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

REV	ZONE	ECN	DESCRIPTION OF CHANGE	CK APPD / DATE	ENG APPD / DATE
C		358886	PRODUCTION RELEASED	01/07/05	?

SCHEM,MLB,PB17"

01/07/2005

BOM OPTIONS	STUFF	NO STUFF
D3_HOT		✓
D3_COLD	✓	
GPU_SS	✓	
GPU_SWITCH	✓	
SERIAL_DEBUG		✓
VCORE_OFFSET	✓	
1_8V_MAXBUS	✓	
1_5V_MAXBUS		✓
NEC_USB	✓	
INTREPID_USB		✓
BBANG		✓
NO_BBANG		✓
ATI_MEMIO_HI	✓	
ATI_MEMIO_LO		✓
SSCG		✓
NO_SSCG	✓	
5V_HD_LOGIC	✓	
3V_HD_LOGIC		✓
EXT_TMDS	✓	
INT_TMDS		✓
MMM	✓	
INT_CLK	✓	
EXT_CLK		✓

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-6694	1	SCHEM,MLB,PB17	SCH1	
820-1688	1	PCBF,MLB,PB17	PCB1	

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

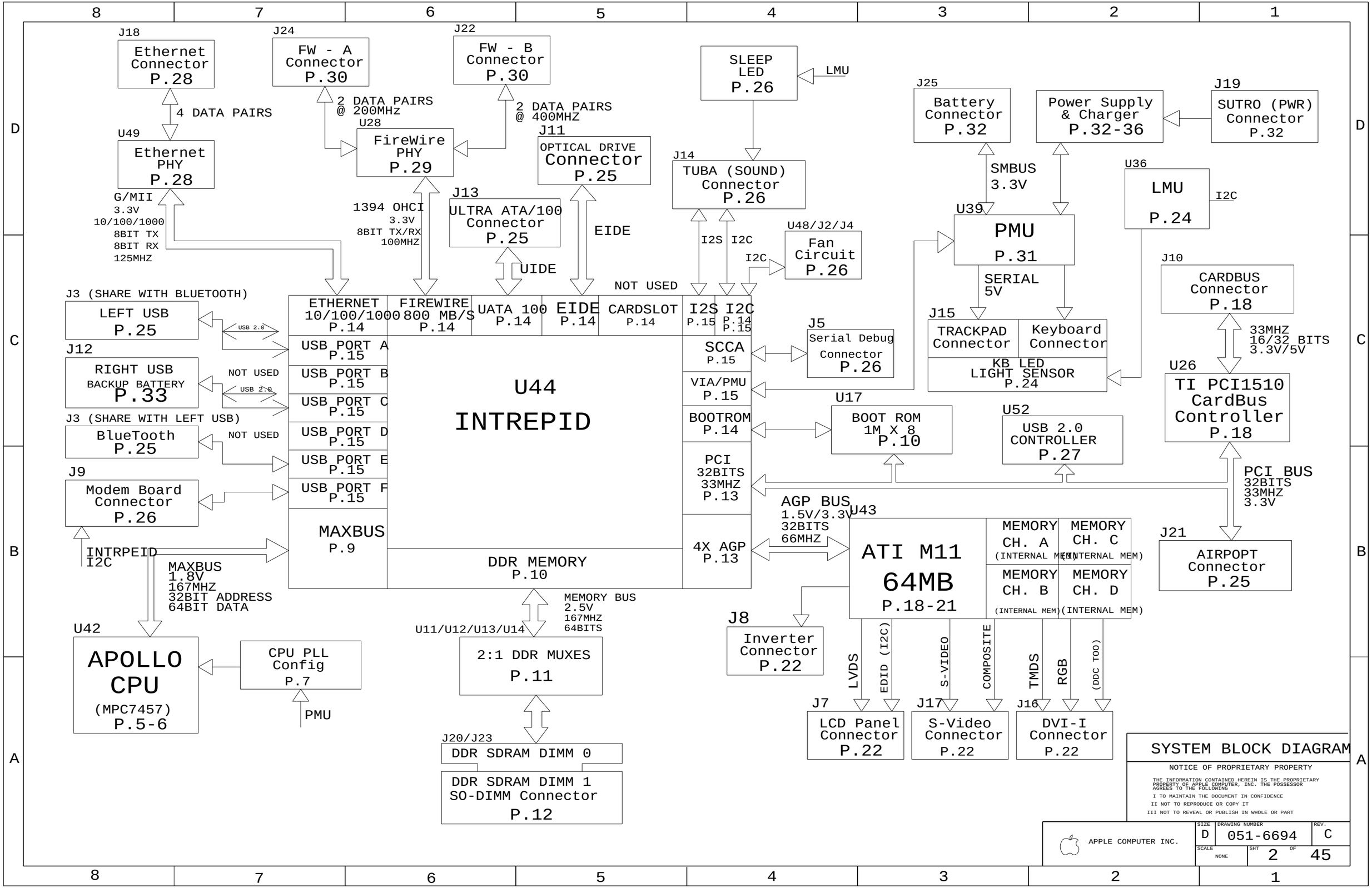
SIZE D

Apple Computer Inc.

TITLE: SCHEM,MLB,PB17"

DRAWING NUMBER 051-6694 REV. C

SHT 1 OF 45


J18
Ethernet Connector P.28
4 DATA PAIRS
U49
Ethernet PHY P.28
G/MII
3.3V
10/100/1000
8BIT TX
8BIT RX
125MHZ
J24
FW - A Connector P.30
2 DATA PAIRS @ 200MHz
J22
FW - B Connector P.30
2 DATA PAIRS @ 400MHZ
U28
FireWire PHY P.29
1394 OHCI
3.3V
8BIT TX/RX
100MHZ
J11
OPTICAL DRIVE Connector P.25
EIDE
J13
ULTRA ATA/100 Connector P.25
UIDE
SLEEP LED P.26
LMU
J14
TUBA (SOUND) Connector P.26
I2S
I2C
I2C
U48/J2/J4
Fan Circuit P.26
J25
Battery Connector P.32
Power Supply & Charger P.32-36
J19
SUTRO (PWR) Connector P.32
SMBUS
3.3V
U36
LMU P.24
I2C
U39
PMU P.31
SERIAL
5V
J10
CARDBUS Connector P.18
33MHZ
16/32 BITS
3.3V/5V
NOT USED
J3 (SHARE WITH BLUETOOTH)
LEFT USB P.25
USB 2.0
J12
RIGHT USB BACKUP BATTERY P.33
NOT USED
USB 2.0
J3 (SHARE WITH LEFT USB)
BlueTooth P.25
NOT USED
J9
Modem Board Connector P.26
INTRPEID
I2C
MAXBUS
1.8V
167MHZ
32BIT ADDRESS
64BIT DATA
ETHERNET 10/100/1000 P.14
FIREWIRE 800 MB/S P.14
UATA 100 P.14
EIDE P.14
CARDSLOT P.14
I2S P.15
I2C P.14 P.15
USB PORT A P.15
USB PORT B P.15
USB PORT C P.15
USB PORT D P.15
USB PORT E P.15
USB PORT F P.15
MAXBUS P.9
U44
INTREPID
SCCA P.15
VIA/PMU P.15
BOOTROM P.14
PCI 32BITS 33MHZ P.13
4X AGP P.13
DDR MEMORY P.10
J5
Serial Debug Connector P.26
J15
TRACKPAD Connector
Keyboard Connector
KB LED
LIGHT SENSOR P.24
U17
BOOT ROM 1M X 8 P.10
U52
USB 2.0 CONTROLLER P.27
U26
TI PCI1510 CardBus Controller P.18
PCI BUS
32BITS
33MHZ
3.3V
AGP BUS
1.5V/3.3V
32BITS
66MHZ
U43
ATI M11
64MB
P.18-21
MEMORY CH. A (INTERNAL MEM)
MEMORY CH. C (INTERNAL MEM)
MEMORY CH. B (INTERNAL MEM)
MEMORY CH. D (INTERNAL MEM)
J21
AIRPOPT Connector P.25
J8
Inverter Connector P.22
LVDS
EDID (I2C)
S-VIDEO
COMPOSITE
TMDS
RGB
(DDC TOO)
J7
LCD Panel Connector P.22
J17
S-Video Connector P.22
J16
DVI-I Connector P.22
U42
APOLLO CPU
(MPC7457)
P.5-6
CPU PLL Config P.7
PMU
MEMORY BUS
2.5V
167MHZ
64BITS
U11/U12/U13/U14
2:1 DDR MUXES P.11
J20/J23
DDR SDRAM DIMM 0
DDR SDRAM DIMM 1
SO-DIMM Connector P.12
SYSTEM BLOCK DIAGRAM
NOTICE OF PROPRIETARY PROPERTY
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APPLE COMPUTER INC.
SIZE D
DRAWING NUMBER 051-6694
REV. C
SCALE NONE
SHT 2 OF 45

POWER SYSTEM ARCHITECTURE

1V20_REF
>~13.44V TURNS-ON
<~13.44V SHUTS-OFF
U21 PG 31

AC ADAPTER IN PG 31

INRUSH LIMITER PG 30

+24V_PBUS

RUN/SS
BUCK VCC REGULATOR (LTC1625) PG 32
AC: 12.8V
NO AC: BATTERY VOLTAGE 1625 NOT RUNNING
SHUTDOWN: RUNNING
SLEEP: RUNNING
RUN: RUNNING

+PBUS (12.8V)

BACKLIGHT INVERTER

+5V_MAIN

VCC
MAIN 2.5V/1.5V DC/DC (MAX1715) PG 35
SHUTDOWN: STOPPED
SLEEP: RUNNING
RUN: RUNNING
TURNS ON OUTPUT @ 2.4V ON1/ON2
PGOOD 1_5V_2_5V_OK

MAP31 DDR I/O
MAP31 DDR CORE
DDR POWER
+2.5V_MAIN
+1.5V_MAIN
INTREPID CORE
AGP I/O

+PBUS

DCDC_EN
SLEEP
MAXBUS SEQUENCING

+5V_MAIN
VCC SHDN
DC/DC (MAX1717) PG 34
SHUTDOWN: STOPPED
SLEEP: STOPPED
RUN: RUNNING

CPU_VCORE (+1.4V/+1.5V)

14V_PBUS

+3V_PMU LDO PG 32
+5V_MAIN
+3V_PMU
+4_6V_BU

+BATT

RC AT 1M*0.047UF @ 24V
STARTS 2.0MSEC AFTER DCDC_EN_L BECOMES LOW

DCDC_EN_L
AFTER PMU IS UP AND RUNNING DCDC_EN_L WILL PULL ON1/ON2 LOW IN SHUTDOWN

RUN/SS - 5V
TURNS ON AT >1V
<100UA ALLOWED
INTERNAL ZENER CLAMP TO 6V

MAIN 3V/5V DC/DC (LTC3707) PG 33
VCC
SHUTDOWN: STOPPED
SLEEP: RUNNING
RUN: RUNNING
INTERNAL ZENER CLAMP TO 6V
<100UA ALLOWED
TURNS ON AT >1V
RUN/SS - 3V

+5V_MAIN
PGOOD 3V_5V_OK
HOLDS BOTH RUN/SS AT GND WHEN IT'S CONNECTED TO GND
TURNS CONTROL TO RUN/SS WHEN IT'S OPEN
STBYMD

+3.3V_MAIN

+5V_MAIN
+PBUS (12.8V)

EXT_VCC DC/DC (LTC1778) PG 20
VCC
SHUTDOWN: STOPPED
SLEEP: D3HOT/D3COLD
RUN: RUNNING
TURNS ON AS LOW AS 0.8V/TYP 1.5V
INTERNAL 1.2UA CURRENT SOURCE
RUN/SS

GPU_VCORE +1.2V/+1.0V

DCDC_EN
SLEEP
D3_COLD
GPU_VCORE SEQUENCING

1M & 0.1UF @14V, IT TAKES ~5.88MS TO START SWITCHER

1_5V_2_5V_OK
D3_HOT

DCDC_EN_L
D3_HOT

1_5V_2_5V_OK WILL NOT PULL LOW UNTIL +5V_MAIN TURNS ON
HOWEVER, 5V SHOULD TURN ON ~2.23MS AFTER DCDC_EN_L OR PMU_POWERUP_L BECOMES '1'; MUCH LESS THAN THE RC CHARGING AT INT_VCC (5V)

+PBUS
12.8V CHARGES BACKUP BATTERY

BACKUP BATTERY

24V IS OUTPUT ONLY FROM BACKUP BATTERY

CHARGER INPUT & BOOST OUTPUT PG 32

BACKUP BATTERY CIRCUIT CHARGES OFF +PBUS AND PREVENTS +PBUS AND +24V_PBUS FROM DROPPING BELOW 6V (UNTIL DRAINED)

RC AT 1M*0.1UF @ 24V
STARTS ~4.25MSEC AFTER DCDC_EN_L BECOMES LOW

NO INRUSH PROTECTION WHEN ONLY BATTERY IS CONNECTED

+24V_PBUS

DC/DC (LTC3411) PG 35
SHUTDOWN: STOPPED
SLEEP: STOPPED
RUN: RUNNING
+1.8V_MAIN
MAXBUS BROADCOM

BATTERY CHARGER (MAX1772) PG 31

+BATT

3S 3P PRISMATIC CELLS

NO INRUSH PROTECTION WHEN ONLY BATTERY IS CONNECTED

BATTERY VOLTAGE FEED-IN PATH PG 31

+PBUS

SHUT-DOWN RUN SLEEP RUN SHUT-DOWN

SLEEP
SLEEP_L_LS5
DCDC_EN
DCDC_EN_L
+5V_MAIN ~11MS
+5V_SLEEP
+3V_MAIN ~13.5MS
+3V_SLEEP
3V_5V_OK 2.4V - ??? MS
+2_5V_MAIN 2.6 MS
+2_5V_SLEEP
+1_5V_MAIN 2.6 MS
+1_5V_SLEEP
1_5V_2_5V_OK (MAX1715 OUTPUT)
1_5V_2_5V_OK (AT LTC1778 RUN/SS)
GPU_VCORE (D3HOT) ~???MS
GPU_VCORE (D3COLD)
+1_8V_MAIN 1.9 MS

POWER BLOCK DIAGRAM

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C

SCALE NONE

SHT 3 OF 45

PCB SPECS

THICKNESS : 1.2 MM / 0.047 IN
1/2 OZ CU THICKNESS: 0.7 MILS
1.0 OZ CU THICKNESS: 1.4 MILS

IMPEDANCE : 50 OHMS +/- 10%
DIELECTRIC: FR-4
LAYER COUNT: 12
SIGNAL TRACE WIDTH: 4 MILS
SIGNAL TRACE SPACING: 4 MILS
PREPREG THICKNESS: 2-3 MILS

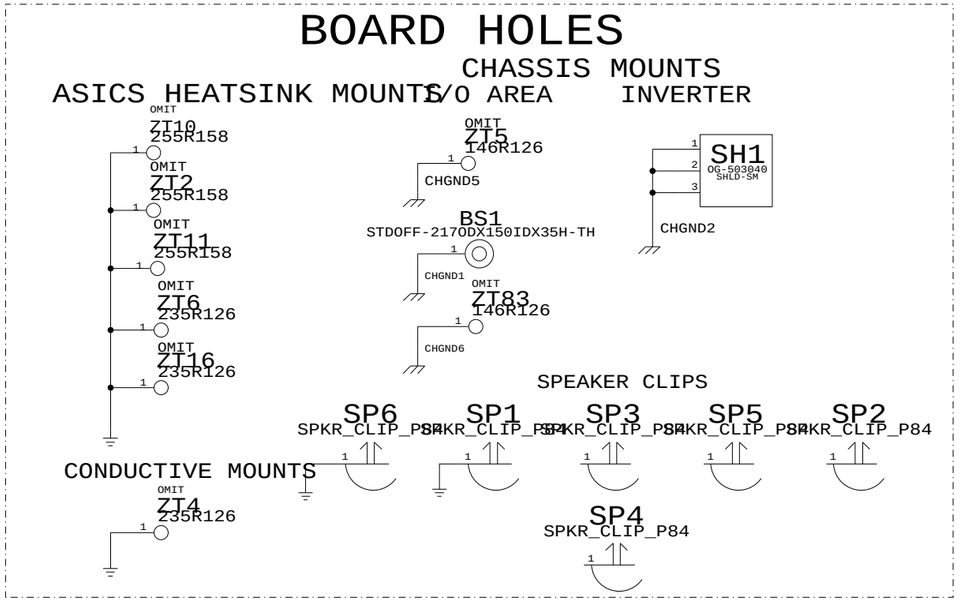
SEE PCB CAD FILES FOR MORE SPECIFIC INFO.

BOARD STACK-UP AND CONSTRUCTION

20R10 TH VIA OR VIA IN PAD

1		SIGNAL (1/3 OZ + COPPER PLATING)
2	PREPREG (3MIL)	GROUND (1/2 OZ)
3	LAMINATE (4MIL)	SIGNAL (1/2 OZ)
4	PREPREG (3MIL)	SIGNAL (1/2 OZ)
5	LAMINATE (4MIL)	GROUND (1/2 OZ)
6	PREPREG (2MIL)	CUT POWER PLANE(1 OZ)
7	LAMINATE (3MIL)	CUT POWER PLANE(1 OZ)
8	PREPREG (2MIL)	GROUND (1/2 OZ)
9	LAMINATE (4MIL)	SIGNAL (1/2 OZ)
10	PREPREG (3MIL)	SIGNAL (1/2 OZ)
11	LAMINATE (4MIL)	GROUND (1/2 OZ)
12	PREPREG (3MIL)	SIGNAL (1/3 OZ + COPPER PLATING)

BOARD HOLES



GROUND VIAS

BOARD INFORMATION

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 4 OF 45	

CPU_VCORE_SLEEP

CPU_VCORE DECOUPLING NETWORK

CPU_OVDD DECOUPLING NETWORK

MPC7447 PULL-UPS

MAXBUS_SLEEP

+1_5V_SLEEP

+1_8V_SLEEP

MORE 0805 10UF CAPS ON VCORE

POWER SUPPLY PAGE (PG 33)

PLCAE SHORT CLOSE TO CENTER OF CPU

XW31 SM OMIT

ADT7467 VCORE MON

PLACE BELOW CPU
IN FORMER L3 AREA

VDD

OVDD

AVDD

OVDDSENSE

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S2955	1	IC,A7PM,R1.2.3,1.67GHZ,1.28V	U43	CRITICAL	?
337S3029	1	IC,A7PM,R1.3,1.67GHZ,1.28V	U43	CRITICAL	NO STUFF

OMIT

CRITICAL

U43

1.50GHZ-1.28V

APOLL7_PM-R1.1

BGA

(1 OF 3)

NO STUFF

CPU_AVDD

CPU_AVDD_VOUT

VOUT = 0.59*(1+R1/R2)
PLACE R88X AND R89X CLOSE
TO UXX PIN 5 AND 6

1.8V_SLEEP

CPU_AVDD_VIN

CPU_AVDD_SHDN_L

CPU_AVDD_ADJ

VCORE_SHDN_L

U6 FAN2558 SOT23-6

CRITICAL

MIN_NECK_WIDTH=10MIL
MIN_LINE_WIDTH=25MIL

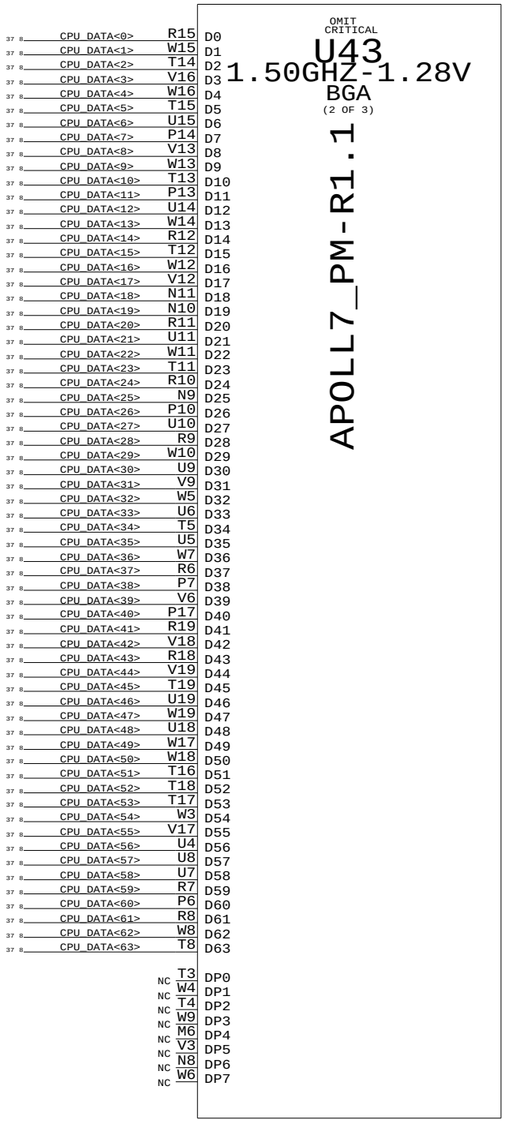
470OHM FOR BOOT BANGER

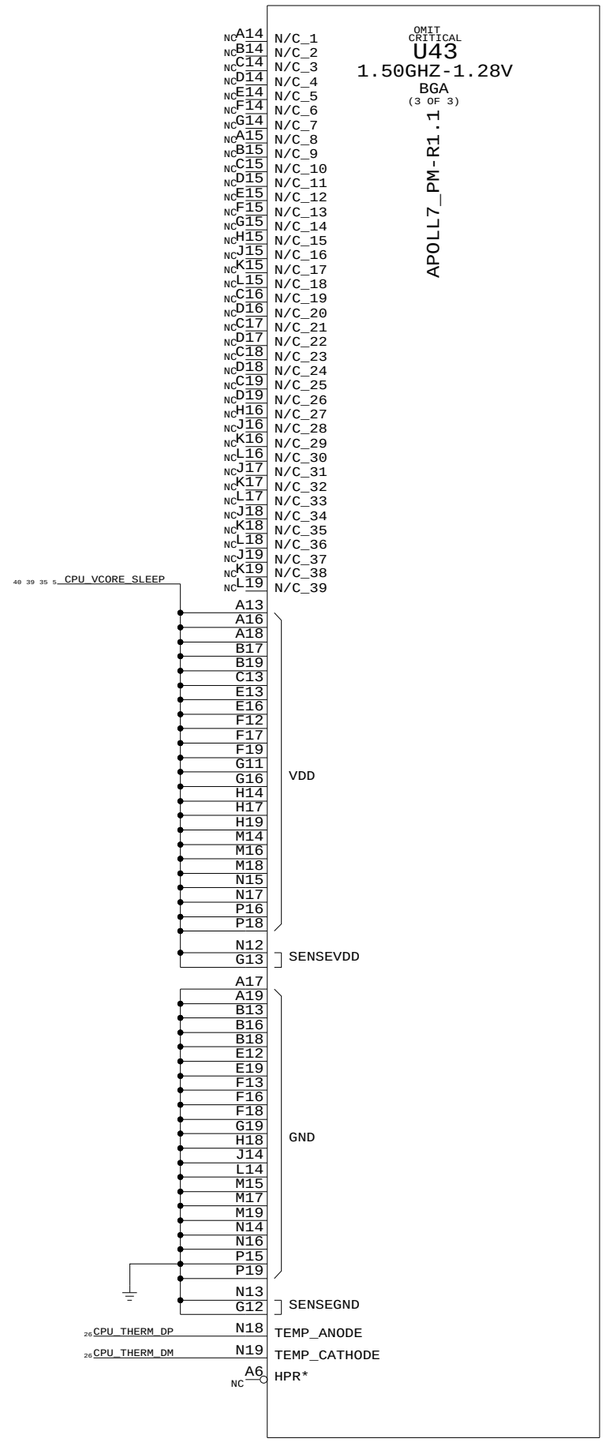
GND

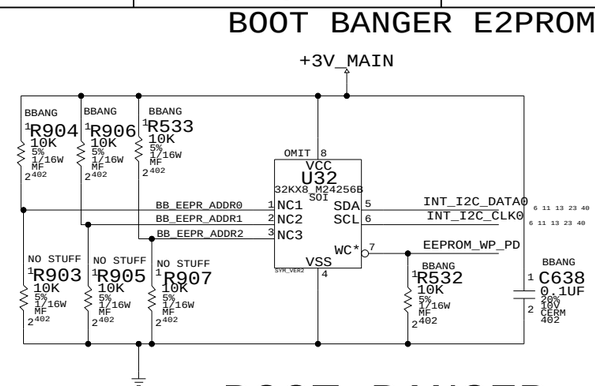
MPC7447 MAXBUS

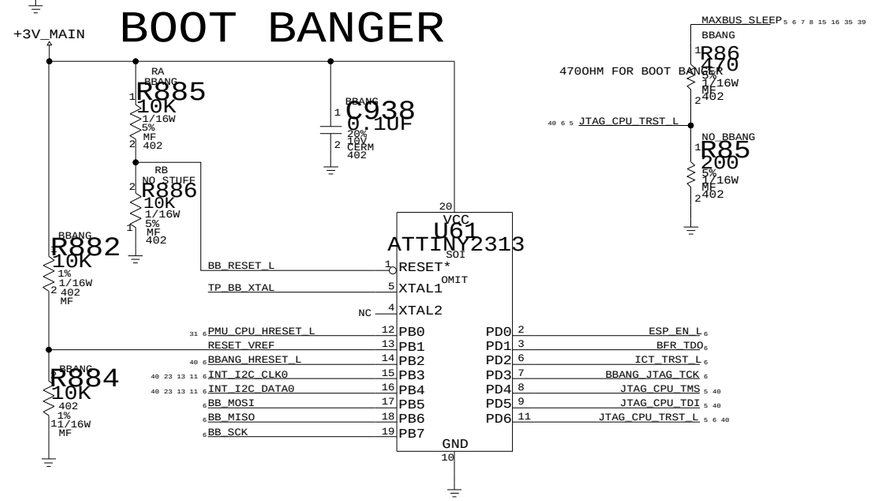
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 5 OF 45	



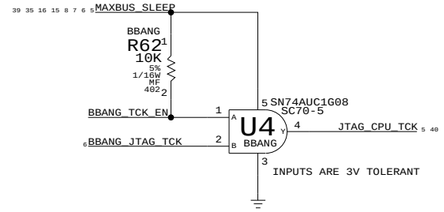


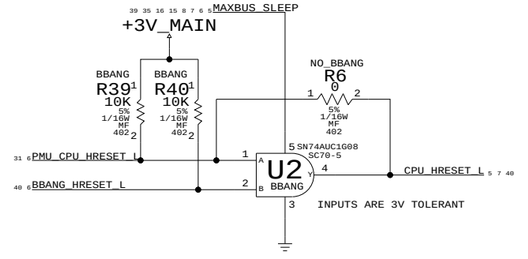




UNSTUFFING RA AND STUFFING RB
WILL DISABLE THE CONTROLLER

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
341S1660	1	MCU,PROGRAMMED W/ BANGER	U61	BBANG
341S1661	1	I2C EEPROM,PROGRAMMED W/ BANGER	U32	BBANG





BOOT BANGING SIGNAL DEFINITION

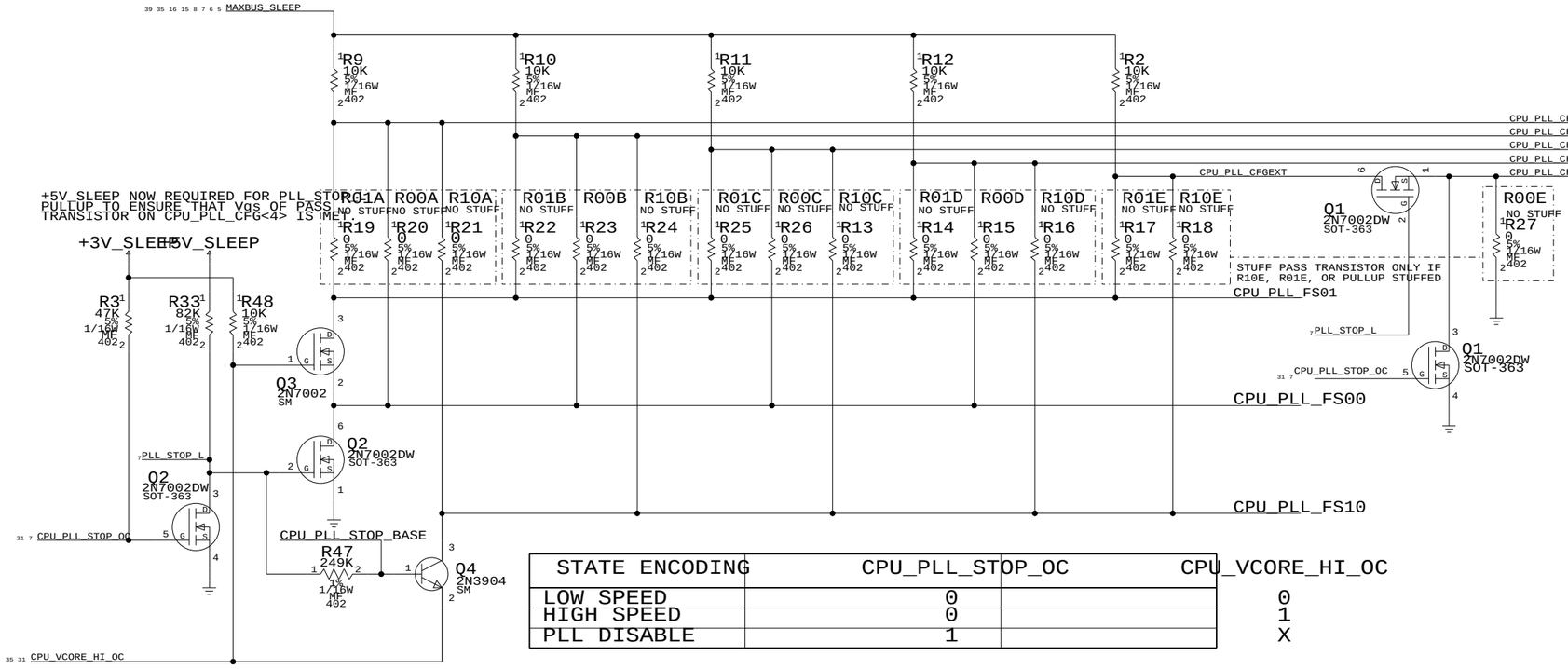
1/ BBANG_HRESET_L (OPEN COLLECTOR OUTPUT - 10K PULLUP ON MLB)
2/ PMU_HRESET_L (3V INPUT INTO LMU)
3/ BBANG_JTAG_TCK (REGULAR OUTPUT)
4/ JTAG_CPU_TMS (OPEN COLLECTOR OUTPUT - 470OHM PULLUP ON MLB)
5/ JTAG_CPU_TDI (OPEN COLLECTOR OUTPUT - 470OHM PULLUP ON MLB)
6/ JTAG_CPU_TRST_L (OPEN COLLECTOR OUTPUT - 470OHM PULLUP ON MLB)

MPC7447/BBANG

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 6 OF 45	

CPU PLL CONFIG CIRCUITRY



STATE ENCODING	CPU_PLL_STOP_OC		CPU_VCORE_HI_OC
LOW SPEED	0		0
HIGH SPEED	0		1
PLL DISABLE	1		X

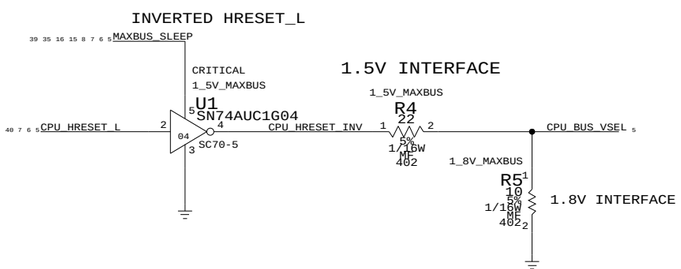
CPU FREQUENCY CONFIGURATION

APOLLO 7

MULTIPLIER (Bus-to-Core)	CORE FREQUENCY (AT BUS FREQUENCY) 167MHZ (MHZ)	133MHZ	CPU_PLL_CFG 4 E	0123 ABCD HEX
0.0X	PLL OFF		0	1111 0F
1.0X	PLL BYPASS		0	0011 03
2.0X	333	267	0	0100 04
3.0X	500	400	0	1000 08
4.0X	667	533	0	1010 0A
5.0X	833	667	0	1011 0B
5.5X	917	733	0	1001 09
6.0X	1000	800	0	1101 0D
6.5X	1083	867	0	0101 05
7.0X	1167	933	0	0010 02
7.5X	1250	1000	0	0001 01
8.0X	1333	1067	0	1100 0C
8.5X	1417	1133	0	0110 06
9.0X	1500	1200	1	0111 17
9.5X	1583	1267	0	0111 07
10.0X	1667	1333	1	1010 1A
10.5X	1750	1400	1	1000 18
11.0X	1833	1467	1	1001 19
11.5X	1917	1533	0	0000 00
12.0X	2000	1600	1	1011 1B
12.5X	2083	1667	1	1111 1F
13.0X	2167	1733	1	0101 15
13.5X	2250	1800	0	1110 0E
14.0X	2333	1867	1	1100 1C
15.0X	2500	2000	1	0001 11
16.0X	2667	2133	1	1101 1D
17.0X	2833	2267	1	0000 10
18.0X	3000	2400	1	0010 12
20.0X	3333	2667	1	0011 13
21.0X	3500	2800	1	0100 14
24.0X	4000	3200	1	0110 16
28.0X	4667	3733	1	1110 1E

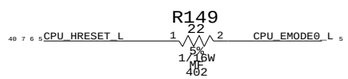
CPU CONFIGURATION

MAXBUS VSEL



DESKTOP HAD PROBLEM USING INVERTER TO INVERT HRESET_L NEED TO CHARACTERIZE

BUSTYPE SELECT



APOLLO ONLY SUPPORTS MAXBUS

SIGNAL	TIED	APPLICATION
CPU_EMODE0_L (PROCESSOR)	HIGH	60X BUS MODE
	CPU_HRESET_L	MAX BUS MODE
CPU_BUS_VSEL (PROCESSOR)	CPU_HRESET_L	2.5V INTERFACE
	LOW	1.8V INTERFACE
	CPU_HRESET_INV	1.5V INTERFACE

CPU CONFIGURATION

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 7 OF 45	

INTREPID BOOT STRAPS

BIT 32 TO 39

MAXBUS_SLEEP

NO STUFF R642[1]	NO STUFF R135[1]	NO STUFF R123[1]	NO STUFF R153[1]	NO STUFF R166[1]	NO STUFF R179[1]	NO STUFF R651[1]	NO STUFF R178[1]
CPU_DATA<32>	CPU_DATA<33>	CPU_DATA<34>	CPU_DATA<35>	CPU_DATA<36>	CPU_DATA<37>	CPU_DATA<38>	CPU_DATA<39>

10K 5% 1/16W MF 402

NO STUFF

R136[1]	R643[1]	R639[1]	R657[1]	R664[1]	R673[1]	R143[1]	R674[1]
Spare	Spare	Spare	Extra PU/PD	Spare	Spare	Spare	Spare

10K 5% 1/16W MF 402

Bit 32: PCI1 Source Clock 0: PLL5 (NO SPREAD) 1: PLL5 (SPREAD)
Bit 33: PCI0 Source Clock 0: PLL5 (NO SPREAD) 1: PLL5 (SPREAD)
Bit 34: Disable Internal Pull-up/Pull-down 0: Pull-up/Pull-down Enabled 1: Pull-up/Pull-down Disabled
Bit 35: Enable Clock Output 0: Disable 1: Enable
Bit 36: Reserved
Bit 37: Reserved
Bit 38: Reserved
Bit 39: Reserved

BIT 40 TO 47

MAXBUS_SLEEP

NO STUFF R122[1]	NO STUFF R142[1]	NO STUFF R164[1]	EXT_CNO STUFF R134[1]	R184[1]	INT_CLK R177[1]	INT_CLK R152[1]	INT_CLK R165[1]
CPU_DATA<40>	CPU_DATA<41>	CPU_DATA<42>	CPU_DATA<43>	CPU_DATA<44>	CPU_DATA<45>	CPU_DATA<46>	CPU_DATA<47>

10K 5% 1/16W MF 402

INT_CLK R640[1]	R652[1]	R665[1]	EXT_CLK R644[1]	R683[1]	EXT_CLK R675[1]	EXT_CLK R658[1]	EXT_CLK R666[1]
Spare	Spare	BIT2	BIT1	BIT0	PCI1 Source Clock 0: PLL5 (NO SPREAD)	PCI0 Source Clock 0: PLL5 (NO SPREAD)	

10K 5% 1/16W MF 402

PLL4MODESEL_NXT[2:0]
000: 166.4MHZ (2.5X)
001: 149.76MHZ
010: 133.12MHZ (2.0X)
011: 99.84MHZ (1.5X)
100: 83.20MHZ

MODE A (2.5X) IS FOR STATIC OPERATION
MODE C (2.0X) IS FOR CLOCK SLEW OPERATION

BIT 48 TO 55

MAXBUS_SLEEP

EXT_CLK R133[1]	EXT_CLK R121[1]	NO STUFF R163[1]	NO STUFF R151[1]	NO STUFF R162[1]	NO STUFF R141[1]	NO STUFF R183[1]	NO STUFF R176[1]
CPU_DATA<48>	CPU_DATA<49>	CPU_DATA<50>	CPU_DATA<51>	CPU_DATA<52>	CPU_DATA<53>	CPU_DATA<54>	CPU_DATA<55>

10K 5% 1/16W MF 402

INT_CLK R645[1]	INT_CLK R641[1]	NO STUFF R668[1]	R659[1]	R667[1]	R653[1]	NO STUFF R684[1]	R676[1]
BUF_REF_CLK_OUTEnable_h 1: Active	Select PLL4ExtSrc 1: External source	Spare	BIT2	BIT1	BIT0	Spare	

10K 5% 1/16W MF 402

Bit 48: 139A workaround 0: Not Any 139A workaround
Bit 49: Reserved
Bit 50: Reserved
Bit 51: Reserved
Bit 52: Reserved
Bit 53: Reserved
Bit 54: Reserved
Bit 55: Reserved

MaxBus output impedance
111: 28.6 ohm
011: 33.3 ohm
101: 40 ohm
001: 50 ohm
110: 66.6 ohm
010: 100 ohm
100: 200 ohm
000: 200 ohm

THE FOLLOWING STRAP BITS CAN BE CHANGED BY SOFTWARE:
1/ D47 - SELAGPSPREADCLK - SLEEP/WAKE CYCLE REQUIRED
2/ D46 - SELPCI1SPREADCLK - SLEEP/WAKE CYCLE REQUIRED
3/ D44 - PLL4MODESEL_NXT<0> - SLEEP/WAKE CYCLE REQUIRED
4/ D43 - PLL4MODESEL_NXT<1> - SLEEP/WAKE CYCLE REQUIRED
5/ D42 - PLL4MODESEL_NXT<2> - SLEEP/WAKE CYCLE REQUIRED
6/ D33 - ANALYZERCLK_EN_H - IMMEDIATE EFFECT

IF A STRAP IS NOT LISTED, THEN
IT CANNOT BE CHANGED BY SOFTWARE

+1_5V_INTREPID_PLL — R227 4.7 5% 1/16W MF 402 — +1_5V_INTREPID_PLL7

C308 0.22UF 20% 6.3V CERM 402

H26 VDD15A_7 (PLL6) OMIT CRITICAL

U45 INTREPID-REV2.1 BGA

CPU_BR_L	E29	BR	INPUT - PU
CPU_BG_L	E26	BG	NO BUS KEEPER
CPU_TS_L	B27	TS	NO BUS KEEPER

(1 OF 9)

CPU_ADDR<0>	D24	A_0
CPU_ADDR<1>	D25	A_1
CPU_ADDR<2>	A27	A_2
CPU_ADDR<3>	E24	A_3
CPU_ADDR<4>	G23	A_4
CPU_ADDR<5>	B26	A_5
CPU_ADDR<6>	A26	A_6
CPU_ADDR<7>	D23	A_7
CPU_ADDR<8>	A25	A_8
CPU_ADDR<9>	E23	A_9
CPU_ADDR<10>	J22	A_10
CPU_ADDR<11>	B25	A_11
CPU_ADDR<12>	H22	A_12
CPU_ADDR<13>	G22	A_13
CPU_ADDR<14>	D22	A_14
CPU_ADDR<15>	B24	A_15
CPU_ADDR<16>	B23	A_16
CPU_ADDR<17>	E22	A_17
CPU_ADDR<18>	J21	A_18
CPU_ADDR<19>	G21	A_19
CPU_ADDR<20>	E21	A_20
CPU_ADDR<21>	A24	A_21
CPU_ADDR<22>	D21	A_22
CPU_ADDR<23>	A23	A_23
CPU_ADDR<24>	H20	A_24
CPU_ADDR<25>	B22	A_25
CPU_ADDR<26>	H21	A_26
CPU_ADDR<27>	A22	A_27
CPU_ADDR<28>	E20	A_28
CPU_ADDR<29>	B21	A_29
CPU_ADDR<30>	D20	A_30
CPU_ADDR<31>	A21	A_31

MAXBUS INTERFACE

CPU_CI_L	G26	CI
CPU_GBL_L	A29	GBL
CPU_TBST_L	A28	TBST
CPU_TSIZ<0>	G24	TSIZ_0
CPU_TSIZ<1>	H24	TSIZ_1
CPU_TSIZ<2>	D26	TSIZ_2
CPU_TT<0>	E25	TT_0
CPU_TT<1>	G25	TT_1
CPU_TT<2>	B28	TT_2
CPU_TT<3>	D27	TT_3
CPU_TT<4>	J25	TT_4
CPU_WT_L	D28	WT
CPU_AACK_L	B29	AACK NO BUS KEEPER - PU
CPU_ARTRY_L	H23	ARTRY NO BUS KEEPER - PU
CPU_HIT_L	B31	HIT INPUT - PU
CPU_QREQ_L	A32	QREQ INPUT - PD
CPU_QACK_L	G27	QACK NO BUS KEEPER - ?
INT_SUSPEND_REQ_L	AK9	SUSPENDREQ
INT_SUSPEND_ACK_L	AM8	SUSPENDACK

Vin = Intrepid Vcore (1.5V)
Vout = MaxBus rail (1.8V)

FB BUFFER HAS 50 OHM OUTPUT IMPEDANCE

INT_CPUFB_IN	J24	CPU_FB_IN	
INT_CPUFB_OUT	H16	CPU_FB_OUT	NO BUS KEEPER - PU
SYSCLK_LA_TP	G8	ANALYZER_CLK	
CPU_CLK_EN	AH9	STOPCPUCLK	INPUT - PU
INTREPID_ACS_REF	H13	ACS_REF	NO BUS KEEPER - ?
SYSCLK_CPU_UF	J15	CPU_CLK	NO BUS KEEPER - PU
CPU_TBEN	A31	TBEN	NO BUS KEEPER - PU

CPU_DBG_L	A30	DBG	
CPU_DRDY_L	G28	DRDY	
CPU_DTI<0>	K25	DTI_0	NO BUS KEEPER - ?
CPU_DTI<1>	D29	DTI_1	NO BUS KEEPER - ?
CPU_DTI<2>	B30	DTI_2	NO BUS KEEPER - ?
CPU_TA_L	E27	TA	NO BUS KEEPER - PU
CPU_TEA_L	E28	TEA	NO BUS KEEPER - PU

INTREPID OUTPUTS HIGH BY DEFAULT

VSSA_7 (PLL6) H25

R197[1] 511 1% 1/16W MF 402

R144 0 5% 1/16W MF 402

R137[1] 1K 1% 1/16W MF 402

SHORT = 1" SHORTER THAN MATCHED LENGTH
LONG = 1" LONGER THAN MATCHED LENGTH

INT_CPUFB_OUT — R167 0 5% 1/16W MF 402 — INT_CPUFB_OUT_SHORT — R215 0 5% 1/16W MF 402 — INT_CPUFB_OUT_NORM — NO STUFF R207 0 5% 1/16W MF 402 — INT_CPUFB_LONG

NO STUFF R225[1] 0 5% 1/16W MF 402

R226 0 5% 1/16W MF 402

R208[1] 0 5% 1/16W MF 402

NO STUFF R196 0 5% 1/16W MF 402

INT_CPUFB_IN — INT_CPUFB_IN_NORM

MAXBUS PULL-UPS

MAXBUS_SLEEP

CPU_TS_L	RP21 10K 5% 1/16W SM1	2	7
CPU_TA_L	RP21 10K 5% 1/16W SM1	1	8
CPU_ARTRY_L	RP21 10K 5% 1/16W SM1	4	5
CPU_BR_L	RP23 10K 5% 1/16W SM1	1	8
CPU_HIT_L	RP24 10K 5% 1/16W SM1	3	6
CPU_DRDY_L	RP23 10K 5% 1/16W SM1	3	6
CPU_TEA_L	RP23 10K 5% 1/16W SM1	4	5
CPU_AACK_L	RP23 10K 5% 1/16W SM1	2	7
CPU_DBG_L	RP24 10K 5% 1/16W SM1	4	5
CPU_BG_L	RP21 10K 5% 1/16W SM1	3	6
CPU_QREQ_L	RP24 10K 5% 1/16W SM1	2	7

INTREPID BOOT STRAPS

BIT 56 TO 63

MAXBUS_SLEEP

NO STUFF R140[1]	NO STUFF R161[1]	NO STUFF R175[1]	NO STUFF R132[1]	NO STUFF R131[1]	NO STUFF R150[1]	R174[1]	NO STUFF R182[1]
CPU_DATA<56>	CPU_DATA<57>	CPU_DATA<58>	CPU_DATA<59>	CPU_DATA<60>	CPU_DATA<61>	CPU_DATA<62>	CPU_DATA<63>

10K 5% 1/16W MF 402

R654[1]	R669[1]	R677[1]	R646[1]	R647[1]	R660[1]	NO STUFF R678[1]	R685[1]
Spare	Spare	Spare	PCI1_REQ2_L / PCI1_GNT2_L 1: 3.3V PCI 0: 5V PCI	PCI1_REQ1_L / PCI1_GNT1_L 1: 3.3V PCI 0: 5V PCI	PCI1_REQ0_L / PCI1_GNT0_L 1: 3.3V PCI 0: 5V PCI	Ethernet PHY interface 1: B-mode interface	Processor Bus Mode 1: 60X Bus (64)

10K 5% 1/16W MF 402

Intrepid MaxBus

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 8 OF 45	

SERIES RESISTORS FOR CLOCK/CONTROL SIGNALS

PINS ARE SWAPABLE FOR RPAKS

U45
INTREPID-REV2.1
BGA
(2 OF 9)
OMIT
CRITICAL

DDR_DATA_0	AK32	MEM_DATA<0>	H35	DDR_A_0
DDR_DATA_1	AK33	MEM_DATA<1>	G35	DDR_A_1
DDR_DATA_2	AK31	MEM_DATA<2>	G36	DDR_A_2
DDR_DATA_3	AK35	MEM_DATA<3>	F36	DDR_A_3
DDR_DATA_4	AK36	MEM_DATA<4>	F35	DDR_A_4
DDR_DATA_5	AJ32	MEM_DATA<5>	E35	DDR_A_5
DDR_DATA_6	AJ35	MEM_DATA<6>	E36	DDR_A_6
DDR_DATA_7	AJ36	MEM_DATA<7>	G32	DDR_A_7
DDR_DATA_8	AG33	MEM_DATA<8>	D36	DDR_A_8
DDR_DATA_9	AG35	MEM_DATA<9>	H36	DDR_A_9
DDR_DATA_10	AH35	MEM_DATA<10>	G33	DDR_A_10
DDR_DATA_11	AG36	MEM_DATA<11>	H33	DDR_A_11
DDR_DATA_12	AH36	MEM_DATA<12>	D35	DDR_A_12
DDR_DATA_13	AH32	MEM_DATA<13>	L30	DDR_BA_0
DDR_DATA_14	AG32	MEM_DATA<14>	M29	DDR_BA_1
DDR_DATA_15	AG31	MEM_DATA<15>		
DDR_DATA_16	AE32	MEM_DATA<16>	AN34	DDRCS_0
DDR_DATA_17	AF35	MEM_DATA<17>	AN36	DDRCS_1
DDR_DATA_18	AF36	MEM_DATA<18>	AL35	DDRCS_2
DDR_DATA_19	AE36	MEM_DATA<19>	AL33	DDRCS_3
DDR_DATA_20	AE35	MEM_DATA<20>		
DDR_DATA_21	AE33	MEM_DATA<21>	AJ31	DDR_DQS_0
DDR_DATA_22	AD36	MEM_DATA<22>	AH31	DDR_DQS_1
DDR_DATA_23	AD35	MEM_DATA<23>	AD32	DDR_DQS_2
DDR_DATA_24	AA36	MEM_DATA<24>	AB30	DDR_DQS_3
DDR_DATA_25	AA35	MEM_DATA<25>	V30	DDR_DQS_4
DDR_DATA_26	AA33	MEM_DATA<26>	P32	DDR_DQS_5
DDR_DATA_27	AB36	MEM_DATA<27>	N29	DDR_DQS_6
DDR_DATA_28	AB35	MEM_DATA<28>	L32	DDR_DQS_7
DDR_DATA_29	AC36	MEM_DATA<29>		
DDR_DATA_30	AA32	MEM_DATA<30>	AJ33	DDR_DM_0
DDR_DATA_31	AB33	MEM_DATA<31>	AH33	DDR_DM_1
DDR_DATA_32	V36	MEM_DATA<32>	AD33	DDR_DM_2
DDR_DATA_33	U33	MEM_DATA<33>	AC35	DDR_DM_3
DDR_DATA_34	U32	MEM_DATA<34>	T35	DDR_DM_4
DDR_DATA_35	V35	MEM_DATA<35>	T33	DDR_DM_5
DDR_DATA_36	T30	MEM_DATA<36>	N32	DDR_DM_6
DDR_DATA_37	U36	MEM_DATA<37>	L33	DDR_DM_7
DDR_DATA_38	U35	MEM_DATA<38>		
DDR_DATA_39	T36	MEM_DATA<39>	L29	DDRRAS
DDR_DATA_40	P33	MEM_DATA<40>	H32	DDRCAS
DDR_DATA_41	R30	MEM_DATA<41>	K30	DDRWE
DDR_DATA_42	P35	MEM_DATA<42>	AN35	DDRCKE0
DDR_DATA_43	P36	MEM_DATA<43>	AM35	DDRCKE1
DDR_DATA_44	R36	MEM_DATA<44>	AM36	DDRCKE2
DDR_DATA_45	R35	MEM_DATA<45>	AL36	DDRCKE3
DDR_DATA_46	R33	MEM_DATA<46>		
DDR_DATA_47	R32	MEM_DATA<47>	AB32	DDR_SELHI_0
DDR_DATA_48	N35	MEM_DATA<48>	AE29	DDR_SELHI_1
DDR_DATA_49	M36	MEM_DATA<49>	N30	DDR_SELLO_0
DDR_DATA_50	L35	MEM_DATA<50>	T32	DDR_SELLO_1
DDR_DATA_51	M35	MEM_DATA<51>		
DDR_DATA_52	M33	MEM_DATA<52>	Y32	DDR_MCLK_0_P
DDR_DATA_53	L36	MEM_DATA<53>	Y33	DDR_MCLK_0_N
DDR_DATA_54	N33	MEM_DATA<54>	Y35	DDR_MCLK_1_P
DDR_DATA_55	M30	MEM_DATA<55>	Y36	DDR_MCLK_1_N
DDR_DATA_56	J32	MEM_DATA<56>	Y30	DDR_MCLK_2_P
DDR_DATA_57	J33	MEM_DATA<57>	W30	DDR_MCLK_2_N
DDR_DATA_58	J35	MEM_DATA<58>	W32	DDR_MCLK_3_P
DDR_DATA_59	K32	MEM_DATA<59>	W33	DDR_MCLK_3_N
DDR_DATA_60	K33	MEM_DATA<60>	V33	DDR_MCLK_4_P
DDR_DATA_61	J36	MEM_DATA<61>	V32	DDR_MCLK_4_N
DDR_DATA_62	K36	MEM_DATA<62>	W35	DDR_MCLK_5_P
DDR_DATA_63	K35	MEM_DATA<63>	W36	DDR_MCLK_5_N
			AA22	DDR_REF
			Y22	DDR_VREF_0
			T22	DDR_VREF_1

DDR MEMORY INTERFACE

MEM_ADDR<10>
MEM_ADDR<11>
MEM_ADDR<12>
MEM_BA<0>
MEM_BA<1>
MEM_CS_L<0> '0' & '1' GO TO SLOT A
MEM_CS_L<1> '2' & '3' GO TO SLOT B
MEM_CS_L<2>
MEM_CS_L<3>
MEM_DQS<0>
MEM_DQS<1>
MEM_DQS<2>
MEM_DQS<3>
MEM_DQS<4>
MEM_DQS<5>
MEM_DQS<6>
MEM_DQS<7>
MEM_DQM<0>
MEM_DQM<1>
MEM_DQM<2>
MEM_DQM<3>
MEM_DQM<4>
MEM_DQM<5>
MEM_DQM<6>
MEM_DQM<7>
MEM_RAS_L
MEM_CAS_L
MEM_WE_L
MEM_CKE<0> '0' & '1' GO TO SLOT A
MEM_CKE<1> '2' & '3' GO TO SLOT B
MEM_CKE<2>
MEM_CKE<3>
MEM_MUXSEL_H<0> '0'S ARE SAME POLARITY (ACTIVE-LO)
MEM_MUXSEL_H<1> '1'S ARE SAME POLARITY (ACTIVE-HI)
MEM_MUXSEL_L<0>
MEM_MUXSEL_L<1>
SYSCLK_DDRCLK_A0_UF
SYSCLK_DDRCLK_A0_L_UF
SYSCLK_DDRCLK_A1_UF
SYSCLK_DDRCLK_A1_L_UF
INT_DDRCLK2_P_TP
INT_DDRCLK2_N_TP
SYSCLK_DDRCLK_B0_UF
SYSCLK_DDRCLK_B0_L_UF
SYSCLK_DDRCLK_B1_UF
SYSCLK_DDRCLK_B1_L_UF
INT_DDRCLK5_P_TP
INT_DDRCLK5_N_TP
INT_MEM_REF_H
INT_MEM_VREF

MEM_VREF

+2_5V_INTREPID
R198 10K 1% 1/16W MF 402
R191 10K 1% 1/16W MF 402
C245 0.1UF 20% 10V CERM 402
INT_MEM_VREF

CLOCKS

SYSCLK_DDRCLK_A1_UF	RP33 22	4 5	SYSCLK_DDRCLK_A1
SYSCLK_DDRCLK_A1_L_UF	RP33 22	3 6	SYSCLK_DDRCLK_A1_L
SYSCLK_DDRCLK_A0_UF	RP34 22	1 8	SYSCLK_DDRCLK_A0
SYSCLK_DDRCLK_A0_L_UF	RP34 22	2 7	SYSCLK_DDRCLK_A0_L
SYSCLK_DDRCLK_B1_UF	RP33 22	2 7	SYSCLK_DDRCLK_B1
SYSCLK_DDRCLK_B1_L_UF	RP33 22	1 8	SYSCLK_DDRCLK_B1_L
SYSCLK_DDRCLK_B0_UF	RP34 22	3 6	SYSCLK_DDRCLK_B0
SYSCLK_DDRCLK_B0_L_UF	RP34 22	4 5	SYSCLK_DDRCLK_B0_L

CS

MEM_CS_L<0>	RP36 22	1 8	RAM_CS_L<0>
MEM_CS_L<1>	RP36 22	3 6	RAM_CS_L<1>
MEM_CS_L<2>	RP35 22	4 5	RAM_CS_L<2>
MEM_CS_L<3>	RP35 22	2 7	RAM_CS_L<3>

CKE

MEM_CKE<0>	RP36 22	2 7	RAM_CKE<0>
MEM_CKE<1>	RP36 22	4 5	RAM_CKE<1>
MEM_CKE<2>	RP35 22	1 8	RAM_CKE<2>
MEM_CKE<3>	RP35 22	3 6	RAM_CKE<3>

ADDR

MEM_ADDR<0>	RP31 22	1 8	RAM_ADDR<0>
MEM_ADDR<1>	RP25 22	1 8	RAM_ADDR<1>
MEM_ADDR<2>	RP25 22	2 7	RAM_ADDR<2>
MEM_ADDR<3>	RP25 22	4 5	RAM_ADDR<3>
MEM_ADDR<4>	RP25 22	3 6	RAM_ADDR<4>
MEM_ADDR<5>	RP30 22	1 8	RAM_ADDR<5>
MEM_ADDR<6>	RP30 22	2 7	RAM_ADDR<6>
MEM_ADDR<7>	RP31 22	3 6	RAM_ADDR<7>
MEM_ADDR<8>	RP30 22	4 5	RAM_ADDR<8>
MEM_ADDR<9>	RP31 22	2 7	RAM_ADDR<9>
MEM_ADDR<10>	RP31 22	4 5	RAM_ADDR<10>
MEM_ADDR<11>	RP26 22	4 5	RAM_ADDR<11>
MEM_ADDR<12>	RP30 22	3 6	RAM_ADDR<12>

BA

MEM_BA<0>	RP26 22	2 7	RAM_BA<0>
MEM_BA<1>	RP26 22	1 8	RAM_BA<1>

CNTL

MEM_WE_L	RP26 22	3 6	RAM_WE_L
MEM_CAS_L	R250 22	1 2	RAM_CAS_L
MEM_RAS_L	R238 22	1 2	RAM_RAS_L

1MB BOOT ROM

+3V_MAIN
C460 2.2UF 20% 10V CERM 805
C470 0.1UF 20% 10V CERM 402
C479 0.1UF 20% 10V CERM 402

U17
FEPR-1MX8
3.3V
TSOP

PCI_AD<0>	21	A0	DQ0 25 PCI_AD<24>
PCI_AD<1>	20	A1	DQ1 26 PCI_AD<25>
PCI_AD<2>	19	A2	DQ2 27 PCI_AD<26>
PCI_AD<3>	18	A3	DQ3 28 PCI_AD<27>
PCI_AD<4>	17	A4	DQ4 32 PCI_AD<28>
PCI_AD<5>	16	A5	DQ5 33 PCI_AD<29>
PCI_AD<6>	15	A6	DQ6 34 PCI_AD<30>
PCI_AD<7>	14	A7	DQ7 35 PCI_AD<31>
PCI_AD<8>	8	A8	
PCI_AD<9>	7	A9	
PCI_AD<10>	36	A10	
PCI_AD<11>	6	A11	
PCI_AD<12>	5	A12	
PCI_AD<13>	4	A13	
PCI_AD<14>	3	A14	
PCI_AD<15>	2	A15	
PCI_AD<16>	1	A16	
PCI_AD<17>	40	A17	
PCI_AD<18>	13	A18	
PCI_AD<19>	37	A19	
PCI_AD<20>	38	A20	
ROM_ONBOARD_CS_L	22	CE	
ROM_OE_L	24	OE	
ROM_RW_L	9	WE	
ROM_WP_L	12	WP	
INT_RESET_L	10	PWD	
		GND	23 39

VPP 11, VCC 30, 31

+3V_MAIN
R338 10K 5% 1/16W MF 402
R386 10K 5% 1/16W MF 402
R357 1K 5% 1/16W MF 402
ROM_CS_L

OVERRIDE ROM MODULE
INTERCEPTS ROM CHIP SELECT

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S1556	1	IC,BOOTROM,Q41B	U17	CRITICAL	?

PULL-DOWN RESISTORS TO ENSURE
CKE STAYS LOW AFTER INTREPID
2.5V I/O SHUTS OFF

RAM_CKE<0>
RAM_CKE<1>
RAM_CKE<2>
RAM_CKE<3>
R500 10K 5% 1/16W MF 402
R439 10K 5% 1/16W MF 402
R409 10K 5% 1/16W MF 402
R387 10K 5% 1/16W MF 402

INT - DDR/BOOTROM

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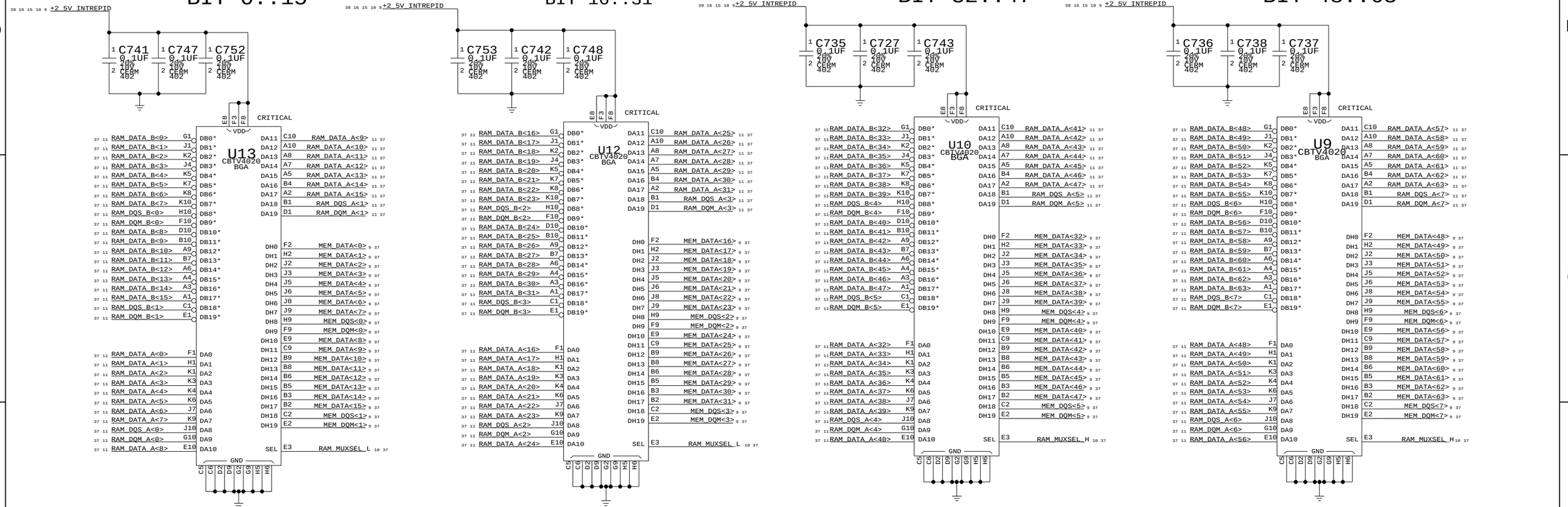
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 9 OF 45	



SEL = LOW; HOST = B PORT; A PORT = 100OHM TO GND
SEL = HIGH; HOST = A PORT; B PORT = 100OHM TO GND
MEM_MUXSEL_H<0> AND MEM_MUXSEL_L<0> ARE ACTIVE LOW
MEM_MUXSEL_H<1> AND MEM_MUXSEL_L<1> ARE ACTIVE HIGH

ADDED 0 OHM RESISTORS IN CASE POLARITY IS WRONG

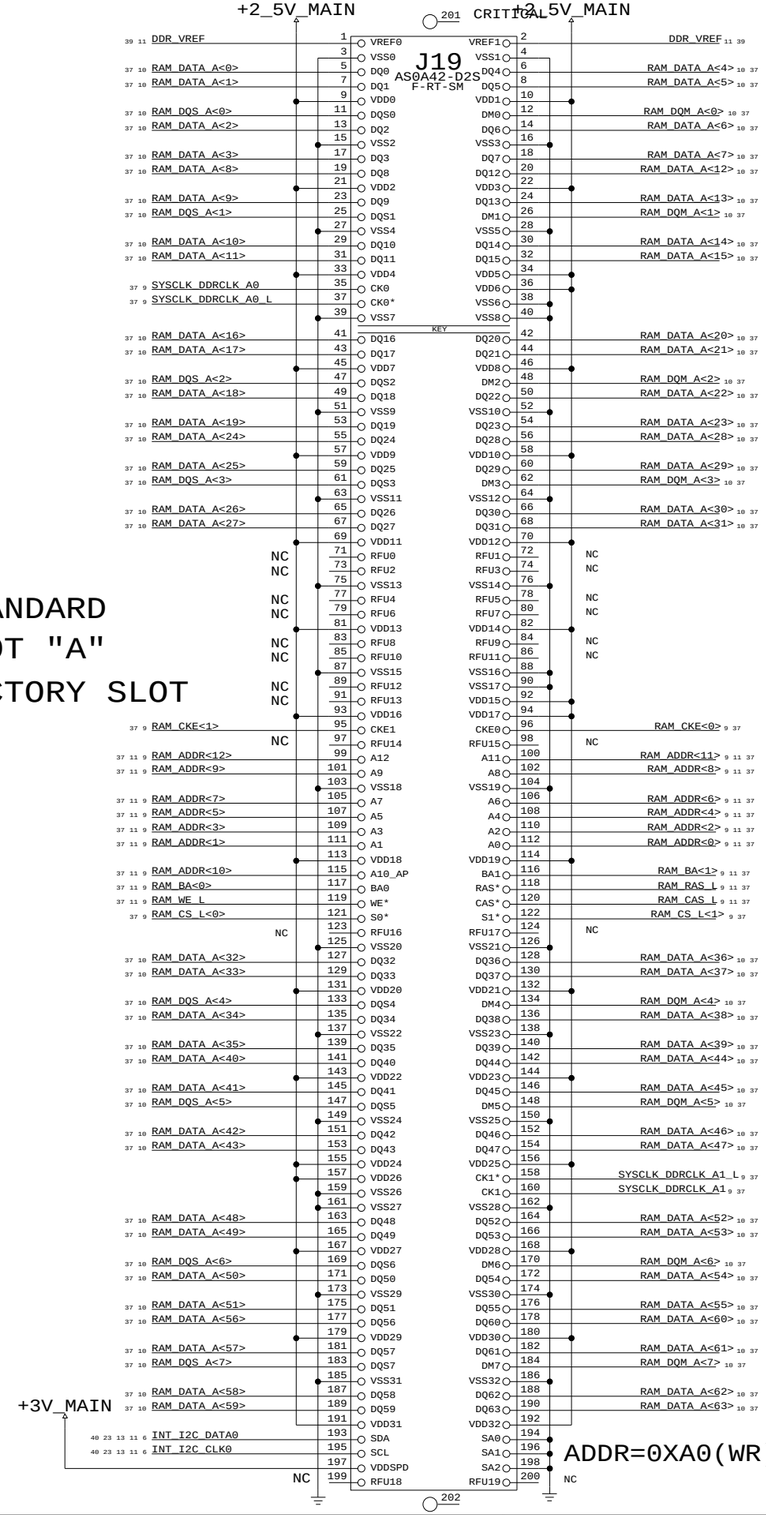
16BIT 2:1 DDR MUXES

APPLE COMPUTER INC.

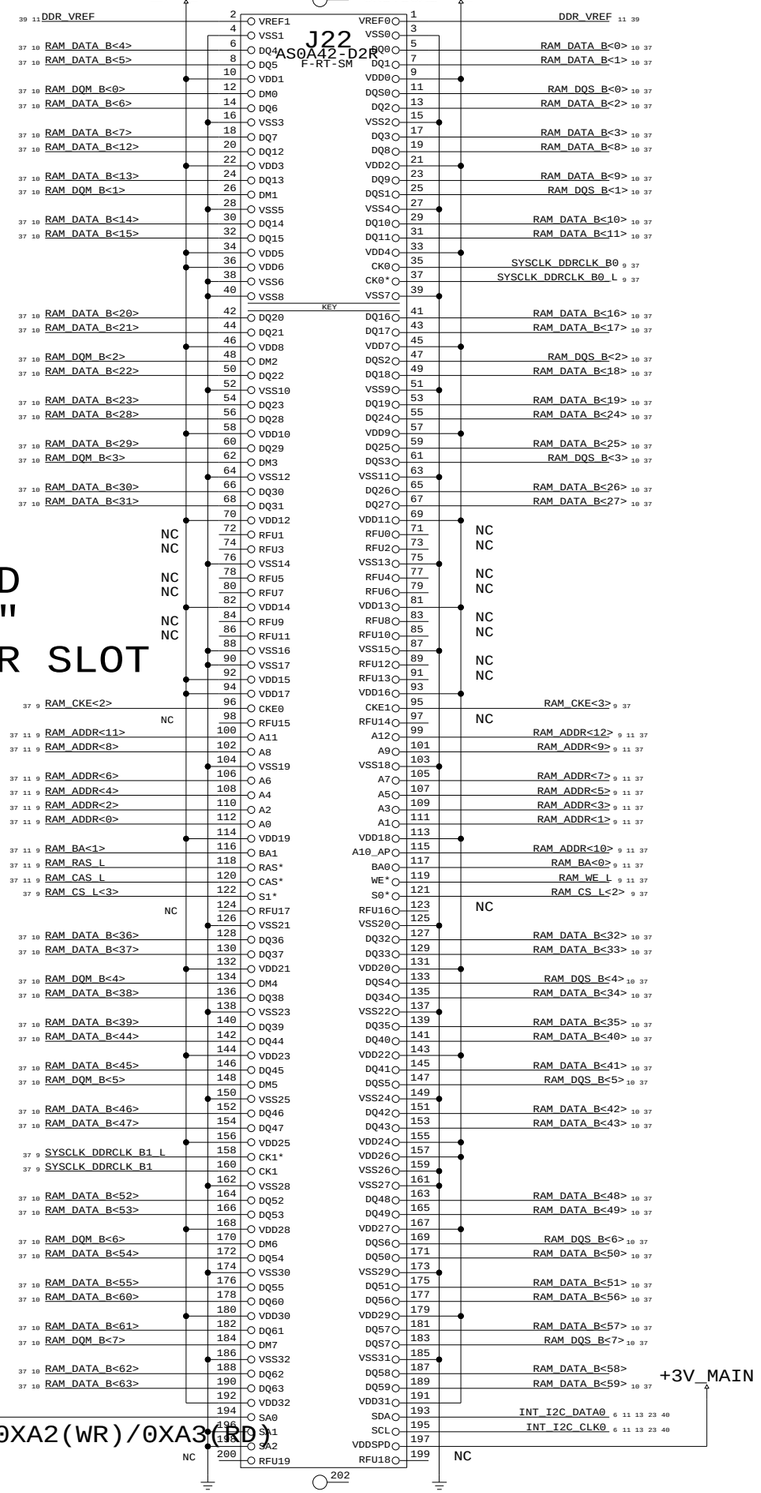
SIZE	DRAWING NUMBER	REV.
D	051-6694	C

SCALE NONE

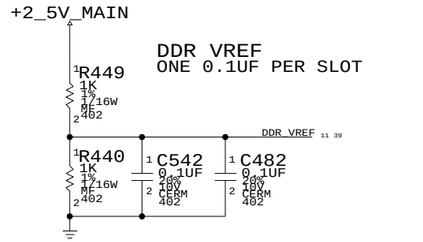
SHT 10 OF 45

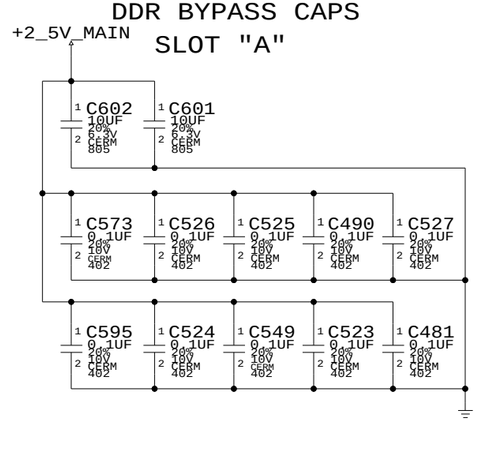


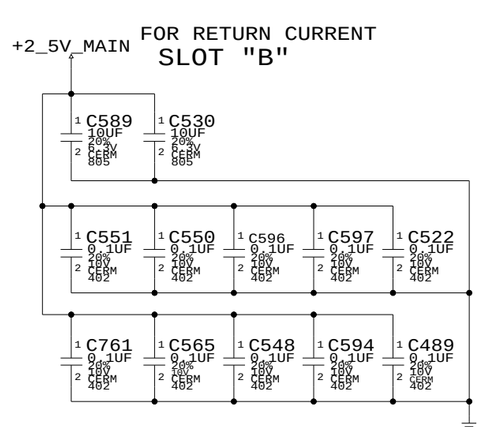
STANDARD
SLOT "A"
FACTORY SLOT



REVERSED
SLOT "B"
CUSTOMER SLOT







DDR SODIMM CONNS

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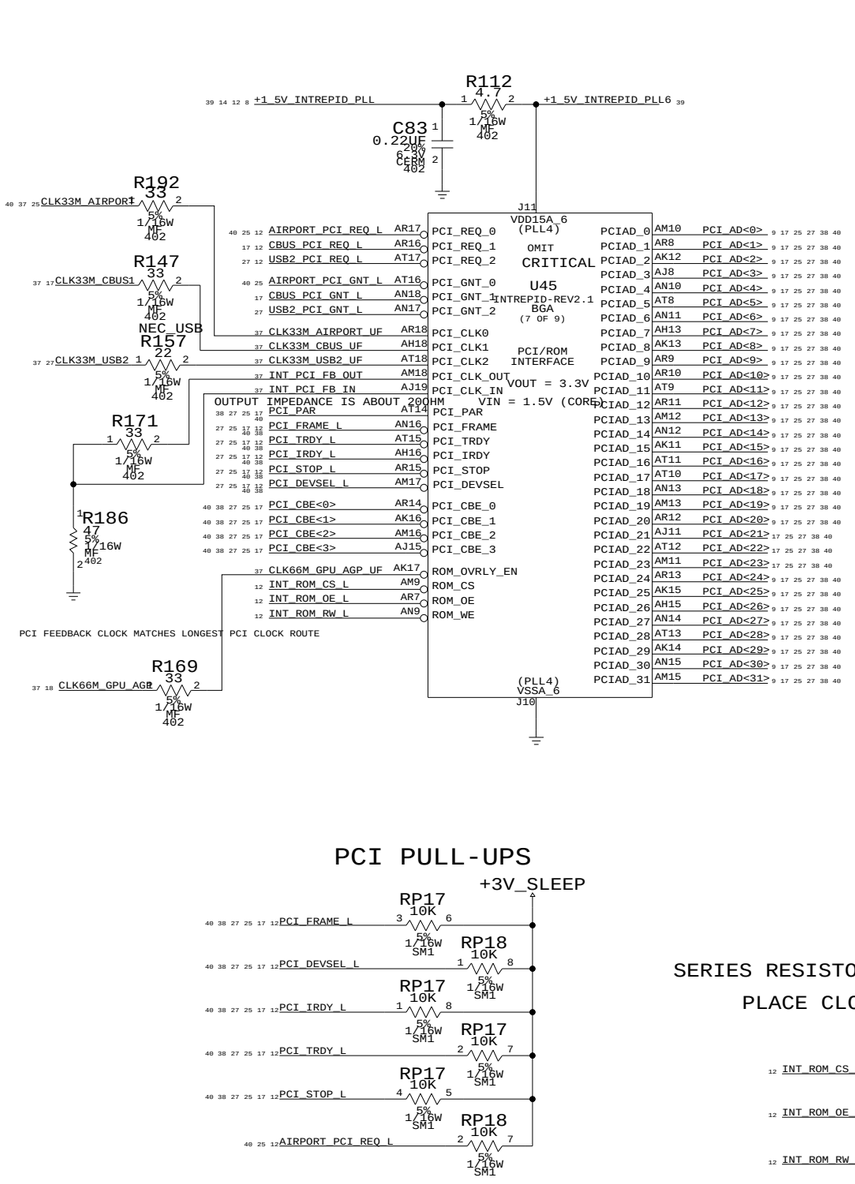
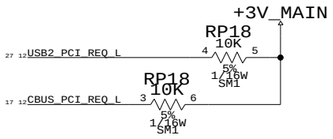
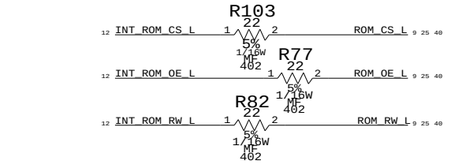
APPLE COMPUTER INC.

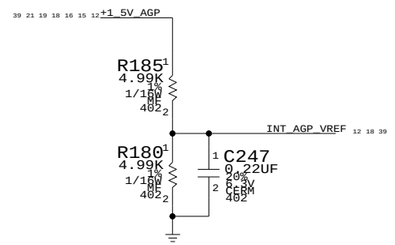
SIZE	DRAWING NUMBER	REV.
D	051-6694	C

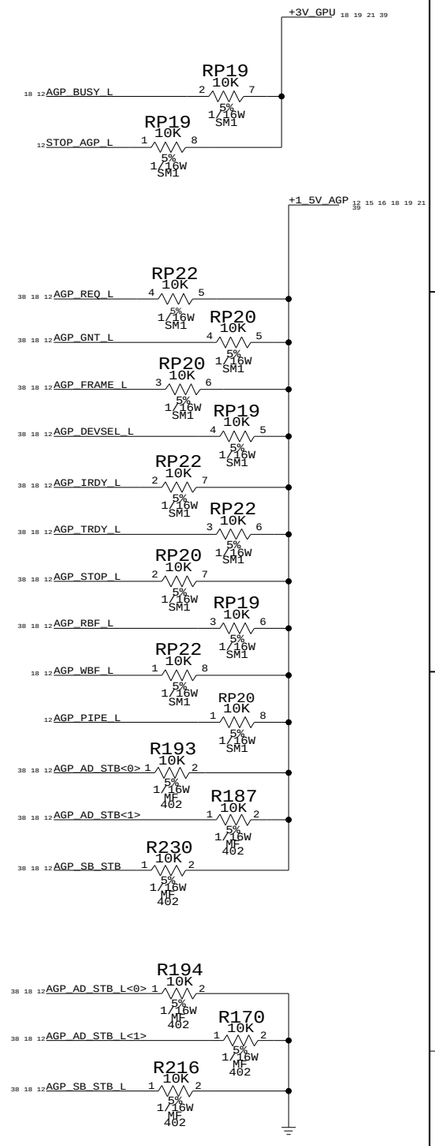
SCALE: NONE
SHT 11 OF 45











INTREPID AGP/PCI

APPLE COMPUTER INC.

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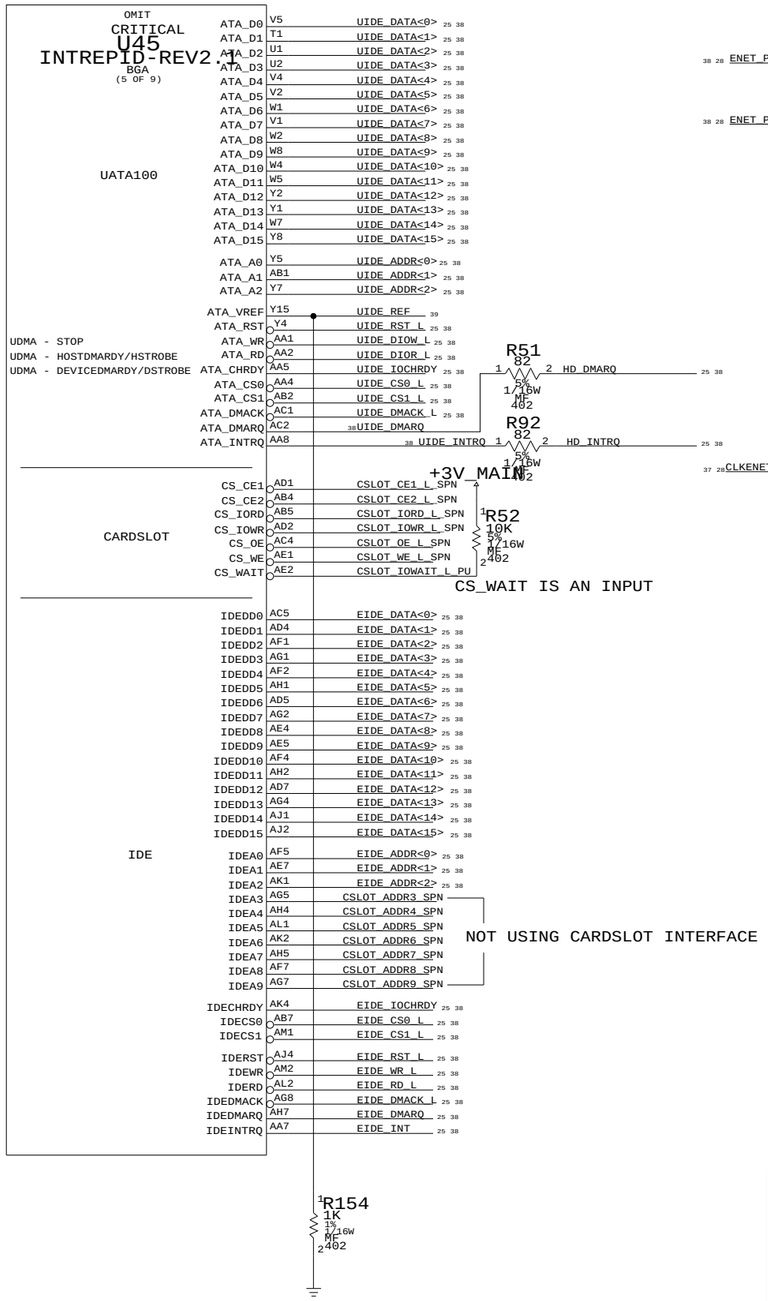

JTG_RSTN_L	TST_TEI_H	JTG_TDO_H (I/O)	JTG_TDI_H (I/O)	TST_PLLEN_H	ANALYZER_CLK	DESCRIPTION
1	X	X	X	X	X	JTAG MODE
0	0	EXTPLL SHUTDOWN (OUTPUT)	DDR_ TPDENABLE (OUTPUT)	0	(OUTPUT)	NORMAL OPERATION
0	0	(OUTPUT)	0(I)	1	SELECTED PLL OUTPUTS	VIEW PLLS (SOFTWARE)
0	0	HWPLL_ TESTSEL5 (INPUT)	1(I)	1	SELECTED PLL OUTPUTS	VIEW PLLS (HARDWARE)
0	1	0(I)	0(I)	MEMWE	SYNC/MEM DATA BYPASS	ATPG NORMAL
0	1	0(I)	1(I)	0	X(I)	ATPG IDDQ
0	1	0(I)	1(I)	1	X(I)	TEST TRI-STATE
0	1	1(I)	0(I)	0	X(I)	FUNCTIONAL TEST WITHOUT POSTSCALAR BYPASS
0	1	1(I)	0(I)	1	X(I)	FUNCTIONAL TEST WITH POSTSCALAR BYPASS
0	1	1(I)	1(I)	X	X(I)	FUNCTIONAL TEST IDDQ

BUS / ADDR	I2C-0 (MAIN)	I2C-1 (MAIN)	I2C-2 (SLEEP)	PMU (SLEEP)
A0-WR A1-RD	RAM - STANDARD J20 - PG 12	N/A	N/A	N/A
A2-WR A3-RD	RAM - REVERSED J23 - PG 12	N/A	N/A	N/A
AC-WR AD-RD	N/A	N/A	DASH MODEM J9 - PG 25	N/A
AE-WR AF-RD	BOOTBANG E2PROM U37 - PG 23	N/A	N/A	N/A
84-WR 85-RD	LMU U36 - PG 23	N/A	N/A	N/A
58-WR 59-RD	N/A	FAN CONTROLLER U3 - PG 24	N/A	N/A
6A-WR 6B-RD	N/A	N/A	SNAPPER SOUND J12 - PG 24	N/A
D0-WR D1-RD	N/A	CLOCK SLEW SSCG U56 - PG 15	N/A	N/A
B0-WR B1-RD	N/A	MMM	N/A	N/A

ADDR LSB INDICATES READ (‘1’) OR WRITE (‘0’) MODES

INT - ENET/FW/UATA EIDE/I2C

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USB PORT ASSIGNMENTS

PORT A - RIGHT USB 1

PORT B - UNUSE

PORT C - LEFT USB

PORT D - MODEM

PORT E - BLUETOOTH

PORT F - TPAD

R89,R80 NEED PLACE NEAR TPAD CONNECTOR

USB POWER FAULT SIGNALS

NO STUFF

CRITICAL

PLACE R68 CLOSE TO INTREPID SIDE
OTHERWISE A LOT OF OVERSHOOT/UNDERSHOOT

CRYSTAL LOAD CAPACITANCE IS 16PF

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
359S0074	359S0086	?	U42	ALT FOR NEW SCREEN

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0090	1	XTAL,CER,LOW PROF,18,432MHZ,8X4.5MM,SMD	Y1	CRITICAL	?

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
116S1104	1	RES,METAL FILM,10 K OHM,5,1/16W,0402,SM	R100	NO_SSCG

HWPLL_TESTMUXSEL	SIGNAL NAME
5	MOD_BITCLK_B_H
4	MOD_CLKOUT_B_H
3	MOD_DTO_B_H
2	MOD_SYNC_B_H
1	MOD_DTI_B_H
0	JTG_TDO_H

INT - USB/GPIOS/I2S

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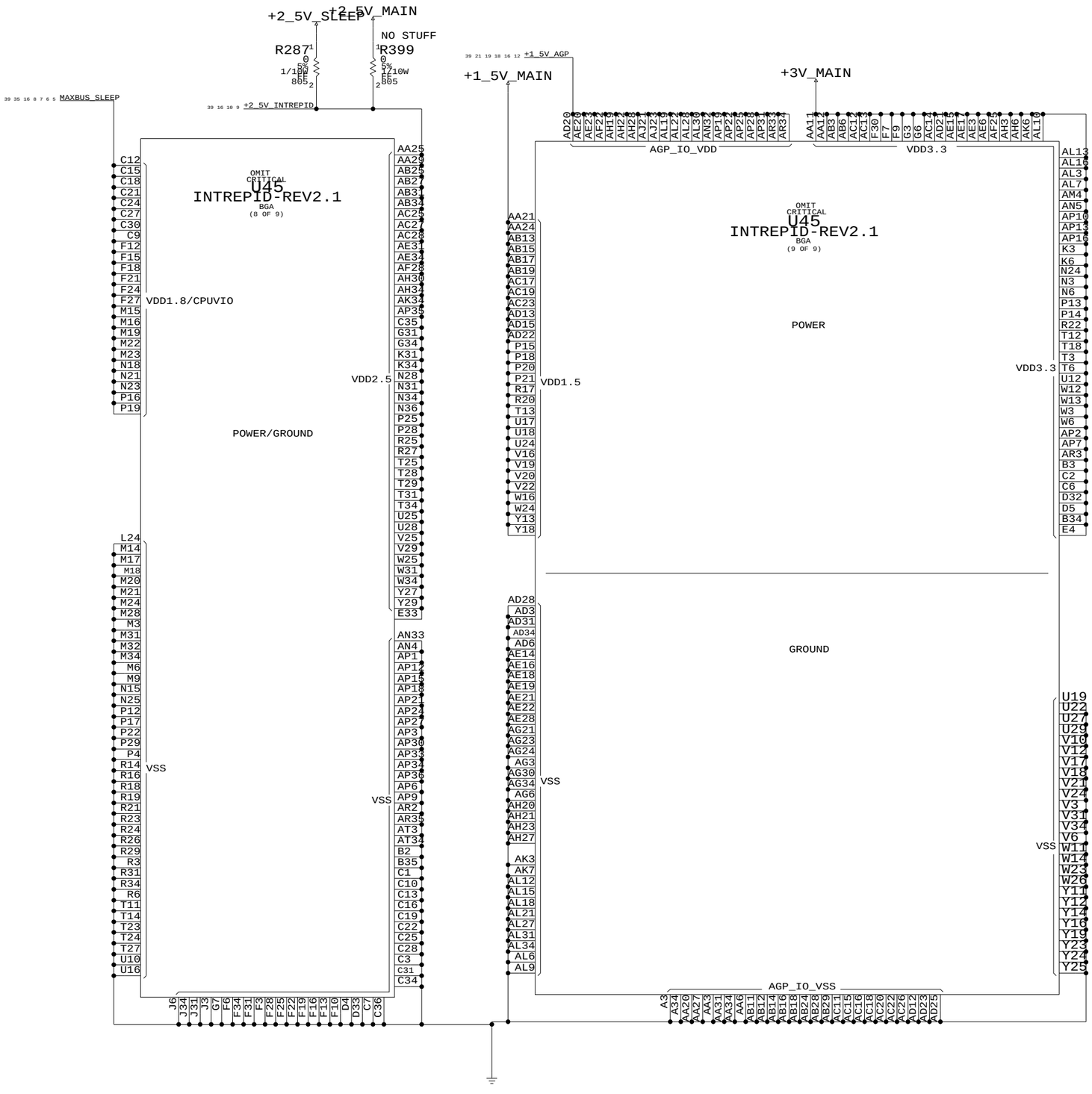

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S0305	1	IC,ASIC,INTREPID,REV2.1,974BGA,FAST	U45	CRITICAL	?

Intrepid Power

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NONE	15	45

35 15 8 7 6 5 39 MAXBUS SLEEP

INTREPID MAXBUS DECOUPLING

24 Balls
4 X 10UF (0805)
32 X 0.22UF (0402)

C204 10UF 20% 6.3V CERM 805 | C348 10UF 20% 6.3V CERM 805 | C239 0.22UF 20% 6.3V CERM 402 | C240 0.22UF 20% 6.3V CERM 402 | C350 0.22UF 20% 6.3V CERM 402 | C312 0.22UF 20% 6.3V CERM 402 | C176 0.22UF 20% 6.3V CERM 402 | C288 0.22UF 20% 6.3V CERM 402 | C313 0.22UF 20% 6.3V CERM 402 | C94 0.22UF 20% 6.3V CERM 402 | C286 0.22UF 20% 6.3V CERM 402 | C158 0.22UF 20% 6.3V CERM 402

C236 10UF 20% 6.3V CERM 805 | C196 10UF 20% 6.3V CERM 805 | C174 0.22UF 20% 6.3V CERM 402 | C206 0.22UF 20% 6.3V CERM 402 | C259 0.22UF 20% 6.3V CERM 402 | C237 0.22UF 20% 6.3V CERM 402 | C238 0.22UF 20% 6.3V CERM 402 | C95 0.22UF 20% 6.3V CERM 402 | C117 0.22UF 20% 6.3V CERM 402 | C241 0.22UF 20% 6.3V CERM 402 | C260 0.22UF 20% 6.3V CERM 402 | C314 0.22UF 20% 6.3V CERM 402

C173 0.22UF 20% 6.3V CERM 402 | C171 0.22UF 20% 6.3V CERM 402 | C175 0.22UF 20% 6.3V CERM 402 | C226 0.22UF 20% 6.3V CERM 402 | C172 0.22UF 20% 6.3V CERM 402 | C207 0.22UF 20% 6.3V CERM 402 | C118 0.22UF 20% 6.3V CERM 402 | C287 0.22UF 20% 6.3V CERM 402 | C119 0.22UF 20% 6.3V CERM 402 | C349 0.22UF 20% 6.3V CERM 402

C205 0.22UF 20% 6.3V CERM 402 | C209 0.22UF 20% 6.3V CERM 402

39 21 19 18 15 12 +1.5V AGP

INTREPID AGP I/O DECOUPLING

21 Balls
4 X 10UF (0805)
24 X 0.22UF (0402)

C371 10UF 20% 6.3V CERM 805 | C231 10UF 20% 6.3V CERM 805 | C356 0.22UF 20% 6.3V CERM 402 | C297 0.22UF 20% 6.3V CERM 402 | C268 0.22UF 20% 6.3V CERM 402 | C217 0.22UF 20% 6.3V CERM 402 | C355 0.22UF 20% 6.3V CERM 402 | C267 0.22UF 20% 6.3V CERM 402 | C250 0.22UF 20% 6.3V CERM 402 | C298 0.22UF 20% 6.3V CERM 402 | C377 0.22UF 20% 6.3V CERM 402 | C216 0.22UF 20% 6.3V CERM 402

C281 10UF 20% 6.3V CERM 805 | C394 10UF 20% 6.3V CERM 805 | C228 0.22UF 20% 6.3V CERM 402 | C230 0.22UF 20% 6.3V CERM 402 | C265 0.22UF 20% 6.3V CERM 402 | C378 0.22UF 20% 6.3V CERM 402 | C357 0.22UF 20% 6.3V CERM 402 | C229 0.22UF 20% 6.3V CERM 402 | C325 0.22UF 20% 6.3V CERM 402 | C393 0.22UF 20% 6.3V CERM 402 | C324 0.22UF 20% 6.3V CERM 402 | C323 0.22UF 20% 6.3V CERM 402

C251 0.22UF 20% 6.3V CERM 402 | C266 0.22UF 20% 6.3V CERM 402 | C249 0.22UF 20% 6.3V CERM 402

39 15 10 9 +2.5V INTREPID

INTREPID DDR DECOUPLING

44 Balls
4 X 10UF (0805)
51 X 0.22UF (0402)

C422 10UF 20% 6.3V CERM 805 | C417 10UF 20% 6.3V CERM 805 | C407 0.22UF 20% 6.3V CERM 402 | C391 0.22UF 20% 6.3V CERM 402 | C310 0.22UF 20% 6.3V CERM 402 | C317 0.22UF 20% 6.3V CERM 402 | C480 0.22UF 20% 6.3V CERM 402 | C390 0.22UF 20% 6.3V CERM 402 | C370 0.22UF 20% 6.3V CERM 402 | C320 0.22UF 20% 6.3V CERM 402 | C365 0.22UF 20% 6.3V CERM 402 | C366 0.22UF 20% 6.3V CERM 402

C418 10UF 20% 6.3V CERM 805 | C423 10UF 20% 6.3V CERM 805 | C367 0.22UF 20% 6.3V CERM 402 | C292 0.22UF 20% 6.3V CERM 402 | C295 0.22UF 20% 6.3V CERM 402 | C403 0.22UF 20% 6.3V CERM 402 | C291 0.22UF 20% 6.3V CERM 402 | C352 0.22UF 20% 6.3V CERM 402 | C322 0.22UF 20% 6.3V CERM 402 | C392 0.22UF 20% 6.3V CERM 402 | C385 0.22UF 20% 6.3V CERM 402 | C376 0.22UF 20% 6.3V CERM 402

C321 0.22UF 20% 6.3V CERM 402 | C318 0.22UF 20% 6.3V CERM 402 | C399 0.22UF 20% 6.3V CERM 402 | C410 0.22UF 20% 6.3V CERM 402 | C335 0.22UF 20% 6.3V CERM 402 | C369 0.22UF 20% 6.3V CERM 402 | C384 0.22UF 20% 6.3V CERM 402 | C294 0.22UF 20% 6.3V CERM 402 | C406 0.22UF 20% 6.3V CERM 402 | C405 0.22UF 20% 6.3V CERM 402

C404 0.22UF 20% 6.3V CERM 402 | C400 0.22UF 20% 6.3V CERM 402 | C386 0.22UF 20% 6.3V CERM 402 | C289 0.22UF 20% 6.3V CERM 402 | C387 0.22UF 20% 6.3V CERM 402 | C401 0.22UF 20% 6.3V CERM 402 | C354 0.22UF 20% 6.3V CERM 402 | C389 0.22UF 20% 6.3V CERM 402 | C309 0.22UF 20% 6.3V CERM 402 | C398 0.22UF 20% 6.3V CERM 402

C337 0.22UF 20% 6.3V CERM 402 | C290 0.22UF 20% 6.3V CERM 402 | C402 0.22UF 20% 6.3V CERM 402 | C397 0.22UF 20% 6.3V CERM 402 | C368 0.22UF 20% 6.3V CERM 402 | C334 0.22UF 20% 6.3V CERM 402 | C388 0.22UF 20% 6.3V CERM 402 | C293 0.22UF 20% 6.3V CERM 402 | C319 0.22UF 20% 6.3V CERM 402 | C336 0.22UF 20% 6.3V CERM 402

C316 0.22UF 20% 6.3V CERM 402

+1_5V_MAIN

INTREPID CORE DECOUPLING

30 Balls
4 X 10UF (0805)
29 X 0.22UF (0402)

C128 10UF 20% 6.3V CERM 805 | C101 10UF 20% 6.3V CERM 805 | C147 0.22UF 20% 6.3V CERM 402 | C243 0.22UF 20% 6.3V CERM 402 | C262 0.22UF 20% 6.3V CERM 402 | C242 0.22UF 20% 6.3V CERM 402 | C227 0.22UF 20% 6.3V CERM 402 | C181 0.22UF 20% 6.3V CERM 402 | C142 0.22UF 20% 6.3V CERM 402 | C215 0.22UF 20% 6.3V CERM 402 | C278 0.22UF 20% 6.3V CERM 402 | C264 0.22UF 20% 6.3V CERM 402

C157 10UF 20% 6.3V CERM 805 | C315 10UF 20% 6.3V CERM 805 | C244 0.22UF 20% 6.3V CERM 402 | C212 0.22UF 20% 6.3V CERM 402 | C178 0.22UF 20% 6.3V CERM 402 | C179 0.22UF 20% 6.3V CERM 402 | C177 0.22UF 20% 6.3V CERM 402 | C159 0.22UF 20% 6.3V CERM 402 | C161 0.22UF 20% 6.3V CERM 402 | C162 0.22UF 20% 6.3V CERM 402 | C280 0.22UF 20% 6.3V CERM 402 | C279 0.22UF 20% 6.3V CERM 402

C144 0.22UF 20% 6.3V CERM 402 | C246 0.22UF 20% 6.3V CERM 402 | C211 0.22UF 20% 6.3V CERM 402 | C263 0.22UF 20% 6.3V CERM 402 | C180 0.22UF 20% 6.3V CERM 402 | C213 0.22UF 20% 6.3V CERM 402 | C197 0.22UF 20% 6.3V CERM 402 | C208 0.22UF 20% 6.3V CERM 402 | C214 0.22UF 20% 6.3V CERM 402

+3V_MAIN

INTREPID 3.3V DECOUPLING

57 Balls
4 X 10UF (0805)
72 X 0.22UF (0402)

C164 10UF 20% 6.3V CERM 805 | C395 10UF 20% 6.3V CERM 805 | C375 0.22UF 20% 6.3V CERM 402 | C351 0.22UF 20% 6.3V CERM 402 | C53 0.22UF 20% 6.3V CERM 402 | C42 0.22UF 20% 6.3V CERM 402 | C21 0.22UF 20% 6.3V CERM 402 | C185 0.22UF 20% 6.3V CERM 402 | C31 0.22UF 20% 6.3V CERM 402 | C143 0.22UF 20% 6.3V CERM 402 | C123 0.22UF 20% 6.3V CERM 402 | C121 0.22UF 20% 6.3V CERM 402

C10 10UF 20% 6.3V CERM 805 | C9 10UF 20% 6.3V CERM 805 | C33 0.22UF 20% 6.3V CERM 402 | C184 0.22UF 20% 6.3V CERM 402 | C43 0.22UF 20% 6.3V CERM 402 | C35 0.22UF 20% 6.3V CERM 402 | C261 0.22UF 20% 6.3V CERM 402 | C60 0.22UF 20% 6.3V CERM 402 | C52 0.22UF 20% 6.3V CERM 402 | C199 0.22UF 20% 6.3V CERM 402 | C57 0.22UF 20% 6.3V CERM 402 | C19 0.22UF 20% 6.3V CERM 402

C16 0.22UF 20% 6.3V CERM 402 | C108 0.22UF 20% 6.3V CERM 402 | C55 0.22UF 20% 6.3V CERM 402 | C32 0.22UF 20% 6.3V CERM 402 | C125 0.22UF 20% 6.3V CERM 402 | C45 0.22UF 20% 6.3V CERM 402 | C76 0.22UF 20% 6.3V CERM 402 | C277 0.22UF 20% 6.3V CERM 402 | C28 0.22UF 20% 6.3V CERM 402 | C26 0.22UF 20% 6.3V CERM 402

C34 0.22UF 20% 6.3V CERM 402 | C23 0.22UF 20% 6.3V CERM 402 | C120 0.22UF 20% 6.3V CERM 402 | C146 0.22UF 20% 6.3V CERM 402 | C141 0.22UF 20% 6.3V CERM 402 | C30 0.22UF 20% 6.3V CERM 402 | C145 0.22UF 20% 6.3V CERM 402 | C96 0.22UF 20% 6.3V CERM 402 | C54 0.22UF 20% 6.3V CERM 402 | C50 0.22UF 20% 6.3V CERM 402

C75 0.22UF 20% 6.3V CERM 402 | C122 0.22UF 20% 6.3V CERM 402 | C51 0.22UF 20% 6.3V CERM 402 | C59 0.22UF 20% 6.3V CERM 402 | C163 0.22UF 20% 6.3V CERM 402 | C126 0.22UF 20% 6.3V CERM 402 | C98 0.22UF 20% 6.3V CERM 402 | C109 0.22UF 20% 6.3V CERM 402 | C56 0.22UF 20% 6.3V CERM 402 | C27 0.22UF 20% 6.3V CERM 402

C296 0.22UF 20% 6.3V CERM 402 | C248 0.22UF 20% 6.3V CERM 402 | C210 0.22UF 20% 6.3V CERM 402 | C58 0.22UF 20% 6.3V CERM 402 | C22 0.22UF 20% 6.3V CERM 402 | C20 0.22UF 20% 6.3V CERM 402 | C61 0.22UF 20% 6.3V CERM 402 | C44 0.22UF 20% 6.3V CERM 402 | C29 0.22UF 20% 6.3V CERM 402 | C24 0.22UF 20% 6.3V CERM 402

C183 0.22UF 20% 6.3V CERM 402 | C18 0.22UF 20% 6.3V CERM 402 | C49 0.22UF 20% 6.3V CERM 402 | C36 0.22UF 20% 6.3V CERM 402 | C17 0.22UF 20% 6.3V CERM 402 | C99 0.22UF 20% 6.3V CERM 402 | C396 0.22UF 20% 6.3V CERM 402 | C124 0.22UF 20% 6.3V CERM 402 | C127 0.22UF 20% 6.3V CERM 402 | C100 0.22UF 20% 6.3V CERM 402

Intrepid Decoupling

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PCI1510 PULL-UPS

+3V_MAIN

R757 10K 5% 1/16W MF 402 — CBUS_PCI_PERR_L 17
R756 10K 5% 1/16W MF 402 — CBUS_PCI_SERR_L 17
R753 10K 5% 1/16W MF 402 — CBUS_SUSPEND_PU 17

+3V_MAIN

C813 10UF 20% 6.3V CERM 805
C795 0.22UF 20% 6.3V CERM 402
C798 0.22UF 20% 6.3V CERM 402
C790 0.22UF 20% 6.3V CERM 402
C796 0.22UF 20% 6.3V CERM 402
C797 0.22UF 20% 6.3V CERM 402
C791 0.22UF 20% 6.3V CERM 402

R762 10K 5% 1/16W MF 402

+2_5V_MAIN

C789 0.22UF 20% 6.3V CERM 402

A7 C13 D5 E1 M1 N7 N11 — VCC

PCI1510_VR_EN_L D4

U26 PCI1510GGU BGA

NC H10	CLK_48_RSVD/NC	
PCI1510_VR_EN_L D4	VR_EN*	
L8	VR_PORT	
PCI_AD<0> 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	
PCI_CBE<0> K6	C/BE0*	
PCI_CBE<1> M3	C/BE1*	
PCI_CBE<2> J2	C/BE2*	
PCI_CBE<3> A1	C/BE3*	
PCI_PAR N1	PAR	
PCI_IRDY_L K1	IRDY	
CBUS_PCI_SERR_L L2	SERR	
CBUS_PCI_IDSEL F2	IDSEL	
CBUS_PCI_PERR_L K3	PERR	
PCI_FRAME_L J1	FRAME	
PCI_STOP_L L1	STOP	
PCI_TRDY_L J3	TRDY	
PCI_DEVSEL_L K2	DEVSEL	
CBUS_PCI_RESET_L G3	PRST	
CBUS_PCI_REQ_L C2	REQ	
CBUS_PCI_GNT_L C1	GNT	
CLK33M_CBUS G1	PCLK	
NC M9	SPKROUT	
NC M8	RI_OUT/PME	
CBUS_SUSPEND_PU N10	SUSPEND	
CBUS_INT_L K7	MFUNC0	
CBUS_MFUNC1_PD N9	MFUNC1	
CBUS_MFUNC2_PD L9	MFUNC2	
CBUS_MFUNC3_PD K10	MFUNC3	
CBUS_MFUNC4_PD M10	MFUNC4	
CBUS_MFUNC5_PD N12	MFUNC5	
CBUS_MFUNC6_PD L10	MFUNC6	
L11	GRST	
CRITICAL CLAMP FOR PC-CARD CLAMP FOR PCI VCCCB B11		
VCCP L3		
VCCD0* N13	CBUS_VCCD0_L	
VCCD1* L12	CBUS_VCCD1_L	
VPPD0 K9	CBUS_VPPD0	
VPPD1 M11	CBUS_VPPD1	
CD1*/CCD1* L13	CBUS_DET_1_L 17 40	
CD2*/CCD2* B5	CBUS_DET_2_L 17 40	
IORD*/CAD13 F12	CBUS_IORD_L 17	
IOWR*/CAD15 C11	CBUS_IOWR_L 17	
OE*/CAD11 G10	CBUS_OE_L 17	
CE1*/CC/BE0* H13	CBUS_CE1_L 17	
VS1*/CVS1 B2	CBUS_VS1 17	
VS2*/CVS2 A9	CBUS_VS2 17	
WE*/CGNT* D13	CBUS_WE_L 17	
RDY/IREQ*/CINT* A6	CBUS_READY 17	
RESET/CRST* D8	CBUS_RESET_L 17	
REG*/CC/BE3* A8	CBUS_REG_L 17	
BVD1/CSTSCHG/STSCHG*/RI* C6	CBUS_BVD1_L 17	
BVD2/SPKR*/CAUDIO D6	CBUS_BVD2_L 17	
INTEGRATED PULL-UP WP/IOIS16*/CCLKRUN* A5	CBUS_WP_L 17	
CE2/CAD10* G13	CBUS_CE2_L 17	
INPACK/CREQ* B8	CBUS_INPACK_L 17	
WAIT/CSERR* B6	CBUS_WAIT_L 17	
A0/CAD26 C7	CBUS_ADDR<0> 17	
A1/CAD25 D7	CBUS_ADDR<1> 17	
A2/CAD24 B7	CBUS_ADDR<2> 17	
A3/CAD23 D10	CBUS_ADDR<3> 17	
A4/CAD22 B12	CBUS_ADDR<4> 17	
A5/CAD21 C8	CBUS_ADDR<5> 17	
A6/CAD20 C9	CBUS_ADDR<6> 17	
A7/CAD18 A12	CBUS_ADDR<7> 17	
A8/CC/BE1* E11	CBUS_ADDR<8> 17	
A9/CAD14 F11	CBUS_ADDR<9> 17	
A10/CAD9 G11	CBUS_ADDR<10> 17	
A11/CAD12 G12	CBUS_ADDR<11> 17	
A12/CC/BE2* D9	CBUS_ADDR<12> 17	
A13/CPAR E12	CBUS_ADDR<13> 17	
A14/CPERR* D12	CBUS_ADDR<14> 17	
A15/CIRDY* C10	CBUS_ADDR<15> 17	
A16/CCLK B13	CBUS_ADDR_16_UF	
A17/CAD16 F10	CBUS_ADDR<17> 17	
A18/RSVD E13	CBUS_ADDR<18> 17	
A19/CBLOCK* A13	CBUS_ADDR<19> 17	
A20/CSTOP* E10	CBUS_ADDR<20> 17	
A21/CDEVSEL* D11	CBUS_ADDR<21> 17	
A22/CTRDY* C12	CBUS_ADDR<22> 17	
A23/CFRAME* A10	CBUS_ADDR<23> 17	
A24/CAD17 B10	CBUS_ADDR<24> 17	
A25/CAD19 B9	CBUS_ADDR<25> 17	
D0/CAD27 A4	CBUS_DATA<0> 17	
D1/CAD29 C4	CBUS_DATA<1> 17	
D2/RSVD A3	CBUS_DATA<2> 17	
D3/CAD0 K11	CBUS_DATA<3> 17	
D4/CAD1 K12	CBUS_DATA<4> 17	
D5/CAD3 J13	CBUS_DATA<5> 17	
D6/CAD5 J10	CBUS_DATA<6> 17	
D7/CAD7 H12	CBUS_DATA<7> 17	
D8/CAD28 C5	CBUS_DATA<8> 17	
D9/CAD30 B4	CBUS_DATA<9> 17	
D10/CAD31 B3	CBUS_DATA<10> 17	
D11/CAD2 M12	CBUS_DATA<11> 17	
D12/CAD4 J11	CBUS_DATA<12> 17	
D13/CAD6 K13	CBUS_DATA<13> 17	
D14/RSVD J12	CBUS_DATA<14> 17	
D15/CAD8 H11	CBUS_DATA<15> 17	

A2 A11 D1 F13 H4 K8 M13 N2 — GND

R767 22 5% 1/16W MF 402

NO STUFF
R764 47 5% 1/16W MF 402 — IO_RESET_L 31 28 27 24 23

R766 47 5% 1/16W MF 402 — MAIN_RESET_L 40 31 27 25 20 18 17 14

RP39 10K 5% 1/16W 4SIP SM
CBUS_MFUNC1_PD 17
CBUS_MFUNC2_PD 17
CBUS_MFUNC3_PD 17
CBUS_MFUNC4_PD 17
CBUS_MFUNC5_PD 17
CBUS_MFUNC6_PD 17
NC
NC

MAIN_RESET_L 40 31 27 25 20 18 17 14

THIS PROPERLY SHUTS DOWN CARDBUS POWER FOR PSUEDO-D3COLD

R348 47 5% 1/16W MF 402

+3V_MAIN
+5V_MAIN

NO STUFF
R373 10K 5% 1/16W MF 402

MAKE SURE VCC AND VPP ARE WIDE PLANE/TRACES TO MINIMIZE INDUCTANCE!

U19 TPS2211 SSOP

NC 9	V_12	AVPP 10
5	V_5_1	
6	V_5_2	AVCC0 11
3	V_3_1	AVCC1 12
4	V_3_2	AVCC2 13
1	VCCD0	
2	VCCD1	
15	VPPD0	CRITICAL
14	VPPD1	
16	SHTDWN	
7	GND	OC 8 NC

TPS2211_SHDN_L_PU

+VPP_CBUS_SW 17 39
+VCC_CBUS_SW 17 39

C773 0.1UF 20% 10V CERM 402
C467 0.1UF 20% 10V CERM 402

0.1UF ARE USED TO INCREASE ESD DISCHARGES OF UP TO 10KV

R750 47 5% 1/16W MF 402 — CBUS_ADDR<16> 17

TI REFERENCE SCHEMATIC DID NOT HAVE BULK ON +VCC_CBUS_SW

C783 2.2UF 20% 16V CERM 805
C776 2.2UF 20% 16V CERM 805

PC CARD/CARDBUS CONNECTOR

CRITICAL

J9 QT500806-L111 M-ST-SM1

	2	1	CBUS_DATA<3> 17
40 17 CBUS_DET_1_L	4	3	CBUS_DATA<4> 17
17 CBUS_DATA<11>	6	5	CBUS_DATA<5> 17
17 CBUS_DATA<12>	8	7	CBUS_DATA<6> 17
17 CBUS_DATA<13>	10	9	
	12	11	CBUS_DATA<7> 17
17 CBUS_DATA<14>	14	13	CBUS_CE1_L 17
17 CBUS_DATA<15>	16	15	CBUS_ADDR<10> 17
17 CBUS_CE2_L	18	17	CBUS_OE_L 17
17 CBUS_VS1	20	19	
	22	21	CBUS_ADDR<11> 17
17 CBUS_IORD_L	24	23	CBUS_ADDR<9> 17
17 CBUS_IOWR_L	26	25	CBUS_ADDR<8> 17
17 CBUS_ADDR<17>	28	27	CBUS_ADDR<13> 17
17 CBUS_ADDR<18>	30	29	
	32	31	CBUS_ADDR<14> 17
17 CBUS_ADDR<19>	34	33	CBUS_WE_L 17
17 CBUS_ADDR<20>	36	35	CBUS_READY 17
17 CBUS_ADDR<21>	38	37	+VCC_CBUS_SW 17 39
39 17 +VCC_CBUS_SW	40	39	
	42	41	+VPP_CBUS_SW 17 39
39 17 +VPP_CBUS_SW	44	43	CBUS_ADDR<16> 17
17 CBUS_ADDR<22>	46	45	CBUS_ADDR<15> 17
17 CBUS_ADDR<23>	48	47	CBUS_ADDR<12> 17
17 CBUS_ADDR<24>	50	49	
	52	51	CBUS_ADDR<7> 17
17 CBUS_ADDR<25>	54	53	CBUS_ADDR<6> 17
17 CBUS_VS2	56	55	CBUS_ADDR<5> 17
17 CBUS_RESET_L	58	57	CBUS_ADDR<4> 17
17 CBUS_WAIT_L	60	59	
	62	61	CBUS_ADDR<3> 17
17 CBUS_INPACK_L	64	63	CBUS_ADDR<2> 17
17 CBUS_REG_L	66	65	CBUS_ADDR<1> 17
17 CBUS_BVD2_L	68	67	CBUS_ADDR<0> 17
17 CBUS_BVD1_L	70	69	
	72	71	CBUS_DATA<0> 17
17 CBUS_DATA<8>	74	73	CBUS_DATA<1> 17
17 CBUS_DATA<9>	76	75	CBUS_DATA<2> 17
17 CBUS_DATA<10>	78	77	CBUS_WP_L 17
40 17 CBUS_DET_2_L	80	79	
	83	82	

CARDBUS

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S0214	1	IC,ATI,M11-CSP128,GRPHCTLR,667BGA,HYNIX GDDR	U44	CRITICAL	M11_CSP128

27M OSC

(PLACE THE OSCILLATOR AND R189 AND R195 CLOSE TO ATI PIN AJ29)

+3V_SLEEP — L4 FERR-EMI-100-OHM (SM) — +3V ATI OSC SLEEP

C77 0.1uF 20% 10V CERM 402 — C78 4.7uF 20% 6.3V CERM 805

NO STUFF R188 100K 5% 1/16W MF 402 — CRITICAL — G2 27.0000M OSC SM-1 (VCC, OE, GND, OUT) — ATI OSC OE — ATI CLK27M OSC

(PLACE R200 CLOSE TO OSC) — GPU_SS — R200 0 5% 1/16W MF 402 — ATI CLK27M OSC SS

R189 287 1% 1/16W MF 402 — ATI CLK27M IN

R195 162 1% 1/16W MF 402

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

+3V_SLEEP — L3 FERR-EMI-100-OHM (SM) — GPU_SS — +3V ATI SS

C70 10uF 20% 6.3V CERM 805 — C71 0.1uF 20% 10V CERM 402

NO STUFF R173 0 5% 1/16W MF 402 — R181 0 5% 1/16W MF 402 — GPU_SS — CRITICAL

U47 CY25811 SOI (VDD, XIN/CLKIN, XOUT, NC, NC, FRSEL, CY25811 S1, CY25811 S0, VSS, SSCLK) — ATI CLK27M OSC SS — ATI SSCLK UF

R201 33 5% 1/16W MF 402 — GPU_SS — ATI SSCLK IN

NO STUFF R37 0 5% 1/16W MF 402 — NO STUFF R38 0 5% 1/16W MF 402

U44 RAGE MOBILITY M11-CSP64 64MB BGA (1 OF 6)

AGP_AD<31:0> → AD31..AD0

AGP_CBE<3:0> → CBEB3..CBEB0

CLK66M_GPU_AGP → PCICLK

AGP_FRAME_L → FRAMEB

AGP_IRDY_L → IRDYB

AGP_TRDY_L → TRDYB

AGP_STOP_L → STOPB

AGP_DEVSEL_L → DEVSELB

AGP_PAR → PAR

AGP_REQ_L → REQB

AGP_GNT_L → GNTB

AGP_INT_L → INTAB

AGP_ATI_RESET → RSTB

AGP_WBF_L → WBF

AGP_ATI_VREEG → VREFG

AGP_ATI_VREF → MVREF

AD_STB0 → AGP_AD_STB<0>

AD_STB1 → AGP_AD_STB<1>

AD_STBB0 → AGP_AD_STB_L<0>

AD_STBB1 → AGP_AD_STB_L<1>

AGP_BUSYB → AGP_BUSY_L

AGPREF — R159 20K 5% 1/16W MF 402 — INT AGP VREF

AGPTEST → GPU_AGP_TEST

AGP8X_DETB → AGP8X_DET_PU

SUS_STAT → AGP_SUS_STAT_L_PU

ST0 → AGP_ST<0>

ST1 → AGP_ST<1>

ST2 → AGP_ST<2>

SBA7 → AGP_SBA<7>

SBA6 → AGP_SBA<6>

SBA5 → AGP_SBA<5>

SBA4 → AGP_SBA<4>

SBA3 → AGP_SBA<3>

SBA2 → AGP_SBA<2>

SBA1 → AGP_SBA<1>

SBA0 → AGP_SBA<0>

RBFB → AGP_RBF_L

STP_AGPB → AGP_STP_L

SB_STB → AGP_SB_STB

SB_STBS → AGP_SB_STB_L

RSTB_MSK → ATI_RSTB_MSK

DBI_LO → ATI_DBI_LO_PU

DBI_HI → ATI_DBI_HI_PU

OMIT

+3V GPU — R119 47 5% 1/16W MF 402 — R127 10K 5% 1/16W MF 402

+1.5V AGP — R126 47K 5% 1/16W MF 402 — R138 47K 5% 1/16W MF 402

C62 0.1uF 20% 10V CERM 402 — C63 0.01uF 20% 16V CERM 402 — (PLACE C1002 CLOSE TO AGPREF PIN)

R172 20K 5% 1/16W MF 402

R158 0 5% 1/16W MF 402

MAIN_RESET_L IS TOGGLED FOR SLEEP

MAIN_RESET_L — R53 47 5% 1/16W MF 402 — R54 10K 5% 1/16W MF 402 — +3V GPU

R43 1K 1% 1/16W MF 402 — +3V GPU

R44 1K 1% 1/16W MF 402 — +GPU_MEM

R45 1K 1% 1/16W MF 402

PLACE VERF VOLTAGE DIVIDER CLOSE TO ATI M10 VREF PIN

R46 1K 1% 1/16W MF 402 — C11 0.1uF 20% 10V CERM 402 — C37 10uF 20% 6.3V CERM 805

+1.8V GPU

ATI_MEMIO_LO — R55 4.7K 5% 1/16W MF 402 — R104 4.7K 5% 1/16W MF 402 — ATI_MEMIO_HI

ATI_MEMIO_HI — R70 4.7K 5% 1/16W MF 402 — R105 4.7K 5% 1/16W MF 402 — ATI_MEMIO_LO

ATI_MEMVMODE0 → B7 MEMVMODE0

ATI_MEMVMODE1 → B6 MEMVMODE1

FOR 2.5 VDDR1
MEMVMODE0=1.8V
MEMVMODE1=GND

FOR 1.8 VDDR1
MEMVMODE0=GND
MEMVMODE1=1.8V

AD_STB0 → AC10 GPU_THERM_DP_TP

AD_STB1 → AC11 GPU_THERM_DM_TP

TEST_YCLK → E8 +GPU_MEM

TEST_MLCK → J6 (PULL-UP to GPU_MEM_IO)

MEMTEST → C8 ATI_MEMTEST

PLLTEST → AC22 NC

R118 45.3 1% 1/16W MF 402

GPU_VCORE — L2 60-OHM-EMI (SM) — +GPU_VCORE_VDDCI

C64 0.01uF 20% 16V CERM 402 — C67 10uF 20% 6.3V CERM 805

C65 0.01uF 20% 16V CERM 402 — C68 0.01uF 20% 16V CERM 402

C66 0.01uF 20% 16V CERM 402 — C69 0.01uF 20% 16V CERM 402

U44 RAGE MOBILITY M11-CSP64 64MB BGA (2 OF 6)

VSS

OMIT

U44 RAGE MOBILITY M11-CSP64 64MB BGA (6 OF 6)

OMIT

VSS

VDDCI

U6 AE15 F18 P25

M11 AGP INTERFACE

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D	051-6694	C

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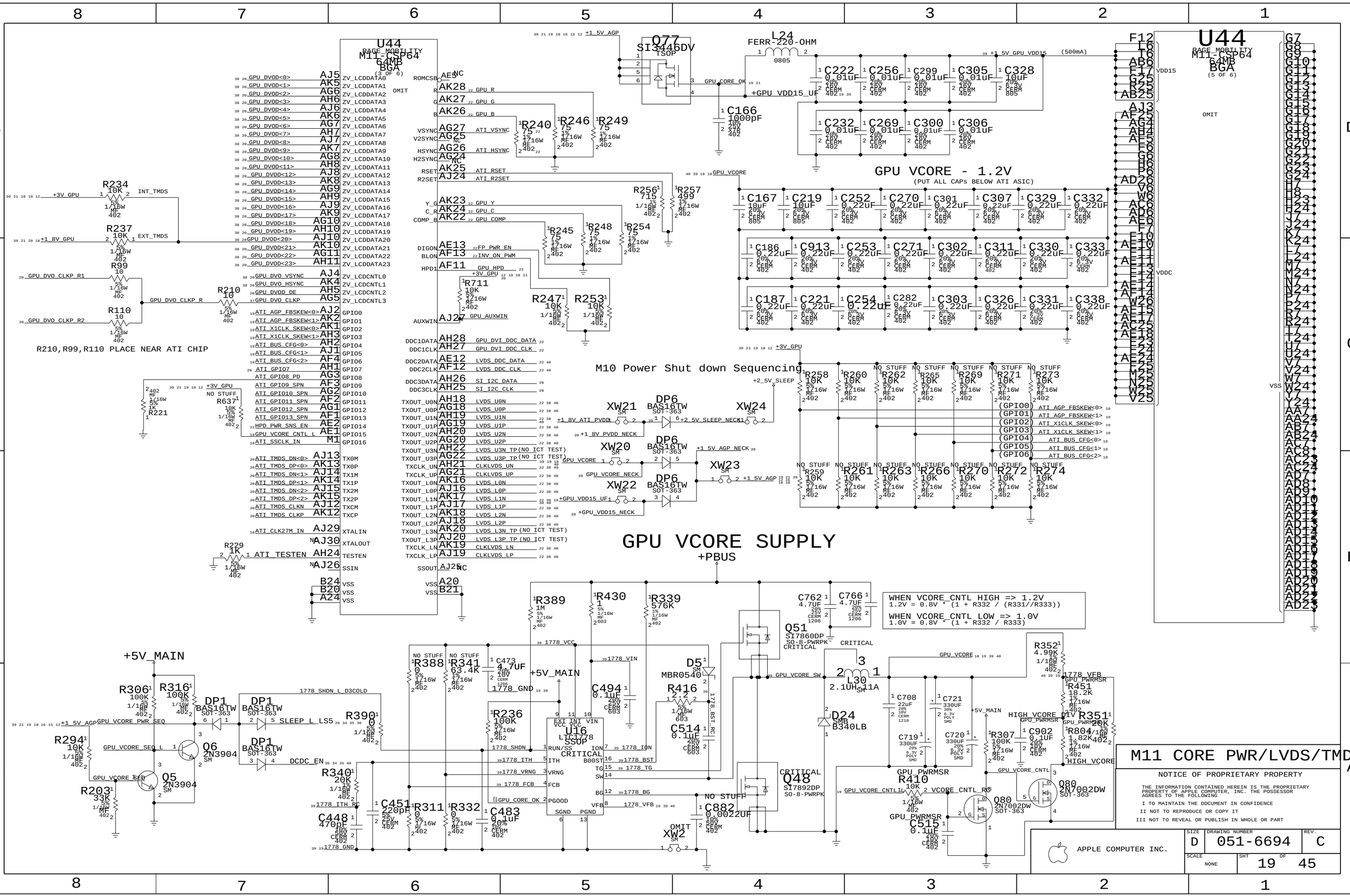
NONE	18	45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M11-CSP64
64MB
BGA
(6 OF 6)
PAGE MOBILITY
OMIT
GPU_DVO0<0>
GPU_DVO0<1>
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GPU_DVO0<4>
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GPU_DVO0<19>
GPU_DVO0<20>
GPU_DVO0<21>
GPU_DVO0<22>
GPU_DVO0<23>
GPU_DVO_VSYNC
GPU_DVO_HSYNC
GPU_DVO0_DE
GPU_DVO_CLKP
ATI_AGP_FBSKEW<0>
ATI_AGP_FBSKEW<1>
ATI_X1CLK_SKEW<0>
ATI_X1CLK_SKEW<1>
ATI_BUS_CFG<0>
ATI_BUS_CFG<1>
ATI_BUS_CFG<2>
ATI_GPIO7
ATI_GPIO8_PD
ATI_GPIO9_SPN
ATI_GPIO10_SPN
ATI_GPIO11_SPN
ATI_GPIO12_SPN
ATI_GPIO13_SPN
HPD_PWR_SNS_EN
GPU_VCORE_CNTL_L
ATI_SSCLK_IN
ATI_TMDS_DN<0>
ATI_TMDS_DP<0>
ATI_TMDS_DN<1>
ATI_TMDS_DP<1>
ATI_TMDS_DN<2>
ATI_TMDS_DP<2>
ATI_TMDS_CLKN
ATI_TMDS_CLKP
ATI_CLK27M_IN
ATI_TESTEN
SSIN
VSS
R234
10K
INT_TMDS
+3V_GPU
R237
10K
EXT_TMDS
+1_8V_GPU
R99
10
R110
10
R210
10
GPU_DVO_CLKP_R1
GPU_DVO_CLKP_R2
GPU_DVO_CLKP_R
R210,R99,R110 PLACE NEAR ATI CHIP
R221
1K
R637
10K
NO STUFF
R229
1K
Q077
SI3446DV
TSOP
L24
FERR-220-OHM
0805
+1_5V_AGP
+1_5V_GPU_VDD15
(500mA)
VDD15
VDDC
VSS
C222
C256
C299
C305
C328
C232
C269
C300
C306
C166
1000pF
GPU_CORE_OK
+GPU_VDD15_UF
GPU VCORE - 1.2V
(PUT ALL CAPs BELOW ATI ASIC)
C167
C219
C252
C270
C301
C307
C329
C332
C186
C913
C253
C271
C302
C311
C330
C333
C187
C221
C254
C282
C303
C326
C331
C338
GPU_VCORE
R240
R246
R249
R256
R257
R245
R248
R254
GPU_VCORE_PWR_SEQ
GPU_VCORE_SEQ_L
GPU_VCORE_SEQ_R
Q6
2N3904
Q5
2N3904
R294
10K
R203
33K
DP1
BAS16TW
SOT-363
SLEEP_L_LS5
DCDC_EN
M10 Power Shut down Sequencing
+2_5V_SLEEP
+3V_GPU
XW21
XW24
XW20
XW23
XW22
DP6
BAS16TW
SOT-363
+1_8V_ATI_PVDD
+1_8V_PVDD_NECK
+2_5V_SLEEP_NECK
+1_5V_AGP_NECK
+GPU_VDD15_UF
+GPU_VDD15_NECK
R258
R260
R262
R265
R269
R271
R273
R259
R261
R263
R266
R270
R272
R274
(GPIO0)
(GPIO1)
(GPIO2)
(GPIO3)
(GPIO4)
(GPIO5)
(GPIO6)
GPU VCORE SUPPLY
+PBUS
+5V_MAIN
1778_GND
1778_SHDN_L_D3COLD
R306
100K
R316
100K
R390
0
R388
0
R341
63.4K
C473
4.7UF
R389
1M
R430
1
R339
576K
C494
0.1UF
R236
100K
U16
LTC1778
SSOP
CRITICAL
R340
20K
C451
220PF
R311
0
R332
0
C483
0.1UF
C448
470PF
R416
2.2
D5
MBR0540
C514
0.1UF
C762
4.7UF
C766
4.7UF
Q51
SI7860DP
SO-8-PWRPK
CRITICAL
L30
2.1UH-11A
D24
SMB
B340LB
Q48
SI7892DP
SO-8-PWRPK
C882
0.0022UF
XW2
OMIT
WHEN VCORE_CNTL HIGH => 1.2V
1.2V = 0.8V * (1 + R332 / (R331//R333))
WHEN VCORE_CNTL LOW => 1.0V
1.0V = 0.8V * (1 + R332 / R333)
C708
22UF
C721
330UF
C719
330UF
C720
330UF
R307
100K
R352
4.99K
R451
18.2K
R804
1.82K
R351
20K
C902
0.1UF
R410
2 VCORE_CNTL_R
C515
0.1UF
Q80
2N7002DW
SOT-363
HIGH_VCORE
GPU_PWRMSR
GPU_VCORE_CNTL
M11 CORE PWR/LVDS/TMDS
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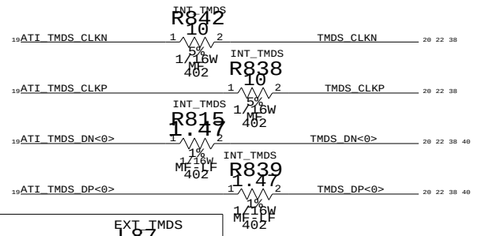
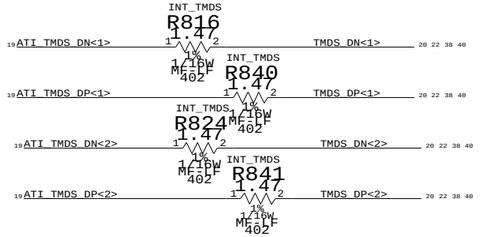
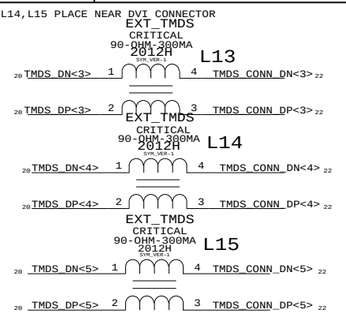
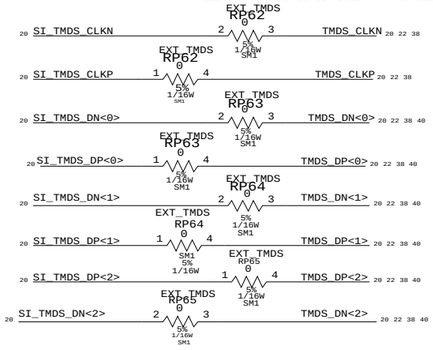
INTERNAL TMDS SERIES TERMINATION

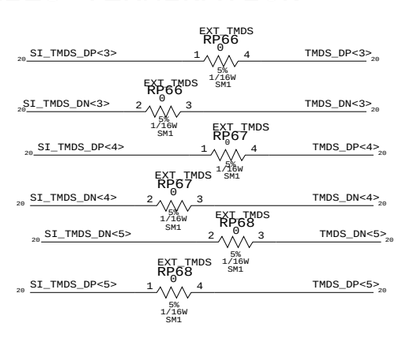




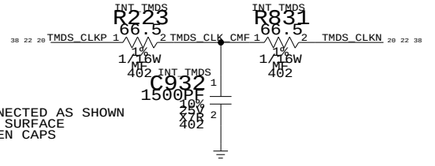


EXTERNAL TMDS SERIES TERMINATION

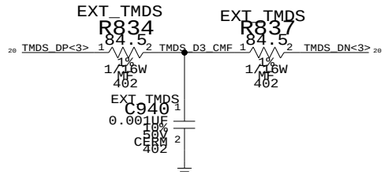




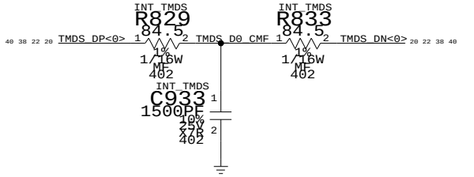
INT/EXT TMDS CLK & D<0:2> TERMINATION

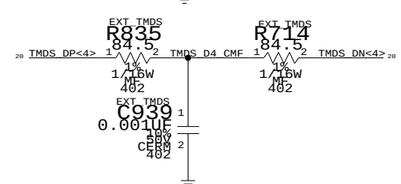


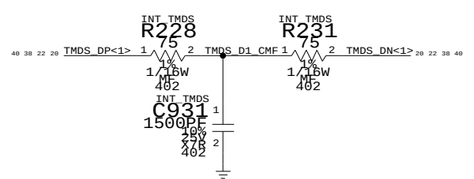
EXT. TMDS D<3:5> TERMINATION

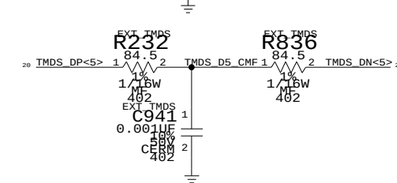


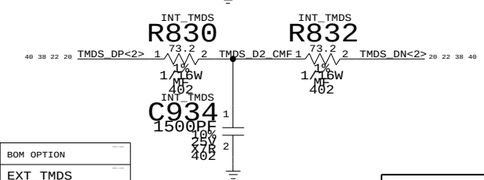
TERMINATION NETWORK SHOULD BE CONNECTED AS SHOWN
CMF LINE SHOULD BE ROUTED AS 4MIL SURFACE
TRACE SO THAT IT MAY BE CUT BETWEEN CAPS

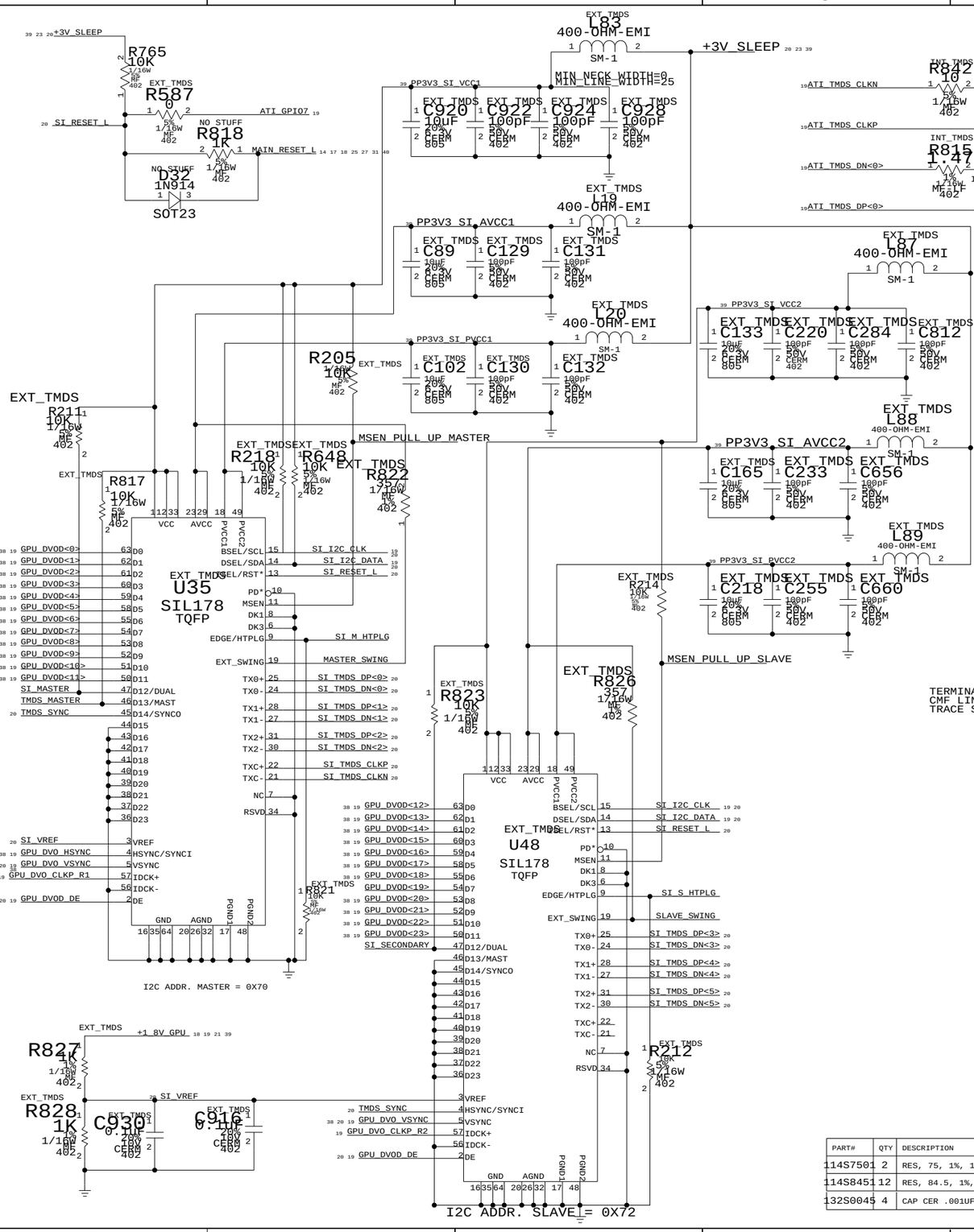












PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
114S7501	2	RES, 75, 1%, 1/16W, 0402	R223,R831	EXT_TMDS
114S8451	12	RES, 84.5, 1%, 1/16W, 0402	R829,R833,R228,R231,R830,R832,R834,R837,R835,R714,R232,R836	EXT_TMDS
132S0045	4	CAP CER .001UF,10%,50V,0402,X7R	C931,C932,C933,C934	EXT_TMDS

INT/EXT TMDS

APPLE COMPUTER INC.

SIZE: D | DRAWING NUMBER: 051-6694 | REV: C

SCALE: NONE | SHT: 20 OF 45

GPU POWER SOURCES - 1.5V, 1.8V, 2.5V & 3.3V

GPU PLL - 1.8V

AGP 4X I/O - 1.5V

MEMORY CORE - 2.5V

LVDS PLL - 1.8V

MEMORY PLL - 1.8V

LVDS - 2.5V

LVDS/TMDS - 1.8V

MEMORY I/O

3.3V IO SUPPLY

(Max Current varies, depends on usage)

M11 SHUT DOWN POWER SEQUENCING

M11 POWER

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
353S0828	1	IC,MAX8860,LDO,2.77V	U8	?

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S0647	353S0828	?	U8	ALT FOR 2.82V PART

APPLE COMPUTER INC.

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SCALE NONE | SHT 21 OF 45

EXTERNAL VIDEO (DVI) INTERFACE

ANALOG FILTERING PLACE CLOSE TO CONNECTOR

FL2 CRITICAL LCFILTER SM-220MHZ — GPU_B → VGA_B
FL1 CRITICAL LCFILTER SM-220MHZ — GPU_G → VGA_G
FL3 CRITICAL LCFILTER SM-220MHZ — GPU_R → VGA_R
C685 3.3PF 0.25% 50V CERM 402
C676 3.3PF 0.25% 50V CERM 402
C684 3.3PF 0.25% 50V CERM 402

+3V_MAIN

VGA VSYNC BUFFERS

CRITICAL 74AHC1G32 SM U56: ATI_HSYNC → R718 33 5% 1/16W MF 402 → VGA_HSYNC
CRITICAL 74AHC1G32 SM U57: ATI_VSYNC → R687 33 5% 1/16W MF 402 → VGA_VSYNC

TMDS FILTERING PLACE CLOSE TO CONNECTOR

L72 CRITICAL 90-OHM-300MA 2012H SYM_VER_1: TMDS_DN<0> → TMDS_CONN_DN<0>; TMDS_DP<0> → TMDS_CONN_DP<0>
L21 CRITICAL 165-OHM SM SYM_VER_1: TMDS_CLKP → TMDS_CONN_CLKP; TMDS_CLKN → TMDS_CONN_CLKN
L73 CRITICAL 90-OHM-300MA 2012H SYM_VER_1: TMDS_DN<1> → TMDS_CONN_DN<1>; TMDS_DP<1> → TMDS_CONN_DP<1>
L74 CRITICAL 90-OHM-300MA 2012H SYM_VER_1: TMDS_DN<2> → TMDS_CONN_DN<2>; TMDS_DP<2> → TMDS_CONN_DP<2>

S-VIDEO/COMP OUT INTERFACE

Place GND shorts at graphics controller

XW12 SM: GPU_TV_GND1 → L26 FERR-10-OHM-500MA SM → TV_GND1
L25 3.3UH 0603: GPU_Y → TV_C
L29 3.3UH 0603: GPU_C → TV_Y
L27 3.3UH 0603: GPU_COMP → TV_COMP
C712 0.01UF 20% 50V CERM 603
C702 560PF 10% 50V CERM 402
C707 560PF 10% 50V CERM 402
C718 560PF 10% 50V CERM 402
C724 560PF 10% 50V CERM 402
C714 560PF 10% 50V CERM 402
C713 560PF 10% 50V CERM 402
CRITICAL J15 MINIDIN RT-TH MH117
XW13 SM: GPU_TV_GND2 → L28 FERR-10-OHM-500MA SM → TV_GND2
C717 0.01UF 20% 50V CERM 603
Place GND shorts at graphics controller
CHGND1

DVI DDC CURRENT LIMIT

(55mA requirement per DVI spec)

+5V_SLEEP → F1 0.5AMP-13.2V SM → +5V_DDC_SLEEP_UF → L23 400-OHM-EMI SM-1 → +5V_DDC_SLEEP

Isolation required for DVI power switch

D21 SM MBR0530: DDC_CLK_ISO → R655 4.7K 5% 1/16W MF 402 → DVI_DDC_CLK_UF
R661 4.7K 5% 1/16W MF 402 → (+5V_DDC_SLEEP)
R670 100 5% 1/16W MF 402 → DVI_DDC_DATA_UF
R649 100 5% 1/16W MF 402 → VGA_VSYNC
R650 100 5% 1/16W MF 402 → DVI_HPD_UF

CRITICAL J14 QH1112 F-RT-TH 36-pin:
TMDS_CONN_DN<0> → pin 17; TMDS_CONN_DP<0> → pin 18; TMDS_CONN_DN<1> → pin 19; TMDS_CONN_DP<1> → pin 20; TMDS_CONN_DN<2> → pin 21; TMDS_CONN_DP<2> → pin 22; TMDS_CONN_DN<3> → pin 23; TMDS_CONN_DP<3> → pin 24; TMDS_CONN_DN<4> → pin 25; TMDS_CONN_DP<4> → pin 26; TMDS_CONN_DN<5> → pin 27; TMDS_CONN_DP<5> → pin 28; TMDS_CONN_CLKP → pin 29; TMDS_CONN_CLKN → pin 30; VGA_R → pin 1; VGA_G → pin 2; VGA_B → pin 3; VGA_HSYNC → pin 13; pins 4–12, 14–16, 31–36 → CHGND5

C706 100PF 5% 50V CERM 402
C669 100PF 5% 50V CERM 402
C710 0.01UF 20% 50V CERM 603
C1 100PF 5% 50V CERM 402
C3 C5B C4 C1 C5A C2
R706 0 5% 1/16W MF 402
R1 0 5% 1/16W MF 402
PLACE NEAR 3, 11 & 19
PLACE NEAR C5A & C5B
CHGND1

3V LEVEL SHIFTERS

+3V_SLEEP

Q38 2N7002DW SOT-363 DVI_DDC_CLK: R662 10K 5% 1/16W MF 402 → GPU_DVI_DDC_CLK
Q38 2N7002DW SOT-363 DVI_DDC_DATA: R671 10K 5% 1/16W MF 402 → GPU_DVI_DDC_DATA
Q35 2N7002DW SOT-363 DVI_HPD: R694 100K 5% 1/16W MF 402 → GPU_HPD

NOTE: Pulldown for DVI_HPD provided by DVI power switch interface

NOTE: DVI_HPD SHARES Q68 WITH ALS BECAUSE OF BOARD REAL ESTATE

DVI POWER SWITCH

Power key detect path when system is shutdown or asleep.. DDC_CLK is isolated from NV17M DURING SHUTDOWN. WHEN power key on remote device is pressed, 5V will be driven into DDC_CLK. Since rest rails will be low, tp0610 will turn on, driving SOFT_PWR_ON_L low. As post rails rise, tp0610 will turn off. This will let remote device be used as well. Isolation will be disabled as well.

Q40 TP0610 SM: DVI_DDC_CLK_UP → DVI_TURN_ON; +5V_DDC_SLEEP
R690 0 5% 1/16W MF 402 → DVI_TRUN_ON_ILIM
R688 330 5% 1/16W MF 402: Pulldown prevents 3904 from turning on when DVI monitor has active self-powered DDC clock pullup.
R691 10K 5% 1/16W MF 402 → Q42 2N3904 SM: DVI_TURN_ON_BASE; SOFT_PWR_ON_L

Power key detect path when system is running. HPD normally driven to 3.3V. When power key +3V_SLEEP on remote device pressed, HPD will be driven to 5V. COMPARATOR ENABLED BY NV17MAP GPIO.

R680 68.1K 1% 1/16W MF 402
C696 0.1UF 20% 10V CERM 402
HPD_4V_REF
U46 LMC7211 SM CRITICAL: DVI_HPD_UF1 → R663 10K 1% 1/16W MF 402 → DVI_HPD_DIV; R686 10K 1% 1/16W MF 402; R681 100K 1% 1/16W MF 402
HPD_PWR_SW
Q41 2N7002DW SOT-363: HPD_ON
R703 330 5% 1/16W MF 402
R700 20K 5% 1/16W MF 402 → Q44 2N3904 SM: HPD_BASE
HPD_ON_RC
+PBUS
Q45 TP0610: COMP_ENABLE
COMP_DISABLE
R696 100K 5% 1/16W MF 402
R704 100K 5% 1/16W MF 402
C703 47UF 20% 6.3V CERM 1210
R705 68K 5% 1/16W MF 402
NEED PULL-DOWN BECAUSE THIS SIGNAL IS TRISTATED INITIALLY
Q41 2N7002DW SOT-363: HPD_PWR_SNS_EN
R213 100K 5% 1/16W MF 402

LCD INTERFACE

LVDS INTERFACE

100K pull-ups are for no-panel case (development) Panel has 2K pull-ups

+3V_SLEEP
R342 100K 5% 1/16W MF 402 → LVDS_DDC_CLK
R320 100K 5% 1/16W MF 402 → LVDS_DDC_DATA
NO STUFF
C449 0.001UF 20% 50V CERM 402
C452 0.001UF 20% 50V CERM 402
C416 0.001UF 20% 50V CERM 402 → CHGND4

CRITICAL J6 G-501973 F-RT-SM 34-pin:
+3V_LCD → pin 1; (LVDS_DDC_POWER) → pin 3; NC → pin 5; LVDS_L0N → pin 7; LVDS_L0P → pin 8; LVDS_L1N → pin 10; LVDS_L1P → pin 11; LVDS_L2N → pin 13; LVDS_L2P → pin 14; CLKLVDS_LN → pin 16; CLKLVDS_LP → pin 17; LVDS_U0N → pin 19; LVDS_U0P → pin 20; LVDS_U1N → pin 22; LVDS_U1P → pin 23; LVDS_U2N → pin 25; LVDS_U2P → pin 26; CLKLVDS_UN → pin 28; CLKLVDS_UP → pin 29; pins 2, 4, 6, 9, 12, 15, 18, 21, 24, 27, 30, 31, 32, 33 → CHGND4
C500 0.001UF 20% 50V CERM 402

LCD POWER SWITCHES

+3V_MAIN
R400 100K 5% 1/16W MF 402
C484 2200pF 5% 50V CERM 603
R391 100K 5% 1/16W MF 402
LCD_DIGON_L
LCD_PWREN_L
Q11 SI3443DV TSOP
+3V_LCD_SW
L6 FERR-250-OHM SM
C474 0.001UF 20% 50V CERM 402
Q8 2N7002 SM: FP_PWR_EN
CHGND4

INVERTER INTERFACE

+PBUS
L33 FERR-1K-OHM-EMI SM: +12_8V_INV
+5V_MAIN
Q7 FDG6324L SC70-6
+5V_INV_UF_SW
L32 400-OHM-EMI SM-1
R317 100K 5% 1/16W MF 402
C440 10UF 20% 25V CERM 805
FP_PWR_EN
Q7 FDG6324L SC70-6
+5V_INV_SW
L31 400-OHM-EMI SM-1: BRIGHT_PWM
C746 0.001UF 20% 50V CERM 402
C749 0.001UF 20% 50V CERM 402
C739 0.001UF 20% 50V CERM 402
CRITICAL J7 SM-2MT
+3V_PMU
C552 0.1UF 20% 16V CERM 402
U24 74LVC32 TSSOP: INV_ON_PWM → BRIGHT_PWM_UF
INVERTER EXPECTS ACTIVE HIGH SIGNAL
CHGND2

SHARES LOGIC WITH KB RESET SIGNALS (PG 28)
R724 0 5% 1/16W MF 402
C744 0.01UF 20% 16V CERM 603
CHGND2

VIDEO CONNECTORS

APPLE COMPUTER INC.
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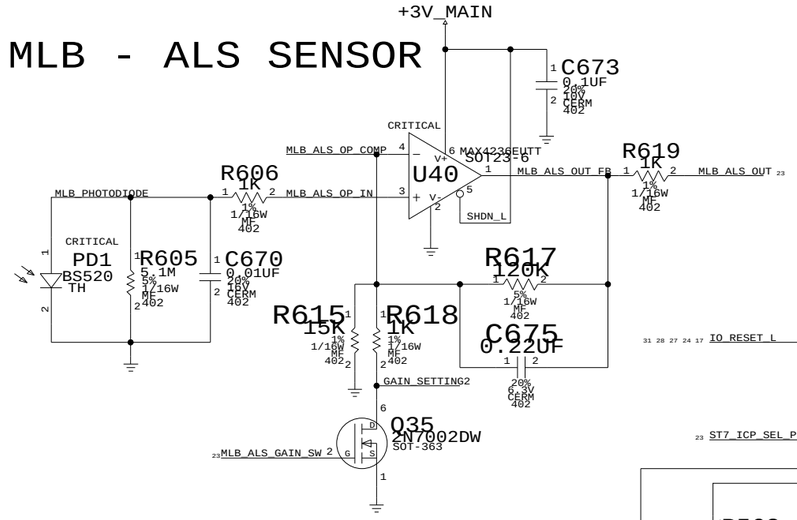
SCALE NONE | SHT 22 OF 45

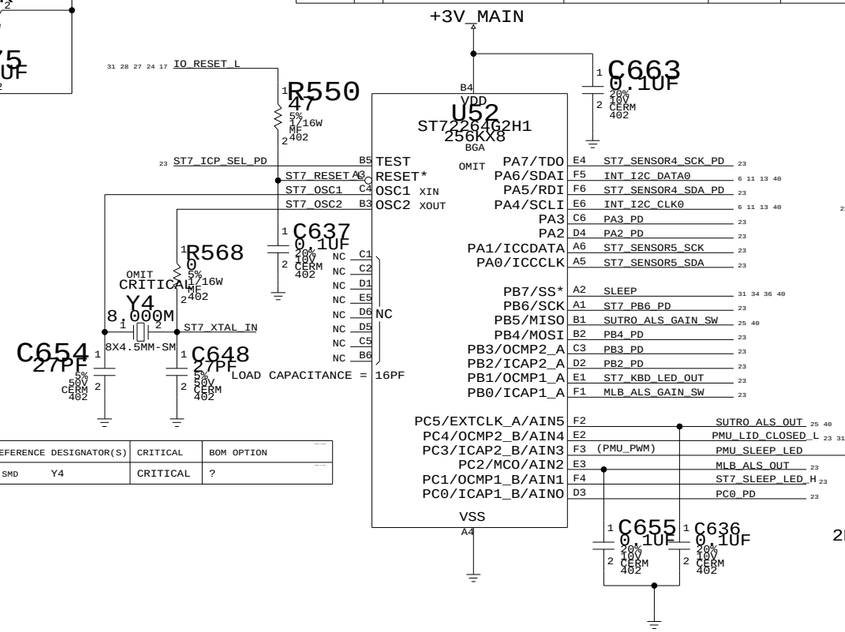
MLB - ALS SENSOR



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S0856	353S0504	?	U40	ALT FOR SUPPLY PROBLEM

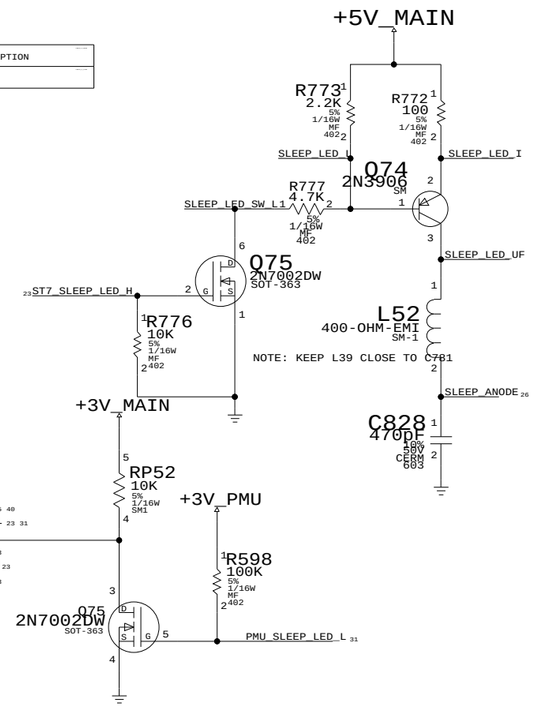
LMU

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S1194	1	IC,LMU,P84	U52	CRITICAL	?

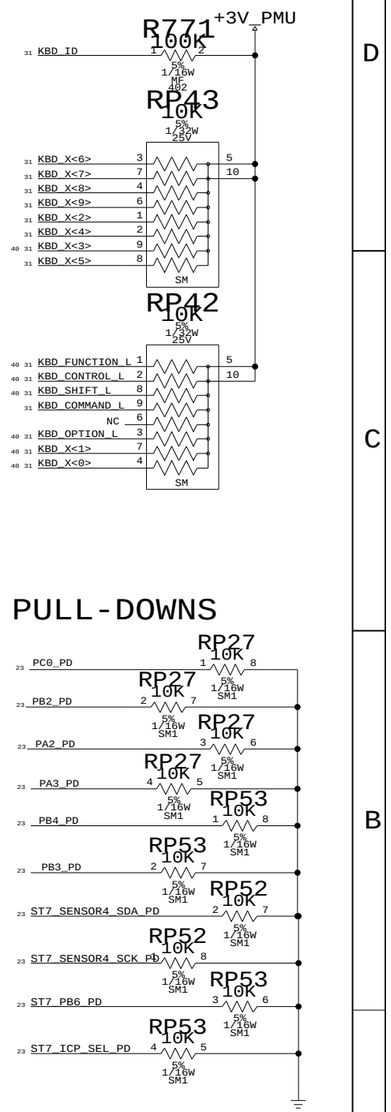


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0091	1	XTAL,CER,LOW PROF,8.000MHZ,8X4.5MM,SMD	Y4	CRITICAL	?

SLEEP LED

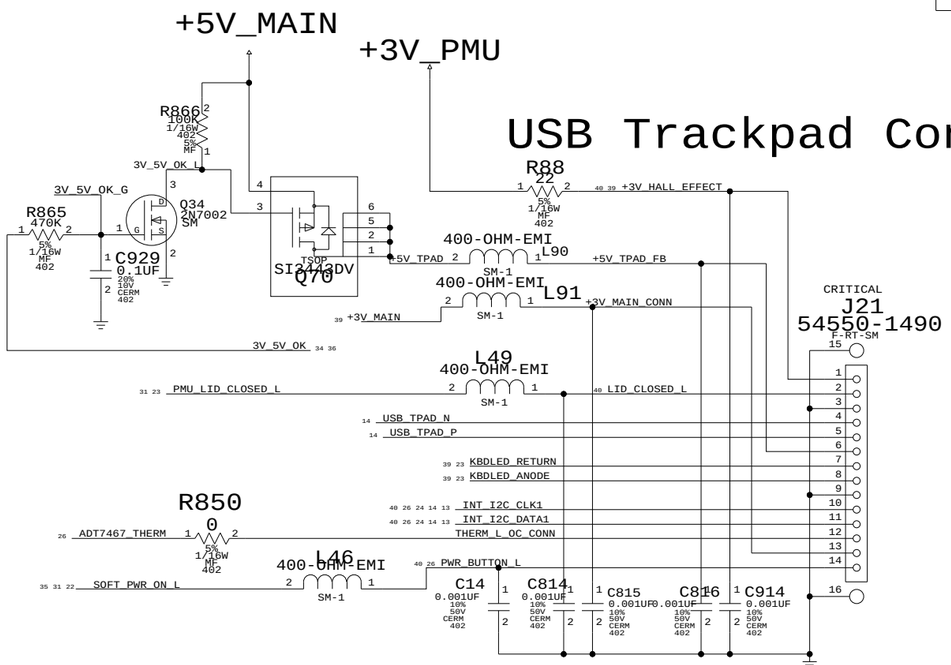


KEYBOARD PULLUPS

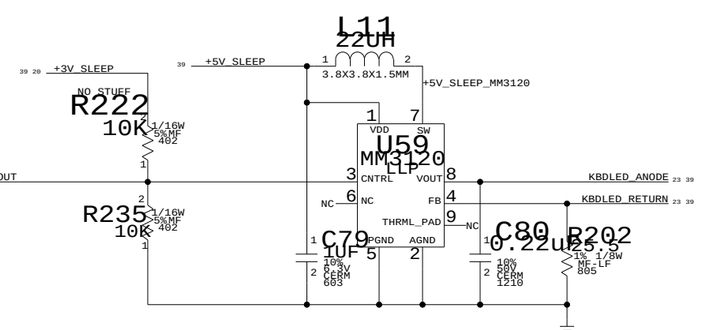


LMU PULL-DOWNS

USB Trackpad Connector



Keyboard LED Driver



LMU/BOOTBANGER/SPIDEY

APPLE COMPUTER INC.

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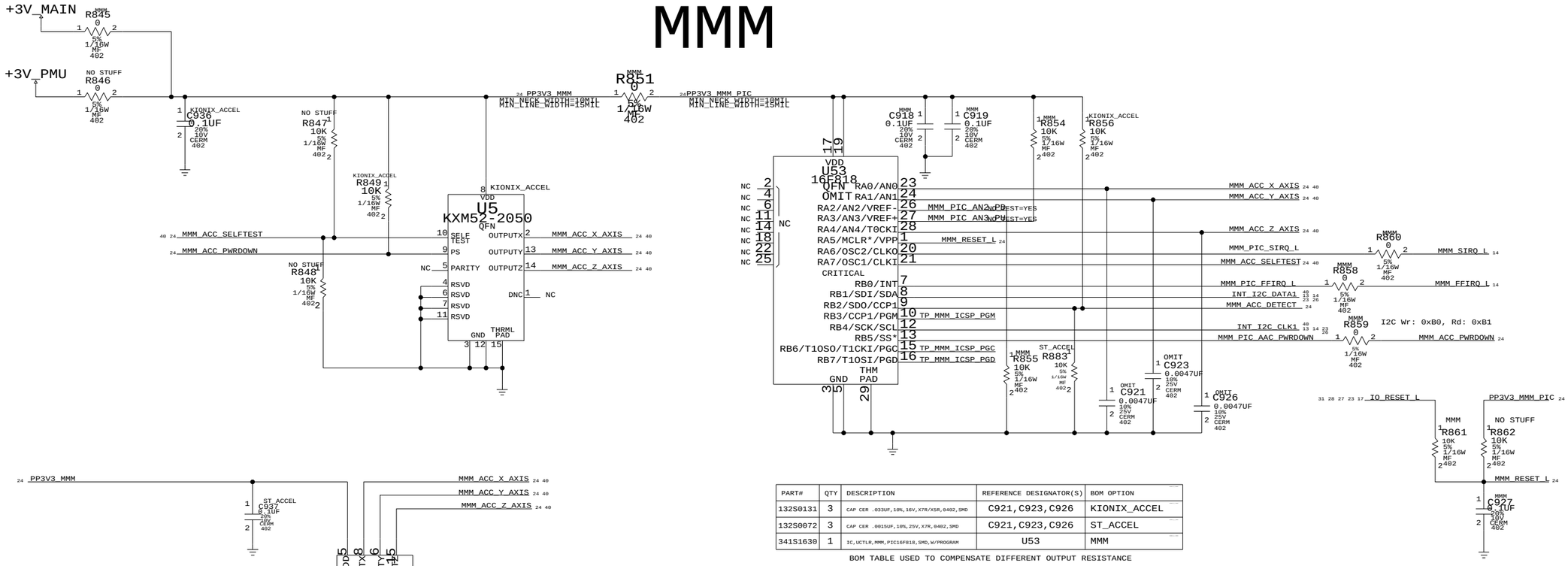
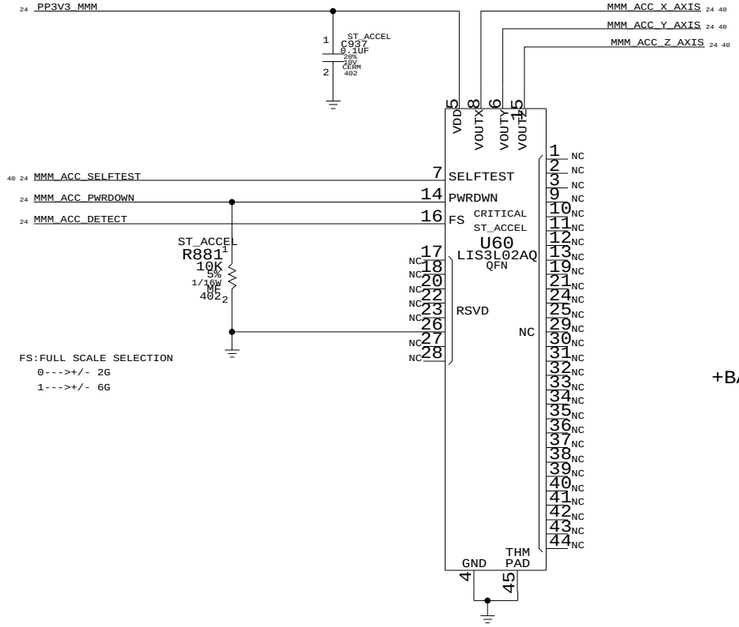
MMM

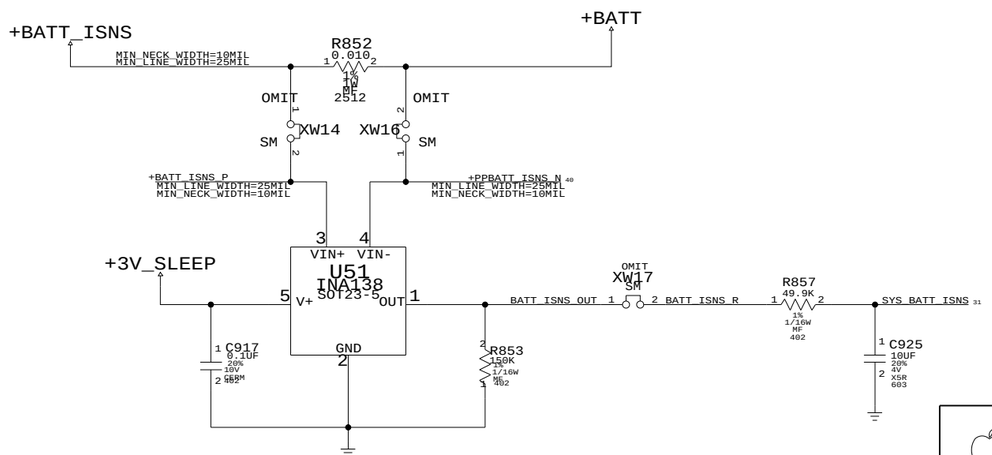


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
132S0131	3	CAP CER .033UF,10%,16V,X7R/X5R,0402,SMD	C921,C923,C926	KIONIX_ACCEL
132S0072	3	CAP CER .0015UF,10%,25V,X7R,0402,SMD	C921,C923,C926	ST_ACCEL
341S1630	1	IC,UCTLR,MMM,PIC16F818,SMD,W/PROGRAM	U53	MMM

BOM TABLE USED TO COMPENSATE DIFFERENT OUTPUT RESISTANCE



BATTERY CURRENT SENSE



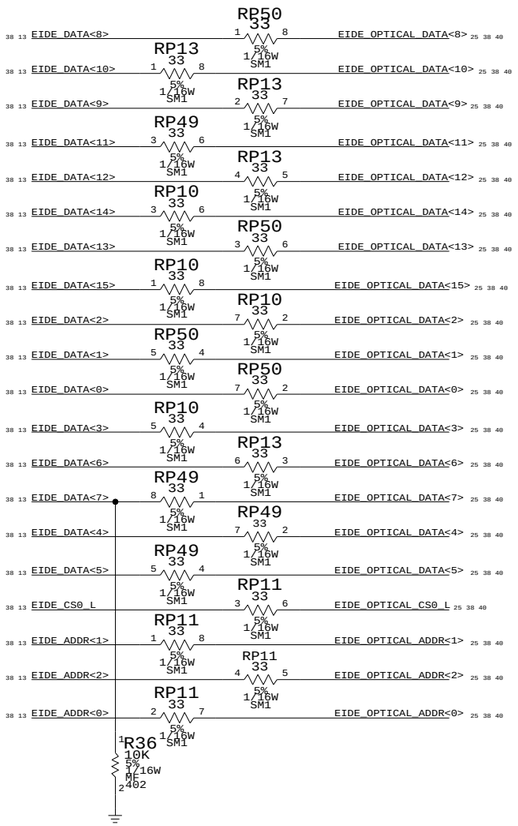
MMM, BATTERY CURRENT SENSE

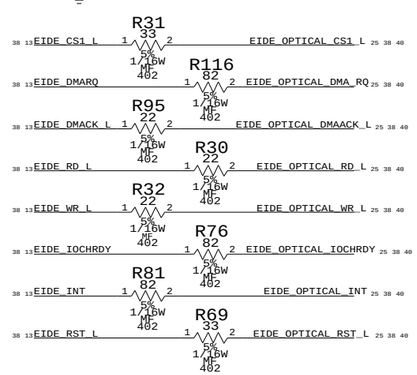
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 24 OF 45	

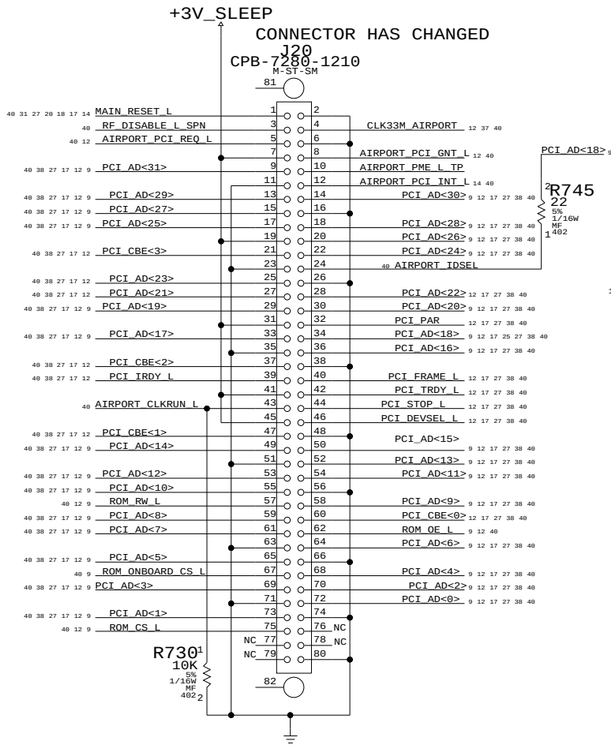
EIDE SERIES TERMINATION

PLACE TERMINATORS NEAR INTREPID

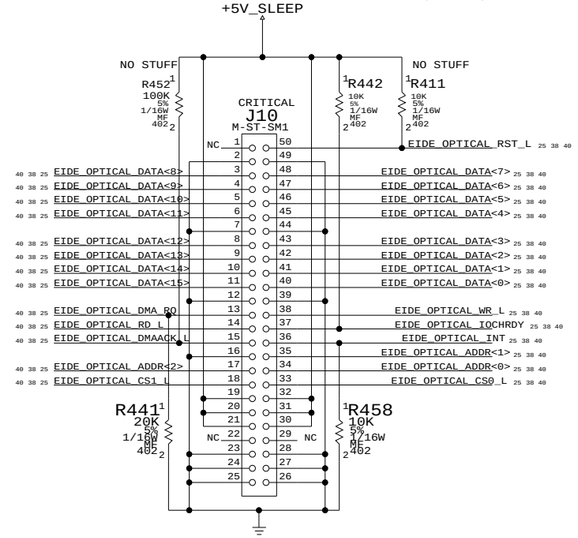




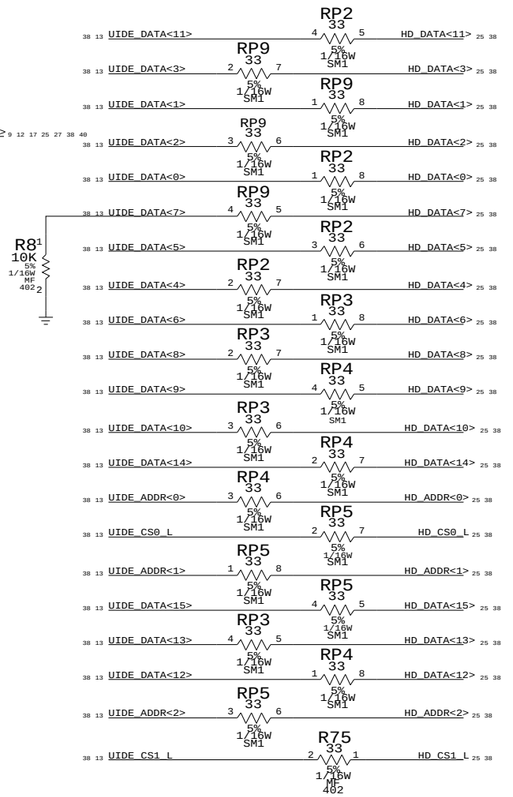
WIRELESS INTERFACE



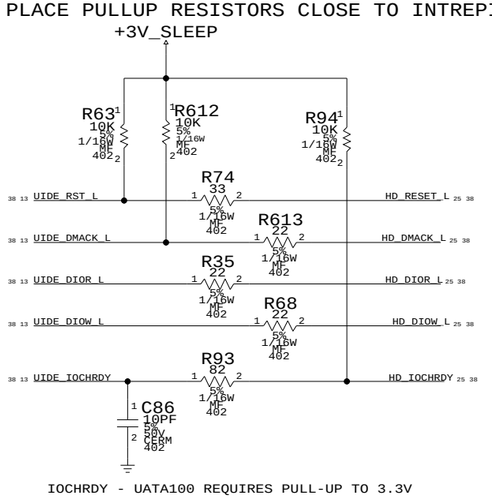
OPTICAL DRIVE INTERFACE (EIDE)



PLACE SERIES R CLOSE TO INTERPID

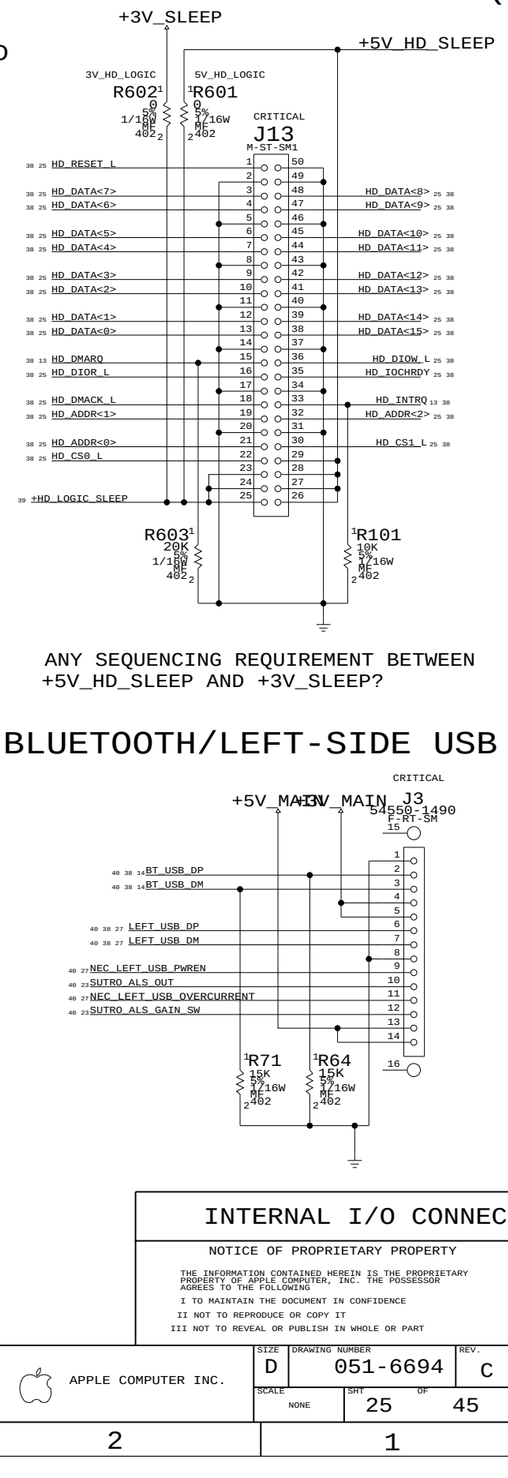


PLACE PULLUP RESISTORS CLOSE TO INTREPID



IOCHRDY - UATA100 REQUIRES PULL-UP TO 3.3V

HARD DRIVE INTERFACE (UATA100)



ANY SEQUENCING REQUIREMENT BETWEEN +5V_HD_SLEEP AND +3V_SLEEP?

BLUETOOTH/LEFT-SIDE USB

INTERNAL I/O CONNECTORS

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SOUND BOARD (SOUSAPHONE)

AUDIO - CRYSTAL SND - INTREPID

Sound Board Connector

Place shorts at 3.3V and 5V regulators

R534 0 5% 1/16W MF 402 — SOUND_SPDIF_GPO0 ↔ SPDIF_GPO0

R581 0 5% 1/16W MF 402 — AUDIO_MCLK_SEL ↔ AUDIO_EXT_MCLK_SEL

R552 0 5% 1/16W MF 402 — AUDIO_LO_SPDIF_PLUG ↔ AUDIO_LO_OPTICAL_PLUG_L

R582 0 5% 1/16W MF 402 — AUDIO_LI_SPDIF_PLUG ↔ AUDIO_LI_OPTICAL_PLUG_L

+5V_MAIN

XW9 SM — This is an internal board short — PLACE XW9 CLOSE TO 5V SWITCHER (U27) — +5V_MAIN_AUDIO

R918 0 5% 1/16W MF 402 — +5V_MAIN_AUDIO ↔ +5V_MAIN_AUDIO_0

R917 0 NO STUFF 5% 1/16W MF 402

CRITICAL

J12 QT500406-L111 M-ST-SM1

SPDIF_GPO0	13	14	AUDIO_LO_DET_L
+3V_SLEEP_AUDIO	15	16	AUDIO_LO_OPTICAL_PLUG_L
AUDIO_EXT_MCLK_SEL	17	18	AUDIO_LI_DET_L
AUDIO_LO_MUTE_L	19	20	AUDIO_LI_OPTICAL_PLUG_L
	21	22	AUDIO_SPKR_MUTE_F
I2S0_MCLK_F	23	24	
I2S0_BITCLK_F	25	26	I2S0_RESET_L_F
I2S0_SYNC_F	27	28	I2S1_RESET_L_F
I2S0_SB_TO_DEV_DTO_F	29	30	
I2S0_DEV_TO_SB_DTI_F	31	32	INT_I2C_DATA2
	33	34	INT_I2C_CLK2
I2S1_BITCLK_F	35	36	
I2S1_SYNC_F	37	38	SLEEP_ANODE
I2S1_DEV_TO_SB_DTI_F	39	40	(SLEEP_LED_GND)
	43	44	

VER_1 516S0154

XW11 SM — This is an internal board short — SND_AGND

XW10 SM — +3V_SLEEP ↔ +3V_SLEEP_AUDIO — This is an internal board short

L77 FERR-220-OHM 0402 — SND_SYNC ↔ I2S0_SYNC_F

C895 0.01UF 20% 16V CERM 402 NO STUFF

L80 FERR-220-OHM 0402 — SND_CLKOUT ↔ I2S0_MCLK_F

C899 0.01UF 20% 16V CERM 402 NO STUFF

L81 FERR-220-OHM 0402 — INT_AUDIO_TO_SND ↔ I2S0_DEV_TO_SB_DTI_F

C896 0.01UF 20% 16V CERM 402 NO STUFF

L82 FERR-220-OHM 0402 — SND_TO_AUDIO ↔ I2S0_SB_TO_DEV_DTO_F

C897 0.01UF 20% 16V CERM 402 NO STUFF

L76 FERR-220-OHM 0402 — SND_AMP_MUTE_INV ↔ AUDIO_SPKR_MUTE_F

C898 0.01UF 20% 16V CERM 402 NO STUFF

L78 FERR-220-OHM 0402 — SND_HW_RESET_L ↔ I2S0_RESET_L_F

C900 0.01UF 20% 16V CERM 402 NO STUFF

L79 FERR-220-OHM 0402 — SND_SCLK ↔ I2S0_BITCLK_F

C901 0.01UF 20% 16V CERM 402 NO STUFF

L84 FERR-220-OHM 0402 — MOD_SYNC ↔ I2S1_SYNC_F

C81 0.01UF 20% 16V CERM 402 NO STUFF

L48 FERR-220-OHM 0402 — MOD_BITCLK ↔ I2S1_BITCLK_F

C82 0.01UF 20% 16V CERM 402 NO STUFF

L85 FERR-220-OHM 0402 — INT_MOD_DTI ↔ I2S1_DEV_TO_SB_DTI_F

C87 0.01UF 20% 16V CERM 402 NO STUFF

L86 FERR-220-OHM 0402 — AUDIO_SPDIF_RESET_L ↔ I2S1_RESET_L_F

C88 0.01UF 20% 16V CERM 402 NO STUFF

CAPS FOR EMI EXPERIMENTATION ONLY

KEEP STUFFING RESISTORS CLOSE TO ADT7467 CONTROLLER

R719 0 5% 1/16W MF 402 — CPU_M_DP ↔ THERM1_DP

R725 0 5% 1/16W MF 402 — CPU_M_DM ↔ THERM1_DM

R713 0 5% 1/16W MF 402 — SUPPLY_M_DP ↔ THERM2_DP

R716 0 5% 1/16W MF 402 — SUPPLY_M_DM ↔ THERM2_DM

KEEP STUFFING RESISTORS CLOSE TO ADT7467 CONTROLLER

R628 0 NO STUFF 5% 1/16W MF 402 — CPU_THERM_DP ↔ THERM1_DP

R620 0 5% 1/16W MF 402 — CPU_THERM_DM1 ↔ THERM1_DM

R723 0 NO STUFF 5% 1/16W MF 402 — THERM1_A_DP ↔ THERM1_DP

R726 0 NO STUFF 5% 1/16W MF 402 — THERM1_A_DM ↔ THERM1_DM

R710 0 NO STUFF 5% 1/16W MF 402 — THERM2_A_DP ↔ THERM2_DP

R717 0 NO STUFF 5% 1/16W MF 402 — THERM2_A_DM ↔ THERM2_DM

PLACE CAPS AS CLOSE TO THERMISTORS AS POSSIBLE

PLACE IN BETWEEN 3/5/1.5/2.5V PWR SUPPLY

PLACE CLOSE TO CPU

MAIN1

SUPPLY_M_DP — C681 0.001UF 50V CERM 402 — Q66 2N3904 SM — SUPPLY_M_DM

MAIN2

CPU_M_DP — C668 0.001UF 50V CERM 402 — Q39 2N3904 SM — CPU_M_DM

PLACE UNDERNEATH UPPER RAM

ALTERNATE1

THERM1_A_DP — C678 0.001UF 50V CERM 402 NO STUFF — Q47 2N3904 SM NO STUFF — THERM1_A_DM

PLACE CLOSE TO BATTERY CHARGER/VCORE

ALTERNATE2

THERM2_A_DP — C651 0.001UF 50V CERM 402 NO STUFF — Q62 2N3904 SM NO STUFF — THERM2_A_DM

MODEM

SUPPORTS BOTH THE LAST DASH AND Q52 SOFT MODEM

+5V_MAIN

R224 10K 5% 1/16W MF 402 NO STUFF

SND_AMP_MUTE_INV — Q33 2N7002 SM — SND_AMP_MUTE

R915 0 5% 1/16W MF 402

Q26 2N7002DW SOT-363

SND_AMP_MUTE ↔ SND_AMP_MUTE_L

AMP_CONTROL — R875 100K 5% 1/16W MF 402 — INT_PU_RESET_L

+5V_MAIN

R874 100K 5% 1/16W MF 402 — SND_AMP_MUTE

+5V_MAIN

C767 10UF 20% 6.3V CERM 805

C513 0.1UF 20% 10V CERM 402 NO STUFF

+3V_MAIN

R405 10K 5% 1/16W MF 402

C478 0.1UF 20% 10V CERM 402 NO STUFF

C469 10UF 20% 6.3V CERM 805

CRITICAL

J8 QT510166-L010 F-ST-SM1

MOD_DTO	1	2	MOD_SYNC
MOD_CLKOUT	3	4	INT_MOD_DTI
	5	6	MOD_BITCLK
COMM_RESET_L	7	8	
COMM_SHUTDOWN	9	10	MODEM_USB_DM
INT_I2C_CLK2	11	12	MODEM_USB_DP
INT_I2C_DATA2	13	14	COMM_RING_DET_L
	15	16	

+5V_MAIN

SERIAL_DEBUG CRITICAL J16 M-ST-5087 SM

COMM_TXD_L	1	10	COMM_DTR_L
COMM_TRXC	2	9	COMM_RTS_L
	3	8	
COMM_GPIO_L	4	7	COMM_RXD
	5	6	

SERIAL DEBUG INTERFACE

DEBUG POWER BUTTON

NO STUFF R527 0 5% 1/16W MF 603 — PWR_BUTTON_L

+3V_MAIN

R872 10K 5% 1/16W MF 402 — AUDIO_LO_MUTE_L

R689 100K 5% 1/16W MF 402

Q31 2N7002DW SOT-363 — SND_HP_MUTE

Q31 2N7002DW SOT-363 — SND_HP_MUTE_L

R873 100K 5% 1/16W MF 402 — AMP_CONTROL

+3V_MAIN

R814 10 5% 1/16W MF 402 — ADT7467_VCC

C904 1UF 20% 10V CERM 603

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
353S0608	1	IC,ADT7460,FAN,CTLR,16P,QSOP	U3	ADT7460

FAN CONTROLLER

+3V_SLEEP

ADT7460 R692 10K 5% 1/16W MF 402 — R293 10K 5% 1/16W MF 402 — R42 10K 5% 1/16W MF 402

ADT7460 R695 10K 5% 1/16W MF 402 — R295 10K 5% 1/16W MF 402

FAN INTERFACE

C711 0.1UF 20% 10V CERM 402

U3 ADT7467 QSOP

ADT7467_VCORE_MON	5	14	VCCP
INT_I2C_DATA1	16		SDA
INT_I2C_CLK1	1		SCL
THERM1_DP	13		D1+
THERM1_DM	12		D1-
THERM2_DP	11		D2+
THERM2_DM	10		D2-
		15	PWM1
		6	XTO
		5	TACH1
		7	PWM2
		8	TACH2
		4	PWM3
		9	TACH3
		2	TACH4/THERM#/SMBALERT#/GPIO
		3	GND

ADT7467 — SMBALERT# — CRITICAL

FAN1_PWM_L — FAN1_TACH — FAN2_PWM_L — FAN2_TACH

ADT7467_ADR_EN_L — ADT7460_TACH3_TP — ADT7467_THERM

C1000 1000PF 10% 50V CERM 402 NO STUFF

C690 0.001UF 20% 50V CERM 402 NO STUFF

C905 0.001UF 20% 50V CERM 402 NO STUFF

C688 0.001UF 20% 50V CERM 402 NO STUFF

C846 0.001UF 20% 50V CERM 402 NO STUFF

THERM ISOLATION

+3V_MAIN

R813 100K 5% 1/16W MF 402 — R811 100K 5% 1/16W MF 402 — R812 100K 5% 1/16W MF 402

+3V_PMU_AVCC

THERM_L_OC

Q87 2N7002DW SOT-363 — THERM_INV

Q87 2N7002DW SOT-363 — C903 0.1UF 20% 10V CERM 402 — ADT7467_THERM

DEBUG JUMPERS

NO STUFF R537 0 5% 1/16W MF 603 — PMU_NMI_BUTTON_L

NO STUFF R553 0 5% 1/16W MF 603 — PMU_RESET_BUTTON

LEFT FAN (CPU)

+5V_SLEEP

R679 10K 5% 1/16W MF 402 — ADT7467 R678 0 5% 1/16W MF 402 — FAN1_PWM_L

NO STUFF R910 10K 5% 1/16W MF 402 — R908 0 5% 1/16W MF 603 — CRITICAL J4 SM-2MT

+FAN1_PWR — FAN1_TACH — FAN1_PWM

ADT7460 Q78 2N7002DW SOT-363

C134 4.7UF 20% 10V CERM 1206 TO CONNECTOR PLACE CLOSE

RIGHT FAN (GPU)

+5V_SLEEP

R623 10K 5% 1/16W MF 402 — ADT7467 R679 0 5% 1/16W MF 402 — FAN2_PWM_L

NO STUFF R911 10K 5% 1/16W MF 402 — R909 0 5% 1/16W MF 603 — CRITICAL J2 SM-2MT

+FAN2_PWR — FAN2_TACH — FAN2_PWM

ADT7460 Q78 2N7002DW SOT-363

C135 4.7UF 20% 10V CERM 1206 PLACE CLOSE TO CONNECTOR

FAN/MODEM/SOUND/SLEEP LED/DEBUG

APPLE COMPUTER INC.

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0087	1	XTAL,CER,LW PROF,30.0000MHZ,8X4.5MM,SMD	Y5	CRITICAL	NEC_USB

Y7 LOAD CAPACITANCE IS 16PF

CRITICAL
OMIT
Y5
30.0000M
8X4.5MM-SM

NEC_USB U39
NEC_UPD720101_USB2
FBGA

Low/Full/High Speed (External)

SERR_L AND PERR_L
HAS DEDICATED PULL-UP
FOR BOTH CBUS AND USB2

Series Rpaks required to facilitate NAND-tree testing

NEED PULL-UP RESISTORS IN CASE USB 1.0 IS USED FOR PORT POWER

PLACE NEAR J3

SUTRO CONNECTOR

PLACE NEAR J12

BUBBA CONNECTOR

INTREPID USB CONSTRAINTS

USB_DAM	USB_DA	5 MIL SPACING	14
USB_DAP	USB_DA	5 MIL SPACING	14
USB_DCM	USB_DC	5 MIL SPACING	14
USB_DCP	USB_DC	5 MIL SPACING	14
USB_D1M	USB_D1	5 MIL SPACING	14 27
USB_D1P	USB_D1	5 MIL SPACING	14 27
USB_D2M	USB_D2	5 MIL SPACING	
USB_D2P	USB_D2	5 MIL SPACING	

USB 2.0

APPLE COMPUTER INC.

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Ethernet routing priority:
1. Decoupling caps
2. TX SERIES TERMINATION - LOCATE NEAR LINK
3. RX SERIES TERMINATION - LOCATE NEAR PHY

All differential signals should be close, parallel, matched lengths, with minimum via count, and short if possible

Must maintain 50-ohms trace impedance on all MDI pairs and all RJ45 pairs

Sandwich each RJ54 pair between chassis grounds

+3V_MAIN

R633 10K 5% 1/16W MF 402 — JTAG_ASIC_TDI 28 40

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
338S0223	338S0079		U49	88EE1111 B1

+3V_MAIN

NO STUFF R333 0 5% 1/10W MF 402 — 3405_MODE

R319 0 5% 1/10W MF 402

C442 10uF 20% 6.3V CERM 805

U14 LTC3405 SOT23-6: VIN, RUN, MODE, GND, CRITICAL SW, VFB

LTC3405_SW 39

CRITICAL L5 3.3uH SM1

+1_0V_MARVELL

R334 665K 1% 1/16W MF 402 R2A

C471 22PF 50V CERM 402

R361 49.9K 1% 1/16W MF 402 R2B

C486 10uF 20% 6.3V CERM 805

3405_VFB

R362 162K 1% 1/16W MF 402 R1

VOUT = 0.8V*(1+R2EQV/R1)

R2EQV = R2A||R2B

PLACE ALL SERIES RES CLOSE TO PHY

R370 0 5% 1/16W MF 402 — CLKENET_LINK_TX ↔ CLKENET_PHY_TX

R353 0 5% 1/16W MF 402 — CLKENET_LINK_RX ↔ CLKENET_PHY_RX

R344 0 5% 1/16W MF 402 — CLKENET_LINK_GBE_REF ↔ CLKENET_PHY_GBE_REF

CRITICAL U49 88E1111 BCC

TX_CLK, RX_CLK, 125CLK, TXD0–TXD7, TX_EN, TX_ER, GTX_CLK, RXD0–RXD7, RX_DV, RX_ER, CRS, COL, MDC, MDIO, INT-/INT+, RESET, COMA, S_IN+/-, S_OUT+/-, S_CLK+/-, HSDAC+/-, XTAL1, XTAL2, VSSC

CTRL10 — NC

DVDD: C492 0.1UF, C511 0.01UF, C517 0.1UF, C502 0.01UF, C465 0.1UF, C475 0.01UF

PLACE CAPS (IN ORDER) ON PINS 1, 6, 10/15, 57/62, 67/71, 85

VDDO: C464 0.1UF, C472 0.01UF, C453 0.1UF, C503 0.01UF, C501 0.1UF, C496 10uF

39 28 +2_5V_MARVELL

PLACE CAPS (IN ORDER) ON PINS 5, 21/26, 48/52, 66/72, 88, 96

VDDOH

VDDOX

+2_5V_MARVELL_AVDD — L34 FERR-EMI-600-OHM SM

AVDD: C497 0.1UF, C504 0.01UF, C487 0.1UF, C476 0.01UF, C754 10uF

PLACE CAPS (IN ORDER) ON PINS 32/35, 36/40, 45 & 78

+2_5V_MARVELL

R371 10K 5% 1/16W MF 402

R345 10K 5% 1/16W MF 402

R354 1.5K 1% 1/16W MF 402

R343 1K 5% 1/16W MF 402 — INT_ENET_RST_L1

D1 1N914 SOT23 — IO_RESET_L ↔ ENET_RST_L

ENET_COMA

C755 2.2uF 20% 10V CERM 805

Q15 2N7002DW SOT-363 — AC_IN

Q15 2N7002DW SOT-363 — SLEEP_L_LS5

PLACES PHY IN "COMA" MODE WHEN ASLEEP ON BATTERY (SAVES POWER)

ENET_HSDACP, ENET_HSDACM

CLK25M_ENET_XIN, CLK25M_ENET_XOUT

ENET_VSSC

NO STUFF R435 20K 5% 1/16W MF 402

PUT CRYSTAL CIRCUIT CLOSE TO PHY

OMIT CRITICAL Y3 25.0000M 8X4.5MM-SM — CLK25M_XTAL_IN

C555 33PF 50V CERM 402

C491 33PF 50V CERM 402

Y3'S LOAD CAPACITANCE IS 20PF

R427 0 5% 1/16W MF 402

NO STUFF R393 49.9 1% 1/16W MF 402

NO STUFF R403 49.9 1% 1/16W MF 402

R335 10K 5% 1/16W MF 402

R380 4.99K 1% 1/16W MF 402

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0086	1	XTAL,CER,25MHZ,.005%,20PF,8X4.5MM,SMD	Y3	CRITICAL	?

LED_LINK10, LED_LINK100, LED_LINK1000 (NC), LED_DUPLEX (NC), LED_RX → LED_RX SPN, LED_TX (NC)

CONFIG0 (000), CONFIG1 (000), CONFIG2 (111), CONFIG3 (110), CONFIG4 (111), CONFIG5 (101), CONFIG6 (000)

SEE CONFIG TABLES (BELOW)

TDI, TDO → JTAG_ENET_TDO 13, TCK, TMS, TRST → JTAG_ASIC_TDI 28 40 / JTAG_ASIC_TCK 13 40 / JTAG_ASIC_TMS 13 40 / JTAG_ASIC_TRST_L 13 40

RSET → ENET_RSET

SEL_OSC (NC), SEL_2.5V

GND 97

MDI0+/-, MDI1+/-, MDI2+/-, MDI3+/- ↔ MDI_P<0>/M<0> … MDI_P<3>/M<3>

R346 49.9 1% 1/16W MF 402 — R355 49.9 … MDI0_PD — C454 0.01UF

R372 49.9 … R381 49.9 … MDI1_PD — C477 0.01UF

R404 49.9 … R406 49.9 … MDI2_PD — C493 0.01UF

R413 49.9 … R428 49.9 … MDI3_PD — C505 0.01UF

PLACE RESISTORS CLOSE TO PHY

+2_5V_MAIN

R465 0 5% 1/10W MF 805

PLACE CLOSE TO ETHERNET CONNECTOR

R438 0 5% 1/10W MF 805 — CHGND1

C488 0.1UF, C466 0.1UF, C506 0.1UF, C520 0.1UF

PLACE CAPS AT TRANSFORMER PINS 1, 4, 7 & 10

CRITICAL J17 RJ45 RT-TH

RJ45_DP<0>, RJ45_C0_PD, RJ45_DN<0>, RJ45_DP<1>, RJ45_C1_PD, RJ45_DN<1>, RJ45_DP<2>, RJ45_C2_PD, RJ45_DN<2>, RJ45_DP<3>, RJ45_C3_PD, RJ45_DN<3>

SM XFR-ENET-1000BT T1 CRITICAL

Short shielded RJ-45 — CHGND1

R735 75 5% 1/16W MF 402

R733 75 5% 1/16W MF 402

R382 75 5% 1/16W MF 402

R347 75 5% 1/16W MF 402 — ENET_CTAP_CHGND 39

C457 100PF 10% 2KV CERM 1808 — CHGND1

CONFIG DEFINITIONS	
PIN	BIT[2:0]
VDDO	111
LED_LINK10	110
LED_LINK100	101
LED_LINK1000	100
LED_DUPLEX	011
LED_RX	010
LED_TX	001
VSS	000

CONFIG INPUTS			
PIN	BIT[2]	BIT[1]	BIT[0]
CONFIG<0>	PHYADR[2]	PHYADR[1]	PHYADR[0]
CONFIG<1>	ENA_PAUSE	PHYADR[4]	PHYADR[3]
CONFIG<2>	ANEG[3]	ANEG[2]	ANEG[1]
CONFIG<3>	ANEG[0]	ENA_XC	DIS_125
CONFIG<4>	MODE[2]	MODE[1]	MODE[0]
CONFIG<5>	DIS_FC	DIS_SLEEP	MODE[3]
CONFIG<6>	SEL_BDT	INT_POL	75/50 OHM

MARVELL 88E1111 10/100/1000 ETHERNET

APPLE COMPUTER INC.

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PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S0011	197S0052	?	G1	SIWARD ALT FOR FW OSC

DSX STRAP OPTIONS

0 -> BILINGUAL PORT

1 -> A-ONLY PORT

PLACE NEAR PHY

PLACE NEAR PHY

VOUT = 1.22*(1+R2/R1)+ IADJ*R2

IADJ = 30NA AT 25C

CAPACITOR IN CONJUCTION WITH INTERNAL PULLUP PROVIDES RESET PULSE WHEN PHY FIRST RECEIVES POWER

FIREWIRE

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APPLE COMPUTER INC.

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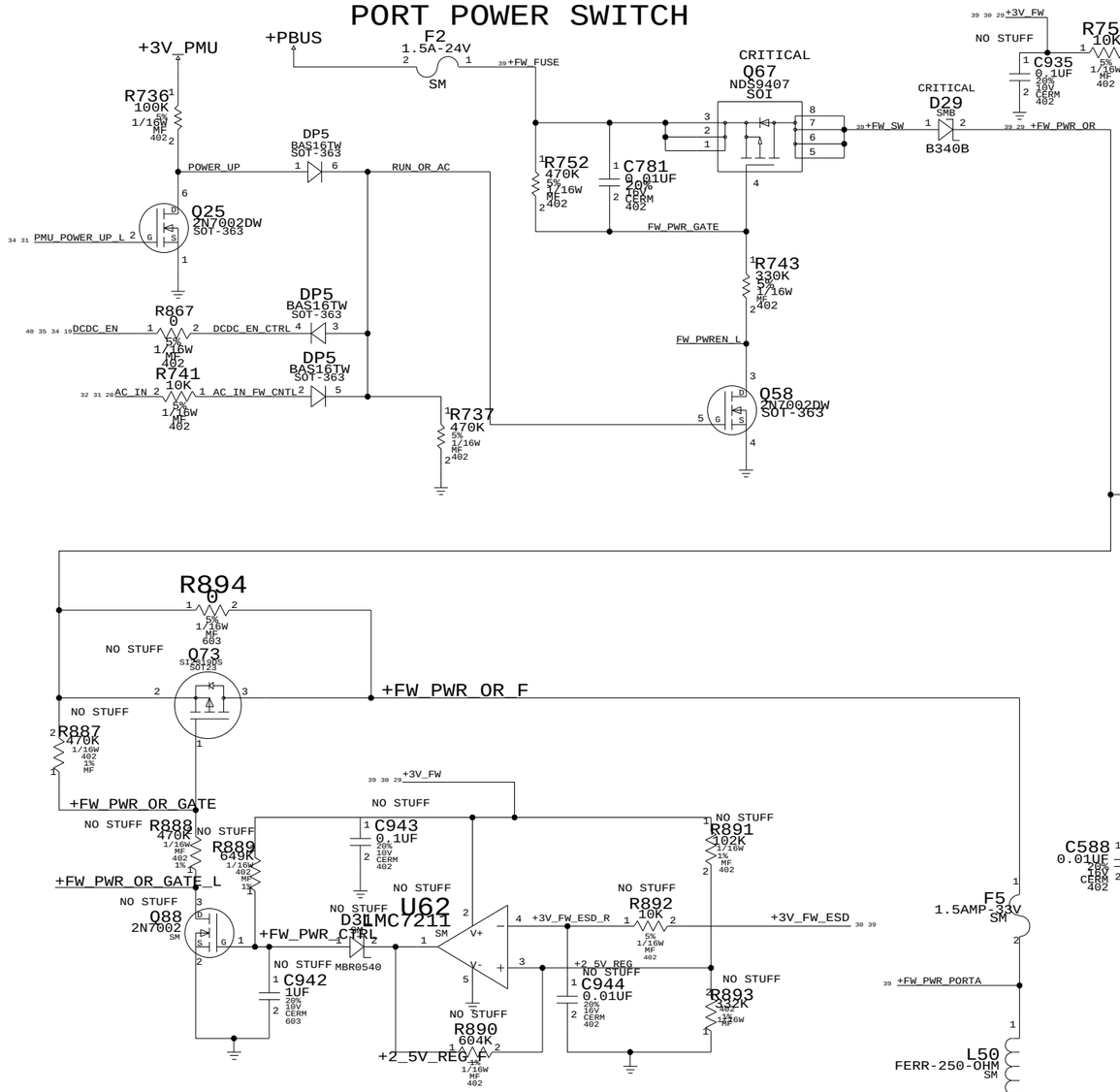
PORT POWER SWITCH



ENABLES PORT POWER WHEN MACHINE IS RUNNING, SHUTDOEN OR WHEN ASLEEP ON AC

STATE	PMU_POWER_UP_L	POWER_UP	DCDC_EN	AC_IN	STUFF R867	NO STUFF R867
SHUTDOWN (AC)	1	0	0	1	OFF	ON
SLEEP (AC)	1	0	1	1	ON	ON
RUN (AC)	0	1	1	1	ON	ON
SHUTDOWN (BATT)	1	0	0	0	OFF	OFF
SLEEP (BATT)	1	0	1	0	OFF (PULL-DOWN RESISTOR)	OFF (PULL-DOWN RESISTOR)
RUN (BATT)	0	1	1	0	ON	ON
	2.99V	+3V_PMU	+4_6V_BU	+3V_PMU		

AREF NEEDS TO BE ISOLATED FROM ALL LOCAL GROUNDS PER 1394B SPEC

SO WHEN A BILINGUAL DEVICE IS PLUGGED TO BETA-ONLY DEVICE, THERE'S 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

FIREWIRE PORTS

APPLE COMPUTER INC.

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D	051-6694	C
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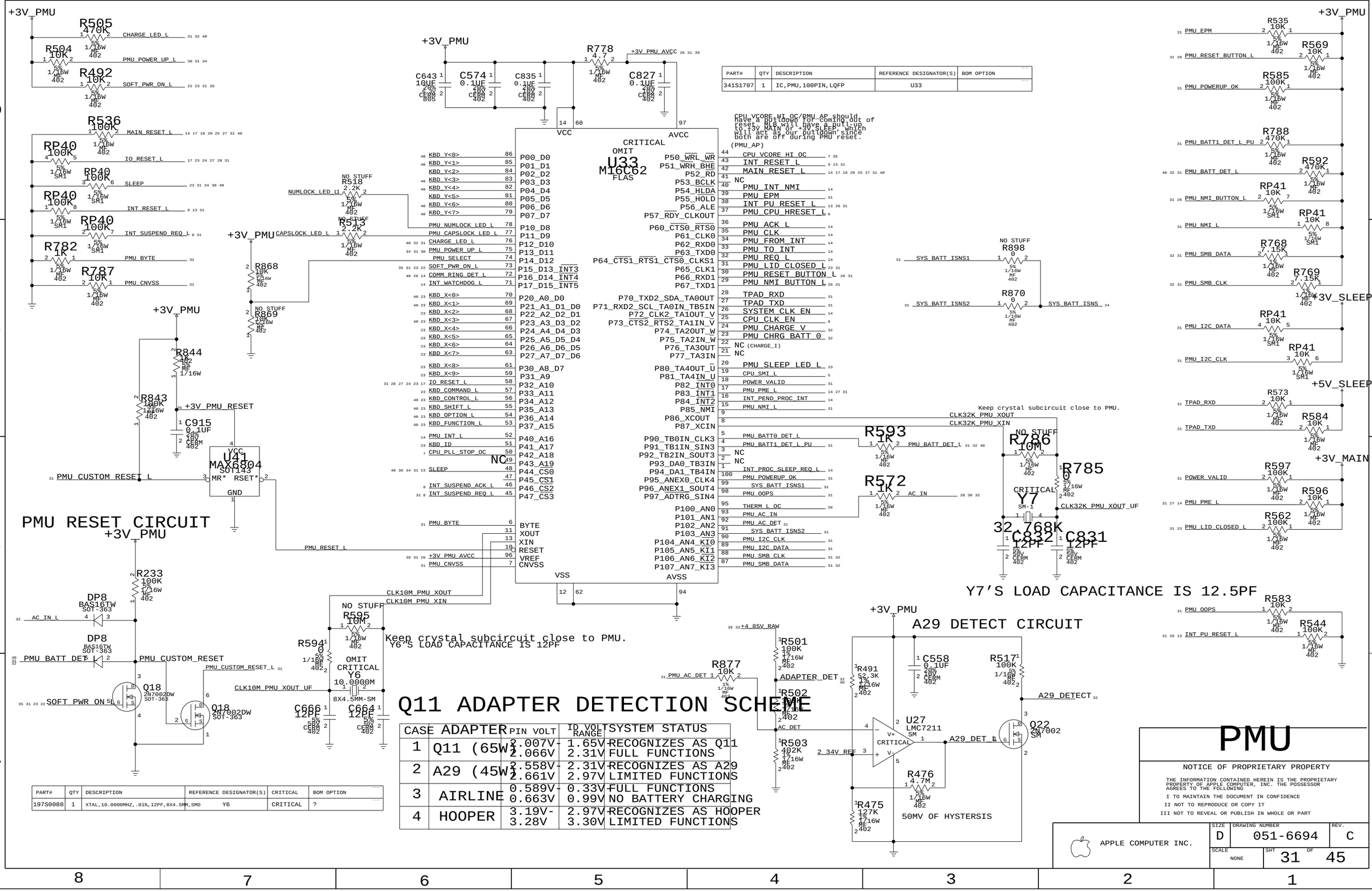

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
341S1707	1	IC,PMU,100PIN,LQFP	U33	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0088	1	XTAL,10.0000MHZ,.01%,12PF,8X4.5MM,SMD	Y6	CRITICAL	?

Q11 ADAPTER DETECTION SCHEME

CASE	ADAPTER	PIN VOLT	ID VOLT RANGE	SYSTEM STATUS
1	Q11 (65W)	2.007V-2.066V	1.65V-2.31V	RECOGNIZES AS Q11 FULL FUNCTIONS
2	A29 (45W)	2.558V-2.661V	2.31V-2.97V	RECOGNIZES AS A29 LIMITED FUNCTIONS
3	AIRLINE	0.589V-0.663V	0.33V-0.99V	FULL FUNCTIONS NO BATTERY CHARGING
4	HOOPER	3.19V-3.28V	2.97V-3.30V	RECOGNIZES AS HOOPER LIMITED FUNCTIONS

PMU

APPLE COMPUTER INC.

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DC POWER INPUT

(POWER JACK, ETC. ON SEPARATE BOARD)
CRITICAL

J18
87438-0833
M-RT-SM

CHARGE_LED_L
+ADAPTER
ADAPTER_DET

R396 20K 1% 1/16W MF 402
R395 102K 1% 1/16W MF 402
R375 10K 1% 1/16W MF 402
R364 102K 1% 1/16W MF 402
R365 57.6K 1% 1/16W MF 402

NO STUFF
C757 0.1UF 20% 50V CERM 805
PLACE CLOSE TO DC INPUT

+3V_PMU

C468 0.01UF 20% 16V CERM 402
R363 10K 5% 1/16W MF 402
R394 1M 5% 1/16W MF 402

U15 LMC7211 SM
CRITICAL
1V20_REF
AC_DIV
AC_IN
AC_IN_L

Q10 2N7002DW SOT-363
R383 470K 5% 1/16W MF 402
AC_ENABLE_L

GREATER THAN 13.5V DETECT

DC INRUSH LIMITER

+ADAPTER_SW
+ADAPTER_SENSE

Q13 SI4435DY SOI
Q16 SI4435DY SOI
GATE

R414 330K 5% 1/16W MF 402
C458 0.1UF 20% 50V CERM 805

R474 47K 5% 1/16W MF 402
AC_ENABLE_GATE
BCKFD_PROT_GATE

R374 470K 5% 1/16W MF 402
C592 0.01UF 20% 16V CERM 603
R499 68K 5% 1/16W MF 402
BCKFD_PROT_EN_L

Q21 2N7002DW SOT-363
AC_IN

PLACE U23 NEXT TO R460

U23 SENSE VOLTAGE DROP ACROSS R460

C572 0.010UF 20% 50V CERM 603

U23 MAX4172 TSSOP
RS+ RS-
NC1 NC2 OUT GND
CRITICAL
PG
MAX4172_OUT

+24V_PBUS

R466 10K 1% 1/16W MF 402
CURRENT_THRESHOLD

R454 2.21K 1% 1/16W MF 603
C883 0.1UF 10% 50V X7R 603-1

R460 0.025 1% 1W MF 2512
IF A29 ADAPTER USED, ADJUST CURRENT SETTING

R488 4.7 5% 1/16W MF 402
R498 4.7 5% 1/16W MF 402
1772_CSSP
1772_CSSN

R754 100K 1% 1/16W MF 402
D9 1N914 SOT23
R755 7K 1% 1/16W MF 402
C600 1UF 20% 50V CERM1 1210

1MSEC INTEGRATION TIME

R742 1K 1% 1/16W MF 402
C771 0.1UF 20% 16V CERM 402
IAC_RC_COMP

+3V_PMU

C772 0.1UF 20% 16V CERM 402
R747 42.2K 0.1% 1/16W 603

U50 SOT23
CRITICAL
IAC_FB
LTC1625_ITH
1625_COMP

DP4 BAS16TW SOT-363
R358 150 1% 1/16W MF 402
ADAPTER_I_REG

PLACE R358 CLOSE TO LTC1625
ROUTE LTC1625_ITH CAREFULLY

R738 42.2K 0.1% 1/16W MF 603
R734 82.5K 0.1% 1/16W MF 603
A29_CURRENT_ADJ

R739 51.1K 0.1% 1/16W MF 603
IF ADAPTER IS OVER 18V, ADJUST CURRENT SETTING
OVER_18V_ADJ

Q20 2N7002DW SOT-363
A29_DETECT
AC_GTR_18V

R748 100K 5% 1/16W MF 402
Q65 2N7002DW SOT-363
1772_ACOK

C775 1UF 20% 10V CERM 603

BATTERY SWITCH-OVER CIRCUIT

+BATT

F4 5AMP-125V SM-2
F3 5AMP-125V SM-2
+24V_PBUS
+PBUS
+BATT_24V_FUSE
+BATT_14V_FUSE

CRITICAL
Q24 SI4435DY SOI
GATE
Q76 SUD45P03 TO-252

R490 47K 5% 1/16W MF 402
R746 47K 5% 1/16W MF 402
BATT_24V_GATE
BATT_14V_GATE

R512 10K 5% 1/16W MF 402
R744 10K 5% 1/16W MF 402
BATT_24PBUS_EN
BATT_14PBUS_EN

DP4 BAS16TW SOT-363
R489 158K 1% 1/16W MF 402
AC_IN_L_RC
C593 10UF 20% 6.3V CERM 805

Q21 2N7002DW SOT-363

WHEN AC IS IN, P-CHANNEL FETS ARE QUICKLY (DIODE) TURNED OFF
WHEN AC IS NOT PLUGGED, P-CHANNEL FETS ARE ON
RC TIME IS 480K*10UF @ +3V_PMU

+3V_PMU
SWITCHER VOLTAGE CONTROL
PMU SELECTS BETWEEN TWO VOLTAGES

SWITCHER CURRENT CONTROL
CHARGE DISABLED BY PMU OR INPUT VOLTAGE < 13.5V
CHARGE THROTTLED BY LOW BATTERY VOLTAGE

R567 27.4K 1% 1/16W MF 402
R558 10K 1% 1/16W MF 402
R548 10K 1% 1/16W MF 402
OD OUTPUT LOW - WHEN AC GREATER THAN 13.5V

R560 4.12K 1% 1/16W MF 402
R565 48.7K 1% 1/16W MF 402
R566 1K 1% 1/16W MF 402
R542 1K 1% 1/16W MF 402

R561 100K 5% 1/16W MF 402
BATTV_HIGH
Q27 2N7002DW SOT-363
R580 23K 1% 1/16W MF 402
BATTV_LOW
Q27 2N7002DW SOT-363
PMU_CHARGE_V

Q29 2N7002DW SOT-363
BATT_LOW_L
Q29 2N7002DW SOT-363

R578 100K 5% 1/16W MF 402
Q30 2N7002DW SOT-363
CHARGE_DISABLE
Q30 2N7002DW SOT-363
PMU_CHRG_BATT_0

U31 MAX1772 QSOP
CRITICAL

1	DCIN	CSSP	27
11	ACIN	CSSN	26
12	ACOK	CELLS	16
13	RFIN	LDO	2
15	VCTL	DLOV	22
14	ICTL	BST	25
10	ICHG	DHI	24
28	IINP	LX	23
7	CCV	DLO	21
6	CCI	PGND	20
5	CCS	CSIP	19
4	REF = 4.096V	CSIN	18
3	REF_CLS	BATT	17
8	GND		
9			

1772_DCIN
1772_ACIN
1772_ACOK_L
(+3V_PMU)
1772_VCTL
1772_ICTL
1772_ICHG
1772_IINP
1772_CCV
1772_CCI
1772_CCS
1772_GND
1772_CELLS
1772_DLOV
1772_BST
1772_DHI
1772_LX
1772_DLO
(GND)
1772_CSIP
1772_CSIN

R526 1K 1% 1/16W MF 402
C622 0.01UF 20% 16V CERM 402
C616 0.01UF 20% 16V CERM 402
1772_CCV_RC
C621 0.1UF 20% 16V CERM 402
1772_REF
C630 1UF 20% 10V CERM 603
R497 1K 1% 1/16W MF 402
R487 10K 1% 1/16W MF 402
R473 4.12K 1% 1/16W MF 402
1772_CLS

R559 100K 1% 1/16W MF 402
C652 1UF 20% 10V CERM 603
C817 0.1UF 20% 25V CERM 603
C802 0.1UF 20% 25V CERM 603

XW19 SM
NO STUFF
C906 0.0022UF 10% 50V CERM 402

D10 1N914 SOT23
R571 33 5% 1/8W MF 1206
1772_LDO
1772_BST_ESR
R549 100K 5% 1/16W MF 402
C624 0.1UF 20% 25V CERM 603
R774 4.7 5% 1/16W MF 603
C608 0.1UF 20% 25V CERM 805

Q63 IRF7805 SM
CRITICAL
Q64 IRF7811W SO-8
CRITICAL

C547 2.2UF 10% 25V CERM 1812
C562 2.2UF 10% 25V CERM 1812
C563 2.2UF 10% 25V CERM 1812
C557 2.2UF 10% 25V CERM 1812
C564 2.2UF 10% 25V CERM 1812

L42 10UH SM1
CRITICAL
+BATT_RSNS
R763 0.05 1% 1W MF 2512
D30 MBRS140T3 SM
CRITICAL

C619 4.7UF 20% 25V CERM 1206
C632 4.7UF 20% 25V CERM 1206
C617 4.7UF 20% 25V CERM 1206
C824 33UF 20% 25V ELEC SMI
C631 4.7UF 20% 25V CERM 1206
C633 4.7UF 20% 25V CERM 1206
C618 4.7UF 20% 25V CERM 1206

R543 1 5% 1/16W MF 603
R511 1 5% 1/16W MF 603

+BATT_VSNS
+BATT_ISNS

BATTERY CONNECTOR
CRITICAL
J25
87438-0833
M-RT-SM

L9 FERR-EMI-100-OHM SM
L53 FERR-50-OHM SM
L10 FERR-EMI-100-OHM SM
L8 FERR-EMI-100-OHM SM
L12 FERR-50-OHM SM

+BATT_POS (BATT_IN_PD)
BATT_CLK
BATT_DATA
PMU_BATT_DET_L
BATT_NEG
PMU_SMB_CLK
PMU_SMB_DATA

R599 100K 1% 1/16W MF 402
R570 100K 1% 1/16W MF 402
C658 0.047UF 10% 16V CERM 402
BATT_DIV
1V65_REF

U38 LMC7211 SM
CRITICAL
BATT_LOW

R588 100K 1% 1/16W MF 402
R579 499K 1% 1/16W MF 402
C615 0.1UF 20% 16V CERM 402

R749 6.34K 1% 1/16W MF 402
A29_CLS_ADJ
Q65 2N7002DW SOT-363
A29_DETECT

C578 0.47UF 20% 6.3V CERM 1206
C579 0.47UF 20% 6.3V CERM 1206

$V_{BATT} = CELLS \times (4.096 + (0.4096 * V_{VCTL} / V_{REFIN}))$

For 4.15V cells, VCTL = 0.123 REFIN
For 4.20V cells, VCTL = 0.245 REFIN

$I_{CHG} = (0.2048/R_{62}) * (V_{ICTL} / V_{REFIN})$

BATTERY CHARGER

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 32 OF 45	

12.8V PBUS SUPPLY

PBUS HOLD-UP CAPS

BACKUP BATTERY / USB CONNECTOR

PMU SUPPLY

BOOTSTRAP SYSTEM FROM ADAPTER OR BATTERY

+PBUS IS BOTH AN INPUT AND OUTPUT TO BUBBA
24V IS AN OUTPUT FROM BUBBA

WHEN +24V_PBUS IS BELOW ~13.44V, 1625 IS SHUT-OFF

CONNECT LTC1625 TK PIN AT TOP-SIDE FET

KEEP VIN/TK LOOP SHORT

IF SUPERCAP BOM OPTION IS CHOSEN:
OUTPUT AT U30.1 IS 5.65V
INPUT AT U25.8 IS 5.4V

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
114S3575	1	RES,MF,1/16W/357K OHM,1%,0	402,SMD R521	?	SUPERCAP

12.8V REGULATOR

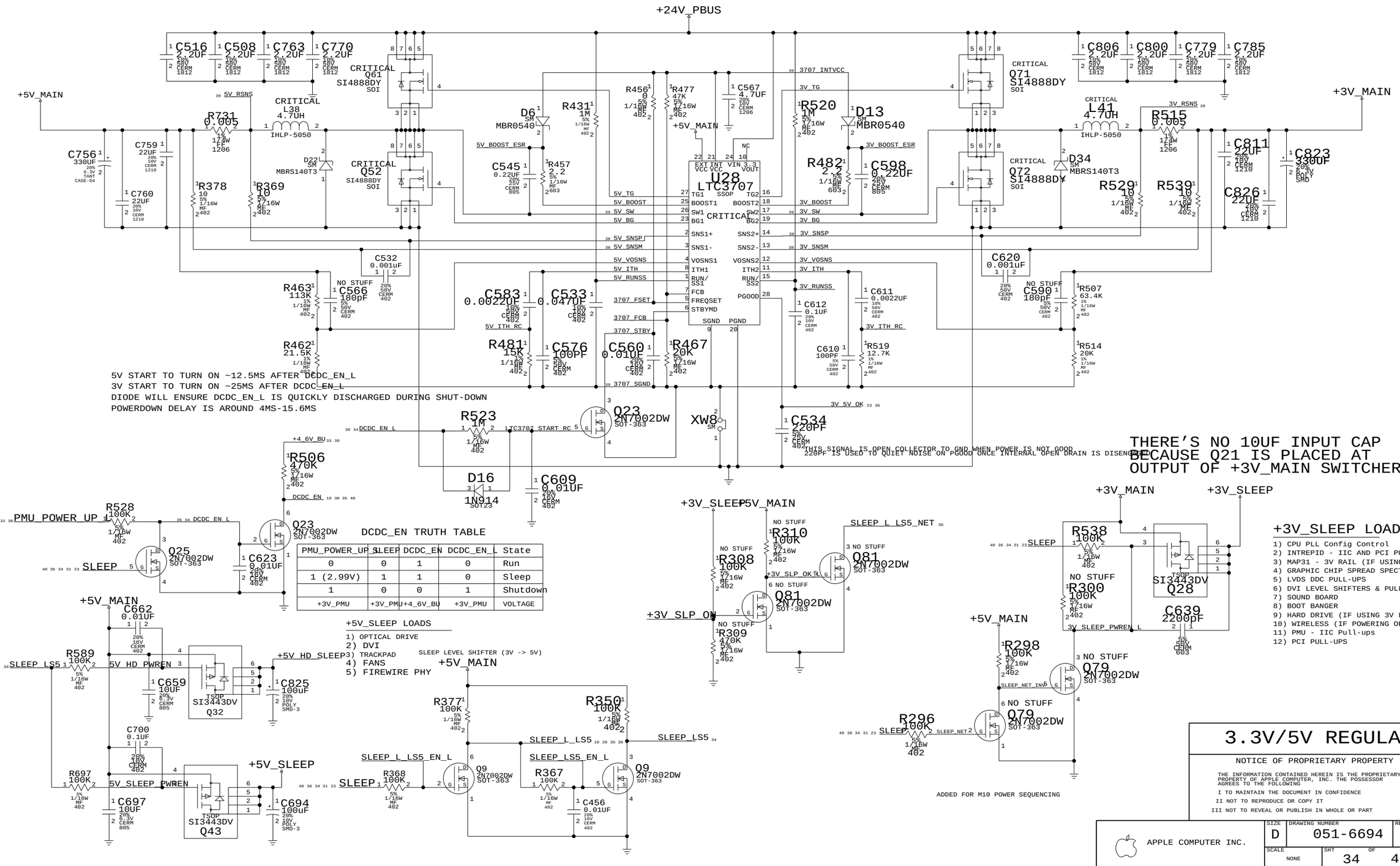
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C

SCALE: NONE

SHT 33 OF 45

3.3V/5V MAIN SUPPLY



5V START TO TURN ON ~12.5MS AFTER DCDC_EN_L
3V START TO TURN ON ~25MS AFTER DCDC_EN_L
DIODE WILL ENSURE DCDC_EN_L IS QUICKLY DISCHARGED DURING SHUT-DOWN
POWERDOWN DELAY IS AROUND 4MS-15.6MS

THERE'S NO 10UF INPUT CAP BECAUSE Q21 IS PLACED AT OUTPUT OF +3V_MAIN SWITCHER

DCDC_EN TRUTH TABLE

PMU_POWER_UP	SLEEP	DCDC_EN	DCDC_EN_L	State
0	0	1	0	Run
1 (2.99V)	1	1	0	Sleep
1	0	0	1	Shutdown
+3V_PMU	+3V_PMU	+4_6V_BU	+3V_PMU	VOLTAGE

+5V_SLEEP LOADS

1) OPTICAL DRIVE
2) DVI
3) TRACKPAD
4) FANS
5) FIREWIRE PHY

+3V_SLEEP LOADS

1) CPU PLL Config Control
2) INTREPID - IIC AND PCI PULL-UPS
3) MAP31 - 3V RAIL (IF USING D3COLD)
4) GRAPHIC CHIP SPREAD SPECTRUM CHIP
5) LVDS DDC PULL-UPS
6) DVI LEVEL SHIFTERS & PULL-UPS & HPD
7) SOUND BOARD
8) BOOT BANGER
9) HARD DRIVE (IF USING 3V LOGIC)
10) WIRELESS (IF POWERING OFF IN SLEEP)
11) PMU - IIC Pull-ups
12) PCI PULL-UPS

ADDED FOR M10 POWER SEQUENCING

3.3V/5V REGULATOR

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C

SCALE	SHT	OF
NONE	34	45

VCORE POWER SEQUENCING

CPU core follows CPU I/O voltage
(approx. 7ms delay)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
152S0242	1	IND,PWR,1.0UH,20,20.5A,SMD	L36	CRITICAL	

OUTPUT VOLTAGE

V_{DAC} D4=0	V_{DAC} D4=1	D3	D2	D1	D0
2.00	1.275	0	0	0	0
1.95	1.250	0	0	0	1
1.90	1.225	0	0	1	0
1.85	1.200	0	0	1	1
1.80	1.175	0	1	0	0
1.75	1.150	0	1	0	1
1.70	1.125	0	1	1	0
1.65	1.100	0	1	1	1
1.60	1.075	1	0	0	0
1.55	1.050	1	0	0	1
1.50	1.025	1	0	1	0
1.45	1.000	1	0	1	1
1.40	0.975	1	1	0	0
1.35	0.950	1	1	0	1
1.30	0.925	1	1	1	0
NO CPU	NO CPU	1	1	1	1

FOR V-STEP:

D<4..0>	A/B_ = Hi/Fast	A/B_ = Lo/Slow
<= 1K PU	1	0
>= 100K PU	1	1
>= 100K PD	0	1
<= 1K PD	0	0

When A/B_ is high (fast): D4-D0 read as-is
When A/B_ is low (slow): <=1K-ohm -> 0
>=100K-ohm -> 1

If all pull-ups are >=100K and all pull-downs are <=1K, VB = V .

MAX1717 VID CAN TAKE 3.3V TO 5.5V INPUTS

1.67GHZ (WITHOUT VCORE OFFSET) 1.300V -> 0.975V

1.67GHZ (WITH VCORE OFFSET) 1.320V -> 0.990V
(CPU SPEC: 1.280V -> 0.980V)

SEL = 0; Y1=A1
SEL = 1; Y1=B1

Keep trace fat (40-100 mils) and short!!

Keep trace fat and short!!

Keep trace fat and short!!

Connect MAX1717 GND pin 13 to GND at bottom-side FET

GROUND SENSE VOLTAGE DIVIDER

This allows for an offset to the ground sense to adjust the output voltage.
VREF = 2.0V WITH A 0.85 SCALE FACTOR, HENCE VOFFSET = 1.7V * (R1/(R1+R2)) AND VCORE = VDAC + VOFFSET.

NOTE: R310 (R2) NO STUFFED FOR NO OFFSET CASE

ROUTE AS DIFFERENTIAL PAIR

PLACE THIS SHORT AT PIN OF 1000uF CAP CLOSEST TO CPU

PLACE C423 CLOSE TO PINS 15 & 13!!!

FMAX CONNECTOR

J5 M-ST-SM-52465-1217

VCORE SUPPLY

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6694 | REV. C
SCALE NONE | SHT 35 OF 45

1.5V/2.5V SWITCHER

+1_5V_SLEEP LOADS

1) AGP I/O - IF USING D3COLD
2) MAXBUS I/O - IF 1.5V INTERFACE

+1_5V_MAIN LOADS

1) INTREPID CORE
2) AGP I/O IF USING D3HOT

+2_5V_MAIN LOADS

1) MAP31 - FBCORE/FBIO IF USING D3HOT
2) GIGABIT ETHERNET - AVDDL
3) DDR SODIMMS - CORE/IO
4) DDR MUXES
5) CLOCK SLEWING I/O
6) PCI1510 CORE

+2_5V_SLEEP LOADS

1) FBCORE/FBIO IF USING D3COLD
2) INTREPID MEMORY I/O

THERE'S 100K PULL-UP ON PG 31 ALREADY

DIODE PROVIDE PROVIDE QUICK SHUT DOWN
POWER DOWN DELAY 1.5MS TO 2.5MS

CHANGE R424 BACK TO 10K, 1%, AND STUFF 5.11K FOR 1.5V OPERATION
CONNECTING 1_5V_FB TO GND, FORCES 1.8V OUTPUT

1.8V SWITCHER

+1_8V_MAIN LOADS

1) INTREPID PLLS

+1_8V_SLEEP LOADS

1) MPC7450 - MAXBUS I/O - IF 1.8V INTERFACE
2) CPU JTAG & MaxBus Pull-ups
3) CPU PLL Config Straps
4) OPTIONAL VIDEO MEMORY (M10 PRO ONLY)

CONTINUOUS MODE

BURST MODE
NO STUFF

1.5V/1.8V/2.5V SUPPLIES

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SIZE	DRAWING NUMBER	REV.
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SCALE: NONE	SHT 36 OF 45	

DIGITAL SIGNALS

GROUP	SIG_NAME		MAX_VIAS	MAX_EXPOSED_LENGTH	STUB_LENGTH	NET_SPACING_TYPE	PULSE_TESTPULSE_PARAM	
MAXBUS	CPU_AACK_L				250.0000	10 MIL SPACING		5 8
	CPU_ADDR<0..31>		5		250		83 MHZ	5 8
	CPU_ARTRY_L				250.0000	10 MIL SPACING		5 8
	CPU_BG_L				250.0000	10 MIL SPACING		5 8
	CPU_BR_L				250.0000	10 MIL SPACING		5 8
	CPU_CI_L		5		250.0000			5 8
	CPU_DATA<0..31>		5		250		83 MHZ	6 8
	CPU_DATA<32..63>		5		250		83 MHZ	6 8
	CPU_DBG_L		5		250.0000	10 MIL SPACING		5 8
	CPU_DTI<0..2>		5		250			5 8
	CPU_DRDY_L_UF					10 MIL SPACING		
	CPU_DRDY_L				250.0000	10 MIL SPACING		5 8
	CPU_GBL_L		5		250.0000			5 8
	CPU_HIT_L				250.0000	10 MIL SPACING		5 8
	CPU_QACK_L		5		250.0000	10 MIL SPACING		5 8
	CPU_QREQ_L				250.0000	10 MIL SPACING		5 8
	CPU_TA_L				250.0000	10 MIL SPACING		5 8
	CPU_TBST_L		5		250.0000	10 MIL SPACING		5 8
	CPU_TEA_L				250.0000			5 8
	CPU_TS_L				250.0000	10 MIL SPACING		5 8
	CPU_TSIZ<0..2>		5		250			5 8
	CPU_TT<0..4>		5		250			5 8
	CPU_WT_L		5		250.0000			5 8
GROUP 0	MEM_DATA<7..0>		4		200		167 MHZ	9 10
	RAM_DATA_A<7..0>		4		200		167 MHZ	10 11
	RAM_DATA_B<7..0>		4		200		167 MHZ	10 11
	MEM_DQS<0>			TOTAL LENGTH CONTROLLED BY SPREADSHEET	200			9 10
	RAM_DQS_A<0>		4		200			10 11
	RAM_DQS_B<0>		4		200			10 11
	MEM_DQM<0>		4		200			9 10
	RAM_DQM_A<0>		4		200			10 11
	RAM_DQM_B<0>		4		200			10 11
GROUP 1	MEM_DATA<15..8>		4		200		167 MHZ	9 10
	RAM_DATA_A<15..8>		4		200		167 MHZ	10 11
	RAM_DATA_B<15..8>		4		200		167 MHZ	10 11
	MEM_DQS<1>		4	TOTAL LENGTH CONTROLLED BY SPREADSHEET	200			9 10
	RAM_DQS_A<1>		4		200			10 11
	RAM_DQS_B<1>		4		200			10 11
	MEM_DQM<1>				200			9 10
	RAM_DQM_A<1>		4		200			10 11
	RAM_DQM_B<1>		4		200			10 11
GROUP 2/3	MEM_DATA<31..16>		4		200		167 MHZ	9 10
	RAM_DATA_A<31..16>		4		200		167 MHZ	10 11
	RAM_DATA_B<31..16>		4		200		167 MHZ	10 11
	MEM_DQS<3..2>		4	TOTAL LENGTH CONTROLLED BY SPREADSHEET	200		167 MHZ	9 10
DDR RAM	RAM_DQS_A<3..2>		4		200		167 MHZ	10 11
	RAM_DQS_B<3..2>		4		200		167 MHZ	10 11
	MEM_DQM<3..2>		4		200		167 MHZ	9 10
	RAM_DQM_A<3..2>		4		200		167 MHZ	10 11
	RAM_DQM_B<3..2>		4		200		167 MHZ	10 11
GROUP 4/5	MEM_DATA<47..32>		4		200		167 MHZ	9 10
	RAM_DATA_A<47..32>		4		200		167 MHZ	10 11
	RAM_DATA_B<47..32>		4		200		167 MHZ	10 11
	MEM_DQS<5..4>		4	TOTAL LENGTH CONTROLLED BY SPREADSHEET	200		167 MHZ	9 10
	RAM_DQS_A<5..4>		4		200		167 MHZ	10 11
	RAM_DQS_B<5..4>		4		200		167 MHZ	10 11
	MEM_DQM<5..4>		4		200		167 MHZ	9 10
	RAM_DQM_A<5..4>		4		200		167 MHZ	10 11
	RAM_DQM_B<5..4>		4		200		167 MHZ	10 11
GROUP 6	MEM_DATA<55..48>		4		200		167 MHZ	9 10
	RAM_DATA_A<55..48>		4		200		167 MHZ	10 11
	RAM_DATA_B<55..48>		4		200		167 MHZ	10 11
	MEM_DQS<6>		4	TOTAL LENGTH CONTROLLED BY SPREADSHEET	200			9 10
	RAM_DQS_A<6>				200			10 11
	RAM_DQS_B<6>		4		200			10 11
	MEM_DQM<6>				200			9 10
	RAM_DQM_A<6>		4		200			10 11
	RAM_DQM_B<6>		4		200			10 11
GROUP 7	MEM_DATA<63..56>		4		200		167 MHZ	9 10
	RAM_DATA_A<63..56>		4		200		167 MHZ	10 11
	RAM_DATA_B<63..56>		4		200		167 MHZ	10 11
	MEM_DQS<7>		4	TOTAL LENGTH CONTROLLED BY SPREADSHEET	200			9 10
	RAM_DQS_A<7>				200			10 11
	RAM_DQS_B<7>				200			10 11
	MEM_DQM<7>		4		200			9 10
	RAM_DQM_A<7>		4		200			10 11
	RAM_DQM_B<7>		4		200			10 11
ADDR	MEM_ADDR<12..0>		4				83 MHZ	9
	RAM_ADDR<12..0>		6		200			9 11
	MEM_BA<1..0>		4					9
	RAM_BA<1..0>		6		200			9 11
CONTROL	MEM_CS_L<3..0>		4					9
	RAM_CS_L<3..0>		6		200			9 11
	MEM_CKE<3..0>		4					9
	RAM_CKE<3..0>		6		200			9 11
	MEM_RAS_L		4					9
	RAM_RAS_L				200.0000			9 11
	MEM_CAS_L		4					9
	RAM_CAS_L				200.0000			9 11
	MEM_WE_L		4					9
	RAM_WE_L				200.0000			9 11
	MEM_MUXSEL_H<1..0>		3					9 10
	MEM_MUXSEL_L<1..0>		3					9 10
	RAM_MUXSEL_H		5					10
	RAM_MUXSEL_L		5					10

CLOCK LINE CONSTRAINTS

GROUP	SIG_NAME			MAX VIAS	MAX EXPOSED LENGTH	STUB_LENGTH	NET_SPACING_TYPE	PULSE PARAM	
INTREPID CLOCKS	SYSCLK_CPU_UF						10 MIL SPACING		8
	SYSCLK_CPU			4		200.0000	10 MIL SPACING		5 8
	INT_CPUFB_OUT			3			10 MIL SPACING		8
	INT_CPUFB_OUT_SHORT			3			10 MIL SPACING		8
	INT_CPUFB_OUT_NORM			3			10 MIL SPACING		8
	INT_CPUFB_IN_NORM			3			10 MIL SPACING		8
	INT_CPUFB_LONG			3			10 MIL SPACING		8
	INT_CPUFB_IN					200.0000	10 MIL SPACING		8
	SYSCLK_DDRCLK_A0_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_A0_L_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_A1_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_A1_L_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_B0_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_B0_L_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_B1_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_B1_L_UF			3		200.0000	10 MIL SPACING		9
	SYSCLK_DDRCLK_A0	DDRCLK_A0		3		200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_A0_L	DDRCLK_A0				200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_A1	DDRCLK_A1		3		200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_A1_L	DDRCLK_A1				200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_B0	DDRCLK_B0		3		200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_B0_L	DDRCLK_B0		3		200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_B1	DDRCLK_B1		3		200.0000	10 MIL SPACING		9 11
	SYSCLK_DDRCLK_B1_L	DDRCLK_B1		3		200.0000	10 MIL SPACING		9 11
	INT_REF_CLK_OUT			3		200.0000	10 MIL SPACING		14
	INT_REF_CLK_IN					200.0000	10 MIL SPACING		14
	CLK66M_GPU_AGP_UF					200.0000	10 MIL SPACING		12
	CLK66M_GPU_AGP			4		200.0000	10 MIL SPACING		12 18
	INT_AGP_FB_OUT					200.0000	10 MIL SPACING		12
	INT_AGP_FB_IN			4		200.0000	10 MIL SPACING		12
	CLK33M_CBUS_UF					200.0000	10 MIL SPACING		12
	CLK33M_CBUS		SHOULD BE AT MOST 4 VIAS FOR CLK	6		200.0000	10 MIL SPACING		12 17
	CLK33M_AIRPORT_UF					200.0000	10 MIL SPACING		12
	CLK33M_AIRPORT		SHOULD BE AT MOST 4 VIAS FOR CLK	6		200.0000	10 MIL SPACING		12 25 40
	CLK33M_USB2_UF					200.0000	10 MIL SPACING		12
	CLK33M_USB2		SHOULD BE AT MOST 4 VIAS FOR CLK	6		200.0000	10 MIL SPACING		12 27
	INT_PCI_FB_OUT					200.0000	10 MIL SPACING		12
	INT_PCI_FB_IN			3		200.0000	10 MIL SPACING		12
MAP31	GPU_CLK27M_OUT						10 MIL SPACING		
	GPU_CLK27M_UF						10 MIL SPACING		
	GPU_SSCLK_UF						10 MIL SPACING		
	GPU_SSCLK_IN						10 MIL SPACING		
	GPU_FBCLK0						10 MIL SPACING		
	GPU_FBCLK0_L						10 MIL SPACING		
	GPU_FBCLK1						10 MIL SPACING		
	GPU_FBCLK1_L						10 MIL SPACING		
	GPU_DVO_CLKP						10 MIL SPACING		19
CRYSTALS	CLK27M_GPU_XOUT						10 MIL SPACING		
	CLK27M_XTAL_IN						10 MIL SPACING		
	CLK27M_GPU_XIN						10 MIL SPACING		
	CLK18M_INT_XIN						10 MIL SPACING		14
	CLK18M_INT_XOUT						10 MIL SPACING		14
	CLK18M_XTAL_IN						10 MIL SPACING		14
	CLK18M_INT_EXT						10 MIL SPACING		14
	CLK25M_ENET_XIN						10 MIL SPACING		28
	CLK25M_ENET_XOUT						10 MIL SPACING		28
	NEC_XT1						10 MIL SPACING		27
	NEC_XT2		THERE'S ANOTHER 280MIL LEG				10 MIL SPACING		27
SOUND	SND_SCLK			7		200.0000	10 MIL SPACING		14 26 40
	SND_CLKOUT					200.0000	10 MIL SPACING		14 26 40
ETHERNET MARVELL	CLKENET_PHY_RX					200.0000			28
	CLKENET_LINK_RX			3		200.0000	10 MIL SPACING		13 28
	CLKENET_PHY_GBE_REF					200.0000			28
	CLKENET_LINK_GBE_REF			3		200.0000	10 MIL SPACING		13 28
	CLKENET_PHY_TX					200.0000			28
	CLKENET_LINK_TX			5		200.0000	10 MIL SPACING		13 28
	CLKENET_LINK_GTX					200.0000			13
	CLKENET_PHY_GTX			3		200.0000	10 MIL SPACING		13 28
FIREWIRE	CLKFW_PHY_PCLK					200.0000			29
	CLKFW_LINK_PCLK			3		200.0000	10 MIL SPACING		13 29
	CLKFW_PHY_LCLK			3		200.0000	10 MIL SPACING		13 29
	CLKFW_LINK_LCLK					200.0000			13
	FW_XI					200.0000	10 MIL SPACING		29
	FW_OSC					200.0000	10 MIL SPACING		29

SIGNAL CONSTRAINTS - PAGE 1

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Digital Signals (cont'd)

GROUP	SIG_NAME	DELAY_RULE	MAX_VIAS	MAX_EXPOSED_LENGTH	STUB_LENGTH	NET_SPACING_TYPE	NO_TEST	PULSE_PARAM
AGP	AGP_AD<15..0>		5	100				66 MHZ
AGP BYTES 0-1	AGP_CBE<1..0>		5	100				66 MHZ
	AGP_AD_STB<0>		5	100		8 MIL SPACING		
	AGP_AD_STB_L<0>		5	100		8 MIL SPACING		
AGP BYTES 2-3	AGP_AD<31..16>		5	100				66 MHZ
	AGP_CBE<3..2>		5	100				66 MHZ
	AGP_AD_STB<1>		5	100		8 MIL SPACING		
	AGP_AD_STB_L<1>			100		8 MIL SPACING		
AGP SIDEBAND	AGP_SBA<7..0>		5	100				66 MHZ
	AGP_SB_STB			100.0000		8 MIL SPACING		
	AGP_SB_STB_L		5	100.0000		8 MIL SPACING		
AGP CONTROL	AGP_FRAME_L			250.0000				
	AGP_IRDY_L			250.0000				
	AGP_TRDY_L		6	250.0000				
	AGP_DEVSEL_L			250.0000				
	AGP_STOP_L		6	250.0000				
	AGP_PAR		6	250.0000				
	AGP_REQ_L			285.0000				
	AGP_GNT_L			250.0000				
	AGP_RBF_L			250.0000				
DVO	GPU_DVOD<0..23>		5	250				
	GPU_DVO_HSYNC							
	GPU_DVO_VSYNC							
PCI	PCI_AD<31..0>					MIN_DAISY_CHAIN		33 MHZ
	PCI_CBE<3..0>					MIN_DAISY_CHAIN		33 MHZ
	PCI_FRAME_L					MIN_DAISY_CHAIN		
	PCI_IRDY_L					MIN_DAISY_CHAIN		
	PCI_TRDY_L					MIN_DAISY_CHAIN		
	PCI_DEVSEL_L					MIN_DAISY_CHAIN		
	PCI_STOP_L					MIN_DAISY_CHAIN		
	PCI_PAR					MIN_DAISY_CHAIN		
ULTRA ATA-100	UIDE_DATA<15..8>				200			100 MHZ
	UIDE_DATA<7>			NEED TO MATCH DELAY TO 250	200			
	UIDE_DATA<6..0>				200			100 MHZ
	UIDE_ADDR<2..0>				200			100 MHZ
	UIDE_RST_L				200.0000			
	UIDE_DIOW_L				200.0000			
	UIDE_DIOR_L			10 MIL SPACING	200.0000			
	UIDE_DMACK_L				200.0000			
	UIDE_CS0_L				200.0000			
	UIDE_CS1_L				200.0000			
	UIDE_DMARQ				200.0000			
	UIDE_IOCHRDY			10 MIL SPACING	200.0000			
	UIDE_INTRQ				200.0000			
	HD_DATA<15..0>		5	TOTAL UIDE+HD SKEW <500MIL	200			100 MHZ
	HD_ADDR<2..0>		5		200			100 MHZ
	HD_RESET_L		5		200.0000			
	HD_DIOW_L		5		200.0000			
	HD_DIOR_L		5	10 MIL SPACING	200.0000			
	HD_DMACK_L		5		200.0000			
	HD_CS0_L		5		200.0000			
	HD_CS1_L		5		200.0000			
	HD_DMARQ				200.0000			
	HD_IOCHRDY		5	10 MIL SPACING	200.0000			
	HD_INTRQ		5					
EIDE INTREPID	EIDE_DATA<15..0>							33 MHZ
	EIDE_ADDR<2..0>							33 MHZ
	EIDE_CS0_L							
	EIDE_CS1_L							
	EIDE_RD_L							
	EIDE_WR_L							
	EIDE_IOCHRDY							
	EIDE_INT							
	EIDE_RST_L							
	EIDE_DMACK_L							
	EIDE_DMARQ							
OPTICAL	EIDE_OPTICAL_DATA<15..0>							33 MHZ
	EIDE_OPTICAL_ADDR<2..0>							33 MHZ
	EIDE_OPTICAL_CS0_L							
	EIDE_OPTICAL_CS1_L							
	EIDE_OPTICAL_RD_L							
	EIDE_OPTICAL_WR_L							
	EIDE_OPTICAL_IOCHRDY							
	EIDE_OPTICAL_INT							
	EIDE_OPTICAL_RST_L							
	EIDE_OPTICAL_DMAACK_L							
	EIDE_OPTICAL_DMA_RQ							
ETHERNET MII	ENET_LINK_RXD<7..0>		5					
	ENET_RX_DV							
	ENET_RX_ER							
	ENET_PHY_TXD<7..0>		5					
	ENET_LINK_TXD<7..0>							
	ENET_PHY_TX_ER		5					
	ENET_LINK_TX_ER							
	ENET_PHY_TX_EN		5					
	ENET_LINK_TX_EN							
	ENET_MDIO							
	ENET_MDC							
	ENET_COL							
	ENET_CRS							
FIREWIRE MII	FW_LINK_DATA<7..0>		5					
	FW_PHY_DATA<7..0>		5					
	FW_LINK_CNTL<1..0>							
	FW_PHY_CNTL<1..0>							
	FW_LINK_LREQ							
	FW_PHY_LREQ							
	FW_PINT							

Differential Signals

GROUP	SIG_NAME	DIFFERENTIAL_PAIR	MAX_EXPOSED_LENGTH	NET_SPACING_TYPE	MAX_VIAS
ETHERNET	MDI_M<0>	ENET_MDI0			
	MDI_P<0>	ENET_MDI0			
	MDI_M<1>	ENET_MDI1	SPACING DELETED BECAUSE		
	MDI_P<1>	ENET_MDI1	OF PHYSICAL CONSTRAINTS		
	MDI_M<2>	ENET_MDI2	AROUND MARVELL PHY		
	MDI_P<2>	ENET_MDI2			
	MDI_M<3>	ENET_MDI3			
	MDI_P<3>	ENET_MDI3			
	RJ45_DN<0>	RJ45_DP0		10 MIL SPACING	
	RJ45_DP<0>	RJ45_DP0		10 MIL SPACING	
	RJ45_DN<1>	RJ45_DP1		10 MIL SPACING	
	RJ45_DP<1>	RJ45_DP1		10 MIL SPACING	
	RJ45_DN<2>	RJ45_DP2		10 MIL SPACING	
	RJ45_DP<2>	RJ45_DP2		10 MIL SPACING	
	RJ45_DN<3>	RJ45_DP3		10 MIL SPACING	
	RJ45_DP<3>	RJ45_DP3		10 MIL SPACING	
FIREWIRE	FW_TPA0N	FW_TPA0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPA0P	FW_TPA0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPB0N	FW_TPB0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPB0P	FW_TPB0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPI0N	FW_TPI0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPI0P	FW_TPI0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPO0N	FW_TPO0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPO0P	FW_TPO0		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPA1N	FW_TPA1	500.0000	MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPA1P	FW_TPA1	500.0000	MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPB1N	FW_TPB1	500.0000	MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPB1P	FW_TPB1	500.0000	MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPI1N	FW_TPI1		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPI1P	FW_TPI1		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPO1N	FW_TPO1		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
	FW_TPO1P	FW_TPO1		MIN_LINE_WIDTH=3.4 10 MIL SPACING	
LVDS LOWER	CLKLVDS_LN	CLKLVDS_L		10 MIL SPACING	4
	CLKLVDS_LP	CLKLVDS_L		10 MIL SPACING	4
	LVDS_L0N	LVDS_L0		10 MIL SPACING	
	LVDS_L0P	LVDS_L0		10 MIL SPACING	
	LVDS_L1N	LVDS_L1		10 MIL SPACING	
	LVDS_L1P	LVDS_L1		10 MIL SPACING	
	LVDS_L2N	LVDS_L2		10 MIL SPACING	
	LVDS_L2P	LVDS_L2		10 MIL SPACING	
UPPER	CLKLVDS_UN	CLKLVDS_U		10 MIL SPACING	4
	CLKLVDS_UP	CLKLVDS_U		10 MIL SPACING	4
	LVDS_U0N	LVDS_U0		10 MIL SPACING	
	LVDS_U0P	LVDS_U0		10 MIL SPACING	
	LVDS_U1N	LVDS_U1		10 MIL SPACING	
	LVDS_U1P	LVDS_U1		10 MIL SPACING	
	LVDS_U2N	LVDS_U2		10 MIL SPACING	
	LVDS_U2P	LVDS_U2		10 MIL SPACING	
TMDS	TMDS_CONN_CLKN	CLKCONN_TMDS		10 MIL SPACING	4
	TMDS_CONN_CLKP	CLKCONN_TMDS		10 MIL SPACING	4
	TMDS_CLKN	CLKTMDS		10 MIL SPACING	4
	TMDS_CLKP	CLKTMDS		10 MIL SPACING	4
	TMDS_DN<0>	TMDS_D0		10 MIL SPACING	
	TMDS_DP<0>	TMDS_D0		10 MIL SPACING	
	TMDS_DN<1>	TMDS_D1		10 MIL SPACING	
	TMDS_DP<1>	TMDS_D1		10 MIL SPACING	
	TMDS_DN<2>	TMDS_D2		10 MIL SPACING	
	TMDS_DP<2>	TMDS_D2		10 MIL SPACING	
USB	NEC_USB_DAM	NEC_USB_DA	MIN_LINE_WIDTH=5	10 MIL SPACING	
	NEC_USB_DAP	NEC_USB_DA	MIN_LINE_WIDTH=5	10 MIL SPACING	
	USB_DEM	USB_DE		5 MIL SPACING	
	USB_DEP	USB_DE		5 MIL SPACING	
	NEC_USB_DBM	NEC_USB_DB	MIN_LINE_WIDTH=5	10 MIL SPACING	
	NEC_USB_DBP	NEC_USB_DB	MIN_LINE_WIDTH=5	10 MIL SPACING	
	USB_DFM	USB_DF		5 MIL SPACING	
	USB_DFP	USB_DF		5 MIL SPACING	
	BT_USB_DM	BT_USB_D		5 MIL SPACING	
	BT_USB_DP	BT_USB_D		5 MIL SPACING	
	NEC_USB_RSDM1	NEC_USB_RSD1	MIN_LINE_WIDTH=5	10 MIL SPACING	
	NEC_USB_RSDP1	NEC_USB_RSD1	MIN_LINE_WIDTH=5	10 MIL SPACING	
	NEC_USB_RSDM2	NEC_USB_RSD2	MIN_LINE_WIDTH=5	10 MIL SPACING	
	NEC_USB_RSDP2	NEC_USB_RSD2	MIN_LINE_WIDTH=5	10 MIL SPACING	
	MODEM_USB_DM	MODEM_USB_D		5 MIL SPACING	
	MODEM_USB_DP	MODEM_USB_D		5 MIL SPACING	
	LEFT_USB_DM	LEFT_USB	MIN_LINE_WIDTH=5	10 MIL SPACING	
	LEFT_USB_DP	LEFT_USB	MIN_LINE_WIDTH=5	10 MIL SPACING	
	RIGHT_USB_DM	RIGHT_USB	MIN_LINE_WIDTH=5	10 MIL SPACING	
	RIGHT_USB_DP	RIGHT_USB	MIN_LINE_WIDTH=5	10 MIL SPACING	
POWER SUPPLIES	1772_CSSN	1772_CSS		DIFF	
	1772_CSSP	1772_CSS		DIFF	
	1772_CSIN	1772_CSI		DIFF	
	1772_CSIP	1772_CSI		DIFF	
	3V_SNSM	3V_SNS		DIFF	
	3V_SNSP	3V_SNS		DIFF	
	5V_SNSM	5V_SNS		DIFF	
	5V_SNSP	5V_SNS		DIFF	
THERMOSTAT	THERM1_DM	THERM1		DIFF	
	THERM1_DP	THERM1		DIFF	
	THERM2_DM	THERM2		DIFF	
	THERM2_DP	THERM2		DIFF	
	THERM1_M_DM	THERM1_MAIN		DIFF	
	THERM1_M_DP	THERM1_MAIN		DIFF	
	THERM2_M_DM	THERM2_MAIN		DIFF	
	THERM2_M_DP	THERM2_MAIN		DIFF	
	THERM1_A_DM	THERM1_ALT		DIFF	
	THERM1_A_DP	THERM1_ALT		DIFF	
	THERM2_A_DM	THERM2_ALT		DIFF	
	THERM2_A_DP	THERM2_ALT		DIFF	

INTERNAL LAYER

ER = 4.3 (DIELECTRIC CONSTANT)
W = 4MIL (TRACE WIDTH)
B = 12.2MIL (DIST BETW 2 GND PLANES)
T = 0.7MIL (TRACE THICKNESS)
S = 10MIL (SEPERATION OF DIFF TRACES)
ZSINGLE = 51.57OHM
ZDIFF = 99.80HM

FOR FIREWIRE
ER = 4.3 (DIELECTRIC CONSTANT)
W = 3.4MIL (TRACE WIDTH)
B = 12.2MIL (DIST BETW 2 GND PLANES)
T = 0.7MIL (TRACE THICKNESS)
S = 10MIL (SEPERATION OF DIFF TRACES)
ZSINGLE = 53.37OHM
ZDIFF = 107.17OHM

INTERNAL LAYER (USB1.1/USB 2.0)

ER = 4.3 (DIELECTRIC CONSTANT)
W = 4MIL(USB 1.1)/ 5MIL(USB 2.0) (TRACE WIDTH)
B = 12.2MIL (DIST BETW 2 GND PLANES)
T = 0.7MIL (TRACE THICKNESS)
S = 5MIL (USB 1.1) (SEPERATION OF DIFF TRACES)
S = 10MIL (USB 2.0) (SEPERATION OF DIFF TRACES)
ZSINGLE = 51.5OHM (USB 1.1)/ 46.2OHM (USB 2.0)
ZDIFF = 89.3OHM (USB 1.1)/ 89.4OHM (USB 2.0)

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POWER NET CONSTRAINTS

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH
MAIN/SLEEP	+24V_PBUS	VOLTAGE=24V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 40
	+BATT	VOLTAGE=12.6V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+PBUS	VOLTAGE=12.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 40
	+5V_MAIN	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+5V_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 23
	+3V_MAIN	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 23
	+3V_SLEEP	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=6 20 23
	+3V_PMU	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 40
	+2_5V_MAIN	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+2_5V_SLEEP	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+1_8V_MAIN	VOLTAGE=1.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=6 40
	+1_8V_SLEEP	VOLTAGE=1.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+1_5V_MAIN	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+1_5V_SLEEP	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+1_5V_LDO	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 36
	+1_5V_SLEEP_VIN	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 36
ADAPTER	+ADAPTER	VOLTAGE=24V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10 32 33
	+ADAPTER_SW	VOLTAGE=24V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10 32
	+ADAPTER_SENSE	VOLTAGE=24V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10 32
BATTERY CHARGER	+BATT_POS	VOLTAGE=16.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 32 40
	BATT_NEG	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 32 40
	1772_DCIN	VOLTAGE=24V	MIN_LINE_WIDTH=10	32
	1772_LX	VOLTAGE=12.6V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 32
	+BATT_14V_FUSE	VOLTAGE=12.6V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 32
	+BATT_24V_FUSE	VOLTAGE=12.6V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 32
	+BATT_RSNS	VOLTAGE=12.6V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 32
	+BATT_VSNS	VOLTAGE=12.6V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 32
	1772_LDO	VOLTAGE=5.4V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 32
	1772_DLOV	VOLTAGE=5.4V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 32
	1772_GND	VOLTAGE=0V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 32
PMU	+ADAPTER_ILIM	VOLTAGE=24V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	+ADAPTER_OR_BATT	VOLTAGE=24V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	+4_85V_RAW	VOLTAGE=4.85V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 31 33
	+4_6V_BU	VOLTAGE=4.6V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33 34
	+4_85V_ESR	VOLTAGE=4.85V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	+3V_PMU_ESR	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	+3V_PMU_AVCC	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 26 31
MISC HD	+5V_HD_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 25 34
	+HD_LOGIC_SLEEP	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 25
TRACKPAD	+5V_MAIN_CONN	VOLTAGE=5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6
HALL EFFECT	+3V_HALL_EFFECT	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 23 40
VIDEO	+12_8V_INV	VOLTAGE=12.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22 40
	+5V_INV_UF_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22
	+5V_INV_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22 40
	+5V_DDC_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 22 40
	+5V_DDC_SLEEP_UF	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 22
	+3V_LCD	VOLTAGE=3.3V	MIN_LINE_WIDTH=12	MIN_NECK_WIDTH=10 22
	+3V_LCD_SW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22
	GPU_TV_GND1	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22
	GPU_TV_GND2	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22
	TV_GND1	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22 40
	TV_GND2	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 22 40
KB LED	KBDLED_ANODE	VOLTAGE=0V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 23
	KBDLED_RETURN	VOLTAGE=0V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 23
FAN GND	FANL_GND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 40
	FANR_GND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 40
SOUND	+5V_SOUND_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	SND_AGND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=15 26

I/O AREA	GND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=6
	CHGND1	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 CHGND1
INVERTER	CHGND2	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 CHGND2
TRACKPAD	CHGND3	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 CHGND3
LVDS	CHGND4	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 CHGND4 40
I/O AREA	CHGND5	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 CHGND5
I/O AREA	CHGND6	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 CHGND6
	ENET_CTAP_CHGND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12 28

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH
CPU	CPU_VCORE_SLEEP	VOLTAGE=1.4V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 5 6 35 40
	CPU_AVDD	VOLTAGE=1.4V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 5
	MAXBUS_SLEEP	VOLTAGE=1.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 5 6 7 8 15 16 35
DDR RAM INTREPID PLLS	DDR_VREF	VOLTAGE=1.25V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 11
	+2_5V_INTREPID	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 9 10 15 16
	+3V_INTREPID_USB	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 14
	+1_5V_INTREPID_PLL	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 8 12 14
	+1_5V_INTREPID_PLL1	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6 14
	+1_5V_INTREPID_PLL2	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6 14
	+1_5V_INTREPID_PLL3	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6 14
	+1_5V_INTREPID_PLL4	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=5 14
	+1_5V_INTREPID_PLL5	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=5 12
	+1_5V_INTREPID_PLL6	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6 12
	+1_5V_INTREPID_PLL7	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6 8
	+1_5V_INTREPID_PLL8	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6 14
REFERENCE	INT_MEM_VREF	VOLTAGE=1.25V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 9
	INT_AGP_VREF	VOLTAGE=1.25V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 12 18
	INT_MEM_REF_H	VOLTAGE=0V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 9
	UIDE_REF	VOLTAGE=0V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 13
CARDBUS	+VCC_CBUS_SW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 17
	+VPP_CBUS_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 17
ATI M11	GPU_VCORE	VOLTAGE=1.2V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10 18 19 40
	+GPU_MEM	VOLTAGE=2.5V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10 18 21
	+3V_GPU	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 12 18 19 21
	+3V_GPU_FLT	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=8 21
	+1_5V_AGP	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 12 15 16 18 19 21
	GPU_MEM_IO	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	GPU_MEM_IO_FLT	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 21
	+GPU_MEMCORE	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 21
	+1_8V_GPU	VOLTAGE=1.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 18 19 20 21
	+2_5V_GPU_PNLIO	VOLTAGE=2.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 21
	+1_8V_ATI_PVDD	VOLTAGE=1.8V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 19 21
	+1_5V_AGP_GPU	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 21
	+1_5V_GPU_VDD15	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 19
	+1_8V_GPU_PLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 21
	1_8V_GPU_VDDCI	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 21
	GPU_VCORE_VDDCI	VOLTAGE=1.2V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 18
	2_5V_GPU_A2VDD	VOLTAGE=2.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 21
	1_8V_GPU_AVDD	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 21
	1_8V_GPU_PNLPLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 21
	1_8V_GPU_PNLIO	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 21
	GPU_MCLK	VOLTAGE=2.5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
	1_8V_GPU_AVDDQ	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10
	1_8V_GPU_MEMPLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
	3V_ATI_OSC_SLEEP	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 18
	3V_ATI_SS	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 18
	GPU_VDD15_UF	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 19
	2_5V_SLEEP_NECK2	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 19
	+3V_SLEEP_NECK	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
	1_5V_AGP_NECK	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 19
	1_8V_PVDD_NECK	VOLTAGE=2.5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 19
	GPU_VCORE_NECK	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 19
	GPU_VDD15_NECK	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 19
	2_5V_SLEEP_NECK2	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
	1_8V_SLEEP_NECK	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
	1_5V_SLEEP_NECK	VOLTAGE=1.5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
	2_5V_GPU	VOLTAGE=2.5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 21
SILICON IMIAGE	PP3V3_SI_PVCC1	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=0 20
	PP3V3_SI_AVCC1	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=0 20
	PP3V3_SI_VCC1	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=0 20
	PP3V3_SI_PVCC2	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=0 20
	PP3V3_SI_AVCC2	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=0 20
	PP3V3_SI_VCC2	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=0 20
88E1111 FW	+2_5V_MARVELL	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 28
	+2_5V_MARVELL_AVDD	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=8 28
	+1_0V_MARVELL	VOLTAGE=1.0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=8 28
	LTC3405_SW	VOLTAGE=1.0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=8 28
	LM2594_IN	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+3V_FW_ESD_ILIM	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 30
	+3V_FW_ESD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 30
	+FW_FUSE	VOLTAGE=12.8V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	+FW_SW	VOLTAGE=12.8V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	+FW_PWR_OR	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 29 30
	+FW_VP0	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	+FW_PWR_PORTA	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	+FW_VP1	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	+3V_FW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29 30
	+3V_FW_UF	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+3V_FW_AVDD_PORT2	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+3V_FW_AVDD_PORT1	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=6 29
	+3V_FW_AVDD_PORT0	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+3V_FW_AVDD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_DVDD	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_DVDD_RX0	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_DVDD_TX0	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_DVDD_PORT1	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_PLLVDD	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_PLL400VDD	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	+1_95V_FW_PLL500VDD	VOLTAGE=1.95V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 29
	FW_VGND0	VOLTAGE=0V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	FW_VGND1	VOLTAGE=0V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12 30
	FW_TPO0R	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 30 40
USB 2.0 INTREPID SSCG	NEC_AVDD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 27
	+3V_NEC_VDD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 27
	+3V_CG_PLL_MAIN	VOLTAGE=3.3V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=8 14
	+2_5V_CG_MAIN	VOLTAGE=2.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=8 14

MIN_NECK_WIDTH REDUCED FOR TESTPOINTS

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH
LTC1625 14V SWITCHER	1625_VIN	VOLTAGE=24V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	1625_VSW	VOLTAGE=12.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 33
	1625_EXTVCC	VOLTAGE=5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	1625_INTVCC	VOLTAGE=5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	1625_SGND	VOLTAGE=0V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 33
	1V20_REF	VOLTAGE=1.2V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 2 33
LTC3707 5V SWITCHER	3707_INTVCC	VOLTAGE=5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10 4
	5V_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 4
	5V_RSNS	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 4
3V SWITCHER	3V_SW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 4
	3V_RSNS	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10 4
	3707_SGND	VOLTAGE=0V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6 34
MAX1715 2.5V SWITCHER	2_5V_LX	VOLTAGE=2.5V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10 6
	2_5V_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 6
	2_5V_BOOST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 6
	2_5V_DH	VOLTAGE=2.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 6
	2_5V_DL	VOLTAGE=2.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 6
1.5V SWITCHER	1_5V_FB	VOLTAGE=1.5V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	1_5V_LX	VOLTAGE=1.5V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10 6
	1_5V_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 6
	1_5V_BOOST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 6
	1_5V_DH	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 6
	1_5V_DL	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 6
CONTROL	1_5V_ILIM		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	2_5V_ILIM		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	MAX1715_TON		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	MAX1715_SKIP		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	MAX1715_REF	VOLTAGE=2.0V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	MAX1715_VCC	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 6
	MAX1715_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10 6
MAX1717	VCORE_VCC	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 5
	VCORE_LX	VOLTAGE=1.4V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 5
	VCORE_DH		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 5
	VCORE_DL		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 5
	VCORE_BOOST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 5
	VCORE_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 5
	VCORE_ILIM		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_REF		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_TON	VOLTAGE=5V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_CC		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_FB	VOLTAGE=1.4V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35 40
	VCORE_TIME		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_VGATE		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 14 35
	VCORE_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=15 5
	VCORE_GNDSNS	VOLTAGE=0V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_SNS	VOLTAGE=1.4V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
	VCORE_GNDDIV	VOLTAGE=0V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 35
LTC1778	1778_VIN	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 9
	1778_VCC	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 9
	1778_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10 9
	1778_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 9
	1778_BST_RC	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10 9
	1778_TG		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 9
	1778_BG		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 9
	GPU_VCORE_SW	VOLTAGE=1.2V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10 9
	1778_ION		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 19
	1778_ITH		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 19
	1778_ITH_RC		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 19
	1_5V_2_5V_OK		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 36
	1778_VFB		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 19 40
	1778_FCB		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 19
	1778_VRNG		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6 19
LTC3411	LTC3411_VCC	VOLTAGE=3.3V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	LTC3411_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10
	1_8V_SW	VOLTAGE=1.8V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10 6
	1_8V_VFB		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6
	LTC3411_ITH_RC		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6
	LTC3411_ITH		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6
	LTC3411_SYNC		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6
	LTC3411_SHDN		MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=6
LTC1962 INT PLLS	LTC1962_INT_VIN		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 4
	LTC1962_L3_VIN		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	LTC1962_L3_VOUT		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	LTC1962_1V5_VIN		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	LTC1962_1V5_VOUT		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10

SIGNAL CONSTRAINTS - PAGE 3

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 39 OF 45	

FUNCTIONAL TEST POINTS

FUNC_TEST=YES JTAG_ASIC_TMS 13 28
FUNC_TEST=YES JTAG_ASIC_TDI 28
FUNC_TEST=YES JTAG_ASIC_TDO 13 14
FUNC_TEST=YES JTAG_ASIC_TCK 13 28
FUNC_TEST=YES JTAG_ASIC_TRST_L 13 28
FUNC_TEST=YES CPU_CHKSTP_OUT_L 5
FUNC_TEST=YES CPU_SRESET_L 5
FUNC_TEST=YES CPU_HRESET_L 5 6 7
FUNC_TEST=YES JTAG_CPU_TMS 5 6
FUNC_TEST=YES JTAG_CPU_TDI 5 6
FUNC_TEST=YES JTAG_CPU_TDO_TP 5
FUNC_TEST=YES JTAG_CPU_TCK 5 6
FUNC_TEST=YES JTAG_CPU_TRST_L 5 6 40

FUNC_TEST=YES TMDS_CONN_CLKP 22 38
FUNC_TEST=YES VGA_R 22
FUNC_TEST=YES VGA_G 22
FUNC_TEST=YES VGA_B 22
FUNC_TEST=YES VGA_VSYNC 22
FUNC_TEST=YES VGA_HSYNC 22
FUNC_TEST=YES DVI_DDC_CLK_UF 22
FUNC_TEST=YES DVI_DDC_DATA_UF 22
FUNC_TEST=YES DVI_HPD_UF 22
FUNC_TEST=YES LVDS_L0N 19 22 38
FUNC_TEST=YES LVDS_L0P 19 22 38
FUNC_TEST=YES LVDS_L1N 19 22 38
FUNC_TEST=YES LVDS_L1P 19 22 38
FUNC_TEST=YES LVDS_L2N 19 22 38
FUNC_TEST=YES LVDS_L2P 19 22 38
FUNC_TEST=YES CLKLVDS_LN 19 22 38
FUNC_TEST=YES CLKLVDS_LP 19 22 38
FUNC_TEST=YES LVDS_U0N 19 22 38
FUNC_TEST=YES LVDS_U0P 19 22 38
FUNC_TEST=YES LVDS_U1N 19 22 38
FUNC_TEST=YES LVDS_U1P 19 22 38
FUNC_TEST=YES LVDS_U2N 19 22 38
FUNC_TEST=YES LVDS_U2P 19 22 38
FUNC_TEST=YES CLKLVDS_UN 19 22 38
FUNC_TEST=YES CLKLVDS_UP 19 22 38
FUNC_TEST=YES LVDS_DDC_CLK 19 22
FUNC_TEST=YES LVDS_DDC_DATA 19 22
FUNC_TEST=YES BRIGHT_PWM 22
FUNC_TEST=YES TV_GND1 22 39
FUNC_TEST=YES TV_GND2 22 39

FUNC_TEST=YES TV_C 22
FUNC_TEST=YES TV_Y 22
FUNC_TEST=YES TV_COMP 22
FUNC_TEST=YES SND_TO_AUDIO 14 26
FUNC_TEST=YES SND_SYNC 14 26
FUNC_TEST=YES SND_CLKOUT 14 26 37

FUNC_TEST=YES INT_AUDIO_TO_SND 14 26
FUNC_TEST=YES SND_SCLK 14 26 37
FUNC_TEST=YES SND_HW_RESET_L 14 26
FUNC_TEST=YES SND_HP_SENSE_L
FUNC_TEST=YES SND_LIN_SENSE_L
FUNC_TEST=YES INT_I2C_DATA2 14 26
FUNC_TEST=YES INT_I2C_CLK2 14 26

~~I393~~ CHGND4 39
~~I394~~ SLEEP_LED

FUNC_TEST=YES INT_I2C_CLK0 6 11 13 23
FUNC_TEST=YES INT_I2C_DATA0 6 11 13 23
FUNC_TEST=YES INT_I2C_CLK1 13 14 23 24 26
FUNC_TEST=YES INT_I2C_DATA1 13 14 23 24 26
FUNC_TEST=YES CBUS_DET_1_L 17
FUNC_TEST=YES CBUS_DET_2_L 17
FUNC_TEST=YES TMDS_DN<0> 20 22 38
FUNC_TEST=YES TMDS_DP<0> 20 22 38
FUNC_TEST=YES TMDS_DN<1> 20 22 38
FUNC_TEST=YES TMDS_DP<1> 20 22 38
FUNC_TEST=YES TMDS_DN<2> 20 22 38
FUNC_TEST=YES TMDS_DP<2> 20 22 38
FUNC_TEST=YES TMDS_CONN_CLKN 22 38

FUNC_TEST=YES BT_USB_DM 14 25 38
FUNC_TEST=YES BT_USB_DP 14 25 38
FUNC_TEST=YES MODEM_USB_DM 14 26 38
FUNC_TEST=YES MODEM_USB_DP 14 26 38
FUNC_TEST=YES PCI_AD<0> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<1> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<2> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<3> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<4> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<5> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<6> 9 12 17 25 27 38

FUNC_TEST=YES PCI_AD<7> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<8> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<9> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<10> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<11> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<12> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<13> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<14> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<15> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<16> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<17> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<18> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<19> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<20> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<21> 12 17 25 27 38
FUNC_TEST=YES PCI_AD<22> 12 17 25 27 38
FUNC_TEST=YES PCI_AD<23> 12 17 25 27 38
FUNC_TEST=YES PCI_AD<24> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<25> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<26> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<27> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<28> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<29> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<30> 9 12 17 25 27 38
FUNC_TEST=YES PCI_AD<31> 9 12 17 25 27 38
FUNC_TEST=YES PCI_FRAME_L 12 17 25 27 38
FUNC_TEST=YES PCI_TRDY_L 12 17 25 27 38
FUNC_TEST=YES PCI_IRDY_L 12 17 25 27 38
FUNC_TEST=YES PCI_DEVSEL_L 12 17 25 27 38
FUNC_TEST=YES PCI_STOP_L 12 17 25 27 38

FUNC_TEST=YES PCI_PAR 12 17 25 27 38
FUNC_TEST=YES PCI_CBE<0> 12 17 25 27 38
FUNC_TEST=YES PCI_CBE<1> 12 17 25 27 38
FUNC_TEST=YES PCI_CBE<2> 12 17 25 27 38
FUNC_TEST=YES PCI_CBE<3> 12 17 25 27 38
FUNC_TEST=YES AIRPORT_PCI_REQ_L 12 25
FUNC_TEST=YES AIRPORT_PCI_GNT_L 12 25
FUNC_TEST=YES AIRPORT_PCI_INT_L 14 25
FUNC_TEST=YES EIDE_OPTICAL_DATA<0> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<1> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<2> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<3> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<4> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<5> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<6> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<7> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<8> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<9> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<10> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<11> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<12> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<13> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<14> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DATA<15> 25 38
FUNC_TEST=YES EIDE_OPTICAL_DMA_RQ 25 38
FUNC_TEST=YES EIDE_OPTICAL_RD_L 25 38
FUNC_TEST=YES EIDE_OPTICAL_DMAACK_L 25 38
FUNC_TEST=YES EIDE_OPTICAL_ADDR<0> 25 38
FUNC_TEST=YES EIDE_OPTICAL_ADDR<1> 25 38
FUNC_TEST=YES EIDE_OPTICAL_ADDR<2> 25 38
FUNC_TEST=YES SND_AMP_MUTE 26
FUNC_TEST=YES SND_HP_MUTE_INV

FUNC_TEST=YES EIDE_OPTICAL_CS0_L 25 38
FUNC_TEST=YES EIDE_OPTICAL_CS1_L 25 38
FUNC_TEST=YES EIDE_OPTICAL_RST_L 25 38
FUNC_TEST=YES EIDE_OPTICAL_WR_L 25 38
FUNC_TEST=YES EIDE_OPTICAL_IOCHRDY 25 38
FUNC_TEST=YES EIDE_OPTICAL_INT 25 38
FUNC_TEST=YES TPAD_F_TXD
FUNC_TEST=YES TPAD_F_RXD
FUNC_TEST=YES LID_CLOSED_L 23
FUNC_TEST=YES COMM_RESET_L 14 26
FUNC_TEST=YES COMM_SHUTDOWN 14 26
FUNC_TEST=YES COMM_RING_DET_L 14 26 31

FUNC_TEST=YES +5V_TPAD_SLEEP
FUNC_TEST=YES +3V_HALL_EFFECT 23 39
FUNC_TEST=YES KBD_CAPSLOCK_LED
FUNC_TEST=YES KBD_FUNCTION_L 23 31
FUNC_TEST=YES KBD_CONTROL_L 23 31
FUNC_TEST=YES +PPBATT_ISNS_N 24
FUNC_TEST=YES KBD_OPTION_L 23 31
FUNC_TEST=YES KBD_SHIFT_L 23 31
FUNC_TEST=YES KBD_X<0> 23 31
FUNC_TEST=YES KBD_X<1> 23 31
FUNC_TEST=YES KBD_X<3> 23 31
FUNC_TEST=YES MMM_ACC_SELFTEST 24
FUNC_TEST=YES MMM_ACC_X_AXIS 24
FUNC_TEST=YES MMM_ACC_Y_AXIS 24
FUNC_TEST=YES MMM_ACC_Z_AXIS 24

FUNC_TEST=YES SRCLK_TP 27
FUNC_TEST=YES SRMOD_TP 27
FUNC_TEST=YES TEB_TP 27
FUNC_TEST=YES TEST_TP 27

FUNC_TEST=YES KBD_Y<0> 31
FUNC_TEST=YES KBD_Y<1> 31
FUNC_TEST=YES KBD_Y<3> 31
FUNC_TEST=YES KBD_Y<4> 31
FUNC_TEST=YES KBD_Y<6> 31
FUNC_TEST=YES KBD_Y<7> 31
FUNC_TEST=YES KBD_NUMLOCK_LED
FUNC_TEST=YES +BATT_POS 32 39
FUNC_TEST=YES BATT_CLK 32
FUNC_TEST=YES BATT_DATA 32
FUNC_TEST=YES BATT_NEG 32 39
FUNC_TEST=YES PMU_BATT_DET_L 31 32
FUNC_TEST=YES FANR_GND 39

FUNC_TEST=YES FANL_GND 39
FUNC_TEST=YES FANL_TACH
FUNC_TEST=YES FANR_PWM
FUNC_TEST=YES FANL_PWM
FUNC_TEST=YES RJ45_DP<0> 28 38
FUNC_TEST=YES RJ45_DN<0> 28 38
FUNC_TEST=YES RJ45_DP<1> 28 38
FUNC_TEST=YES RJ45_DN<1> 28 38
FUNC_TEST=YES RJ45_DP<2> 28 38
FUNC_TEST=YES RJ45_DN<2> 28 38
FUNC_TEST=YES RJ45_DP<3> 28 38
FUNC_TEST=YES RJ45_DN<3> 28 38
FUNC_TEST=YES FW_TPO0R 30 39
FUNC_TEST=YES VCORE_VID0
FUNC_TEST=YES VCORE_VID1
FUNC_TEST=YES VCORE_VID2
FUNC_TEST=YES VCORE_VID3
FUNC_TEST=YES VCORE_VID4

FUNC_TEST=YES FW_TPO1P 30 38
FUNC_TEST=YES FW_TPO1N 30 38
FUNC_TEST=YES FW_TPI1P 30 38
FUNC_TEST=YES FW_TPI1N 30 38
FUNC_TEST=YES CHARGE_LED_L 31 32
FUNC_TEST=YES ADAPTER_DET 31 32
FUNC_TEST=YES SUTRO_ALS_GAIN_SW 23 25
FUNC_TEST=YES SUTRO_ALS_OUT 23 25
FUNC_TEST=YES KBD_LED1_OUT
FUNC_TEST=YES KBD_LED2_OUT
FUNC_TEST=YES COMM_TXD_L 14 26
FUNC_TEST=YES COMM_TRXC 14 26
FUNC_TEST=YES COMM_GPIO_L 14 26
FUNC_TEST=YES COMM_DTR_L 14 26
FUNC_TEST=YES COMM_RTS_L 14 26
FUNC_TEST=YES COMM_RXD 14 26
FUNC_TEST=YES PMU_KB_RESET_L
FUNC_TEST=YES PWR_BUTTON_L 23 26
FUNC_TEST=YES +PBUS 39
FUNC_TEST=YES +24V_PBUS 39
FUNC_TEST=YES GPU_VCORE 18 19 39
FUNC_TEST=YES CPU_VCORE_SLEEP 5 6 35 39
FUNC_TEST=YES VCORE_FB 35 39
FUNC_TEST=YES +1_8V_MAIN 39
FUNC_TEST=YES +3V_PMU 39
FUNC_TEST=YES +5V_DDC_SLEEP 22 39
FUNC_TEST=YES +12_8V_INV 22 39
FUNC_TEST=YES VCORE_MUX_EN 35

FUNC_TEST=YES +5V_INV_SW 22 39
FUNC_TEST=YES LEFT_USB_DM 25 27 38
FUNC_TEST=YES LEFT_USB_DP 25 27 38
FUNC_TEST=YES RIGHT_USB_DM 27 33 38
FUNC_TEST=YES RIGHT_USB_DP 27 33 38
FUNC_TEST=YES NEC_LEFT_USB_PWREN 25 27
FUNC_TEST=YES NEC_LEFT_USB_OVERCURRENT 25 27
FUNC_TEST=YES NEC_RIGHT_USB_PWREN 27 33
FUNC_TEST=YES NEC_RIGHT_USB_OVERCURRENT 27 33
FUNC_TEST=YES DCDC_EN 19 30 34 35
FUNC_TEST=YES BBANG_HRESET_L 6

FUNC_TEST=YES MAIN_RESET_L 14 17 18 20 25 27 31
FUNC_TEST=YES RF_DISABLE_L_SPN 25
FUNC_TEST=YES AIRPORT_CLKRUN_L 25
FUNC_TEST=YES ROM_RW_L 9 12 25
FUNC_TEST=YES ROM_ONBOARD_CS_L 9 25
FUNC_TEST=YES ROM_CS_L 9 12 25
FUNC_TEST=YES CLK33M_AIRPORT 12 25 37
FUNC_TEST=YES AIRPORT_IDSEL 25
FUNC_TEST=YES ROM_OE_L 9 12 25
FUNC_TEST=YES INT_MOD_DTI 14 26
FUNC_TEST=YES JTAG_CPU_TRST_L 5 6 40
FUNC_TEST=YES MOD_BITCLK 14 26
FUNC_TEST=YES MOD_CLKOUT 14 26
FUNC_TEST=YES MOD_DTO 14 26
FUNC_TEST=YES MOD_SYNC 14 26
FUNC_TEST=YES SLEEP 23 31 34 36
FUNC_TEST=YES 1778_VFB 19 39

FUNCTIONAL TEST POINTS

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 40 OF 45	

REVISION HISTORY

12/11/03

1) IMPORTED Q41 PRODUCTION RELEASE SCHEMATIC
2) CHANGED CPU (U43) TO A7PM
3) CHANGED PLL CONFIG STUFFING FOR NEW CPU
4) CHANGED U41 TO M1T-CSP64 SYMBOL
5) ADDED CPU AVDD LDO (D5)
6) ADDED R284 AND R604 TO ADD OPTION FOR PD_L OF U42 (CLOCK CHIP) TO BE DRIVEN BY JTAG_ASIC_TDO FROM INTREPID
7) ADDED R888 TO DISCONNECT INT_GPIO0 FROM CC FSE
8) CHANGED JTAG_ASIC_TDO_TP TO JTAG_ASIC_TDO AND MOVED IT TO INTREPID'S TDO
9) CHANGED JTAG_ASIC_TDI TO CONNECT TO ETHERNET PHY'S TDI

12/15/03

10) CHANGED PIN 4 (DCDC_EN) ON J11 TO NEC_RIGHT_USBOVERCURRENT
11) CHANGED PIN 11 OF J11 TO NC

12/16/03

12) ADDED R633 AS PULLUP ON JTAG_ASIC_TDI
13) CHANGED CPU_TEMP_DN TO CPU_THERM_DM
14) CHANGED CPU_TEMP_DP TO CPU_THERM_DP
15) CHANGED GPU_THERM_DP TO GPU_THERM_DP_TP
16) CHANGED GPU_THERM_DN TO GPU_THERM_DM_TP
17) FIXED MISSED CONNECTION WITH MAXBUS_SLEEP TO CPU

12/17/03

18) CHANGED R657 (EXTPLL_SDWN_POL_BOOT_STRAP) TO NO_STUFF AND REMOVED NO_STUFF FROM R153
19) UPDATE DIFF_NET_SPACING_TYPE PROPERTY ON POWER_SUPPLY_SENSE AND THERMAL DIODE DIFF PAIRS
20) CHANGED FIREWIRE OSCILLATOR (G1) TO NEW PREFERRED SUNNY PART

12/18/03

21) CHANGED MAX VIA COUNT ON ALL AGP STB NETS TO 5 TO CLEAR DRCS

** RELEASED FOR EVT **

2/10/04

22) REMOVED XW11 - JUMPER ON 1.8V SWITCHER OUTPUT
23) CHANGED R857 TO STUFFED AND R153 TO NO STUFF
24) CHANGED CPU PLL CONFIG TO 9X HIGH AND 5X LOW

** RELEASED FOR DVT **

3/24/04

25) REMOVED ALTERNATE BOM OPTION FROM ALTERNATE ETHERNET CRYSTALS

3/29/04

26) ADDED ALTERNATE FOR Q41A REV 1.1.1 CPU (U43)
27) ADDED ALTERNATES FOR 128MB AND 64MB A16 M1T'S
28) CHANGED TMDS SERIES RPAKS TO 0 OHMS (RP57,RP27,RP32,RP28)
29) ADDED ALTERNATE FOR ALS OP-AMP (U40)

** RELEASED TO REV A **

30) CHANGED TMDS TERMINATION R,C AND LS TO PRODUCTION VALUES

** RELEASED TO REV A UNDER NEW PART NUMBER **

09/17/2004

1) GPU_DVOD<0..12> NETNAME CHANGE TO GPU_DVOD<0..23>
2) D8 FROM 1N5227B CHANGE TO BZX84C2V7LT1
3) R751 VALUE FROM 10K OHM CHANGE TO 604 OHM
4) ADD C935 (0.1UF)
5) ADD R867 (0 OHM) FOR IPOD ACTION
6) PMU PIN74 NETNAME FROM NC TO PMU_SELECT
7) ADD R868 (10K OHM; NO_STUFF) PULL UP TO +3V_PMU
8) ADD R869 (10K OHM) PULL DOWN TO GND
9) PMU PIN 91 NETNAME FROM NC TO SYS_BATT_ISNS2
10)ADD R870 (0 OHM) SYS_BATT_ISNS2 LINK TO SYS_BATT_ISNS
11)ADD U51 (INA138)
12)ADD R852 (0.010 OHM),R853 (150K OHM) AND R857(49.9 OHM)
13)ADD C917 (0.1UF) AND C925 (10UF)
14)ADD DESCRIPTION FOR MMM I2C BUS
15)MMM I2C BUS LINK TO INTREPID :INT_I2C_CLK1 AND INT_I2C_DATA1
16)CHANGE NETNAME FROM INT_EXTINT11_PU TO MMM_FFIRQ_L
17)CHANGE NETNAME FROM INT_EXTINT12_PU TO MMM_SIRQ_L
18)ADD R863 (10K OHM) AND R864 (10K OHM) FOR MMM_FFIRQ_L&MMM_SIRQ_L PULL UP TO +3V_MAIN
19)ADD U53 (16F818) AND U5 (KXM52)
20)ADD R845 (0 OHM),R846 (0 OHM;NO_STUFF),R847 (10K OHM;NO_STUFF),R848 (10K OHM;NO_STUFF)
21)ADD R849 (10K OHM),R850 (10K OHM;NO_STUFF),R851(0 OHM),R854 (10K OHM),R856 (10K OHM),
22)ADD R860 (0 OHM),R858 (0 OHM),R859 (0 OHM),R855 (10K OHM),R861 (10K OHM),R862(10K OHM;NO_STUFF)
23)ADD C936(0.1UF),C918(0.1UF),C919(0.1UF),C921(0.0047UF),C923(0.0047UF),C926(0.0047UF),C927(0.1UF)
24)DEL RP44 (100K OHM) AND ADD R874 (100K OHM), R875 (100K OHM) AND R873 (100K OHM)
25)ADD R872 (10K OHM) FOR AUDIO_LO_MUTE_L
26)ADD R871 (100 OHM) AND SUPERCAP C937 (N20P80;5.5V;ELEC;0.33F)
27)J21 PIN12 NETNAME FROM NC CHANGE TO THERM_L_OC
28)J21 PIN10 NETNAME FROM NC CHANGE TO INT_I2C_DATA1
29)J21 PIN11 NETNAME FROM NC CHANGE TO INT_I2C_CLK1
30)C592 VALUE FROM 0.001UF CHANGE TO 0.01UF (20%,50V,0603)
31)U59 FROM MP1518DJ CHANGE TO MM3120
32)L11 CHANGE TO 152S0235 (22UH;3.8*3.8*1.5MM)
33)DEL D31
34)R202 VALUE FROM 5.23 OHM CHANGE TO 25.5 OHM
35)C79 VALUE FROM 2.2UF CHANGE TO 1UF
36)ADD Q70 (SI3443), Q34 (2N7002)
37)ADD R866 (100K OHM),R865 (4.7 OHM),C929 (0.022UF)

09/20/2004

1) ADD R877 (10K OHM)
2) ADD R876 (470K OHM;NO_STUFF)

09/21/2004

1) ADD R878 AND R879 (0 OHM;NO_STUFF)[ADD A 0-OHM RESISTOR TO BY-PASS THE N-FET ON EACH FAN]

09/22/2004

1) R822 (680 OHM CHANGE TO 510 OHM) AND R826 (680 OHM CHANGE TO 510 OHM)

09/23/2004

1) ADD NC NETNAME AT U59 PIN6 AND PIN9
2) CHANGE R465 CAP SIZE FROM 0603 TO 0805
3) BOM OPTION FROM NO STUFF CHANGE TO SUPERCAP

09/24/2004

1) CHANGE R465 FROM MF 1/16W TO FF 1/10W
2) ADD R880 AND R871 (0 OHM;BOM_OPTIOM;FOR SUPERCAP AND BACKUP BATTERY SWITCH)
3) ADD U60 (LIS3L02AQ;ST SENSOR)
4) ADD R881 (10K OHM) ,R882 (10K OHM), R883 (10K OHM)
5) ADD C937 (0.1UF,10V,20%,0402)
6) ADD BOM_OPTION (KIONIX_ACCEL AND ST_ACCEL)

10/04/2004

1) CHANGE TEST POINT FUNC_TEST=NO FOR FUNC_TP_WRONG_SIDE.LOG
2) ADD NO_TEST=YES FOR NOTP.LOG(MMM_PIC_AN2_PD,MMM_PIC_AN3_PU)

10/05/2004

1) ADD R850 (0 OHM)

10/15/2004

1) REPLACE BOOT BANGER EEPROM U32 WITH 32KX M24256B FUNC_TP_WRONG_SIDE.LOG

12/16/2004

1) SCHEMATIC RELEASE FOR PRODUCTION

REVISION HISTORY(1 OF 1)

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 41 OF 45	

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

+1_0V_MARVELL     28D2< 39B3>
+1_5V_AGP         12C5< 12D1< 12D4< 15D6< 16C8<
                 18C6< 18D6< 19A8< 19B4<> 19D5<>
                 21B8< 21D6< 39C3>
+1_5V_AGP_GPU     21C5< 39C3>
+1_5V_AGP_NECK    19B4<> 39B3>
+1_5V_GPU_VDD15   19D3< 39C3>
+1_5V_INTREPID_PLL  8D6< 12D4< 12D8< 14D6<> 39D3>
+1_5V_INTREPID_PLL1  14C3< 39D3>
+1_5V_INTREPID_PLL2  14D3< 39D3>
+1_5V_INTREPID_PLL3  14D3< 39D3>
+1_5V_INTREPID_PLL4  14D3< 39D3>
+1_5V_INTREPID_PLL5  12D3< 39D3>
+1_5V_INTREPID_PLL6  12D6< 39D3>
+1_5V_INTREPID_PLL7  8D5< 39D3>
+1_5V_INTREPID_PLL8  14D3< 39D3>
+1_5V_LDO         36D8< 39D6>
+1_5V_MAIN        39D6>
+1_5V_SLEEP       39D6>
+1_5V_SLEEP_NECK  21A3<> 39B3>
+1_5V_SLEEP_VIN   36D8<> 39D6>
+1_8V_ATI_PVDD    19C5<> 21B6< 21B6< 21D6<> 39C3>
+1_8V_ATI_TPVDD   21D2<>
+1_8V_DVO_F       21B2<
+1_8V_GPU         18A7< 19C8< 20A8< 21A2< 21A6<
                 21B1< 21B6< 21C8< 21D6< 21D8< 39C3>
+1_8V_GPU_AVDD    21D5< 39C3>
+1_8V_GPU_AVDDQ   21D4< 21D7< 39C3>
+1_8V_GPU_MEMPLL  21B5< 39C3>
+1_8V_GPU_PLL     21D5< 39C3>
+1_8V_GPU_PNLIO   21A5< 39C3>
+1_8V_GPU_PNLPLL  21B5< 39C3>
+1_8V_GPU_TP_PLL  21B4< 21D1<
+1_8V_GPU_VDDDI   21C7< 21D4< 39C3>
+1_8V_MAIN        39D6> 40A2>
+1_8V_PVDD_NECK   19B5<> 39B3>
+1_8V_SLEEP       39D6>
+1_8V_SLEEP_NECK  21A3<> 39B3>
+1_95V_FW_DVDD    29C4< 29C7<> 29D5< 39A3>
+1_95V_FW_DVDD_PORT1  29D6< 39A3>
+1_95V_FW_DVDD_RX0  29C5< 39A3>
+1_95V_FW_DVDD_TX0  29C5< 39A3>
+1_95V_FW_PLL400VDD  29D5< 39A3>
+1_95V_FW_PLL500VDD  29D5< 39A3>
+1_95V_FW_PLLVDD  29D5< 29D7<> 39A3>
+2_5V_CG_MAIN     14C6< 39A3>
+2_5V_GPU         21A8< 21B6< 21D3< 21D7< 21D8<
                 39B3>
+2_5V_GPU_A2VDD   21D4< 21D7< 39C3>
+2_5V_GPU_PNLIO   21A5< 39C3>
+2_5V_INTREPID    9A8< 10D3< 10D5< 10D7< 10D8< 15D7<
                 16B8< 39D3>
+2_5V_MAIN        39D6>
+2_5V_MARVELL     28B8< 28C4<> 39B3>
+2_5V_MARVELL_AVDD  28C4< 39B3>
+2_5V_REG         30B6<
+2_5V_REG_F       30A7<>
+2_5V_SLEEP       39D6>
+2_5V_SLEEP_NECK1  19C4<> 39B3>
+2_5V_SLEEP_NECK2  21A3<> 39B3>
+2_8V_GPU_LVDS_LDO  21A6<>
+3V_ATI_OSC_SLEEP  18D2< 39C3>
+3V_ATI_SS        18B2< 39C3>
+3V_CG_PLL_MAIN   14C6< 39A3>
+3V_FW            29A3< 29D7<> 30B7<> 30D5< 39A3>
+3V_FW_AVDD       29C6< 39A3>
+3V_FW_AVDD_PORT0  29C6< 39A3>
+3V_FW_AVDD_PORT1  29C6< 39A3>
+3V_FW_AVDD_PORT2  29D6< 39A3>
+3V_FW_ESD        30B3<> 30B5< 30D2<> 39B3>
+3V_FW_ESD_ILIM   30D4< 39B3>
+3V_FW_ESD_R      30B6<
+3V_FW_UF         29D7<> 39A3>
+3V_GPU           12D1< 18B8< 18C5< 18C7< 18D6<
                 19C4< 19C5< 19C7< 19D8< 21A7< 21B1<
                 21B8< 39C3>
+3V_GPU_FLT       21B2< 39C3>
+3V_HALL_EFFECT   23B6<> 39B6> 40C4>
+3V_INTREPID_USB  14C3< 39D3>
+3V_LCD           22B4<> 39B6>
+3V_LCD_SW        22A4<> 39B6>
+3V_MAIN          23A7< 39D6>
+3V_MAIN_CONN     23A6<>
+3V_NEC_VDD       27D7< 27D7< 39A3>
+3V_PMU           39D6> 40A2>
+3V_PMU_AVCC      26B1< 31B6< 31D5<> 39C6>
+3V_PMU_ESR       33A2< 39C6>
+3V_PMU_RESET     31C7< 35A3<>
+3V_SLEEP         20D5< 20D8< 23A5< 39D6>
+3V_SLEEP_AUDIO   26D6<> 26D7<>
+3V_SLEEP_NECK    21A3<> 39B3>
+3V_SLP_OK_L      34B4<>
+3V_SLP_ON        34A5<>
+4_6V_BU          33A3<> 34B6< 39C6>
+4_85V_ESR        33A4< 39C6>
+4_85V_RAW        31B4< 33A4<> 39C6>
+5V_DDC_SLEEP     22D3<> 22D5<> 39B6> 40A2>
+5V_DDC_SLEEP_UF  22D6< 39B6>
+5V_HD_SLEEP      25D1<> 34A7<> 39C6>
+5V_INV_SW        22B2<> 39B6> 40D1>
+5V_INV_UF_SW     22B2<> 39B6>
+5V_MAIN          39D6>
+5V_MAIN_AUDIO    26D7<>
+5V_MAIN_AUDIO_0  26D7<>
+5V_MAIN_CONN     39B6>
+5V_SLEEP         23A4< 39D6>
+5V_SLEEP_MM3120  23A4<>
+5V_SOUND_SLEEP   39B6>
+5V_TPAD          23B7<>
+5V_TPAD_FB       23B6<>
+5V_TPAD_SLEEP    40C4>
+12_8V_INV        22B1<> 39B6> 40A2>
+24V_PBUS         39D6> 40B2>
+24V_PBUS_CONN    33A8<>
+ADAPTER          32D8<> 33B7< 39D6>
+ADAPTER_ILIM     33B6<> 39C6>
+ADAPTER_OR_BATT  33A5<> 39C6>
+ADAPTER_SENSE    32D5<> 39C6>
+ADAPTER_SW       32D6<> 39C6>
+BATT             39D6>
+BATT_14V_FUSE    32D1<> 39C6>
+BATT_24V_FUSE    32B1< 32D2<> 39C6>
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+BATT_POS         32A4<> 39C6> 40C3>
+BATT_RSNS        32B2< 39C6>
+BATT_VSNS        32A4< 39C6>
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+FAN2_PWR         26A3<>
+FW_FUSE          30D7<> 39A3>
+FW_PWR_CTRL      30B7<>
+FW_PWR_OR        29B8< 29D8<> 30D5<> 39A3>
+FW_PWR_OR_F      30B7<>
+FW_PWR_OR_GATE   30B8<>
+FW_PWR_OR_GATE_L  30B8<
+FW_PWR_PORTA     30B5< 39A3>
+FW_SW            30D5<> 39A3>
+FW_VP0           30C2<> 39A3>
+FW_VP1           30A3<> 39A3>
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+GPU_MEM          18A6<> 18B8< 21B4< 21B7< 21C6<
                 21C8< 21D2< 39C3>
+GPU_MEMCORE      21C5< 39C3>
+GPU_VDD15_NECK   19B5<> 39B3>
+GPU_VDD15_UF     19B5<> 19D4<> 39C3>
+HD_LOGIC_SLEEP   25C2<> 39C6>
+PBUS             39D6> 40B2>
+PPBATT_ISNS_N    24A4<> 40B4>
+VCC_CBUS_SW      17B1< 17B2< 17D2<> 39D3>
+VPP_CBUS_SW      17B1< 17B2< 17D2<> 39C3>
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1V65_REF          32A5<
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1_5V_BOOST        36C6<> 39C1>
1_5V_BST          36C5<> 39C1>
1_5V_DH           36C5<> 39C1>
1_5V_DL           36B5<> 39C1>
1_5V_FB           36B5< 36B7< 39C1>
1_5V_ILIM         36C5<> 39C1>
1_5V_LX           36B5<> 39C1>
1_5V_SLEEP_EN_L   36C7<> 36D7<>
1_8V_SLEEP_PWREN_L  36A3<>
1_8V_SW           36A5<> 39A1>
1_8V_VFB          39A1>
2_5V_BOOST        36C4<> 39D1>
2_5V_BST          36C4<> 39D1>
2_5V_DH           36C4<> 39D1>
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NEC_PPONS_TP      27B5>
NEC_RIGHT_USB_OVERCURRENT  27D1< 33B7<> 40C1>
NEC_RIGHT_USB_PWREN  27B5<> 33A7<> 40C1>
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NEC_SMI_L_TP      27A7>
NEC_USB_DAN       27B4< 27C2<> 38B2>
NEC_USB_DAP       27A4< 27C2<> 38B2>
NEC_USB_DBM       27A4< 27C2<> 38B2>
NEC_USB_DBP       27A4< 27C2<> 38B2>
NEC_USB_RSDM1     27C5<> 38B2>
NEC_USB_RSDM2     27C5<> 38B2>
NEC_USB_RSDP1     27C5<> 38B2>
NEC_USB_RSDP2     27C5<> 38B2>
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NEC_XT2           27D5<> 37B1>
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NTEST1_TP         27B5<
NUMLOCK_LED_L     31D7<
OVER_18V_ADJ      32C3<>
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PMU_AC_DET      31A5< 31B4<>
PMU_AC_IN       31B4<>
PMU_BATT0_DET_L  31B4<>
PMU_BATT1_DET_L_PU  31B4<> 31D2<
PMU_BATT_DET_L   31A8<> 31B3< 31D2< 32A4<> 40C3>
PMU_BYTE         31B6< 31C7<
PMU_CAPSLOCK_LED_L  31C6<>
PMU_CHARGE_V     31C4<> 32B8<>
PMU_CHRG_BATT_B  31C4<> 32A8<>
PMU_CLK          14C2<> 31C4<>
PMU_CNVSS        31B6< 31C7<
PMU_CPU_HRESET_L  8A2< 6C3<> 31C4<>
PMU_CUSTOM_RESET  31A8<>
PMU_CUSTOM_RESET_L  31A7<> 31B8<
PMU_EPM          31D2< 31D4<>
PMU_FROM_INT     14C2<> 31C4<>
PMU_I2C_CLK      31B4<> 31C2<
PMU_I2C_DATA     31B4<> 31C2<
PMU_INT_L        14B5<> 14B7< 31B6<>
PMU_INT_NMI      14B5<> 14B7< 31D4<>
PMU_KB_RESET_L   40B2>
PMU_LID_CLOSED_L  23A8< 23B4<> 31B2< 31C4<>
PMU_NMI_BUTTON_L  26A1< 31C2< 31C4<>
PMU_NMI_L        31C2< 31C4<>
PMU_NUMLOCK_LED_L  31C6<>
PMU_OOPS         31B2< 31B4<>
PMU_PME_L        14B5<> 27B8< 31B2< 31C4<>
PMU_POWERUP_OK   31B4<> 31D2<
PMU_POWER_UP_L   30D8<> 31C6<> 31D7< 34B8<
PMU_REQ_L        14B7< 14C2> 31C4<>
PMU_RESET_BUTTON_L  26A2< 31C4<> 31D2<
PMU_RESET_L      31B7<>
PMU_SELECT       31C6<>
PMU_SLEEP_LED    23B4<>
PMU_SLEEP_LED_L  23B3<> 31C4<>
PMU_SMB_CLK      31B4<> 31C2< 32A3<
PMU_SMB_DATA     31B4<> 31C2< 32A2<
PMU_TO_INT       14C2<> 31C4<>
POWER_UP         30D8<>
POWER_VALID      31B2< 31C4<>
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PP3V3_MMM_PIC    24C1< 24D5<
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PP3V3_SI_AVCC2   20C5< 39B3>
PP3V3_SI_PVCC1   20C7< 39B3>
PP3V3_SI_PVCC2   20C5< 39B3>
PP3V3_SI_VCC1    20D7< 39B3>
PP3V3_SI_VCC2    20C5< 39B3>
PWR_BUTTON_L     23A7<> 26C1< 40B2>
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RAM_ADDR<2>      9B4< 11B5<> 11B6<>
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RAM_ADDR<4>      9B4< 11B5<> 11B6<>
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RAM_ADDR<12>     9A4< 11B3<> 11B8<>
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RAM_BA<1..0>     37A5>
RAM_BA<1>        9A4< 11B5<> 11B6<>
RAM_CAS_L        9A4< 11B5<> 11B6<> 37A5>
RAM_CKE<0>       9A3< 9C4< 11B6<>
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RAM_CKE<2>       9A3< 9C4< 11C5<>
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RAM_DATA_A<8>    10B8<> 11D8<>
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RAM_DATA_A<31..16>  37B5>
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RAM_DQM_A<2>     10B6<> 11C6<>
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RAM_DQM_A<4>     10B4<> 11B6<>
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RAM_DQS_B<7>     10C2<> 11A3<> 37A5>
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RAM_MUXSEL_L     10A3< 10A5< 10B5<> 10B7<> 37A5>
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RAM_WE_L         9A4< 11B3<> 11B6<> 37A5>
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RF_DISABLE_L_SPN  25D6<> 40C1>
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RIGHT_USB_DP     27A3< 33A7<> 38A2> 40D1>
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ROM_OE_L         9B3< 12A5< 25C5<> 40B1>
ROM_ONBOARD_CS_L  9B3< 25C6<> 40B1>
ROM_RW_L         9B3< 12A5< 25C6<> 40B1>
ROM_WP_L         9B3<
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SI_MASTER        20B8<
SI_M_HTPLG       20B7<
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SI_SECONDARY     20C8<
SI_S_HTPLG       20A5<
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SLEEP_ANODE      23C2< 26C5<>
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SLEEP_LED_I      23C2<
SLEEP_LED_L      23C2<
SLEEP_LED_SW_L   23C3<>
SLEEP_LED_UF     23C2<
SLEEP_LS5        34A5<> 34AB<
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SLEEP_L_LS5      19A7<> 28A8<> 34A5<> 35C8<> 36C8<
SLEEP_L_LS5_EN_L  34A6<>
SLEEP_L_LS5_INV  36A3< 36C2< 36C8<>
SLEEP_L_LS5_NET  34B3<> 36C8<>
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SLEEP_NET_INV    34A3<>
SMC_TP           27B5<
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SND_AMP_MUTE_INV  26C8< 26D4<
SND_AMP_MUTE_L   14C5<> 26D3<>
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SND_HP_MUTE      26C4<>
SND_HP_MUTE_INV  40A4>
SND_HP_MUTE_L    14C5<> 26C4<>
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SND_HW_RESET_L   14A7< 14B5<> 26B8< 40C6>
SND_LIN_SENSE_L  40C6>
SND_SCLK         14B1< 26B8< 37B1> 40C6>
SND_SYNC         14B1< 26C8< 40D6>
SND_TO_AUDIO     14B1< 26C8< 40D6>
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ST7_PB6_PD       23A2< 23C4<>
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ST7_SENSOR5_SCK  23B2< 23C4<>
ST7_SENSOR5_SDA  23B3< 23C4<>
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SUPPLY_M_DM      26A8< 26B6<
SUPPLY_M_DP      26A8< 26B6<
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SUTRO_ALS_OUT    23B4<> 25B2<> 40C2>
SYSCLK_CPU       5C4< 8A6< 37D1>
SYSCLK_CPU_UF    8A6<> 37D1>
SYSCLK_DDRCLK_A0  9D4< 11D8<> 37D1>
SYSCLK_DDRCLK_A0_L  9D4< 11D8<> 37D1>
SYSCLK_DDRCLK_A0_L_UF  9B6<> 9D5< 37D1>
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SYSCLK_DDRCLK_A1_L  9D4< 11A6<> 37D1>
SYSCLK_DDRCLK_A1_L_UF  9B6<> 9D5< 37D1>
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SYSCLK_DDRCLK_B0  9D4< 11D3<> 37D1>
SYSCLK_DDRCLK_B0_L  9C4< 11D3<> 37C1>
SYSCLK_DDRCLK_B0_L_UF  9B6<> 9C5< 37D1>
SYSCLK_DDRCLK_B0_UF  9B6<> 9D5< 37D1>
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SYSCLK_DDRCLK_B1_L_UF  9B6<> 9D5< 37D1>
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SYSCLK_LA_TP     8A6<>
SYSTEM_CLK_EN    14A5< 14A7< 31C4<>
SYS_BATT_ISNS    24A2< 31C2<
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THERM1_M_DP      38A2>

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THERM_L_OC       26B1<> 31B4<>
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TMDS_SYNC        20A7< 20B8<
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TPAD_F_TXD       40C4>
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TPAD_TXD         31B2< 31C4<>
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TP_MMM_ICSP_PGM  24C3<>
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TV_COMP          22A6<> 40D6>
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UIDE_RDY         13C7<> 39D3>
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USB_D2P          27A5>
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USB_DEP          14B2<> 14C2< 38B2>
USB_DFM          14B2<> 14B2< 38B2>
USB_DFP          14B2< 14B2<> 38B2>
USB_OC_AB_L      14B2< 14C7<
USB_OC_CD_L      14B2< 14C7<
USB_OC_EF_L      14B2< 14D7<
USB_PWREN_AB_L   14B2<> 14C7<
USB_PWREN_CD_L   14B2<> 14C7<
USB_PWREN_EF_L   14B2<> 14D7<
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USB_TPAD_P       14B1< 23A7<>
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VCORE_BST        35C5<> 39C1>
VCORE_CC         35B6<> 39B1>
VCORE_CNTL_RC    19A3<>
VCORE_DH         35B5<> 39C1>
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VCORE_TIME       35B4<> 39B1>
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VCORE_VCC        35C6< 39C1>
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VGA_HSYNC        22C6<> 22C7< 40D7>
VGA_HSYNC_BUF    22C8<>
VGA_R            22C5<> 22D7< 40D7>
VGA_VSYNC        22C5<> 22C7< 40D7>
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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6694	C
SCALE: NONE	SHT 43 OF 45	

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

BS1 PCB_STANDOFF 4
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U16	LTC1778	19
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