

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

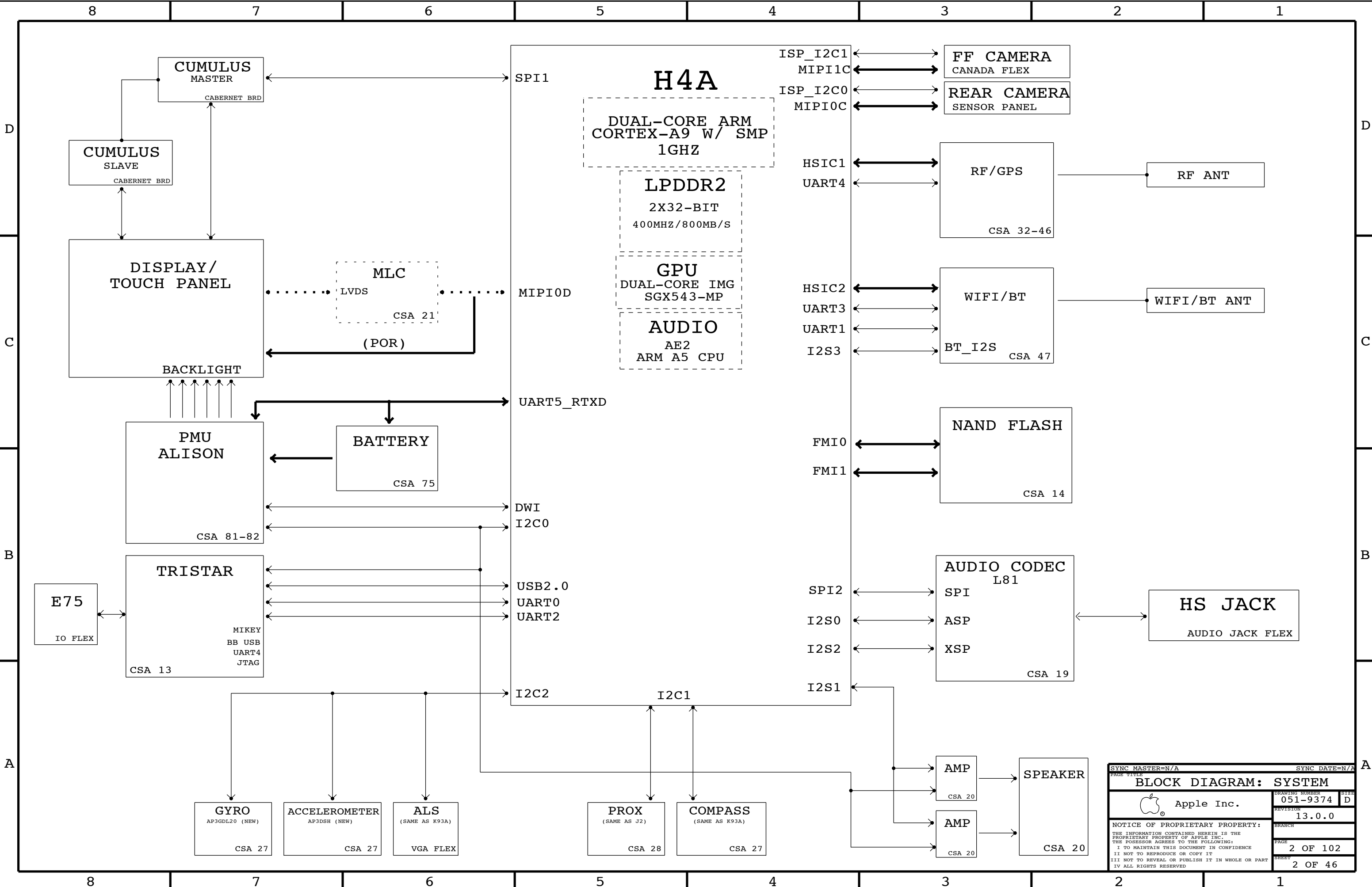
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820-3243	1	PCB,MLB,X123	PCB1	

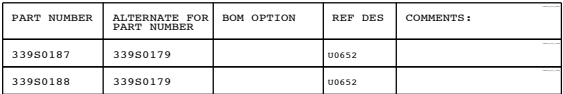
PDF	CSA	CONTENTS	SYNC	MASTER	DATE
1	1	TABLE OF CONTENTS		N/A	N/A
2	2	BLOCK DIAGRAM: SYSTEM		N/A	N/A
3	6	AP: MAIN		N/A	04/18/2011
4	7	AP: I/Os		N/A	05/05/2011
5	8	AP: FLASH MEMORY INTERFACE		N/A	04/18/2011
6	9	AP: TV/DP/MIPI/CAMERA		MLB	05/04/2012
7	10	AP: PWR		N/A	04/18/2011
8	11	AP: PWR		N/A	04/18/2011
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

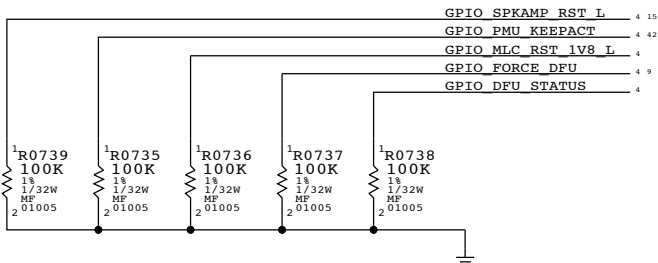
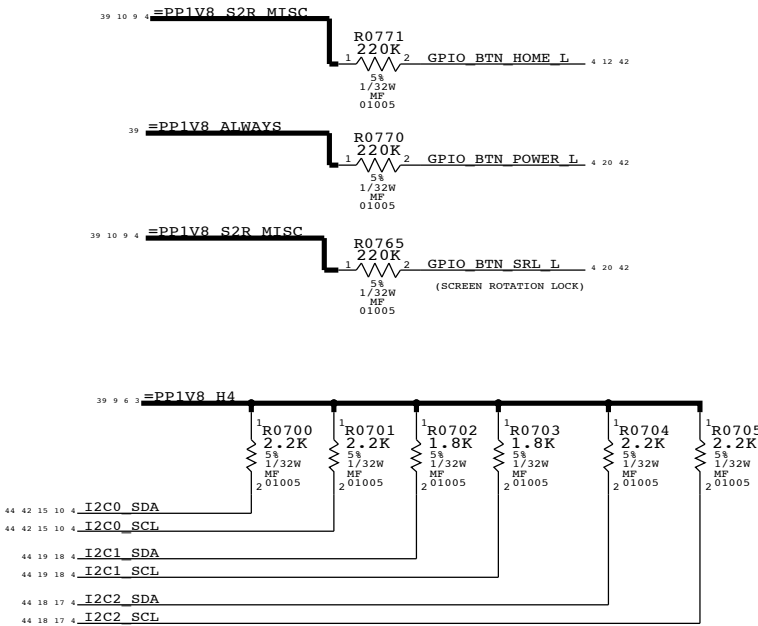
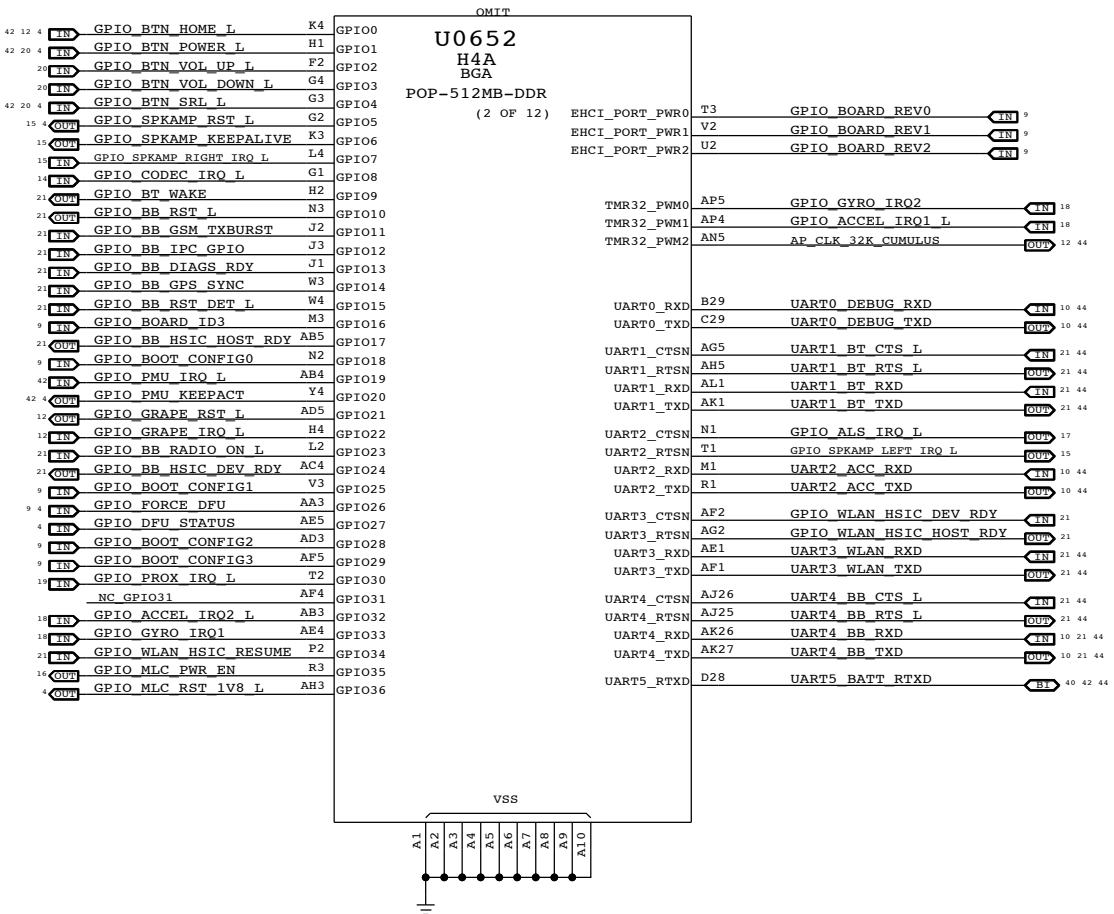
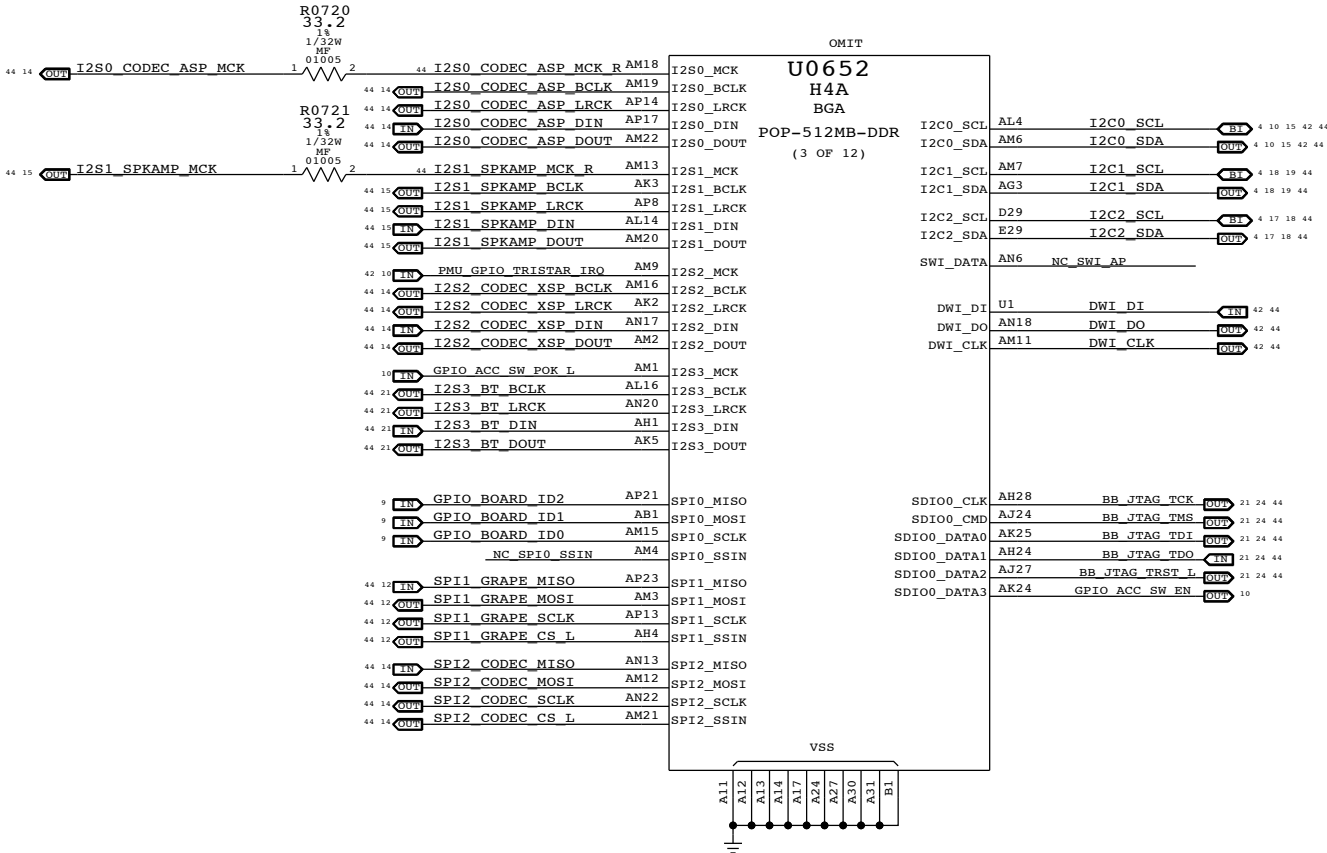
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	BRANCH
	PAGE
	1 OF 102
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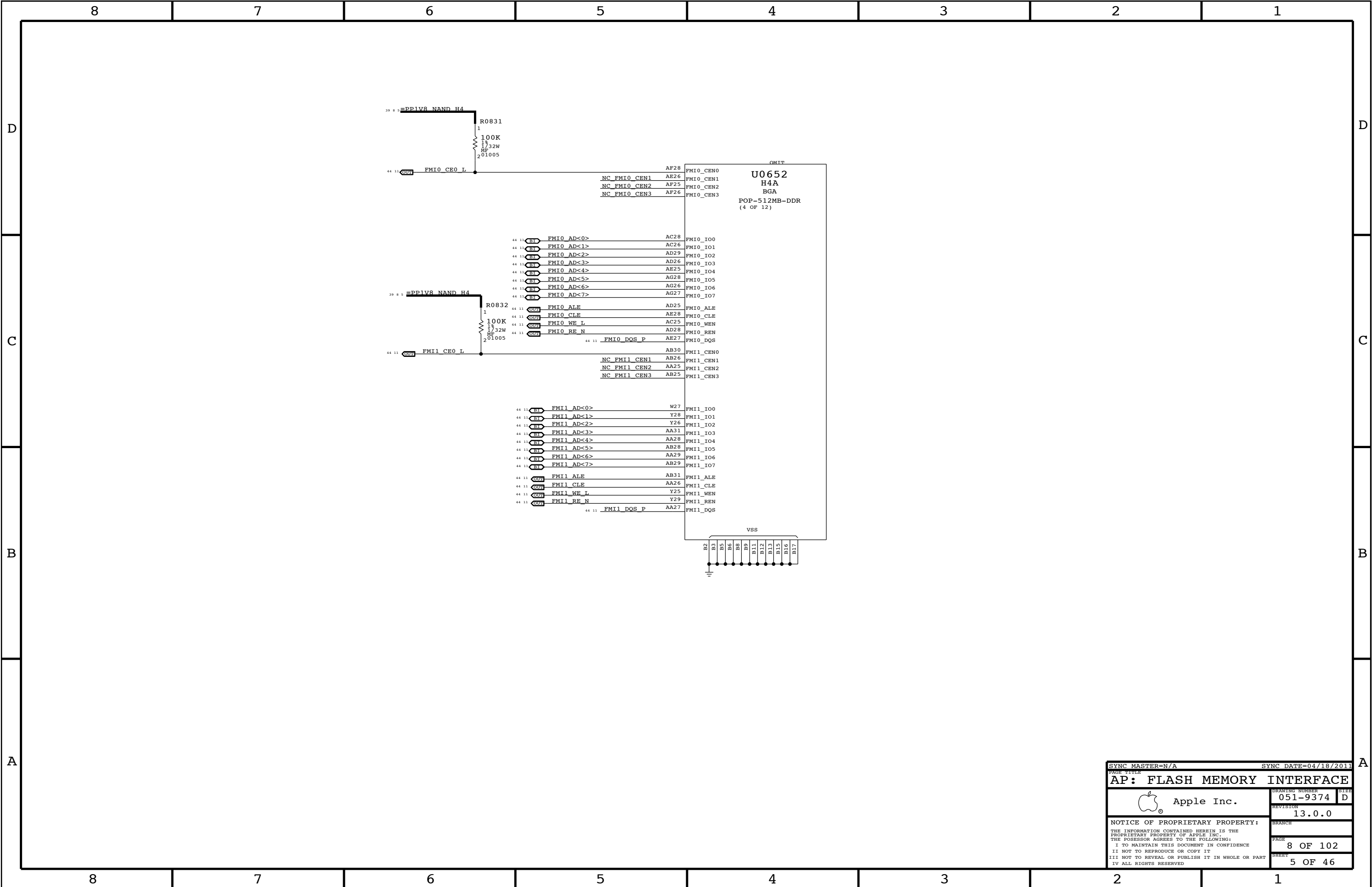


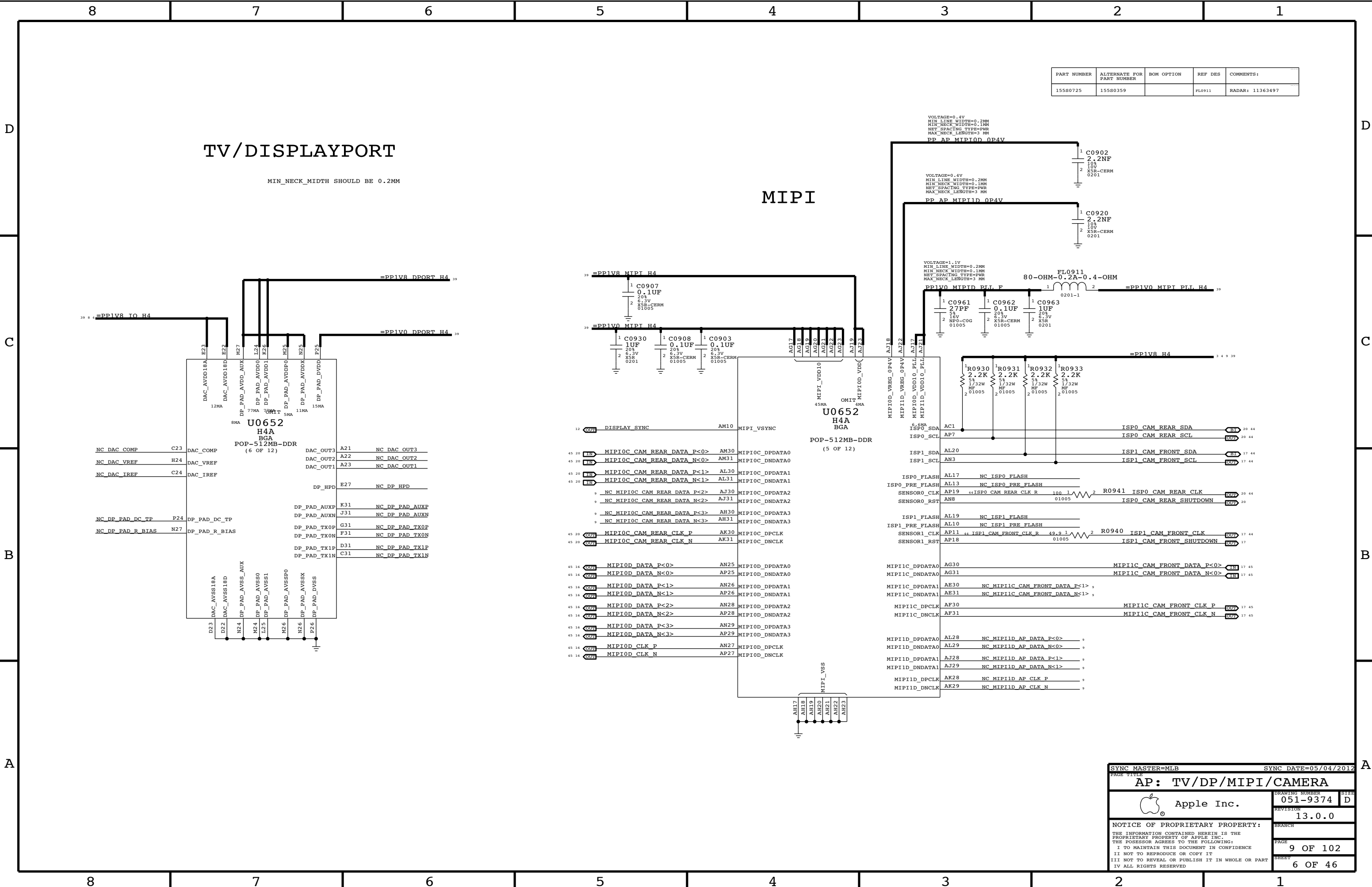
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		SHEET 3 OF 46	

H4A I/OS




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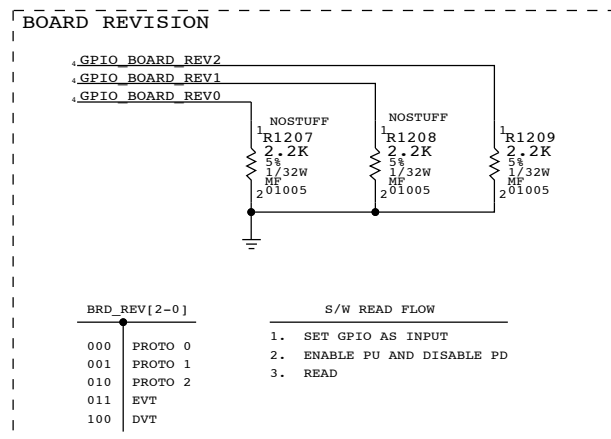
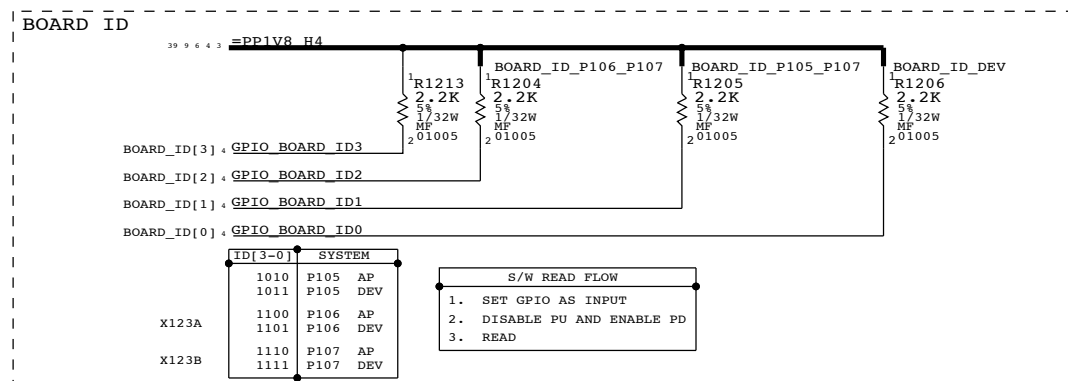
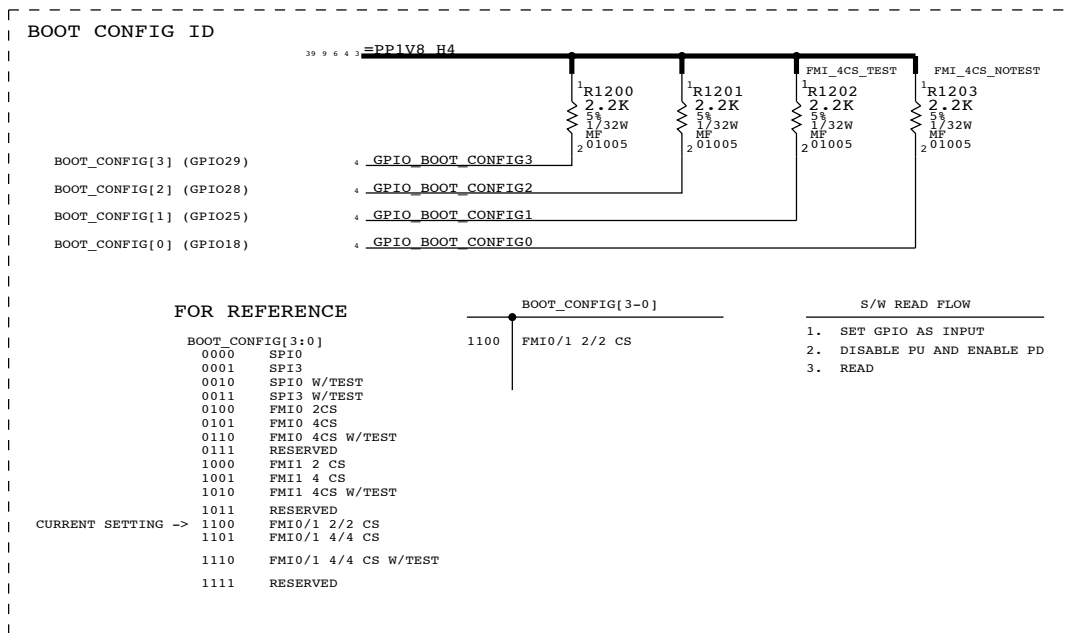




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AP: TV/DP/MIPI/CAMERA			
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NOTE: PADS USED FOR DEBUG

39 10 4 =PP1V8_S2R_MISC

NOSTUFF

1 R1270

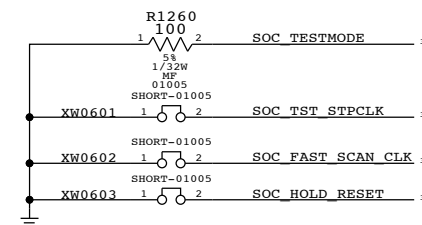
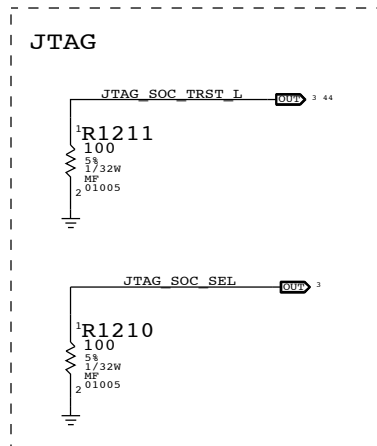
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2 1/20W

100

2 201


4 GPIO_FORCE_DEFU

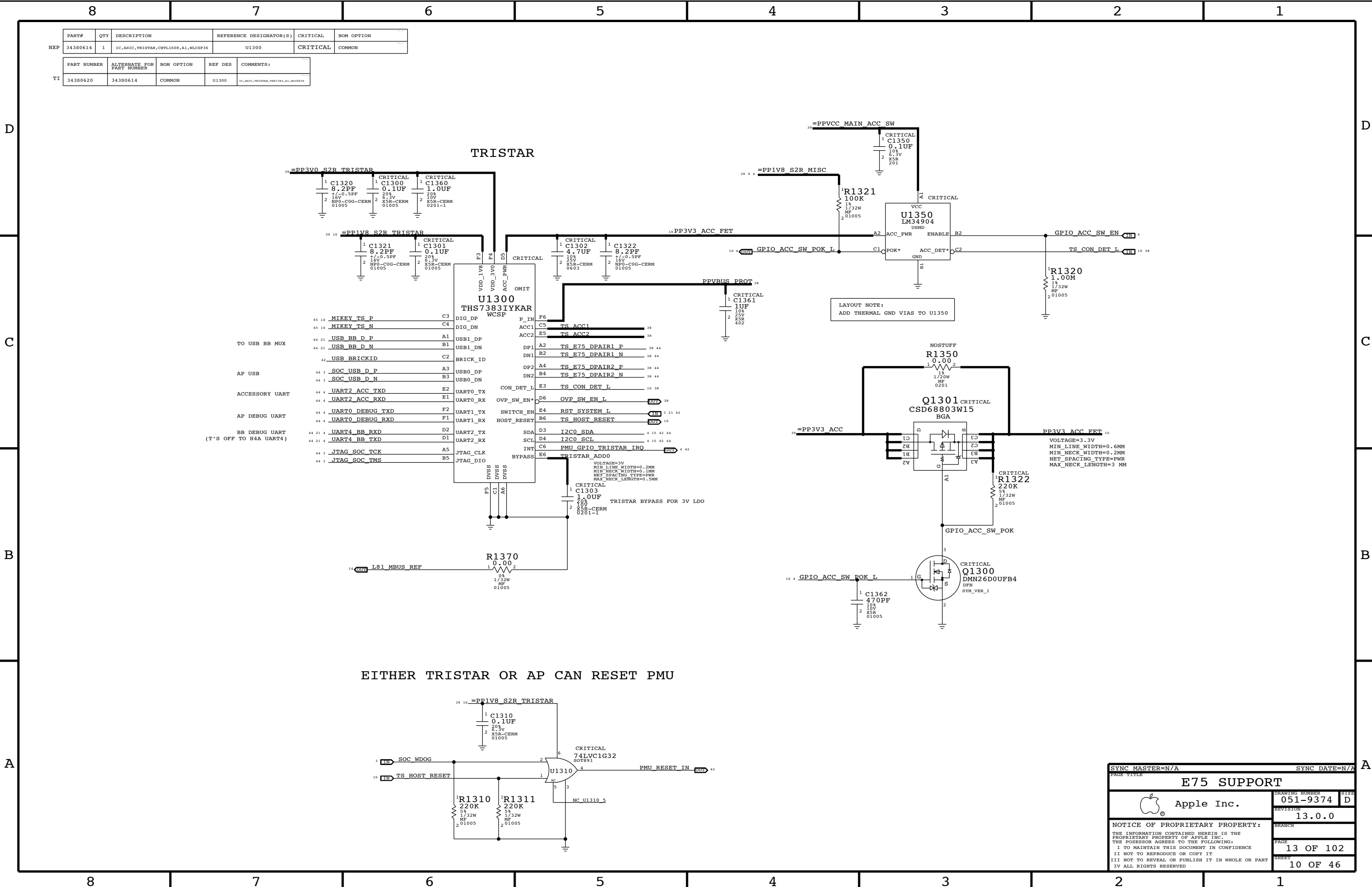


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NC_FMI0_RE_POS	=====	FMI0_RE_P	11
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NC_JTAG_SOC_TDO	=====	JTAG_SOC_TDO	3 44
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NC_AP_MIPI0C_DPDATA3	==	NC_MIPI0C_CAM_REAR_DATA_P<3>	6
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AP: MISC & ALIASES		PAGE TOTAL	
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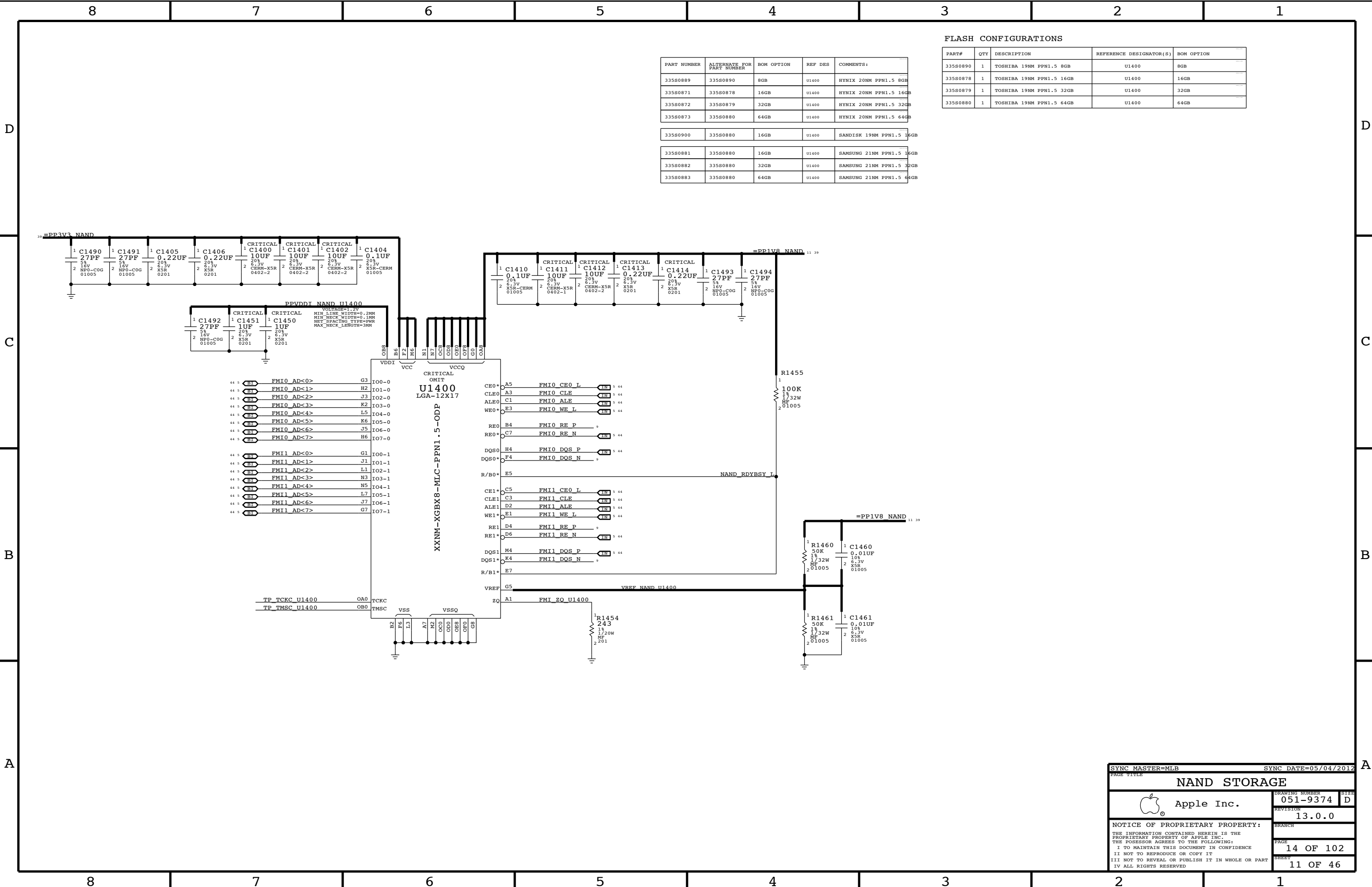


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NXP	343S0614	1	IC,ASIC,TRISTAR,CBTL1608,A1,MLCSP36	U1300	CRITICAL
TI	343S0620	1	IC,ASIC,TRISTAR,CBTL1608,A1,MLCSP36	U1300	CRITICAL

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
343S0620	343S0614	COMMON	U1300	IC,ASIC,TRISTAR,CBTL1608,A1,MLCSP36

45 14	MIKEY TS P	C3	DIG_DP	P_IN	F6	TS ACC1	38
45 14	MIKEY TS N	C4	DIG_DN	ACC1	C5	TS ACC2	38
44 21	USB_BB_D_P	A1	USB1_DP	ACC2	E5	TS E75_DPAIR1_P	38 44
44 21	USB_BB_D_N	B1	USB1_DN	DP1	A2	TS E75_DPAIR1_N	38 44
42	USB_BRICKID	C2	BRICK_ID	DN1	B2	TS E75_DPAIR2_P	38 44
44 3	SOC_USB_D_P	A3	USB0_DP	DN2	A4	TS E75_DPAIR2_N	38 44
44 3	SOC_USB_D_N	B3	USB0_DN	CON_DET_L	E3	TS CON DET L	10 38
44 4	UART2_ACC_TXD	E2	UART0_TX	OVP_SW_EN*	D6	OVP SW EN L	38
44 4	UART2_ACC_RXD	E1	UART0_RX	SWITCH_EN	E4	RST SYSTEM L	3 21 42
44 4	UART0_DEBUG_TXD	F2	UART1_TX	HOST_RESET	B6	TS HOST RESET	10
44 4	UART0_DEBUG_RXD	F1	UART1_RX	SDA	D3	I2C0_SDA	4 15 42 44
44 21 4	UART4_BB_RXD	D2	UART2_TX	SCL	D4	I2C0_SCL	4 15 42 44
44 21 4	UART4_BB_TXD	D1	UART2_RX	INT	C6	PMU_GPIO_TRISTAR_IRO	4 15 42 44
44 3	JTAG_SOC_TCK	A5	JTAG_CLK	BYPASS	E6	TRISTAR_ADD0	4 42
44 3	JTAG_SOC_TMS	B5	JTAG_DIO				

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E75 SUPPORT		051-9374		D
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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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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

Apple Inc.

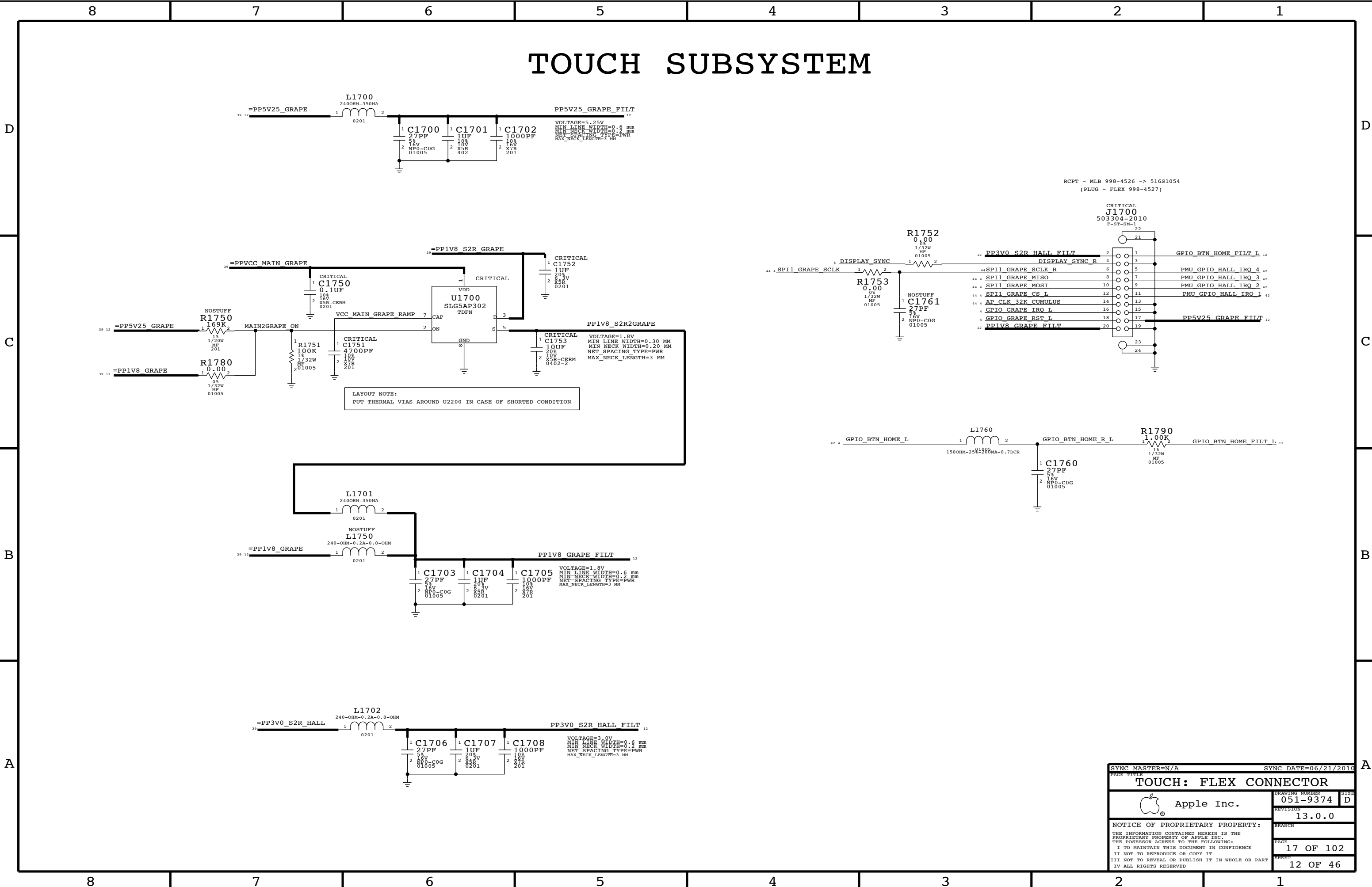
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TOUCH SUBSYSTEM

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

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

LAYOUT NOTE:
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TOUCH: FLEX CONNECTOR

Apple Inc.

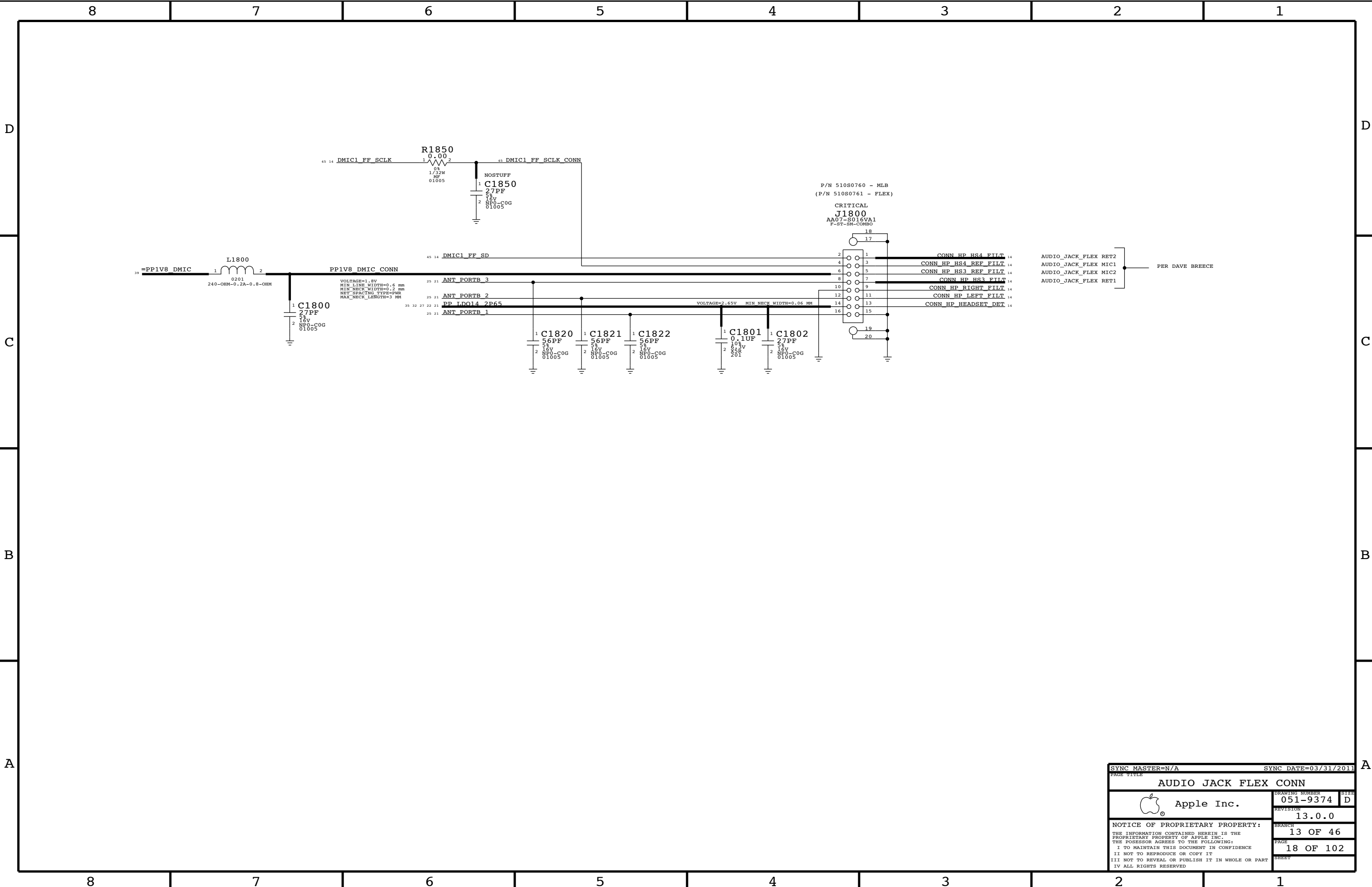
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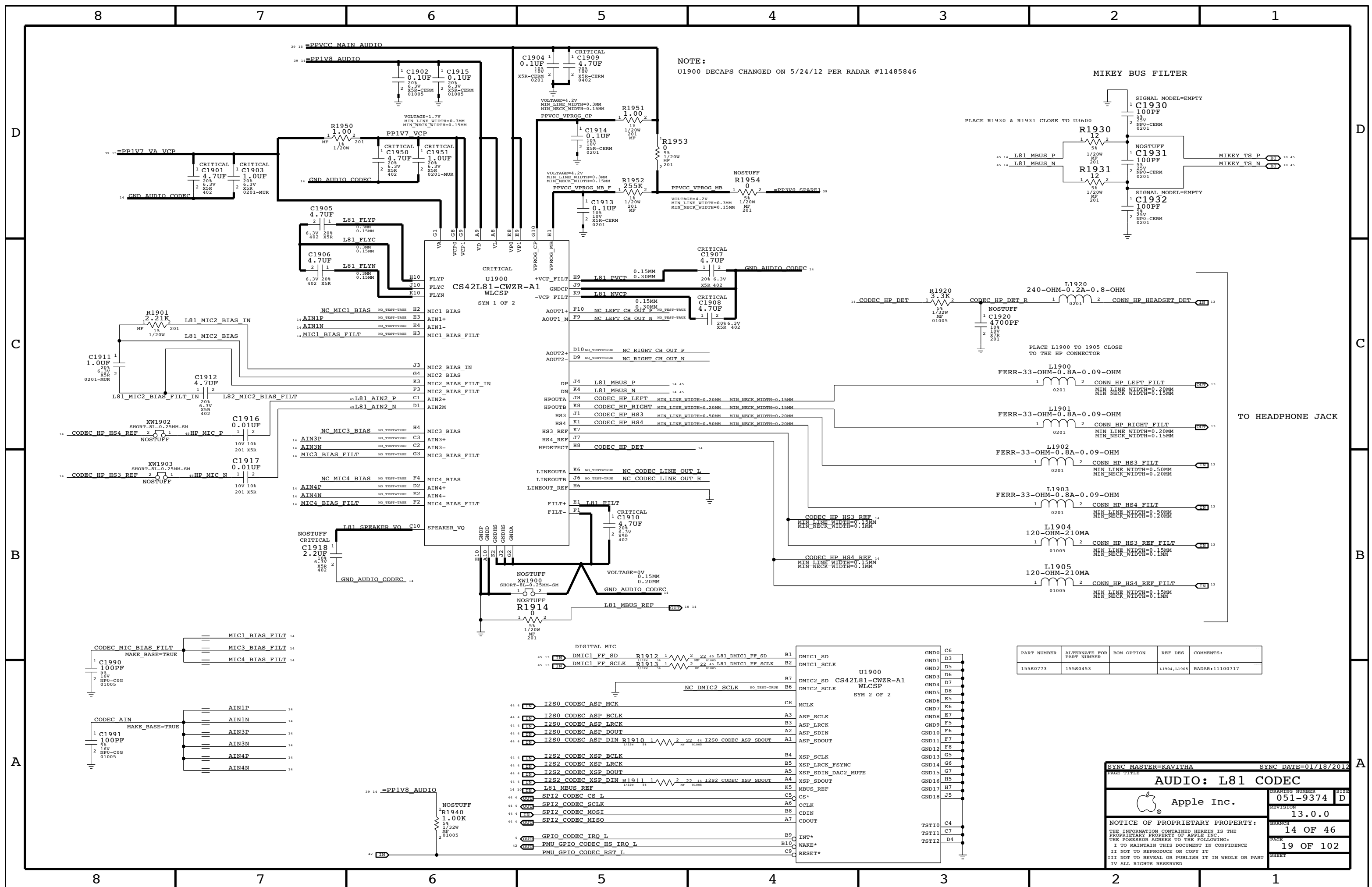
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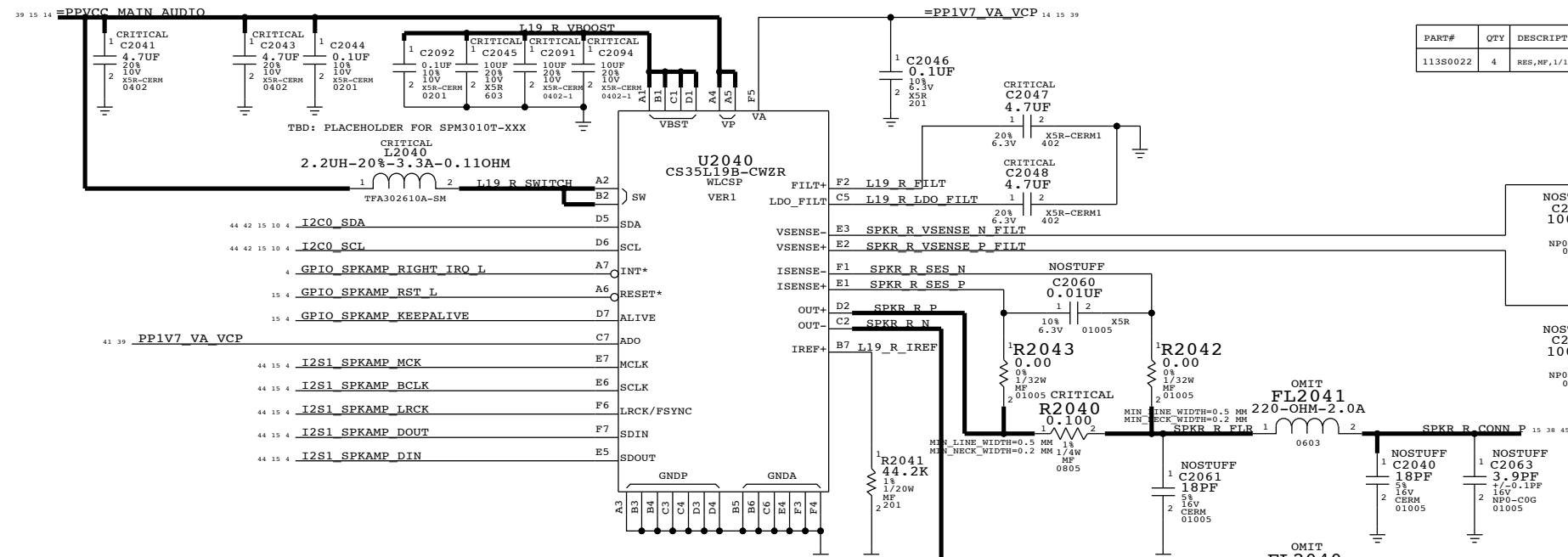
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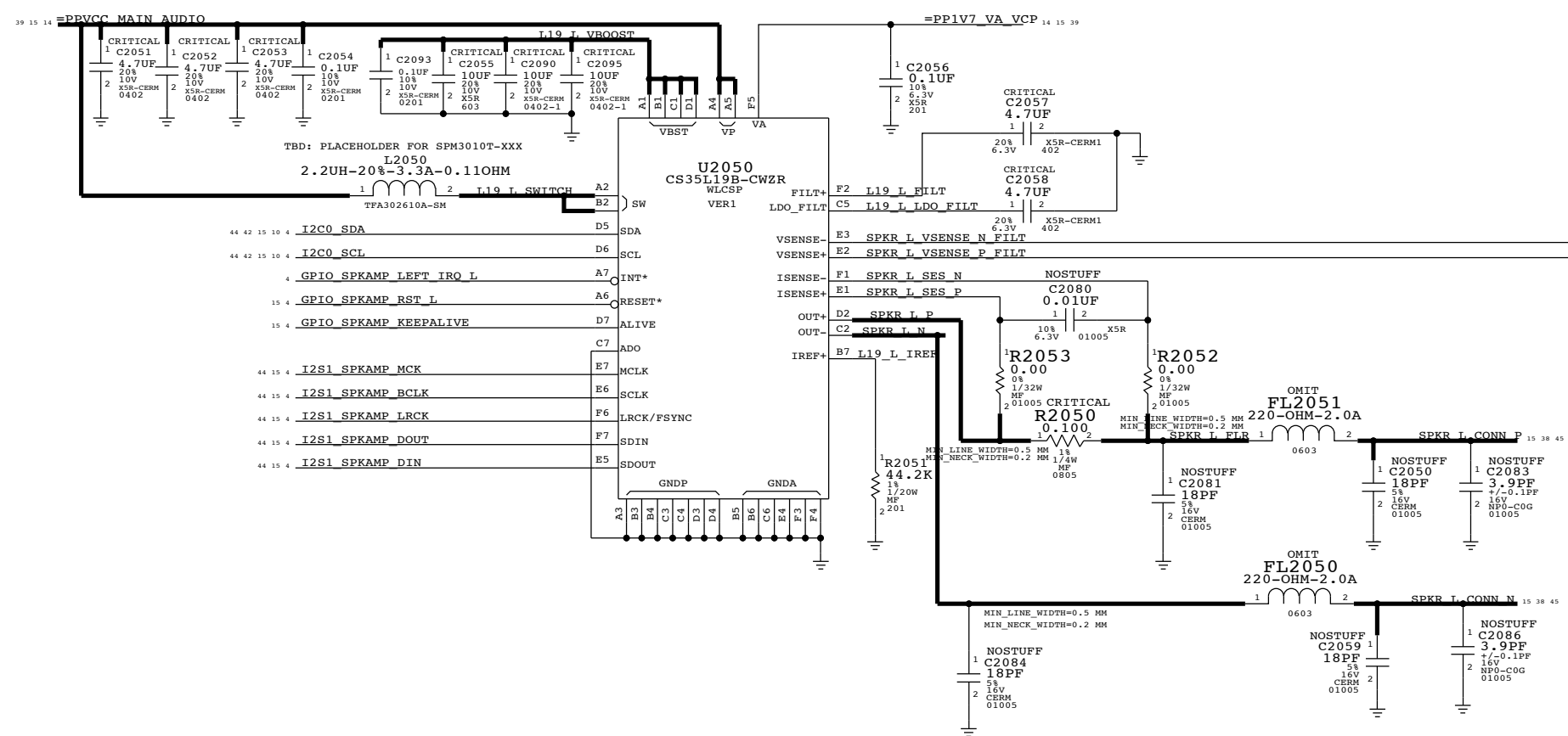
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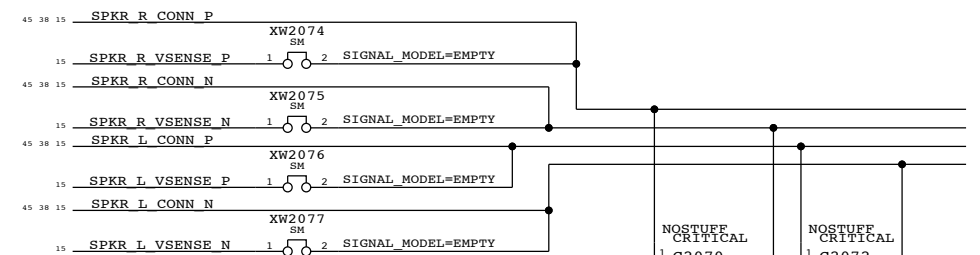
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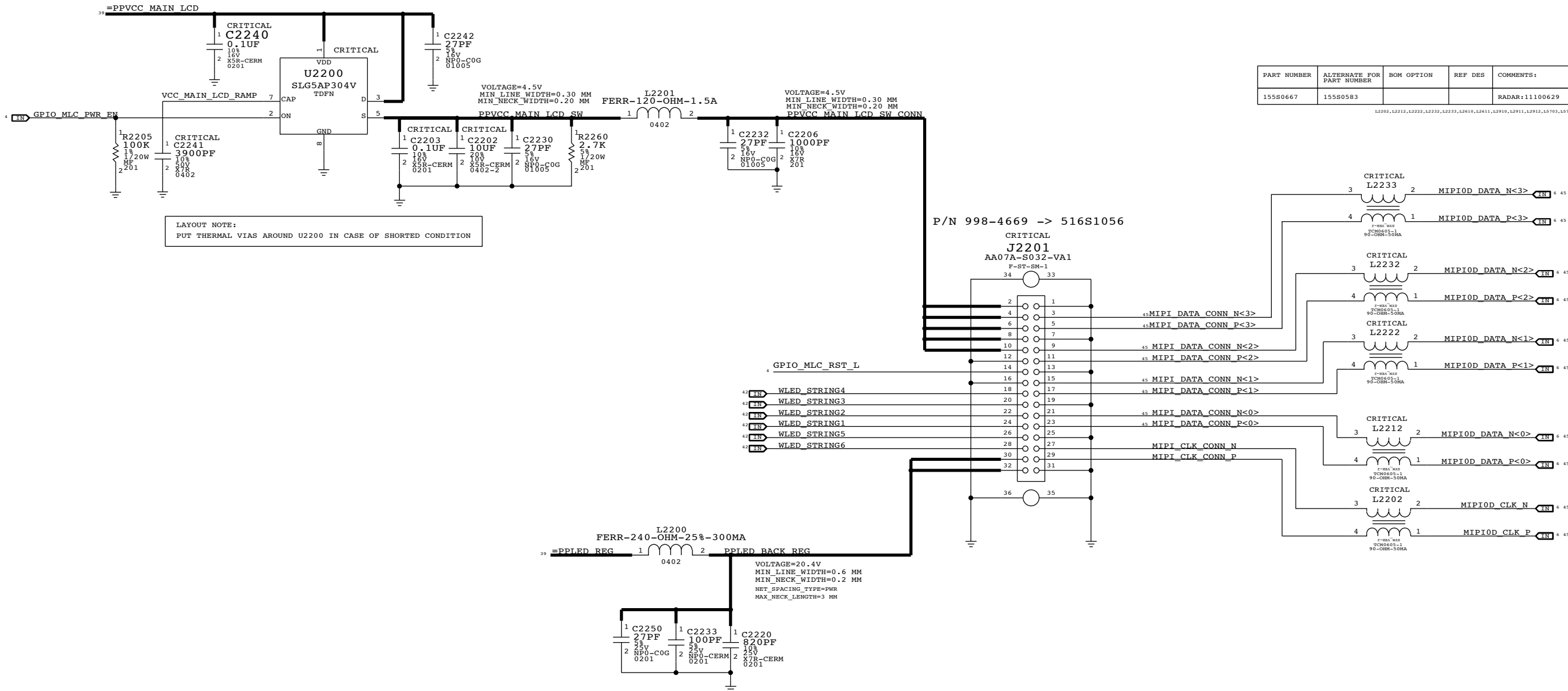



SPEAKER CONNECTOR



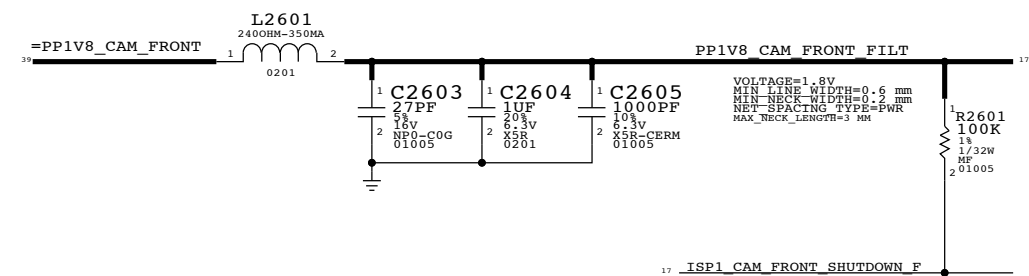
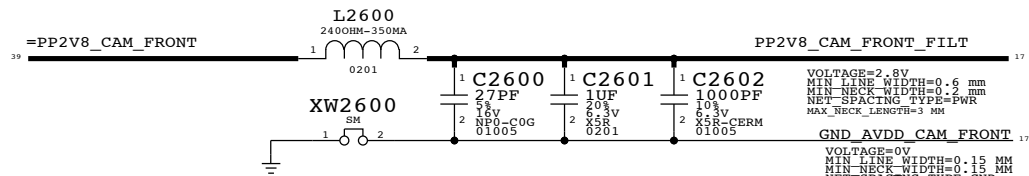
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MIPI CONNECTOR

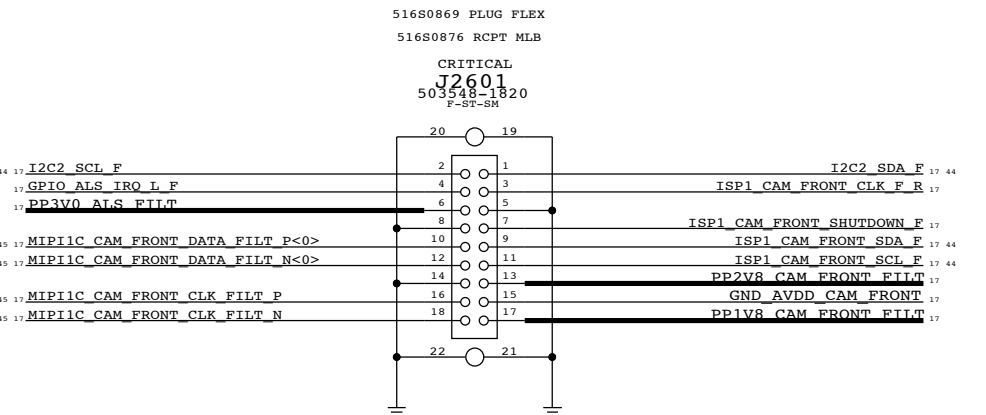
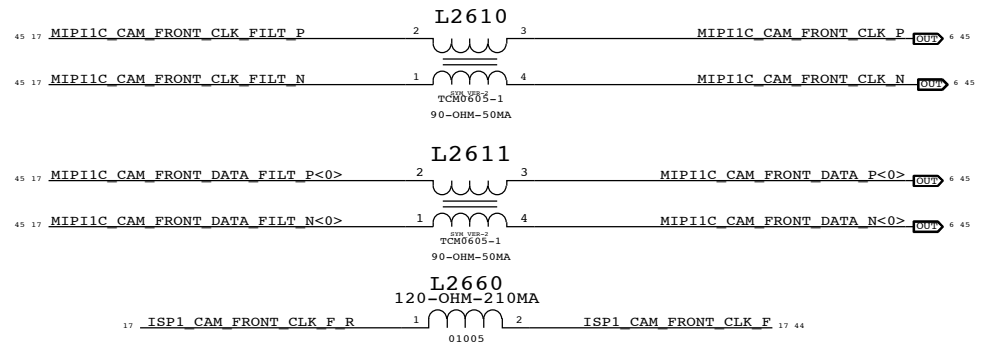
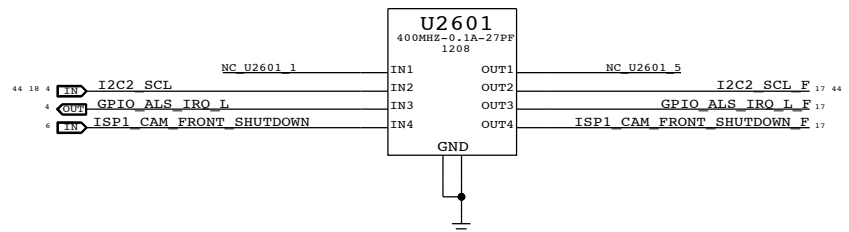
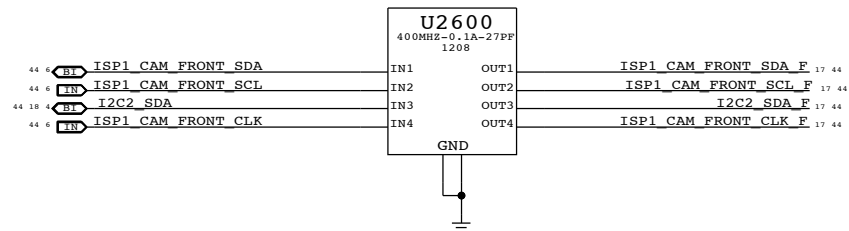
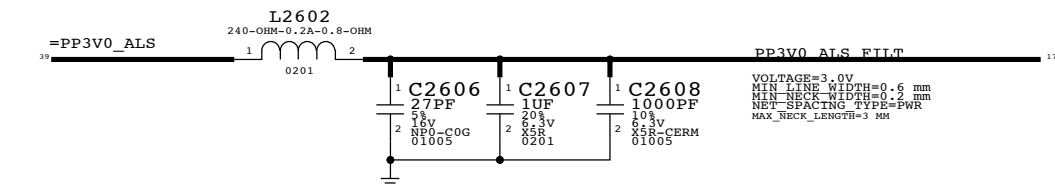


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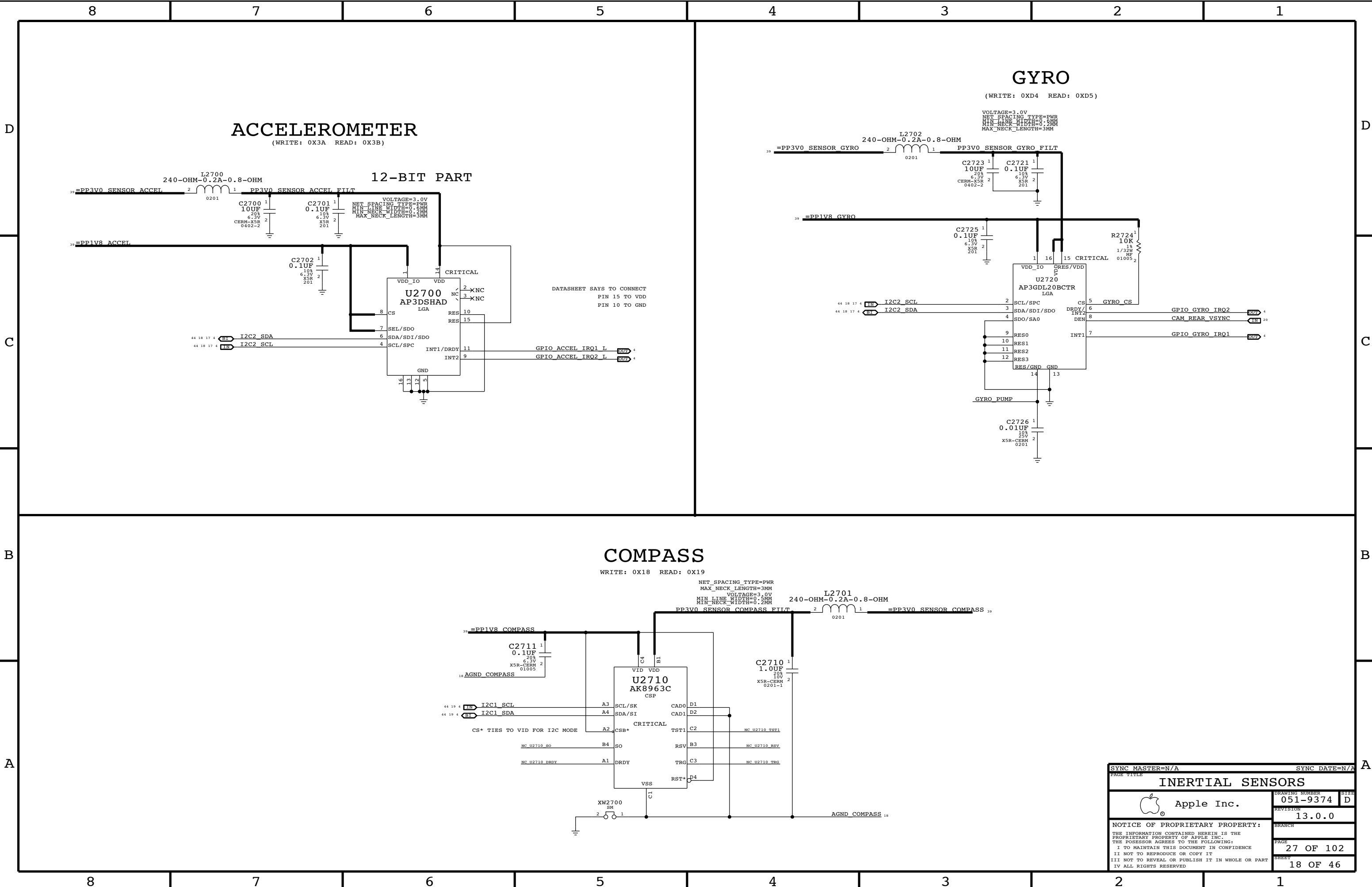
VGA FRONT CAMERA CONNECTOR



ISP1_CAM_FRONT_SHUTDOWN
LOW = ENABLES CAMERA TO TURN ON
HIGH = DISABLES / TURNS OFF CAMERA



PAGE TITLE		SYNC MASTER=N/A		SYNC DATE=N/A	
FF CAM & MIC CONNECTORS		DRAWING NUMBER		SIZE	
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ACCELEROMETER

(WRITE: 0X3A READ: 0X3B)

12-BIT PART

COMPASS

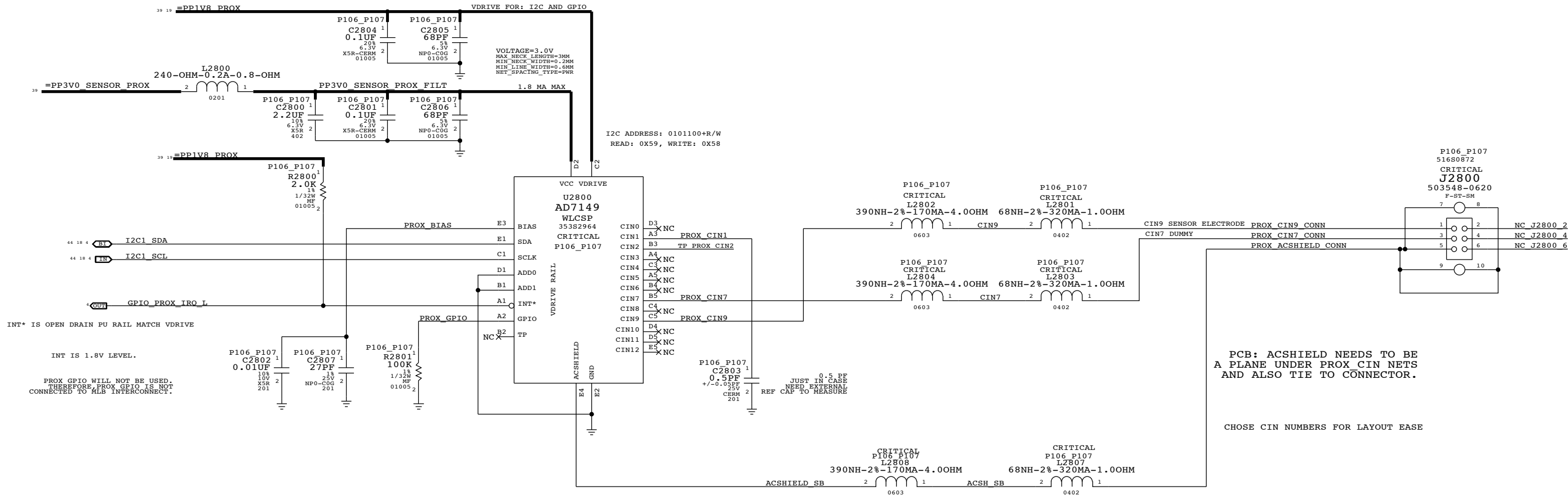
WRITE: 0X18 READ: 0X19


GYRO

(WRITE: 0XD4 READ: 0XD5)

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PROX SENSOR

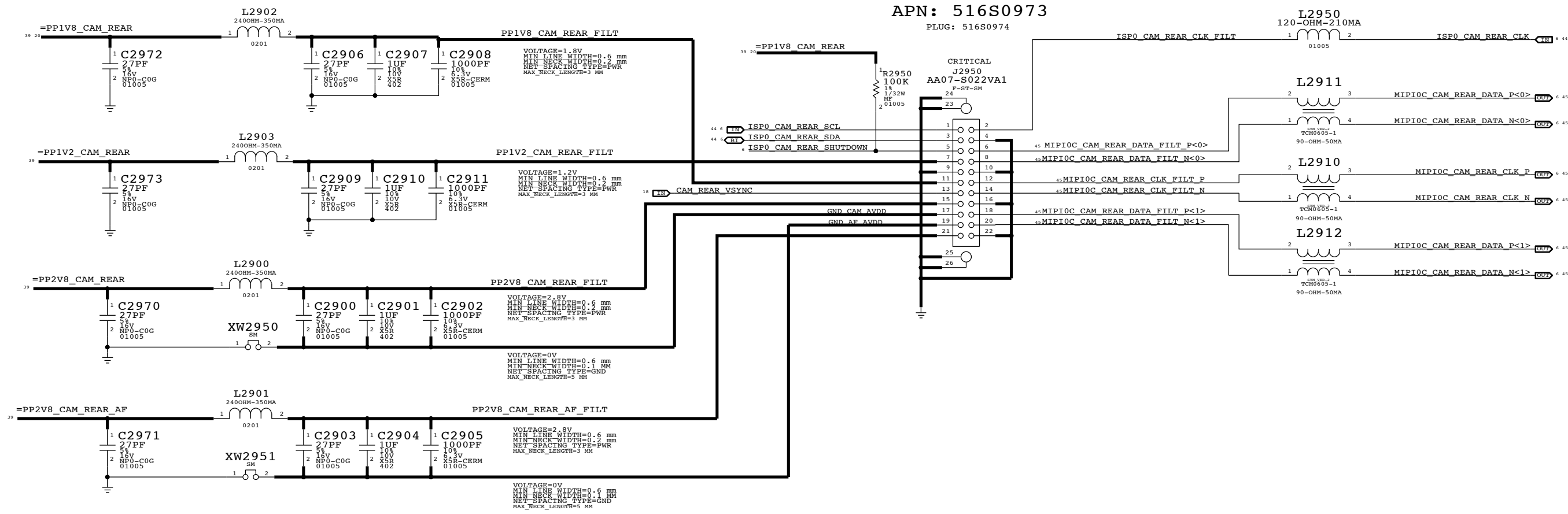


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REAR CAMERA CONNECTOR

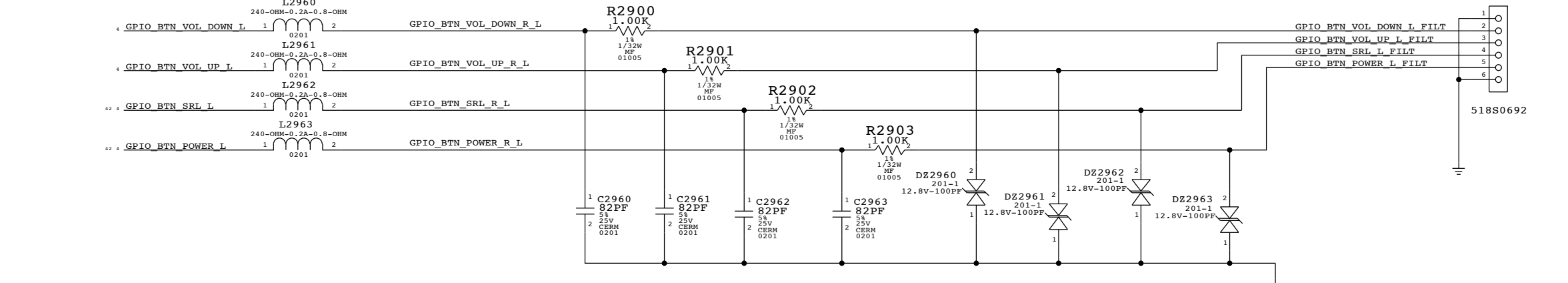
APN: 516S0973

PLUG: 516S0974



BUTTON CONNECTOR

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



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		20 OF 46	

AP INTERFACE & DEBUG CONNECTOR

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AP CONNECTIONS

34	33	31	30	29	23	21	PP BATT VCC CONN	=	PPBATT VCC RF	39
25							TX GTR THRESH	=	GPIO BB GSM TXBURST	4
24	23	21					BB_RST_L	=	GPIO BB_RST_L	4
							RESET_DET_L	=	GPIO BB_RST_DET_L	4
25	21						RADIO_ON_L	=	GPIO BB_RADIO_ON_L	4
23	21						RESET_PMU_L	=	PMU GPIO_BB_RST_L	42
25	21						BB_WAKE_HOST	=	PMU GPIO_BB_WAKE	42
21							RF_RESET_L	=	RST_SYSTEM_L	3 10 42
25	21						PBL_RUN_BB_HSIC1_RDY	=	GPIO_BB_HSIC_DEV_RDY	4

25							AP_WAKE_MODEM	=	GPIO_BB_IPC_GPIO	4
25	21						AP_HSIC1_RDY	=	GPIO_BB_HSIC_HOST_RDY	4
24	21						50_HSIC_BB_DATA	=	HSIC1_BB_DATA	3 44
24	21						50_HSIC_BB_STROBE	=	HSIC1_BB_STB	3 44

25							BB_HSIC1_REMOTE_WAKE	=	GPIO_BB_DIAGS_RDY	4
25	21						BB_UART_TXD	=	UART4_BB_RXD	4 10 44
25	21						BB_UART_RXD	=	UART4_BB_TXD	4 10 44
25	21						BB_UART_RTS_L	=	UART4_BB_CTS_L	4 44
25	21						BB_UART_CTS_L	=	UART4_BB_RTS_L	4 44

24	21						BB_USB_VBUS	=	BB_VBUS_DET	42
24	21						90_BB_USB_D_P	=	USB_BB_D_P	10 44
24	21						90_BB_USB_D_N	=	USB_BB_D_N	10 44

37							PP_WLAN_MAIN_VCC	=	PPBATT_VCC_WL	39
25							PP_SYNC	=	GPIO_BB_GPS_SYNC	4
37							PP_WL_BT_VDDIO_AP	=	PP1V8_S2R_WL	39

37							CLK32K_AP	=	PMU_CLK_32K_WLAN	42 44
----	--	--	--	--	--	--	-----------	---	------------------	-------

37	21						WLAN_REG_ON	=	PMU_GPIO_WLAN_REG_ON	42
37							WLAN_UART_TXD	=	UART3_WLAN_RXD	4 44
37							WLAN_UART_RXD	=	UART3_WLAN_TXD	4 44
37							WLAN_HOST_WAKE	=	PMU_GPIO_WLAN_HOST_WAKE	42

37							WLAN_HSIC3_RESUME	=	GPIO_WLAN_HSIC_RESUME	4
37							DEV_HSIC3_RDY	=	GPIO_WLAN_HSIC_DEV_RDY	4
37							AP_HSIC3_RDY	=	GPIO_WLAN_HSIC_HOST_RDY	4
37							50_HSIC_WLAN_DATA	=	HSIC2_WLAN_DATA	3 44
37							50_HSIC_WLAN_STROBE	=	HSIC2_WLAN_STB	3 44

37							BT_HOST_WAKE	=	PMU_GPIO_BT_HOST_WAKE	42
----	--	--	--	--	--	--	--------------	---	-----------------------	----

37	21						BT_WAKE	=	GPIO_BT_WAKE	4
37	21						BT_UART_TXD	=	UART1_BT_RXD	4 44
37	21						BT_UART_RXD	=	UART1_BT_TXD	4 44
37	21						BT_UART_RTS_L	=	UART1_BT_CTS_L	4 44
37	21						BT_UART_CTS_L	=	UART1_BT_RTS_L	4 44
37	21						BT_REG_ON	=	PMU_GPIO_BT_REG_ON	42
37							BT_PCM_CLK	=	I2S3_BT_BCLK	4 44
37							BT_PCM_SYNC	=	I2S3_BT_LRCK	4 44
37							BT_PCM_OUT	=	I2S3_BT_DIN	4 44
37							BT_PCM_IN	=	I2S3_BT_DOUT	4 44

25	21	13					ANT_PORTB_1	=	ANT_PORTB_1	13 21 25
25	21	13					ANT_PORTB_2	=	ANT_PORTB_2	13 21 25
25	21	13					ANT_PORTB_3	=	ANT_PORTB_3	13 21 25
25	21						LAT_SW1_CTL	=	ANT_PORTA_1	13 21 25
35	32	27	22	21	13		PP_LDO14_2P65	=	PP_LDO14_2P65	13 21 22 27 32 35

PARTS TABLE FOR P105 SIM CARD, WHILE PINOUT IS BEING FIXED				
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
512S0088	1	P105 SIM TRAY	J31001_RF	CELL

PP31007_RF	P4MM	SM	1	BB_ERROR_FLAG	25
PP31001_RF	P4MM	SM	1	SLEEP_CLK_32K	23 24
PP31006_RF	P4MM	SM	1	PMIC_SSB_I	23 24
PP31005_RF	P4MM	SM	1	RADIO_ON_L	21 23
PP31003_RF	P4MM	SM	1	PBL_RUN_BB_HSIC1_RDY	21 25
PP31004_RF	P4MM	SM	1	AP_HSIC1_RDY	21 25

PP31013_RF	P4MM	SM	1	BT_UART_TXD	21 37
PP31014_RF	P4MM	SM	1	BT_UART_RXD	21 37

PP31015_RF	P4MM	SM	1	SPI_DATA_MOSI	25
PP31016_RF	P4MM	SM	1	SPI_DATA_MISO	25
PP31017_RF	P4MM	SM	1	SPI_CS_L	25
PP31018_RF	P4MM	SM	1	SPI_CLK	25

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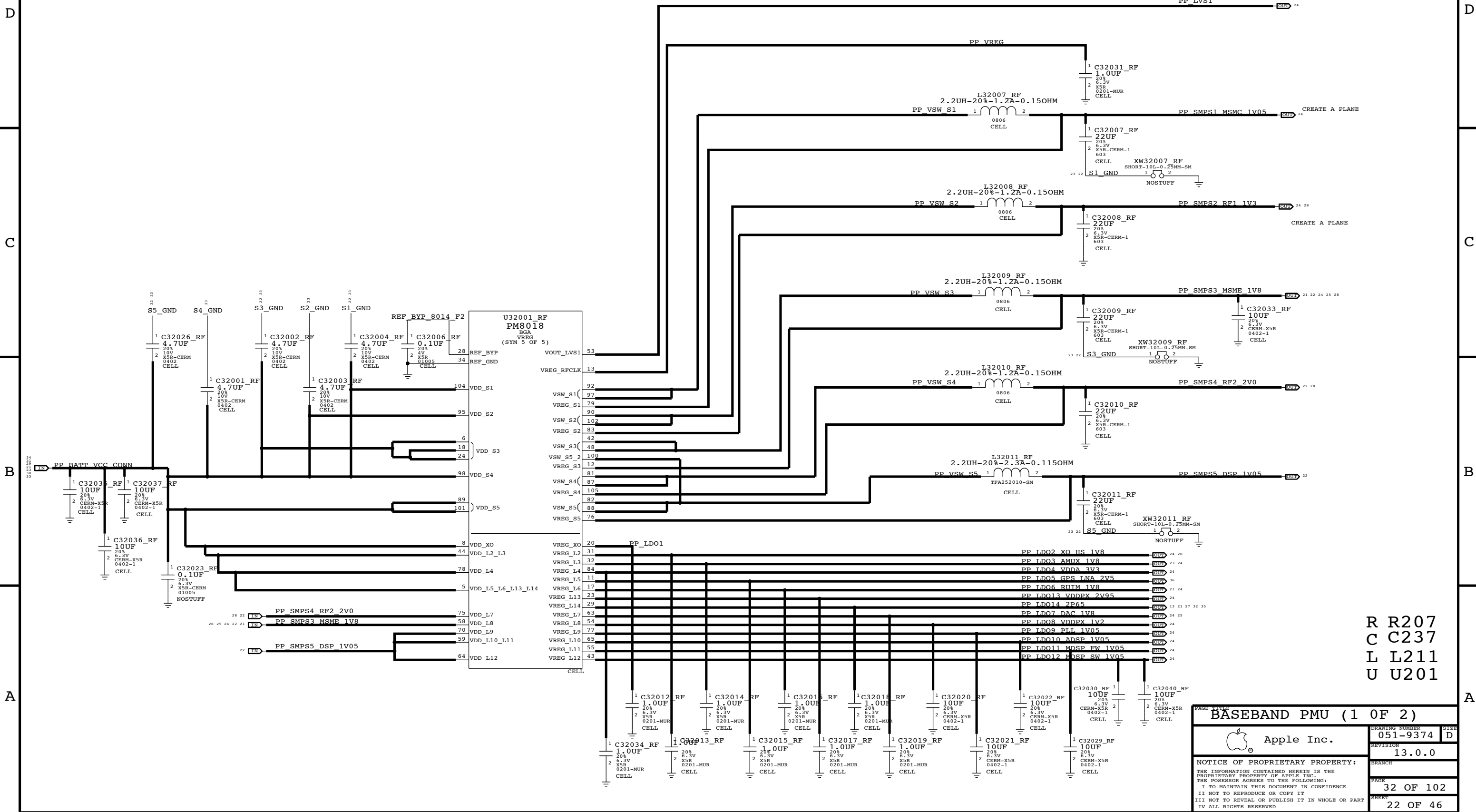
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PP31017_RF	P4MM	SM	1	SPI_DATA_CS	25

BASEBAND PMU (1 OF 2)

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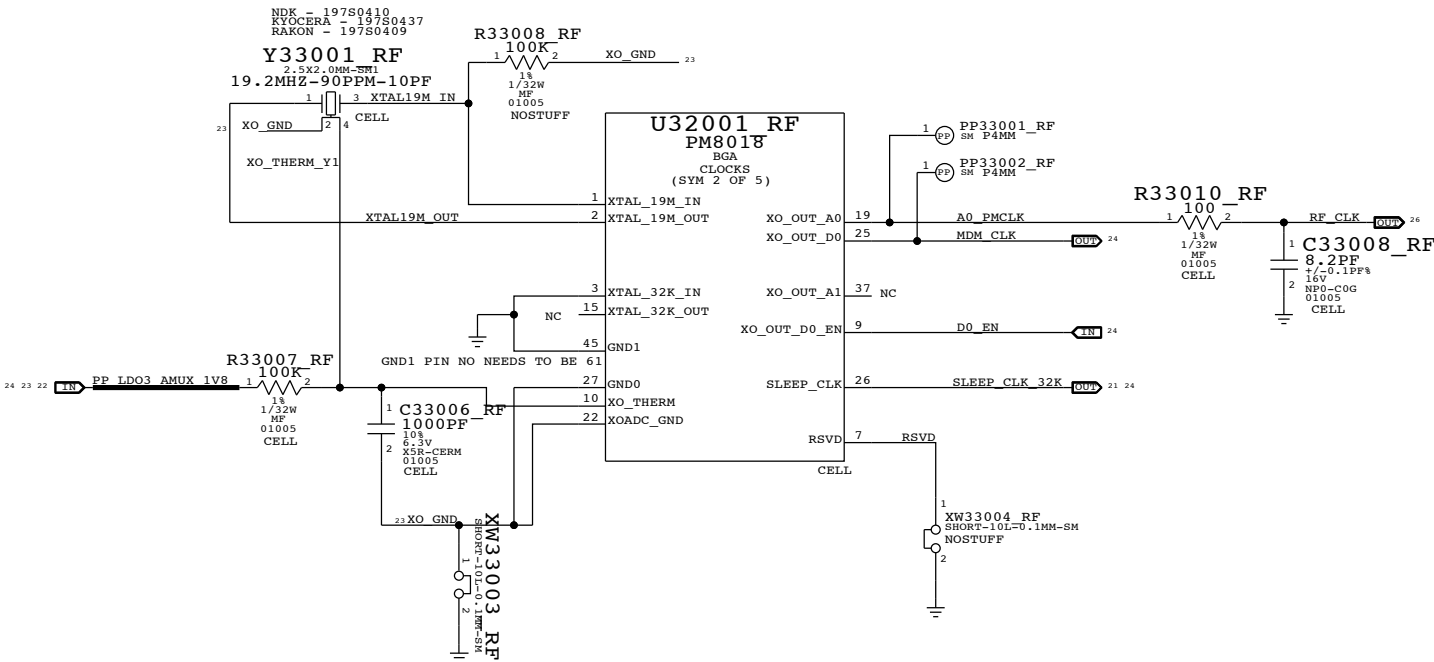
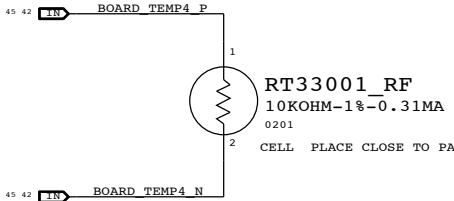
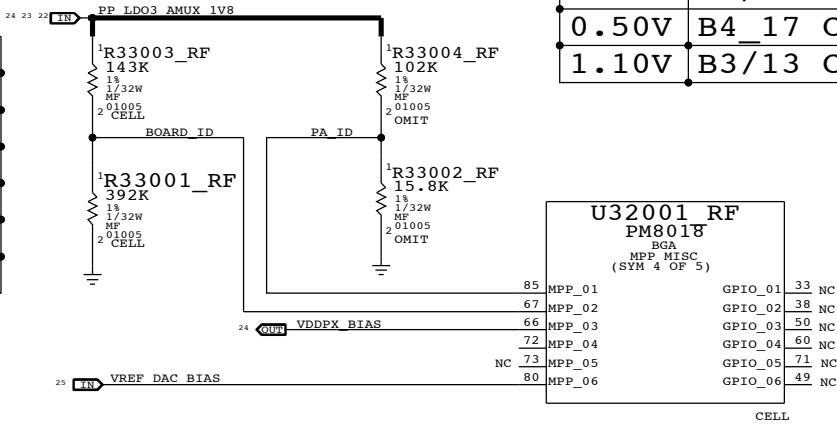
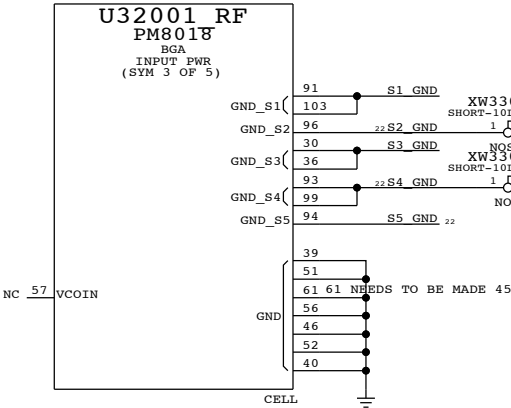
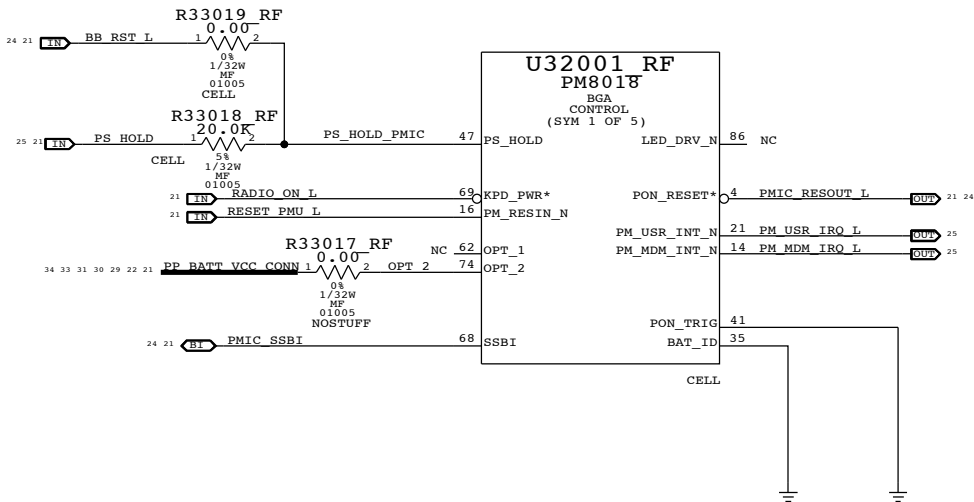
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BASEBAND PMU (2 OF 2)

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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

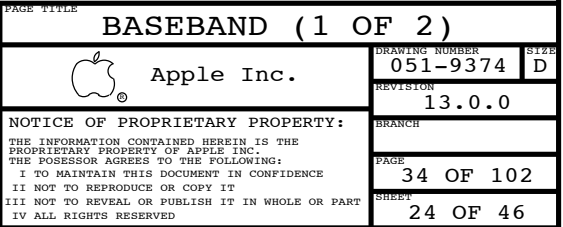
BOM OPTIONS

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

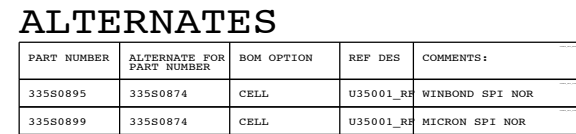
R R317
C C309
L LXXX
U U301
XW XW305


PAGE TITLE		
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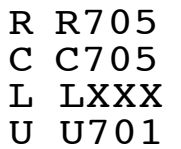


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RF TRANSCEIVER SWITCHING NETWORKS (2 OF 3)

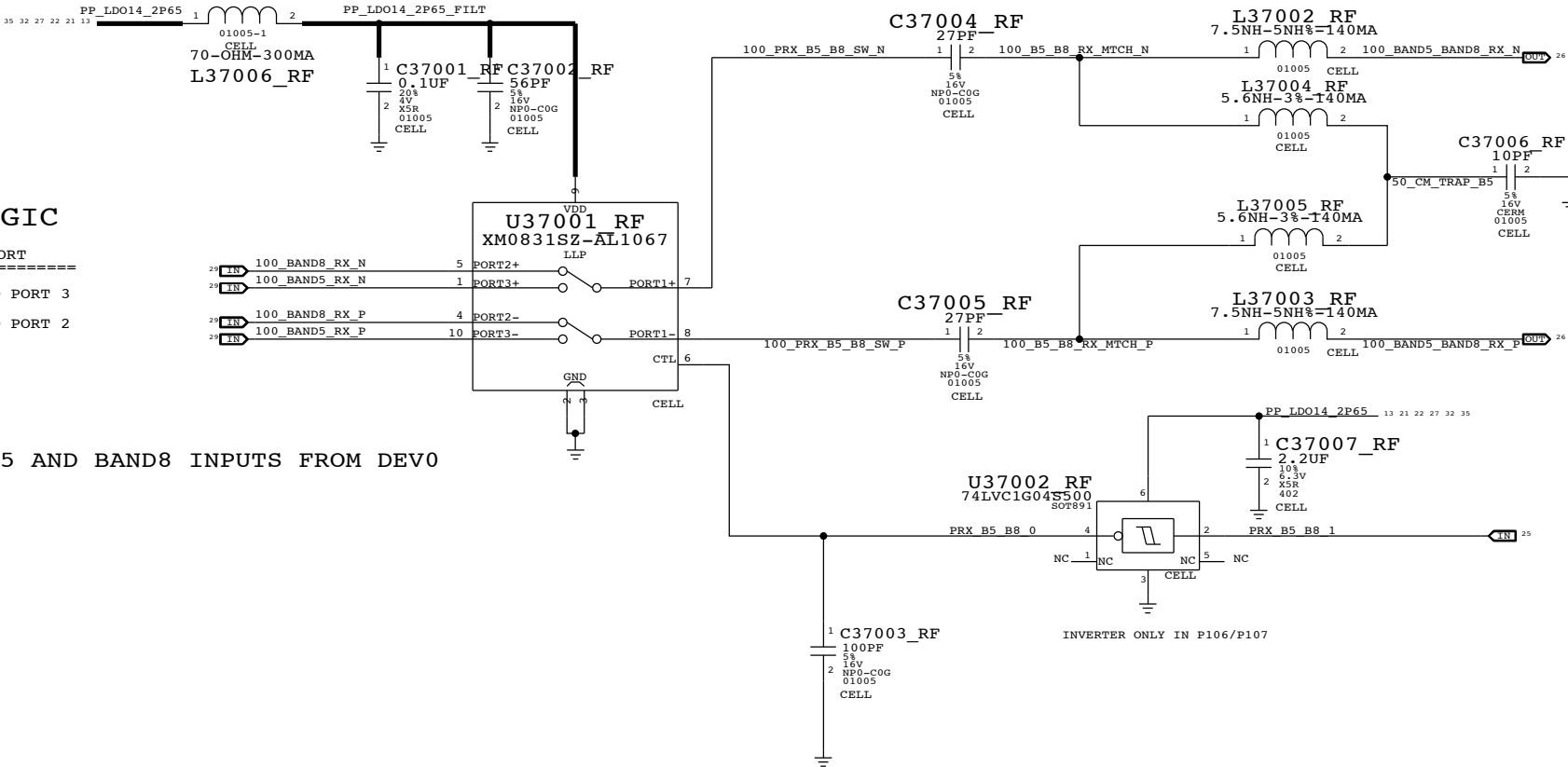
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BAND 5/BAND 8 PRX TRANSCEIVER SWITCH


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)		
 Apple Inc.	DRAWING NUMBER	051-9374
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		PAGE 37 OF 102
		SHEET 27 OF 46

D



D

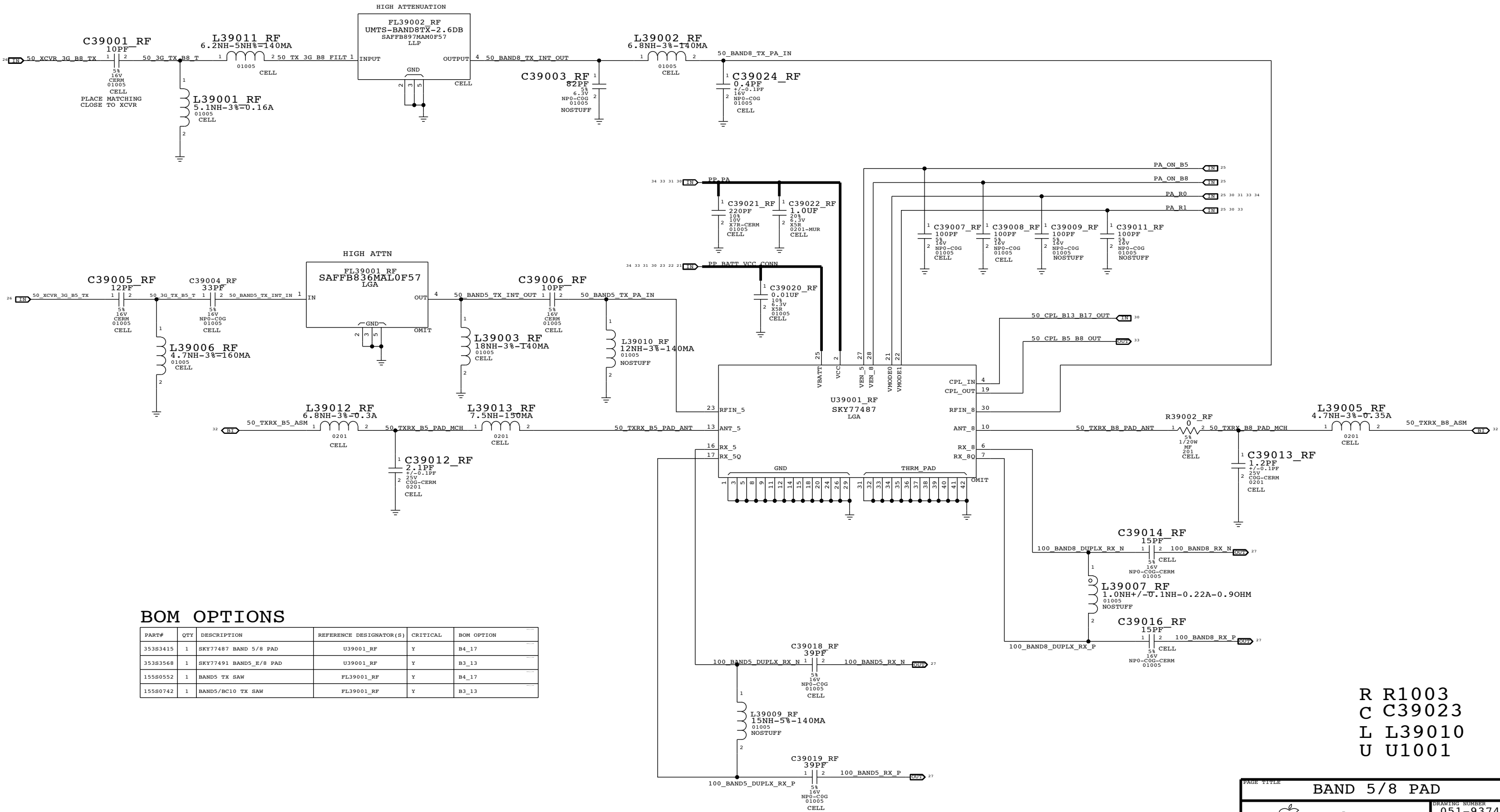


A


8	7	6	5	4	3	2	1
---	---	---	---	---	---	---	---

BAND 5/8 PAD

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R R1003
C C39023
L L39010
U U1001


PAGE TITLE		
BAND 5/8 PAD		
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	REVISION	13.0.0
	BRANCH	
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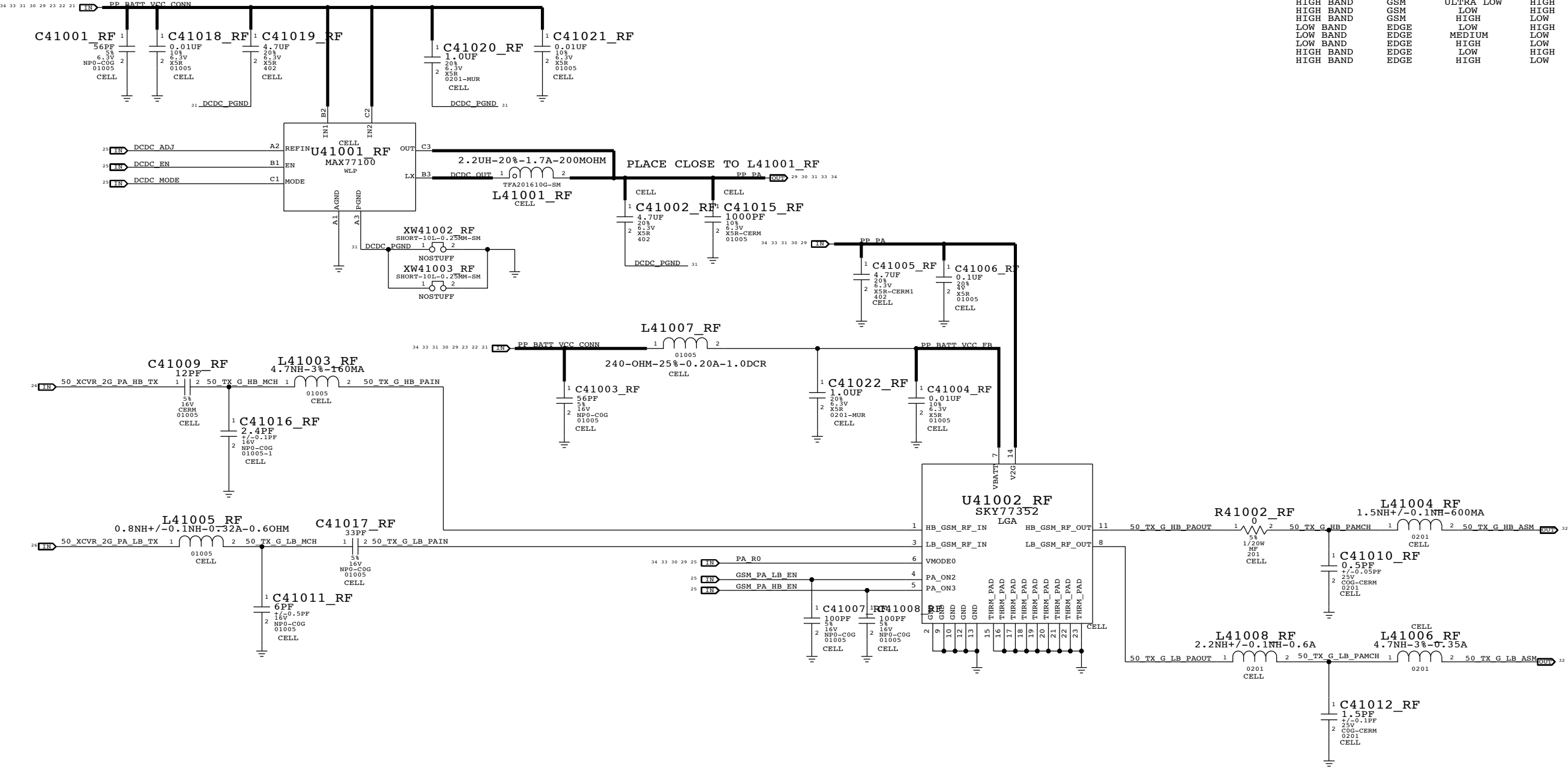
FLFL1101
R R1102
C C1118
L L1108
U U1102

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

PAGE TITLE	
BAND 13 PA	
 Apple Inc.	DRAWING NUMBER 051-9374
	SIZE D
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	BRANCH
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	SHEET 30 OF 46

2G PA, PA DC/DC CONVERTER


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2G PA GAIN MODES

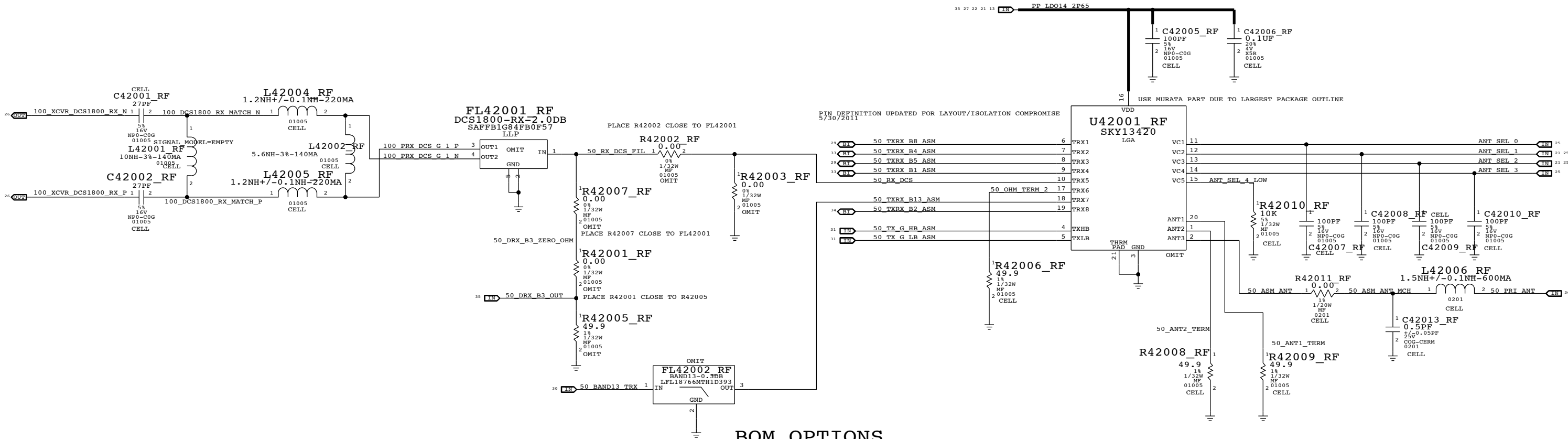
BAND	MODE	GAIN MODE	PA_R1	PCL RANGE
LOW BAND	GSM	ULTRA LOW	HIGH	16 TO 19
LOW BAND	GSM	LOW	HIGH	14 TO 15
LOW BAND	GSM	MEDIUM	LOW	7 TO 13
LOW BAND	GSM	HIGH	LOW	5 TO 6
HIGH BAND	GSM	ULTRA LOW	HIGH	10 TO 15
HIGH BAND	GSM	LOW	HIGH	7 TO 9
HIGH BAND	GSM	HIGH	LOW	0 TO 6
LOW BAND	EDGE	LOW	HIGH	15 TO 19
LOW BAND	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		
 Apple Inc.	DRAWING NUMBER	051-9374
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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, SKYWOKKS	U42001_RF	Y	B4_17
35383573	1	ASM, SKYWOKKS	U42001_RF	Y	B3_13

R R42011
C C42013
L 42006
U U1301
FL FL1302

PAGE TITLE		
DCS RX, ASM		
 Apple Inc.	DRAWING NUMBER	051-9374
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D

C

B

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C

B

A

BOM OPTIONS

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

8

7

6

5

4

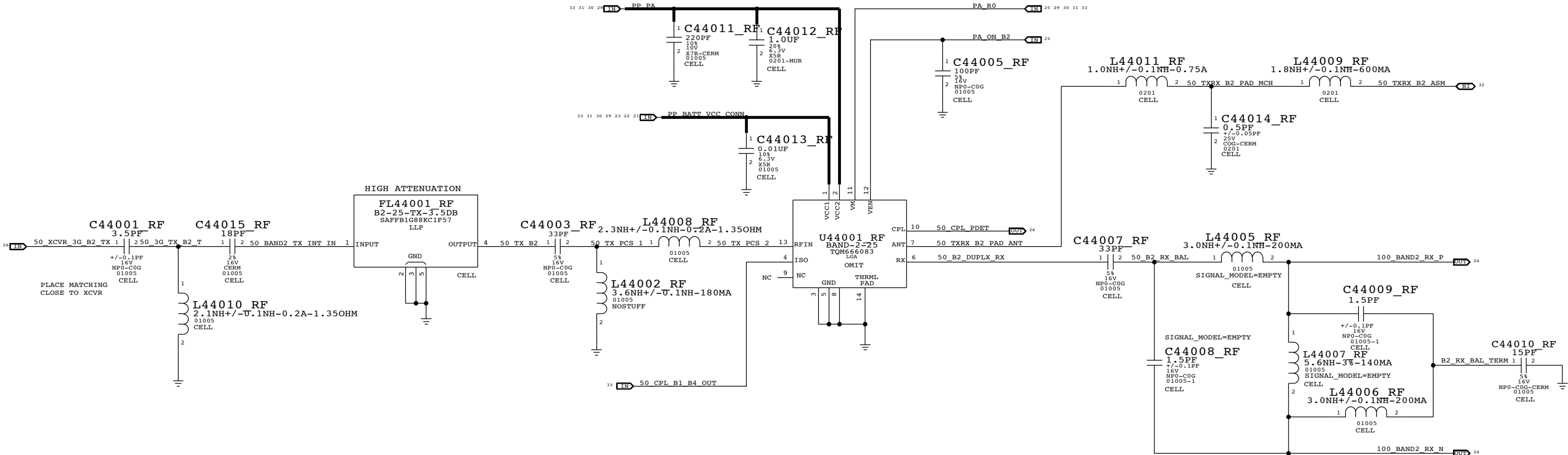
3

2

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

PAGE TITLE		
BAND2 PAD		
 Apple Inc.	DRAWING NUMBER	051-9374
	REVISION	13.0.0
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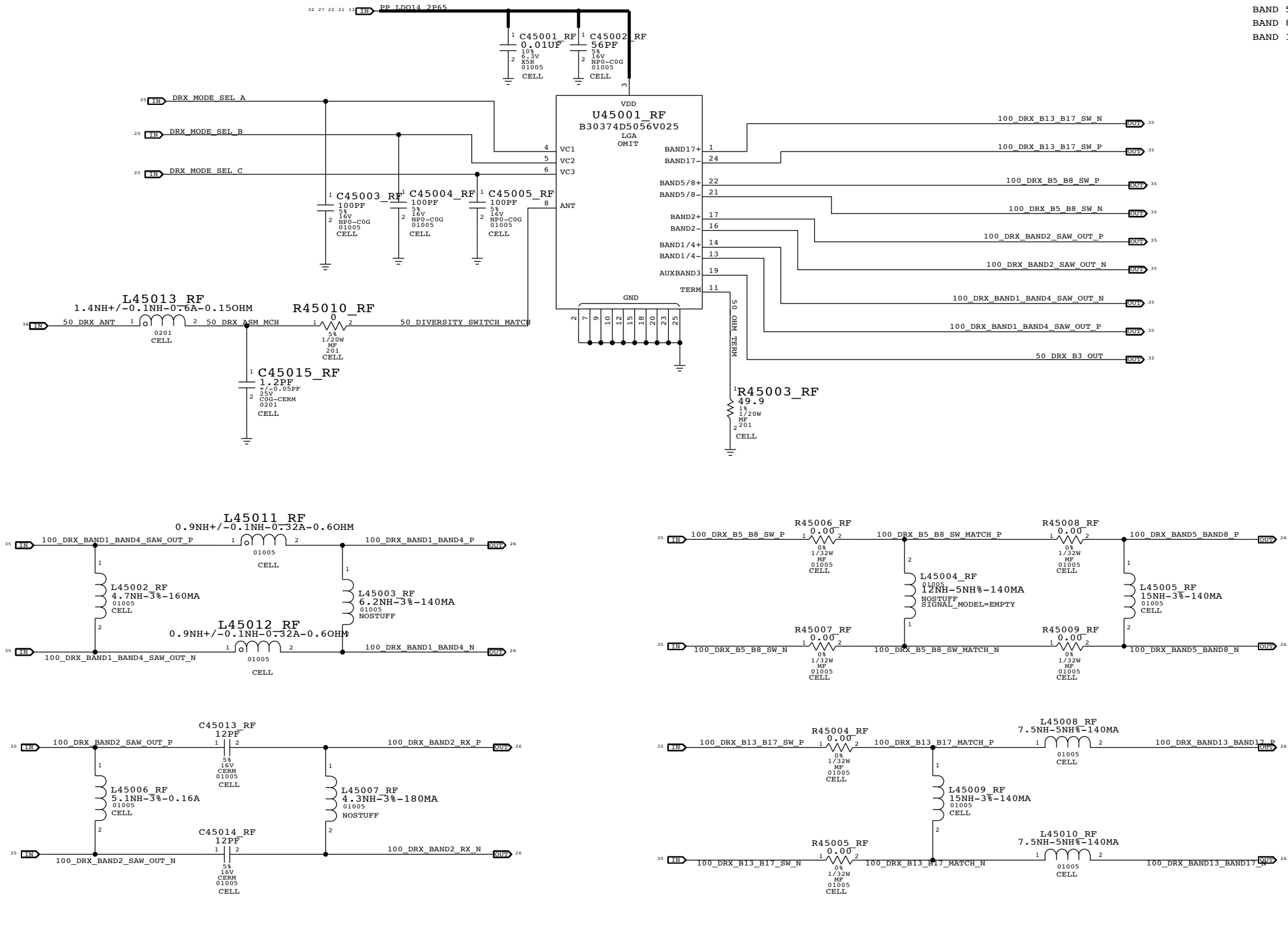
RX DIVERSITY

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DIVERSITY MODULE LOGIC

BAND VC1 VC2 VC3
=====


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



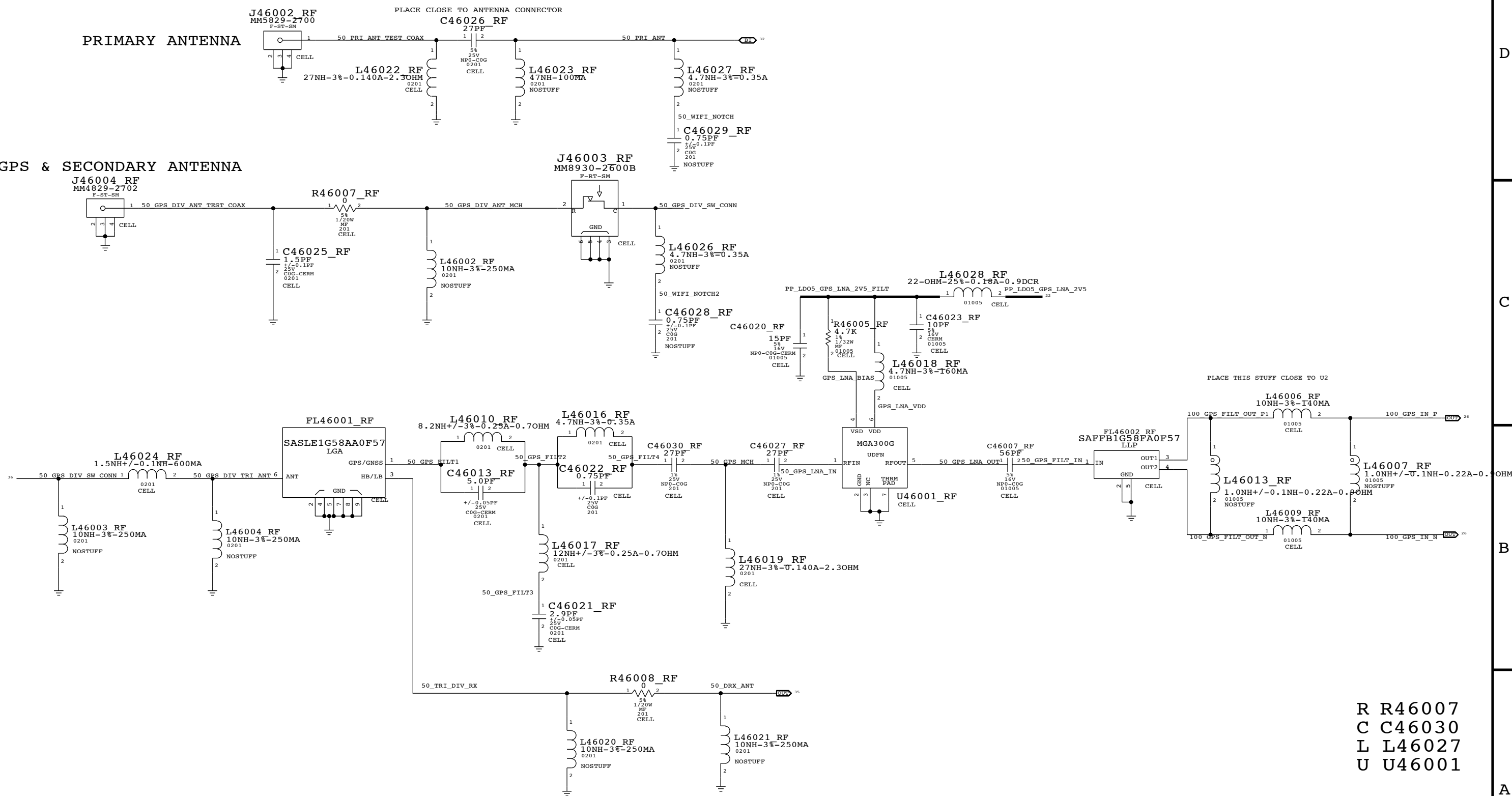
R R1603
C C1616
L L1610
U U1601

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


PAGE TITLE		
RX DIVERSITY		
 Apple Inc.	DRAWING NUMBER	051-9374
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GPS



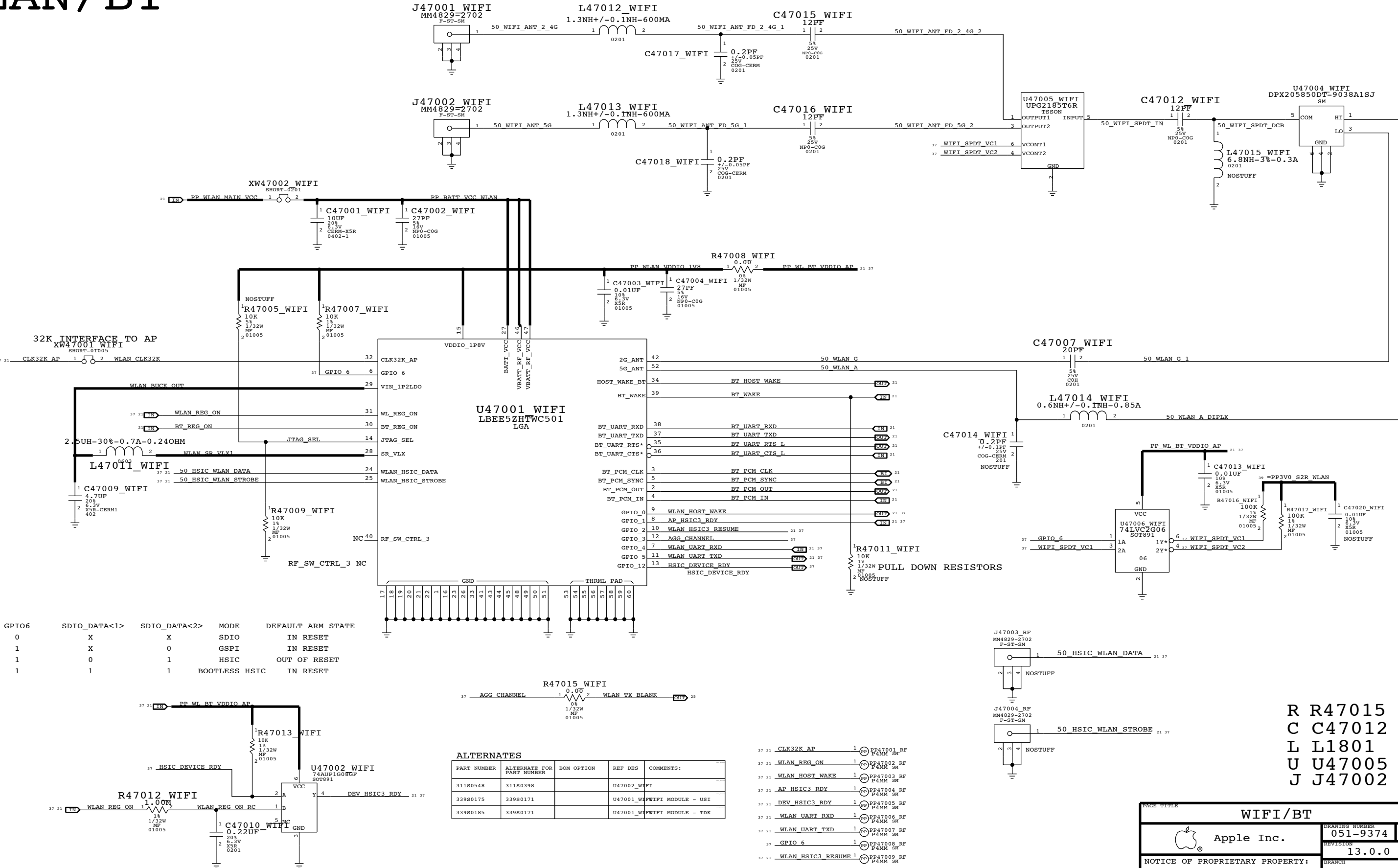
R R46007
C C46030
L L46027
U U46001

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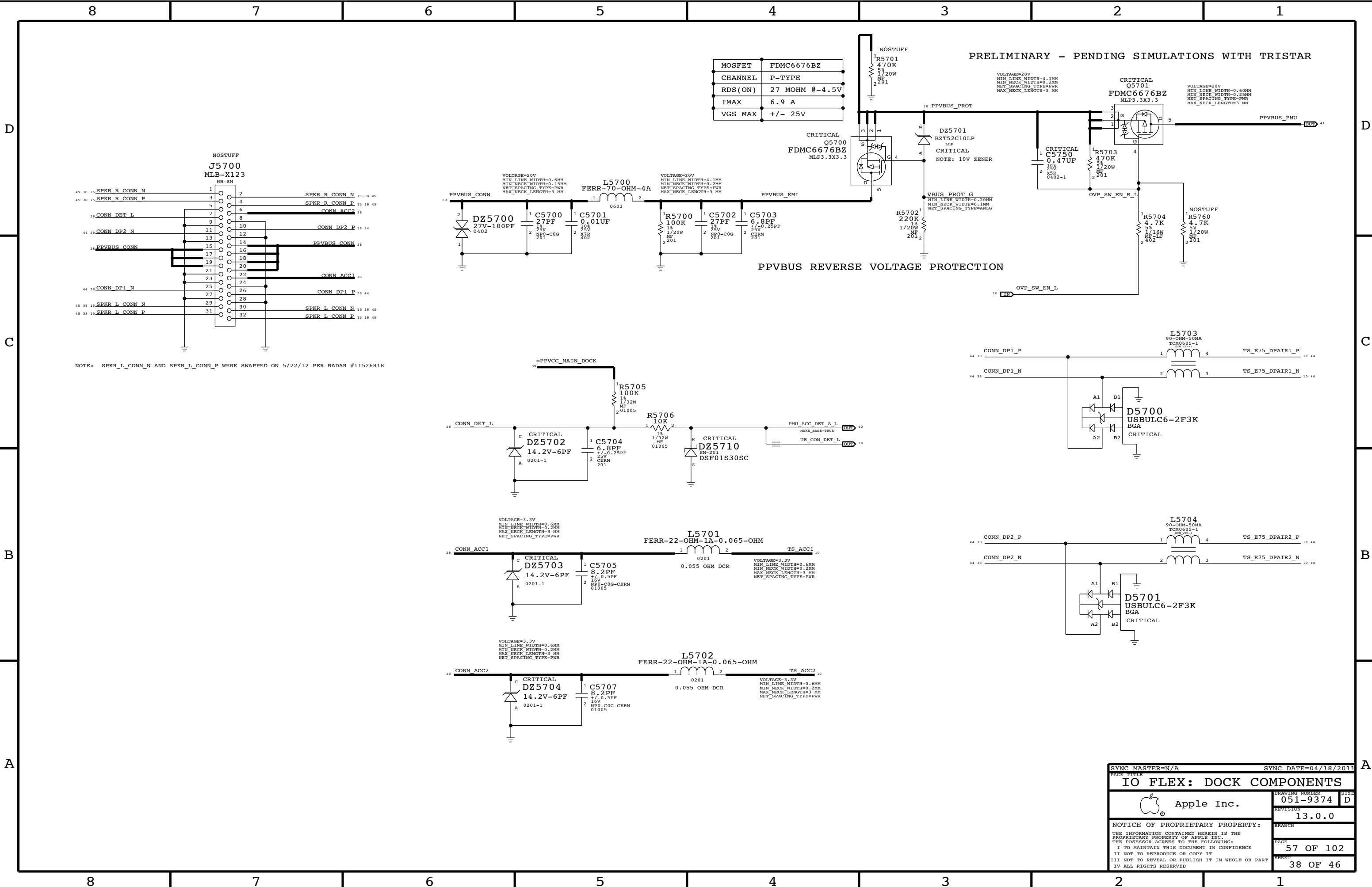
GPS		
 Apple Inc.	DRAWING NUMBER	051-9374
	REVISION	13.0.0
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	PAGE	46 OF 102
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WLAN/BT

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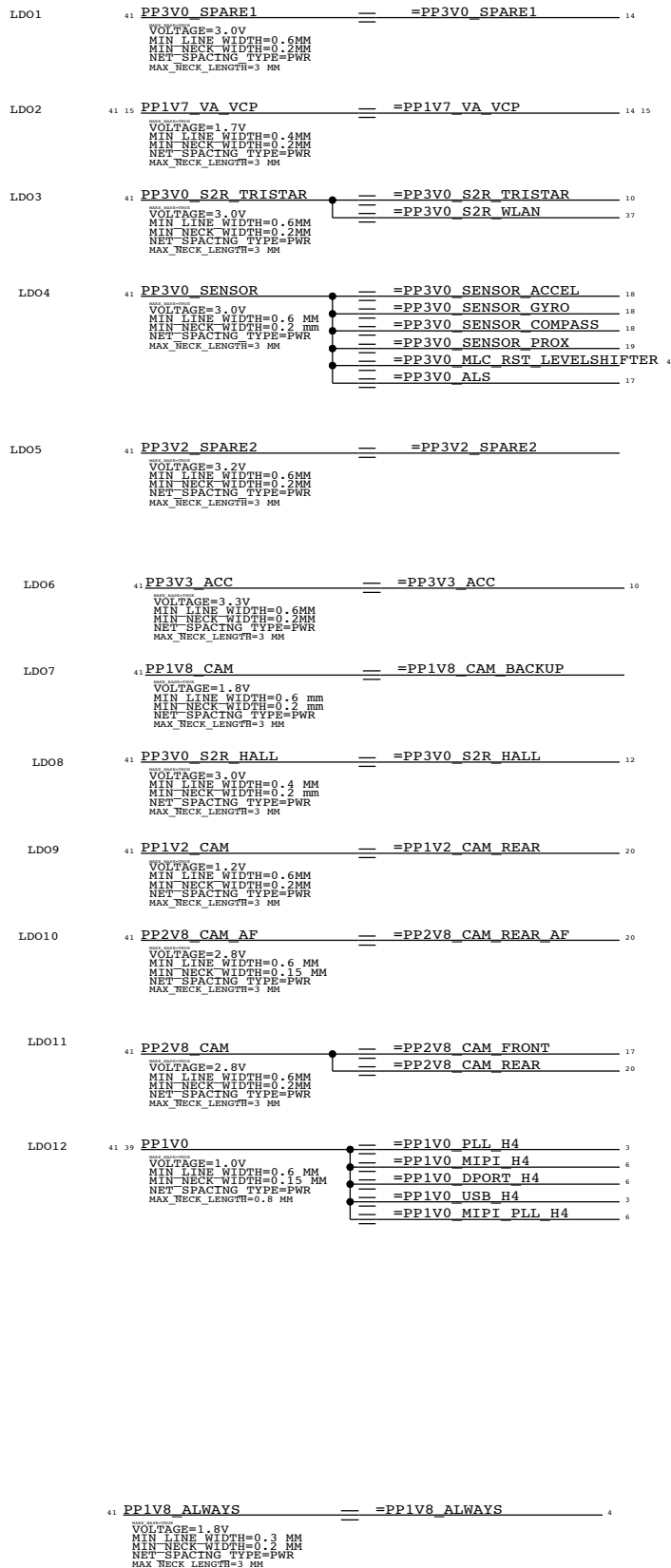
R R47015
C C47012
L L1801
U U47005
J J47002



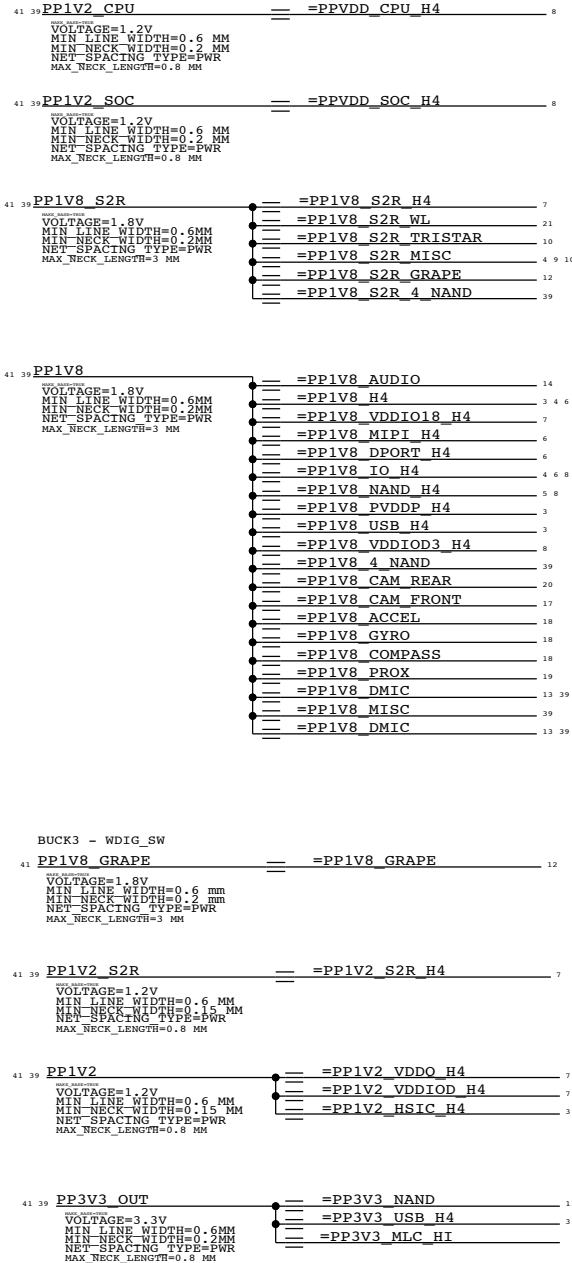
POWER CONN / ALIAS

LDO RAILS

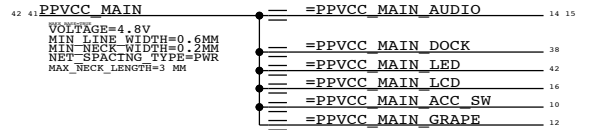
PROGRAMMABLE ON/OFF



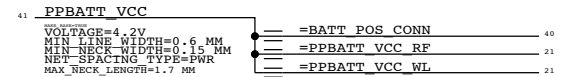
BUCK RAILS



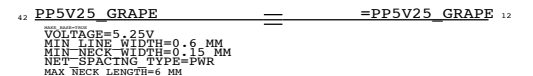
CHARGER MAIN



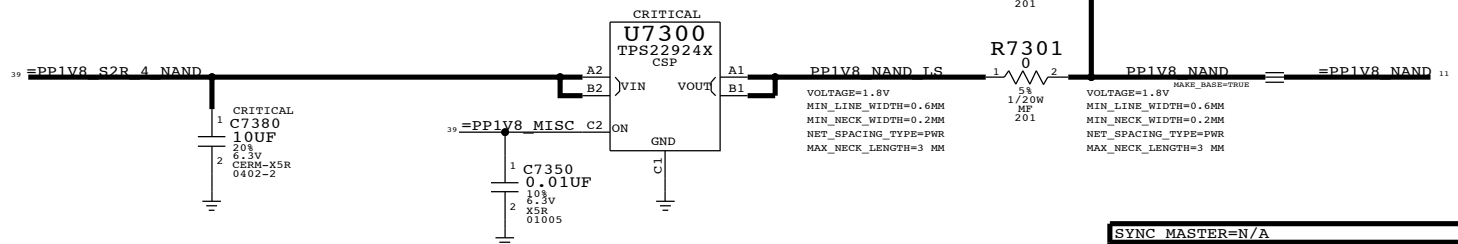
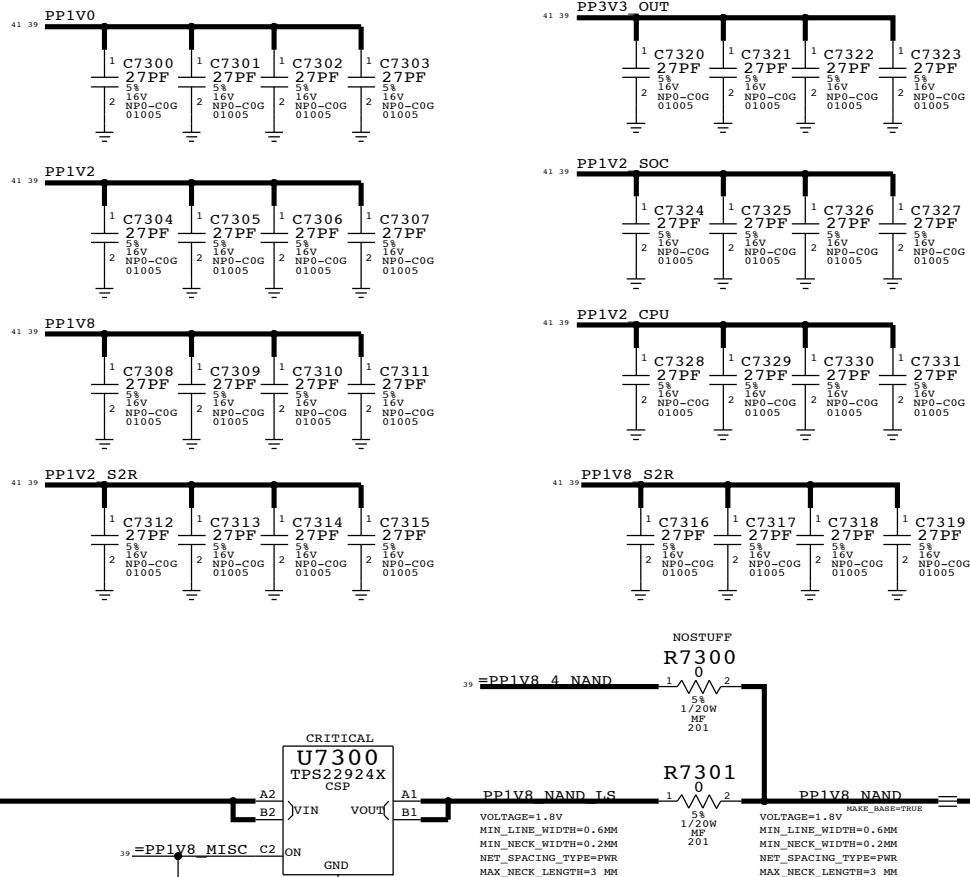
BATTERY



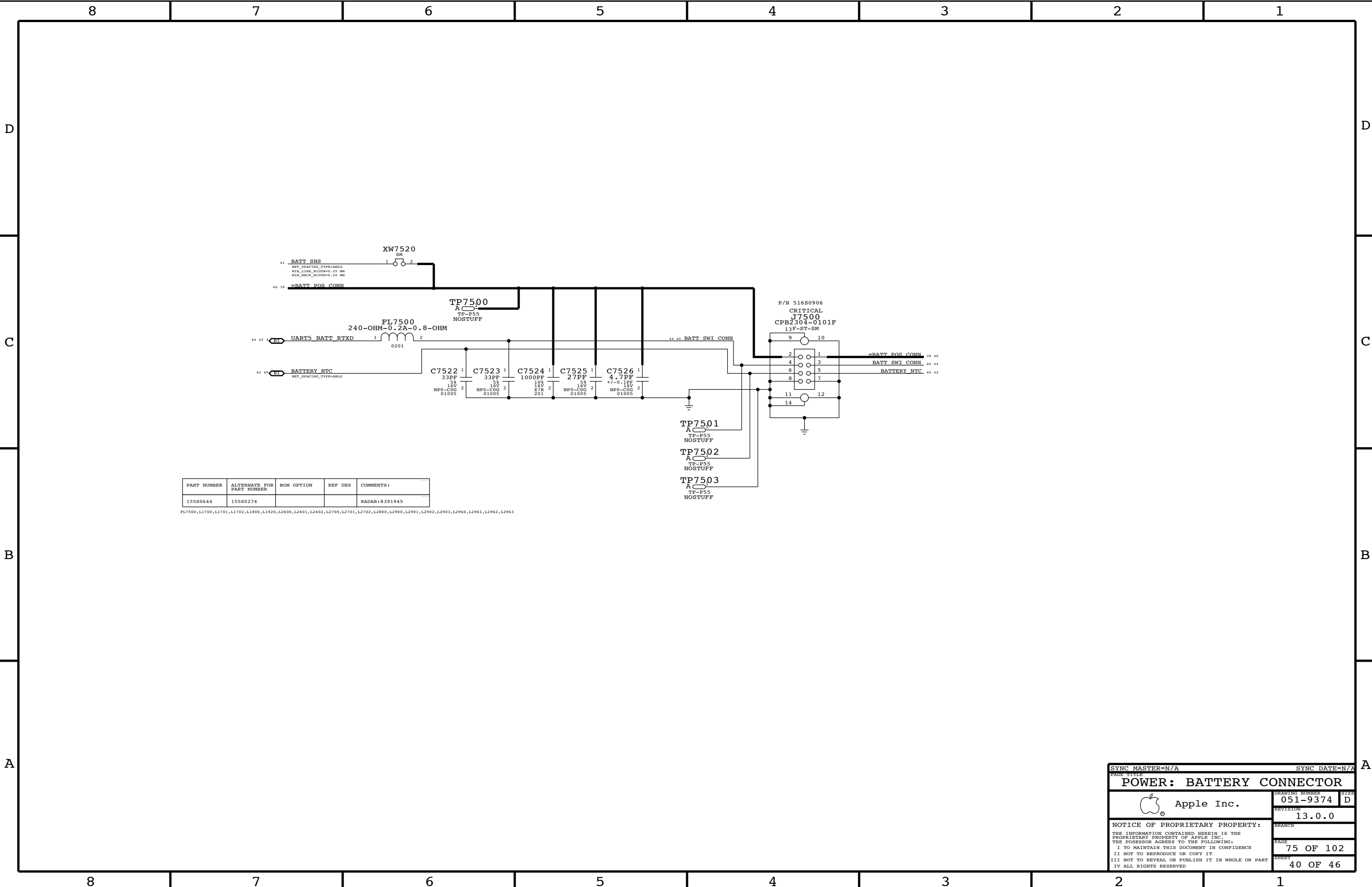
BOOST->LDOS



DESENSE CAPS



SYNC MASTER=N/A		SYNC DATE=N/A	
PAGE TITLE			
Power: Aliases			
Apple Inc.		DRAWING NUMBER	051-9374
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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

 Apple Inc.

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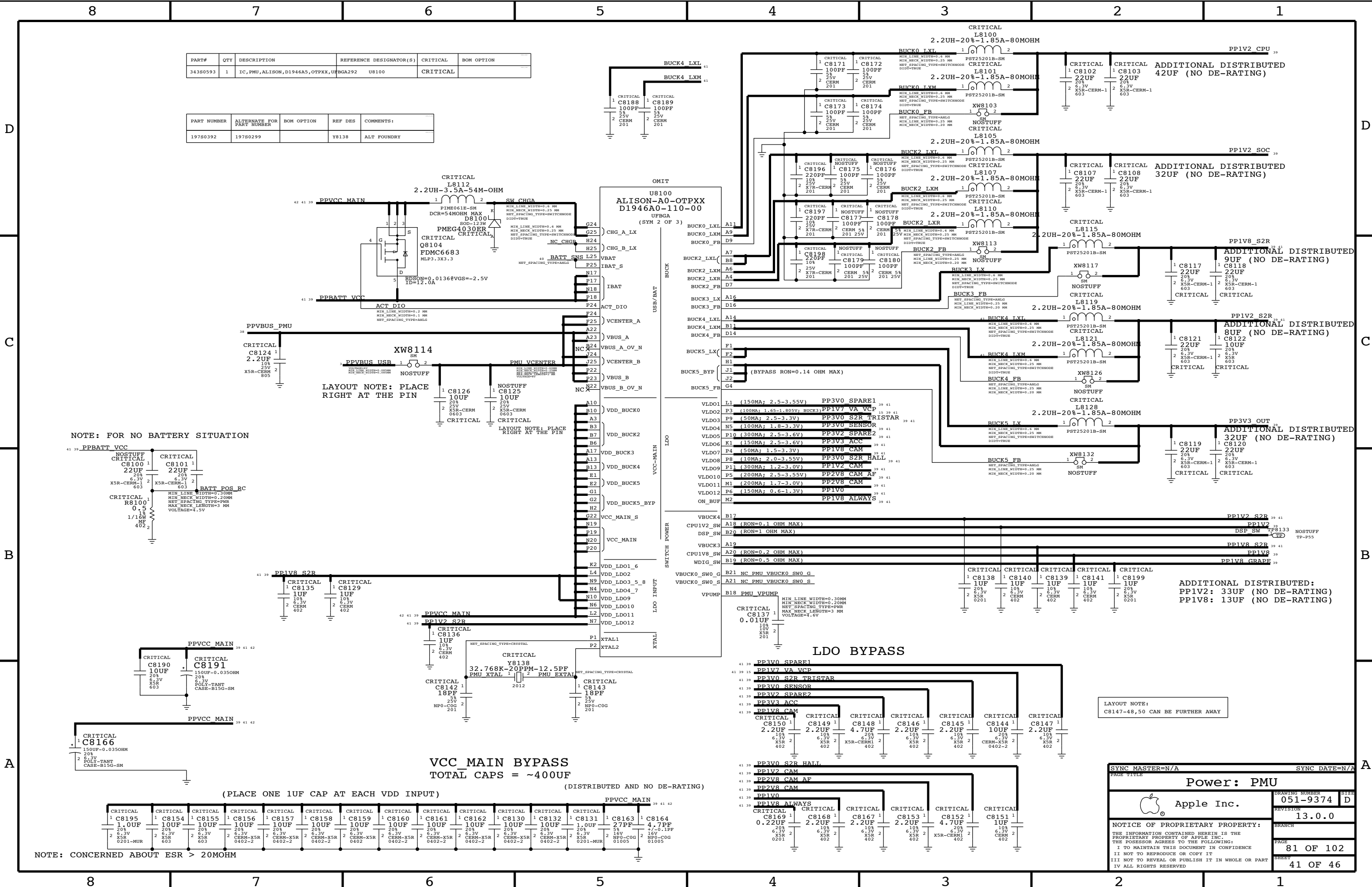
DRAWING NUMBER
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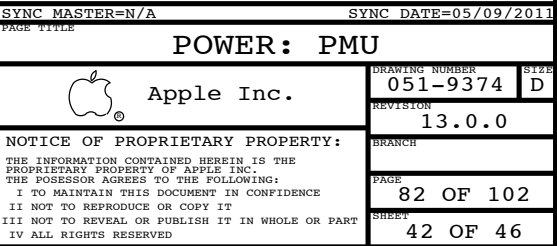
SHEET
40 OF 46



PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
34380593	1	IC, PMU, ALISON, D1946A5, OTPMX, UHBGA292	U8100	CRITICAL	

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
19780392	19780299		Y8138	ALT FOUNDRY

SYNC MASTER=N/A		SYNC DATE=N/A	
PAGE TITLE		Power: PMU	
Drawing Number		051-9374	SIZE D
Revision		13.0.0	BRANCH
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MECHANCIAL PARTS

PD PARTS

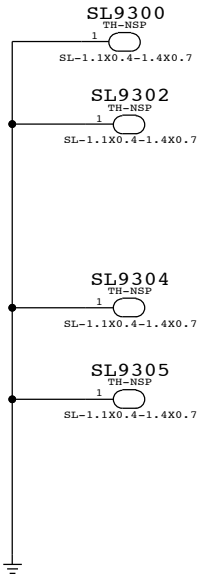
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
806-4017	1	FENCE,MAIN,MLB,YYY	FENCE_MLB	
806-3782	1	CAN,MAIN,MLB,WIFI,YYY	CAN_WIFI	
806-3715	1	FENCE,RADIO,MLB,SWAPPED,YYY	CAN_RADIO	CELL

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

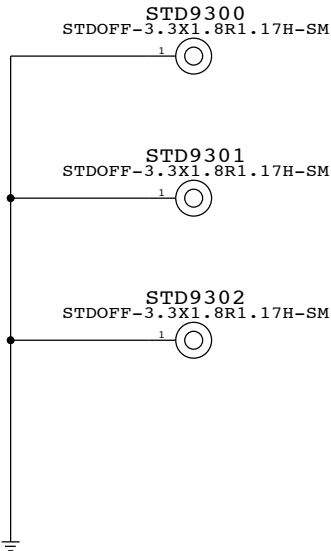
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7639	1	EEEE FOR 639-3251 (X123 ENTRY)	DWNV	CRITICAL	EEEE_X123_ENTRY
825-7639	1	EEEE FOR 639-4129 (X123A ENTRY)	F78H	CRITICAL	EEEE_X123A_ENTRY
825-7639	1	EEEE FOR 639-4130 (X123B ENTRY)	F78J	CRITICAL	EEEE_X123B_ENTRY
825-7639	1	EEEE 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



SYNC MASTER=N/A		SYNC DATE=N/A	
PAGE TITLE			
MECHANICAL PARTS			
 Apple Inc.		DRAWING NUMBER	SIZE
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D

ELECTRICAL_CONSTRAINT_SET	NET_TYPE	
	PHYSICAL	SPACING
50A	CLK_50S	CLK
50C	CLK_50S	CLK
50D	CLK_50S	CLK
50E	CLK_50S	CLK
50F	CLK_50S	CLK
50G	CLK_50S	CLK
50H	CLK_50S	CLK
50I	CLK_50S	CLK
50J	CLK_50S	CLK
50K	CLK_50S	CLK
50L	CLK_50S	CLK
50M	CLK_50S	CLK
50N	CLK_50S	CLK
50O	CLK_50S	CLK
50P	CLK_50S	CLK





C

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
500	NAND_50S	NAND	FMIO0_AD<7..0>
501	NAND_50S	NAND	FMIO0_CE0_L
502	NAND_50S	NAND	FMIO0_CLE
503	NAND_50S	NAND	FMIO0_ALE
504	NAND_50S	NAND	FMIO0_RE_N
505	NAND_50S	NAND	FMIO0_WE_L
506	NAND_50S	NAND	FMIO0_DQS_P
507	NAND_50S	NAND	FMII0_AD<7..0>
508	NAND_50S	NAND	FMII0_CE0_L
509	NAND_50S	NAND	FMII0_CLE
510	NAND_50S	NAND	FMII0_ALE
511	NAND_50S	NAND	FMII0_RE_N
512	NAND_50S	NAND	FMII0_WE_L
513	NAND_50S	NAND	FMII0_DQS_P

B

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
ES	USB_90D	USB	SOC_USB_D_P 3 10
ES	USB_90D	USB	SOC_USB_D_N 3 10
BB	USB_90D	USB	USB_BB_D_P 10 2
BB	USB_90D	USB	USB_BB_D_N 10 2
DP2_P	USB_90D	USB	TS_E75_DPAIR1_P 10 3
DP2_N	USB_90D	USB	TS_E75_DPAIR1_N 10 3
DP2_P	USB_90D	USB	TS_E75_DPAIR2_P 10 3
DP2_N	USB_90D	USB	TS_E75_DPAIR2_N 10 3
DP1_P	USB_90D	USB	CONN_DP1_P 38
DP1_N	USB_90D	USB	CONN_DP1_N 38
DP2_P	USB_90D	USB	CONN_DP2_P 38
DP2_N	USB_90D	USB	CONN_DP2_N 38

A

ELECTRICAL_CONSTRAINT_SET		NET_TYPE		
		PHYSICAL	SPACING	
		HSIC_50S	HSIC	HSIC1_BB_STB 3 21
		HSIC_50S	HSIC	HSIC1_BB_DATA 3 21
		HSIC_50S	HSIC	HSIC2_WLAN_STB 3 21
		HSIC_50S	HSIC	HSIC2_WLAN_DATA 3 21

1

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
R16	JTAG_50S	JTAG	JTAG_SOC_TCK	3 10
R15	JTAG_50S	JTAG	JTAG_SOC_TMS	3 10
R4	JTAG_50S	JTAG	JTAG_SOC_TDI	3
R13	JTAG_50S	JTAG	JTAG_SOC_TDO	3 9
R20	JTAG_50S	JTAG	JTAG_SOC_TRST_L	3 9
R120	JTAG_50S	JTAG	BB_JTAG_TCK	4 21 24
R117	JTAG_50S	JTAG	BB_JTAG_TMS	4 21 24
R118	JTAG_50S	JTAG	BB_JTAG_TDI	4 21 24
R119	JTAG_50S	JTAG	BB_JTAG_TDO	4 21 24
R119	JTAG_50S	JTAG	BB_JTAG_TRST_L	4 21 24

I2

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
I1	I2C_50S	I2C	I2C0_SDA	4 10 15 42
I2	I2C_50S	I2C	I2C0_SCL	4 10 15 42
I8	I2C_50S	I2C	I2C1_SDA	4 18 19
I4	I2C_50S	I2C	I2C1_SCL	4 18 19
I5	I2C_50S	I2C	I2C2_SDA	4 17 18
I6	I2C_50S	I2C	I2C2_SCL	4 17 18
I8A	I2C_50S	I2C	I2C2_SDA_F	4 17 18
I22	I2C_50S	I2C	I2C2_SCL_F	17
I51	I2C_50S	I2C	ISPO_CAM_REAR_SCL	6 20
I52	I2C_50S	I2C	ISPO_CAM_REAR_SDA	6 20
I800	I2C_50S	I2C	ISP1_CAM_FRONT_SCL	6 17
I801	I2C_50S	I2C	ISP1_CAM_FRONT_SDA	6 17
I92	I2C_50S	I2C	ISP1_CAM_FRONT_SCL_F	17
I93	I2C_50S	I2C	ISP1_CAM_FRONT_SDA_F	17
I20	I2C_50S	I2C	MLC_SDA_3V3	
I200	I2C_50S	I2C	MLC_SCL_3V3	
I25	I2C_50S	I2C	LVDS_DDC_DATA	
I26	I2C_50S	I2C	LVDS_DDC_CLK	

13

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
DDR0		VREF	PPVREF DDR0 CA 7
DDR0		VREF	PPVREF DDR0 DO 7
DDR1		VREF	PPVREF DDR1 CA 7
DDR1		VREF	PPVREF DDR1 DO 7

115:

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
DWI	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
	DWT_45S	DWT	
	DWT_45S	DWT	
	DWT_45S	DWT	
RES0			DWI_CLK 4 4:2
RES0			DWI_DI 4 4:2
RES0			DWI_DO 4 4:2

D

ELECTRICAL_CONSTRAINT_SET	NET_TYPE			
	PHYSICAL	SPACING		
REQD	T2S_45S	T2S	T2S0 CODEC ASP_BCLK	4 14
REQD	T2S_45S	T2S	T2S0 CODEC ASP_LRCK	4 14
REQD	T2S_45S	T2S	T2S0 CODEC ASP_DOUT	4 14
REQD	T2S_45S	T2S	T2S0 CODEC ASP_DIN	4 14
REQD	T2S_45S	T2S	T2S0 CODEC ASP_SDOUT	14
REQD	T2S_45S	T2S	T2S1 SPKAMP_BCLK	4 15
REQD	T2S_45S	T2S	T2S1 SPKAMP_LRCK	4 15
REQD	T2S_45S	T2S	T2S1 SPKAMP_DOUT	4 15
REQD	T2S_45S	T2S	T2S1 SPKAMP_DIN	4 15
REQD	T2S_45S	T2S	T2S2 CODEC_XSP_BCLK	4 14
REQD	T2S_45S	T2S	T2S2 CODEC_XSP_LRCK	4 14
REQD	T2S_45S	T2S	T2S2 CODEC_XSP_DOUT	4 14
REQD	T2S_45S	T2S	T2S2 CODEC_XSP_DIN	4 14
REQD	T2S_45S	T2S	T2S2 CODEC_XSP_SDOUT	14
REQD	T2S_45S	T2S	T2S3 BT_BCLK	4 21
REQD	T2S_45S	T2S	T2S3 BT_LRCK	4 21
REQD	T2S_45S	T2S	T2S3 BT_DOUT	4 21
REQD	T2S_45S	T2S	T2S3 BT_DIN	4 21

C

ELECTRICAL_CONSTRAINT_SET		NET_TYPE		
		PHYSICAL	SPACING	
UART0	UART_4SS	UART	UART0_DEBUG_RXD	4 10
UART0	UART_4SS	UART	UART0_DEBUG_TXD	4 10
UART1	UART_4SS	UART	UART1_BT_RXD	4 21
UART1	UART_4SS	UART	UART1_BT_TXD	4 21
UART1	UART_4SS	UART	UART1_BT_RTS_L	4 21
UART1	UART_4SS	UART	UART1_BT_CTS_L	4 21
UART2	UART_4SS	UART	UART2_ACC_RXD	4 10
UART2	UART_4SS	UART	UART2_ACC_TXD	4 10
UART3	UART_4SS	UART	UART3_WLAN_RXD	4 21
UART3	UART_4SS	UART	UART3_WLAN_TXD	4 21
UART4	UART_4SS	UART	UART4_BB_RXD	4 10 21
UART4	UART_4SS	UART	UART4_BB_TXD	4 10 21
UART4	UART_4SS	UART	UART4_BB_RTS_L	4 21
UART4	UART_4SS	UART	UART4_BB_CTS_L	4 21
UART5	UART_4SS	UART	UART5_BATT_RTXD	4 40 42
BATT	UART_4SS	UART	BATT_SWI_CONN	40

B

ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
R224	SPI_45S	SPT	SPI1 GRAPE MISO 4 12
R225	SPI_45S	SPT	SPI1 GRAPE MOSI 4 12
R226	SPI_45S	SPT	SPI1 GRAPE SCLK 4 12
R227	SPI_45S	SPT	SPI1 GRAPE SCLK_R 12
R228	SPI_45S	SPT	SPI1 GRAPE CS_L 4 12
R229	SPI_45S	SPT	SPI2 CODEC MISO 4 14
R230	SPI_45S	SPT	SPI2 CODEC MOSI 4 14
R231	SPI_45S	SPT	SPI2 CODEC SCLK 4 14
	SPI_45S	SPT	SPI2 CODEC CS_L 4 14

A

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_SST	NET_TYPE			
	PHYSICAL	SPACING		
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_P<0>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_N<0>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_P<1>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_N<1>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_P<2>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_N<2>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_P<3>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_DATA_N<3>	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_CLK_P	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOD_CLK_N	6 16
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_P<0>	6 20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_N<0>	6 20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_P<1>	6 20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_N<1>	6 20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_CLK_P	6 20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_CLK_N	6 20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_P<0>	20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_N<0>	20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_P<1>	20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_DATA_FILT_N<1>	20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_CLK_FILT_P	20
<u>M09</u>	MIPI_90D	MIPT	MIPIOC_CAM_REAR_CLK_FILT_N	20
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_DATA_P<0>	6 17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_DATA_N<0>	6 17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_CLK_P	6 17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_CLK_N	6 17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_DATA_FILT_P<0>	17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_DATA_FILT_N<0>	17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_CLK_FILT_P	17
<u>M09</u>	MIPI_90D	MIPT	MIPI1C_CAM_FRONT_CLK_FILT_N	17

LVDS		NET_PHYSICAL_TYPE	AREA_TYPE	SIGNALING_RULE_SET
		LVDS_90D	*	90_OHM_DIFF
NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SIGNALING_RULE_SET	
LVDS	*	*	3:1_SPACING	






NET_TYPE	NET_PHYSICAL_TYPE		SIGNALING_RULE_SET
	PHYSICAL	SPACING	
MIPI	LVDS_90D	LVDS	MIPI
MIPI	LVDS_90D	LVDS	MIPI
MIPI	LVDS_90D	LVDS	MIPI
MIPI	LVDS_90D	LVDS	MIPI

X T A L

NET_SPACING_TYP1		NET_SPACING_TYP2		AREA_TYPE		SPACING_RULE_SET	
CRYSTAL		*		*		5:1_SPACING	

NET_TYPE					
ELECTRICAL_CONSTRAINT_SET		PHYSICAL		SPACING	
532C				CRYSTAL	X T
532D				CRYSTAL	X T
532E				CRYSTAL	X T

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	
	DMIC_45S	DMIC	L81 DMIC1_FF_SCLK 14
	DMIC_45S	DMIC	L81 DMIC1_FF_SD 14
	DMIC_45S	DMIC	DMIC1_FF_SCLK 13 14
	DMIC_45S	DMIC	DMIC1_FF_SD 13 14
	DMIC_45S	DMIC	DMIC1_FF_SCLK_CONN 13

AUDIO			
NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
AUDIO	*	*	3:1_SPACING


ELECTRICAL_CONSTRAINT_SET	NET_TYPE		
	PHYSICAL	SPACING	
E2B	USB_90D	USB	MIK
E2B	USB_90D	USB	MIK
E1B	USB_90D	USB	L81
E3B	USB_90D	USB	L81
E4B	SPEAKER	AUDIO	SPK
E4B	SPEAKER	AUDIO	SPK
E5B	SPEAKER	AUDIO	SPK
E2B	SPEAKER	AUDIO	SPK
E1B	AUDIO_DIFF	AUDIO	HP
E5B	AUDIO_DIFF	AUDIO	HP
E1B	AUDIO_DIFF	AUDIO	L81
E1B	AUDIO_DIFF	AUDIO	L81

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	
E83P	TEMP	TEMP	BOARD_TEMP1_P 42
E83N	TEMP	TEMP	BOARD_TEMP1_N 42
E40P	TEMP	TEMP	BOARD_TEMP2_P 42
E40N	TEMP	TEMP	BOARD_TEMP2_N 42
E40P	TEMP	TEMP	BOARD_TEMP3_P 42
E40N	TEMP	TEMP	BOARD_TEMP3_N 42
E40P	TEMP	TEMP	BOARD_TEMP4_P 23 42
E40N	TEMP	TEMP	BOARD_TEMP4_N 23 42

SYNC MASTER=N/A		SYNC DATE=N/A	
PAGE TITLE			
CONSTRAINTS: ASSIGNMENTS			
 Apple Inc.		DRAWING NUMBER 051-9374	
		SIZE D	
		REVISION 13.0.0	
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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	

SYNC MASTER=N/A		SYNC DATE=N/A	
PAGE TITLE			
CONSTRAINTS: MLB RULES			
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		REVISION	13.0.0
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