

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
4	0001109172	ENGINEERING RELEASED	2011-04-18

SCHEM,PCB,LIO,K78

EVT 1, 2011-04-18

Page		Contents	Sync	Date
1	1	Table of Contents		
2	2	System Block Diagram	K78_MLB	04/05/2011
3	7	FUNC TEST	(K6_MLB)	(12/11/2009)
4	8	Power Aliases	(K24_MLB)	(02/04/2009)
5	46	External USB Connectors	(K84_MLB)	(11/09/2009)
6	47	LIO CONNECTORS	MASTER	MASTER
7	62	AUDIO: CODEC/REGULATOR	AUDIO	04/05/2011
8	65	AUDIO: HEADPHONE FILTER	AUDIO	04/05/2011
9	66	AUDIO: SPEAKER AMP	AUDIO	04/05/2011
10	67	AUDIO: JACK	AUDIO	04/05/2011
11	68	AUDIO: JACK TRANSLATORS	AUDIO	04/05/2011
12	69	MPM CONNECTOR	MASTER	MASTER
13	103	MCP Constraints 2	(K24_MLB)	(04/06/2009)

Alternate Parts


PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S0694	155S0387		ALL	Murata alt to TDK
155S0661	155S0511		ALL	Murata alt to TDK
155S0660	155S0513		ALL	Murata alt to TDK

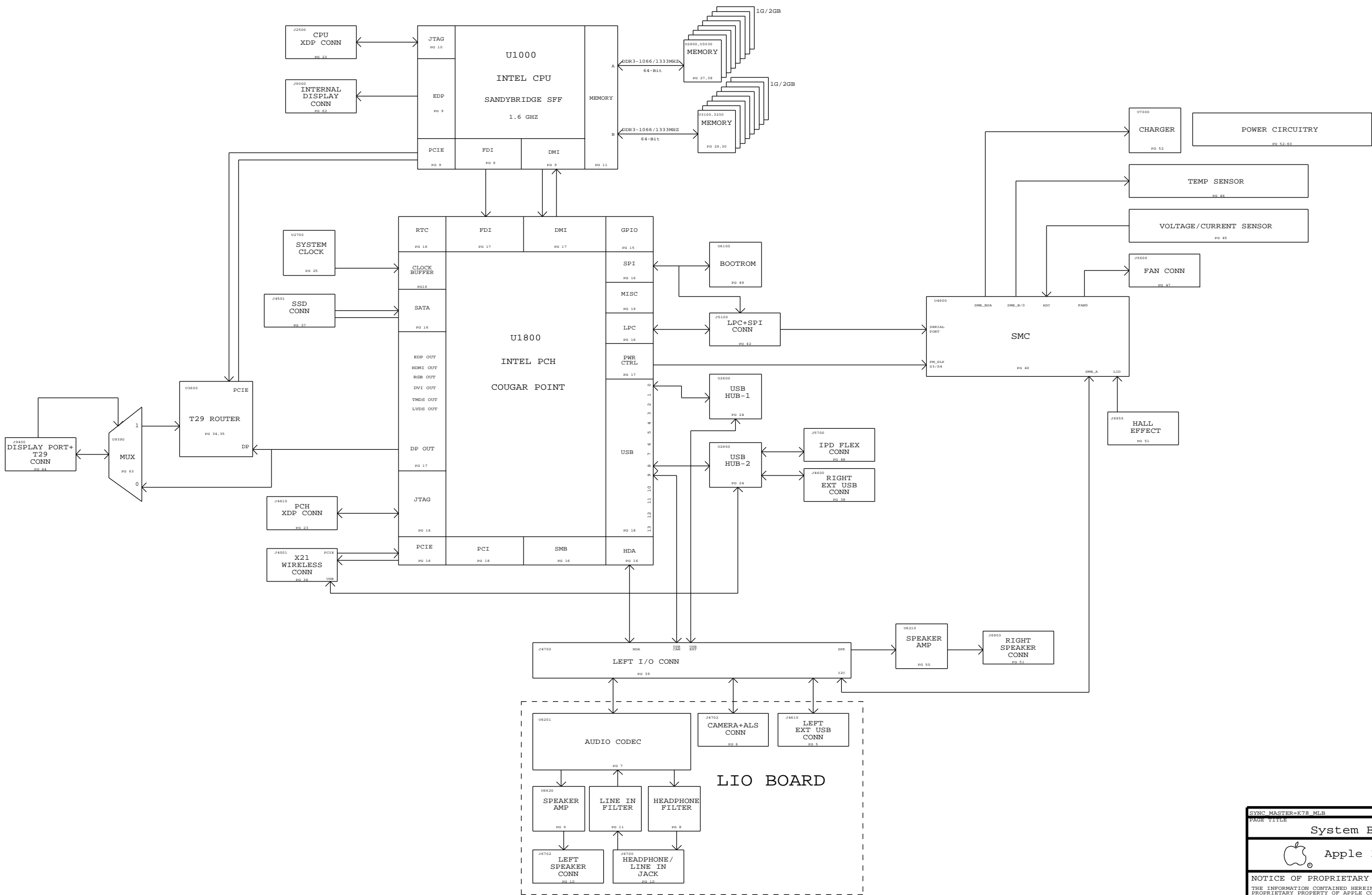
Schematic / PCB #'s

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
051-8540	1	SCHEM,PCB,LIO,K78	SCH	CRITICAL	
820-3053	1	PCBF,LIO,K78	PCB	CRITICAL	
946-3092	1	LIO LOCTITE UV EB 0.08, K78	UV_GLUE	CRITICAL	

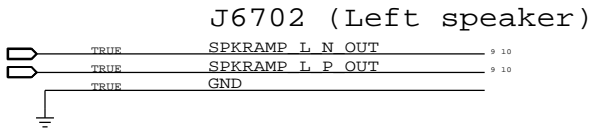
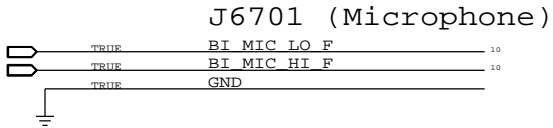
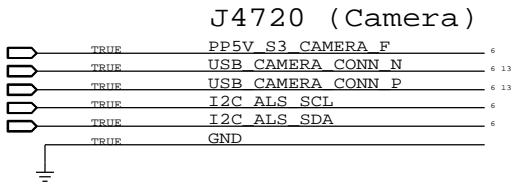
BOM: 639-1784 PCBA,LIO,K78
MCO: 056-4207 MCO,LIO,K78
EEEE: DK05

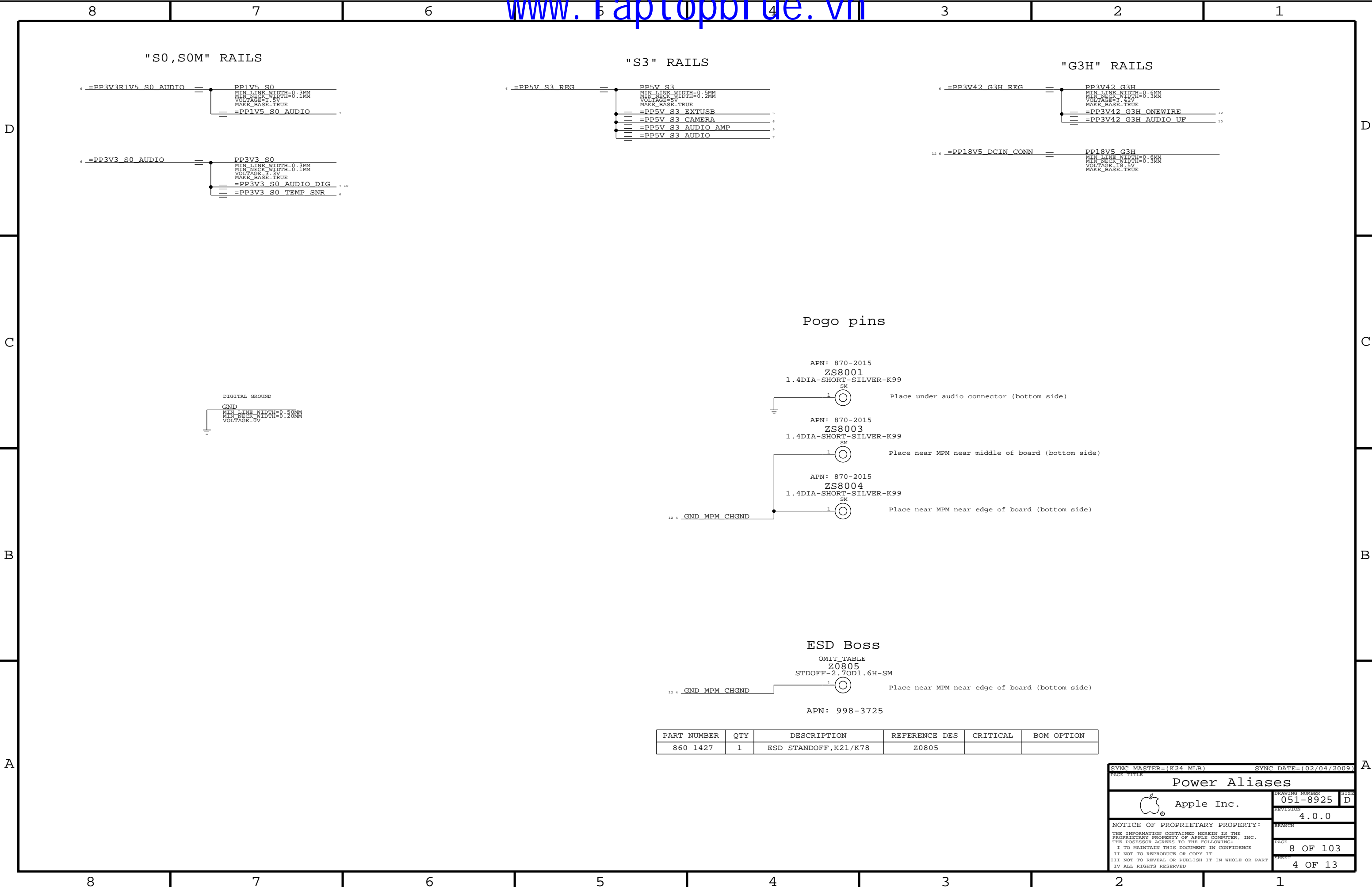
PRODUCT SAFETY REQUIREMENTS:
PCB, UL RECOGNIZED, MIN. 130-C TEMP. RATING AND V-0 FLAME RATING PER UL 796 & UL 94.
PCB TO BE SILKSCREENED WITH UL/CUL RECOGNITION MARK, MANUFACTURER'S UL FILE
NUMBER, UL PCB MATERIAL DESIGNATION, 130-C TEMP. RATING AND V-0 FLAME RATING

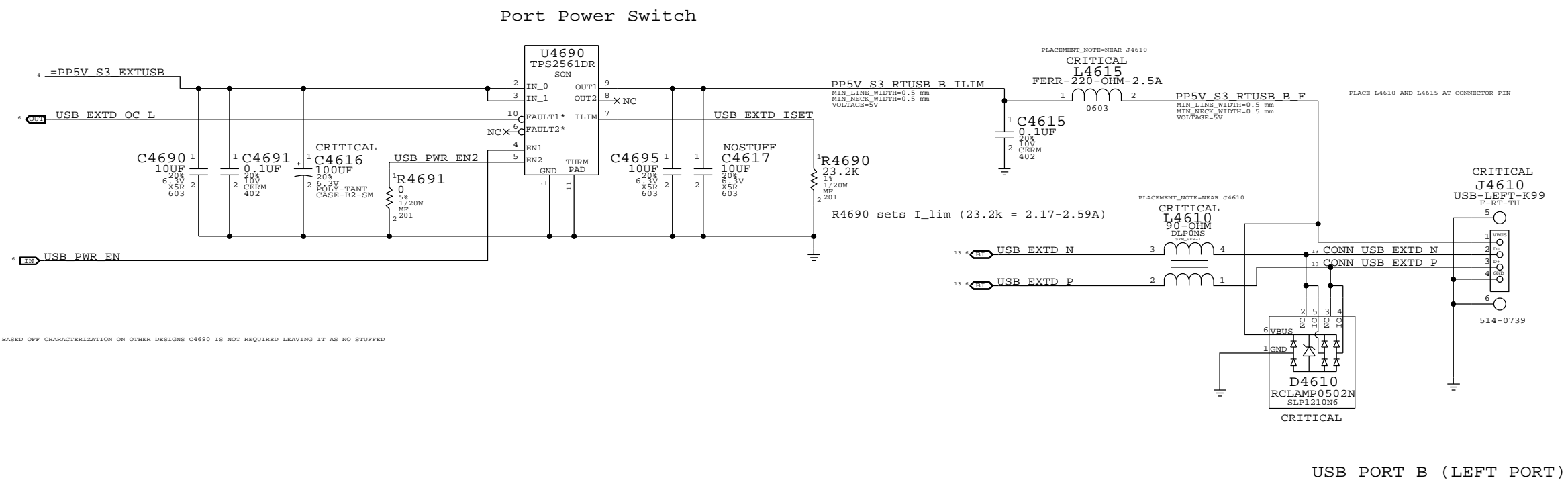
DRAWING TITLE		
SCHEM,PCB,LIO,K78		
 Apple Inc.	DRAWING NUMBER	051-8925
	REVISION	4.0.0
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	PAGE	1 OF 103
	SHEET	1 OF 13



Functional Test Points

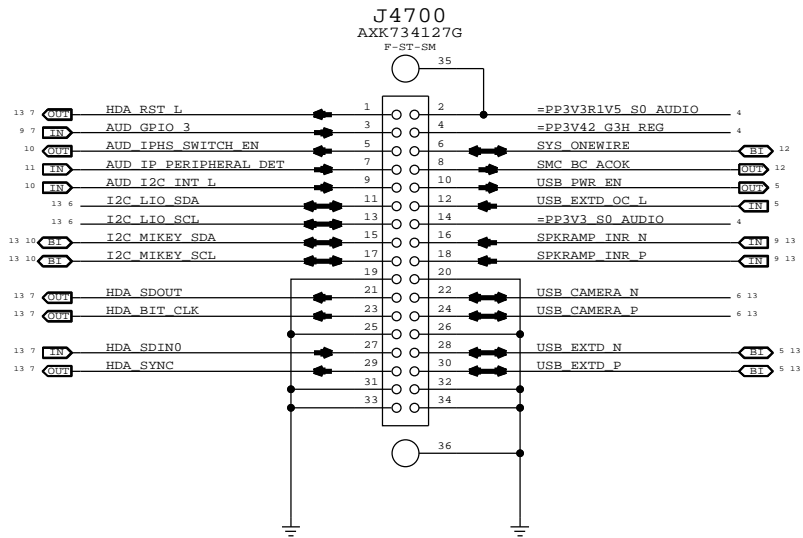




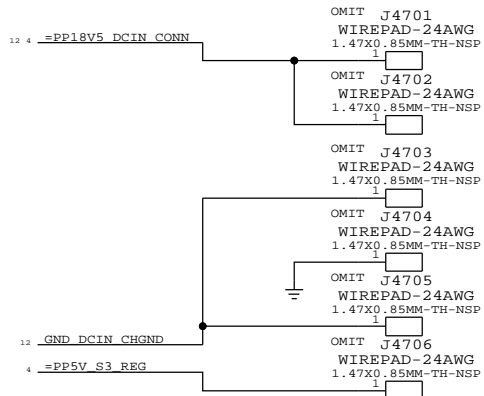


34 Pin LIO Flex Connector

APN: 516S0859

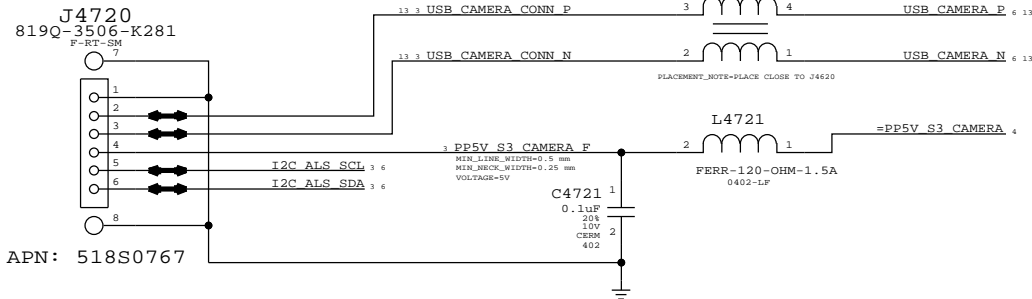


LIO POWER

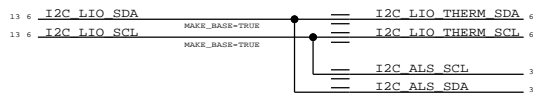


SPACE THE HOLES 2MM APART CENTER TO CENTER

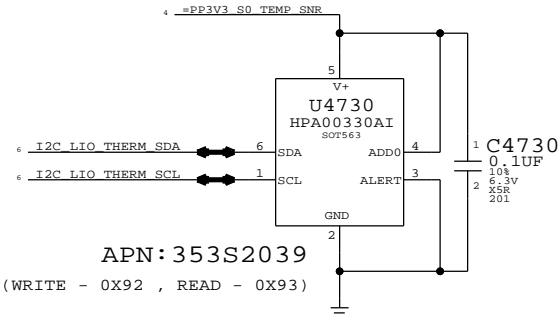
CAMERA/ALS



I2C aliases




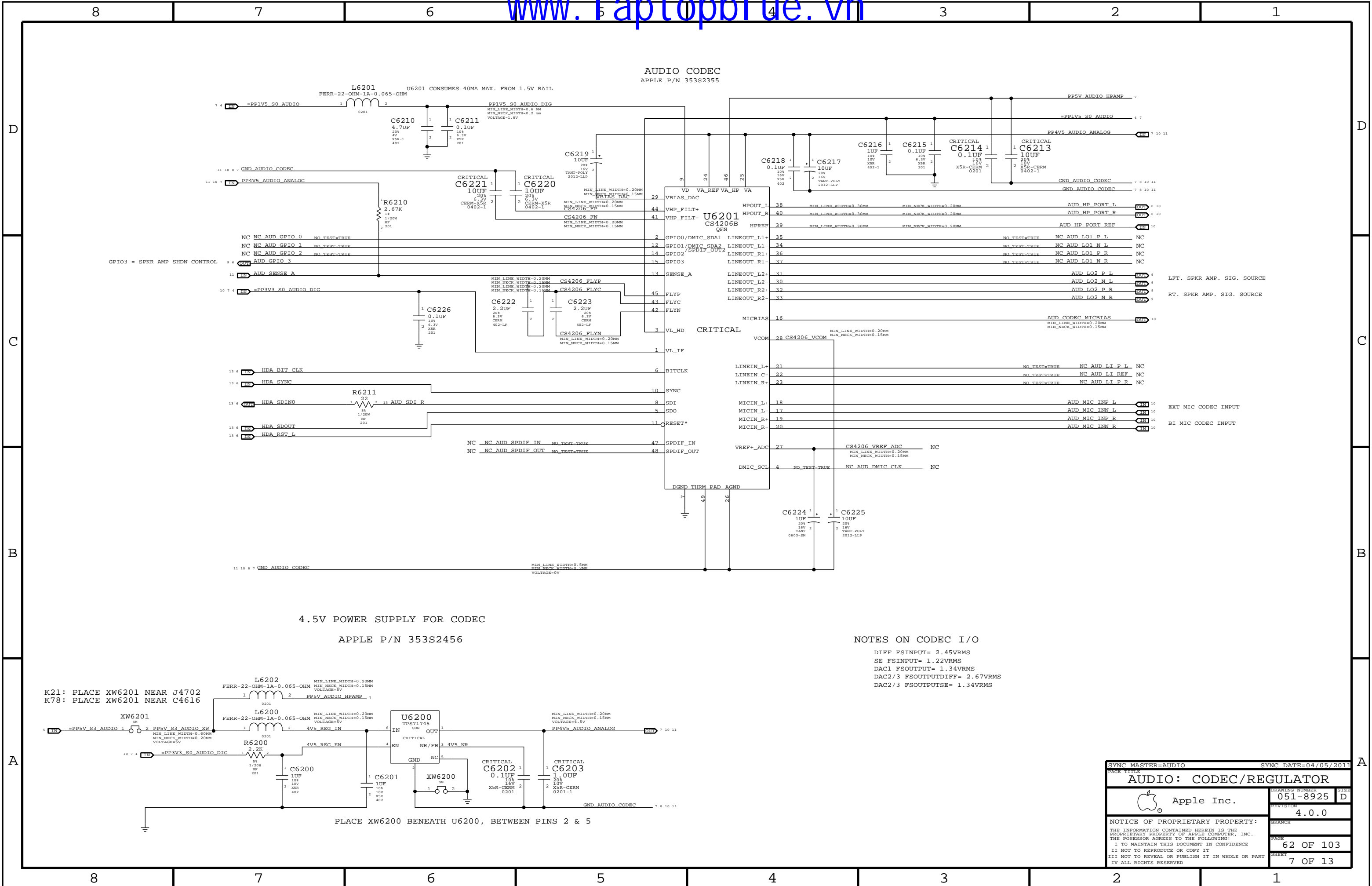
Temp Sensor



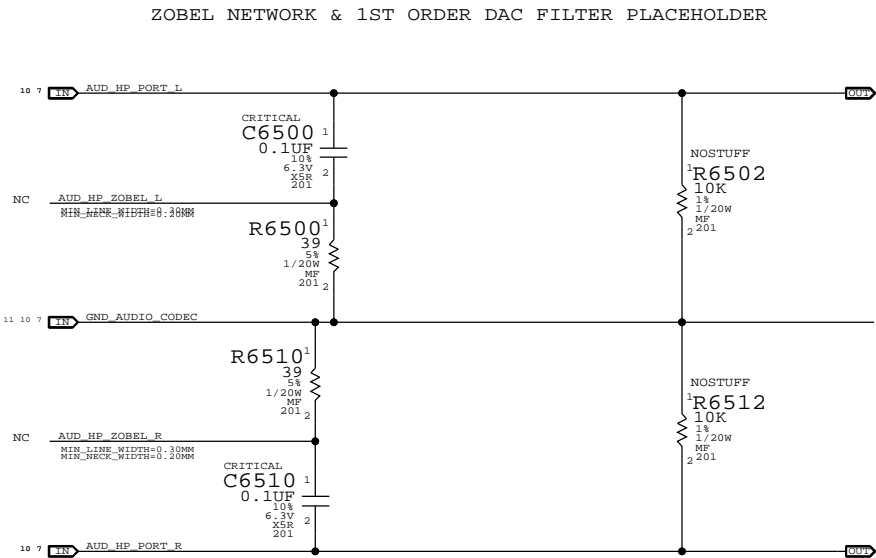
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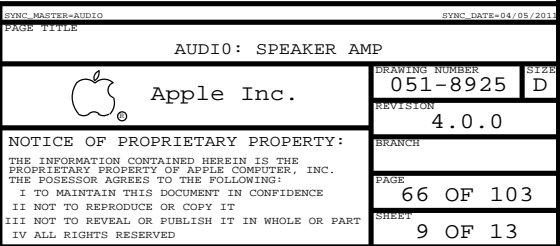
(WRITE - 0X92 , READ - 0X93)

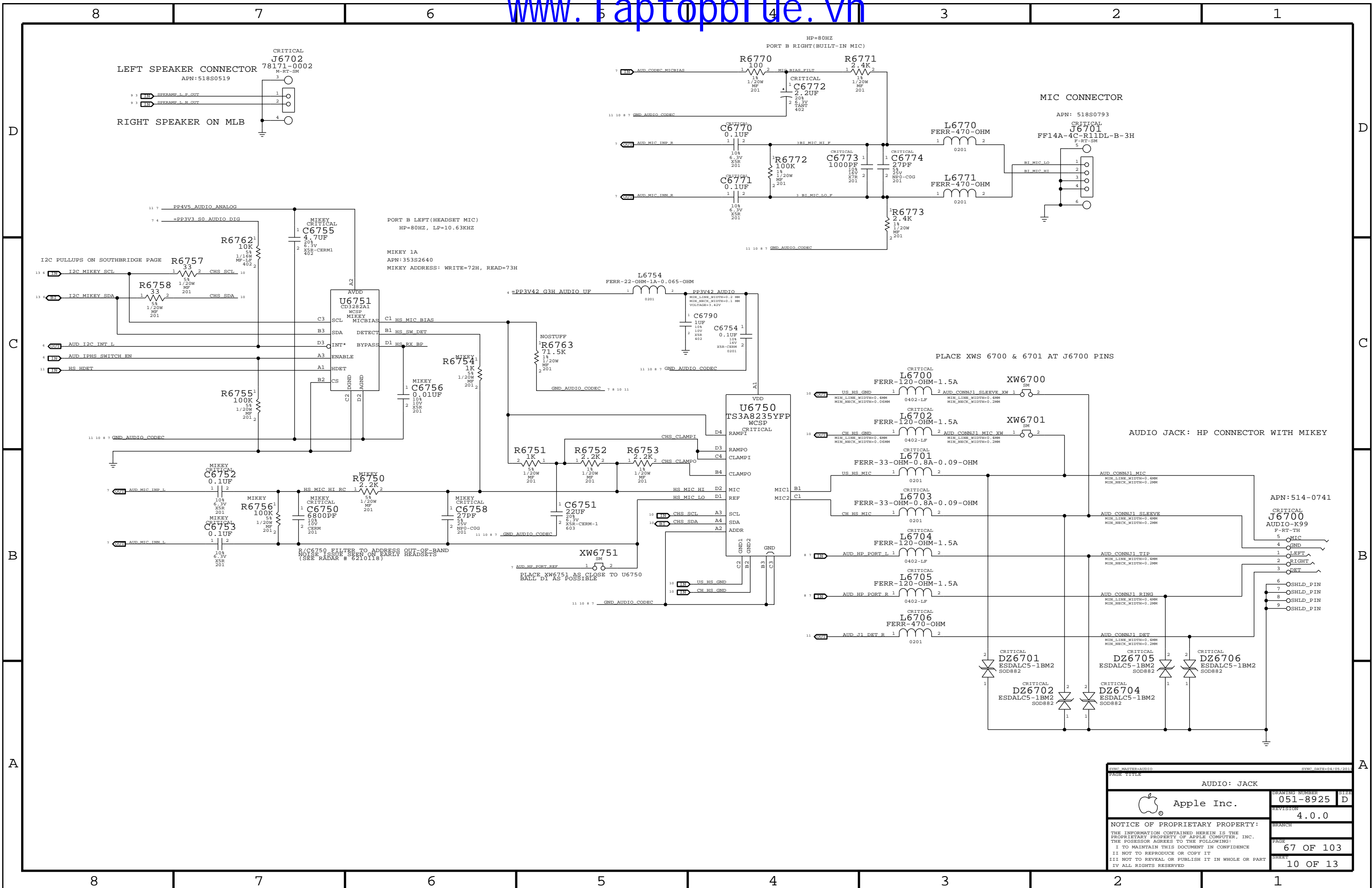
SYNC MASTER=MASTER		SYNC DATE=MASTER	
PAGE TITLE			
LIO CONNECTORS			
 Apple Inc.		DRAWING NUMBER	051-8925
		SIZE	D
		REVISION	4.0.0
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		PAGE	47 OF 103
		SHEET	6 OF 13



PAGE TITLE		SYNC DATE=04/05/2011	
AUDIO: CODEC/REGULATOR		DRAWING NUMBER	051-8925
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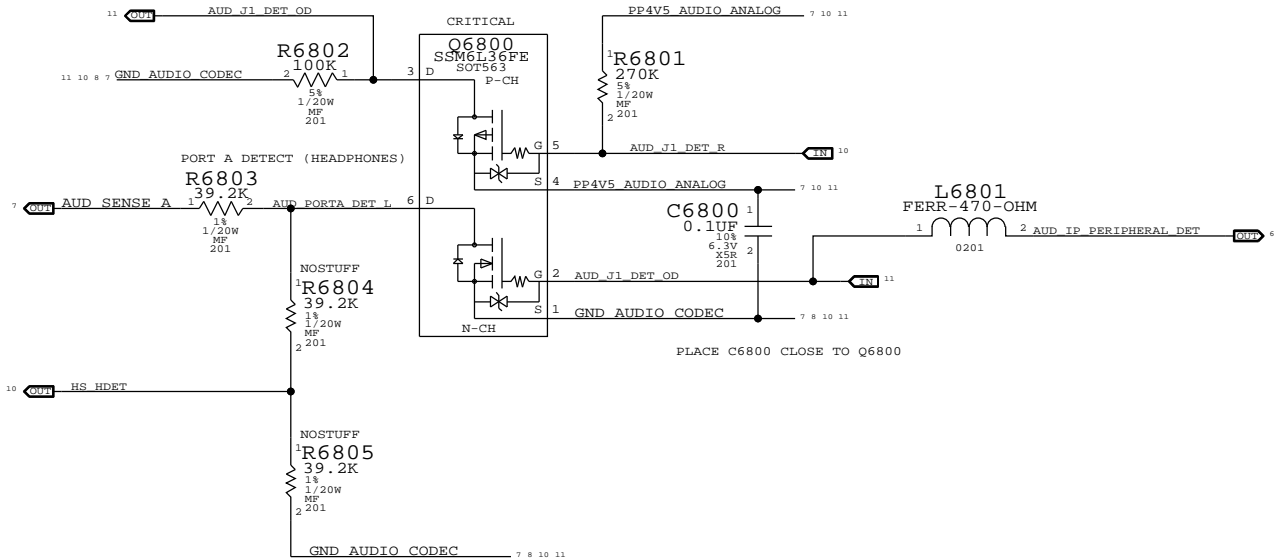




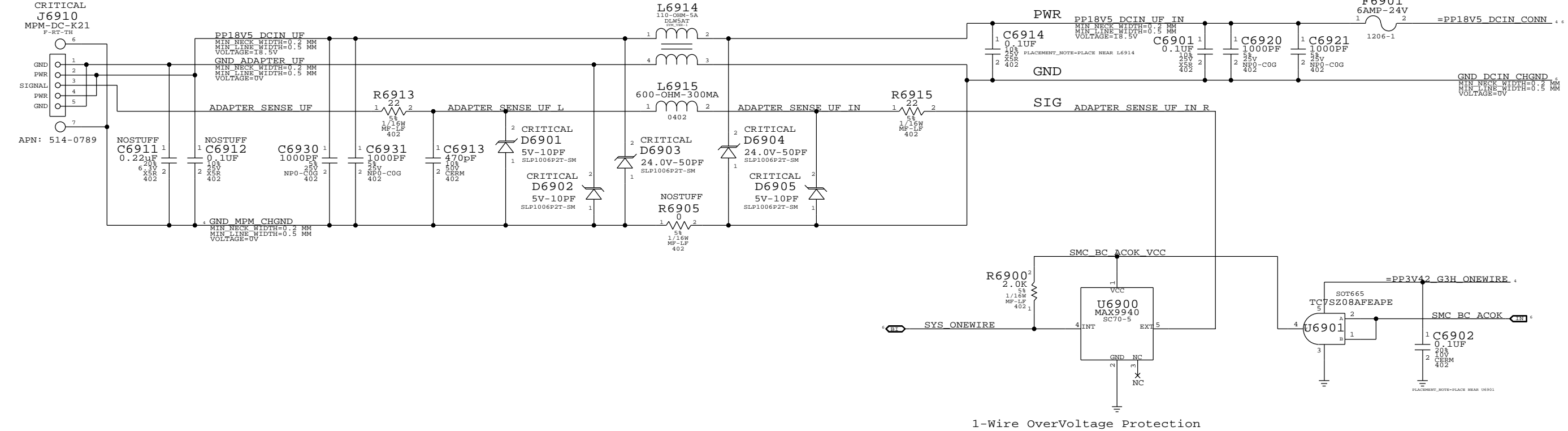
CODEC OUTPUT SIGNAL PATHS					
FUNCTION	VOLUME	CONVERTER	PIN COMPLEX	MUTE CONTROL	DET ASSIGNMENT
HP/LINE OUT	0X02 (2)	UX02 (2)	0X09 (9,A)	GPIO_0 AND GPIO_1	0X09 (A)
SPEAKERS	0X04 (4)	0X04 (4)	0X0B (11)	GPIO_3	N/A

CODEC INPUT SIGNAL PATHS					
FUNCTION	CONVERTER	PIN COMPLEX	VEEF	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			



MPM Connector



PAGE TITLE		PAGE TITLE	
MPM CONNECTOR		MPM CONNECTOR	
Apple Inc.		DRAWING NUMBER	051-8925
		REVISION	4.0.0
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K16 LIO BOARD-SPECIFIC SPACING & PHYSICAL CONSTRAINTS

BOARD LAYERS	BOARD AREAS	BOARD UNITS (MIL OR MM)	ALLEGRO VERSION
TOP, ISL2, ISL3, ISL4, ISL5, BOTTOM	NO_TYPE, SGA_P1MM	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	0.120 MM	0.120 MM			
55_OHM_SE	*	Y	0.125 MM	0.125 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	ISL3, ISL4	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		0.110 MM	0.110 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
36_DISELECTRIC	TOP, BOTTOM	0.180 MM	?
36_DISELECTRIC	TOP, BOTTOM	0.180 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	SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
USB	*	=24_DISELECTRIC	?	USB	TOP, BOTTOM	=46_DISELECTRIC	?

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

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
USB_EXTN	USB_90D	USB	CONN USB EXTND N	5
USB_EXTN	USB_90D	USB	CONN USB EXTND P	5
USB_EXTN	USB_90D	USB	USB EXTND N	5 6
USB_EXTN	USB_90D	USB	USB EXTND P	5 6
USB_CAMERA	USB_90D	USB	USB CAMERA P	6
USB_CAMERA	USB_90D	USB	USB CAMERA N	6
USB_CAMERA	USB_90D	USB	USB CAMERA CONN P	3 6
USB_CAMERA	USB_90D	USB	USB CAMERA CONN N	3 6
	SMB_55S	SMB	I2C LIO_SDA	6
	SMB_55S	SMB	I2C LIO_SCL	6
	SMB_55S	SMB	I2C MIKEY_SCL	6 10
	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_55S	HDA	HDA_RST_L	6 7
HDA_SDIN0	HDA_55S	HDA	HDA SDIN0	6 7
	HDA_55S	HDA	AUD SDI_R	7
HDA_SDOUT	HDA_55S	HDA	HDA SDOUT	6 7
	DIFFPAIR	AUDIO	SPKRAMP INL N	9
	DIFFPAIR	AUDIO	SPKRAMP INL P	9
	DIFFPAIR	AUDIO	SPKRAMP INR N	6 9
	DIFFPAIR	AUDIO	SPKRAMP INR P	6 9
	DIFFPAIR	AUDIO	MAX98300 L N	9
	DIFFPAIR	AUDIO	MAX98300 L P	9