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.

LINK

02/23/2004

REV	ZONE	ECN	DESCRIPTION OF CHANGE	CK APPD / DATE	ENG APPD / DATE
03		316008	ENGINEERING RELEASED	02/23/04	?

EVT1

BOM Option Table

BOM Options	630-4843 630-4902 PCBA,LINK,Q51 STUFF	NO STUFF
DEVELOPMENT	√	
GPU_SS	√	
MPIC_NB		√
MPIC_SB	√	
PATA_3V3_LOGIC		√
PATA_5V_LOGIC	√	
PCI_64BIT		√
SMU_CPU_I2C	√	
SMU_CPU_JTAG		√
THERM_1	√	
THERM_1B		√
THERM_2	√	
THERM_2B		√
THERM_3	√	
THERM_3B		√
VESTA1V2_BURST		√
VESTA1V2_PULSE		√
VESTA_DS_ONLY_EN0	√	
VESTA_PWR_CLASS_0		√
AGP_BUSYSTOP		√
NO_SMU_I2C_D		√
EI_3TO1	√	
CPU_PLL_MEDIUM	√	
CPU_AVDD_2V8	√	
SB_HT_200M		√
M11CSP64	630-4843	
M11CSP128	630-4902	
INT_TMDS	√	
EXT_TMDS		√

Module Components

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S2835	1	IC,PPC970,1.8GHz,1.1V,80C,25W,576CBGA	U2900	CRITICAL	
343S0284	1	IC,U3LITE,V1.1,300MM,PBGA	U3	CRITICAL	
343S0283	1	IC,ASIC,SHASTA,V1.1,484BALL,PBGA	U2300	CRITICAL	
338S0154	1	IC,ATI,M11-CSP64,NO HEATSPREADER	U4900	CRITICAL	M11CSP64
338S0158	1	IC,ATI,M11-CSP128,NO HEATSPREADER	U4900	CRITICAL	M11CSP128
343S0288	1	IC,ASIC,VESTA,V1.1	U8600	CRITICAL	
341S1340	1	BOOTROM,PROTO,Q51	U7500	CRITICAL	
341S1394	1	SMU,PROTO,Q51	U1300	CRITICAL	

Alternates Components

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
343S0282	343S0284		U3	U3L,V1.1,200MM,PBGA

Schematic / PCB #'s

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-6532	1	SCHEM,LINK,Q51	SCH1	
820-1573	1	PCBF,LINK,Q51	PCB1	

_DRAWING
TITLE=LINK
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 18:35:53 2004

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
SCHEM,LINK,Q51

DRAWING NUMBER 051-6532 | REV. 03

SHT 1 OF 103

SYSTEM BLOCK DIAGRAM

J700
Nicky (PWR) Connector
P.7

Power Supply & Charger
P.7-12

J750
Battery Connector
P.7

U2900
CPU
NEO 10S
P.26-29

ELASTIC INTERFACE
44-BIT/Directional
APPLE PI
1.2V/600MHz

AGP BUS
4X/8X
1.5V/0.8V
32BITS
267/533MHZ

U3
U3LITE
CORE
PAGE 19
AGP PAGE 35
APPLE PI PAGE 25
HYPERTRANSPORT PAGE 42
MISC PAGE 21
MAIN MEMORY PAGE 32

MEMORY BUS
2.5V
333MHz
128BITS

U1300
SMU
P.13

I2C
Level shifting
P.17

I2C buses

RTC
P.13

Max1668
Thermal
P.15

J4010/J4020
DDR SDRAM DIMM 0

DDR SDRAM DIMM 1
SODIMM Connector
P.34

HYPERTRANSPORT
8-BIT/Direction
1.2V/400MHZ
CONTROL = 2.5V

U4900
ATI
M11
64/128MB
P.36,38-40

MEMORY CH. A (INTERNAL MEM)
MEMORY CH. C (INTERNAL MEM)
MEMORY CH. B (INTERNAL MEM)
MEMORY CH. D (INTERNAL MEM)

TMDS
RGB
DDC
J5900
DVI-I Connector
P.41

S-Video/Comp
J5960
S-Video Connector
P.41

LVDS

J5980
Inverter Connector
P.41

J5970
LCD Panel Connector
P.41

J1600
LEFT USB Bluetooth Connector
P.16

U2600
Pulsar Clock Gen
P.23-24

EI Clocks
VSP Clock
HT Clocks
AGP Clocks
PCI Clocks
SATA Clock

ENET Pairs
4 Datapairs @125MHz
J8700
Gigabit Ethernet Connector
P.54

U8600
VESTA
Core PAGE 12
ETHERNET PAGE 53
FIREWIRE PAGE 56

8-bit TX & 8-bit RX
GMII (3.3V/125MHz)

1394 OHCI (3.3V/98MHz)

FW-A Pairs
2 Datapairs @200MHz
J9010
Firewire A Connector
P.57

FW-B pairs
2 Datapairs @400MHz
J9020
Firewire B Connector
P.57

J8350
Hard DRIVE Connector
P.51

133MHz/3.3V/16 Bit

U8150
Serial ATA Bridge
P.50

1.5Gbps/1.2V/1 Bit/Directonal

Not Used

HYPERTRANSPORT PAGE 43
U2300
SHASTA
SATA PAGE 49 (SATA1, SATA2)
ETHERNET PAGE 52
FIREWIRE PAGE 55
UATA PAGE 49
CORE PAGE 20
PCI PAGE 44
GPIO/PCI64 PAGE 22
I2S PAGE 22 (I2S0, SCCA I2S1, SCCB I2S2)

J8300
OPTICAL DRIVE Connector
P.51

133MHz/3.3V/16 Bit

J1699
SMU/JR Debug Connector
P.16

J790
Backup Battery
Right USB Connector
P.7

J7800
Cardbus Connector
P.48

33MHZ
16/32 BITS
3.3V/5V

PCI BUS
32BITS
33MHZ
3.3V

J7600
Airport Extreme Connector
PAGE 46

U7800
Cardbus
PCI1510
PAGE 48

U7700
USB 2.0
uPD720101
PAGE 47

U7500
BOOTROM
PAGE 45

J9500
Sound (Kazoo) Connector
P.60

Sleep LED
P.18

J9400
Modem Connector
P.59

USB 1.1 (Low/Full Speed)

USB 2.0 (Low/Full/High Speed)

PORT = USB 2.0 (Low/Full/High Speed)

Bluetooth = USB 1.1 (Low/Full Speed)

USB 1.1

J2130
USB Trackpad Connector
P.18

KB LED
P.18

SYSTEM BLOCK DIAGRAM

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE: NONE

SHT 2 OF 103

LEGEND

PP=Power Positive
PN=Power Negative
_ALL=ON during Shutdown/Run/Sleep
_PWRON=ON during Run/Sleep
_RUN=ON during Run

AC Adapter (pg 7)
PP18V5_ALL_DCIN
In-Rush Limiter (pg 7)
PP18V5_ALL_INRUSH
Backfeed Protection (pg 8)
PP18V5_ALL_SENSE
Current Sense (pg 8)
(overcurrent shutoff)
(MAX1544 Built-in Current Sense)
PPBUS_ALL_B

SMU 4.6V/3.3V Power Supplies (pg 11)
Backup Battery Connector (pg 7)
Max1535 Battery Charger
Stops charging when system draws more than xxW
(pg 8)
Charge Enable Circuit (pg 8)
Battery Connector (pg 11)

PBUS Isolation Circuit (pg 8)
PPBUS_ALL_A

MAX1544 CPU Vcore Switcher
Voltage Toggled by SMU
(pg 29)
PPVCORE_RUN_CPU

MAX1993 GPU Vcore Switcher
Selectable 1.2V/1.0V
(pg 35)
PP1V2_RUN_GPU

Inverter Connector (pg 39)
PPBUS_INVERTER

5A Fuse (pg 8)
5A Fuse (pg 8)

Battery Out Enable Circuit A (pg 8)
Battery Out Enable Circuit B (pg 8)

Cell 1	Cell 2	Cell 3
Cell 4	Cell 5	Cell 6
Cell 7	Cell 8	Cell 9

3S3P Prismatic Battery Pack

TPS5120
5V/3.3V DC Switcher
(pg 10)

LTC3412
1.2V DC Switcher
(pg 9)
PP1V2_PWRON
SLEEP FET
PP1V2_RUN

SLEEP FET
PP5V_RUN_HD
PP5V_PWRON
SLEEP FET
PP5V_RUN
PP3V3_PWRON
SLEEP FET
PP3V3_RUN

TP62050
1.5V DC Switcher
(pg 9)
PP1V5_PWRON
SLEEP FET
PP1V5_RUN

LP3982
1.8V LDO
(pg 9)
PP1V8_RUN

TPS5120
NBVCORE/2.5V DC Switcher
(pg 11)
PP2V5_PWRON
SLEEP FET
PP2V5_RUN
PPVCORE_NB_PWRON

Firewire B Conn (pg 56)
1.5A Fuse (pg 12)
Port PWR Enable Circuit (pg 56)
1.5A Fuse (pg 56)
Firewire A Conn (pg 56)

Power Budget

PPBUS_ALL_A

CPU_Core	=>	28W
GPU_Core	=>	6W
Inverter	=>	7W
1V8_RUN	=>	5W
Charger	=>	??W
TOTAL	=>	46W+?

Power Budget

PPBUS_ALL_B

5VPWRON	=>	20W/25W
3V3PWRON	=>	10W/6.6W
2V5PWRON	=>	10W
1V2PWRON	=>	10W
Firewire	=>	8W/15W
TOTAL	=>	58W/67W

Power Block Diagram

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE: NONE
SHT 3 OF 103

DRAWING
TITLE=LINK
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 18:35:54 2004

Revision Notes

1/14/04
1) moved Q3001-Q3004,D3001-D3002,R3044,R3046,R3048,R3070,R3050,R3052,R3054 from Page 27 to page 16 to allow sync with Gila
2) moved AGP_Vref (R4802,R4803,C4818) circuit to M11 specific page (49)
3) changed R2191 to pulldown on SYS_LED
** sync with Gila **
1/20/04
4) added 10 mil MIN_LINE_WIDTH and MIN_NECK_WIDTH to BKFD_PROT_EN_L
5) changed MIN_LINE_WIDTH of PPBUS_CHGR_LDO to 10 mils
6) moved J790 (backup battery/R_VSB_connector) to page 18 for syncing with Logic
7) moved J1600 (BT/USB connector) to page 18 for syncing with Logic
8) moved C800-C805 (PBus_hold-up_caps) to page 19 for syncing with Logic
9) moved Z79900-Z79903 (EMI_vias) to page 18 for syncing with Logic
10) moved SP5500-SP5505 and SP9900 to (Speaker_wire_clips) to page 18 for syncing with Logic
11) moved Z1500-Z1505, Z7910, and Z7911 (plated_screw_holes) to page 18 for syncing with Logic
12) moved R5010 to page 18 for syncing with Logic
13) moved J2130 (trackpad connector) to page 18 for syncing with Logic
14) changed C2150 to 20%
15) added 10 mil MIN_LINE_WIDTH and MIN_NECK_WIDTH to KBDLED_ANODE and KDBLED_RETURN
16) changed C2115 to R2116 (3.32K 1% 402) to divide ALS output to 2.5V
** sync with Logic **
2/2/04
17) changed PCI_ from shasta to PCI_SB to allow desktops to insert series R's
18) added pg 73 to alias PCI_SB nets back to PCI to reconnect
19) changed R2150 to 8.25 to reduce LED drive current to 20mA
20) changed Q2113 to FDC6D0 FET 5V to 05909
21) changed SMU_ADAPTER_ID to SMU_ONEWIRE
22) added R1809 and R1824 to divide ALS_Vrcput down to 2.5V
23) added alias from TP_SATA_CLK2SM to SATA_CLK2SM
2/3/04
24) changed PPVCORE_RUN_CPU connection to XW592 to _PP1V5_RUN_FET
2/6/04
25) changed C720 to 0.22uF
26) changed R900 and R818 to 1/2W 1206 10mohm
27) changed C1968 to NO_STUFF
28) removed Q1117 and C1114
29) changed L1115 to 2.2UH IHLP5050CE (152S0152)
30) changed C1121 to 680pF 402
31) changed R1102 to 20K 1% 402
32) added MIN_LINE_WIDTH and MIN_NECK_WIDTH properties to CPUVCORE_CM_N and CPUVCORE_CS_N
33) added MIN_LINE_WIDTH and MIN_NECK_WIDTH properties to ALS1_PHOTODIODE and ALS1_OP_IN
2/7/04
34) changed R5019 to 26.7K 1% to increase GPU Vcore current limit (rdar://3510721)
35) sync with Gila (Q45) to fix several power disconnects
36) added aliases on page 5 to set unused CKE, CS, and MUX controls back to TP
37) sync with Logic (Q43) to get DVO contraints
2/10/04
38) changed R3671 to 100K 0.1% to adjust the Tdiode range
39) changed C3671 to 10uF 20% 6.3V to adjust the Tdiode range
40) changed R3672 to 40.2K 0.1% to adjust the Tdiode range
41) changed R3676 to 100K 0.1% to adjust the Tdiode range
42) changed C3676 to 10uF 20% 6.3V to adjust the Tdiode range
43) changed R3677 to 40.2K 0.1% to adjust the Tdiode range
44) mirrored FL9020 and FL9021 to fix layout
2/11/04
45) changed L970 to 152S0154 (10uH) to reduce size
2/12/04
46) removed 197S0703 as alternate for 197S0037 (25MHz_Vesta_crystal)
47) changed all references to SMU_MANUAL_RESET_L to SMU_RESET_L

2/19/04
48) removed DC current limit circuit (U870 and associated discretes)
49) added BOMOPTION for 2.8V CMU_AVdd_LDO
50) changed R4809 to 2.2 ohm 603, C4811 to 1uF 402, and C4816 to 0.1uF 402 in U3Lite AGP Avdd filter.
51) changed R1610 (series R on SMU_ONEWIRE output) to 0 ohm
52) added R1611 (1K pullup to PP3V3_ALL) on ADAPTER_ID to power SMU_ONEWIRE interface
2/23/04
53) changed C8160-C8160 (SATA_AC_coupling_caps) to 0.01uF per Marvell recommendation
54) added NO_TEST properties to CPUVCORE_GNDSENSE and CPUVCORE_SENSE

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6532 | REV. 03

SCALE NONE | SHT 4 OF 103

Page Notes

Power aliases required by this page:
N/A (Most aliases are on this page)

Signal aliases required by this page:
N/A (Most aliases are on this page)

BOM options provided by this page:
(NONE)

AGP Signal Aliasing

GPU is D3cold

48 47 46 45 5 PCI_RESET_L — MAKE_BASE=TRUE — ALIAS — GPU_RESET_L — 37 41

PCI Signal Aliasing

CardBus is D3cold

48 47 46 45 5 PCI_RESET_L — MAKE_BASE=TRUE — ALIAS — PCI_CBUS_RESET_L — 49

6 PCI_CLK33M_AIRPORT — MAKE_BASE=TRUE — ALIAS — PCI_CLK_P3 — 25
PCI_CLK33M_AIRPORT — 47

PCI_CLK33M_CBUS — MAKE_BASE=TRUE — ALIAS — PCI_CLK_GP1 — 25
PCI_CLK33M_CBUS — 49

PCI_CLK33M_USB2 — MAKE_BASE=TRUE — ALIAS — PCI_CLK_GP0 — 25
PCI_CLK33M_USB2 — 48

SATA_CLK25M — MAKE_BASE=TRUE — ALIAS — PCI_CLK_P4 — 25
SATA_CLK25M — 51

45 25 PCI_CLK33M_SB_EXT — MAKE_BASE=TRUE — ALIAS — PCI_CLK_P1 — 25

USB Signal Aliasing

USB "0": Left USB Port

59 6 USB2_N<0> — ALIAS — USB2_LT_N — MAKE_BASE=TRUE — 17
59 6 USB2_P<0> — ALIAS — USB2_LT_P — MAKE_BASE=TRUE — 17
59 6 USB2_PWREN<0> — ALIAS — LTUSB_PWREN — MAKE_BASE=TRUE — 17
59 6 USB2_OC<0> — ALIAS — LTUSB_OVERCURRENT — MAKE_BASE=TRUE — 17

USB "1": Right USB Port

59 6 USB2_N<1> — ALIAS — USB2_RT_N — MAKE_BASE=TRUE — 17
59 6 USB2_P<1> — ALIAS — USB2_RT_P — MAKE_BASE=TRUE — 17
59 6 USB2_PWREN<1> — ALIAS — RTUSB_PWREN — MAKE_BASE=TRUE — 17
59 6 USB2_OC<1> — ALIAS — RTUSB_OVERCURRENT — MAKE_BASE=TRUE — 17

USB "2": BlueTooth

59 6 USB2_N<2> — ALIAS — USB_BT_N — MAKE_BASE=TRUE — 17
59 6 USB2_P<2> — ALIAS — USB_BT_P — MAKE_BASE=TRUE — 17
59 USB2_PWREN<2> — ALIAS — TP_USB2_PWREN2 — MAKE_BASE=TRUE
59 USB2_OC<2> — ALIAS — USB2_OC2_PU — MAKE_BASE=TRUE

USB "3": MicroDash Modem

59 6 USB2_N<3> — ALIAS — USB_MODEM_N — MAKE_BASE=TRUE — 60
59 6 USB2_P<3> — ALIAS — USB_MODEM_P — MAKE_BASE=TRUE — 60
59 USB2_PWREN<3> — ALIAS — TP_USB2_PWREN3 — MAKE_BASE=TRUE
59 USB2_OC<3> — ALIAS — USB2_OC3_PU — MAKE_BASE=TRUE

USB "4": Trackpad/Keyboard

59 6 USB2_N<4> — ALIAS — USB_TPAD_N — MAKE_BASE=TRUE — 17
59 6 USB2_P<4> — ALIAS — USB_TPAD_P — MAKE_BASE=TRUE — 17
59 USB2_PWREN<4> — ALIAS — TP_USB2_PWREN4 — MAKE_BASE=TRUE
59 USB2_OC<4> — ALIAS — USB2_OC4_PU — MAKE_BASE=TRUE

SMU Signal Aliasing

13 SMU_SLEEP — ALIAS — SYS_SLEEP — MAKE_BASE=TRUE — 10 11 25
22 13 SMU_WARM_RESET_L — SYS_WARM_RESET_L — MAKE_BASE=TRUE — 22 23 45 48

Test Point Aliasing

EXT_LED_L — ALIAS — TP_EXT_LED_L — MAKE_BASE=TRUE
13 FAN_RPM2 — ALIAS — TP_FAN_RPM2 — MAKE_BASE=TRUE
13 FAN_TACH2 — ALIAS — TP_FAN_TACH2 — MAKE_BASE=TRUE
13 FAN_TACH3 — ALIAS — TP_FAN_TACH3 — MAKE_BASE=TRUE
13 FAN_TACH4 — ALIAS — TP_FAN_TACH4 — MAKE_BASE=TRUE
13 FAN_TACH5 — ALIAS — TP_FAN_TACH5 — MAKE_BASE=TRUE
13 I2C_SMU_D_SCL — ALIAS — TP_I2C_SMU_D_SCL — MAKE_BASE=TRUE
22 NB_PMR_OBSV — ALIAS — TP_NB_PMR_OBSV — MAKE_BASE=TRUE
22 NB_THMI — ALIAS — TP_NB_THMI — MAKE_BASE=TRUE
22 NB_THMO — ALIAS — TP_NB_THMO — MAKE_BASE=TRUE
50 SATA_RXD_P2_C — ALIAS — TP_SATA_RXD_P2 — MAKE_BASE=TRUE
50 SATA_RXD_N2_C — ALIAS — TP_SATA_RXD_N2 — MAKE_BASE=TRUE
50 SATA_TXD_P2 — ALIAS — TP_SATA_TXD_P2 — MAKE_BASE=TRUE
50 SATA_TXD_N2 — ALIAS — TP_SATA_TXD_N2 — MAKE_BASE=TRUE

PBUS PWR

6 PPBUS_ALL_A — VOLTAGE=18.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PPBUS_ALL_A — 8 17 42
ALIAS — PPVIN_CPUVCORE — 31
ALIAS — PPVIN_GPUVCORE — 38
ALIAS — PPBUS_INV — 42
ALIAS — PPBUSA_BBATT — 17

6 PPBUS_ALL_B — VOLTAGE=18.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PPBUS_ALL_B — 8 17
ALIAS — PPVIN_5V3VPWRON — 10
ALIAS — PPVIN_2V5_NBVCORE_PWRON — 11
ALIAS — PPBUS_FW — 12
ALIAS — PPBUSB_BBATT — 17

CPU/GPU Core PWR

32 31 PPVCORE_CPU_REG — ALIAS — PPVCORE_RUN_CPU 6 — MAKE_BASE=TRUE, VOLTAGE=1.1V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil — ALIAS — PPVCORE_CPU — 27 29 30 31 32

38 PPVCORE_GPU_REG — ALIAS — XW510 2 — JUMPER OPEN — PP1V2_RUN_GPU 6 — MAKE_BASE=TRUE, VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil — ALIAS — PPVCORE_GPU — 37 39
PPVCORE_GPU_REG — MAKE_BASE=TRUE, VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

Graphic PWR

5 PP2V5_RUN — R505 1 — 0, 5%, 1/10W, FF, 805 2 — PP2V5_GPU — 40
ALIAS — PP2V5_GPU — MAKE_BASE=TRUE, VOLTAGE=2.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

6 PP3V3_RUN — R502 1 — 0, 5%, 1/10W, FF, 805 2 — PP3V3_GPU — 37 39 40
ALIAS — PP3V3_GPU — MAKE_BASE=TRUE, VOLTAGE=3.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PP3V3_AGP — 35 — VOLTAGE=3.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

5 PP2V5_RUN — ATI_MEMIO_1V8 — R503 1 — 0, 5%, 1/4W, FF, 1210 2 — ATI_MEMIO_2V5 — R501 1 — 0, 5%, 1/4W, FF, 1210 2 — PPVCORE_GPUFB — 37 40
6 5 PP1V8_RUN
ALIAS — PPVCORE_GPUFB — MAKE_BASE=TRUE, VOLTAGE=1.0V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

6 5 PP1V8_RUN — R504 1 — 0, 5%, 1/10W, FF, 805 2 — PP1V8_GPU — 37 39 40 41
ALIAS — PP1V8_GPU — MAKE_BASE=TRUE, VOLTAGE=1.8V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

PP3V3_PWRON — R599 1 — 100K, 5%, 1/16W, MF, 402 2 — SYS_WARM_RESET_L — MAKE_BASE=TRUE

PP1V5_RUN — R500 1 — 0, 5%, 1/10W, FF, 805 2 — PP1V5_GPU_AGP — 37 39 40
ALIAS — PP1V5_GPU — MAKE_BASE=TRUE, VOLTAGE=1.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

33 RAM_MUXEN0 — ALIAS — TP_RAM_MUXEN0
33 RAM_MUXEN4 — ALIAS — TP_RAM_MUXEN4

More Test Point Aliasing

25 EI_CPU1_CLK_N_R — ALIAS — TP_EI_CPU1_CLK_N — MAKE_BASE=TRUE
25 EI_CPU1_CLK_P_R — ALIAS — TP_EI_CPU1_CLK_P — MAKE_BASE=TRUE
25 CPU1_HTBEN_R — ALIAS — TP_CPU1_HTBEN_R — MAKE_BASE=TRUE
25 EI_CPU1_SYNC_R — ALIAS — TP_EI_CPU1_SYNC_R — MAKE_BASE=TRUE
33 RAM_CKE_R<2> — ALIAS — TP_RAM_CKE_R<2>
33 RAM_CKE_R<3> — ALIAS — TP_RAM_CKE_R<3>
33 RAM_CKE_R<6> — ALIAS — TP_RAM_CKE_R<6>
33 RAM_CKE_R<7> — ALIAS — TP_RAM_CKE_R<7>
33 RAM_CS_L_R<2> — ALIAS — TP_RAM_CS_L_R<2>
33 RAM_CS_L_R<3> — ALIAS — TP_RAM_CS_L_R<3>
33 RAM_CS_L_R<10> — ALIAS — TP_RAM_CS_L_R<10>
33 RAM_CS_L_R<11> — ALIAS — TP_RAM_CS_L_R<11>

_PWRON PWR

10 PP5V_PWRON_REG — ALIAS — XW520 2 — JUMPER OPEN — PP5V_PWRON — VOLTAGE=5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
PP5V_PWRON_REG — MAKE_BASE=TRUE, VOLTAGE=5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PP5V_PWRON_AUDIO — 61
ALIAS — PP5V_PWRON_MODEM — 60
ALIAS — PP5V_PWRON_LTUSB — 17
ALIAS — PP5V_PWRON_RTUSB — 17
ALIAS — PP5V_PWRON_SLEEPLED — 19
ALIAS — PP5V_PWRON_TPAD — 17
ALIAS — PP5V_PWRON_3V3ALL — 11
ALIAS — PP5V_PWRON_FAN — 15
ALIAS — PP5V_PWRON_GPUVCORE — 38
ALIAS — PP5V_PWRON_SERIAL — 16
ALIAS — PPVIN_1V2PWRON — 9
ALIAS — PP5V_PWRON_5VRUN — 10
ALIAS — PP5V_CBUS — 49
ALIAS — PP5V_CPUVCORE_VDD — 31
ALIAS — PP5V_CPUTHERM — 32

10 PP3V3_PWRON_REG — ALIAS — XW530 2 — JUMPER OPEN — PP3V3_PWRON — VOLTAGE=3.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
PP3V3_PWRON_REG — MAKE_BASE=TRUE, VOLTAGE=3.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PP3V3_PWRON_AUDIO — 61
ALIAS — PP3V3_PWRON_MODEM — 60
ALIAS — PP3V3_PWRON_SB — 18 21 23 45
ALIAS — PPPCIG4_PWRON_SB — 21
ALIAS — PPPCI32_PWRON_SB — 21
ALIAS — PP3V3_PWRON_USB — 59
ALIAS — PP3V3_PWRON_BT — 17
ALIAS — PP3V3_PWRON_ALS1 — 19
ALIAS — PPVIN_1V5PWRON — 9
ALIAS — PP3V3_PWRON_THERM — 15
ALIAS — PP3V3_PWRON_3V3RUN — 10
ALIAS — PP3V3_CBUS — 49
ALIAS — PP3V3_CPUTHERM — 32
ALIAS — PP3V3_PWRON_1V8RUN — 9

11 PP2V5_PWRON_REG — ALIAS — XW540 2 — JUMPER OPEN — PP2V5_PWRON — VOLTAGE=2.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
PP2V5_PWRON_REG — MAKE_BASE=TRUE, VOLTAGE=2.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PP2V5_PWRON_SB — 21 23 45 56
ALIAS — PP2V5_PWRON_HT — 44
ALIAS — PP2V5_PWRON_DIMM — 35
ALIAS — PP2V5_ENET — 55
ALIAS — PP2V5_HT — 43
ALIAS — PPSPD_DIMM — 35
ALIAS — PP2V5_PWRON_2V5RUN — 11
ALIAS — PP2V5_PWRON_1V8RUN — 9
ALIAS — PP2V5_PWRON_RAM — 24 33

9 PP1V5_PWRON_REG — ALIAS — XW560 2 — JUMPER OPEN — PP1V5_PWRON — VOLTAGE=1.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
PP1V5_PWRON_REG — MAKE_BASE=TRUE, VOLTAGE=1.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PPVCORE_PWRON_PULSAR — 24
ALIAS — PP1V5_PWRON_1V5RUN — 9
ALIAS — PP1V5_PWRON_NB_AVDD — 26 33 36 43

9 PP1V2_PWRON_REG — ALIAS — XW561 — JUMPER OPEN — PP1V2_PWRON — VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
PP1V2_PWRON_REG — MAKE_BASE=TRUE, VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
ALIAS — PP1V2_PWRON_DISK_SB — 50
ALIAS — PP1V2_PWRON_HT — 44
ALIAS — PP1V2_PWRON_SB — 23
ALIAS — PPVCORE_PWRON_SB — 21
ALIAS — PP1V2_PWRON_1V2RUN — 9

ONLY ONE CAN BE CLOSED Between XW560/XW561!!!

11 PPVCORE_NB_REG — ALIAS — XW552 2 — JUMPER OPEN — PPVCORE_PWRON_NB — 20
PPVCORE_NB_REG — MAKE_BASE=TRUE, VOLTAGE=1.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
PPVCORE_PWRON_NB — MAKE_BASE=TRUE, VOLTAGE=1.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

XW552 Always close

ONLY ONE CAN BE CLOSED Between XW550/XW551!!!

GND — VOLTAGE=0V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

_RUN PWR

PP3V3_ALL — VOLTAGE=3.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
11 PP3V3_ALL_LDO — ALIAS
ALIAS — PP3V3_ALL_ACIN — 7
ALIAS — PP3V3_ALL_DCILIM
ALIAS — PP3V3_ALL_HALLEFFECT — 17
ALIAS — PP3V3_ALL_RTC — 13
ALIAS — PP3V3_ALL_SMU — 13 16 18

2.5V SMU VRef
32 PP2V5_SMU_VREF — MAKE_BASE=TRUE — ALIAS — PPVREF_SMU — 13

PP5V_RUN — VOLTAGE=5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
10 PP5V_RUN_FET — ALIAS
ALIAS — PP5V_RUN_KBDLED — 19
ALIAS — PP5V_UATA — 52
ALIAS — PPBU_RUN_FW — 12
ALIAS — PP5V_RUN_CPU — 16 29

PP5V_RUN_HD 6 — VOLTAGE=5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
10 PP5V_RUN_HD_FET — ALIAS
ALIAS — PP5V_PATA — 52
ALIAS — PP5V_RUN_AUDIO — 61

PP3V3_RUN — VOLTAGE=3.3V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
10 PP3V3_RUN_FET — ALIAS
ALIAS — PP3V3_SATABR — 51
ALIAS — PP3V3_PATA — 52
ALIAS — PPVIO_PCI_USB2 — 48
ALIAS — PPVIO_PCI_CBUS — 49
ALIAS — PP3V3_PCI — 23 45 46 47 48 49
ALIAS — PP3V3_SB_PCI — 45
ALIAS — PP3V3_CPUVCORE — 31
ALIAS — PP3V3_RUN_FAN — 15
ALIAS — PP3V3_RUN_SI — 41

PP2V5_RUN — VOLTAGE=2.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
11 PP2V5_RUN_FET — ALIAS
ALIAS — PP2V5_PCI — 49
ALIAS — PP2V5_RUN_CPU — 29

PP1V8_RUN — VOLTAGE=1.8V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
9 PP1V8_RUN_LDO — ALIAS — XW518 2 — JUMPER OPEN — ALIAS — PP1V8_SATABR — 51
PP1V8_RUN_LDO — MAKE_BASE=TRUE, VOLTAGE=1.8V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

PP1V5_RUN — VOLTAGE=1.5V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
9 5 PP1V5_RUN_FET — ALIAS
ALIAS — PP1V5_AGP — 36 37
ALIAS — PPVCORE_PULSAR — 24

PP1V2_RUN — VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
9 PP1V2_RUN_FET — ALIAS
ALIAS — PP1V2_HT — 22 43
ALIAS — PP1V2_PULSAR — 24

ONLY ONE CAN BE CLOSED Between XW590/XW591!!!

XW590 2 — JUMPER OPEN — PP1V2_EI_NB — 18 26 — VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil
XW591 2 — JUMPER OPEN

9 5 PP1V5_RUN_FET — XW592 2 — JUMPER OPEN — PP1V2_EI_CPU — 18 27 28 29 — VOLTAGE=1.2V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil

Chassis Grounds

17 GND_CHASSIS_DVI — VOLTAGE=0V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil — ALIAS — GND_CHASSIS_DVI_TOP — 42
17 GND_CHASSIS_INVERTER — VOLTAGE=0V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil — ALIAS — GND_CHASSIS_INV — 42
6 GND_CHASSIS_LVDS — VOLTAGE=0V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil — ALIAS — GND_CHASSIS_LVDS — 42

ALIAS — GND_CHASSIS_ENET — 55
ALIAS — GND_CHASSIS_FW_PORT1 — 58
ALIAS — GND_CHASSIS_FW_PORT2 — 58
ALIAS — GND_CHASSIS_DVI_BOTTOM — 42
6 GND_CHASSIS_IO — 17 VOLTAGE=0V, MIN_LINE_WIDTH=25 mil, MIN_NECK_WIDTH=10 mil — ALIAS — GND_CHASSIS_SVIDEO — 42

Power Connections

NOTICE OF PROPRIETARY PROPERTY

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 5 OF	103

FUNCTIONAL TEST POINTS

Wireless
Within 1" of connector

FUNC_TEST=TRUE
PCI_AD<0> 45 46 47 48 49 62
PCI_AD<1> 45 46 47 48 49 62
PCI_AD<2> 45 46 47 48 49 62
PCI_AD<3> 45 46 47 48 49 62
PCI_AD<4> 45 46 47 48 49 62
PCI_AD<5> 45 46 47 48 49 62
PCI_AD<6> 45 46 47 48 49 62
PCI_AD<7> 45 46 47 48 49 62
PCI_AD<8> 45 46 47 48 49 62
PCI_AD<9> 45 46 47 48 49 62
PCI_AD<10> 45 46 47 48 49 62
PCI_AD<11> 45 46 47 48 49 62
PCI_AD<12> 45 46 47 48 49 62
PCI_AD<13> 45 46 47 48 49 62
PCI_AD<14> 45 46 47 48 49 62
PCI_AD<15> 45 46 47 48 49 62
PCI_AD<16> 45 46 47 48 49 62
PCI_AD<17> 45 46 47 48 49 62
PCI_AD<18> 45 46 47 48 49 62
PCI_AD<19> 45 46 47 48 49 62
PCI_AD<20> 45 46 47 48 49 62
PCI_AD<21> 45 47 48 49 62
PCI_AD<22> 45 47 48 49 62
PCI_AD<23> 45 47 48 49 62
PCI_AD<24> 45 46 47 48 49 62
PCI_AD<25> 45 46 47 48 49 62
PCI_AD<26> 45 46 47 48 49 62
PCI_AD<27> 45 46 47 48 49 62
PCI_AD<28> 45 46 47 48 49 62
PCI_AD<29> 45 46 47 48 49 62
PCI_AD<30> 45 46 47 48 49 62
PCI_AD<31> 45 46 47 48 49 62
PCI_FRAME_L 45 47 48 49 62
PCI_TRDY_L 45 47 48 49 62
PCI_IRDY_L 45 47 48 49 62
PCI_DEVSEL_L 45 47 48 49 62
PCI_STOP_L 45 47 48 49 62
PCI_PAR 45 47 48 49 62
PCI_CBE_L<0> 45 47 48 49 62
PCI_CBE_L<1> 45 47 48 49 62
PCI_CBE_L<2> 45 47 48 49 62
PCI_CBE_L<3> 45 47 48 49 62
PCI_SLOTA_REQ_L 45 47
PCI_SLOTA_GNT_L 45 47
PCI_SLOTA_INT_L 23 47
PCI_SLOTA_IDSEL 47
PCI_CLK33M_AIRPORT 5
TP_AIRPORT_PME_L 47
TP_AIRPORT_RF_DISABLE 47
AIRPORT_CLKRUN_L_PD 47
PP3V3_RUN 5 6 X 4

GND x 4

DVI/VGA
Within 1" of connector

TMDS_DN<0> 41 42 62
TMDS_DP<0> 41 42 62
TMDS_DN<1> 41 42 62
TMDS_DP<1> 41 42 62
TMDS_DN<2> 41 42 62
TMDS_DP<2> 41 42 62
TMDS_CONN_CLKN 42 62
TMDS_CONN_CLKP 42 62
VGA_R 42
VGA_G 42
VGA_B 42
VGA_VSYNC 42
VGA_HSYNC 42
DVI_DDC_CLK_UF 42
DVI_DDC_DATA_UF 42
DVI_HPD_UF 42
PP5V_RUN_DDC 42
GND_CHASSIS_IO 5 17

GND x 1

LVDS
Within 1" of connector

LVDS_L0N 39 42
LVDS_L0P 39 42
LVDS_L1N 39 42
LVDS_L1P 39 42
LVDS_L2N 39 42
LVDS_L2P 39 42
CLKLVDS_LN 39 42
CLKLVDS_LP 39 42
LVDS_U0N 39 42
LVDS_U0P 39 42
LVDS_U1N 39 42
LVDS_U1P 39 42
LVDS_U2N 39 42
LVDS_U2P 39 42
CLKLVDS_UN 39 42
CLKLVDS_UP 39 42
LVDS_DDC_CLK 39 42
LVDS_DDC_DATA 39 42
PP3V3_LCD 42
GND_CHASSIS_LVDS 5

2 x GND

INVERTER
Within 1" of connector

PPBUS_ALL_A 5 6
PP5V_INVERTER 42
BRIGHT_PWM 42

1 x GND

S-Video
Within 1 of connector

TV_GND1 42
TV_GND2 42
TV_C 42
TV_Y 42
TV_COMP 42

PATA (SATA Bridge)
Within 1" of connector

PATA_DD<0> 51 52
PATA_DD<1> 51 52
PATA_DD<2> 51 52
PATA_DD<3> 51 52
PATA_DD<4> 51 52
PATA_DD<5> 51 52
PATA_DD<6> 51 52
PATA_DD<7> 51 52
PATA_DD<8> 51 52
PATA_DD<9> 51 52
PATA_DD<10> 51 52
PATA_DD<11> 51 52
PATA_DD<12> 51 52
PATA_DD<13> 51 52
PATA_DD<14> 51 52
PATA_DD<15> 51 52
PATA_DMARQ_R 52
PATA_DMACK_L 51 52
PATA_DA<0> 51 52
PATA_DA<1> 51 52
PATA_DA<2> 51 52
PATA_CS0_L 51 52
PATA_CS1_L 51 52
PATA_RESET_L 51 52
PATA_DSTROBE_R 52
PATA_HSTROBE 51 52
PATA_STOP 51 52
PATA_INTRQ_R 52
PP5V_RUN_HD 5 x4
PPLOGIC_PATA 52 x3

GND x 5

Battery Conn
Within 1" of connector

PPBATT_ALL_F 7 x2
I2C_SMU_E_SCL 13 18 (I2C_BATT_SCL)
I2C_SMU_E_SDA 13 18 (I2C_BATT_SDA)
BATT_DET_L 7
GND_BATT 7 x2

DC-in Connectors
Within 1" of connector

PP18V5_ALL_DCIN 7 11 x 3

GND x 3

UATA (Optical)
Within 2" of connector

UATA_DD<0> 50 52
UATA_DD<1> 50 52
UATA_DD<2> 50 52
UATA_DD<3> 50 52
UATA_DD<4> 50 52
UATA_DD<5> 50 52
UATA_DD<6> 50 52
UATA_DD<7> 50 52
UATA_DD<8> 50 52
UATA_DD<9> 50 52
UATA_DD<10> 50 52
UATA_DD<11> 50 52
UATA_DD<12> 50 52
UATA_DD<13> 50 52
UATA_DD<14> 50 52
UATA_DD<15> 50 52
UATA_DMARQ_R 52
UATA_DMACK_L 50 52
UATA_DA<0> 50 52
UATA_DA<1> 50 52
UATA_DA<2> 50 52
UATA_CS0_L 50 52
UATA_CS1_L 50 52
UATA_RESET_L 50 52
UATA_HSTROBE_R 52
UATA_HSTROBE 50 52
UATA_STOP 50 52
UATA_INTRQ_R 52
PP5V_RUN x4

GND x 5

Trackpad
Within 3" of connector

I2C_SMU_B_SCL 13 18 (I2C_DS1775_SCL)
I2C_SMU_B_SDA 13 18 (I2C_DS1775_SDA)
SYS_OVERTEMP_L 13 15 17 23 25
USB2_N<4> 5 59
USB2_P<4> 5 59
KBDLED_ANODE 17 19
KBDLED_RETURN 17 19
SYS_DOOR_AJAR (SYS_LID_OPEN)
SYS_POWER_BUTTON_L 6 13 16 17 42
PP3V3_PWRON 17 25
PP5V_PWRON 6 11
PP3V3_ALL 6
PP3V3_RUN 5 6

Firewire B
Within 1" of connector

FW_PORT1_TPA_P_FL 58
FW_PORT1_TPA_N_FL 58
FW_PORT1_TPB_P_FL 58
FW_PORT1_TPB_N_FL 58
FW_PORT1_AREF 58
GND_FW_PORT1_VG 58
PPFW_PORT1_VP 58

Firewire A
Within 1" of connector

FW_PORT2_TPA_P_FL 58
FW_PORT2_TPA_N_FL 58
FW_PORT2_TPB_P_FL 58
FW_PORT2_TPB_N_FL 58
PPFW_PORT2_VP 58
GND_FW_PORT2_VG 58

Fan Connectors
Within 2" of connector

FAN_RPM0 13 15
FAN_TACH0 13 15
FAN_RPM1 13 15
FAN_TACH1 13 15
PP5V_PWRON 6 11 x2 one by each fan

GND x 2 - one by each fan

BT/USB Flex
Within 2" of connector

USB2_N<2> 5 59 (USB_BT_N)
USB2_P<2> 5 59 (USB_BT_P)
USB2_N<0> 5 59 (USB2_LT_N)
USB2_P<0> 5 59 (USB2_LT_P)
USB2_PWREN<0> 5 59 (LTUSB_PWREN)
ALS0_OUT 13 17
USB2_OC<0> 5 59 (LTUSB_OVERCURRENT)
ALS_GAIN_BOOST 13 17 19
ADAPTER_ID 17

PP3V3_PWRON x 1
PP5V_PWRON x 1
GND x 1

Backup Battery/USB Flex
Within 2" of connector

PPBUS_ALL_B 5 6
PPBUS_ALL_A 5 6
SYS_POWERUP 14
USB2_N<1> 5 59 (USB2_RT_N)
USB2_P<1> 5 59 (USB2_RT_P)
USB2_PWREN<1> 5 59 (RTUSB_PWREN)
USB2_OC<1> 5 59 (RTUSB_OVERCURRENT)

PP5V_PWRON x 1
GND x 1

Sound Connector
Within 2" of connector

I2S0_DEV_TO_SB_DTI_F 61
I2S0_BITCLK_F 61
I2S0_MCLK_F 61
I2S0_SYNC_F 61
I2S0_SB_TO_DEV_DTO_F 61
I2S2_DEV_TO_SB_DTI_F 61
I2S2_BITCLK_F 61
I2S2_SYNC_F 61
AUDIO_GPIO_11 23 61
AUDIO_EXT_MCLK_SEL 23 61
AUDIO_LO_MUTE_L 23 61
AUDIO_SPKR_MUTE_L 23 61
AUDIO_LO_DET_L 23 61
AUDIO_LO_OPTICAL_PLUG_L 23 61
AUDIO_LI_DET_L 23 61
AUDIO_LI_OPTICAL_PLUG_L 23 61
I2S0_RESET_L_F 61
I2S2_RESET_L_F 61
SLEEPLED_ANODE 19 61
GND_AUDIO 61 x4
PP5V_PWRON_AUDIO 61 x3
PP3V3_PWRON_AUDIO 61 x2

GND x 2

Modem Connector
Within 3" of connector

I2S1_SB_TO_DEV_DTO 16 23 60
I2S1_BITCLK 16 23 60
I2S1_SYNC 16 23 60
I2S1_RESET_L 16 23 60
I2S1_MCLK 16 23 60
I2S1_DEV_TO_SB_DTI 16 23 60
USB2_N<3> 5 59 (USB_MODEM_N)
USB2_P<3> 5 59 (USB_MODEM_P)
MODEM_RING2SYS_L 23 60
UDASH_SDOWN 23 60
I2C_SB_SCL 18 23 (I2C_MODEM_SCL)
I2C_SB_SDA 18 23 (I2C_MODEM_SDA)

ROM Control
Within 2" of U7500

ROM_ONBOARD_CS_L 46 47
ROM_OE_L 45 46 47
ROM_CS_L 45 46 47
ROM_WE_L 45 46 47

MISC

JTAG_NB_TMS 22
JTAG_NB_TDI 22
JTAG_NB_TDO 22
JTAG_NB_TCK 22
JTAG_NB_TRST_L 22
JTAG_SB_TMS 18 23
JTAG_SB_TDI 18 23
JTAG_SB_TDO 23
JTAG_SB_TCK 18 23
JTAG_SB_TRST_L 18 23
JTAG_VESTA_TMS 12
JTAG_VESTA_TDI 12
JTAG_VESTA_TDO 12
JTAG_VESTA_TCK 12
JTAG_VESTA_TRST_L 12
JTAG_CPU_TMS 18 27 28
JTAG_CPU_TDI 18 27 28
JTAG_CPU_TDO 18 27 28
JTAG_CPU_TCK 18 27 28
JTAG_CPU_TRST_L 27 28
SMU_RESET_L 13 16 19
SYS_POWER_BUTTON_L 6 13 16 17 42
SYS_RESET_BUTTON_L 13 16
PP1V8_RUN 5
PP2V5_PWRON
PPBUS_ALL_B 5 6
PP3V3_ALL 6
PPVCORE_RUN_CPU 5
PP1V2_RUN_GPU 5
(SMU_BOOT_BUSY) CPU_VID<4> 13 31
(SMU_BOOT_SCLK) CPU_VID<5> 13
SMU_BOOT_CNVSS 13 16
SMU_BOOT_TXD 13 16
(SMU_BOOT_CE) SMU_BOOT_RXD 13 16
SYS_POWERUP_L 13 14

Functional Testpoints

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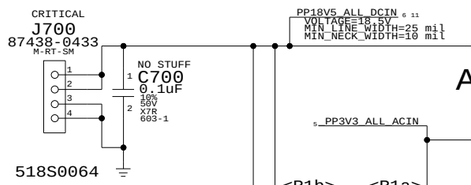
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 6 OF 103	

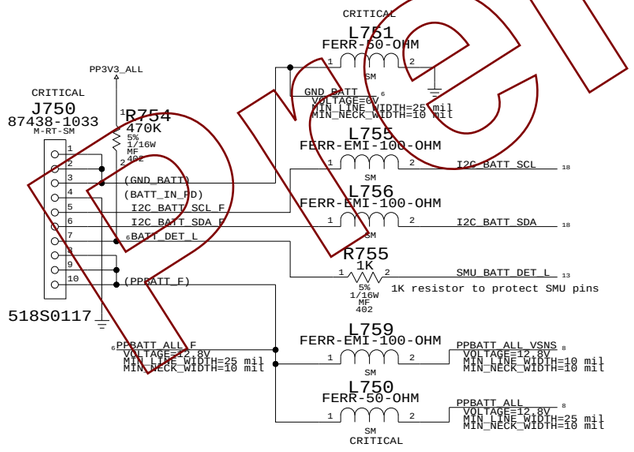
DC Power Input

(DC-In jack and associated circuit are on separate baord)



DC Inrush Limiter

Main Battery Connector



Place L759 as close to J750 as possible

Power Connectors

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 7 OF 103	

DC-IN Input Current Limiter

Place U800 and U870 near R800

CRITICAL
Q850
SI4405DY
SO-8

PP18V5_ALL_INRUSH

PP18V5_ALL_SENSE
VOLTAGE=18.5V
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

R850 49.9K 1% 1/16W MF 402

BKFD_PROT_EN_L_DIV
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

C851 0.1uF 20% 25V CERM 603

R851 68K 5% 1/16W MF 402

BKFD_PROT_EN_L
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

Q800
2N7002DW
SOT-363

13 12 8 7 SMU_ACIN

CRITICAL
R800
0.010
1% 1/2W ME 1206

PPBUS_ALL_B 5 8 17

CRITICAL
Q880
SI4435DY
SOI

PPBUS_ALL_A 5 8 17 42

R880 470K 5% 1/16W MF 402

CHGR_PBUS_EN_L_DIV
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

R881 330K 5% 1/16W MF 402

CHGR_PBUS_EN_L

13 12 8 7 SMU_ACIN

R882 100K 5% 1/16W MF 402

DP800
BAS16TW
SOT-363

CHGR_ACIN_RC

Q882
2N7002DW
SOT-363

C882 0.01UF 10% 16V CERM 402

Keep short and route as pair

(PP18V5_ALL_SENSE)
(PP18V5_ALL)

R801 4.7 5% 1/16W MF 402

R802 4.7 5% 1/16W MF 402

C801 0.47UF 20% 6.3V CERM 1206

C802 0.47UF 20% 6.3V CERM 1206

C830 0.1UF 20% 10V CERM 402

C825 1uF 20% 10V CERM 603

R830 100K 5% 1/16W MF 402

R826 33 5% 1/16W MF 402

PP5V4_CHGR_LDO
VOLTAGE=5.4V
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

42 1 8 5 PPBUS_ALL_A

C831 0.1UF 20% 10V CERM 402

C805 4.7uF 20% 25V CERM 1206

C806 4.7uF 20% 25V CERM 1206

C807 4.7uF 20% 25V CERM 1206

C808 4.7uF 20% 25V CERM 1206

R824 100K 1% 1/16W MF 402

R820 100K 1% 1/16W MF 402

8 CHGR_REF

NO STUFF
R805 100K 1% 1/16W MF 402

D800
1N914
SOT23

NO STUFF
R806 13K 1% 1/16W MF 402

C800 1uF 20% 25V CERM 805

CHGR_CSSP
CHGR_CSSN
CHGR_DCIN
CHGR_ACIN
I2C_CHGR_SCL
I2C_CHGR_SDA
CHGR_IMAX
CHGR_VMAX
CHGR_CCS
CHGR_CCI
CHGR_CCV

U800
MAX1535A
QFN
CRITICAL

VDD LDO
SRC PDS PDL
REF
DHV DHI
DLOV DLO
ACOK* DAC I.C.
BATT THM
GND THM PAD PGND

CHGR_REF 8

R823 0 5% 1/16W MF 402

CHGR_DHV
MIN_LINE_WIDTH=20 mil
MIN_NECK_WIDTH=10 mil

CHGR_DHI
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

CHGR_DLOV_RC
MIN_LINE_WIDTH=20 mil
MIN_NECK_WIDTH=10 mil

CHGR_DLO
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

CHGR_DAC

CHGR_THM

CRITICAL
Q810
SI4835BDY
SOI

CRITICAL
L810
10uH
SM1

PPBATT_CHGR_SW
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

CRITICAL
R810
0.010
1% 1/2W ME 1206

PPBATT_CHGR_RSNS
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

PPBATT_CHGR_OUT 8
VOLTAGE=12.6V
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

R827 0 5% 1/16W MF 402

R828 0 5% 1/16W MF 402

CHGR_CCS_RC
CHGR_CCI_RC

C824 0.01UF 20% 16V CERM 402

C823 0.01UF 20% 16V CERM 402

R825 20.5K 1% 1/16W MF 402

R821 169K 1% 1/16W MF 402

R822 30K 1% 1/16W MF 402

CHGR_CCV_RC

C822 0.01UF 20% 16V CERM 402

R829 100K 5% 1/16W MF 402

C826 1UF 20% 10V CERM 603

C820 0.1UF 20% 10V CERM 402

XW800 SM

C829 1UF 20% 10V CERM 603

NO STUFF
C811 0.001uF 10% 50V CERM 402

CRITICAL
Q811
SI4336DY
SO-8

D810
MBRS140T3
SM

R811 1 5% 1/16W MF 603

R812 1 5% 1/16W MF 603

C827 0.1uF 20% 25V CERM 603

C828 0.1uF 20% 25V CERM 603

C812 4.7uF 20% 25V CERM 1206

C813 4.7uF 20% 25V CERM 1206

C814 4.7uF 20% 25V CERM 1206

C815 4.7uF 20% 25V CERM 1206

C816 4.7uF 20% 25V CERM 1206

C817 4.7uF 20% 25V CERM 1206

CRITICAL
C818
33uF
20% 25V ELEC SM1

GND_CHGR
VOLTAGE=0V
MIN_LINE_WIDTH=15 mil
MIN_NECK_WIDTH=10 mil

CHGR_CSIP
CHGR_CSIN

SMU_CHARGE_BATT_L

PPBATT_ALL_VSNS 7

13 8 SMU_CHARGE_BATT

Q877
2N7002DW
SOT-363

SMBus Battery Charger

Battery Switch-over Circuit

Battery Charge Path

Battery charge FET is open when not charging

7 PPBATT_ALL

F895
5AMP-125V
SM-2

F899
5AMP-125V
SM-2

CRITICAL
Q890
SI4435DY
SOI

11 PPBATT_ALL_FUSEA
VOLTAGE=12.6V
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

PPBATT_ALL_FUSEB
VOLTAGE=12.6V
MIN_LINE_WIDTH=25 mil
MIN_NECK_WIDTH=10 mil

8 PPBATT_CHGR_OUT

17 8 5 32 PPBUS_ALL_A

PPBUS_ALL_B 5 8 17

R890 470K 5% 1/16W MF 402

CHGR_CHARGE_EN_L_DIV

CRITICAL
Q895
SUD45P03
TO-252

CRITICAL
Q899
SUD45P03
TO-252

R895 470K 5% 1/16W MF 402

R899 470K 5% 1/16W MF 402

BATT_PBUSA_EN_L
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

BATT_PBUSB_EN_L
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

R891 100K 5% 1/16W MF 402

CHGR_CHARGE_EN_L

R896 100K 5% 1/16W MF 402

R898 100K 5% 1/16W MF 402

BATT_PBUS_EN_L

13 8 SMU_CHARGE_BATT

Q882
2N7002DW
SOT-363

R892 100K 5% 1/16W MF 402

7 SMU_ACIN_L

R897 158K 1% 1/16W MF 402

DP800
BAS16TW
SOT-363

BATT_ACIN_L_RC

Q800
2N7002DW
SOT-363

C897 10uF 20% 6.3V CERM 805

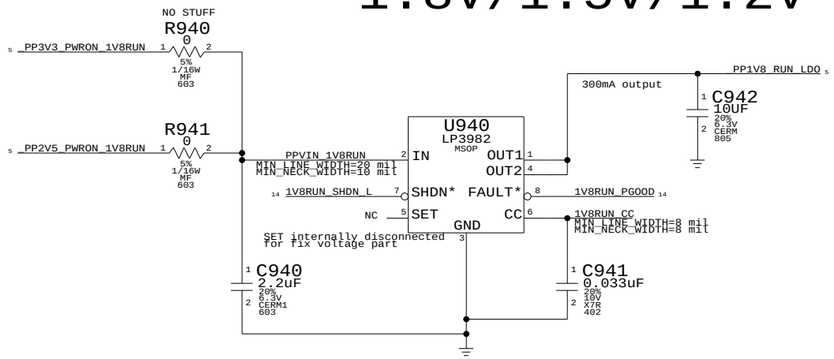
When AC is disconnected, P-channel FETs turn on
RC time is 480K * 10uF @ 3.3V
When AC is connected, P-channel
FETs are quickly turned off (diode)

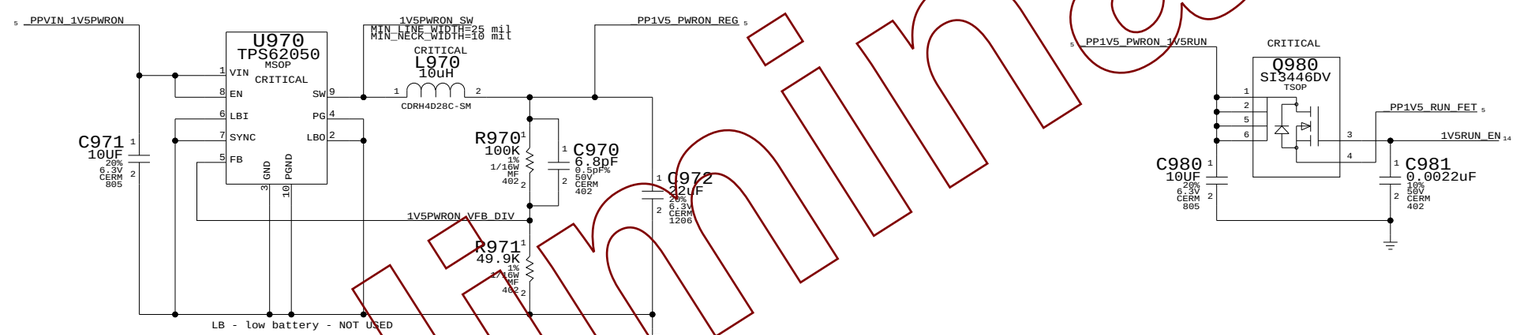
SMBus Battery Charger

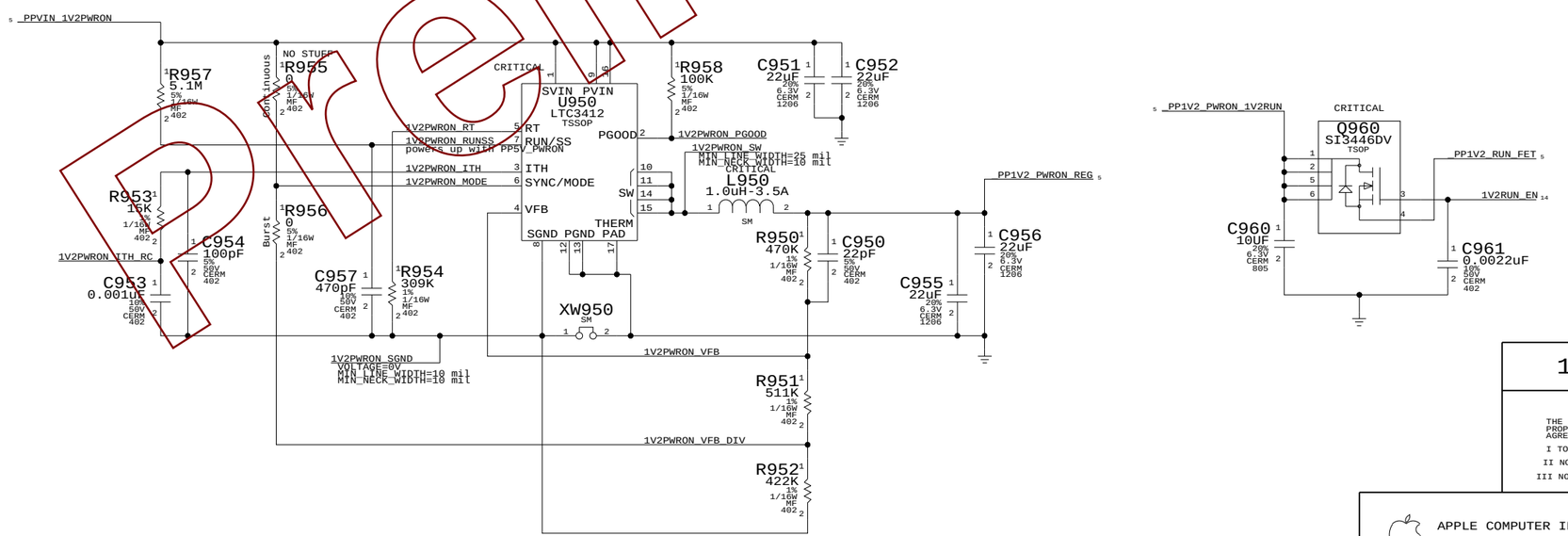
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 8 OF 103	

1.8V/1.5V/1.2V MAIN SUPPLIES







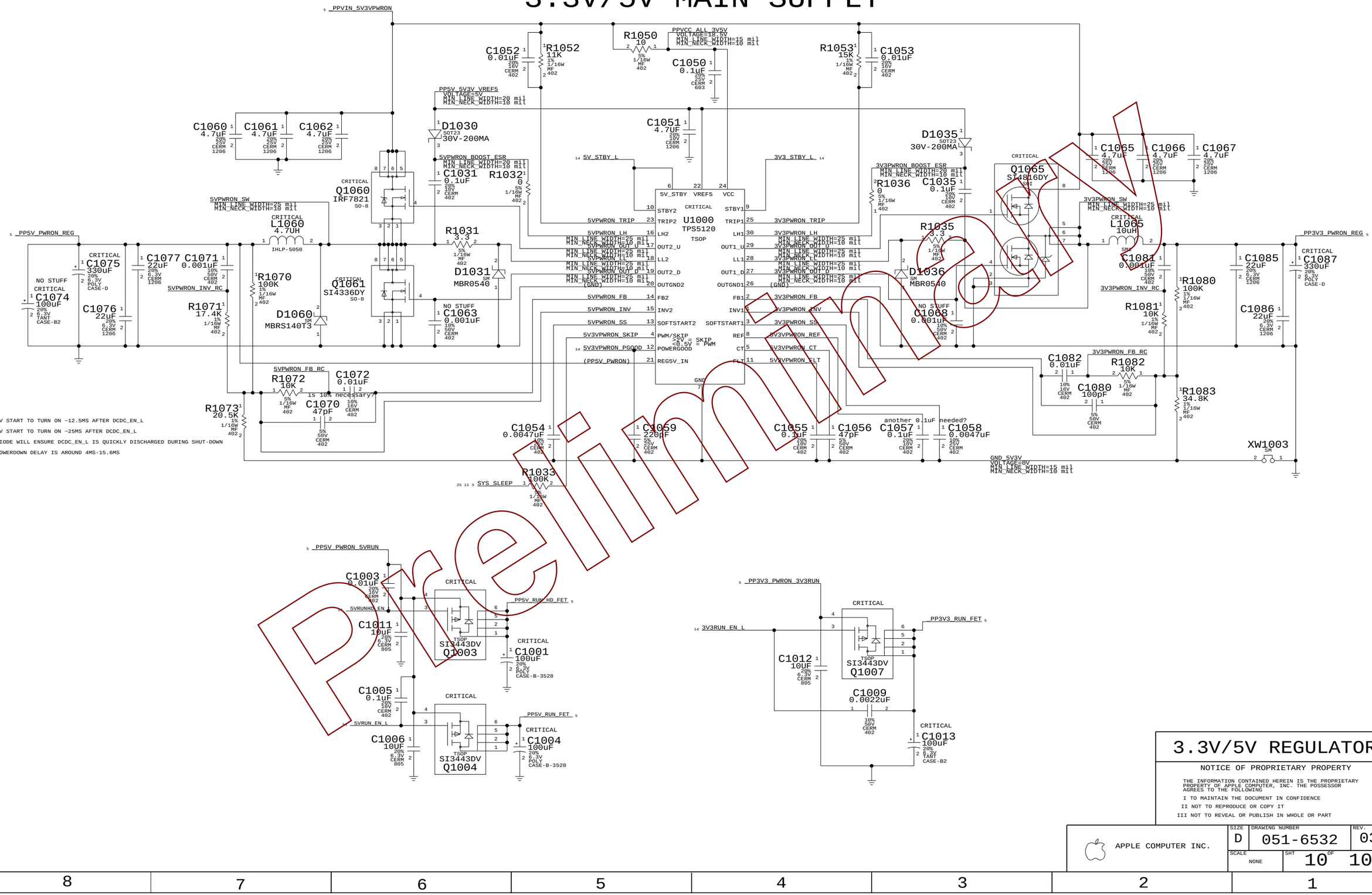
1.8V/1.5V Supplies

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	9	103

3.3V/5V MAIN SUPPLY



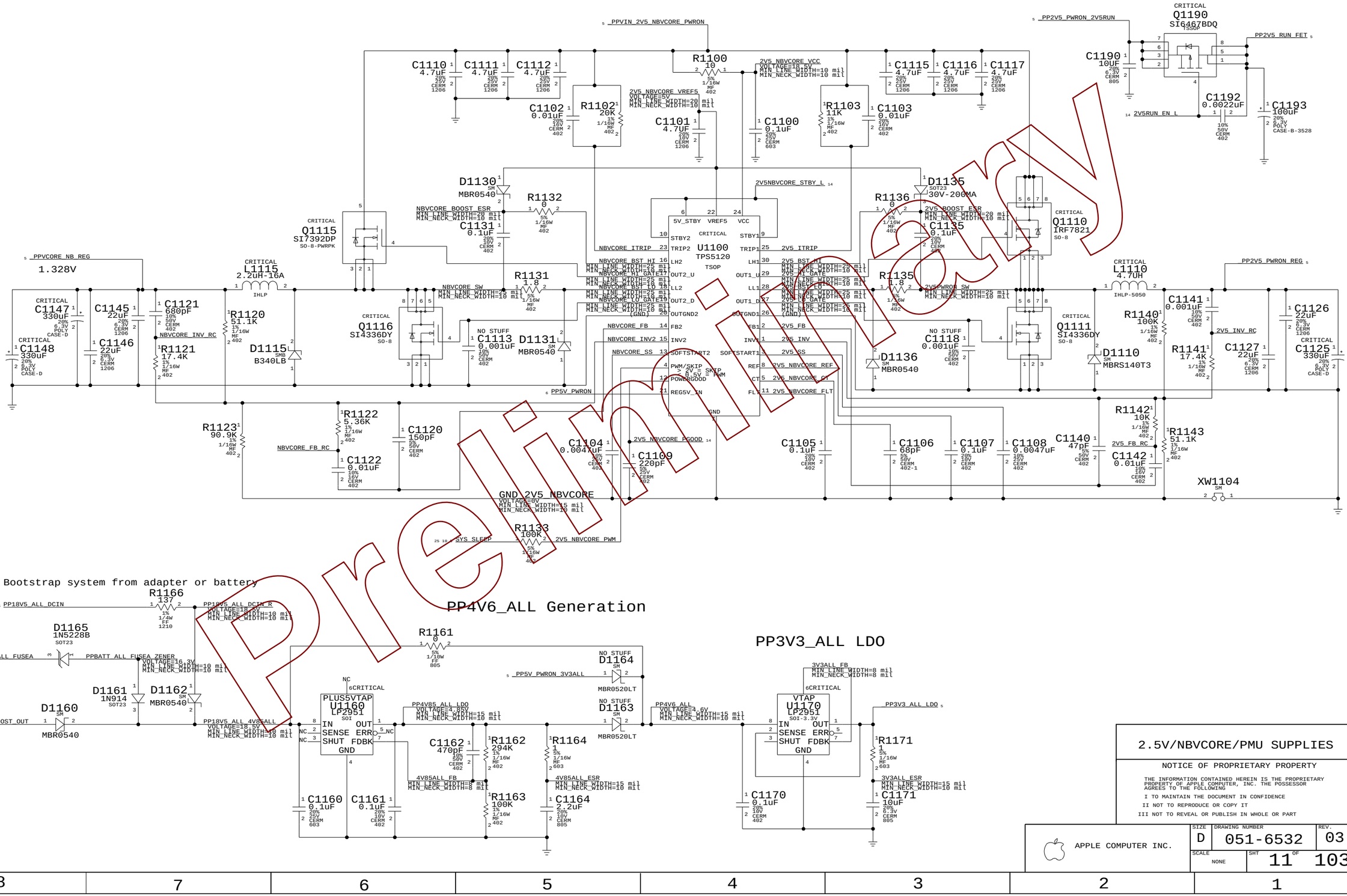
3.3V/5V REGULATOR

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT
NONE	10 OF 103

2.5V/NBVCORE MAIN SUPPLIES



2.5V/NBVCORE/PMU SUPPLIES

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	11	103

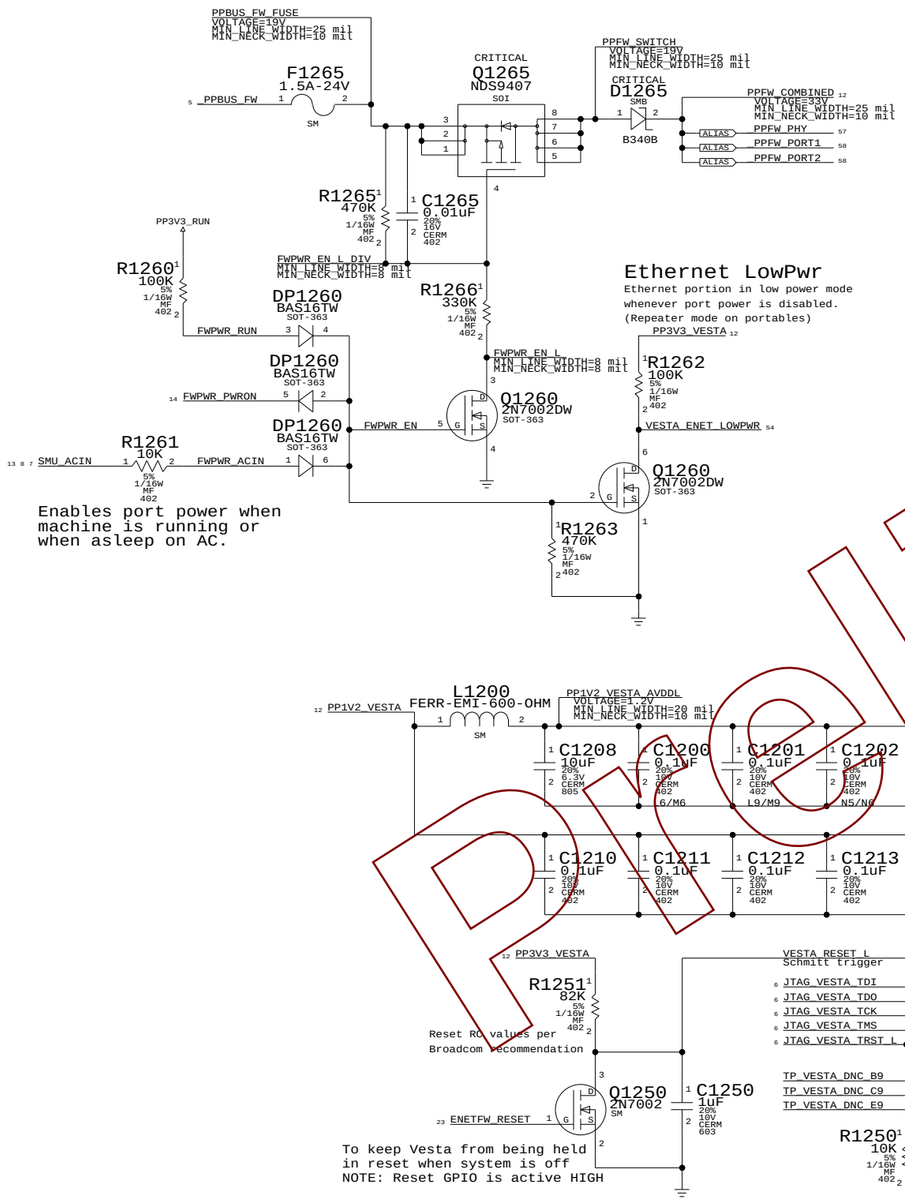
Page Notes

Power aliases required by this page:
- _PPBUS_FW (system supply for bus power)
- _PP12V_RUN_FW (backup PHY power)

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.

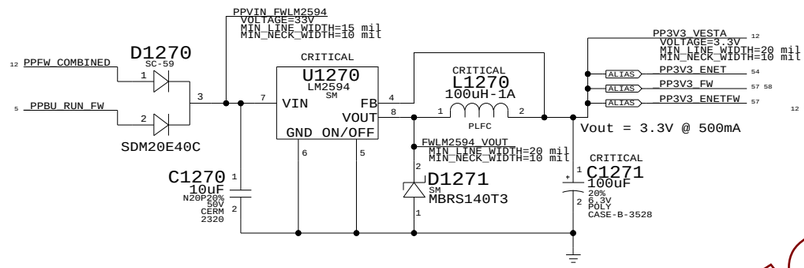
Port Power Switch



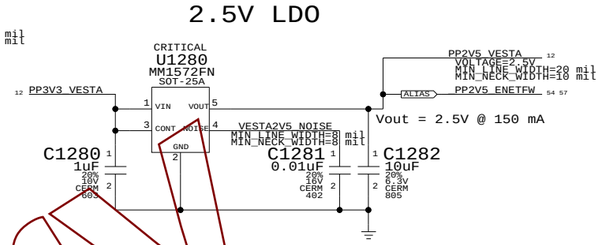
Ethernet LowPwr

Ethernet portion in low power mode whenever port power is disabled.
(Repeater mode on portables)

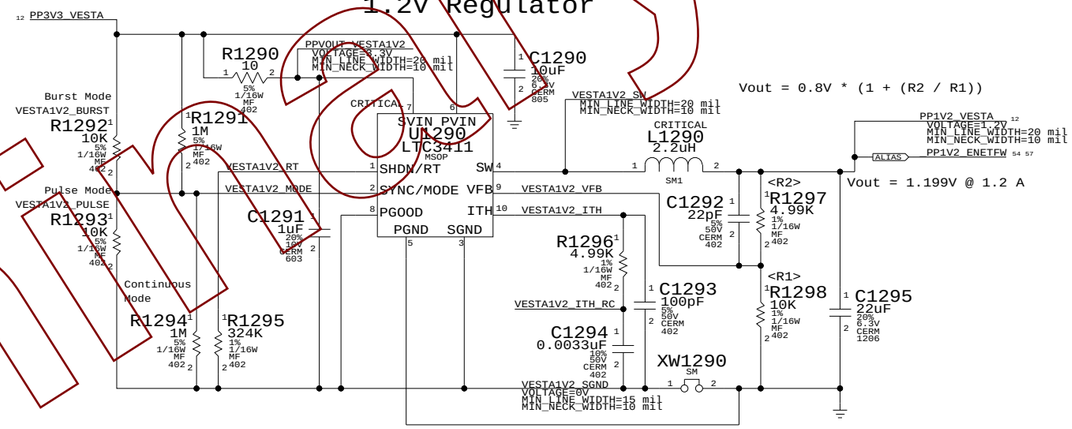
3.3V Regulator



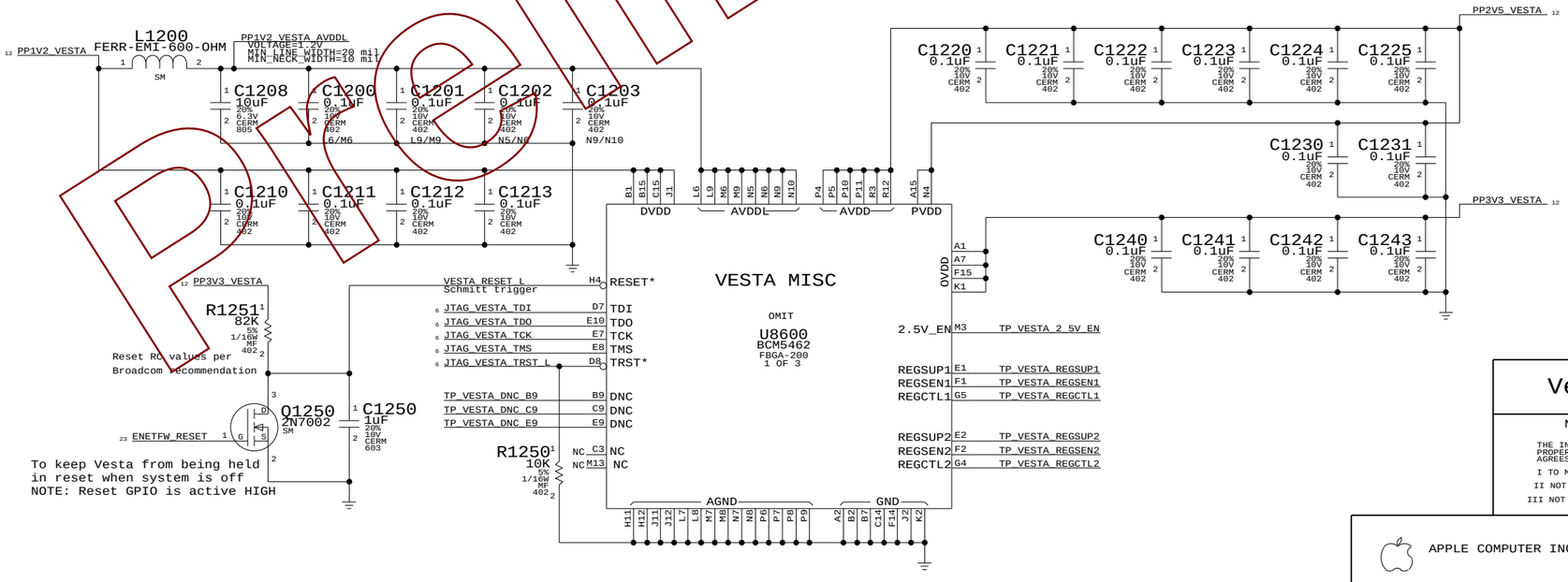
2.5V LDO



1.2V Regulator



VESTA MISC



Master: Link

Vesta Core / Misc

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 12 OF 103	

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:03:46 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
SMU_CLK10M_XTAL	15 MIL SPACING		SMU_CLK10M_XIN 13
	15 MIL SPACING		SMU_CLK10M_XOUT 13
	15 MIL SPACING		SMU_CLK10M_XOUT_R 13
RTC_CLK32K_XTAL	15 MIL SPACING		RTC_CLK32K_X1 13
	15 MIL SPACING		RTC_CLK32K_X2 13

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)

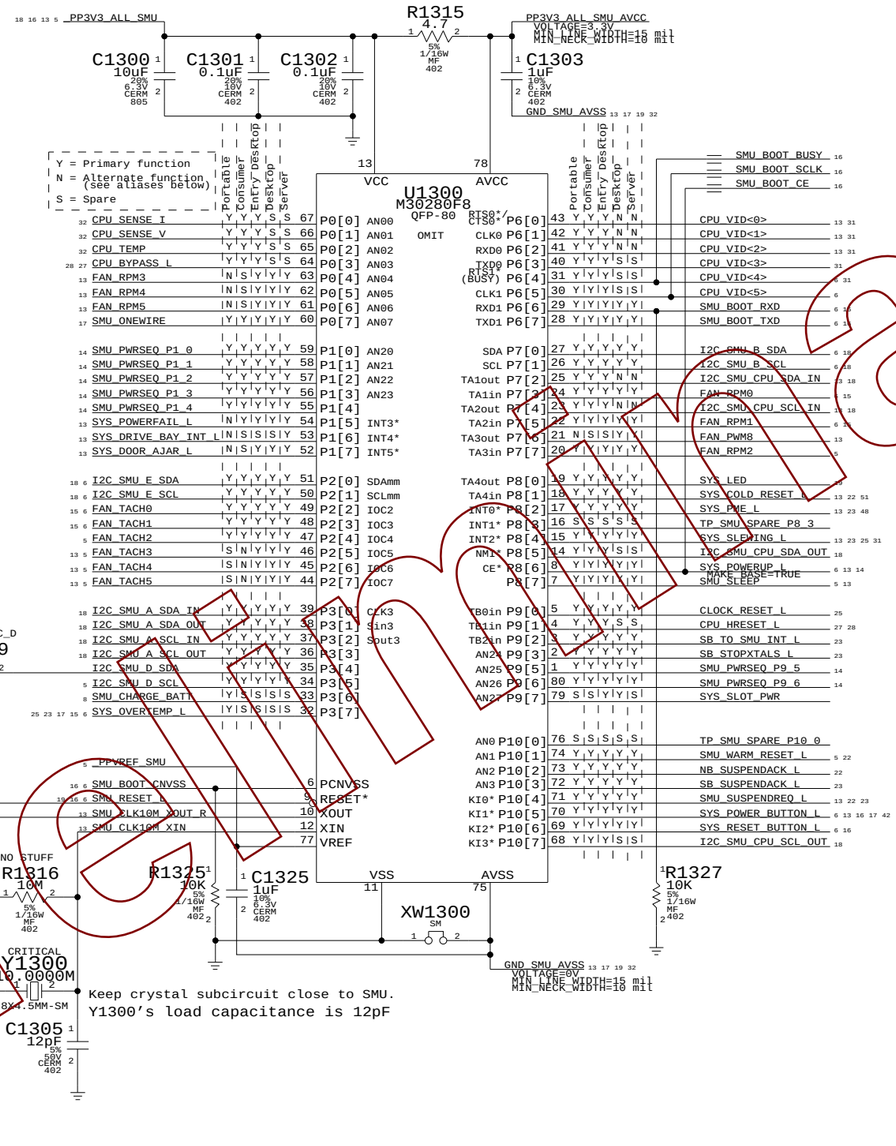
NOTE: CPU current/voltage monitoring (CPU_SENSE_I/CPU_SENSE_V) requires 100K/10uF RC filter at SMU pins. Caps should connect to GND_SMU_AVSS. SMU_VREF should be same signal or reference used by monitoring circuit, but be aware that this will affect other analog inputs such as AC adapter ID.

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.

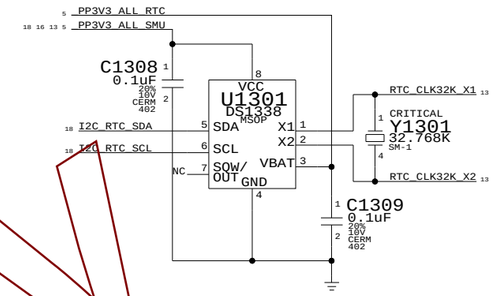
NOTE: Some primary and alternate functions reuire pull-ups that are not. provided on this page. Please. review the latest SMU specification to ensure missing pull-ups are provided on another page.

NOTE: Pinout matches SMU pinout v1.51.

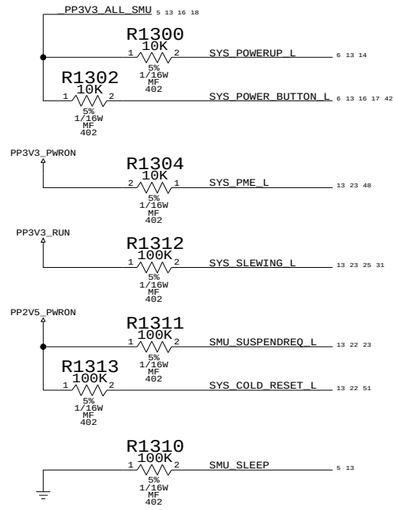
System Management Unit



Real Time Clock



SMU Pull-ups / pull-down



Alternate Functions

Portable

	Port		
FAN_RPM3	0.4	ALS0_OUT	6 17
FAN_RPM4	0.5	ALS1_OUT	19
FAN_RPM5	0.6	ALS_GAIN_BOOST	6 17 19
SYS_POWERFAIL_L	1.5	SMU_ACIN	7 8 12
SYS_DRIVE_BAY_INT_L	1.6	SMU_BATT_DET_L	7
SYS_DOOR_AJAR_L	1.7	SYS_LID_OPEN	17
FAN_PWM8	7.6	SYS_KBDLED	19

Consumer

	Port		
FAN_TACH3	2.5	SYS_LED_RED	
FAN_TACH4	2.6	SYS_LED_GREEN	
FAN_TACH5	2.7	SYS_LED_BLUE	

Tower & Server

	Port		
CPU_VID<0>	6.0	FAN_TACH6	
CPU_VID<1>	6.1	FAN_TACH7	
CPU_VID<2>	6.2	FAN_TACH8	
I2C_SMU_CPU_SDA_IN	7.2	FAN_PWM6	
I2C_SMU_CPU_SCL_IN	7.4	FAN_PWM7	

Master: Link

System Management Unit

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 13 OF 103	

POWER-UP
SLEEP
WAKE
SHUT-DOWN

ACTIVE-LOW, OUTPUT, PUSH-PULL
SYS_POWERUP_L
100K pull-up to 3.3V_ALL on pg 13
R1400 0 5% 1/16W MF 402
SYS_POWERUP_L_R

PP3V3_ALL
R1401 68K 5% 1/16W MF 402
TPS5120 needs a pull-up stronger than 82.5K
SYS_POWERUP

ACTIVE-HIGH, OUTPUT, PUSH-PULL
SMU_PWRSEQ_P1_0 (ALIAS) SYS_PWRSEQ_1 MAKE_BASE=TRUE
R1410 0 5% 1/16W MF 402 → 3V3_STBY_L
R1411 0 5% 1/16W MF 402 → 2V5NBVCORE_STBY_L
R1412 100K 5% 1/16W MF 402

R1402 0 5% 1/16W MF 402 → 5V_STBY_L
R1403 0 5% 1/16W MF 402 → FWPWR_PWRON
Q1400 2N7002DW SOT-363

PP5V_PWRON
R1429 100K 5% 1/16W MF 402

SYS_PWRSEQ_2_L
R1420 100K 5% 1/16W MF 402 → 5VRUN_EN_L
R1421 100K 5% 1/16W MF 402 → 5VRUNHD_EN_L
R1422 100K 5% 1/16W MF 402 → 3V3RUN_EN_L

ACTIVE-HIGH, OUTPUT, PUSH-PULL
SMU_PWRSEQ_P1_1 (ALIAS) SYS_PWRSEQ_2 MAKE_BASE=TRUE
Q1400 2N7002DW SOT-363

ACTIVE-LOW, OUTPUT, PUSH-PULL
SMU_PWRSEQ_P1_2 (ALIAS) SYS_PWRSEQ_3_L MAKE_BASE=TRUE
R1430 0 5% 1/16W MF 402 → 2V5RUN_EN_L

PP5V_RUN
R1435 100K 5% 1/16W MF 402

SYS_PWRSEQ_3_LS5
R1436 100K 5% 1/16W MF 402 → 1V5RUN_EN
R1437 100K 5% 1/16W MF 402 → 1V2RUN_EN
Q1435 2N7002DW SOT-363

PP3V3_RUN
R1448 100K 5% 1/16W MF 402

ACTIVE-HIGH, OUTPUT/INPUT, OPEN-COLLECTOR
SMU_PWRSEQ_P1_3 (ALIAS) SYS_PWRSEQ_4 MAKE_BASE=TRUE
R1440 100K 5% 1/16W MF 402 → CPUVCORE_SHDN_L
R1441 100K 5% 1/16W MF 402 → 1V8RUN_SHDN_L
R1449 0 5% 1/16W MF 402

5V3VPWRON_PGOOD (ALIAS)
2V5_NBVCORE_PGOOD (ALIAS) PWRON_REGS_PGOOD MAKE_BASE=TRUE

PP3V3_RUN
R1458 100K 5% 1/16W MF 402

ACTIVE-HIGH, OUTPUT/INPUT, OPEN-COLLECTOR
SMU_PWRSEQ_P1_4 (ALIAS) SYS_PWRSEQ_5 MAKE_BASE=TRUE
R1450 0 5% 1/16W MF 402 → GPUVCORE_SHDN_L
R1451 0 5% 1/16W MF 402 → CPU_AVDD_EN
R1459 0 5% 1/16W MF 402 ← 1V8RUN_PGOOD

ACTIVE-LOW, OUTPUT, PUSH-PULL
SMU_PWRSEQ_P9_5 (ALIAS) SYS_PWRSEQ_6_L MAKE_BASE=TRUE
(ALIAS) VCORE_SWITCHING

PP5V_RUN
R1465 100K 5% 1/16W MF 402

GPUVCORE_PGOOD
R1469 0 5% 1/16W MF 402

SYS_PWRSEQ_6_LS5 MAKE_BASE=TRUE
R1466 100K 5% 1/16W MF 402 → GPUVDD15_EN
R1467 0 5% 1/16W MF 402 → GPUPVDD_EN
Q1435 2N7002DW SOT-363

ANALOG INPUT, SENSE > 1.7V
SMU_PWRSEQ_P9_6 (ALIAS) SYS_PWRSEQ_7 MAKE_BASE=TRUE
XW1470 SM → PP1V8_GPU_PVDD
Used to see if last rail is up

Power Sequencing

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 14 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
	THERM	MAX1989_D1	MAX1989_D1_P
	THERM	MAX1989_D1	MAX1989_D1_N
	THERM	MAX1989_D2	MAX1989_D2_P
	THERM	MAX1989_D2	MAX1989_D2_N
	THERM	MAX1989_D3	MAX1989_D3_P
	THERM	MAX1989_D3	MAX1989_D3_N
	THERM	MAX1989_D4	MAX1989_D4_P
	THERM	MAX1989_D4	MAX1989_D4_N
	THERM	THERM_1	THERM_1_P
	THERM	THERM_1	THERM_1_N
	THERM	THERM_2	THERM_2_P
	THERM	THERM_2	THERM_2_N
	THERM	THERM_3	THERM_3_P
	THERM	THERM_3	THERM_3_N
	THERM	THERM_1B	THERM_1B_P
	THERM	THERM_1B	THERM_1B_N
	THERM	THERM_2B	THERM_2B_P
	THERM	THERM_2B	THERM_2B_N
	THERM	THERM_3B	THERM_3B_P
	THERM	THERM_3B	THERM_3B_N

Page Notes

Power aliases required by this page:
- _PP3V3_PWRON_THERM
- _PP5V_PWRON_FAN

Signal aliases required by this page:
(NONE)

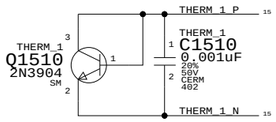
BOM options provided by this page:
- THERM_x / THERM_xB
  Selects between primary and backup thermal sensors for each of the available remote sensor locations.

Remote Temperature Sensors

Place each cap close to associated transistor

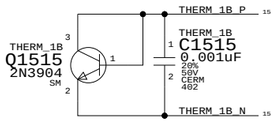
Remote 1

Place close to CPU_VCORE



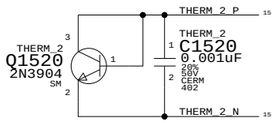
Remote 1 (Backup)

Place close to 5V/3.3V



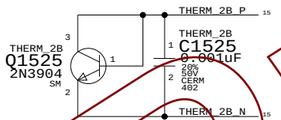
Remote 2

Place close to CPU



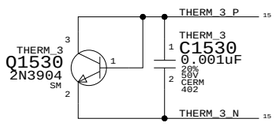
Remote 2 (Backup)

Place close to U3Lite



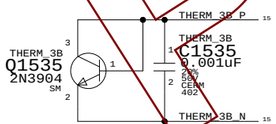
Remote 3

Place close to Shasta/GPU_Vcore



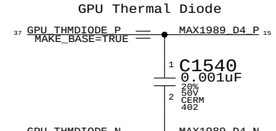
Remote 3 (Backup)

Place close to bottom RAM

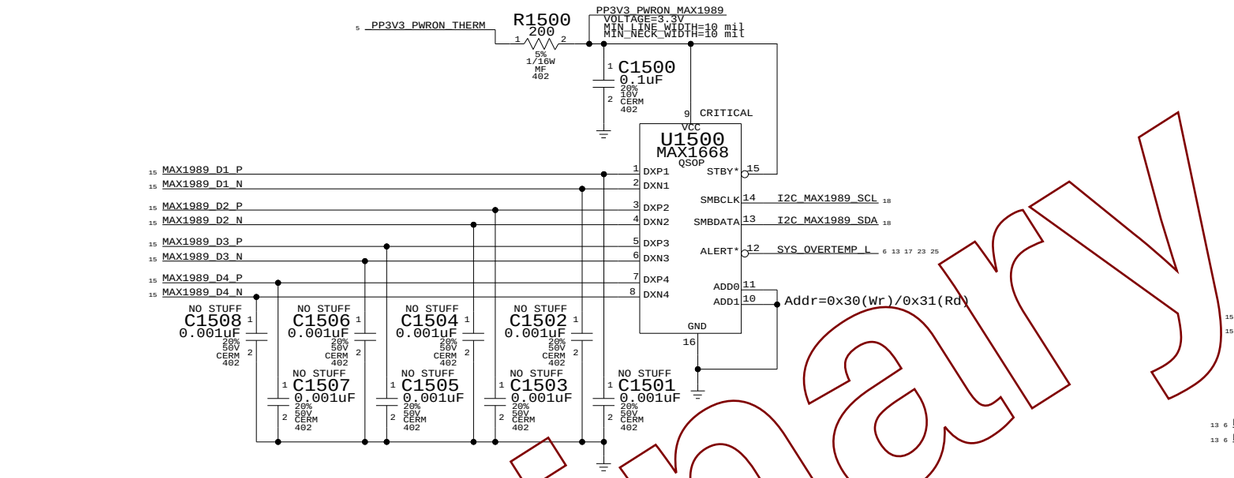


Remote 4

GPU Thermal Diode

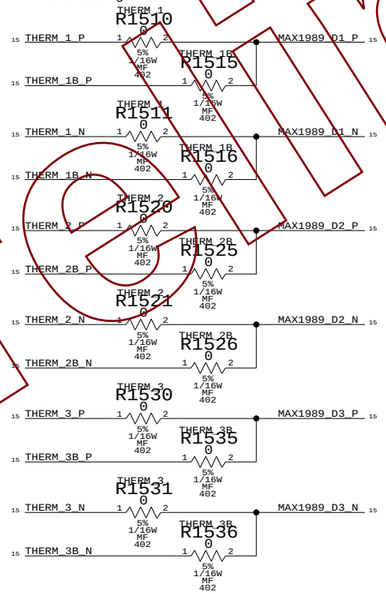


MAX1989 Thermal Sensor

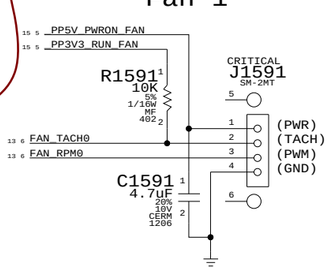


Sensor Selection

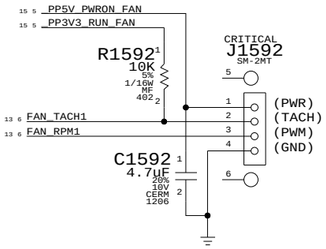
First 3 MAX1668 inputs can connect to two different sensors. These resistors should be close to MAX1668, minimizing stubs.



Fan 1



Fan 2



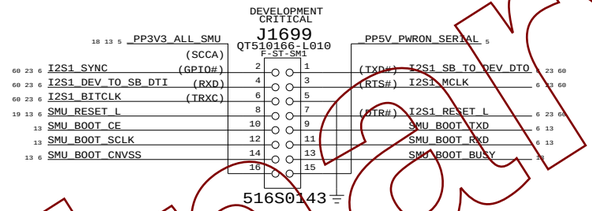
Thermal Sensor / Fans

APPLE COMPUTER INC.

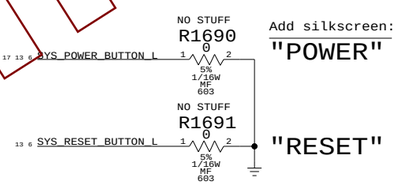
SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 15 OF 103	

SMU Download / Serial Debug Connector

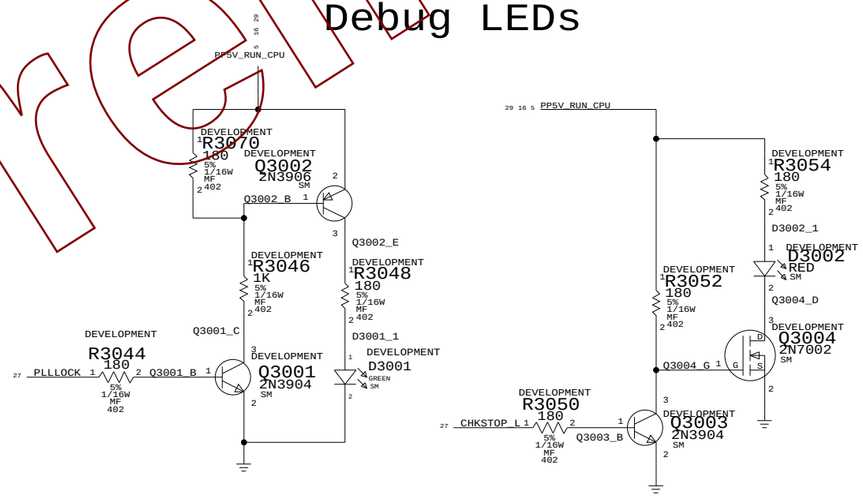
SCC same pins have pinout as modem connector to
allow serial debug flex to use either connector



Debug "Buttons"



Debug LEDs



INTERNAL I/O CONNECTORS

NOTICE OF PROPRIETARY PROPERTY

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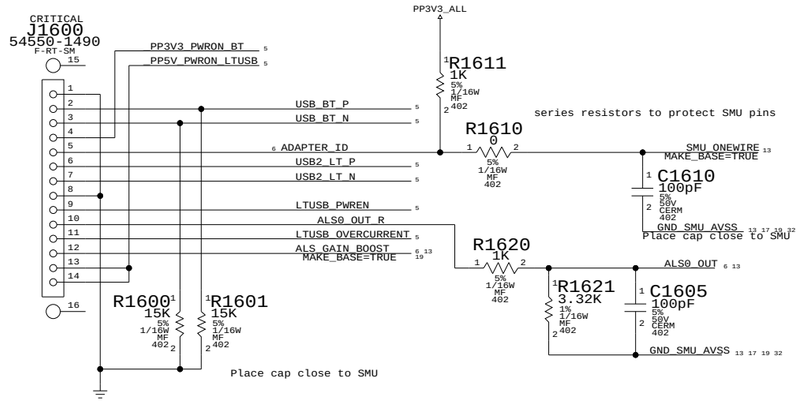
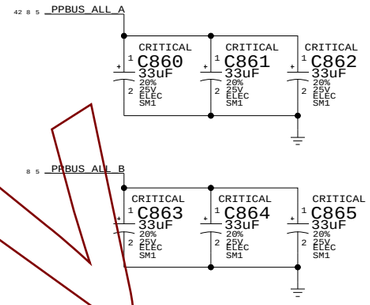
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 16 OF 103	

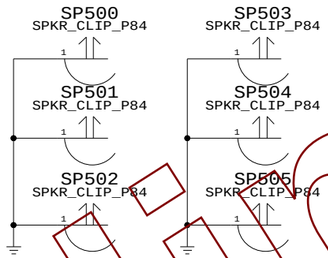
BlueTooth / Left USB Flex Connector



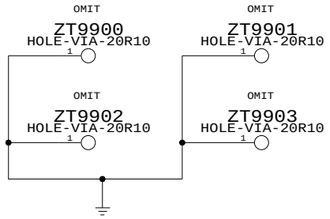
PPBUS Hold-Up Caps



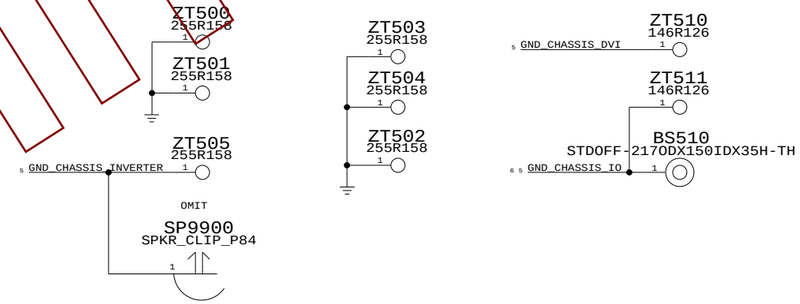
Speaker Clips



For EMI around ENET magnetic

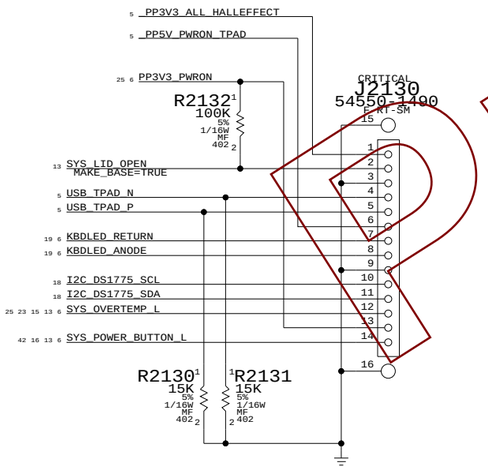


CPU Heat Sink Graphic Heat Sink Right I/O area



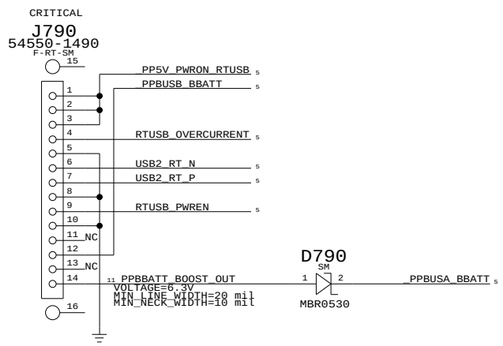
for EMI testing only

USB Trackpad Connector



overtemp may need pull-up resistor

Backup Battery / Right USB Flex Connector



_PPBUSB_BBATT is both an input and an output for backup battery circuit. _PPBUSA_BBATT is an output only.

Q51 Specific connectors

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 18 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
I2C_SMU_A_OUT	I2C	I2C_SMU_A_OUT	I2C_SMU_A_SCL_OUT 13 18
I2C_SMU_A_OUT	I2C	I2C_SMU_A_OUT	I2C_SMU_A_SDA_OUT 13 18
I2C_SMU_A_IN	I2C	I2C_SMU_A_IN	I2C_SMU_A_SCL_IN 13 18
I2C_SMU_A_IN	I2C	I2C_SMU_A_IN	I2C_SMU_A_SDA_IN 13 18
I2C_SMU_CPU_OUT	I2C	I2C_SMU_CPU_OUT	I2C_SMU_CPU_SCL_OUT 13 18
I2C_SMU_CPU_OUT	I2C	I2C_SMU_CPU_OUT	I2C_SMU_CPU_SDA_OUT 13 18
I2C_SMU_CPU_IN	I2C	I2C_SMU_CPU_IN	I2C_SMU_CPU_SCL_IN 13 18
I2C_SMU_CPU_IN	I2C	I2C_SMU_CPU_IN	I2C_SMU_CPU_SDA_IN 13 18
	I2C		I2C_CPU_A_SCL 18 27
	I2C		I2C_CPU_A_SDA 18 27
	I2C		SMU_CPU_JTAG_OR_I2C 18
	I2C		I2C_CPU_A_SDA_TO_SMU 18
I2C_SMU_B	I2C	I2C_SMU_B	I2C_SMU_B_SCL 6 13 18
I2C_SMU_B	I2C	I2C_SMU_B	I2C_SMU_B_SDA 6 13 18
I2C_NB_B	I2C	I2C_NB_B	I2C_NB_B_SCL 18 22
I2C_NB_B	I2C	I2C_NB_B	I2C_NB_B_SDA 18 22
I2C_NB_C	I2C	I2C_NB_C	I2C_NB_C_SCL 18 22
I2C_NB_C	I2C	I2C_NB_C	I2C_NB_C_SDA 18 22
I2C_SB	I2C	I2C_SB	I2C_SB_SCL 6 18 23
I2C_SB	I2C	I2C_SB	I2C_SB_SDA 6 18 23

Page Notes

Power aliases required by this page:
(NONE)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

U3 Lite I2C inversion

I2C_SMU_A_SCL_OUT_L 18
Q2000 2N7002DW SOT-363
18 13 I2C_SMU_A_SCL_OUT MAKE_BASE=TRUE

I2C_SMU_A_SDA_OUT_L 18
Q2000 2N7002DW SOT-363
18 13 I2C_SMU_A_SDA_OUT MAKE_BASE=TRUE

PP3V3_PWRON_SB 5 21 23 45
RP2060 4.7K 5% 1/16W SM1
JTAG_SB_TDI 6 23
JTAG_SB_TMS 6 23
JTAG_SB_TCK 6 23
JTAG_SB_TRST_L 6 23

I2C "A" Bus

PP5V_PWRON
PP3V3_PWRON
C2015 0.1uF 10% 10V CERM 402
R2015 4.7K 5% 1/16W MF 402
R2010 2K 5% 1/16W MF 402
R2011 2K 5% 1/16W MF 402
LM339A SOI U2015 GND V+ CRITICAL

SMU U1300 (MASTER)
18 13 I2C_SMU_A_SCL_IN MAKE_BASE=TRUE
18 I2C_SMU_A_SCL_OUT_L
18 13 I2C_SMU_A_SDA_IN MAKE_BASE=TRUE
18 I2C_SMU_A_SDA_OUT_L

PP1V2_EI_NB 5 26
R2018 200 5% 1/16W MF 402
R2019 200 5% 1/16W MF 402
ALIAS
U3Lite U3 (Write: 0x?? Read: 0x??)
I2C_NB_A_SCL 22
I2C_NB_A_SDA 22

R2080 2K 5% 1/16W MF 402
R2081 2K 5% 1/16W MF 402

SMU U1300 (MASTER)
18 13 I2C_SMU_CPU_SCL_IN MAKE_BASE=TRUE
18 13 I2C_SMU_CPU_SCL_OUT MAKE_BASE=TRUE
18 13 I2C_SMU_CPU_SDA_IN MAKE_BASE=TRUE
18 13 I2C_SMU_CPU_SDA_OUT MAKE_BASE=TRUE

SMU_CPU_I2C
RP2080 0K 5% 1/16W SM1
18 SMU_CPU_JTAG_OR_I2C
(I2C_CPU_A_SCL)
18 I2C_CPU_A_SDA_TO_SMU
(I2C_CPU_A_SDA)

SMU_CPU_JTAG
RP2085 0K 5% 1/16W SM1
JTAG_CPU_TCK 6 27 28
JTAG_CPU_TMS 6 27 28
JTAG_CPU_TDI 6 27 28
JTAG_CPU_TDO 6 27 28

PP1V2_EI_CPU 5 27 28 29
R2082 1K 5% 1/16W MF 402
R2083 1K 5% 1/16W MF 402
CPU U2900 (Write: 0x?? Read: 0x??)
I2C_CPU_A_SCL 18 27
I2C_CPU_A_SDA 18 27

I2C_0V546_REF
R2016 576 1% 1/10W MF 402
C2016 0.1uF 20% 10V CERM 402

NorthBridge I2C "B" Bus

PP2V5_PWRON
U3Lite U3 (MASTER)
22 18 I2C_NB_B_SCL MAKE_BASE=TRUE
22 18 I2C_NB_B_SDA MAKE_BASE=TRUE
R2028 2K 5% 1/16W MF 402
R2029 2K 5% 1/16W MF 402

NorthBridge I2C "C" Bus

PP2V5_PWRON
U3Lite U3 (MASTER)
22 18 I2C_NB_C_SCL MAKE_BASE=TRUE
22 18 I2C_NB_C_SDA MAKE_BASE=TRUE
R2030 2K 5% 1/16W MF 402
R2031 2K 5% 1/16W MF 402
DIMMs J4010 / J4020 (Write: 0xA0 / 0xA2, Read: 0xA1 / 0xA3)
I2C_DIMM_SCL 35
I2C_DIMM_SDA 35

I2C "B" Bus

PP3V3_PWRON
SMU U1300 (MASTER)
18 13 6 I2C_SMU_B_SCL MAKE_BASE=TRUE
18 13 6 I2C_SMU_B_SDA MAKE_BASE=TRUE
R2020 1K 5% 1/16W MF 402
R2021 1K 5% 1/16W MF 402
Pulsar U2600 (Write: 0x?? Read: 0x??)
I2C_CLOCK_SCL 25
I2C_CLOCK_SDA 25
MAX1989 U1500 (Write: 0x30 Read: 0x31)
I2C_MAX1989_SCL 15
I2C_MAX1989_SDA 15
DS1775 On Trackpad Flex (Write: 0x?? Read: 0x??)
I2C_DS1775_SCL 17
I2C_DS1775_SDA 17

I2C "E" Bus

16 13 5 PP3V3_ALL_SMU
SMU U1300 (MASTER)
13 6 I2C_SMU_E_SCL MAKE_BASE=TRUE
13 6 I2C_SMU_E_SDA MAKE_BASE=TRUE
R2050 7.15K 1% 1/16W MF 402
R2051 7.15K 1% 1/16W MF 402
RTC U1301 (Write: 0x?? Read: 0x??)
I2C_RTC_SCL 13
I2C_RTC_SDA 13
Battery Conn J790 (Write: 0x?? Read: 0x??)
I2C_BATT_SCL 7
I2C_BATT_SDA 7
Battery Charger U800 (Write: 0x?? Read: 0x??)
I2C_CHGR_SCL 8
I2C_CHGR_SDA 8

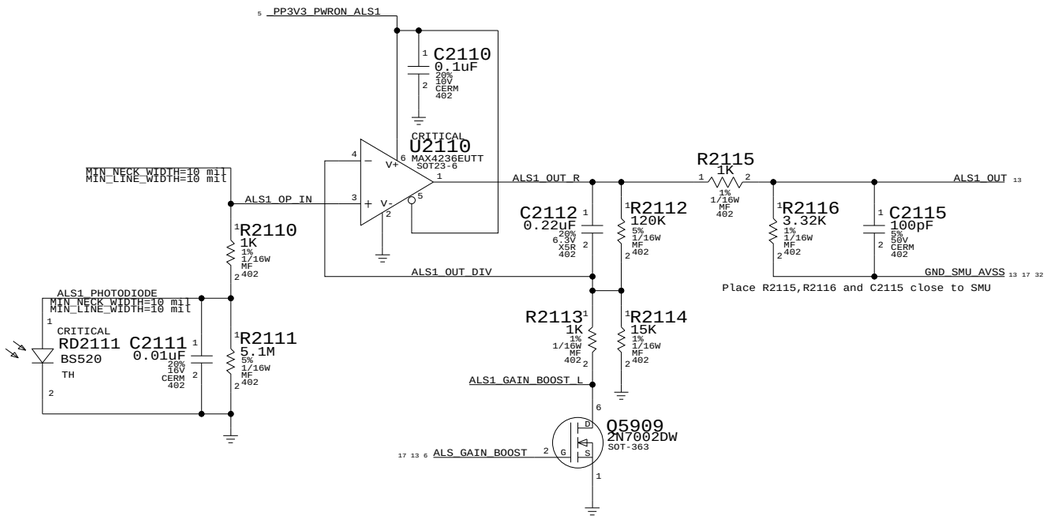
SouthBridge I2C Bus

PP3V3_RUN
Shasta U2300 (MASTER)
23 18 6 I2C_SB_SCL MAKE_BASE=TRUE
23 18 6 I2C_SB_SDA MAKE_BASE=TRUE
R2040 1K 5% 1/16W MF 402
R2041 1K 5% 1/16W MF 402
MicroDash J9400 (Write: 0xAC Read: 0xAD) (Address set on modem flex)
I2C_MODEM_SCL 60
I2C_MODEM_SDA 60
Audio Board J9500 (Write: 0x?? Read: 0x??)
I2C_AUDIO_SCL 61
I2C_AUDIO_SDA 61

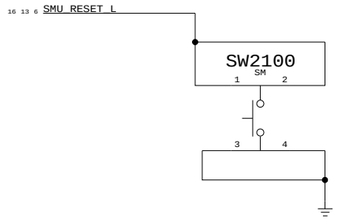
I2C CONNECTIONS

APPLE COMPUTER INC.
SIZE D | DRAWING NUMBER 051-6532 | REV. 03
SCALE NONE | SHT 20 OF 103

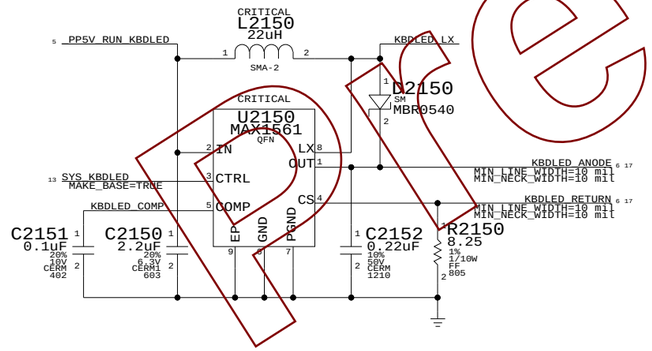
Ambient Light Sensor #1



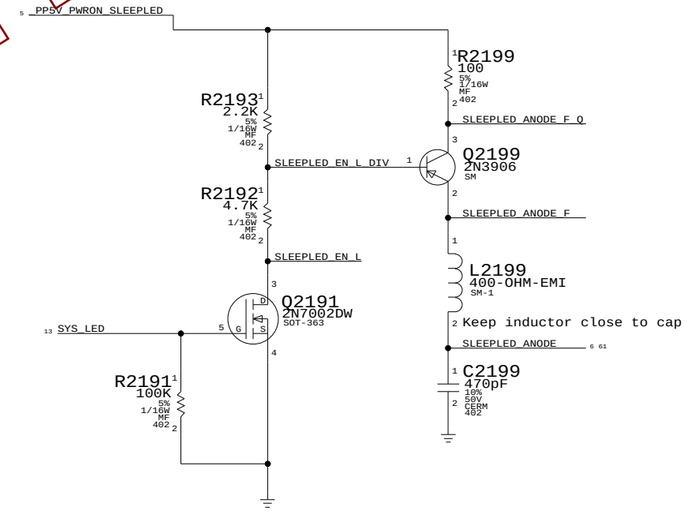
SMU / System Reset Button



Keyboard LED Driver



Sleep LED Circuit



SMU ALS/LEDs

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

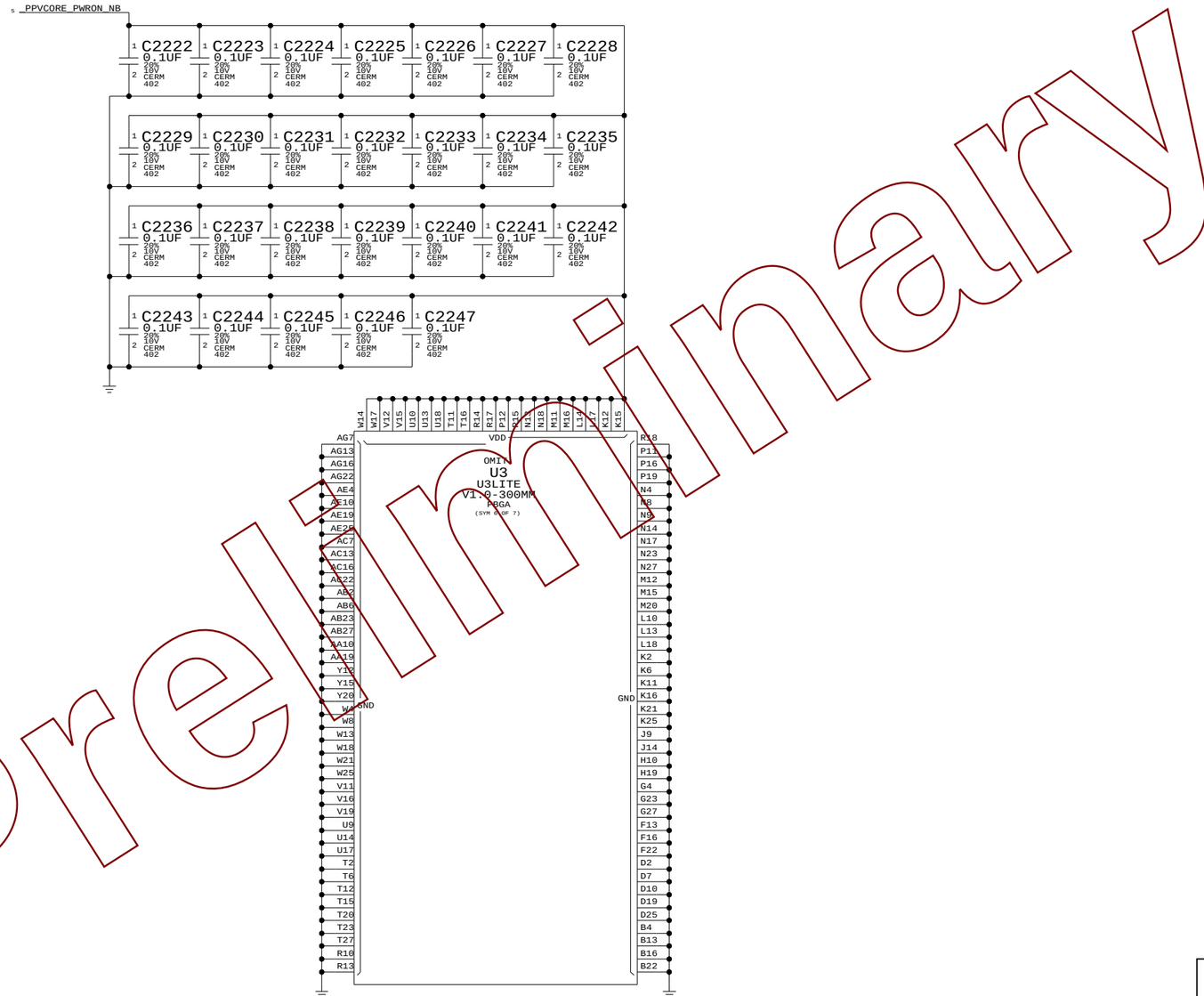
SCALE	SHT
NONE	21 OF 103

Page Notes

Power aliases required by this page:
- _PPVCORE_PWRON_NB

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)



Master: Link

U3Lite Core Power

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT
NONE	22 OF 103

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:04:04 2004

Page Notes

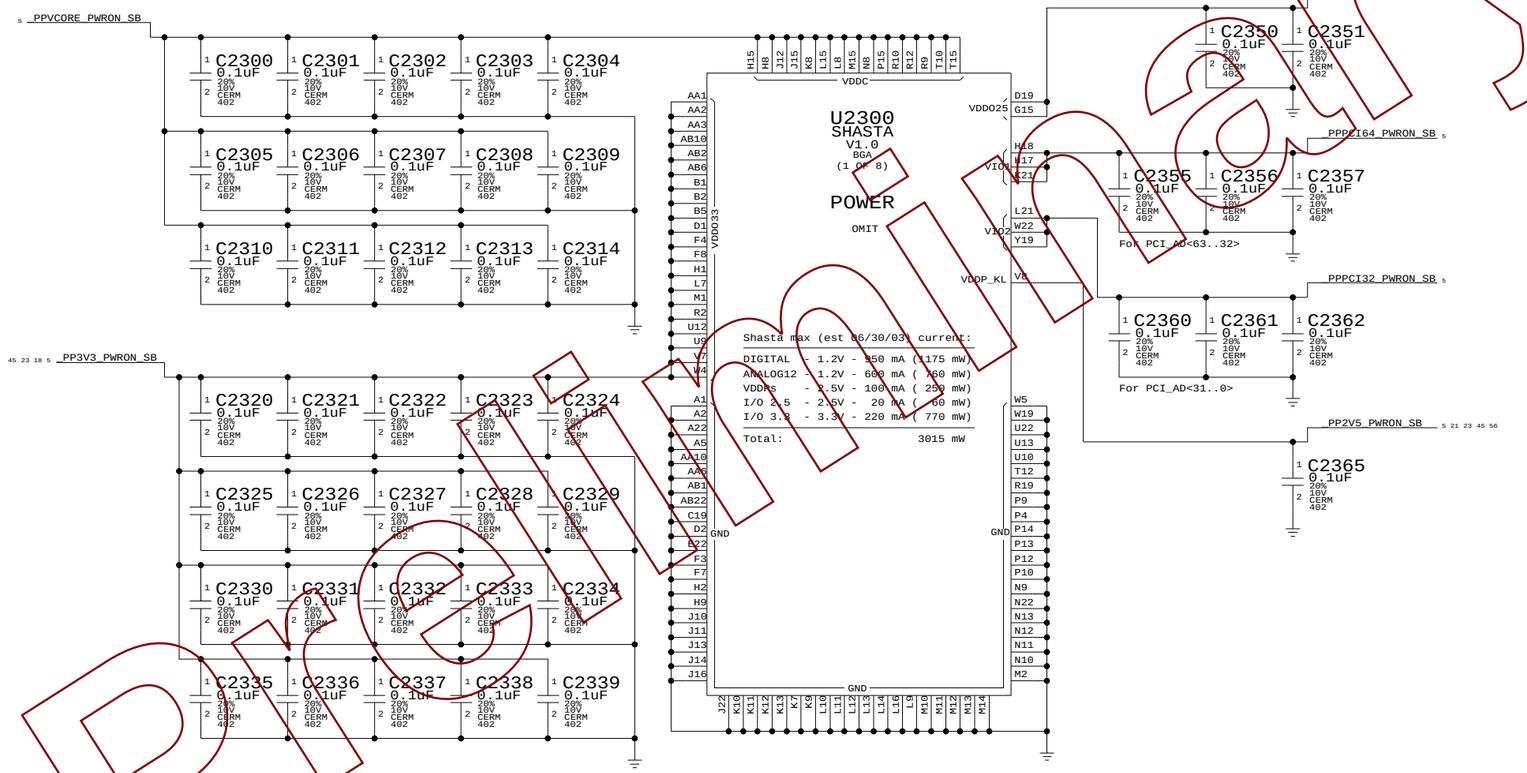
Power aliases required by this page:
- _PPPCI64_PWRON_SB (to 5V or 3.3V)
- _PPPCI32_PWRON_SB (to 5V or 3.3V)
- _PP3V3_PWRON_SB
- _PP2V5_PWRON_SB
- _PPVCORE_PWRON_SB (1.2V)

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 _PPPCI32_PWRON_SB to appropriate PCI bus voltage and _PPPCI64_PWRON_SB 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.



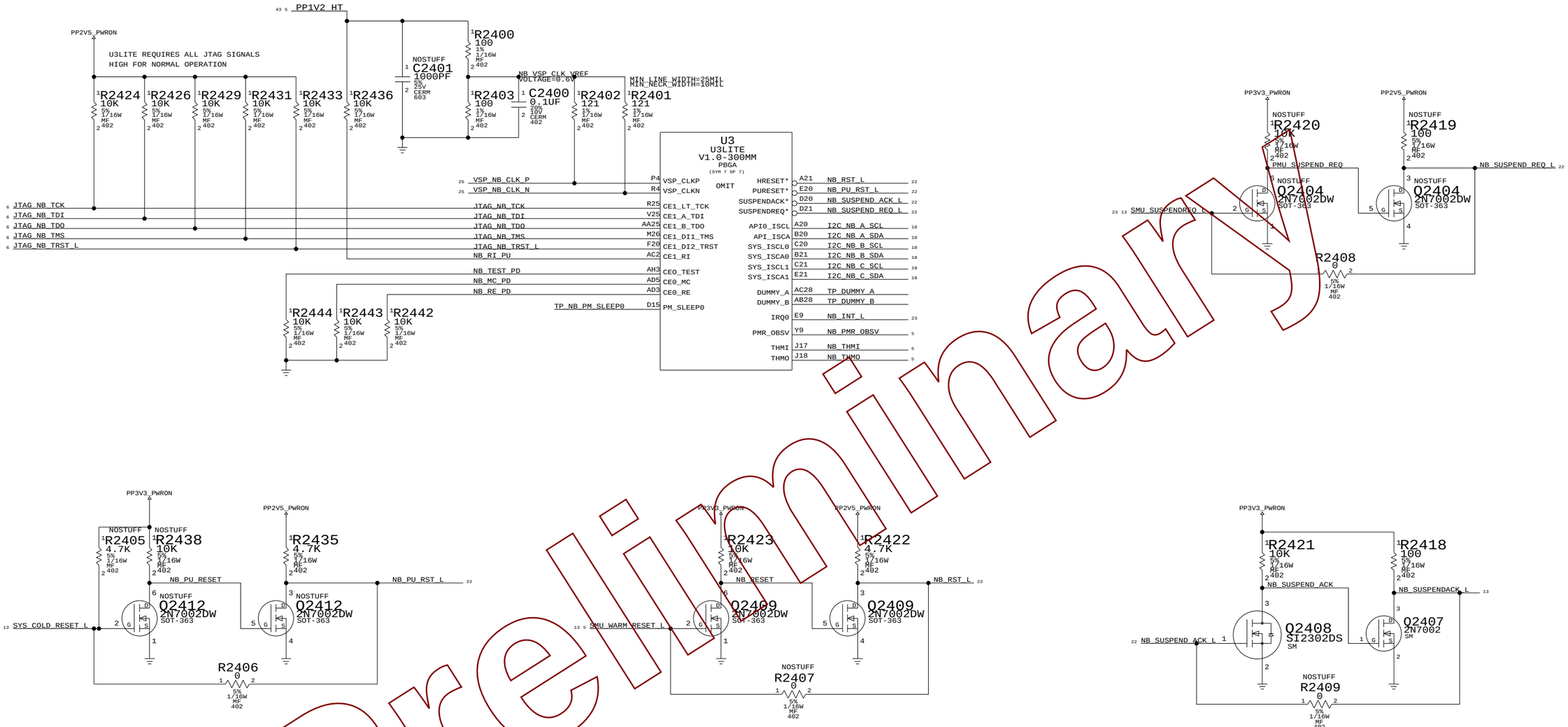
Master: Link

Shasta Core Power

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 23 OF 103	

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:04:08 2004



ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
1100 SMU_RESET	10 MIL SPACING		SYS_COLD_RESET_L 13 22 51
1100 SMU_RESET	10 MIL SPACING		SYS_WARM_RESET_L 5 23 45 48

MASTER: GILA

U3LITE MISC

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT
NONE	24 OF 103

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
I2S0_TO_SB			I2S0_DEV_TO_SB_DTI	23 61
I2S0_TO_DEV			I2S0_SB_TO_DEV_DTO	23 61
I2S0_TO_DEV	10_MIL_SPACING		I2S0_MCLK	23 61
I2S0_BIDIR			I2S0_BITCLK	23 61
I2S0_BIDIR			I2S0_SYNC	23 61
I2S1_TO_SB			I2S1_DEV_TO_SB_DTI	6 16 23 60
I2S1_TO_DEV			I2S1_SB_TO_DEV_DTO	6 16 23 60
I2S1_TO_DEV	10_MIL_SPACING		I2S1_MCLK	6 16 23 60
I2S1_BIDIR			I2S1_BITCLK	6 16 23 60
I2S1_BIDIR			I2S1_SYNC	6 16 23 60
I2S2_TO_SB			I2S2_DEV_TO_SB_DTI	23 61
I2S2_TO_DEV			I2S2_SB_TO_DEV_DTO	23
I2S2_TO_DEV	10_MIL_SPACING		I2S2_MCLK	23
I2S2_BIDIR			I2S2_BITCLK	23 61
I2S2_BIDIR			I2S2_SYNC	23 61
SB_CLK18M_XTAL	15_MIL_SPACING		SB_CLK18M_XTALI	23
	15_MIL_SPACING		SB_CLK18M_XTALO	23
	15_MIL_SPACING		SB_CLK18M_XTALO_R	23
SB_CLK25M_ATA	15_MIL_SPACING		SB_CLK25M_ATA	23 25

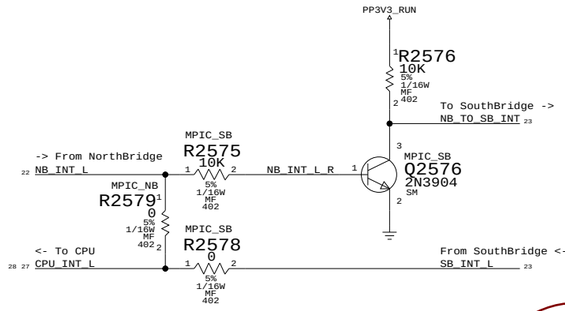
Page Notes

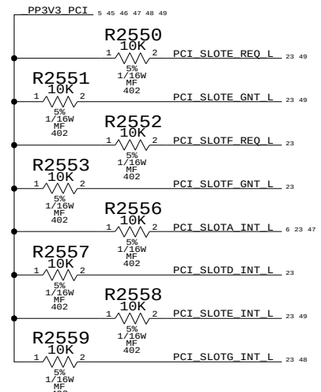
Power aliases required by this page:
- _PP3V3_PCI
- _PP3V3_PWRON_SB
- _PP2V5_PWRON_SB
- _PP1V2_PWRON_SB

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.

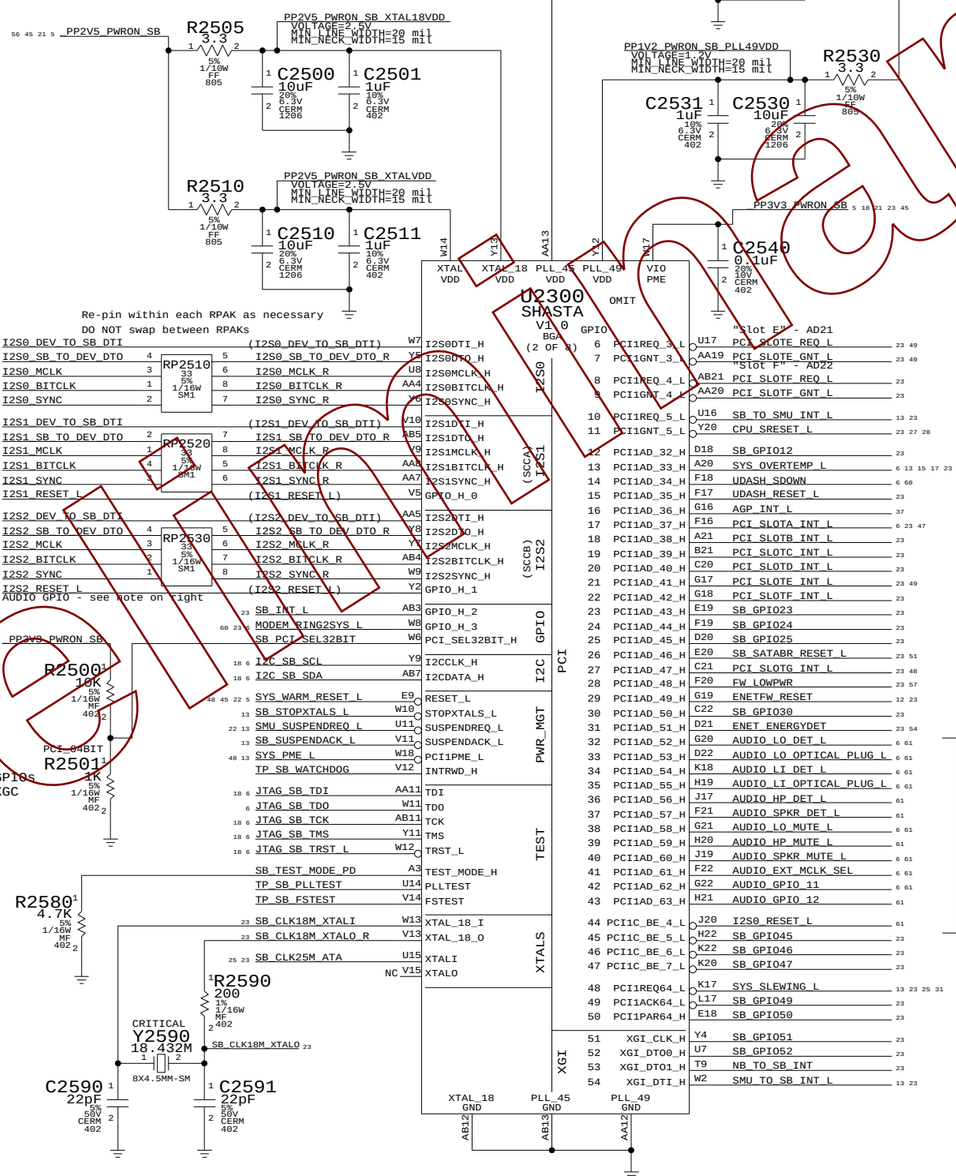
NorthBridge / SouthBridge MPIC Routing

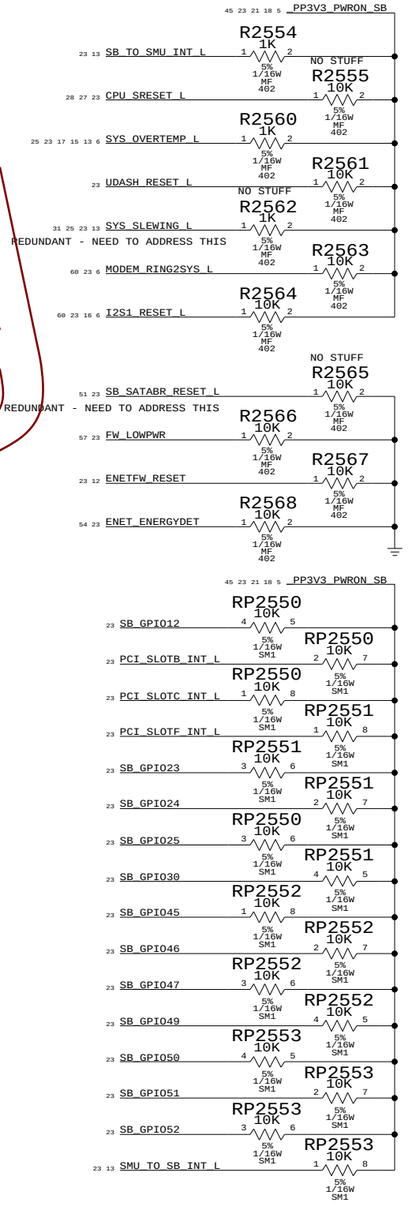




DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:04:13 2004

PCI 32-bit select
1 = 32-bit PCI & GPIOs
0 = 64-bit PCI & XGC





AUDIO GPIOS

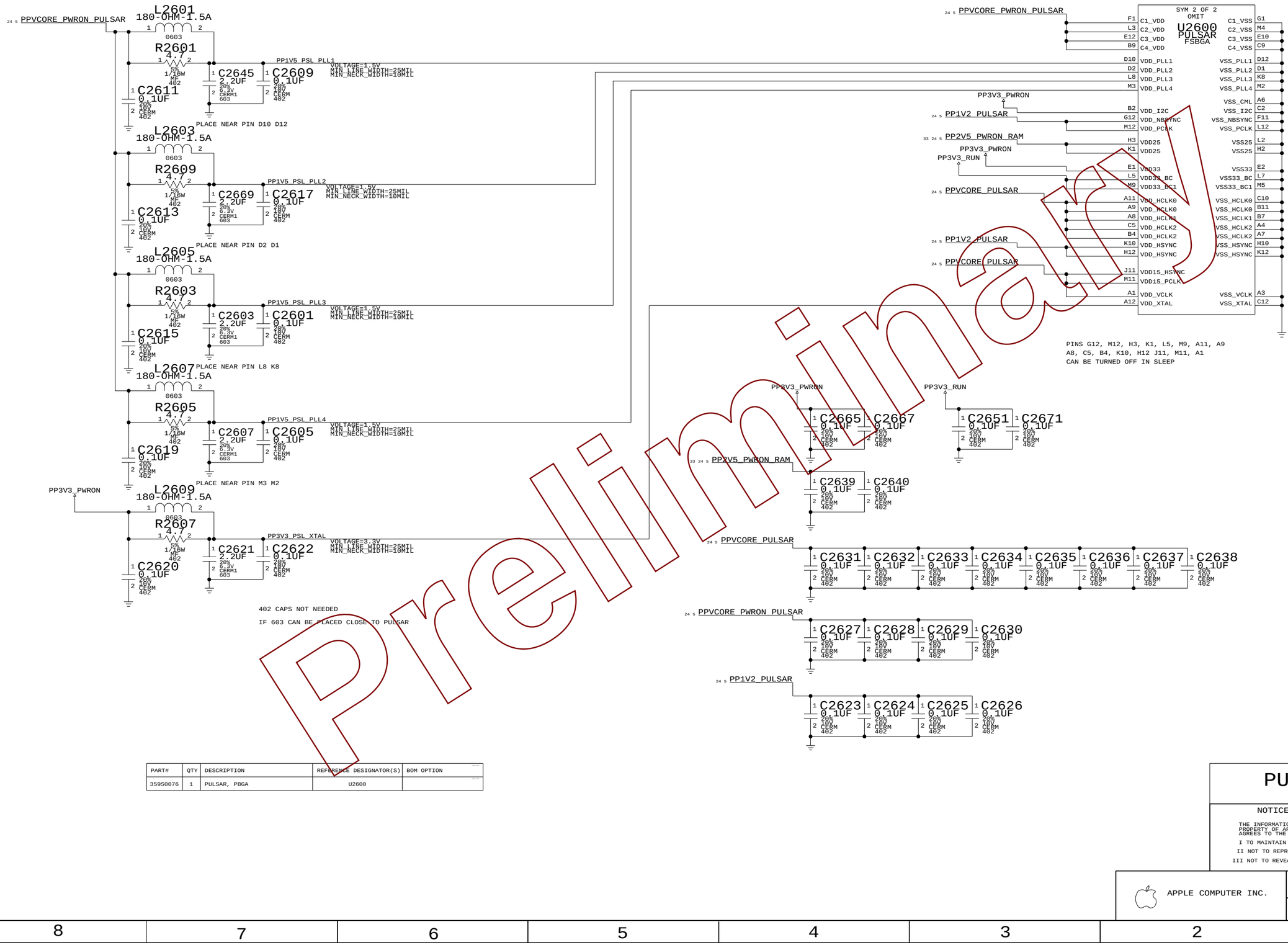
NOTE: It is the responsibility of the audio circuit to provide the necessary pull-ups & pull-downs.

Master: Link

Shasta Serial / Misc

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 25 OF 103	



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
359S0076	1	PULSAR, PBGA	U2600	

MASTER: GILA

PULSAR POWER

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 26 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
EI_CPU_CLK_P	EI_CPU_CLK	CLOCKS	EI_CPU_CLK
EI_CPU_CLK_N	EI_CPU_CLK	CLOCKS	EI_CPU_CLK
EI_CPU1_CLK_P	EI_CPU1_CLK	CLOCKS	EI_CPU1_CLK
EI_CPU1_CLK_N	EI_CPU1_CLK	CLOCKS	EI_CPU1_CLK
EI_NB_CLK_P	EI_NB_CLK	CLOCKS	EI_NB_CLK
EI_NB_CLK_N	EI_NB_CLK	CLOCKS	EI_NB_CLK
EI_CPU_SYNC	EI_SYNC	CLOCKS	
EI_NB_SYNC		CLOCKS	
EI_CPU1_SYNC	EI_CPU1_SYNC	CLOCKS	
VSP_NB_CLK_P	VSP_NB_CLK	CLOCKS	VSP_NB_CLK
VSP_NB_CLK_N	VSP_NB_CLK	CLOCKS	VSP_NB_CLK
AGP_CLK66M_NB	AGP_NB_CLK	CLOCKS	
AGP_CLK66M_GPU	AGP_GPU_CLK	CLOCKS	
HT_CLK66M_NB	HT_NB_CLK	CLOCKS	
HT_CLK66M_SB	HT_SB_CLK	CLOCKS	
PCI_CLK66M_SB_INT	CLOCKS_PCI	CLOCKS	
PCI_CLK33M_SB_EXT	CLOCKS_PCI	CLOCKS	
PLS_EXTCLK	PLS_XTAL	CLOCKS	

DIFFERENTIAL SIGNALS SHOULD HAVE 5 MIL SPACING TO EACH OTHER
ALL SPACING GROUPS SHOULD HAVE 15 MIL SPACING TO SIGNALS NOT IN THEIR GROUP

EI_NB_SYNC IS PART OF EI_CPU_SYNC TOPOLOGY

NET SPACING TYPE

SYM 1 OF 2

OMIT
U2600
PULSAR
FSBGA

GPCLK33_0	L4	PCI_CLK_GP0_R	CLOCKS	
GPCLK33_1	K4	PCI_CLK_GP1_R	CLOCKS	
VCLKN	A2	VSP_NB_CLK_N_C	CLOCKS	
VCLKP	B3	VSP_NB_CLK_P_C	CLOCKS	
HCLKN_0	B10	EI_CPU_CLK_N_C	CLOCKS	
HCLKN_1	C8	EI_CPU1_CLK_N_R	CLOCKS	5
HCLKN_2	C4	EI_NB_CLK_N_C	CLOCKS	
HCLKP_0	A10	EI_CPU_CLK_P_C	CLOCKS	
HCLKP_1	B8	EI_CPU1_CLK_P_R	CLOCKS	5
HCLKP_2	B5	EI_NB_CLK_P_C	CLOCKS	
GPCLK25_0	J3	PLS_CLK_66M_0_R	CLOCKS	
GPCLK25_1	J1	PLS_CLK_66M_1_R	CLOCKS	
PCLK25_0	K2	HT_CLK66M_NB_R	CLOCKS	
PCLK25_1	L1	RAM_CLK66M_NB_R	CLOCKS	
PCLK33_0	M5	PCI_CLK66M_SB_INT_R	CLOCKS	
PCLK33_1	L6	PCI_CLK_P1_R	CLOCKS	
PCLK33_2	M7	AGP_CLK66M_GPU_R	CLOCKS	
PCLK33_3	L9	PCI_CLK_P3_R	CLOCKS	
PCLK33_4	M10	PCI_CLK_P4_R	CLOCKS	
HTBEN_0	K11	CPU_HTBEN_R	CLOCKS	
HTBEN_1	J12	CPU1_HTBEN_R	CLOCKS	5
NBSYNC	F12	EI_NB_SYNC_R	CLOCKS	
HSYNC_0	J10	EI_CPU_SYNC_R	CLOCKS	
HSYNC_1	H11	EI_CPU1_SYNC_R	CLOCKS	5
REFCLK_0	G2	SB_CLK25M_ATA_R	CLOCKS	
REFCLK_1	H1	SATA_CLK25M_R	CLOCKS	
SLEWING*	K9	SLEWING_L_R	CLOCKS	
ERROR*	M8	CLOCK_ERROR_L		
PCLK12	L11	HT_CLK66M_SB_R	CLOCKS	
PCLK15	L10	AGP_CLK66M_NB_R	CLOCKS	

I2C_CLOCK_SCL	C1	SCLK		18
I2C_CLOCK_SDA	B1	SDATA		18
CLOCK_RESET_L	D3	RESET*	PLS_RESET_L	R2704 0 5% 402
	C11	XIN	PLS_X_IN	
	B12	XOUT	PLS_X_OUT	
	E3	ADDRSEL	PLS_X_ADDRSEL	NOSTUFF R2738 1K 5% 402
	K3	TEST1	TP_PLS_TEST1	
	F11	TEST2	TP_PLS_TEST2	
	D11	TEST3	TP_PLS_TEST3	
	M1	SCAN_MODE	PLS_SCAN_MODE	R2706 249 1%
	G11	REF15	PLS_REF15	R2744 681 1%
	J2	REF25	PLS_REF25	R2740 1K 1%
	M6	REF33	PLS_REF33	R2746 1K 1%
	A5	REF_CML	TP_PLS_REF_CML	
	B6	RRES_CML	PLS_PRES_CML	R2742 806 1%
	F2	FORCESPO*	PLS_FORCE_P0_L_R	
	C3	PD		R2750 0 5%

0=IIC ADDR D2/D3
1=IIC ADDR D4/D5

17 6 PP3V3_PWRON
R2722 1K 5% 1/16W MF 402
NOSTUFF R2748 0 5% 1/16W MF 402
23 17 15 13 6 SYS_OVERTEMP_L

11 10 5 SYS_SLEEP (SLEEP)

NO STUFF R2724 1K 5%

NOSTUFF J2700 U.FL-R_SMT F-ST-SM

25 PLS_EXTCLK
NOSTUFF R2762 24 5% 1/16W MF 402
PLS_INTERM
NOSTUFF R2764 24 5% 1/16W MF 402

NO STUFF R2752 0 5% 1/16W MF 402
R2754 0 5% 1/16W MF 402
NO STUFF R2758 330K 5% 1/16W MF 402
R2756 0 5% 1/16W MF 402

CRITICAL Y2701 25.0000M 8X4.5MM-SM
PLS_X_IN_B
PLS_X_OUT_B

C2707 33PF 5% 50V CERM 402
C2705 33PF 5% 50V CERM 402

R2701 0 5% 1/16W MF 402 — PCI_CLK_GP0 — 3.3V 33MHZ
R2761 0 5% 402 — PCI_CLK_GP1 — 3.3V 33MHZ

C2708 0.001UF 50V 10% 2CERM 402 — VSP_NB_CLK_P 22 25
C2710 0.001UF 50V 10% 2CERM 402 — VSP_NB_CLK_N 22 25
C2713 0.001UF 50V 10% 2CERM 402
C2715 0.001UF 50V 10% 2CERM 402 — EI_CPU_CLK_P 25 27 / EI_CPU_CLK_N 25 27
C2700 0.001UF 50V 10% 2CERM 402 — EI_NB_CLK_P 25 26
C2702 0.001UF 50V 10% 2CERM 402 — EI_NB_CLK_N 25 26

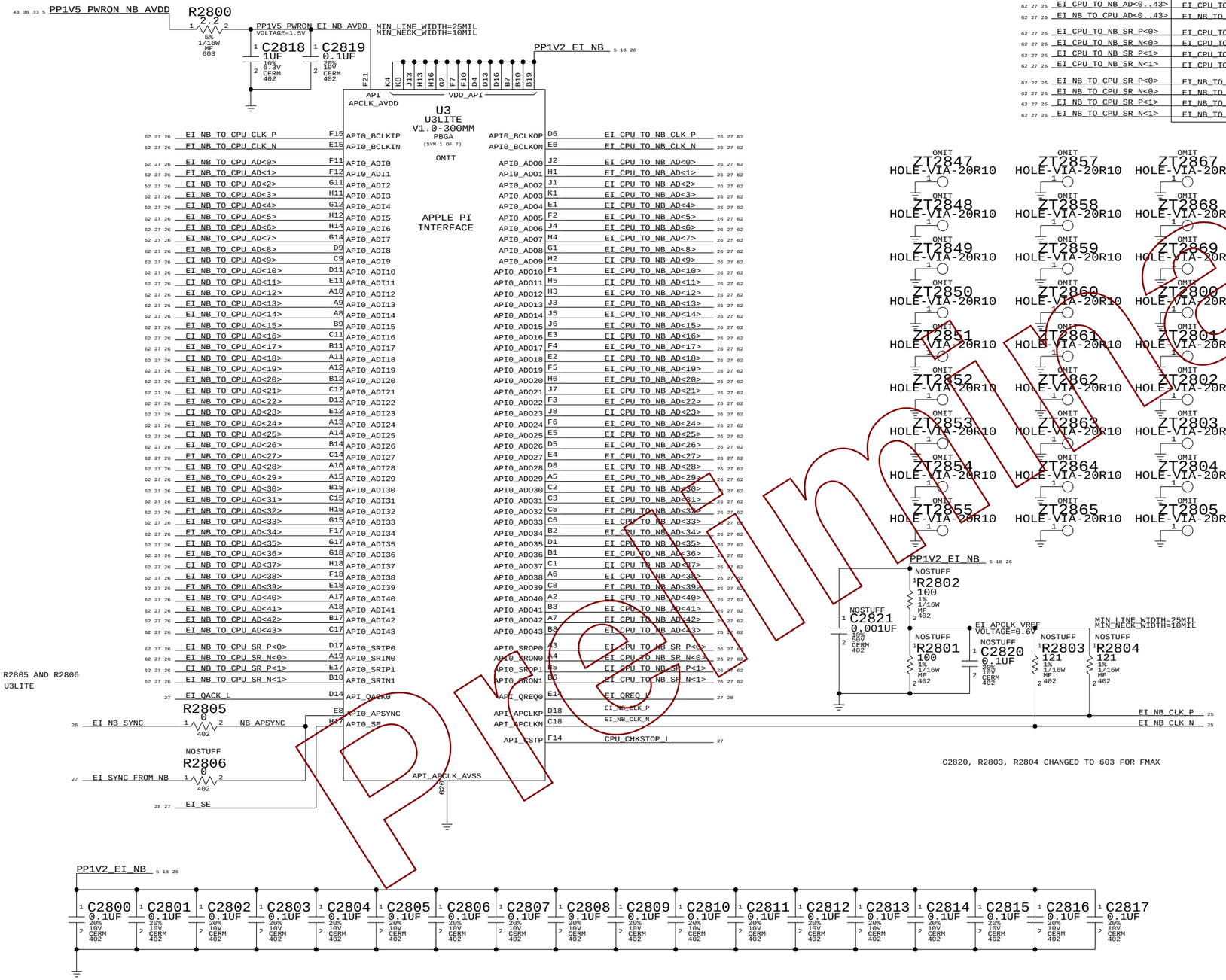
R2775 0 5% 402	2.5V	66MHZ	TP_PLS_CLK_66M_0
R2776 0 5% 402	2.5V	66MHZ	TP_PLS_CLK_66M_1
R2703 20 5% 402	2.5V	66MHZ	HT_CLK66M_NB 25 43
R2709 20 5% 402	2.5V	66MHZ	RAM_CLK66M_NB 33
R2705 0 5% 402	3.3V	66MHZ	PCI_CLK66M_SB_INT 25 45
R2711 0 5% 402	3.3V	33MHZ	PCI_CLK_P1 5
R2707 0 5% 402	3.3V	66MHZ	AGP_CLK66M_GPU 25 37
R2702 0 5% 402	3.3V	33MHZ	PCI_CLK_P3 5
R2779 0 5% 402			PCI_CLK_P4 5
R2715 0 5% 402	1.2V	33MHZ	CPU_HTBEN 27 28
R2768 0 5% 402	1.2V		EI_NB_SYNC 25 26
R2772 0 5% 402	1.2V		EI_CPU_SYNC 25 27
R2770 22 5% 402	2.5V	25MHZ	SB_CLK25M_ATA 23
R2700 0 5% 402	2.5V	25MHZ	TP_SATA_CLK25M
R2720 0 5% 402	SYS_SLEWING_L 13 23 31		
R2717 0 5% 402	1.2V	66MHZ	HT_CLK66M_SB 25 44
R2719 0 5% 402	1.5V	66MHZ	AGP_CLK66M_NB 25 36

MASTER: GILA

PULSAR CLOCKS

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 27 OF 103	



MASTER: GILA

U3LITE APPLE PI

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT
NONE	28 OF 103

PLACE AT PROCESSOR PINS.

PLACE NEAR PROCESSOR.

25 EI_CPU_CLK_P — NOSTUFF R2903 46.4 1% 1/16W MF 402

25 EI_CPU_CLK_N — NOSTUFF R2901 46.4 1% 1/16W MF 402

NOSTUFF C2901 0.22UF 20% 6.3V X5R 402

SYSCLK_TERM VOLTAGE=0.6V

29 28 27 18 5 PP1V2_EI_CPU

NOSTUFF R2909 100 1% 1/16W MF 402

NOSTUFF R2907 100 1% 1/16W MF 402

SYSCLK* (B22) SYSCLK (B22)

(SEE TABLE) OMIT CRITICAL

U2900 GPUL (1 OF 3) CBGA

EI_NB_TO_CPU_CLK_P	E24	EI_CLKI	EI_CPU_TO_NB_CLK_P
EI_NB_TO_CPU_CLK_N	D24	EI_CLKI*	EI_CPU_TO_NB_CLK_N
EI_NB_TO_CPU_AD<0>	H25	EI_AD10	EI_CPU_TO_NB_AD<0>
EI_NB_TO_CPU_AD<1>	J25	EI_AD11	EI_CPU_TO_NB_AD<1>
EI_NB_TO_CPU_AD<2>	H27	EI_AD12	EI_CPU_TO_NB_AD<2>
EI_NB_TO_CPU_AD<3>	J27	EI_AD13	EI_CPU_TO_NB_AD<3>
EI_NB_TO_CPU_AD<4>	C31	EI_AD14	EI_CPU_TO_NB_AD<4>
EI_NB_TO_CPU_AD<5>	A30	EI_AD15	EI_CPU_TO_NB_AD<5>
EI_NB_TO_CPU_AD<6>	K28	EI_AD16	EI_CPU_TO_NB_AD<6>
EI_NB_TO_CPU_AD<7>	H28	EI_AD17	EI_CPU_TO_NB_AD<7>
EI_NB_TO_CPU_AD<8>	J29	EI_AD18	EI_CPU_TO_NB_AD<8>
EI_NB_TO_CPU_AD<9>	G30	EI_AD19	EI_CPU_TO_NB_AD<9>
EI_NB_TO_CPU_AD<10>	F28	EI_AD110	EI_CPU_TO_NB_AD<10>
EI_NB_TO_CPU_AD<11>	G29	EI_AD111	EI_CPU_TO_NB_AD<11>
EI_NB_TO_CPU_AD<12>	G28	EI_AD112	EI_CPU_TO_NB_AD<12>
EI_NB_TO_CPU_AD<13>	E28	EI_AD113	EI_CPU_TO_NB_AD<13>
EI_NB_TO_CPU_AD<14>	E30	EI_AD114	EI_CPU_TO_NB_AD<14>
EI_NB_TO_CPU_AD<15>	B31	EI_AD115	EI_CPU_TO_NB_AD<15>
EI_NB_TO_CPU_AD<16>	A34	EI_AD116	EI_CPU_TO_NB_AD<16>
EI_NB_TO_CPU_AD<17>	C33	EI_AD117	EI_CPU_TO_NB_AD<17>
EI_NB_TO_CPU_AD<18>	B33	EI_AD118	EI_CPU_TO_NB_AD<18>
EI_NB_TO_CPU_AD<19>	A36	EI_AD119	EI_CPU_TO_NB_AD<19>
EI_NB_TO_CPU_AD<20>	C35	EI_AD120	EI_CPU_TO_NB_AD<20>
EI_NB_TO_CPU_AD<21>	E36	EI_AD121	EI_CPU_TO_NB_AD<21>
EI_NB_TO_CPU_AD<22>	E33	EI_AD122	EI_CPU_TO_NB_AD<22>
EI_NB_TO_CPU_AD<23>	B35	EI_AD123	EI_CPU_TO_NB_AD<23>
EI_NB_TO_CPU_AD<24>	B36	EI_AD124	EI_CPU_TO_NB_AD<24>
EI_NB_TO_CPU_AD<25>	F34	EI_AD125	EI_CPU_TO_NB_AD<25>
EI_NB_TO_CPU_AD<26>	B37	EI_AD126	EI_CPU_TO_NB_AD<26>
EI_NB_TO_CPU_AD<27>	B38	EI_AD127	EI_CPU_TO_NB_AD<27>
EI_NB_TO_CPU_AD<28>	C39	EI_AD128	EI_CPU_TO_NB_AD<28>
EI_NB_TO_CPU_AD<29>	C37	EI_AD129	EI_CPU_TO_NB_AD<29>
EI_NB_TO_CPU_AD<30>	B39	EI_AD130	EI_CPU_TO_NB_AD<30>
EI_NB_TO_CPU_AD<31>	B40	EI_AD131	EI_CPU_TO_NB_AD<31>
EI_NB_TO_CPU_AD<32>	B42	EI_AD132	EI_CPU_TO_NB_AD<32>
EI_NB_TO_CPU_AD<33>	A42	EI_AD133	EI_CPU_TO_NB_AD<33>
EI_NB_TO_CPU_AD<34>	C43	EI_AD134	EI_CPU_TO_NB_AD<34>
EI_NB_TO_CPU_AD<35>	C45	EI_AD135	EI_CPU_TO_NB_AD<35>
EI_NB_TO_CPU_AD<36>	A43	EI_AD136	EI_CPU_TO_NB_AD<36>
EI_NB_TO_CPU_AD<37>	A46	EI_AD137	EI_CPU_TO_NB_AD<37>
EI_NB_TO_CPU_AD<38>	A48	EI_AD138	EI_CPU_TO_NB_AD<38>
EI_NB_TO_CPU_AD<39>	A50	EI_AD139	EI_CPU_TO_NB_AD<39>
EI_NB_TO_CPU_AD<40>	A45	EI_AD140	EI_CPU_TO_NB_AD<40>
EI_NB_TO_CPU_AD<41>	A47	EI_AD141	EI_CPU_TO_NB_AD<41>
EI_NB_TO_CPU_AD<42>	C48	EI_AD142	EI_CPU_TO_NB_AD<42>
EI_NB_TO_CPU_AD<43>	A49	EI_AD143	EI_CPU_TO_NB_AD<43>
EI_NB_TO_CPU_SR_P<0>	L2	EI_SR10	EI_CPU_TO_NB_SR_P<0>
EI_NB_TO_CPU_SR_N<0>	K2	EI_SR10*	EI_CPU_TO_NB_SR_N<0>
EI_NB_TO_CPU_SR_P<1>	L1	EI_SR11	EI_CPU_TO_NB_SR_P<1>
EI_NB_TO_CPU_SR_N<1>	K1	EI_SR11*	EI_CPU_TO_NB_SR_N<1>
EI_QACK_L	V2	QACK*	EI_QREQ_L
CHKSTOP_L	B32	CHKSTOP*	CPU_INT_L
CPU_HTBEN	A31	TBEN	
TP_PSYNCOUT	A51	APSYNCOUT	MATCH TO SYSCLK
CPU_HRESET_L	V3	HRESET*	
CPU_SRESET_L	A6	SRESET*	
PROC_THERM_INT_L	V1	THERM_INT*	
PROCID0	L35	PROCID0	
PROCID1	K35	PROCID1	
PROCID2	K37	PROCID2	
EI_SE	N3	TRIGGER_IN	
TP_PROC_TRIGGER_OUT	N35	TRIGGER_OUT	
TP_AFN	AA12	AFN	
AVPRESET_L	W2	AVPRESET*	
BIMODE_L	AC2	BIMODE*	
C1UNDGLOBAL	AC12	C1UNDGLOBAL	
C2UNDGLOBAL	AC10	C2UNDGLOBAL	
DIZ_L	U2	DIZ*	
LSSDMODE	A8	LSSDMODE	
LSSDSTOPC2ENABLE	U33	LSSDSCANENABLE	
LSSDSTOPC2ENABLE	A28	LSSDSTOPC2ENABLE	
LSSDSTOPC2STARENABLE	A27	LSSDSTOPC2STARENABLE	
LSSDSTOPENABLE	A11	LSSDSTOPENABLE	
MCP_L	A52	MCP*	
TP_PSRO1	V35	PSRO1	
TP_PSRO2	V5	PSRO2	
PULSESEL0	AC6	PULSESEL0	
PULSESEL1	AB13	PULSESEL1	
PULSESEL2	AC46	PULSESEL2	
RAMSTOPENABLE	A9	RAMSTOPENABLE	
RI_L	AC4	RI*	
SYNCENABLE	AB32	SYNCENABLE*	

EI_CLKO	L3	EI_CLKO	EI_CPU_TO_NB_CLK_P
EI_CLKO*	L2	EI_CLKO*	EI_CPU_TO_NB_CLK_N
EI_AD00	G1	EI_AD00	EI_CPU_TO_NB_AD<0>
EI_AD01	G2	EI_AD01	EI_CPU_TO_NB_AD<1>
EI_AD02	E1	EI_AD02	EI_CPU_TO_NB_AD<2>
EI_AD03	E2	EI_AD03	EI_CPU_TO_NB_AD<3>
EI_AD04	B1	EI_AD04	EI_CPU_TO_NB_AD<4>
EI_AD05	B2	EI_AD05	EI_CPU_TO_NB_AD<5>
EI_AD06	D2	EI_AD06	EI_CPU_TO_NB_AD<6>
EI_AD07	C1	EI_AD07	EI_CPU_TO_NB_AD<7>
EI_AD08	B5	EI_AD08	EI_CPU_TO_NB_AD<8>
EI_AD09	C4	EI_AD09	EI_CPU_TO_NB_AD<9>
EI_AD010	F2	EI_AD010	EI_CPU_TO_NB_AD<10>
EI_AD011	F3	EI_AD011	EI_CPU_TO_NB_AD<11>
EI_AD012	G5	EI_AD012	EI_CPU_TO_NB_AD<12>
EI_AD013	G4	EI_AD013	EI_CPU_TO_NB_AD<13>
EI_AD014	H2	EI_AD014	EI_CPU_TO_NB_AD<14>
EI_AD015	H1	EI_AD015	EI_CPU_TO_NB_AD<15>
EI_AD016	J2	EI_AD016	EI_CPU_TO_NB_AD<16>
EI_AD017	J3	EI_AD017	EI_CPU_TO_NB_AD<17>
EI_AD018	J5	EI_AD018	EI_CPU_TO_NB_AD<18>
EI_AD019	J4	EI_AD019	EI_CPU_TO_NB_AD<19>
EI_AD020	K1	EI_AD020	EI_CPU_TO_NB_AD<20>
EI_AD021	K2	EI_AD021	EI_CPU_TO_NB_AD<21>
EI_AD022	K3	EI_AD022	EI_CPU_TO_NB_AD<22>
EI_AD023	K5	EI_AD023	EI_CPU_TO_NB_AD<23>
EI_AD024	K4	EI_AD024	EI_CPU_TO_NB_AD<24>
EI_AD025	M2	EI_AD025	EI_CPU_TO_NB_AD<25>
EI_AD026	M3	EI_AD026	EI_CPU_TO_NB_AD<26>
EI_AD027	M5	EI_AD027	EI_CPU_TO_NB_AD<27>
EI_AD028	M4	EI_AD028	EI_CPU_TO_NB_AD<28>
EI_AD029	N2	EI_AD029	EI_CPU_TO_NB_AD<29>
EI_AD030	N1	EI_AD030	EI_CPU_TO_NB_AD<30>
EI_AD031	N4	EI_AD031	EI_CPU_TO_NB_AD<31>
EI_AD032	P1	EI_AD032	EI_CPU_TO_NB_AD<32>
EI_AD033	P2	EI_AD033	EI_CPU_TO_NB_AD<33>
EI_AD034	P3	EI_AD034	EI_CPU_TO_NB_AD<34>
EI_AD035	P5	EI_AD035	EI_CPU_TO_NB_AD<35>
EI_AD036	P4	EI_AD036	EI_CPU_TO_NB_AD<36>
EI_AD037	R1	EI_AD037	EI_CPU_TO_NB_AD<37>
EI_AD038	R2	EI_AD038	EI_CPU_TO_NB_AD<38>
EI_AD039	R3	EI_AD039	EI_CPU_TO_NB_AD<39>
EI_AD040	R4	EI_AD040	EI_CPU_TO_NB_AD<40>
EI_AD041	R5	EI_AD041	EI_CPU_TO_NB_AD<41>
EI_AD042	T1	EI_AD042	EI_CPU_TO_NB_AD<42>
EI_AD043	T2	EI_AD043	EI_CPU_TO_NB_AD<43>
EI_SR00	L5	EI_SR00	EI_CPU_TO_NB_SR_P<0>
EI_SR00*	L4	EI_SR00*	EI_CPU_TO_NB_SR_N<0>
EI_SR01	K6	EI_SR01	EI_CPU_TO_NB_SR_P<1>
EI_SR01*	K7	EI_SR01*	EI_CPU_TO_NB_SR_N<1>
QREQ*	AB12	QREQ*	EI_QREQ_L
INT*	AB13	INT*	CPU_INT_L
APSYNCIN	AA10	APSYNCIN	CPU_APSYNC
IIC_SCL	AA20	IIC_SCL	I2C_CPU_A_SCL
IIC_SDA	Y21	IIC_SDA	I2C_CPU_A_SDA
I2CGO	N12	I2CGO	I2CGO
CKTERMDIS	AA14	CKTERMDIS	CKTERMDIS_L
EI_DISABLE	J24	EI_DISABLE	EI_DISABLE
BUSCFG0	AA19	BUSCFG0	BUSCFG0
BUSCFG1	AC19	BUSCFG1	BUSCFG1
BUSCFG2	AB18	BUSCFG2	BUSCFG2
ATTENTION	AB12	ATTENTION	TP_ATTENTION
GPUL_DBG	AA22	GPUL_DBG	GPUL_DBG
JTAGMODE	W1	JTAGMODE	JTAGMODE_SQUEEZ
TCK	AD21	TCK	JTAG_CPU_TCK
TDI	AD23	TDI	JTAG_CPU_TDI
TDO	AD13	TDO	JTAG_CPU_TDO
TMS	AD22	TMS	JTAG_CPU_TMS
TRST*	W29	TRST*	JTAG_CPU_TRST_L
BYPASS*	V24	BYPASS*	CPU_BYPASS_L
PLLLOCK	T28	PLLLOCK	PLLLOCK
PLLMULT	A56	PLLMULT	PLLMULT
PLLRANGE0	W27	PLLRANGE0	PLLRANGE0
PLLRANGE1	W25	PLLRANGE1	PLLRANGE1
PLLTEST	W23	PLLTEST	PLLTEST
PLLTESTOUT	T19	PLLTESTOUT	PLLTESTOUT
SPARE	AA13	SPARE	CPU_SPARE

PPVCORE_CPU (32 31 30 29 5)

MORE PROCESSOR DECOUPLING ON PAGES 31 & 32

C2953 C2947 C2945 C2939 C2937 C2928 C2924 C2920 C2914 C2912 1UF 10% 6.3V CERM 402

C2954 C2948 C2946 C2940 C2938 C2929 C2925 C2921 C2915 C2913 1UF 10% 6.3V CERM 402

C2955 C2951 C2949 C2943 C2941 C2930 C2926 C2922 C2918 C2916 1UF 10% 6.3V CERM 402

C2956 C2952 C2950 C2944 C2942 C2931 C2927 C2923 C2919 C2917 1UF 10% 6.3V CERM 402

C2900 C2960 C2959 C2958 C2957 C2936 C2935 C2934 C2933 C2932 1UF 10% 6.3V CERM 402

C2911 C2910 C2909 C2908 C2907 C2906 C2905 C2904 C2903 C2902 1UF 10% 6.3V CERM 402

R2910 0 5% 1/16W MF 402 — EI_CPU_SYNC (29)

NOSTUFF R2911 0 5% 1/16W MF 402 — EI_SYNC_FROM_NB (29)

PROCESSOR IIC ADDRESS: 80,84

29 28 27 18 5 PP1V2_EI_CPU

R2906 1K 5% 1/16W MF 402

R2908 1K 5% 1/16W MF 402

R2902 0 5% 1/16W MF 402 — CHKSTOP_L (16 27)

26 CPU_CHKSTOP_L

NOSTUFF R2904 0 5% 1/16W MF 402 — MCP_L (27)

NOSTUFF R2905 49.9 1% 1/16W MF 402 — 28 27 25 CPU_HTBEN

PLACE BY PROCESSOR PIN.

PROCESSOR LOGIC I/O

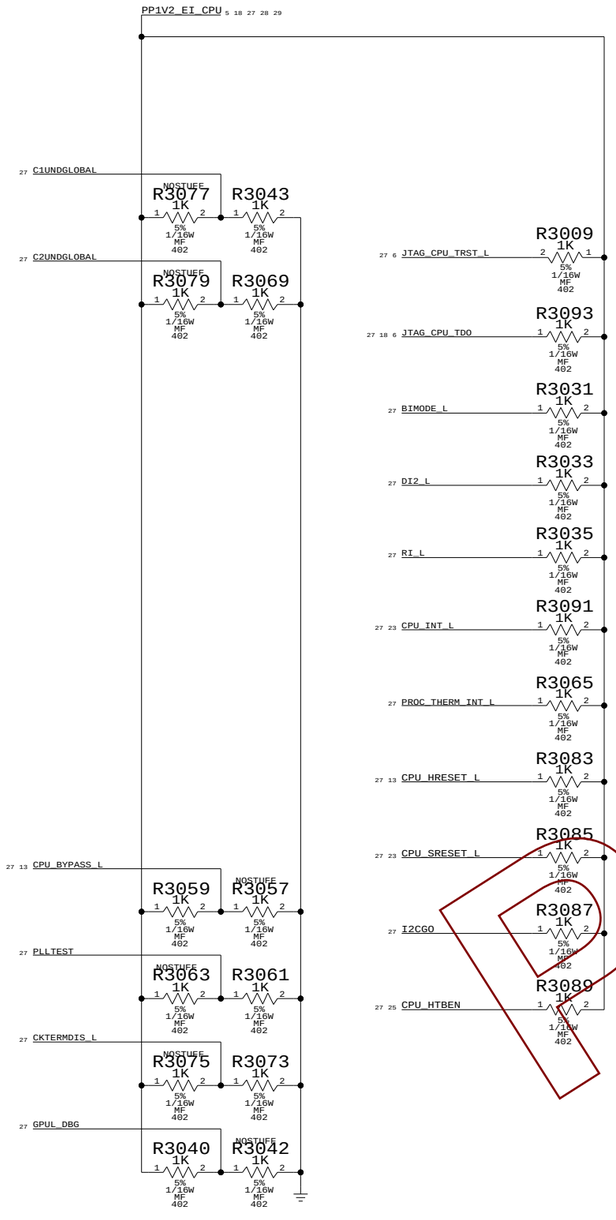
MASTER: GILA

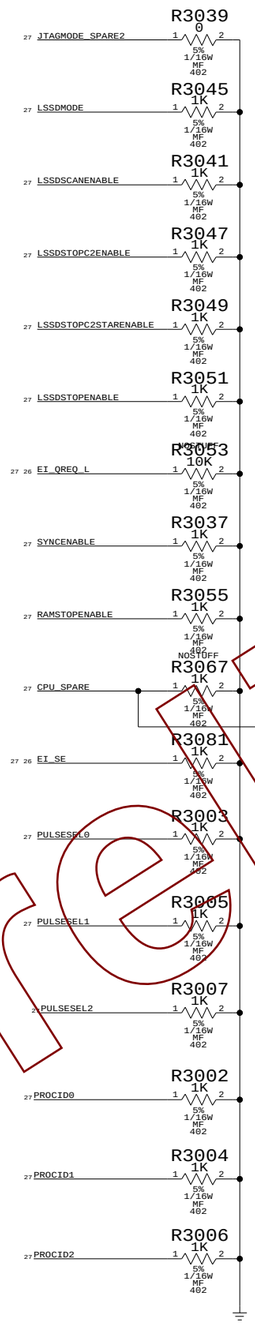
NEO APPLE PI

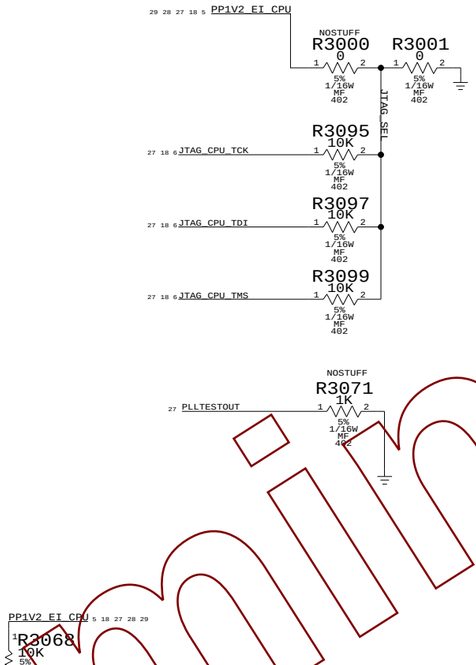
APPLE COMPUTER INC.

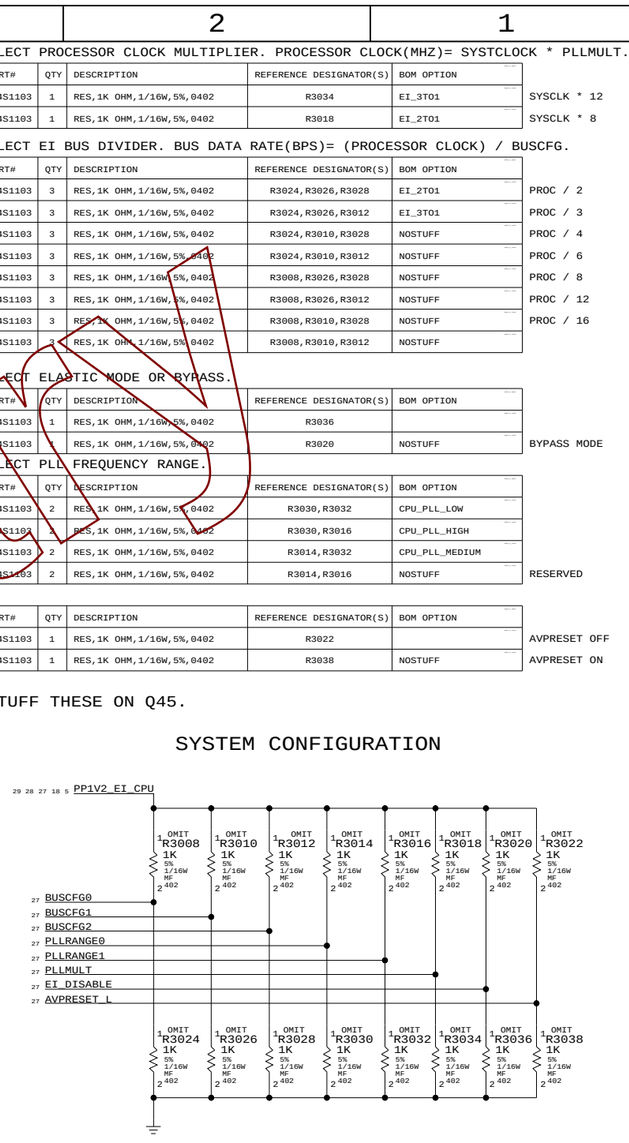
SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	29	103









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

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
*	114S1103	1	RES,1K OHM,1/16W,5%,0402	R3034	EI_3TO1	SYSCLK * 12
	114S1103	1	RES,1K OHM,1/16W,5%,0402	R3018	EI_2TO1	SYSCLK * 8

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

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
*	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3024,R3026,R3028	EI_2TO1	PROC / 2
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3024,R3026,R3012	EI_3TO1	PROC / 3
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3024,R3010,R3028	NOSTUFF	PROC / 4
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3024,R3010,R3012	NOSTUFF	PROC / 6
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3008,R3026,R3028	NOSTUFF	PROC / 8
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3008,R3026,R3012	NOSTUFF	PROC / 12
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3008,R3010,R3028	NOSTUFF	PROC / 16
	114S1103	3	RES,1K OHM,1/16W,5%,0402	R3008,R3010,R3012	NOSTUFF	

SELECT ELASTIC MODE OR BYPASS.

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
*	114S1103	1	RES,1K OHM,1/16W,5%,0402	R3036		
	114S1103	1	RES,1K OHM,1/16W,5%,0402	R3020	NOSTUFF	BYPASS MODE

SELECT PLL FREQUENCY RANGE.

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
	114S1103	2	RES,1K OHM,1/16W,5%,0402	R3030,R3032	CPU_PLL_LOW
*	114S1103	2	RES,1K OHM,1/16W,5%,0402	R3030,R3016	CPU_PLL_HIGH
	114S1103	2	RES,1K OHM,1/16W,5%,0402	R3014,R3032	CPU_PLL_MEDIUM
	114S1103	2	RES,1K OHM,1/16W,5%,0402	R3014,R3016	NOSTUFF RESERVED

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION	
114S1103	1	RES,1K OHM,1/16W,5%,0402	R3022		AVPRESET OFF
114S1103	1	RES,1K OHM,1/16W,5%,0402	R3038	NOSTUFF	AVPRESET ON

* STUFF THESE ON Q45.

SYSTEM CONFIGURATION

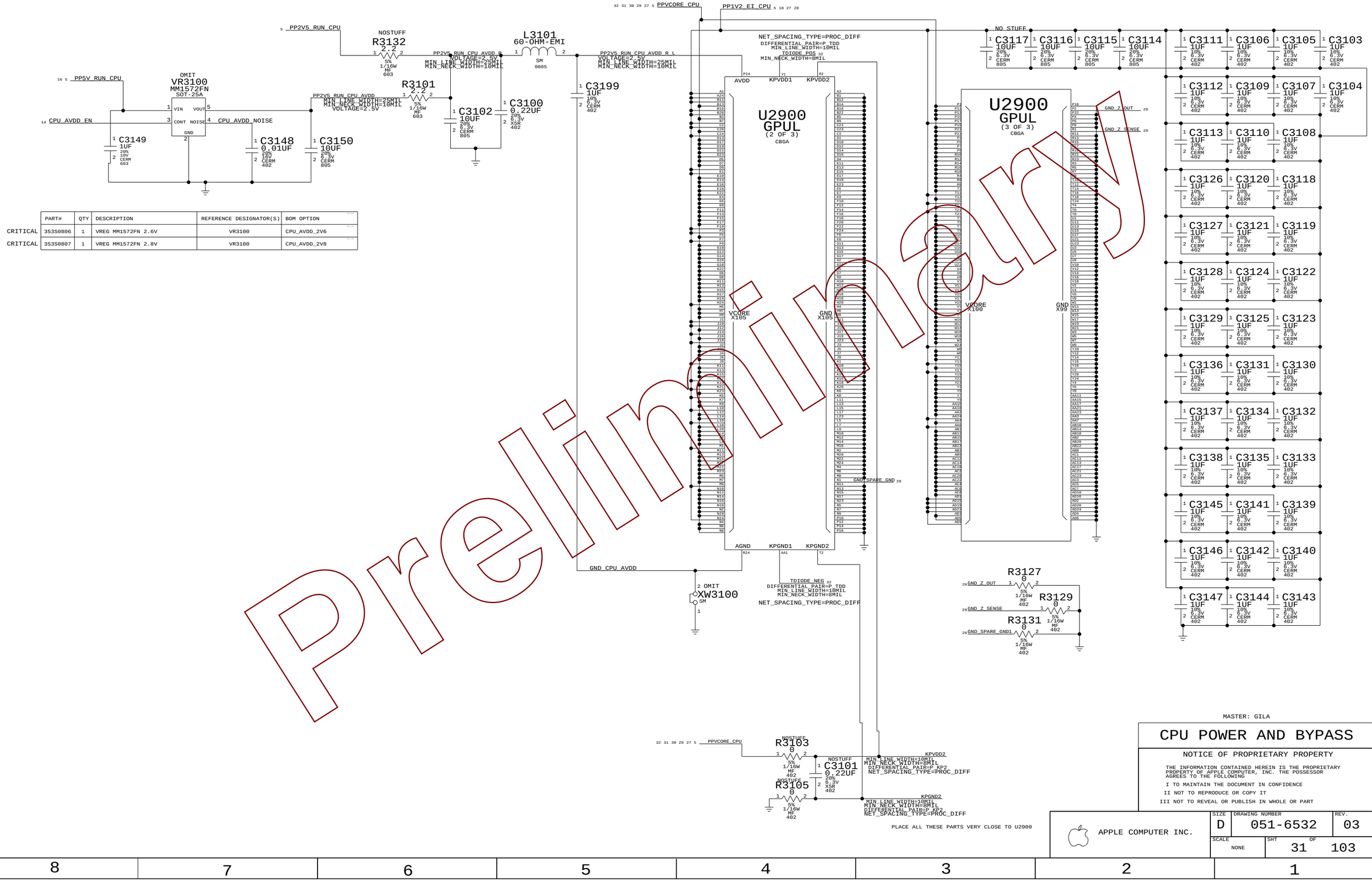
MASTER: GILA

CPU STRAPS

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	30	103



	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
CRITICAL	353S0806	1	VREG MM1572FN 2.6V	VR3100	CPU_AVDD_2V6
CRITICAL	353S0807	1	VREG MM1572FN 2.8V	VR3100	CPU_AVDD_2V8

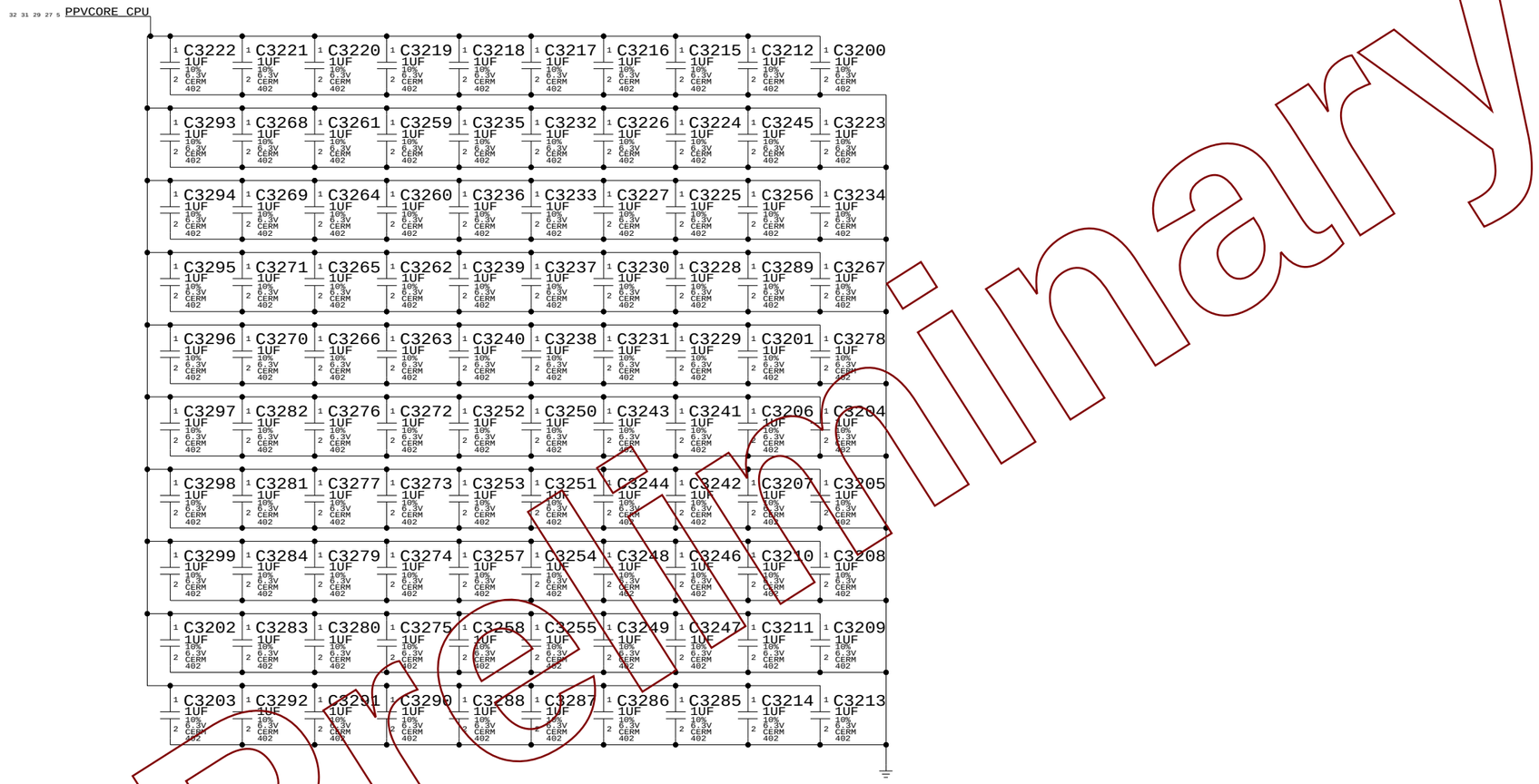
MASTER: GILA

CPU POWER AND BYPASS

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	31	103



MASTER: GILA

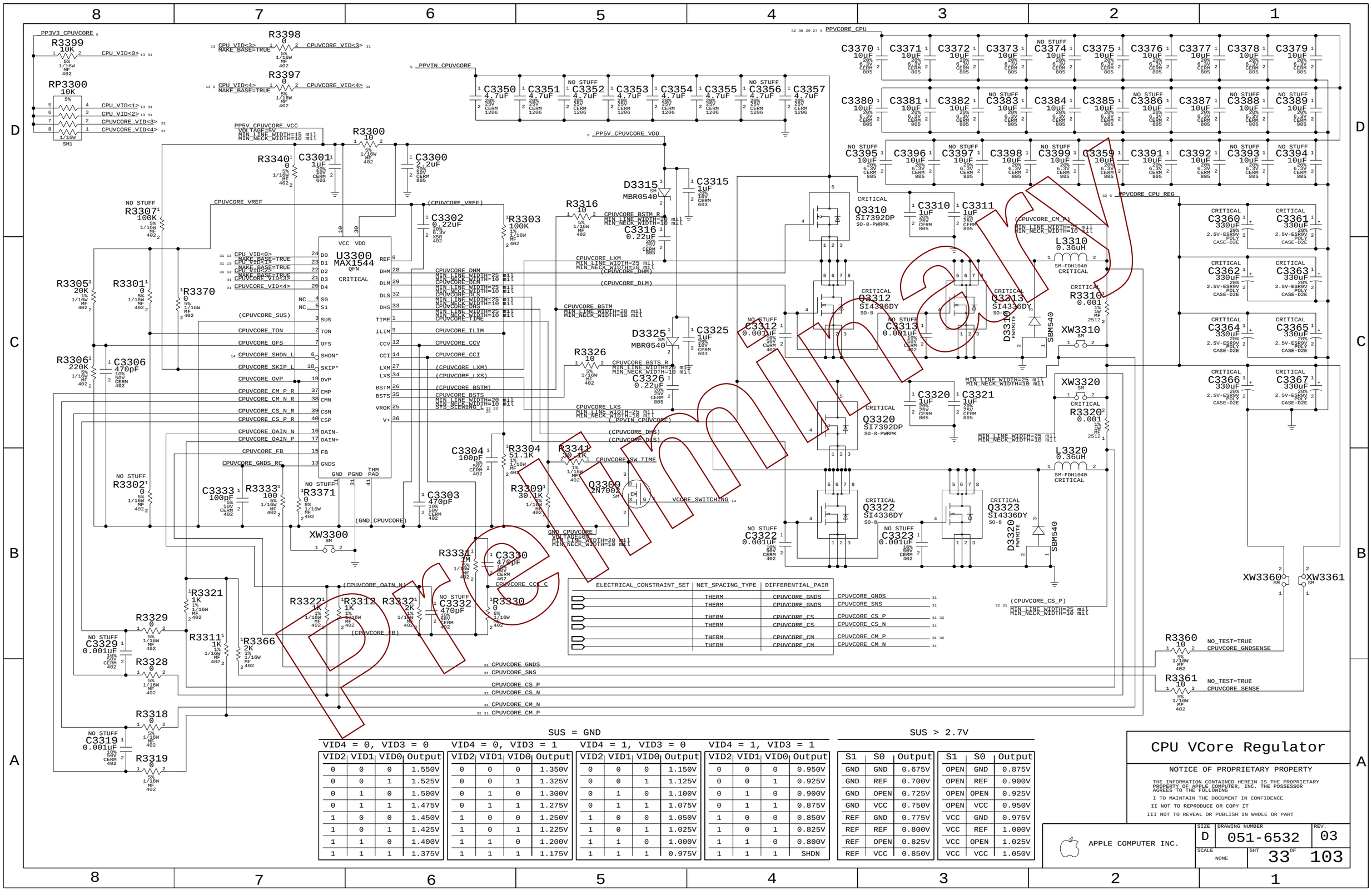
PROC DECOUPLING

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE: NONE

SHT 32 OF 103


PP3V3_CPUVCORE
R3399 10K 5% 1/16W MF 402
CPU_VID<0>
RP3300 10K 5% SM1
CPU_VID<1>
CPU_VID<2>
CPUVCORE_VID<3>
CPUVCORE_VID<4>
R3398 0 5% 1/16W MF 402
CPU_VID<3> MAKE_BASE=TRUE
R3397 0 5% 1/16W MF 402
CPU_VID<4> MAKE_BASE=TRUE
PPVIN_CPUVCORE
C3350 4.7uF 20% 25V CERM 1206
C3351 4.7uF 20% 25V CERM 1206
NO STUFF C3352 4.7uF 20% 25V CERM 1206
C3353 4.7uF 20% 25V CERM 1206
C3354 4.7uF 20% 25V CERM 1206
C3355 4.7uF 20% 25V CERM 1206
NO STUFF C3356 4.7uF 20% 25V CERM 1206
C3357 4.7uF 20% 25V CERM 1206
PPVCORE_CPU
C3370 10uF 20% 6.3V CERM 805
C3371 10uF 20% 6.3V CERM 805
C3372 10uF 20% 6.3V CERM 805
C3373 10uF 20% 6.3V CERM 805
NO STUFF C3374 10uF 20% 6.3V CERM 805
C3375 10uF 20% 6.3V CERM 805
C3376 10uF 20% 6.3V CERM 805
C3377 10uF 20% 6.3V CERM 805
C3378 10uF 20% 6.3V CERM 805
C3379 10uF 20% 6.3V CERM 805
C3380 10uF 20% 6.3V CERM 805
C3381 10uF 20% 6.3V CERM 805
C3382 10uF 20% 6.3V CERM 805
NO STUFF C3383 10uF 20% 6.3V CERM 805
C3384 10uF 20% 6.3V CERM 805
C3385 10uF 20% 6.3V CERM 805
NO STUFF C3386 10uF 20% 6.3V CERM 805
C3387 10uF 20% 6.3V CERM 805
NO STUFF C3388 10uF 20% 6.3V CERM 805
NO STUFF C3389 10uF 20% 6.3V CERM 805
NO STUFF C3395 10uF 20% 6.3V CERM 805
C3396 10uF 20% 6.3V CERM 805
NO STUFF C3397 10uF 20% 6.3V CERM 805
C3398 10uF 20% 6.3V CERM 805
NO STUFF C3399 10uF 20% 6.3V CERM 805
C3359 10uF 20% 6.3V CERM 805
C3391 10uF 20% 6.3V CERM 805
C3392 10uF 20% 6.3V CERM 805
NO STUFF C3393 10uF 20% 6.3V CERM 805
NO STUFF C3394 10uF 20% 6.3V CERM 805
PPVCORE_CPU_REG
PP5V_CPUVCORE_VCC VOLTAGE=5V MIN_LINE_WIDTH=15 mil MIN_NECK_WIDTH=10 mil
R3340 0 5% 1/16W MF 402
C3301 1uF 20% 10V CERM 603
R3300 10 5% 1/16W MF 402
C3300 2.2uF 20% 10V CERM 805
PP5V_CPUVCORE_VDD
D3315 SM MBR0540
C3315 1uF 20% 10V CERM 603
CPUVCORE_VREF
(CPUVCORE_VREF)
NO STUFF R3307 100K 5% 1/16W MF 402
C3302 0.22uF 10% 6.3V X5R 402
R3303 100K 1% 1/16W MF 402
R3316 10 5% 1/16W MF 402
CPUVCORE_BSTM_R MIN_LINE_WIDTH=20 mil MIN_NECK_WIDTH=10 mil
C3316 0.22uF 20% 25V CERM 805
U3300 MAX1544 QFN CRITICAL
VCC VDD
D0 D1 D2 D3 D4 S0 S1 SUS TON OFS SHDN* SKIP* OVP CMP CMN CSN CSP OAIN- OAIN+ FB GNDS
REF DHM DLM DLS DHS TIME ILIM CCV CCI LXM LXS BSTM BSTS VROK V+
CPUVCORE_LXM MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
(CPUVCORE_DHM)
(CPUVCORE_DLM)
CPUVCORE_BSTM MIN_LINE_WIDTH=20 mil MIN_NECK_WIDTH=10 mil
R3305 20K 1% 1/16W MF 402
R3301 0 5% 1/16W MF 402
R3370 0 5% 1/16W MF 402
(CPUVCORE_SUS)
CPUVCORE_TON
CPUVCORE_OFS
CPUVCORE_SHDN_L
CPUVCORE_SKIP_L
CPUVCORE_OVP
CPUVCORE_CM_P_R
CPUVCORE_CM_N_R
CPUVCORE_CS_N_R
CPUVCORE_CS_P_R
CPUVCORE_OAIN_N
CPUVCORE_OAIN_P
CPUVCORE_FB
CPUVCORE_GNDS_RC
R3306 220K 1% 1/16W MF 402
C3306 470pF 10% 50V CERM 402
D3325 SM MBR0540
C3325 1uF 20% 10V CERM 603
R3326 10 5% 1/16W MF 402
CPUVCORE_BSTS_R MIN_LINE_WIDTH=20 mil MIN_NECK_WIDTH=10 mil
C3326 0.22uF 20% 25V CERM 805
CPUVCORE_LXS MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
(PPVIN_CPUVCORE)
(CPUVCORE_DHS)
(CPUVCORE_DLS)
C3304 100pF 5% 50V CERM 402
R3304 51.1K 1% 1/16W MF 402
R3341 30.1K 1% 1/16W MF 402
CPUVCORE_SW_TIME
Q3309 2N7002 SM
VCORE_SWITCHING
R3309 30.1K 1% 1/16W MF 402
GND_CPUVCORE VOLTAGE=0V MIN_LINE_WIDTH=20 mil MIN_NECK_WIDTH=10 mil
NO STUFF R3302 0 5% 1/16W MF 402
C3333 100pF 5% 50V CERM 402
R3333 100 5% 1/16W MF 402
NO STUFF R3371 0 5% 1/16W MF 402
C3303 470pF 10% 50V CERM 402
(GND_CPUVCORE)
GND PGND THM PAD
XW3300 SM
R3331 1M 5% 1/16W MF 402
C3330 470pF 10% 50V CERM 402
CPUVCORE_CCI_C
R3330 0 5% 1/16W MF 402
(CPUVCORE_OAIN_N)
R3322 1K 1% 1/16W MF 402
R3312 1K 1% 1/16W MF 402
R3332 2K 1% 1/16W MF 402
NO STUFF C3332 470pF 10% 50V CERM 402
(CPUVCORE_FB)
R3321 1K 1% 1/16W MF 402
R3311 1K 1% 1/16W MF 402
R3366 2K 1% 1/16W MF 402
R3329 0 5% 1/16W MF 402
NO STUFF C3329 0.001uF 10% 50V CERM 402
R3328 0 5% 1/16W MF 402
R3318 0 5% 1/16W MF 402
NO STUFF C3319 0.001uF 10% 50V CERM 402
R3319 0 5% 1/16W MF 402
CRITICAL Q3310 SI7392DP SO-8-PWRPK
C3310 1uF 20% 25V CERM 805
C3311 1uF 20% 25V CERM 805
(CPUVCORE_CM_P)
MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
L3310 0.36uH SM-FDH1040 CRITICAL
CRITICAL Q3312 SI4336DY SO-8
NO STUFF C3312 0.001uF 10% 50V CERM 402
CRITICAL Q3313 SI4336DY SO-8
NO STUFF C3313 0.001uF 10% 50V CERM 402
D3310 PWRMITE
SBM540
CRITICAL R3310 0.001 1% 1W MF 2512
XW3310 SM
MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
CRITICAL Q3320 SI7392DP SO-8-PWRPK
C3320 1uF 20% 25V CERM 805
C3321 1uF 20% 25V CERM 805
XW3320 SM
CRITICAL R3320 0.001 1% 1W MF 2512
MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
L3320 0.36uH SM-FDH1040 CRITICAL
CRITICAL Q3322 SI4336DY SO-8
NO STUFF C3322 0.001uF 10% 50V CERM 402
CRITICAL Q3323 SI4336DY SO-8
NO STUFF C3323 0.001uF 10% 50V CERM 402
D3320 PWRMITE
SBM540
(CPUVCORE_CS_P)
MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
CRITICAL C3360 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3361 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3362 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3363 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3364 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3365 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3366 330uF 20% 2.5V-ESR9V POLY CASE-D2E
CRITICAL C3367 330uF 20% 2.5V-ESR9V POLY CASE-D2E
XW3360 SM
XW3361 SM
R3360 10 5% 1/16W MF 402
NO_TEST=TRUE CPUVCORE_GNDSENSE
R3361 10 5% 1/16W MF 402
NO_TEST=TRUE CPUVCORE_SENSE
ELECTRICAL_CONSTRAINT_SET | NET_SPACING_TYPE | DIFFERENTIAL_PAIR
THERM CPUVCORE_GNDS CPUVCORE_GNDS
THERM CPUVCORE_GNDS CPUVCORE_SNS
THERM CPUVCORE_CS CPUVCORE_CS_P
THERM CPUVCORE_CS CPUVCORE_CS_N
THERM CPUVCORE_CM CPUVCORE_CM_P
THERM CPUVCORE_CM CPUVCORE_CM_N
CPUVCORE_GNDS
CPUVCORE_SNS
CPUVCORE_CS_P
CPUVCORE_CS_N
CPUVCORE_CM_N
CPUVCORE_CM_P
SUS = GND
VID4 = 0, VID3 = 0
VID2 VID1 VID0 Output
0 0 0 1.550V
0 0 1 1.525V
0 1 0 1.500V
0 1 1 1.475V
1 0 0 1.450V
1 0 1 1.425V
1 1 0 1.400V
1 1 1 1.375V
VID4 = 0, VID3 = 1
VID2 VID1 VID0 Output
0 0 0 1.350V
0 0 1 1.325V
0 1 0 1.300V
0 1 1 1.275V
1 0 0 1.250V
1 0 1 1.225V
1 1 0 1.200V
1 1 1 1.175V
VID4 = 1, VID3 = 0
VID2 VID1 VID0 Output
0 0 0 1.150V
0 0 1 1.125V
0 1 0 1.100V
0 1 1 1.075V
1 0 0 1.050V
1 0 1 1.025V
1 1 0 1.000V
1 1 1 0.975V
VID4 = 1, VID3 = 1
VID2 VID1 VID0 Output
0 0 0 0.950V
0 0 1 0.925V
0 1 0 0.900V
0 1 1 0.875V
1 0 0 0.850V
1 0 1 0.825V
1 1 0 0.800V
1 1 1 SHDN
SUS > 2.7V
S1 S0 Output
GND GND 0.675V
GND REF 0.700V
GND OPEN 0.725V
GND VCC 0.750V
REF GND 0.775V
REF REF 0.800V
REF OPEN 0.825V
REF VCC 0.850V
S1 S0 Output
OPEN GND 0.875V
OPEN REF 0.900V
OPEN OPEN 0.925V
OPEN VCC 0.950V
VCC GND 0.975V
VCC REF 1.000V
VCC OPEN 1.025V
VCC VCC 1.050V
CPU VCore Regulator
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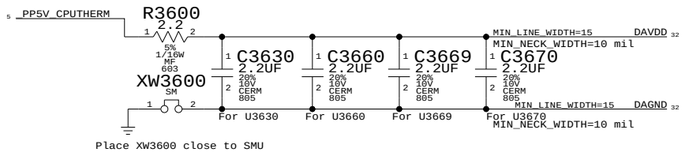
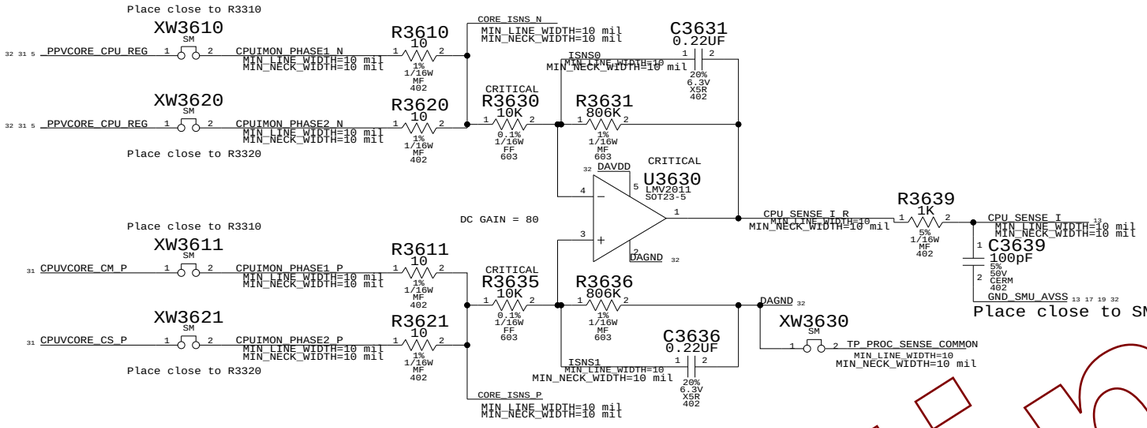
APPLE COMPUTER INC.
SIZE D
DRAWING NUMBER 051-6532
REV. 03
SCALE NONE
SHT 33 OF 103
Preliminary



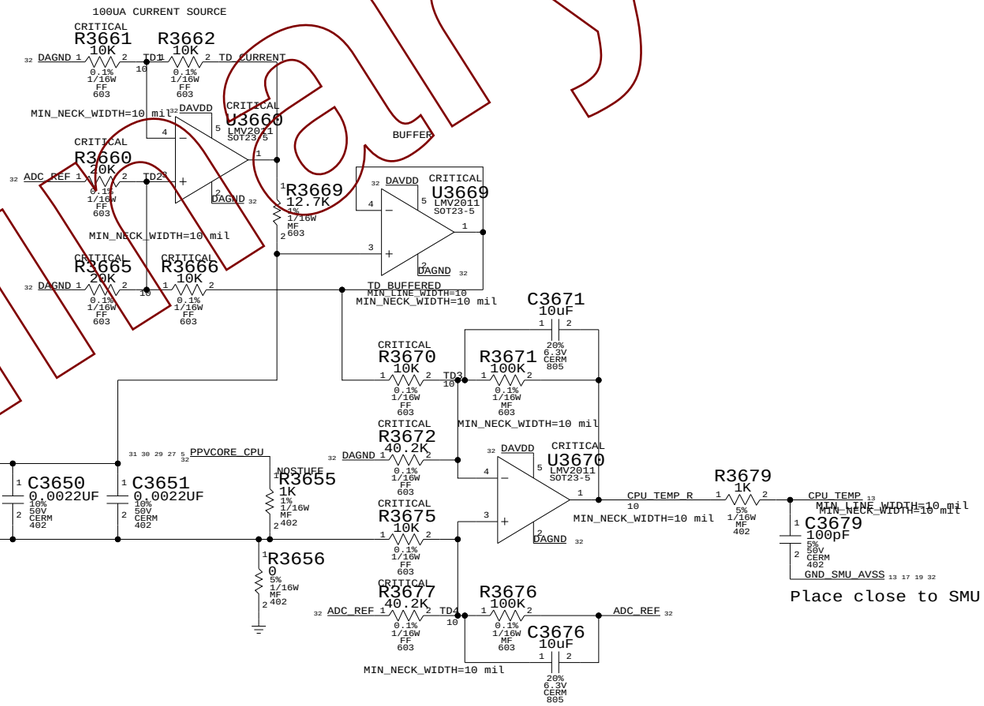
CPU Current Monitoring

Place close to CPU Power Supply

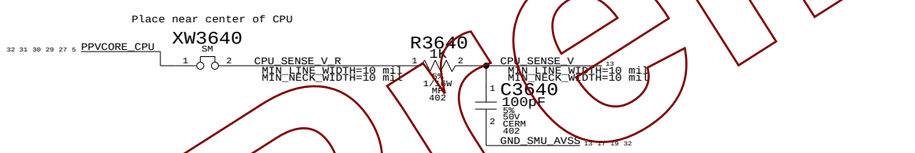


CPU Thermal Diode Circuit

Place close to CPU

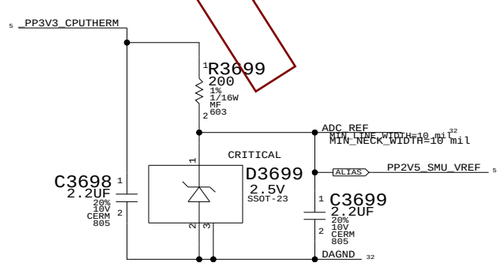


CPU Voltage Monitoring



SMU Voltage Reference

Place close to SMU



CPU Temp Monitoring

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 36 OF 103	

U3TWINS DO NOT HAVE MASKS

PP2V5_PWRON_RAM

U3 U3LITE V1.0-300MM PBGA (SYM 2 OF 7) OMIT

MEMORY DATA INTERFACE

RAM_DQ_R<0>	AF20	DDR_DQ0	DDR_DQ64 AF27 RAM_DQ_R<64>
RAM_DQ_R<1>	AH22	DDR_DQ1	DDR_DQ65 AF24 RAM_DQ_R<65>
RAM_DQ_R<2>	AH21	DDR_DQ2	DDR_DQ66 AE24 RAM_DQ_R<66>
RAM_DQ_R<3>	AG21	DDR_DQ3	DDR_DQ67 AG26 RAM_DQ_R<67>
RAM_DQ_R<4>	AB20	DDR_DQ4	DDR_DQ68 AF26 RAM_DQ_R<68>
RAM_DQ_R<5>	AC21	DDR_DQ5	DDR_DQ69 AD24 RAM_DQ_R<69>
RAM_DQ_R<6>	AD23	DDR_DQ6	DDR_DQ70 AD25 RAM_DQ_R<70>
RAM_DQ_R<7>	AD21	DDR_DQ7	DDR_DQ71 AG28 RAM_DQ_R<71>
RAM_DQ_R<8>	AH26	DDR_DQ8	DDR_DQ72 AF28 RAM_DQ_R<72>
RAM_DQ_R<9>	AH25	DDR_DQ9	DDR_DQ73 AE28 RAM_DQ_R<73>
RAM_DQ_R<10>	AH24	DDR_DQ10	DDR_DQ74 AD26 RAM_DQ_R<74>
RAM_DQ_R<11>	AH23	DDR_DQ11	DDR_DQ75 AF27 RAM_DQ_R<75>
RAM_DQ_R<12>	AH27	DDR_DQ12	DDR_DQ76 AC26 RAM_DQ_R<76>
RAM_DQ_R<13>	AG24	DDR_DQ13	DDR_DQ77 AC25 RAM_DQ_R<77>
RAM_DQ_R<14>	AF23	DDR_DQ14	DDR_DQ78 AC27 RAM_DQ_R<78>
RAM_DQ_R<15>	AH28	DDR_DQ15	DDR_DQ79 AD27 RAM_DQ_R<79>
RAM_DQ_R<16>	U25	DDR_DQ16	DDR_DQ80 AA27 RAM_DQ_R<80>
RAM_DQ_R<17>	AA23	DDR_DQ17	DDR_DQ81 AA26 RAM_DQ_R<81>
RAM_DQ_R<18>	Y22	DDR_DQ18	DDR_DQ82 AA24 RAM_DQ_R<82>
RAM_DQ_R<19>	AA22	DDR_DQ19	DDR_DQ83 AA28 RAM_DQ_R<83>
RAM_DQ_R<20>	U24	DDR_DQ20	DDR_DQ84 Y26 RAM_DQ_R<84>
RAM_DQ_R<21>	V23	DDR_DQ21	DDR_DQ85 Y25 RAM_DQ_R<85>
RAM_DQ_R<22>	V22	DDR_DQ22	DDR_DQ86 Y28 RAM_DQ_R<86>
RAM_DQ_R<23>	U22	DDR_DQ23	DDR_DQ87 Y24 RAM_DQ_R<87>
RAM_DQ_R<24>	P25	DDR_DQ24	DDR_DQ88 V26 RAM_DQ_R<88>
RAM_DQ_R<25>	R22	DDR_DQ25	DDR_DQ89 V27 RAM_DQ_R<89>
RAM_DQ_R<26>	R21	DDR_DQ26	DDR_DQ90 V24 RAM_DQ_R<90>
RAM_DQ_R<27>	U23	DDR_DQ27	DDR_DQ91 W28 RAM_DQ_R<91>
RAM_DQ_R<28>	P26	DDR_DQ28	DDR_DQ92 U27 RAM_DQ_R<92>
RAM_DQ_R<29>	R24	DDR_DQ29	DDR_DQ93 V28 RAM_DQ_R<93>
RAM_DQ_R<30>	P24	DDR_DQ30	DDR_DQ94 T28 RAM_DQ_R<94>
RAM_DQ_R<31>	P23	DDR_DQ31	DDR_DQ95 U26 RAM_DQ_R<95>
RAM_DQ_R<32>	M25	DDR_DQ32	DDR_DQ96 R27 RAM_DQ_R<96>
RAM_DQ_R<33>	M23	DDR_DQ33	DDR_DQ97 R26 RAM_DQ_R<97>
RAM_DQ_R<34>	P21	DDR_DQ34	DDR_DQ98 R28 RAM_DQ_R<98>
RAM_DQ_R<35>	P22	DDR_DQ35	DDR_DQ99 P27 RAM_DQ_R<99>
RAM_DQ_R<36>	M24	DDR_DQ36	DDR_DQ100 M28 RAM_DQ_R<100>
RAM_DQ_R<37>	L22	DDR_DQ37	DDR_DQ101 N28 RAM_DQ_R<101>
RAM_DQ_R<38>	L23	DDR_DQ38	DDR_DQ102 L28 RAM_DQ_R<102>
RAM_DQ_R<39>	J23	DDR_DQ39	DDR_DQ103 P28 RAM_DQ_R<103>
RAM_DQ_R<40>	D23	DDR_DQ40	DDR_DQ104 L25 RAM_DQ_R<104>
RAM_DQ_R<41>	D24	DDR_DQ41	DDR_DQ105 L26 RAM_DQ_R<105>
RAM_DQ_R<42>	C26	DDR_DQ42	DDR_DQ106 L27 RAM_DQ_R<106>
RAM_DQ_R<43>	C27	DDR_DQ43	DDR_DQ107 K28 RAM_DQ_R<107>
RAM_DQ_R<44>	A22	DDR_DQ44	DDR_DQ108 H27 RAM_DQ_R<108>
RAM_DQ_R<45>	A25	DDR_DQ45	DDR_DQ109 H28 RAM_DQ_R<109>
RAM_DQ_R<46>	C24	DDR_DQ46	DDR_DQ110 J27 RAM_DQ_R<110>
RAM_DQ_R<47>	C23	DDR_DQ47	DDR_DQ111 L24 RAM_DQ_R<111>
RAM_DQ_R<48>	B24	DDR_DQ48	DDR_DQ112 J25 RAM_DQ_R<112>
RAM_DQ_R<49>	B23	DDR_DQ49	DDR_DQ113 J24 RAM_DQ_R<113>
RAM_DQ_R<50>	A23	DDR_DQ50	DDR_DQ114 J26 RAM_DQ_R<114>
RAM_DQ_R<51>	A24	DDR_DQ51	DDR_DQ115 G28 RAM_DQ_R<115>
RAM_DQ_R<52>	A27	DDR_DQ52	DDR_DQ116 H25 RAM_DQ_R<116>
RAM_DQ_R<53>	A28	DDR_DQ53	DDR_DQ117 H24 RAM_DQ_R<117>
RAM_DQ_R<54>	B28	DDR_DQ54	DDR_DQ118 F27 RAM_DQ_R<118>
RAM_DQ_R<55>	A26	DDR_DQ55	DDR_DQ119 H26 RAM_DQ_R<119>
RAM_DQ_R<56>	F24	DDR_DQ56	DDR_DQ120 E28 RAM_DQ_R<120>
RAM_DQ_R<57>	J22	DDR_DQ57	DDR_DQ121 E27 RAM_DQ_R<121>
RAM_DQ_R<58>	E23	DDR_DQ58	DDR_DQ122 F26 RAM_DQ_R<122>
RAM_DQ_R<59>	H23	DDR_DQ59	DDR_DQ123 E26 RAM_DQ_R<123>
RAM_DQ_R<60>	J21	DDR_DQ60	DDR_DQ124 D28 RAM_DQ_R<124>
RAM_DQ_R<61>	H21	DDR_DQ61	DDR_DQ125 C28 RAM_DQ_R<125>
RAM_DQ_R<62>	G21	DDR_DQ62	DDR_DQ126 E25 RAM_DQ_R<126>
RAM_DQ_R<63>	H22	DDR_DQ63	DDR_DQ127 E24 RAM_DQ_R<127>

PP1V5_PWRON_NB_AVDD

R3702 2.2 5% 1/16W MF 603

PP1V5_PWRON_RAM_NB_AVDD VOLTAGE=1.5V

C3745 1UF 10% 6.3V CERM 402

C3744 0.1UF 20% 10V CERM 402

MIN_LINE_WIDTH=25MIL MIN_NECK_WIDTH=10MIL

PP2V5_PWRON_RAM

DDR CLK_AVDD AB21

DDR_CLK_AVSS AA20

U3 U3LITE V1.0-300MM PBGA (SYM 3 OF 7) OMIT

MEMORY CONTROL INTERFACE

RAM_CLK66M_NB	AC20	DDR_CLKP	
RAM_CLK_A_P_R	AA12	DDR_CK_A	
RAM_CLK_A_N_R	AB12	DDR_CK_AN	
RAM_CLK_B_P_R	AB14	DDR_CK_B	
RAM_CLK_B_N_R	AA14	DDR_CK_BN	
RAM_CLK_C_P_R	AE15	DDR_CK_C	
RAM_CLK_C_N_R	AE14	DDR_CK_CN	
RAM_CLK_D_P_R	AC14	DDR_CK_D	
RAM_CLK_D_N_R	AD14	DDR_CK_DN	
RAM_CLK_E_P_R	AD15	DDR_CK_E	
RAM_CLK_E_N_R	AC15	DDR_CK_EN	
RAM_CLK_F_P_R	AA15	DDR_CK_F	
RAM_CLK_F_N_R	AB15	DDR_CK_FN	
RAM_CKE_R<0>	AC17	DDR_CKE0	
RAM_CKE_R<1>	AD17	DDR_CKE1	
RAM_CKE_R<2>	AE17	DDR_CKE2	
RAM_CKE_R<3>	AF17	DDR_CKE3	
RAM_CKE_R<4>	AG17	DDR_CKE4	
RAM_CKE_R<5>	AA17	DDR_CKE5	
RAM_CKE_R<6>	AB18	DDR_CKE6	
RAM_CKE_R<7>	AA18	DDR_CKE7	
	Y21	DDR_VREF0	
	U21	DDR_VREF1	
	L21	DDR_VREF2	
	H20	DDR_VREF3	
	AJ21	DDR_VREF4	
	M21	DDR_VREF5	
	V21	DDR_VREF6	
	J20	DDR_VREF7	
	AE21	DDR_RAS	RAM_RAS_L_R
	AD20	DDR_CAS	RAM_CAS_L_R
	AC23	DDR_WE	RAM_WE_L_R
	AF21	DDR_BA0	RAM_BA_R<0>
	AE20	DDR_BA1	RAM_BA_R<1>
	AH16	DDR_MUXEN0	RAM_MUXEN0
	AH18	DDR_MUXEN1	RAM_MUXEN1
	AG12	DDR_MAD0	RAM_A_R<0>
	AH13	DDR_MAD1	RAM_A_R<1>
	AH14	DDR_MAD2	RAM_A_R<2>
	AH15	DDR_MAD3	RAM_A_R<3>
	AF12	DDR_MAD4	RAM_A_R<4>
	AE12	DDR_MAD5	RAM_A_R<5>
	AD12	DDR_MAD6	RAM_A_R<6>
	AC12	DDR_MAD7	RAM_A_R<7>
	AG15	DDR_MAD8	RAM_A_R<8>
	AF15	DDR_MAD9	RAM_A_R<9>
	AF14	DDR_MAD10	RAM_A_R<10>
	AG14	DDR_MAD11	RAM_A_R<11>
	AH17	DDR_MAD12	RAM_A_R<12>
	AG17	DDR_MAD13	RAM_A_R<13>
	AF18	DDR_CS0	RAM_CS_L_R<0>
	AE18	DDR_CS1	RAM_CS_L_R<1>
	AG20	DDR_CS2	RAM_CS_L_R<2>
	AH20	DDR_CS3	RAM_CS_L_R<3>
	AC18	DDR_CS8	RAM_CS_L_R<8>
	AD18	DDR_CS9	RAM_CS_L_R<9>
	AG18	DDR_CS10	RAM_CS_L_R<10>
	AH19	DDR_CS11	RAM_CS_L_R<11>
	AC24	DDR_DQSP0	RAM_DQS_R<0>
	AG23	DDR_DQSP1	RAM_DQS_R<1>
	Y23	DDR_DQSP2	RAM_DQS_R<2>
	R23	DDR_DQSP3	RAM_DQS_R<3>
	M22	DDR_DQSP4	RAM_DQS_R<4>
	B26	DDR_DQSP5	RAM_DQS_R<5>
	B27	DDR_DQSP6	RAM_DQS_R<6>
	F23	DDR_DQSP7	RAM_DQS_R<7>
	AE23	DDR_DQSP8	RAM_DQS_R<8>
	AD28	DDR_DQSP9	RAM_DQS_R<9>
	Y27	DDR_DQSP10	RAM_DQS_R<10>
	U28	DDR_DQSP11	RAM_DQS_R<11>
	M27	DDR_DQSP12	RAM_DQS_R<12>
	J28	DDR_DQSP13	RAM_DQS_R<13>
	F28	DDR_DQSP14	RAM_DQS_R<14>
	F25	DDR_DQSP15	RAM_DQS_R<15>

PP2V5_PWRON_RAM

R3700 1K 1% 1/16W MF 402

R3701 1K 1% 1/16W MF 402

PP1V25_PWRON_RAM_VREF_NB VOLTAGE=1.25V

MIN_LINE_WIDTH=25MIL MIN_NECK_WIDTH=10MIL

C3730 0.1UF 20% 10V CERM 402

C3746 0.1UF 20% 10V CERM 402

C3747 0.1UF 20% 10V CERM 402

C3748 0.1UF 20% 10V CERM 402

PP2V5_PWRON_RAM

C3700 C3701 C3702 C3703 C3704 C3705 C3706 C3707 C3708 C3709 C3710 C3711 C3712 C3713 C3714 C3731 C3732 C3733 C3734 C3735 C3736 C3737 0.1UF 20% 10V CERM 402

C3715 C3716 C3717 C3718 C3719 C3720 C3721 C3722 C3724 C3725 C3726 C3727 C3728 C3729 C3743 C3742 C3740 C3739 C3738 0.1UF 20% 10V CERM 402

MASTER: GILA

U3LITE MEMORY

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 37 OF 103	

Page Notes

Power aliases required by this page:
(NONE)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

NOTE: SO-DIMMs only use 2 of the 3 clocks provided for each DIMM module. Unused clocks renamed below.

33 RAM_CLK_C_P_R — ALIAS — TP_RAM_CLK_C_P MAKE_BASE=TRUE
33 RAM_CLK_C_N_R — ALIAS — TP_RAM_CLK_C_N MAKE_BASE=TRUE
33 RAM_CLK_F_P_R — ALIAS — TP_RAM_CLK_F_P MAKE_BASE=TRUE
33 RAM_CLK_F_N_R — ALIAS — TP_RAM_CLK_F_N MAKE_BASE=TRUE

Series Termination for Clock/Control Signals

RPAKs can be swapped if the 3rd number in reference designator (RP38x0) is the same.

CLOCKS

62 33 RAM_CLK_A_P_R — RP3800 22 (1, 8) 5% 1/16W SM1 — RAM_CLK_A_P 35 62
62 33 RAM_CLK_A_N_R — RP3800 22 (2, 7) 5% 1/16W SM1 — RAM_CLK_A_N 35 62
62 33 RAM_CLK_B_P_R — RP3800 22 (4, 5) 5% 1/16W SM1 — RAM_CLK_B_P 35 62
62 33 RAM_CLK_B_N_R — RP3800 22 (3, 6) 5% 1/16W SM1 — RAM_CLK_B_N 35 62
62 33 RAM_CLK_D_P_R — RP3801 22 (3, 6) 5% 1/16W SM1 — RAM_CLK_D_P 35 62
62 33 RAM_CLK_D_N_R — RP3801 22 (4, 5) 5% 1/16W SM1 — RAM_CLK_D_N 35 62
62 33 RAM_CLK_E_P_R — RP3801 22 (1, 8) 5% 1/16W SM1 — RAM_CLK_E_P 35 62
62 33 RAM_CLK_E_N_R — RP3801 22 (2, 7) 5% 1/16W SM1 — RAM_CLK_E_N 35 62

CS

62 33 RAM_CS_L_R<0> — RP3810 22 (2, 7) 5% 1/16W SM1 — RAM_CS_L<0> 35 62
62 33 RAM_CS_L_R<1> — RP3810 22 (3, 6) 5% 1/16W SM1 — RAM_CS_L<1> 35 62
62 33 RAM_CS_L_R<8> — RP3810 22 (1, 8) 5% 1/16W SM1 — RAM_CS_L<8> 35 62
62 33 RAM_CS_L_R<9> — RP3810 22 (4, 5) 5% 1/16W SM1 — RAM_CS_L<9> 35 62

CKE

62 33 RAM_CKE_R<0> — RP3820 22 (4, 5) 5% 1/16W SM1 — RAM_CKE<0> 34 35 62
62 33 RAM_CKE_R<1> — RP3820 22 (3, 6) 5% 1/16W SM1 — RAM_CKE<1> 34 35 62
62 33 RAM_CKE_R<4> — RP3820 22 (1, 8) 5% 1/16W SM1 — RAM_CKE<4> 34 35 62
62 33 RAM_CKE_R<5> — RP3820 22 (2, 7) 5% 1/16W SM1 — RAM_CKE<5> 34 35 62

ADDR

62 33 RAM_A_R<0> — RP3830 22 (2, 7) 5% 1/16W SM1 — RAM_A<0> 35 62
62 33 RAM_A_R<1> — RP3830 22 (4, 5) 5% 1/16W SM1 — RAM_A<1> 35 62
62 33 RAM_A_R<2> — RP3830 22 (1, 8) 5% 1/16W SM1 — RAM_A<2> 35 62
62 33 RAM_A_R<3> — RP3830 22 (3, 6) 5% 1/16W SM1 — RAM_A<3> 35 62
62 33 RAM_A_R<4> — RP3831 22 (2, 7) 5% 1/16W SM1 — RAM_A<4> 35 62
62 33 RAM_A_R<5> — RP3831 22 (3, 6) 5% 1/16W SM1 — RAM_A<5> 35 62
62 33 RAM_A_R<6> — RP3831 22 (1, 8) 5% 1/16W SM1 — RAM_A<6> 35 62
62 33 RAM_A_R<7> — RP3831 22 (4, 5) 5% 1/16W SM1 — RAM_A<7> 35 62
62 33 RAM_A_R<8> — RP3832 22 (3, 6) 5% 1/16W SM1 — RAM_A<8> 35 62
62 33 RAM_A_R<9> — RP3832 22 (1, 8) 5% 1/16W SM1 — RAM_A<9> 35 62
62 33 RAM_A_R<10> — RP3832 22 (4, 5) 5% 1/16W SM1 — RAM_A<10> 35 62
62 33 RAM_A_R<11> — RP3832 22 (2, 7) 5% 1/16W SM1 — RAM_A<11> 35 62
62 33 RAM_A_R<12> — RP3833 22 (4, 5) 5% 1/16W SM1 — RAM_A<12> 35 62
62 33 RAM_A_R<13> — RP3833 22 (3, 6) 5% 1/16W SM1 — RAM_A<13> 35 62

BA

62 33 RAM_BA_R<0> — RP3833 22 (1, 8) 5% 1/16W SM1 — RAM_BA<0> 35
62 33 RAM_BA_R<1> — RP3833 22 (2, 7) 5% 1/16W SM1 — RAM_BA<1> 35

CNTL

62 33 RAM_WE_L_R — R3840 22 (1, 2) 5% 1/16W MF 402 — RAM_WE_L 35
62 33 RAM_CAS_L_R — R3841 22 (1, 2) 5% 1/16W MF 402 — RAM_CAS_L 35
62 33 RAM_RAS_L_R — R3842 22 (1, 2) 5% 1/16W MF 402 — RAM_RAS_L 35

CKE pulldowns to put RAM into self refresh during sleep

62 35 34 RAM_CKE<0> — RP3850 10K (2, 7) 5% 1/16W SM1
62 35 34 RAM_CKE<1> — RP3850 10K (4, 5) 5% 1/16W SM1
62 35 34 RAM_CKE<4> — RP3850 10K (1, 8) 5% 1/16W SM1
62 35 34 RAM_CKE<5> — RP3850 10K (3, 6) 5% 1/16W SM1

No series termination on data signals

DIMM "A"

62 33 RAM_DQ_R<0> — ALIAS — RAM_DQ<0> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<1> — ALIAS — RAM_DQ<1> MAKE_BASE=TRUE 35 62
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DIMM "B"

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62 33 RAM_DQ_R<105> — ALIAS — RAM_DQ<105> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<106> — ALIAS — RAM_DQ<106> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<107> — ALIAS — RAM_DQ<107> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<108> — ALIAS — RAM_DQ<108> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<109> — ALIAS — RAM_DQ<109> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<110> — ALIAS — RAM_DQ<110> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<111> — ALIAS — RAM_DQ<111> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<112> — ALIAS — RAM_DQ<112> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<113> — ALIAS — RAM_DQ<113> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<114> — ALIAS — RAM_DQ<114> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<115> — ALIAS — RAM_DQ<115> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<116> — ALIAS — RAM_DQ<116> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<117> — ALIAS — RAM_DQ<117> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<118> — ALIAS — RAM_DQ<118> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<119> — ALIAS — RAM_DQ<119> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<120> — ALIAS — RAM_DQ<120> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<121> — ALIAS — RAM_DQ<121> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<122> — ALIAS — RAM_DQ<122> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<123> — ALIAS — RAM_DQ<123> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<124> — ALIAS — RAM_DQ<124> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<125> — ALIAS — RAM_DQ<125> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<126> — ALIAS — RAM_DQ<126> MAKE_BASE=TRUE 35 62
62 33 RAM_DQ_R<127> — ALIAS — RAM_DQ<127> MAKE_BASE=TRUE 35 62

No series termination on strobe signals

62 33 RAM_DQS_R<0> — ALIAS — RAM_DQS<0> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<1> — ALIAS — RAM_DQS<1> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<2> — ALIAS — RAM_DQS<2> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<3> — ALIAS — RAM_DQS<3> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<4> — ALIAS — RAM_DQS<4> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<5> — ALIAS — RAM_DQS<5> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<6> — ALIAS — RAM_DQS<6> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<7> — ALIAS — RAM_DQS<7> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<8> — ALIAS — RAM_DQS<8> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<9> — ALIAS — RAM_DQS<9> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<10> — ALIAS — RAM_DQS<10> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<11> — ALIAS — RAM_DQS<11> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<12> — ALIAS — RAM_DQS<12> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<13> — ALIAS — RAM_DQS<13> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<14> — ALIAS — RAM_DQS<14> MAKE_BASE=TRUE 35 62
62 33 RAM_DQS_R<15> — ALIAS — RAM_DQS<15> MAKE_BASE=TRUE 35 62

Memory Series Term

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 38 OF 103	

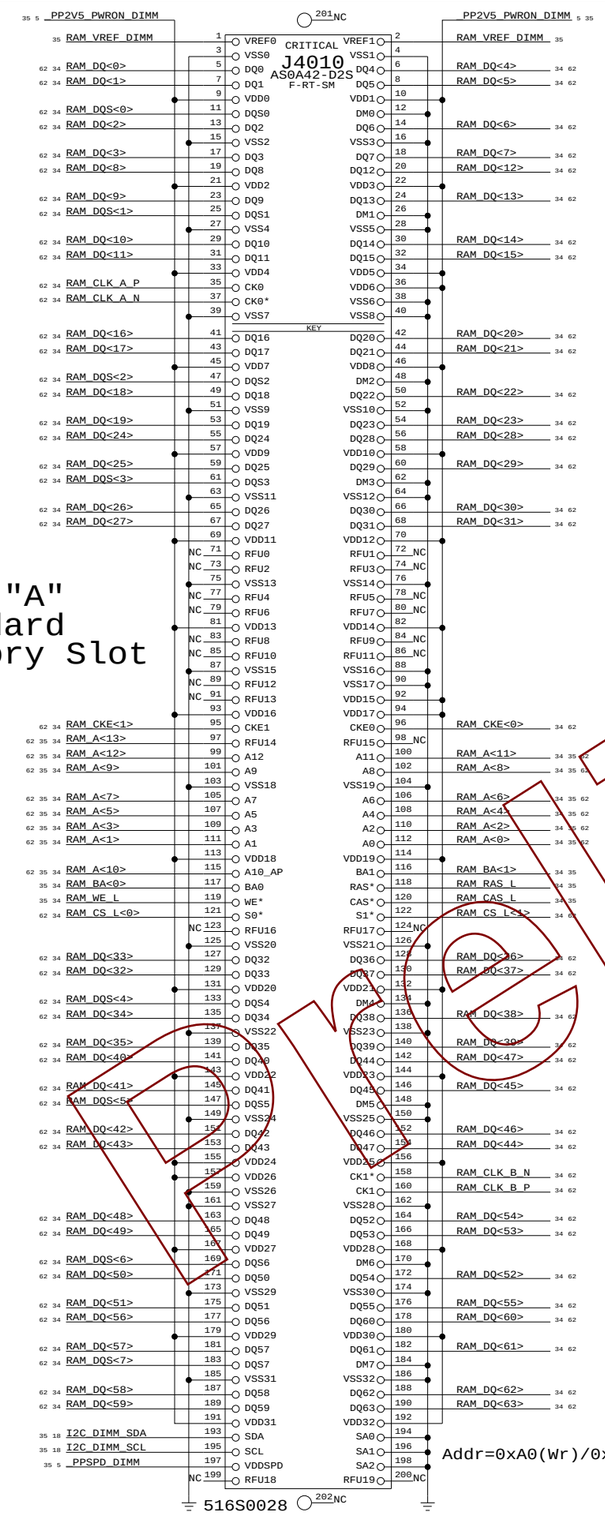
Page Notes

Power aliases required by this page:
- _PP2V5_PWRON_DIMM
- _PPSPD_DIMM (2.5V - 3.3V)

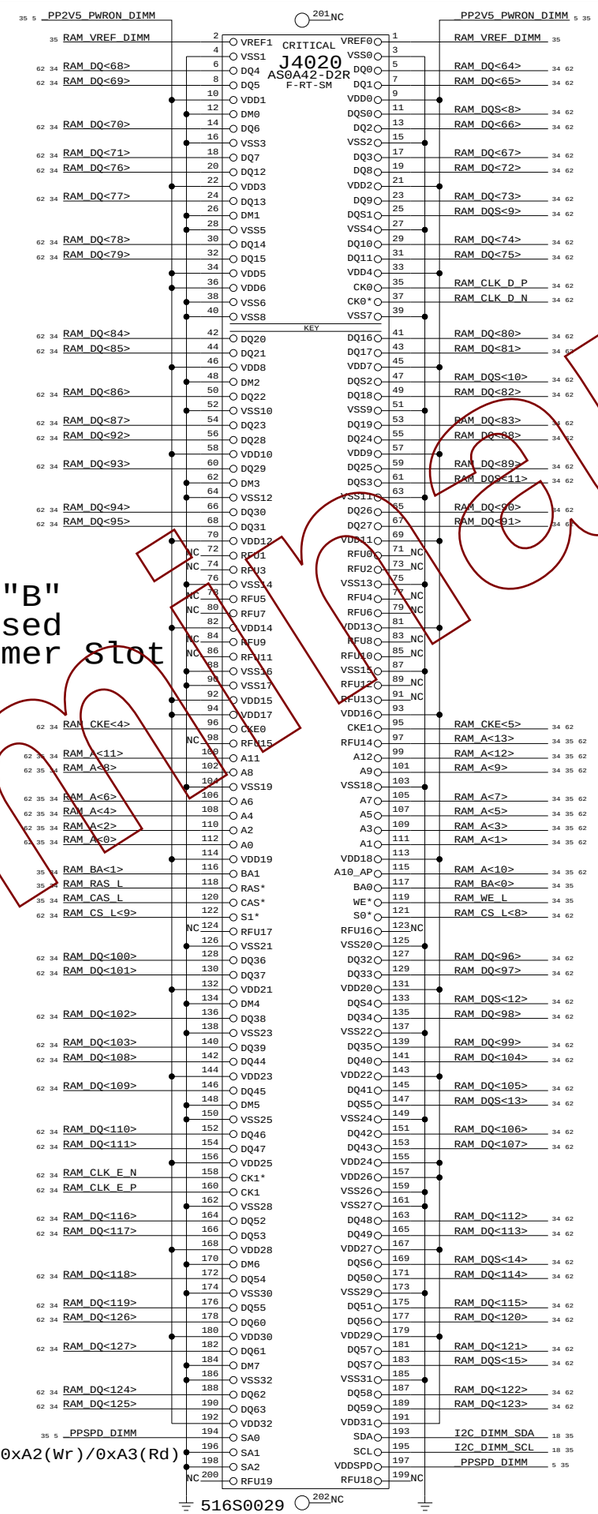
Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Slot "A" Standard Factory Slot



Slot "B" Reversed Customer Slot

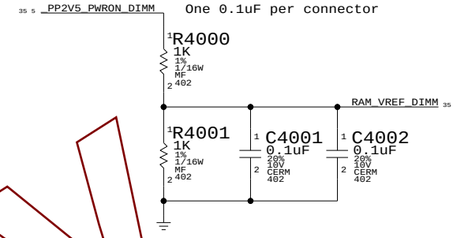


Addr=0xA0(Wr)/0xA1(Rd)

Addr=0xA2(Wr)/0xA3(Rd)

DDR VRef

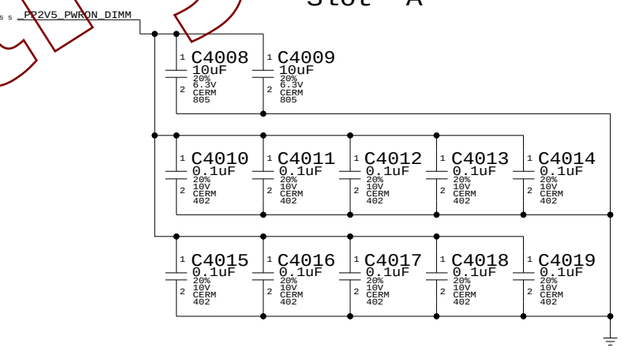
One 0.1uF per connector



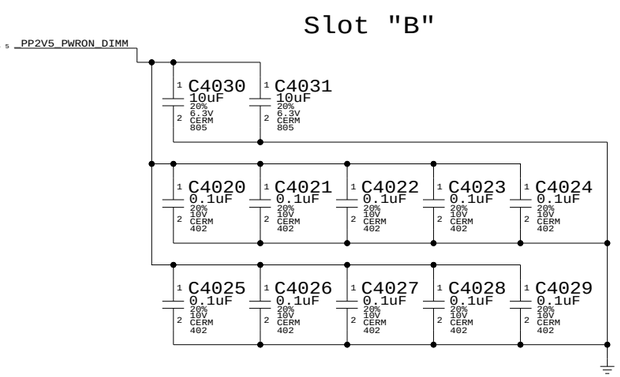
DDR Bypass Caps

(For return current)

Slot "A"



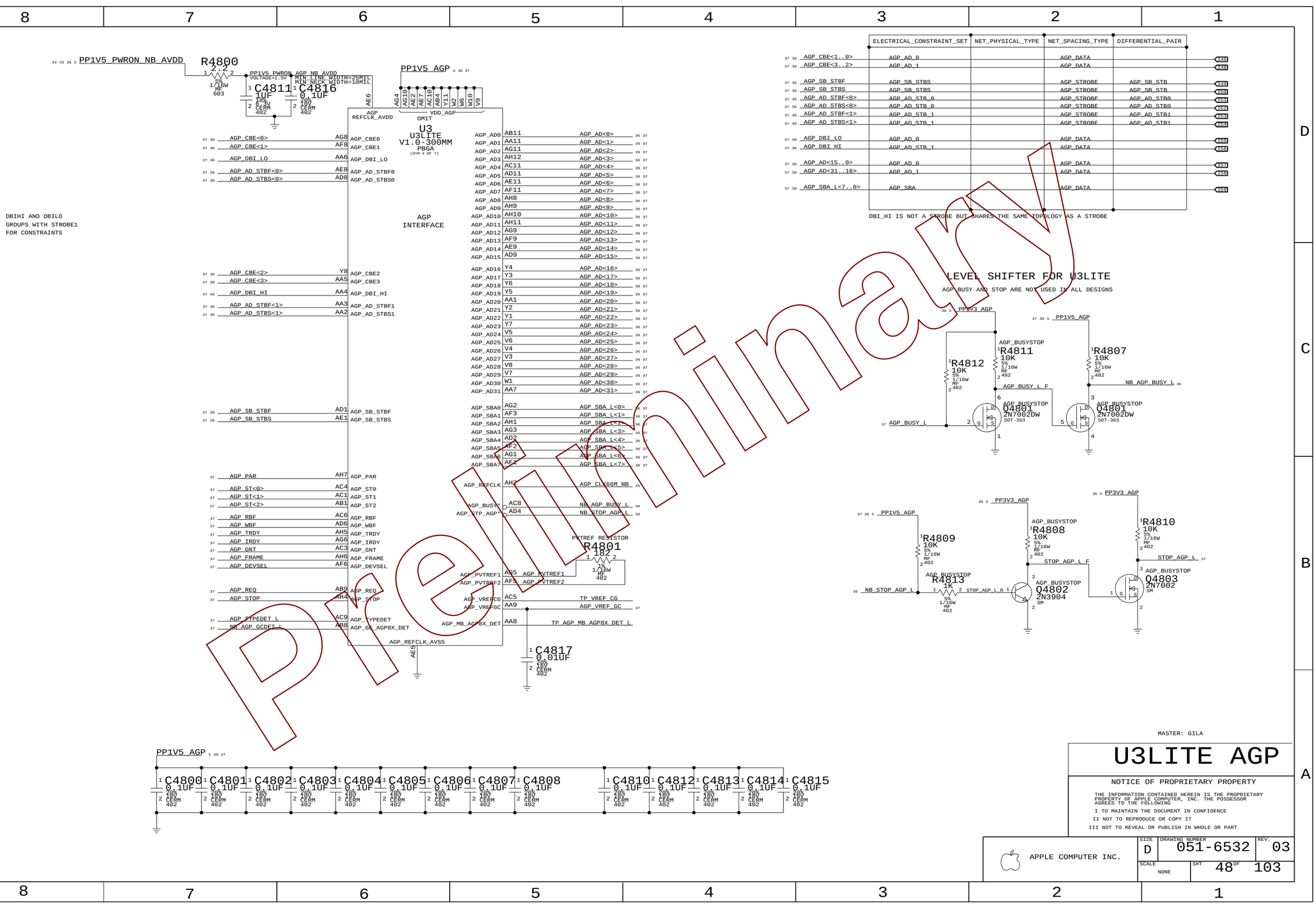
Slot "B"



DDR SODIMM CONNS

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 40 OF 103	


43 33 26 5 PP1V5_PWRON_NB_AVDD
R4800
2.2
5%
1/16W
MF
603
PP1V5_PWRON_NB_AVDD
VOLTAGE=1.5V
MIN_LINE_WIDTH=25MIL
MIN_NECK_WIDTH=10MIL
C4811
1UF
10%
6.3V
CERM
402
C4816
0.1UF
20%
10V
CERM
402
PP1V5_AGP 5 36 37
AE6
AG4
AG10
AE2
AE7
AC10
AB4
Y11
W2
W6
W10
V9
AGP
REFCLK_AVDD
VDD_AGP
OMIT
U3
U3LITE
V1.0-300MM
PBGA
(SYM 4 OF 7)
37 36 AGP_CBE<0>
37 36 AGP_CBE<1>
37 36 AGP_DBI_LO
37 36 AGP_AD_STBF<0>
37 36 AGP_AD_STBS<0>
AG8 AGP_CBE0
AF8 AGP_CBE1
AA6 AGP_DBI_LO
AE8 AGP_AD_STBF0
AD8 AGP_AD_STBS0
DBIHI AND DBILO
GROUPS WITH STROBE1
FOR CONSTRAINTS
AGP
INTERFACE
AGP_AD0 AB11 AGP_AD<0> 36 37
AGP_AD1 AA11 AGP_AD<1> 36 37
AGP_AD2 AG11 AGP_AD<2> 36 37
AGP_AD3 AH12 AGP_AD<3> 36 37
AGP_AD4 AC11 AGP_AD<4> 36 37
AGP_AD5 AD11 AGP_AD<5> 36 37
AGP_AD6 AE11 AGP_AD<6> 36 37
AGP_AD7 AF11 AGP_AD<7> 36 37
AGP_AD8 AH8 AGP_AD<8> 36 37
AGP_AD9 AH9 AGP_AD<9> 36 37
AGP_AD10 AH10 AGP_AD<10> 36 37
AGP_AD11 AH11 AGP_AD<11> 36 37
AGP_AD12 AG9 AGP_AD<12> 36 37
AGP_AD13 AF9 AGP_AD<13> 36 37
AGP_AD14 AE9 AGP_AD<14> 36 37
AGP_AD15 AD9 AGP_AD<15> 36 37
AGP_AD16 Y4 AGP_AD<16> 36 37
AGP_AD17 Y3 AGP_AD<17> 36 37
AGP_AD18 Y6 AGP_AD<18> 36 37
AGP_AD19 Y5 AGP_AD<19> 36 37
AGP_AD20 AA1 AGP_AD<20> 36 37
AGP_AD21 Y2 AGP_AD<21> 36 37
AGP_AD22 Y1 AGP_AD<22> 36 37
AGP_AD23 Y7 AGP_AD<23> 36 37
AGP_AD24 V5 AGP_AD<24> 36 37
AGP_AD25 V6 AGP_AD<25> 36 37
AGP_AD26 V4 AGP_AD<26> 36 37
AGP_AD27 V3 AGP_AD<27> 36 37
AGP_AD28 V8 AGP_AD<28> 36 37
AGP_AD29 V7 AGP_AD<29> 36 37
AGP_AD30 W1 AGP_AD<30> 36 37
AGP_AD31 AA7 AGP_AD<31> 36 37
37 36 AGP_CBE<2>
37 36 AGP_CBE<3>
37 36 AGP_DBI_HI
37 36 AGP_AD_STBF<1>
37 36 AGP_AD_STBS<1>
Y8 AGP_CBE2
AA5 AGP_CBE3
AA4 AGP_DBI_HI
AA3 AGP_AD_STBF1
AA2 AGP_AD_STBS1
AGP_SBA0 AG2 AGP_SBA_L<0> 36 37
AGP_SBA1 AF3 AGP_SBA_L<1> 36 37
AGP_SBA2 AH1 AGP_SBA_L<2> 36 37
AGP_SBA3 AG3 AGP_SBA_L<3> 36 37
AGP_SBA4 AD2 AGP_SBA_L<4> 36 37
AGP_SBA5 AF2 AGP_SBA_L<5> 36 37
AGP_SBA6 AG1 AGP_SBA_L<6> 36 37
AGP_SBA7 AF1 AGP_SBA_L<7> 36 37
37 AGP_SB_STBF
37 AGP_SB_STBS
AD1 AGP_SB_STBF
AE1 AGP_SB_STBS
37 AGP_PAR
37 AGP_ST<0>
37 AGP_ST<1>
37 AGP_ST<2>
37 AGP_RBF
37 AGP_WBF
37 AGP_TRDY
37 AGP_IRDY
37 AGP_GNT
37 AGP_FRAME
37 AGP_DEVSEL
AH7 AGP_PAR
AC4 AGP_ST0
AC1 AGP_ST1
AB1 AGP_ST2
AC6 AGP_RBF
AD6 AGP_WBF
AH5 AGP_TRDY
AG6 AGP_IRDY
AC3 AGP_GNT
AH6 AGP_FRAME
AF6 AGP_DEVSEL
37 AGP_REQ
37 AGP_STOP
AB9 AGP_REQ
AH4 AGP_STOP
37 AGP_TYPEDET_L
37 NB_AGP_GCDET_L
AC9 AGP_TYPEDET
AB8 AGP_GC_AGP8X_DET
AGP_REFCLK_AVSS
AE5
AGP_REFCLK AH2 AGP_CLK66M_NB 25
AGP_BUSY* AC8 NB_AGP_BUSY_L 36
AGP_STP_AGP* AD4 NB_STOP_AGP_L 36
PVTREF RESISTOR
R4801
182
1%
1/16W
MF
402
AGP_PVTREF1 AE5 AGP_PVTREF1
AGP_PVTREF2 AF5 AGP_PVTREF2
AGP_VREFCG AC5 TP_VREF_CG
AGP_VREFGC AA9 AGP_VREF_GC 37
AGP_MB_AGP8X_DET AA8 TP_AGP_MB_AGP8X_DET_L
C4817
0.01UF
20%
16V
CERM
402
ELECTRICAL_CONSTRAINT_SET
NET_PHYSICAL_TYPE
NET_SPACING_TYPE
DIFFERENTIAL_PAIR
37 36 AGP_CBE<1..0> AGP_AD_0 AGP_DATA 146
37 36 AGP_CBE<3..2> AGP_AD_1 AGP_DATA 148
37 36 AGP_SB_STBF AGP_SB_STBS AGP_STROBE AGP_SB_STB 140
37 36 AGP_SB_STBS AGP_SB_STBS AGP_STROBE AGP_SB_STB 160
37 36 AGP_AD_STBF<0> AGP_AD_STB_0 AGP_STROBE AGP_AD_STB0 151
37 36 AGP_AD_STBS<0> AGP_AD_STB_0 AGP_STROBE AGP_AD_STB0 152
37 36 AGP_AD_STBF<1> AGP_AD_STB_1 AGP_STROBE AGP_AD_STB1 153
37 36 AGP_AD_STBS<1> AGP_AD_STB_1 AGP_STROBE AGP_AD_STB1 154
37 36 AGP_DBI_LO AGP_AD_0 AGP_DATA 155
37 36 AGP_DBI_HI AGP_AD_STB_1 AGP_DATA 156
37 36 AGP_AD<15..0> AGP_AD_0 AGP_DATA 157
37 36 AGP_AD<31..16> AGP_AD_1 AGP_DATA 158
37 36 AGP_SBA_L<7..0> AGP_SBA AGP_DATA 159
DBI_HI IS NOT A STROBE BUT SHARES THE SAME TOPOLOGY AS A STROBE
LEVEL SHIFTER FOR U3LITE
AGP BUSY AND STOP ARE NOT USED IN ALL DESIGNS
36 5 PP3V3_AGP
37 36 5 PP1V5_AGP
R4812
10K
5%
1/16W
MF
402
AGP_BUSYSTOP
R4811
10K
5%
1/16W
MF
402
R4807
10K
5%
1/16W
MF
402
AGP_BUSY_L_F
NB_AGP_BUSY_L 36
37 AGP_BUSY_L
Q4801
2N7002DW
SOT-363
AGP_BUSYSTOP
Q4801
2N7002DW
SOT-363
36 5 PP3V3_AGP
37 36 5 PP1V5_AGP
R4809
10K
5%
1/16W
MF
402
AGP_BUSYSTOP
R4808
10K
5%
1/16W
MF
402
R4810
10K
5%
1/16W
MF
402
STOP_AGP_L_F
STOP_AGP_L 37
36 NB_STOP_AGP_L
R4813
1K
5%
1/16W
MF
402
STOP_AGP_L_R
AGP_BUSYSTOP
Q4802
2N3904
SM
AGP_BUSYSTOP
Q4803
2N7002
SM
PP1V5_AGP 5 36 37
C4800 0.1UF 20% 10V CERM 402
C4801 0.1UF 20% 10V CERM 402
C4802 0.1UF 20% 10V CERM 402
C4803 0.1UF 20% 10V CERM 402
C4804 0.1UF 20% 10V CERM 402
C4805 0.1UF 20% 10V CERM 402
C4806 0.1UF 20% 10V CERM 402
C4807 0.1UF 20% 10V CERM 402
C4808 0.1UF 20% 10V CERM 402
C4810 0.1UF 20% 10V CERM 402
C4812 0.1UF 20% 10V CERM 402
C4813 0.1UF 20% 10V CERM 402
C4814 0.1UF 20% 10V CERM 402
C4815 0.1UF 20% 10V CERM 402
MASTER: GILA
U3LITE AGP
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APPLE COMPUTER INC.
SIZE D
DRAWING NUMBER 051-6532
REV. 03
SCALE NONE
SHT 48 OF 103
Preliminary

U3LITE AGP I/O REFERENCE
(PLACE CLOSE TO GPU AGP BALL)

PP1V5_AGP
R4802 3.32K 1% 1/16W MF 402
AGP_VREF_GC
R4803 1.02K 1% 1/16W MF 402
C4818 0.01UF 20% 16V CERM 402

CRITICAL
U4900 RAGE_MOBILITY M10-CSP64 64MB BGA (1 OF 6) OMIT

PP3V3_GPU
PP1V5_GPU_AGP
R4920 47 5% 1/16W MF 402
NO STUFF
R4906 10K 5% 1/16W MF 402 AGP 4X
R4902 10K 5% 1/16W MF 402
R4913 10K 5% 1/16W MF 402 AGP 8X
U3LITE SIGNAL
AGP_TYPEDET_L
R4914 0 5% 1/16W MF 402
C4912 0.1UF 20% 16V CERM 402
C4913 0.01UF 20% 16V CERM 402
(PLACE C4913 CLOSE TO AGPREF PIN)
AGP_VREF_GC
MIN_LINE_WIDTH=8 mil
MIN_NECK_WIDTH=8 mil

AGP_AD<31>	AB30	AD31	
AGP_AD<30>	AB27	AD30	
AGP_AD<29>	AA29	AD29	
AGP_AD<28>	AB28	AD28	
AGP_AD<27>	AA30	AD27	
AGP_AD<26>	AA27	AD26	
AGP_AD<25>	Y30	AD25	
AGP_AD<24>	AA28	AD24	
AGP_AD<23>	W30	AD23	
AGP_AD<22>	W27	AD22	
AGP_AD<21>	V30	AD21	
AGP_AD<20>	V28	AD20	
AGP_AD<19>	V29	AD19	
AGP_AD<18>	V27	AD18	
AGP_AD<17>	U30	AD17	
AGP_AD<16>	U28	AD16	
AGP_AD<15>	R27	AD15	
AGP_AD<14>	R29	AD14	
AGP_AD<13>	P28	AD13	
AGP_AD<12>	P30	AD12	
AGP_AD<11>	P27	AD11	
AGP_AD<10>	P29	AD10	
AGP_AD<9>	N28	AD9	
AGP_AD<8>	N30	AD8	
AGP_AD<7>	M30	AD7	
AGP_AD<6>	M27	AD6	
AGP_AD<5>	M29	AD5	
AGP_AD<4>	L28	AD4	
AGP_AD<3>	L30	AD3	
AGP_AD<2>	L27	AD2	
AGP_AD<1>	L29	AD1	
AGP_AD<0>	K28	AD0	

AGP_CBE<3>	W28	CBEB3	
AGP_CBE<2>	U29	CBEB2	
AGP_CBE<1>	R30	CBEB1	
AGP_CBE<0>	N27	CBEB0	
AGP_CLK66M_GPU	AG30	PCICLK	
AGP_FRAME	U27	FRAMEB	
AGP_IRDY	T30	IRDYB	
AGP_TRDY	T28	TRDYB	
AGP_STOP	T27	STOPB	
AGP_DEVSEL	T29	DEVSELB	
AGP_PAR	R28	PAR	
AGP_REQ	AF29	REQB	
AGP_GNT	AF27	GNTB	
AGP_INT_L	AH29	INTAB	
GPU_RESET_L_R	AH30	RSTB	
AGP_WBF	AE27	WBF	
AGP_ATI_VREFG	AK3	VREFG	
AGP_ATI_MVREF	D8	VREF	

AGP_AD_STBF0	N29	AD_STB0	
AGP_AD_STBF<1>	W29	AD_STB1	
AGP_AD_STBS<0>	M28	AD_STBB0	
AGP_AD_STBS<1>	Y29	AD_STBB1	
AGP_BUSY_L	AG28	AGP_BUSYB	
	K30	AGPREF	
GPU_AGP_TEST	K29	AGPTEST	
NB_AGP_GCDET_L	U25	AGP8X_DETB	
AGP_SUS_STAT_L_PU	AJ28	SUS_STAT	
AGP_ST<0>	AF30	ST0	
AGP_ST<1>	AF28	ST1	
AGP_ST<2>	AE29	ST2	
AGP_SBA_L<7>	AC28	SBA7	
AGP_SBA_L<6>	AB29	SBA6	
AGP_SBA_L<5>	AC27	SBA5	
AGP_SBA_L<4>	AC30	SBA4	
AGP_SBA_L<3>	AD27	SBA3	
AGP_SBA_L<2>	AD30	SBA2	
AGP_SBA_L<1>	AE28	SBA1	
AGP_SBA_L<0>	AD29	SBA0	
AGP_RBF	AE30	RBFB	
STOP_AGP_L	AG29	STP_AGPB	
AGP_SB_STBF	AC29	SB_STB	
AGP_SB_STBS	AD28	SB_STBS	
ATI_RSTB_MSK	AD24	RSTB_MSK	
AGP_DBI_LO	Y25	DBI_LO	
AGP_DBI_HI	Y27	DBI_HI	

R4905 0 5% 1/16W MF 402

OMIT
U4900 RAGE_MOBILITY M10-CSP64 64MB BGA (6 OF 6)
VSS
VDDCI

U4900 RAGE_MOBILITY M10-CSP64 64MB BGA (2 OF 6)
OMIT
VSS
VSS
VSS
VSS

27MHz OSC
(PLACE THE OSCILLATOR AND R4981 AND RR4982 CLOSE TO GPU PIN AJ29)

PP3V3_GPU
L4980 FERR-EMI-100-OHM SM
PP3V3_GPU_OSC
VOLTAGE=3.3V
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil
C4981 0.1UF 20% 16V CERM 402
C4980 4.7UF 20% 6.3V CERM 805
NO STUFF
R4980 100K 5% 1/16W MF 402
CRITICAL
G4980 27.0000M OSC SM-1
VCC
OE
OUT
GND
GPU_OSC_OE
GPU_CLK27M_OSC
(PLACE R4985 CLOSE TO OSC)
GPU_SS
R4985 0 5% 1/16W MF 402
GPUSS_CLK27M
R4981 287 1% 1/16W MF 402
R4982 162 1% 1/16W MF 402
GPU_CLK27M_DIV

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

PP3V3_GPU
L4990 FERR-EMI-100-OHM SM
PP3V3_GPUSS_VDD
VOLTAGE=3.3V
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil
GPU_SS
C4990 10uF 20% 6.3V CERM 805
C4991 0.1UF 20% 16V CERM 402
NO STUFF
R4990 0 5% 1/16W MF 402
R4991 0 5% 1/16W MF 402
GPUSS_CLK27M
CRITICAL
VDD
U4990 CY25811 SOI
XIN/CLKIN
XOUT
SSCLK
FRSEL
S1
S0
VSS
GPU_SSCLK_UF
R4995 33 5% 1/16W MF 402
GPU_SSCLK_IN
GPUSS_S1
GPUSS_S0
NO STUFF
R4992 0 5% 1/16W MF 402
NO STUFF
R4993 0 5% 1/16W MF 402

PP3V3_GPU
R4900 47 5% 1/16W MF 402
R4901 10K 5% 1/16W MF 402
GPU_RESET_L
R4909 1K 1% 1/16W MF 402
MIN_LINE_WIDTH=8 mil
MIN_NECK_WIDTH=8 mil
R4910 1K 1% 1/16W MF 402
PPVCORE_GPUFB
R4911 1K 1% 1/16W MF 402
PLACE VREF_VOLTAGE DIVIDER CLOSE TO ATI M10 VREF PIN
R4912 1K 1% 1/16W MF 402
C4906 0.1UF 20% 16V CERM 402
C4907 10UF 20% 6.3V CERM 805
MIN_LINE_WIDTH=10 mil
MIN_NECK_WIDTH=10 mil

PP1V8_GPU
NO STUFF
R4924 4.7K 5% 1/16W MF 402
R4907 4.7K 5% 1/16W MF 402
NO STUFF
R4908 4.7K 5% 1/16W MF 402
R4923 4.7K 5% 1/16W MF 402
GPU_MEMVMODE0
GPU_MEMVMODE1

FOR 2.5 VDDR1
MEMVMODE0=1.8V
MEMVMODE1=GND
FOR 1.8 VDDR1
MEMVMODE0=GND
MEMVMODE1=1.8V

	B7	MEMVMODE0	
	B6	MEMVMODE1	
	E8	TEST_YCLK	
	J6	TEST_MLCK	
	C8	MEMTEST	
	AC22	PLLTEST	NC

(PULL-UP to GPU_MEM_IO)
GPU_MEMTEST
R4904 45.3 1% 1/16W MF 402

	A10		
	C5		
	A3		
	G4		
	B2		
	U2		
	V4		
	AB2		
	AC4		
	B23		
	K2		
	A23		
	K1		
	B22		
	L2		
	A22		
	L1		

	P2		
	B18		
	P4		
	A19		
	R3		
	A18		
	R4		
	D19		
VSS	P1		
	G29		
	G27		
	B29		
	C20		
	C16		
	A15		
	C11		

	C19		
	D18		
	C10		
	B19		
	M15		
	N15		
	R15		
VSS	T15		
	T12		
	T13		
	T14		
	W16		
	V16		
	U16		
	T16		
	R16		
	R17		
	R18		
	R19		

	M2		
	R3		
	A21		
	B19		
	M15		
	N15		
	R15		
VSS	T15		
	T12		
	T13		
	T14		
	W16		
	V16		
	U16		
	T16		
	R16		
	R17		
	R18		
	R19		
	U6		
VDDCI	AE15		
	F18		
	P25		

	AC10	D+	GPU_THMDIODE_P
	AC11	D-	GPU_THMDIODE_N

PPVCORE_GPUFB

PPVCORE_GPU_VDDCI
VOLTAGE=1.2V
MIN_LINE_WIDTH=20 mil
MIN_NECK_WIDTH=10 mil
PPVCORE_GPU
L4900 60-OHM-EMI SM
C4900 0.01UF 20% 16V CERM 402
C4902 10UF 20% 6.3V CERM 805
C4903 0.01UF 20% 16V CERM 402
C4901 0.01UF 20% 16V CERM 402
C4904 0.01UF 20% 16V CERM 402

	B26		
	A26		
	B25		
	A25		
	C22		
	D21		
	C21		
	D20		
	C20		
	D22		
	C23		
	D23		
	A27		
	B27		
	H2		
	H1		
	J2		
	J1		
	K4		
	K3		
	L4		
	M3		
VSS	L3		
	M4		
	N2		
	N1		
	N4		
	N3		
	G30		
	G28		
	B30		
	D26		
	D16		
	B15		
	D11		
	B10		
	D9		
	B3		
	G3		
	E1		
	U1		
	V3		
	AB1		
	AC3		
	J30		
	J29		
	H30		
	H29		
	F30		
	F29		
	E30		
	E29		
	J28		
	J27		
	H28		
	H27		
	F28		
	F27		
	E28		
	E27		
	D30		
VSS	D29		
	C30		
	C29		
	A30		
	A29		
	A28		
	B28		
	D28		
	C28		
	D27		
	C27		
	D25		
	C25		
	D24		
	C24		
	D18		
	C18		
	D17		
	C17		
	D15		
	C15		
	D14		
	C14		
	B17		

	A17		
	B16		
	A16		
	B14		
	A14		
	B13		
	A13		
	D13		
	C13		
	D12		
	C12		
	D10		
	C10		
	D9		
	C9		
	B12		
	A12		
	B11		
	A11		
	B9		
	A9		
	B8		
	A8		
	C7		
	D7		
	C6		
	D6		
	C4		
	D4		
	C3		
	D3		
	A5		
	B5		
	A4		
	B4		
	A2		
	B2		
	A1		
	B1		
	E4		
	E3		
	F3		
	F4		
	H3		
	H4		
	J3		
	J4		
	C1		
	C2		
	D1		
	D2		
	F1		
	F2		
	G1		
	G2		
	R1		
	R2		
	T1		
	T2		
	V1		
	V2		
	W1		
	W2		
	T3		
	T4		
	U3		
	U4		
	W3		
	W4		
	Y3		
	Y4		
	Y1		
	Y2		
	AA1		
	AA2		
	AC1		
	AC2		
	AD1		
	AD2		
	AA3		
	AA4		
	AB3		
	AB4		
	AD3		
	AD4		
	AE3		
	AE4		

M11 AGP INTERFACE

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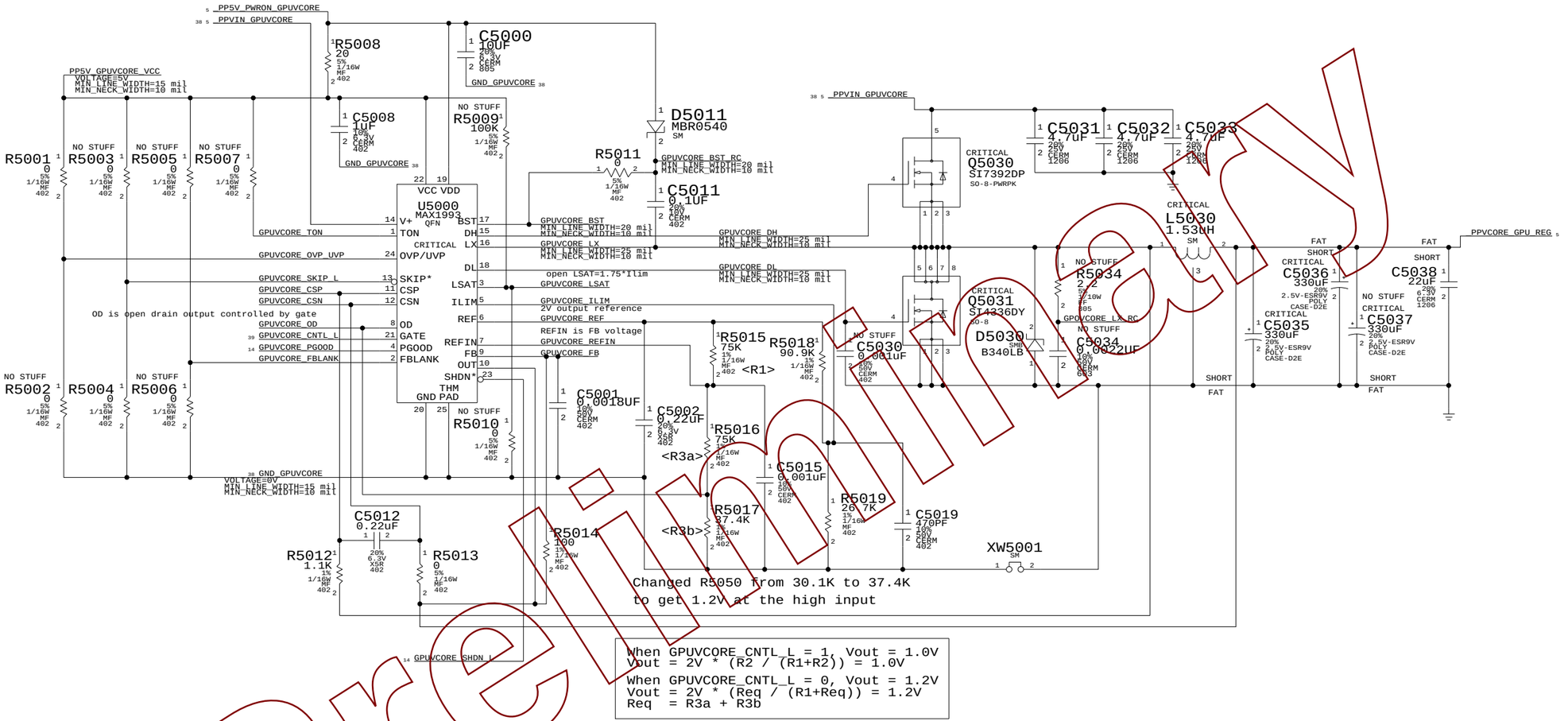

GPU VCore Regulator

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ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
	LVDS	LVDS_L0	LVDS_L0P	6 39 42
	LVDS	LVDS_L0	LVDS_L0N	6 39 42
	LVDS	LVDS_L1	LVDS_L1P	6 39 42
	LVDS	LVDS_L1	LVDS_L1N	6 39 42
	LVDS	LVDS_L2	LVDS_L2P	6 39 42
	LVDS	LVDS_L2	LVDS_L2N	6 39 42
	LVDS	LVDS_LCLK	CLKLVDS_LP	6 39 42
	LVDS	LVDS_LCLK	CLKLVDS_LN	6 39 42
	LVDS	LVDS_U0	LVDS_U0P	6 39 42
	LVDS	LVDS_U0	LVDS_U0N	6 39 42
	LVDS	LVDS_U1	LVDS_U1P	6 39 42
	LVDS	LVDS_U1	LVDS_U1N	6 39 42
	LVDS	LVDS_U2	LVDS_U2P	6 39 42
	LVDS	LVDS_U2	LVDS_U2N	6 39 42
	LVDS	LVDS_UCLK	CLKLVDS_UP	6 39 42
	LVDS	LVDS_UCLK	CLKLVDS_UN	6 39 42
GPU_DVO_DATA	8 MIL SPACING		GPU_DVO0<0..19>	39 41
GPU_DVO_DATA20	8 MIL SPACING		GPU_DVO0<20>	39 41
GPU_DVO_DATA	8 MIL SPACING		GPU_DVO0<21..23>	39 41
GPU_DVO_DATA	8 MIL SPACING		GPU_DVO_HSYNC	39 41
GPU_DVO_CTL	8 MIL SPACING		GPU_DVO_VSYNC	39 41
GPU_DVO_CTL	8 MIL SPACING		GPU_DVO_DE	39 41
GPU_DVO_CTL	8 MIL SPACING		GPU_DVO_CLKP	39 41

Page Notes

Power aliases required by this page:
_PP1V5_GPU_AGP, _PP3V3_GPU, PPVCORE_GPU

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: LVDS

Line To Line:	15 mils
Length Tolerance:	50 mils
Primary Max Sep:	10 mils
Secondary Max Sep:	100 mils
Secondary Length:	250 mils

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

GPU VCORE - 1.2V

(PUT ALL CAPs BELOW ATI ASIC)

M10 Power Shut down Sequencing

M11 CORE PWR/LVDS/TMDS

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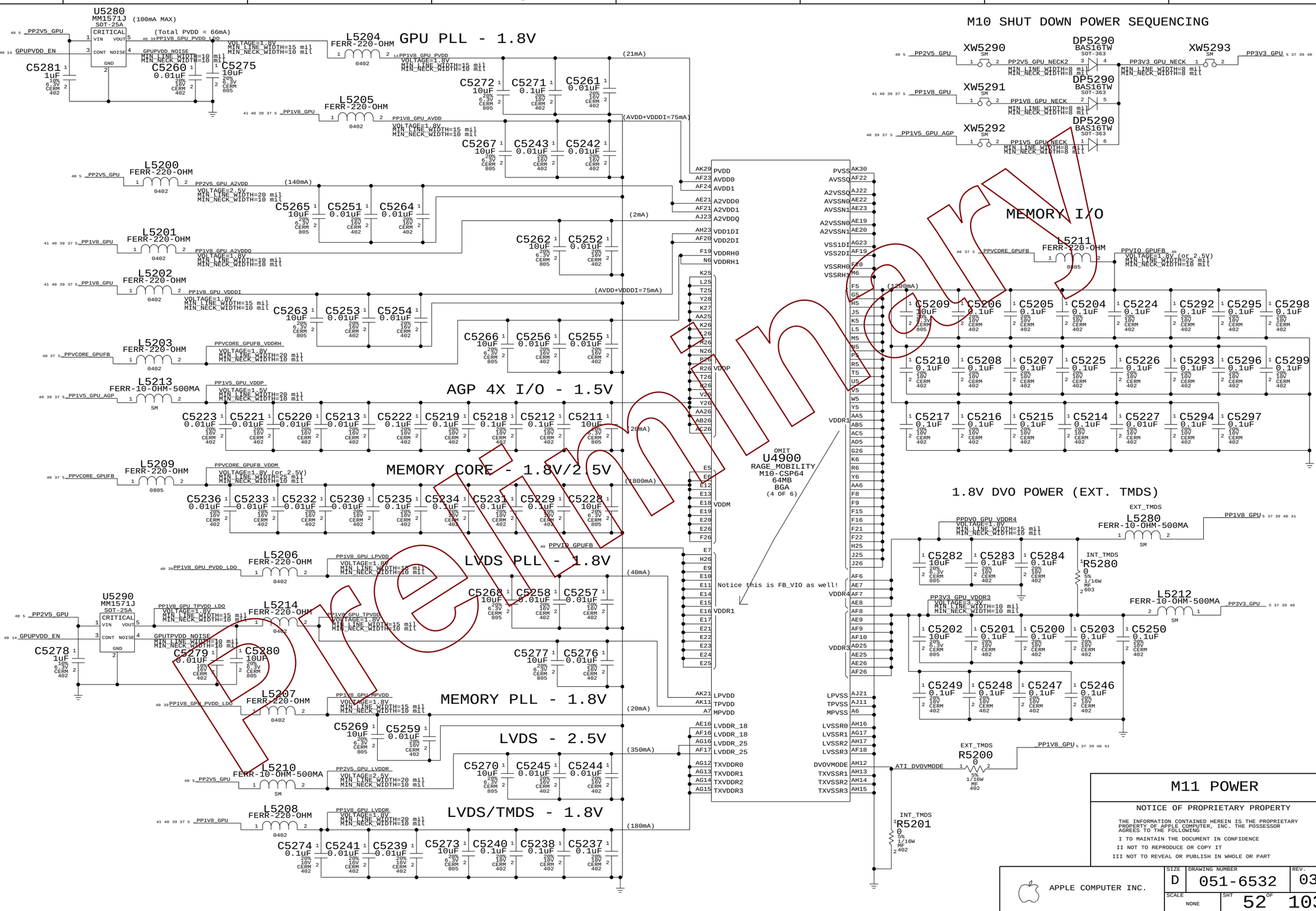
SCALE: NONE	SHT 51 OF 103	


M10 SHUT DOWN POWER SEQUENCING
GPU PLL - 1.8V
AGP 4X I/O - 1.5V
MEMORY CORE - 1.8V/2.5V
LVDS PLL - 1.8V
MEMORY PLL - 1.8V
LVDS - 2.5V
LVDS/TMDS - 1.8V
MEMORY I/O
1.8V DVO POWER (EXT. TMDS)
U4900
RAGE_MOBILITY
M10-CSP64
64MB
BGA
(4 OF 6)
Notice this is FB_VIO as well!
M11 POWER
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SCALE NONE
SHT 52 OF 103

Page Notes

Power aliases required by this page:
(None)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: TMDS

Line To Line:	15 mils
Length Tolerance:	50 mils
Primary Max Sep:	10 mils
Secondary Max Sep:	100 mils
Secondary Length:	250 mils

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

ATI TMDS

SILICON IMAGE TMDS

INTERNAL TMDS TERMINATION

TERMINATION NETWORK SHOULD BE CONNECTED AS SHOWN
CMF LINE SHOULD BE ROUTED AS 4MIL SURFACE
TRACE SO THAT IT MAY BE CUT BETWEEN CAPS

EXTERNAL TMDS TERMINATION

TERMINATION NETWORK SHOULD BE CONNECTED AS SHOWN
CMF LINE SHOULD BE ROUTED AS 4MIL SURFACE
TRACE SO THAT IT MAY BE CUT BETWEEN CAPS

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EXTERNAL VIDEO (DVI) INTERFACE

ANALOG FILTERING PLACE CLOSE TO CONNECTOR

FL5910 CRITICAL LCFILTER SM-220MHZ — GPU_B → VGA_B
FL5911 CRITICAL LCFILTER SM-220MHZ — GPU_G → VGA_G
FL5912 CRITICAL LCFILTER SM-220MHZ — GPU_R → VGA_R
C5910 3.3PF 0.25% 50V CERM 402
C5911 3.3PF 0.25% 50V CERM 402
C5912 3.3PF 0.25% 50V CERM 402

VGA VSYNC BUFFERS

PP3V3_PWRON
CRITICAL U5913 74AHC1G32 SM
GPU_HSYNC → R5913 33 5% 1/16W MF 402 → VGA_HSYNC
CRITICAL U5914 74AHC1G32 SM
GPU_VSYNC → R5914 33 5% 1/16W MF 402 → VGA_VSYNC

TMDS FILTERING PLACE CLOSE TO CONNECTOR

CRITICAL L5916 90-OHM-300mA 2012H SYM_VER-1 — TMDS_DN<0> / TMDS_DP<0>
CRITICAL L5917 90-OHM-300mA 2012H SYM_VER-1 — TMDS_DN<1> / TMDS_DP<1>
CRITICAL L5918 90-OHM-300mA 2012H SYM_VER-1 — TMDS_DN<2> / TMDS_DP<2>
CRITICAL L5919 90-OHM-300mA 2012H SYM_VER-1 — TMDS_DN<3> / TMDS_DP<3>
CRITICAL L5920 90-OHM-300mA 2012H SYM_VER-1 — TMDS_DN<4> / TMDS_DP<4>
CRITICAL L5921 90-OHM-300mA 2012H SYM_VER-1 — TMDS_DN<5> / TMDS_DP<5>

DVI DDC CURRENT LIMIT

(55mA requirement per DVI spec)

PP5V_RUN → F5900 0.5AMP-13.2V SM → PP5V_RUN_DDC_F (MIN_LINE_WIDTH=10 MIL, MIN_NECK_WIDTH=10 MIL)
L5900 400-OHM-EMI SM-1 — Isolation required for DVI power switch
PP5V_RUN_DDC → D5900 MBR0530 SM
DDC_CLK_ISO (MIN_LINE_WIDTH=10 MIL, MIN_NECK_WIDTH=10 MIL)
R5902 4.7K 5% 1/16W MF 402
R5903 4.7K 5% 1/16W MF 402
R5904 100 5% 1/16W MF 402
R5905 100 5% 1/16W MF 402
R5906 100 5% 1/16W MF 402
C5904 100pF 5% 50V CERM 402
C5905 100pF 5% 50V CERM 402
C5906 100pF 5% 50V CERM 402
C5900 0.01UF 20% 50V CERM 603

J5900 CRITICAL QH1112 F-RT-TH 36-pin

TMDS_CONN_DN<0>	TMDS_CONN_DN<2>
TMDS_CONN_DP<0>	TMDS_CONN_DP<2>
TMDS_CONN_DN<5>	TMDS_CONN_DN<4>
TMDS_CONN_DP<5>	TMDS_CONN_DP<4>
TMDS_CONN_CLKP	TMDS_CONN_DN<1>
TMDS_CONN_CLKN	TMDS_CONN_DP<1>
	TMDS_CONN_DN<3>
	TMDS_CONN_DP<3>
	DVI_DDC_CLK_UF (+5V_DDC_SLEEP)
	DVI_DDC_DATA_UF
	VGA_VSYNC
	DVI_HPD_UF
VGA_B	VGA_R
VGA_HSYNC	VGA_G
GND_CHASSIS_DVI_TOP	
GND_CHASSIS_DVI_BOTTOM	

R5900 0 5% 1/16W MF 402 — PLACE NEAR 3, 11 & 19
R5901 0 5% 1/16W MF 402 — PLACE NEAR C5A & C5B

3V LEVEL SHIFTERS

PP3V3_RUN
Q5907 2N7002DW SOT-363 — DVI_DDC_CLK → GPU_DVI_DDC_CLK
Q5907 2N7002DW SOT-363 — DVI_DDC_DATA → GPU_DVI_DDC_DATA
Q5909 2N7002DW SOT-363 — DVI_HPD → GPU_HPD
R5907 10K 5% 1/16W MF 402
R5908 10K 5% 1/16W MF 402
R5909 100K 5% 1/16W MF 402
Q5909 shares with ALS sensor to save space
NOTE: Pulldown for DVI_HPD provided by DVI power switch interface

DVI POWER SWITCH

Power key detect path when system is shutdown or asleep.. DDC_CLK is isolated from GPU DURING SHUTDOWN. WHEN power key on remote device is pressed, 5V will be driven into DDC_CLK. Once host rails will be low, TP0610 will turn on, driving SOFT_PWR_ON_L low. As host rails rise, TP0610 will turn off, as will remote device path into DDC_CLK. Isolation will be disabled as well.

Q5933 TP0610 SM — DVI_DDC_CLK_UF → DVI_DDC_CLK
R5933 680 5% 1/16W MF 402 — DVI_TURN_ON → DVI_TRUN_ON_ILIM
R5935 10K 5% 1/16W MF 402 — DVI_TURN_ON_BASE
Q5935 2N3904 SM — SYS_POWER_BUTTON_L
R5934 330 5% 1/10W MF 402 — Pulldown prevents 3904 from turning on when DVI monitor has active, self-powered DDC clock pullup.
PP5V_RUN_DDC

Power key detect path when system is running. HPD normally driven to 3.3V. When power key on remote device pressed, HPD will be driven to 5V. COMPARATOR ENABLED BY GPU's GPIO.

R5920 68.1K 1% 1/16W MF 402
C5920 0.1UF 20% 10V CERM 402
U5920 LMC7211 SM — CRITICAL
HPD_4V_REF
R5922 10K 1% 1/16W MF 402 — DVI_HPD_UF
R5923 10K 1% 1/16W MF 402
R5921 100K 1% 1/16W MF 402 — DVI_HPD_DIV
HPD_PWR_SW
Q5925 2N7002DW SOT-363 — HPD_ON
Q5926 TP0610 SM
R5928 330 5% 1/16W MF 402
R5930 20K 5% 1/16W MF 402 — HPD_BASE
Q5930 2N3904 SM — HPD_ON_RC
PPBUS_ALL_A
COMP_ENABLE
COMP_DISABLE
R5926 100K 5% 1/16W MF 402
R5927 100K 5% 1/16W MF 402
C5929 47UF 20% 6.3V CERM 1210
R5929 68K 5% 1/16W MF 402
Q5925 2N7002DW SOT-363 — NEED PULL-DOWN BECAUSE THIS SIGNAL IS TRISTATED INITIALLY
HPD_PWR_SNS_EN
R5925 100K 5% 1/16W MF 402

LCD INTERFACE

100K pull-ups are for no-panel case (development) Panel has 2K pull-ups
C5970 0.001uF 20% 50V CERM 402 — GND_CHASSIS_LVDS
CRITICAL J5970 G-501973 F-RT-SM 34-pin
PP3V3_RUN
R5972 100K 5% 1/16W MF 402
R5973 100K 5% 1/16W MF 402
PP3V3_LCD (MIN_LINE_WIDTH=20 MIL, MIN_NECK_WIDTH=10 MIL) (LVDS DDC POWER)
LVDS_DDC_CLK
LVDS_DDC_DATA
NO STUFF
C5972 0.001uF 20% 50V CERM 402
C5973 0.001uF 20% 50V CERM 402
GND_CHASSIS_LVDS

NC	
LVDS_L0N	
LVDS_L0P	
LVDS_L1N	
LVDS_L1P	
LVDS_L2N	
LVDS_L2P	
CLKLVDS_LN	
CLKLVDS_LP	
LVDS_U0N	
LVDS_U0P	
LVDS_U1N	
LVDS_U1P	
LVDS_U2N	
LVDS_U2P	
CLKLVDS_UN	
CLKLVDS_UP	

INVERTER INTERFACE

PPBUS_INV → L5980 FERR-1K-OHM-EMI SM (PPBUS_INVERTER MIN_LINE_WIDTH=20 MIL, MIN_NECK_WIDTH=10 MIL)
PP5V_PWRON
Q5984 FDG6324L SC70-6
R5984 100K 5% 1/16W MF 402
FP_PWR_EN_L
PP5V_INVERTER_F (MIN_LINE_WIDTH=10 MIL, MIN_NECK_WIDTH=10 MIL)
L5981 400-OHM-EMI SM-1
C5984 10UF 20% 6.3V CERM 805
PP5V_INVERTER
Q5984 FDG6324L SC70-6
FP_PWR_EN
L5982 400-OHM-EMI SM-1
BRIGHT_PWM
PP3V3_ALL
C5983 0.1UF 20% 10V CERM 402
INV_ON_PWM
CRITICAL U5983 74AHC1G32 SM
BRIGHT_PWM_UF
INVERTER EXPECTS ACTIVE HIGH SIGNAL
C5980 0.001UF 20% 50V CERM 402
C5981 0.001UF 20% 50V CERM 402
C5982 0.001UF 20% 50V CERM 402
CRITICAL J5980 SM-2MT
GND_CHASSIS_INV

S-VIDEO/COMP OUT INTERFACE

XW5960 SM — GPU_TV_GND1 → L5960 FERR-10-OHM-500MA SM (MIN_LINE_WIDTH=15 MIL, MIN_NECK_WIDTH=10 MIL) → TV_GND1
C5960 0.01UF 20% 50V CERM 603
Place GND shorts at graphics controller
L5962 3.3UH 0603 — GPU_Y → TV_C
C5967 560PF 10% 50V CERM 402
C5962 560PF 10% 50V CERM 402
L5963 3.3UH 0603 — GPU_C → TV_Y
C5968 560PF 10% 50V CERM 402
C5963 560PF 10% 50V CERM 402
CRITICAL J5960 MINIDIN RT-TH MH1177
L5964 3.3UH 0603 — GPU_COMP → TV_COMP
C5969 560PF 10% 50V CERM 402
C5964 560PF 10% 50V CERM 402
XW5961 SM — GPU_TV_GND2 → L5961 FERR-10-OHM-500MA SM (MIN_LINE_WIDTH=15 MIL, MIN_NECK_WIDTH=10 MIL) → TV_GND2
C5961 0.01UF 20% 50V CERM 603
Place GND shorts at graphics controller
GND_CHASSIS_SVIDEO

LCD POWER SWITCH

PP3V3_PWRON
R5977 100K 5% 1/16W MF 402
C5976 0.0022uF 10% 50V CERM 402
R5976 100K 5% 1/16W MF 402 — LCD_PWREN_L
LCD_DIGON_L
Q5977 2N7002 SM — FP_PWR_EN
PP3V3_LCD_FET (MIN_LINE_WIDTH=20 MIL, MIN_NECK_WIDTH=10 MIL)
L5975 FERR-250-OHM SM
Q5975 SI3443DV TSOP
C5975 0.001uF 20% 50V CERM 402
C5971 0.001uF 20% 50V CERM 402
R5999 0 5% 1/16W MF 402
C5999 0.01uF 20% 50V CERM 603
GND_CHASSIS_INV

VIDEO CONNECTORS

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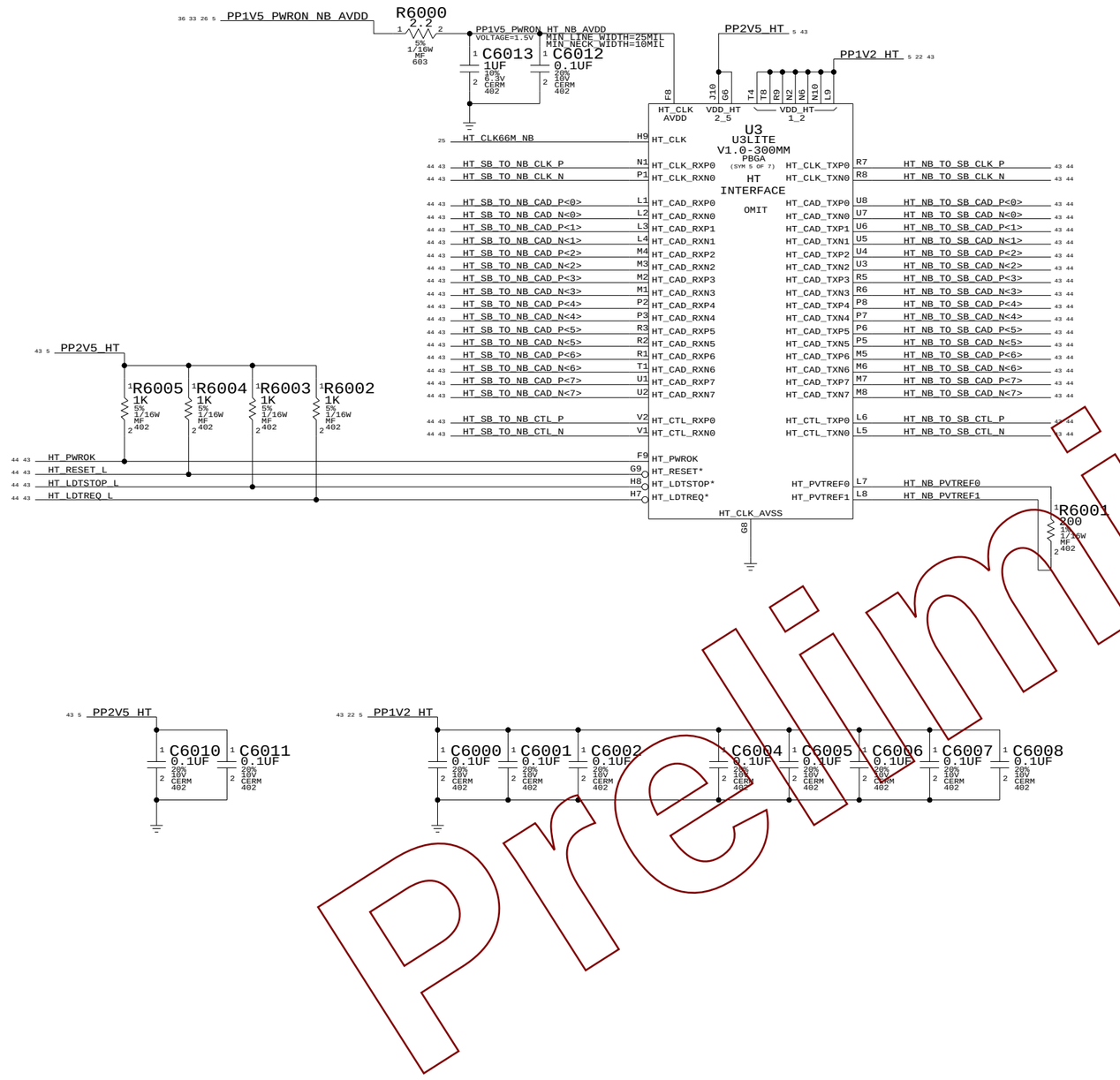


	ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
HT_NB_TO_SB_CLK_P	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CLK	146
HT_NB_TO_SB_CLK_N	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CLK	147
HT_NB_TO_SB_CTL_P	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CTL	183
HT_NB_TO_SB_CTL_N	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CTL	182
HT_NB_TO_SB_CAD_P<0>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD0	151
HT_NB_TO_SB_CAD_N<0>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD0	150
HT_NB_TO_SB_CAD_P<1>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD1	152
HT_NB_TO_SB_CAD_N<1>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD1	153
HT_NB_TO_SB_CAD_P<2>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD2	154
HT_NB_TO_SB_CAD_N<2>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD2	155
HT_NB_TO_SB_CAD_P<3>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD3	156
HT_NB_TO_SB_CAD_N<3>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD3	157
HT_NB_TO_SB_CAD_P<4>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD4	158
HT_NB_TO_SB_CAD_N<4>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD4	159
HT_NB_TO_SB_CAD_P<5>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD5	160
HT_NB_TO_SB_CAD_N<5>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD5	161
HT_NB_TO_SB_CAD_P<6>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD6	162
HT_NB_TO_SB_CAD_N<6>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD6	163
HT_NB_TO_SB_CAD_P<7>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD7	164
HT_NB_TO_SB_CAD_N<7>	HT_NB_TO_SB	HT_NB_TO_SB	HT_NB_TO_SB_CAD7	165
HT_SB_TO_NB_CLK_P	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CLK	148
HT_SB_TO_NB_CLK_N	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CLK	149
HT_SB_TO_NB_CTL_P	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CTL	184
HT_SB_TO_NB_CTL_N	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CTL	185
HT_SB_TO_NB_CAD_P<0>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD0	166
HT_SB_TO_NB_CAD_N<0>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD0	167
HT_SB_TO_NB_CAD_P<1>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD1	168
HT_SB_TO_NB_CAD_N<1>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD1	169
HT_SB_TO_NB_CAD_P<2>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD2	170
HT_SB_TO_NB_CAD_N<2>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD2	171
HT_SB_TO_NB_CAD_P<3>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD3	172
HT_SB_TO_NB_CAD_N<3>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD3	173
HT_SB_TO_NB_CAD_P<4>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD4	174
HT_SB_TO_NB_CAD_N<4>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD4	175
HT_SB_TO_NB_CAD_P<5>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD5	176
HT_SB_TO_NB_CAD_N<5>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD5	177
HT_SB_TO_NB_CAD_P<6>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD6	178
HT_SB_TO_NB_CAD_N<6>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD6	179
HT_SB_TO_NB_CAD_P<7>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD7	180
HT_SB_TO_NB_CAD_N<7>	HT_SB_TO_NB	HT_SB_TO_NB	HT_SB_TO_NB_CAD7	181
HT_PWROK	HT_PWROK	HT_2V5		186
HT_RESET_L	HT_CTL	HT_2V5		187
HT_LDTSTOP_L	HT_CTL	HT_2V5		188
HT_LDTREQ_L	HT_CTL	HT_2V5		189

HT_1V2

5 MIL SPACING FOR DIFF PAIR
10 MIL SPACING TO ANYTHING ELSE

HT_2V5

4 MIL SPACING IN GROUP
8 MIL SPACING TO ANYTHING ELSE

LENGTH TOLERENCE DOES NOT NEED TO BE SPECIFIED
MATCHED GROUP CONSTRAINT IS TIGHT ENOUGH

MASTER: GILA

U3LITE HT

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 60 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
	15 MIL SPACING	

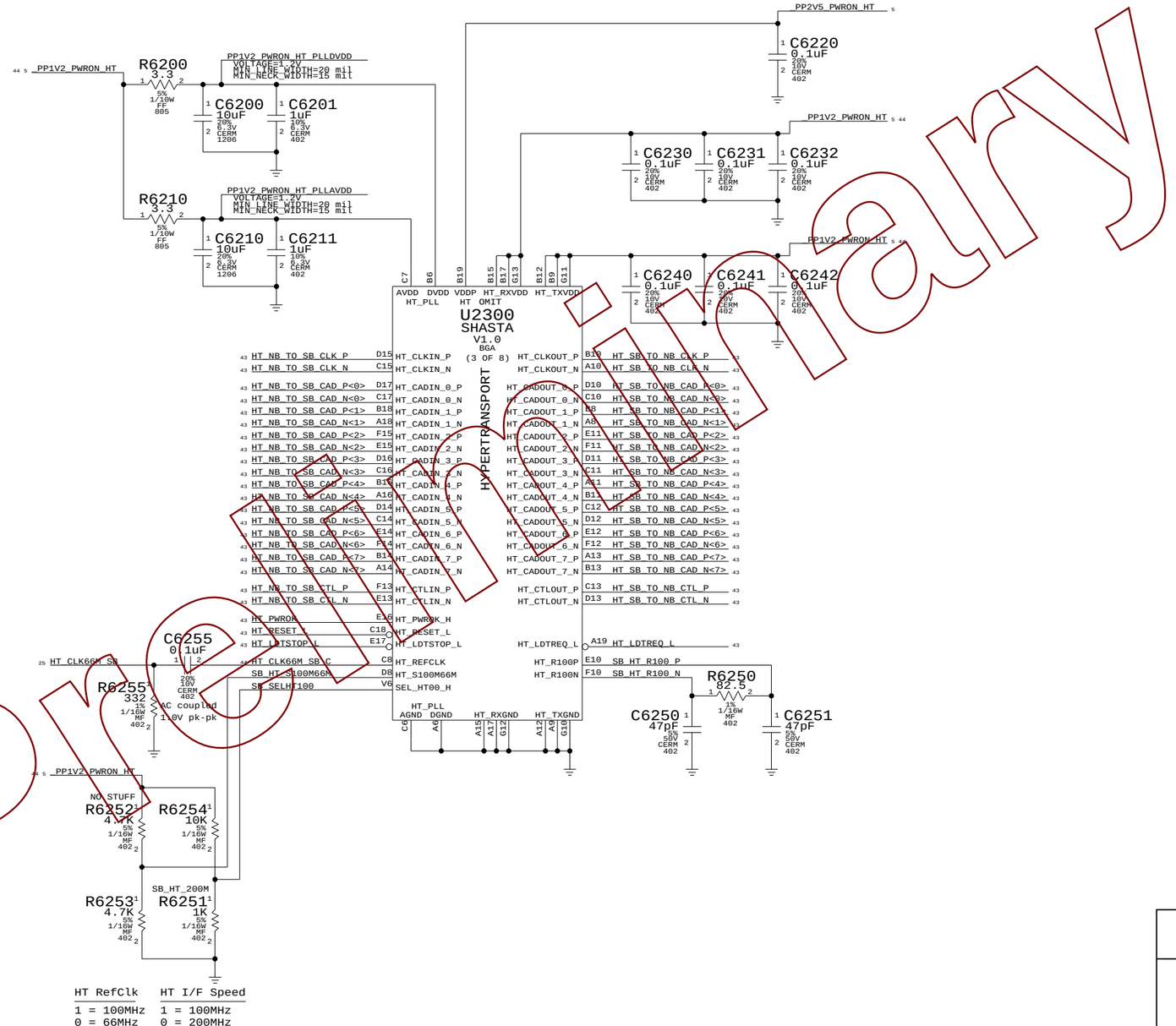
HT_CLK66M_SB_C 44

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.



Master: Fizzy

Shasta HyperTransport

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 62 OF 103	

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:06:27 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
PCI_AD		PCI_AD<31..28> 6 46 47 48 49 62
PCI_AD27		PCI_AD<27> 6 46 47 48 49 62
PCI_AD		PCI_AD<26..24> 6 46 47 48 49 62
PCI_AD23		PCI_AD<23> 6 47 48 49 62
PCI_AD22		PCI_AD<22> 6 47 48 49 62
PCI_AD21		PCI_AD<21> 6 47 48 49 62
PCI_AD20		PCI_AD<20> 6 46 47 48 49 62
PCI_AD		PCI_AD<19..18> 6 46 47 48 49 62
PCI_AD17		PCI_AD<17> 6 46 47 48 49 62
PCI_AD		PCI_AD<16..0> 6 46 47 48 49 62
PCI		PCI_CBE_L<3..0> 6 47 48 49 62
PCI		PCI_PAR 6 47 48 49 62
PCI_CTL		PCI_DEVSEL_L 6 45 47 48 49 62
PCI_CTL		PCI_FRAME_L 6 45 47 48 49 62
PCI_CTL		PCI_IRDY_L 6 45 47 48 49 62
PCI_CTL		PCI_TRDY_L 6 45 47 48 49 62
PCI_CTL		PCI_STOP_L 6 45 47 48 49 62

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)

5 _PP3V3_SB_PCI

NO_STUFF C7410 10uF 20% 6.3V CERM 805
C7400 0.1uF 20% 10V CERM 402
C7401 0.1uF 20% 10V CERM 402
C7402 0.1uF 20% 10V CERM 402
C7403 0.1uF 20% 10V CERM 402
C7404 0.1uF 20% 10V CERM 402

NO_STUFF C7411 10uF 20% 6.3V CERM 805
C7405 0.1uF 20% 10V CERM 402
C7406 0.1uF 20% 10V CERM 402
C7407 0.1uF 20% 10V CERM 402
C7408 0.1uF 20% 10V CERM 402
C7409 0.1uF 20% 10V CERM 402

PP2V5_PWRON_SB 5 6 21 23 56

C7420 0.1uF 20% 10V CERM 402
C7421 0.1uF 20% 10V CERM 402
C7422 0.1uF 20% 10V CERM 402
C7423 0.1uF 20% 10V CERM 402

U2300 SHASTA V1.0 BGA (1 OF 8)

VDDOPC: AA22, B22, E21, H16, J21, M16, N21, R20, U21, V19
PCIVDDP: B20, J18, N20, U20
OMIT

25 PCI_CLK66M_SB_INT	AB9	PCIBR_CLK_H	
25 5 PCI_CLK33M_SB_EXT	U19	PCIICLK_H	
"Slot A" - AD17			
47 46 6 PCI_SLOTA_REQ_L	AB18	PCI1REQ_0_L	
47 48 PCI_SLOTA_GNT_L	AA18	PCI1GNT_0_L	
"Slot G" - AD27			
48 45 PCI_SLOTG_REQ_L	AB20	PCI1REQ_1_L	
48 45 PCI_SLOTG_GNT_L	AB19	PCI1GNT_1_L	
"Slot D" - AD26			
45 PCI_SLOTD_REQ_L	V17	PCI1REQ_2_L	
45 PCI_SLOTD_GNT_L	V18	PCI1GNT_2_L	
47 46 6 ROM_CS_L	AB8	ROMCS_L	
47 46 6 ROM_OE_L	AA9	ROMOE_L	
47 46 6 ROM_WE_L	Y10	ROMRW_L	

PCI1AD_0_H	L18	PCI_SB_AD<0>	62
PCI1AD_1_H	K19	PCI_SB_AD<1>	62
PCI1AD_2_H	L22	PCI_SB_AD<2>	62
PCI1AD_3_H	M22	PCI_SB_AD<3>	62
PCI1AD_4_H	M18	PCI_SB_AD<4>	62
PCI1AD_5_H	L20	PCI_SB_AD<5>	62
PCI1AD_6_H	M21	PCI_SB_AD<6>	62
PCI1AD_7_H	N16	PCI_SB_AD<7>	62
PCI1AD_8_H	M20	PCI_SB_AD<8>	62
PCI1AD_9_H	P22	PCI_SB_AD<9>	62
PCI1AD_10_H	M17	PCI_SB_AD<10>	62
PCI1AD_11_H	N18	PCI_SB_AD<11>	62
PCI1AD_12_H	M19	PCI_SB_AD<12>	62
PCI1AD_13_H	N19	PCI_SB_AD<13>	62
PCI1AD_14_H	P21	PCI_SB_AD<14>	62
PCI1AD_15_H	R22	PCI_SB_AD<15>	62
PCI1AD_16_H	P20	PCI_SB_AD<16>	62
PCI1AD_17_H	V21	PCI_SB_AD<17>	62
PCI1AD_18_H	P18	PCI_SB_AD<18>	62
PCI1AD_19_H	T20	PCI_SB_AD<19>	62
PCI1AD_20_H	R16	PCI_SB_AD<20>	62
PCI1AD_21_H	R17	PCI_SB_AD<21>	62
PCI1AD_22_H	W21	PCI_SB_AD<22>	62
PCI1AD_23_H	Y22	PCI_SB_AD<23>	62
PCI1AD_24_H	R18	PCI_SB_AD<24>	62
PCI1AD_25_H	T19	PCI_SB_AD<25>	62
PCI1AD_26_H	T18	PCI_SB_AD<26>	62
PCI1AD_27_H	Y21	PCI_SB_AD<27>	48 62
PCI1AD_28_H	W20	PCI_SB_AD<28>	62
PCI1AD_29_H	T16	PCI_SB_AD<29>	62
PCI1AD_30_H	AA21	PCI_SB_AD<30>	62
PCI1AD_31_H	T17	PCI_SB_AD<31>	62
PCI1C_BE_0_L	L19	PCI_SB_CBE_L<0>	62
PCI1C_BE_1_L	P16	PCI_SB_CBE_L<1>	62
PCI1C_BE_2_L	V22	PCI_SB_CBE_L<2>	62
PCI1C_BE_3_L	V20	PCI_SB_CBE_L<3>	62
PCI1DEVSEL_L	T22	PCI_SB_DEVSEL_L	62
PCI1FRAME_L	T21	PCI_SB_FRAME_L	62
PCI1IRDY_L	R21	PCI_SB_IRDY_L	62
PCI1TRDY_L	P19	PCI_SB_TRDY_L	62
PCI1STOP_L	P17	PCI_SB_STOP_L	62
PCI1PAR_H	N17	PCI_SB_PAR	62
PCI1RST_L	U18	SB_PCI_RESET_L	

PP3V3_PCI 5 23 45 46 47 48 49

RP7400 4.7K 5% 1/16W SM1: PCI_SLOTA_REQ_L 6 45 47
RP7400 4.7K 5% 1/16W SM1: PCI_SLOTA_GNT_L 6 45 47
RP7400 4.7K 5% 1/16W SM1: PCI_SLOTG_REQ_L 45 48
RP7400 4.7K 5% 1/16W SM1: PCI_SLOTG_GNT_L 45 48
RP7401 4.7K 5% 1/16W SM1: PCI_SLOTD_REQ_L 45
RP7401 4.7K 5% 1/16W SM1: PCI_SLOTD_GNT_L 45

PP3V3_PWRON_SB 5 18 21 23

R7455 4.7K 5% 1/16W MF 402
C7450 0.1uF 20% 10V CERM 402
R7450 4.7K 5% 1/16W MF 402

U7450 MC74VHC1G08 SOT23-5
PCI_RESET_L 5 46 47 48

48 23 22 5 SYS_WARM_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.

49 48 47 46 45 23 5 PP3V3_PCI

RP7402 4.7K 5% 1/16W SM1: PCI_DEVSEL_L 62 49 48 47 45 6
RP7402 4.7K 5% 1/16W SM1: PCI_FRAME_L 62 49 48 47 45 6
RP7402 4.7K 5% 1/16W SM1: PCI_IRDY_L 62 49 48 47 45 6
RP7402 4.7K 5% 1/16W SM1: PCI_TRDY_L 62 49 48 47 45 6
RP7401 4.7K 5% 1/16W SM1: PCI_STOP_L 62 49 48 47 45 6

Master: Link

Shasta PCI Interface

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 74 OF 103	

DRAWING
TITLE=LINK
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:06:40 2004

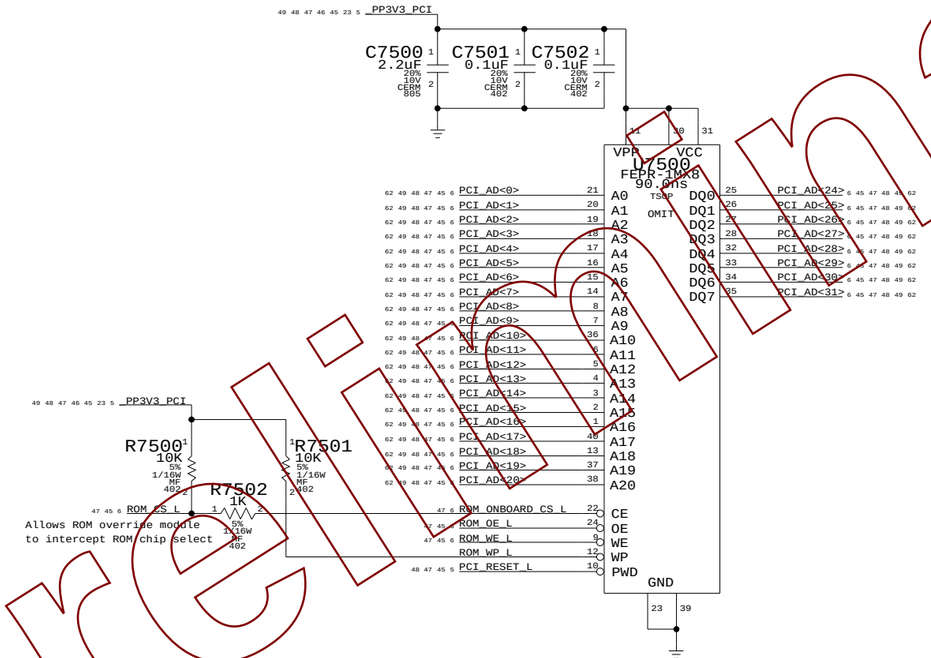
Page Notes

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.



Master: Fizzy

BootROM

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	75	103

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:06:47 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
PCI_CLK_AIRPORT	CLOCKS	

_PCI_CLK33M_AIRPORT 5 47

Page Notes

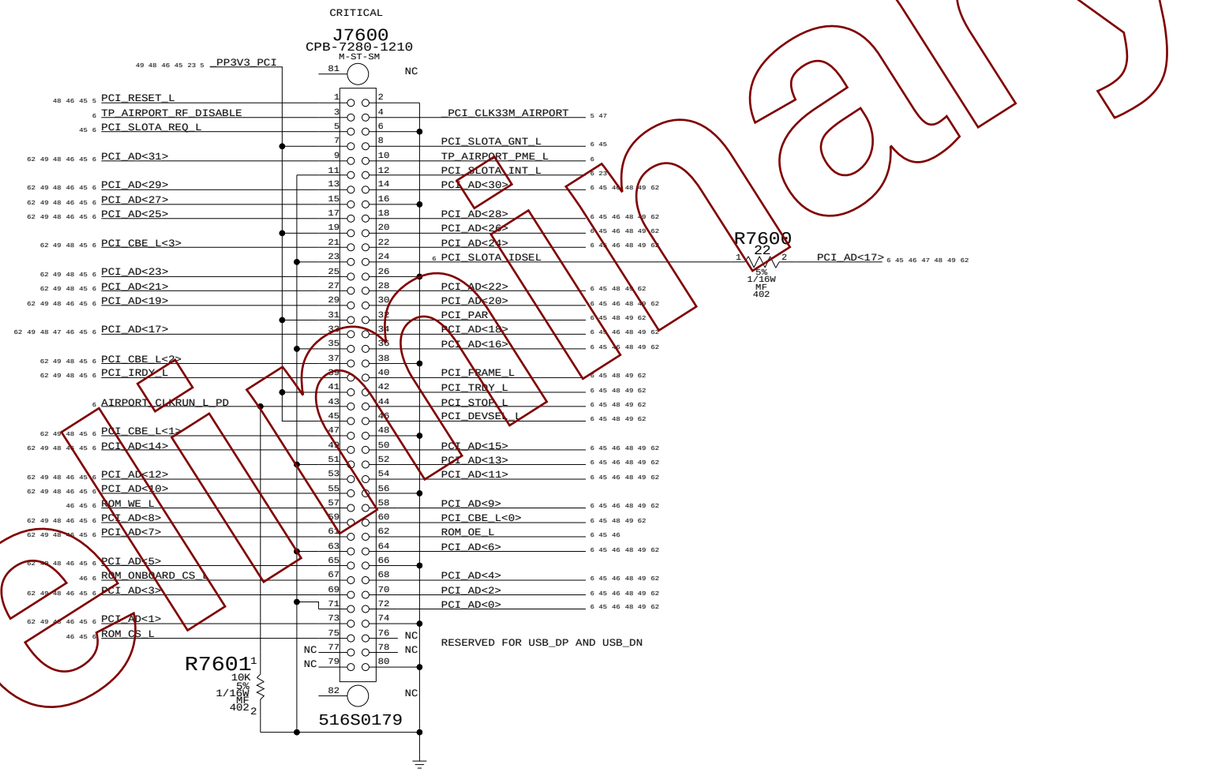
Power aliases required by this page:
- _PP3V3_PCI

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#.



_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:06:53 2004

AirPort Extreme

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 76 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
PCI_CLK_USB2	CLOCKS	

_PCI_CLK33M_USB2 5 48

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.

5 _PPVIO_PCI_USB2

C7703 0.1uF 20% 10V CERM 402

VDD_PCI

CRITICAL
U7700
NEC_uPD720101_USB2
FBGA

PCI_AD<0>	M5	AD0
PCI_AD<1>	P5	AD1
PCI_AD<2>	N5	AD2
PCI_AD<3>	P4	AD3
PCI_AD<4>	N4	AD4
PCI_AD<5>	M3	AD5
PCI_AD<6>	N3	AD6
PCI_AD<7>	M1	AD7
PCI_AD<8>	L2	AD8
PCI_AD<9>	L1	AD9
PCI_AD<10>	K2	AD10
PCI_AD<11>	L3	AD11
PCI_AD<12>	K1	AD12
PCI_AD<13>	K3	AD13
PCI_AD<14>	J2	AD14
PCI_AD<15>	J1	AD15
PCI_AD<16>	F2	AD16
PCI_AD<17>	E3	AD17
PCI_AD<18>	E1	AD18
PCI_AD<19>	D3	AD19
PCI_AD<20>	D1	AD20
PCI_AD<21>	D2	AD21
PCI_AD<22>	C2	AD22
PCI_AD<23>	C1	AD23
PCI_AD<24>	B4	AD24
PCI_AD<25>	A4	AD25
PCI_AD<26>	B5	AD26
(PCI_AD<27>)	C4	AD27
PCI_AD<28>	A5	AD28
PCI_AD<29>	C5	AD29
PCI_AD<30>	B6	AD30
PCI_AD<31>	A6	AD31
PCI_CBE_L<0>	M2	CBE0
PCI_CBE_L<1>	J3	CBE1
PCI_CBE_L<2>	F1	CBE2
PCI_CBE_L<3>	C3	CBE3
PCI_PAR	J4	PAR
PCI_FRAME_L	F3	FRAME
PCI_IRDY_L	F4	IRDY
PCI_TRDY_L	G1	TRDY
PCI_STOP_L	G3	STOP
PCI_SLOTG_IDSEL	B3	IDSEL
PCI_DEVSEL_L	G4	DEVSEL
PCI_SLOTG_REQ_L	C6	REQ
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
48 5 _PCI_CLK33M_USB2	A8	PCLK
NEC_VBBRST_L	B8	VBBRST(CHIP RESET)
NEC_CRUN_L_PD	N6	CRUN
NEC_PME_L	D9	PME OD
NEC_VCCRST_L	C9	VCCRST(PCI RESET)
TP_NEC_SMI_L	L6	SMI OD
NEC_LEGC_PD	L7	LEGC

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

62 45 PCI_SB_AD<27>

R7714 22 5% 1/16W MF 402

49 47 46 45 23 5 _PP3V3_PCI

R7716 10K 5% 1/16W MF 402

R7713 10K 5% 1/16W MF 402

23 PCI_SLOTG_INT_L

RP7703 47 5% 1/16W SM1

RP7703 47 5% 1/16W SM1

RP7703 47 5% 1/16W SM1

RP7702 47 5% 1/16W SM1

45 23 22 5 SYS_WARM_RESET_L

RP7702 47 5% 1/16W SM1

23 13 SYS_PME_L

RP7702 47 5% 1/16W SM1

47 46 45 5 PCI_RESET_L

RP7702 & RP7703 required to facilitate NAND-tree testing

R7715 4.7K 5% 1/16W MF 402

RP7703 47 5% 1/16W SM1

Master: Fizzy

USB 2.0 PCI Interface

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	77	103

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:00 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR
PCI_CLK_CBUS	CLOCKS	

PCI_CLK33M_CBUS 5 49

Page Notes

Power aliases required by this page:
- _PP5V_CBUS
- _PP3V3_CBUS
- _PP3V3_PCI
- _PP2V5_PCI
- _PPVIO_PCI (to _PP5V_PCI or _PP3V3_PCI)

NOTE: All 4 rails MUST implement the same power state (PWRON or RUN). For PWRON must alias _PCI_CBUS_RESET_L to SYS_WARM_RESET_L. For RUN must alias to PCI_RESET_L instead.

Signal aliases required by this page:
- _PCI_CBUS_RESET_L (see note above)
- _PCI_CLK33M_CBUS (33MHz PCI clock)

BOM options provided by this page:
(NONE)

PCI Devices implemented on this page:
AD21 (Slot "E") - CardBus (0x104C/0xAC56)

Power Sequencing:

Power Up	Power Down
1. Assert RESET	1. Assert RESET
2. _PP3V3_PCI	2. _PPVIO_PCI
3. _PPVIO_PCI	3. _PP3V3_PCI

(_PPVIO_PCI can be same as _PP3V3_PCI)

NOTE: This CardBus implementation does not provide PME# or 12V Vpp support.

PP3V3_PCI 5 23 45 46 47 48 49

R7802 10K 5% 1/16W MF 402 — CBUS_VR_EN_L_PU 49
R7803 10K 5% 1/16W MF 402 — CBUS_PERR_L_PU 49
R7804 10K 5% 1/16W MF 402 — CBUS_SERR_L_PU 49
R7805 10K 5% 1/16W MF 402 — CBUS_SUSPEND_L_PU 49

PP3V3_PCI 49 48 47 46 45 23 5

C7800 10uF 20% 6.3V CERM 805
C7801 0.22uF 20% 6.3V X5R 402
C7802 0.22uF 20% 6.3V X5R 402
C7803 0.22uF 20% 6.3V X5R 402
C7804 0.22uF 20% 6.3V X5R 402
C7805 0.22uF 20% 6.3V X5R 402
C7806 0.22uF 20% 6.3V X5R 402

VCC: A7 C13 D5 E1 M1 N7 N11

PP2V5_PCI 5

C7807 0.22uF 20% 6.3V X5R 402

CBUS_VR_EN_L_PU 49

PCI_AD<0> 62 48 47 46 45 6 — N8 AD0
PCI_AD<1> — M7 AD1
PCI_AD<2> — L7 AD2
PCI_AD<3> — N6 AD3
PCI_AD<4> — K4 AD4
PCI_AD<5> — M6 AD5
PCI_AD<6> — L6 AD6
PCI_AD<7> — N5 AD7
PCI_AD<8> — N4 AD8
PCI_AD<9> — M2 AD9
PCI_AD<10> — M5 AD10
PCI_AD<11> — L4 AD11
PCI_AD<12> — N3 AD12
PCI_AD<13> — K5 AD13
PCI_AD<14> — L5 AD14
PCI_AD<15> — M4 AD15
PCI_AD<16> — J4 AD16
PCI_AD<17> — H1 AD17
PCI_AD<18> — H3 AD18
PCI_AD<19> — H2 AD19
PCI_AD<20> — G2 AD20
PCI_AD<21> — G4 AD21
PCI_AD<22> — F1 AD22
PCI_AD<23> — C3 AD23
PCI_AD<24> — F3 AD24
PCI_AD<25> — E2 AD25
PCI_AD<26> — F4 AD26
PCI_AD<27> — B1 AD27
PCI_AD<28> — D2 AD28
PCI_AD<29> — E4 AD29
PCI_AD<30> — D3 AD30
PCI_AD<31> — E3 AD31

R7806 22 5% 1/16W MF 402

PCI_CBE_L<0> — K6 C/BE0*
PCI_CBE_L<1> — M3 C/BE1*
PCI_CBE_L<2> — J1 C/BE2*
PCI_CBE_L<3> — A1 C/BE3*

PCI_PAR — N1 PAR
PCI_IRDY_L — K1 IRDY
CBUS_SERR_L_PU — L2 SERR
PCI_SLOTE_IDSEL — F2 IDSEL
CBUS_PERR_L_PU — K3 PERR
PCI_FRAME_L — J2 FRAME
PCI_STOP_L — L1 STOP
PCI_TRDY_L — J3 TRDY
PCI_DEVSEL_L — K2 DEVSEL

R7808 47 5% 1/16W MF 402

PCI_CBUS_RESET_L 5 — PCI_CBUS_RESET_L_R 49 — G3 PRST
PCI_SLOTE_REQ_L 23 — C2 REQ
PCI_SLOTE_GNT_L 23 — C1 GNT
PCI_CLK33M_CBUS 49 5 — G1 PCLK

NC — M9 SPKROUT
NC — M8 RI_OUT/PME
CBUS_SUSPEND_L_PU 49 — N10 SUSPEND

RP7800 10K 5% 1/32W 8SS

5 — 10
6 — CBUS_MFUNC1_PD — N9 MFUNC1
4 — CBUS_MFUNC2_PD — L9 MFUNC2
7 — CBUS_MFUNC3_PD — K10 MFUNC3
3 — CBUS_MFUNC4_PD — M10 MFUNC4
9 — CBUS_MFUNC5_PD — N12 MFUNC5
8 — CBUS_MFUNC6_PD — L10 MFUNC6
2 — NC
1 — NC
SM

PCI_SLOTE_INT_L 23 — K7 MFUNC0

L11 GRST

GND: A2 A11 D1 F13 H4 K8 M13 N2

CRITICAL
U7800
PCI1510GGU
BGA

Clamp for PC Card
Clamp for PCI

NC — H10 CLK_48_RSVD/NC
DA — VR_EN*
L8 — VR_PORT

PPVIO_PCI_CBUS 5

VCCCB — B11 — PPVCC_CBUS_XW (VOLTAGE=5V (or 3.3V) MIN_LINE_WIDTH=10 mil MIN_NECK_WIDTH=6 mil)
VCCP — L3
VCCD0* — N13 — CBUS_VCCD0_L
VCCD1* — L12 — CBUS_VCCD1_L
VPPD0 — K9 — CBUS_VPPD0
VPPD1 — M11 — CBUS_VPPD1

Integrated Pullup CD1*/CCD1* — L13 — CBUS_DET_1_L 49
Integrated Pullup CD2*/CCD2* — B5 — CBUS_DET_2_L 49
IORD*/CAD13 — F12 — CBUS_IORD_L 49
IOWR*/CAD15 — C11 — CBUS_IOWR_L 49
OE*/CAD11 — G10 — CBUS_OE_L 49
CE1*/CC/BE0* — H13 — CBUS_CE1_L 49
Integrated Pullup VS1*/CVS1* — B2 — CBUS_VS1 49
Integrated Pullup VS2*/CVS2* — A9 — CBUS_VS2 49
WE*/CGNT* — D13 — CBUS_WE_L 49
Integrated Pullup RDY/IREQ*/CINT* — A6 — CBUS_READY 49
Integrated Pullup RESET/CRST* — D8 — CBUS_RESET_L 49
REG*/CC/BE3* — A8 — CBUS_REG_L 49
Integrated Pullup / Pulldown BVD1/GSTSCHG/STSCHG*/RI* — C6 — CBUS_BVD1_L 49
Integrated Pullup BVD2/SPKR*/CAUDIO — D6 — CBUS_BVD2_L 49
Integrated Pullup WP/IOIS16*/CCLKRUN* — A5 — CBUS_WP_L 49
CE2/CAD10* — G13 — CBUS_CE2_L 49
Integrated Pullup INPACK/CREQ* — B8 — CBUS_INPACK_L 49
Integrated Pullup WAIT/CSERR* — B6 — CBUS_WAIT_L 49

A0/CAD26 — C7 — CBUS_ADDR<0> 49
A1/CAD25 — D7 — CBUS_ADDR<1> 49
A2/CAD24 — B7 — CBUS_ADDR<2> 49
A3/CAD23 — D10 — CBUS_ADDR<3> 49
A4/CAD22 — B12 — CBUS_ADDR<4> 49
A5/CAD21 — C8 — CBUS_ADDR<5> 49
A6/CAD20 — C9 — CBUS_ADDR<6> 49
A7/CAD18 — A12 — CBUS_ADDR<7> 49
A8/CC/BE1* — E11 — CBUS_ADDR<8> 49
A9/CAD14 — F11 — CBUS_ADDR<9> 49
A10/CAD9 — G11 — CBUS_ADDR<10> 49
A11/CAD12 — G12 — CBUS_ADDR<11> 49
A12/CC/BE2* — D9 — CBUS_ADDR<12> 49
A13/CPAR — E12 — CBUS_ADDR<13> 49
Integrated Pullup A14/CPERR* — D12 — CBUS_ADDR<14> 49
Integrated Pullup A15/CIRDY* — C10 — CBUS_ADDR<15> 49
A16/CCLK — B13 — CBUS_ADDR16_R
A17/CAD16 — F10 — CBUS_ADDR<17> 49
A18/RSVD — E13 — CBUS_ADDR<18> 49
Integrated Pullup A19/CBLOCK* — A13 — CBUS_ADDR<19> 49
Integrated Pullup A20/CSTOP* — E10 — CBUS_ADDR<20> 49
Integrated Pullup A21/CDEVSEL* — D11 — CBUS_ADDR<21> 49
Integrated Pullup A22/CTRDY* — C12 — CBUS_ADDR<22> 49
A23/CFRAME* — A10 — CBUS_ADDR<23> 49
A24/CAD17 — B10 — CBUS_ADDR<24> 49
A25/CAD19 — B9 — CBUS_ADDR<25> 49

D0/CAD27 — A4 — CBUS_DATA<0> 49
D1/CAD29 — C4 — CBUS_DATA<1> 49
D2/RSVD — A3 — CBUS_DATA<2> 49
D3/CAD0 — K11 — CBUS_DATA<3> 49
D4/CAD1 — K12 — CBUS_DATA<4> 49
D5/CAD3 — J13 — CBUS_DATA<5> 49
D6/CAD5 — J10 — CBUS_DATA<6> 49
D7/CAD7 — H12 — CBUS_DATA<7> 49
D8/CAD28 — C5 — CBUS_DATA<8> 49
D9/CAD30 — B4 — CBUS_DATA<9> 49
D10/CAD31 — B3 — CBUS_DATA<10> 49
D11/CAD2 — M12 — CBUS_DATA<11> 49
D12/CAD4 — J11 — CBUS_DATA<12> 49
D13/CAD6 — K13 — CBUS_DATA<13> 49
D14/RSVD — J12 — CBUS_DATA<14> 49
D15/CAD8 — H11 — CBUS_DATA<15> 49

PC Card Power Switch

Make sure Vcc and Vpp are wide plane/traces to minimize inductance!

5 PP5V_CBUS
5 PP3V3_CBUS

CRITICAL
U7801
TPS2211
SSOI

NC — V_12 — AVPP — 10
V_5_1
V_5_2 — AVCC0 — 11
V_3_1 — AVCC1 — 12
V_3_2 — AVCC2 — 13
VCCD0
VCCD1
VPPD0
VPPD1
SHTDWN — 15
GND — 7
OC — 8 NC

PPVPP_CBUS 49 VOLTAGE=5V (or 3.3V) MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil
PPVCC_CBUS 49 VOLTAGE=5V (or 3.3V) MIN_LINE_WIDTH=25 mil MIN_NECK_WIDTH=10 mil

C7808 0.1UF 20% 10V CERM 402
C7809 0.1UF 20% 10V CERM 402

PCI_CBUS_RESET_L_R 49 — Disable card power during reset

0.1uF are used to increase ESD of up to 10kV

XW7800 SM — This is an internal board short. Allows thinner trace to BGA

TI reference schematic does not have bulk on PPVCC_CBUS

C7810 2.2uF 20% 10V CERM 805
C7811 2.2uF 20% 10V CERM 805

R7809 47 5% 1/16W MF 402 — CBUS_ADDR<16> 49

PC Card/CardBus Connector

CRITICAL
J7800
QT500806-L111
M-ST-SM

	84	81	
	2	1	CBUS_DATA<3> 49
	4	3	CBUS_DATA<4> 49
CBUS_DATA<11> 49	6	5	CBUS_DATA<5> 49
CBUS_DATA<12> 49	8	7	CBUS_DATA<6> 49
CBUS_DATA<13> 49	10	9	
	12	11	CBUS_DATA<7> 49
CBUS_DATA<14> 49	14	13	CBUS_CE1_L 49
CBUS_DATA<15> 49	16	15	CBUS_ADDR<10> 49
CBUS_CE2_L 49	18	17	CBUS_OE_L 49
CBUS_VS1 49	20	19	
	22	21	CBUS_ADDR<11> 49
CBUS_IORD_L 49	24	23	CBUS_ADDR<9> 49
CBUS_IOWR_L 49	26	25	CBUS_ADDR<8> 49
CBUS_ADDR<17> 49	28	27	CBUS_ADDR<13> 49
CBUS_ADDR<18> 49	30	29	
	32	31	CBUS_ADDR<14> 49
CBUS_ADDR<19> 49	34	33	CBUS_WE_L 49
CBUS_ADDR<20> 49	36	35	CBUS_READY 49
CBUS_ADDR<21> 49	38	37	PPVCC_CBUS 49
PPVCC_CBUS 49	40	39	
	42	41	PPVPP_CBUS 49
PPVPP_CBUS 49	44	43	CBUS_ADDR<16> 49
CBUS_ADDR<22> 49	46	45	CBUS_ADDR<15> 49
CBUS_ADDR<23> 49	48	47	CBUS_ADDR<12> 49
CBUS_ADDR<24> 49	50	49	
	52	51	CBUS_ADDR<7> 49
CBUS_ADDR<25> 49	54	53	CBUS_ADDR<6> 49
CBUS_VS2 49	56	55	CBUS_ADDR<5> 49
CBUS_RESET_L 49	58	57	CBUS_ADDR<4> 49
CBUS_WAIT_L 49	60	59	
	62	61	CBUS_ADDR<3> 49
CBUS_INPACK_L 49	64	63	CBUS_ADDR<2> 49
CBUS_REG_L 49	66	65	CBUS_ADDR<1> 49
CBUS_BVD2_L 49	68	67	CBUS_ADDR<0> 49
CBUS_BVD1_L 49	70	69	
	72	71	CBUS_DATA<0> 49
CBUS_DATA<8> 49	74	73	CBUS_DATA<1> 49
CBUS_DATA<9> 49	76	75	CBUS_DATA<2> 49
CBUS_DATA<10> 49	78	77	CBUS_WP_L 49
CBUS_DET_2_L 49	80	79	
	83	82	

516S0089

Master: Fizzy

CardBus Interface

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 78 OF 103	

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:07 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
SATA_RXD1	SATA	SATA_RXD1_C	SATA_RXD_P1_C
SATA_RXD1	SATA	SATA_RXD1_C	SATA_RXD_N1_C
SATA_TXD1	SATA	SATA_TXD1	SATA_TXD_P1
SATA_TXD1	SATA	SATA_TXD1	SATA_TXD_N1
SATA_RXD2	SATA	SATA_RXD2_C	SATA_RXD_P2_C
SATA_RXD2	SATA	SATA_RXD2_C	SATA_RXD_N2_C
SATA_TXD2	SATA	SATA_TXD2	SATA_TXD_P2
SATA_TXD2	SATA	SATA_TXD2	SATA_TXD_N2
UATA_DD			UATA_DD<15..8>
UATA_DD7			UATA_DD<7>
UATA_DD			UATA_DD<6..0>
UATA_HOST			UATA_DA<2..0>
UATA_HOST			UATA_CS0_L
UATA_HOST			UATA_CS1_L
UATA_HOST			UATA_HSTROBE
UATA_HOST			UATA_STOP
UATA_HOST_R			UATA_DMACK_L
UATA_HOST_R			UATA_RESET_L
UATA_DEV_R_C			UATA_DSTROBE
UATA_DEV_R			UATA_DMARQ
UATA_DEV_R			UATA_INTRQ

Page Notes

Power aliases required by this page:
- _PP1V2_PWRON_DISK

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: SATA

Line To Line:	15 mils
Length Tolerance:	50 mils
Primary Max Sep:	10 mils outer
Primary Max Sep:	9 mils inner
Secondary Max Sep:	100 mils
Secondary Length:	500 mils

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

SATA_VDD x 5

_PP1V2_PWRON_DISK_SB

C8000 0.1uF 20% 10V CERM 402
C8001 0.1uF 20% 10V CERM 402
C8002 0.1uF 20% 10V CERM 402
C8003 0.1uF 20% 10V CERM 402
C8004 0.1uF 20% 10V CERM 402

AB14 AB17 T14 W15 Y18 → SATA_VDD

U2300 OMIT
SHASTA
V2.0
BGA
(5 OF 8)

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

UATA

DSTROBE aka:
IORDY/HDMARDY*

HSTROBE aka:
DIOR*

STOP aka:
DIOW*

UATA_DSTROBE	F9	UD_IDECHRDY_H	
UATA_DMARQ	D7	UD_IDEDMARQ_H	
UATA_INTRQ	C5	UD_IDEINTRQ_H	

SATA_RXD_P1_C	Y17	RXDP1	TXDP1 → AA16 SATA_TXD_P1
SATA_RXD_N1_C	Y16	RXDN1	TXDN1 → AB16 SATA_TXD_N1
SATA_RXD_P2_C	AB15	RXDP2	TXDP2 → Y15 SATA_TXD_P2
SATA_RXD_N2_C	AA15	RXDN2	TXDN2 → Y14 SATA_TXD_N2

SATA 0
SATA 1

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)

UATA Termination

R8005 10K 5% 1/10W MF 402 → _PP1V2_PWRON_DISK_SB

RP8000	4	5	UATA_DD_R<0> ↔ UATA_DD<0>
RP8000	3	6	UATA_DD_R<1> ↔ UATA_DD<1>
RP8000	2	7	UATA_DD_R<2> ↔ UATA_DD<2>
RP8003	4	5	UATA_DD_R<3> ↔ UATA_DD<3>
RP8001	1	8	UATA_DD_R<4> ↔ UATA_DD<4>
RP8001	2	7	UATA_DD_R<5> ↔ UATA_DD<5>
RP8003	3	6	UATA_DD_R<6> ↔ UATA_DD<6>
RP8002	1	8	UATA_DD_R<7> ↔ UATA_DD<7>
RP8002	2	7	UATA_DD_R<8> ↔ UATA_DD<8>
RP8003	2	7	UATA_DD_R<9> ↔ UATA_DD<9>
RP8000	1	8	UATA_DD_R<10> ↔ UATA_DD<10>
RP8002	4	5	UATA_DD_R<11> ↔ UATA_DD<11>
RP8001	3	6	UATA_DD_R<12> ↔ UATA_DD<12>
RP8002	3	6	UATA_DD_R<13> ↔ UATA_DD<13>
RP8004	1	8	UATA_DD_R<14> ↔ UATA_DD<14>
RP8003	1	8	UATA_DD_R<15> ↔ UATA_DD<15>
RP8004	2	7	UATA_DA_R<0> ↔ UATA_DA<0>
RP8001	4	5	UATA_DA_R<1> ↔ UATA_DA<1>
RP8004	4	5	UATA_DA_R<2> ↔ UATA_DA<2>
RP8004	3	6	UATA_RESET_L_R ↔ UATA_RESET_L
R8000	1	2	UATA_CS0_L_R ↔ UATA_CS0_L
R8001	1	2	UATA_CS1_L_R ↔ UATA_CS1_L
R8002	1	2	UATA_HSTROBE_R ↔ UATA_HSTROBE
R8003	1	2	UATA_STOP_R ↔ UATA_STOP
R8004	1	2	UATA_DMACK_L_R ↔ UATA_DMACK_L

All resistors: 5% 1/16W SM1 (MF 402 for R8000, R8001, R8002, R8003, R8004)

Master: Link

Shasta Disk

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 80 OF 103	

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:21 2004

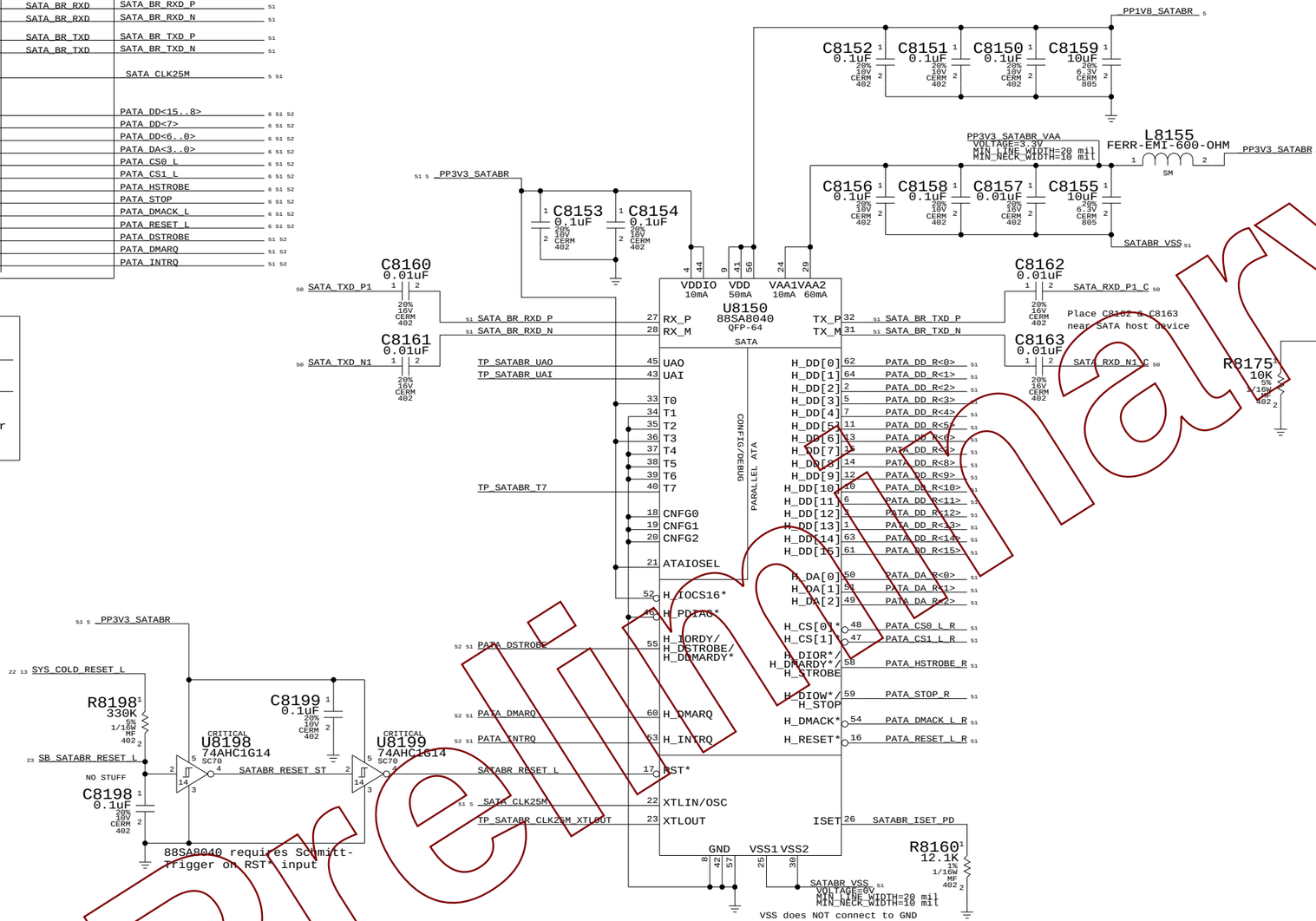
ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
PROVIDED BY SATA CONTROLLER	SATA	SATA_BR_RXD	SATA_BR_RXD_P 51
	SATA	SATA_BR_RXD	SATA_BR_RXD_N 51
	SATA	SATA_BR_TXD	SATA_BR_TXD_P 51
	SATA	SATA_BR_TXD	SATA_BR_TXD_N 51
	CLOCKS		SATA_CLK25M 5 51
PATA_HOST			PATA_DD<15..8> 6 51 52
PATA_DD7			PATA_DD<7> 6 51 52
PATA_HOST			PATA_DD<6..0> 6 51 52
PATA_HOST			PATA_DA<3..0> 6 51 52
PATA_HOST			PATA_CS0_L 6 51 52
PATA_HOST			PATA_CS1_L 6 51 52
PATA_HOST			PATA_HSTROBE 6 51 52
PATA_HOST			PATA_STOP 6 51 52
PATA_HOST_R			PATA_DMACK_L 6 51 52
PATA_HOST_R			PATA_RESET_L 6 51 52
PATA_DEV_R_C			PATA_DSTROBE 51 52
PATA_DEV_R			PATA_DMARQ 51 52
PATA_DEV_R			PATA_INTRQ 51 52

Page Notes

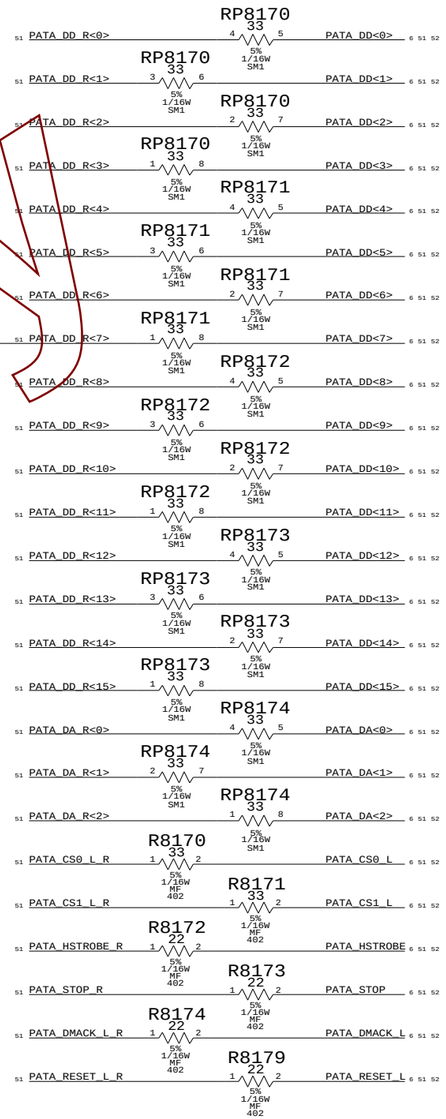
Power aliases required by this page:
- _PP3V3_SATABR
- _PP1V8_SATABR

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
- SATA_1_BRIDGE (/ SATA_1_CONN)
  Selects whether 88SA8040 SATA Bridge or SATA connector is connected to Shasta SATA port 1.



PATA Termination



Sourced by host or bi-directional
Terminate near bridge

88SA8040 Config Straps (Device Mode):

T<1..0> - Vendor Unique (VU) and Read/Write Long

T<1..0>	VU Type	R/W Long Type
00	1	1
01	1	2
10	1	1 (default)
11	2	2

T2 - SSC Enable
1 - Enable SATA Spread Spectrum Clocking
0 - Disable SATA Spread Spectrum Clocking
(Internal Pull-down)

T<4..3> - Reference Clock Configuration

T<4..3>	Clock Frequency
00	20 MHz
01	25 MHz
10	30 MHz
11	40 MHz

(Internal Pull-downs)

T5 - Fixed UDMA
1 - UDMA mode fixed by CNFG<2..0> pins
0 - UDMA mode adjustable with Set Features
(Internal Pull-up)

T6 - Power Mode Enable
1 - Enable translation of ATA power management commands into SATA Partial or Slumber mode
0 - Disable translation
(Internal Pull-down)

T7 - Plug-in (output)
1 - SATA cable plugged in
0 - SATA cable unplugged
(Internal Pull-down)

CNFG<2..0> - Mode Configuration

CNFG<2..0>	Mode
000	Device Mode - 100MB/s
001	Device Mode - 133MB/s
010	Device Mode - 150MB/s (default)
100	Host Mode - 100MB/s
101	Host Mode - 133MB/s
110	Host Mode - 150MB/s
011	Reserved
111	Reserved

H_IOCS16_N - DMA_EN
1 - Good status on Set Features to set DMA
0 - Error status on Set Features to set DMA
(Internal Pull-up)

H_PDIAG_N - PATA_ORDER
1 - Reverse Order mode for Parallel ATA pins
0 - Normal Order mode

ATAIOSEL - ATA I/O Enable
1 - Enable output to ATA bus
0 - Disable output to ATA bus
(Internal Pull-up)

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:28 2004

Master: Link

Serial ATA Bridge

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6532 | REV. 03

SCALE NONE | SHT 81 OF 103

Page Notes

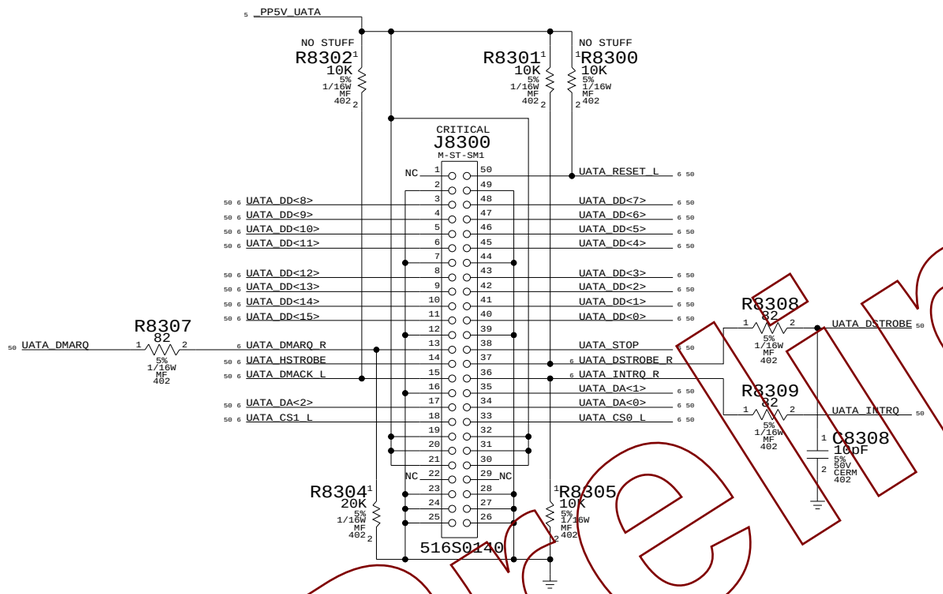
Power aliases required by this page:
- _PP5V_PATA
- _PP5V_UATA
- _PP3V3_PATA
- _PP3V3_UATA

Signal aliases required by this page:
(NONE)

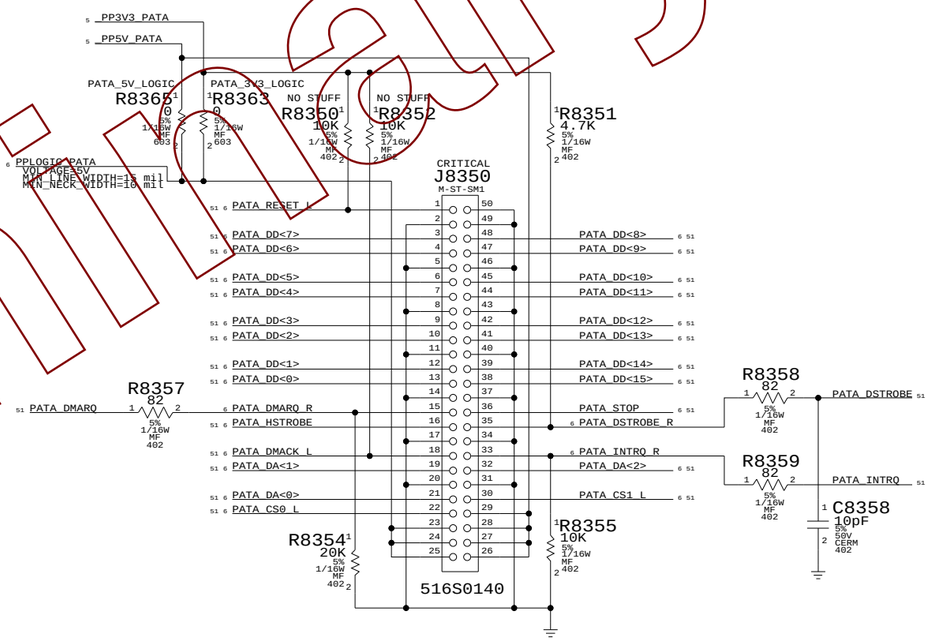
BOM options provided by this page:
(NONE)

NOTE: ATA constraints are expected to be defined on another page (ATA host) and apply to this page via XNets.

UATA (SouthBridge) Connector



PATA (SATA Bridge) Connector



DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:36 2004

IDE Connectors

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 83 OF 103	

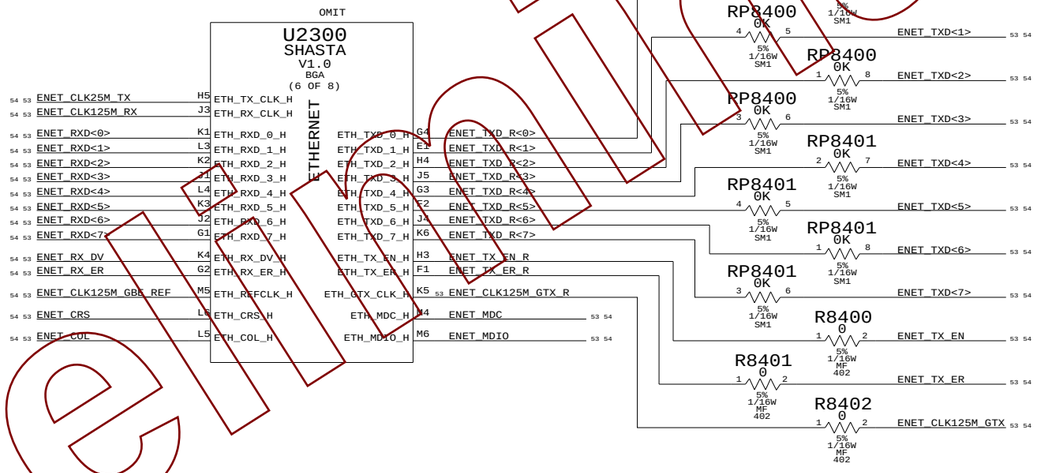
ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
ENET_RX_CLK	ENET	15_MIL_SPACING		ENET_CLK25M_TX 53 54
ENET_RX_CLK	ENET	15_MIL_SPACING		ENET_CLK125M_RX 53 54
ENET_GBE_REF	ENET	15_MIL_SPACING		ENET_CLK125M_GBE_REF 53 54
ENET_TX_CLK	ENET	15_MIL_SPACING		ENET_CLK125M_GTX 53 54
	ENET	15_MIL_SPACING		ENET_CLK125M_GTX_R 53
ENET_RX	ENET			ENET_RXD<7..0> 53 54
ENET_RX_CTL	ENET			ENET_RX_DV 53 54
ENET_RX_CTL	ENET			ENET_RX_ER 53 54
ENET_TX	ENET			ENET_TXD<7..0> 53 54
ENET_TX_CTL	ENET			ENET_TX_EN 53 54
ENET_TX_CTL	ENET			ENET_TX_ER 53 54
ENET_RX_CTL	ENET			ENET_CRS 53 54
ENET_RX_CTL	ENET			ENET_COL 53 54
ENET_MDC	ENET			ENET_MDC 53 54
ENET_MDIO	ENET			ENET_MDIO 53 54

Page Notes

Power aliases required by this page:
(NONE)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)



Master: Link

Shasta Ethernet

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE: NONE

SHT 84 OF 103

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 18:36:38 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
	15 MIL SPACING		ENET_CLK125M_GBE_REF_R
	15 MIL SPACING		ENET_CLK125M_RX_R
	15 MIL SPACING		ENET_CLK25M_TX_R
ENET_MDI	ENET	ENET_MDI0	ENET_MDI_P<0>
ENET_MDI	ENET	ENET_MDI0	ENET_MDI_N<0>
ENET_MDI	ENET	ENET_MDI1	ENET_MDI_P<1>
ENET_MDI	ENET	ENET_MDI1	ENET_MDI_N<1>
ENET_MDI	ENET	ENET_MDI2	ENET_MDI_P<2>
ENET_MDI	ENET	ENET_MDI2	ENET_MDI_N<2>
ENET_MDI	ENET	ENET_MDI3	ENET_MDI_P<3>
ENET_MDI	ENET	ENET_MDI3	ENET_MDI_N<3>
VESTA_CLK25M_XTAL	15 MIL SPACING		VESTA_CLK25M_XTALI
	15 MIL SPACING		VESTA_CLK25M_XTALO
	15 MIL SPACING		VESTA_CLK25M_XTALO_R

Page Notes

Power aliases required by this page:
- _PP3V3_ENET
- _PP2V5_ENETFW
- _PP1V2_ENETFW

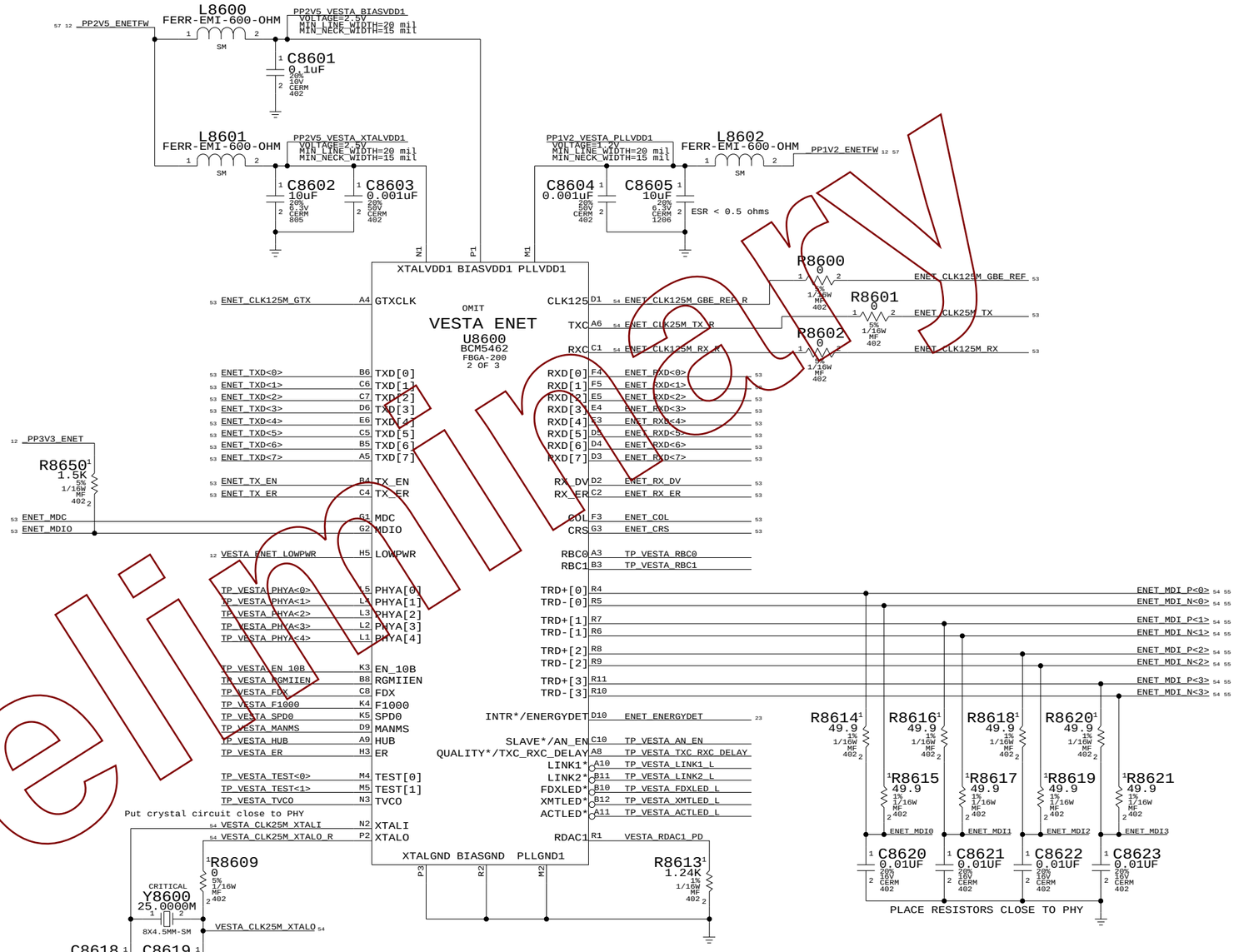
Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Net Spacing Type: ENET

Line To Line: 15 mils
Length Tolerance: 50 mils
Primary Max Sep: 5 mils
Secondary Max Sep: 100 mils
Secondary Length: 500 mils

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



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

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:51 2004

Master: Link

Vesta Ethernet PHY

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 86 OF 103	

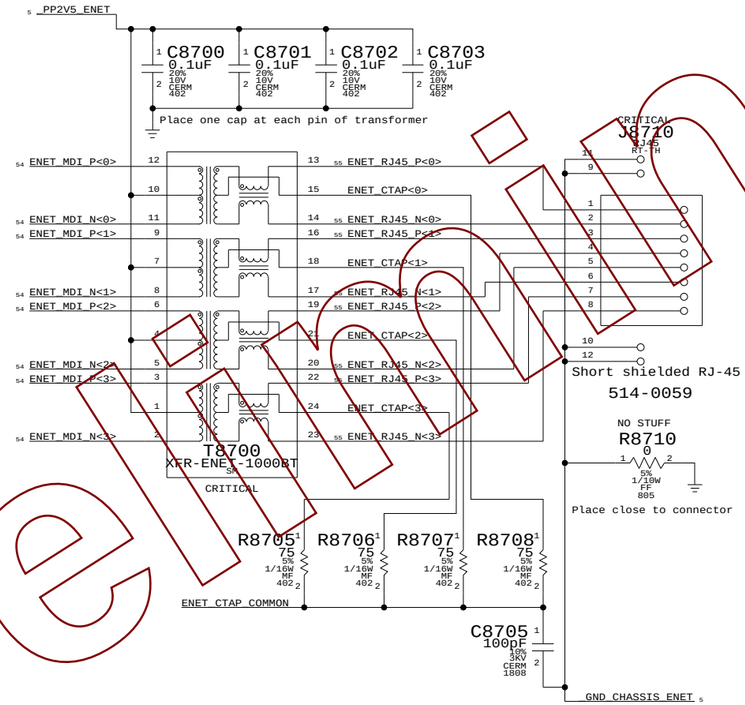
ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
PROVIDED BY ETHERNET PHY	ENET	ENET_RJ45_0	ENET_RJ45_P<0> 55
	ENET	ENET_RJ45_0	ENET_RJ45_N<0> 55
	ENET	ENET_RJ45_1	ENET_RJ45_P<1> 55
	ENET	ENET_RJ45_1	ENET_RJ45_N<1> 55
	ENET	ENET_RJ45_2	ENET_RJ45_P<2> 55
	ENET	ENET_RJ45_2	ENET_RJ45_N<2> 55
	ENET	ENET_RJ45_3	ENET_RJ45_P<3> 55
	ENET	ENET_RJ45_3	ENET_RJ45_N<3> 55

Page Notes

Power aliases required by this page:
- _PP2V5_ENET
- _GND_CHASSIS_ENET

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)



DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:07:58 2004

Ethernet Connector

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 87 OF 103	

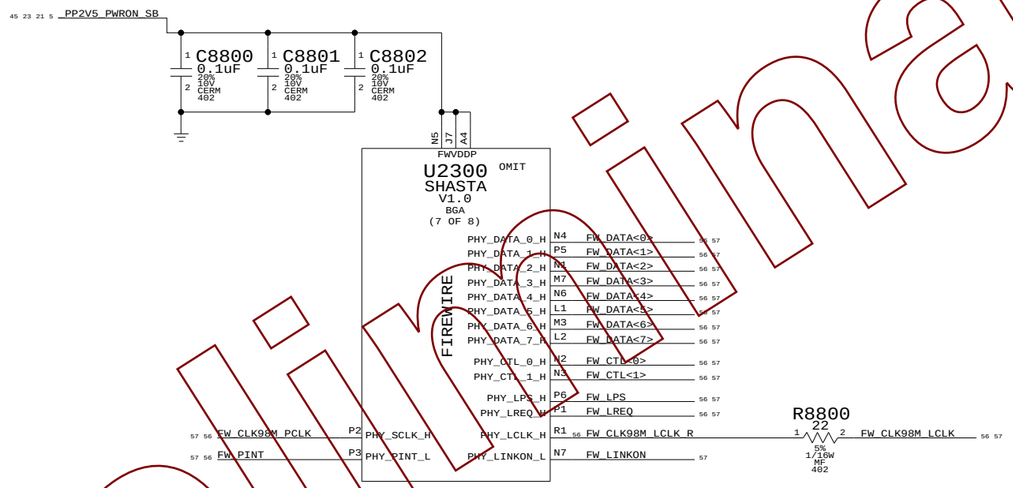
ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
FW	FW			FW_DATA<7..0> 56 57
FW	FW			FW_CTL<1..0> 56 57
FW_LPS	FW			FW_LPS 56 57
FW_LREQ	FW			FW_LREQ 56 57
FW_PINT	FW			FW_PINT 56 57
FW_LCLK	FW	15_MIL_SPACING		FW_CLK98M_LCLK 56 57
FW_PCLK	FW	15_MIL_SPACING		FW_CLK98M_PCLK 56 57
		15_MIL_SPACING		FW_CLK98M_LCLK_R 56

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)



Master: Link

Shasta FireWire

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 88 OF 103	

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:08:06 2004

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
(PROVIDED BY LINK PAGE)	15 MIL SPACING		FW_CLK98M_PCLK_R	57
FW_TPA1	FW	FW_TPA0	FW_TPA_P<0>	57 58
FW_TPA1	FW	FW_TPA0	FW_TPA_N<0>	57 58
FW_TPB1	FW	FW_TPB0	FW_TPB_P<0>	57 58
FW_TPB1	FW	FW_TPB0	FW_TPB_N<0>	57 58
FW_TPA2	FW	FW_TPA1	FW_TPA_P<1>	57 58
FW_TPA2	FW	FW_TPA1	FW_TPA_N<1>	57 58
FW_TPB2	FW	FW_TPB1	FW_TPB_P<1>	57 58
FW_TPB2	FW	FW_TPB1	FW_TPB_N<1>	57 58
FW_TPA3	FW	FW_TPA2	FW_TPA_P<2>	57 58
FW_TPA3	FW	FW_TPA2	FW_TPA_N<2>	57 58
FW_TPB3	FW	FW_TPB2	FW_TPB_P<2>	57 58
FW_TPB3	FW	FW_TPB2	FW_TPB_N<2>	57 58
VESTA_CLK24M_XTAL	15 MIL SPACING		VESTA_CLK24M_XTALI	57
	15 MIL SPACING		VESTA_CLK24M_XTALO	57
	15 MIL SPACING		VESTA_CLK24M_XTALO_R	57

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

Line To Line: 15 mils
Length Tolerance: 100 mils
Primary Max Sep: 7.5 mils
Secondary Max Sep: 100 mils
Secondary Length: 500 mils

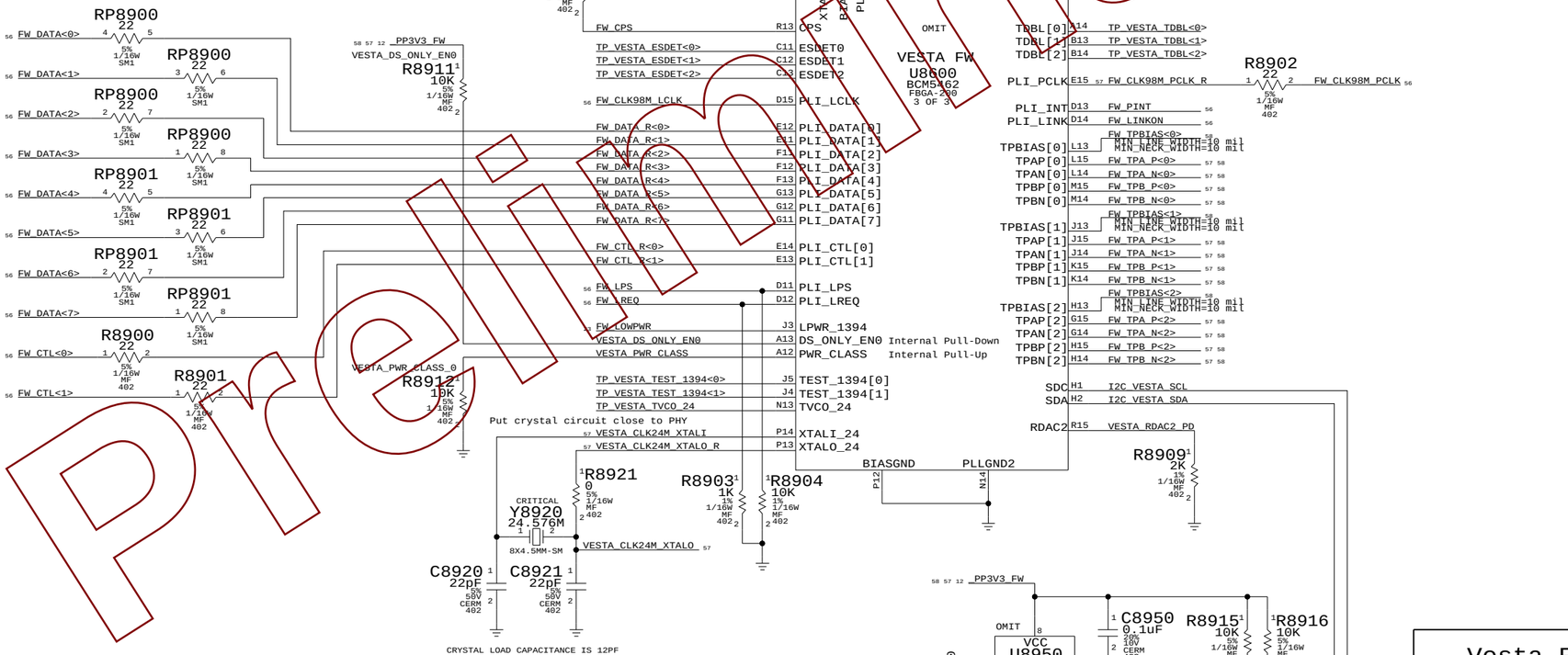
NOTE: Target differential impedance for FW data pairs is 110 ohms.

Vesta Config Straps:

PWR_CLASS - FireWire Power Class
1 - Sets Power Class to 0x4
0 - Sets Power Class to 0x0
(Internal Pull-up)

DS_ONLY_EN0 - Port 0 Data/Strobe
1 - Port 0 Data/Strobe mode only
0 - Port 0 Bilingual mode
(Internal Pull-down)

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:08:14 2004



Master: Link

Vesta FireWire PHY

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 89 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
PROVIDED BY PHY PAGE	FW	FW_PORT1_TPA_FL	FW_PORT1_TPA_P_FL	6 58
	FW	FW_PORT1_TPA_FL	FW_PORT1_TPA_N_FL	6 58
	FW	FW_PORT1_TPB_FL	FW_PORT1_TPB_P_FL	6 58
	FW	FW_PORT1_TPB_FL	FW_PORT1_TPB_N_FL	6 58
	FW	FW_PORT2_TPA_FL	FW_PORT2_TPA_P_FL	6 58
	FW	FW_PORT2_TPA_FL	FW_PORT2_TPA_N_FL	6 58
	FW	FW_PORT2_TPB_FL	FW_PORT2_TPB_P_FL	6 58
	FW	FW_PORT2_TPB_FL	FW_PORT2_TPB_N_FL	6 58

Page Notes

Power aliases required by this page:
- _PPFW_PORT1
- _PPFW_PORT2
- _PPFW_PORT3
- _PP3V3_FW
- _GND_CHASSIS_FW_PORT1
- _GND_CHASSIS_FW_PORT2
- _GND_CHASSIS_FW_PORT3

Signal aliases required by this page:
(NONE)

NOTE: This page is expected to contain the necessary aliases to map the FireWire TPA/TPB pairs to their appropriate connectors and/or to properly terminate unused signals.

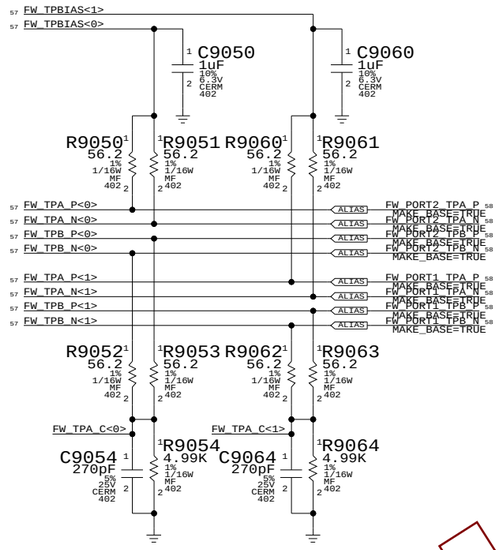
BOM options provided by this page:
(NONE)

NOTE: FireWire TPA/TPB pairs are NOT constrained on this page. It is assumed that FireWire PHY page will provide the appropriate constraints to apply to entire TPA/TPB XNets.

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

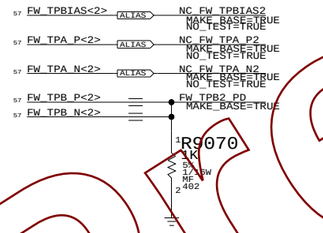
Termination

Place close to FireWire PHY

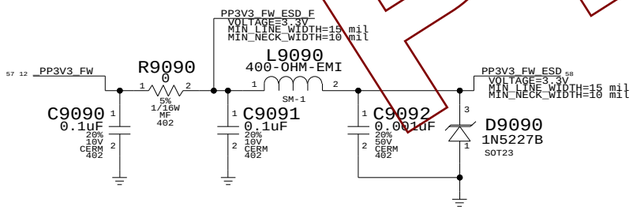


3rd TPA/TPB pair unused

(Is this correct for Vesta?)

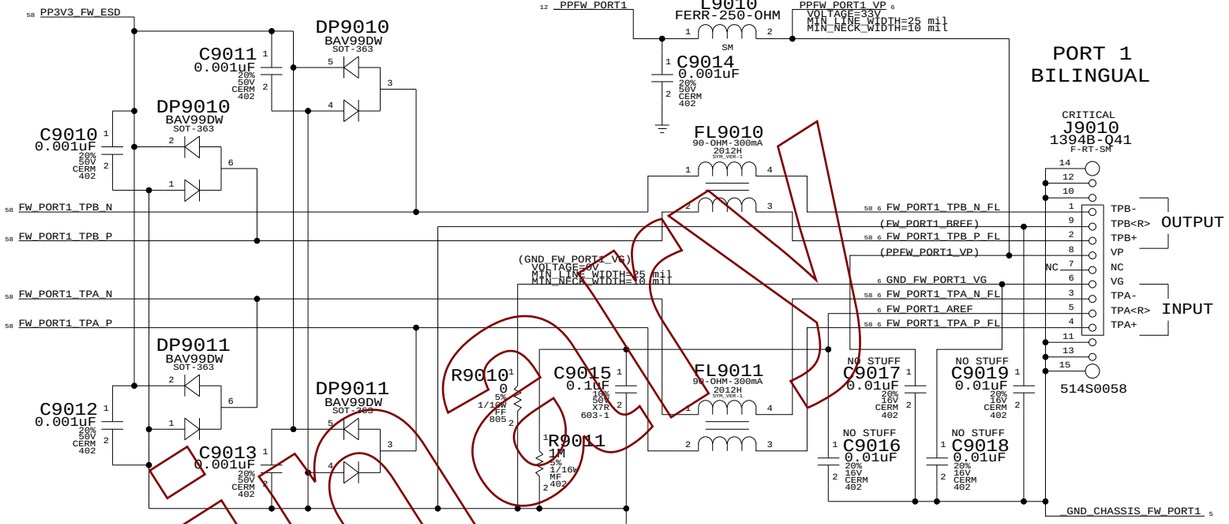


ESD Rail



Cable Power

"Snapback" & "Late VG" Protection

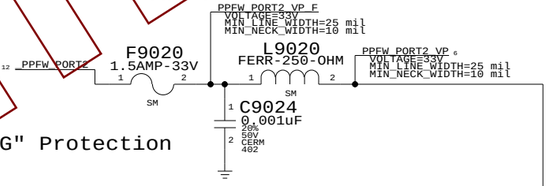


AREF needs to be isolated from all local grounds per 1394b spec

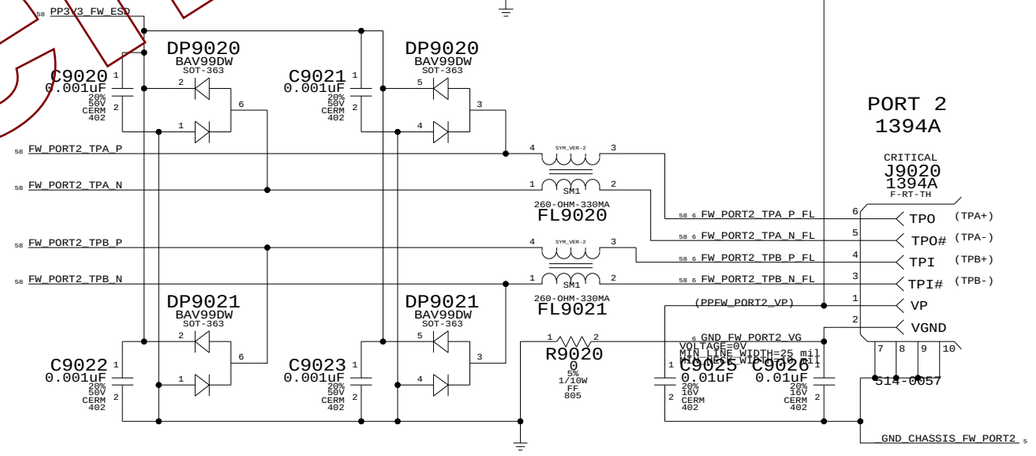
When a bilingual device is connected to a beta-only device, there is no DC path between them (to avoid ground offset issue)

BREF should be hard-connected to logic ground for speed signaling and connection detection currents per 1394b V1.33

Cable Power



"Snapback" & "Late VG" Protection



FireWire Ports

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:08:30 2004

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 90 OF 103	

ELECTRICAL_CONSTRAINT_SET	NET_PHYSICAL_TYPE	NET_SPACING_TYPE	DIFFERENTIAL_PAIR	
USB2_0	USB2	USB2	USB2_0	USB2_P<0> 5 6 59
USB2_0	USB2	USB2	USB2_0	USB2_N<0> 5 6 59
USB2_1	USB2	USB2	USB2_1	USB2_P<1> 5 6 59
USB2_1	USB2	USB2	USB2_1	USB2_N<1> 5 6 59
USB2_2	USB2	USB2	USB2_2	USB2_P<2> 5 6 59
USB2_2	USB2	USB2	USB2_2	USB2_N<2> 5 6 59
USB2_3	USB2	USB2	USB2_3	USB2_P<3> 5 6 59
USB2_3	USB2	USB2	USB2_3	USB2_N<3> 5 6 59
USB2_4	USB2	USB2	USB2_4	USB2_P<4> 5 6 59
USB2_4	USB2	USB2	USB2_4	USB2_N<4> 5 6 59
USB2_NEC_XTAL		15_MIL_SPACING		NEC_CLK30M_XT1 59
		15_MIL_SPACING		NEC_CLK30M_XT2 59
		15_MIL_SPACING		NEC_CLK30M_XT2_R 59

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: 19.5 mils
Length Tolerance: 50 mils
Primary Max Sep: 7.5 mils
Secondary Max Sep: 100 mils
Secondary Length: 500 mils

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

U2300 SHASTA V1.0 BGA (8 OF 8) OMIT

NC0	P7	TP_SB_NC_P7
NC1	P8	TP_SB_NC_P8
NC2	R3	TP_SB_NC_R3
NC3	R4	TP_SB_NC_R4
NC4	R5	TP_SB_NC_R5
NC5	R6	TP_SB_NC_R6
NC6	R7	TP_SB_NC_R7
NC7	R8	TP_SB_NC_R8
NC8	T1	TP_SB_NC_T1
NC9	T2	TP_SB_NC_T2
NC10	T3	TP_SB_NC_T3
NC11	T4	TP_SB_NC_T4
NC12	T5	TP_SB_NC_T5
NC13	T6	TP_SB_NC_T6
NC14	T7	TP_SB_NC_T7
NC15	T8	TP_SB_NC_T8
NC16	U1	TP_SB_NC_U1
NC17	U2	TP_SB_NC_U2
NC18	U3	TP_SB_NC_U3
NC19	U4	TP_SB_NC_U4
NC20	U5	TP_SB_NC_U5
NC21	U6	TP_SB_NC_U6
NC22	V1	TP_SB_NC_V1
NC23	V2	TP_SB_NC_V2
NC24	V3	TP_SB_NC_V3
NC25	V4	TP_SB_NC_V4
NC26	W1	TP_SB_NC_W1
NC27	W3	TP_SB_NC_W3
NC28	Y1	TP_SB_NC_Y1
NC29	Y3	TP_SB_NC_Y3

59 5 _PP3V3_PWRON_USB
L9135 FERR-EMI-100-OHM SM
PP3V3_PWRON_NEC_AVDD VOLTAGE=3.3V MIN_LINE_WIDTH=20 mil MIN_NECK_WIDTH=10 mil
R9135 4.7 5% 1/16W MF 603
C9135 10uF 20% 6.3V CERM 805
C9136 0.1uF 20% 10V CERM 402
C9137 0.1uF 20% 10V CERM 402
C9120 10uF 20% 6.3V CERM 805
C9121 0.1uF 20% 10V CERM 402
C9122 0.1uF 20% 10V CERM 402
C9123 0.1uF 20% 10V CERM 402
C9124 0.1uF 20% 10V CERM 402
C9125 0.1uF 20% 10V CERM 402
C9126 0.1uF 20% 10V CERM 402
C9127 0.1uF 20% 10V CERM 402
C9128 0.1uF 20% 10V CERM 402
C9129 0.1uF 20% 10V CERM 402
C9130 0.1uF 20% 10V CERM 402
P2 P3 P12 A13 A12 A3 E2 N8 L13 J13 H13 F13 D13 G12 H4 D7 VDD
M10 N12 AVDD

CRITICAL
U7700 NEC_uPD720101_USB2 FCBGA

59 5 _PP3V3_PWRON_USB
R9110 10K 5% 1/16W MF 402
RP9110 10K 5% 1/16W SM1
6 5 USB2_OC<0> (USB2_OC<0>) B12 OCI1
6 5 USB2_OC<1> (USB2_OC<1>) B11 OCI2
5 USB2_OC<2> (USB2_OC<2>) B10 OCI3
5 USB2_OC<3> (USB2_OC<3>) C10 OCI4
5 USB2_OC<4> (USB2_OC<4>) B9 OCI5
6 5 USB2_PWREN<0> C12 PRON1
6 5 USB2_PWREN<1> A11 PRON2
5 USB2_PWREN<2> C11 PRON3
5 USB2_PWREN<3> C10 PRON4
5 USB2_PWREN<4> A9 PRON5

59 5 _PP3V3_PWRON_USB
R9140 1.5K 5% 1/16W MF 402
R9141 1.5K 5% 1/16W MF 402
NEC_NC1_PU P6 NC1
NEC_NC2_PU M6 NC2

59 NEC_CLK30M_XT1 L9 XT1/SCLK
59 NEC_CLK30M_XT2_R P8 XT2
R9145 100 5% 1/16W MF 402
CRITICAL
Y9145 30.0000M 8X4.5MM-SM
NEC_CLK30M_XT2 59
C9145 22pF 5% 50V CERM 402
C9146 22pF 5% 50V CERM 402
Y9145 LOAD CAPACITANCE IS 16pF

VSS
B1 N2 P10 M3 H5 B5 A2 D2 M2 K1 B4 M1 L12 H12 D12 G4 J11 F11 D8
R9139 0 5% 1/16W MF 603
AVSS AVSS(R)
Tie to GND at ball N11
GND_NEC_AVSS_R VOLTAGE=0V MIN_LINE_WIDTH=20 mil MIN_NECK_WIDTH=10 mil

RREF P11 NEC_RREF_PD
R9138 9.09K 1% 1/16W MF 402

R9100 36 1% 1/16W MF 402
RSDM1 M14 USB_NEC_N<0>
DM1 M13 (USB2_N<0>) USB2_N<0> 5 6 59
DP1 L14 (USB2_P<0>) USB2_P<0> 5 6 59
RSDP1 K13 USB_NEC_P<0>

R9101 36 1% 1/16W MF 402

R9102 36 1% 1/16W MF 402
RSDM2 K14 USB_NEC_N<1>
DM2 K12 (USB2_N<1>) USB2_N<1> 5 6 59
DP2 J14 (USB2_P<1>) USB2_P<1> 5 6 59
RSDP2 J12 USB_NEC_P<1>

R9103 36 1% 1/16W MF 402

R9104 36 1% 1/16W MF 402
RSDM3 H11 USB_NEC_N<2>
DM3 G11 (USB2_N<2>) USB2_N<2> 5 6 59
DP3 G13 (USB2_P<2>) USB2_P<2> 5 6 59
RSDP3 G14 USB_NEC_P<2>

R9105 36 1% 1/16W MF 402

R9106 36 1% 1/16W MF 402
RSDM4 F12 USB_NEC_N<3>
DM4 F14 (USB2_N<3>) USB2_N<3> 5 6 59
DP4 E12 (USB2_P<3>) USB2_P<3> 5 6 59
RSDP4 E14 USB_NEC_P<3>

R9107 36 1% 1/16W MF 402

R9108 36 1% 1/16W MF 402
RSDM5 E13 USB_NEC_N<4>
DM5 D14 (USB2_N<4>) USB2_N<4> 5 6 59
DP5 C13 (USB2_P<4>) USB2_P<4> 5 6 59
RSDP5 C14 USB_NEC_P<4>

R9109 36 1% 1/16W MF 402

Master: Fizzy

USB Host Interfaces

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 91 OF 103	

DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:08:38 2004

Page Notes

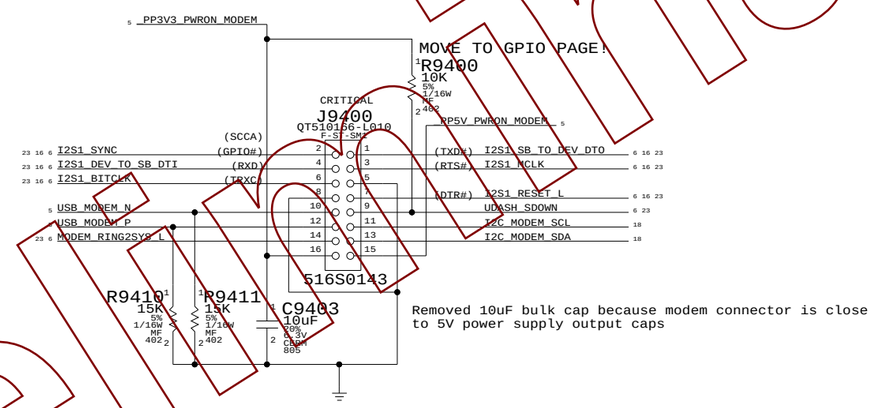
Power aliases required by this page:
- _PP3V3_PWRON_MODEM
  Spec Load: 0.5 A active, 3 mA auxiliary

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

Modem Connector

Supports both The Last Dash and Q52 Modems



Removed 10uF bulk cap because modem connector is close to 5V power supply output caps

Modem Interface

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT
NONE	94 OF 103

_DRAWING
TITLE=FIZZY
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:08:46 2004

Page Notes

Power aliases required by this page:
- _PP5V_PWRON_AUDIO
- _PP3V3_PWRON_AUDIO

Signal aliases required by this page:
(NONE)

BOM options provided by this page:
(NONE)

NOTE: It is considered the responsibility of the audio section to provide the appropriate pull-ups and pull-downs for ALL audio GPIOs.

EMI Filtering

L9530 FERR-220-OHM 0402
23 I2S0_SYNC 1 2 I2S0_SYNC_F 6 61

L9531 FERR-220-OHM 0402
23 I2S0_MCLK 1 2 I2S0_MCLK_F 6 61

L9532 FERR-220-OHM 0402
23 I2S0_DEV_TO_SB_DTI 1 2 I2S0_DEV_TO_SB_DTI_F 6 61

L9533 FERR-220-OHM 0402
23 I2S0_SB_TO_DEV_DTO 1 2 I2S0_SB_TO_DEV_DTO_F 6 61

L9534 FERR-220-OHM 0402
23 6 AUDIO_SPKR_MUTE_L 1 2 AUDIO_SPKR_MUTE_L_F 61

L9535 FERR-220-OHM 0402
23 I2S0_RESET_L 1 2 I2S0_RESET_L_F 6 61

L9536 FERR-220-OHM 0402
23 I2S0_BITCLK 1 2 I2S0_BITCLK_F 6 61

L9537 FERR-220-OHM 0402
23 I2S2_SYNC 1 2 I2S2_SYNC_F 6 61

L9538 FERR-220-OHM 0402
23 I2S2_BITCLK 1 2 I2S2_BITCLK_F 6 61

L9539 FERR-220-OHM 0402
23 I2S2_DEV_TO_SB_DTI 1 2 I2S2_DEV_TO_SB_DTI_F 6 61

L9540 FERR-220-OHM 0402
23 I2S2_RESET_L 1 2 I2S2_RESET_L_F 6 61

Sound Board Connector

Place shorts at 3.3V and 5V regulators

XW9505 SM
5 PP5V_PWRON_AUDIO 2 1 6 PP5V_PWRON_AUDIO
VOLTAGE=5V
MIN_LINE_WIDTH=20 mil
MIN_NECK_WIDTH=10 mil
This is an internal board short

CRITICAL
J9500 QT500406-L111 M-ST-SM1
41 42
1 2 3 4 5 6 7 8 9 10 11 12
5 PP5V_RUN_AUDIO
23 6 AUDIO_GPIO_11 13 14 AUDIO_LO_DET_L 6 23
15 16 AUDIO_LO_OPTICAL_PLUG_L 6 23
23 6 AUDIO_EXT_MCLK_SEL 17 18 AUDIO_LI_DET_L 6 23
23 6 AUDIO_LO_MUTE_L 19 20 AUDIO_LI_OPTICAL_PLUG_L 6 23
21 22 AUDIO_SPKR_MUTE_L_F 61
61 6 I2S0_MCLK_F 23 24
61 6 I2S0_BITCLK_F 25 26 I2S0_RESET_L_F 6 61
61 6 I2S0_SYNC_F 27 28 I2S2_RESET_L_F 61
61 6 I2S0_SB_TO_DEV_DTO_F 29 30
61 6 I2S0_DEV_TO_SB_DTI_F 31 32 I2C_AUDIO_SDA 18
33 34 I2C_AUDIO_SCL 18
61 6 I2S2_BITCLK_F 35 36
61 6 I2S2_SYNC_F 37 38 SLEEPLED_ANODE 6 19
6 I2S2_DEV_TO_SB_DTI_F 39 40 (SLEEP_LED_GND)
43 44
516S0154

Place shorts at 3.3V and 5V regulators

XW9503 SM
6 PP3V3_PWRON_AUDIO 2 1 PP3V3_PWRON_AUDIO 61
VOLTAGE=3.3V
MIN_LINE_WIDTH=20 mil
MIN_NECK_WIDTH=10 mil
This is an internal board short

Place ground short near 3.3V and 5V regulators

XW9500 SM
6 GND_AUDIO 2 1
VOLTAGE=0V
MIN_LINE_WIDTH=20 mil
MIN_NECK_WIDTH=10 mil
This is an internal board short

Audio GPIO Pull-ups & Pull-downs

61 5 PP3V3_PWRON_AUDIO

AUDIO_LO_DET_L - 100k PU on Kazoo (pg 6)
AUDIO_LO_OPTICAL_PLUG_L - 100k PU on Kazoo (pg 6)
AUDIO_LI_DET_L - 100k PU on Kazoo (pg 7)
AUDIO_LI_OPTICAL_PLUG_L - 100k PU on Kazoo (pg 8)

23 AUDIO_HP_DET_L — R9504 10K 5% 1/16W MF 402 — NO STUFF
23 AUDIO_SPKR_DET_L — R9515 10K 5% 1/16W MF 402 — R9505 10K 5% 1/16W MF 402

AUDIO_LO_MUTE_L - 100k PD on Kazoo (pg 6)

23 AUDIO_HP_MUTE_L — R9507 10K 5% 1/16W MF 402

AUDIO_SPKR_MUTE_L - 100k PD on Kazoo (pg 5)
AUDIO_EXT_MCLK_SEL - 100k PD on Kazoo (pg 8)
AUDIO_GPIO_11 - 100k PD on Kazoo (pg 8)

23 AUDIO_GPIO_12 — R9511 10K 5% 1/16W MF 402

I2S0_RESET_L - 100k PD on Kazoo (pg 4)
I2S2_RESET_L - 100k PD on Kazoo (pg 8)

DRAWING
TITLE=LINK
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 19:08:54 2004

Audio Interface

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 95 OF 103	

Electrical Constraints

No series termination on PCI signals

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
	RAM_CAD		RAM_DQS_R<15..0>	33 34
	RAM_CAD		RAM_DQ_R<127..0>	33 34
RAM_DQS0	RAM_CAD		RAM_DQS<0>	34 35
RAM_DQS0	RAM_CAD		RAM_DQ<7..0>	34 35
RAM_DQS1	RAM_CAD		RAM_DQS<1>	34 35
RAM_DQS1	RAM_CAD		RAM_DQ<15..8>	34 35
RAM_DQS2	RAM_CAD		RAM_DQS<2>	34 35
RAM_DQS2	RAM_CAD		RAM_DQ<23..16>	34 35
RAM_DQS3	RAM_CAD		RAM_DQS<3>	34 35
RAM_DQS3	RAM_CAD		RAM_DQ<31..24>	34 35
RAM_DQS4	RAM_CAD		RAM_DQS<4>	34 35
RAM_DQS4	RAM_CAD		RAM_DQ<39..32>	34 35
RAM_DQS5	RAM_CAD		RAM_DQS<5>	34 35
RAM_DQS5	RAM_CAD		RAM_DQ<47..40>	34 35
RAM_DQS6	RAM_CAD		RAM_DQS<6>	34 35
RAM_DQS6	RAM_CAD		RAM_DQ<55..48>	34 35
RAM_DQS7	RAM_CAD		RAM_DQS<7>	34 35
RAM_DQS7	RAM_CAD		RAM_DQ<63..56>	34 35
RAM_DQS8	RAM_CAD		RAM_DQS<8>	34 35
RAM_DQS8	RAM_CAD		RAM_DQ<71..64>	34 35
RAM_DQS9	RAM_CAD		RAM_DQS<9>	34 35
RAM_DQS9	RAM_CAD		RAM_DQ<79..72>	34 35
RAM_DQS10	RAM_CAD		RAM_DQS<10>	34 35
RAM_DQS10	RAM_CAD		RAM_DQ<87..80>	34 35
RAM_DQS11	RAM_CAD		RAM_DQS<11>	34 35
RAM_DQS11	RAM_CAD		RAM_DQ<95..88>	34 35
RAM_DQS12	RAM_CAD		RAM_DQS<12>	34 35
RAM_DQS12	RAM_CAD		RAM_DQ<103..96>	34 35
RAM_DQS13	RAM_CAD		RAM_DQS<13>	34 35
RAM_DQS13	RAM_CAD		RAM_DQ<111..104>	34 35
RAM_DQS14	RAM_CAD		RAM_DQS<14>	34 35
RAM_DQS14	RAM_CAD		RAM_DQ<119..112>	34 35
RAM_DQS15	RAM_CAD		RAM_DQS<15>	34 35
RAM_DQS15	RAM_CAD		RAM_DQ<127..120>	34 35

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
	RAM_CLK	RAM_CLK_A_R	RAM_CLK_A_P_R	33 34
	RAM_CLK	RAM_CLK_A_R	RAM_CLK_A_N_R	33 34
	RAM_CLK	RAM_CLK_B_R	RAM_CLK_B_P_R	33 34
	RAM_CLK	RAM_CLK_B_R	RAM_CLK_B_N_R	33 34
	RAM_CLK	RAM_CLK_D_R	RAM_CLK_D_P_R	33 34
	RAM_CLK	RAM_CLK_D_R	RAM_CLK_D_N_R	33 34
	RAM_CLK	RAM_CLK_E_R	RAM_CLK_E_P_R	33 34
	RAM_CLK	RAM_CLK_E_R	RAM_CLK_E_N_R	33 34
RAM_CLK0	RAM_CLK	RAM_CLK_A	RAM_CLK_A_P	34 35
RAM_CLK0	RAM_CLK	RAM_CLK_A	RAM_CLK_A_N	34 35
RAM_CLK0	RAM_CLK	RAM_CLK_B	RAM_CLK_B_P	34 35
RAM_CLK0	RAM_CLK	RAM_CLK_B	RAM_CLK_B_N	34 35
RAM_CLK1	RAM_CLK	RAM_CLK_D	RAM_CLK_D_P	34 35
RAM_CLK1	RAM_CLK	RAM_CLK_D	RAM_CLK_D_N	34 35
RAM_CLK1	RAM_CLK	RAM_CLK_E	RAM_CLK_E_P	34 35
RAM_CLK1	RAM_CLK	RAM_CLK_E	RAM_CLK_E_N	34 35
	RAM_CAD		RAM_CKE_R<1..0>	33 34
	RAM_CAD		RAM_CKE_R<5..4>	33 34
RAM_CKE0	RAM_CAD		RAM_CKE<0>	34 35
RAM_CKE0	RAM_CAD		RAM_CKE<1>	34 35
RAM_CKE1	RAM_CAD		RAM_CKE<4>	34 35
RAM_CKE1	RAM_CAD		RAM_CKE<5>	34 35
	RAM_CAD		RAM_CS_L_R<1..0>	33 34
	RAM_CAD		RAM_CS_L_R<9..8>	33 34
RAM_CS0	RAM_CAD		RAM_CS_L<0>	34 35
RAM_CS0	RAM_CAD		RAM_CS_L<1>	34 35
RAM_CS1	RAM_CAD		RAM_CS_L<8>	34 35
RAM_CS1	RAM_CAD		RAM_CS_L<9>	34 35
	RAM_CAD		RAM_A_R<13..0>	33 34
	RAM_CAD		RAM_BA_R<1..0>	33 34 62
	RAM_CAD		RAM_RAS_L_R	33 34 62
	RAM_CAD		RAM_CAS_L_R	33 34 62
	RAM_CAD		RAM_WE_L_R	33 34 62
RAM_A_CTL	RAM_CAD		RAM_A<13..0>	34 35
RAM_A_CTL	RAM_CAD		RAM_BA_R<1..0>	33 34 62
RAM_A_CTL	RAM_CAD		RAM_RAS_L_R	33 34 62
RAM_A_CTL	RAM_CAD		RAM_CAS_L_R	33 34 62
RAM_A_CTL	RAM_CAD		RAM_WE_L_R	33 34 62

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
	TMDS	TMDS_D0	TMDS_DP<0>	6 41 42
	TMDS	TMDS_D0	TMDS_DN<0>	6 41 42
	TMDS	TMDS_D1	TMDS_DP<1>	6 41 42
	TMDS	TMDS_D1	TMDS_DN<1>	6 41 42
	TMDS	TMDS_D2	TMDS_DP<2>	6 41 42
	TMDS	TMDS_D2	TMDS_DN<2>	6 41 42
	TMDS	TMDS_CLK	TMDS_CLKP	41 42
	TMDS	TMDS_CLK	TMDS_CLKN	41 42
	TMDS	TMDS_D3	TMDS_DP<3>	41 42
	TMDS	TMDS_D3	TMDS_DN<3>	41 42
	TMDS	TMDS_D4	TMDS_DP<4>	41 42
	TMDS	TMDS_D4	TMDS_DN<4>	41 42
	TMDS	TMDS_D5	TMDS_DP<5>	41 42
	TMDS	TMDS_D5	TMDS_DN<5>	41 42
	TMDS	CONN_TMDS_D0	TMDS_CONN_DP<0>	42
	TMDS	CONN_TMDS_D0	TMDS_CONN_DN<0>	42
	TMDS	CONN_TMDS_D1	TMDS_CONN_DP<1>	42
	TMDS	CONN_TMDS_D1	TMDS_CONN_DN<1>	42
	TMDS	CONN_TMDS_D2	TMDS_CONN_DP<2>	42
	TMDS	CONN_TMDS_D2	TMDS_CONN_DN<2>	42
	TMDS	CONN_TMDS_CLK	TMDS_CONN_CLKP	6 42
	TMDS	CONN_TMDS_CLK	TMDS_CONN_CLKN	6 42
	TMDS	CONN_TMDS_D3	TMDS_CONN_DP<3>	42
	TMDS	CONN_TMDS_D3	TMDS_CONN_DN<3>	42
	TMDS	CONN_TMDS_D4	TMDS_CONN_DP<4>	42
	TMDS	CONN_TMDS_D4	TMDS_CONN_DN<4>	42
	TMDS	CONN_TMDS_D5	TMDS_CONN_DP<5>	42
	TMDS	CONN_TMDS_D5	TMDS_CONN_DN<5>	42
	TMDS	SI_TMDS_D0	SI_TMDS_DP<0>	41
	TMDS	SI_TMDS_D0	SI_TMDS_DN<0>	41
	TMDS	SI_TMDS_D1	SI_TMDS_DP<1>	41
	TMDS	SI_TMDS_D1	SI_TMDS_DN<1>	41
	TMDS	SI_TMDS_D2	SI_TMDS_DP<2>	41
	TMDS	SI_TMDS_D2	SI_TMDS_DN<2>	41
	TMDS	SI_TMDS_CLK	SI_TMDS_CLKP	41
	TMDS	SI_TMDS_CLK	SI_TMDS_CLKN	41
	TMDS	SI_TMDS_D3	SI_TMDS_DP<3>	41
	TMDS	SI_TMDS_D3	SI_TMDS_DN<3>	41
	TMDS	SI_TMDS_D4	SI_TMDS_DP<4>	41
	TMDS	SI_TMDS_D4	SI_TMDS_DN<4>	41
	TMDS	SI_TMDS_D5	SI_TMDS_DP<5>	41
	TMDS	SI_TMDS_D5	SI_TMDS_DN<5>	41
	TMDS	GPU_TMDS_D0	GPU_TMDS_DP<0>	39 41
	TMDS	GPU_TMDS_D0	GPU_TMDS_DN<0>	39 41
	TMDS	GPU_TMDS_D1	GPU_TMDS_DP<1>	39 41
	TMDS	GPU_TMDS_D1	GPU_TMDS_DN<1>	39 41
	TMDS	GPU_TMDS_D2	GPU_TMDS_DP<2>	39 41
	TMDS	GPU_TMDS_D2	GPU_TMDS_DN<2>	39 41
	TMDS	GPU_TMDS_CLK	GPU_TMDS_CLKP	39 41
	TMDS	GPU_TMDS_CLK	GPU_TMDS_CLKN	39 41
	TMDS	GPU_TMDS_D0_R	GPU_TMDS_DP_R<0>	41
	TMDS	GPU_TMDS_D0_R	GPU_TMDS_DN_R<0>	41
	TMDS	GPU_TMDS_D1_R	GPU_TMDS_DP_R<1>	41
	TMDS	GPU_TMDS_D1_R	GPU_TMDS_DN_R<1>	41
	TMDS	GPU_TMDS_D2_R	GPU_TMDS_DP_R<2>	41
	TMDS	GPU_TMDS_D2_R	GPU_TMDS_DN_R<2>	41
	TMDS	GPU_TMDS_CLK_R	GPU_TMDS_CLKP_R	41
	TMDS	GPU_TMDS_CLK_R	GPU_TMDS_CLKN_R	41

ELECTRICAL_CONSTRAINT_SET	NET_SPACING_TYPE	DIFFERENTIAL_PAIR		
			EI_CPU_TO_NB_CLK_P	26 27
			EI_CPU_TO_NB_CLK_N	26 27
			EI_NB_TO_CPU_CLK_P	26 27
			EI_NB_TO_CPU_CLK_N	26 27
			EI_CPU_TO_NB_AD<43..0>	26 27
			EI_NB_TO_CPU_AD<43..0>	26 27
			EI_CPU_TO_NB_SR_P<0>	26 27
			EI_CPU_TO_NB_SR_N<0>	26 27
			EI_CPU_TO_NB_SR_P<1>	26 27
			EI_CPU_TO_NB_SR_N<1>	26 27
			EI_NB_TO_CPU_SR_P<0>	26 27
			EI_NB_TO_CPU_SR_N<0>	26 27
			EI_NB_TO_CPU_SR_P<1>	26 27
			EI_NB_TO_CPU_SR_N<1>	26 27

45	PCI_SB_AD<0>	ALTAS	PCI_AD<0> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<1>	ALTAS	PCI_AD<1> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<2>	ALTAS	PCI_AD<2> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<3>	ALTAS	PCI_AD<3> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<4>	ALTAS	PCI_AD<4> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<5>	ALTAS	PCI_AD<5> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<6>	ALTAS	PCI_AD<6> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<7>	ALTAS	PCI_AD<7> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<8>	ALTAS	PCI_AD<8> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<9>	ALTAS	PCI_AD<9> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<10>	ALTAS	PCI_AD<10> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<11>	ALTAS	PCI_AD<11> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<12>	ALTAS	PCI_AD<12> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<13>	ALTAS	PCI_AD<13> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<14>	ALTAS	PCI_AD<14> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<15>	ALTAS	PCI_AD<15> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<16>	ALTAS	PCI_AD<16> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<17>	ALTAS	PCI_AD<17> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<18>	ALTAS	PCI_AD<18> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<19>	ALTAS	PCI_AD<19> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<20>	ALTAS	PCI_AD<20> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<21>	ALTAS	PCI_AD<21> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_AD<22>	ALTAS	PCI_AD<22> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_AD<23>	ALTAS	PCI_AD<23> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_AD<24>	ALTAS	PCI_AD<24> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<25>	ALTAS	PCI_AD<25> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<26>	ALTAS	PCI_AD<26> MAKE_BASE=TRUE	6 45 46 47 48 49
48 45	PCI_SB_AD<27>	ALTAS	PCI_AD<27> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<28>	ALTAS	PCI_AD<28> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<29>	ALTAS	PCI_AD<29> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<30>	ALTAS	PCI_AD<30> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_AD<31>	ALTAS	PCI_AD<31> MAKE_BASE=TRUE	6 45 46 47 48 49
45	PCI_SB_CBE_L<0>	ALTAS	PCI_CBE_L<0> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_CBE_L<1>	ALTAS	PCI_CBE_L<1> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_CBE_L<2>	ALTAS	PCI_CBE_L<2> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_CBE_L<3>	ALTAS	PCI_CBE_L<3> MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_DEVSEL_L		PCI_DEVSEL_L MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_FRAME_L		PCI_FRAME_L MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_IRDY_L		PCI_IRDY_L MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_TRDY_L		PCI_TRDY_L MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_STOP_L		PCI_STOP_L MAKE_BASE=TRUE	6 45 47 48 49
45	PCI_SB_PAR		PCI_PAR MAKE_BASE=TRUE	6 45 47 48 49

_DRAWING
TITLE=LINK
ABBREV=DRAWING
LAST_MODIFIED=Mon Feb 23 18:36:43 2004

Electrical Constraints

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE: NONE	SHT 99 OF 103	

*** Signal Cross-Reference for the entire design ***

Preliminary

```
PCI_SLOTB_INT_L  23B3<> 23C2<
PCI_SLOTC_INT_L  23B2< 23B3<>
PCI_SLOTD_GNT_L  45A7< 45B5<>
PCI_SLOTD_INT_L  23A7< 23B3<>
PCI_SLOTD_REQ_L  45B5<> 45B7<
PCI_SLOTE_GNT_L  23A7< 23C3<> 49A6<
PCI_SLOTE_IDSEL  49B6<
PCI_SLOTE_INT_L  23A7< 23B3<> 49A6<>
PCI_SLOTE_REQ_L  23A7< 23C3<> 49A6>
PCI_SLOTF_GNT_L  23A7< 23C3<>
PCI_SLOTF_INT_L  23B2< 23B3<>
PCI_SLOTF_REQ_L  23A7< 23C3<>
PCI_SLOTG_GNT_L  45B5<> 45B7< 48B5<
PCI_SLOTG_IDSEL  48B5<
PCI_SLOTG_INT_L  23A7< 23B3<> 48B7<
PCI_SLOTG_REQ_L  45B5<> 45B7< 48B5>
PCI_STOP_L       6B8> 45A2< 45D6> 47B4<> 48B6<>
                 49A6<> 62B1>
PCI_TRDY_L       6B8> 45A2< 45D6> 47B4<> 48B5<>
                 49A6<> 62B1>
PLLLOCK          16A6< 27B6<>
PLLMULT          27B6<> 28B3<
PLLRANGE0        27B6<> 28B3<
PLLRANGE1        27B6<> 28B3<
PLLTEST          27B6<> 28A8<
PLLTESTOUT       27B6<> 28C4<
PLS_CLK_66M_0_R  25C4<>
PLS_CLK_66M_1_R  25C4<>
PLS_EXTCLK       25B7<> 25C8<
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PPBATT_ALL_F       6A5> 7A7<>
PPBATT_ALL_FUSEA   8C2<> 11A8<>
PPBATT_ALL_FUSEA_ZENER  11A7<>
PPBATT_ALL_FUSEB   8C1<>
PPBATT_ALL_VSNS    7A5< 8A5<
PPBATT_CHGR_OUT    8A3< 8C3<>
PPBATT_CHGR_RSNS   8B3<
PPBATT_CHGR_SW     8A4<>
PPBBATT_BOOST_OUT  11A8<> 17A4<>
PPBUS_ALL_A        5D7< 6A3> 6A7>
PPBUS_ALL_B        5D7< 6A3> 6B1>
PPBUS_FW_FUSE      12D7<>
PPBUS_INVERTER     42B1<>
PPDVO_GPU_VDDR4    40B2<
PPFW_COMBINED      12D5<> 12D5<>
PPLOGIC_PATA       6A5> 52C4<>
PPVCC_CBUS         49B1<> 49B2<> 49D1<>
PPVCC_CBUS_XW      49C4<>
PPVCORE_CPU        5C5> 27D4< 29A4< 29D5<> 30D7<
PPVCORE_GPU        5C5> 37A6< 39A3<> 39D4<
PPVCORE_GPUFB      5B6>
PPVCORE_GPUFB_VDDM  40B6<
PPVCORE_GPUFB_VDDRH  40C6<
```


APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03
SCALE NONE	SHT 100	OF 103

8 7 6 5 4 3 2 1

D

C

B

A

APPLE COMPUTER INC.	SIZE D	DRAWING NUMBER 051-6532	REV. 03
	SCALE NONE	SHT 101	OF 103

8 7 6 5 4 3 2 1

*** Part Cross-Reference for the entire design ***

Part	Type	Page
BS510	PCB_STANDOFF	17
C700	CAP	7
C710	CAP	7
C720	CAP	7
C800	CAP	8
C801	CAP	8
C802	CAP	8
C805	CAP	8
C806	CAP	8
C807	CAP	8
C808	CAP	8
C811	CAP	8
C812	CAP	8
C813	CAP	8
C814	CAP	8
C815	CAP	8
C816	CAP	8
C817	CAP	8
C818	CAP_P	8
C820	CAP	8
C822	CAP	8
C823	CAP	8
C824	CAP	8
C825	CAP	8
C826	CAP	8
C827	CAP	8
C828	CAP	8
C829	CAP	8
C830	CAP	8
C831	CAP	8
C851	CAP	8
C860	CAP_P	17
C861	CAP_P	17
C862	CAP_P	17
C863	CAP_P	17
C864	CAP_P	17
C865	CAP_P	17
C882	CAP	8
C897	CAP	8
C940	CAP	9
C941	CAP	9
C942	CAP	9
C950	CAP	9
C951	CAP	9
C952	CAP	9
C953	CAP	9
C954	CAP	9
C955	CAP	9
C956	CAP	9
C957	CAP	9
C960	CAP	9
C961	CAP	9
C970	CAP	9
C971	CAP	9
C972	CAP	9
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J750	CON_M10RT_S_SM	7
J790	CON_F14RT_S2MT_SM	17
J1591	CON_4RT_WRIB	15
J1592	CON_4RT_WRIB	15
J1600	CON_F14RT_S2MT_SM	17
J1699	CON_F16ST_D_SMA	16
J2130	CON_F14RT_S2MT_SM	17
J2700	CON_F1ST_S2MT_SM	25
J4010	CON_F200RT_DDRDIMM_SM1	35
J4020	CON_F200RT_DDRDIMM_SM2	35
J5900	CON_F30RT_T6MT_TH1	42
J5960	CON_F5RT_MINIDIN_TH	42
J5970	CON_F30RT_S2MT_SM	42
J5980	CON_4RT_WRIB	42
J7600	CON_M80ST_D2MT_SM3	47
J7800	CON_M80ST_D4MT_SM	49
J8300	CON_M50SM_5MM	52
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J8710	CON_RJ45_SHORT_4MT_TH	55
J9010	CON_F9RT_1394B_S6MT_SMA	58
J9020	CON_F6RT_S4MT_TH1	58
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APPLE COMPUTER INC.

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U2110 OPAMP_MAX4236EUTT 19
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U2600 PULSAR    24 25
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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6532	03

SCALE	SHT	OF
NONE	103	103