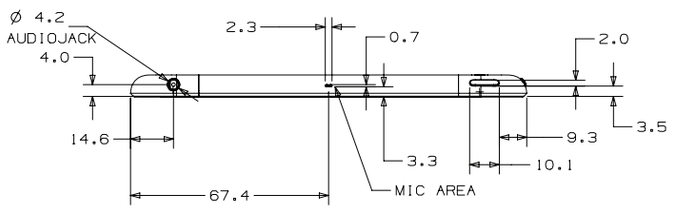
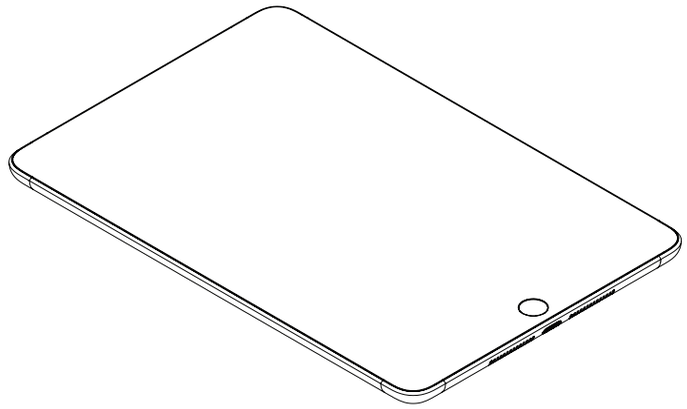
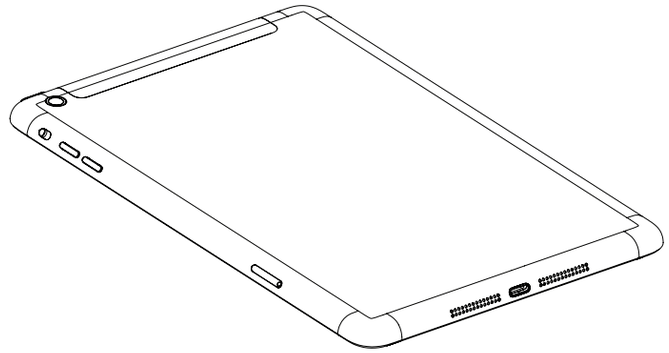
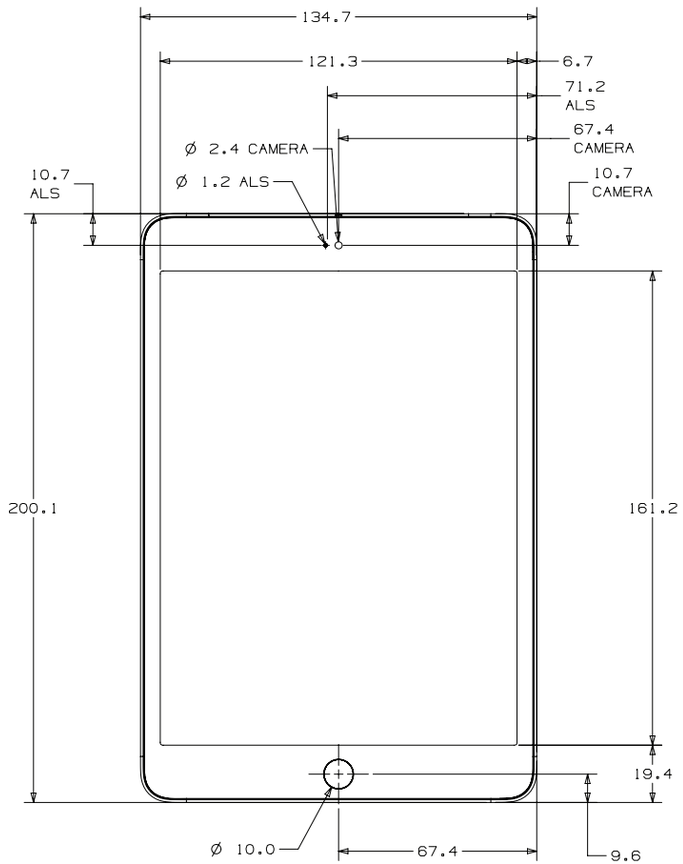
REV	ECO#	DESCRIPTION OF REVISION

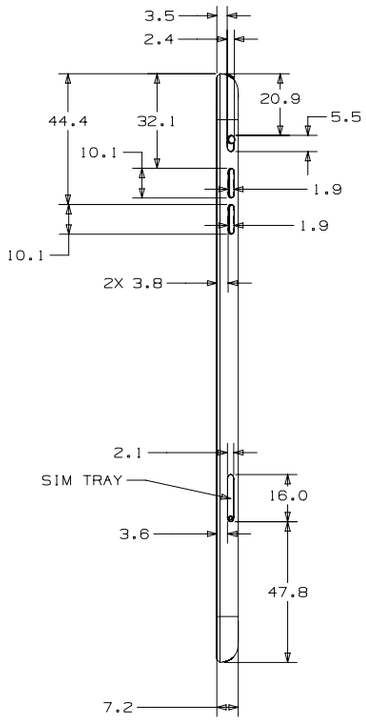
NOTES: (UNLESS OTHERWISE SPECIFIED)

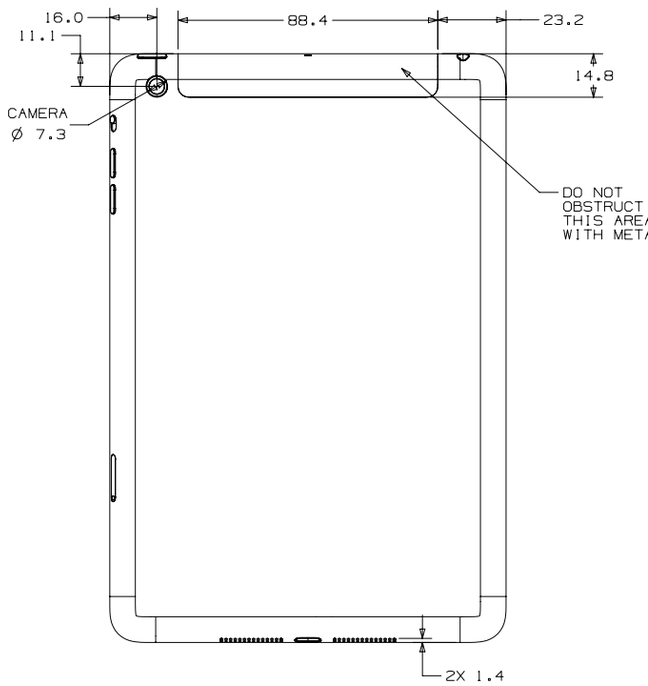


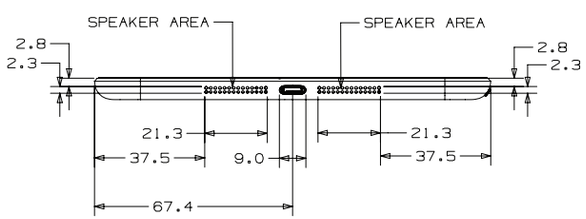


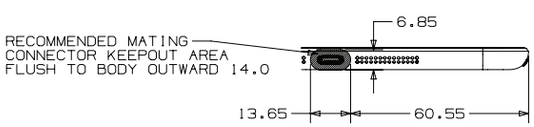


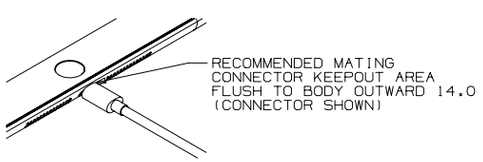












METRIC	Apple Inc.
DRAFTER: APPLE INC. — DATE	NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: (i) TO MAINTAIN THIS DOCUMENT IN CONFIDENCE (ii) NOT TO REPRODUCE OR COPY IT (iii) NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART (iv) ALL RIGHTS RESERVED
DESIGNER: APPLE INC. — DATE	
DIMENSIONS ARE IN MILLIMETERS TOLERANCES X.X ±0.2 X.XX ±0.10 X.XXX ±0.050 ANGLES ±0.5° DO NOT SCALE DRAWINGS	TITLE: IPAD MINI WITH WI-FI + 4G
	DRAWING NUMBER — REV.
THIRD ANGLE PROJECTION — SIZE: D	SCALE: NONE — SHT 1 OF 1

NX GENERATED

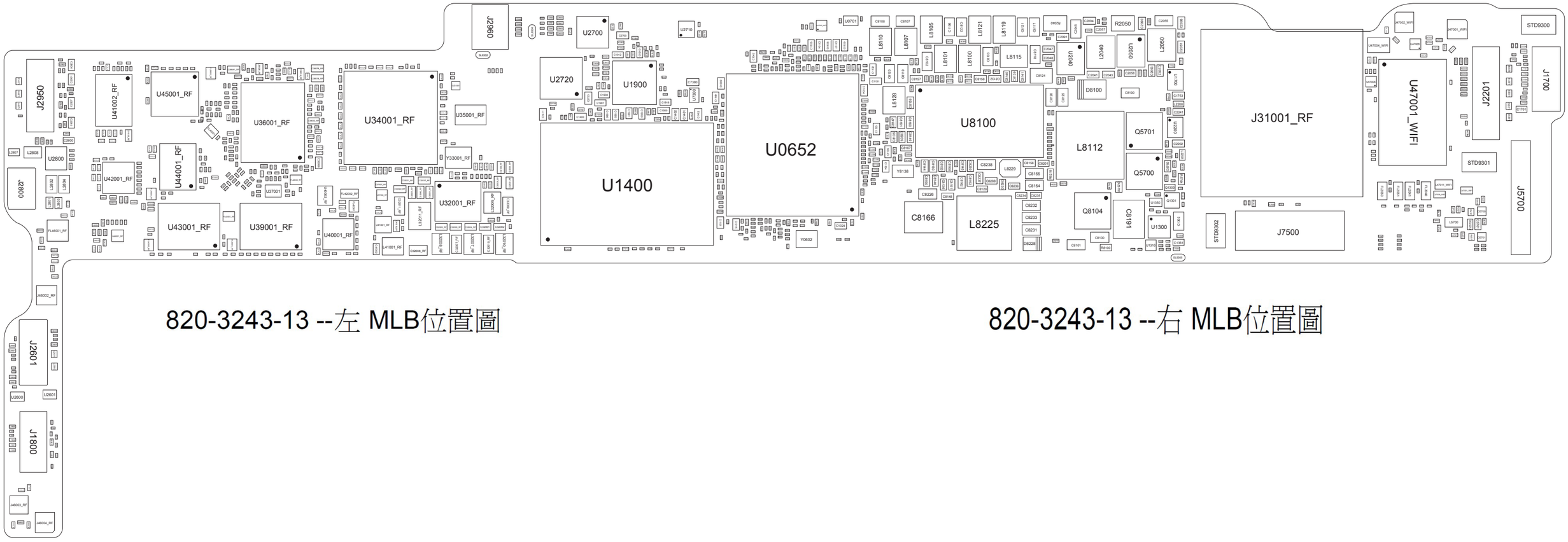
www.witesomtesla.com

Diesel57

www.witesomtesla.com

Diesel57

www.mobile-files.com



820-3243-13 --左 MLB位置圖

820-3243-13 --右 MLB位置圖

Diesel57

www.witesomtesla.com

Diesel57

www.witesomtesla.com

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 16:39:53 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
21	31	SYSTEM & DEBUG CONNECTORS	JORGE	06/27/2012
22	32	BASEBAND PMU (1 0F 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 0F 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	MECHANCIAL 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

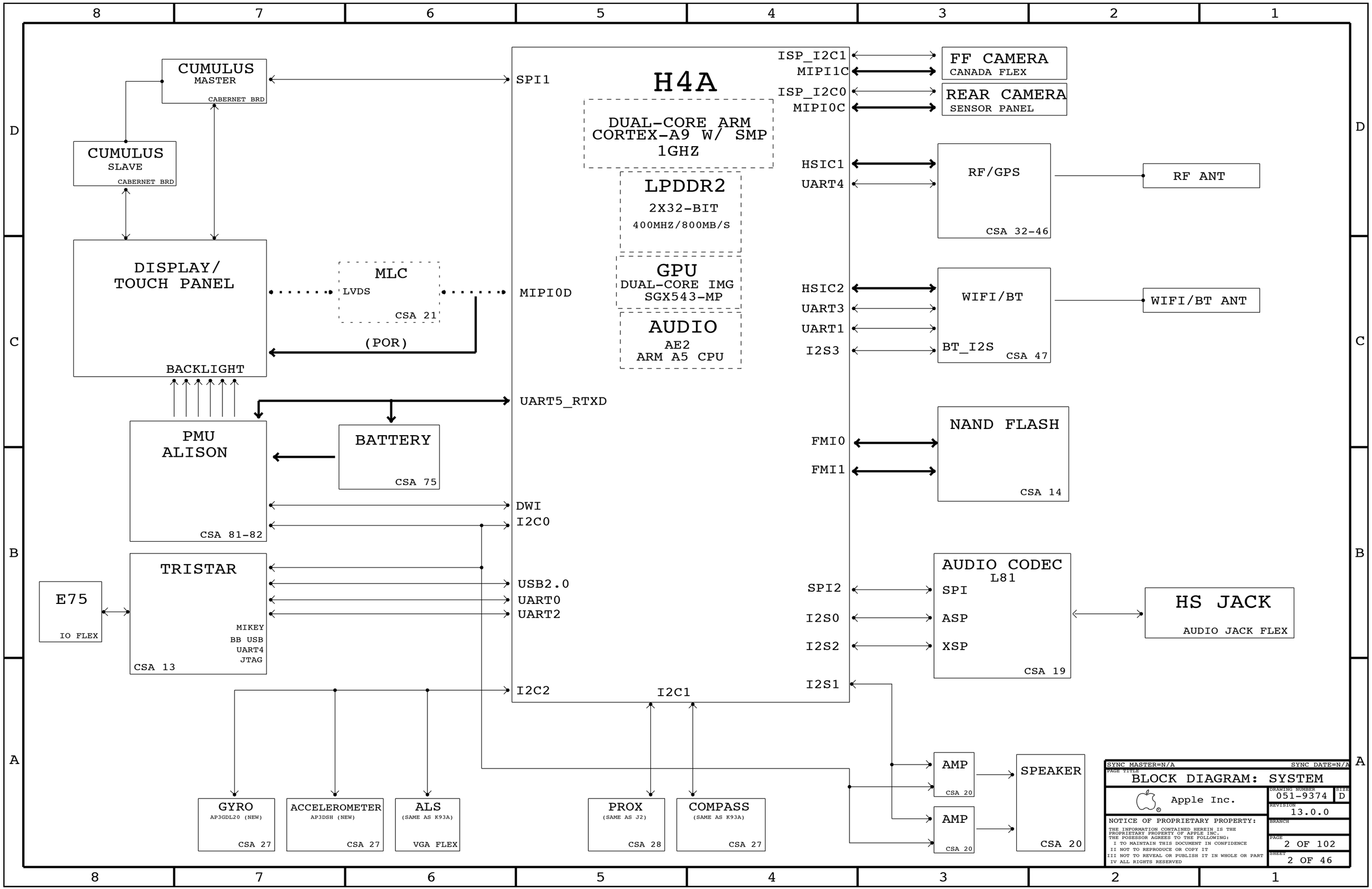
DRAWING TITLE: SCH,MLB,X123

Apple Inc.

DRAWING NUMBER: 051-9374 | SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 1 OF 102
SHEET: 1 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



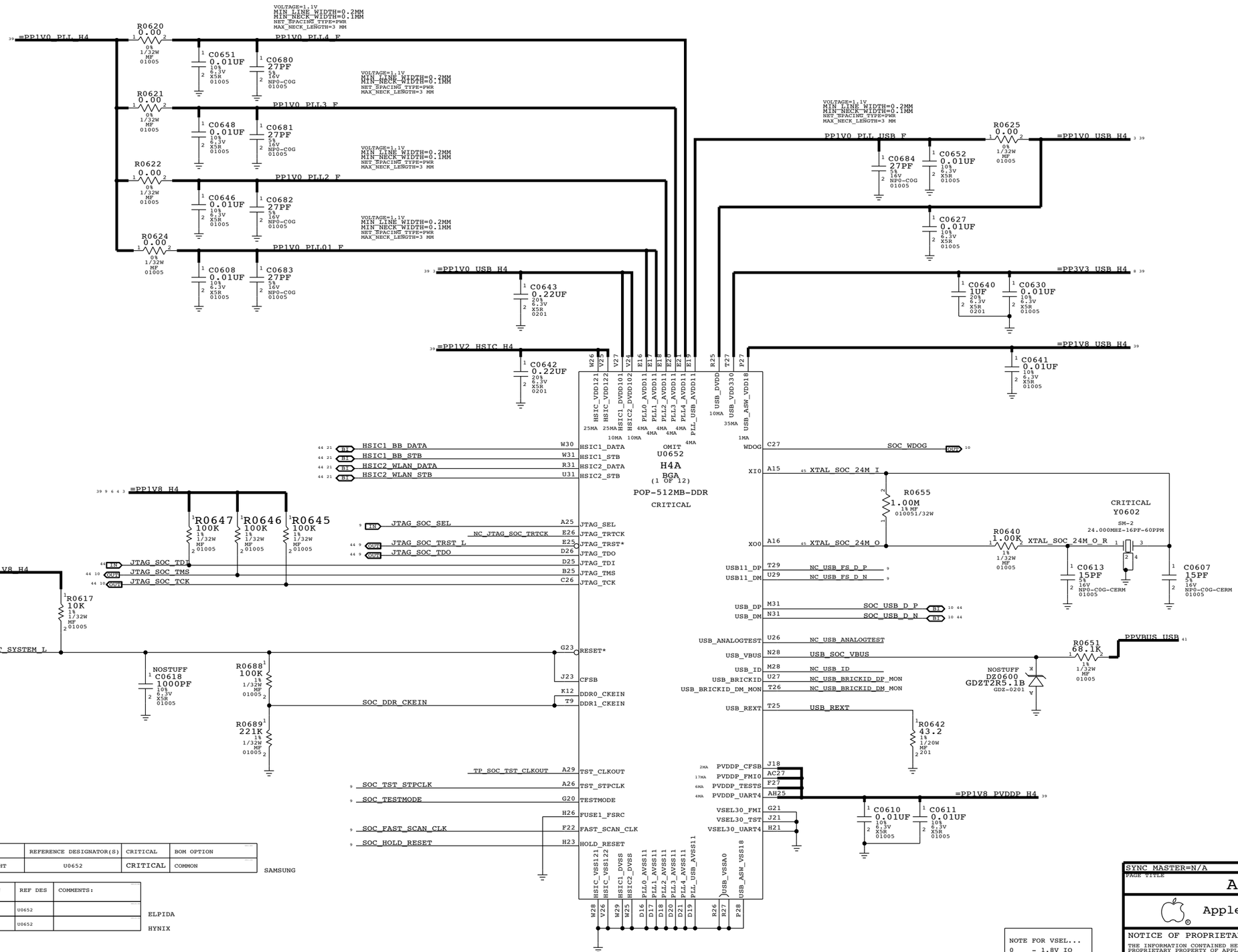
SYNC MASTER=N/A SYNC DATE=N/A

PAGE TITLE
BLOCK DIAGRAM: SYSTEM

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 2 OF 102
SHEET 2 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



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

SAMSUNG

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

PAGE TITLE

AP: MAIN

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

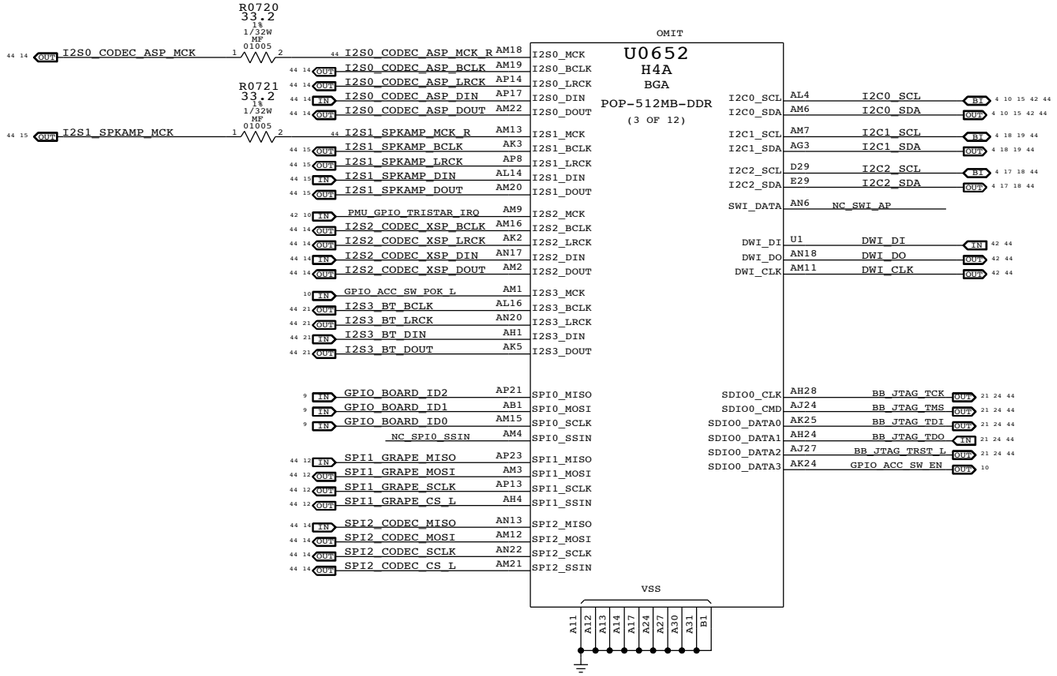
BRANCH

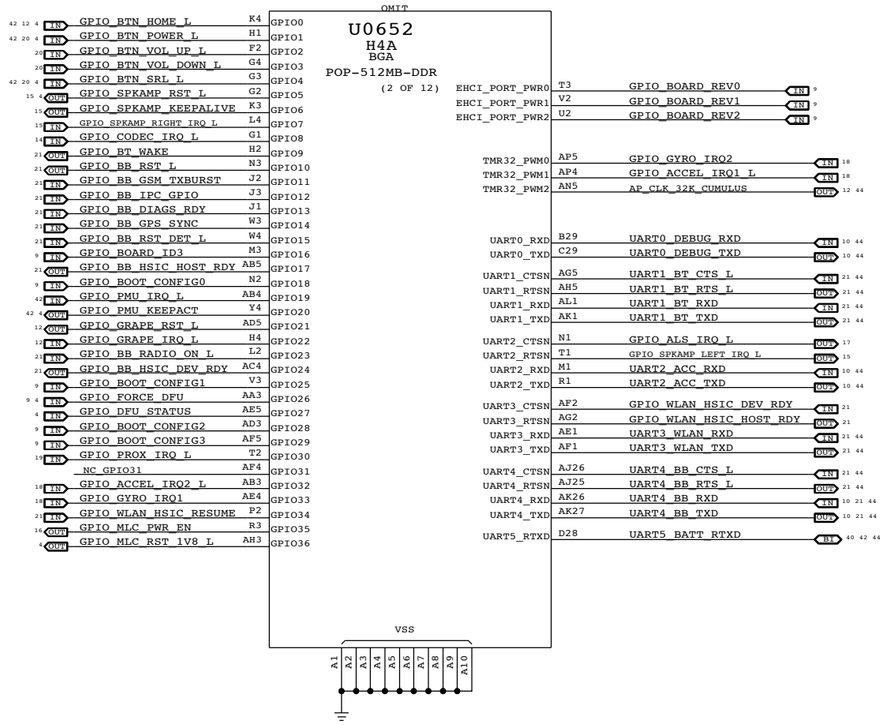
PAGE 6 OF 102

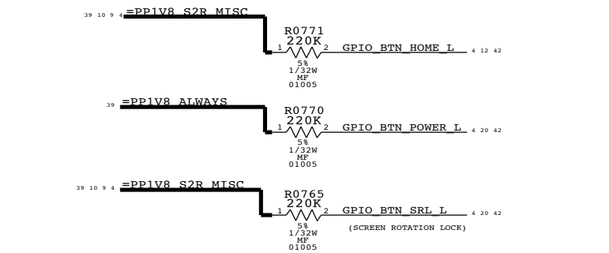
SHEET 3 OF 46

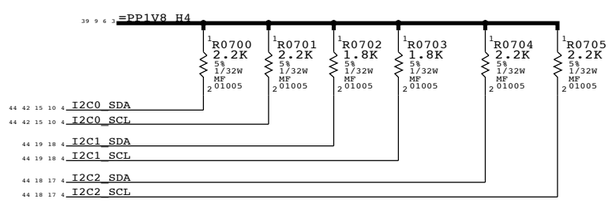
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

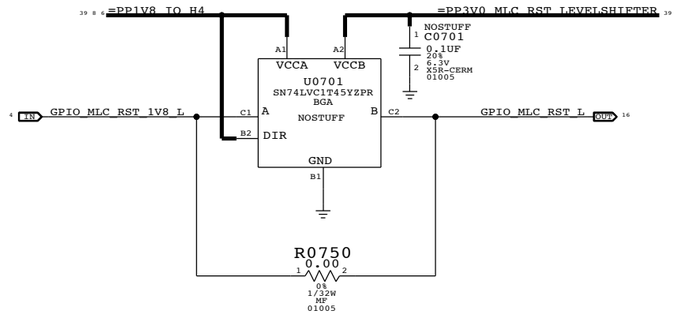
H4A I/OS

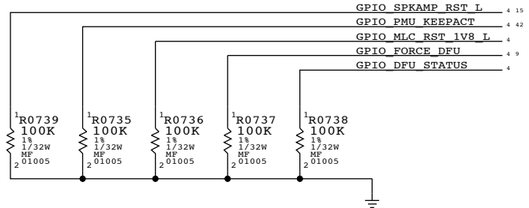












SYNC_MASTER=N/A SYNC_DATE=05/05/2011

PAGE TITLE

AP: I/Os

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

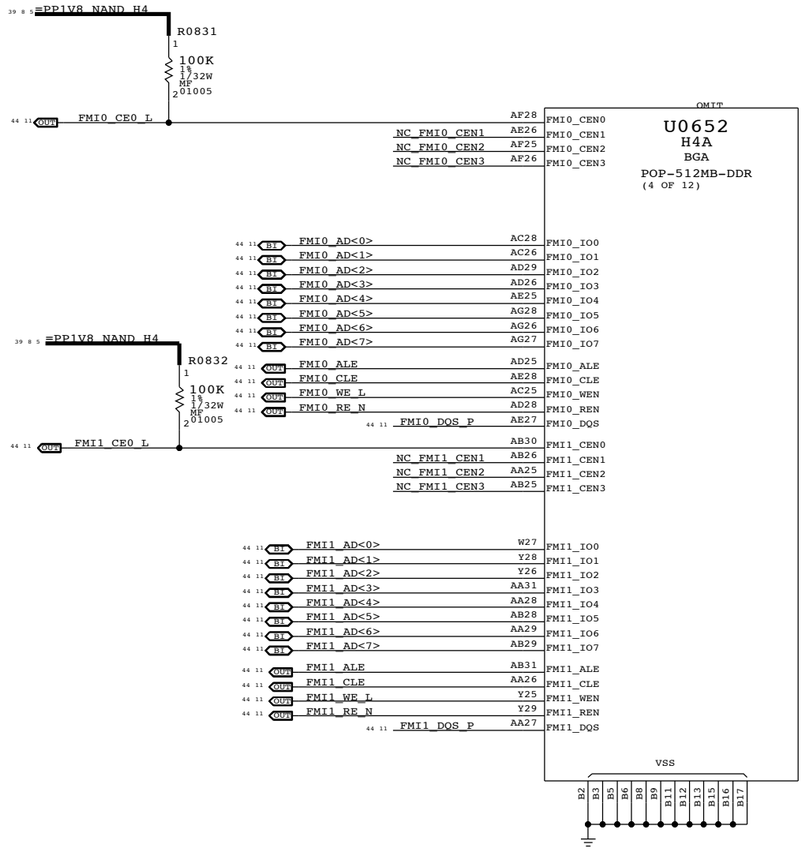
BRANCH

PAGE 7 OF 102

SHEET 4 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



SYNC MASTER=N/A SYNC DATE=04/18/2011

PAGE TITLE

AP: FLASH MEMORY INTERFACE

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

BRANCH

PAGE 8 OF 102

SHEET 5 OF 46

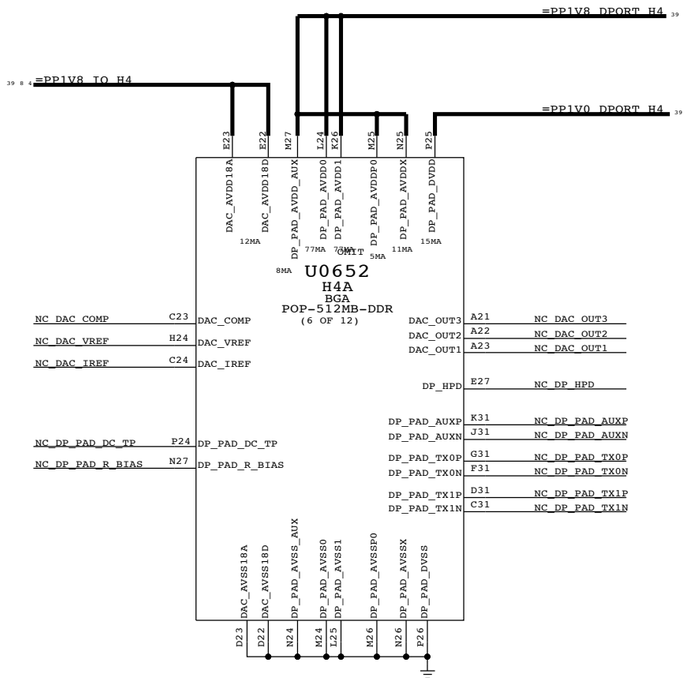
NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

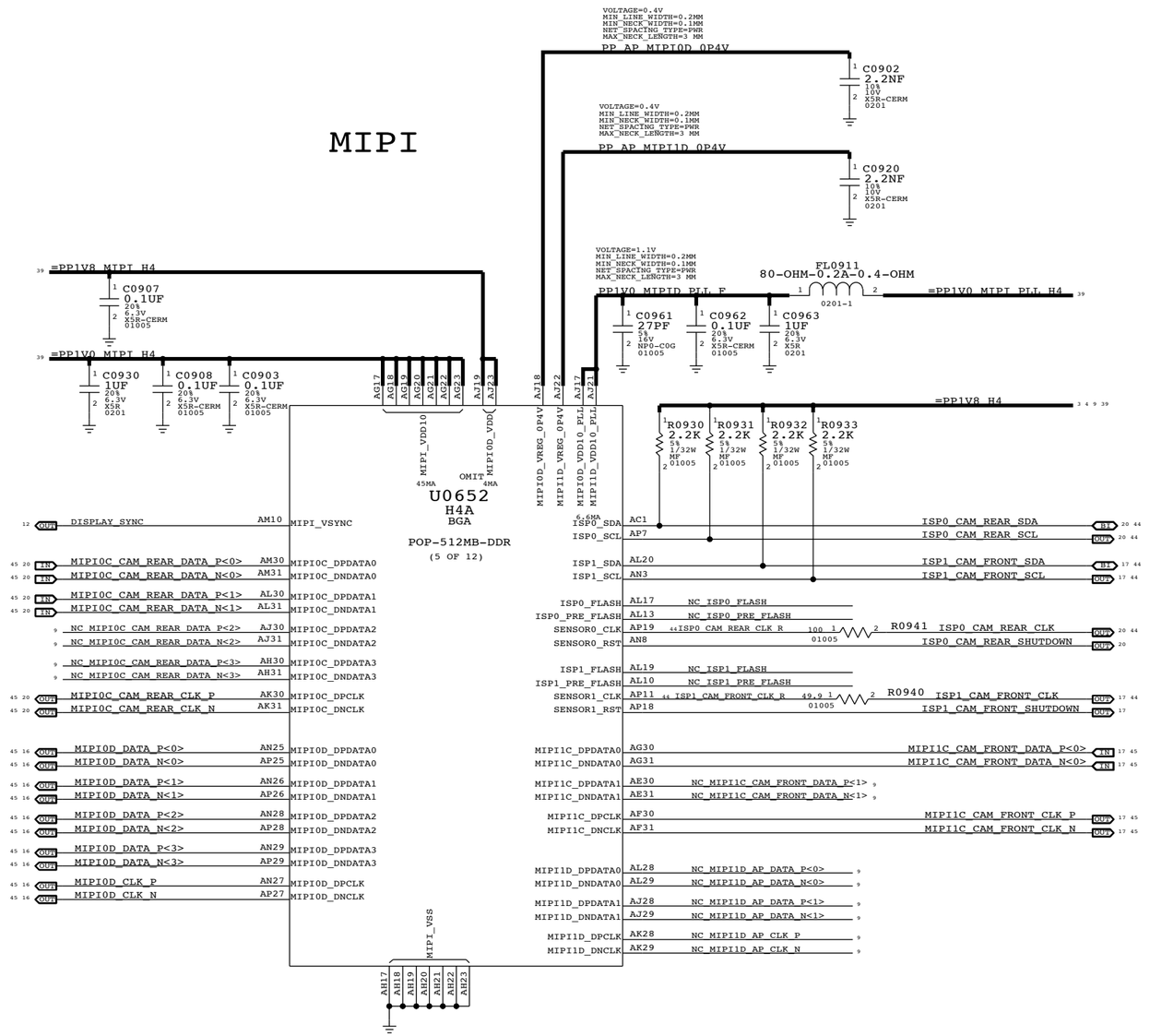
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S0725	155S0359		FL0911	RADAR: 11363497

TV/DISPLAYPORT

MIN_NECK_MIDTH SHOULD BE 0.2MM



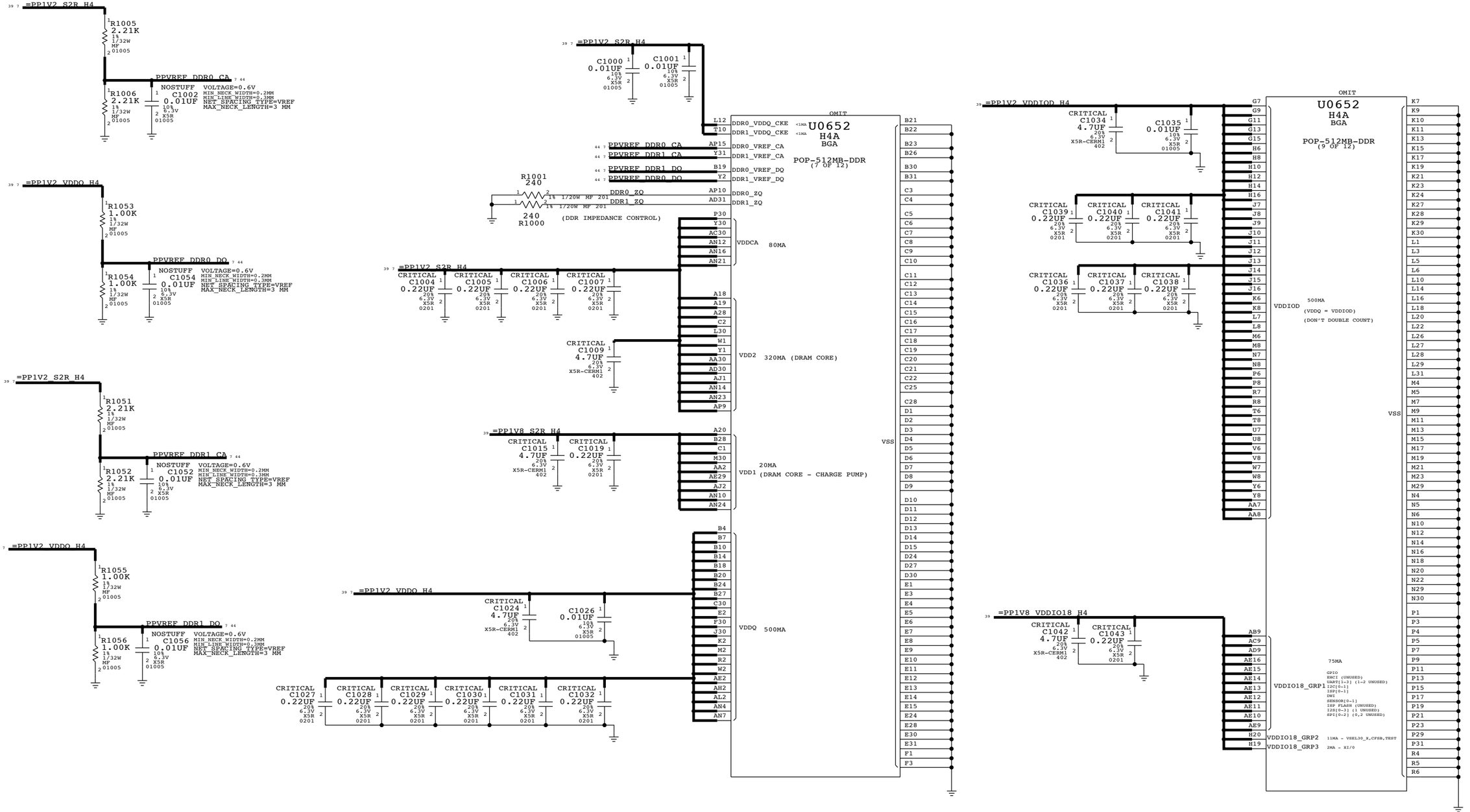
MIPI



SYNC_MASTER=MLB	SYNC_DATE=05/04/2012
PAGE TITLE: AP: TV/DP/MIPI/CAMERA	
Apple Inc.	DRAWING NUMBER: 051-9374 SIZE: D
	REVISION: 13.0.0
	BRANCH:
	PAGE: 9 OF 102
	SHEET: 6 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



SYNC_MASTER=N/A SYNC_DATE=04/18/2011

PAGE TITLE

AP: PWR

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

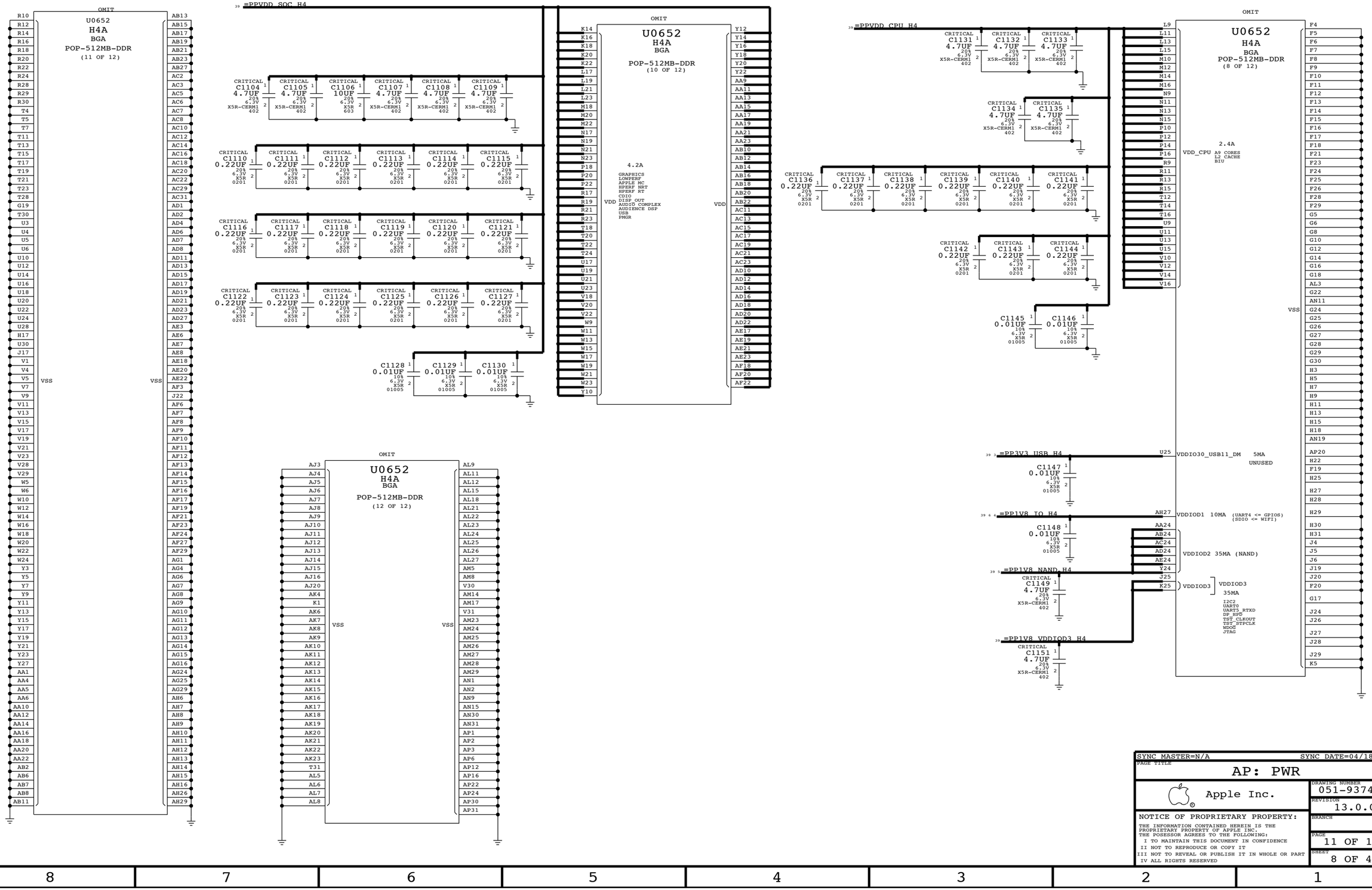
BRANCH

PAGE 10 OF 102

SHEET 7 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED


U0652
H4A
BGA
POP-512MB-DDR
(11 OF 12)
VSS
U0652
H4A
BGA
POP-512MB-DDR
(10 OF 12)
4.2A
GRAPHICS
LOWPERF
APPLE MC
HPERF NRT
HPERF RT
CDIO
DISP OUT
AUDIO COMPLEX
AUDIENCE DSP
USB
PMGR
VDD
U0652
H4A
BGA
POP-512MB-DDR
(8 OF 12)
2.4A
VDD_CPU
A9 CORES
L2 CACHE
BIU
VSS
U0652
H4A
BGA
POP-512MB-DDR
(12 OF 12)
VSS
VDDIO30_USB11_DM 5MA
UNUSED
VDDIOD1 10MA (UART4 <= GPIOS) (SDIO <= WIFI)
VDDIOD2 35MA (NAND)
VDDIOD3
VDDIOD3
35MA
I2C2
UART0
UART0_RTXD
DP_HPD
TST_CLKOUT
TST_STPCLK
WDOG
JTAG
SYNC_MASTER=N/A
SYNC_DATE=04/18/2011
PAGE TITLE
AP: PWR
Apple Inc.
DRAWING NUMBER 051-9374
SIZE D
REVISION 13.0.0
BRANCH
PAGE 11 OF 102
SHEET 8 OF 46
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

BOOT CONFIG ID

39 9 6 4 3 =PP1V8_H4

R1200	R1201	R1202	R1203
2.2K	2.2K	2.2K	2.2K
5% 1/32W MF 01005	5% 1/32W MF 01005	5% 1/32W MF 01005	5% 1/32W MF 01005
		FMI_4CS_TEST	FMI_4CS_NOTEST

BOOT_CONFIG[3] (GPIO29) — 4 GPIO_BOOT_CONFIG3
BOOT_CONFIG[2] (GPIO28) — 4 GPIO_BOOT_CONFIG2
BOOT_CONFIG[1] (GPIO25) — 4 GPIO_BOOT_CONFIG1
BOOT_CONFIG[0] (GPIO18) — 4 GPIO_BOOT_CONFIG0

FOR REFERENCE

BOOT_CONFIG[3:0]	
0000	SPI0
0001	SPI3
0010	SPI0 W/TEST
0011	SPI3 W/TEST
0100	FMI0 2CS
0101	FMI0 4CS
0110	FMI0 4CS W/TEST
0111	RESERVED
1000	FMI1 2 CS
1001	FMI1 4 CS
1010	FMI1 4CS W/TEST
1011	RESERVED
CURRENT SETTING -> 1100	FMI0/1 2/2 CS
1101	FMI0/1 4/4 CS
1110	FMI0/1 4/4 CS W/TEST
1111	RESERVED

BOOT_CONFIG[3-0]	
1100	FMI0/1 2/2 CS

S/W READ FLOW

1. SET GPIO AS INPUT
2. DISABLE PU AND ENABLE PD
3. READ

BOARD ID

39 9 6 4 3 =PP1V8_H4

R1213	R1204	R1205	R1206
2.2K	2.2K	2.2K	2.2K
5% 1/32W MF 01005	5% 1/32W MF 01005	5% 1/32W MF 01005	5% 1/32W MF 01005
	BOARD_ID_P106_P107	BOARD_ID_P105_P107	BOARD_ID_DEV

BOARD_ID[3] — 4 GPIO_BOARD_ID3
BOARD_ID[2] — 4 GPIO_BOARD_ID2
BOARD_ID[1] — 4 GPIO_BOARD_ID1
BOARD_ID[0] — 4 GPIO_BOARD_ID0

	ID[3-0]	SYSTEM	
X123A	1010	P105	AP
	1011	P105	DEV
	1100	P106	AP
	1101	P106	DEV
X123B	1110	P107	AP
	1111	P107	DEV

S/W READ FLOW

1. SET GPIO AS INPUT
2. DISABLE PU AND ENABLE PD
3. READ

BOARD REVISION

4 GPIO_BOARD_REV2
4 GPIO_BOARD_REV1
4 GPIO_BOARD_REV0

R1207	R1208	R1209
NOSTUFF	NOSTUFF	
2.2K	2.2K	2.2K
5% 1/32W MF 01005	5% 1/32W MF 01005	5% 1/32W MF 01005

BRD_REV[2-0]	
000	PROTO 0
001	PROTO 1
010	PROTO 2
011	EVT
100	DVT

S/W READ FLOW

1. SET GPIO AS INPUT
2. ENABLE PU AND DISABLE PD
3. READ

NOTE: PADS USED FOR DEBUG

39 10 4 =PP1V8_S2R_MISC

R1270 NOSTUFF 1K 5% 1/20W MF 201

4 GPIO_FORCE_DFU

JTAG

JTAG_SOC_TRST_L — OUT — 3 44
R1211 100 5% 1/32W MF 01005

JTAG_SOC_SEL — OUT — 3
R1210 100 5% 1/32W MF 01005

R1260 100 5% 1/32W MF 01005 SHORT-01005

XW0601 SHORT-01005 SOC_TST_STPCLK 3
XW0602 SHORT-01005 SOC_FAST_SCAN_CLK 3
XW0603 SHORT-01005 SOC_HOLD_RESET 3

SOC_TESTMODE 3

SINGLE-PIN NETS

NC_FMI0_DQS_NEG	MAKE_BASE=TRUE	FMI0_DQS_N 11
NC_FMI0_RE_POS	MAKE_BASE=TRUE	FMI0_RE_P 11
NC_FMI1_DQS_NEG	MAKE_BASE=TRUE	FMI1_DQS_N 11
NC_FMI1_RE_POS	MAKE_BASE=TRUE	FMI1_RE_P 11
NC_PMU_SHDWN	MAKE_BASE=TRUE	PMU_SHDWN 42
NC_JTAG_SOC_TDO	MAKE_BASE=TRUE	JTAG_SOC_TDO 3 44

NC_AP_MIPI0C_DPDATA2		NC_MIPI0C_CAM_REAR_DATA_P<2> 6
NC_AP_MIPI0C_DNDATA2	MAKE_BASE=TRUE	NC_MIPI0C_CAM_REAR_DATA_N<2> 6
NC_AP_MIPI0C_DPDATA3	MAKE_BASE=TRUE	NC_MIPI0C_CAM_REAR_DATA_P<3> 6
NC_AP_MIPI0C_DNDATA3	MAKE_BASE=TRUE	NC_MIPI0C_CAM_REAR_DATA_N<3> 6
	MAKE_BASE=TRUE	
NC_AP_MIPI1D_DPCLK		NC_MIPI1D_AP_CLK_P 6
NC_AP_MIPI1D_DNCLK	MAKE_BASE=TRUE	NC_MIPI1D_AP_CLK_N 6
	MAKE_BASE=TRUE	
NC_AP_MIPI1D_DPDATA0		NC_MIPI1D_AP_DATA_P<0> 6
NC_AP_MIPI1D_DNDATA0	MAKE_BASE=TRUE	NC_MIPI1D_AP_DATA_N<0> 6
NC_AP_MIPI1D_DPDATA1	MAKE_BASE=TRUE	NC_MIPI1D_AP_DATA_P<1> 6
NC_AP_MIPI1D_DNDATA1	MAKE_BASE=TRUE	NC_MIPI1D_AP_DATA_N<1> 6
	MAKE_BASE=TRUE	
NC_AP_MIPI1C_DPDATA1		NC_MIPI1C_CAM_FRONT_DATA_P<1> 6
NC_AP_MIPI1C_DNDATA1	MAKE_BASE=TRUE	NC_MIPI1C_CAM_FRONT_DATA_N<1> 6
	MAKE_BASE=TRUE	
NC_AP_USB11_DPD		NC_USB_FS_D_P 3
NC_AP_USB11_DND	MAKE_BASE=TRUE	NC_USB_FS_D_N 3
	MAKE_BASE=TRUE	

SYNC_MASTER=N/A SYNC_DATE=04/11/2011

PAGE TITLE
AP: MISC & ALIASES

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 12 OF 102
SHEET 9 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

	PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
NXP	343S0614	1	IC,ASIC,TRISTAR,CSTL1608,A1,WLCSP36	U1300	CRITICAL	COMMON

	PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
TI	343S0620	343S0614	COMMON	U1300	IC,ASIC,TRISTAR,THS7383,A1,WLCSP36

TRISTAR

=PP3V0_S2R_TRISTAR
C1320 8.2PF ±/-0.5PF 16V NP0-C0G-CERM 01005
CRITICAL C1300 0.1UF 20% 6.3V X5R-CERM 01005
CRITICAL C1360 1.0UF 20% 10V X5R-CERM 0201-1

=PP1V8_S2R_TRISTAR
C1321 8.2PF ±/-0.5PF 16V NP0-C0G-CERM 01005
CRITICAL C1301 0.1UF 20% 6.3V X5R-CERM 01005

CRITICAL C1302 4.7UF 10% 25V X5R-CERM 0603
C1322 8.2PF ±/-0.5PF 16V NP0-C0G-CERM 01005

PP3V3_ACC_FET

=PPVCC_MAIN_ACC_SW
CRITICAL C1350 0.1UF 10% 6.3V X5R 201

=PP1V8_S2R_MISC
R1321 100K 1% 1/32W MF 01005

CRITICAL U1350 LM34904 USMD
VCC A1
ACC_PWR A2
ENABLE B2
POK* C1
ACC_DET* C2
GND B1

GPIO_ACC_SW_POK_L (OUT)
GPIO_ACC_SW_EN (IN)
TS_CON_DET_L (IN)

R1320 1.00M 1% 1/32W MF 01005

LAYOUT NOTE:
ADD THERMAL GND VIAS TO U1350

PPVBUS_PROT
CRITICAL C1361 1UF 10% 25V X5R 402

CRITICAL U1300 THS7383IYKAR WCSP
OMIT

	MIKEY_TS_P	C3	DIG_DP	P_IN	F6	
	MIKEY_TS_N	C4	DIG_DN	ACC1	C5	TS_ACC1
TO USB BB MUX	USB_BB_D_P	A1	USB1_DP	ACC2	E5	TS_ACC2
	USB_BB_D_N	B1	USB1_DN	DP1	A2	TS_E75_DPAIR1_P
	USB_BRICKID	C2	BRICK_ID	DN1	B2	TS_E75_DPAIR1_N
AP USB	SOC_USB_D_P	A3	USB0_DP	DP2	A4	TS_E75_DPAIR2_P
	SOC_USB_D_N	B3	USB0_DN	DN2	B4	TS_E75_DPAIR2_N
ACCESSORY UART	UART2_ACC_TXD	E2	UART0_TX	CON_DET_L	E3	TS_CON_DET_L
	UART2_ACC_RXD	E1	UART0_RX	OVP_SW_EN*	D6	OVP_SW_EN_L (OUT)
AP DEBUG UART	UART0_DEBUG_TXD	F2	UART1_TX	SWITCH_EN	E4	RST_SYSTEM_L (IN)
	UART0_DEBUG_RXD	F1	UART1_RX	HOST_RESET	B6	TS_HOST_RESET (OUT)
BB DEBUG UART (T'S OFF TO H4A UART4)	UART4_BB_RXD	D2	UART2_TX	SDA	D3	I2C0_SDA
	UART4_BB_TXD	D1	UART2_RX	SCL	D4	I2C0_SCL
	JTAG_SOC_TCK	A5	JTAG_CLK	INT	C6	PMU_GPIO_TRISTAR_IRQ (OUT)
	JTAG_SOC_TMS	B5	JTAG_DIO	BYPASS	E6	TRISTAR_ADD0

VOLTAGE=3V
MIN_LINE_WIDTH=0.2MM
MIN_NECK_WIDTH=0.1MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.5MM

DVSS F5, DVSS C1, DVSS A6

CRITICAL C1303 1.0UF 20% 10V X5R-CERM 0201-1
TRISTAR BYPASS FOR 3V LDO

R1370 0.00 0% 1/32W MF 01005
L81_MBUS_REF (OUT)

NOSTUFF R1350 0.00 1% 1/20W MF 0201

Q1301 CRITICAL CSD68803W15 BGA
=PP3V3_ACC
PP3V3_ACC_FET
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

CRITICAL R1322 220K 5% 1/32W MF 01005
GPIO_ACC_SW_POK

CRITICAL Q1300 DMN26D0UFB4 DFN SYM_VER_1
GPIO_ACC_SW_POK_L
C1362 470PF 10% 10V X5R 01005

EITHER TRISTAR OR AP CAN RESET PMU

=PP1V8_S2R_TRISTAR
C1310 0.1UF 20% 6.3V X5R-CERM 01005

CRITICAL 74LVC1G32 SOT891 U1310
SOC_WDOG (IN)
TS_HOST_RESET (IN)
PMU_RESET_IN (OUT)
NC_U1310_5

R1310 220K 5% 1/32W MF 01005
R1311 220K 5% 1/32W MF 01005

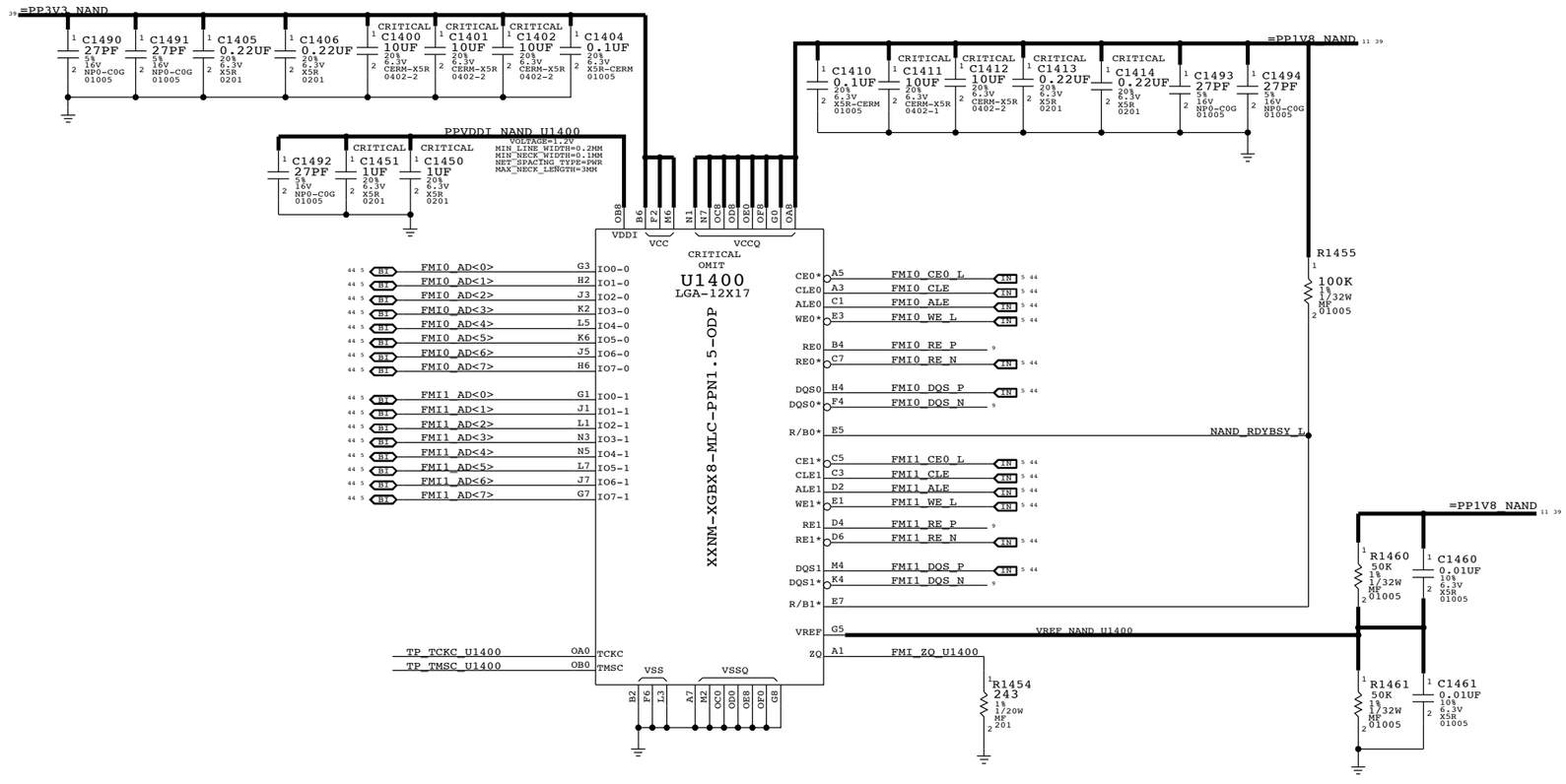
SYNC_MASTER=N/A	SYNC_DATE=N/A
PAGE TITLE	E75 SUPPORT
Apple Inc.	DRAWING NUMBER 051-9374 · SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 13 OF 102
	SHEET 10 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

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

FLASH CONFIGURATIONS

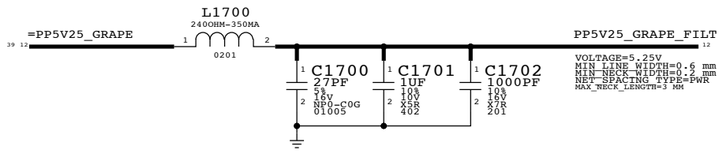
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
335S0890	1	TOSHIBA 19NM PPN1.5 8GB	U1400	8GB
335S0878	1	TOSHIBA 19NM PPN1.5 16GB	U1400	16GB
335S0879	1	TOSHIBA 19NM PPN1.5 32GB	U1400	32GB
335S0880	1	TOSHIBA 19NM PPN1.5 64GB	U1400	64GB

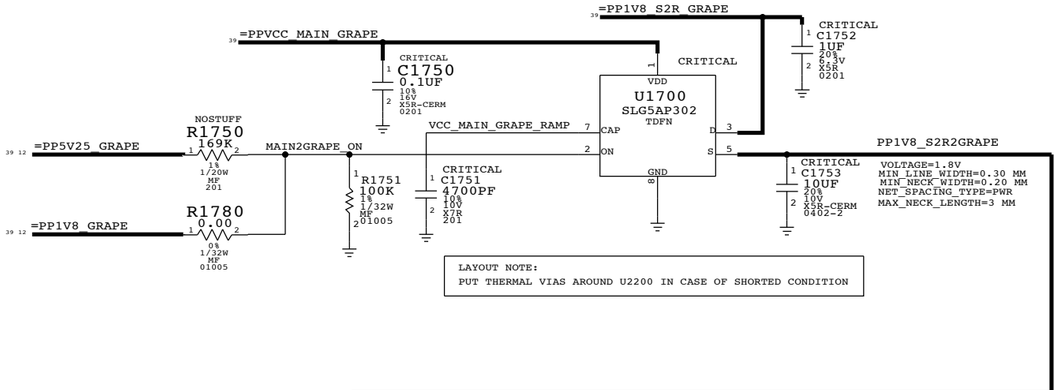


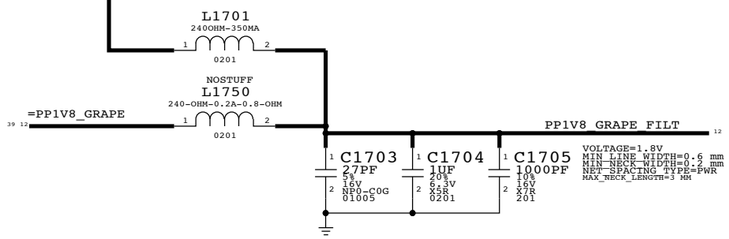
SYNC MASTER=MLB	SYNC DATE=05/04/2012
PAGE TITLE	NAND STORAGE
Apple Inc.	DRAWING NUMBER 051-9374 SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 14 OF 102
	SHEET 11 OF 46

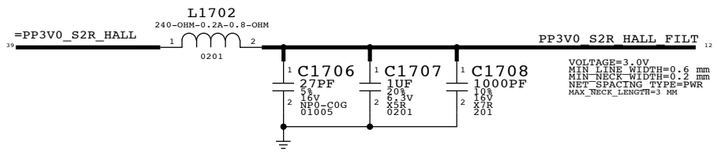
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

TOUCH SUBSYSTEM

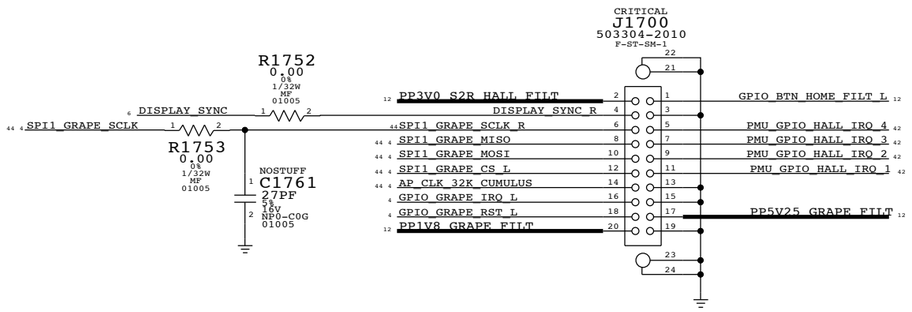


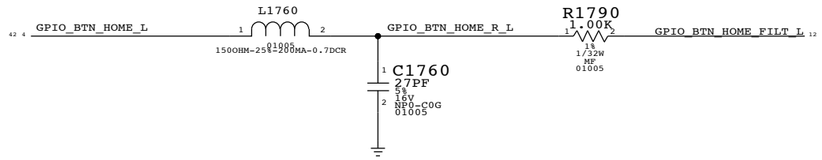






RCPT - MLB 998-4526 -> 516S1054
(PLUG - FLEX 998-4527)





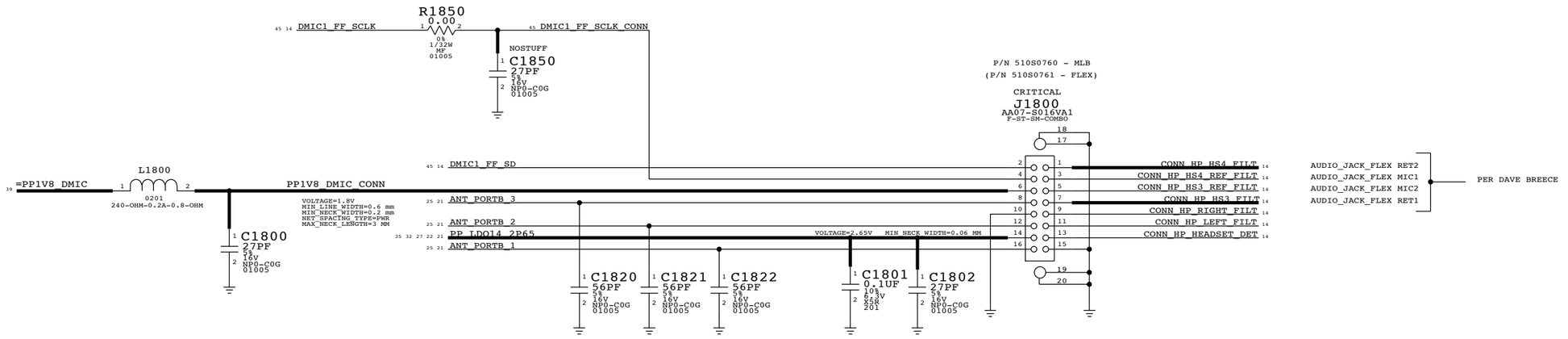
SYNC_MASTER=N/A SYNC_DATE=06/21/2010

PAGE TITLE
TOUCH: FLEX CONNECTOR

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 17 OF 102
SHEET 12 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



SYNC_MASTER=N/A SYNC_DATE=03/31/2011

PAGE TITLE

AUDIO JACK FLEX CONN

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

BRANCH 13 OF 46

PAGE 18 OF 102

SHEET

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

NOTE:
U1900 DECAPS CHANGED ON 5/24/12 PER RADAR #11485846

MIKEY BUS FILTER

PLACE R1930 & R1931 CLOSE TO U3600

TO HEADPHONE JACK

PLACE L1900 TO 1905 CLOSE TO THE HP CONNECTOR

DIGITAL MIC

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S0773	155S0453		L1904,L1905	RADAR:11100717

SYNC_MASTER=KAVITHA SYNC_DATE=01/18/2012

PAGE TITLE: AUDIO: L81 CODEC

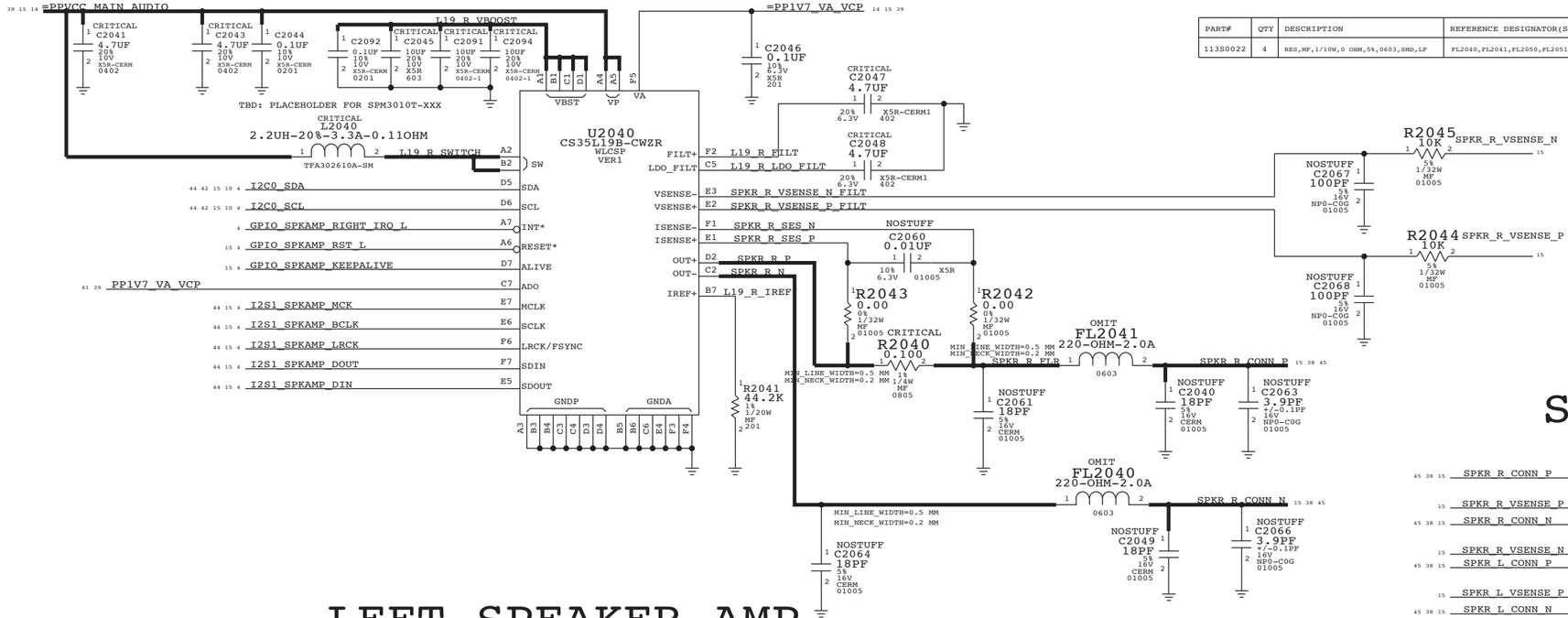
Apple Inc.

DRAWING NUMBER: 051-9374 SIZE: D
REVISION: 13.0.0
BRANCH: 14 OF 46
PAGE: 19 OF 102
SHEET:

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

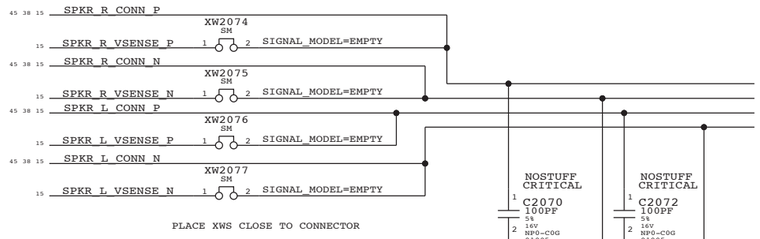
RIGHT SPEAKER AMP

I2C ADDRESS: 1000001X



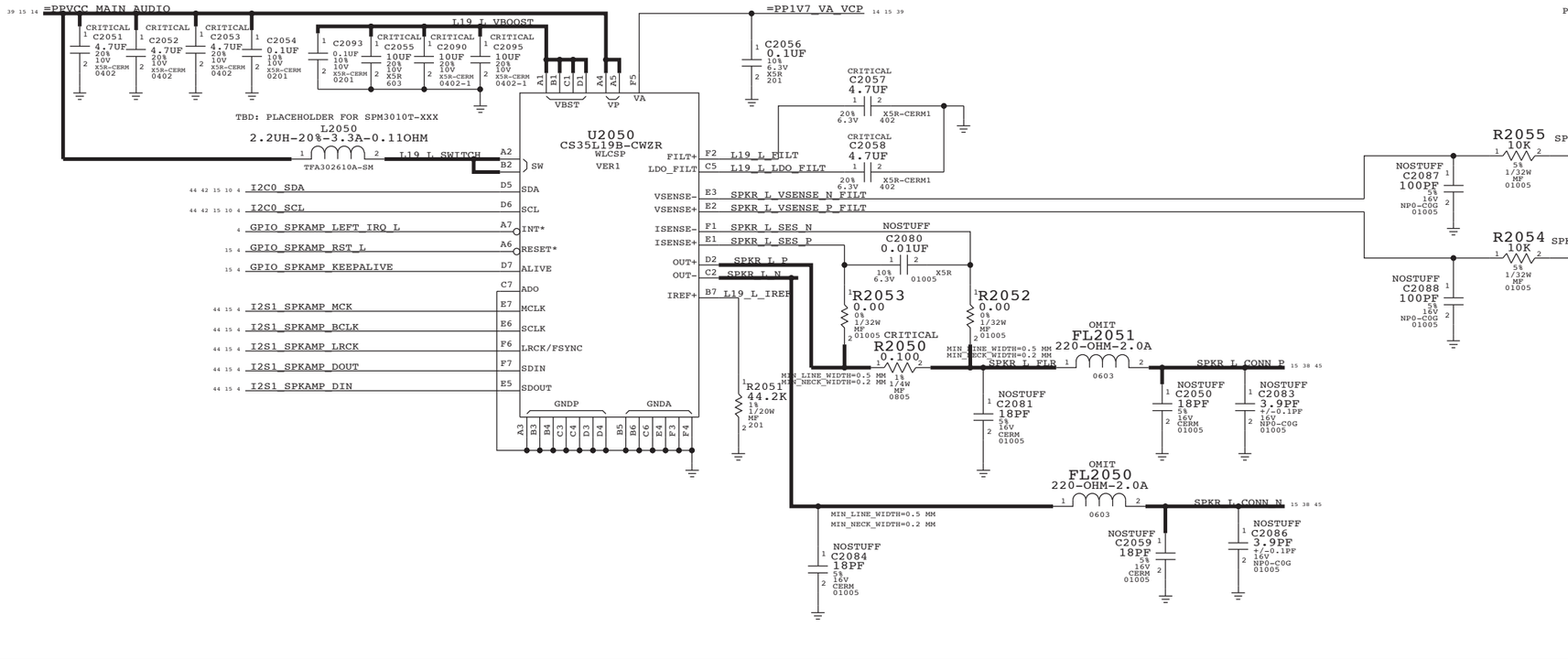
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
113S0022	4	RES,MF,1/10W,0 OHM,5%,0603,SMD,LF	FL2040,FL2041,FL2050,FL2051		

SPEAKER CONNECTOR



LEFT SPEAKER AMP

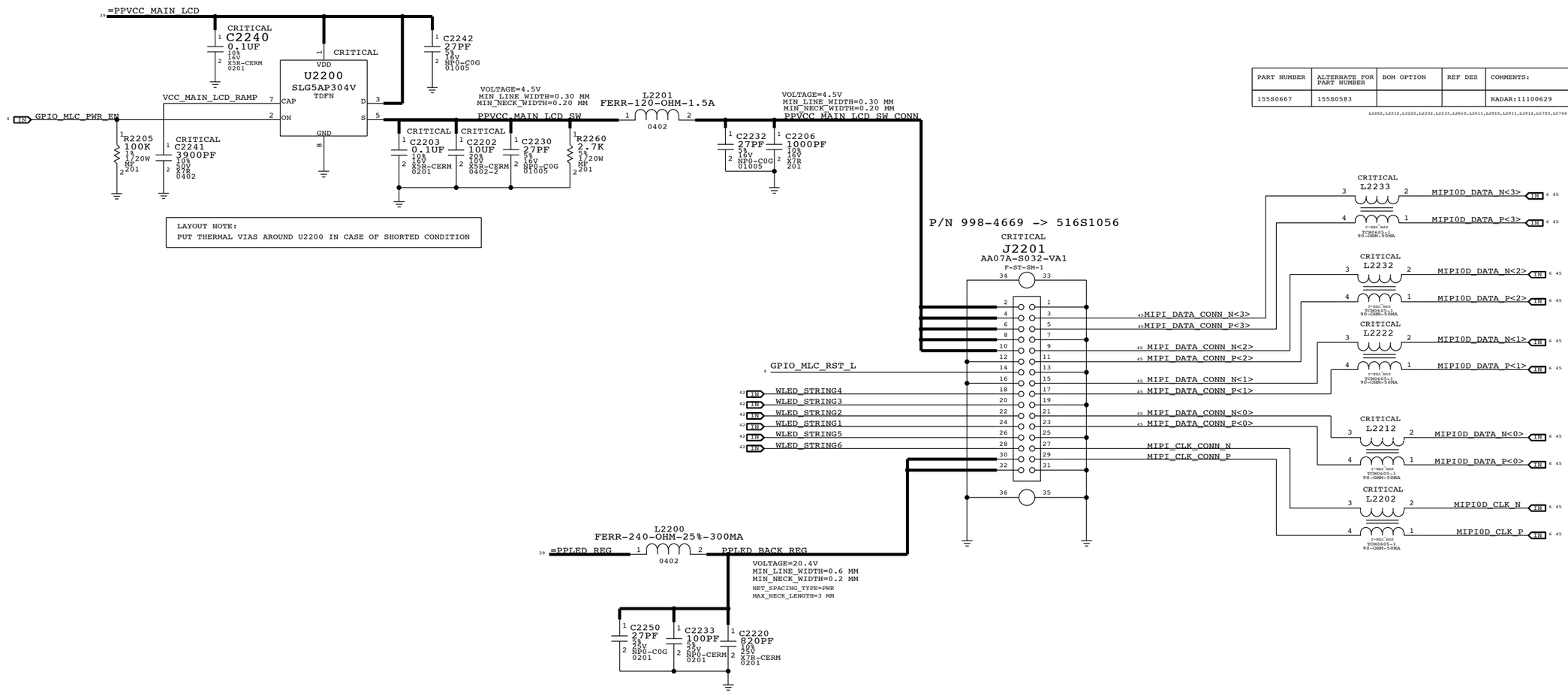
I2C ADDRESS: 1000000X



SYNC_MASTER=KAVITHA	SYNC_DATE=01/18/2012
PAGE TITLE	AUDIO: CS35L19A AMPS
Apple Inc.	DRAWING NUMBER 051-9374 SIZE D
	REVISION 13.0.0
	BRANCH 4 OF 4
	PAGE 20 OF 102
	SHEET 15 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

MIPI CONNECTOR



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S0667	155S0583			RADAR:11100629

L2202,L2212,L2222,L2232,L2233,L2610,L2611,L2910,L2911,L2912,L5703,L5704

SYNC MASTER=N/A SYNC DATE=N/A

PAGE TITLE

VIDEO: MIPI CONNECTOR

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

BRANCH

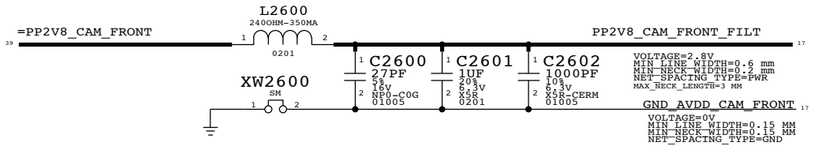
PAGE 22 OF 102

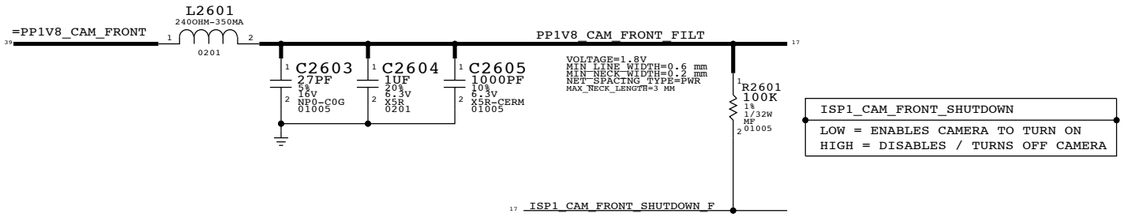
SHEET 16 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

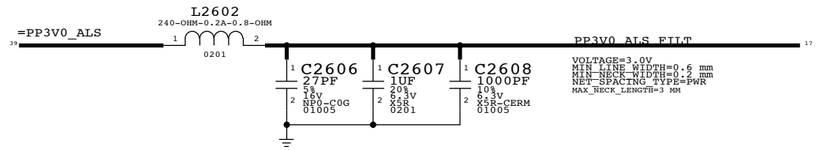
VGA FRONT CAMERA CONNECTOR

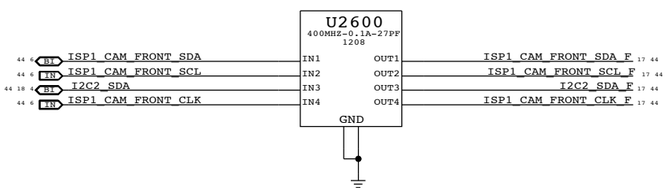


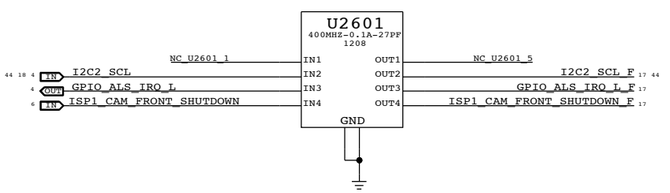


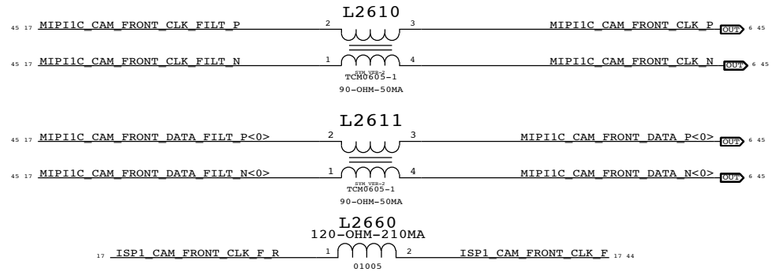
ISP1_CAM_FRONT_SHUTDOWN

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

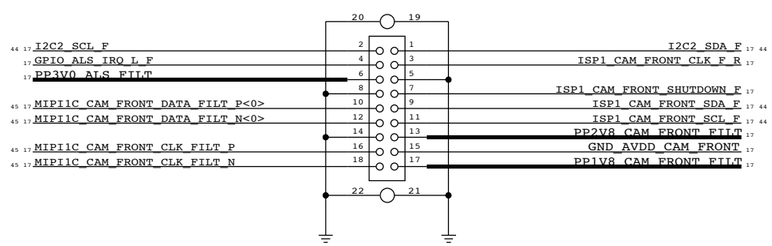








516S0869 PLUG FLEX
516S0876 RCPT MLB
CRITICAL



SYNC_MASTER=N/A SYNC_DATE=N/A

PAGE TITLE
FF CAM & MIC CONNECTORS

Apple Inc.

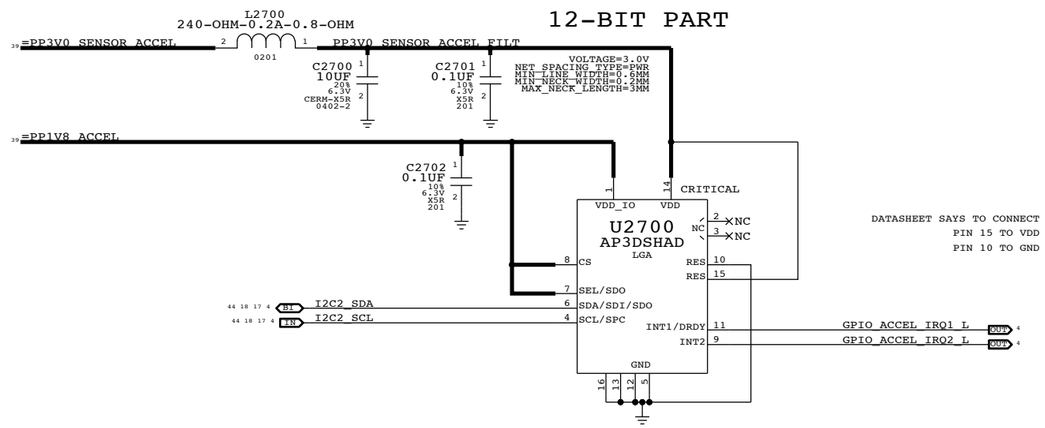
DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 26 OF 102
SHEET 17 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

ACCELEROMETER

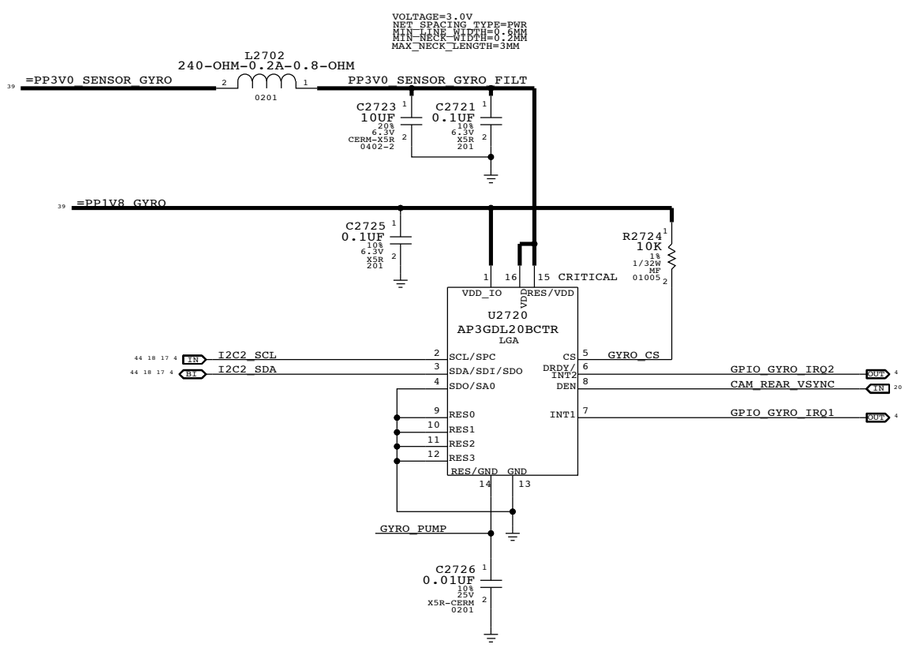
(WRITE: 0X3A READ: 0X3B)

12-BIT PART



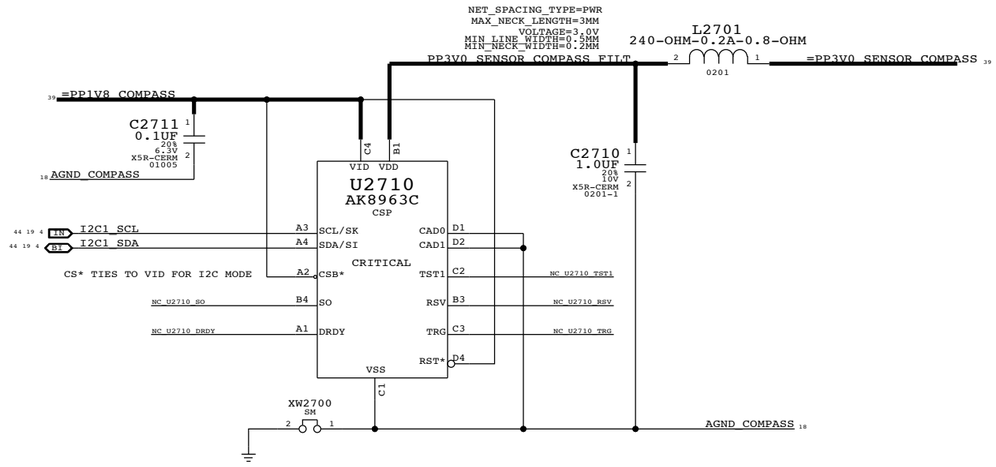
GYRO

(WRITE: 0XD4 READ: 0XD5)



COMPASS

WRITE: 0X18 READ: 0X19



SYNC_MASTER=N/A SYNC_DATE=N/A

PAGE TITLE

INERTIAL SENSORS

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

BRANCH

PAGE 27 OF 102

SHEET 18 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSESSOR AGREES TO THE FOLLOWING:

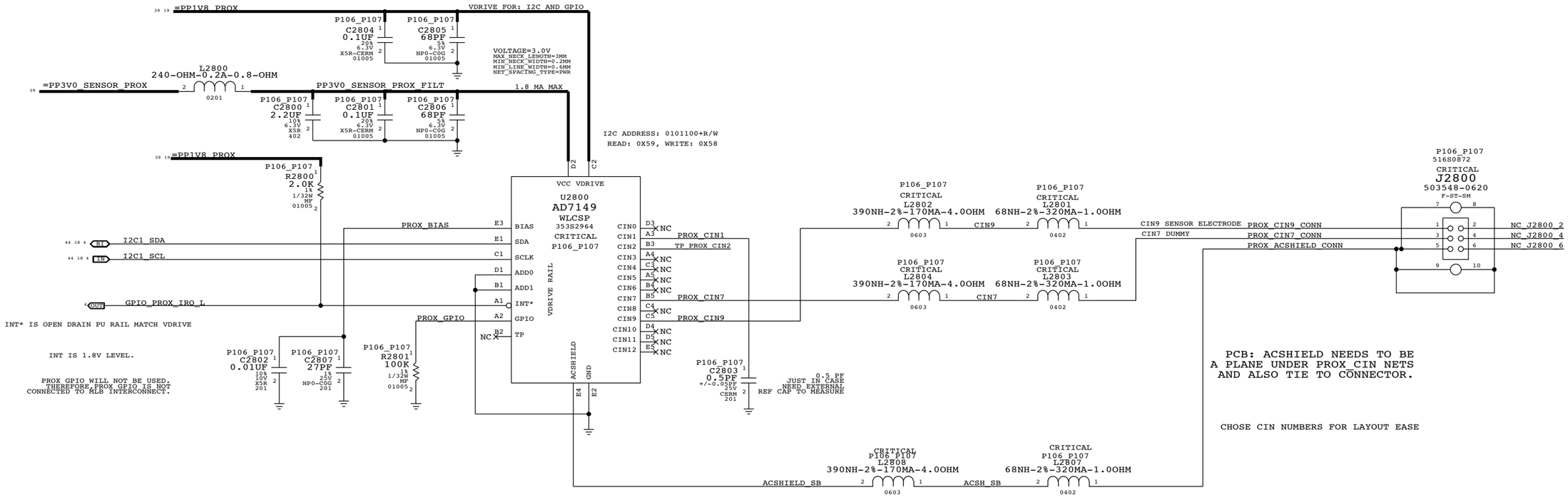
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART

IV ALL RIGHTS RESERVED

PROX SENSOR



PCB: ACSHIELD NEEDS TO BE A PLANE UNDER PROX_CIN NETS AND ALSO TIE TO CONNECTOR.

CHOSE CIN NUMBERS FOR LAYOUT EASE

PCB: ENSURE ACSHIELD PLANE UNDER U3200, NO GND PLANE NEAR PROX_CIN NETS..

SYNC_MASTER=N/A SYNC_DATE=N/A

PAGE TITLE: PROX SENSOR

Apple Inc.

DRAWING NUMBER: 051-9374 SIZE: D

REVISION: 13.0.0

BRANCH:

PAGE: 28 OF 102

SHEET: 19 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

REAR CAMERA CONNECTOR

=PP1V8_CAM_REAR
L2902 240OHM-350MA 0201
C2972 27PF 5% 16V NP0-C0G 01005
C2906 27PF 5% 16V NP0-C0G 01005
C2907 1UF 10% 10V X5R 402
C2908 1000PF 10% 6.3V X5R-CERM 01005
PP1V8_CAM_REAR_FILT
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

=PP1V2_CAM_REAR
L2903 240OHM-350MA 0201
C2973 27PF 5% 16V NP0-C0G 01005
C2909 27PF 5% 16V NP0-C0G 01005
C2910 1UF 10% 10V X5R 402
C2911 1000PF 10% 6.3V X5R-CERM 01005
PP1V2_CAM_REAR_FILT
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

=PP2V8_CAM_REAR
L2900 2400HM-350MA 0201
C2970 27PF 5% 16V NP0-C0G 01005
XW2950 SM
C2900 27PF 5% 16V NP0-C0G 01005
C2901 1UF 10% 10V X5R 402
C2902 1000PF 10% 6.3V X5R-CERM 01005
PP2V8_CAM_REAR_FILT
VOLTAGE=2.8V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
VOLTAGE=0V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.1 MM
NET_SPACING_TYPE=GND
MAX_NECK_LENGTH=5 MM

=PP2V8_CAM_REAR_AF
L2901 2400HM-350MA 0201
C2971 27PF 5% 16V NP0-C0G 01005
XW2951 SM
C2903 27PF 5% 16V NP0-C0G 01005
C2904 1UF 10% 10V X5R 402
C2905 1000PF 10% 6.3V X5R-CERM 01005
PP2V8_CAM_REAR_AF_FILT
VOLTAGE=2.8V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
VOLTAGE=0V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.1 MM
NET_SPACING_TYPE=GND
MAX_NECK_LENGTH=5 MM

APN: 516S0973
PLUG: 516S0974

=PP1V8_CAM_REAR
R2950 100K 1% 1/32W MF 01005
CRITICAL
J2950 AA07-S022VA1 F-ST-SM

ISP0_CAM_REAR_SCL
ISP0_CAM_REAR_SDA
ISP0_CAM_REAR_SHUTDOWN
CAM_REAR_VSYNC
GND_CAM_AVDD
GND_AF_AVDD

ISP0_CAM_REAR_CLK_FILT
L2950 120-OHM-210MA 01005
ISP0_CAM_REAR_CLK

L2911 TCM0605-1 90-OHM-50MA
MIPI0C_CAM_REAR_DATA_P<0>
MIPI0C_CAM_REAR_DATA_N<0>

L2910 TCM0605-1 90-OHM-50MA
MIPI0C_CAM_REAR_CLK_P
MIPI0C_CAM_REAR_CLK_N

L2912 TCM0605-1 90-OHM-50MA
MIPI0C_CAM_REAR_DATA_P<1>
MIPI0C_CAM_REAR_DATA_N<1>

MIPI0C_CAM_REAR_DATA_FILT_P<0>
MIPI0C_CAM_REAR_DATA_FILT_N<0>
MIPI0C_CAM_REAR_CLK_FILT_P
MIPI0C_CAM_REAR_CLK_FILT_N
MIPI0C_CAM_REAR_DATA_FILT_P<1>
MIPI0C_CAM_REAR_DATA_FILT_N<1>

BUTTON CONNECTOR

L2960 240-OHM-0.2A-0.8-OHM 0201
GPIO_BTN_VOL_DOWN_L
GPIO_BTN_VOL_DOWN_R_L
L2961 240-OHM-0.2A-0.8-OHM 0201
GPIO_BTN_VOL_UP_L
GPIO_BTN_VOL_UP_R_L
L2962 240-OHM-0.2A-0.8-OHM 0201
GPIO_BTN_SRL_L
GPIO_BTN_SRL_R_L
L2963 240-OHM-0.2A-0.8-OHM 0201
GPIO_BTN_POWER_L
GPIO_BTN_POWER_R_L

R2900 1.00K 1% 1/32W MF 01005
R2901 1.00K 1% 1/32W MF 01005
R2902 1.00K 1% 1/32W MF 01005
R2903 1.00K 1% 1/32W MF 01005

C2960 82PF 5% 25V CERM 0201
C2961 82PF 5% 25V CERM 0201
C2962 82PF 5% 25V CERM 0201
C2963 82PF 5% 25V CERM 0201

DZ2960 201-1 12.8V-100PF
DZ2961 201-1 12.8V-100PF
DZ2962 201-1 12.8V-100PF
DZ2963 201-1 12.8V-100PF

GPIO_BTN_VOL_DOWN_L_FILT
GPIO_BTN_VOL_UP_L_FILT
GPIO_BTN_SRL_L_FILT
GPIO_BTN_POWER_L_FILT

CRITICAL
J2960 FF18-6A-R11AD-B-3H F-RT-SM
518S0692

SYNC_MASTER=N/A SYNC_DATE=N/A
PAGE TITLE: BUTTON & REAR CAMERA CONN

Apple Inc.

DRAWING NUMBER: 051-9374
SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 29 OF 102
SHEET: 20 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

AP INTERFACE & DEBUG CONNECTOR

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

AP CONNECTIONS

PP_BATT_VCC_CONN	=PPBATT_VCC_RF	
TX_GTR_THRESH	GPIO_BB_GSM_TXBURST	4
BB_RST_L	GPIO_BB_RST_L	4
RESET_DET_L	GPIO_BB_RST_DET_L	4
RADIO_ON_L	GPIO_BB_RADIO_ON_L	4
RESET_PMU_L	PMU_GPIO_BB_RST_L	42
BB_WAKE_HOST	PMU_GPIO_BB_WAKE	42
RF_RESET_L	RST_SYSTEM_L	3 10 42
PBL_RUN_BB_HSIC1_RDY	GPIO_BB_HSIC_DEV_RDY	4
AP_WAKE_MODEM	GPIO_BB_IPC_GPIO	4
AP_HSIC1_RDY	GPIO_BB_HSIC_HOST_RDY	4
50_HSIC_BB_DATA	HSIC1_BB_DATA	3 44
50_HSIC_BB_STROBE	HSIC1_BB_STB	3 44
BB_HSIC1_REMOTE_WAKE	GPIO_BB_DIAGS_RDY	4
BB_UART_TXD	UART4_BB_RXD	4 10 44
BB_UART_RXD	UART4_BB_TXD	4 10 44
BB_UART_RTS_L	UART4_BB_CTS_L	4 44
BB_UART_CTS_L	UART4_BB_RTS_L	4 44
BB_USB_VBUS	BB_VBUS_DET	42
90_BB_USB_D_P	USB_BB_D_P	10 44
90_BB_USB_D_N	USB_BB_D_N	10 44
PP_WLAN_MAIN_VCC	=PPBATT_VCC_WL	39
PP_SYNC	GPIO_BB_GPS_SYNC	4
PP_WL_BT_VDDIO_AP	=PP1V8_S2R_WL	39
CLK32K_AP	PMU_CLK_32K_WLAN	42 44
WLAN_REG_ON	PMU_GPIO_WLAN_REG_ON	42
WLAN_UART_TXD	UART3_WLAN_RXD	4 44
WLAN_UART_RXD	UART3_WLAN_TXD	4 44
WLAN_HOST_WAKE	PMU_GPIO_WLAN_HOST_WAKE	42
WLAN_HSIC3_RESUME	GPIO_WLAN_HSIC_RESUME	4
DEV_HSIC3_RDY	GPIO_WLAN_HSIC_DEV_RDY	4
AP_HSIC3_RDY	GPIO_WLAN_HSIC_HOST_RDY	4
50_HSIC_WLAN_DATA	HSIC2_WLAN_DATA	3 44
50_HSIC_WLAN_STROBE	HSIC2_WLAN_STB	3 44
BT_HOST_WAKE	PMU_GPIO_BT_HOST_WAKE	42
BT_WAKE	GPIO_BT_WAKE	4
BT_UART_TXD	UART1_BT_RXD	4 44
BT_UART_RXD	UART1_BT_TXD	4 44
BT_UART_RTS_L	UART1_BT_CTS_L	4 44
BT_UART_CTS_L	UART1_BT_RTS_L	4 44
BT_REG_ON	PMU_GPIO_BT_REG_ON	42
BT_PCM_CLK	I2S3_BT_BCLK	4 44
BT_PCM_SYNC	I2S3_BT_LRCK	4 44
BT_PCM_OUT	I2S3_BT_DIN	4 44
BT_PCM_IN	I2S3_BT_DOUT	4 44
ANT_PORTB_1	ANT_PORTB_1	13 21 25
ANT_PORTB_2	ANT_PORTB_2	13 21 25
ANT_PORTB_3	ANT_PORTB_3	13 21 25
LAT_SW1_CTL	ANT_PORTA_1	
PP_LDO14_2P65	PP_LDO14_2P65	13 21 22 27 32 35

PP31007_RF P4MM SM 1 PP NOSTUFF — BB_ERROR_FLAG 25

PP31001_RF P4MM SM 1 PP NOSTUFF — SLEEP_CLK_32K 23 24

PP31006_RF P4MM SM 1 PP NOSTUFF — PMIC_SSBI 23 24

PP31005_RF P4MM SM 1 PP NOSTUFF — RADIO_ON_L 21 23

PP31003_RF P4MM SM 1 PP NOSTUFF — PBL_RUN_BB_HSIC1_RDY 21 25

PP31004_RF P4MM SM 1 PP NOSTUFF — AP_HSIC1_RDY 21 25

BT UART

PP31013_RF P4MM SM 1 PP NOSTUFF — BT_UART_TXD 21 37

PP31014_RF P4MM SM 1 PP NOSTUFF — BT_UART_RXD 21 37

BB NOR SPI

PP31015_RF P4MM SM 1 PP NOSTUFF — SPI_DATA_MOSI 25

PP31016_RF P4MM SM 1 PP NOSTUFF — SPI_DATA_MISO 25

PP31017_RF P4MM SM 1 PP NOSTUFF — SPI_CS_L 25

PP31018_RF P4MM SM 1 PP NOSTUFF — SPI_CLK 25

J31002_RF MM4829-2702 F-ST-SM 1 NOSTUFF — 50_HSIC_BB_DATA 21 24

J31003_RF MM4829-2702 F-ST-SM 1 NOSTUFF — 50_HSIC_BB_STROBE 21 24

DEBUG CONNECTOR

J31010_RF AXE654124 M-ST-SM

PP_BATT_VCC_CONN IN 21 22 23 29 30 31 33 34

24 OUT	DEBUG_RST_L	10	9	PP_SMPS3_MSME_1V8 IN 21 22 24 25 28
23 21 OUT	RESET_PMU_L	12	11	BT_WAKE OUT 21 37
23 21 OUT	RADIO_ON_L	14	13	
		16	15	PP_LDO6_RUIM_1V8 IN 21 22 24
24 21 OUT	BB_USB_VBUS	18	17	WLAN_REG_ON OUT 21 37
24 21 BI	90_BB_USB_D_N	20	19	HSIC_BB_DATA
24 21 BI	90_BB_USB_D_P	22	21	HSIC_BB_STROBE
21 OUT	RF_RESET_L	24	23	PMIC_RESOUT_L IN 23 24
44 24 4 OUT	BB_JTAG_TCK	26	25	NC
44 24 4 OUT	BB_JTAG_TMS	28	27	
44 24 4 IN	BB_JTAG_TDO	30	29	AP_HSIC1_RDY IN 21 25
44 24 4 OUT	BB_JTAG_TDI	32	31	BT_REG_ON IN 21 37
44 24 4 OUT	BB_JTAG_TRST_L	34	33	BB_WAKE_HOST IN 21 25
24 OUT	BB_JTAG_RTCLK	36	35	NC
		38	37	RESET_DET_L IN 21 25
25 23 OUT	PS_HOLD	40	39	SIMCRD_CLK_CONN IN 21 25
25 21 IN	BB_UART_TXD	42	41	SIMCRD_IO_CONN BI 21 25
25 21 OUT	BB_UART_RXD	44	43	SIM_DETECT OUT 21 25
25 21 IN	BB_UART_RTS_L	46	45	BB_RST_L OUT 21 23 24
25 21 OUT	BB_UART_CTS_L	48	47	SIMCRD_RST_CONN IN 21 25
25 IN	GPIO_DEBUG_LED	50	49	PBL_RUN_BB_HSIC1_RDY IN 21 25
25 21 OUT	GPIO_51 GPIO51/BOOT_CONFIG_3	52	51 GPIO54/BOOT_CONFIG_0	ANT_SEL_2 OUT 21 25 32
32 25 21 OUT	ANT_SEL_1 GPIO53/BOOT_CONFIG_1	54	53 GPIO48/BOOT_CONFIG_6	LAT_SW1_CTL OUT 21 25
		58	57	

NOSTUFF

PP_SMPS3_MSME_1V8 28 25 24 22 21

R31101_RF	R31102_RF	R31103_RF	R31104_RF
10K 1% 1/32W MF 01005	10K 1% 1/32W MF 01005	10K 1% 1/32W MF 01005	10K 1% 1/32W MF 01005
CELL	CELL	CELL	CELL
GPIO_51 25 21			
ANT_SEL_1 32 25 21			
ANT_SEL_2 32 25 21			
LAT_SW1_CTL 25 21			

BOOT OPTIONS	BOOT_CONFIG SW REGISTER VALUE	GPIO/BOOT_CONFIG CONFIGURATION 6	5	4	3	2	1	0
		47	48	49	50	51	52	53	54	55
BOOT_DEFAULT_OPTION	0X00	X	0	0	0	0	0	0	0	X
BOOT_NAND_OPTION	0X01	X	1	0	0	0	0	0	1	X
BOOT_HSIC_OPTION	0X02	X	1	0	0	0	0	1	0	X
BOOT_USB_OPTION	0X03	X	1	0	0	0	0	1	1	X
ENABLE SAHARA PROTOCOL	0X08	X	1	0	0	1	0	X	X	X

SIM CARD CONNECTOR

PP_LDO6_RUIM_1V8 24 22 21

R31005_RF 0.00 0% 1/32W MF 01005 NOSTUFF

R31004_RF 15.00K 1% 1/32W MF 01005 *CELL

J31001_RF SIM-CARD-N41 F-ST-SM

VCC			
SIMCRD_RST_CONN 25 21	RST	I/O	SIMCRD_IO_CONN 21 25
SIMCRD_CLK_CONN 25 21	CLK	DETECT	SIM_DETECT 21 25
GND		SWP	SIM_SWP
		OMIT	

PP_LDO6_RUIM_1V8 21 22 24

DZ31002_RF 12V-33PF 01005 CELL

DZ31001_RF TPD4E101DPW SON4

SIMCRD_IO_CONN 25 21	1	4	SIM_DETECT 21 25
	5 GND		
SIMCRD_RST_CONN 25 21	2	3	SIMCRD_CLK_CONN 21 25
	CELL		

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

R R104
C CXXX
XWXW206
DZDZ101
U U101

PAGE TITLE: SYSTEM & DEBUG CONNECTORS

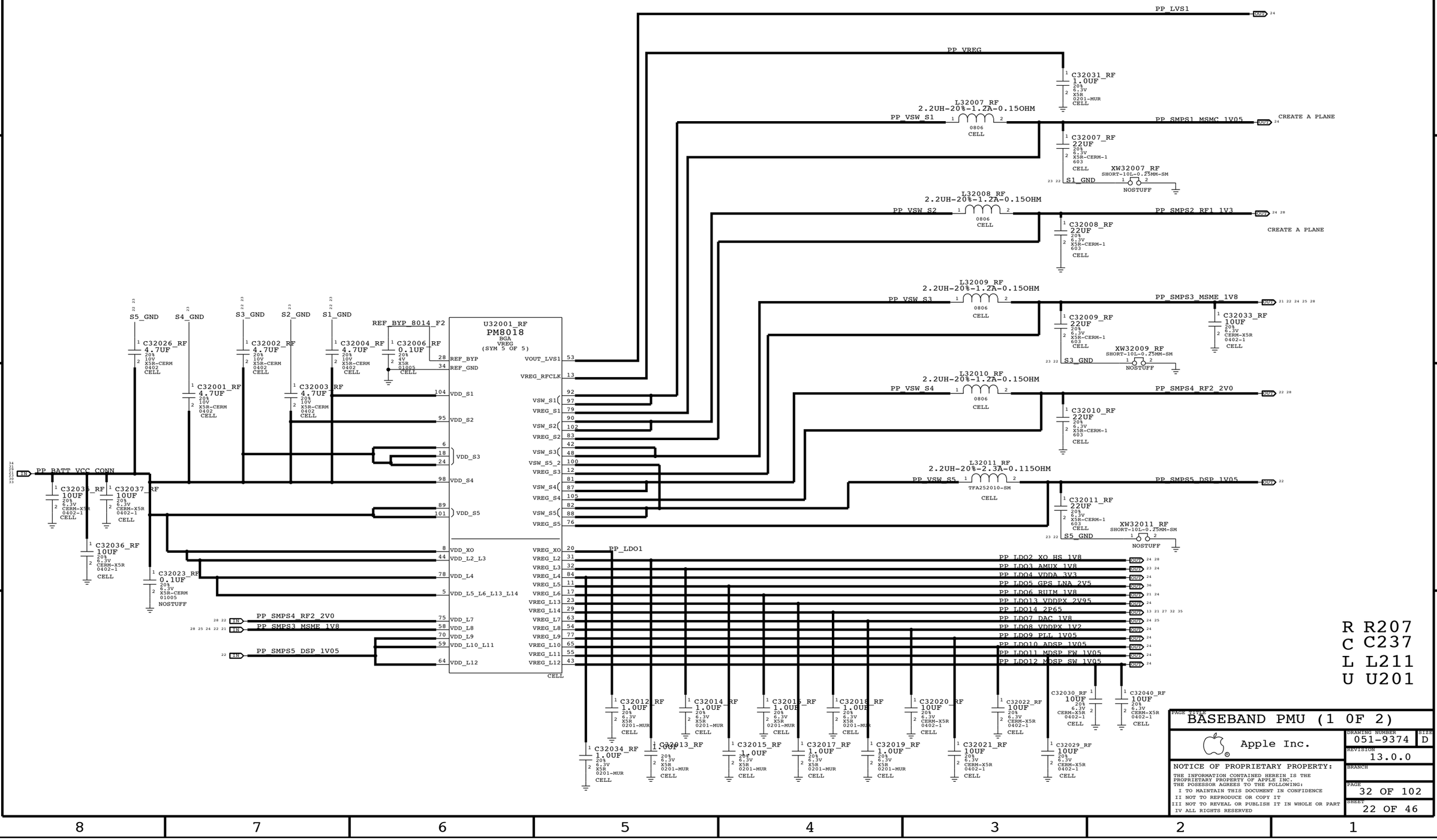
Apple Inc.

DRAWING NUMBER: 051-9374 SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 31 OF 102
SHEET: 21 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

BASEBAND PMU (1 OF 2)

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.



PAGE TITLE	BASEBAND PMU (1 0F 2)
Apple Inc.	DRAWING NUMBER 051-9374 SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 32 OF 102
	SHEET 22 OF 46

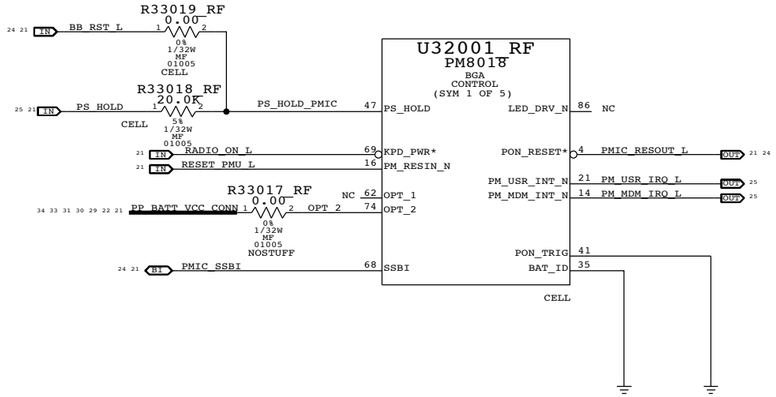
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

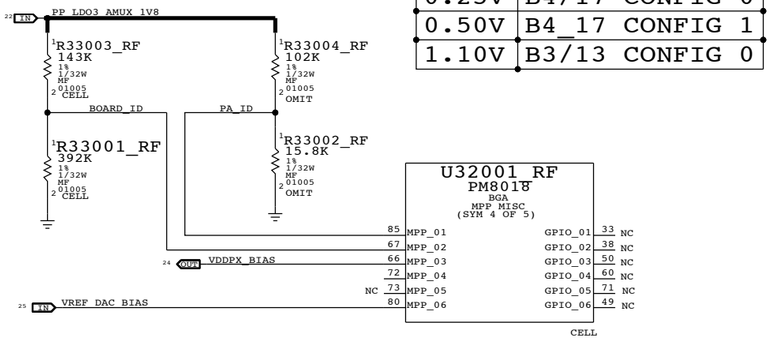
BASEBAND PMU (2 OF 2)

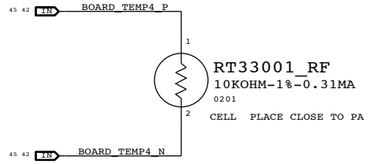
CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

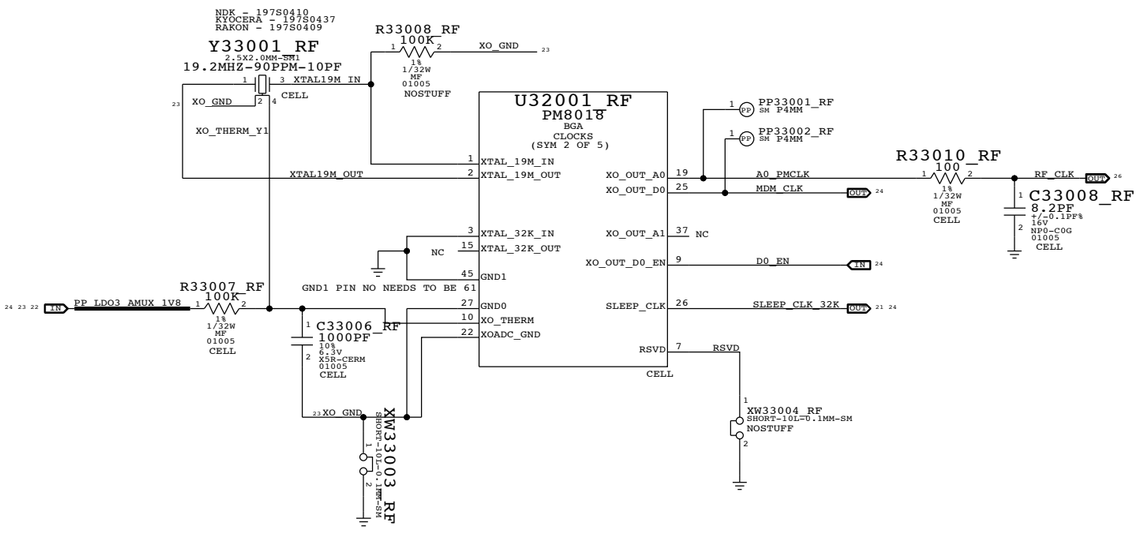
BOARD_ID	REVISION
0.25V	N41 PROTO 1
0.50V	N41 PROTO 2, X122 RF DEV 1
0.70V	N41 PROTO 3, X122 PROTO 0
0.90V	N41 EVT 1, X122 PROTO 1
1.10V	N41 EVT 2, X122 EVT
1.30V	N41 EVT 3, X122 DVT

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_RF	KYOCERA CRYSTAL
197S0409	197S0410	CELL	Y33001_RF	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)

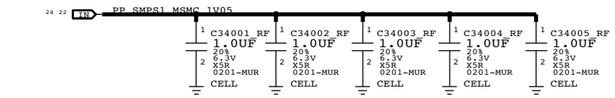
Apple Inc.

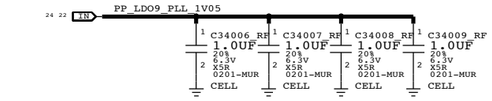
DRAWING NUMBER: 051-9374 SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 33 OF 102
SHEET: 23 OF 46

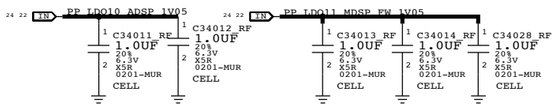
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

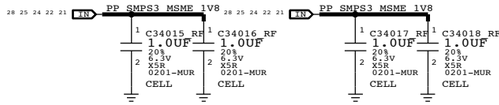
BASEBAND (1 OF 2)

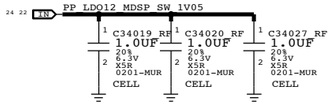
CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

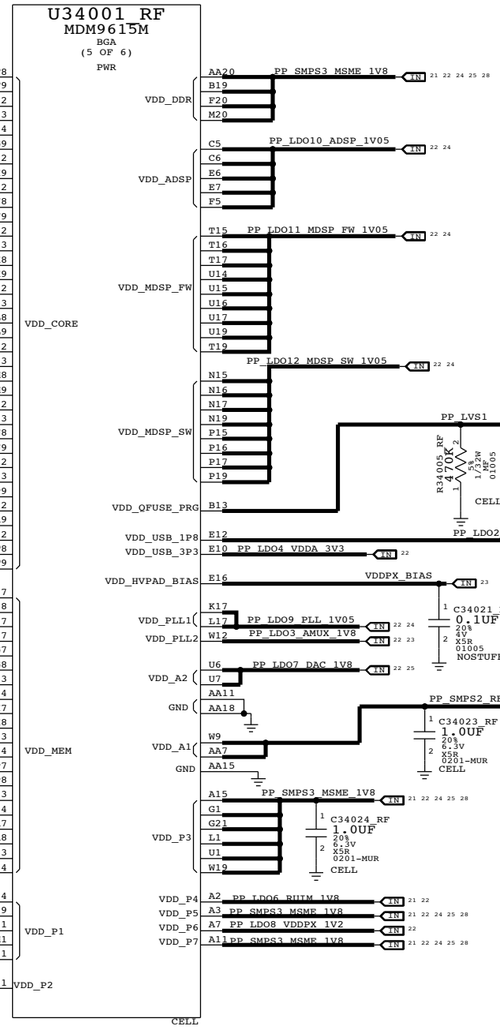


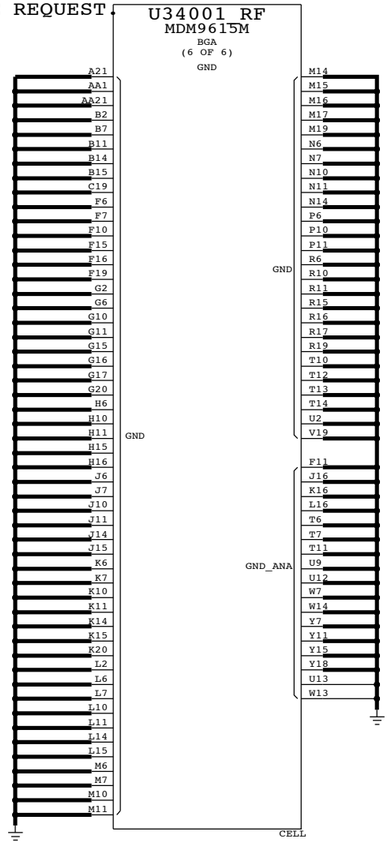


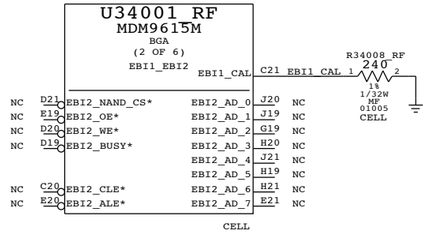


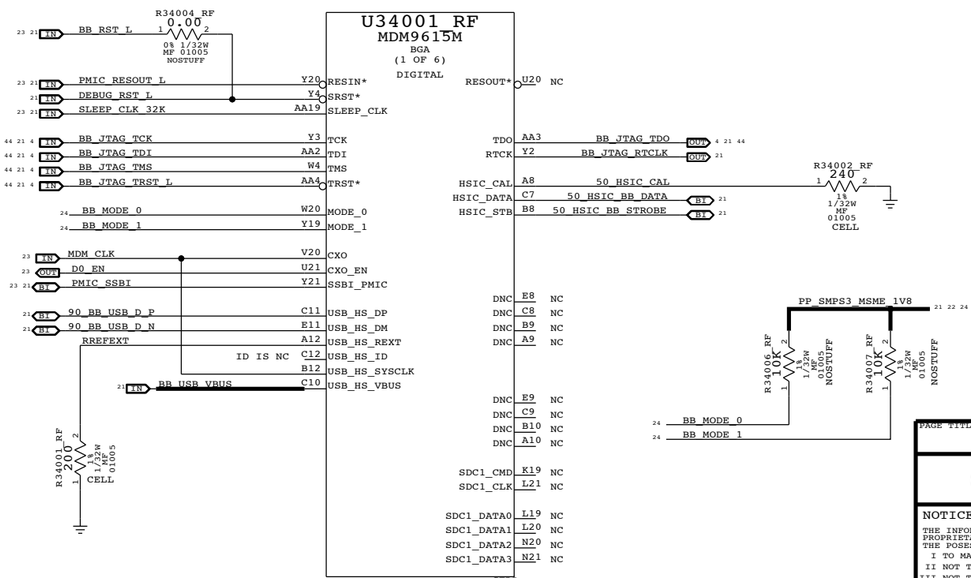


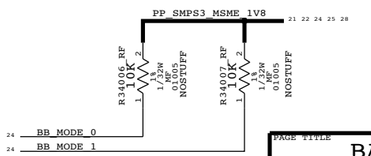












R R502
C C528
L LXXX
U U501

PAGE TITLE
BASEBAND (1 OF 2)

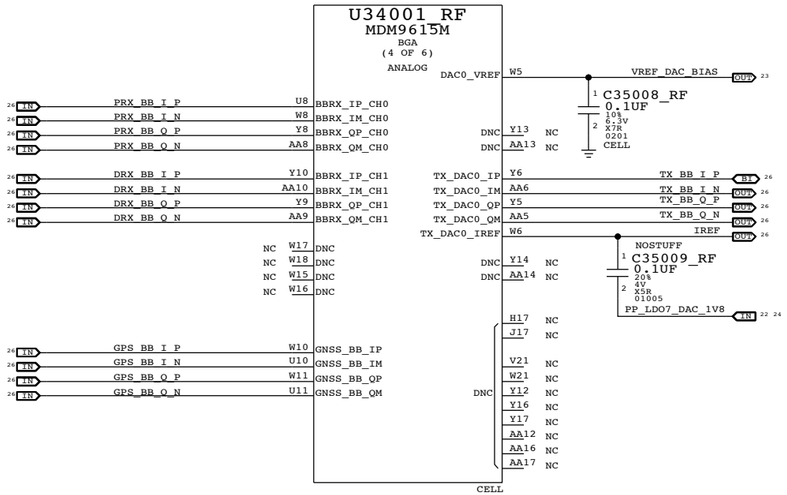
Apple Inc.

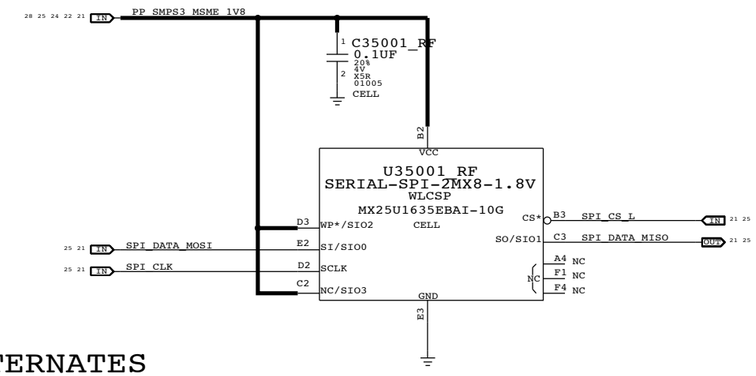
DRAWING NUMBER 051-9374
SIZE D
REVISION 13.0.0
BRANCH
PAGE 34 OF 102
SHEET 24 OF 46

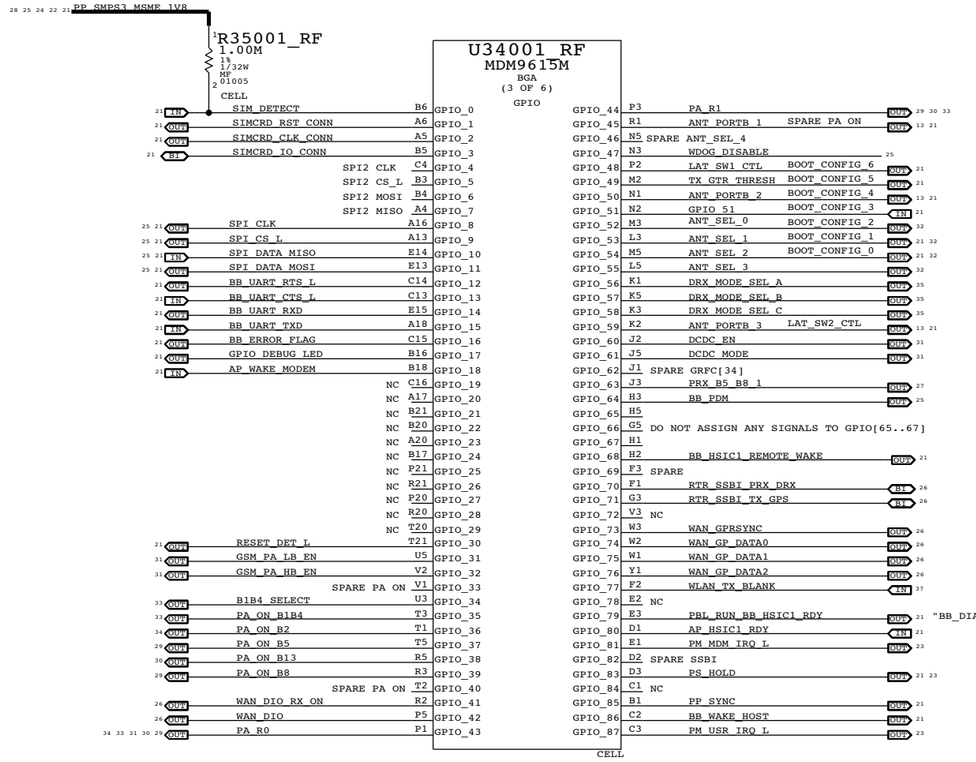
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

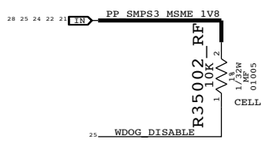
BASEBAND (2 OF 2)

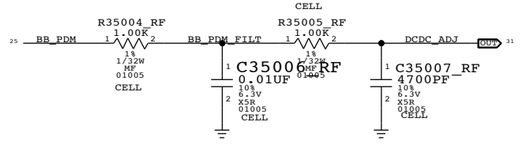
CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.











ALTERNATES

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0895	335S0874	CELL	U35001_RF	WINBOND SPI NOR
335S0899	335S0874	CELL	U35001_RF	MICRON SPI NOR

R R608
C C609
L L601

PAGE TITLE
MOBILE DATA MODEM (2 OF 2)

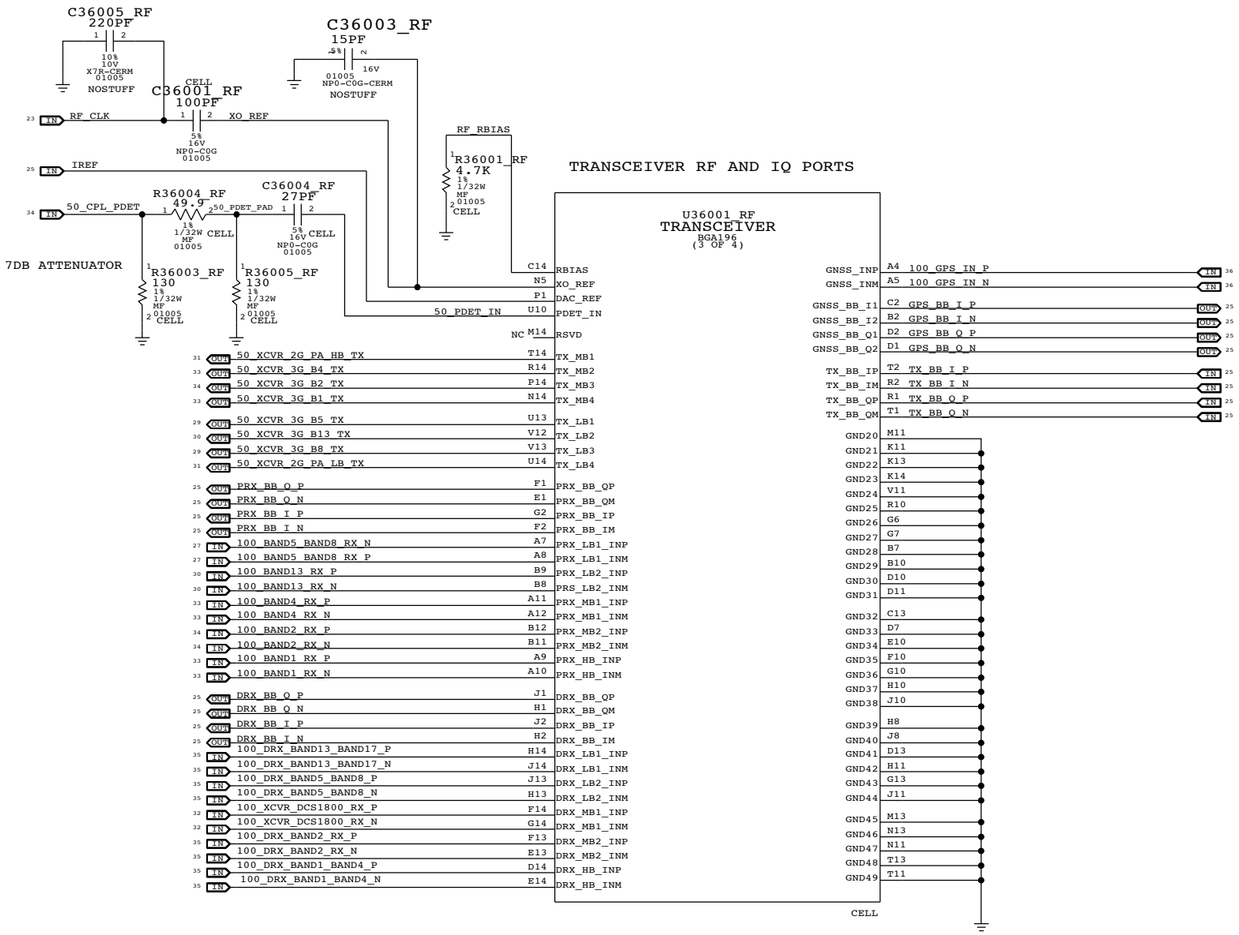
Apple Inc.

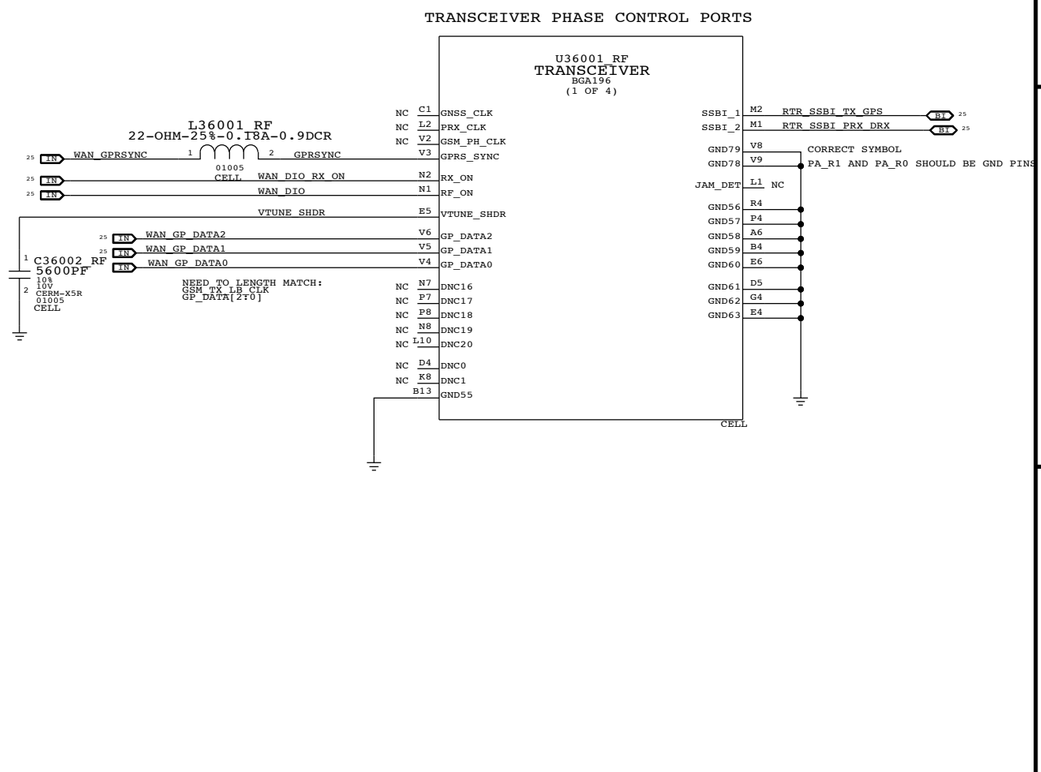
DRAWING NUMBER 051-9374
SIZE D
REVISION 13.0.0
BRANCH
PAGE 35 OF 102
SHEET 25 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

RF TRANSCEIVER (1 OF 3)

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.





R R705
C C705
L LXXX
U U701

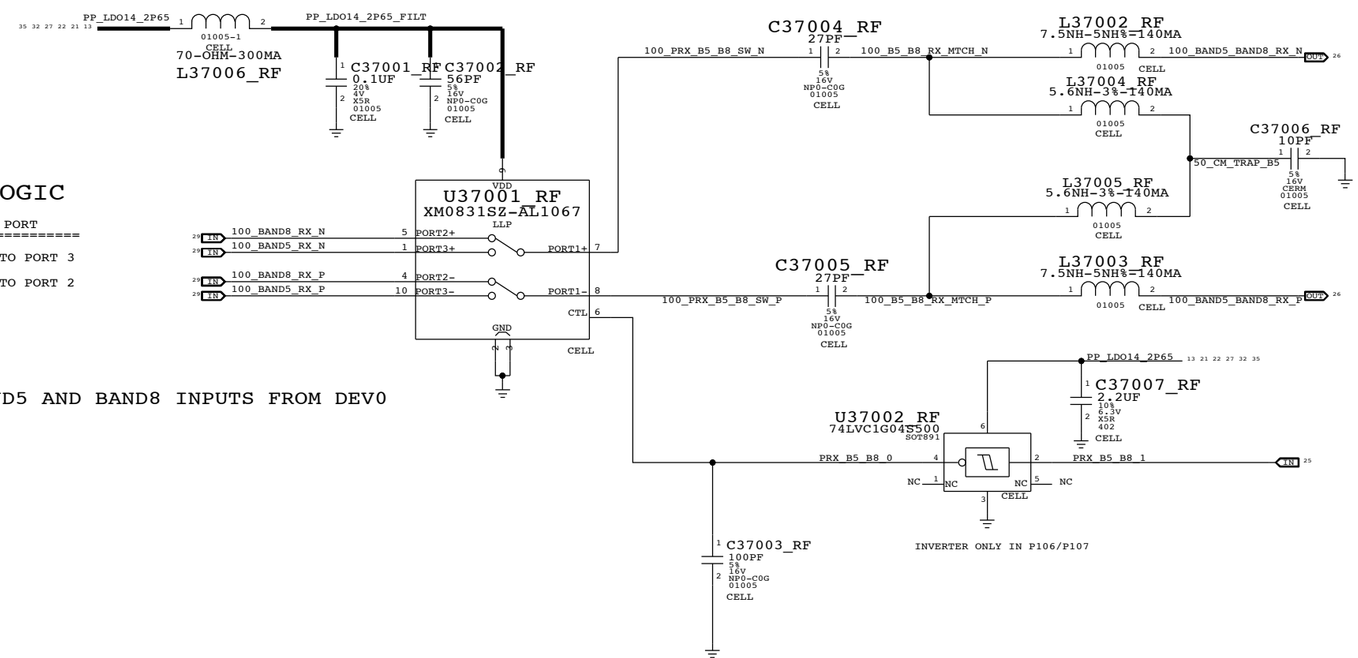
PAGE TITLE	RF TRANSCEIVER (1 0F 3)
Apple Inc.	DRAWING NUMBER 051-9374 · SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 36 OF 102
	SHEET 26 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

RF TRANSCEIVER SWITCHING NETWORKS (2 OF 3)

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

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

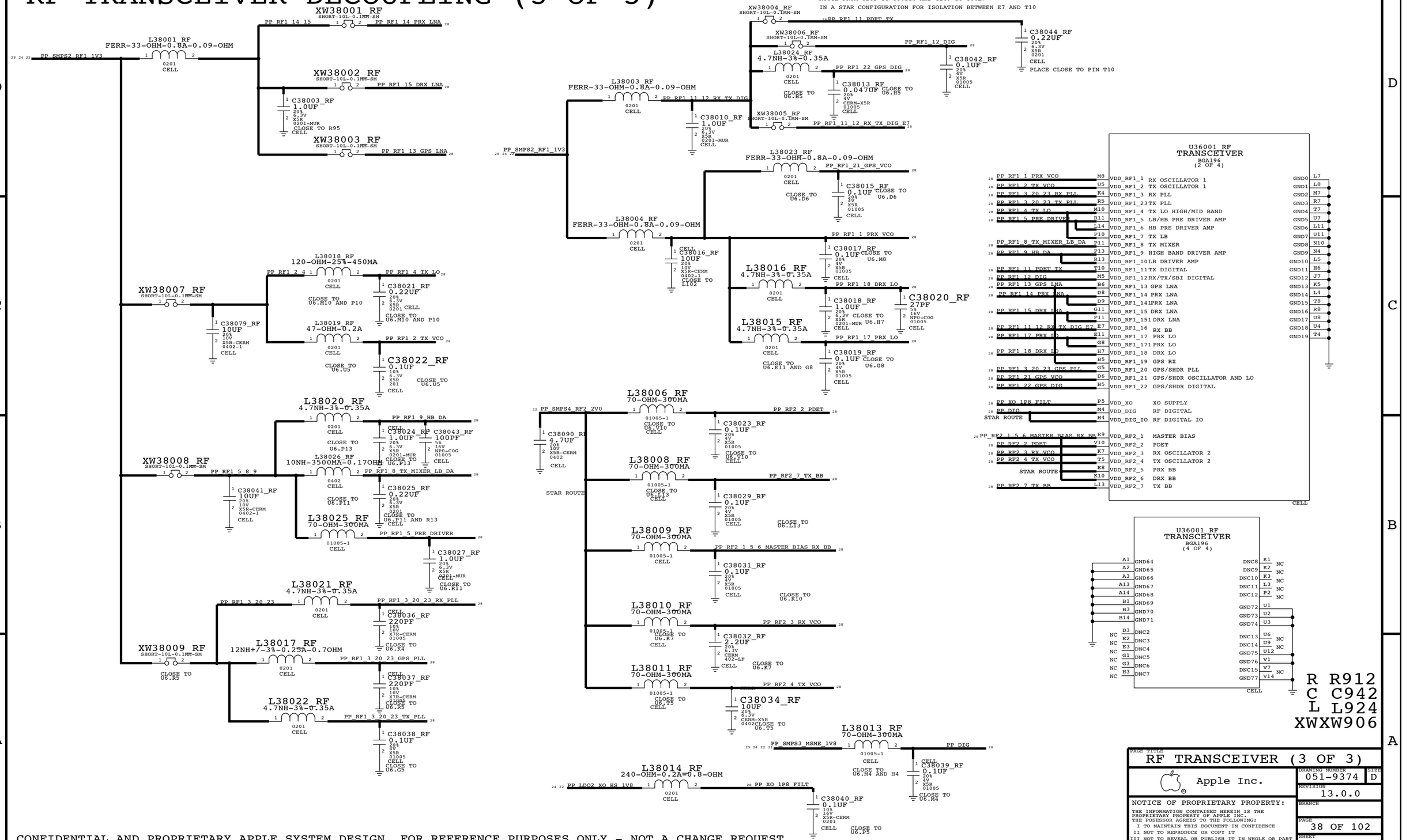
SWAPPED BAND5 AND BAND8 INPUTS FROM DEV0

R RXXX
C C37007
L L803
U U801

PAGE TITLE	RF TRANSCEIVER (2 OF 3)
	Apple Inc.
DRAWING NUMBER	051-9374
SIZE	D
REVISION	13.0.0
BRANCH	
PAGE	37 OF 102
SHEET	27 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

RF TRANSCEIVER DECOUPLING (3 OF 3)



CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

PAGE TITLE
RF TRANSCEIVER (3 OF 3)

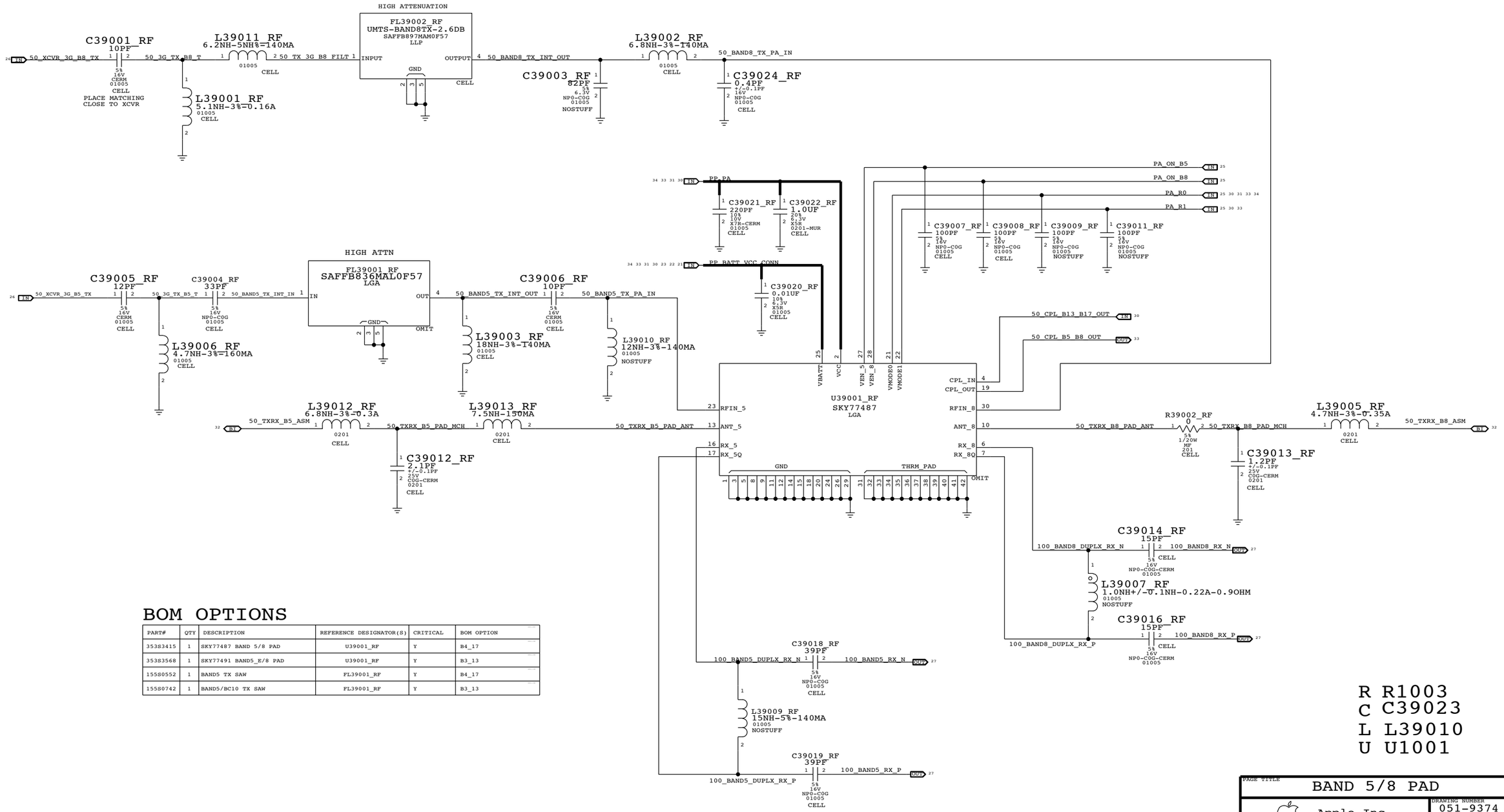
Apple Inc.

DRAWING NUMBER 051-9374 | SIZE D
REVISION 13.0.0
BRANCH
PAGE 38 OF 102
SHEET 28 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

BAND 5/8 PAD

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.



BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S3415	1	SKY77487 BAND 5/8 PAD	U39001_RF	Y	B4_17
353S3568	1	SKY77491 BAND5_E/8 PAD	U39001_RF	Y	B3_13
155S0552	1	BAND5 TX SAW	FL39001_RF	Y	B4_17
155S0742	1	BAND5/BC10 TX SAW	FL39001_RF	Y	B3_13

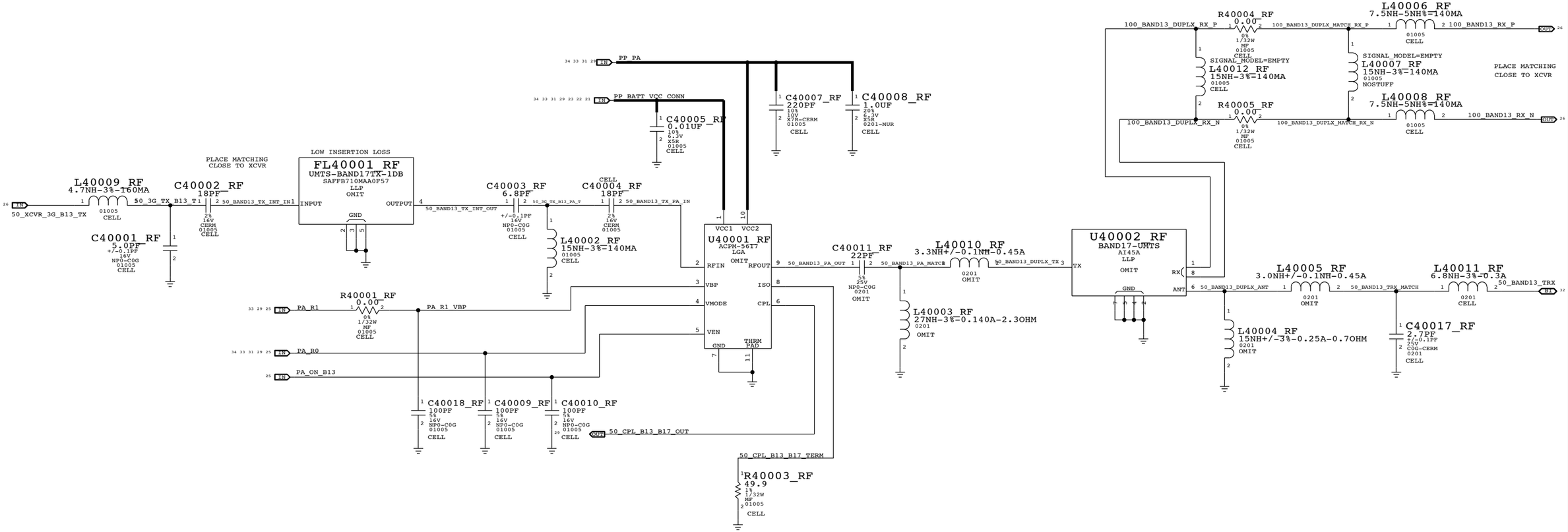
R R1003
C C39023
L L39010
U U1001

PAGE TITLE	BAND 5/8 PAD
Apple Inc.	DRAWING NUMBER 051-9374 · SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 39 OF 102
	SHEET 29 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

B13/17 INTERSTAGE, PA, AND DUPLEXER

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.



PA POWER MODES

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

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

PAGE TITLE: BAND 13 PA

Apple Inc.

DRAWING NUMBER: 051-9374 SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 40 OF 102
SHEET: 30 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

2G PA, PA DC/DC CONVERTER

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

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

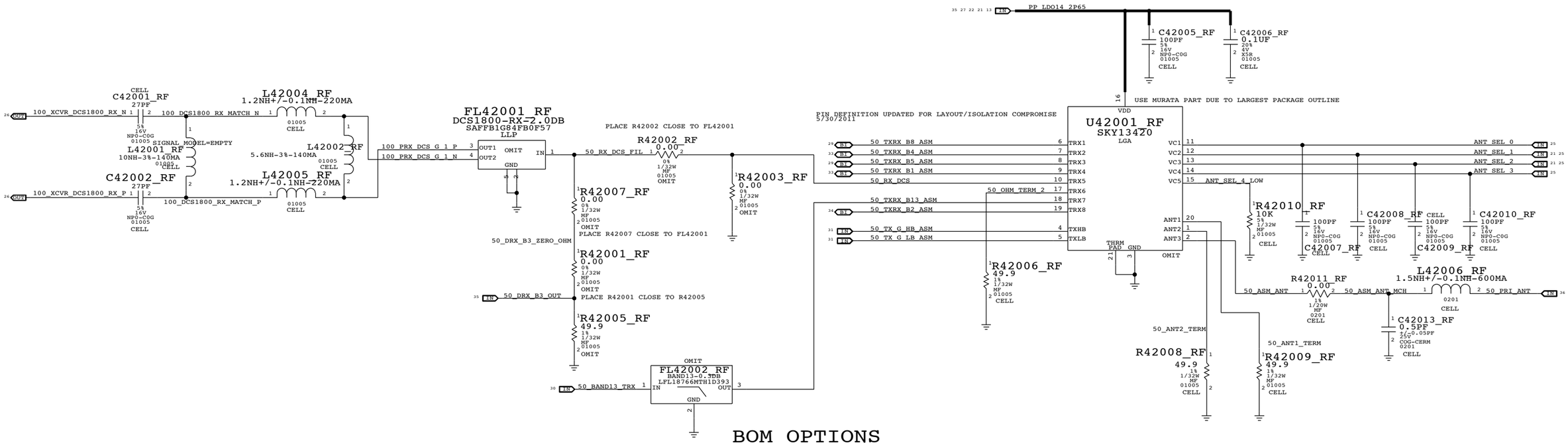
R R1209
C C1215
L L41007
U U1202

PAGE TITLE	2G PA, DCDC CONVERTER
	Apple Inc.
DRAWING NUMBER	051-9374
SIZE	D
REVISION	13.0.0
BRANCH	
PAGE	41 OF 102
SHEET	31 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

ASM,DCS RX

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.



BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
155S0596	1	DCS1800 RX FIL	FL42001_RF	Y	B4_17
155S0729	1	BAND3 RX FIL	FL42001_RF	Y	B3_13
155S0695	1	THRU LINE	FL42002_RF	Y	B4_17
155S0722	1	BAND13 TX LPF	FL42002_RF	Y	B3_13
117S0161	1	0OHM RES	R42001_RF	Y	B3_13
117S0161	1	0OHM RES	R42002_RF	Y	B4_17
118S0652	1	49.9OHM RES	R42003_RF	Y	B3_13
118S0652	1	49.9OHM RES	R42005_RF	Y	B4_17
117S0161	1	0OHM RES	R42007_RF	Y	B3_13
353S3573	1	ASM, SKYWORKS	U42001_RF	Y	B4_17
353S3573	1	ASM, SKYWORKS	U42001_RF	Y	B3_13

R R42011
C C42013
L 42006
U U1301
FL FL1302

PAGE TITLE: DCS RX, ASM

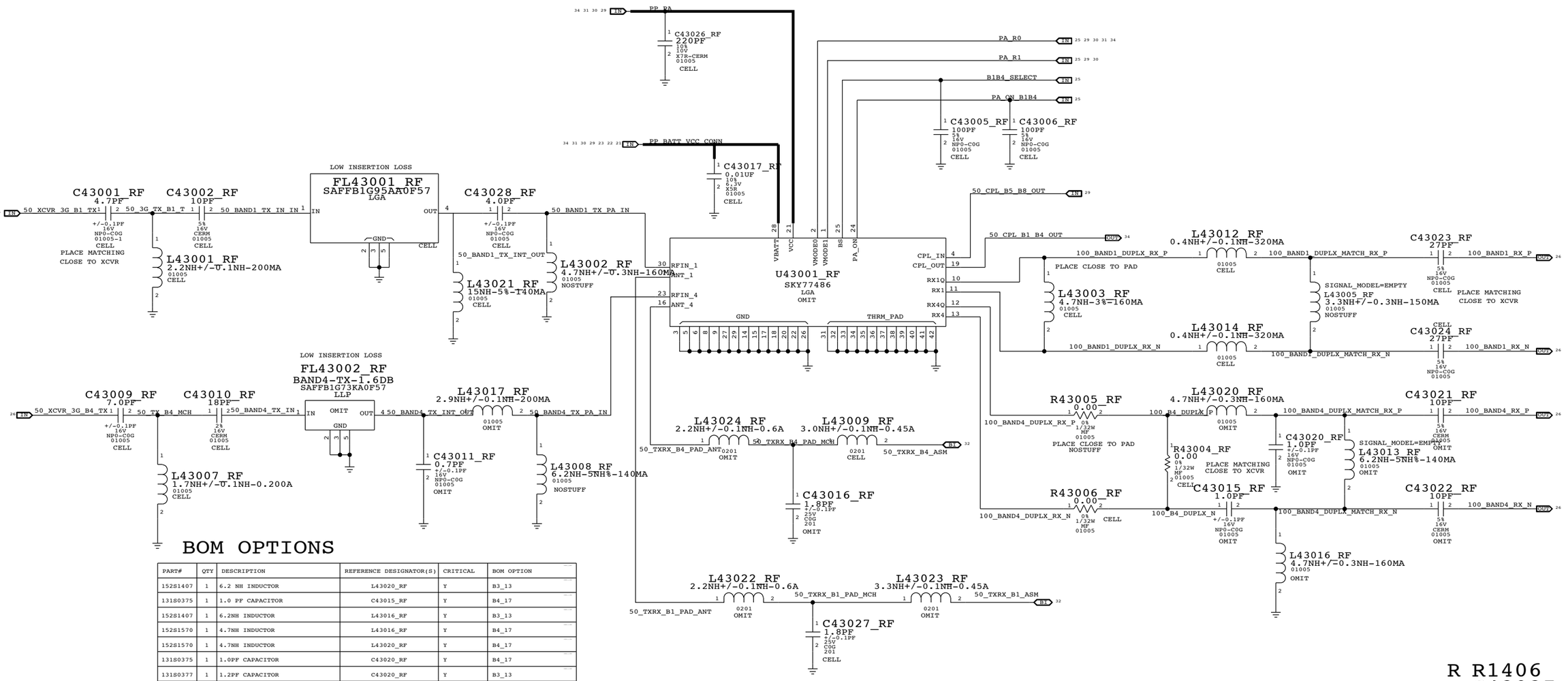
Apple Inc.

DRAWING NUMBER: 051-9374 SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 42 OF 102
SHEET: 32 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

BAND 1/4 PAD

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.



BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
152S1407	1	6.2 NH INDUCTOR	L43020_RF	Y	B3_13
131S0375	1	1.0 PF CAPACITOR	C43015_RF	Y	B4_17
152S1407	1	6.2NH INDUCTOR	L43016_RF	Y	B3_13
152S1570	1	4.7NH INDUCTOR	L43016_RF	Y	B4_17
152S1570	1	4.7NH INDUCTOR	L43020_RF	Y	B4_17
131S0375	1	1.0PF CAPACITOR	C43020_RF	Y	B4_17
131S0377	1	1.2PF CAPACITOR	C43020_RF	Y	B3_13
131S0377	1	1.2PF CAPACITOR	C43015_RF	Y	B3_13
131S0377	1	1.2 PF CAPACITOR	C43011_RF	Y	B4_17
152S1571	1	5.6 NH INDUCTOR	C43011_RF	Y	B3_13
152S1567	1	3.3 NH INDUCTOR	L43017_RF	Y	B4_17
131S0215	1	22 PF CAPACITOR	L43017_RF	Y	B3_13
131S0198	1	1.8 PF CAPACITOR	C43016_RF	Y	B4_17
131S0337	1	1.5 PF CAPACITOR	C43016_RF	Y	B3_13
152S1407	1	6.2NH INDUCTOR	L43013_RF	Y	B4_17
152S1571	1	5.6NH INDUCTOR	L43013_RF	Y	B3_13
131S0219	1	10PF CAPACITOR	C43021_RF	Y	B4_17
131S0219	1	10PF CAPACITOR	C43022_RF	Y	B4_17
131S0307	1	100PF CAPACITOR	C43021_RF	Y	B3_13
131S0307	1	100PF CAPACITOR	C43022_RF	Y	B3_13

BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S3255	1	B1/4 PAD, AVAGO AFEM-7814	U43001_RF	Y	B4_17
353S3443	1	B1/3 PAD, AVAGO AFEM-7813	U43001_RF	Y	B3_13
155S0590	1	B4 TX FIL	FL43002_RF	Y	B4_17
155S0712	1	B3 TX FIL	FL43002_RF	Y	B3_13
152S1063	1	2.2NH INDUCTOR	L43022_RF	Y	B4_17
152S1222	1	3.0NH INDUCTOR	L43022_RF	Y	B3_13
152S1284	1	3.3NH INDUCTOR	L43023_RF	Y	B4_17
152S1222	1	3.0NH INDUCTOR	L43023_RF	Y	B3_13
152S1063	1	2.2NH INDUCTOR	L43024_RF	Y	B4_17
152S1222	1	3.0NH INDUCTOR	L43024_RF	Y	B3_13

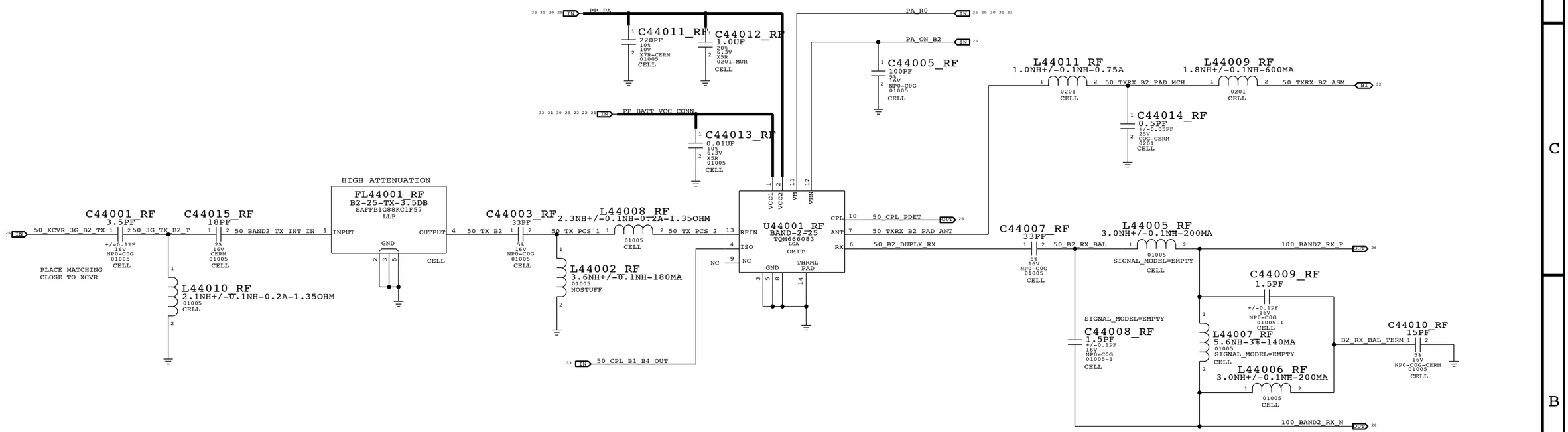
R R1406
C C43027
L L43018
U U1401
FL FL1101

PAGE TITLE	BAND 1/4 PAD
Apple Inc.	DRAWING NUMBER 051-9374 SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 43 OF 102
	SHEET 33 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

BAND2 PAD

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.



BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S3715	1	B2 PAD, TRIQUINT B2 PAD	U44001_RF	Y	B4_17
353S3459	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
SIZE: D
REVISION: 13.0.0
BRANCH:
PAGE: 44 OF 102
SHEET: 34 OF 46

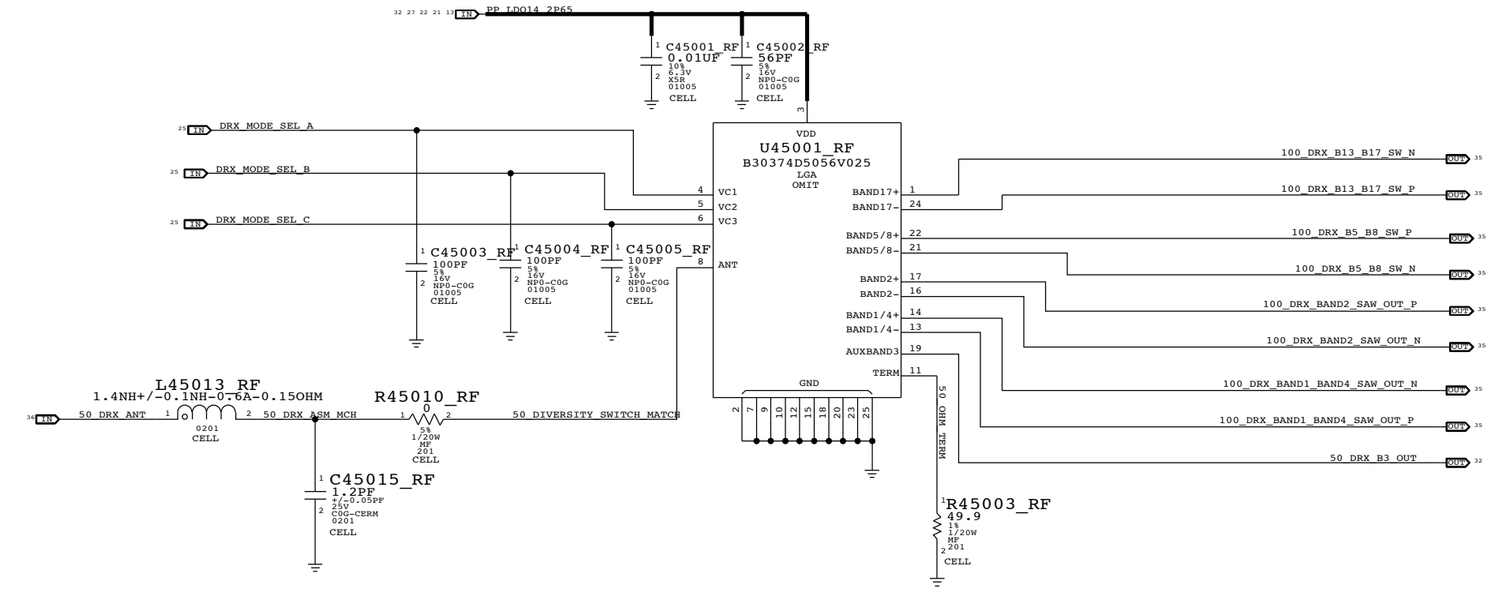
NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

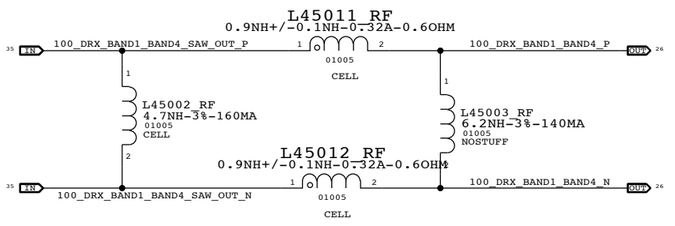
RX DIVERSITY

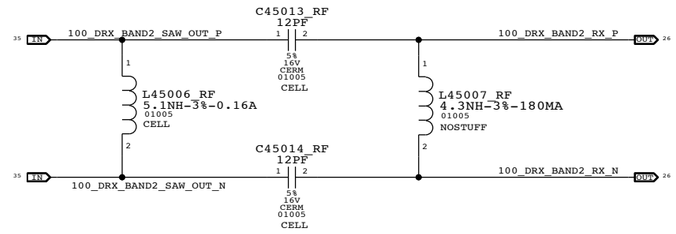
CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

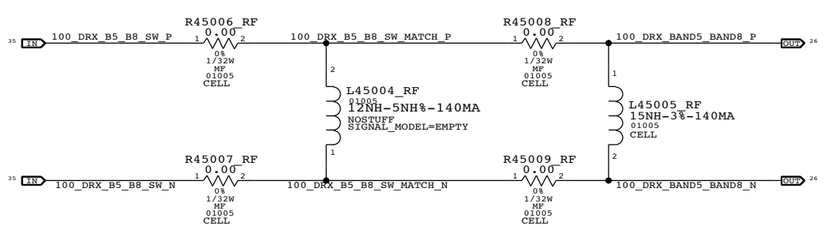
DIVERSITY MODULE LOGIC

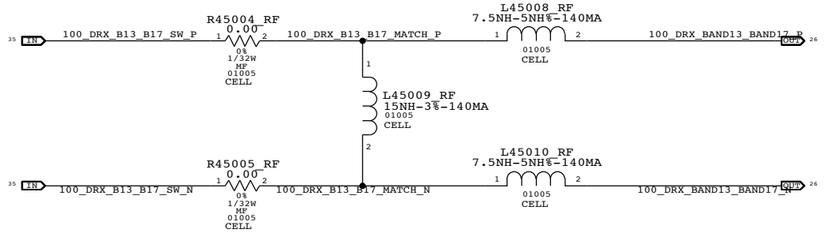
BAND	VC1	VC2	VC3
BAND 1/4			
BAND 2			
BAND 5			
BAND 8			
BAND 13/17			











R R1603
C C1616
L L1610
U U1601

BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S3538	1	EPCOS B17 DIVERSITY MODULE	U45001_RF	Y	B4_17
353S3537	1	EPCOS B13/BC10 DIV. MODULE	U45001_RF	Y	B3_13

PAGE TITLE: RX DIVERSITY

Apple Inc.

DRAWING NUMBER: 051-9374 SIZE: D

REVISION: 13.0.0

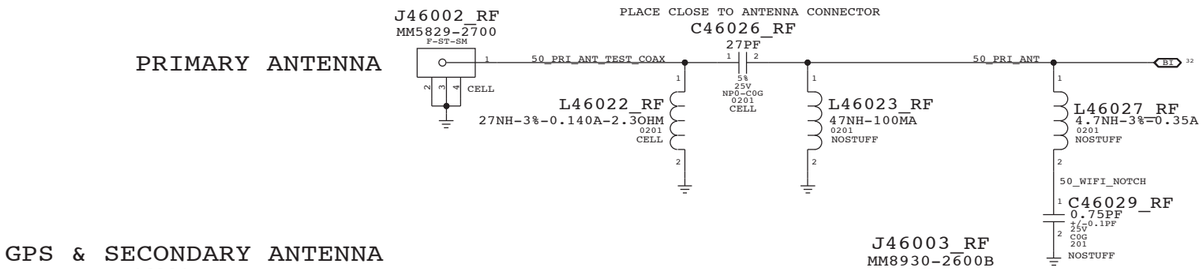
BRANCH:

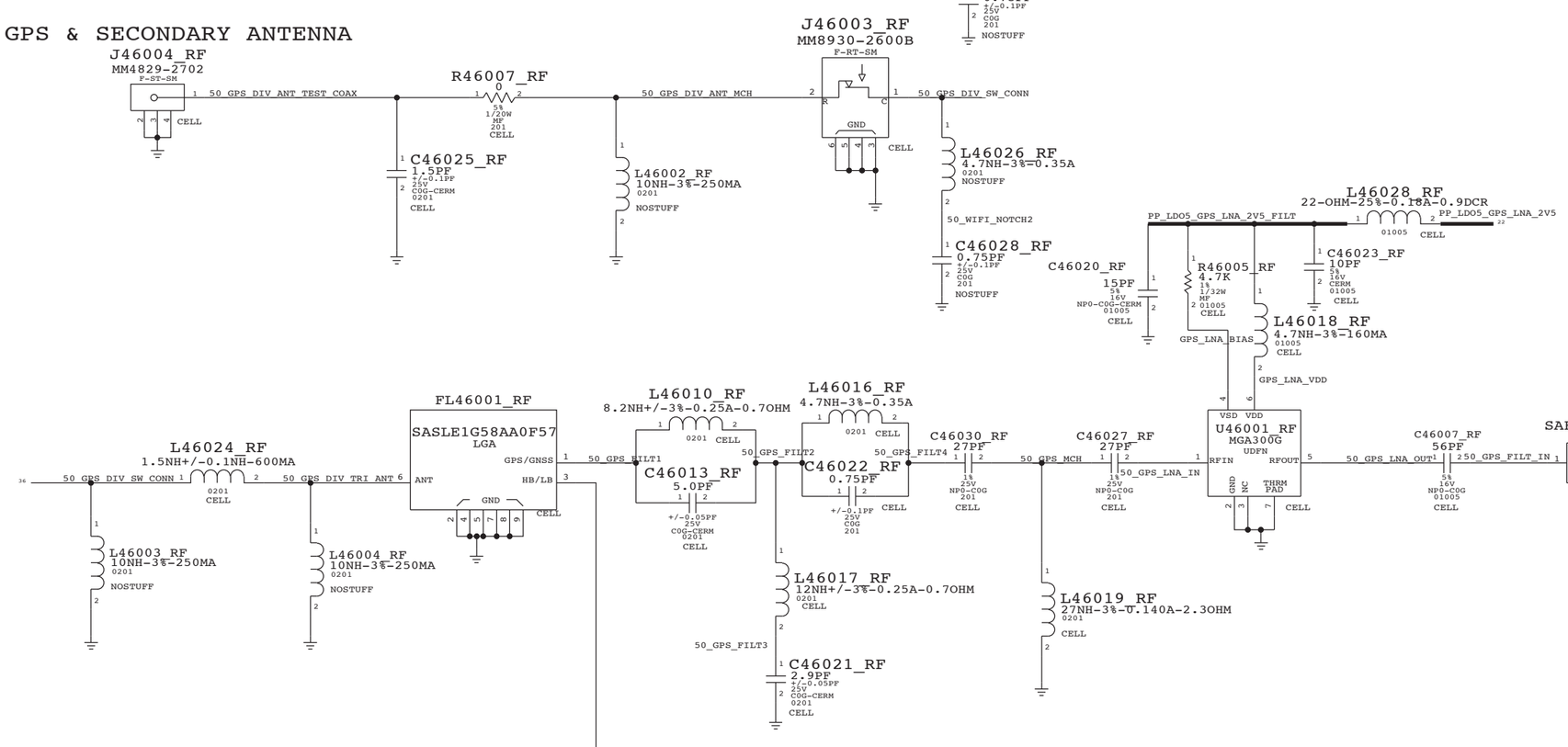
PAGE: 45 OF 102

SHEET: 35 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

GPS





R R46007
C C46030
L L46027
U U46001

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

PAGE TITLE: GPS

Apple Inc.

DRAWING NUMBER: 051-9374 | SIZE: D

REVISION: 13.0.0

BRANCH:

PAGE: 46 OF 102

SHEET: 36 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

WLAN/BT

CONFIDENTIAL AND PROPRIETARY APPLE SYSTEM DESIGN. FOR REFERENCE PURPOSES ONLY - NOT A CHANGE REQUEST.

J47001_WIFI
MM4829-2702
F-ST-SM

L47012_WIFI
1.3NH+/-0.1NH-600MA
0201

C47015_WIFI
12PF
5%
25V
NPO-C0G
0201

C47017_WIFI
0.2PF
+/-0.05PF
25V
COG-CERM
0201

J47002_WIFI
MM4829-2702
F-ST-SM

L47013_WIFI
1.3NH+/-0.1NH-600MA
0201

C47016_WIFI
12PF
5%
25V
NPO-C0G
0201

C47018_WIFI
0.2PF
+/-0.05PF
25V
COG-CERM
0201

U47005_WIFI
UPG2185T6R
TSSON
OUTPUT1
OUTPUT2
INPUT
VCONT1
VCONT2
GND

C47012_WIFI
12PF
5%
25V
NPO-C0G
0201

L47015_WIFI
6.8NH-3%-0.3A
0201
NOSTUFF

U47004_WIFI
DPX205850DT-9038A1SJ
SM
COM
HI
LO
GND

XW47002_WIFI
SHORT-0701

C47001_WIFI
10UF
20%
6.3V
CERM-X5R
0402-1

C47002_WIFI
27PF
5%
16V
NPO-C0G
01005

R47008_WIFI
0.00
0%
1/32W
MF
01005

C47003_WIFI
0.01UF
10%
6.3V
X5R
01005

C47004_WIFI
27PF
5%
16V
NPO-C0G
01005

NOSTUFF
R47005_WIFI
10K
1%
1/32W
MF
01005

R47007_WIFI
10K
1%
1/32W
MF
01005

32K_INTERFACE_TO_AP
XW47001_WIFI
SHORT-0T005

U47001_WIFI
LBEE5ZHTWC501
LGA

2.5UH-30%-0.7A-0.24OHM
0603

L47011_WIFI

C47009_WIFI
4.7UF
20%
6.3V
X5R-CERM1
402

R47009_WIFI
10K
1%
1/32W
MF
01005

RF_SW_CTRL_3 NC

C47007_WIFI
20PF
5%
25V
COG
0201

L47014_WIFI
0.6NH+/-0.1NH-0.85A
0201

C47014_WIFI
0.2PF
+/-0.1PF
25V
COG-CERM
201
NOSTUFF

C47013_WIFI
0.01UF
10%
6.3V
X5R
01005

R47016_WIFI
100K
1%
1/32W
MF
01005

R47017_WIFI
100K
1%
1/32W
MF
01005

C47020_WIFI
0.01UF
10%
6.3V
X5R
01005
NOSTUFF

U47006_WIFI
74LVC2G06
SOT891
VCC
1A
2A
1Y*
2Y*
GND

R47011_WIFI
10K
1%
1/32W
MF
01005
NOSTUFF

PULL DOWN RESISTORS

R47015_WIFI
0.00
0%
1/32W
MF
01005

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

R47013_WIFI
10K
1%
1/32W
MF
01005

U47002_WIFI
74AUP1G08GF
SOT891

R47012_WIFI
1.00M
1%
1/32W
MF
01005

C47010_WIFI
0.22UF
20%
6.3V
X5R
0201

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

J47003_RF
MM4829-2702
F-ST-SM
NOSTUFF

J47004_RF
MM4829-2702
F-ST-SM
NOSTUFF

R R47015
C C47012
L L1801
U U47005
J J47002

PAGE TITLE	
WIFI/BT	
Apple Inc.	DRAWING NUMBER 051-9374 SIZE D
	REVISION 13.0.0
	BRANCH
	PAGE 47 OF 102
	SHEET 37 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

NOSTUFF
J5700
MLB-X123
HB-SM

45 38 15 SPKR_R_CONN_N	1	2	SPKR_R_CONN_N 15 38 45
45 38 15 SPKR_R_CONN_P	3	4	SPKR_R_CONN_P 15 38 45
	5	6	CONN_ACC2 38
38 CONN_DET_L	7	8	
	9	10	CONN_DP2_P 38 44
44 38 CONN_DP2_N	11	12	
	13	14	PPVBUS_CONN 38
38 PPVBUS_CONN	15	16	
	17	18	
	19	20	
	21	22	CONN_ACC1 38
44 38 CONN_DP1_N	23	24	
	25	26	CONN_DP1_P 38 44
	27	28	
45 38 15 SPKR_L_CONN_N	29	30	SPKR_L_CONN_N 15 38 45
45 38 15 SPKR_L_CONN_P	31	32	SPKR_L_CONN_P 15 38 45

NOTE: SPKR_L_CONN_N AND SPKR_L_CONN_P WERE SWAPPED ON 5/22/12 PER RADAR #11526818

MOSFET	FDMC6676BZ
CHANNEL	P-TYPE
RDS(ON)	27 MOHM @-4.5V
IMAX	6.9 A
VGS MAX	+/- 25V

PRELIMINARY - PENDING SIMULATIONS WITH TRISTAR

NOSTUFF
R5701 470K 5% 1/20W MF 201

CRITICAL
Q5700
FDMC6676BZ
MLP3.3X3.3

10 PPVBUS_PROT

DZ5701
BZT52C10LP
LLP
CRITICAL
NOTE: 10V ZENER

VOLTAGE=20V
MIN_LINE_WIDTH=4.1MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

CRITICAL
Q5701
FDMC6676BZ
MLP3.3X3.3

VOLTAGE=20V
MIN_LINE_WIDTH=0.60MM
MIN_NECK_WIDTH=0.25MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

PPVBUS_PMU OUT 41

CRITICAL
C5750 0.47UF 10% 35V X5R 0402-1

R5703 470K 5% 1/20W MF 201

OVP_SW_EN_R_L

R5704 4.7K 5% 1/16W MF-LF 402

NOSTUFF
R5760 4.7K 5% 1/20W MF 201

VOLTAGE=20V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.15MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

PPVBUS_CONN 38

L5700
FERR-70-OHM-4A
0603

VOLTAGE=20V
MIN_LINE_WIDTH=4.1MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

PPVBUS_EMI

DZ5700 27V-100PF 0402

C5700 27PF 1% 25V NP0-C0G 201

C5701 0.01UF 10% 25V X7R 402

R5700 100K 1% 1/20W MF 201

C5702 27PF 1% 25V NP0-C0G 201

C5703 6.8PF +/-0.25PF 25V CERM 201

R5702 220K 1% 1/20W MF 201

VBUS_PROT_G
MIN_LINE_WIDTH=0.20MM
MIN_NECK_WIDTH=0.1MM
NET_SPACING_TYPE=ANLG

PPVBUS REVERSE VOLTAGE PROTECTION

10 OVP_SW_EN_L IN

=PPVCC_MAIN_DOCK 39

R5705 100K 1% 1/32W MF 01005

R5706 10K 1% 1/32W MF 01005

CONN_DET_L 38

CRITICAL
DZ5702 14.2V-6PF 0201-1

C5704 6.8PF +/-0.25PF 25V CERM 201

CRITICAL
DZ5710 SM-201 DSF01S30SC

PMU_ACC_DET_A_L OUT 42
MAKE_BASE=TRUE

TS_CON_DET_L OUT 10

L5703
90-OHM-50MA
TCM0605-1

CONN_DP1_P 44 38
CONN_DP1_N 44 38

TS_E75_DPAIR1_P 10 44
TS_E75_DPAIR1_N 10 44

D5700
USBULC6-2F3K
BGA
CRITICAL

L5704
90-OHM-50MA
TCM0605-1

CONN_DP2_P 44 38
CONN_DP2_N 44 38

TS_E75_DPAIR2_P 10 44
TS_E75_DPAIR2_N 10 44

D5701
USBULC6-2F3K
BGA
CRITICAL

VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
MAX_NECK_LENGTH=3 MM
NET_SPACING_TYPE=PWR

L5701
FERR-22-OHM-1A-0.065-OHM

CONN_ACC1 38

CRITICAL
DZ5703 14.2V-6PF 0201-1

C5705 8.2PF +/-0.5PF 16V NP0-C0G-CERM 01005

0201
0.055 OHM DCR

TS_ACC1 10

VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
MAX_NECK_LENGTH=3 MM
NET_SPACING_TYPE=PWR

VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
MAX_NECK_LENGTH=3 MM
NET_SPACING_TYPE=PWR

L5702
FERR-22-OHM-1A-0.065-OHM

CONN_ACC2 38

CRITICAL
DZ5704 14.2V-6PF 0201-1

C5707 8.2PF +/-0.5PF 16V NP0-C0G-CERM 01005

0201
0.055 OHM DCR

TS_ACC2 10

VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
MAX_NECK_LENGTH=3 MM
NET_SPACING_TYPE=PWR

SYNC_MASTER=N/A SYNC_DATE=04/18/2011

PAGE TITLE
IO FLEX: DOCK COMPONENTS

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 57 OF 102
SHEET 38 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

POWER CONN / ALIAS

LDO RAILS

PROGRAMMABLE ON/OFF

LDO1
41 PP3V0_SPARE1 = =PP3V0_SPARE1 14
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO2
41 15 PP1V7_VA_VCP = =PP1V7_VA_VCP 14 15
VOLTAGE=1.7V
MIN_LINE_WIDTH=0.4MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO3
41 PP3V0_S2R_TRISTAR = =PP3V0_S2R_TRISTAR 10
=PP3V0_S2R_WLAN 37
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO4
41 PP3V0_SENSOR = =PP3V0_SENSOR_ACCEL 18
=PP3V0_SENSOR_GYRO 18
=PP3V0_SENSOR_COMPASS 18
=PP3V0_SENSOR_PROX 19
=PP3V0_MLC_RST_LEVELSHIFTER 4
=PP3V0_ALS 17
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO5
41 PP3V2_SPARE2 = =PP3V2_SPARE2
VOLTAGE=3.2V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO6
41 PP3V3_ACC = =PP3V3_ACC 10
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO7
41 PP1V8_CAM = =PP1V8_CAM_BACKUP
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO8
41 PP3V0_S2R_HALL = =PP3V0_S2R_HALL 12
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO9
41 PP1V2_CAM = =PP1V2_CAM_REAR 20
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO10
41 PP2V8_CAM_AF = =PP2V8_CAM_REAR_AF 20
VOLTAGE=2.8V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO11
41 PP2V8_CAM = =PP2V8_CAM_FRONT 17
=PP2V8_CAM_REAR 20
VOLTAGE=2.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

LDO12
41 39 PP1V0 = =PP1V0_PLL_H4 3
=PP1V0_MIPI_H4 6
=PP1V0_DPORT_H4 6
=PP1V0_USB_H4 3
=PP1V0_MIPI_PLL_H4 6
VOLTAGE=1.0V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM

41 PP1V8_ALWAYS = =PP1V8_ALWAYS 4
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.3 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

BUCK RAILS

41 39 PP1V2_CPU = =PPVDD_CPU_H4 8
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM

41 39 PP1V2_SOC = =PPVDD_SOC_H4 8
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM

41 39 PP1V8_S2R = =PP1V8_S2R_H4 7
=PP1V8_S2R_WL 21
=PP1V8_S2R_TRISTAR 10
=PP1V8_S2R_MISC 4 9 10
=PP1V8_S2R_GRAPE 12
=PP1V8_S2R_4_NAND 39
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

41 39 PP1V8 = =PP1V8_AUDIO 14
=PP1V8_H4 3 4 6 9
=PP1V8_VDDIO18_H4 7
=PP1V8_MIPI_H4 6
=PP1V8_DPORT_H4 6
=PP1V8_IO_H4 4 6 8
=PP1V8_NAND_H4 5 8
=PP1V8_PVDDP_H4 3
=PP1V8_USB_H4 3
=PP1V8_VDDIOD3_H4 8
=PP1V8_4_NAND 39
=PP1V8_CAM_REAR 20
=PP1V8_CAM_FRONT 17
=PP1V8_ACCEL 18
=PP1V8_GYRO 18
=PP1V8_COMPASS 18
=PP1V8_PROX 19
=PP1V8_DMIC 13 39
=PP1V8_MISC 39
=PP1V8_DMIC 13 39

BUCK3 - WDIG_SW
41 PP1V8_GRAPE = =PP1V8_GRAPE 12
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

41 39 PP1V2_S2R = =PP1V2_S2R_H4 7
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM

41 39 PP1V2 = =PP1V2_VDDQ_H4 7
=PP1V2_VDDIOD_H4 7
=PP1V2_HSIC_H4 3
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM

41 39 PP3V3_OUT = =PP3V3_NAND 11
=PP3V3_USB_H4 3 8
=PP3V3_MLC_HI
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM

42 PPLED_OUT = =PPLED_REG 16
VOLTAGE=20.4V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

GND
VOLTAGE=0V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.10MM
NET_SPACING_TYPE=GND
MAX_NECK_LENGTH=5 MM

CHARGER MAIN

42 41 PPVCC_MAIN = =PPVCC_MAIN_AUDIO 14 15
=PPVCC_MAIN_DOCK 38
=PPVCC_MAIN_LED 42
=PPVCC_MAIN_LCD 16
=PPVCC_MAIN_ACC_SW 10
=PPVCC_MAIN_GRAPE 12
VOLTAGE=4.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

BATTERY

41 PPBATT_VCC = =BATT_POS_CONN 40
=PPBATT_VCC_RF 21
=PPBATT_VCC_WL 21
VOLTAGE=4.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=1.7 MM

BOOST->LDOS

42 PP5V25_GRAPE = =PP5V25_GRAPE 12
VOLTAGE=5.25V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=6 MM

DESENSE CAPS

41 39 PP1V0
C7300 27PF 5% 16V NP0-C0G 01005
C7301 27PF 5% 16V NP0-C0G 01005
C7302 27PF 5% 16V NP0-C0G 01005
C7303 27PF 5% 16V NP0-C0G 01005

41 39 PP1V2
C7304 27PF 5% 16V NP0-C0G 01005
C7305 27PF 5% 16V NP0-C0G 01005
C7306 27PF 5% 16V NP0-C0G 01005
C7307 27PF 5% 16V NP0-C0G 01005

41 39 PP1V8
C7308 27PF 5% 16V NP0-C0G 01005
C7309 27PF 5% 16V NP0-C0G 01005
C7310 27PF 5% 16V NP0-C0G 01005
C7311 27PF 5% 16V NP0-C0G 01005

41 39 PP1V2_S2R
C7312 27PF 5% 16V NP0-C0G 01005
C7313 27PF 5% 16V NP0-C0G 01005
C7314 27PF 5% 16V NP0-C0G 01005
C7315 27PF 5% 16V NP0-C0G 01005

41 39 PP3V3_OUT
C7320 27PF 5% 16V NP0-C0G 01005
C7321 27PF 5% 16V NP0-C0G 01005
C7322 27PF 5% 16V NP0-C0G 01005
C7323 27PF 5% 16V NP0-C0G 01005

41 39 PP1V2_SOC
C7324 27PF 5% 16V NP0-C0G 01005
C7325 27PF 5% 16V NP0-C0G 01005
C7326 27PF 5% 16V NP0-C0G 01005
C7327 27PF 5% 16V NP0-C0G 01005

41 39 PP1V2_CPU
C7328 27PF 5% 16V NP0-C0G 01005
C7329 27PF 5% 16V NP0-C0G 01005
C7330 27PF 5% 16V NP0-C0G 01005
C7331 27PF 5% 16V NP0-C0G 01005

41 39 PP1V8_S2R
C7316 27PF 5% 16V NP0-C0G 01005
C7317 27PF 5% 16V NP0-C0G 01005
C7318 27PF 5% 16V NP0-C0G 01005
C7319 27PF 5% 16V NP0-C0G 01005

39 =PP1V8_S2R_4_NAND
CRITICAL
C7380 10UF 20% 6.3V CERM-X5R 0402-2

CRITICAL
U7300 TPS22924X CSP
A2 VIN
B2 ON
A1 VOUT
B1 GND
C1

39 =PP1V8_MISC C2
C7350 0.01UF 10% 6.3V X5R 01005

PP1V8_NAND_LS
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

NOSTUFF
R7300 0 5% 1/20W MF 201

39 =PP1V8_4_NAND

R7301 0 5% 1/20W MF 201

PP1V8_NAND
MAKE_BASE=TRUE
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

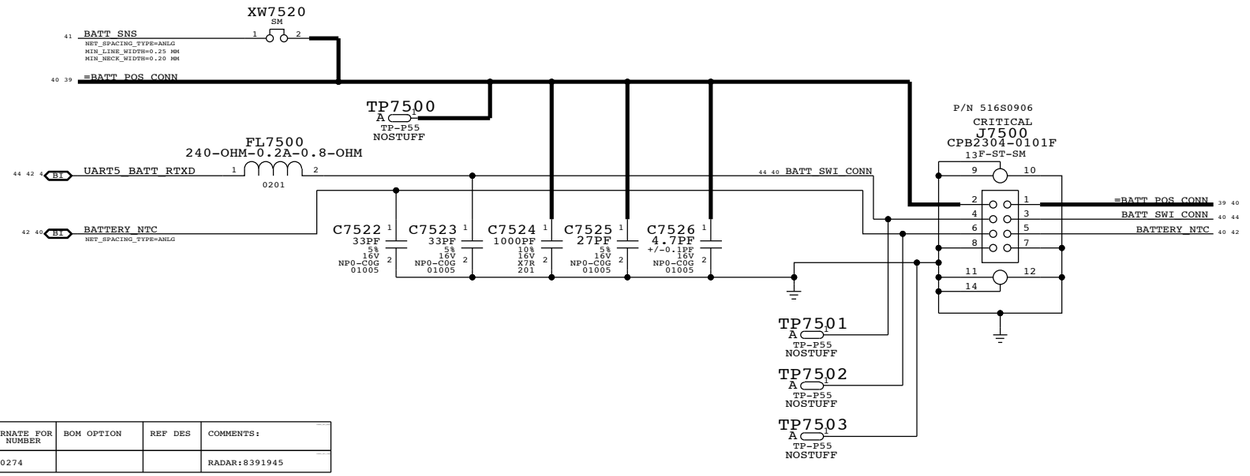
=PP1V8_NAND 11

SYNC_MASTER=N/A SYNC_DATE=N/A
PAGE TITLE
Power: Aliases

Apple Inc.

DRAWING NUMBER 051-9374
SIZE D
REVISION 13.0.0
BRANCH
PAGE 73 OF 102
SHEET 39 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
155S0644	155S0274			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

PAGE TITLE
POWER: BATTERY CONNECTOR

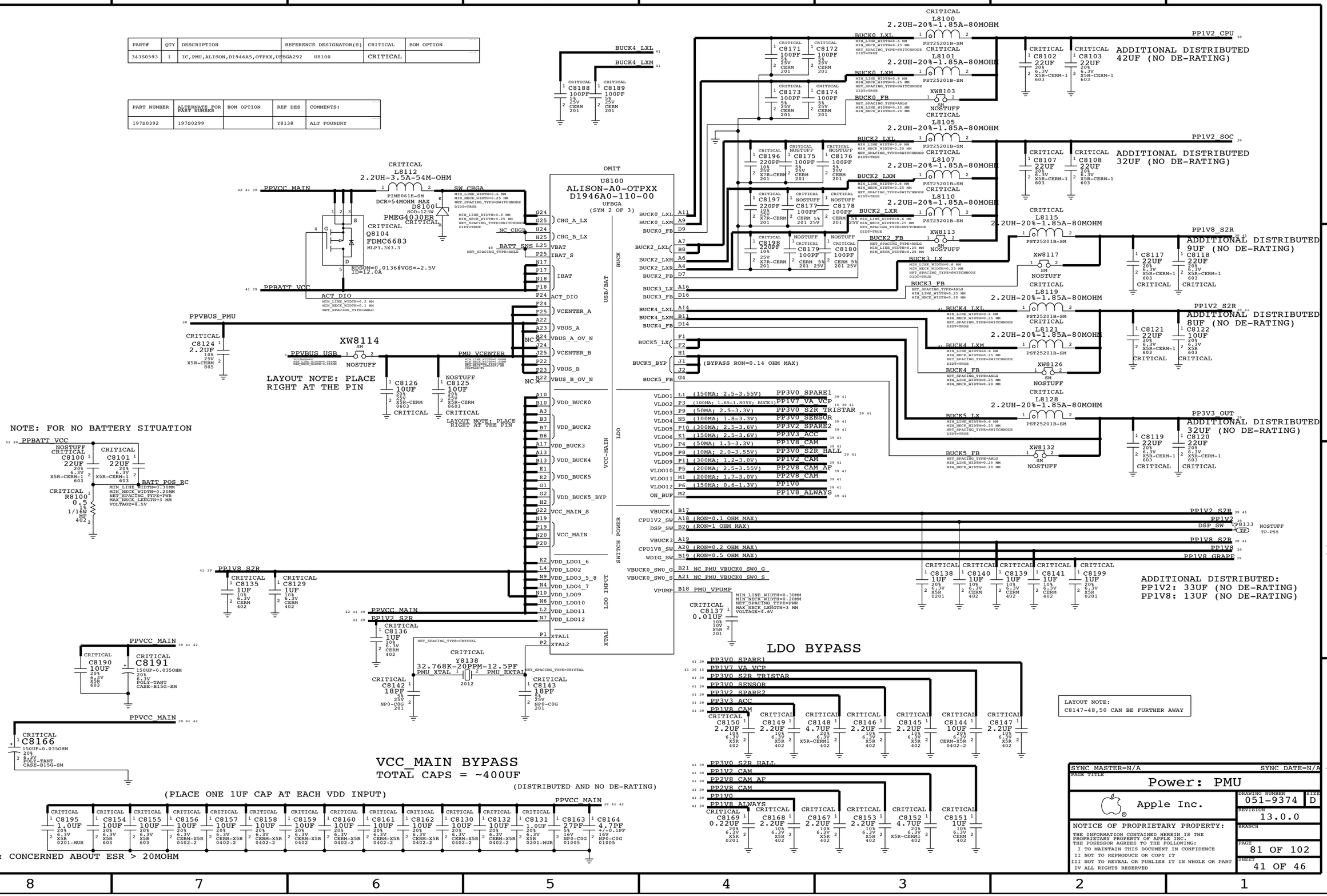
Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 75 OF 102
SHEET 40 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S0593	1	IC,PMU,ALISON,D1946A5,OTPXX,UFBGA292	U8100	CRITICAL	

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



SYNC MASTER=N/A SYNC DATE=N/A

PAGE TITLE

Power: PMU

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

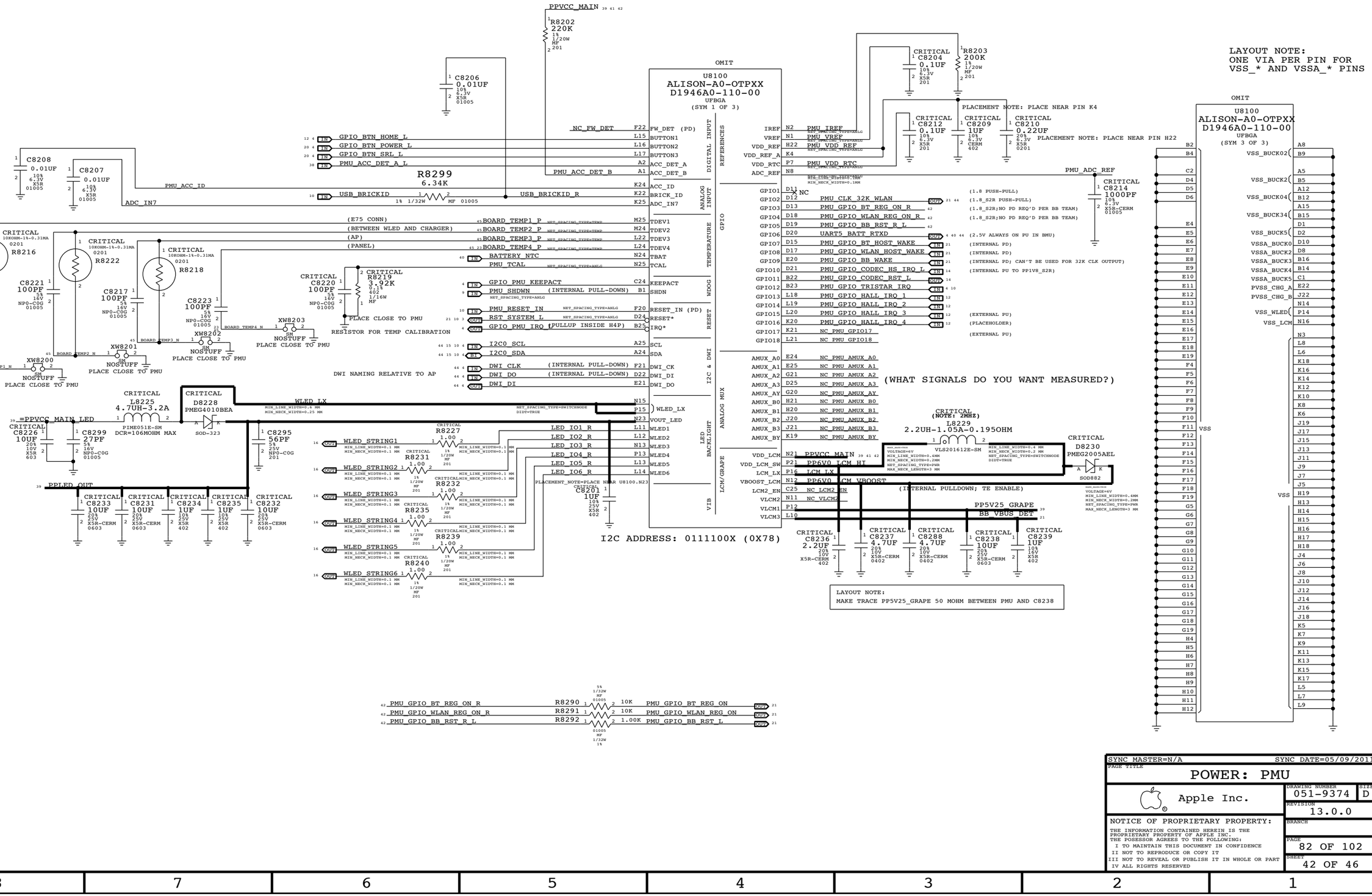
BRANCH

PAGE 81 OF 102

SHEET 41 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED



SYNC_MASTER=N/A SYNC_DATE=05/09/2011

PAGE TITLE

POWER: PMU

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

BRANCH

PAGE 82 OF 102

SHEET 42 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

MECHANCIAL PARTS

PD PARTS

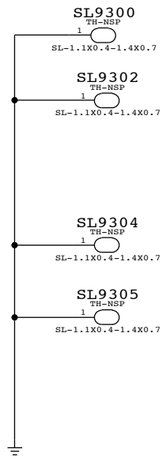
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
806-4017	1	FENCE,MAIN,MLB,YYY	FENCE_MLB	
806-3782	1	CAN,MAIN,MLB,WIFI,YYY	CAN_WIFI	
806-3715	1	FENCE,RADIO,MLB,SWAPPED,YYY	CAN_RADIO	CELL

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

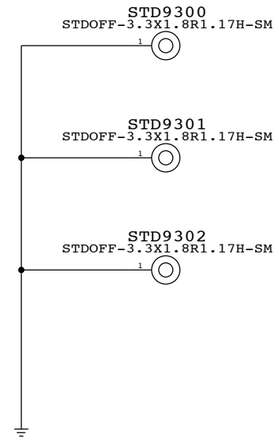
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7639	1	EEEE FOR 639-3251 (X123 ENTRY)	DWNV	CRITICAL	EEEE_X123_ENTRY
825-7639	1	EEEE FOR 639-4129 (X123A ENTRY)	F78H	CRITICAL	EEEE_X123A_ENTRY
825-7639	1	EEEE FOR 639-4130 (X123B ENTRY)	F78J	CRITICAL	EEEE_X123B_ENTRY
825-7639	1	EEEE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

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 93 OF 102
SHEET 43 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

Clock Signal Constraints

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
CLK_50S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
CLK	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E63	CLK_50S	CLK	AP_CLK_32K_CUMULUS 4 12
E162	CLK_50S	CLK	PMU_CLK_32K_WLAN 21 42
E88	CLK_50S	CLK	ISP0_CAM_REAR_CLK_R 6
E89	CLK_50S	CLK	ISP0_CAM_REAR_CLK 6 20
E95	CLK_50S	CLK	ISP1_CAM_FRONT_CLK_R 6
E96	CLK_50S	CLK	ISP1_CAM_FRONT_CLK 6 17
E233	CLK_50S	CLK	ISP1_CAM_FRONT_CLK_F 17
E130	CLK_50S	CLK	I2S0_CODEC_ASP_MCK 4 14
E131	CLK_50S	CLK	I2S0_CODEC_ASP_MCK_R 4
E159	CLK_50S	CLK	I2S1_SPKAMP_MCK 4 15
E158	CLK_50S	CLK	I2S1_SPKAMP_MCK_R 4

NAND

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
NAND_50S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
NAND	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E150	NAND_50S	NAND	FMI0_AD<7..0> 5 11
E145	NAND_50S	NAND	FMI0_CE0_L 5 11
E141	NAND_50S	NAND	FMI0_CLE 5 11
E142	NAND_50S	NAND	FMI0_ALE 5 11
E143	NAND_50S	NAND	FMI0_RE_N 5 11
E144	NAND_50S	NAND	FMI0_WE_L 5 11
E137	NAND_50S	NAND	FMI0_DQS_P 5 11
E149	NAND_50S	NAND	FMI1_AD<7..0> 5 11
E151	NAND_50S	NAND	FMI1_CE0_L 5 11
E155	NAND_50S	NAND	FMI1_CLE 5 11
E156	NAND_50S	NAND	FMI1_ALE 5 11
E157	NAND_50S	NAND	FMI1_RE_N 5 11
E158	NAND_50S	NAND	FMI1_WE_L 5 11
E159	NAND_50S	NAND	FMI1_DQS_P 5 11

USB

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
USB_90D	*	90_OHM_DIFF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
USB	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E5	USB_90D	USB	SOC_USB_D_P 3 10
E6	USB_90D	USB	SOC_USB_D_N 3 10
E7	USB_90D	USB	USB_BB_D_P 10 21
E8	USB_90D	USB	USB_BB_D_N 10 21
E182	USB_90D	USB	TS_E75_DPAIR1_P 10 38
E183	USB_90D	USB	TS_E75_DPAIR1_N 10 38
E184	USB_90D	USB	TS_E75_DPAIR2_P 10 38
E185	USB_90D	USB	TS_E75_DPAIR2_N 10 38
E186	USB_90D	USB	CONN_DP1_P 38
E187	USB_90D	USB	CONN_DP1_N 38
E188	USB_90D	USB	CONN_DP2_P 38
E189	USB_90D	USB	CONN_DP2_N 38

HSIC

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
HSIC_50S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
HSIC	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E182	HSIC_50S	HSIC	HSIC1_BB_STB 3 21
E181	HSIC_50S	HSIC	HSIC1_BB_DATA 3 21
E183	HSIC_50S	HSIC	HSIC2_WLAN_STB 3 21
E185	HSIC_50S	HSIC	HSIC2_WLAN_DATA 3 21

JTAG

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
JTAG_50S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
JTAG	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E16	JTAG_50S	JTAG	JTAG_SOC_TCK 3 10
E15	JTAG_50S	JTAG	JTAG_SOC_TMS 3 10
E14	JTAG_50S	JTAG	JTAG_SOC_TDI 3
E13	JTAG_50S	JTAG	JTAG_SOC_TDO 3 9
E20	JTAG_50S	JTAG	JTAG_SOC_TRST_L 3 9
E190	JTAG_50S	JTAG	BB_JTAG_TCK 4 21 24
E192	JTAG_50S	JTAG	BB_JTAG_TMS 4 21 24
E193	JTAG_50S	JTAG	BB_JTAG_TDI 4 21 24
E191	JTAG_50S	JTAG	BB_JTAG_TDO 4 21 24
E195	JTAG_50S	JTAG	BB_JTAG_TRST_L 4 21 24

I2C

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
I2C_50S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
I2C	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E1	I2C_50S	I2C	I2C0_SDA 4 10 15 42
E2	I2C_50S	I2C	I2C0_SCL 4 10 15 42
E3	I2C_50S	I2C	I2C1_SDA 4 18 19
E4	I2C_50S	I2C	I2C1_SCL 4 18 19
E61	I2C_50S	I2C	I2C2_SDA 4 17 18
E62	I2C_50S	I2C	I2C2_SCL 4 17 18
E230	I2C_50S	I2C	I2C2_SDA_F 17
E229	I2C_50S	I2C	I2C2_SCL_F 17
E98	I2C_50S	I2C	ISP0_CAM_REAR_SCL 6 20
E99	I2C_50S	I2C	ISP0_CAM_REAR_SDA 6 20
E100	I2C_50S	I2C	ISP1_CAM_FRONT_SCL 6 17
E101	I2C_50S	I2C	ISP1_CAM_FRONT_SDA 6 17
E231	I2C_50S	I2C	ISP1_CAM_FRONT_SCL_F 17
E232	I2C_50S	I2C	ISP1_CAM_FRONT_SDA_F 17
E202	I2C_50S	I2C	MLC_SDA_3V3
E203	I2C_50S	I2C	MLC_SCL_3V3
E205	I2C_50S	I2C	LVDS_DDC_DATA
E204	I2C_50S	I2C	LVDS_DDC_CLK

VREF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
VREF	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E136		VREF	PPVREF_DDR0_CA 7
E137		VREF	PPVREF_DDR0_DQ 7
E139		VREF	PPVREF_DDR1_CA 7
E138		VREF	PPVREF_DDR1_DQ 7

DWI

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
DWI_45S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
DWI	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E152	DWI_45S	DWI	DWI_CLK 4 42
E153	DWI_45S	DWI	DWI_DI 4 42
E156	DWI_45S	DWI	DWI_DO 4 42

I2S

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
I2S_45S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
I2S	*	*	3:1_SPACING
I2S	I2S	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E140	I2S_45S	I2S	I2S0_CODEC_ASP_BCLK 4 14
E141	I2S_45S	I2S	I2S0_CODEC_ASP_LRCK 4 14
E142	I2S_45S	I2S	I2S0_CODEC_ASP_DOUT 4 14
E143	I2S_45S	I2S	I2S0_CODEC_ASP_DIN 4 14
E150	I2S_45S	I2S	I2S0_CODEC_ASP_SDOUT 14
E144	I2S_45S	I2S	I2S1_SPKAMP_BCLK 4 15
E145	I2S_45S	I2S	I2S1_SPKAMP_LRCK 4 15
E146	I2S_45S	I2S	I2S1_SPKAMP_DOUT 4 15
E147	I2S_45S	I2S	I2S1_SPKAMP_DIN 4 15
E160	I2S_45S	I2S	I2S2_CODEC_XSP_BCLK 4 14
E161	I2S_45S	I2S	I2S2_CODEC_XSP_LRCK 4 14
E149	I2S_45S	I2S	I2S2_CODEC_XSP_DOUT 4 14
E150	I2S_45S	I2S	I2S2_CODEC_XSP_DIN 4 14
E151	I2S_45S	I2S	I2S2_CODEC_XSP_SDOUT 14
E152	I2S_45S	I2S	I2S3_BT_BCLK 4 21
E153	I2S_45S	I2S	I2S3_BT_LRCK 4 21
E154	I2S_45S	I2S	I2S3_BT_DOUT 4 21
E155	I2S_45S	I2S	I2S3_BT_DIN 4 21

UART

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
UART_45S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
UART	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E206	UART_45S	UART	UART0_DEBUG_RXD 4 10
E208	UART_45S	UART	UART0_DEBUG_TXD 4 10
E209	UART_45S	UART	UART1_BT_RXD 4 21
E206	UART_45S	UART	UART1_BT_TXD 4 21
E210	UART_45S	UART	UART1_BT_RTS_L 4 21
E213	UART_45S	UART	UART1_BT_CTS_L 4 21
E211	UART_45S	UART	UART2_ACC_RXD 4 10
E212	UART_45S	UART	UART2_ACC_TXD 4 10
E214	UART_45S	UART	UART3_WLAN_RXD 4 21
E215	UART_45S	UART	UART3_WLAN_TXD 4 21
E216	UART_45S	UART	UART4_BB_RXD 4 10 21
E215	UART_45S	UART	UART4_BB_TXD 4 10 21
E218	UART_45S	UART	UART4_BB_RTS_L 4 21
E217	UART_45S	UART	UART4_BB_CTS_L 4 21
E220	UART_45S	UART	UART5_BATT_RTXD 4 40 42
E219	UART_45S	UART	BATT_SWI_CONN 40

SPI

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
SPI_45S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
SPI	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E235	SPI_45S	SPI	SPI1_GRAPE_MISO 4 12
E236	SPI_45S	SPI	SPI1_GRAPE_MOSI 4 12
E238	SPI_45S	SPI	SPI1_GRAPE_SCLK 4 12
E239	SPI_45S	SPI	SPI1_GRAPE_SCLK_R 12
E240	SPI_45S	SPI	SPI1_GRAPE_CS_L 4 12
E225	SPI_45S	SPI	SPI2_CODEC_MISO 4 14
E226	SPI_45S	SPI	SPI2_CODEC_MOSI 4 14
E227	SPI_45S	SPI	SPI2_CODEC_SCLK 4 14
E228	SPI_45S	SPI	SPI2_CODEC_CS_L 4 14

SYNC_MASTER=N/A SYNC_DATE=N/A

PAGE TITLE

CONSTRAINTS: ASSIGNMENTS

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D

REVISION 13.0.0

BRANCH

PAGE 100 OF 102

SHEET 44 OF 46

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

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	NET_TYPE SPACING	
J91	MIPI_90D	MIPI	MIPI0D_DATA_P<0> 6 16
J92	MIPI_90D	MIPI	MIPI0D_DATA_N<0> 6 16
J93	MIPI_90D	MIPI	MIPI0D_DATA_P<1> 6 16
J94	MIPI_90D	MIPI	MIPI0D_DATA_N<1> 6 16
J95	MIPI_90D	MIPI	MIPI0D_DATA_P<2> 6 16
J96	MIPI_90D	MIPI	MIPI0D_DATA_N<2> 6 16
J97	MIPI_90D	MIPI	MIPI0D_DATA_P<3> 6 16
J98	MIPI_90D	MIPI	MIPI0D_DATA_N<3> 6 16
J97	MIPI_90D	MIPI	MIPI0D_CLK_P 6 16
J98	MIPI_90D	MIPI	MIPI0D_CLK_N 6 16
J111	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_P<0> 6 20
J112	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_N<0> 6 20
J113	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_P<1> 6 20
J114	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_N<1> 6 20
J143	MIPI_90D	MIPI	MIPI0C_CAM_REAR_CLK_P 6 20
J144	MIPI_90D	MIPI	MIPI0C_CAM_REAR_CLK_N 6 20
J186	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_FILT_P<0> 20
J187	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_FILT_N<0> 20
J188	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_FILT_P<1> 20
J189	MIPI_90D	MIPI	MIPI0C_CAM_REAR_DATA_FILT_N<1> 20
J190	MIPI_90D	MIPI	MIPI0C_CAM_REAR_CLK_FILT_P 20
J191	MIPI_90D	MIPI	MIPI0C_CAM_REAR_CLK_FILT_N 20
J115	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_DATA_P<0> 6 17
J116	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_DATA_N<0> 6 17
J117	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_CLK_P 6 17
J118	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_CLK_N 6 17
J182	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_DATA_FILT_P<0> 17
J183	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_DATA_FILT_N<0> 17
J184	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_CLK_FILT_P 17
J185	MIPI_90D	MIPI	MIPI1C_CAM_FRONT_CLK_FILT_N 17

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	NET_TYPE SPACING	
J376	DMIC_45S	DMIC	L81_DMIC1_FF_SCLK 14
J374	DMIC_45S	DMIC	L81_DMIC1_FF_SD 14
J376	DMIC_45S	DMIC	DMIC1_FF_SCLK 13 14
J377	DMIC_45S	DMIC	DMIC1_FF_SD 13 14
E40K	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	NET_TYPE SPACING	
F28Y	USB_90D	USB	MIKEY_TS_P 10 14
F28D	USB_90D	USB	MIKEY_TS_N 10 14
B39Y	USB_90D	USB	L81_MBUS_P 14
B39Y	USB_90D	USB	L81_MBUS_N 14
F29Y	SPEAKER	AUDIO	SPKR_L_CONN_P 15 38
F29K	SPEAKER	AUDIO	SPKR_L_CONN_N 15 38
B35K	SPEAKER	AUDIO	SPKR_R_CONN_P 15 38
F29A	SPEAKER	AUDIO	SPKR_R_CONN_N 15 38
B35K	AUDIO_DIFF	AUDIO	HP_MIC_P 14
B35K	AUDIO_DIFF	AUDIO	HP_MIC_N 14
B37K	AUDIO_DIFF	AUDIO	L81_AIN2_P 14
B37K	AUDIO_DIFF	AUDIO	L81_AIN2_N 14

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	NET_TYPE SPACING	
E24Y	LVDS_90D	LVDS	MIPI_DATA_CONN_P<3..0> 16
E24K	LVDS_90D	LVDS	MIPI_DATA_CONN_N<3..0> 16
E23Y	LVDS_90D	LVDS	MIPI_CLK_CONN_P 16
E23K	LVDS_90D	LVDS	MIPI_CLK_CONN_N 16

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	NET_TYPE SPACING	
F39Y	TEMP	TEMP	BOARD_TEMP1_P 42
F39K	TEMP	TEMP	BOARD_TEMP1_N 42
F40Y	TEMP	TEMP	BOARD_TEMP2_P 42
F40A	TEMP	TEMP	BOARD_TEMP2_N 42
F40Y	TEMP	TEMP	BOARD_TEMP3_P 42
F40K	TEMP	TEMP	BOARD_TEMP3_N 42
F40A	TEMP	TEMP	BOARD_TEMP4_P 23 42
F40K	TEMP	TEMP	BOARD_TEMP4_N 23 42

XTAL

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
CRYSTAL	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E27A		CRYSTAL	XTAL_SOC_24M_I 3
E38D		CRYSTAL	XTAL_SOC_24M_O 3
E38K		CRYSTAL	XTAL_SOC_24M_O_R 3

SYNC_MASTER=N/A SYNC_DATE=N/A

PAGE TITLE
CONSTRAINTS: ASSIGNMENTS

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 101 OF 102
SHEET 45 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED

MLB CONSTRAINTS

BOARD LAYERS	BOARD AREAS	BOARD UNITS (MIL or 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

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	

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

SYNC MASTER=N/A SYNC DATE=N/A

PAGE TITLE
CONSTRAINTS: MLB RULES

Apple Inc.

DRAWING NUMBER 051-9374 SIZE D
REVISION 13.0.0
BRANCH
PAGE 102 OF 102
SHEET 46 OF 46

NOTICE OF PROPRIETARY PROPERTY:
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC.
THE POSESSOR AGREES TO THE FOLLOWING:
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE
II NOT TO REPRODUCE OR COPY IT
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART
IV ALL RIGHTS RESERVED