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
F		480829	PRODUCTION RELEASED	01/10/07	?

SCHEM,MLB,PB15"
08/25/2005

PAGE	CONTENTS
1	TITLE PAGE AND CONTENTS
2	SYSTEM BLOCK DIAGRAM
3	POWER BLOCK DIAGRAM
4	PCB NOTES AND HOLES
5	MPC7447A MAXBUS INTERFACE
6	MPC7447A DATA/NC PINS/BOOTBANGER
7	CPU PLL AND CONFIGURATION STRAPS
8	INTREPID MAXBUS AND BOOT STRAPS
9	INTREPID MEMORY INTERFACE/BOOTROM
10	DDR MEMORY MUXES
11	400PIN STACKED DDR SODIMM CONNECTOR
12	INTREPID AGP 4X/PCI
13	INTREPID ENET/FW/UATA/EIDE INTERFACES
14	INTREPID GPIOS/SERIAL/USB INTERFACES/SSCG
15	INTREPID POWER RAILS/1.5V LDO
16	INTREPID DECOUPLING
17	USB 2.0 INTERFACE (uPD720101)
18	CARDBUS INTERFACE (PCI1510)
19	M11 AGP INTERFACE & SPREAD SPECTRUM
20	EXTERNAL TMDS (DUAL TMDS - SIL178)
21	M11 LVDS/TMDS/GPIO & GPU VCORE
22	M11 POWER

PAGE	CONTENTS
23	VIDEO CONNECTORS - INVERTER,DVI, LVDS,S-VIDEO
24	SPIDEY,PWR BUTTON,ALS
25	MMM & BATTERY CURRENT SENSE CIRCUIT
26	INTERNAL CONNECTORS-AIRPORT,HDD,ODD
27	FAN CONTROLLER,SW MODEM,SERIAL DEBUG SOUND/LEFT USB/BLUETOOTH
28	GIGABIT ETHERNET INTERFACE
29	FIREWIRE PHY
30	FIREWIRE PORTS
31	PMU
32	BATTERY CHARGER AND CONNECTOR
33	PBUS SUPPLY,PMU SUPPLY,SUPERCAP ,BACKUP BATTERY
34	3.3V/5V SYSTEM POWER SUPPLY
35	CPU CORE VOLTAGE POWER SUPPLY
36	1.5V/1.8V/2.5V SYS. POWER SUPPLIES
37	SIGNAL CONSTRAINTS(PG1)-DDR MEM/CLK
38	SIGNAL CONSTRAINTS(PG2)-CPU
39	SIGNAL CONSTRAINTS(PG3)-DIGITAL/DIFF
40	SIGNAL CONSTRAINTS(PG4)-POWER NETS
41	FUNCTIONAL TESTPOINTS
42	REVISION HISTORY
43-46	SCHEMATIC CREF AND NETLIST REPORTS

BOM OPTIONS (IN COMMON PARTS)

STUFF	NO STUFF
1_8V_MAXBUS	1_5V_MAXBUS
NO_SSCG	SSCG
5V_HD_LOGIC	3V_HD_LOGIC
NO_BBANG	BBANG
INT_2_5V_COLD	INT_2_5V_HOT
ATI_MEMIO_HI	ATI_MEMIO_LO
SOFT_MODEM	USB_MODEM
GPU_PWRMSR	EMI
GPU_SS	EXT_TMDS (BETTER/BEST)
VGA_BUFFER_RES	INT_TMDS (BEST128)
MMM	SUPERCAP
INT_TMDS (BETTER/BEST)	ADT7460
EXT_TMDS (BEST128)	
BACKUP_BATT	
ADT7467	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-6680	1	SCHEM,MLB,PB15	SCH1	
820-1679	1	PCBF,MLB,PB15	PCB1	
826-4393	1	LABEL,PCB,28MM X 6MM	EEE:U3Z	LABEL_BST128
826-4393	1	LABEL,PCB,28MM X 6MM	EEE:U40	LABEL_BST64
826-4393	1	LABEL,PCB,28MM X 6MM	EEE:U41	LABEL_BTR

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,PB15

DRAWING NUMBER 051-6680 REV. F

SHT 1 OF 46

U51 INTREPID

J23 Ethernet Connector P.28
4 DATA PAIRS
U43 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
J20 FW - B Connector P.30
2 DATA PAIRS @ 400MHZ
U36 FireWire PHY P.29
1394 OHCI 3.3V 8BIT TX/RX 50MHZ

J13 ODD Connector P.26
EIDE
J12 HDD Connector P.26
UIDE

J15 SW MODEM Connector P.27
J3 LIO/Audio Connector P.27
I2S
I2C
I2C
U53/J1/J18 Fan Circuit P.27

J2 RUX Board Connector P.24
J19 ALS BOARD Connector P.24
J16 BACKUP BATTERY CONNECTOR P.33
C692 SUPERCAP P.33
J26 Battery Connector P.32
Power Supply & Charger P.32-36
J27 DC-In Connector P.32
J8 SLEEP LED P.24
SMBUS 3.3V

U15/U20/U58 MMM P.25
U41 BATTERY CURRENT SENSOR P.25

NOT USED

ETHERNET 10/100/1000 P.13	FIREWIRE 400 MB/S P.13	UATA 100 P.13	EIDE P.13	CARDSLOT P.13	I2S P.14	I2C P.13 P.14
USB PORT A P.14					SCCA P.14	
USB PORT B P.14					VIA/PMU P.14	
USB PORT C P.14					BOOTROM P.12	
USB PORT D P.14					PCI 64BITS 33MHZ P.12	
USB PORT E P.14						
USB PORT F P.14						
MAXBUS P.8	DDR MEMORY P.9				4X AGP P.12	

J28 Serial Debug Connector P.27
U28 PMU P.31
SERIAL 5V
J5 CARDBUS Connector P.18
33MHZ 16/32 BITS 3.3V/5V
U8 TI PCI1510 CardBus Controller P.18

J3 BlueTooth (LIO) P.27
J10 SPIDEY P.24
U11 BOOT ROM 1M X 8 P.9
J6 AIRPORT Connector P.26
PCI BUS 32BITS 33MHZ 3.3V

AGP BUS 1.5V/3.3V 32BITS 66MHZ
U47 ATI M11 64MB P.19-22
MEMORY CH. A (INTERNAL MEM)
MEMORY CH. C (INTERNAL MEM)
MEMORY CH. B (INTERNAL MEM)
MEMORY CH. D (INTERNAL MEM)
U17 NEC USB2.0 EHCI HC P.17
J3 LEFT USB (VIA LIO) P.27
J17 RIGHT USB (VIA STATLER) P.27

MAXBUS 1.8V 167MHZ 32BIT ADDRESS 64BIT DATA
U56 APOLLO CPU (MPC7447) P.5-6
CPU PLL Config P.7
PMU
MEMORY BUS 2.5V 167MHZ 64BITS
U16/U18/U28/U27 2:1 DDR MUXES P.10
J4 Inverter Connector P.23
LVDS
EDID (I2C)
S-VIDEO
COMPOSITE
TMDS (VIA SIL1162)
RGB
DDC
J14 LCD Panel Connector P.23
J21 S-Video Connector P.23
J22 DVI-I Connector P.23
J25 DDR SDRAM DIMM 0
DDR SDRAM DIMM 1 SO-DIMM Connector P.11

SYSTEM BLOCK DIAGRAM

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 2 OF 46	

POWER SYSTEM ARCHITECTURE

AC ADAPTER IN PG 32

INRUSH LIMITER PG 32

+24V_PBUS

1V20_REF - PG 33
>~13.44V TURNS-ON
<~13.44V SHUTS-OFF

RUN/SS
BUCK VCC REGULATOR (LTC1625) PG 33
AC: 12.8V
NO AC: BATTERY VOLTAGE
1625 NOT RUNNING
SHUTDOWN: RUNNING
SLEEP: RUNNING
RUN: RUNNING

+PBUS

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

14V_PBUS

+3V_PMU LDO PG 33

+BATT

+5V_MAIN
+3V_PMU
+4_6V_BU

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

MAIN 3V/5V DC/DC (LTC3707) PG 34

VCC
STBYMD
PGOOD

SHUTDOWN: STOPPED
SLEEP: RUNNING
RUN: RUNNING

INTERNAL ZENER CLAMP TO 6V
<100UA ALLOWED
TURNS ON AT >1V
RUN/SS - 3V

+5V_MAIN
3V_5V_OK

HOLDS BOTH RUN/SS AT GND WHEN IT'S CONNECTED TO GND
TURNS CONTROL TO RUN/SS WHEN IT'S OPEN

+3.3V_MAIN

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

BACKUP BATTERY

14V_PBUS

14V CHARGES BACKUP BATTERY

24V IS OUTPUT ONLY FROM BACKUP BATTERY

CHARGER INPUT & BOOST OUTPUT PG 33

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

BATTERY CHARGER (MAX1772) PG 32

DC/DC (LTC3411)
SHUTDOWN: STOPPED
SLEEP: STOPPED
RUN: RUNNING
PG 36

+1.8V_MAIN
MAXBUS

+BATT

3S 2P 18650 CELLS

NO INRUSH PROTECTION
WHEN ONLY BATTERY IS CONNECTED

BATTERY VOLTAGE FEED-IN PATH PG 32

+PBUS

BACKLIGHT INVERTER

+5V_MAIN

VCC
MAIN 2.5V/1.5V DC/DC (MAX1715) PG 36

SHUTDOWN: STOPPED
SLEEP: RUNNING
RUN: RUNNING

TURNS ON OUTPUT @ 2.4V ON1/ON2

PGOOD

MAP31 DDR CORE
MAP31 DDR I/O
DDR POWER

+2.5V_MAIN
1_5V_2_5V_OK
+1.5V_MAIN

INTREPID CORE
AGP I/O

DCDC_EN_L

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

+PBUS

+5V_MAIN

EXT_VCC
VCC
DC/DC (LTC1778)
SHUTDOWN: STOPPED
SLEEP: D3COLD
RUN: RUNNING

TURNS ON AS LOW AS 0.8V/TYP 1.5V
INTERNAL 1.2UA CURRENT SOURCE

RUN/SS PG 20

GPU_VCORE +1.2V

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)

DCDC_EN
SLEEP

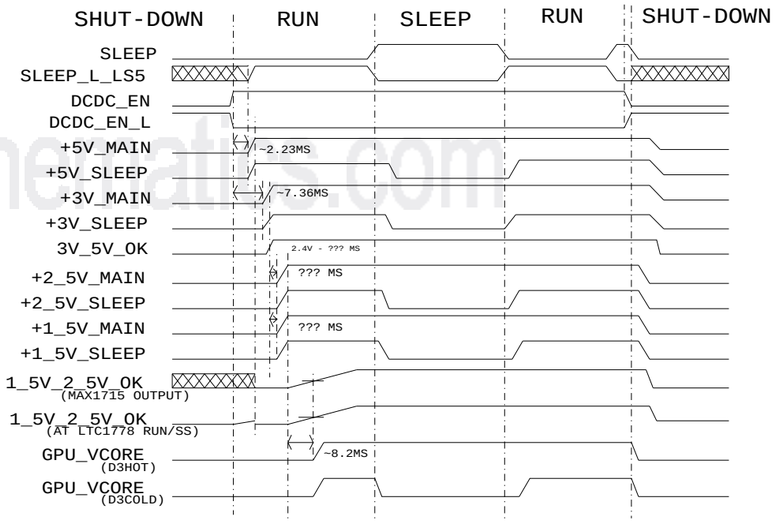
MAXBUS SEQUENCING

+PBUS

+5V_MAIN

VCC
SHDN
DC/DC (MAX1717)
SHUTDOWN: STOPPED
SLEEP: STOPPED
RUN: RUNNING
PG 35

CPU_VCORE (+1.385V)



POWER BLOCK DIAGRAM

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F

SCALE	SHT	OF
NONE	3	46

PCB SPECS

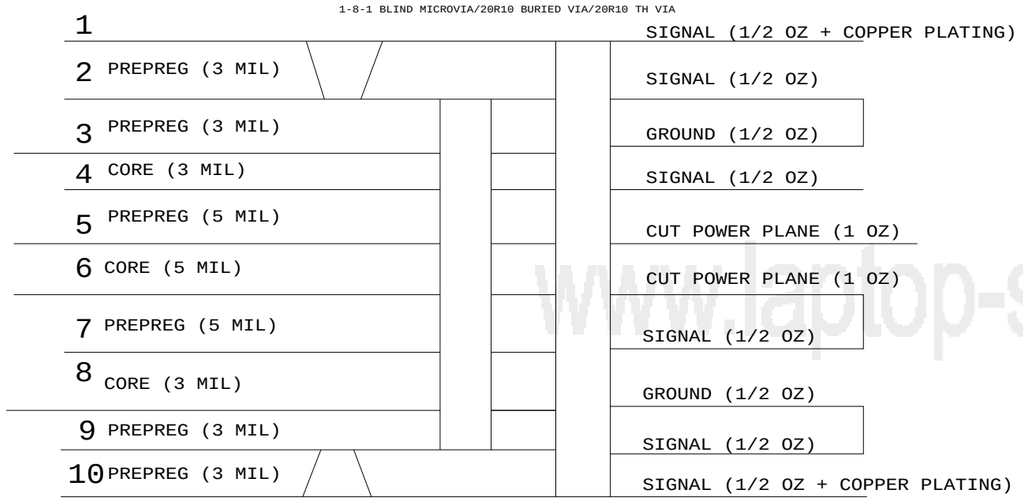
THICKNESS : 1.2 MM / 0.047 IN
1/2 OZ CU THICKNESS: 0.7 MILS
1.0 OZ CU THICKNESS: 1.4 MILS

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

SEE PCB CAD FILES FOR MORE SPECIFIC INFO.

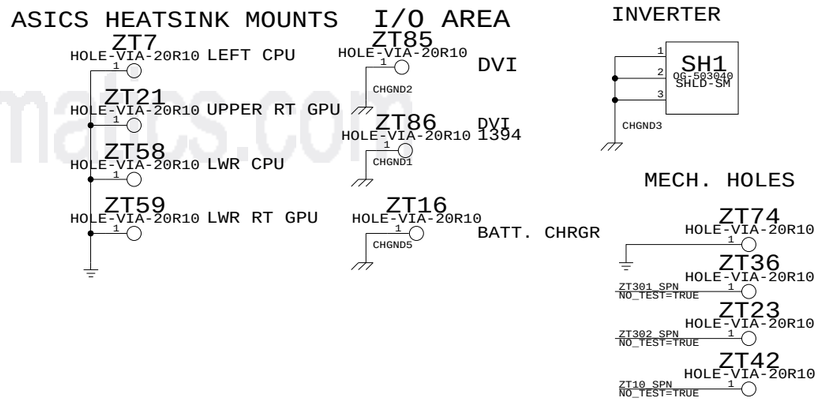
BOARD STACK-UP AND CONSTRUCTION

1-8-1 BLIND MICROVIA/20R10 BURIED VIA/20R10 TH VIA



BOARD HOLES

CHASSIS MOUNTS

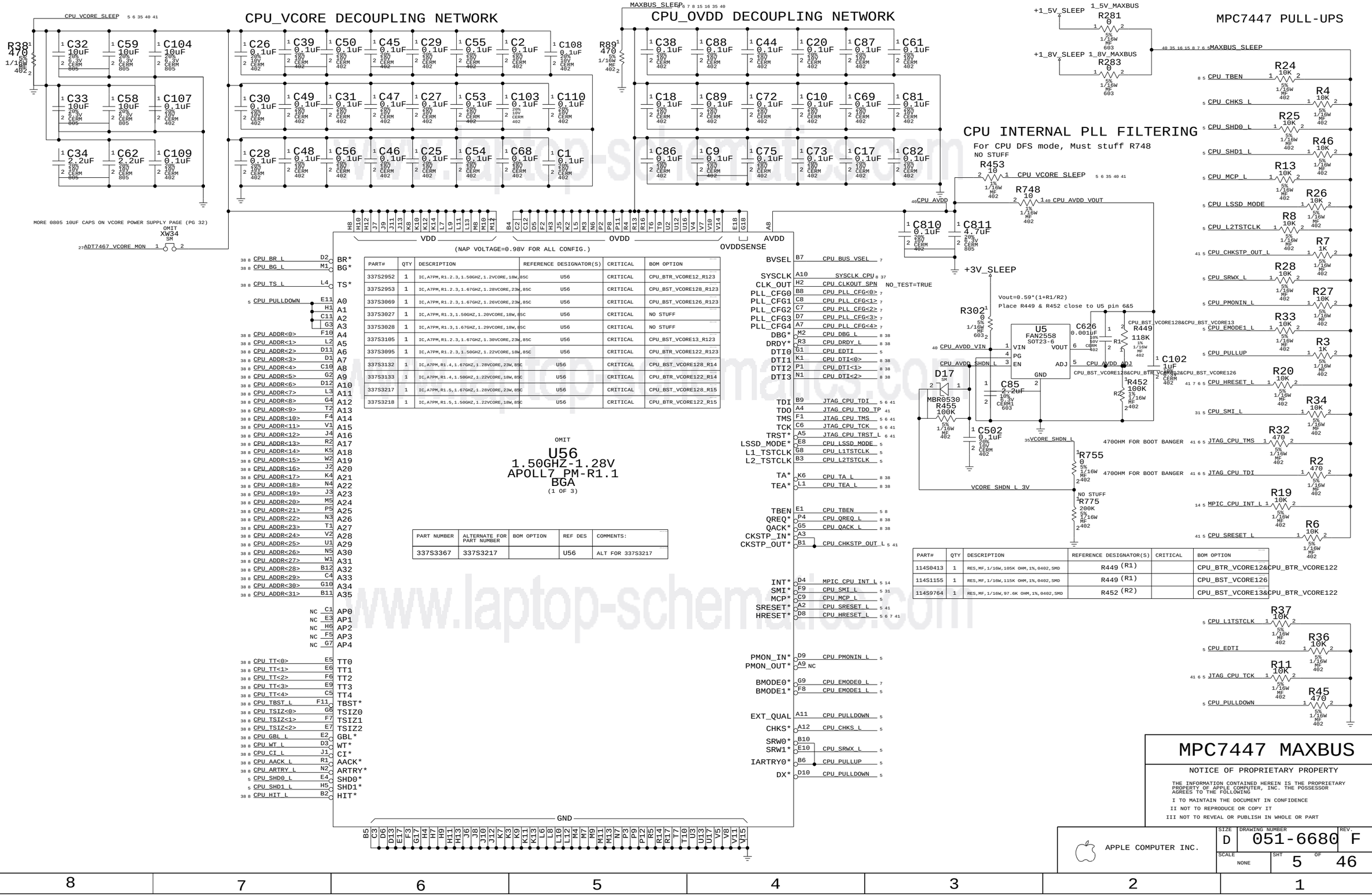


GROUND VIAS

BOARD INFORMATION

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 4 OF 46	



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S2952	1	IC,A7PM,R1.2.3,1.50GHZ,1.2VCORE,18W,85C	U56	CRITICAL	CPU_BTR_VCORE12_R123
337S2953	1	IC,A7PM,R1.2.3,1.67GHZ,1.28VCORE,23W,85C	U56	CRITICAL	CPU_BST_VCORE128_R123
337S3069	1	IC,A7PM,R1.2.3,1.67GHZ,1.26VCORE,23W,85C	U56	CRITICAL	CPU_BST_VCORE126_R123
337S3027	1	IC,A7PM,R1.3,1.50GHZ,1.20VCORE,18W,85C	U56	CRITICAL	NO STUFF
337S3028	1	IC,A7PM,R1.3,1.67GHZ,1.29VCORE,18W,85C	U56	CRITICAL	NO STUFF
337S3105	1	IC,A7PM,R1.2.3,1.67GHZ,1.30VCORE,23W,85C	U56	CRITICAL	CPU_BST_VCORE13_R123
337S3095	1	IC,A7PM,R1.2.3,1.50GHZ,1.22VCORE,18W,85C	U56	CRITICAL	CPU_BTR_VCORE122_R123
337S3132	1	IC,A7PM,R1.4,1.67GHZ,1.28VCORE,23W,85C	U56	CRITICAL	CPU_BST_VCORE128_R14
337S3133	1	IC,A7PM,R1.4,1.50GHZ,1.22VCORE,18W,85C	U56	CRITICAL	CPU_BTR_VCORE122_R14
337S3217	1	IC,A7PM,R1.5,1.67GHZ,1.28VCORE,23W,85C	U56	CRITICAL	CPU_BST_VCORE128_R15
337S3218	1	IC,A7PM,R1.5,1.50GHZ,1.22VCORE,18W,85C	U56	CRITICAL	CPU_BTR_VCORE122_R15

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
337S3367	337S3217		U56	ALT FOR 337S3217

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
114S0413	1	RES,MF,1/16W,105K OHM,1%,0402,SMD	R449 (R1)		CPU_BTR_VCORE12&CPU_BTR_VCORE122
114S1155	1	RES,MF,1/16W,115K OHM,1%,0402,SMD	R449 (R1)		CPU_BST_VCORE126
114S9764	1	RES,MF,1/16W,97.6K OHM,1%,0402,SMD	R452 (R2)		CPU_BST_VCORE13&CPU_BTR_VCORE122

MPC7447 MAXBUS

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

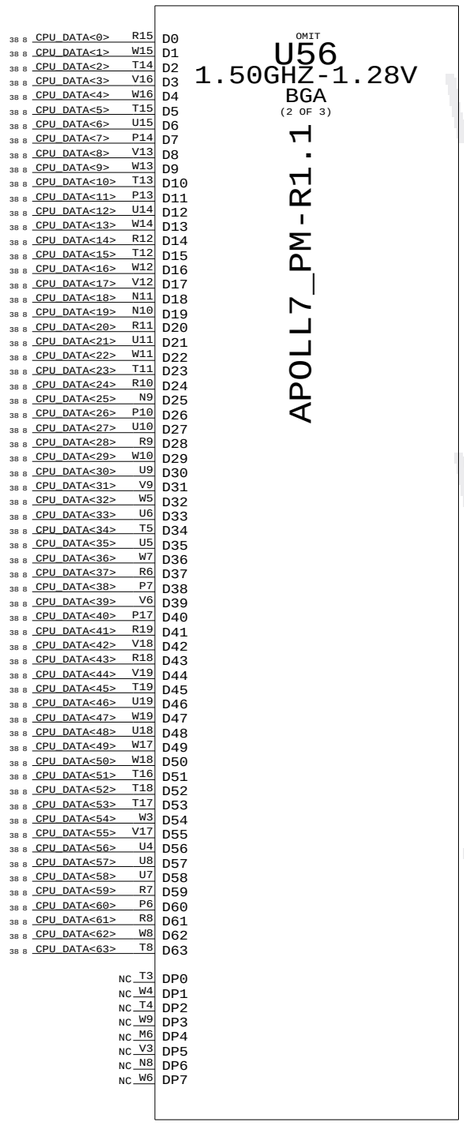
I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

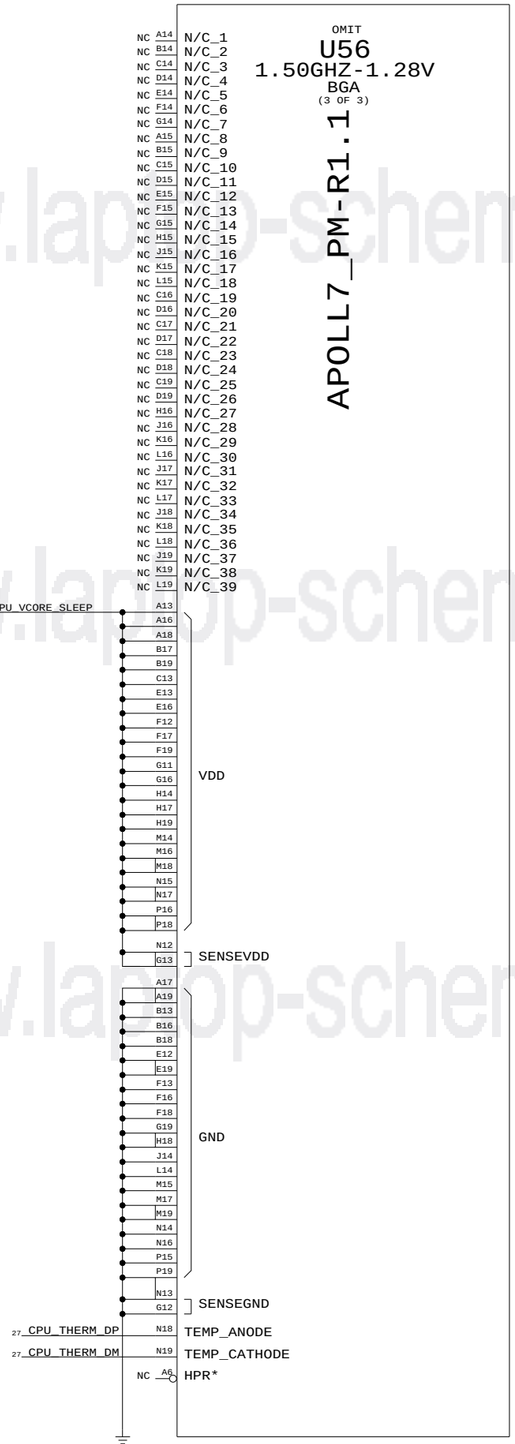
II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

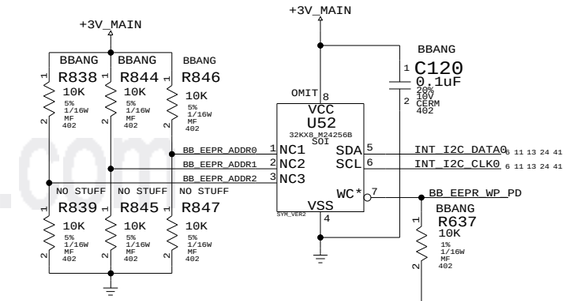
APPLE COMPUTER INC.

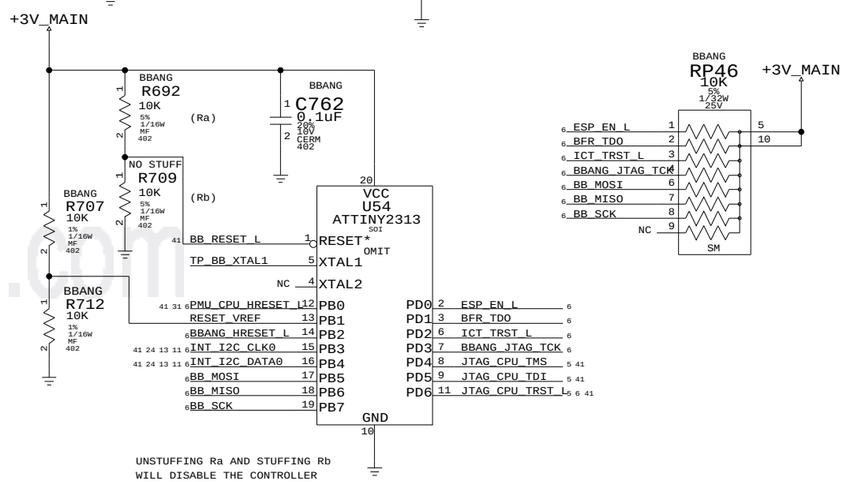
SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 5 OF 46	





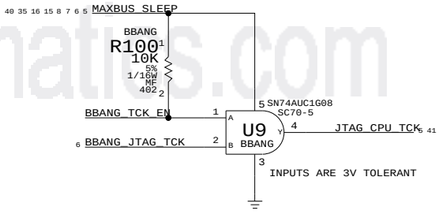
BOOT BANGER - TWEAK PROCESSOR BITS AFTER POWER-ON

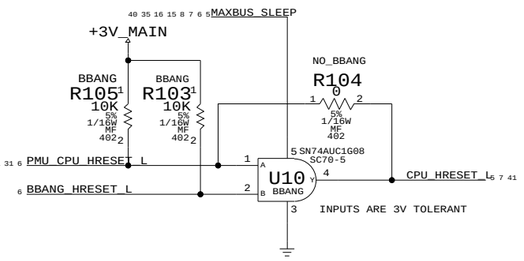


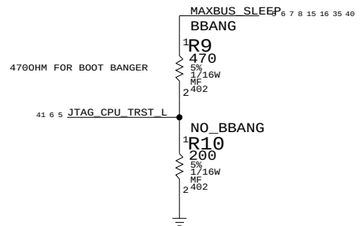


UNSTUFFING Ra AND STUFFING Rb
WILL DISABLE THE CONTROLLER

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
341S1660	1	MCU,PROGRAMMED W/ BBANGER	U54	BBANG
341S1661	1	I2C EEPROM,PROGRAMMED W/ BBANGER	U52	BBANG







MPC7447/BBANG

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

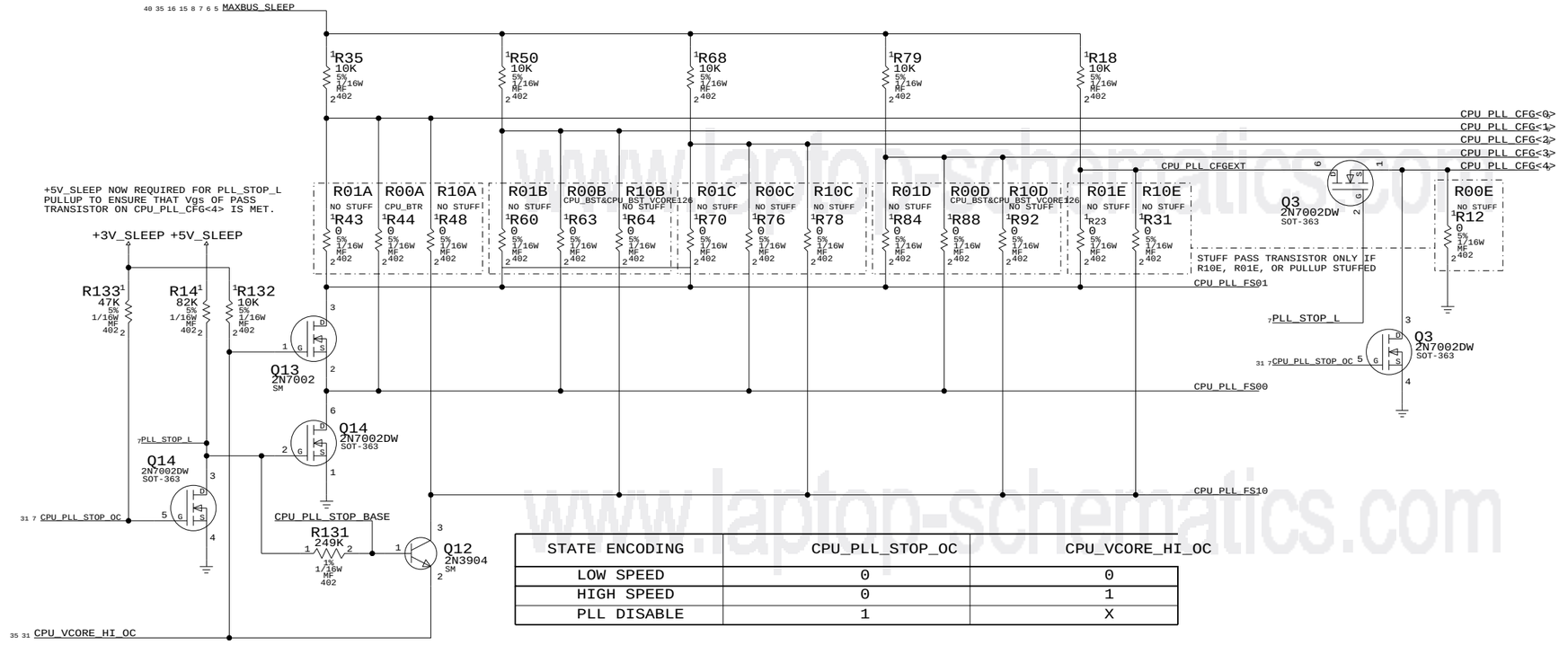
II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 6 OF 46	

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

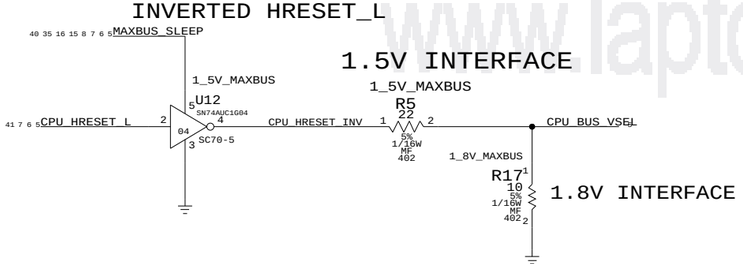
APOLLO 7PM

MULTIPLIER (Bus-to-Core)	CORE FREQUENCY (AT BUS FREQUENCY) 167MHZ (MHZ)	133MHZ (MHZ)	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

INVERTED HRESET_L



BUSTYPE SELECT

APOLLO ONLY SUPPORTS MAXBUS

DESKTOP HAD PROBLEM USING INVERTER TO INVERT HRESET_L NEED TO CHARACTERIZE

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	051-6680	F
SCALE: NONE	SHT 7 OF 46	

INTREPID BOOT STRAPS

BIT 32 TO 39

40 35 16 15 8 7 6 5 MAXBUS_SLEEP

R640[1] 10K	R639[1] 10K	R638[1] 10K	R666[1] 10K				
NO STUFF	NO STUFF	NO STUFF					
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402				
R622[1] 10K	R619[1] 10K	R618[1] 10K	R653[1] 10K	R621[1] 10K	R620[1] 10K	R652[1] 10K	R650[1] 10K
			NO STUFF				
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402

38 8 6 CPU_DATA<32>
38 8 6 CPU_DATA<33>
38 8 6 CPU_DATA<34>
38 8 6 CPU_DATA<35>
38 8 6 CPU_DATA<36>
38 8 6 CPU_DATA<37>
38 8 6 CPU_DATA<38>
38 8 6 CPU_DATA<39>

0: DDR_TRPMODEEnable
1: HDI output

0: Analyzer Clk_En_h
1: Active

0: PLL1 Active low
1: DDR_TRPEN Active High

0: PLL1 Active low
1: CPU Active High

Spare | Spare | Spare | Spare

BIT 40 TO 47

40 35 16 15 8 7 6 5 MAXBUS_SLEEP

R641[1] 10K	R665[1] 10K	R664[1] 10K	R693[1] 10K	R694[1] 10K	R699[1] 10K		
NO STUFF	SSCG	NO STUFF	NO_SSCG	NO STUFF	NO STUFF		
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402		
R648[1] 10K	R677[1] 10K	R623[1] 10K	R651[1] 10K	R649[1] 10K	R678[1] 10K	R679[1] 10K	R684[1] 10K
			NO_SSCG		SSCG		
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402

38 8 6 CPU_DATA<40>
38 8 6 CPU_DATA<41>
38 8 6 CPU_DATA<42>
38 8 6 CPU_DATA<43>
38 8 6 CPU_DATA<44>
38 8 6 CPU_DATA<45>
38 8 6 CPU_DATA<46>
38 8 6 CPU_DATA<47>

Spare | Spare | BIT2 BIT1 BIT0 | 0: Pull down (SW ONLY) 1: Active Pull up | 0: PLL1 Source (Clock Spread) 1: PLL1 Source (no spread) | 0: PLL2 Source (Clock Spread) 1: PLL2 Source (no spread)

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

40 35 16 15 8 7 6 8 MAXBUS_SLEEP

R696[1] 10K	R695[1] 10K	R667[1] 10K	R668[1] 10K	R643[1] 10K	R642[1] 10K	R698[1] 10K	
SSCG	SSCG		NO STUFF	NO STUFF	NO STUFF		
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	
R681[1] 10K	R680[1] 10K	R654[1] 10K	R655[1] 10K	R625[1] 10K	R624[1] 10K	R683[1] 10K	R626[1] 10K
NO_SSCG	NO_SSCG	NO STUFF				NO STUFF	
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402

38 8 6 CPU_DATA<48>
38 8 6 CPU_DATA<49>
38 8 6 CPU_DATA<50>
38 8 6 CPU_DATA<51>
38 8 6 CPU_DATA<52>
38 8 6 CPU_DATA<53>
38 8 6 CPU_DATA<54>
38 8 6 CPU_DATA<55>

0: PLL4ExtSrc
1: External source

OBSOLETE (Should remain high)
0: BOOTROM on IDE/CardSlot
1: BOOTROM on PCI1

0: 100ohm workaround
1: HI PHY workaround

BIT2 BIT1 BIT0 | Spare

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

BUF_REF CLK OUTEnable_h
0: TRISTATE
1: Active

R159 4.7 5% 1/16W ME 402

40 14 12 +1_5V_INTREPID_PLL — 1 — 2 — +1_5V_INTREPID_PLL7

C187 0.22uF 20% 6.3V CERM 402

H26 VDD15A_7 (PLL6)

OMIT
U51
INTREPID-REV2.1
BGA

38 8 5 CPU_BR_L	E29	BR	INPUT
38 8 5 CPU_BG_L	E26	BG	NO BUS KEEPER
38 8 5 CPU_TS_L	B27	TS	NO BUS KEEPER
38 8 5 CPU_ADDR<0>	D24	A_0	
38 8 5 CPU_ADDR<1>	D25	A_1	
38 8 5 CPU_ADDR<2>	A27	A_2	
38 8 5 CPU_ADDR<3>	E24	A_3	
38 8 5 CPU_ADDR<4>	G23	A_4	
38 8 5 CPU_ADDR<5>	B26	A_5	
38 8 5 CPU_ADDR<6>	A26	A_6	
38 8 5 CPU_ADDR<7>	D23	A_7	
38 8 5 CPU_ADDR<8>	A25	A_8	
38 8 5 CPU_ADDR<9>	E23	A_9	
38 8 5 CPU_ADDR<10>	J22	A_10	
38 8 5 CPU_ADDR<11>	B25	A_11	
38 8 5 CPU_ADDR<12>	H22	A_12	
38 8 5 CPU_ADDR<13>	G22	A_13	
38 8 5 CPU_ADDR<14>	D22	A_14	
38 8 5 CPU_ADDR<15>	B24	A_15	
38 8 5 CPU_ADDR<16>	B23	A_16	
38 8 5 CPU_ADDR<17>	E22	A_17	
38 8 5 CPU_ADDR<18>	J21	A_18	
38 8 5 CPU_ADDR<19>	G21	A_19	
38 8 5 CPU_ADDR<20>	E21	A_20	
38 8 5 CPU_ADDR<21>	A24	A_21	
38 8 5 CPU_ADDR<22>	D21	A_22	
38 8 5 CPU_ADDR<23>	A23	A_23	
38 8 5 CPU_ADDR<24>	H20	A_24	
38 8 5 CPU_ADDR<25>	B22	A_25	
38 8 5 CPU_ADDR<26>	H21	A_26	
38 8 5 CPU_ADDR<27>	A22	A_27	
38 8 5 CPU_ADDR<28>	E20	A_28	
38 8 5 CPU_ADDR<29>	B21	A_29	
38 8 5 CPU_ADDR<30>	D20	A_30	
38 8 5 CPU_ADDR<31>	A21	A_31	
38 5 CPU_CI_L	G26	CI	
38 5 CPU_GBL_L	A29	GBL	
38 5 CPU_TBST_L	A28	TBST	
38 5 CPU_TSIZ<0>	G24	TSIZ_0	
38 5 CPU_TSIZ<1>	H24	TSIZ_1	
38 5 CPU_TSIZ<2>	D26	TSIZ_2	
38 5 CPU_TT<0>	E25	TT_0	
38 5 CPU_TT<1>	G25	TT_1	
38 5 CPU_TT<2>	B28	TT_2	
38 5 CPU_TT<3>	D27	TT_3	
38 5 CPU_TT<4>	J25	TT_4	
38 5 CPU_WT_L	D28	WT	
38 8 5 CPU_AACK_L	B29	AACK	NO BUS KEEPER - PU
38 8 5 CPU_ARTRY_L	H23	ARTRY	NO BUS KEEPER - PU
38 8 5 CPU_HIT_L	B31	HIT	INPUT - PU
38 8 5 CPU_QREQ_L	A32	QREQ	INPUT - PD
38 5 CPU_QACK_L	G27	QACK	NO BUS KEEPER - ?
31 INT_SUSPEND_REQ_L	AK9	SUSPENDREQ	
31 INT_SUSPEND_ACK_L	AM8	SUSPENDACK	
37 8 INT_CPUFB_IN	J24	CPU_FB_IN	
37 8 INT_CPUFB_OUT	H16	CPU_FB_OUT	NO BUS KEEPER - PU
SYSCLK_LA_TP	G8	ANALYZER_CLK	
31 CPU_CLK_EN	AH9	STOPCPUCLK	INPUT - PU
INTREPID_ACS_REF	H13	ACS_REF	NO BUS KEEPER - ? NO BUS KEEPER - ? NO BUS KEEPER - ?
37 5 SYSCLK_CPU	J15	CPU_CLK	NO BUS KEEPER - PU NO BUS KEEPER - PU
5 CPU_TBEN	A31	TBEN	NO BUS KEEPER - PU
		VSSA_7 (PLL6)	

(1 OF 9)
CRITCAL

MAXBUS INTERFACE

D_0	D10	CPU_DATA<0>	6 38
D_1	G12	CPU_DATA<1>	6 38
D_2	E11	CPU_DATA<2>	6 38
D_3	H11	CPU_DATA<3>	6 38
D_4	B9	CPU_DATA<4>	6 38
D_5	B8	CPU_DATA<5>	6 38
D_6	A9	CPU_DATA<6>	6 38
D_7	A8	CPU_DATA<7>	6 38
D_8	E12	CPU_DATA<8>	6 38
D_9	D11	CPU_DATA<9>	6 38
D_10	B10	CPU_DATA<10>	6 38
D_11	J13	CPU_DATA<11>	6 38
D_12	A10	CPU_DATA<12>	6 38
D_13	D12	CPU_DATA<13>	6 38
D_14	E13	CPU_DATA<14>	6 38
D_15	G13	CPU_DATA<15>	6 38
D_16	B11	CPU_DATA<16>	6 38
D_17	D13	CPU_DATA<17>	6 38
D_18	A11	CPU_DATA<18>	6 38
D_19	G14	CPU_DATA<19>	6 38
D_20	H14	CPU_DATA<20>	6 38
D_21	E14	CPU_DATA<21>	6 38
D_22	B12	CPU_DATA<22>	6 38
D_23	G15	CPU_DATA<23>	6 38
D_24	B13	CPU_DATA<24>	6 38
D_25	H15	CPU_DATA<25>	6 38
D_26	D14	CPU_DATA<26>	6 38
D_27	B14	CPU_DATA<27>	6 38
D_28	A12	CPU_DATA<28>	6 38
D_29	G16	CPU_DATA<29>	6 38
D_30	E15	CPU_DATA<30>	6 38
D_31	J16	CPU_DATA<31>	6 38
D_32	D15	CPU_DATA<32>	6 8 38
D_33	A14	CPU_DATA<33>	6 8 38
D_34	A13	CPU_DATA<34>	6 8 38
D_35	D16	CPU_DATA<35>	6 8 38
D_36	E16	CPU_DATA<36>	6 8 38
D_37	G17	CPU_DATA<37>	6 8 38
D_38	B15	CPU_DATA<38>	6 8 38
D_39	H17	CPU_DATA<39>	6 8 38
D_40	A15	CPU_DATA<40>	6 8 38
D_41	B16	CPU_DATA<41>	6 8 38
D_42	E17	CPU_DATA<42>	6 8 38
D_43	A16	CPU_DATA<43>	6 8 38
D_44	J18	CPU_DATA<44>	6 8 38
D_45	H18	CPU_DATA<45>	6 8 38
D_46	D17	CPU_DATA<46>	6 8 38
D_47	G18	CPU_DATA<47>	6 8 38
D_48	A17	CPU_DATA<48>	6 8 38
D_49	B17	CPU_DATA<49>	6 8 38
D_50	E18	CPU_DATA<50>	6 8 38
D_51	B18	CPU_DATA<51>	6 8 38
D_52	D18	CPU_DATA<52>	6 8 38
D_53	A18	CPU_DATA<53>	6 8 38
D_54	A19	CPU_DATA<54>	6 8 38
D_55	H19	CPU_DATA<55>	6 8 38
D_56	B19	CPU_DATA<56>	6 8 38
D_57	J19	CPU_DATA<57>	6 8 38
D_58	A20	CPU_DATA<58>	6 8 38
D_59	D19	CPU_DATA<59>	6 8 38
D_60	E19	CPU_DATA<60>	6 8 38
D_61	G19	CPU_DATA<61>	6 8 38
D_62	B20	CPU_DATA<62>	6 8 38
D_63	G20	CPU_DATA<63>	6 8 38
DBG	A30	CPU_DBG_L	5 8 38
DRDY	G28	CPU_DRDY_L	5 8 38
DTI_0	K25	CPU_DTI<0>	5 38
DTI_1	D29	CPU_DTI<1>	5 38
DTI_2	B30	CPU_DTI<2>	5 38
TA	E27	CPU_TA_L	5 8 38
TEA	E28	CPU_TEA_L	5 8 38

FB BUFFER HAS 50 OHM OUTPUT IMPEDANCE

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

R169 511 1% 1/16W ME 402

R168 0 5% 1/16W ME 402

R161 1K 1% 1/16W ME 402

INTREPID OUTPUTS HIGH BY DEFAULT

SHORT = 1" SHORTER THAN MATCHED LENGTH

R155 0 5% 1/16W ME 402 — 37 INT_CPUFB_OUT — 1 — 2 — 37 INT_CPUFB_OUT_SHORT

R140 0 5% 1/16W ME 402 — 37 INT_CPUFB_OUT_SHORT — 1 — 2 — 37 INT_CPUFB_OUT_NORM

R128 NO STUFF 0 5% 1/16W ME 402 — 37 INT_CPUFB_OUT_NORM — 1 — 2 — 37 INT_CPUFB_LONG

LONG = 1" LONGER THAN MATCHED LENGTH

R146[1] NO STUFF 0 5% 1/16W ME 402 — 37 8 INT_CPUFB_IN — 1 — 2 — R147 0 5% 1/16W ME 402 — 37 INT_CPUFB_IN_NORM

R141[1] 0 5% 1/16W ME 402 — NO STUFF R136 0 5% 1/16W ME 402 — 37 INT_CPUFB_IN_NORM — 1 — 2 — 37 INT_CPUFB_LONG

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

MAXBUS PULL-UPS

MAXBUS_SLEEP 6 7 8 15 16 35 40

RP3 10K	RP3 10K	RP3 10K	RP2 10K	R152 10K	RP2 10K	RP2 10K	RP2 10K
38 8 5 CPU_TS_L	38 8 5 CPU_TA_L	38 8 5 CPU_ARTRY_L	38 8 5 CPU_BR_L	38 8 5 CPU_HIT_L	38 8 5 CPU_DRDY_L	38 8 5 CPU_TEA_L	38 8 5 CPU_AACK_L
5% 1/16W SM1	5% 1/16W SM1	5% 1/16W SM1	5% 1/16W SM1	5% 1/16W ME 402	5% 1/16W SM1	5% 1/16W SM1	5% 1/16W SM1

R150 10K	RP3 10K	R151 10K	
38 8 5 CPU_DBG_L	38 8 5 CPU_BG_L	38 8 5 CPU_QREQ_L	
5% 1/16W ME 402	5% 1/16W SM1	5% 1/16W ME 402	

INTREPID BOOT STRAPS

BIT 56 TO 63

40 35 16 15 8 7 6 5 MAXBUS_SLEEP

R669[1] 10K	R645[1] 10K	R697[1] 10K	R670[1] 10K	R644[1] 10K	R646[1] 10K		
NO STUFF	NO STUFF	NO STUFF	NO STUFF		NO STUFF		
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402		
R656[1] 10K	R685[1] 10K	R657[1] 10K	R628[1] 10K	R682[1] 10K	R658[1] 10K	R627[1] 10K	R629[1] 10K
						NO STUFF	
5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402	5% 1/16W ME 402

38 8 6 CPU_DATA<56>
38 8 6 CPU_DATA<57>
38 8 6 CPU_DATA<58>
38 8 6 CPU_DATA<59>
38 8 6 CPU_DATA<60>
38 8 6 CPU_DATA<61>
38 8 6 CPU_DATA<62>
38 8 6 CPU_DATA<63>

Spare | Spare | OBSOLETE
0: Boot ROM on IDE / 2nd PCI1
1: 0-1 IDE / 2-3 PCI1 | PCI1_REQ2_L / PCI1_GNT2_L
0: REQ/GNT
1: GPIOs | PCI1_REQ1_L / PCI1_GNT1_L
0: REQ/GNT
1: GPIOs | PCI1_REQ0_L / PCI1_GNT0_L
0: REQ/GNT
1: GPIOs | Firewire PHY interface
1: B-mode interface | Processor Bus Mode
0: 64x bus (G4)
1: 60x bus (G3)

Intrepid MaxBus

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 8 OF 46	

SERIES RESISTORS FOR CLOCK/CONTROL SIGNALS

PINS ARE SWAPABLE FOR RPAKS

1MB BOOT ROM

U51 — OMIT — INTREPID-REV2.1 BGA (2 OF 9) CRITICAL

DDR MEMORY INTERFACE

DDR_DATA_0	AK32	MEM_DATA<0>	
DDR_DATA_1	AK33	MEM_DATA<1>	
DDR_DATA_2	AK31	MEM_DATA<2>	
DDR_DATA_3	AK35	MEM_DATA<3>	
DDR_DATA_4	AK36	MEM_DATA<4>	
DDR_DATA_5	AJ32	MEM_DATA<5>	
DDR_DATA_6	AJ35	MEM_DATA<6>	
DDR_DATA_7	AJ36	MEM_DATA<7>	
DDR_DATA_8	AG33	MEM_DATA<8>	
DDR_DATA_9	AG35	MEM_DATA<9>	
DDR_DATA_10	AH35	MEM_DATA<10>	
DDR_DATA_11	AG36	MEM_DATA<11>	
DDR_DATA_12	AH36	MEM_DATA<12>	
DDR_DATA_13	AH32	MEM_DATA<13>	
DDR_DATA_14	AG32	MEM_DATA<14>	
DDR_DATA_15	AG31	MEM_DATA<15>	
DDR_DATA_16	AE32	MEM_DATA<16>	
DDR_DATA_17	AF35	MEM_DATA<17>	
DDR_DATA_18	AF36	MEM_DATA<18>	
DDR_DATA_19	AE36	MEM_DATA<19>	
DDR_DATA_20	AE35	MEM_DATA<20>	
DDR_DATA_21	AE33	MEM_DATA<21>	
DDR_DATA_22	AD36	MEM_DATA<22>	
DDR_DATA_23	AD35	MEM_DATA<23>	
DDR_DATA_24	AA36	MEM_DATA<24>	
DDR_DATA_25	AA35	MEM_DATA<25>	
DDR_DATA_26	AA33	MEM_DATA<26>	
DDR_DATA_27	AB36	MEM_DATA<27>	
DDR_DATA_28	AB35	MEM_DATA<28>	
DDR_DATA_29	AC36	MEM_DATA<29>	
DDR_DATA_30	AA32	MEM_DATA<30>	
DDR_DATA_31	AB33	MEM_DATA<31>	
DDR_DATA_32	V36	MEM_DATA<32>	
DDR_DATA_33	U33	MEM_DATA<33>	
DDR_DATA_34	U32	MEM_DATA<34>	
DDR_DATA_35	V35	MEM_DATA<35>	
DDR_DATA_36	T36	MEM_DATA<36>	
DDR_DATA_37	U36	MEM_DATA<37>	
DDR_DATA_38	U35	MEM_DATA<38>	
DDR_DATA_39	T36	MEM_DATA<39>	
DDR_DATA_40	P33	MEM_DATA<40>	
DDR_DATA_41	R36	MEM_DATA<41>	
DDR_DATA_42	P35	MEM_DATA<42>	
DDR_DATA_43	P36	MEM_DATA<43>	
DDR_DATA_44	R36	MEM_DATA<44>	
DDR_DATA_45	R35	MEM_DATA<45>	
DDR_DATA_46	R33	MEM_DATA<46>	
DDR_DATA_47	R32	MEM_DATA<47>	
DDR_DATA_48	N35	MEM_DATA<48>	
DDR_DATA_49	M36	MEM_DATA<49>	
DDR_DATA_50	L35	MEM_DATA<50>	
DDR_DATA_51	M35	MEM_DATA<51>	
DDR_DATA_52	M33	MEM_DATA<52>	
DDR_DATA_53	L36	MEM_DATA<53>	
DDR_DATA_54	N33	MEM_DATA<54>	
DDR_DATA_55	M36	MEM_DATA<55>	
DDR_DATA_56	J32	MEM_DATA<56>	
DDR_DATA_57	J33	MEM_DATA<57>	
DDR_DATA_58	J35	MEM_DATA<58>	
DDR_DATA_59	K32	MEM_DATA<59>	
DDR_DATA_60	K33	MEM_DATA<60>	
DDR_DATA_61	J36	MEM_DATA<61>	
DDR_DATA_62	K36	MEM_DATA<62>	
DDR_DATA_63	K35	MEM_DATA<63>	

DDR_A_0	H35	MEM_ADDR<0>	
DDR_A_1	G35	MEM_ADDR<1>	
DDR_A_2	G36	MEM_ADDR<2>	
DDR_A_3	F36	MEM_ADDR<3>	
DDR_A_4	F35	MEM_ADDR<4>	
DDR_A_5	E35	MEM_ADDR<5>	
DDR_A_6	E36	MEM_ADDR<6>	
DDR_A_7	G32	MEM_ADDR<7>	
DDR_A_8	D36	MEM_ADDR<8>	
DDR_A_9	H36	MEM_ADDR<9>	
DDR_A_10	G33	MEM_ADDR<10>	
DDR_A_11	H33	MEM_ADDR<11>	
DDR_A_12	D35	MEM_ADDR<12>	
DDR_BA_0	L30	MEM_BA<0>	
DDR_BA_1	M29	MEM_BA<1>	
DDRCS_0	AN34	MEM_CS_L<0>	’0’ & ’1’ GO TO SLOT A
DDRCS_1	AN36	MEM_CS_L<1>	’2’ & ’3’ GO TO SLOT B
DDRCS_2	AL35	MEM_CS_L<2>	
DDRCS_3	AL33	MEM_CS_L<3>	
DDR_DQS_0	AJ31	MEM_DQS<0>	
DDR_DQS_1	AH31	MEM_DQS<1>	
DDR_DQS_2	AD32	MEM_DQS<2>	
DDR_DQS_3	AB30	MEM_DQS<3>	
DDR_DQS_4	V30	MEM_DQS<4>	
DDR_DQS_5	P32	MEM_DQS<5>	
DDR_DQS_6	N29	MEM_DQS<6>	
DDR_DQS_7	L32	MEM_DQS<7>	
DDR_DM_0	AJ33	MEM_DQM<0>	
DDR_DM_1	AH33	MEM_DQM<1>	
DDR_DM_2	AD33	MEM_DQM<2>	
DDR_DM_3	AC35	MEM_DQM<3>	
DDR_DM_4	T35	MEM_DQM<4>	
DDR_DM_5	T33	MEM_DQM<5>	
DDR_DM_6	N32	MEM_DQM<6>	
DDR_DM_7	L33	MEM_DQM<7>	
DDRRAS	L29	MEM_RAS_L	
DDRCAS	H32	MEM_CAS_L	
DDRWE	K30	MEM_WE_L	
DDRCKE0	AN35	MEM_CKE<0>	’0’ & ’1’ GO TO SLOT A
DDRCKE1	AM35	MEM_CKE<1>	’2’ & ’3’ GO TO SLOT B
DDRCKE2	AM36	MEM_CKE<2>	
DDRCKE3	AL36	MEM_CKE<3>	
DDR_SELHI_0	AB32	MEM_MUXSEL_MSB_L_TP	
DDR_SELHI_1	AE29	MEM_MUXSEL_MSB	’0’S ARE SAME POLARITY (ACTIVE-LO)
DDR_SELLO_0	N30	MEM_MUXSEL_LSB_L_TP	’1’S ARE SAME POLARITY (ACTIVE-HI)
DDR_SELLO_1	T32	MEM_MUXSEL_LSB	
DDR_MCLK_0_P	Y32	SYSCLK_DDRCLK_A0_UF	
DDR_MCLK_0_N	Y33	SYSCLK_DDRCLK_A0_L_UF	
DDR_MCLK_1_P	Y35	SYSCLK_DDRCLK_A1_UF	
DDR_MCLK_1_N	Y36	SYSCLK_DDRCLK_A1_L_UF	
DDR_MCLK_2_P	Y30	INT_DDRCLK2_P_TP	
DDR_MCLK_2_N	W30	INT_DDRCLK2_N_TP	
DDR_MCLK_3_P	W32	SYSCLK_DDRCLK_B0_UF	
DDR_MCLK_3_N	W33	SYSCLK_DDRCLK_B0_L_UF	
DDR_MCLK_4_P	V33	SYSCLK_DDRCLK_B1_UF	
DDR_MCLK_4_N	V32	SYSCLK_DDRCLK_B1_L_UF	
DDR_MCLK_5_P	W35	INT_DDRCLK5_P_TP	
DDR_MCLK_5_N	W36	INT_DDRCLK5_N_TP	
DDR_REF	AA22	INT_MEM_REF_H	
DDR_VREF_0	Y22	INT_MEM_VREF	
DDR_VREF_1	T22		

R209 1K 1% 1/16W MF 402 — INT_MEM_VREF

MEM_VREF

+2.5V_INTREPID

R208 10K 1% 1/16W MF 402

R202 10K 1% 1/16W MF 402

C249 0.1uF 10% 10V CERM 402

INT_MEM_VREF

CLOCKS

SYSCLK_DDRCLK_A1_UF	RP20 22	SYSCLK_DDRCLK_A1
SYSCLK_DDRCLK_A1_L_UF	RP20 22	SYSCLK_DDRCLK_A1_L
SYSCLK_DDRCLK_A0_UF	RP22 22	SYSCLK_DDRCLK_A0
SYSCLK_DDRCLK_A0_L_UF	RP22 22	SYSCLK_DDRCLK_A0_L
SYSCLK_DDRCLK_B1_UF	RP20 22	SYSCLK_DDRCLK_B1
SYSCLK_DDRCLK_B1_L_UF	RP20 22	SYSCLK_DDRCLK_B1_L
SYSCLK_DDRCLK_B0_UF	RP22 22	SYSCLK_DDRCLK_B0
SYSCLK_DDRCLK_B0_L_UF	RP22 22	SYSCLK_DDRCLK_B0_L

CS

MEM_CS_L<0>	RP31 22	RAM_CS_L<0>
MEM_CS_L<1>	RP31 22	RAM_CS_L<1>
MEM_CS_L<2>	RP29 22	RAM_CS_L<2>
MEM_CS_L<3>	RP29 22	RAM_CS_L<3>

CKE

MEM_CKE<0>	RP31 22	RAM_CKE<0>
MEM_CKE<1>	RP31 22	RAM_CKE<1>
MEM_CKE<2>	RP29 22	RAM_CKE<2>
MEM_CKE<3>	RP29 22	RAM_CKE<3>

ADDR

MEM_ADDR<0>	RP14 22	RAM_ADDR<0>
MEM_ADDR<1>	RP12 22	RAM_ADDR<1>
MEM_ADDR<2>	RP12 22	RAM_ADDR<2>
MEM_ADDR<3>	RP12 22	RAM_ADDR<3>
MEM_ADDR<4>	RP9 22	RAM_ADDR<4>
MEM_ADDR<5>	RP9 22	RAM_ADDR<5>
MEM_ADDR<6>	RP14 22	RAM_ADDR<6>
MEM_ADDR<7>	RP9 22	RAM_ADDR<7>
MEM_ADDR<8>	RP14 22	RAM_ADDR<8>
MEM_ADDR<9>	RP14 22	RAM_ADDR<9>
MEM_ADDR<10>	RP17 22	RAM_ADDR<10>
MEM_ADDR<11>	RP9 22	RAM_ADDR<11>
MEM_ADDR<12>	RP17 22	RAM_ADDR<12>

BA

MEM_BA<0>	RP17 22	RAM_BA<0>
MEM_BA<1>	RP17 22	RAM_BA<1>

CNTL

MEM_WE_L	RP17 22	RAM_WE_L
MEM_CAS_L	R162 22	RAM_CAS_L
MEM_RAS_L	R176 22	RAM_RAS_L

ROM_CS_TP_L

R236 0 NO STUFF

R691 10K

R112 10K

ROM_CS_L

R674 1K

R1 0 NO STUFF — ROM_ONBOARD_CS_TP_L

R271 0 NO STUFF — ROM_OE_TP_L

R194 0 NO STUFF — ROM_RW_TP_L

+3V_MAIN

C125 2.2uF 10% 10V CERM 805

C773 0.1uF 10% 10V CERM 402

C122 0.1uF 10% 10V CERM 402

U11 — VPP OMIT VCC — 1MX8-3.3V TSOP

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

11, 30, 31 — GND 23, 39

PCI_AD<0> … PCI_AD<31>

ROM_ONBOARD_CS_L, ROM_OE_L, ROM_RW_L, ROM_WP_L, INT_RESET_L

OVERRIDE ROM MODULE INTERCEPTS ROM CHIP SELECT

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S1792	1	IC,BOOTROM,4.9.1F3,Q16B	U11	CRITICAL	?

Weak pulldowns ensure CKEs stay low after 2.5V I/O to Intrepid shuts off.

RAM_CKE<0>, RAM_CKE<1>, RAM_CKE<2>, RAM_CKE<3>

R247 10K — INT_2_5V_COLD

R257 10K — INT_2_5V_COLD

R260 10K — INT_2_5V_COLD

R265 10K — INT_2_5V_COLD

INT - DDR/BOOTROM

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

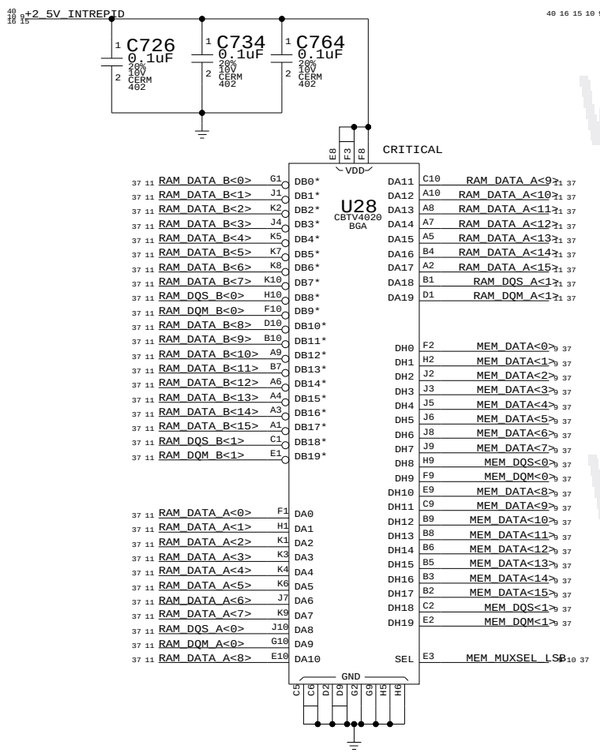
II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

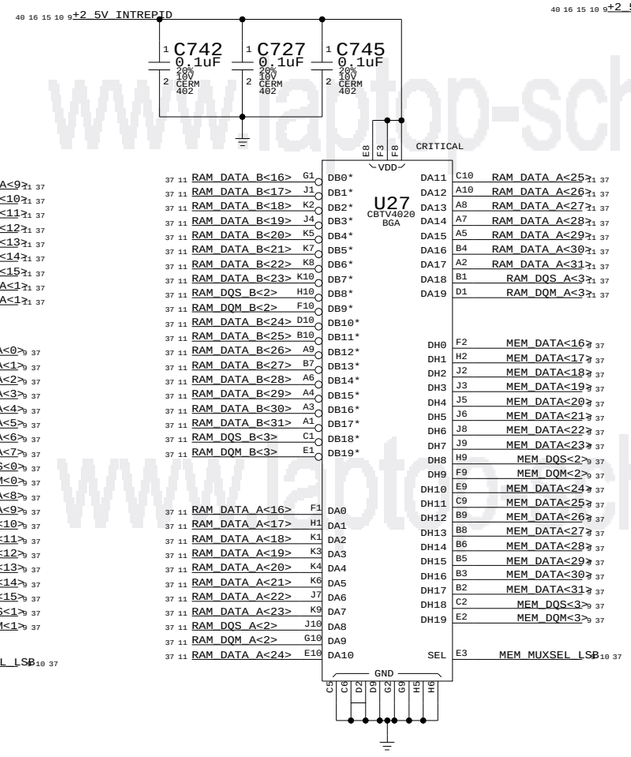
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 9 OF 46	

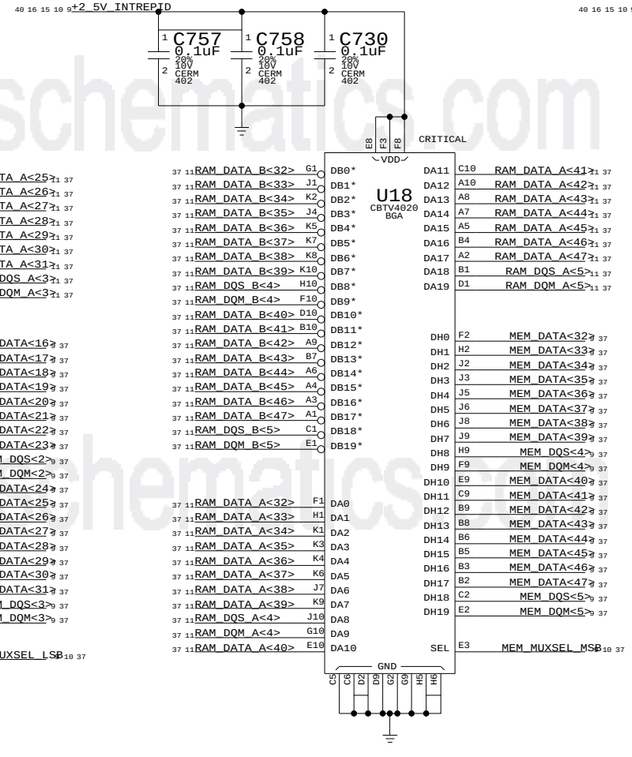
BIT 0..15



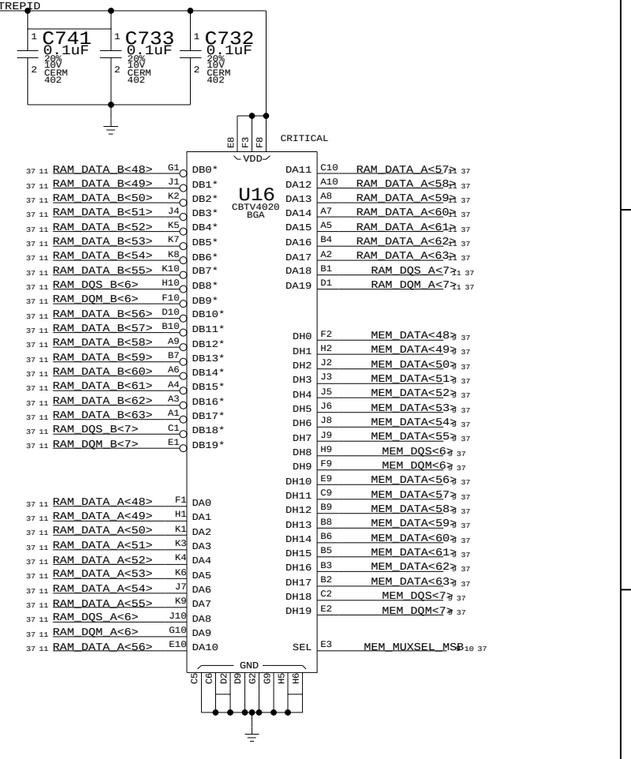
BIT 16..31



BIT 32..47



BIT 48..63



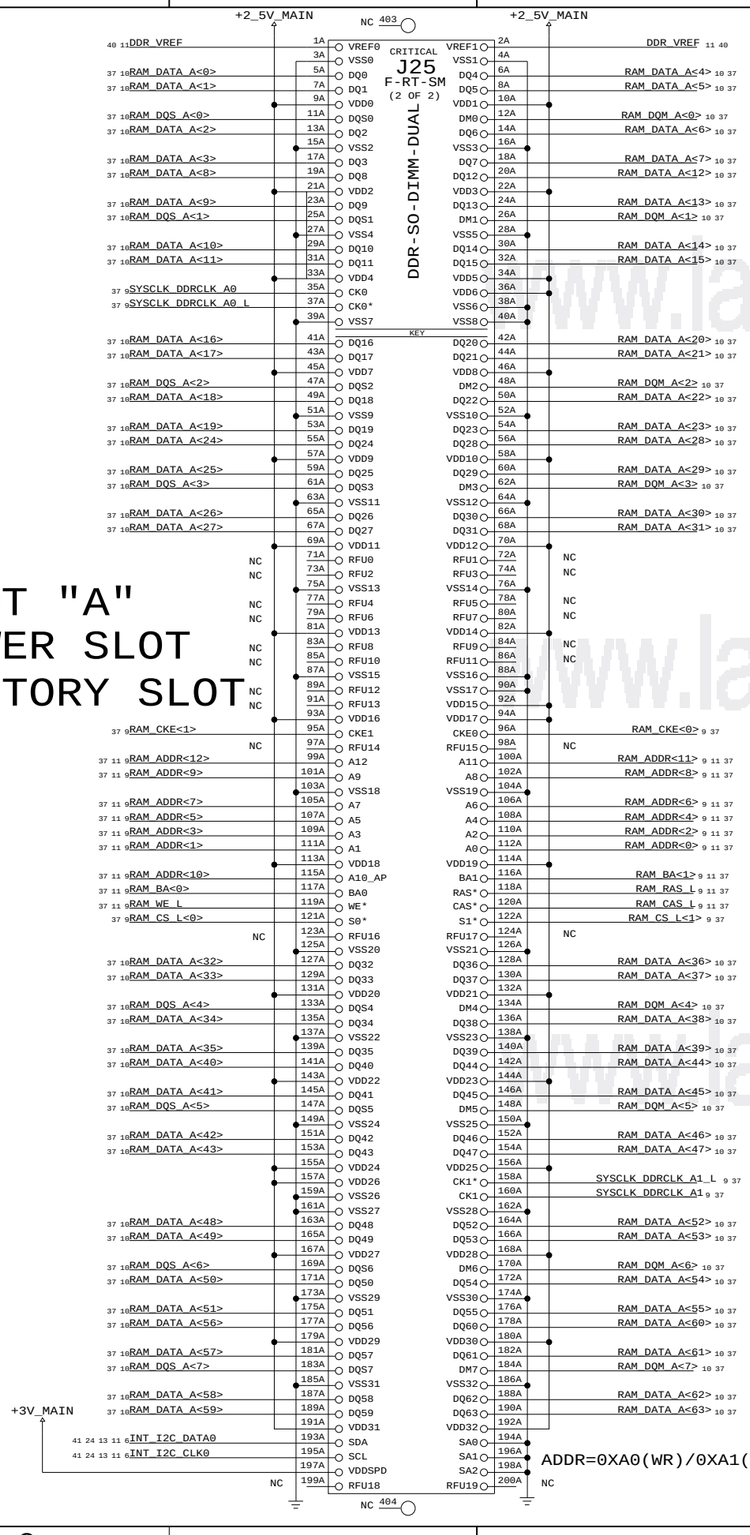
SEL = LOW; HOST = B PORT; A PORT = 100OHM TO GND
SEL = HIGH; HOST = A PORT; B PORT = 100OHM TO GND

16BIT 2:1 DDR MUXES

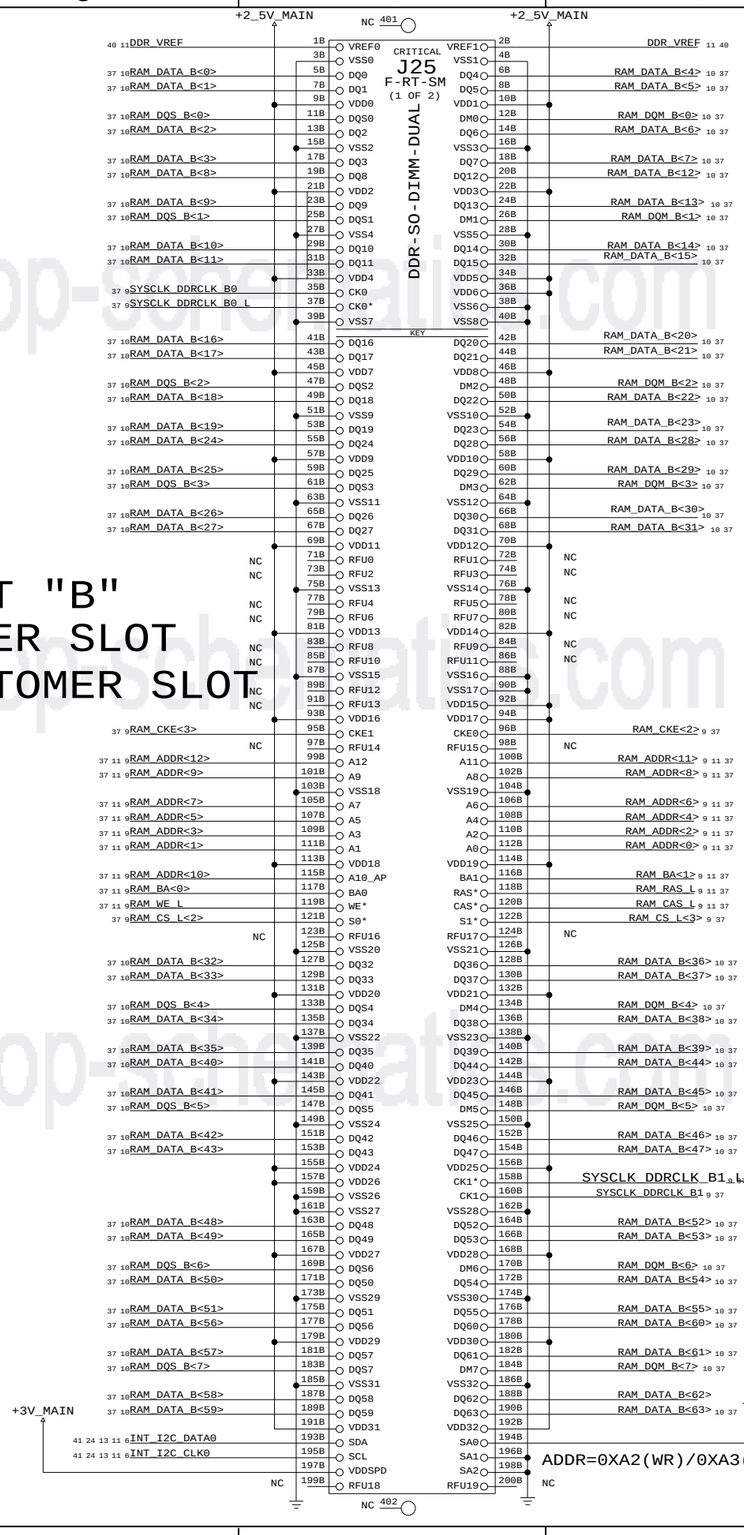
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F

SCALE	SHT OF
NONE	10 OF 46

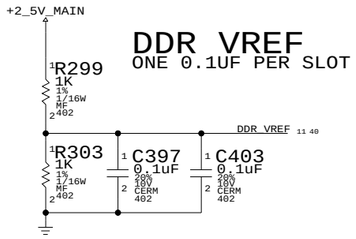


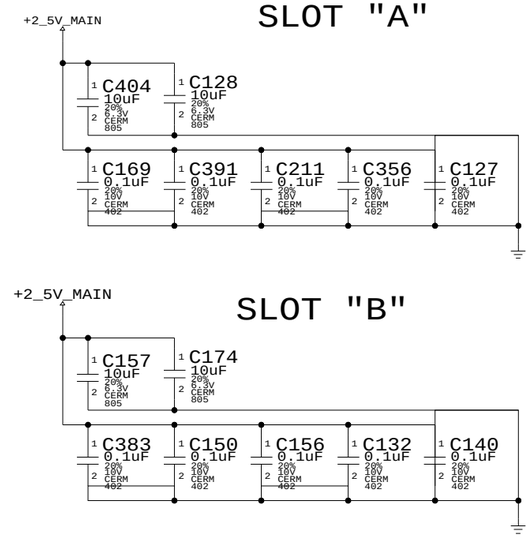
SLOT "A"
LOWER SLOT
FACTORY SLOT



SLOT "B"
UPPER SLOT
CUSTOMER SLOT

NOTE: The SODIMM connector footprint has a through-hole slot on the PCB for additional mounting





DDR SODIMM CONNS

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 11 OF 46	

AGP PULL-UPS/PULL DOWNS

R334 10K 5% 1/16W MF 402 — +3V_GPU 19 21 22 40
- 19 12 AGP_BUSY_L
- R308 10K 5% 1/16W MF 402 — 12 STOP_AGP_L

+1 5V AGP 12 15 16 19 21 22 40

RP34 10K 4 5 5% 1/16W SM1
- 39 19 12 AGP_REQ_L

R553 10K 5% 1/16W MF 402
- 39 19 12 AGP_GNT_L

R318 10K 5% 1/16W MF 402
- 39 19 12 AGP_FRAME_L

R317 10K 5% 1/16W MF 402
- 39 19 12 AGP_DEVSEL_L

RP34 10K 1 8 5% 1/16W SM1
- 39 19 12 AGP_IRDY_L

RP34 10K 2 7 5% 1/16W SM1
- 39 19 12 AGP_TRDY_L

R316 10K 5% 1/16W SM1
- 39 19 12 AGP_STOP_L

R552 10K 5% 1/16W MF 402
- 39 19 12 AGP_RBF_L

RP34 10K 3 6 5% 1/16W SM1
- 19 12 AGP_WBF_L

R314 10K 5% 1/16W MF 402
- 12 AGP_PIPE_L

R254 10K 5% 1/16W MF 402
- 39 19 12 AGP_AD_STB<0>

R255 10K 5% 1/16W MF 402
- 39 19 12 AGP_AD_STB<1>

R239 10K 5% 1/16W MF 402
- 39 19 12 AGP_SB_STB

R253 10K 5% 1/16W MF 402
- 39 19 12 AGP_AD_STB_L<0>

R256 10K 5% 1/16W MF 402
- 39 19 12 AGP_AD_STB_L<1>

R235 10K 5% 1/16W MF 402
- 39 19 12 AGP_SB_STB_L

R167 4.7 5% 1/16W MF 402 — 40 14 12 8 +1 5V INTREPID_PLL — +1 5V INTREPID_PLL 5 6

C190 0.22UF 20% 6.3V CERM 402

R272 33 5% 1/16W MF 402 — 37 26 11 CLK33M_AIRPORT
- NO STUFF C362 12PF 5% 50V CERM 402

R230 33 5% 1/16W MF 402 — 37 18 CLK33M_CBUS
- NO STUFF C311 12PF 5% 50V CERM 402

R273 22 5% 1/16W MF 402 — 37 17 CLK33M_NEC
- NO STUFF C372 12PF 5% 50V CERM 402

R264 33 5% 1/16W MF 402

PCI FEEDBACK CLOCK MATCHES LONGEST PCI CLOCK ROUTE

R244 47 5% 1/16W MF 402 — PLACE NEAR INTREPID

R252 33 5% 1/16W MF 402 — 37 19 CLK66M_GPU_AGP

J11

U51 INTREPID-REV2.1 BGA (7 OF 9) CRITICAL — OMIT

PCI/ROM INTERFACE — VOUT = 3.3V — VIN = 1.5V

41 26 12 AIRPORT_PCI_REQ_L	AR17	PCI_REQ_0	
18 12 CBUS_PCI_REQ_L	AR16	PCI_REQ_1	
17 12 NEC_PCI_REQ_L	AT17	PCI_REQ_2	
41 26 AIRPORT_PCI_GNT_L	AT16	PCI_GNT_0	
18 CBUS_PCI_GNT_L	AU18	PCI_GNT_1	
17 NEC_PCI_GNT_L	AU17	PCI_GNT_2	
37 CLK33M_AIRPORT_UF	AR18	PCI_CLK0	
37 CLK33M_CBUS_UF	AH18	PCI_CLK1	
37 CLK33M_NEC_UF	AT18	PCI_CLK2	
37 INT_PCI_FB_OUT	AM18	PCI_CLK_OUT	
37 INT_PCI_FB_IN	AJ19	PCI_CLK_IN	
39 26 18 17 41 PCI_PAR	AT14	PCI_PAR	
26 18 17 41 39 PCI_FRAME_L	AN16	PCI_FRAME	
26 18 17 12 41 39 PCI_TRDY_L	AT15	PCI_TRDY	
26 18 17 12 41 39 PCI_IRDY_L	AH16	PCI_IRDY	
26 18 17 12 41 39 PCI_STOP_L	AR15	PCI_STOP	
26 18 17 12 41 39 PCI_DEVSEL_L	AM17	PCI_DEVSEL	
39 26 18 17 PCI_CBE<0>	AR14	PCI_CBE_0	
39 26 18 17 PCI_CBE<1>	AK16	PCI_CBE_1	
39 26 18 17 PCI_CBE<2>	AM16	PCI_CBE_2	
39 26 18 17 PCI_CBE<3>	AJ15	PCI_CBE_3	
37 CLK66M_GPU_AGP_UF	AK17	ROM_OVRLY_EN	
12 INT_ROM_CS_L	AM9	ROM_CS	
12 INT_ROM_OE_L	AR7	ROM_OE	
12 INT_ROM_RW_L	AN9	ROM_WE	

(PLL4) VSSA_6 J10

PCIAD_0	AM10	PCI_AD<0> 9 17 18 26 39 41
PCIAD_1	AR8	PCI_AD<1> 9 17 18 26 39 41
PCIAD_2	AK12	PCI_AD<2> 9 17 18 26 39 41
PCIAD_3	AJ8	PCI_AD<3> 9 17 18 26 39 41
PCIAD_4	AN10	PCI_AD<4> 9 17 18 26 39 41
PCIAD_5	AT8	PCI_AD<5> 9 17 18 26 39 41
PCIAD_6	AN11	PCI_AD<6> 9 17 18 26 39 41
PCIAD_7	AH13	PCI_AD<7> 9 17 18 26 39 41
PCIAD_8	AK13	PCI_AD<8> 9 17 18 26 39 41
PCIAD_9	AR9	PCI_AD<9> 9 17 18 26 39 41
PCIAD_10	AR10	PCI_AD<10> 9 17 18 26 39 41
PCIAD_11	AT9	PCI_AD<11> 9 17 18 26 39 41
PCIAD_12	AR11	PCI_AD<12> 9 17 18 26 39 41
PCIAD_13	AM12	PCI_AD<13> 9 17 18 26 39 41
PCIAD_14	AN12	PCI_AD<14> 9 17 18 26 39 41
PCIAD_15	AK11	PCI_AD<15> 9 17 18 26 39 41
PCIAD_16	AT11	PCI_AD<16> 9 17 18 26 39 41
PCIAD_17	AT10	PCI_AD<17> 9 17 18 26 39 41
PCIAD_18	AN13	PCI_AD<18> 9 17 18 26 39 41
PCIAD_19	AM13	PCI_AD<19> 9 17 18 26 39 41
PCIAD_20	AR12	PCI_AD<20> 9 17 18 26 39 41
PCIAD_21	AJ11	PCI_AD<21> 17 18 26 39 41
PCIAD_22	AT12	PCI_AD<22> 17 18 26 39 41
PCIAD_23	AM11	PCI_AD<23> 17 18 26 39 41
PCIAD_24	AR13	PCI_AD<24> 9 17 18 26 39 41
PCIAD_25	AK15	PCI_AD<25> 9 17 18 26 39 41
PCIAD_26	AH15	PCI_AD<26> 9 17 18 26 39 41
PCIAD_27	AN14	PCI_AD<27> 9 17 18 26 39 41
PCIAD_28	AT13	PCI_AD<28> 9 17 18 26 39 41
PCIAD_29	AK14	PCI_AD<29> 9 17 18 26 39 41
PCIAD_30	AN15	PCI_AD<30> 9 17 18 26 39 41
PCIAD_31	AM15	PCI_AD<31> 9 17 18 26 39 41

PCI PULL-UPS

+3V_SLEEP

RP33 10K 4 5 5% 1/16W SM1
- 41 39 26 18 17 12 PCI_FRAME_L

RP33 10K 2 7 5% 1/16W SM1
- 41 39 26 18 17 12 PCI_DEVSEL_L

RP36 10K 4 5 5% 1/16W SM1
- 41 39 26 18 17 12 PCI_IRDY_L

RP36 10K 3 6 5% 1/16W SM1
- 41 39 26 18 17 12 PCI_TRDY_L

RP36 10K 2 7 5% 1/16W SM1
- 41 39 26 18 17 12 PCI_STOP_L

RP33 10K 1 8 5% 1/16W SM1
- 41 26 12 AIRPORT_PCI_REQ_L

RP36 10K 1 8 5% 1/16W SM1
- 18 12 CBUS_PCI_REQ_L

+3V_MAIN

RP33 10K 3 6 5% 1/16W SM1
- 17 12 NEC_PCI_REQ_L

NEC USB2 REQ REMAINS ON +3V_MAIN
BECAUSE THIS CHIP IS POWERED DURING SLEEP

R197 4.7 5% 1/16W MF 402 — 40 14 12 8 +1 5V INTREPID_PLL — +1 5V INTREPID_PLL 5 40

C270 0.22UF 20% 6.3V CERM 402

40 22 21 19 16 15 12 +1 5V AGP

R245 60.4 1% 1/16W MF 402

NOTE: Designs using AGP slot should USE 52-OHM A RESISTOR HERE.

V14 VDD15A_5 (PLL5) OMIT

U51 INTREPID-REV2.1 BGA (3 OF 9) CRITICAL

12 STOP_AGP_L	AN19	STP_AGP	
INT_AGPPVT	AJ24	AGPPVT	
40 19 12 INT_AGP_VREF	AB20	AGPVREF0	
	AB21	AGPVREF1	
19 12 AGP_BUSY_L	AT19	AGP_BUSY	
CLK66M_AGP_1_5V_MCP	AR28	AGP_CLK	Vout = AGPIO (1.5V)
37 INT_AGP_FB_IN	AK27	AGP_FB_IN	Vin = Vcore (1.5V)
37 INT_AGP_FB_OUT	AL25	AGP_FB_OUT	Vout = AGPIO (1.5V)

R246 0 5% 1/16W MF 402

AGP_FB_CLK IS ROUTED THE SAME LENGTH AS CLK66M_GPU_AGP

AGP INTERFACES

AGPREQ	AT33	AGP_REQ_L	12 19 39
AGPGNT	AM29	AGP_GNT_L	12 19 39
AGPAD0	AR19	AGP_AD<0>	19 39
AGPAD1	AM19	AGP_AD<1>	19 39
AGPAD2	AT20	AGP_AD<2>	19 39
AGPAD3	AR20	AGP_AD<3>	19 39
AGPAD4	AT21	AGP_AD<4>	19 39
AGPAD5	AN20	AGP_AD<5>	19 39
AGPAD6	AR21	AGP_AD<6>	19 39
AGPAD7	AN21	AGP_AD<7>	19 39
AGPAD8	AM21	AGP_AD<8>	19 39
AGPAD9	AT22	AGP_AD<9>	19 39
AGPAD10	AR22	AGP_AD<10>	19 39
AGPAD11	AN22	AGP_AD<11>	19 39
AGPAD12	AM22	AGP_AD<12>	19 39
AGPAD13	AN23	AGP_AD<13>	19 39
AGPAD14	AR23	AGP_AD<14>	19 39
AGPAD15	AT24	AGP_AD<15>	19 39
AGPAD16	AM23	AGP_AD<16>	19 39
AGPAD17	AR24	AGP_AD<17>	19 39
AGPAD18	AT25	AGP_AD<18>	19 39
AGPAD19	AR25	AGP_AD<19>	19 39
AGPAD20	AM24	AGP_AD<20>	19 39
AGPAD21	AN25	AGP_AD<21>	19 39
AGPAD22	AL24	AGP_AD<22>	19 39
AGPAD23	AR26	AGP_AD<23>	19 39
AGPAD24	AT26	AGP_AD<24>	19 39
AGPAD25	AM25	AGP_AD<25>	19 39
AGPAD26	AN26	AGP_AD<26>	19 39
AGPAD27	AM26	AGP_AD<27>	19 39
AGPAD28	AR27	AGP_AD<28>	19 39
AGPAD29	AT27	AGP_AD<29>	19 39
AGPAD30	AR28	AGP_AD<30>	19 39
AGPAD31	AN27	AGP_AD<31>	19 39
AGPCBE_0	AM20	AGP_CBE<0>	19 39
AGPCBE_1	AT23	AGP_CBE<1>	19 39
AGPCBE_2	AN24	AGP_CBE<2>	19 39
AGPCBE_3	AL25	AGP_CBE<3>	19 39
AGPPAR	AT29	AGP_PAR	19 39
AGPFRAME	AN28	AGP_FRAME_L	12 19 39
AGPTRDY	AR29	AGP_TRDY_L	12 19 39
AGPIRDY	AT28	AGP_IRDY_L	12 19 39
AGPSTOP	AM28	AGP_STOP_L	12 19 39
AGPDEVSEL	AM27	AGP_DEVSEL_L	12 19 39
AGP_SBA0	AT32	AGP_SBA<0>	19 39
AGP_SBA1	AR32	AGP_SBA<1>	19 39
AGP_SBA2	AM31	AGP_SBA<2>	19 39
AGP_SBA3	AN31	AGP_SBA<3>	19 39
AGP_SBA4	AR31	AGP_SBA<4>	19 39
AGP_SBA5	AT31	AGP_SBA<5>	19 39
AGP_SBA6	AM30	AGP_SBA<6>	19 39
AGP_SBA7	AN30	AGP_SBA<7>	19 39
AGP_SB_STB_P	AH25	AGP_SB_STB	12 19 39
AGP_SB_STB_N	AG25	AGP_SB_STB_L	12 19 39
AGP_ST0	AN29	AGP_ST<0>	19
AGP_ST1	AT30	AGP_ST<1>	19
AGP_ST2	AR30	AGP_ST<2>	19
AGP_AD_STB0_P	AK20	AGP_AD_STB<0>	12 19 39
AGP_AD_STB0_N	AK19	AGP_AD_STB_L<0>	12 19 39
AGP_AD_STB1_P	AK21	AGP_AD_STB<1>	12 19 39
AGP_AD_STB1_N	AK22	AGP_AD_STB_L<1>	12 19 39
AGPPIPE	AJ29	AGP_PIPE_L	12
AGPRBF	AK24	AGP_RBF_L	12 19 39

19 12 AGP_WBF_L — AK30 — AGP_WBF

VSSA_5 (PLL5) V13

AGP I/O REFERENCE

(PLACE CLOSE TO INTREPID AGP BALLS)

40 22 21 19 16 15 12 +1 5V AGP

R225 1K 1% 1/16W MF 402

R219 1K 1% 1/16W MF 402

C291 0.22uF 20% 6.3V CERM 402 — INT_AGP_VREF 12 19 40

SIMPLY PROVIDING REFERENCE TO CHIP
BECAUSE SINGLE AGP PWR PLANE AND CLOSE PROXIMITY OF CHIPS

SERIES RESISTORS FOR BOOTROM CONTROL SIGNALS

PLACE CLOSE TO INTREPID SIDE

R277 22 5% 1/16W MF 402
- 12 INT_ROM_CS_L — ROM_CS_L 9 41

R282 22 5% 1/16W MF 402
- 12 INT_ROM_OE_L — ROM_OE_L 9 41

R278 22 5% 1/16W MF 402
- 12 INT_ROM_RW_L — ROM_RW_L 9 41

INTREPID AGP/PCI

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

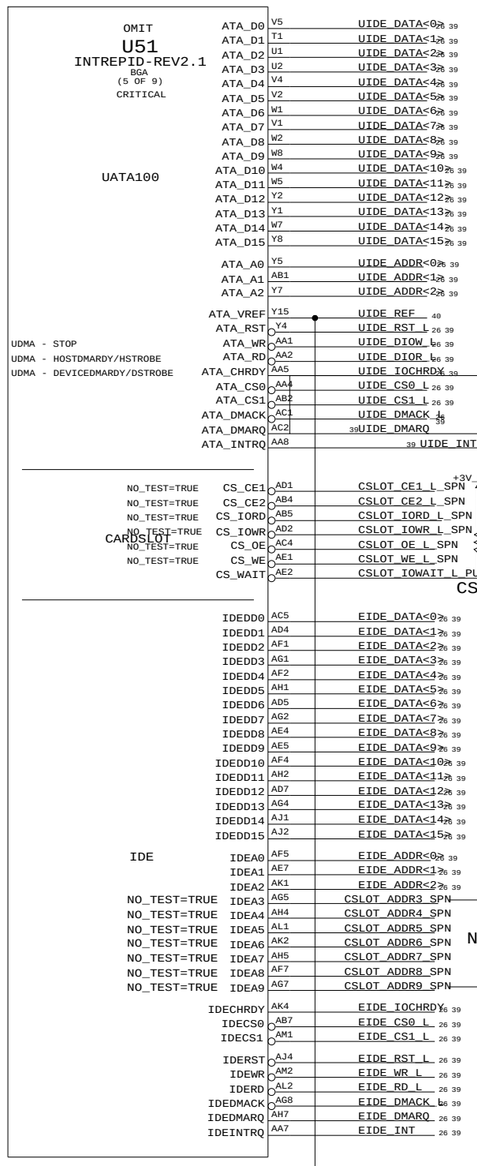
I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

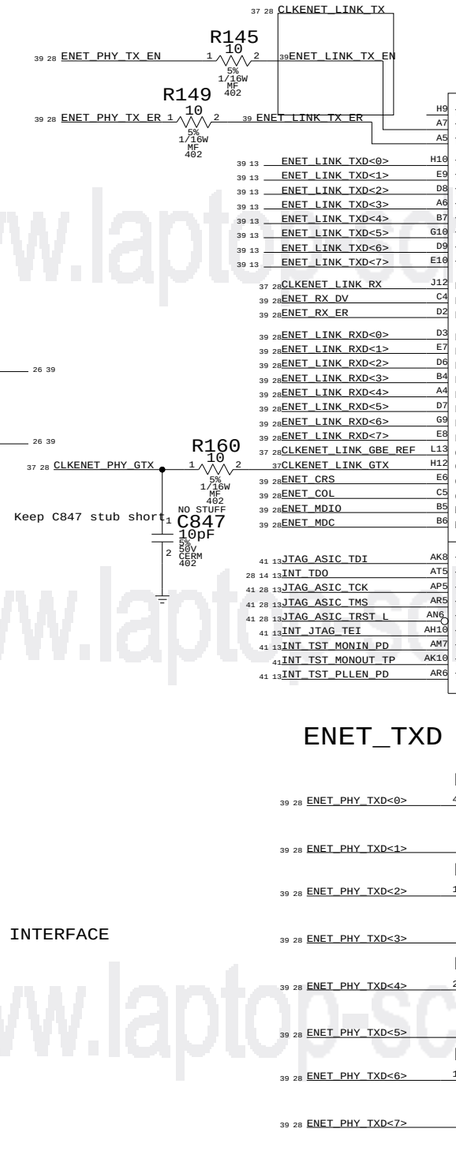
II NOT TO REPRODUCE OR COPY IT

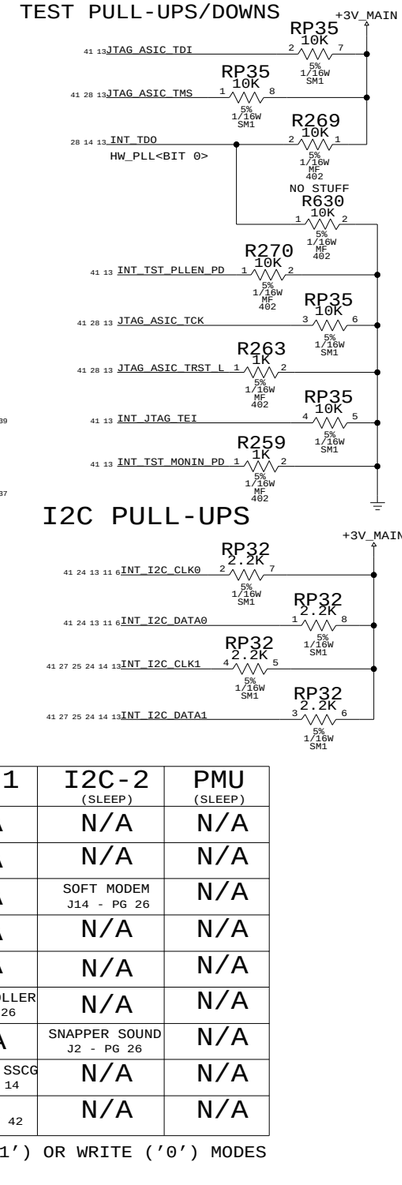
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

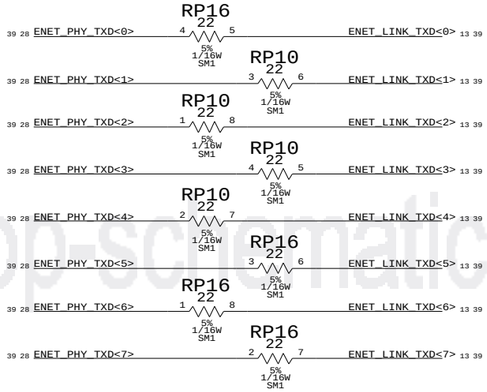
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 12 OF 46	









BUS / ADDR	I2C-0 (MAIN)	I2C-1 (MAIN)	I2C-2 (SLEEP)	PMU (SLEEP)
A0-WR A1-RD	RAM - LOWER J25 - PG 11	N/A	N/A	N/A
A2-WR A3-RD	RAM - UPPER J25 - PG 11	N/A	N/A	N/A
AC-WR AD-RD	N/A	N/A	SOFT MODEM J14 - PG 26	N/A
AE-WR AF-RD	BOOTBANG EEPROM U51 - PG 6	N/A	N/A	N/A
84-WR 85-RD	LMU J3000 - PG 24 (LMU on RUX Brd.)	N/A	N/A	N/A
5C-WR 5D-RD	N/A	FAN CONTROLLER U52 - PG 26	N/A	N/A
6A-WR 6B-RD	N/A	N/A	SNAPPER SOUND J2 - PG 26	N/A
D2-WR D3-RD	N/A	CLOCK SLEW SSCG U30 - PG 14	N/A	N/A
B0-WR B1-RD	N/A	MMM U15 - PG 42	N/A	N/A

ADDR LSB INDICATES READ ('1') OR WRITE ('0') MODES

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

INT - ENET/FW/UATA EIDE/I2C

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F

SCALE: NONE

SHT 13 OF 46

USB PORT ASSIGNMENTS

PORT A B C D/UNUSED

R181 10K — USB_DAM
R183 10K — USB_DAP
R123 10K — USB_DBP
R121 10K — USB_DBM
R164 10K — USB_DCM
R165 10K — USB_DCP
R182 10K — USB_DDM
R180 10K — USB_DDP

PORT E/BLUETOOTH

R174 22 — USB_DEP — BT_USB_DP
R179 22 — USB_DEM — BT_USB_DM
R178 15K — R175 15K

PORT F/TRACKPAD

R635 22 — USB_DFP — USB_TPAD_P
R603 22 — USB_DFM — USB_TPAD_N
R129 15K — R125 15K

+2_5V_MAIN — NO STUFF R568 0 — +1_8V_MAIN — R565 0

U49 LT1962-ADJ MSOP
IN ← LTC1962_INT_VIN (40)
OUT → +1_5V_INTREPID_PLL (8 12 40) -> 1.55V OUTPUT
NC, NC
ADJ ← LT1962_INT_ADJ
BYP ← LT1962_INT_BYP
SHDN
GND

C721 1uF 10V CERM 603
C392 0.01uF 20% 16V CERM 402
R574 18.7K 1% 1/16W MF 402
R567 68.1K 1% 1/16W MF 402
C723 10uF 20% 6.3V CERM 805

+3V_SLEEP

PCI INTERRUPTS
R148 10K — CBUS_INT_L (4 18)
R746 10K — AIRPORT_PCI_INT_L (26 41)
+3V_MAIN — R158 10K — NEC_PCI_INT_L (17)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
359S0086	1	IC,CY28512-2	U31	CRITICAL	SSCG

GPIO/EXTINT PULLUPS
+3V_MAIN
R187 10K — USB_PWREN_EF_L (4)
R191 10K — USB_OC_EF_L (4)
RP11 10K — USB_OC_AB_L (4)
RP11 10K — USB_PWREN_CD_L (4)
RP8 10K — USB_PWREN_AB_L (4)
RP11 10K — USB_OC_CD_L (4)
RP8 10K — INT_EXTINT14_PU (4)
RP5 10K — INT_EXTINT8_PU (4)
RP6 10K — COMM_RING_DET_L (27 31 41)
RP11 10K — INT_GPIO15_PU (4)
RP6 10K — PMU_INT_NMI (4 31)
RP6 10K — PMU_INT_L (4 31 41 27 25 24 13)
R250 10K — PMU_REQ_L (4 31)
RP7 10K — INT_GPIO12_PU (4)
RP7 10K — INT_EXTINT13_PU (4)
RP4 10K — INT_EXTINT16_PU (35 4 40)
RP6 10K — INT_EXTINT10_PU (4)
RP8 10K — INT_GPIO9_PU (4)
RP8 10K — INT_GPIO1_PU (35)
R153 10K — INT_EXTINT3_PU (4)
USB_MODEM RP15 10K — INT_MOD_DTO_UF (4)
USB_MODEM RP15 10K — INT_MOD_CLKOUT_UF (4)
RP5 10K — NC NC EXTINT11
RP4 10K — NC NC EXTINT12
USB_MODEM RP15 10K — INT_MOD_DTI (14 27)
USB_MODEM RP15 10K — INT_MOD_SYNC_UF (14)
USB_MODEM R206 10K — INT_MOD_BITCLK_UF (14)
R166 100K — SND_HW_RESET_L (14 27 41)

+3V_MAIN
L15 400-OHM-EMI SM-1 (SSCG)
+2_5V_MAIN
L14 400-OHM-EMI SM-1 (SSCG)
+3V_CG_PLL_MAIN
C402 1uF 20% 10V CERM 603 (SSCG)
C399 0.1uF 10% 10V CERM 402 (SSCG)
+2_5V_CG_MAIN
C394 0.1uF 20% 10V CERM 402 (SSCG)
C400 0.1uF 20% 10V CERM 402 (SSCG)

MAIN_RESET_L (41 31 26 20 19 18 17)
NO STUFF R286 0 — SSCG R287 10K — SSCG R288 10K — NO STUFF R295 10K

U31 CY28512D TSSOP OMIT — CRITICAL
VDD0 1, VDD1 10, VDDA 12, VDDC 5, VDDP 18
CLKIN 20
FSEL 3 — INTERNAL 250K PULL-UP
SCLK 9
SDATA 8
ADDRSEL 14 — INTERNAL 250K PULL-DOWN
RESET* 17
PD* 13
LOCK 2 — OPEN DRAIN OUTPUT
ODSEL 4 — INTERNAL 250K PULL-UP
CPU0 16 — OUTPUT IMPEDANCE ~18-20 OHMS
VSS0 19, VSS1 11, VSSA 6, VSSC 15, VSSQ

CG_FSEL (14) — INT_REF_CLK_OUT (37 14)
INT_I2C_CLK1 (41 27 25 24 13)
INT_I2C_DATA1 (41 27 25 24 13)
CG_ADDRSEL
CG_RESET_L
CG_SYSCLK_EN (14)
CG_LOCK
CG_CLKOUT (16) → SSCG R293 33 → INT_REF_CLK_IN (14 37)

SSCG R284 0 — VCORE_VGATE (1 40 35)
NO STUFF R296 10K
SSCG R142 0 — VCORE_VGATE (1 40 35)
SSCG R292 75 — PLACE NEAR INTREPID TO MINIMIZE OVERSHOOT

NO STUFF R467 0 — SYSTEM_CLK_EN (31 14)
NO STUFF R457 0 — INT_TDO (28 13)
CG_SYSCLK_EN (14)

NO STUFF J9 U.FL-R-SMT F-ST-SM
CLK18M_INT_EXT (7)
NO STUFF R134 0
NO STUFF R113 51
NO STUFF R144 10M
R143 0
CRITICAL Y2 OMIT 18.432M 8X4.5MM-SM
CLK18M_XTAL_IN
C152 22pF 5% 50V CERM 402
C151 22pF 5% 50V CERM 402
CRYSTAL LOAD CAPACITANCE IS 16PF

CLK18M_INT_XOUT (37)
SYSTEM_CLK_EN (31 14) → XTAL_IN U4, XTAL_OUT V1, STOPXTAL ANT
INT_WATCHDOG_L (31) → WATCHDOG AT7
R218 — INT_REF_CLK_OUT (37 14) → BUF_REF_CLK_OUT U15
INT_REF_CLK_IN (37 14) → SS_REF_CLK_IN K9

+3V_MAIN
R802 10K — NO STUFF — MMM_SIRQ_L (14 25)
R801 10K — NO STUFF — MMM_FFIRQ_L (14 25)

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

R240 4.7 — +1_5V_INTREPID_PLL (8)
C337 0.22uF 20% 6.3V CERM 402
R280 4.7 — +1_5V_INTREPID_PLL (4)
C389 0.22uF 20% 6.3V CERM 402
R279 4.7 — +1_5V_INTREPID_PLL (3)
C388 0.22uF 20% 6.3V CERM 402
R243 4.7 — +1_5V_INTREPID_PLL (2)
C386 0.22uF 20% 6.3V CERM 402
R201 4.7 — +1_5V_INTREPID_PLL (1)
C387 0.22uF 20% 6.3V CERM 402

+3V_MAIN — L13 FERR-EMI-100-OHM SM
+3V_INTREPID_USB
C235 0.01uF 20% 16V CERM 402
C246 0.1uF 10% 10V CERM 402
C256 10uF 20% 6.3V CERM 805

SSCG R450 0 — CG_FSEL (14)

U51 INTREPID-REV2.1 BGA CRITICAL (6 OF 9)
OMIT
VCORE A/B SEL
GENERAL PURPOSE I/O'S

GPIO0	G5	CG_FSEL_INT
GPIO1	E1	INT_GPIO1_PU (35 14)
GPIO2	J7	NC
GPIO3	F2	COMM_RESET_L (41 27)
GPIO4	J8	FW_PHY_PD (29)
GPIO5	H5	SND_HP_MUTE_L (41 27)
GPIO6	L9	SND_AMP_MUTE_L (27)
GPIO9	H4	INT_GPIO9_PU (14)
GPIO11	J5	SND_HW_RESET_L (41 27 14)
GPIO12	K8	INT_GPIO12_PU (14)
GPIO15	F1	INT_GPIO15_PU (14)
GPIO16	K7	INT_ENET_RST_L (28)
EXTINT0	F33	COMM_RING_DET_L (41 31 27 14)
EXTINT1	E34	PMU_INT_L (31 14)
EXTINT2	C33	AGP_ATI_INT_L (19)
EXTINT3	D34	INT_EXTINT3_PU (14)
EXTINT4	B33	SND_LIN_SENSE_L (41 27)
EXTINT5	A33	ENET_ENERGY_DET (28)
EXTINT6	E31	AIRPORT_PCI_INT_L (41 26 14)
EXTINT7	G30	CBUS_INT_L (18 14)
EXTINT8	D31	INT_EXTINT8_PU (14)
EXTINT9	C32	PMU_INT_NMI (31 14)
EXTINT10	B32	INT_EXTINT10_PU (14)
EXTINT11	E30	MMM_FFIRQ_L (25 14)
EXTINT12	J9	MMM_SIRQ_L (25 14)
EXTINT13	F4	INT_EXTINT13_PU (14)
EXTINT14	D1	INT_EXTINT14_PU (14)
EXTINT15	E2	SND_HP_SENSE_L (41 27)
EXTINT16	H7	INT_EXTINT16_PU (14)
EXTINT17	G4	NEC_PCI_INT_L (17 14)
CPU_INT	D30	MPIC_CPU_INT_L (5)
PCIPME	AJ7	PMU_PME_L (41 31 26 17)
PROCSLEEPREQ	AT6	INT_PROC_SLEEP_REQ (31)
PENDPROCINT	AN8	INT_PEND_PROC_INT (31)

INTERRUPTS
POWERBOOK SPARE
CBUS_REG_L
CBUS_IREQ_L
CLOCKS

PCI VDD15A_1 (PLL1) AA16
PCI VDD15A_2 (PLL2) AJ12
PCI VDD15A_3 (PLL3) AJ17
PCI VDD15A_4 (PLL7) AJ18
PCI VDD15A_8 (PLL9) AG29
VDDU33_1 T8
VDDU33_2 U8

USB

USB_VD0_P	L8	USB_DAP (14)
USB_VD0_N	L7	USB_DAM (14)
USB_VD1_P	G2	USB_DBP (14)
USB_VD1_N	G1	USB_DBM (14)
USB_PRTPWR0	J4	USB_PWREN_AB_L (14)
USB_PWRFLT0	K4	USB_OC_AB_L (14)
USB_VD2_P	H2	USB_DCP (14)
USB_VD2_N	H1	USB_DCM (14)
USB_VD3_P	M7	USB_DDP (14)
USB_VD3_N	M8	USB_DDM (14)
USB_PRTPWR1	J2	USB_PWREN_CD_L (14)
USB_PWRFLT1	J1	USB_OC_CD_L (14)
USB_VD4_P	K5	USB_DEP (14 39)
USB_VD4_N	L5	USB_DEM (14 39)
USB_VD5_P	P8	USB_DFP (14 39)
USB_VD5_N	N8	USB_DFM (14 39)
USB_PRTPWR2	M5	USB_PWREN_EF_L (14)
USB_PWRFLT2	N7	USB_OC_EF_L (14)

AUDIO/I2S

AUD_DTO	R4	INT_I2S0_SND_TO_DAC_UF
AUD_DTI	R7	INT_I2S0_SND_FROM_ADC (41)
AUD_SYNC	T5	INT_I2S0_SND_LRCLK_UF
AUD_BITCLK	P2	INT_I2S0_SND_SCLK_UF
AUD_CLKOUT	R5	INT_I2S0_SND_MCLK_UF
MOD_DTO	R2	INT_MOD_DTO_UF (14)
MOD_DTI (SIGNAL FROM MODEM)	T4	INT_MOD_DTI (14 27)
MOD_SYNC	R1	INT_MOD_SYNC_UF (14)
MOD_BITCLK	V8	INT_MOD_BITCLK_UF (14)
MOD_CLKOUT	P1	INT_MOD_CLKOUT_UF (14)

IIC
IICCLK_2 AL4
IICDATA_2 AH8
+3V_SLEEP
2R258 1K — INT_I2C_CLK2 (41)
2R241 1K — INT_I2C_DATA2 (41)

SCCTXDA AF9 COMM_TXD_L (27 41)
SCCRTSA AN3 COMM_RTS_L (27 41)
SCCDTRA AF10 COMM_DTR_L (27 41)
SCCRXDA AG11 COMM_RXD (27 41)
SCCGPIOA AG9 COMM_GPIO_L (27 41)
VIA SCCTRXCA AT4 COMM_TRXC (27 41)
MISO SCCTXDB AR4 PMU_FROM_INT (31)
REQ* SCCRTSB AL5 PMU_REQ_L (14 31)
MOSI SCCRXDB AG10 PMU_TO_INT (31)
ACK* SCCGPIOB AP4 PMU_ACK_L (31)
SCK SCCTRXCB AM5 PMU_CLK (31)
USB_PWREN_AB_L J4
USB_OC_AB_L K4
USB_PWREN_CD_L J2
USB_OC_CD_L J1
USB_PWREN_EF_L M5
USB_OC_EF_L N7

SOFT_MODEM
RP47 0K — INT_MOD_DTO (7)
RP47 0K — INT_MOD_SYNC (7)
RP47 0K — INT_MOD_BITCLK (7)
RP47 0K — INT_MOD_CLKOUT (7)
RP13 47 — INT_I2S0_SND_TO_DAC (41)
RP13 47 — INT_I2S0_SND_LRCLK (41)
RP13 47 — INT_I2S0_SND_SCLK (41)
RP13 47 — INT_I2S0_SND_MCLK (37 41)

VSSA1 (PLL1) AA15
VSSA2 (PLL2) AJ13
VSSA3 (PLL3) AJ16
VSSA4 (PLL7) AK18
VSSA_8 (PLL9) AH29
VSSU_1 R9
VSSU_2 R8

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0090	1	XTAL,CER,LOW PROF,18,432MHZ,8X4.5MM,SMD	Y2	CRITICAL	?

PART #	QTY	DEVICE	PACKAGE	DESCRIPTION	VALUE	VOLT.	WATT.	TOL.	REFERENCE DESIGNATOR(S)	BOM OPTION
116S1104	1	RES	RES-0402-V2	RESISTOR	10K		1/16W	5%	R292	NO_SSCG

INT - USB/GPIOS/I2S

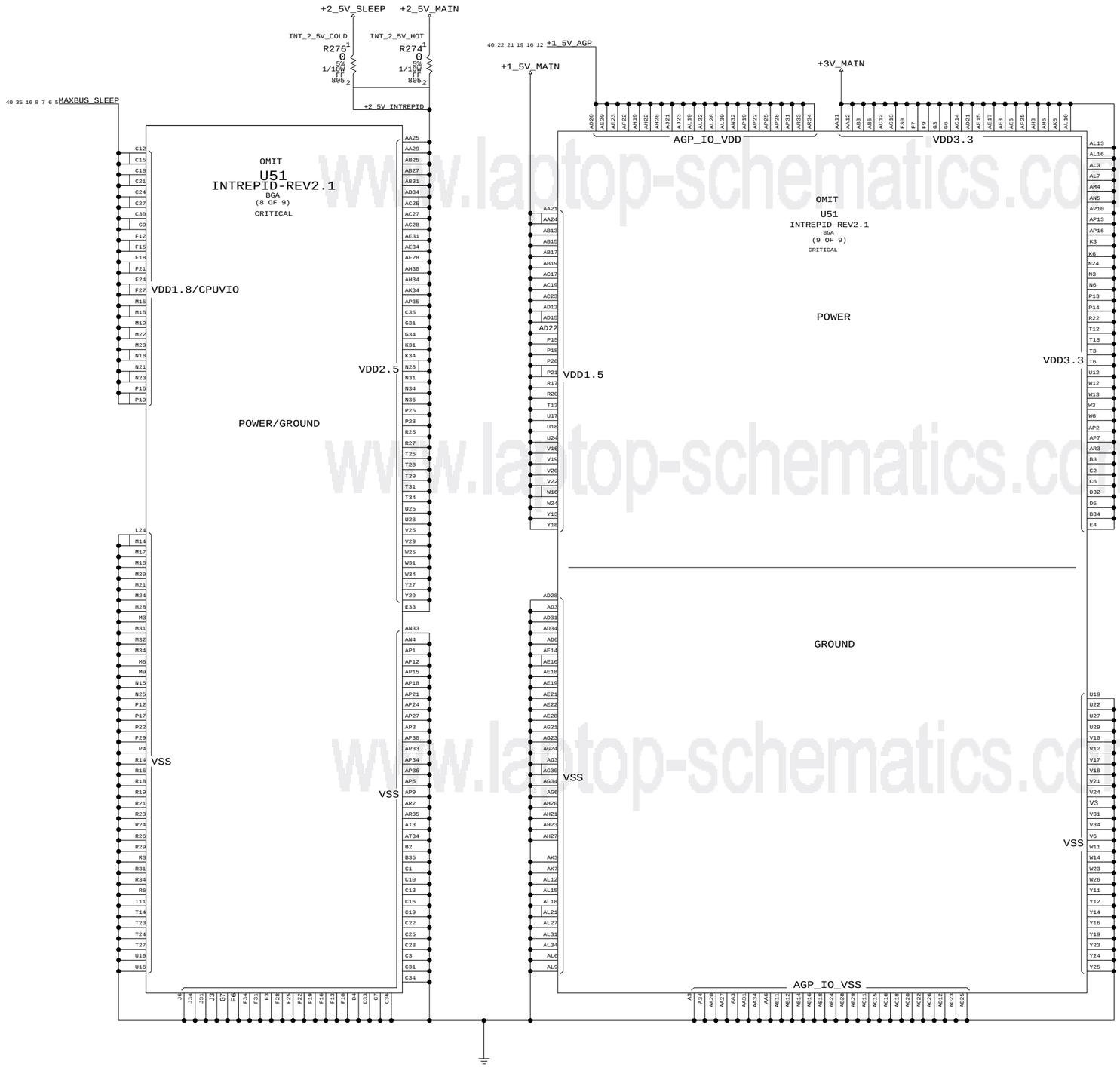
NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 14 OF 46	



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S0305	1	IC,ASIC,INTREPID,REV2.1,974 BGA,FAST	U51	CRITICAL	?

Intrepid Power

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 15 OF 46	

INTREPID MAXBUS DECOUPLING

35 15 8 7 6 5 MAXBUS_SLEEP 40

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

C148 10uF 20% 6.3V CERM 805 · C142 10uF 20% 6.3V CERM 805 · C144 10uF 20% 6.3V CERM 805 · C146 10uF 20% 6.3V CERM 805

C182 0.22uF 20% 6.3V CERM 402 · C178 0.22uF 20% 6.3V CERM 402 · C141 0.22uF 20% 6.3V CERM 402 · C145 0.22uF 20% 6.3V CERM 402 · C214 0.22uF 20% 6.3V CERM 402 · C163 0.22uF 20% 6.3V CERM 402 · C164 0.22uF 20% 6.3V CERM 402 · C225 0.22uF 20% 6.3V CERM 402 · C160 0.22uF 20% 6.3V CERM 402 · C159 0.22uF 20% 6.3V CERM 402

C204 0.22uF 20% 6.3V CERM 402 · C166 0.22uF 20% 6.3V CERM 402 · C205 0.22uF 20% 6.3V CERM 402 · C223 0.22uF 20% 6.3V CERM 402 · C229 0.22uF 20% 6.3V CERM 402 · C181 0.22uF 20% 6.3V CERM 402 · C207 0.22uF 20% 6.3V CERM 402 · C208 0.22uF 20% 6.3V CERM 402 · C183 0.22uF 20% 6.3V CERM 402 · C180 0.22uF 20% 6.3V CERM 402

C165 0.22uF 20% 6.3V CERM 402 · C206 0.22uF 20% 6.3V CERM 402 · C147 0.22uF 20% 6.3V CERM 402 · C149 0.22uF 20% 6.3V CERM 402 · C179 0.22uF 20% 6.3V CERM 402 · C162 0.22uF 20% 6.3V CERM 402 · C161 0.22uF 20% 6.3V CERM 402 · C213 0.22uF 20% 6.3V CERM 402

INTREPID CORE DECOUPLING

+1_5V_MAIN

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

C324 10uF 20% 6.3V CERM 805 · C325 10uF 20% 6.3V CERM 805 · C201 10uF 20% 6.3V CERM 805 · C200 10uF 20% 6.3V CERM 805

C299 0.22uF 20% 6.3V CERM 402 · C279 0.22uF 20% 6.3V CERM 402 · C262 0.22uF 20% 6.3V CERM 402 · C292 0.22uF 20% 6.3V CERM 402 · C248 0.22uF 20% 6.3V CERM 402 · C302 0.22uF 20% 6.3V CERM 402 · C300 0.22uF 20% 6.3V CERM 402 · C290 0.22uF 20% 6.3V CERM 402 · C272 0.22uF 20% 6.3V CERM 402 · C259 0.22uF 20% 6.3V CERM 402

C301 0.22uF 20% 6.3V CERM 402 · C278 0.22uF 20% 6.3V CERM 402 · C226 0.22uF 20% 6.3V CERM 402 · C238 0.22uF 20% 6.3V CERM 402 · C250 0.22uF 20% 6.3V CERM 402 · C263 0.22uF 20% 6.3V CERM 402 · C224 0.22uF 20% 6.3V CERM 402 · C222 0.22uF 20% 6.3V CERM 402 · C261 0.22uF 20% 6.3V CERM 402 · C227 0.22uF 20% 6.3V CERM 402

C271 0.22uF 20% 6.3V CERM 402 · C310 0.22uF 20% 6.3V CERM 402 · C288 0.22uF 20% 6.3V CERM 402 · C260 0.22uF 20% 6.3V CERM 402 · C303 0.22uF 20% 6.3V CERM 402 · C287 0.22uF 20% 6.3V CERM 402 · C258 0.22uF 20% 6.3V CERM 402 · C236 0.22uF 20% 6.3V CERM 402 · C289 0.22uF 20% 6.3V CERM 402

INTREPID AGP I/O DECOUPLING

40 22 21 19 15 12 +1_5V_AGP

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

C381 10uF 20% 6.3V CERM 805 · C380 10uF 20% 6.3V CERM 805 · C382 10uF 20% 6.3V CERM 805 · C379 10uF 20% 6.3V CERM 805

C367 0.22uF 20% 6.3V CERM 402 · C319 0.22uF 20% 6.3V CERM 402 · C330 0.22uF 20% 6.3V CERM 402 · C363 0.22uF 20% 6.3V CERM 402 · C366 0.22uF 20% 6.3V CERM 402 · C332 0.22uF 20% 6.3V CERM 402 · C361 0.22uF 20% 6.3V CERM 402 · C320 0.22uF 20% 6.3V CERM 402 · C328 0.22uF 20% 6.3V CERM 402 · C364 0.22uF 20% 6.3V CERM 402

C365 0.22uF 20% 6.3V CERM 402 · C329 0.22uF 20% 6.3V CERM 402 · C345 0.22uF 20% 6.3V CERM 402 · C346 0.22uF 20% 6.3V CERM 402 · C373 0.22uF 20% 6.3V CERM 402 · C344 0.22uF 20% 6.3V CERM 402 · C331 0.22uF 20% 6.3V CERM 402 · C312 0.22uF 20% 6.3V CERM 402 · C354 0.22uF 20% 6.3V CERM 402 · C347 0.22uF 20% 6.3V CERM 402

C321 0.22uF 20% 6.3V CERM 402

INTREPID 3.3V DECOUPLING

+3V_MAIN

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

C378 10uF 20% 6.3V CERM 805 · C376 10uF 20% 6.3V CERM 805 · C377 10uF 20% 6.3V CERM 805 · C375 10uF 20% 6.3V CERM 805

C170 0.22uF 20% 6.3V CERM 402 · C358 0.22uF 20% 6.3V CERM 402 · C268 0.22uF 20% 6.3V CERM 402 · C327 0.22uF 20% 6.3V CERM 402 · C342 0.22uF 20% 6.3V CERM 402 · C215 0.22uF 20% 6.3V CERM 402 · C352 0.22uF 20% 6.3V CERM 402 · C171 0.22uF 20% 6.3V CERM 402 · C158 0.22uF 20% 6.3V CERM 402 · C309 0.22uF 20% 6.3V CERM 402

C175 0.22uF 20% 6.3V CERM 402 · C357 0.22uF 20% 6.3V CERM 402 · C351 0.22uF 20% 6.3V CERM 402 · C350 0.22uF 20% 6.3V CERM 402 · C286 0.22uF 20% 6.3V CERM 402 · C176 0.22uF 20% 6.3V CERM 402 · C189 0.22uF 20% 6.3V CERM 402 · C167 0.22uF 20% 6.3V CERM 402 · C371 0.22uF 20% 6.3V CERM 402 · C359 0.22uF 20% 6.3V CERM 402

C285 0.22uF 20% 6.3V CERM 402 · C283 0.22uF 20% 6.3V CERM 402 · C269 0.22uF 20% 6.3V CERM 402 · C221 0.22uF 20% 6.3V CERM 402 · C234 0.22uF 20% 6.3V CERM 402 · C247 0.22uF 20% 6.3V CERM 402 · C257 0.22uF 20% 6.3V CERM 402 · C343 0.22uF 20% 6.3V CERM 402 · C313 0.22uF 20% 6.3V CERM 402 · C228 0.22uF 20% 6.3V CERM 402

C360 0.22uF 20% 6.3V CERM 402 · C308 0.22uF 20% 6.3V CERM 402 · C318 0.22uF 20% 6.3V CERM 402 · C237 0.22uF 20% 6.3V CERM 402 · C317 0.22uF 20% 6.3V CERM 402 · C341 0.22uF 20% 6.3V CERM 402 · C177 0.22uF 20% 6.3V CERM 402 · C212 0.22uF 20% 6.3V CERM 402 · C349 0.22uF 20% 6.3V CERM 402 · C184 0.22uF 20% 6.3V CERM 402

INTREPID DDR DECOUPLING

40 15 10 9 +2_5V_INTREPID

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

C314 10uF 20% 6.3V CERM 805 · C322 10uF 20% 6.3V CERM 805 · C191 10uF 20% 6.3V CERM 805 · C202 10uF 20% 6.3V CERM 805

C304 0.22uF 20% 6.3V CERM 402 · C266 0.22uF 20% 6.3V CERM 402 · C172 0.22uF 20% 6.3V CERM 402 · C281 0.22uF 20% 6.3V CERM 402 · C243 0.22uF 20% 6.3V CERM 402 · C253 0.22uF 20% 6.3V CERM 402 · C334 0.22uF 20% 6.3V CERM 402 · C241 0.22uF 20% 6.3V CERM 402 · C348 0.22uF 20% 6.3V CERM 402 · C192 0.22uF 20% 6.3V CERM 402

C306 0.22uF 20% 6.3V CERM 402 · C252 0.22uF 20% 6.3V CERM 402 · C275 0.22uF 20% 6.3V CERM 402 · C297 0.22uF 20% 6.3V CERM 402 · C240 0.22uF 20% 6.3V CERM 402 · C218 0.22uF 20% 6.3V CERM 402 · C274 0.22uF 20% 6.3V CERM 402 · C369 0.22uF 20% 6.3V CERM 402 · C368 0.22uF 20% 6.3V CERM 402 · C168 0.22uF 20% 6.3V CERM 402

C265 0.22uF 20% 6.3V CERM 402 · C251 0.22uF 20% 6.3V CERM 402 · C216 0.22uF 20% 6.3V CERM 402 · C254 0.22uF 20% 6.3V CERM 402 · C305 0.22uF 20% 6.3V CERM 402 · C186 0.22uF 20% 6.3V CERM 402 · C219 0.22uF 20% 6.3V CERM 402 · C315 0.22uF 20% 6.3V CERM 402 · C264 0.22uF 20% 6.3V CERM 402 · C294 0.22uF 20% 6.3V CERM 402

C323 0.22uF 20% 6.3V CERM 402 · C273 0.22uF 20% 6.3V CERM 402 · C242 0.22uF 20% 6.3V CERM 402 · C203 0.22uF 20% 6.3V CERM 402 · C333 0.22uF 20% 6.3V CERM 402 · C217 0.22uF 20% 6.3V CERM 402 · C230 0.22uF 20% 6.3V CERM 402 · C293 0.22uF 20% 6.3V CERM 402 · C231 0.22uF 20% 6.3V CERM 402 · C296 0.22uF 20% 6.3V CERM 402

C239 0.22uF 20% 6.3V CERM 402 · C316 0.22uF 20% 6.3V CERM 402 · C185 0.22uF 20% 6.3V CERM 402 · C282 0.22uF 20% 6.3V CERM 402 · C295 0.22uF 20% 6.3V CERM 402 · C280 0.22uF 20% 6.3V CERM 402

INTREPID/MAIN 2.5V DECOUPLING

+2_5V_MAIN

10 X 0.22UF (0402)

C770 0.22uF 20% 6.3V CERM 402 · C139 0.22uF 20% 6.3V CERM 402 · C335 0.22uF 20% 6.3V CERM 402 · C735 0.22uF 20% 6.3V CERM 402 · C245 0.22uF 20% 6.3V CERM 402 · C736 0.22uF 20% 6.3V CERM 402 · C739 0.22uF 20% 6.3V CERM 402 · C395 0.22uF 20% 6.3V CERM 402 · C374 0.22uF 20% 6.3V CERM 402 · C385 0.22uF 20% 6.3V CERM 402

Place these 2.5V Decoupling Caps near the Edge of +2.5V_MAIN and +2.5V_INTREPID split

Intrepid Decoupling

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT: 16 OF 46	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0087	1	XTAL,CER,LW PROF,30.0000MHZ,8X4.5MM,SMD	Y1	CRITICAL	?

+3V_NEC_VDD 17 40

C749 0.1uF 20% 10V CERM 402
C746 0.1uF 20% 10V CERM 402
C761 0.1uF 20% 10V CERM 402
C750 0.1uF 20% 10V CERM 402
C756 0.1uF 20% 10V CERM 402
C748 0.1uF 20% 10V CERM 402
C769 0.1uF 20% 10V CERM 402
C752 0.1uF 20% 10V CERM 402
C747 0.1uF 20% 10V CERM 402
C197 10uF 20% 6.3V CERM 805
C765 0.1uF 20% 10V CERM 402
C768 0.1uF 20% 10V CERM 402

+3V_MAIN

L7 FERR-EMI-100-OHM SM

R172 0 5% 1/16W MF 603

C760 0.1uF 20% 10V CERM 402
C751 0.1uF 20% 10V CERM 402
C173 10uF 20% 6.3V CERM 805

40 NEC_AVDD

40 17 +3V_NEC_VDD

H3 M4 C8 P2 P3 P12 A13 A12 A3 E2 N8 L13 J13 H13 F13 D13 G12 H4 D7 — VDD
VDD_PCI
N10 M12 — AVDD

Y1's LOAD CAPACITANCE = 16 pF

OMIT CRITICAL
Y1 30.0000M 8X4.5MM-SM

NEC_XT2_R

C759 27pF 5% 50V CERM 402
C136 27pF 5% 50V CERM 402
R124 100 5% 1/16W MF 402

XT1/SCLK L9 NEC_XT1
XT2 P8 NEC_XT2

R613 43.2 1% 1/16W MF 402 — NEC_USB_DAM 27 39 41 — Low/Full/High Speed (External)
R612 43.2 1% 1/16W MF 402 — NEC_USB_DAP 27 39 41
R609 43.2 1% 1/16W MF 402 — NEC_USB_DBM 27 39 41 — Low/Full/High Speed (External)
R610 43.2 1% 1/16W MF 402 — NEC_USB_DBP 27 39 41

RSDM1 M14 NEC_USB_RSDM1
DM1 M13 (NEC_USB_DAM)
DP1 L14 (NEC_USB_DAP)
RSDP1 K13 NEC_USB_RSDP1
RSDM2 K14 NEC_USB_RSDM2
DM2 K12 (NEC_USB_DBM)
DP2 J14 (NEC_USB_DBP)
RSDP2 J12 NEC_USB_RSDP2
RSDM3 H11 NC
DM3 G11
DP3 G13
RSDP3 G14 NC
RSDM4 F12 NC
DM4 F14
DP4 E12
RSDP4 E14 NC
RSDM5 E13 NC
DM5 D14
DP5 C13
RSDP5 C14 NC

CRITICAL
U17
NEC_uPD720101_USB2
FBGA

41 39 26 18 12 9 PCI_AD<0>	M5	AD0
41 39 26 18 12 9 PCI_AD<1>	P5	AD1
41 39 26 18 12 9 PCI_AD<2>	N5	AD2
41 39 26 18 12 9 PCI_AD<3>	P4	AD3
41 39 26 18 12 9 PCI_AD<4>	N4	AD4
41 39 26 18 12 9 PCI_AD<5>	M3	AD5
41 39 26 18 12 9 PCI_AD<6>	N3	AD6
41 39 26 18 12 9 PCI_AD<7>	M1	AD7
41 39 26 18 12 9 PCI_AD<8>	L2	AD8
41 39 26 18 12 9 PCI_AD<9>	L1	AD9
41 39 26 18 12 9 PCI_AD<10>	K2	AD10
41 39 26 18 12 9 PCI_AD<11>	L3	AD11
41 39 26 18 12 9 PCI_AD<12>	K1	AD12
41 39 26 18 12 9 PCI_AD<13>	K3	AD13
41 39 26 18 12 9 PCI_AD<14>	J2	AD14
41 39 26 18 12 9 PCI_AD<15>	J1	AD15
41 39 26 18 12 9 PCI_AD<16>	F2	AD16
41 39 26 18 12 9 PCI_AD<17>	E3	AD17
41 39 26 18 12 9 PCI_AD<18>	E1	AD18
41 39 26 18 12 9 PCI_AD<19>	D3	AD19
41 39 26 18 12 9 PCI_AD<20>	D1	AD20
41 39 26 18 12 PCI_AD<21>	D2	AD21
41 39 26 18 12 PCI_AD<22>	C2	AD22
41 39 26 18 12 PCI_AD<23>	C1	AD23
41 39 26 18 12 9 PCI_AD<24>	B4	AD24
41 39 26 18 12 9 PCI_AD<25>	A4	AD25
41 39 26 18 12 9 PCI_AD<26>	B5	AD26
(PCI_AD<27>)	C4	AD27
41 39 26 18 12 9 PCI_AD<28>	A5	AD28
41 39 26 18 12 9 PCI_AD<29>	C5	AD29
41 39 26 18 12 9 PCI_AD<30>	B6	AD30
41 39 26 18 12 9 PCI_AD<31>	A6	AD31
39 26 18 12 PCI_CBE<0>	M2	CBE0
39 26 18 12 PCI_CBE<1>	J3	CBE1
39 26 18 12 PCI_CBE<2>	F1	CBE2
39 26 18 12 PCI_CBE<3>	C3	CBE3
41 39 26 18 12 PCI_PAR	J4	PAR
41 39 26 18 12 PCI_FRAME_L	F3	FRAME
41 39 26 18 12 PCI_IRDY_L	F4	IRDY
41 39 26 18 12 PCI_TRDY_L	G1	TRDY
41 39 26 18 12 PCI_STOP_L	G3	STOP
NEC_IDSEL	B3	IDSEL
41 39 26 18 12 PCI_DEVSEL_L	G2	DEVSEL
12 NEC_PCI_REQ_L	C6	REQ
12 NEC_PCI_GNT_L	D6	GNT
18 PCI_PERR_L	H2	PERR
18 PCI_SERR_L	H1 OD	SERR
NEC_PCI_INTA_L	C7 OD	INTA
NEC_PCI_INTB_L	B7 OD	INTB
NEC_PCI_INTC_L	A7 OD	INTC
37 12 CLK33M_NEC	A8	PCLK
17 NEC_IO_RESET_L	B8	VBRRST
NEC_CRUN_L	N6	CRUN
17 NEC_PME_L	D8 OD	PME
17 NEC_MAIN_RESET_L	C8	VCCRST
NEC_SMI_L_TP	L6 OD	SMI
17 NEC_LEGC	L7	LEGC

R636 22 5% 1/16W MF 402

Series Rpaks required to facilitate NAND-tree testing

RP45 47 5% 1/16W SM1
NC 1 — 8 NC
14 NEC_PCI_INT 2 — 7 NEC_PCI_INTA_L
3 — 6 NEC_PCI_INTB_L
4 — 5 NEC_PCI_INTC_L

R617 4.7k 5% 1/16W MF 402

RP44 47 5% 1/16W SM1
31 28 25 24 IO_RESET_L 1 — 8 NEC_IO_RESET_L 17
41 31 26 14 PMU_PME_L 2 — 7 NEC_PME_L 17
41 31 26 20 19 18 14 MAIN_RESET_L 3 — 6 NEC_MAIN_RESET_L 17
17 NEC_LEGC 4 — 5

VSS

B1	N1	P10	N14	H14	B14	A2	B2	N2	N13	B13	M11	L12	H12	D12	G4	J11	F11	D8	

R614 Tie to GND (NEC_AVSS_F) at ball N11
9.09K 1% 1/16W MF 402

RREF P11 NEC_RREF — NEC_AVSS_F 17

OCI1 B12 NEC_LUSB_OCI
OCI2 B11 NEC_RUSB_OCI
OCI3 B10 NEC_OCI<3>
OCI4 A10 NEC_OCI<4>
OCI5 B9 NEC_OCI<5>

RP43 10K 5% 1/16W SM1 (pins 3, 6)
RP43 10K 5% 1/16W SM1 (pins 4, 5)
R606 10K 5% 1/16W MF 402
R615 1K 5% 1/16W MF 402
R632 1K 5% 1/16W MF 402

+3V_NEC_VDD 17 40

PPON1 C12 OUT NEC_LUSB_PPON 41
PPON2 A11 OUT NEC_RUSB_PPON 41
PPON3 C11 OUT NEC_PPON3_TP
PPON4 C10 OUT NEC_PPON4_TP
PPON5 A9 OUT NEC_PPON5_TP
NC1 P6 NEC_NC<1>
NC2 M6 NEC_NC<2>

NEC documentation indicates that NCs must be tied high.

NTEST1 M8 IPD NC
SMC M7 IPD NC
TEB N7 IPD NC
AMC P7 IPD NEC_AMC_TP
TEST L8 IPD NC
NANDTEST M10 NEC_NANDTESTEN_TP
SRCLK M9 NC
SRDTA N9 NEC_NANDTESTOUT_TP
SRMOD P9 IPD NC
AVSS

AVSS(R) N11 P13 M12

R798 0 5% 1/16W MF 603 — NEC_AVSS_F 1

+3V_MAIN

RP43 10K 5% 1/16W SM1 (pins 7, 8)

R607 0 5% 1/16W 402 — 17 NEC_LUSB_OCI — NEC_LUSB_OCI_UF 27 41
R608 0 5% 1/16W 402 — 17 NEC_RUSB_OCI — NEC_RUSB_OCI_UF 27 41

C743 0.1uF 20% 10V CERM 402 NO STUFF
C744 0.1uF 20% 10V CERM 402 NO STUFF

USB 2.0

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 17 OF 46	

PCI1510 PULL-UPS

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

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

TI REFERENCE SCHEMATIC DID NOT HAVE BULK ON +VCC_CBUS_SW

INTEGRATED PULL-UP

CRITICAL CLAMP FOR PC-CARD CLAMP FOR PCI

PC CARD/CARDBUS CONNECTOR

CARDBUS

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

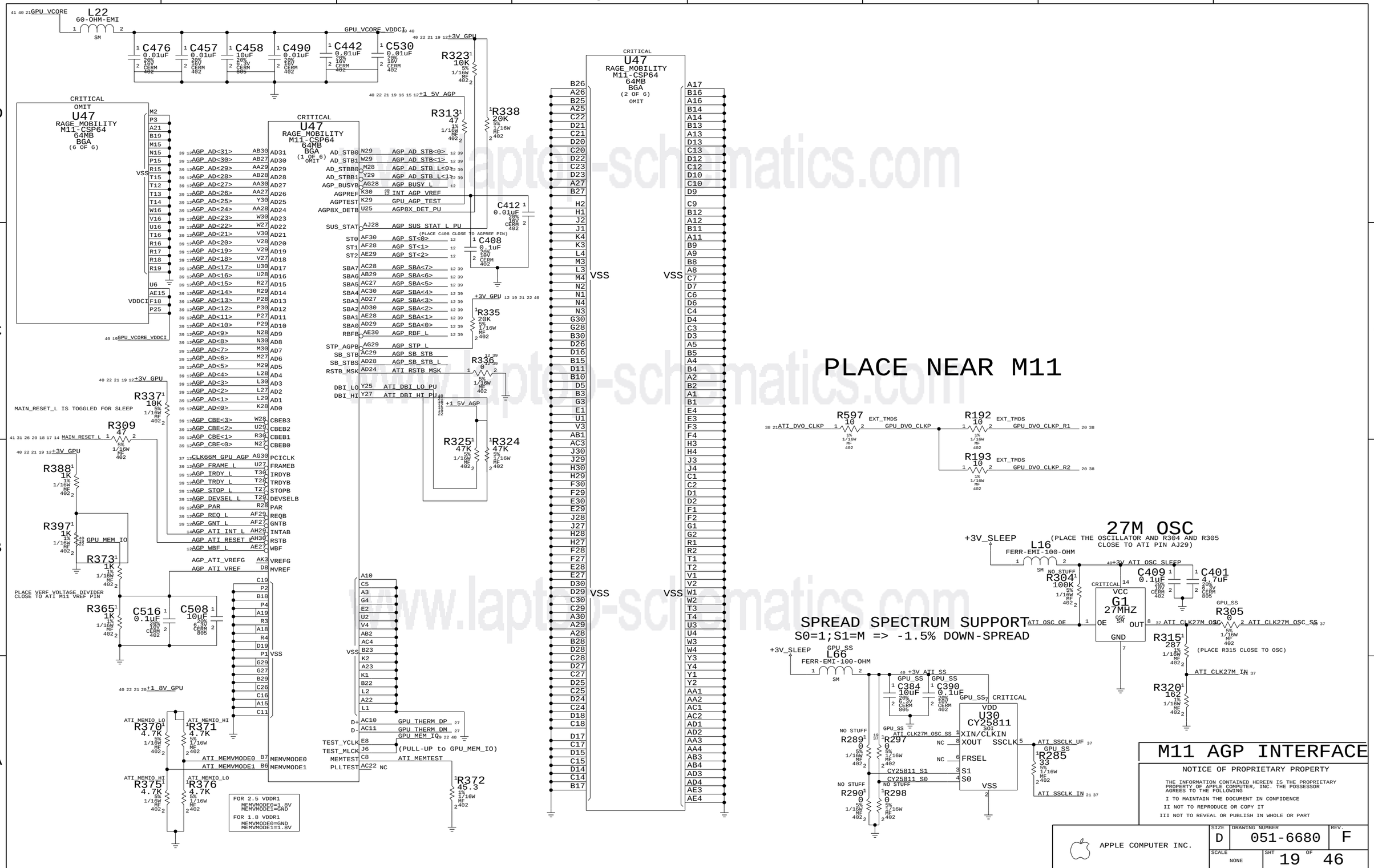
I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

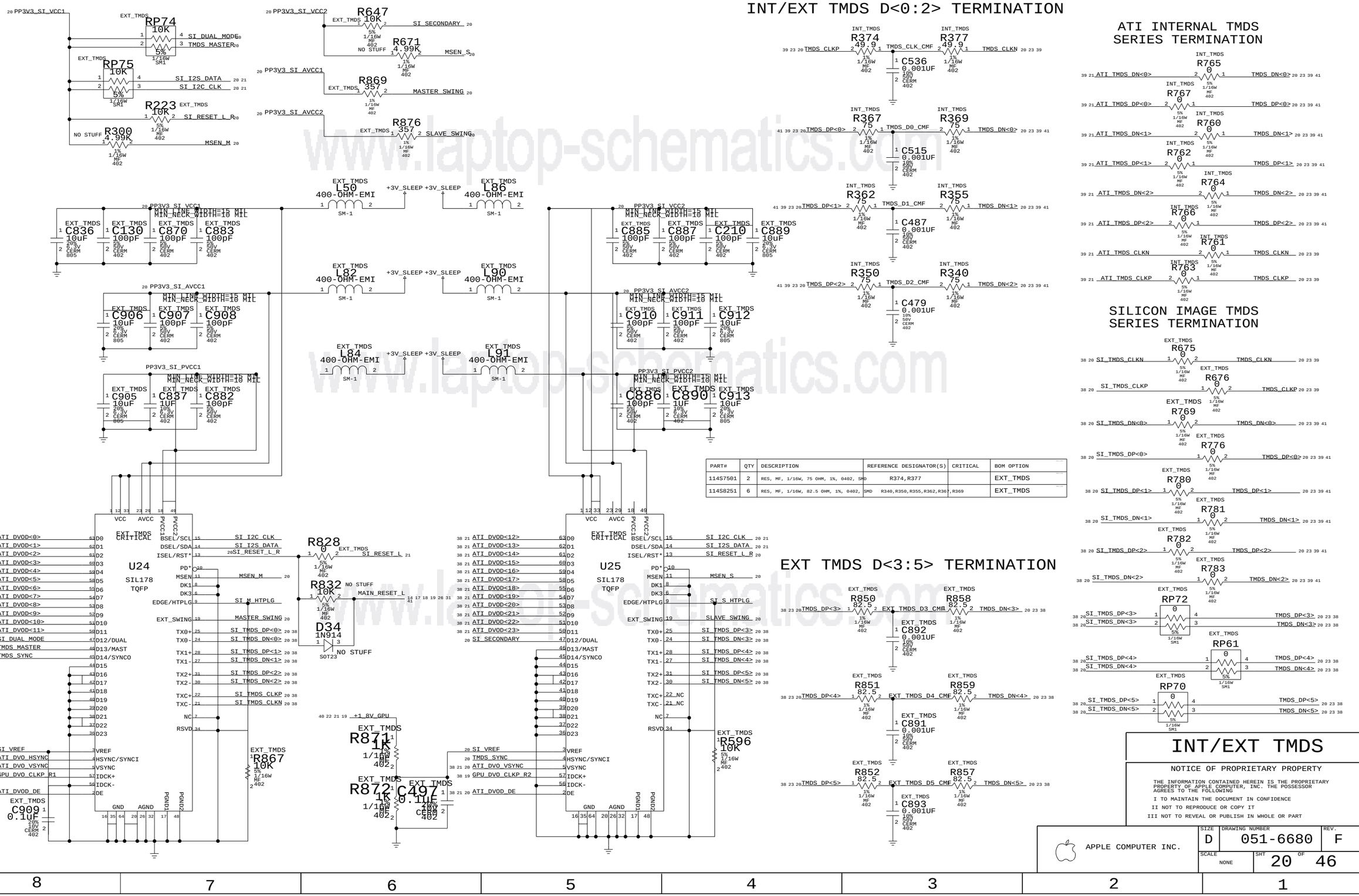
II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

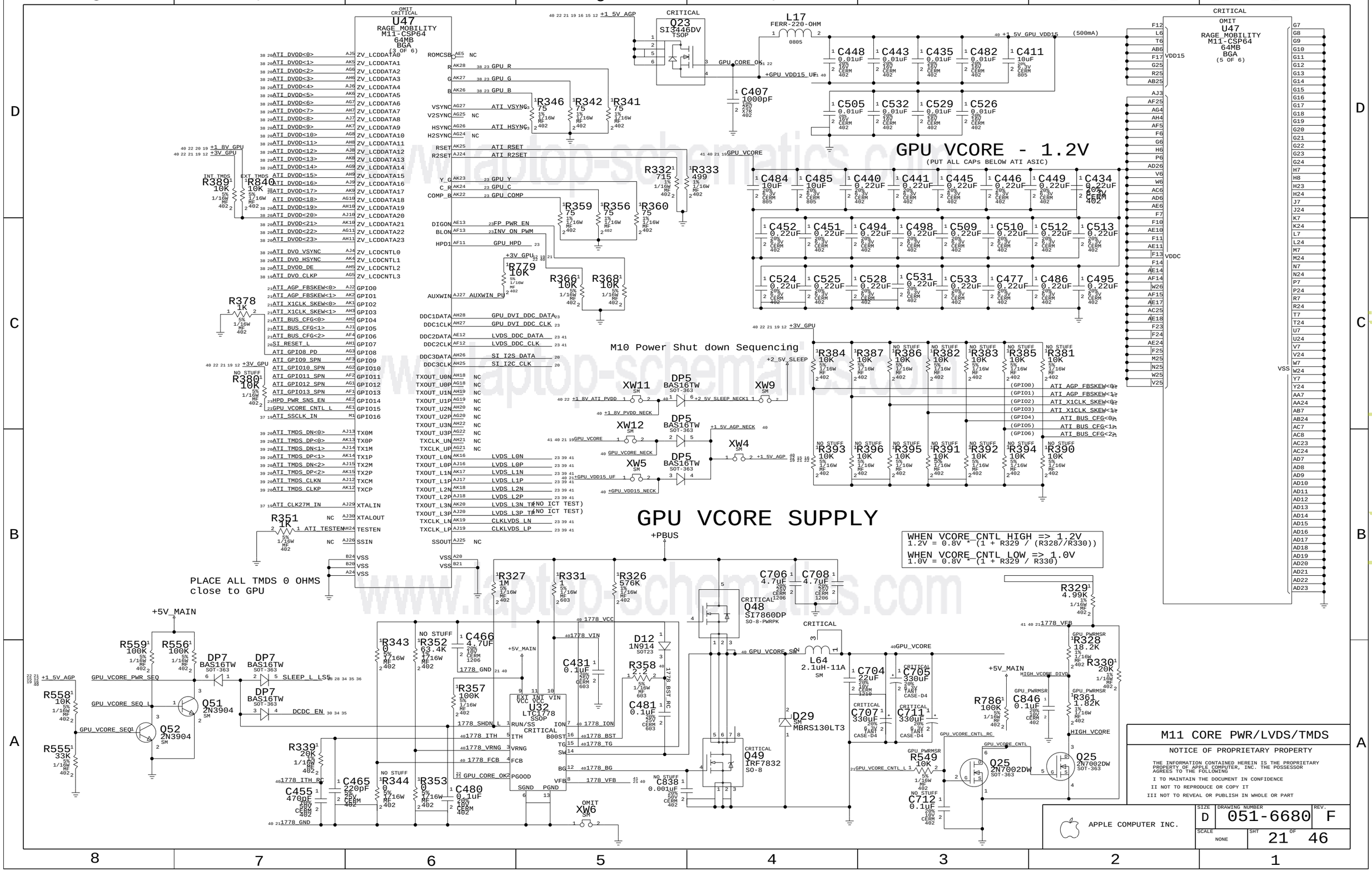
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 18 OF 46	





PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
114S7501	2	RES, MF, 1/16W, 75 OHM, 1%, 0402, SMD	R374,R377		EXT_TMDS
114S8251	6	RES, MF, 1/16W, 82.5 OHM, 1%, 0402, SMD	R340,R350,R355,R362,R367,R369		EXT_TMDS


U47
RAGE_MOBILITY
M11-CSP64
64MB
BGA
(3 OF 6)
(5 OF 6)
OMIT
CRITICAL
Q23
SI3446DV
TSOP
L17
FERR-220-OHM
0805
GPU VCORE - 1.2V
(PUT ALL CAPS BELOW ATI ASIC)
GPU VCORE SUPPLY
M10 Power Shut down Sequencing
PLACE ALL TMDS 0 OHMS
close to GPU
WHEN VCORE_CNTL HIGH => 1.2V
1.2V = 0.8V * (1 + R329 / (R328//R330))
WHEN VCORE_CNTL LOW => 1.0V
1.0V = 0.8V * (1 + R329 / R330)
M11 CORE PWR/LVDS/TMDS
NOTICE OF PROPRIETARY PROPERTY
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING
I TO MAINTAIN THE DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART
APPLE COMPUTER INC.
SIZE D
DRAWING NUMBER 051-6680
REV. F
SCALE NONE
SHT 21 OF 46
www.laptop-schematics.com

GPU PLL - 1.8V

+2_5V_SLEEP
U34 MM1571J SOT-25A CRITICAL (150mA MAX)
GPU_CORE_OK
+1_8V_ATI_PVDD
ATI_PVDD_BYP
C830 1uF 20% 16V CERM 603
C553 0.01uF 20% 16V CERM 402
1_8V_PVDD_STD
R787 0 5% 1/16W MF 402
L20 FERR-220-OHM 0402
+1_8V_GPU_PLL
C418 10uF 20% 6.3V CERM 805
C414 0.1uF 20% 10V CERM 402
C413 0.01uF 20% 16V CERM 402 (21mA)
C552 10uF 20% 6.3V CERM 805
+1_8V_GPU
L19 FERR-220-OHM 0402
+1_8V_GPU_AVDD (AVDD+VDDDI=75mA)
C427 10uF 20% 6.3V CERM 805
C453 0.01uF 20% 16V CERM 402
C450 0.01uF 20% 16V CERM 402

+2_5V_SLEEP
L23 FERR-220-OHM 0402
+2_5V_GPU_A2VDD (140mA)
C459 10uF 20% 6.3V CERM 805
C460 0.01uF 20% 16V CERM 402
C461 0.01uF 20% 16V CERM 402

+1_8V_GPU
L21 FERR-220-OHM 0402
+1_8V_GPU_AVDDQ (2mA)
C464 10uF 20% 6.3V CERM 805
C463 0.01uF 20% 16V CERM 402

+1_8V_GPU
L24 FERR-220-OHM 0402
+1_8V_GPU_VDDDI (AVDD+VDDDI=75mA)
C478 10uF 20% 6.3V CERM 805
C462 0.01uF 20% 16V CERM 402
C454 0.01uF 20% 16V CERM 402

+2_5V_SLEEP
L28 FERR-220-OHM 0402
+2_5V_GPU_MCLK
C511 10uF 20% 6.3V CERM 805
C527 0.01uF 20% 16V CERM 402
C472 0.01uF 20% 16V CERM 402

+1_5V_SLEEP
R275 0 5% 1/10W FF 805
+1_5V_AGP
1.5V

+1_8V_SLEEP
R363 0 5% 1/10W FF 805
+1_8V_GPU
1.8V

+1_8V_SLEEP +2_5V_SLEEP
ATI_MEMIO_LO R312 0 5% 1/10W FF 805
ATI_MEMIO_HI R319 0 5% 1/10W FF 805
GPU_MEM_IO
1.8V 2.5V

+3V_SLEEP
R379 0 5% 1/10W FF 805
+3V_GPU
3.3V

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

AGP 4X I/O - 1.5V

+1_5V_AGP
L18 FERR-10-OHM-500MA SM
+1_5V_AGP_GPU (20mA)
C438 0.1uF 20% 10V CERM 402
C444 0.1uF 20% 10V CERM 402
C423 0.1uF 20% 10V CERM 402
C424 0.1uF 20% 10V CERM 402
C422 10uF 20% 6.3V CERM 805
C439 0.01uF 20% 16V CERM 402
C447 0.01uF 20% 16V CERM 402
C425 0.01uF 20% 16V CERM 402
C417 0.01uF 20% 16V CERM 402

MEMORY CORE - 2.5V

+2_5V_SLEEP
L25 FERR-220-OHM 0805
+2_5V_GPU_MEMCORE (1800mA)
C470 0.1uF 20% 10V CERM 402
C539 0.1uF 20% 10V CERM 402
C475 0.1uF 20% 10V CERM 402
C419 0.1uF 20% 10V CERM 402
C483 10uF 20% 6.3V CERM 805
C471 0.01uF 20% 16V CERM 402
C538 0.01uF 20% 16V CERM 402
C504 0.01uF 20% 16V CERM 402
C420 0.01uF 20% 16V CERM 402

LVDS PLL - 1.8V

+1_8V_ATI_PVDD
L32 FERR-220-OHM 0402
+1_8V_GPU_PNLPLL (40mA)
C493 10uF 20% 6.3V CERM 805
C468 0.01uF 20% 16V CERM 402

MEMORY PLL - 1.8V

+1_8V_ATI_PVDD
L30 FERR-220-OHM 0402
+1_8V_GPU_MEMPLL
C537 10uF 20% 6.3V CERM 805
C523 0.01uF 20% 16V CERM 402
+1_8V_GPU_TP_PLL
C831 10uF 20% 6.3V CERM 805
C832 0.01uF 20% 16V CERM 402

LVDS - 2.5V

+2_5V_SLEEP
L26 FERR-10-OHM-500MA SM
+2_5V_GPU_PNLIO (350mA)
C499 10uF 20% 6.3V CERM 805
C500 0.01uF 20% 16V CERM 402
C473 0.01uF 20% 16V CERM 402

LVDS/TMDS - 1.8V

+1_8V_GPU
L29 FERR-220-OHM 0402
+1_8V_GPU_PNLIO (180mA)
C514 10uF 20% 6.3V CERM 805
C492 0.1uF 20% 10V CERM 402
C496 0.1uF 20% 10V CERM 402
C489 0.1uF 20% 10V CERM 402
C491 0.1uF 20% 10V CERM 402
C501 0.01uF 20% 16V CERM 402
C506 0.01uF 20% 16V CERM 402

U47 RAGE_MOBILITY M11-CSP64 64MB BGA (4 OF 6) OMIT CRITICAL

AK29	PVDD		PVSS	AK30	
AF23	AVDD0		AVSSQ	AF22	
AF24	AVDD1		A2VSSQ	AJ22	
	A2VDD0		AVSSN0	AE22	
	A2VDD1		AVSSN1	AE23	
	A2VDDQ		A2VSSN0	AE19	
AH23	VDD1DI		A2VSSN1	AE20	
AF20	VDD2DI		VSS1DI	AG23	
	VDDRH0		VSS2DI	AF19	
	VDDRH1		VSSRH0	F20	
			VSSRH1	M6	
K25			F5		
L25			G5		
T25			H5		
Y28			J5		
K27			K5		
AA25			L5		
K26			M5		
L26			N5		
M26			P5		
N26			R5		
P26			T5		
R26	VDDP		U5		
T26			V5		
U26			W5		
V26			Y5		
Y26			AA5		VDDR1
AA26			AB5		
AB26			AC5		
AC26			AD5		
			G26		
E5			K6		
E6			R6		
E12			Y6		
E13			AA6		
E18	VDDM		F8		
E19			F9		
E20			F15		
E26			F16		
F26			F21		
			F22		
E7			H25		
H26			J25		
E9			J26		
E10			AF6		
E11			AE7		
E14			AF7		VDDR4
E15			AE8		
E16	VDDR1		AF8		
E17			AE9		
E21			AF9		
E22			AF10		
E23			AD25		VDDR3
E24			AE25		
E25			AE26		
			AF26		
AK21	LPVDD		LPVSS	AJ21	
AK11	TPVDD		TPVSS	AJ11	
A7	MPVDD		MPVSS	A6	
AE16	LVDDR_18		LVSSR0	AH16	
AF16	LVDDR_18		LVSSR1	AG17	
AG16	LVDDR_25		LVSSR2	AH17	
AF17	LVDDR_25		LVSSR3	AF18	
AG12	TXVDDR0		DVOVMODE	AH12	
AG13	TXVDDR1		TXVSSR1	AH13	
AG14	TXVDDR2		TXVSSR2	AH14	
AG15	TXVDDR3		TXVSSR3	AH15	

MEMORY I/O

+2_5V_SLEEP
U60 MM1571J SOT-25A CRITICAL (150mA MAX)
GPU_CORE_OK
+1_8V_ATI_TPVDD
ATI_TPVDD_BYP
C833 1uF 20% 16V CERM 603
C834 0.01uF 20% 16V CERM 402
1_8V_TPVDD_STD
R788 0 5% 1/16W MF 402
C835 10uF 20% 6.3V CERM 805
GPU_MEM_IO
L75 FERR-220-OHM 0402
+1_8V_GPU_TP_PLL
L31 FERR-220-OHM 0805
GPU_MEM_IO_FLT (1200mA)
C551 10uF 20% 6.3V CERM 805
C421 0.1uF 20% 10V CERM 402
C456 0.1uF 20% 10V CERM 402
C488 0.1uF 20% 10V CERM 402
C517 0.1uF 20% 10V CERM 402
C546 0.1uF 20% 10V CERM 402
C545 0.1uF 20% 10V CERM 402
C544 0.1uF 20% 10V CERM 402
C543 0.1uF 20% 10V CERM 402
C541 0.1uF 20% 10V CERM 402
C436 0.1uF 20% 10V CERM 402
C437 0.1uF 20% 10V CERM 402
C540 0.1uF 20% 10V CERM 402
C547 0.1uF 20% 10V CERM 402
C542 0.01uF 20% 16V CERM 402

1.8V DVO POWER (EXT.TMDS)

+1_8V_GPU
EXT_TMDS L81 FERR-10-OHM-500MA SM
+1_8V_GPU_DVO
C535 10uF 20% 6.3V CERM 805
C519 0.1uF 20% 10V CERM 402
C534 0.1uF 20% 10V CERM 402
C521 0.1uF 20% 10V CERM 402
INT_TMDS R843 0 5% 1/16W MF 603

3.3V IO SUPPLY

(Max Current varies, depends on usage)

+3V_GPU
L33 FERR-10-OHM-500MA SM
+3V_GPU_FLT
C550 10uF 20% 6.3V CERM 805
C518 0.1uF 20% 10V CERM 402
C520 0.1uF 20% 10V CERM 402
C430 0.1uF 20% 10V CERM 402
C880 0.1uF 20% 10V CERM 402
C881 0.1uF 20% 10V CERM 402
C426 0.1uF 20% 10V CERM 402
+1_8V_GPU
EXT_TMDS R842 0 5% 1/16W MF 402
ATI_DVOVMODE
INT_TMDS R841 0 5% 1/10W MF 402

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S0214	1	IC,ATI,M11-CSP128,GRAPHICTLR,667BGA,HYNIX GC	U47	CRITICAL	ATI_128MB
338S0207	1	IC,ATI,M11-CSP64,GRAPHICTLR,667BGA,HYNIX MEM	U47	CRITICAL	ATI_64MB

M11 POWER

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 22 OF 46	

EXTERNAL VIDEO (DVI) INTERFACE

VGA SYNC BUFFERS

+3V_MAIN

74AHC1G32 U40 (SM, 32) — OMIT L38 FERR-60-OHM-0.1A 0402

21 ATI_VSYNC → ATI_VSYNC_BUF → 2 VGA_VSYNC 3 41

PLACE L1002 & L1003 CLOSE TO DVI CONNECTOR

+3V_MAIN

74AHC1G32 U39 (SM, 32) — OMIT L36 FERR-60-OHM-0.1A 0402

21 ATI_HSYNC → ATI_HSYNC_BUF → 2 VGA_HSYNC 3 41

TMDS FILTERING

PLACE CLOSE TO CONNECTOR

L37 370-OHM SM SYM_VER-1

39 20 TMDS_CLKP ↔ TMDS_CONN_CLKP 38 41

39 20 TMDS_CLKN ↔ TMDS_CONN_CLKN 38 41

ANALOG FILTERING

PLACE CLOSE TO CONNECTOR

FL1 LCFILTER SM-220MHZ CRITICAL — 38 21 GPU_B → VGA_B 23 41

FL2 LCFILTER SM-220MHZ CRITICAL — 38 21 GPU_G → VGA_G 23 41

FL3 LCFILTER SM-220MHZ CRITICAL — 38 21 GPU_R → VGA_R 23 41

C641 3.3pF ±0.25% 50V CERM 402 — R462 75 1% 1/16W MF 402 NO STUFF

C634 3.3pF ±0.25% 50V CERM 402 — R458 75 1% 1/16W MF 402 NO STUFF

C631 3.3pF ±0.25% 50V CERM 402 — R456 75 1% 1/16W MF 402 NO STUFF

DVI DDC CURRENT LIMIT

(55mA requirement per DVI spec)

+5V_SLEEP → F2 CRITICAL 0.5AMP-13.2V SM → +5V_DDC_SLEEP_UF

L42 400-OHM-EMI SM-1 → +5V_DDC_SLEEP 40 41

Isolation required for DVI power switch

D19 SM MBR0530: DDC_CLK_ISO

R476 4.7K 5% 1/16W MF 402

R478 4.7K 5% 1/16W MF 402

R479 100 5% 1/16W MF 402 — DVI_DDC_CLK

R477 100 5% 1/16W MF 402 — DVI_DDC_DATA

R469 100 5% 1/16W MF 402 — DVI_HPD

C654 100pF 5% 25V CERM 201

C655 100pF 5% 25V CERM 201

C653 100pF 5% 25V CERM 201

C667 0.01UF 10% 50V CERM 603

R464 0 5% 1/16W MF 402 — PLACE NEAR C5A & C5B

R463 0 5% 1/16W MF 402 — PLACE NEAR 3, 11 & 19

CHGND1 / CHGND2

J22 CRITICAL QHI112 F-RT-TH

L45 CRITICAL 90-OHM-300mA 2012H SYM_VER-1

41 39 20 TMDS_DN<0> ↔ TMDS_CONN_DN<0> — TMDS_DP<0> ↔ TMDS_CONN_DP<0>

38 23 TMDS_CONN_DN<5> — TMDS_CONN_DP<5>

41 38 23 TMDS_CONN_CLKP — TMDS_CONN_CLKN

41 23 VGA_B — VGA_R — VGA_G — VGA_HSYNC

CHGND1 — CHGND2

CHGND1: TMDS_CONN_DN<2> 23 38; TMDS_CONN_DN<1> 23 38; TMDS_CONN_DP<2> 23 38; TMDS_CONN_DP<1> 23 38; TMDS_CONN_DN<4> 23 38; TMDS_CONN_DN<3> 23 38; TMDS_CONN_DP<4> 23 38; TMDS_CONN_DP<3> 23 38; DVI_DDC_CLK_UF (+5V_DDC_SLEEP); DVI_DDC_DATA_UF; VGA_VSYNC 23 41; DVI_HPD_UF 23 41; VGA_R 23 41; VGA_G 23 41

3V LEVEL SHIFTERS

+3V_SLEEP

Q39 2N7002DW SOT-363 — DVI_DDC_CLK → GPU_DVI_DDC_CLK 41

Q39 2N7002DW SOT-363 — DVI_DDC_DATA → GPU_DVI_DDC_DATA 41

Q40 2N7002DW SOT-363 — DVI_HPD → GPU_HPD 21

R480 10K 5% 1/16W MF 402

R474 10K 5% 1/16W MF 402

R481 100K 5% 1/16W MF 402

NOTE: Pulldown for DVI_HPD provided by DVI power switch interface

L47 CRITICAL 90-OHM-300mA 2012H SYM_VER-1

38 23 TMDS_CONN_DN<2> 1 ↔ 4 TMDS_DN<2> 20 39 41

38 23 TMDS_CONN_DP<2> 2 ↔ 3 TMDS_DP<2> 20 39 41

L46 CRITICAL 90-OHM-300mA 2012H SYM_VER-1

38 23 TMDS_CONN_DN<1> 1 ↔ 4 TMDS_DN<1> 20 39 41

38 23 TMDS_CONN_DP<1> 2 ↔ 3 TMDS_DP<1> 20 39 41

L44 CRITICAL 90-OHM-300mA 2012H SYM_VER-1 EXT_TMDS

38 20 TMDS_DN<3> 2 ↔ 3 TMDS_CONN_DN<3> 23 38

38 20 TMDS_DP<3> 1 ↔ 4 TMDS_CONN_DP<3> 23 38

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 most rails will be low, TP0610 will turn on, driving SOFT_PWR_ON low. As most rails rise, TP0610 will turn off, and DDC/remote device path into DVI will be isolated with 0s. Disabled as well.

Q38 TP0610 SM

41 23 DVI_DDC_CLK_UF ↔ DVI_TURN_ON — 41 40 23 +5V_DDC_SLEEP

R473 680 5% 1/16W MF 402 — DVI_TURN_ON_L

R459 330 5% 1/16W MF 402 — Pulldown prevents 3904 from turning on when DVI monitor has active, self-powered DDC clock pullup.

DVI_TURN_ON_BASE — R460 10K 5% 1/16W MF 402 — Q35 MMDT3904 SOT-363 — SOFT_PWR_ON_L 24 31 35 41

+3V_SLEEP

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

R485 68.1K 1% 1/16W MF 402 — C668 0.1UF 20% 10V CERM 402

HPD_4V_REF — GPIO.

U42 LMC7211 SM — HPD_PWR_SW_BASE — R475 10K 5% 1/16W MF 402 — Q35 MMDT3904 SOT-363

41 23 DVI_HPD_UF → DVI_HPD_DIV — R472 10K 1% 1/16W MF 402 — R482 10K 1% 1/16W MF 402

R484 100K 1% 1/16W MF 402 — HPD_PWR_SW — R470 330 5% 1/16W MF 402

HPD_REF_EN_L — Q40 2N7002DW SOT-363

21 HPD_PWR_SNS_EN → R483 470K 5% 1/16W MF 402

L49 CRITICAL 90-OHM-300mA 2012H SYM_VER-1 EXT_TMDS

38 20 TMDS_DN<4> 2 ↔ 3 TMDS_CONN_DN<4> 23 38

38 20 TMDS_DP<4> 1 ↔ 4 TMDS_CONN_DP<4> 23 38

L85 CRITICAL 90-OHM-300mA 2012H SYM_VER-1 EXT_TMDS

38 20 TMDS_DN<5> 2 ↔ 3 TMDS_CONN_DN<5> 23 38

38 20 TMDS_DP<5> 1 ↔ 4 TMDS_CONN_DP<5> 23 38

+PBUS INVERTER INTERFACE

L73 FERR-1K-OHM-EMI SM — 2 41 40 1 +14V_INV

+5V_MAIN

Q76 FDG6324L SC70-6 — +5V_INV_UF_SW

R750 100K 5% 1/16W MF 402 — FP_PWR_EN_L

L74 400-OHM-EMI SM-1 — C813 10UF 20% 6.3V CERM 805

Q76 FDG6324L SC70-6 — 23 21 FP_PWR_EN

41 40 +5V_INV_SW

C812 0.001uF 20% 50V CERM 402 — C815 0.001uF 20% 50V CERM 402

J4 CRITICAL SM-2MT

L72 400-OHM-EMI SM-1 — BRIGHT_PWM

+3V_MAIN

C816 0.001uF 20% 50V CERM 402 — C19 0.001uF 20% 50V CERM 402 — L1 FERR-250-OHM SM — INV_GND

C22 0.1UF 10% 16V CERM 402

21 INV_ON_PWM → U2 NC7S32 SC70 → BRIGHT_PWM_UF

INVERTER EXPECTS ACTIVE HIGH SIGNAL

LCD INTERFACE

LVDS INTERFACE

+3V_MAIN

LCD POWER SWITCH

R347 100K 5% 1/16W MF 402 — C474 2200pF 10% 50V CERM 603

R354 100K 5% 1/16W MF 402 — LCD_PWREN_L

+3V_LCD_SW

L27 FERR-250-OHM SM

Q29 SI3443DV TSOP — LCD_DIGON_L

Q28 2N7002 SM — 23 21 FP_PWR_EN

+3V_SLEEP

R543 100K 5% 1/16W MF 402 — R544 100K 5% 1/16W MF 402

LVDS_DDC_CLK 23 41 — LVDS_DDC_DATA 23 41

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

C548 0.001uF 20% 50V CERM 402 — CHGND4

C503 0.001uF 20% 50V CERM 402 — CHGND4

C701 0.001uF 20% 50V CERM 402

C702 0.001uF 20% 50V CERM 402 NO STUFF

C549 0.001uF 20% 50V CERM 402 — CHGND4

J14 CRITICAL G-501973 F-RT-SM

41 40 +3V_LCD (LVDS DDC POWER)

23 21 41 LVDS_DDC_CLK — LVDS_DDC_DATA — 39 21 41 LVDS_L0N — LVDS_L0P — LVDS_L1N — LVDS_L1P — LVDS_L2N — LVDS_L2P — CLKLVDS_LN — CLKLVDS_LP

NC

S-VIDEO/COMP OUT INTERFACE

Place GND shorts at graphics controller

XW15 SM — 40 GPU_TV_GND1 → L54 FERR-10-OHM-500MA SM → TV_GND1 40 41

C657 0.01uF 10% 50V CERM 603

GPU_Y → L53 3.3uH 0603 → TV_C 41

C663 560pF 10% 50V CERM 402 — C656 560pF 10% 50V CERM 402

GPU_C → L57 3.3uH 0603 → TV_Y 41

C661 560pF 10% 50V CERM 402 — C660 560pF 10% 50V CERM 402

GPU_COMP → L55 3.3uH 0603 → TV_COMP 41

C664 560pF 10% 50V CERM 402 — C658 560pF 10% 50V CERM 402

CRITICAL J21 MINIDIN RT-TH MH11773-WMR8A — CHGND1

XW14 SM — 40 GPU_TV_GND2 → L56 FERR-10-OHM-500MA SM → TV_GND2 40 41

C659 0.01uF 10% 50V CERM 603

Place GND shorts at graphics controller

CHGND1

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
116S1331	2	DISCRETE,RES,33OHM,0402	L36,L38		VGA_BUFFER_RES

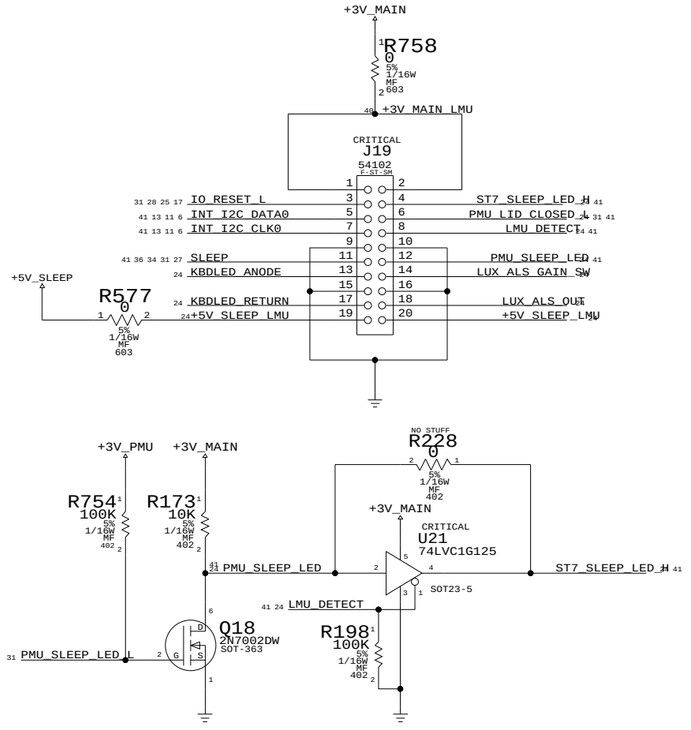
VIDEO CONNECTORS

APPLE COMPUTER INC.

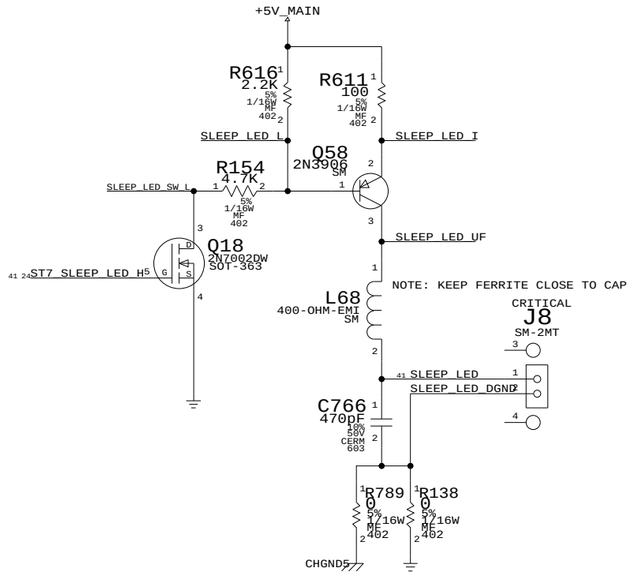
SIZE D | DRAWING NUMBER 051-6680 | REV. F

SCALE NONE | SHT 23 OF 46

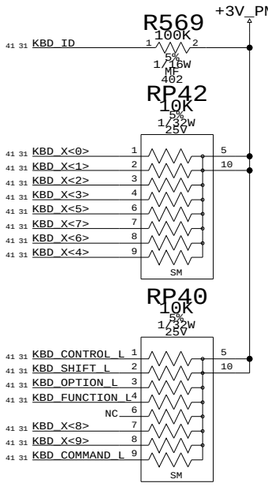
LMU/RIGHT SENSOR CONNECTOR



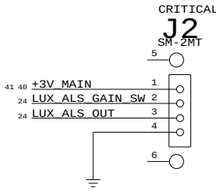
SLEEP LED



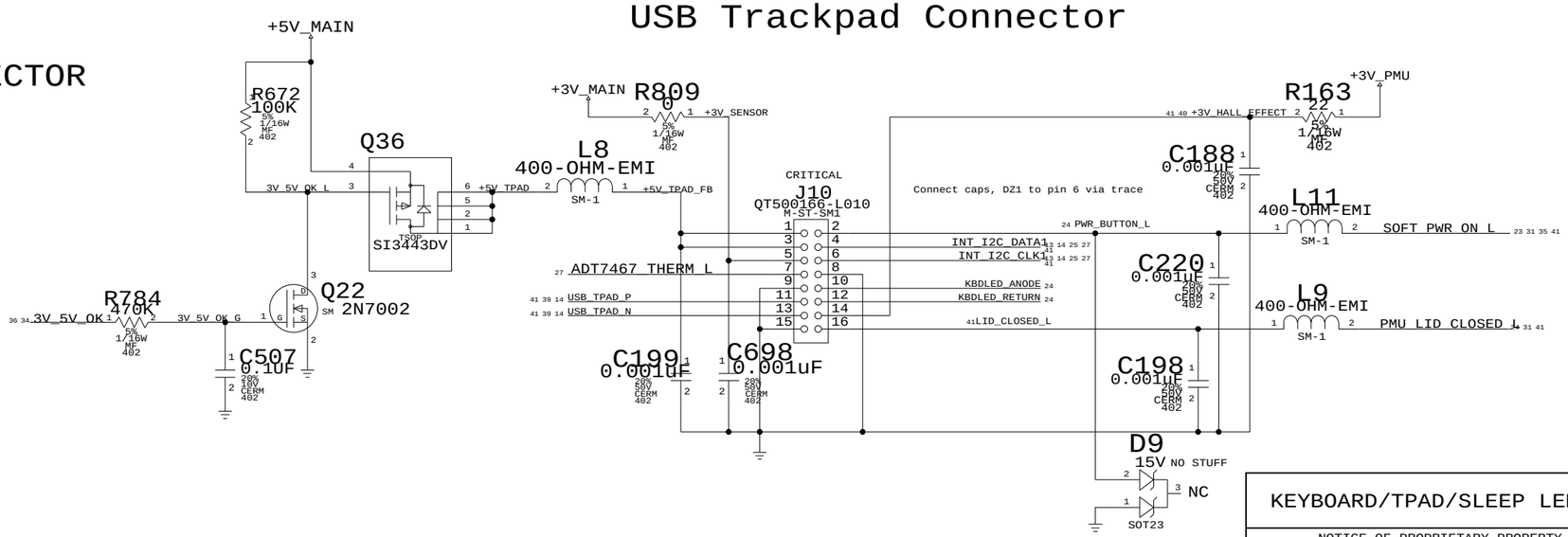
KEYBOARD PULLUPS



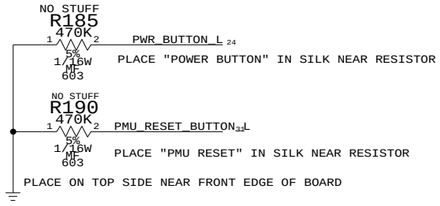
LEFT LIGHT SENSOR CONNECTOR



USB Trackpad Connector



DEBUG HELPERS



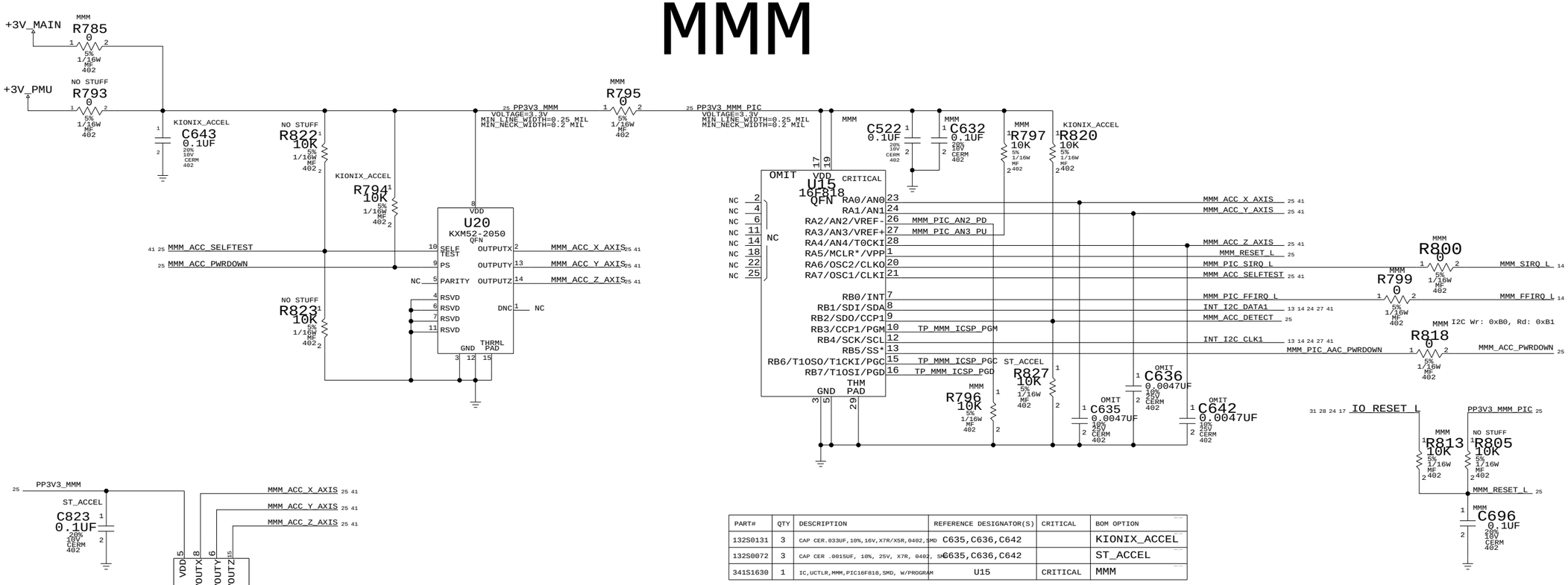
KEYBOARD/TPAD/SLEEP LED

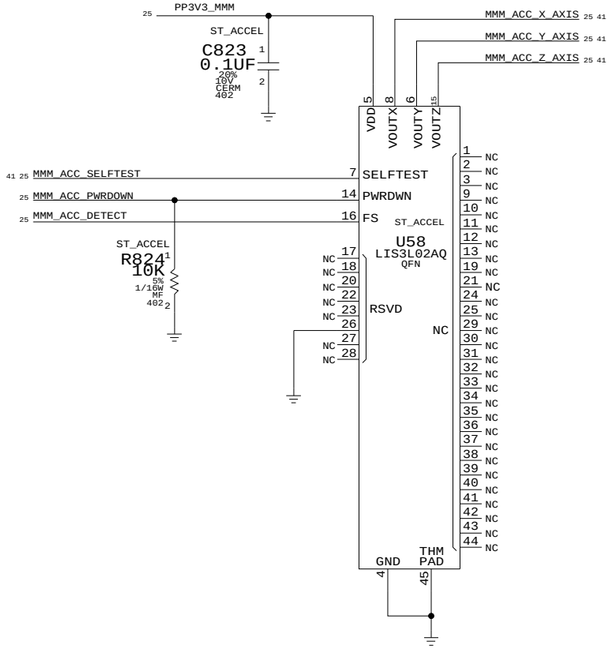
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F

SCALE	SHT	OF
NONE	24	46

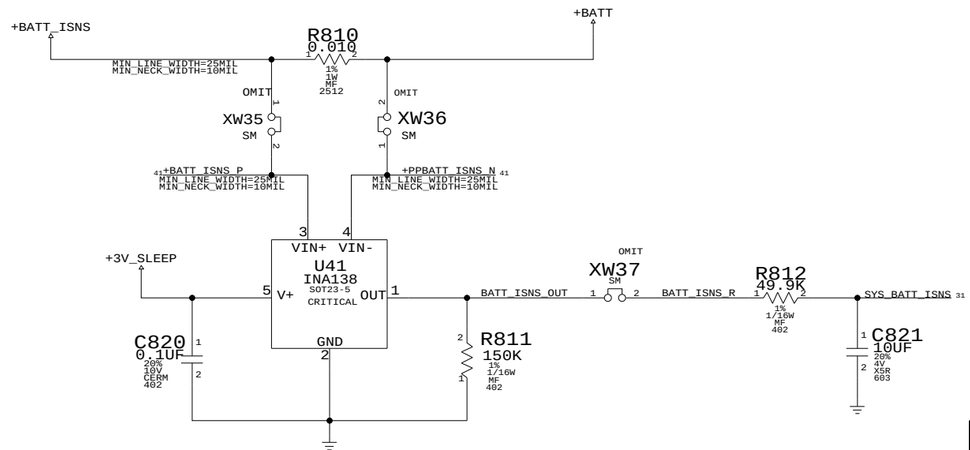
MMM





PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
132S0131	3	CAP CER.033UF,10%,16V,X7R/X5R,0402,SMD	C635,C636,C642		KIONIX_ACCEL
132S0072	3	CAP CER .0015UF, 10%, 25V, X7R, 0402, SM	C635,C636,C642		ST_ACCEL
341S1630	1	IC,UCTLR,MMM,PIC16F818,SMD, W/PROGRAM	U15	CRITICAL	MMM

BATTERY CURRENT SENSE



MMM & BATTERY CURRENT SENSOR

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

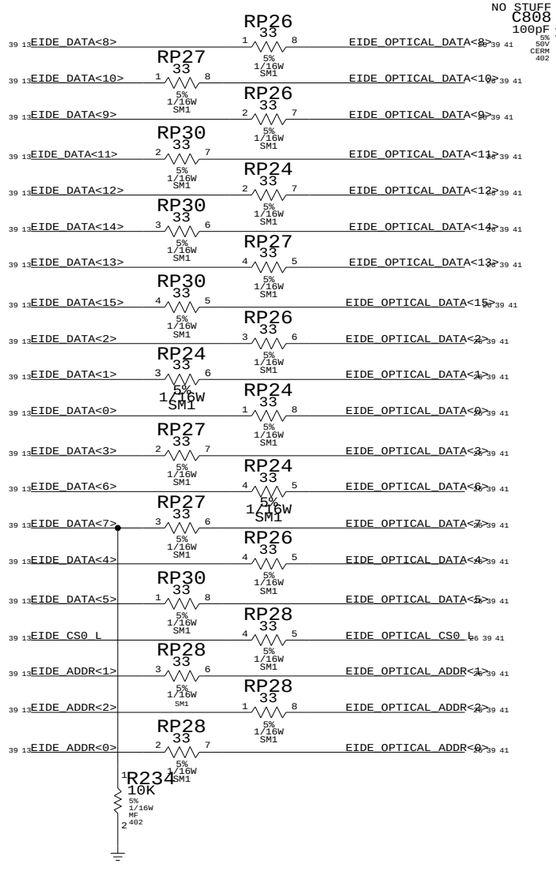
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

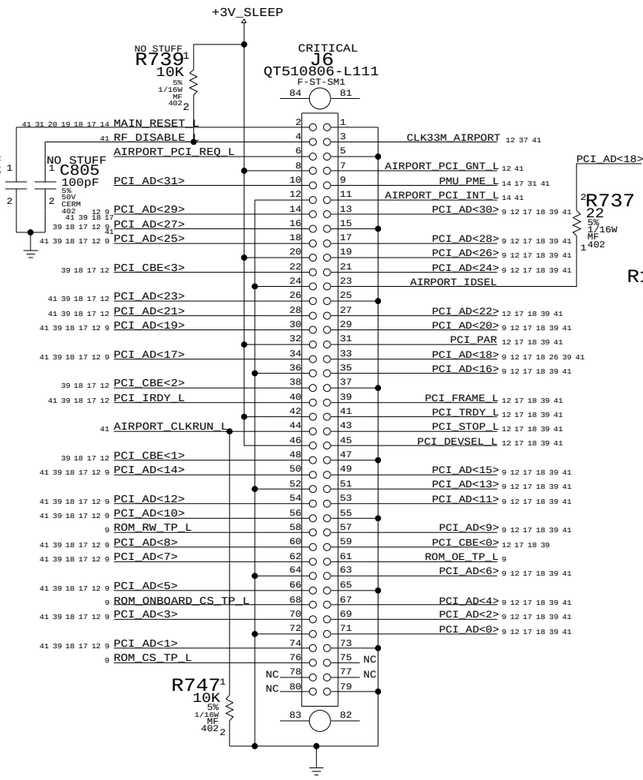
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 25 OF 46	

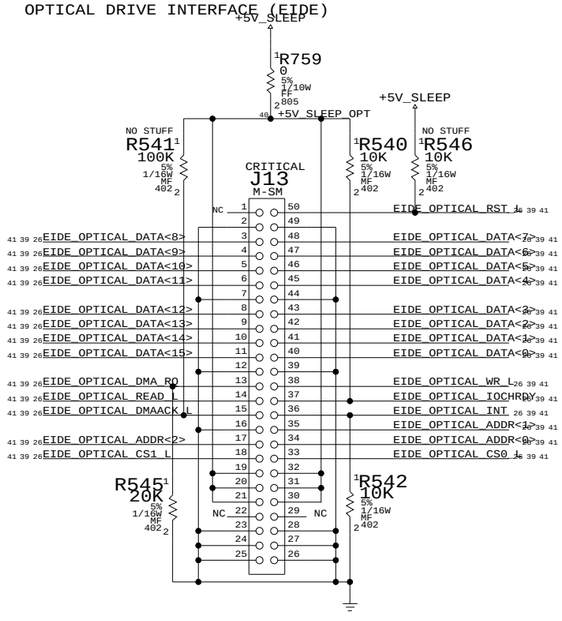
WIRELESS INTERFACE

EIDE SERIES TERMINATION
PLACE TERMINATORS NEAR INTREPID

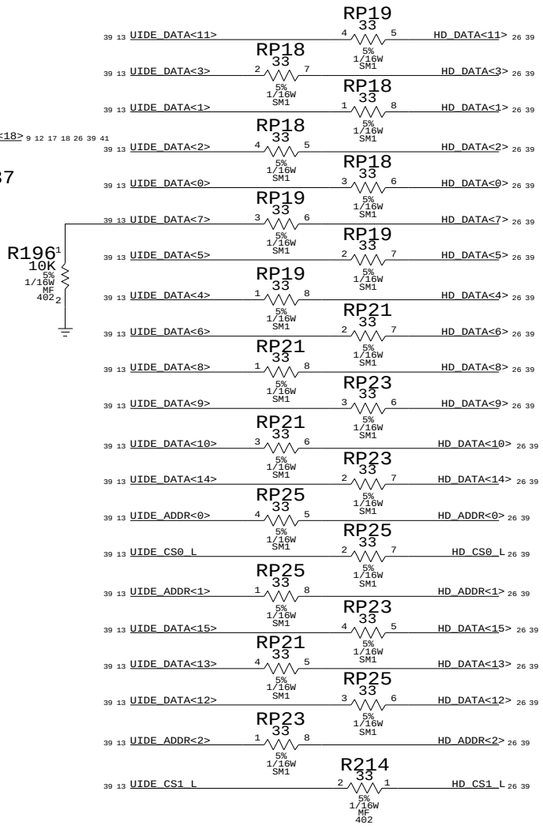


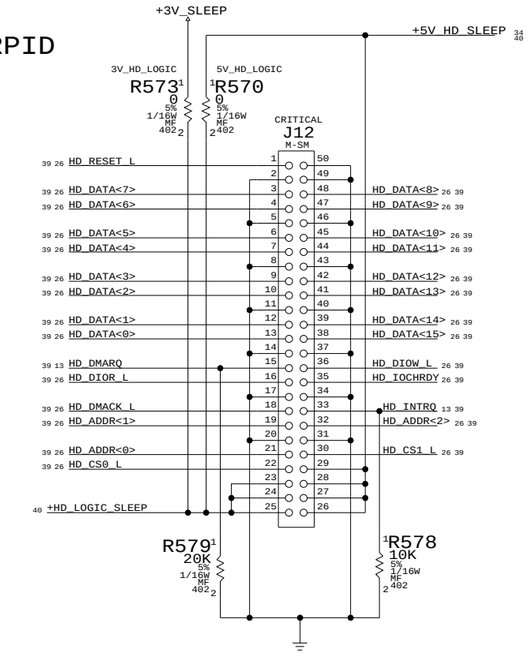


OPTICAL DRIVE INTERFACE (EIDE)



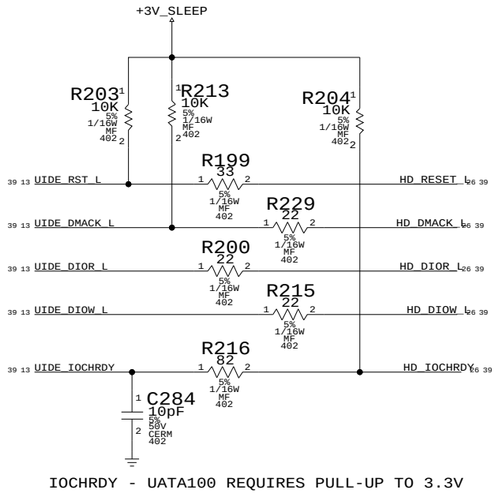
HARD DRIVE INTERFACE (UATA100)
PLACE SERIES R CLOSE TO INTERPID





ANY SEQUENCING REQUIREMENT BETWEEN +5V_HD_SLEEP AND +3V_SLEEP

PLACE PULLUP RESISTORS CLOSE TO INTREPID



IOCHRDY - UATA100 REQUIRES PULL-UP TO 3.3V

INTERNAL I/O CONNECTORS

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 26 OF 46	

LEFT I/O & AUDIO BOARD (LIO)

CRITICAL
J3
QT500406-L111
M-ST-SM1

ADAPTER_DET
CHARGE_LED_L
NEC_LUSB_PPON
NEC_LUSB_OCI_UF
BT_USB_DM
BT_USB_DP
INT_I2S0_SND_MCLK
INT_I2S0_SND_LRCLK
INT_I2S0_SND_TO_DAC
SND_HP_SENSE_L
SND_LIN_SENSE_L
NEC_USB_DAM
NEC_USB_DAP
SLEEP
INT_I2S0_SND_SCLK
INT_I2S0_SND_FROM_ADC
SND_HW_RESET_L
INT_I2C_CLK2
INT_I2C_DATA2
SND_HP_MUTE_LO
SND_AMP_MUTE
+3V_MAIN_AUD
+5V_MAIN_AUD
VER 1

Place it near J3
C848 150uF 20% 6.3V TANT SMD-1

NO STUFF C818 0.001uF 20% 50V CERM 402
NO STUFF C817 0.001uF 20% 50V CERM 402
C828 0.1uF 20% 10V CERM 402
C829 0.1uF 20% 10V CERM 402
OMIT XW30 SM
AUD_GND

+5V_MAIN
R751 100K 5% 1/16W MF 402
SND_AMP_MUTE
Q77 2N7002DW SOT-363
SND_AMP_MUTE_L
SND_AMP_MUTE_CTRL
R752 100K 5% 1/16W MF 402
Q77 2N7002DW SOT-363
INT_PU_RESET_L

PREVENTS POWER-ON POP AND
GENERATES ACTIVE HIGH SPKR MUTE

+3V_MAIN
R768 100K 5% 1/16W MF 402
R156 100K 5% 1/16W MF 402
SND_HP_MUTE_LO
Q78 2N7002DW SOT-363
SND_HP_MUTE
SND_HP_MUTE_L
SND_AMP_MUTE_CTRL
R770 100K 5% 1/16W MF 402
Q78 2N7002DW SOT-363

PREVENTS POWER-ON POP AND
PROPAGATES ACTIVE LOW HP MUTE

PLACE CLOSE TO CPU
MAIN1

THERM1_M_DP
THERM1_M_DM
Q59 2N3904 SM

KEEP STUFFING RESISTORS CLOSE TO ADT7460 CONTROLLER

R703 0 5% 1/16W MF 402 (THERM1_M_DP → THERM1_DP)
R704 0 5% 1/16W MF 402 (THERM1_M_DM → THERM1_DM)
R686 0 5% 1/16W MF 402 (THERM2_M_DP → THERM2_DP)
R687 0 5% 1/16W MF 402 (THERM2_M_DM → THERM2_DM)

PLACE IN BETWEEN 3/5/1.5/2.5V PWR SUPPLY
MAIN2

THERM2_M_DP
THERM2_M_DM
Q46 2N3904 SM

PLACE UNDERNEATH UPPER RAM
ALTERNATE1

THERM1_A_DP
THERM1_A_DM
Q61 2N3904 SM

KEEP STUFFING RESISTORS CLOSE TO ADT7460 CONTROLLER

NO STUFF R701 0 5% 1/16W MF 402 (THERM1_A_DP → THERM1_DP)
NO STUFF R702 0 5% 1/16W MF 402 (THERM1_A_DM → THERM1_DM)
NO STUFF R688 0 5% 1/16W MF 402 (THERM2_A_DP → THERM2_DP)
NO STUFF R689 0 5% 1/16W MF 402 (THERM2_A_DM → THERM2_DM)

PLACE CLOSE TO BATTERY CHARGER/VCORE
ALTERNATE2

THERM2_A_DP
THERM2_A_DM
Q67 2N3904 SM

KEEP STUFFING RESISTORS CLOSE TO ADT7460 CONTROLLER

NO STUFF R700 0 5% 1/16W MF 402 (CPU_THERM_DP → THERM1_DP)
NO STUFF R705 0 5% 1/16W MF 402 (CPU_THERM_DM → THERM1_DM)
NO STUFF R659 0 5% 1/16W MF 402 (GPU_THERM_DP → THERM2_DP)
NO STUFF R661 0 5% 1/16W MF 402 (GPU_THERM_DM → THERM2_DM)

SOFT MODEM CONN

+3V_MAIN
R778 10K 5% 1/16W MF 402
R530 10K 5% 1/16W MF 402
C689 10uF 20% 6.3V CERM 805
PLACE NEAR CONNECTOR PINS 1
J15 FF14-10A F-RT-SM

COMM_RING_DET_L
SOFTMODEM_FC_RQST
COMM_RESET_L
INT_MOD_CLKOUT
INT_MOD_DTO
INT_MOD_BITCLK
INT_MOD_DTI
INT_MOD_SYNC

FAN INTERFACE

FAN CONTROLLER

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S0608	1	IC,ADT7460,FAN CTLR,16P QSOP	U53	CRITICAL	ADT7460

+3V_MAIN
R806 10 5% 1/16W MF 402
ADT7467_VCC
C849 1uF 10% 6.3V CERM 603
C763 0.1uF 20% 10V CERM 402
R633 10K 5% 1/16W MF 402

U53 ADT7467 QSOP
ADT7467_VCORE_MON
INT_I2C_DATA1
INT_I2C_CLK1
THERM1_DP
THERM1_DM
THERM2_DP
THERM2_DM
C868 1000pF 10% 25V X7R 402
C869 1000pF 10% 25V X7R 402

VCCP
SDA
SCL
D1+
D1-
D2+
D2-
PWM1/XTO
TACH1
PWM2/SMBALERT#
TACH2
PWM3
TACH3
TACH4/THERM#/SMBALERT#/GPIO
GND

ADT7467 CRITICAL
ADT7467_ADR_ENABLE_L
ADT7467_TACH3_TP
ADT7467_THERM_L

+3V_SLEEP
R774 10K 5% 1/16W MF 402 (ADT7460)
R773 10K 5% 1/16W MF 402 (ADT7460)
+3V_SLEEP
R749 10K 5% 1/16W MF 402
R454 10K 5% 1/16W MF 402
+5V_SLEEP
NO STUFF R848 10K 5% 1/16W MF 402
NO STUFF R849 10K 5% 1/16W MF 402

FAN1_PWM_L
FAN1_TACH
FAN2_PWM_L
FAN2_TACH

+3V_PMU_AVCC
R817 100K 5% 1/16W MF 402
THERM_L_OC

+3V_MAIN
R808 100K 5% 1/16W MF 402
THERM_INV
Q83 2N7002DW SOT-363
R807 100K 5% 1/16W MF 402
Q83 2N7002DW SOT-363
C850 0.1uF 20% 10V CERM 402
ADT7467_THERM_L

CPU FAN

+5V_SLEEP
R771 10K 5% 1/16W MF 402
R547 0 5% 1/10W MF 805
CRITICAL J1 SM04B-SSR 1/10WM-RT-SM
ADT7467 R135 0 5% 1/16W MF 402
+FAN_PWR
FAN1_TACH
FAN1_PWM
FAN1_PWM_L
ADT7460 Q79 2N7002DW SOT-363
C669 4.7uF 20% 6.3V CERM 805

GPU FAN

+5V_SLEEP
R772 10K 5% 1/16W MF 402
CRITICAL J18 SM04B-SSR M-RT-SM
ADT7467 R189 0 5% 1/16W MF 402
+FAN_PWR
FAN2_TACH
FAN2_PWM
FAN2_PWM_L
ADT7460 Q79 2N7002DW SOT-363
C814 4.7uF 20% 6.3V CERM 805

RIGHT USB BOARD

+5V_MAIN
CRITICAL
J17
QT500166-L010
M-ST-SM1

NEC_USB_DBM
NEC_USB_DBP
NEC_RUSB_OCI_UF
NEC_RUSB_PPON

SERIAL DEBUG INTERFACE

+5V_MAIN
NO STUFF CRITICAL J28 M-ST-5087 SM

COMM_TXD_L
COMM_TRXC
COMM_GPIO_L
COMM_DTR_L
COMM_RTS_L
COMM_RXD

FAN/MODEM/SOUND/BACKUP BATT.

APPLE COMPUTER INC.
SIZE D | DRAWING NUMBER 051-6680 | REV. F
SCALE NONE | SHT 27 OF 46

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
338S0079	338S0223		U43	ALT FOR 88E1111 B1

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

C680 10uF 20% 6.3V CERM 805

NO STUFF R513 0 5% 1/16W MF 402

3405_MODE

R507 0 5% 1/16W MF 402

U45 LTC3405 SOT23-6 CRITICAL

VIN, RUN, MODE, SW, VFB, GND

LTC3405_SW

CRITICAL L60 3.3uH SM1

R506 665K 1% 1/16W MF 402 R2A

C675 22pF 5% 50V CERM 402

R504 49.9K 1% 1/16W MF 402 R2B

C674 10uF 20% 6.3V CERM 805

3405_VFB

R503 182K 1% 1/16W MF 402 R1

+1_0V_MARVELL

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

R2EQV = R2A||R2B

PLACE ALL SERIES RES CLOSE TO PHY

R423 0 5% 1/16W MF 402

R421 0 5% 1/16W MF 402

R445 0 5% 1/16W MF 402

CLKENET_LINK_TX

CLKENET_LINK_RX

CLKENET_LINK_GBE_REF

CLKENET_PHY_TX

CLKENET_PHY_RX

CLKENET_PHY_GBE_REF

NO STUFF C851 10pF 5% 50V CERM 402

C852 10pF 5% 50V CERM 402

Keep C851 & C852 Stubs short

U43 88E1111-BDIE BCC

TX_CLK, RX_CLK, 125CLK (CRITICAL), CTRL10, NC

DVDD: C594 0.1uF, C601 0.01uF, C608 0.1uF, C619 0.01uF, C603 0.1uF, C599 0.01uF

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

VDDO: C597 0.1uF, C612 0.01uF, C623 0.1uF, C600 0.01uF, C598 0.1uF, C595 10uF

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

+2_5V_MARVELL

+2_5V_MAIN

R442 0 5% 1/10W FF 805

C646 0.1uF, C648 0.1uF, C645 0.1uF, C647 0.1uF

PLACE CAPS AT CONNECTOR PINS 5 & 6

VDDOH, VDDOX

AVDD: C614 0.1uF, C616 0.1uF, C618 0.1uF, C602 0.01uF, C592 10uF

+2_5V_MARVELL_AVDD

L35 FERR-EMI-600-OHM SM

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

R814 0 5% 1/10W FF 805

+2_5V_MARVELL_CONN

J23 MJ-R0076 F-RT-TH

PRIMARY

ENET_CTAP, MDI_0+, MDI_0-, MDI_1+, MDI_1-, MDI_2+, MDI_2-, MDI_3+, MDI_3-

1CT:1CT, 75 OHM

SECONDARY J1 J2 J3 J4 J5 J6 J7 J8

RJ45 CABLE SIDE

RJ45 CHIP SIDE

CHGND1

SHIELD 1000PF, 2000V

TXD0–TXD7, TX_EN, TX_ER, GTX_CLK

RXD0–RXD7, RX_DV, RX_ER, CRS, COL, MDC, MDIO

MDI0+, MDI0-, MDI1+, MDI1-, MDI2+, MDI2-, MDI3+, MDI3-

R433 49.9 1% 1/16W MF 402

R435 49.9 1% 1/16W MF 402

R437 49.9 1% 1/16W MF 402

R439 49.9 1% 1/16W MF 402

R434 49.9 1% 1/16W MF 402

R436 49.9 1% 1/16W MF 402

R438 49.9 1% 1/16W MF 402

R440 49.9 1% 1/16W MF 402

MDI0_PD, MDI1_PD, MDI2_PD, MDI3_PD

C622 0.01uF, C613 0.01uF, C615 0.01uF, C617 0.01uF

PLACE RESISTORS CLOSE TO PHY

LED_LINK10, LED_LINK100, LED_LINK1000, LED_DUPLEX, LED_RX, LED_TX

LED_RX_SPN

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

SEE CONFIG TABLES (BELOW)

TDI, TDO, TCK, TMS, TRST

JTAG_ASIC_TDO_TP, JTAG_ASIC_TCK, JTAG_ASIC_TMS, JTAG_ASIC_TRST_L

RSET, SEL_OSC, SEL_2.5V, GND

ENET_RSET

R427 4.99K 1% 1/16W MF 402

R424 49.9 1% 1/16W MF 402 (NO STUFF)

R429 49.9 1% 1/16W MF 402 (NO STUFF)

R428 10K 5% 1/16W MF 402

R431 10K 5% 1/16W MF 402

R430 10K 5% 1/16W MF 402

R432 1.5K 5% 1/16W MF 402

R422 1K 5% 1/16W MF 402

INT_ENET_RST_L

ENET_ENERGY_DET

IO_RESET_L

D15 1N914 SOT23

ENET_RST_L

ENET_COMA

C611 2.2uF 10% 10V CERM 805

Q32 2N7002DW SOT-363

AC_IN

SLEEP_L_LS5

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

ENET_HSDACP, ENET_HSDACM

HSDAC+, HSDAC-

S_IN+, S_IN-, S_OUT+, S_OUT-, S_CLK+, S_CLK-

CLK25M_ENET_XIN, CLK25M_ENET_XOUT

XTAL1, XTAL2

ENET_VSSC

VSSC

PUT CRYSTAL CIRCUIT CLOSE TO PHY

NO STUFF R425 20K 5% 1/10W MF 402

R441 0 5% 1/16W MF 402

CRITICAL Y5 SM-3 25.0000M

CLK25M_XTAL_IN

C604 27pF 5% 50V CERM 402

C624 27pF 5% 50V CERM 402

Y6 LOAD CAPACITANCE IS 16PF

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

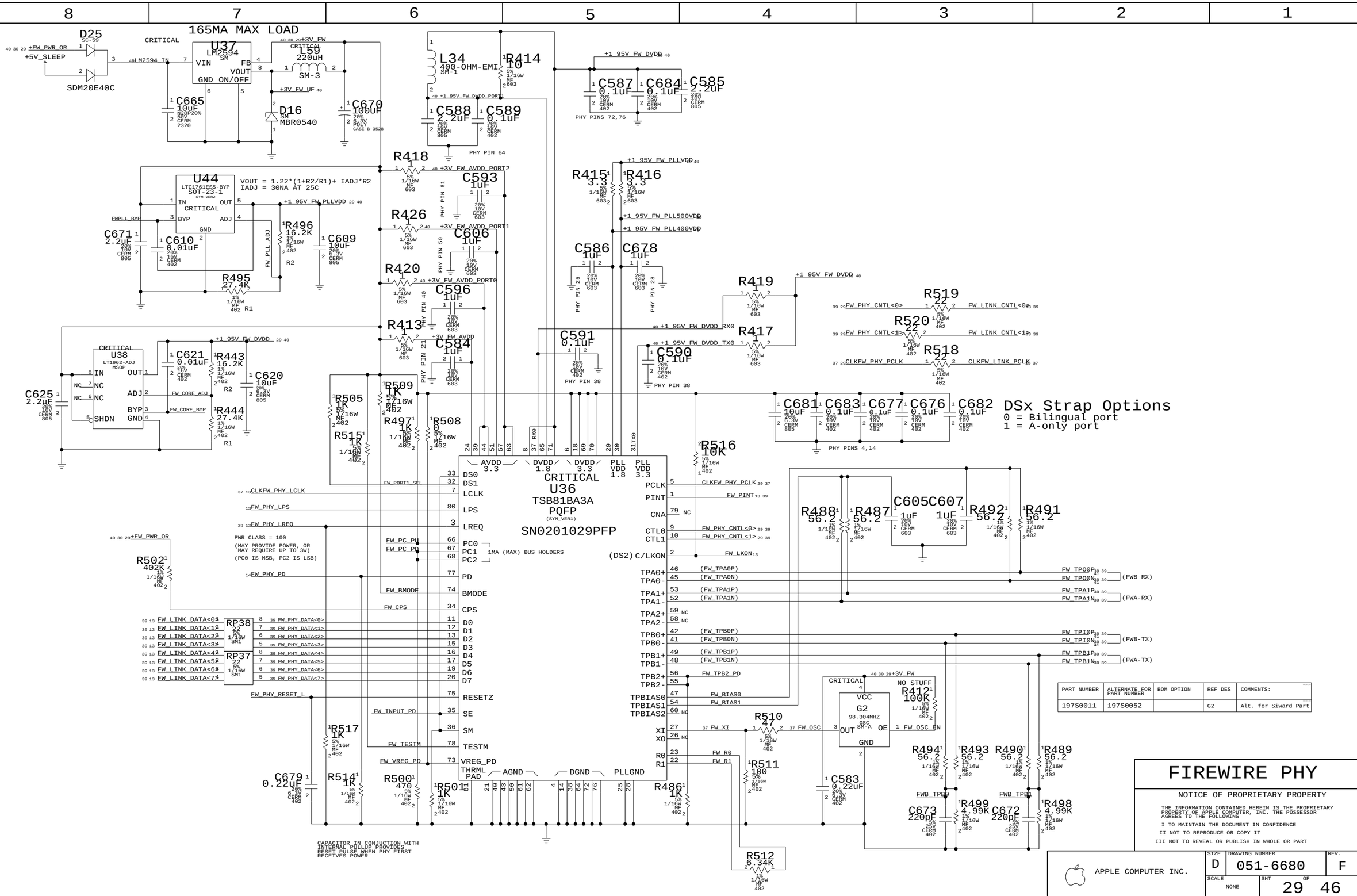
CONFIG INPUTS			
PIN	BIT[2]	BIT[1]	BIT[0]
CONFIG<0>	PHYADR[2]	PHYADR[1]	PHYADR[0]
CONFIG<1>	ENA_PAUSE	PHYADR[4]	PHYADR[3]
CONFIG<2>	ANEG[3]	ANEG[2]	ANEG[1]
CONFIG<3>	ANEG[0]	ENA_XC	DIS_125
CONFIG<4>	MODE[2]	MODE[1]	MODE[0]
CONFIG<5>	DIS_FC	DIS_SLEEP	MODE[3]
CONFIG<6>	SEL_BDT	INT_POL	75/50 OHM

MARVELL 88E1111

10/100/1000 ETHERNET

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 28 OF 46	



PORT POWER SWITCH

+PBUS
F3 1.5A-24V MINISMDC
+FW_PBUS
CRITICAL Q34 NDS9407 SOI
+FW_SW
CRITICAL D24 SMB B340B
+FW_PWR_OR
R448 470K 5% 1/16W MF 402
C639 0.01UF 20% 16V CERM 402
FW_GATE_EN
+3V_PMU
R447 100K 5% 1/16W MF 402
DP6 BAS16TW SOT-363
POWER_UP
Q33 2N7002DW SOT-363
PMU_POWER_UP_L
R461 330K 5% 1/16W MF 402
FW_GATE_EN_RC
Q33 2N7002DW SOT-363
FW_POWER_UP
R803 0 5% 1/16W MF 402
DCDC_EN
DCDC_EN_CTRL
DP6 BAS16TW SOT-363
R446 10K 5% 1/16W MF 402
AC_IN
AC_IN_FW_CNTL
DP6 BAS16TW SOT-363
R777 470K 5% 1/16W MF 402

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

+3V_FW
R451 10K 5% 1/16W MF 402
+3V_FW_ESD_ITM
L39 400-OHM-EMI SM-1
NO STUFF C822 0.1UF 20% 10V CERM 402
C630 0.1UF 20% 10V CERM 402
C637 0.001UF 20% 50V CERM 402
D21 1N5227B SOT23
C638 0.01UF 20% 16V CERM 402
+3V_FW_ESD
D20 BAV99DW SOT-363
D23 BAV99DW SOT-363
D20 BAV99DW SOT-363
D23 BAV99DW SOT-363
C633 0.01UF 20% 16V CERM 402

L76 CRITICAL 90-OHM-300mA 2012H SYM_VER-1
FW_TPO0P
FW_TPO0N
L77 CRITICAL 90-OHM-300mA 2012H SYM_VER-1
FW_TPI0P
FW_TPI0N
L51 FERR-250-OHM SM

PORT 0
1394a/b
(BILINGUAL)
514S0058

CRITICAL J20 1394B F-RT-SM
INT-SHIELD
TPA
TPA(R)
TPA*
VG
SC
VP
TPB
TPB(R)
TPB*
INT-SHIELD
FW_TPA0P
(AREF)
FW_TPA0N
FW_VGND0
NC
+FW_VP0
FW_TPB0P
(BREF)
FW_TPB0N
C650 0.01UF 20% 16V CERM 402
CHGND1

R465 1M 5% 1/16W MF 402
C649 0.1uF 20% 50V CERM 805
NO STUFF C652 0.01UF 20% 16V CERM 402
R466 0 5% 1/10W MF 805
NO STUFF C651 0.01UF 20% 16V CERM 402
CHGND1

AREF NEEDS TO BE ISOLATED FROM
ALL LOCAL GROUNDS PER 1394B SPEC
SO WHEN A BILINGUAL DEVICE IS
PLUGGED TO A 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

R837 0 5% 1/16W MF 603
+FW_PWR_OR_F
PLACE NEAR D24
Q37 NO STUFF SI2319DS SOT23
NO STUFF R829 470K 5% 1/16W MF 402
+FW_PWR_OR_GATE
NO STUFF R830 470K 5% 1/16W MF 402
+FW_PWR_OR_GATE_L
NO STUFF R831 649K 1% 1/16W MF 402
NO STUFF Q73 2N7002 SM
+FW_PWR_CTRL
NO STUFF C824 1UF 20% 10V CERM 603
NO STUFF D35 SM MBR0540
+2_5V_REG_F
NO STUFF C825 0.1UF 20% 10V CERM 402
NO STUFF U59 LMC7211 SM
+3V_FW_ESD_R
NO STUFF R834 10K 5% 1/16W MF 402
NO STUFF R835 102K 1% 1/16W MF 402
2.5V REG
NO STUFF C826 0.01UF 20% 16V CERM 402
NO STUFF R836 332K 1% 1/16W MF 402
PLACE NEAR D23
NO STUFF R833 604K 1% 1/16W MF 402

2.5V REG: 2.50V - 2.15V
200MS - 500MS

F1 1.5AMP-33V SM
+FW_PWR1
L58 FERR-250-OHM SM

+3V_FW_ESD
D22 BAV99DW SOT-363
D18 BAV99DW SOT-363
D22 BAV99DW SOT-363
D18 BAV99DW SOT-363
C640 0.01UF 20% 16V CERM 402
C644 0.01UF 20% 16V CERM 402

PORT 1
1394a ONLY
514-0057

L52 260-OHM-330MA SM1 SYM_VER-2
FW_TPA1P
FW_TPA1N
L48 260-OHM-330MA SM1 SYM_VER-2
FW_TPB1P
FW_TPB1N
CRITICAL J24 1394A F-RT-TH
TPO
TPO#
TPI
TPI#
VP
VGND
FW_TPO1P
FW_TPO1N
FW_TPI1P
FW_TPI1N
+FW_VP1
FW_VGND1

CLEAR OUT ALL PLANES UNDER TRANSFORMERS

R471 0 5% 1/10W MF 805
C662C666 0.01uF 0.01UF 20% 16V CERM 402
CHGND1

R816 0 5% 1/16W MF 402 EMI
CHGND1

FIREWIRE PORTS

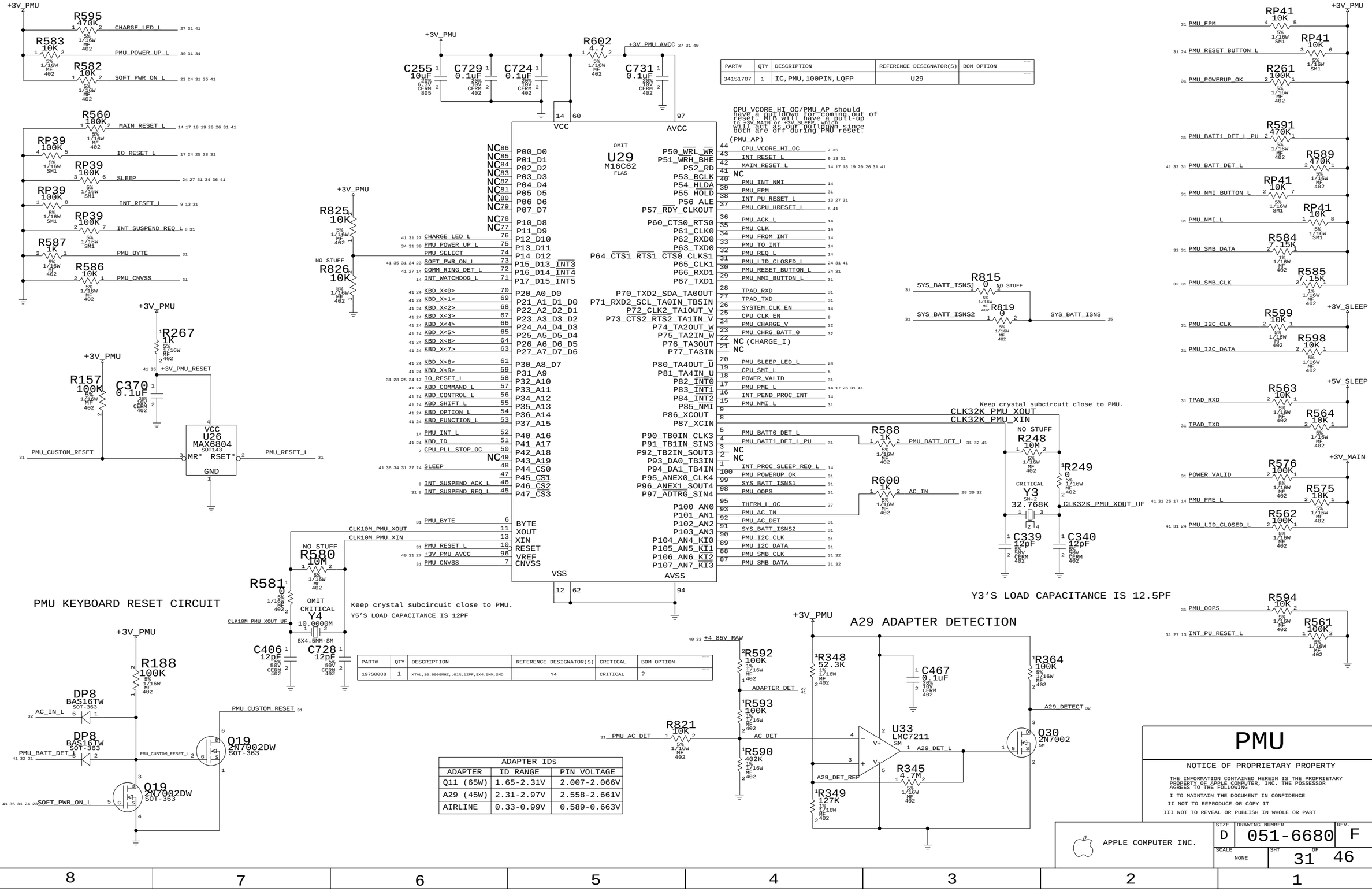
NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 30 OF 46	



DC POWER INPUT

(POWER JACK, ETC. ON SEPARATE BOARD)

CRITICAL
J27
87438-0433
M-RT-SM

+ADAPTER

C35 0.1uF 10% 50V X7R 603-1

DC INRUSH LIMITER

Q68 SI4435DY SOI

R21 330K 5% 1/16W MF 402

C11 0.1uF 20% 50V CERM 805

AC ENABLE GATE

R51 20K 1% 1/16W MF 402

+3V_PMU

R40 97.6K 1% 1/16W MF 402

R16 100K 1% 1/16W MF 402

C801 0.01uF 20% 16V CERM 402

R15 10K 5% 1/16W MF 402

R29 470K 5% 1/16W MF 402

AC ENABLE L

1V20 REF

U1 LMC7211 SM

AC IN

AC DIV

R41 1M 5% 1/16W MF 402

Q1 2N7002DW SOT-363

AC IN L

R42 10K 1% 1/16W MF 402

R30 57.6K 1% 1/16W MF 402

R22 470K 5% 1/16W MF 402

GREATER THAN 13.1V DETECT

BACKFEED PROTECTION

Q69 SI4435DY SOI

+ADAPTER SW

+ADAPTER SENSE

BKFD PROT GATE

C803 0.01uF 20% 16V CERM 603

R732 47K 5% 1/16W MF 402

R734 68K 1% 1/16W MF 402

BKFD PROT EN L

Q9 2N7002DW SOT-363

AC IN

CRITICAL
U3 MAX4172 TSSOP
RS+ RS- PG OUT GND
NC NC NC NC

MAX4172 OUT

CRITICAL
R77 2.21K 0.1% 1/16W MF 603

C36 0.01uF 20% 50V CERM 603

+24V_PBUS

C233 0.1uF 10% 50V X7R 603-1

Place close to RS-

PLACE U24 NEXT TO R382

CRITICAL
R61 0.025 1% 1W MF 2512

R82 4.7 5% 1/10W MF 402

R87 4.7 5% 1/16W MF 402

1772_CSSP

1772_CSSN

R57 100K 1% 1/16W MF 402

D4 1N914 SOT23

R49 12.7K 1% 1/16W MF 402

C67 1uF 20% 6.3V CERM 1210

C71 0.47uF 10% 16V CERM 1206

C95 0.47UF 10% 16V CERM 1206

U6 MAX1772 QSOP

CSSP CSSN DCIN ACIN ACOK RFIN VCTL ICTL ICHG IINP CCV CCI CCS REF CLS GND CELLS LDO DLOV BST DHI LX DLO PGND CSIP CSIN BATT

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

C41 1uF 20% 25V CERM 1206

C98 0.1uF 20% 25V CERM 603

C99 0.1uF 20% 25V CERM 603

R55 1K 1% 1/16W MF 402

C43 0.01uF 20% 16V CERM 402

C42 0.01uF 20% 16V CERM 402

1772_CCV_RC

1772_REF

R54 10K 1% 1/16W MF 402

R53 4.12K 1% 1/16W MF 402

1772_CLS

R83 1K 1% 1/16W MF 402

C24 0.1uF 20% 16V CERM 402

C23 1uF 20% 10V CERM 603

R94 100K 5% 1/16W MF 402

1772_GND

+PBUS CURRENT LIMIT

R728 1K 1% 1/16W MF 402

IAC RC COMP

C798 0.1uF 20% 16V CERM 402

+3V_PMU

C794 0.1uF 20% 16V CERM 402

R745 47.2K 0.1% 1/16W TF 603

IAC FB

U55 LMC7111 SOT23-5

PLACE R383 CLOSE TO LTC1625
ROUTE LTC1625_ITH CAREFULLY

LTC1625 ITH

R727 10K 1% 1/16W MF 402

DP1 BAS16TW SOT-363

R119 150 1% 1/16W MF 402

1625_COMP

ADAPTER I REG

CURRENT THRESHOLD

R736 42.2K 0.1% 1/16W TF 603

R738 82.5K 0.1% 1/16W TF 603

R742 51.1K 0.1% 1/16W TF 603

A29_CURRENT_ADJ

R744 100K 1% 1/16W MF 402

OVER 18V ADJ

Q2 2N7002DW SOT-363

A29_DETECT

AC_GTR_18V

Q74 2N7002DW SOT-363

C809 1uF 20% 25V CERM 603

1772_ACOK_L

Q74 2N7002DW SOT-363

BATTERY SWITCH-OVER CIRCUIT

+BATT

+24V_PBUS

F5 5AMP-125V SM-2

+PBUS

F4 5AMP-125V SM-2

+BATT_24V_FUSE

+BATT_14V_FUSE

CRITICAL
Q6 SI4435DY SOI

CRITICAL
Q7 SUD45P03 TO-252

R716 47K 5% 1/16W MF 402

R710 47K 5% 1/16W MF 402

BATT_24V_GATE

BATT_14V_GATE

R717 10K 5% 1/16W MF 402

R711 10K 5% 1/16W MF 402

DP1 BAS16TW SOT-363

BATT_24PBUS_EN

BATT_14PBUS_EN

AC_IN_L

DP1 BAS16TW SOT-363

R102 158K 1% 1/16W MF 402

Q9 2N7002DW SOT-363

AC_IN_L_RC

C118 10uF 20% 6.3V CERM 805

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

SWITCHER VOLTAGE CONTROL

PMU SELECTS BETWEEN TWO VOLTAGES

SWITCHER CURRENT CONTROL

CHARGE DISABLED BY PMU OR INPUT VOLTAGE <18V
CHARGE THROTTLED BY LOW BATTERY VOLTAGE

+3V_PMU

R73 27.4K 1% 1/16W MF 402

R62 10K 1% 1/16W MF 402

R58 10K 1% 1/16W MF 402

OD OUTPUT LOW - WHEN AC GREATER THAN 18V

R74 4.12K 1% 1/16W MF 402

R733 20K 1% 1/16W MF 402

R731 1K 1% 1/16W MF 402

R56 1K 1% 1/16W MF 402

BATT_LOW_L

BATTV_HIGH

R59 100K 5% 1/16W MF 402

Q4 2N7002DW SOT-363

R75 5.23K 1% 1/16W MF 402

BATTV_LOW

Q71 2N7002DW SOT-363

Q71 2N7002DW SOT-363

PMU_CHARGE_V

Q4 2N7002DW SOT-363

+3V_PMU

R741 100K 5% 1/16W MF 402

CHARGE_DISABLE

Q72 2N7002DW SOT-363

PMU_CHRG_BATT_0

Q72 2N7002DW SOT-363

+3V_PMU

C799 0.1uF 20% 16V CERM 402

U57 LMC7211 SM

BATT_LOW

R729 100K 1% 1/16W MF 402

R740 499K 1% 1/16W MF 402

BATT_DIV

1V65_REF

R730 100K 1% 1/16W MF 402

R735 100K 1% 1/16W MF 402

C807 0.047uF 10% 16V CERM 402

R47 6.34K 1% 1/16W MF 402

A29_CLS_ADJ

Q2 2N7002DW SOT-363

A29_DETECT

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

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 CONNECTOR

CRITICAL
J26
87438-0833
M-RT-SM

+BATT_VSNS

+BATT_POS

(BATT_IN_PD)

BATT_CLK

BATT_DATA

PMU_BATT_DET_L

BATT_NEG

L5 FERR-EMI-100-OHM SM

L2 FERR-50-OHM SM

+BATT_ISNS

L6 FERR-50-OHM SM

L4 FERR-EMI-100-OHM SM

PMU_SMB_CLK

L3 FERR-EMI-100-OHM SM

PMU_SMB_DATA

D6 1N914 SOT23

1772_BST_ESR

R725 33 5% 1/10W FF 1206

1772_LDO

R52 100K 5% 1/16W MF 402

C97 0.1uF 20% 25V CERM 603

R96 4.7 5% 1/16W MF 603

C96 0.1uF 20% 50V CERM 805

CRITICAL
Q70 IRF7805 SM

C112 2.2UF 20% 6.3V X7R 1206

C117 2.2UF 20% 6.3V X7R 1206

C113 2.2UF 20% 6.3V X7R 1206

C115 2.2UF 20% 6.3V X7R 1206

C116 2.2UF 20% 6.3V X7R 1206

CRITICAL
L70 10uH SM1

+BATT_RSNS

R715 0.05 1% 1W MF 2512

+BATT_24V_FUSE

D36 SM MBRS140T3

CRITICAL
Q64 IRF7811W SO-8

NO STUFF
C853 1000pF 10% 25V X7R 402

XW1 SM

C780 4.7UF 20% 25V CERM 1206

C795 4.7UF 20% 25V CERM 1206

C790 4.7UF 20% 25V CERM 1206

C779 33uF 20% 25V SPEC SM1

R720 1 1% 1/16W MF 603

R713 1 1% 1/16W MF 603

C777 4.7UF 20% 25V CERM 1206

C792 4.7UF 20% 25V CERM 1206

C785 4.7UF 20% 25V CERM 1206

BATTERY CHARGER

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

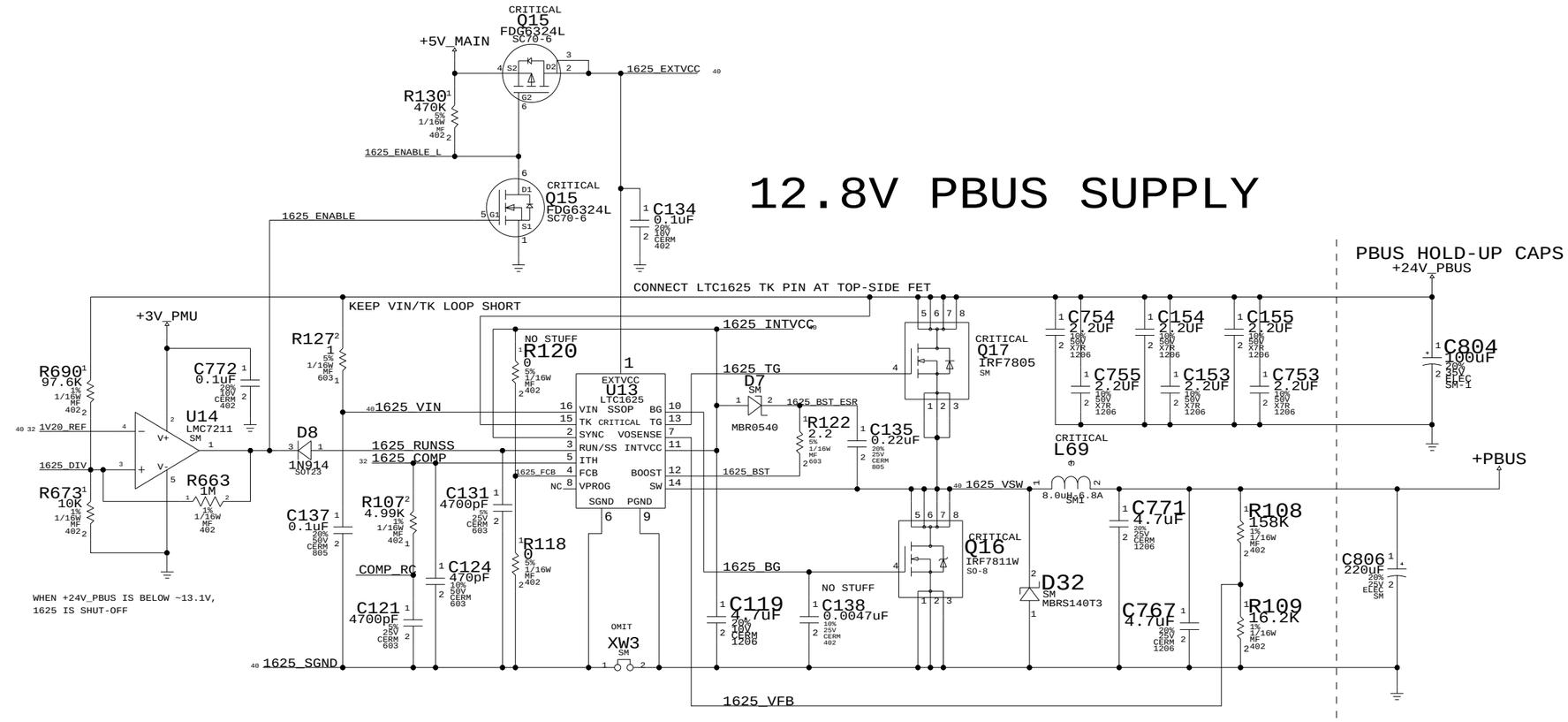
II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

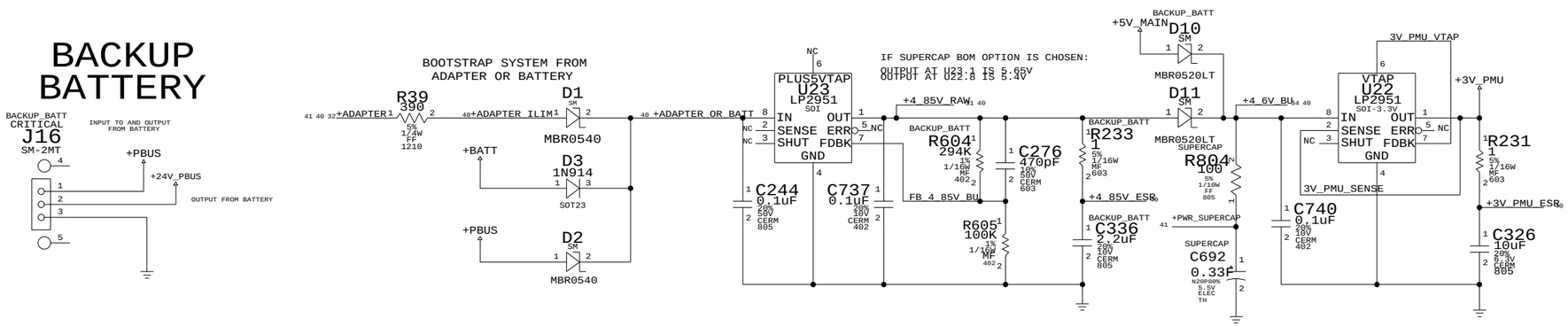
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 32 OF 46	

12.8V PBUS SUPPLY



PMU SUPPLY



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
114S3575	1	RES,MF,1/16W,357K OHM,1%,0402,SMD	R604	?	SUPERCAP

12.8V REGULATOR

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING

I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 33 OF 46	

3.3V/5V MAIN SUPPLY

DCDC_EN TRUTH TABLE

PMU_POWER_UP_L	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

SLEEP LEVEL SHIFTER (3V -> 5V)

+5V_SLEEP LOADS

1) FAN
2) Headphone amplifier
3) OPTICAL DRIVE
4) DVI
5) TRACKPAD

+3V_SLEEP LOADS

1) CPU PLL CONFIG CONTROL
2) INTREPID - I2C PULLUPS & OSCILLATOR
3) MAP31 - 3V RAIL (IF USING D3COLD)
4) GRAPHIC CHIP SPREAD SPECTRUM CHIP
5) LVDS DDC PULL-UPS
6) DVI LEVEL SHIFTERS & PULLUPS & HPD
7) BOOT BANGER
8) HARD DRIVE (IF USING 3V LOGIC)
9) WIRELESS
10) PMU - I2C PULLUPS

DISTRIBUTE CAPS ALONG TOP EDGE AND FAN CUT-OUT

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

THIS SIGNAL IS OPEN COLLECTOR TO GND WHEN POWER IS NOT GOOD

220PF IS USED TO QUIET NOISE ON PGOOD ONCE INTERNAL OPEN DRAIN IS DISENGAGED

3.3V/5V REGULATOR

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 34 OF 46	

VCORE POWER SEQUENCING

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

1.67GHZ (1.28VCORE) 1.300V->0.975V

1.50GHZ 1.200V->0.975V

1.67GHZ (1.26VCORE) 1.300V->0.975V

(VALUE WITHOUT OFFSET)

MAX1717 VID INPUTS ARE 3.3-5V TOLERANT

Note:No stuff R67 to set skip mode of VCore

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

Keep trace fat and short!!

Keep trace fat and short!!

Keep trace fat and short!!

ROUTE AS DIFFERENTIAL PAIR

PLACE C423 CLOSE TO PINS 15 & 13!

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

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, V = VA. B

GROUND SENSE VOLTAGE DIVIDER

This allows for an offset to the ground sense to adjust the output voltage.
VREF = 2.0V, HENCE VOFFSET = 2.0V*0.85*(Rb / Ra) AND VCORE = VDAC + VOFFSET.
NOTE: Ra NO STUFFED FOR NO OFFSET CASE

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

(CPU Vcore value with offset)

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

1.50GHZ 1.240V->0.990V (CPU SPEC: 1.200V -> 0.980V)

1.67GHZ(1.26VCORE) 1.300V->0.990V (CPU SPEC: 1.260V -> 0.980V)

Fmax Test Connections

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
126S0036	7	CAP,AL,POLY,8.2uF,20%,16V,V CASE,SMD	C51,C52,C77,C78,C91,C92,C111	CRITICAL	
152S0242	1	IND,PWR,1.0UH,20,20.5A,SMD	L71	CRITICAL	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
114S2493	1	RES,MF,1/16W,2.49K OHM,1%,0402,SMD	R93	?	CPU_BTR_VCORE12
114S4023	1	RES,MF,1/16W,4.02K OHM,1%,0402,SMD	R97	?	CPU_BTR_VCORE12
116S1000	1	RES,MF,1/16W,0 OHM,5%,0402,SMD	R93	?	CPU_BST_VCORE126
114S1503	1	RES,MF,1/16W,1.5K OHM,1%,0402,SMD	R97	?	CPU_BST_VCORE126
114S2433	1	RES,MF,1/16W,2.43K OHM,1%,0402,SMD	R93	?	CPU_BST_VCORE13
114S4023	1	RES,MF,1/16W,4.02K OHM,1%,0402,SMD	R97	?	CPU_BST_VCORE13
114S2003	1	RES,MF,1/16W,2K OHM,1%,0402,SMD	R93	?	CPU_BTR_VCORE122
114S6043	1	RES,MF,1/16W,6.04K OHM,1%,0402,SMD	R97	?	CPU_BTR_VCORE122

VCORE SUPPLY

NOTICE OF PROPRIETARY PROPERTY

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE COMPUTER, INC. THE POSSESSOR AGREES TO THE FOLLOWING
I TO MAINTAIN THE DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F

SCALE: NONE | SHT 35 OF 46

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_5V_MAIN LOADS

1) MAP31 - FBCORE/FBIO IF USING D3HOT
2) GIGABIT ETHERNET - AVDDL
3) DDR SODIMMS - CORE/IO
4) DDR MUXES

M11 Power Shut down Sequencing

+2_5V_SLEEP LOADS

1) FBCORE/FBIO IF USING D3COLD

1.8V SWITCHER

+1_8V_MAIN LOADS

1) INTREPID PLLS

+1_8V_SLEEP LOADS

1) MPC7447 - MAXBUS I/O - IF 1.8V INTERFACE
2) CPU JTAG & MaxBus Pull-ups
3) CPU PLL Config Straps

1.5V/1.8V/2.5V SUPPLIES

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 36 OF 46	

DIGITAL SIGNALS

GROUP	SIG_NAME	PROPAGATION_DELAY	MAX_VIAS	MAX_EXPOSED_LENGTH	STUB_LENGTH	NET_SPACING_TYPE	NO_TEST	PULSE_PARAM
				STUB_LENGTH OF 200 MILS NEEDED WHEN WE CONVERT TO 14.2				
GROUP 0	126 MEM_DATA<7..0>	L:S:1602:1700	7	500	(200)			167 MHZ
	126 MEM_DQM<0>	L:S:1602 MIL:1700 MIL	7	500.0000	(200)			167.0 MHz
	126 MEM_DQS<0>	L:S:1602 MIL:1700 MIL	7	500.0000	(200)			167.0 MHz
	126 RAM_DATA_A<7..0>	L:S:1903:2000	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	126 RAM_DQM_A<0>	L:S:1903 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	126 RAM_DQS_A<0>	L:S:1903 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	126 RAM_DATA_B<7..0>	L:S:2000:2100	7	500	(200)			167 MHZ
	126 RAM_DQM_B<0>	L:S:2000 MIL:2100 MIL	7	500.0000	(200)			167.0 MHz
	126 RAM_DQS_B<0>	L:S:2000 MIL:2100 MIL	7	500.0000	(200)			167.0 MHz
GROUP 1	MEM_DATA<15..8>	L:S:1344:1660	7	500	(200)			167 MHZ
	MEM_DQM<1>	L:S:1344 MIL:1660 MIL	7	500.0000	(200)			167.0 MHz
	MEM_DQS<1>	L:S:1344 MIL:1660 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_A<15..8>	L:S:1905:2000	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	RAM_DQM_A<1>	L:S:1905 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_A<1>	L:S:1905 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_B<15..8>	L:S:2004:2412	7	500	(200)			167 MHZ
	RAM_DQM_B<1>	L:S:2004 MIL:2412 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_B<1>	L:S:2004 MIL:2412 MIL	7	500.0000	(200)			167.0 MHz
GROUP 2	127 MEM_DATA<23..16>	L:S:1435:1500	7	500	(200)			167 MHZ
	127 MEM_DQM<2>	L:S:1435 MIL:1500 MIL	7	500.0000	(200)			167.0 MHz
	127 MEM_DQS<2>	L:S:1435 MIL:1500 MIL	7	500.0000	(200)			167.0 MHz
	127 RAM_DATA_A<23..16>	L:S:1707:1800	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	127 RAM_DQM_A<2>	L:S:1707 MIL:1800 MIL	7	500.0000	(200)			167.0 MHz
	127 RAM_DQS_A<2>	L:S:1707 MIL:1800 MIL	7	500.0000	(200)			167.0 MHz
	127 RAM_DATA_B<23..16>	L:S:1900:2000	7	500	(200)			167 MHZ
	127 RAM_DQM_B<2>	L:S:1900 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	127 RAM_DQS_B<2>	L:S:1900 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
GROUP 3	MEM_DATA<31..24>	L:S:1233:1485	7	500	(200)			167 MHZ
	MEM_DQM<3>	L:S:1233 MIL:1485 MIL	7	500.0000	(200)			167.0 MHz
	MEM_DQS<3>	L:S:1233 MIL:1485 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_A<31..24>	L:S:1700:2165	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	RAM_DQM_A<3>	L:S:1700 MIL:2165 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_A<3>	L:S:1700 MIL:2165 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_B<25..24>	L:S:1907:2356	7	500	(200)			167 MHZ
	128 RAM_DATA_B<26>	L:S:1907 MIL:2356 MIL	7		(200)			167.0 MHz
	128 RAM_DATA_B<31..27>	L:S:1907:2356	7	500	(200)			167 MHZ
	128 RAM_DQM_B<3>	L:S:1907 MIL:2356 MIL	7	500.0000	(200)			167.0 MHz
	128 RAM_DQS_B<3>	L:S:1907 MIL:2356 MIL	7	500.0000	(200)			167.0 MHz
GROUP 4	MEM_DATA<39..32>	L:S:1915:2000	7	500	(200)			167 MHZ
	MEM_DQM<4>	L:S:1915 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	MEM_DQS<4>	L:S:1915 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_A<39..32>	L:S:1205:1387	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
DDR RAM	RAM_DQM_A<4>	L:S:1205 MIL:1387 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_A<4>	L:S:1205 MIL:1387 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_B<39..32>	L:S:1404:1686	7	500	(200)			167 MHZ
	RAM_DQM_B<4>	L:S:1404 MIL:1686 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_B<4>	L:S:1404 MIL:1686 MIL	7	500.0000	(200)			167.0 MHz
GROUP 5	MEM_DATA<47..40>	L:S:1719:1893	7	500	(200)			167 MHZ
	MEM_DQM<5>	L:S:1719 MIL:1893 MIL	7	500.0000	(200)			167.0 MHz
	MEM_DQS<5>	L:S:1719 MIL:1893 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_A<47..40>	L:S:1607:1898	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	RAM_DQM_A<5>	L:S:1607 MIL:1898 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_A<5>	L:S:1607 MIL:1898 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_B<47..40>	L:S:1716:2102	7	500	(200)			167 MHZ
	RAM_DQM_B<5>	L:S:1716 MIL:2102 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_B<5>	L:S:1716 MIL:2102 MIL	7	500.0000	(200)			167.0 MHz
GROUP 6	MEM_DATA<55..48>	L:S:2101:2170	7	500	(200)			167 MHZ
	MEM_DQM<6>	L:S:2101 MIL:2170 MIL	7	500.0000	(200)			167.0 MHz
	MEM_DQS<6>	L:S:2101 MIL:2170 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_A<55..48>	L:S:1204:1357	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	RAM_DQM_A<6>	L:S:1204 MIL:1357 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_A<6>	L:S:1204 MIL:1357 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_B<55..48>	L:S:1400:1546	7	500	(200)			167 MHZ
	RAM_DQM_B<6>	L:S:1400 MIL:1546 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_B<6>	L:S:1400 MIL:1546 MIL	7	500.0000	(200)			167.0 MHz
GROUP 7	MEM_DATA<63..56>	L:S:1903:2000	7	500	(200)			167 MHZ
	MEM_DQM<7>	L:S:1903 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	MEM_DQS<7>	L:S:1903 MIL:2000 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_A<63..56>	L:S:1611:1696	7	500	(200)	TOTAL LENGTH CONTROLLED BY SPREADSHEET		167 MHZ
	RAM_DQM_A<7>	L:S:1611 MIL:1696 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_A<7>	L:S:1611 MIL:1696 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DATA_B<63..56>	L:S:1809:1887	7	500	(200)			167 MHZ
	RAM_DQM_B<7>	L:S:1809 MIL:1887 MIL	7	500.0000	(200)			167.0 MHz
	RAM_DQS_B<7>	L:S:1809 MIL:1887 MIL	7	500.0000	(200)			167.0 MHz
ADDR	MEM_ADDR<12..0>	L:S::500	4					83 MHZ
	RAM_ADDR<12..0>	L:S:2000:3000	10		(200)			
	MEM_BA<1..0>	L:S::500	4					
	RAM_BA<1..0>	L:S:2000:3300	8		(200)			
CONTROL	MEM_CS_L<3..0>	L:S::500	4					
	RAM_CS_L<3..0>	L:S:2500:3200	7		(200)			
	MEM_CKE<3..0>	L:S::500	4					
	RAM_CKE<3..0>	L:S:2500:3200	7		(200)			
	MEM_RAS_L	L:S::500 MIL	4					
	RAM_RAS_L	L:S:2000 MIL:4100 MIL	7		(200)			
	MEM_CAS_L	L:S::500 MIL	4					
	RAM_CAS_L	L:S:2000 MIL:4100 MIL	7		(200)			
	MEM_WE_L	L:S::500 MIL	4					
	RAM_WE_L	L:S:2000 MIL:3100 MIL	8		(200)			
	MEM_MUXSEL_MSB	L:S:1700 MIL:3000 MIL	8					
	MEM_MUXSEL_LSB	L:S:1700 MIL:3000 MIL	7					

PRIORITY: 2
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9
GOAL: MINIMIZE
EXPOSED ROUTES
MINIMIZE VIAS

CLOCK LINE CONSTRAINTS

GROUP	SIG_NAME	PROPAGATION_DELAY	MATCHED_DELAY	MAX VIAS	MAX EXPOSED LENGTH	STUB_LENGTH	NET_SPACING_TYPE	PULSE PARAM
INTREPID CLOCKS	SYSCLK_CPU_UF	L:S::150 MIL					10 MIL SPACING	167.0 MHz
	SYSCLK_CPU	L:S:2650 MIL:2750 MIL		5	250.0000	(200)	10 MIL SPACING	167.0 MHz
	INT_CPUFB_OUT	L:S::150 MIL		5	250.0000		10 MIL SPACING	167.0 MHz
	INT_CPUFB_OUT_SHORT	L:S:700 MIL:850 MIL		5	250.0000		10 MIL SPACING	167.0 MHz
	INT_CPUFB_OUT_NORM	L:S:500 MIL:600 MIL		5	250.0000		10 MIL SPACING	167.0 MHz
	INT_CPUFB_IN_NORM	L:S:500 MIL:600 MIL		5	250.0000		10 MIL SPACING	167.0 MHz
	INT_CPUFB_LONG	L:S:1050 MIL:1150 MIL		5	250.0000		10 MIL SPACING	167.0 MHz
	INT_CPUFB_IN	L:S:700 MIL:800 MIL		5	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A0_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_A0_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A0_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_A0_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A1_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_A1_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A1_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_A1_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B0_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_B0_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B0_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_B0_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B1_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_B1_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B1_UF	L:S:300 MIL:350 MIL	SYSCLK_DDRCLK_B1_UF:G:L:S:0 MIL:25 MIL			(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A0	L:S:2900 MIL:3000 MIL	SYSCLK_DDRCLK_A0:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A0	L:S:2900 MIL:3000 MIL	SYSCLK_DDRCLK_A0:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A1	L:S:2900 MIL:3000 MIL	SYSCLK_DDRCLK_A1:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_A1	L:S:2900 MIL:3000 MIL	SYSCLK_DDRCLK_A1:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B0	L:S:3100 MIL:3200 MIL	SYSCLK_DDRCLK_B0:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B0	L:S:3100 MIL:3200 MIL	SYSCLK_DDRCLK_B0:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B1	L:S:3100 MIL:3200 MIL	SYSCLK_DDRCLK_B1:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	SYSCLK_DDRCLK_B1	L:S:3100 MIL:3200 MIL	SYSCLK_DDRCLK_B1:G:L:S:0 MIL:25 MIL	7	250.0000	(200)	10 MIL SPACING	167.0 MHz
	126 INT_REF_CLK_OUT_UF	L:S::400 MIL				(200)	10 MIL SPACING	49.92 MHz
	126 INT_REF_CLK_OUT	L:S:1000 MIL:1150 MIL		5	250.0000	(200)	10 MIL SPACING	49.92 MHz
	125 INT_REF_CLK_IN	L:S:1900 MIL:2000 MIL		5	250.0000	(200)	10 MIL SPACING	167.0 MHz
	125 CLK66M_GPU_AGP_UF	L:S::150 MIL				(200)	10 MIL SPACING	66.00 MHz
	CLK66M_GPU_AGP	L:S:1800 MIL:1900 MIL		6	400.0000	(200)	10 MIL SPACING	66.00 MHz
	INT_AGP_FB_OUT	L:S::150 MIL				(200)	10 MIL SPACING	66.00 MHz
	INT_AGP_FB_IN	L:S:1450 MIL:1550 MIL		6	500.0000	(200)	10 MIL SPACING	66.00 MHz
	CLK33M_CBUS_UF	L:S::250 MIL				(200)	10 MIL SPACING	33.00 MHz
	CLK33M_CBUS	L:S:5000 MIL:6000 MIL		9	500.0000	(200)	10 MIL SPACING	33.00 MHz
	CLK33M_AIRPORT_UF	L:S::250 MIL				(200)	10 MIL SPACING	33.00 MHz
	CLK33M_AIRPORT	L:S:9500 MIL:10500 MIL		6	500.0000	(200)	10 MIL SPACING	33.00 MHz
	128 CLK33M_NEC_UF	L:S::250 MIL				(200)	10 MIL SPACING	33.00 MHz
	128 CLK33M_NEC	L:S:4000 MIL:6000 MIL		7	500.0000	(200)	10 MIL SPACING	33.00 MHz
	INT_PCI_FB_OUT	L:S::300 MIL				(200)	10 MIL SPACING	33.00 MHz
	INT_PCI_FB_IN	L:S:6500 MIL:7500 MIL		7	500.0000	(200)	10 MIL SPACING	33.00 MHz
M11 & OSC	ATI_CLK27M_OSC	L:S::400 MIL		5		(200)	10 MIL SPACING	
	ATI_CLK27M_OSC_SS	L:S::400 MIL		5		(200)	10 MIL SPACING	
	ATI_CLK27M_IN	L:S::200 MIL		5		(200)	10 MIL SPACING	
	ATI_SSCLK_UF	L:S::200 MIL		5		(200)	10 MIL SPACING	
	ATI_SSCLK_IN	L:S::1800 MIL		5	500.0000	(200)	10 MIL SPACING	
CRYSTALS	CLK18M_INT_XIN	L:S:1400 MIL:1500 MIL					10 MIL SPACING	
	CLK18M_INT_XOUT	L:S:1250 MIL:1350 MIL					10 MIL SPACING	
	CLK18M_XTAL_IN	L:S::300 MIL					10 MIL SPACING	
	CLK18M_INT_EXT	L:S::400 MIL					10 MIL SPACING	
SOUND	INT_I2S0_SND_MCLK			6	500.0000	(200)	10 MIL SPACING	
ETHERNET	CLKENET_PHY_RX	L:S::300 MIL				(200)		125.0 MHz
	CLKENET_LINK_RX	L:S:8000 MIL:9000 MIL		6	800.0000	(200)	10 MIL SPACING	125.0 MHz
	CLKENET_PHY_GBE_REF	L:S::300 MIL				(200)		125.0 MHz
	CLKENET_LINK_GBE_REF	L:S:8000 MIL:9000 MIL		6	500.0000	(200)	10 MIL SPACING	125.0 MHz
	CLKENET_PHY_TX	L:S::300 MIL				(200)		25.00 MHz
	CLKENET_LINK_TX	L:S:8000 MIL:9000 MIL		6	500.0000	(200)	10 MIL SPACING	25.00 MHz
	CLKENET_LINK_GTX	L:S::300 MIL				(200)		125.0 MHz
	CLKENET_PHY_GTX	L:S:8000 MIL:9000 MIL		6	600.0000	(200)	10 MIL SPACING	125.0 MHz
FIREWIRE	CLKFW_PHY_PCLK	L:S::300 MIL				(200)		49.15 MHz
	CLKFW_LINK_PCLK	L:S:7500 MIL:8000 MIL		5	500.0000	(200)	10 MIL SPACING	49.15 MHz
	CLKFW_PHY_LCLK	L:S:7500 MIL:8000 MIL		5	500.0000	(200)	10 MIL SPACING	49.15 MHz
	CLKFW_LINK_LCLK	L:S::300 MIL				(200)		49.15 MHz
	FW_XI	L:S::500 MIL				(200)	10 MIL SPACING	98.03 MHz
	FW_OSC	L:S::300 MIL				(200)	10 MIL SPACING	98.03 MHz

PRIORITY: 1
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9
GOAL: MINIMIZE EXPOSURE ON LONG NETS

SIGNAL CONSTRAINTS - PAGE 1

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6680 | REV. F

SCALE NONE | SHT 37 OF 46

DIGITAL SIGNALS

GROUP	SIG_NAME	PROPAGATION_DELAY	MAX_VIAS	MAX_EXPOSED_LENGTH	STUB_LENGTH	NET_SPACING_TYPE	NO_TEST	PULSE_PARAM
MAXBUS0	CPU_AACK_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_ADDR<0..31>	L:S:1500:3100	7		(250)		TRUE	83 MHZ
	CPU_ARTRY_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_BG_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_BR_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_CI_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_DATA<0..31>	L:S:1100:2700	7		(250)		TRUE	83 MHZ
	CPU_DATA<32..63>	L:S:1100:2700	8		(250)			83 MHZ
	CPU_DBG_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_DTI<0..2>	L:S:1500:2950	7		(250)			
	CPU_DRDY_L	L:S:1500 MIL:3200	MIL7		(250)			
	CPU_GBL_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_HIT_L	L:S:1500 MIL:2800	MIL7		(250)			
	CPU_OACK_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_OREQ_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_TA_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_TBST_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_TEA_L	L:S:1500 MIL:3000	MIL7		(250)			
	CPU_TS_L	L:S:1500 MIL:2700	MIL7		(250)			
	CPU_TSIZ<0..2>	L:S:1500:3500	7		(250)			
	CPU_TT<0..4>	L:S:1500:3400	7		(250)			
	CPU_WT_L	L:S:1500 MIL:3100	MIL7		(250)			

PRIORITY: 4
PRIMARY LAYERS: 9
SECONDARY LAYERS: 4,7
GOAL: MINIMIZE TH VIAS

STUB_LENGTH OF 250 MILS NEEDED WHEN DESIGN SWITCHED TO 14.2

TMDS/DVO SIGNAL CONSTRAINTS

ALL TMDS GROUP SIGNALS ROUTE AT LAYER 4 OR 7 AND HAVE SAME WIDTH SPACING RULE AS OTHER TMDS SIGNALES

SI_TMDS_CLKN	SI_CLKTMDS	SITMDS:G:L:S:0 MIL:300 MIL		100 OHM SPACING FOR TMDS
SI_TMDS_CLKP	SI_CLKTMDS	SITMDS:G:L:S:0 MIL:300 MIL		100 OHM SPACING FOR TMDS
SI_TMDS_DN<0>	SI_TMDS_D0			100 OHM SPACING FOR TMDS
SI_TMDS_DP<0>	SI_TMDS_D0			100 OHM SPACING FOR TMDS
SI_TMDS_DN<1>	SI_TMDS_D1			100 OHM SPACING FOR TMDS
SI_TMDS_DP<1>	SI_TMDS_D1			100 OHM SPACING FOR TMDS
SI_TMDS_DN<2>	SI_TMDS_D2			100 OHM SPACING FOR TMDS
SI_TMDS_DP<2>	SI_TMDS_D2			100 OHM SPACING FOR TMDS
SI_TMDS_DN<3>	SI_TMDS_D3			100 OHM SPACING FOR TMDS
SI_TMDS_DP<3>	SI_TMDS_D3			100 OHM SPACING FOR TMDS
SI_TMDS_DN<4>	SI_TMDS_D4			100 OHM SPACING FOR TMDS
SI_TMDS_DP<4>	SI_TMDS_D4			100 OHM SPACING FOR TMDS
SI_TMDS_DN<5>	SI_TMDS_D5			100 OHM SPACING FOR TMDS
SI_TMDS_DP<5>	SI_TMDS_D5			100 OHM SPACING FOR TMDS

ALL THE DVOD GROUP SIGNALS ROUTE AT LAYER 4 OR 7 AND ROUTE AS STANDARD 50OHM SIGNALS AT 4 MILS

ATI_DVOD<23..0>	ATIDVOD:G:L:S:1600 MIL:1700 MIL	6	610		
ATI_DVOD_DE	ATIDVOD:G:L:S:1600 MIL:1700 MIL	6	610.0000		
ATI_DVO_HSYNC	ATIDVOD:G:L:S:1600 MIL:1700 MIL	6	610.0000		
ATI_DVO_VSYNC	ATIDVOD:G:L:S:1600 MIL:1700 MIL	6	610.0000		
ATI_DVO_CLKP	ATIDVOD:G:L:S:0 MIL:500 MIL	6	610.0000	165.0 MHz:::	
GPU_DVO_CLKP_R1	ATIDVOD:G:L:S:0 MIL:1100 MIL	6	610.0000	165.0 MHz:::	
GPU_DVO_CLKP_R2	ATIDVOD:G:L:S:0 MIL:1100 MIL	6	610.0000	165.0 MHz:::	

TMDS_CONN_CLKN	CLKCONN_TMDS	TMDS_CONN:G:L:S:0 MIL:50 MIL	500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_CLKP	CLKCONN_TMDS	TMDS_CONN:G:L:S:0 MIL:50 MIL	500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DN<0>	CONN_TMDS_D0		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DP<0>	CONN_TMDS_D0		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DN<1>	CONN_TMDS_D1		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DP<1>	CONN_TMDS_D1		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DN<2>	CONN_TMDS_D2		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DP<2>	CONN_TMDS_D2		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DN<3>	CONN_TMDS_D3		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DP<3>	CONN_TMDS_D3		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DN<4>	CONN_TMDS_D4		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DP<4>	CONN_TMDS_D4		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DN<5>	CONN_TMDS_D5		500.0000	100 OHM SPACING FOR TMDS
TMDS_CONN_DP<5>	CONN_TMDS_D5		500.0000	100 OHM SPACING FOR TMDS

GPU_R	GPU_R	500.0000	100 OHM SPACING
GPU_G	GPU_G	500.0000	100 OHM SPACING
GPU_B	GPU_B	500.0000	100 OHM SPACING

SIGNAL CONSTRAINTS - PAGE 1

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F

SCALE: NONE | SHT 38 OF 46

Digital Signals (cont'd)

GROUP	SIG_NAME	PROPAGATION_DELAY	MAX_VIAS	MAX_EXPOSED_LENGTH	STUB_LENGTH	NET_SPACING_TYPE	NO_TEST	PULSE_PARAM
AGP	AGP_AD<15..0>	L:S:1050:1450	7					66 MHz
AGP BYTES 0-1	AGP_CBE<1..0>	L:S:1050:1450	7					66 MHz
	AGP_AD_STB<0>	L:S:1050 MIL:1450 MIL			(250)	8 MIL SPACING		133.0 MHz
	AGP_AD_STB_L<0>	L:S:1050 MIL:1450 MIL			(250)	8 MIL SPACING		133.0 MHz
AGP BYTES 2-3	AGP_AD<31..16>	L:S:1050:1450	7					66 MHz
	AGP_CBE<3..2>	L:S:1050:1450	7					66 MHz
	AGP_AD_STB<1>	L:S:1050 MIL:1450 MIL			(250)	8 MIL SPACING		133.0 MHz
	AGP_AD_STB_L<1>	L:S:1050 MIL:1450 MIL			(250)	8 MIL SPACING		133.0 MHz
AGP SIDEBAND	AGP_SBA<7..0>	L:S:1050:1450	7					66 MHz
	AGP_SB_STB	L:S:1050 MIL:1450 MIL			(350)	8 MIL SPACING		66.00 MHz
	AGP_SB_STB_L	L:S:1050 MIL:1450 MIL			(350)	8 MIL SPACING		66.00 MHz
AGP CONTROL	AGP_FRAME_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_IRDY_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_TRDY_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_DEVSEL_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_STOP_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_PAR	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_REQ_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_GNT_L	L:S:1250 MIL:1950 MIL						66.00 MHz
	AGP_RBF_L	L:S:1250 MIL:1950 MIL						66.00 MHz
PCI	PCI_AD<31..0>	L:S:6000:12500				MIN_DAISY_CHAIN		33 MHz
	PCI_CBE<3..0>	L:S:6000:12500				MIN_DAISY_CHAIN		33 MHz
	PCI_FRAME_L	L:S:6000 MIL:12500 MIL				MIN_DAISY_CHAIN		33.00 MHz
	PCI_IRDY_L	L:S:6000 MIL:12500 MIL				MIN_DAISY_CHAIN		33.00 MHz
	PCI_TRDY_L	L:S:6000 MIL:12500 MIL				MIN_DAISY_CHAIN		33.00 MHz
	PCI_DEVSEL_L	L:S:6000 MIL:12500 MIL				MIN_DAISY_CHAIN		33.00 MHz
	PCI_STOP_L	L:S:6000 MIL:12500 MIL				MIN_DAISY_CHAIN		33.00 MHz
	PCI_PAR	L:S:6000 MIL:12500 MIL				MIN_DAISY_CHAIN		33.00 MHz
ULTRA ATA-100	UIDE_DATA<15..8>	L:S::710			(200)			100 MHZ
	UIDE_DATA<7>	U51.V1:RP19.3::600 MIL			(200)			100.0 MHz
	UIDE_DATA<6..0>	L:S::600			(200)			100 MHZ
	UIDE_ADDR<2..0>	L:S::650			(200)	NEED TO MATCH DELAY TO 250		100 MHz
	UIDE_RST_L	L:S::400 MIL			(200)			100.0 MHz
	UIDE_DIOW_L	L:S::400 MIL			(200)			100.0 MHz
	UIDE_DIOR_L	L:S::600 MIL		10 MIL SPACING	(200)			100.0 MHz
	UIDE_DMACK_L	L:S::400 MIL			(200)			100.0 MHz
	UIDE_CS0_L	L:S::500 MIL			(200)			100.0 MHz
	UIDE_CS1_L	L:S::500 MIL			(200)			100.0 MHz
	UIDE_DMARQ	L:S::400 MIL			(200)			100.0 MHz
	UIDE_IOCHRDY	L:S::600 MIL		10 MIL SPACING	(200)			100.0 MHz
	UIDE_INTRQ	L:S::400 MIL			(200)			100.0 MHz
	HD_DATA<15..0>	L:S:5000:6500	7		(200)			100 MHZ
	HD_ADDR<2..0>	L:S:5000:6500	7		(200)			100 MHZ
	HD_RESET_L	L:S:4000 MIL:6000 MIL			(200)	TOTAL UIDE+HD SKEW <500MIL		100.0 MHz
	HD_DIOW_L	L:S:3000 MIL:5200 MIL			(200)			100.0 MHz
	HD_DIOR_L	L:S:6100 MIL:6150 MIL		10 MIL SPACING	(200)			100.0 MHz
	HD_DMACK_L	L:S:4500 MIL:6000 MIL			(200)			100.0 MHz
	HD_CS0_L	L:S:3000 MIL:6000 MIL			(200)			100.0 MHz
	HD_CS1_L	L:S:3000 MIL:6000 MIL			(200)			100.0 MHz
	HD_DMARQ	L:S:4500 MIL:6000 MIL			(200)			100.0 MHz
	HD_IOCHRDY	L:S:6200 MIL:6300 MIL		10 MIL SPACING	(200)			100.0 MHz
	HD_INTRQ	L:S:3000 MIL:5000 MIL						100.0 MHz
EIDE INTREPID	EIDE_DATA<15..0>	L:S::850						33 MHZ
	EIDE_ADDR<2..0>	L:S::850						33 MHZ
	EIDE_CS0_L	L:S::850 MIL						33.00 MHz
	EIDE_CS1_L	L:S::850 MIL						33.00 MHz
	EIDE_RD_L	L:S::500 MIL						33.00 MHz
	EIDE_WR_L	L:S::500 MIL						33.00 MHz
	EIDE_IOCHRDY	L:S::500 MIL						33.00 MHz
	EIDE_INT	L:S::500 MIL						33.00 MHz
	EIDE_RST_L	L:S::500 MIL						33.00 MHz
	EIDE_DMACK_L	L:S::500 MIL						33.00 MHz
	EIDE_DMARQ	L:S::500 MIL						33.00 MHz
OPTICAL	EIDE_OPTICAL_DATA<15..0>	L:S:4000:6000						33 MHZ
	EIDE_OPTICAL_ADDR<2..0>	L:S:4000:6000						33 MHZ
	EIDE_OPTICAL_CS0_L	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_CS1_L	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_READ_L	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_WR_L	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_IOCHRDY	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_INT	L:S:5000 MIL:7000 MIL						33.00 MHz
	EIDE_OPTICAL_RST_L	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_DMAACK_L	L:S:4500 MIL:6500 MIL						33.00 MHz
	EIDE_OPTICAL_DMA_RQ	L:S:4500 MIL:6500 MIL						33.00 MHz
ETHERNET MII	ENET_LINK_RXD<7..0>	L:S:8000:9000	7	(400)		(400)		
	ENET_RX_DV	L:S:8000 MIL:9000 MIL						
	ENET_RX_ER	L:S:8000 MIL:9000 MIL						
	ENET_PHY_TXD<7..0>	L:S:8000:9000	7	(400)		(400)		
	ENET_LINK_TXD<7..0>	L:S::600						
	ENET_PHY_TX_ER	L:S:8000 MIL:9000 MIL						
	ENET_LINK_TX_ER	L:S::400 MIL						
	ENET_PHY_TX_EN	L:S:8000 MIL:9000 MIL						
	ENET_LINK_TX_EN	L:S::400 MIL						
	ENET_MDIO	L:S:8000 MIL:9000 MIL						
	ENET_MDC	L:S:8000 MIL:9000 MIL						
	ENET_COL	L:S:8000 MIL:9000 MIL						
	ENET_CRS	L:S:8000 MIL:9000 MIL						
FIREWIRE MII	FW_LINK_DATA<7..0>	L:S:2700:3500	7	(400)		(400)		
	FW_PHY_DATA<7..0>	L:S:4700:5500	7	(400)		(400)		
	FW_LINK_CNTL<1..0>	L:S:9000:10000						
	FW_PHY_CNTL<1..0>	L:S::300						
	FW_LINK_LREQ	L:S::300 MIL						
	FW_PHY_LREQ	L:S:8500 MIL:9500 MIL						
	FW_PINT	L:S:8500 MIL:9500 MIL						

PRIORITY: 4
PRIMARY LAYERS: 9
SECONDARY LAYERS: 4,7
GOAL: MINIMIZE TH VIAS

PRIORITY: 7
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9

PRIORITY: 6
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9

PRIORITY: 8
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9

PRIORITY: 5
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9

PRIORITY: 5
PRIMARY LAYERS: 4,7
SECONDARY LAYERS: 2,9

Differential Signals

GROUP	SIG_NAME	DIFFERENTIAL_PAIR	RELATIVE_PROPAGATION_DELAY	MAX_EXPOSED_LENGTH	NET_SPACING_TYPE	MAX_VIAS
FIREWIRE Zo = 110	FW_TPI0N	FW_TPI0	FW_TPI0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPI0P	FW_TPI0	FW_TPI0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPO0N	FW_TPO0	FW_TPO0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPO0P	FW_TPO0	FW_TPO0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPBI0N	FW_TPBI0	FW_TPBI0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPBI0P	FW_TPBI0	FW_TPBI0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPAO0N	FW_TPAO0	FW_TPAO0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPAO0P	FW_TPAO0	FW_TPAO0:G:L:S:0 MIL:5 MIL	500.0000	110 OHM SPACING	
	FW_TPA1N	FW_TPA1	FW_TPA1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPA1P	FW_TPA1	FW_TPA1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPB1N	FW_TPB1	FW_TPB1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPB1P	FW_TPB1	FW_TPB1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPI1N	FW_TPI1	FW_TPI1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPI1P	FW_TPI1	FW_TPI1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPO1N	FW_TPO1	FW_TPO1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
	FW_TPO1P	FW_TPO1	FW_TPO1:G:L:S:0 MIL:4%	500.0000	110 OHM SPACING	
ETHERNET Zo = 100	MDI_P<0>	ENET_MDI0	ENET_MDI0:G:U43.29:J23.1:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_M<0>	ENET_MDI0	ENET_MDI0:G:U43.31:J23.2:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_P<1>	ENET_MDI1	ENET_MDI1:G:U43.33:J23.3:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_M<1>	ENET_MDI1	ENET_MDI1:G:U43.34:J23.4:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_P<2>	ENET_MDI2	ENET_MDI2:G:U43.39:J23.7:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_M<2>	ENET_MDI2	ENET_MDI2:G:U43.41:J23.8:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_P<3>	ENET_MDI3	ENET_MDI3:G:U43.42:J23.9:0 MIL:100 MIL		ENET 11 MIL SPACING	
	MDI_M<3>	ENET_MDI3	ENET_MDI3:G:U43.43:J23.10:0 MIL:100 MIL		ENET 11 MIL SPACING	
LVDS Zo = 100 LOWER	CLKLVDS_LN	CLKLVDS_L	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	4
	CLKLVDS_LP	CLKLVDS_L	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	4
	LVDS_L0N	LVDS_L0	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_L0P	LVDS_L0	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_L1N	LVDS_L1	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_L1P	LVDS_L1	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_L2N	LVDS_L2	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_L2P	LVDS_L2	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
UPPER	CLKLVDS_UN	CLKLVDS_U	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	4
	CLKLVDS_UP	CLKLVDS_U	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	4
	LVDS_U0N	LVDS_U0	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_U0P	LVDS_U0	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_U1N	LVDS_U1	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_U1P	LVDS_U1	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_U2N	LVDS_U2	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
	LVDS_U2P	LVDS_U2	LVDS:G:L:S:0 MIL:110 MIL	500.0000	100 OHM SPACING	
TMDS Zo = 100	TMDS_CLKN	CLKTMDS	TMDS:G:L:S:0 MIL:50 MIL	500.0000	100 OHM SPACING	5
	TMDS_CLKP	CLKTMDS	TMDS:G:L:S:0 MIL:50 MIL	500.0000	100 OHM SPACING	5
	TMDS_DN<0>	TMDS_D0		500.0000	100 OHM SPACING	8
	TMDS_DP<0>	TMDS_D0		500.0000	100 OHM SPACING	8
	TMDS_DN<1>	TMDS_D1		500.0000	100 OHM SPACING	8
	TMDS_DP<1>	TMDS_D1		500.0000	100 OHM SPACING	8
	TMDS_DN<2>	TMDS_D2		500.0000	100 OHM SPACING	8
	TMDS_DP<2>	TMDS_D2		500.0000	100 OHM SPACING	8
	ATI_TMDS_CLKN	ATI_CLKTMDS	ATITMDS:G:L:S:0 MIL:50 MIL	200.0000	100 OHM SPACING	5
	ATI_TMDS_CLKP	ATI_CLKTMDS	ATITMDS:G:L:S:0 MIL:50 MIL	200.0000	100 OHM SPACING	5
	ATI_TMDS_DN<0>	ATI_TMDS_D0		200.0000	100 OHM SPACING	8
	ATI_TMDS_DP<0>	ATI_TMDS_D0		200.0000	100 OHM SPACING	8
	ATI_TMDS_DN<1>	ATI_TMDS_D1		200.0000	100 OHM SPACING	8
	ATI_TMDS_DP<1>	ATI_TMDS_D1		200.0000	100 OHM SPACING	8
	ATI_TMDS_DN<2>	ATI_TMDS_D2		500.0000	100 OHM SPACING	8
	ATI_TMDS_DP<2>	ATI_TMDS_D2		500.0000	100 OHM SPACING	8
USB 1.1 Zo = 90	USB_DEM	USB_DE	USB_DE:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	USB_DEP	USB_DE	USB_DE:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	USB_DFM	USB_DF	USB_DF:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	USB_DFP	USB_DF	USB_DF:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	BT_USB_DM	BT_USB_D	BT_USB:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	BT_USB_DP	BT_USB_D	BT_USB:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	USB_TPAD_N	USB_TPAD_N	TPAD_USB:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
	USB_TPAD_P	USB_TPAD_P	TPAD_USB:G:L:S:0 MIL:200 MIL		5.6 MIL SPACING	
USB 2.0 Zo = 90	NEC_USB_DAM	USB_D1	USB_D1:G:L:S:0 MIL:20 MIL	500.0000	90 OHM SPACING	
	NEC_USB_DAP	USB_D1	USB_D1:G:L:S:0 MIL:20 MIL	500.0000	90 OHM SPACING	
	NEC_USB_DBM	USB_D2	USB_D2:G:L:S:0 MIL:20 MIL	500.0000	90 OHM SPACING	
	NEC_USB_DBP	USB_D2	USB_D2:G:L:S:0 MIL:20 MIL	500.0000	90 OHM SPACING	
THERMOSTAT	THERM1_DM		THERM1:G:L:S:0 MIL:100 MIL			
	THERM1_DP		THERM1:G:L:S:0 MIL:100 MIL			
	THERM2_DM		THERM2:G:L:S:0 MIL:100 MIL			
	THERM2_DP		THERM2:G:L:S:0 MIL:100 MIL			
REMOVE CONSTRAIN TO AVOID DRC OCCUR	1772_CSSN					
	1772_CSSP					
	1772_CSIN					
	1772_CSIP					
	3V_SNSM					
	3V_SNSP					
	5V_SNSM					
	5V_SNSP					
	THERM1_M_DM					
	THERM1_M_DP					
	THERM2_M_DM					
	THERM2_M_DP					
	THERM1_A_DM					
	THERM1_A_DP					
	THERM2_A_DM					
	THERM2_A_DP					

PRIORITY: 3
PRIMARY LAYERS: 4,7 FOR CONTROLLED IMPEDANCE DIFF PAIRS
SECONDARY LAYERS: 2,9 FOR UNCONTROLLED IMPEDANCE DIFF PAIRS

LAYERS 4 OR 7
Er = 4.3 (DIELECTRIC CONSTANT)
W = 3MIL (TRACE WIDTH)
S = 11MIL (TRACE SEPERATION)
H = 16.8MIL (DIST BETW PLANES)
T = 0.6MIL (TRACE THICKNESS)

Zo(diff) = 106.2 OHMS
Zo(single) = 55.4 OHMS

Clear adjacent power plane!
Zo will be lower due to asymmetric stackup.

LAYERS 4 OR 7
Er = 4.3 (DIELECTRIC CONSTANT)
W = 3.1MIL (TRACE WIDTH)
S = 4.9MIL (TRACE SEPERATION)
H = 9.6MIL (DIST BETW PLANES)
T = 0.6MIL (TRACE THICKNESS)

Zo(diff) = 94 OHMS
Zo(single) = 50 OHMS

LAYERS 4 OR 7
Er = 4.3 (DIELECTRIC CONSTANT)
W = 3.9MIL (TRACE WIDTH)
S = 5.6MIL (TRACE SEPERATION)
H = 9.6MIL (DIST BETW PLANES)
T = 0.6MIL (TRACE THICKNESS)

Zo(diff) = 89.8 OHMS
Zo(single) = 46.6 OHMS

LAYERS 2 OR 9

SIGNAL CONSTRAINTS - PAGE 2

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 39 OF 46	

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	41
	+BATT	VOLTAGE=12.8V	MIN_LINE_WIDTH=10MIL	MIN_NECK_WIDTH=25MIL	
	+PBUS	VOLTAGE=12.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
	+5V_MAIN	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
	+5V_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
	+3V_MAIN	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	24 41
	+3V_SLEEP	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=6	41
	+3V_PMU	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
	+2_5V_MAIN	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
	+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	41
	+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	
	+1_5V_SLEEP_VIN	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	
ADAPTER	+ADAPTER	VOLTAGE=24V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	32 33 41
	1486 +ADAPTER_SW	VOLTAGE=24V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	32 40
	+ADAPTER_SW	VOLTAGE=24V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	32 40
	+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 41
	BATT_NEG	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	32 41
	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=25	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		32
	1772_DLOV	VOLTAGE=5.4V	MIN_LINE_WIDTH=10		32
	1772_GND	VOLTAGE=0V	MIN_LINE_WIDTH=10		32
PMU	+ADAPTER_ILIM	VOLTAGE=24V	MIN_LINE_WIDTH=10		33
	+ADAPTER_OR_BATT	VOLTAGE=24V	MIN_LINE_WIDTH=10		33
	+4_85V_RAW	VOLTAGE=4.85V	MIN_LINE_WIDTH=10		31 33
	+4_6V_BU	VOLTAGE=4.6V	MIN_LINE_WIDTH=10		33 34
	+4_85V_ESR	VOLTAGE=4.85V	MIN_LINE_WIDTH=10		33
	+3V_PMU_ESR	VOLTAGE=3.3V	MIN_LINE_WIDTH=10		33
	+3V_PMU_AVCC	VOLTAGE=3.3V	MIN_LINE_WIDTH=10		27 31
MISC HD	+5V_HD_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	26 34
	+HD_LOGIC_SLEEP	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	26
TRACKPAD	+5V_TPAD_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=10		41
HALL EFFECT	+3V_HALL_EFFECT	VOLTAGE=3.3V	MIN_LINE_WIDTH=10		24 41
VIDEO	+14V_INV	VOLTAGE=14V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	23 41
	+5V_INV_UF_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	23
	+5V_INV_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	23 41
	+5V_DDC_SLEEP	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	23 41
	+5V_DDC_SLEEP_UF	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	23
	+3V_LCD	VOLTAGE=3.3V	MIN_LINE_WIDTH=12	MIN_NECK_WIDTH=10	23 41
	+3V_LCD_SW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	23
	GPU_TV_GND1	VOLTAGE=0V	MIN_LINE_WIDTH=25		23
	GPU_TV_GND2	VOLTAGE=0V	MIN_LINE_WIDTH=25		23
	TV_GND1	VOLTAGE=0V	MIN_LINE_WIDTH=25		23 41
	TV_GND2	VOLTAGE=0V	MIN_LINE_WIDTH=25		23 41
AUDIO	1385 +5V_MAIN_AUD	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	27 34
	1385 +3V_MAIN_AUD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	27 34
	1385 AUD_GND	VOLTAGE=0V	MIN_LINE_WIDTH=50		27
FAN	1388 +FAN_PWR	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	27 41
	FAN1_GND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
	FAN2_GND	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41

I/O AREA	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=6	IN
INVERTER	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12	IN
	CHGND1			
TRACKPAD	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12	IN
	CHGND2			
LVDS	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12	IN
	CHGND3			
	VOLTAGE=0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=12	IN
	CHGND4			

ENET_CTAP_CHGND VOLTAGE=0V MIN_LINE_WIDTH=25 MIN_NECK_WIDTH=12

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
CPU	CPU_VCORE_SLEEP	VOLTAGE=1.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	5 6 35 41
	CPU_AVDD	VOLTAGE=1.3V	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
	1386 CPU_AVDD_VIN	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	5
	1386 CPU_AVDD_VOUT	VOLTAGE=1.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	5
DDR RAM	DDR_VREF	VOLTAGE=1.25V	MIN_LINE_WIDTH=10		11
INTREPID	1385 +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
PLLS	+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=10	MIN_NECK_WIDTH=6	14
	+1_5V_INTREPID_PLL4	VOLTAGE=1.5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=6	14
	+1_5V_INTREPID_PLL5	VOLTAGE=1.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=6	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		9
	INT_AGP_VREF	VOLTAGE=1.25V	MIN_LINE_WIDTH=10		12 19
	INT_MEM_REF_H	VOLTAGE=0V	MIN_LINE_WIDTH=10		9
	VIDE_REF	VOLTAGE=0V	MIN_LINE_WIDTH=8		13
AIRPORT	+3V_AIRPORT	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	41
CARDBUS	1386 +3V_SLEEP_PCCARD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	18
	+VCC_CBUS_SW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	18
	+VPP_CBUS_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	18
ATI M11	GPU_VCORE	VOLTAGE=1.2V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	19 21 41
	+3V_GPU	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	12 19 21 22
	+3V_GPU_FLT	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	22
	+2_5V_GPU	VOLTAGE=2.5V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	22
	GPU_MEM_IO	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	19 22
	GPU_MEM_IO_FLT	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	22
	+2_5V_GPU_MEMCORE	VOLTAGE=2.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	22
	+1_8V_GPU	VOLTAGE=1.8V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	19 20 21 22
	+1_5V_AGP	VOLTAGE=1.5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	12 15 16 19 21 22
	+2_5V_GPU_PNLIO	VOLTAGE=2.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	22
	+1_8V_ATI_PVDD	VOLTAGE=1.8V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21 22
	+1_5V_AGP_GPU	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	22
	+1_5V_GPU_VDD15	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21
	+1_8V_GPU_PLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
	+1_8V_GPU_VDDDI	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
	GPU_VCORE_VDDCI	VOLTAGE=1.2V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	19
	+2_5V_GPU_A2VDD	VOLTAGE=2.5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
	+1_8V_GPU_AVDD	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
	+1_8V_GPU_PNLPLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
	+1_8V_GPU_PNLIO	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
	+2_5V_GPU_MCLK	VOLTAGE=2.5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10	22
	+1_8V_GPU_AVDDQ	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10	22
	+1_8V_GPU_MEMPLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10	22
	+3V_ATI_OSC_SLEEP	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10	19
	+3V_ATI_SS	VOLTAGE=3.3V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10	19
	+GPU_VDD15_UF	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21
	1346 +2_5V_SLEEP_NECK1	VOLTAGE=2.5V	MIN_LINE_WIDTH=10		21
	1346 +3V_SLEEP_NECK	VOLTAGE=3V	MIN_LINE_WIDTH=10		36
	1346 +1_5V_AGP_NECK	VOLTAGE=1.5V	MIN_LINE_WIDTH=10		21
	1386 +1_8V_PVDD_NECK	VOLTAGE=1.8V	MIN_LINE_WIDTH=10		21
	1386 GPU_VCORE_NECK	VOLTAGE=1.2V	MIN_LINE_WIDTH=10		21
	1386 +GPU_VDD15_NECK	VOLTAGE=1.5V	MIN_LINE_WIDTH=10		21
	1386 +2_5V_SLEEP_NECK2	VOLTAGE=2.5V	MIN_LINE_WIDTH=10		36
	1386 +1_8V_SLEEP_NECK	VOLTAGE=1.8V	MIN_LINE_WIDTH=10		36
	1386 +1_5V_SLEEP_NECK	VOLTAGE=1.5V	MIN_LINE_WIDTH=10		36
	1386 +1_8V_ATI_TPVDD	VOLTAGE=1.8V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	22
	1386 +1_8V_GPU_TP_PLL	VOLTAGE=1.8V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	22
ETHERNET 88E1111	+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=10	28
	+1_0V_MARVELL	VOLTAGE=1.0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	28
	LTC3405_SW	VOLTAGE=1.0V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	28
NEC USB2.0	1414 +3V_NEC_VDD	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	17
	1414 NEC_AVDD	VOLTAGE=3.3V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	17
FW	LM2594_IN	VOLTAGE=33V	MIN_LINE_WIDTH=40	MIN_NECK_WIDTH=12	29
	1412 +FW_PBUS	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
	1345 +FW_AMP_SENSE	VOLTAGE=12.8V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	
	+FW_PWR_OR	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	29 30
	1416 +FW_PWR1	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	30
	+FW_VP0	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	30 41
	+FW_VP1	VOLTAGE=33V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	30 41
	+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=10	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
	1414 FW_VGND1	VOLTAGE=0V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	30
	1386 FW_VDD_ON	VOLTAGE=12.8V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=12	

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH	
LTC1625 14V SWITCHER	1625_VIN	VOLTAGE=24V	MIN_LINE_WIDTH=10		33
	1625_VSW	VOLTAGE=14V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	33
	+PBUS_JUMPER	VOLTAGE=14V	MIN_LINE_WIDTH=10		33
	1625_EXTVCC	VOLTAGE=5V	MIN_LINE_WIDTH=10		33
	1625_INTVCC	VOLTAGE=5V	MIN_LINE_WIDTH=10		33
	1625_SGND	VOLTAGE=0V	MIN_LINE_WIDTH=10		33
	1V20_REF	VOLTAGE=1.2V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	32 33
LTC3707 5V SWITCHER	3707_INTVCC	VOLTAGE=5V	MIN_LINE_WIDTH=10	MIN_NECK_WIDTH=10	34
	5V_SW	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	34
	5V_RSNS	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	34
	+5V_MAIN_JUMPER	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	34
3V SWITCHER	3V_SW	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	34
	3V_RSNS	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	34
	+3V_MAIN_JUMPER	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	34
	3707_SGND	VOLTAGE=0V	MIN_LINE_WIDTH=10		34
MAX1715 2.5V SWITCHER	2_5V_LX	VOLTAGE=2.5V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	36
	2_5V_LX_F	VOLTAGE=2.5V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	36
	2_5V_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	36
	2_5V_BOOST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	36
	2_5V_DH	VOLTAGE=2.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	36
	2_5V_DL	VOLTAGE=2.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	36
1.65V SWITCHER	1_5V_FB	VOLTAGE=1.5V	MIN_LINE_WIDTH=8		36
	1_5V_LX	VOLTAGE=1.5V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	36
	1_5V_LX_F	VOLTAGE=1.5V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	36
	1_5V_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	36
	1_5V_BOOST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	36
	1_5V_DH	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	36
	1_5V_DL	VOLTAGE=1.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	36
CONTROL	1_5V_ILIM		MIN_LINE_WIDTH=8		36
	2_5V_ILIM		MIN_LINE_WIDTH=8		36
	MAX1715_TON		MIN_LINE_WIDTH=8		36
	MAX1715_SKIP		MIN_LINE_WIDTH=8		36
	MAX1715_REF	VOLTAGE=2.0V	MIN_LINE_WIDTH=8		36
	MAX1715_VCC	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	36
	MAX1715_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	36
	VCORE_VCC	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	35
MAX1717	VCORE_LX	VOLTAGE=1.4V	MIN_LINE_WIDTH=200	MIN_NECK_WIDTH=10	35
	VCORE_DH		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	35
	VCORE_DL		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	35
	VCORE_BOOST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	35
	VCORE_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	35
	VCORE_ILIM		MIN_LINE_WIDTH=8		35
	VCORE_REF		MIN_LINE_WIDTH=8		35
	VCORE_TON	VOLTAGE=5V	MIN_LINE_WIDTH=8		35
	VCORE_CC		MIN_LINE_WIDTH=8		35
	VCORE_FB	VOLTAGE=1.4V	MIN_LINE_WIDTH=8		35 41
	VCORE_TIME		MIN_LINE_WIDTH=8		35
	VCORE_VGATE		MIN_LINE_WIDTH=8		14 35
	VCORE_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30		35
	VCORE_GNDSNS	VOLTAGE=0V	MIN_LINE_WIDTH=8		35
	VCORE_SNS	VOLTAGE=1.4V	MIN_LINE_WIDTH=8		35
	VCORE_GNDDIV	VOLTAGE=0V	MIN_LINE_WIDTH=8		35
	1331 VCORE_GNDA	VOLTAGE=0V	MIN_LINE_WIDTH=10		35
LTC1778	1778_VIN	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21
	1778_VCC	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21
	1778_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	21
	1778_BST	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	21
	1778_BST_RC	VOLTAGE=5V	MIN_LINE_WIDTH=15	MIN_NECK_WIDTH=10	21
	1778_TG		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21
	1778_BG		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	21
	GPU_VCORE_SW	VOLTAGE=1.2V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	21
	GPU_VCORE_SW_F	VOLTAGE=1.2V	MIN_LINE_WIDTH=50	MIN_NECK_WIDTH=10	21
	1778_ION		MIN_LINE_WIDTH=8		21
	1778_ITH		MIN_LINE_WIDTH=8		21
	1778_ITH_RC		MIN_LINE_WIDTH=8		21
	1778_VFB		MIN_LINE_WIDTH=8		21 41
	1778_FCB		MIN_LINE_WIDTH=8		21
	1778_VRNG		MIN_LINE_WIDTH=8		21
LTC3411	LTC3411_VCC	VOLTAGE=3.3V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	36
	LTC3411_GND	VOLTAGE=0V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	36
	1_8V_SW	VOLTAGE=1.8V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	36
	1_8V_SW_F	VOLTAGE=1.8V	MIN_LINE_WIDTH=30	MIN_NECK_WIDTH=10	36
	1_8V_VFB		MIN_LINE_WIDTH=8		36
	LTC3411_ITH_RC		MIN_LINE_WIDTH=8		36
	LTC3411_ITH		MIN_LINE_WIDTH=8		36
	LTC3411_SYNC		MIN_LINE_WIDTH=8		36
	LTC3411_SHDN		MIN_LINE_WIDTH=8		36
LTC1962 INT PLLS	LTC1962_INT_VIN		MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10	14
CY28512D LMU CONN	1385 +3V_MAIN_SSCG	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	
	1385 +3V_MAIN_LMU	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	24
OPT DRIVER	1385 +5V_SLEEP_OPT	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10	26

SIGNAL CONSTRAINTS - PAGE 3

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 40 OF 46	

FUNCTIONAL TEST POINTS

PROBES ARE ON BOTTOM SIDE. MINIMUM PAD/HOLE SIZE IS 25 MIL.
FUNC_TEST IS ONLY PROPERTY USED BY THE TOOLS. FUNC_QTY IS FOR REFERENCE AND LISTS THE NUMBER OF TEST POINTS ON THAT NET AND WITHIN THAT GROUP/CONNECTOR.
FUNC_DIST IS SIMILARLY USED TO DEFINE MAXIMUM DISTANCE FROM A CONNECTOR.

GROUP	SIG_NAME	FUNC_TEST	FUNC_QTY	FUNC_DIST	
SCAN/TEST	JTAG_ASIC_TMS	TRUE			13 28
	JTAG_ASIC_TDI	TRUE			13
	JTAG_ASIC_TDO_TP	TRUE			28
	JTAG_ASIC_TCK	TRUE			13 28
	JTAG_ASIC_TRST_L	TRUE			13 28
	CPU_CHKSTP_OUT_L	TRUE			5
	CPU_SRESET_L	TRUE			5
	CPU_HRESET_L	TRUE			5 6 7
	JTAG_CPU_TMS	TRUE			5 6
	JTAG_CPU_TDI	TRUE			5 6
	JTAG_CPU_TDO_TP	TRUE			5
	JTAG_CPU_TCK	TRUE			5 6
	JTAG_CPU_TRST_L	TRUE			5 6
	INT_JTAG_TEI	TRUE			13
	INT_TST_MONIN_PD	TRUE			13
	INT_TST_MONOUT_TP	TRUE			13
	INT_TST_PLLEN_PD	TRUE			13
INT I2C	INT_I2C_CLK0	TRUE			6 11 13 24
	INT_I2C_DATA0	TRUE			6 11 13 24
	INT_I2C_CLK1	TRUE			13 14 24 25 27
	INT_I2C_DATA1	TRUE			13 14 24 25 27
PWR/GND	+PBUS	TRUE			40
	+24V_PBUS	TRUE			40
	GPU_VCORE	TRUE			19 21 40
	1778_VFB	TRUE			21 40
	CPU_VCORE_SLEEP	TRUE			5 6 35 40
	VCORE_FB	TRUE			35 40
	+1_8V_MAIN	TRUE			40
	+2_5V_MAIN	TRUE			40
	+5V_MAIN	TRUE	2		40 41
	+5V_SLEEP	TRUE	2		40 41
	+3V_MAIN	TRUE	4		24 40
		TRUE		1000	IN
	+3V_PMU	TRUE			40
CARDBUS DVI	CBUS_DET_1_L	TRUE		2000	18
	CBUS_DET_2_L	TRUE		2000	18
	TMDS_CONN_CLKN	TRUE		1000	23 38
	TMDS_CONN_CLKP	TRUE		1000	23 38
	VGA_R	TRUE		1000	23
	VGA_G	TRUE		1000	23
	VGA_B	TRUE		1000	23
	VGA_HSYNC	TRUE		1000	23
	VGA_VSYNC	TRUE		1000	23
	DVI_DDC_CLK_UF	TRUE		1000	23
	DVI_DDC_DATA_UF	TRUE		1000	23
	DVI_HPD_UF	TRUE		1000	23
	+5V_DDC_SLEEP	TRUE		2000	23 40
		TRUE	2	2000	IN
CHGND1		TRUE	6	1000	IN
LVDS	LVDS_L0N			1000	21 23 39
	LVDS_L0P			1000	21 23 39
	LVDS_L1N			1000	21 23 39
	LVDS_L1P			1000	21 23 39
	LVDS_L2N			1000	21 23 39
	LVDS_L2P			1000	21 23 39
	CLKLVDS_LN	TRUE		1000	21 23 39
	CLKLVDS_LP	TRUE		1000	21 23 39
	LVDS_DDC_CLK	TRUE		1000	21 23
	LVDS_DDC_DATA	TRUE		1000	21 23
	+3V_LCD	TRUE	2	2000	23 40
	+3V_SLEEP	TRUE		2000	40 41
		TRUE	2	2000	IN
CHGND4		TRUE	6	1000	IN
INVERTER	+14V_INV	TRUE		2000	23 40
	+5V_INV_SW	TRUE		2000	23 40
	BRIGHT_PWM	TRUE		2000	23
	INV_GND	TRUE		2000	23
		TRUE		1000	IN
S-VIDEO	TV_C	TRUE		2000	23
	TV_Y	TRUE		2000	23
	TV_COMP	TRUE		2000	23
	TV_GND1	TRUE		2000	23 40
	TV_GND2	TRUE		2000	23 40
LIO	INT_I2S0_SND_TO_DAC	TRUE		1000	14 27
	INT_I2S0_SND_LRCLK	TRUE		1000	14 27
	INT_I2S0_SND_MCLK	TRUE		1000	14 27 37
	INT_I2S0_SND_SCLK	TRUE		1000	14 27
	INT_I2S0_SND_FROM_ADC	TRUE		1000	14 27
	SND_HP_MUTE_L	TRUE		1000	14 27
	SND_AMP_MUTE	TRUE		1000	27
	SND_HW_RESET_L	TRUE		1000	14 27
	SND_HP_SENSE_L	TRUE		1000	14 27
	SND_LIN_SENSE_L	TRUE		1000	14 27
	INT_I2C_CLK2	TRUE		1000	14 27
	INT_I2C_DATA2	TRUE		1000	14 27
	ADAPTER_DET	TRUE		1000	27 31
	CHARGE_LED_L	TRUE		1000	27 31
	NEC_LUSB_OCI_UF	TRUE		1000	17 27
	NEC_LUSB_PPON	TRUE		1000	17 27
	+5V_MAIN	TRUE	2	2000	40 41
	+5V_SLEEP	TRUE	2	3000	40 41
	+3V_SLEEP	TRUE		2000	40 41

GROUP	SIG_NAME	FUNC_TEST	FUNC_QTY	FUNC_DIST	
USB	NEC_USB_DAM	TRUE			17 27 39
	NEC_USB_DAP	TRUE			17 27 39
	NEC_USB_DBM	TRUE			17 27 39
	NEC_USB_DBP	TRUE			17 27 39
	BT_USB_DM	TRUE			14 27 39
	BT_USB_DP	TRUE			14 27 39
	USB_TPAD_N	TRUE			14 24 39
	USB_TPAD_P	TRUE			14 24 39
RT. USB	NEC_RUSB_PPON	TRUE			17 27
	NEC_RUSB_OCI_UF	TRUE			17 27
WIRELESS	PCI_AD<0..31>	TRUE		1000	9 12 17 18 26 39
	PCI_FRAME_L	TRUE		1000	12 17 18 26 39
	PCI_TRDY_L	TRUE		1000	12 17 18 26 39
	PCI_IRDY_L	TRUE		1000	12 17 18 26 39
	PCI_DEVSEL_L	TRUE		1000	12 17 18 26 39
	PCI_STOP_L	TRUE		1000	12 17 18 26 39
	PCI_PAR	TRUE		1000	12 17 18 26 39
	AIRPORT_PCI_REQ_L	TRUE		1000	12 26
	AIRPORT_PCI_GNT_L	TRUE		1000	12 26
	AIRPORT_PCI_INT_L	TRUE		1000	14 26
	MAIN_RESET_L	TRUE		1000	14 17 18 19 20 26 31
	CLK33M_AIRPORT	TRUE		1000	12 26 37
	PMU_PME_L	TRUE		1000	14 17 26 31
	ROM_ONBOARD_CS_L	TRUE		1000	9
	ROM_OE_L	TRUE		1000	9 12
	ROM_CS_L	TRUE		1000	9 12
	ROM_RW_L	TRUE		1000	9 12
	RF_DISABLE_L	TRUE		1000	26
	AIRPORT_CLKRUN_L	TRUE		1000	26
	+3V_AIRPORT	TRUE	4	2000	40
		TRUE	6	1000	IN
OPTICAL	EIDE_OPTICAL_DATA<0..15>	TRUE		2000	26 39
	EIDE_OPTICAL_DMA_RQ	TRUE		2000	26 39
	EIDE_OPTICAL_READ_L	TRUE		2000	26 39
	EIDE_OPTICAL_DMAACK_L	TRUE		2000	26 39
	EIDE_OPTICAL_ADDR<0..2>	TRUE		2000	26 39
	EIDE_OPTICAL_CS0_L	TRUE		2000	26 39
	EIDE_OPTICAL_CS1_L	TRUE		2000	26 39
	EIDE_OPTICAL_RST_L	TRUE		2000	26 39
	EIDE_OPTICAL_WR_L	TRUE		2000	26 39
	EIDE_OPTICAL_IOCHRDY	TRUE		2000	26 39
	EIDE_OPTICAL_INT	TRUE		2000	26 39
TRACKPAD	+5V_TPAD_SLEEP	TRUE		3000	40
	TPAD_F_TXD	TRUE		3000	
	TPAD_F_RXD	TRUE		3000	
	SOFT_PWR_ON_L	TRUE		3000	23 24 31 35
MODEM/ SERIAL	COMM_RESET_L	TRUE		4000	14 27
	COMM_SHUTDOWN	TRUE		4000	
	COMM_RING_DET_L	TRUE		4000	14 27 31
	COMM_TXD_L	TRUE		4000	14 27
	COMM_TRXC	TRUE		4000	14 27
	COMM_GPIO_L	TRUE		4000	14 27
	COMM_DTR_L	TRUE		4000	14 27
	COMM_RTS_L	TRUE		4000	14 27
	COMM_RXD	TRUE		4000	14 27
KEYBOARD	KBD_ID	TRUE		3000	24 31
	KBD_INTL	TRUE		3000	
	KBD_JIS	TRUE		3000	
	KBD_CAPSLOCK_LED	TRUE		3000	
	KBD_NUMLOCK_LED	TRUE		3000	
	KBD_FUNCTION_L			3000	24 31
	KBD_COMMAND_L			3000	24 31
	KBD_OPTION_L			3000	24 31
	KBD_CONTROL_L			3000	24 31
	KBD_SHIFT_L			3000	24 31
	KBD_X<0..9>			3000	24 31
	KBD_Y<0..7>	TRUE		3000	
BATTERY	+BATT_POS	TRUE	(100 MIL PROBE PREFERRED)	1000	32 40
	BATT_NEG	TRUE	(100 MIL PROBE PREFERRED)	1000	32 40
	BATT_CLK	TRUE		1000	32
	BATT_DATA	TRUE		1000	32
	PMU_BATT_DET_L	TRUE		1000	31 32
FANS	+FAN_PWR	TRUE		3000	27 40
	FAN1_TACH	TRUE		3000	27
	FAN2_TACH	TRUE		3000	27
	FAN1_GND	TRUE		3000	40
	FAN2_GND	TRUE		3000	40
ETHERNET	MDI_P<0..3>	TRUE		1000	28 39
	MDI_M<0..3>	TRUE		1000	28 39
FIREWIRE	FW_TPO0P	TRUE		1000	29 30 39
	FW_TPO0N	TRUE		1000	29 30 39
	FW_TPO0R	TRUE		1000	30
	FW_TPI0P	TRUE		1000	29 30 39
	FW_TPI0N	TRUE		1000	29 30 39
	+FW_VP0	TRUE		1000	30 40
	FW_VGND	TRUE		1000	41

GROUP	SIG_NAME	FUNC_TEST	FUNC_QTY	FUNC_DIST	
FIREWIRE (CONT.)	FW_TPO1P	TRUE		1000	30 39
	FW_TPO1N	TRUE		1000	30 39
	FW_TPI1P	TRUE		1000	30 39
	FW_TPI1N	TRUE		1000	30 39
	+FW_VP1	TRUE		1000	30 40
	FW_VGND	TRUE		1000	41
DC PWR IN	+ADAPTER	TRUE	3 (100 MIL PROBE PREFERRED)	1000	32 33 40
LMU/ALS	ST7_SLEEP_LED_H	TRUE			24
	PMU_SLEEP_LED	TRUE			24
	PMU_LID_CLOSED_L	TRUE			24 31
	LMU_DETECT	TRUE			24
		TRUE	6	1000	IN
MISC.	SLEEP_LED	TRUE	(100 MIL PROBE PREFERRED)		24
	PMU_KB_RESET_L	TRUE			
	SLEEP	TRUE			24 27 31 34 36
	PMU_CPU_HRESET_L	TRUE			6 31
	BB_RESET_L	TRUE			6
	+3V_PMU_RESET	TRUE			31 35
	MMM_ACC_X_AXIS	TRUE			25
	MMM_ACC_Y_AXIS	TRUE			25
	MMM_ACC_Z_AXIS	TRUE			25
	MMM_ACC_SELFTEST	TRUE			25
	+BATT_ISNS_P	TRUE			25
	+PPBATT_ISNS_N	TRUE			25
	+PWR_SUPERCAP	TRUE			33
	REMOVE CONSTRAIN FOR UNUSED FUNCTIONAL TP				
	+3V_HALL_EFFECT				24 40
	LID_CLOSED_L				24
	TMDS_DN<0..2>				20 23 39
	TMDS_DP<0..2>				20 23 39

APPLE COMPUTER INC.

SIZE D | DRAWING NUMBER 051-6680 | REV. F

SCALE NONE | SHT 41 OF 46

REVISION HISTORY

EVT2 RELEASE

08/13/04 - 1. CHANGE EXT TMDS SWING RESISTORS TO 510 OHM (R869, R876), REMOVE SI_RESET PULL HIGH
2. CHANGE RGB SIGNAL INPEDENCE (R341, R342, R346, R456, R458, R462)
3. ADD 2 RESISTORS (NO STUFF) BETWEEN FAN_PWM AND FAN_PWM_L OF FAN1 AND FAN2
4. CHANGE 2 CAPS (C233, C803) TO IMPROVE FEEDBACK PROTECTION AND PBUS CURRENT LIMIT CIRCUIT
5. MODIFY CPU_VCORE VID AND CPU_VCORE SETTING

08/16/04 - 1. MODIFY CPU_AVDD SETTING
08/20/04 - 1. ADD TRACKPAD POWER +5V_TPAD CONTROL CIRCUIT
09/01/04 - 1. CHANGE ALL FONTS INTO SMALL ONES
09/02/04 - 1. MODIFT CPU_VCORE VID AND CPU_VCORE SEETING AGAIN
2. MODIFY CPU_AVDD SEETING AGAIN
3. CHANGE INT TMDS DAMPING RESISTERS (R760-R767) TO 0 OHM
09/03/04 - 1. ADD MMM CIRCUIT, ARRANGE 2 INTREPID GPIOS FOR MM_FFIRQ_L, MM_SIRQ_L AND PULL UP RESISTORS R801, R802
2. ADD R803 BETWEEN DP6 AND DCDC_IN
3. ADD R804 AND SUPERCAP C692 ON +4_6V_BU
4. CHANGE TRACKPAD CONNECTOR J10 AND PIN OUT

09/06/04 - 1. ADD EMI SOLUTION L12
09/07/04 - 1. CHANGE TRACKPAD CONNECTOR PIN OUT
09/08/04 - 1. ADD BATTERY CURRENT SENSOR CIRCUIT
09/09/04 - 1. ADD EMI SOLUTION R816; ADD MMM RESET CIRCUIT
09/10/04 - 1. MODIFY FIREWIRE PORT0 POWER CIRCUIT
2. ADD NET FROM BATTERY CURRENT SENSOR CIRCUIT TO PMU
09/13/04 - 1. ADD CURRENT LIMITER R821 BETWEEN PMU(U29) AND U33
2. ADD PULL UP AND PULL DOWN RESISTORS FOR MMM SENSOR

DVT RELEASE

09/27/04 - 1. ADD ST MMM SENSOR CIRCUIT
10/14/04 - 2. ADD FIREWIRE POWER PROTECT CIRCUIT
10/15/04 - 3. CHANGE EXT_TMDS TERMINAL RESISTERS AND V SWINING RESISTOR
10/22/04 - 4. CHANGE FAN CONTROLLER FROM ADT7460 TO ADT7467
11/02/04 - 5. CHANGE BBANG IC TO ATTINY2313

PVT RELEASE

12/17/04 - 1. REMOVE ALL OPEN JUMPER
12/17/04 - 2. SCHEMATIC RELEASE FOR PRODUCTION

PVT RELEASE (REV C)

02/11/05 - 1. CHANGE FW F3 TO 740S0018

PRODUCTION RELEASE (REV D)

04/12/05 - 1. ADD MPU R1.4
2. CHANGE 88E1111 B1(338S0223) TO PRIMARY AND B0 (338S0079) TO SECONDARY

PRODUCTION RELEASE (REV E)

08/24/05 - 1. ADD MPU R1.5 (337S3217 AND 337S3218)
08/25/05 - 1. ADD 341S1792 (BOOTROM,4.9.1F3)

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 42 OF 46	

8 7 6 5 4 3 2 1

D

C

B

A

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

8 7 6 5 4 3 2 1

```
PCI_STOP_L       12A7< 12C7<> 17B7<> 18B7<> 26C5<>
                 39C5> 41C3>
PCI_TRDY_L       12B7< 12C7<> 17B7<> 18A7<> 26C5<>
                 39C5> 41D3>
PLL_STOP_L        7C4<> 7C8<>
PMU_ACK_L        14C2< 31C4<>
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<> 41A3>
PMU_BYTE         31B6< 31C7<
PMU_CHARGE_V     31C4<> 32B8<>
PMU_CHRG_BATT_B  31C4<> 32A8<>
PMU_CLK          14C2<> 31C4<>
PMU_CNVSS        31B6< 31C7<
PMU_CPU_HRESET_L  6A2< 6C3<> 31C4<> 41C1>
PMU_CUSTOM_RESET  31A7<> 31B8<
PMU_CUSTOM_RESET_L  31A8<>
PMU_EPM          31C4<> 31D2<
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   41C1>
PMU_LID_CLOSED_L  24A1< 24D6<> 31B2< 31C4<> 41D1>
PMU_NMI_BUTTON_L  31C2< 31C4<>
PMU_NMI_L        31C2< 31C4<>
PMU_OOPS         31B2< 31B4<>
PMU_PME_L        14A5<> 17A8< 26D5<> 31B2< 31C4<>
                 41C3>
PMU_POWERUP_OK   31B4<> 31D2<
PMU_POWER_UP_L   30C8<> 31C6<> 31D7< 34BB<
PMU_RFQ_L        14B7< 14C2> 31C4<>
PMU_RESET_BUTTON_L  24A7< 31C4<> 31D2<
PMU_RESET_L      31B6< 31B7>
PMU_SELECT       31C6<>
PMU_SLEEP_LED    24C7<> 24D6<> 41D1>
PMU_SLEEP_LED_L  24C6<> 31C4<>
PMU_SMB_CLK      31B4<> 31C2< 32A3<
PMU_SMB_DATA     31B4<> 31C2< 32A2<
PMU_TO_INT       14C2<> 31C4<>
POWER_UP         30D7<>
POWER_VALID      31B2< 31C4<>
PP3V3_MMM        25C8< 25D5<
PP3V3_MMM_PIC    25C1< 25D5<
PP3V3_SI_AVCC1   20C7< 20D7<
PP3V3_SI_AVCC2   20C5< 20D7<
PP3V3_SI_PVCC1   20C7<
PP3V3_SI_PVCC2   20C5<
PP3V3_SI_VCC1    20C7< 20D8<
PP3V3_SI_VCC2    20C5< 20D7<
PWR_BUTTON_L     24A7< 24B3<>
RAM_ADDR<0>      9B4< 11B3<> 11B6<>
RAM_ADDR<12..0>  37A5>
RAM_ADDR<1>      9B4< 11B5<> 11B8<>
RAM_ADDR<2>      9B4< 11B3<> 11B6<>
RAM_ADDR<3>      9B4< 11B5<> 11B8<>
RAM_ADDR<4>      9B4< 11B3<> 11B6<>
RAM_ADDR<5>      9B4< 11B5<> 11B8<>
RAM_ADDR<6>      9B4< 11B3<> 11B6<>
RAM_ADDR<7>      9B4< 11B5<> 11B8<>
RAM_ADDR<8>      9B4< 11B3<> 11B6<>
RAM_ADDR<9>      9A4< 11B5<> 11B8<>
RAM_ADDR<10>     9A4< 11B5<> 11B8<>
RAM_ADDR<11>     9A4< 11B3<> 11B6<>
RAM_ADDR<12>     9A4< 11B5<> 11B8<>
RAM_BA<0>        9A4< 11B5<> 11B8<>
RAM_BA<1..0>     37A5>
RAM_BA<1>        9A4< 11B3<> 11B6<>
RAM_CAS_L        9A4< 11B3<> 11B6<> 37A5>
RAM_CKE<0>       9A4< 9C4< 11C6<>
RAM_CKE<3..0>    37A5>
RAM_CKE<1>       9A4< 9C4< 11C8<>
RAM_CKE<2>       9A4< 9C4< 11C3<>
RAM_CKE<3>       9A4< 9C4< 11C5<>
RAM_CS_L<0>      9C4< 11B8<>
RAM_CS_L<3..0>   37A5>
RAM_CS_L<1>      9C4< 11B6<>
RAM_CS_L<2>      9C4< 11B5<>
RAM_CS_L<3>      9C4< 11B3<>
RAM_DATA_A<0>    10C8<> 11D8<>
RAM_DATA_A<7..0>  37D5>
RAM_DATA_A<1>    10C8<> 11D8<>
RAM_DATA_A<2>    10C8<> 11D8<>
RAM_DATA_A<3>    10B8<> 11D6<>
RAM_DATA_A<4>    10B8<> 11D6<>
RAM_DATA_A<5>    10B8<> 11D6<>
RAM_DATA_A<6>    10B8<> 11D6<>
RAM_DATA_A<7>    10B8<> 11D6<>
RAM_DATA_A<8>    10B8<> 11D8<>
RAM_DATA_A<15..8>  37C5>
RAM_DATA_A<9>    10C7<> 11D8<>
RAM_DATA_A<10>   10C7<> 11D8<>
RAM_DATA_A<11>   10C7<> 11D8<>
RAM_DATA_A<12>   10C7<> 11D6<>
RAM_DATA_A<13>   10C7<> 11D6<>
RAM_DATA_A<14>   10C7<> 11D6<>
RAM_DATA_A<15>   10C7<> 11D6<>
RAM_DATA_A<16>   10C6<> 11D8<>
RAM_DATA_A<23..16>  37C5>
RAM_DATA_A<17>   10C6<> 11C8<>
RAM_DATA_A<18>   10C6<> 11C8<>
RAM_DATA_A<19>   10B6<> 11C8<>
RAM_DATA_A<20>   10B6<> 11D6<>
RAM_DATA_A<21>   10B6<> 11C6<>
RAM_DATA_A<22>   10B6<> 11C6<>
RAM_DATA_A<23>   10B6<> 11C6<>
RAM_DATA_A<24>   10B6<> 11C8<>
RAM_DATA_A<31..24>  37C5>
RAM_DATA_A<25>   10C5<> 11C8<>
RAM_DATA_A<26>   10C5<> 11C8<>
RAM_DATA_A<27>   10C5<> 11C8<>
RAM_DATA_A<28>   10C5<> 11C6<>
RAM_DATA_A<29>   10C5<> 11C6<>
RAM_DATA_A<30>   10C5<> 11C6<>
RAM_DATA_A<31>   10C5<> 11C6<>
RAM_DATA_A<32>   10C4<> 11B8<>
RAM_DATA_A<39..32>  37B5>
RAM_DATA_A<33>   10C4<> 11B8<>
RAM_DATA_A<34>   10C4<> 11B8<>
RAM_DATA_A<35>   10C4<> 11B8<>
RAM_DATA_A<36>   10B4<> 11B6<>
RAM_DATA_A<37>   10B4<> 11B6<>
RAM_DATA_A<38>   10B4<> 11B6<>
RAM_DATA_A<39>   10B4<> 11B6<>
RAM_DATA_A<40>   10B4<> 11B8<>
RAM_DATA_A<47..40>  37B5>
RAM_DATA_A<41>   10D3<> 11B8<>
RAM_DATA_A<42>   10C3<> 11A8<>
RAM_DATA_A<43>   10C3<> 11A8<>
RAM_DATA_A<44>   10C3<> 11B6<>
RAM_DATA_A<45>   10C3<> 11B6<>
RAM_DATA_A<46>   10C3<> 11A6<>
RAM_DATA_A<47>   10C3<> 11A6<>
RAM_DATA_A<48>   10C2<> 11A8<>
RAM_DATA_A<55..48>  37B5>
RAM_DATA_A<49>   10C2<> 11A8<>
RAM_DATA_A<50>   10C2<> 11A8<>
RAM_DATA_A<51>   10C2<> 11A8<>
RAM_DATA_A<52>   10B2<> 11A6<>
RAM_DATA_A<53>   10B2<> 11A6<>
RAM_DATA_A<54>   10B2<> 11A6<>
RAM_DATA_A<55>   10B2<> 11A6<>
RAM_DATA_A<56>   10B2<> 11A8<>
RAM_DATA_A<63..56>  37A5>
RAM_DATA_A<57>   10D1<> 11A8<>
RAM_DATA_A<58>   10C1<> 11A8<>
RAM_DATA_A<59>   10C1<> 11A8<>
RAM_DATA_A<60>   10C1<> 11A6<>
RAM_DATA_A<61>   10C1<> 11A6<>
RAM_DATA_A<62>   10C1<> 11A6<>
RAM_DATA_A<63>   10C1<> 11A6<>
RAM_DATA_B<0>    10C8<> 11D5<>
RAM_DATA_B<7..0>  37D5>
RAM_DATA_B<1>    10C8<> 11D5<>
RAM_DATA_B<2>    10C8<> 11D5<>
RAM_DATA_B<3>    10C8<> 11D5<>
RAM_DATA_B<4>    10C8<> 11D3<>
RAM_DATA_B<5>    10C8<> 11D3<>
RAM_DATA_B<6>    10C8<> 11D3<>
RAM_DATA_B<7>    10C8<> 11D3<>
RAM_DATA_B<8>    10C8<> 11D5<>
RAM_DATA_B<15..8>  37C5>
RAM_DATA_B<9>    10C8<> 11D5<>
RAM_DATA_B<10>   10C8<> 11D5<>
RAM_DATA_B<11>   10C8<> 11D5<>
```

```
RAM_DATA_B<12>   10C8<> 11D3<>
RAM_DATA_B<13>   10C8<> 11D3<>
RAM_DATA_B<14>   10C8<> 11D3<>
RAM_DATA_B<15>   10C8<> 11D3<>
RAM_DATA_B<16>   10C6<> 11D5<>
RAM_DATA_B<23..16>  37C5>
RAM_DATA_B<17>   10C6<> 11C5<>
RAM_DATA_B<18>   10C6<> 11C5<>
RAM_DATA_B<19>   10C6<> 11C5<>
RAM_DATA_B<20>   10C6<> 11D3<>
RAM_DATA_B<21>   10C6<> 11C3<>
RAM_DATA_B<22>   10C6<> 11C3<>
RAM_DATA_B<23>   10C6<> 11C3<>
RAM_DATA_B<32>   10C4<> 11B5<>
RAM_DATA_B<25..24>  37C5>
RAM_DATA_B<26>   10C6<> 11C5<> 37C5>
RAM_DATA_B<27>   10C6<> 11C5<>
RAM_DATA_B<31..27>  37C5>
RAM_DATA_B<28>   10C6<> 11C3<>
RAM_DATA_B<29>   10C6<> 11C3<>
RAM_DATA_B<30>   10C6<> 11C3<>
RAM_DATA_B<31>   10C6<> 11C3<>
RAM_DATA_B<39..32>  37B5>
RAM_DATA_B<33>   10C4<> 11B5<>
RAM_DATA_B<34>   10C4<> 11B5<>
RAM_DATA_B<35>   10C4<> 11B5<>
RAM_DATA_B<36>   10C4<> 11B3<>
RAM_DATA_B<37>   10C4<> 11B3<>
RAM_DATA_B<38>   10C4<> 11B3<>
RAM_DATA_B<39>   10C4<> 11B3<>
RAM_DATA_B<40>   10C4<> 11B5<>
RAM_DATA_B<47..40>  37B5>
RAM_DATA_B<41>   10C3<> 11A5<>
RAM_DATA_B<42>   10C4<> 11A5<>
RAM_DATA_B<43>   10C4<> 11A5<>
RAM_DATA_B<44>   10C4<> 11B3<>
RAM_DATA_B<45>   10C4<> 11B3<>
RAM_DATA_B<46>   10C4<> 11A3<>
RAM_DATA_B<47>   10C4<> 11A3<>
RAM_DATA_B<48>   10D2<> 11A5<>
RAM_DATA_B<55..48>  37B5>
RAM_DATA_B<49>   10C2<> 11A5<>
RAM_DATA_B<50>   10C2<> 11A5<>
RAM_DATA_B<51>   10C2<> 11A5<>
RAM_DATA_B<52>   10C2<> 11A3<>
RAM_DATA_B<53>   10C2<> 11A3<>
RAM_DATA_B<54>   10C2<> 11A3<>
RAM_DATA_B<55>   10C2<> 11A3<>
RAM_DATA_B<56>   10C2<> 11A5<>
RAM_DATA_B<63..56>  37A5>
RAM_DATA_B<57>   10C2<> 11A5<>
RAM_DATA_B<58>   10C2<> 11A5<>
RAM_DATA_B<59>   10C2<> 11A5<>
RAM_DATA_B<60>   10C2<> 11A3<>
RAM_DATA_B<61>   10C2<> 11A3<>
RAM_DATA_B<62>   10C2<> 11A3<>
RAM_DATA_B<63>   10C2<> 11A3<>
RAM_DQM_A<0>     10B8<> 11D6<> 37D5>
RAM_DQM_A<1>     10C7<> 11D6<> 37C5>
RAM_DQM_A<2>     10B6<> 11C6<> 37C5>
RAM_DQM_A<3>     10C5<> 11C6<> 37C5>
RAM_DQM_A<4>     10B4<> 11B6<> 37B5>
RAM_DQM_A<5>     10C3<> 11B6<> 37B5>
RAM_DQM_A<6>     10B2<> 11A6<> 37B5>
RAM_DQM_A<7>     10C1<> 11A6<> 37A5>
RAM_DQM_B<0>     10C8<> 11D3<> 37D5>
RAM_DQM_B<1>     10C8<> 11D3<> 37C5>
RAM_DQM_B<2>     10C6<> 11C3<> 37C5>
RAM_DQM_B<3>     10C6<> 11C3<> 37C5>
RAM_DQM_B<4>     10C4<> 11B3<> 37B5>
RAM_DQM_B<5>     10C4<> 11B3<> 37B5>
RAM_DQM_B<6>     10C2<> 11A3<> 37A5>
RAM_DQM_B<7>     10C2<> 11A3<> 37A5>
RAM_DQS_A<0>     10B8<> 11D8<> 37D5>
RAM_DQS_A<1>     10C7<> 11D8<> 37C5>
RAM_DQS_A<2>     10B6<> 11C8<> 37C5>
RAM_DQS_A<3>     10C5<> 11C8<> 37C5>
RAM_DQS_A<4>     10B4<> 11B8<> 37B5>
RAM_DQS_A<5>     10C3<> 11B8<> 37B5>
RAM_DQS_A<6>     10B2<> 11A8<> 37B5>
RAM_DQS_A<7>     10C1<> 11A8<> 37A5>
RAM_DQS_B<0>     10C8<> 11D5<> 37D5>
RAM_DQS_B<1>     10C8<> 11D5<> 37C5>
RAM_DQS_B<2>     10C6<> 11C5<> 37C5>
RAM_DQS_B<3>     10C6<> 11C5<> 37C5>
RAM_DQS_B<4>     10C4<> 11B5<> 37B5>
RAM_DQS_B<5>     10C4<> 11B5<> 37B5>
RAM_DQS_B<6>     10C2<> 11A5<> 37B5>
RAM_DQS_B<7>     10C2<> 11A5<> 37A5>
RAM_RAS_L        9A4< 11B3<> 11B6<> 37A5>
RAM_WE_L         9A4< 11B5<> 11B8<> 37A5>
RESET_VREF       6C3<>
RF_DISABLE_L     26D6<> 41C3>
ROM_CS_L         9B3< 12A4< 41C3>
ROM_CS_TP_L      9C4< 26B6<>
ROM_OE_L         9B3< 12A4< 41C3>
ROM_OE_TP_L      9B3< 26C5<>
ROM_ONBOARD_CS_L  9B3< 41C3>
ROM_ONBOARD_CS_TP_L  9B3< 26C6<>
ROM_RW_L         9B3< 12A4< 41C3>
ROM_RW_TP_L      9B3< 26C6<>
ROM_WP_L         9B3<
SI_DUAL_MODE     20A8< 20D7<
SI_I2C_CLK       20B4< 20B7< 20D7< 21C5<>
SI_I2S_DATA      20B4<> 20B7<> 20D7< 21C5<>
SI_M_HTPLG       20B7<
SI_RESET_L       20B6< 21C7<>
SI_RESET_L_R     20B4< 20B7< 20D7<
SI_SECONDARY     20A8< 20D5<>
SI_S_HTPLG       20B4<
SI_TMDS_CLKN     20A7< 20C2< 38D1>
SI_TMDS_CLKP     20A7< 20C2< 38D1>
SI_TMDS_DN<0>    20A7< 20B2< 38D1>
SI_TMDS_DN<1>    20A7< 20B2< 38D1>
SI_TMDS_DN<2>    20A7< 20B2< 38D1>
SI_TMDS_DN<3>    20A4< 20B2< 38D1>
SI_TMDS_DN<4>    20A2< 20A4< 38D1>
SI_TMDS_DN<5>    20A2< 20A4< 38D1>
SI_TMDS_DP<0>    20A7< 20B2< 38D1>
SI_TMDS_DP<1>    20A7< 20B2< 38D1>
SI_TMDS_DP<2>    20A7< 20B2< 38D1>
SI_TMDS_DP<3>    20A4< 20B2< 38D1>
SI_TMDS_DP<4>    20A2< 20A4< 38D1>
SI_TMDS_DP<5>    20A2< 20A4< 38C1>
SI_VREF          20A6< 20A8<
SLAVE_SWING      20B4< 20D6<
SLEEP            24D7<> 27D7<> 31B6<> 31D7< 34A4<
                 34A6< 34B3< 34B8<> 36B3< 36C2< 41C1>
SLEEP_LED        24C3<> 41C1>
SLEEP_LED_DGND   24C3<>
SLEEP_LED_I      24D3<
SLEEP_LED_L      24D4<
SLEEP_LED_SW_L   24D4<>
SLEEP_LED_UF     24D3<
SLEEP_LS5        34A4<> 34A8<
SLEEP_LS5_EN_L   34A6<>
SLEEP_L_LS5      18D5< 21A7<> 28A8<> 34A5<> 35C7<>
                 36C8<
SLEEP_L_LS5_EN_L  34A6<>
SLEEP_L_LS5_INV  36A3< 36C2< 36C8<>
SLEEP_L_LS5_NET  34B3<> 36C8<>
SLEEP_NET        34A3<>
SLEEP_NET_INV    34A3<>
SND_AMP_MUTE     27C7<> 27D6<> 41A6>
SND_AMP_MUTE_CTRL  27B5<> 27D6<>
SND_AMP_MUTE_L   14B5<> 27D5<>
SND_HP_MUTE      27C5<>
SND_HP_MUTE_L    14C5<> 27C5<> 41A6>
SND_HP_MUTE_LO   27C6<> 27C7<>
SND_HP_SENSE_L   14B5<> 27C8<> 41A6>
SND_HW_RESET_L   14A8< 14B5<> 27D7<> 41A6>
SND_LIN_SENSE_L  14B5<> 27C8<> 41A6>
SOFTMODEM_FC_RGDT  27D3<
SOFT_PWR_ON_L    23D1<> 24B1< 31A8<> 31C6<> 31D7<
                 35A4<> 41B3>
ST7_SLEEP_LED_H  24C5<> 24C6<> 24D6<> 41D1>
STOP_AGP_L       12D2< 12D4<>
SYSCLK_CPU       5C3< 8A6< 37D1>
SYSCLK_CPU_UF    8A5<> 37D1>
SYSCLK_DDRCLK_A0  9D4< 11D8<> 37D1>
SYSCLK_DDRCLK_A0_L  9D4< 11D8<> 37C1>
SYSCLK_DDRCLK_A0_L_UF  9B6<> 9D5< 37D1>
SYSCLK_DDRCLK_A0_UF  9B6<> 9D5< 37D1>
SYSCLK_DDRCLK_A1  9D4< 11A6<> 37C1>
SYSCLK_DDRCLK_A1_L  9D4< 11A6<> 37C1>
```

```
SYSCLK_DDRCLK_A1_L_UF  9B6<> 9D5< 37D1>
SYSCLK_DDRCLK_A1_UF  9B6<> 9D5< 37D1>
SYSCLK_DDRCLK_B0  9D4< 11D5<> 37C1>
SYSCLK_DDRCLK_B0_L  9C4< 11D5<> 37C1>
SYSCLK_DDRCLK_B0_L_UF  9B6<> 9C5< 37D1>
SYSCLK_DDRCLK_B0_UF  9B6<> 9D5< 37D1>
SYSCLK_DDRCLK_B1  9D4< 11A3<> 37C1>
SYSCLK_DDRCLK_B1_L  9D4< 11A3<> 37C1>
SYSCLK_DDRCLK_B1_L_UF  9B6<> 9D5< 37D1>
SYSCLK_DDRCLK_B1_UF  9B6<> 9D5< 37D1>
SYSCLK_LA_TP     8A5<>
SYSTEM_CLK_EN    14A5< 14B6< 31C4<>
SYS_BATT_ISNS    25A2< 31C2<
SYS_BATT_ISNS1   31B4<> 31C3<
SYS_BATT_ISNS2   31B4<> 31C3<
THERM1_A_DM      27A7< 27A8< 39A2>
THERM1_A_DP      27A7< 27A8< 39A2>
THERM1_DM        27A5< 27A6< 27B5<> 27B6< 39B2>
THERM1_DP        27A5< 27A6< 27B5<> 27B6< 39A2>
THERM1_M_DM      27B7< 27B8< 39A2>
THERM1_M_DP      27B7< 27B8< 39A2>
THERM2_A_DM      27A7< 27A8< 39A2>
THERM2_A_DP      27A7< 27A8< 39A2>
THERM2_DM        27A5< 27A6< 27B5<> 27B6< 39A2>
THERM2_DP        27A5< 27A6< 27B5<> 27B6< 39A2>
THERM2_M_DM      27B7< 27B8< 39A2>
THERM2_M_DP      27B7< 27B8< 39B5<>
THERM_INV        27B1<>
THERM_L_OC       27B1<> 31B4<>
TMDS_CLKN        20C1< 20C1< 20D3< 23C8<> 39C2>
TMDS_CLKP        20C1< 20C1< 20D4< 23C8<> 39C2>
TMDS_CLK_CMF     20D3<
TMDS_CONN_CLKN   23C6<> 23C7<> 38C1> 41C6>
TMDS_CONN_CLKP   23C6<> 23C7<> 38C1> 41C6>
TMDS_CONN_DN<0>  23D6<> 38C1>
TMDS_CONN_DN<1>  23C4<> 23D5<> 38C1>
TMDS_CONN_DN<2>  23C4<> 23D5<> 38C1>
TMDS_CONN_DN<3>  23B3<> 23C5<> 38B1>
TMDS_CONN_DN<4>  23C1<> 23C5<> 38B1>
TMDS_CONN_DN<5>  23C1<> 23C6<> 38B1>
TMDS_CONN_DP<0>  23D6<> 38C1>
TMDS_CONN_DP<1>  23B4<> 23D5<> 38C1>
TMDS_CONN_DP<2>  23C4<> 23D5<> 38B1>
TMDS_CONN_DP<3>  23B3<> 23C5<> 38B1>
TMDS_CONN_DP<4>  23C1<> 23C5<> 38B1>
TMDS_CONN_DP<5>  23B1<> 23C6<> 38B1>
TMDS_D0_CMF      20D3<
TMDS_D1_CMF      20C3<
TMDS_D2_CMF      20C3<
TMDS_DN<0>       20B1< 20D1< 20D3< 23D7<> 39C2>
TMDS_DN<0..2>    41C1>
TMDS_DN<1>       20B1< 20C3< 20D1< 23C3<> 39C2>
TMDS_DN<2>       20B1< 20C1< 20C3< 23C3<> 39B2>
TMDS_DN<3>       20B1< 20B2< 23B4<> 38B1>
TMDS_DN<4>       20A1< 20A2< 23C2<> 38B1>
TMDS_DN<5>       20A1< 20A2< 23C2<> 38B1>
TMDS_DP<0>       20B1< 20D1< 20D4< 23D7<> 39C2>
TMDS_DP<0..2>    41C1>
TMDS_DP<1>       20B1< 20C4< 20D1< 23B3<> 39B2>
TMDS_DP<2>       20B1< 20C1< 20C4< 23C3<> 39B2>
TMDS_DP<3>       20B1< 20B4< 23B4<> 38B1>
TMDS_DP<4>       20A1< 20A4< 23C2<> 38B1>
TMDS_DP<5>       20A1< 20A4< 23B2<> 38B1>
TMDS_MASTER      20A8< 20D7<
TMDS_SYNC        20A6< 20A8<
TPAD_F_RXD       41B3>
TPAD_F_TXD       41B3>
TPAD_RXD         31C2< 31C4<>
TPAD_TXD         31B2< 31C4<>
TPS2211_SHTDWN_L  18C5<
TP_BB_XTAL1      6C3<>
TP_MMM_ICSP_PGC  25C3<>
TP_MMM_ICSP_PGD  25C3<>
TP_MMM_ICSP_PGM  25C3<>
TV_C             23A6<> 41A6>
TV_COMP          23A6<> 41A6>
TV_GND1          23B6<> 40B6> 41A6>
TV_GND2          23A6<> 40B6> 41A6>
TV_Y             23A6<> 41A6>
UIDE_ADDR<0>     13D7<> 26C4<
UIDE_ADDR<2..0>  39C5>
UIDE_ADDR<1>     13D7<> 26C4<
UIDE_ADDR<2>     13D7<> 26B4<
UIDE_CS0_L       13C7<> 26C4< 39C5>
UIDE_CS1_L       13C7<> 26B4< 39C5>
UIDE_DATA<0>     13D7<> 26D4<
UIDE_DATA<6..0>  39C5>
UIDE_DATA<1>     13D7<> 26D4<
UIDE_DATA<2>     13D7<> 26D4<
UIDE_DATA<3>     13D7<> 26D4<
UIDE_DATA<4>     13D7<> 26C4<
UIDE_DATA<5>     13D7<> 26C4<
UIDE_DATA<6>     13D7<> 26C4<
UIDE_DATA<7>     13D7<> 26C4< 39C5>
UIDE_DATA<8>     13D7<> 26C4<
UIDE_DATA<15..8>  39C5>
UIDE_DATA<9>     13D7<> 26C4<
UIDE_DATA<10>    13D7<> 26C4<
UIDE_DATA<11>    13D7<> 26D4<
UIDE_DATA<12>    13D7<> 26B4<
UIDE_DATA<13>    13D7<> 26B4<
UIDE_DATA<14>    13D7<> 26C4<
UIDE_DATA<15>    13D7<> 26B4<
UIDE_DIOR_L      13C7<> 26A4< 39C5>
UIDE_DIOW_L      13C7<> 26A4< 39C5>
UIDE_DMACK_L     13C7<> 26A4< 39C5>
UIDE_DMARQ       13C7<> 39C5>
UIDE_INTRQ       13C7< 39C5>
UIDE_IOCHRDY     13C7< 26A4< 39C5>
UIDE_REF         13C7<> 40C3>
UIDE_RST_L       13C7<> 26A4< 39C5>
USB_DAM          14B2<> 14D2<
USB_DAP          14B2<> 14D2<
USB_DBM          14B2<> 14D2<
USB_DBP          14B2<> 14D2<
USB_DCM          14B2<> 14D2<
USB_DCP          14B2<> 14D2<
USB_DDM          14B2<> 14C2<
USB_DDP          14B2<> 14C2<
USB_DEM          14B2<> 14C2< 39B2>
USB_DEP          14B2<> 14C2< 39B2>
USB_DFM          14B2<> 14B2< 39B2>
USB_DFP          14B2<> 14C2< 39B2>
USB_OC_AB_L      14B2< 14C7<
USB_OC_CD_L      14B2< 14C7<
USB_OC_EF_L      14B2< 14C7<
USB_PWREN_AB_L   14B2<> 14C7<
USB_PWREN_CD_L   14B2<> 14C7<
USB_PWREN_EF_L   14B2<> 14C7<
USB_TPAD_N       14B1< 24A4<> 39B2> 41D3>
USB_TPAD_P       14C1< 24B4<> 39B2> 41D3>
VCORE_AB_SEL     35A7<> 35C6<
VCORE_AB_SEL_INV  35A7<>
VCORE_AB_SEL_OPT  35A6<>
VCORE_BOOST      35C4<> 40C1>
VCORE_BST        35C5<> 40C1>
VCORE_CC         35B6<> 40C1>
VCORE_DG         35A3<>
VCORE_D1         35A3<>
VCORE_D2         35A3<>
VCORE_D3         35A3<>
VCORE_D4         35A3<>
VCORE_DH         35B5<> 40C1>
VCORE_DL         35B5<> 40C1>
VCORE_FB         35B5< 40B1> 41C6>
VCORE_GND        35B5<> 40B1>
VCORE_GNDA       35B6<> 40B1>
VCORE_GNDDIV     35A5< 35A5< 40B1>
VCORE_GNDDIV_TEST  35A4<>
VCORE_GNDSNS     35A1<> 35A5< 40B1>
VCORE_GNDSNS_TEST  35A4<>
VCORE_ILIM       35C6<> 40C1>
VCORE_LX         35B5<> 40C1>
VCORE_OFFSET_DIV  35B6<>
VCORE_REF        35B6<> 40C1>
VCORE_SHDN_L     5B3< 35C6<>
VCORE_SHDN_L_3V  5B3<>
VCORE_SNS        35A1<> 40B1>
VCORE_TIME       35B4<> 40B1>
VCORE_TON        35B6< 40C1>
VCORE_VCC        35C6< 40C1>
VCORE_VGATE      14B5< 14B7< 35B4> 40B1>
VCORE_VID<0>     35B7<
VCORE_VID<1>     35B7< 35D4<
VCORE_VID<2>     35B7< 35D4<
VCORE_VID<3>     35B7< 35D4<
VCORE_VID<4>     35B7< 35D4<
VCORE_VSENSE     35C2<>
```

```
VGA_B            23C6< 23C6<> 41B6>
VGA_G            23C5<> 23C6< 41B6>
VGA_HSYNC        23C6<> 23D7< 41B6>
VGA_R            23B6< 23C5<> 41B6>
VGA_VSYNC        23C5<> 23D7< 41B6>
ZT10_SPN         4C2<>
ZT301_SPN        4C2<>
ZT302_SPN        4C2<>
```


APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	051-6680	F
SCALE: NONE	SHT 44 OF 46	

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

C1	CAP	5
C2	CAP	5
C3	CAP	35
C4	CAP	35
C5	CAP	35
C6	CAP	35
C7	CAP	34
C8	CAP	34
C9	CAP	5
C10	CAP	5
C11	CAP	32
C12	CAP	35
C13	CAP	35
C14	CAP	35
C15	CAP	35
C16	CAP	35
C17	CAP	5
C18	CAP	5
C19	CAP	23
C20	CAP	5
C21	CAP	35
C22	CAP	23
C23	CAP	32
C24	CAP	32
C25	CAP	5
C26	CAP	5
C27	CAP	5
C28	CAP	5
C29	CAP	5
C30	CAP	5
C31	CAP	5
C32	CAP	5
C33	CAP	5
C34	CAP	5
C35	CAP	32
C36	CAP	32
C37	CAP	18
C38	CAP	5
C39	CAP	5
C40	CAP	18
C41	CAP	32
C42	CAP	32
C43	CAP	32
C44	CAP	5
C45	CAP	5
C46	CAP	5
C47	CAP	5
C48	CAP	5
C49	CAP	5
C50	CAP	5
C51	CAP_P	35
C52	CAP_P	35
C53	CAP	5
C54	CAP	5
C55	CAP	5
C56	CAP	5
C57	CAP	35
C58	CAP	5
C59	CAP	5
C60	CAP	18
C61	CAP	5
C62	CAP	5
C63	CAP	35
C64	CAP	35
C65	CAP	35
C66	CAP	35
C67	CAP	32
C68	CAP	5
C69	CAP	5
C70	CAP	35
C71	CAP	32
C72	CAP	5
C73	CAP	5
C74	CAP	35
C75	CAP	5
C76	CAP	35
C77	CAP_P	35
C78	CAP_P	35
C79	CAP	35
C80	CAP	35
C81	CAP	5
C82	CAP	5
C83	CAP	35
C84	CAP	35
C85	CAP	5
C86	CAP	5
C87	CAP	5
C88	CAP	5
C89	CAP	5
C90	CAP	35
C91	CAP_P	35
C92	CAP_P	35
C93	CAP	35
C94	CAP	35
C95	CAP	32
C96	CAP	32
C97	CAP	32
C98	CAP	32
C99	CAP	32
C100	CAP	35
C101	CAP	35
C102	CAP	5
C103	CAP	5
C104	CAP	5
C105	CAP	35
C106	CAP	35
C107	CAP	5
C108	CAP	5
C109	CAP	5
C110	CAP	5
C111	CAP_P	35
C112	CAP	32
C113	CAP	32
C114	CAP	34
C115	CAP	32
C116	CAP	32
C117	CAP	32
C118	CAP	32
C119	CAP	33
C120	CAP	6
C121	CAP	33
C122	CAP	9
C123	CAP	34
C124	CAP	33
C125	CAP	9
C126	CAP	34
C127	CAP	11
C128	CAP	11
C129	CAP	36
C130	CAP	20
C131	CAP	33
C132	CAP	11
C133	CAP	36
C134	CAP	33
C135	CAP	33
C136	CAP	17
C137	CAP	33
C138	CAP	33
C139	CAP	16
C140	CAP	11
C141	CAP	16
C142	CAP	16
C143	CAP	34
C144	CAP	16
C145	CAP	16
C146	CAP	16
C147	CAP	16
C148	CAP	16
C149	CAP	16
C150	CAP	11
C151	CAP	14
C152	CAP	14
C153	CAP	33
C154	CAP	33
C155	CAP	33
C156	CAP	11
C157	CAP	11
C158	CAP	16
C159	CAP	16
C160	CAP	16
C161	CAP	16
C162	CAP	16
C163	CAP	16
C164	CAP	16
C165	CAP	16
C166	CAP	16
C167	CAP	16
C168	CAP	16
C169	CAP	11
C170	CAP	16
C171	CAP	16
C172	CAP	16
C173	CAP	17
C174	CAP	11
C175	CAP	16
C176	CAP	16
C177	CAP	16
C178	CAP	16
C179	CAP	16
C180	CAP	16
C181	CAP	16
C182	CAP	16
C183	CAP	16
C184	CAP	16
C185	CAP	16
C186	CAP	16
C187	CAP	8
C188	CAP	24
C189	CAP	16
C190	CAP	12
C191	CAP	16
C192	CAP	16
C193	CAP	36
C194	CAP	36
C195	CAP	36
C196	CAP	36
C197	CAP	17
C198	CAP	24
C199	CAP	24
C200	CAP	16
C201	CAP	16
C202	CAP	16
C203	CAP	16
C204	CAP	16
C205	CAP	16
C206	CAP	16
C207	CAP	16
C208	CAP	16
C209	CAP	36
C210	CAP	20
C211	CAP	11
C212	CAP	16
C213	CAP	16
C214	CAP	16
C215	CAP	16
C216	CAP	16
C217	CAP	16
C218	CAP	16
C219	CAP	16
C220	CAP	24
C221	CAP	16
C222	CAP	16
C223	CAP	16
C224	CAP	16
C225	CAP	16
C226	CAP	16
C227	CAP	16
C228	CAP	16
C229	CAP	16
C230	CAP	16
C231	CAP	16
C232	CAP	36
C233	CAP	32
C234	CAP	16
C235	CAP	14
C236	CAP	16
C237	CAP	16
C238	CAP	16
C239	CAP	16
C240	CAP	16
C241	CAP	16
C242	CAP	16
C243	CAP	16
C244	CAP	33
C245	CAP	16
C246	CAP	14
C247	CAP	16
C248	CAP	16
C249	CAP	9
C250	CAP	16
C251	CAP	16
C252	CAP	16
C253	CAP	16
C254	CAP	16
C255	CAP	31
C256	CAP	14
C257	CAP	16
C258	CAP	16
C259	CAP	16
C260	CAP	16
C261	CAP	16
C262	CAP	16
C263	CAP	16
C264	CAP	16
C265	CAP	16
C266	CAP	16
C267	CAP_P	36
C268	CAP	16
C269	CAP	16
C270	CAP	12
C271	CAP	16
C272	CAP	16
C273	CAP	16
C274	CAP	16
C275	CAP	16
C276	CAP	33
C277	CAP	34
C278	CAP	16
C279	CAP	16
C280	CAP	16
C281	CAP	16
C282	CAP	16
C283	CAP	16
C284	CAP	26
C285	CAP	16
C286	CAP	16
C287	CAP	16
C288	CAP	16
C289	CAP	16
C290	CAP	16
C291	CAP	12
C292	CAP	16
C293	CAP	16
C294	CAP	16
C295	CAP	16
C296	CAP	16
C297	CAP	16
C298	CAP	36
C299	CAP	16
C300	CAP	16
C301	CAP	16
C302	CAP	16
C303	CAP	16
C304	CAP	16
C305	CAP	16
C306	CAP	16
C307	CAP_P	36
C308	CAP	16
C309	CAP	16
C310	CAP	16
C311	CAP	12
C312	CAP	16
C313	CAP	16
C314	CAP	16
C315	CAP	16
C316	CAP	16
C317	CAP	16
C318	CAP	16
C319	CAP	16
C320	CAP	16
C321	CAP	16
C322	CAP	16
C323	CAP	16
C324	CAP	16
C325	CAP	16
C326	CAP	33
C327	CAP	16
C328	CAP	16
C329	CAP	16
C330	CAP	16
C331	CAP	16
C332	CAP	16
C333	CAP	16
C334	CAP	16
C335	CAP	16
C336	CAP	33
C337	CAP	14
C338	CAP	36
C339	CAP	31
C340	CAP	31
C341	CAP	16
C342	CAP	16
C343	CAP	16
C344	CAP	16
C345	CAP	16
C346	CAP	16
C347	CAP	16
C348	CAP	16
C349	CAP	16
C350	CAP	16
C351	CAP	16
C352	CAP	16
C353	CAP	34
C354	CAP	16
C355	CAP	36
C356	CAP	11
C357	CAP	16
C358	CAP	16
C359	CAP	16
C360	CAP	16
C361	CAP	16
C362	CAP	12
C363	CAP	16
C364	CAP	16
C365	CAP	16
C366	CAP	16
C367	CAP	16
C368	CAP	16
C369	CAP	16
C370	CAP	31
C371	CAP	16
C372	CAP	12
C373	CAP	16
C374	CAP	16
C375	CAP	16
C376	CAP	16
C377	CAP	16
C378	CAP	16
C379	CAP	16
C380	CAP	16
C381	CAP	16
C382	CAP	16
C383	CAP	11
C384	CAP	19
C385	CAP	16
C386	CAP	14
C387	CAP	14
C388	CAP	14
C389	CAP	14
C390	CAP	19
C391	CAP	11
C392	CAP	14
C393	CAP_P	36
C394	CAP	14
C395	CAP	16
C396	CAP_P	36
C397	CAP	11
C398	CAP	34
C399	CAP	14
C400	CAP	14
C401	CAP	19
C402	CAP	14
C403	CAP	11
C404	CAP	11
C405	CAP_P	36
C406	CAP	31
C407	CAP	21
C408	CAP	19
C409	CAP	19
C410	CAP	34
C411	CAP	21
C412	CAP	19
C413	CAP	22
C414	CAP	22
C415	CAP	34
C416	CAP	34
C417	CAP	22
C418	CAP	22
C419	CAP	22
C420	CAP	22
C421	CAP	22
C422	CAP	22
C423	CAP	22
C424	CAP	22
C425	CAP	22
C426	CAP	22
C427	CAP	22
C428	CAP	34
C429	CAP	34
C430	CAP	22
C431	CAP	21
C432	CAP	34
C433	CAP	34
C434	CAP	21
C435	CAP	21
C436	CAP	22
C437	CAP	22
C438	CAP	22
C439	CAP	22
C440	CAP	21
C441	CAP	21
C442	CAP	19
C443	CAP	21
C444	CAP	22
C445	CAP	21
C446	CAP	21
C447	CAP	22
C448	CAP	21
C449	CAP	21
C450	CAP	22
C451	CAP	21
C452	CAP	21
C453	CAP	22
C454	CAP	22
C455	CAP	21
C456	CAP	22
C457	CAP	19
C458	CAP	19
C459	CAP	22
C460	CAP	22
C461	CAP	22
C462	CAP	22
C463	CAP	22
C464	CAP	22
C465	CAP	21
C466	CAP	21
C467	CAP	31
C468	CAP	22
C469	CAP	34
C470	CAP	22
C471	CAP	22
C472	CAP	22
C473	CAP	22
C474	CAP	23
C475	CAP	22
C476	CAP	19
C477	CAP	21
C478	CAP	22
C479	CAP	20
C480	CAP	21
C481	CAP	21
C482	CAP	21
C483	CAP	22
C484	CAP	21
C485	CAP	21
C486	CAP	21
C487	CAP	20
C488	CAP	22
C489	CAP	22
C490	CAP	19
C491	CAP	22
C492	CAP	22
C493	CAP	22
C494	CAP	21
C495	CAP	21
C496	CAP	22
C497	CAP	20
C498	CAP	21
C499	CAP	22
C500	CAP	22
C501	CAP	22
C502	CAP	5
C503	CAP	23
C504	CAP	22
C505	CAP	21
C506	CAP	22
C507	CAP	24
C508	CAP	19
C509	CAP	21
C510	CAP	21
C511	CAP	22
C512	CAP	21
C513	CAP	21
C514	CAP	22
C515	CAP	20
C516	CAP	19
C517	CAP	22
C518	CAP	22
C519	CAP	22
C520	CAP	22
C521	CAP	22
C522	CAP	25
C523	CAP	22
C524	CAP	21
C525	CAP	21
C526	CAP	21
C527	CAP	22
C528	CAP	21
C529	CAP	21
C530	CAP	19
C531	CAP	21
C532	CAP	21
C533	CAP	21
C534	CAP	22
C535	CAP	22
C536	CAP	20
C537	CAP	22
C538	CAP	22
C539	CAP	22
C540	CAP	22
C541	CAP	22
C542	CAP	22
C543	CAP	22
C544	CAP	22
C545	CAP	22
C546	CAP	22
C547	CAP	22
C548	CAP	23
C549	CAP	23
C550	CAP	22
C551	CAP	22
C552	CAP	22
C553	CAP	22
C554	CAP	34
C555	CAP	34
C556	CAP	34
C557	CAP	34
C558	CAP	34
C559	CAP	34
C560	CAP	34
C561	CAP	34
C562	CAP	34
C563	CAP	34
C564	CAP	34
C565	CAP	34
C566	CAP	34
C567	CAP	34
C568	CAP	34
C569	CAP	34
C570	CAP	34
C571	CAP	34
C572	CAP	34
C573	CAP	34
C574	CAP	34
C575	CAP	34
C576	CAP	34
C577	CAP	34
C578	CAP	34
C579	CAP	34
C580	CAP	34
C581	CAP	34
C582	CAP	34
C583	CAP	29
C584	CAP	29
C585	CAP	29
C586	CAP	29
C587	CAP	29
C588	CAP	29
C589	CAP	29
C590	CAP	29
C591	CAP	29
C592	CAP	28
C593	CAP	29
C594	CAP	28
C595	CAP	28
C596	CAP	29
C597	CAP	28
C598	CAP	28
C599	CAP	28
C600	CAP	28
C601	CAP	28
C602	CAP	28
C603	CAP	28
C604	CAP	28
C605	CAP	29
C606	CAP	29
C607	CAP	29
C608	CAP	28
C609	CAP	29
C610	CAP	29
C611	CAP	28
C612	CAP	28
C613	CAP	28
C614	CAP	28
C615	CAP	28
C616	CAP	28
C617	CAP	28
C618	CAP	28
C619	CAP	28
C620	CAP	29
C621	CAP	29
C622	CAP	28
C623	CAP	28
C624	CAP	28
C625	CAP	29
C626	CAP	5
C627	CAP	34
C628	CAP	34
C629	CAP	34
C630	CAP	30
C631	CAP	23
C632	CAP	25
C633	CAP	30
C634	CAP	23
C635	CAP	25
C636	CAP	25
C637	CAP	30
C638	CAP	30
C639	CAP	30
C640	CAP	30
C641	CAP	23
C642	CAP	25
C643	CAP	25
C644	CAP	30
C645	CAP	28
C646	CAP	28
C647	CAP	28
C648	CAP	28
C649	CAP	30
C650	CAP	30
C651	CAP	30
C652	CAP	30
C653	CAP	23
C654	CAP	23
C655	CAP	23
C656	CAP	23
C657	CAP	23
C658	CAP	23
C659	CAP	23
C660	CAP	23
C661	CAP	23
C662	CAP	30
C663	CAP	23
C664	CAP	23
C665	CAP	29
C666	CAP	30
C667	CAP	23
C668	CAP	23
C669	CAP	27
C670	CAP_P	29
C671	CAP	29
C672	CAP	29
C673	CAP	29
C674	CAP	28
C675	CAP	28
C676	CAP	29
C677	CAP	29
C678	CAP	29
C679	CAP	29
C680	CAP	28
C681	CAP	29
C682	CAP	29
C683	CAP	29
C684	CAP	29
C685	CAP_P	34
C686	CAP	34
C687	CAP	34
C688	CAP	34
C689	CAP	27
C690	CAP	36
C691	CAP	36
C692	CAP_P	33
C693	CAP	36
C694	CAP	34
C695	CAP	36
C696	CAP	25
C697	CAP	36
C698	CAP	24
C699	CAP	34
C700	CAP	34
C701	CAP	23
C702	CAP	23
C703	CAP_P	34
C704	CAP	21
C705	CAP_P	21
C706	CAP	21
C707	CAP_P	21
C708	CAP	21
C709	CAP_P	34
C710	CAP_P	34
C711	CAP_P	21
C712	CAP	21
C713	CAP_P	34
C714	CAP	36
C715	CAP	36
C716	CAP	36
C717	CAP	36
C718	CAP	36
C719	CAP	36
C720	CAP	36
C721	CAP	14
C722	CAP	36
C723	CAP	14
C724	CAP	31
C725	CAP	36
C726	CAP	10
C727	CAP	10
C728	CAP	31
C729	CAP	31
C730	CAP	10
C731	CAP	31
C732	CAP	10
C733	CAP	10
C734	CAP	10
C735	CAP	16
C736	CAP	16
C737	CAP	33
C738	CAP	36
C739	CAP	16
C740	CAP	33
C741	CAP	10
C742	CAP	10
C743	CAP	17
C744	CAP	17
C745	CAP	10
C746	CAP	17
C747	CAP	17
C748	CAP	17
C749	CAP	17
C750	CAP	17
C751	CAP	17
C752	CAP	17
C753	CAP	33
C754	CAP	33
C755	CAP	33
C756	CAP	17
C757	CAP	10
C758	CAP	10
C759	CAP	17
C760	CAP	17
C761	CAP	17
C762	CAP	6
C763	CAP	27
C764	CAP	10
C765	CAP	17
C766	CAP	24
C767	CAP	33
C768	CAP	17
C769	CAP	17
C770	CAP	16
C771	CAP	33
C772	CAP	33
C773	CAP	9
C774	CAP_P	35
C775	CAP	18
C776	CAP	18
C777	CAP	32
C778	CAP	18
C779	CAP_P	32
C780	CAP	32
C781	CAP_P	35
C782	CAP	18
C783	CAP	18
C784	CAP	18
C785	CAP	32
C786	CAP	18
C787	CAP	18
C788	CAP_P	35
C789	CAP	18
C790	CAP	32
C791	CAP	18
C792	CAP	32
C793	CAP_P	35
C794	CAP	32
C795	CAP	32
C796	CAP	18
C797	CAP_P	35
C798	CAP	32
C799	CAP	32
C800	CAP	18
C801	CAP	32
C802	CAP_P	35
C803	CAP	32
C804	CAP_P	33
C805	CAP	26
C806	CAP_P	33
C807	CAP	32
C808	CAP	26
C809	CAP	32
C810	CAP	5
C811	CAP	5
C812	CAP	23
C813	CAP	23
C814	CAP	27
C815	CAP	23
C816	CAP	23
C817	CAP	27
C818	CAP	27
C819	CAP	23
C820	CAP	25
C821	CAP	25
C822	CAP	30
C823	CAP	25
C824	CAP	30
C825	CAP	30
C826	CAP	30
C828	CAP	27
C829	CAP	27
C830	CAP	22
C831	CAP	22
C832	CAP	22
C833	CAP	22
C834	CAP	22
C835	CAP	22
C836	CAP	20
C837	CAP	20
C838	CAP	21
C841	CAP	35
C842	CAP	35
C843	CAP	35
C844	CAP	36
C845	CAP	36
C846	CAP	21
C847	CAP	13
C848	CAP_P	27
C849	CAP	27
C850	CAP	27
C851	CAP	28
C852	CAP	28
C853	CAP	32
C868	CAP	27
C869	CAP	27
C870	CAP	20
C880	CAP	22
C881	CAP	22
C882	CAP	20
C883	CAP	20
C885	CAP	20
C886	CAP	20
C887	CAP	20
C889	CAP	20
C890	CAP	20
C891	CAP	20
C892	CAP	20
C893	CAP	20
C905	CAP	20
C906	CAP	20
C907	CAP	20
C908	CAP	20
C909	CAP	20
C910	CAP	20
C911	CAP	20
C912	CAP	20
C913	CAP	20
D1	DIODE_SCHOT	33
D2	DIODE_SCHOT	33
D3	DIODE	33
D4	DIODE	32
D5	DIODE_SCHOT	35
D6	DIODE	32
D7	DIODE_SCHOT	33
D8	DIODE	33
D9	ZENER_MMBZ15VDLT1	24
D10	DIODE_SCHOT	33
D11	DIODE_SCHOT	33
D12	DIODE	21
D13	DIODE_SCHOT	34
D14	DIODE_SCHOT	34
D15	DIODE	28
D16	DIODE_SCHOT	29
D17	DIODE_SCHOT	5
D18	DIODE_DUAL_6P	30
D19	DIODE_SCHOT	23
D20	DIODE_DUAL_6P	30
D21	ZENER	30
D22	DIODE_DUAL_6P	30
D23	DIODE_DUAL_6P	30
D24	DIODE_SCHOT	30
D25	DIODE_SCHOT_3P2	29
D26	DIODE_SCHOT	34
D27	DIODE	34
D28	DIODE_SCHOT	34
D29	DIODE_SCHOT	21
D30	DIODE_SCHOT	36
D31	DIODE_SCHOT	36
D32	DIODE_SCHOT	33
D33	DIODE	35
D34	DIODE	20
D35	DIODE_SCHOT	30
D36	DIODE_SCHOT	32
DP1	DPAK3P	32
DP2	DPAK3P	35
DP3	DPAK3P	36
DP4	DPAK3P	36
DP5	DPAK3P	21
DP6	DPAK3P	30
DP7	DPAK3P	21
DP8	DPAK3P	31
F1	FUSE	30
F2	FUSE	23
F3	FUSE	30
F4	FUSE	32
F5	FUSE	32
FL1	FILTER_LC	23
FL2	FILTER_LC	23
FL3	FILTER_LC	23
G1	OSC	19
G2	OSC	29
J1	CON_M4RT_S2MT_SM	27
J2	CON_4RT_WRIB	24
J3	CON_M40ST_D4MT_SM	27
J4	CON_4RT_WRIB	23
J5	CON_M80ST_D4MT_SM	18
J6	CON_F80ST_D4MT_SM	26
J7	CON_12	35
J8	CON_2RTSM_125	24
J9	CON_F1ST_S2MT_SM	14
J10	CON_M16ST_D_SMA	24
J12	CON_M50SM_5MM	26
J13	CON_M50SM_5MM	26
J14	CON_F30RT_S2MT_SM	23
J15	CON_F10RT_S2MT_SM	27
J16	CON_3RTSM_125	33
J17	CON_M16ST_D_SMA	27
J18	CON_M4RT_S2MT_SM	27
J19	CON_F20ST_D_SM	24
J20	CON_F9RT_1394B_S6MT_SMA	30
J21	CON_F5RT_MINIDIN_TH	23
J22	CON_F30RT_T6MT_TH1	23
J23	CON_RJ45_10RT_S4MT_TH1	28
J24	CON_F6RT_S4MT_TH1	30
J25	CON_F400RT_DDRDIMM_SM3	11
J26	CON_M8RT_S_SM	32
J27	CON_M4RT_S_SM	32
J28	CON_10STSM_5087	27
L1	IND	23
L2	IND	32
L3	IND	32
L4	IND	32
L5	IND	32
L6	IND	32
L7	IND	17
L8	IND	24
L9	IND	24
L11	IND	24
L13	IND	14
L14	IND	14
L15	IND	14
L16	IND	19
L17	IND	21
L18	IND	22
L19	IND	22
L20	IND	22
L21	IND	22
L22	IND	19
L23	IND	22
L24	IND	22
L25	IND	22
L26	IND	22
L27	IND	23
L28	IND	22
L29	IND	22
L30	IND	22
L31	IND	22
L32	IND	22
L33	IND	22
L34	IND	29
L35	IND	28
L36	IND	23
L37	FILTER_4P	23
L38	IND	23
L39	IND	30
L42	IND	23
L44	FILTER_4P	23
L45	FILTER_4P	23
L46	FILTER_4P	23
L47	FILTER_4P	23
L48	FILTER_4P	30
L49	FILTER_4P	23
L50	IND	20
L51	IND	30
L52	FILTER_4P	30
L53	IND	23
L54	IND	23
L55	IND	23
L56	IND	23
L57	IND	23
L58	IND	30
L59	IND	29
L60	IND	28
L61	IND	34
L62	IND	34
L63	IND	36
L64	IND_3P	21
L65	IND	36
L66	IND	19
L67	IND	36
L68	IND	24
L69	IND_3P	33
L70	IND	32
L71	IND_3P	35
L72	IND	23
L73	IND	23
L74	IND	23
L75	IND	22
L76	FILTER_4P	30
L77	FILTER_4P	30
L81	IND	22
L82	IND	20
L84	IND	20
L85	FILTER_4P	23
L86	IND	20
L90	IND	20
L91	IND	20
Q1	TRA_2N7002DW	32
Q2	TRA_2N7002DW	32
Q3	TRA_2N7002DW	7
Q4	TRA_2N7002DW	32
Q5	TRA_2N3904	35
Q6	TRA_SI4435DY	32
Q7	TRA_SUD45P03	32
Q8	TRA_2N3904	35
Q9	TRA_2N7002DW	32
Q10	TRA_2N7002	36
Q11	TRA_2N7002DW	36
Q12	TRA_2N3904	7
Q13	TRA_2N7002	7
Q14	TRA_2N7002DW	7
Q15	TRA_FDG6324L	33
Q16	TRA_IRF7811W	33
Q17	TRA_IRF7805	33
Q18	TRA_2N7002DW	24
Q19	TRA_2N7002DW	31
Q20	TRA_2N7002DW	34
Q21	TRA_SI3443DV	34
Q22	TRA_2N7002	24
Q23	TRA_SI3446DV	21
Q24	TRA_2N7002DW	34
Q25	TRA_2N7002DW	21
Q26	TRA_SI3443DV	34
Q27	TRA_SI3443DV	34
Q28	TRA_2N7002	23
Q29	TRA_SI3443DV	23
Q30	TRA_2N7002	31
Q31	TRA_2N7002	36
Q32	TRA_2N7002DW	28
Q33	TRA_2N7002DW	30
Q34	TRA_NDS9407	30
Q35	TRA_DUAL_MMDT3904	23
Q36	TRA_SI3443DV	24
Q37	TRA_SI2319DS	30
Q38	TRA_TP0610	23
Q39	TRA_2N7002DW	23
Q40	TRA_2N7002DW	23
Q41	TRA_IRF7805	34
Q42	TRA_IRF7811W	34
Q43	TRA_2N7002	34
Q44	TRA_2N7002DW	34
Q45	TRA_IRF7805	34
Q46	TRA_2N3904	27
Q47	TRA_IRF7811W	34
Q48	TRA_SI7860DP	21
Q49	TRA_IRF7832	21
Q50	TRA_2N7002DW	34
Q51	TRA_2N3904	21
Q52	TRA_2N3904	21
Q53	TRA_SI3446DV	36
Q54	TRA_IRF7811W	36
Q55	TRA_IRF7805	36
Q56	TRA_IRF7805	36
Q57	TRA_IRF7811W	36
Q58	TRA_2N3906	24
Q59	TRA_2N3904	27
Q60	TRA_IRF7832	35
Q61	TRA_2N3904	27
Q62	TRA_SI7860DP	35
Q63	TRA_IRF7832	35
Q64	TRA_IRF7811W	32
Q65	TRA_SI7860DP	35
Q66	TRA_IRF7832	35
Q67	TRA_2N3904	27
Q68	TRA_SI4435DY	32
Q69	TRA_SI4435DY	32
Q70	TRA_IRF7805	32
Q71	TRA_2N7002DW	32
Q72	TRA_2N7002DW	32
Q73	TRA_2N7002	30
Q74	TRA_2N7002DW	32
Q76	TRA_FDG6324L	23
Q77	TRA_2N7002DW	27
Q78	TRA_2N7002DW	27
Q79	TRA_2N7002DW	27
Q82	TRA_2N7002DW	35
Q83	TRA_2N7002DW	27
R1	RES	9
R2	RES	5
R3	RES	5
R4	RES	5
R5	RES	7
R6	RES	5
R7	RES	5
R8	RES	5
R9	RES	6
R10	RES	6
R11	RES	5
R12	RES	7
R13	RES	5
R14	RES	7
R15	RES	32
R16	RES	32
R17	RES	7
R18	RES	7
R19	RES	5
R20	RES	5
R21	RES	32
R22	RES	32
R23	RES	7
R24	RES	5
R25	RES	5
R26	RES	5
R27	RES	5
R28	RES	5
R29	RES	32
R30	RES	32
R31	RES	7
R32	RES	5
R33	RES	5
R34	RES	5
R35	RES	7
R36	RES	5
R37	RES	5
R38	RES	5
R39	RES	33
R40	RES	32
R41	RES	32
R42	RES	32
R43	RES	7
R44	RES	7
R45	RES	5
R46	RES	5
R47	RES	32
R48	RES	7
R49	RES	32
R50	RES	7
R51	RES	32
R52	RES	32
R53	RES	32
R54	RES	32
R55	RES	32
R56	RES	32
R57	RES	32
R58	RES	32
R59	RES	32
R60	RES	7
R61	RES	32
R62	RES	32
R63	RES	7
R64	RES	7
R65	RES	35
R66	RES	35
R67	RES	35
R68	RES	7
R69	RES	35
R70	RES	7
R71	RES	35
R72	RES	35
R73	RES	32
R74	RES	32
R75	RES	32
R76	RES	7
R77	RES	32
R78	RES	7
R79	RES	7
R80	RES	35
R81	RES	35
R82	RES	32
R83	RES	32
R84	RES	7
R85	RES	35
R86	RES	35
R87	RES	32
R88	RES	7
R89	RES	5
R90	RES	35
R91	RES	35
R92	RES	7
R93	RES	35
R94	RES	32
R95	RES	35
R96	RES	32
R97	RES	35
R98	RES	35
R99	RES	35
R100	RES	6
R101	RES	35
R102	RES	32
R103	RES	6
R104	RES	6
R105	RES	6
R106	RES	35
R107	RES	33
R108	RES	33
R109	RES	33
R110	RES	7
R111	RES	35
R112	RES	9
R113	RES	14
R114	RES	36
R115	RES	36
R116	RES	36
R117	RES	36
R118	RES	33
R119	RES	32
R120	RES	33
R121	RES	14
R122	RES	33
R123	RES	14
R124	RES	17
R125	RES	14
R126	RES	35
R127	RES	33
R128	RES	8
R129	RES	14
R130	RES	33
R131	RES	7
R132	RES	7
R133	RES	7
R134	RES	14
R135	RES	27
R136	RES	8
R137	RES	35
R138	RES	24
R139	RES	35
R140	RES	8
R141	RES	8
R142	RES	14
R143	RES	14
R144	RES	14
R145	RES	13
R146	RES	8
R147	RES	8
R148	RES	14
R149	RES	13
R150	RES	8
R151	RES	8
R152	RES	8
R153	RES	14
R154	RES	24
R155	RES	8
R156	RES	27
R157	RES	31
R158	RES	14
R159	RES	8
R160	RES	13
R161	RES	8
R162	RES	9
R163	RES	24
R164	RES	14
R165	RES	14
R166	RES	14
R167	RES	12
R168	RES	8
R169	RES	8
R170	RES	36
R171	RES	36
R172	RES	17
R173	RES	24
R174	RES	14
R175	RES	14
R176	RES	9
R177	RES	36
R178	RES	14
R179	RES	14
R180	RES	14
R181	RES	14
R182	RES	14
R183	RES	14
R184	RES	36
R185	RES	24
R186	RES	13
R187	RES	14
R188	RES	31
R189	RES	27
R190	RES	24
R191	RES	14
R192	RES	19
R193	RES	19
R194	RES	9
R195	RES	13
R196	RES	26
R197	RES	12
R198	RES	24
R199	RES	26
R200	RES	26
R201	RES	14
R202	RES	9
R203	RES	26
R204	RES	26
R205	RES	13
R206	RES	14
R207	RES	13
R208	RES	9
R209	RES	9
R210	RES	36
R211	RES	36
R212	RES	36
R213	RES	26
R214	RES	26
R215	RES	26
R216	RES	26
R217	RES	26
R218	RES	14
R219	RES	12
R220	RES	36
R221	RES	36
R222	RES	36
R223	RES	20
R224	RES	13
R225	RES	12
R226	RES	36
R227	RES	36
R228	RES	24
R229	RES	26
R230	RES	12
R231	RES	33
R232	RES	13
R233	RES	33
R234	RES	26
R235	RES	12
R236	RES	9
R237	RES	26
R238	RES	26
R239	RES	12
R240	RES	14
R241	RES	14
R242	RES	26
R243	RES	14
R244	RES	12
R245	RES	12
R246	RES	12
R247	RES	9
R248	RES	31
R249	RES	31
R250	RES	14
R251	RES	26
R252	RES	12
R253	RES	12
R254	RES	12
R255	RES	12
R256	RES	12
R257	RES	9
R258	RES	14
R259	RES	13
R260	RES	9
R261	RES	31
R262	RES	26
R263	RES	13
R264	RES	12
R265	RES	9
R266	RES	26
R267	RES	31
R268	RES	26
R269	RES	13
R270	RES	13
R271	RES	9
R272	RES	12
R273	RES	12
R274	RES	15
R275	RES	22
R276	RES	15
R277	RES	12
R278	RES	12
R279	RES	14
R280	RES	14
R281	RES	5
R282	RES	12
R283	RES	5
R284	RES	14
R285	RES	19
R286	RES	14
R287	RES	14
R288	RES	14
R289	RES	19
R290	RES	19
R291	RES	34
R292	RES	14
R293	RES	14
R294	RES	34
R295	RES	14
R296	RES	14
R297	RES	19
R298	RES	19
R299	RES	11
R300	RES	20
R301	RES	34
R302	RES	5
R303	RES	11
R304	RES	19
R305	RES	19
R306	RES	34
R307	RES	34
R308	RES	12
R309	RES	19
R310	RES	34
R311	RES	34
R312	RES	22
R313	RES	19
R314	RES	12
R315	RES	19
R316	RES	12
R317	RES	12
R318	RES	12
R319	RES	22
R320	RES	19
R321	RES	34
R322	RES	34
R323	RES	19
R324	RES	19
R325	RES	19
R326	RES	21
R327	RES	21
R328	RES	21
R329	RES	21
R330	RES	21
R331	RES	21
R332	RES	21
R333	RES	21
R334	RES	12
R335	RES	19
R336	RES	19
R337	RES	19
R338	RES	19
R339	RES	21
R340	RES	20
R341	RES	21
R342	RES	21
R343	RES	21
R344	RES	21
R345	RES	31
R346	RES	21
R347	RES	23
R348	RES	31
R349	RES	31
R350	RES	20
R351	RES	21
R352	RES	21
R353	RES	21
R354	RES	23
R355	RES	20
R356	RES	21
R357	RES	21
R358	RES	21
R359	RES	21
R360	RES	21
R361	RES	21
R362	RES	20
R363	RES	22
R364	RES	31
R365	RES	19
R366	RES	21
R367	RES	20
R368	RES	21
R369	RES	20
R370	RES	19
R371	RES	19
R372	RES	19
R373	RES	19
R374	RES	20
R375	RES	19
R376	RES	19
R377	RES	20
R378	RES	21
R379	RES	22
R380	RES	21
R381	RES	21
R382	RES	21
R383	RES	21
R384	RES	21
R385	RES	21
R386	RES	21
R387	RES	21
R388	RES	19
R389	RES	21
R390	RES	21
R391	RES	21
R392	RES	21
R393	RES	21
R394	RES	21
R395	RES	21
R396	RES	21

R397	RES	19
R398	RES	36
R399	RES	34
R400	RES	34
R401	RES	34
R402	RES	34
R403	RES	34
R404	RES	34
R405	RES	34
R406	RES	34
R407	RES	34
R408	RES	34
R409	RES	34
R410	RES	34
R411	RES	34
R412	RES	29
R413	RES	29
R414	RES	29
R415	RES	29
R416	RES	29
R417	RES	29
R418	RES	29
R419	RES	29
R420	RES	29
R421	RES	28
R422	RES	28
R423	RES	28
R424	RES	28
R425	RES	28
R426	RES	29
R427	RES	28
R428	RES	28
R429	RES	28
R430	RES	28
R431	RES	28
R432	RES	28
R433	RES	28
R434	RES	28
R435	RES	28
R436	RES	28
R437	RES	28
R438	RES	28
R439	RES	28
R440	RES	28
R441	RES	28
R442	RES	28
R443	RES	29
R444	RES	29
R445	RES	28
R446	RES	30
R447	RES	30
R448	RES	30
R449	RES	5
R450	RES	14
R451	RES	30
R452	RES	5
R453	RES	5
R454	RES	27
R455	RES	5
R456	RES	23
R457	RES	14
R458	RES	23
R459	RES	23
R460	RES	23
R461	RES	30
R462	RES	23
R463	RES	23
R464	RES	23
R465	RES	30
R466	RES	30
R467	RES	14
R468	RES	36
R469	RES	23
R470	RES	23
R471	RES	30
R472	RES	23
R473	RES	23
R474	RES	23
R475	RES	23
R476	RES	23
R477	RES	23
R478	RES	23
R479	RES	23
R480	RES	23
R481	RES	23
R482	RES	23
R483	RES	23
R484	RES	23
R485	RES	23
R486	RES	29
R487	RES	29
R488	RES	29
R489	RES	29
R490	RES	29
R491	RES	29
R492	RES	29
R493	RES	29
R494	RES	29
R495	RES	29
R496	RES	29
R497	RES	29
R498	RES	29
R499	RES	29
R500	RES	29
R501	RES	29
R502	RES	29
R503	RES	28
R504	RES	28
R505	RES	29
R506	RES	28
R507	RES	28
R508	RES	29
R509	RES	29
R510	RES	29
R511	RES	29
R512	RES	29
R513	RES	28
R514	RES	29
R515	RES	29
R516	RES	29
R517	RES	29
R518	RES	29
R519	RES	29
R520	RES	29
R521	RES	34
R522	RES	34
R523	RES	34
R524	RES	34
R525	RES	36
R526	RES	36
R527	RES	36
R528	RES	36
R529	RES	36
R530	RES	27
R531	RES	36
R532	RES	36
R533	RES	34
R534	RES	34
R535	RES	36
R536	RES	36
R537	RES	34
R538	RES	34
R539	RES	34
R540	RES	26
R541	RES	26
R542	RES	26
R543	RES	23
R544	RES	23
R545	RES	26
R546	RES	26
R547	RES	27
R548	RES	34
R549	RES	21
R550	RES	34
R551	RES	34
R552	RES	12
R553	RES	12
R554	RES	36
R555	RES	21
R556	RES	21
R557	RES	36
R558	RES	21
R559	RES	21
R560	RES	31
R561	RES	31
R562	RES	31
R563	RES	31
R564	RES	31

R565	RES	14
R566	RES	36
R567	RES	14
R568	RES	14
R569	RES	24
R570	RES	26
R571	RES	36
R572	RES	34
R573	RES	26
R574	RES	14
R575	RES	31
R576	RES	31
R577	RES	24
R578	RES	26
R579	RES	26
R580	RES	31
R581	RES	31
R582	RES	31
R583	RES	31
R584	RES	31
R585	RES	31
R586	RES	31
R587	RES	31
R588	RES	31
R589	RES	31
R590	RES	31
R591	RES	31
R592	RES	31
R593	RES	31
R594	RES	31
R595	RES	31
R596	RES	20
R597	RES	19
R598	RES	31
R599	RES	31
R600	RES	31
R601	RES	36
R602	RES	31
R603	RES	14
R604	RES	33
R605	RES	33
R606	RES	17
R607	RES	17
R608	RES	17
R609	RES	17
R610	RES	17
R611	RES	24
R612	RES	17
R613	RES	17
R614	RES	17
R615	RES	17
R616	RES	24
R617	RES	17
R618	RES	8
R619	RES	8
R620	RES	8
R621	RES	8
R622	RES	8
R623	RES	8
R624	RES	8
R625	RES	8
R626	RES	8
R627	RES	8
R628	RES	8
R629	RES	8
R630	RES	13
R631	RES	35
R632	RES	17
R633	RES	27
R634	RES	35
R635	RES	14
R636	RES	17
R637	RES	6
R638	RES	8
R639	RES	8
R640	RES	8
R641	RES	8
R642	RES	8
R643	RES	8
R644	RES	8
R645	RES	8
R646	RES	8
R647	RES	20
R648	RES	8
R649	RES	8
R650	RES	8
R651	RES	8
R652	RES	8
R653	RES	8
R654	RES	8
R655	RES	8
R656	RES	8
R657	RES	8
R658	RES	8
R659	RES	27
R660	RES	35
R661	RES	27
R662	RES	35
R663	RES	33
R664	RES	8
R665	RES	8
R666	RES	8
R667	RES	8
R668	RES	8
R669	RES	8
R670	RES	8
R671	RES	20
R672	RES	24
R673	RES	33
R674	RES	9
R675	RES	20
R676	RES	20
R677	RES	8
R678	RES	8
R679	RES	8
R680	RES	8
R681	RES	8
R682	RES	8
R683	RES	8
R684	RES	8
R685	RES	8
R686	RES	27
R687	RES	27
R688	RES	27
R689	RES	27
R690	RES	33
R691	RES	9
R692	RES	6
R693	RES	8
R694	RES	8
R695	RES	8
R696	RES	8
R697	RES	8
R698	RES	8
R699	RES	8
R700	RES	27
R701	RES	27
R702	RES	27
R703	RES	27
R704	RES	27
R705	RES	27
R706	RES	35
R707	RES	6
R708	RES	35
R709	RES	6
R710	RES	32
R711	RES	32
R712	RES	6
R713	RES	32
R714	RES	18
R715	RES	32
R716	RES	32
R717	RES	32
R718	RES	18
R719	RES	18
R720	RES	32
R721	RES	18
R722	RES	18
R723	RES	18
R724	RES	18
R725	RES	32
R726	RES	18
R727	RES	32
R728	RES	32
R729	RES	32
R730	RES	32
R731	RES	32
R732	RES	32

R733	RES	32
R734	RES	32
R735	RES	32
R736	RES	32
R737	RES	26
R738	RES	32
R739	RES	26
R740	RES	32
R741	RES	32
R742	RES	32
R743	RES	35
R744	RES	32
R745	RES	32
R746	RES	14
R747	RES	26
R748	RES	5
R749	RES	27
R750	RES	23
R751	RES	27
R752	RES	27
R753	RES	23
R754	RES	24
R755	RES	5
R756	RES	18
R757	RES	35
R758	RES	24
R759	RES	26
R760	RES	20
R761	RES	20
R762	RES	20
R763	RES	20
R764	RES	20
R765	RES	20
R766	RES	20
R767	RES	20
R768	RES	27
R769	RES	20
R770	RES	27
R771	RES	27
R772	RES	27
R773	RES	27
R774	RES	27
R775	RES	5
R776	RES	20
R777	RES	30
R778	RES	27
R779	RES	21
R780	RES	20
R781	RES	20
R782	RES	20
R783	RES	20
R784	RES	24
R785	RES	25
R786	RES	21
R787	RES	22
R788	RES	22
R789	RES	24
R790	RES	35
R791	RES	35
R792	RES	35
R793	RES	25
R794	RES	25
R795	RES	25
R796	RES	25
R797	RES	25
R798	RES	17
R799	RES	25
R800	RES	25
R801	RES	14
R802	RES	14
R803	RES	30
R804	RES	33
R805	RES	25
R806	RES	27
R807	RES	27
R808	RES	27
R809	RES	24
R810	RES	25
R811	RES	25
R812	RES	25
R813	RES	25
R814	RES	28
R815	RES	31
R816	RES	30
R817	RES	27
R818	RES	25
R819	RES	31
R820	RES	25
R821	RES	31
R822	RES	25
R823	RES	25
R824	RES	25
R825	RES	31
R826	RES	31
R827	RES	25
R828	RES	20
R829	RES	30
R830	RES	30
R831	RES	30
R832	RES	20
R833	RES	30
R834	RES	30
R835	RES	30
R836	RES	30
R837	RES	30
R838	RES	6
R839	RES	6
R840	RES	21
R841	RES	22
R842	RES	22
R843	RES	22
R844	RES	6
R845	RES	6
R846	RES	6
R847	RES	6
R848	RES	27
R849	RES	27
R850	RES	20
R851	RES	20
R852	RES	20
R857	RES	20
R858	RES	20
R859	RES	20
R867	RES	20
R869	RES	20
R871	RES	20
R872	RES	20
R876	RES	20
RP1	RPAK10P2C	18
RP2	RPAK4P	8
RP3	RPAK4P	8
RP4	RPAK4P	14
RP5	RPAK4P	14
RP6	RPAK4P	14
RP7	RPAK4P	14
RP8	RPAK4P	14
RP9	RPAK4P	9
RP10	RPAK4P	13
RP11	RPAK4P	14
RP12	RPAK4P	9
RP13	RPAK4P	14
RP14	RPAK4P	9
RP15	RPAK4P	14
RP16	RPAK4P	13
RP17	RPAK4P	9
RP18	RPAK4P	26
RP19	RPAK4P	26
RP20	RPAK4P	9
RP21	RPAK4P	26
RP22	RPAK4P	9
RP23	RPAK4P	26
RP24	RPAK4P	26
RP25	RPAK4P	26
RP26	RPAK4P	26
RP27	RPAK4P	26
RP28	RPAK4P	26
RP29	RPAK4P	9
RP30	RPAK4P	26
RP31	RPAK4P	9
RP32	RPAK4P	13
RP33	RPAK4P	12
RP34	RPAK4P	12
RP35	RPAK4P	13
RP36	RPAK4P	12
RP37	RPAK4P	29
RP38	RPAK4P	29
RP39	RPAK4P	31
RP40	RPAK10P2C	24

RP41	RPAK4P	31
RP42	RPAK10P2C	24
RP43	RPAK4P	17
RP44	RPAK4P	17
RP45	RPAK4P	17
RP46	RPAK10P2C	6
RP47	RPAK4P	14
RP61	RPAK2P	20
RP70	RPAK2P	20
RP72	RPAK2P	20
RP74	RPAK2P	35
RP75	RPAK2P	20
SH1	SHLD_3P_EMI	4
U1	COMPARATOR_LMC7211	32
U2	NC7S32	23
U3	AMP_MAX4172	32
U4	PWR_CNTRL_TPS2211	18
U5	FAN2558	5
U6	MAX1772	32
U7	MAX1717	35
U8	PCI1510GGU	18
U9	SN74AUC1G08	6
U10	SN74AUC1G08	6
U11	FEPR_1MX8	9
U12	SN74AUC1G04	7
U13	LTC1625	33
U14	COMPARATOR_LMC7211	33
U15	PIC16F818_QFN	25
U16	CBTV4020	10
U17	UPD720101_FBGA	17
U18	CBTV4020	10
U19	MAX1715	36
U20	KXM52	25
U21	741125	24
U22	VREG_LP2951	33
U23	VREG_LP2951	33
U24	SIL178	20
U25	SIL178	20
U26	MAX6804	31
U27	CBTV4020	10
U28	CBTV4020	10
U29	M16C62	31
U30	CLK_GEN_CY25811	19
U31	CLK_GEN_CY28512	14
U32	LTC1778	21
U33	COMPARATOR_LMC7211	31
U34	VREG_MM1571J	22
U35	LTC3707	34
U36	TSB81BA3A	29
U37	VREG_LM2594	29
U38	VREG_LT1962	29
U39	741G32	23
U40	741G32	23
U41	INA138	25
U42	COMPARATOR_LMC7211	23
U43	TRANSCEIVER_88E1111	28
U44	LTC1761	29
U45	LTC3405	28
U46	LTC3411	36
U47	RAGE_MBLTY_M11_CSP64_667	19 21 22
U48	TRA_SI5467BDQ	36
U49	VREG_LT1962	14
U50	TRA_SI3447DV	36
U51	INTREPID 8 9 12 13 14 15	
U52	EEPROM_32KX8_M24256B	6
U53	ADT7467	27
U54	ATTINY2313	6
U55	OPAMP_LMC7111	32
U56	APOLLO_MPC7447A_360	5 6
U57	COMPARATOR_LMC7211	32
U58	LI53L02AQ	25
U59	COMPARATOR_LMC7211	30
U60	VREG_MM1571J	22
XW1	SHORT	32
XW2	SHORT	35
XW3	SHORT	33
XW4	SHORT	21
XW5	SHORT	21
XW6	SHORT	21
XW7	JUMPER	21
XW8	SHORT	36
XW9	SHORT	21
XW10	SHORT	36
XW11	SHORT	21
XW12	SHORT	21
XW13	SHORT	34
XW14	SHORT	23
XW15	SHORT	23
XW16	JUMPER	22
XW17	SHORT	36
XW18	JUMPER	26
XW19	JUMPER	33
XW20	JUMPER	34
XW21	SHORT	36
XW22	JUMPER	34
XW23	SHORT	36
XW24	JUMPER	36
XW25	SHORT	36
XW26	JUMPER	36
XW27	SHORT	35
XW28	SHORT	35
XW29	SHORT	35
XW30	SHORT	27
XW31	SHORT	34
XW32	SHORT	34
XW33	JUMPER	36
XW34	SHORT	5
XW35	SHORT	25
XW36	SHORT	25
XW37	SHORT	25
Y1	CRYSTAL	17
Y2	CRYSTAL	14
Y3	CRYSTAL_4PIN	31
Y4	CRYSTAL	31
Y5	CRYSTAL_4PIN	28
ZT1	HOLE_VIA	4
ZT2	HOLE_VIA	4
ZT3	HOLE_VIA	4
ZT4	HOLE_VIA	4
ZT5	HOLE_VIA	4
ZT6	HOLE_VIA	4
ZT7	HOLE_VIA	4
ZT8	HOLE_VIA	4
ZT9	HOLE_VIA	4
ZT10	HOLE_VIA	4
ZT11	HOLE_VIA	4
ZT12	HOLE_VIA	4
ZT13	HOLE_VIA	4
ZT14	HOLE_VIA	4
ZT15	HOLE_VIA	4
ZT16	HOLE_VIA	4
ZT17	HOLE_VIA	4
ZT18	HOLE_VIA	4
ZT19	HOLE_VIA	4
ZT20	HOLE_VIA	4
ZT21	HOLE_VIA	4
ZT22	HOLE_VIA	4
ZT23	HOLE_VIA	4
ZT24	HOLE_VIA	4
ZT25	HOLE_VIA	4
ZT26	HOLE_VIA	4
ZT27	HOLE_VIA	4
ZT28	HOLE_VIA	4
ZT29	HOLE_VIA	4
ZT30	HOLE_VIA	4
ZT31	HOLE_VIA	4
ZT32	HOLE_VIA	4
ZT33	HOLE_VIA	4
ZT34	HOLE_VIA	4
ZT35	HOLE_VIA	4
ZT36	HOLE_VIA	4
ZT37	HOLE_VIA	4
ZT38	HOLE_VIA	4
ZT39	HOLE_VIA	4
ZT40	HOLE_VIA	4
ZT41	HOLE_VIA	4
ZT42	HOLE_VIA	4
ZT43	HOLE_VIA	4
ZT44	HOLE_VIA	4
ZT45	HOLE_VIA	4
ZT46	HOLE_VIA	4
ZT47	HOLE_VIA	4
ZT48	HOLE_VIA	4
ZT49	HOLE_VIA	4
ZT50	HOLE_VIA	4
ZT51	HOLE_VIA	4
ZT52	HOLE_VIA	4
ZT53	HOLE_VIA	4

ZT54	HOLE_VIA	4
ZT55	HOLE_VIA	4
ZT56	HOLE_VIA	4
ZT57	HOLE_VIA	4
ZT58	HOLE_VIA	4
ZT59	HOLE_VIA	4
ZT60	HOLE_VIA	4
ZT61	HOLE_VIA	4
ZT62	HOLE_VIA	4
ZT63	HOLE_VIA	4
ZT64	HOLE_VIA	4
ZT65	HOLE_VIA	4
ZT66	HOLE_VIA	4
ZT67	HOLE_VIA	4
ZT68	HOLE_VIA	4
ZT69	HOLE_VIA	4
ZT70	HOLE_VIA	4
ZT71	HOLE_VIA	4
ZT72	HOLE_VIA	4
ZT73	HOLE_VIA	4
ZT74	HOLE_VIA	4
ZT75	HOLE_VIA	4
ZT76	HOLE_VIA	4
ZT77	HOLE_VIA	4
ZT78	HOLE_VIA	4
ZT79	HOLE_VIA	4
ZT80	HOLE_VIA	4
ZT81	HOLE_VIA	4
ZT82	HOLE_VIA	4
ZT83	HOLE_VIA	4
ZT84	HOLE_VIA	4
ZT85	HOLE_VIA	4
ZT86	HOLE_VIA	4