_N — SATA_B_R2D_C_N_SPN
SATA_B_R2D_C_P — SATA_B_R2D_C_P_SPN
SATA_C_D2R_N — SATA_C_D2R_N_SPN
SATA_C_D2R_P — SATA_C_D2R_P_SPN
SATA_C_R2D_C_N — SATA_C_R2D_C_N_SPN
SATA_C_R2D_C_P — SATA_C_R2D_C_P_SPN
(MAKE_BASE=TRUE)

PCI_EXP ALIASES
NO-CONNECT UNUSED PCI_EXP INTERFACE PORTS

TP_PCIE_A_D2R_N — PCIE_A_D2R_N_SPN
TP_PCIE_A_D2R_P — PCIE_A_D2R_P_SPN
TP_PCIE_A_R2D_C_N — PCIE_A_R2D_C_N_SPN
TP_PCIE_A_R2D_C_P — PCIE_A_R2D_C_P_SPN
TP_PCIE_B_D2R_N — PCIE_B_D2R_N_SPN
TP_PCIE_B_D2R_P — PCIE_B_D2R_P_SPN
TP_PCIE_B_R2D_C_N — PCIE_B_R2D_C_N_SPN
TP_PCIE_B_R2D_C_P — PCIE_B_R2D_C_P_SPN
TP_PCIE_EXCARD_D2R_N — PCIE_C_D2R_N_SPN
TP_PCIE_EXCARD_D2R_P — PCIE_C_D2R_P_SPN
TP_PCIE_EXCARD_R2D_C_N — PCIE_C_R2D_C_N_SPN
TP_PCIE_EXCARD_R2D_C_P — PCIE_C_R2D_C_P_SPN
TP_PCIE_FW_D2R_N — PCIE_D_D2R_N_SPN
TP_PCIE_FW_D2R_P — PCIE_D_D2R_P_SPN
TP_PCIE_FW_R2D_C_N — PCIE_D_R2D_C_N_SPN
TP_PCIE_FW_R2D_C_P — PCIE_D_R2D_C_P_SPN
(MAKE_BASE=TRUE)

CLOCK ALIASES
NO-CONNECT UNUSED CLOCK INTERFACE PORTS

TP_CK505_SRC1_N — CK505_SRC1_N_SPN
TP_CK505_SRC1_P — CK505_SRC1_P_SPN
TP_CK505_SRC3_N — CK505_SRC3_N_SPN
TP_CK505_SRC3_P — CK505_SRC3_P_SPN
TP_CK505_SRC7_N — CK505_SRC7_N_SPN
TP_CK505_SRC7_P — CK505_SRC7_P_SPN
CK505_PCI2_CLK — CK505_PCI2_CLK_SPN
CK505_PCI4_CLK — CK505_PCI4_CLK_SPN
=ENET_CLKREQ_L — ENET_CLKREQ_L
(MAKE_BASE=TRUE)

SB ALIASES
NO-CONNECT UNUSED CLOCK INTERFACE PORTS

VR_PWRGD_CLKEN — VR_PWRGD_CK505
=SB_CLINK_MPWROK — CLINK_MPWROK
=SB_SATA_CLKREQ_L — SB_CLK100M_SATA_OE_L
EXTGPU_RST_L — TP_SB_GPIO17
(MAKE_BASE=TRUE)

SO-DIMM ALIASES
NO-CONNECT UNUSED ADDRESS INTERFACE PORTS

MEM_A_A<15> — MEM_A_A15_SPN
MEM_B_A<15> — MEM_B_A15_SPN
TP_MEM_CLKP2 — MEM_CLK_P_2_SPN
TP_MEM_CLKN2 — MEM_CLK_N_2_SPN
TP_MEM_CLKP5 — MEM_CLK_P_5_SPN
TP_MEM_CLKN5 — MEM_CLK_N_5_SPN
(MAKE_BASE=TRUE)

=GND_AUDIO_CODEC — GND_AUDIO_CODEC — XW0801 SM 1 2
=GND_AUDIO_AMP — GND_AUDIO_AMP — XW0802 SM 1 2
(MAKE_BASE=TRUE)

Ethernet ALIASES
=PP3V3_S0_ENET — =ENET_VMAIN_AVLBL
=YUKON_EC_PP2V5_ENET

AIRPORT CARD STANDOFF SCREW HOLE
OMIT Z0912 STDOFF-4.2OD2.15H-1.2-3.2TH — NC
OMIT Z0913 STDOFF-4.2OD3.95H-5.52R3.37-6B — NC

FIREWIRE ALIASES
NO-CONNECT UNUSED FIREWIRE INTERFACE PORTS

FW_B_TPBIAS — FW_B_TPBIAS_SPN
FW_B_TPA_P — FW_B_TPA_P_SPN
FW_B_TPA_N — FW_B_TPA_N_SPN
FW_B_TPB_P — FW_B_TPB_P_SPN
FW_B_TPB_N — FW_B_TPB_N_SPN
FW_C_TPBIAS — FW_C_TPBIAS_SPN
FW_C_TPA_P — FW_C_TPA_P_SPN
FW_C_TPA_N — FW_C_TPA_N_SPN
FW_C_TPB_P — FW_C_TPB_P_SPN
FW_C_TPB_N — FW_C_TPB_N_SPN
(MAKE_BASE=TRUE)

USB PORT [0] = External USB2.0 Port A
USB2_EXTA_P — USB2_EXTA_P — USB_EXTA_P
USB2_EXTA_N — USB2_EXTA_N — USB_EXTA_N
=EXTAUSB_OC_L — EXTAUSB_OC_L — USB_EXTA_OC_L
(MAKE_BASE=TRUE)

USB PORT [1] = PCI-E Mini Card
=USB2_AIRPORT_P — USB2_AIRPORT_P — USB_MINI_P
=USB2_AIRPORT_N — USB2_AIRPORT_N — USB_MINI_N
(MAKE_BASE=TRUE)

USB PORT [2] = 3G USB
=USB2_3G_P — USB2_3G_P — USB_EXTD_P
=USB2_3G_N — USB2_3G_N — USB_EXTD_N
(MAKE_BASE=TRUE)

USB PORT [3] = CAMERA
=USB2_CAMERA_P — USB2_CAMERA_P — USB_CAMERA_P
=USB2_CAMERA_N — USB2_CAMERA_N — USB_CAMERA_N
(MAKE_BASE=TRUE)

USB PORT [4] = IR CONTROLLER
=USB2_IR_P — USB_IR_P
=USB2_IR_N — USB_IR_N — USB_IR_N
(MAKE_BASE=TRUE)

USB PORT [5] = Trackpad(Geyser)
USB2_GEYSER_P — USB_TPAD_P
USB2_GEYSER_N — USB_TPAD_N
(MAKE_BASE=TRUE)

USB PORT [6] = BLUETOOTH
USB2_BT_P — USB_BT_P
USB2_BT_N — USB_BT_N
(MAKE_BASE=TRUE)

USB PORT [7] = External USB2.0 Port B
USB2_EXTB_P — USB_EXTB_P
USB2_EXTB_N — USB_EXTB_N
=EXTBUSB_OC_L — EXTBUSB_OC_L — USB_EXTB_OC_L
(MAKE_BASE=TRUE)

USB PORT [8] = Unused
TP_USB_EXCARD_P — USB_EXCARD_P
TP_USB_EXCARD_N — USB_EXCARD_N
(MAKE_BASE=TRUE)

USB PORT [9] = Unused
TP_USB_EXTC_P — USB_EXTC_P
TP_USB_EXTC_N — USB_EXTC_N
(MAKE_BASE=TRUE)

ANALOG SWITCH GPIO
PM_EXTTS_L<0> — DIMM_OVERTEMPA_L
PM_EXTTS_L<1> — DIMM_OVERTEMPB_L
(MAKE_BASE=TRUE)

NB ALIASES
=GFX_VR_EN — GFX_VR_EN
=NB_CLINK_MPWROK — CLINK_MPWROK
=NB_CLK96M_DOT_P — NB_CLK96M_DOT_P
=NB_CLK96M_DOT_N — NB_CLK96M_DOT_N
=NB_CLK100M_DPLLSS_P — NB_CLK100M_DPLLSS_P
=NB_CLK100M_DPLLSS_N — NB_CLK100M_DPLLSS_N
=NB_TDE_SENSE
=NB_TDE_FORCE
=NB_TDB_FORCE
=NB_TDB_SENSE
(MAKE_BASE=TRUE)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
860-0876	4	THERMAL STANDOFF	Z0903,Z0904,Z0905,Z0921	STANDOFF
860-0723	1	STANDOFF WIRELESS	Z0912	STANDOFF
860-0749	1	STANDOFF W/THRU HOLES,WIRELESS	Z0913	STANDOFF

SIGNAL ALIAS /RESET
SYNC_MASTER=GPU — SYNC_DATE=07/17/2006

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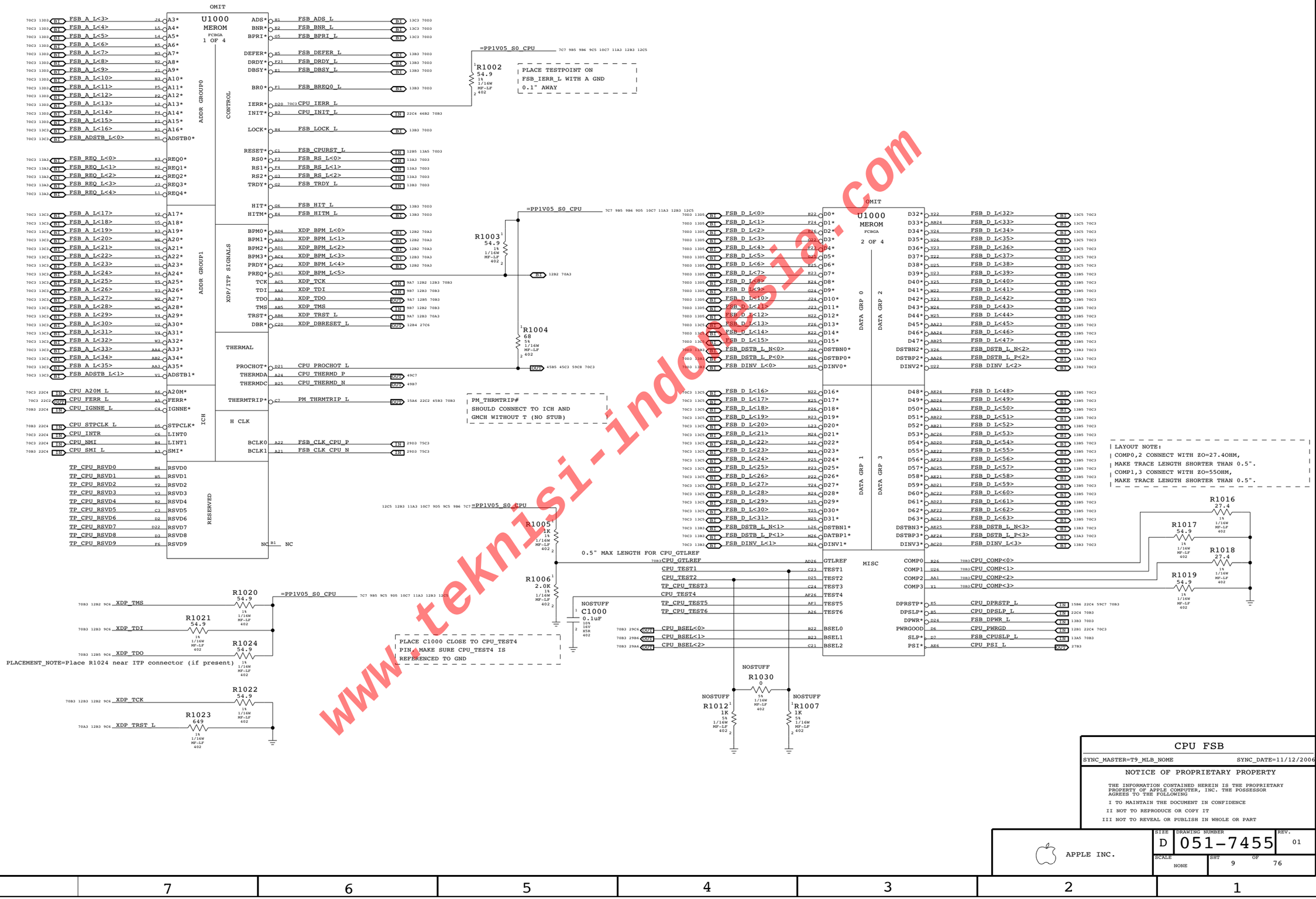
SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE — SHT 8 OF 76



CPU FSB

SYNC_MASTER=T9_MLB_NOME SYNC_DATE=11/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	9	76

(CPU CORE POWER)

=PPVCORE_S0_CPU 7D7 10B5 11D7 48B3 48B5

Standard Voltage:

44.0 A (Design Target)

41.0 A (HFM)
30.4 A (LFM)
25.5 A (SuperLFM)

27.4 A (Auto-Halt/Stop-Grant HFM)
17.0 A (Auto-Halt/Stop-Grant SuperLFM)

27.4 A (Sleep HFM)
16.8 A (Sleep SuperLFM)

25.0 A (Deep Sleep HFM)
16.0 A (Deep Sleep SuperLFM)

11.5 A (Deeper Sleep)

9.4 A (Enhanced Deeper Sleep)

Low Voltage:

23.0 A (Design Target)

21.0 A (HFM)
18.7 A (LFM)
TBD A (SuperLFM)

TBD A (Auto-Halt/Stop-Grant HFM)
TBD A (Auto-Halt/Stop-Grant SuperLFM)

TBD A (Sleep HFM)
TBD A (Sleep SuperLFM)

TBD A (Deep Sleep HFM)
TBD A (Deep Sleep SuperLFM)

TBD A (Deeper Sleep)

TBD A (Enhanced Deeper Sleep)

Ultra Low Voltage:

17.0 A (Design Target)

TBD A (HFM)
TBD A (LFM)

TBD A (Auto-Halt/Stop-Grant HFM)
TBD A (Auto-Halt/Stop-Grant LFM)

TBD A (Sleep HFM)
TBD A (Sleep LFM)

TBD A (Deep Sleep HFM)
TBD A (Deep Sleep LFM)

TBD A (Deeper Sleep)

TBD A (Enhanced Deeper Sleep)

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U1000
MEROM
FCBGA
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VCC: A7 A9 A10 A12 A13 A15 A17 A18 A20 B7 B9 B10 B12 B14 B15 B17 B18 B20 C9 C10 C12 C13 C15 C17 C18 D9 D10 D12 D14 D15 D17 D18 E7 E9 E10 E12 E13 E15 E17 E18 E20 F7 F9 F10 F12 F14 F15 F17 F18 F20 AA7 AA9 AA10 AA12 AA13 AA15 AA17 AA18 AA20 AB9 AC10 AB10 AB12 AB14 AB15 AB17 AB18

VCC: AB20 AB7 AC7 AC9 AC12 AC13 AC15 AC17 AC18 AD7 AD9 AD10 AD12 AD14 AD15 AD17 AD18 AE9 AE10 AE12 AE13 AE15 AE17 AE18 AE20 AF9 AF10 AF12 AF14 AF15 AF17 AF18 AF20

(CPU IO POWER 1.05V)

=PP1V05_S0_CPU 7C7 9B5 9B6 9C5 9D5 11A3 12B3 12C5

4500 mA (before VCC stable)
2500 mA (after VCC stable)

VCCP: G21 V6 J6 K6 M6 J21 K21 M21 N21 N6 R21 R6 T21 T6 V21 W21

(CPU INTERNAL PLL POWER 1.5V)

=PP1V5_S0_CPU 7C7 11B3

130 mA

VCCA: B26 C26

VID0	AD6	CPU_VID<0>	OUT 59C7 70A3
VID1	AF5	CPU_VID<1>	OUT 59C7 70A3
VID2	AE5	CPU_VID<2>	OUT 59C7 70A3
VID3	AF4	CPU_VID<3>	OUT 59C7 70A3
VID4	AE3	CPU_VID<4>	OUT 59C7 70A3
VID5	AF3	CPU_VID<5>	OUT 59C7 70A3
VID6	AE2	CPU_VID<6>	OUT 59C7 70A3

VCCSENSE AF7 CPU_VCCSENSE_P OUT 59A4 59A5 70A3

VSSSENSE AE7 CPU_VCCSENSE_N OUT 59A4 59A5 70A3

=PPVCORE_S0_CPU 7D7 10D7 11D7 48B3 48B5

R1100
100
1%
1/16W
MF-LF
402
PLACEMENT_NOTE=Place within 1 inch of CPU, no stub.

R1101
100
1%
1/16W
MF-LF
402
PLACEMENT_NOTE=Place within 1 inch of CPU, no stub.

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VSS: A4 A8 A11 A14 A16 A19 A23 AF2 B6 B8 B11 B13 B16 B19 B21 B24 C5 C8 C11 C14 C16 C19 C2 C22 C25 D1 D4 D8 D11 D13 D16 D19 D23 D26 E3 E6 E8 E11 E14 E16 E19 E21 E24 F5 F8 F11 F13 F16 F19 F2 F22 F25 G4 G1 G23 G26 H3 H6 H21 H24 J2 J5 J22 J25 K1 K4 K23 K26 L3 L6 L21 L24 M2 M5 M22 M25 N1 N4 N23 N26 P3

VSS: P6 P21 P24 R2 R5 R22 R25 T1 T4 T23 T26 U3 U6 U21 U24 V2 V5 V22 V25 W1 W4 W23 W26 Y3 Y6 Y21 Y24 AA2 AA5 AA8 AA11 AA14 AA16 AA19 AA22 AA25 AB1 AB4 AB8 AB11 AB13 AB16 AB19 AB23 AB26 AC3 AC6 AC8 AC11 AC14 AC16 AC19 AC21 AC24 AD2 AD5 AD8 AD11 AD13 AD16 AD19 AD22 AD25 AE1 AE4 AE8 AE11 AE14 AE16 AE19 AE23 AE26 A2 AF6 AF8 AF11 AF13 AF16 AF19 AF21 A25 AF25

Current numbers from Merom for Santa Rosa EMTS, doc #22221.

CPU Power & Ground

SYNC_MASTER=T9_MLB_NOME SYNC_DATE=11/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	10	76

CPU VCORE HF AND BULK DECOUPLING

4x 330uF. 20x 10uF 0805

48B5 48B3 10D7 10B5 7D7 =PPVCORE_S0_CPU

LAYOUT NOTE:
PLACE INSIDE SOCKET CAVITY (ON BOTTOMSIDE)

CRITICAL C1200 10UF 10% 6.3V X5R 805-2
CRITICAL C1201 10UF 10% 6.3V X5R 805-2
CRITICAL C1202 10UF 10% 6.3V X5R 805-2
CRITICAL C1203 10UF 10% 6.3V X5R 805-2
CRITICAL C1204 10UF 10% 6.3V X5R 805-2
CRITICAL C1205 10UF 10% 6.3V X5R 805-2
CRITICAL C1206 10UF 10% 6.3V X5R 805-2
CRITICAL C1207 10UF 10% 6.3V X5R 805-2
CRITICAL C1208 10UF 10% 6.3V X5R 805-2
CRITICAL C1209 10UF 10% 6.3V X5R 805-2

LAYOUT NOTE:
PLACE INSIDE SOCKET CAVITY (ON BOTTOMSIDE)

CRITICAL C1210 10UF 10% 6.3V X5R 805-2
CRITICAL C1211 10UF 10% 6.3V X5R 805-2
CRITICAL C1212 10UF 10% 6.3V X5R 805-2
CRITICAL C1213 10UF 10% 6.3V X5R 805-2
CRITICAL C1214 10UF 10% 6.3V X5R 805-2
CRITICAL C1215 10UF 10% 6.3V X5R 805-2
CRITICAL C1216 10UF 10% 6.3V X5R 805-2
CRITICAL C1217 10UF 10% 6.3V X5R 805-2
CRITICAL C1218 10UF 10% 6.3V X5R 805-2
CRITICAL C1219 10UF 10% 6.3V X5R 805-2

LAYOUT NOTE:
PLACE ON BOTTOMSIDE

CRITICAL C1250 330UF 10% 2.0V TANT D2T
CRITICAL C1251 330UF 10% 2.0V TANT D2T
CRITICAL C1252 330UF 10% 2.0V TANT D2T
CRITICAL C1253 330UF 10% 2.0V TANT D2T

LAYOUT NOTE:
PLACE ON BOTTOMSIDE

C1250, C1251, C1252 AND C1253 NEED TO USE 6mOHM CAPS.

VCCA (CPU AVdd) DECOUPLING

10B7 7C7 =PP1V5_S0_CPU

1x 10uF, 1x 0.01uF

C1280 10uF 20% 6.3V X5R 603
C1281 0.01UF 10% 16V CERM 402

LAYOUT NOTE:
PLACE C1281 NEAR PIN B26 OF U1000

VCCP (CPU I/O) DECOUPLING

12C5 12B3 10C7 9D5 9C5 9B6 9B5 7C7 =PP1V05_S0_CPU

1X 330UF, 6X 0.1UF

CRITICAL C1235 330uF 10% 2.5V TANT D2T
C1236 0.1UF 20% 10V CERM 402
C1237 0.1UF 20% 10V CERM 402
C1238 0.1UF 20% 10V CERM 402
C1239 0.1UF 20% 10V CERM 402
C1240 0.1UF 20% 10V CERM 402
C1241 0.1UF 20% 10V CERM 402

LAYOUT NOTE:
PLACE C1235 CLOSE TO CPU

CPU Decoupling & VID

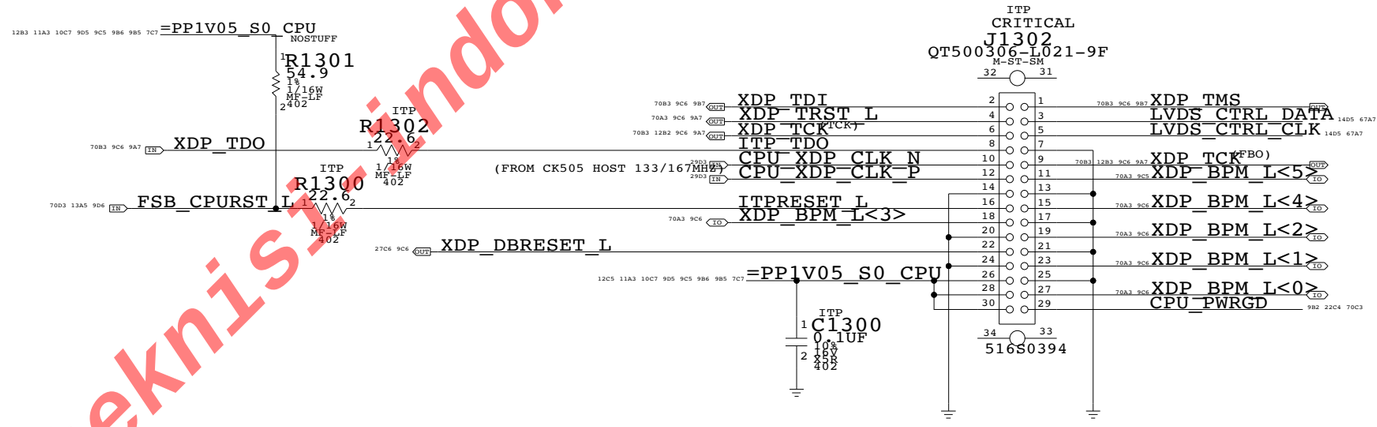
SYNC_MASTER=MSARWAR SYNC_DATE=04/26/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	11	76

CPU ITP700FLEX DEBUG SUPPORT



(DBA#) INDICATE THAT ITP IS USING TAP I/F, NC IN 965GM CHIPSET SYSTEM.
(DEBUG PORT ACTIVE)
(DBR#) TO ICH8M SYS_RST*, AND WITH SYSTEM RESET LOGIC
(DEBUG PORT RESET)

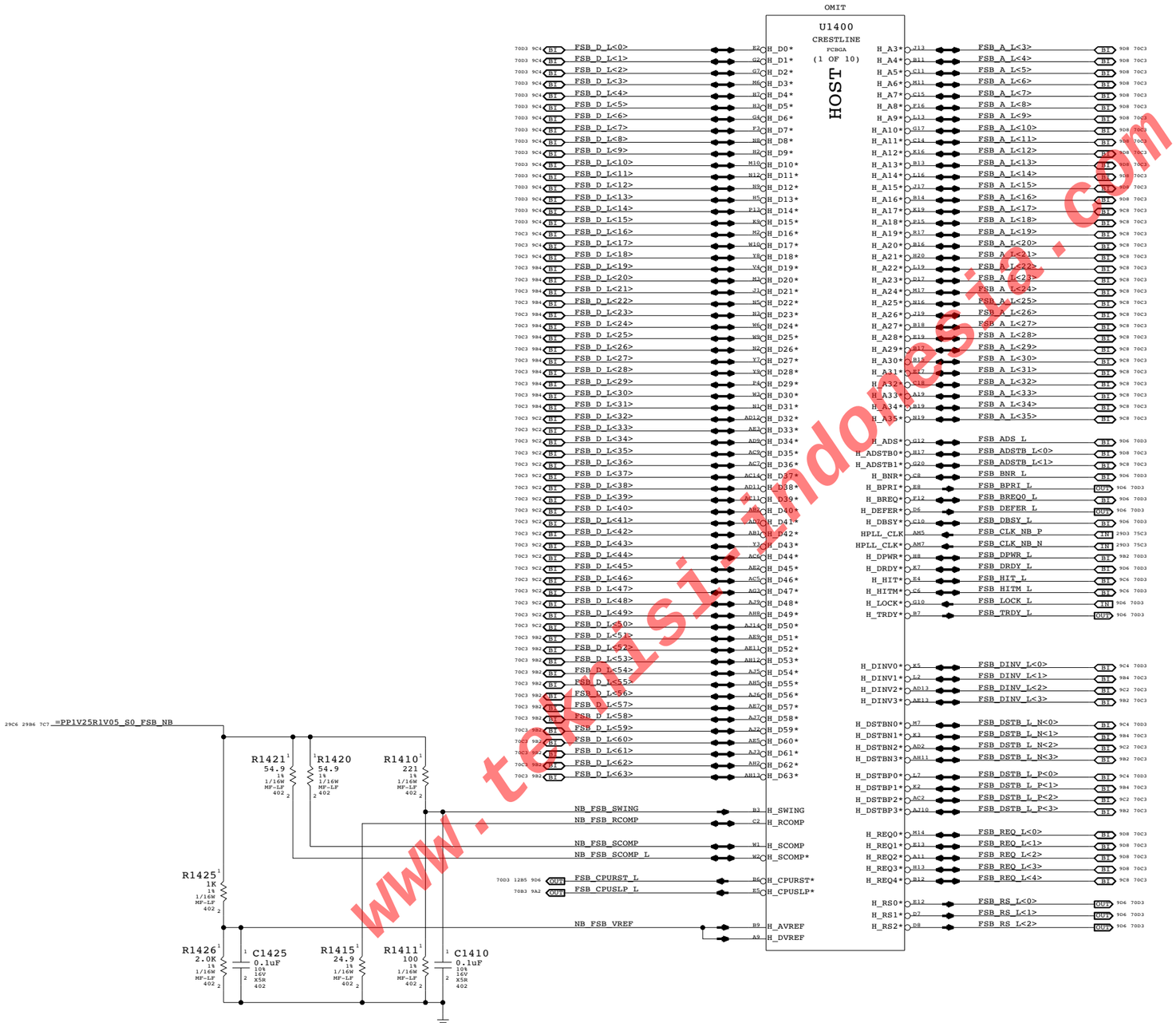
ITP TCK SIGNAL LAYOUT NOTE:
ROUTE THE TCK SIGNAL FROM ITP700FLEX CONNECTOR'S TCK PIN TO CPU'S TCK PIN AND THEN FORK BACK FROM CPU TCK PIN AND ROUTE BACK TO ITP700FLEX CONNECTOR'S FBO PIN.

CPU ITP700FLEX DEBUG
SYNC_MASTER=MASTER SYNC_DATE=5/23/05

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	12	76



NB CPU Interface

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	13	76

LVDS Disable

Can leave all signals NC if LVDS is not implemented.
Tie VCC_TX_LVDS and VCCA_LVDS to GND.

If SDVO is used, VCCD_LVDS must remain powered with proper decoupling. Otherwise, tie VCCD_LVDS to GND also.

TV-Out Signal Usage:

Composite: DACA only
S-Video: DACB & DACC only
Component: DACA, DACB & DACC

Unused DAC outputs must remain powered, but can omit filtering components. Unused DAC outputs should connect to GND through 75-ohm resistors.

TV-Out Disable / CRT Enable

Tie TVx_DAC and TVx_RTN to GND. Must power all TVDAC rails. VCCA_TVx_DAC and VCCA_DAC_BG can share filtering with VCCA_CRT_DAC.

CRT Disable / TV-Out Enable

Tie R/R#/G/G#/B/B#, HSYNC and VSYNC to GND. All CRT/TVDAC rails must be powered. All rails must be filtered except for VCCA_CRT.

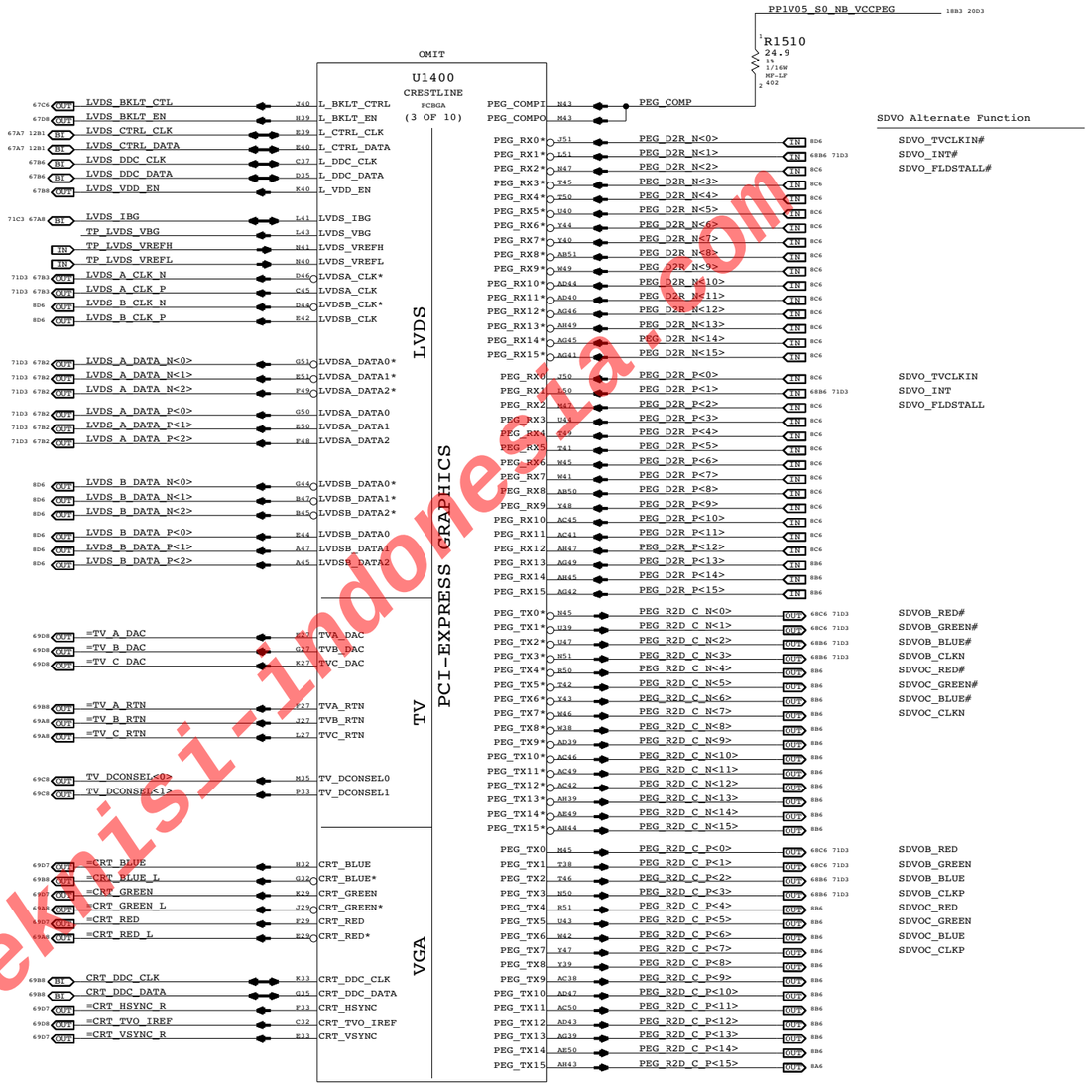
CRT & TV-Out Disable

Tie TVx_DAC, TVx_RTN, R/R#/G/G#/B/B#, HSYNC, VSYNC and CRT_TVO_IREF to GND.
Can tie the following rails to GND:
VCCA_CRT_DAC, VCCA_DAC_BG, VCCA_TVx_DAC, VCCD_CRT, VCCD_QDAC and VCC_SYNC.

NOTE: Must keep VDDC_TVDAC powered and filtered at all times!

Internal Graphics Disable

Follow instructions for LVDS and CRT & TV-Out Disable above.
Can also tie CRT_DDC_*, L_CTRL_*, L_DDC_*, SDVO_CTRL_* and TV_DCONSELx to GND.
Tie DPLL_REF_CLK and DPLL_REF_SSCLK to GND.
Tie DPLL_REF_CLK* and DPLL_REF_SSCLK* to VCC (VCore).
Tie VCCA_DPLLA and VCCA_DPLLB to VCC (VCore).
Tie VCC_AXG and VCC_AXG_NCTF to GND.
Leave GFX_VID<3..0> and GFX_VR_EN as NC.



NB PEG / Video Interfaces

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE | SHT 14 OF 76

NB_CFG<3>	RESERVED
NB_CFG<4>	RESERVED
NB_CFG<5> DMI x2 Select	High = DMIx4 Low = DMIx2
NB_CFG<6>	RESERVED
NB_CFG<7>	RESERVED
NB_CFG<8>	RESERVED
NB_CFG<9> PCIe Graphics Lane Reversal	High = Normal Low = Reversed
NB_CFG<10>	RESERVED
NB_CFG<11>	RESERVED
NB_CFG<12>	See Below
NB_CFG<13>	See Below
NB_CFG<14>	RESERVED
NB_CFG<15>	RESERVED
NB_CFG<16> FSB Dynamic ODT	High = Enabled Low = Disabled
NB_CFG<17>	RESERVED
NB_CFG<18>	RESERVED
NB_CFG<19> DMI Lane Reversal	High = Reversed Low = Normal
NB_CFG<20> Concurrent SDVO/PCIe x1	High = Both active Low = Only SDVO or PCIe x16

NB_CFG<13:12>

00 = RESERVED
01 = XOR Mode Enabled
10 = All-Z Mode Enabled
11 = Normal Operation

NB_CFG<5> 15B6
NBCFG_DMI_X2
R1655 3.9K 5% 1/16W MF-LF 402

NB_CFG<9> 15B6
NBCFG_PEG_REVERSE
R1659 3.9K 5% 1/16W MF-LF 402

NB_CFG<16> 15B6
NBCFG_DYN_ODT_DISABLE
R1666 3.9K 5% 1/16W MF-LF 402

=PP3V3_S0_NB_VCCHV 7D4 15B7 15C7 18B3 20A8 21B7
NBCFG_DMI_REVERSE
R1669 3.9K 5% 1/16W MF-LF 402
NB_CFG<19> 15B6

=PP3V3_S0_NB_VCCHV 7D4 15B7 15C7 18B3 20A8 21B7
NBCFG_SDVO_AND_PCIE
R1670 3.9K 5% 1/16W MF-LF 402
NB_CFG<20> 15B6

NB CFG<8:0> used for debug access

NB CFG<13:12> require ICT access

21B7 20A8 18B3 15C7 7D4 =PP3V3_S0_NB_VCCHV
R1630 10K 5% 1/16W MF-LF 402
R1631 10K 5% 1/16W MF-LF 402
44B8 8B2 IN PM_EXTTS_L<0>
44B8 8B2 IN PM_EXTTS_L<1>

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FCBGA
(2 OF 10)

RSVD

TP_NB_RSVD<1>	P16	RSVD1
TP_NB_RSVD<2>	P17	RSVD2
TP_NB_RSVD<3>	R35	RSVD3
TP_NB_RSVD<4>	N35	RSVD4
TP_NB_RSVD<5>	AR12	RSVD5
TP_NB_RSVD<6>	AR13	RSVD6
TP_NB_RSVD<7>	AM12	RSVD7
TP_NB_RSVD<8>	AN13	RSVD8
TP_NB_RSVD<9>	J12	RSVD9
TP_NB_RSVD<10>	AR37	RSVD10
TP_NB_RSVD<11>	AM36	RSVD11
TP_NB_RSVD<12>	AL36	RSVD12
TP_NB_RSVD<13>	AM37	RSVD13
TP_NB_RSVD<14>	D20	RSVD14
TP_NB_RSVD<20>	H10	RSVD20
TP_NB_RSVD<21>	B51	RSVD21
TP_NB_RSVD<22>	BJ20	RSVD22
TP_NB_RSVD<23>	BK22	RSVD23
TP_NB_RSVD<24>	BF19	RSVD24
TP_NB_RSVD<25>	BH20	RSVD25
TP_NB_RSVD<26>	BK18	RSVD26
TP_NB_RSVD<27>	BJ18	RSVD27
TP_MEM_CLKP2	BF23	SM_CK2
TP_MEM_CLKN2	BG23	SM_CK2*
TP_MEM_CLKP5	BC23	SM_CK5
TP_MEM_CLKN5	BD24	SM_CK5*
MEM_A_A<14>	BJ29	SA_MA14
MEM_B_A<14>	BE24	SB_MA14
TP_NB_RSVD<34>	BH39	RSVD34
TP_NB_RSVD<35>	AW20	RSVD35
TP_NB_RSVD<36>	BK20	RSVD36
TP_LVDS_A_DATAN3	C48	RSVD37
TP_LVDS_A_DATAP3	D47	RSVD38
TP_LVDS_B_DATAN3	B44	RSVD39
TP_LVDS_B_DATAP3	C44	RSVD40
TP_NB_RSVD<41>	A35	RSVD41
TP_NB_RSVD<42>	B37	RSVD42
TP_NB_RSVD<43>	B36	RSVD43
TP_NB_RSVD<44>	B34	RSVD44
TP_NB_RSVD<45>	C34	RSVD45

CFG

NB_BSEL<0>	P27	CFG0	
NB_BSEL<1>	N27	CFG1	
NB_BSEL<2>	N24	CFG2	
NB_CFG<3>	C21	CFG3	IPU
NB_CFG<4>	C23	CFG4	IPU
NB_CFG<5>	F23	CFG5	IPU
NB_CFG<6>	N21	CFG6	IPU
NB_CFG<7>	G23	CFG7	IPU
NB_CFG<8>	J20	CFG8	IPU
NB_CFG<9>	C20	CFG9	IPU
TP_NB_CFG<10>	R24	CFG10	IPU
TP_NB_CFG<11>	L23	CFG11	IPU
TP_NB_CFG<12>	J23	CFG12	IPU
TP_NB_CFG<13>	E23	CFG13	IPU
TP_NB_CFG<14>	E20	CFG14	IPU
TP_NB_CFG<15>	K23	CFG15	IPU
NB_CFG<16>	R20	CFG16	IPU
TP_NB_CFG<17>	N24	CFG17	IPU
TP_NB_CFG<18>	L22	CFG18	IPD
NB_CFG<19>	N33	CFG19	IPD
NB_CFG<20>	L35	CFG20	IPD

PM

PM_BMBUSY_L	G41	PM_BM_BUSY*
CPU_DPRSTP_L	L33	PM_DPRSTP*
	L34	PM_EXT_TS0*
	J35	PM_EXT_TS1*
VR_PWRGOOD_DELAY	AM49	PWROK
NB_RESET_L	AV23	RSTIN*
PM_THRMTRIP_L	N20	THERMTRIP*
PM_DPRSLPVR	G36	DPRSLPVR

NC

TP_NB_NC<1>	BJ51	NC1
TP_NB_NC<2>	BK51	NC2
TP_NB_NC<3>	BK50	NC3
TP_NB_NC<4>	BL50	NC4
TP_NB_NC<5>	BL49	NC5
TP_NB_NC<6>	BL3	NC6
TP_NB_NC<7>	BL2	NC7
TP_NB_NC<8>	BK1	NC8
TP_NB_NC<9>	BJ1	NC9
TP_NB_NC<10>	B1	NC10
TP_NB_NC<11>	A5	NC11
TP_NB_NC<12>	C51	NC12
TP_NB_NC<13>	B50	NC13
TP_NB_NC<14>	A50	NC14
TP_NB_NC<15>	A49	NC15
TP_NB_NC<16>	BK2	NC16

DDR MUXING

SM_CK0	AV29	MEM_CLK_P<0>	OUT 30D4 72D3
SM_CK1	BB23	MEM_CLK_P<1>	OUT 30A4 72D3
SM_CK3	BA25	MEM_CLK_P<3>	OUT 31D4 72B3
SM_CK4	AV23	MEM_CLK_P<4>	OUT 31A4 72B3
SM_CK0*	AW30	MEM_CLK_N<0>	OUT 30D4 72D3
SM_CK1*	BA23	MEM_CLK_N<1>	OUT 30A4 72D3
SM_CK3*	AW25	MEM_CLK_N<3>	OUT 31D4 72B3
SM_CK4*	AW23	MEM_CLK_N<4>	OUT 31A4 72B3
SM_CKE0	BE29	MEM_CKE<0>	OUT 30C6 32D6 72D3
SM_CKE1	AY32	MEM_CKE<1>	OUT 30C4 32D6 72D3
SM_CKE3	BD39	MEM_CKE<3>	OUT 31C6 32D6 72B3
SM_CKE4	BG37	MEM_CKE<4>	OUT 31C4 32D5 72B3
SM_CS0*	BG20	MEM_CS_L<0>	OUT 30B4 32D6 72D3
SM_CS1*	BK16	MEM_CS_L<1>	OUT 30B6 32D6 72D3
SM_CS2*	BG16	MEM_CS_L<2>	OUT 31B4 32D6 72B3
SM_CS3*	BE13	MEM_CS_L<3>	OUT 31B6 32D6 72B3
SM_ODT0	BH18	MEM_ODT<0>	OUT 30B4 32D6 72D3
SM_ODT1	BJ15	MEM_ODT<1>	OUT 30B6 32D6 72D3
SM_ODT2	BJ14	MEM_ODT<2>	OUT 31B4 32D6 72B3
SM_ODT3	BE16	MEM_ODT<3>	OUT 31B6 32D6 72B3
SM_RCOMP	BL15	MEM_RCOMP	
SM_RCOMP*	BK14	MEM_RCOMP_L	
SM_RCOMP_VOH	BK31	MEM_RCOMP_VOH	
SM_RCOMP_VOL	BL31	MEM_RCOMP_VOL	
SM_VREF0	AR49	=PP0V9_S3M_MEM_NBVREFA	IN 20A5
SM_VREF1	AN4	=PP0V9_S3M_MEM_NBVREFB	IN 20A4

31D2 30D2 20C8 17D7 7A4 =PP1V8_S3M_MEM_NB
R1610 20 1% 1/16W MF-LF 402
R1620 1K 1% 1/16W MF-LF 402
C1623 0.01UF 10% 16V CERM 402
C1622 2.2UF 20% 6.3V CERM1 603
R1622 3.01K 1% 1/16W MF-LF 402
R1611 20 1% 1/16W MF-LF 402
C1625 0.01UF 10% 16V CERM 402
C1624 2.2UF 20% 6.3V CERM1 603
R1624 1K 1% 1/16W MF-LF 402
C1615 0.1uF 20% 10V CERM 402
C1616 0.1uF 20% 10V CERM 402

CLK

DPLL_REF_CLK	B42	=NB_CLK96M_DOT_P	IN 8B2
DPLL_REF_CLK*	C42	=NB_CLK96M_DOT_N	IN 8B2
DPLL_REF_SSCLK	H48	=NB_CLK100M_DPLLSS_P	IN 8B2
DPLL_REF_SSCLK*	H47	=NB_CLK100M_DPLLSS_N	IN 8B2
PEG_CLK	AK44	NB_CLK100M_PCIE_P	IN 29C3 75B3
PEG_CLK*	AK45	NB_CLK100M_PCIE_N	IN 29C3 75B3

Clk used for PEG and DMI

DMI

DMI_RXN0	AN47	DMI_S2N_N<0>	IN 23D2 71D3
DMI_RXN1	AJ38	DMI_S2N_N<1>	IN 23D2 71D3
DMI_RXN2	AN42	DMI_S2N_N<2>	IN 23D2 71D3
DMI_RXN3	AN46	DMI_S2N_N<3>	IN 23D2 71D3
DMI_RXP0	AM47	DMI_S2N_P<0>	IN 23D2 71D3
DMI_RXP1	AJ39	DMI_S2N_P<1>	IN 23D2 71D3
DMI_RXP2	AN41	DMI_S2N_P<2>	IN 23D2 71D3
DMI_RXP3	AN45	DMI_S2N_P<3>	IN 23D2 71D3
DMI_TXN0	AJ46	DMI_N2S_N<0>	OUT 23D2 71D3
DMI_TXN1	AJ41	DMI_N2S_N<1>	OUT 23D2 71D3
DMI_TXN2	AM40	DMI_N2S_N<2>	OUT 23D2 71D3
DMI_TXN3	AM44	DMI_N2S_N<3>	OUT 23D2 71D3
DMI_TXP0	AJ47	DMI_N2S_P<0>	OUT 23D2 71D3
DMI_TXP1	AJ42	DMI_N2S_P<1>	OUT 23D2 71D3
DMI_TXP2	AM39	DMI_N2S_P<2>	OUT 23D2 71D3
DMI_TXP3	AM43	DMI_N2S_P<3>	OUT 23D2 71D3

GRAPHICS VID

GFX_VID0	E35	GFX_VID<0>	OUT 21B6 60C6
GFX_VID1	A39	GFX_VID<1>	OUT 21B6 60C6
GFX_VID2	C38	GFX_VID<2>	OUT 21B6 60C6
GFX_VID3	B39	GFX_VID<3>	OUT 21B6 60C6
GFX_VR_EN	E36	=GFX_VR_EN	OUT 8B2
		GFX_VID<4>	OUT 60C6

R1600 0 5% 1/16W MF-LF 402

ME

CL_CLK	AM49	CLINK_NB_CLK	BI 24C3 74A3
CL_DATA	AK50	CLINK_NB_DATA	BI 24C3 74A3
CL_PWROK	AT43	=NB_CLINK_MPWROK	IN 8B2
CL_RST*	AN49	CLINK_NB_RESET_L	OUT 24C3 74A3
CL_VREF	AM50	NB_CLINK_VREF	74A3

MISC

SDVO_CTRL_CLK	H35	SDVO_CTRLCLK	BI 68A6
SDVO_CTRL_DATA	K36	SDVO_CTRLDATA	BI 68A6
CLKREQ*	G39	NB_CLKREQ_L	OUT 28B4
ICH_SYNC*	G40	NB_SB_SYNC_L	OUT 24B5
TEST1	A37	NB_TEST1	
TEST2	R32	NB_TEST2	

R1691 20K 5% 1/16W MF-LF 402
R1690 0 5% 1/16W MF-LF 402

PP1V25_S0M_NB_VCCAXD 18C3 20A6
R1640 1K 1% 1/16W MF-LF 402
C1640 0.1uF 20% 10V CERM 402
R1641 392 1% 1/16W MF-LF 402

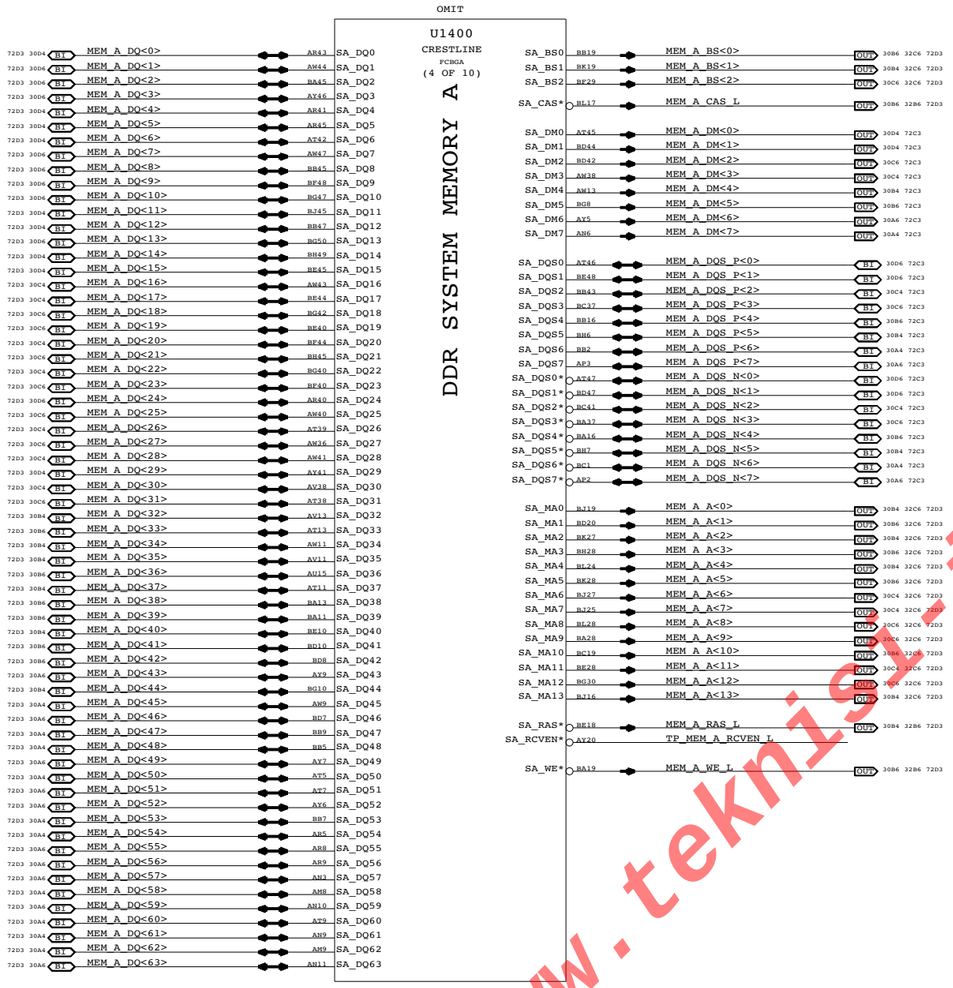
NOTE: GMCH CL_PWROK input must be PWRGD signal for PP3V3_S0M, PP3V3_S0MWOL, PP1V8_S3M, PP1V25_S0M, PP1V05_S0M, PP0V9_S3M and PP0V9_S0M.
If ME/AMT is not used, short CL_PWROK to PWROK.

NB Misc Interfaces

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 15 OF 76	



NB DDR2 Interfaces

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	16	76

U1400
CRESTLINE
(6 OF 10)
OMIT

=PPVCORE_S0_NB
1310 mA (Ext Graphics)
1573 mA (Int Graphics)

VCC CORE POWER
VCC1 AT35
VCC2 AT34
VCC3 AH28
VCC5 AC32
VCC4 AC31
VCC6 AK32
VCC7 AJ31
VCC8 AJ28
VCC9 AH32
VCC10 AH31
VCC11 AH29
VCC12 AF32
VCC13 R30

=PP1V8_S3M_MEM_NB
3300 mA (2 ch, 667MHz)
2700 mA (2 ch, 533MHz)
1700 mA (1 ch, 667MHz)
1395 mA (1 ch, 533MHz)
5 mA (standby)

VCC SM
VCC_SM1 AU32
VCC_SM2 AU33
VCC_SM3 AU35
VCC_SM4 AV33
VCC_SM5 AW33
VCC_SM6 AW35
VCC_SM7 AY35
VCC_SM8 BA32
VCC_SM9 BA33
VCC_SM10 BA35
VCC_SM11 BB33
VCC_SM12 BC32
VCC_SM13 BC33
VCC_SM14 BC35
VCC_SM15 BD32
VCC_SM16 BD35
VCC_SM17 BE32
VCC_SM18 BE33
VCC_SM19 BE35
VCC_SM20 BF33
VCC_SM21 BF34
VCC_SM22 BG32
VCC_SM23 BG33
VCC_SM24 BG35
VCC_SM25 BH32
VCC_SM26 BH34
VCC_SM27 BH35
VCC_SM28 BJ32
VCC_SM29 BJ33
VCC_SM30 BJ34
VCC_SM31 BK32
VCC_SM32 BK33
VCC_SM33 BK34
VCC_SM34 BK35
VCC_SM35 BL33
VCC_SM36 AU30

=PPVCORE_S0_NB_GFX
7700 mA (Int Graphics)

VCC GFX
VCC_AXG1 R20
VCC_AXG2 T14
VCC_AXG3 W13
VCC_AXG4 W14
VCC_AXG5 Y12
VCC_AXG6 AA20
VCC_AXG7 AA23
VCC_AXG8 AA26
VCC_AXG9 AA28
VCC_AXG10 AB21
VCC_AXG11 AB24
VCC_AXG12 AB29
VCC_AXG13 AC20
VCC_AXG14 AC21
VCC_AXG15 AC23
VCC_AXG16 AC24
VCC_AXG17 AC26
VCC_AXG18 AC28
VCC_AXG19 AC29
VCC_AXG20 AD20
VCC_AXG21 AD23
VCC_AXG22 AD24
VCC_AXG23 AD28
VCC_AXG24 AF21
VCC_AXG25 AF26
VCC_AXG26 AA31
VCC_AXG27 AH20
VCC_AXG28 AH21
VCC_AXG29 AH23
VCC_AXG30 AH24
VCC_AXG31 AH26
VCC_AXG32 AD31
VCC_AXG33 AJ20
VCC_AXG34 AH14

VCC GFX NCTF
VCC_AXG_NCTF1 T17
VCC_AXG_NCTF2 T18
VCC_AXG_NCTF3 T19
VCC_AXG_NCTF4 T21
VCC_AXG_NCTF5 T22
VCC_AXG_NCTF6 T23
VCC_AXG_NCTF7 T25
VCC_AXG_NCTF8 U15
VCC_AXG_NCTF9 U16
VCC_AXG_NCTF10 U17
VCC_AXG_NCTF11 U19
VCC_AXG_NCTF12 U20
VCC_AXG_NCTF13 U21
VCC_AXG_NCTF14 U23
VCC_AXG_NCTF15 U26
VCC_AXG_NCTF16 V16
VCC_AXG_NCTF17 V17
VCC_AXG_NCTF18 V19
VCC_AXG_NCTF19 V20
VCC_AXG_NCTF20 V21
VCC_AXG_NCTF21 V23
VCC_AXG_NCTF22 V24
VCC_AXG_NCTF23 Y15
VCC_AXG_NCTF24 Y16
VCC_AXG_NCTF25 Y17
VCC_AXG_NCTF26 Y19
VCC_AXG_NCTF27 Y20
VCC_AXG_NCTF28 Y21
VCC_AXG_NCTF29 Y23
VCC_AXG_NCTF20 Y24
VCC_AXG_NCTF31 Y26
VCC_AXG_NCTF32 Y28
VCC_AXG_NCTF33 Y29
VCC_AXG_NCTF34 AA16
VCC_AXG_NCTF35 AA17
VCC_AXG_NCTF36 AB16
VCC_AXG_NCTF37 AB19
VCC_AXG_NCTF38 AC16
VCC_AXG_NCTF39 AC17
VCC_AXG_NCTF40 AC19
VCC_AXG_NCTF41 AD15
VCC_AXG_NCTF42 AD16
VCC_AXG_NCTF43 AD17
VCC_AXG_NCTF44 AF16
VCC_AXG_NCTF45 AF19
VCC_AXG_NCTF46 AH15
VCC_AXG_NCTF47 AH16
VCC_AXG_NCTF48 AH17
VCC_AXG_NCTF49 AH19
VCC_AXG_NCTF50 AJ16
VCC_AXG_NCTF51 AJ17
VCC_AXG_NCTF52 AJ19
VCC_AXG_NCTF53 AK16
VCC_AXG_NCTF54 AK19
VCC_AXG_NCTF55 AL16
VCC_AXG_NCTF56 AL17
VCC_AXG_NCTF57 AL19
VCC_AXG_NCTF58 AL20
VCC_AXG_NCTF59 AL21
VCC_AXG_NCTF60 AL23
VCC_AXG_NCTF61 AM15
VCC_AXG_NCTF62 AM16
VCC_AXG_NCTF63 AM19
VCC_AXG_NCTF64 AM20
VCC_AXG_NCTF65 AM21
VCC_AXG_NCTF66 AM23
VCC_AXG_NCTF67 AP15
VCC_AXG_NCTF68 AP16
VCC_AXG_NCTF69 AP17
VCC_AXG_NCTF70 AP19
VCC_AXG_NCTF71 AP20
VCC_AXG_NCTF72 AP21
VCC_AXG_NCTF73 AP23
VCC_AXG_NCTF74 AP24
VCC_AXG_NCTF75 AR20
VCC_AXG_NCTF76 AR21
VCC_AXG_NCTF77 AR23
VCC_AXG_NCTF78 AR24
VCC_AXG_NCTF79 AR26
VCC_AXG_NCTF80 V26
VCC_AXG_NCTF81 V24
VCC_AXG_NCTF82 V29
VCC_AXG_NCTF83 Y31

VCC SM LF
VCC_SM_LF1 AW45 NB_VCCSM_LF1
VCC_SM_LF2 BC39 NB_VCCSM_LF2
VCC_SM_LF3 BE39 NB_VCCSM_LF3
VCC_SM_LF4 BD17 NB_VCCSM_LF4
VCC_SM_LF5 BD4 NB_VCCSM_LF5
VCC_SM_LF6 AH8 NB_VCCSM_LF6
VCC_SM_LF7 AT6 NB_VCCSM_LF7

C1807 0.1uF 20% 10V CERM 402
C1806 0.1uF 20% 10V CERM 402
C1805 0.22UF 20% 6.3V X5R 402
C1804 0.22UF 20% 6.3V X5R 402
C1803 0.47UF 10% 4.3V CERM-X5R 402
C1802 1uF 10% 6.3V CERM 402
C1801 1uF 10% 6.3V CERM 402

Current numbers from Crestline EDS, doc #21749.

NCTF balls are Not Critical To Function
These connections can break without impacting part performance.

U1400
CRESTLINE
FCBGA
(7 OF 10)
OMIT

=PPVCORE_S0_NB

VCC NCTF
VCC_NCTF1 AB33
VCC_NCTF2 AB36
VCC_NCTF3 AB37
VCC_NCTF4 AC33
VCC_NCTF5 AC35
VCC_NCTF6 AC36
VCC_NCTF7 AD35
VCC_NCTF8 AD36
VCC_NCTF9 AF33
VCC_NCTF10 AF36
VCC_NCTF11 AH33
VCC_NCTF12 AH35
VCC_NCTF13 AH36
VCC_NCTF14 AH37
VCC_NCTF15 AJ33
VCC_NCTF16 AJ35
VCC_NCTF17 AK33
VCC_NCTF18 AK35
VCC_NCTF19 AK36
VCC_NCTF20 AK37
VCC_NCTF21 AD33
VCC_NCTF22 AJ36
VCC_NCTF23 AM35
VCC_NCTF24 AL33
VCC_NCTF25 AL35
VCC_NCTF26 AA33
VCC_NCTF27 AA35
VCC_NCTF28 AA36
VCC_NCTF29 AP35
VCC_NCTF30 AP36
VCC_NCTF31 AR35
VCC_NCTF32 AR36
VCC_NCTF33 Y32
VCC_NCTF34 Y33
VCC_NCTF35 Y35
VCC_NCTF36 Y36
VCC_NCTF37 Y37
VCC_NCTF38 T30
VCC_NCTF39 T34
VCC_NCTF40 T35
VCC_NCTF41 U29
VCC_NCTF42 U31
VCC_NCTF43 U32
VCC_NCTF44 U33
VCC_NCTF45 U35
VCC_NCTF46 U36
VCC_NCTF47 V32
VCC_NCTF48 V33
VCC_NCTF49 V36
VCC_NCTF50 V37

POWER
VSS NCTF
VSS_NCTF1 T27
VSS_NCTF2 T37
VSS_NCTF3 U24
VSS_NCTF4 U28
VSS_NCTF5 V31
VSS_NCTF6 V35
VSS_NCTF7 AA19
VSS_NCTF8 AB17
VSS_NCTF9 AB35
VSS_NCTF10 AD19
VSS_NCTF11 AD37
VSS_NCTF12 AF17
VSS_NCTF13 AF35
VSS_NCTF14 AK17
VSS_NCTF15 AM17
VSS_NCTF16 AM24
VSS_NCTF17 AP26
VSS_NCTF18 AP28
VSS_NCTF19 AR15
VSS_NCTF20 AR19
VSS_NCTF21 AR28

VSS SCB
VSS_SCB1 A3
VSS_SCB2 B2
VSS_SCB3 C1
VSS_SCB4 BL1
VSS_SCB5 BL51
VSS_SCB6 A51

=PP1V05_S0M_NB_VCCAXM
540 mA

VCC AXM
VCC_AXM1 AT33
VCC_AXM2 AT31
VCC_AXM3 AK29
VCC_AXM4 AK24
VCC_AXM5 AK23
VCC_AXM6 AJ26
VCC_AXM7 AJ23

=PP1V05_S0M_NB_VCCAXM

VCC AXM NCTF
VCC_AXM_NCTF1 AL24
VCC_AXM_NCTF2 AL26
VCC_AXM_NCTF3 AL28
VCC_AXM_NCTF4 AM26
VCC_AXM_NCTF5 AM28
VCC_AXM_NCTF6 AM29
VCC_AXM_NCTF7 AM31
VCC_AXM_NCTF8 AM32
VCC_AXM_NCTF9 AM33
VCC_AXM_NCTF10 AP29
VCC_AXM_NCTF11 AP31
VCC_AXM_NCTF12 AP32
VCC_AXM_NCTF13 AP33
VCC_AXM_NCTF14 AL29
VCC_AXM_NCTF15 AL31
VCC_AXM_NCTF16 AL32
VCC_AXM_NCTF17 AR31
VCC_AXM_NCTF18 AR32
VCC_AXM_NCTF19 AR33

NB Power 1
SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

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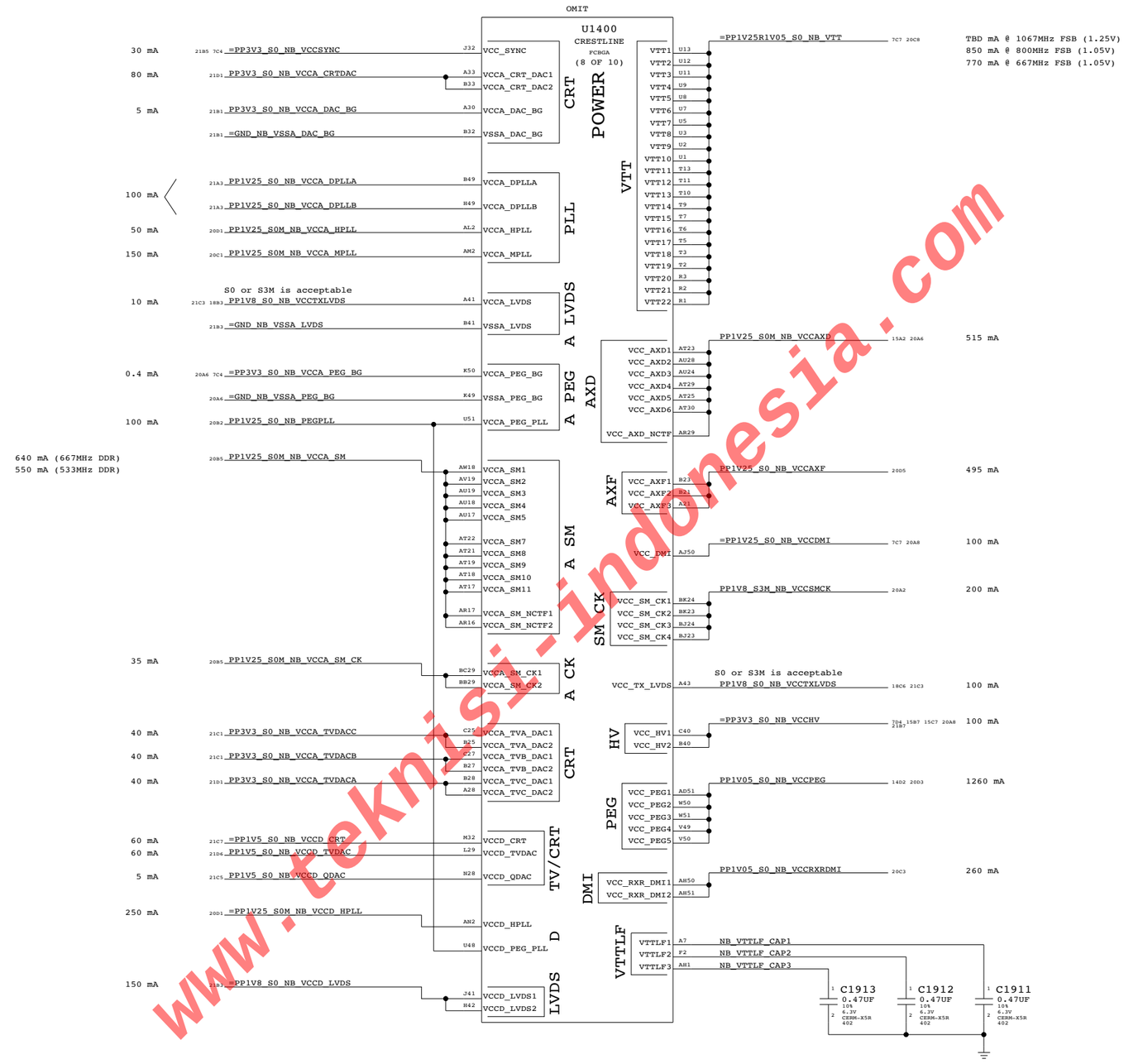
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 17 OF 76	



Current numbers from Crestline EDS, doc #21749.

NB Power 2

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	18	76

OMIT

U1400
CRESTLINE
FCBGA
(9 OF 10)
VSS

A13	VSS1	VSS100	AW24
A15	VSS2	VSS101	AW29
A17	VSS3	VSS102	AW32
A24	VSS4	VSS103	AW5
AA21	VSS5	VSS104	AW7
AA24	VSS6	VSS105	AY10
AA29	VSS7	VSS106	AY24
AB20	VSS8	VSS107	AY37
AB23	VSS9	VSS108	AY42
AB26	VSS10	VSS109	AY43
AB28	VSS11	VSS110	AY45
AB31	VSS12	VSS111	AY47
AC10	VSS13	VSS112	AY50
AC13	VSS14	VSS113	B10
AC3	VSS15	VSS114	B20
AC39	VSS16	VSS115	B24
AC43	VSS17	VSS116	B29
AC47	VSS18	VSS117	B30
AD1	VSS19	VSS118	B35
AD21	VSS20	VSS119	B38
AD26	VSS21	VSS120	B43
AD29	VSS22	VSS121	B46
AD3	VSS23	VSS122	B5
AD41	VSS24	VSS123	B8
AD45	VSS25	VSS124	BA1
AD49	VSS26	VSS125	BA17
AD5	VSS27	VSS126	BA18
AD50	VSS28	VSS127	BA2
AD8	VSS29	VSS128	BA24
AE10	VSS30	VSS129	BB12
AE14	VSS31	VSS130	BB25
AE6	VSS32	VSS131	BB40
AF20	VSS33	VSS132	BB44
AF23	VSS34	VSS133	BB49
AF24	VSS35	VSS134	BB8
AF31	VSS36	VSS135	BC16
AG2	VSS37	VSS136	BC24
AG38	VSS38	VSS137	BC25
AG43	VSS39	VSS138	BC36
AG47	VSS40	VSS139	BC40
AG50	VSS41	VSS140	BC51
AH3	VSS42	VSS141	BD13
AH40	VSS43	VSS142	BD2
AH41	VSS44	VSS143	BD28
AH7	VSS45	VSS144	BD45
AH9	VSS46	VSS145	BD48
AJ11	VSS47	VSS146	BD5
AJ13	VSS48	VSS147	BE1
AJ21	VSS49	VSS148	BE19
AJ24	VSS50	VSS149	BE23
AJ29	VSS51	VSS150	BE30
AJ32	VSS52	VSS151	BE42
AJ43	VSS53	VSS152	BE51
AJ45	VSS54	VSS153	BE8
AJ49	VSS55	VSS154	BF12
AK20	VSS56	VSS155	BF16
AK21	VSS57	VSS156	BF36
AK26	VSS58	VSS157	BG19
AK28	VSS59	VSS158	BG2
AK31	VSS60	VSS159	BG24
AK51	VSS61	VSS160	BG29
AL1	VSS62	VSS161	BG39
AM11	VSS63	VSS162	BG48
AM13	VSS64	VSS163	BG5
AM3	VSS65	VSS164	BG51
AM4	VSS66	VSS165	BH17
AM41	VSS67	VSS166	BH30
AM45	VSS68	VSS167	BH44
AN1	VSS69	VSS168	BH46
AN38	VSS70	VSS169	BH8
AN39	VSS71	VSS170	BJ11
AN43	VSS72	VSS171	BJ13
AN5	VSS73	VSS172	BJ38
AN7	VSS74	VSS173	BJ4
AP4	VSS75	VSS174	BJ42
AP48	VSS76	VSS175	BJ46
AP50	VSS77	VSS176	BK15
AR11	VSS78	VSS177	BK17
AR2	VSS79	VSS178	BK25
AR39	VSS80	VSS179	BK29
AR44	VSS81	VSS180	BK36
AR47	VSS82	VSS181	BK40
AR7	VSS83	VSS182	BK48
AT10	VSS84	VSS183	BK6
AT14	VSS85	VSS184	BK8
AT41	VSS86	VSS185	BL11
AT49	VSS87	VSS186	BL13
AU1	VSS88	VSS187	BL19
AU23	VSS89	VSS188	BL22
AU29	VSS90	VSS189	BL37
AU3	VSS91	VSS190	BL47
AU36	VSS92	VSS191	C12
AU49	VSS93	VSS192	C16
AU51	VSS94	VSS193	C19
AV39	VSS95	VSS194	C28
AV48	VSS96	VSS195	C29
AW1	VSS97	VSS196	C33
AW12	VSS98	VSS197	C36
AW16	VSS99	VSS198	C41

OMIT

U1400
CRESTLINE
FCBGA
(10 OF 10)
VSS

C46	VSS199	VSS287	W11
C50	VSS200	VSS288	W39
C7	VSS201	VSS289	W43
D13	VSS202	VSS290	W47
D24	VSS203	VSS291	W5
D3	VSS204	VSS292	W7
D32	VSS205	VSS293	Y13
D39	VSS206	VSS294	Y2
D45	VSS207	VSS295	Y41
D49	VSS208	VSS296	Y45
E10	VSS209	VSS297	Y49
E16	VSS210	VSS298	Y5
E24	VSS211	VSS299	Y50
E28	VSS212	VSS300	Y11
E32	VSS213	VSS301	P29
E47	VSS214		
F19	VSS215		
F36	VSS216	TDE_SENSE	VSS302 T29
F4	VSS217		
F40	VSS218		
F50	VSS219	TDE_FORCE	VSS303 T31
G1	VSS220		
G13	VSS221		
G16	VSS222	TDB_FORCE	VSS304 T33
G19	VSS223		
G24	VSS224		
G28	VSS225	TDB_SENSE	VSS305 R28
G29	VSS226		
G33	VSS227		
G42	VSS228		
G45	VSS229	VSS306	AA32
G48	VSS230	VSS307	AB32
G8	VSS231	VSS308	AD32
H24	VSS232	VSS309	AF28
H28	VSS233	VSS310	AF29
H4	VSS234	VSS311	AT27
H45	VSS235	VSS312	AV25
J11	VSS236	VSS313	H50
J16	VSS237		
J2	VSS238		
J24	VSS239		
J28	VSS240		
J33	VSS241		
J35	VSS242		
J39	VSS243		
K12	VSS245		
K47	VSS246		
K8	VSS247		
L1	VSS248		
L17	VSS249		
L20	VSS250		
L24	VSS251		
L28	VSS252		
L3	VSS253		
L33	VSS254		
L49	VSS255		
M28	VSS256		
M42	VSS257		
M46	VSS258		
M49	VSS259		
M5	VSS260		
M50	VSS261		
M9	VSS262		
N11	VSS263		
N14	VSS264		
N17	VSS265		
N29	VSS266		
N32	VSS267		
N36	VSS268		
N39	VSS269		
N44	VSS270		
N49	VSS271		
N7	VSS272		
P19	VSS273		
P2	VSS274		
P23	VSS275		
P3	VSS276		
P50	VSS277		
R49	VSS278		
T39	VSS279		
T43	VSS280		
T47	VSS281		
U41	VSS282		
U45	VSS283		
U50	VSS284		
V2	VSS285		
V3	VSS286		

Crestline Thermal Diode Pins

Mainly for investigation. If not used, alias these nets directly to GND.

=NB_TDE_SENSE 8A2

NOTE: TDE = _P

=NB_TDE_FORCE 8A2

=NB_TDB_FORCE 8A2

NOTE: TDB = _N

=NB_TDB_SENSE 8A2

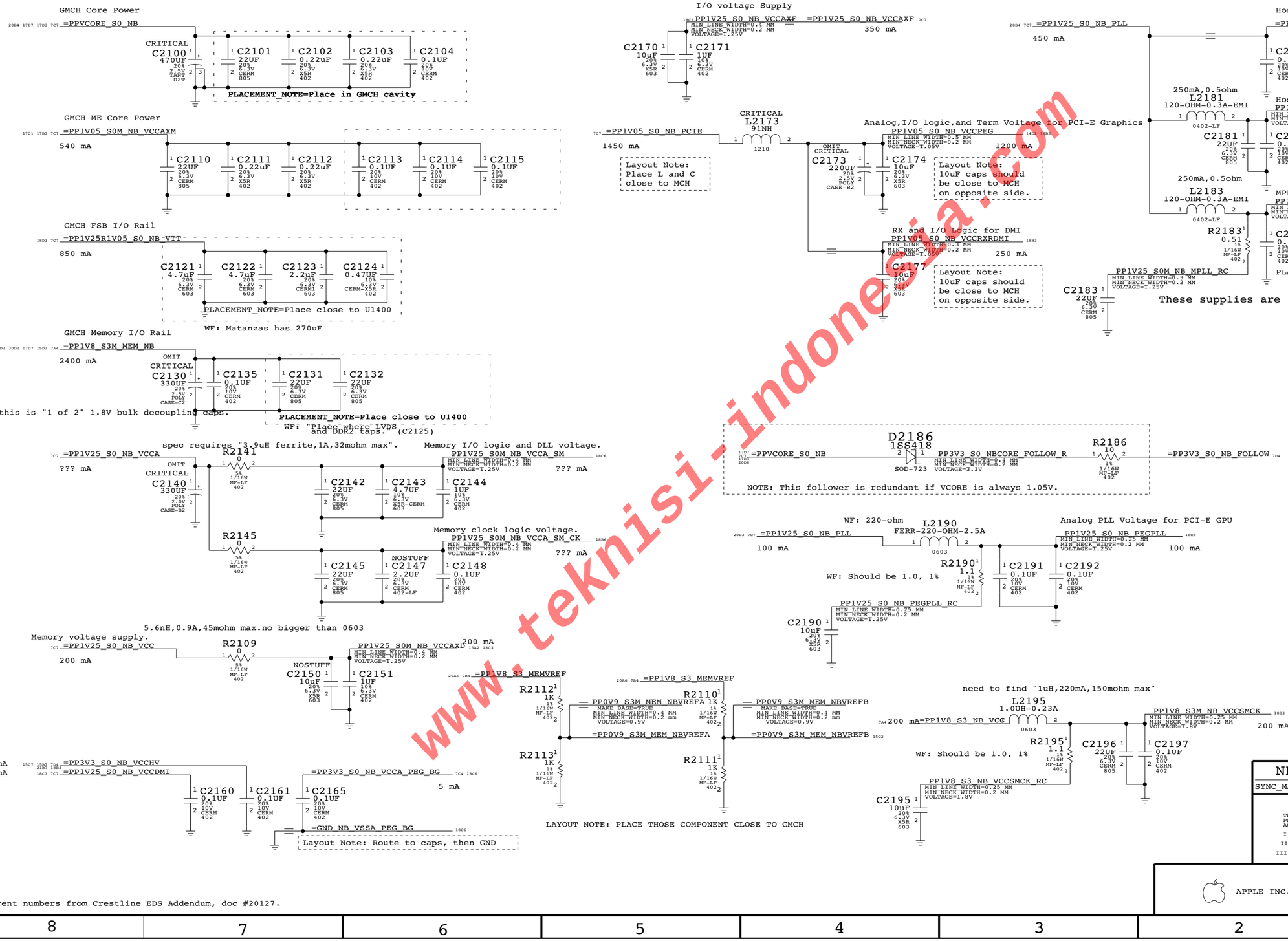
NB Grounds

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 19 OF 76



NOTE: This filter is required even if using only external graphics.
VCCD_TVDAC also powers internal thermal sensors.

=PP1V5_S0_NB_TVDAC
65 mA
R2205 100 5% 1/16W MF-LF 402
CRITICAL C2201 22000pF-1000mA 16V NPM18
C2200 0.1UF 20% 10V CERM 402
PP1V5_S0_NB_VCCD_TVDAC
PP1V5_S0_NB_VCCD_CRT
60 mA
6 mA
=PP1V5_S0_NB_VCCD_CRT
PP1V5_S0_NB_VCCD_CRT
MAKE_BASE=TRUE

PP1V5_S0_NB_QDAC
CRITICAL C2206 22000pF-1000mA 16V NPM18
C2205 1UF 10% 10V X5R 402
PP1V5_S0_NB_VCCD_QDAC
5 mA
C2207 0.1UF 20% 10V CERM 402
Layout Note: These 4 caps should be within 6.35 mm of NB edge

=PP5V_S0_NB_TVDAC
205 mA
R2281 0 5% 1/16W MF-LF 402
C2280 1UF 10% 6.3V CERM 402
C2281 1UF 10% 6.3V CERM 402 NO STUFF
P3V3TVDAC_EN_R
CRITICAL U2280 TPS79933 SON
IN OUT EN NR NC GND THRML PAD
MIN_LINE_WIDTH=0.6MM MIN_NECK_WIDTH=0.2MM VOLTAGE=3.3V
PP3V3_S0_NB_TVDAC 205 mA
P3V3TVDAC_NOISE
C2282 0.01UF 10% 16V CERM 402
C2285 10UF 20% 6.3V X5R 603
L2288 120-OHM-0.3A-EMI 0402-LF
PP3V3_S0_NB_CRTDAC_F
80 mA
CRITICAL C2289 22000pF-1000mA 16V NPM18
C2288 0.1UF 20% 10V CERM 402
PP3V3_S0_NB_VCCA_CRTDAC
80 mA
Layout Note: These 2 caps should be within 6.35 mm of NB edge

NO STUFF D2285 1SS418 SOD-723
=PP1V5_S0_NB_FOLLOW
PP3V3_S0_NB_TVDAC_FOLLOW
NO STUFF R2285 10 1% 1/16W MF-LF 402
L2290 120-OHM-0.3A-EMI 0402-LF
C2290 10UF 20% 6.3V X5R 603
PP3V3_S0_NB_TVDAC_F
125 mA
CRITICAL C2292 22000pF-1000mA 16V NPM18
C2291 0.1UF 20% 10V CERM 402
PP3V3_S0_NB_VCCA_TVDACA
40 mA

GMCH Graphics Core Power
=PPVCORE_S0_NB_GFX
7700 mA
CRITICAL C2210 470UF 20% 2.5V TANT D2T
WF: Matanzas has 2x 330uF
C2212 22UF 20% 6.3V CERM 805
C2213 10UF 20% 6.3V X5R 603
C2214 1UF 10% 6.3V CERM 402
C2215 0.47UF 10% 6.3V CERM-X5R 402
C2216 0.1UF 20% 10V CERM 402
C2217 0.1UF 20% 10V CERM 402
PLACEMENT_NOTE=Place in GMCH cavity

PP3V3_S0_NB_VCCA_TVDACB
40 mA
CRITICAL C2294 22000pF-1000mA 16V NPM18
C2293 0.1UF 20% 10V CERM 402
Layout Note: These 8 caps should be within 6.35 mm of NB edge

CRITICAL C2296 22000pF-1000mA 16V NPM18
C2295 0.1UF 20% 10V CERM 402
PP3V3_S0_NB_VCCA_TVDACC
40 mA

NEED TO FIND A "1#GH, 500MA, 78MOHM" INDUCTOR
WF: Should be 1uH, 30% L2220 1.0UH-0.5A-0.675A
WF: Check part properties
=PP1V8_S0_NB_LVDS
260 mA
1007 OMIT
CRITICAL C2220 220UF 20% 2.5V POLY CASE-B2-SM
C2221 0.001uF 20% 50V CERM 402
PP1V8_S0_NB_VCCTXLVDS
110 mA
C2223 0.001uF 20% 50V CERM 402
=GND_NB_VSSA_LVDS
Layout Note: Route to cap, then GND
=PP1V8_S0_NB_VCCD_LVDS
150 mA
C2226 1UF 10% 6.3V CERM 402

CRITICAL C2298 22000pF-1000mA 16V NPM18
C2297 0.1UF 20% 10V CERM 402
PP3V3_S0_NB_VCCA_DAC_BG
5 mA
=GND_NB_VSSA_DAC_BG
Layout Note: Route to caps, then GND

=PP3V3_S0_NB_VCCHV
R2242 22K 5% 1/16W MF-LF 402
R2243 22K 5% 1/16W MF-LF 402 NO STUFF
R2244 22K 5% 1/16W MF-LF 402 NO STUFF
R2245 22K 5% 1/16W MF-LF 402
GFX_VID<0>
GFX_VID<1>
GFX_VID<2>
GFX_VID<3>
R2247 22K 5% 1/16W MF-LF 402 NO STUFF
R2248 22K 5% 1/16W MF-LF 402
R2249 22K 5% 1/16W MF-LF 402
R2250 22K 5% 1/16W MF-LF 402 NO STUFF
VID<3:0>=1001=1.05575V
1000=1.08150V
0011=1.21025V

=PP3V3_S0_NB_VCCSYNC
10 mA
C2230 0.1UF 20% 10V CERM 402

WARNING VOLTAGE DROP
=PP1V8_S0_NB_DPLL
(1.7V - 5.5V)
80 mA
C2265 1UF 10% 6.3V CERM 402
CRITICAL U2265 TPS731125 SOT23-5
IN OUT EN NR/FB GND
Vout = 1.204V * (Ra + Rb)/Rb
Ra || Rb should be 19Kohms
PP1V25_S0_NB_DPLL
P1V25S0NBDPLL_FB
C2266 10UF 20% 6.3V X5R 603
PP1V25_S0_NB_DPLL_RF
C2267 0.01UF 10% 16V CERM 402
R2266 0.300 5% 1/10W FF 603
WF: Is this the best part to use?
WF: Check C2266 value, R2267 value
80 mA
R2261 0 5% 1/16W MF-LF 402
PP1V25_S0_NB_VCCA_DPLLA
C2261 0.1UF 20% 10V CERM 402
R2262 0 5% 1/16W MF-LF 402
PP1V25_S0_NB_VCCA_DPLLB
C2262 0.1UF 20% 10V CERM 402
80 mA

Current numbers from Crestline EDS Addendum, doc #20127.

NB Graphics Decoupling
SYNC_MASTER=WFERRY SYNC_DATE=06/15/2006

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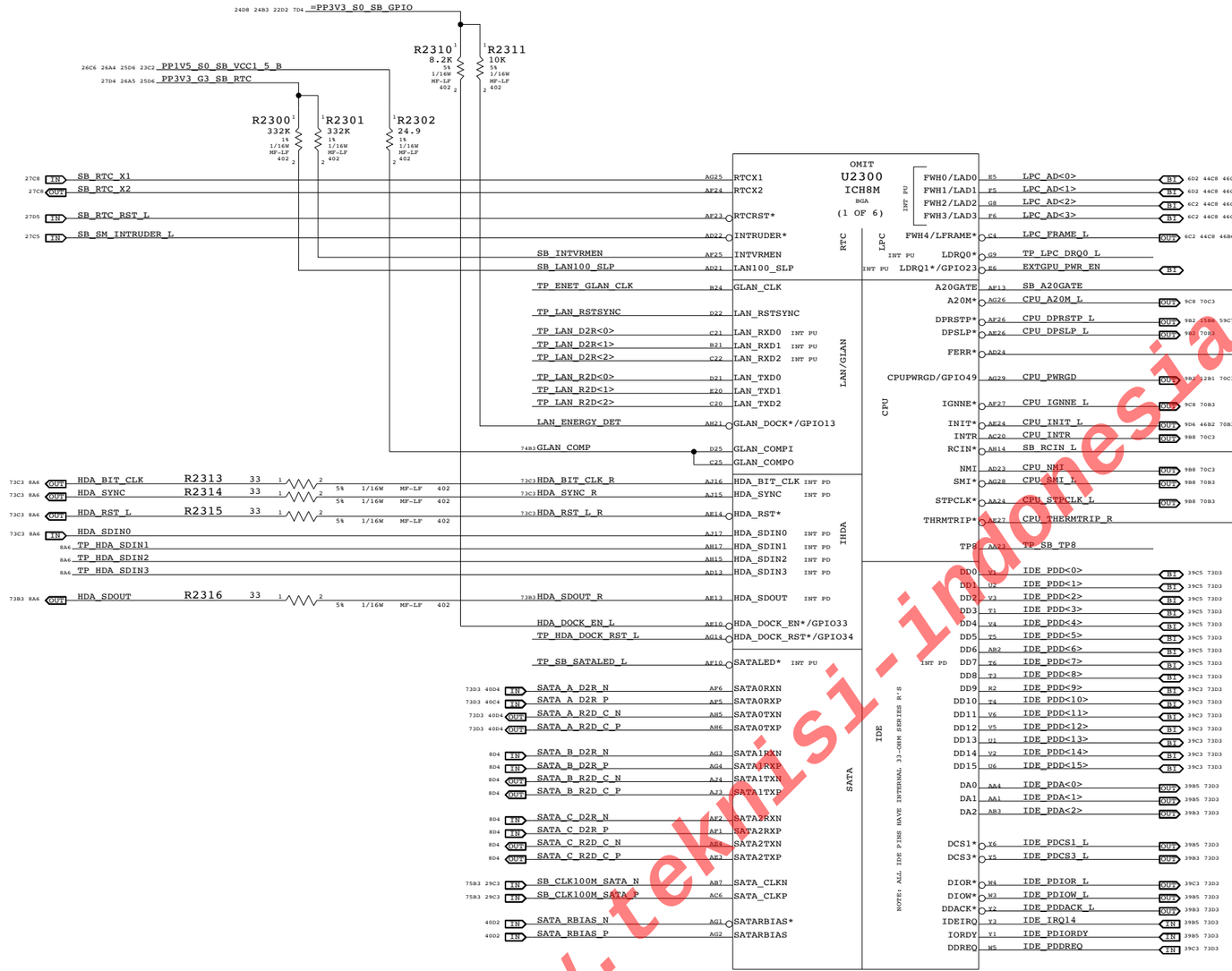


	HDA
HDA_BIT_CLK	24.000MHZ CLOCK W/INTERNAL WEAK PD
HDA_RST#	
HDA_SDIN[0-2]	INTEGRATED PDs
HDA_SDOUT	INTEGRATED PD
ACZ_SYNC	INTEGRATED PD

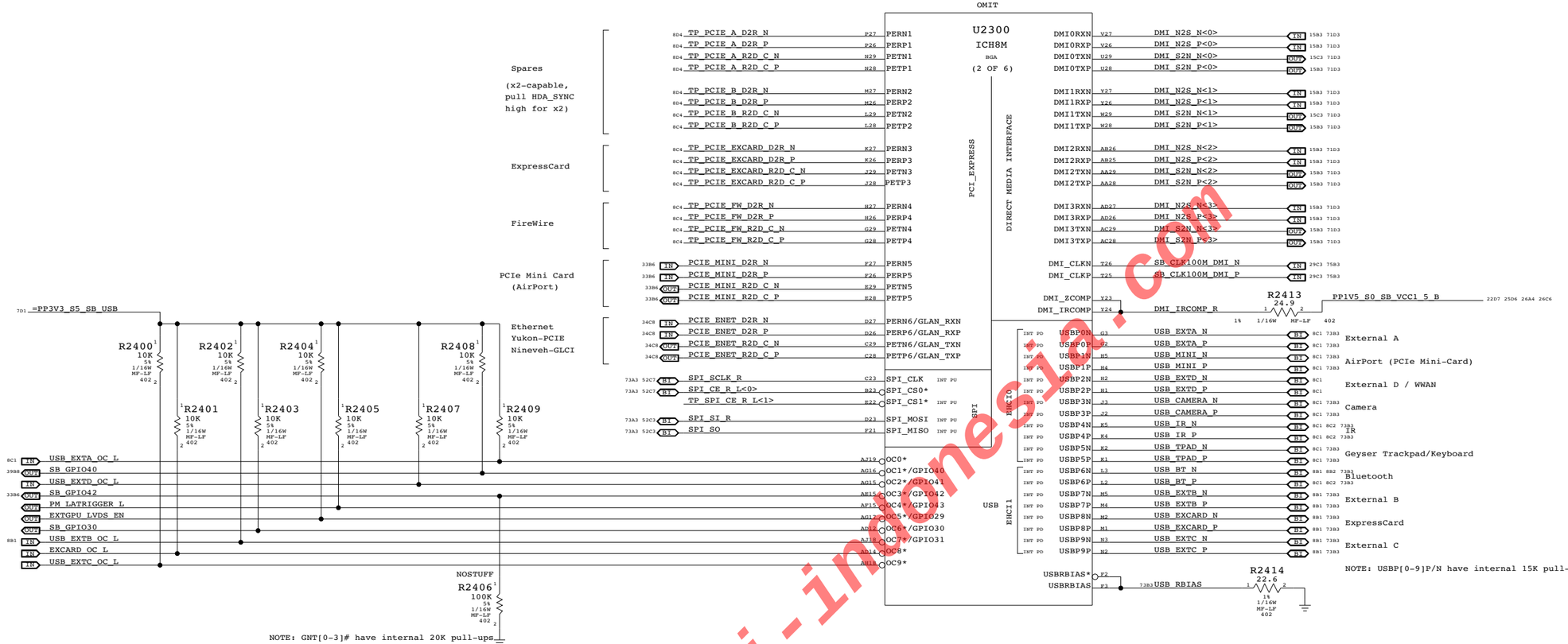
SB Enet, Disk, FSB, LPC

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 22 OF 76



SB PCI, PCIe, DMI, USB

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

APPLE INC.

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SCALE NONE | SHT 23 OF 76

=PP3V3_S0_SB_GPIO
=PP3V3_S5_SB_GPIO
NO_REBOOT_MODE

R2500 1K 5% 1/16W MF-LF 402
R2551 8.2K 5% 1/16W MF-LF 402
R2553 8.2K 5% 1/16W MF-LF 402
R2504 10K 5% 1/16W MF-LF 402
R2506 10K 5% 1/16W MF-LF 402
R2510 1K 5% 1/16W MF-LF 402

R2502 10K 5% 1/16W MF-LF 402
R2550 10K 5% 1/16W MF-LF 402
R2552 10K 5% 1/16W MF-LF 402
R2547 10K 5% 1/16W MF-LF 402
R2505 8.2K 5% 1/16W MF-LF 402
R2507 8.2K 5% 1/16W MF-LF 402

R2532 10K 5% 1/16W MF-LF 402
R2535 10K 5% 1/16W MF-LF 402
R2533 10K 5% 1/16W MF-LF 402
R2534 10K 5% 1/16W MF-LF 402

OMIT

U2300 ICH8M BGA (4 OF 6)

SMB
- SMB_CLK ↔ SMBCLK (AJ26)
- SMB_DATA ↔ SMBDATA (AD19)
- CLINK_WLAN_RESET_L → LINKALERT* (AG21)
- SMB_ME_CLK ↔ SMLINK0 (AC17)
- SMB_ME_DATA ↔ SMLINK1 (AE19)

SATA GPIO
- SATA0GP/GPIO21 (AJ12) → RSVD_EXTGPU_LVDS_EN → OUT
- SATA1GP/GPIO19 (AJ10) → SATA_B_DET_L
- SATA2GP/GPIO36 (AF11) → SB_GPIO36
- SATA3GP/GPIO37 (AG11) → SB_CRT_TVOUT_MUX_L → OUT 69A6

CLOCKS
- CLK14 (AG9) → SB_CLK14P3M_TIMER → IN 29A5 29D6 75B3
- CLK48 (G5) → SB_CLK48M_USBCTLR → IN 29A5 29D6 75B3
- SUSCLK (D3) → SUS_CLK_SB → OUT 45A8

SYS GPIO
- PM_RI_L ← RI* (AF17)
- PM_SUS_STAT_L → SUS_STAT*/LPCPD* (F4)
- PM_SYSRST_L → SYS_RESET* (AD15)
- PM_BMBUSY_L → BMBUSY*/GPIO0 (AG12)
- LINDACARD_GPIO ↔ SMBALERT*/GPIO11 (AG22)
- PM_STPPCI_L → STP_PCI*/GPIO15 (AE20)
- PM_STPCPU_L → STP_CPU*/GPIO25 (AG18)
- PM_CLKRUN_L ↔ CLKRUN*/GPIO32 (AH11)
- PCIE_WAKE_L ↔ WAKE* (AE17)
- INT_SERIRQ ↔ SERIRQ (AF12)
- PM_THRM_L → THERM* (AC13)
- VR_PWRGD_CLKEN → VRMPWRGD (AJ20)
- TP_SB_TP7 ↔ TP7 (AJ22)

POWER MGT
- SLP_S3* (AG23) → PM_SLP_S3_L → OUT 33C7 35C7 44C5 45A6 58B7 62B8
- SLP_S4* (AF21) → TP_PM_SLP_S4_L
- SLP_S5* (AD18) → PM_SLP_S5_L → OUT 44C5 45C3
- S4_STATE*/GPIO26 (AB27) → PM_S4_STATE_L → OUT 33B7 44C5 65A6 65C4
- PWROK (AE23) → PM_SB_PWROK → IN 27A6
- DPRSLPVR/GPIO16 (AJ14) → PM_DPRSLPVR → OUT 15A6 59D8 70B3
- BATLOW* (AF21) → PM_BATLOW_L → IN 24A5 44B8
- PWRBTN* (C7, INT PU) → PM_PWRBTN_L → IN 44C8
- LAN_RST* (AH20) → PM_LAN_ENABLE → IN 44D8
- RSMRST* (AG27) → PM_RSMRST_L → IN 44C8
- CK_PWRGD (E1) → CLK_PWRGD → OUT 28A4
- CLPWROK (E3) → =SB_CLINK_MPWROK (see note below) → IN 8B4
- SLP_M* (AJ25) → TP_PM_SLP_M_L

NOTE: DPRSLPVR HAS INT 20K PD ENABLED AT BOOT/RESET FOR STRAPPING FUNCTION

PM_LAN_ENABLE must remain deasseted until VccCL3_3, VccLAN3_3 and VccLAN1_05 have been up for at least 1ms.

R2524 100K 5% 1/16W MF-LF 402
R2525 10K 5% 1/16W MF-LF 402

GPIO
- LAN_PHYPC → GPIO12 (AC19)
- EXTGPU_RST_L → TACH0/GPIO17 (AG8, INT PU)
- SB_GPIO18 ↔ GPIO18 (AH12)
- TP_SB_GPIO20 ↔ GPIO20 (AE11, INT PD)
- SB_SCLOCK ↔ SCLOCK/GPIO22 (AG10)
- SATA_B_PWR_EN_L → QRT_STATE0/GPIO27 (AH25)
- FWH_MFG_MODE → QRT_STATE1/GPIO28 (AD16)
- SB_SATA_CLKREQ_L → SATACLKREQ*/GPIO35 (AG13)
- SB_SLOAD ↔ SLOAD/GPIO38 (AF9)
- SB_SDATAOUT<0> ↔ SDATAOUT0/GPIO39 (AH11)
- SB_SDATAOUT<1> ↔ SDATAOUT1/GPIO48 (AD10)
- PCI_PME_FW_L ← TACH1/GPIO1 (AJ8, INT PU)
- TP_SB_GPIO6 ↔ TACH2/GPIO6 (AJ9, INT PU)
- TACH3/GPIO7 (AH9, INT PU)
- GPIO8 (AE16)

CONTROLLER LINK
- CL_CLK0 (F23) → CLINK_NB_CLK → BI 15A3 74A3
- CL_CLK1 (AE18) → CLINK_WLAN_CLK → BI 74A3
- CL_DATA0 (F22) → CLINK_NB_DATA → BI 15A3 74A3
- CL_DATA1 (AF19) → CLINK_WLAN_DATA → BI 74A3
- CL_VREF0 (D24, 74A3) → SB_CLINK_VREF0
- CL_VREF1 (AH23, 74A3) → SB_CLINK_VREF1
- CL_RST* (AJ23, INT PU) → CLINK_NB_RESET_L → OUT 15A3 74A3

MISC
- MEM_LED/GPIO24 (AJ27) → ARB_DETECT_L → BI 24A7
- ME_EC_ALERT/GPIO10 (AJ24) → SB_GPIO10_CL1 → 24A5
- EC_ME_ALERT/GPIO14 (AF22) → SB_GPIO14_CL2 → 24A5
- WOL_EN/GPIO9 (AG19, 35B7) → WOL_EN
- NB_SB_SYNC_L ← MCH_SYNC* (AJ13)
- TP_SB_TP3 ↔ TP3 (AJ21, INT PU)

Test access required for XOR chain testing.

NOTE: ICH CLPWROK input must be PWRGD signal for PP3V3_S0M, PP3V3_S0MWOL, PP1V8_S3M, PP1V25_S0M, PP1V05_S0M, PP0V9_S3M and PP0V9_S0M. If ME/AMT is not used, short CLPWROK to PWROK.

NOSTUFF
R2523 100K 5% 1/16W MF-LF 402

=PP3V3_S0MWOL_SB_CLINK0 (7C4)
R2526 3.24K 1% 1/16W MF-LF 402
C2500 0.1uF 10% 16V X5R 402
R2527 453 1% 1/16W MF-LF 402

=PP3V3_S5_SB_CLINK1 (7C1)
R2528 3.24K 1% 1/16W MF-LF 402
C2501 0.1uF 10% 16V X5R 402
R2529 453 1% 1/16W MF-LF 402

LAYOUT NOTE:
PLACE R2511-16 WHERE PHYSICALLY ACCESSIBLE

35C7 26D8 24A3 7D1 =PP3V3_S5_SB

R2511 10K 5% 1/16W MF-LF 402
R2514 100K 5% 1/16W MF-LF 402
R2515 10K 5% 1/16W MF-LF 402

FWH_MFG_MODE (24C5)
LINDACARD_GPIO (6C2 24D5 46B4)
ARB_DETECT_L (24B3)

NOSTUFF
R2512 0 5% 1/16W MF-LF 402
ARB_ONLY
R2516 0 5% 1/16W MF-LF 402

=PP3V3_S0_SB_GPIO (7D4 22D2 22D7 24D8)

R2597 10K 1% 1/16W MF-LF 402 — 24C5 TP_SB_GPIO6
R2596 10K 1% 1/16W MF-LF 402 — 24C5 8B4 EXTGPU_RST_L
R2530 10K 1% 1/16W MF-LF 402 — 24C5 SATA_B_PWR_EN_L
R2531 10K 1% 1/16W MF-LF 402 — 37A5 24C5 PCI_PME_FW_L

=PP3V3_S5_SB (7D1 24A8 26D8 35C7)

R2536 10K 1% 1/16W MF-LF 402 — 24D5 PM_RI_L
R2544 8.2K 5% 1/16W MF-LF 402 — 44B8 24C9 PM_BATLOW_L
R2545 10K 1% 1/16W MF-LF 402 — 24C5 LAN_PHYPC
R2598 10K 1% 1/16W MF-LF 402 — 24B3 SB_GPIO10_CL1
R2546 10K 1% 1/16W MF-LF 402 — 24B3 SB_GPIO14_CL2

SB Pwr Mgt, GPIO, Clink			
SYNC_MASTER=T9_MLB	SYNC_DATE=10/30/2006		
NOTICE OF PROPRIETARY PROPERTY			
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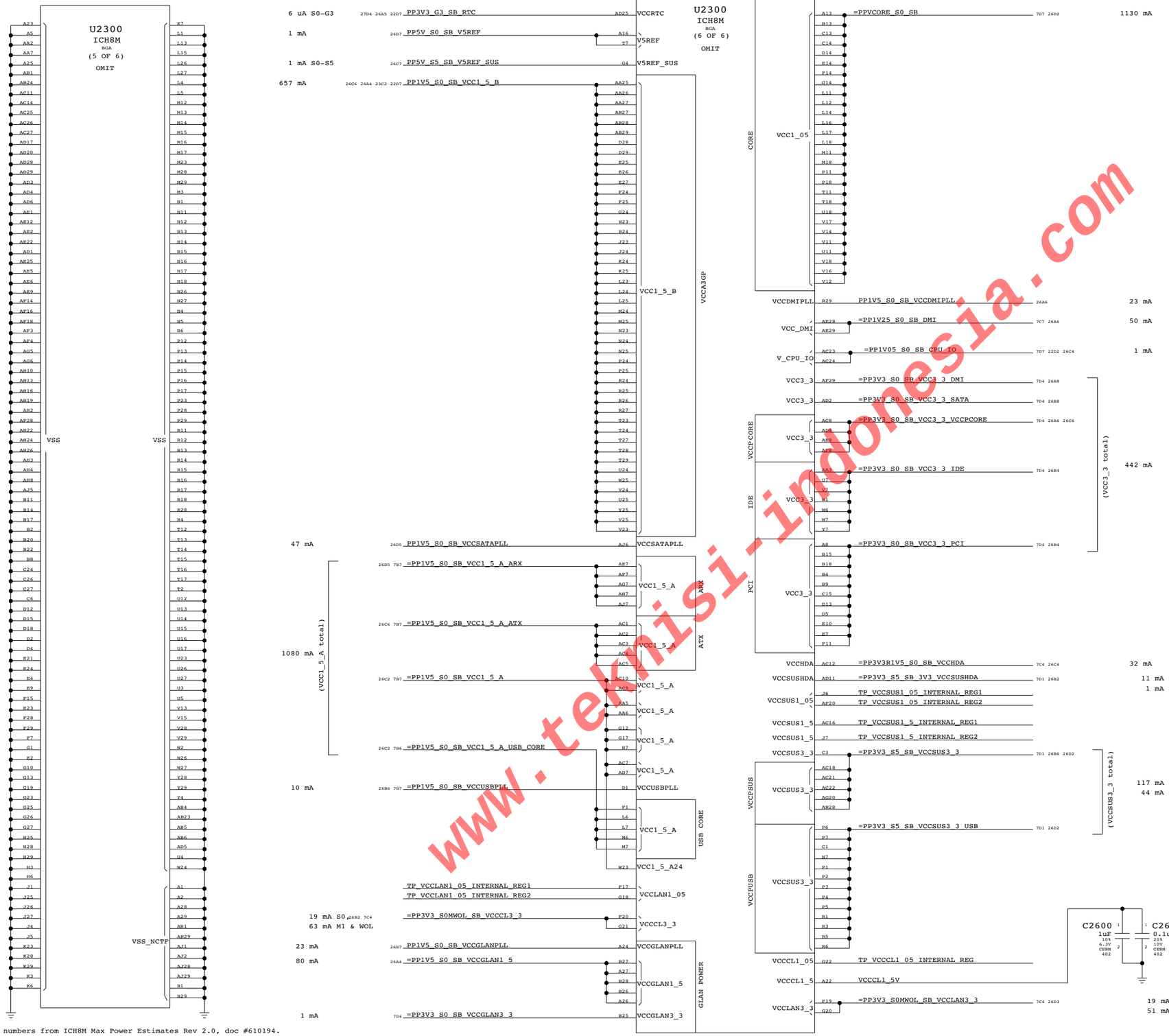
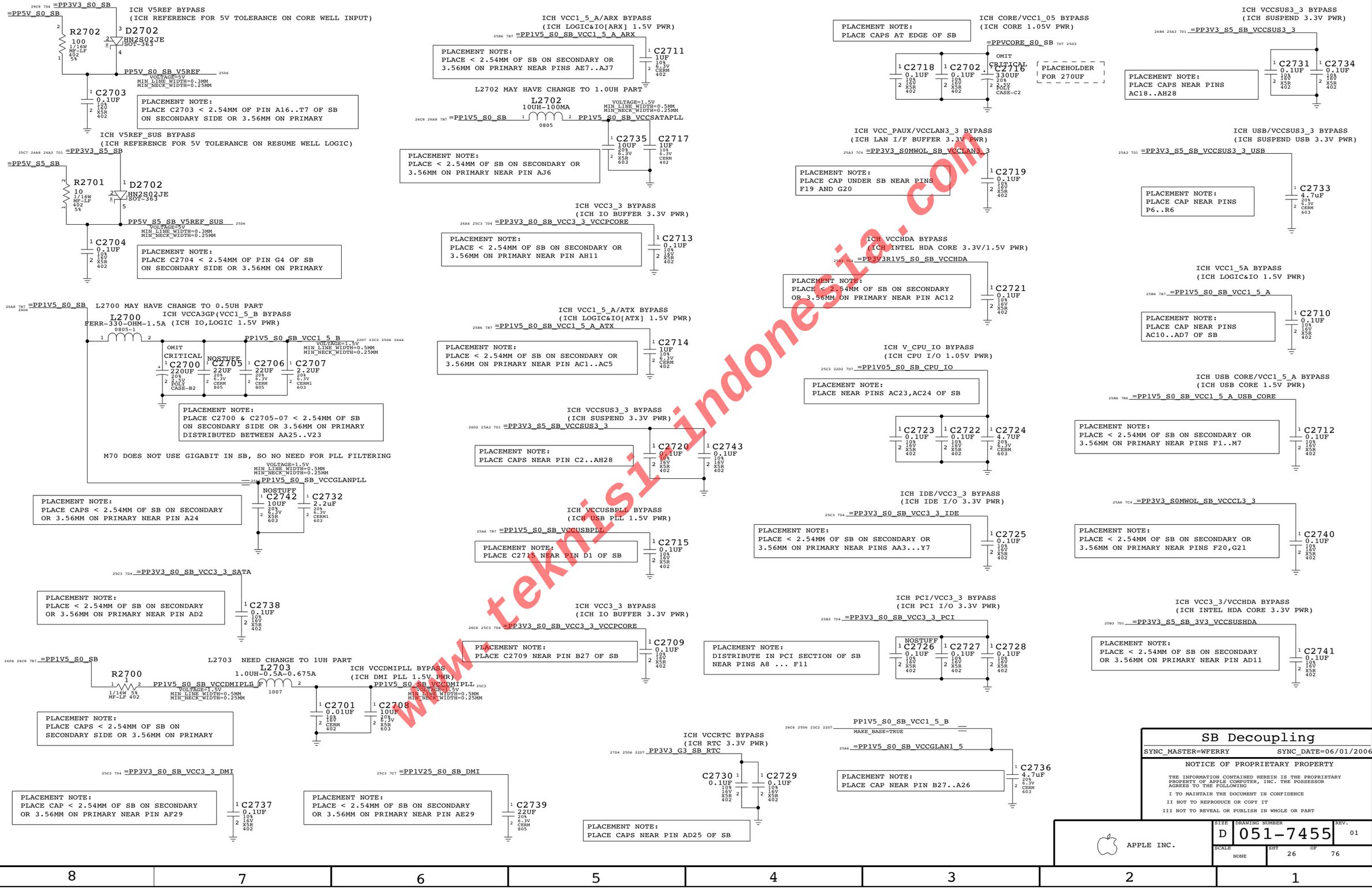
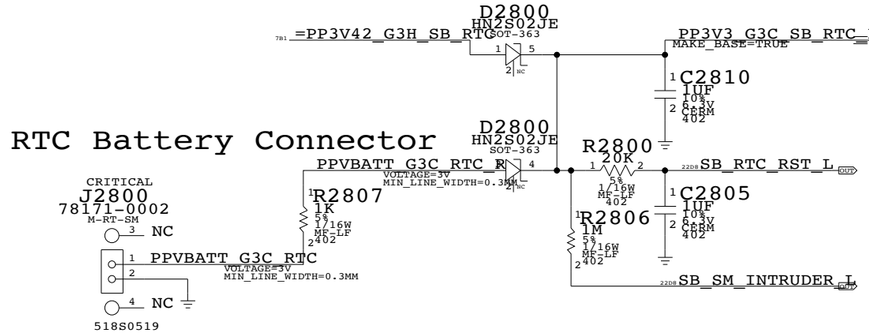
APPLE INC.	SIZE D	DRAWING NUMBER 051-7455	REV. 01
	SCALE NONE	SHT 24 OF 76	



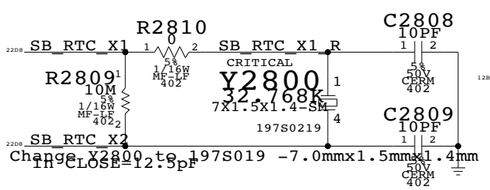


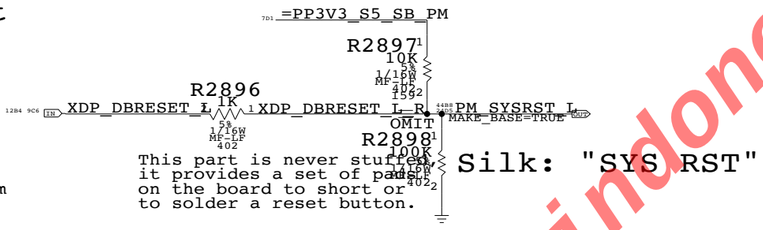
Platform Reset Connections

RTC Battery Connector



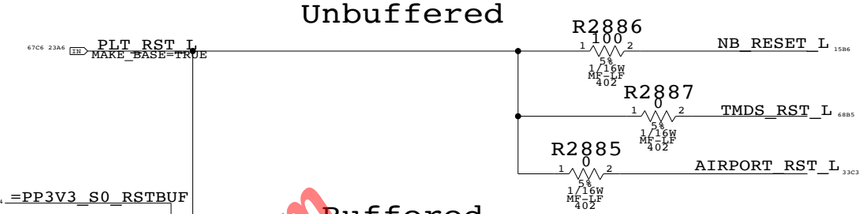
SB RTC Crystal Circuit



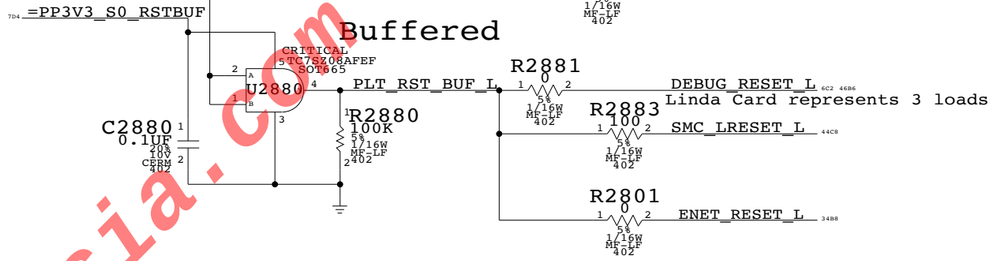


Silk: "SYS RST"

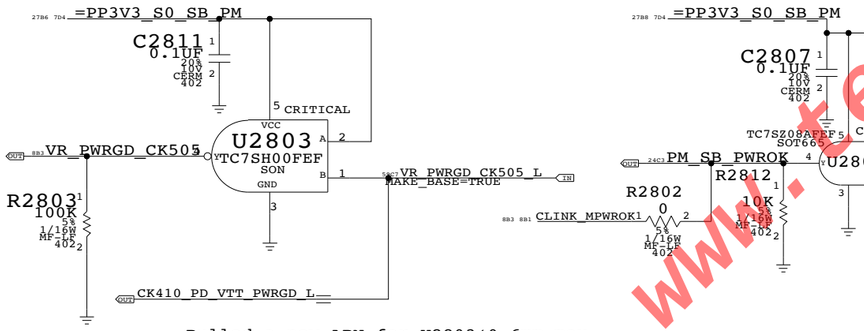
Unbuffered

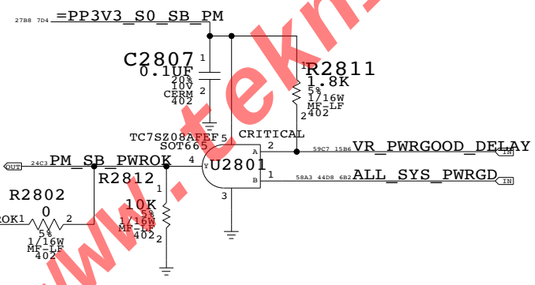


Buffered



CPU VCORE PSI





Pulled a new APN for U2803(0.6mm max
2-input NAND gate-APN:311S0304
It may take a few days before this is done through
This will allow us to sequence this part under wireless card

Initial resistor values are based on CRB,
but may change after characterization.

SB Misc

SYNC_MASTER=NB SYNC_DATE=07/26/2005

APPLE INC.

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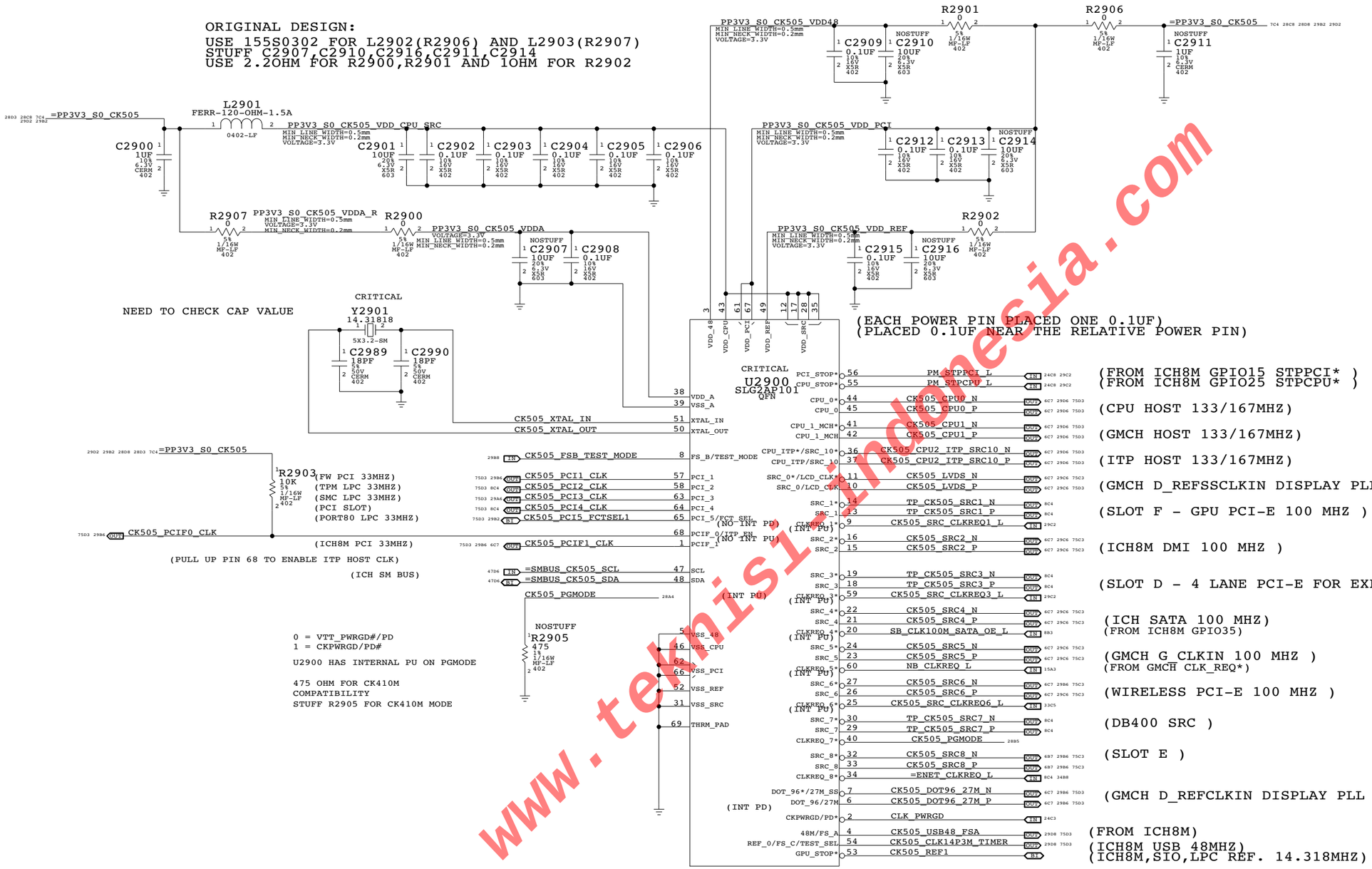
SELIGO RECOMMEND TO REMOVE L2903,R2900,C2907,C2910
R2901,L2902,C2916,C2911,C2914 and R2902

ORIGINAL DESIGN:
USE 155S0302 FOR L2902(R2906) AND L2903(R2907)
STUFF C2907,C2910,C2916,C2911,C2914
USE 2.2OHM FOR R2900,R2901 AND 1OHM FOR R2902



FCTSEL1	PIN 6	PIN 7	PIN 10	PIN 11
0	DOT96T	DOT96C	100MT_SST	100MC_SST
1	27M NON SPREAD	27M SPREAD	SRCT0	SRCC0

* FOR INT. GRAPHIC SYSTEM
* FOR EXT. GRAPHIC SYSTEM

Clock (CK505)

SYNC_MASTER=DSIMON SYNC_DATE=06/06/2006

APPLE INC.

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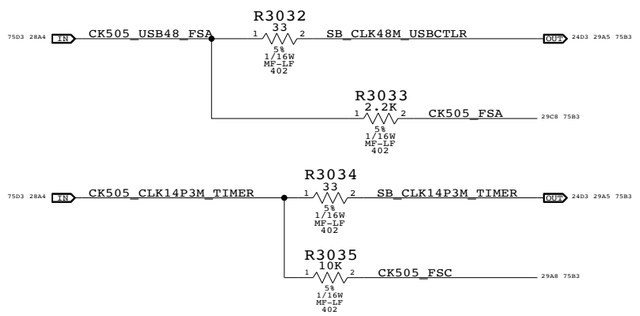
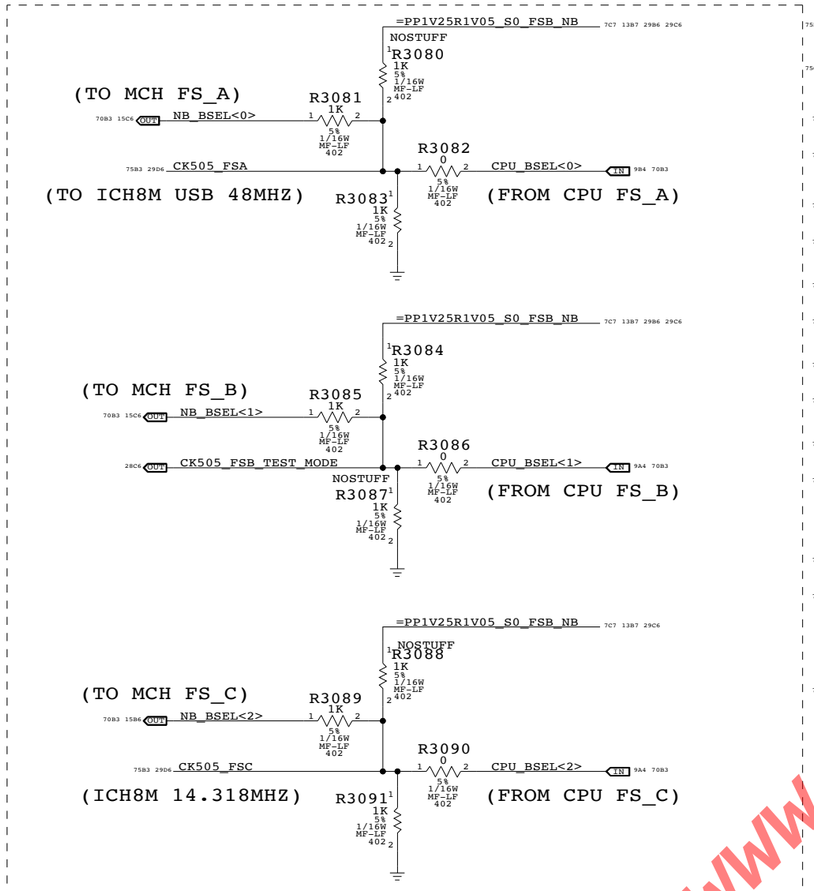
SCALE NONE | SHT 28 OF 76

CLK Termination

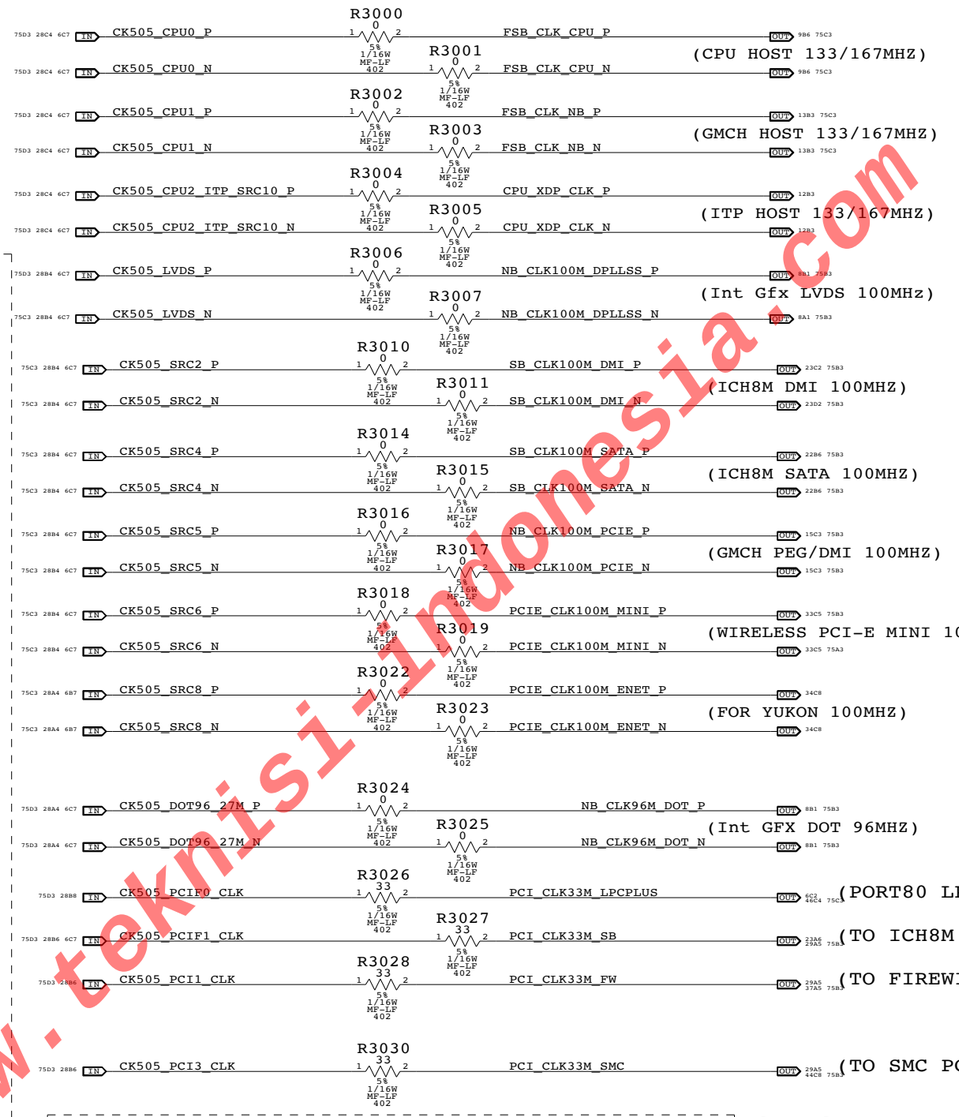


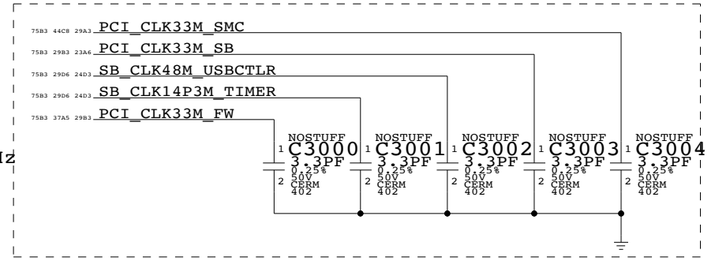


	FS_C	FS_B	FS_A	CPU
	0	0	0	266M
	0	0	1	133M
	0	1	1	166M
*	0	1	0	200M
	1	1	0	400M
	1	1	1	Resrvd
	1	0	1	100M
	1	0	0	333M

NOSTUFF R3082, R3086, R3090
FOR MANUAL CPU FREQUENCY

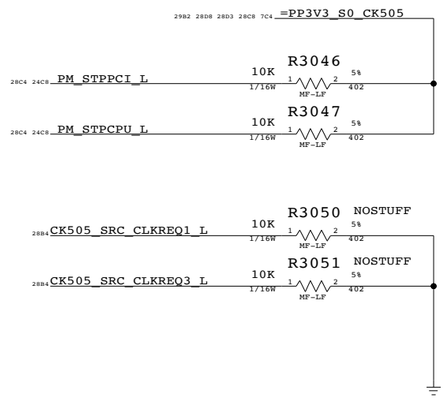
CPU speed is currently set to 200MHz





Place close to CLK Gen
For reducing noise coupling to wireless frequencies

CLKREQ Controls



Clock Termination

SYNC_MASTER=DSIMON-WF SYNC_DATE=06/06/2006

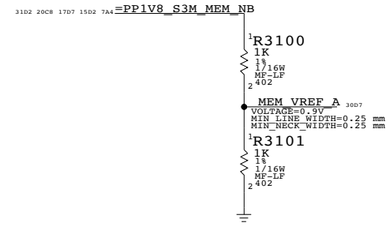
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 29 OF 76

DDR2 VRef

One 0.1uF per connector



Yellow uses 10K divider and TLV2463 to drive MCH and DIMM connectors. (See Capell Valley pg 47)

Page Notes

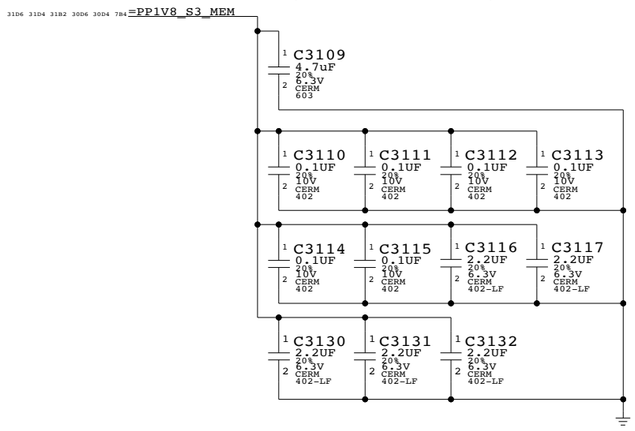
Power aliases required by this page:
- =PP1V8_S3_MEM
- =PPSPD_S0_MEM (2.5V - 3.3V)

Signal aliases required by this page:
- =I2C_MEM_SCL
- =I2C_MEM_SDA

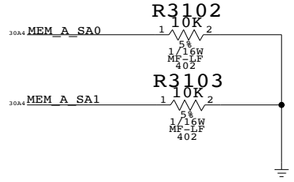
BOM options provided by this page:
(NONE)

DDR2 Bypass Caps

(For return current)



The 4.7uF and 1.0uF caps can be changed to 5x 2.2uF caps, when they get cheaper.



DDR2 SO-DIMM Connector A

SYNC_MASTER=MEMORY SYNC_DATE=06/20/2005

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE | SHT 30 OF 76

DDR2 VREF (FOR CONNECTOR B)

One 0.1uF per connector

=PP1V8_S3M_MEM_NB

R3201 1K 1% 1/16W MF-LF 402

MEM_VREF_B

VOLTAGE=0.9V
MIN_LINE_WIDTH=0.25 mm
MIN_NECK_WIDTH=0.25 mm

R3202 1K 1% 1/16W MF-LF 402

Yellow uses 10K divider and TLV2463 to drive MCH and DIMM connectors. (See Capell Valley pg 47)

Page Notes

Power aliases required by this page:
- =PP1V8_S3_MEM
- =PPSPD_S0_MEM (2.5V - 3.3V)

Signal aliases required by this page:
- =I2C_MEM_SCL
- =I2C_MEM_SDA

BOM options provided by this page:
(NONE)

NOTE: This page does not supply VREF. The reference voltage must be provided by another page.

DDR2 Bypass Caps

(For return current)

=PP1V8_S3_MEM

C3209 4.7uF 20% 6.3V CERM 603

C3210 0.1UF 20% 10V CERM 402
C3211 0.1UF 20% 10V CERM 402
C3212 0.1UF 20% 10V CERM 402
C3213 0.1UF 20% 10V CERM 402

C3214 0.1UF 20% 10V CERM 402
C3215 0.1UF 20% 10V CERM 402
C3216 2.2UF 20% 6.3V CERM 402-LF
C3217 2.2UF 20% 6.3V CERM 402-LF

C3230 2.2UF 20% 6.3V CERM 402-LF
C3231 2.2UF 20% 6.3V CERM 402-LF
C3232 2.2UF 20% 6.3V CERM 402-LF

The 4.7uF and 1.0uF caps can be changed to 5x 2.2uF caps, when they get cheaper.

DIP DIMM CONN

J3201 CRITICAL F-RT-TH3 DDR2-SODIMM-STD

=PP1V8_S3_MEM

MEM_VREF_B

C3220 2.2UF 20% 4V X5R 402
C3200 0.1UF 20% 10V CERM 402

=GND_CHASSIS_DIPDIMM_RIGHT

1	VREF		2	VSS0			
3	VSS1		4	DQ4	MEM_B_DQ<1>	MEM_B_DQ<5>	MEM_B_DQ<5>
5	DQ0	MEM_B_DQ<1>	6	DQ5	MEM_B_DQ<4>	MEM_B_DQ<0>	MEM_B_DQ<0>
7	DQ1	MEM_B_DQ<4>	8	VSS2			
9	VSS4		10	DM0	MEM_B_DM<0>	MEM_B_DM<0>	MEM_B_DM<0>
11	DQS0*	MEM_B_DQS_N<0>	12	VSS5			
13	DQS0	MEM_B_DQS_P<0>	14	DQ6	MEM_B_DQ<7>	MEM_B_DQ<6>	MEM_B_DQ<6>
15	VSS6		16	DQ7	MEM_B_DQ<3>	MEM_B_DQ<2>	MEM_B_DQ<2>
17	DQ2	MEM_B_DQ<7>	18	VSS7			
19	DQ3	MEM_B_DQ<3>	20	DQ12	MEM_B_DQ<13>	MEM_B_DQ<15>	MEM_B_DQ<15>
21	VSS8		22	DQ13	MEM_B_DQ<12>	MEM_B_DQ<11>	MEM_B_DQ<11>
23	DQ8	MEM_B_DQ<13>	24	VSS9			
25	DQ9	MEM_B_DQ<12>	26	DM1	MEM_B_DM<1>	MEM_B_DM<1>	MEM_B_DM<1>
27	VSS10		28	VSS11			
29	DQS1*	MEM_B_DQS_N<1>	30	CK0	MEM_CLK_N<2>	MEM_CLK_P<3>	MEM_CLK_P<3>
31	DQS1	MEM_B_DQS_P<1>	32	CK0*	MEM_CLK_P<2>	MEM_CLK_N<3>	MEM_CLK_N<3>
33	VSS12		34	VSS13			
35	DQ10	MEM_B_DQ<10>	36	DQ14	MEM_B_DQ<9>	MEM_B_DQ<9>	MEM_B_DQ<9>
37	DQ11	MEM_B_DQ<8>	38	DQ15	MEM_B_DQ<14>	MEM_B_DQ<14>	MEM_B_DQ<14>
39	VSS14		40	VSS15			
KEY							
41	VSS16		42	VSS17			
43	DQ16	MEM_B_DQ<17>	44	DQ20	MEM_B_DQ<20>	MEM_B_DQ<21>	MEM_B_DQ<21>
45	DQ17	MEM_B_DQ<20>	46	DQ21	MEM_B_DQ<16>	MEM_B_DQ<16>	MEM_B_DQ<16>
47	VSS18		48	VSS19			
49	DQS2*	MEM_B_DQS_N<2>	50	NC0		DIMM_OVERTEMPB_L	DIMM_OVERTEMPB_L
51	DQS2	MEM_B_DQS_P<2>	52	DM2	MEM_B_DM<2>	MEM_B_DM<2>	MEM_B_DM<2>
53	VSS21		54	VSS22			
55	DQ18	MEM_B_DQ<22>	56	DQ22	MEM_B_DQ<23>	MEM_B_DQ<23>	MEM_B_DQ<23>
57	DQ19	MEM_B_DQ<18>	58	DQ23	MEM_B_DQ<19>	MEM_B_DQ<19>	MEM_B_DQ<19>
59	VSS23		60	VSS24			
61	DQ24	MEM_B_DQ<29>	62	DQ28	MEM_B_DQ<25>	MEM_B_DQ<25>	MEM_B_DQ<25>
63	DQ25	MEM_B_DQ<27>	64	DQ29	MEM_B_DQ<28>	MEM_B_DQ<28>	MEM_B_DQ<28>
65	VSS25		66	VSS26			
67	DM3	MEM_B_DM<3>	68	DQS3*	MEM_B_DQS_N<3>	MEM_B_DQS_N<3>	MEM_B_DQS_N<3>
69	NC1	NC	70	DQS3	MEM_B_DQS_P<3>	MEM_B_DQS_P<3>	MEM_B_DQS_P<3>
71	VSS27		72	VSS28			
73	DQ26	MEM_B_DQ<30>	74	DQ30	MEM_B_DQ<24>	MEM_B_DQ<24>	MEM_B_DQ<24>
75	DQ27	MEM_B_DQ<31>	76	DQ31	MEM_B_DQ<26>	MEM_B_DQ<26>	MEM_B_DQ<26>
77	VSS29		78	VSS30			
79	CKE0	MEM_CKE<3>	80	NC/CKE1	MEM_CKE<4>	MEM_CKE<4>	MEM_CKE<4>
81	VDD0		82	VDD1			
83	NC2	NC	84	NC/A15	MEM_B_A<15>	NC	MEM_B_A<15>
85	BA2	MEM_B_BS<2>	86	NC/A14	MEM_B_A<14>	NC	MEM_B_A<14>
87	VDD2		88	VDD3			
89	A12	MEM_B_A<12>	90	A11	MEM_B_A<11>	MEM_B_A<11>	MEM_B_A<11>
91	A9	MEM_B_A<9>	92	A7	MEM_B_A<7>	MEM_B_A<7>	MEM_B_A<7>
93	A8	MEM_B_A<8>	94	A6	MEM_B_A<6>	MEM_B_A<6>	MEM_B_A<6>
95	VDD4		96	VDD5			
97	A5	MEM_B_A<5>	98	A4	MEM_B_A<4>	MEM_B_A<4>	MEM_B_A<4>
99	A3	MEM_B_A<3>	100	A2	MEM_B_A<2>	MEM_B_A<2>	MEM_B_A<2>
101	A1	MEM_B_A<1>	102	A0	MEM_B_A<0>	MEM_B_A<0>	MEM_B_A<0>
103	VDD6		104	VDD7			
105	A10/AP	MEM_B_A<10>	106	BA1	MEM_B_BS<1>	MEM_B_BS<1>	MEM_B_BS<1>
107	BA0	MEM_B_BS<0>	108	RAS*	MEM_B_RAS_L	MEM_B_RAS_L	MEM_B_RAS_L
109	WE*	MEM_B_WE_L	110	S0*	MEM_CS_L<3>	MEM_CS_L<2>	MEM_CS_L<2>
111	VDD8		112	VDD9			
113	CAS*	MEM_B_CAS_L	114	ODT0	MEM_ODT<3>	MEM_ODT<2>	MEM_ODT<2>
115	NC/S1*	MEM_CS_L<3>	116	NC/A13	MEM_B_A<13>	MEM_B_A<13>	MEM_B_A<13>
117	VDD10		118	VDD11			
119	NC/ODT1	MEM_ODT<3>	120	NC3	NC	NC	NC
121	VSS31		122	VSS32			
123	DQ32	MEM_B_DQ<38>	124	DQ36	MEM_B_DQ<32>	MEM_B_DQ<36>	MEM_B_DQ<36>
125	DQ33	MEM_B_DQ<32>	126	DQ37	MEM_B_DQ<33>	MEM_B_DQ<37>	MEM_B_DQ<37>
127	VSS33		128	VSS34			
129	DQS4*	MEM_B_DQS_N<4>	130	DM4	MEM_B_DM<5>	MEM_B_DM<4>	MEM_B_DM<4>
131	DQS4	MEM_B_DQS_P<4>	132	VSS35			
133	VSS36		134	DQ38	MEM_B_DQ<34>	MEM_B_DQ<34>	MEM_B_DQ<34>
135	DQ34	MEM_B_DQ<39>	136	DQ39	MEM_B_DQ<35>	MEM_B_DQ<33>	MEM_B_DQ<33>
137	DQ35	MEM_B_DQ<35>	138	VSS37			
139	VSS38		140	DQ44	MEM_B_DQ<47>	MEM_B_DQ<43>	MEM_B_DQ<43>
141	DQ40	MEM_B_DQ<47>	142	DQ45	MEM_B_DQ<45>	MEM_B_DQ<42>	MEM_B_DQ<42>
143	DQ41	MEM_B_DQ<45>	144	VSS39			
145	VSS40		146	DQS5*	MEM_B_DQS_N<5>	MEM_B_DQS_N<5>	MEM_B_DQS_N<5>
147	DM5	MEM_B_DM<5>	148	DQS5	MEM_B_DQS_P<5>	MEM_B_DQS_P<5>	MEM_B_DQS_P<5>
149	VSS41		150	VSS42			
151	DQ42	MEM_B_DQ<44>	152	DQ46	MEM_B_DQ<40>	MEM_B_DQ<41>	MEM_B_DQ<41>
153	DQ43	MEM_B_DQ<40>	154	DQ47	MEM_B_DQ<41>	MEM_B_DQ<46>	MEM_B_DQ<46>
155	VSS43		156	VSS44			
157	DQ48	MEM_B_DQ<48>	158	DQ52	MEM_B_DQ<52>	MEM_B_DQ<53>	MEM_B_DQ<53>
159	DQ49	MEM_B_DQ<52>	160	DQ53	MEM_B_DQ<53>	MEM_B_DQ<49>	MEM_B_DQ<49>
161	VSS45		162	VSS46			
163	NC_TEST	NC	164	CK1	MEM_CLK_N<2>	MEM_CLK_P<4>	MEM_CLK_P<4>
165	VSS47		166	CK1*	MEM_CLK_P<2>	MEM_CLK_N<4>	MEM_CLK_N<4>
167	DQS6*	MEM_B_DQS_N<6>	168	VSS48			
169	DQS6	MEM_B_DQS_P<6>	170	DM6	MEM_B_DM<6>	MEM_B_DM<6>	MEM_B_DM<6>
171	VSS49		172	VSS50			
173	DQ50	MEM_B_DQ<50>	174	DQ54	MEM_B_DQ<54>	MEM_B_DQ<51>	MEM_B_DQ<51>
175	DQ51	MEM_B_DQ<55>	176	DQ55	MEM_B_DQ<55>	MEM_B_DQ<54>	MEM_B_DQ<54>
177	VSS51		178	VSS52			
179	DQ56	MEM_B_DQ<56>	180	DQ60	MEM_B_DQ<60>	MEM_B_DQ<60>	MEM_B_DQ<60>
181	DQ57	MEM_B_DQ<57>	182	DQ61	MEM_B_DQ<57>	MEM_B_DQ<62>	MEM_B_DQ<62>
183	VSS53		184	VSS54			
185	DM7	MEM_B_DM<7>	186	DQS7*	MEM_B_DQS_N<7>	MEM_B_DQS_N<7>	MEM_B_DQS_N<7>
187	VSS55		188	DQS7	MEM_B_DQS_P<7>	MEM_B_DQS_P<7>	MEM_B_DQS_P<7>
189	DQ58	MEM_B_DQ<61>	190	VSS56			
191	DQ59	MEM_B_DQ<63>	192	DQ62	MEM_B_DQ<58>	MEM_B_DQ<58>	MEM_B_DQ<58>
193	VSS57		194	DQ63	MEM_B_DQ<59>	MEM_B_DQ<59>	MEM_B_DQ<59>
195	SDA	=I2C_SODIMMB_SDA	196	VSS58			
197	SCL	=I2C_SODIMMB_SCL	198	SA0	MEM_B_SA0	MEM_B_SA0	MEM_B_SA0
199	VDDSPD		200	SA1	J3201_SA1	J3201_SA1	J3201_SA1

516-0135

202 =GND_CHASSIS_DIPDIMM_CENTER

ADDR=0xA4(WR)/0xA5(RD)

MEM_B_SA0 — R3203 10K 5% 1/16W MF-LF 402 — 2

=PPSPD_S0_MEM

R3200 10K 5% 1/16W MF-LF 402

Resistor prevents pwr-gnd short

=PPSPD_S0_MEM

C3222 2.2UF 20% 4V X5R 402
C3221 0.1UF 20% 10V CERM 402

Page Notes

Power aliases required by this page:
- =PP1V8_S3_MEM
- =PPSPD_S0_MEM (2.5V - 3.3V)

Signal aliases required by this page:
- =I2C_MEM_SCL
- =I2C_MEM_SDA

BOM options provided by this page:
(NONE)

NOTE: This page does not supply VREF. The reference voltage must be provided by another page.

DDR2 SO-DIMM Connector B		
SYNC_MASTER=MEMORY	SYNC_DATE=06/20/2005	
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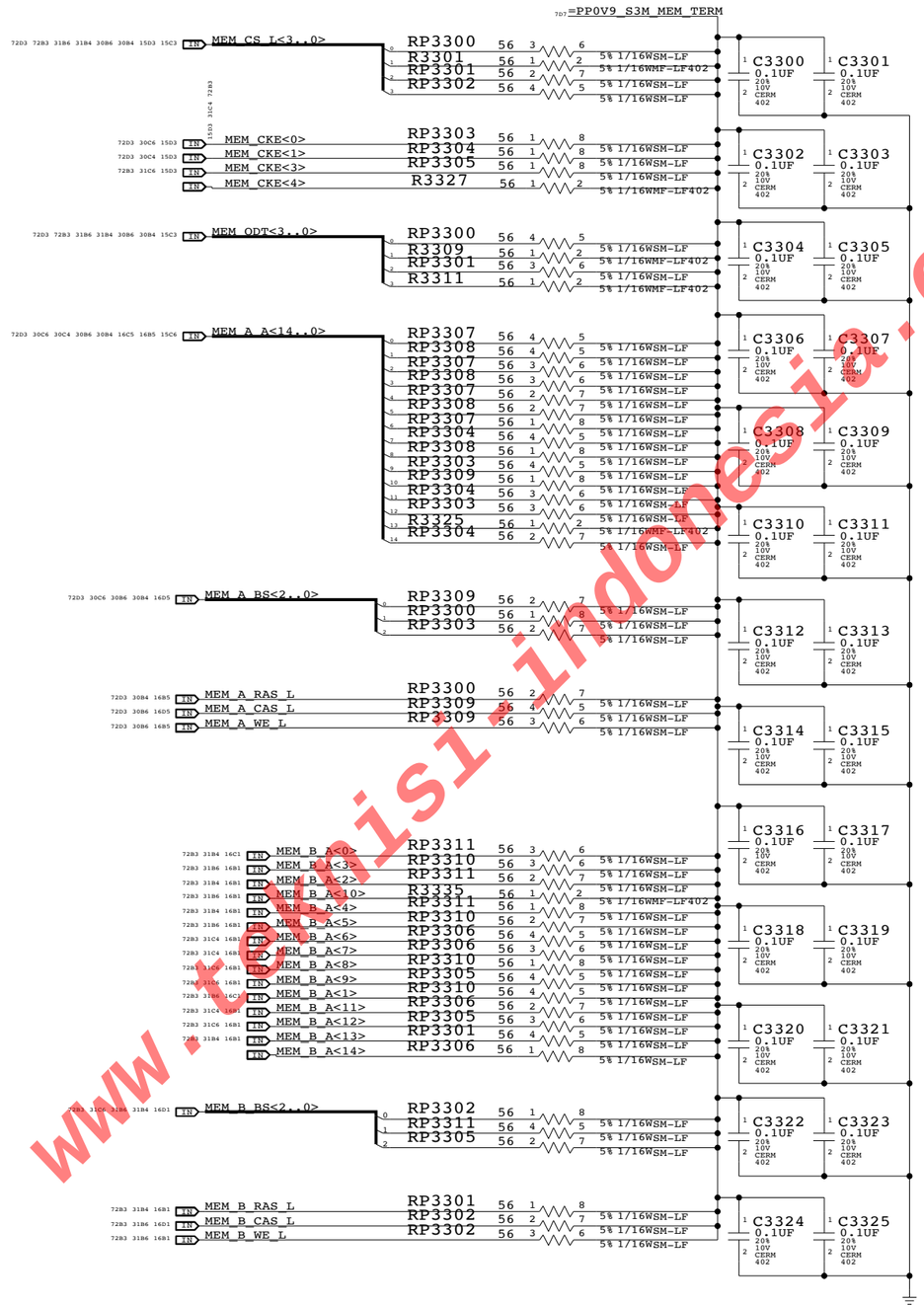
APPLE INC.	SIZE D	DRAWING NUMBER 051-7455 REV. 01
	SCALE NONE	SHT 31 OF 76

One cap for each side of every RPAK, one cap for every two discrete resistors
BOMOPTION shown at the top of each group applies to every part below it



LAYOUT NOTE:PLACE ONE CAP CLOSE TO EVERY TWO PULLUP RESISTORS TERMINATED TO PP0V9_S0_MEM_TERM

Memory Active Termination

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE

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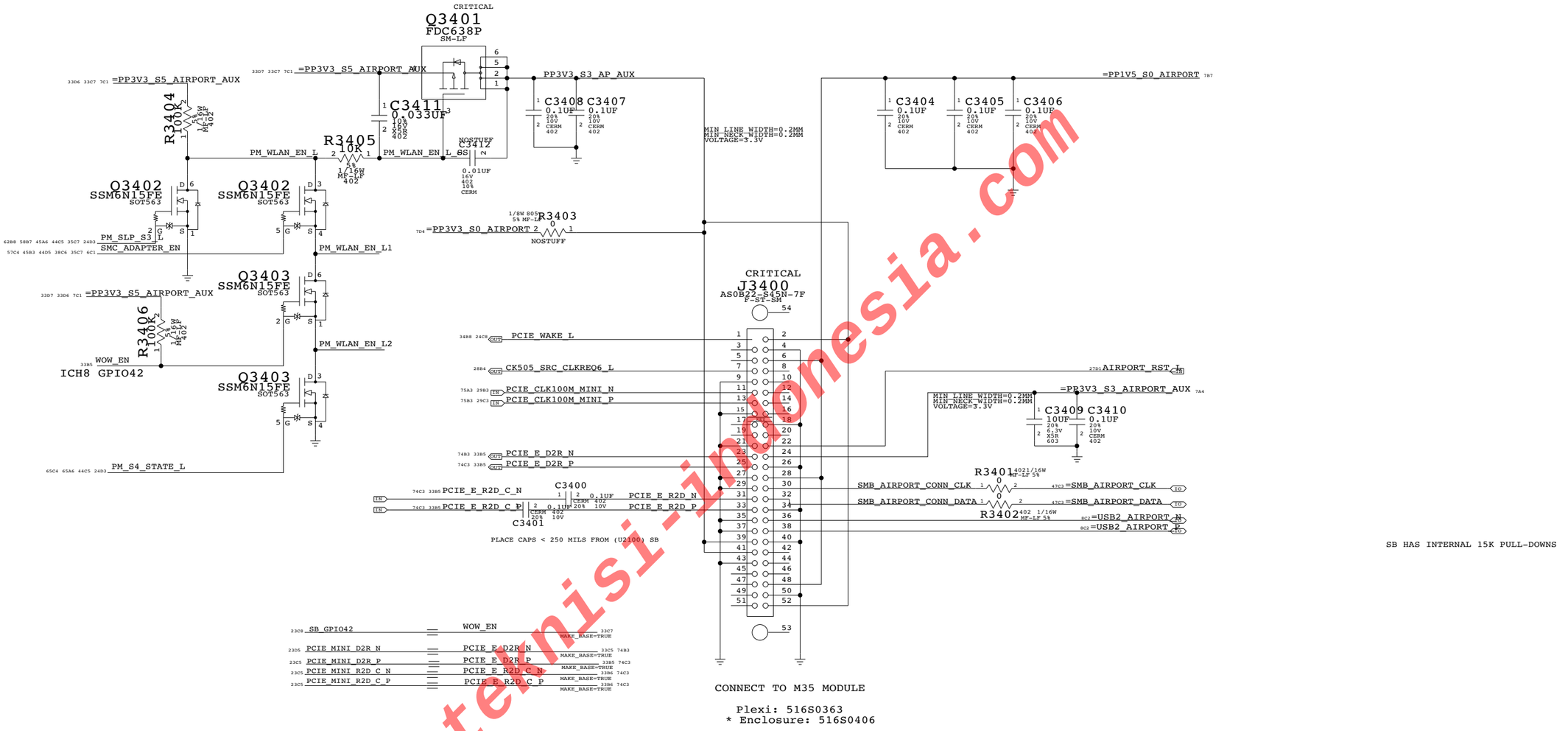

AIRPORT CONN

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	33	76

Page Notes

Power aliases required by this page:
- =PP3V3_ENET_PHY (EC / Ultra)
- =PP1V8R2V5_ENET_PHY (2.5V / 1.8V)
- =YUKON_EC_PP2V5_ENET (2.5V / GND)
- =PP1V2_ENET_PHY

Signal aliases required by this page:
- =ENET_CLKREQ_L (NC/TP for Yukon EC)
- =ENET_VMAIN_AVLBL

BOM options provided by this page:
YUKON_EC - Selects Yukon EC RSET value.
YUKON_ULTRA - Selects Yukon Ultra RSET.

NOTE: Yukon IC and EEPROM are OMITted on this page. Proper part numbers must be called out elsewhere.

NOTE: See bottom of page for instructions for dual Yukon EC / Yukon Ultra schematic support.

=PP1V2_ENET_PHY

Yukon EC		Yukon Ultra	
No link:	171 mA	No link:	130 mA
10 Mbps:	179 mA	10 Mbps:	130 mA
100 Mbps:	203 mA	100 Mbps:	150 mA
1000 Mbps:	426 mA	1000 Mbps:	290 mA

C3700 4.7UF 20% 6.3V CERM 603; C3701 C3702 C3703 C3704 C3705 C3706 C3707 C3708 0.1UF 10% 16V X5R 402 (C3706 C3707 C3708: 0.001UF 10% 50V CERM 402)

=PP3V3_ENET_PHY

Yukon EC		Yukon Ultra	
No link:	4 mA	No link:	60 mA
10 Mbps:	4 mA	10 Mbps:	70 mA
100 Mbps:	4 mA	100 Mbps:	70 mA
1000 Mbps:	4 mA	1000 Mbps:	80 mA

C3710 4.7UF 20% 6.3V CERM 603; C3711 C3712 C3713 C3714 C3715 0.1UF 10% 16V X5R 402 (C3714 C3715: 0.001UF 10% 50V CERM 402)

L3720 FERR-120-OHM-1.5A 0402-LF

=PP1V8R2V5_ENET_PHY — PP1V8R2V5_ENET_PHY_AVDD
MIN_LINE_WIDTH=0.4 mm
MIN_NECK_WIDTH=0.22 mm
VOLTAGE=1.8V
(EC:2.5V)

Yukon EC (2.5V)		Yukon Ultra (1.8V)	
No link:	82 mA	No link:	0 mA
10 Mbps:	108 mA	10 Mbps:	30 mA
100 Mbps:	126 mA	100 Mbps:	40 mA
1000 Mbps:	218 mA	1000 Mbps:	150 mA

C3720 4.7UF 20% 6.3V CERM 603; C3721 C3722 C3723 0.1UF 10% 16V X5R 402; C3724 0.001UF 10% 50V CERM 402

=YUKON_EC_PP2V5_ENET
Yukon EC: Alias to PP1V8R2V5_ENET_PHY_AVDD, add 1x 0.1uF & 1x 0.001uF caps
Yukon Ultra: Alias to GND

PCIE_ENET_D2R_P — C3735 0.1UF 10% 16V X5R 402 — PCIE_ENET_D2R_C_P
PCIE_ENET_D2R_N — C3736 0.1UF 10% 16V X5R 402 — PCIE_ENET_D2R_C_N
PCIE_ENET_R2D_C_P — C3730 0.1UF 10% 16V X5R 402 — PCIE_ENET_R2D_P
PCIE_ENET_R2D_C_N — C3731 0.1UF 10% 16V X5R 402 — PCIE_ENET_R2D_N
PLACEMENT_NOTE=Place C3730 close to southbridge.
PLACEMENT_NOTE=Place C3731 close to southbridge.
PCIE_CLK100M_ENET_P
PCIE_CLK100M_ENET_N
=ENET_CLKREQ_L — Yukon EC: Pin 42 should be NC (or TP) net.
PCIE_WAKE_L
ENET_RESET_L
ENET_MDI_P<0>
ENET_MDI_N<0>
ENET_MDI_P<1>
ENET_MDI_N<1>
ENET_MDI_P<2>
ENET_MDI_N<2>
ENET_MDI_P<3>
ENET_MDI_N<3>

SIGNAL_MODEL=EMPTY
R3740 R3741 R3742 R3743 R3744 R3745 R3746 R3747 49.9 1% 1/16W MF-LF 402
ENET_MDI0 — C3740 0.001UF 10% 50V CERM 402
ENET_MDI1 — C3742 0.001UF 10% 50V CERM 402
ENET_MDI2 — C3744 0.001UF 10% 50V CERM 402
ENET_MDI3 — C3746 0.001UF 10% 50V CERM 402

CRITICAL
Y3750 SM-3.2X2.5MM 25.0000M
C3750 15PF 5% 50V CERM 402
C3751 15PF 5% 50V CERM 402
ENET_CLK25M_XTALI
ENET_CLK25M_XTALO

U3700 88E8058 QFN
CRITICAL
EC:AVDD 2.5V

PCIE_ENET_D2R_C_P	49	TX_P	
PCIE_ENET_D2R_C_N	50	TX_N	
PCIE_ENET_R2D_P	54	RX_P	
PCIE_ENET_R2D_N	53	RX_N	
PCI EXPRESS			
PCIE_CLK100M_ENET_P	55	REFCLKP	
PCIE_CLK100M_ENET_N	56	REFCLKN	
=ENET_CLKREQ_L	42	CLKREQ*	EC:NO CONNECT
PCIE_WAKE_L	6	WAKE*	
ENET_RESET_L	5	PERST*	
ENET_MDI_P<0>	17	MDIP0	
ENET_MDI_N<0>	18	MDIN0	
ENET_MDI_P<1>	20	MDIP1	
ENET_MDI_N<1>	21	MDIN1	
ENET_MDI_P<2>	26	MDIP2	
ENET_MDI_N<2>	27	MDIN2	
ENET_MDI_P<3>	30	MDIP3	
ENET_MDI_N<3>	31	MDIN3	
MEDIA			
ENET_CLK25M_XTALI	15	XTALI	
ENET_CLK25M_XTALO	14	XTALO	
MAIN CLK			
	65	THRML_PAD	

ANALOG
LOM_DISABLE* 10 — ENET_LOM_DIS_L
VAUX_AVLBL 12
SWITCH_VAUX 9 NC
VMAIN_AVLBL 47 — Must be high in S0 state (can use PP3V3_S0 as input) =ENET_VMAIN_AVLBL
SWITCH_VCC 11 NC
EC:CTRL25 CTRL18 4 — TP_YUKON_CTRL18
CTRL12 3 — TP_YUKON_CTRL12
RSET 16 — YUKON_RSET

LED
LED_ACT* 59 NC
LED_LINK10/100* 60 NC
LED_LINK1000* 62 NC
LED_DUPLEX* 63 NC

SPI
(IPU) SPI_DO 34 NC
(IPU) SPI_DI 35 NC
(IPU) SPI_CLK 37 NC
(IPU) SPI_CS 36 NC

TWSI
(IPU) VPD_CLK 38 — YUKON_VPD_CLK
(IPU) VPD_DATA 41 — YUKON_VPD_DATA

TEST/RSVD
(IPD) TESTMODE 46
RSVD_24 24 NC
RSVD_25 25 NC
RSVD_29 29 NC
RSVD_43 43 NC

R3760 4.7K 5% 1/16W MF-LF 402 — YUKON_ULTRA
R3765 4.99K 1% 1/16W MF-LF 402 — If characterization shows eye height is too small, make R3765 smaller

VPD ROM
C3780 0.1UF 10% 16V X5R 402
R3780 4.7K 5% 1/16W MF-LF 402
R3781 4.7K 5% 1/16W MF-LF 402
U3780 M24C08 SO8 CRITICAL
E2 NC NC WC* VCC OMIT SDA SCL VSS

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
114S0285	1	RES,4.87K,1%,1/16W,0402,LF	R3760		YUKON_EC

To support Yukon EC and Ultra on the same board:
- Alias =YUKON_EC_PP2V5_ENET to PP1V8R2V5_ENET_PHY_AVDD, add 1x 0.1uF and 1x 0.001uF caps
- Use 0-ohm resistors or variable supply to provide 1.8V or 2.5V to =PP1V8R2V5_ENET_PHY
- Connect =ENET_CLKREQ_L to clock generator via 0-ohm resistor (BOMOPTION: YUKON_ULTRA)
- Use YUKON_EC and YUKON_ULTRA BOMOPTIONs to select stuffed part

Ethernet (Yukon)
SYNC_MASTER=USB SYNC_DATE=10/07/2006

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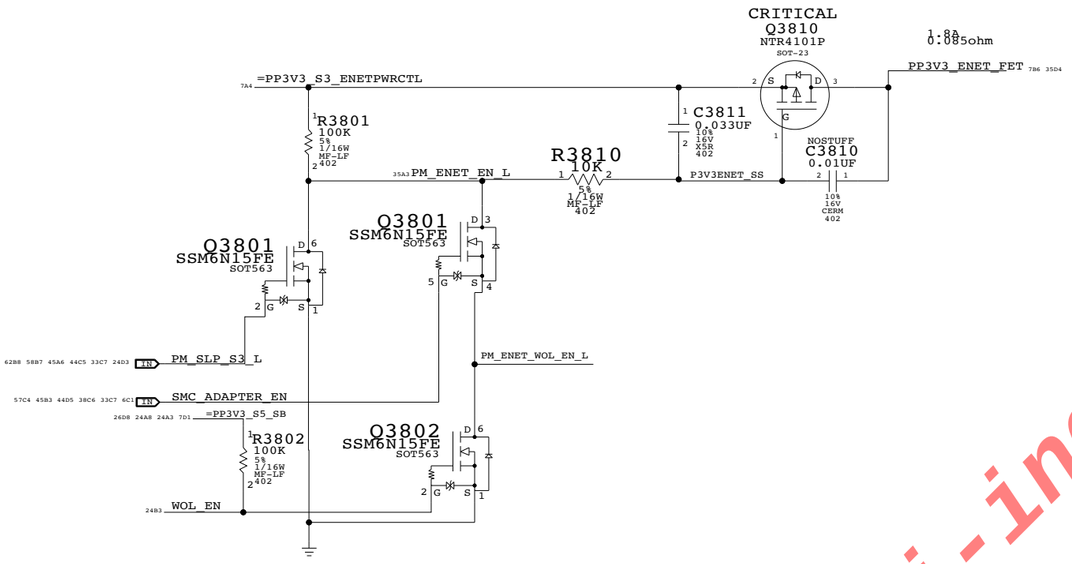
SIZE D | DRAWING NUMBER 051-7455 | REV. 01
SCALE NONE | SHT 34 OF 76

ENET Enable Generation

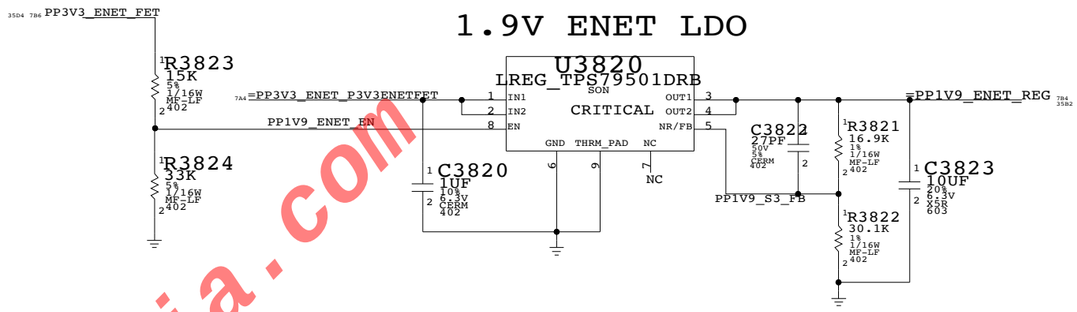
"ENET" = "S0" || AC

3.3V ENET FET



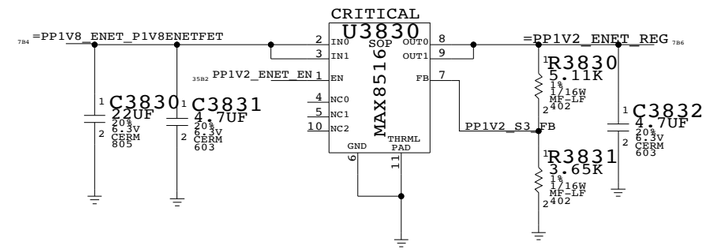
Name	PM_SLP_S3_L	SMC_ADAPTER_EN	PM_ENET_EN_L	PM_ENET_EN	Yukon Power
Logic	S0	AC			Powered by S3
S0 on Battery	High (3.3V)	Low (0V)	Low (0V)	High (3.3V)	Power
S3 on Battery	Low (0V)	Low (0V)	High (3.3V)	Low (0V)	Power
S0 on AC	High (3.3V)	High (3.3V)	Low (0V)	High (3.3V)	Power
S3 on AC	Low (0V)	High (3.3V)	Low (0V)	High (3.3V)	Power
S5 on anything	N/A	N/A	N/A	N/A	No Power

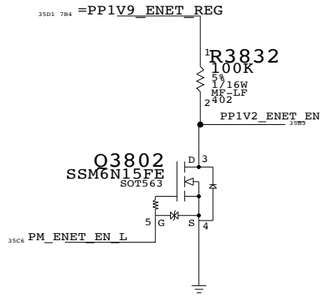
1.9V ENET LDO



Vout = 1.2246V * (1 + R3821 / R3822)

1.2V ENET LDO





Yukon Power Control

SYNC_MASTER=USB SYNC_DATE=10/07/2006

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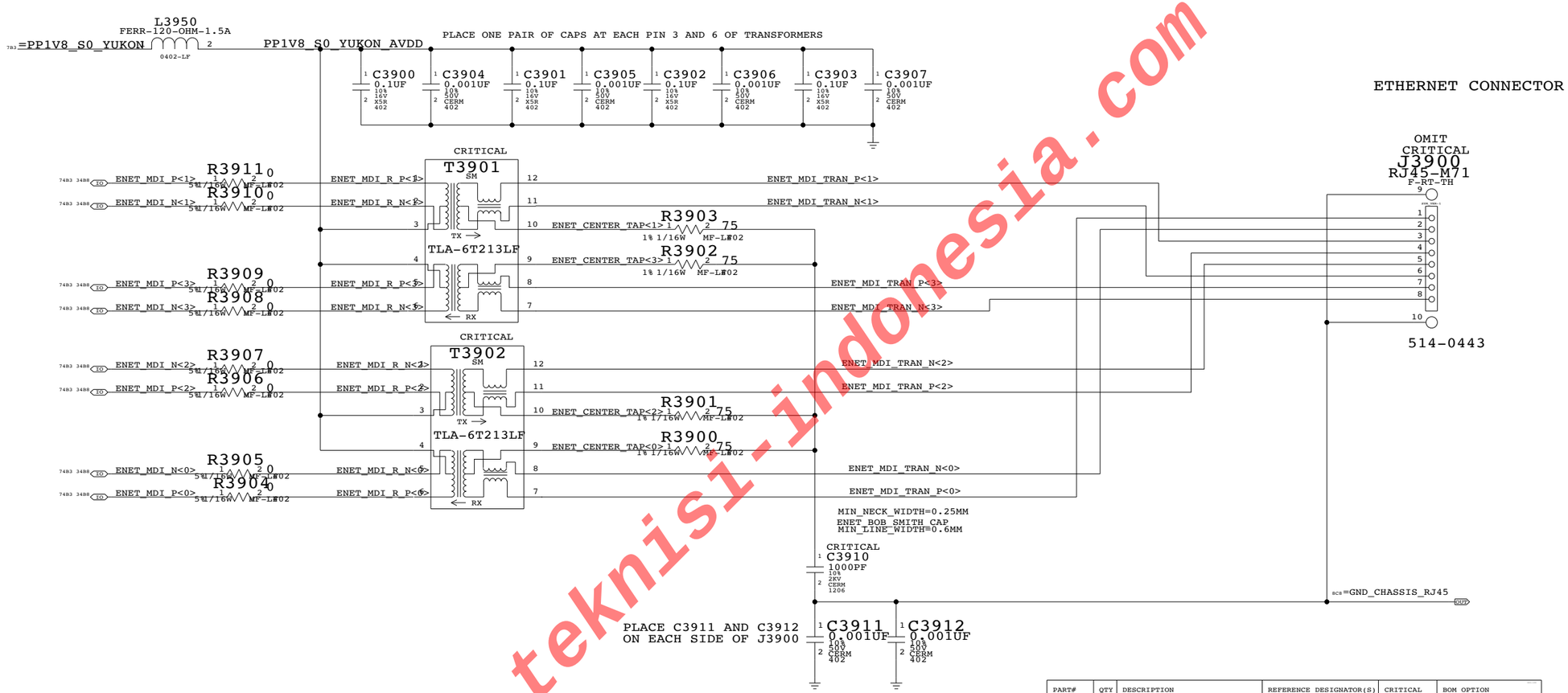
SCALE	SHT	OF
NONE	35	76



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0443	1	CONN,8P RJ-45 JACK,TH,MG3,LF	J3900	CRITICAL	NORMAL
514-0475	1	CONN,8P RJ-45 JACK,TH,BLACK,LF	J3900	CRITICAL	FANCY

ETHERNET CONNECTOR

SYNC_MASTER=USB SYNC_DATE=09/14/2006

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE | SHT 36 OF 76

PAGE NOTES

INPUT

=PP3V3_S0_FW - 3.3V POWER FOR FIREWIRE (MOBILE: OFF DURING SLEEP)
=PP3V3_S0_PCI - 3.3V POWER FOR PCI FIREWIRE (MOBILE: OFF DURING SLEEP)
PCI_GNT3_L - PCI GRANT FROM SB
PCI_CLK_FW - NEED TO REFERENCE TO ALIAS PAGE
PCI_RST_L - PCI RESET FROM SB
FW_PC0 - FIREWIRE POWER CLASS IDENTIFIER

INPUT/OUTPUT

PCI_AD<0..31>,PCI_C_BE_L<0..3>,PCI_FRAME_L,PCI_IRDY_L,PCI_TRDY_L,
PCI_DEVSEL_L, PCI_STOP_L, PCI_PAR, PCI_PERR_L, PCI_SERR_L
FW_A_TPA_P/N, FW_A_TPB_P/N, FW_A_TPBIAS - PORT 0 FIREWIRE DIFF PAIRS
FW_B_TPA_P/N, FW_B_TPB_P/N, FW_B_TPBIAS - PORT 1 FIREWIRE DIFF PAIRS
FW_C_TPA_P/N, FW_C_TPB_P/N, FW_C_TPBIAS - PORT 2 FIREWIRE DIFF PAIRS

OUTPUT

PCI_REQ3_L - PCI REQUEST TO SB
PM_CLKRUN_L - CLOCK-RUN PCI PROTOCOL
INT_PIROD_L - INTERRUPT TO SB
PCI_PME_FW_L - DEDICATED PME FOR FIREWIRE (SB GPIO1)

PAGE HISTORY

5/19/2005 - FIRST REVISION OF PAGE
6/20/2005 - BGA VERSION OF FW323-06 ADDED
6/21/2005 - CHANGED INT* TO INT_PIROD_L (PER ARCHITECTURAL DEFINITION)
6/21/2005 - CHANGED PCI_ID TO AD15 (PER ARCHITECTURAL DEFINITION)
6/21/2005 - CHANGED REQ3OUT TO REQ3/GNT3 (PER ARCHITECTURAL DEFINITION)
6/22/2005 - ADDED 510R PULL-DOWN ON RST* AND REMOVED CONNECTION TO PLT_RST_L
6/22/2005 - CHANGED CLK_PME CLIP PAIR NAMES TO BE RE-USE COMPLIANT
6/22/2005 - REMOVED CONSTRAINT SETS AS THEY WILL BE MANAGED ON BOARD SIDE
6/22/2005 - REMOVED C4421 - REDUNDANT
6/22/2005 - BRING OUT PCO CONNECTION TO BE CONNECTED ON PORT PAGE
7/26/2005 - CONNECTED PIN E10 TO GND

MOBILE TURNS OFF CONTROLLER POWER DURING SLEEP
0.001A DURING SLEEP

=PP3V3_S3_FW

PLACE ONE CAP PER TWO PINS STARTING WITH C4024 ON VDD0

C4024 10UF 20% 6.3V X5R 603
C4018 0.1UF 10% 16V X5R 402
C4022 0.1UF 10% 16V X5R 402
C4026 0.1UF 10% 16V X5R 402
C4028 0.1UF 10% 16V X5R 402
C4030 0.1UF 10% 16V X5R 402
C4032 0.1UF 10% 16V X5R 402

L4000
600-OHM-300MA 0402

PLACE ONE CAP PER TWO PINS STARTING WITH C4016 ON VDDA0

PP3V3_S3_FW_AVDD
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.5MM
MIN_NECK_WIDTH=0.2MM

C4016 10UF 20% 6.3V X5R 603
C4017 0.1UF 10% 16V X5R 402
C4029 0.1UF 10% 16V X5R 402
C4025 0.1UF 10% 16V X5R 402

=PP3V3_S3_PCI

CONNECT TO VDD FOR 3.3V OPERATION

CRITICAL
U4000
FW32306
BGA

PCI_AD<0> F10
PCI_AD<1> G10
PCI_AD<2> H10
PCI_AD<3> H12
PCI_AD<4> J13
PCI_AD<5> J12
PCI_AD<6> K13
PCI_AD<7> K10
PCI_AD<8> L12
PCI_AD<9> M13
PCI_AD<10> L11
PCI_AD<11> M12
PCI_AD<12> M11
PCI_AD<13> N12
PCI_AD<14> M10
PCI_AD<15> N11
PCI_AD<16> M4
PCI_AD<17> N5
PCI_AD<18> N4
PCI_AD<19> M3
PCI_AD<20> M2
PCI_AD<21> N3
PCI_AD<22> K4
PCI_AD<23> M1
PCI_AD<24> K2
PCI_AD<25> J4
PCI_AD<26> K1
PCI_AD<27> J2
PCI_AD<28> J1
PCI_AD<29> H2
PCI_AD<30> H4
PCI_AD<31> H1

PCI_C_BE_L<0> K12
PCI_C_BE_L<1> M9
PCI_C_BE_L<2> L3
PCI_C_BE_L<3> L1
PCI_PAR N10
PCI_FRAME_L N6
PCI_IRDY_L M6
PCI_TRDY_L N7
PCI_DEVSEL_L N8
PCI_STOP_L M7
FW_PCI_IDSEL L2
PCI_FW_REQ_L E2
PCI_FW_GNT_L E1
PCI_PERR_L M8
PCI_SERR_L N9
PCI_CLK33M_FW G2
PM_CLKRUN_L D1
FW_PCI_RST_L F1
INT_PIROD_L D2
PCI_PME_FW_L F2

R4031 22 5% 1/16W MF-LF 402

R4032 100 1% 1/16W MF-LF 402
PCI_RST_L

THIS IS FROM ICH-8
PLACE R4032 VERY CLOSE TO SB

197S0030 3.2MMX2.5MM
CRITICAL
Y4003
SM-3.2X2.5MM
24.576MHZ

R4000 390 5% 1/16W MF-LF 402
FW_XO
C4011 15PF 5% 50V C0BNM 402
C4012 15PF 5% 50V C0BNM 402
NEED TO CHECK CRYSTAL LOAD CAPACITANCE

FW_XI
FW_XO
FW_PWRON_RST_L
FW_R1
FW_R0

SPEC RECOMMENDS 2.49K

R4052 2.1K 1% 1/16W MF-LF 402
C4020 0.1UF 10% 16V X5R 402
R4020 510K 5% 1/16W MF-LF 402

FW_A_TPBIAS
FW_A_TPA_P
FW_A_TPA_N
FW_A_TPB_P
FW_A_TPB_N
FW_B_TPBIAS
FW_B_TPA_P
FW_B_TPA_N
FW_B_TPB_P
FW_B_TPB_N
FW_C_TPBIAS
FW_C_TPA_P
FW_C_TPA_N
FW_C_TPB_P
FW_C_TPB_N

MODE FOR EXTERNAL LINK
FW_PC0
DUAL PORT DEVICES ARE POWER CLASS 4 (‘100’)
SINGLE PORT DEVICES ARE POWER CLASS 0 (‘000’)
LOW = NOT BUS MANAGER
LOW = PCI OPERATION

MANUFACTURING TEST PINS
FW_TEST0
FW_TEST1
FW_PTEST
FW_SE
FW_SM

R4033 47 5% 1/16W MF-LF 402
R4034 47 5% 1/16W MF-LF 402
R4035 47 5% 1/16W MF-LF 402
R4036 47 5% 1/16W MF-LF 402
R4037 47 5% 1/16W MF-LF 402

FIREWIRE CONTROLLER

SYNC_MASTER=ENET SYNC_DATE=08/30/2005

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE
SHT 37 OF 76

Page Notes

INPUT:

=PPBUS_FW - PORT POWER
=PP3V3_S5_FW - DIGITAL POWER
=GND_CHASSIS_FW_PORT0 - CHASSIS GROUND
=FWPWR_PWRON - ADDITIONAL POWER CONTROL

INPUT/OUTPUT:

FW_TPA0_P/N,FW_TPB0_P/N,FW_TPBIAS0 - FIREWIRE DIFF PAIRS

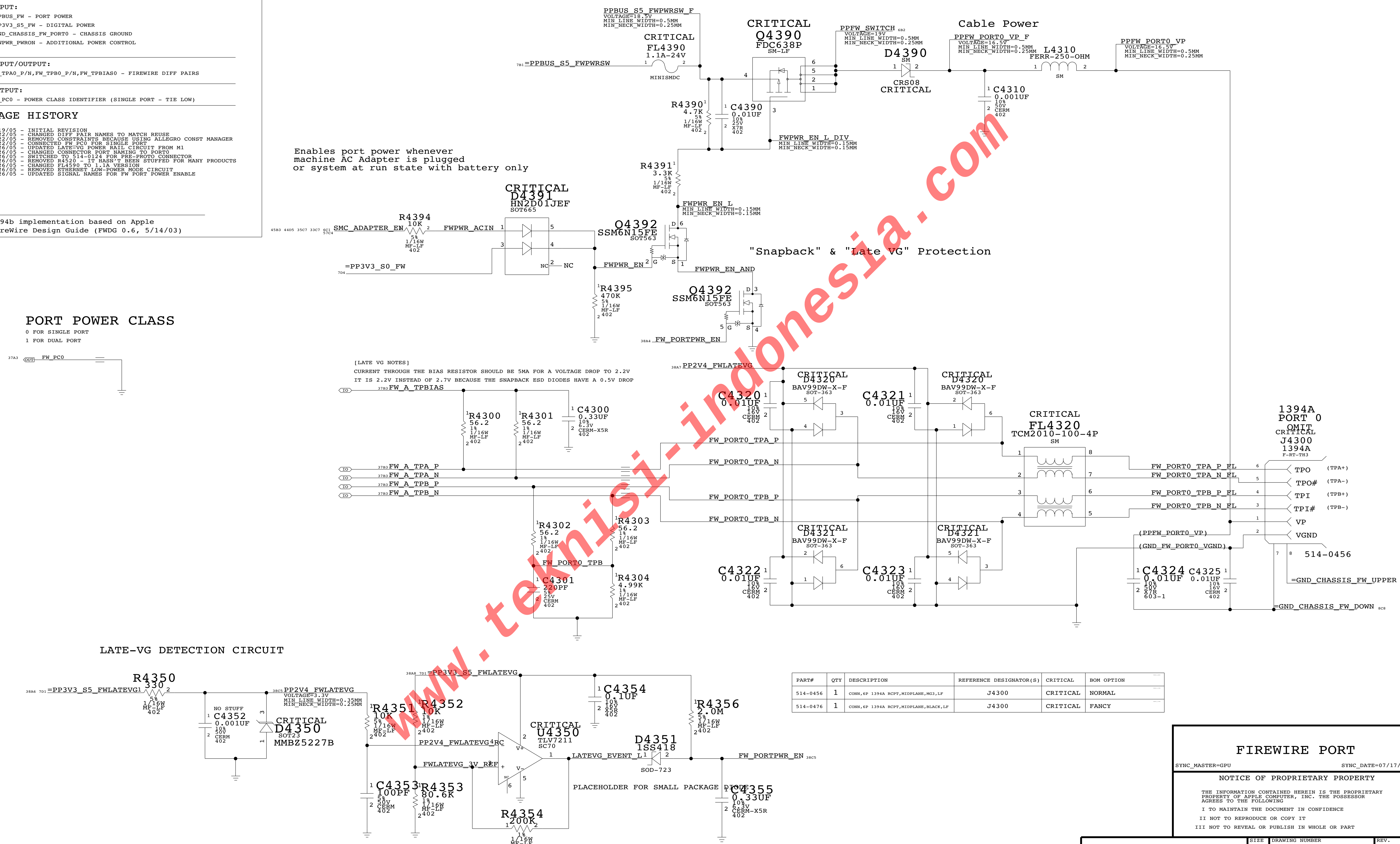
OUTPUT:

FW_PC0 - POWER CLASS IDENTIFIER (SINGLE PORT - TIE LOW)

PAGE HISTORY

5/19/05 - INITIAL REVISION
6/22/05 - CHANGED DIFF PAIR NAMES TO MATCH REUSE
6/22/05 - REMOVED CONSTRAINTS BECAUSE USING ALLEGRO CONST MANAGER
6/22/05 - CONNECTED FW_PC0 FOR SINGLE PORT
7/26/05 - UPDATED LATE-VG POWER RAIL CIRCUIT FROM M1
7/26/05 - CHANGED CONNECTOR PORT NAMING TO PORT0
7/26/05 - SWITCHED TO 514-0124 FOR PRE-PROTO CONNECTOR
7/26/05 - REMOVED R4520 - IT HASN'T BEEN STUFFED FOR MANY PRODUCTS
7/26/05 - CHANGED FL4590 TO 1.1A VERSION
7/26/05 - REMOVED ETHERNET LOW-POWER MODE CIRCUIT
7/26/05 - UPDATED SIGNAL NAMES FOR FW PORT POWER ENABLE

1394b implementation based on Apple FireWire Design Guide (FWDG 0.6, 5/14/03)



Enables port power whenever machine AC Adapter is plugged or system at run state with battery only
Cable Power
"Snapback" & "Late VG" Protection
PORT POWER CLASS
0 FOR SINGLE PORT
1 FOR DUAL PORT
FW_PC0
PPBUS_S5_FWPWRSW_F
=PPBUS_S5_FWPWRSW
CRITICAL
FL4390
1.1A-24V
MINISMDC
CRITICAL
Q4390
FDC638P
SM-LF
PPFW_SWITCH
D4390
CRS08
CRITICAL
PPFW_PORT0_VP_F
L4310
FERR-250-OHM
PPFW_PORT0_VP
C4310
0.001UF
R4390
4.7K
C4390
0.01UF
FWPWR_EN_L_DIV
R4391
3.3K
FWPWR_EN_L
CRITICAL
D4391
HN2D01JEF
SOT665
R4394
10K
SMC_ADAPTER_EN
FWPWR_ACIN
=PP3V3_S0_FW
Q4392
SSM6N15FE
SOT563
FWPWR_EN
FWPWR_EN_AND
R4395
470K
FW_PORTPWR_EN
[LATE VG NOTES]
CURRENT THROUGH THE BIAS RESISTOR SHOULD BE 5MA FOR A VOLTAGE DROP TO 2.2V
IT IS 2.2V INSTEAD OF 2.7V BECAUSE THE SNAPBACK ESD DIODES HAVE A 0.5V DROP
FW_A_TPBIAS
PP2V4_FWLATEVG
R4300
56.2
R4301
56.2
C4300
0.33UF
FW_A_TPA_P
FW_A_TPA_N
FW_A_TPB_P
FW_A_TPB_N
FW_PORT0_TPA_P
FW_PORT0_TPA_N
FW_PORT0_TPB_P
FW_PORT0_TPB_N
R4302
56.2
R4303
56.2
FW_PORT0_TPB
C4301
220PF
R4304
4.99K
CRITICAL
D4320
BAV99DW-X-F
SOT-363
C4320
0.01UF
C4321
0.01UF
CRITICAL
D4321
BAV99DW-X-F
C4322
0.01UF
C4323
0.01UF
CRITICAL
FL4320
TCM2010-100-4P
SM
FW_PORT0_TPA_P_FL
FW_PORT0_TPA_N_FL
FW_PORT0_TPB_P_FL
FW_PORT0_TPB_N_FL
(PPFW_PORT0_VP)
(GND_FW_PORT0_VGND)
C4324
0.01UF
C4325
0.01UF
1394A
PORT 0
OMIT
CRITICAL
J4300
1394A
F-RT-TH3
TPO (TPA+)
TPO# (TPA-)
TPI (TPB+)
TPI# (TPB-)
VP
VGND
514-0456
=GND_CHASSIS_FW_UPPER
=GND_CHASSIS_FW_DOWN
LATE-VG DETECTION CIRCUIT
R4350
330
=PP3V3_S5_FWLATEVG
PP2V4_FWLATEVG
NO STUFF
C4352
0.001UF
CRITICAL
D4350
SOT23
MMBZ5227B
=PP3V3_S5_FWLATEVG
R4351
10K
R4352
10K
PP2V4_FWLATEVG_RC
FWLATEVG_3V_REF
C4353
100PF
R4353
80.6K
C4354
0.1UF
CRITICAL
U4350
TLV7211
SC70
R4354
200K
D4351
1SS418
SOD-723
LATEVG_EVENT_L
R4356
2.0M
FW_PORTPWR_EN
C4355
0.33UF
PLACEHOLDER FOR SMALL PACKAGE DIODE

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0456	1	CONN,6P 1394A RCPT,MIDPLANE,MG3,LF	J4300	CRITICAL	NORMAL
514-0476	1	CONN,6P 1394A RCPT,MIDPLANE,BLACK,LF	J4300	CRITICAL	FANCY

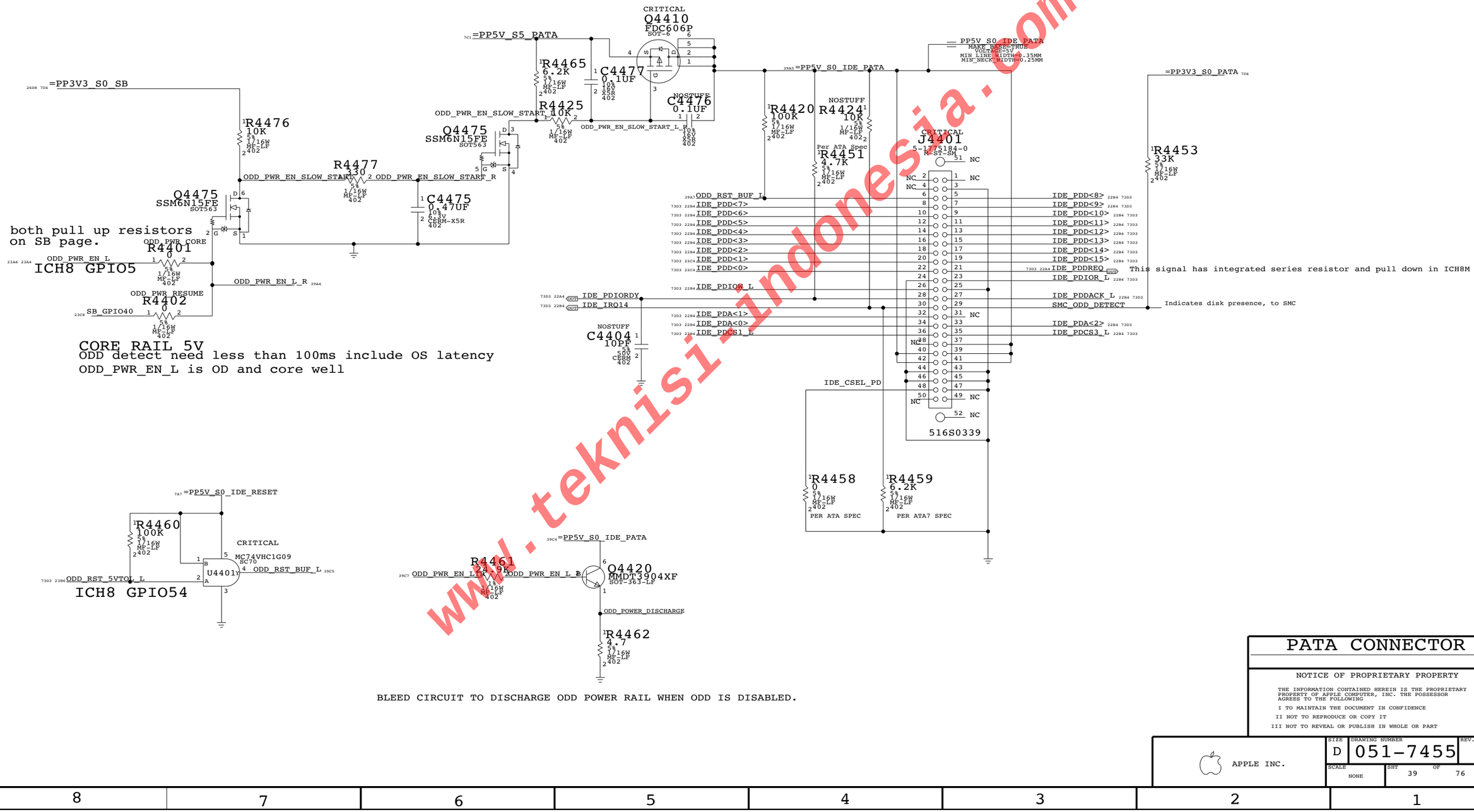
FIREWIRE PORT

SYNC_MASTER=GPU SYNC_DATE=07/17/2006

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE



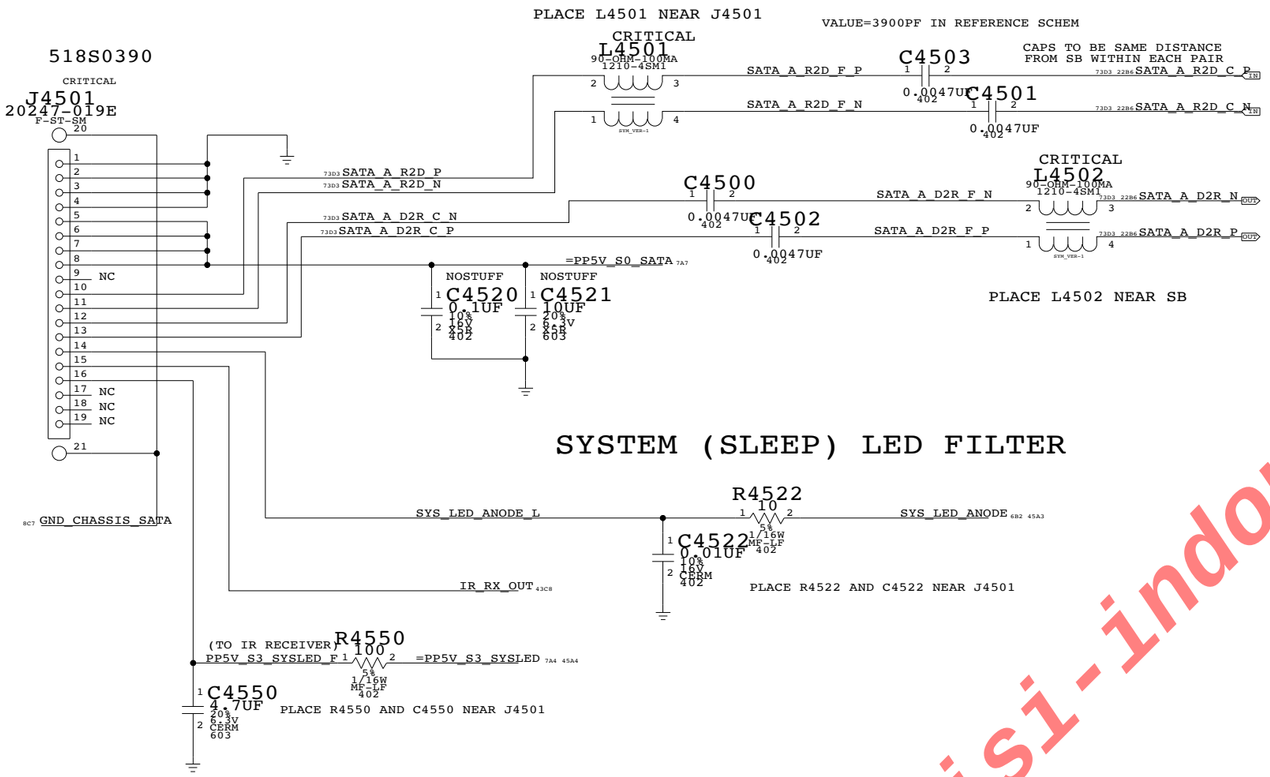
PATA CONNECTOR

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

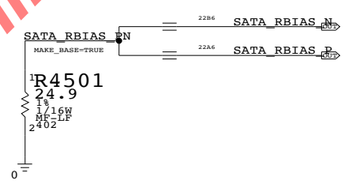
SCALE	SHT	OF
NONE	39	76

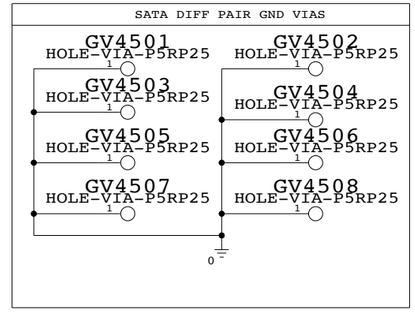
SATA CONNECTOR



SYSTEM (SLEEP) LED FILTER

PLACE NEAR ICH8 PIN





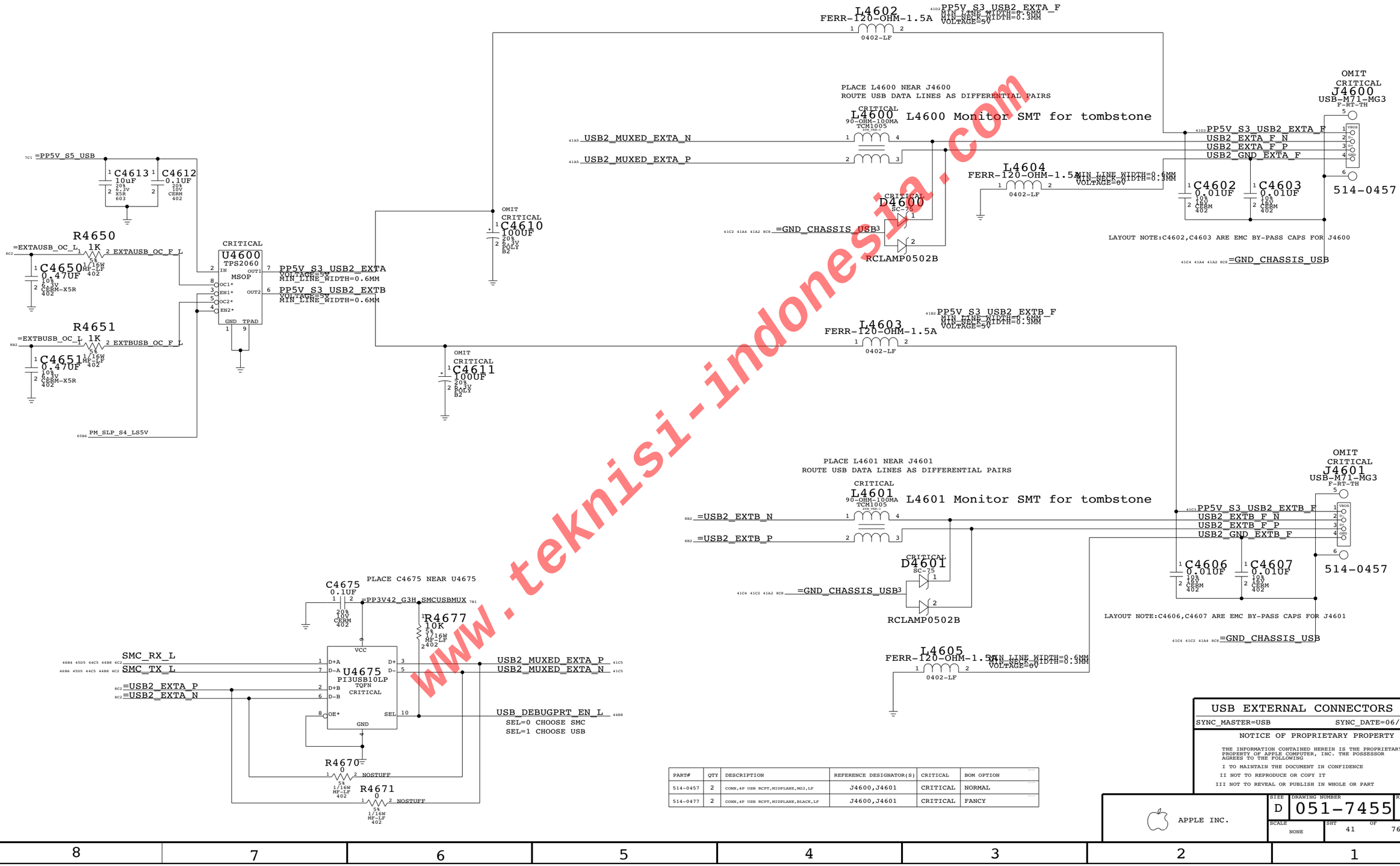
SATA CONNECTOR

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	40	76

USB 2.0 CONNECTORS



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0457	2	CONN,4P USB RCPT,MIDPLANE,MG3,LF	J4600,J4601	CRITICAL	NORMAL
514-0477	2	CONN,4P USB RCPT,MIDPLANE,BLACK,LF	J4600,J4601	CRITICAL	FANCY

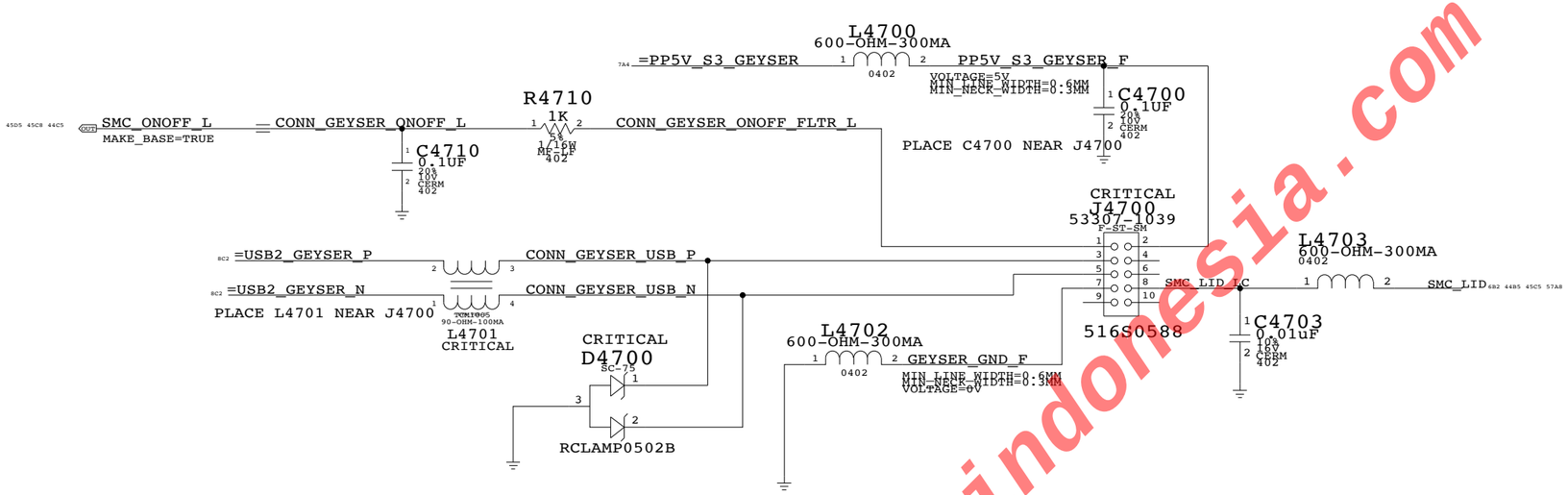
USB EXTERNAL CONNECTORS

SYNC_MASTER=USB SYNC_DATE=06/30/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 41 OF 76	

GEYSER AND DIMM0 REMOTE TEMP SENSORS



CONNECTOR MISC

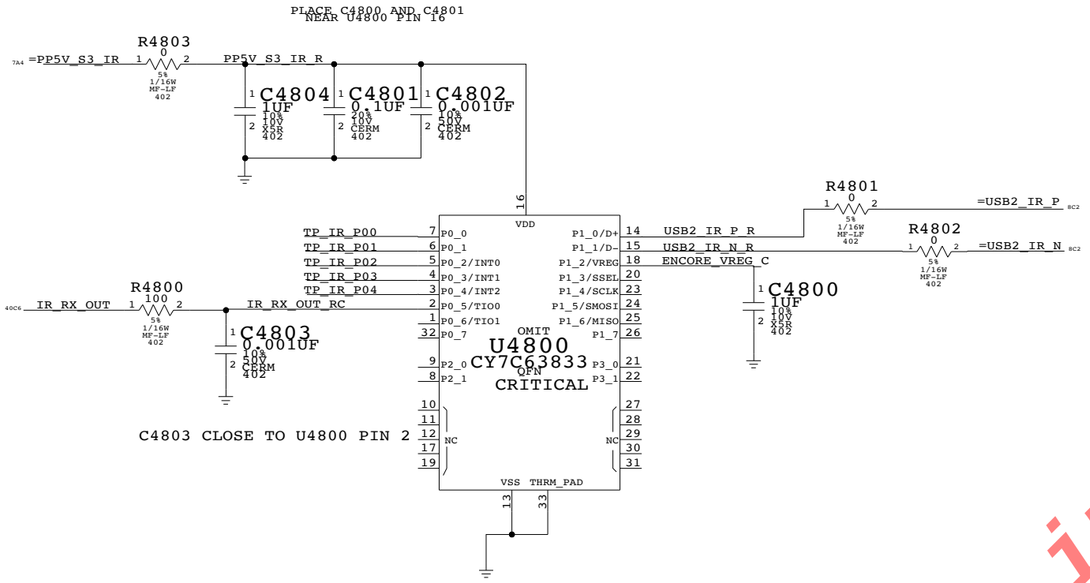
SYNC_MASTER=USB SYNC_DATE=06/29/2006

APPLE INC.

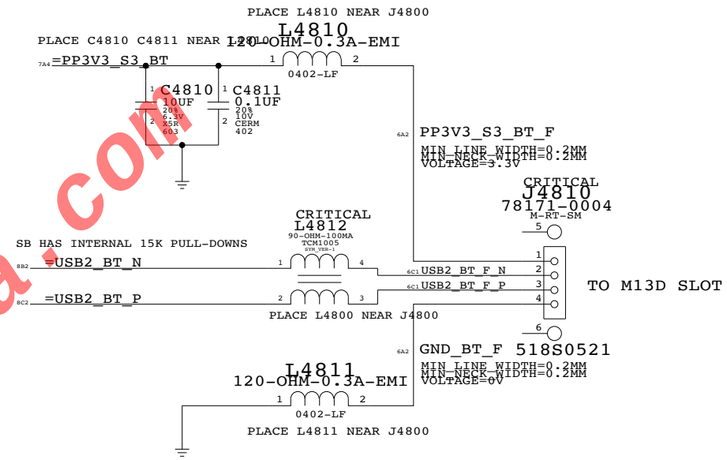
SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	42	76

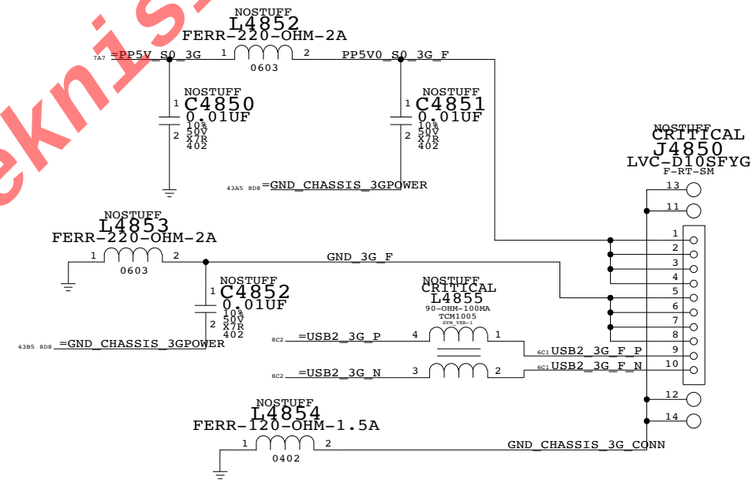
IR CYPRESS ENCORE II USB CONTROLLER



BLUETOOTH



3G CONNECTOR



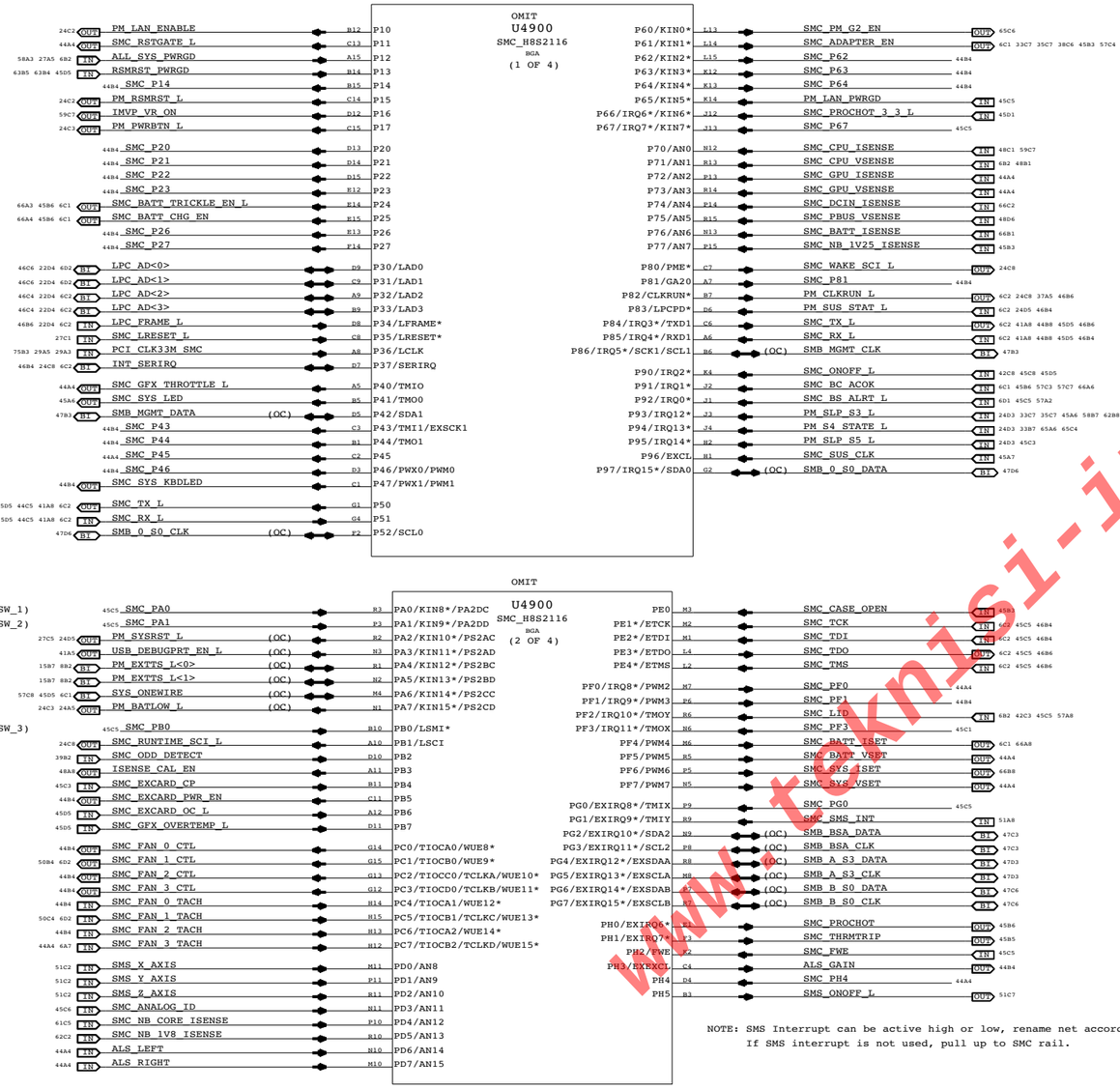
IR CONTROLLER & BT INTERFACE

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	43	76

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



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

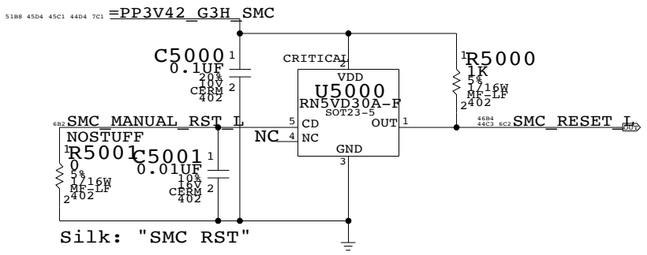
SMC

SYNC_MASTER=T9_MLB SYNC_DATE=10/30/2006

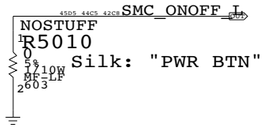
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 44 OF 76	

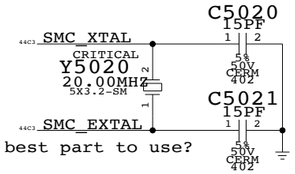
SMC Reset Button / Brownout Detect



Debug Power Button

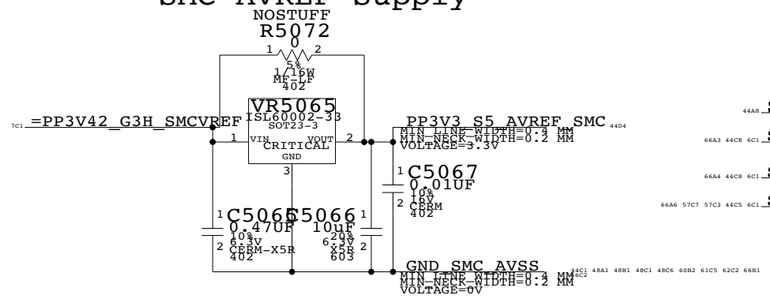


SMC Crystal Circuit



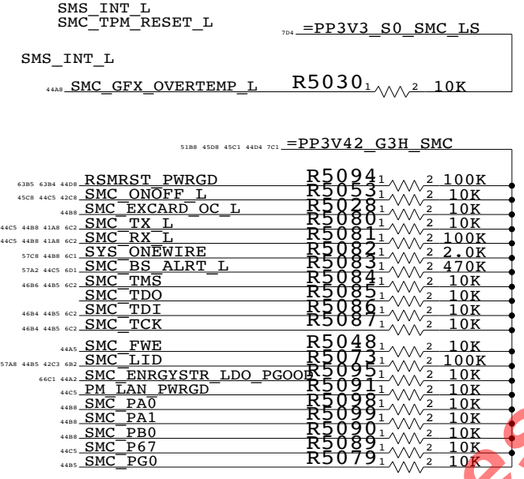
Is this the best part to use?

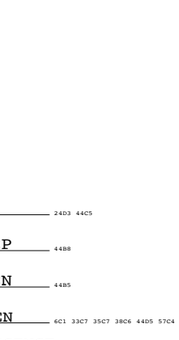
SMC AVREF Supply

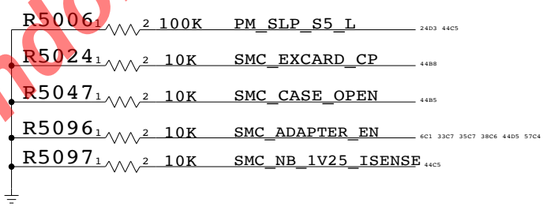


PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S1278	353S1381	?	VR5065	TI REF3133

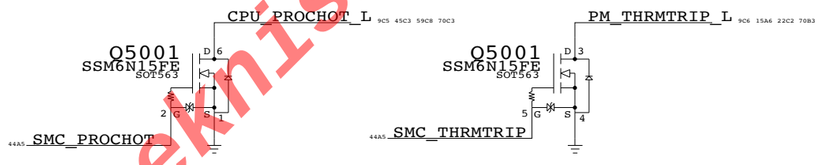
THESE NEED TO BE PULLED TO THE PROPER RAIL:





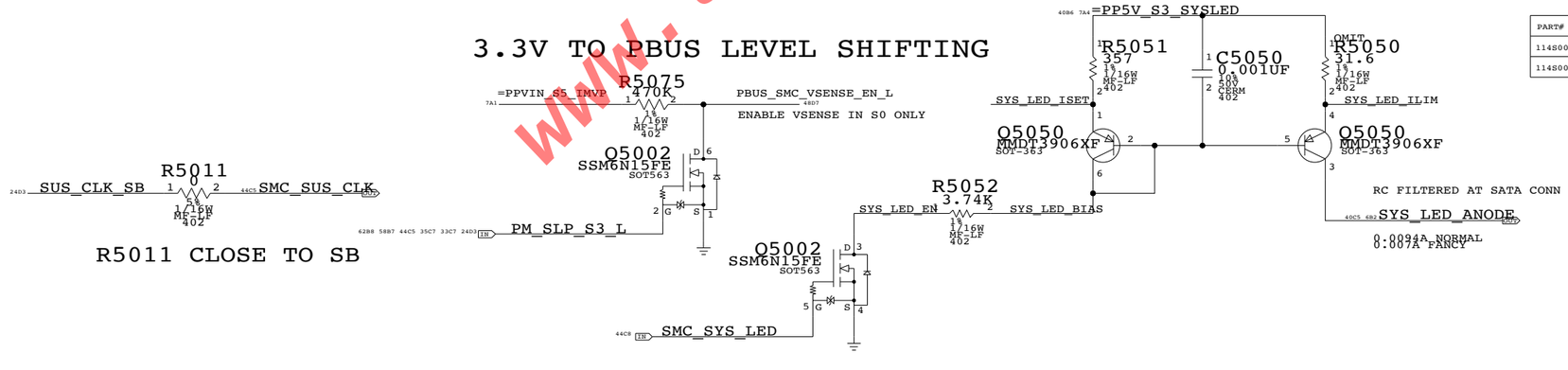


SMC 3.3V to 1.05V Level Shifting



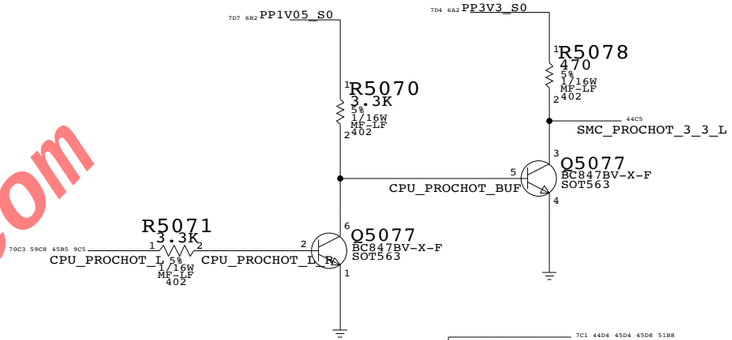
SYSTEM (SLEEP) LED CURRENT DRIVER

3.3V TO PBUS LEVEL SHIFTING



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
114S0071	1	31.6, 1%, 1/16W, MF-LF, 402	R5050	NORMAL
114S0086	1	44.2, 1%, 1/16W, MF-LF, 402	R5050	FANCY

SMC 1.05V to 3.3V Level Shifting



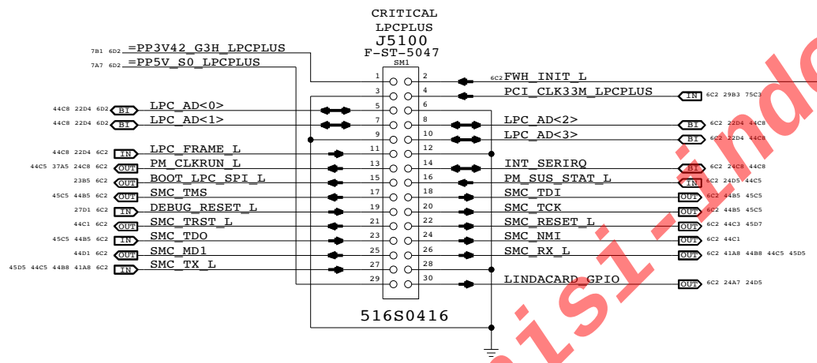
SMC SUPPORT

SYNC_MASTER=GPU SYNC_DATE=07/17/2006

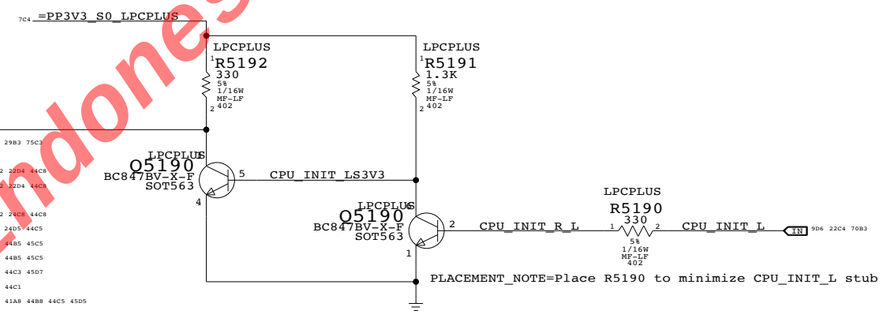
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 45 OF 76	

LPC+ Connector



FWH_INIT_L Generation



LPC+ Debug Connector

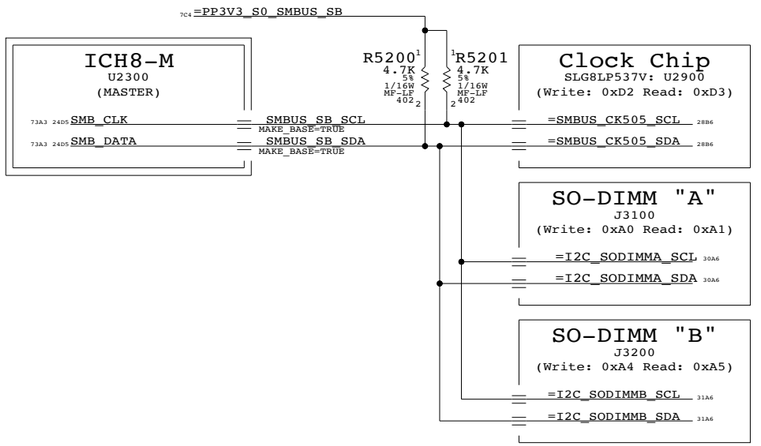
SYNC_MASTER=WFERRY SYNC_DATE=06/01/2006

APPLE INC.

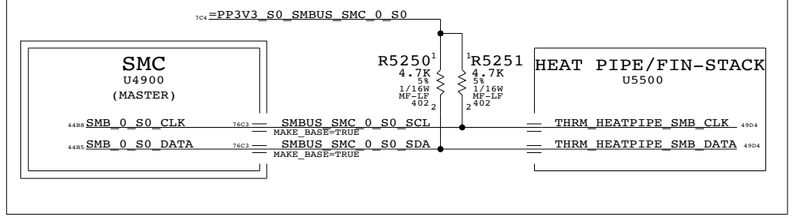
SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 46 OF 76

ICH8-M SMBus Connections

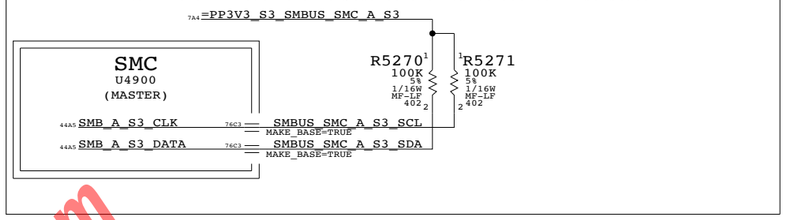


SMC "0" SMBus Connections

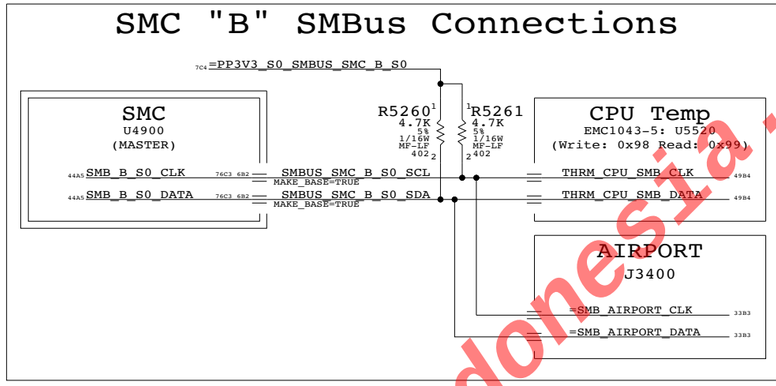


SMC "A" SMBus Connections

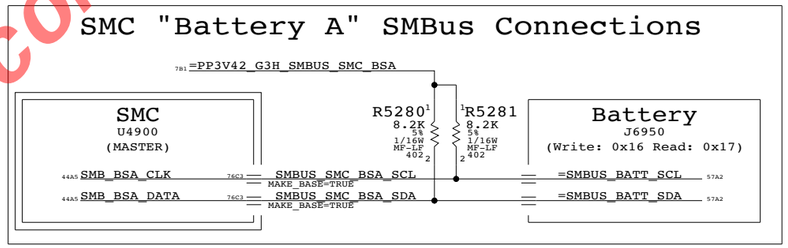
NOTE: SMC RMT bus remains powered and may be active in S3 state



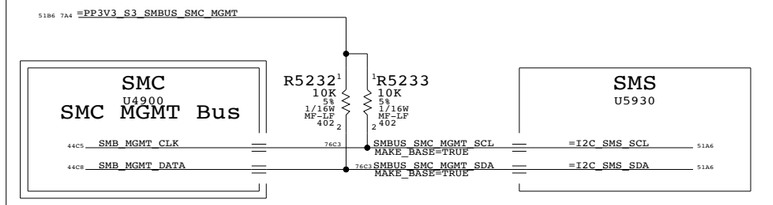
SMC "B" SMBus Connections



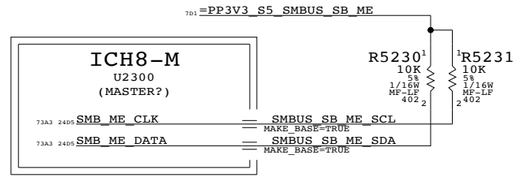
SMC "Battery A" SMBus Connections



SMC "MANAGEMENT" SMBUS CONNECTIONS



ICH8-M ME SMBus Connections



SMBUS CONNECTIONS

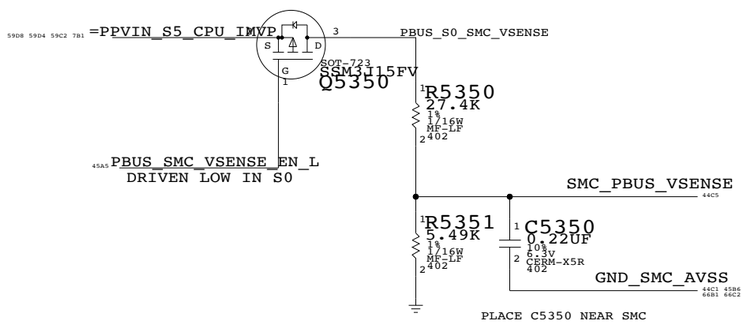
SYNC_MASTER=WFERRY SYNC_DATE=06/01/2006

APPLE INC.

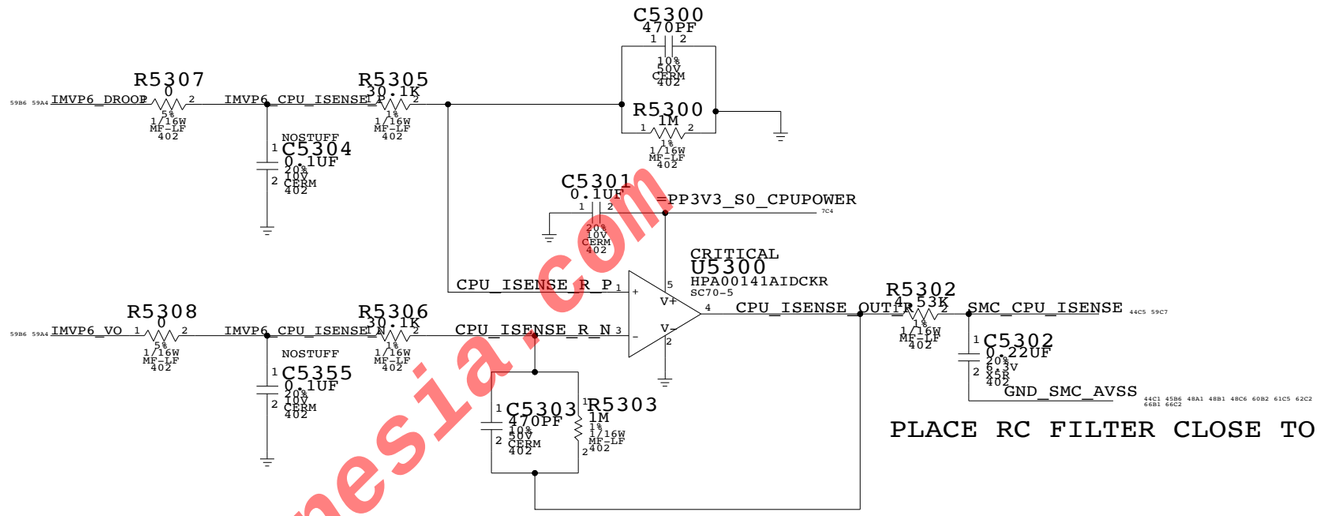
SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 47 OF 76

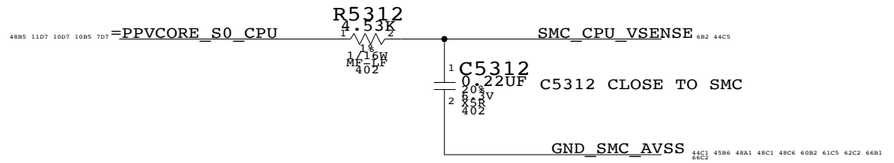
PROCESSOR DCIN VOLTAGE SENSE



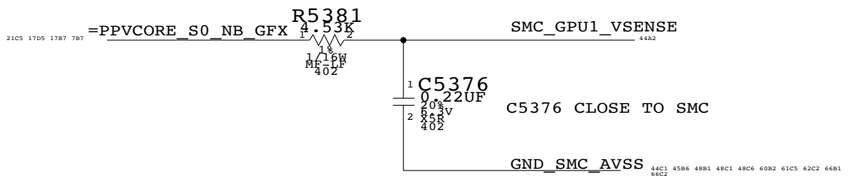
CPU CURRENT SENSE



CPU VOLTAGE SENSE

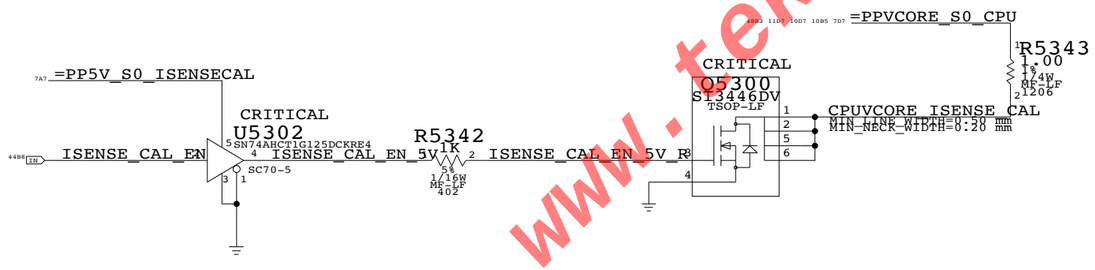


GPU VOLTAGE SENSE



Current Sense Calibration Circuit

Switches in fixed load on power supplies to calibrate current sense circuits



CPU Current & Voltage Sense

SYNC_MASTER=GPU SYNC_DATE=07/17/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE NONE SHT 48 OF 76

HEAT-PIPE/FIN-STACK TEMPERATURE ZONE

CRITICAL
J5550
78171-0004
M-RT-SM

CONNECTOR DRIVES TWO TEMP DIODE JUNCTIONS

518S0521

1. ROUTE DXP AND DXN DIFFERENTIALLY
2. ROUTE GROUNDED GAURD TRACES AROUND THE DXP/DXN DIFF PAIR
3. 10 MIL TRACE WIDTHS AND 10MIL SPACING BETWEEN THE GAURD

6A1 THRM_HEATPIPE_P

PLACE C5510 NEXT TO U5500

C5510 0.0022UF 10% 50V CERM 402

6A1 THRM_HEATPIPE_N

1. ROUTE DXP AND DXN DIFFERENTIALLY
2. ROUTE GROUNDED GAURD TRACES AROUND THE DXP/DXN DIFF PAIR
3. 10 MIL TRACE WIDTHS AND 10MIL SPACING BETWEEN THE GAURD

6A1 THRM_FINSTACK_P

C5511 0.0022UF 10% 50V CERM 402 PLACE C5511 NEXT TO U5500

6A1 THRM_FINSTACK_N

CRITICAL

PP3V3_S0_THRM_HEATPIPE_F

PLACE C5501 NEXT TO U5500 VDD

C5501 0.1UF 10% 16V X5R 402

C5502 1UF 10% 6.3V CERM 402

PLACE C5501 NEAR U5500 VDD

R5501 33 1% 1/16W MF-LF 402 =PP3V3_S0_THRM_SNR 7C4 49C2

U5500 EMC1043-5 MSOP

VDD 6
DP1 1
DN1 2
DP2 3
DN2 4
GND 5
SMCLK 8 — 47D3 THRM_HEATPIPE_SMB_CLK
SMDATA 7 — 47D3 THRM_HEATPIPE_SMB_DATA

ADDR= 1001 100B

(WRITE: 0X98 READ: 0X99)

LAYOUT NOTE:
ADD GND GUARD TRACE FOR CPU_THERMD_P AND CPU_THERMD_N

LAYOUT NOTE:
ROUTE CPU_THERMD_P AND CPU_THERMD_N ON SAME LAYER.
10 MIL TRACE
10 MIL SPACING

CPU TEMPERATURE ZONE

9C6 CPU_THERMD_P

C5520 0.0022UF 10% 50V CERM 402

(TO CPU INTERNAL THERMAL DIODE)

9C6 CPU_THERMD_N

1. ROUTE DXP AND DXN DIFFERENTIALLY
2. ROUTE GROUNDED GAURD TRACES AROUND THE DXP/DXN DIFF PAIR
3. 10 MIL TRACE WIDTHS AND 10MIL SPACING BETWEEN THE GAURD

6A1 THRM_DIMM_DX_F_P

R5522 10 1% 1/16W MF-LF 402

THRM_DIMM_DX_P
THRM_DIMM_DX_N

C5521 0.0022UF 10% 50V CERM 402

CRITICAL
Q5520
BC846BM3T5G
SOT732-3

PLACE UNDER J3101

NOSTUFF
C5524 0.0022UF 10% 50V CERM 402 PLACE C5524 NEXT TO Q5520

R5523 10 1% 1/16W MF-LF 402

6A1 THRM_DIMM_DX_F_N

1. ROUTE DXP AND DXN DIFFERENTIALLY
2. ROUTE GROUNDED GAURD TRACES AROUND THE DXP/DXN DIFF PAIR
3. 10 MIL TRACE WIDTHS AND 10MIL SPACING BETWEEN THE GAURD

PP3V3_S0_THRM_CPU_F

C5522 0.1UF 10% 16V X5R 402

C5523 1UF 10% 6.3V CERM 402

R5524 33 1% 1/16W MF-LF 402 =PP3V3_S0_THRM_SNR 7C4 49D2

PLACE C5522 NEAR U5520 VDD

CRITICAL

U5520 EMC1043-5 MSOP

VDD 6
DP1 1
DN1 2
DP2 3
DN2 4
GND 5
SMCLK 8 — 47C3 THRM_CPU_SMB_CLK
SMDATA 7 — 47C3 THRM_CPU_SMB_DATA

ADDR= 1001 100B

(Write: 0x98 Read: 0x99)

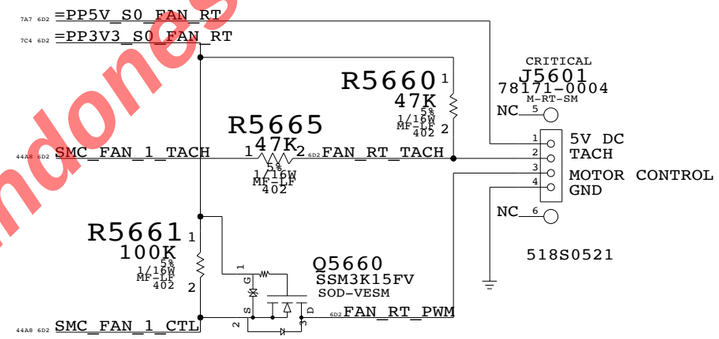
TEMPERATURE SENSE

SYNC_MASTER=GPU SYNC_DATE=06/21/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	49	76



Fan

SYNC_MASTER=ENES SYNC_DATE=11/10/2005

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	50	76

PAGE NOTES

INPUT

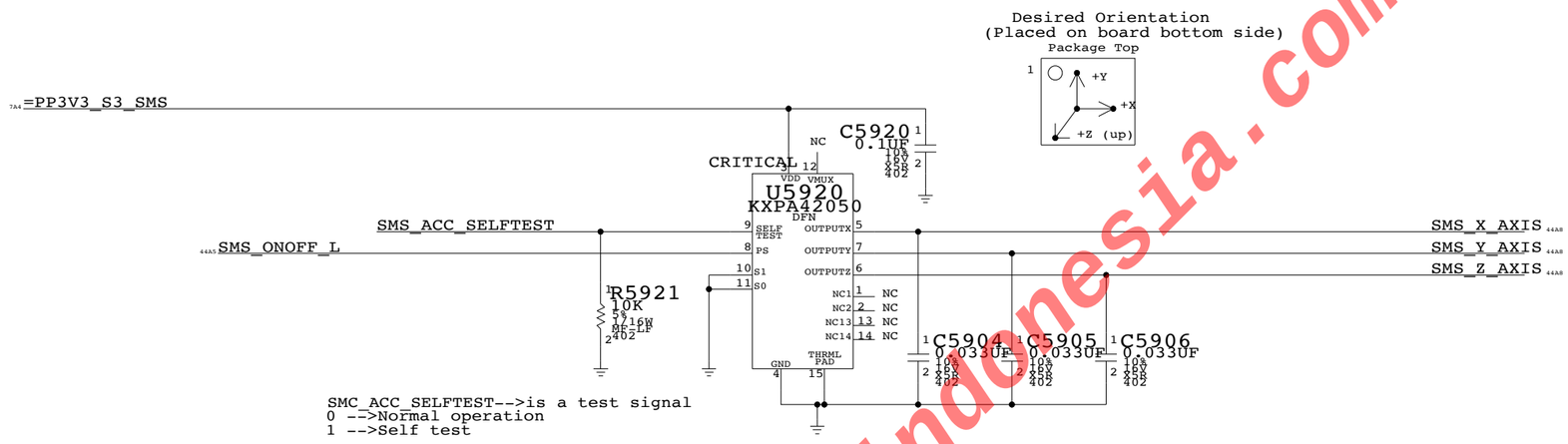
=PP3V3_S3_SMS - 3.3V POWER FOR SMS (STAYS ALIVE IN SLEEP)
SMS_ONOFF_L - CONNECT TO SMC TO BE ABLE TO PUT SMS INTO LOW-POWER MODE

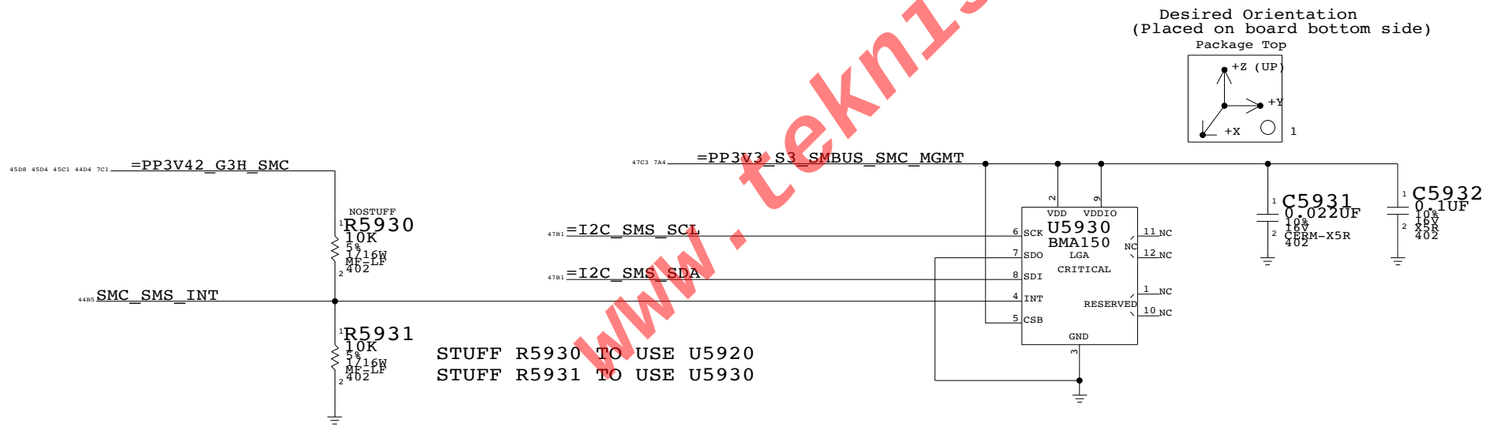
OUTPUT

SMS_ACC_*_AXIS - ACCELEROMETER OUTPUT TO SCU

PAGE HISTORY

5/19/2005 - FIRST REVISION OF PAGE
7/26/2005 - REMOVED BOM TABLE AND UPDATED SYMBOL TO KXM52-2050
7/26/2005 - CONNECTED PD PIN TO SMC'S SMS_ONOFF_L
7/26/2005 -



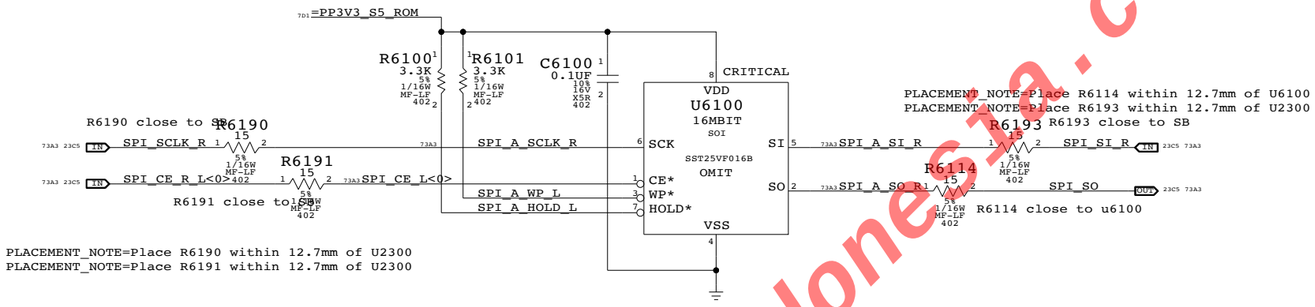


SMS
SYNC_MASTER=SMC SYNC_DATE=08/23/2005

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	51	76



SPI ROMs

SYNC_MASTER=WFERRY SYNC_DATE=04/26/2006

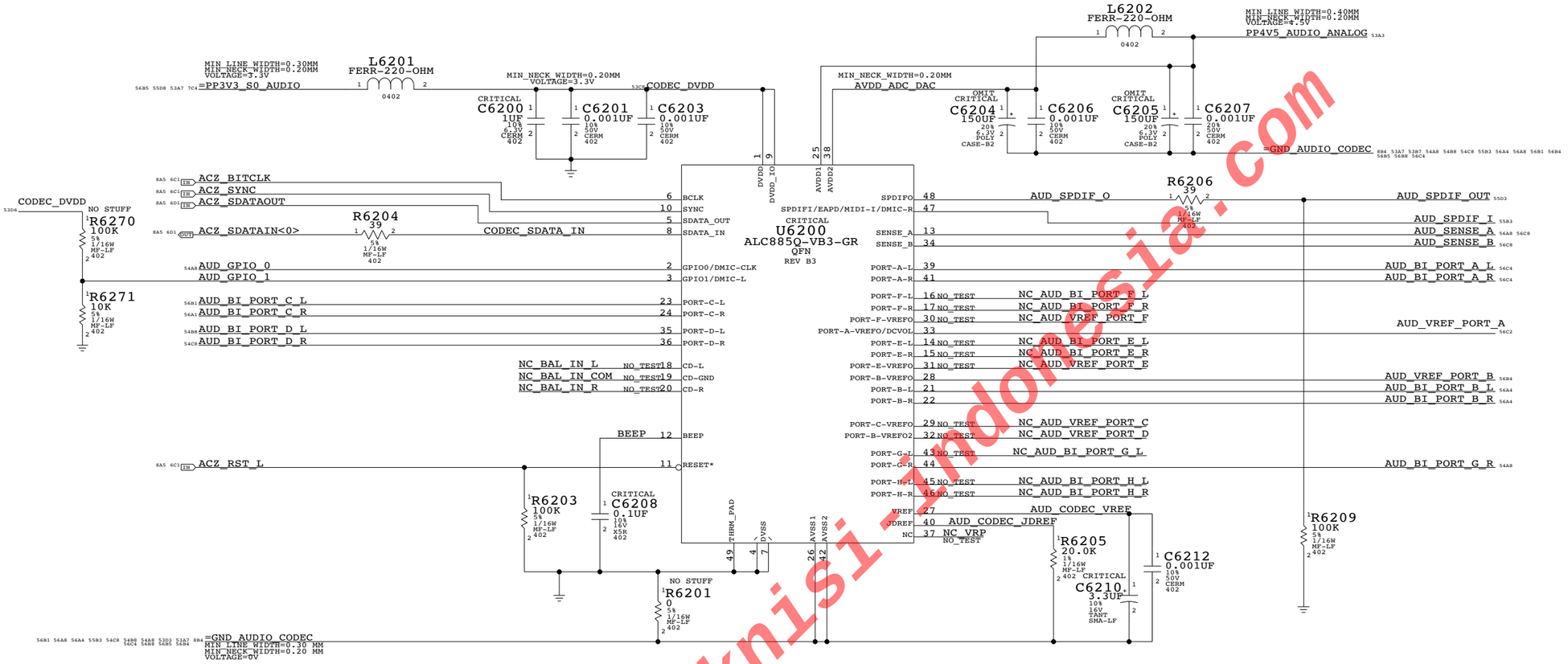
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 52 OF 76

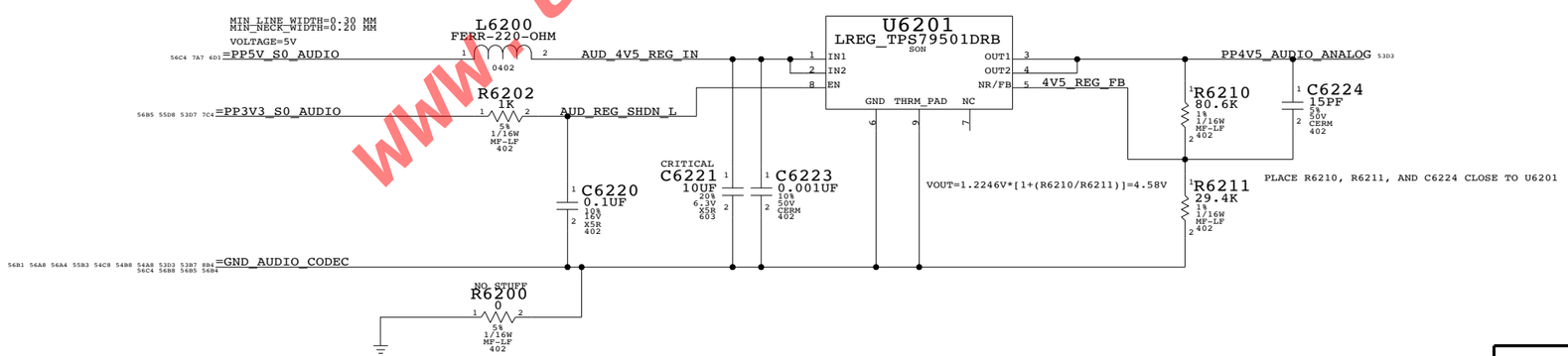
AUDIO CODEC

APPLE P/N 353S1538



AUDIO 4.5V REGULATOR

APPLE P/N 353S1576



AUDIO: CODEC

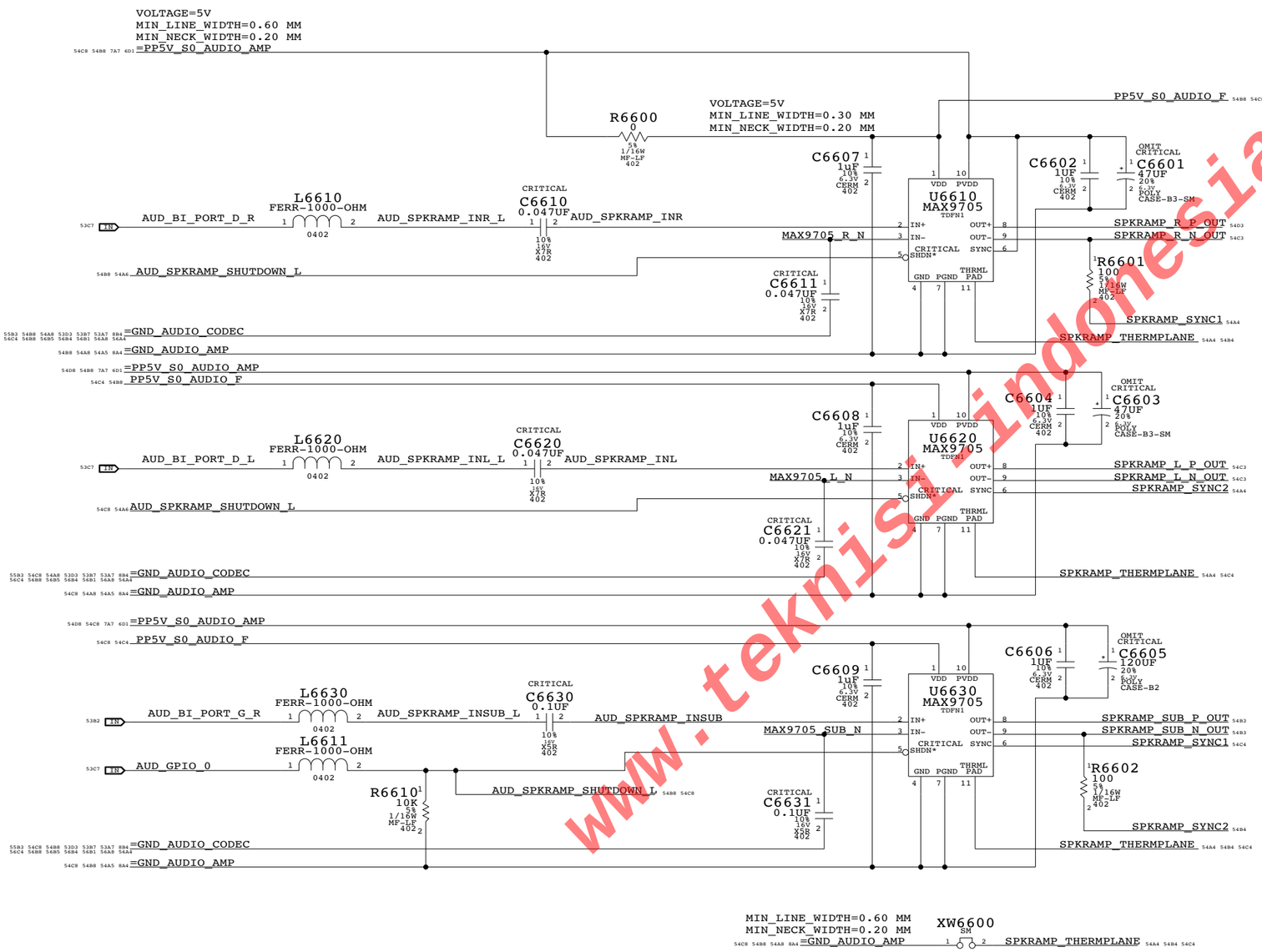
SYNC_MASTER=M70AUDIO

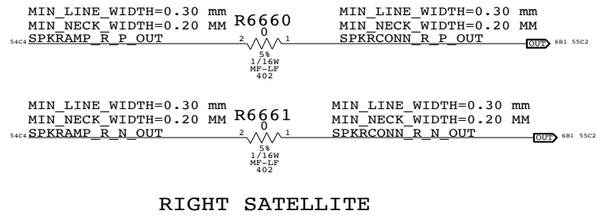
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 53 OF 76	

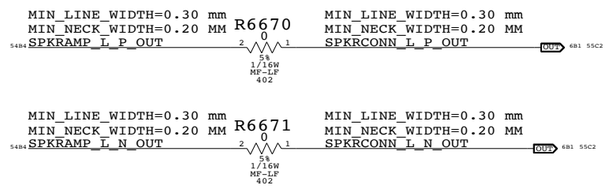
SATELLITE & SUB TWEETER AMPLIFIER APN:353S1595

SATELLITE	169 HZ < FC < 282 HZ
SUB	80 HZ < FC < 132 HZ
GAIN	12DB

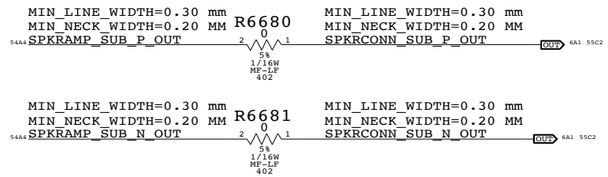




RIGHT SATELLITE



LEFT SATELLITE



SUB-TWEETER

AUDIO: SPEAKER AMP

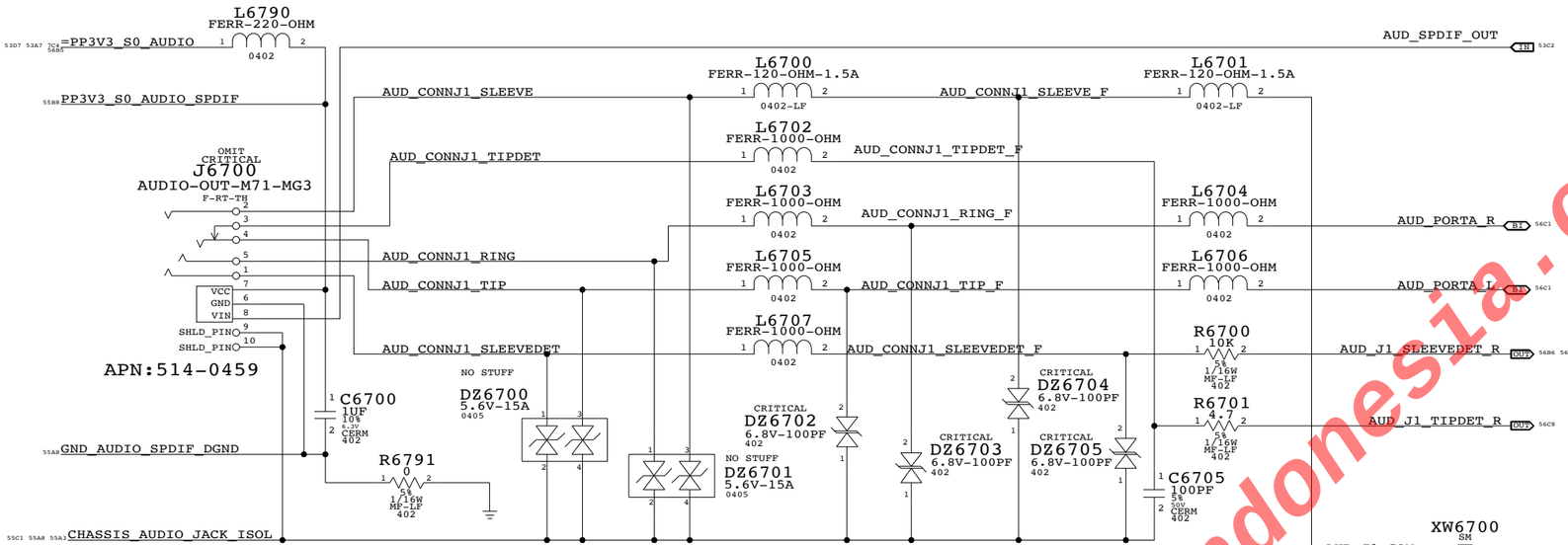
SYNC_MASTER=M70AUDIO SYNC_DATE=03/12/2007

APPLE INC.

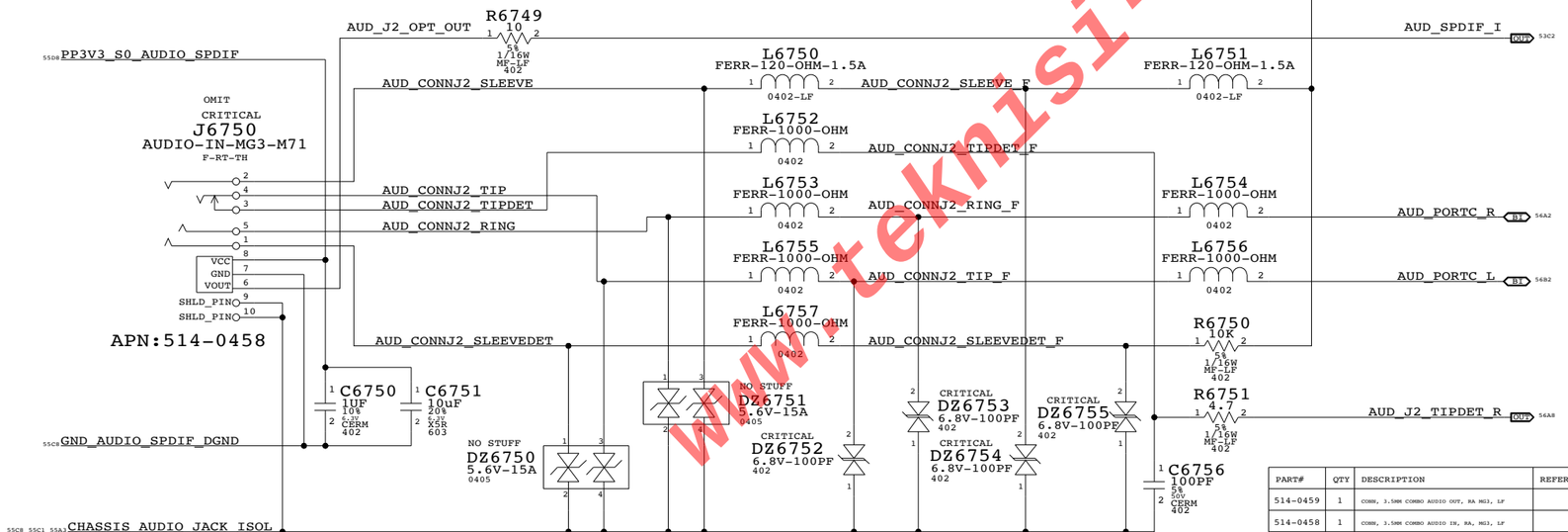
SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE NONE SHT 54 OF 76

AUDIO JACK 1: LO/HP CONNECTOR, SPDIF TX

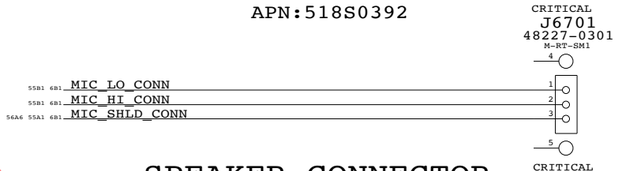


AUDIO JACK 2: LINE IN CONNECTOR, SPDIF RX



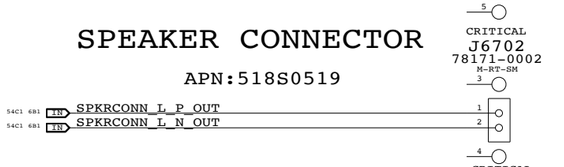
MIC CONNECTOR

APN:518S0392

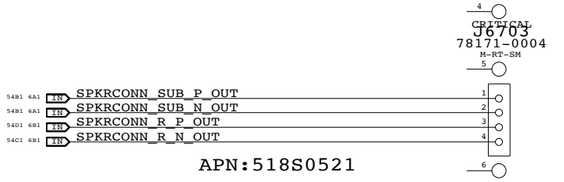


SPEAKER CONNECTOR

APN:518S0519



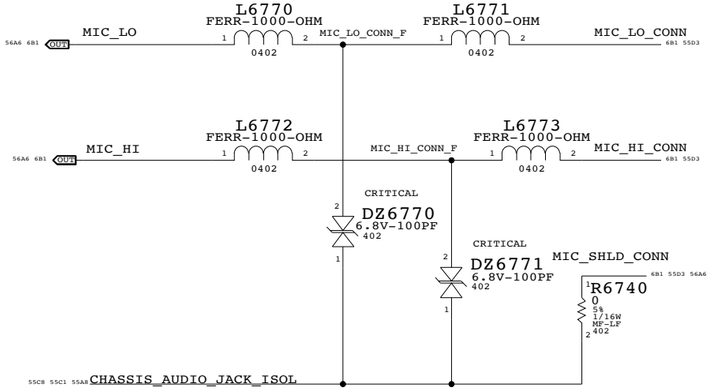
APN:518S0521



XW6705

=GND_CHASSIS_AUDIO_JACK — SM — CHASSIS_AUDIO_JACK_ISOL

MIC EMI FILTER



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0459	1	CONN, 3.5MM COMBO AUDIO OUT, RA MG3, LF	J6700	CRITICAL	NORMAL
514-0458	1	CONN, 3.5MM COMBO AUDIO IN, RA, MG3, LF	J6750	CRITICAL	NORMAL
514-0479	1	CONN, 3.5MM COMBO AUDIO OUT, RA, BLACK, LF	J6700	CRITICAL	FANCY
514-0478	1	CONN, 3.5MM COMBO AUDIO IN, RA, BLACK, LF	J6750	CRITICAL	FANCY

AUDIO: JACK

SYNC_MASTER=M70AUDIO SYNC_DATE=03/12/2007

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APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 55 OF 76

CODEC OUTPUT SIGNAL PATHS

FUNCTION	VOLUME	CONVERTER	PIN COMPLEX	MUTE CONTROL	DET ASSIGNMENT
HP OUT	0X0F (15)	0X05 (5)	0X15 (21,PORTA)	VREF_A(100%)	0X15 (21,PORTA)
SAT SPKR	0X26 (38)	0X25 (37)	0X14 (20,PORTD)	GPIO 0	N/A
SUB SPKR	0X0E (14)	0X04 (4)	0X16 (22,PORTG)	GPIO 0	N/A
SPDIF OUT	N/A	0X06 (6)	0X1E (30,SPDIF OUT)	N/A	0X1B (27,PORTE)

CODEC INPUT SIGNAL PATHS

FUNCTION	MIXER	VOLUME	MUTE CONTROL	CONVERTER	PIN COMPLEX	VREF	DET ASSIGNMENT
LINE IN	0X23 (35)	0X08 (8)	0X08 (8)	0X08 (8)	0X1A (26,PORTC)	N/A	0X1A (26,PORTC)
MIC IN	0X24 (36)	0X07 (7)	0X07 (7)	0X07 (7)	0X18 (24,PORTB)	VREF_B (80%)	N/A
SPDIF IN	N/A	N/A	N/A	0X0A (10)	0X1F (31,SPDIF IN)	N/A	N/A

PORT A DETECT

PORT E DETECT(SPDIF DELEGATE)

AUD_SENSE_B

AUD_SENSE_A

PP3V3_S0_AUDIO_F

R6801 270K 5% 1/16W MF-LF 402

Q6800 SSM6N15FE SOT563

AUD_OUTJACK_INSERT_L

R6806 39.2K 1% 1/16W MF-LF 402

AUD_PORTA_DET_L NC

R6805 39.2K 1% 1/16W MF-LF 402

AUD_PORTE_DET_L NC

Q6801 SSM6N15FE SOT563

Q6801 SSM6N15FE SOT563

R6802 47K 5% 1/16W MF-LF 402

AUD_J1_TIPDET_R

AUD_J1_DET_RC

C6801 0.1UF 10% 16V X5R 402

=GND_AUDIO_CODEC

R6803 100K 5% 1/16W MF-LF 402

AUD_J1_SLEEVEDET_INV

PP3V3_S0_AUDIO_F

R6861 270K 5% 1/16W MF-LF 402

Q6800 SSM6N15FE SOT563

AUD_J1_SLEEVEDET_R

C6802 0.01UF 10% 16V CERM 402

=GND_AUDIO_CODEC

AUD_J1_SLEEVEDET_R

PLACE L6800/C6800 CLOSE TO Q6800

L6800 FERR-1000-OHM 0402

=PP3V3_S0_AUDIO

PP3V3_S0_AUDIO_F

C6800 0.1UF 10% 16V X5R 402

=GND_AUDIO_CODEC

HP/LO DE-POP SWITCH

APN:353S1459

PORT A HP/LO

=PP5V_S0_AUDIO

C6836 1UF 10% 6.3V CERM 402

AUD_BI_PORT_A_R

AUD_BI_PORT_A_L

U6801 MAX9890BETA+ TDFN

VCC INR INL SHDN* CEXT GND OUTL OUTR THM PAD

MAX9890_OUTL

MAX9890_OUTR

AUD_VREF_PORT_A

MAX9890_CEXT

C6835 0.1UF 10% 16V X5R 402

R6839 10K 5% 1/16W MF-LF 402

OMIT CRITICAL C6830 100UF 20% 6.3V POLY B2

OMIT CRITICAL C6831 100UF 20% 6.3V POLY B2

AUD_PORTA_L

AUD_PORTA_R

R6834 27.4K 1% 1/16W MF-LF 402

R6835 27.4K 1% 1/16W MF-LF 402

=GND_AUDIO_CODEC

MIC INPUT CIRCUITRY

R6850 6.81K 1% 1/16W MF-LF 402

VREF_PORT_B_R

R6855 2.2K 1% 1/16W MF-LF 402

AUD_VREF_PORT_B

C6853 CRITICAL 10UF 20% 6.3V X5R 603

=GND_AUDIO_CODEC

MIC_HI

R6851 330 1% 1/16W MF-LF 402

C6850 0.1uF 10% 16V X5R 402

MIC_IN

AUD_BI_PORT_B_L MAKE_BASE=TRUE

AUD_BI_PORT_B_R

C6851 CRITICAL 680PF 10% 50V CERM 402

R6852 CRITICAL 100K 5% 1/16W MF-LF 402

C6852 CRITICAL 100PF 5% 50V CERM 402 NO STUFF

PLACE C6852 NEAR U6200

MIC_LO

XW6800 8M

=GND_AUDIO_CODEC

MIC_SHLD_CONN

NO STUFF R6853 0 5% 1/16W MF-LF 402

NO STUFF R6854 0 5% 1/16W MF-LF 402

=GND_CHASSIS_AUDIO_MIC

NO STUFF R6856 0 5% 1/16W MF-LF 402

PORT C LI

CRITICAL C6832 3.3UF 10% 16V TANT SMA-LF

AUD_PORTC_L

AUD_BI_PORT_C_L

R6836 27.4K 1% 1/16W MF-LF 402

=GND_AUDIO_CODEC

R6837 27.4K 1% 1/16W MF-LF 402

CRITICAL C6833 3.3UF 10% 16V TANT SMA-LF

AUD_PORTC_R

AUD_BI_PORT_C_R

Line-in (PORT C) DETECT

AUD_SENSE_A

PP3V3_S0_AUDIO_F

R6813 10K 5% 1/16W MF-LF 402

AUD_INJACK_INSERT_L NC

R6811 270K 5% 1/16W MF-LF 402

Q6802 SSM3K15FV SOD-VESM

R6812 47K 5% 1/16W MF-LF 402

AUD_J2_TIPDET_R

AUD_J2_DET_RC

C6811 0.1UF 10% 16V X5R 402

=GND_AUDIO_CODEC

AUDIO: JACK TRANSLATORS

SYNC_MASTER=M70AUDIO SYNC_DATE=03/12/2007

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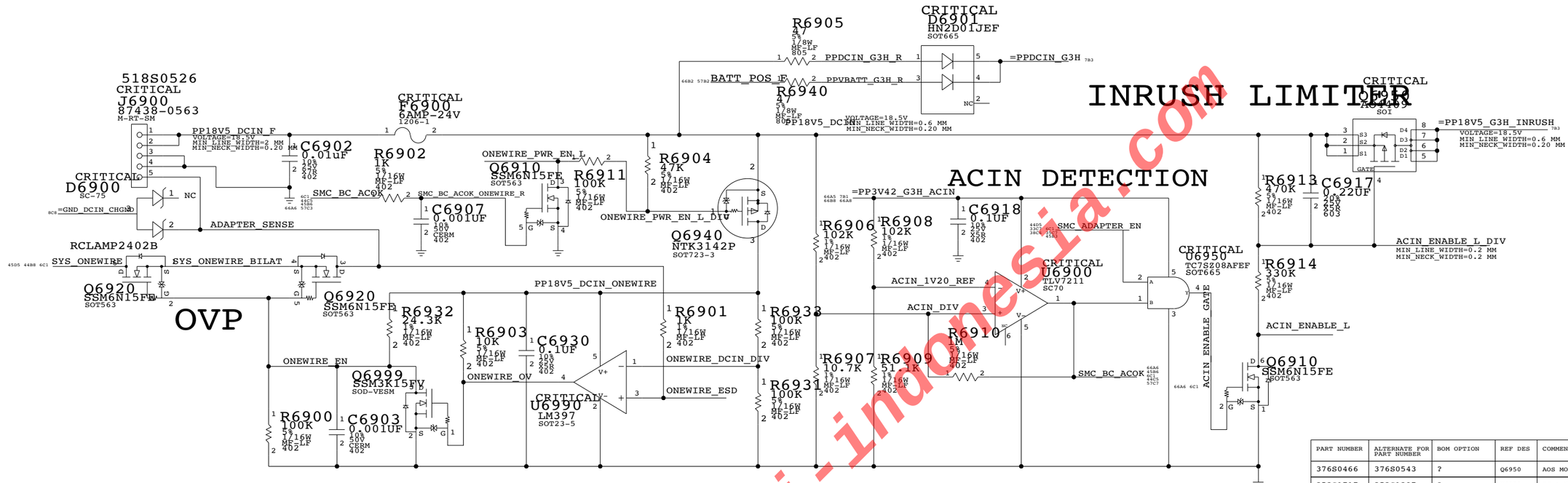
APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

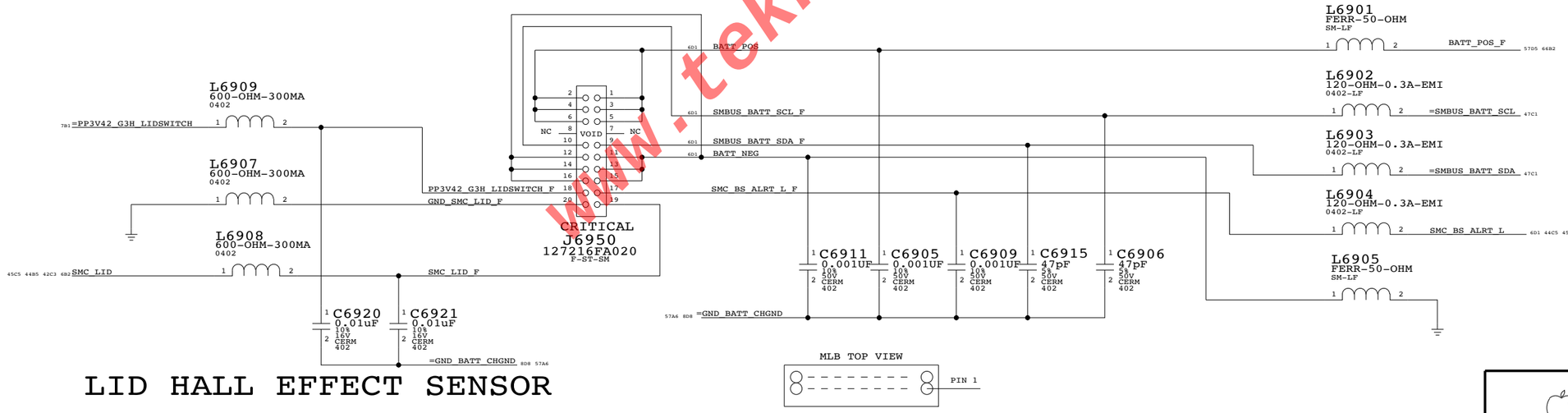
SCALE NONE | SHT 56 OF 76

DC-JACK INTERFACE



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0466	376S0543	?	Q6950	AOS MOSFET
353S1717	353S1297	?	U6990	TI & NATIONAL

BATTERY INTERFACE



LID HALL EFFECT SENSOR

DC-In & Battery Connectors

SYNC_MASTER=POWER SYNC_DATE=07/13/2005

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 57 OF 76	

S0 FETS & POWER SEQUENCING & PGOOD

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0448	376S0445	?	Q7000	

5V S0 FET

MOSFET	FDM6296
CHANNEL	N-TYPE
RDS(ON)	15 mOhm @4.5V
LOADING	4.348 A

3.3V S0 FET

MOSFET	FDC655BN
CHANNEL	N-TYPE
RDS(ON)	33 mOhm @4.5V
LOADING	1.810 A

1.8V S0 FET

MOSFET	FDC655BN
CHANNEL	N-TYPE
RDS(ON)	33 mOhm @4.5V
LOADING	0.260 A

1.05V S0 RUN/SS CONTROL

1.25V S0 RUN/SS CONTROL

1.5V S0 RUN/SS CONTROL

DEASSERTED 160MS
AFTER UVLO_D VALID

~26MS

MAKEBASE=TRUE
U7002.3 has int 90K pull-up

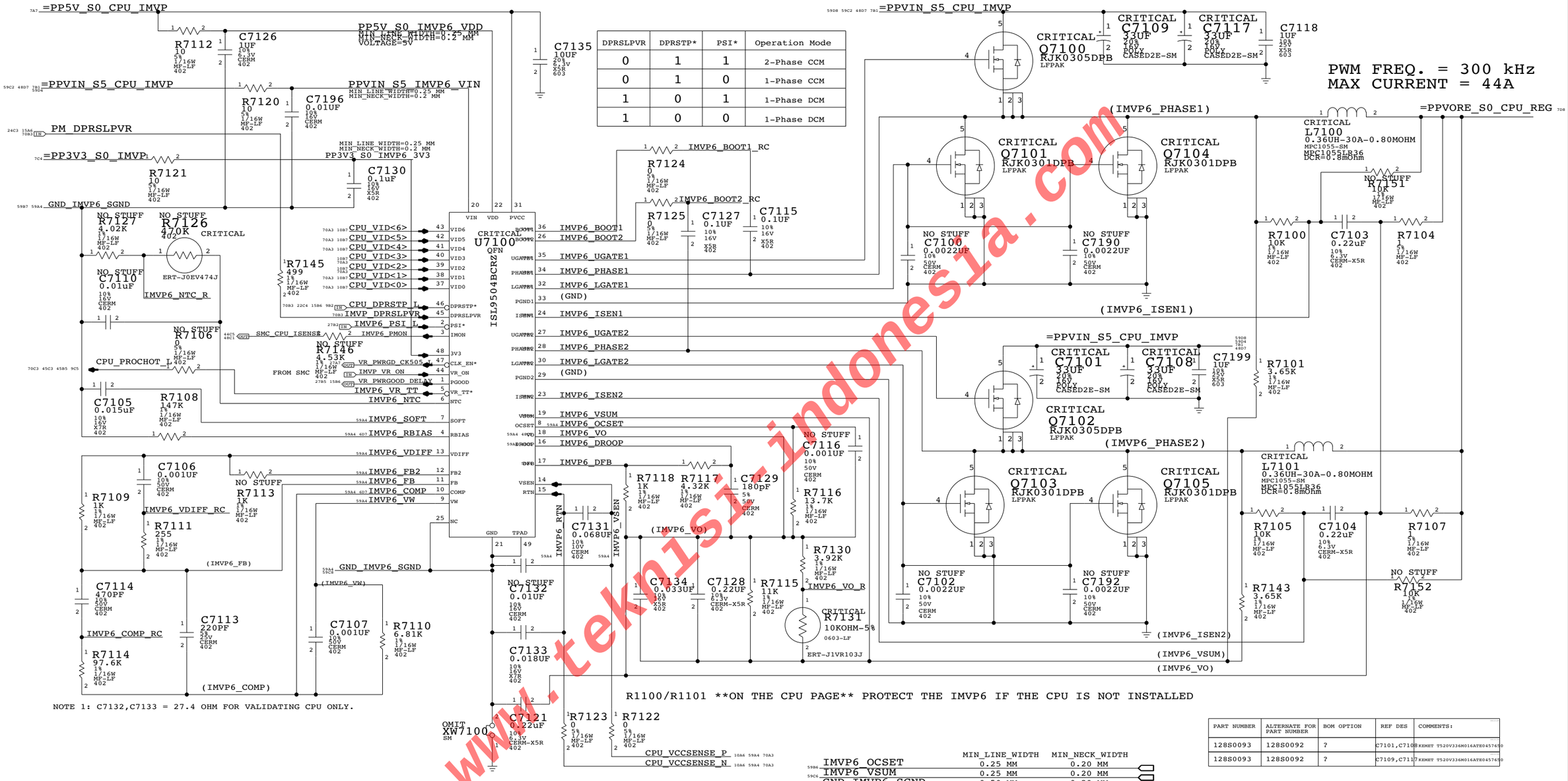
S0 FETS & Power Sequencing
SYNC_MASTER=DSIMON-WF SYNC_DATE=05/31/2006

APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

SCALE NONE | SHT 58 OF 76

LATEST ISSUE: 2007/01/02



DPRSLPVR	DPRSTP*	PSI*	Operation Mode
0	1	1	2-Phase CCM
0	1	0	1-Phase CCM
1	0	1	1-Phase DCM
1	0	0	1-Phase DCM

NOTE 1: C7132,C7133 = 27.4 OHM FOR VALIDATING CPU ONLY.

R1100/R1101 **ON THE CPU PAGE** PROTECT THE IMVP6 IF THE CPU IS NOT INSTALLED

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S0093	128S0092	?	C7101,C7108	KEMET T520V336M016ATE045/650
128S0093	128S0092	?	C7109,C7117	KEMET T520V336M016ATE045/650

IMVP6 CPU VCORE REGULATOR

	MIN_LINE_WIDTH	MIN_NECK_WIDTH
IMVP6_PHASE1	1.5 MM	0.25 MM
IMVP6_BOOT1	0.25 MM	0.25 MM
IMVP6_UGATE1	1.5 MM	0.25 MM
IMVP6_LGATE1	1.5 MM	0.25 MM
IMVP6_ISEN1	0.25 MM	0.25 MM

	MIN_LINE_WIDTH	MIN_NECK_WIDTH
IMVP6_PHASE2	0.25 MM	0.25 MM
IMVP6_BOOT2	0.25 MM	0.25 MM
IMVP6_UGATE2	0.25 MM	0.25 MM
IMVP6_LGATE2	0.25 MM	0.25 MM
IMVP6_ISEN2	0.25 MM	0.25 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_FB2	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	0.25 MM
CPU_VCCSENSE_P	0.25 MM	0.25 MM
CPU_VCCSENSE_N	0.25 MM	0.25 MM
IMVP6_RTN	0.25 MM	0.25 MM
IMVP6_VSEN	0.25 MM	0.25 MM

LATEST ISSUE: 2007/01/23

IMVP6 CPU VCore Regulator

SYNC_MASTER=POWER SYNC_DATE=07/13/2005

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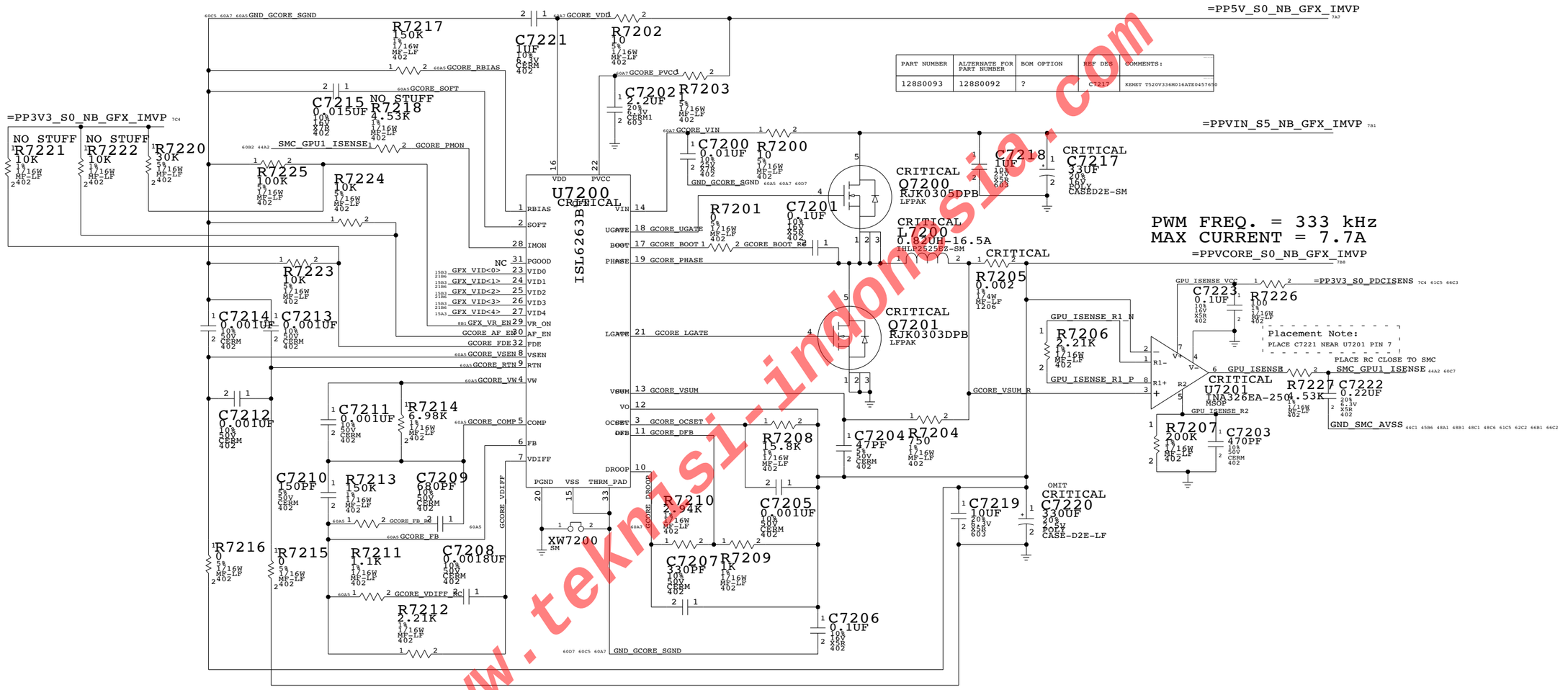
SCALE NONE | SHT 59 OF 76

RENDER VCORE POWER SUPPLY



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S0093	128S0092	?	C7217	KEMET T520V336M016ATE0457610

	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
GCORE_PHASE	1 MM	0.25 MM	103
GCORE_BOOT	0.3 MM	0.25 MM	104
GCORE_UGATE	1 MM	0.25 MM	105
GCORE_LGATE	1 MM	0.25 MM	106
GCORE_BOOT_RC	0.3 MM	0.25 MM	107
GND_GCORE_SGND	0.6 MM	0.25 MM	108
GCORE_VDD	0.3 MM	0.25 MM	109
GCORE_PVCC	0.3 MM	0.25 MM	110
GCORE_VIN	0.3 MM	0.25 MM	111
GCORE_DROOP	0.3 MM	0.25 MM	112
GCORE_VSUM	0.3 MM	0.25 MM	113
GCORE_DFB	0.3 MM	0.25 MM	114

	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
GCORE_OCSET	0.3 MM	0.25 MM	115
GCORE_VW	0.3 MM	0.25 MM	116
GCORE_RTN	0.3 MM	0.25 MM	117
GCORE_VSEN	0.3 MM	0.25 MM	118
GCORE_RBIAS	0.3 MM	0.25 MM	119
GCORE_SOFT	0.3 MM	0.25 MM	120
GCORE_COMP	0.3 MM	0.25 MM	121
GCORE_FB	0.3 MM	0.25 MM	122
GCORE_VDIFF	0.3 MM	0.25 MM	123
GCORE_FB_RC	0.3 MM	0.25 MM	124
GCORE_VDIFF_RC	0.3 MM	0.25 MM	125

Render VCore Supplies

SYNC_MASTER=GPU SYNC_DATE=06/29/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 60 OF 76

LATEST ISSUE: 2006/12/22

1.5V/1.05V POWER SUPPLY

State	PM_SLP_S3_L	PP1V5_S0	PP1V05_S0
S0	HIGH	1.5V	1.05V
S3/S5/G3Hot	LOW	0.0V	0.00V

PWM FREQ. = 300 kHz
MAX CURRENT = 8A

Vout = 0.758V * (1 + Rc / Rd)

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S0093	128S0092	?	C7380,C7340	KEMET T520V336M016ATE045 7850

PWM FREQ. = 360 kHz
MAX CURRENT = 4A

Vout = 0.758V * (1 + Ra / Rb)

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0448	376S0445	?	Q7360	

LATEST ISSUE: 2006/12/22

1.5V / 1.05V Supplies
SYNC_MASTER=POWER SYNC_DATE=07/13/2005

APPLE INC.

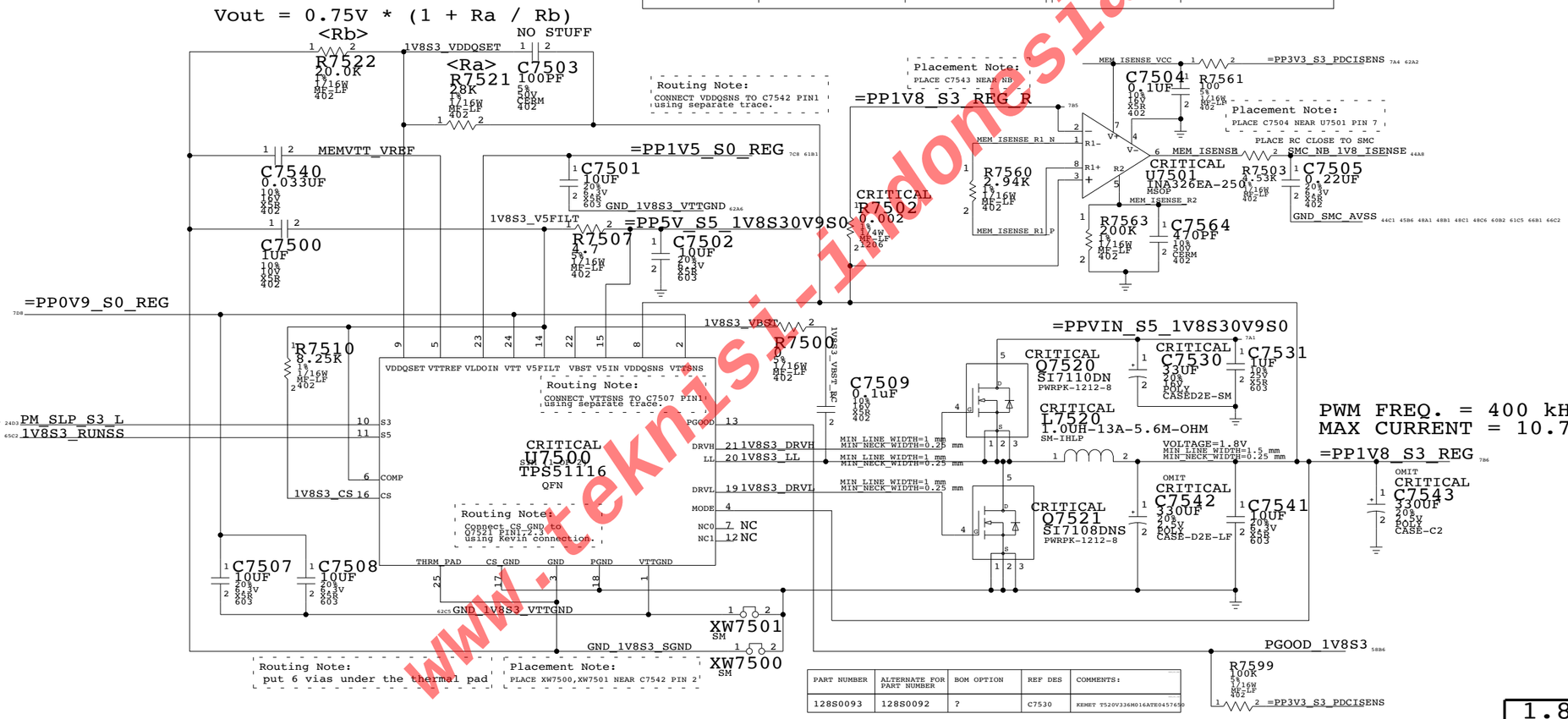
SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE | SHT 61 OF 76

1.8V/0.9V POWER SUPPLY

State	PM_SLP_S4	PM_SLP_S3	PP1V8_S3	PP0V9_S0
S0	HIGH	HIGH	1.8V	0.9V
S3	HIGH	LOW	1.8V	0.0V
S5/G3Hot	LOW	LOW	0.0V	0.0V

Vout = 0.75V * (1 + Ra / Rb)



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S0093	128S0092	?	C7530	KEMET T520V336M016ATE0457650

1.8V/0.9V Supplies

SYNC_MASTER=POWER SYNC_DATE=07/13/2005

LATEST ISSUE: 2006/12/22

APPLE INC.

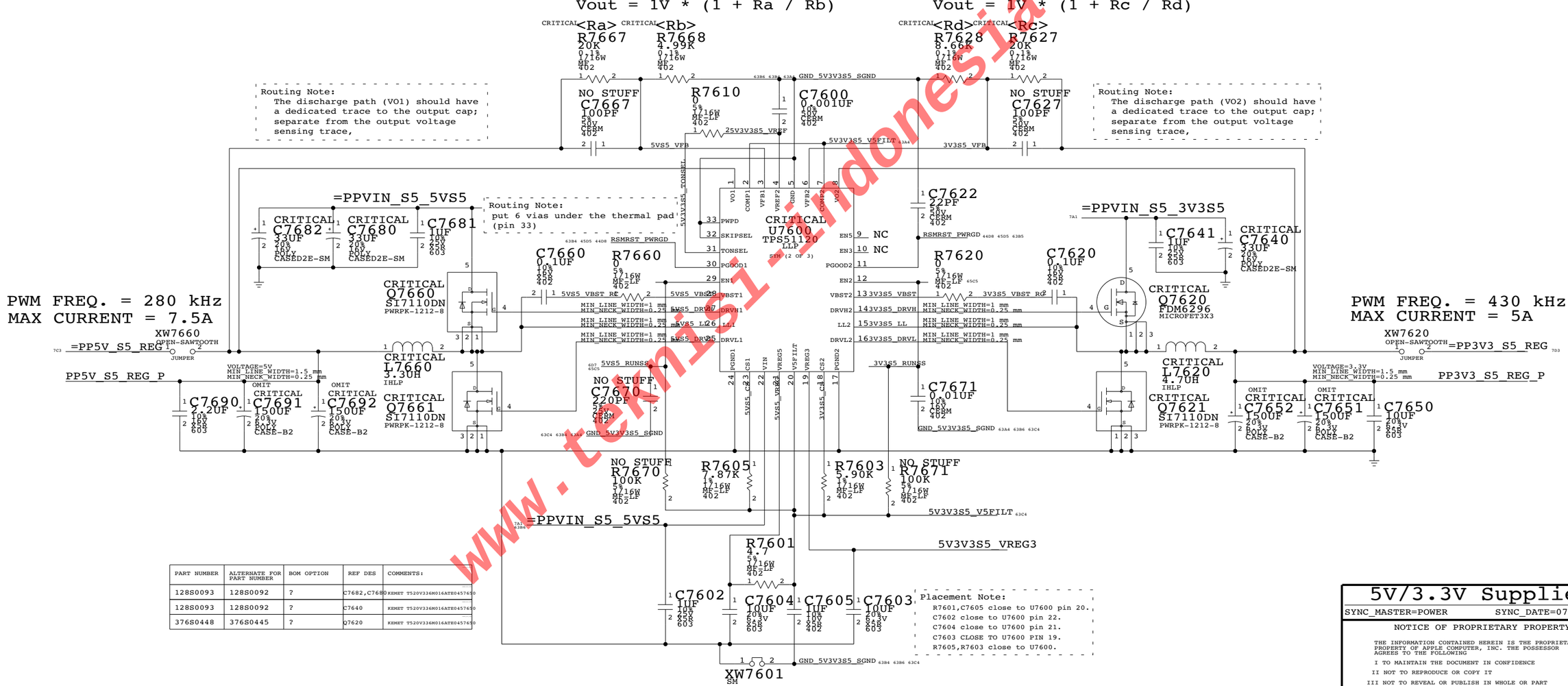
SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 62 OF 76	

5V/3.3V POWER SUPPLY

State	SMC_PM_G2_EN	PP3V3_G3H	PP5V_S5	PP3V3_S5
G3H	LOW	3.3V	0.0V	0.0V
S0/S3/S5	HIGH	3.3V	5.0V	3.3V

Vout = 1V * (1 + Ra / Rb)

Vout = 1V * (1 + Rc / Rd)



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S0093	128S0092	?	C7682,C7680	KEMET T520V336M016ATE0457650
128S0093	128S0092	?	C7640	KEMET T520V336M016ATE0457650
376S0448	376S0445	?	Q7620	KEMET T520V336M016ATE0457650

5V/3.3V Supplies

SYNC_MASTER=POWER SYNC_DATE=07/13/2005

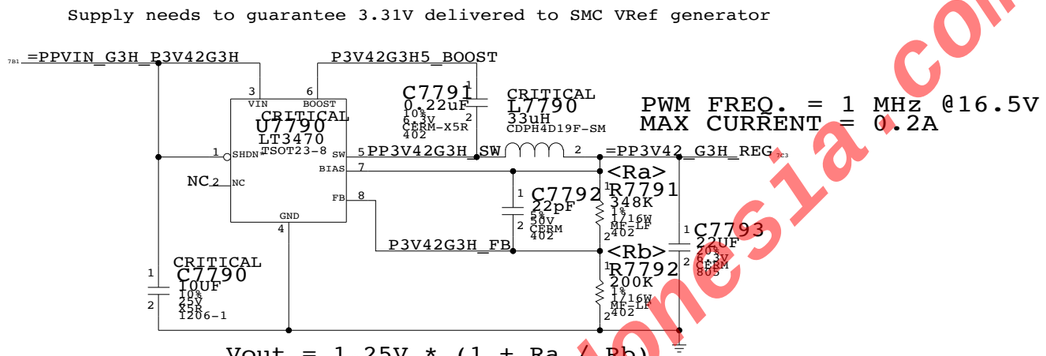
APPLE INC.

SIZE D | DRAWING NUMBER 051-7455 | REV. 01

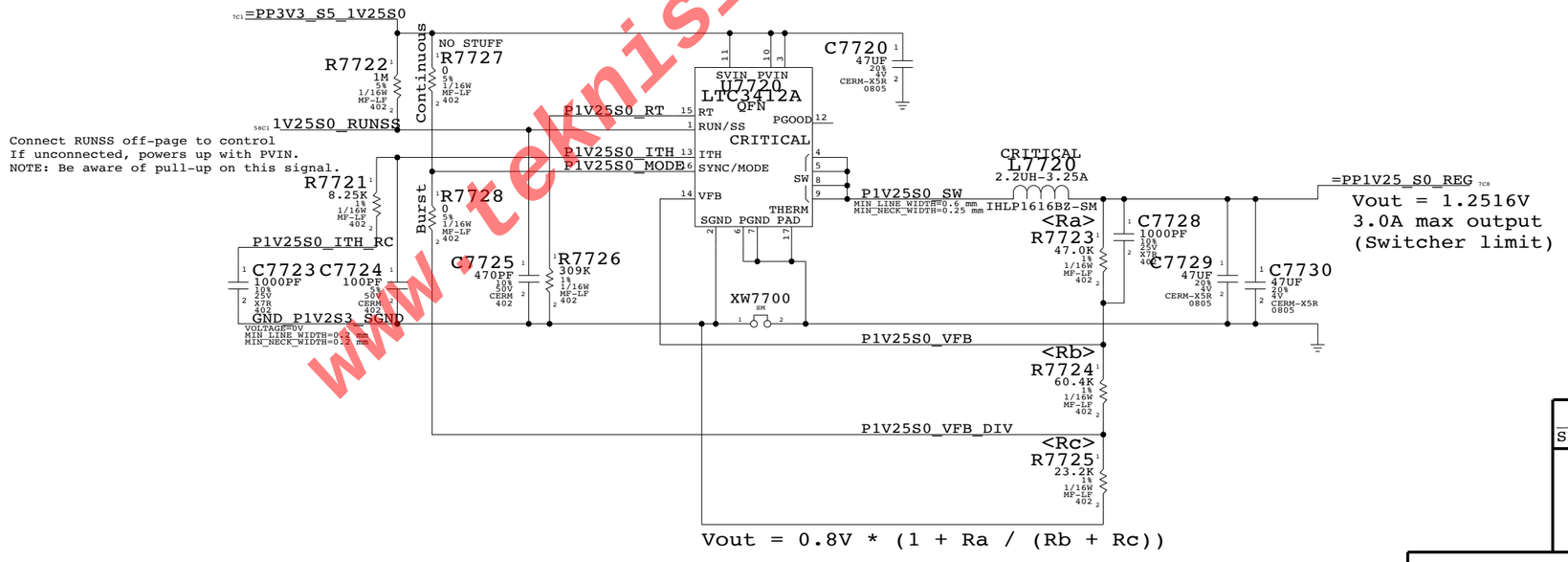
SCALE NONE | SHT 63 OF 76

LATEST ISSUE: 2006/12/22

3.425V G3H SUPPLY



1.25V S0 REGULATOR



LATEST ISSUE: 2007/3/8

3.42V/1.25V Switcher

SYNC_MASTER=ENET SYNC_DATE=12/06/2005

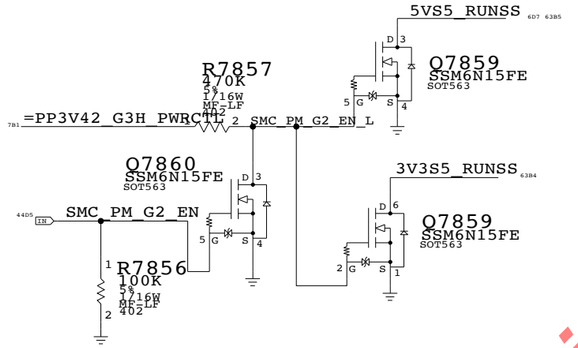
APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

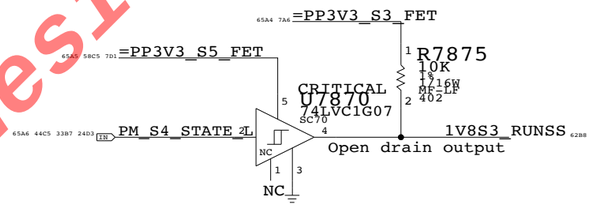
SCALE	SHT	OF
NONE	64	76

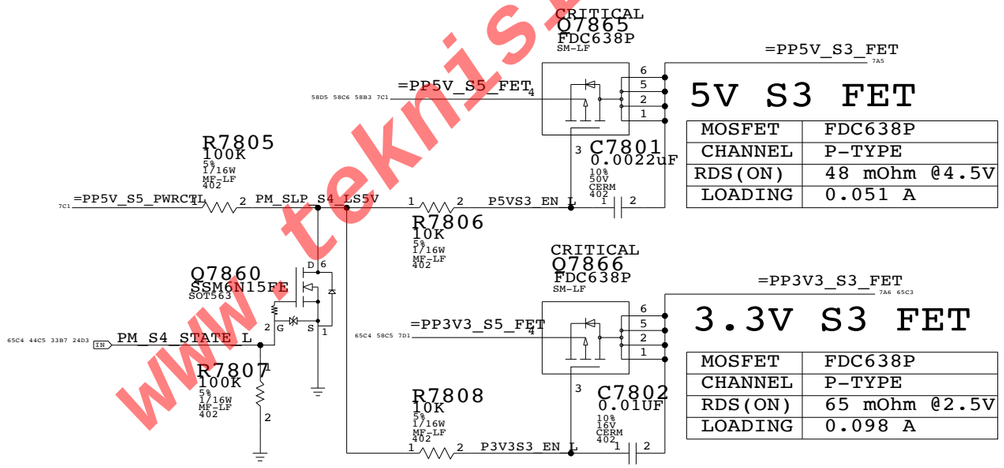
S3 FETS & S3/S5 CONTROL

5V/3.3V S5 RUN/SS CONTROL



1.8V S3 RUN/SS CONTROL





5V S3 FET

MOSFET	FDC638P
CHANNEL	P-TYPE
RDS(ON)	48 mOhm @4.5V
LOADING	0.051 A

3.3V S3 FET

MOSFET	FDC638P
CHANNEL	P-TYPE
RDS(ON)	65 mOhm @2.5V
LOADING	0.098 A

LATEST ISSUE: 2006/12/22

S3 FET & S3/S5 Control

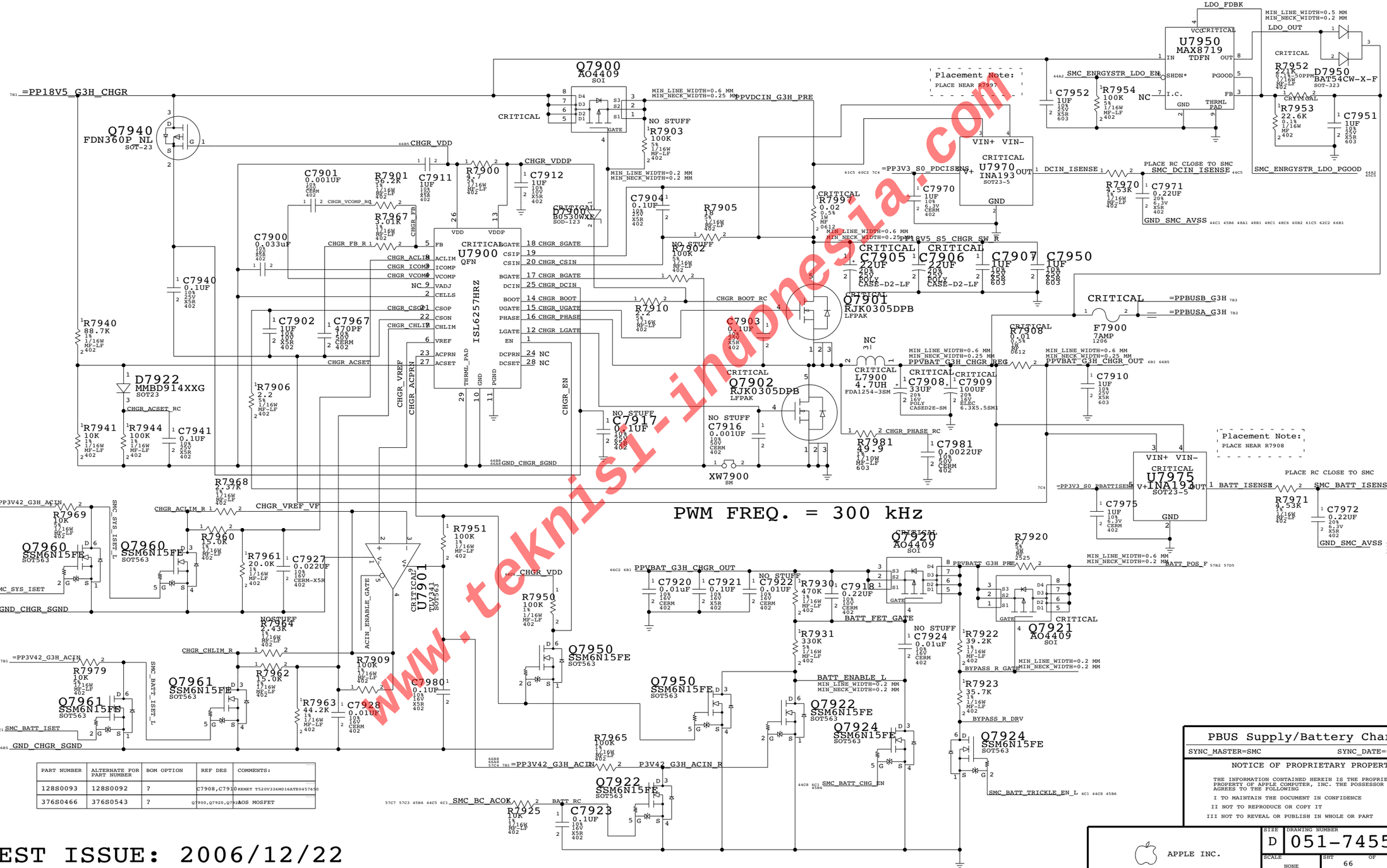
SYNC_MASTER=DSIMSON SYNC_DATE=06/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

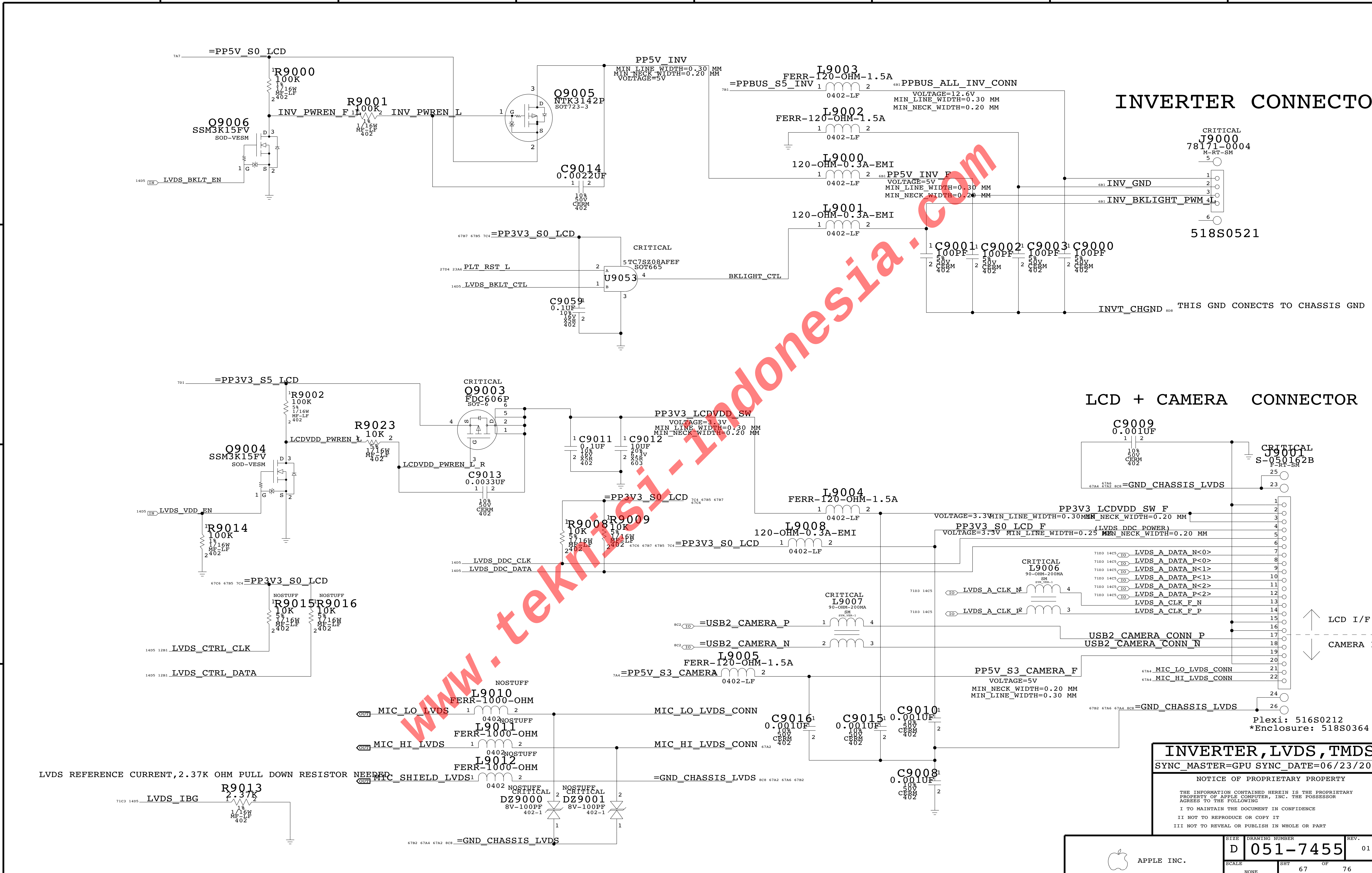
SCALE	SHT	OF
NONE	65	76

PBUS SUPPLY / BATTERY CHARGER



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
128S0093	128S0092	?	C7908,C7910	KEMET T520V336M016ATE045/450
376S0466	376S0543	?	Q7900,Q7920,Q7921	AOS MOSFET

LATEST ISSUE: 2006/12/22



INVERTER,LVDS,TMDS

SYNC_MASTER=GPU SYNC_DATE=06/23/2006

NOTICE OF PROPRIETARY PROPERTY

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE NONE	SHT 67 OF 76	

L9206
FERR-120-OHM-1.5A
=PP3V3_S0_TMDS
0402-LF
PP3V3_S0_ANALOG_TMDS_F
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.5MM
MIN_NECK_WIDTH=0.25MM
C9236 0.001UF 10% 50V CERM 402
C9237 0.001UF 10% 50V CERM 402
C9238 0.1UF 10% 16V X5R 402
C9239 0.1UF 10% 16V X5R 402
C9240 10UF 20% 6.3V X5R 603
ONE 0.1UF AND 1000PF FOR EACH PIN

L9201
FERR-120-OHM-1.5A
=PP1V8_S0_TMDS
0402-LF
PP1V8_S0_TMDS_F
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.5MM
MIN_NECK_WIDTH=0.25MM
C9207 0.1UF 10% 16V X5R 402
C9208 0.001UF 10% 50V CERM 402
C9209 0.1UF 10% 16V X5R 402
C9210 0.001UF 10% 50V CERM 402
C9211 0.1UF 10% 16V X5R 402
C9212 0.001UF 10% 50V CERM 402
C9213 10UF 20% 6.3V X5R 603
ONE 0.1UF AND 1000PF FOR EACH PIN

L9203
FERR-120-OHM-1.5A
=PP3V3_S0_TMDS
0402-LF
PP3V3_S0_ANALOG_SDVO_F
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.3MM
MIN_NECK_WIDTH=0.25MM
C9230 0.001UF 10% 50V CERM 402
C9231 0.1UF 10% 16V X5R 402
C9214 0.1UF 10% 16V X5R 402

L9200
FERR-120-OHM-1.5A
=PP1V8_S0_TMDS
0402-LF
PP1V8_S0_ANALOG_SDVO_F
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.5MM
MIN_NECK_WIDTH=0.25MM
C9200 0.001UF 10% 50V CERM 402
C9201 0.001UF 10% 50V CERM 402
C9202 0.1UF 10% 16V X5R 402
C9203 0.1UF 10% 16V X5R 402
C9204 10UF 20% 6.3V X5R 603
ONE 0.1UF AND 1000PF FOR EACH PIN

L9204
FERR-120-OHM-1.5A
=PP3V3_S0_TMDS
0402-LF
PP3V3_S0_PVCC1_TMDS_F
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.3MM
MIN_NECK_WIDTH=0.25MM
C9232 0.001UF 10% 50V CERM 402
C9233 0.1UF 10% 16V X5R 402
C9206 0.1UF 10% 16V X5R 402

L9205
FERR-120-OHM-1.5A
=PP3V3_S0_TMDS
0402-LF
PP3V3_S0_PVCC2_TMDS_F
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.3MM
MIN_NECK_WIDTH=0.25MM
C9234 0.001UF 10% 50V CERM 402
C9235 0.1UF 10% 16V X5R 402

R9207 49.9 1% 1/16W MF-LF 402 — TMDS_TX_P<0> — TMDS_TX<0>
R9237 49.9 1% 1/16W MF-LF 402 — TMDS_TX_N<0>
C9222 0.001UF 10% 50V CERM 402
R9208 49.9 1% 1/16W MF-LF 402 — TMDS_TX_P<1> — TMDS_TX<1>
R9238 49.9 1% 1/16W MF-LF 402 — TMDS_TX_N<1>
C9223 0.001UF 10% 50V CERM 402
R9209 49.9 1% 1/16W MF-LF 402 — TMDS_TX_P<2> — TMDS_TX<2>
R9239 49.9 1% 1/16W MF-LF 402 — TMDS_TX_N<2>
C9224 0.001UF 10% 50V CERM 402
R9210 49.9 1% 1/16W MF-LF 402 — TMDS_TX_CLK_P — TMDS_TX_CLK
R9240 49.9 1% 1/16W MF-LF 402 — TMDS_TX_CLK_N
C9225 0.001UF 10% 50V CERM 402

MCH SDVO CHANNEL R,G,B,CLK SIGNAL TO TMDS CHIP
PLACE THE CAP NEAR THE NB SIDE
PEG_R2D_C_P<0>
PEG_R2D_C_N<0>
PEG_R2D_C_P<1>
PEG_R2D_C_N<1>
PEG_R2D_C_P<2>
PEG_R2D_C_N<2>
PEG_R2D_C_P<3>
PEG_R2D_C_N<3>

PP3V3_S0_ANALOG_SDVO_F
PP1V8_S0_ANALOG_SDVO_F
PP3V3_S0_PVCC2_TMDS_F
PP3V3_S0_PVCC1_TMDS_F
PP3V3_S0_ANALOG_TMDS_F
PP1V8_S0_TMDS_F

C9241 0.1UF 10% 16V X5R 402
C9242 0.1UF 10% 16V X5R 402
C9243 0.1UF 10% 16V X5R 402
C9244 0.1UF 10% 16V X5R 402
C9245 0.1UF 10% 16V X5R 402
C9246 0.1UF 10% 16V X5R 402
C9247 0.1UF 10% 16V X5R 402
C9248 0.1UF 10% 16V X5R 402

CRITICAL
U9200
SIL1362ACLU
LQFP
SDVO RCVR CORE
DIFF SIG DATA
I2C MASTER INTER
CONFIG/ PRGRM
TEXT MODE

TMDS_SDR_P 37 SDR_P
TMDS_SDR_N 38 SDR_N
TMDS_SDG_P 40 SDG_P
TMDS_SDG_N 41 SDG_N
TMDS_SDB_P 43 SDB_P
TMDS_SDB_N 44 SDB_N
TMDS_SDC_P 46 SDC_P
TMDS_SDC_N 47 SDC_N
32 SDI_P
33 SDI_N
TMDS_EXT_RES 35 EXT_RES
RESET* 2
5 SDSCL
4 SDSDA
A1 6
HTPLG 29
TEST 30
TX0_P 17 TMDS_TX_P<0>
TX0_N 16 TMDS_TX_N<0>
TX1_P 20 TMDS_TX_P<1>
TX1_N 19 TMDS_TX_N<1>
TX2_P 23 TMDS_TX_P<2>
TX2_N 22 TMDS_TX_N<2>
TXC_P 14 TMDS_TX_CLK_P
TXC_N 13 TMDS_TX_CLK_N
EXT_SWING 25 TMDS_EXT_SWING
SCLDDC 8 TMDS_I2C_SCL
SDADDC 9 TMDS_I2C_SDA
VCC0 10, VCC1 28, VCC2 34
AVCC0 15, AVCC1 21
PVCC1 11, PVCC2 26
SVCC0 36, SVCC1 42
SPVCC 48
OVCC 1
GND0 7, GND1 31
AGND0 12, AGND1 18, AGND2 24
PGND2 27
SGND0 39, SGND1 45
SPGND 3

C9219 0.1UF 10% 16V X5R 402
C9220 0.1UF 10% 16V X5R 402
PEG_D2R_P<1>
PEG_D2R_N<1>
TMDS_INT_P
TMDS_INT_N
TMDS CHIP SDVO INPUT INTERRUPT SIGNAL TO MCH

PLACE R9200,U9201 CLOSE TO MINI DVI CONN J9401
CRITICAL
U9201
74LVC1G17DRL
SOT-553
R9201 2.94K 1% 1/16W MF-LF 402
R9202 2.94K 1% 1/16W MF-LF 402
SDVO_CTRLCLK
SDVO_CTRLDATA
TMDS_RST_L
TMDS_HTPLG
R9200 10K 5% 1/16W MF-LF 402 — 5.5V TOL INPUT — TMDS_HTPLG_R2
3.3V ACTIVE OUTPUT
TMDS_HTPLG_BUF
R9200 INSURES ESD DIODE CURRENT IS SMALL
R9213 270K 5% 1/16W MF-LF 402
R9211 9.09K 1% 1/16W MF-LF 402
R9212 9.09K 1% 1/16W MF-LF 402
DVI_HOTPLUG_DET
R9203 1K 5% 1/16W MF-LF 402

DVI_HOTPLUG_DET
R9250 100K 5% 1/16W MF-LF 402
"Place R9250 near U2300.F12"

=PP3V3_S0_TMDS
C9221 0.1UF 10% 16V X5R 402
C9205 10UF 20% 6.3V X5R 603

PP3V3_S0_ANALOG_TMDS_F
R9204 249 1% 1/16W MF-LF 402
=PP3V3_S0_TMDS
R9205 10K 5% 1/16W MF-LF 402
R9206 10K 5% 1/16W MF-LF 402
TMDS_I2C_SCL
TMDS_I2C_SDA
TMDS_I2C_SCL AND TMDS_I2C_SDA DON'T NEED TO CONNECT

EXTERNAL TMDS

SYNC_MASTER=GRAPHSYNC_DATE=06/06/2005

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APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01
SCALE: NONE	SHT 68 OF 76	

Video Connectors

EXTERNAL VIDEO (VGA) INTERFACE

TMDS(MINI DVI) INTERFACE

NB VIDEO ALIASES

=CRT_TVO_IREF = CRT_TVO_IREF
=TV_A_DAC = TV_A_DAC
=TV_B_DAC = TV_B_DAC
=TV_C_DAC = TV_C_DAC
=CRT_BLUE = CRT_BLUE
=CRT_GREEN = CRT_GREEN
=CRT_RED = CRT_RED
=CRT_HSYNC_R = CRT_HSYNC_R
=CRT_VSYNC_R = CRT_VSYNC_R
MAKE_BASE=TRUE

A 1.3K OHM 1% RESISTOR IS REQUIRED BETWEEN CRT_IREF AND GROUND

R9469 1.21K 1% 1/16W MF-LF 402 — CRT_TVO_IREF

=PP3V3_S0_NB
R9466 2.2K 5% 1/16W MF-LF 402 — TV_DCONSEL<0>
R9467 2.2K 5% 1/16W MF-LF 402 — TV_DCONSEL<1>

F9404 0.5AMP-13.2V SM-LF
=PP5V_S0_TMDS — PP5V_S0_TMDS_FUSE
VOLTAGE=5V MIN_LINE_WIDTH=0.30 MM MIN_NECK_WIDTH=0.20 MM
VOLTAGE=5V MIN_LINE_WIDTH=0.5 MM MIN_NECK_WIDTH=0.25 MM

D9401 ISS418 SOD-723

L9444 600-OHM-300MA 0402
PP5V_S0_DVIPORT
VOLTAGE=5V MIN_LINE_WIDTH=0.5 MM MIN_NECK_WIDTH=0.25 MM

C9404 0.1UF 20% 10V CERM 402
=GND_CHASSIS_TMDS_UPPER

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
740S0044	740S0028	?	F9404	

PP5V_S0_DVIPORT_D

DVI power DIODE on page 95 (D9500)

R9462 2.2K 5% 1/16W MF-LF 402
R9463 2.2K 5% 1/16W MF-LF 402

TMDS_HTPLG

=PP3V3_S0_TMDS

R9421 2.2K 5% 1/16W MF-LF 402 — CRT_DDC_CLK
R9422 2.2K 5% 1/16W MF-LF 402 — CRT_DDC_DATA
NOTE: CRT_DDC_* ARE NOT 5V COMPLIANT

Q9401 SSM6N15FE SOT563 — GPU_CRT_DDC_CLK
Q9401 SSM6N15FE SOT563 — GPU_CRT_DDC_DATA

C9410 0.001UF 10% 50V CERM 402
C9411 100PF 5% 50V CERM 402
C9412 100PF 5% 50V CERM 402

PLACE R9450 R9451 CLOSE TO GMCH
TV_A_DAC
CRT_BLUE
R9450 75 1% 1/16W MF-LF 402
R9451 75 1% 1/16W MF-LF 402
=TV_A_RTN
=CRT_BLUE_L

PLACE R9452 R9453 CLOSE TO GMCH
TV_B_DAC
CRT_GREEN
R9452 75 1% 1/16W MF-LF 402
R9453 75 1% 1/16W MF-LF 402
=TV_B_RTN
=CRT_GREEN_L

PLACE R9454 R9455 CLOSE TO GMCH
TV_C_DAC
CRT_RED
R9454 75 1% 1/16W MF-LF 402
R9455 75 1% 1/16W MF-LF 402
=TV_C_RTN
=CRT_RED_L

=PP3V3_S0_TMDS
C9439 0.1UF 10% 16V X5R 402

CRITICAL
U9401 TS3V330 SOP
VCC
S1A S2A S1B S2B S1C S2C S1D S2D
DA DB DC DD EN_L IN GND

EXT_COMPVID_B
EXT_Y_G
EXT_C_R

FL9400 210MHZ MEA2010P-SM — CRITICAL

SB_CRT_TVOUT_MUX_L

Isolation required for DVI power switch

PLACE THE RESISTOR CLOSE TO GMCH AND THE CAP NEAR CONNECTOR

=PP3V3_S0_TMDS
C9460 0.1UF 20% 10V CERM 402
CRITICAL U9404 SN74LVC2G125DCU
R9460 39 5% 1/16W MF-LF 402 — CRT_HSYNC_R
CRT_HSYNC_LS_R
R9470 39 5% 1/16W MF-LF 402 — CRT_HSYNC_LS
VGA_HSYNC
C9442 33PF 5% 50V CERM 402 NOSTUFF

PLACE THE RESISTOR CLOSE TO GMCH AND THE CAP NEAR THE CONNECTOR

CRITICAL U9404 SN74LVC2G125DCU
R9461 39 5% 1/16W MF-LF 402 — CRT_VSYNC_R
CRT_VSYNC_LS_R
R9471 39 5% 1/16W MF-LF 402 — CRT_VSYNC_LS
VGA_VSYNC
C9443 33PF 5% 50V CERM 402 NOSTUFF

OMIT
CRITICAL
J9401 MINI-DVI-M42-BLK F-RT-TH
PP5V_S0_DVIPORT
NC NC
VGA_B VGA_HSYNC VGA_G VGA_VSYNC VGA_R
=GND_CHASSIS_TMDS_UPPER =GND_CHASSIS_TMDS_DOWN
514-0376

TMDS_TX_CONN_P<2>
TMDS_TX_CONN_N<2>
TMDS_TX_CONN_P<1>
TMDS_TX_CONN_N<1>
TMDS_TX_CONN_P<0>
TMDS_TX_CONN_N<0>
TMDS_TX_CONN_CLK_P
TMDS_TX_CONN_CLK_N

CRITICAL L9405 90-OHM-100MA 1210-4SM1
TMDS_TX_P<2>
TMDS_TX_N<2>
CRITICAL L9407 90-OHM-100MA 1210-4SM1
TMDS_TX_P<1>
TMDS_TX_N<1>
CRITICAL L9406 90-OHM-100MA 1210-4SM1
TMDS_TX_P<0>
TMDS_TX_N<0>
CRITICAL L9404 90-OHM-100MA 1210-4SM1
TMDS_TX_CLK_P
TMDS_TX_CLK_N

C9421 0.1UF 10% 16V X5R 402

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0480	1	CONN,REC,MINI-DVI,32P,RA,TABS,MG3	J9401	CRITICAL	NORMAL
514-0481	1	CONN,REC,MINI-DVI,32P,RA,TABS,BLK	J9401	CRITICAL	FANCY

MINI-DVI CONNECTOR

SYNC_MASTER=EUGENE SYNC_DATE=05/21/05

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE — SHT 69 OF 76

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_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
FSB_DSTB_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=1:1_DIFFPAIR	=1:1_DIFFPAIR

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
FSB_ADDR	*	=3:1_SPACING	?
FSB_ADDR2ADDR	*	=2:1_SPACING	?
FSB_ADSTB	*	=3:1_SPACING	?
FSB_ADDR2ADSTB	*	=3:1_SPACING	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
FSB_DATA	*	=3:1_SPACING	?
FSB_DATA2DATA	*	=2:1_SPACING	?
FSB_DSTB	*	=3:1_SPACING	?
FSB_DATA2DSTB	*	=3:1_SPACING	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
FSB_COMMON	*	=2:1_SPACING	?

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
FSB_ADDR	FSB_ADDR	*	FSB_ADDR2ADDR
FSB_ADDR	FSB_ADSTB	*	FSB_ADDR2ADSTB
FSB_DATA	FSB_DATA	*	FSB_DATA2DATA
FSB_DATA	FSB_DSTB	*	FSB_DATA2DSTB

All FSB signals with impedance requirements are 55-ohm single-ended.
Worst-case spacing is 2:1 within Addr bus, with 3:1 spacing to the ADSTBs.
Worst-case spacing is 2:1 within Data bus, with 3:1 spacing to the DSTBs.
DSTB complementary pairs are spaced 1:1 and routed as differential pairs.

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

NOTE: Design Guide does not indicate FSB spacing to other signals, assumed 3:1.
NOTE: Design Guide allows closer spacing if signal lengths can be shortened.

SOURCE: Santa Rosa Platform DG, Rev 0.9 (#20517), 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_27P4S	*	Y	=27P4_OHM_SE	=27P4_OHM_SE	=27P4_OHM_SE	7 MIL	7 MIL
CPU_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

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

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CPU_2TO1	*	=2:1_SPACING	?
CPU_COMP	*	25 MIL	?
CPU_GTLREF	*	25 MIL	?
CPU_ITP	*	=2:1_SPACING	?
CPU_VCCSENSE	*	25 MIL	?

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: Santa Rosa Platform DG, Rev 0.9 (#20517), Sections 4.4 & 5.8.2.4

CPU / FSB Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_ADS_L	9D6 13C3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_BNR_L	9D6 13C3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_BPRI_L	9D6 13C3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_BREQ0_L	9D6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_DBSY_L	9D6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_DEFER_L	9D6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_DPWR_L	9B2 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_DRDY_L	9D6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_HIT_L	9C6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_HITM_L	9C6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_LOCK_L	9D6 13B3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_RS_L<2..0>	9D6 13A3
FSB_COMMON	FSB_55S	FSB_COMMON	FSB_TRDY_L	9D6 13B3
FSB_CPURST_L	FSB_55S	FSB_COMMON	FSB_CPURST_L	9D6 12B5 13A5
FSB_DATA_GROUP0	FSB_55S	FSB_DATA	FSB_D_L<15..0>	9C4 13C5 13D5
FSB_DATA_GROUP0	FSB_55S	FSB_DATA	FSB_DINV_L<0>	9C4 13B3
FSB_DSTB0	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_P<0>	9C4 13B3
	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_N<0>	9C4 13B3
FSB_DATA_GROUP1	FSB_55S	FSB_DATA	FSB_D_L<31..16>	9B4 9C4 13C5
FSB_DATA_GROUP1	FSB_55S	FSB_DATA	FSB_DINV_L<1>	9B4 13B3
FSB_DSTB1	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_P<1>	9B4 13B3
	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_N<1>	9B4 13B3
FSB_DATA_GROUP2	FSB_55S	FSB_DATA	FSB_D_L<47..32>	9C2 13B5 13C5
FSB_DATA_GROUP2	FSB_55S	FSB_DATA	FSB_DINV_L<2>	9C2 13B3
FSB_DSTB2	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_P<2>	9C2 13A3
	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_N<2>	9C2 13B3
FSB_DATA_GROUP3	FSB_55S	FSB_DATA	FSB_D_L<63..48>	9B2 9C2 13B5
FSB_DATA_GROUP3	FSB_55S	FSB_DATA	FSB_DINV_L<3>	9B2 13B3
FSB_DSTB3	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_P<3>	9B2 13A3
	FSB_DSTB_55S	FSB_DSTB	FSB_DSTB_L_N<3>	9B2 13B3
FSB_ADDR_GROUP0	FSB_55S	FSB_ADDR	FSB_A_L<16..3>	9D8 13C3 13D3
FSB_ADDR_GROUP0	FSB_55S	FSB_ADDR	FSB_REQ_L<4..0>	9C8 9D8 13A3
FSB_ADSTB0	FSB_55S	FSB_ADSTB	FSB_ADSTB_L<0>	9D8 13C3
FSB_ADDR_GROUP1	FSB_55S	FSB_ADDR	FSB_A_L<35..17>	9C8 13C3
FSB_ADSTB1	FSB_55S	FSB_ADSTB	FSB_ADSTB_L<1>	9C8 13C3
CPU_IERR_L	CPU_55S		CPU_IERR_L	9D6
CPU_FERR_L	CPU_55S		CPU_FERR_L	9C8 22C2
CPU_PROCHOT_L	CPU_55S	CPU_2TO1	CPU_PROCHOT_L	9C5 45B5 45C3 59C8
CPU_PWRGD	CPU_55S		CPU_PWRGD	9B2 12B1 22C4
CPU_FROM_SB	CPU_55S		CPU_INTR	9B8 22C4
CPU_FROM_SB	CPU_55S		CPU_NMI	9B8 22C4
CPU_FROM_SB	CPU_55S		CPU_A20M_L	9C8 22C4
CPU_FROM_SB	CPU_55S		CPU_DPSLP_L	9B2 22C4
CPU_FROM_SB	CPU_55S		CPU_IGNNE_L	9C8 22C4
CPU_INIT_L	CPU_55S		CPU_INIT_L	9D6 22C4 46B2
CPU_FROM_SB	CPU_55S		CPU_SMI_L	9B8 22C4
CPU_FROM_SB	CPU_55S		CPU_STPCLK_L	9B8 22C4
PM_THRMTRIP_L	CPU_55S	CPU_2TO1	PM_THRMTRIP_L	9C6 15A6 22C2 45B3
FSB_CPUSLP_L	CPU_55S		FSB_CPUSLP_L	9A2 13A5
PM_DPRSLPVR	CPU_55S	CPU_2TO1	PM_DPRSLPVR	15A6 24C3 59D8
(See above)	CPU_55S	CPU_2TO1	IMVP_DPRSLPVR	59C7
CPU_BSEL0	CPU_55S	CPU_2TO1	CPU_BSEL<0>	9B4 29C6
(See above)	CPU_55S	CPU_2TO1	NB_BSEL<0>	15C6 29C8
CPU_BSEL1	CPU_55S	CPU_2TO1	CPU_BSEL<1>	9A4 29B6
(See above)	CPU_55S	CPU_2TO1	NB_BSEL<1>	15C6 29B8
CPU_BSEL2	CPU_55S	CPU_2TO1	CPU_BSEL<2>	9A4 29A6
(See above)	CPU_55S	CPU_2TO1	NB_BSEL<2>	15B6 29B8
CPU_DPRSTP_L	CPU_55S	CPU_2TO1	CPU_DPRSTP_L	9B2 15B6 22C4 59C7
CPU_GTLREF	CPU_55S	CPU_GTLREF	CPU_GTLREF	9B4
CPU_COMP	CPU_55S	CPU_COMP	CPU_COMP<3>	9B3
CPU_COMP	CPU_27P4S	CPU_COMP	CPU_COMP<2>	9B3
CPU_COMP	CPU_55S	CPU_COMP	CPU_COMP<1>	9B3
CPU_COMP	CPU_27P4S	CPU_COMP	CPU_COMP<0>	9B3
XDP_TDI	CPU_55S	CPU_ITP	XDP_TDI	9B7 9C6 12B3
XDP_TDO	CPU_55S	CPU_ITP	XDP_TDO	9A7 9C6 12B5
XDP_TMS	CPU_55S	CPU_ITP	XDP_TMS	9B7 9C6 12B2
XDP_TCK	CPU_55S	CPU_ITP	XDP_TCK	9A7 9C6 12B2 12B3
XDP_TRST_L	CPU_55S	CPU_ITP	XDP_TRST_L	9A7 9C6 12B3
XDP_BPM_L	CPU_55S	CPU_ITP	XDP_BPM_L<4..0>	9C6 12B2 12B3
XDP_BPM_L5	CPU_55S	CPU_ITP	XDP_BPM_L<5>	9C5 12B2
	CLK_FSB_100D	CLK_FSB	XDP_CLK_P	75C3
	CLK_FSB_100D	CLK_FSB	XDP_CLK_N	75C3
(FSB_CPURST_L)	CPU_55S	CPU_ITP	ITP_CPURST_L	
	CPU_55S	CPU_2TO1	CPU_VID<6..0>	10B7 59C7
	CPU_55S	CPU_2TO1	IMVP6_VID<6..0>	
CPU_VCCSENSE	CPU_27P4S	CPU_VCCSENSE	CPU_VCCSENSE_P	10A6 59A4 59A5
CPU_VCCSENSE	CPU_27P4S	CPU_VCCSENSE	CPU_VCCSENSE_N	10A6 59A4 59A5
	CPU_27P4S	CPU_VCCSENSE	IMVP6_VSEN_P	
	CPU_27P4S	CPU_VCCSENSE	IMVP6_VSEN_N	

CPU/FSB Constraints

SYNC_MASTER=WFERRY SYNC_DATE=06/08/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 70 OF 76

PCI-Express / DMI 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
PCIE_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
DMI_100D	*	Y	=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	*	20 MIL	?
DMI	*	20 MIL	?

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 7.2, 9.2 & 10.5

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
LVDS_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
CRT_50S	*	Y	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD
CRT_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT	
LVDS	*	20 MIL	?	
CRT	*	25 MIL	?	DG Says 40 mil spacing minimum
CRT_2CRT	*	20 MIL	?	
CRT_SYNC	*	25 MIL	?	DG Says 30 mil spacing minimum
CRT_SYNC2SYNC	*	20 MIL	?	
TVDAC	*	25 MIL	?	DG Says 40 mil spacing minimum
TVDAC_2TVDAC	*	20 MIL	?	

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
CRT	CRT	*	CRT_2CRT
CRT_SYNC	CRT_SYNC	*	CRT_SYNC2SYNC
TVDAC	TVDAC	*	TVDAC_2TVDAC

LVDS signals are 100-ohm +/- 20% differential impedence.
CRT & TVDAC signal single-ended impedence varies by location:
- 37.5-ohm +/- 15% from GMCH to first termination resistor.
- 50-ohm +/- 15% from first to second termination resistor.
- 55-ohm +/- 15% from second termination resistor to connector.

CRT_HSYNC/CRT_VSYNC signals are 55-ohm +/- 15% single-ended impedence.

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 8.1 - 8.3.

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
PEG_R2D	PCIE_100D	PCIE	PEG_D2R_N<1>	14D3 68B6
	PCIE_100D	PCIE	PEG_D2R_P<1>	14C3 68B6
	PCIE_100D	PCIE	PEG_R2D_C_P<3..0>	14B3 68B6 68C6
	PCIE_100D	PCIE	PEG_R2D_C_N<3..0>	14B3 14C3 68B6 68C6
DMI_N2S	DMI_100D	DMI	DMI_N2S_P<3..0>	15B3 23D2
	DMI_100D	DMI	DMI_N2S_N<3..0>	15B3 23D2
DMI_S2N	DMI_100D	DMI	DMI_S2N_P<3..0>	15B3 23D2
	DMI_100D	DMI	DMI_S2N_N<3..0>	15B3 15C3 23D2
LVDS_A_CLK	LVDS_100D	LVDS	LVDS_A_CLK_P	14C5 67B3
LVDS_A_CLK	LVDS_100D	LVDS	LVDS_A_CLK_N	14C5 67B3
LVDS_A_DATA	LVDS_100D	LVDS	LVDS_A_DATA_P<2..0>	14C5 67B2
LVDS_A_DATA	LVDS_100D	LVDS	LVDS_A_DATA_N<2..0>	14C5 67B2
LVDS_A_DATA3	LVDS_100D	LVDS	LVDS_A_DATA_P<3>	
LVDS_A_DATA3	LVDS_100D	LVDS	LVDS_A_DATA_N<3>	
LVDS_IBG		LVDS	LVDS_IBG	14D5 67A8
CRT_TVO_IREF		CRT	CRT_TVO_IREF	69D7 69D8
CRT_RED	CRT_50S	CRT	CRT_RED	69A8 69D5
CRT_GREEN	CRT_50S	CRT	CRT_GREEN	69A8 69D5
CRT_BLUE	CRT_50S	CRT	CRT_BLUE	69B8 69D5
CRT_SYNC	CRT_55S	CRT_SYNC	CRT_HSYNC_R	69C3 69D5
CRT_SYNC	CRT_55S	CRT_SYNC	CRT_VSYNC_R	69C3 69D5
TV_A_DAC	CRT_50S	TVDAC	TV_A_DAC	69B8 69D7
TV_B_DAC	CRT_50S	TVDAC	TV_B_DAC	69A8 69D7
TV_C_DAC	CRT_50S	TVDAC	TV_C_DAC	69A8 69D7

NB Constraints

SYNC_MASTER=WFERRY SYNC_DATE=06/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	71	76

DDR2 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_45S	*	Y	=45_OHM_SE	=45_OHM_SE	=45_OHM_SE	=STANDARD	=STANDARD
MEM_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
MEM_70D	*	Y	=70_OHM_DIFF	=70_OHM_DIFF	=70_OHM_DIFF	=70_OHM_DIFF	=70_OHM_DIFF
MEM_85D	*	Y	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF	=85_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
MEM_CLK2MEM	*	=4:1_SPACING	?
MEM_CTRL2CTRL	*	=2:1_SPACING	?
MEM_CTRL2MEM	*	=3:1_SPACING	?
MEM_CMD2CMD	*	=1.5:1_SPACING	?
MEM_CMD2MEM	*	=3:1_SPACING	?
MEM_DATA2DATA	*	=1.5:1_SPACING	?
MEM_DATA2MEM	*	=3:1_SPACING	?
MEM_DQS2MEM	*	=3:1_SPACING	?
MEM_2OTHER	*	25 MIL	?

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_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_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

Need to support MEM_*-style wildcards!

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Section 6.2

Memory Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
MEM_A_CLK	MEM_70D	MEM_CLK	MEM_CLK_P<2..0>	15D3 30A4 30D4
	MEM_70D	MEM_CLK	MEM_CLK_N<2..0>	15D3 30A4 30D4
MEM_A_CNTL	MEM_45S	MEM_CTRL	MEM_CKE<1..0>	15D3 30C4 30C6 32D6
MEM_A_CNTL	MEM_45S	MEM_CTRL	MEM_CS_L<1..0>	15D3 30B4 30B6 32D6
MEM_A_CNTL	MEM_45S	MEM_CTRL	MEM_ODT<1..0>	15C3 30B4 30B6 32D6
MEM_A_CMD	MEM_55S	MEM_CMD	MEM_A_A<14..0>	15C6 16B5 16C5 30B4 30B6 30C4 30C6 32C6
MEM_A_CMD	MEM_55S	MEM_CMD	MEM_A_BS<2..0>	16D5 30B4 30B6 30C6 32C6
MEM_A_CMD	MEM_55S	MEM_CMD	MEM_A_RAS_L	16B5 30B4 32B6
MEM_A_CMD	MEM_55S	MEM_CMD	MEM_A_CAS_L	16D5 30B6 32B6
MEM_A_CMD	MEM_55S	MEM_CMD	MEM_A_WE_L	16B5 30B6 32B6
MEM_A_DQ_BYTE0	MEM_55S	MEM_DATA	MEM_A_DQ<7..0>	16D8 30D4 30D6
MEM_A_DQ_BYTE1	MEM_55S	MEM_DATA	MEM_A_DQ<15..8>	16C8 30D4 30D6
MEM_A_DQ_BYTE2	MEM_55S	MEM_DATA	MEM_A_DQ<23..16>	16C8 30C4 30C6
MEM_A_DQ_BYTE3	MEM_55S	MEM_DATA	MEM_A_DQ<31..24>	16C8 30C4 30C6 30D4 30D6
MEM_A_DQ_BYTE4	MEM_55S	MEM_DATA	MEM_A_DQ<39..32>	16B8 16C8 30B4 30B6
MEM_A_DQ_BYTE5	MEM_55S	MEM_DATA	MEM_A_DQ<47..40>	16B8 30A4 30A6 30B4 30B6
MEM_A_DQ_BYTE6	MEM_55S	MEM_DATA	MEM_A_DQ<55..48>	16B8 30A4 30A6
MEM_A_DQ_BYTE7	MEM_55S	MEM_DATA	MEM_A_DQ<63..56>	16A8 16B8 30A4 30A6
MEM_A_DM0	MEM_55S	MEM_DATA	MEM_A_DM<0>	16D5 30D4
MEM_A_DM1	MEM_55S	MEM_DATA	MEM_A_DM<1>	16D5 30D4
MEM_A_DM2	MEM_55S	MEM_DATA	MEM_A_DM<2>	16C5 30C6
MEM_A_DM3	MEM_55S	MEM_DATA	MEM_A_DM<3>	16C5 30C4
MEM_A_DM4	MEM_55S	MEM_DATA	MEM_A_DM<4>	16C5 30B4
MEM_A_DM5	MEM_55S	MEM_DATA	MEM_A_DM<5>	16C5 30B6
MEM_A_DM6	MEM_55S	MEM_DATA	MEM_A_DM<6>	16C5 30A6
MEM_A_DM7	MEM_55S	MEM_DATA	MEM_A_DM<7>	16C5 30A4
MEM_A_DQS0	MEM_85D	MEM_DQS	MEM_A_DQS_P<0>	16C5 30D6
	MEM_85D	MEM_DQS	MEM_A_DQS_N<0>	16C5 30D6
MEM_A_DQS1	MEM_85D	MEM_DQS	MEM_A_DQS_P<1>	16C5 30D6
	MEM_85D	MEM_DQS	MEM_A_DQS_N<1>	16C5 30D6
MEM_A_DQS2	MEM_85D	MEM_DQS	MEM_A_DQS_P<2>	16C5 30C4
	MEM_85D	MEM_DQS	MEM_A_DQS_N<2>	16C5 30C4
MEM_A_DQS3	MEM_85D	MEM_DQS	MEM_A_DQS_P<3>	16C5 30C6
	MEM_85D	MEM_DQS	MEM_A_DQS_N<3>	16C5 30C6
MEM_A_DQS4	MEM_85D	MEM_DQS	MEM_A_DQS_P<4>	16C5 30B6
	MEM_85D	MEM_DQS	MEM_A_DQS_N<4>	16C5 30B6
MEM_A_DQS5	MEM_85D	MEM_DQS	MEM_A_DQS_P<5>	16C5 30B4
	MEM_85D	MEM_DQS	MEM_A_DQS_N<5>	16C5 30B4
MEM_A_DQS6	MEM_85D	MEM_DQS	MEM_A_DQS_P<6>	16C5 30A4
	MEM_85D	MEM_DQS	MEM_A_DQS_N<6>	16C5 30A4
MEM_A_DQS7	MEM_85D	MEM_DQS	MEM_A_DQS_P<7>	16C5 30A6
	MEM_85D	MEM_DQS	MEM_A_DQS_N<7>	16C5 30A6
MEM_B_CLK	MEM_70D	MEM_CLK	MEM_CLK_P<5..3>	15D3 31A4 31D4
	MEM_70D	MEM_CLK	MEM_CLK_N<5..3>	15D3 31A4 31D4
MEM_B_CNTL	MEM_45S	MEM_CTRL	MEM_CKE<4..3>	15D3 31C4 31C6 32D5 32D6
MEM_B_CNTL	MEM_45S	MEM_CTRL	MEM_CS_L<3..2>	15C3 15D3 31B4 31B6 32D6
MEM_B_CNTL	MEM_45S	MEM_CTRL	MEM_ODT<3..2>	15C3 31B4 31B6 32D6
MEM_B_CMD	MEM_55S	MEM_CMD	MEM_B_A<14..0>	15C6 16B1 16C1 31B4 31B6 31C4 31C6 32A5 32B5
MEM_B_CMD	MEM_55S	MEM_CMD	MEM_B_BS<2..0>	16D1 31B4 31B6 31C6 32A6
MEM_B_CMD	MEM_55S	MEM_CMD	MEM_B_RAS_L	16B1 31B4 32A6
MEM_B_CMD	MEM_55S	MEM_CMD	MEM_B_CAS_L	16D1 31B6 32A6
MEM_B_CMD	MEM_55S	MEM_CMD	MEM_B_WE_L	16B1 31B6 32A6
MEM_B_DQ_BYTE0	MEM_55S	MEM_DATA	MEM_B_DQ<7..0>	16D4 31D4 31D6
MEM_B_DQ_BYTE1	MEM_55S	MEM_DATA	MEM_B_DQ<15..8>	16C4 31D4 31D6
MEM_B_DQ_BYTE2	MEM_55S	MEM_DATA	MEM_B_DQ<23..16>	16C4 31C4 31C6
MEM_B_DQ_BYTE3	MEM_55S	MEM_DATA	MEM_B_DQ<31..24>	16C4 31C4 31C6
MEM_B_DQ_BYTE4	MEM_55S	MEM_DATA	MEM_B_DQ<39..32>	16B4 16C4 31B4 31B6
MEM_B_DQ_BYTE5	MEM_55S	MEM_DATA	MEM_B_DQ<47..40>	16B4 31A4 31A6 31B4 31B6
MEM_B_DQ_BYTE6	MEM_55S	MEM_DATA	MEM_B_DQ<55..48>	16B4 31A4 31A6
MEM_B_DQ_BYTE7	MEM_55S	MEM_DATA	MEM_B_DQ<63..56>	16A4 16B4 31A4 31A6
MEM_B_DM0	MEM_55S	MEM_DATA	MEM_B_DM<0>	16D1 31D4
MEM_B_DM1	MEM_55S	MEM_DATA	MEM_B_DM<1>	16D1 31D4
MEM_B_DM2	MEM_55S	MEM_DATA	MEM_B_DM<2>	16C1 31C4
MEM_B_DM3	MEM_55S	MEM_DATA	MEM_B_DM<3>	16C1 31C6
MEM_B_DM4	MEM_55S	MEM_DATA	MEM_B_DM<4>	16C1 31B4
MEM_B_DM5	MEM_55S	MEM_DATA	MEM_B_DM<5>	16C1 31A6
MEM_B_DM6	MEM_55S	MEM_DATA	MEM_B_DM<6>	16C1 31A4
MEM_B_DM7	MEM_55S	MEM_DATA	MEM_B_DM<7>	16C1 31A6
MEM_B_DQS0	MEM_85D	MEM_DQS	MEM_B_DQS_P<0>	16C1 31D6
	MEM_85D	MEM_DQS	MEM_B_DQS_N<0>	16C1 31D6
MEM_B_DQS1	MEM_85D	MEM_DQS	MEM_B_DQS_P<1>	16C1 31D6
	MEM_85D	MEM_DQS	MEM_B_DQS_N<1>	16C1 31D6
MEM_B_DQS2	MEM_85D	MEM_DQS	MEM_B_DQS_P<2>	16C1 31C6
	MEM_85D	MEM_DQS	MEM_B_DQS_N<2>	16C1 31C6
MEM_B_DQS3	MEM_85D	MEM_DQS	MEM_B_DQS_P<3>	16C1 31C4
	MEM_85D	MEM_DQS	MEM_B_DQS_N<3>	16C1 31C4
MEM_B_DQS4	MEM_85D	MEM_DQS	MEM_B_DQS_P<4>	16C1 31B6
	MEM_85D	MEM_DQS	MEM_B_DQS_N<4>	16C1 31B6
MEM_B_DQS5	MEM_85D	MEM_DQS	MEM_B_DQS_P<5>	16C1 31A4
	MEM_85D	MEM_DQS	MEM_B_DQS_N<5>	16C1 31B4
MEM_B_DQS6	MEM_85D	MEM_DQS	MEM_B_DQS_P<6>	16C1 31A6
	MEM_85D	MEM_DQS	MEM_B_DQS_N<6>	16C1 31A6
MEM_B_DQS7	MEM_85D	MEM_DQS	MEM_B_DQS_P<7>	16C1 31A4
	MEM_85D	MEM_DQS	MEM_B_DQS_N<7>	16C1 31A4

Memory Constraints

SYNC_MASTER=WFERRY SYNC_DATE=06/08/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE: NONE SHT 72 OF 76

Disk 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
IDE_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
SATA_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
SATA_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
IDE	*	=1.8:1_SPACING	?
SATA	*	20 MIL	?

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 10.7 & 10.9

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	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
HDA	*	=1.8:1_SPACING	?

SOURCE: Napa Platform DG, Rev 0.9 (#17978), Section 10.9.1

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
USB_60S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
USB_90D	*	Y	=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	*	20 MIL	?
USB_2CLK	*	25 MIL	?

DG says minimum spacing 50 mils to clocks

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Section 10.13.2

Internal 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	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
SPI_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SMB	*	=3:1_SPACING	?
SPI	*	=1.8:1_SPACING	?

SOURCE: Santa Platform DG, Rev 1.0 (#21112), Section 10.17

NET_TYPE			
ELECTRICAL_CONSTRAINT_SET	PHYSICAL	SPACING	
IDE_PDD	IDE_55S	IDE	IDE_PDD<15..0> 22B4 22C4 39C3 39C5
IDE_PDA	IDE_55S	IDE	IDE_PDA<2..0> 22B4 39B3 39B5
IDE_PDCS	IDE_55S	IDE	IDE_PDCS1_L 22B4 39B5
IDE_PDCS	IDE_55S	IDE	IDE_PDCS3_L 22B4 39B3
IDE_CNTL	IDE_55S	IDE	IDE_PDIOW_L 22B4 39B5
IDE_PDIOR_L	IDE_55S	IDE	IDE_PDIOR_L 22B4 39C3
IDE_CNTL	IDE_55S	IDE	IDE_PDDACK_L 22B4 39B3
IDE_CNTL	IDE_55S	IDE	IDE_PDDREQ 22A4 39C3
IDE_PDIORDY	IDE_55S	IDE	IDE_PDIORDY 22A4 39B5
IDE_IRQ14	IDE_55S	IDE	IDE_IRQ14 22B4 39B5
IDE_RST_L	IDE_55S	IDE	ODD_RST_5VTOL_L 23B6 39A8
SATA_A_R2D	SATA_100D	SATA	SATA_A_R2D_C_P 22B6 40D4
	SATA_100D	SATA	SATA_A_R2D_C_N 22B6 40D4
	SATA_100D	SATA	SATA_A_R2D_P 40D7
	SATA_100D	SATA	SATA_A_R2D_N 40D7
SATA_A_D2R	SATA_100D	SATA	SATA_A_D2R_P 22B6 40C4
	SATA_100D	SATA	SATA_A_D2R_N 22B6 40D4
	SATA_100D	SATA	SATA_A_D2R_C_P 40C7
	SATA_100D	SATA	SATA_A_D2R_C_N 40D7
HDA_BIT_CLK	HDA_55S	HDA	HDA_BIT_CLK 8A6 22C8
	HDA_55S	HDA	HDA_BIT_CLK_R 22C6
HDA_SYNC	HDA_55S	HDA	HDA_SYNC 8A6 22C8
	HDA_55S	HDA	HDA_SYNC_R 22C6
HDA_RST_L	HDA_55S	HDA	HDA_RST_L 8A6 22C8
	HDA_55S	HDA	HDA_RST_L_R 22C6
HDA_SDIN0	HDA_55S	HDA	HDA_SDIN0 8A6 22C8
HDA_SDOUT	HDA_55S	HDA	HDA_SDOUT 8A6 22B8
	HDA_55S	HDA	HDA_SDOUT_R 22B6
USB_EXTA	USB_90D	USB	USB_EXTA_P 8C1 23C2
	USB_90D	USB	USB_EXTA_N 8C1 23C2
	USB_90D	USB	USB_EXTA_MUXED_P
	USB_90D	USB	USB_EXTA_MUXED_N
USB_MINI	USB_90D	USB	USB_MINI_P 8C1 23C2
	USB_90D	USB	USB_MINI_N 8C1 23C2
USB_3G	USB_90D	USB	USB_3G_P
	USB_90D	USB	USB_3G_N
USB_CAMERA	USB_90D	USB	USB_CAMERA_P 8C1 23C2
	USB_90D	USB	USB_CAMERA_N 8C1 23C2
USB_BT	USB_90D	USB	USB_BT_P 8C1 8C2 23C2
	USB_90D	USB	USB_BT_N 8B1 8B2 23C2
USB_TPAD	USB_90D	USB	USB_TPAD_P 8C1 23C2
	USB_90D	USB	USB_TPAD_N 8C1 23C2
USB_IR	USB_90D	USB	USB_IR_P 8C1 8C2 23C2
	USB_90D	USB	USB_IR_N 8C1 8C2 23C2
USB_EXTB	USB_90D	USB	USB_EXTB_P 8B1 23C2
	USB_90D	USB	USB_EXTB_N 8B1 23C2
USB_EXCARD	USB_90D	USB	USB_EXCARD_P 8B1 23C2
	USB_90D	USB	USB_EXCARD_N 8B1 23C2
USB_EXTC	USB_90D	USB	USB_EXTC_P 8B1 23C2
	USB_90D	USB	USB_EXTC_N 8B1 23C2
USB_RBIAS	USB_60S		USB_RBIAS 23B3
SMB_SB_SCL	SMB_55S	SMB	SMB_CLK 24D5 47D8
SMB_SB_SDA	SMB_55S	SMB	SMB_DATA 24D5 47D8
SMB_SB_ME_SCL	SMB_55S	SMB	SMB_ME_CLK 24D5 47A8
SMB_SB_ME_SDA	SMB_55S	SMB	SMB_ME_DATA 24D5 47A8
SPI_SCLK	SPI_55S	SPI	SPI_SCLK_R 23C5 52C7
	SPI_55S	SPI	SPI_A_SCLK_R 52C5
SPI_SI	SPI_55S	SPI	SPI_SI_R 23C5 52C3
	SPI_55S	SPI	SPI_A_SI_R 52C4
SPI_SO	SPI_55S	SPI	SPI_SO 23C5 52C3
	SPI_55S	SPI	SPI_A_SO_R 52C4
SPI_CE_L0	SPI_55S	SPI	SPI_CE_R_L<0> 23C5 52C7
	SPI_55S	SPI	SPI_CE_L<0> 52C6
SPI_CE_L1	SPI_55S	SPI	SPI_CE_R_L<1>

SB Constraints (1 of 2)

SYNC_MASTER=WFERRY SYNC_DATE=06/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

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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	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PCI	*	=2:1_SPACING	?

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 10.18.1 & 10.19

Platform LAN (Nineveh) Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
LAN_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
ENET_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
GLAN_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
ENET_CLK	*	=2.5:1_SPACING	?
ENET_GLAN	*	20 MILS	?
ENET_LAN	*	=1.5:1_SPACING	?
ENET_MDI	*	25 MILS	?

DG says 30 mils min separation.

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 10.27.1.5-7, 10.29 & 10.30

Controller Link (AMT) Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
CLINK_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
CLINK_12MIL	*	Y	12 MILS	5 MILS	300 MILS	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CLINK	*	=1.8:1_SPACING	?
CLINK_VREF	*	12 MILS	?

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 10.27.1.5-7, 10.29 & 10.30

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING		
PCI_AD	PCI_55S	PCI	PCI_AD<18..0>	23A8 23B8 37B5 37C5
PCI_AD19	PCI_55S	PCI	PCI_AD<19>	23A8 37B6
PCI_AD20	PCI_55S	PCI	PCI_AD<20>	23A8 37B5
PCI_AD	PCI_55S	PCI	PCI_AD<31..21>	23A8 37B5
PCI_AD	PCI_55S	PCI	PCI_PAR	23A6 37B5
PCI_C_BE_L	PCI_55S	PCI	PCI_C_BE_L<3..0>	23B6 37B5
PCI_CNTL	PCI_55S	PCI	PCI_IRDY_L	23A4 23A6 37A5
PCI_CNTL	PCI_55S	PCI	PCI_DEVSEL_L	23A4 23A6 37A5
PCI_CNTL	PCI_55S	PCI	PCI_PERR_L	23A4 23A6 37A5
PCI_LOCK_L	PCI_55S	PCI	PCI_LOCK_L	23A4 23A6
PCI_CNTL	PCI_55S	PCI	PCI_SERR_L	23A4 23A6 37A5
PCI_CNTL	PCI_55S	PCI	PCI_STOP_L	23A4 23A6 37A5
PCI_CNTL	PCI_55S	PCI	PCI_TRDY_L	23A4 23A6 37A5
PCI_CNTL	PCI_55S	PCI	PCI_FRAME_L	23A4 23A6 37A5
PCI_FW_REQ_L	PCI_55S	PCI	PCI_FW_REQ_L	23A4 23B6 37A5
PCI_FW_GNT_L	PCI_55S	PCI	PCI_FW_GNT_L	23B5 37A5
PCI_REQ1_L	PCI_55S	PCI	PCI_REQ1_L	23A4 23B6
PCI_GNT1_L	PCI_55S	PCI	PCI_GNT1_L	
PCI_REQ2_L	PCI_55S	PCI	PCI_REQ2_L	23A4 23B6
PCI_GNT2_L	PCI_55S	PCI	PCI_GNT2_L	
INT_PIRQA_L	PCI_55S	PCI	INT_PIRQA_L	23A4 23A8
INT_PIRQB_L	PCI_55S	PCI	INT_PIRQB_L	23A4 23A8
INT_PIRQC_L	PCI_55S	PCI	INT_PIRQC_L	23A4 23A8
INT_PIRQD_L	PCI_55S	PCI	INT_PIRQD_L	23A4 23A8 37A5
INT_PIRQE_L	PCI_55S	PCI	INT_PIRQE_L	23A4 23A6
INT_PIRQF_L	PCI_55S	PCI	INT_PIRQF_L	23A4 23A6
PCIE_E_R2D	PCIE_100D	PCIE	PCIE_E_R2D_C_P	33B5 33B6
	PCIE_100D	PCIE	PCIE_E_R2D_C_N	33B5 33B6
PCIE_E_D2R	PCIE_100D	PCIE	PCIE_E_D2R_P	33B5
	PCIE_100D	PCIE	PCIE_E_D2R_N	33B5 33C5
GLAN_COMP			GLAN_COMP	22C6
ENET_LAN	LAN_55S	ENET_LAN	LAN_RSTSYNC	
ENET_LAN	LAN_55S	ENET_LAN	LAN_R2D<2..0>	
ENET_LAN	LAN_55S	ENET_LAN	LAN_D2R<2..0>	
ENET_GLAN_CLK	LAN_55S	ENET_CLK	ENET_GLAN_CLK_R	
	LAN_55S	ENET_CLK	ENET_GLAN_CLK	
ENET_MDI0	ENET_100D	ENET_MDI	ENET_MDI_P<0>	34B8 36B7
	ENET_100D	ENET_MDI	ENET_MDI_N<0>	34B8 36B7
ENET_MDI1	ENET_100D	ENET_MDI	ENET_MDI_P<1>	34B8 36C7
	ENET_100D	ENET_MDI	ENET_MDI_N<1>	34B8 36C7
ENET_MDI2	ENET_100D	ENET_MDI	ENET_MDI_P<2>	34B8 36B7
	ENET_100D	ENET_MDI	ENET_MDI_N<2>	34B8 36C7
ENET_MDI3	ENET_100D	ENET_MDI	ENET_MDI_P<3>	34B8 36C7
	ENET_100D	ENET_MDI	ENET_MDI_N<3>	34B8 36C7
CLINK_NB	CLINK_55S	CLINK	CLINK_NB_CLK	15A3 24C3
CLINK_NB	CLINK_55S	CLINK	CLINK_NB_DATA	15A3 24C3
CLINK_NB_RESET_L	CLINK_55S	CLINK	CLINK_NB_RESET_L	15A3 24C3
CLINK_WLAN	CLINK_55S	CLINK	CLINK_WLAN_CLK	24C3
CLINK_WLAN	CLINK_55S	CLINK	CLINK_WLAN_DATA	24C3
CLINK_WLAN_RESET_L	CLINK_55S	CLINK	CLINK_WLAN_RESET_L	24D5
NB_CLINK_VREF	CLINK_12MIL	CLINK_VREF	NB_CLINK_VREF	15A4
SB_CLINK_VREF0	CLINK_12MIL	CLINK_VREF	SB_CLINK_VREF0	24C3
SB_CLINK_VREF1	CLINK_12MIL	CLINK_VREF	SB_CLINK_VREF1	24C3

SB Constraints (2 of 2)

SYNC_MASTER=WFERRY SYNC_DATE=06/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

SCALE	SHT	OF
NONE	74	76

Clock 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_FSB_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
CLK_PCIE_100D	*	Y	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF	=100_OHM_DIFF
CLK_MED_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
CLK_SLOW_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
CLK_FSB	*	25 MIL	?
CLK_PCIE	*	20 MIL	?
CLK_MED	*	20 MIL	?
CLK_SLOW	*	10 MIL	?

SOURCE: Santa Rosa Platform DG, Rev 1.0 (#21112), Sections 14.1 - 14.6

Clock Net Properties

NET_TYPE ELECTRICAL_CONSTRAINT_SET	PHYSICAL	SPACING		
CK505_CPU	CLK_FSB_100D	CLK_FSB	CK505_CPU0_P	4C7 28C4 29D6
CK505_CPU	CLK_FSB_100D	CLK_FSB	CK505_CPU0_N	4C7 28C4 29D6
CK505_NB	CLK_FSB_100D	CLK_FSB	CK505_CPU1_P	4C7 28C4 29D6
CK505_NB	CLK_FSB_100D	CLK_FSB	CK505_CPU1_N	4C7 28C4 29D6
CK505_ITP	CLK_FSB_100D	CLK_FSB	CK505_CPU2_ITP_SRC10_P	4C7 28C4 29D6
CK505_ITP	CLK_FSB_100D	CLK_FSB	CK505_CPU2_ITP_SRC10_N	4C7 28C4 29D6
CK505_PCIF0	CLK_MED_55S	CLK_MED	CK505_PCIF0_CLK	28B8 29B6
CK505_PCIF1	CLK_MED_55S	CLK_MED	CK505_PCIF1_CLK	4C7 28B6 29B6
CK505_PCI1	CLK_MED_55S	CLK_MED	CK505_PCI1_CLK	28B6 29B6
CK505_PCI2	CLK_MED_55S	CLK_MED	CK505_PCI2_CLK	8C4 28B6
CK505_PCI3	CLK_MED_55S	CLK_MED	CK505_PCI3_CLK	28B6 29A6
CK505_PCI4	CLK_MED_55S	CLK_MED	CK505_PCI4_CLK	8C4 28B6
CK505_PCI5	CLK_MED_55S	CLK_MED	CK505_PCI5_FCTSEL1	28B6 29B2
(CPU_BSEL0)	CLK_MED_55S	CLK_MED	CK505_USB48_FSA	28A4 29D8
(CPU_BSEL2)	CLK_MED_55S	CLK_MED	CK505_CLK14P3M_TIMER	28A4 29D8
CK505_DOT96	CLK_PCIE_100D	CLK_PCIE	CK505_DOT96_27M_P	4C7 28A4 29B6
	CLK_PCIE_100D	CLK_PCIE	CK505_DOT96_27M_N	4C7 28A4 29B6
CK505_LVDS	CLK_PCIE_100D	CLK_PCIE	CK505_LVDS_P	4C7 28B4 29C6
	CLK_PCIE_100D	CLK_PCIE	CK505_LVDS_N	4C7 28B4 29C6
CK505_SRC1	CLK_PCIE_100D	CLK_PCIE	CK505_SRC1_P	
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC1_N	
CK505_SRC2	CLK_PCIE_100D	CLK_PCIE	CK505_SRC2_P	4C7 28B4 29C6
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC2_N	4C7 28B4 29C6
CK505_SRC3	CLK_PCIE_100D	CLK_PCIE	CK505_SRC3_P	
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC3_N	
CK505_SRC4	CLK_PCIE_100D	CLK_PCIE	CK505_SRC4_P	4C7 28B4 29C6
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC4_N	4C7 28B4 29C6
CK505_SRC5	CLK_PCIE_100D	CLK_PCIE	CK505_SRC5_P	4C7 28B4 29C6
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC5_N	4C7 28B4 29C6
CK505_SRC6	CLK_PCIE_100D	CLK_PCIE	CK505_SRC6_P	4C7 28B4 29C6
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC6_N	4C7 28B4 29B6
CK505_SRC7	CLK_PCIE_100D	CLK_PCIE	CK505_SRC7_P	
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC7_N	
CK505_SRC8	CLK_PCIE_100D	CLK_PCIE	CK505_SRC8_P	6B7 28A4 29B6
	CLK_PCIE_100D	CLK_PCIE	CK505_SRC8_N	6B7 28A4 29B6
(CK505_CPU)	CLK_FSB_100D	CLK_FSB	FSB_CLK_CPU_P	9B6 29D3
(CK505_CPU)	CLK_FSB_100D	CLK_FSB	FSB_CLK_CPU_N	9B6 29D3
(CK505_NB)	CLK_FSB_100D	CLK_FSB	FSB_CLK_NB_P	13B3 29D3
(CK505_NB)	CLK_FSB_100D	CLK_FSB	FSB_CLK_NB_N	13B3 29D3
(CK505_ITP)	CLK_FSB_100D	CLK_FSB	XDP_CLK_P	70A3
(CK505_ITP)	CLK_FSB_100D	CLK_FSB	XDP_CLK_N	70A3
(CK505_PCIF0)	CLK_MED_55S	CLK_MED	PCI_CLK33M_LPCPLUS	6C2 29B3 46C4
(CK505_PCIF1)	CLK_MED_55S	CLK_MED	PCI_CLK33M_SB	23A6 29A5 29B3
(CK505_PCI1)	CLK_MED_55S	CLK_MED	PCI_CLK33M_FW	29A5 29B3 37A5
(CK505_PCI2)	CLK_MED_55S	CLK_MED	PCI_CLK33M_TPM	
(CK505_PCI3)	CLK_MED_55S	CLK_MED	PCI_CLK33M_SMC	29A3 29A5 44C8
			CK505 PCI4 is project-specific	
			CK505 PCI5 is project-specific	
(CPU_BSEL0)	CLK_MED_55S	CLK_MED	SB_CLK48M_USBCTLR	24D3 29A5 29D6
(CPU_BSEL2)	CLK_MED_55S	CLK_MED	SB_CLK14P3M_TIMER	24D3 29A5 29D6
(CPU_BSEL0)	CLK_MED_55S	CLK_MED	CK505_FSA	29C8 29D6
(CPU_BSEL2)	CLK_MED_55S	CLK_MED	CK505_FSC	29A8 29D6
(CK505_DOT96)	CLK_PCIE_100D	CLK_PCIE	NB_CLK96M_DOT_P	8B1 29B3
(CK505_DOT96)	CLK_PCIE_100D	CLK_PCIE	NB_CLK96M_DOT_N	8B1 29B3
(CK505_LVDS)	CLK_PCIE_100D	CLK_PCIE	NB_CLK100M_DPLLSS_P	8B1 29C3
(CK505_LVDS)	CLK_PCIE_100D	CLK_PCIE	NB_CLK100M_DPLLSS_N	8A1 29C3
(CK505_SRC1)	CLK_PCIE_100D	CLK_PCIE	PEG_CLK100M_P	
(CK505_SRC1)	CLK_PCIE_100D	CLK_PCIE	PEG_CLK100M_N	
(CK505_SRC2)	CLK_PCIE_100D	CLK_PCIE	SB_CLK100M_DMI_P	23C2 29C3
(CK505_SRC2)	CLK_PCIE_100D	CLK_PCIE	SB_CLK100M_DMI_N	23D2 29C3
(CK505_SRC3)	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_EXCARD_P	
(CK505_SRC3)	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_EXCARD_N	
(CK505_SRC4)	CLK_PCIE_100D	CLK_PCIE	SB_CLK100M_SATA_P	22B6 29C3
(CK505_SRC4)	CLK_PCIE_100D	CLK_PCIE	SB_CLK100M_SATA_N	22B6 29C3
(CK505_SRC5)	CLK_PCIE_100D	CLK_PCIE	NB_CLK100M_PCIE_P	15C3 29C3
(CK505_SRC5)	CLK_PCIE_100D	CLK_PCIE	NB_CLK100M_PCIE_N	15C3 29C3
(CK505_SRC6)	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_MINI_P	29C3 33C5
(CK505_SRC6)	CLK_PCIE_100D	CLK_PCIE	PCIE_CLK100M_MINI_N	29B3 33C5
			CK505 SRC7 is project-specific	
			CK505 SRC8 is project-specific	

Clock Constraints

SYNC_MASTER=WFERRY SYNC_DATE=06/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
D	051-7455	01

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FireWire 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
FW_55S	*	Y	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD
FW_110D	*	Y	=110_OHM_DIFF	=110_OHM_DIFF	=110_OHM_DIFF	=110_OHM_DIFF	=110_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
FW	*	=2:1_SPACING	?
FW_TP	*	=3:1_SPACING	?

FireWire Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	SPACING	
FW_D_CTL	FW_55S	FW	FW_LINK<7..0>
FW_D_CTL	FW_55S	FW	FW_CTL<1..0>
FW_LCLK	CLK_MED_55S	CLK_MED	CLKFW_LINK_LCLK
	CLK_MED_55S	CLK_MED	CLKFW_PHY_LCLK
FW_PCLK	CLK_MED_55S	CLK_MED	CLKFW_LINK_PCLK
	CLK_MED_55S	CLK_MED	CLKFW_PHY_PCLK
FW_LKON	FW_55S	FW	FW_LKON
	FW_55S	FW	FW_LKON_R
FW_LPS	FW_55S	FW	FW_LPS
FW_LREQ	FW_55S	FW	FW_LREQ
FW_PINT	FW_55S	FW	FW_PINT
FWPHY_CLK98P304M_XI	CLK_MED_55S	CLK_MED	CLK98P304M_FW_XI_R
	CLK_MED_55S	CLK_MED	CLK98P304M_FW_XI
FW_0_TPA	FW_110D	FW_TP	FW_0_TPA_P
FW_0_TPA	FW_110D	FW_TP	FW_0_TPA_N
FW_0_TPB	FW_110D	FW_TP	FW_0_TPB_P
	FW_110D	FW_TP	FW_0_TPB_N
FW_1_TPA	FW_110D	FW_TP	FW_1_TPA_P
FW_1_TPA	FW_110D	FW_TP	FW_1_TPA_N
FW_1_TPB	FW_110D	FW_TP	FW_1_TPB_P
	FW_110D	FW_TP	FW_1_TPB_N

Port 2 Not Used

SMC SMBus Net Properties

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	SPACING		
SMBUS_SMC_A_S3_SCL	SMB_55S	SMB	SMBUS_SMC_A_S3_SCL	47D2
SMBUS_SMC_A_S3_SDA	SMB_55S	SMB	SMBUS_SMC_A_S3_SDA	47D2
SMBUS_SMC_B_S0_SCL	SMB_55S	SMB	SMBUS_SMC_B_S0_SCL	68Z 47C5
SMBUS_SMC_B_S0_SDA	SMB_55S	SMB	SMBUS_SMC_B_S0_SDA	68Z 47C5
SMBUS_SMC_0_S0_SCL	SMB_55S	SMB	SMBUS_SMC_0_S0_SCL	47D5
SMBUS_SMC_0_S0_SDA	SMB_55S	SMB	SMBUS_SMC_0_S0_SDA	47D5
SMBUS_SMC_BSA_SCL	SMB_55S	SMB	SMBUS_SMC_BSA_SCL	47C2
SMBUS_SMC_BSA_SDA	SMB_55S	SMB	SMBUS_SMC_BSA_SDA	47C2
SMBUS_SMC_MGMT_SCL	SMB_55S	SMB	SMBUS_SMC_MGMT_SCL	47B2
SMBUS_SMC_MGMT_SDA	SMB_55S	SMB	SMBUS_SMC_MGMT_SDA	47B2

FireWire & SMC Constraints

SYNC_MASTER=WFERRY SYNC_DATE=06/12/2006

APPLE INC.

SIZE	DRAWING NUMBER	REV.
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