

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
B		260495	PRODUCTION RELEASED	02/05/03	?

PAGE

CONTENTS

PAGE

CONTENTS

1	TITLE PAGE AND CONTENTS
2	SYSTEM BLOCK DIAGRAM
3	POWER BLOCK DIAGRAM
4	PCB NOTES AND HOLES
5	MPC7450 MAXBUS INTERFACE
6	MPC7450 DATA / L3 CACHE INTERFACES/L3 LDO
7	CPU PLL AND CONFIGURATION STRAPS
8	DDR L3 CACHE
9	INTREPID MAXBUS AND BOOT STRAPS
10	INTREPID MEMORY INTERFACE / BOOT ROM
11	DDR MEMORY MUXES
12	200PIN DDR MEMORY SODIMM CONNECTORS
13	INTREPID AGP 4X/PCI
14	INTREPID ENET/FW/UATA/EIDE INTERFACES
15	INTREPID GPIO/SERIAL/USB INTERFACES/SSCG
16	INTREPID POWER RAILS/1.5V LDO
17	INTREPID DECOUPLING
18	CARDBUS CONTROLLER (PCI1510)
19	MAP17/31 AGP & FRAME BUFFER
20	MAP17/31 LVDS/TMDS/GPIO & GPU VCORE
21	MAP17/31 ANALOG, DVO INTERFACE, GND

22	VIDEO CONNECTORS - INVERTER, DVI, S-VIDEO DUAL-CHANNEL LVDS
23	LMU, LIGHT SENSOR, BOOTBANGER, SLEEP LED SPIDEY - KBD,TPAD,HALL EFFECT,PWR BUTTON
24	INTERNAL CONNECTORS - DVD, CARDSLOT, HARD DRIVE, LEFT USB/BLUETOOTH
25	FAN CONTROLLER, MODEM, SOUND SERIAL DEBUG (JOLLY ROGER, PWR/NMI/RESET)
26	USB 2.0
27	MARVELL GIGABIT ETHERNET PHY
28	FIREWIRE A/B PHY
29	FIREWIRE A/B CONNECTORS, PORT POWER LIMITER
30	PMU (POWER MANAGEMENT UNIT)
31	BATTERY CHARGER AND CONNECTOR
32	12.8V SYSTEM POWER SUPPLY / PMU POWER SUPPLY
33	3.3V / 5V SYSTEM POWER SUPPLIES
34	CPU CORE VOLTAGE POWER SUPPLY
35	1.5V/ 1.8V / 2.5V SYSTEM POWER SUPPLIES
36	SIGNAL CONSTRAINTS (1 OF 3) - DIGITAL/CLK
37	SIGNAL CONSTRAINTS (2 OF 3) - DIGITAL/DIFF
38	SIGNAL CONSTRAINTS (3 OF 3) - POWER NETS
39	FUNCTIONAL TEST POINTS
40	REVISION HISTORY (1 OF 1)
41-42	SIGNAL NAMES
43-44	COMPONENT LOCATIONS

SCHEM, MLB, PG 17 "

01/24/2003

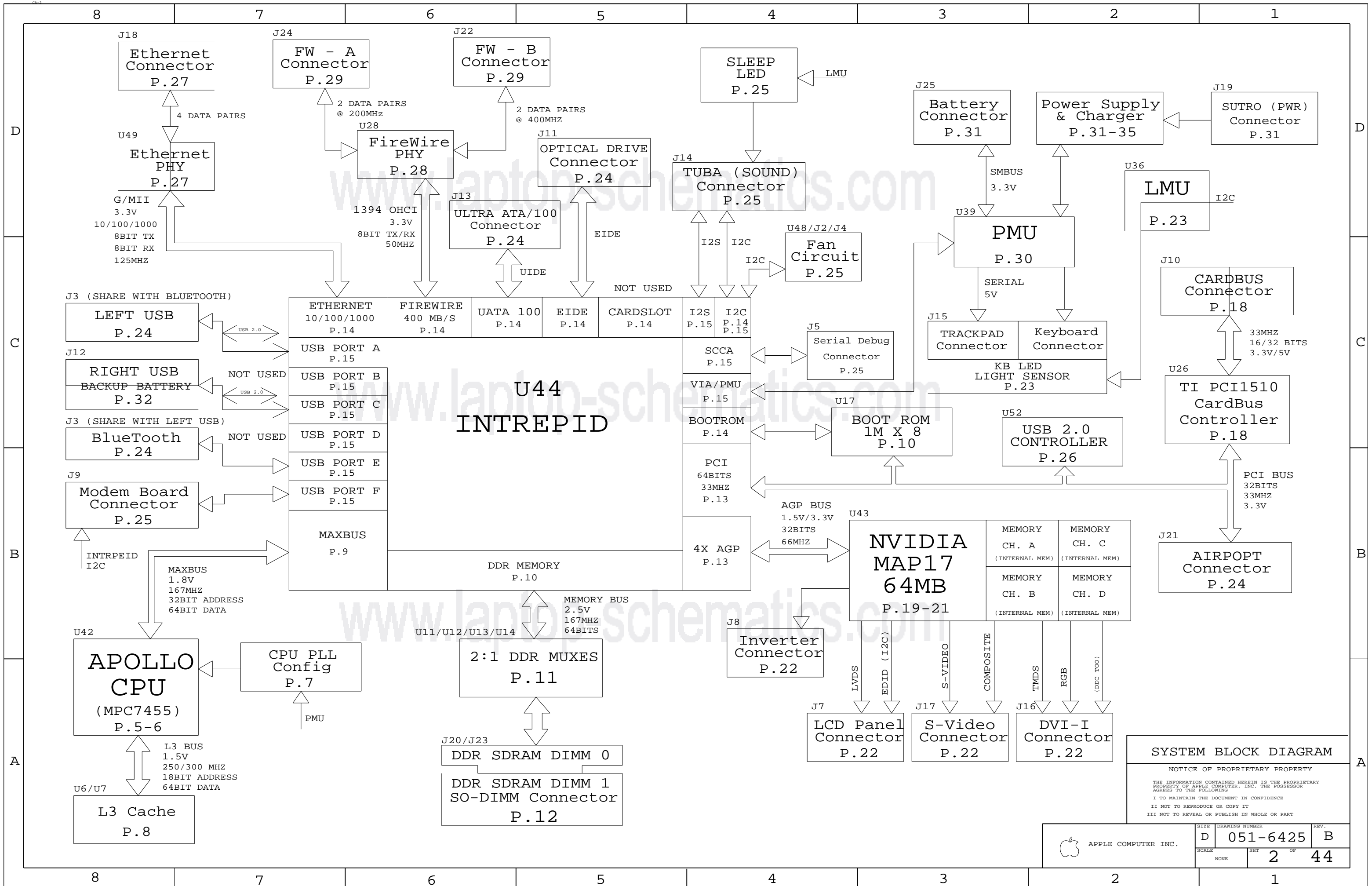
BOM OPTIONS	STUFF	NO STUFF
D3_HOT		✓
D3_COLD	✓	
GPU_SS	✓	
GPU_SWITCH	✓	
SERIAL_DEBUG	✓	
VCORE_OFFSET	✓	
1_8V_MAXBUS	✓	
1_5V_MAXBUS		✓
NEC_USB		✓
INTREPID_USB	✓	
BBANG		✓
NO_BBANG	✓	
MAP31		✓
MAP17	✓	
SSCG		✓
NO_SSCG	✓	
5V_HD_LOGIC	✓	
3V_HD_LOGIC		✓
NO_4XVCORE	✓	
4X_VCORE		✓

MAP17/MAP31

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-6425	1	SCHEM,MLB,PB 17	SCH1	
820-1502	1	PCBF,MLB,PB 17	PCB1	

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
33880076	1	IC,ASSP,MAP17-464,GRPHCS CTRLR	548 BGA U43	CRITICAL	MAP17
33880094	1	IC,ASSP,MAP31-464,GRPHCS CTRLR	548 BGA U43	CRITICAL	MAP31

DIMENSIONS ARE IN MILLIMETERS		METRIC		Apple Computer Inc.	
xx : _____	_____	DRAFTER	DESIGN CK	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	
x.xx : _____	_____	ENG APPD	MFG APPD		
x.xxx : _____	_____	QA APPD	DESIGNER		
ANGLES : _____	_____	RELEASE	SCALE		
DO NOT SCALE DRAWING		NONE		TITLE	
THIRD ANGLE PROJECTION		MATERIAL/FINISH NOTED AS APPLICABLE		DRAWING NUMBER	
		SIZE D		051-6425	
				REV. B	
				SHT 1 OF 44	

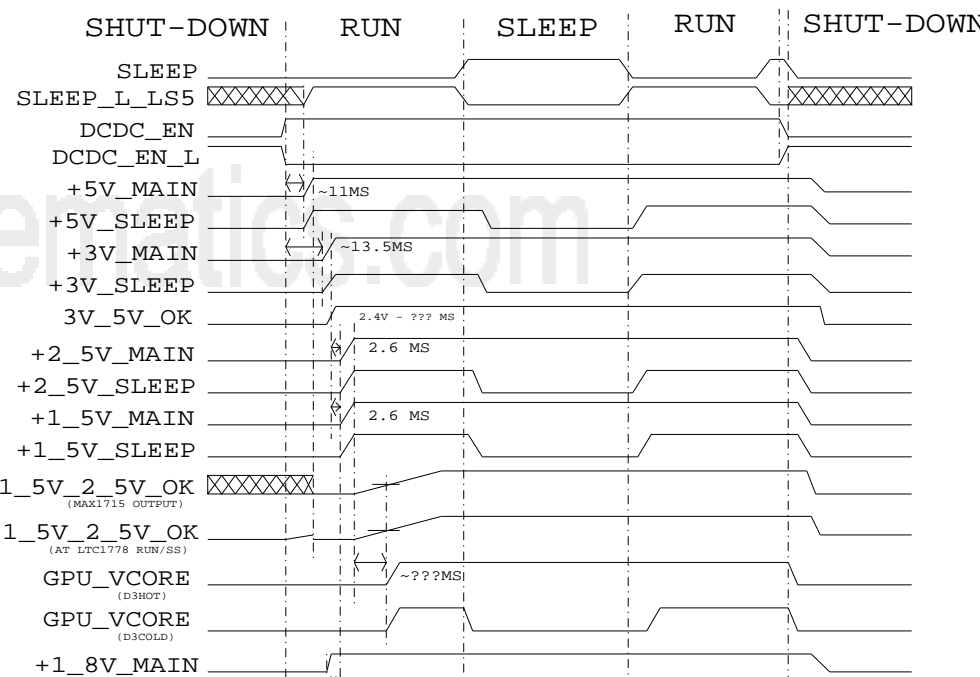
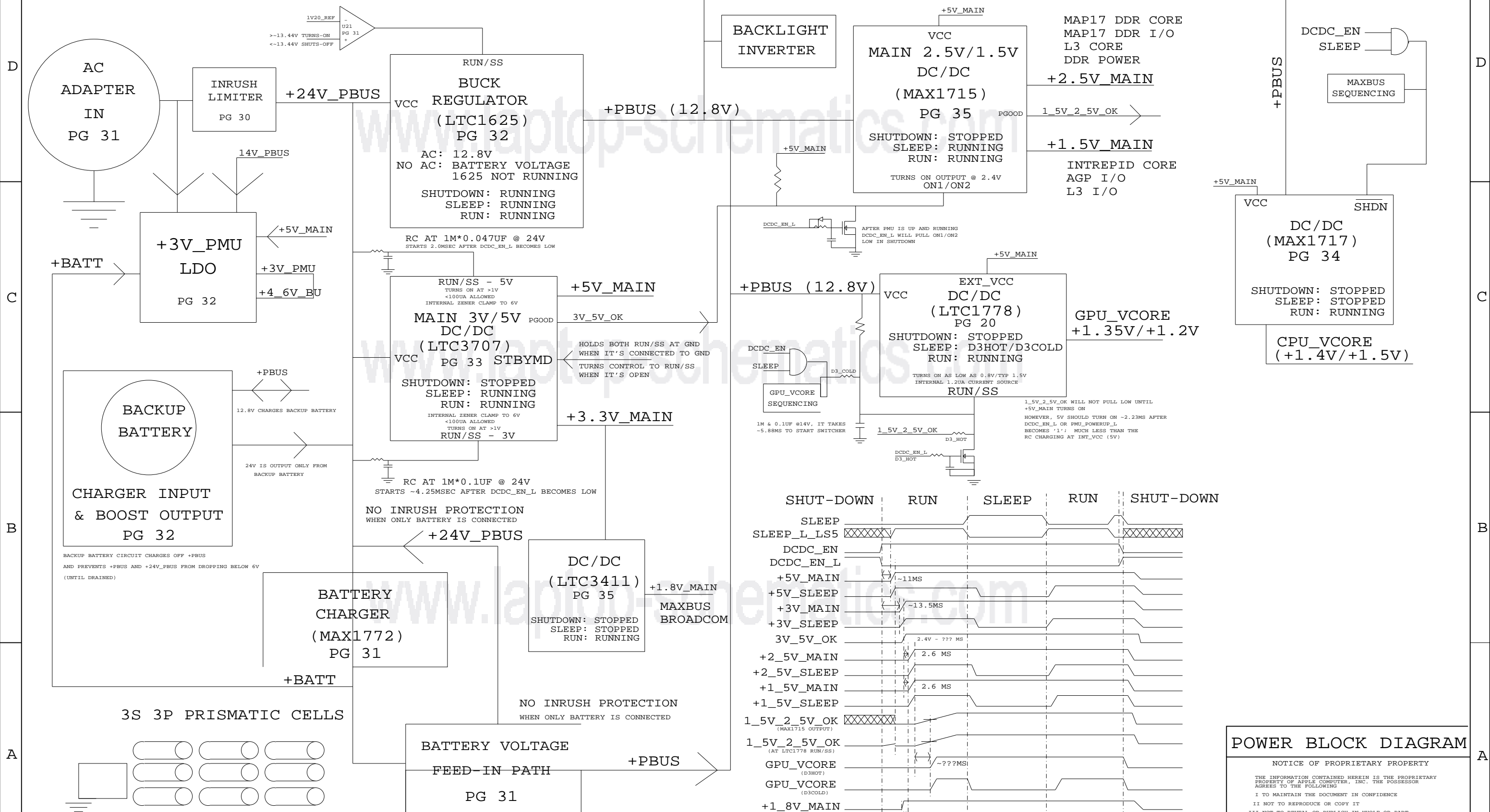


SYSTEM BLOCK DIAGRAM

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	D	051-6425	B
SCALE	SHT	OF	
NONE	2	44	

POWER SYSTEM ARCHITECTURE



POWER BLOCK DIAGRAM

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	D	051-6425	B
SCALE	SHT	OF	
NONE	3	44	

PCB SPECS

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

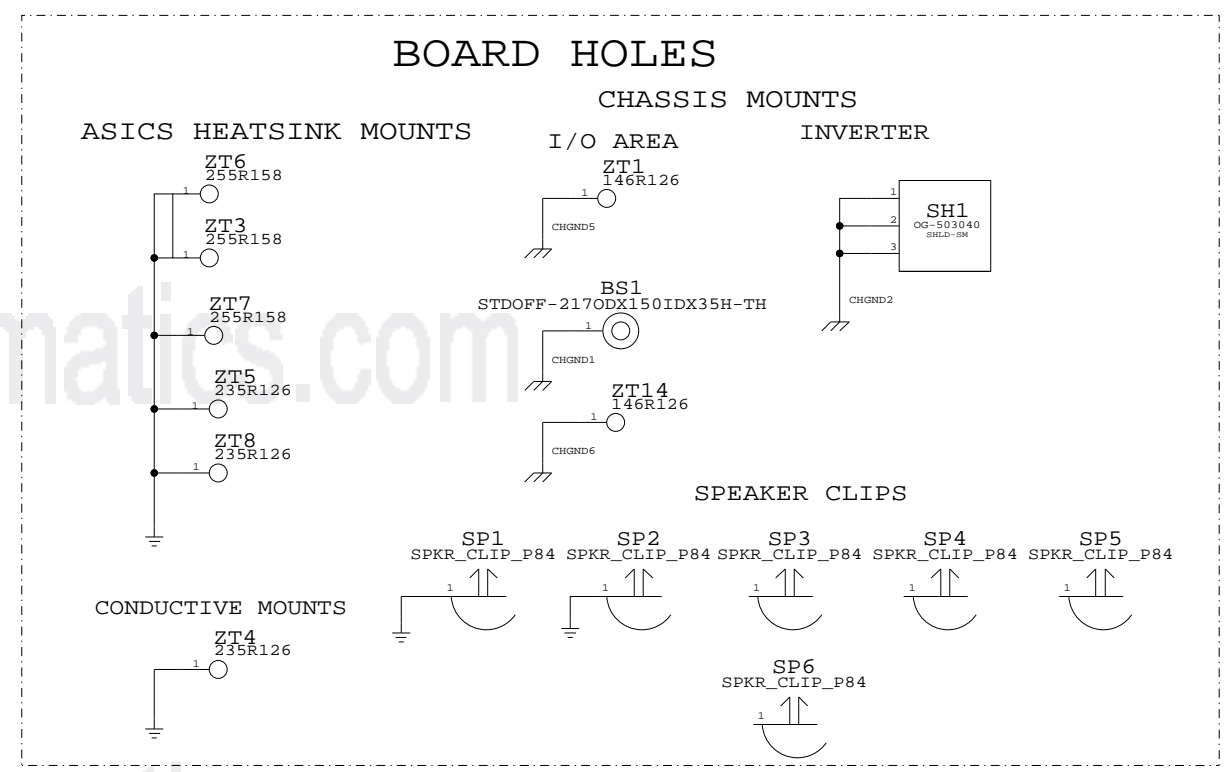
IMPEDANCE : 50 OHMS +/- 10%
 DIELECTRIC: FR-4
 LAYER COUNT: 12
 SIGNAL TRACE WIDTH: 4 MILS
 SIGNAL TRACE SPACING: 4 MILS
 PREPREG THICKNESS: 2-3 MILS

SEE PCB CAD FILES FOR MORE SPECIFIC INFO.

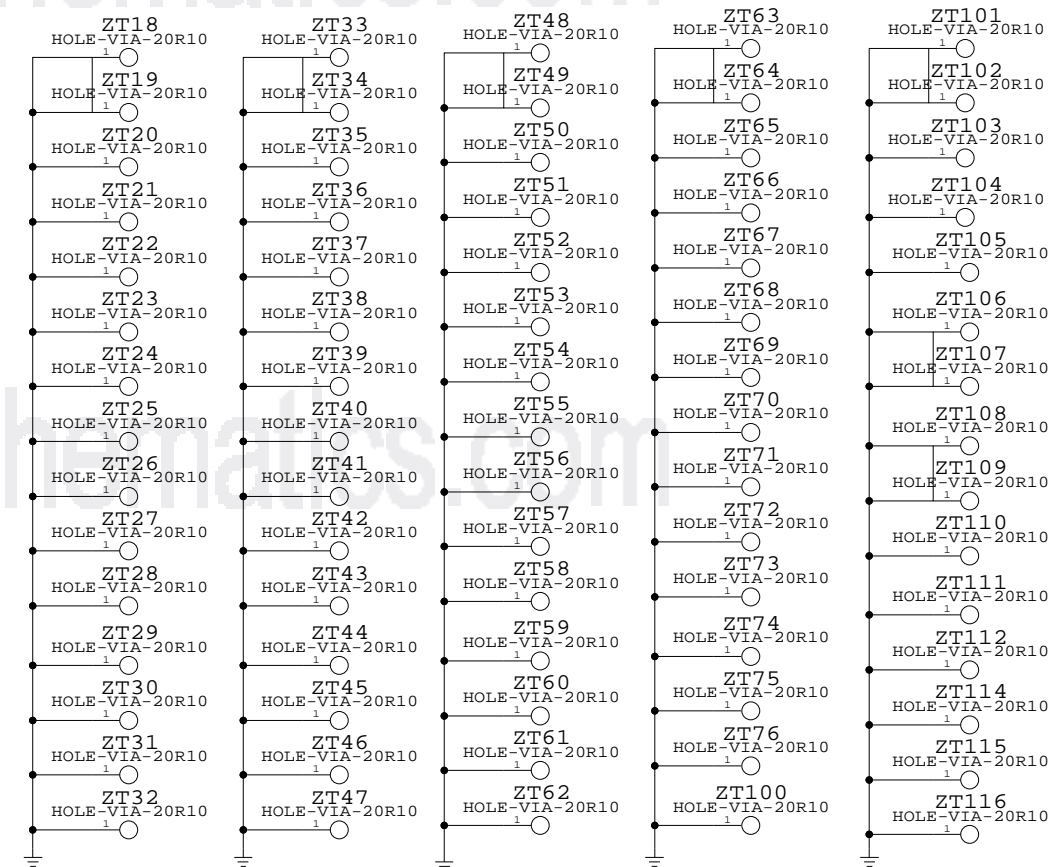
BOARD STACK-UP AND CONSTRUCTION

20R10 TH VIA OR VIA IN PAD

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



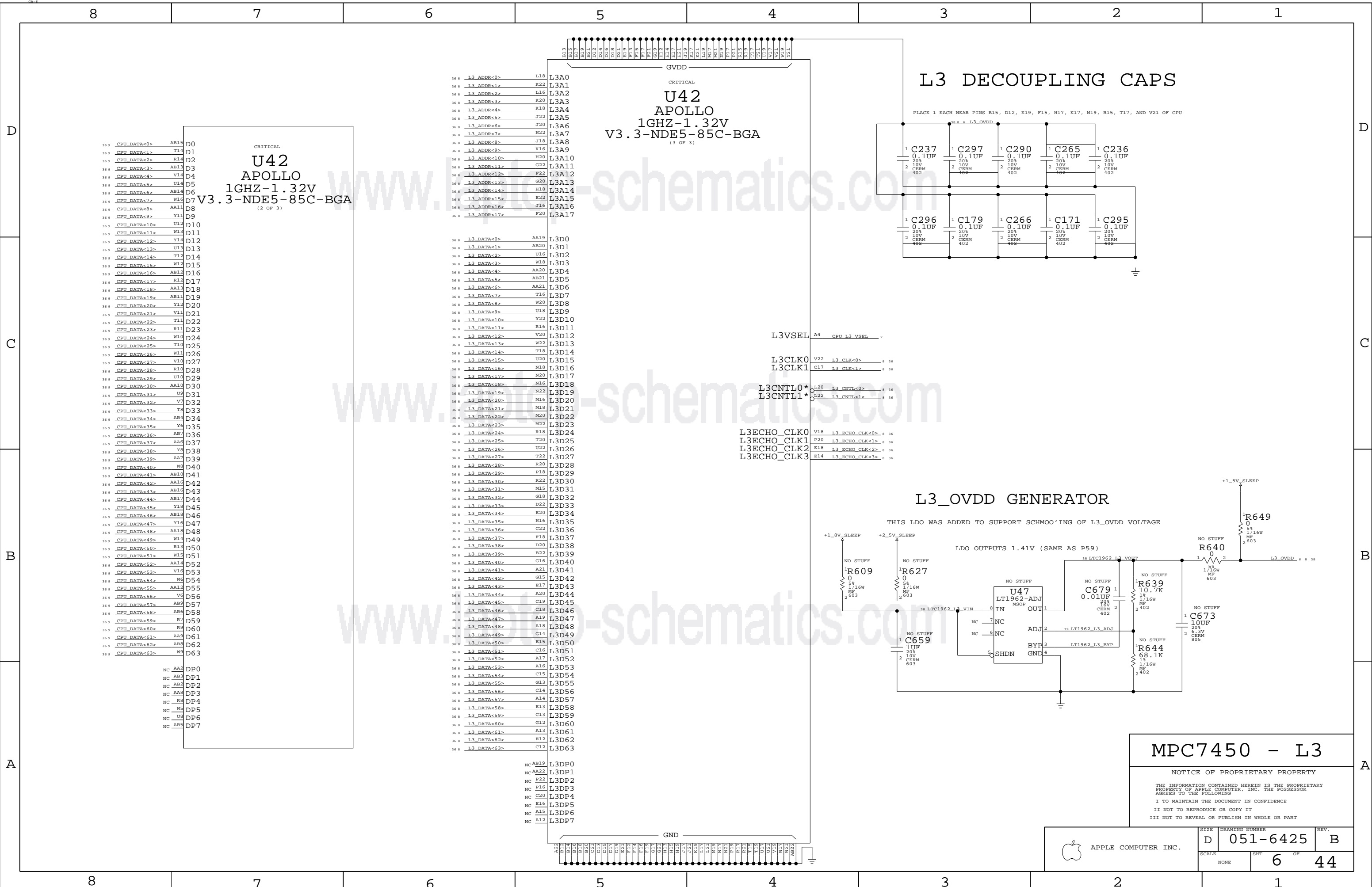
GROUND VIAS



BOARD INFORMATION

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SCALE	NONE	SHT	4 OF 44



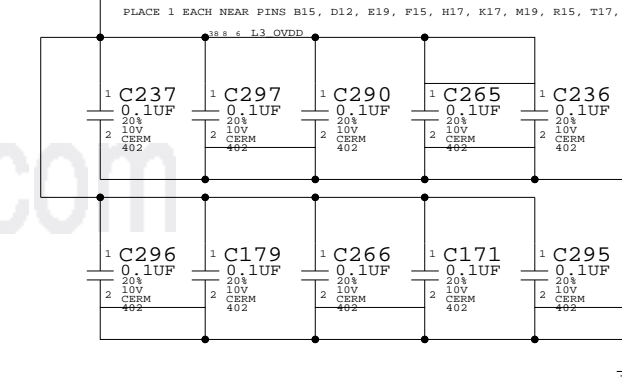
U42 APOLLO
1GHZ-1.32V
V3.3-NDE5-85C-BGA
(2 OF 3)

369	CPU_DATA<0>	AB15	D0
369	CPU_DATA<1>	T14	D1
369	CPU_DATA<2>	R14	D2
369	CPU_DATA<3>	AB13	D3
369	CPU_DATA<4>	V14	D4
369	CPU_DATA<5>	U14	D5
369	CPU_DATA<6>	AB14	D6
369	CPU_DATA<7>	W16	D7
369	CPU_DATA<8>	AA11	D8
369	CPU_DATA<9>	Y11	D9
369	CPU_DATA<10>	U12	D10
369	CPU_DATA<11>	W13	D11
369	CPU_DATA<12>	Y14	D12
369	CPU_DATA<13>	U13	D13
369	CPU_DATA<14>	T12	D14
369	CPU_DATA<15>	W12	D15
369	CPU_DATA<16>	AB12	D16
369	CPU_DATA<17>	R12	D17
369	CPU_DATA<18>	AA13	D18
369	CPU_DATA<19>	AB11	D19
369	CPU_DATA<20>	Y12	D20
369	CPU_DATA<21>	V11	D21
369	CPU_DATA<22>	T11	D22
369	CPU_DATA<23>	R11	D23
369	CPU_DATA<24>	W10	D24
369	CPU_DATA<25>	T10	D25
369	CPU_DATA<26>	W11	D26
369	CPU_DATA<27>	V10	D27
369	CPU_DATA<28>	R10	D28
369	CPU_DATA<29>	U10	D29
369	CPU_DATA<30>	AA10	D30
369	CPU_DATA<31>	U9	D31
369	CPU_DATA<32>	V7	D32
369	CPU_DATA<33>	T8	D33
369	CPU_DATA<34>	AB4	D34
369	CPU_DATA<35>	Y6	D35
369	CPU_DATA<36>	AB7	D36
369	CPU_DATA<37>	AA6	D37
369	CPU_DATA<38>	Y8	D38
369	CPU_DATA<39>	AA7	D39
369	CPU_DATA<40>	W8	D40
369	CPU_DATA<41>	AB10	D41
369	CPU_DATA<42>	AA16	D42
369	CPU_DATA<43>	AB16	D43
369	CPU_DATA<44>	AB17	D44
369	CPU_DATA<45>	Y18	D45
369	CPU_DATA<46>	AB18	D46
369	CPU_DATA<47>	Y16	D47
369	CPU_DATA<48>	AA18	D48
369	CPU_DATA<49>	W14	D49
369	CPU_DATA<50>	R13	D50
369	CPU_DATA<51>	W15	D51
369	CPU_DATA<52>	AA14	D52
369	CPU_DATA<53>	V16	D53
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369	CPU_DATA<55>	AA12	D55
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369	CPU_DATA<57>	AB9	D57
369	CPU_DATA<58>	AB8	D58
369	CPU_DATA<59>	R7	D59
369	CPU_DATA<60>	R9	D60
369	CPU_DATA<61>	AA9	D61
369	CPU_DATA<62>	AB8	D62
369	CPU_DATA<63>	W9	D63
NC	AA2	DP0	
NC	AB3	DP1	
NC	AB2	DP2	
NC	AA8	DP3	
NC	R8	DP4	
NC	W5	DP5	
NC	U8	DP6	
NC	AB5	DP7	

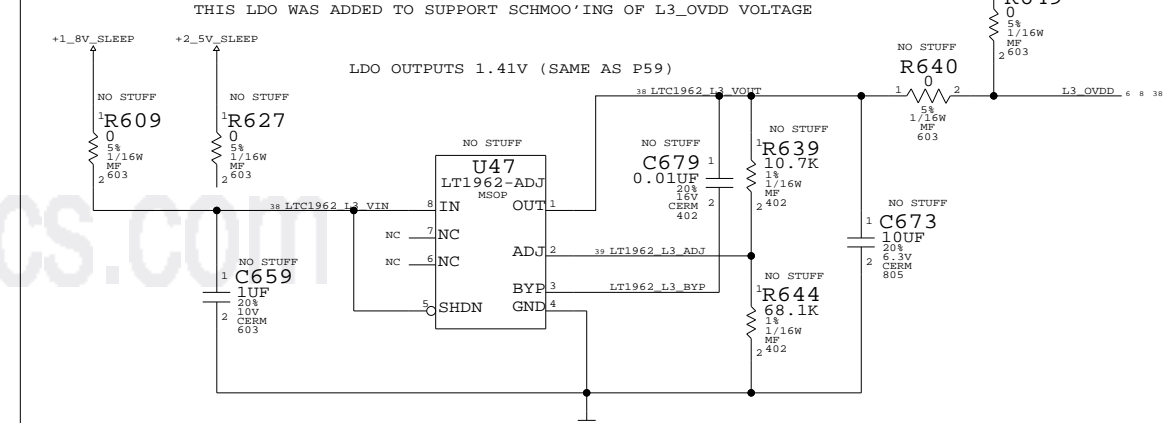
U42 APOLLO
1GHZ-1.32V
V3.3-NDE5-85C-BGA
(3 OF 3)

368	L3_ADDR<0>	L18	L3A0
368	L3_ADDR<1>	K22	L3A1
368	L3_ADDR<2>	L16	L3A2
368	L3_ADDR<3>	K20	L3A3
368	L3_ADDR<4>	K18	L3A4
368	L3_ADDR<5>	J22	L3A5
368	L3_ADDR<6>	J20	L3A6
368	L3_ADDR<7>	H22	L3A7
368	L3_ADDR<8>	J18	L3A8
368	L3_ADDR<9>	K16	L3A9
368	L3_ADDR<10>	H20	L3A10
368	L3_ADDR<11>	G22	L3A11
368	L3_ADDR<12>	F22	L3A12
368	L3_ADDR<13>	G20	L3A13
368	L3_ADDR<14>	H18	L3A14
368	L3_ADDR<15>	E22	L3A15
368	L3_ADDR<16>	J16	L3A16
368	L3_ADDR<17>	F20	L3A17
368	L3_DATA<0>	AA19	L3D0
368	L3_DATA<1>	AB20	L3D1
368	L3_DATA<2>	U16	L3D2
368	L3_DATA<3>	W18	L3D3
368	L3_DATA<4>	AA20	L3D4
368	L3_DATA<5>	AB21	L3D5
368	L3_DATA<6>	AA21	L3D6
368	L3_DATA<7>	T16	L3D7
368	L3_DATA<8>	W20	L3D8
368	L3_DATA<9>	U18	L3D9
368	L3_DATA<10>	Y22	L3D10
368	L3_DATA<11>	R16	L3D11
368	L3_DATA<12>	V20	L3D12
368	L3_DATA<13>	W22	L3D13
368	L3_DATA<14>	T18	L3D14
368	L3_DATA<15>	U20	L3D15
368	L3_DATA<16>	N18	L3D16
368	L3_DATA<17>	N20	L3D17
368	L3_DATA<18>	N16	L3D18
368	L3_DATA<19>	N22	L3D19
368	L3_DATA<20>	M16	L3D20
368	L3_DATA<21>	M18	L3D21
368	L3_DATA<22>	M20	L3D22
368	L3_DATA<23>	M22	L3D23
368	L3_DATA<24>	R18	L3D24
368	L3_DATA<25>	T20	L3D25
368	L3_DATA<26>	U22	L3D26
368	L3_DATA<27>	T22	L3D27
368	L3_DATA<28>	R20	L3D28
368	L3_DATA<29>	F18	L3D29
368	L3_DATA<30>	E22	L3D30
368	L3_DATA<31>	M15	L3D31
368	L3_DATA<32>	G18	L3D32
368	L3_DATA<33>	D22	L3D33
368	L3_DATA<34>	E20	L3D34
368	L3_DATA<35>	H16	L3D35
368	L3_DATA<36>	C22	L3D36
368	L3_DATA<37>	F18	L3D37
368	L3_DATA<38>	D20	L3D38
368	L3_DATA<39>	B22	L3D39
368	L3_DATA<40>	G16	L3D40
368	L3_DATA<41>	A21	L3D41
368	L3_DATA<42>	G15	L3D42
368	L3_DATA<43>	E17	L3D43
368	L3_DATA<44>	A20	L3D44
368	L3_DATA<45>	C19	L3D45
368	L3_DATA<46>	C18	L3D46
368	L3_DATA<47>	A19	L3D47
368	L3_DATA<48>	A18	L3D48
368	L3_DATA<49>	G14	L3D49
368	L3_DATA<50>	E15	L3D50
368	L3_DATA<51>	C16	L3D51
368	L3_DATA<52>	A17	L3D52
368	L3_DATA<53>	A16	L3D53
368	L3_DATA<54>	C15	L3D54
368	L3_DATA<55>	G13	L3D55
368	L3_DATA<56>	C14	L3D56
368	L3_DATA<57>	A14	L3D57
368	L3_DATA<58>	E13	L3D58
368	L3_DATA<59>	C13	L3D59
368	L3_DATA<60>	G12	L3D60
368	L3_DATA<61>	A13	L3D61
368	L3_DATA<62>	E12	L3D62
368	L3_DATA<63>	C12	L3D63
NC	AA19	L3DP0	
NC	AA22	L3DP1	
NC	F22	L3DP2	
NC	F16	L3DP3	
NC	C20	L3DP4	
NC	E16	L3DP5	
NC	A15	L3DP6	
NC	A12	L3DP7	

L3 DECOUPLING CAPS



L3_OVDD GENERATOR



MPC7450 - L3

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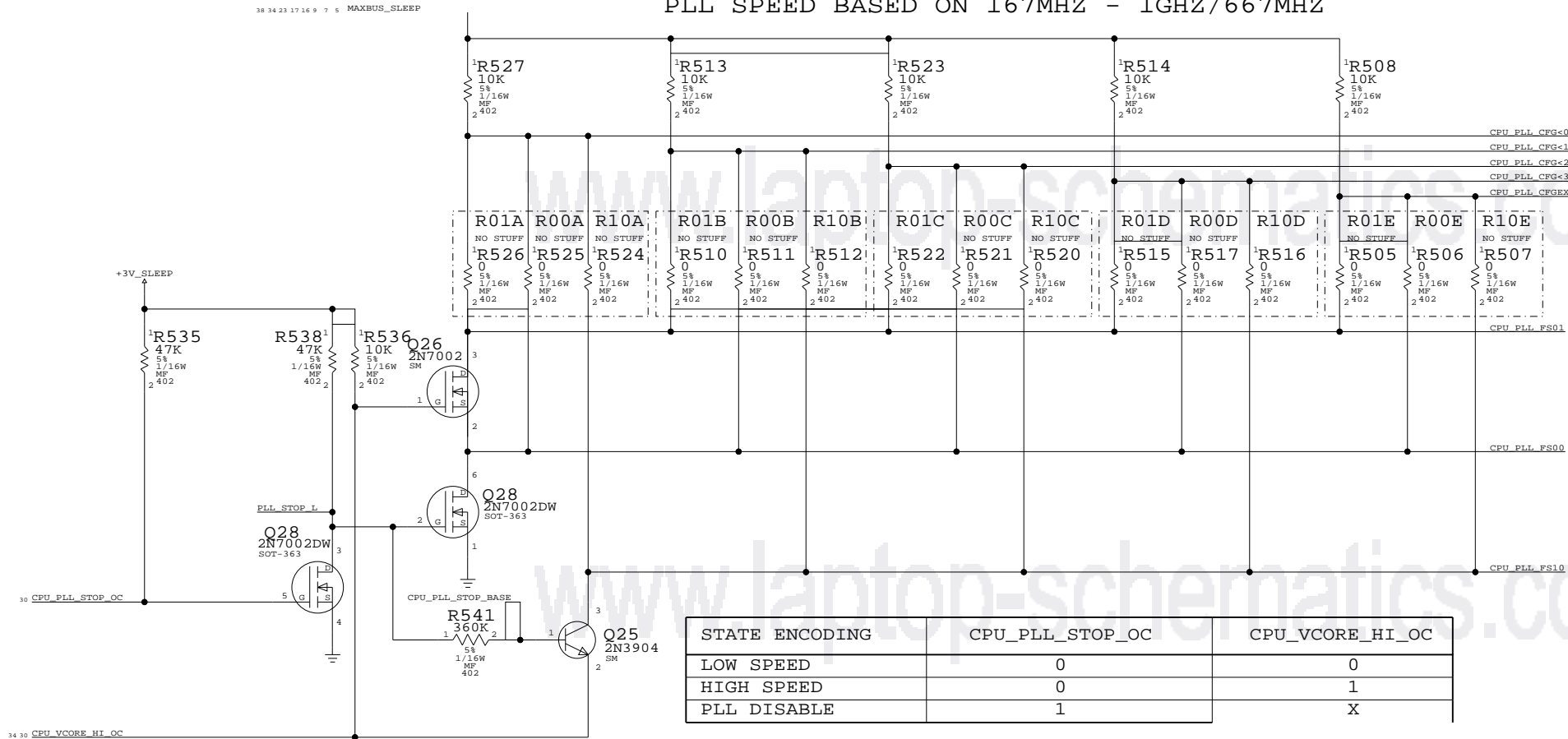
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CPU PLL CONFIG CIRCUITRY

PLL SPEED BASED ON 167MHZ - 1GHZ/667MHZ



CPU FREQUENCY CONFIGURATION

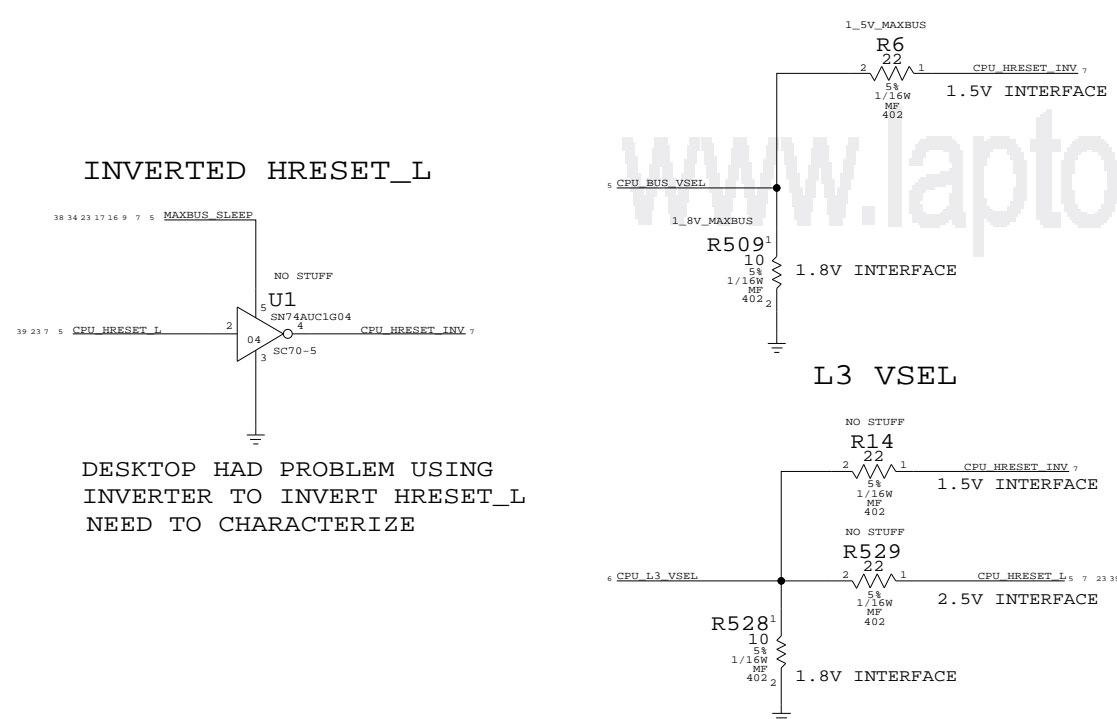
APOLLO REV 3.0

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

BUSTYPE SELECT



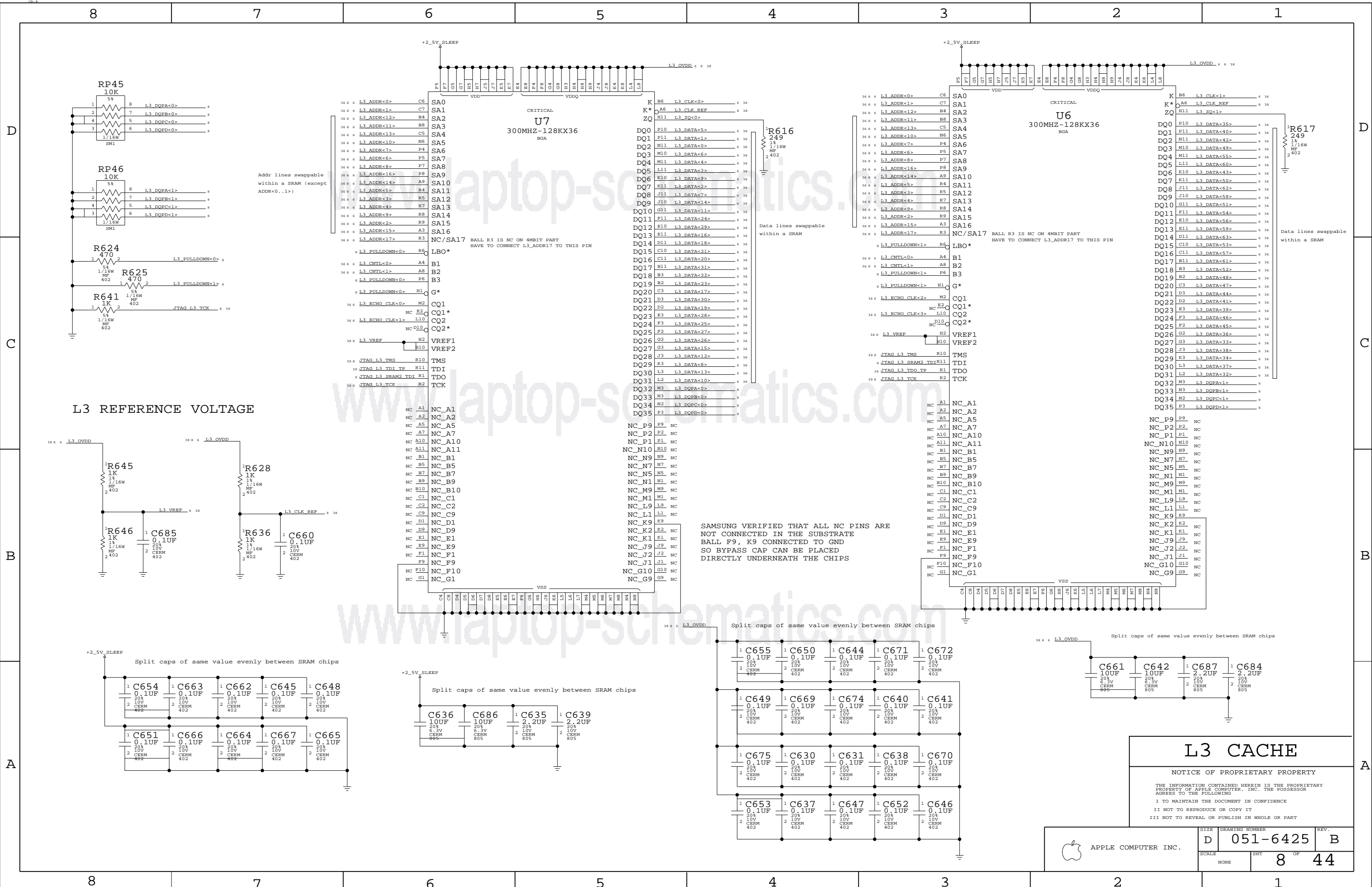
SIGNAL	TIED	APPLICATION
CPU_EMODE0_L (PROCESSOR)	HIGH	60X BUS MODE
CPU_BUS_VSEL (PROCESSOR)	CPU_HRESET_L	MAX BUS MODE
	CPU_HRESET_INV	2.5V INTERFACE
CPU_L3_VSEL (PROCESSOR)	CPU_HRESET_L	1.8V INTERFACE
	CPU_HRESET_INV	1.5V INTERFACE
CPU_HRESET_L (PROCESSOR)	CPU_HRESET_L or INT. PU	2.5V INTERFACE
	LOW	1.8V INTERFACE
CPU_HRESET_INV (PROCESSOR)	LOW	1.5V INTERFACE

CPU CONFIGURATION

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APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	NONE	SHT	7 OF 44



D

D

C

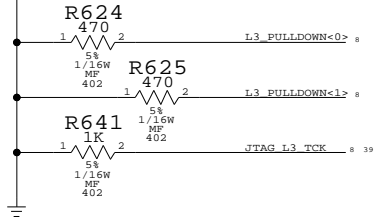
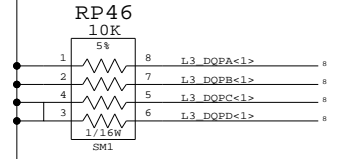
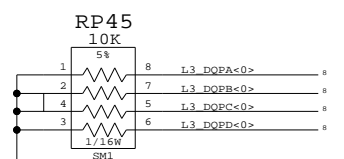
C

B

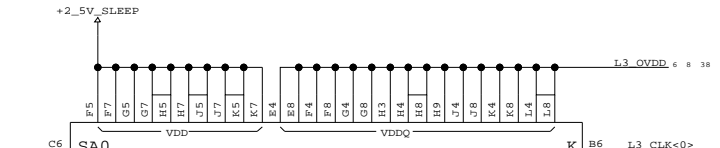
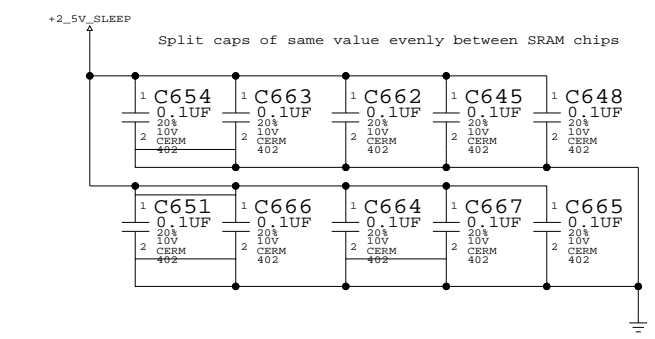
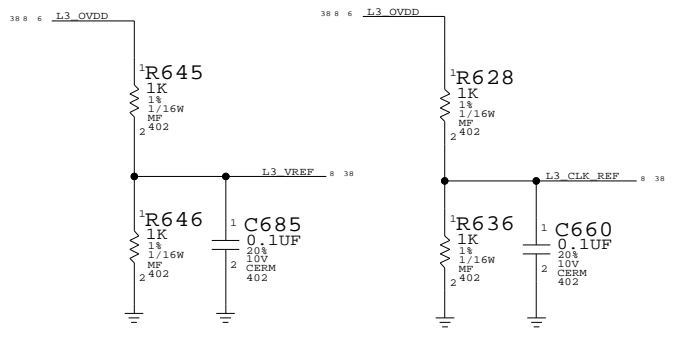
B

A

A



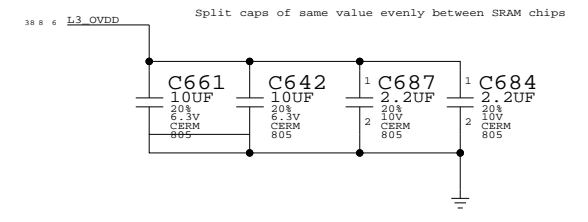
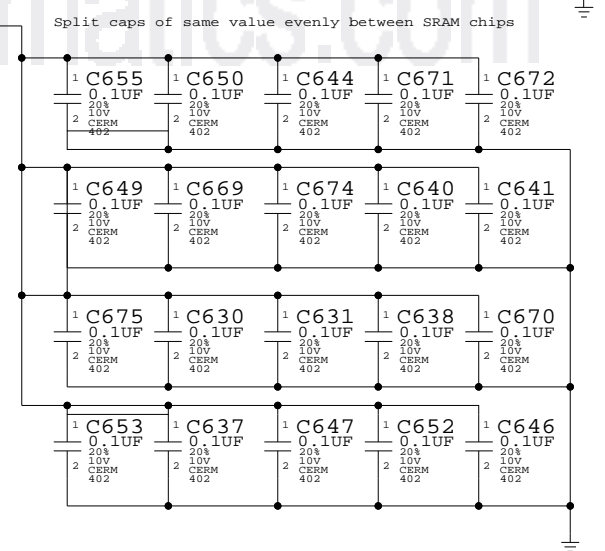
L3 REFERENCE VOLTAGE



CRITICAL
U7
300MHZ-128KX36
BGA

36 6	L3_ADDR<0>	C6	SA0	K6	L3_CLK<0>	C5	SA0	
36 6	L3_ADDR<1>	C7	SA1	K7	L3_CLK_REF	C6	SA1	
36 6	L3_ADDR<12>	B4	SA2	H11	L3_ZQ<0>	H11	L3_ZQ<1>	
36 6	L3_ADDR<11>	B8	SA3	DQ0	P10	L3_DATA<5>	P10	L3_DATA<35>
36 6	L3_ADDR<13>	C5	SA4	DQ1	P11	L3_DATA<1>	P11	L3_DATA<40>
36 6	L3_ADDR<10>	N6	SA5	DQ2	N11	L3_DATA<0>	N11	L3_DATA<42>
36 6	L3_ADDR<7>	P4	SA6	DQ3	M10	L3_DATA<6>	M10	L3_DATA<49>
36 6	L3_ADDR<6>	P5	SA7	DQ4	M11	L3_DATA<4>	M11	L3_DATA<55>
36 6	L3_ADDR<8>	P7	SA8	DQ5	L11	L3_DATA<3>	L11	L3_DATA<60>
36 6	L3_ADDR<16>	P8	SA9	DQ6	R10	L3_DATA<9>	R10	L3_DATA<43>
36 6	L3_ADDR<14>	A9	SA10	DQ7	K11	L3_DATA<2>	K11	L3_DATA<50>
36 6	L3_ADDR<5>	R4	SA11	DQ8	J11	L3_DATA<7>	J11	L3_DATA<62>
36 6	L3_ADDR<3>	R5	SA12	DQ9	J10	L3_DATA<14>	J10	L3_DATA<58>
36 6	L3_ADDR<4>	R7	SA13	DQ10	G11	L3_DATA<11>	G11	L3_DATA<51>
36 6	L3_ADDR<9>	R8	SA14	DQ11	F11	L3_DATA<24>	F11	L3_DATA<54>
36 6	L3_ADDR<2>	R9	SA15	DQ12	E10	L3_DATA<29>	E10	L3_DATA<56>
36 6	L3_ADDR<15>	A3	SA16	DQ13	E11	L3_DATA<16>	E11	L3_DATA<59>
36 6	L3_ADDR<17>	R3	NC/SA17	DQ14	D11	L3_DATA<18>	D11	L3_DATA<63>
36 6	L3_PULLDOWN<0>	R6	LBO*	DQ15	C10	L3_DATA<21>	C10	L3_DATA<65>
36 6	L3_CNTRL<0>	A4	B1	DQ16	C11	L3_DATA<20>	C11	L3_DATA<57>
36 6	L3_CNTRL<1>	A8	B2	DQ17	B11	L3_DATA<31>	B11	L3_DATA<61>
36 6	L3_PULLDOWN<1>	P6	B3	DQ18	B3	L3_DATA<22>	B3	L3_DATA<52>
36 6	L3_PULLDOWN<2>	H1	C*	DQ19	B2	L3_DATA<23>	B2	L3_DATA<48>
36 6	L3_ECHO_CLK<0>	M2	CQ1	DQ20	C3	L3_DATA<17>	C3	L3_DATA<47>
36 6	L3_ECHO_CLK<1>	L10	CQ1*	DQ21	D3	L3_DATA<30>	D3	L3_DATA<44>
36 6	L3_CNTRL<1>	A8	B2	DQ22	D2	L3_DATA<19>	D2	L3_DATA<41>
36 6	L3_CNTRL<2>	A8	B2	DQ23	E3	L3_DATA<28>	E3	L3_DATA<39>
36 6	L3_CNTRL<3>	A8	B2	DQ24	F3	L3_DATA<25>	F3	L3_DATA<46>
36 6	L3_CNTRL<4>	A8	B2	DQ25	F2	L3_DATA<27>	F2	L3_DATA<45>
36 6	L3_CNTRL<5>	A8	B2	DQ26	G2	L3_DATA<26>	G2	L3_DATA<36>
36 6	L3_CNTRL<6>	A8	B2	DQ27	G3	L3_DATA<15>	G3	L3_DATA<33>
36 6	L3_CNTRL<7>	A8	B2	DQ28	J3	L3_DATA<12>	J3	L3_DATA<38>
36 6	L3_CNTRL<8>	A8	B2	DQ29	K3	L3_DATA<8>	K3	L3_DATA<34>
36 6	L3_CNTRL<9>	A8	B2	DQ30	L3	L3_DATA<13>	L3	L3_DATA<37>
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36 6	L3_CNTRL<14>	A8	B2	DQ35	P3	L3_DQPD<0>	P3	L3_DQPD<1>
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36 6	L3_CNTRL<16>	A8	B2					
36 6	L3_CNTRL<17>	A8	B2					
36 6	L3_CNTRL<18>	A8	B2					
36 6	L3_CNTRL<19>	A8	B2					
36 6	L3_CNTRL<20>	A8	B2					
36 6	L3_CNTRL<21>	A8	B2					
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36 6	L3_CNTRL<78>	A8	B2					
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36 6	L3_CNTRL<80>	A8	B2					
36 6	L3_CNTRL<81>	A8	B2					
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36 6	L3_CNTRL<84>	A8	B2					
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36 6	L3_CNTRL<86>	A8	B2					
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36 6	L3_CNTRL<92>	A8	B2					
36 6	L3_CNTRL<93>	A8	B2					
36 6	L3_CNTRL<94>	A8	B2					
36 6	L3_CNTRL<95>	A8	B2					
36 6	L3_CNTRL<96>	A8	B2					
36 6	L3_CNTRL<97>	A8	B2					
36 6	L3_CNTRL<98>	A8	B2					
36 6	L3_CNTRL<99>	A8	B2					
36 6	L3_CNTRL<100>	A8	B2					

SAMSUNG VERIFIED THAT ALL NC PINS ARE NOT CONNECTED IN THE SUBSTRATE BALL F9, K9 CONNECTED TO GND SO BYPASS CAP CAN BE PLACED DIRECTLY UNDERNEATH THE CHIPS



L3 CACHE

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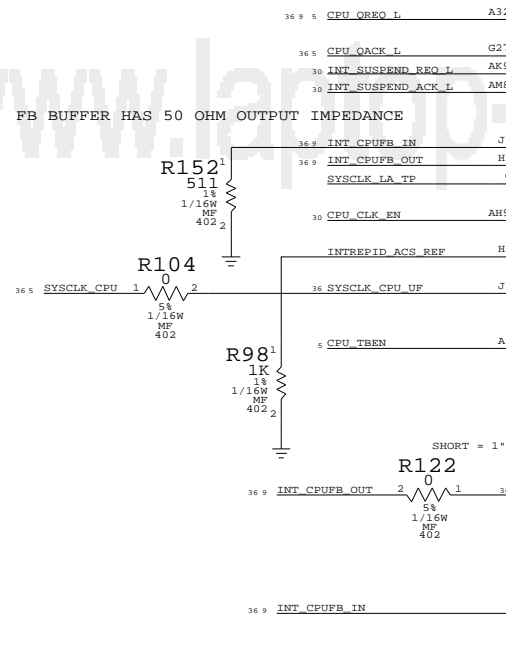
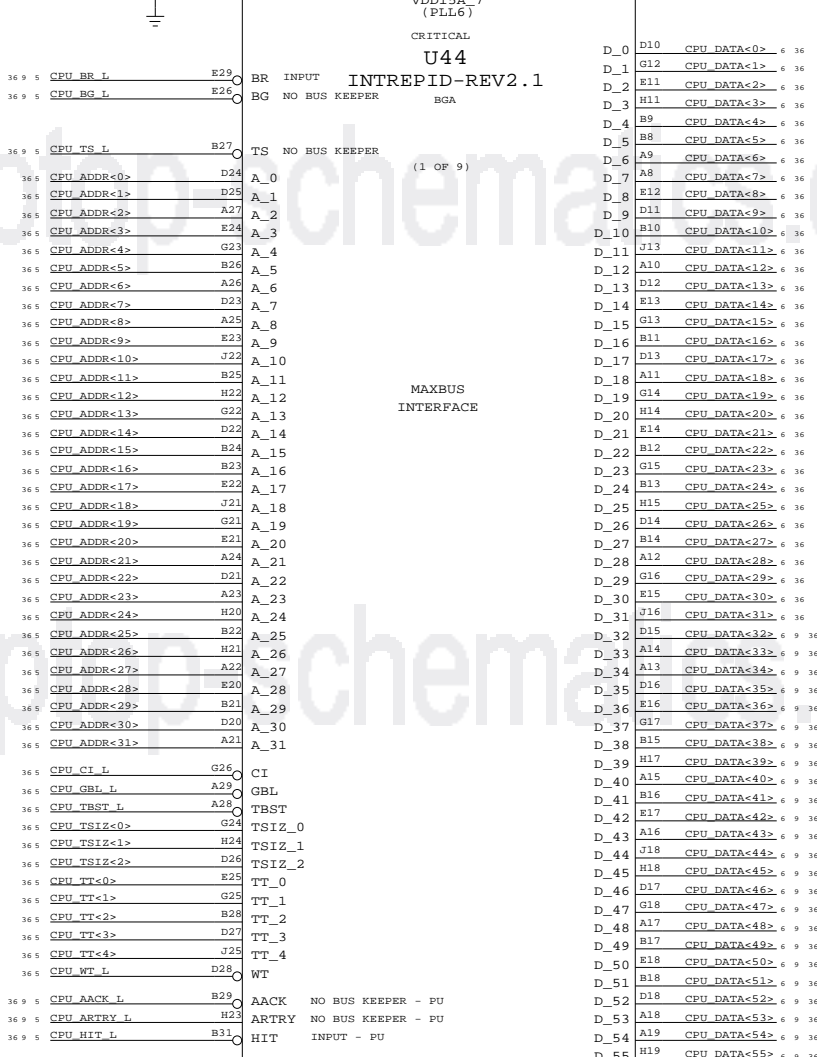
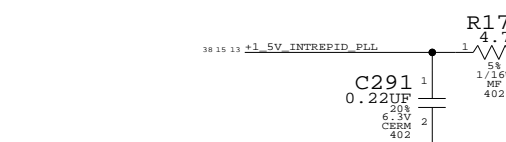
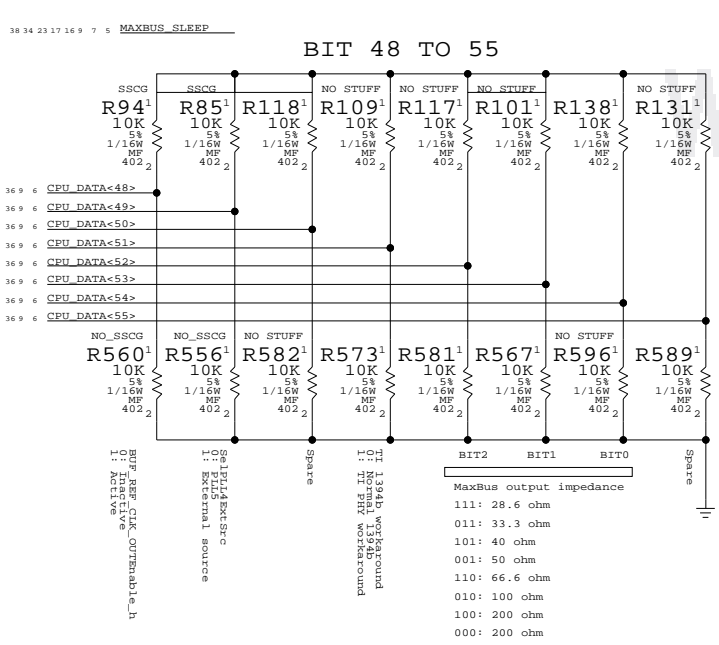
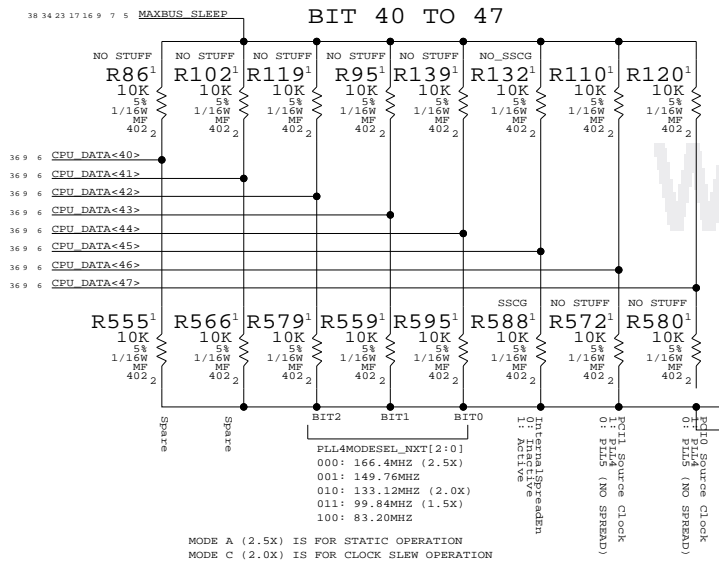
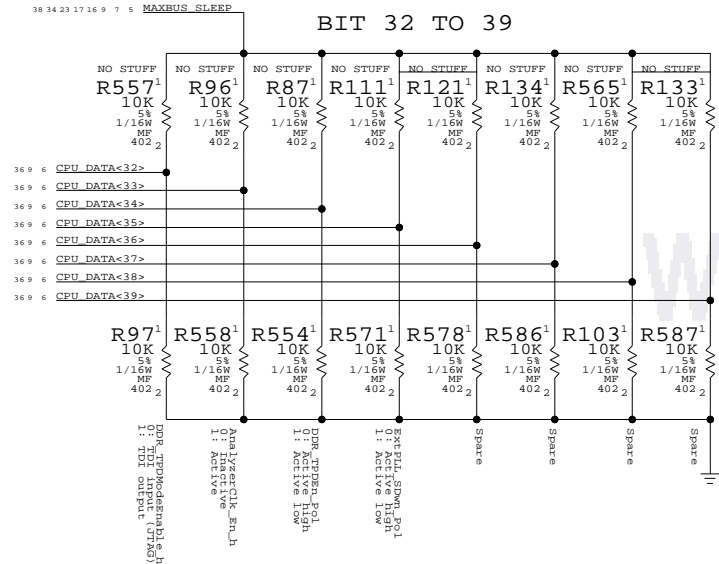
INTREPID BOOT STRAPS

THE FOLLOWING STRAP BITS CAN BE CHANGED BY SOFTWARE:

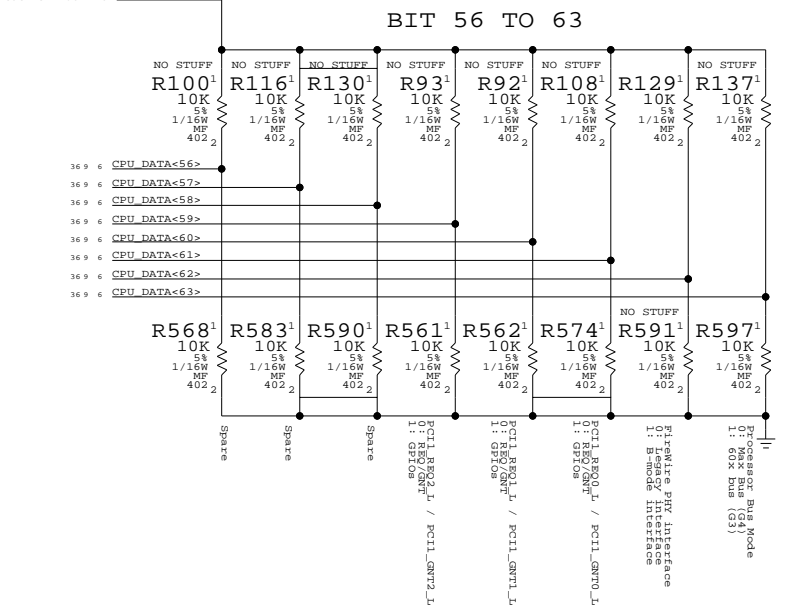
- 1/ D47 - SELAGPSPPREADCLK - SLEEP/WAKE CYCLE REQUIRED
- 2/ D46 - SELPC11SPREADCLK - SLEEP/WAKE CYCLE REQUIRED
- 3/ D44 - PLL4MODESEL_NXT<0> - SLEEP/WAKE CYCLE REQUIRED
- 4/ D43 - PLL4MODESEL_NXT<1> - SLEEP/WAKE CYCLE REQUIRED
- 5/ D42 - PLL4MODESEL_NXT<2> - SLEEP/WAKE CYCLE REQUIRED
- 6/ D33 - ANALYZERCLK_EN_H - IMMEDIATE EFFECT

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

MAXBUS PULL-UPS



INTREPID BOOT STRAPS



Intrepid MaxBus

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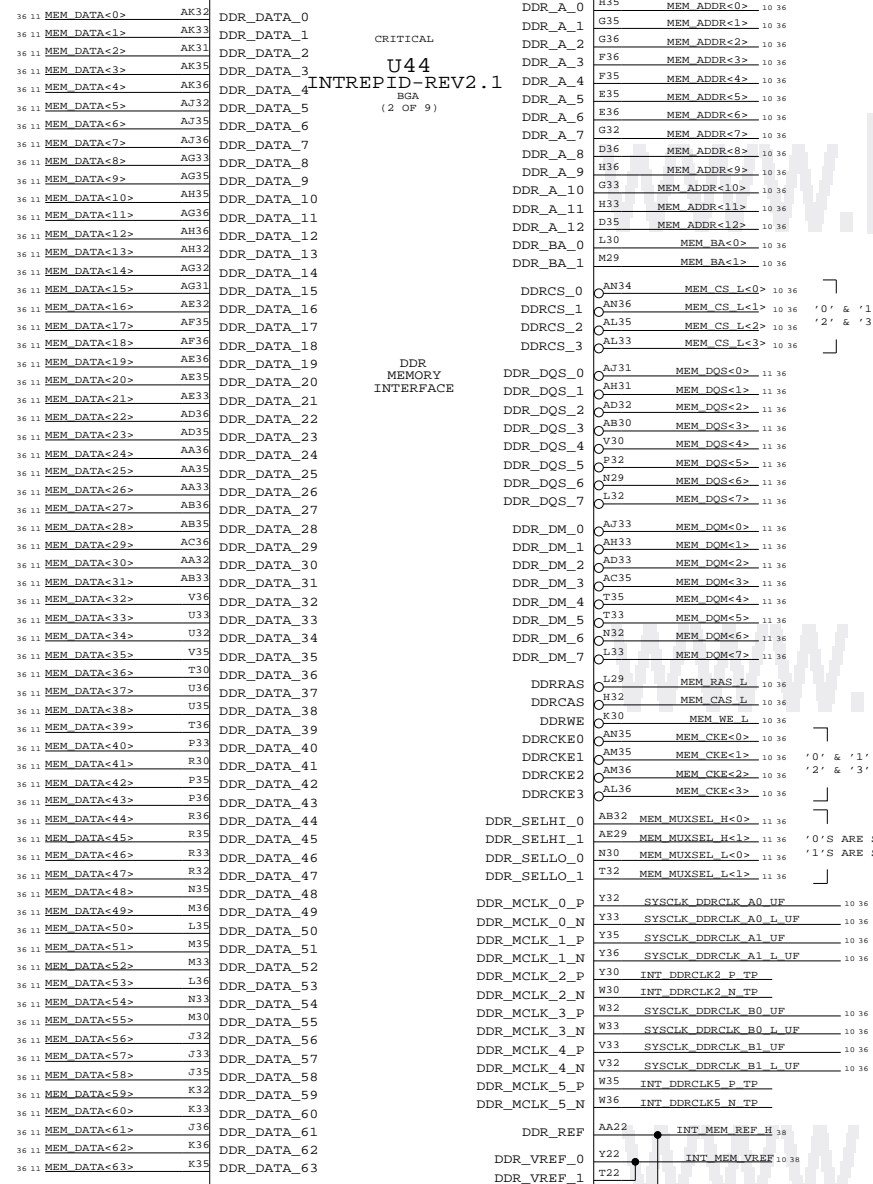
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SERIES RESISTORS FOR CLOCK/CONTROL SIGNALS

PINS ARE SWAPABLE FOR RPAKS

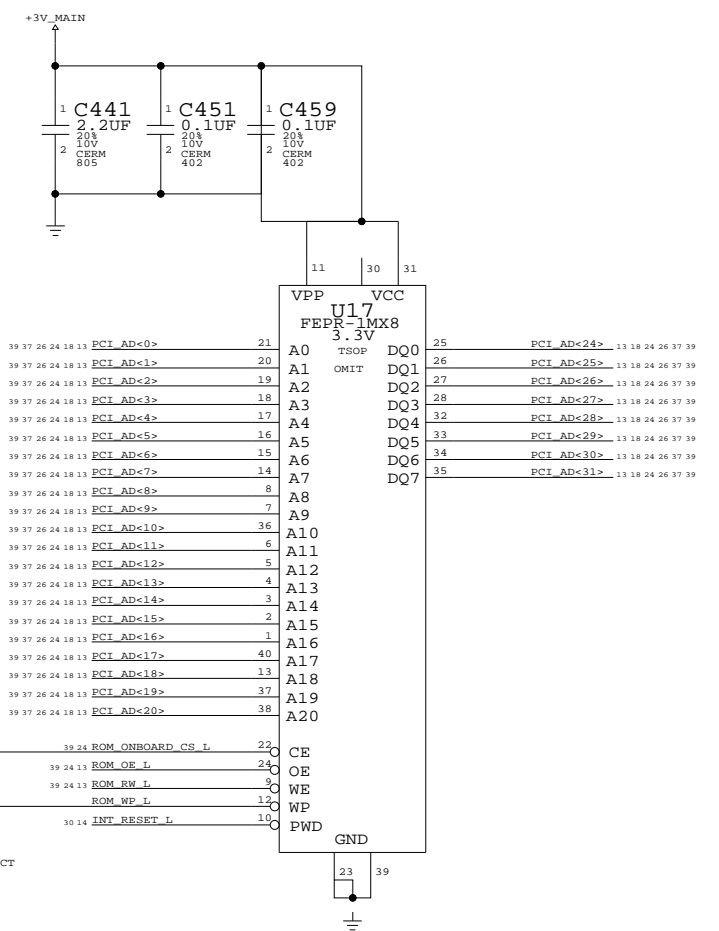
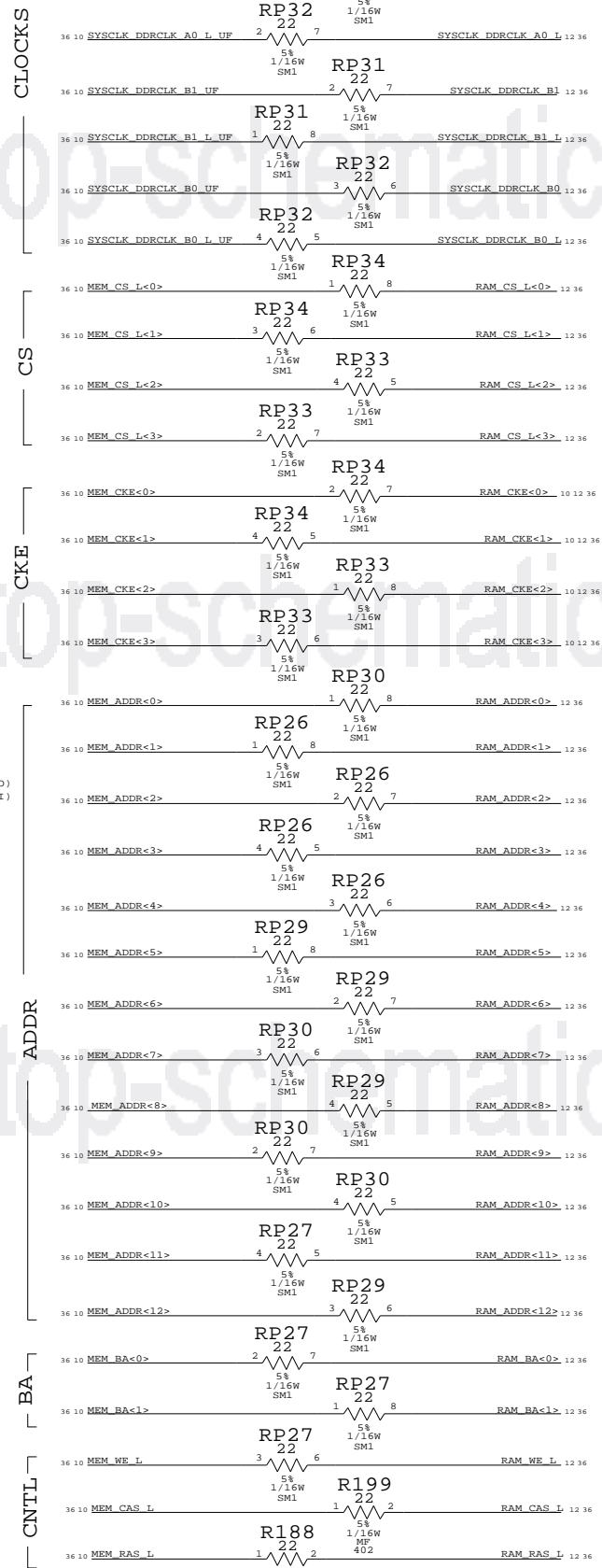
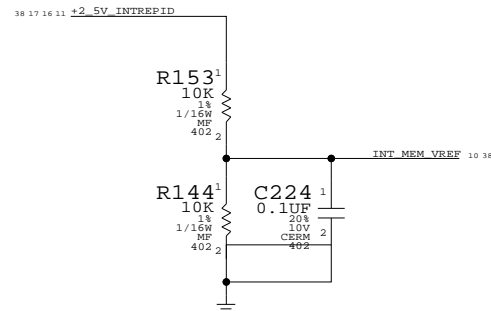
1MB BOOT ROM



CRITICAL U44 INTREPID-REV2.1 BGA (2 OF 9)

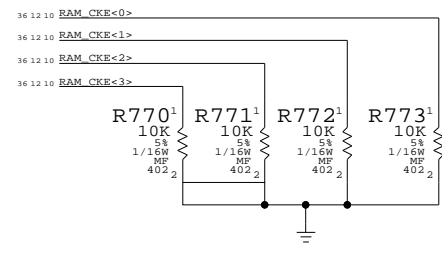
DDR MEMORY INTERFACE

MEM_VREF



OVERVERRIDE ROM MODULE INTERCEPTS ROM CHIP SELECT

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



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S1193	1	BOOTROM,P84	U17	CRITICAL	?

INT - DDR/BOOTROM

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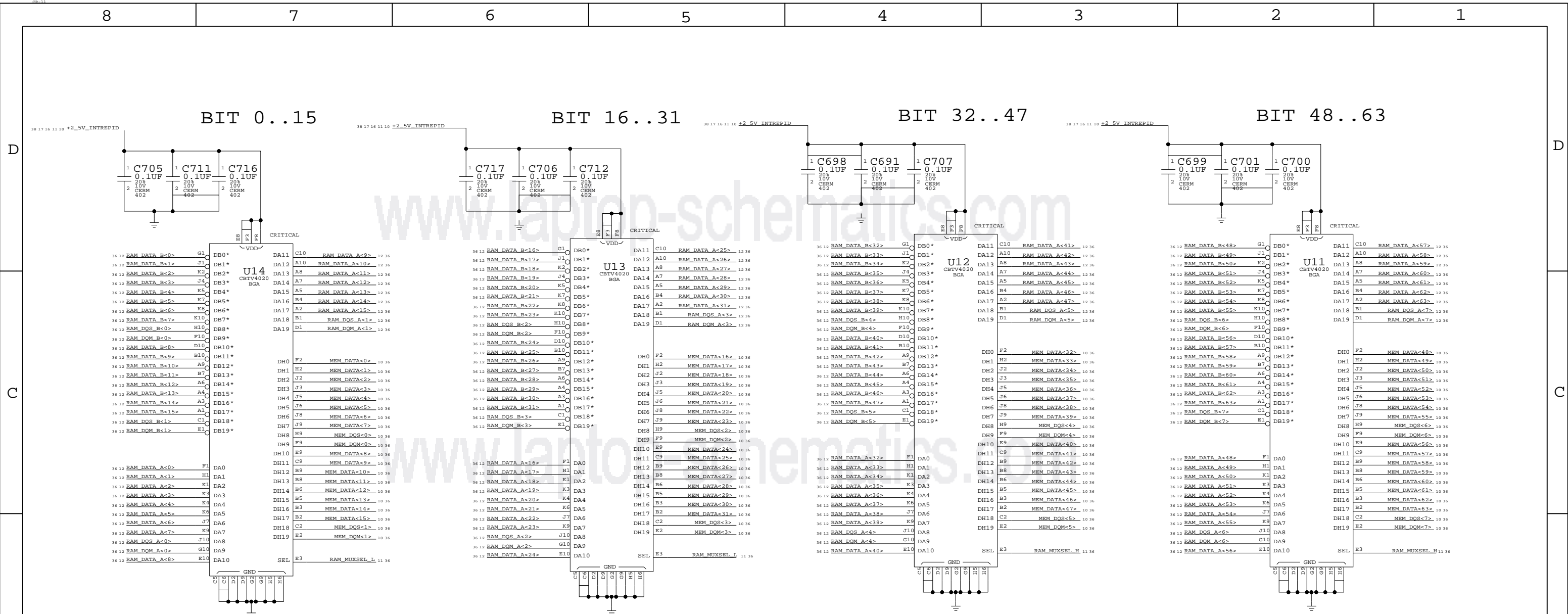
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APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	10 ^{OF} 44	
NONE			



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

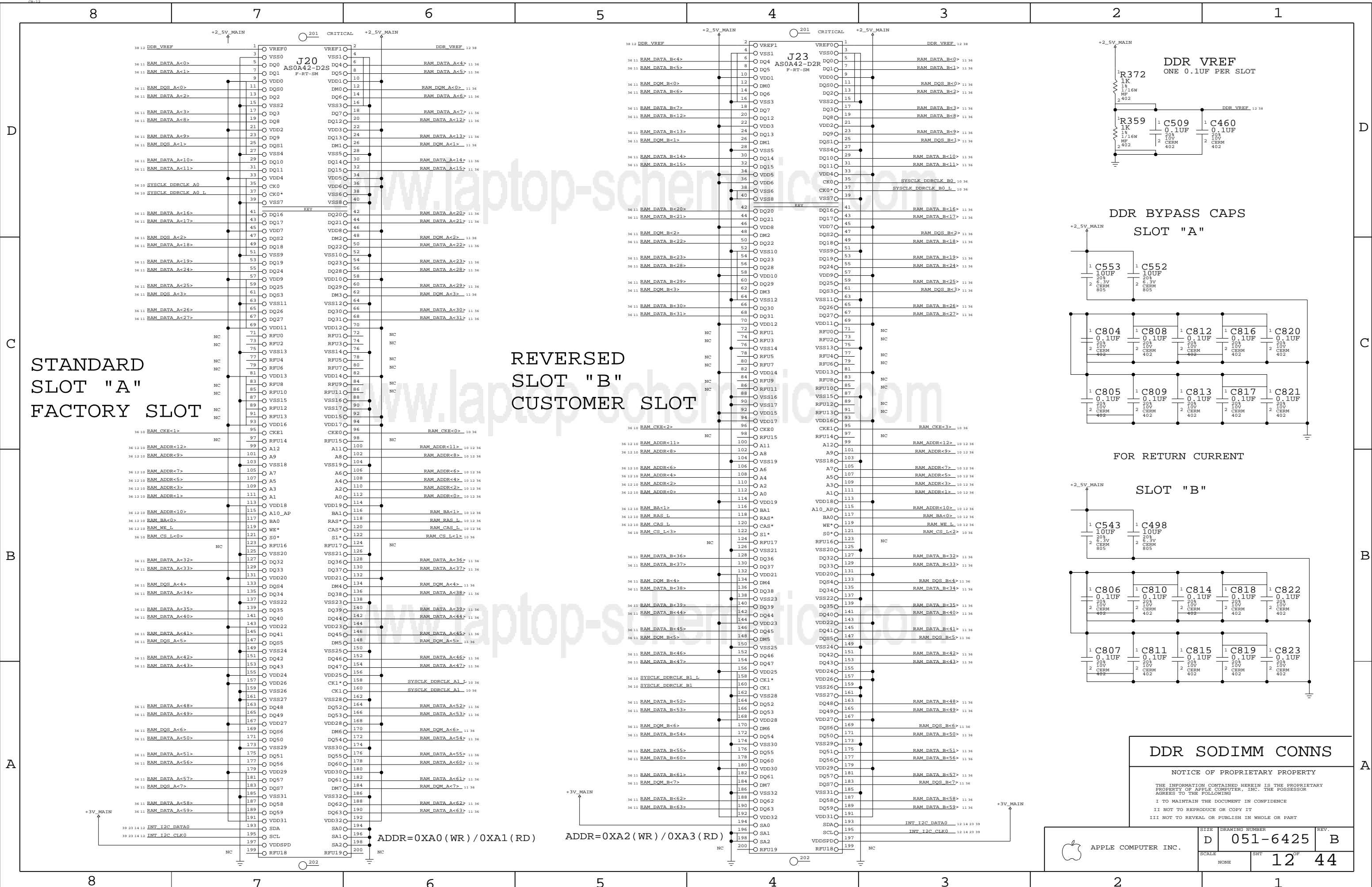
ADDED 0 OHM RESISTORS IN CASE POLARITY IS WRONG



16BIT 2:1 DDR MUXES

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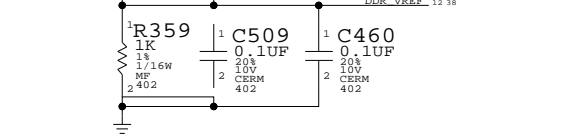
APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	NONE	SHT	11 OF 44



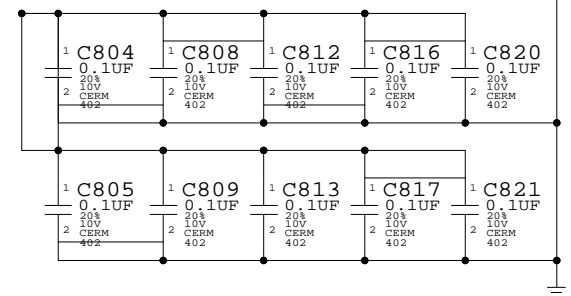
STANDARD
SLOT "A"
FACTORY SLOT

REVERSED
SLOT "B"
CUSTOMER SLOT

DDR VREF
ONE 0.1UF PER SLOT

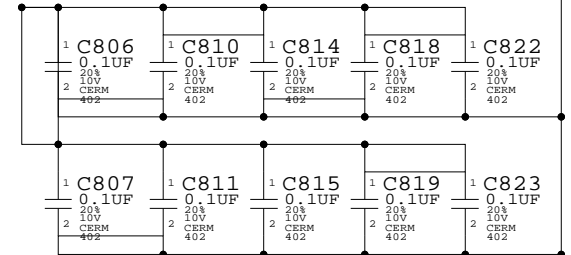
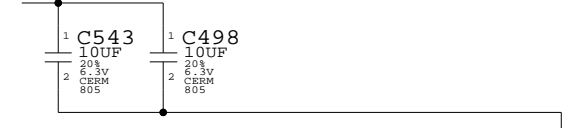


DDR BYPASS CAPS
SLOT "A"



FOR RETURN CURRENT

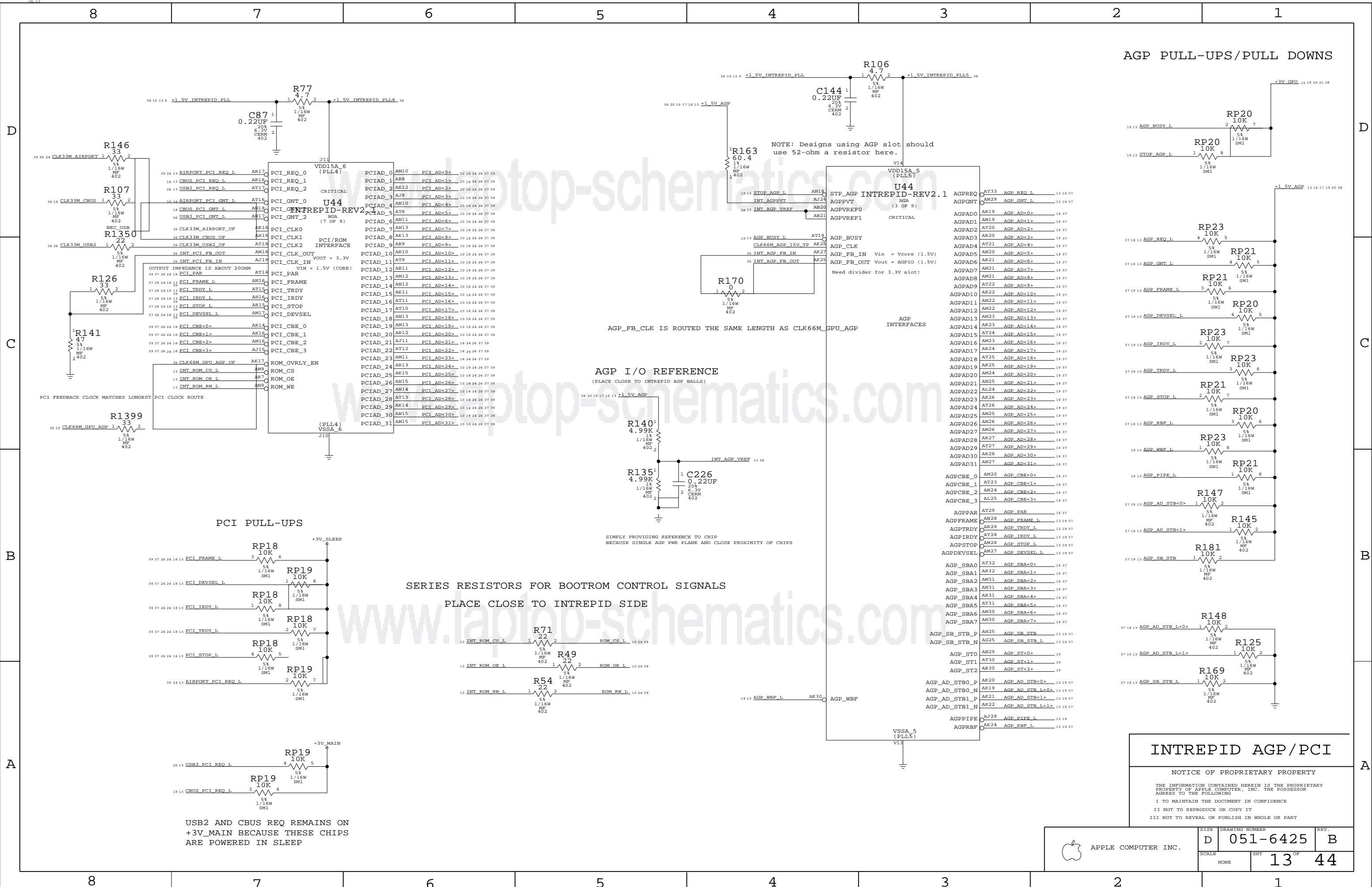
SLOT "B"



DDR SODIMM CONNS

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APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	REV.	
NONE	12	44	



INTREPID AGP/PCI

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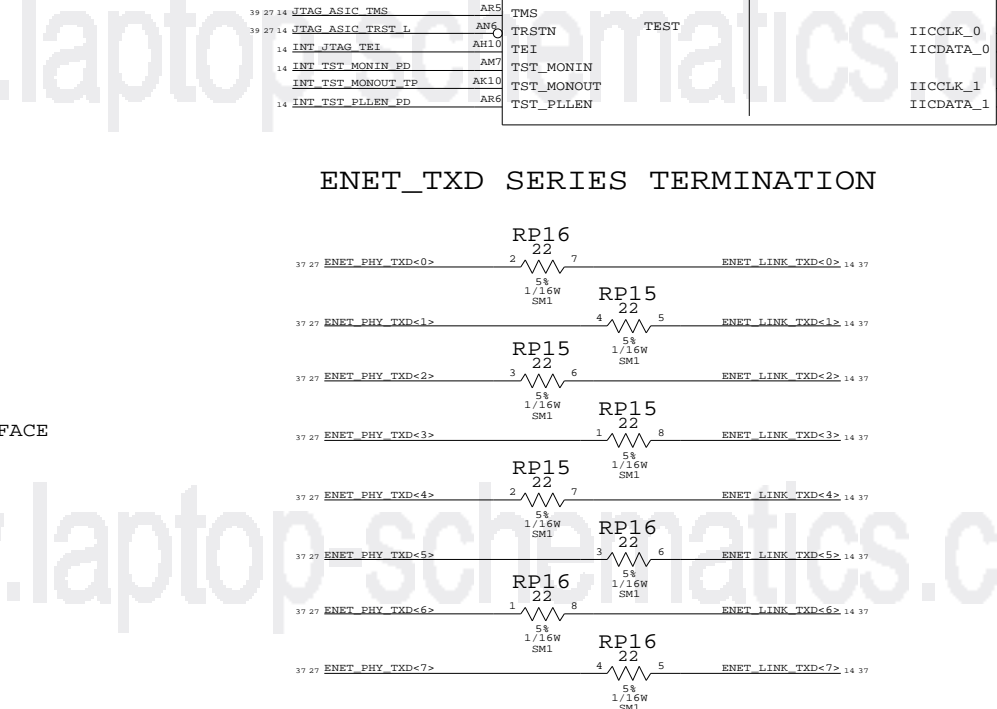
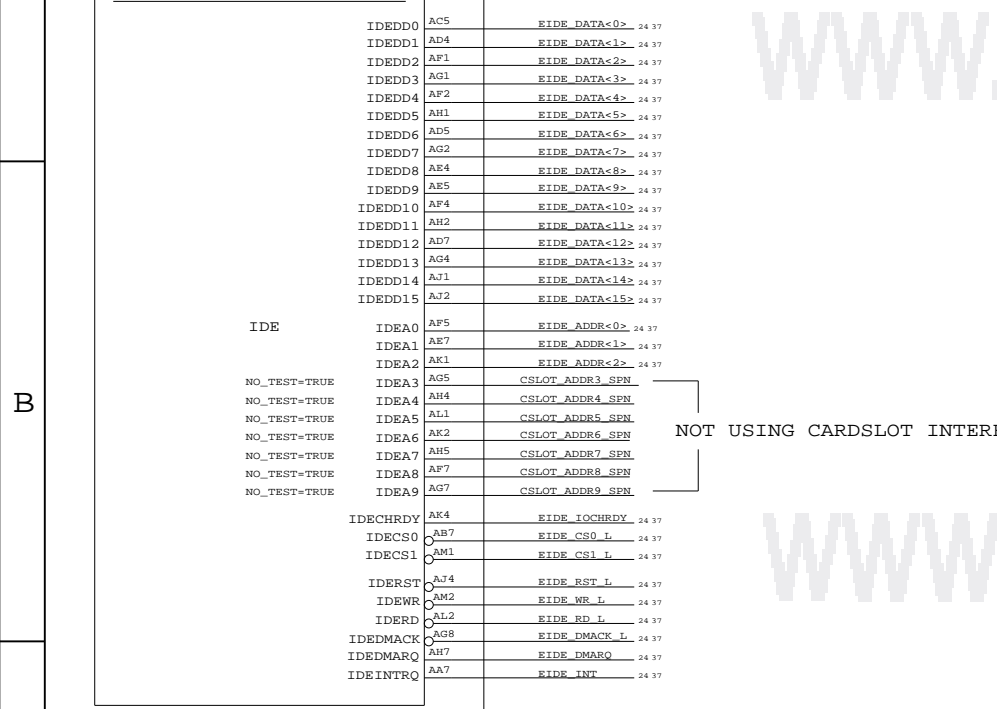
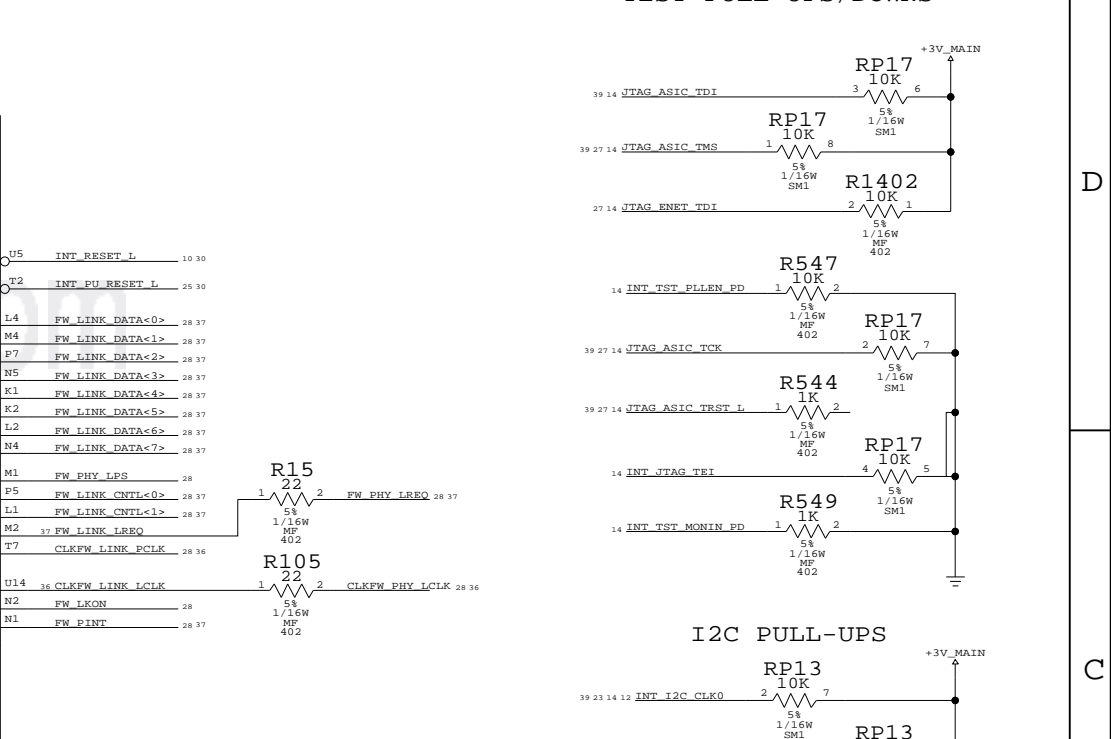
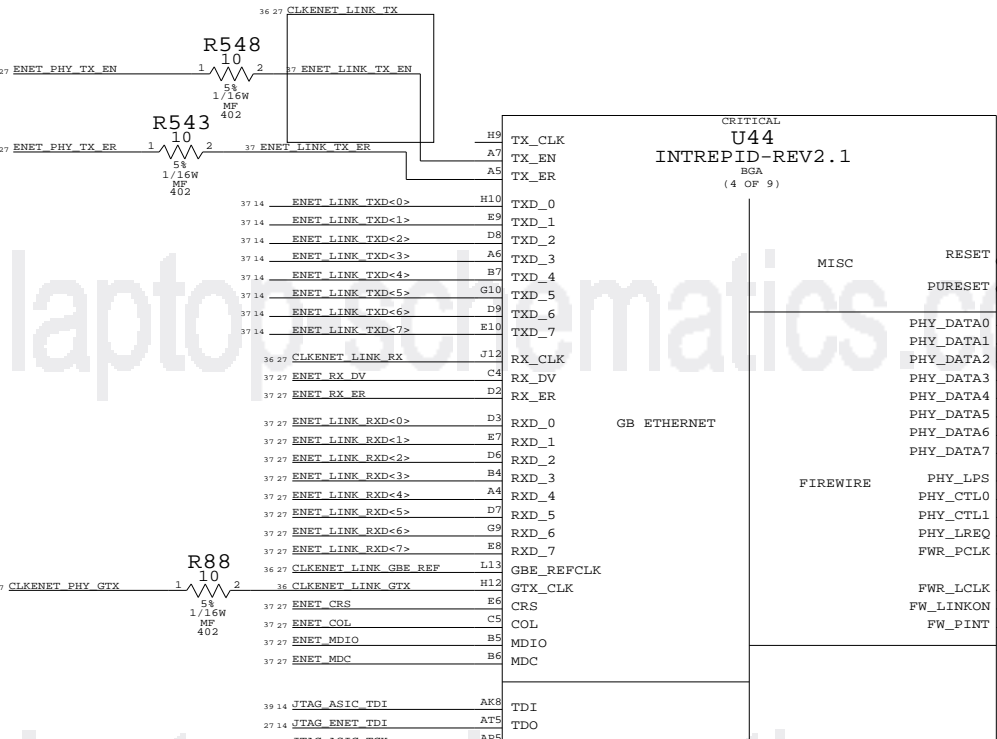
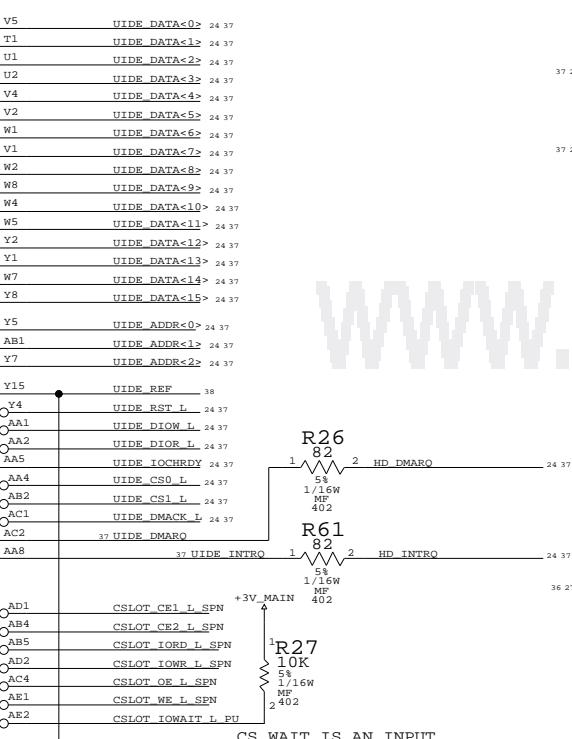
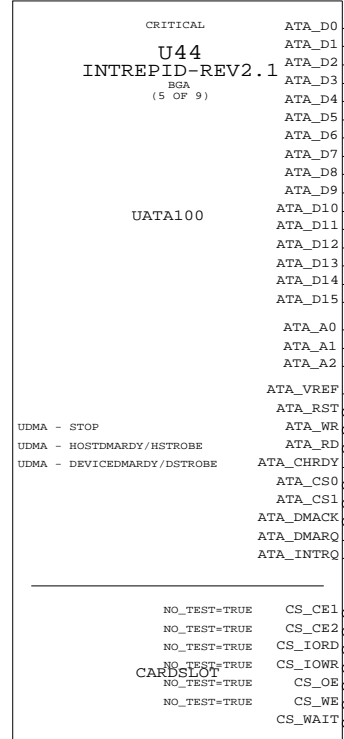
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SCALE NONE	SHT 13 OF 44	SIZE D	DRAWING NUMBER 051-6425	REV. B
		APPLE COMPUTER INC.		

USB2 AND CBUS REQ REMAINS ON +3V_MAIN BECAUSE THESE CHIPS ARE POWERED IN SLEEP

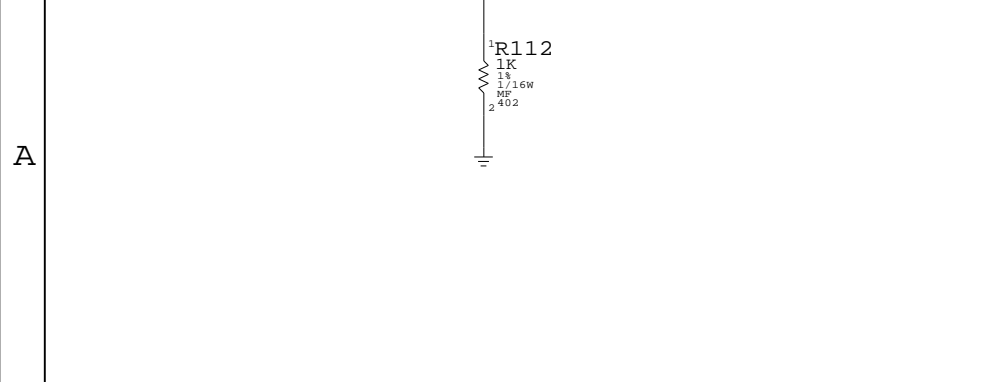


I2C PULL-UPS

39 23 14 12 INT_I2C_CLK0 RP13 10K 1/16W MF 402
39 23 14 12 INT_I2C_DATA0 RP13 10K 1/16W MF 402
39 25 15 14 INT_I2C_CLK1 RP13 10K 1/16W MF 402
39 25 15 14 INT_I2C_DATA1 RP13 10K 1/16W MF 402

ADDR	BUS	I2C-0 (MAIN)	I2C-1 (MAIN)	I2C-2 (SLEEP)	PMU (SLEEP)
A0-WR	RAM - STANDARD	J20 - PG 12	N/A	N/A	N/A
A1-RD					
A2-WR	RAM - REVERSED	J23 - PG 12	N/A	N/A	N/A
A3-RD					
AC-WR				DASH MODEM	N/A
AD-RD				J9 - PG 25	
AE-WR	BOOTBANG E2PROM	U37 - PG 23	N/A	N/A	N/A
AF-RD					
84-WR	LMU	U36 - PG 23	N/A	N/A	N/A
85-RD					
58-WR		FAN CONTROLLER	N/A	N/A	N/A
59-RD		U48 - PG 25			
6A-WR				SNAPPER SOUND	N/A
6B-RD				J14 - PG 25	
D0-WR		CLOCK SLEW SSCG	N/A	N/A	N/A
D1-RD		U56 - PG 15			

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



JTAG_RSTN_L	TST_TEI_H	JTAG_TDO_H (I/O)	JTAG_TDI_H (I/O)	TST_PLEN_H	ANALYZER_CLK	DESCRIPTION
1	X	X	X	X	X	JTAG MODE
0	0	0	0	0	(OUTPUT)	NORMAL OPERATION
0	0	(OUTPUT)	0 (I)	1	SELECTED PLL OUTPUTS	VIEW PLLS (SOFTWARE)
0	0	HWFLL 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

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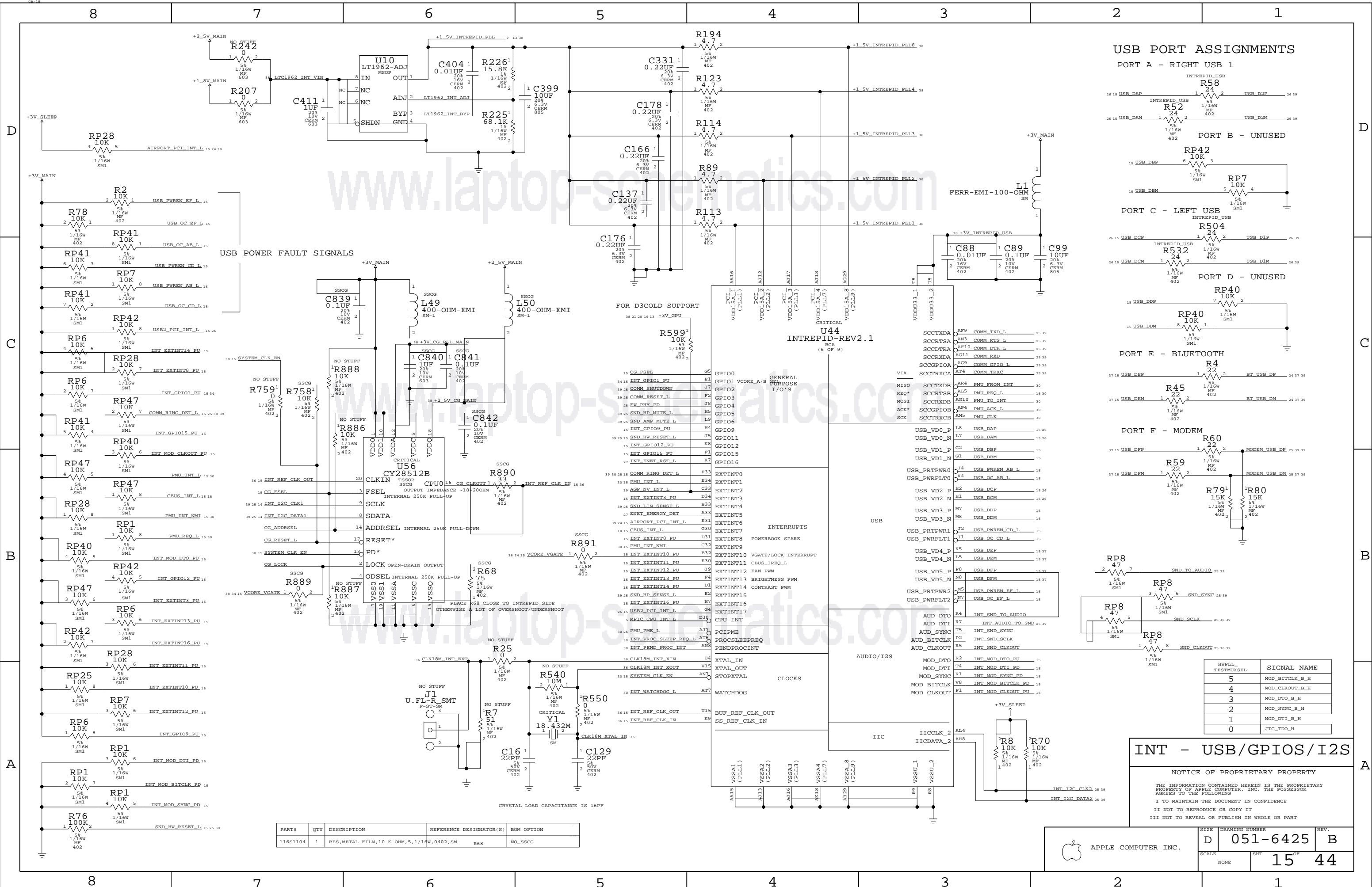
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SCALE NONE SHEET 14 OF 44

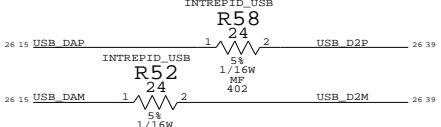
SIZE DRAWING NUMBER REV.
D 051-6425 B

APPLE COMPUTER INC.

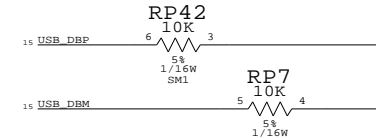


USB PORT ASSIGNMENTS

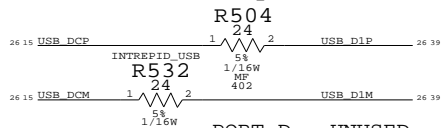
PORT A - RIGHT USB 1



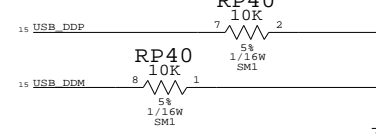
PORT B - UNUSED



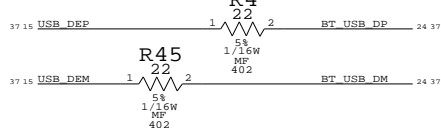
PORT C - LEFT USB



PORT D - UNUSED



PORT E - BLUETOOTH



PORT F - MODEM

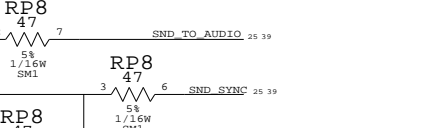
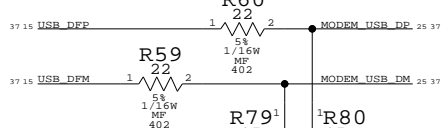


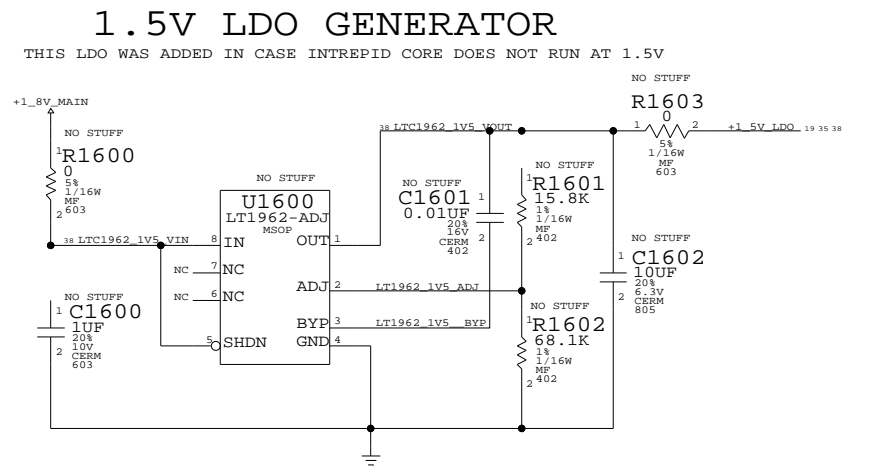
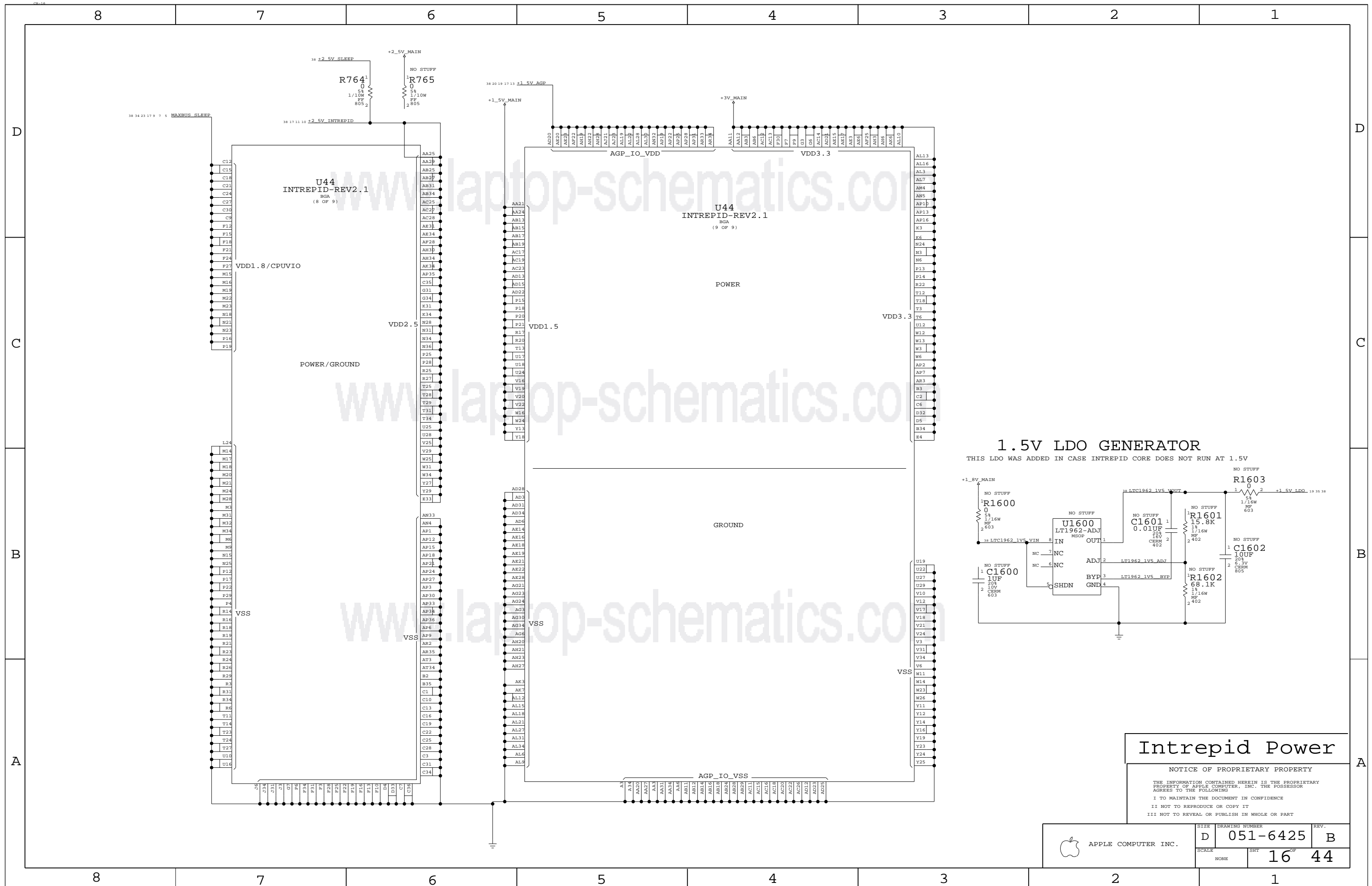
Table with 2 columns: HWPLL, TESTMUXSEL and SIGNAL NAME. It lists signal names like MOD_BITCLK_B_H, MOD_CLKOUT_B_H, MOD_DTO_B_H, MOD_SYNC_B_H, MOD_DTI_B_H, and JTG_TDO_H.

INT - USB/GPIOS/I2S

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Table with 4 columns: PART#, QTY, DESCRIPTION, REFERENCE DESIGNATOR(S), BOM OPTION. It lists a resistor R68 with quantity 1 and description RES, METAL FILM, 10 K OHM, 5, 1/16W, 0402, SM.

Apple Computer Inc. logo and drawing information including drawing number 051-6425, revision B, and sheet number 15 of 44.



Intrepid Power

NOTICE OF PROPRIETARY PROPERTY

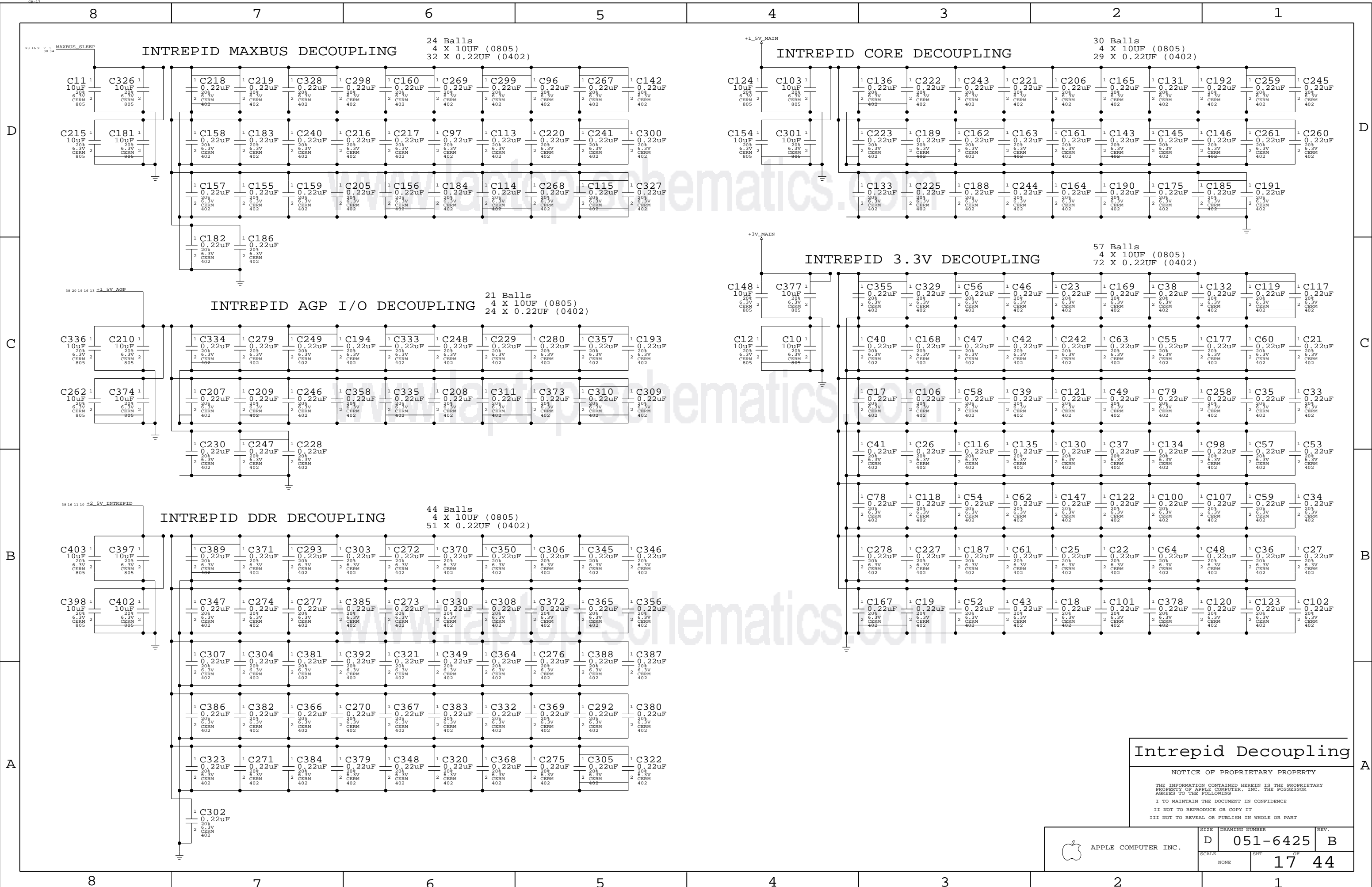
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APPLE COMPUTER INC.	SIZE D	DRAWING NUMBER 051-6425	REV. B
	SCALE NONE	SHT 16	OF 44

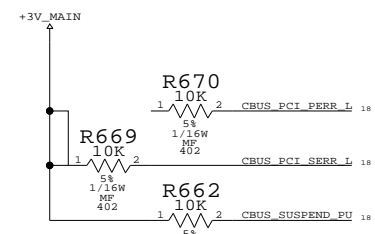


Intrepid Decoupling

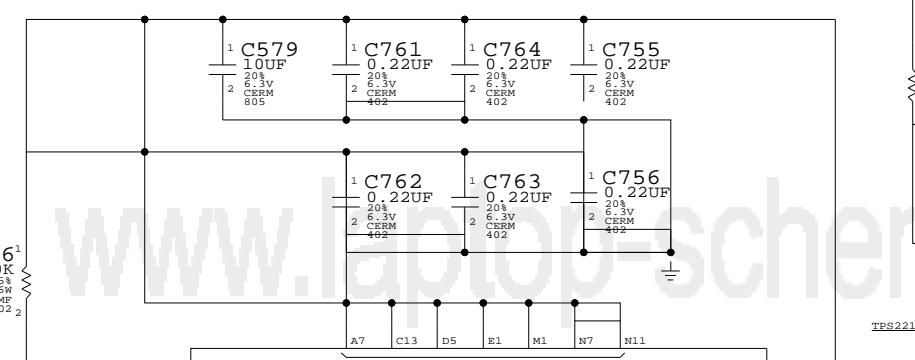
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APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	OF	
NONE	17	44	

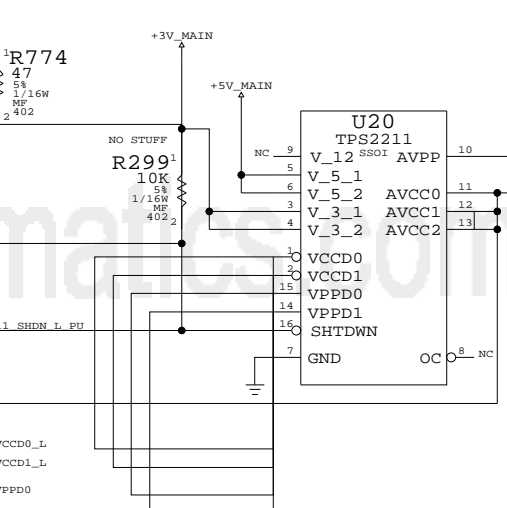
PCI1510 PULL-UPS



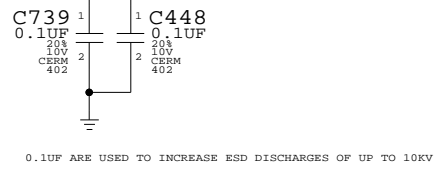
+3V_MAIN
MAIN_RESET L



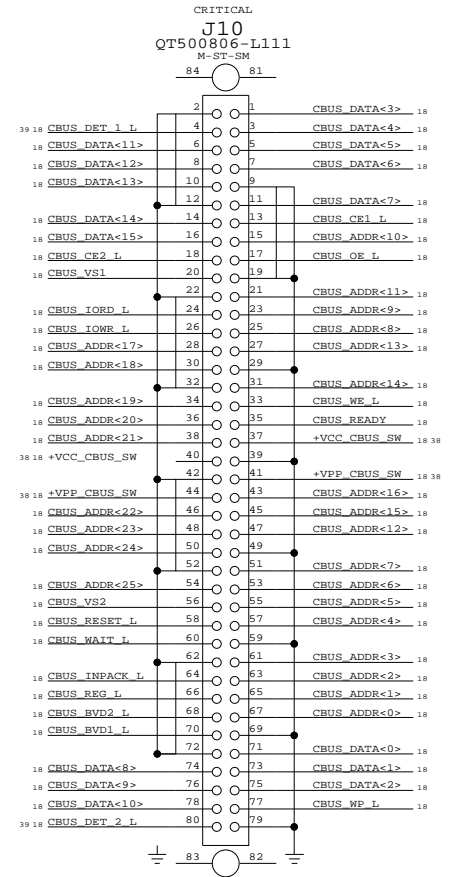
THIS PROPERLY SHUTS DOWN
CARDBUS POWER FOR PSUEDO-D3COLD



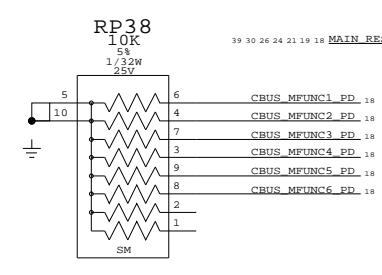
MAKE SURE VCC AND VPP ARE WIDE PLANE/TRACES
TO MINIMIZE INDUCTANCE!



PC CARD/CARDBUS CONNECTOR



Pinout table for U26 PCI1510GGU showing signals like CLK_48_RSVD/NC, VR_EN*, VR_PORT, VCC, VCCCB, VCCP, VCCD0*, VCCD1*, VPPD0, VPPD1, and various address and data lines.



CARDBUS
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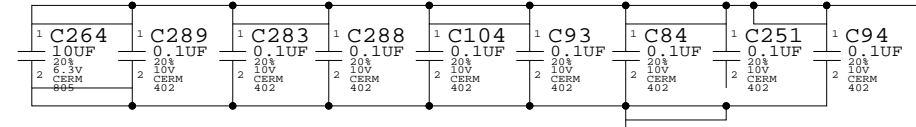
Table with columns for SIZE, DRAWING NUMBER, REV., SCALE, and SHT. Values include D, 051-6425, B, NONE, 18 OF 44.



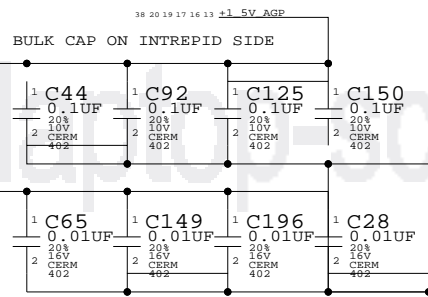
APPLE COMPUTER INC.

IMPORTANT NOTES ON MAP17
NEED TO RESET GRAPHIC CHIP DURING RESTARTS

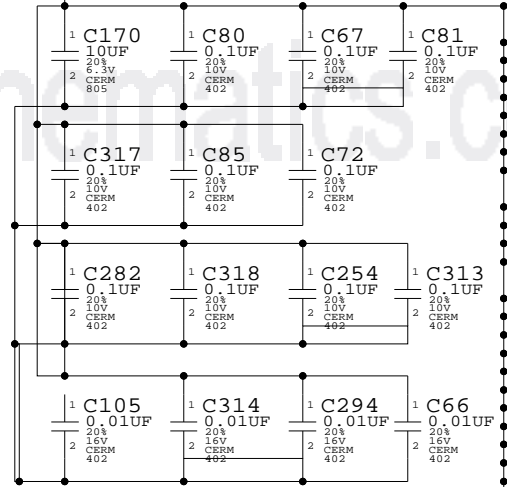
MEMORY CORE - 2.5V



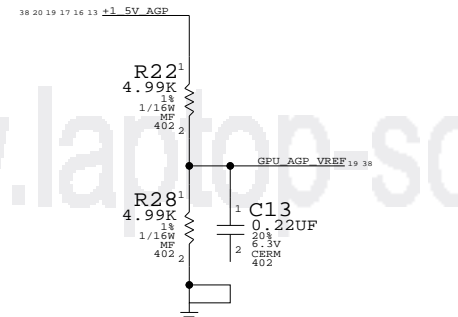
AGP 4X I/O - 1.5V



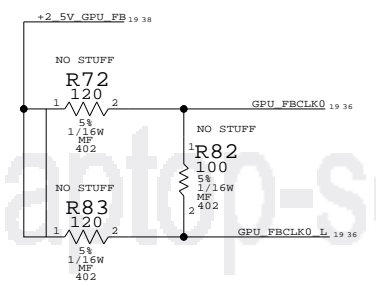
MEMORY I/O - 2.5V



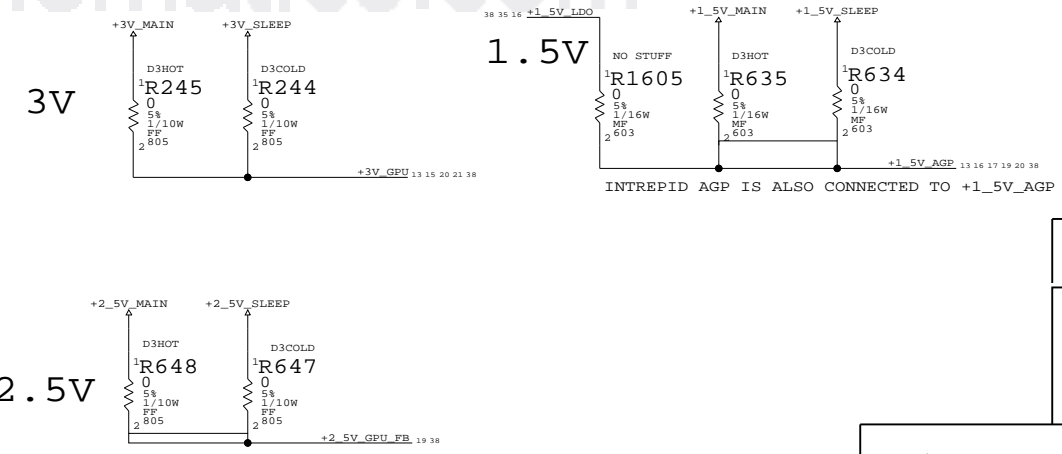
AGP I/O REFERENCE
(PLACE CLOSE TO NV17M AGP BALLS)



FRAME BUFFER CLOCK TERMINATION



D3HOT VS. D3COLD POWER INTAKE



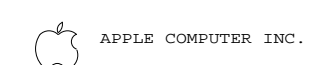
MAP31	U43	MAP31
37 13 AGP_AD<0>	AD30	PCIAD0
37 13 AGP_AD<1>	AE30	PCIAD1
37 13 AGP_AD<2>	AD29	PCIAD2
37 13 AGP_AD<3>	AE29	PCIAD3
37 13 AGP_AD<4>	AD28	PCIAD4
37 13 AGP_AD<5>	AG30	PCIAD5
37 13 AGP_AD<6>	AF28	PCIAD6
37 13 AGP_AD<7>	AG29	PCIAD7
37 13 AGP_AD<8>	AH30	PCIAD8
37 13 AGP_AD<9>	AC28	PCIAD9
37 13 AGP_AD<10>	AH29	PCIAD10
37 13 AGP_AD<11>	AE28	PCIAD11
37 13 AGP_AD<12>	AJ30	PCIAD12
37 13 AGP_AD<13>	AG28	PCIAD13
37 13 AGP_AD<14>	AK30	PCIAD14
37 13 AGP_AD<15>	AG27	PCIAD15
37 13 AGP_AD<16>	AH23	PCIAD16
37 13 AGP_AD<17>	AJ24	PCIAD17
37 13 AGP_AD<18>	AH22	PCIAD18
37 13 AGP_AD<19>	AK24	PCIAD19
37 13 AGP_AD<20>	AH21	PCIAD20
37 13 AGP_AD<21>	AJ22	PCIAD21
37 13 AGP_AD<22>	AH20	PCIAD22
37 13 AGP_AD<23>	AK22	PCIAD23
37 13 AGP_AD<24>	AG21	PCIAD24
37 13 AGP_AD<25>	AJ19	PCIAD25
37 13 AGP_AD<26>	AG18	PCIAD26
37 13 AGP_AD<27>	AK19	PCIAD27
37 13 AGP_AD<28>	AG19	PCIAD28
37 13 AGP_AD<29>	AJ18	PCIAD29
37 13 AGP_AD<30>	AF19	PCIAD30
37 13 AGP_AD<31>	AK18	PCIAD31
37 13 AGP_CBE<0>	AH28	PCICBE0*
37 13 AGP_CBE<1>	AJ27	PCICBE1*
37 13 AGP_CBE<2>	AK25	PCICBE2*
37 13 AGP_CBE<3>	AF21	PCICBE3*
38 13 CLK66M GPU AGP	AJ12	PCICLK
AGP_GPU_RESET_L	AH11	PCIRST*
37 13 AGP_GNT_L	AG12	PCIGNT*
37 13 AGP_REQ_L	AK12	PCIREQ*
37 13 AGP_FRAME_L	AH24	PCIFRAME*
37 13 AGP_IDY_L	AJ25	PCIIRDY*
37 13 AGP_TRDY_L	AH25	PCITRDY*
37 13 AGP_DEVSEL_L	AK27	PCIDEVSEL*
37 13 AGP_STOP_L	AH26	PCISTOP*
37 13 AGP_PAR	AH27	PCIPAR
16 AGP_NV_INT_L	AK11	PCIINTA*
37 13 AGP_RBF_L	AJ13	AGPRBF*
AGP_NV_WBF_L	AG15	AGPWBF*
AGP_NV_PIPE_L	AF18	AGPPPIPE*
13 AGP_ST<0>	AF12	AGPST0
13 AGP_ST<1>	AF13	AGPST1
13 AGP_ST<2>	AG13	AGPST2
37 13 AGP_AD_STB<1>	AK21	AGPADSTB1
37 13 AGP_AD_STB_L<1>	AJ21	AGPADSTB1*
37 13 AGP_AD_STB<0>	AK28	AGPADSTB0
37 13 AGP_AD_STB_L<0>	AJ28	AGPADSTB0*
13 AGP_BUSY_L	AF10	AGPBUSY*
13 STOP_AGP_L	AG10	AGPSTOP*
AGP_CAL_PD	AH15	AGP_CAL_PD
AGP_CAL_PU	AH14	AGP_CAL_PU
AGP_DBI_LO	AH19	AGP_DBI_LO
AGP_MB_DET*	AK13	AGP_MB_DET*
38 19 GPU_AGP_VREF	AC30	AGPVREF
37 13 AGP_SBA<0>	AJ15	AGPSBA0
37 13 AGP_SBA<1>	AF15	AGPSBA1
37 13 AGP_SBA<2>	AK15	AGPSBA2
37 13 AGP_SBA<3>	AG16	AGPSBA3
37 13 AGP_SBA<4>	AK16	AGPSBA4
37 13 AGP_SBA<5>	AF16	AGPSBA5
37 13 AGP_SBA<6>	AJ16	AGPSBA6
37 13 AGP_SBA<7>	AH18	AGPSBA7
37 13 AGP_SB_STB	AH16	AGPSBSTB
37 13 AGP_SB_STB_L	AH17	AGPSBSTB*

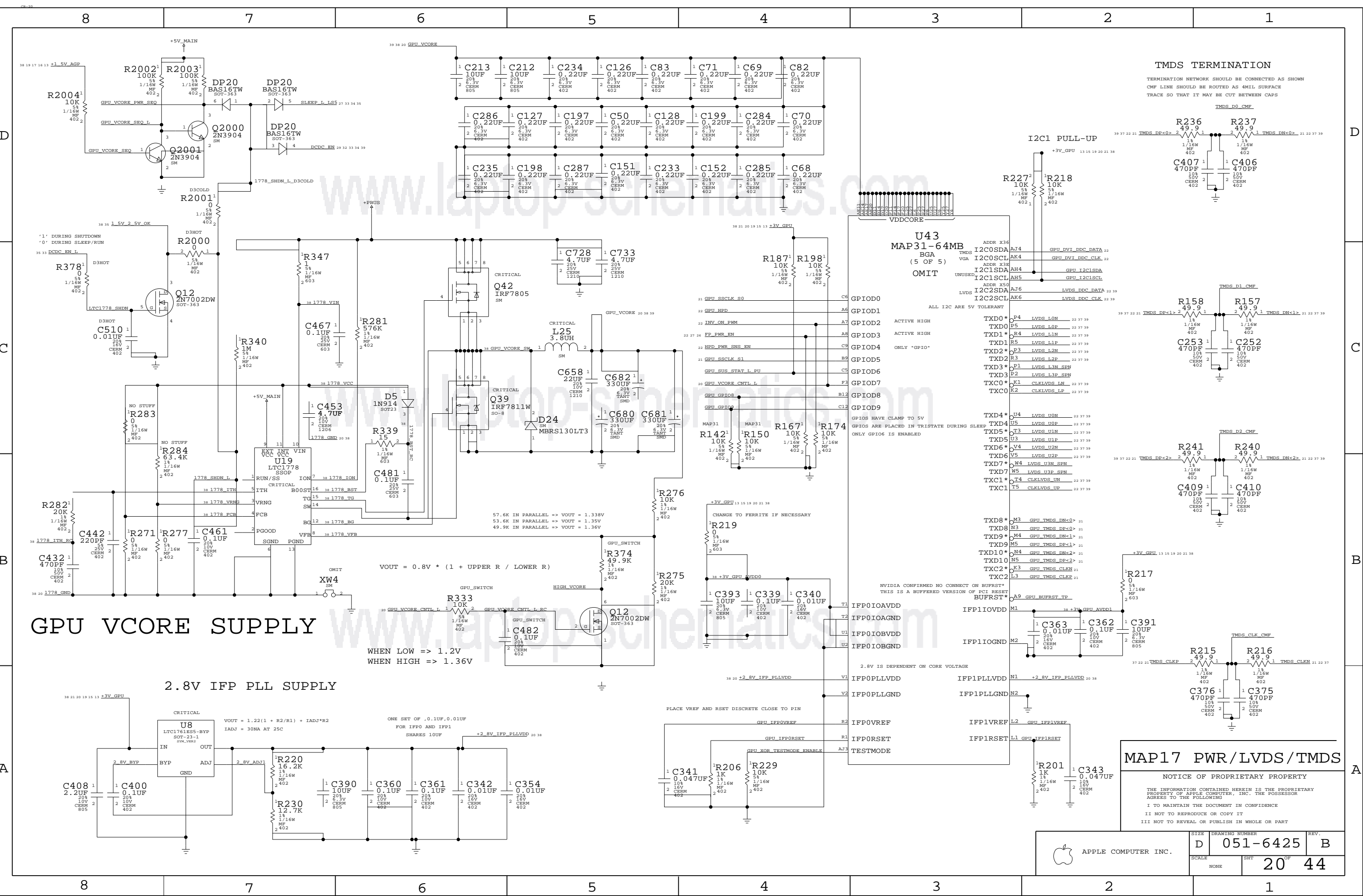
FOR AGP 8X

MAP17 AGP/DDR RAM

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D	051-6425	B
SCALE	SHT	
NONE	19	44





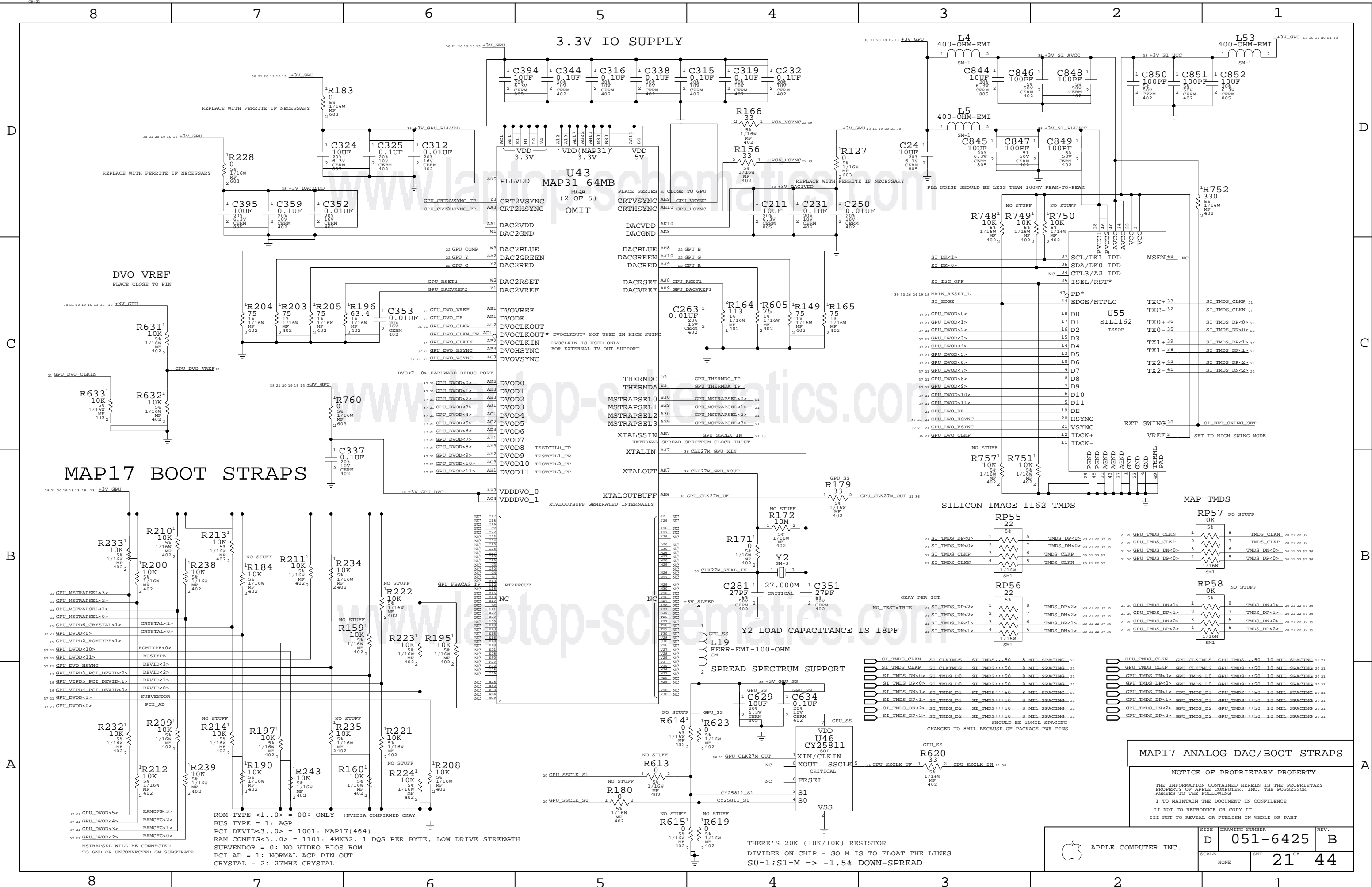
GPU Vcore supply

2.8V IFP PLL supply

MAP17 PWR/LVDS/TMS

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APPLE COMPUTER INC.		
SIZE	DRAWING NUMBER	REV.
	051-6425	B
SCALE	SHT 20 OF 44	



3.3V IO SUPPLY

DVO VREF
PLACE CLOSE TO PIN

MAP17 BOOT STRAPS

ROM TYPE <1..0> = 00: ONLY (NVIDIA CONFIRMED OKAY)
 BUS TYPE = 1: AGP
 PCI_DEVID<3..0> = 1001: MAP17(464)
 RAM CONFIG<3..0> = 1101: 4MX32, 1 DQS PER BYTE, LOW DRIVE STRENGTH
 SUBVENDOR = 0: NO VIDEO BIOS ROM
 PCI_AD = 1: NORMAL AGP PIN OUT
 CRYSTAL = 2: 27MHZ CRYSTAL

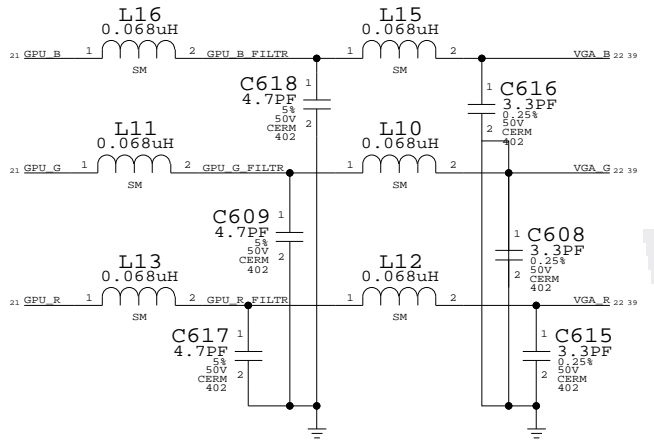
MAP17 ANALOG DAC/BOOT STRAPS

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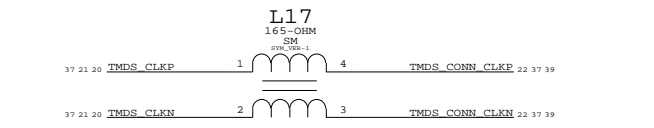
APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	NONE	SHT	21 OF 44

EXTERNAL VIDEO (DVI) INTERFACE

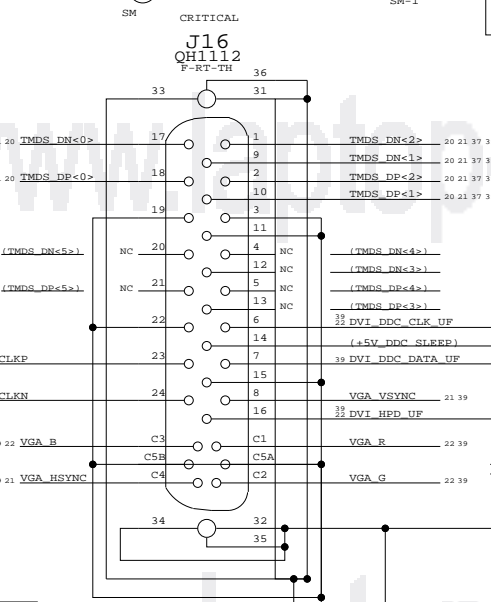
ANALOG FILTERING
PLACE CLOSE TO CONNECTOR



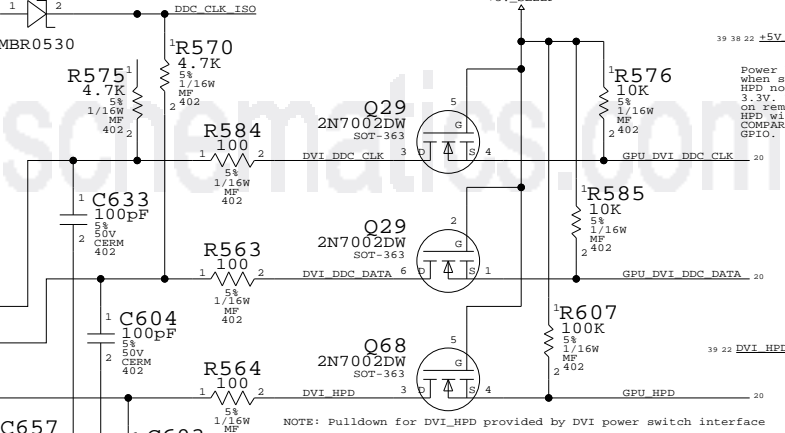
TMDS FILTERING
PLACE CLOSE TO CONNECTOR



DVI DDC CURRENT LIMIT
(55mA requirement per DVI spec)



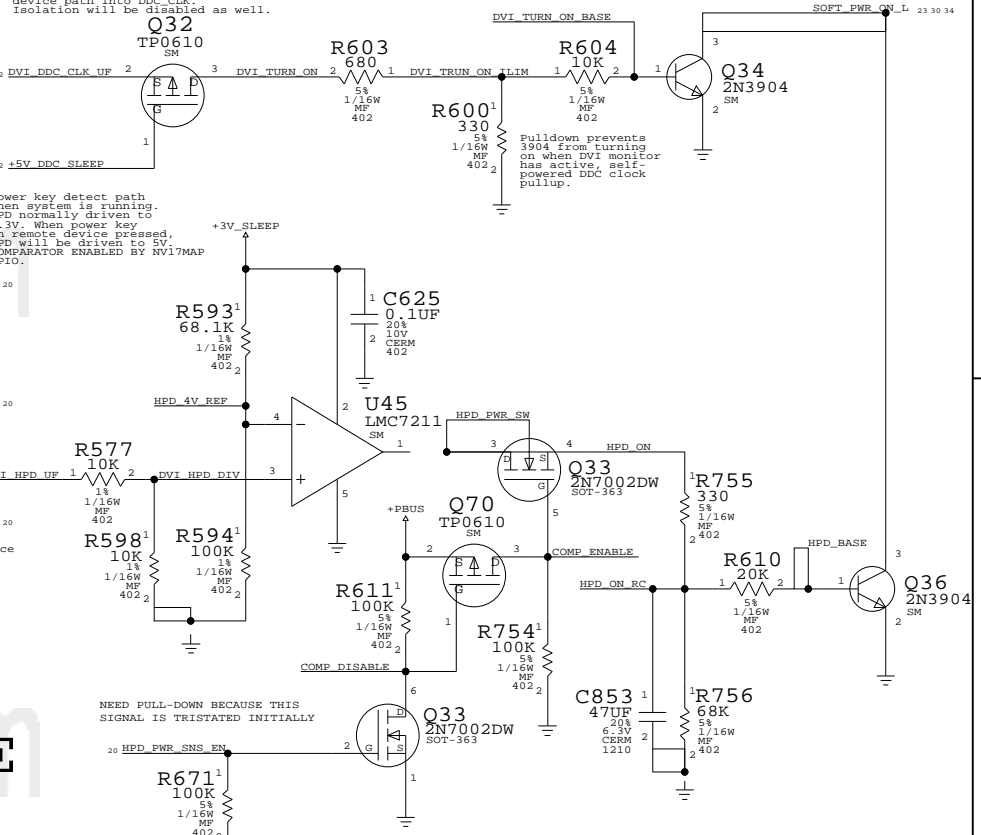
3V LEVEL SHIFTERS



NOTE: Pull-down for DVI_HPD provided by DVI power switch interface
BECAUSE OF BOARD REAL ESTATE

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 host rails will be low, TP0610 will turn on, driving SOFT_PWR_ON_L low. As host rails rise, TP0610 will turn off, as will remote device path into DDC CLK. Isolation will be disabled as well.

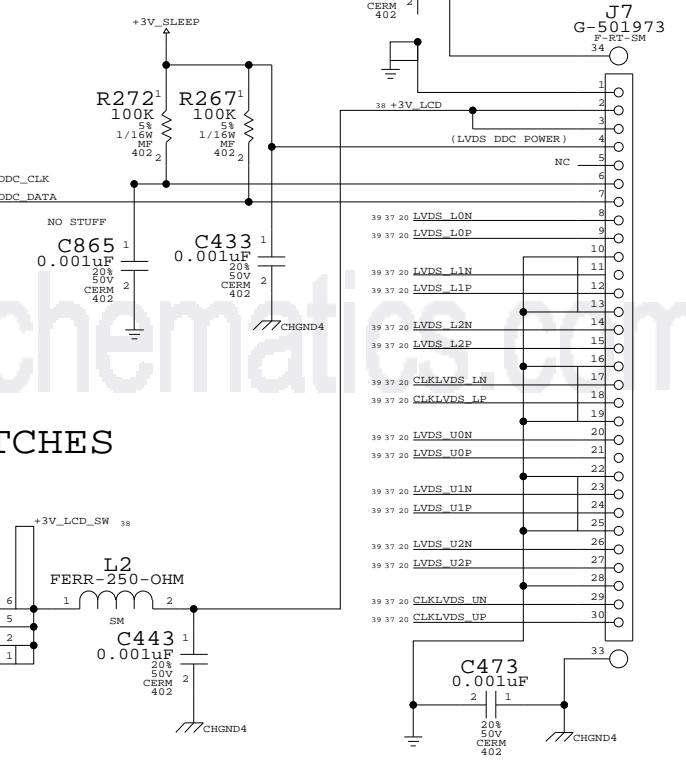
DVI POWER SWITCH



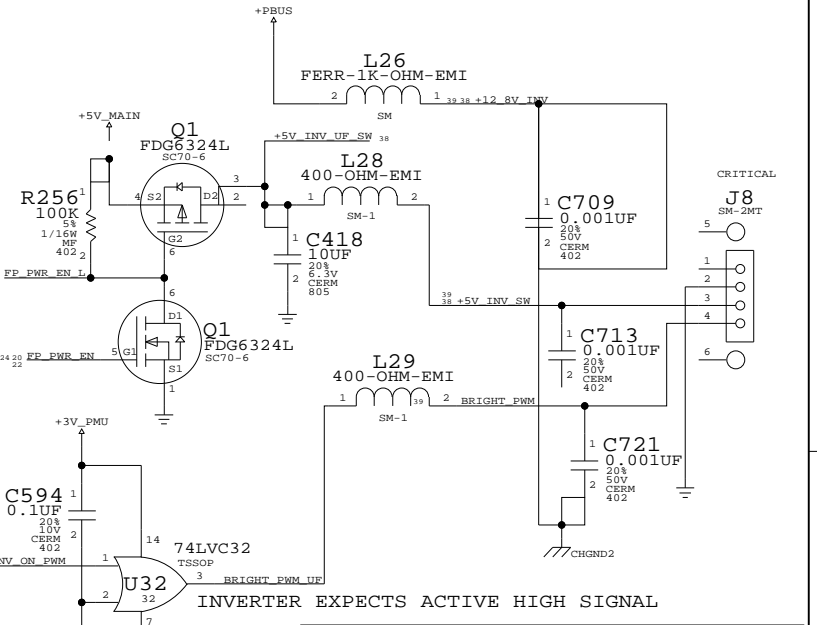
LCD INTERFACE

LVDS INTERFACE

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



INVERTER INTERFACE

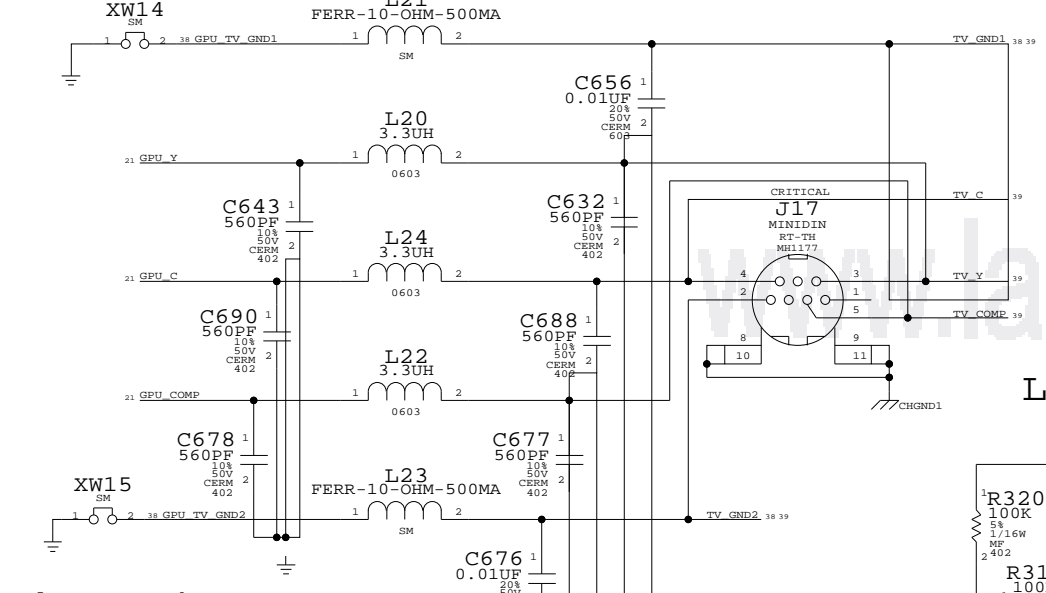


VIDEO CONNECTORS

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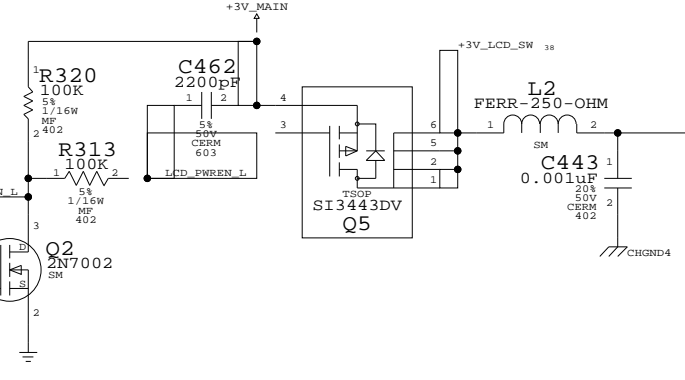
S-VIDEO/COMP OUT INTERFACE

Place GND shorts at graphics controller



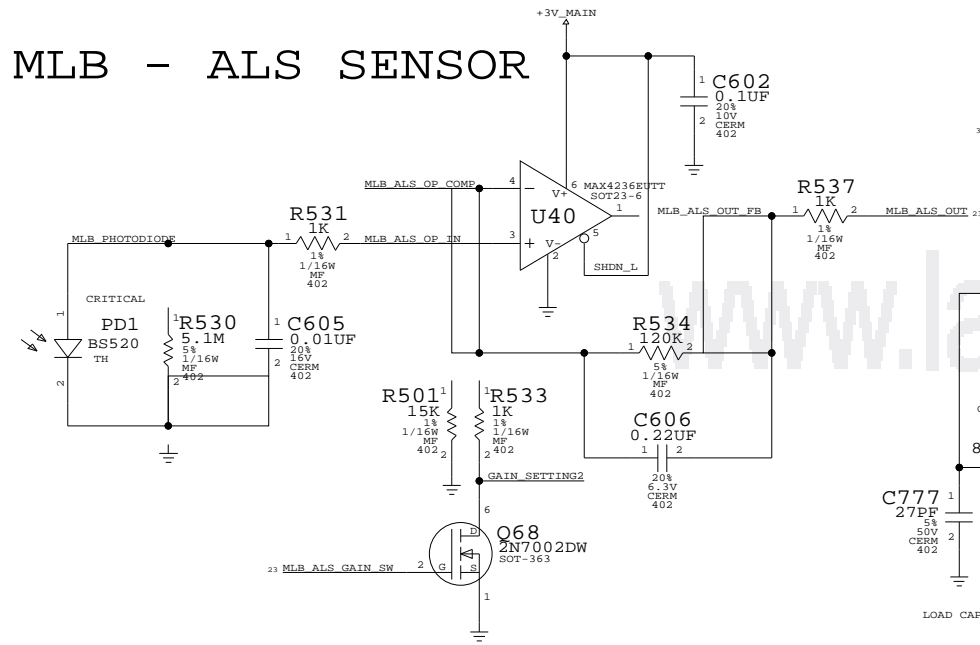
Place GND shorts at graphics controller

LCD POWER SWITCHES

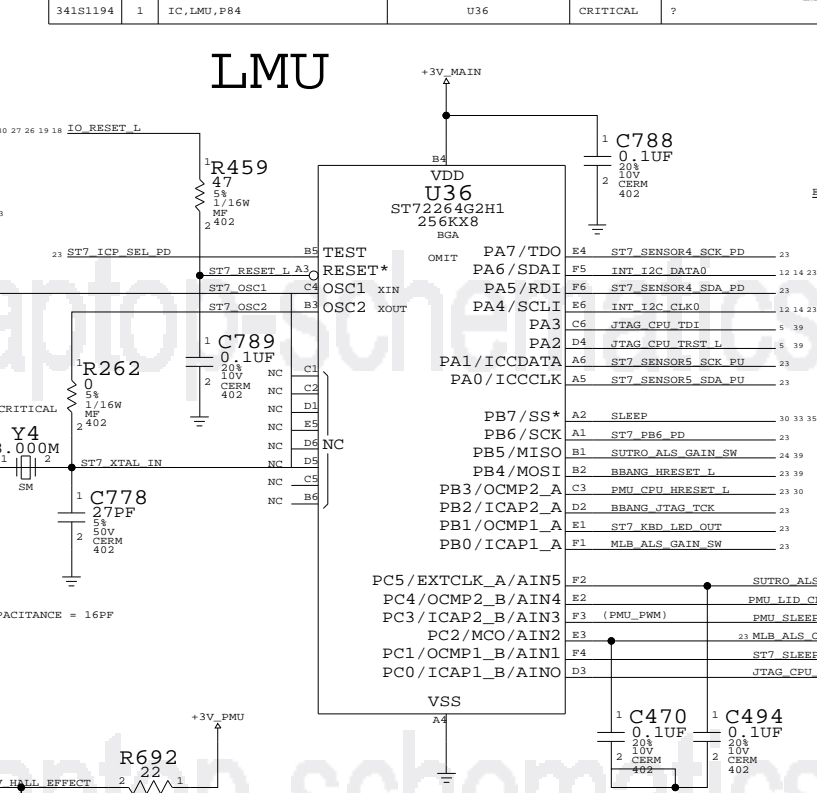


PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
155S0147	1	CHOKE, COMM MODE 370OHM, 2-LINE SMD	L17	CRITICAL	

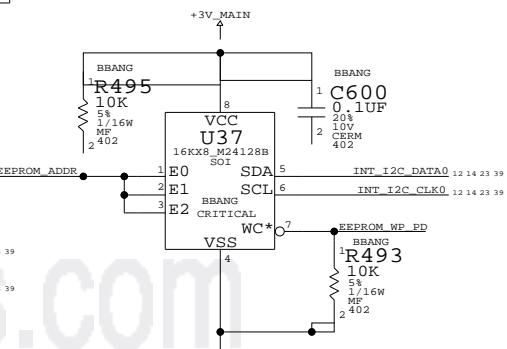
MLB - ALS SENSOR



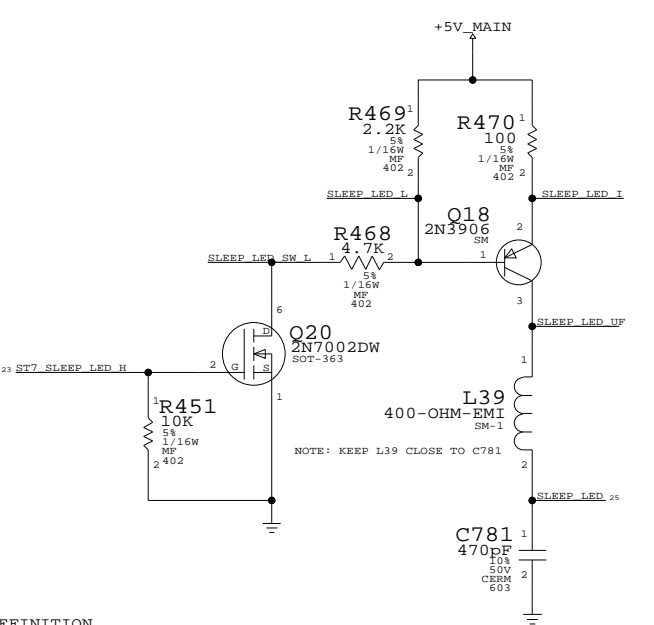
LMU



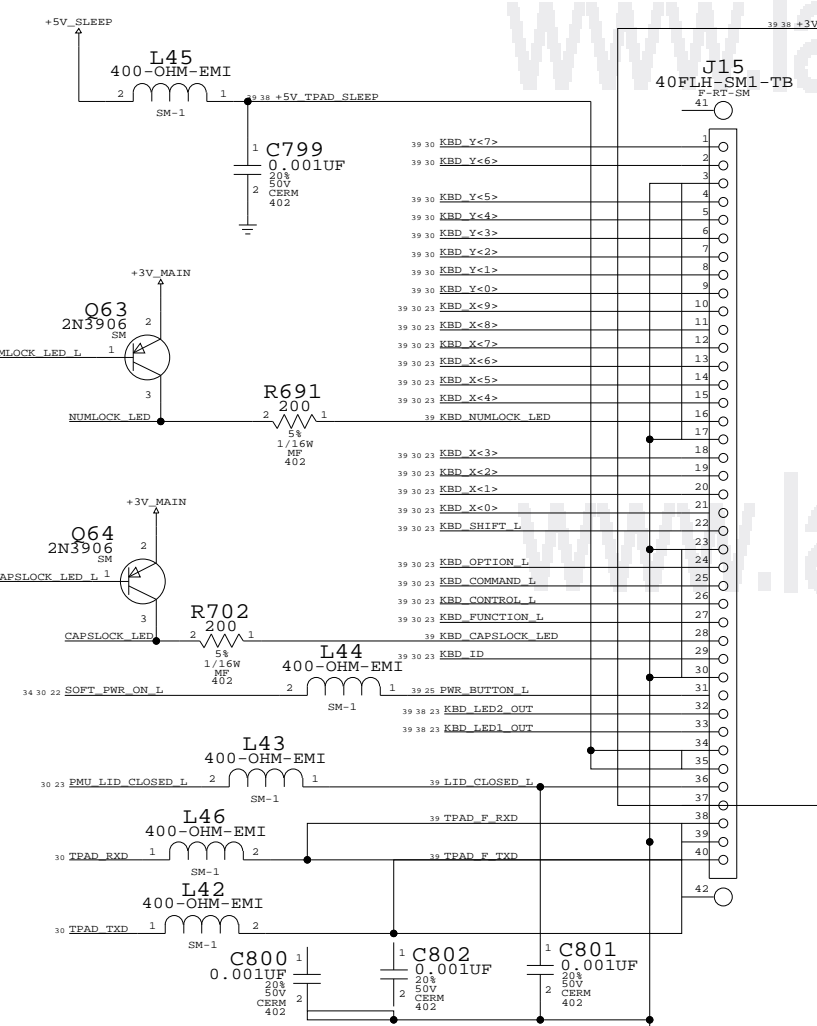
BOOT BANGER E2PROM



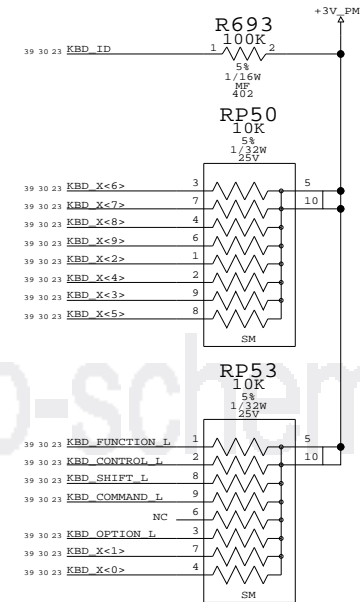
SLEEP LED



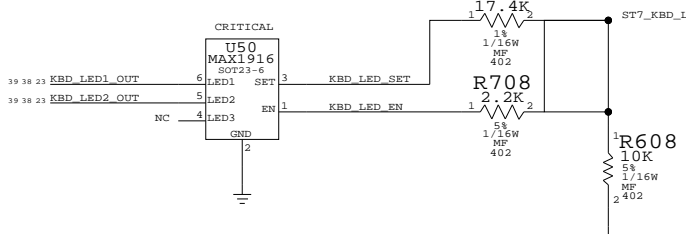
SPIDEY FLEX



KEYBOARD PULLUPS

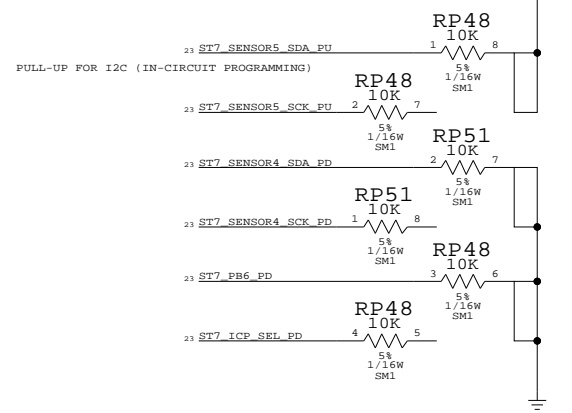


KB LED DRIVER



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

LMU PULL-DOWNS



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S1194	1	IC,LMU,P84	U36	CRITICAL	7

LMU/BOOTBANGER/SPIDEY

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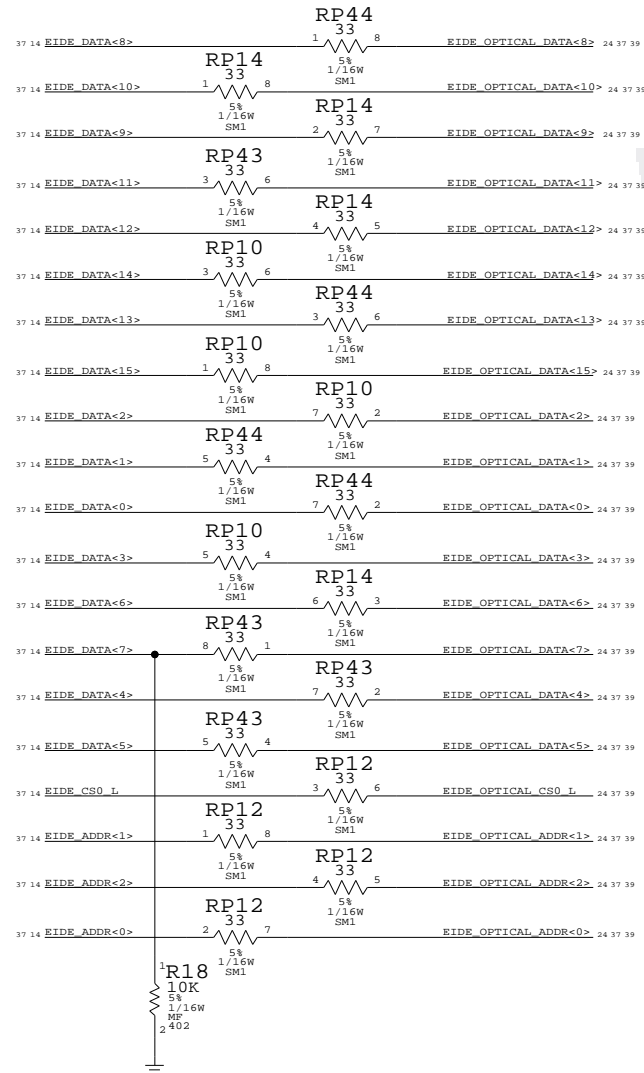
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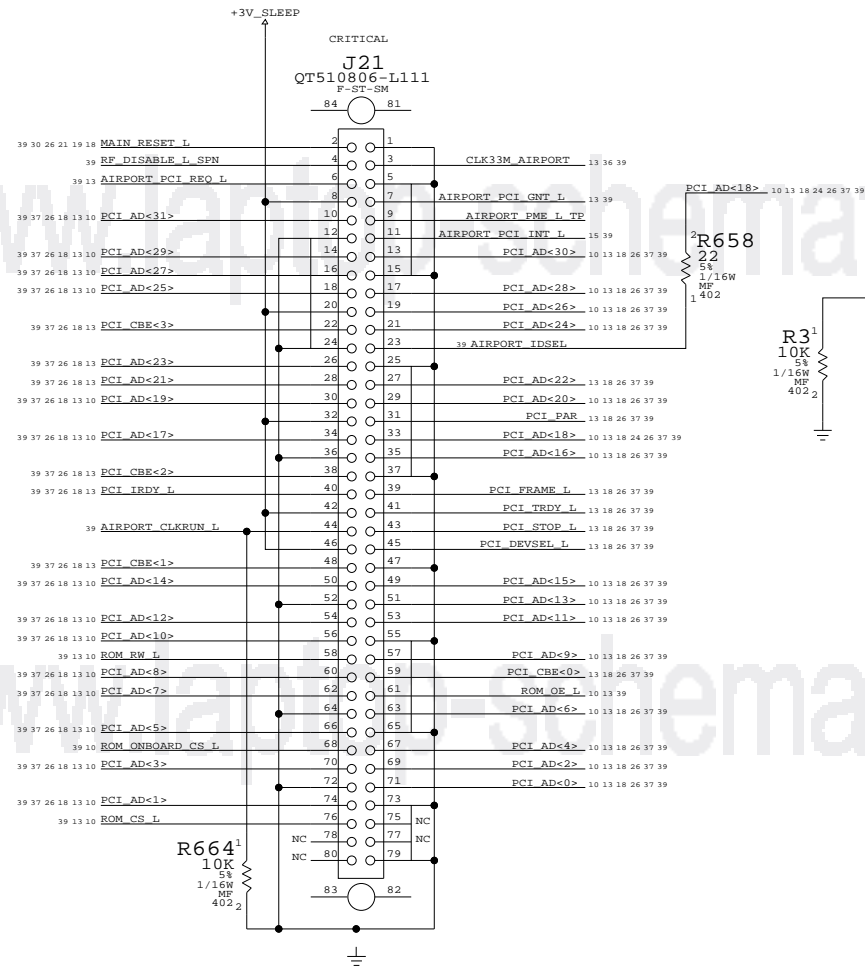
APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	23	44
NONE			

HARD DRIVE INTERFACE (UATA100)

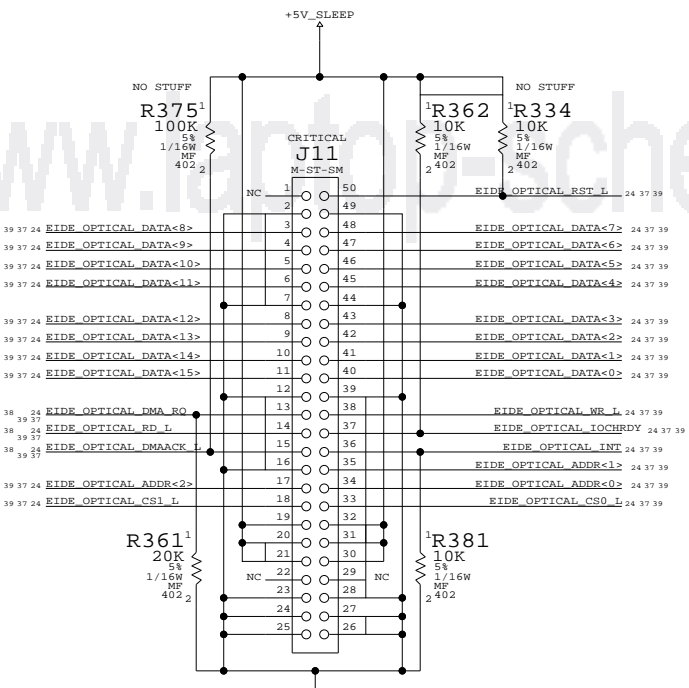
EIDE SERIES TERMINATION PLACE TERMINATORS NEAR INTREPID



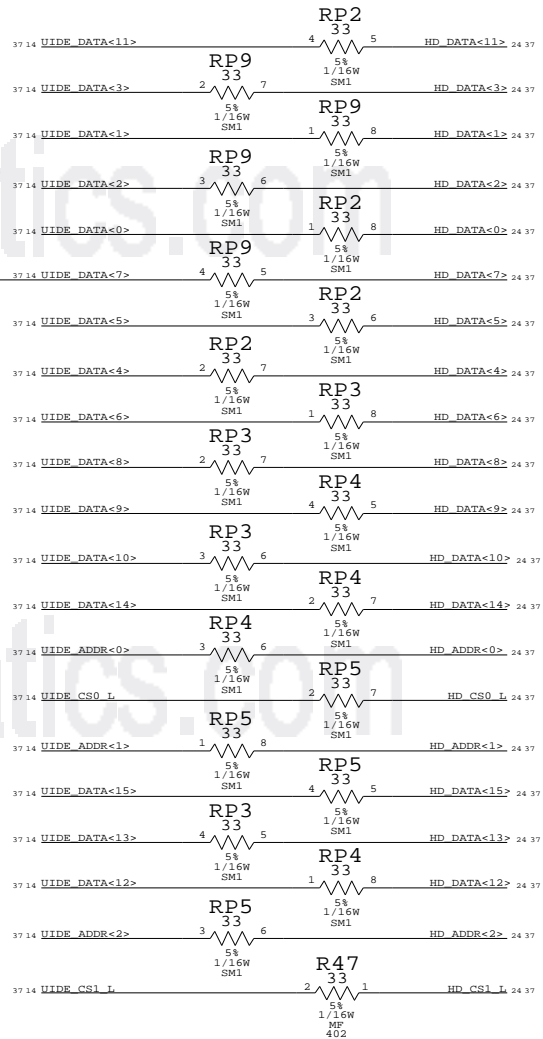
WIRELESS INTERFACE



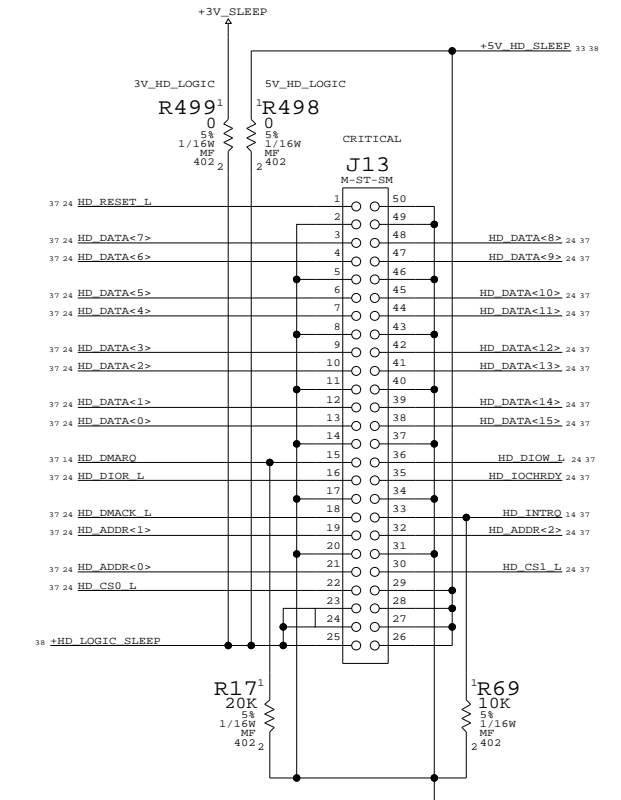
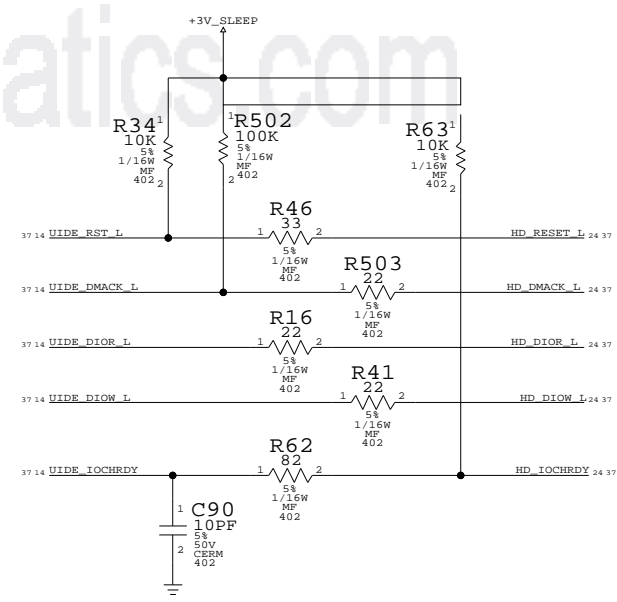
OPTICAL DRIVE INTERFACE (EIDE)



PLACE SERIES R CLOSE TO INTERPID

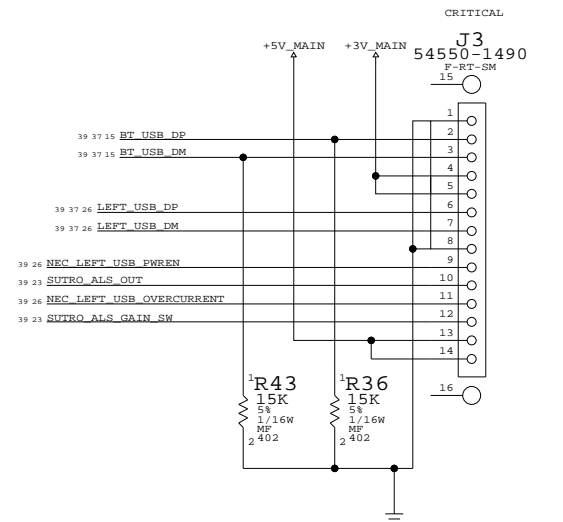


PLACE PULLUP RESISTORS CLOSE TO INTREPID



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

BLUETOOTH/LEFT-SIDE USB



INTERNAL I/O CONNECTORS

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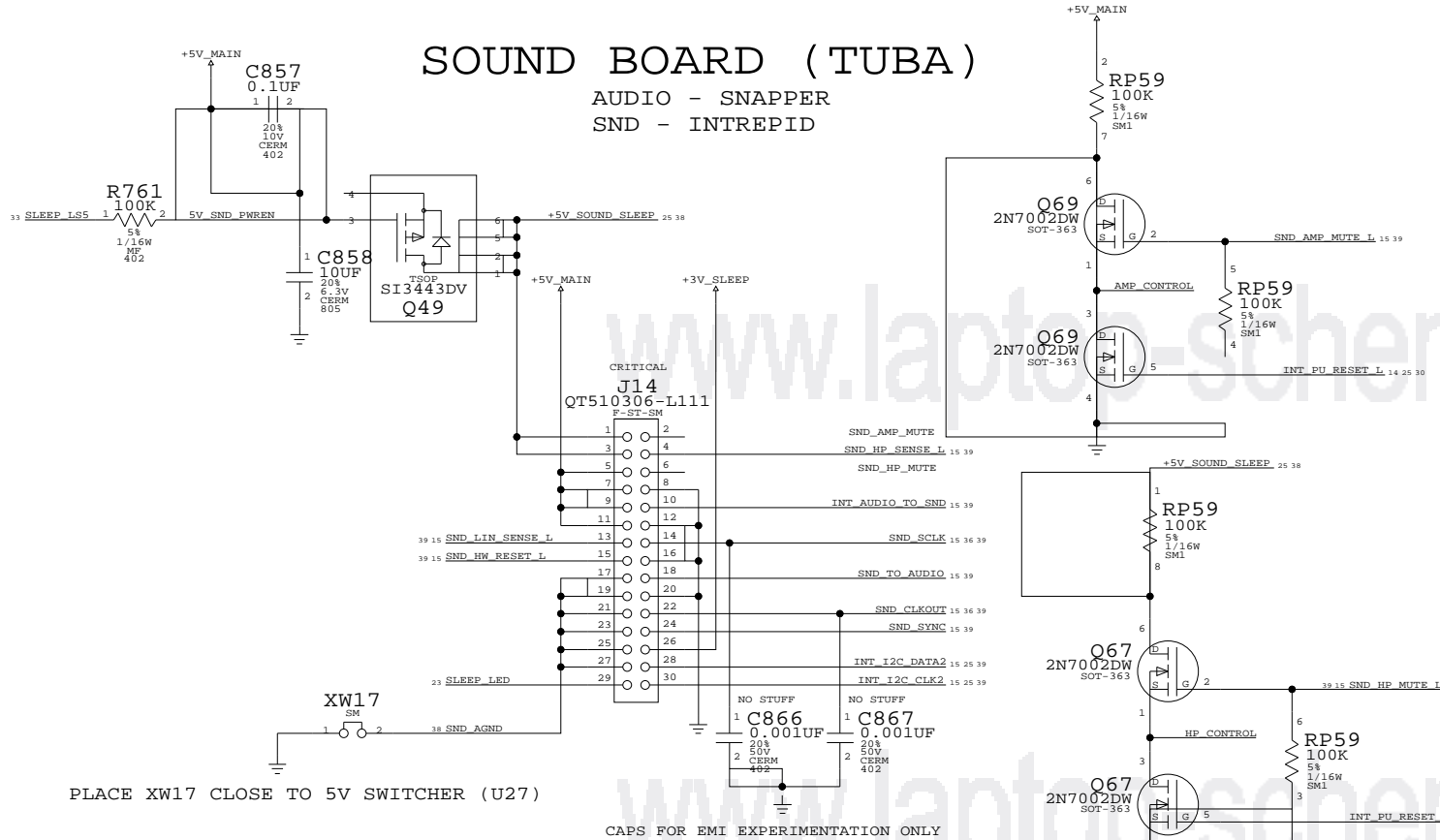
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	24 OF 44	
NONE			

IOCHRDY - UATA100 REQUIRES PULL-UP TO 3.3V

SOUND BOARD (TUBA)

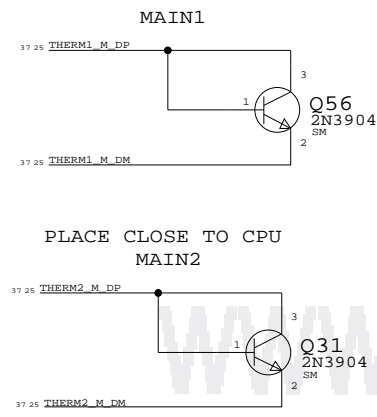
AUDIO - SNAPPER
SND - INTREPID



PLACE XW17 CLOSE TO 5V SWITCHER (U27)

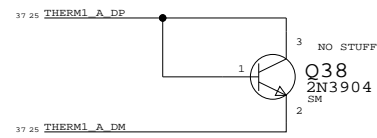
CAPS FOR EMI EXPERIMENTATION ONLY

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

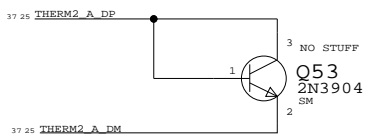


PLACE CLOSE TO CPU MAIN2

PLACE UNDERNEATH UPPER RAM ALTERNATE1

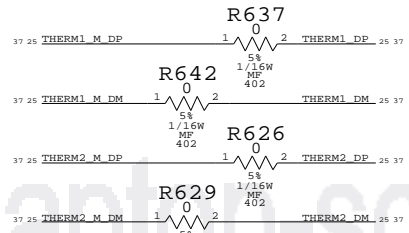


PLACE CLOSE TO BATTERY CHARGER/VCORE ALTERNATE2

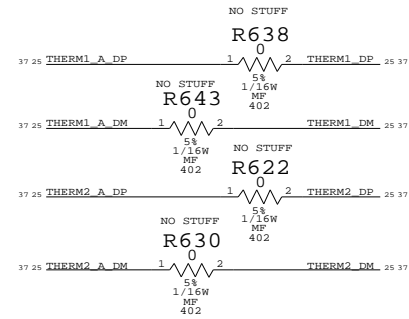


FAN INTERFACE

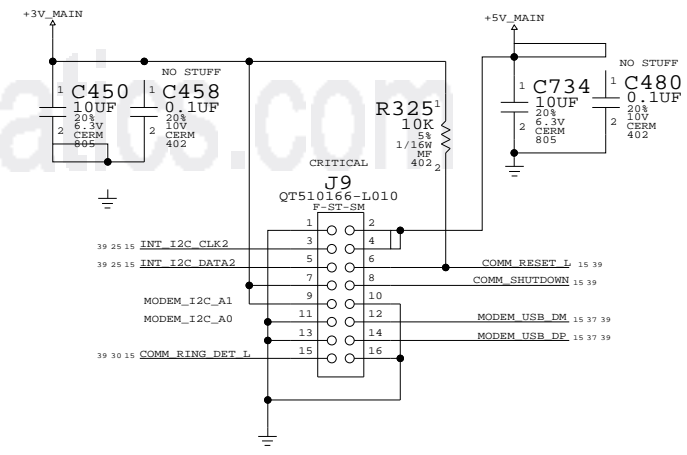
KEEP STUFFING RESISTORS CLOSE TO ADM1031 CONTROLLER



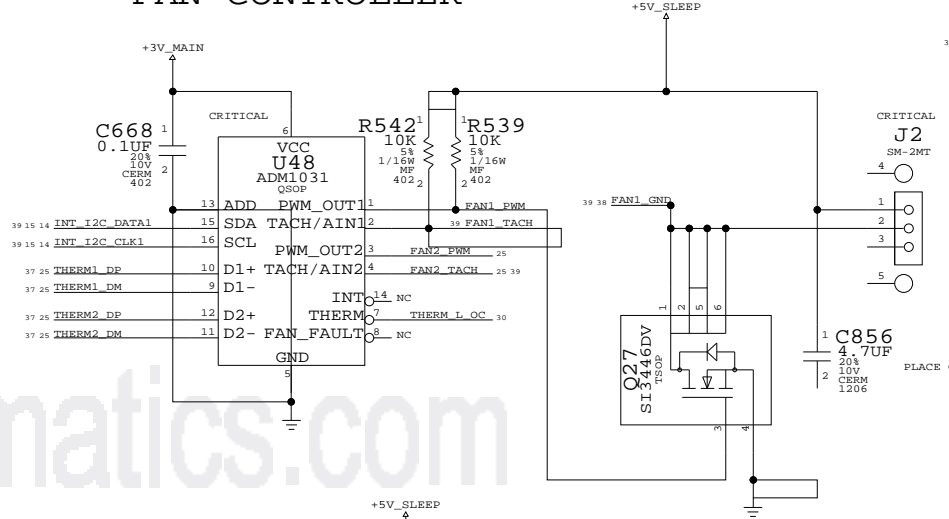
KEEP STUFFING RESISTORS CLOSE TO ADM1031 CONTROLLER



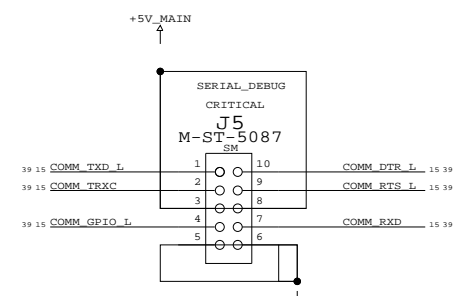
MODEM



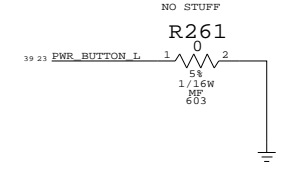
FAN CONTROLLER



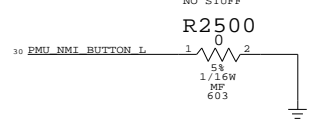
SERIAL DEBUG INTERFACE



DEBUG POWER BUTTON



DEBUG JUMPERS



FAN/MODEM/SOUND/SLEEP LED/DEBUG

NOTICE OF PROPRIETARY PROPERTY

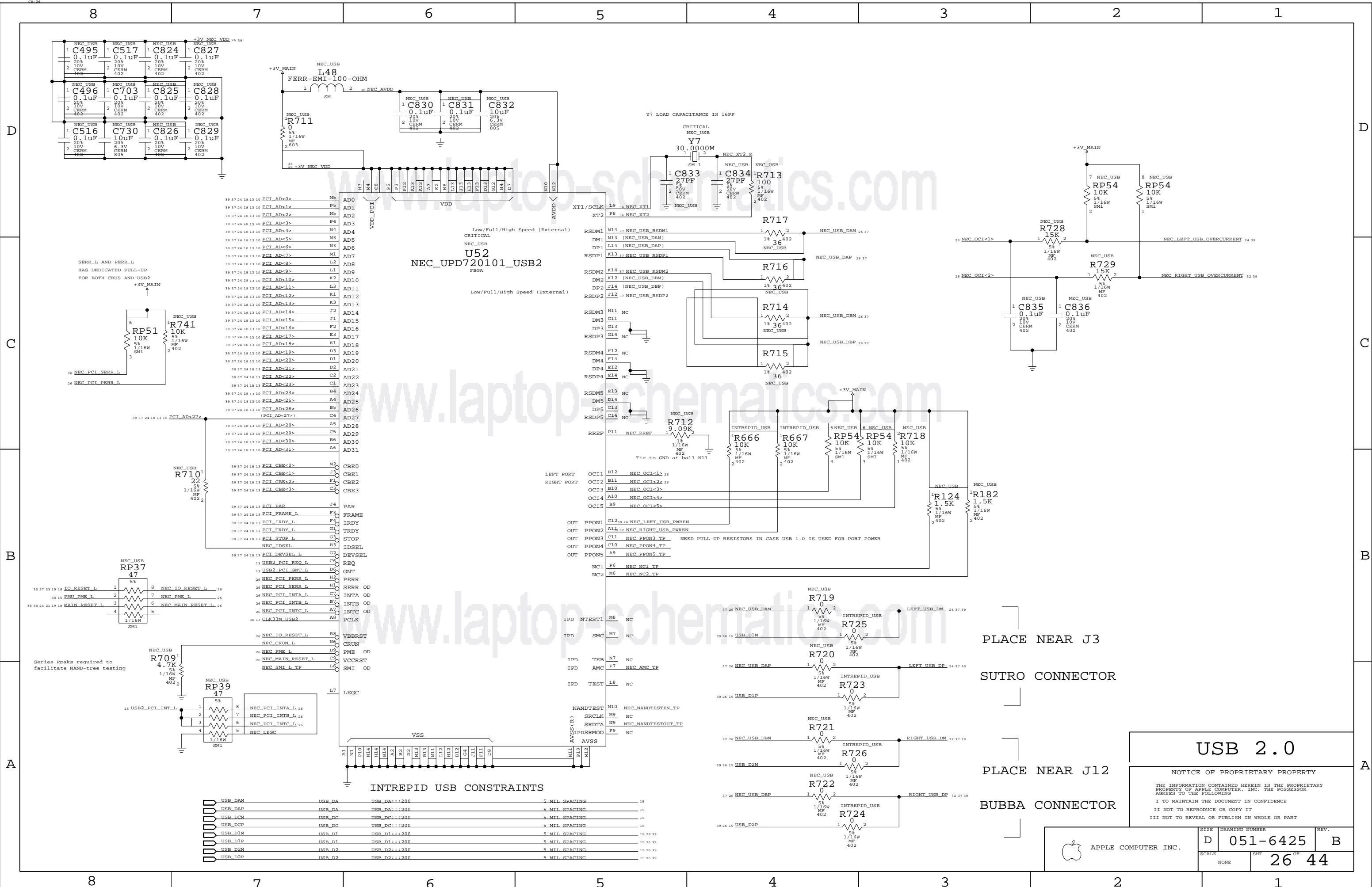
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	D	051-6425	B
SCALE	SHT	25	44
NONE	OF		



PLACE NEAR J3

SUTRO CONNECTOR

PLACE NEAR J12

BUBBA CONNECTOR

USB 2.0

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APPLE COMPUTER INC.	SIZE D	DRAWING NUMBER 051-6425	REV. B
	SCALE NONE	SHT 26 OF 44	

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 R45 pairs

Sandwich each RJ54 pair between chassis grounds

www.laptop-schematics.com

PLACE ALL SERIES RES CLOSE TO PHY

$$V_{OUT} = 0.8V * (1 + R2EQV/R1)$$

$$R2EQV = R2A || R2B$$

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

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

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

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

CRITICAL

Short shielded RJ-45

PLACE RESISTORS CLOSE TO PHY

SEE CONFIG TABLES (BELOW)

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

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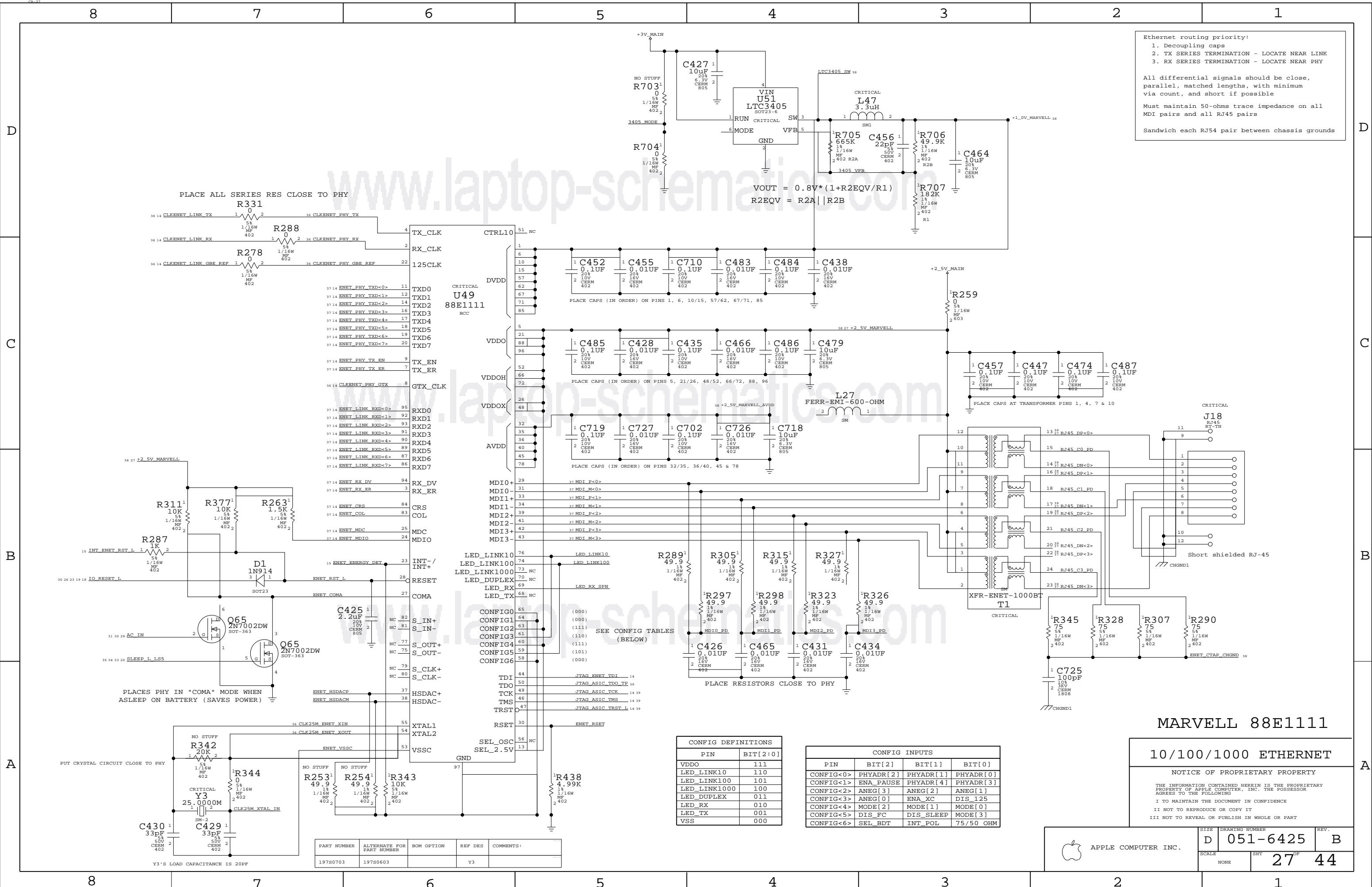
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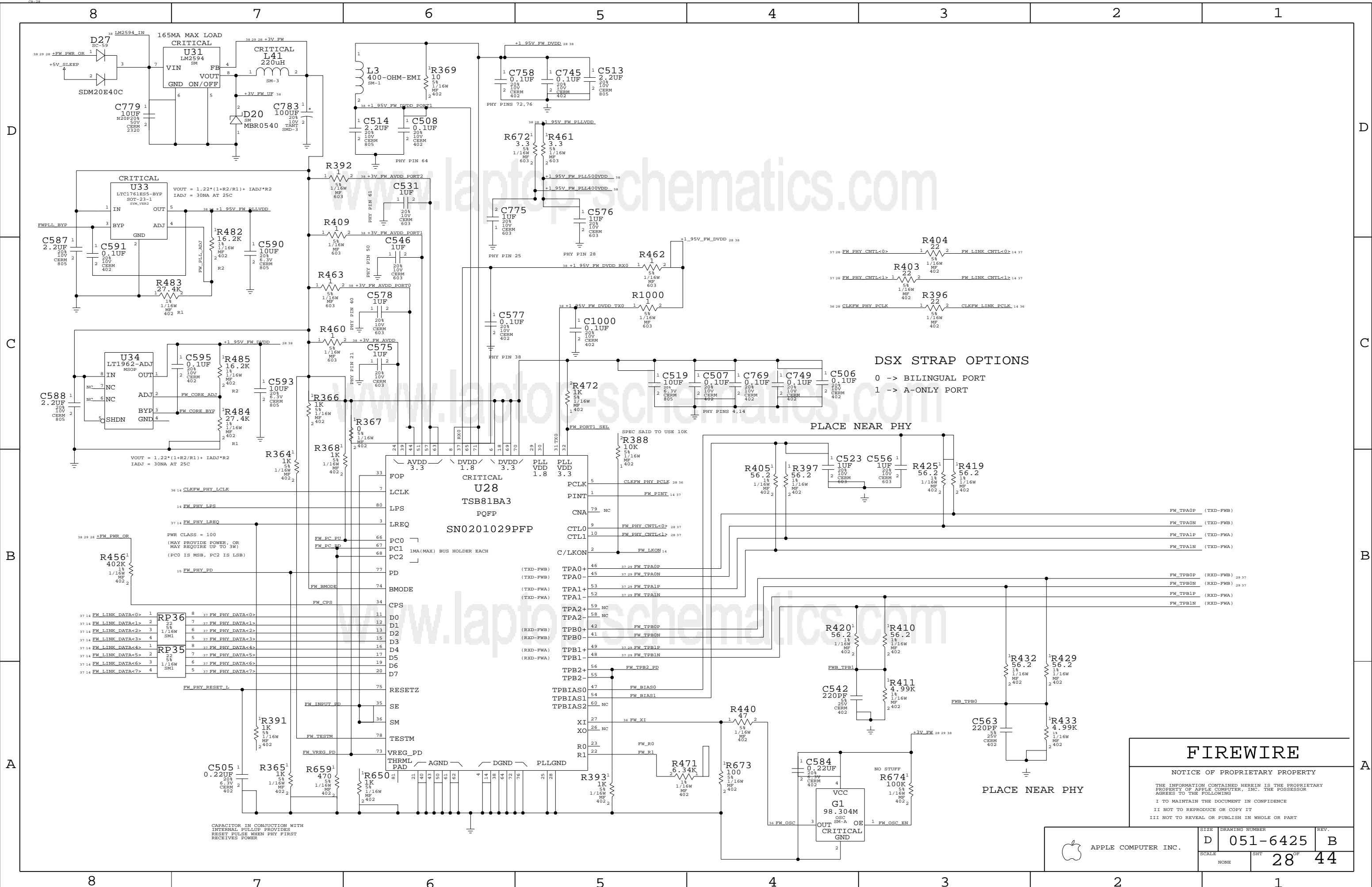
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APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	27 44	
NONE			

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S0703	197S0603		Y3	

Y3'S LOAD CAPACITANCE IS 20PF





DSX STRAP OPTIONS

0 -> BILINGUAL PORT
 1 -> A-ONLY PORT

PLACE NEAR PHY

PLACE NEAR PHY

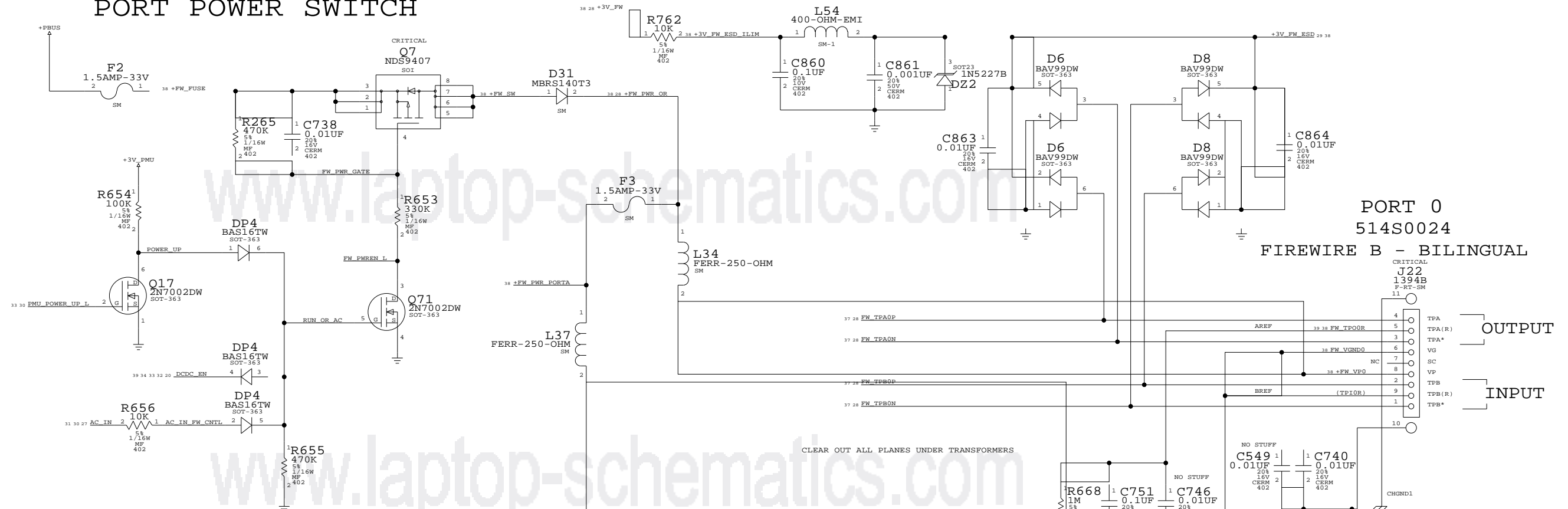
FIREWIRE

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	D	051-6425	B
SCALE	SHT	28 OF 44	
NONE			

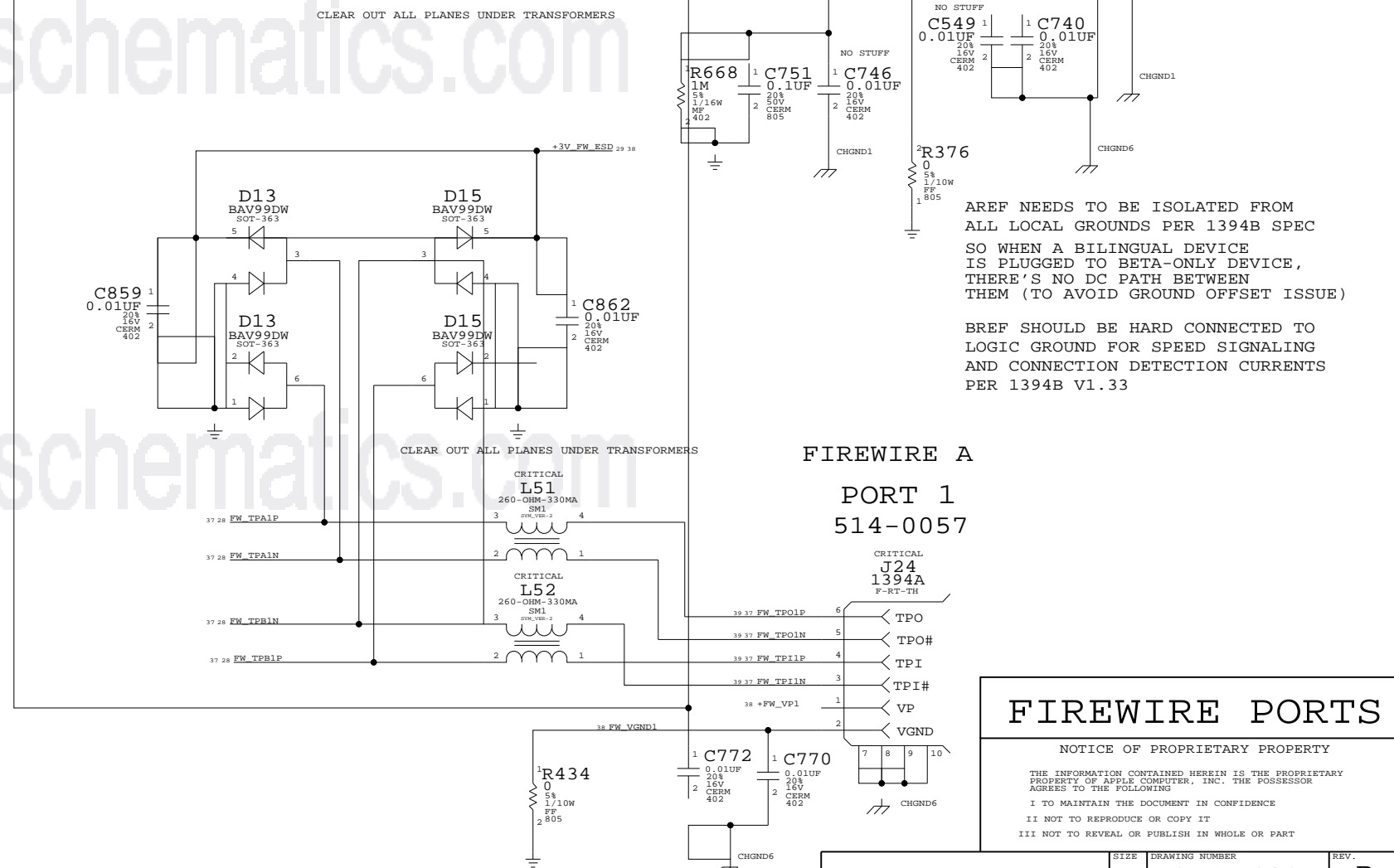
CAPACITOR IN CONJUNCTION WITH INTERNAL PULLUP PROVIDES RESET PULSE WHEN PHY FIRST RECEIVES POWER

PORT POWER SWITCH



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

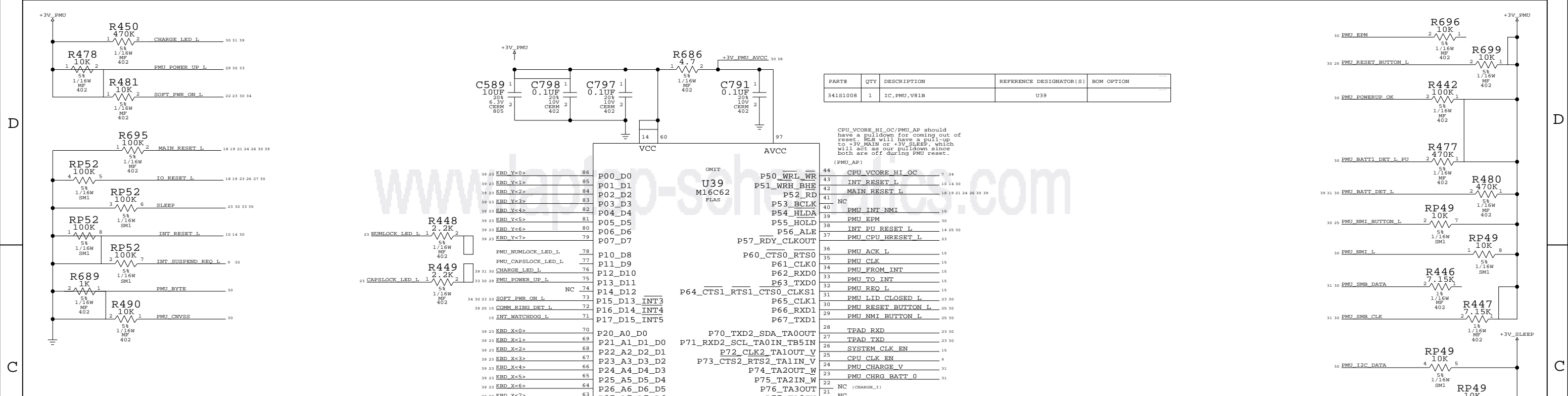
STATE	PMU_POWER_UP_L	POWER_UP	DCDC_EN	AC_IN	LTC4210_ON
SHUTDOWN (AC)	1	0	0	1	OFF
SLEEP (AC)	1	0	1	1	ON
RUN (AC)	0	1	1	1	ON
SHUTDOWN (BATT)	1	0	0	0	OFF
SLEEP (BATT)	1	0	1	0	OFF (PULL-DOWN RESISTOR)
RUN (BATT)	0	1	1	0	ON
	2.99V	+3V_PMU	+4_6V_BU	+3V_PMU	



FIREWIRE PORTS

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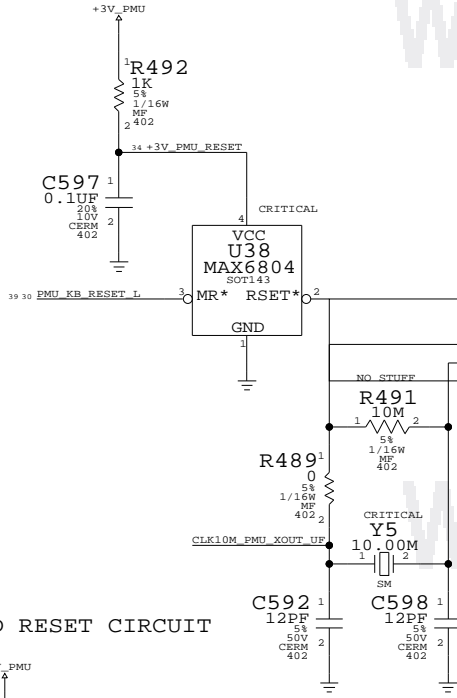
APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	29 OF 44	
NONE			



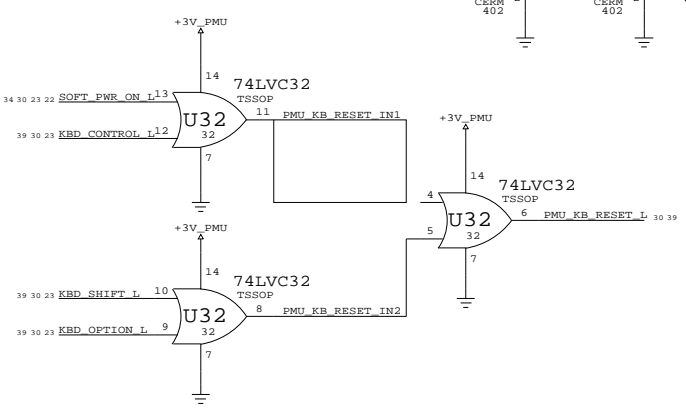
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
341S1008	1	IC,PMU,V81B	U39	

PMU_VCORE_HI_OC/PMU_AP should have a pulldown for coming out of reset. MB will have a pull-up to +3V_MAIN or +3V_SLEEP, which will act as our pulldown since both are off during PMU reset.

UNDERVOLTAGE RESET CIRCUIT



PMU KEYBOARD RESET CIRCUIT

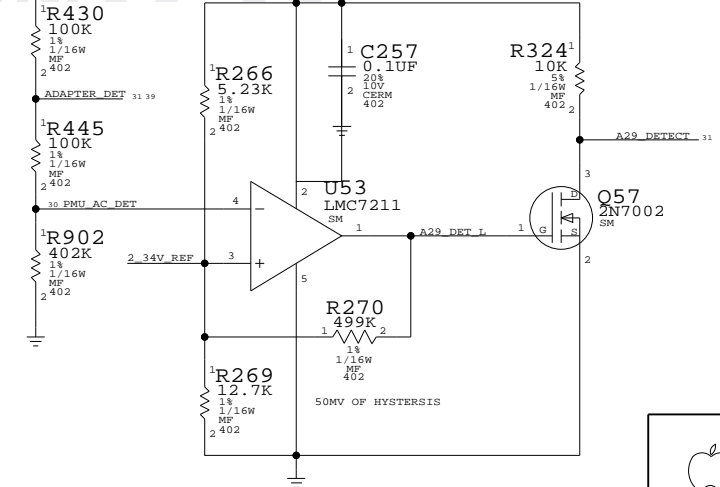


PIN	FUNCTION	CONNECT TO
86	P00_D0	86
85	P01_D1	85
84	P02_D2	84
83	P03_D3	83
82	P04_D4	82
81	P05_D5	81
80	P06_D6	80
79	P07_D7	79
78	P10_D8	78
77	P11_D9	77
76	P12_D10	76
75	P13_D11	75
74	P14_D12	74
73	P15_D13_INT3	73
72	P16_D14_INT4	72
71	P17_D15_INT5	71
70	P20_A0_D0	70
69	P21_A1_D1_D0	69
68	P22_A2_D2_D1	68
67	P23_A3_D3_D2	67
66	P24_A4_D4_D3	66
65	P25_A5_D5_D4	65
64	P26_A6_D6_D5	64
63	P27_A7_D7_D6	63
61	P30_A8_D7	61
59	P31_A9	59
58	P32_A10	58
57	P33_A11	57
56	P34_A12	56
55	P35_A13	55
54	P36_A14	54
53	P37_A15	53
52	P40_A16	52
51	P41_A17	51
50	P42_A18	50
49	P43_A19	49
48	P44_CS0	48
47	P45_CS1	47
46	P46_CS2	46
45	P47_CS3	45
6	BYTE	6
11	XOUT	11
13	XIN	13
10	RESET	10
96	VREF	96
7	CNVSS	7
12	VSS	12
62	AVSS	62
94	AVCC	94

Q11 ADAPTER DETECTION SCHEME

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

A29 DETECT CIRCUIT



PMU

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DC POWER INPUT

(POWER JACK, ETC. ON SEPARATE BOARD)

CRITICAL

J19
87438-0833
M-RT-SM

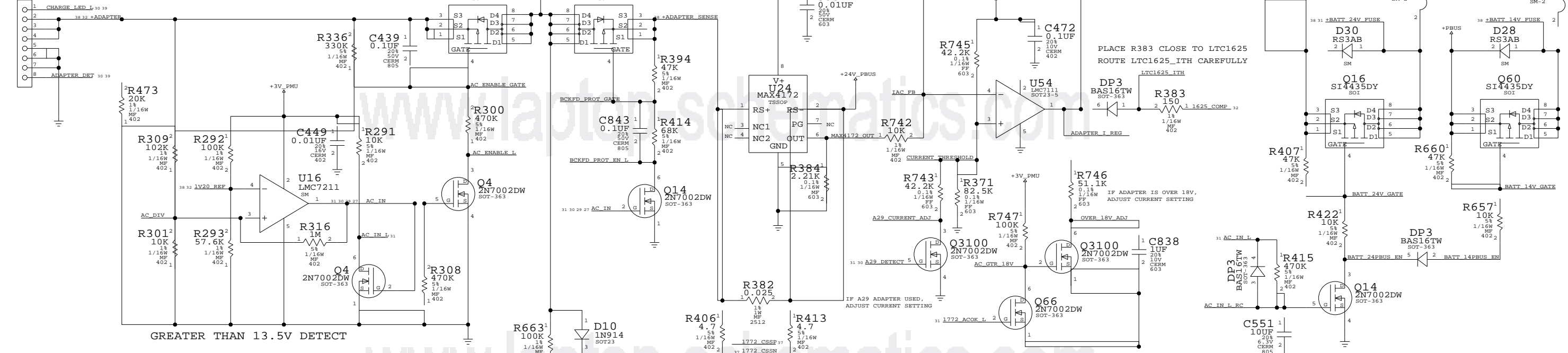
DC INRUSH LIMITER

PLACE U24 NEXT TO R382

U24 SENSE VOLTAGE DROP ACROSS R382

1MSEC INTEGRATION TIME

BATTERY SWITCH-OVER CIRCUIT



GREATER THAN 13.5V DETECT

SWITCHER VOLTAGE CONTROL

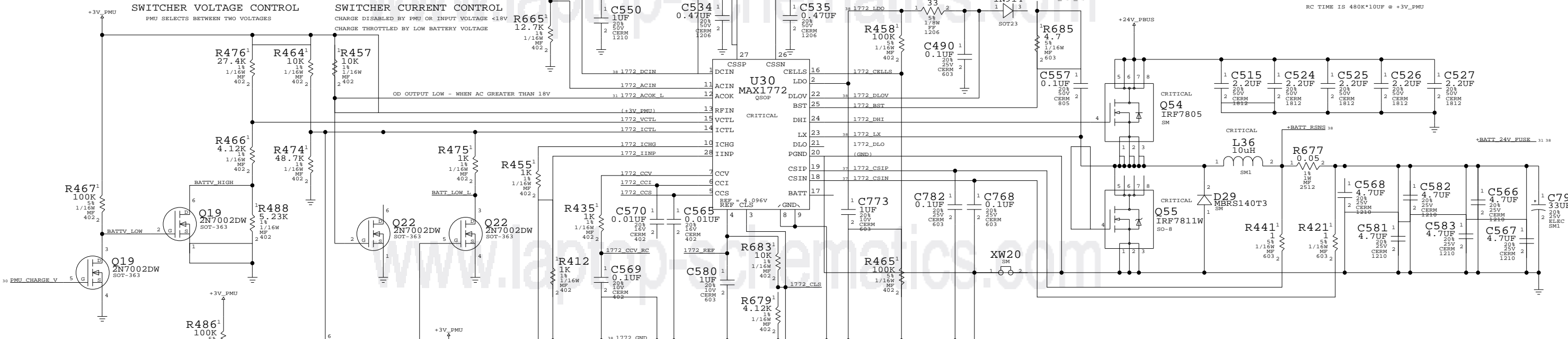
PMU SELECTS BETWEEN TWO VOLTAGES

SWITCHER CURRENT CONTROL

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

OD OUTPUT LOW - WHEN AC GREATER THAN 18V

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



BATTERY CONNECTOR

CRITICAL

J25
87438-0833
M-RT-SM

BATTERY CHARGER

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

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

$$I_{CHG} = (0.2048/R_{62}) \times (\frac{V_{ICTL}}{V_{REFIN}})$$

SCALE	SHEET	REV.	REV.
		31	
DRAWING NUMBER		REV.	
051-6425		B	
NONE		31 OF 44	



APPLE COMPUTER INC.

D

D

C

C

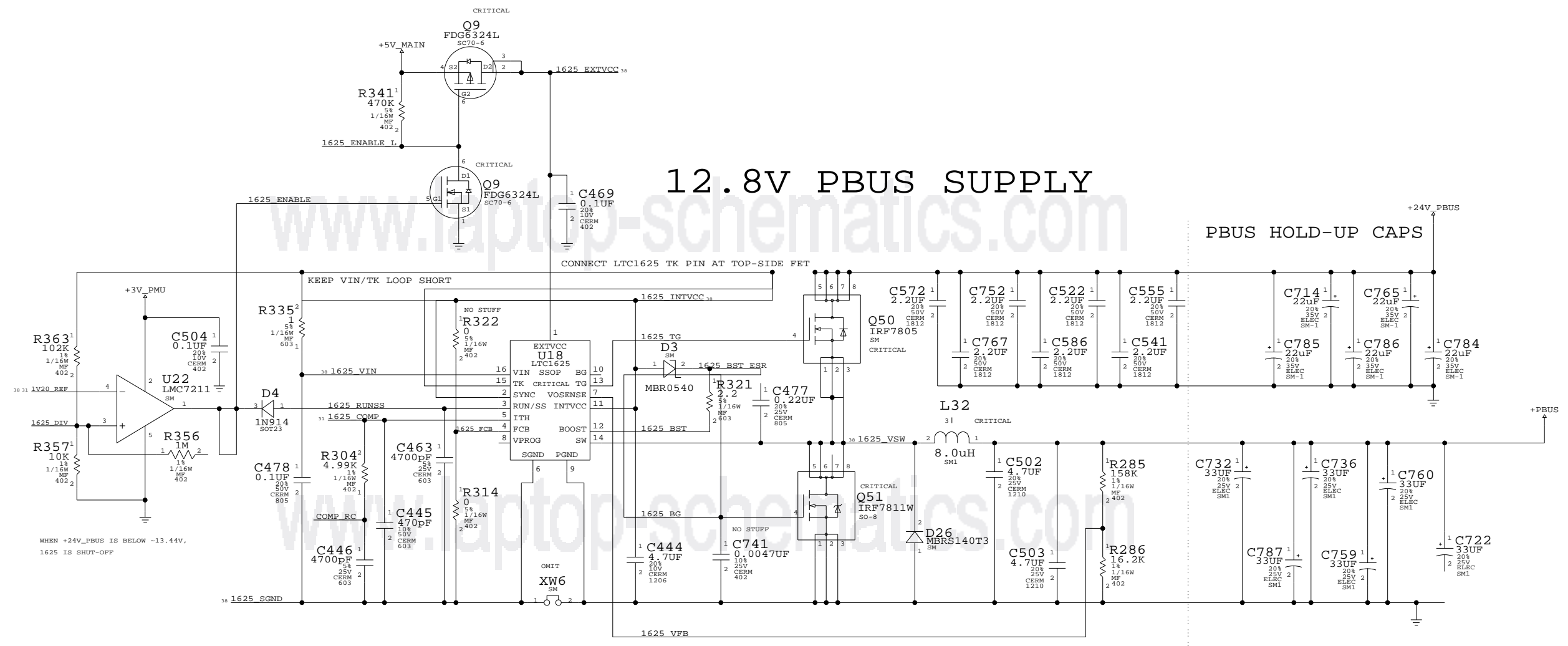
B

B

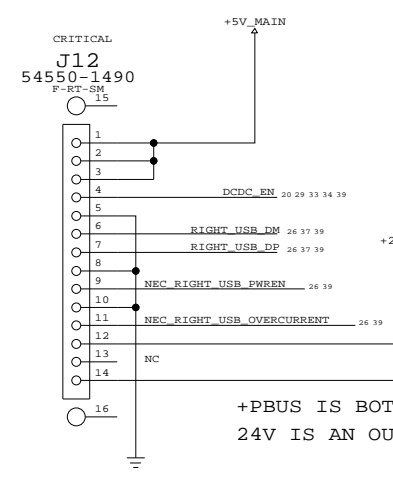
A

A

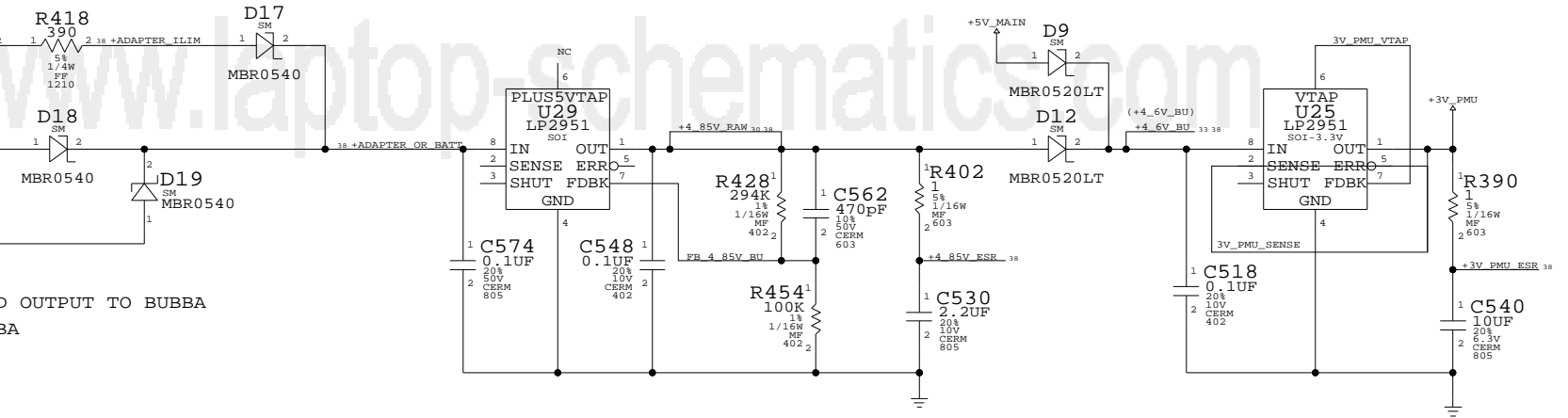
12.8V PBUS SUPPLY



BACKUP BATTERY / USB CONNECTOR



PMU SUPPLY



12.8V REGULATOR

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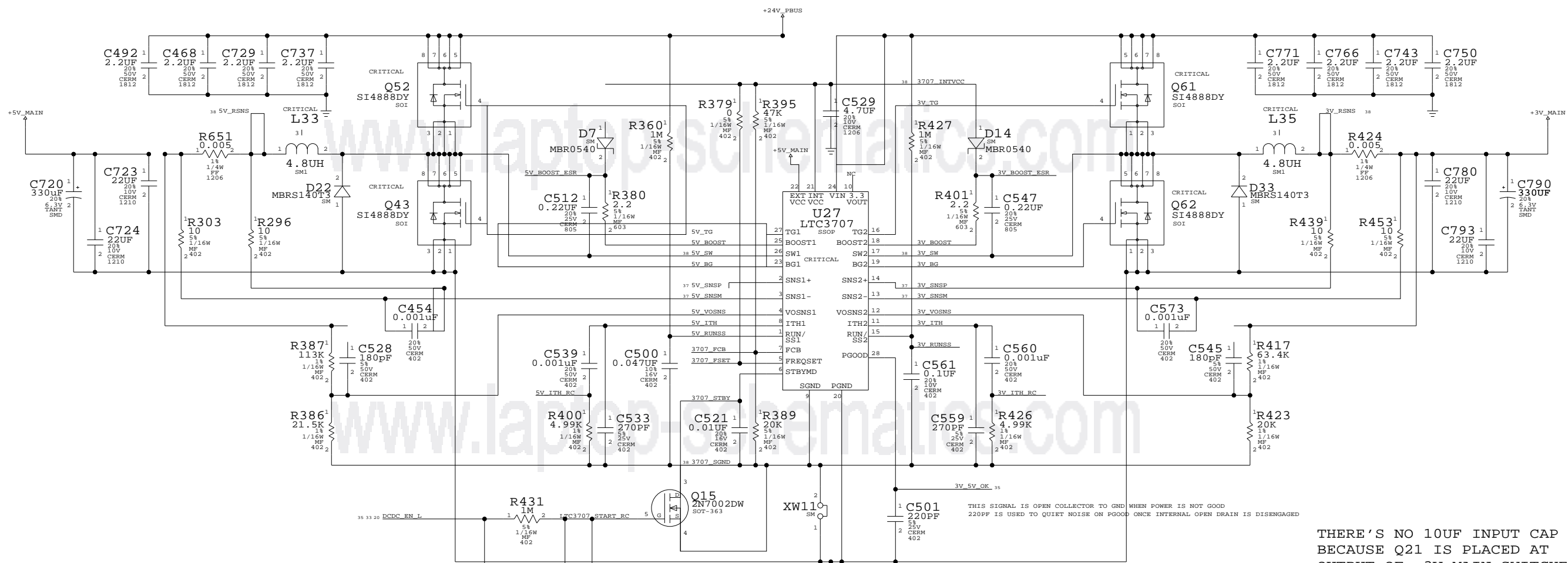
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SCALE	SHT	32 44	
NONE			

3.3V/5V MAIN SUPPLY

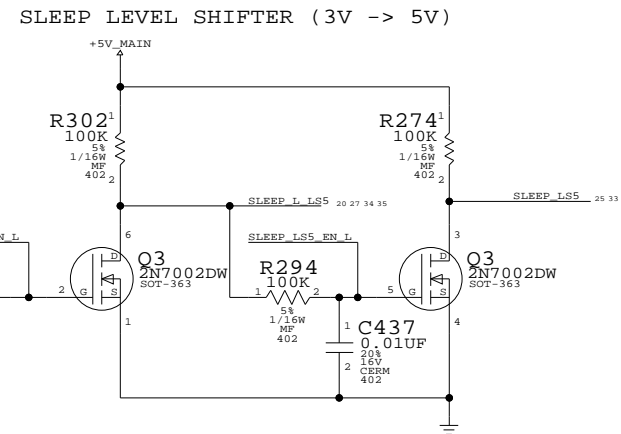
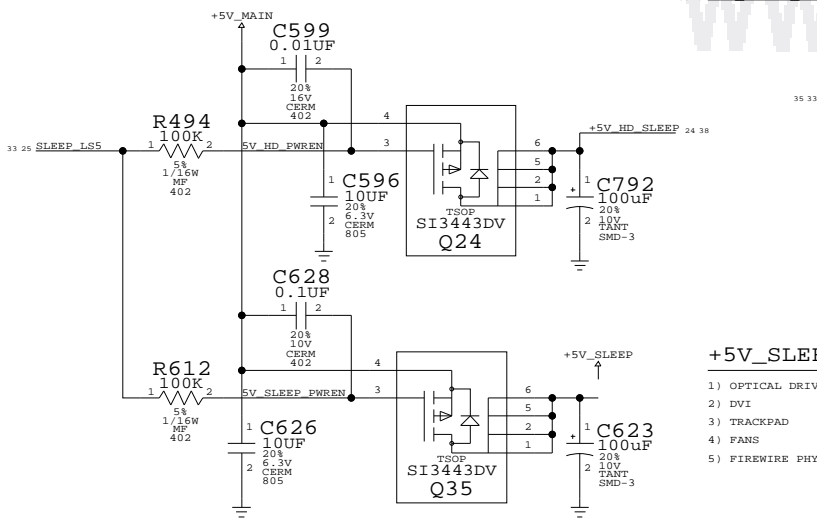
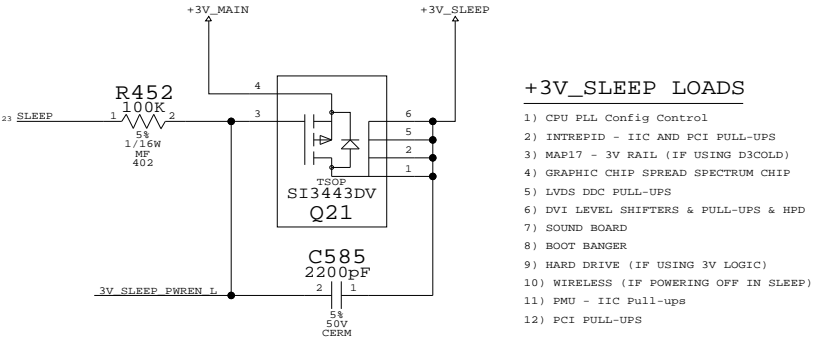


5V START TO TURN ON ~12.5MS AFTER DCDC_EN_L
 3V START TO TURN ON ~25MS AFTER DCDC_EN_L
 DIODE WILL ENSURE DCDC_EN_L IS QUICKLY DISCHARGED DURING SHUT-DOWN
 POWERDOWN DELAY IS AROUND 4MS-15.6MS

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

DCDC_EN TRUTH TABLE

PMU_POWER_UP_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



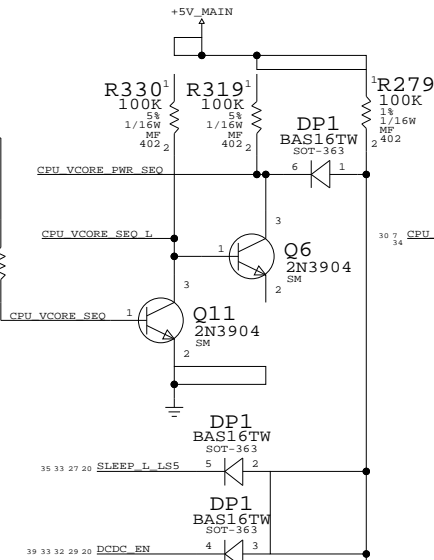
3.3V/5V REGULATOR

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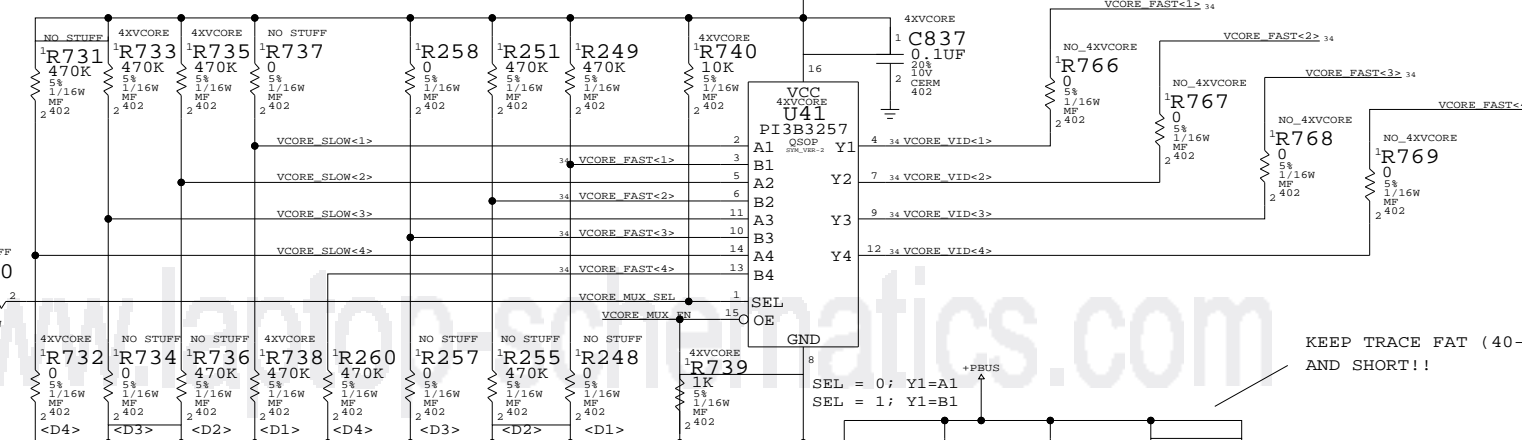
APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	33 44	
NONE			

VCORE POWER SEQUENCING

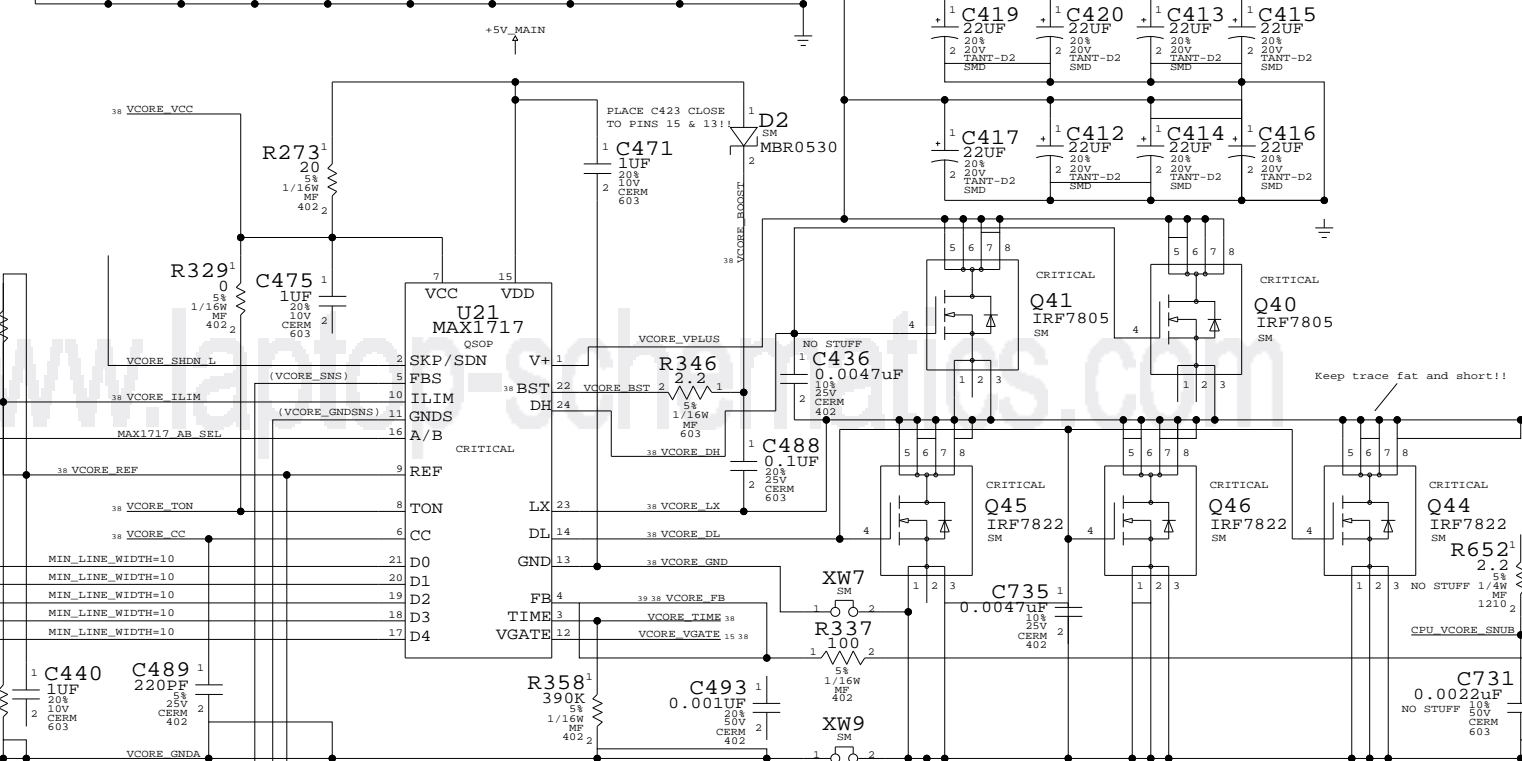
CPU core follows CPU I/O voltage
(approx. 7ms delay)



NEW 1.35V->1.30V 1GHZ@1.32V->667MHZ@1.145V



KEEP TRACE FAT (40-100 MILS) AND SHORT!!



OUTPUT VOLTAGE

V _{DAC}		D3	D2	D1	D0
D4=0	D4=1				
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 _n =	
	Hi/Fast	Lo/Slow
<= 1K PU	1	0
>= 100K PU	1	1
>= 100K PD	0	1
<= 1K PD	0	0

When A/B_n is high (fast): D4-D0 read as-is

When A/B_n is low (slow): <=1K-ohm -> 0

>=100K-ohm -> 1

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

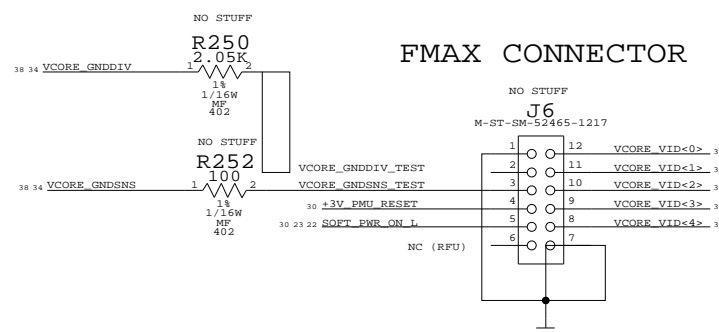
GROUND SENSE VOLTAGE DIVIDER

This allows for an offset to the ground sense to adjust the output voltage.
VREF = 2.0V, HENCE VOFFSET = 2.0V * (R1/(R1+R2)) AND VCORE = VDCA + VOFFSET.

PART #	QTY	DEVICE	PACKAGE	DESCRIPTION	VALUE	VOLT.	WATT.	TOL.	REFERENCE DESIGNATOR(S)	BOM OPTION	
116S1000	1	RES	0402	RES,MTL FILM,1/16W,0 OHM,5%,0402,SMD	0			1/16W	5%	R306	VCORE_NO_OFFSET

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

FMAX CONNECTOR

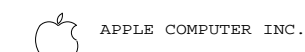


VCORE SUPPLY

NOTICE OF PROPRIETARY PROPERTY

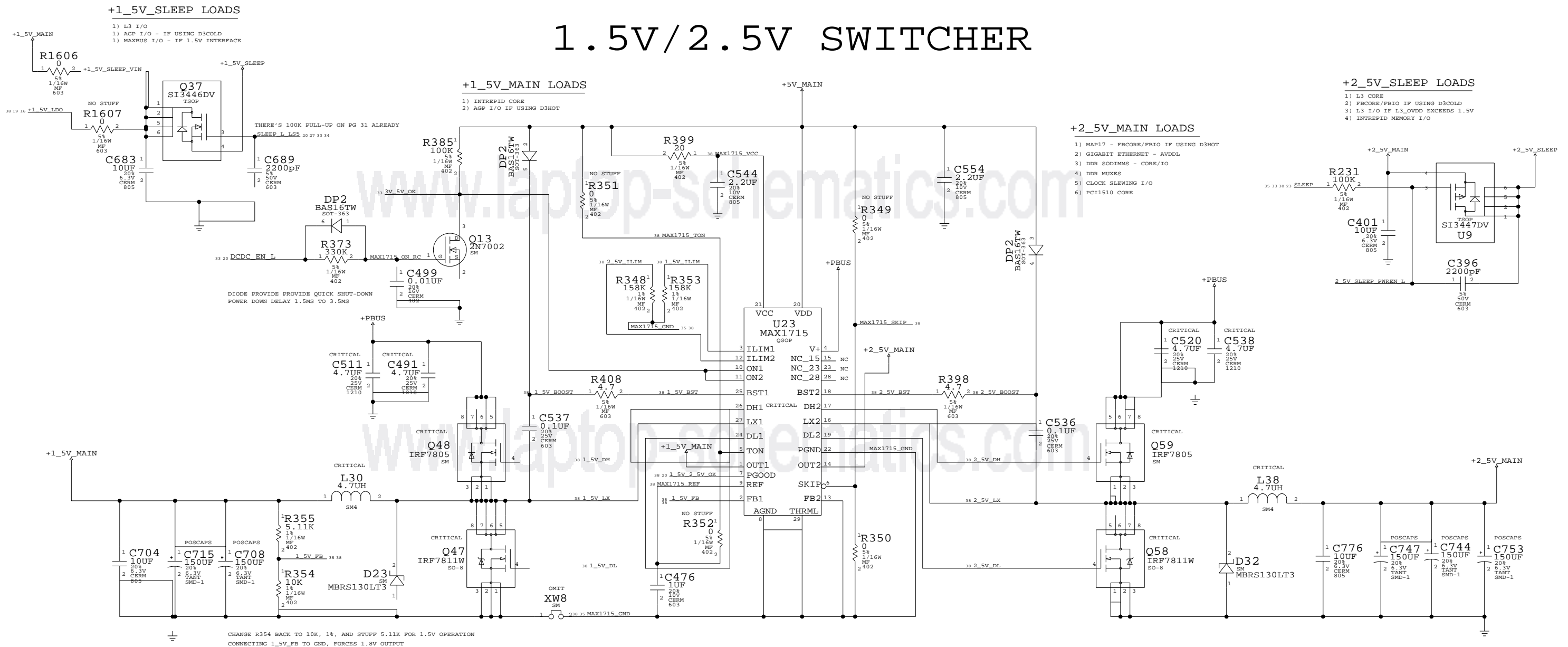
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SCALE NONE	SHT 34	DRAWING NUMBER 051-6425	REV. B

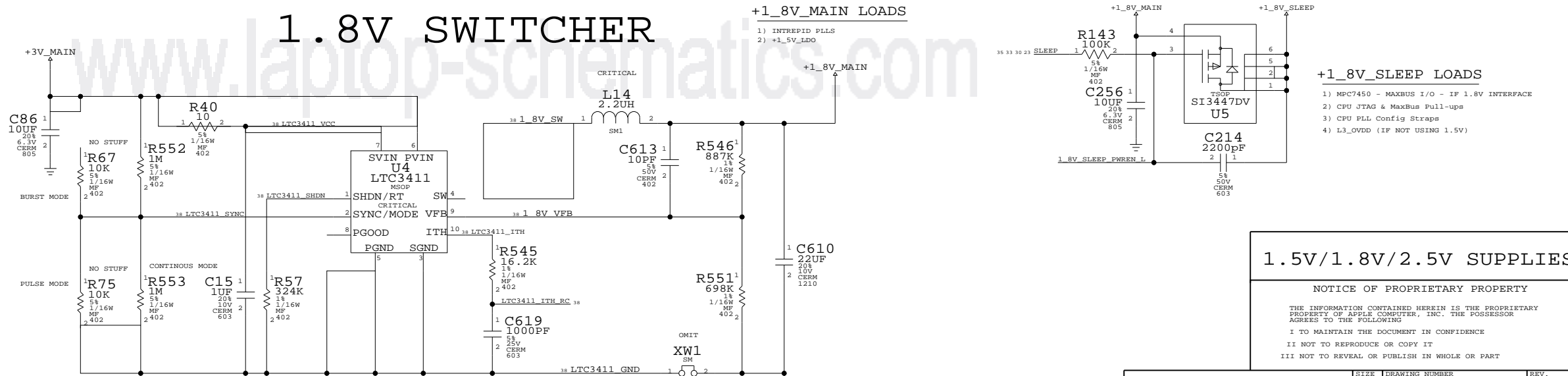


SIZE D	DRAWING NUMBER 051-6425	REV. B
SCALE NONE	SHT 34	OF 44

1.5V/2.5V SWITCHER



1.8V SWITCHER



1.5V/1.8V/2.5V SUPPLIES

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APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	35 44	
NONE			

Digital Signals (cont'd)

Table with columns: GROUP, SIG_NAME, DELAY_RULE, MAX_VIAS, MAX_EXPOSED_LENGTH, STUB_LENGTH, NET_SPACING_TYPE, NO_TEST, PULSE_PARAM. Rows include AGP, PCI, ULTRA ATA-100, EIDE INTREPID, OPTICAL, ETHERNET MII, and FIREWIRE MII.

Differential Signals

Table with columns: GROUP, SIG_NAME, DIFFERENTIAL_PAIR, MATCHED_DELAY, MAX_EXPOSED_LENGTH, NET_SPACING_TYPE, MAX_VIAS. Rows include ETHERNET, FIREWIRE, LVDS LOWER, LVDS UPPER, TMDS, USB, and POWER SUPPLIES.

INTERNAL LAYER
ER = 4.3 (DIELECTRIC CONSTANT)
W = 4MIL (TRACE WIDTH)
B = 12.2MIL (DIST BETW 2 GND PLANES)
T = 0.7MIL (TRACE THICKNESS)
S = 10MIL (SEPERATION OF DIFF TRACES)
ZSINGLE = 51.57OHM
ZDIFF = 99.8OHM

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


INTERNAL LAYER (USB1.1/USB 2.0)
ER = 4.3 (DIELECTRIC CONSTANT)
W = 4MIL(USB 1.1)/ 5MIL(USB 2.0) (TRACE WIDTH)
B = 12.2MIL (DIST BETW 2 GND PLANES)
T = 0.7MIL (TRACE THICKNESS)
S = 5MIL (USB 1.1) (SEPERATION OF DIFF TRACES)
S = 10MIL (USB 2.0) (SEPERATION OF DIFF TRACES)
ZSINGLE = 51.50HM (USB 1.1)/ 46.20HM (USB 2.0)
ZDIFF = 89.30HM (USB 1.1)/ 89.40HM (USB 2.0)

SIGNAL CONSTRAINTS - PAGE 2
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FUNCTIONAL TEST POINTS

	8	7	6	5	4	3	2	1
	FUNC_TEST=YES JTAG ASIC_TMS 14 27	FUNC_TEST=YES TMS_CONN_CLKP 22 37	FUNC_TEST=TRUE TV_C 22	FUNC_TEST=TRUE PCI_AD<7> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_PAR 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_CS0_L 24 37	FUNC_TEST=TRUE KBD_X<9> 23 30	FUNC_TEST=TRUE +5V_INV_SW 22 38
	FUNC_TEST=YES JTAG ASIC_TDI 14	FUNC_TEST=TRUE VGA_R 22	FUNC_TEST=TRUE TV_Y 22	FUNC_TEST=TRUE PCI_AD<8> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_CBE<0> 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_CS1_L 24 37	FUNC_TEST=TRUE KBD_Y<0> 23 30	FUNC_TEST=TRUE LEFT_USB_DM 24 26 37
	FUNC_TEST=TRUE JTAG ASIC_TDO_TP 27	FUNC_TEST=TRUE VGA_G 22	FUNC_TEST=TRUE TV_COMP 22	FUNC_TEST=TRUE PCI_AD<9> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_CBE<1> 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_RST_L 24 37	FUNC_TEST=TRUE KBD_Y<1> 23 30	FUNC_TEST=TRUE LEFT_USB_DP 24 26 37
	FUNC_TEST=TRUE JTAG ASIC_TCK 14 27	FUNC_TEST=TRUE VGA_B 22	FUNC_TEST=TRUE SND_TO_AUDIO 15 25	FUNC_TEST=TRUE PCI_AD<10> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_CBE<2> 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_WR_L 24 37	FUNC_TEST=TRUE KBD_Y<2> 23 30	FUNC_TEST=TRUE RIGHT_USB_DM 26 32 37
	FUNC_TEST=TRUE JTAG ASIC_TRST_L 14 27	FUNC_TEST=TRUE VGA_VSYNC 21 22	FUNC_TEST=TRUE SND_SYNC 15 25	FUNC_TEST=TRUE PCI_AD<11> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_CBE<3> 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_IOCHRDY 24 37	FUNC_TEST=TRUE KBD_Y<3> 23 30	FUNC_TEST=TRUE RIGHT_USB_DP 26 32 37
	FUNC_TEST=TRUE CPU_CHKSTP_OUT_L 5	FUNC_TEST=TRUE VGA_HSYNC 21 22	FUNC_TEST=TRUE SND_CLKOUT 15 25 36	FUNC_TEST=TRUE PCI_AD<12> 10 13 18 24 26 37	FUNC_TEST=TRUE AIRPORT_PCI_REQ_L 13 24	FUNC_TEST=TRUE EIDE_OPTICAL_INT 24 37	FUNC_TEST=TRUE KBD_Y<4> 23 30	FUNC_TEST=TRUE NEC_LEFT_USB_PWREN 24 26
	FUNC_TEST=TRUE CPU_HRESET_L 5	FUNC_TEST=TRUE DVI_DDC_CLK_UP 22	FUNC_TEST=TRUE SND_HP_MUTE_L 15 25	FUNC_TEST=TRUE PCI_AD<13> 10 13 18 24 26 37	FUNC_TEST=TRUE AIRPORT_PCI_GNT_L 13 24	FUNC_TEST=TRUE TPAD_F_TXD 23	FUNC_TEST=TRUE KBD_Y<5> 23 30	FUNC_TEST=TRUE NEC_LEFT_USB_OVERCURRENT 24 26
	FUNC_TEST=TRUE CPU_HRESET_L 5 7 23	FUNC_TEST=TRUE DVI_DDC_DATA_UP 22	FUNC_TEST=TRUE SND_AMP_MUTE_L 15 25	FUNC_TEST=TRUE PCI_AD<14> 10 13 18 24 26 37	FUNC_TEST=TRUE AIRPORT_PCI_INT_L 15 24	FUNC_TEST=TRUE TPAD_F_RXD 23	FUNC_TEST=TRUE KBD_Y<6> 23 30	FUNC_TEST=TRUE NEC_RIGHT_USB_PWREN 26 32
	FUNC_TEST=TRUE JTAG_CPU_TMS 5 23	FUNC_TEST=TRUE DVI_HPD_UP 22	FUNC_TEST=TRUE INT_AUDIO_TO_SND 15 25	FUNC_TEST=TRUE PCI_AD<15> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<0> 24 37	FUNC_TEST=TRUE LID_CLOSED_L 23	FUNC_TEST=TRUE KBD_Y<7> 23 30	FUNC_TEST=TRUE NEC_RIGHT_USB_OVERCURRENT 26 32
	FUNC_TEST=TRUE JTAG_CPU_TDI 5 23	FUNC_TEST=TRUE LVDS_L0N 20 22 37	FUNC_TEST=TRUE SND_SCLK 15 25 36	FUNC_TEST=TRUE PCI_AD<16> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<1> 24 37	FUNC_TEST=TRUE COMM_RESET_L 15 25	FUNC_TEST=TRUE KBD_NUMLOCK_LED 23	FUNC_TEST=TRUE DCDC_EN 20 29 32 33 34
	FUNC_TEST=TRUE JTAG_CPU_TDO_TP 5	FUNC_TEST=TRUE LVDS_L0P 20 22 37	FUNC_TEST=TRUE SND_HW_RESET_L 15 25	FUNC_TEST=TRUE PCI_AD<17> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<2> 24 37	FUNC_TEST=TRUE COMM_SHUTDOWN 15 25	FUNC_TEST=TRUE +BATT_POS 31 38	FUNC_TEST=TRUE BBANG_HRESET_L 23
	FUNC_TEST=TRUE JTAG_CPU_TCK 5 23	FUNC_TEST=TRUE LVDS_L1N 20 22 37	FUNC_TEST=TRUE SND_HP_SENSE_L 15 25	FUNC_TEST=TRUE PCI_AD<18> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<3> 24 37	FUNC_TEST=TRUE COMM_RING_DET_L 15 25 30	FUNC_TEST=TRUE BATT_CLK 31	FUNC_TEST=TRUE LT1962_L3_ADJ 6
	FUNC_TEST=TRUE JTAG_CPU_TEST_L 5 23	FUNC_TEST=TRUE LVDS_L1P 20 22 37	FUNC_TEST=TRUE SND_L1N_SENSE_L 15 25	FUNC_TEST=TRUE PCI_AD<19> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<4> 24 37	FUNC_TEST=TRUE KBD_ID 23 30	FUNC_TEST=TRUE BATT_DATA 31	FUNC_TEST=TRUE MAIN_RESET_L 18 19 21 24 26 30
	FUNC_TEST=TRUE JTAG_L3_TMS 8	FUNC_TEST=TRUE LVDS_L2N 20 22 37	FUNC_TEST=TRUE INT_I2C_DATA2 15 25	FUNC_TEST=TRUE PCI_AD<20> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<5> 24 37	FUNC_TEST=TRUE +5V_TPAD_SLEEP 23 38	FUNC_TEST=TRUE BATT_NEG 31 38	FUNC_TEST=TRUE RF_DISABLE_L_SFEN 24
	FUNC_TEST=TRUE JTAG_L3_TDI_TP 8	FUNC_TEST=TRUE LVDS_L2P 20 22 37	FUNC_TEST=TRUE INT_I2C_CLK2 15 25	FUNC_TEST=TRUE PCI_AD<21> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<6> 24 37	FUNC_TEST=TRUE +3V_HALL_EFFECT 23 38	FUNC_TEST=TRUE PMU_BATT_DET_L 10 31	FUNC_TEST=TRUE AIRPORT_CLKREQN_L 24
	FUNC_TEST=TRUE JTAG_L3_TDO_TP 8	FUNC_TEST=TRUE CLKLVDS_LN 20 22 37	FUNC_TEST=TRUE USB_D1M 15 26	FUNC_TEST=TRUE PCI_AD<22> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<7> 24 37	FUNC_TEST=TRUE KBD_CAPSLOCK_LED 23	FUNC_TEST=TRUE FAN1_GND 25 38	FUNC_TEST=TRUE ROM_RM_L 10 13 24
	FUNC_TEST=TRUE JTAG_L3_TCK 8	FUNC_TEST=TRUE CLKLVDS_LP 20 22 37	FUNC_TEST=TRUE USB_D1P 15 26	FUNC_TEST=TRUE PCI_AD<23> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<8> 24 37	FUNC_TEST=TRUE KBD_FUNCTION_L 23 30	FUNC_TEST=TRUE FAN1_TACH 25	FUNC_TEST=TRUE ROM_ONBOARD_CS_L 10 24
	FUNC_TEST=TRUE INT_I2C_CLK0 12 14 23	FUNC_TEST=TRUE LVDS_U0N 20 22 37	NO LONGER NEEDED BY TEST GROUP FUNC_TEST=TRUE USB_D2M 15 26	FUNC_TEST=TRUE PCI_AD<24> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<9> 24 37	FUNC_TEST=TRUE KBD_CONTROL_L 23 30	FUNC_TEST=TRUE FAN2_GND 25 38	FUNC_TEST=TRUE ROM_CS_L 10 13 24
	FUNC_TEST=TRUE INT_I2C_DATA0 12 14 23	FUNC_TEST=TRUE LVDS_U0P 20 22 37	FUNC_TEST=TRUE USB_D2P 15 26	FUNC_TEST=TRUE PCI_AD<25> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<10> 24 37	FUNC_TEST=TRUE KBD_COMMAND_L 23 30	FUNC_TEST=TRUE FAN2_TACH 25	FUNC_TEST=TRUE CLK33M_AIRPORT 13 24 36
	FUNC_TEST=TRUE INT_I2C_CLK1 14 15 25	FUNC_TEST=TRUE LVDS_U1N 20 22 37	FUNC_TEST=TRUE BT_USB_DM 15 24 37	FUNC_TEST=TRUE PCI_AD<26> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<11> 24 37	FUNC_TEST=TRUE KBD_OPTION_L 23 30	FUNC_TEST=TRUE RJ45_DP<0> 27 37	FUNC_TEST=TRUE AIRPORT_IDSEL 24
	FUNC_TEST=TRUE INT_I2C_DATA1 14 15 25	FUNC_TEST=TRUE LVDS_U1P 20 22 37	FUNC_TEST=TRUE BT_USB_DP 15 24 37	FUNC_TEST=TRUE PCI_AD<27> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<12> 24 37	FUNC_TEST=TRUE KBD_SHIFT_L 23 30	FUNC_TEST=TRUE RJ45_DN<0> 27 37	FUNC_TEST=TRUE ROM_OE_L 10 13 24
	FUNC_TEST=TRUE CBUS_DET_1_L 18	FUNC_TEST=TRUE LVDS_U2N 20 22 37	FUNC_TEST=TRUE MODEM_USB_DM 15 25 37	FUNC_TEST=TRUE PCI_AD<28> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<13> 24 37	FUNC_TEST=TRUE KBD_X<0> 23 30	FUNC_TEST=TRUE RJ45_DP<1> 27 37	FUNC_TEST=TRUE +24V_PBUS 38
	FUNC_TEST=TRUE CBUS_DET_2_L 18	FUNC_TEST=TRUE LVDS_U2P 20 22 37	FUNC_TEST=TRUE MODEM_USB_DP 15 25 37	FUNC_TEST=TRUE PCI_AD<29> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<14> 24 37	FUNC_TEST=TRUE KBD_X<1> 23 30	FUNC_TEST=TRUE RJ45_DN<1> 27 37	FUNC_TEST=TRUE GPU_VCORE 20 38
	FUNC_TEST=TRUE TMS_DP<0> 20 21 22 37	FUNC_TEST=TRUE CLKLVDS_UN 20 22 37	FUNC_TEST=TRUE PCI_AD<0> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_AD<30> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DATA<15> 24 37	FUNC_TEST=TRUE KBD_X<2> 23 30	FUNC_TEST=TRUE RJ45_DP<2> 27 37	FUNC_TEST=TRUE CPU_VCORE_SLEEP 5 34 38
	FUNC_TEST=TRUE TMS_DP<0> 20 21 22 37	FUNC_TEST=TRUE CLKLVDS_UP 20 22 37	FUNC_TEST=TRUE PCI_AD<1> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_AD<31> 10 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DMA_REQ 24 36 24 37	FUNC_TEST=TRUE KBD_X<3> 23 30	FUNC_TEST=TRUE RJ45_DN<2> 27 37	FUNC_TEST=TRUE VCORE_FB 34 38
	FUNC_TEST=TRUE TMS_DN<1> 20 21 22 37	FUNC_TEST=TRUE LVDS_DDC_CLK 20 22	FUNC_TEST=TRUE PCI_AD<2> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_FRAME_L 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_RD_L 24 36 24 37	FUNC_TEST=TRUE KBD_X<4> 23 30	FUNC_TEST=TRUE RJ45_DP<3> 27 37	FUNC_TEST=TRUE +1_RV_MAIN 38
	FUNC_TEST=TRUE TMS_DP<1> 20 21 22 37	FUNC_TEST=TRUE LVDS_DDC_DATA 20 22	FUNC_TEST=TRUE PCI_AD<3> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_TRDY_L 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_DMAACK_L 24 36 24 37	FUNC_TEST=TRUE KBD_X<5> 23 30	FUNC_TEST=TRUE RJ45_DN<3> 27 37	FUNC_TEST=TRUE +3V_PMU 38
	FUNC_TEST=TRUE TMS_DN<2> 20 21 22 37	FUNC_TEST=TRUE BRIGHT_PWM 22	FUNC_TEST=TRUE PCI_AD<4> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_TRDY_L 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_ADDR<0> 24 37	FUNC_TEST=TRUE KBD_X<6> 23 30	FUNC_TEST=TRUE RJ45_DN<4> 27 37	FUNC_TEST=TRUE +5V_DDC_SLEEP 22 38
	FUNC_TEST=TRUE TMS_DP<2> 20 21 22 37	FUNC_TEST=TRUE TV_GND1 22 38	FUNC_TEST=TRUE PCI_AD<5> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_DEVSEL_L 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_ADDR<1> 24 37	FUNC_TEST=TRUE KBD_X<7> 23 30	FUNC_TEST=TRUE FW_TPOOR 29 38	FUNC_TEST=TRUE +12_RV_INV 22 38
	FUNC_TEST=TRUE TMS_CONN_CLKN 22 37	FUNC_TEST=TRUE TV_GND2 22 38	FUNC_TEST=TRUE PCI_AD<6> 10 13 18 24 26 37	FUNC_TEST=TRUE PCI_STOP_L 13 18 24 26 37	FUNC_TEST=TRUE EIDE_OPTICAL_ADDR<2> 24 37	FUNC_TEST=TRUE KBD_X<8> 23 30		

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 APPLE COMPUTER INC.	SIZE	DRAWING NUMBER	REV.
	D	051-6425	B
SCALE	SHT	39 OF 44	
NONE			

8 7 6 5 4 3 2 1

USB_DM	1582	15C2	3782	
USB_DP	1582	15C2	3782	
USB_DPM	1582	3782		
USB_DPP	1582	3782		
USB_OC_AH_L	1582	15C7		
USB_OC_CD_L	1582	15C7		
USB_OC_EP_L	1582	15C7		
USB_PWRAN_AH_L	1582	15C7		
USB_PWRAN_CD_L	1582	15C7		
USB_PWRAN_EP_L	1582	15D7		
VOORE_BOOT	34C4	38C1		
VOORE_BUT	34C5	38C1		
VOORE_CC	3486	38B1		
VOORE_DH	3485	38C1		
VOORE_DL	3485	38C1		
VOORE_FAST4.1*	34D2	34D3	34D5	
VOORE_FP	3485	38B1	38A2	
VOORE_GND	3485	38B1		
VOORE_GND_A	3486			
VOORE_GNDIV	3445	3485	38B1	
VOORE_GNDIV_TEST	3444			
VOORE_GNDIBS	3441	3444	38B1	
VOORE_GNDING_TEST	3444			
VOORE_ILIM	34C6	38C1		
VOORE_LX	3485	38C1		
VOORE_MX_BN	34D5			
VOORE_MX_SEL	34D5			
VOORE_PEP	3486	38C1		
VOORE_SHEN_L	34C6			
VOORE_SLOW4.1*	34D6			
VOORE_SNS	3443	38B1		
VOORE_TDR	3486	38C1		
VOORE_VCC	34C6	38C1		
VOORE_VGATE	1585	15B7	34B4	38B1
VOORE_VID4.0*	34A3	34B8	34D4	
VGA_B	22C5	22D7	39D7	
VGA_G	22C5	22D7	39D7	
VGA_HSYNC	21D4	22C6	39D7	
VGA_R	22C5	22D7	39D7	
VGA_VSYNC	21D4	22C5	39D7	
VIPPCLA_PD	19C2			

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	D	051-6425	B
SCALE	SHEET		
NONE	42 OF		44

8 7 6 5 4 3 2 1

	8	7	6	5	4	3	2	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	<p>*** Unit Cross-Reference *** --- For this entire design ---</p> <table border="1"> <tr> <td>801 PCB_STANDOFF 403</td> <td>C167 CAP 1783</td> <td>C336 CAP 1708</td> <td>C508 CAP 2826</td> <td>C676 CAP 2247</td> <td>C844 CAP 2103</td> <td>C16 TRA_S144350V 3102</td> <td>C21 TRA_2070020M 2307 3146</td> <td></td> </tr> <tr> <td>C2 CAP 3402</td> <td>C168 CAP 1702</td> <td>C337 CAP 2187</td> <td>C509 CAP 2827</td> <td>C677 CAP 2247</td> <td>C845 CAP 2103</td> <td>C17 TRA_2070020M 2307 3146</td> <td>C22 TRA_2070020M 2307 3146</td> <td></td> </tr> <tr> <td>C3 CAP 3401</td> <td>C169 CAP 1702</td> <td>C338 CAP 2105</td> <td>C510 CAP 2808</td> <td>C678 CAP 2248</td> <td>C846 CAP 2102</td> <td>C18 TRA_2070020M 2307 3146</td> <td>C23 TRA_2070020M 2307 3146</td> <td></td> </tr> <tr> <td>C4 CAP 3402</td> <td>C170 CAP 1904</td> <td>C339 CAP 2084</td> <td>C511 CAP 2807</td> <td>C679 CAP 2247</td> <td>C847 CAP 2102</td> <td>C19 TRA_2070020M 2307 3146</td> <td>C24 TRA_2070020M 2307 3146</td> <td></td> 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C11 CAP 1704	C177 CAP 1401	C346 CAP 1785	C518 CAP 2807	C686 CAP 2248	C854 CAP 2201	C26 TRA_2070020M 2307 3146	C31 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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C13 CAP 1704	C179 CAP 603	C348 CAP 1786	C520 CAP 2807	C688 CAP 2247	C856 CAP 2201	C28 TRA_2070020M 2307 3146	C33 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C14 CAP 1704	C180 CAP 1704	C349 CAP 1786	C521 CAP 2807	C689 CAP 2248	C857 CAP 2201	C29 TRA_2070020M 2307 3146	C34 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C15 CAP 1704	C181 CAP 1708	C350 CAP 1786	C522 CAP 2807	C690 CAP 2248	C858 CAP 2201	C30 TRA_2070020M 2307 3146	C35 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C16 CAP 1704	C182 CAP 1707	C351 CAP 2184	C523 CAP 2884	C691 CAP 2247	C859 CAP 2201	C31 TRA_2070020M 2307 3146	C36 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C17 CAP 1704	C183 CAP 1905	C352 CAP 2107	C524 CAP 2107	C692 CAP 2248	C860 CAP 2201	C32 TRA_2070020M 2307 3146	C37 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C18 CAP 1704	C184 CAP 1706	C353 CAP 2106	C525 CAP 2106	C693 CAP 2248	C861 CAP 2201	C33 TRA_2070020M 2307 3146	C38 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C19 CAP 1704	C185 CAP 1701	C354 CAP 2045	C526 CAP 2182	C694 CAP 2248	C862 CAP 2201	C34 TRA_2070020M 2307 3146	C39 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C20 CAP 1704	C186 CAP 1702	C355 CAP 1703	C527 CAP 2181	C695 CAP 2248	C863 CAP 2201	C35 TRA_2070020M 2307 3146	C40 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C21 CAP 1704	C187 CAP 1703	C356 CAP 1783	C528 CAP 2106	C696 CAP 2248	C864 CAP 2201	C36 TRA_2070020M 2307 3146	C41 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C22 CAP 1704	C188 CAP 1703	C357 CAP 1705	C529 CAP 2104	C697 CAP 2248	C865 CAP 2201	C37 TRA_2070020M 2307 3146	C42 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C23 CAP 1704	C189 CAP 1703	C358 CAP 1705	C530 CAP 2104	C698 CAP 2248	C866 CAP 2201	C38 TRA_2070020M 2307 3146	C43 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C24 CAP 1704	C190 CAP 1702	C359 CAP 2107	C531 CAP 2806	C699 CAP 2247	C867 CAP 2201	C39 TRA_2070020M 2307 3146	C44 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C25 CAP 1704	C191 CAP 1702	C360 CAP 2107	C532 CAP 2104	C700 CAP 2247	C868 CAP 2201	C40 TRA_2070020M 2307 3146	C45 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C26 CAP 1704	C192 CAP 1702	C361 CAP 2046	C533 CAP 2102	C701 CAP 2247	C869 CAP 2201	C41 TRA_2070020M 2307 3146	C46 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C27 CAP 1704	C193 CAP 1705	C362 CAP 2046	C534 CAP 2105	C702 CAP 2247	C870 CAP 2201	C42 TRA_2070020M 2307 3146	C47 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C28 CAP 1704	C194 CAP 1705	C363 CAP 2046	C535 CAP 2104	C703 CAP 2247	C871 CAP 2201	C43 TRA_2070020M 2307 3146	C48 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C29 CAP 1704	C195 CAP 1905	C364 CAP 1786	C536 CAP 2103	C704 CAP 2247	C872 CAP 2201	C44 TRA_2070020M 2307 3146	C49 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C30 CAP 1704	C196 CAP 2005	C365 CAP 1785	C537 CAP 2106	C705 CAP 2247	C873 CAP 2201	C45 TRA_2070020M 2307 3146	C50 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C31 CAP 1704	C197 CAP 1905	C366 CAP 1787	C538 CAP 2106	C706 CAP 2247	C874 CAP 2201	C46 TRA_2070020M 2307 3146	C51 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C32 CAP 1704	C198 CAP 2004	C367 CAP 1786	C539 CAP 2105	C707 CAP 2247	C875 CAP 2201	C47 TRA_2070020M 2307 3146	C52 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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C39 CAP 1704	C205 CAP 1706	C374 CAP 1708	C546 CAP 2806	C714 CAP 2247	C882 CAP 2201	C54 TRA_2070020M 2307 3146	C59 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C40 CAP 1704	C206 CAP 1702	C375 CAP 2041	C547 CAP 2041	C715 CAP 2247	C883 CAP 2201	C55 TRA_2070020M 2307 3146	C60 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C41 CAP 1704	C207 CAP 1702	C376 CAP 2041	C548 CAP 2041	C716 CAP 2247	C884 CAP 2201	C56 TRA_2070020M 2307 3146	C61 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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C46 CAP 1704	C212 CAP 2005	C381 CAP 1786	C553 CAP 2102	C721 CAP 2247	C889 CAP 2201	C61 TRA_2070020M 2307 3146	C66 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C47 CAP 1704	C213 CAP 1704	C382 CAP 1786	C554 CAP 2102	C722 CAP 2247	C890 CAP 2201	C62 TRA_2070020M 2307 3146	C67 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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C56 CAP 1704	C222 CAP 1704	C391 CAP 2082	C563 CAP 2802	C731 CAP 2247	C899 CAP 2201	C71 TRA_2070020M 2307 3146	C76 TRA_2070020M 2307 3146																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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