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.

SCHEM,DC-IN/LT USB,PB17"
07/24/03

REV	ZONE	ECN	DESCRIPTION OF CHANGE	CK APPD / DATE	ENG APPD / DATE
B		285243	PRODUCTION RELEASED	07/25/03?	

PAGE CONTENTS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-6474	1	SCHEM,DC-IN/LT USB,PB17INCH	SCH1	
820-1536	1	PCBF,DC-IN/LT USB,PB17INCH	PCB1	

DIMENSIONS ARE IN MILLIMETERS
XX ±
X.XX ±
X.XXX ±
ANGLES °
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

METRIC

DRAFTER		DESIGN CK	
ENG APPD		MFG APPD	
QA APPD		DESIGNER	
RELEASE		SCALE	NONE

MATERIAL/FINISH NOTED AS APPLICABLE

SIZE D

Apple Computer Inc.

TITLE
SCHEM,DC-IN/LT USB,PB17INCH

DRAWING NUMBER 405685
REV. AA
SHT 1 OF 8

PCB SPECS

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

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

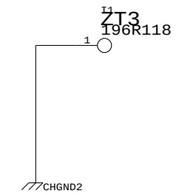
SEE PCB CAD FILES FOR MORE SPECIFIC INFO.

BOARD STACK-UP AND CONSTRUCTION

20R10 TH VIA OR VIA IN PAD

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

BOARD HOLES



PCB BOARD STANDOFFS

BOARD INFORMATION

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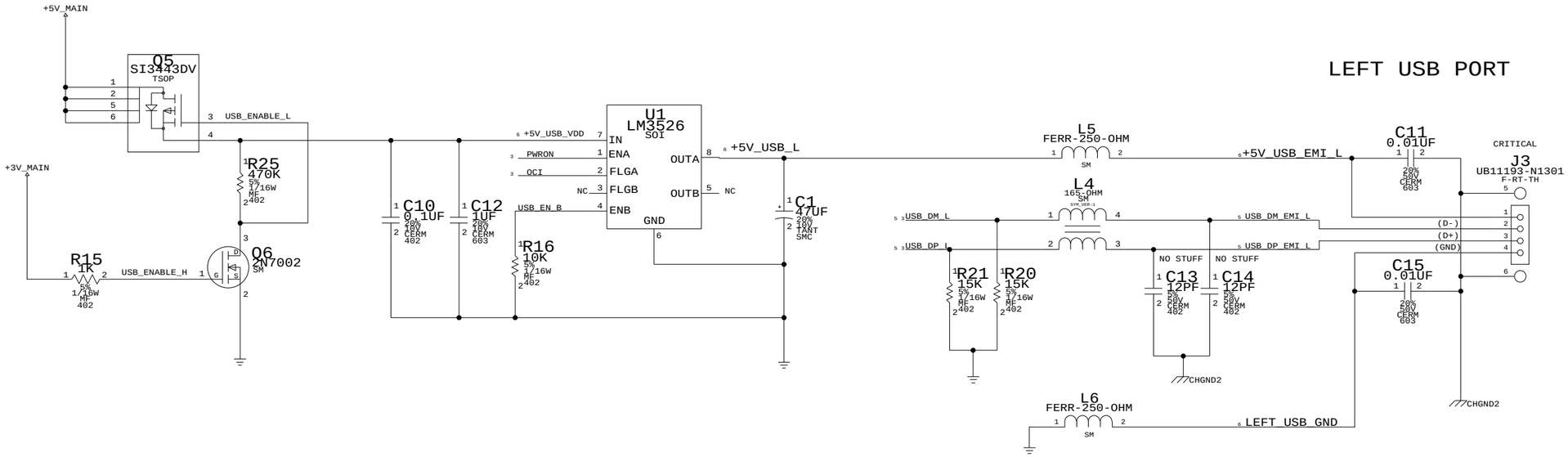
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	405685	. AA

SCALE NONE SHT 2 OF 8



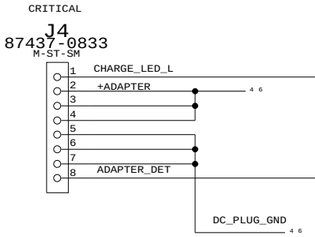
USB & ALS

APPLE COMPUTER INC.

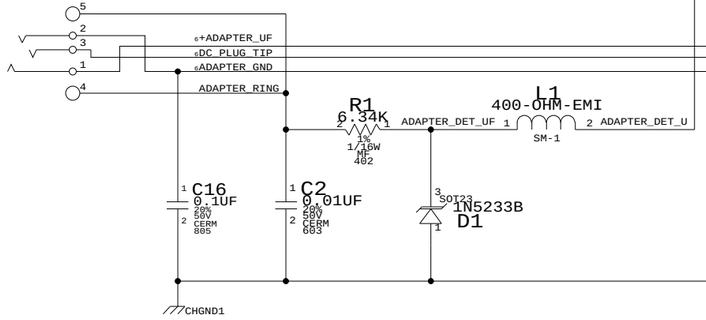
SIZE	DRAWING NUMBER	REV.
D	405685	AA

SCALE	SHT	OF
NONE	3	8

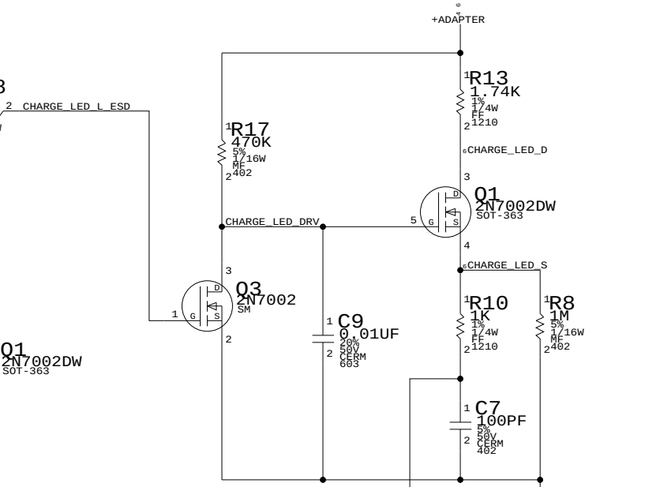
POWER CONNECTOR



DC POWER JACK



CHARGE LED SUPPORT



PLACE C2, C3 AND C16 CLOSE TO J1

PLACE L1, L2 AND L3 CLOSE TO J1

DC POWER INTERFACE

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APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	405685	AA
SCALE: NONE	SHT 4 OF 8	

REVISION HISTORY

04/22/03 - DESIGN ORIGINATED FROM 051-6282
04/28/03 - PG 3 - REPLACED R19 & R23 WITH 250-OHM 2A FERRITES (TABLE ITEM)
PG 4 - CHANGED C3 TO 0.1UF 0805 (WAS 0.01UF 0603)
REPLACED R2 WITH C16 0.1UF 0805 (WAS 0-OHM 0402)
EVT 04/29/03 - PG 4 - REPLACED R19 & R23 WITH L5 & L6 (PAD CHANGE FOR FERRITES)
CHANGED L2 & L3 FROM 50-OHM FERRITES TO 160-OHM
07/24/03 - PRODUCTION RELEASE

Differential Signals

GROUP	SIG_NAME	DIFFERENTIAL_PAIR	MATCHED_DELAY	MIN_LINE_WIDTH	NET_SPACING_TYPE		MAX_VIAS
USB							
	USB_DM_L	USB_D1	USB_DM:J1.4:L4.1:20	MIN_LINE_WIDTH=5	10 MIL SPACING		3
	USB_DP_L	USB_D1	USB_DP:J1.3:L4.2:20	MIN_LINE_WIDTH=5	10 MIL SPACING		3
	USB_DM_EMI_L	USB_D1_EMI	USB_D1_EMI:L4.4:J3.2:20	MIN_LINE_WIDTH=5	10 MIL SPACING		3
	USB_DP_EMI_L	USB_D1_EMI	USB_D1_EMI:L4.3:J3.3:20	MIN_LINE_WIDTH=5	10 MIL SPACING		3

FOR USB DIFFERENTIAL TRACES (ZSINGLE=45 OHM +- 10%,ZDIFF=90 OHM +- 15%)		
	MICROSTRIP (OUTER LAYERS)	STRIPLINE (INTERNAL LAYERS)
TRACE WIDTH	4 MIL	5 MIL
SEPARATION OF TRACES	8 MIL	10 MIL

ALS SIGNALS

GROUP	SIG_NAME	DELAY_RULE	MATCHED DELAY	STUB_LENGTH	MIN_LINE_WIDTH	NET_SPACING_TYPE
ALS						
	3 LIGHT_SENSOR				MIN_LINE_WIDTH=20	
	3 GAIN_SETTING1				MIN_LINE_WIDTH=20	
	3 MAX4236_IN+				MIN_LINE_WIDTH=20	
	3 MAX4236_IN-				MIN_LINE_WIDTH=20	
	3 MAX4236_OUT				MIN_LINE_WIDTH=20	
	3 ALS_GAIN				MIN_LINE_WIDTH=5	
	3 ALS_OUT				MIN_LINE_WIDTH=10	

SIGNAL CONSTRAINTS - PAGE 3

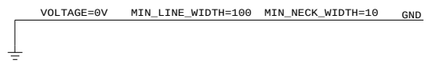
APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	405685	AA

SCALE NONE | SHT 5 OF 8

POWER NET CONSTRAINTS

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH
ADAPTER	+5V_MAIN	VOLTAGE=5V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+3V_MAIN	VOLTAGE=3.3V	MIN_LINE_WIDTH=25	MIN_NECK_WIDTH=10
	+ADAPTER_UF	VOLTAGE=24V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=10 4
	+ADAPTER_FUSE	VOLTAGE=24V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=10 4
	+ADAPTER	VOLTAGE=24V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=10 4
	ADAPTER_GND	VOLTAGE=0V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=10 4
	CHARGE_LED_D	VOLTAGE=	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 4
	CHARGE_LED_S	VOLTAGE=	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 4
	DC_PLUG_TIP	VOLTAGE=	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 4
	DC_PLUG_GND	VOLTAGE=0V	MIN_LINE_WIDTH=100	MIN_NECK_WIDTH=10 4
USB	+5V_USB_VDD	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 3
	+5V_USB_L	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 3
	+5V_USB_EMI_L	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 3
	LEFT_USB_GND	VOLTAGE=0V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10 3



SIGNAL CONSTRAINTS - PAGE 4

APPLE COMPUTER INC.

SIZE	DRAWING NUMBER	REV.
D	405685	AA

SCALE	SHT	OF
NONE	6	8

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

+3V_MAIN	6D6>
+5V_MAIN	6D6>
+5V_USB_EMI_L	3C3<> 6C6>
+5V_USB_L	3D5<> 6C6>
+5V_USB_VDD	3D6<> 6C6>
+ADAPTER	4B3< 4C3< 4C5< 4C7<> 6D6>
+ADAPTER_FUSE	4B4< 6D6>
+ADAPTER_UF	4B6<> 6D6>
ADAPTER_DET	4C7<>
ADAPTER_DET_F	4C6<>
ADAPTER_DET_G	4C6<>
ADAPTER_DET_U	4B5<>
ADAPTER_DET_UF	4B6<>
ADAPTER_GND	4B6<> 6C6>
ADAPTER_RING	4B6<>
ALS_GAIN	3B4<> 5C8<
ALS_OUT	3B3<> 5C8<
CHARGE_LED_D	4C3<> 6C6>
CHARGE_LED_DRV	4C4<>
CHARGE_LED_L	4C7<>
CHARGE_LED_L_ESD	4C5<
CHARGE_LED_S	4C3<> 6C6>
DC_PLUG_GND	4B3< 4B5< 4C6<> 6C6>
DC_PLUG_TIP	4B6<> 6C6>
GAIN_SETTING1	3A7<> 5C8<
LEFT_USB_GND	3C3<> 6C6>
LIGHT_SENSOR	3B7<> 5C8<
MAX4236_IN+	3B5< 5C8<
MAX4236_IN-	3B5< 5C8<
MAX4236_OUT	3B5<> 5C8<
OCI	3B4<> 3C6>
PWRON	3B4<> 3C6<
USB_DM_EMI_L	3C3<> 5D2>
USB_DM_L	3B4<> 3C4<> 5D2>
USB_DP_EMI_L	3C3<> 5D2>
USB_DP_L	3B3<> 3C4<> 5D2>
USB_ENABLE_H	3C8<
USB_ENABLE_L	3D7<>
USB_EN_B	3C6<

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

C1	CAP_P	3
C2	CAP	4
C3	CAP	4
C4	CAP	3
C5	CAP	3
C6	CAP	3
C7	CAP	4
C8	CAP	4
C9	CAP	4
C10	CAP	3
C11	CAP	3
C12	CAP	3
C13	CAP	3
C14	CAP	3
C15	CAP	3
C16	CAP	4
D1	ZENER	4
F1	FUSE	4
J1	CON_F3RT_S2MT_TH3	4
J2	CON_F12ST_D4MT_SM1	3
J3	CON_F4RT_S2MT_TH	3
J4	CON_MOST_S_SM	4
L1	IND	4
L2	IND	4
L3	IND	4
L4	FILTER_4P	3
L5	IND	3
L6	IND	3
PD1	PHOTODIODE_2P	3
Q1	TRA_2N7002DW	4
Q3	TRA_2N7002	4
Q4	TRA_2N7002DW	3
Q5	TRA_SI3443DV	3
Q6	TRA_2N7002	3
R1	RES	4
R3	RES	3
R4	RES	3
R5	RES	3
R6	RES	3
R7	RES	3
R8	RES	4
R10	RES	4
R11	RES	4
R12	RES	4
R13	RES	4
R15	RES	3
R16	RES	3
R17	RES	4
R18	RES	4
R20	RES	3
R21	RES	3
R22	RES	4
R24	RES	3
R25	RES	3
U1	LM3526	3
U2	OPAMP_MAX423GEUTT	3
ZT3	MTGHOLE	2