

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	ECN	DESCRIPTION OF REVISION	CK APPD	DATE
				2011-04-18

# SCHEM, PCB, LIO, K21

EVT, 2011-4-14

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ALTERNATIVE PARTS

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S0660	155S0513		ALL	TDK ALT TO MURATA
155S0661	155S0511		ALL	TDK ALT TO MURATA
155S0694	155S0387		ALL	TDK ALT TO MURATA

Schematic / PCB #'s

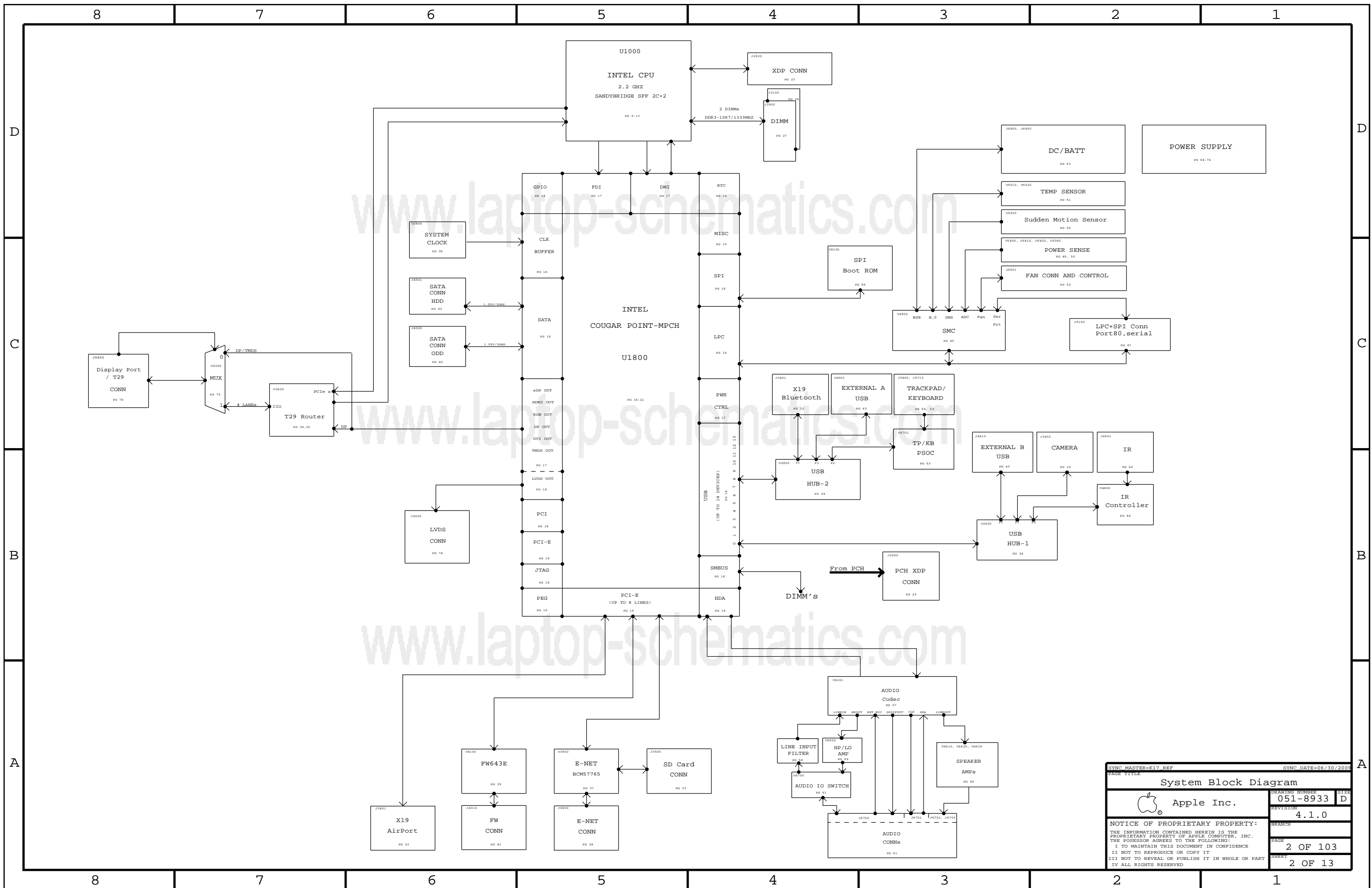
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
051-8933	1	SCHEM, PCB, LIO, K21	SCH	CRITICAL	
820-3057	1	PCBF, LIO, K21	PCB	CRITICAL	
825-7563	1	LABEL, LIO, K21/K78	[EEEE_DK6V]	CRITICAL	
946-3092	1	LIO LOCTITE UV EB 0.07, K21	UV_GLUE	CRITICAL	

BOM: 639-1796 PCBA, LIO, K21  
 MCO: 056-4170 MCO, LIO, K21

PRODUCT SAFETY REQUIREMENTS:

PCB, UL RECOGNIZED, MIN. 130-C TEMP. RATING AND V-0 FLAME RATING PER UL 796 & UL 94.  
 PCB TO BE SILK-SCREENED WITH UL/CUL RECOGNITION MARK, MANUFACTURER'S UL FILE NUMBER, UL PCB MATERIAL DESIGNATION, 130-C TEMP. RATING AND V-0 FLAME RATING.

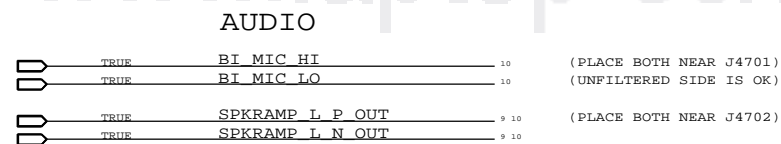
DRAWING TITLE		SCHEM, PCB, LIO, K21	
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REVISION		4.1.0	
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System Block Diagram			
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		REVISION	4.1.0
		PAGE	2 OF 103
		SHEET	2 OF 13


# Functional Test Points

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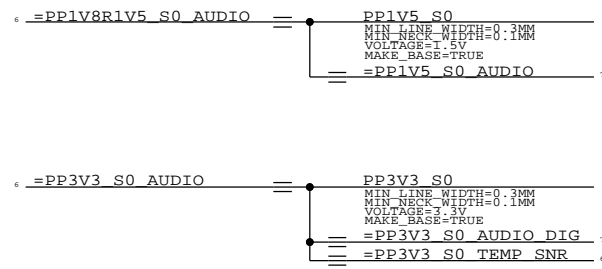


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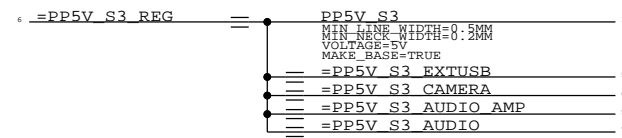
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SYNC_MASTER=(K6_MLB)		SYNC_DATE=(12/11/2009)	
<b>FUNC TEST</b>			
 Apple Inc.		DRAWING NUMBER	051-8933
		REVISION	4.1.0
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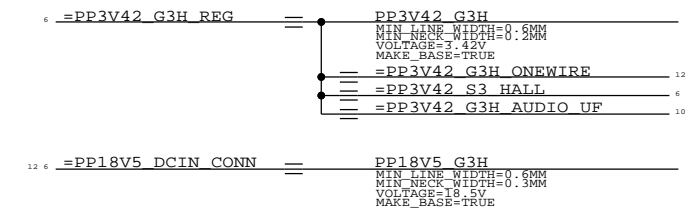
"S0,S0M" RAILS



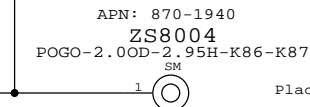
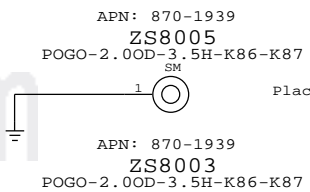
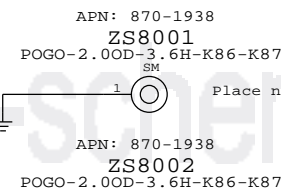
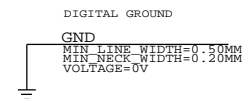
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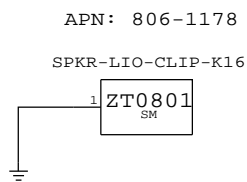
"G3H" RAILS



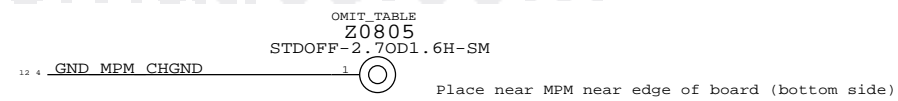
Pogo pins



Speaker clip



ESD BOSS

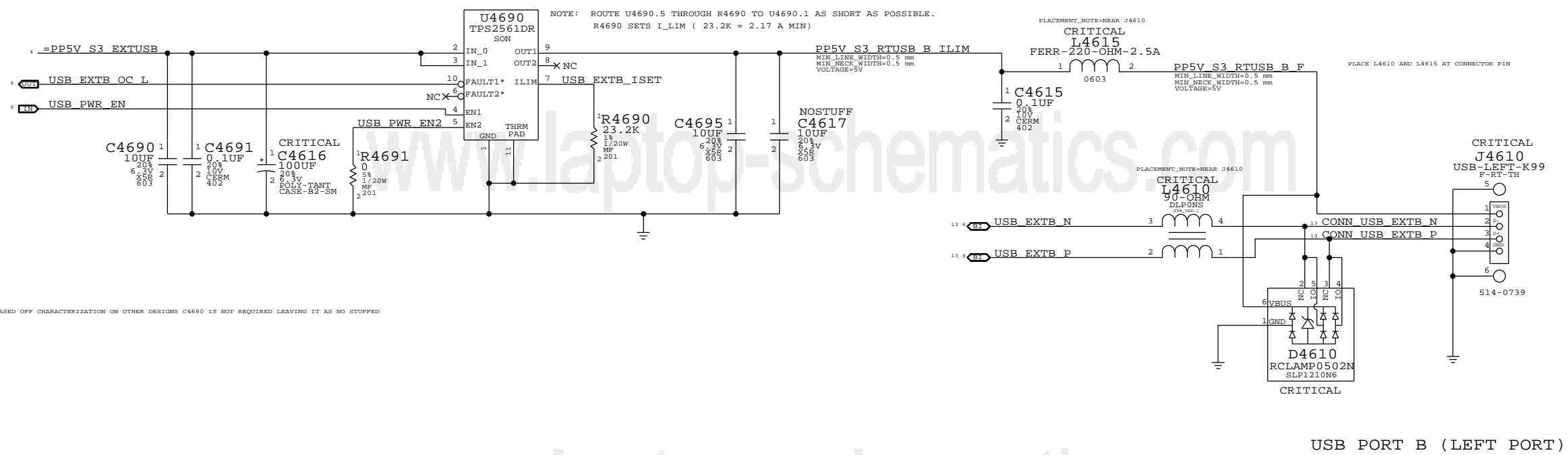


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
860-1427	1	ESD STANDOFF, K21/78	Z0805		

SYNC MASTER=(K24_MLB)		SYNC DATE=(02/04/2009)	
<b>Power Aliases</b>			
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		SHEET	4 OF 13

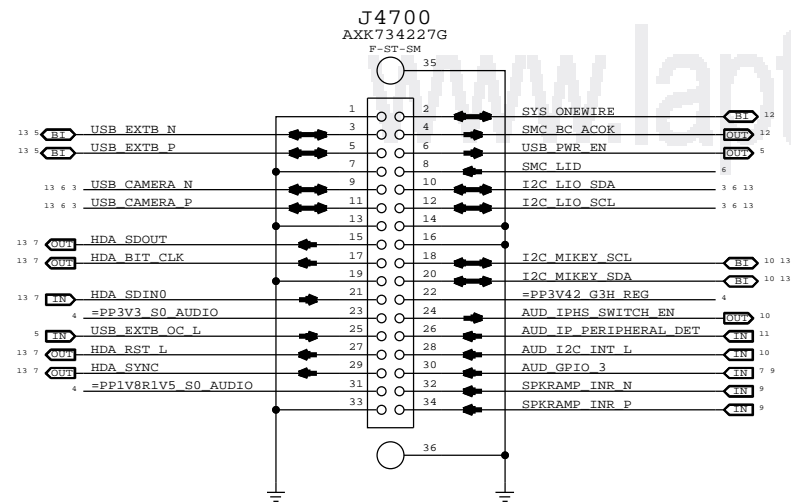
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### Port Power Switch

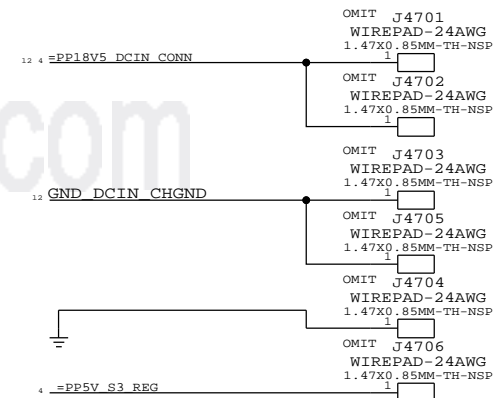


SYNC MASTER=(K84_MLB)		SYNC DATE=(11/09/2009)	
External USB Connectors			
Apple Inc.		DRAWING NUMBER	051-8933
		REVISION	4.1.0
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34 PIN LIO FLEX CONNECTOR  
APN: 516S0870 3.0 MM RECEPTACLE

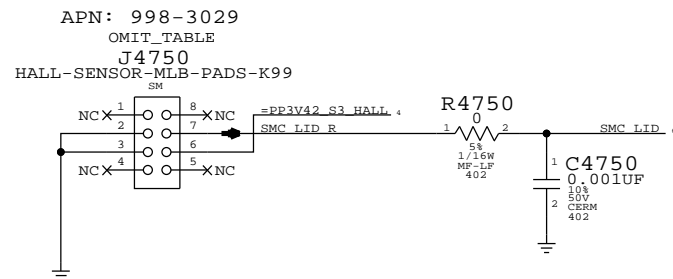


LIO POWER



SPACE THE HOLES 2MM APART CENTER TO CENTER

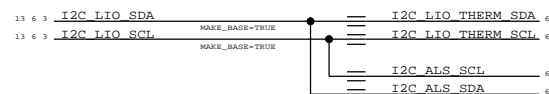
Hall Effect pads



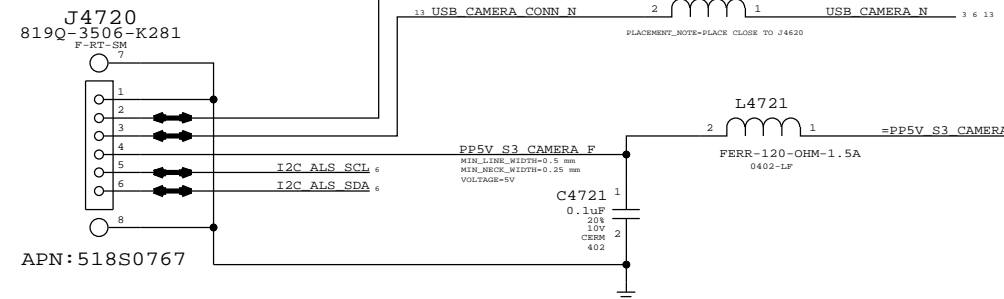
PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
607-6812	1	SUBASSY,PCBA HALL EFFECT,K16	J4750	CRITICAL	

639-1017 (K16 Hall effect board) reports to 607-6812

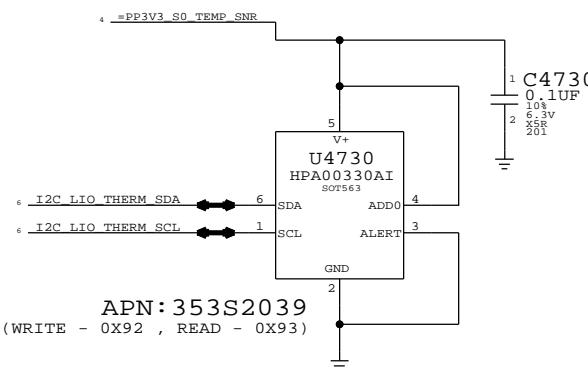
I2C aliases



CAMERA/ALS



APN: 353S2039  
(WRITE - 0X92 , READ - 0X93)



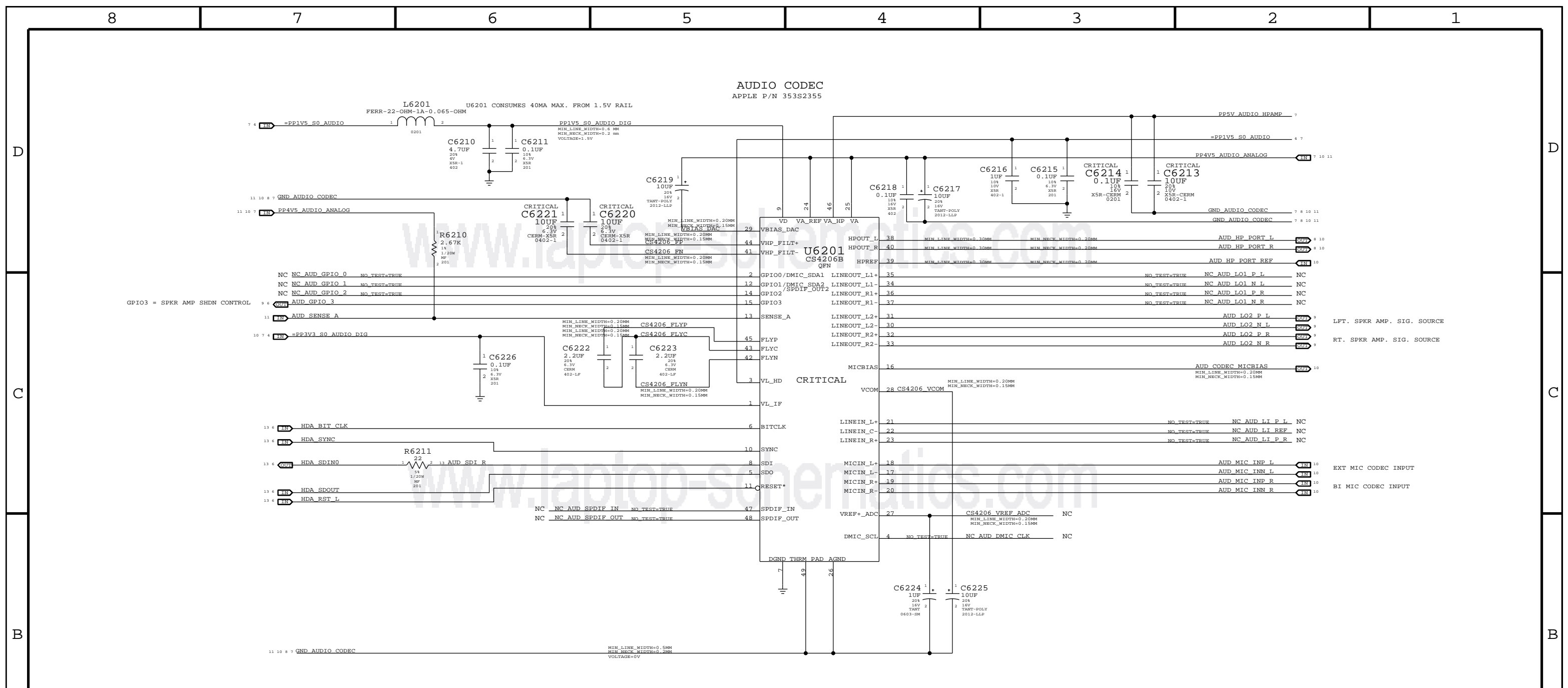
CRITICAL  
L4720

L4721

C4721

C4730

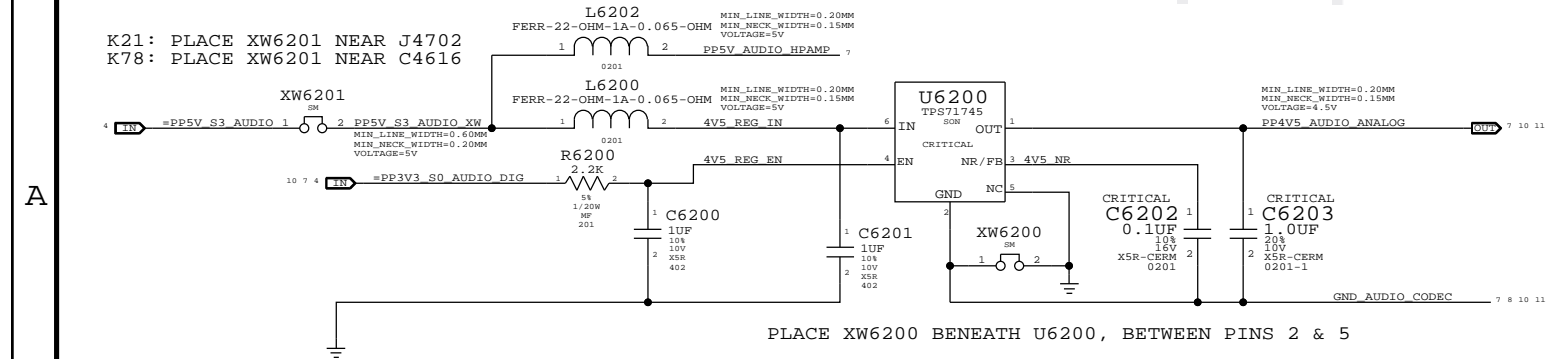
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<b>LIO CONNECTORS</b>			
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**4.5V POWER SUPPLY FOR CODEC**  
APPLE P/N 353S2456

**NOTES ON CODEC I/O**

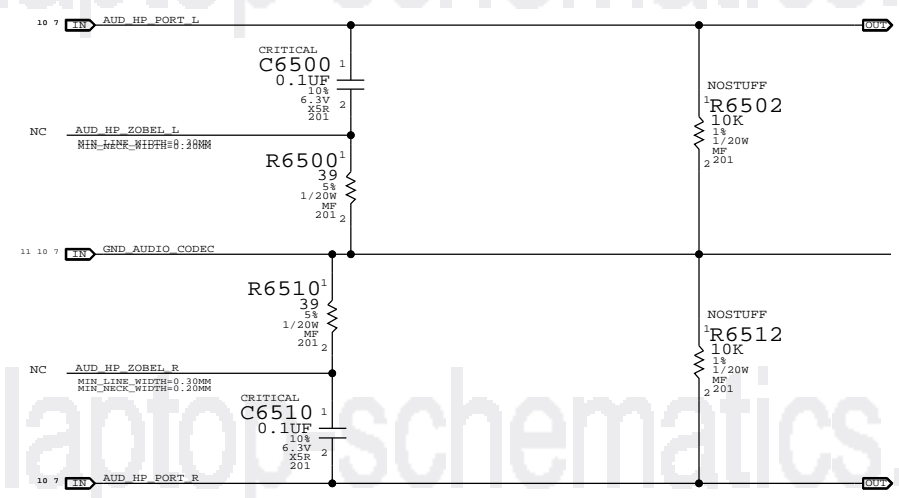
DIFF FSINPUT= 2.45VRMS  
 SE FSINPUT= 1.22VRMS  
 DAC1 FSOUTPUT= 1.34VRMS  
 DAC2/3 FSOUTPUTDIFF= 2.67VRMS  
 DAC2/3 FSOUTPUTSE= 1.34VRMS



PAGE TITLE		SYNC DATE=04/06/2011	
<b>AUDIO: CODEC/REGULATOR</b>		DRAWING NUMBER	SIZE
Apple Inc.		051-8933	D
REVISION		4.1.0	
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ZOBEL NETWORK & 1ST ORDER DAC FILTER PLACEHOLDER



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SYNC MASTER=AUDIO		SYNC DATE=04/06/2011	
PAGE TITLE			
AUDIO: HEADPHONE FILTER			
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051-8933		D	
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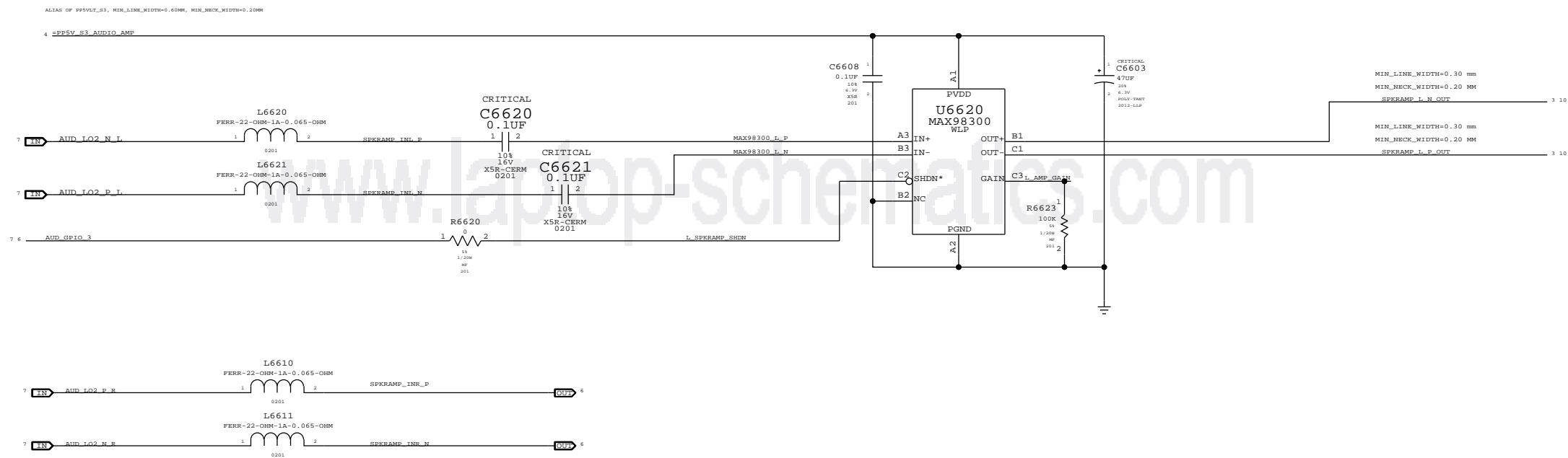
SPEAKER AMPLIFIERS

APN:353S2888


SPEAKER LOWPASS 80 HZ < FC < 132 HZ

GAIN 6DB

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SYMC_WAFER-AUDIO		SYMC_DATE=04/05/2011	
PAGE TITLE			
AUDIO: SPEAKER AMP			
 Apple Inc.	DRAWING NUMBER	051-8933	SIZE
	REVISION	4.1.0	D
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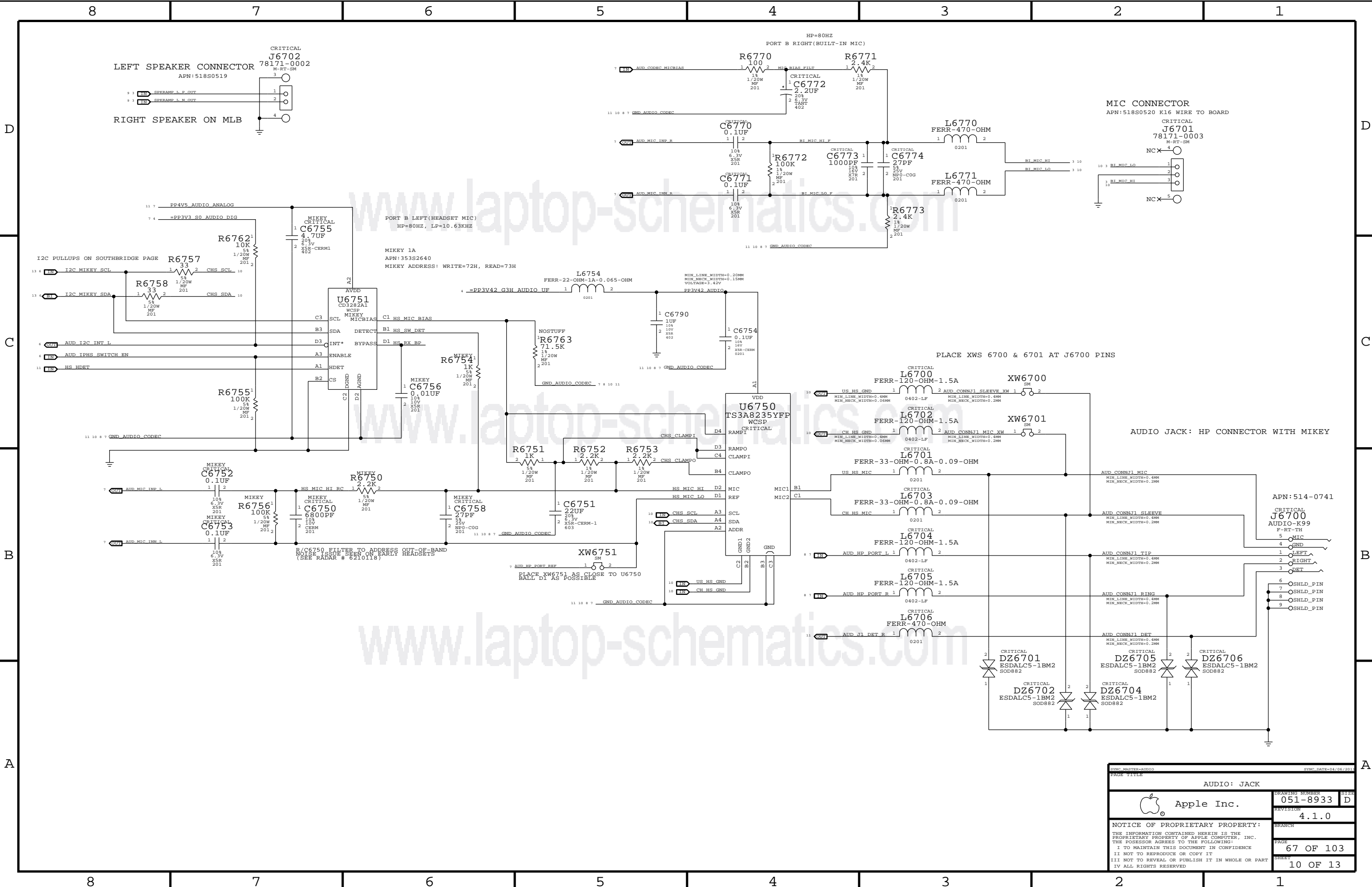
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AUDIO: JACK	
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CODEC OUTPUT SIGNAL PATHS

FUNCTION	VOLUME	CONVERTER	PIN COMPLEX	MUTE CONTROL	DET ASSIGNMENT
HP/LINE OUT	0X02 (2)	0X02 (2)	0X09 (9,A)	GPIO_0 AND GPIO_1	0X09 (A)
SPEAKERS	0X04 (4)	0X04 (4)	0X0B (11)	GPIO_3	N/A

CODEC INPUT SIGNAL PATHS

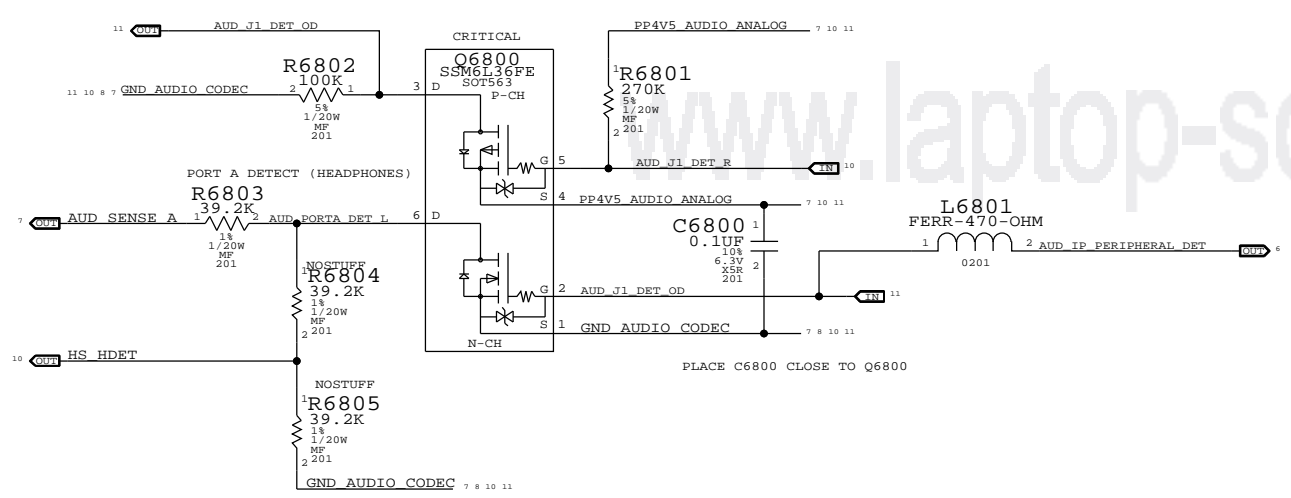
FUNCTION	CONVERTER	PIN COMPLEX	VREF	DET ASSIGNMENT
BUILT-IN MIC	0X06 (6)	0X0D (13,B,RIGHT)	MIC_BIAS (80%)	N/A
HEADSET MIC	0X06 (6)	0X0D (13,V22,B,LEFT)	MIKEY	MIKEY

SOUTHBRIDGE RESOURCE/PIN ALLOCATIONS

FUNCTION	NET NAME	SB GPIO/INT
PERIPHERAL/EXTRACTION DETECT	AUD_IP_PERIPHERAL_DET	GPIO 38
MIKEY INTERRUPT	AUD_I2C_INT_L	GPIO 55
MIKEY ENABLE	AUD_IPHS_SWITCH_EN	GPIO 7
MIKEY I2C BUS	I2C_MIKEY_SDA/SCL	MCP89 SMBUS 0

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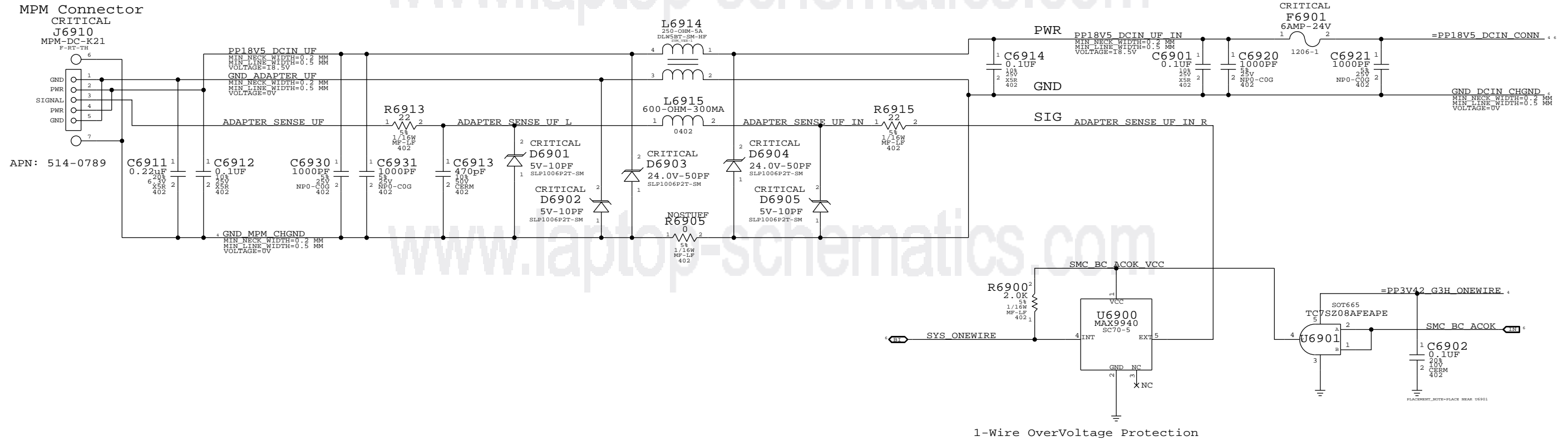
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SYNC MASTER=MASTER		SYNC DATE=MASTER	
MPM CONNECTOR			
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		SHEET	12 OF 13

K21 LIO BOARD-SPECIFIC SPACING & PHYSICAL CONSTRAINTS

BOARD LAYERS	BOARD AREAS	BOARD UNITS (MIL OR MM)	ALLEGRO VERSION
TOP, I2L2, I2L3, I2L4, I2L5, BOTTOM	NO_TYPE, SDA_P10M	MM	15.5.1

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
DEFAULT	*	Y	=50_OHM_SE	0.100MM	30 MM	0 MM	0 MM
STANDARD	*	Y	=DEFAULT	=DEFAULT	12.7 MM	=DEFAULT	=DEFAULT

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
55_OHM_SE	TOP, BOTTOM	Y	0.12 MM	0.12 MM			
55_OHM_SE	*	Y	0.110 MM	0.110 MM	=STANDARD	=STANDARD	=STANDARD

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
90_OHM_DIFF	*	N	=STANDARD	=STANDARD	=STANDARD	=STANDARD	=STANDARD
90_OHM_DIFF	I2L3, I2L4	Y	0.115 MM	0.115 MM		0.130 MM	0.130 MM
90_OHM_DIFF	TOP, BOTTOM	Y	0.125 MM	0.125 MM		0.11 MM	0.11 MM

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
50_OHM_SE	TOP, BOTTOM	Y	0.090 MM	0.090 MM			
50_OHM_SE	*	Y	0.076 MM	0.076 MM	=STANDARD	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
24_DISELECTRIC	TOP, BOTTOM	0.193 MM	?
24_DISELECTRIC	TOP, BOTTOM	0.193 MM	?
24_DISELECTRIC	*	0.254 MM	?
46_DISELECTRIC	*	0.305 MM	?

USB 2.0 INTERFACE CONSTRAINTS

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
USB_90D	*	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF	=90_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
USB	*	=24_DISELECTRIC	?
USB	TOP, BOTTOM	=46_DISELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001\_v0D), Section 2.10.1.

SMBus Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
SMB_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SMB	*	=24_DISELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001\_v0D), Section 2.11.1.

HD Audio Interface Constraints

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
HDA_55S	*	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=55_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
HDA	*	=24_DISELECTRIC	?

SOURCE: MCP79 Interface DG (DG-03328-001\_v0D), Section 2.12.1.

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
USB_EXTB_N	USB_90D	USB	CONN USB_EXTB N 5
USB_EXTB_P	USB_90D	USB	CONN USB_EXTB P 5
USB_CAMERA_P	USB_90D	USB	USB_CAMERA P 3 6
USB_CAMERA_N	USB_90D	USB	USB_CAMERA N 3 6
USB_CAMERA_CONN_P	USB_90D	USB	USB_CAMERA_CONN P 6
USB_CAMERA_CONN_N	USB_90D	USB	USB_CAMERA_CONN N 6
I2C_LIO_SDA	SMB_55S	SMB	I2C_LIO_SDA 3 6
I2C_LIO_SCL	SMB_55S	SMB	I2C_LIO_SCL 3 6
I2C_MIKEY_SCL	SMB_55S	SMB	I2C_MIKEY_SCL 6 10
I2C_MIKEY_SDA	SMB_55S	SMB	I2C_MIKEY_SDA 6 10
HDA_BIT_CLK	HDA_55S	HDA	HDA_BIT_CLK 6 7
HDA_SYNC	HDA_55S	HDA	HDA_SYNC 6 7
HDA_RST_L	HDA_55S	HDA	HDA_RST_L 6 7
HDA_SDIN0	HDA_55S	HDA	HDA_SDIN0 6 7
AUD_SDI_R	HDA_55S	HDA	AUD_SDI_R 7
HDA_SDOUT	HDA_55S	HDA	HDA_SDOUT 6 7

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SYNC MASTER=(K24\_MLB) SYNC DATE=(04/06/2009)

COUGAR POINT CONSTRAINTS 2

Apple Inc.

DRAWING NUMBER: 051-8933 SIZE: D

REVISION: 4.1.0

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