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.

IMG5 17" REV E
11/01/05

REV	ZONE	ECN	DESCRIPTION OF CHANGE	CK APPD / DATE	ENG APPD / DATE
E		408158	PRODUCTION RELEASED	11/01/05	?

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9	11	1.8V Vreg		M23-PC	06/20/2005
10	12	1.5V Vreg		FINO-PC	06/20/2005
11	13	1.2V Vreg		FINO-PC	06/20/2005
12	15	2.5V Vreg		FINO-PC	06/20/2005
13	16	5V & 3.3V Fets		FINO-PC	06/20/2005
14	17	Vesta Core / Misc		FINO-DC	06/20/2005
15	19	KODIAK CORE & BYPASS		Q63	08/01/2005
16	20	KODIAK & SHASTA MISC		FINO-ME	06/20/2005
17	23	Shasta Core Power		Q63	08/01/2005
18	24	Shasta Serial / Misc		FINO-ME	06/20/2005
19	25	PULSAR2 POWER		Q63	08/01/2005
20	26	PULSAR2 CLOCKS		FINO-ME	06/20/2005
21	27	Pulsar Aliases		FINO-ME	06/20/2005
22	28	System Management Unit		Q63	08/01/2005
23	29	SMU SUPPLEMENTAL (2)		FINO-HS	06/20/2005
24	30	SMU SUPPLEMENTAL (3)		FINO-HS	06/20/2005
25	31	SMU SUPPLEMENTAL (4)		FINO-HS	06/20/2005
26	32	Fan 0, 1 & System Temp		FINO-HS	06/20/2005
27	33	Fan 2 & HD Temp		FINO-HS	06/20/2005
28	39	I2C Connections		FINO-ME	06/20/2005
29	41	KODIAK EI PWR & CAPS		Q63	08/01/2005
30	42	KODIAK EI A		Q63	08/01/2005
31	43	CPU EI AND IO		FINO-HS	06/20/2005
32	44	KODIAK EI B		Q63	08/01/2005
33	47	CPU STRAPS		FINO-HS	06/20/2005
34	48	CPU POWER AND BYPASS		FINO-HS	06/20/2005
35	49	PROC DECOUPLING		FINO-HS	06/20/2005
36	50	CPU VCORE VREG		M23-HS	06/20/2005
37	52	CPU VCORE MORE BYPASS		FINO-HS	06/20/2005
38	54	CPU AVDD VREG		FINO-HS	06/20/2005
39	55	T,V,I SENSORS		FINO-HS	06/20/2005
40	56	CPU ALIASES & MISC		FINO-HS	06/20/2005
41	58	KODIAC NBMEM PWR & CAPS		Q63	08/01/2005
42	59	Kodiak Memory Dq/Ctl		FINO-DS	06/20/2005
43	61	Parallel Term		FINO-DS	06/20/2005
44	62	Main Memory Clock Buffer		FINO-DS	06/20/2005
45	63	MEMORY ADDR BRANCHING		FINO-DS	06/20/2005
46	67	Memory Dimm A		FINO-DS	06/20/2005
47	68	MLB Mem Series Term		FINO-DS	06/20/2005
48	69	On-Board DDR SDRAM		FINO-DS	06/20/2005
49	70	On-Board DDR SDRAM		FINO-DS	06/20/2005
50	82	KODIAK PCI-E X16		Q63	08/01/2005
51	84	GPU PCIe		M23-DD	06/20/2005
52	85	Graphics Vregs		M23-DD	06/20/2005
53	86	GPU Core Power		FINO-DD	06/20/2005
54	87	GPU Frame Buffer		FINO-DD	06/20/2005
55	88	FB Series Termination		FINO-DD	06/20/2005
56	89	GPU GDDR SDRAM A		FINO-DD	06/20/2005
57	90	GPU GDDR SDRAM B		FINO-DD	06/20/2005
58	92	GPU Straps		FINO-DD	06/20/2005
59	93	GPU DVI & DACs		FINO-DD	06/20/2005
60	96	TMDS/Inverter/ExtVGA		M23-DD	06/20/2005
61	97	KODIAK PCI-E CONST		FINO-DD	06/20/2005
62	98	KODIAK HT16		Q63	08/01/2005
63	101	HT ALIASES		FINO-ME	06/20/2005
64	103	Shasta HyperTransport		Q63	08/01/2005
65	119	Shasta PCI Interface		Q63	08/01/2005
66	120	PCI SERIES TERMINATION		FINO-MW	06/20/2005
67	121	AIRPORT & BLUETOOTH		FINO-MW	06/20/2005
68	122	USB 2.0 PCI Interface		Q63	08/01/2005
69	125	BootROM		Q63	08/01/2005
70	127	Shasta Disk		M23-DC	06/20/2005
71	129	Disk Connectors		M23-DC	06/20/2005
72	130	ENET SERIES TERM		FINO-DC	06/20/2005
73	131	Shasta Ethernet		Q63	08/01/2005
74	132	Vesta Ethernet PHY		Q63	08/01/2005
75	136	ETHERNET CONNECTOR		FINO-DC	06/20/2005
76	138	Shasta FireWire		Q63	08/01/2005
77	139	Vesta FireWire PHY		Q63	08/01/2005
78	140	FIREWIRE CONNECTORS		FINO-DC	06/20/2005
79	142	USB Host Interfaces		FINO-PC	07/05/2005
80	143	USB Device Interfaces		FINO-PC	06/20/2005
81	144	Flash Media Ctrl		FINO-PC	06/20/2005
82	145	Flash Connector		FINO-PC	06/20/2005
83	147	AUDIO: CODEC		FINO-SO	10/07/2005
84	148	AUDIO: LINE INPUT AMP		FINO-SO	10/07/2005
85	150	AUDIO: LINE OUT AMP		FINO-SO	10/07/2005
86	152	AUDIO: SPEAKER AMP		FINO-SO	10/07/2005
87	153	AUDIO: CONNECTORS		FINO-SO	10/07/2005
88	154	AUDIO: POWER SUPPLIES		FINO-SO	10/07/2005

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

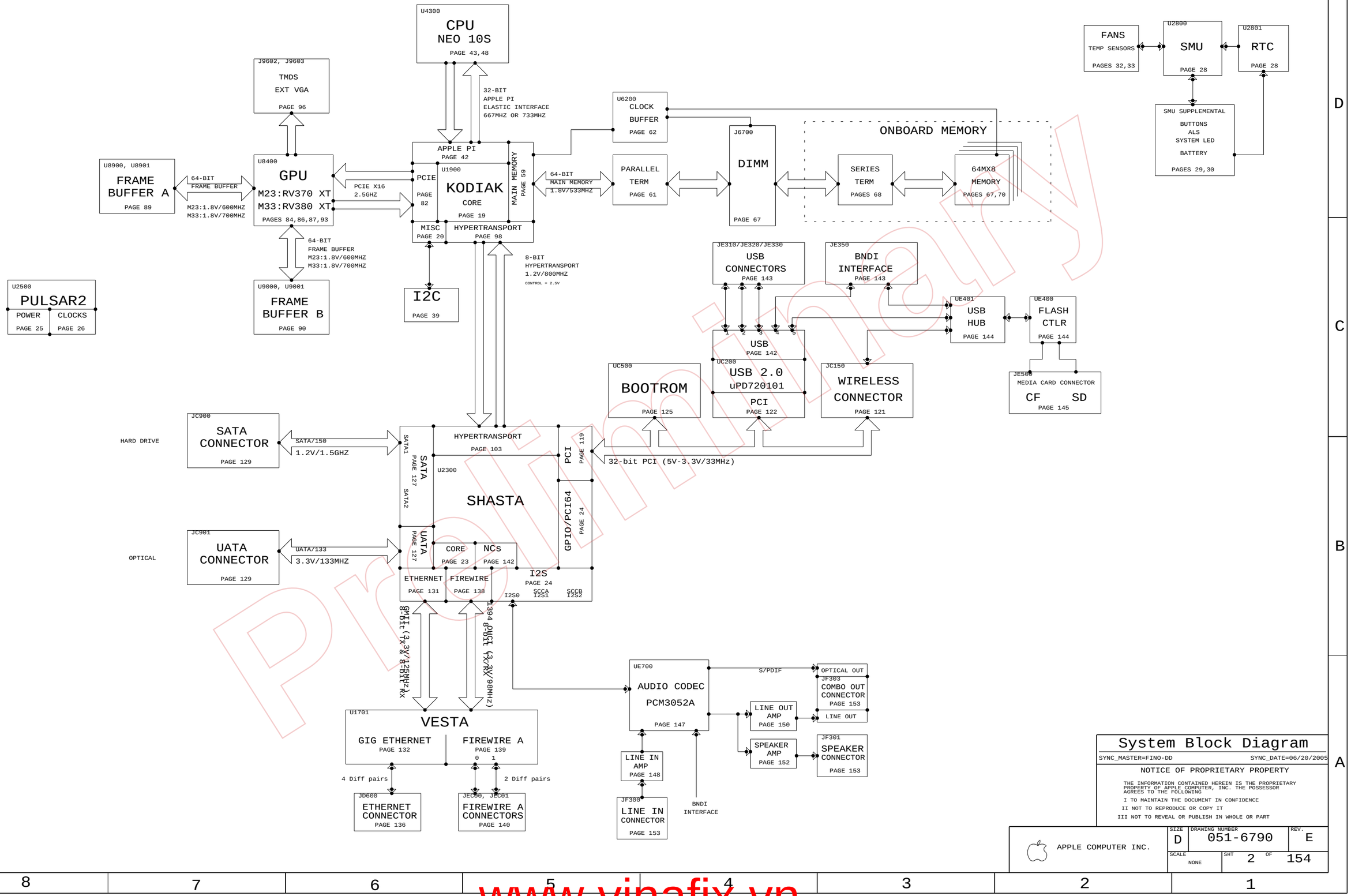
SIZE D

Apple Computer Inc.

TITLE
SCH,MLB,IMG5,17

DRAWING NUMBER 051-6790 REV. E

SHT 1 OF 154



System Block Diagram

SYNC_MASTER=FINO-DD SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

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POWER CONNECTOR

J700
PAGE 7

SYS_POWERUP_L

PP12V_ALL	PP12V_RUN	PP5V_RUN	PP5V_ALL	PP3V3_ALL	PP3V3_RUN
FW CONN	20" PANEL POWER 17" LCD INVERTER	OPTICAL			PCI BUS AUDIO CODEC

SMU
POWER SEQUENCE PIN

SYS_POWERUP_L
NC_SMU_PWRSEQ_P1_0 — SMU_PWRSEQ_P1_0
NC_SMU_PWRSEQ_P1_4 — SMU_PWRSEQ_P1_4
TURN_ON_PP1V2_L — SMU_PWRSEQ_P1_1
PP3V3_PWRON
PWR_GOOD_PP1V5 — SMU_PWRSEQ_P9_5
PWR_GOOD_PP1V8 — SMU_PWRSEQ_P9_6
TURN_ON_PP3V3_PWRON_L — SMU_PWRSEQ_P1_2
SMU_PWRSEQ_P1_3

PP1V5_PWRON SWITCHER
PAGE 12
PULSAR
KODIAK CORE

PP1V5_RUN FET SWITCH
PAGE 12
EI

CPU CORE SWITCHER
PAGE 50

GPU CORE SWITCHER
PAGE 85

PP1V8_PWRON SWITCHER
PAGE 11
MAIN MEMORY

PP1V8_RUN
PP1V8_RUN POWER SW
PAGE 11
GPU MEMORY

PP0V9_GPU_VTT LINEAR
PAGE 91

PP4V5_RUN_AUDIO LINEAR
PAGE 154
AUDIO CODEC

PP5V_PWRON FET SWITCH
PAGE 16
USB CONN

PP2V5_ALL LINEAR
PAGE 15
VESTA

PP2V5_PWRON FET SWITCH
PAGE 15

PP2V5_RUN FET SWITCH
PAGE 15

PP3V3_PWRON FET SWITCH
PAGE 16
MODEM & BT
USB2 HOST

PP2V5_RUN_CPU_AVDD LINEAR
PAGE 54

PP2V5_GPU_A2VDD LINEAR
PAGE 85

PP1V8_TPVDD LINEAR
PAGE 85

PP1V5_VDDC_CT LINEAR
PAGE 85

PP1V8_GPU LINEAR
PAGE 85

PP1V2_ALL SWITCHER
PAGE 13
VESTA CORE

PP1V2_TPVDD LINEAR
PAGE 85

PP1V2_PWRON FET SWITCH
PAGE 13
SHASTA CORE

PP1V2_RUN FET SWITCH
PAGE 13
HT BUS

PP2V5_ALL
R431 10K 5% 1/16W MF-LF 402

PP1V5_PWRON
R430 100K 5% 1/10W MF-LF 402
PS_1V_REF
COMPARE_PP1V5
LM339A SOI-LF
U400 V+ GND
C430 0.01UF 20% 16V CERM 402

R440 100K 5% 1/16W MF-LF 402
COMPARE_PP1V8
C440 0.01UF 20% 16V CERM 402

PP2V5_ALL
R442 150K 5% 1/16W MF-LF 402
PS_1V_REF
R443 100K 1% 1/10W MF-LF 402

PP5V_ALL
LM339A SOI-LF
U400 V+ GND

PP2V5_ALL
R441 10K 5% 1/16W MF-LF 402
C441 0.1UF 20% 10V CERM 402

PP2V5_ALL
U400P2
LM339A SOI-LF
U400 V+ GND

Power Block Diagram

SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 4 OF 154	

PROCESSORS

NEED TO UPDATED BIN CODES AS NOTES

PART #	QTY	DEVICE	PACKAGE	DESCRIPTION	VALUE	VOLT.	WATT.	TOL.	REFERENCE DESIGNATOR(S)	BOM OPTION	
337S3224	1	PROCESSOR	CBGA-576-1MM	IC,GPUL,DD3.1,1.9G,85C	1.9GHZ	1.10V	45W	50MV	U4300	17_INCH_LCD	CRITICAL
337S3220	1	PROCESSOR	CBGA-576-1MM	IC,GPUL,DD3.1,2.1G,85C	2.1GHZ	1.10V	45W	50MV	U4300	20_INCH_LCD	CRITICAL

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
337S3225	337S3224	17_INCH_LCD	U4300	IC,DD3.1,1.9G,1.15V
337S3226	337S3224	17_INCH_LCD	U4300	IC,DD3.1,1.9G,1.20V
337S3227	337S3224	17_INCH_LCD	U4300	IC,DD3.1,1.9G,1.25V
337S3228	337S3224	17_INCH_LCD	U4300	IC,DD3.0X,1.9G,1.15V
337S3229	337S3224	17_INCH_LCD	U4300	IC,DD3.0X,1.9G,1.20V
337S3230	337S3224	17_INCH_LCD	U4300	IC,DD3.0X,1.9G,1.25V
337S3231	337S3224	17_INCH_LCD	U4300	IC,DD3.0X,1.9G,1.30V
337S3221	337S3220	20_INCH_LCD	U4300	IC,DD3.1,2.1G,1.15V
337S3222	337S3220	20_INCH_LCD	U4300	IC,DD3.1,2.1G,1.20V
337S3223	337S3220	20_INCH_LCD	U4300	IC,DD3.1,2.1G,1.25V

ASICS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
343S0379	1	IC,KODIAK,V1.2,PBGA,200MM	U1900		CRITICAL
343S0377	1	IC,ASIC,SHASTA,V1.1,PBGA,LF	U2300		CRITICAL
343S0356	1	IC,ASIC,VESTA,V1.3,LF	U1701		CRITICAL
343S0319	1	IC,PULSAR2,100P,P8MM,BGA	U2500		CRITICAL

MISC PARTS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION		
051-6790	1	PCB,SCHEM,MLB,M23	SCH1	17_INCH_LCD		
051-6863	1	PCB,SCHEM,MLB,M33	SCH1	20_INCH_LCD		
820-1783	1	PCB,FAB,MLB,M23	MLB1	17_INCH_LCD	CRITICAL	
820-1766	1	PCB,FAB,MLB,M33	MLB1	20_INCH_LCD	CRITICAL	
062-2082	1	SPEC,VENDOR PACKAGING PROCEDURE	VPP1			
825-6447	1	BARCODE LABEL, MLB	LBL1			
341T1751	1	IC,FLASH,1MX8,3.3V,90NS	UC500		CRITICAL	
341T1752	1	PURCH ASSY, SMU BIG	U2800		CRITICAL	
603-7318	1	M23 CPU HEATSINK	MECH1	OMIT	CRITICAL	
603-7321	1	M33 CPU HEATSINK	MECH1	OMIT	CRITICAL	
603-7319	1	M23 GPU HEATSINK	MECH2	OMIT	CRITICAL	HEATSINKS ARE NOW ON THE PD BOM
603-7322	1	M33 GPU HEATSINK	MECH2	OMIT	CRITICAL	
603-7320	1	M23 NB HEATSINK	MECH3	OMIT	CRITICAL	
603-7323	1	M33 NB HEATSINK	MECH3	OMIT	CRITICAL	
875-1905	1	CPU GAP FILLER	GAP1			
875-2429	1	LED COVER TAPE	TAPE1	17_INCH_LCD		

ALTERNATES

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
378S0140	378S0141		LED700,LED702	KINGBRIGHT LED
343S0388	343S0356		U1701	VESTA A4
126S0078	126S0086		C722	EL CAP
126S0068	126S0088		CF000	EL CAP
353S1321	353S1105		U400	LM339
138S0558	138S0547			10UF CAP ALL LOC.
124-0338	124-0333			PANASONIC CAPS

Table Items

SYNC_MASTER=FINO-M23 SYNC_DATE=08/26/2005

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6790 | REV. E

SCALE NONE | SHT 5 OF 154

NO TEST XW NETS

U17	NO_TEST=YES	GND_U1100	11
U18	NO_TEST=YES	GND_U1200	12
U48	NO_TEST=YES	GND_U1300	13
U95	NO_TEST=YES	PP_2V5PWRONNBMISC	20
U95	NO_TEST=YES	PP_1V2PWRONSBVCORE	23
U95	NO_TEST=YES	PP_3V3PWRONSBPCI64	23
U95	NO_TEST=YES	PP_2V5PWRONSB	23
U95	NO_TEST=YES	PP_1V2PWRONSBPLL45VDD	24
U96	NO_TEST=YES	PP_OVDD_PULSAR1	25
U96	NO_TEST=YES	PP_1V2PWRONPULSAR1	25
U96	NO_TEST=YES	PP_1V5PULSAR2	25
U97	NO_TEST=YES	PP_1V5PWRONPULSAR2	25
U98	NO_TEST=YES	GND_SMU_AVSS	28 55
U98	NO_TEST=YES	PP_3V3ALLSMUAVCC	28
U98	NO_TEST=YES	PP_3V3ALLSMU	28
U99	NO_TEST=YES	PP_VEINB	41
U99	NO_TEST=YES	GND_CPU_AVDD	48
U99	NO_TEST=YES	VC_AGND	50
U99	NO_TEST=YES	VC_OUTSEN_R	50
U99	NO_TEST=YES	KPVDD2_FMAX	55
U99	NO_TEST=YES	GND_GPU_PVSS	86
U97	NO_TEST=YES	GND_GPU_MPVSS	87
U106	NO_TEST=YES	GND_AUDIO_MIC	153 154

U90	NO_TEST=YES	GND_GPU_TPVSS	93
U90	NO_TEST=YES	GND_GPU_TXVSSR	93
U92	NO_TEST=YES	GND_GPU_VSSDI	93
U100	NO_TEST=YES	GND_GPU_AVSSN	93
U100	NO_TEST=YES	GND_GPU_AVSSQ	93
U100	NO_TEST=YES	GND_GPU_A2VSSN	93
U100	NO_TEST=YES	GND_GPU_A2VSSQ	93
U100	NO_TEST=YES	KOD_L15_GND	98 101
U100	NO_TEST=YES	PP_3V3SBPCI_B9	
U100	NO_TEST=YES	PP_2V5PWRONSB_B9	119
U100	NO_TEST=YES	PP_VIOPCIUSB2_C2	122
U101	NO_TEST=YES	PP_1V2PWRONDISKSB_CC	127
U101	NO_TEST=YES	PP2V5_VESTA_BIASVDD1	132
U101	NO_TEST=YES	PP2V5_VESTA_XTALVDD1	132
U102	NO_TEST=YES	PP1V2_VESTA_PLLVDD1	132
U102	NO_TEST=YES	PP1V2_VESTA_PLLVDD2	139
U102	NO_TEST=YES	PP2V5_VESTA_BIASVDD2	139
U102	NO_TEST=YES	PP2V5_VESTA_XTALVDD2	139
U103	NO_TEST=YES	PP1V2_VESTA_FAVDDL	139
U103	NO_TEST=YES	PP2V5_VESTA_FAVDDM	139
U103	NO_TEST=YES	PP3V3_VESTA_FAVDDH	139
U104	NO_TEST=YES	PP3V3_PWRON_NEC_AVDD	142
U104	NO_TEST=YES	GND_AUD_LOAMP	150 154

U101	NO_TEST=YES	GND_NEC_AVSS_R	142
U101	NO_TEST=YES	GND_AUDIO_SPKRAMP_PLANE	152 154
U101	NO_TEST=YES	GND_AUDIO_CODEC	147 148 150 154
U101	NO_TEST=YES	KPGND2_FMAX	55
U101	NO_TEST=YES	TDIODE_POS_FMAX	55
U101	NO_TEST=YES	TDIODE_NEG_FMAX	55
U101	NO_TEST=YES	DAGND	55
U101	NO_TEST=YES	INA138_OUT	55
U102	NO_TEST=YES	RAMCLK_AVSS	62
U102	NO_TEST=YES	PP12V_AUDIO_SPKRAMP	7 152
U102	NO_TEST=YES	GND_AUDIO	7 154
U102	NO_TEST=YES	GND_AUDIO_SPKRAMP	7 152 154
U103	NO_TEST=YES	KOD_H05_GND	82 97
U103	NO_TEST=YES	KOD_K07_GND	82 97
U103	NO_TEST=YES	KOD_G10_GND	82 97
U103	NO_TEST=YES	KOD_J13_GND	82 97
U103	NO_TEST=YES	KOD_L13_GND	82 97
U103	NO_TEST=YES	KOD_H08_GND	82 97
U103	NO_TEST=YES	PCIE_SLOTA_PRSNT_L	82 84
U103	NO_TEST=YES	U8500_GND	85
U103	NO_TEST=YES	GND_AUD_LOAMP_CHGPMP	150 154

EE IDENTIFIED NO TEST NETS

U95	NO_TEST=YES	NC_EI_NB_TO_CPU_B_CLK_P	56
U95	NO_TEST=YES	NC_EI_NB_TO_CPU_B_CLK_N	56
U95	NO_TEST=YES	NC_EI_NB_TO_CPU_B_AD<0..43>	56
U95	NO_TEST=YES	NC_EI_NB_TO_CPU_B_SR_P<0..1>	56
U96	NO_TEST=YES	NC_EI_NB_TO_CPU_B_SR_N<0..1>	56
U96	NO_TEST=YES	NC_EI_CPU_B_TO_NB_CLK_P	56
U96	NO_TEST=YES	NC_EI_CPU_B_TO_NB_CLK_N	56
U96	NO_TEST=YES	NC_EI_CPU_B_TO_NB_AD<0..43>	56
U96	NO_TEST=YES	NC_EI_CPU_B_TO_NB_SR_P<0..1>	56
U96	NO_TEST=YES	NC_EI_CPU_B_TO_NB_SR_N<0..1>	56
U96	NO_TEST=YES	NC_NB_CPU_A1_INT_L	56
U97	NO_TEST=YES	NC_NB_CPU_B0_INT_L	56
U97	NO_TEST=YES	NC_NB_CPU_B1_INT_L	56
U97	NO_TEST=YES	NC_CPU_A1_QACK_L	56
U97	NO_TEST=YES	NC_CPU_B0_QACK_L	56
U97	NO_TEST=YES	NC_CPU_B1_QACK_L	56
U97	NO_TEST=YES	NC_HT_MB_TO_NB_CAD_P<8..15>	101
U97	NO_TEST=YES	NC_HT_MB_TO_NB_CAD_N<8..15>	101
U97	NO_TEST=YES	NC_HT_NB_TO_MB_CAD_P<8..15>	101
U98	NO_TEST=YES	NC_HT_NB_TO_MB_CAD_N<8..15>	101
U104	NO_TEST=YES	NC_CLK_RAI_200M_N<0>	27
U104	NO_TEST=YES	NC_CLK_RAI_200M_P<0>	27
U104	NO_TEST=YES	NC_CLK_RAI_PCIEA_N<0>	27
U104	NO_TEST=YES	NC_CLK_RAI_PCIEA_P<0>	27
U104	NO_TEST=YES	NC_CLK_RAI_PCIEB_N<0>	27
U105	NO_TEST=YES	NC_CLK_RAI_PCIEB_P<0>	27
U105	NO_TEST=YES	NC_CLK_RAI_PCIEC_N<0>	27
U105	NO_TEST=YES	NC_CLK_RAI_PCIEC_P<0>	27
U105	NO_TEST=YES	NC_A_AVREG_0	82
U105	NO_TEST=YES	NC_A_AVREG_1	82
U105	NO_TEST=YES	NC_A_AVREG_2	82
U105	NO_TEST=YES	NC_CPU_B_APSYNC	27
U106	NO_TEST=YES	NC_EI_CPU_B_SYSCLK_N	27
U106	NO_TEST=YES	NC_EI_CPU_B_SYSCLK_P	27
U106	NO_TEST=YES	NC_HT_NB_TO_MB_CLK_N<1>	101
U106	NO_TEST=YES	NC_HT_NB_TO_MB_CLK_P<1>	101
U100	NO_TEST=YES	NC_J2904_11	29
U100	NO_TEST=YES	NC_J2904_12	29
U100	NO_TEST=YES	NC_NCV1009_1	55
U100	NO_TEST=YES	NC_NCV1009_2	55
U100	NO_TEST=YES	NC_NCV1009_3	55
U100	NO_TEST=YES	NC_NCV1009_4	55
U100	NO_TEST=YES	NC_NCV1009_5	55
U100	NO_TEST=YES	NC_NCV1009_ADJ	55
U100	NO_TEST=YES	NC_RAM_ARB0_REF25MHZ	27
U107	NO_TEST=YES	NC_RAM_ARB1_REF25MHZ	27
U107	NO_TEST=YES	NC_SMU_PWRSEQ_P1_0	4
U107	NO_TEST=YES	NC_SMU_PWRSEQ_P1_4	4
U116	NO_TEST=YES	RFBD<38>	88 89
U116	NO_TEST=YES	RFBD<37>	88 89
U116	NO_TEST=YES	RFBD<36>	88 89
U116	NO_TEST=YES	RFBD<34>	88 89
U116	NO_TEST=YES	RFBD<33>	88 89
U116	NO_TEST=YES	RFBD<32>	88 89
U116	NO_TEST=YES	RFBD<31>	88 89
U116	NO_TEST=YES	RFBD<30>	88 89
U117	NO_TEST=YES	RFBD<28>	88 89
U117	NO_TEST=YES	RFBD<27>	88 89
U117	NO_TEST=YES	RFBD<26>	88 89
U117	NO_TEST=YES	RFBD<25>	88 89
U117	NO_TEST=YES	RFBD<23>	88 89
U117	NO_TEST=YES	RFBD<22>	88 89
U117	NO_TEST=YES	RFBD<21>	88 89

U100	NO_TEST=YES	KPVDD2	48 50 55
U100	NO_TEST=YES	KPGND2	48 50 55
U100	NO_TEST=YES	CPU_DIODE_POS	48 55
U100	NO_TEST=YES	CPU_DIODE_NEG	48 55
U110	NO_TEST=YES	FMAXT_P	55
U110	NO_TEST=YES	FMAXT_M	55
U110	NO_TEST=YES	CORE_ISNS_P	55
U110	NO_TEST=YES	CORE_ISNS_M	55
U110	NO_TEST=YES	PPV_RUN_CPU_AVDD_R_L	48
U110	NO_TEST=YES	NC_CLK_RAI_GIGE_25MHZ	27
U110	NO_TEST=YES	NC_CLK_RAI_REFCLK_66M	27
U110	NO_TEST=YES	NC_CPU_B_TBEN_CLK_US	26
U110	NO_TEST=YES	NC_PMR_CLK_DIS_L	20
U110	NO_TEST=YES	NC_I2S2_MCLK	154
U111	NO_TEST=YES	NC_SATA_RXD_N2_C	129
U111	NO_TEST=YES	NC_SATA_RXD_P2_C	129
U111	NO_TEST=YES	NC_SATA_TXD_N2	129
U111	NO_TEST=YES	NC_SATA_TXD_P2	129
U111	NO_TEST=YES	TP_SB<29>	142
U111	NO_TEST=YES	TP_SB<28>	142
U111	NO_TEST=YES	TP_SB<27>	142
U111	NO_TEST=YES	TP_SB<26>	142
U111	NO_TEST=YES	TP_SB<25>	142
U112	NO_TEST=YES	TP_SB<24>	142
U112	NO_TEST=YES	TP_SB<23>	142
U112	NO_TEST=YES	TP_SB<22>	142
U112	NO_TEST=YES	TP_SB<21>	142
U112	NO_TEST=YES	TP_SB<20>	142
U112	NO_TEST=YES	TP_SB<19>	142
U112	NO_TEST=YES	TP_SB<18>	142
U112	NO_TEST=YES	TP_SB<17>	142
U112	NO_TEST=YES	TP_SB<16>	142
U112	NO_TEST=YES	TP_SB<15>	142
U112	NO_TEST=YES	TP_SB<14>	142
U113	NO_TEST=YES	TP_SB<13>	142
U113	NO_TEST=YES	TP_SB<12>	142
U113	NO_TEST=YES	TP_SB<11>	142
U113	NO_TEST=YES	TP_SB<10>	142
U113	NO_TEST=YES	TP_SB<9>	142
U113	NO_TEST=YES	TP_SB<8>	142
U113	NO_TEST=YES	TP_SB<7>	142
U113	NO_TEST=YES	TP_SB<6>	142
U113	NO_TEST=YES	TP_SB<5>	142
U114	NO_TEST=YES	TP_SB<4>	142
U114	NO_TEST=YES	TP_SB<3>	142
U114	NO_TEST=YES	TP_SB<2>	142
U114	NO_TEST=YES	TP_SB<1>	142
U114	NO_TEST=YES	TP_SB<0>	142
U115	NO_TEST=YES	RFBD<61>	88 89
U115	NO_TEST=YES	RFBD<60>	88 89
U115	NO_TEST=YES	RFBD<59>	88 89
U117	NO_TEST=YES	RFBD<57>	88 89
U118	NO_TEST=YES	RFBD<56>	88 89
U118	NO_TEST=YES	RFBD<54>	88 89
U118	NO_TEST=YES	RFBD<53>	88 89
U118	NO_TEST=YES	RFBD<52>	88 89
U118	NO_TEST=YES	RFBD<50>	88 89
U118	NO_TEST=YES	RFBD<49>	88 89
U118	NO_TEST=YES	RFBD<48>	88 89
U118	NO_TEST=YES	RFBD<47>	88 89
U119	NO_TEST=YES	RFBD<45>	88 89
U119	NO_TEST=YES	RFBD<44>	88 89
U119	NO_TEST=YES	RFBD<42>	88 89
U119	NO_TEST=YES	RFBD<41>	88 89
U119	NO_TEST=YES	RFBD<40>	88 89

U119	NO_TEST=YES	RFBD<126>	88 90
U120	NO_TEST=YES	RFBD<125>	88 90
U119	NO_TEST=YES	RFBD<124>	88 90
U120	NO_TEST=YES	RFBD<122>	88 90
U120	NO_TEST=YES	RFBD<121>	88 90
U120	NO_TEST=YES	RFBD<120>	88 90
U120	NO_TEST=YES	RFBD<118>	88 90
U120	NO_TEST=YES	RFBD<117>	88 90
U120	NO_TEST=YES	RFBD<116>	88 90
U121	NO_TEST=YES	RFBD<114>	88 90
U121	NO_TEST=YES	RFBD<113>	88 90
U121	NO_TEST=YES	RFBD<112>	88 90
U121	NO_TEST=YES	RFBD<110>	88 90
U121	NO_TEST=YES	RFBD<109>	88 90
U121	NO_TEST=YES	RFBD<108>	88 90
U122	NO_TEST=YES	RFBD<106>	88 90
U122	NO_TEST=YES	RFBD<105>	88 90
U122	NO_TEST=YES	RFBD<104>	88 90
U122	NO_TEST=YES	RFBD<102>	88 90
U122	NO_TEST=YES	RFBD<101>	88 90
U122	NO_TEST=YES	RFBD<100>	88 90
U122	NO_TEST=YES	RFBD<98>	88 90
U122	NO_TEST=YES	RFBD<97>	88 90
U122	NO_TEST=YES	RFBD<96>	88 90
U122	NO_TEST=YES	RFBD<95>	88 90
U123	NO_TEST=YES	RFBD<94>	88 90
U123	NO_TEST=YES	RFBD<92>	88 90
U123	NO_TEST=YES	RFBD<91>	88 90
U123	NO_TEST=YES	RFBD<90>	88 90
U123	NO_TEST=YES	RFBD<88>	88 90
U123	NO_TEST=YES	RFBD<87>	88 90
U123	NO_TEST=YES	RFBD<86>	88 90
U123	NO_TEST=YES	RFBD<85>	88 90
U124	NO_TEST=YES	RFBD<83>	88 90
U124	NO_TEST=YES	RFBD<82>	88 90
U124	NO_TEST=YES	RFBD<81>	88 90
U124	NO_TEST=YES	RFBD<79>	88 90
U124	NO_TEST=YES	RFBD<78>	88 90
U124	NO_TEST=YES	RFBD<76>	88 90
U124	NO_TEST=YES	RFBD<75>	88 90
U124	NO_TEST=YES	RFBD<74>	88 90
U125	NO_TEST=YES	RFBD<72>	88 90
U125	NO_TEST=YES	RFBD<71>	88 90
U125	NO_TEST=YES	RFBD<70>	88 90
U125	NO_TEST=YES	RFBD<69>	88 90
U125	NO_TEST=YES	RFBD<67>	88 90
U125	NO_TEST=YES	RFBD<66>	88 90
U125	NO_TEST=YES	RFBD<65>	88 90
U126	NO_TEST=YES	RFBD<62>	88 89

U80	NO_TEST=YES	TP_FBBCS1_L	87
U82	NO_TEST=YES	AUD_4V5_FB	154
U83	NO_TEST=YES	ITS_RUNNING	7
U83	NO_TEST=YES	LED801_1	8
U83	NO_TEST=YES	LED802_1	8
U83	NO_TEST=YES	PCI_CLK66M_SB_INT_R	26
U84	NO_TEST=YES	Q800_D	8
U84	NO_TEST=YES	Q800_G	8
U84	NO_TEST=YES	Q801_B	8
U84	NO_TEST=YES	Q802_B	8
U84	NO_TEST=YES	Q802_E	8
U85	NO_TEST=YES	Q803_B	8
U42	NO_TEST=YES	TP_USB2_PWREN<0>	143
U42	NO_TEST=YES	TP_USB2_PWREN<1>	143
U87	NO_TEST=YES	TP_SB_FSTEST	24
U87	NO_TEST=YES	TP_SB_PLLTEST	24
U84	NO_TEST=YES	TP_USB2_PWREN<2>	143
U85	NO_TEST=YES	TP_USB2_PWREN<3>	143
U84	NO_TEST=YES	TP_USB2_PWREN<4>	143
U85	NO_TEST=YES	TP_NEC_NTEST1	122
U85	NO_TEST=YES	TP_NEC_SMC	122
U85	NO_TEST=YES	TP_NEC_SMI_L	122
U86	NO_TEST=YES	TP_NEC_SRCLK	122
U86	NO_TEST=YES	TP_NEC_SRMOD	122
U86	NO_TEST=YES	TP_NEC_TEST	122
U88	NO_TEST=YES	UATA_DASP_L_DS	129
U120	NO_TEST=YES	RFBD<19>	88 89
U120	NO_TEST=YES	RFBD<18>	88 89
U120	NO_TEST=YES	RFBD<16>	88 89
U120	NO_TEST=YES	RFBD<15>	88 89
U120	NO_TEST=YES	RFBD<14>	88 89
U120	NO_TEST=YES	RFBD<13>	88 89
U127	NO_TEST=YES	RFBD<11>	88 89
U127	NO_TEST=YES	RFBD<10>	88 89
U127	NO_TEST=YES	RFBD<8>	88 89
U127	NO_TEST=YES	RFBD<7>	88 89
U127	NO_TEST=YES	RFBD<6>	88 89
U127	NO_TEST=YES	RFBD<5>	88 89
U127	NO_TEST=YES	RFBD<3>	88 89
U128	NO_TEST=YES	RFBD<2>	88 89
U128	NO_TEST=YES	RFBD<1>	88 89
U128	NO_TEST=YES	RAM_DQ_R<63>	61 68 70
U128	NO_TEST=YES	RAM_DQ_R<60>	61 68 70
U128	NO_TEST=YES	RAM_DQ_R<59>	61 68 70
U128	NO_TEST=YES	RAM_DQ_R<58>	61 68 70
U128	NO_TEST=YES	RAM_DQ_R<57>	61 68 70
U128	NO_TEST=YES	RAM_DQ_R<56>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<54>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<53>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<52>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<50>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<49>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<48>	61 68 70
U129	NO_TEST=YES	RAM_DQ_R<46>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<45>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<44>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<43>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<41>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<40>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<37>	61 68 70
U130	NO_TEST=YES	RAM_DQ_R<38>	61 68 70
U131	NO_TEST=YES	RAM_DQ_R<36>	61 68 70
U131	NO_TEST=YES	RAM_DQ_R<34>	61 68 70
U131	NO_TEST=YES	RAM_DQ_R<33>	61 68 70
U131	NO_TEST=YES	RAM_DQ_R<32>	61 68 70
U132	NO_TEST=YES	RAM_DQ_R<30>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<29>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<28>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<31>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<25>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<24>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<22>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<21>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<20>	61 68 69
U132	NO_TEST=YES	RAM_DQ_R<19>	61 68 69
U133	NO_TEST=YES	RAM_DQ_R<17>	61 68 69
U133	NO_TEST=YES	RAM_DQ_R<16>	61 68 69
U133	NO_TEST=YES	RAM_DQ_R<14>	61 68 69
U133	NO_TEST=YES	RAM_DQ_R<13>	61 68 69
U133	NO_TEST=YES	RAM_DQ_R<12>	61 68 69
U133	NO_TEST=YES	RAM_DQ_R<11>	61 68 69

U134	NO_TEST=YES	RAM_DQ_R<9>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<8>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<7>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<6>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<5>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<3>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<2>	61 68 69
U134	NO_TEST=YES	RAM_DQ_R<1>	61 68 69

FUNC TEST NETS

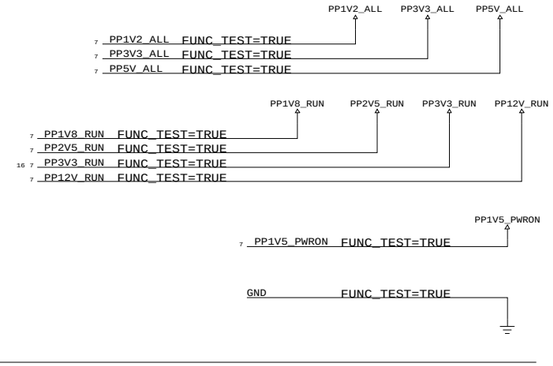
NOTES FROM TOM FUSSELMAN

PLACE TWO TEST POINTS ON TOP SIDE
FOR PP3V3_ALL AND GND
PLACE WITHIN 1 INCH OF EACH OTHER
USE FAT TRACES

U108	FUNC_TEST=TRUE	PPVCORE_CPU	50
U108	FUNC_TEST=TRUE	=PP3V3_ALL_SMU	7 28 29
U108	FUNC_TEST=TRUE	=PP5V_RUN_CPU	7 8
U109	FUNC_TEST=TRUE	SYS_POWER_BUTTON_L	28 29
U109	FUNC_TEST=TRUE	POWER_BUTTON_L	29
U109	FUNC_TEST=TRUE	RESET_BUTTON_L	29
U109	FUNC_TEST=TRUE	SMU_RESET_L	28 29
U109	FUNC_TEST=TRUE	SYS_POWERUP_L	7 12 28 50 85

TOP SIDE ONLY

U138	FUNC_TEST=TRUE	SMU_BOOT_SCLK	28 29
U138	FUNC_TEST=TRUE	SMU_BOOT_RXD	28 29
U138	FUNC_TEST=TRUE	SMU_BOOT_CE	28 29
U138	FUNC_TEST=TRUE	SMU_BOOT_CNVSS	28 29
U138	FUNC_TEST=TRUE	SMU_BOOT_TXD	28 29
U138	FUNC_TEST=TRUE	SMU_BOOT_BUSY	28 29
U109	FUNC_TEST=TRUE	SMU_MANUAL_RESET_L	29



FUNC TEST 1 OF 2

SYNC_MASTER=FINO-ME SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

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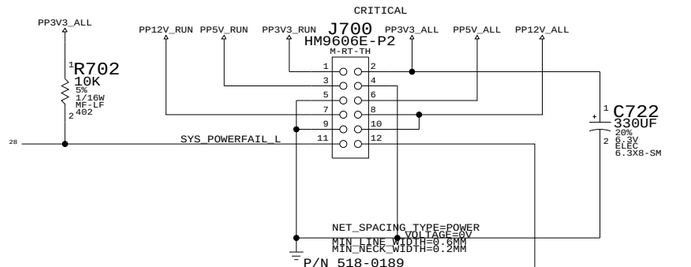
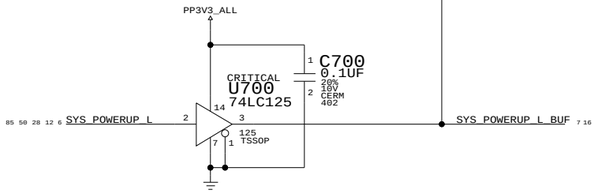
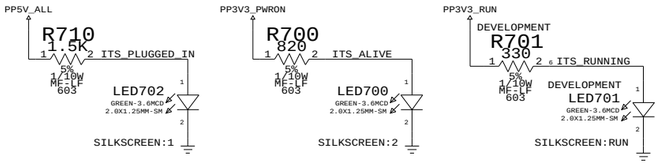
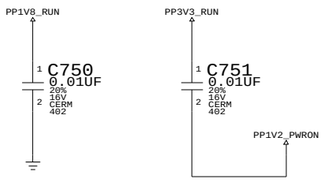
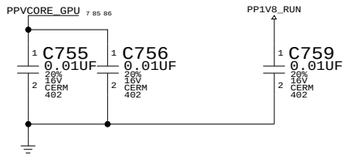


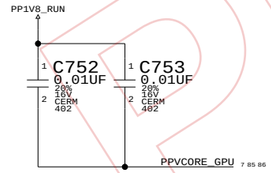


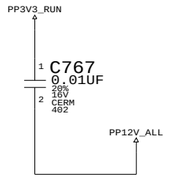




PLANE STICHING CAPS

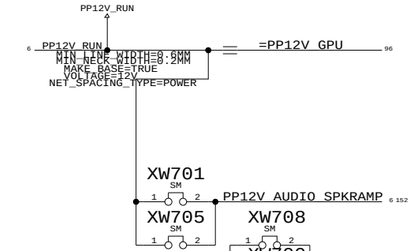


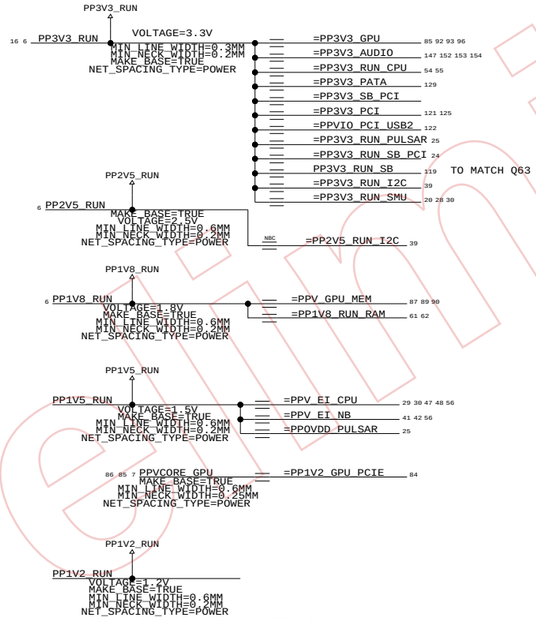


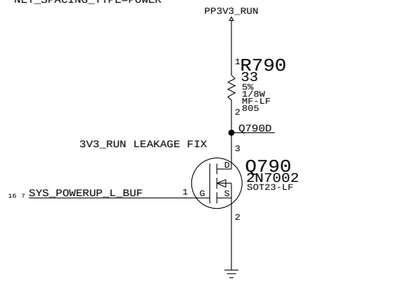


RUN RAILS

ONLY ON IN RUN

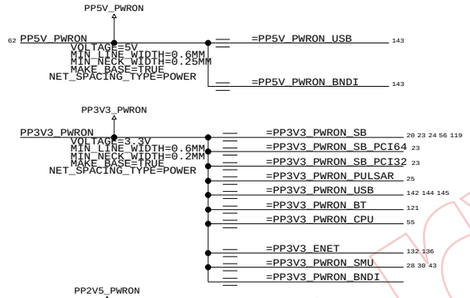


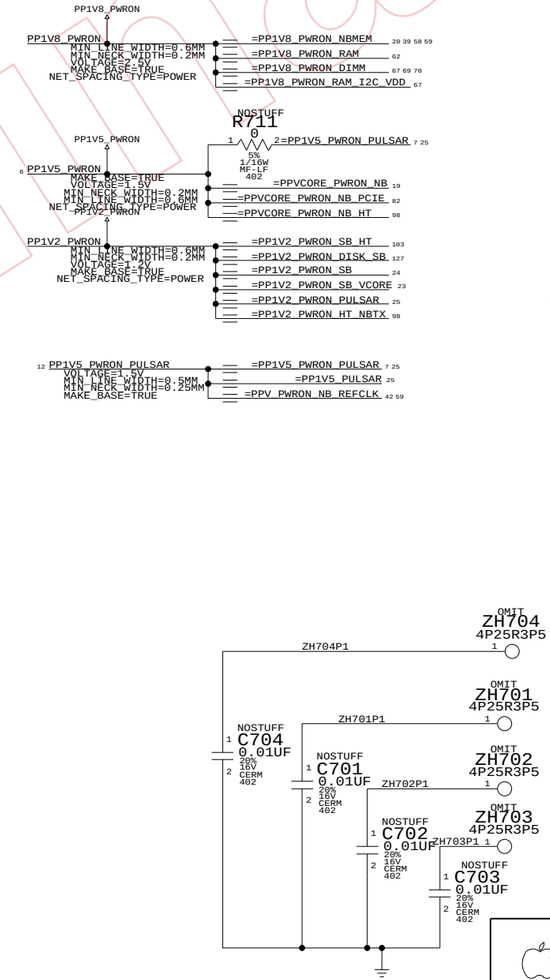




PWRON RAILS

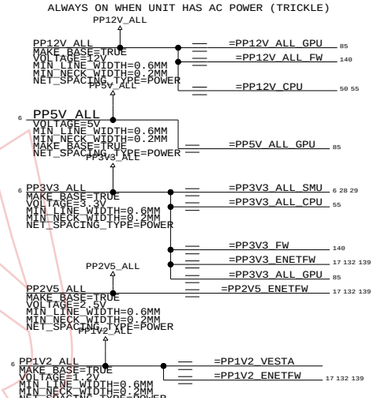
ON IN RUN AND SLEEP



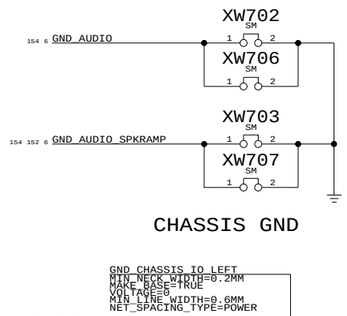


ALL RAILS

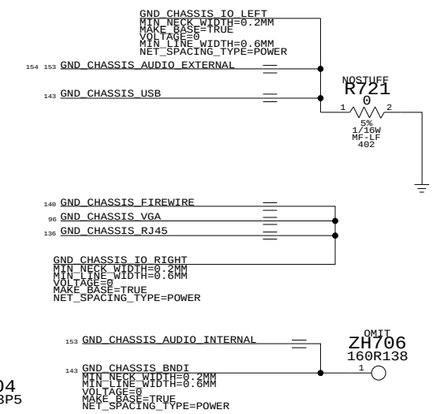
ALWAYS ON WHEN UNIT HAS AC POWER (TRICKLE)



GND RAILS



CHASSIS GND



Power Conn / Alias

SYNC_MASTER=M23-PC SYNC_DATE=06/20/2005

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APPLE COMPUTER INC.

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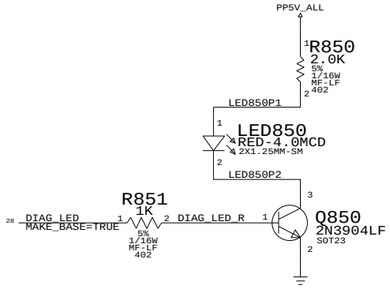
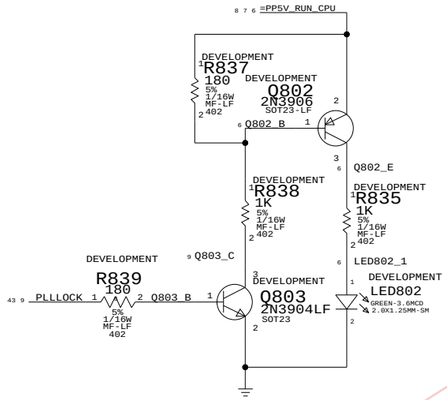
DIAG LED

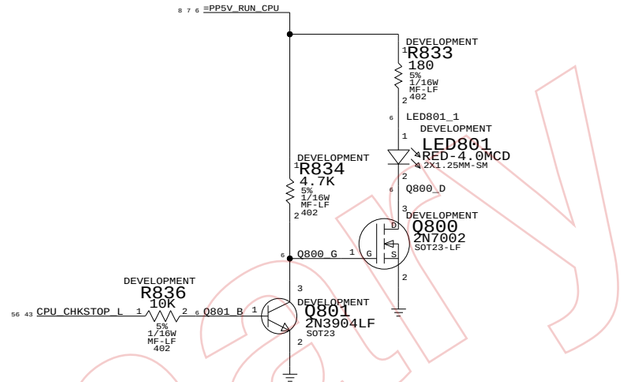
(OVERTEMP LED)



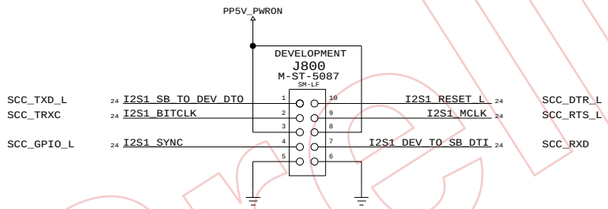
PLL LOCK LED



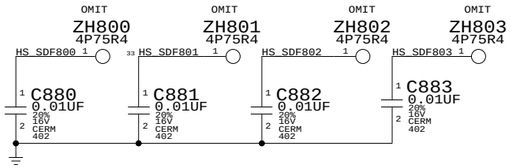
CHKSTOP LED



SERIAL DEBUG



CPU HEATSINK MOUNTING HOLES



Signal Alias

SYNC_MASTER=FINO-DD SYNC_DATE=06/20/2005

APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6790	E
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T1	NO_TEST=YES	ENET_TXD_R<7>	130 131
T2	NO_TEST=YES	ENET_TXD_R<6>	130 131
T3	NO_TEST=YES	ENET_TXD_R<5>	130 131
T4	NO_TEST=YES	ENET_TXD_R<4>	130 131
T5	NO_TEST=YES	ENET_TXD_R<3>	130 131
T6	NO_TEST=YES	ENET_TXD_R<2>	130 131
T7	NO_TEST=YES	ENET_TXD_R<1>	130 131
T8	NO_TEST=YES	ENET_TXD_R<0>	130 131
T9	NO_TEST=YES	ENET_TXD<7>	130 131 132
T10	NO_TEST=YES	ENET_TXD<6>	130 131 132
T12	NO_TEST=YES	ENET_TXD<5>	130 131 132
T11	NO_TEST=YES	ENET_TXD<4>	130 131 132
T13	NO_TEST=YES	ENET_TXD<3>	130 131 132
T14	NO_TEST=YES	ENET_TXD<2>	130 131 132
T15	NO_TEST=YES	ENET_TXD<1>	130 131 132
T16	NO_TEST=YES	ENET_TXD<0>	130 131 132
T18	NO_TEST=YES	ENET_RXD_R<7>	130 131 132
T17	NO_TEST=YES	ENET_RXD_R<6>	130 131 132
T19	NO_TEST=YES	ENET_RXD_R<5>	130 131 132
T20	NO_TEST=YES	ENET_RXD_R<4>	130 131 132
T21	NO_TEST=YES	ENET_RXD_R<3>	130 131 132
T22	NO_TEST=YES	ENET_RXD_R<2>	130 131 132
T24	NO_TEST=YES	ENET_RXD_R<1>	130 131 132
T23	NO_TEST=YES	ENET_RXD_R<0>	130 131 132
T25	NO_TEST=YES	ENET_RXD<7>	130 131
T26	NO_TEST=YES	ENET_RXD<6>	130 131
T27	NO_TEST=YES	ENET_RXD<5>	130 131
T28	NO_TEST=YES	ENET_RXD<4>	130 131
T30	NO_TEST=YES	ENET_RXD<3>	130 131
T29	NO_TEST=YES	ENET_RXD<2>	130 131
T31	NO_TEST=YES	ENET_RXD<1>	130 131
T32	NO_TEST=YES	ENET_RXD<0>	130 131
T33	NO_TEST=YES	ENET_TX_EN_R	130 131
T34	NO_TEST=YES	ENET_TX_ER_R	130 131
T36	NO_TEST=YES	ENET_TX_EN	130 131 132
T35	NO_TEST=YES	ENET_TX_ER	130 131 132
T37	NO_TEST=YES	TP_HT_MB_TO_NB_CLK_N<1>	101
T38	NO_TEST=YES	TP_HT_MB_TO_NB_CLK_P<1>	101
T39	NO_TEST=YES	NC_CPU_AFN	56
T40	NO_TEST=YES	NC_I2C_SMU_CPU_SCL_IN	31
T42	NO_TEST=YES	NC_PSRO	56
T41	NO_TEST=YES	NC_PSRO_ENABLE	56
T43	NO_TEST=YES	NC_SLOT_TOTAL_PWR	31
T44	NO_TEST=YES	NC_SMU_CPU_VID_LE0	31
T45	NO_TEST=YES	NC_SMU_CPU_VID_LE1	31
T46	NO_TEST=YES	NC_SMU_FAN_RPM3	31
T48	NO_TEST=YES	NC_SMU_FAN_RPM4	31
T47	NO_TEST=YES	NC_SMU_FAN_RPM5	31
T49	NO_TEST=YES	NC_SMU_FAN_TACH3	31
T50	NO_TEST=YES	NC_SMU_FAN_TACH4	31
T51	NO_TEST=YES	NC_SMU_FAN_TACH5	31
T52	NO_TEST=YES	NC_SMU_FAN_TACH7	31
T54	NO_TEST=YES	NC_SMU_SER_SEL	31
T53	NO_TEST=YES	NC_SYS_DOOR_AJAR_L	31
T55	NO_TEST=YES	TP_VESTA_2_5V_EN	17
T56	NO_TEST=YES	TP_VESTA_AN_EN	132
T57	NO_TEST=YES	TP_VESTA_DNC_C9	17
T58	NO_TEST=YES	TP_VESTA_DNC_E9	17
T60	NO_TEST=YES	TP_VESTA_EN_10B	132
T59	NO_TEST=YES	TP_VESTA_ER	132
T61	NO_TEST=YES	TP_VESTA_F1000	132
T62	NO_TEST=YES	TP_VESTA_FDX	132
T63	NO_TEST=YES	TP_VESTA_FDXLED_L	132
T64	NO_TEST=YES	TP_VESTA_HUB	132
T66	NO_TEST=YES	TP_VESTA_LINK1_L	132
T65	NO_TEST=YES	TP_VESTA_LINK2_L	132
T67	NO_TEST=YES	TP_VESTA_MANMS	132
T68	NO_TEST=YES	TP_VESTA_PHYA<0>	132
T69	NO_TEST=YES	TP_VESTA_PHYA<1>	132
T70	NO_TEST=YES	TP_VESTA_PHYA<2>	132
T72	NO_TEST=YES	TP_VESTA_PHYA<3>	132
T71	NO_TEST=YES	TP_VESTA_PHYA<4>	132
T73	NO_TEST=YES	TP_VESTA_RBC0	132
T74	NO_TEST=YES	TP_VESTA_RBC1	132
T76	NO_TEST=YES	TP_VESTA_REGCTL1	17
T76	NO_TEST=YES	TP_VESTA_REGCTL2	17
T78	NO_TEST=YES	TP_VESTA_REGSEN1	17
T77	NO_TEST=YES	TP_VESTA_REGSEN2	17
T79	NO_TEST=YES	TP_VESTA_REGSUP1	17
T80	NO_TEST=YES	TP_VESTA_REGSUP2	17
T81	NO_TEST=YES	TP_VESTA_RGMIIEN	132
T82	NO_TEST=YES	TP_VESTA_SPD0	132
T84	NO_TEST=YES	TP_VESTA_TDBL<0>	139
T83	NO_TEST=YES	TP_VESTA_TDBL<1>	139
T85	NO_TEST=YES	TP_VESTA_TDBL<2>	139
T86	NO_TEST=YES	TP_VESTA_TEST<0>	132
T87	NO_TEST=YES	TP_VESTA_TEST<1>	132
T88	NO_TEST=YES	TP_VESTA_TEST_1394<0>	139
T90	NO_TEST=YES	TP_VESTA_TEST_1394<1>	139
T89	NO_TEST=YES	TP_VESTA_TVCO	132
T222	NO_TEST=YES	CARD_READER_ACTIVITY_R	144
T223	NO_TEST=YES	TP_VESTA_FAVDDL	139
T224	NO_TEST=YES	TP_NB_A_TRIGGER_OUT	56
T225	NO_TEST=YES	TP_NB_B_TRIGGER_OUT	56

T91	NO_TEST=YES	TP_VESTA_TVCO_24	139
T92	NO_TEST=YES	TP_VESTA_TXC_RXC_DELAY	132
T93	NO_TEST=YES	TP_I2S2_SB_TO_DEV_DTO	154
T94	NO_TEST=YES	TP_NB_APSYNC	44
T95	NO_TEST=YES	TP_SB_WATCHDOG	24
T96	NO_TEST=YES	NC_CPU_TBEN_CLK	
T97	NO_TEST=YES	NC_J3108_10	31
T98	NO_TEST=YES	NC_J3108_11	31
T99	NO_TEST=YES	NC_J3108_12	31
T100	NO_TEST=YES	NC_J3108_8	31
T101	NO_TEST=YES	NC_J3108_9	31
T102	NO_TEST=YES	NC_JTAGMUX_3	30
T103	NO_TEST=YES	NC_PP1V5_PULSAR	12

THE FOLLOWING NETS ARE USED ONLY
WHEN THE DEVELOPMENT BOM OPTION IS ENABLED

T109	NO_TEST=YES	Q803_C	8
T109	NO_TEST=YES	PLLLOCK	8 43

T112	NO_TEST=YES	LED_PP1V8_RUN_P	11
T113	NO_TEST=YES	LED_PP1V8_RUN_N	11
T114	NO_TEST=YES	PP1V5_RUN_FOR_LED	12
T115	NO_TEST=YES	LED_PP1V5_RUN_N	12
T116	NO_TEST=YES	LED_PP1V5_RUN_P	12
T117	NO_TEST=YES	PULSAR_1V5_RUN_SWITCH	12
T120	NO_TEST=YES	PP1V2_RUN_FOR_LED	13
T121	NO_TEST=YES	LED_PP1V2_RUN_N	13
T122	NO_TEST=YES	LED_PP1V2_RUN_P	13
T123	NO_TEST=YES	KP_V<1>	55
T124	NO_TEST=YES	KP_V<2>	55
T125	NO_TEST=YES	CPU_SENSE_KP_V	55
T126	NO_TEST=YES	NB_PLL_OUT_TRG_R	
T127	NO_TEST=YES	NB_PLL_OUT_TRG	59
T128	NO_TEST=YES	PP5V_T555	
T131	NO_TEST=YES	T555_DISC	
T130	NO_TEST=YES	T555_THRES	
T129	NO_TEST=YES	T555_OUT	
T132	NO_TEST=YES	T555_PWM	
T133	NO_TEST=YES	PP3V3_GPU_TSENSE	93
T134	NO_TEST=YES	TSENSE_GPU_OVERTEMP_L	93
T135	NO_TEST=YES	TSENSE_GPU_ADD0	93
T136	NO_TEST=YES	TSENSE_GPU_ADD1	93
T137	NO_TEST=YES	GPU_DIODE_PLUS	93
T138	NO_TEST=YES	GPU_DIODE_MINUS	93
T139	NO_TEST=YES	LED8700_P	136
T140	NO_TEST=YES	LED8701_P	136

THE FOLLOWING PULSAR NETS WILL BE
TESTED VIA TEST JET

T143	NO_TEST=YES	CPU_A_TBEN_CLK_R	26
T144	NO_TEST=YES	CPU_B_TBEN_CLK_R	26
T145	NO_TEST=YES	CPU_A_APSYNC_R	26
T146	NO_TEST=YES	CPU_B_APSYNC_R	26
T148	NO_TEST=YES	NB_APSYNC_R	26
T149	NO_TEST=YES	HT_SB_REFCLK_R	26
T147	NO_TEST=YES	HT_NB_REFCLK_H0_R	26
T150	NO_TEST=YES	HT_NB_REFCLK_L0_R	26
T151	NO_TEST=YES	CLK_RAIREF_200M_P_R	26
T152	NO_TEST=YES	CLK_RAIREF_200M_N_R	26
T153	NO_TEST=YES	NB_PMR_CLK_P_R	26
T155	NO_TEST=YES	NB_PMR_CLK_N_R	26
T154	NO_TEST=YES	NB_PCIE_REFCLK_P_C	26
T156	NO_TEST=YES	NB_PCIE_REFCLK_N_C	26
T158	NO_TEST=YES	GFX_SLOT_PCIE_REFCLK_P_C	26
T159	NO_TEST=YES	GFX_SLOT_PCIE_REFCLK_N_C	26
T157	NO_TEST=YES	PCIE_A_REFCLKIN_P_C	26
T160	NO_TEST=YES	PCIE_A_REFCLKIN_N_C	26
T161	NO_TEST=YES	PCIE_B_REFCLKIN_P_C	26
T162	NO_TEST=YES	PCIE_B_REFCLKIN_N_C	26
T163	NO_TEST=YES	PCIE_C_REFCLKIN_P_C	26
T164	NO_TEST=YES	PCIE_C_REFCLKIN_N_C	26
T165	NO_TEST=YES	NB_DDR_REFCLK_P_R	26
T166	NO_TEST=YES	NB_DDR_REFCLK_N_R	26
T167	NO_TEST=YES	CLK_RAI_GIGE_25MHZ_R	26
T168	NO_TEST=YES	QUA0_REF_25MHZ_R	26
T169	NO_TEST=YES	SB_CLK25M_SATA_R	26
T170	NO_TEST=YES	QUA1_REF_25MHZ_R	26
T171	NO_TEST=YES	PCI_CLK33M_SB_EXT_R	26
T172	NO_TEST=YES	SB_AIRPRT_CLK_33MHZ_R	26
T173	NO_TEST=YES	CLK_RAI_REFCLK_66M_R	26
T174	NO_TEST=YES	SB_USB2_CLK_33MHZ_R	26

THE FOLLOWING NETS DO NOT HAVE
TEST POINT BECAUSE OF ROUTING DENSITY
AND SIGNAL INTEGRITY.
TEST COVERAGE WILL BE BY FCT
NOTE FOR SHARING: DO NOT INCLUDE THIS LIST UNTIL
PCB LAYOUT ADDS TEST POINTS. THIS LIST IS A RESULT OF PCB
LAYOUT HAVING DIFFICULTY PLACING TEST POINTS ON THESE NETS

T177	NO_TEST=YES	100M_N<0>	82 97
T178	NO_TEST=YES	100M_P<0>	82 97
T179	NO_TEST=YES	CKA_N<0>	84 97
T179	NO_TEST=YES	CKA_P<0>	84 97
T177	NO_TEST=YES	HT_NB_N<0>	98 101
T178	NO_TEST=YES	HT_NB_P<0>	98 101
T179	NO_TEST=YES	HT_NB_REFCLK_NF<0>	98 101
T180	NO_TEST=YES	HT_NB_REFCLK_PF<0>	98 101
T185	NO_TEST=YES	HT_NB_TO_SB_CAD_N<0..7>	101
T187	NO_TEST=YES	HT_NB_TO_SB_CAD_P<0..7>	101
T186	NO_TEST=YES	HT_NB_TO_SB_CLK_P<0>	101
T188	NO_TEST=YES	HT_NB_TO_SB_CLK_N<0>	101
T189	NO_TEST=YES	HT_SB_TO_NB_CAD_N<0..7>	101
T190	NO_TEST=YES	HT_SB_TO_NB_CAD_P<0..7>	101
T192	NO_TEST=YES	HT_SB_TO_NB_CLK_P<0>	101
T193	NO_TEST=YES	HT_SB_TO_NB_CLK_N<0>	101
T194	NO_TEST=YES	PCIE_SLOTA_TO_NB_N<0..15>	9 82 84 97
T195	NO_TEST=YES	PCIE_SLOTA_TO_NB_P<0..15>	9 82 84 97
T197	NO_TEST=YES	UATA_DA<0>	127 129
T198	NO_TEST=YES	UATA_DD<1>	127 129
T199	NO_TEST=YES	UATA_DD<14>	127 129
T196	NO_TEST=YES	PCIE_NB_TO_SLOTA_N<0>	9 82 84 97
T198	NO_TEST=YES	PCIE_NB_TO_SLOTA_N<3>	9 82 84 97
T197	NO_TEST=YES	PCIE_NB_TO_SLOTA_NF<13>	9 82 97
T199	NO_TEST=YES	PCIE_NB_TO_SLOTA_NF<7>	9 82 97
T199	NO_TEST=YES	PCIE_NB_TO_SLOTA_P<1>	9 82 84 97
T200	NO_TEST=YES	PCIE_NB_TO_SLOTA_P<10>	9 82 84 97
T207	NO_TEST=YES	PCIE_NB_TO_SLOTA_PF<13>	9 82 97
T207	NO_TEST=YES	PCIE_NB_TO_SLOTA_PF<14>	9 82 97
T208	NO_TEST=YES	PCIE_NB_TO_SLOTA_NF<12>	9 82 97
T205	NO_TEST=YES	PCIE_NB_TO_SLOTA_PF<10>	9 82 97
T206	NO_TEST=YES	PCIE_NB_TO_SLOTA_PF<4>	9 82 97
T208	NO_TEST=YES	HT_MB_TO_NB_CTL_N<1>	98
T209	NO_TEST=YES	HT_MB_TO_NB_CTL_P<1>	98
T207	NO_TEST=YES	HT_NB_TO_MB_CTL_N<1>	98
T210	NO_TEST=YES	HT_NB_TO_MB_CTL_P<1>	98
T205	NO_TEST=YES	HT_NB_TO_SB_CTL_N<0>	101
T210	NO_TEST=YES	HT_SB_TO_NB_CTL_P<0>	101
T210	NO_TEST=YES	CLK_KOD_100M_NF<0>	82 97
T210	NO_TEST=YES	CLK_KOD_100M_PF<0>	82 97
T214	NO_TEST=YES	EI_CPU_TO_NB_CLK_N	43 56
T214	NO_TEST=YES	EI_CPU_TO_NB_CLK_P	43 56
T215	NO_TEST=YES	EI_CPU_TO_NB_SR_N<1>	9 43 56
T215	NO_TEST=YES	EI_CPU_TO_NB_SR_P<1>	9 43 56
T217	NO_TEST=YES	EI_NB_TO_CPU_CLK_N	43 56
T216	NO_TEST=YES	EI_NB_TO_CPU_CLK_P	43 56
T222	NO_TEST=YES	EI_NB_TO_CPU_SR_N<0>	9 43 56
T220	NO_TEST=YES	EI_NB_TO_CPU_SR_P<0>	9 43 56

T257	NO_TEST=YES	PLLTESTOUT	43 47
T258	NO_TEST=YES	UATA_DD<13>	127 129
T259	NO_TEST=YES	CPU_SPARE2	43 47
T260	NO_TEST=YES	RFBD<51>	88 89
T261	NO_TEST=YES	TP_CPU_TRIGGER_OUT	56
T262	NO_TEST=YES	UATA_DD<12>	127 129
T263	NO_TEST=YES	EI_CPU_SYSCLK_P	43 56
T264	NO_TEST=YES	EI_CPU_TO_NB_SR_N<1>	9 43 56
T265	NO_TEST=YES	EI_CPU_TO_NB_SR_P<1>	9 43 56
T266	NO_TEST=YES	EI_NB_TO_CPU_SR_N<0>	9 43 56
T267	NO_TEST=YES	EI_NB_TO_CPU_SR_P<0>	9 43 56

JTAG TEST POINTS NEED TO BE ON THE BOTTOM
OF THE BOARD
ADDING FUNC_TEST=TRUE TO THESE NETS

T220	FUNC_TEST=TRUE	TP_JTAG_SB_TCK	20
T222	FUNC_TEST=TRUE	TP_JTAG_SB_TDI	20
T226	FUNC_TEST=TRUE	TP_JTAG_SB_TDO	20
T224	FUNC_TEST=TRUE	TP_JTAG_SB_TMS	20
T230	FUNC_TEST=TRUE	JTAG_SB_TRST_L	20 24

T232	FUNC_TEST=TRUE	JTAG_NB_TCK	20 30
T234	FUNC_TEST=TRUE	JTAG_NB_TDI	20 30
T233	FUNC_TEST=TRUE	JTAG_NB_TDO	20 30
T236	FUNC_TEST=TRUE	JTAG_NB_TMS	20 30
T235	FUNC_TEST=TRUE	JTAG_NB_TRST_L	20

T238	FUNC_TEST=TRUE	TP_JTAG_VESTA_TDI	17
T240	FUNC_TEST=TRUE	TP_JTAG_VESTA_TDO	17
T239	FUNC_TEST=TRUE	TP_JTAG_VESTA_TCK	17
T242	FUNC_TEST=TRUE	TP_JTAG_VESTA_TMS	17
T241	FUNC_TEST=TRUE	TP_JTAG_VESTA_TRST_L	17

T244	FUNC_TEST=TRUE	JTAG_CPU_TCK	30 43
T246	FUNC_TEST=TRUE	JTAG_CPU_TDI	30 43
T245	FUNC_TEST=TRUE	JTAG_CPU_TDO	30 43 47
T248	FUNC_TEST=TRUE	JTAG_CPU_TMS	30 43
T247	FUNC_TEST=TRUE	JTAG_CPU_TRST_L	43 47

ADDING NO_TEST TO ALL PCIE NETS
TO AVOID STUBS
WILL GET COVERAGE IN FCT WITH A DIAG
THAT CHECKS THAT THE BUS IS 16 LANES WIDE

T240	NO_TEST=YES	PCIE_NB_TO_SLOTA_NF<0..15>	9 82 97
T250	NO_TEST=YES	PCIE_NB_TO_SLOTA_PF<0..15>	9 82 97
T251	NO_TEST=YES	PCIE_NB_TO_SLOTA_N<0..15>	9 82 84 97
T252	NO_TEST=YES	PCIE_NB_TO_SLOTA_P<0..15>	9 82 84 97
T253	NO_TEST=YES	PCIE_SLOTA_TO_NB_NF<0..15>	84 97
T254	NO_TEST=YES	PCIE_SLOTA_TO_NB_PF<0..15>	84 97
T255	NO_TEST=YES	PCIE_SLOTA_TO_NB_N<0..15>	9 82 84 97
T256	NO_TEST=YES	PCIE_SLOTA_TO_NB_P<0..15>	9 82 84 97

FUNC TEST 2 OF 2

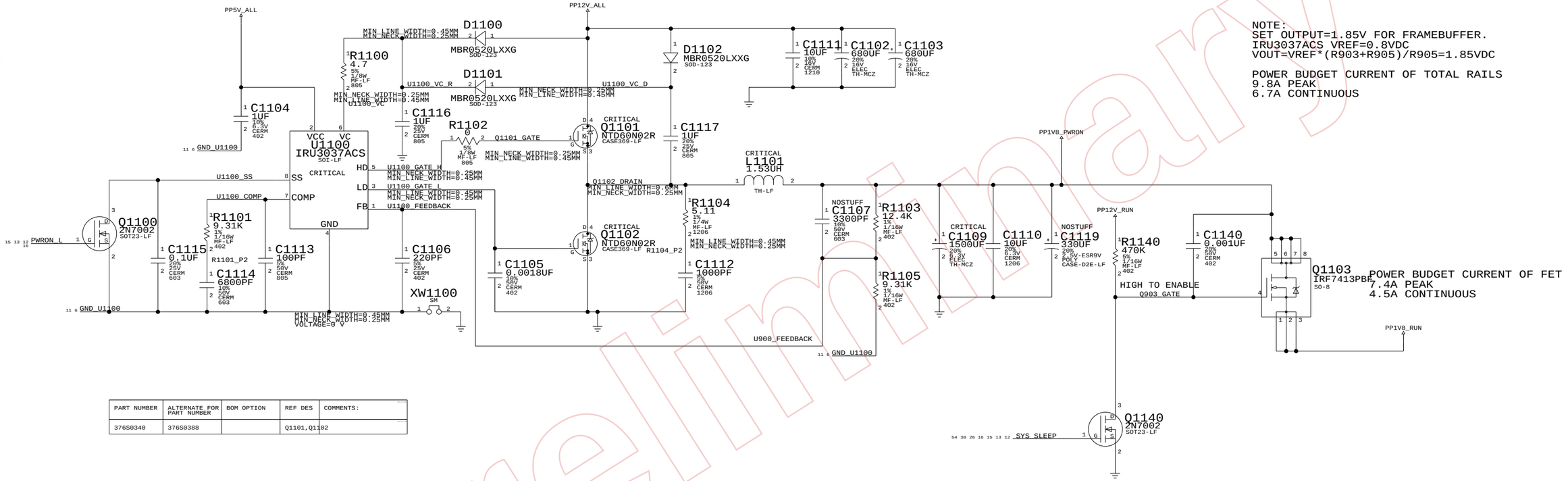
SYNC_MASTER=FINO-ME SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT 9 OF 154

1.8V VOLTAGE REGULATOR

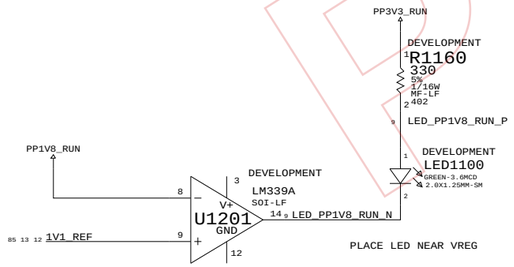


NOTE:
SET OUTPUT=1.85V FOR FRAMEBUFFER.
IRU3037ACS VREF=0.8VDC
VOUT=VREF*(R903+R905)/R905=1.85VDC

POWER BUDGET CURRENT OF TOTAL RAILS
9.8A PEAK
6.7A CONTINUOUS

POWER BUDGET CURRENT OF FET
7.4A PEAK
4.5A CONTINUOUS

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0340	376S0388		Q1101,Q1102	



1.8V Vreg	
SYNC_MASTER=M23-PC	SYNC_DATE=06/20/2005

APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6790	E
	SCALE: NONE	SHT 11 OF 154	

KODIAK CORE VOLTAGE REGULATOR

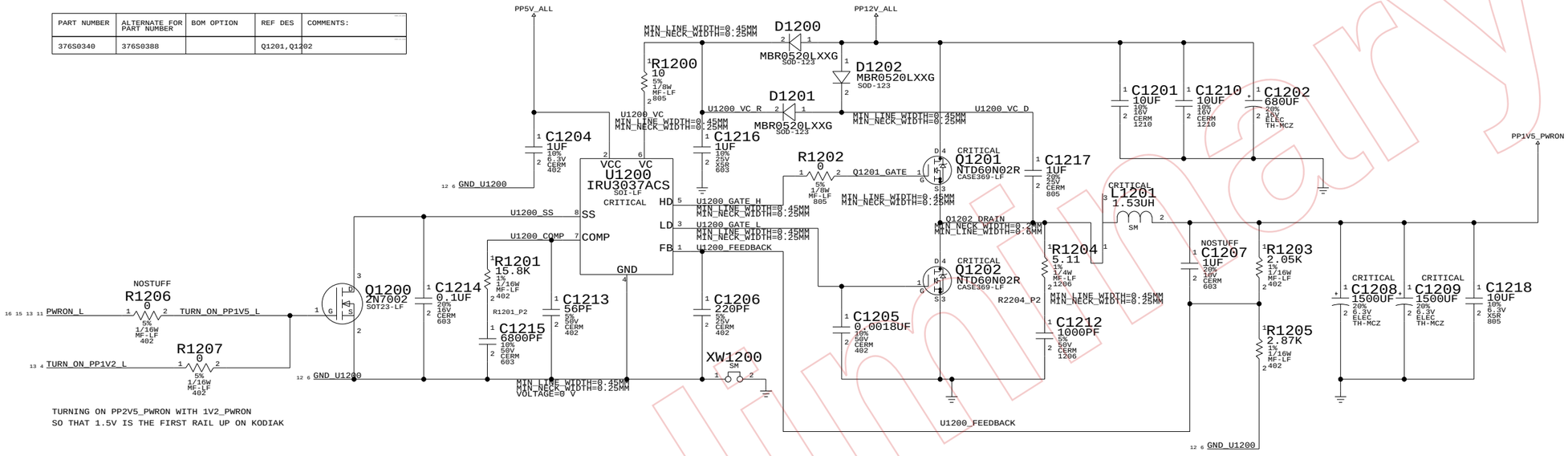
NOTE:

IRU3037ACS VREF=0.8VDC
VOUT=VREF*(R1203+R1205)/R1205=1.25VDC

LOAD FROM POWER BUDGET
8.5A PEAK CURRENT DRAW
7.2A CONTINUOUS CURRENT DRAW

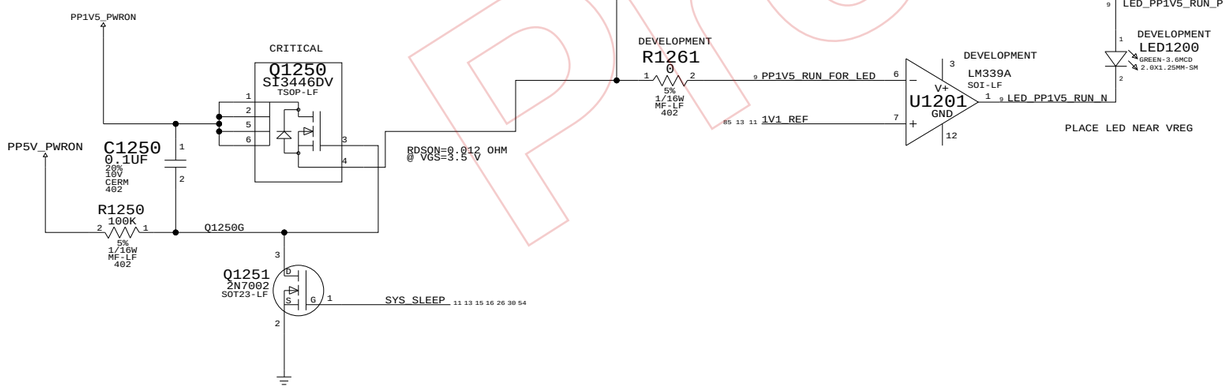
1.35V	R1205=2.87K
1.30V	R1205=3.24K
1.25V	R1205=3.65K

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0340	376S0388		Q1201,Q1202	

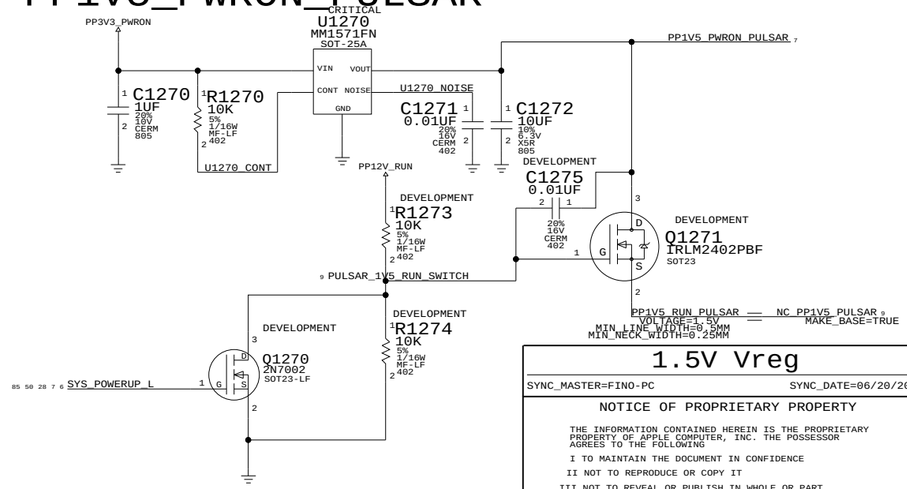


TURNING ON PP2V5_PWRON WITH 1V2_PWRON
SO THAT 1.5V IS THE FIRST RAIL UP ON KODIAK

LOAD FROM POWER BUDGET
1.3A PEAK CURRENT DRAW
1.0A CONTINUOUS CURRENT DRAW



PP1V5_PWRON_PULSAR



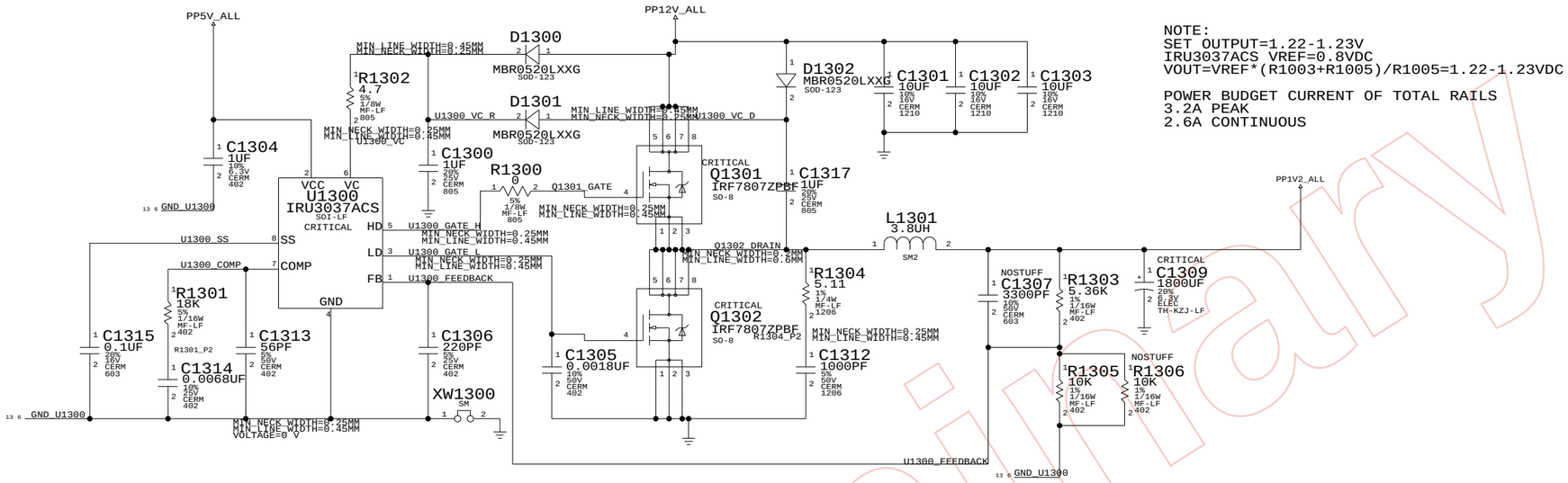
1.5V Vreg

SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 12 OF 154	

PP1V2_ALL VOLTAGE REGULATOR

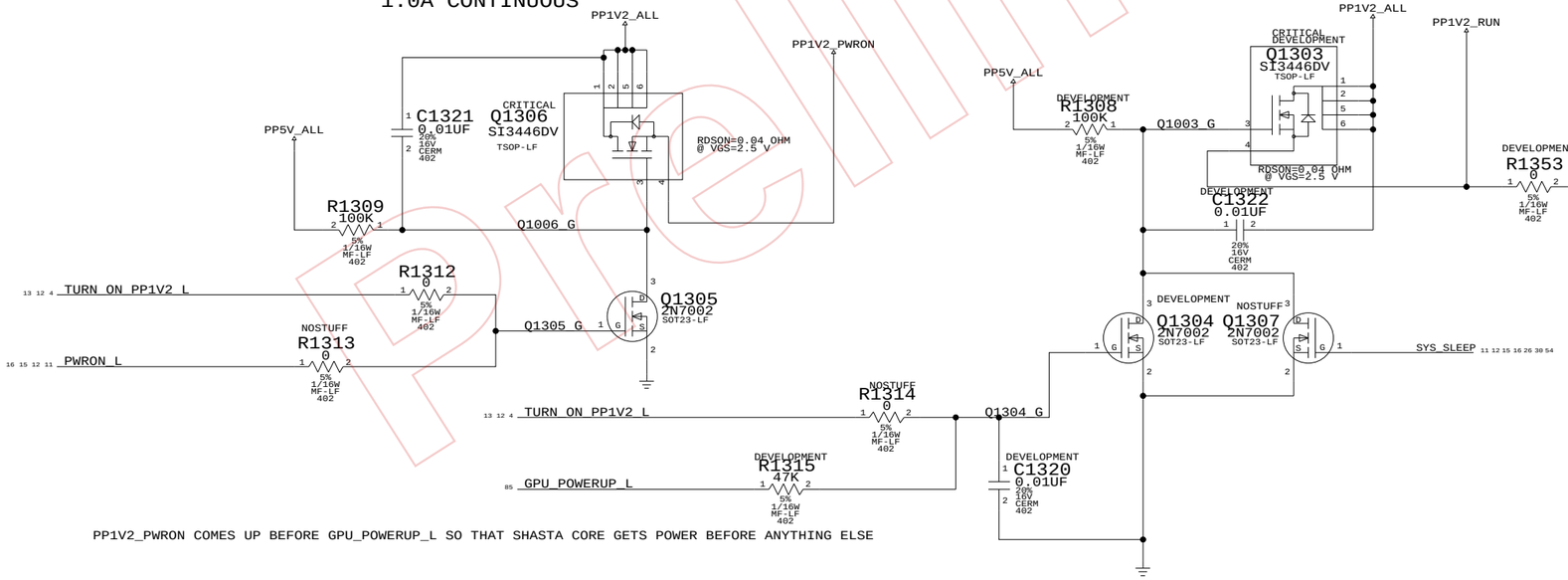


NOTE:
SET OUTPUT=1.22-1.23V
IRU3037ACS VREF=0.8VDC
VOUT=VREF*(R1003+R1005)/R1005=1.22-1.23VDC

POWER BUDGET CURRENT OF TOTAL RAILS
3.2A PEAK
2.6A CONTINUOUS

PP1V2_PWRON FET SWITCH

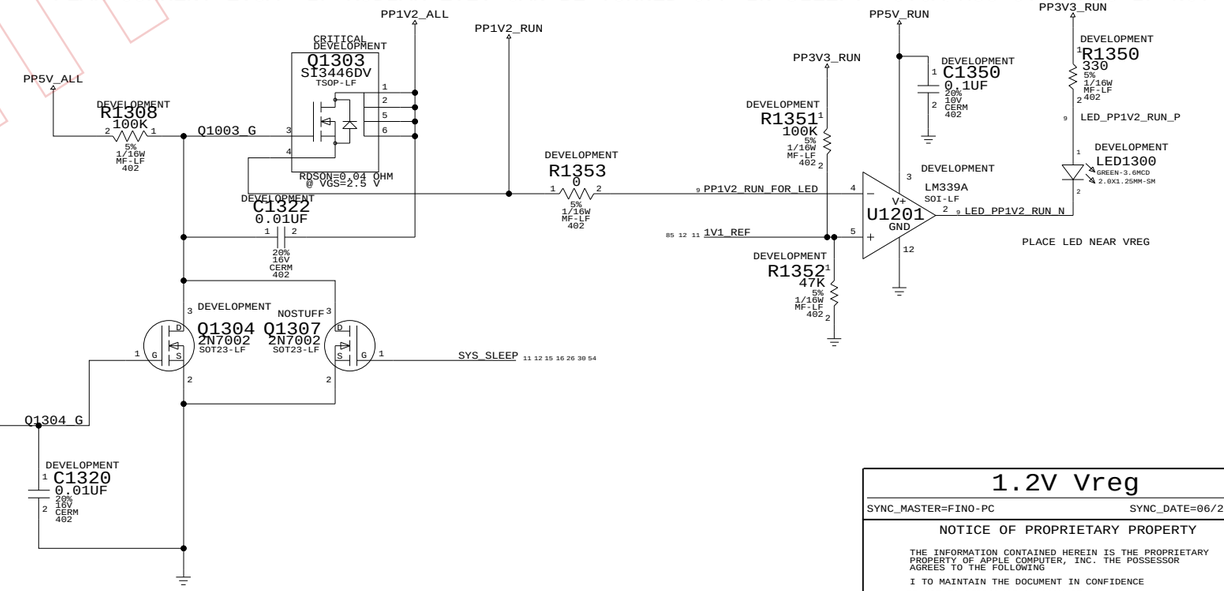
PEAK CURRENT 1.3A
1.0A CONTINUOUS



PP1V2_PWRON COMES UP BEFORE GPU_POWERUP_L SO THAT SHASTA CORE GETS POWER BEFORE ANYTHING ELSE

PP1V2_RUN FET SWITCH

PEAK CURRENT 1.3A IF KODIAK 1.2V CAN BE TURNED OFF IN SLEEP. 0.6A/M33 0.0A/M23 IF NOT



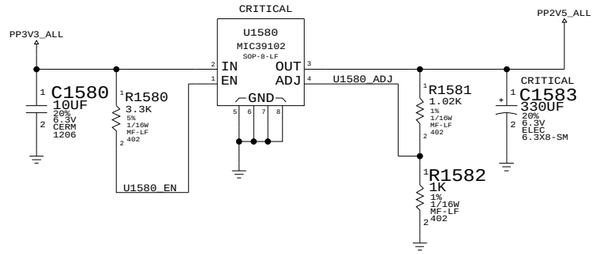
1.2V Vreg

SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 13 OF 154	

PP2V5_ALL VOLTAGE REGULATOR

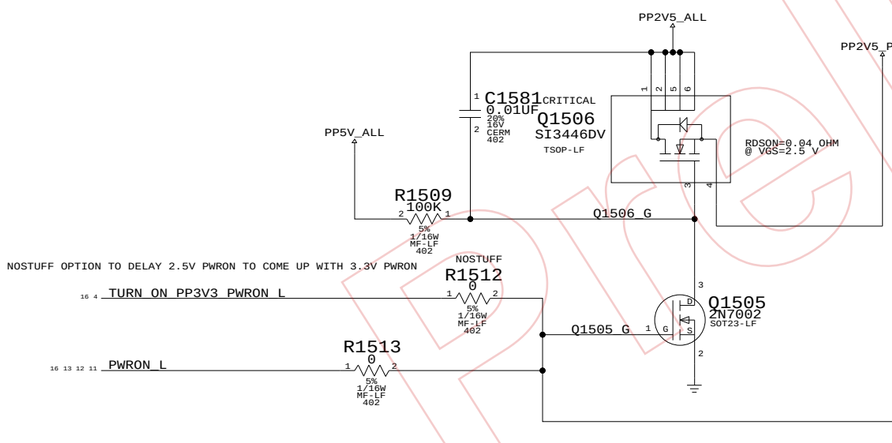


NOTE:
SET OUTPUT=2.5V
IRU3037CS VREF=1.24VDC
VOUT=VREF*(R1581+R1582)+1=5.505VDC

POWER BUDGET CURRENT OF TOTAL RAILS
0.2A PEAK
0.1A CONTINUOUS

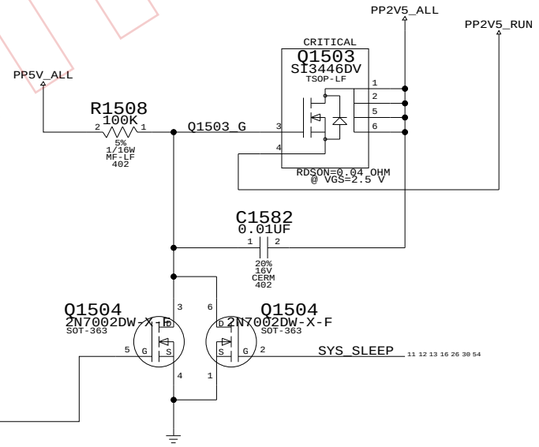
PP2V5_PWRON FET SWITCH

PEAK CURRENT 0.1A



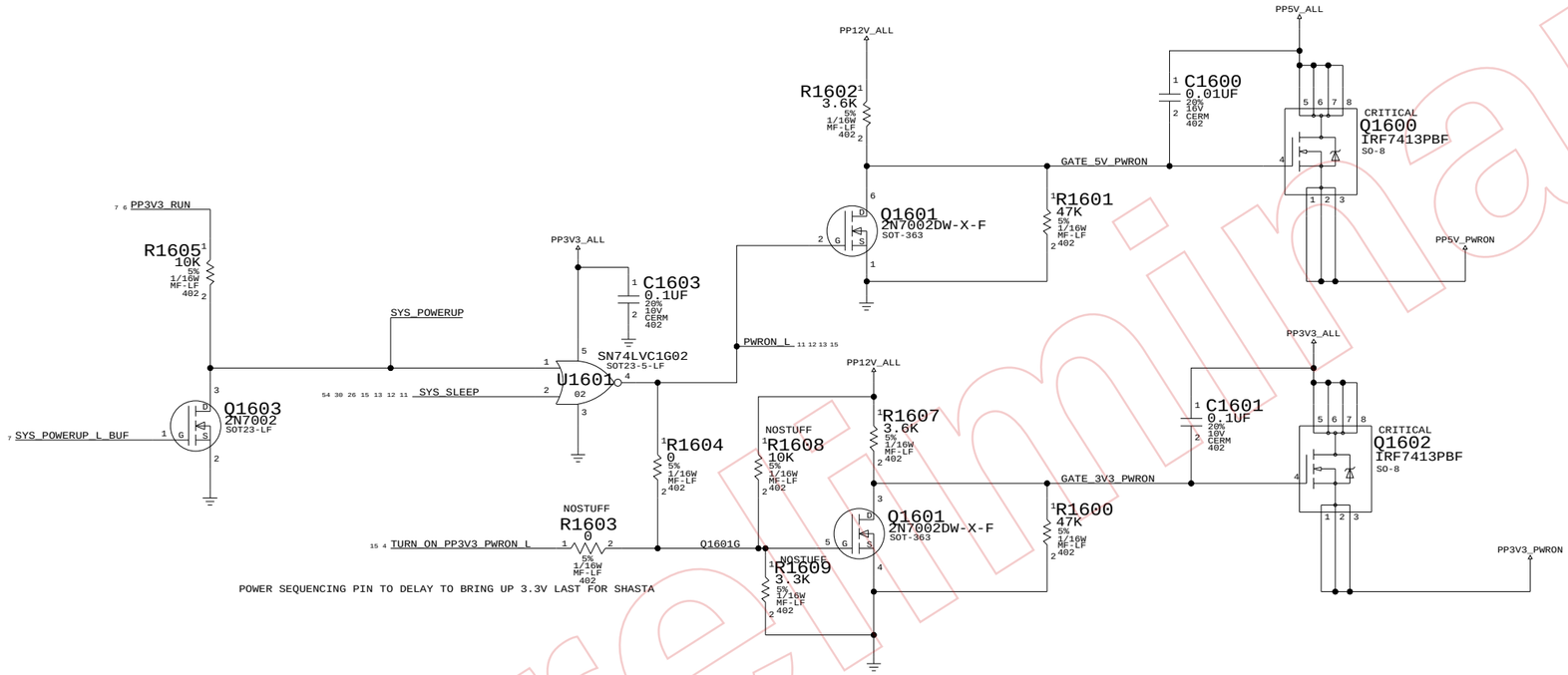
PP2V5_RUN FET SWITCH

PEAK CURRENT 0.1A



2.5V Vreg	
SYNC_MASTER=FINO-PC	SYNC_DATE=06/20/2005

APPLE COMPUTER INC.	SIZE: D	DRAWING NUMBER: 051-6790	REV: E
	SCALE: NONE	SHT: 15 OF 154	



5V & 3.3V Fets

SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

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Page Notes

Power aliases required by this page:

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
- VESTA1V2_BURST / VESTA1V2_PULSE
  Controls operating mode of Vesta 1.2V regulator. If both options are off the regulator will be in continuous mode.

VESTA JTAG

139 132 17 7 =PP3V3_ENETFW

VESTA HAS INTERNAL PULLUPS. MLB PULLUPS MAY BE NOSTUFFED IN EVT.

R1741 1K 5% 1/16W MF-LF 402
R1742 1K 5% 1/16W MF-LF 402
R1743 1K 5% 1/16W MF-LF 402

9 TP_JTAG_VESTA_TCK	MAKE_BASE=TRUE	=JTAG_VESTA_TCK	17
9 TP_JTAG_VESTA_TDI	MAKE_BASE=TRUE	=JTAG_VESTA_TDI	17
9 TP_JTAG_VESTA_TDO	MAKE_BASE=TRUE	=JTAG_VESTA_TDO	17
9 TP_JTAG_VESTA_TMS	MAKE_BASE=TRUE	=JTAG_VESTA_TMS	17
9 TP_JTAG_VESTA_TRST_L	MAKE_BASE=TRUE	=JTAG_VESTA_TRST_L	

R1740 1K 5% 1/16W MF-LF 402

139 132 7 =PP1V2_ENETFW

L1700 FERR-EMI-600-OHM SM

PP1V2_VESTA_AVDDL
MIN_LINE_WIDTH=0.50 MM
MIN_NECK_WIDTH=0.25 MM
VOLTAGE=1.2V

C1708 10UF 10% 6.3V X5R 805
C1700 0.1uF 20% 10V CERM 402 (L6/M6)
C1701 0.1uF 20% 10V CERM 402 (L9/M9)
C1702 0.1uF 20% 10V CERM 402 (N5/N6)
C1703 0.1uF 20% 10V CERM 402 (N9/N10)

M23: PP3V3_ENETFW IS AN ALL RAIL
139 132 17 7 =PP3V3_ENETFW

R1750 10K 5% 1/16W MF-LF 402

M23: PP3V3_ENETFW IS AN ALL RAIL
139 132 17 7 =PP3V3_ENETFW

R1751 47K 5% 1/16W MF-LF 402

VESTA_RESET_RC

Q1750 2N7002DW-X-F SOT-363

C1750 1UF 10% 6.3V CERM 402

C1714 10UF 10% 6.3V X5R 805
C1710 0.1uF 20% 10V CERM 402
C1711 0.1uF 20% 10V CERM 402
C1712 0.1uF 20% 10V CERM 402
C1713 0.1uF 20% 10V CERM 402

=PP3V3_ENETFW 7 17 132 139

R1752 10K 5% 1/16W MF-LF 402

VESTA_RESET_L
SCHMITT TRIGGER W/ INTERNAL PULLUP

RESET ASSERT REQUIREMENT IS 20MS TO 100MS

NOSTUFF
R1720 0 5% 1/16W MF-LF 402

24 ENETFW_RESET

Q1750 2N7002DW-X-F SOT-363

132 VESTA_RESET_H

To keep Vesta from being held in reset when system is off
NOTE: Reset GPIO is active HIGH

VESTA MISC

SEE_TABLE

U1701
VESTA-V1.3
FBGA-200-LF
1 OF 3

	H4	RESET* IPU	VESTA_RESET_L
17 =JTAG_VESTA_TDI	D7	TDI IPU	
17 =JTAG_VESTA_TDO	E10	TDO	
17 =JTAG_VESTA_TCK	E7	TCK IPU	
17 =JTAG_VESTA_TMS	E8	TMS IPU	
17 =JTAG_VESTA_TRST_L	D8	TRST* IPU	
9 TP_VESTA_DNC_C9	C9	DNC	
9 TP_VESTA_DNC_E9	E9	DNC	
NC C3		NC	
NC M13		NC	

DVDD B1 B15 C15 J1
AVDDL L6 L9 M6 M9 M5 N6 N9 N10
AVDD P4 P5 P10 P11 R3 R12
PVDD A15 M4
OVDD A1 A7 F15 K1
AGND H11 H12 J11 J12 L7 L8 M7 M8 N7 N8 P6 P7 P8 P9
GND A2 B2 B7 C14 F14 J2 K2

IPD 2.5V_EN M3 TP_VESTA_2_5V_EN 9

REGSUP1	E1	TP_VESTA_REGSUP1	9
REGSEN1	F1	TP_VESTA_REGSEN1	9
REGCTL1	G5	TP_VESTA_REGCTL1	9
REGSUP2	E2	TP_VESTA_REGSUP2	9
REGSEN2	F2	TP_VESTA_REGSEN2	9
REGCTL2	G4	TP_VESTA_REGCTL2	9

M23: ADDED C1726 AND C1744 PER BROADCOM RECOMMENDATIONS

=PP2V5_ENETFW 7 132 139

C1720 0.1uF 20% 10V CERM 402
C1721 0.1uF 20% 10V CERM 402
C1722 0.1uF 20% 10V CERM 402
C1723 0.1uF 20% 10V CERM 402
C1724 0.1uF 20% 10V CERM 402
C1725 0.1uF 20% 10V CERM 402
C1726 10UF 10% 6.3V X5R 805

C1730 0.1uF 20% 10V CERM 402
C1731 0.1uF 20% 10V CERM 402

=PP3V3_ENETFW 7 17 132 139

C1740 0.1uF 20% 10V CERM 402
C1741 0.1uF 20% 10V CERM 402
C1742 0.1uF 20% 10V CERM 402
C1743 0.1uF 20% 10V CERM 402
C1744 10UF 10% 6.3V X5R 805

2.5V_EN
0 - OVDD=3.3V
1 - OVDD=2.5V
WHEN OVDD=2.5V GMII PINS ARE NOT 3.3V TOLERANT

Vesta Core / Misc

SYNC_MASTER=FINO-DC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

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D	051-6790	E
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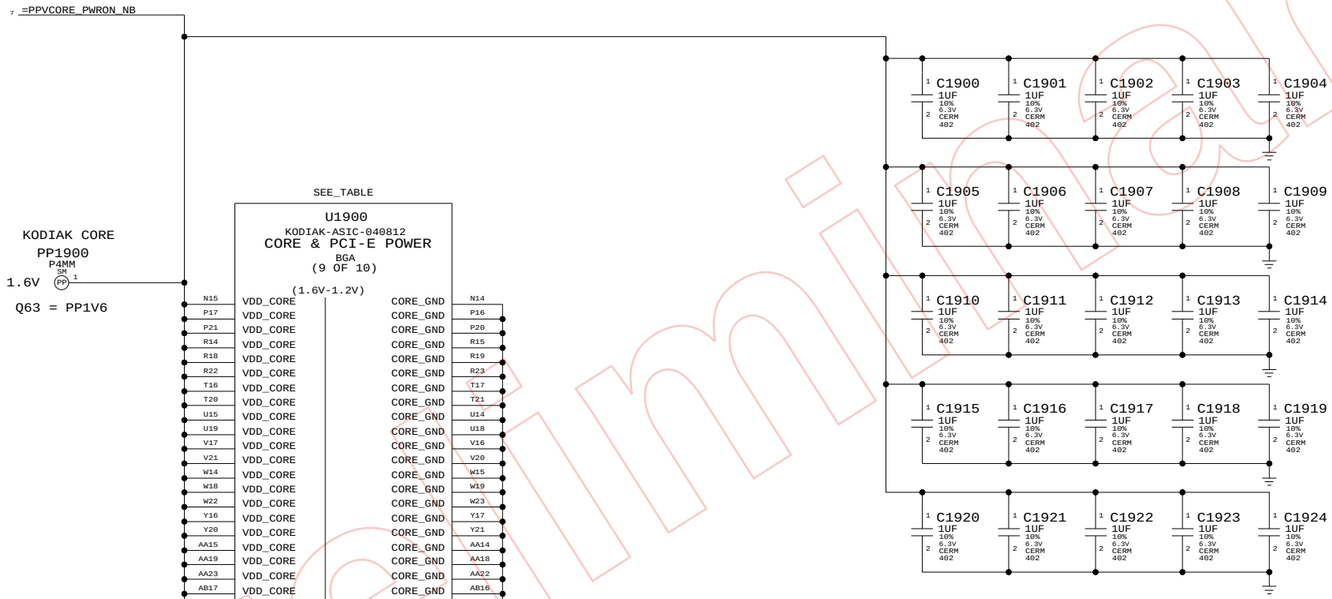

KODIAK CORE & BYPASS

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 19 OF 154	

SHASTA ALIASES

PCI_RESET_L IS AN 'AND' OF SB_PCI_RESET_L (SB)
AND SYS_IO_RESET_L (SMU)

119 92 PCI_RESET_L — MAKE_BASE=TRUE
- =PCI_AIRPORT_RESET_L 121
- =PCI_ROM_RESET_L 125
- =PCI_USB2_RESET_L 122

24 NB_SLOT_RESET_L — MAKE_BASE=TRUE — =GPU_RESET_L 84

SHASTA JTAG

24 9 JTAG_SB_TRST_L — R2053 4.7K 5% 1/16W MF-LF 402

THESE PINS HAVE INTERNAL PULLUPS OR PULLDOWNS

9 TP_JTAG_SB_TCK — MAKE_BASE=TRUE — JTAG_SB_TCK 24
9 TP_JTAG_SB_TDI — MAKE_BASE=TRUE — JTAG_SB_TDI 24
9 TP_JTAG_SB_TDO — MAKE_BASE=TRUE — JTAG_SB_TDO 24
9 TP_JTAG_SB_TMS — MAKE_BASE=TRUE — JTAG_SB_TMS 24

SHASTA GPIO TERMINATIONS (SOME OF THESE ARE NOSTUFF ON PAGE 24)

119 56 24 23 7 =PP3V3_PWRON_SB

24 RAI_EXP_INTR_L<3> — R2061 10K 5% 1/16W MF-LF 402
24 RAI_EXP_INTR_L<2> — R2062 10K 5% 1/16W MF-LF 402
24 RAI_EXP_INTR_L<1> — R2063 10K 5% 1/16W MF-LF 402
24 RAI_EXP_INTR_L<0> — R2064 10K 5% 1/16W MF-LF 402

KODIAK ALIASES

6 NC_PMR_CLK_DIS_L — MAKE_BASE=TRUE — PMR_CLK_DIS_L 20

KODIAK JTAG_TRST PULLED HIGH TO ALLOW SMU DEBUG ACCESS

=PP2V5_PWRON_NB_MISC 7 20 28 30 39

R2073 4.7K 5% 1/16W MF-LF 402

20 9 JTAG_NB_TRST_L — NOSTUFF R2074 0 5% 1/16W MF-LF 402 — NB_PU_RST_L 20 30

NOSTUFF R2054 4.7K 5% 1/16W MF-LF 402

=PP1V8_PWRON_NBMEM 7 39 58 59

C2055 1UF 10% 6.3V CERM 402

C2055 ADDED FOR KODIAK RAM DECOUPLING
PAGE 58 IS SHORT ONE CAP

39 30 28 20 7 =PP2V5_PWRON_NB_MISC

P4MM SM TP2002

R2003 1K 1% 1/10W MF-LF 402

U1900
KODIAK-ASIC-040812
BGA
(10 OF 10)

POWER/TEST/MISC

30 9 JTAG_NB_TCK	AJ04	CE1_LT_TCK	NORTH_BRIDGE_RESET_L LL01 — NB_PU_RST_L 20 30
30 9 JTAG_NB_TDI	AG07	CE1_MC_TDI	HRESET_L AG01 — NB_HRST_L
30 9 JTAG_NB_TDO	AG05	CE1_B_TDO	SUSPENDACK_L AJ03 — NB_SUSPEND_ACK_L 30 62
30 9 JTAG_NB_TMS	AL02	CE1_DI1_TMS	SUSPENDREQ_L AJ01 — NB_SUSPEND_REQ_L 30
20 9 JTAG_NB_TRST_L	AK06	CE1_DI2_TRST	SYS_ISCA0 AG04 — I2C_NB_B_SDA 39
			SYS_ISCL0 AK03 — I2C_NB_B_SCL 39
			SYS_ISCA1 AH06 — I2C_NB_C_SDA 39
			SYS_ISCL1 AJ05 — I2C_NB_C_SCL 39
			API_ISCA AG03 — I2C_NB_A_SDA 39
			API_ISCL AH03 — I2C_NB_A_SCL 39
			PMR_CLK_P AE09 — NB_PMR_CLK_P 26 27
			PMR_CLK_N AE10 — NB_PMR_CLK_N 26 27
			PMR_CLK_STOP_L AG02
CE0TEST	AG08	CE0_TEST	
20 NB_THERM_A	F15	SYS_THDIO_D	
20 NB_THERM_K	G15	SYS_THDIO_G	
39 30 28 20 7 =PP2V5_PWRON_NB_MISC	AF02	VD5_0	
	AF05	VD5_1	
	AH01	VD5_2	

NOSTUFF R2001 60.4 1% 1/16W MF-LF 402
NOSTUFF R2002 60.4 1% 1/16W MF-LF 402
TERM_RC
NOSTUFF C2053 1.5PF +/-0.25PF 50V CERM 402

R2000 0 5% 1/16W MF-LF 402

C2050 1UF 10% 6.3V CERM 402
C2051 1UF 10% 6.3V CERM 402
C2052 1UF 10% 6.3V CERM 402

PLACE TERM R/C CLOSE TO KODIAK

NB_OVERTEMP

30 28 7 =PP3V3_RUN_SMU

R2082 2.2 5% 1/16W MF-LF 402

C2080 1UF 10% 6.3V CERM 402

MIN_LINE_WIDTH=0.38mm
MIN_NECK_WIDTH=0.38MM
TSENSE_NB_VCC

U2080 MAX6690MEE
CRITICAL
VCC — STBY — ALERT — SMBDATA — SMBCLK — ADD0 — ADD1 — DXP — DXN — QSOP (SYM_VER2) — NC_1 — NC_5 — NC_9 — NC_13 — NC_16 — GND

TSENSE_NB_OVERTEMP_L
NOSTUFF R2087 0 5% 1/16W MF-LF 402
SYS_OVERTEMP_L 24 28 93

R2083 1K 5% 1/16W MF-LF 402
NOSTUFF R2084 1K 5% 1/16W MF-LF 402
TSENSE_NB_ADD0
TSENSE_NB_ADD1
NOSTUFF R2086 1K 5% 1/16W MF-LF 402
R2085 1K 5% 1/16W MF-LF 402

NEED TO CHECK ALL I2C ADDRESSES

A0	A1	ADDR
0	0	30/31
0	hiZ	32/33
0	1	34/35
hiZ	0	52/53
hiZ	hiZ	54/55
hiZ	1	56/57
1	0	9A/9B
1	hiZ	9A/9B
1	1	9C/9D

39 I2C_NB_TEMP_SDA
39 I2C_NB_TEMP_SCL

20 NB_THERM_A — MIN_LINE_WIDTH=0.25mm MIN_NECK_WIDTH=0.25MM DIFFERENTIAL_PAIR=TSENSE_NB NET_PHYSICAL_TYPE=10MIL_WIDTH NET_SPACING_TYPE=TSENSE_DIFPAIR
C2081 0.0022UF 10% 50V CERM 402 PLACE BY IC
20 NB_THERM_K — MIN_LINE_WIDTH=0.25mm MIN_NECK_WIDTH=0.25MM DIFFERENTIAL_PAIR=TSENSE_NB

NET_SPACING_TYPE=TSENSE_DIFPAIR
NET_PHYSICAL_TYPE=10MIL_WIDTH

TP2000 — P4MM SM — PP_2V5PWRONNBMISC 6 — XW2000

R2013 10K 5% 1/16W MF-LF 402

NOSTUFF R2012 0 5% 1/16W MF-LF 402
20 PMR_CLK_DIS_L — NB_PMR_CLK_STOP_L

NOTE: LOW = DISABLE PMR_CLK

NOTE:
PMR_CLK_STOP CAN BE USED TO STOP ALL CLOCKS IN KODIAK
USED FOR DEBUG
PLACE R2012 IN AN ACCESSIBLE LOCATION

KODIAK & SHASTA MISC

SYNC_MASTER=FINO-ME — SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT: 20 OF 154	

Page Notes

Power aliases required by this page:
- =PP3V3_PWRON_SB_PCI64 (VIO1) (TO 5V OR 3.3V)
- =PP3V3_PWRON_SB_PCI32 (VIO2) (TO 5V OR 3.3V)
- =PP3V3_PWRON_SB
- =PP2V5_PWRON_SB
- =PP1V2_PWRON_SB_VCORE

NOTE: PCI pads use the VIO supply to meet different drive timing characteristics required by the PCI spec for 5V vs. 3.3V operation. CONNECT VIO2 TO appropriate PCI bus voltage and VIO1 TO SAME IF 64-BIT PCI, otherwise 3.3V.

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Power Sequencing:
Must power Shasta VCore rail before any other Shasta supplies.

=PP1V2_PWRON_SB_VCORE

C2300 C2301 C2302 C2303 C2304
C2305 C2306 C2307 C2308 C2309
C2310 C2311 C2312 C2313 C2314
0.1uF 20% 10V CERM 402

=PP3V3_PWRON_SB

C2320 C2321 C2322 C2323 C2324
C2325 C2326 C2327 C2328 C2329
C2330 C2331 C2332 C2333 C2334
C2335 C2336 C2337 C2338 C2339
0.1uF 20% 10V CERM 402

U2300
SHASTA
V1.1
BGA-LF
(1 OF 8)
POWER
SEE_TABLE

VDDC
VDDIO33
GND

Shasta max (est 06/30/03) current:

DIGITAL	1.2V	950 mA (1175 mW)
ANALOG12	1.2V	600 mA (760 mW)
VDDPs	2.5V	100 mA (250 mW)
I/O 2.5	2.5V	20 mA (60 mW)
I/O 3.3	3.3V	220 mA (770 mW)
Total:		3015 mW

XW2300 PP_1V2PWRONSBVCORE → PP2300
XW2303 PP_3V3PWRONSBPCI64 → PP2303
XW2304 NO_TEST=YES PP_2V5PWRONSB → PP2304
P4MM SM

=PP2V5_PWRON_SB
C2350 C2351 0.1uF 20% 10V CERM 402

=PP3V3_PWRON_SB_PCI64
C2355 C2356 C2357 0.1uF 20% 10V CERM 402
For PCI_AD<63..32>

=PP3V3_PWRON_SB_PCI32
C2360 C2361 C2362 0.1uF 20% 10V CERM 402
For PCI_AD<31..0>

=PP2V5_PWRON_SB
C2365 0.1uF 20% 10V CERM 402

VDDO25 VIO1 VIO2 VDDP_KL

LAST_MODIFIED=Tue Nov 1 14:55:47 2005

Shasta Core Power	
SYNC_MASTER=Q63	SYNC_DATE=08/01/2005

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
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SCALE: NONE	SHT 23 OF 154	

DRAWING TITLE=SCHEMA NUMBER=SCHEMA

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
I2S0_TO_SB		
I2S0_TO_DEV		
I2S0_TO_DEV	AUDIO	
I2S0_BIDIR		
I2S0_BIDIR		
I2S1_TO_SB		
I2S1_TO_DEV		
I2S1_TO_DEV	0.25mm SPACING	
I2S1_BIDIR		
I2S1_BIDIR		
I2S2_TO_SB		
I2S2_TO_DEV		
I2S2_TO_DEV	0.25mm SPACING	
I2S2_BIDIR		
I2S2_BIDIR		
SB_CLK18M_XTAL	0.38mm SPACING	
	0.38mm SPACING	
	0.38mm SPACING	
SB_CLK25M_ATA	0.38mm SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	
	P3MM SPACING	

I2S0_DEV_TO_SB_DTI 24 147
I2S0_SB_TO_DEV_DTO 24 147
I2S0_MCLK 24 154
I2S0_BITCLK 24 147
I2S0_SYNC 24 147

I2S1_DEV_TO_SB_DTI 8 24
I2S1_SB_TO_DEV_DTO 8 24
I2S1_MCLK 8 24
I2S1_BITCLK 8 24
I2S1_SYNC 8 24

I2S2_DEV_TO_SB_DTI 24 154
I2S2_SB_TO_DEV_DTO 24 154
I2S2_MCLK 24 154
I2S2_BITCLK 24 154
I2S2_SYNC 24 154

SB_CLK18M_XTALI 24
SB_CLK18M_XTALO 24
SB_CLK18M_XTALO_R 24
SB_CLK25M_SATA 24 26
NB_TO_SB_INT 24
SB_CPU_A0_INT_L 24
SB_CPU_A1_INT_L 24
SB_CPU_B0_INT_L 24
SB_CPU_B1_INT_L 24
PCI_AIRPORT_INT_L 24 121
PCI_USB2_INT_L 24 122
I2S0_RESET_L 24 147
I2S1_RESET_L 8 24
I2S2_RESET_L 24 154
MB_SLOT_RESET_L 24
NB_SLOT_RESET_L 20 24
SB_CPU_A0_SRESET_L 24 56
SB_CPU_A1_SRESET_L 24 56
SB_CPU_B0_SRESET_L 24 56
SB_CPU_B1_SRESET_L 24 56

Page Notes

Power aliases required by this page:
- _PP3V3_PCI
- _PP3V3_PWRON_SB
- _PP2V5_PWRON_SB
- _PP1V2_PWRON_SB

Signal aliases required by this page: (NONE)

BOM options provided by this page:
- PCI_64BIT: Configures Shasta for 64-bit PCI
  NOTE: XGC required for Shasta GPIOs
- MPIC_NB/MPIC_SB: Selects whether NorthBridge or SouthBridge MPIC will be used for interrupt controller.

=PP3V3_RUN_SB_PCI 7 24

R2476 10K 5% 1/16W MF-LF 402 — To SouthBridge -> NB_TO_SB_INT 24

MPIC_SB
NB_CPU_A0_INT_L (42) FROM NORTHBRIDGE — R2475 10K 5% 1/16W MF-LF 402 — NB_INT_L_R — Q2476 2N3904LF SOT23
R2479 MPIC_NB 0 5% 1/16W MF-LF 402
R2478 0 5% 1/16W MF-LF 402
CPU_A0_INT_R_L (56) TO CPU — FROM SOUTHBRIDGE — MPIC_SB SB_CPU_A0_INT_L 24

NorthBridge / SouthBridge MPIC Routing

Re-pin within each RPAK as necessary
DO NOT swap between RPAKs

I2S0_DEV_TO_SB_DTI	147 24	(I2S0_DEV_TO_SB_DTI)				W7	I2S0DTI_H
I2S0_SB_TO_DEV_DTO	147 24	RP2410 3	6	33	I2S0_SB_TO_DEV_DTO_R	Y9	I2S0DTO_H
I2S0_MCLK	154 24	RP2410 4	5	33	I2S0_MCLK_R	U8	I2S0MCLK_H
I2S0_BITCLK	147 24	RP2420 1	8	33	I2S0_BITCLK_R	AA4	I2S0BITCLK_H
I2S0_SYNC	147 24	RP2410 2	7	33	I2S0_SYNC_R	Y6	I2S0SYNC_H
I2S1_DEV_TO_SB_DTI	24 8	(I2S1_DEV_TO_SB_DTI)				V10	I2S1DTI_H
I2S1_SB_TO_DEV_DTO	24 8	RP2420 3	6	33	I2S1_SB_TO_DEV_DTO_R	AB5	I2S1DTO_H
I2S1_MCLK	24 8	RP2430 2	7	33	I2S1_MCLK_R	V9	I2S1MCLK_H
I2S1_BITCLK	24 8	RP2430 3	6	33	I2S1_BITCLK_R	AA8	I2S1BITCLK_H
I2S1_SYNC	24 8	RP2410 1	8	33	I2S1_SYNC_R	AA7	I2S1SYNC_H
I2S1_RESET_L	24 8	(I2S1_RESET_L)				V5	GPIO_H_0
I2S2_DEV_TO_SB_DTI	154 24	(I2S2_DEV_TO_SB_DTI)				AA5	I2S2DTI_H
I2S2_SB_TO_DEV_DTO	154 24	RP2430 4	5	33	I2S2_SB_TO_DEV_DTO_R	Y8	I2S2DTO_H
I2S2_MCLK	154 24	RP2420 4	5	33	I2S2_MCLK_R	Y7	I2S2MCLK_H
I2S2_BITCLK	154 24	RP2420 2	7	33	I2S2_BITCLK_R	AB4	I2S2BITCLK_H
I2S2_SYNC	154 24	RP2430 1	8	33	I2S2_SYNC_R	W9	I2S2SYNC_H
I2S2_RESET_L	154 24	(I2S2_RESET_L)				Y2	GPIO_H_1

AUDIO GPIO - see note on right

119 56 24 23 20 7 =PP3V3_PWRON_SB

R2400 10K 5% 1/16W MF-LF 402 — SB_PCI_SEL32BIT

R2402 0 5% 1/16W MF-LF 402 — 122 119 30 28 SYS_TO_RESET_L

PLACE R2402 CLOSE TO SHASTA

I2S0_RESET_L	147 24					AB3	GPIO_H_2
SB_GPIO_H_3	24					W8	GPIO_H_3
SB_PCI_SEL32BIT						W6	PCI_SEL32BIT_H
I2C_SB_SCL	39					Y9	I2CCLK_H
I2C_SB_SDA	39					AB7	I2CDATA_H
SHASTA_SYS_IO_RESET_L						E9	RESET_L
SB_STOPXTALS_L	28					W10	STOPXTALS_L
SMU_SUSPENDREQ_L	43 30 28					U11	SUSPENDREQ_L
SB_SUSPENDACK_L	28					V11	SUSPENDACK_L
SYS_PME_L	122 28					W10	PCI1PME_L
TP_SB_WATCHDOG	9					V12	INTRWD_H
JTAG_SB_TDI	20					AA11	TDI
JTAG_SB_TDO	20					W11	TDO
JTAG_SB_TCK	20					AB11	TCK
JTAG_SB_TMS	20					Y11	TMS
JTAG_SB_TRST_L	20 9					W12	TRST_L
SB_TEST_MODE_PD						A3	TEST_MODE_H
TP_SB_PLLTEST	6					U14	PLLTEST
TP_SB_FSTEST	6					V14	FSTEST
SB_CLK18M_XTALI	24					W13	XTAL_18_I
SB_CLK18M_XTALO_R	24					V13	XTAL_18_O
SB_CLK25M_SATA	26 24					U15	XTALI
						V15	XTALO

I2S1 | I2S2 | GPIO | I2C | PCI | PWR_MGT | TEST | XTALS

SPEC SHOWS LOAD CAPACITANCE OF 16PF FOR 197S0004

=PP2V5_PWRON_SB 7 23 119 138

R2405 3.3 5% 1/8W MF-LF 805 — PP2V5_PWRON_SB_XTAL18VDD (VOLTAGE=2.5V, MIN_LINE_WIDTH=0.50mm, MIN_NECK_WIDTH=0.38mm) — C2400 10UF 10% 6.3V X5R 805 — C2401 1uF 10% 6.3V CERM 402

R2410 3.3 5% 1/8W MF-LF 805 — PP2V5_PWRON_SB_XTALVDD (VOLTAGE=2.5V, MIN_LINE_WIDTH=0.50mm, MIN_NECK_WIDTH=0.38mm) — C2410 10UF 10% 6.3V X5R 805 — C2411 1uF 10% 6.3V CERM 402

Re-pin within each RPAK as necessary
DO NOT swap between RPAKs

119 56 24 23 20 7 =PP3V3_PWRON_SB

SB_CPU_A0_INT_L	24	R2408 10K	MPIC_NB
SB_CPU_A1_INT_L	24	R2409 10K	MPIC_NB
SB_CPU_B0_INT_L	24	R2412 10K	MPIC_NB
SB_CPU_B1_INT_L	24	R2418 10K	MPIC_NB

5% 1/16W MF-LF 402

R2480 4.7K 1% 1/16W MF-LF 402 — SB_CLK18M_XTALI

R2490 200 1% 1/16W MF-LF 402 — SB_CLK18M_XTALO

CRITICAL Y2490 18.432M SM — C2490 22pF 5% 50V CERM 402 — C2491 22pF 5% 50V CERM 402

PP2406 — P4MM SM PP

=PP3V3_RUN_SB_PCI 24 7

R2456 10K	PCI_AIRPORT_INT_L	24 121	
R2459 10K	PCI_USB2_INT_L	24 122	
SAT_RUN			
R2416 1K 1% 1/16W MF-LF 402	SYS_OVERTEMP_L	20 24 28 93	
NOSTUFF R2417 10K	MAKE_TBEN_SYNC_L	24	

5% 1/16W MF-LF 402

U2300 SHASTA V1.1 BGA-LF (2 OF 8)

XTAL_18 VDD (W14) — XTAL_18 VDD (Y13) — PLL_45 VDD (AA13) — PLL_49 VDD (Y12) — VIO PME (W17)

PCI1REQ_3_L	6	U17	NB_CHP_FLT_N_B	24	
PCI1GNT_3_L	7	AA19	SB_SFC_RESET_L	24	
PCI1REQ_4_L	8	AB21	SB_CPU_VDNAP1	24 28	
PCI1GNT_4_L	9	AA20	SB_CPU_VDNAP2	24 28	
PCI1REQ_5_L	10	U16	SB_TO_SMU_INT_L	24 28	
PCI1GNT_5_L	11	Y20	LOGIC_BRD_GOOD	24	
PCI1AD_32_H	12	D18	SB_VDNAP0	24 31	
PCI1AD_33_H	13	A20	SYS_OVERTEMP_L	20 24 28 93	
PCI1AD_34_H	14	F18	SB_GPIO14	24 143	
PCI1AD_35_H	15	F17	MB_SLOT_RESET_L	24	
PCI1AD_36_H	16	G16	NB_SLOT_RESET_L_R	24	
PCI1AD_37_H	17	F16	PCI_AIRPORT_INT_L	24 121	
PCI1AD_38_H	18	A21	PCIX_INT_L	24	
PCI1AD_39_H	19	B21	RAI_EXP_INTR_L<3>	20	
PCI1AD_40_H	20	C20	RAI_EXP_INTR_L<2>	20	
PCI1AD_41_H	21	G17	RAI_EXP_INTR_L<1>	20	
PCI1AD_42_H	22	G18	RAI_EXP_INTR_L<0>	20	
PCI1AD_43_H	23	E19	GIGE_P1_INTA_L	24	
PCI1AD_44_H	24	F19	GIGE_P2_INTB_L	24	
PCI1AD_45_H	25	D20	RAI_ALERT_L	24	
PCI1AD_46_H	26	E20	RAI_FATAL_L	24	
PCI1AD_47_H	27	C21	PCI_USB2_INT_L	24 122	
PCI1AD_48_H	28	F20	FW_LOWPWR_R	24	
PCI1AD_49_H	29	G19	ENETFW_RESET	17 24	
PCI1AD_50_H	30	C22	MAKE_TBEN_SYNC_L	24	
PCI1AD_51_H	31	D21	ENET_ENERGYDET	24 132	
PCI1AD_52_H	32	G20	AUDIO_LO_DET_L	153	
PCI1AD_53_H	33	D22	AUDIO_LO_OPTICAL_PLUG_L	153	
PCI1AD_54_H	34	K18	AUDIO_LI_DET_L	153	
PCI1AD_55_H	35	H19	AUDIO_LI_OPTICAL_PLUG_L	154	
PCI1AD_56_H	36	J17	AUDIO_HP_DET_L	154	
PCI1AD_57_H	37	F21	AUDIO_MIC_ID	154	
PCI1AD_58_H	38	G21	AUDIO_LO_MUTE_L	150	
PCI1AD_59_H	39	H20	AUDIO_HP_MUTE_L	154	
PCI1AD_60_H	40	J19	AUDIO_SPKR_MUTE_L	152	
PCI1AD_61_H	41	F22	AUDIO_EXT_MCLK_SEL	154	
PCI1AD_62_H	42	G22	AUDIO_SPDIFIN_INT_L	154	
PCI1AD_63_H	43	H21	AUDIO_SPKR_ID	153	
PCI1C_BE_4_L	44	J20	SB_CPU_A0_INT_L	24	
PCI1C_BE_5_L	45	H22	SB_CPU_A1_INT_L	24	
PCI1C_BE_6_L	46	K22	SB_CPU_B0_INT_L	24	
PCI1C_BE_7_L	47	K20	SB_CPU_B1_INT_L	24	
PCI1REQ64_L	48	K17	SYS_SLEWING_L	24 26 28 50	
PCI1ACK64_L	49	L17	SB_CPU_A0_SRESET_L	24 56	
PCI1PAR64_H	50	E18	SB_CPU_A1_SRESET_L	24 56	
XGI_CLK_H	51	Y4	SB_CPU_B0_SRESET_L	24 56	
XGI_DTO0_H	52	U7	SB_CPU_B1_SRESET_L	24 56	
XGI_DTO1_H	53	T9	NB_TO_SB_INT	24	
XGI_DTI_H	54	W2	SMU_TO_SB_INT_L	24	

XGI

XTAL_18 GND (AB12) — PLL_45 GND (AB13) — PLL_49 GND (AA12)

XW2400 — PP_1V2PWRONSBPLL45VDD — P4MM SM PP — PP2400

PP1V2_PWRON_SB_PLL45VDD (VOLTAGE=1.2V, MIN_LINE_WIDTH=0.50mm, MIN_NECK_WIDTH=0.38mm)
C2421 1uF 10% 6.3V CERM 402 — C2420 10UF 10% 6.3V X5R 805 — R2420 3.3 5% 1/8W MF-LF 805 — =PP1V2_PWRON_SB 7

PP1V2_PWRON_SB_PLL49VDD (VOLTAGE=1.2V, MIN_LINE_WIDTH=0.50mm, MIN_NECK_WIDTH=0.38mm)
C2431 1uF 10% 6.3V CERM 402 — C2430 10UF 10% 6.3V X5R 805 — R2430 3.3 5% 1/8W MF-LF 805

=PP3V3_PWRON_SB 7 20 23 24 56 119

C2440 0.1uF 20% 6.3V CERM 402

NET_SPACING_TYPE=P3MM SPACING — P4MM SM PP — PP2405

R2432 0 5% 1/16W MF-LF 402 — NB_SLOT_RESET_L 20 24

PLACE R2432 CLOSE TO SHASTA

AUDIO PAGES IS RESPONSIBLE FOR TERMINATION OF I2S0 AND I2S2
DO NOT ADD PULLUP/DOWN FOR I2S0 AND IS=2S2 IN THIS PAGE

AUDIO GPIOS

NOTE: It is the responsibility of the audio circuit to provide the necessary pull-ups & pull-downs.

119 56 24 23 20 7 =PP3V3_PWRON_SB

I2S1_RESET_L	24 8	R2464 10K	
SB_GPIO_H_3	24	R2463 10K	
NB_CHP_FLT_N_B	24	R2450 10K	
SB_SFC_RESET_L	24	R2451 10K	
SB_CPU_VDNAP1	28 24	R2452 10K	
SB_CPU_VDNAP2	28 24	R2453 10K	
SB_TO_SMU_INT_L	28 24	R2454 10K	
LOGIC_BRD_GOOD	24	R2455 10K	
SB_VDNAP0	31 24	R2404 10K	
SAT_PWRON		R2460 1K	
SYS_OVERTEMP_L	93 28 24 20		
SB_GPIO14	143 24	R2422 10K	
MB_SLOT_RESET_L	24	R2461 4.7K	
NB_SLOT_RESET_L	24 20	NOSTUFF R2406 4.7K	
PCIX_INT_L	24	R2419 10K	
GIGE_P1_INTA_L	24	R2457 10K	
GIGE_P2_INTB_L	24	R2413 10K	
RAI_ALERT_L	24	R2414 10K	
RAI_FATAL_L	24	R2465 10K	
SYS_SLEWING_L	50 28 26 24	NOSTUFF R2462 1K	
SMU_TO_SB_INT_L	24	R2421 10K	
MAKE_TBEN_SYNC_L	24	R2415 10K	

5% 1/16W MF-LF 402

R2407 0 NO STUFF 5% 1/16W MF-LF 402 — FW_LOWPWR 139

FW_LOWPWR_R	24	R2466 10K	
ENETFW_RESET	24 17	R2467 10K	
ENET_ENERGYDET	132 24	R2468 10K	

5% 1/16W MF-LF 402

Shasta Serial / Misc

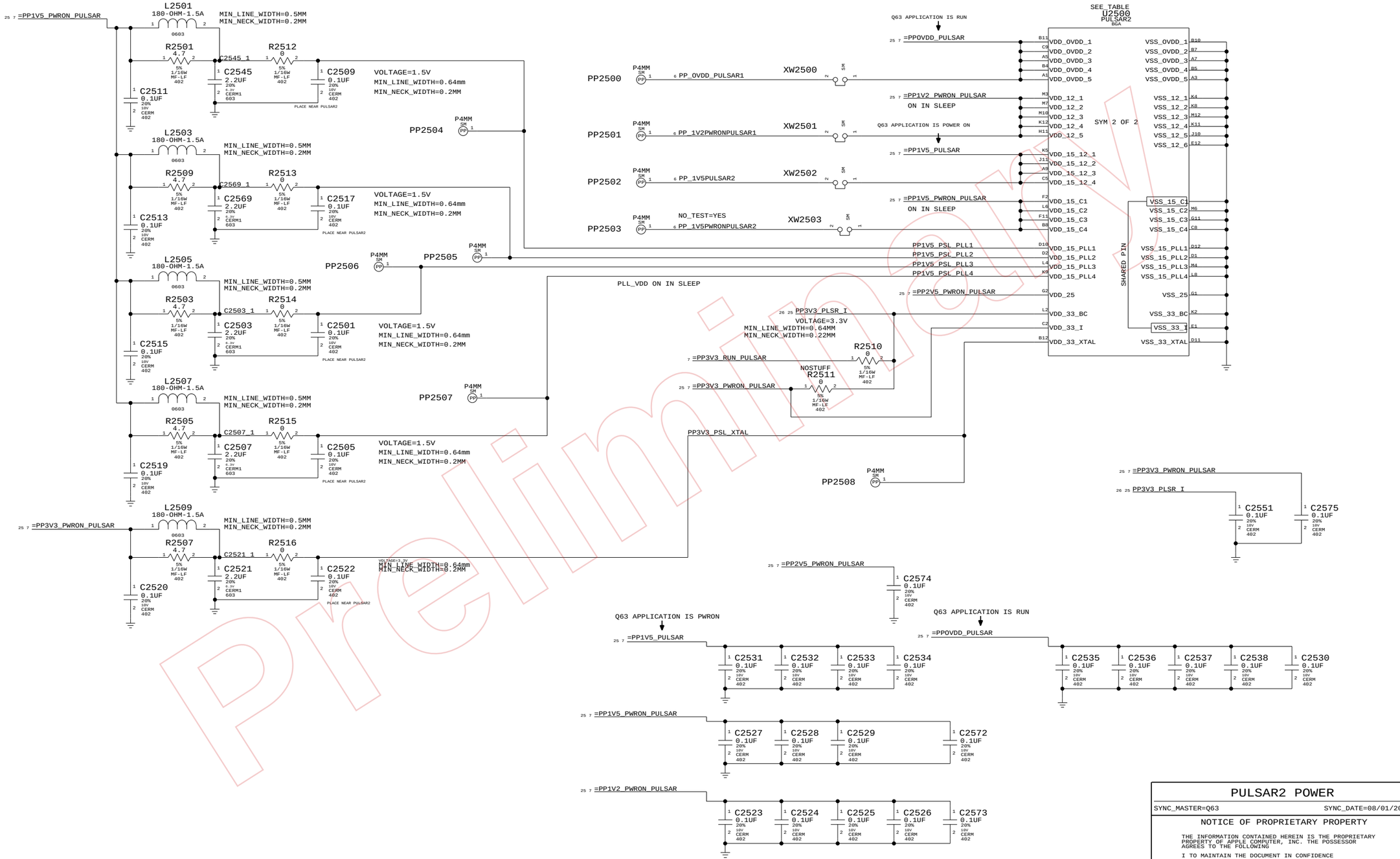
SYNC_MASTER=FINO-ME SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 24 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:48 2005

DRAWING



PULSAR2 POWER

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 25 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:49 2005

DRAWING

PLACE ALL 0-OHM SERIES RESISTORSRES
ON THIS PAGE NEAR PULSAR

REMOVED R2632 AND R2630
FROM UNUSED CLOCKS FOR EMC

QUASAR CLOCKS ARE RESISTOR DIVIDED DOWN
TO 1.8V ON QUASAR PAGES

LAST MODIFIED: APR 26, 04

PULSAR2 CLOCKS

SYNC_MASTER=FINO-ME SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT: 26 OF: 154

LAST_MODIFIED=Tue Nov 1 14:55:50 2005

N/C ALIASES

N/C RAINIER CLOCKS

6 NC_CLK_RAI_REFCLK_66M — CLK_RAI_REFCLK_66M 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_GIGE_25MHZ — CLK_RAI_GIGE_25MHZ 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_200M_P<0> — CLK_RAI_200M_P<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_200M_N<0> — CLK_RAI_200M_N<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_PCIEA_P<0> — CLK_RAI_PCIEA_P<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_PCIEA_N<0> — CLK_RAI_PCIEA_N<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_PCIEB_P<0> — CLK_RAI_PCIEB_P<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_PCIEB_N<0> — CLK_RAI_PCIEB_N<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_PCIEC_P<0> — CLK_RAI_PCIEC_P<0> 26
MAKE_BASE=TRUE

6 NC_CLK_RAI_PCIEC_N<0> — CLK_RAI_PCIEC_N<0> 26
MAKE_BASE=TRUE

N/C CPUB CLOCKS

6 NC_EI_CPU_B_SYSCLK_P — EI_CPU_B_SYSCLK_P 26
MAKE_BASE=TRUE

6 NC_EI_CPU_B_SYSCLK_N — EI_CPU_B_SYSCLK_N 26
MAKE_BASE=TRUE

6 NC_CPU_B_APSYNC — CPU_B_APSYNC 26
MAKE_BASE=TRUE

N/C QUASAR CLOCKS

6 NC_RAM_ARB0_REF25MHZ — RAM_ARB0_REF25MHZ 26
MAKE_BASE=TRUE

6 NC_RAM_ARB1_REF25MHZ — RAM_ARB1_REF25MHZ 26
MAKE_BASE=TRUE

CLOCK CONSTRAINTS

	DIFFERENTIAL_PAIR	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	ELECTRICAL_CONSTAINT_SET
26 20 NB_PMR_CLK_P	NB_PMR_CLK	NB_PMR_CLK	NB_PMR_CLK_SP	NB_PMR_CLK
25 20 NB_PMR_CLK_N	NB_PMR_CLK	NB_PMR_CLK	NB_PMR_CLK_SP	NB_PMR_CLK
119 26 PCI_CLK66M_SB_INT		PCI_CLK_SB	P3MM SPACING	PCI_CLK_SB
119 26 PCI_CLK33M_SB_EXT_RR		PCI_CLK_SB	PCI_CLK_SB	PCI_CLK_SB_CAP

167
168
169
170

NOTE:
ALL OTHER CLOCK CONTRAINTS ON THEIR
RESPECTIVE BUS PAGES

26 PCI_CLK33M_USB2 — =PCI_CLK33M_USB2 122
MAKE_BASE=TRUE

Pulsar Aliases

SYNC_MASTER=FINO-ME SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 27 OF 154	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
SMU_CLK10M_XTAL	0.38MM SPACING		SMU_CLK10M_XIN
	0.38MM SPACING		SMU_CLK10M_XOUT
	0.38MM SPACING		SMU_CLK10M_XOUT_R
RTC_CLK32K_XTAL	0.38MM SPACING		RTC_CLK32K_X1
	0.38MM SPACING		RTC_CLK32K_X2
	P3MM SPACING		SMU_IO_RESET_L
	0.25MM SPACING		SYS_NORTH_RESET_L

Page Notes

Power aliases required by this page:
- =PP3V3_ALL_SMU
- =PP3V3_ALL_RTC
- =PP3V3_PWRON_SMU
- =PPVREF_SMU (SMU AVCC OR 2.5V REFERENCE)

Signal aliases required by this page:
(NONE)

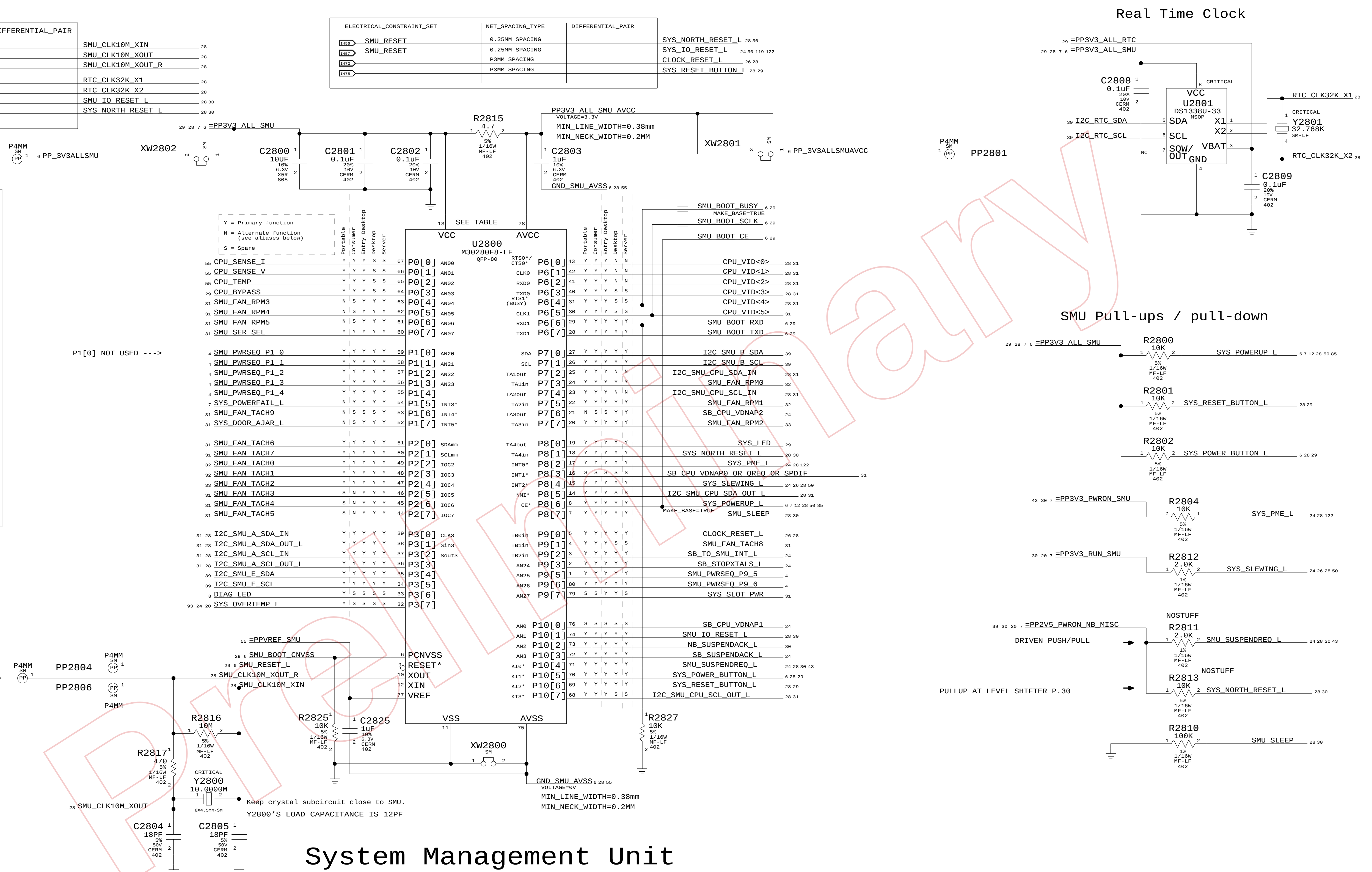
BOM options provided by this page:
(NONE)

NOTE: CPU current/voltage monitoring (CPU_SENSE_I/CPU_SENSE_V) requires 100K/10uF RC filter at SMU pins. Caps should connect to GND_SMU_AVSS. SMU_VREF should be same signal or reference used by monitoring circuit, but be aware that this will affect other analog inputs such as AC adapter ID.

NOTE: All analog inputs to SMU should have a 100pF capacitor to the SMU AVSS signal (GND_SMU_AVSS). None of those capacitors are provided on this page.

NOTE: Some primary and alternate functions reuire pull-ups that are not. provided on this page. Please. review the latest SMU specification to ensure missing pull-ups are provided on another page.

NOTE: Pinout matches SMU pinout v1.51.



System Management Unit

Alternate Functions

Tower & Server

	Port				Port	
31 28 CPU_VID<0>	6.0	SAT_MRESET_L		31 28 CPU_VID<3>	6.3	SMU_FAN_RPM6
31 28 CPU_VID<1>	6.1	CPU_A_INSERTED_L		31 28 CPU_VID<4>	6.4	SMU_FAN_RPM7
31 28 CPU_VID<2>	6.2	CPU_B_INSERTED_L		31 28 I2C_SMU_A_SCL_IN	3.2	NB_TDI
31 28 I2C_SMU_CPU_SDA_IN	7.2	SMU_FAN_PWM8		31 28 I2C_SMU_A_SCL_OUT_L	3.3	NB_TCK
31 28 I2C_SMU_CPU_SCL_IN	7.4	SMU_FAN_PWM9		31 28 I2C_SMU_CPU_SDA_OUT_L	8.5	NB_TMS
31 28 I2C_SMU_A_SDA_IN	3.0	I2C_SMU_A_SDA	31 39	31 28 I2C_SMU_CPU_SCL_OUT_L	10.7	NB_TDO_SMU
31 28 I2C_SMU_A_SDA_OUT_L	3.1	I2C_SMU_A_SCL	31 39			

System Management Unit

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

NOTICE OF PROPRIETARY PROPERTY

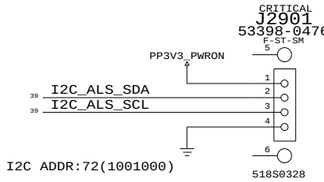
APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6790 | REV. E

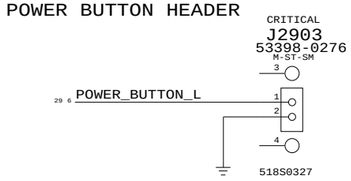
SCALE NONE | SHT 28 OF 154

LAST_MODIFIED=Tue Nov 1 14:55:51 2005

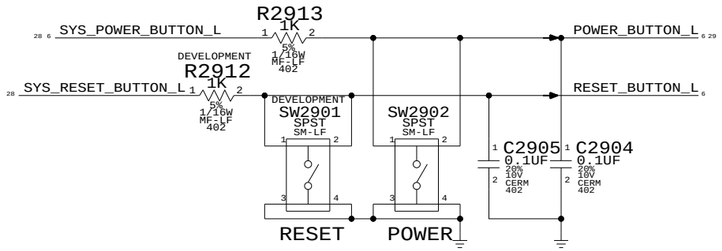
AMBIENT LIGHT SENSOR CONNECTOR



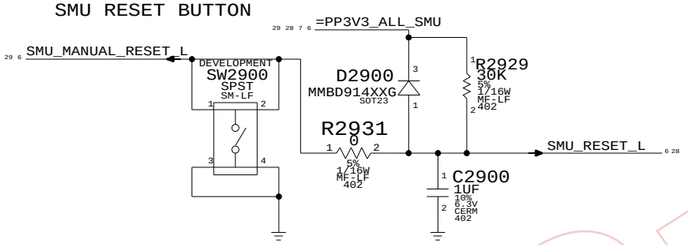
POWER BUTTON HEADER



SYS POWER AND RESET BUTTON

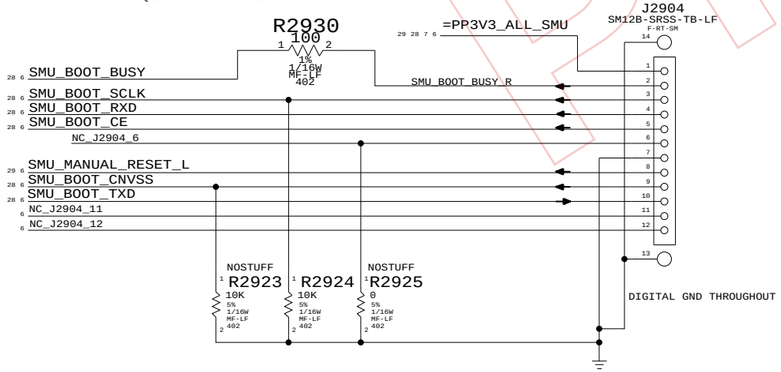


SMU RESET BUTTON



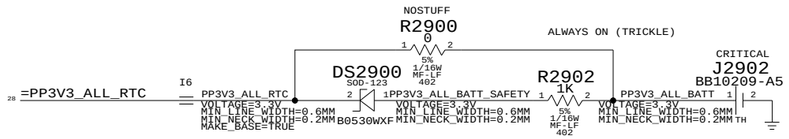
SMU DEBUG/DOWNLOAD CONNECTOR

SAME CONNECTOR AS Q63 CPU CARD FOR SAT

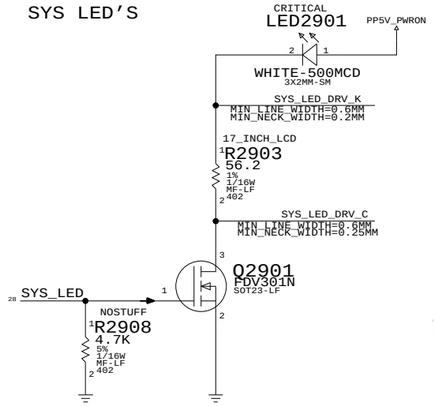


R2930, R2931, J2904 SHOULD BE MOVED BACK TO THE DEVLOPMENT BOM POST-RAMP

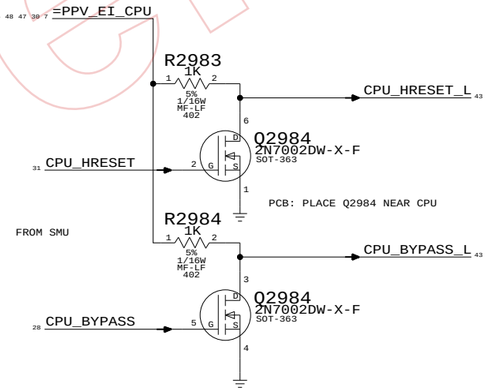
RTC BATTERY



SYS LED'S



DRIVE STRONG HRESET AND BYPASS TO CPU



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
114S0081	1	RES, 39.2 OHM, 1%, 402, LF	R2903	20_INCH_LCD

SMU SUPPLEMENTAL (2)

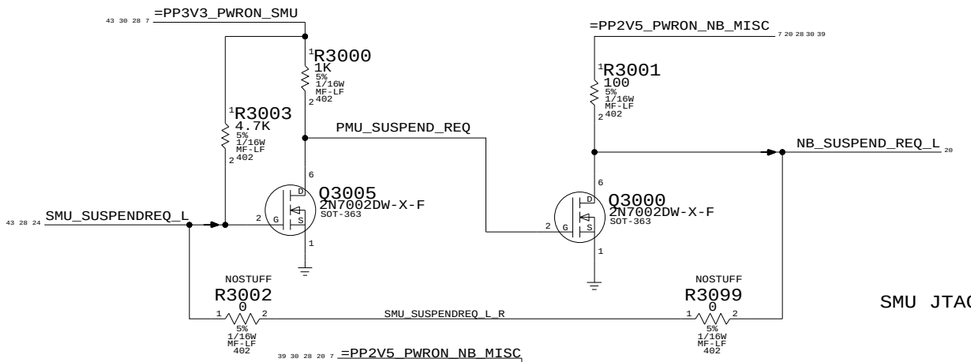
SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 29 OF 154	

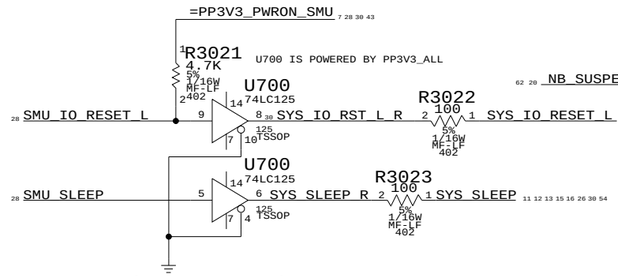
SMU TO NB SUSPEND_REQ

SAME AS Q63

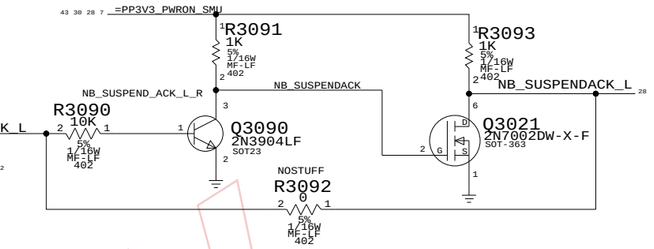


MISC. SMU BUFFERS

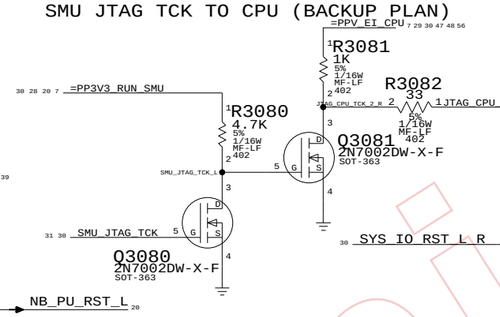
SAME AS (Q63).



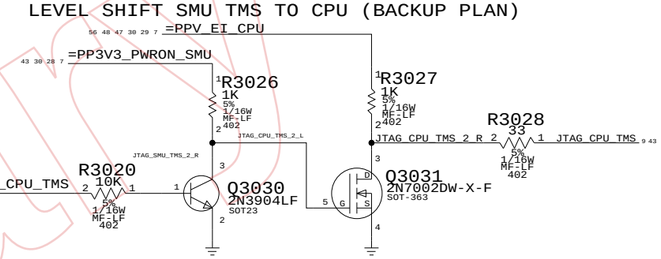
NB SUSPEND_ACK_L LEVEL 2.5V TO 3.3V LEVEL SHIFTER



SMU JTAG TCK TO CPU (BACKUP PLAN)

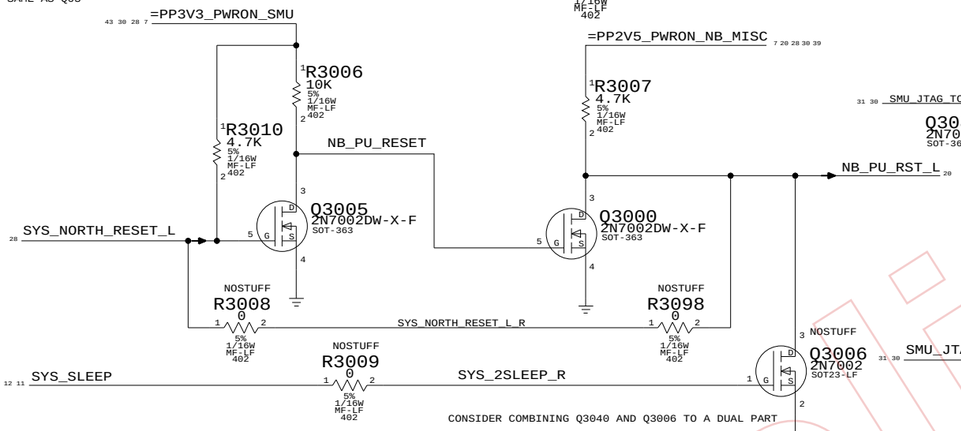


LEVEL SHIFT SMU TMS TO CPU (BACKUP PLAN)

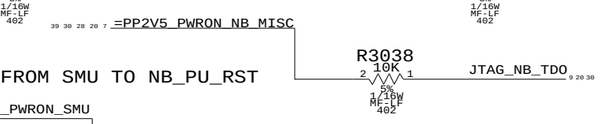


SYS_NORTH_RESET FROM SMU TO NB_PU_RST

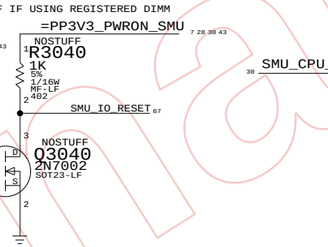
SAME AS Q63



R3038 / JTAG_NB_TDO

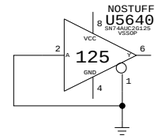


STUFF IF USING REGISTERED DIMM



SHARE SMU JTAG TCK WITH CPU AND NB (PRIMARY PLAN)
SHARE SMU JTAG TDI WITH CPU AND NB (PRIMARY PLAN)
NOTE: WE WENT WITH BACKUP PLAN, PRIMARY REMOVED TO AVOID STUBS

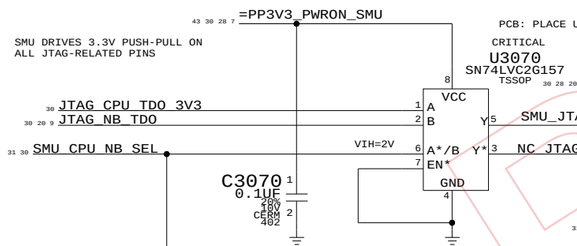
LEFTOVER FROM UNUSED PRIMARY PLAN - NOT STUFFED



SYS_SLEEP

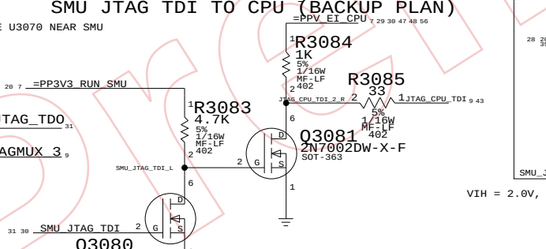
CONSIDER COMBINING Q3040 AND Q3006 TO A DUAL PART

SHARE CPU AND NB JTAG TDO WITH SMU



SMU JTAG TDI TO CPU (BACKUP PLAN)

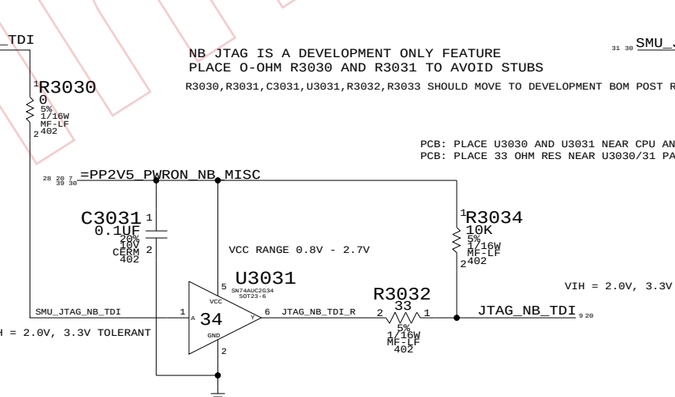
PCB: PLACE U3070 NEAR SMU



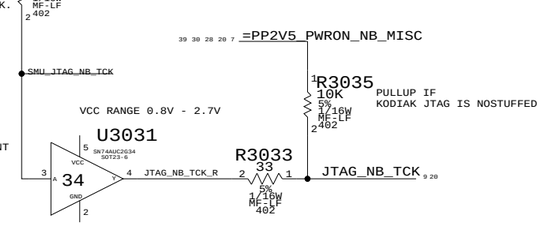
NB JTAG IS A DEVELOPMENT ONLY FEATURE

PLACE 0-OHM R3030 AND R3031 TO AVOID STUBS

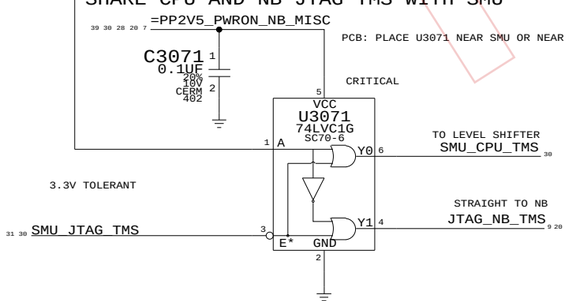
R3030,R3031,C3031,U3031,R3032,R3033 SHOULD MOVE TO DEVELOPMENT BOM POST RAMP



PCB: PLACE U3030 AND U3031 NEAR CPU AND KODIAK.
PCB: PLACE 33 OHM RES NEAR U3030/31 PART.

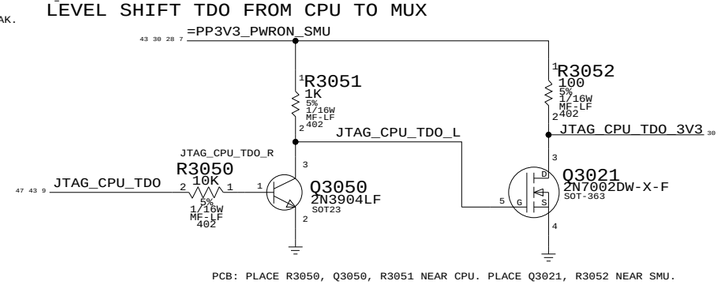


SHARE CPU AND NB JTAG TMS WITH SMU



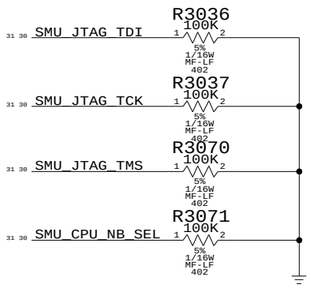
PCB: PLACE U3071 NEAR SMU OR NEAR KODIAK.

LEVEL SHIFT TDO FROM CPU TO MUX



PCB: PLACE R3050, Q3050, R3051 NEAR CPU. PLACE Q3021, R3052 NEAR SMU.

PULLDOWNS TO BUFFERS/LOGIC GATES



SMU SUPPLEMENTAL (3)

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 30 OF 154	

SMU ALIASES

ALIASES ARE ONLY NECESSARY WHERE USE DIFFERS FROM Q63.

COMMENT (ONLY IF USE DIFFERS FROM Q63)	M23 NET NAME	M23 SMU ALLOCATION		Q63 NET NAME (SHARED PAGE)
		CPU_SENSE_I0	P0.0	
		CPU_SENSE_V0	P0.1	
		CPU_TEMP0	P0.2	
Q63 NC'S THESE AS IT USES A SAT.		CPU_BYPASS	P0.3	
	9 NC_SMU_FAN_RPM3	FAN_CNTL0_4	P0.4	SMU_FAN_RPM3 28
M23/M33 DOESN'T HAVE THOSE FANS.	9 NC_SMU_FAN_RPM4	FAN_CNTL0_5	P0.5	SMU_FAN_RPM4 28
	9 NC_SMU_FAN_RPM5	FAN_CNTL0_6	P0.6	SMU_FAN_RPM5 28
Q63 USES SMU_SER_SEL FOR SPDIF-SMU-DEBUG. NOT M23/M33 FEATURE.	9 NC_SMU_SER_SEL	SMU_SCCL_SEL	P0.7	SMU_SER_SEL 28
M23/M33 DOESN'T USE. P1.0 NC ON PG 7.		CPU_SENSE_I1	P1.0	
		CPU_SENSE_V1	P1.1	
SMU USES P1.1, P1.2, P1.3, P9.5, P9.6 FOR PWRSEQ ON PG 7.		CPU_TEMP1	P1.2	
		PS1_3	P1.3	
M23/M33 DOESN'T USE P1.4. NC ON PG 7.		PS1_4	P1.4	
		POWERFAIL*	P1.5	
CPU_VID_LE0 FOR Q82. NOT M23/M33 FEATURE.	9 NC_SMU_CPU_VID_LE0	CPU_VID_LE0	P1.6	SMU_FAN_TACH9 28
CONSIDER DOOR_AJAR FOR M23/M33 DIMM ACCESS DOOR?	9 NC_SYS_DOOR_AJAR_L	DOOR_AJAR*	P1.7	SYS_DOOR_AJAR_L 28
CPU_VID_LE1 FOR Q82. NOT M23/M33 FEATURE.	9 NC_SMU_CPU_VID_LE1	CPU_VID_LE1	P2.0	SMU_FAN_TACH6 28
M23/M33 DOESN'T HAVE THIS FAN.	9 NC_SMU_FAN_TACH7	FAN_TACH2_1	P2.1	SMU_FAN_TACH7 28
		FAN_TACH2_2	P2.2	
		FAN_TACH2_3	P2.3	
		FAN_TACH2_4	P2.4	
M23/M33 DOESN'T HAVE FAN TACHS P2.5, P2.6, P2.7.	9 NC_SMU_FAN_TACH3	FAN_TACH2_5	P2.5	SMU_FAN_TACH3 28
M23/M33 USES TACH0 (P2.2), TACH1 (P2.3), TACH2 (P2.4) ONLY.	9 NC_SMU_FAN_TACH4	FAN_TACH2_6	P2.6	SMU_FAN_TACH4 28
	9 NC_SMU_FAN_TACH5	FAN_TACH2_7	P2.7	SMU_FAN_TACH5 28
M23/M33 ONLY CONNECTS I2C TO KODIAK NOW; CPU HAS PULLUPS ON ITS PG.	39 28 I2C_SMU_A_SDA	IIC_A_DAT	P3.0	I2C_SMU_A_SDA_IN 28
	39 28 I2C_SMU_A_SCL	IIC_A_CLK	P3.1	I2C_SMU_A_SDA_OUT_L 28
	30 SMU_JTAG_TDI	TDI	P3.2	I2C_SMU_A_SCL_IN 28
	30 SMU_JTAG_TCK	TCK	P3.3	I2C_SMU_A_SCL_OUT_L 28
		IIC_E_DAT	P3.4	
		IIC_E_CLK	P3.5	
		DIAG_LED	P3.6	
		OVERTEMP*	P3.7	
		CPU_VID[0]	P6.0	
		CPU_VID[1]	P6.1	
		CPU_VID[2]	P6.2	
		CPU_VID[3]	P6.3	
		CPU_VID[4]	P6.4	
		CPU_VID[5]	P6.5	
		DEBUG_RXD	P6.6	
		DEBUG_TXD	P6.7	
		IIC_B_DAT	P7.0	
		IIC_B_CLK	P7.1	
Q63 USE OF P7.2 IS PWM FAN — SELECT BETWEEN CPU OR NB TMS AND TDO FROM/TO SMU	30 SMU_CPU_NB_SEL	CPU_TMS	P7.2	I2C_SMU_CPU_SDA_IN 28
		FAN_CNTL7_3	P7.3	
M23/M33 DOESN'T HAVE THIS FAN (P7.4)	9 NC_I2C_SMU_CPU_SCL_IN	FAN_CNTL7_4	P7.4	I2C_SMU_CPU_SCL_IN 28
M23/M33 USES FAN_RPM0 (P7.3), FAN_RPM1 (P7.5), FAN_RPM2 (P7.7) ONLY.		FAN_CNTL7_5	P7.5	
		VDNAP2	P7.6	
		FAN_CNTL7_7	P7.7	
		SYSTEM_LED	P8.0	
		NB_RESET*	P8.1	
		PME*	P8.2	
M23/M33 DOESN'T NEED TO MAKE VDNAP0 DO TRIPLE-DUTY.	24 SB_VDNAP0	VDNAP0	P8.3	SB_CPU_VDNAP0_OR_QREQ_OR_SPDIF 28
		SLEWING*	P8.4	
	30 SMU_JTAG_TMS	NB_TMS	P8.5	I2C_SMU_CPU_SDA_OUT_L 28
		POWERUP*	P8.6	
		SLEEP	P8.7	
		CLK_RESET*	P9.0	
Q63 USE OF P9.1 IS TACH 8.	29 CPU_HRESET	CPU_HRESET	P9.1	SMU_FAN_TACH8 28
		SMU_DOORBELL*	P9.2	
		STOP_XTAL*	P9.3	
		PS9_5	P9.5	
		PS9_6	P9.6	
M23/M33 HAS NO SLOTS.	9 NC_SLOT_TOTAL_PWR	SLOT_TOTAL_PWR	P9.7	SYS_SLOT_PWR 28
		VDNAP1	P10.0	
		IO_RESET*	P10.1	
		SUSPEND_ACK*	P10.2	
		SUSPEND_IO_ACK*	P10.3	
		SUSPEND_REQ*	P10.4	
		PWR_BUTTON*	P10.5	
		RST_BUTTON*	P10.6	
	30 SMU_JTAG_TDO	TDO	P10.7	I2C_SMU_CPU_SCL_OUT_L 28

CPU VID<0:5>

VID CONTROLLED BY SMU

PP3V3_RUN

DS3100 SOD-123 B0530WXF

PP3V3_CPU_VID_D MIN_NECK_WIDTH=0.2MM MIN_LINE_WIDTH=0.6MM

R3114 R3116 R3117 R3108 R3109 R3104 1K 5% 1/16W MF-LF 402

28 CPU_VID<0>	R3119 0 5% 1/16W MF-LF 402	CPU_VID_R<0>	50
28 CPU_VID<1>	R3120 0 5% 1/16W MF-LF 402	CPU_VID_R<1>	50
28 CPU_VID<2>	R3121 0 5% 1/16W MF-LF 402	CPU_VID_R<2>	50
28 CPU_VID<3>	R3122 0 5% 1/16W MF-LF 402	CPU_VID_R<3>	50
28 CPU_VID<4>	R3123 0 5% 1/16W MF-LF 402	CPU_VID_R<4>	50
28 CPU_VID<5>	R3124 0 5% 1/16W MF-LF 402	CPU_VID_R<5>	50

MAKE_BASE=TRUE

NOSTUFF J3108 BM12B-SRSS-TB (LF)(SN) 1 2 3 4 5 6 7 8 9 10 11 12 13 MC_I1109_8:9 MC_I1109_9:9 MC_I1109_10:9 MC_I1109_11:9 MC_I1109_12:9

NOSTUFF R3132 R3131 R3130 R3129 R3127 1K 5% 1/16W MF-LF 402

R3111 2.0K 5% 1/16W MF-LF 402

NOTE:PULL UP CPU_VID<5>TO 2.2V FOR CPU VRM10.

NOTE: SC2642 VID PINS HAVE LEAKAGE TO GND. SO PULLUPS MUST BE 1K

SMU SUPPLEMENTAL (4)

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

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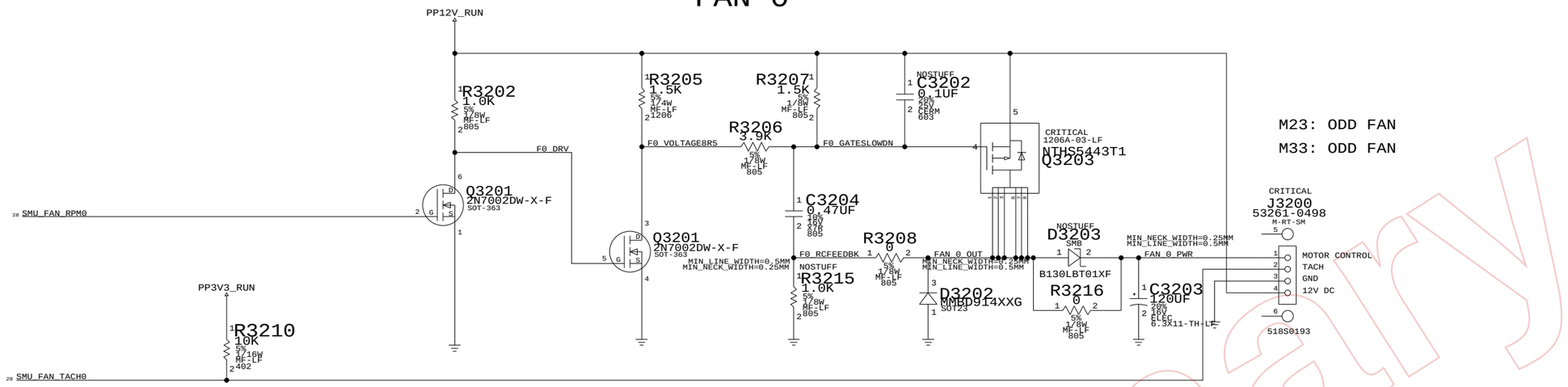
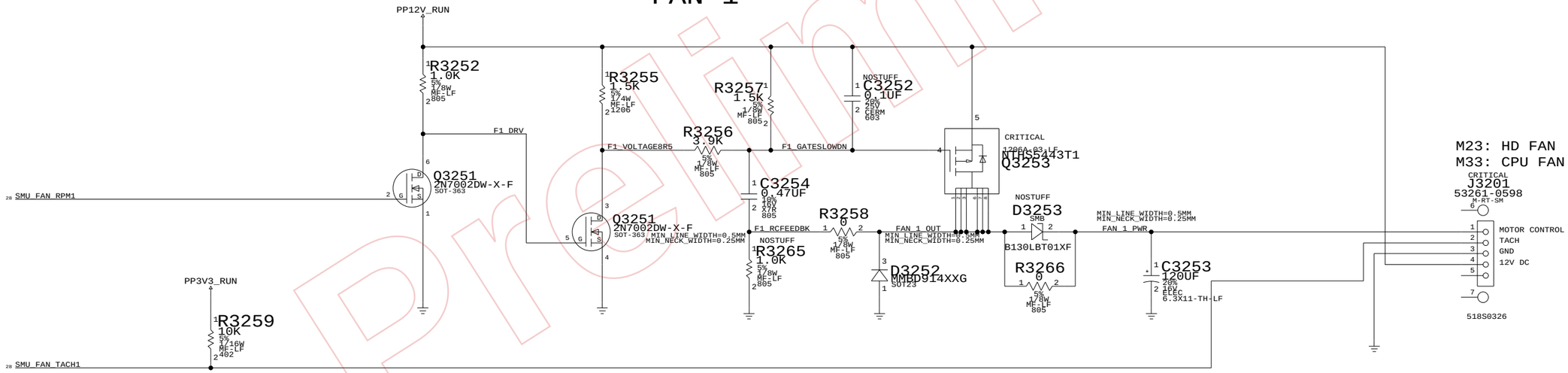
FAN 0



FAN 1



Fan 0, 1 & System Temp

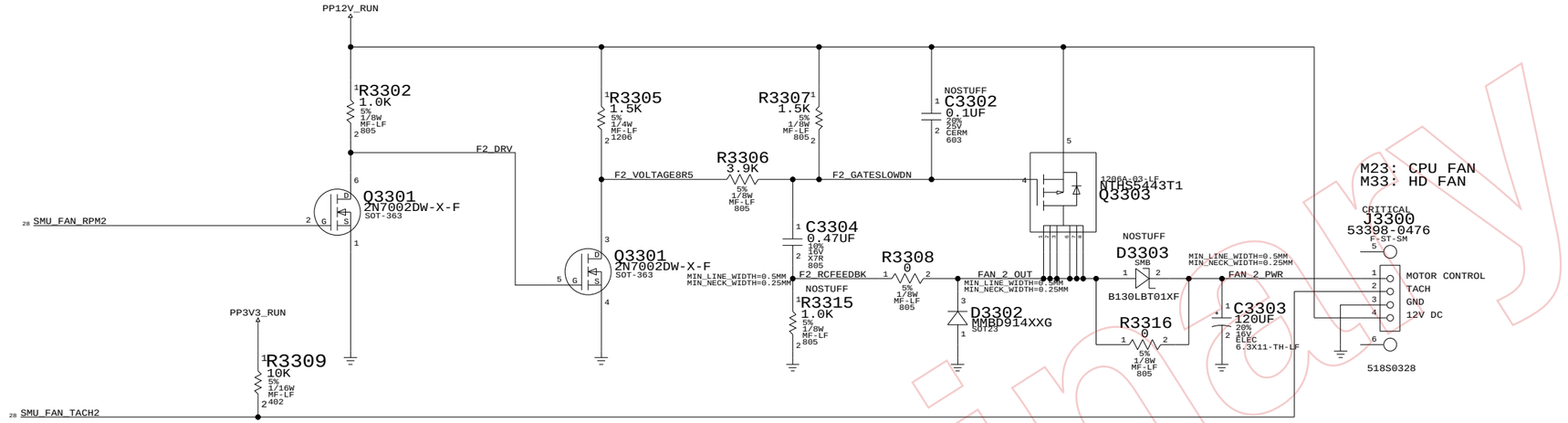
SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

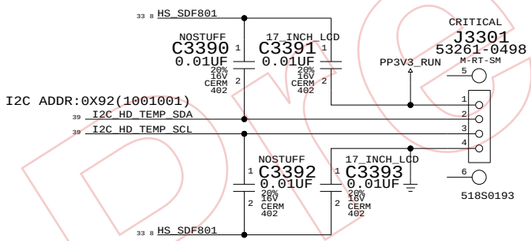
SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	32	154

FAN 2

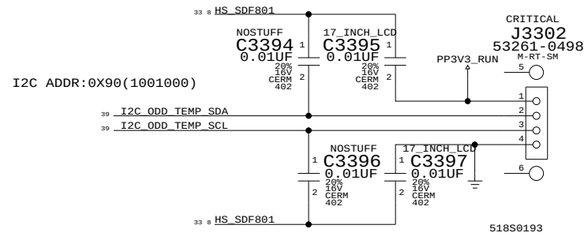


HD TEMP SENSOR



CAPS ARE FOR EMC ON M23 ONLY

ODD TEMP SENSOR



CAPS ARE FOR EMC ON M23 ONLY

Fan 2 & HD Temp

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
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SMU AND NB I2C A BUS

SMU
MASTER
I2C_SMU_A_SDA
I2C_SMU_A_SCL
NET_SPACING_TYPE=I2C

=PP3V3_RUN_I2C
R3953 2.0K 5% 1/16W MF-LF 402
R3969 2.0K 5% 1/16W MF-LF 402
VDIV=2.9V
NOSTUFF R3954 15K 5% 1/16W MF-LF 402
NOSTUFF R3955 15K 5% 1/16W MF-LF 402

=PP2V5_RUN_I2C
R3958 2.0K 5% 1/16W MF-LF 402
R3959 2.0K 5% 1/16W MF-LF 402

KODIAK
I2C_NB_A_SDA
I2C_NB_A_SCL
NET_SPACING_TYPE=I2C

Q3902 SI2302ADSE3 SOT23-3
Q3901 SI2302ADSE3 SOT23-3
Q3902_1
Q3901_1
R3962 0 5% 1/16W MF-LF 402
R3963 0 5% 1/16W MF-LF 402
=PP2V5_RUN_I2C

SB I2C BUS

SHASTA
MASTER
U2300
I2C_SB_SDA
I2C_SB_SCL
MAKE_BASE=TRUE
PINS Y9, AB7

AUDIO
U9500 / AU300
I2C_AUDIO_SDA
I2C_AUDIO_SCL
PINS 18, 19

PP3V3_RUN
R3915 1K 5% 1/16W MF-LF 402
R3914 1K 5% 1/16W MF-LF 402
NET_SPACING_TYPE=AUDIO

SMU I2C B BUS

PP3V3_PWRON
R3903 2.0K 5% 1/16W MF-LF 402
R3902 2.0K 5% 1/16W MF-LF 402

SMU
MASTER
U1300
I2C_SMU_B_SDA
I2C_SMU_B_SCL
MAKE_BASE=TRUE
PINS 26, 27
NET_SPACING_TYPE=I2C

PULSAR2
U2600
I2C_CLOCK_B_SDA
I2C_CLOCK_B_SCL
I2C ADDR:0XD5
R3904 33 5% 1/16W MF-LF 402

ALS HEADER
J2901
I2C_ALS_SDA
I2C_ALS_SCL
I2C ADDR:52
R3908 33 5% 1/16W MF-LF 402

SMU I2C E BUS

PP3V3_ALL
R3907 2.0K 5% 1/16W MF-LF 402
R3906 2.0K 5% 1/16W MF-LF 402
R3965 0 5% 1/16W MF-LF 402
R3964 0 5% 1/16W MF-LF 402

SMU 'E'
MASTER
U2800
I2C_SMU_E_SDA
I2C_SMU_E_SCL
PINS 34,35

RTC
U2801
I2C_RTC_SDA
I2C_RTC_SCL
PINS 5, 6

NB I2C C BUS

=PP2V5_RUN_I2C
R3970 2.0K 5% 1/16W MF-LF 402
R3971 2.0K 5% 1/16W MF-LF 402

KODIAK I2C C
I2C_NB_C_SDA
I2C_NB_C_SCL
NET_SPACING_TYPE=I2C

=PP3V3_RUN_I2C
R3972 2.0K 5% 1/16W MF-LF 402
R3973 2.0K 5% 1/16W MF-LF 402
MAKE_BASE=TRUE
I2C_NB_C_3V3_SDA
I2C_NB_C_3V3_SCL

Q3970 SI2302ADSE3 SOT23-3
Q3971 SI2302ADSE3 SOT23-3
Q3970_G
Q3971_G
R3974 0 5% 1/16W MF-LF 402
R3975 0 5% 1/16W MF-LF 402
=PP2V5_RUN_I2C

ODD TEMP SENSOR HEADER
J3302
I2C_ODD_TEMP_SDA
I2C_ODD_TEMP_SCL
I2C ADDR:90
R3976 33 5% 1/16W MF-LF 402

HD TEMP SENSOR HEADER
J3301
I2C_HD_TEMP_SDA
I2C_HD_TEMP_SCL
I2C ADDR:92
R3977 33 5% 1/16W MF-LF 402

GPU TEMP SENSOR
U9390
I2C_GPU_DIODE_SDA
I2C_GPU_DIODE_SCL
I2C ADDR:9C
R3978 33 5% 1/16W MF-LF 402

KODIAK TEMP SENSOR
U2080
I2C_NB_TEMP_SDA
I2C_NB_TEMP_SCL
I2C ADDR:98
R3979 33 5% 1/16W MF-LF 402

NB I2C B BUS

=PP2V5_PWRON_NB_MISC
=PP1V8_PWRON_NBMEM
R3925 2.0K 5% 1/16W MF-LF 402
R3936 2.0K 5% 1/16W MF-LF 402
R3924 0 5% 1/16W MF-LF 402
R3937 0 5% 1/16W MF-LF 402
R3931 2.0K 5% 1/16W MF-LF 402
R3938 2.0K 5% 1/16W MF-LF 402
Q3903 SI2302ADSE3 SOT23-3
Q3904 SI2302ADSE3 SOT23-3

KODIAK I2C B
MASTER
U1900
I2C_NB_B_SDA
I2C_NB_B_SCL
NET_SPACING_TYPE=I2C
PINS AG04, AK03

DDR2 DIMMS
I2C_NB_RAM_SDA
I2C_NB_RAM_SCL
NET_SPACING_TYPE=I2C

I2C Connections

SYNC_MASTER=FINO-ME SYNC_DATE=06/20/2005

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APPLE COMPUTER INC.

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SCALE: NONE	SHT 39 OF 154	

Q63 APPLICATION IS PP1V5 PWRON

=PPV_EI_NB 7 41 42 56

XW4100 NO_TEST=YES PP_VEINB P4MM PP4100

U1900 BGA (7 OF 10) PART 0 PWR/GND KODIAK-ASIC-040812

AB01	GND_0	VD2_0	AB02
AB04	GND_1	VD2_1	AB05
AB07	GND_2	VD2_2	AB08
AB10	GND_3	VD2_3	AB11
AB12	GND_4	VD2_4	AB13
AD02	GND_5	VD2_5	AD01
AD05	GND_6	VD2_6	AD04
AD08	GND_7	VD2_7	AD07
AD11	GND_8	VD2_8	AD10
AD13	GND_9	VD2_9	AD12
AD17	GND_10	VD2_10	AD16
AD21	GND_11	VD2_11	AD20
AE15	GND_12	VD2_12	AE14
AE19	GND_13	VD2_13	AE18
AF07	GND_14	VD2_14	AF08
AF10	GND_15	VD2_15	AF11
AF13	GND_16	VD2_16	AF15
AF17	GND_17	VD2_17	AF19
AG11	GND_18	VD2_18	AG13
AG15	GND_19	VD2_19	AG17
AG19	GND_20	VD2_20	AG21
AH02	GND_21	VD2_21	AH04
AH05	GND_22	VD2_22	AH07
AH08	GND_23	VD2_23	AH09
AJ13	GND_24	VD2_24	AJ11
AJ17	GND_25	VD2_25	AJ15
AJ21	GND_26	VD2_26	AJ19
AK01	GND_27	VD2_27	AK02
AK04	GND_28	VD2_28	AK05
AK07	GND_29	VD2_29	AK09
AK11	GND_30	VD2_30	AK13
AK15	GND_31	VD2_31	AK17
AK19	GND_32	VD2_32	AK21
AM02	GND_33	VD2_33	AM01
AM05	GND_34	VD2_34	AM04
AM09	GND_35	VD2_35	AM07
AM13	GND_36	VD2_36	AM11
AM17	GND_37	VD2_37	AM15
AM21	GND_38	VD2_38	AM19
AN04	GND_39	VD2_39	AN05
AN07	GND_40	VD2_40	AN09
AN11	GND_41	VD2_41	AN13
AN15	GND_42	VD2_42	AN17
AN19	GND_43	VD2_43	AN21
AP01	GND_44	VD2_44	AP02
AR05	GND_45	VD2_45	AR03
AR09	GND_46	VD2_46	AR07
AR13	GND_47	VD2_47	AR11
AR17	GND_48	VD2_48	AR15
AR21	GND_49	VD2_49	AR19
AT03	GND_50	VD2_50	AT05
AT07	GND_51	VD2_51	AT09
AT11	GND_52	VD2_52	AT13
AT15	GND_53	VD2_53	AT17
AT19	GND_54	VD2_54	AT21
K01	GND_55	VD2_55	K02
K04	GND_56	VD2_56	K05
M02	GND_57	VD2_57	K08
M05	GND_58	VD2_58	M01
M08	GND_59	VD2_59	M04
P01	GND_60	VD2_60	M07
P04	GND_61	VD2_61	M10
P07	GND_62	VD2_62	P02
P10	GND_63	VD2_63	P05
P12	GND_64	VD2_64	P08
T02	GND_65	VD2_65	P11
T05	GND_66	VD2_66	P13
T08	GND_67	VD2_67	T01
T11	GND_68	VD2_68	T04
T13	GND_69	VD2_69	T07
V01	GND_70	VD2_70	T10
V04	GND_71	VD2_71	T12
V07	GND_72	VD2_72	V02
V10	GND_73	VD2_73	V05
V12	GND_74	VD2_74	V08
Y02	GND_75	VD2_75	V11
Y05	GND_76	VD2_76	V13
Y08	GND_77	VD2_77	Y01
Y11	GND_78	VD2_78	Y04
Y13	GND_79	VD2_79	Y07
AF01	GND_80	VD2_80	Y10
AF04	GND_81	VD2_81	Y12
AF21	GND_82		
AJ08	GND_83		
AJ09	GND_84		

Q63 APPLICATION IS PP1V5 PWRON

56 42 41 7 =PPV_EI_NB

C4168	C4146	C4143	C4139	C4137	C4113	C4112	C4106	C4122	C4100
C4169	C4147	C4145	C4140	C4138	C4114	C4110	C4107	C4133	C4111
C4170	C4149	C4148	C4142	C4141	C4115	C4109	C4108	C4155	C4144
C4171	C4161	C4159	C4152	C4150	C4125	C4118	C4116	C4181	C4166
C4172	C4162	C4160	C4153	C4151	C4126	C4124	C4117	C4101	C4177
C4174	C4165	C4163	C4157	C4154	C4127	C4123		C4104	C4102
C4173	C4167	C4164	C4158	C4156	C4128	C4121	C4120	C4105	C4103
C4180	C4179	C4178	C4176	C4175	C4136	C4135	C4134	C4130	C4129
								C4132	C4131

All: 0.22UF 20% 6.3V X5R 402

KODIAK EI PWR & CAPS

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

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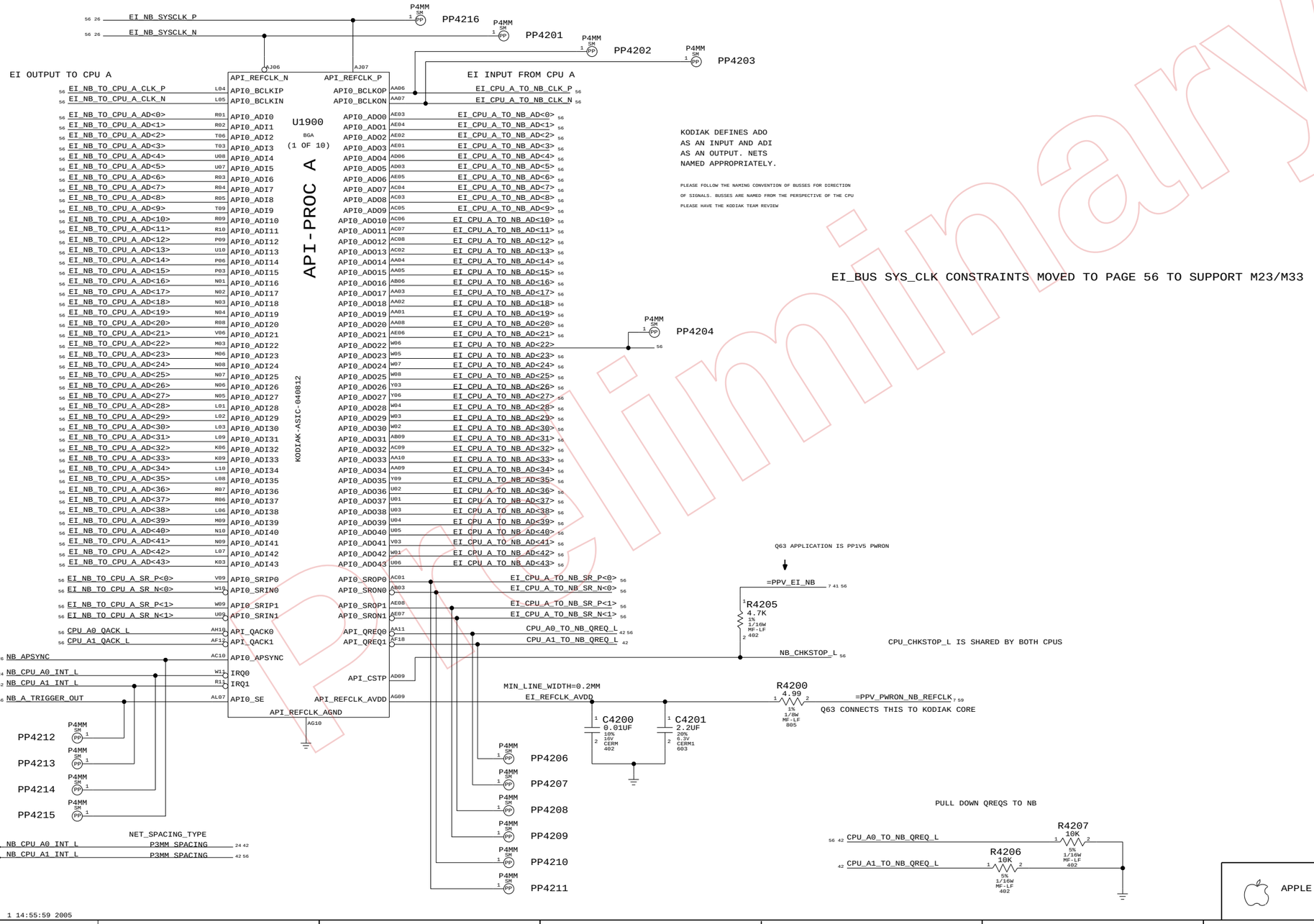
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT: 41 OF: 154

LAST_MODIFIED=Tue Nov 1 14:55:58 2005

DRAWING



LAST_MODIFIED=Tue Nov 1 14:55:59 2005

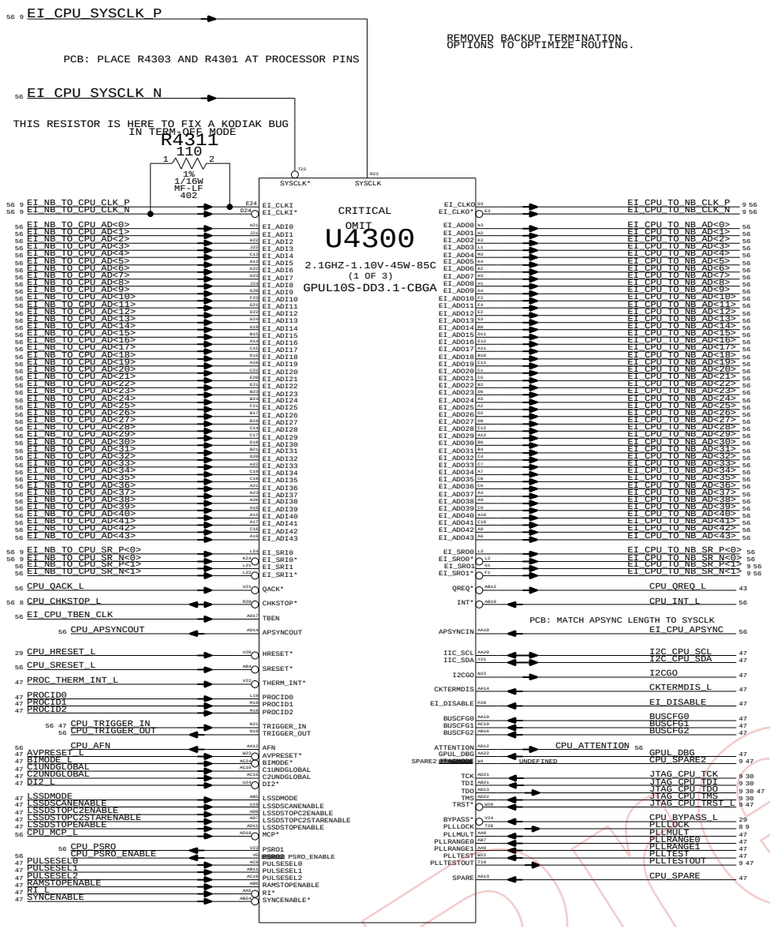
DRAWING

KODIAK EI A

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 42 OF 154	



PG 49 & 52 HAVE MORE CAPS

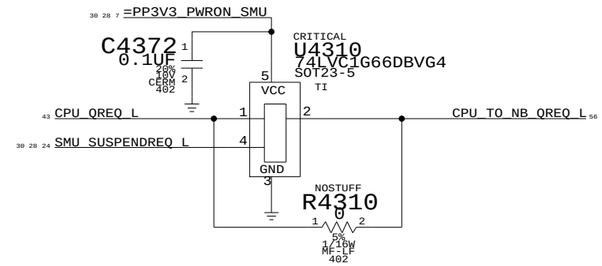
=PPVCORE_CPU

C4353 C4347 C4345 C4339 C4337 C4328 C4324 C4320 C4314 C4312
C4354 C4348 C4346 C4340 C4338 C4329 C4325 C4321 C4315 C4313
C4355 C4351 C4349 C4343 C4341 C4330 C4326 C4322 C4318 C4316
C4356 C4352 C4350 C4344 C4342 C4331 C4327 C4323 C4319 C4317
C4300 C4360 C4359 C4358 C4357 C4336 C4335 C4334 C4333 C4332
C4311 C4310 C4309 C4308 C4307 C4306 C4305 C4304 C4303 C4302

1UF 10% 6.3V 2 CERM 402

QREQ_L AND SUSPENDREQ_L AND HACK

SAME AS Q45



CPU EI AND IO

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	43	154

PLEASE FOLLOW THE NAMING CONVENTION OF BUSSES FOR DIRECTION
OF SIGNALS. BUSSES ARE NAMED FROM THE PERSPECTIVE OF THE CPU
PLEASE HAVE THE KODIAK TEAM REVIEW

EI OUTPUT TO CPU B

EI INPUT FROM CPU B

U1900
BGA
(2 OF 10)
API-PROC B
KODIAK-ASIC-040812

EI_NB_TO_CPU_B_CLK_P	AT08	API1_BCLKIP	API1_BCLKOP	AT16	EI_CPU_B_TO_NB_CLK_P	
EI_NB_TO_CPU_B_CLK_N	AR08	API1_BCLKIN	API1_BCLKON	AR16	EI_CPU_B_TO_NB_CLK_N	
EI_NB_TO_CPU_B_AD<0>	AM12	API1_ADI0	API1_AD00	AP20	EI_CPU_B_TO_NB_AD<0>	
EI_NB_TO_CPU_B_AD<1>	AN12	API1_ADI1	API1_AD01	AN20	EI_CPU_B_TO_NB_AD<1>	
EI_NB_TO_CPU_B_AD<2>	AL12	API1_ADI2	API1_AD02	AR20	EI_CPU_B_TO_NB_AD<2>	
EI_NB_TO_CPU_B_AD<3>	AK12	API1_ADI3	API1_AD03	AT20	EI_CPU_B_TO_NB_AD<3>	
EI_NB_TO_CPU_B_AD<4>	AP11	API1_ADI4	API1_AD04	AL19	EI_CPU_B_TO_NB_AD<4>	
EI_NB_TO_CPU_B_AD<5>	AL11	API1_ADI5	API1_AD05	AP19	EI_CPU_B_TO_NB_AD<5>	
EI_NB_TO_CPU_B_AD<6>	AP12	API1_ADI6	API1_AD06	AM20	EI_CPU_B_TO_NB_AD<6>	
EI_NB_TO_CPU_B_AD<7>	AR12	API1_ADI7	API1_AD07	AM18	EI_CPU_B_TO_NB_AD<7>	
EI_NB_TO_CPU_B_AD<8>	AT12	API1_ADI8	API1_AD08	AL18	EI_CPU_B_TO_NB_AD<8>	
EI_NB_TO_CPU_B_AD<9>	AH12	API1_ADI9	API1_AD09	AN18	EI_CPU_B_TO_NB_AD<9>	
EI_NB_TO_CPU_B_AD<10>	AG12	API1_ADI10	API1_AD010	AP18	EI_CPU_B_TO_NB_AD<10>	
EI_NB_TO_CPU_B_AD<11>	AH13	API1_ADI11	API1_AD011	AR18	EI_CPU_B_TO_NB_AD<11>	
EI_NB_TO_CPU_B_AD<12>	AJ12	API1_ADI12	API1_AD012	AT18	EI_CPU_B_TO_NB_AD<12>	
EI_NB_TO_CPU_B_AD<13>	AG14	API1_ADI13	API1_AD013	AK18	EI_CPU_B_TO_NB_AD<13>	
EI_NB_TO_CPU_B_AD<14>	AM10	API1_ADI14	API1_AD014	AP17	EI_CPU_B_TO_NB_AD<14>	
EI_NB_TO_CPU_B_AD<15>	AL10	API1_ADI15	API1_AD015	AL17	EI_CPU_B_TO_NB_AD<15>	
EI_NB_TO_CPU_B_AD<16>	AN10	API1_ADI16	API1_AD016	AH20	EI_CPU_B_TO_NB_AD<16>	
EI_NB_TO_CPU_B_AD<17>	AP10	API1_ADI17	API1_AD017	AJ20	EI_CPU_B_TO_NB_AD<17>	
EI_NB_TO_CPU_B_AD<18>	AR10	API1_ADI18	API1_AD018	AK20	EI_CPU_B_TO_NB_AD<18>	
EI_NB_TO_CPU_B_AD<19>	AT10	API1_ADI19	API1_AD019	AH19	EI_CPU_B_TO_NB_AD<19>	
EI_NB_TO_CPU_B_AD<20>	AK10	API1_ADI20	API1_AD020	AG20	EI_CPU_B_TO_NB_AD<20>	
EI_NB_TO_CPU_B_AD<21>	AJ10	API1_ADI21	API1_AD021	AL20	EI_CPU_B_TO_NB_AD<21>	
EI_NB_TO_CPU_B_AD<22>	AM08	API1_ADI22	API1_AD022	AM16	EI_CPU_B_TO_NB_AD<22>	
EI_NB_TO_CPU_B_AD<23>	AN08	API1_ADI23	API1_AD023	AN16	EI_CPU_B_TO_NB_AD<23>	
EI_NB_TO_CPU_B_AD<24>	AL08	API1_ADI24	API1_AD024	AL16	EI_CPU_B_TO_NB_AD<24>	
EI_NB_TO_CPU_B_AD<25>	AP07	API1_ADI25	API1_AD025	AK16	EI_CPU_B_TO_NB_AD<25>	
EI_NB_TO_CPU_B_AD<26>	AT06	API1_ADI26	API1_AD026	AP15	EI_CPU_B_TO_NB_AD<26>	
EI_NB_TO_CPU_B_AD<27>	AR06	API1_ADI27	API1_AD027	AL15	EI_CPU_B_TO_NB_AD<27>	
EI_NB_TO_CPU_B_AD<28>	AP08	API1_ADI28	API1_AD028	AP16	EI_CPU_B_TO_NB_AD<28>	
EI_NB_TO_CPU_B_AD<29>	AT04	API1_ADI29	API1_AD029	AM14	EI_CPU_B_TO_NB_AD<29>	
EI_NB_TO_CPU_B_AD<30>	AR04	API1_ADI30	API1_AD030	AL14	EI_CPU_B_TO_NB_AD<30>	
EI_NB_TO_CPU_B_AD<31>	AP05	API1_ADI31	API1_AD031	AN14	EI_CPU_B_TO_NB_AD<31>	
EI_NB_TO_CPU_B_AD<32>	AM06	API1_ADI32	API1_AD032	AP14	EI_CPU_B_TO_NB_AD<32>	
EI_NB_TO_CPU_B_AD<33>	AN06	API1_ADI33	API1_AD033	AR14	EI_CPU_B_TO_NB_AD<33>	
EI_NB_TO_CPU_B_AD<34>	AP06	API1_ADI34	API1_AD034	AT14	EI_CPU_B_TO_NB_AD<34>	
EI_NB_TO_CPU_B_AD<35>	AP04	API1_ADI35	API1_AD035	AK14	EI_CPU_B_TO_NB_AD<35>	
EI_NB_TO_CPU_B_AD<36>	AM03	API1_ADI36	API1_AD036	AP13	EI_CPU_B_TO_NB_AD<36>	
EI_NB_TO_CPU_B_AD<37>	AN01	API1_ADI37	API1_AD037	AL13	EI_CPU_B_TO_NB_AD<37>	
EI_NB_TO_CPU_B_AD<38>	AL06	API1_ADI38	API1_AD038	AG16	EI_CPU_B_TO_NB_AD<38>	
EI_NB_TO_CPU_B_AD<39>	AL05	API1_ADI39	API1_AD039	AH15	EI_CPU_B_TO_NB_AD<39>	
EI_NB_TO_CPU_B_AD<40>	AL04	API1_ADI40	API1_AD040	AJ14	EI_CPU_B_TO_NB_AD<40>	
EI_NB_TO_CPU_B_AD<41>	AL03	API1_ADI41	API1_AD041	AH14	EI_CPU_B_TO_NB_AD<41>	
EI_NB_TO_CPU_B_AD<42>	AN02	API1_ADI42	API1_AD042	AH16	EI_CPU_B_TO_NB_AD<42>	
EI_NB_TO_CPU_B_AD<43>	AN03	API1_ADI43	API1_AD043	AH17	EI_CPU_B_TO_NB_AD<43>	
EI_NB_TO_CPU_B_SR_P<0>	AP09	API1_SRIP0	API1_SROP0	AG18	EI_CPU_B_TO_NB_SR_P<0>	
EI_NB_TO_CPU_B_SR_N<0>	AL09	API1_SRIN0	API1_SRON0	AJ16	EI_CPU_B_TO_NB_SR_N<0>	
EI_NB_TO_CPU_B_SR_P<1>	AR02	API1_SRIP1	API1_SROP1	AJ18	EI_CPU_B_TO_NB_SR_P<1>	
EI_NB_TO_CPU_B_SR_N<1>	AP02	API1_SRIN1	API1_SRON1	AH18	EI_CPU_B_TO_NB_SR_N<1>	
CPU_B0_QACK_L	AF12	API_QACK2	API_QREQ2	AF16	CPU_B0_TO_NB_QREQ_L	
CPU_B1_QACK_L	AC12	API_QACK3	API_QREQ3	AF20	CPU_B1_TO_NB_QREQ_L	
NB_CPU_B0_INT_L	N12	IRQ2				
NB_CPU_B1_INT_L	U12	IRQ3				
TP_NB_APSYNC	AH11	API1_APSYNC				
NB_B_TRIGGER_OUT	AK08	API1_SE				

P4MM SM 1 PP — PP4410
P4MM SM 1 PP — PP4411
P4MM SM 1 PP — PP4413

KODIAK DEFINES ADO
AS AN INPUT AND ADI
AS AN OUTPUT. NETS
NAMED APPROPRIATELY.

WE MAY NEED A DIFFERENT
ELECTRICAL_CONSTRAINT_SET
FOR CPU_A AND CPU_B.

EI_BUS SYS_CLK CONSTRAINTS MOVED TO PAGE 56 TO SUPPORT M23/M33

WIRE TP_NB_APSYNC TO A TEST POINT

P4MM SM 1 PP — PP4406
P4MM SM 1 PP — PP4407
P4MM SM 1 PP — PP4408

NET_SPACING_TYPE

NB_CPU_B0_INT_L	P3MM_SPACING	44 56
NB_CPU_B1_INT_L	P3MM_SPACING	44 56

P4MM SM 1 PP — PP4400
P4MM SM 1 PP — PP4401
P4MM SM 1 PP — PP4402
P4MM SM 1 PP — PP4403
P4MM SM 1 PP — PP4404
P4MM SM 1 PP — PP4405

PULL DOWN QREQS TO NB

CPU_B0_TO_NB_QREQ_L — R4407 10K 5% 1/16W MF-LF 402
CPU_B1_TO_NB_QREQ_L — R4406 10K 5% 1/16W MF-LF 402

KODIAK EI B

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

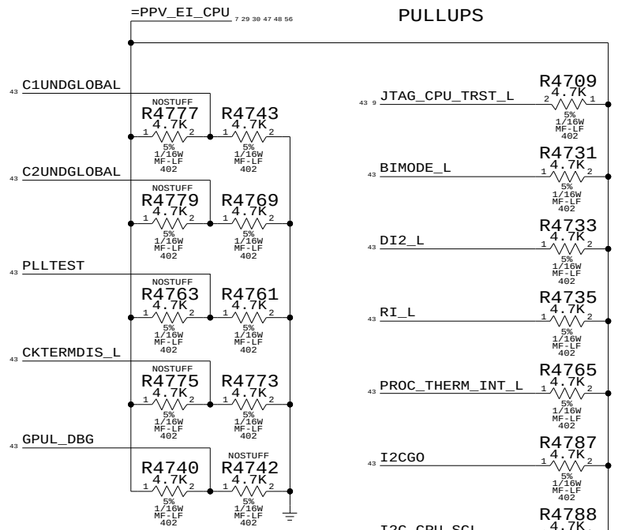
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT 44 OF 154

LAST_MODIFIED=Tue Nov 1 14:56:00 2005

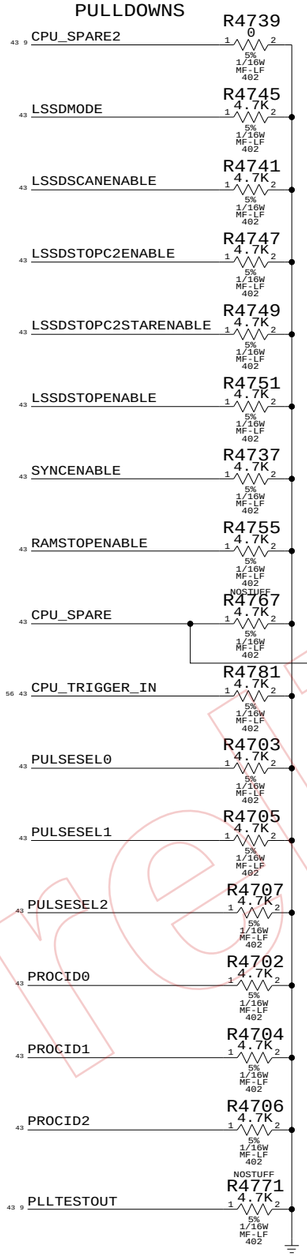
DRAWING



M23/M33 IS JTAG ONLY, NO I2C

PULLUPS

PULLDOWNS



NOTES

JTAG DRIVEN ON SMU PG 30
QREQ PULLDOWNS ON Q63 SHARED PAGE
SRESET DRIVEN ON PG 56
INT DRIVEN BY KODIAK
R4739 REQUIRED TO ACCESS THE RINGS

4.7K RESISTORS FOR MANUFACTURING-TEST-TYPE PULLUPS OR PULLDOWNS.
1K RESISTORS FOR IMPORTANT USE OR STRAPPING OPTIONS.

=PPV_EI_CPU → R4768 10K 5% 1/16W MF-LF 402

>= 1.8 GHZ *

SELECT PROCESSOR CLOCK MULTIPLIER. PROCESSOR CLOCK(MHZ)= SYSTCLOCK * PLLMULT.

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
*	116S0066	1	RES,1K OHM,1/16W,5%,0402	R4734	EI_3TO1	SYSCLK * 12
	116S0066	1	RES,1K OHM,1/16W,5%,0402	R4718	EI_2TO1	SYSCLK * 8

SELECT EI BUS DIVIDER. BUS DATA RATE(BPS)= (PROCESSOR CLOCK) / BUSCFG.

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
*	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4724,R4726,R4728	EI_2TO1	PROC / 2
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4724,R4726,R4712	EI_3TO1	PROC / 3
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4724,R4710,R4728	NOSTUFF	PROC / 4
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4724,R4710,R4712	NOSTUFF	PROC / 6
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4708,R4726,R4728	NOSTUFF	PROC / 8
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4708,R4726,R4712	NOSTUFF	PROC / 12
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4708,R4710,R4728	NOSTUFF	PROC / 16
	116S0066	3	RES,1K OHM,1/16W,5%,0402	R4708,R4710,R4712	NOSTUFF	

SELECT ELASTIC MODE OR BYPASS.

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
*	116S0066	1	RES,1K OHM,1/16W,5%,0402	R4736		
	116S0066	1	RES,1K OHM,1/16W,5%,0402	R4720	NOSTUFF	BYPASS MODE

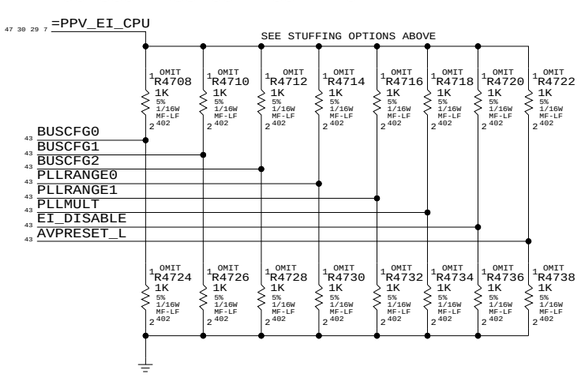
SELECT PLL FREQUENCY RANGE.

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
116S0066	2	RES,1K OHM,1/16W,5%,0402	R4730,R4732	CPU_PLL_LOW	
116S0066	2	RES,1K OHM,1/16W,5%,0402	R4730,R4716	CPU_PLL_HIGH	
116S0066	2	RES,1K OHM,1/16W,5%,0402	R4714,R4732	CPU_PLL_MEDIUM	
116S0066	2	RES,1K OHM,1/16W,5%,0402	R4714,R4716	NOSTUFF	RESERVED

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
116S0066	1	RES,1K OHM,1/16W,5%,0402	R4722		AVPRESET OFF
116S0066	1	RES,1K OHM,1/16W,5%,0402	R4738	NOSTUFF	AVPRESET ON

* STUFF THESE ON M23.

PROCESSOR BUS CONFIGURATION



CPU STRAPS

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT: 47 OF: 154

56 55 52 50 49 43 =PPVCORE_CPU
VOLTAGE=1.3V
MIN_LINE_WIDTH=0.50MM
MIN_NECK_WIDTH=0.20MM

=PPV_EI_CPU 7 29 30 47 56

54 PPV_RUN_AVDD_CPU

R4832 2.2 5% 1/10W MF-LF 603

PPV_RUN_CPU_AVDD_R
VOLTAGE=2.8V
MIN_LINE_WIDTH=0.60MM
MIN_NECK_WIDTH=0.20MM

L4801 60-OHM-EMI SM 0805

6 PPV_RUN_CPU_AVDD_R_L
VOLTAGE=2.8V
MIN_LINE_WIDTH=0.60MM
MIN_NECK_WIDTH=0.20MM

C4802 10UF 20% 6.3V X5R 805

C4800 0.1UF 10% 16V X5R 402

NET_PHYSICAL_TYPE=PROC_DIFF
NET_SPACING_TYPE=PROC_DIFF
DIFFERENTIAL_PAIR=P_TDO
MIN_LINE_WIDTH=0.25MM
MIN_NECK_WIDTH=0.20MM

CPU_DIODE_POS 6 55

C4817 10UF 20% 6.3V X5R 805
C4816 10UF 20% 6.3V X5R 805
C4815 10UF 20% 6.3V X5R 805
C4814 10UF 20% 6.3V X5R 805

C4811 C4806 C4805 C4803 0.1UF 20% 10V CERM 402
C4812 C4809 C4807 C4804 0.1UF 20% 10V CERM 402
C4813 C4810 C4808 0.1UF 20% 10V CERM 402
C4826 C4820 C4818 0.1UF 20% 10V CERM 402
C4827 C4821 C4819 0.1UF 20% 10V CERM 402
C4828 C4824 C4822 0.1UF 20% 10V CERM 402
C4829 C4825 C4823 0.1UF 20% 10V CERM 402
C4836 C4831 C4830 0.1UF 20% 10V CERM 402
C4837 C4834 C4832 0.1UF 20% 10V CERM 402
C4838 C4835 C4833 0.1UF 20% 10V CERM 402
C4845 C4841 C4839 0.1UF 20% 10V CERM 402
C4846 C4842 C4840 0.1UF 20% 10V CERM 402
C4847 C4844 C4843 0.1UF 20% 10V CERM 402

P24 AVDD
KPVDD1 (NOSTUFF)
DIODEPOS
KPVDD2

OMIT CRITICAL
U4300
2.1GHZ-1.10V-45W-85C
(2 OF 3)
GPUL10S-DD3.1-CBGA

CRITICAL OMIT
U4300
2.1GHZ-1.10V-45W-85C
(3 OF 3)
GPUL10S-DD3.1-CBGA

VCORE X105
GND X105
VCORE X100
GND X99

SPARE_GND

AGND R24
DIODENEG (NOSTUFF) AA1
KPGND2 T2

6 GND_CPU_AVDD

2 OMIT
XW4800
SM
1

55 6 CPU_DIODE_NEG
DIFFERENTIAL_PAIR=P_TDO
MIN_LINE_WIDTH=0.25MM
MIN_NECK_WIDTH=0.20MM
NET_SPACING_TYPE=PROC_DIFF
NET_PHYSICAL_TYPE=PROC_DIFF

NOSTUFF
R4810 100K 5% 1/10W MF-LF 603

PROCESSOR KELVIN POINT PROBE POINT

KPVDD2 6 50 55
DIFFERENTIAL_PAIR=P_KP2
MIN_LINE_WIDTH=0.25MM
MIN_NECK_WIDTH=0.20MM
NET_SPACING_TYPE=PROC_DIFF
NET_PHYSICAL_TYPE=PROC_DIFF

REMEMBER TO CHANGE KPVDD TO NO_TEST ON PG 6.

PCB:PUT R4810 AS CLOSE TO RESPECTIVE PINS AS POSSIBLE.

KPGND2 6 50 55
DIFFERENTIAL_PAIR=P_KP2
MIN_LINE_WIDTH=0.25MM
MIN_NECK_WIDTH=0.20MM
NET_SPACING_TYPE=PROC_DIFF
NET_PHYSICAL_TYPE=PROC_DIFF

CPU POWER AND BYPASS

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	48	154

56 55 52 50 48 43 =PPVCORE_CPU

C4922 1UF 10% 6.3V CERM 402	C4921 1UF 10% 6.3V CERM 402	C4920 1UF 10% 6.3V CERM 402	C4919 1UF 10% 6.3V CERM 402	C4918 1UF 10% 6.3V CERM 402	C4917 1UF 10% 6.3V CERM 402	C4916 1UF 10% 6.3V CERM 402	C4915 1UF 10% 6.3V CERM 402	C4912 1UF 10% 6.3V CERM 402	C4900 1UF 10% 6.3V CERM 402
C4993 1UF 10% 6.3V CERM 402	C4968 1UF 10% 6.3V CERM 402	C4961 1UF 10% 6.3V CERM 402	C4959 1UF 10% 6.3V CERM 402	C4935 1UF 10% 6.3V CERM 402	C4932 1UF 10% 6.3V CERM 402	C4926 1UF 10% 6.3V CERM 402	C4924 1UF 10% 6.3V CERM 402	C4945 1UF 10% 6.3V CERM 402	C4923 1UF 10% 6.3V CERM 402
C4994 1UF 10% 6.3V CERM 402	C4969 1UF 10% 6.3V CERM 402	C4964 1UF 10% 6.3V CERM 402	C4960 1UF 10% 6.3V CERM 402	C4936 1UF 10% 6.3V CERM 402	C4933 1UF 10% 6.3V CERM 402	C4927 1UF 10% 6.3V CERM 402	C4925 1UF 10% 6.3V CERM 402	C4956 1UF 10% 6.3V CERM 402	C4934 1UF 10% 6.3V CERM 402
C4995 1UF 10% 6.3V CERM 402	C4971 1UF 10% 6.3V CERM 402	C4965 1UF 10% 6.3V CERM 402	C4962 1UF 10% 6.3V CERM 402	C4939 1UF 10% 6.3V CERM 402	C4937 1UF 10% 6.3V CERM 402	C4930 1UF 10% 6.3V CERM 402	C4928 1UF 10% 6.3V CERM 402	C4989 1UF 10% 6.3V CERM 402	C4967 1UF 10% 6.3V CERM 402
C4996 1UF 10% 6.3V CERM 402	C4970 1UF 10% 6.3V CERM 402	C4966 1UF 10% 6.3V CERM 402	C4963 1UF 10% 6.3V CERM 402	C4940 1UF 10% 6.3V CERM 402	C4938 1UF 10% 6.3V CERM 402	C4931 1UF 10% 6.3V CERM 402	C4929 1UF 10% 6.3V CERM 402	C4901 1UF 10% 6.3V CERM 402	C4978 1UF 10% 6.3V CERM 402
C4997 1UF 10% 6.3V CERM 402	C4982 1UF 10% 6.3V CERM 402	C4976 1UF 10% 6.3V CERM 402	C4972 1UF 10% 6.3V CERM 402	C4952 1UF 10% 6.3V CERM 402	C4950 1UF 10% 6.3V CERM 402	C4943 1UF 10% 6.3V CERM 402	C4941 1UF 10% 6.3V CERM 402	C4906 1UF 10% 6.3V CERM 402	C4904 1UF 10% 6.3V CERM 402
C4998 1UF 10% 6.3V CERM 402	C4981 1UF 10% 6.3V CERM 402	C4977 1UF 10% 6.3V CERM 402	C4973 1UF 10% 6.3V CERM 402	C4953 1UF 10% 6.3V CERM 402	C4951 1UF 10% 6.3V CERM 402	C4944 1UF 10% 6.3V CERM 402	C4942 1UF 10% 6.3V CERM 402	C4907 1UF 10% 6.3V CERM 402	C4905 1UF 10% 6.3V CERM 402
C4999 1UF 10% 6.3V CERM 402	C4984 1UF 10% 6.3V CERM 402	C4979 1UF 10% 6.3V CERM 402	C4974 1UF 10% 6.3V CERM 402	C4957 1UF 10% 6.3V CERM 402	C4954 1UF 10% 6.3V CERM 402	C4948 1UF 10% 6.3V CERM 402	C4946 1UF 10% 6.3V CERM 402	C4910 1UF 10% 6.3V CERM 402	C4908 1UF 10% 6.3V CERM 402
C4902 1UF 10% 6.3V CERM 402	C4983 1UF 10% 6.3V CERM 402	C4980 1UF 10% 6.3V CERM 402	C4975 1UF 10% 6.3V CERM 402	C4958 1UF 10% 6.3V CERM 402	C4955 1UF 10% 6.3V CERM 402	C4949 1UF 10% 6.3V CERM 402	C4947 1UF 10% 6.3V CERM 402	C4911 1UF 10% 6.3V CERM 402	C4909 1UF 10% 6.3V CERM 402
C4903 1UF 10% 6.3V CERM 402	C4992 1UF 10% 6.3V CERM 402	C4991 1UF 10% 6.3V CERM 402	C4990 1UF 10% 6.3V CERM 402	C4988 1UF 10% 6.3V CERM 402	C4987 1UF 10% 6.3V CERM 402	C4986 1UF 10% 6.3V CERM 402	C4985 1UF 10% 6.3V CERM 402	C4914 1UF 10% 6.3V CERM 402	C4913 1UF 10% 6.3V CERM 402

PROC DECOUPLING

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE NONE	SHT 49 OF 154	

VCORE VOLTAGE CONTROLLER (VC)

M23/M33: PP12V_CPU IS AN ALL RAIL

=PP12V_CPU
R5029 10 5% 1/16W MF-LF 402
VC_VCC
C5019 1UF 20% 16V CERM 1206
SYS_POWERUP_L
VRM_EN
R5000 1.5K 5% 1/16W MF-LF 402
Q5012 2N7002 SOT23-LF
C5001 1UF 10% 6.3V CERM 402
CPU_VID_R<0>
CPU_VID_R<1>
CPU_VID_R<2>
CPU_VID_R<3>
CPU_VID_R<4>
CPU_VID_R<5>
VC_AGND
VC_BGOUT
VC_OSCREF
VC_DACSTEP
VC_OS1
VC_OS2
U5000 SC2642 TSSOP
VCC
BGOUT
OSCREF
VID0
VID1
VID2
VID3
VID4
VID5
DACSTEP
FB
GSENSE
OS1
OS2
AGND
CRITICAL
OUTSEN
OUT1
OUT2
PGOOD
EROUT
VC_OUTSEN
VC_OUT1
VC_OUT2
VC_PGOOD
PGOOD IS OC
R5030 0 5% 1/16W MF-LF 402
SYS_SLEWING_L
NOSTUFF R5003 2.7M 5% 1/10W MF-LF 603
VC_ERROUT
VC_VCC
R5001 20K 5% 1/16W MF-LF 402
NOSTUFF R5002 0 5% 1/16W MF-LF 402
VC_ERROUT_RC
C5002 470PF 10% 50V CERM 402
OMIT XW5000 SM
C5000 0.1UF 20% 10V CERM 402
R5028 221K 1% 1/16W MF-LF 402
VC_AUX1
VC_AUX2
R5013 20.5K 1% 1/16W MF-LF 402
R5016 20.5K 1% 1/16W MF-LF 402
C5004 0.01UF 10% 16V CERM 402
NOSTUFF R5014 20.5K 1% 1/16W MF-LF 402
C5005 0.01UF 10% 16V CERM 402
NOSTUFF R5015 20.5K 1% 1/16W MF-LF 402
VCORE_SENSE_GND
DIFFERENTIAL PAIR FOR REMOTE SENSE
VCORE_SENSE_VOUT
R5005 4.99K 1% 1/16W MF-LF 402
R5004 261 1% 1/16W MF-LF 402
C5008 0.33UF 10% 6.3V CERM-X5R 402
NOSTUFF R5026 301 1% 1/16W MF-LF 402
AVP ADJUSTMENT
NOSTUFF R5024 330 5% 1/16W MF-LF 402
NOSTUFF R5025 1K 5% 1/16W MF-LF 402
VC_OS_HUB_RC
PCB:PLACE R5025 CLOSE TO INDUCTOR OUTPUT LEAD.
NOSTUFF C5009 0.015UF 10% 16V X7R 402
R5027 1.5K 1% 1/16W MF-LF 402
VC_OUTSEN_R
OMIT XW5002 SM
=PPVCORE_CPU
PCB:CONNECT BETWEEN THE INDUCTOR & BULK CAPS.

VC PROCESSOR VOLTAGE SENSING

CHOICE OF:
1) VCORE PLANE SENSING
2) KELVIN POINT SENSING

PPVCORE_CPU
MIN_NECK_WIDTH=0.20MM
MIN_LINE_WIDTH=0.50MM
UNDER PROCESSOR
R5035 0 5% 1/16W MF-LF 402
R5036 0 5% 1/16W MF-LF 402
VCORE_SENSE_VOUT
VCORE_SENSE_GND
NOSTUFF R5041 0 5% 1/16W MF-LF 402
KPVDD2
CPU SENSE SIDE
NOSTUFF R5042 0 5% 1/16W MF-LF 402
KPGND2

	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
GD1_DRN	0.25 MM	0.25 MM	R836
GD1_BST	0.25 MM	0.25 MM	R837
GD1_VREG	0.25 MM	0.25 MM	R838
GD1_VPN	0.25 MM	0.25 MM	R839
GD1_TG	0.25 MM	0.25 MM	R840
GD1_BG	0.25 MM	0.25 MM	R841
GD1_FET_RC	0.25 MM	0.25 MM	R842
GD1_PN	0.60 MM	0.25 MM	R843
GD1_BST_R	0.25 MM	0.25 MM	R858

	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
GD2_DRN	0.25 MM	0.25 MM	R844
GD2_BST	0.25 MM	0.25 MM	R845
GD2_VREG	0.25 MM	0.25 MM	R846
GD2_VPN	0.25 MM	0.25 MM	R847
GD2_TG	0.25 MM	0.25 MM	R848
GD2_BG	0.25 MM	0.25 MM	R849
GD2_FET_RC	0.25 MM	0.25 MM	R850
GD2_PN	0.60 MM	0.25 MM	R851
GD2_BST_R	0.25 MM	0.25 MM	R852

VCORE SUPPLY PHASE 1 (GD1)

PP12V_CPU_R_L
C5010 1UF 20% 16V CERM 1206
GD1_BST_R
GD1_DRN
CRITICAL
U5010 SC1211
VIN SOIC-LF
CO
DRN
BST
BG
VREG
TG
VPN
THMPAD
C5029 1UF 20% 16V CERM 1206
R5007 4.7 5% 1/10W MF-LF 603
GD1_BST
D5010 BAS16-75V-0.25A SOT23-LF
GD1_VREG
C5013 1UF 20% 16V CERM 1206
GD1_VPN
R5012 200 5% 1/16W MF-LF 402
VC_AUX1
C5014 470PF 10% 50V CERM 402
GD1_PN
C5011 680UF 20% 16V ELEC TH-MCZ
C5035 330UF 20% 16V ELEC SM-LF
C5012 10UF 10% 16V CERM 1210
GD1_TG
CRITICAL Q5010 NTD60N02R CASE369-LF
R5050 10K 5% 1/16W MF-LF 402
R5010 1 5% 1/10W MF-LF 402
GD1_BG
CRITICAL Q5011 NTD70N03R CASE369-LF
R5011 1.0 5% 1/4W MF-LF 1206
GD1_FET_RC
CRITICAL Q5013 NTD70N03R CASE369-LF
C5015 0.0022UF 10% 50V CERM 402
C5016 3300PF 10% 50V CERM 603
CRITICAL L5010 0.6UH-24A TH2
=PPVCORE_CPU
PPVCORE_CPU
MAKE BASE=TRUE
C5018 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5017 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5032 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5037 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5038 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5039 1800UF 20% 6.3V ELEC TH-KZJ-LF

VCORE SUPPLY PHASE 2 (GD2)

PP12V_CPU_R_L
C5020 1UF 20% 16V CERM 1206
GD2_BST_R
GD2_DRN
CRITICAL
U5020 SC1211
VIN SOIC-LF
CO
DRN
BST
BG
VREG
TG
VPN
THMPAD
C5030 1UF 20% 16V CERM 1206
R5006 4.7 5% 1/10W MF-LF 603
GD2_BST
D5020 BAS16-75V-0.25A SOT23-LF
GD2_VREG
C5023 1UF 20% 16V CERM 1206
GD2_VPN
R5022 200 5% 1/16W MF-LF 402
VC_AUX2
C5024 470PF 10% 50V CERM 402
GD2_PN
C5021 1000UF 20% 16V ELEC TH-KZJ-LF
C5034 1000UF 20% 16V ELEC TH-KZJ-LF
C5022 10UF 10% 16V CERM 1210
GD2_TG
CRITICAL Q5020 NTD60N02R CASE369-LF
R5051 10K 5% 1/16W MF-LF 402
R5020 1 5% 1/10W MF-LF 402
GD2_BG
CRITICAL Q5021 NTD70N03R CASE369-LF
R5021 1.0 5% 1/4W MF-LF 1206
GD2_FET_RC
CRITICAL Q5023 NTD70N03R CASE369-LF
C5025 0.0022UF 10% 50V CERM 402
C5026 3300PF 10% 50V CERM 603
CRITICAL L5020 0.6UH-24A TH2
PPVCORE_CPU
C5028 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5033 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5040 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5041 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5042 1800UF 20% 6.3V ELEC TH-KZJ-LF
C5043 1800UF 20% 6.3V ELEC TH-KZJ-LF

PHYSICAL CONSTRAINTS

	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
VC_OSCREF	0.25 MM	0.20 MM	R826
CPU_VID_R<0..5>	0.25 MM	0.20 MM	R830
VC_DACSTEP	0.25 MM	0.20 MM	R821
VC_AGND	0.50 MM	0.20 MM	R822
VC_BGOUT	0.25 MM	0.20 MM	R827
VC_OS1	0.25 MM	0.20 MM	R823
VC_OS2	0.25 MM	0.20 MM	R824
VC_VCC	0.25 MM	0.25 MM	R831
VC_OS_HUB	0.25 MM	0.20 MM	R825
VC_OUTSEN	0.25 MM	0.20 MM	R826
VC_OUTSEN_R	0.25 MM	0.20 MM	R827
VCORE_SENSE_GND	0.25 MM	0.20 MM	R828
VCORE_SENSE_VOUT	0.25 MM	0.20 MM	R829
VC_AUX1	0.25 MM	0.25 MM	R832
VC_AUX2	0.25 MM	0.25 MM	R833
VC_OUT1	0.45 MM	0.25 MM	R834
VC_OUT2	0.45 MM	0.25 MM	R835
VC_ERROUT	0.25 MM	0.20 MM	R855
VC_ERROUT_RC	0.25 MM	0.20 MM	R856
VC_OS_HUB_RC	0.25 MM	0.20 MM	R854

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0340	376S0388		Q5010,Q5020	
376S0341	376S0390		Q5011,Q5013,Q5021,Q5023	

CPU VCORE VREG

SYNC_MASTER=M23-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6790 | REV. E

SCALE NONE | SHT 50 OF 154

56 55 50 49 48 43 =PPVCORE_CPU

CRITICAL

C5200 10UF 10% 6.3V X5R 805	C5212 10UF 10% 6.3V X5R 805	C5223 10UF 10% 6.3V X5R 805	C5234 10UF 10% 6.3V X5R 805	C5245 10UF 10% 6.3V X5R 805	C5201 10UF 10% 6.3V X5R 805	C5289 10UF 10% 6.3V X5R 805	C5278 10UF 10% 6.3V X5R 805	C5267 10UF 10% 6.3V X5R 805	C5256 10UF 10% 6.3V X5R 805
C5213 10UF 10% 6.3V X5R 805	C5211 10UF 10% 6.3V X5R 805	C5210 10UF 10% 6.3V X5R 805	C5209 10UF 10% 6.3V X5R 805	C5208 10UF 10% 6.3V X5R 805	C5207 10UF 10% 6.3V X5R 805	C5206 10UF 10% 6.3V X5R 805	C5205 10UF 10% 6.3V X5R 805	C5204 10UF 10% 6.3V X5R 805	C5203 10UF 10% 6.3V X5R 805
C5224 10UF 10% 6.3V X5R 805	C5222 10UF 10% 6.3V X5R 805	C5221 10UF 10% 6.3V X5R 805	C5220 10UF 10% 6.3V X5R 805	C5219 10UF 10% 6.3V X5R 805	C5218 10UF 10% 6.3V X5R 805	C5217 10UF 10% 6.3V X5R 805	C5216 10UF 10% 6.3V X5R 805	C5215 10UF 10% 6.3V X5R 805	C5214 10UF 10% 6.3V X5R 805
C5235 10UF 10% 6.3V X5R 805	C5233 10UF 10% 6.3V X5R 805	C5232 10UF 10% 6.3V X5R 805	C5231 10UF 10% 6.3V X5R 805	C5230 10UF 10% 6.3V X5R 805	C5229 10UF 10% 6.3V X5R 805	C5228 10UF 10% 6.3V X5R 805	C5227 10UF 10% 6.3V X5R 805	C5226 10UF 10% 6.3V X5R 805	C5225 10UF 10% 6.3V X5R 805
C5246 10UF 10% 6.3V X5R 805	C5244 10UF 10% 6.3V X5R 805	C5243 10UF 10% 6.3V X5R 805	C5242 10UF 10% 6.3V X5R 805	C5241 10UF 10% 6.3V X5R 805	C5240 10UF 10% 6.3V X5R 805	C5239 10UF 10% 6.3V X5R 805	C5238 10UF 10% 6.3V X5R 805	C5237 10UF 10% 6.3V X5R 805	C5236 10UF 10% 6.3V X5R 805
C5257 10UF 10% 6.3V X5R 805	C5255 10UF 10% 6.3V X5R 805	C5254 10UF 10% 6.3V X5R 805	C5253 10UF 10% 6.3V X5R 805	C5252 10UF 10% 6.3V X5R 805	C5251 10UF 10% 6.3V X5R 805	C5250 10UF 10% 6.3V X5R 805	C5249 10UF 10% 6.3V X5R 805	C5248 10UF 10% 6.3V X5R 805	C5247 10UF 10% 6.3V X5R 805
C5268 10UF 10% 6.3V X5R 805	C5266 10UF 10% 6.3V X5R 805	C5265 10UF 10% 6.3V X5R 805	C5264 10UF 10% 6.3V X5R 805	C5263 10UF 10% 6.3V X5R 805	C5262 10UF 10% 6.3V X5R 805	C5261 10UF 10% 6.3V X5R 805	C5260 10UF 10% 6.3V X5R 805	C5259 10UF 10% 6.3V X5R 805	C5258 10UF 10% 6.3V X5R 805
C5279 10UF 10% 6.3V X5R 805	C5277 10UF 10% 6.3V X5R 805	C5276 10UF 10% 6.3V X5R 805	C5275 10UF 10% 6.3V X5R 805	C5274 10UF 10% 6.3V X5R 805	C5273 10UF 10% 6.3V X5R 805	C5272 10UF 10% 6.3V X5R 805	C5271 10UF 10% 6.3V X5R 805	C5270 10UF 10% 6.3V X5R 805	C5269 10UF 10% 6.3V X5R 805
C5290 10UF 10% 6.3V X5R 805	C5288 10UF 10% 6.3V X5R 805	C5287 10UF 10% 6.3V X5R 805	C5286 10UF 10% 6.3V X5R 805	C5285 10UF 10% 6.3V X5R 805	C5284 10UF 10% 6.3V X5R 805	C5283 10UF 10% 6.3V X5R 805	C5282 10UF 10% 6.3V X5R 805	C5281 10UF 10% 6.3V X5R 805	C5280 10UF 10% 6.3V X5R 805
C5202 10UF 10% 6.3V X5R 805	C5299 10UF 10% 6.3V X5R 805	C5298 10UF 10% 6.3V X5R 805	C5297 10UF 10% 6.3V X5R 805	C5296 10UF 10% 6.3V X5R 805	C5295 10UF 10% 6.3V X5R 805	C5294 10UF 10% 6.3V X5R 805	C5293 10UF 10% 6.3V X5R 805	C5292 10UF 10% 6.3V X5R 805	C5291 10UF 10% 6.3V X5R 805

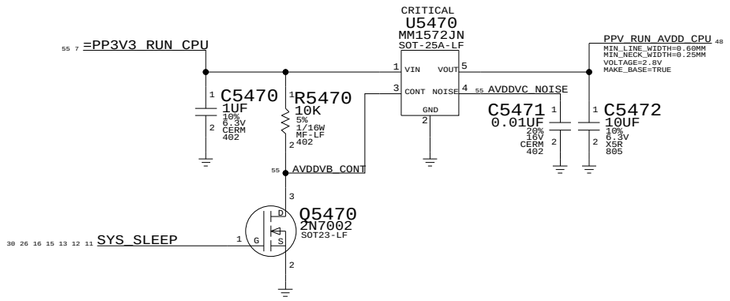
CPU VCORE MORE BYPASS

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 52 OF 154	

PROCESSOR AVDD VREG



CPU AVDD VREG

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

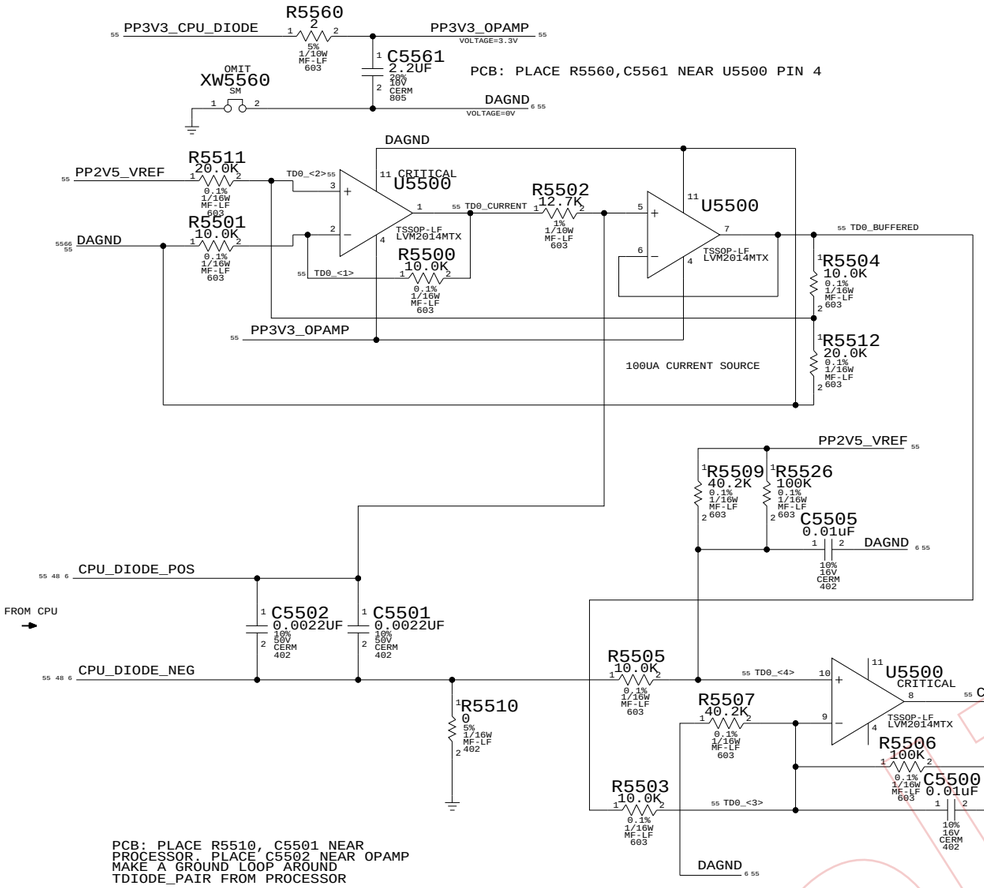
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

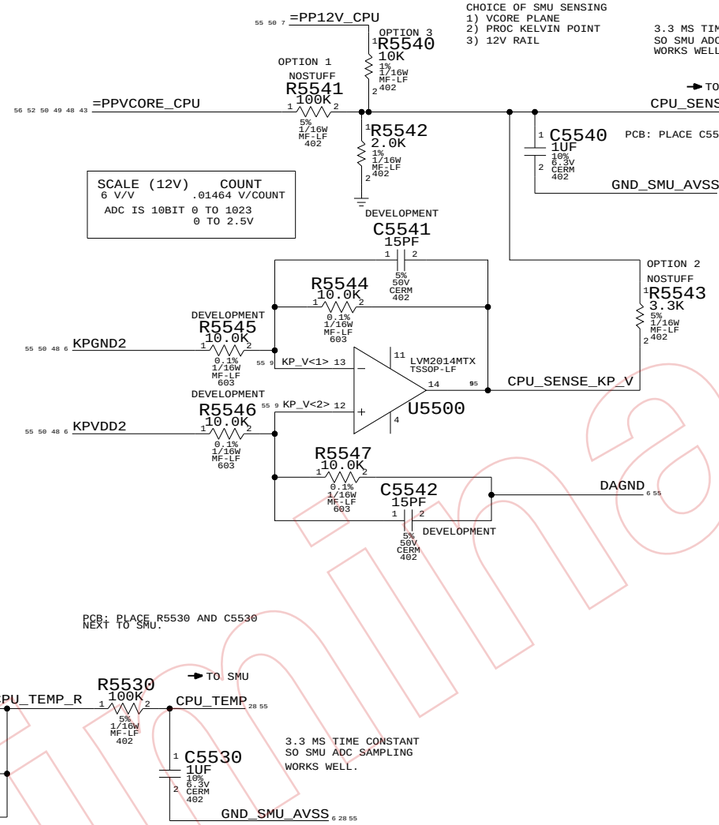
SCALE NONE

SHT 54 OF 154

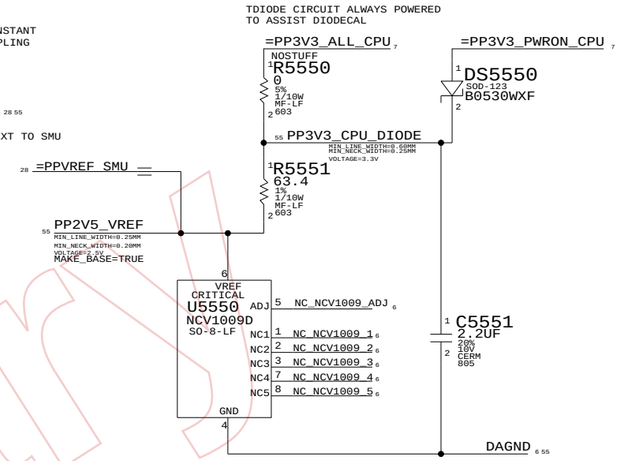
PROCESSOR TEMP SENSE (TDIODE EXCITATION CIRCUIT AND OPAMP)



PROCESSOR VCORE VOLTAGE SENSE



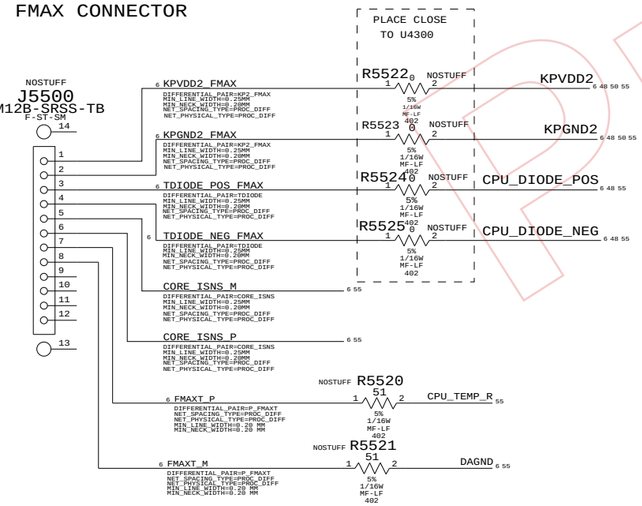
2.5V PRECISION VOLTAGE REFERENCE SOURCE



PHYSICAL CONSTRAINTS

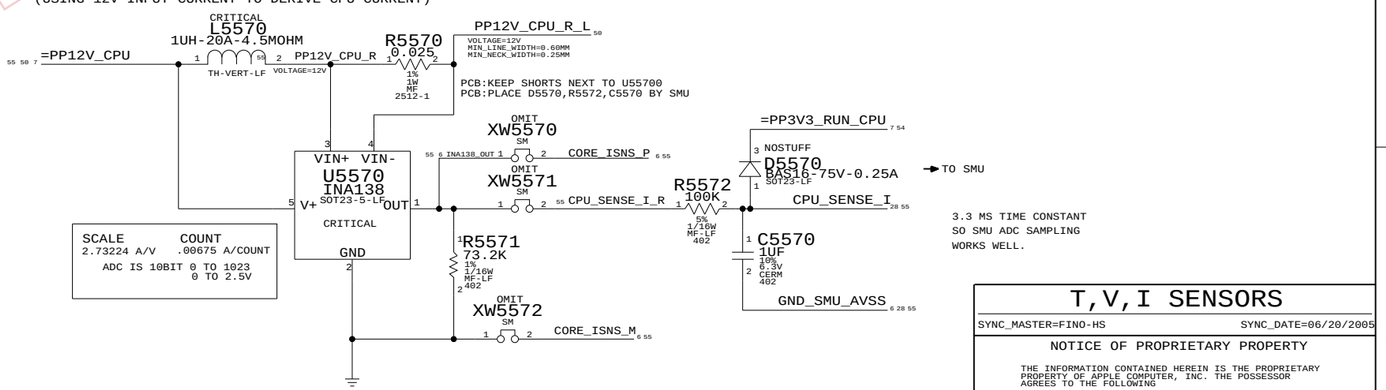
	MIN_LINE_WIDTH	MIN_NECK_WIDTH
TD0_<1..4>	0.25 MM	0.25 MM
PP12V_CPU_R	0.60 MM	0.25 MM
TD0_CURRENT	0.25 MM	0.25 MM
TD0_BUFFERED	0.25 MM	0.25 MM
KP_V<1..2>	0.25 MM	0.25 MM
CPU_SENSE_KP_V	0.25 MM	0.25 MM
PP3V3_OPAMP	0.60 MM	0.25 MM
INA138_OUT	0.25 MM	0.25 MM
CPU_SENSE_I_R	0.25 MM	0.25 MM
CPU_SENSE_I	0.25 MM	0.20 MM
CPU_SENSE_V	0.25 MM	0.20 MM
CPU_TEMP	0.25 MM	0.20 MM
CPU_TEMP_R	0.25 MM	0.20 MM
AVDDVC_NOISE	0.25 MM	0.20 MM
AVDDVB_CONT	0.25 MM	0.20 MM
PP12V_CPU_R	0.60 MM	0.25 MM
DAGND	0.60 MM	0.25 MM

FMAX CONNECTOR



PROCESSOR VCORE CURRENT SENSE

(USING 12V INPUT CURRENT TO DERIVE CPU CURRENT)



T,V,I SENSORS

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 55 OF 154	

CONNECT PULSAR CLKS TO CPU/NB

EI_CPU_SYSCLK_P	MAKE_BASE=TRUE	EI_CPU_A_SYSCLK_P	26
EI_CPU_SYSCLK_N	MAKE_BASE=TRUE	EI_CPU_A_SYSCLK_N	26
EI_CPU_APSYNC	MAKE_BASE=TRUE	CPU_A_APSYNC	26
EI_CPU_TBEN_CLK	MAKE_BASE=TRUE	CPU_A_TBEN_CLK_US	26
EI_NB_APSYNC	MAKE_BASE=TRUE	NB_APSYNC	26 42

CONNECT KODIAK EI A TO/FROM CPU

EI_NB_TO_CPU_CLK_P		EI_NB_TO_CPU_A_CLK_P	42
EI_NB_TO_CPU_CLK_N	MAKE_BASE=TRUE	EI_NB_TO_CPU_A_CLK_N	42
EI_NB_TO_CPU_AD<0..43>	MAKE_BASE=TRUE	EI_NB_TO_CPU_A_AD<0..43>	42
EI_NB_TO_CPU_SR_P<0..1>	MAKE_BASE=TRUE	EI_NB_TO_CPU_A_SR_P<0..1>	42
EI_NB_TO_CPU_SR_N<0..1>	MAKE_BASE=TRUE	EI_NB_TO_CPU_A_SR_N<0..1>	42
	MAKE_BASE=TRUE		
EI_CPU_TO_NB_CLK_P		EI_CPU_A_TO_NB_CLK_P	42
EI_CPU_TO_NB_CLK_N	MAKE_BASE=TRUE	EI_CPU_A_TO_NB_CLK_N	42
EI_CPU_TO_NB_AD<0..43>	MAKE_BASE=TRUE	EI_CPU_A_TO_NB_AD<0..43>	42
EI_CPU_TO_NB_SR_P<0..1>	MAKE_BASE=TRUE	EI_CPU_A_TO_NB_SR_P<0..1>	42
EI_CPU_TO_NB_SR_N<0..1>	MAKE_BASE=TRUE	EI_CPU_A_TO_NB_SR_N<0..1>	42
	MAKE_BASE=TRUE		

CONNECT CPU TO KODIAK QREQ A0

CPU_TO_NB_QREQ_L		CPU_A0_TO_NB_QREQ_L	42
	MAKE_BASE=TRUE		

CONNECT CPU TO KODIAK QACK A0, NC OTHERWISE

CPU_QACK_L		CPU_A0_QACK_L	42
NC_CPU_A1_QACK_L	MAKE_BASE=TRUE	CPU_A1_QACK_L	42
NC_CPU_B0_QACK_L	MAKE_BASE=TRUE	CPU_B0_QACK_L	44
NC_CPU_B1_QACK_L	MAKE_BASE=TRUE	CPU_B1_QACK_L	44
	MAKE_BASE=TRUE		

CONNECT CPU TO KODIAK/SHASTA INT A0, NC OTHERWISE

CPU_INT_L		CPU_A0_INT_R_L	24 56
NC_NB_CPU_A1_INT_L	MAKE_BASE=TRUE	NB_CPU_A1_INT_L	42
NC_NB_CPU_B0_INT_L	MAKE_BASE=TRUE	NB_CPU_B0_INT_L	44
NC_NB_CPU_B1_INT_L	MAKE_BASE=TRUE	NB_CPU_B1_INT_L	44
	MAKE_BASE=TRUE		

CONNECT CPU TO SHASTA SRESET A0, NC OTHERWISE

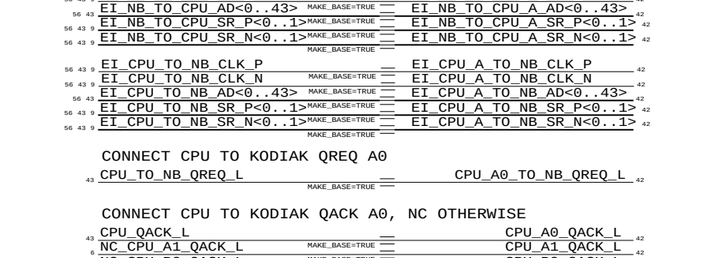
CPU_SRESET_L_R		SB_CPU_A0_SRESET_L	24 56
NOTUSED_CPU_A1_SRESET_L	MAKE_BASE=TRUE	SB_CPU_A1_SRESET_L	24 56
NOTUSED_CPU_B0_SRESET_L	MAKE_BASE=TRUE	SB_CPU_B0_SRESET_L	24 56
NOTUSED_CPU_B1_SRESET_L	MAKE_BASE=TRUE	SB_CPU_B1_SRESET_L	24 56
	MAKE_BASE=TRUE		

WIRE OUT KODIAK AND CPU SIGNALS FOR TP'S

TP_NB_B_TRIGGER_OUT		NB_B_TRIGGER_OUT	44
TP_NB_A_TRIGGER_OUT	MAKE_BASE=TRUE	NB_A_TRIGGER_OUT	42
TP_CPU_APSYNCOUT	MAKE_BASE=TRUE	CPU_APSYNCOUT	43
TP_CPU_TRIGGER_IN	MAKE_BASE=TRUE	CPU_TRIGGER_IN	43 47
TP_CPU_TRIGGER_OUT	MAKE_BASE=TRUE	CPU_TRIGGER_OUT	43
NC_PSRO	MAKE_BASE=TRUE	CPU_PSRO	43
NC_PSRO_ENABLE	MAKE_BASE=TRUE	CPU_PSRO_ENABLE	43
TP_CPU_ATTENTION	MAKE_BASE=TRUE	CPU_ATTENTION	43
NC_CPU_AFN	MAKE_BASE=TRUE	CPU_AFN	43
	MAKE_BASE=TRUE		

REMEMBER TO UPDATE NO_TEST PROPERTIES ON PG 6

CPU CHKSTOP OR MCP TO NB



TO/FROM NB

EI BUS AND SYSCLK CONSTRAINT LABELS

	ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	NET_PHYSICAL_TYPE	DIFFERENTIAL_PAIR	
EI_CPU_TO_NB_CLK_P	EICNCLK	EI_CPU_TO_NB_CLK	EI_CPU_TO_NB_CLK	EI_CPU_TO_NB_CLK	128
EI_CPU_TO_NB_CLK_N	EICNCLK	EI_CPU_TO_NB_CLK	EI_CPU_TO_NB_CLK	EI_CPU_TO_NB_CLK	127
EI_CPU_TO_NB_AD<0..21>	EICNCAD	EI_CPU_TO_NB_AD	EI_CPU_TO_NB_AD		131
EI_CPU_TO_NB_SR_P<0..1>	EICNCSR	EI_CPU_TO_NB_AD	EI_CPU_TO_NB_AD		134
EI_CPU_TO_NB_SR_N<0..1>	EICNCSR	EI_CPU_TO_NB_AD	EI_CPU_TO_NB_AD		132
EI_NB_TO_CPU_CLK_P	EINCCLK	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	129
EI_NB_TO_CPU_CLK_N	EINCCLK	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	130
EI_NB_TO_CPU_AD<0..43>	EINCCAD	EI_NB_TO_CPU_AD	EI_NB_TO_CPU_AD		135
EI_NB_TO_CPU_SR_P<0..1>	EINCCAD	EI_NB_TO_CPU_AD	EI_NB_TO_CPU_AD		140
EI_NB_TO_CPU_SR_N<0..1>	EINCCAD	EI_NB_TO_CPU_AD	EI_NB_TO_CPU_AD		137
EI_NB_APSYNC	EIPNAPSYNC	EI_NB_TO_CPU_AD	EI_NB_TO_CPU_AD		
EI_CPU_APSYNC	EIPCAPSYNC	EI_NB_TO_CPU_AD	EI_NB_TO_CPU_AD		138
EI_CPU_SYSCLK_P	EIPCSYSCLK	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	EI_CPU_SYSCLK	139
EI_CPU_SYSCLK_N	EIPCSYSCLK	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	EI_CPU_SYSCLK	141
EI_NB_SYSCLK_P	EIPNSYSCLK_P	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	EI_NB_SYSCLK	136
EI_NB_SYSCLK_N	EIPNSYSCLK_N	EI_NB_TO_CPU_CLK	EI_NB_TO_CPU_CLK	EI_NB_SYSCLK	142
EI_CPU_TO_NB_AD<22>	EICNCAD_PP	EI_CPU_TO_NB_AD	EI_CPU_TO_NB_AD		1496
EI_CPU_TO_NB_AD<23..43>	EICNCAD	EI_CPU_TO_NB_AD	EI_CPU_TO_NB_AD		1496

NC KODIAK EI B OUTPUT PORT

NC_EI_NB_TO_CPU_B_CLK_P		EI_NB_TO_CPU_B_CLK_P	44
NC_EI_NB_TO_CPU_B_CLK_N	MAKE_BASE=TRUE	EI_NB_TO_CPU_B_CLK_N	44
NC_EI_NB_TO_CPU_B_AD<0..43>	MAKE_BASE=TRUE	EI_NB_TO_CPU_B_AD<0..43>	44
NC_EI_NB_TO_CPU_B_SR_P<0..1>	MAKE_BASE=TRUE	EI_NB_TO_CPU_B_SR_P<0..1>	44
NC_EI_NB_TO_CPU_B_SR_N<0..1>	MAKE_BASE=TRUE	EI_NB_TO_CPU_B_SR_N<0..1>	44
	MAKE_BASE=TRUE		

NC KODIAK EI B INPUT PORT

NC_EI_CPU_B_TO_NB_CLK_P		EI_CPU_B_TO_NB_CLK_P	44
NC_EI_CPU_B_TO_NB_CLK_N	MAKE_BASE=TRUE	EI_CPU_B_TO_NB_CLK_N	44
NC_EI_CPU_B_TO_NB_AD<0..43>	MAKE_BASE=TRUE	EI_CPU_B_TO_NB_AD<0..43>	44
NC_EI_CPU_B_TO_NB_SR_P<0..1>	MAKE_BASE=TRUE	EI_CPU_B_TO_NB_SR_P<0..1>	44
NC_EI_CPU_B_TO_NB_SR_N<0..1>	MAKE_BASE=TRUE	EI_CPU_B_TO_NB_SR_N<0..1>	44
	MAKE_BASE=TRUE		

PULLUPS FOR SRESET'S FROM SHASTA

ALL SHASTA GPIOS MUST HAVE A PULL-UP WHEN SHASTA IS STARTING UP.

=PP3V3_PWRON_SB

R5608 10K 5% 1/16W MF-LF 402	NOSTUFF	SB_CPU_A0_SRESET_L 24 56
R5609 10K 5% 1/16W MF-LF 402		SB_CPU_A1_SRESET_L 24 56
R5610 10K 5% 1/16W MF-LF 402		SB_CPU_B0_SRESET_L 24 56
R5611 10K 5% 1/16W MF-LF 402		SB_CPU_B1_SRESET_L 24 56

IF SHASTA SHOULD DRIVE OD WITH EI LEVEL PULLUP, STUFF R5612, NOSTUFF R5608, STUFF R5646

=PPV_EI_CPU

R5612 1K 5% 1/16W MF-LF 402 — SRCOM_SRESET 56

NOTE, NB UNUSED INTS DO NOT REQUIRE PULLUPS, ONLY SHASTA (SINCE ITS OUTPUTS ARE TEMPORARILY INPUTS ON BOOTUP).

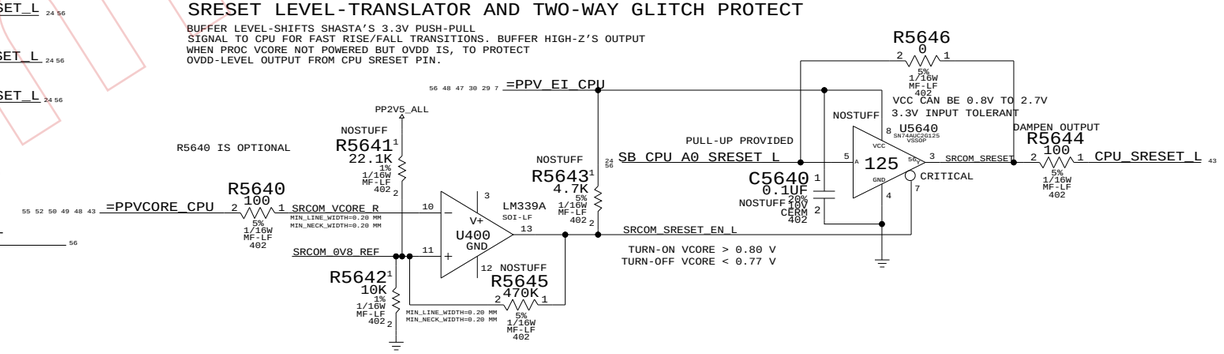
INT PULLUP IS SO INT PIN IS NOT FLOATING TO PROCESSOR BUT WEAK TO ALLOW KODIAK TO DRIVE PUSH-PULL STRONGLY

=PPV_EI_NB

R5604 10K 5% 1/16W MF-LF 402 — CPU_A0_INT_R_L 24 56

SRESET LEVEL-TRANSLATOR AND TWO-WAY GLITCH PROTECT

BUFFER LEVEL-SHIFTS SHASTA'S 3.3V PUSH-PULL SIGNAL TO CPU FOR FAST RISE/FALL TRANSITIONS. BUFFER HIGH-Z'S OUTPUT WHEN PROC VCORE NOT POWERED BUT OVDD IS, TO PROTECT OVDD-LEVEL OUTPUT FROM CPU SRESET PIN.



CPU ALIASES & MISC

SYNC_MASTER=FINO-HS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6790	E
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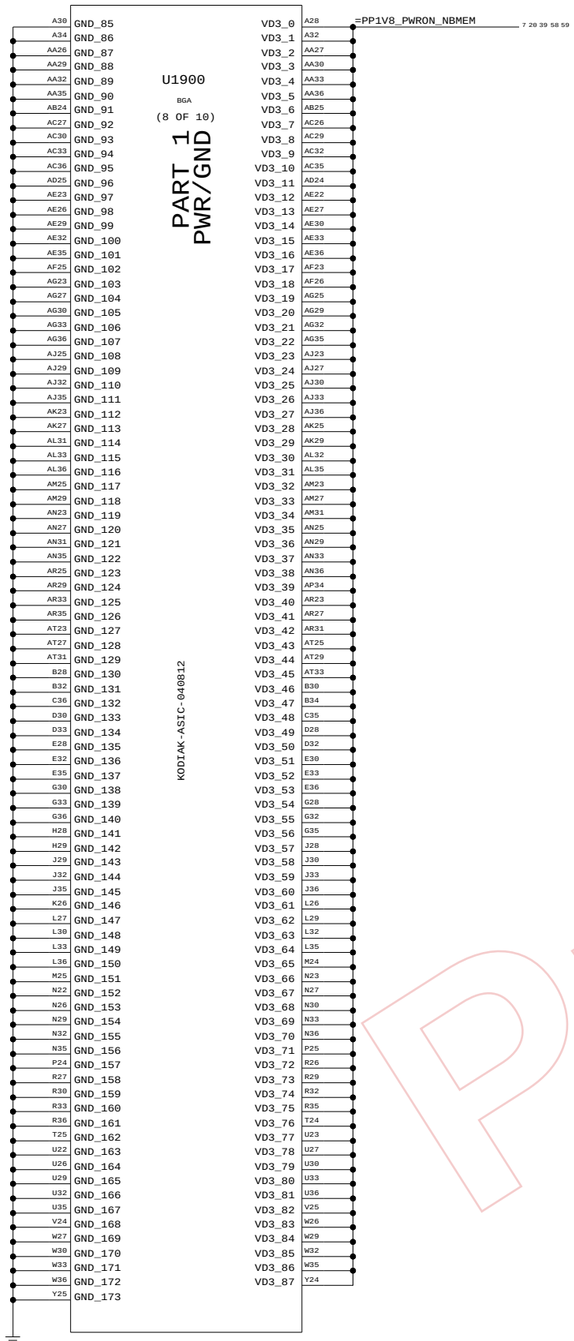

59 58 39 20 7 =PP1V8_PWRON_NBMEM

C5836 C5835 C5834 C5832 C5831 C5830 C5829 C5822 C5811 C5800
C5864 C5859 C5857 C5842 C5840 C5837 C5828 C5801 C5855 C5833
C5863 C5860 C5858 C5843 C5841 C5838 C5827 C5802 C5866 C5844
C5865 C5862 C5861 C5846 C5845 C5839 C5826 C5803 C5887 C5877
C5874 C5869 C5867 C5852 C5850 C5847 C5825 C5810 C5806 C5804
C5873 C5870 C5868 C5853 C5851 C5848 C5824 C5812 C5807 C5805
C5875 C5872 C5871 C5856 C5854 C5849 C5823 C5813 C5809 C5808
C5886 C5885 C5883 C5881 C5879 C5876 C5821 C5818 C5816 C5814
C5884 C5882 C5880 C5878 C5820 C5819 C5817 C5815

1UF 10% 6.3V CERM 402

Q63: SEE P.20 FOR MORE DECOUPLING CAPS FOR THESE PINS.

KODIAC NBMEM PWR & CAPS

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

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D	051-6790	E

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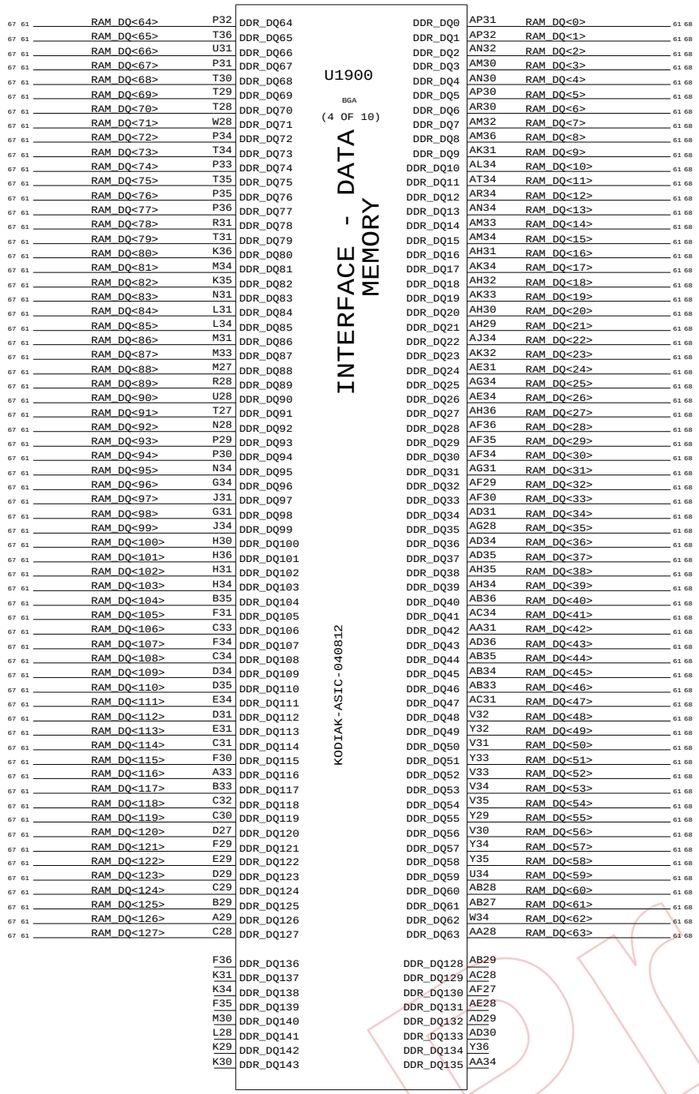
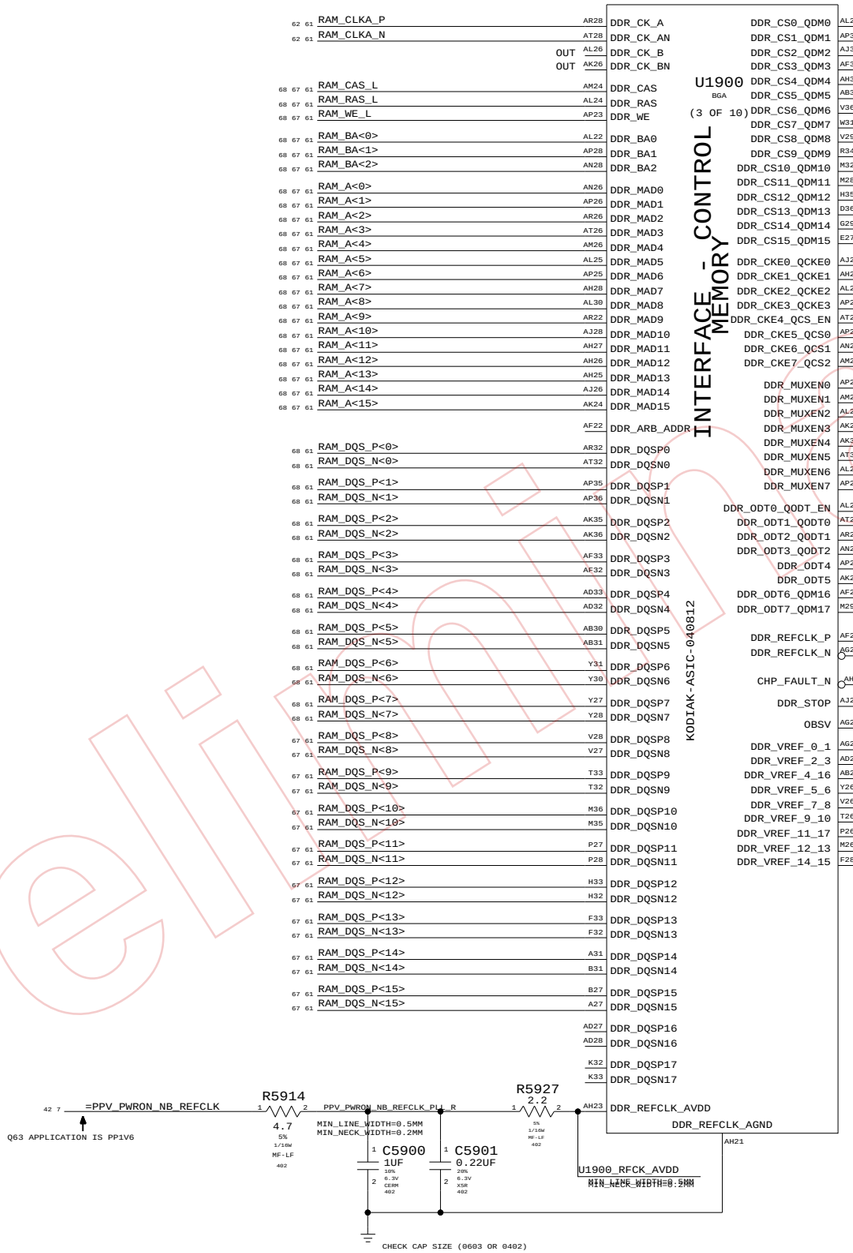
LAST_MODIFIED=Tue Nov 1 14:56:09 2005

DRAWING





Kodiak 128bit CS/CKE/ODT mapping (Q63 style)

DIMM RANK	CS*	CKE	ODT	M23 Function	D bits
A0	0	0	0	onboard DRAM	0:63
A1	1	1	-	*unused*	0:63
B2	0	0	4	J6700 rank 1	64:127
B3	1	1	-	J6700 rank 2	64:127
C4	2	2	1	*unused*	0:63
C5	3	3	-	*unused*	0:63
D6	10	4	5	*unused*	64:127
D7	11	5	-	*unused*	64:127
E8	4	2	2	*unused*	0:63
E9	5	3	-	*unused*	0:63
F10	12	4	6	*unused*	64:127
F11	13	5	-	*unused*	64:127
G12	6	0	3	*unused*	0:63
G13	7	1	-	*unused*	0:63
H14	14	6	7	*unused*	64:127
H15	15	7	-	*unused*	64:127

Kodiak 128bit CS/CKE/ODT mapping (v1.1 only)

DIMM RANK	CS*	CKE	ODT	M23 Function	D bits
A0	0	0	0	onboard DRAM	0:63
A1	1	1	-	*unused*	0:63
B2	4	4	2	J6700 rank 1	64:127
B3	5	5	-	J6700 rank 2	64:127
C4	2	2	1	*unused*	0:63
C5	3	3	-	*unused*	0:63
D6	6	6	3	*unused*	64:127
D7	7	7	-	*unused*	64:127

Kodiak Memory Dq/Ctl

SYNC_MASTER=FINO-DS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

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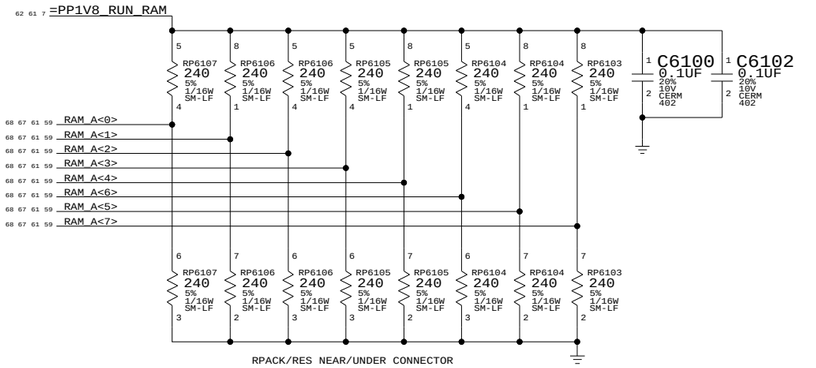
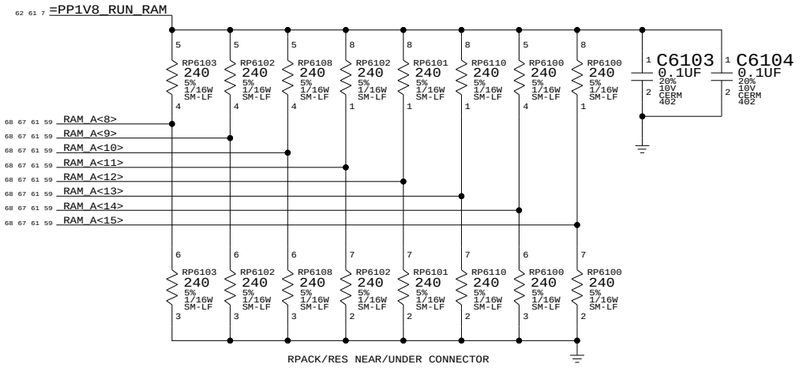
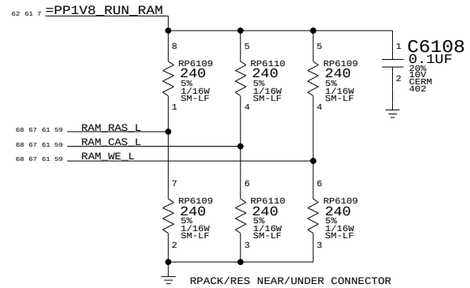
SCALE: NONE	SHT: 59	OF: 154

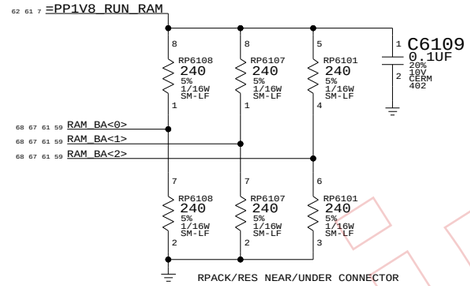
KODIAK MEMORY INTERFACE

ALL R PACKS ARE 1/16W 5%









RAM_CS_L<0>	RAM_CS_ONBOARD_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_L<4>	RAM_CS_DIMM_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_L<5>	RAM_CS_DIMM_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_L<8>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_L<9>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_L_R<0>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_DIMM_A		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CS_DIMM_B		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE<0>	RAM_CKE_DIMM_ONBOARD_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE<1>	RAM_CKE_DIMM_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE<4>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE<5>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE_R<0>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE_DIMM_B		RAM_CSCKEODT	RAM_CSCKEODT
RAM_CKE_DIMM_A		RAM_CSCKEODT	RAM_CSCKEODT
RAM_ODT<0>	RAM_ODT_ONBOARD_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_ODT<2>	RAM_ODT_DIMM_EC	RAM_CSCKEODT	RAM_CSCKEODT
RAM_ODT<4>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_ODT_R<0>		RAM_CSCKEODT	RAM_CSCKEODT
RAM_ODT_DIMM_A		RAM_CSCKEODT	RAM_CSCKEODT

	ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
RAM_CLKA_P	RAM_KODIAK_CLK_EC	RAM_CLK	RAM_CLK	RAM_KODIAK_CLK_DP
RAM_CLKA_N		RAM_CLK	RAM_CLK	RAM_KODIAK_CLK_DP
RAM_DIMM_A_CLK_P0	RAM_DIMM_CLK_EC	RAM_CLK	RAM_CLK	RAM_DIMM_CLK0_DP
RAM_DIMM_A_CLK_N0	RAM_DIMM_CLK_EC	RAM_CLK	RAM_CLK	RAM_DIMM_CLK0_DP
RAM_DIMM_A_CLK_P1	RAM_DIMM_CLK_EC	RAM_CLK	RAM_CLK	RAM_DIMM_CLK1_DP
RAM_DIMM_A_CLK_N1	RAM_DIMM_CLK_EC	RAM_CLK	RAM_CLK	RAM_DIMM_CLK1_DP
RAM_DIMM_A_CLK_P2	RAM_DIMM_CLK_EC	RAM_CLK	RAM_CLK	RAM_DIMM_CLK2_DP
RAM_DIMM_A_CLK_N2	RAM_DIMM_CLK_EC	RAM_CLK	RAM_CLK	RAM_DIMM_CLK2_DP
RAM_ONBOARD_CLK_P0_1	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK0_DP
RAM_ONBOARD_CLK_N0_1	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK0_DP
RAM_ONBOARD_CLK_P2_3	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK2_DP
RAM_ONBOARD_CLK_N2_3	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK2_DP
RAM_ONBOARD_CLK_P4_5	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK4_DP
RAM_ONBOARD_CLK_N4_5	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK4_DP
RAM_ONBOARD_CLK_P6_7	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK6_DP
RAM_ONBOARD_CLK_N6_7	RAM_ONBOARD_CLK_EC	RAM_CLK	RAM_CLK	RAM_ONBOARD_CLK6_DP
RAM_CLK_FBIN_P	RAM_FB_CLK_EC	RAM_CLK	RAM_CLK	RAM_FBIN_CLK_DP
RAM_CLK_FBIN_N		RAM_CLK	RAM_CLK	RAM_FBIN_CLK_DP
RAM_CLK_FBOUT_P		RAM_CLK	RAM_CLK	RAM_FBOUT_CLK_DP
RAM_CLK_FBOUT_N		RAM_CLK	RAM_CLK	RAM_FBOUT_CLK_DP
RAM_DQ<7..0>		RAM_CAD	RAM_CAD	
RAM_DQS_P<0>	RAM_DQS0_EC	RAM_DQS	RAM_DQS	RAM_DQS_0_DP
RAM_DQS_N<0>	RAM_DQS0_EC	RAM_DQS	RAM_DQS	RAM_DQS_0_DP
RAM_DQ<15..8>	RAM_DQS1_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<1>	RAM_DQS1_EC	RAM_DQS	RAM_DQS	RAM_DQS_1_DP
RAM_DQS_N<1>	RAM_DQS1_EC	RAM_DQS	RAM_DQS	RAM_DQS_1_DP
RAM_DQ<23..16>	RAM_DQS2_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<2>	RAM_DQS2_EC	RAM_DQS	RAM_DQS	RAM_DQS_2_DP
RAM_DQS_N<2>	RAM_DQS2_EC	RAM_DQS	RAM_DQS	RAM_DQS_2_DP
RAM_DQ<31..24>	RAM_DQS3_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<3>	RAM_DQS3_EC	RAM_DQS	RAM_DQS	RAM_DQS_3_DP
RAM_DQS_N<3>	RAM_DQS3_EC	RAM_DQS	RAM_DQS	RAM_DQS_3_DP
RAM_DQ<39..32>	RAM_DQS4_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<4>	RAM_DQS4_EC	RAM_DQS	RAM_DQS	RAM_DQS_4_DP
RAM_DQS_N<4>	RAM_DQS4_EC	RAM_DQS	RAM_DQS	RAM_DQS_4_DP
RAM_DQ<47..40>	RAM_DQS5_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<5>	RAM_DQS5_EC	RAM_DQS	RAM_DQS	RAM_DQS_5_DP
RAM_DQS_N<5>	RAM_DQS5_EC	RAM_DQS	RAM_DQS	RAM_DQS_5_DP
RAM_DQ<55..48>	RAM_DQS6_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<6>	RAM_DQS6_EC	RAM_DQS	RAM_DQS	RAM_DQS_6_DP
RAM_DQS_N<6>	RAM_DQS6_EC	RAM_DQS	RAM_DQS	RAM_DQS_6_DP
RAM_DQ<63..56>	RAM_DQS7_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<7>	RAM_DQS7_EC	RAM_DQS	RAM_DQS	RAM_DQS_7_DP
RAM_DQS_N<7>	RAM_DQS7_EC	RAM_DQS	RAM_DQS	RAM_DQS_7_DP
RAM_DQ<71..64>	RAM_DQS8_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<8>	RAM_DQS8_EC	RAM_DQS	RAM_DQS	RAM_DQS_8_DP
RAM_DQS_N<8>	RAM_DQS8_EC	RAM_DQS	RAM_DQS	RAM_DQS_8_DP
RAM_DQ<79..72>	RAM_DQS9_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<9>	RAM_DQS9_EC	RAM_DQS	RAM_DQS	RAM_DQS_9_DP
RAM_DQS_N<9>	RAM_DQS9_EC	RAM_DQS	RAM_DQS	RAM_DQS_9_DP
RAM_DQ<87..80>	RAM_DQS10_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<10>	RAM_DQS10_EC	RAM_DQS	RAM_DQS	RAM_DQS_10_DP
RAM_DQS_N<10>	RAM_DQS10_EC	RAM_DQS	RAM_DQS	RAM_DQS_10_DP
RAM_DQ<95..88>	RAM_DQS11_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<11>	RAM_DQS11_EC	RAM_DQS	RAM_DQS	RAM_DQS_11_DP
RAM_DQS_N<11>	RAM_DQS11_EC	RAM_DQS	RAM_DQS	RAM_DQS_11_DP
RAM_DQ<103..96>	RAM_DQS12_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<12>	RAM_DQS12_EC	RAM_DQS	RAM_DQS	RAM_DQS_12_DP
RAM_DQS_N<12>	RAM_DQS12_EC	RAM_DQS	RAM_DQS	RAM_DQS_12_DP
RAM_DQ<111..104>	RAM_DQS13_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<13>	RAM_DQS13_EC	RAM_DQS	RAM_DQS	RAM_DQS_13_DP
RAM_DQS_N<13>	RAM_DQS13_EC	RAM_DQS	RAM_DQS	RAM_DQS_13_DP
RAM_DQ<119..112>	RAM_DQS14_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<14>	RAM_DQS14_EC	RAM_DQS	RAM_DQS	RAM_DQS_14_DP
RAM_DQS_N<14>	RAM_DQS14_EC	RAM_DQS	RAM_DQS	RAM_DQS_14_DP
RAM_DQ<127..120>	RAM_DQS15_EC	RAM_CAD	RAM_CAD	
RAM_DQS_P<15>	RAM_DQS15_EC	RAM_DQS	RAM_DQS	RAM_DQS_15_DP
RAM_DQS_N<15>	RAM_DQS15_EC	RAM_DQS	RAM_DQS	RAM_DQS_15_DP
RAM_DQ_R<127..0>		RAM_CAD	RAM_CAD	
RAM_DQS_P_R<15..0>		RAM_DQS	RAM_DQS	
RAM_DQS_N_R<15..0>		RAM_DQS	RAM_DQS	
RAM_A<15..14>	RAM_A_CTL_EC	RAM_CAD	RAM_CAD	
RAM_A<13..0>	RAM_A_CTL_EC	RAM_CAD	RAM_CAD	
RAM_BA<1..0>	RAM_A_CTL_EC	RAM_CAD	RAM_CAD	
RAM_BA<2>	RAM_A_CTL_1_EC	RAM_CAD	RAM_CAD	
RAM_RAS_L	RAM_A_CTL_EC	RAM_CAD	RAM_CAD	
RAM_CAS_L	RAM_A_CTL_EC	RAM_CAD	RAM_CAD	
RAM_WE_L	RAM_A_CTL_EC	RAM_CAD	RAM_CAD	
RAM_A_R<15..0>		RAM_CAD	RAM_CAD	
RAM_BA_R<2..0>		RAM_CAD	RAM_CAD	
RAM_RAS_L_R		RAM_CAD	RAM_CAD	
RAM_CAS_L_R		RAM_CAD	RAM_CAD	
RAM_WE_L_R		RAM_CAD	RAM_CAD	

RAM_CLK PRIMARY SPACING SET BASED ON DIFF IMPEDANCE
RAM_CLK LINE-LINE SPACING SET TO 15MIL
TOTAL LENGTH TOLERENCE = 20PS = 2.82MM

RAM_CAD SPACING IS 10MIL

Parallel Term

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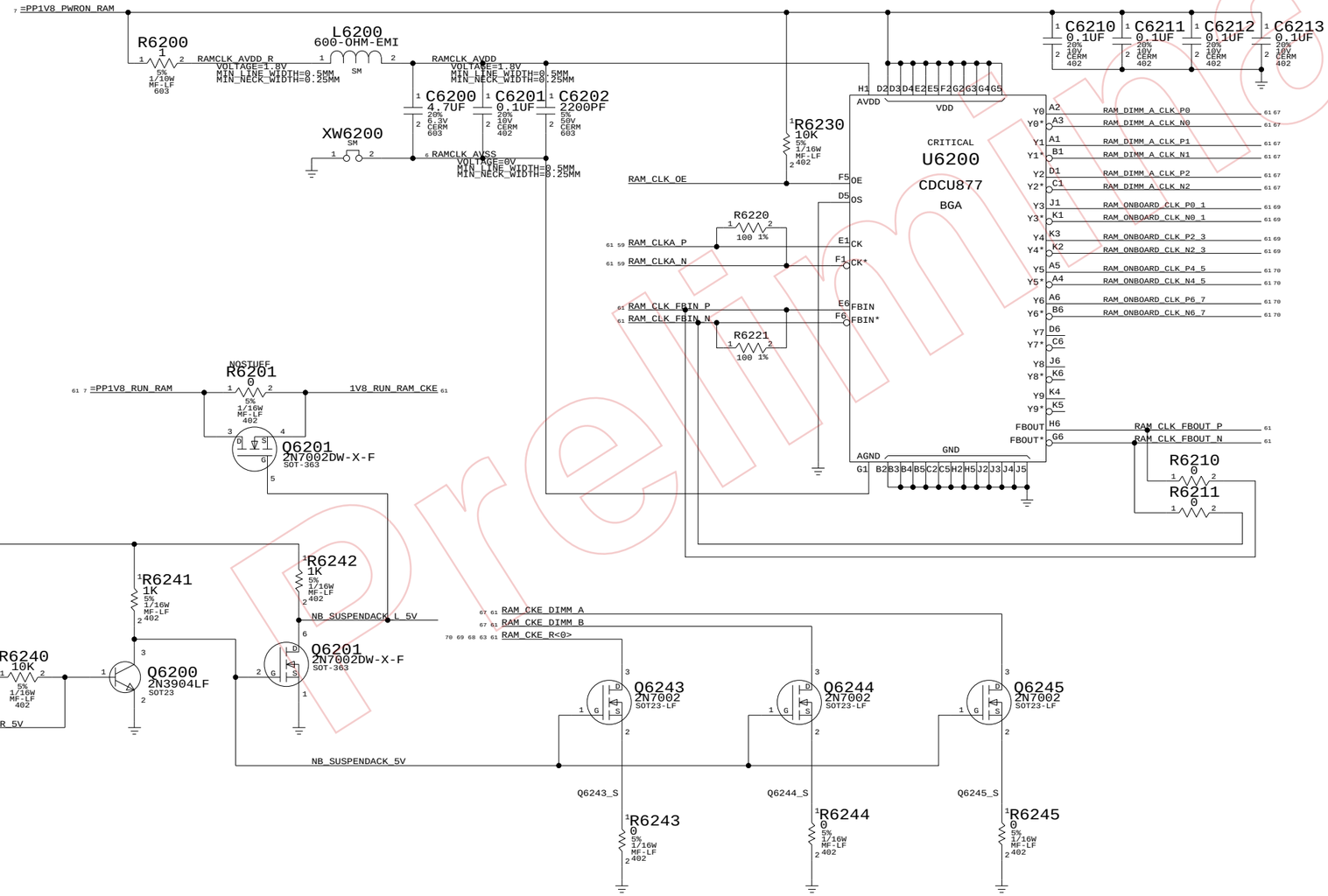
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT: 61 OF 154	

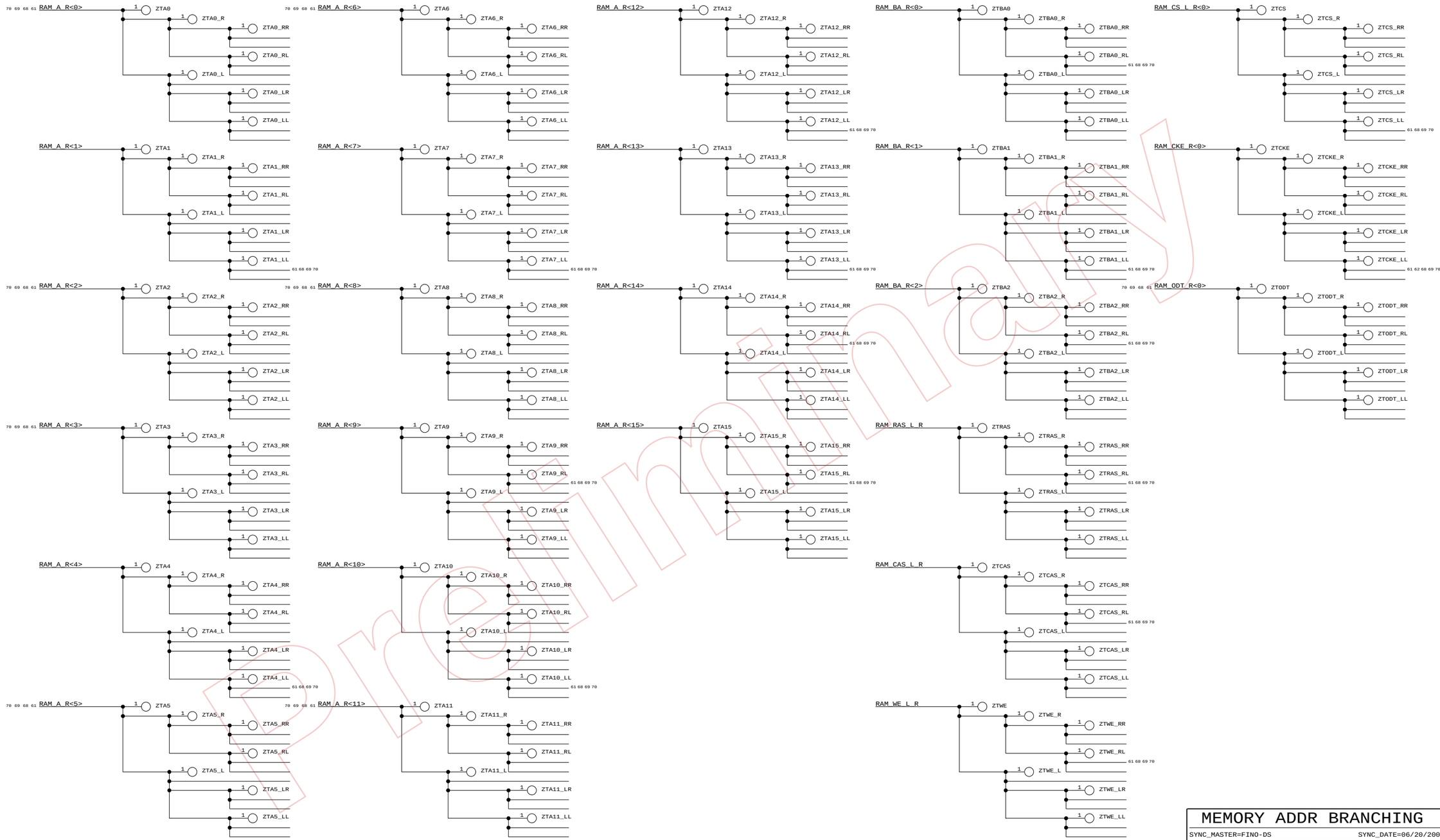


Main Memory Clock Buffer

SYNC_MASTER=FINO-DS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 62 OF 154	



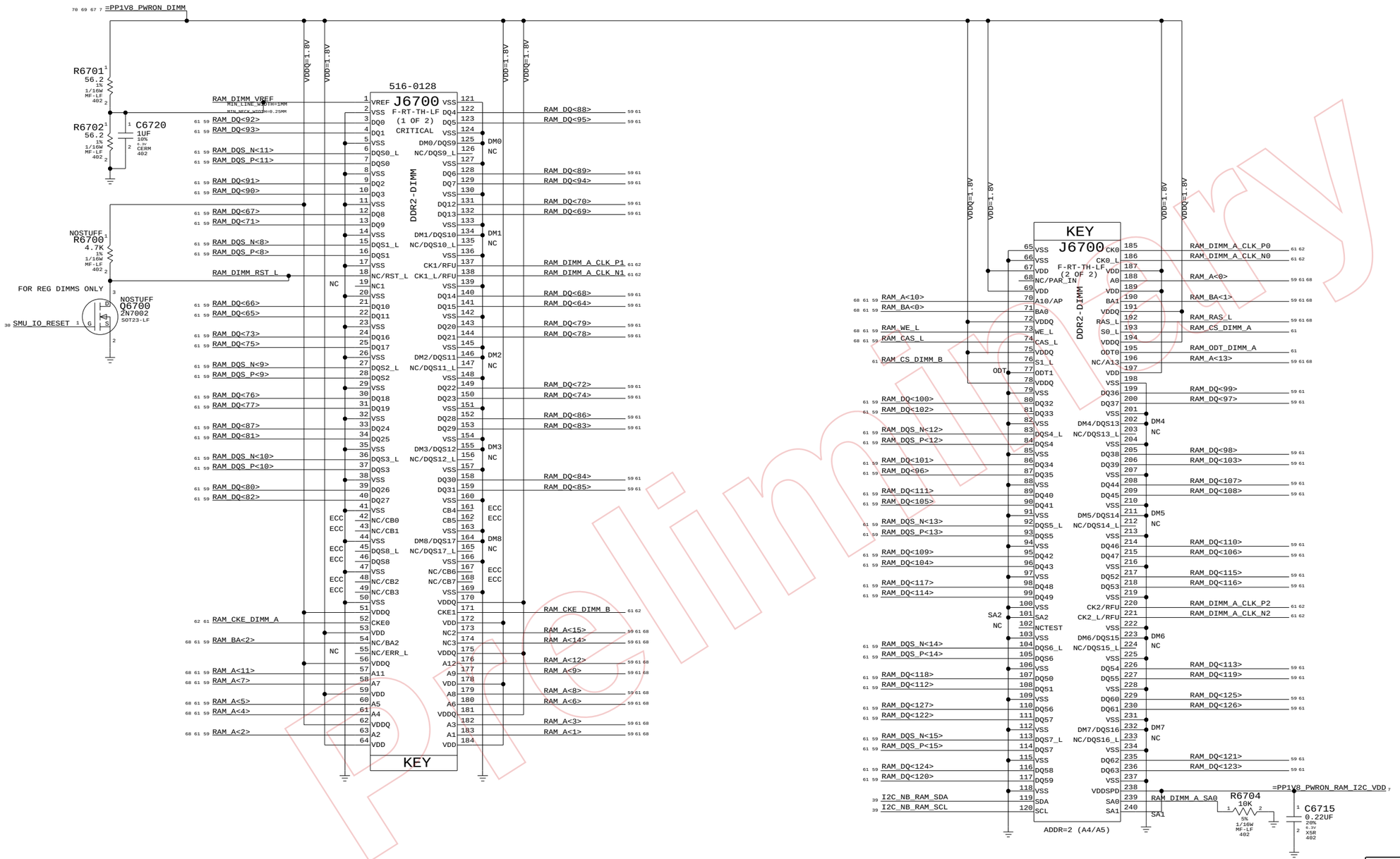
MEMORY ADDR BRANCHING

SYNC_MASTER=FINO-DS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE NONE SHT 63 OF 154



Memory Dimm A

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 67 OF 154	

ONBOARD MEMORY SHOULD FOLLOW SPEC FOR RAW CARD VERSION A

RAM_DQ<0>	22	4	5	RP6800	RAM_DQ_R<0>	61 69	
RAM_DQ<1>	22	3	6	RP6800	RAM_DQ_R<1>	6 61 69	
RAM_DQ<2>	22	1	8	RP6801	RAM_DQ_R<2>	6 61 69	
RAM_DQ<3>	22	3	6	RP6801	RAM_DQ_R<3>	6 61 69	
RAM_DQ<4>	22	4	5	RP6801	RAM_DQ_R<4>	61 69	
RAM_DQ<5>	22	2	7	RP6800	RAM_DQ_R<5>	6 61 69	
RAM_DQ<6>	22	2	7	RP6801	RAM_DQ_R<6>	6 61 69	
RAM_DQ<7>	22	1	8	RP6800	RAM_DQ_R<7>	6 61 69	
RAM_DQ<8>	22	3	6	RP6802	RAM_DQ_R<8>	6 61 69	
RAM_DQ<9>	22	4	5	RP6803	RAM_DQ_R<9>	6 61 69	
RAM_DQ<10>	22	1	8	RP6803	RAM_DQ_R<10>	61 69	
RAM_DQ<11>	22	4	5	RP6802	RAM_DQ_R<11>	6 61 69	
RAM_DQ<12>	22	3	6	RP6803	RAM_DQ_R<12>	6 61 69	
RAM_DQ<13>	22	2	7	RP6802	RAM_DQ_R<13>	6 61 69	
RAM_DQ<14>	22	2	7	RP6803	RAM_DQ_R<14>	6 61 69	
RAM_DQ<15>	22	1	8	RP6802	RAM_DQ_R<15>	61 69	
RAM_DQ<16>	22	3	6	RP6805	RAM_DQ_R<16>	6 61 69	
RAM_DQ<17>	22	4	5	RP6805	RAM_DQ_R<17>	6 61 69	
RAM_DQ<18>	22	1	8	RP6804	RAM_DQ_R<18>	61 69	
RAM_DQ<19>	22	2	7	RP6805	RAM_DQ_R<19>	6 61 69	
RAM_DQ<20>	22	2	7	RP6804	RAM_DQ_R<20>	6 61 69	
RAM_DQ<21>	22	4	5	RP6804	RAM_DQ_R<21>	6 61 69	
RAM_DQ<22>	22	3	6	RP6804	RAM_DQ_R<22>	6 61 69	
RAM_DQ<23>	22	1	8	RP6805	RAM_DQ_R<23>	61 69	
RAM_DQ<24>	22	4	5	RP6807	RAM_DQ_R<24>	6 61 69	
RAM_DQ<25>	22	2	7	RP6806	RAM_DQ_R<25>	6 61 69	
RAM_DQ<26>	22	4	5	RP6806	RAM_DQ_R<26>	61 69	
RAM_DQ<27>	22	1	8	RP6807	RAM_DQ_R<27>	61 69	
RAM_DQ<28>	22	3	6	RP6807	RAM_DQ_R<28>	6 61 69	
RAM_DQ<29>	22	3	6	RP6806	RAM_DQ_R<29>	6 61 69	
RAM_DQ<30>	22	2	7	RP6807	RAM_DQ_R<30>	6 61 69	
RAM_DQ<31>	22	1	8	RP6806	RAM_DQ_R<31>	6 61 69	
RAM_DQ<32>	22	4	5	RP6809	RAM_DQ_R<32>	6 61 70	
RAM_DQ<33>	22	2	7	RP6808	RAM_DQ_R<33>	6 61 70	
RAM_DQ<34>	22	3	6	RP6808	RAM_DQ_R<34>	6 61 70	
RAM_DQ<35>	22	1	8	RP6809	RAM_DQ_R<35>	61 70	
RAM_DQ<36>	22	2	7	RP6809	RAM_DQ_R<36>	6 61 70	
RAM_DQ<37>	22	1	8	RP6808	RAM_DQ_R<37>	6 61 70	
RAM_DQ<38>	22	3	6	RP6809	RAM_DQ_R<38>	6 61 70	
RAM_DQ<39>	22	4	5	RP6808	RAM_DQ_R<39>	61 70	
RAM_DQ<40>	22	4	5	RP6810	RAM_DQ_R<40>	6 61 70	
RAM_DQ<41>	22	3	6	RP6811	RAM_DQ_R<41>	6 61 70	
RAM_DQ<42>	22	1	8	RP6811	RAM_DQ_R<42>	61 70	
RAM_DQ<43>	22	2	7	RP6810	RAM_DQ_R<43>	6 61 70	
RAM_DQ<44>	22	4	5	RP6811	RAM_DQ_R<44>	6 61 70	
RAM_DQ<45>	22	3	6	RP6810	RAM_DQ_R<45>	6 61 70	
RAM_DQ<46>	22	2	7	RP6811	RAM_DQ_R<46>	6 61 70	
RAM_DQ<47>	22	1	8	RP6810	RAM_DQ_R<47>	61 70	
RAM_DQ<48>	22	3	6	RP6812	RAM_DQ_R<48>	6 61 70	
RAM_DQ<49>	22	4	5	RP6812	RAM_DQ_R<49>	6 61 70	
RAM_DQ<50>	22	2	7	RP6813	RAM_DQ_R<50>	6 61 70	
RAM_DQ<51>	22	1	8	RP6813	RAM_DQ_R<51>	61 70	
RAM_DQ<52>	22	3	6	RP6813	RAM_DQ_R<52>	6 61 70	
RAM_DQ<53>	22	4	5	RP6813	RAM_DQ_R<53>	6 61 70	
RAM_DQ<54>	22	2	7	RP6812	RAM_DQ_R<54>	6 61 70	
RAM_DQ<55>	22	1	8	RP6812	RAM_DQ_R<55>	61 70	
RAM_DQ<56>	22	3	6	RP6814	RAM_DQ_R<56>	6 61 70	
RAM_DQ<57>	22	4	5	RP6815	RAM_DQ_R<57>	6 61 70	
RAM_DQ<58>	22	2	7	RP6815	RAM_DQ_R<58>	6 61 70	
RAM_DQ<59>	22	3	6	RP6815	RAM_DQ_R<59>	6 61 70	
RAM_DQ<60>	22	2	7	RP6814	RAM_DQ_R<60>	6 61 70	
RAM_DQ<61>	22	1	8	RP6814	RAM_DQ_R<61>	61 70	
RAM_DQ<62>	22	1	8	RP6815	RAM_DQ_R<62>	61 70	
RAM_DQ<63>	22	4	5	RP6814	RAM_DQ_R<63>	6 61 70	

RAM_DQS_P<0>	22	1	2	R6800	DIFFERENTIAL PAIR	RAM_DQS_P_R<0> 61 69
RAM_DQS_N<0>	22	1	2	R6810	DIFFERENTIAL PAIR	RAM_DQS_N_R<0> 61 69
RAM_DQS_P<1>	22	1	2	R6801	DIFFERENTIAL PAIR	RAM_DQS_P_R<1> 61 69
RAM_DQS_N<1>	22	1	2	R6811	DIFFERENTIAL PAIR	RAM_DQS_N_R<1> 61 69
RAM_DQS_P<2>	22	1	2	R6802	DIFFERENTIAL PAIR	RAM_DQS_P_R<2> 61 69
RAM_DQS_N<2>	22	1	2	R6812	DIFFERENTIAL PAIR	RAM_DQS_N_R<2> 61 69
RAM_DQS_P<3>	22	1	2	R6803	DIFFERENTIAL PAIR	RAM_DQS_P_R<3> 61 69
RAM_DQS_N<3>	22	1	2	R6813	DIFFERENTIAL PAIR	RAM_DQS_N_R<3> 61 69
RAM_DQS_P<4>	22	1	2	R6804	DIFFERENTIAL PAIR	RAM_DQS_P_R<4> 61 70
RAM_DQS_N<4>	22	1	2	R6814	DIFFERENTIAL PAIR	RAM_DQS_N_R<4> 61 70
RAM_DQS_P<5>	22	1	2	R6805	DIFFERENTIAL PAIR	RAM_DQS_P_R<5> 61 70
RAM_DQS_N<5>	22	1	2	R6815	DIFFERENTIAL PAIR	RAM_DQS_N_R<5> 61 70
RAM_DQS_P<6>	22	1	2	R6806	DIFFERENTIAL PAIR	RAM_DQS_P_R<6> 61 70
RAM_DQS_N<6>	22	1	2	R6816	DIFFERENTIAL PAIR	RAM_DQS_N_R<6> 61 70
RAM_DQS_P<7>	22	1	2	R6807	DIFFERENTIAL PAIR	RAM_DQS_P_R<7> 61 70
RAM_DQS_N<7>	22	1	2	R6817	DIFFERENTIAL PAIR	RAM_DQS_N_R<7> 61 70

RAM_A<0>	5.1	1	8	RP6824	RAM_A_R<0>	61 63 69 70	ZT6800
RAM_A<1>	5.1	1	8	RP6823	RAM_A_R<1>	61 63 69 70	ZT6801
RAM_A<2>	5.1	2	7	RP6823	RAM_A_R<2>	61 63 69 70	ZT6802
RAM_A<3>	5.1	4	5	RP6822	RAM_A_R<3>	61 63 69 70	ZT6803
RAM_A<4>	5.1	3	6	RP6822	RAM_A_R<4>	61 63 69 70	ZT6804
RAM_A<5>	5.1	2	7	RP6822	RAM_A_R<5>	61 63 69 70	ZT6805
RAM_A<6>	5.1	1	8	RP6822	RAM_A_R<6>	61 63 69 70	ZT6806
RAM_A<7>	5.1	3	6	RP6821	RAM_A_R<7>	61 63 69 70	ZT6807
RAM_A<8>	5.1	4	5	RP6821	RAM_A_R<8>	61 63 69 70	ZT6808
RAM_A<9>	5.1	1	8	RP6821	RAM_A_R<9>	61 63 69 70	ZT6809
RAM_A<10>	5.1	3	6	RP6824	RAM_A_R<10>	61 63 69 70	ZT6810
RAM_A<11>	5.1	2	7	RP6821	RAM_A_R<11>	61 63 69 70	ZT6811
RAM_A<12>	5.1	4	5	RP6820	RAM_A_R<12>	61 63 69 70	ZT6812
RAM_A<13>	5.1	4	5	RP6825	RAM_A_R<13>	61 63 69 70	ZT6813
RAM_A<14>	5.1	2	7	RP6820	RAM_A_R<14>	61 63 69 70	ZT6814
RAM_A<15>	5.1	1	8	RP6820	RAM_A_R<15>	61 63 69 70	ZT6815

VIAS FOR ECC STUB

RAM_BA<0>	5.1	4	5	RP6824	RAM_BA_R<0>	61 63 69 70	ZT6820
RAM_BA<1>	5.1	2	7	RP6824	RAM_BA_R<1>	61 63 69 70	ZT6821
RAM_BA<2>	5.1	3	6	RP6820	RAM_BA_R<2>	61 63 69 70	ZT6822
RAM_RAS_L	5.1	1	8	RP6825	RAM_RAS_L_R	61 63 69 70	ZT6825
RAM_CAS_L	5.1	3	6	RP6825	RAM_CAS_L_R	61 63 69 70	ZT6826
RAM_WE_L	5.1	2	7	RP6825	RAM_WE_L_R	61 63 69 70	ZT6827

VIAS FOR ECC STUB

PLACE NEAR KODIAK PRIOR TO BRANCH

PLACE AT END POINT TO SIMULATE ECC

C6870 24PF 5% 50V C0G 402	RAM_CS_L_R<0> 61 63 69 70	C6871 2PF +/-0.25PF 50V C0G 402-1	
C6880 24PF 5% 50V C0G 402	RAM_CKE_R<0> 61 62 63 69 70	C6881 2PF +/-0.25PF 50V C0G 402-1	
C6890 24PF 5% 50V C0G 402	RAM_ODT_R<0> 61 63 69 70	C6891 2PF +/-0.25PF 50V C0G 402-1	

MLB Mem Series Term

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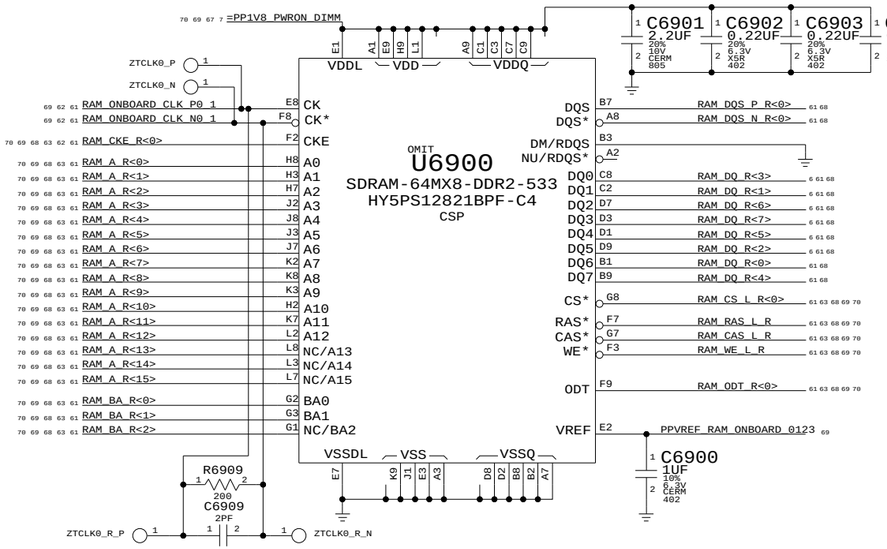

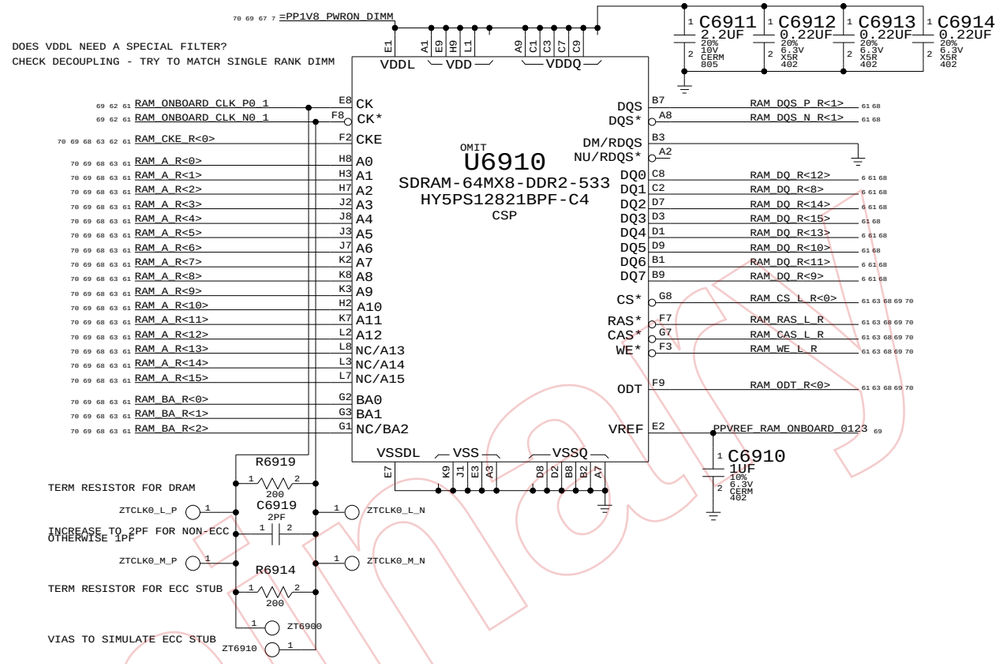

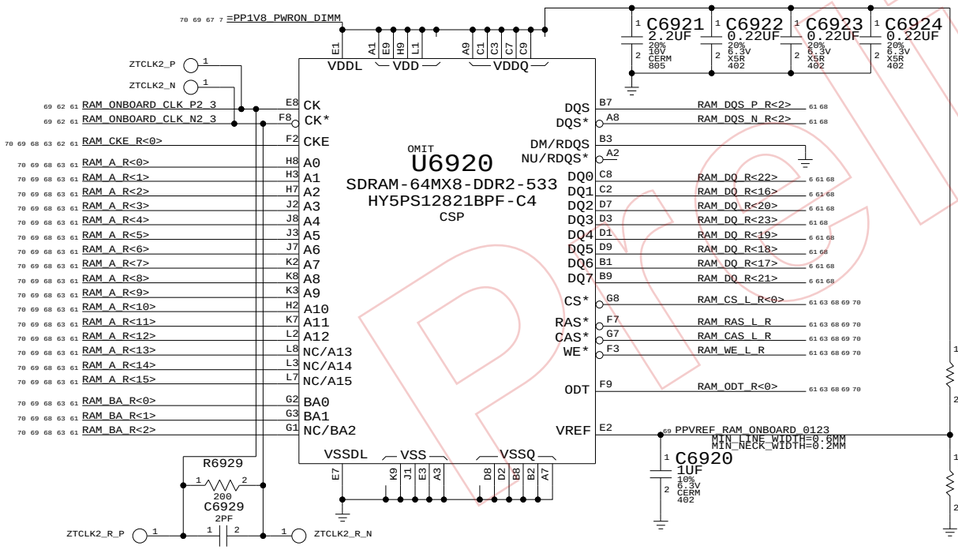

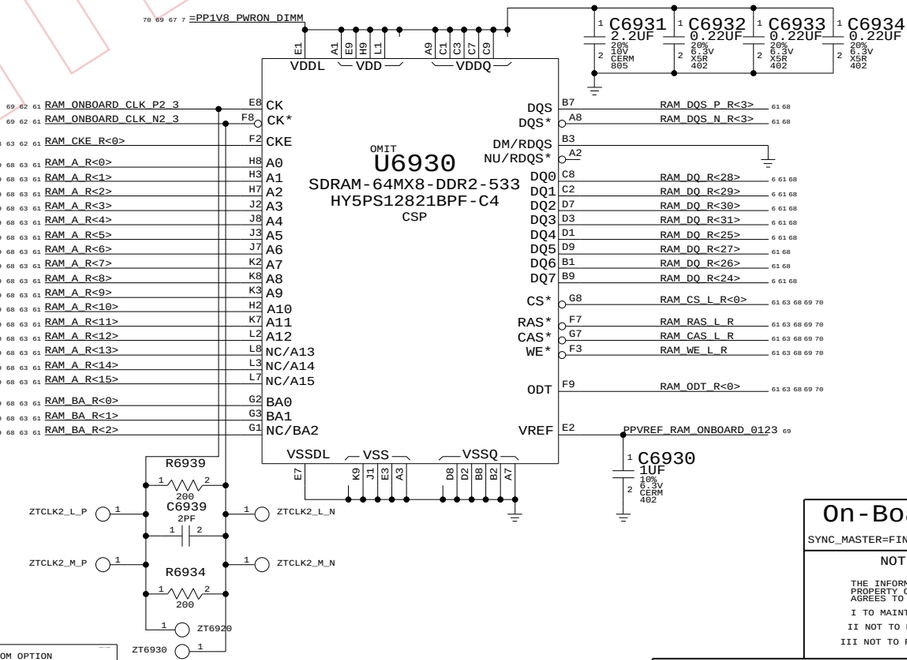

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
333T0032	4	IC,SDRAM,DDR2,512MBIT,X8	U6900,U6910,U6920,U6930	CRITICAL	
333T0032	4	IC,SDRAM,DDR2,512MBIT,X8	U7040,U7050,U7060,U7070	CRITICAL	

On-Board DDR SDRAM

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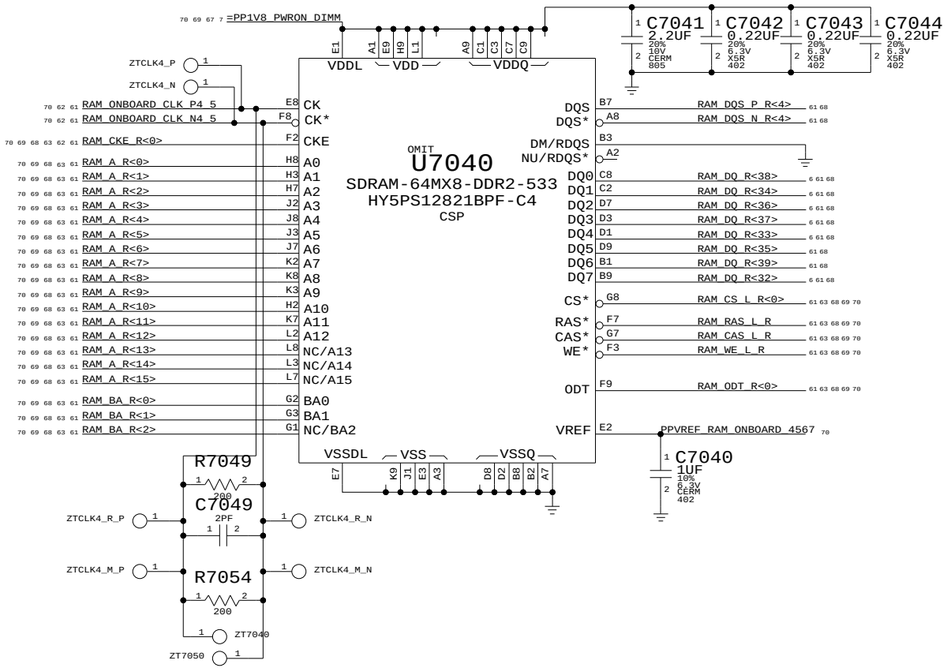
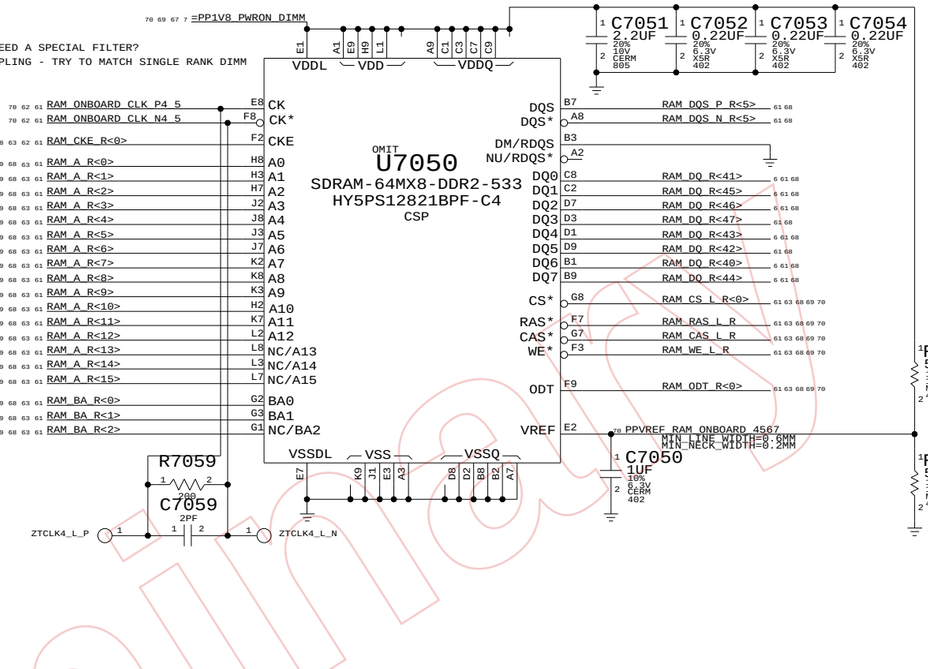
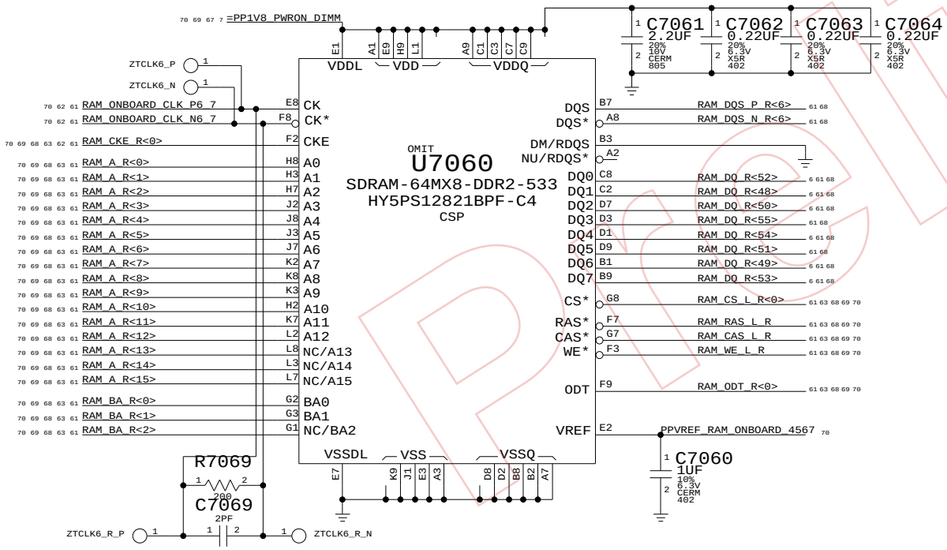
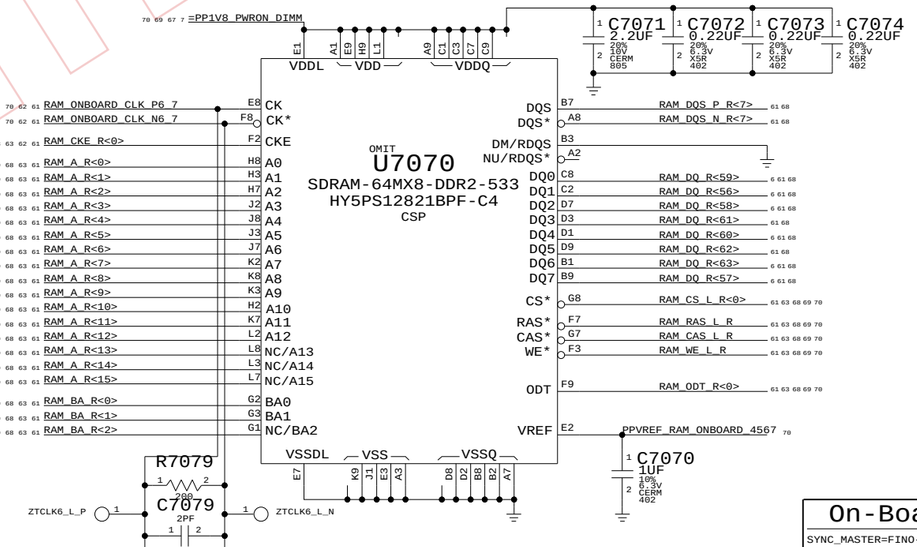
SCALE: NONE	SHT 69 OF 154	









On-Board DDR SDRAM

SYNC_MASTER=FINO-DS SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	70	154

KODIAK AVDD FILTERING
(LOCATE CLOSE TO POWER AND GROUND PINS)

82 7 =PP2V5_PWRON_NB_PCIE
L8200 0.22UH 0805-1
PWR_PCIE_A_AVDD_2 82 97
C8200 0.01UF 10% 16V CERM 402
C8201 10UF 10% 6.3V X5R 805
C8202 1UF 10% 6.3V CERM 402
97 82 6 KOD_G10_GND (THIS PAGE)

82 7 =PP2V5_PWRON_NB_PCIE
L8201 0.22UH 0805-1
PWR_PCIE_A_AVDD_1 82 97
C8203 0.01UF 10% 16V CERM 402
C8204 10UF 10% 6.3V X5R 805
C8205 1UF 10% 6.3V CERM 402
97 82 6 KOD_K07_GND (THIS PAGE)

82 7 =PP2V5_PWRON_NB_PCIE
L8202 0.22UH 0805-1
PWR_PCIE_A_AVDD_0 82 97
C8206 0.01UF 10% 16V CERM 402
C8207 10UF 10% 6.3V X5R 805
C8208 1UF 10% 6.3V CERM 402
97 82 6 KOD_H05_GND (THIS PAGE)

97 82 PWR_PCIE_A_AVDD_2 — J06
97 82 PWR_PCIE_A_AVDD_1 — J07
97 82 PWR_PCIE_A_AVDD_0 — H11
97 PWR_PCIE_A_AVDD_A — J12
97 PWR_PCIE_A_AVDD_B — K13
97 PWR_PCIE_A_AVDD_C — J09

PCIE_AVDD_0 (1.65V-2.75V) SERDES
PCIE_AVDD_1 (1.65V-2.75V) SERDES
PCIE_AVDD_2 (1.65V-2.75V) SERDES
PCIE_REFCLK_AVDDA (1.65V-2.75V) PLL
PCIE_REFCLK_AVDDB (1.65V-2.75V) PLL
PCIE_REFCLK_AVDD2 (1.65V-2.75V) PLL

U1900
KODIAK-ASIC-040812
PCI-E X16 INTERFACE
BGA
(5 OF 10)
SEE_TABLE

(1.6V-1.2V)
PCIE_VDD A04, A08, A12, B06, B10, C03, D01, D04, D08, D12, E06, E10, E14
82 7 =PPVCORE_PWRON_NB_PCIE

(1.6V-1.2V)
PCIE_VDD F02, F05, G08, G12, H01, H04, H07, H10, H14, K12, L11, L14, M12
=PPVCORE_PWRON_NB_PCIE 7 82

L8203 0.22UH 0805-1
=PP2V5_PWRON_NB_PCIE 7 82
97 PWR_PCIE_A_AVDD
C8222 1UF 10% 6.3V CERM 402
C8225 1UF 10% 6.3V CERM 402
C8223 10UF 10% 6.3V X5R 805
C8224 0.01UF 10% 16V CERM 402
KOD_L13_GND 6 82 97 (THIS PAGE)
KOD_J13_GND 6 82 97 (THIS PAGE)

L8205 0.22UH 0805-1
=PP2V5_PWRON_NB_PCIE 7 82
C8228 1UF 10% 6.3V CERM 402
C8229 10UF 10% 6.3V X5R 805
C8230 0.01UF 10% 16V CERM 402
KOD_H08_GND 6 82 97 (THIS PAGE)

KODIAK PCI-E 100MHZ REFCLK

PP8201 P4MM SM
100+ 97 9 CLK_KOD_100M_PF<0>
100- 97 9 CLK_KOD_100M_NF<0>
PP8200 P4MM SM

PCIE_REFCLK_P J11
PCIE_REFCLK_N J10 (100MHZ)

KODIAK PCIE REFCLK TERMINATION
(LOCATE CLOSE TO INPUT PINS)

97 26 CLK_KOD_100M_P<0> — R8202 20.5 1% 1/10W MF-LF 402 — 97 9 100M_P<0>
C8245 0.01UF 10% 16V CERM 402
NOSTUFF
R8203 29.4 1% 1/10W MF-LF 402
C8244 0.01UF 10% 16V CERM 402
100M_G
R8204 29.4 1% 1/10W MF-LF 402
97 26 CLK_KOD_100M_N<0> — R8205 20.5 1% 1/10W MF-LF 402 — 97 9 100M_N<0>
C8246 0.01UF 10% 16V CERM 402

97 84 9 PCIE_SLOTA_TO_NB_N<0>	G05	PCIE_HSIN0
97 84 9 PCIE_SLOTA_TO_NB_P<0>	G04	PCIE_HSIP0
97 84 9 PCIE_SLOTA_TO_NB_N<1>	G01	PCIE_HSIN1
97 84 9 PCIE_SLOTA_TO_NB_P<1>	G02	PCIE_HSIP1
97 84 9 PCIE_SLOTA_TO_NB_N<2>	C04	PCIE_HSIN2
97 84 9 PCIE_SLOTA_TO_NB_P<2>	C05	PCIE_HSIP2
97 84 9 PCIE_SLOTA_TO_NB_N<3>	C07	PCIE_HSIN3
97 84 9 PCIE_SLOTA_TO_NB_P<3>	C06	PCIE_HSIP3
97 84 9 PCIE_SLOTA_TO_NB_N<4>	E01	PCIE_HSIN4
97 84 9 PCIE_SLOTA_TO_NB_P<4>	E02	PCIE_HSIP4
97 84 9 PCIE_SLOTA_TO_NB_N<5>	J05	PCIE_HSIN5
97 84 9 PCIE_SLOTA_TO_NB_P<5>	J04	PCIE_HSIP5
97 84 9 PCIE_SLOTA_TO_NB_N<6>	H06	PCIE_HSIN6
97 84 9 PCIE_SLOTA_TO_NB_P<6>	G06	PCIE_HSIP6
97 84 9 PCIE_SLOTA_TO_NB_N<7>	E05	PCIE_HSIN7
97 84 9 PCIE_SLOTA_TO_NB_P<7>	D05	PCIE_HSIP7
97 84 9 PCIE_SLOTA_TO_NB_N<8>	D11	PCIE_HSIN8
97 84 9 PCIE_SLOTA_TO_NB_P<8>	E11	PCIE_HSIP8
97 84 9 PCIE_SLOTA_TO_NB_N<9>	F12	PCIE_HSIN9
97 84 9 PCIE_SLOTA_TO_NB_P<9>	F13	PCIE_HSIP9
97 84 9 PCIE_SLOTA_TO_NB_N<10>	H09	PCIE_HSIN10
97 84 9 PCIE_SLOTA_TO_NB_P<10>	G09	PCIE_HSIP10
97 84 9 PCIE_SLOTA_TO_NB_N<11>	F09	PCIE_HSIN11
97 84 9 PCIE_SLOTA_TO_NB_P<11>	F08	PCIE_HSIP11
97 84 9 PCIE_SLOTA_TO_NB_N<12>	G13	PCIE_HSIN12
97 84 9 PCIE_SLOTA_TO_NB_P<12>	H13	PCIE_HSIP12
97 84 9 PCIE_SLOTA_TO_NB_N<13>	C13	PCIE_HSIN13
97 84 9 PCIE_SLOTA_TO_NB_P<13>	C12	PCIE_HSIP13
97 84 9 PCIE_SLOTA_TO_NB_N<14>	D07	PCIE_HSIN14
97 84 9 PCIE_SLOTA_TO_NB_P<14>	E07	PCIE_HSIP14
97 84 9 PCIE_SLOTA_TO_NB_N<15>	G07	PCIE_HSIN15
97 84 9 PCIE_SLOTA_TO_NB_P<15>	F07	PCIE_HSIP15

82 7 =PP2V5_PWRON_NB_PCIE
R8200 8.2K 5% 1/10W MF-LF 402
84 6 PCIE_SLOTA_PRSNT_L — AJ02 PCIE_PRESENTN

PCIE_VCAL_RES0 — F14 PCIE_VCAL_RES0
PCIE_VCAL_RES1 — J14 PCIE_VCAL_RES1
R8201 200 1% 1/10W MF-LF 402

PCIE_GND A06, A10, B02, B04, B08, B12, D02, D06, D10, D14, E08, E12, F01

PCIE_GND F04, F06, G14, H02, H12, K10, K14, L12, M11, M13

(DNU)
PCIE_AVREG_2 G11 — NC_A_AVREG_2 6
PCIE_AVREG_1 J08 — NC_A_AVREG_1 6
PCIE_AVREG_0 E04 — NC_A_AVREG_0 6

KODIAK PCI-E AC COUPLERS
(LOCATE NEAR SOURCE PINS)

PCIE_HSON0	D03	97 9 PCIE_NB_TO_SLOTA_NF<0>	0.1UF	C8247	PCIE_NB_TO_SLOTA_N<0> 9 84 97
PCIE_HSOP0	E03	97 9 PCIE_NB_TO_SLOTA_PF<0>	0.1UF	C8248	PCIE_NB_TO_SLOTA_P<0> 9 84 97
PCIE_HSON1	J01	97 9 PCIE_NB_TO_SLOTA_NF<1>	0.1UF	C8249	PCIE_NB_TO_SLOTA_N<1> 9 84 97
PCIE_HSOP1	J02	97 9 PCIE_NB_TO_SLOTA_PF<1>	0.1UF	C8250	PCIE_NB_TO_SLOTA_P<1> 9 84 97
PCIE_HSON2	C01	97 9 PCIE_NB_TO_SLOTA_NF<2>	0.1UF	C8251	PCIE_NB_TO_SLOTA_N<2> 9 84 97
PCIE_HSOP2	C02	97 9 PCIE_NB_TO_SLOTA_PF<2>	0.1UF	C8252	PCIE_NB_TO_SLOTA_P<2> 9 84 97
PCIE_HSON3	A07	97 9 PCIE_NB_TO_SLOTA_NF<3>	0.1UF	C8253	PCIE_NB_TO_SLOTA_N<3> 9 84 97
PCIE_HSOP3	B07	97 9 PCIE_NB_TO_SLOTA_PF<3>	0.1UF	C8254	PCIE_NB_TO_SLOTA_P<3> 9 84 97
PCIE_HSON4	F03	97 9 PCIE_NB_TO_SLOTA_NF<4>	0.1UF	C8255	PCIE_NB_TO_SLOTA_N<4> 9 84 97
PCIE_HSOP4	G03	97 9 PCIE_NB_TO_SLOTA_PF<4>	0.1UF	C8256	PCIE_NB_TO_SLOTA_P<4> 9 84 97
PCIE_HSON5	H03	97 9 PCIE_NB_TO_SLOTA_NF<5>	0.1UF	C8257	PCIE_NB_TO_SLOTA_N<5> 9 84 97
PCIE_HSOP5	J03	97 9 PCIE_NB_TO_SLOTA_PF<5>	0.1UF	C8258	PCIE_NB_TO_SLOTA_P<5> 9 84 97
PCIE_HSON6	A03	97 9 PCIE_NB_TO_SLOTA_NF<6>	0.1UF	C8259	PCIE_NB_TO_SLOTA_N<6> 9 84 97
PCIE_HSOP6	B03	97 9 PCIE_NB_TO_SLOTA_PF<6>	0.1UF	C8260	PCIE_NB_TO_SLOTA_P<6> 9 84 97
PCIE_HSON7	A05	97 9 PCIE_NB_TO_SLOTA_NF<7>	0.1UF	C8261	PCIE_NB_TO_SLOTA_N<7> 9 84 97
PCIE_HSOP7	B05	97 9 PCIE_NB_TO_SLOTA_PF<7>	0.1UF	C8262	PCIE_NB_TO_SLOTA_P<7> 9 84 97
PCIE_HSON8	C11	97 9 PCIE_NB_TO_SLOTA_NF<8>	0.1UF	C8263	PCIE_NB_TO_SLOTA_N<8> 9 84 97
PCIE_HSOP8	C10	97 9 PCIE_NB_TO_SLOTA_PF<8>	0.1UF	C8264	PCIE_NB_TO_SLOTA_P<8> 9 84 97
PCIE_HSON9	B11	97 9 PCIE_NB_TO_SLOTA_NF<9>	0.1UF	C8265	PCIE_NB_TO_SLOTA_N<9> 9 84 97
PCIE_HSOP9	A11	97 9 PCIE_NB_TO_SLOTA_PF<9>	0.1UF	C8266	PCIE_NB_TO_SLOTA_P<9> 9 84 97
PCIE_HSON10	F11	97 9 PCIE_NB_TO_SLOTA_NF<10>	0.1UF	C8267	PCIE_NB_TO_SLOTA_N<10> 9 84 97
PCIE_HSOP10	F10	97 9 PCIE_NB_TO_SLOTA_PF<10>	0.1UF	C8268	PCIE_NB_TO_SLOTA_P<10> 9 84 97
PCIE_HSON11	B09	97 9 PCIE_NB_TO_SLOTA_NF<11>	0.1UF	C8269	PCIE_NB_TO_SLOTA_N<11> 9 84 97
PCIE_HSOP11	A09	97 9 PCIE_NB_TO_SLOTA_PF<11>	0.1UF	C8270	PCIE_NB_TO_SLOTA_P<11> 9 84 97
PCIE_HSON12	D13	97 9 PCIE_NB_TO_SLOTA_NF<12>	0.1UF	C8271	PCIE_NB_TO_SLOTA_N<12> 9 84 97
PCIE_HSOP12	E13	97 9 PCIE_NB_TO_SLOTA_PF<12>	0.1UF	C8272	PCIE_NB_TO_SLOTA_P<12> 9 84 97
PCIE_HSON13	B13	97 9 PCIE_NB_TO_SLOTA_NF<13>	0.1UF	C8273	PCIE_NB_TO_SLOTA_N<13> 9 84 97
PCIE_HSOP13	A13	97 9 PCIE_NB_TO_SLOTA_PF<13>	0.1UF	C8274	PCIE_NB_TO_SLOTA_P<13> 9 84 97
PCIE_HSON14	D09	97 9 PCIE_NB_TO_SLOTA_NF<14>	0.1UF	C8275	PCIE_NB_TO_SLOTA_N<14> 9 84 97
PCIE_HSOP14	E09	97 9 PCIE_NB_TO_SLOTA_PF<14>	0.1UF	C8276	PCIE_NB_TO_SLOTA_P<14> 9 84 97
PCIE_HSON15	C08	97 9 PCIE_NB_TO_SLOTA_NF<15>	0.1UF	C8277	PCIE_NB_TO_SLOTA_N<15> 9 84 97
PCIE_HSOP15	C09	97 9 PCIE_NB_TO_SLOTA_PF<15>	0.1UF	C8278	PCIE_NB_TO_SLOTA_P<15> 9 84 97

KODIAK PCI-E DECOUPLING
(LOCATE CLOSE TO POWER AND GROUND PINS)

=PPVCORE_PWRON_NB_PCIE 7 82
C8209 C8210 C8211 C8212
C8213 C8214 C8215 C8216
C8217 C8218 C8219 C8220 C8221
(all 1UF 10% 6.3V CERM 402)

=PPVCORE_PWRON_NB_PCIE 7 82
C8231 C8232 C8233 C8234 C8235 C8236
C8241 C8242 C8243 C8237 C8238 C8239 C8240
(all 1UF 10% 6.3V CERM 402)

KODIAK PCI-E DECOUPLING
(LOCATE CLOSE TO POWER AND GROUND PINS)

AVDD_0_GND H05 — 97 82 6 KOD_H05_GND — XW8200 SM
AVDD_1_GND K07 — 97 82 6 KOD_K07_GND — XW8201 SM
AVDD_2_GND G10 — 97 82 6 KOD_G10_GND — XW8202 SM
(THIS PAGE, X3)

REFCLK_AGNDA J13 — XW8203 SM
REFCLK_AGNDB L13 — XW8204 SM
REFCLK_AGND2 H08 — KOD_H08_GND 6 82 97 — KOD_L13_GND 6 82 97 — KOD_J13_GND 6 82 97 — XW8205 SM
(THIS PAGE, X3)

KODIAK PCI-E X16

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

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PAGE 82

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 82 OF 154	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
338S0239	1	IC,RV370 XT, GRAPHICS CTLR	U8400	RV370XT	CRITICAL
338S0265	1	IC,RV380 XT A23, GRAPHICS CTLR	U8400	RV380XT	CRITICAL

REMOVED COMPLIANCE TEST POINTS
FINO WILL PLACE COUPLING CAPACITORS ON RECEIVING SIDE
(THIS IS ALLOWED FOR CHIP TO CHIP PCIE)
CAP PAD CAN BE USED FOR COMPLIANCE TEST

THIS IS ALIASED TO
PPVCORE_GPU ON PAGE 7

L8460 FERR-220-OHM 0805
L8461 FERR-220-OHM 0805
=PP1V2_GPU_PCIE → PP1V2_GPU_PCIE_VDDR (VOLTAGE=1.2V, MIN_LINE_WIDTH=0.5MM, MIN_NECK_WIDTH=0.25MM)

C8460 1UF 10% 6.3V CERM 402
C8461 1UF 10% 6.3V CERM 402
C8462 1UF 10% 6.3V CERM 402
C8463 0.1UF 20% 10V CERM 402
C8464 0.1UF 20% 10V CERM 402
C8465 0.1UF 20% 10V CERM 402
C8466 0.1UF 20% 10V CERM 402

PP1V2_GPU_PCIE_PVDD

SYS_POWERUP_L SHOULD CONTROL THE FET ON PP1V2_RUN

C8450 1UF 10% 6.3V CERM 402
C8451 1UF 10% 6.3V CERM 402
C8452 0.1UF 20% 10V CERM 402
C8453 0.1UF 20% 10V CERM 402
C8454 0.1UF 20% 10V CERM 402
C8455 0.1UF 20% 10V CERM 402

L8440 FERR-220-OHM 0805
=PP1V8_GPU → PP1V8_GPU_PCIE_PVDD (VOLTAGE=1.8V, MIN_LINE_WIDTH=0.5MM, MIN_NECK_WIDTH=0.25MM)

C8440 1UF 10% 6.3V CERM 402
C8441 1UF 10% 6.3V CERM 402
C8442 0.1UF 20% 10V CERM 402
C8443 0.1UF 20% 10V CERM 402
C8444 0.1UF 20% 10V CERM 402
C8445 0.1UF 20% 10V CERM 402

PLACE R8470 CLOSE TO U9670

U9670 74LC125 TSSOP
=GPU_RESET_L → U9670 pin 12
U9670 pin 11 → ATI_RESET_L
R8469 8.2K 5% 1/16W MF-LF 402
R8470 33 5% 1/10W MF-LF 402

PP1V2_GPU_PCIE_PVDD
R8471 301 1% 1/16W MF-LF 402
R8472 21 1% 1/16W MF-LF 402
R8473 21 1% 1/16W MF-LF 402
R8474 60.4 1% 1/16W MF-LF 402
R8475 21 1% 1/16W MF-LF 402
R8476 60.4 1% 1/16W MF-LF 402
R8477 21 1% 1/16W MF-LF 402
R8478 301 1% 1/16W MF-LF 402
PP1V2_GPU_PCIE_PVDD
CKA_PCIE<0> / CKA_PCIE_N<0>
C8472 5PF +/-0.25PF 50V CERM 402
C8473 5PF +/-0.25PF 50V CERM 402
CLK_PCIE_SLOTA_P<0>
CLK_PCIE_SLOTA_N<0>

PCI-E SLOTA 100MHZ
REFCLK TERMINATION
(LOCATE CLOSE TO GPU)

U8400
RV370XT
BGA
(1 OF 5)
OMIT
PCI-E

T23 U23 V23 W23 N23 N24 P23 AG26 AG27 AG28 AJ30 AK29
PCIE_PVDD_18 PCIE_PVDD_12 PCIE_VDDR_12

CLK_PCIE_SLOTA_PF<0>	AF27	PCIE_REFCLKP
CLK_PCIE_SLOTA_NF<0>	AE27	PCIE_REFCLKN
PCIE_NB_TO_SLOTA_P<0>	AH30	PCIE_RX0P
PCIE_NB_TO_SLOTA_N<0>	AG30	PCIE_RX0N
PCIE_NB_TO_SLOTA_P<1>	AG29	PCIE_RX1P
PCIE_NB_TO_SLOTA_N<1>	AF29	PCIE_RX1N
PCIE_NB_TO_SLOTA_P<2>	AE29	PCIE_RX2P
PCIE_NB_TO_SLOTA_N<2>	AE30	PCIE_RX2N
PCIE_NB_TO_SLOTA_P<3>	AD30	PCIE_RX3P
PCIE_NB_TO_SLOTA_N<3>	AD29	PCIE_RX3N
PCIE_NB_TO_SLOTA_P<4>	AC29	PCIE_RX4P
PCIE_NB_TO_SLOTA_N<4>	AB29	PCIE_RX4N
PCIE_NB_TO_SLOTA_P<5>	AB30	PCIE_RX5P
PCIE_NB_TO_SLOTA_N<5>	AA30	PCIE_RX5N
PCIE_NB_TO_SLOTA_P<6>	AA29	PCIE_RX6P
PCIE_NB_TO_SLOTA_N<6>	Y29	PCIE_RX6N
PCIE_NB_TO_SLOTA_P<7>	W29	PCIE_RX7P
PCIE_NB_TO_SLOTA_N<7>	W30	PCIE_RX7N
PCIE_NB_TO_SLOTA_P<8>	V30	PCIE_RX8P
PCIE_NB_TO_SLOTA_N<8>	V29	PCIE_RX8N
PCIE_NB_TO_SLOTA_P<9>	U29	PCIE_RX9P
PCIE_NB_TO_SLOTA_N<9>	T29	PCIE_RX9N
PCIE_NB_TO_SLOTA_P<10>	T30	PCIE_RX10P
PCIE_NB_TO_SLOTA_N<10>	R30	PCIE_RX10N
PCIE_NB_TO_SLOTA_P<11>	R29	PCIE_RX11P
PCIE_NB_TO_SLOTA_N<11>	P29	PCIE_RX11N
PCIE_NB_TO_SLOTA_P<12>	N29	PCIE_RX12P
PCIE_NB_TO_SLOTA_N<12>	N30	PCIE_RX12N
PCIE_NB_TO_SLOTA_P<13>	M30	PCIE_RX13P
PCIE_NB_TO_SLOTA_N<13>	M29	PCIE_RX13N
PCIE_NB_TO_SLOTA_P<14>	L29	PCIE_RX14P
PCIE_NB_TO_SLOTA_N<14>	K29	PCIE_RX14N
PCIE_NB_TO_SLOTA_P<15>	K30	PCIE_RX15P
PCIE_NB_TO_SLOTA_N<15>	J30	PCIE_RX15N

PERST* AD25 ATI_RESET_L_R

GPU PCI-E AC COUPLERS (PLACE NEAR GPU)

PCIE_TX0P	AF26	PCIE_SLOTA_TO_NB_PF<0>	0.1UF	C8400	PCIE_SLOTA_TO_NB_P<0>	
PCIE_TX0N	AE26	PCIE_SLOTA_TO_NB_NF<0>	0.1UF	C8401	PCIE_SLOTA_TO_NB_N<0>	
PCIE_TX1P	AC25	PCIE_SLOTA_TO_NB_PF<1>	0.1UF	C8402	PCIE_SLOTA_TO_NB_P<1>	
PCIE_TX1N	AB25	PCIE_SLOTA_TO_NB_NF<1>	0.1UF	C8403	PCIE_SLOTA_TO_NB_N<1>	
PCIE_TX2P	AC27	PCIE_SLOTA_TO_NB_PF<2>	0.1UF	C8404	PCIE_SLOTA_TO_NB_P<2>	
PCIE_TX2N	AB27	PCIE_SLOTA_TO_NB_NF<2>	0.1UF	C8405	PCIE_SLOTA_TO_NB_N<2>	
PCIE_TX3P	AC26	PCIE_SLOTA_TO_NB_PF<3>	0.1UF	C8406	PCIE_SLOTA_TO_NB_P<3>	
PCIE_TX3N	AB26	PCIE_SLOTA_TO_NB_NF<3>	0.1UF	C8407	PCIE_SLOTA_TO_NB_N<3>	
PCIE_TX4P	Y25	PCIE_SLOTA_TO_NB_PF<4>	0.1UF	C8408	PCIE_SLOTA_TO_NB_P<4>	
PCIE_TX4N	W25	PCIE_SLOTA_TO_NB_NF<4>	0.1UF	C8409	PCIE_SLOTA_TO_NB_N<4>	
PCIE_TX5P	Y27	PCIE_SLOTA_TO_NB_PF<5>	0.1UF	C8410	PCIE_SLOTA_TO_NB_P<5>	
PCIE_TX5N	W27	PCIE_SLOTA_TO_NB_NF<5>	0.1UF	C8411	PCIE_SLOTA_TO_NB_N<5>	
PCIE_TX6P	Y26	PCIE_SLOTA_TO_NB_PF<6>	0.1UF	C8412	PCIE_SLOTA_TO_NB_P<6>	
PCIE_TX6N	W26	PCIE_SLOTA_TO_NB_NF<6>	0.1UF	C8413	PCIE_SLOTA_TO_NB_N<6>	
PCIE_TX7P	U25	PCIE_SLOTA_TO_NB_PF<7>	0.1UF	C8414	PCIE_SLOTA_TO_NB_P<7>	
PCIE_TX7N	T25	PCIE_SLOTA_TO_NB_NF<7>	0.1UF	C8415	PCIE_SLOTA_TO_NB_N<7>	
PCIE_TX8P	U27	PCIE_SLOTA_TO_NB_PF<8>	0.1UF	C8416	PCIE_SLOTA_TO_NB_P<8>	
PCIE_TX8N	T27	PCIE_SLOTA_TO_NB_NF<8>	0.1UF	C8417	PCIE_SLOTA_TO_NB_N<8>	
PCIE_TX9P	U26	PCIE_SLOTA_TO_NB_PF<9>	0.1UF	C8418	PCIE_SLOTA_TO_NB_P<9>	
PCIE_TX9N	T26	PCIE_SLOTA_TO_NB_NF<9>	0.1UF	C8419	PCIE_SLOTA_TO_NB_N<9>	
PCIE_TX10P	P25	PCIE_SLOTA_TO_NB_PF<10>	0.1UF	C8420	PCIE_SLOTA_TO_NB_P<10>	
PCIE_TX10N	N25	PCIE_SLOTA_TO_NB_NF<10>	0.1UF	C8421	PCIE_SLOTA_TO_NB_N<10>	
PCIE_TX11P	P27	PCIE_SLOTA_TO_NB_PF<11>	0.1UF	C8422	PCIE_SLOTA_TO_NB_P<11>	
PCIE_TX11N	N27	PCIE_SLOTA_TO_NB_NF<11>	0.1UF	C8423	PCIE_SLOTA_TO_NB_N<11>	
PCIE_TX12P	P26	PCIE_SLOTA_TO_NB_PF<12>	0.1UF	C8424	PCIE_SLOTA_TO_NB_P<12>	
PCIE_TX12N	N26	PCIE_SLOTA_TO_NB_NF<12>	0.1UF	C8425	PCIE_SLOTA_TO_NB_N<12>	
PCIE_TX13P	L25	PCIE_SLOTA_TO_NB_PF<13>	0.1UF	C8426	PCIE_SLOTA_TO_NB_P<13>	
PCIE_TX13N	K25	PCIE_SLOTA_TO_NB_NF<13>	0.1UF	C8427	PCIE_SLOTA_TO_NB_N<13>	
PCIE_TX14P	L27	PCIE_SLOTA_TO_NB_PF<14>	0.1UF	C8428	PCIE_SLOTA_TO_NB_P<14>	
PCIE_TX14N	K27	PCIE_SLOTA_TO_NB_NF<14>	0.1UF	C8429	PCIE_SLOTA_TO_NB_N<14>	
PCIE_TX15P	L26	PCIE_SLOTA_TO_NB_PF<15>	0.1UF	C8430	PCIE_SLOTA_TO_NB_P<15>	
PCIE_TX15N	K26	PCIE_SLOTA_TO_NB_NF<15>	0.1UF	C8431	PCIE_SLOTA_TO_NB_N<15>	

PCIE_CALI AB23 GPU_PCIE_CALI
PCIE_TEST AE25 GPU_PCIE_TEST

PP1V2_GPU_PCIE_VDDR
R8400 100 1% 1/16W MF-LF 402
GPU_PCIE_CALRN AB24 PCIE_CALRN
GPU_PCIE_CALRP AC23 PCIE_CALRP
R8401 150 1% 1/16W MF-LF 402
R8402 10K 5% 1/16W MF-LF 402
R8403 10K 1% 1/16W MF-LF 402

PCIE_VSS: K28 L28 M24 M25 M26 M27 M28 N28 P28 R23
PCIE_VSS: AH29 AF28 AE28 AD28 AD27 AD26 AD24 AC28 AB28 AA28
PCIE_VSS: R24 R25 R26 R27 R28 T24 T28 U28 V24 V25 V26 V27 V28 W24 W28 Y28 AA23 AA24 AA25 AA26 AA27

XW8405 SM
PCIE_SLOTA_PRSNT_L

GROUND VIAS FOR LAYER TRANSITIONS

ZH8400 HOLE-VIA
ZH8401 HOLE-VIA
ZH8402 HOLE-VIA
ZH8403 HOLE-VIA
ZH8404 HOLE-VIA
ZH8405 HOLE-VIA
ZH8406 HOLE-VIA
ZH8407 HOLE-VIA
ZH8408 HOLE-VIA
ZH8409 HOLE-VIA
ZH8410 HOLE-VIA
ZH8411 HOLE-VIA
ZH8412 HOLE-VIA
ZH8413 HOLE-VIA
ZH8414 HOLE-VIA
ZH8415 HOLE-VIA
ZH8416 HOLE-VIA
ZH8417 HOLE-VIA
ZH8418 HOLE-VIA
ZH8419 HOLE-VIA

GPU PCIe

SYNC_MASTER=M23-DD SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

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D	051-6790	E
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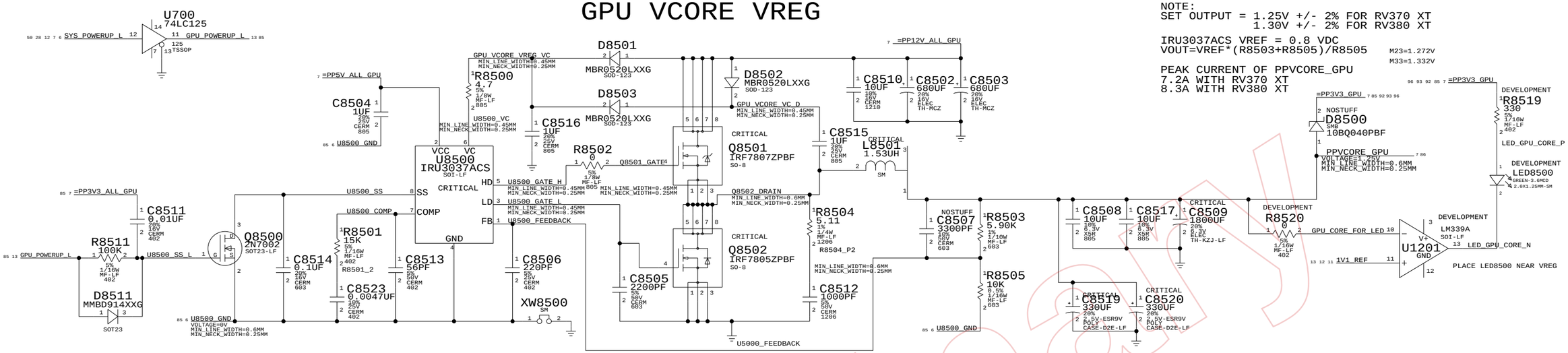
GPU VCORE VREG

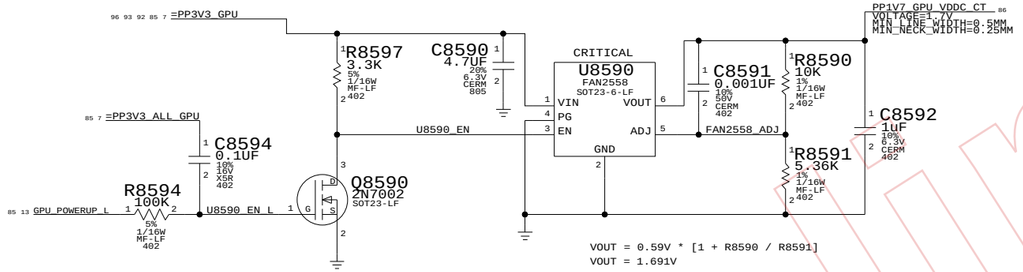
NOTE:
SET OUTPUT = 1.25V +/- 2% FOR RV370 XT
1.30V +/- 2% FOR RV380 XT

IRU3037ACS VREF = 0.8 VDC
VOUT=VREF*(R8503+R8505)/R8505
M23=1.272V
M33=1.332V

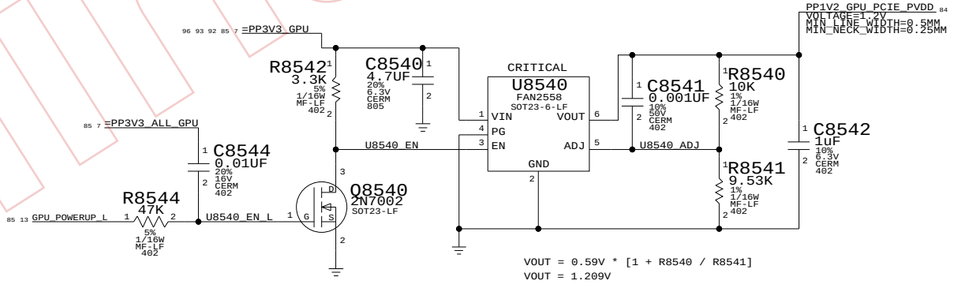
PEAK CURRENT OF PPVCORE_GPU
7.2A WITH RV370 XT
8.3A WITH RV380 XT



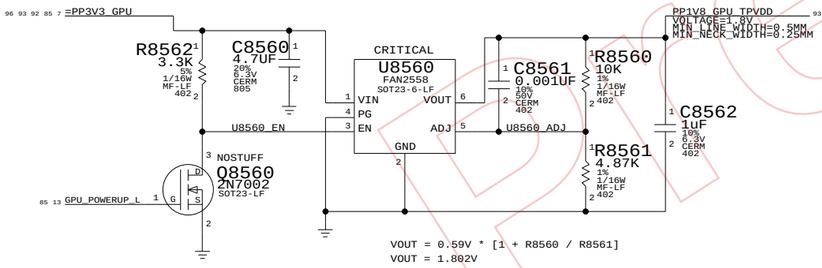
GPU 1.7V VDDC_CT



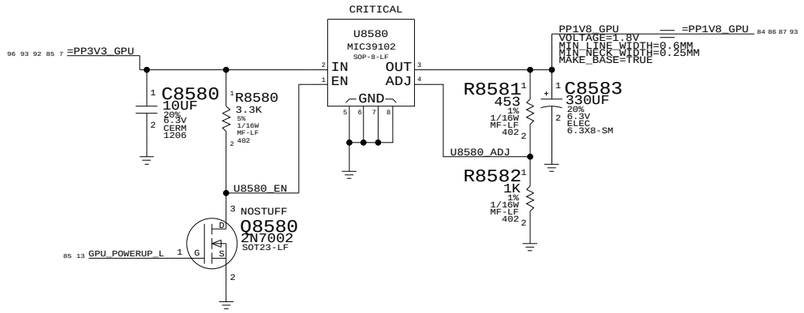
GPU 1.20V PCIE PVDD



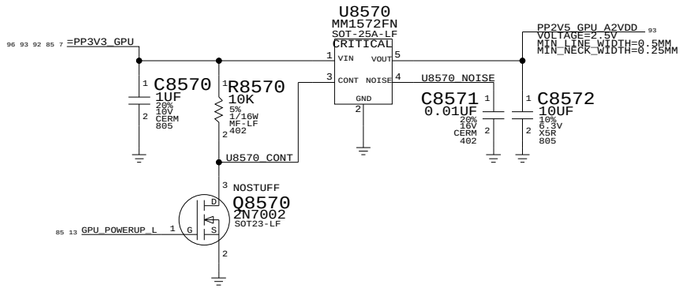
GPU 1.80V TPVDD



GPU 1.8V VREG



GPU 2.5V A2VDD



POWER SEQUENCING FOR RV370/80: =PP3V3_GPU > =PPV_GPU_MEM > VDDC_CT > PPVCORE_GPU
PP2V5_GPU_A2VDD > PP1V8_GPU > PCIE_PVDD

THE ENTIRE SEQUENCE SHOULD TAKE LESS THAN 40 MS (T1+T3 IN DATABOOK)
HOWEVER IDEALLY ALL POWER RAILS SHOULD RAMP TOGETHER
POWER DOWN SEQUENCE SHOULD BE IN REVERSE ORDER

Graphics Vregs

SYNC_MASTER=M23-DD SYNC_DATE=06/20/2005

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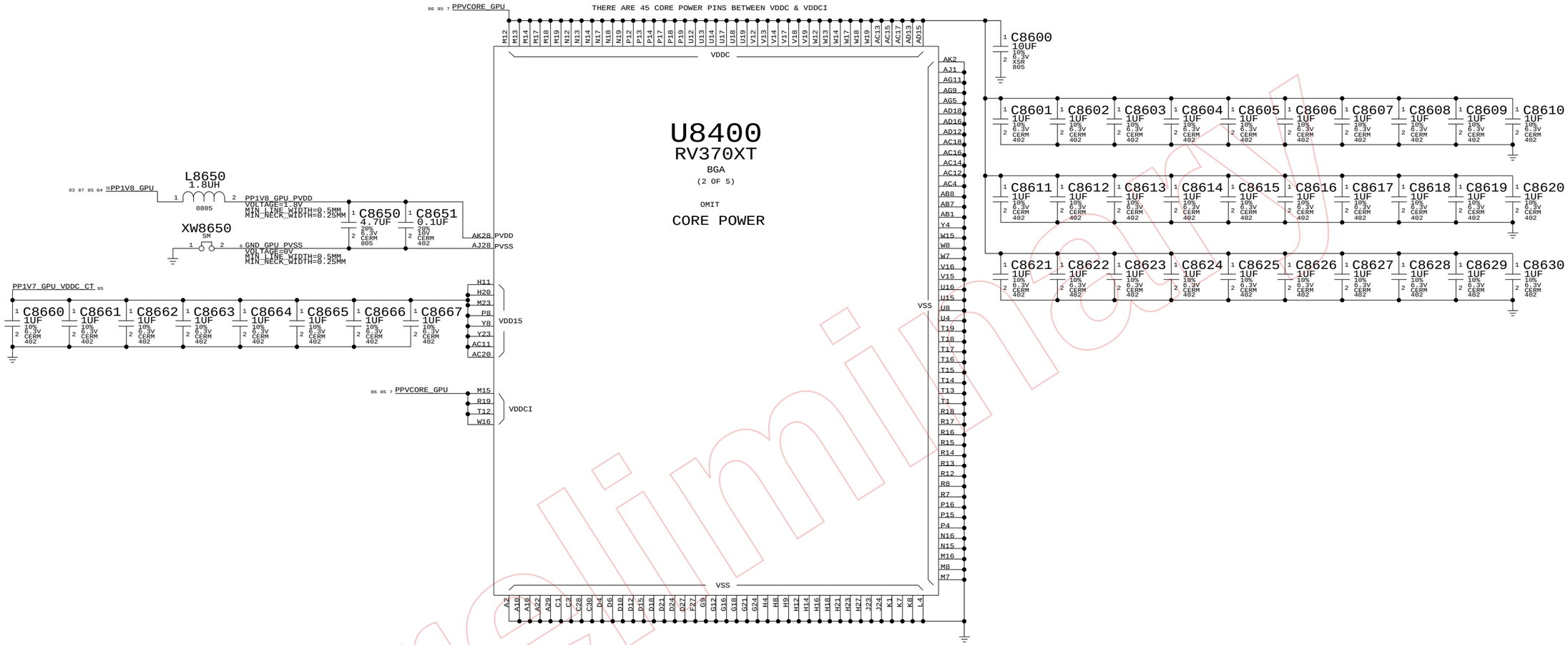
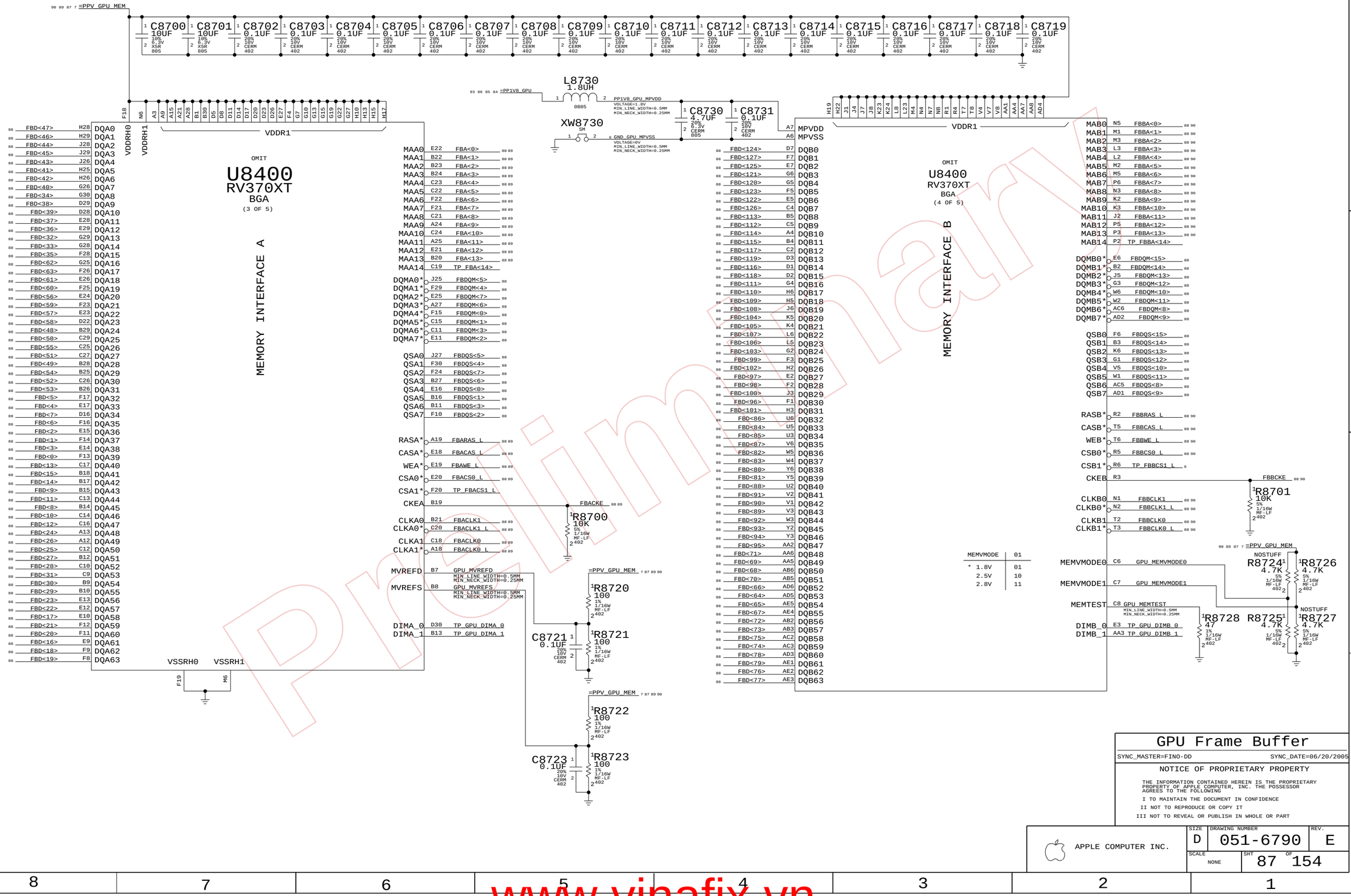


GPU Core Power

SYNC_MASTER=FINO-DD SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 86 OF 154	



FRAME BUFFER A TERMINATION

PLACE R'S CLOSE TO MEMORY

FBD<31>	22	3	6	RP8820	RFBD<31>
FBD<30>	22	4	5	RP8820	RFBD<30>
FBD<29>	22	1	8	RP8820	RFBD<29>
FBD<28>	22	2	7	RP8820	RFBD<28>
FBD<27>	22	3	6	RP8821	RFBD<27>
FBD<26>	22	4	5	RP8821	RFBD<26>
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FBD<24>	22	1	8	RP8821	RFBD<24>
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FBD<2>	22	4	5	RP8822	RFBD<2>
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FBD<17>	22	1	8	RP8823	RFBD<17>
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FBD<18>	22	3	6	RP8823	RFBD<18>
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FBD<15>	22	4	5	RP8824	RFBD<15>
FBD<14>	22	3	6	RP8824	RFBD<14>
FBD<13>	22	2	7	RP8824	RFBD<13>
FBD<12>	22	1	8	RP8824	RFBD<12>
FBD<10>	22	3	6	RP8825	RFBD<10>
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FBD<8>	22	2	7	RP8825	RFBD<8>
FBD<5>	22	2	7	RP8826	RFBD<5>
FBD<6>	22	3	6	RP8826	RFBD<6>
FBD<4>	22	1	8	RP8826	RFBD<4>
FBD<7>	22	4	5	RP8826	RFBD<7>
FBD<20>	22	1	8	RP8827	RFBD<20>
FBD<21>	22	2	7	RP8827	RFBD<21>
FBD<22>	22	3	6	RP8827	RFBD<22>
FBD<23>	22	4	5	RP8827	RFBD<23>

FBD<32>	22	3	6	RP8828	RFBD<32>
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FBD<37>	22	3	6	RP8816	RFBD<37>
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FBD<40>	22	3	6	RP8829	RFBD<40>
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FBD<42>	22	2	7	RP8829	RFBD<42>
FBD<43>	22	1	8	RP8829	RFBD<43>
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FBD<61>	22	2	7	RP8802	RFBD<61>
FBD<62>	22	3	6	RP8802	RFBD<62>
FBD<63>	22	1	8	RP8802	RFBD<63>

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FBDQS<1>	22	1	R8801
FBDQS<2>	22	1	R8802
FBDQS<3>	22	1	R8803
FBDQS<4>	22	1	R8804
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FBDQS<7>	22	1	R8807

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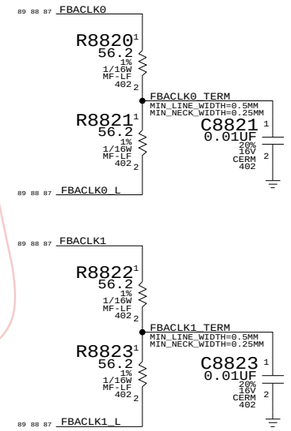
PLACE CLOCK TERMINATION AFTER MEMORY
GPU -> MEMORY -> TERMINATION



FRAME BUFFER B TERMINATION

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FBD<68>	22	1	8	RP8808	RFBD<68>
FBD<70>	22	2	7	RP8808	RFBD<70>
FBD<69>	22	3	6	RP8808	RFBD<69>
FBD<71>	22	4	5	RP8808	RFBD<71>
FBD<80>	22	1	8	RP8807	RFBD<80>
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FBD<79>	22	3	6	RP8817	RFBD<79>
FBD<91>	22	3	6	RP8818	RFBD<91>
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FBD<93>	22	1	8	RP8803	RFBD<93>
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FBD<96>	22	4	5	RP8815	RFBD<96>
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FBD<115>	22	1	8	RP8811	RFBD<115>
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FBDQS<14>	22	1	R8814
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FBDQM<8>	22	1	R8838
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FBDQM<10>	22	1	R8840
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FBDQM<13>	22	1	R8843
FBDQM<14>	22	1	R8844
FBDQM<15>	22	1	R8845

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RFBD<127..0>	GPU_FB	GPU_FB	
FBA<13..0>	GPU_FB	GPU_FB	
FBBA<13..0>	GPU_FB	GPU_FB	
FBDQM<15..0>	GPU_FB	GPU_FB	
FBDQS<15..0>	GPU_FB	GPU_FBDQS	
FBARAS_L	GPU_FB	GPU_FB	
FBACAS_L	GPU_FB	GPU_FB	
FBAWE_L	GPU_FB	GPU_FB	
FBACS0_L	GPU_FB	GPU_FB	
FBACKE	GPU_FB	GPU_FB	
FBBRAS_L	GPU_FB	GPU_FB	
FBBCAS_L	GPU_FB	GPU_FB	
FBBWE_L	GPU_FB	GPU_FB	
FBBCS0_L	GPU_FB	GPU_FB	
FBBCKE	GPU_FB	GPU_FB	

ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
FBACLK0	GPU_FBCLK	GPU_FBCLK	FBACLK0
FBACLK0_L	GPU_FBCLK	GPU_FBCLK	FBACLK0
FBACLK1	GPU_FBCLK	GPU_FBCLK	FBACLK1
FBACLK1_L	GPU_FBCLK	GPU_FBCLK	FBACLK1
FBBCLK0	GPU_FBCLK	GPU_FBCLK	FBBCLK0
FBBCLK0_L	GPU_FBCLK	GPU_FBCLK	FBBCLK0
FBBCLK1	GPU_FBCLK	GPU_FBCLK	FBBCLK1
FBBCLK1_L	GPU_FBCLK	GPU_FBCLK	FBBCLK1

FB Series Termination

SYNC_MASTER=FINO-DD SYNC_DATE=06/20/2005

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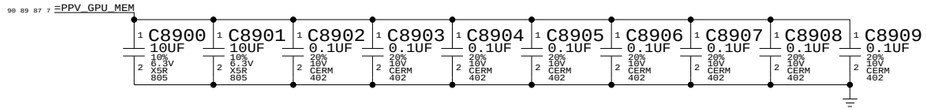
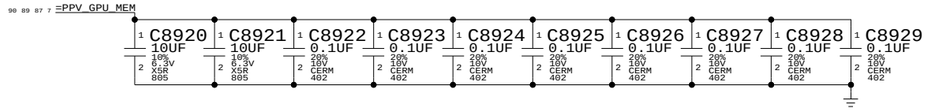
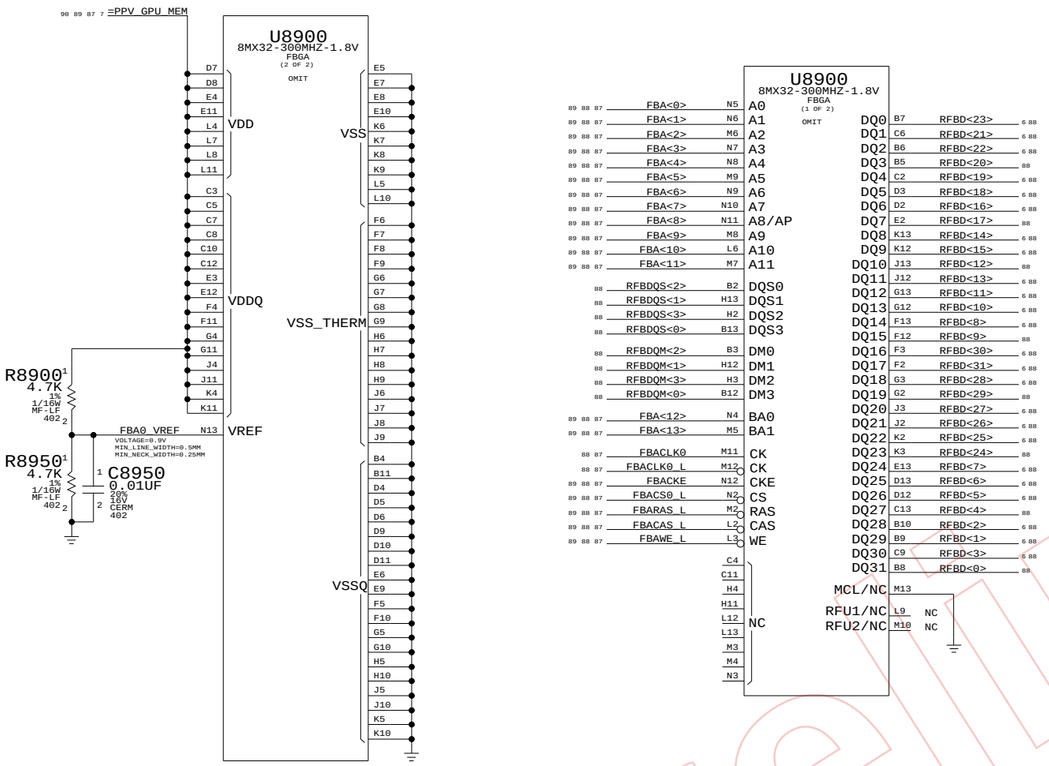
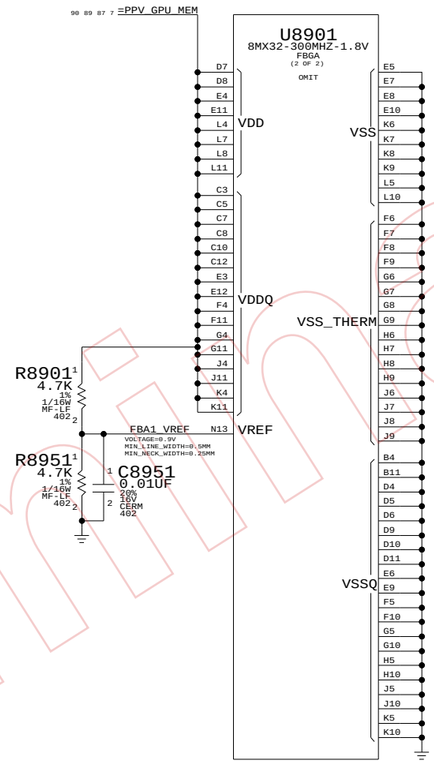
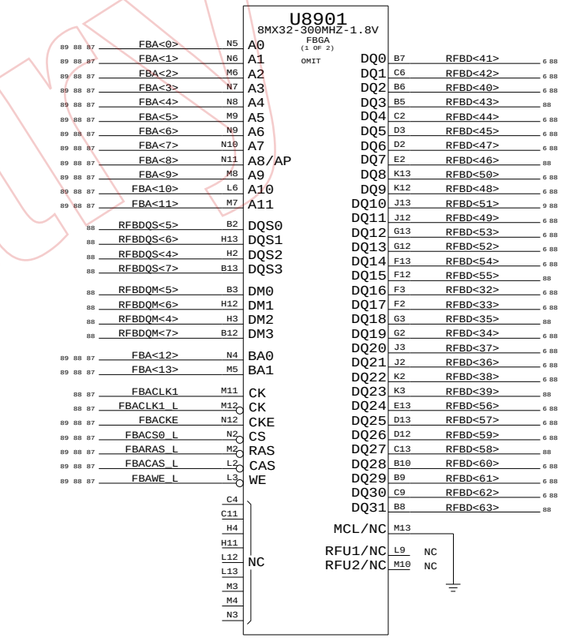
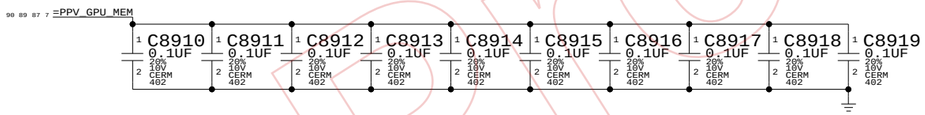


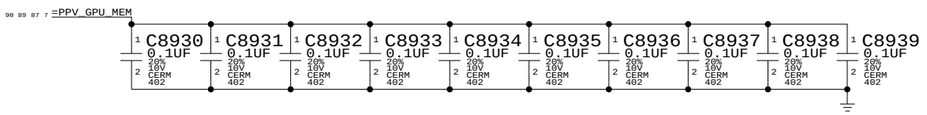




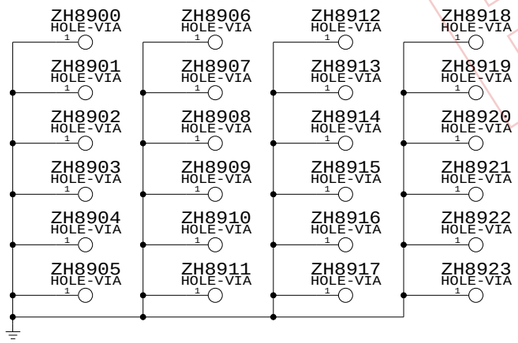








GROUND VIAS FOR SIGNAL LAYER TRANSITIONS



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	
333S0319	2	SDRAM,4MX32,GDDR,300MHZ,1.8V,SAM	U8900,U8901	CRITICAL	FB64MB_300MHZ_SAM	SAMSUNG
333S0311	2	SDRAM,8MX32,GDDR,300MHZ,1.8V,SAM	U8900,U8901	CRITICAL	FB128MB_300MHZ_SAM	
333S0312	2	SDRAM,8MX32,GDDR,350MHZ,1.8V,SAM	U8900,U8901	CRITICAL	FB128MB_350MHZ_SAM	
333S0320	2	SDRAM,4MX32,GDDR,300MHZ,1.8V,HYN	U8900,U8901	CRITICAL	FB64MB_300MHZ_HYN	HYNIX
333S0314	2	SDRAM,8MX32,GDDR,300MHZ,1.8V,HYN	U8900,U8901	CRITICAL	FB128MB_300MHZ_HYN	
333S0315	2	SDRAM,8MX32,GDDR,350MHZ,1.8V,HYN	U8900,U8901	CRITICAL	FB128MB_350MHZ_HYN	

GPU GDDR SDRAM A

SYNC_MASTER=FINO-DD SYNC_DATE=06/20/2005

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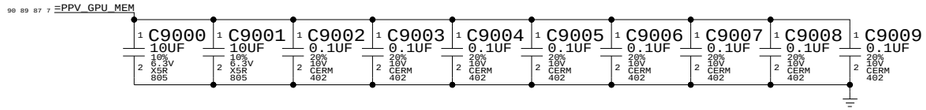

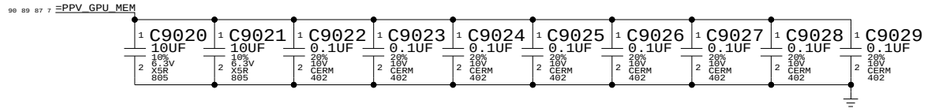

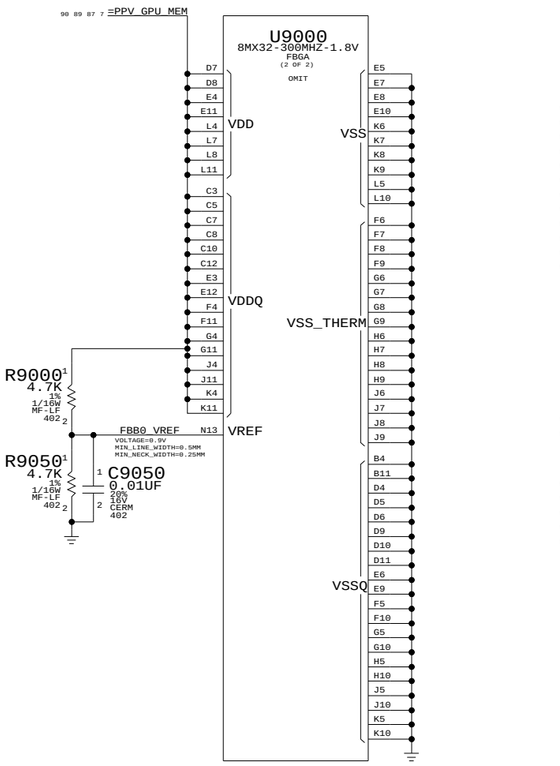

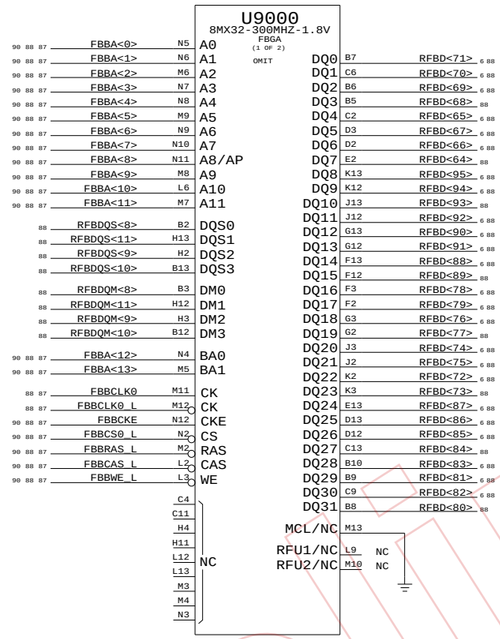

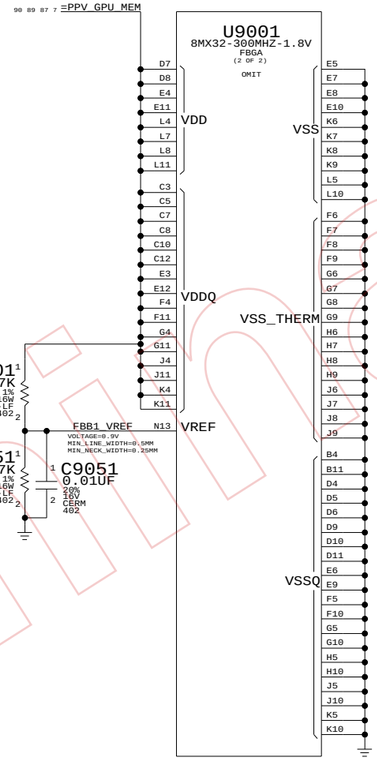

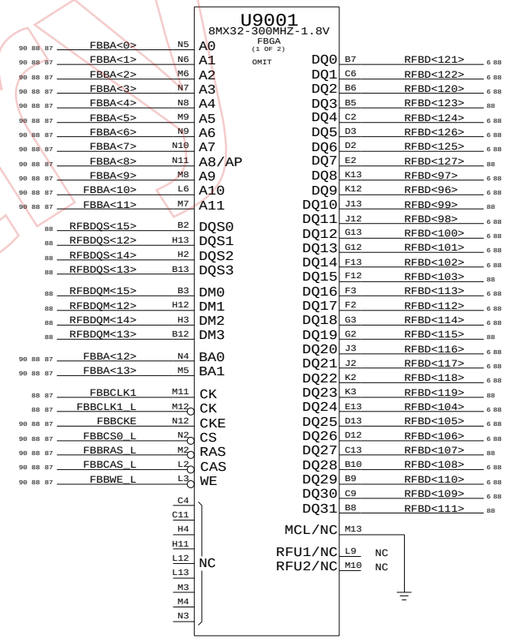

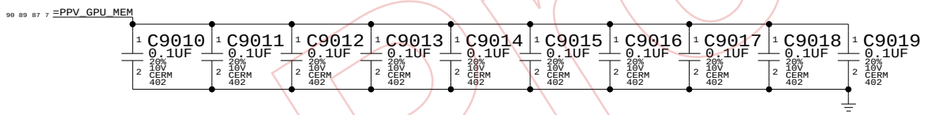

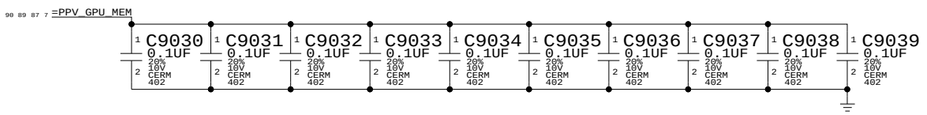

GROUND VIAS FOR SIGNAL LAYER TRANSITIONS

ZH9000 HOLE-VIA, ZH9001 HOLE-VIA, ZH9002 HOLE-VIA, ZH9003 HOLE-VIA, ZH9004 HOLE-VIA, ZH9005 HOLE-VIA
ZH9006 HOLE-VIA, ZH9007 HOLE-VIA, ZH9008 HOLE-VIA, ZH9009 HOLE-VIA, ZH9010 HOLE-VIA, ZH9011 HOLE-VIA
ZH9012 HOLE-VIA, ZH9013 HOLE-VIA, ZH9014 HOLE-VIA, ZH9015 HOLE-VIA, ZH9016 HOLE-VIA, ZH9017 HOLE-VIA
ZH9018 HOLE-VIA, ZH9019 HOLE-VIA, ZH9020 HOLE-VIA, ZH9021 HOLE-VIA, ZH9022 HOLE-VIA, ZH9023 HOLE-VIA

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION	
333S0319	2	SDRAM,4MX32,GDDR,300MHZ,1.8V,SAM	U9000,U9001	CRITICAL	FB64MB_300MHZ_SAM	SAMSUNG
333S0311	2	SDRAM,8MX32,GDDR,300MHZ,1.8V,SAM	U9000,U9001	CRITICAL	FB128MB_300MHZ_SAM	
333S0312	2	SDRAM,8MX32,GDDR,350MHZ,1.8V,SAM	U9000,U9001	CRITICAL	FB128MB_350MHZ_SAM	
333S0320	2	SDRAM,4MX32,GDDR,300MHZ,1.8V,HYN	U9000,U9001	CRITICAL	FB64MB_300MHZ_HYN	HYNIX
333S0314	2	SDRAM,8MX32,GDDR,300MHZ,1.8V,HYN	U9000,U9001	CRITICAL	FB128MB_300MHZ_HYN	
333S0315	2	SDRAM,8MX32,GDDR,350MHZ,1.8V,HYN	U9000,U9001	CRITICAL	FB128MB_350MHZ_HYN	

GPU GDDR SDRAM B

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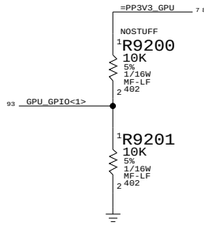
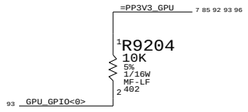
NONE	90	154

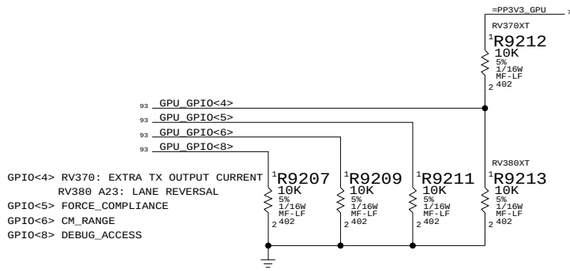
ATI STRAPS

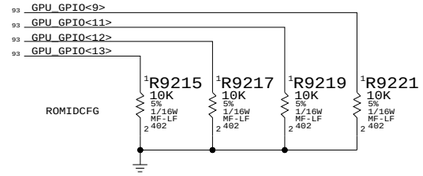


GPIO<1> TRANSMITTER DE-EMPHASIS (ACTIVE LOW)

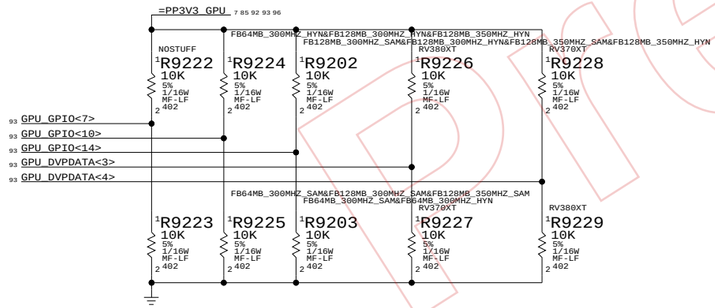


GPIO<0> TRANSMITTER POWER SAVINGS
(FEATURE DOES NOT WORK - PULLED HIGH TO DISABLE)



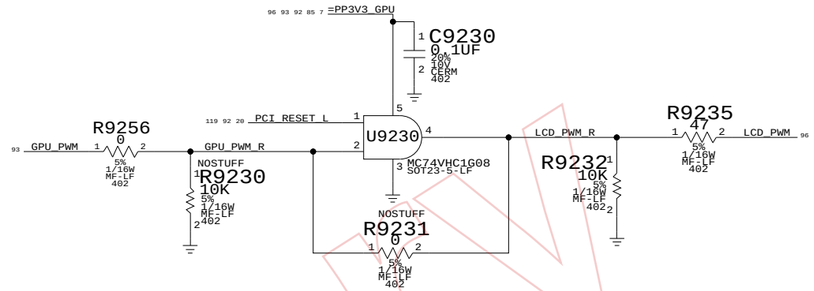


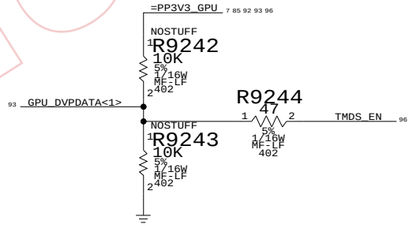
MEMORY STRAPS

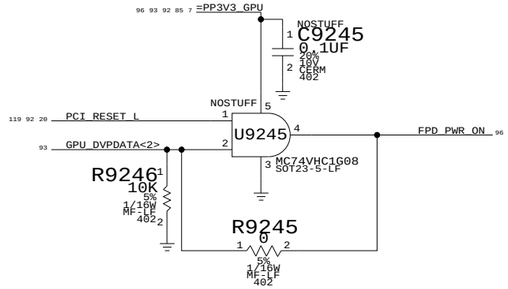


GPIO<7> - MEMORY DIE REVISION
  0 - ORIGINAL DIE REVISION
  1 - NEW (FUTURE) DIE REV
GPIO<10> - MEMORY VENDOR
  0 - SAMSUNG
  1 - HYNIX
GPIO<14> - MEMORY DENSITY
  0 - 4MX32
  1 - 8MX32
DVPDATA<3,4> - SPEED
  00 - 325E / 200M
  01 - 400E / 300M
  10 - 500E / 350M
  11 - RESERVED FOR FUTURE USE

APPLE GPIOS







GPU Straps

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SPREAD SPECTRUM SUPPORT

S0=1;S1=M => -1.5% DOWN-SPREAD

27M OSC

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0176	1	OSC, XTAL, 27 MHZ, 30PPM	G9370	CRITICAL	

DIFFERENTIAL IMPEDANCE SHOULD BE 100 OHM

ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
TMDS_TCKM	GPU_TMDS	GPU_TMDS	TMDS_CK
	GPU_TMDS	GPU_TMDS	TMDS_CK
TMDS0	GPU_TMDS	GPU_TMDS	TMDS_D0
	GPU_TMDS	GPU_TMDS	TMDS_D0
TMDS0	GPU_TMDS	GPU_TMDS	TMDS_D1
	GPU_TMDS	GPU_TMDS	TMDS_D1
TMDS0	GPU_TMDS	GPU_TMDS	TMDS_D2
	GPU_TMDS	GPU_TMDS	TMDS_D2
	GPU_VGA	GPU_VGA	
	GPU_VGA	GPU_VGA	
	GPU_VGA	GPU_VGA	
	GPU_VGA	GPU_VGA	
	GPU_VGA	GPU_VGA	
	I2C	I2C	
	I2C	I2C	
	I2C	I2C	
	I2C	I2C	

GPU THERMAL SENSOR

PLACE C9392 CLOSE TO TEMP SENSOR

PLACE R9321-3 & FL9600-2 NEAR MINI-VGA CONNECTOR
ROUTE GND IN BETWEEN RGB SIGNALS WITH A VIA EVERY INCH

GPU DVI & DACs

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SCALE: NONE	SHT: 93	OF: 154

INTERNAL LCD

	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
TCKP	GPU_TMDS	GPU_TMDS	TCK
TCKM	GPU_TMDS	GPU_TMDS	TCK
TD0P	GPU_TMDS	GPU_TMDS	TD0
TD0M	GPU_TMDS	GPU_TMDS	TD0
TD1P	GPU_TMDS	GPU_TMDS	TD1
TD1M	GPU_TMDS	GPU_TMDS	TD1
TD2P	GPU_TMDS	GPU_TMDS	TD2
TD2M	GPU_TMDS	GPU_TMDS	TD2

PLACE R9600-R9604, C9600 AS CLOSE TO GPU AS POSSIBLE

PLACE FILTER CLOSE TO TMDS CONNECTOR

TMDS_D2M — R9604 332 1% 1/16W MF-LF 402 — TMDS_D2P

TMDS_D1M — R9603 332 1% 1/16W MF-LF 402 — TMDS_D1P

TMDS_D0M — R9602 332 1% 1/16W MF-LF 402 — TMDS_D0P

TMDS_CKM — R9601 165 1% 1/16W MF-LF 402 — TMDS_CKP

TMDS_CK_TERM
MIN_LINE_WIDTH=0.3MM
MIN_NECK_WIDTH=0.2MM

C9600 22PF 5% 50V CERM 402 — R9600 165 1% 1/16W MF-LF 402

NOSTUFF R9626 0 — L9602 90-OHM SM — TD2M, TD2P
NOSTUFF R9627 0

NOSTUFF R9628 0 — L9608 90-OHM SM — TD1M, TD1P
NOSTUFF R9629 0

NOSTUFF R9630 0 — L9609 90-OHM SM — TD0M, TD0P
NOSTUFF R9631 0

NOSTUFF R9632 0 — L9610 90-OHM SM — TCKM, TCKP

NOSTUFF R9633 0

=PP3V3_GPU — R9605 2.0K 5% 1/16W MF-LF 402 — R9607 2.0K 5% 1/16W MF-LF 402 — R9682 0 5% 1/8W MF-LF 805 — PP3V3_DDC

C9601 0.01UF 10% 16V CERM 402

I2C_GPU_TMDS_SCL — R9608 33 5% 1/16W MF-LF 402 — I2C_TMDS_SCL

I2C_GPU_TMDS_SDA — R9606 33 5% 1/16W MF-LF 402 — I2C_TMDS_SDA

INTERNAL TMDS CONNECTOR

SDF9600 STDOFF-3MMOD4.6MMH-1.35-TH — GND_CHASSIS_TMDS0

(516S0241) CRITICAL — J9602 53307-3072 F-ST-SM

C9620 0.01UF 10% 16V CERM 402

PPVCC_TMDS

PP3V3_DDC VOLTAGE=3.3V MIN_LINE_WIDTH=0.5MM MIN_NECK_WIDTH=0.25MM

TD0M, TD0P, TD2M, TD2P, I2C_TMDS_SDA, TCKM, TCKP, TD1M, TD1P, I2C_TMDS_SCL

C9616 10UF 10% 6.3V X5R 805 — C9615 0.01UF 10% 16V CERM 402

SDF9601 STDOFF-3MMOD4.6MMH-1.35-TH — GND_CHASSIS_TMDS1

C9621 0.01UF 10% 16V CERM 402

PANEL POWER SEQUENCING

=PP3V3_GPU — Q9600 IRF7410PBF SO-8 — NOSTUFF

=PP3V3_GPU — R9634 0 5% 1/4W MF-LF 1206

NOSTUFF C9610 0.01UF 20% 16V CERM 402

NOSTUFF R9625 100K 5% 1/16W MF-LF 402

376S0337

NOSTUFF C9618 0.022UF 20% 16V CERM 402

PPVCC_TMDS VOLTAGE=3.3V MIN_LINE_WIDTH=0.6MM MIN_NECK_WIDTH=0.25MM

FPD_PWR_SW_G — NOSTUFF R9613 10K 5% 1/16W MF-LF 402

D9614 MMBD914XXG SOT23

C9617 10UF 10% 6.3V X5R 805 — NOSTUFF R9660 10K 5% 1/16W MF-LF 402

FPD_PWR_ON_D — NOSTUFF Q9601 2N7002 SOT23-LF — FPD_PWR_ON

TMDS_EN_R — R9614 10K 5% 1/16W MF-LF 402 — TMDS_EN

INVERTER INTERFACE

U9670 74LC125 — FPD_PWR_ON — LED5900_PWR — R9612 820 5% 1/10W MF-LF 603 — LED5900_P1

LED9600 GREEN-3.6MCD 2.0X1.25MM-SM

SILKSCREEN: 3

=PP12V_GPU — C9642 4.7UF 20% 6.3V CERM 805 — CRITICAL J9601 87437-0443-BLK M-ST-SM

LCD_PWM, INV_CUR_HI

518S0331

EXTERNAL VGA CONNECTOR

	NET_PHYSICAL_TYPE	NET_SPACING_TYPE
FILT_ANALOG_GRN	GPU_VGA	GPU_VGA
ANALOG_GRN_LC	GPU_VGA	GPU_VGA
ANALOG_GRN_LCL	GPU_VGA	GPU_VGA
FILT_ANALOG_RED	GPU_VGA	GPU_VGA
ANALOG_RED_LC	GPU_VGA	GPU_VGA
ANALOG_RED_LCL	GPU_VGA	GPU_VGA
FILT_ANALOG_BLU	GPU_VGA	GPU_VGA
ANALOG_BLU_LC	GPU_VGA	GPU_VGA
ANALOG_BLU_LCL	GPU_VGA	GPU_VGA
VGA_VSYNC	GPU_VGA	GPU_VGA
VGA_VSYNC_R	GPU_VGA	GPU_VGA
VGA_HSYNC	GPU_VGA	GPU_VGA
VGA_HSYNC_R	GPU_VGA	GPU_VGA

PP5V_USB2 — R9680 0 5% 1/8W MF-LF 805 — PP5V_VGA VOLTAGE=5V MIN_LINE_WIDTH=0.6MM MIN_NECK_WIDTH=0.25MM

C9602 0.01UF 10% 16V CERM 402 — GND_CHASSIS_VGA

=PP3V3_GPU — C9670 0.1UF 20% 10V CERM 402 — CRITICAL U9670 74LC125 14 TSSOP

ANALOG_VSYNC — VGA_VSYNC — R9671 33 5% 1/16W MF-LF 402 — VGA_VSYNC_R

U9670 74LC125 — ANALOG_HSYNC — VGA_HSYNC — R9672 33 5% 1/16W MF-LF 402 — VGA_HSYNC_R

NOSTUFF C9607 22PF 5% 50V CERM 402 — NOSTUFF C9608 22PF 5% 50V CERM 402 — GND_CHASSIS_VGA

=PP3V3_GPU — R9673 10K 5% 1/16W MF-LF 402 — R9674 10K 5% 1/16W MF-LF 402

Q9675 2N7002DW-X-F SOT-363 — I2C_GPU_MON_SCL — R9675 100 5% 1/16W MF-LF 402 — I2C_MON_SCL_R

Q9675 2N7002DW-X-F SOT-363 — I2C_GPU_MON_SDA — R9676 100 5% 1/16W MF-LF 402 — I2C_MON_SDA_R

PP5V_VGA — R9677 4.7K 5% 1/16W MF-LF 402 — R9678 4.7K 5% 1/16W MF-LF 402

C9677 47PF 5% 50V CERM 402 — C9678 47PF 5% 50V CERM 402 — GND_CHASSIS_VGA

INDUCTORS SHOULD BE 47 NH
ANY ~8PF CAP SHOULD DO

ANALOG_RED — L9640 47NH-0.20-OHM 0805 — ANALOG_RED_LC — L9641 47NH-0.20-OHM 0805

C9640 8.2PF +/-0.25PF 50V CERM 402

NOSTUFF FL9600 LCFILTER SM-220MHZ-LF — R9640 0 — ANALOG_RED_LCL

R9643 301 1% 1/10W MF-LF 402

ANALOG_GRN — L9642 47NH-0.20-OHM 0805 — ANALOG_GRN_LC — L9643 47NH-0.20-OHM 0805

C9643 8.2PF +/-0.25PF 50V CERM 402

NOSTUFF FL9601 LCFILTER SM-220MHZ-LF — R9641 0 — ANALOG_GRN_LCL

R9644 301 1% 1/10W MF-LF 402

ANALOG_BLU — L9644 47NH-0.20-OHM 0805 — ANALOG_BLU_LC — L9645 47NH-0.20-OHM 0805

C9644 8.2PF +/-0.25PF 50V CERM 402

NOSTUFF FL9602 LCFILTER SM-220MHZ-LF — R9642 0 — ANALOG_BLU_LCL

R9645 301 1% 1/10W MF-LF 402

PLACE R9321-3 & FL9600-2 CLOSE TO J9603

M23: 514S0089

CRITICAL J9603 MINI-VGA F-ST-SM

NC — PIN 15 NC REQUESTED BY EMC

VGA_HSYNC_R, FILT_ANALOG_RED, FILT_ANALOG_GRN, FILT_ANALOG_BLU, I2C_MON_SCL_R, MON_DETECT, VGA_VSYNC_R, (GRN_RTN), PP5V_VGA, I2C_MON_SDA_R, (BLU_RTN)

C9605 0.01UF 10% 16V CERM 402 — C9604 0.01UF 10% 16V CERM 402 — C9603 0.01UF 10% 16V CERM 402 — GND_CHASSIS_VGA

TMDS/Inverter/ExtVGA

SYNC_MASTER=M23-DD SYNC_DATE=06/20/2005

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SCALE: NONE	SHT 96 OF 154	

KODIAK PCI-E PHYSICAL CONSTRAINT TABLE

SIG_NAME	ELECTRICAL_CONSTRAINT_SET	DIFFERENTIAL_PAIR	NET_PHYSICAL_TYPE	NET_SPACING_TYPE
100M_N<0>		CLK_100M	PCIE_CLK	PCIE_CLK
100M_P<0>		CLK_100M	PCIE_CLK	PCIE_CLK
CLK_KOD_100M_N<0>		CLK_KODPCIE_100M	PCIE_CLK	PCIE_CLK
CLK_KOD_100M_P<0>		CLK_KODPCIE_100M	PCIE_CLK	PCIE_CLK
CLK_KOD_100M_NF<0>		CLK_KODPCIE_100MF	PCIE_CLK	PCIE_CLK
CLK_KOD_100M_PF<0>		CLK_KODPCIE_100MF	PCIE_CLK	PCIE_CLK
PCIE_NB_TO_SLOTA_NF<0>	PCIE_NB2SA0	PCIE_NB_TO_SLOTA_0_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<0>	PCIE_NB2SA0	PCIE_NB_TO_SLOTA_0_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<1>	PCIE_NB2SA1	PCIE_NB_TO_SLOTA_1_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<1>	PCIE_NB2SA1	PCIE_NB_TO_SLOTA_1_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<2>	PCIE_NB2SA2	PCIE_NB_TO_SLOTA_2_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<2>	PCIE_NB2SA2	PCIE_NB_TO_SLOTA_2_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<3>	PCIE_NB2SA3	PCIE_NB_TO_SLOTA_3_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<3>	PCIE_NB2SA3	PCIE_NB_TO_SLOTA_3_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<4>	PCIE_NB2SA4	PCIE_NB_TO_SLOTA_4_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<4>	PCIE_NB2SA4	PCIE_NB_TO_SLOTA_4_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<5>	PCIE_NB2SA5	PCIE_NB_TO_SLOTA_5_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<5>	PCIE_NB2SA5	PCIE_NB_TO_SLOTA_5_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<6>	PCIE_NB2SA6	PCIE_NB_TO_SLOTA_6_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<6>	PCIE_NB2SA6	PCIE_NB_TO_SLOTA_6_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<7>	PCIE_NB2SA7	PCIE_NB_TO_SLOTA_7_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<7>	PCIE_NB2SA7	PCIE_NB_TO_SLOTA_7_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<8>	PCIE_NB2SA8	PCIE_NB_TO_SLOTA_8_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<8>	PCIE_NB2SA8	PCIE_NB_TO_SLOTA_8_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<9>	PCIE_NB2SA9	PCIE_NB_TO_SLOTA_9_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<9>	PCIE_NB2SA9	PCIE_NB_TO_SLOTA_9_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<10>	PCIE_NB2SA10	PCIE_NB_TO_SLOTA_10_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<10>	PCIE_NB2SA10	PCIE_NB_TO_SLOTA_10_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<11>	PCIE_NB2SA11	PCIE_NB_TO_SLOTA_11_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<11>	PCIE_NB2SA11	PCIE_NB_TO_SLOTA_11_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<12>	PCIE_NB2SA12	PCIE_NB_TO_SLOTA_12_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<12>	PCIE_NB2SA12	PCIE_NB_TO_SLOTA_12_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<13>	PCIE_NB2SA13	PCIE_NB_TO_SLOTA_13_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<13>	PCIE_NB2SA13	PCIE_NB_TO_SLOTA_13_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<14>	PCIE_NB2SA14	PCIE_NB_TO_SLOTA_14_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<14>	PCIE_NB2SA14	PCIE_NB_TO_SLOTA_14_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_NF<15>	PCIE_NB2SA15	PCIE_NB_TO_SLOTA_15_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_PF<15>	PCIE_NB2SA15	PCIE_NB_TO_SLOTA_15_F	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<0>		PCIE_NB_TO_SLOTA_0	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<0>		PCIE_NB_TO_SLOTA_0	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<1>		PCIE_NB_TO_SLOTA_1	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<1>		PCIE_NB_TO_SLOTA_1	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<2>		PCIE_NB_TO_SLOTA_2	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<2>		PCIE_NB_TO_SLOTA_2	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<3>		PCIE_NB_TO_SLOTA_3	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<3>		PCIE_NB_TO_SLOTA_3	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<4>		PCIE_NB_TO_SLOTA_4	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<4>		PCIE_NB_TO_SLOTA_4	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<5>		PCIE_NB_TO_SLOTA_5	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<5>		PCIE_NB_TO_SLOTA_5	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<6>		PCIE_NB_TO_SLOTA_6	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<6>		PCIE_NB_TO_SLOTA_6	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<7>		PCIE_NB_TO_SLOTA_7	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<7>		PCIE_NB_TO_SLOTA_7	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<8>		PCIE_NB_TO_SLOTA_8	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<8>		PCIE_NB_TO_SLOTA_8	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<9>		PCIE_NB_TO_SLOTA_9	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<9>		PCIE_NB_TO_SLOTA_9	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<10>		PCIE_NB_TO_SLOTA_10	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<10>		PCIE_NB_TO_SLOTA_10	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<11>		PCIE_NB_TO_SLOTA_11	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<11>		PCIE_NB_TO_SLOTA_11	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<12>		PCIE_NB_TO_SLOTA_12	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<12>		PCIE_NB_TO_SLOTA_12	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<13>		PCIE_NB_TO_SLOTA_13	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<13>		PCIE_NB_TO_SLOTA_13	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<14>		PCIE_NB_TO_SLOTA_14	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<14>		PCIE_NB_TO_SLOTA_14	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_N<15>		PCIE_NB_TO_SLOTA_15	PCIE_DATA	PCIE_DATA
PCIE_NB_TO_SLOTA_P<15>		PCIE_NB_TO_SLOTA_15	PCIE_DATA	PCIE_DATA

SIG_NAME	ELECTRICAL_CONSTRAINT_SET	DIFFERENTIAL_PAIR	NET_PHYSICAL_TYPE	NET_SPACING_TYPE
CLK_PCIE_SLOTA_N<0>		KODPCIE_CLK	PCIE_CLK	PCIE_CLK
CLK_PCIE_SLOTA_P<0>		KODPCIE_CLK	PCIE_CLK	PCIE_CLK
CLK_PCIE_SLOTA_NF<0>		KODPCIE_CLKF	PCIE_CLK	PCIE_CLK
CLK_PCIE_SLOTA_PF<0>		KODPCIE_CLKF	PCIE_CLK	PCIE_CLK
CKA_P<0>		CLK_SLOTA_CKA	PCIE_CLK	PCIE_CLK
CKA_N<0>		CLK_SLOTA_CKA	PCIE_CLK	PCIE_CLK
PCIE_SLOTA_TO_NB_NF<0>	PCIE_SA2NB0	PCIE_SLOTA_TO_NB_0_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<0>	PCIE_SA2NB0	PCIE_SLOTA_TO_NB_0_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<1>	PCIE_SA2NB1	PCIE_SLOTA_TO_NB_1_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<1>	PCIE_SA2NB1	PCIE_SLOTA_TO_NB_1_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<2>	PCIE_SA2NB2	PCIE_SLOTA_TO_NB_2_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<2>	PCIE_SA2NB2	PCIE_SLOTA_TO_NB_2_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<3>	PCIE_SA2NB3	PCIE_SLOTA_TO_NB_3_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<3>	PCIE_SA2NB3	PCIE_SLOTA_TO_NB_3_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<4>	PCIE_SA2NB4	PCIE_SLOTA_TO_NB_4_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<4>	PCIE_SA2NB4	PCIE_SLOTA_TO_NB_4_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<5>	PCIE_SA2NB5	PCIE_SLOTA_TO_NB_5_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<5>	PCIE_SA2NB5	PCIE_SLOTA_TO_NB_5_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<6>	PCIE_SA2NB6	PCIE_SLOTA_TO_NB_6_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<6>	PCIE_SA2NB6	PCIE_SLOTA_TO_NB_6_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<7>	PCIE_SA2NB7	PCIE_SLOTA_TO_NB_7_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<7>	PCIE_SA2NB7	PCIE_SLOTA_TO_NB_7_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<8>	PCIE_SA2NB8	PCIE_SLOTA_TO_NB_8_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<8>	PCIE_SA2NB8	PCIE_SLOTA_TO_NB_8_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<9>	PCIE_SA2NB9	PCIE_SLOTA_TO_NB_9_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<9>	PCIE_SA2NB9	PCIE_SLOTA_TO_NB_9_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<10>	PCIE_SA2NB10	PCIE_SLOTA_TO_NB_10_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<10>	PCIE_SA2NB10	PCIE_SLOTA_TO_NB_10_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<11>	PCIE_SA2NB11	PCIE_SLOTA_TO_NB_11_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<11>	PCIE_SA2NB11	PCIE_SLOTA_TO_NB_11_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<12>	PCIE_SA2NB12	PCIE_SLOTA_TO_NB_12_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<12>	PCIE_SA2NB12	PCIE_SLOTA_TO_NB_12_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<13>	PCIE_SA2NB13	PCIE_SLOTA_TO_NB_13_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<13>	PCIE_SA2NB13	PCIE_SLOTA_TO_NB_13_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<14>	PCIE_SA2NB14	PCIE_SLOTA_TO_NB_14_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<14>	PCIE_SA2NB14	PCIE_SLOTA_TO_NB_14_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_NF<15>	PCIE_SA2NB15	PCIE_SLOTA_TO_NB_15_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_PF<15>	PCIE_SA2NB15	PCIE_SLOTA_TO_NB_15_F	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<0>		PCIE_SLOTA_TO_NB_0	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<0>		PCIE_SLOTA_TO_NB_0	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<1>		PCIE_SLOTA_TO_NB_1	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<1>		PCIE_SLOTA_TO_NB_1	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<2>		PCIE_SLOTA_TO_NB_2	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<2>		PCIE_SLOTA_TO_NB_2	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<3>		PCIE_SLOTA_TO_NB_3	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<3>		PCIE_SLOTA_TO_NB_3	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<4>		PCIE_SLOTA_TO_NB_4	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<4>		PCIE_SLOTA_TO_NB_4	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<5>		PCIE_SLOTA_TO_NB_5	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<5>		PCIE_SLOTA_TO_NB_5	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<6>		PCIE_SLOTA_TO_NB_6	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<6>		PCIE_SLOTA_TO_NB_6	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<7>		PCIE_SLOTA_TO_NB_7	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<7>		PCIE_SLOTA_TO_NB_7	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<8>		PCIE_SLOTA_TO_NB_8	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<8>		PCIE_SLOTA_TO_NB_8	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<9>		PCIE_SLOTA_TO_NB_9	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<9>		PCIE_SLOTA_TO_NB_9	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<10>		PCIE_SLOTA_TO_NB_10	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<10>		PCIE_SLOTA_TO_NB_10	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<11>		PCIE_SLOTA_TO_NB_11	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<11>		PCIE_SLOTA_TO_NB_11	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<12>		PCIE_SLOTA_TO_NB_12	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<12>		PCIE_SLOTA_TO_NB_12	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<13>		PCIE_SLOTA_TO_NB_13	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<13>		PCIE_SLOTA_TO_NB_13	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<14>		PCIE_SLOTA_TO_NB_14	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<14>		PCIE_SLOTA_TO_NB_14	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_N<15>		PCIE_SLOTA_TO_NB_15	PCIE_DATA	PCIE_DATA
PCIE_SLOTA_TO_NB_P<15>		PCIE_SLOTA_TO_NB_15	PCIE_DATA	PCIE_DATA

KODIAK PCI-E POWER PHYSICAL CONSTRAINT TABLE

SIG_NAME	MIN_LINE_WIDTH	MIN_NECK_WIDTH	VOLTAGE
KOD_G10_GND	0.3MM	0.25MM	0
KOD_H05_GND	0.3MM	0.25MM	0
KOD_H08_GND	0.3MM	0.25MM	0
KOD_J13_GND	0.3MM	0.25MM	0
KOD_K07_GND	0.3MM	0.25MM	0
KOD_L13_GND	0.3MM	0.25MM	0
PWR_PCIE_A_AVDD	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_2	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_1	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_0	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_A	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_B	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_C	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_2	0.3MM	0.25MM	1.2
PWR_PCIE_A_AVDD_0	0.3MM	0.25MM	1.2

KODIAK PCI-E CONST

SYNC_MASTER=FINO-DD SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	97	154

PLANE-SPLIT AC RETURN PATHS

LOCATE EACH CAPACITOR SO THAT
THEY STRADDLE EACH PLANE SPLIT

=PPVCORE_PWRON_NB_HT 98 7 — C9834 0.1UF 20% 16V CERM 402 — =PP1V2_PWRON_HT_NBTX 98 7

KODIAK HT DECOUPLING

(LOCATE CLOSE TO PINS AS INDICATED)

=PPVCORE_PWRON_NB_HT 98 7

C9806 1UF 10% 6.3V CERM 402
C9807 1UF 10% 6.3V CERM 402
C9808 1UF 10% 6.3V CERM 402
C9809 1UF 10% 6.3V CERM 402
C9810 1UF 10% 6.3V CERM 402
C9811 1UF 10% 6.3V CERM 402
C9812 1UF 10% 6.3V CERM 402
C9813 1UF 10% 6.3V CERM 402
C9814 1UF 10% 6.3V CERM 402
C9815 1UF 10% 6.3V CERM 402

KODIAK CORES

PP9806 P4MM SM — 1.6V — Q63 = PP1V6

=PP2V5_PWRON_NB_HT 98 7 — L9800 0.22UH 0805-1 — PWR_HT_AVDD

C9800 0.01UF 10% 16V CERM 402
C9801 10UF 10% 6.3V X5R 805
C9802 1UF 10% 6.3V CERM 402

KOD_L15_GND 101 98 6 (THIS PAGE)

=PPVCORE_PWRON_NB_HT 98 7

PP9807 P4MM SM — 1.2V — Q63 = PP1V2

=PP1V2_PWRON_HT_NBTX 7 98

L9801 0.22UH 0805-1 — PWR_HT_AVDD2 101 — =PP2V5_PWRON_NB_HT 7 98

C9803 1UF 10% 6.3V CERM 402
C9804 10UF 10% 6.3V X5R 805
C9805 0.01UF 10% 16V CERM 402

KOD_L15_GND 6 98 101 (THIS PAGE)

C9817 1UF 10% 6.3V CERM 402
C9818 1UF 10% 6.3V CERM 402
C9819 1UF 10% 6.3V CERM 402
C9820 1UF 10% 6.3V CERM 402
C9821 1UF 10% 6.3V CERM 402
C9822 1UF 10% 6.3V CERM 402
C9823 1UF 10% 6.3V CERM 402
C9824 1UF 10% 6.3V CERM 402
C9825 1UF 10% 6.3V CERM 402
C9826 1UF 10% 6.3V CERM 402

KODIAK HT DECOUPLING

(LOCATE CLOSE TO PINS AS INDICATED)
(CAPACITORS ARE DOUBLED-UP WHERE POSSIBL;E)

=PP1V2_PWRON_HT_NBTX 98 7

C9827 1UF 10% 6.3V CERM 402
C9828 1UF 10% 6.3V CERM 402
C9829 1UF 10% 6.3V CERM 402
C9830 1UF 10% 6.3V CERM 402
C9831 1UF 10% 6.3V CERM 402
C9832 1UF 10% 6.3V CERM 402
C9833 1UF 10% 6.3V CERM 402
C9839 1UF 10% 6.3V CERM 402
C9840 1UF 10% 6.3V CERM 402
C9841 1UF 10% 6.3V CERM 402
C9847 1UF 10% 6.3V CERM 402
C9842 1UF 10% 6.3V CERM 402
C9843 1UF 10% 6.3V CERM 402
C9844 1UF 10% 6.3V CERM 402
C9845 1UF 10% 6.3V CERM 402
C9846 1UF 10% 6.3V CERM 402

PP9808 P4MM SM — HTM2NC0- / HTM2NC0+ — PP9809 P4MM SM

=PP1V2_PWRON_HT_NBTX 98 7

HT_MB_TO_NB_CLK_N<0> 101
HT_MB_TO_NB_CLK_P<0> 101
HT_MB_TO_NB_CTL_N<0> 101
HT_MB_TO_NB_CTL_P<0> 101

PP9800 P4MM SM — MHT0- / MHT0+ — PP9801 P4MM SM

KODIAK HT RECEIVE CLOCKS

PP9802 P4MM SM — MHT1- / MHT1+ — PP9803 P4MM SM

R9806 8.2K 5% 1/16W MF-LF 402
R9807 8.2K 5% 1/16W MF-LF 402

HT_MB_TO_NB_CLK_N<1> 101
HT_MB_TO_NB_CLK_P<1> 101
HT_MB_TO_NB_CTL_N<1> 9
HT_MB_TO_NB_CTL_P<1> 9

HT_MB_TO_NB_CAD_N<0> 101 — F26 — HT_CAD_RXN0
HT_MB_TO_NB_CAD_P<0> 101 — F27 — HT_CAD_RXP0
HT_MB_TO_NB_CAD_N<1> 101 — F25 — HT_CAD_RXN1
HT_MB_TO_NB_CAD_P<1> 101 — F24 — HT_CAD_RXP1
HT_MB_TO_NB_CAD_N<2> 101 — A25 — HT_CAD_RXN2
HT_MB_TO_NB_CAD_P<2> 101 — B25 — HT_CAD_RXP2
HT_MB_TO_NB_CAD_N<3> 101 — G25 — HT_CAD_RXN3
HT_MB_TO_NB_CAD_P<3> 101 — H25 — HT_CAD_RXP3
HT_MB_TO_NB_CAD_N<4> 101 — L25 — HT_CAD_RXN4
HT_MB_TO_NB_CAD_P<4> 101 — K25 — HT_CAD_RXP4
HT_MB_TO_NB_CAD_N<5> 101 — G27 — HT_CAD_RXN5
HT_MB_TO_NB_CAD_P<5> 101 — H27 — HT_CAD_RXP5
HT_MB_TO_NB_CAD_N<6> 101 — J25 — HT_CAD_RXN6
HT_MB_TO_NB_CAD_P<6> 101 — J26 — HT_CAD_RXP6
HT_MB_TO_NB_CAD_N<7> 101 — C26 — HT_CAD_RXN7
HT_MB_TO_NB_CAD_P<7> 101 — C27 — HT_CAD_RXP7

F22 — HT_CLK_RXN1
F23 — HT_CLK_RXP1
E21 — HT_CTL_RXP1
D21 — HT_CTL_RXN1

HT_MB_TO_NB_CAD_N<8> 101 — E23 — HT_CAD_RXN8
HT_MB_TO_NB_CAD_P<8> 101 — D23 — HT_CAD_RXP8
HT_MB_TO_NB_CAD_N<9> 101 — A23 — HT_CAD_RXN9
HT_MB_TO_NB_CAD_P<9> 101 — B23 — HT_CAD_RXP9
HT_MB_TO_NB_CAD_N<10> 101 — H23 — HT_CAD_RXN10
HT_MB_TO_NB_CAD_P<10> 101 — G23 — HT_CAD_RXP10
HT_MB_TO_NB_CAD_N<11> 101 — C22 — HT_CAD_RXN11
HT_MB_TO_NB_CAD_P<11> 101 — C23 — HT_CAD_RXP11
HT_MB_TO_NB_CAD_N<12> 101 — K23 — HT_CAD_RXN12
HT_MB_TO_NB_CAD_P<12> 101 — L23 — HT_CAD_RXP12
HT_MB_TO_NB_CAD_N<13> 101 — J23 — HT_CAD_RXN13
HT_MB_TO_NB_CAD_P<13> 101 — J24 — HT_CAD_RXP13
HT_MB_TO_NB_CAD_N<14> 101 — A21 — HT_CAD_RXN14
HT_MB_TO_NB_CAD_P<14> 101 — B21 — HT_CAD_RXP14
HT_MB_TO_NB_CAD_N<15> 101 — C24 — HT_CAD_RXN15
HT_MB_TO_NB_CAD_P<15> 101 — C25 — HT_CAD_RXP15

HT_KOD_PVTREF0 — K19 — HT_PVTREF0
HT_KOD_PVTREF1 — L19 — HT_PVTREF1
HT_KOD_PVTREF2_ALT — L17 — HT_PVTREF2_ALT
HT_KOD_PVTREF3_ALT — K17 — HT_PVTREF3_ALT

R9800 100 1% 1/16W MF-LF 402
R9801 200 1% 1/16W MF-LF 402

HT_NB_REFCLK_P<0> 101 9 — J16 — HT_REFCLK_N
HT_NB_REFCLK_N<0> 101 9 — J15 — HT_REFCLK_P
(200MHZ)

K15 — HT_REFCLK_AVDD (1.65V-2.75V) (1.6V-1.2V)

HT_RX_VDD: A24, B22, B26, D24, E22, E26, G24, H26, K24, L22

HT_RX_GND: A22, A26, B24, D22, D26, E24, G26, H24, K22, L24

HT_REFCLK_AGND

L15 — XW9800 SM — KOD_L15_GND 101 98 6 (THIS PAGE)

PP9804 P4MM SM — HREF0- / HREF0+ — PP9805 P4MM SM

KODIAK HT REFCLK

KODIAK HT REFCLK TERMINATION

(LOCATE CLOSE TO INPUT PINS)

HT_NB_REFCLK_P<0> 101 26
HT_NB_REFCLK_N<0> 101 26

R9802 20.5 1% 1/16W MF-LF 402
R9803 29.4 1% 1/16W MF-LF 402
R9804 29.4 1% 1/16W MF-LF 402
R9805 20.5 1% 1/16W MF-LF 402

C9837 0.01UF 10% 16V CERM 402
C9838 0.01UF 10% 16V CERM 402

NOSTUFF C9836 0.01UF 10% 16V CERM 402

HT_NB_CLKP<0> 101
HT_NB_CLKN<0> 101
HT_NB_G 101

H15 — HT_REFCLK_AVDD2 (1.65V-2.75V) (1.6V-1.2V)

HT_VD4: A16, A20, B14, B18, D16, D20, E18, G16, G20, H18, H22, K16, K20, L18, M17, M21, N19

HT_VD4_GND: A14, A18, B16, B20, D18, E16, E20, G18, G22, H16, H20, K18, L16, L20, M16, M20, N18

HT_CLK_TXN0 — J19 — HT_NB_TO_MB_CLK_N<0> 101
HT_CLK_TXP0 — J20 — HT_NB_TO_MB_CLK_P<0> 101
HT_CTL_TXN0 — J22 — HT_NB_TO_MB_CTL_N<0> 101
HT_CTL_TXP0 — J21 — HT_NB_TO_MB_CTL_P<0> 101

HT_CAD_TXN0 — F16 — HT_NB_TO_MB_CAD_N<0> 101
HT_CAD_TXP0 — F17 — HT_NB_TO_MB_CAD_P<0> 101
HT_CAD_TXN1 — G17 — HT_NB_TO_MB_CAD_N<1> 101
HT_CAD_TXP1 — H17 — HT_NB_TO_MB_CAD_P<1> 101
HT_CAD_TXN2 — J18 — HT_NB_TO_MB_CAD_N<2> 101
HT_CAD_TXP2 — J17 — HT_NB_TO_MB_CAD_P<2> 101
HT_CAD_TXN3 — F18 — HT_NB_TO_MB_CAD_N<3> 101
HT_CAD_TXP3 — F19 — HT_NB_TO_MB_CAD_P<3> 101
HT_CAD_TXN4 — G19 — HT_NB_TO_MB_CAD_N<4> 101
HT_CAD_TXP4 — H19 — HT_NB_TO_MB_CAD_P<4> 101
HT_CAD_TXN5 — G21 — HT_NB_TO_MB_CAD_N<5> 101
HT_CAD_TXP5 — H21 — HT_NB_TO_MB_CAD_P<5> 101
HT_CAD_TXN6 — F21 — HT_NB_TO_MB_CAD_N<6> 101
HT_CAD_TXP6 — F20 — HT_NB_TO_MB_CAD_P<6> 101
HT_CAD_TXN7 — K21 — HT_NB_TO_MB_CAD_N<7> 101
HT_CAD_TXP7 — L21 — HT_NB_TO_MB_CAD_P<7> 101

HT_CLK_TXN1 — C16 — HT_NB_TO_MB_CLK_N<1> 101
HT_CLK_TXP1 — C17 — HT_NB_TO_MB_CLK_P<1> 101
HT_CTL_TXP1 — E15 — 9 HT_NB_TO_MB_CTL_P<1>
HT_CTL_TXN1 — D15 — 9 HT_NB_TO_MB_CTL_N<1>

HT_CAD_TXN8 — D19 — HT_NB_TO_MB_CAD_N<8> 101
HT_CAD_TXP8 — E19 — HT_NB_TO_MB_CAD_P<8> 101
HT_CAD_TXN9 — D17 — HT_NB_TO_MB_CAD_N<9> 101
HT_CAD_TXP9 — E17 — HT_NB_TO_MB_CAD_P<9> 101
HT_CAD_TXN10 — C19 — HT_NB_TO_MB_CAD_N<10> 101
HT_CAD_TXP10 — C18 — HT_NB_TO_MB_CAD_P<10> 101
HT_CAD_TXN11 — A15 — HT_NB_TO_MB_CAD_N<11> 101
HT_CAD_TXP11 — B15 — HT_NB_TO_MB_CAD_P<11> 101
HT_CAD_TXN12 — A17 — HT_NB_TO_MB_CAD_N<12> 101
HT_CAD_TXP12 — B17 — HT_NB_TO_MB_CAD_P<12> 101
HT_CAD_TXN13 — B19 — HT_NB_TO_MB_CAD_N<13> 101
HT_CAD_TXP13 — A19 — HT_NB_TO_MB_CAD_P<13> 101
HT_CAD_TXN14 — C15 — HT_NB_TO_MB_CAD_N<14> 101
HT_CAD_TXP14 — C14 — HT_NB_TO_MB_CAD_P<14> 101
HT_CAD_TXN15 — C20 — HT_NB_TO_MB_CAD_N<15> 101
HT_CAD_TXP15 — C21 — HT_NB_TO_MB_CAD_P<15> 101

HT_LDTSTOP_L — AF06 — HT_LDTSTOP_L 103
HT_LDTREQ_L — AF09 — HT_LDTREQ_L 103
HT_PWROK — AF03 — HT_PWROK 103
HT_RESET_L — AE11 — HT_LDTRESET_L 103

U1900
KODIAK-ASIC-040812
HT X16 INTERFACE
BGA
(6 OF 10)
SEE_TABLE

=PP1V2_PWRON_HT_NBTX 98 7

NOSTUFF R9808 8.2K 5% 1/16W MF-LF 402
NOSTUFF R9809 8.2K 5% 1/16W MF-LF 402

=PP2V5_PWRON_HT 7 103

R9810 1K 5% 1/16W MF-LF 402
R9811 1K 5% 1/16W MF-LF 402
R9812 1K 5% 1/16W MF-LF 402
R9813 1K 5% 1/16W MF-LF 402

KODIAK HT16

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 98 OF 154	

DRAWING

SIG_NAME	MAKE_BASE	DIFFERENTIAL_PAIR	EC_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	
HT_NB_TO_MB_CLK_N<0>	TRUE	HT_NB_TO_SB_CLK	HT_NB_TO_SB_PP	HT_CAD	HT_NB_TO_SB_CLK	HT_MB_TO_SB_CLK_N<0>
HT_NB_TO_MB_CLK_P<0>	TRUE	HT_NB_TO_SB_CLK	HT_NB_TO_SB_PP	HT_CAD	HT_NB_TO_SB_CLK	HT_MB_TO_SB_CLK_P<0>
HT_NB_TO_MB_CAD_N<0>	TRUE	HT_NB_TO_SB_CAD0	HT_NB_TO_SB_PP	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<0>
HT_NB_TO_MB_CAD_P<0>	TRUE	HT_NB_TO_SB_CAD0	HT_NB_TO_SB_PP	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<0>
HT_NB_TO_MB_CAD_N<1>	TRUE	HT_NB_TO_SB_CAD1	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<1>
HT_NB_TO_MB_CAD_P<1>	TRUE	HT_NB_TO_SB_CAD1	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<1>
HT_NB_TO_MB_CAD_N<2>	TRUE	HT_NB_TO_SB_CAD2	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<2>
HT_NB_TO_MB_CAD_P<2>	TRUE	HT_NB_TO_SB_CAD2	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<2>
HT_NB_TO_MB_CAD_N<3>	TRUE	HT_NB_TO_SB_CAD3	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<3>
HT_NB_TO_MB_CAD_P<3>	TRUE	HT_NB_TO_SB_CAD3	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<3>
HT_NB_TO_MB_CAD_N<4>	TRUE	HT_NB_TO_SB_CAD4	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<4>
HT_NB_TO_MB_CAD_P<4>	TRUE	HT_NB_TO_SB_CAD4	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<4>
HT_NB_TO_MB_CAD_N<5>	TRUE	HT_NB_TO_SB_CAD5	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<5>
HT_NB_TO_MB_CAD_P<5>	TRUE	HT_NB_TO_SB_CAD5	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<5>
HT_NB_TO_MB_CAD_N<6>	TRUE	HT_NB_TO_SB_CAD6	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<6>
HT_NB_TO_MB_CAD_P<6>	TRUE	HT_NB_TO_SB_CAD6	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<6>
HT_NB_TO_MB_CAD_N<7>	TRUE	HT_NB_TO_SB_CAD7	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_N<7>
HT_NB_TO_MB_CAD_P<7>	TRUE	HT_NB_TO_SB_CAD7	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CAD_P<7>
HT_NB_TO_MB_CTL_N<0>	TRUE	HT_NB_TO_SB_CTL0	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CTL_N<0>
HT_NB_TO_MB_CTL_P<0>	TRUE	HT_NB_TO_SB_CTL0	HT_NB_TO_SB	HT_CAD	HT_NB_TO_SB_CAD	HT_MB_TO_SB_CTL_P<0>
HT_MB_TO_NB_CLK_N<0>	TRUE	HT_SB_TO_NB_CLK	HT_SB_TO_NB_PP	HT_CAD	HT_SB_TO_NB_CLK	HT_SB_TO_MB_CLK_N<0>
HT_MB_TO_NB_CLK_P<0>	TRUE	HT_SB_TO_NB_CLK	HT_SB_TO_NB_PP	HT_CAD	HT_SB_TO_NB_CLK	HT_SB_TO_MB_CLK_P<0>
HT_MB_TO_NB_CAD_N<0>	TRUE	HT_SB_TO_NB_CAD0	HT_SB_TO_NB_PP	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<0>
HT_MB_TO_NB_CAD_P<0>	TRUE	HT_SB_TO_NB_CAD0	HT_SB_TO_NB_PP	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<0>
HT_MB_TO_NB_CAD_N<1>	TRUE	HT_SB_TO_NB_CAD1	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<1>
HT_MB_TO_NB_CAD_P<1>	TRUE	HT_SB_TO_NB_CAD1	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<1>
HT_MB_TO_NB_CAD_N<2>	TRUE	HT_SB_TO_NB_CAD2	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<2>
HT_MB_TO_NB_CAD_P<2>	TRUE	HT_SB_TO_NB_CAD2	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<2>
HT_MB_TO_NB_CAD_N<3>	TRUE	HT_SB_TO_NB_CAD3	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<3>
HT_MB_TO_NB_CAD_P<3>	TRUE	HT_SB_TO_NB_CAD3	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<3>
HT_MB_TO_NB_CAD_N<4>	TRUE	HT_SB_TO_NB_CAD4	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<4>
HT_MB_TO_NB_CAD_P<4>	TRUE	HT_SB_TO_NB_CAD4	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<4>
HT_MB_TO_NB_CAD_N<5>	TRUE	HT_SB_TO_NB_CAD5	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<5>
HT_MB_TO_NB_CAD_P<5>	TRUE	HT_SB_TO_NB_CAD5	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<5>
HT_MB_TO_NB_CAD_N<6>	TRUE	HT_SB_TO_NB_CAD6	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<6>
HT_MB_TO_NB_CAD_P<6>	TRUE	HT_SB_TO_NB_CAD6	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<6>
HT_MB_TO_NB_CAD_N<7>	TRUE	HT_SB_TO_NB_CAD7	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_N<7>
HT_MB_TO_NB_CAD_P<7>	TRUE	HT_SB_TO_NB_CAD7	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CAD_P<7>
HT_MB_TO_NB_CTL_N<0>	TRUE	HT_SB_TO_NB_CTL0	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CTL_N<0>
HT_MB_TO_NB_CTL_P<0>	TRUE	HT_SB_TO_NB_CTL0	HT_SB_TO_NB	HT_CAD	HT_SB_TO_NB_CAD	HT_SB_TO_MB_CTL_P<0>
NC_HT_MB_TO_NB_CAD_P<8..15>	TRUE					HT_MB_TO_NB_CAD_P<8..15>
NC_HT_MB_TO_NB_CAD_N<8..15>	TRUE					HT_MB_TO_NB_CAD_N<8..15>
TP_HT_MB_TO_NB_CLK_N<1>	TRUE					HT_MB_TO_NB_CLK_N<1>
TP_HT_MB_TO_NB_CLK_P<1>	TRUE					HT_MB_TO_NB_CLK_P<1>
NC_HT_NB_TO_MB_CAD_P<8..15>	TRUE					HT_NB_TO_MB_CAD_P<8..15>
NC_HT_NB_TO_MB_CAD_N<8..15>	TRUE					HT_NB_TO_MB_CAD_N<8..15>
NC_HT_NB_TO_MB_CLK_N<1>	TRUE					HT_NB_TO_MB_CLK_N<1>
NC_HT_NB_TO_MB_CLK_P<1>	TRUE					HT_NB_TO_MB_CLK_P<1>
HT_NB_REFCLK_P<0>		HT_NB_REFCLK0	HT_NB_REFCLK	HT_CLK	HT_CLK	IN
HT_NB_REFCLK_N<0>		HT_NB_REFCLK0		HT_CLK	HT_CLK	IN
HT_NB_P<0>		HT_NB0		HT_CLK	HT_CLK	IN
HT_NB_N<0>		HT_NB0		HT_CLK	HT_CLK	IN
HT_NB_REFCLK_PF<0>		HT_NB_REFCLK_F0		HT_CLK	HT_CLK	IN
HT_NB_REFCLK_NF<0>		HT_NB_REFCLK_F0		HT_CLK	HT_CLK	IN

I97

SIG_NAME	MIN_LINE_WIDTH	MIN_NECK_WIDTH	VOLTAGE	
PWR_HT_AVDD	0.4MM	0.2MM	2.5	IN
PWR_HT_AVDD2	0.4MM	0.2MM	2.5	IN
KOD_L15_GND	0.4MM	0.2MM	0	IN
HT_NB_G KEEP DIFF CLOCK FROM BEING A SINGLE XNET			0	IN

HT ALIASES

FINO-ME 06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE NONE SHT 101 OF 154

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
	0.38mm SPACING	HT_CLK66M_SB_C
HT_CLK66M_SB	0.38mm SPACING	HT_CLK66M_SB
	P3MM SPACING	HT_LDTRESET_L

Page Notes

Power aliases required by this page:
=PP2V5_PWRON_HT
=PP1V2_PWRON_HT

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
- SB_HT_200M
  Stuffs resistor to select 200MHz HT I/F.

RA300 3.3 5% 1/8W MF-LF 805 — PP1V2_PWRON_HT_PLLDVDD — MIN_LINE_WIDTH=0.50mm MIN_NECK_WIDTH=0.38mm
CA300 10UF 10% 6.3v X5R 805
CA301 1uF 10% 6.3v CERM 402

RA310 3.3 5% 1/8W MF-LF 805 — PP1V2_PWRON_HT_PLLAVDD — MIN_LINE_WIDTH=0.50mm MIN_NECK_WIDTH=0.38mm
CA310 10UF 10% 6.3v X5R 805
CA311 1uF 10% 6.3v CERM 402

=PP1V2_PWRON_SB_HT 7 103

=PP2V5_PWRON_HT 7 98
CA320 0.1uF 20% 10v CERM 402

=PP1V2_PWRON_SB_HT 7 103
CA302 10UF 10% 6.3v X5R 805
CA330 0.1uF 20% 10v CERM 402
CA331 0.1uF 20% 10v CERM 402
CA332 0.1uF 20% 10v CERM 402

=PP1V2_PWRON_SB_HT 7 103
CA309 10UF 10% 6.3v X5R 805
CA340 0.1uF 20% 10v CERM 402
CA341 0.1uF 20% 10v CERM 402
CA342 0.1uF 20% 10v CERM 402

HTS2MC0+ PPA300 P4MM SM
HTS2MC0- PPA301 P4MM SM
HTS2MC0+ PPA303 P4MM SM
HTS2MC0- PPA304 P4MM SM

PPA302 P4MM SM

U2300 SHASTA V1.1 BGA-LF — HYPERTRANSPORT — SEE_TABLE (3 OF 8)

HT_MB_TO_SB_CLK_P<0>	HT_CLKIN_P	D15	HT_CLKOUT_P	B10	HT_SB_TO_MB_CLK_P<0>
HT_MB_TO_SB_CLK_N<0>	HT_CLKIN_N	C15	HT_CLKOUT_N	A10	HT_SB_TO_MB_CLK_N<0>
HT_MB_TO_SB_CAD_P<0>	HT_CADIN_0_P	D17	HT_CADOUT_0_P	D10	HT_SB_TO_MB_CAD_P<0>
HT_MB_TO_SB_CAD_N<0>	HT_CADIN_0_N	C17	HT_CADOUT_0_N	C10	HT_SB_TO_MB_CAD_N<0>
HT_MB_TO_SB_CAD_P<1>	HT_CADIN_1_P	B18	HT_CADOUT_1_P	B8	HT_SB_TO_MB_CAD_P<1>
HT_MB_TO_SB_CAD_N<1>	HT_CADIN_1_N	A18	HT_CADOUT_1_N	A8	HT_SB_TO_MB_CAD_N<1>
HT_MB_TO_SB_CAD_P<2>	HT_CADIN_2_P	F15	HT_CADOUT_2_P	E11	HT_SB_TO_MB_CAD_P<2>
HT_MB_TO_SB_CAD_N<2>	HT_CADIN_2_N	E15	HT_CADOUT_2_N	F11	HT_SB_TO_MB_CAD_N<2>
HT_MB_TO_SB_CAD_P<3>	HT_CADIN_3_P	D16	HT_CADOUT_3_P	D11	HT_SB_TO_MB_CAD_P<3>
HT_MB_TO_SB_CAD_N<3>	HT_CADIN_3_N	C16	HT_CADOUT_3_N	C11	HT_SB_TO_MB_CAD_N<3>
HT_MB_TO_SB_CAD_P<4>	HT_CADIN_4_P	B16	HT_CADOUT_4_P	A11	HT_SB_TO_MB_CAD_P<4>
HT_MB_TO_SB_CAD_N<4>	HT_CADIN_4_N	A16	HT_CADOUT_4_N	B11	HT_SB_TO_MB_CAD_N<4>
HT_MB_TO_SB_CAD_P<5>	HT_CADIN_5_P	D14	HT_CADOUT_5_P	C12	HT_SB_TO_MB_CAD_P<5>
HT_MB_TO_SB_CAD_N<5>	HT_CADIN_5_N	C14	HT_CADOUT_5_N	D12	HT_SB_TO_MB_CAD_N<5>
HT_MB_TO_SB_CAD_P<6>	HT_CADIN_6_P	E14	HT_CADOUT_6_P	E12	HT_SB_TO_MB_CAD_P<6>
HT_MB_TO_SB_CAD_N<6>	HT_CADIN_6_N	F14	HT_CADOUT_6_N	F12	HT_SB_TO_MB_CAD_N<6>
HT_MB_TO_SB_CAD_P<7>	HT_CADIN_7_P	B14	HT_CADOUT_7_P	A13	HT_SB_TO_MB_CAD_P<7>
HT_MB_TO_SB_CAD_N<7>	HT_CADIN_7_N	A14	HT_CADOUT_7_N	B13	HT_SB_TO_MB_CAD_N<7>
HT_MB_TO_SB_CTL_P<0>	HT_CTLIN_P	F13	HT_CTLOUT_P	C13	HT_SB_TO_MB_CTL_P<0>
HT_MB_TO_SB_CTL_N<0>	HT_CTLIN_N	E13	HT_CTLOUT_N	D13	HT_SB_TO_MB_CTL_N<0>
HT_PWROK	HT_PWROK_H	E16			
HT_LDTRESET_L	HT_RESET_L	C18			
HT_LDTSTOP_L	HT_LDTSTOP_L	E17	HT_LDTREQ_L	A19	HT_LDTREQ_SB_L
HT_CLK66M_SB_C	HT_REFCLK	C8	HT_R100P	E10	SB_HT_R100_P
SB_HT_S100M66M	HT_S100M66M	D8	HT_R100N	F10	SB_HT_R100_N
SB_SELHT100	SEL_HT00_H	V8			

HT_PLL AGND DGND — HT_RXGND — HT_TXGND

HT_LDTREQ_L — RA301 0 5% 1/10W MF-LF 402 — HT_LDTREQ_L

RA350 82.5 1% 1/10W MF-LF 402
CA350 47pF 5% 50v CERM 402
CA351 47pF 5% 50v CERM 402

HT_CLK66M_SB — RA355 0 5% 1/10W MF-LF 402 — HT_CLK66M_SB_C

1.0V pk-pk

=PP1V2_PWRON_SB_HT

RA352 4.7K 1% 1/10W MF-LF 402 — NOSTUFF — 1 = 100MHz
RA354 10K 5% 1/10W MF-LF 402 — NOSTUFF — 1 = 100MHz
RA353 4.7K 1% 1/10W MF-LF 402 — 0 = 66MHz
RA351 1K 1% 1/10W MF-LF 402 — 0 = 200MHz

HT Refclk	HT I/F Speed
1 = 100MHz	1 = 100MHz
0 = 66MHz	0 = 200MHz

← DETERMINES THE OPERATING FREQUENCY OF HT CORE
1: THE HT SLAVE, HTGS AND THE HT SIDE OF THE PCI BRIDGES OPERATE AT 100 MHZ
0: THE HT SLAVE, HTGS AND THE HT SIDE OF THE PCI BRIDGES OPERATE AT 200 MHZ

Shasta HyperTransport

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT: 103 OF: 154	

LAST_MODIFIED=Tue Nov 1 14:55:22 2005

DRAWING

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
		PCI_AD<31..28> 120 121 122 125
		PCI_AD<27> 120 121 122 125
		PCI_AD<26..24> 120 121 122 125
		PCI_AD<23> 120 121 122
		PCI_AD<22> 120 121 122
		PCI_AD<21> 120 121 122
		PCI_AD<20> 120 121 122 125
		PCI_AD<19..18> 120 121 122 125
		PCI_AD<17> 120 121 122 125
		PCI_AD<16..0> 120 121 122 125
		PCI_CBE_L<3..0> 120 121 122
		PCI_PAR 120 121 122
		PCI_DEVSEL_L 119 120 121 122
		PCI_FRAME_L 119 120 121 122
		PCI_IRDY_L 119 120 121 122
		PCI_TRDY_L 119 120 121 122
		PCI_STOP_L 119 120 121 122
1181	P3MM_SPACING	PCI_CLK66M_SB_INT 26 27 119

Page Notes

Power aliases required by this page:
- =PP3V3_PCI
- =PP3V3_SB_PCI (CAN BE _PP3V3_PCI)
- =PP3V3_PWRON_SB
- =PP2V5_PWRON_SB

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

PCI Devices implemented on this page:
AD11 - PCI0 (0x106B/0x0053)
AD11 - PCI1 (0x106B/0x0054)
AD11 - PCI2 (0x106B/0x0055)

AD23 - KeyLargo (0x106B/0x004F, PCI1)
AD28 - SATA 150 (0x1166/0x0240, PCI0 or 2)
AD29 - UATA 133 (0x106B/0x0050, PCI0 or 2)
AD30 - FireWire (0x106B/0x0052, PCI0 or 2)
AD31 - Ethernet (0x106B/0x0051, PCI0)

Q63 APPLICATION OF POWER NET "=PP3V3_SB_PCI" IS RUN

PPB905 P4MM SM PP
PP_3V3RUNSB_B9
XWB900 3PK
119 7 PP3V3_RUN_SB
CB910 10UF 10% 6.3V X5R 805
CB900 0.1UF 20% 10V CERM 402
CB901 0.1UF 20% 10V CERM 402
CB902 0.1UF 20% 10V CERM 402
CB903 0.1UF 20% 10V CERM 402
CB904 0.1UF 20% 10V CERM 402
NO STUFF
CB911 10UF 10% 6.3V X5R 805
CB905 0.1UF 20% 10V CERM 402
CB906 0.1UF 20% 10V CERM 402
CB907 0.1UF 20% 10V CERM 402
CB908 0.1UF 20% 10V CERM 402
CB909 0.1UF 20% 10V CERM 402

XWB901 3PK
6 PP_2V5PWRONSB_B9
PPB906 P4MM SM PP
=PP2V5_PWRON_SB 7 23 24 138
CB920 0.1UF 20% 10V CERM 402
CB921 0.1UF 20% 10V CERM 402
CB922 0.1UF 20% 10V CERM 402
CB923 0.1UF 20% 10V CERM 402

PPB900 P4MM SM PP
P3MM SPACING
119 27 26 PCI_CLK66M_SB_INT
PPB901 P4MM SM PP
27 26 PCI_CLK33M_SB_EXT_RR
NOSTUFF
CB912 2PF +/-0.25PF 50V C0G 402-1
STUFF NEAR SHASTA

U2300 SHASTA V1.1 BGA-LF (4 OF 8)
SEE_TABLE
VDDOPC: AA22 B22 E21 H16 J21 M16 N21 R20 U21 V19
PCIVDDP: J18 N20 U20

"Slot A" - AD17
121 119 PCI_SLOTA_REQ_L AB18 PCI1REQ_0_L
121 119 PCI_SLOTA_GNT_L AA18 PCI1GNT_0_L
"Slot G" - AD27
122 119 PCI_SLOTG_REQ_L AB20 PCI1REQ_1_L
122 119 PCI_SLOTG_GNT_L AB19 PCI1GNT_1_L
"Slot D" - AD20
119 PCI_SLOTD_REQ_L V17 PCI1REQ_2_L
119 PCI_SLOTD_GNT_L V18 PCI1GNT_2_L

125 121 ROM_CS_L AB8 ROMCS_L
125 121 ROM_OE_L AA9 ROMOE_L
125 121 ROM_WE_L Y10 ROMRW_L

PCIBR_CLK_H AB9
PCI1CLK_H U19
PCI1RST_L U18 SB_PCI_RESET_L
NET_SPACING_TYPE=P3MM SPACING

PCI1AD_0_H L18 PCI_SB_AD<0>
PCI1AD_1_H K19 PCI_SB_AD<1>
PCI1AD_2_H L22 PCI_SB_AD<2>
PCI1AD_3_H M22 PCI_SB_AD<3>
PCI1AD_4_H M18 PCI_SB_AD<4>
PCI1AD_5_H L20 PCI_SB_AD<5>
PCI1AD_6_H M21 PCI_SB_AD<6>
PCI1AD_7_H N16 PCI_SB_AD<7>
PCI1AD_8_H M20 PCI_SB_AD<8>
PCI1AD_9_H P22 PCI_SB_AD<9>
PCI1AD_10_H M17 PCI_SB_AD<10>
PCI1AD_11_H N18 PCI_SB_AD<11>
PCI1AD_12_H M19 PCI_SB_AD<12>
PCI1AD_13_H N19 PCI_SB_AD<13>
PCI1AD_14_H P21 PCI_SB_AD<14>
PCI1AD_15_H R22 PCI_SB_AD<15>
PCI1AD_16_H P20 PCI_SB_AD<16>
PCI1AD_17_H V21 PCI_SB_AD<17>
PCI1AD_18_H P18 PCI_SB_AD<18>
PCI1AD_19_H T20 PCI_SB_AD<19>
PCI1AD_20_H R16 PCI_SB_AD<20>
PCI1AD_21_H R17 PCI_SB_AD<21>
PCI1AD_22_H W21 PCI_SB_AD<22>
PCI1AD_23_H Y22 PCI_SB_AD<23>
PCI1AD_24_H R18 PCI_SB_AD<24>
PCI1AD_25_H T19 PCI_SB_AD<25>
PCI1AD_26_H T18 PCI_SB_AD<26>
PCI1AD_27_H Y21 PCI_SB_AD<27>
PCI1AD_28_H W20 PCI_SB_AD<28>
PCI1AD_29_H T16 PCI_SB_AD<29>
PCI1AD_30_H AA21 PCI_SB_AD<30>
PCI1AD_31_H T17 PCI_SB_AD<31>

PCI1C_BE_0_L L19 PCI_SB_CBE_L<0>
PCI1C_BE_1_L P16 PCI_SB_CBE_L<1>
PCI1C_BE_2_L V22 PCI_SB_CBE_L<2>
PCI1C_BE_3_L V20 PCI_SB_CBE_L<3>

PCI1DEVSEL_L T22 PCI_SB_DEVSEL_L
PCI1FRAME_L T21 PCI_SB_FRAME_L
PCI1IRDY_L R21 PCI_SB_IRDY_L
PCI1TRDY_L P19 PCI_SB_TRDY_L
PCI1STOP_L P17 PCI_SB_STOP_L
PCI1PAR_H N17 PCI_SB_PAR

PCI

=PP3V3_PWRON_SB 7 20 23 24 56
RB955 4.7K 1% 1/16W MF-LF 402
CB950 0.1UF 20% 10V CERM 402
NOSTUFF
RB950 4.7K 1% 1/16W MF-LF 402
UB950 MC74VHC1G08 SOT23-5-LF
PCI_RESET_L 20 92
122 30 28 24 SYS_IO_RESET_L
Shasta drives PCI RESET, but its output may not be valid during power-up, so it is ANDed with a reset from the SMU.
RB900 0 5% 1/16W MF-LF 402 NOSTUFF

PP3V3_RUN_SB 7 119
RPB900 4.7K 5% 1/16W SM-LF
PCI_SLOTA_REQ_L 119 121
RPB900 4.7K 5% 1/16W SM-LF
PCI_SLOTA_GNT_L 119 121
RPB900 4.7K 5% 1/16W SM-LF
PCI_SLOTG_REQ_L 119 122
RPB900 4.7K 5% 1/16W SM-LF
PCI_SLOTG_GNT_L 119 122
RPB901 4.7K 5% 1/16W SM-LF
PCI_SLOTD_REQ_L 119
RPB901 4.7K 5% 1/16W SM-LF
PCI_SLOTD_GNT_L 119

119 7 PP3V3_RUN_SB
RPB902 4.7K 5% 1/16W SM-LF
122 121 120 119 PCI_DEVSEL_L
RPB902 4.7K 5% 1/16W SM-LF
122 121 120 119 PCI_FRAME_L
RPB902 4.7K 5% 1/16W SM-LF
122 121 120 119 PCI_IRDY_L
RPB902 4.7K 5% 1/16W SM-LF
122 121 120 119 PCI_TRDY_L
RPB901 4.7K 5% 1/16W SM-LF
122 121 120 119 PCI_STOP_L

Shasta PCI Interface

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 119 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:26 2005
DRAWING
TITLE=K13.SHARA
ASSEMBLY=SHARING

ALL RESISTOR PACKS ARE 47 OHM 1/16W 5%

R PAKS ARE PIN SWAPPABLE ACROSS ALL SIGNALS (EXCEPT IDSELS)

119	PCI_SB_AD<0>	RPC003	4	5	47	PCI_AD<0>	119 121 122 125
119	PCI_SB_AD<1>	RPC003	1	8	47	PCI_AD<1>	119 121 122 125
119	PCI_SB_AD<2>	RPC009	1	8	47	PCI_AD<2>	119 121 122 125
119	PCI_SB_AD<3>	RPC001	3	6	47	PCI_AD<3>	119 121 122 125
119	PCI_SB_AD<4>	RPC000	3	6	47	PCI_AD<4>	119 121 122 125
119	PCI_SB_AD<5>	RPC003	2	7	47	PCI_AD<5>	119 121 122 125
119	PCI_SB_AD<6>	RPC001	4	5	47	PCI_AD<6>	119 121 122 125
119	PCI_SB_AD<7>	RPC000	2	7	47	PCI_AD<7>	119 121 122 125
119	PCI_SB_AD<8>	RPC007	4	5	47	PCI_AD<8>	119 121 122 125
119	PCI_SB_AD<9>	RPC002	1	8	47	PCI_AD<9>	119 121 122 125
119	PCI_SB_AD<10>	RPC000	1	8	47	PCI_AD<10>	119 121 122 125
119	PCI_SB_AD<11>	RPC009	3	6	47	PCI_AD<11>	119 121 122 125
119	PCI_SB_AD<12>	RPC000	4	5	47	PCI_AD<12>	119 121 122 125
119	PCI_SB_AD<13>	RPC009	4	5	47	PCI_AD<13>	119 121 122 125
119	PCI_SB_AD<14>	RPC002	2	7	47	PCI_AD<14>	119 121 122 125
119	PCI_SB_AD<15>	RPC002	4	5	47	PCI_AD<15>	119 121 122 125
119	PCI_SB_AD<16>	RPC002	3	6	47	PCI_AD<16>	119 121 122 125

RC000

119	PCI_SB_AD<17>		1	2	47 5% 1/16W MF-LF 402	PCI_AD<17>	119 121 122 125

119	PCI_SB_AD<18>	RPC007	1	8	47	PCI_AD<18>	119 121 122 125
119	PCI_SB_AD<19>	RPC006	2	7	47	PCI_AD<19>	119 121 122 125
119	PCI_SB_AD<20>	RPC007	2	7	47	PCI_AD<20>	119 121 122 125
119	PCI_SB_AD<21>	RPC008	1	8	47	PCI_AD<21>	119 121 122
119	PCI_SB_AD<22>	RPC004	1	8	47	PCI_AD<22>	119 121 122
119	PCI_SB_AD<23>	RPC006	4	5	47	PCI_AD<23>	119 121 122
119	PCI_SB_AD<24>	RPC008	4	5	47	PCI_AD<24>	119 121 122 125
119	PCI_SB_AD<25>	RPC006	3	6	47	PCI_AD<25>	119 121 122 125
119	PCI_SB_AD<26>	RPC008	3	6	47	PCI_AD<26>	119 121 122 125

RC001

119	PCI_SB_AD<27>		1	2	47 5% 1/16W MF-LF 402	PCI_AD<27>	119 121 122 125

119	PCI_SB_AD<28>	RPC004	4	5	47	PCI_AD<28>	119 121 122 125
119	PCI_SB_AD<29>	RPC008	2	7	47	PCI_AD<29>	119 121 122 125
119	PCI_SB_AD<30>	RPC004	2	7	47	PCI_AD<30>	119 121 122 125
119	PCI_SB_AD<31>	RPC007	3	6	47	PCI_AD<31>	119 121 122 125
119	PCI_SB_CBE_L<0>	RPC003	3	6	47	PCI_CBE_L<0>	119 121 122
119	PCI_SB_CBE_L<1>	RPC001	1	8	47	PCI_CBE_L<1>	119 121 122
119	PCI_SB_CBE_L<2>	RPC006	1	8	47	PCI_CBE_L<2>	119 121 122
119	PCI_SB_CBE_L<3>	RPC004	3	6	47	PCI_CBE_L<3>	119 121 122
119	PCI_SB_DEVSEL_L	RPC005	3	6	47	PCI_DEVSEL_L	119 121 122
119	PCI_SB_FRAME_L	RPC005	4	5	47	PCI_FRAME_L	119 121 122
119	PCI_SB_IRDY_L	RPC005	2	7	47	PCI_IRDY_L	119 121 122
119	PCI_SB_TRDY_L	RPC005	1	8	47	PCI_TRDY_L	119 121 122
119	PCI_SB_STOP_L	RPC001	2	7	47	PCI_STOP_L	119 121 122
119	PCI_SB_PAR	RPC009	2	7	47	PCI_PAR	119 121 122

PLACE CLOSE TO SHASTA

AD<17> IS IDSEL FOR AIRPORT
AD<27> IS IDSEL FOR USB

PCI SERIES TERMINATION

SYNC_MASTER=FINO-MW SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 120 OF 154	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
PCI_CLK_AIRPORT	CLOCKS	

PCI_CLK33M_AIRPORT 26 121

Page Notes

Power aliases required by this page:
- _PP3V3_PCI

Signal aliases required by this page:
- _PCI_CLK33M_AIRPORT (33MHz PCI clock)

BOM options provided by this page:
(NONE)

PCI Devices implemented on this page:
AD17 (Slot "A") - AirPort (0x????/0x????)

NOTE: This AirPort implementation does not support PME#.

Q85 WIRELESS CONNECTOR

125 7 =PP3V3_PCI

SDFC100
STDOFF-3MMOD5MMH-1.35-TH

NOSTUFF
CC150 10UF 10% 6.3V X6S 805
CC151 1UF 10% 6.3V CERM 402
CC152 1UF 10% 6.3V CERM 402

CRITICAL
JC150
20-5602-080-041-829
F-ST-SM

		1	2	PCI_AD<31>	119 120 122 125
125 122 120 119	PCI_AD<30>	3	4	AIRPORT_CLKRUN_L_PD	
		5	6	TP_AP_PME_L	
125 122 120 119	PCI_AD<27>	7	8	PCI_SLOTA_GNT_L	119
119	PCI_SLOTA_REQ_L	9	10		
125 122 120 119	PCI_AD<25>	11	12		
125 122 120 119	PCI_AD<29>	13	14	PCI_AD<24>	119 120 122 125
		15	16	=PCI_AIRPORT_RESET_L	20
122 120 119	PCI_CBE_L<3>	17	18	PCI_AD<28>	119 120 122 125
125 122 120 119	PCI_AD<26>	19	20		
122 120 119	PCI_AD<22>	21	22	PCI_AD<23>	119 120 122
	PCI_SLOTA_IDSEL	23	24		
		25	26	PCI_AD<20>	119 120 122 125
125 122 120 119	PCI_AD<19>	27	28	PCI_FRAME_L	119 120 122
122 120 119	PCI_AD<21>	29	30	PCI_AD<17>	119 120 121 122 125
122 120 119	PCI_IRDY_L	31	32		
125 122 120 119	PCI_AD<18>	33	34	PCI_TRDY_L	119 120 122
122 120 119	PCI_DEVSEL_L	35	36		
		37	38	PCI_CBE_L<2>	119 120 122
121 26	PCI_CLK33M_AIRPORT	39	40	PCI_AD<16>	119 120 122 125
122 120 119	PCI_STOP_L	41	42		
125 122 120 119	PCI_AD<12>	43	44		
122 120 119	PCI_PAR	45	46		
		47	48	PCI_AD<14>	119 120 122 125
125 122 120 119	PCI_AD<8>	49	50	PCI_AD<13>	119 120 122 125
125 122 120 119	PCI_AD<9>	51	52		
122 120 119	PCI_CBE_L<0>	53	54	PCI_AD<10>	119 120 122 125
		55	56	PCI_AD<15>	119 120 122 125
125 122 120 119	PCI_AD<7>	57	58	AP_ALT_ANT	= NC_AP_ALT_ANT MAKE_BASE=TRUE NO_TEST=YES
125 122 120 119	PCI_AD<3>	59	60	PCI_CBE_L<1>	119 120 122
125 122 120 119	PCI_AD<6>	61	62	PCI_AD<4>	119 120 122 125
		63	64		
125 122 120 119	PCI_AD<1>	65	66	PCI_AD<11>	119 120 122 125
125 122 120 119	PCI_AD<5>	67	68	ROM_WE_L	119 125
125 122 120 119	PCI_AD<0>	69	70	PCI_AD<2>	119 120 122 125
		71	72		
143	USB_BT_P	73	74	PCI_AIRPORT_INT_L	24
143	USB_BT_N	75	76	ROM_OE_L	119 125
		77	78	ROM_ONBOARD_CS_L	125
7	=PP3V3_PWRON_BT	79	80	ROM_CS_L	119 125

516S0347

RC151 22 5% 1/16W MF-LF 402
125 122 121 120 119 PCI_AD<17>

RC150 10K 5% 1/16W MF-LF 402

CC160 1UF 10% 6.3V CERM 402

SDFC101
STDOFF-3MMOD5MMH-1.35-TH

AIRPORT & BLUETOOTH

SYNC_MASTER=FINO-MW SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 121 OF 154	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
	CLOCKS	

=PCI_CLK33M_USB2 27 122

Page Notes

Power aliases required by this page:
- _PPVIO_PCI (to 3.3V or 5V)

Signal aliases required by this page:
- _PCI_CLK33M_USB2 (33MHz PCI clock)

BOM options provided by this page:
(NONE)

PCI Devices implemented on this page:
AD27 (Slot "G") - USB2 (0x1033/0x0035)

NOTE: This USB2 implementation supports
D3cold.

Q63 APPLICATION OF POWER NET "=PPVIO_PCI_USB2" IS PP3V3_RUN

122 7 =PPVIO_PCI_USB2

CC201 0.1uF 20% 10V CERM 402
CC202 0.1uF 20% 10V CERM 402
CC203 0.1uF 20% 10V CERM 402

XWC200 SM 2 1 6 PP_VIOPCIUSB2_C2 P4MM SM PP 1 PPC203

M3 M4 C8 VDD_PCI

CRITICAL
UC200
NEC_UPD720101_USB2
FBGA-LF

125 121 120 119 PCI_AD<0>	M5	AD0	
125 121 120 119 PCI_AD<1>	P5	AD1	
125 121 120 119 PCI_AD<2>	N5	AD2	
125 121 120 119 PCI_AD<3>	P4	AD3	
125 121 120 119 PCI_AD<4>	N4	AD4	
125 121 120 119 PCI_AD<5>	M3	AD5	
125 121 120 119 PCI_AD<6>	N3	AD6	
125 121 120 119 PCI_AD<7>	M1	AD7	
125 121 120 119 PCI_AD<8>	L2	AD8	
125 121 120 119 PCI_AD<9>	L1	AD9	
125 121 120 119 PCI_AD<10>	K2	AD10	
125 121 120 119 PCI_AD<11>	L3	AD11	
125 121 120 119 PCI_AD<12>	K1	AD12	
125 121 120 119 PCI_AD<13>	K3	AD13	
125 121 120 119 PCI_AD<14>	J2	AD14	
125 121 120 119 PCI_AD<15>	J1	AD15	
125 121 120 119 PCI_AD<16>	F2	AD16	
125 121 120 119 PCI_AD<17>	E1	AD17	
125 121 120 119 PCI_AD<18>	E2	AD18	
125 121 120 119 PCI_AD<19>	D1	AD19	
125 121 120 119 PCI_AD<20>	D2	AD20	
121 120 119 PCI_AD<21>	D3	AD21	
121 120 119 PCI_AD<22>	C1	AD22	
121 120 119 PCI_AD<23>	C2	AD23	
125 121 120 119 PCI_AD<24>	B1	AD24	
125 121 120 119 PCI_AD<25>	A2	AD25	
125 121 120 119 PCI_AD<26>	B3	AD26	
125 121 120 119 PCI_AD<27> (PCI_AD<27>)	C4	AD27	
125 121 120 119 PCI_AD<28>	A5	AD28	
125 121 120 119 PCI_AD<29>	C5	AD29	
125 121 120 119 PCI_AD<30>	B6	AD30	
125 121 120 119 PCI_AD<31>	A6	AD31	
121 120 119 PCI_CBE_L<0>	M2	CBE0	
121 120 119 PCI_CBE_L<1>	J3	CBE1	
121 120 119 PCI_CBE_L<2>	F1	CBE2	
121 120 119 PCI_CBE_L<3>	C3	CBE3	
121 120 119 PCI_PAR	J4	PAR	
121 120 119 PCI_FRAME_L	F3	FRAME	
121 120 119 PCI_IRDY_L	F4	IRDY	
121 120 119 PCI_TRDY_L	G1	TRDY	
121 120 119 PCI_STOP_L	G3	STOP	
PCI_SLOTG_IDSEL	B5	IDSEL	
121 120 119 PCI_DEVSEL_L	G2	DEVSEL	
119 PCI_SLOTG_REQ_L	C6	REQ	
119 PCI_SLOTG_GNT_L	D6	GNT	
NEC_PERR_L_PU	H2	PERR	
NEC_SERR_L_PU	H1	SERR (OD)	
NEC_INTA_L	C7	INTA (OD)	
NEC_INTB_L	B7	INTB (OD)	
NEC_INTC_L	A7	INTC (OD)	
122 27 =PCI_CLK33M_USB2	A8	PCLK	
NEC_VBBRST_L	B8	VBBRST (CHIP RESET)	
NEC_CRUN_L_PD	N6	CRUN	
NEC_PME_L	D5	PME (OD)	
	C5	VCCRST (PCI RESET)	
6 TP_NEC_SMI_L	L6	SMI (OD)	
NEC_LEGC_PD	L7	LEGC	

IPD	NTEST1	M8	TP_NEC_NTEST1 6
IPD	SMC	M7	TP_NEC_SMC 6
IPD	TEB	N7	TP_NEC_TEB
IPD	AMC	P7	TP_NEC_AMC
IPD	TEST	L8	TP_NEC_TEST 6
	NANDTEST	M10	TP_NEC_NANDTEST
	SRCLK	M9	TP_NEC_SRCLK 6
	SRDTA	N9	TP_NEC_SRDATA
IPD	SRMOD	P9	TP_NEC_SRMOD 6

ALL NETS TO FUNCTIONAL TEST PAGE

RC214 22 5% 1/16W MF-LF 402

RC216 10K 5% 1/16W MF-LF 402
RC213 10K 5% 1/16W MF-LF 402

122 7 =PPVIO_PCI_USB2

24 PCI_USB2_INT_L
RPC203 47 5% 1/16W SM-LF (4 5)
RPC203 47 5% 1/16W SM-LF (2 7)
RPC203 47 5% 1/16W SM-LF (3 6)

119 30 28 24 SYS_IO_RESET_L
RC250 47 5% 1/16W MF-LF 402 (1 2)

28 24 SYS_PME_L
RC251 47 5% 1/16W MF-LF 402 (1 2)

20 =PCI_USB2_RESET_L

RC250, RC251 & RPC203 REQUIRED TO facilitate NAND-tree testing

RC215 4.7K 1% 1/16W MF-LF 402
RPC203 47 5% 1/16W SM-LF (8 1)

PPC200 P4MM SM PP 1
PPC201 P4MM SM PP 1

USB 2.0 PCI Interface

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 122 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:28 2005

DRAWING

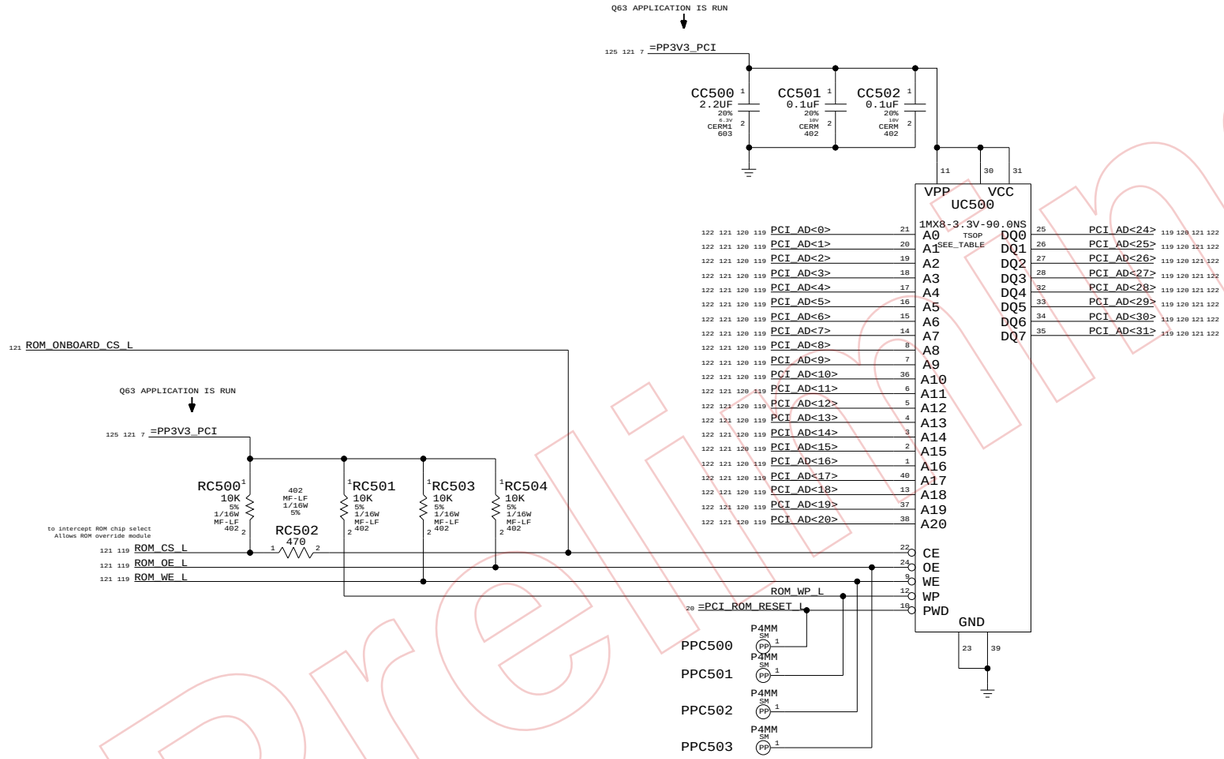
Page Notes

Power aliases required by this page:
- =PP3V3_PCI

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

NOTE: This page does not specify a BootROM part number. Must use a TABLE_x_ITEM symbol to declare U7500 part number.



BootROM	
SYNC_MASTER=Q63	SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 125 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:29 2005

DRAWING

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	NET_PHYSICAL_TYPE	DIFFERENTIAL_PAIR	
	SATA	SATA	SATA_RXD1_C	SATA_RXD_P1_C 127 129
	SATA	SATA	SATA_RXD1_C	SATA_RXD_N1_C 127 129
	SATA	SATA	SATA_TXD1	SATA_TXD_P1 127 129
	SATA	SATA	SATA_TXD1	SATA_TXD_N1 127 129
	SATA	SATA	SATA_RXD2_C	SATA_RXD_P2_C 127 129
	SATA	SATA	SATA_RXD2_C	SATA_RXD_N2_C 127 129
	SATA	SATA	SATA_TXD2	SATA_TXD_P2 127 129
	SATA	SATA	SATA_TXD2	SATA_TXD_N2 127 129
				UATA_DD<15..8> 9 127 129
				UATA_DD<7> 127 129
				UATA_DD<6..0> 9 127 129
				UATA_DA<2..0> 9 127 129
				UATA_CS0_L 127 129
				UATA_CS1_L 127 129
				UATA_HSTROBE 127 129
				UATA_STOP 127 129
				UATA_DMACK_L 127 129
	UATA_NETSPA			UATA_RESET_L 127 129
				UATA_DSTROBE 127 129
				UATA_DMARQ 127 129
				UATA_INTRQ 127 129
374				UATA_DD_R<15..8> 127 129
375				UATA_DD_R<7> 127 129
376				UATA_DD_R<6..0> 127 129
374				UATA_DA_R<2..0> 127 129
375				UATA_CS0_L_R 127 129
376				UATA_CS1_L_R 127 129
377				UATA_DMACK_L_R 127 129
378				UATA_HSTROBE_R 127 129
379				UATA_STOP_R 127 129
380				UATA_RESET_L_R 127 129

Page Notes

Power aliases required by this page:
- _P1V2_PWRON_DISK

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: SATA

Line To Line:	0.38mm
Length Tolerance:	1.27mm
Primary Max Sep:	0.25mm outer
Primary Max Sep:	0.23mm inner
Secondary Max Sep:	2.54mm
Secondary Length:	12.70mm

NOTE: Target differential impedance for SATA data pairs is 100 ohms.

=PP1V2_PWRON_DISK_SB → LC700 600-OHM-1.0A (0805) → =PP1V2_SATA_VDD

MIN_NECK_WIDTH=0.2MM
MIN_LINE_WIDTH=0.6MM

CC705 2.2UF 20% 6.3V CERM1 603
CC700 0.1UF 20% 10V CERM 402
CC701 0.1UF 20% 10V CERM 402
CC702 0.1UF 20% 10V CERM 402
CC703 0.1UF 20% 10V CERM 402
CC704 0.1UF 20% 10V CERM 402

SATA_VDD x 5

XWCC00 (SM) → P4MM (SM, PP) PPCC00
PP_1V2PWRONDISKSB_CC
NO_TEST=YES

SATA_VDD: AB14, AB17, T14, W15, Y18

U2300 SHASTA V1.1 BGA-LF (5 OF 8) SEE_TABLE

UATA

UD_IDEDD_0_H	J6	UATA_DD_R<0>	127 129
UD_IDEDD_1_H	H7	UATA_DD_R<1>	127 129
UD_IDEDD_2_H	H6	UATA_DD_R<2>	127 129
UD_IDEDD_3_H	E2	UATA_DD_R<3>	127 129
UD_IDEDD_4_H	C1	UATA_DD_R<4>	127 129
UD_IDEDD_5_H	C2	UATA_DD_R<5>	127 129
UD_IDEDD_6_H	E3	UATA_DD_R<6>	127 129
UD_IDEDD_7_H	G6	UATA_DD_R<7>	127 129
UD_IDEDD_8_H	G5	UATA_DD_R<8>	127 129
UD_IDEDD_9_H	D4	UATA_DD_R<9>	127 129
UD_IDEDD_10_H	G7	UATA_DD_R<10>	127 129
UD_IDEDD_11_H	F6	UATA_DD_R<11>	127 129
UD_IDEDD_12_H	C3	UATA_DD_R<12>	127 129
UD_IDEDD_13_H	F5	UATA_DD_R<13>	127 129
UD_IDEDD_14_H	E5	UATA_DD_R<14>	127 129
UD_IDEDD_15_H	D5	UATA_DD_R<15>	127 129
UD_IDEDA0_H	E6	UATA_DA_R<0>	127 129
UD_IDEDA1_H	C4	UATA_DA_R<1>	127 129
UD_IDEDA2_H	D6	UATA_DA_R<2>	127 129
UD_IDECS1FX_L	B3	UATA_CS0_L_R	127 129
UD_IDECS3FX_L	B4	UATA_CS1_L_R	127 129
UD_IDEDMACK_L	E8	UATA_DMACK_L_R	127 129
UD_IDERD_L	E4	UATA_HSTROBE_R	127 129
UD_IDEWR_L	D3	UATA_STOP_R	127 129
UD_IDERST_L	E7	UATA_RESET_L_R	127 129

DSTROBE aka: IORDY/HDMARDY*
HSTROBE aka: DIOR*
STOP aka: DIOW*

129 127 UATA_DSTROBE	F9	UD_IDECHRDY_H	
129 127 UATA_DMARQ	D7	UD_IDEDMARQ_H	
129 127 UATA_INTRQ	C5	UD_IDEINTRQ_H	

SATA 0

129 127 SATA_RXD_P1_C	Y17	RXDP1	TXDP1 AA16 SATA_TXD_P1 127 129
129 127 SATA_RXD_N1_C	Y16	RXDN1	TXDN1 AB16 SATA_TXD_N1 127 129

SATA 1

129 127 SATA_RXD_P2_C	AB15	RXDP2	TXDP2 Y15 SATA_TXD_P2 127 129
129 127 SATA_RXD_N2_C	AA15	RXDN2	TXDN2 Y14 SATA_TXD_N2 127 129

SATA_GND: AA14, AA17, T13, W16

AC coupling required for any SATA pair used.
Recommend 0.1uF cap placed close to Shasta.
(Caps provided by device page)

P4MM SM → PPCC01

PLACE TERMINATION RESISTORS AT UATA CONNECTOR JC901

DIOR- :HDMARDY- :HSTROBE >
DIOW- :STOP >

RC706 33 5% 1/16W MF-LF 402: UATA_RESET_L_R → UATA_RESET_L
RC704 22 5% 1/16W MF-LF 402: UATA_DMACK_L_R → UATA_DMACK_L
RC702 22 5% 1/16W MF-LF 402: UATA_HSTROBE_R → UATA_HSTROBE
RC703 22 5% 1/16W MF-LF 402: UATA_STOP_R → UATA_STOP
RC700 33 5% 1/16W MF-LF 402: UATA_CS0_L_R → UATA_CS0_L
RC701 33 5% 1/16W MF-LF 402: UATA_CS1_L_R → UATA_CS1_L

SPARE
RPC704 33 5% 1/16W SM-LF

RPC704 33 5% 1/16W SM-LF:
UATA_DA_R<0> → UATA_DA<0> 9 127 129
UATA_DA_R<1> → UATA_DA<1>
UATA_DA_R<2> → UATA_DA<2>

RPC700 33 5% 1/16W SM-LF:
UATA_DD_R<0> → UATA_DD<0>
UATA_DD_R<1> → UATA_DD<1> 9 127 129
UATA_DD_R<2> → UATA_DD<2>
UATA_DD_R<3> → UATA_DD<3>
UATA_DD_R<4> → UATA_DD<4>
UATA_DD_R<5> → UATA_DD<5>
UATA_DD_R<6> → UATA_DD<6>
UATA_DD_R<7> → UATA_DD<7>
UATA_DD_R<8> → UATA_DD<8>
UATA_DD_R<9> → UATA_DD<9>
UATA_DD_R<10> → UATA_DD<10>
UATA_DD_R<11> → UATA_DD<11>
UATA_DD_R<12> → UATA_DD<12> 9 127 129
UATA_DD_R<13> → UATA_DD<13> 9 127 129
UATA_DD_R<14> → UATA_DD<14> 9 127 129
UATA_DD_R<15> → UATA_DD<15>

RC705 10K 5% 1/16W MF-LF 402 (2)

Shasta Disk			
SYNC_MASTER=M23-DC	SYNC_DATE=06/20/2005		
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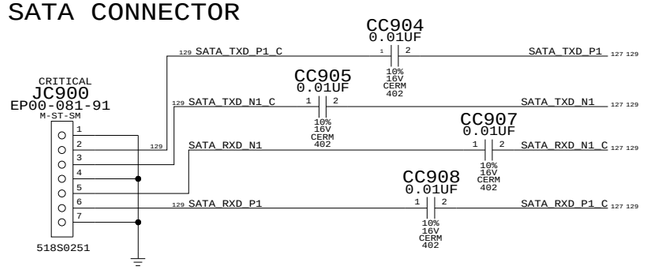
APPLE COMPUTER INC.	SIZE D	DRAWING NUMBER 051-6790	REV. E
	SCALE NONE	SHT 127 OF 154	

DRAWING
TITLE=SCHEMA
ABBREV=SHMAIN
LAST_MODIFIED=Tue Nov 1 14:55:30 2005

SATA CONNECTOR



SATA PORT1 IS NOT USED IN M23/M33:NO TEST

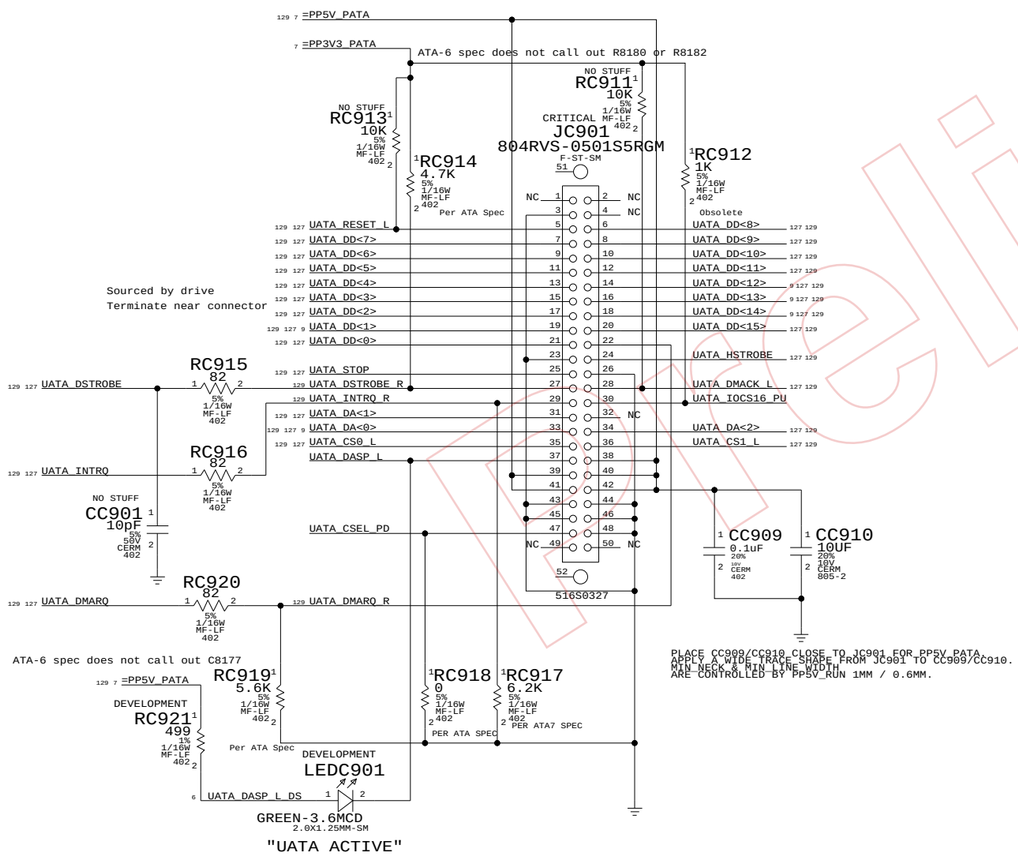
SATA_TXD_P2	NC_SATA_TXD_P2	MAKE_BASE=TRUE
SATA_TXD_N2	NC_SATA_TXD_N2	MAKE_BASE=TRUE
SATA_RXD_N2_C	NC_SATA_RXD_N2_C	MAKE_BASE=TRUE
SATA_RXD_P2_C	NC_SATA_RXD_P2_C	MAKE_BASE=TRUE

SATA DIFF PAIR GND VIAS

GV901 HOLE-VIA-P5RP25
GV902 HOLE-VIA-P5RP25
GV903 HOLE-VIA-P5RP25
GV904 HOLE-VIA-P5RP25
GV905 HOLE-VIA-P5RP25
GV906 HOLE-VIA-P5RP25
GV907 HOLE-VIA-P5RP25
GV908 HOLE-VIA-P5RP25

4-12-05
ADD THESE GROUND VIAS NEAR
EACH LAYER JUMP FOR THE SATA
DIFF PAIRS. ONE GND VIA PER
SIGNAL VIA, AND PLACE GND VIA
NO CLOSER THAN 0.152MM TO
SIGNAL VIA.

PATA CONNECTOR



ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	NO_TEST
UATA_DD<15..8>	UATA_NETPH	UATA_NETSPA		
UATA_DD<7>	UATA_NETPH	UATA_NETSPA		
UATA_DD<6..0>	UATA_NETPH	UATA_NETSPA		
UATA_DA<2..0>	UATA_NETPH	UATA_NETSPA		
UATA_CS0_L	UATA_NETPH	UATA_NETSPA		
UATA_CS1_L	UATA_NETPH	UATA_NETSPA		
UATA_HSTROBE	UATA_NETPH	UATA_NETSPA		
UATA_STOP	UATA_NETPH	UATA_NETSPA		
UATA_DMACK_L	UATA_NETPH	UATA_NETSPA		
UATA_RESET_L	UATA_NETPH	UATA_NETSPA		
UATA_DSTROBE_R	UATA_NETPH	UATA_NETSPA		
UATA_DMARQ_R	UATA_NETPH	UATA_NETSPA		
UATA_INTRQ_R	UATA_NETPH	UATA_NETSPA		

UATA FROM RPAKS TO JC901

UATA_DD_R<15..8>	UATA_NETPH	UATA_NETSPA		R392
UATA_DD_R<7>	UATA_NETPH	UATA_NETSPA		R393
UATA_DD_R<6..0>	UATA_NETPH	UATA_NETSPA		R394
UATA_DA_R<2..0>	UATA_NETPH	UATA_NETSPA		R395
UATA_CS0_L_R	UATA_NETPH	UATA_NETSPA		R396
UATA_CS1_L_R	UATA_NETPH	UATA_NETSPA		R397
UATA_HSTROBE_R	UATA_NETPH	UATA_NETSPA		R398
UATA_STOP_R	UATA_NETPH	UATA_NETSPA		R399
UATA_DMACK_L_R	UATA_NETPH	UATA_NETSPA		R400
UATA_RESET_L_R	UATA_NETPH	UATA_NETSPA		R401
UATA_DSTROBE	UATA_NETPH	UATA_NETSPA		R402
UATA_DMARQ	UATA_NETPH	UATA_NETSPA		R403
UATA_INTRQ	UATA_NETPH	UATA_NETSPA		R404

UATA FROM SHASTA U2300 TO RPAKS

SATA_TXD_P1	SATA_TXD1	SATA	SATA		TRUE
SATA_TXD_N1	SATA_TXD1	SATA	SATA		TRUE
SATA_TXD_P1_C	SATA_TXD1	SATA	SATA	TX1C	TRUE
SATA_TXD_N1_C	SATA_TXD1	SATA	SATA	TX1C	TRUE
SATA_RXD_N1_C	SATA_RXD1	SATA	SATA		TRUE
SATA_RXD_P1_C	SATA_RXD1	SATA	SATA		TRUE
SATA_RXD_N1	SATA_RXD1	SATA	SATA	RX1C	TRUE
SATA_RXD_P1	SATA_RXD1	SATA	SATA	RX1C	TRUE

4-11-05: BOARD FILE HAS PHYSICAL/SPACING NAME ASSIGMENT ALREADY FOR SATA DIFF PAIRS (CAP TO SHASTA).
BUT NOT FOR THE SATA CAP TO CONNECTOR ROUTES, WHICH THE ABOVE ARE ADDED FOR THIS PURPOSE.

UATA TRACE IMPEDANCE ROUTE TO 50 OHMS

4-8-05
NOTES FOR SHARED PAGE 127
FOR M23/M33 CREATE A WIDE SHAPE
FOR PP1V2_SATA_VDD AND THEN NECK DOWN
TO THE DEFAULT VALUE WHEN NECESSARY.
THE WIDTH/NECK PROPERTIES ON PAGE 127
ARE SET BY Q63 FOR SCHEMATIC SHARING.

LC700 CHANGED TO 155S0240 (600 OHM,0.2 OHM DCR,1A)
PREVIOUS ONE WAS 155S0031 (600 OHM,0.6 OHM DCR,0.2A)
PER TOKIN AMERICA PN: N2012Z601.

4-11-05.
PP1V2_ALL REG. IS SET TO BE 1.22V TO 1.23V
AS NOTED ON THE 1.2 REG PAGE 13. THIS WILL
HELP MITIGATE THE LOSS ACROSS THE Q1306 FET
SI3326DV.

4-12-05.
UPDATED AC COUPLING CAPS FOR SATA JC900.
ADDED DECOUPLING CAPS FOR JC901 PP5V_PATA NET.

Disk Connectors

SYNC_MASTER=M23-DC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	129	154

PLACE THESE SERIES TERM CLOSE TO DRIVER: SB/SHASTA

SHASTA -> VESTA

131 9	ENET_TXD_R<0>	I59	MAKE_BASE=TRUE	ENET_TXD<0>	9 131 132
131 9	ENET_TXD_R<1>	I60	MAKE_BASE=TRUE	ENET_TXD<1>	9 131 132
131 9	ENET_TXD_R<2>	I61	MAKE_BASE=TRUE	ENET_TXD<2>	9 131 132
131 9	ENET_TXD_R<3>	I62	MAKE_BASE=TRUE	ENET_TXD<3>	9 131 132
131 9	ENET_TXD_R<4>	I63	MAKE_BASE=TRUE	ENET_TXD<4>	9 131 132
131 9	ENET_TXD_R<5>	I64	MAKE_BASE=TRUE	ENET_TXD<5>	9 131 132
131 9	ENET_TXD_R<6>	I65	MAKE_BASE=TRUE	ENET_TXD<6>	9 131 132
131 9	ENET_TXD_R<7>	I66	MAKE_BASE=TRUE	ENET_TXD<7>	9 131 132
131 9	ENET_TX_EN_R	I67	MAKE_BASE=TRUE	ENET_TX_EN	9 131 132
131 9	ENET_TX_ER_R	I68	MAKE_BASE=TRUE	ENET_TX_ER	9 131 132
131	ENET_CLK125M_GTX_R	I69	MAKE_BASE=TRUE	ENET_CLK125M_GTX	131 132
131	ENET_MDIO_R		MAKE_BASE=TRUE	ENET_MDIO	131 132

PLACE THESE SERIES TERM CLOSE TO DRIVER: VESTA

VESTA -> SHASTA

132	ENET_CLK125M_GBE_REF_R	I84	MAKE_BASE=TRUE	ENET_CLK125M_GBE_REF	131
132	ENET_CLK25M_TX_R	I70	MAKE_BASE=TRUE	ENET_CLK25M_TX	131
132	ENET_CLK125M_RX_R	I71	MAKE_BASE=TRUE	ENET_CLK125M_RX	131
132 131 9	ENET_RXD_R<0>	I72	MAKE_BASE=TRUE	ENET_RXD<0>	9 131
132 131 9	ENET_RXD_R<1>	I73	MAKE_BASE=TRUE	ENET_RXD<1>	9 131
132 131 9	ENET_RXD_R<2>	I74	MAKE_BASE=TRUE	ENET_RXD<2>	9 131
132 131 9	ENET_RXD_R<3>	I75	MAKE_BASE=TRUE	ENET_RXD<3>	9 131
132 131 9	ENET_RXD_R<4>	I76	MAKE_BASE=TRUE	ENET_RXD<4>	9 131
132 131 9	ENET_RXD_R<5>	I77	MAKE_BASE=TRUE	ENET_RXD<5>	9 131
132 131 9	ENET_RXD_R<6>	I78	MAKE_BASE=TRUE	ENET_RXD<6>	9 131
132 131 9	ENET_RXD_R<7>	I79	MAKE_BASE=TRUE	ENET_RXD<7>	9 131
132 131	ENET_RX_DV_R	I80	MAKE_BASE=TRUE	ENET_RX_DV	131
132 131	ENET_RX_ER_R	I81	MAKE_BASE=TRUE	ENET_RX_ER	131
132 131	ENET_COL_R	I82	MAKE_BASE=TRUE	ENET_COL	131
132 131	ENET_CRS_R	I83	MAKE_BASE=TRUE	ENET_CRS	131

ENET SERIES TERM

SYNC_MASTER=FINO-DC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	130	154

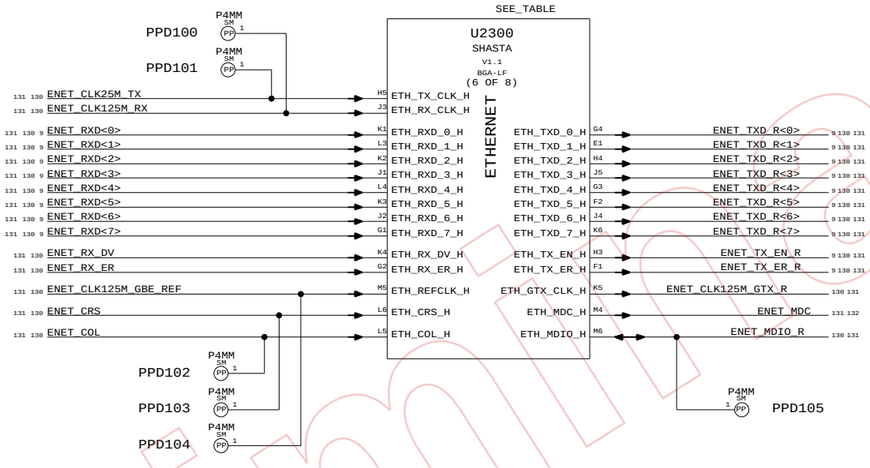
ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
I47	0.38mm SPACING		ENET_CLK25M_TX 130 131
I46	0.38mm SPACING		ENET_CLK125M_RX 130 131
I49	0.38mm SPACING		ENET_CLK125M_GBE_REF 130 131
I22	0.38mm SPACING		ENET_CLK125M_GTX 130 132
I50	0.38mm SPACING		ENET_CLK125M_GTX_R 130 131
I51	ENET_FW_2X		ENET_RXD_R<7..0> 9 130 132
I52	ENET_FW_3X		ENET_RX_DV_R 130 132
I53	ENET_FW_3X		ENET_RX_ER_R 130 132
I54	ENET_FW_2X		ENET_RXD<7..0> 9 130 131
I55	ENET_FW_3X		ENET_RX_DV 130 131
I56	ENET_FW_3X		ENET_RX_ER 130 131
I58	ENET_FW_2X		ENET_TXD_R<7..0> 9 130 131
I57	ENET_FW_3X		ENET_TX_EN_R 9 130 131
I59	ENET_FW_3X		ENET_TX_ER_R 9 130 131
I60	ENET_FW_2X		ENET_TXD<7..0> 9 130 132
I61	ENET_FW_3X		ENET_TX_EN 9 130 132
I62	ENET_FW_3X		ENET_TX_ER 9 130 132
I63	ENET_FW_3X		ENET_CRS_R 130 132
I64	ENET_FW_3X		ENET_COL_R 130 132
I65	ENET_FW_3X		ENET_CRS 130 131
I66	ENET_FW_3X		ENET_COL 130 131
I68	ENET_FW_3X		ENET_MDC 131 132
I41	ENET_FW_3X		ENET_MDIO 130 131 132
I42	ENET_FW_3X		ENET_MDIO_R 130 131
I43	ENET_FW_3X		R8405_1 131
I45	ENET_FW_3X		R8405_2 131
I44	ENET_FW_3X		R8407_2 131

Page Notes

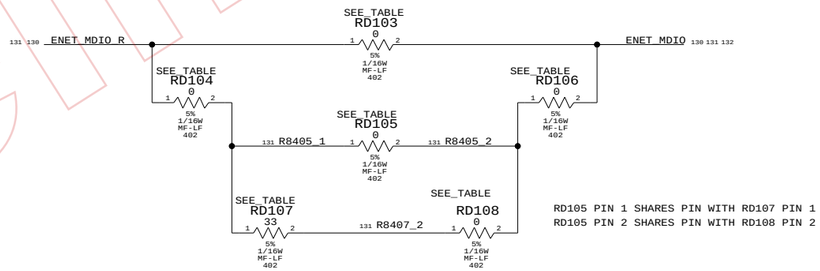
Power aliases required by this page:
(NONE)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)



RD103 PIN 1 SHARES PIN WITH RD104 PIN 1
RD103 PIN 2 SHARES PIN WITH RD106 PIN 2



RD105 PIN 1 SHARES PIN WITH RD107 PIN 1
RD105 PIN 2 SHARES PIN WITH RD108 PIN 2

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
116S0004	1	RES,0-OHM,402,5%	RD103		ENET_MDIO_DELAY_0
116S0004	3	RES,0-OHM,402,5%	RD104,RD105,RD106		ENET_MDIO_DELAY_2NS
116S0004	3	RES,0-OHM,402,5%	RD104,RD108,RD106		ENET_MDIO_DELAY_4NS
116S0030	1	RES,33-OHM,402,5%	RD107		ENET_MDIO_DELAY_4NS

*

Shasta Ethernet

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 131 OF 154	

LAST_MODIFIED=Tue Nov 1 13:56:12 2005

DRAWING

TITLE=KILOWHRA

ABBREV=DRAWING

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
131A	0.38mm SPACING		ENET_CLK125M_GBE_REF_R 130 132
132A	0.38mm SPACING		ENET_CLK125M_RX_R 130 132
124A	0.38mm SPACING		ENET_CLK25M_TX_R 130 132
118A	ENET	ENET_MDI0	ENET_MDI_P<0> 132 136
119A	ENET	ENET_MDI0	ENET_MDI_N<0> 132 136
121A	ENET	ENET_MDI1	ENET_MDI_P<1> 132 136
122A	ENET	ENET_MDI1	ENET_MDI_N<1> 132 136
115A	ENET	ENET_MDI2	ENET_MDI_P<2> 132 136
116A	ENET	ENET_MDI2	ENET_MDI_N<2> 132 136
112A	ENET	ENET_MDI3	ENET_MDI_P<3> 132 136
113A	ENET	ENET_MDI3	ENET_MDI_N<3> 132 136
105A	0.38mm SPACING		VESTA_CLK25M_XTALI 132
104A	0.38mm SPACING		VESTA_CLK25M_XTALO 132
106A	0.38mm SPACING		VESTA_CLK25M_XTALO_R 132

Page Notes

Power aliases required by this page:
- =PP3V3_ENET
- =PP2V5_ENETFW
- =PP1V2_ENETFW

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: ENET

Line To Line: 0.38mm
Length Tolerance: 1.27mm
Primary Max Sep: 0.13mm
Secondary Max Sep: 2.54mm
Secondary Length: 12.70mm

NOTE: Target differential impedance for ENET data pairs is 100 ohms.

Q63 APPLICATION IS ALL
139 17 7 =PP2V5_ENETFW
LD200 FERR-EMI-600-OHM SM
PP2V5_VESTA_BIASVDD1 6 VOLTAGE=2.5V MIN_LINE_WIDTH=0.50mm MIN_NECK_WIDTH=0.38mm
CD201 0.1uF 20% 10V CERM 402
LD201 FERR-EMI-600-OHM SM
PP2V5_VESTA_XTALVDD1 6 VOLTAGE=2.5V MIN_LINE_WIDTH=0.50mm MIN_NECK_WIDTH=0.38mm
CD202 10UF 10% 6.3V X5R 805
CD203 0.001uF 20% 50V CERM 402
XWD200 SM OMIT TP_VESTA_BIASVDD1 P4MM SM PPD239
XWD201 SM OMIT TP_VESTA_XTALVDD1 P4MM SM PPD201
XWD202 SM OMIT TP_VESTA_PLLVDD1 P4MM SM PPD238
PP1V2_VESTA_PLLVDD1 6 VOLTAGE=1.2V MIN_LINE_WIDTH=0.50mm MIN_NECK_WIDTH=0.38mm
LD202 FERR-EMI-600-OHM SM
Q63 APPLICATION IS ALL
=PP1V2_ENETFW 7 17 139
CD204 0.001uF 20% 50V CERM 402
CD205 10UF 10% 6.3V X5R 805
VESTA SPEC CALLS FOR 2.2UF, LOW ESR CAP
ESR < 0.5 ohms
P4MM SM PPD200
131 130 ENET_CLK125M_GTX

XTALVDD1 BIASVDD1 PLLVDD1

SEE_TABLE
VESTA ENET
U1701
VESTA-V1.3
FBGA-200-LF
2 OF 3

GTXCLK A4 IPD
TXD[0] B6 IPD
TXD[1] C6 IPD
TXD[2] C7 IPD
TXD[3] D6 IPD
TXD[4] E6 IPD
TXD[5] C5 IPD
TXD[6] B5 IPD
TXD[7] A5 IPD
TX_EN B4 IPD
TX_ER C4 IPD
MDC G1 IPD
MDIO G2 IPU
LOWPWR H5 IPD
IPD=INTERNAL PULL-DOWN
IPU=INTERNAL PULL-UP
PHYA[0] L5 IPD
PHYA[1] L4 IPD
PHYA[2] L3 IPD
PHYA[3] L2 IPD
PHYA[4] L1 IPD
EN_10B K3 IPD
RGMIIEN B8 IPD
FDX C8 IPU
F1000 K4 IPU
SPD0 K5 IPD
MANMS D9 IPD
HUB A9 IPD
ER H3 IPD
TEST[0] M4
TEST[1] M5
TVCO N3
XTALI N2
XTALO P2
XTALGND BIASGND PLLGND1 P3 R2 N2

CLK125 D1 ENET_CLK125M_GBE_REF_R 130 132
TXC A6 ENET_CLK25M_TX_R 130 132
RXC C1 ENET_CLK125M_RX_R 130 132
RXD[0] F4 ENET_RXD_R<0> 9 130 131
RXD[1] F5 ENET_RXD_R<1> 9 130 131
RXD[2] E5 ENET_RXD_R<2> 9 130 131
RXD[3] E4 ENET_RXD_R<3> 9 130 131
RXD[4] E3 ENET_RXD_R<4> 9 130 131
RXD[5] D5 ENET_RXD_R<5> 9 130 131
RXD[6] D4 ENET_RXD_R<6> 9 130 131
RXD[7] D3 ENET_RXD_R<7> 9 130 131
RX_DV D2 ENET_RX_DV_R 130 131
RX_ER C2 ENET_RX_ER_R 130 131
COL F3 ENET_COL_R 130 131
CRS G3 ENET_CRS_R 130 131
RBC0 A3 TP_VESTA_RBC0 9
RBC1 B3 TP_VESTA_RBC1 9
TRD+[0] R4 ENET_MDI_P<0> 132 136
TRD-[0] R5 ENET_MDI_N<0> 132 136
TRD+[1] R7 ENET_MDI_P<1> 132 136
TRD-[1] R6 ENET_MDI_N<1> 132 136
TRD+[2] R8 ENET_MDI_P<2> 132 136
TRD-[2] R9 ENET_MDI_N<2> 132 136
TRD+[3] R11 ENET_MDI_P<3> 132 136
TRD-[3] R10 ENET_MDI_N<3> 132 136
INTR*/ENERGYDET D10 ENET_ENERGYDET 24
SLAVE*/AN_EN C10 TP_VESTA_AN_EN 9
QUALITY*/TXC_RXC_DELAY A8 TP_VESTA_TXC_RXC_DELAY 9
LINK1* A10 TP_VESTA_LINK1_L 9
LINK2* B11 TP_VESTA_LINK2_L 9
FDXLED* B10 TP_VESTA_FDXLED_L 9
XMTLED* B12 TP_VESTA_XMTLED_L 136
ACTLED* C11 TP_VESTA_ACTLED_L 136
RDAC1 R1 VESTA_RDAC1_PD
RD213 1.24K 1% 1/16W MF-LF 402

TERMINATION OFF PAGE

Q63 APPLICATION IS ALL
139 17 7 =PP3V3_ENETFW
RD204 1K 1% 1/16W MF-LF 402
136 132 7 =PP3V3_ENET
RD250 1.5K 5% 1/16W MF-LF 402
QD200 2N7002DW-X-F SOT-363
CD206 1UF 10% 6.3V CERM 402
17 VESTA_RESET_H
QD200 2N7002DW-X-F SOT-363
131 ENET_MDC
131 130 ENET_MDIO
VESTA_ENET_LOWPWR
9 TP_VESTA_PHYA<0>
9 TP_VESTA_PHYA<1>
9 TP_VESTA_PHYA<2>
9 TP_VESTA_PHYA<3>
9 TP_VESTA_PHYA<4>
9 TP_VESTA_EN_10B
9 TP_VESTA_RGMIIEN
9 TP_VESTA_FDX
9 TP_VESTA_F1000
9 TP_VESTA_SPD0
9 TP_VESTA_MANMS
9 TP_VESTA_HUB
9 TP_VESTA_ER
9 TP_VESTA_TEST<0>
9 TP_VESTA_TEST<1>
9 TP_VESTA_TVCO
Put crystal circuit close to PHY
132 VESTA_CLK25M_XTALI
132 VESTA_CLK25M_XTALO_R
RD209 0 5% 1/16W MF-LF 402
CRITICAL
YD200 25.0000M 8X4.5MM-SM2
VESTA_CLK25M_XTALO 132
CD218 33pF 5% 50V CERM 402
CD219 33pF 5% 50V CERM 402
CRYSTAL LOAD CAPACITANCE IS 20PF

Vesta Config Straps:

PHYA<4..0> - PHY Address Select
(Internal Pull-downs)

EN_10B - TBI Interface Select
1 - TBI/RTBI Mode
0 - GMII/RGMII Mode
(Internal Pull-down)

RGMIIEN - RGMII Enable
1 - RGMII/RTBI Mode
0 - GMII/TBI Mode
(Internal Pull-down)

FDX - Full-Duplex Select
Sets manual duplex mode bit
(Internal Pull-up)

F1000 - Speed Select
See table below
(Internal Pull-up)

SPD0 - Speed Select
See table below
(Internal Pull-down)

MANMS - Manual Master/Slave Configuration Select
Sets manual master/slave configuration enable bit
(Internal Pull-down)

HUB - Repeater Select
Sets Hub/DTE bit and master/slave configuration value bit
(Internal Pull-down)

ER - Edge Rate Select
1 - Rise time approx. 5 ns
0 - Rise time approx. 4 ns
(Internal Pull-down)

AN_EN - Auto-Negotiation Select
1 - Auto-negotiation enabled
0 - Auto-negotiation disabled
(Internal Pull-up)

TXC_RXC_DELAY
1 - If RGMII Mode enabled, RXC clock and GTXCLK are delayed by 1.9 ns
0 - No clock delay
(Internal Pull-down)

AN_EN	F1000	SPD0	Description
0	0	0	Force 10BASE-T
0	0	1	Force 100BASE-TX
0	1	X	Force 1000BASE-T (test use only)
1	0	0	Auto-negotiate advertise 10BASE-T
1	0	1	Auto-negotiate advertise 10/100BASE-TX
1	1	0	Auto-negotiate advertise 10/100/1000BASE-T
1	1	1	Auto-negotiate advertise 1000BASE-T

Vesta Ethernet PHY

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 132 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:32 2005

DRAWING

EXTRA CONSTRAINTS TO SUPPLEMENT THE THE MISSING NET PHYSICAL FROM EARLIER PAGE

NET_PHYSICAL_TYPE

U292	ENET	ENET_MDI_P<0>	132 136
U296	ENET	ENET_MDI_N<0>	132 136
U297	ENET	ENET_MDI_P<1>	132 136
U298	ENET	ENET_MDI_N<1>	132 136
U299	ENET	ENET_MDI_P<2>	132 136
U300	ENET	ENET_MDI_N<2>	132 136
U301	ENET	ENET_MDI_P<3>	132 136
U302	ENET	ENET_MDI_N<3>	132 136

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0253	1	CON,RJ-45 7 DEGRESS	JD600	CRITICAL	17_INCH_LCD
514-0254	1	CON,RJ-45 7 DEGRESS	JD600	CRITICAL	20_INCH_LCD

PUT DEVELOPMENT LEDS ON TOP SIDE OF BOARD

136 132 7 =PP3V3_ENET
DEVELOPMENT
RD601 330 5% 1/10W MF-LF 603
LED8700_P
DEVELOPMENT
LEDD600 GREEN-3.6MCD 2.0X1.25MM-SM

LD600
FERR-EMI-600-OHM
SM

7 =PP2V5_ENET
PP2V5_ENET_CTAP
MIN_LINE_WIDTH=0.58mm
MIN_NECK_WIDTH=0.38mm
VOLTAGE=2.5V
CD600 0.1UF 20% 10V CERM 402
CD601 0.1UF 20% 10V CERM 402

7 GND_CHASSIS_RJ45
CD604 0.001UF 10% 50V CERM 402

132 TP_VESTA_XMTLED_L
VESTA_XMTLED_L
MAKE_BASE=TRUE

ENET TERMINATION

PLACE THESE PARTS NEAR VESTA

136 132 ENET_MDI_P<0>
136 132 ENET_MDI_N<0>
RD604 49.9 1% 1/16W MF-LF 402
RD605 49.9 1% 1/16W MF-LF 402
ENET_MDI0

136 132 ENET_MDI_P<1>
136 132 ENET_MDI_N<1>
CD606 0.01UF 20% 16V CERM 402
RD606 49.9 1% 1/16W MF-LF 402
RD607 49.9 1% 1/16W MF-LF 402
ENET_MDI1

136 132 ENET_MDI_P<2>
136 132 ENET_MDI_N<2>
RD608 49.9 1% 1/16W MF-LF 402
RD609 49.9 1% 1/16W MF-LF 402
CD607 0.01UF 20% 16V CERM 402
ENET_MDI2

136 132 ENET_MDI_P<3>
136 132 ENET_MDI_N<3>
CD608 0.01UF 20% 16V CERM 402
RD610 49.9 1% 1/16W MF-LF 402
RD611 49.9 1% 1/16W MF-LF 402
ENET_MDI3
CD609 0.01UF 20% 16V CERM 402

(514-0253)
OMIT
JD600
JFM38V10-0112-4F
F-ANG-TH

PRIMARY
13
11
5 ENET_CTAP
6 ENET_CTAP
1 MDI_0+
2 MDI_0-
3 MDI_1+
4 MDI_1-
7 MDI_2+
8 MDI_2-
9 MDI_3+
10 MDI_3-
12
RJ45 CHIP SIDE

1CT:1CT
75 OHM
SECONDARY
J1
J2
J3
J4
J5
J6
J7
J8
RJ45 CABLE SIDE

SHIELD 1000PF, 2000V

CD605 0.001UF 10% 50V CERM 402

136 132 7 =PP3V3_ENET
DEVELOPMENT
RD603 330 5% 1/10W MF-LF 603
LED8701_P
DEVELOPMENT
LEDD601 GREEN-3.6MCD 2.0X1.25MM-SM

132 TP_VESTA_ACTLED_L
VESTA_ACTLED_L
MAKE_BASE=TRUE

SPARE GND VIAS FOR LAYER TRAVERSALS DURING ROUTING

ZHD690 HOLE-VIA
ZHD691 HOLE-VIA
ZHD692 HOLE-VIA
ZHD693 HOLE-VIA

ETHERNET CONNECTOR

SYNC_MASTER=FINO-DC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 136 OF 154	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
	ENET_FW_2X	
	ENET_FW_3X	
	ENET_FW_3X	
	ENET_FW_2X	
	ENET_FW_3X	
	ENET_FW_3X	
	ENET_FW_3X	
	ENET_FW_3X	
	0.38mm_SPACING	
	0.38mm_SPACING	
	0.38mm_SPACING	

Page Notes

Power aliases required by this page:
- _PP2V5_PWRON_SB

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

119 24 23 7 =PP2V5_PWRON_SB

CD800 0.1uF 20% 10V CERM 402
CD801 0.1uF 20% 10V CERM 402
CD802 0.1uF 20% 10V CERM 402

FWVDDP
U2300
SHASTA
V1.1
BGA-LF
SEE TABLE (7 OF 8)

FIREWIRE

PHY_DATA_0_H	N4	FW_DATA<0>	138 139
PHY_DATA_1_H	P5	FW_DATA<1>	138 139
PHY_DATA_2_H	N1	FW_DATA<2>	138 139
PHY_DATA_3_H	M7	FW_DATA<3>	138 139
PHY_DATA_4_H	N6	FW_DATA<4>	138 139
PHY_DATA_5_H	L1	FW_DATA<5>	138 139
PHY_DATA_6_H	M3	FW_DATA<6>	138 139
PHY_DATA_7_H	L2	FW_DATA<7>	138 139
PHY_CTL_0_H	N2	139 138 FW_CTL_S<0>	RD801 0 5% 1/16W MF-LF 402 FW_CTL<0> 138 139
PHY_CTL_1_H	N3	139 138 FW_CTL_S<1>	RD802 0 5% 1/16W MF-LF 402 FW_CTL<1> 138 139
PHY_LPS_H	P6	FW_LPS	138 139
PHY_LREQ_H	P1	FW_LREQ	138 139
PHY_SCLK_H	P2	139 138 FW_CLK98M_PCLK	
PHY_PINT_L	P3	139 138 FW_PINT	
PHY_LCLK_H	R1	138 FW_CLK98M_LCLK_R	RD800 22 5% 1/16W MF-LF 402 FW_CLK98M_LCLK 138 139
PHY_LINKON_L	N7	FW_LINKON	139

Shasta FireWire

SYNC_MASTER=Q63 SYNC_DATE=08/01/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT 138 OF 154

LAST_MODIFIED=Tue Nov 1 14:55:34 2005

DRAWING

ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
(PROVIDED BY LINK PAGE)		0.38mm SPACING		FW_CLK98M_PCLK_R 139
	FW	FW	FW_TPA0	FW_TPA_P<0> 139 140
	FW	FW	FW_TPA0	FW_TPA_N<0> 139 140
	FW	FW	FW_TPB0	FW_TPB_P<0> 139 140
	FW	FW	FW_TPB0	FW_TPB_N<0> 139 140
	FW	FW	FW_TPA1	FW_TPA_P<1> 139 140
	FW	FW	FW_TPA1	FW_TPA_N<1> 139 140
	FW	FW	FW_TPB1	FW_TPB_P<1> 139 140
	FW	FW	FW_TPB1	FW_TPB_N<1> 139 140
ETHERNET SPACING TO ROUTE ON LAYER 6	FW	FW	FW_TPA2	FW_TPA_P<2> 139 140
	FW	FW	FW_TPA2	FW_TPA_N<2> 139 140
	FW	FW	FW_TPB2	FW_TPB_P<2> 139 140
	FW	FW	FW_TPB2	FW_TPB_N<2> 139 140
		0.38mm SPACING		VESTA_CLK24M_XTALI 139
		0.38mm SPACING		VESTA_CLK24M_XTALO 139
		0.38mm SPACING		VESTA_CLK24M_XTALO_R 139
100M	FW_CTL			FW_CTL_S<1..0> 138
400M	FW_CTL			FW_CTL<1..0> 138 139
800	FW_CTL			FW_CTL_R<1..0> 138 139

Page Notes

Power aliases required by this page:
- =PPFW_PHY
- =PP3V3_FW
- =PP3V3_ENETFW
- =PP2V5_ENETFW
- =PP1V2_ENETFW

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
- VESTA_DS_ONLY_EN0
  If stuffed, adds external pull-up to counter internal pull-down in Vesta.
  See straps table for more information.
- VESTA_PWR_CLASS_0
  If stuffed, adds external pull-down to counter internal pull-up in Vesta.
  See straps table for more information.

Net Spacing Type: FW

NOTE: Target differential impedance for FW data pairs is 110 ohms.

VESTA CONFIG STRAPS:

FW_PWR_CLASS_MSB - FIREWIRE POWER CLASS
1 - Sets Power Class to 0x4
0 - Sets Power Class to 0x0
(Internal Pull-up)

FW_DS_ONLY_P0 - PORT 0 DATA/STROBE MODE
1 - Port 0 Data/Strobe mode only
0 - Port 0 Bilingual mode
(Internal Pull-down)

ESDET[0]
1=PORTS 1 AND 2 DS ONLY
0=PARTS 1 AND 2 BI-LINGUAL
ESDET[1]
1=PORT 1 PRESENT
0=PORT 1 NOT PRESENT
ESDET[2]
1=PORT 2 PRESENT
0=PORT 2 NOT PRESENT

CRYSTAL LOAD CAPACITANCE IS 12PF

IPD=INTERNAL PULL-DOWN
IPU=INTERNAL PULL-UP

Vesta FireWire PHY		
SYNC_MASTER=Q63	SYNC_DATE=08/01/2005	
NOTICE OF PROPRIETARY PROPERTY		
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APPLE COMPUTER INC.	SIZE: D	DRAWING NUMBER: 051-6790 REV: E
	SCALE: NONE	SHT 139 OF 154

LAST_MODIFIED=Tue Nov 1 14:55:35 2005

NET_TYPE SPACING	PHYSICAL	DIFFERENTIAL_PAIR		
T401 FW	FW	FW_TPA0_FL	FW_PORT0_TPA_P_FL	140
T400 FW	FW	FW_TPA0_FL	FW_PORT0_TPA_N_FL	140
T402 FW	FW	FW_TPB0_FL	FW_PORT0_TPB_P_FL	140
T403 FW	FW	FW_TPB0_FL	FW_PORT0_TPB_N_FL	140
T493 FW	FW	FW_TPA1_FL	FW_PORT1_TPA_P_FL	140
T495 FW	FW	FW_TPA1_FL	FW_PORT1_TPA_N_FL	140
T497 FW	FW	FW_TPB1_FL	FW_PORT1_TPB_P_FL	140
T496 FW	FW	FW_TPB1_FL	FW_PORT1_TPB_N_FL	140

7 =PP12V_ALL_FW

8 WATTS MAX
12 VOLTS

RE056 1.3 20% 1W FF 2512
PP12V_FW MIN_LINE_WIDTH=0.8MM MIN_NECK_WIDTH=0.25MM VOLTAGE=12V MAKE_BASE=TRUE

I443 =PPFW_PHY 139
TO FW CDS PIN (CABLE POWER DETECT)

DE000 MURS320XXG SMC
FW_VP_R MIN_LINE_WIDTH=0.8MM MIN_NECK_WIDTH=0.25MM MAKE_BASE=TRUE VOLTAGE=24V

CE009 0.1UF 10% 50V X7R 603-1
FW_VP MAX IS 24V

CRITICAL
RE002 1.3 20% 1W FF 2512
FW_VP MIN_LINE_WIDTH=0.8MM MIN_NECK_WIDTH=0.25MM VOLTAGE=24V

FE002 0.75AMP-13.2V MINISMD-LF
PPFW_PORT0_VP MIN_LINE_WIDTH=0.6 mm MIN_NECK_WIDTH=0.25 mm VOLTAGE=24V

DESIGNED WITH INTENTION TO RESIZE FUSE LIMITS EQUAL FW SPEC 1.5A LIMIT

FE000 1.5AMP-33V SM-LF
PPFW_PORT1_VP MIN_LINE_WIDTH=0.6 mm MIN_NECK_WIDTH=0.25 mm VOLTAGE=24V

POSSIBLE CURRENT SHARING SCENARIO
KCL = CABLE POWER + SYSTEM POWER = > 1.5 AMPS

Termination

Place close to FireWire PHY

VOLTAGE=1.86V
139 FW_TPBIAS<1> VOLTAGE=1.86V
139 FW_TPBIAS<0> VOLTAGE=1.86V

CE050 1UF 10% 6.3V CERM 402
CE060 1UF 10% 6.3V CERM 402

RE050 56.2 1% 1/10W MF-LF 402
RE051 56.2 1% 1/16W MF-LF 402
RE060 56.2 1% 1/16W MF-LF 402
RE061 56.2 1% 1/16W MF-LF 402

139 FW_TPA_P<0> — FW_PORT0_TPA_P 140
139 FW_TPA_N<0> — FW_PORT0_TPA_N 140
139 FW_TPB_P<0> — FW_PORT0_TPB_P 140
139 FW_TPB_N<0> — FW_PORT0_TPB_N 140
MAKE_BASE=TRUE

139 FW_TPA_P<1> — FW_PORT1_TPA_P 140
139 FW_TPA_N<1> — FW_PORT1_TPA_N 140
139 FW_TPB_P<1> — FW_PORT1_TPB_P 140
139 FW_TPB_N<1> — FW_PORT1_TPB_N 140
MAKE_BASE=TRUE

RE052 56.2 1% 1/10W MF-LF 402
RE053 56.2 1% 1/16W MF-LF 402
RE062 56.2 1% 1/16W MF-LF 402
RE063 56.2 1% 1/16W MF-LF 402

FW_TPA_C<0> VOLTAGE=0V
RE054 4.99K 1% 1/16W MF-LF 402
CE054 270pF 5% 25V CERM 402

FW_TPA_C<1> VOLTAGE=0V
RE064 4.99K 1% 1/16W MF-LF 402
CE064 270pF 5% 25V CERM 402

3rd TPA/TPB pair unused

139 FW_TPBIAS<2> — NC_FW_TPBIAS2 MAKE_BASE=TRUE NO_TEST=YES
139 FW_TPA_P<2> — NC_FW_TPA_P2 MAKE_BASE=TRUE NO_TEST=YES
139 FW_TPA_N<2> — NC_FW_TPA_N2 MAKE_BASE=TRUE NO_TEST=YES
139 FW_TPB_P<2> — FW_TPB2_PD MAKE_BASE=TRUE NO_TEST=YES
139 FW_TPB_N<2>

RE070 1K 5% 1/10W MF-LF 402

"Snapback" & "Late VG" Protection

140 PP3V3_FW_ESD

DPE010 BAV99DW-X-F SOT-363
CE010 0.001UF 10% 50V CERM 402
CE011 0.001UF 10% 50V CERM 402

140 FW_PORT0_TPA_P
140 FW_PORT0_TPA_N
140 FW_PORT0_TPB_P
140 FW_PORT0_TPB_N

FLE010 120-OHM 2012 SYM_VER-1
FLE011 120-OHM 2012 SYM_VER-1

DPE011 BAV99DW-X-F SOT-363
CE012 0.001UF 10% 50V CERM 402
CE013 0.001UF 10% 50V CERM 402

LE010 FERR-160-OHM 1206-LF

PORT 0
1394A
OMIT

JE000 UF01613-M33-4F F-ST-TH

140 FW_PORT0_TPA_P_FL — TPO (TPA+)
140 FW_PORT0_TPA_N_FL — TPO# (TPA-)
140 FW_PORT0_TPB_P_FL — TPI (TPB+)
140 FW_PORT0_TPB_N_FL — TPI# (TPB-)
PPFW_PORT0_VP_FL — VP
VGND
7 8 9 10

514-0251 20_INCH_VERSION SHOWN

FW_VP MAX IS 24V
CE015 0.1UF 10% 50V X7R 603-1
CE016 0.01UF 20% 16V CERM 402

7 140 GND_CHASSIS_FIREWIRE

"Snapback" & "Late VG" Protection

140 PP3V3_FW_ESD

DPE020 BAV99DW-X-F SOT-363
CE020 0.001UF 10% 50V CERM 402
CE021 0.001UF 10% 50V CERM 402

140 FW_PORT1_TPA_P
140 FW_PORT1_TPA_N
140 FW_PORT1_TPB_P
140 FW_PORT1_TPB_N

FLE020 120-OHM 2012 SYM_VER-1
FLE021 120-OHM 2012 SYM_VER-1

DPE021 BAV99DW-X-F SOT-363
CE022 0.001UF 10% 50V CERM 402
CE023 0.001UF 10% 50V CERM 402

PPFW_PORT1_VP 140

LE020 FERR-160-OHM 1206-LF

PORT 1
1394A
OMIT

JE001 UF01613-M33-4F F-ST-TH

140 FW_PORT1_TPA_P_FL — TPO (TPA+)
140 FW_PORT1_TPA_N_FL — TPO# (TPA-)
140 FW_PORT1_TPB_P_FL — TPI (TPB+)
140 FW_PORT1_TPB_N_FL — TPI# (TPB-)
PPFW_PORT1_VP_FL — VP
VGND
7 8 9 10

MIN_LINE_WIDTH=0.6 mm MIN_NECK_WIDTH=0.25 mm VOLTAGE=24V

CE025 0.1UF 10% 50V X7R 603-1
CE026 0.01UF 20% 16V CERM 402

514-0251 20_INCH_VERSION SHOWN

7 140 GND_CHASSIS_FIREWIRE

ESD Rail

CALCULATION = 220 OHMS, THERE'S ALREADY A 215 IN THE DESIGN, SO I'M USING 215 INSTEAD

7 =PP3V3_FW — RE090 215 1% 1/10W MF-LF 402 — PP3V3_FW_ESD_F VOLTAGE=3.3V MIN_LINE_WIDTH=0.38 mm MIN_NECK_WIDTH=0.25 mm

LE090 400-OHM-EMI SM-1

PP3V3_FW_ESD 140 VOLTAGE=3.3V MIN_LINE_WIDTH=0.38 mm MIN_NECK_WIDTH=0.25 mm

DE090 SOT23 BZX84C2V7-X-F

[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 .5V DROP

ZHE090 HOLE-VIA
ZHE091 HOLE-VIA
ZHE092 HOLE-VIA
ZHE093 HOLE-VIA

SPARE GND VIAS FOR LAYER TRAVERSALS DURING ROUTING

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0248	1	CON,1394A 7 DEGREES	JE000	CRITICAL	17_INCH_LCD
514-0248	1	CON,1394A 7 DEGREES	JE001	CRITICAL	17_INCH_LCD
514-0251	1	CON,1394A 7 DEGREES	JE000	CRITICAL	20_INCH_LCD
514-0251	1	CON,1394A 7 DEGREES	JE001	CRITICAL	20_INCH_LCD

FIREWIRE CONNECTORS

SYNC_MASTER=FINO-DC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 140 OF 154	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	NET_PHYSICAL_TYPE	DIFFERENTIAL_PAIR	
	USB2	USB2_S	USB2_0	USB2_P<0> 142 143
	USB2	USB2_S	USB2_0	USB2_N<0> 142 143
	USB2	USB2_S	USB2_1	USB2_P<1> 142 143
	USB2	USB2_S	USB2_1	USB2_N<1> 142 143
	USB2	USB2_S	USB2_2	USB2_P<2> 142 143
	USB2	USB2_S	USB2_2	USB2_N<2> 142 143
	USB2	USB2_S	USB2_3	USB2_P<3> 142 143
	USB2	USB2_S	USB2_3	USB2_N<3> 142 143
	USB2	USB2_S	USB2_4	USB2_P<4> 142 143
	USB2	USB2_S	USB2_4	USB2_N<4> 142 143
	0.38mm SPACING			NEC_CLK30M_XT1 142
	0.38mm SPACING			NEC_CLK30M_XT2 142
	0.38mm SPACING			NEC_CLK30M_XT2_R 142

Page Notes

Power aliases required by this page:
- =PP3V3_PWRON_USB

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: USB2

Line To Line: 0.50mm
Length Tolerance: 1.27mm
Primary Max Sep: 0.19mm
Secondary Max Sep: 2.54mm
Secondary Length: 12.70mm

NOTE: Target differential impedance for USB2 data pairs is 90 ohms.

Q63 USB PORT ALLOCATION
REAR USB (PORT #0)
FRONT PANEL USB (PORT #1)
REAR USB (PORT #2)
REAR USB (PORT #3)

U2300 SHASTA V1.1 BGA-LF (8 OF 8)

NC0 P7 TP_SB<0> 6
NC1 P8 TP_SB<1> 6
NC2 R3 TP_SB<2> 6
NC3 R4 TP_SB<3> 6
NC4 R5 TP_SB<4> 6
NC5 R6 TP_SB<5> 6
NC6 R7 TP_SB<6> 6
NC7 R8 TP_SB<7> 6
NC8 T1 TP_SB<8> 6
NC9 T2 TP_SB<9> 6
NC10 T3 TP_SB<10> 6
NC11 T4 TP_SB<11> 6
NC12 T5 TP_SB<12> 6
NC13 T6 TP_SB<13> 6
NC14 T7 TP_SB<14> 6
NC15 T8 TP_SB<15> 6
NC16 U1 TP_SB<16> 6
NC17 U2 TP_SB<17> 6
NC18 U3 TP_SB<18> 6
NC19 U4 TP_SB<19> 6
NC20 U5 TP_SB<20> 6
NC21 U6 TP_SB<21> 6
NC22 V1 TP_SB<22> 6
NC23 V2 TP_SB<23> 6
NC24 V3 TP_SB<24> 6
NC25 V4 TP_SB<25> 6
NC26 W1 TP_SB<26> 6
NC27 W3 TP_SB<27> 6
NC28 Y1 TP_SB<28> 6
NC29 Y3 TP_SB<29> 6

LE235 FERR-EMI-100-OHM SM
PP3V3_PWRON_NEC_AVDD 6 (VOLTAGE=3.3V)
MIN_LINE_WIDTH=0.50mm
MIN_NECK_WIDTH=0.2MM
XWE200 SM OMIT
P4MM SM PPE2000 TP_NEC_AVDD
RE235 4.7 5% 1/10W MF-LF 603
CE235 10UF 10% 6.3V X5R 805
CE236 0.1uF 20% 10V CERM 402
CE237 0.1uF 20% 10V CERM 402
← MINIMIZE TRACE LENGTH OF CAPS FROM AVDD TO AVSS PINS
145 144 142 7 =PP3V3_PWRON_USB
GND_NEC_AVSS_R 6 142
CE220 10UF 10% 6.3V X5R 805
CE221 0.1uF 20% 10V CERM 402
CE222 0.1uF 20% 10V CERM 402
CE223 0.1uF 20% 10V CERM 402
CE224 0.1uF 20% 10V CERM 402
CE225 0.1uF 20% 10V CERM 402
CE226 0.1uF 20% 10V CERM 402
CE227 0.1uF 20% 10V CERM 402
CE228 0.1uF 20% 10V CERM 402
CE229 0.1uF 20% 10V CERM 402
CE230 0.1uF 20% 10V CERM 402
P2 P3 P12 A13 A12 A3 E2 N8 L13 J13 H13 F13 D13 G12 H4 D7
VDD
N10 N12
AVDD
CRITICAL
UC200 NEC_UPD720101_USB2 FBGA-LF

RE200 36 1% 1/10W MF-LF 402
RSDM1 M14 143 USB_NEC_N<0>
DM1 M13 (USB2_Nc0>)
DP1 L14 (USB2_Pc0>)
RSDP1 K13 143 USB_NEC_P<0>
USB2_N<0> 142 143
USB2_P<0> 142 143
RE201 36 1% 1/10W MF-LF 402
P4MM SM PPE2002
RE202 36 1% 1/10W MF-LF 402
RSDM2 K14 143 USB_NEC_N<1>
DM2 K12 (USB2_Nc1>)
DP2 J14 (USB2_Pc1>)
RSDP2 J12 143 USB_NEC_P<1>
USB2_N<1> 142 143
USB2_P<1> 142 143
RE203 36 1% 1/10W MF-LF 402
P4MM SM PPE2001
RE204 36 1% 1/10W MF-LF 402
RSDM3 H11 143 USB_NEC_N<2>
DM3 G11 (USB2_Nc2>)
DP3 G13 (USB2_Pc2>)
RSDP3 G14 143 USB_NEC_P<2>
USB2_N<2> 142 143
USB2_P<2> 142 143
RE205 36 1% 1/10W MF-LF 402
40.2 OHM RESISTORS ON PORT 2 FOR EVALUATION
RE206 36 1% 1/10W MF-LF 402
RSDM4 F12 143 USB_NEC_N<3>
DM4 F14 (USB2_Nc3>)
DP4 E12 (USB2_Pc3>)
RSDP4 E14 143 USB_NEC_P<3>
USB2_N<3> 142 143
USB2_P<3> 142 143
RE207 36 1% 1/10W MF-LF 402
RE208 36 1% 1/10W MF-LF 402
RSDM5 E13 143 USB_NEC_N<4>
DM5 D14 (USB2_Nc4>)
DP5 C13 (USB2_Pc4>)
RSDP5 C14 143 USB_NEC_P<4>
USB2_N<4> 142 143
USB2_P<4> 142 143
BLUTOOTH CONNECTOR,(PORT #4)
RE209 36 1% 1/10W MF-LF 402

145 144 142 7 =PP3V3_PWRON_USB
RE210 33K 5% 1/16W MF-LF 402
RPE210 10K 5% 1/16W SM-LF
143 USB2_OC<0> (USB2_OC<0>) B12 OCI1
143 USB2_OC<1> (USB2_OC<1>) B11 OCI2
143 USB2_OC<2> (USB2_OC<2>) B10 OCI3
USB2_OC<3> (USB2_OC<3>) A10 OCI4
USB2_OC<4> (USB2_OC<4>) B9 OCI5
143 USB2_PWREN<0> C12 PPON1
143 USB2_PWREN<1> A11 PPON2
143 USB2_PWREN<2> C11 PPON3
143 USB2_PWREN<3> C10 PPON4
143 USB2_PWREN<4> A9 PPON5

145 144 142 7 =PP3V3_PWRON_USB
RE240 1.5K 5% 1/16W MF-LF 402
RE241 1.5K 5% 1/16W MF-LF 402
NEC_NC1_PU P6 NC1
NEC_NC2_PU M6 NC2

142 NEC_CLK30M_XT1 L9 XT1/SCLK
142 NEC_CLK30M_XT2_R P8 XT2
RE245 100 1% 1/16W MF-LF 402
CRITICAL
YE245 30.0000M 8X4.5MM-SM1
142 NEC_CLK30M_XT2
CE245 22pF 5% 50V CERM 402
CE246 22pF 5% 50V CERM 402
SPEC SHOWS LOAD CAPACITANCE OF 16PF

VSS
B1 N1 P10 N14 H14 B14 A2 B2 N2 N13 B13 M11 L12 H12 D12 G4 J11 F11 D8
XWE201 SM OMIT
P13 M12 N11
AVSS
AVSS(R)
RREF P11 NEC_RREF_PD
RE238 9.09K 1% 1/10W MF-LF 402
MINIMIZE TRACE LENGTH TO PINS
Tie to GND at ball N11
GND_NEC_AVSS_R 6 142 (VOLTAGE=0V)
MIN_LINE_WIDTH=0.50mm
MIN_NECK_WIDTH=0.2MM

USB Host Interfaces

SYNC_MASTER=FINO-PC SYNC_DATE=07/05/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 142 OF 154	

LAST_MODIFIED=Tue Nov 1 14:55:37 2005
DRAWING
TITLE=KILOHANA
ABBREV=SMANG

Page Notes

Power aliases required by this page:
- _PP5V_PWRON_USB
- _PP5V_PWRON_UDASH
- _PP3V3_PWRON_UDASH
- _PP3V3_PWRON_BT

Signal aliases required by this page:
(NONE)
NOTE: This page is expected to contain the necessary aliases to map the USB pairs to their appropriate destinations and/or to properly terminate unused signals.

BOM options provided by this page:
(NONE)

NOTE: USB pairs are NOT constrained on this page. It is assumed that the USB Host Controller page will provide the appropriate constraints to apply to entire USB D+/D- XNets.

neoBorg Implementation

NOTE: This design does not provide power control on USB ports 2-4. Rename USB controller outputs to indicate single-pin connections.

142 USB2_PWREN<0> — TP_USB2_PWREN<0> 6 MAKE_BASE=TRUE
142 USB2_PWREN<1> — TP_USB2_PWREN<1> 6 MAKE_BASE=TRUE
142 USB2_PWREN<2> — TP_USB2_PWREN<2> 6 MAKE_BASE=TRUE
142 USB2_PWREN<3> — TP_USB2_PWREN<3> 6 MAKE_BASE=TRUE
142 USB2_PWREN<4> — TP_USB2_PWREN<4> 6 MAKE_BASE=TRUE

External USB Ports

FHB CONNECTOR

518S0324
JE350
53261-1498
M-RT-SM

15 GND_AUDIO_MIC_CONN
153 AUD_MIC_IN_P_CONN 1
153 GND_AUDIO_MIC_CONN 2
153 AUD_MIC_IN_N_CONN 3
143 7 GND_CHASSIS_BNDI 4
5
143 7 GND_CHASSIS_BNDI 6
143 USB2_HUB_P_L<2> 7
143 USB2_HUB_N_L<2> 8
9
143 GND_BNDI 10
143 USB2_P_L<3> 11
143 USB2_N_L<3> 12
24 SB_GPIO14 13
143 PP5V_PWRON_BNDI 14
16

4-14-05
PLACE CE343, CE344 & LE340 NEAR JE350 PIN 14 IN THE ORDER LISTED, AND NOT ON BOTH SIDES OF THE PIN.

PORT 1

OMIT
JE310
UB01123M23-4F
F-ST-TH
514-0247

PORT 2

OMIT
JE320
UB01123M23-4F
F-ST-TH
514-0247

PORT 3

OMIT
JE330
UB01123M23-4F
F-ST-TH
514-0247

USB_HUB IMPLIMENTS 15K PULLDOWNS INTERNAL SO THEY ARE NOT NEEDED HERE

SENDS NEC USB PORT 3 TO BLUETOOTH MODULE

SENDS NEC CONTROLLER PORT 4 TO USB HUB UPSTREAM PORT

CRITICAL

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
514-0294	3	USB RECEPTACLE,4P,UB1123-M23B-4F	JE310,JE320,JE330	CRITICAL	17_INCH_LCD
514-0295	3	USB RECEPTACLE,4P,UB1123-M33B-4F	JE310,JE320,JE330	CRITICAL	20_INCH_LCD

	ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	NET_PHYSICAL_TYPE	
I602	PROVIDED BY USB CONTROLLER	USB2	USB2_PORT1_P_F	USB2	USB2_PORT1_P_F 143
I603		USB2	USB2_PORT1_N_F	USB2	USB2_PORT1_N_F 143
I604		USB2	USB2_PORT2_P_F	USB2	USB2_PORT2_P_F 143
I605		USB2	USB2_PORT2_N_F	USB2	USB2_PORT2_N_F 143
I606		USB2	USB2_PORT3_P_F	USB2	USB2_PORT3_P_F 143
I607		USB2	USB2_PORT3_N_F	USB2	USB2_PORT3_N_F 143
I608		USB2	USB2_HUB_P_L<2>	USB2	USB2_HUB_P_L<2> 143
I609		USB2	USB2_HUB_N_L<2>	USB2	USB2_HUB_N_L<2> 143
I610		USB2	USB2_BNDI_F	USB2	USB2_P_L<3> 143
I611		USB2	USB2_BNDI_F	USB2	USB2_N_L<3> 143
I612		USB2	USB2_0_IC	USB2	USB_NEC_P<0> 142
I613		USB2	USB2_0_IC	USB2	USB_NEC_N<0> 142
I614		USB2	USB2_1_IC	USB2	USB_NEC_P<1> 142
I615		USB2	USB2_1_IC	USB2	USB_NEC_N<1> 142
I620		USB2	USB2_2_IC	USB2	USB_NEC_P<2> 142
I621		USB2	USB2_2_IC	USB2	USB_NEC_N<2> 142
I622		USB2	USB2_3_IC	USB2	USB_NEC_P<3> 142
I623		USB2	USB2_3_IC	USB2	USB_NEC_N<3> 142
I624		USB2	USB2_4_IC	USB2	USB_NEC_P<4> 142
I625		USB2	USB2_4_IC	USB2	USB_NEC_N<4> 142

DUE TO THESE NETS ARE ON A Q63 SHARED PAGE 124, THESE PROPERTIES FOR M23/M33 WERE PLACED ON THIS PAGE.

USB Device Interfaces

SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

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D	051-6790	E
SCALE: NONE	SHT 143 OF 154	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S0257	1	USX2006-NU-01 CUSTOM MASK	UE400	CRITICAL	CARD_READER

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	NET_PHYSICAL_TYPE	DIFFERENTIAL_PAIR	
	USB2	USB2	USB2_HUB_1	USB2_HUB_P<1>
	USB2	USB2	USB2_HUB_1	USB2_HUB_N<1>
	USB2	USB2	USB2_HUB_2	USB2_HUB_P<2>
	USB2	USB2	USB2_HUB_2	USB2_HUB_N<2>
	USB2	USB2	USB2_HUB_3	USB2_HUB_P<3>
	USB2	USB2	USB2_HUB_3	USB2_HUB_N<3>
	0.38MM SPACING			XTAL_IN_CARD_READER
	0.38MM SPACING			XTAL_OUT_CARD_READER
	0.38MM SPACING			XTAL_OUT_CARD_READER_R
	0.38MM SPACING			XTAL_IN_USB_HUB
	0.38MM SPACING			XTAL_OUT_USB_HUB
	0.38MM SPACING			XTAL_OUT_USB_HUB_R

Flash Media Ctrl

SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

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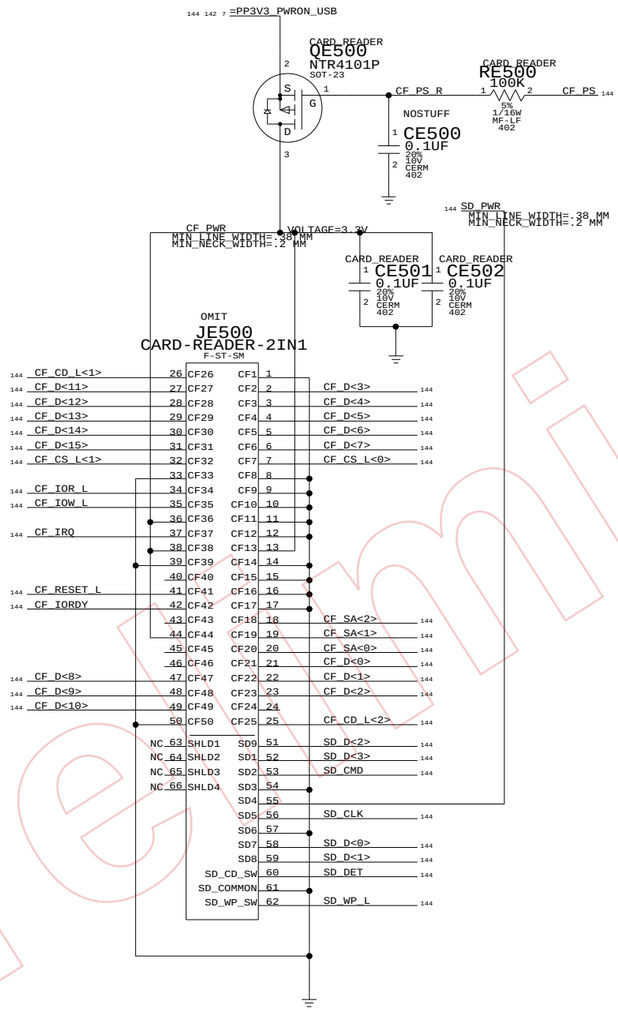
SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT: 144 OF 154	

IF USING THE CARD READER, MUST CHANGE THESE BOM OPTIONS TO:

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION	
512S0010	1	CONN, MEDIA CARD M23	JE500	CRITICAL	CARD_READER	17_INCH_LCD
512S0012	1	CONN, MEDIA CARD M33	JE500	CRITICAL	CARD_READER	20_INCH_LCD



WRITE PROTECT AND CARD DETECT SWITCHES

CARD STATUS	WRITE PROTECT	WRITE ENABLE	CARD DETECT
NOT INSERTED	OPEN	OPEN	OPEN
FULLY INSERTED	OPEN	CLOSE	CLOSE

Flash Connector

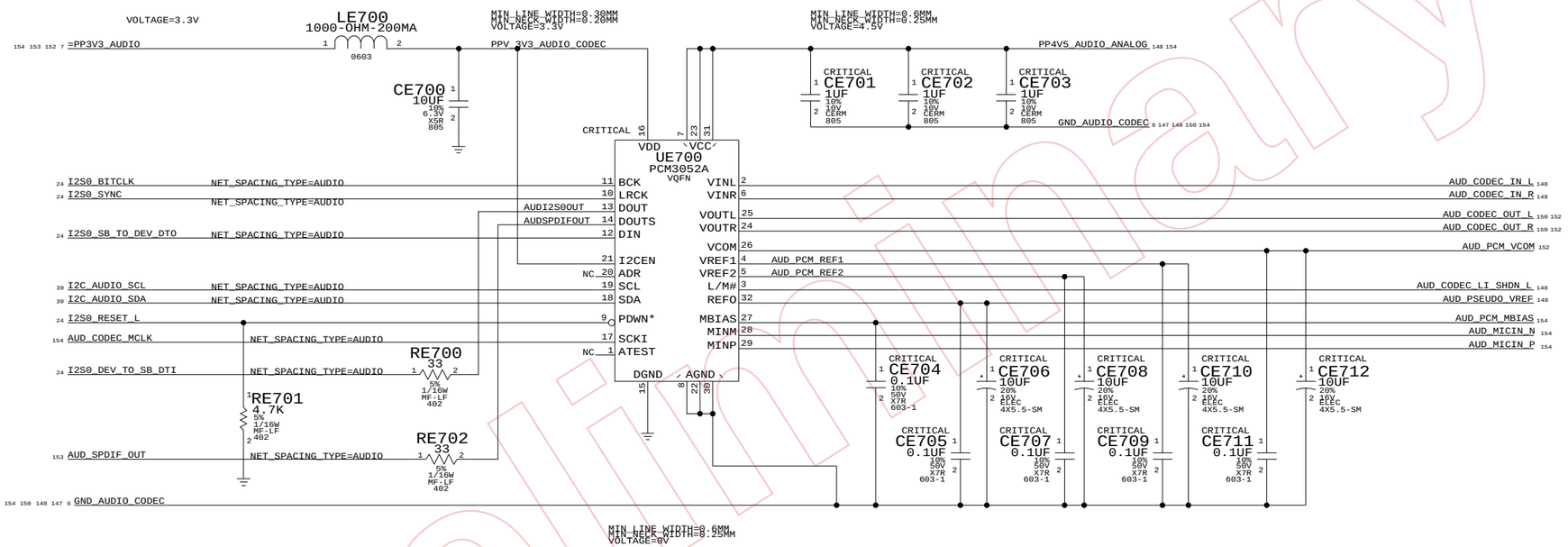
SYNC_MASTER=FINO-PC SYNC_DATE=06/20/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE: NONE SHT 145 OF 154

AUDIO CODEC
APPLE P/N 353S0933



AUDIO: CODEC

SYNC_MASTER=FINO-SO SYNC_DATE=10/07/2005

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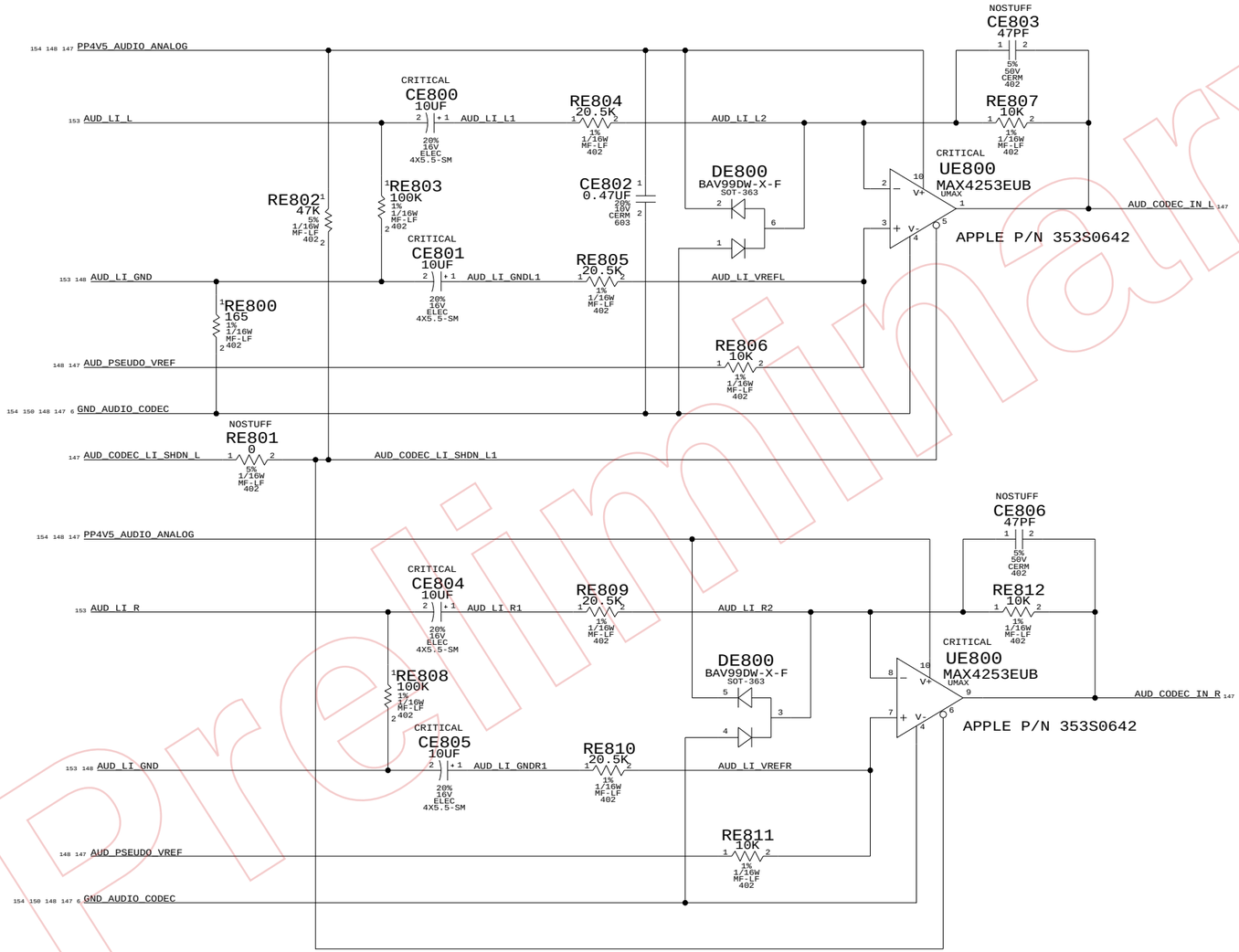
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT	OF
NONE	147	154

LINE IN PSEUDO-DIFFERENTIAL AMP

AV= 0.49



AUDIO: LINE INPUT AMP

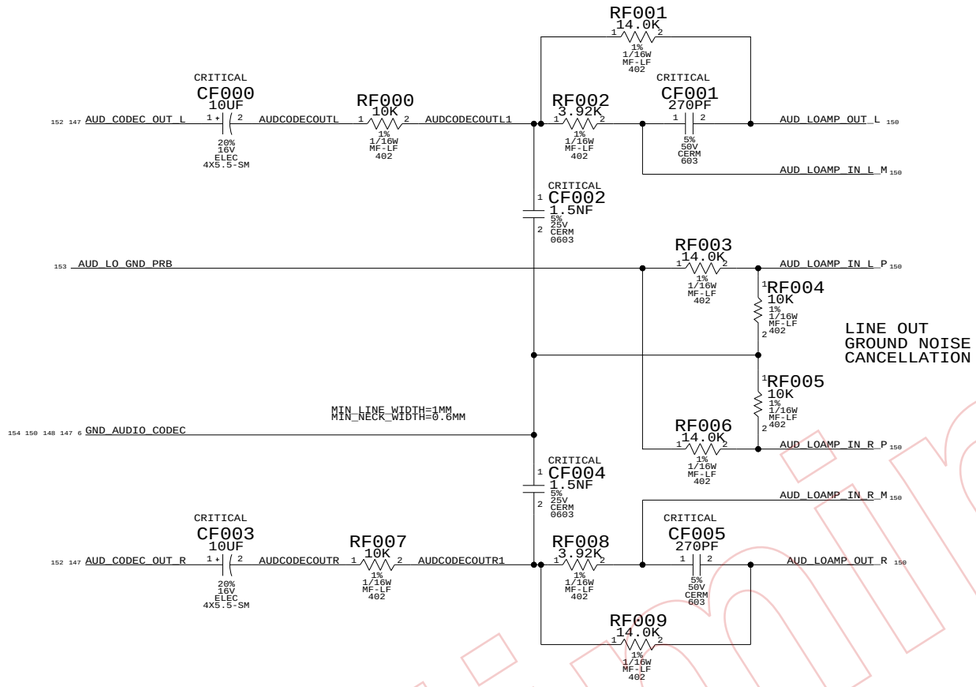
SYNC_MASTER=FINO-SO SYNC_DATE=10/07/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 148 OF 154	

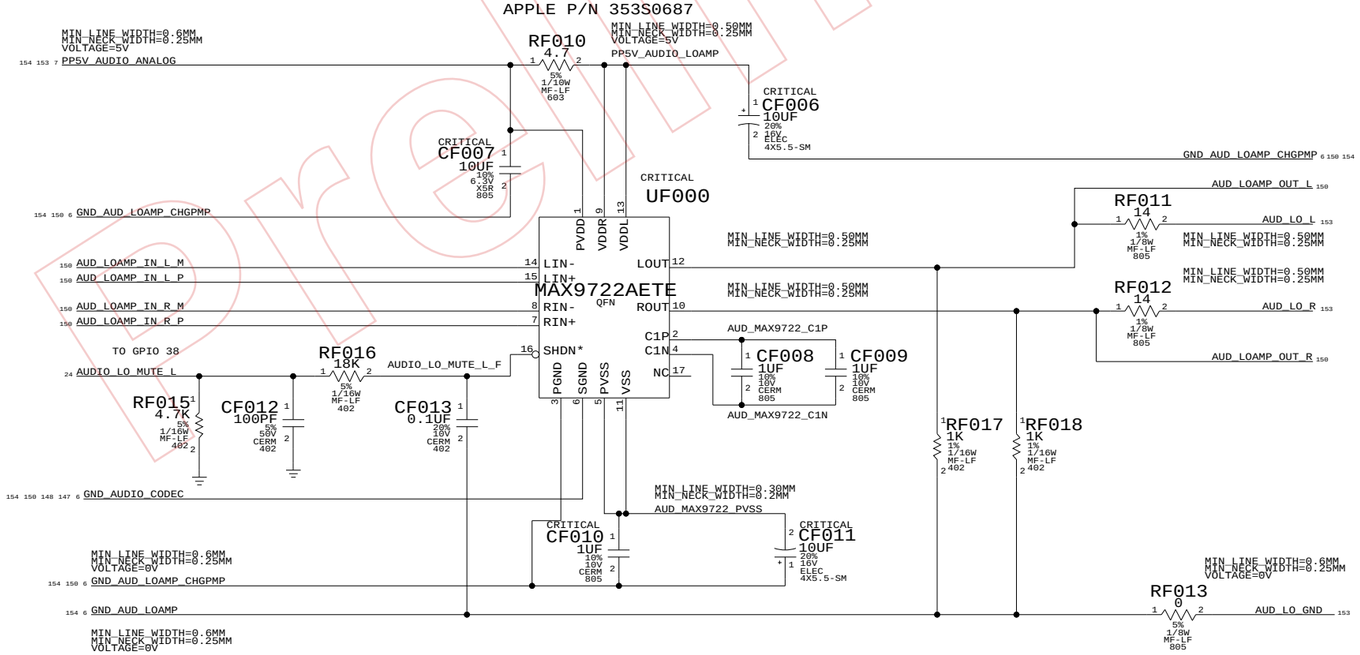
LINE OUT LOW-PASS FILTER

FC = 37 KHZ, HO = -1.4



LINE OUT AMP

APPLE P/N 353S0687



AUDIO: LINE OUT AMP

SYNC_MASTER=FINO-SO SYNC_DATE=10/07/2005

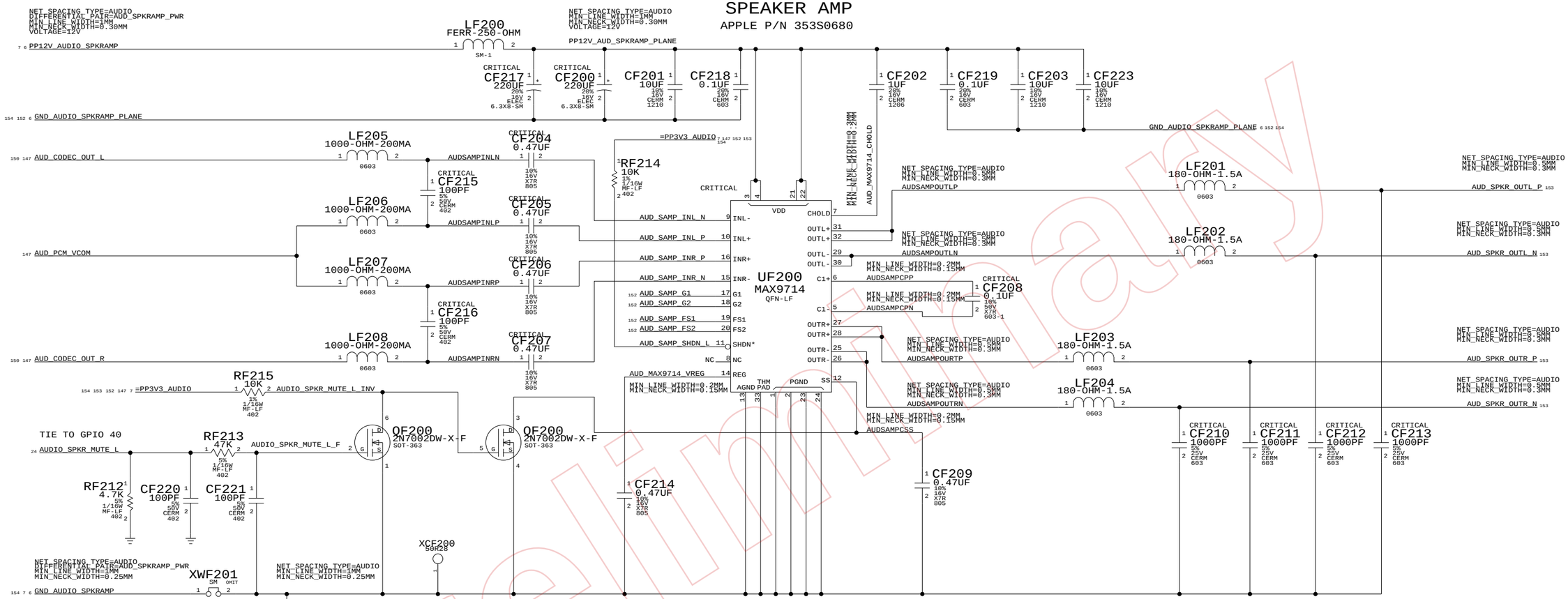
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E

SCALE	SHT OF
NONE	150 154

SPEAKER AMP

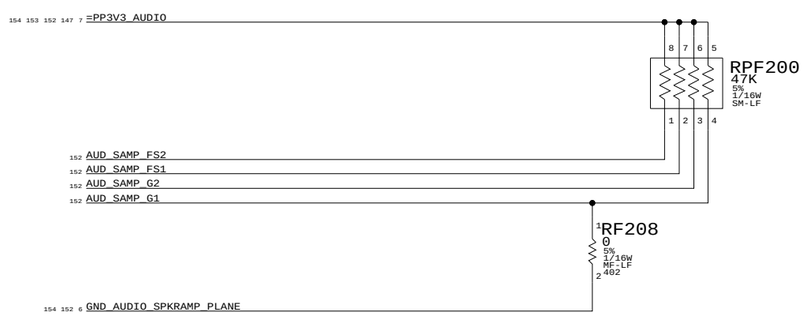
APPLE P/N 353S0680



GAIN SETTINGS: +19DB

MODULATION SETTING: LOW EMI

GAIN AND SWITCHING FREQUENCY STUFF OPTIONS



AUDIO: SPEAKER AMP

SYNC_MASTER=FINO-SO SYNC_DATE=10/07/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 152 OF 154	

LINE IN JACK

APPLE P/N 514-0246 (M23) APPLE P/N 514-0249 (M33)

OMIT
JF300
JA03333-M23-4F
F-ST-TH

LF300 FERR-EMI-100-OHM — AUD_LI_L_JACK → AUD_LI_L_EMI → AUD_LI_L
LF301 FERR-EMI-100-OHM — AUD_LI_DET_JACK → AUD_LI_DET_EMI → AUD_LI_DET_H
LF302 FERR-EMI-100-OHM — AUD_LI_R_JACK → AUD_LI_R_EMI → AUD_LI_R
LF303 FERR-EMI-100-OHM — AUD_LI_GND_JACK → AUD_LI_GND_EMI → AUD_LI_GND
LF304 FERR-EMI-100-OHM — AUD_LI_L_EMI → AUD_LI_L
LF305 FERR-EMI-100-OHM — AUD_LI_DET_EMI → AUD_LI_DET_H
LF306 FERR-EMI-100-OHM — AUD_LI_R_EMI → AUD_LI_R
LF307 FERR-EMI-100-OHM — AUD_LI_GND_EMI → AUD_LI_GND

MIN_LINE_WIDTH=0.2MM MIN_NECK_WIDTH=0.15MM
MIN_LINE_WIDTH=0.4MM MIN_NECK_WIDTH=0.3MM
MIN_LINE_WIDTH=0.2MM MIN_NECK_WIDTH=0.2MM

CF300 100PF 5% 50V CERM 402
CF301 100PF 5% 50V CERM 402
CF302 100PF 5% 50V CERM 402
CF303 100PF 5% 50V CERM 402

DZF300 14V-15A 0405

GND_CHASSIS_AUDIO_EXTERNAL

SPEAKER CABLE CONNECTOR

APPLE P/N 518S0249

JF301
53261-0798
M-RT-SM

AUD_SPKR_OUTR_N_CONN
AUD_SPKR_OUTR_P_CONN
AUDIO_SPKR_ID_CONN
AUD_SPKR_OUTL_N_CONN
AUD_SPKR_OUTL_P_CONN

AUD_SPKR_OUTR_N — LF333 180-OHM-1.5A 0603
AUD_SPKR_OUTR_P — LF330 180-OHM-1.5A 0603
AUDIO_SPKR_ID — LF332 1000-OHM-200MA 0603
AUD_SPKR_OUTL_N — LF331 180-OHM-1.5A 0603
AUD_SPKR_OUTL_P — LF334 180-OHM-1.5A 0603

MIN_LINE_WIDTH=0.5MM MIN_NECK_WIDTH=0.3MM NET_SPACING_TYPE=AUDIO

=PP3V3_AUDIO → RF313 47K 5% 1/16W MF-LF 402 → AUDIO_SPKR_ID

SPEAKER TYPE DETECT TO GPIO 43

CF326 1000PF 5% 25V CERM 603
CF319 1000PF 5% 25V CERM 603
CF325 1000PF 5% 25V CERM 603
CF327 1000PF 5% 25V CERM 603

CRITICAL	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
CRITICAL	514-0246	1	LINE IN CONNECTOR, 5.5 DEG	JF300	17_INCH_LCD
CRITICAL	514-0260	1	COMBO OUT CONN, 4.5 DEG	JF303	17_INCH_LCD
CRITICAL	514-0249	1	LINE IN CONNECTOR, 5.5 DEG	JF300	20_INCH_LCD
CRITICAL	514-0261	1	COMBO OUT CONN, 4.5 DEG	JF303	20_INCH_LCD

LINE IN PLUG DETECT

AUDIO_IN_DET0_L = LOW: PLUG INSERTED
AUDIO_IN_DET0_L = HIGH: PLUG NOT INSERTED

=PP3V3_AUDIO → RF300 100K 5% 1/16W MF-LF 402 → AUD_LI_DET_H
RF301 47K 5% 1/16W MF-LF 402 → AUDIO_LI_DET_L (TO GPIO 34)
RF302 47K 5% 1/16W MF-LF 402 → AUDLINDETH
CF308 0.1UF 20% 10V CERM 402
QF300 2N7002 SOT23-LF

LF308 FERR-EMI-100-OHM — GND_AUDIO_MIC → GND_AUDIO_MIC_EMI
LF309 FERR-EMI-100-OHM — AUD_MIC_IN_P → AUD_MIC_IN_P_EMI
LF310 FERR-EMI-100-OHM — AUD_MIC_IN_N → AUD_MIC_IN_N_EMI
LF311 FERR-EMI-100-OHM — GND_AUDIO_MIC_EMI → GND_AUDIO_MIC_CONN
LF312 FERR-EMI-100-OHM — AUD_MIC_IN_P_EMI → AUD_MIC_IN_P_CONN
LF313 FERR-EMI-100-OHM — AUD_MIC_IN_N_EMI → AUD_MIC_IN_N_CONN

NET_SPACING_TYPE=AUDIO
NET_SPACING_TYPE=AUDIO DIFFERENTIAL_PAIR=AUDIO_MIC
NET_SPACING_TYPE=AUDIO DIFFERENTIAL_PAIR=MIC_IN

CF320 1000PF 10% 25V X7R 402
CF321 1000PF 10% 25V X7R 402
CF322 1000PF 10% 25V X7R 402

DZF302 14V-15A 0405 (NC)
DZF303 14V-15A 0405 (NC)

GND_CHASSIS_AUDIO_INTERNAL

LINE OUT PLUG DETECTS

AUDIO_LO_DET_L = LOW: PLUG INSERTED
AUDIO_LO_DET_L = HIGH: PLUG NOT INSERTED

AUDIO_LO_OPTICAL_PLUG_L = LOW: OPTICAL DIGITAL AUDIO PLUG INSERTED
AUDIO_LO_OPTICAL_PLUG_L = HIGH: ANALOG AUDIO PLUG INSERTED

=PP3V3_AUDIO
RF303 100K 5% 1/16W MF-LF 402
RF304 47K 5% 1/16W MF-LF 402 → AUDIO_LO_DET_L (TO GPIO 32)
RF305 47K 5% 1/16W MF-LF 402 — AUD_LO_DET2 → AUD_LO_DET2_1
CF309 0.1UF 20% 10V CERM 402
QF301 2N7002DW-X-F SOT-363

=PP3V3_AUDIO
RF306 100K 5% 1/16W MF-LF 402
RF307 47K 5% 1/16W MF-LF 402 → AUDIO_LO_OPTICAL_PLUG_L (TO GPIO 33)
RF308 47K 5% 1/16W MF-LF 402 — AUD_LO_DET1 → AUD_LO_DET1_1
NOSTUFF RF309 100K 5% 1/16W MF-LF 402
CF310 0.1UF 20% 10V CERM 402
QF301 2N7002DW-X-F SOT-363

LINE OUT JACK

APPLE P/N 514-0260 (M23)
APPLE P/N 514-0261 (M33)

JF303
UCNT2052E007-0
F-ANG-TH

AUD_LO_DET1_JACK
AUD_LO_L_JACK
AUD_LO_DET2_JACK
AUD_LO_R_JACK
AUD_LO_GND_JACK
TYPE_DET
TIP
TIP_DET
RING
GND_1
GND_2
VIN
VCC
GND
LED

MIN_LINE_WIDTH=0.3MM MIN_NECK_WIDTH=0.2MM
MIN_LINE_WIDTH=0.4MM MIN_NECK_WIDTH=0.4MM
MIN_LINE_WIDTH=0.5MM

LF314 FERR-EMI-100-OHM — AUD_SPDIF_OUT → AUD_SPDIF_OUT_EMI → AUD_SPDIF_OUT_JACK
LF315 FERR-EMI-100-OHM — PP5V_AUDIO_SPDIF_EMI → PP5V_AUDIO_SPDIF_JACK
LF316 FERR-EMI-100-OHM — AUD_LO_DET1 → AUD_LO_DET1_EMI
LF317 FERR-EMI-100-OHM — AUD_LO_R → AUD_LO_R_EMI
LF318 FERR-EMI-100-OHM — AUD_LO_L → AUD_LO_L_EMI
LF319 FERR-EMI-100-OHM — AUD_LO_DET2 → AUD_LO_DET2_EMI
LF320 FERR-EMI-100-OHM — AUD_LO_GND → AUD_LO_GND_EMI
LF321 FERR-EMI-100-OHM — AUD_LO_GND_PRB → AUD_LO_GND_PRB_EMI
LF322 FERR-EMI-100-OHM — AUD_SPDIF_OUT_JACK → AUD_SPDIF_OUT
LF323 FERR-EMI-100-OHM — PP5V_AUDIO_SPDIF_JACK → PP5V_AUDIO_SPDIF_EMI
LF324 FERR-EMI-100-OHM — AUD_LO_DET1_EMI → AUD_LO_DET1
LF325 FERR-EMI-100-OHM — AUD_LO_R_EMI → AUD_LO_R
LF326 FERR-EMI-100-OHM — AUD_LO_L_EMI → AUD_LO_L
LF327 FERR-EMI-100-OHM — AUD_LO_DET2_EMI → AUD_LO_DET2
LF328 FERR-EMI-100-OHM — AUD_LO_GND_EMI → AUD_LO_GND
LF329 FERR-EMI-100-OHM — AUD_LO_GND_PRB_EMI → AUD_LO_GND_PRB

PP5V_AUDIO_ANALOG
=PP3V3_AUDIO → RF311 0 5% 1/16W MF-LF 402 → AUDIO_SPDIF_PWR
RF310 0 NOSTUFF 5% 1/16W MF-LF 402

CF316 0.01UF 10% 16V CERM 402
CF311 100PF 5% 50V CERM 402
CF314 100PF 5% 50V CERM 402
CF312 100PF 5% 50V CERM 402
CF313 100PF 5% 50V CERM 402
CF315 100PF 5% 50V CERM 402
CF323 100PF 5% 50V CERM 402
CF324 100PF 5% 50V CERM 402

CF317 0.1UF 20% 10V CERM 402
CF318 1UF 10% 10V CERM 805

RF312 0 5% 1/16W MF-LF 402

AUD_LI_GND_EMI → DZF301 15V SOT23LF MMBZ15DLT1

GND_CHASSIS_AUDIO_EXTERNAL

AUDIO: CONNECTORS

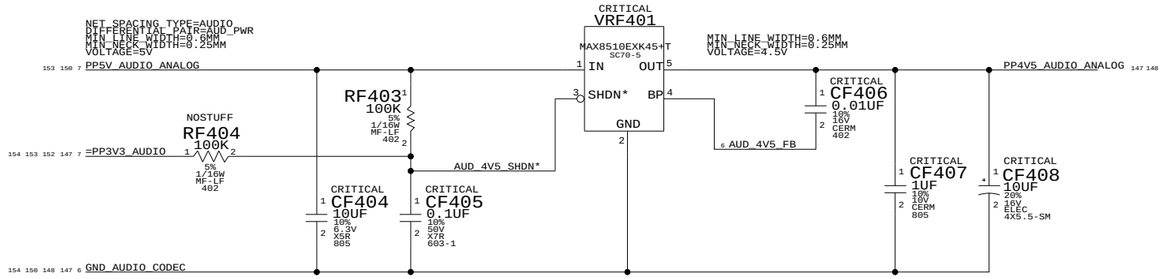
SYNC_MASTER=FINO-SO SYNC_DATE=10/07/2005

APPLE COMPUTER INC.

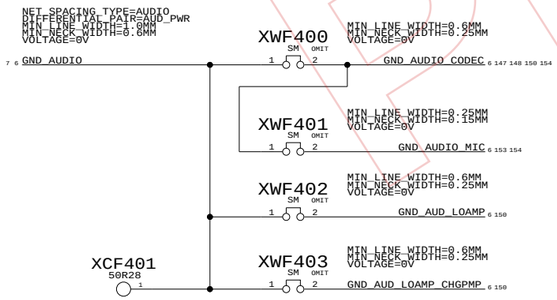
SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 153 OF 154	

4.5V POWER SUPPLY FOR CODEC AND LINE IN AMP

APPLE P/N 353S0733



AUDIO GROUND RETURNS



PLACE ACROSS GROUND SPLIT

NOSTUFF
RF416
0
5%
1/8W
MF-LF
805

152 6 GND_AUDIO_SPKRAMP_PLANE — GND_AUDIO_CODEC 6 147 148 150 154

PLACE NEAR ENTRY TO SPEAKER AMP GROUND PLANE

NOSTUFF
RF417
0
5%
1/8W
MF-LF
805

152 7 6 GND_AUDIO_SPKRAMP

PLACE ACROSS GROUND SPLIT AT CODEC UE700

RF405
0
5%
1/8W
MF-LF
805

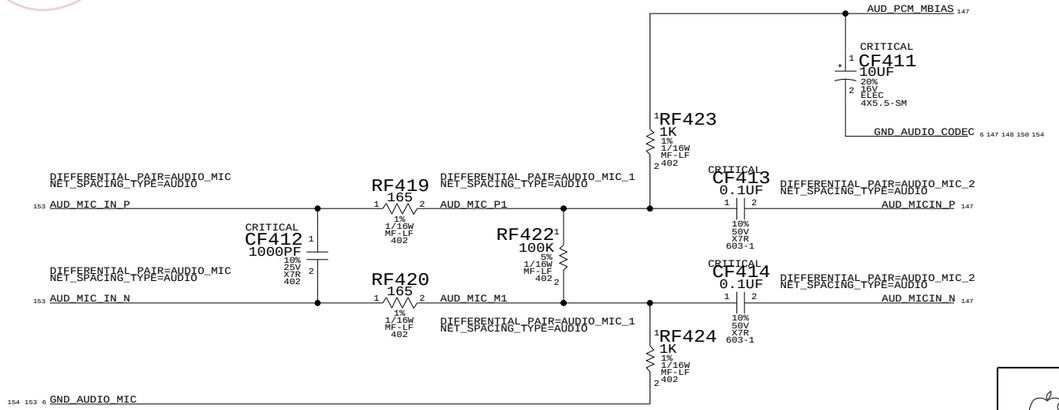
154 150 148 147 6 GND_AUDIO_CODEC

PLACE AT JF303

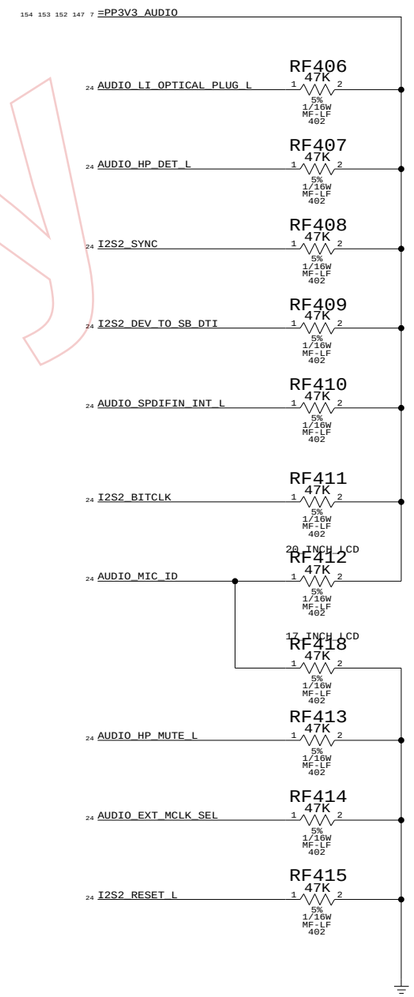
RF429
0
5%
1/8W
MF-LF
805

153 7 GND_CHASSIS_AUDIO_EXTERNAL

MICROPHONE IMPEDANCE MATCHING CIRCUIT



UNUSED GPIO TERMINATIONS



AUDIO: POWER SUPPLIES

SYNC_MASTER=FINO-SO SYNC_DATE=10/07/2005

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6790	E
SCALE: NONE	SHT 154 OF 154	