

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
13	0001520462	ENGINEERING RELEASED	2012-07-02

X123 MAIN LOGIC BOARD  
DVT  
LAST\_MODIFIED=Wed Jun 27 16:39:5

DVT

LAST\_MODIFIED=Wed Jun 27 16:39:53 2012


## SCH AND BOARD PART NUMBERS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-9374	1	SCH,MLB,X123	SCH1	
820-3243	1	PCB,MLB,X123	PCB1	

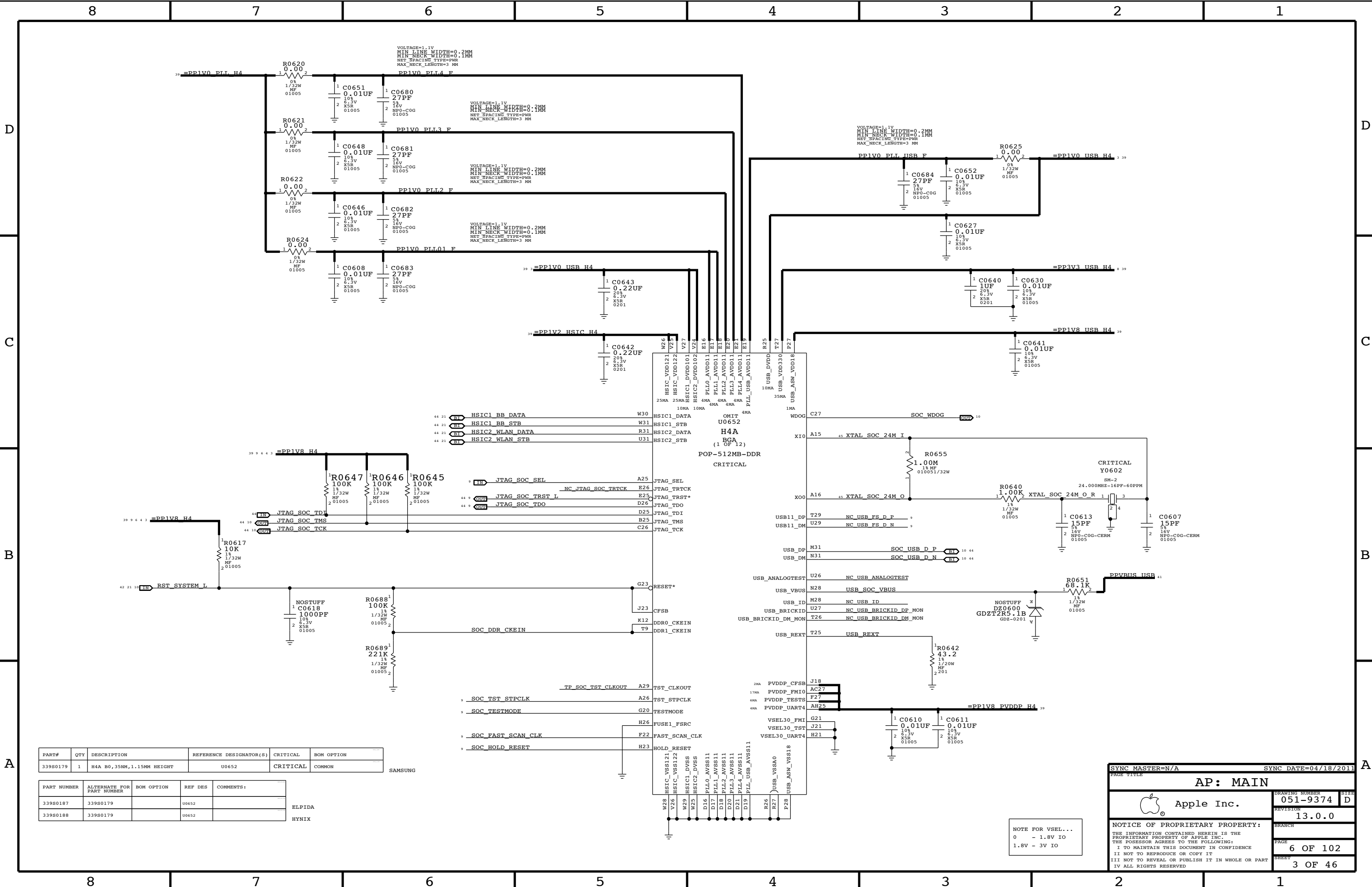
PDF	CSA	CONTENTS	SYNC	MASTER	DATE
1	1	TABLE OF CONTENTS		N/A	N/A
2	2	BLOCK DIAGRAM: SYSTEM		N/A	N/A
3	6	AP: MAIN		N/A	04/18/2011
4	7	AP: I/Os		N/A	05/05/2011
5	8	AP: FLASH MEMORY INTERFACE		N/A	04/18/2011
6	9	AP: TV/DP/MIPI/CAMERA		MLB	05/04/2012
7	10	AP: PWR		N/A	04/18/2011
8	11	AP: PWR		N/A	04/18/2011
9	12	AP: MISC & ALIASES		N/A	04/11/2011
10	13	E75 SUPPORT		N/A	N/A
11	14	NAND STORAGE		MLB	05/04/2012
12	17	TOUCH: FLEX CONNECTOR		N/A	06/21/2010
13	18	AUDIO JACK FLEX CONN		N/A	03/31/2011
14	19	AUDIO: L81 CODEC		KAVITHA	01/18/2012
15	20	AUDIO: CS35L19A AMPS		KAVITHA	01/18/2012
16	22	VIDEO: MIPI CONNECTOR		N/A	N/A
17	26	FF CAM & MIC CONNECTORS		N/A	N/A
18	27	INERTIAL SENSORS		N/A	N/A
19	28	PROX SENSOR		N/A	N/A
20	29	BUTTON & REAR CAMERA CONN		N/A	N/A

PDF	CSA	CONTENTS	SYNC MASTER	DATE
21	31	SYSTEM & DEBUG CONNECTORS	JORGE	06/27/2012
22	32	BASEBAND PMU (1 OF 2)	JORGE	06/27/2012
23	33	BASEBAND PMU (2 OF 2)	JORGE	06/27/2012
24	34	BASEBAND (1 OF 2)	JORGE	06/27/2012
25	35	MOBILE DATA MODEM (2 OF 2)	JORGE	06/27/2012
26	36	RF TRANSCEIVER (1 OF 3)	JORGE	06/27/2012
27	37	RF TRANSCEIVER (2 OF 3)	JORGE	06/27/2012
28	38	RF TRANSCEIVER (3 OF 3)	JORGE	06/27/2012
29	39	BAND 5/8 PAD	JORGE	06/27/2012
30	40	BAND 13 PA	JORGE	06/27/2012
31	41	2G PA, DCDC CONVERTER	JORGE	06/27/2012
32	42	DCS RX, ASM	JORGE	06/27/2012
33	43	BAND 1/4 PAD	JORGE	06/27/2012
34	44	BAND2 PAD	JORGE	06/27/2012
35	45	RX DIVERSITY	JORGE	06/27/2012
36	46	GPS	JORGE	06/27/2012
37	47	WIFI/BT	JORGE	06/27/2012
38	57	IO FLEX: DOCK COMPONENTS	N/A	04/18/2011
39	73	Power: Aliases	N/A	N/A
40	75	POWER: BATTERY CONNECTOR	N/A	N/A
41	81	Power: PMU	N/A	N/A
42	82	POWER: PMU	N/A	05/09/2011
43	93	MECHANICAL PARTS	N/A	N/A
44	100	CONSTRAINTS: ASSIGNMENTS	N/A	N/A
45	101	CONSTRAINTS: ASSIGNMENTS	N/A	N/A
46	102	CONSTRAINTS: MLB RULES	N/A	N/A

DRAWING

DRAWING TITLE		SCH, MLB, X123	
 Apple Inc.	DRAWING NUMBER		SIZE
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	REVISION		
		13.0.0	
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		SHEET 1 OF 46	





PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S0179	1	H4A B0, 35NM, 1.15MM HEIGHT	U0652	CRITICAL	COMMON

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S0187	339S0179		U0652	
339S0188	339S0179		U0652	

ELPIDA  
HYNIX

SYNC MASTER=N/A

SYNC DATE=04/18/2011

AP: MAIN

Apple Inc.

DRAWING NUMBER  
051-9374

REVISION  
13.0.0

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6 OF 102

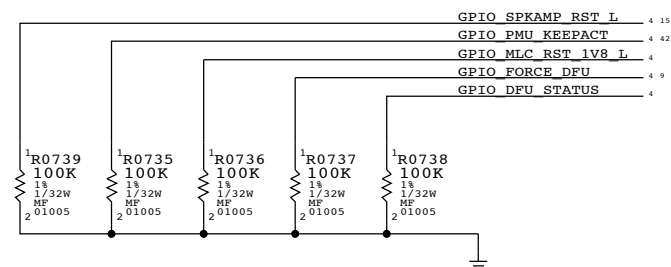
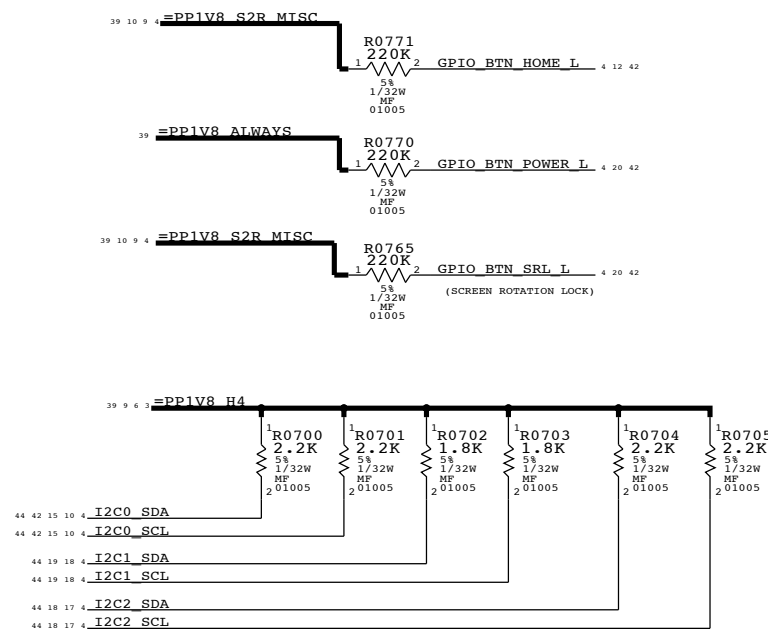
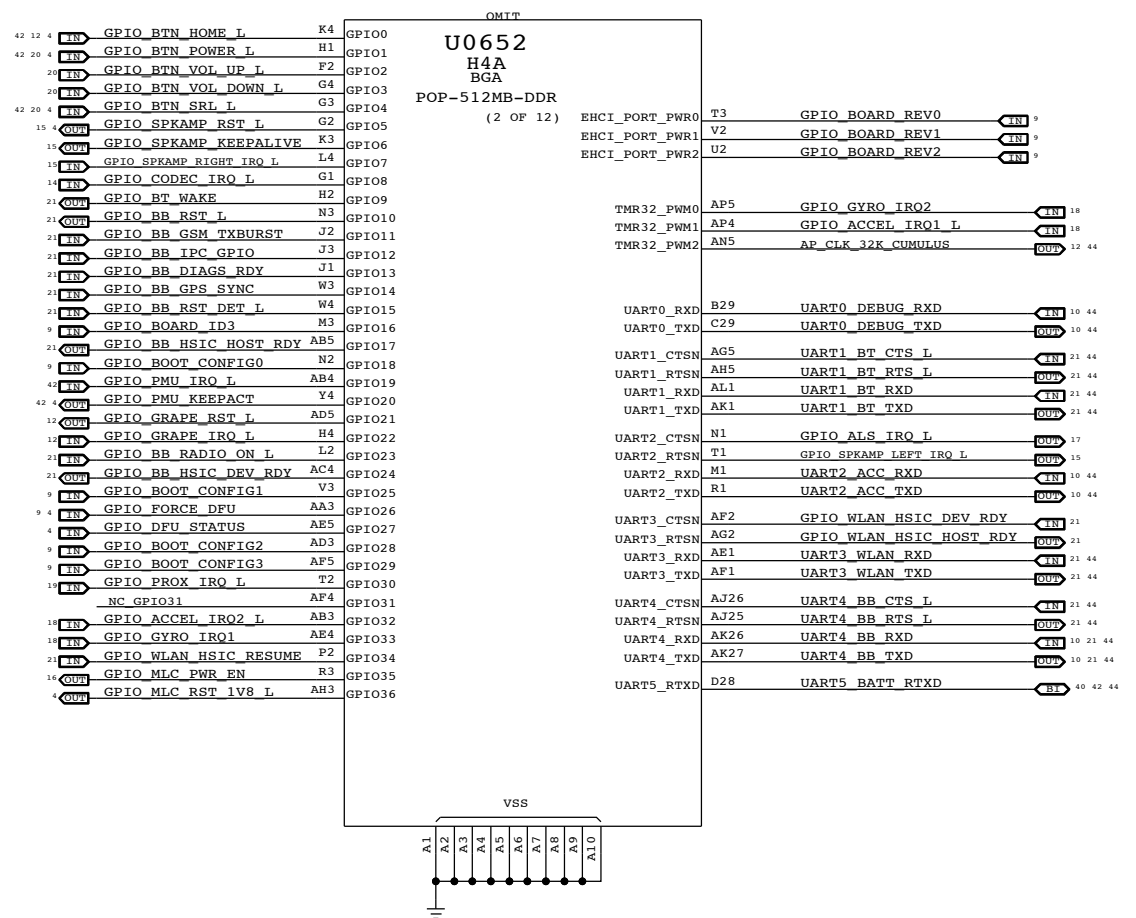
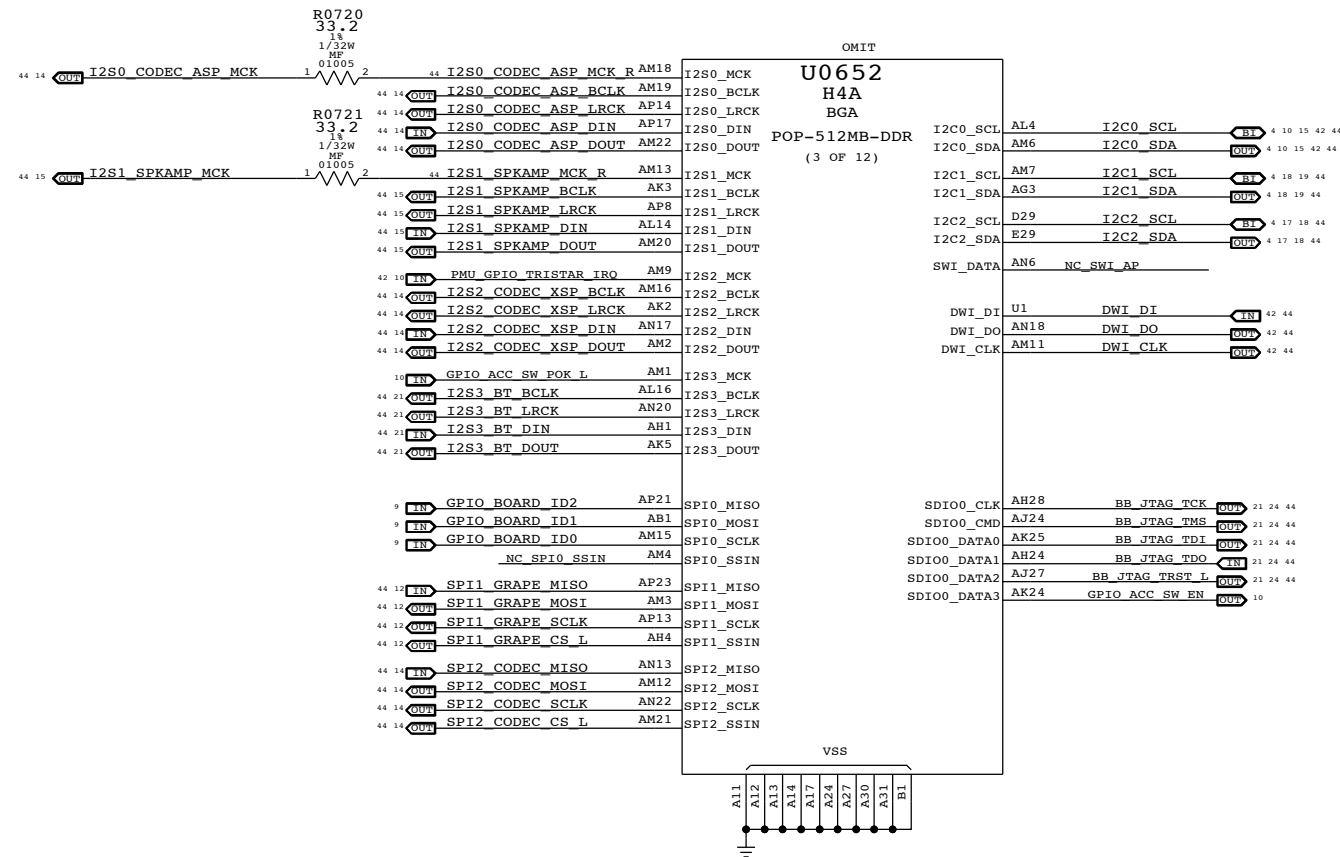
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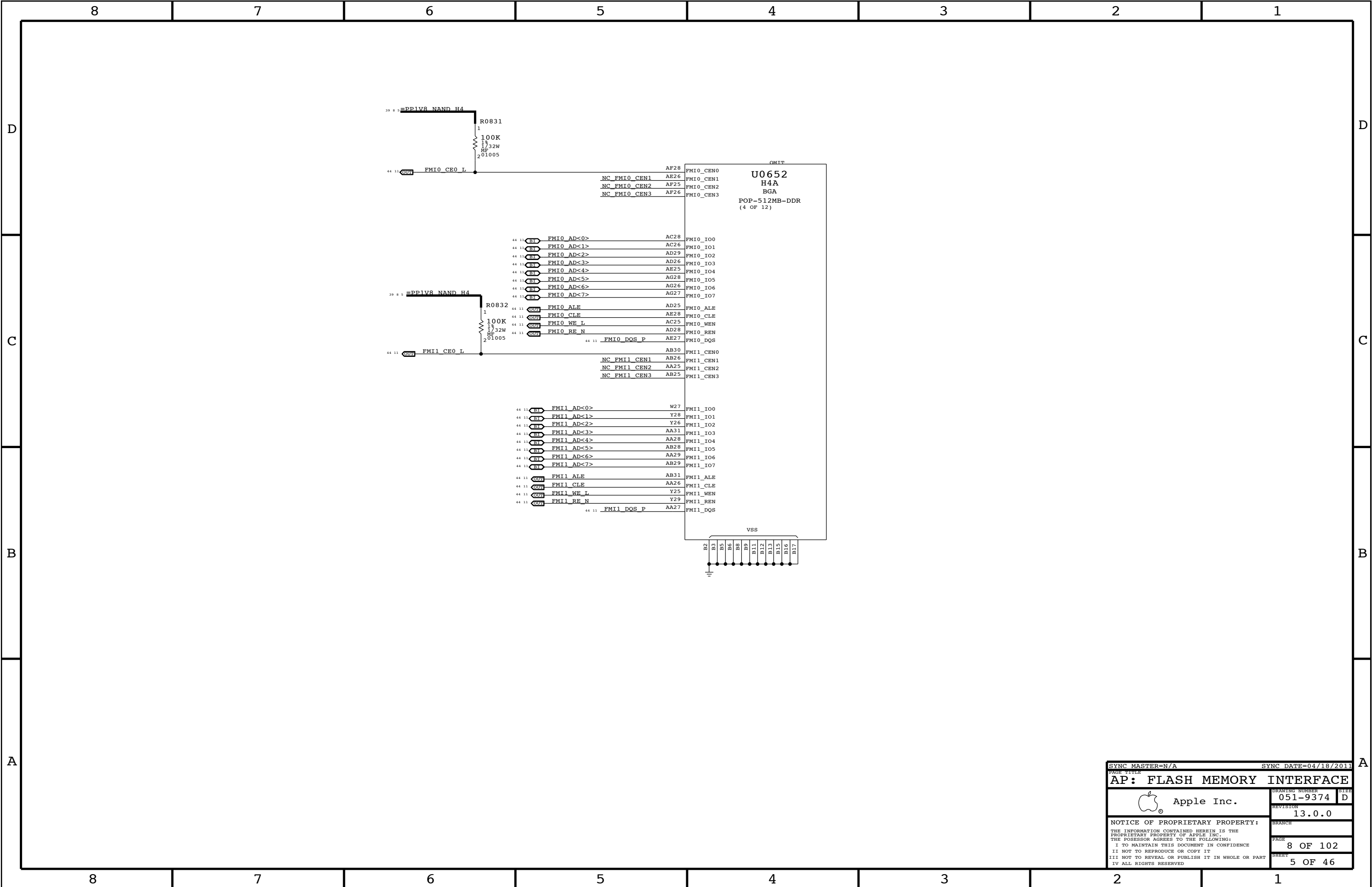
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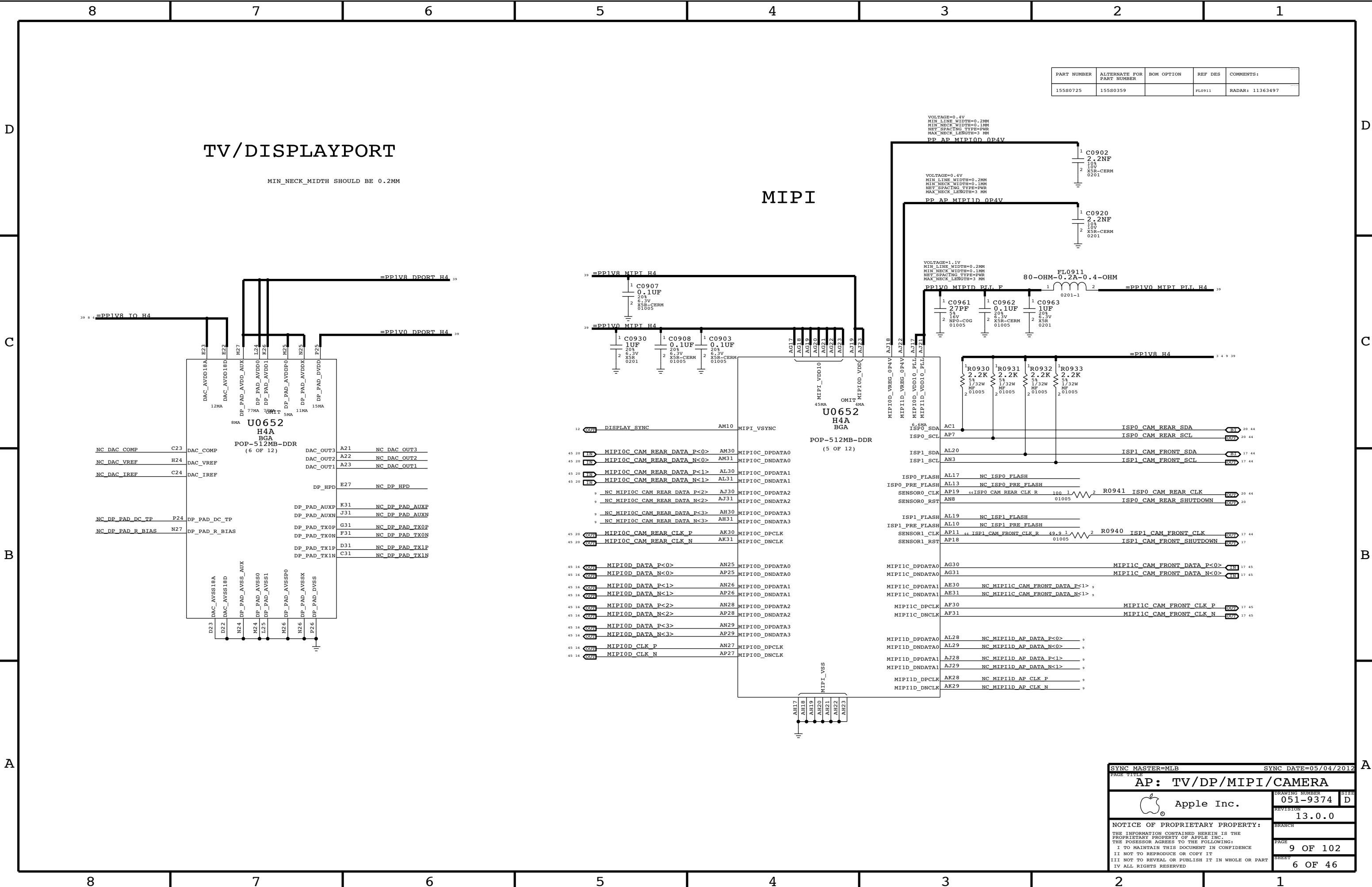
NOTE FOR VSEL...  
0 - 1.8V IO  
1.8V - 3V IO

## H4A I/OS




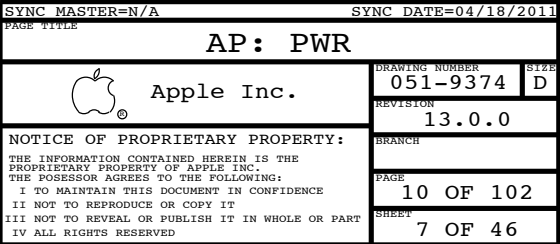
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	REVISION	13.0.0	
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		SHEET	
		4 OF 46	

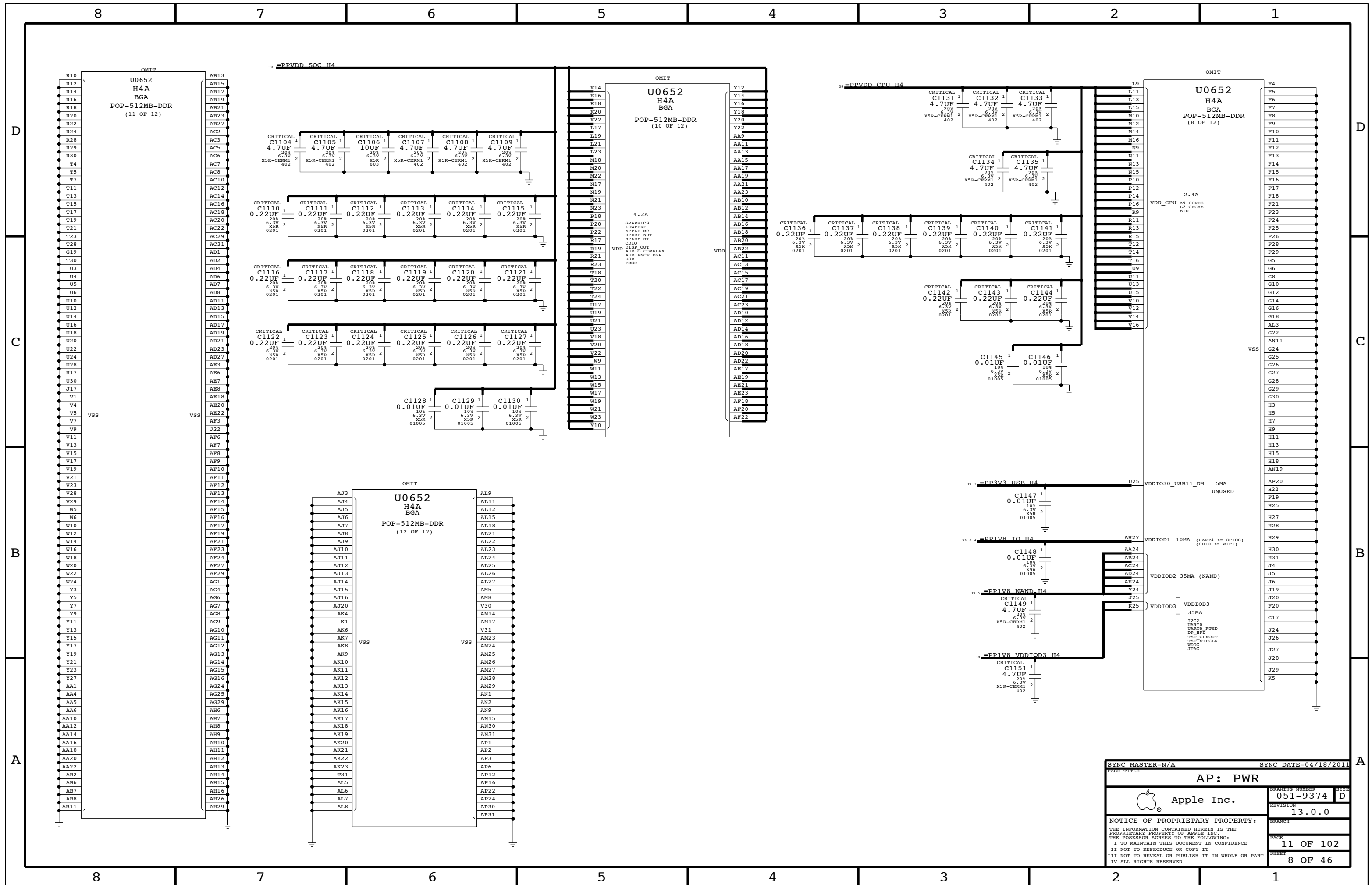




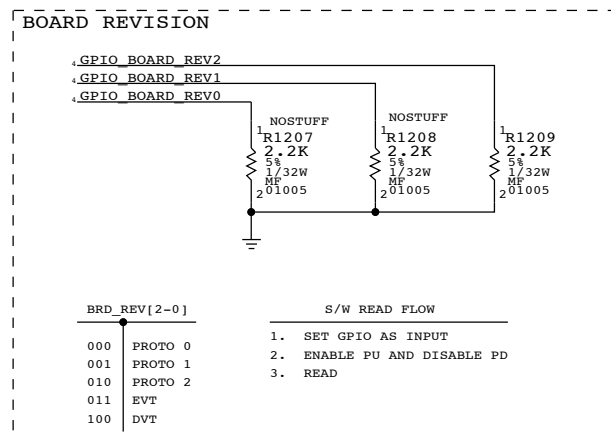
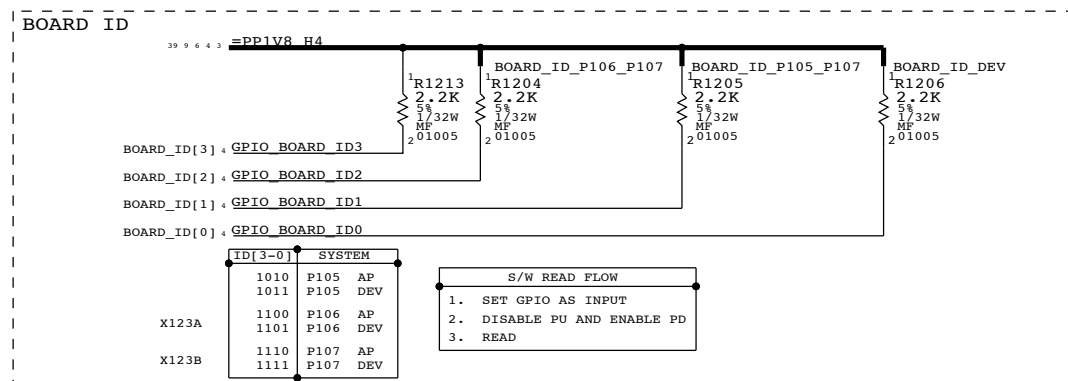
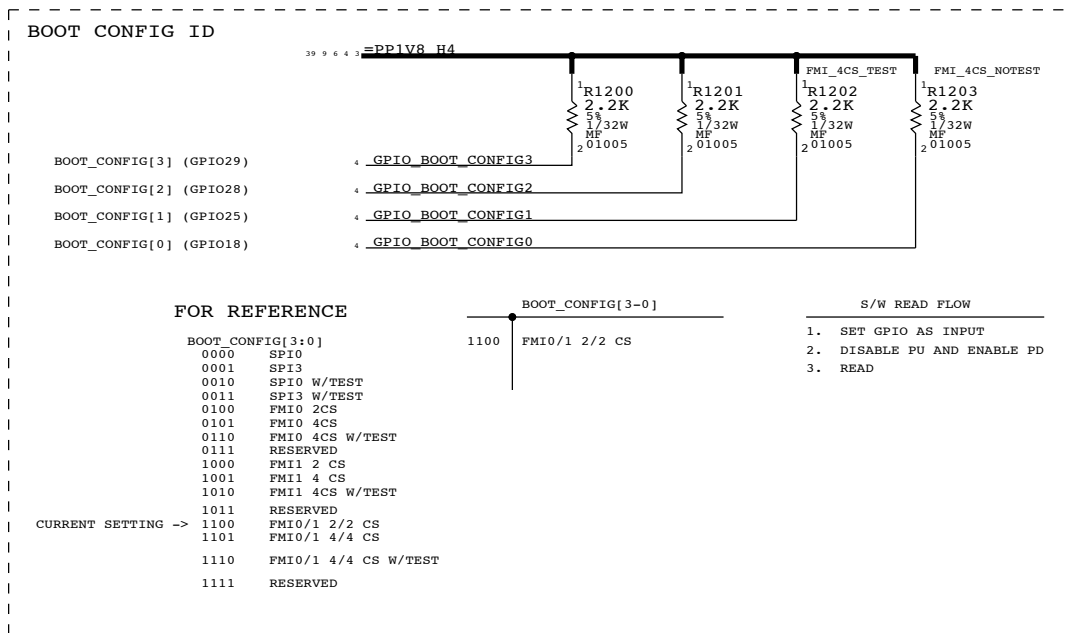
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SYNC MASTER=MLB		SYNC DATE=05/04/2012	
PAGE TITLE			
AP: TV/DP/MIPI/CAMERA		DRAWING NUMBER	
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		REVISION	
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		SHEET	6 OF 46









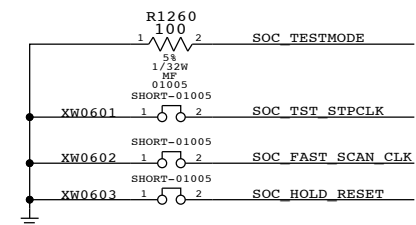
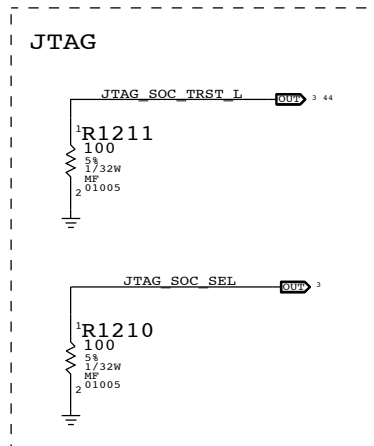
NOTE: PADS USED FOR DEBUG

39 10 PP1V8\_S2R\_MISC

NOSTUFF

1  
R1270  
1K  
1270W  
201  
2


4 GPIO\_FORCE\_DFU

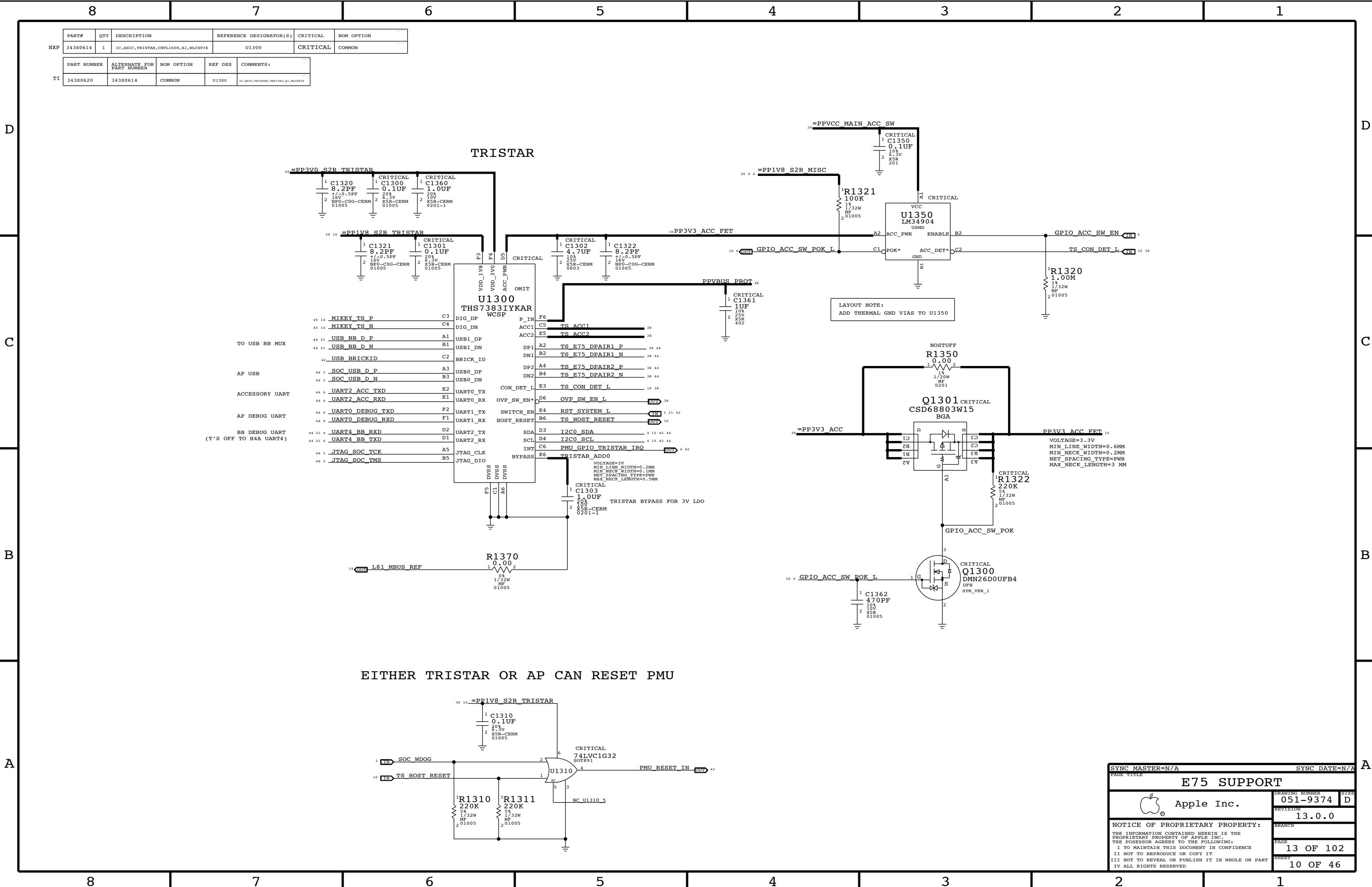


## SINGLE-PIN NETS

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NC_FMI0_RE_POS	==	FMI0_RE_P	11
	HAZE_BASE=TRUE		
NC_FMI1_DQS_NEG	==	FMI1_DQS_N	11
	HAZE_BASE=TRUE		
NC_FMI1_RE_POS	==	FMI1_RE_P	11
	HAZE_BASE=TRUE		
NC_PMU_SHDWN	==	PMU_SHDWN	42
	HAZE_BASE=TRUE		
NC_JTAG_SOC_TDO	==	JTAG_SOC_TDO	3 44
	HAZE_BASE=TRUE		

NC_AP_MIPI0C_DPDATA2	=====	NC_MIPI0C_CAM_REAR_DATA_P<2>	6
NC_AP_MIPI0C_DNDATA2	MAKES_BASE=TRUE	NC_MIPI0C_CAM_REAR_DATA_N<2>	6
NC_AP_MIPI0C_DPDATA3	=====	NC_MIPI0C_CAM_REAR_DATA_P<3>	6
NC_AP_MIPI0C_DNDATA3	MAKES_BASE=TRUE	NC_MIPI0C_CAM_REAR_DATA_N<3>	6
	MAKES_BASE=TRUE		
NC_AP_MIPI1D_DPCLK	=====	NC_MIPI1D_AP_CLK_P	6
NC_AP_MIPI1D_DNCLK	MAKES_BASE=TRUE	NC_MIPI1D_AP_CLK_N	6
NC_AP_MIPI1D_DPDATA0	MAKES_BASE=TRUE	NC_MIPI1D_AP_DATA_P<0>	6
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	MAKES_BASE=TRUE		
NC_AP_MIPI1C_DPDATA1	=====	NC_MIPI1C_CAM_FRONT_DATA_P<1>	6
NC_AP_MIPI1C_DNDATA1	MAKES_BASE=TRUE	NC_MIPI1C_CAM_FRONT_DATA_N<1>	6
	MAKES_BASE=TRUE		
NC_AP_USB11_DPD	=====	NC_USB_FS_D_P	3
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SYNC MASTER=N/A		SYNC DATE=04/11/2011	
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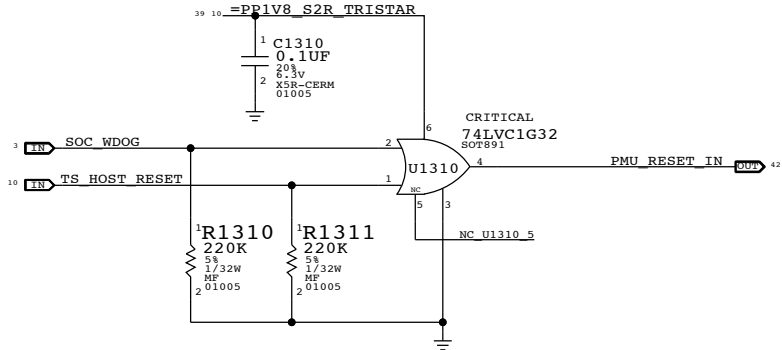
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NXP	34380614	1	IC,ASIC,TRISTAR,CBTL1608,A1,MUCSP36	U1300	CRITICAL
TI	34380620	1	IC,ASIC,TRISTAR,CBTL1608,A1,MUCSP36	U1300	CRITICAL

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
34380620	34380614	COMMON	U1300	IC,ASIC,TRISTAR,CBTL1608,A1,MUCSP36

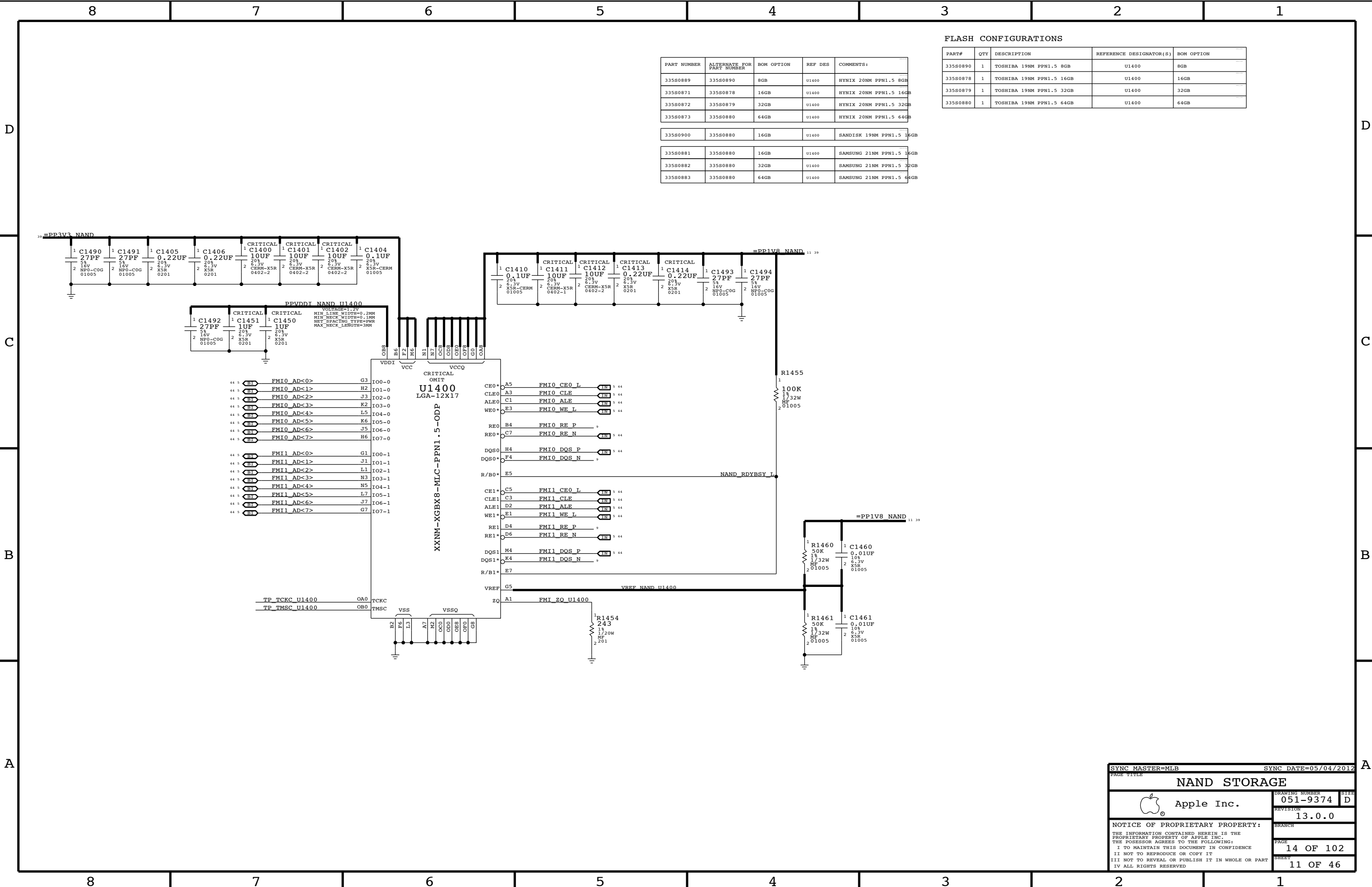
TRISTAR	THS7383IYKAR	WCSP
45 14 MIKEY TS P	C3	DIG_DP
45 14 MIKEY TS N	C4	DIG_DN
44 21 USB_BB_D_P	A1	USB1_DP
44 21 USB_BB_D_N	B1	USB1_DN
42 USB_BRICKID	C2	BRICK_ID
44 3 SOC_USB_D_P	A3	USB0_DP
44 3 SOC_USB_D_N	B3	USB0_DN
44 4 UART2_ACC_TXD	E2	UART0_TX
44 4 UART2_ACC_RXD	E1	UART0_RX
44 4 UART0_DEBUG_TXD	F2	UART1_TX
44 4 UART0_DEBUG_RXD	F1	UART1_RX
44 21 UART4_BB_RXD	D2	UART2_TX
44 21 UART4_BB_TXD	D1	UART2_RX
44 3 JTAG_SOC_TCK	A5	JTAG_CLK
44 3 JTAG_SOC_TMS	B5	JTAG_DIO

45 14 MIKEY TS P	C3	DIG_DP
45 14 MIKEY TS N	C4	DIG_DN
44 21 USB_BB_D_P	A1	USB1_DP
44 21 USB_BB_D_N	B1	USB1_DN
42 USB_BRICKID	C2	BRICK_ID
44 3 SOC_USB_D_P	A3	USB0_DP
44 3 SOC_USB_D_N	B3	USB0_DN
44 4 UART2_ACC_TXD	E2	UART0_TX
44 4 UART2_ACC_RXD	E1	UART0_RX
44 4 UART0_DEBUG_TXD	F2	UART1_TX
44 4 UART0_DEBUG_RXD	F1	UART1_RX
44 21 UART4_BB_RXD	D2	UART2_TX
44 21 UART4_BB_TXD	D1	UART2_RX
44 3 JTAG_SOC_TCK	A5	JTAG_CLK
44 3 JTAG_SOC_TMS	B5	JTAG_DIO

EITHER TRISTAR OR AP CAN RESET PMU



PAGE TITLE		PAGE NUMBER	
E75 SUPPORT		13.0.0	
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FLASH CONFIGURATIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
335S0890	1	TOSHIBA 19NM PPN1.5 8GB	U1400	8GB
335S0878	1	TOSHIBA 19NM PPN1.5 16GB	U1400	16GB
335S0879	1	TOSHIBA 19NM PPN1.5 32GB	U1400	32GB
335S0880	1	TOSHIBA 19NM PPN1.5 64GB	U1400	64GB

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0889	335S0890	8GB	U1400	HYNIX 20NM PPN1.5 8GB
335S0871	335S0878	16GB	U1400	HYNIX 20NM PPN1.5 16GB
335S0872	335S0879	32GB	U1400	HYNIX 20NM PPN1.5 32GB
335S0873	335S0880	64GB	U1400	HYNIX 20NM PPN1.5 64GB

335S0900	335S0880	16GB	U1400	SANDISK 19NM PPN1.5 16GB
335S0881	335S0880	16GB	U1400	SAMSUNG 21NM PPN1.5 16GB
335S0882	335S0880	32GB	U1400	SAMSUNG 21NM PPN1.5 32GB
335S0883	335S0880	64GB	U1400	SAMSUNG 21NM PPN1.5 64GB

SYNC MASTER=MLB

SYNC DATE=05/04/2012

NAND STORAGE

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051-9374

SIZE

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13.0.0

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TOUCH SUBSYSTEM

RCPT - MLB 998-4526 -> 516S1054  
(PLUG - FLEX 998-4527)

CRITICAL  
J1700  
503304-2010  
F-ST-SM-1

LAYOUT NOTE:  
PUT THERMAL VIAS AROUND U2200 IN CASE OF SHORTED CONDITION

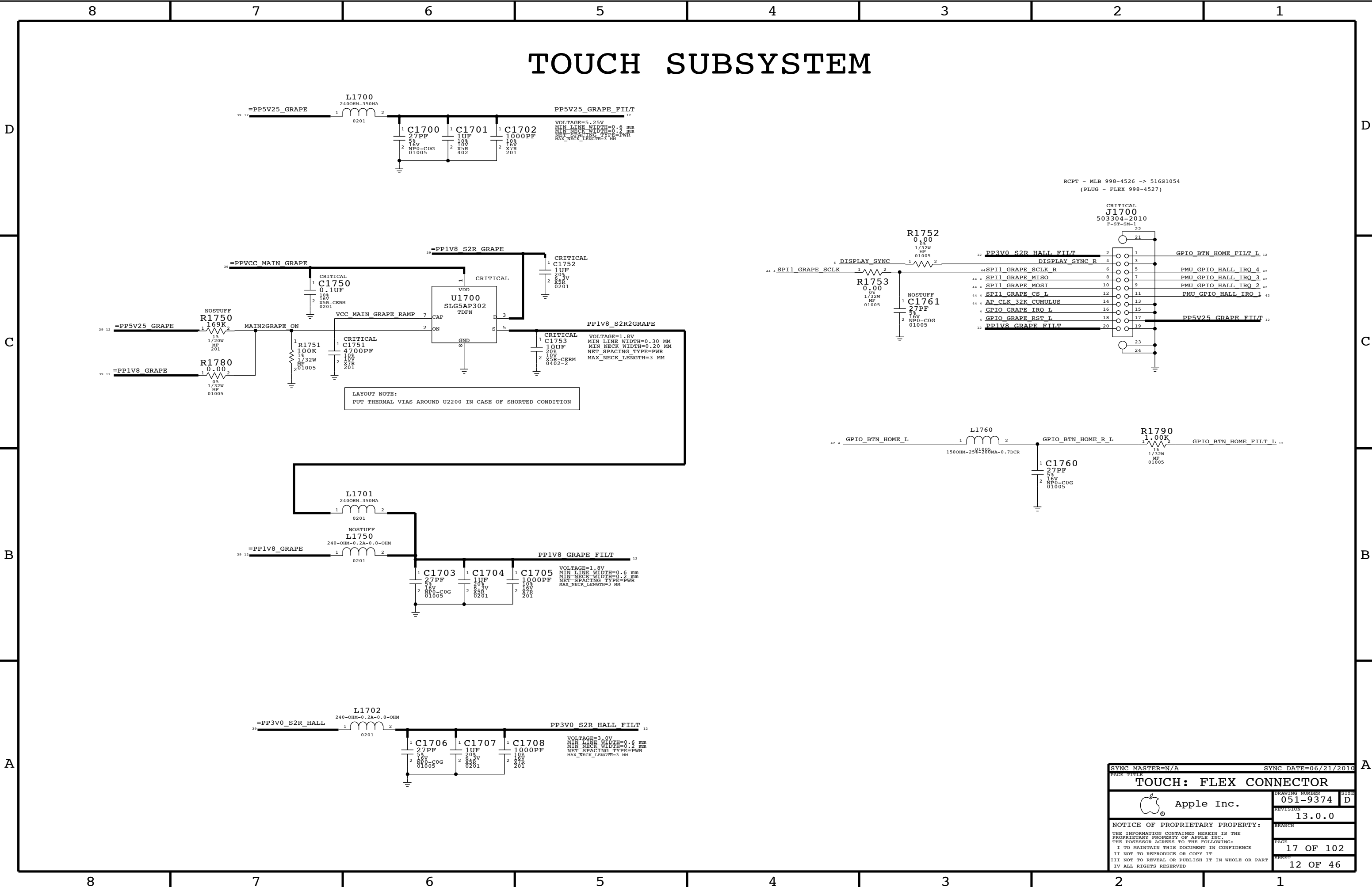
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TOUCH: FLEX CONNECTOR

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051-9374 D  
13.0.0  
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TOUCH SUBSYSTEM

RCPT - MLB 998-4526 -> 516S1054  
(PLUG - FLEX 998-4527)

CRITICAL  
J1700  
503304-2010  
F-ST-SM-1

LAYOUT NOTE:  
PUT THERMAL VIAS AROUND U2200 IN CASE OF SHORTED CONDITION

SYNC MASTER=N/A SYNC DATE=06/21/2010

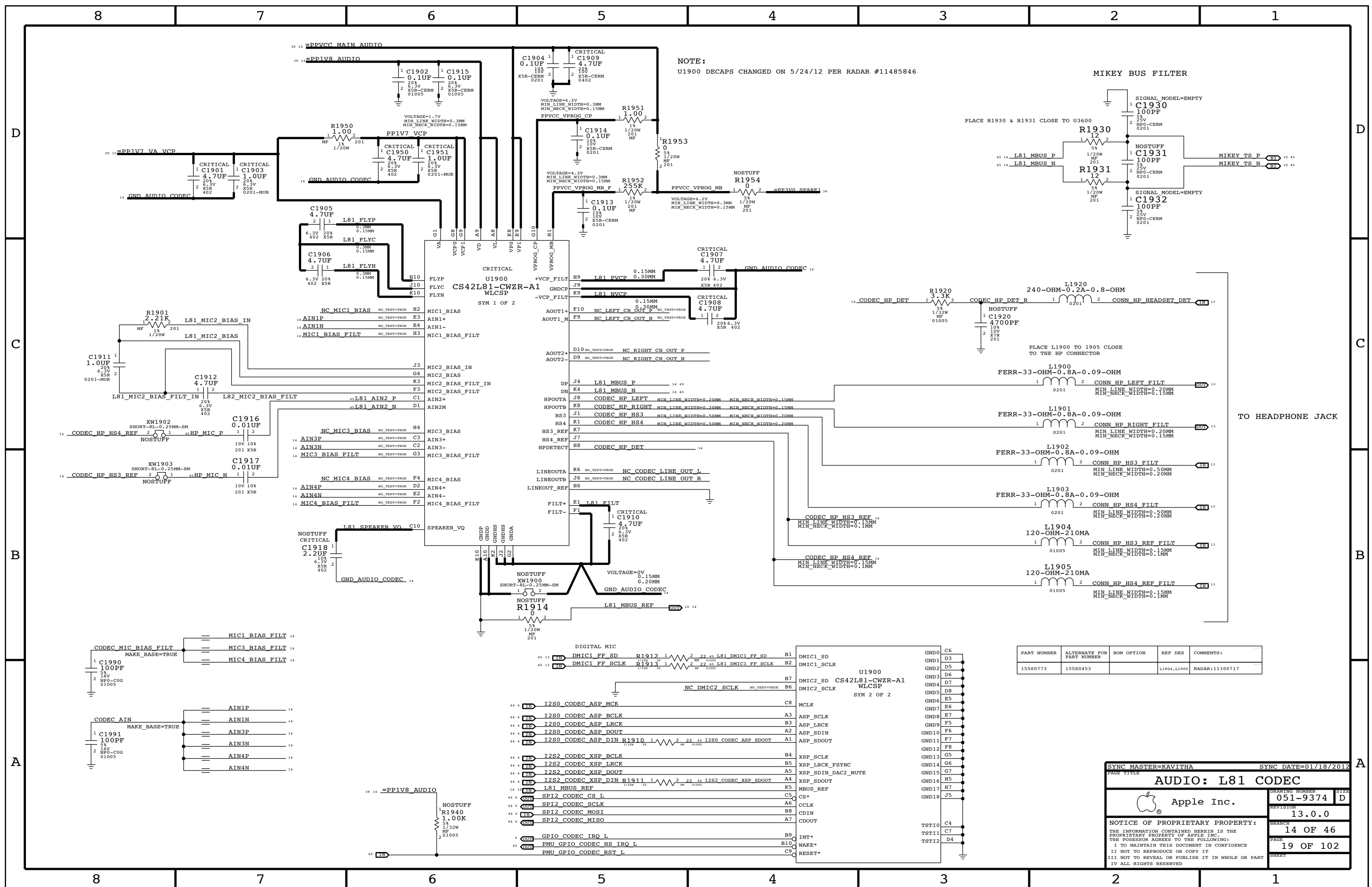
TOUCH: FLEX CONNECTOR

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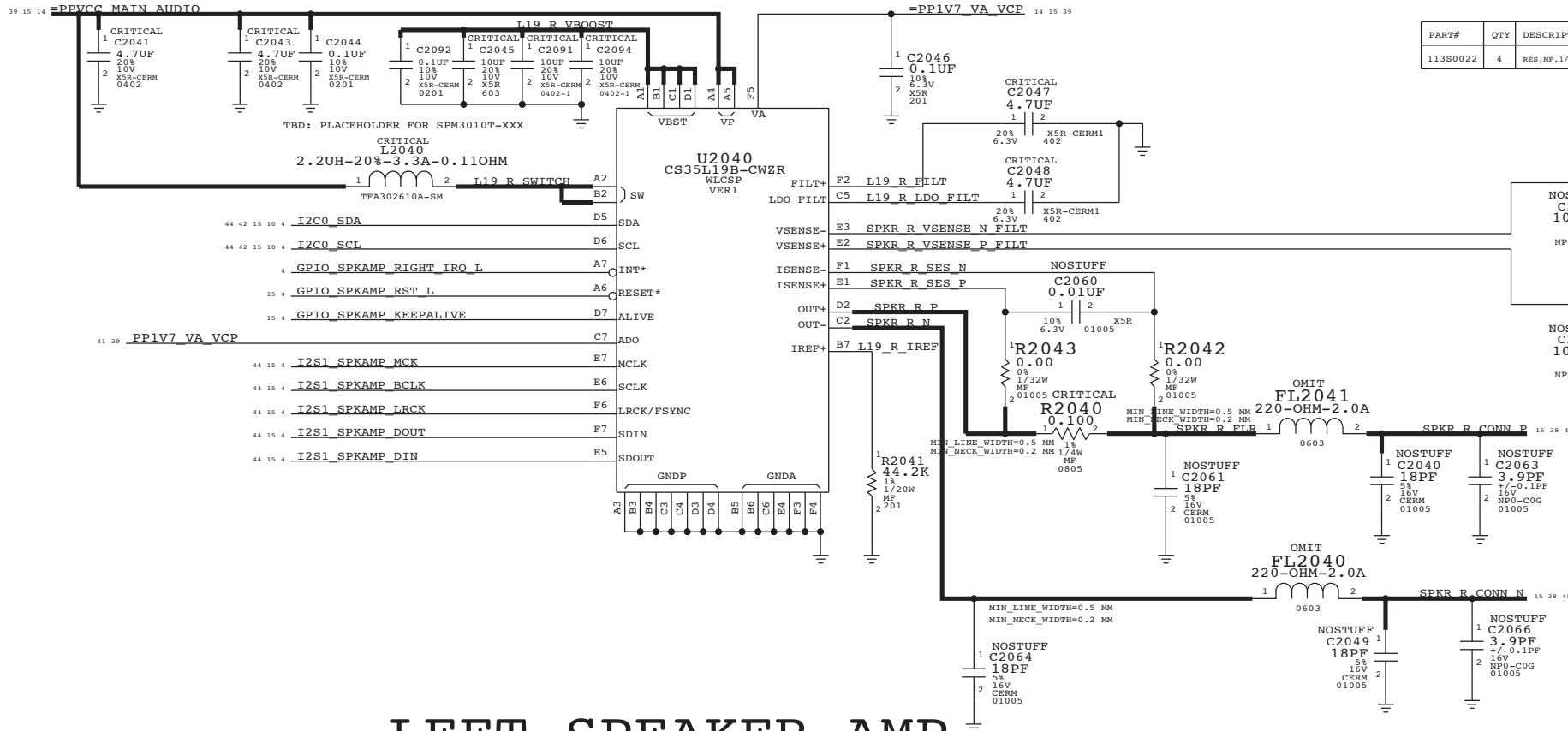
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REVISION 13.0.0  
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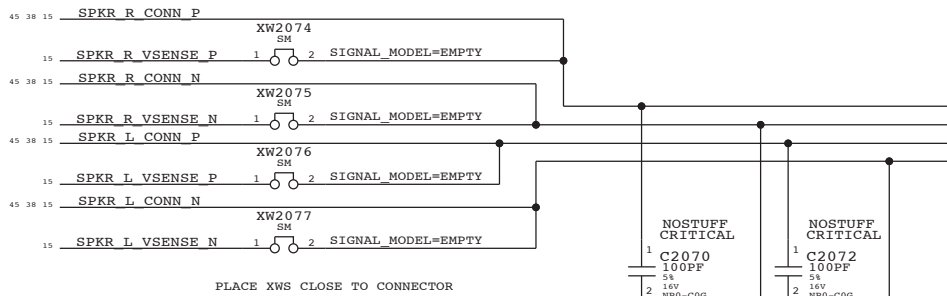
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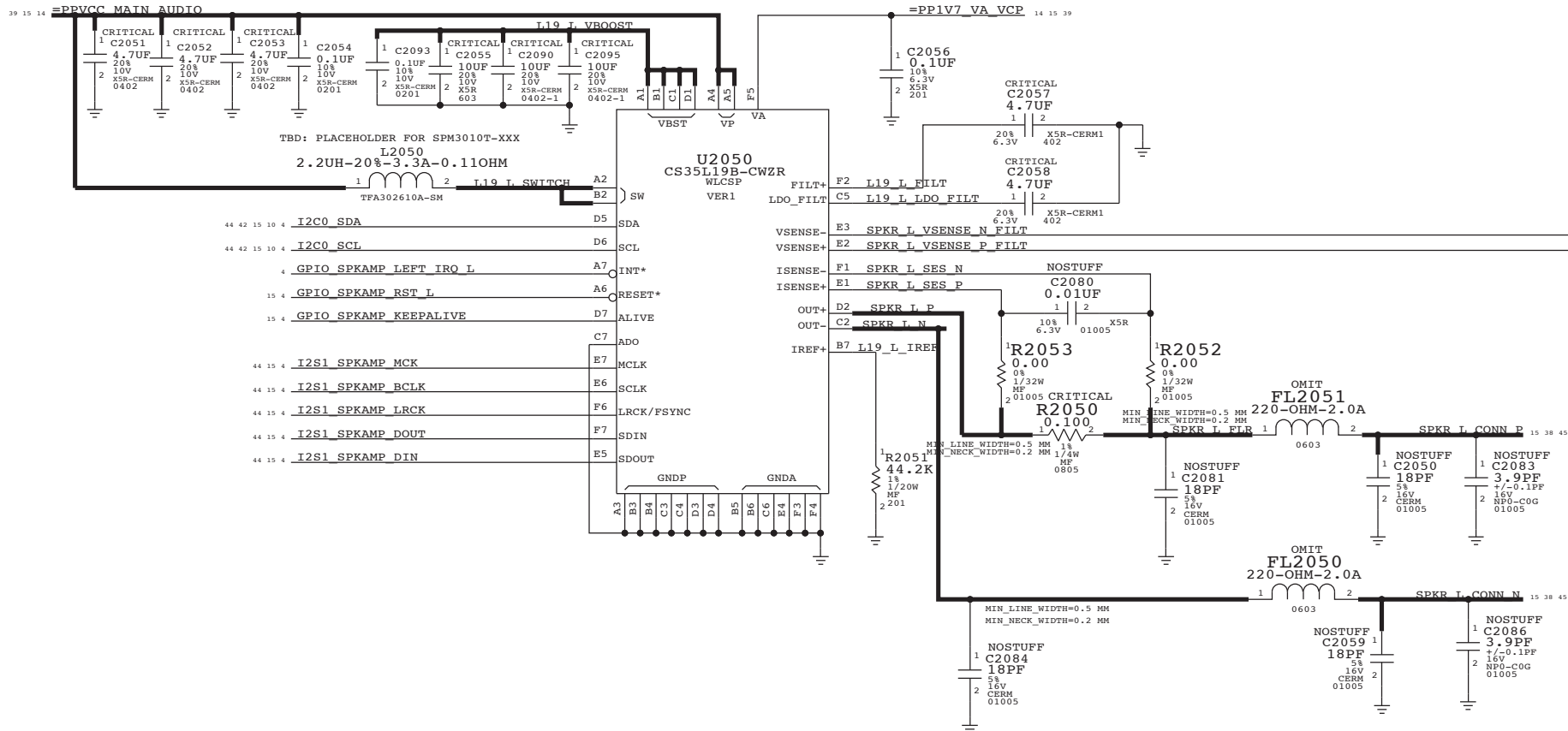
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# SPEAKER CONNECTOR



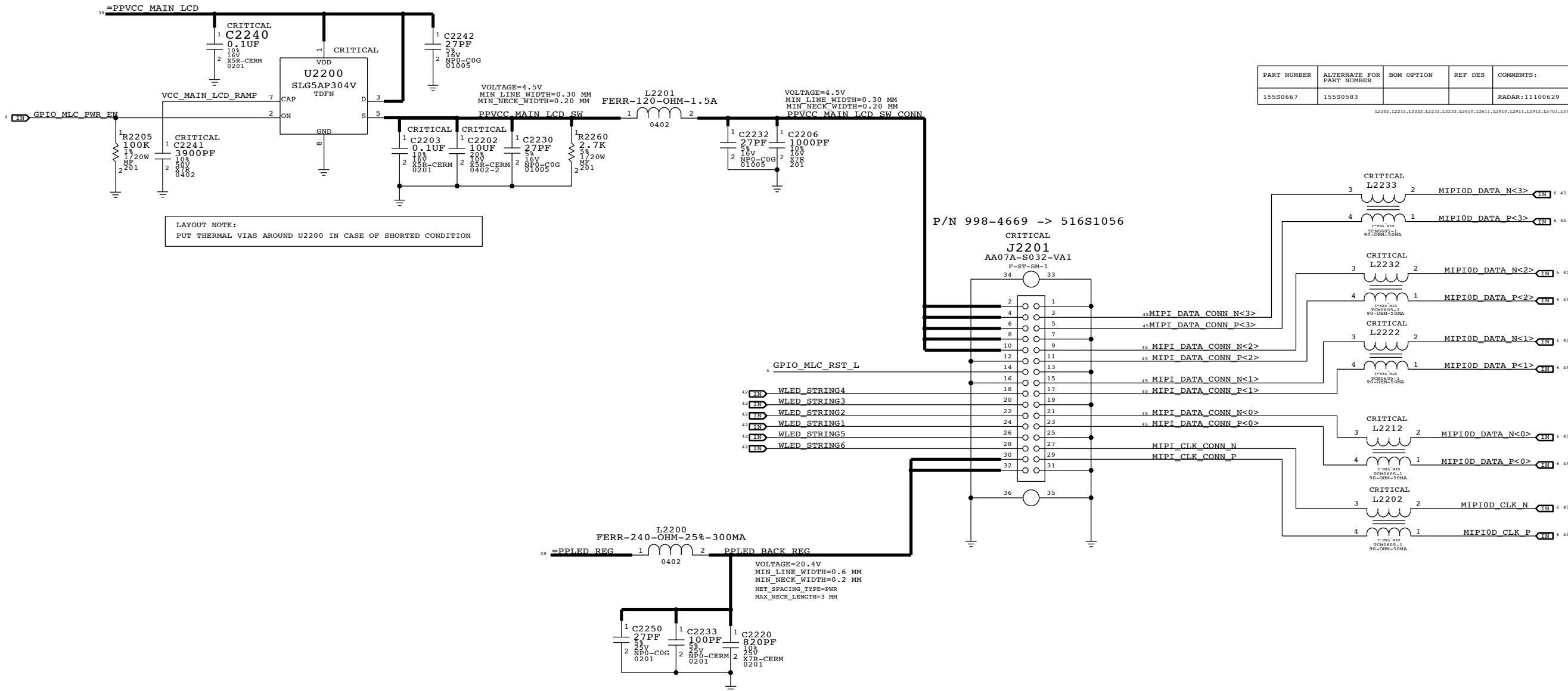
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I2C ADDRESS: 1000000X



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		SIZE	D
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		BRANCH	4 OF 4
		PAGE	20 OF 102
		SHEET	15 OF 46

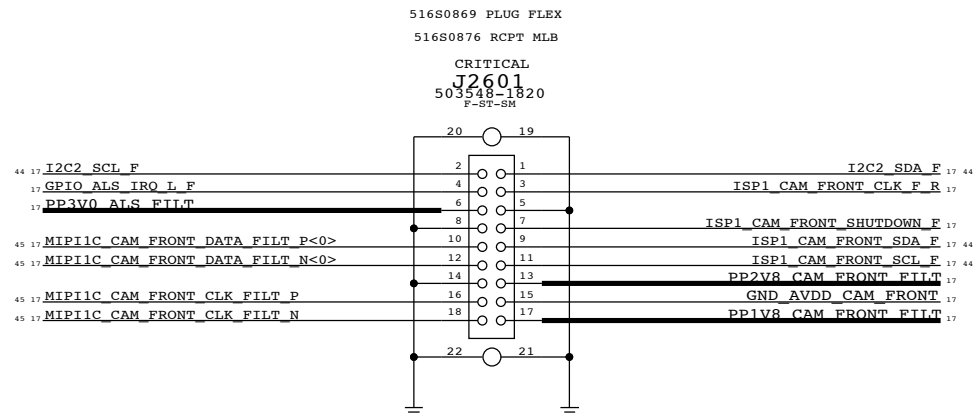
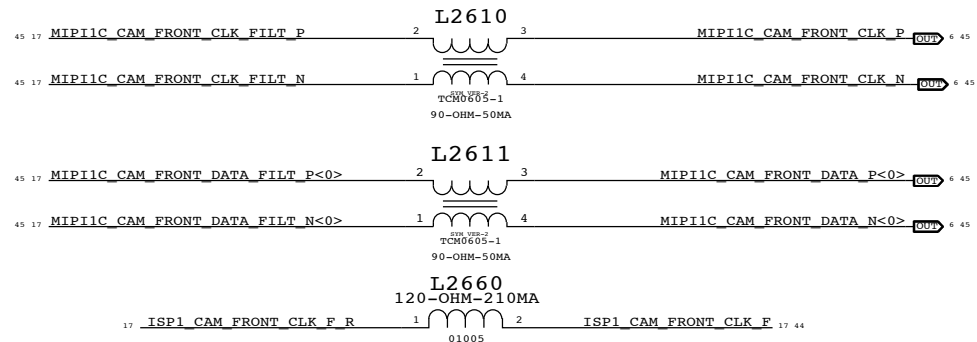
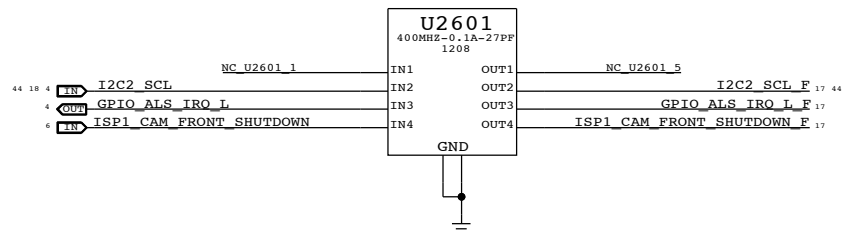
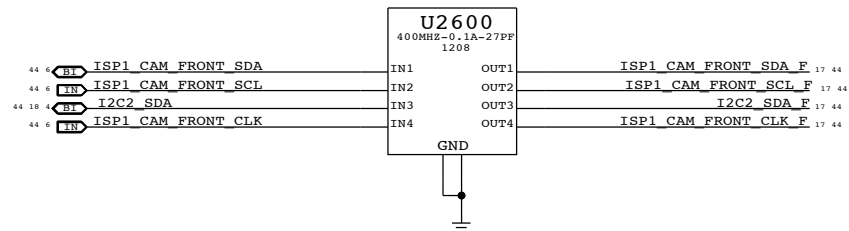
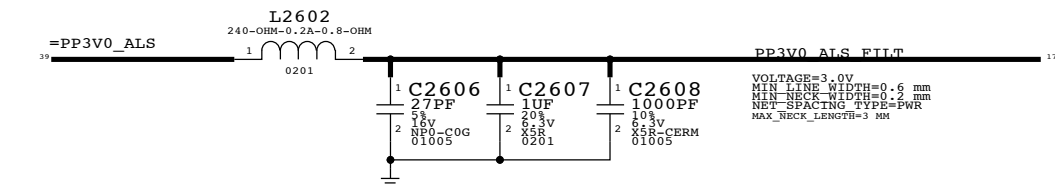
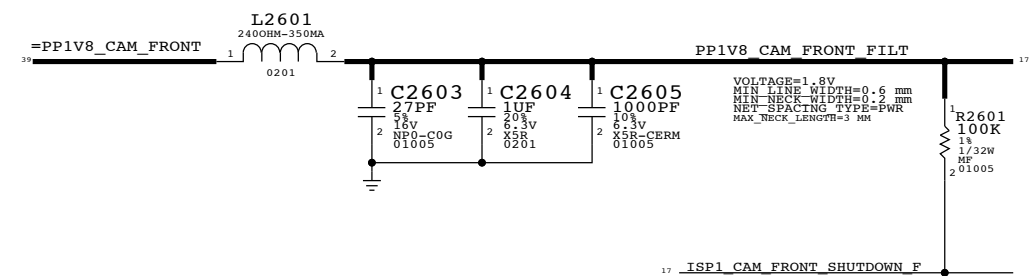
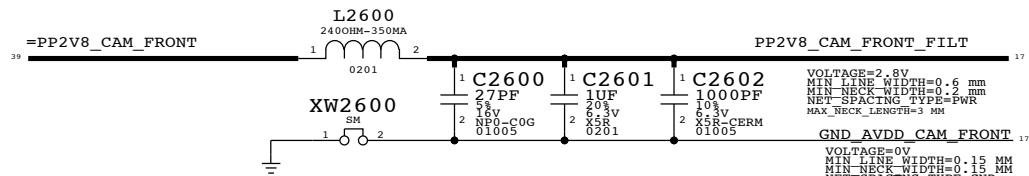
# MIPI CONNECTOR




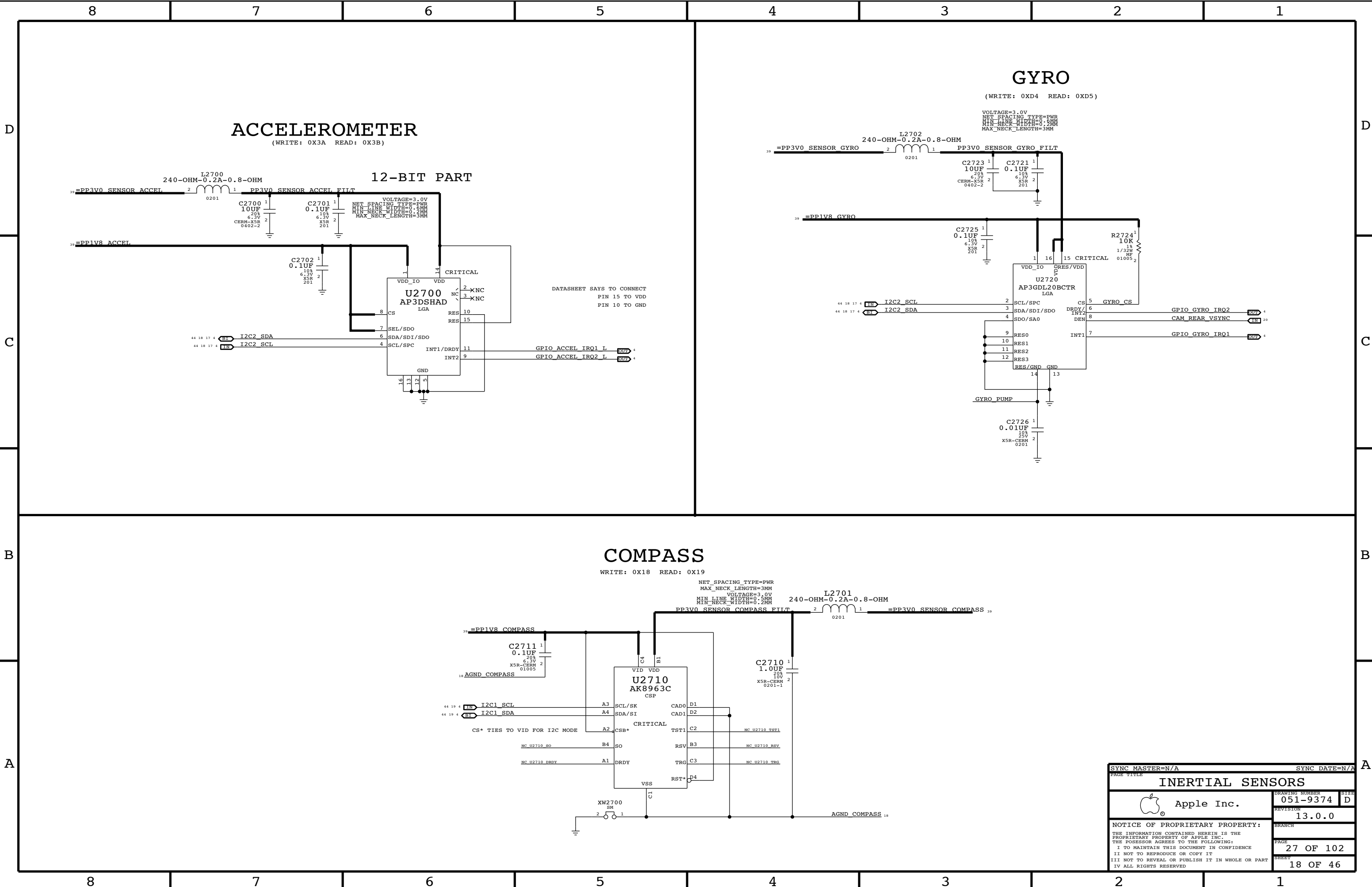
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		REVISION	
		13.0.0	
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		BRANCH	
		PAGE	22 OF 102
		SHEET	16 OF 46



# VGA FRONT CAMERA CONNECTOR



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PAGE TITLE			
FF CAM & MIC CONNECTORS			
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		BRANCH	
		PAGE	26 OF 102
		SHEET	17 OF 46



ACCELEROMETER

(WRITE: 0X3A READ: 0X3B)

12-BIT PART

COMPASS

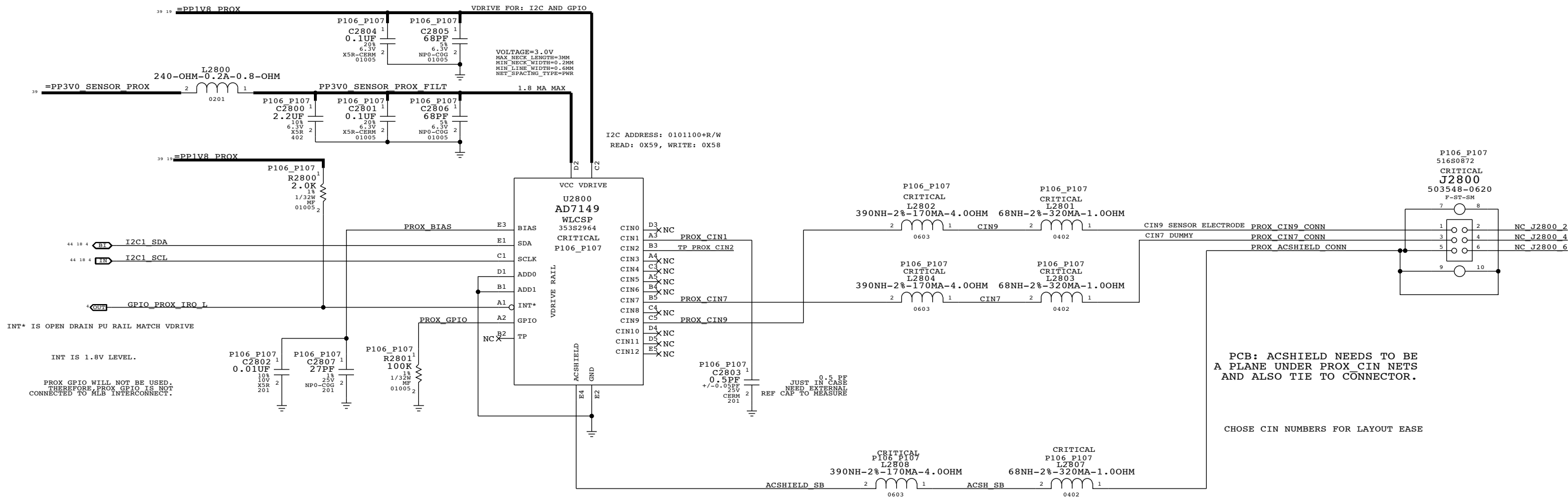
WRITE: 0X18 READ: 0X19

GYRO


(WRITE: 0XD4 READ: 0XD5)

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INERTIAL SENSORS		DRAWING NUMBER		SIZE	
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# PROX SENSOR



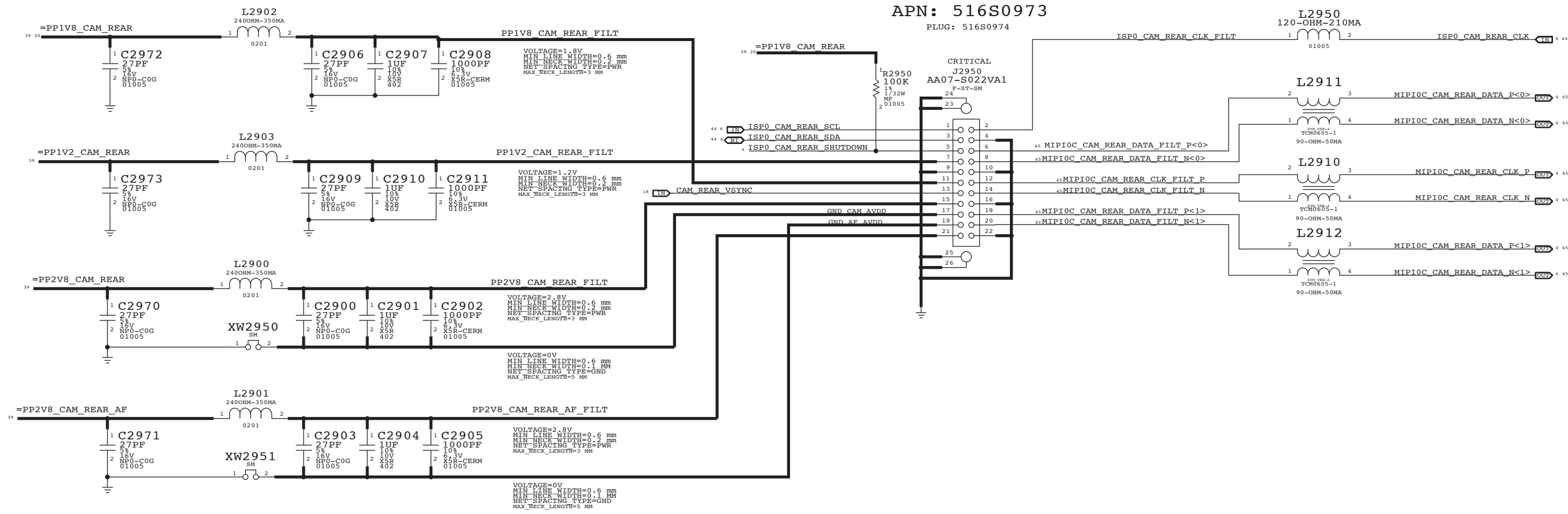
PCB: ENSURE AC SHIELD PLANE UNDER  
U3200, NO GND PLANE NEAR PROX\_CIN NETS..

SYNC MASTER=N/A		SYNC DATE=N/A	
PAGE TITLE			
PROX SENSOR			
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		PAGE	28 OF 102
		SHEET	19 OF 46

# REAR CAMERA CONNECTOR

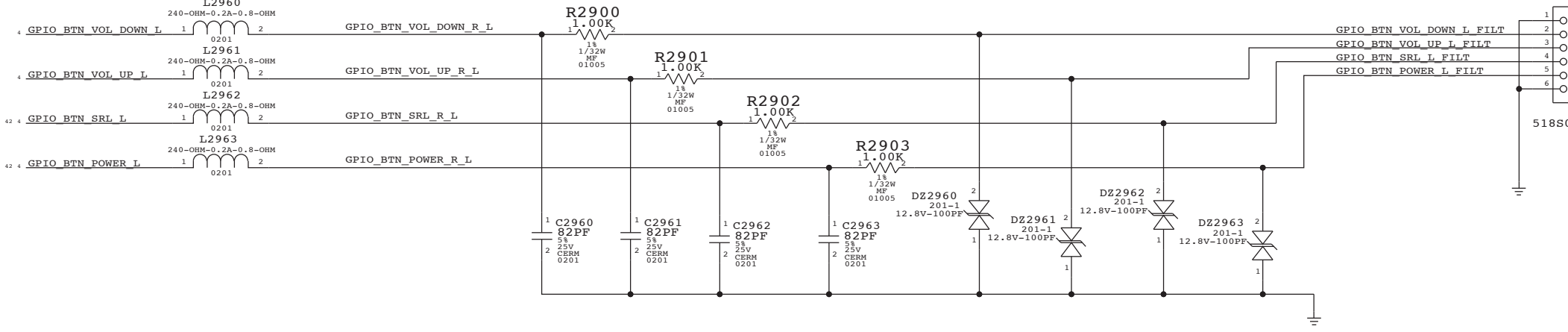
APN: 516S0973

PLUG: 516S0974



# BUTTON CONNECTOR

CRITICAL  
J2960  
FF18-6A-R11AD-B-3H  
F-RT-SM

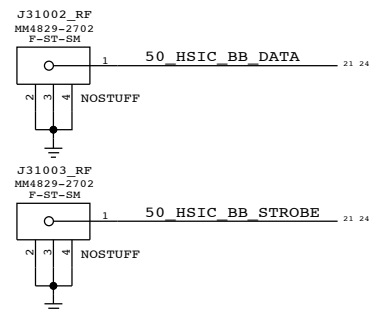


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BUTTON & REAR CAMERA CONN		DRAWING NUMBER	
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## C



28 25 24 22 21 PP SMPS3 MSME 1V8

CELL CELL CELL CELL

R31101\_R1 R31102\_R1 R31103\_R1 R31104\_R1

10K 10K 10K 10K

1/32W 1/32W 1/32W 1/32W

01005 01005 01005 01005

PP LDO6 RUM 1V8

R31005\_RF 0.00 0% 1/32W MF 01005 NOSTUFF

J31001\_RF SIM-CARD-N41 F-ST-SM

VCC

1 2 3 4 5 6 7 12

SIMCRD\_RST\_CONN

SIMCRD\_CLK\_CONN

GND

SWP

OMIT

R31004\_RF 15.00k 1% 1/32W MF 01005 CELL

SIMCRD\_IO\_CONN

SIM\_DETECT

SIM\_SWP

[illegible]C

## B

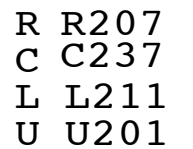
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## A

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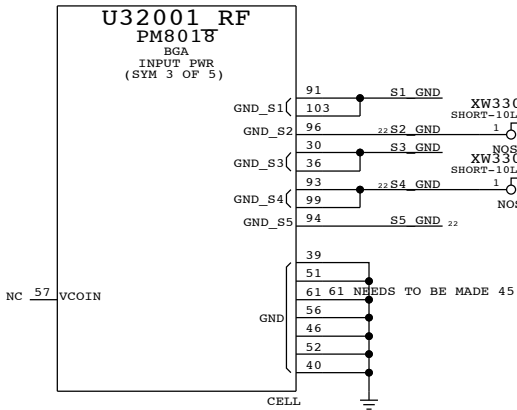
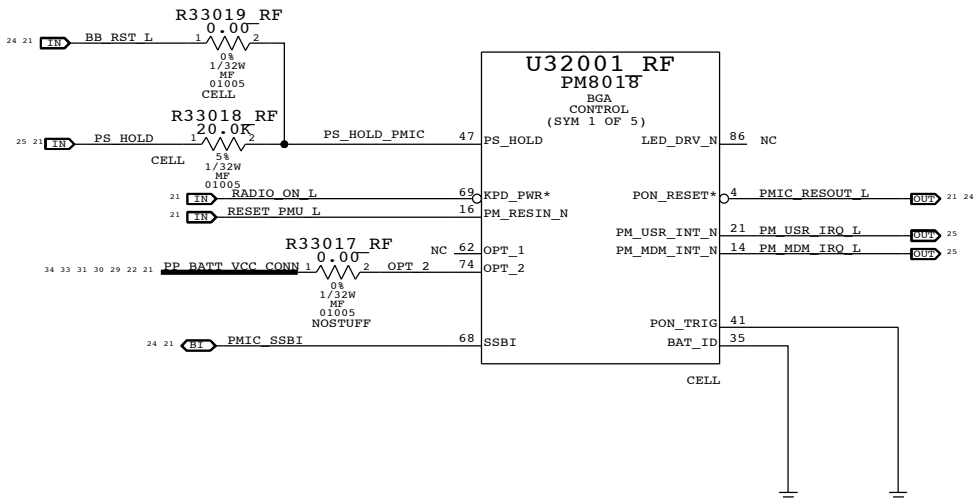
PAGE NUMBER		BASEBAND PMU ( 1 OF 2 )	
		Apple Inc.	
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# BASEBAND PMU (2 OF 2)

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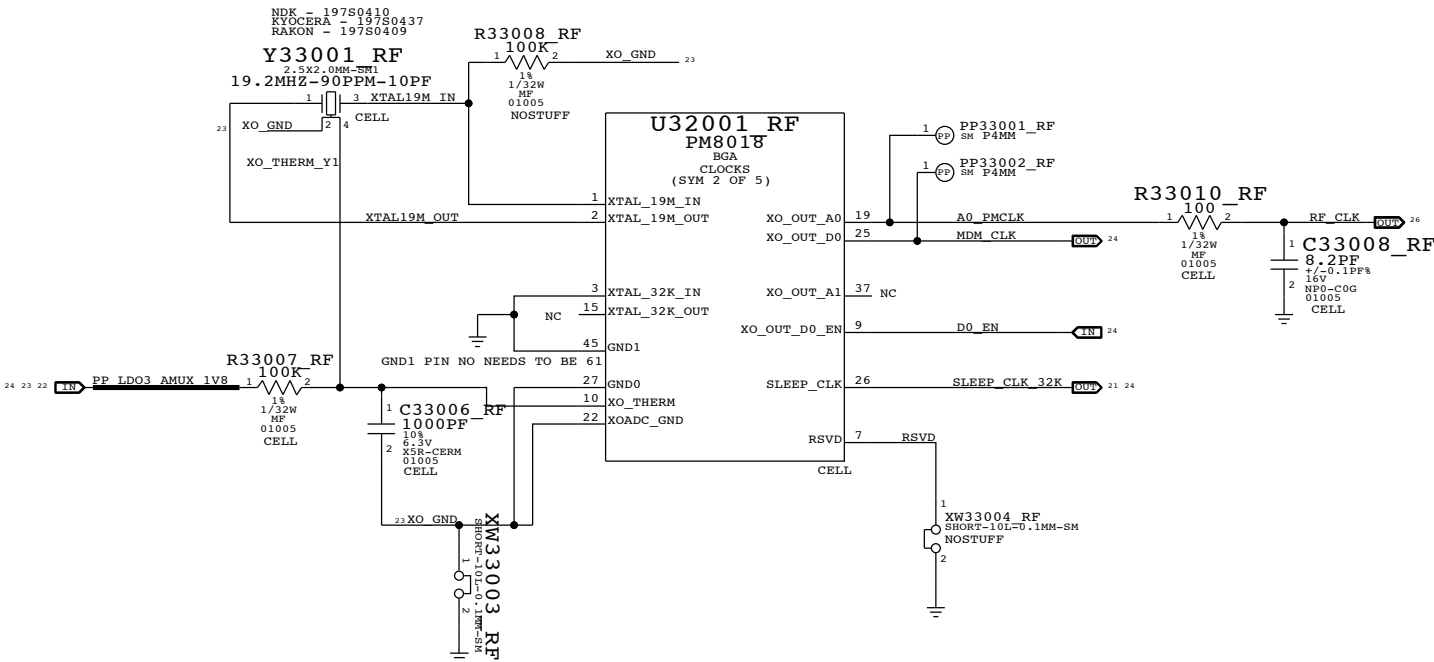
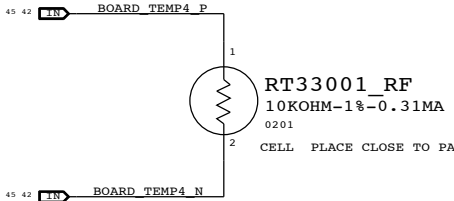
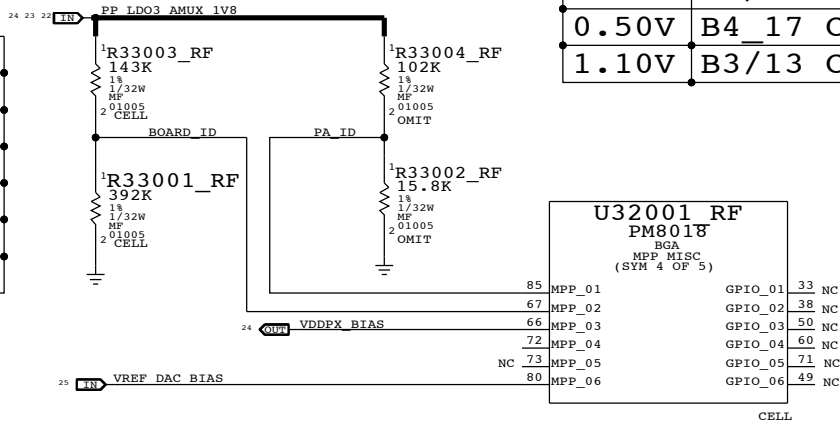
BOARD_ID	REVISION
0.25V	N41 PROTO 1
0.50V	N41 PROTO 2, X122 RF DEV 1
0.70V	N41 PROTO 3, X122 PROTO 0
0.90V	N41 EVT 1, X122 PROTO 1
1.10V	N41 EVT 2, X122 EVT
1.30V	N41 EVT 3, X122 DVT

PA_ID	PA CONFIG
0.25V	B4/17 CONFIG 0
0.50V	B4_17 CONFIG 1
1.10V	B3/13 CONFIG 0



## ALTERNATES


PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S0437	197S0410	CELL	Y33001_RS	KYOCERA CRYSTAL
197S0409	197S0410	CELL	Y33001_RS	RAKON CRYSTAL



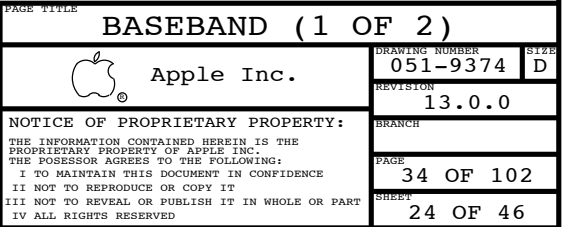
## BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0685	1	PA_ID RES DIVIDER 102K	R33004_RF	Y	B4_17
118S0656	1	PA_ID RES DIVIDER 61.9K	R33004_RF	Y	B3_13
118S0729	1	PA_ID RES DIVIDER 39K	R33002_RF	Y	B4_17
118S0685	1	PA_ID RES DIVIDER 102K	R33002_RF	Y	B3_13

R R317  
C C309  
L LXXX  
U U301  
XW XW305

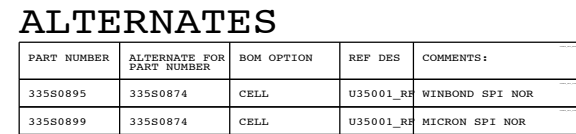
PAGE TITLE		
BASEBAND PMU (2 OF 2)		
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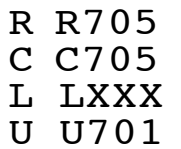


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PAGE TITLE		MOBILE DATA MODEM (2 OF 2)	
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	PAGE		
	35		OF 102
	SHEET		
	25		OF 46

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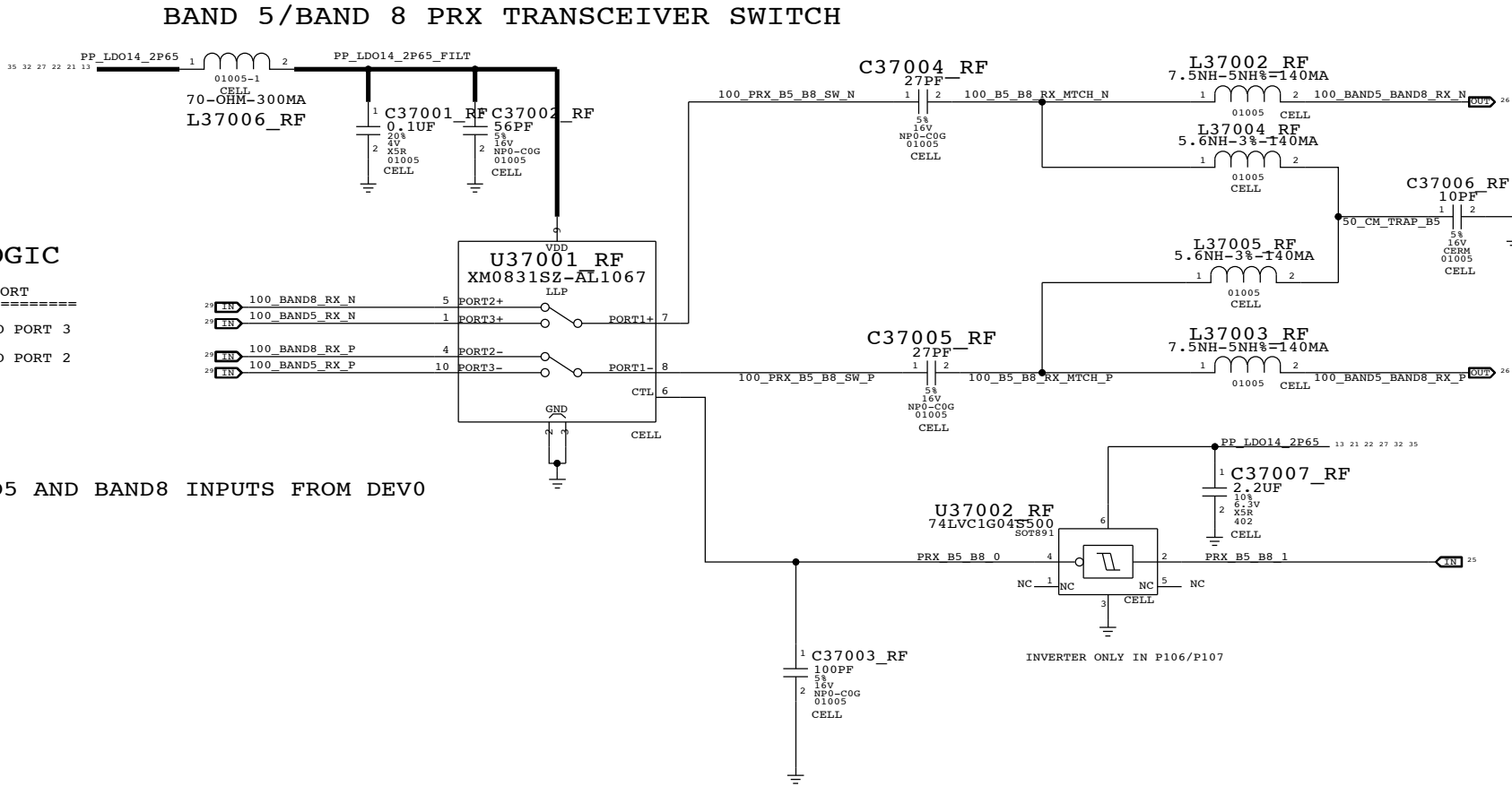
# RF TRANSCEIVER SWITCHING NETWORKS ( 2 OF 3 )

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## XM0830SZ SWITCH LOGIC

PRX_B5_B8	ACTIVE BAND	PORT
=====	=====	=====
HIGH	5	PORT 1 TO PORT 3
LOW	8	PORT 1 TO PORT 2

SWAPPED BAND5 AND BAND8 INPUTS FROM DEV0



R RXXX  
C C37007  
L L803  
U U801

PAGE TITLE		
RF TRANSCEIVER ( 2 OF 3 )		
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		SHEET 27 OF 46

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8	7	6	5	4	3	2	1
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# BAND 5/8 PAD

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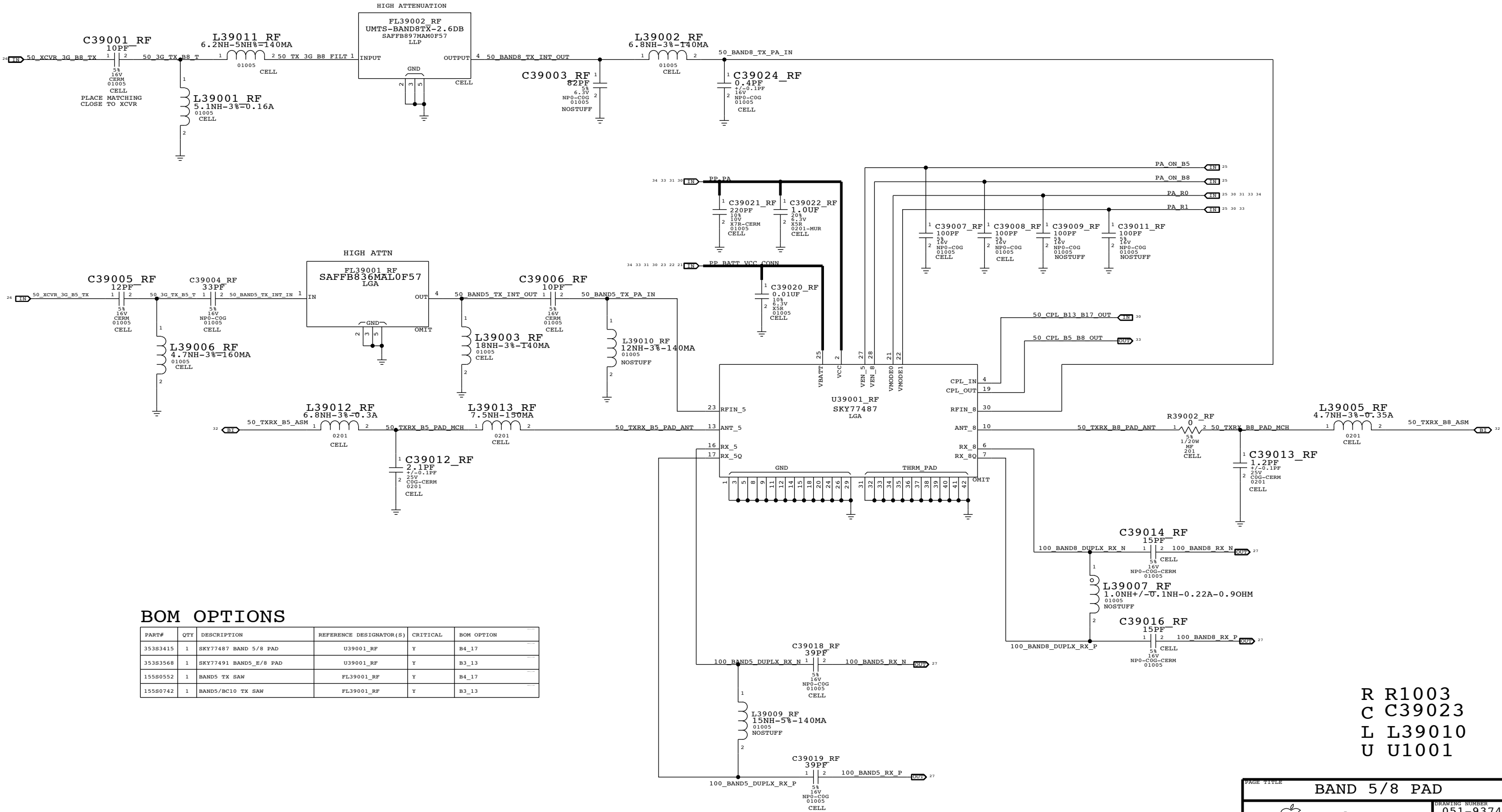
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# B13/17 INTERSTAGE, PA, AND DUPLEXER

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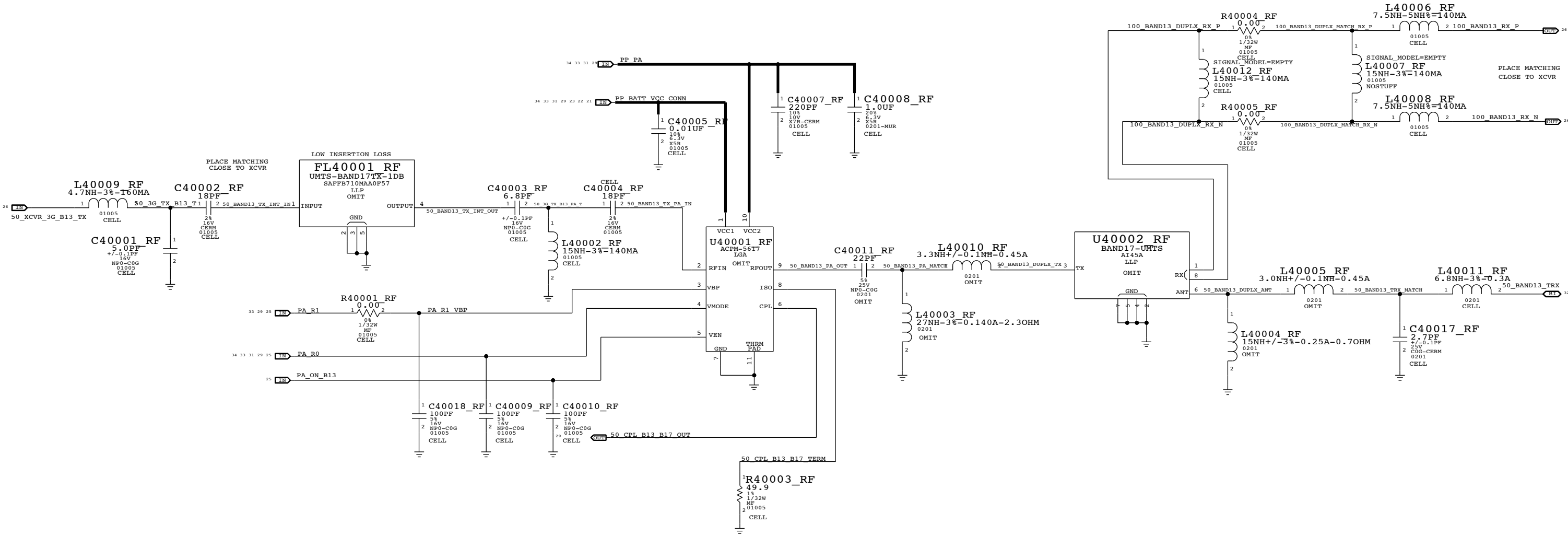
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## BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
155S0620	1	BAND17 TX SAW	FL40001_RF	Y	B4_17
155S0619	1	BAND13 TX SAW	FL40001_RF	Y	B3_13
353S3567	1	BAND17 PAM - SKY77729	U40001_RF	Y	B4_17
353S3441	1	BAND13 PAM - AVAGO ACPM-5613	U40001_RF	Y	B3_13
155S0709	1	BAND17 DUPLEXER	U40002_RF	Y	B4_17
155S0738	1	BAND13 DUPLEXER	U40002_RF	Y	B3_13
152S1280	1	5.1 NH INDUCTOR, 0201	C40011_RF	Y	B4_17
131S0129	1	22 PF CAPACITOR, 0201	C40011_RF	Y	B3_13
131S0198	1	1.8 PF CAPACITOR, 0201	L40003_RF	Y	B4_17
117S0002	1	0 OHMS RESISTOR, 0201	L40010_RF	Y	B4_17
152S1284	1	3.3 NH INDUCTOR, 0201	L40010_RF	Y	B3_13
152S1336	1	8.2 NH INDUCTOR, 0201	L40004_RF	Y	B4_17
152S1342	1	15 NH INDUCTOR, 0201	L40004_RF	Y	B3_13
152S1063	1	2.2 NH INDUCTOR, 0201	L40005_RF	Y	B4_17
152S1222	1	3.0 NH INDUCTOR, 0201	L40005_RF	Y	B3_13

FLFL1101  
R R1102  
C C1118  
L L1108  
U U1102

## PA POWER MODES

MODE	PA_R0	PA_R1
LOW	HIGH	HIGH
MEDIUM	LOW	HIGH
HIGH	LOW	LOW

BAND 13 PA

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051-9374

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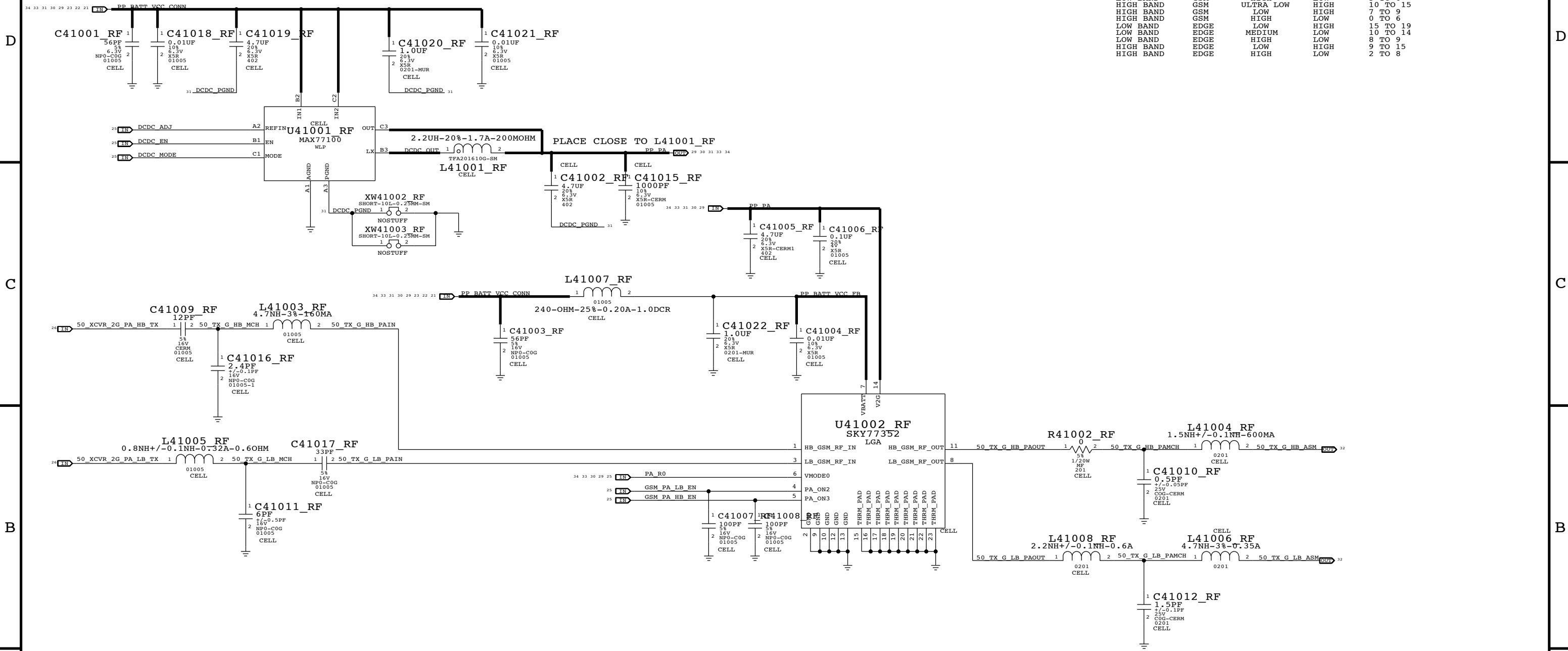
30 OF 46

# 2G PA, PA DC/DC CONVERTER


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## 2G PA GAIN MODES

BAND	MODE	GAIN MODE	PA_R1	PCL RANGE
LOW BAND	GSM	ULTRA LOW	HIGH	16 TO 19
LOW BAND	GSM	LOW	HIGH	14 TO 15
LOW BAND	GSM	MEDIUM	LOW	7 TO 13
LOW BAND	GSM	HIGH	LOW	5 TO 6
HIGH BAND	GSM	ULTRA LOW	HIGH	10 TO 15
HIGH BAND	GSM	LOW	HIGH	7 TO 9
HIGH BAND	GSM	HIGH	LOW	0 TO 6
LOW BAND	EDGE	LOW	HIGH	15 TO 19
LOW BAND	EDGE	MEDIUM	LOW	10 TO 14
LOW BAND	EDGE	HIGH	LOW	8 TO 9
HIGH BAND	EDGE	LOW	HIGH	9 TO 15
HIGH BAND	EDGE	HIGH	LOW	2 TO 8

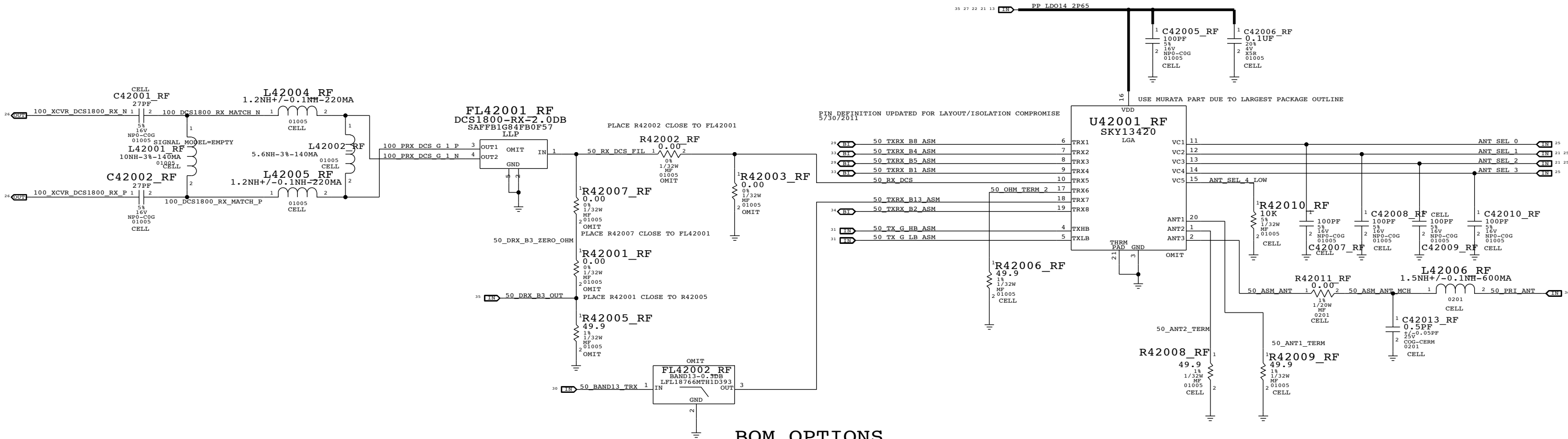


R R1209  
C C1215  
L L41007  
U U1202

PAGE TITLE		
2G PA, DCDC CONVERTER		
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# ASM, DCS RX


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## BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
15580596	1	DCS1800 RX FIL	FL42001_RF	Y	B4_17
15580729	1	BAND3 RX FIL	FL42001_RF	Y	B3_13
15580695	1	THRU LINE	FL42002_RF	Y	B4_17
15580722	1	BAND13 TX LFP	FL42002_RF	Y	B3_13
11780161	1	00HM RES	R42001_RF	Y	B3_13
11780161	1	00HM RES	R42002_RF	Y	B4_17
11880652	1	49.90HM RES	R42003_RF	Y	B3_13
11880652	1	49.90HM RES	R42005_RF	Y	B4_17
11780161	1	00HM RES	R42007_RF	Y	B3_13
35383573	1	ASM, SKYWORKS	U42001_RF	Y	B4_17
35383573	1	ASM, SKYWORKS	U42001_RF	Y	B3_13

R R42011  
C C42013  
L 42006  
U U1301  
FL FL1302

PAGE TITLE		
DCS RX, ASM		
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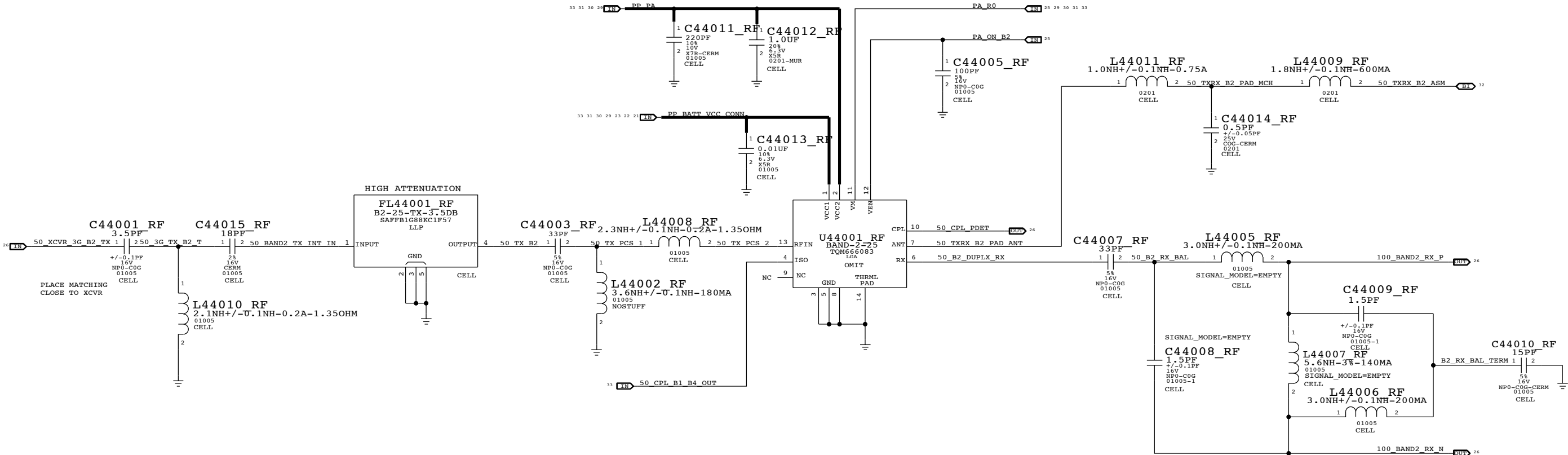
## BOM OPTIONS

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R R1406
C C43027
L L43018
U U1401
FL FL1101
```

1

# BAND2 PAD


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## BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
35383715	1	B2 PAD, TRIQUINT B2 PAD	U44001_RF	Y	B4_17
35383459	1	B2 PAD, TRIQUINT B25 PAD	U44001_RF	Y	B3_13

R R1501  
C C44014  
L L1509  
U U1501  
FL FL1501

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BAND2 PAD		
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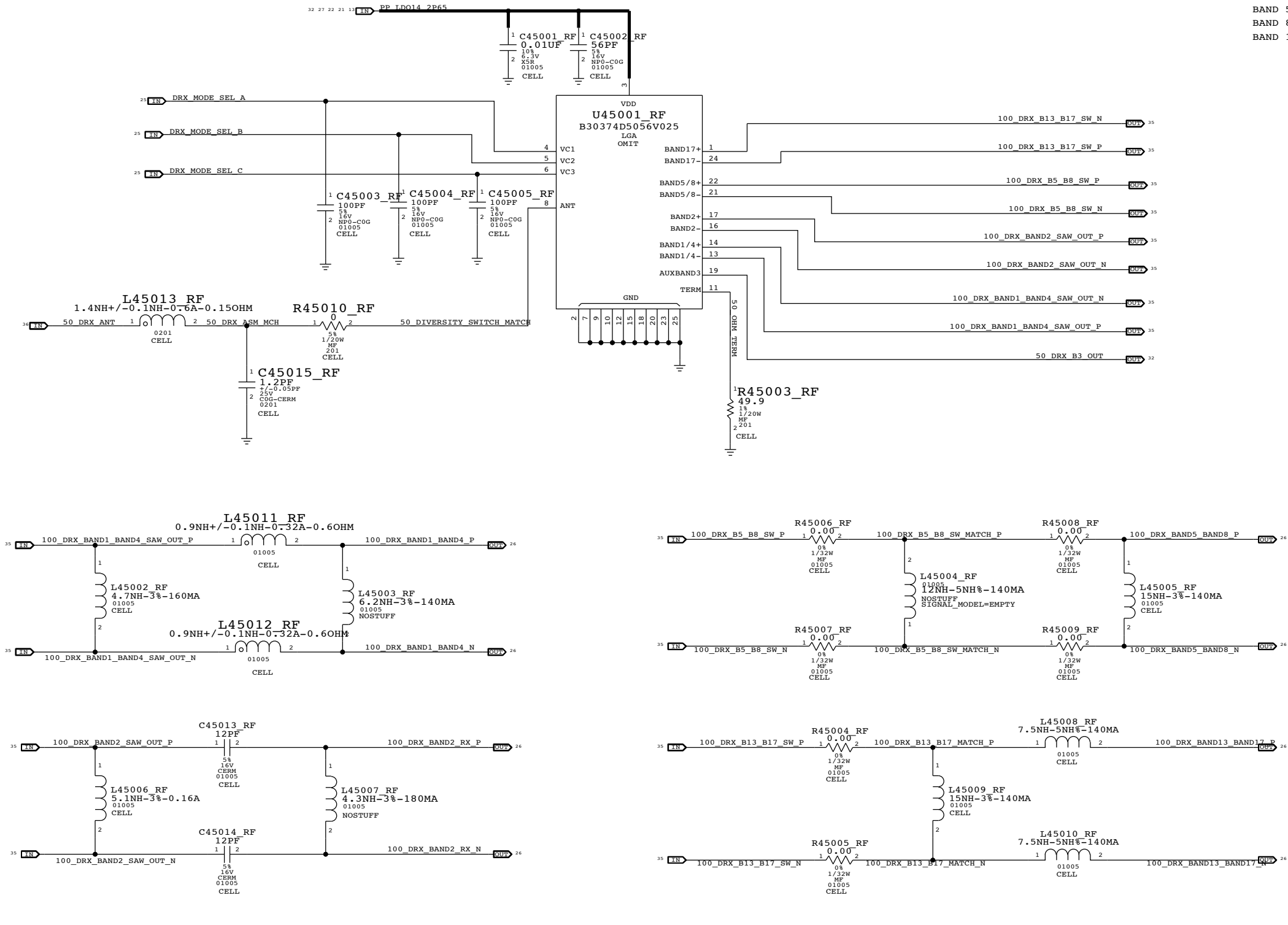
# RX DIVERSITY

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## DIVERSITY MODULE LOGIC

BAND VC1 VC2 VC3  
=====


BAND 1/4  
BAND 2  
BAND 5  
BAND 8  
BAND 13/17



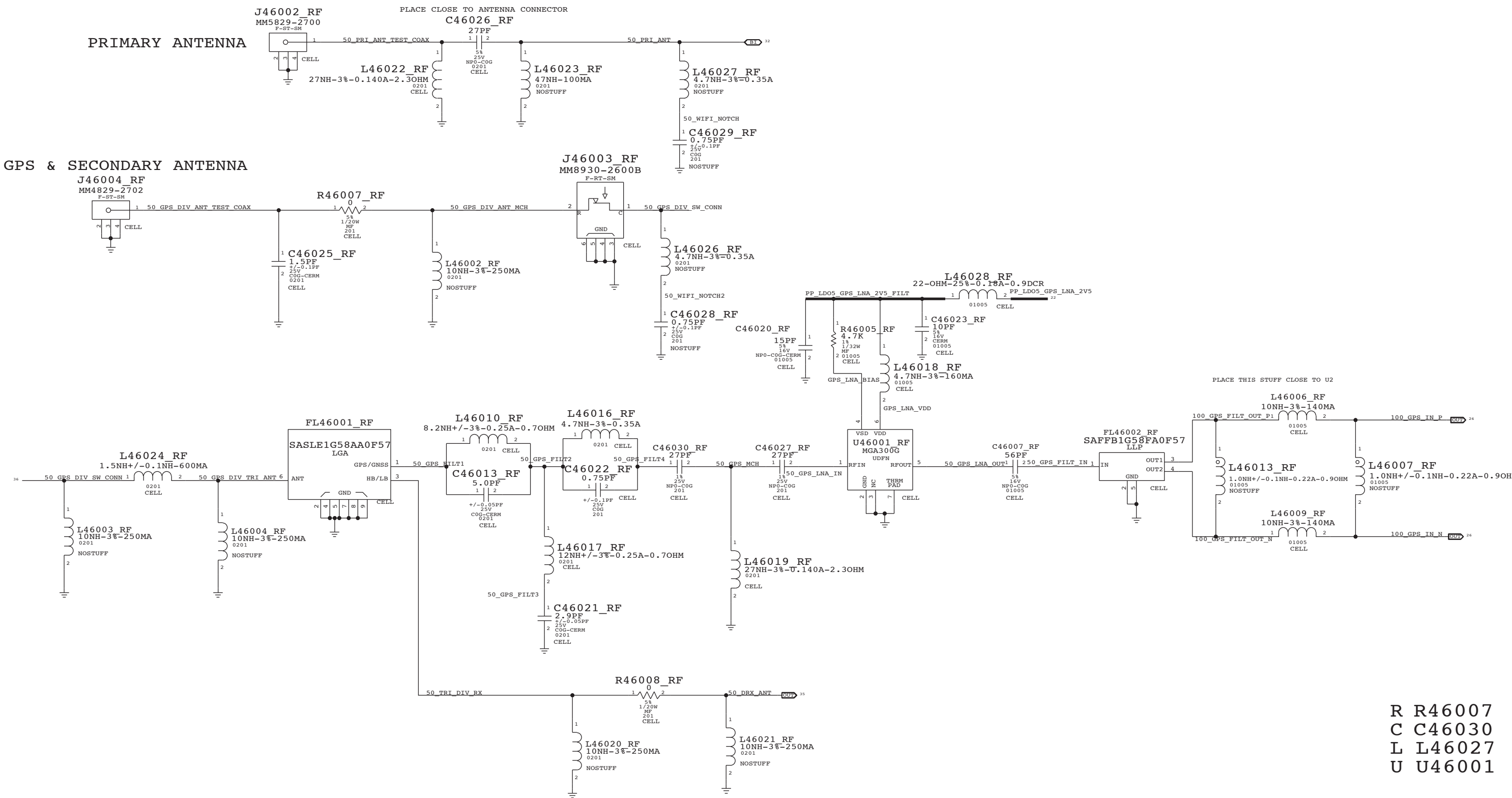
### BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
35383538	1	EPCOS B17 DIVERSITY MODULE	U45001_RF	Y	B4_17
35383537	1	EPCOS B13/BC10 DIV. MODULE	U45001_RF	Y	B3_13

R R1603  
C C1616  
L L1610  
U U1601


RX DIVERSITY		
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# GPS



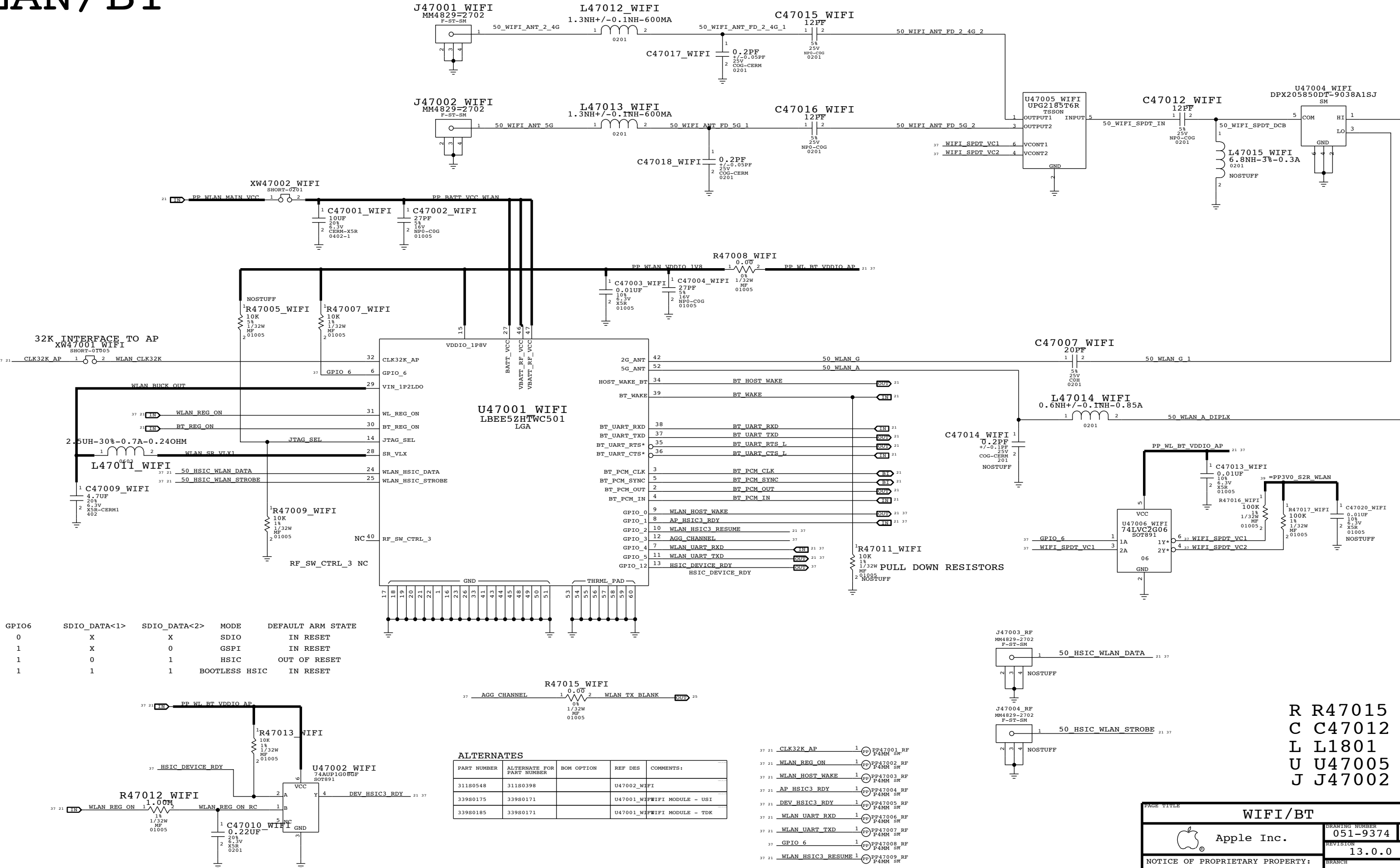
R R46007  
C C46030  
L L46027  
U U46001

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GPS		
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# WLAN/BT

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GPIO6	SDIO_DATA<1>	SDIO_DATA<2>	MODE	DEFAULT ARM STATE
0	X	X	SDIO	IN RESET
1	X	0	GSPI	IN RESET
1	0	1	HSIC	OUT OF RESET
1	1	1	BOOTLESS HSIC	IN RESET

## ALTERNATES

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
311S0548	311S0398		U47002_WIFI	
339S0175	339S0171		U47001_WIFI	WIFI MODULE - USI
339S0185	339S0171		U47001_WIFI	WIFI MODULE - TDK

21	CLK32K_AP	1	PP47001_RF	P4MM SM
21	WLAN_REG_ON	1	PP47002_RF	P4MM SM
21	WLAN_HOST_WAKE	1	PP47003_RF	P4MM SM
21	AP_HSIC3_RDY	1	PP47004_RF	P4MM SM
21	DEV_HSIC3_RDY	1	PP47005_RF	P4MM SM
21	WLAN_UART_RXD	1	PP47006_RF	P4MM SM
21	WLAN_UART_TXD	1	PP47007_RF	P4MM SM
37	GPIO_6	1	PP47008_RF	P4MM SM
21	WLAN_HSIC3_RESUME	1	PP47009_RF	P4MM SM

R R47015  
C C47012  
L L1801  
U U47005  
J J47002

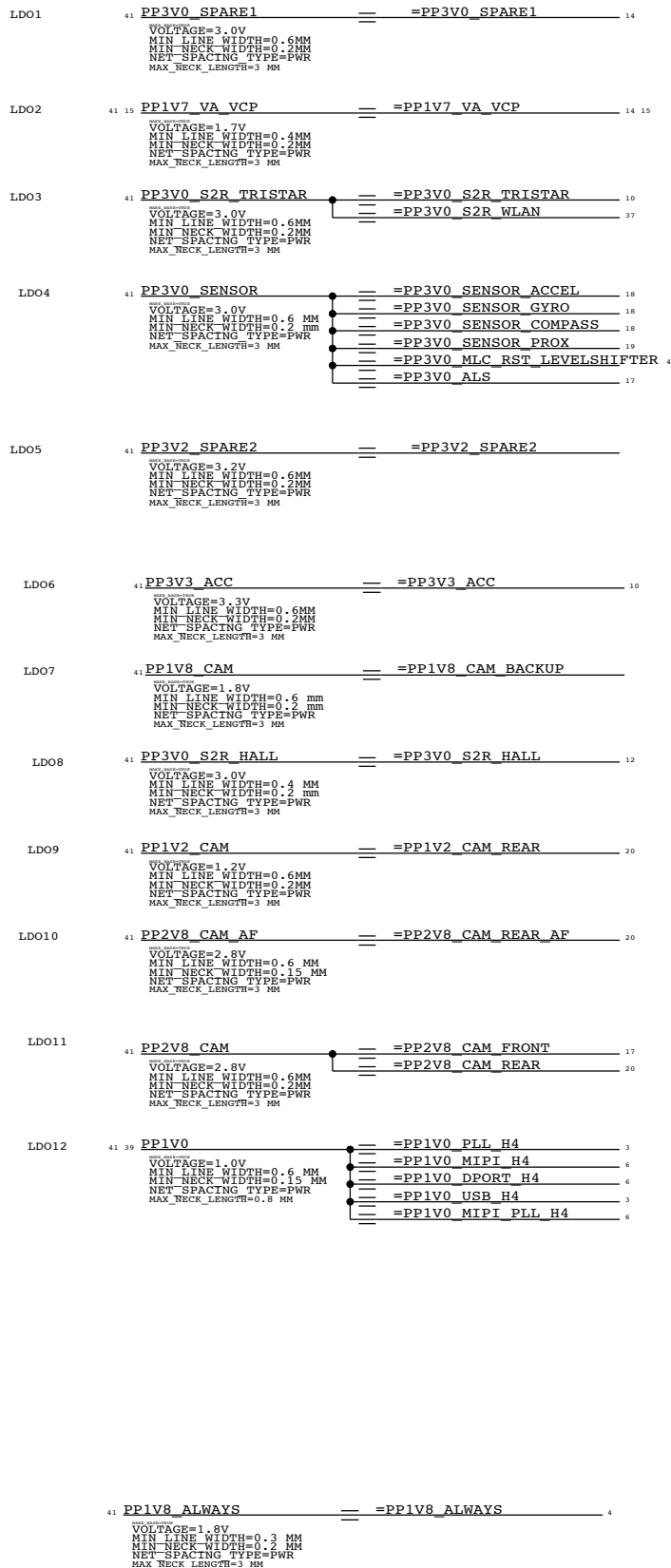
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WIFI/BT		
Apple Inc.	DRAWING NUMBER	051-9374
	REVISION	13.0.0
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	SIZE	D



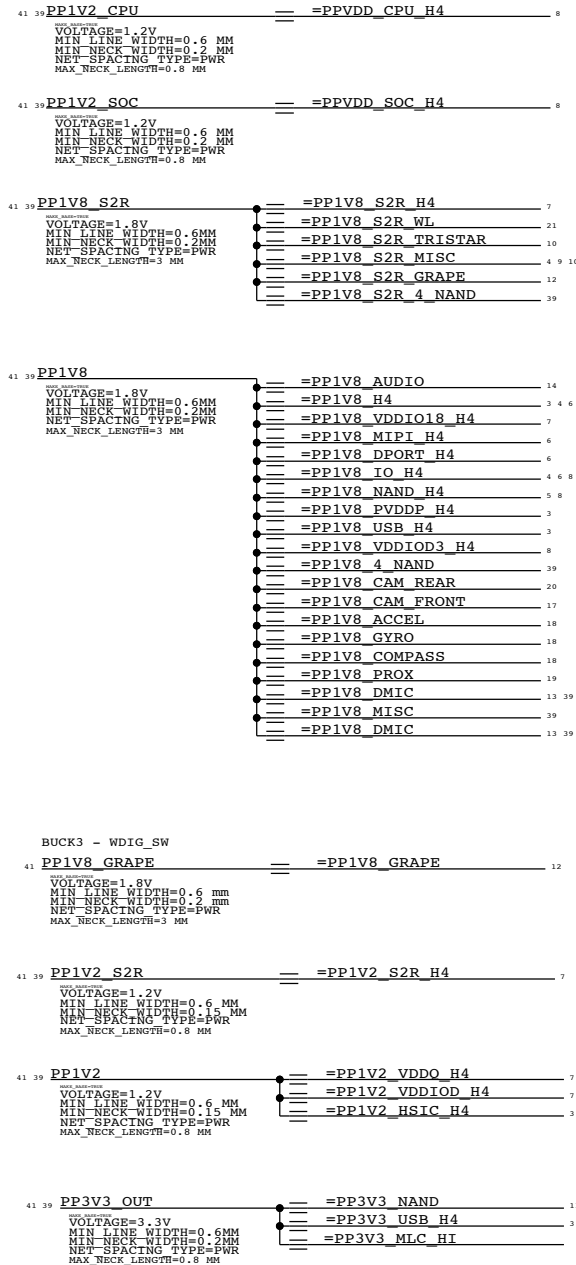
# POWER CONN / ALIAS

## LDO RAILS

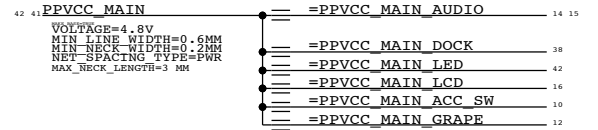
PROGRAMMABLE ON/OFF



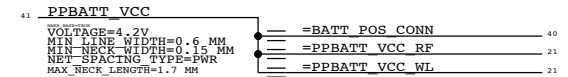
## BUCK RAILS



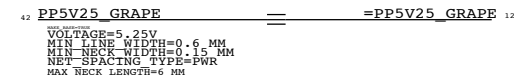
## CHARGER MAIN



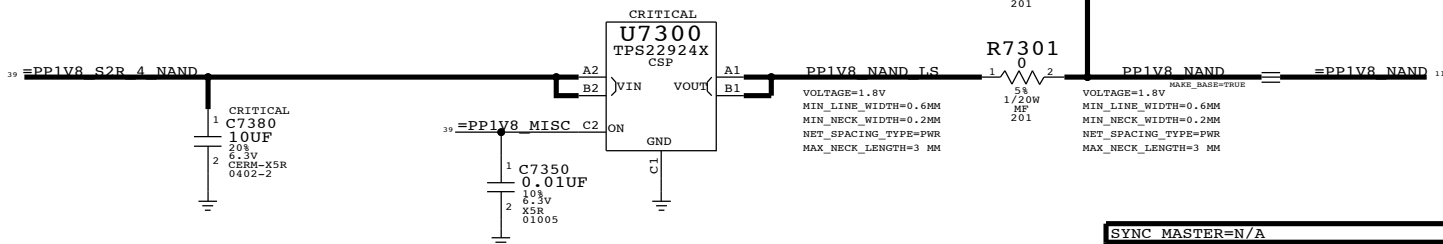
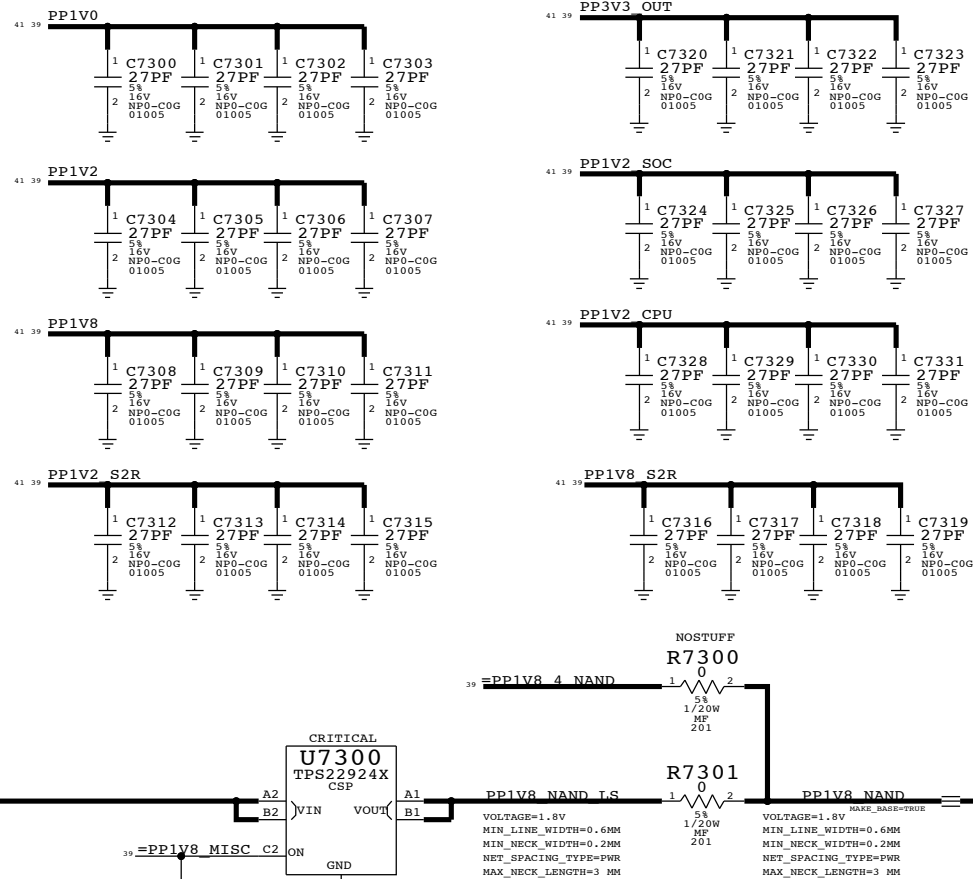
## BATTERY



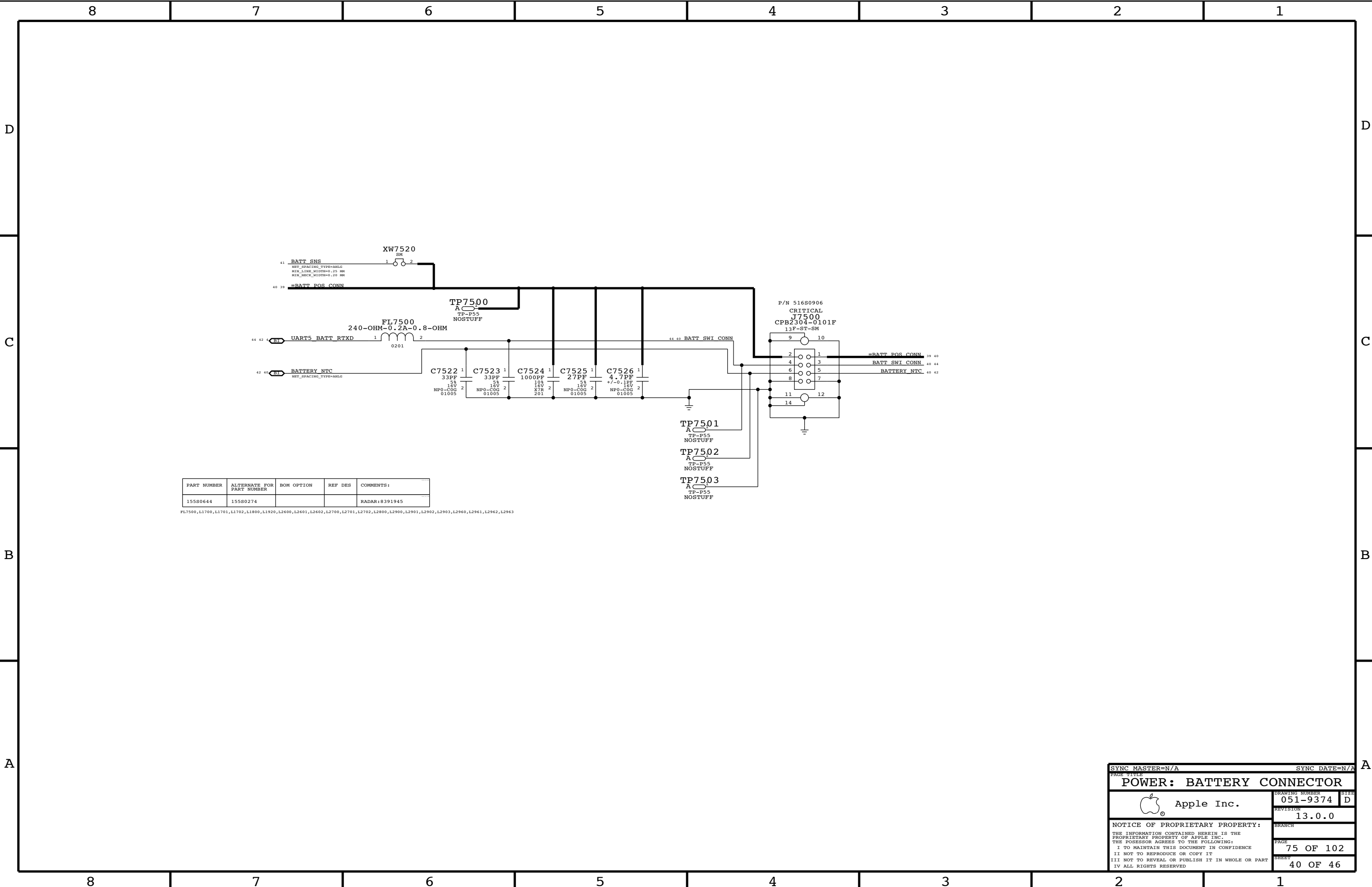
## BOOST->LDOS



## DESENSE CAPS



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Power: Aliases			
Drawing NUMBER		SIZE	
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PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
15580644	15580274			RADAR:8391945

FL7500, L1700, L1701, L1702, L1800, L1920, L2600, L2601, L2602, L2700, L2701, L2702, L2800, L2900, L2901, L2902, L2903, L2960, L2961, L2962, L2963

SYNC MASTER=N/A

SYNC DATE=N/A

POWER: BATTERY CONNECTOR

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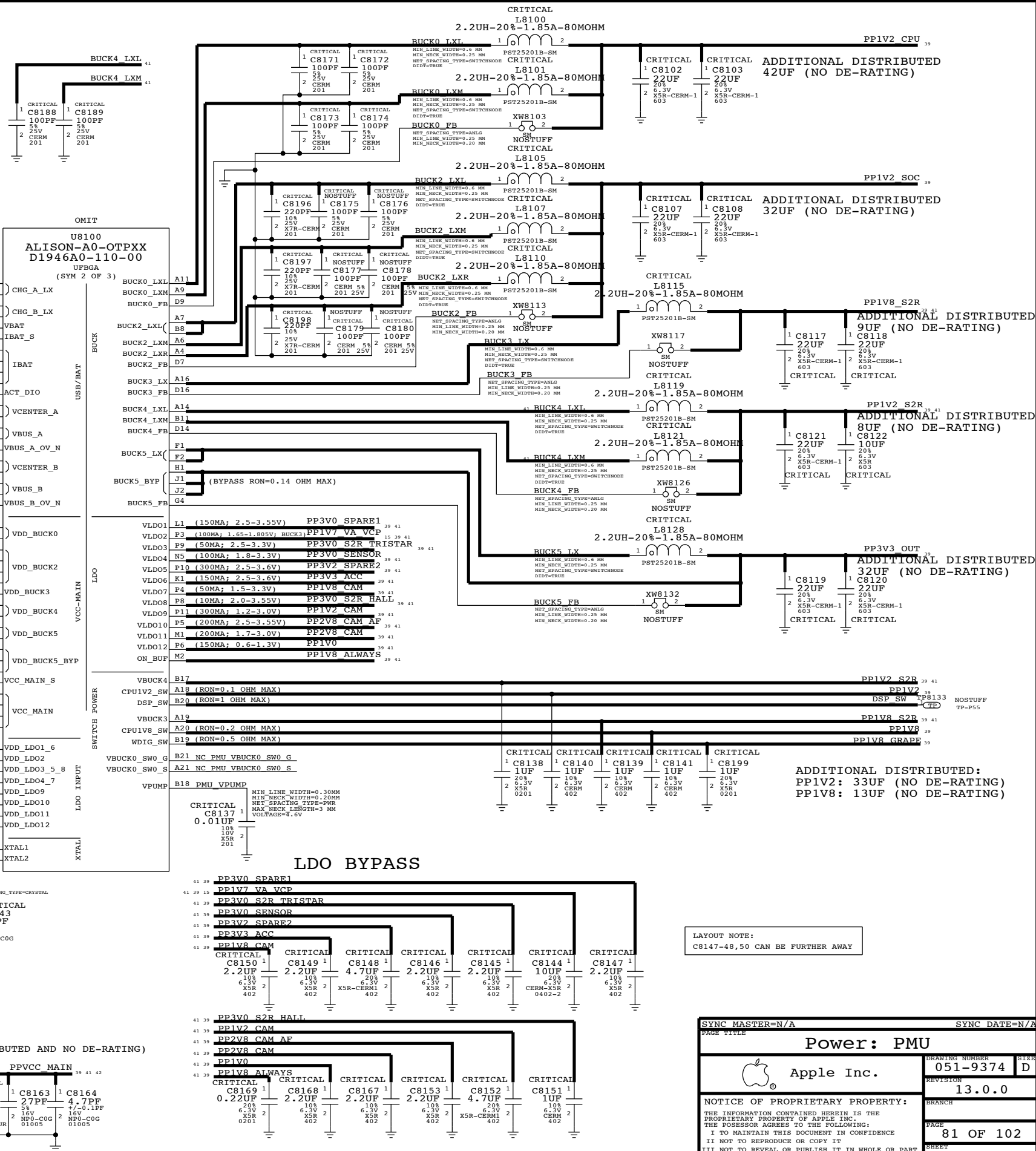
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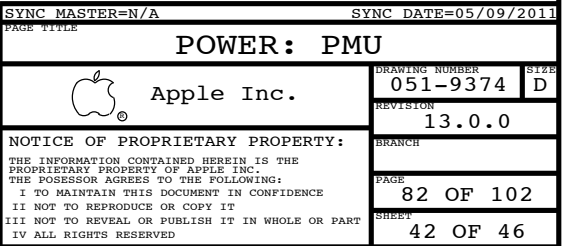
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PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S0392	197S0299		Y8138	ALT FOUNDRY



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# MECHANCIAL PARTS

## PD PARTS

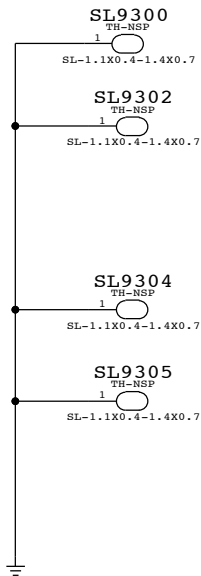
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
806-4017	1	FENCE,MAIN,MLB,YYY	FENCE_MLB	
806-3782	1	CAN,MAIN,MLB,WIFI,YYY	CAN_WIFI	
806-3715	1	FENCE,RADIO,MLB,SWAPPED,YYY	CAN_RADIO	CELL

## TOP BARCODE LABEL/EEE CODES (ONLY ONE IS USED PER BOM)

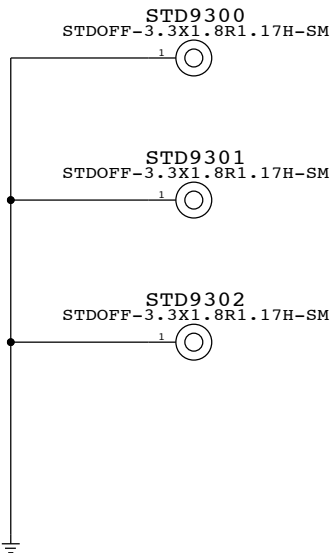
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7639	1	EEEE FOR 639-3251 (X123 ENTRY)	DWNV	CRITICAL	EEEE_X123_ENTRY
825-7639	1	EEEE FOR 639-4129 (X123A ENTRY)	F78H	CRITICAL	EEEE_X123A_ENTRY
825-7639	1	EEEE FOR 639-4130 (X123B ENTRY)	F78J	CRITICAL	EEEE_X123B_ENTRY
825-7639	1	EEEE FOR 639-3923 (X123 GOOD)	F3JV	CRITICAL	EEEE_X123_BETTER
825-7639	1	EEEE FOR 639-3924 (X123 BETTER)	F3JQ	CRITICAL	EEEE_X123_BEST
825-7639	1	EEEE FOR 639-3415 (X123A GOOD)	DY62	CRITICAL	EEEE_X123A_GOOD
825-7639	1	EEEE FOR 639-3925 (X123A BETTER)	F3JN	CRITICAL	EEEE_X123A_BETTER
825-7639	1	EEEE FOR 639-3926 (X123A BEST)	F3JP	CRITICAL	EEEE_X123A_BEST
825-7639	1	EEEE FOR 639-3416 (X123B GOOD)	DY63	CRITICAL	EEEE_X123B_GOOD
825-7639	1	EEEE FOR 639-3927 (X123B BETTER)	F3JR	CRITICAL	EEEE_X123B_BETTER
825-7639	1	EEEE FOR 639-3928 (X123B BEST)	F3JT	CRITICAL	EEEE_X123B_BEST


## PLATED THROUGH HOLES

DRILL SIZE: 1.1MM X 0.4MM  
PLATING SIZE: 1.4MM X 0.7MM



## STANDOFFS: P/N 860-1542



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PAGE TITLE <b>MECHANCIAL PARTS</b>			
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MIPI			
NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET	
MIPI_90D	*	90_OHM_DIFF	

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MIPI	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_P<0>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_N<0>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_P<1>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_N<1>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_P<2>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_N<2>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_P<3>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_DATA_N<3>	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_CLK_P	6 16
MIPT	MIPT_90D	MIPT	MIPIOD_CLK_N	6 16
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_P<0>	6 20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_N<0>	6 20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_P<1>	6 20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_N<1>	6 20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_CLK_P	6 20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_CLK_N	6 20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_P<0>	20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_N<0>	20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_P<1>	20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_N<1>	20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_CLK_FILT_P	20
MIPT	MIPT_90D	MIPT	MIPIOC_CAM_REAR_CLK_FILT_N	20
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_DATA_P<0>	6 17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_DATA_N<0>	6 17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_CLK_P	6 17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_CLK_N	6 17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_DATA_FILT_P<0>	17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_DATA_FILT_N	17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_CLK_FILT_P	17
MIPT	MIPT_90D	MIPT	MIPI1C_CAM_FRONT_CLK_FILT_N	17




LVDS	NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
	LVDS_90D	*	90_OHM_DIFF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
LVDS	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
<del>1225</del>	<del>LVDS_90D</del>	<del>LVDS</del>	<del>MIPI_DATA_CONN_P&lt;3..0&gt;</del>
<del>1226</del>	<del>LVDS_90D</del>	<del>LVDS</del>	<del>MIPI_DATA_CONN_N&lt;3..0&gt;</del>
<del>1230</del>	<del>LVDS_90D</del>	<del>LVDS</del>	<del>MIPI_CLK_CONN_P</del>
<del>1235</del>	<del>LVDS_90D</del>	<del>LVDS</del>	<del>MIPI_CLK_CONN_N</del>

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
CRYSTAL	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
		CRYSTAL	XTAL_SOC_24M_I
		CRYSTAL	XTAL_SOC_24M_O
		CRYSTAL	XTAL_SOC_24M_O_R

DMIC	NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
	DMIC_45S	*	45_OHM_SE
NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
DMIC	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
<b>E39D</b>	DMTC_45S	DMTC	L81 DMIC1 FF SCLK 1.4
<b>E39E</b>	DMTC_45S	DMTC	L81 DMIC1 FF SD 1.4
<b>E39F</b>	DMTC_45S	DMTC	DMIC1 FF SCLK 1.3 1.4
<b>E39G</b>	DMTC_45S	DMTC	DMIC1 FF SD 1.3 1.4
<b>E40D</b>	DMTC_45S	DMTC	DMIC1 FF SCLK_CONN 1.3

## AUDIO

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
AUDIO	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
<b>E23</b>	USB_90D	USB	MIKEY_TS_P	10 14
<b>E25</b>	USB_90D	USB	MIKEY_TS_N	10 14
<b>E89</b>	USB_90D	USB	L81_MBUS_P	14
<b>E89</b>	USB_90D	USB	L81_MBUS_N	14
<b>E23</b>	SPEAKER	AUDIO	SPKR_L_CONN_P	15 38
<b>E25</b>	SPEAKER	AUDIO	SPKR_L_CONN_N	15 38
<b>E89</b>	SPEAKER	AUDIO	SPKR_R_CONN_P	15 38
<b>E25</b>	SPEAKER	AUDIO	SPKR_R_CONN_N	15 38
<b>E93</b>	AUDIO_DIFF	AUDIO	HP_MIC_P	14
<b>E93</b>	AUDIO_DIFF	AUDIO	HP_MIC_N	14
<b>E97</b>	AUDIO_DIFF	AUDIO	L81_AIN2_P	14
<b>E99</b>	AUDIO_DIFF	AUDIO	L81_AIN2_N	14


## TEMP SENSORS

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
TEMP	*	TEMP_SENSE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
TEMP	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
<b>E100</b>	TEMP	TEMP	BOARD_TEMP1_P	42
<b>E100</b>	TEMP	TEMP	BOARD_TEMP1_N	42
<b>E400</b>	TEMP	TEMP	BOARD_TEMP2_P	42
<b>E400</b>	TEMP	TEMP	BOARD_TEMP2_N	42
<b>E600</b>	TEMP	TEMP	BOARD_TEMP3_P	42
<b>E600</b>	TEMP	TEMP	BOARD_TEMP3_N	42
<b>E400</b>	TEMP	TEMP	BOARD_TEMP4_P	23 42
<b>E400</b>	TEMP	TEMP	BOARD_TEMP4_N	23 42

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MLB CONSTRAINTS

BOARD LAYERS	BOARD AREAS	BOARD UNITS (MIL OF MM)	ALLEGRO VERSION
TOP, ISL2, ISL3, ISL4, ISL5, ISL6, ISL7, ISL8, ISL9, BOTTOM	NO_TYPE, BGA	MM	16.2

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	=45_OHM_SE	=45_OHM_SE	30 MM	0 MM	0 MM
STANDARD	*	Y	=DEFAULT	=DEFAULT	12.7 MM	=DEFAULT	=DEFAULT

SINGLE-ENDED PHYSICAL RULES  
45 OHMS

PHYSICAL_RULE_SET	LAYER	ALLOW_ROUTE_ON_LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
45_OHM_SE	ISL2, ISL9	Y	0.053 MM	0.053 MM	3.0 MM		
45_OHM_SE	ISL4, ISL6	Y	0.055 MM	0.055 MM	3.0 MM		
45_OHM_SE	*	N	0.055 MM	0.055 MM	3.0 MM		

50 OHMS – CLEAR ON LAYER 2 AND 9

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	0.085 MM	0.085 MM	3.0 MM		
50_OHM_SE	*	N	0.085 MM	0.085 MM	3.0 MM		

DIFFERENTIAL PAIR PHYSICAL RULES  
90 OHMS

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	TOP	Y	0.089 MM	0.089 MM		0.150 MM	0.150 MM
90_OHM_DIFF	ISL2, ISL9	Y	0.051 MM	0.051 MM	=STANDARD	0.120 MM	0.120 MM
90_OHM_DIFF	ISL4, ISL6	Y	0.052 MM	0.052 MM	=STANDARD	0.120 MM	0.120 MM
90_OHM_DIFF	*	N	0.089 MM	0.089 MM	=STANDARD	0.150 MM	0.150 MM

AUDIO/MISC PHYSICAL RULES

PHYSICAL_RULE_SET	LAYER	ALLOW_ROUTE_ON_LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
1:1_DIFFPAIR	*	Y	=STANDARD	=STANDARD	=STANDARD	0.08 MM	0.08 MM
SPEAKER	*	Y	0.5 MM	0.20MM	10 MM	0.10 MM	0.10 MM
AUDIO_DIFF	*	Y	0.1 MM	0.10MM	10 MM	0.10 MM	0.10 MM
TEMP_SENSE	*	Y	0.1 MM	0.10MM	10 MM	0.08 MM	0.08 MM

BGA AREA PHYSICAL RULES

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
*	BGA	BGA_PHY

PHYSICAL_RULE_SET	LAYER	ALLOW_ROUTE_ON_LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
BGA_PHY	*	Y	0.055 MM	0.055 MM	=STANDARD	0.076 MM	0.075 MM

SPACING CONSTRAINTS

DEFAULT/BGA SPACING RULES

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
DEFAULT	*	0.08 MM	?
STANDARD	*	=DEFAULT	?
BGA_SPA	*	0.055 MM	?

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
*	*	BGA	BGA_SPA
CLK	*	BGA	BGA_SPA
PWR	*	*	PWR_P1SPACING
GND	*	*	GND_P1SPACING
SWITCHNODE	*	*	SWITCHNODE
ANLG	*	*	3:1_SPACING

NOTES:

0.075 MM ~ 3 MIL  
0.089 MM ~ 3.5 MIL  
0.102 MM ~ 4 MIL  
0.114 MM ~ 4.5 MIL  
0.125 MM ~ 5 MIL  
0.140 MM ~ 5.5 MIL  
0.15 MM ~ 6 MIL  
0.18 MM ~ 7 MIL  
0.2 MM ~ 8 MIL  
0.25 MM ~ 10 MIL  
0.3 MM ~ 12 MIL  
0.33 MM ~ 13 MIL  
0.4 MM ~ 16 MIL  
1.0 MM = 39.37 MIL


REGULAR SPACING RULES

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
1:1_SPACING	*	0.055 MM	?
0P08_SPACING	*	0.080 MM	?
1.5:1_SPACING	*	0.0825 MM	?
2:1_SPACING	*	0.11 MM	?
2.5:1_SPACING	*	0.137 MM	?
3:1_SPACING	*	0.165 MM	?
4:1_SPACING	*	0.22 MM	?
5:1_SPACING	*	0.275 MM	?
0P5MM_SPACING	*	0.5 MM	?
0P64MM_SPACING	*	0.64 MM	?

\*NOTE: ASSUMING 0.060MM DIELECTRIC THICKNESS

POWER/GND SPACING RULES

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
PWR_P1SPACING	*	0.1 MM	
GND_P1SPACING	*	0.1 MM	
SWITCHNODE	*	0.2 MM	

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CONSTRAINTS: MLB RULES			
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		REVISION	13.0.0
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