

D

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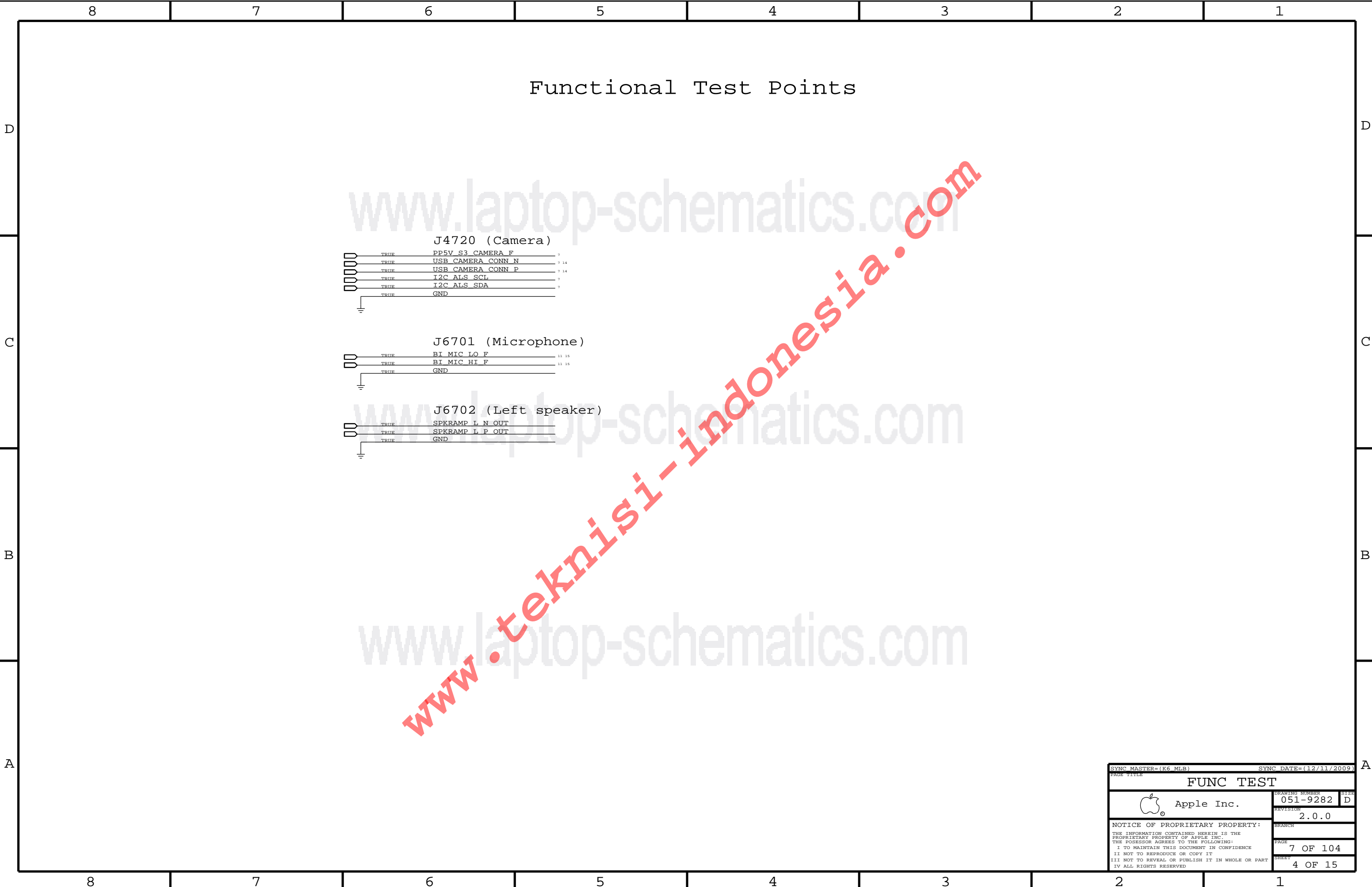
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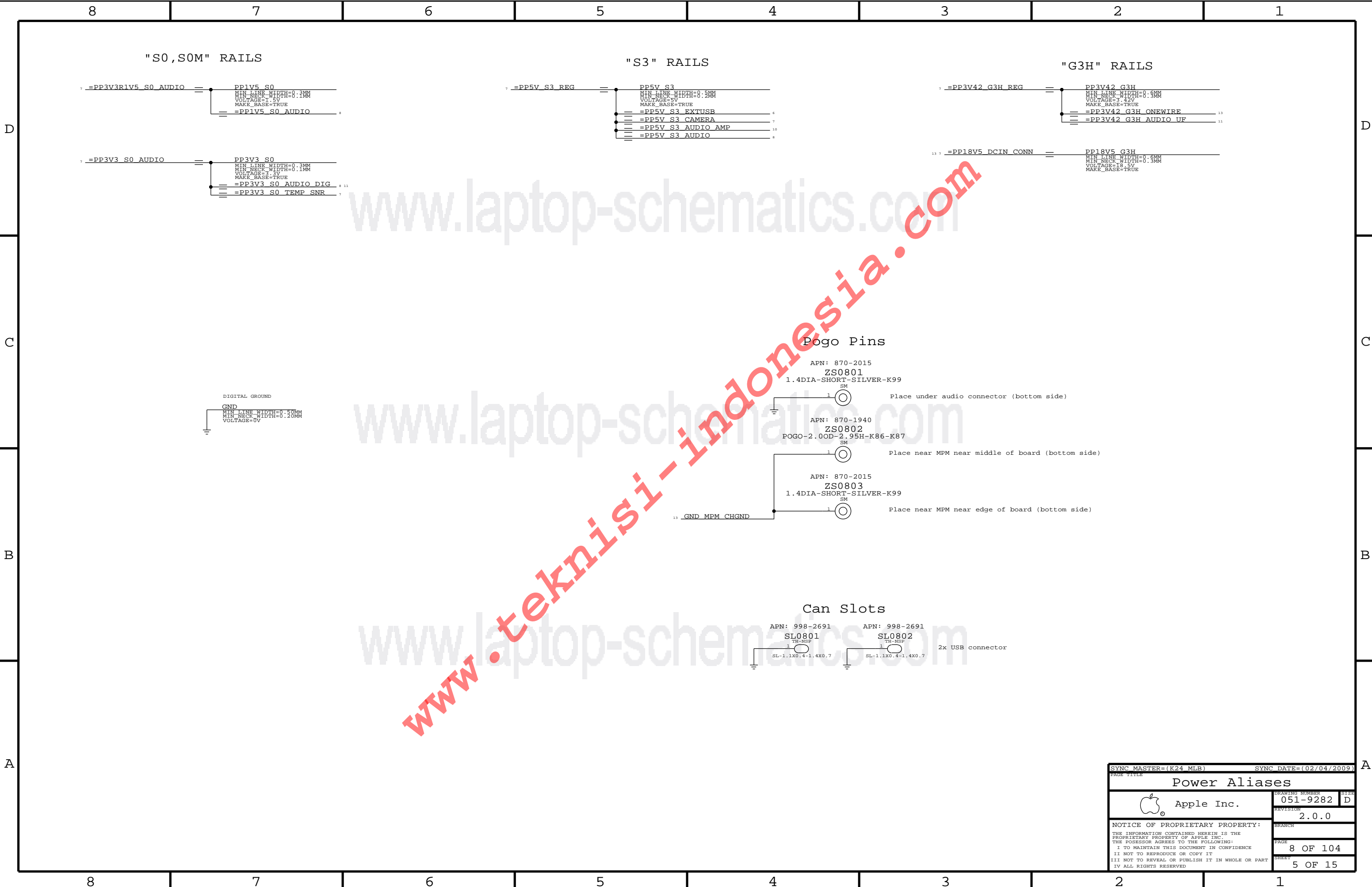
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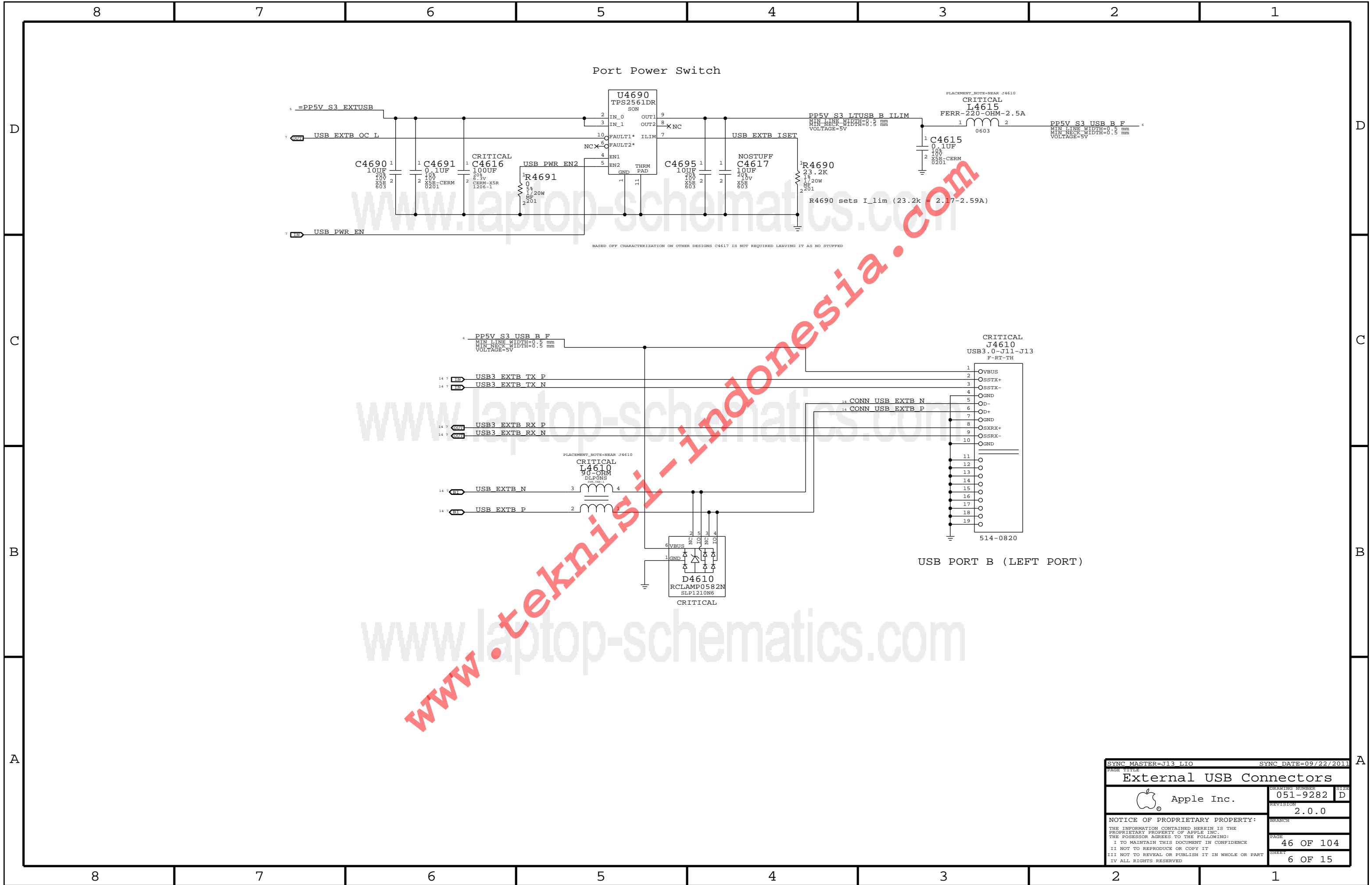
BOM OPTION
BOM OPTION
GLUE

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

SYMC MASTER-K78 MLB		SYMC DATE=04/05/2013	
PAGE TITLE			
System Block Diagram			
 Apple Inc.		DRAWING NUMBER 051-9282	
		SIZE D	
		REVISION 2.0.0	
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		SHEET 3 OF 15	







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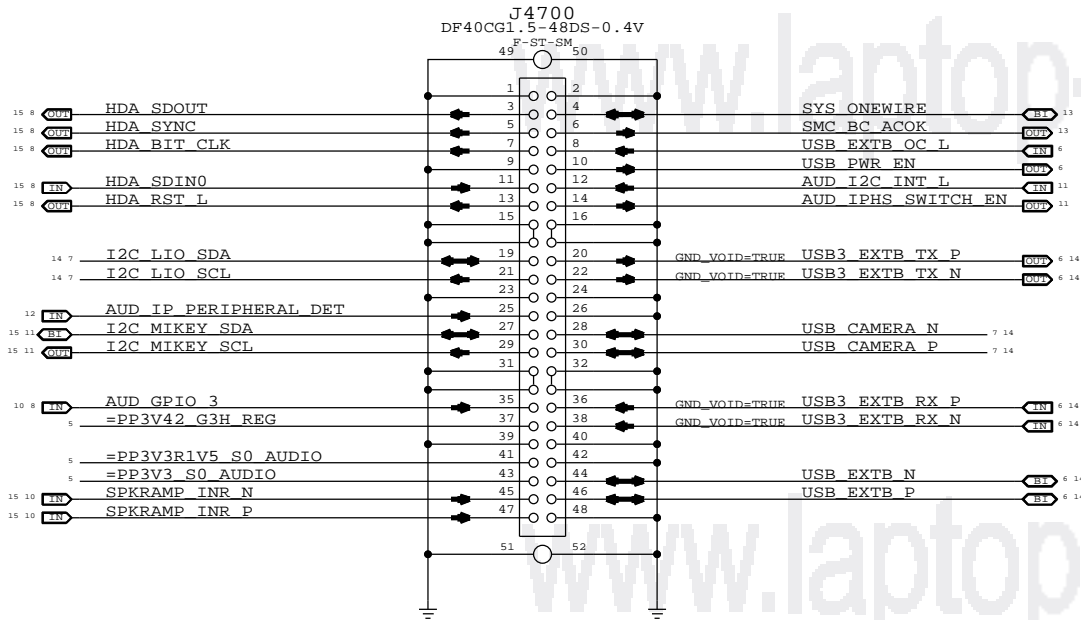
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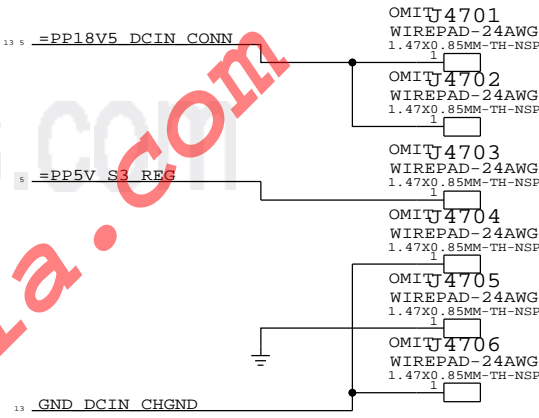
A

40 (48) Pin LIO Flex Connector
APN: 998-4616 (1.5mm Hirose Receptacle)



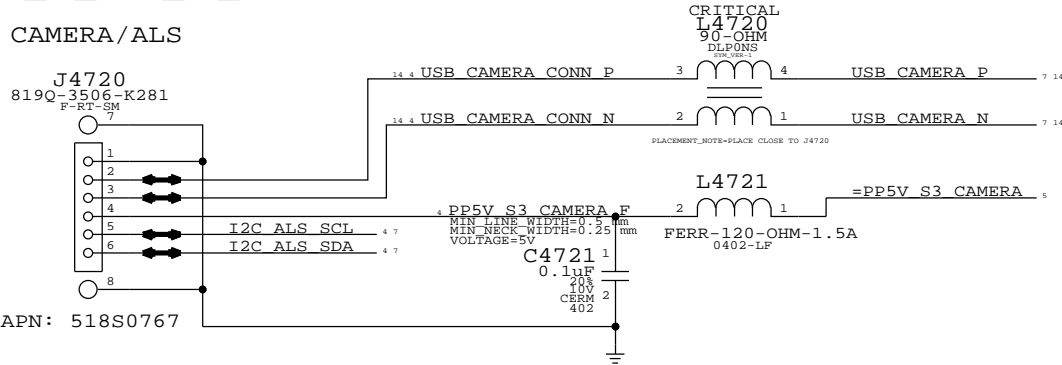
Note: The following pins MUST be GND on J4700
because they connect to the shield:
Pins 15-18, 31-34

LIO POWER

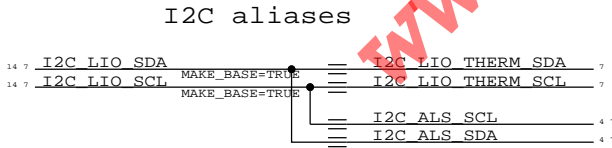
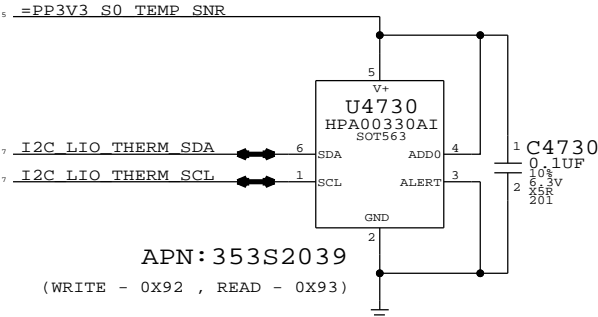


SPACE THE HOLES 2MM APART CENTER TO CENTER

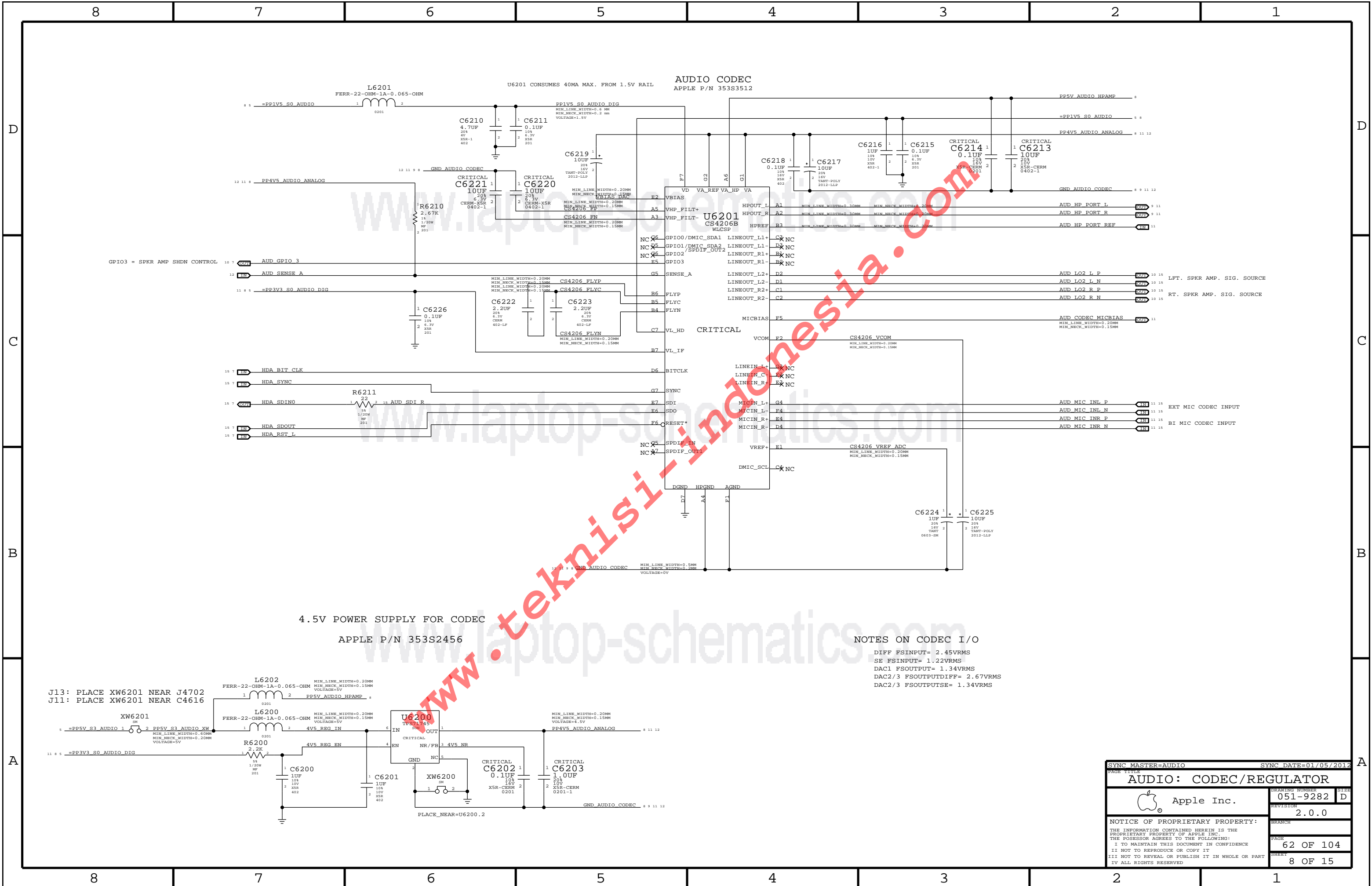
CAMERA/ALS



Temp Sensor



PAGE TITLE		SYNC DATE=MASTER	
LIO CONNECTORS		DRAWING NUMBER	
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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=01/05/2012	
AUDIO: CODEC/REGULATOR		DRAWING NUMBER	051-9282
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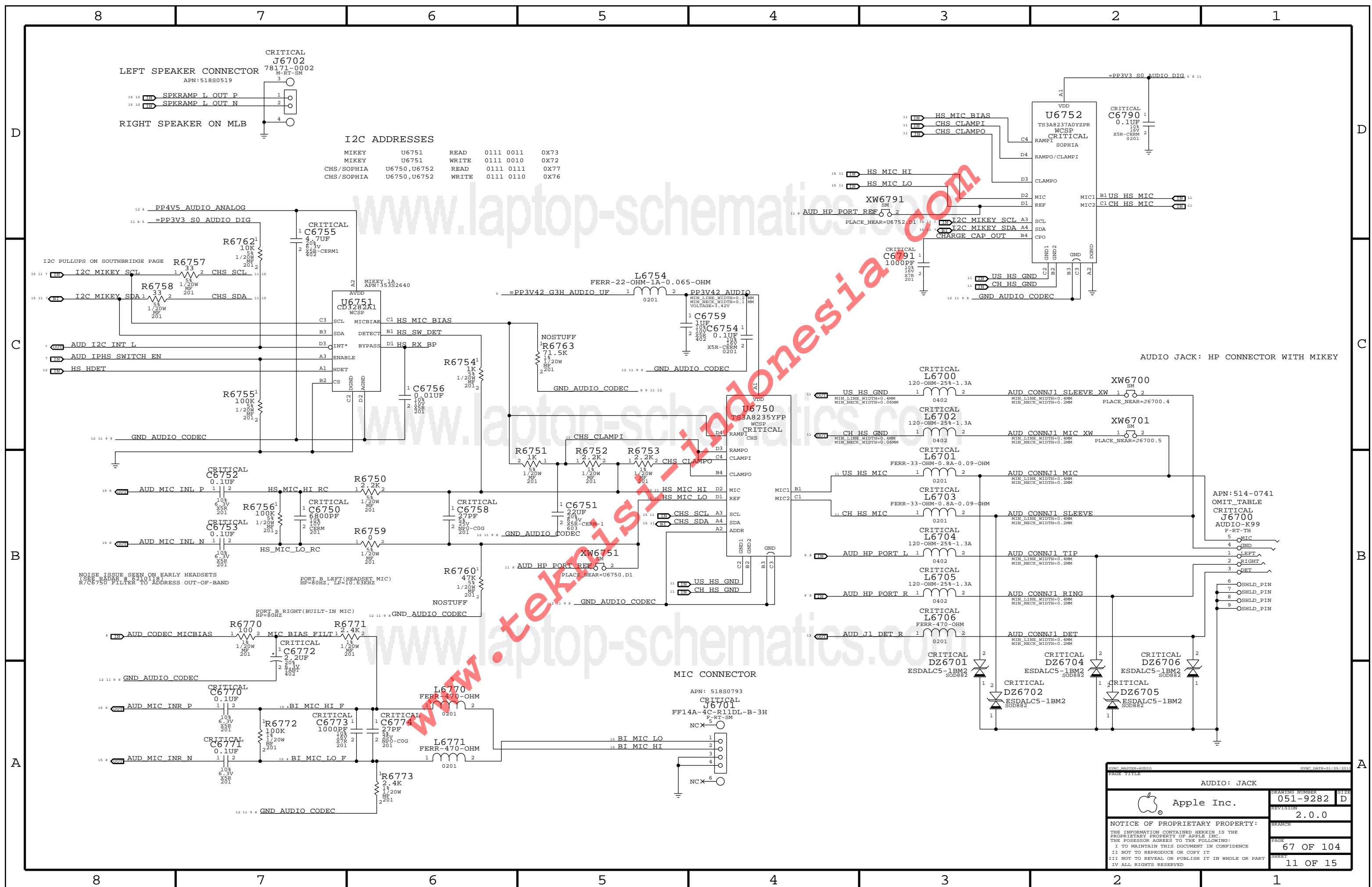
www.laptop-schematics.com

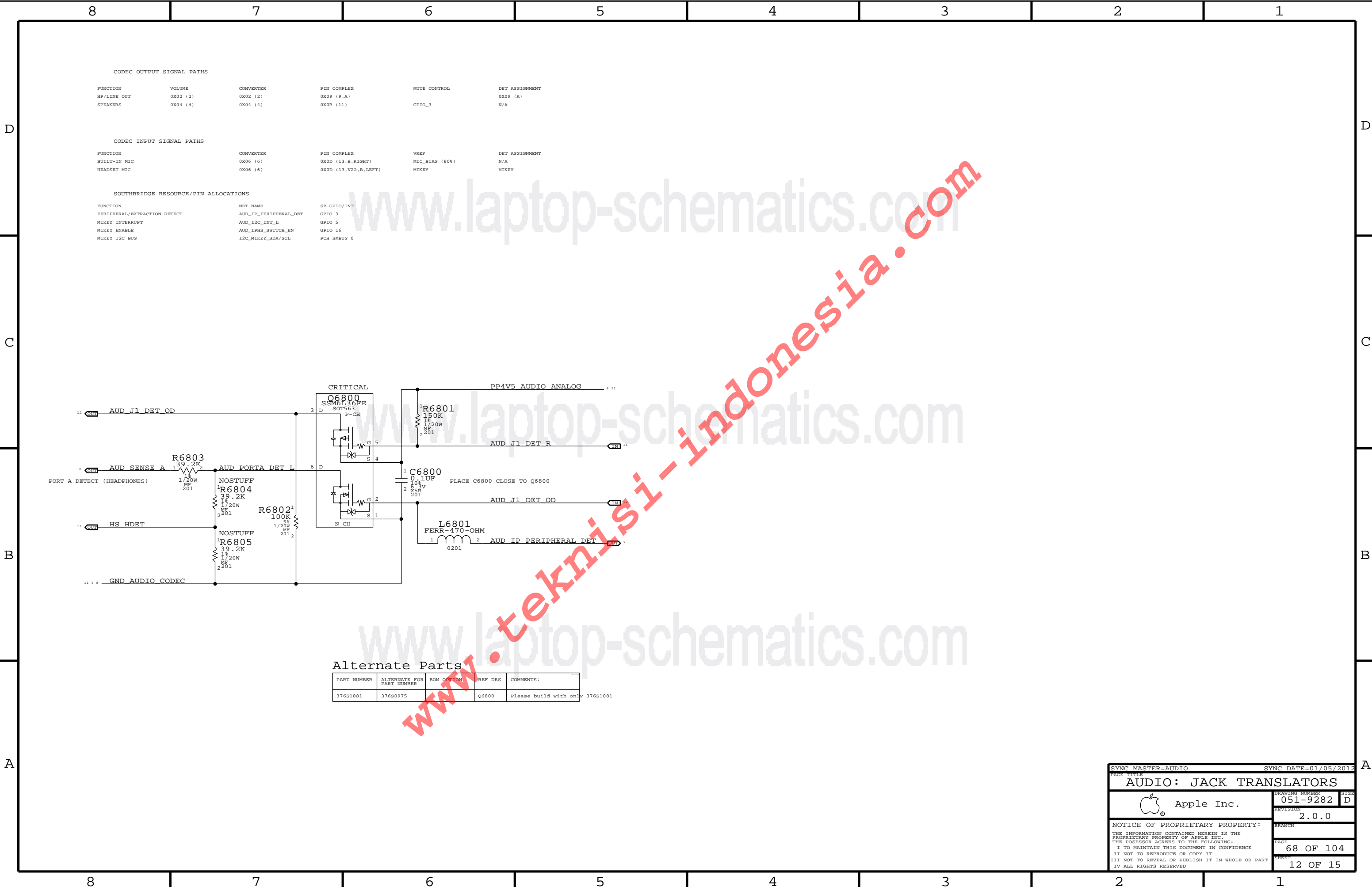
GAIN 3DB



SPEAKER OUT P/N LINES SWAPPED FOR ROUTING EASE ON LIO-SIDE

SYNC MASTER-AUDIO		SYNC DATE-01/08/2016	
PAGE TITLE			
AUDIO0: SPEAKER AMP			
	Apple Inc.	DRAWING NUMBER	SIZE
		051-9282	D
		REVISION	
		2.0.0	
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		SHEET 10 OF 15	






Alternate Parts

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S1081	376S0975		Q6800	Please build with only 376S1081

SYNC MASTER=AUDIO

SYNC DATE=01/05/2012

AUDIO: JACK TRANSLATORS

 Apple Inc.

DRAWING NUMBER
051-9282

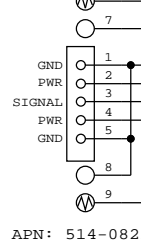
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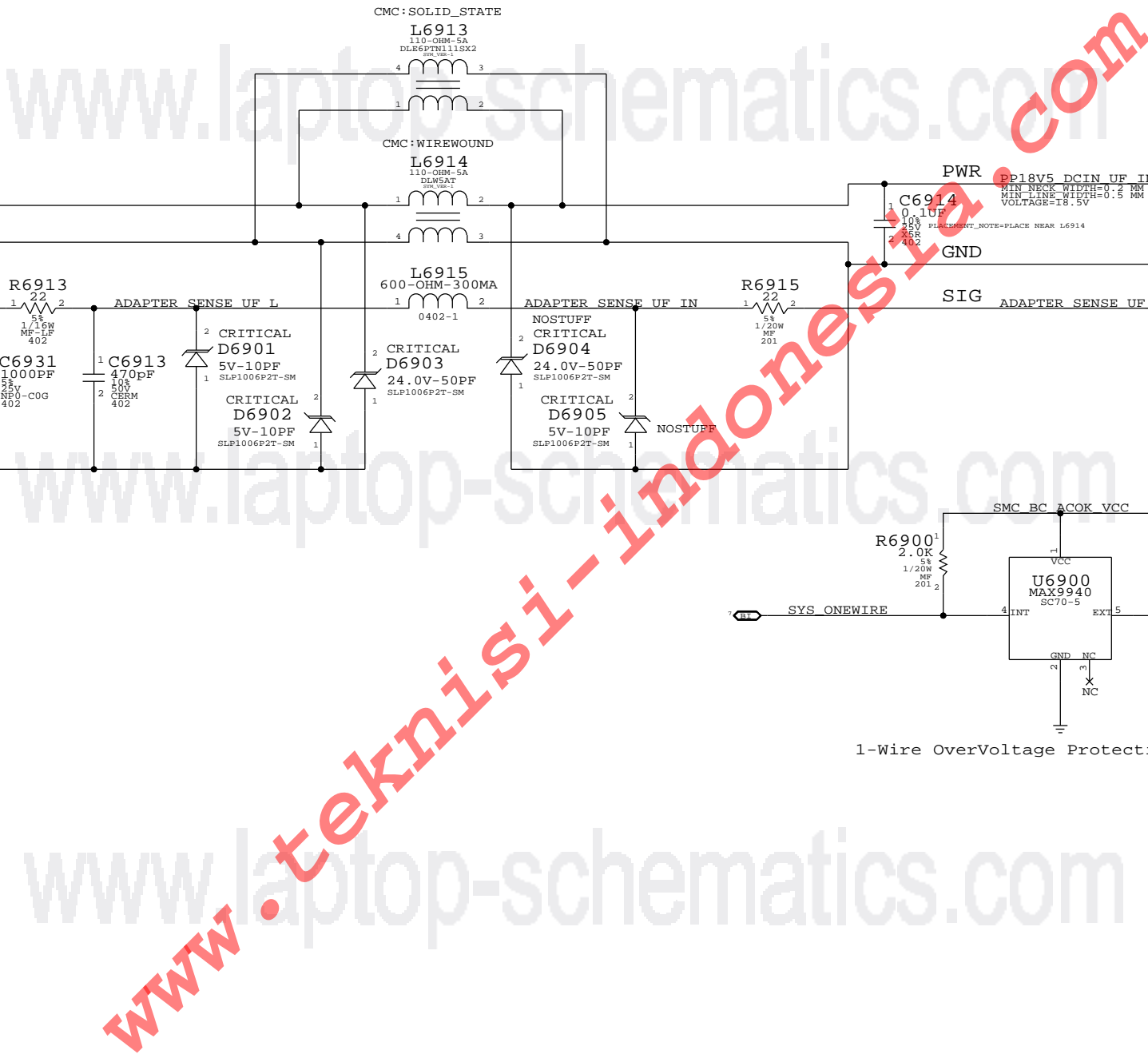
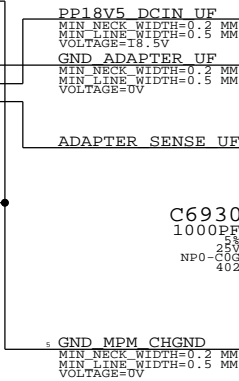
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PAGE
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SHEET
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MPM Connector
CRITICAL
J6910

MPM-J11-J13
F-RT-TH

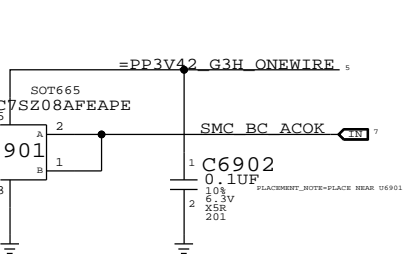
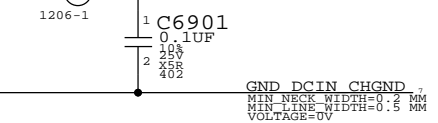



APN: 514-0821



1-Wire OverVoltage Protection

CRITICAL
F6901
6AMP-24V



SYNC MASTER=MASTER		SYNC DATE=MASTER	
PAGE TITLE			
MPM CONNECTOR			
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K21 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		MM	16.2

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	0.110 MM	0.090 MM			
50_OHM_SE	ISL3,ISL4	Y	0.100 MM	0.090 MM			
50_OHM_SE	*	Y	0.100 MM	0.090 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
80_OHM_DIFF	TOP,BOTTOM	Y	0.140 MM	0.125 MM		0.150 MM	0.150 MM
80_OHM_DIFF	ISL3,ISL4	Y	0.135 MM	0.115 MM		0.200 MM	0.200 MM
80_OHM_DIFF	*	Y	0.135 MM	0.115 MM	=STANDARD	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
1X_DIELECTRIC	TOP,BOTTOM	0.071 MM	?
1X_DIELECTRIC	ISL3,ISL4	0.080 MM	?
1X_DIELECTRIC	*	0.080 MM	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
1:1_SPACING	*	0.100 MM	?

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
DEFAULT	*	0.100 MM	?
STANDARD	*	=DEFAULT	?

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		DIFFERENTIAL_PAIR	
	PHYSICAL	SPACING		
USB_EXTB	USB_80D	USB	USB_EXTB_P	DP_USB_EXTB
USB_EXTB	USB_80D	USB	USB_EXTB_N	DP_USB_EXTB
	USB_80D	USB	CONN_USB_EXTB_P	DP_USB_EXTB
	USB_80D	USB	CONN_USB_EXTB_N	DP_USB_EXTB
USB_CAMERA	USB_80D	USB	USB_CAMERA_P	DP_USB_CAMERA
USB_CAMERA	USB_80D	USB	USB_CAMERA_N	DP_USB_CAMERA
	USB_80D	USB	USB_CAMERA_CONN_P	DP_USB_CAMERA
	USB_80D	USB	USB_CAMERA_CONN_N	DP_USB_CAMERA
USB3_EXTB_RX	USB3_80D	USB3_TX	USB3_EXTB_RX_P	DP_USB3_EXTB_RX
USB3_EXTB_RX	USB3_80D	USB3_TX	USB3_EXTB_RX_N	DP_USB3_EXTB_RX
USB3_EXTB_TX	USB3_80D	USB3_RX	USB3_EXTB_TX_P	DP_USB3_EXTB_TX
USB3_EXTB_TX	USB3_80D	USB3_RX	USB3_EXTB_TX_N	DP_USB3_EXTB_TX
SMB	SMB_50S	SMB	I2C_LIO_SDA	
SMB	SMB_50S	SMB	I2C_LIO_SCL	

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_80D	*	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT	SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
USB	TOP,BOTTOM	=4X_DIELECTRIC	?	USB	*	=2X_DIELECTRIC	?

USB 3.0 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
USB3_80D	*	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF	=80_OHM_DIFF

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT	SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
USB3_TX2RX	*	=6X_DIELECTRIC	?	USB3_TX2RX	TOP,BOTTOM	=7X_DIELECTRIC	?
USB3_RX2TX	*	=6X_DIELECTRIC	?	USB3_RX2TX	TOP,BOTTOM	=7X_DIELECTRIC	?
USB3_2OTHER	*	=3X_DIELECTRIC	?	USB3_2OTHER	TOP,BOTTOM	=5X_DIELECTRIC	?


NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
USB3_TX	*_RX	*	USB3_TX2RX
USB3_RX	*_TX	*	USB3_RX2TX
USB3_TX	*	*	USB3_2OTHER
USB3_RX	*	*	USB3_2OTHER

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_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT	SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SMB	TOP,BOTTOM	=4X_DIELECTRIC	?	SMB	*	=2X_DIELECTRIC	?

Chief River SMB 5mil spacing. 50 ohm trace +/- 10.

SYNC MASTER=CONSTRAINTS		SYNC DATE=01/09/2012	
PAGE TITLE		COUGAR POINT CONSTRAINTS 2	
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		PAGE	103 OF 104
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K21 LIO BOARD AUDIO SPECIFIC SPACING & PHYSICAL CONSTRAINTS

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	=50_OHM_SE	10 MM	0 MM	0 MM
STANDARD	*	=DEFAULT	=DEFAULT	=DEFAULT	=DEFAULT	=DEFAULT	=DEFAULT
1:1_DIFFPAIR	*	=STANDARD	=STANDARD	=STANDARD	=STANDARD	0.100 MM	0.100 MM

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_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
HDA	*	=2x_DIELECTRIC	?

Other 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_50S	*	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD
SPK_CONN_DIFF	*	TOP,BOTTOM	0.300 MM	0.200 MM	=1:1_DIFFPAIR	=1:1_DIFFPAIR	=1:1_DIFFPAIR

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
SPEAKER	*	=2:1_SPACING	?
MIC	*	=2.5:1_SPACING	?

ELECTRICAL_CONSTRAINT_SET	PHYSICAL	NET_TYPE	DIFFERENTIAL_PAIR
 HDA_BIT_CLK	HDA_50S	HDA	HDA BIT CLK 7 8
 HDA_SYNC	HDA_50S	HDA	HDA SYNC 7 8
 HDA_RST_L	HDA_50S	HDA	HDA RST L 7 8
 HDA_SDIN0	HDA_50S	HDA	HDA SDIN0 7 8
 HDA_SDI_R	HDA_50S	HDA	AUD SDI R 8
 HDA_SDOUT	HDA_50S	HDA	HDA SDOUT 7 8
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	AUD LO2 R P DP_RIGHT_SPEAKER 8 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	AUD LO2 R N DP_RIGHT_SPEAKER 8 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	SPKRAMP INR P DP_RIGHT_SPEAKER 7 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	SPKRAMP INR N DP_RIGHT_SPEAKER 7 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	AUD LO2 L P DP_LEFT_SPEAKER 8 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	AUD LO2 L N DP_LEFT_SPEAKER 8 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	SPKRAMP INL P DP_LEFT_SPEAKER 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	SPKRAMP INL N DP_LEFT_SPEAKER 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	MAX98300 L P DP_LEFT_SPEAKER 10
 DIFFPAIR	1:1 DIFFPAIR	SPEAKER	MAX98300 L N DP_LEFT_SPEAKER 10
 DIFFPAIR	SPK_CONN DIFF	SPEAKER	SPKRAMP L OUT P DP_SPK_CONN 10 11
 DIFFPAIR	SPK_CONN DIFF	SPEAKER	SPKRAMP L OUT N DP_SPK_CONN 10 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	AUD MIC INR P DP_MIC_INTERNAL 8 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	AUD MIC INR N DP_MIC_INTERNAL 8 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	BI MIC HI F DP_MIC_INTERNAL 4 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	BI MIC LO F DP_MIC_INTERNAL 4 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	BI MIC HI DP_MIC_INTERNAL 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	BI MIC LO DP_MIC_INTERNAL 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	AUD MIC INL P DP_MIC_JACK 8 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	AUD MIC INL N DP_MIC_JACK 8 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	HS MIC HI DP_MIC_JACK 11
 DIFFPAIR	1:1 DIFFPAIR	MIC	HS MIC LO DP_MIC_JACK 11
 SMB_AUDIO	SMB_50S	SMB	CHS SDA 11
 SMB_AUDIO	SMB_50S	SMB	CHS SCL 11
 SMB	SMB_50S	SMB	I2C MIKEY SDA 7 11
 SMB	SMB_50S	SMB	I2C MIKEY SCL 7 11

TO LIO CONNECTOR

TO LEFT SPEAKER

TO INTERNAL MIC

TO JACK MIC