


X123 | MAIN LOGIC BOARD  
DVT  
LAST\_MODIFIED=Wed Jun 27 16:39:53 2012

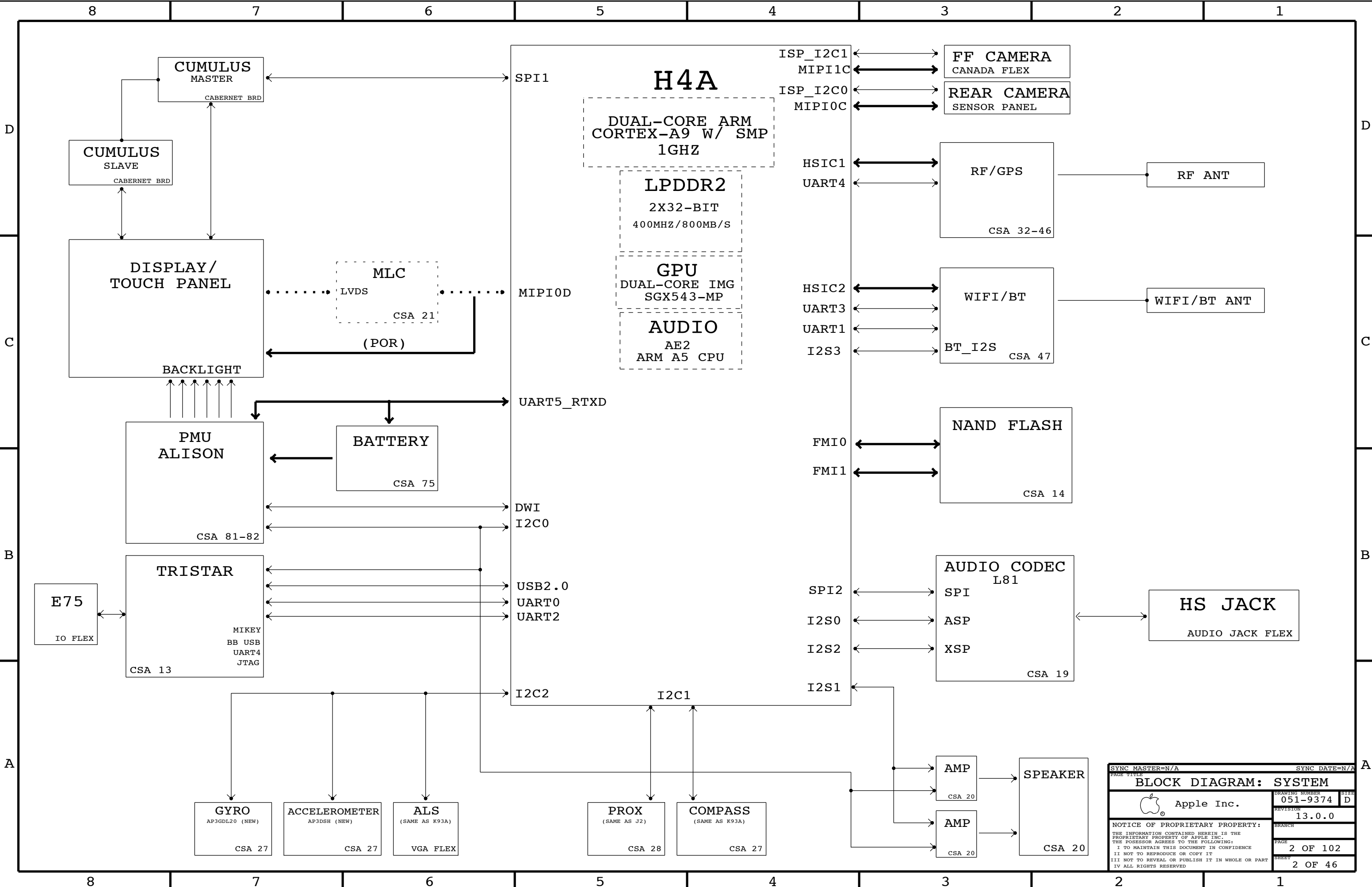
| REV | ECN        | DESCRIPTION OF REVISION | CK APPD<br>DATE |
|-----|------------|-------------------------|-----------------|
| 13  | 0001520462 | ENGINEERING RELEASED    | 2012-07-02      |

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

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

DRAWING


|                                                                                                                                                                                                                                                                                       |                |                  |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|------|
| DRAWING TITLE                                                                                                                                                                                                                                                                         |                | SCH, MLB, X123   |      |
| <br>Apple Inc.                                                                                                                                                                                   | DRAWING NUMBER |                  | SIZE |
|                                                                                                                                                                                                                                                                                       | 051-9374       |                  | D    |
|                                                                                                                                                                                                                                                                                       | REVISION       |                  |      |
|                                                                                                                                                                                                                                                                                       |                | 13.0.0           |      |
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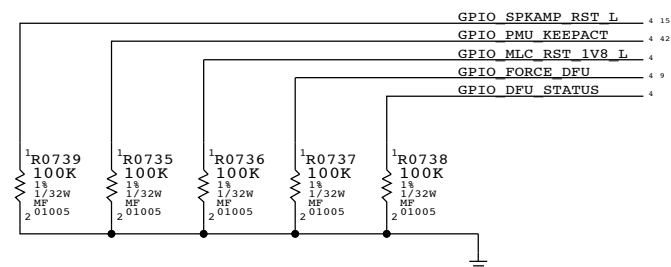
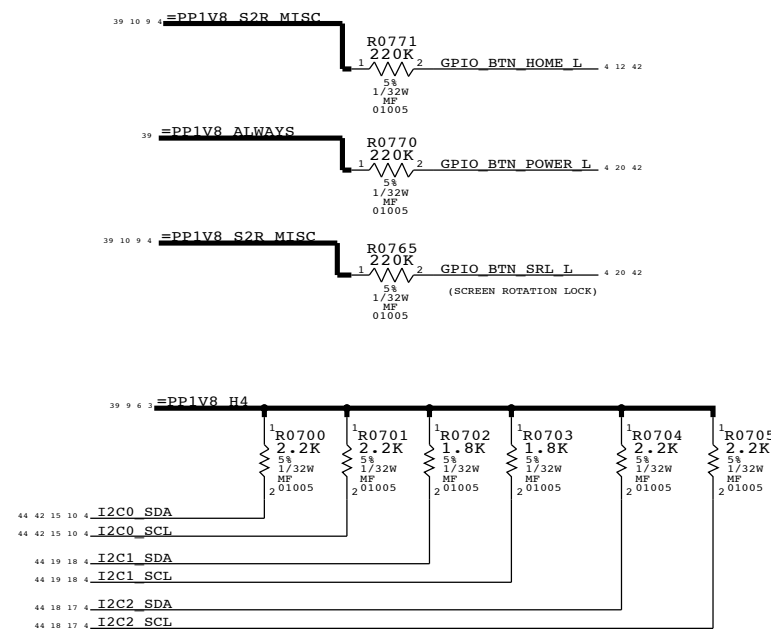
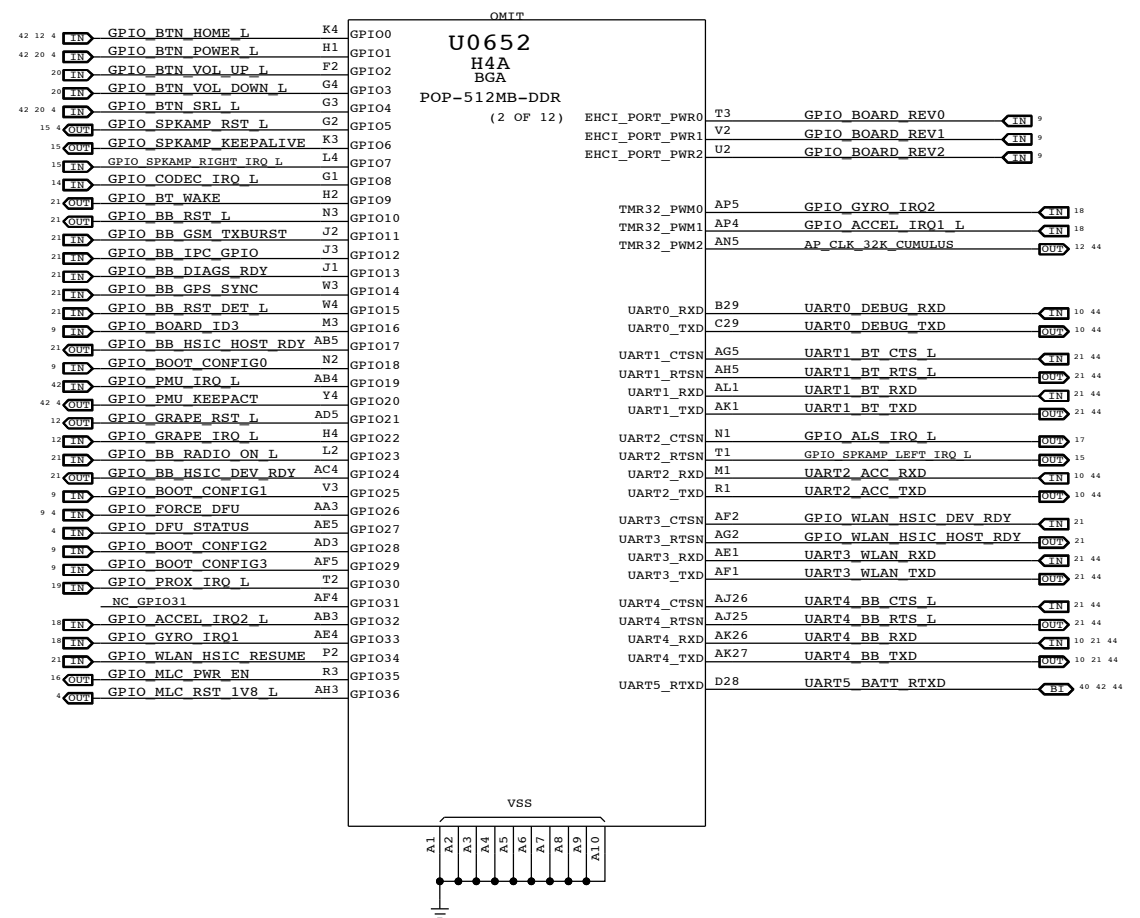
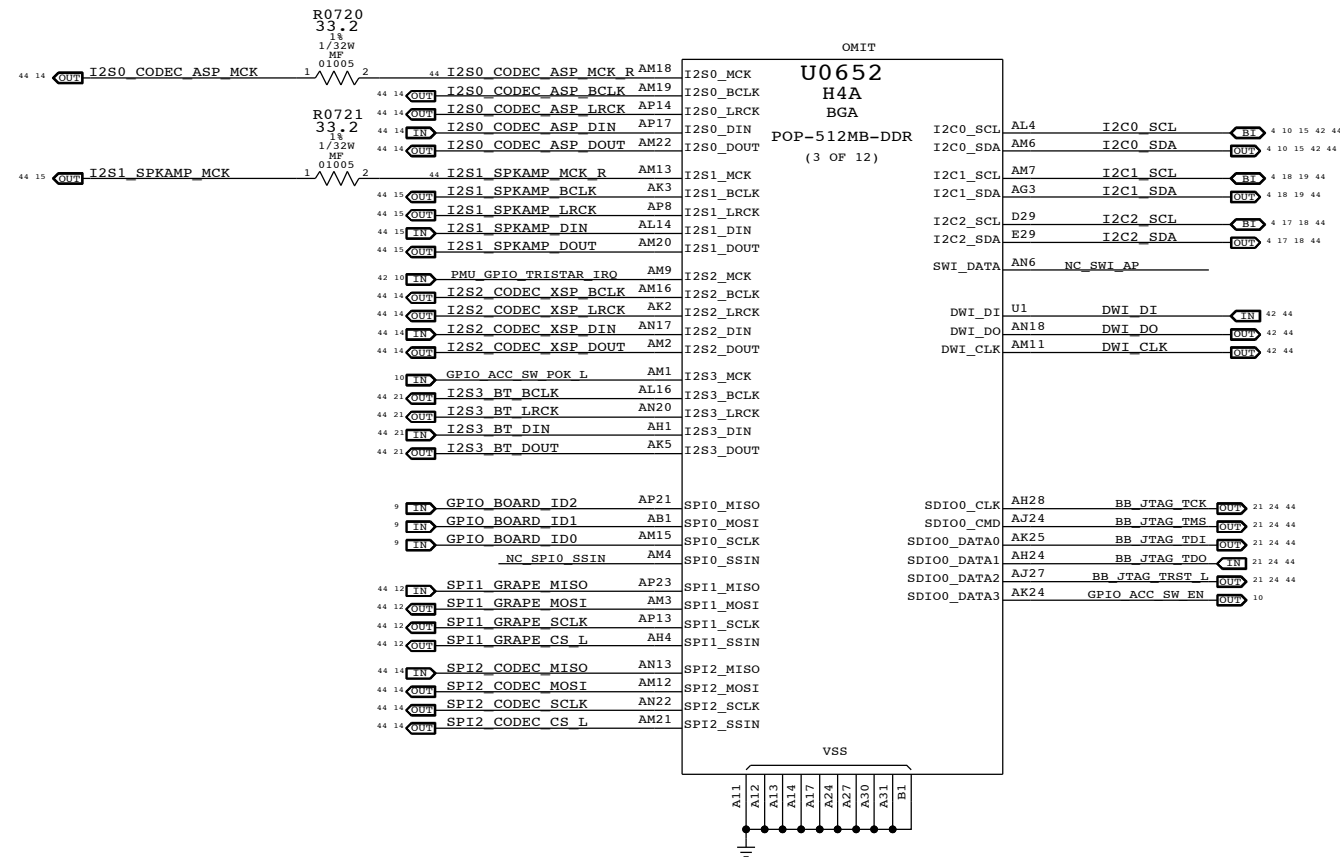



| PART NUMBER | ALTERNATE FOR PART NUMBER | BOM OPTION | REF DES | COMMENTS : |
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| 339S0188    | 339S0179                  |            | U0652   |            |

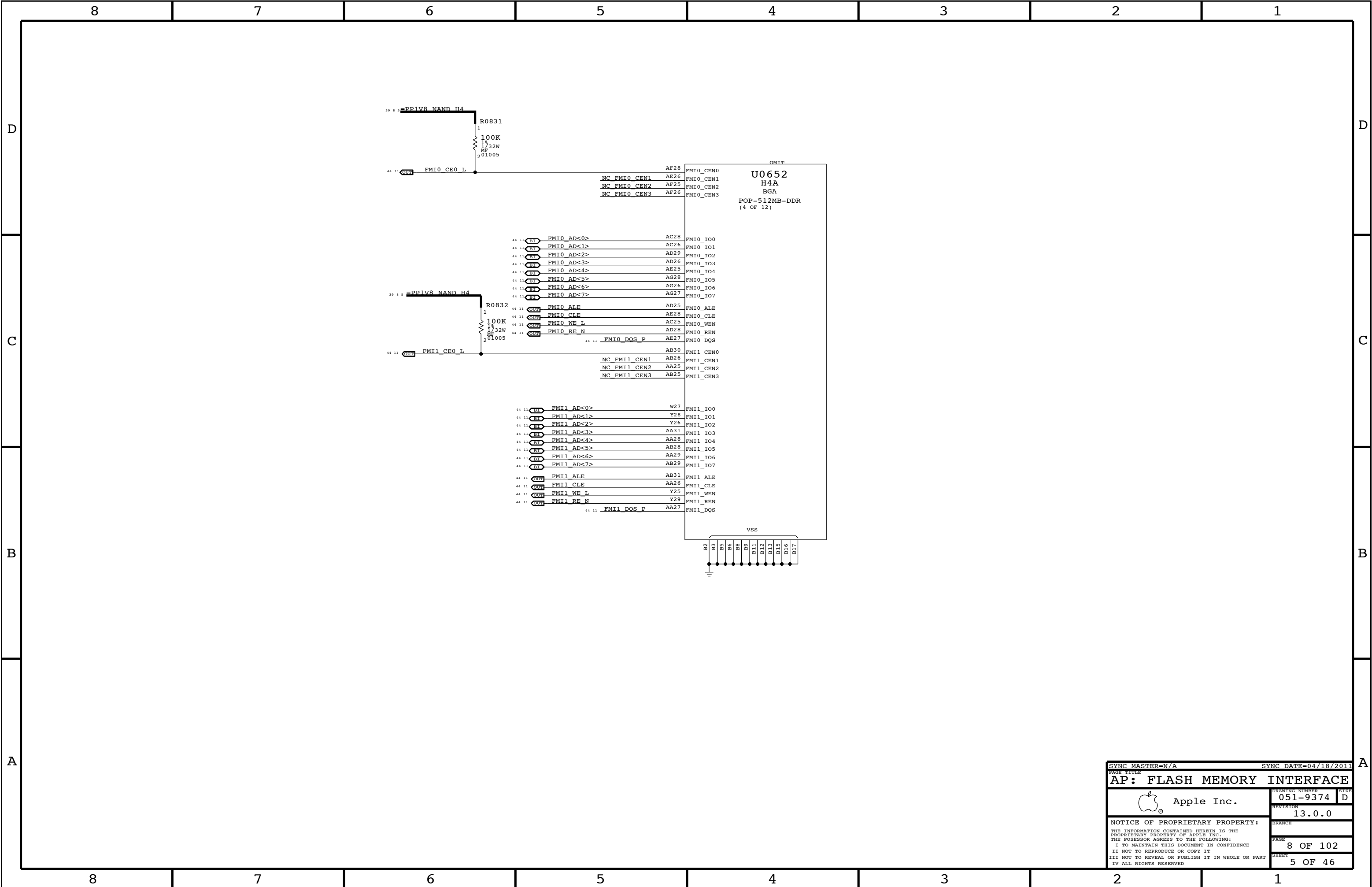
ELPIDA  
HYNIX

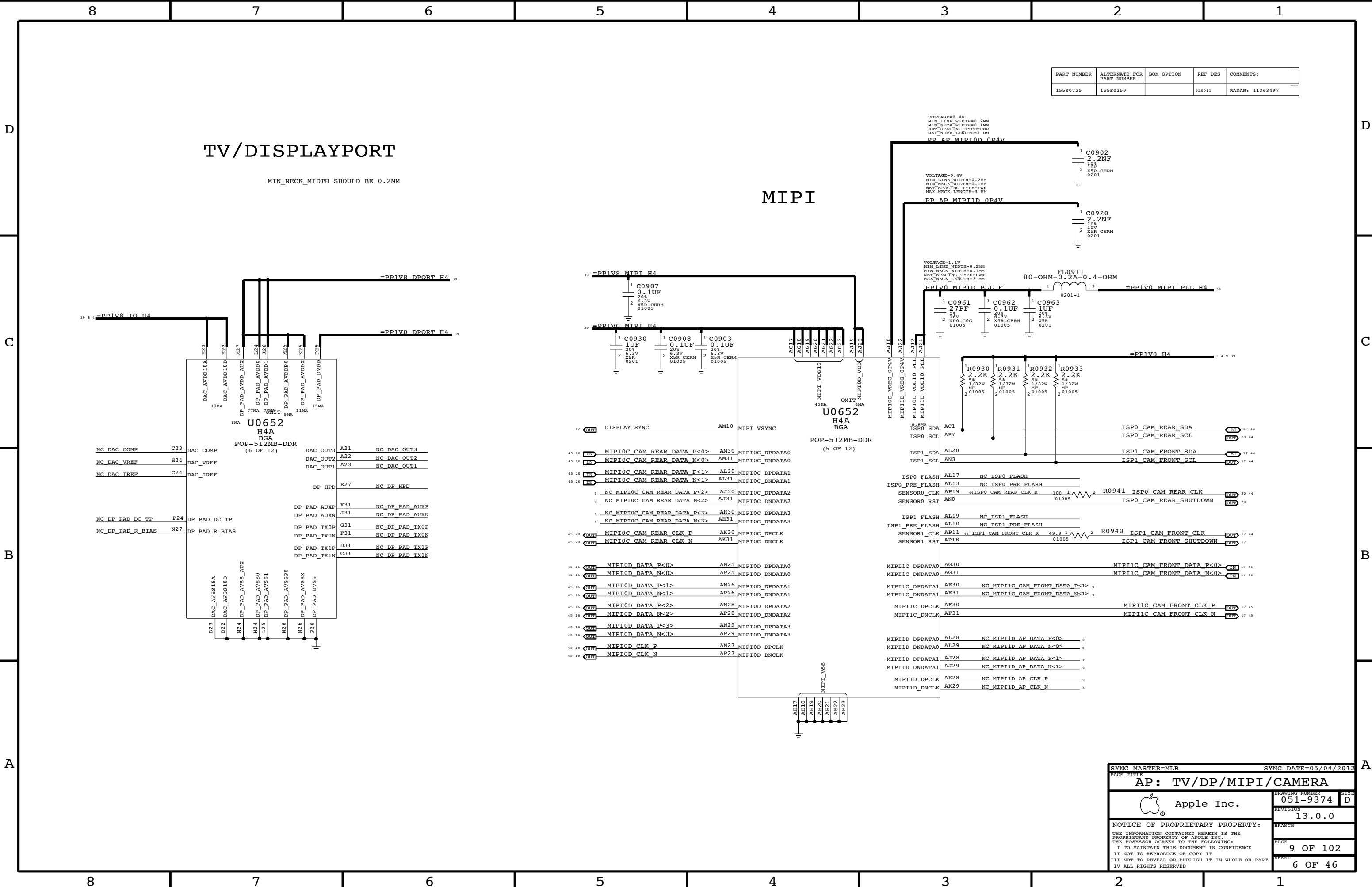
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| PAGE TITLE                                                                                                                                                                                                                                                                                                              |  |                                                                  |  |
| AP : MAIN                                                                                                                                                                                                                                                                                                               |  |                                                                  |  |
|  Apple Inc.                                                                                                                                                                                                                        |  | CREATING NUMBER<br><b>051-9374</b>                               |  |
|                                                                                                                                                                                                                                                                                                                         |  | SITE<br><b>D</b>                                                 |  |
|                                                                                                                                                                                                                                                                                                                         |  | REVISION<br><b>13.0.0</b>                                        |  |
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## H4A I/OS




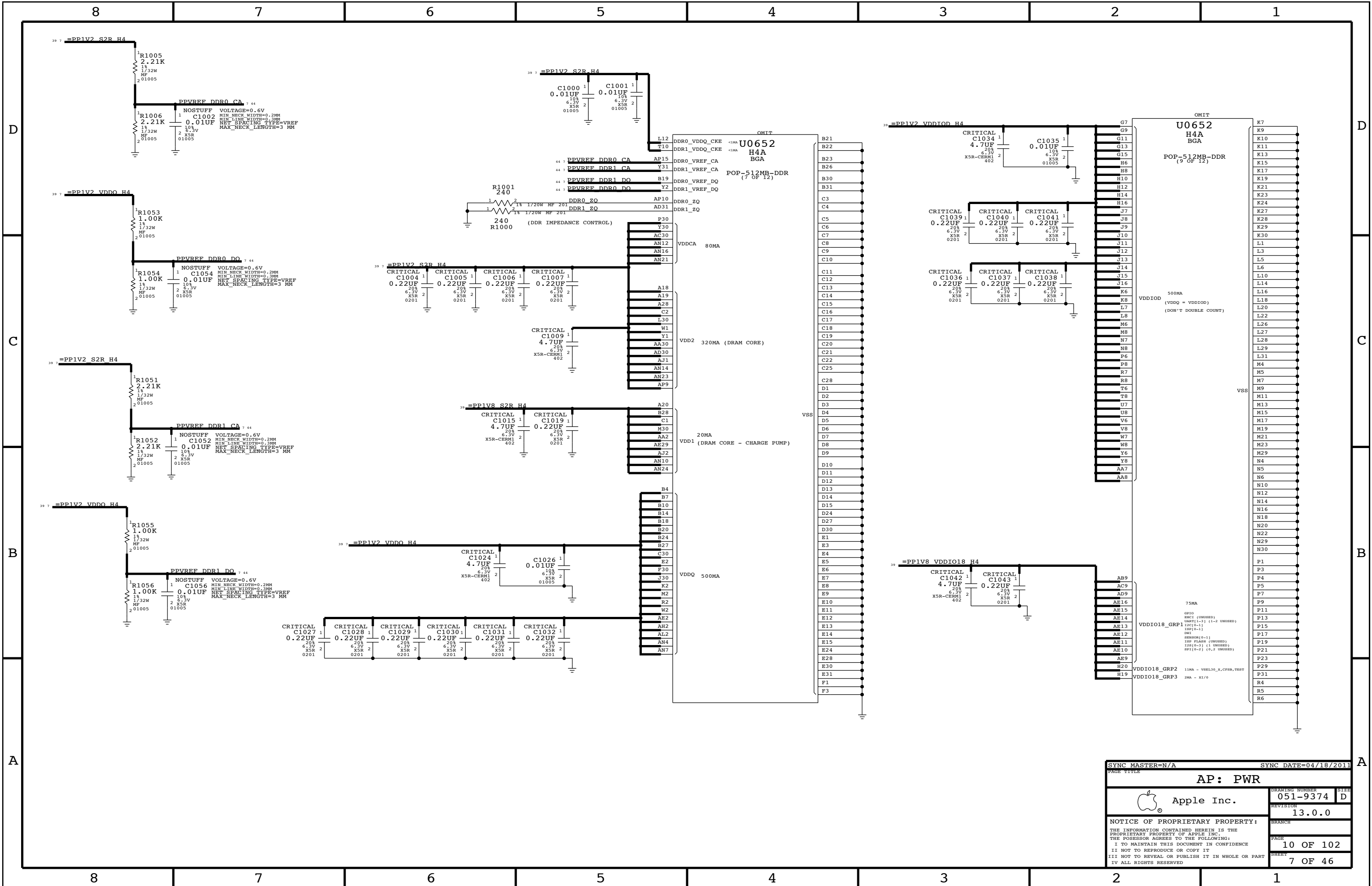
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| PAGE TITLE                                                                            |            |                                    |          |
| AP: I/Os                                                                              |            |                                    |          |
|  | Apple Inc. | DRAWING NUMBER                     | 051-9374 |
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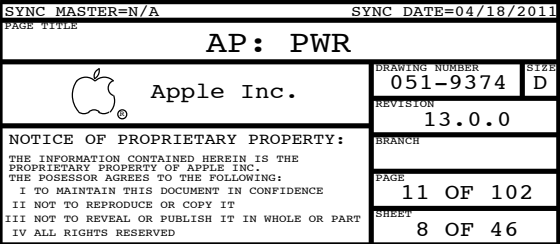




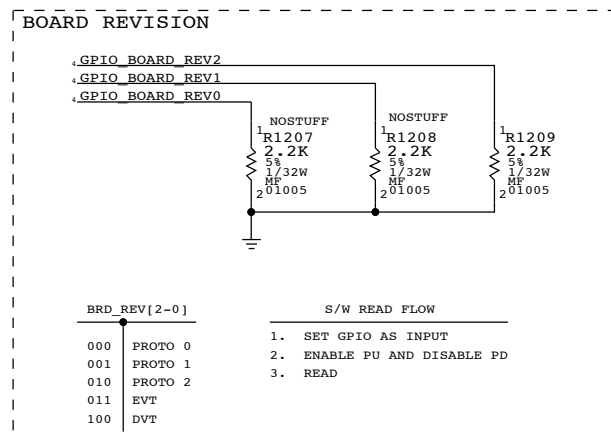
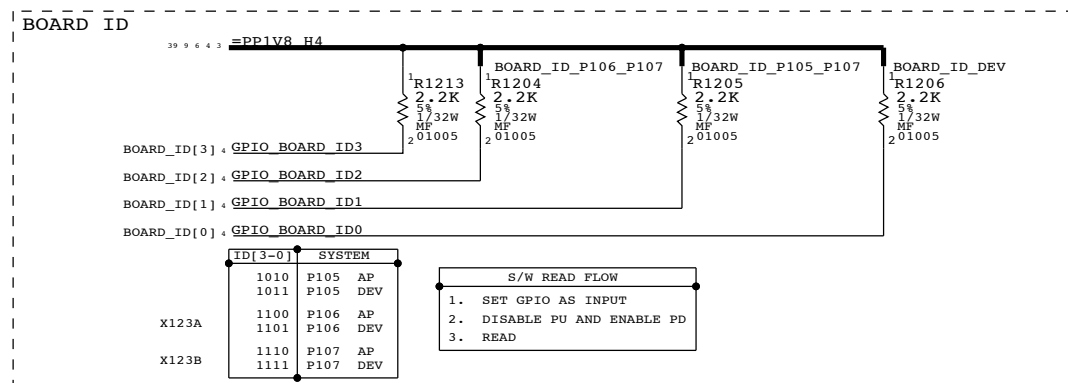
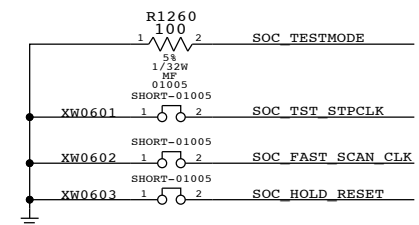
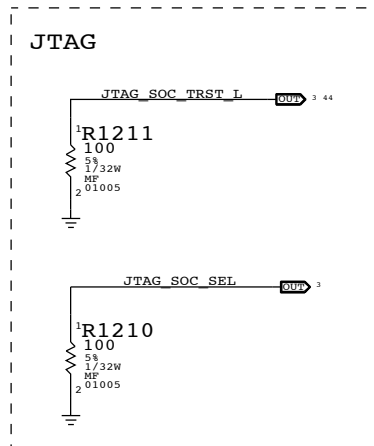
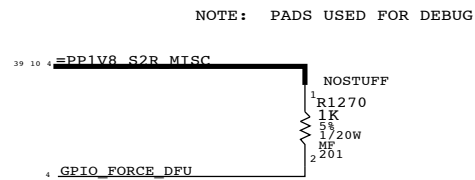
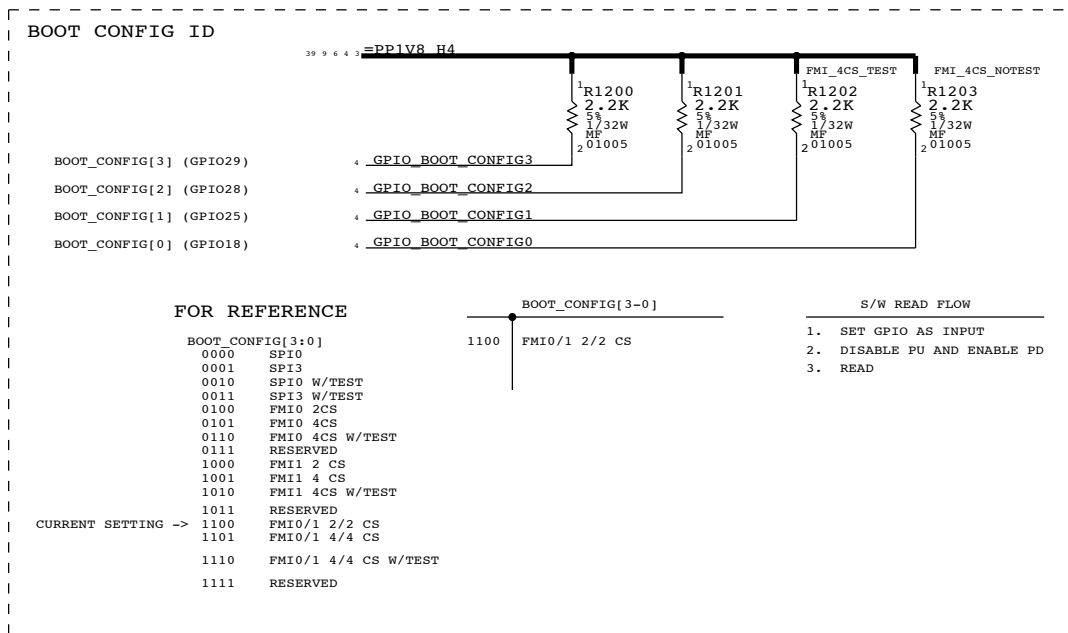
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|-------------|---------------------------|------------|---------|-----------------|
| 15580725    | 15580359                  |            | FL0911  | RADAR: 11363497 |

|                                                                                                                   |  |                      |          |
|-------------------------------------------------------------------------------------------------------------------|--|----------------------|----------|
| SYNC MASTER=MLB                                                                                                   |  | SYNC DATE=05/04/2012 |          |
| PAGE TITLE                                                                                                        |  |                      |          |
| AP: TV/DP/MIPI/CAMERA                                                                                             |  |                      |          |
|  Apple Inc.                  |  | DRAWING NUMBER       | 051-9374 |
|                                                                                                                   |  | SIZE                 | D        |
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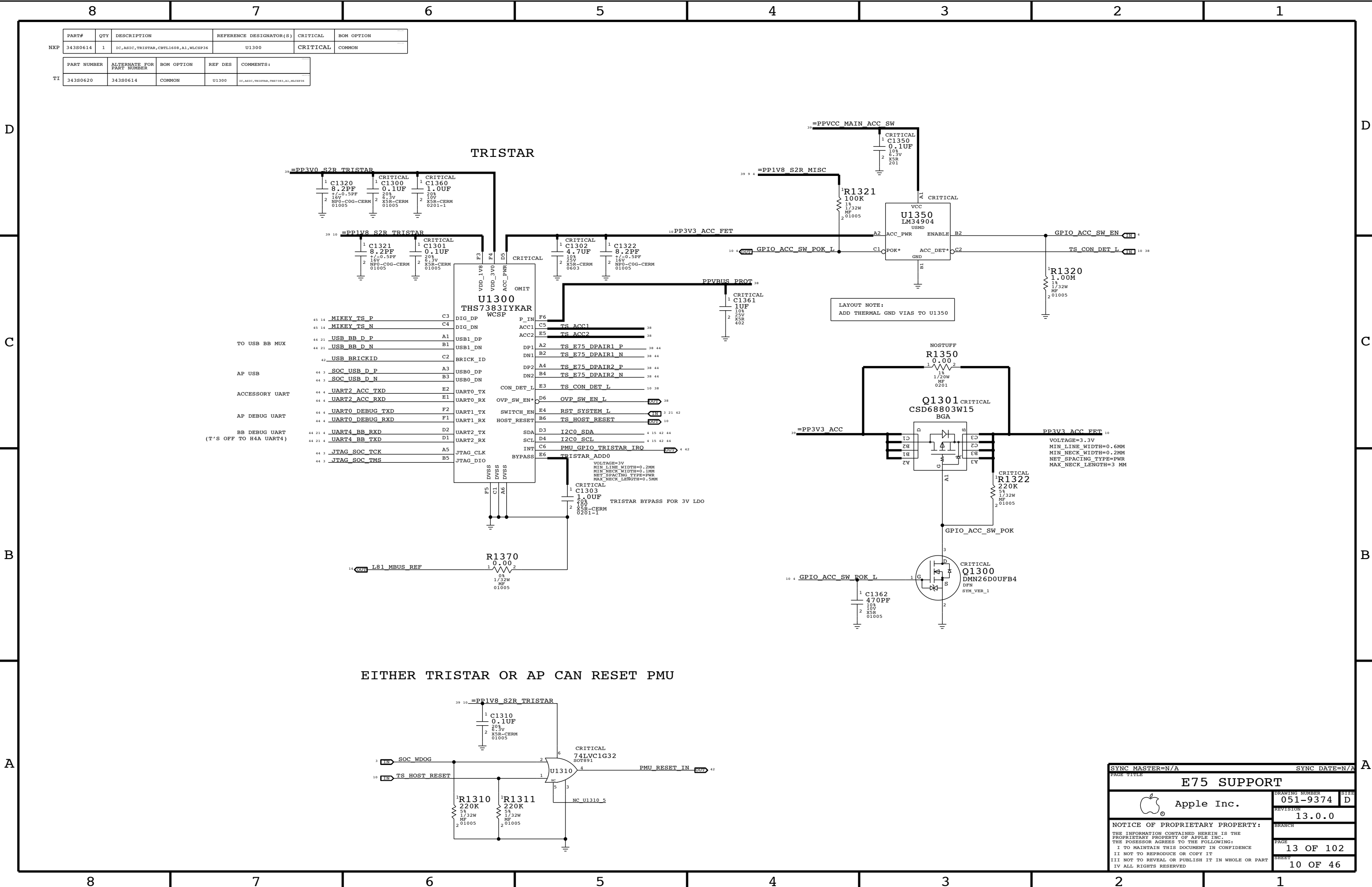


## SINGLE-PIN NETS

|                 |    |              |      |
|-----------------|----|--------------|------|
| NC_FMI0_QOS_NEG | == | FMI0_QOS_N   | 11   |
| NC_FMI0_RE_POS  | == | FMI0_RE_P    | 11   |
| HARF_RASE=TRUE  |    |              |      |
| NC_FMI1_QOS_NEG | == | FMI1_QOS_N   | 11   |
| NC_FMI1_RE_POS  | == | FMI1_RE_P    | 11   |
| HARF_RASE=TRUE  |    |              |      |
| NC_PMU_SHDWN    | == | PMU_SHDWN    | 42   |
| NC_JTAG_SOC     | == | JTAG_SOC_TDO | 3 44 |
| HARF_RASE=TRUE  |    |              |      |

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

|                                                                                                                                                                                                                                                                           |                |                      |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------|------|
| SYNC MASTER=N/A                                                                                                                                                                                                                                                           |                | SYNC DATE=04/11/2011 |      |
| PAGE TITLE                                                                                                                                                                                                                                                                |                |                      |      |
| AP: MISC & ALIASES                                                                                                                                                                                                                                                        |                |                      |      |
|  Apple Inc.                                                                                                                                                                          | DRAWING NUMBER |                      | SIZE |
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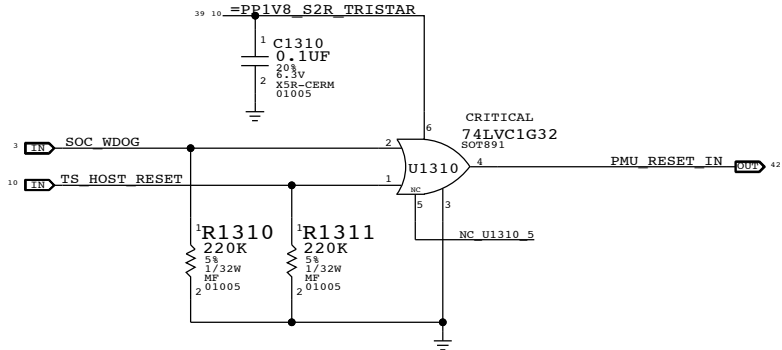


| PART# | QTY      | DESCRIPTION | REFERENCE DESIGNATOR(S)             | CRITICAL | BOM OPTION |
|-------|----------|-------------|-------------------------------------|----------|------------|
| NXP   | 34380614 | 1           | IC,ASIC,TRISTAR,CBTL1608,A1,MLCSP36 | U1300    | CRITICAL   |
| TI    | 34380620 | 1           | IC,ASIC,TRISTAR,CBTL1608,A1,MLCSP36 | U1300    | CRITICAL   |

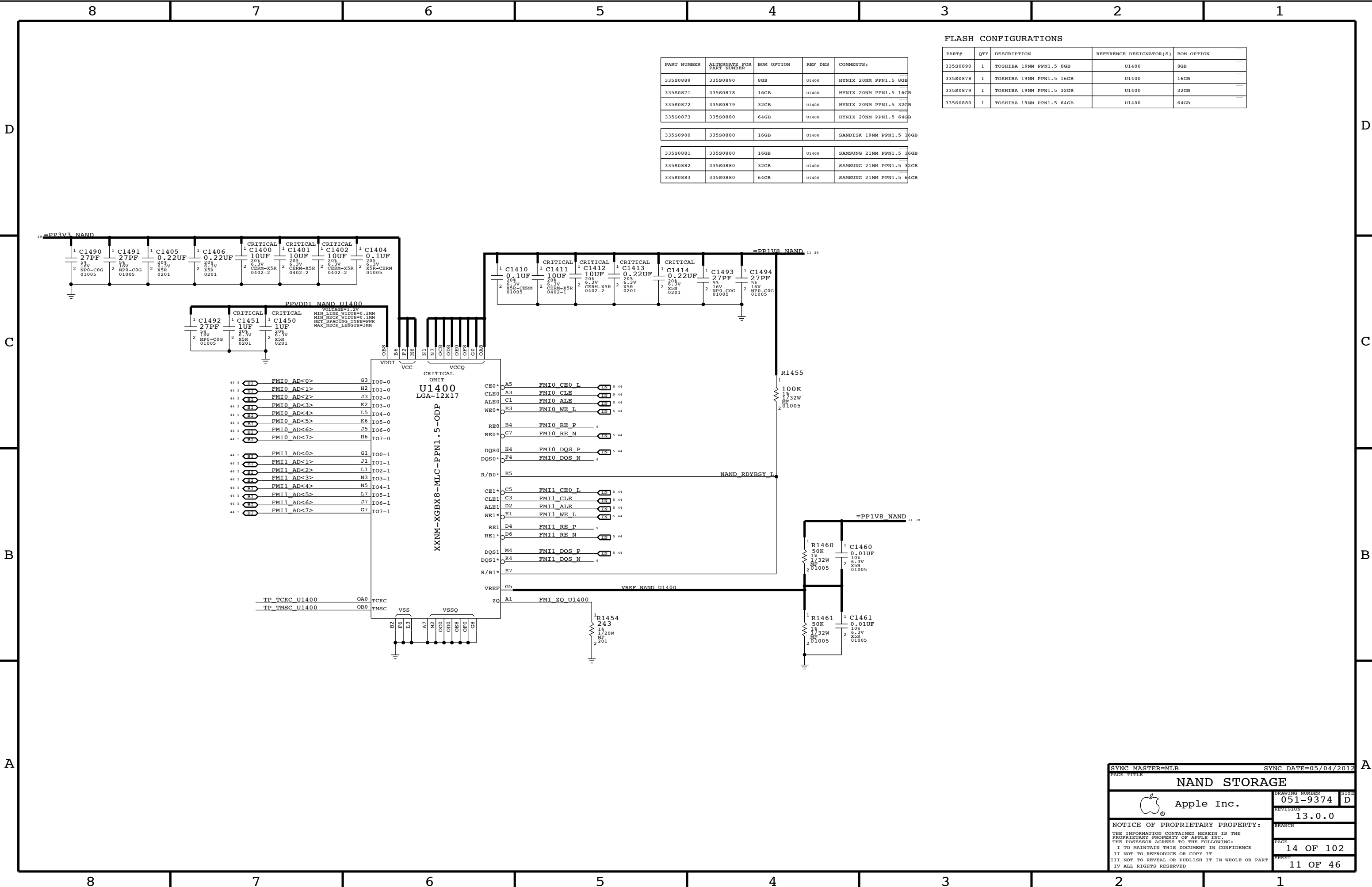
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|-------------|---------------------------|------------|---------|-------------------------------------|
| 34380620    | 34380614                  | COMMON     | U1300   | IC,ASIC,TRISTAR,CBTL1608,A1,MLCSP36 |

| TRISTAR              | THS73831YKAR | WCSP     |
|----------------------|--------------|----------|
| 45 14 MIKEY TS P     | C3           | DIG_DP   |
| 45 14 MIKEY TS N     | C4           | DIG_DN   |
| 44 21 USB_BB_D_P     | A1           | USB1_DP  |
| 44 21 USB_BB_D_N     | B1           | USB1_DN  |
| 42 USB_BRICKID       | C2           | BRICK_ID |
| 44 3 SOC_USB_D_P     | A3           | USB0_DP  |
| 44 3 SOC_USB_D_N     | B3           | USB0_DN  |
| 44 4 UART2_ACC_TXD   | E2           | UART0_TX |
| 44 4 UART2_ACC_RXD   | E1           | UART0_RX |
| 44 4 UART0_DEBUG_TXD | F2           | UART1_TX |
| 44 4 UART0_DEBUG_RXD | F1           | UART1_RX |
| 44 21 UART4_BB_RXD   | D2           | UART2_TX |
| 44 21 UART4_BB_TXD   | D1           | UART2_RX |
| 44 3 JTAG_SOC_TCK    | A5           | JTAG_CLK |
| 44 3 JTAG_SOC_TMS    | B5           | JTAG_DIO |

EITHER TRISTAR OR AP CAN RESET PMU



|                                                                                                                   |  |               |  |
|-------------------------------------------------------------------------------------------------------------------|--|---------------|--|
| PAGE TITLE                                                                                                        |  | SYNC DATE=N/A |  |
| E75 SUPPORT                                                                                                       |  | 051-9374      |  |
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FLASH CONFIGURATIONS

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

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

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

SYNC MASTER=MLB

SYNC DATE=05/04/2012

NAND STORAGE

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DRAWING NUMBER

051-9374

SIZE

D

REVISION

13.0.0

BRANCH

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SHEET

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TOUCH SUBSYSTEM

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

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

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

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

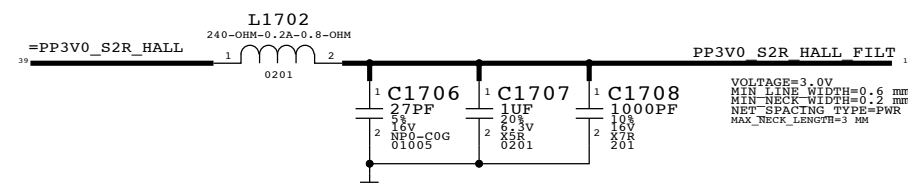
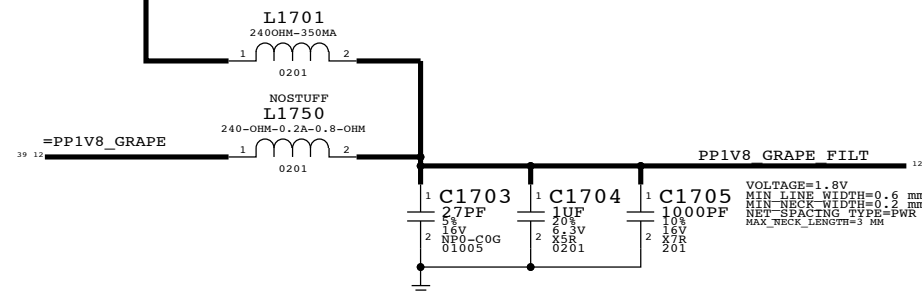
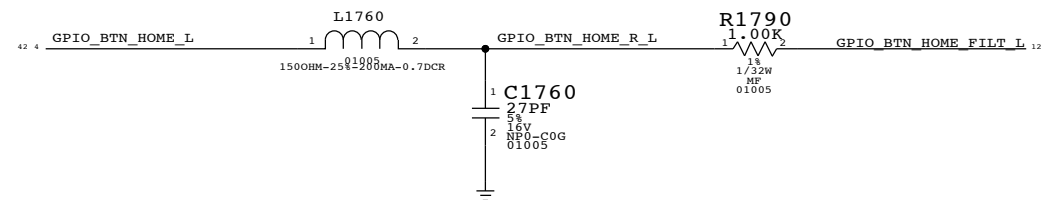
TOUCH: FLEX CONNECTOR


Apple Inc.

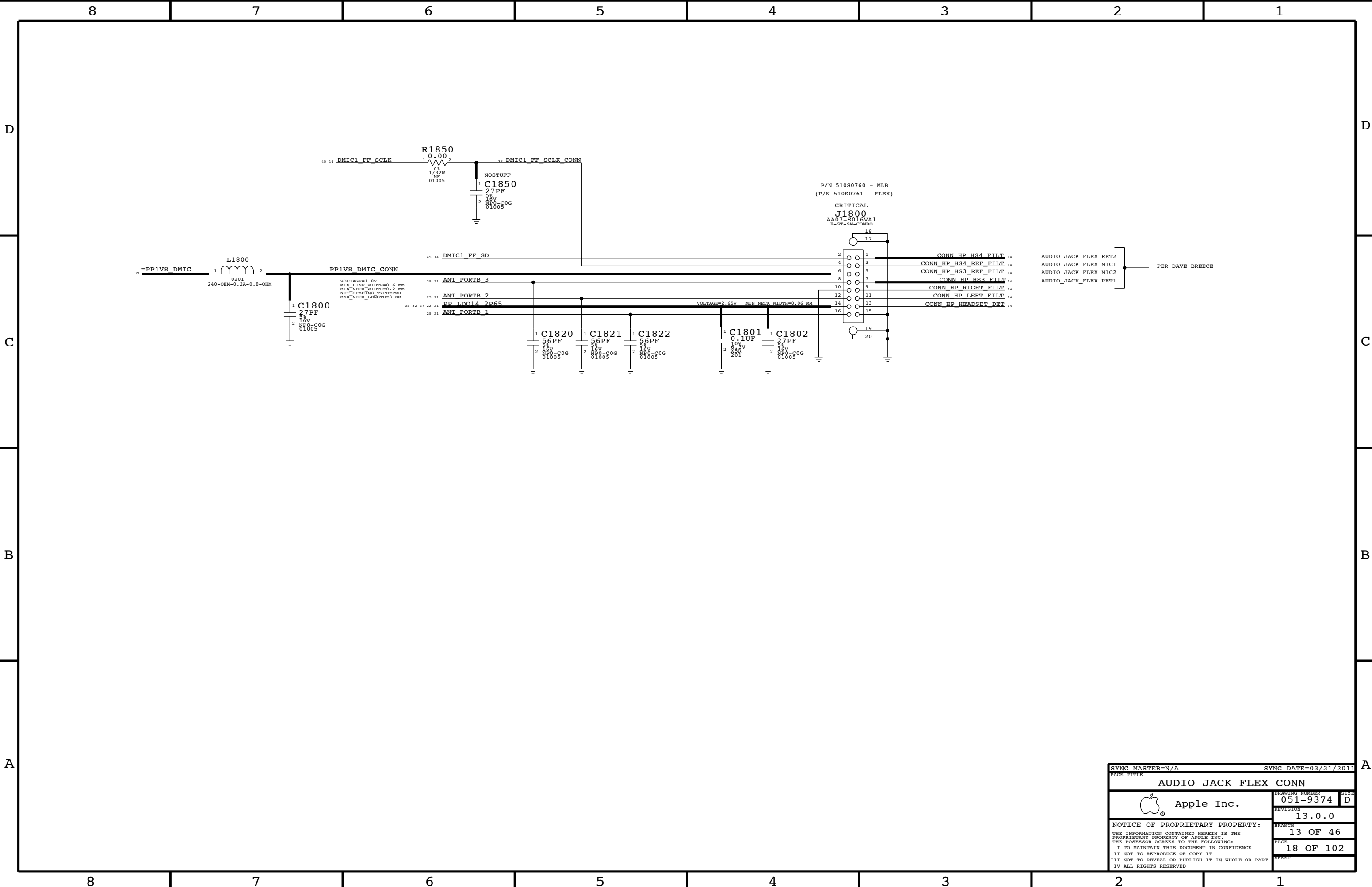
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051-9374 D  
13.0.0  
17 OF 102  
12 OF 46

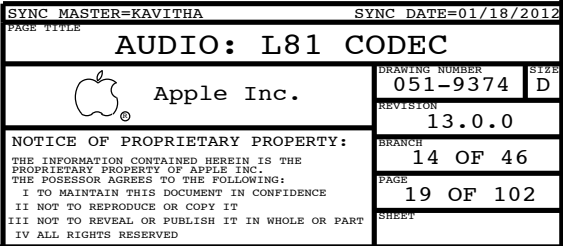
CRITICAL  
J1700  
503304-2010  
F-ST-SM-1  
22



|                                                                                       |            |                      |          |
|---------------------------------------------------------------------------------------|------------|----------------------|----------|
| SYNC MASTER=V/A                                                                       |            | SYNC DATE=06/21/2010 |          |
| PAGE TITLE                                                                            |            |                      |          |
| TOUCH: FLEX CONNECTOR                                                                 |            |                      |          |
|  | Apple Inc. | DRAWING NUMBER       | 051-9374 |
|                                                                                       |            | SIZE                 | D        |
|                                                                                       |            | REVISION             | 13.0.0   |
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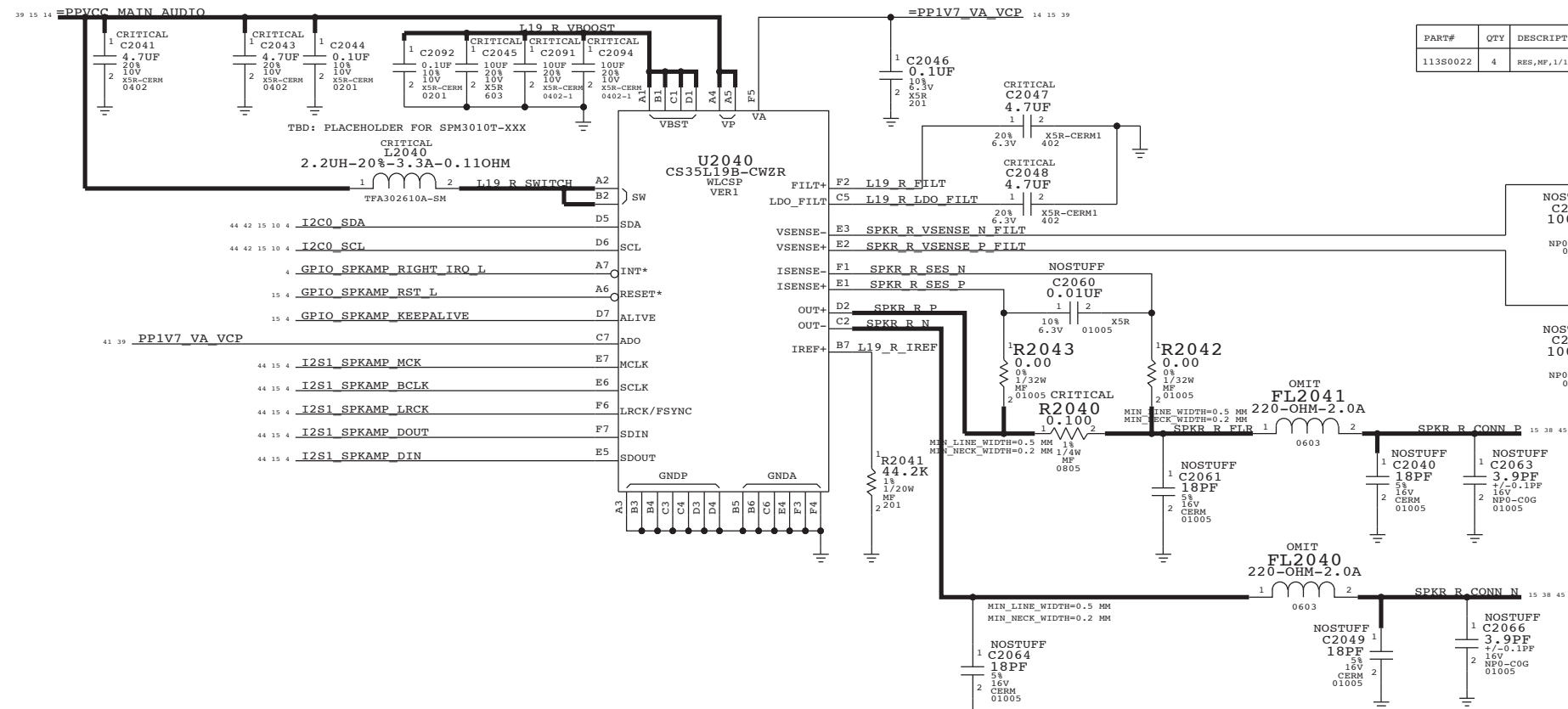


|                                                                                                                                                                                                                                                                                                                         |  |                      |           |
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| SYNC MASTER=N/A                                                                                                                                                                                                                                                                                                         |  | SYNC DATE=03/31/2011 |           |
| PAGE TITLE                                                                                                                                                                                                                                                                                                              |  |                      |           |
| AUDIO JACK FLEX CONN                                                                                                                                                                                                                                                                                                    |  |                      |           |
|  Apple Inc.                                                                                                                                                                                                                        |  | DRAWING NUMBER       | 051-9374  |
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|                                                                                                                                                                                                                                                                                                                         |  | PAGE                 | 18 OF 102 |
|                                                                                                                                                                                                                                                                                                                         |  | SHEET                |           |
|                                                                                                                                                                                                                                                                                                                         |  |                      |           |



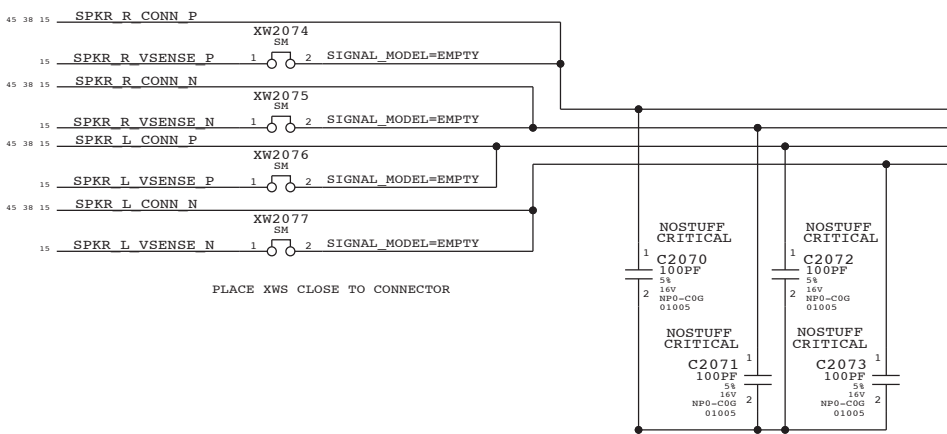
RIGHT SPEAKER AMP

I2C ADDRESS: 1000001X



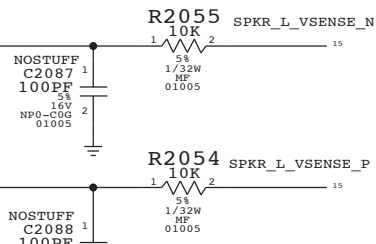
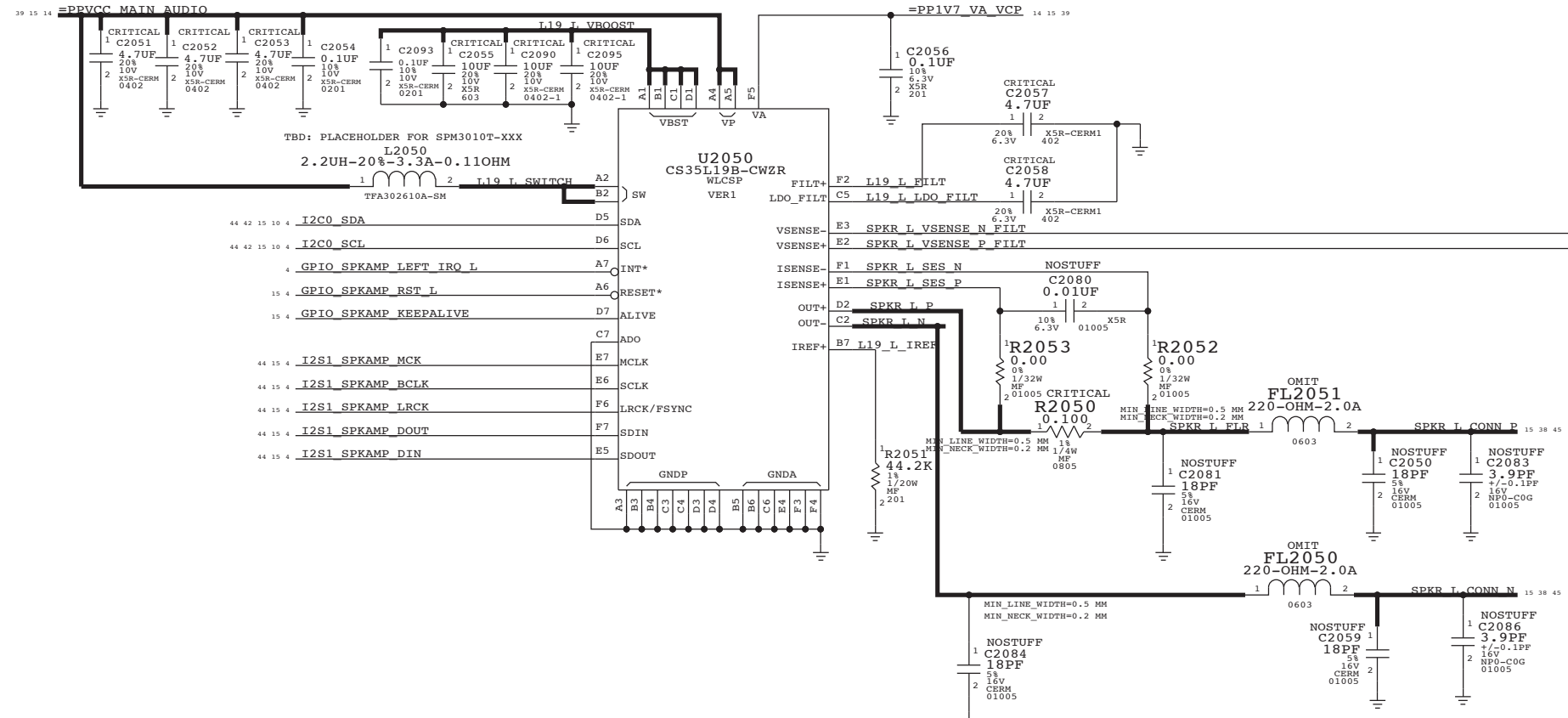
| PART#    | QTY | DESCRIPTION                       | REFERENCE DESIGNATOR(S)     | CRITICAL | BOM OPTION |
|----------|-----|-----------------------------------|-----------------------------|----------|------------|
| 113S0022 | 4   | RES,MP,1/10W,0 OHM,5%,0603,SMD,LF | FL2040,FL2041,FL2050,FL2051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


SPEAKER CONNECTOR



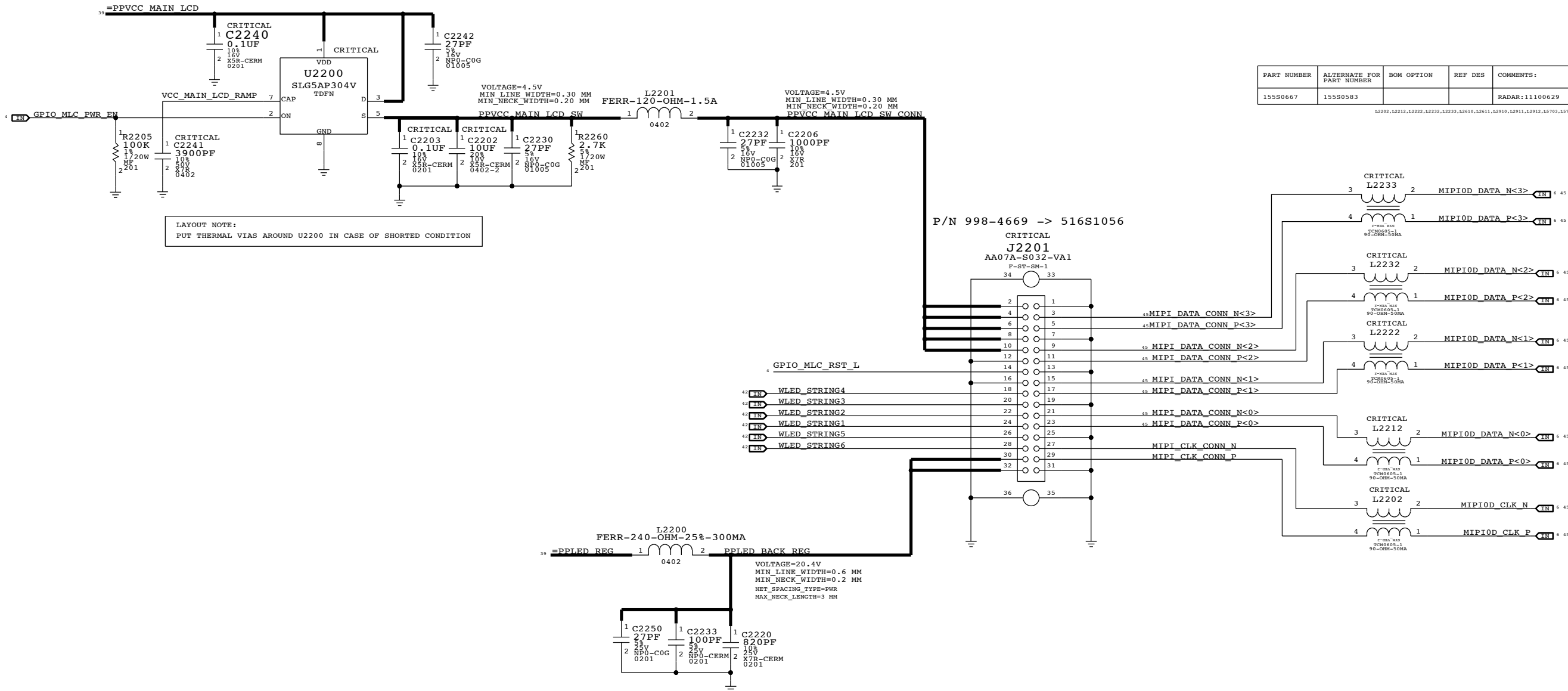
LEFT SPEAKER AMP


I2C ADDRESS: 1000000X



|                                                                                                                                                                                                                                                                                                                         |  |                      |           |
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| SYNC MASTER=KAVITHA                                                                                                                                                                                                                                                                                                     |  | SYNC DATE=01/18/2012 |           |
| PAGE TITLE                                                                                                                                                                                                                                                                                                              |  |                      |           |
| AUDIO: CS35L19A AMPS                                                                                                                                                                                                                                                                                                    |  |                      |           |
|  Apple Inc.                                                                                                                                                                                                                        |  | DRAWING NUMBER       | 051-9374  |
|                                                                                                                                                                                                                                                                                                                         |  | SIZE                 | D         |
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|                                                                                                                                                                                                                                                                                                                         |  | PAGE                 | 20 OF 102 |
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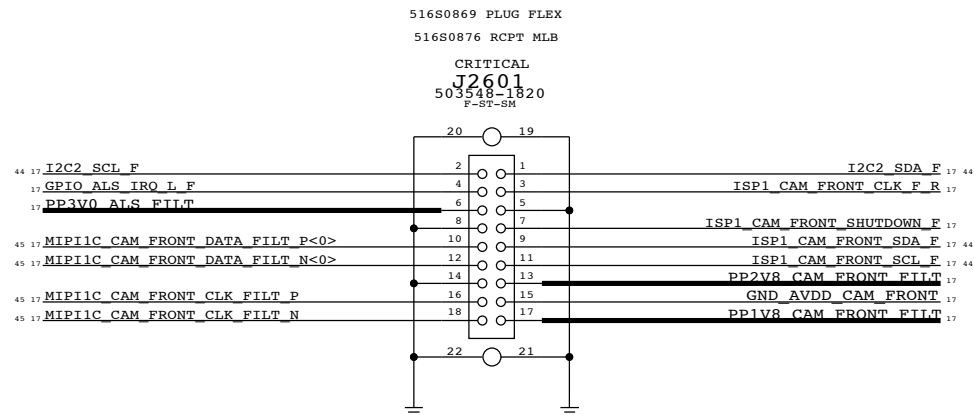
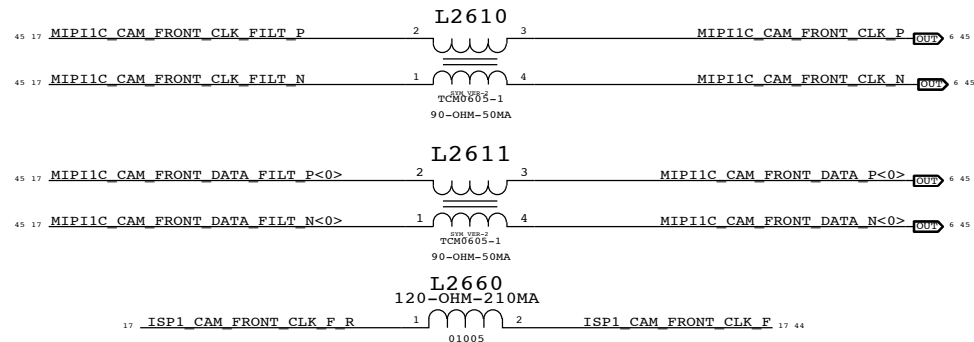
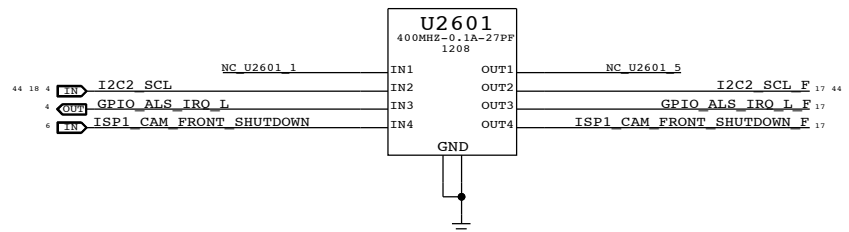
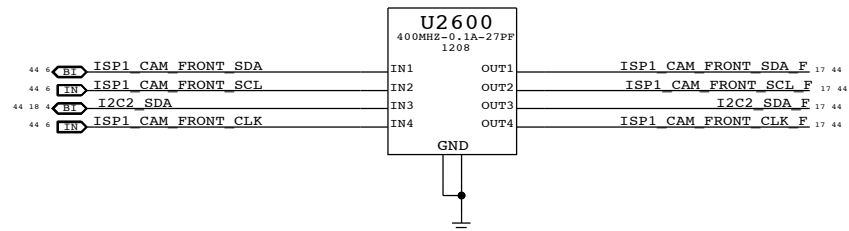
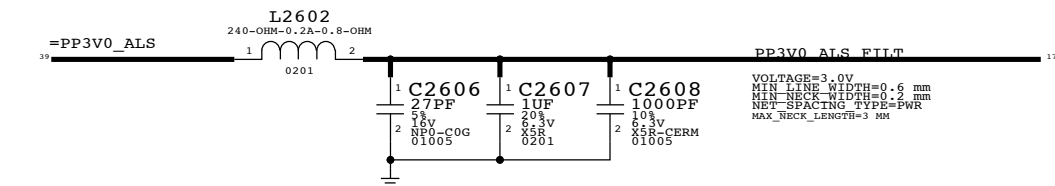
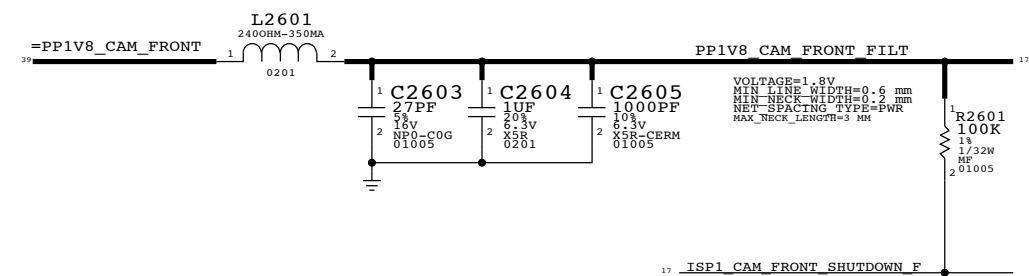
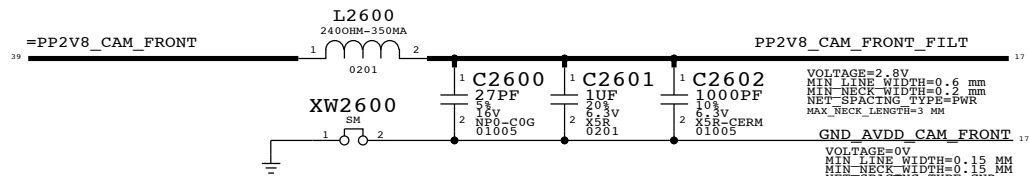
# MIPI CONNECTOR




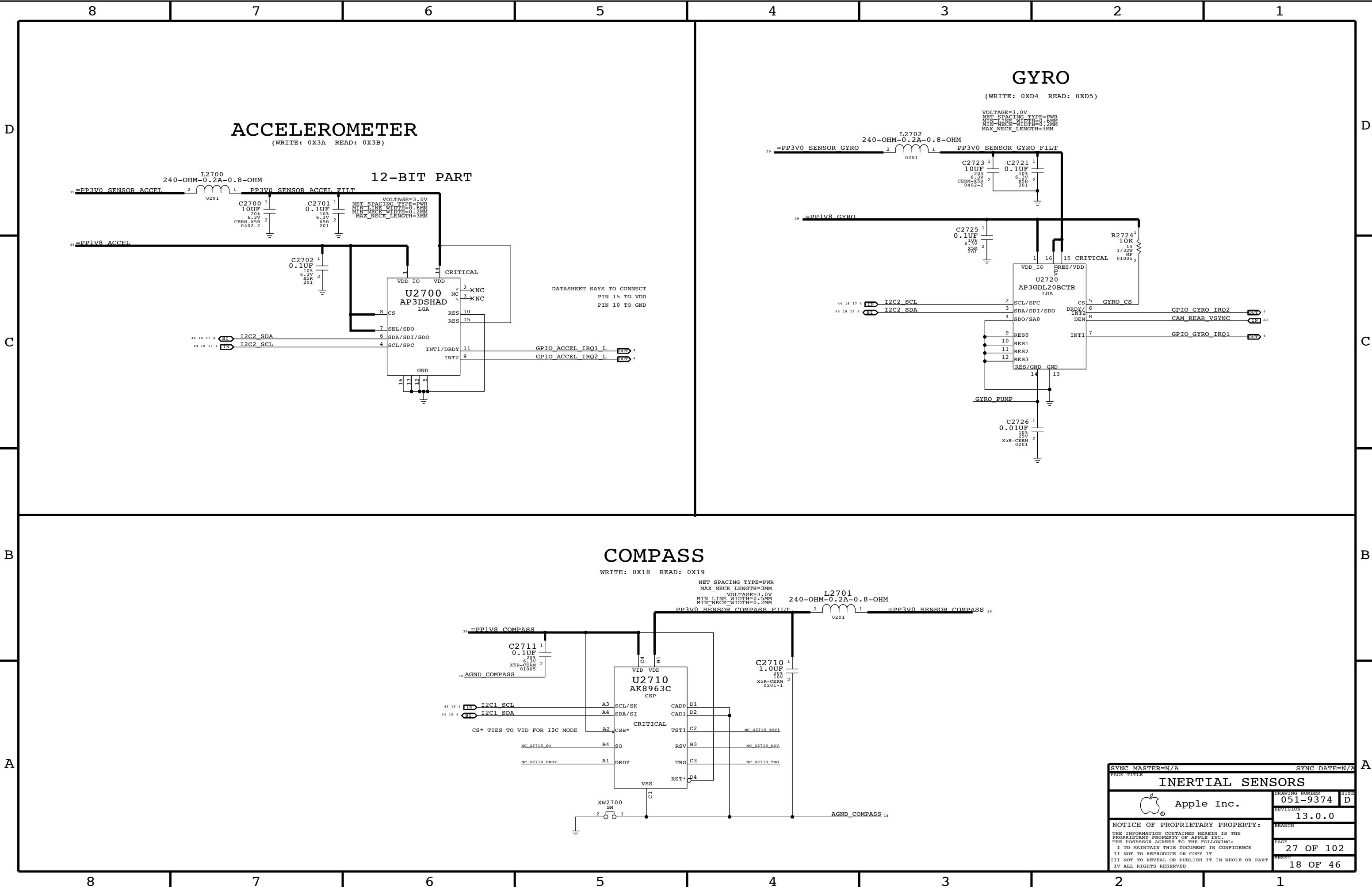
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| SYNC MASTER=N/A                                                                                                   |                | SYNC DATE=N/A |           |
| PAGE TITLE                                                                                                        |                |               |           |
| VIDEO: MIPI CONNECTOR                                                                                             |                |               |           |
|  Apple Inc.                  | DRAWING NUMBER | 051-9374      | SIZE<br>D |
|                                                                                                                   | REVISION       | 13.0.0        |           |
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# VGA FRONT CAMERA CONNECTOR



|                                                                                                                                                                                                                                                                                                                             |  |                |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|-----------|
| SYNC MASTER=N/A                                                                                                                                                                                                                                                                                                             |  | SYNC DATE=N/A  |           |
| PAGE TITLE                                                                                                                                                                                                                                                                                                                  |  |                |           |
| FF CAM & MIC CONNECTORS                                                                                                                                                                                                                                                                                                     |  |                |           |
|  Apple Inc.                                                                                                                                                                                                                            |  | DRAWING NUMBER | 051-9374  |
|                                                                                                                                                                                                                                                                                                                             |  | SIZE           | D         |
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|                                                                                                                                                                                                                                                                                                                             |  | BRANCH         |           |
|                                                                                                                                                                                                                                                                                                                             |  | PAGE           | 26 OF 102 |
|                                                                                                                                                                                                                                                                                                                             |  | SHEET          | 17 OF 46  |



ACCELEROMETER

(WRITE: 0X3A READ: 0X3B)

12-BIT PART

COMPASS

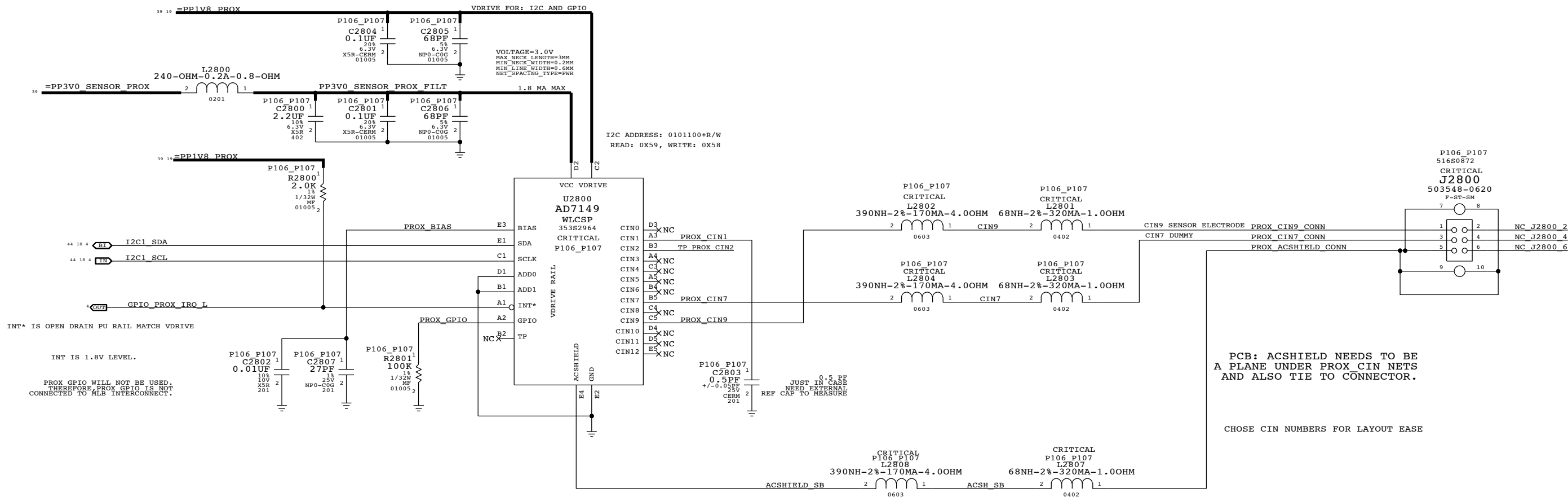
WRITE: 0X18 READ: 0X19

GYRO

(WRITE: 0XD4 READ: 0XD5)

|                                                                                                                   |  |                 |  |               |  |
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| PAGE TITLE                                                                                                        |  | SYNC MASTER=N/A |  | SYNC DATE=N/A |  |
| INERTIAL SENSORS                                                                                                  |  | DRAWING NUMBER  |  | SIZE          |  |
| Apple Inc.                                                                                                        |  | 051-9374        |  | D             |  |
| REVISION                                                                                                          |  | 13.0.0          |  | BRANCH        |  |
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# PROX SENSOR



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

PCB: AC SHIELD NEEDS TO BE  
A PLANE UNDER PROX CIN NETS  
AND ALSO TIE TO CONNECTOR.

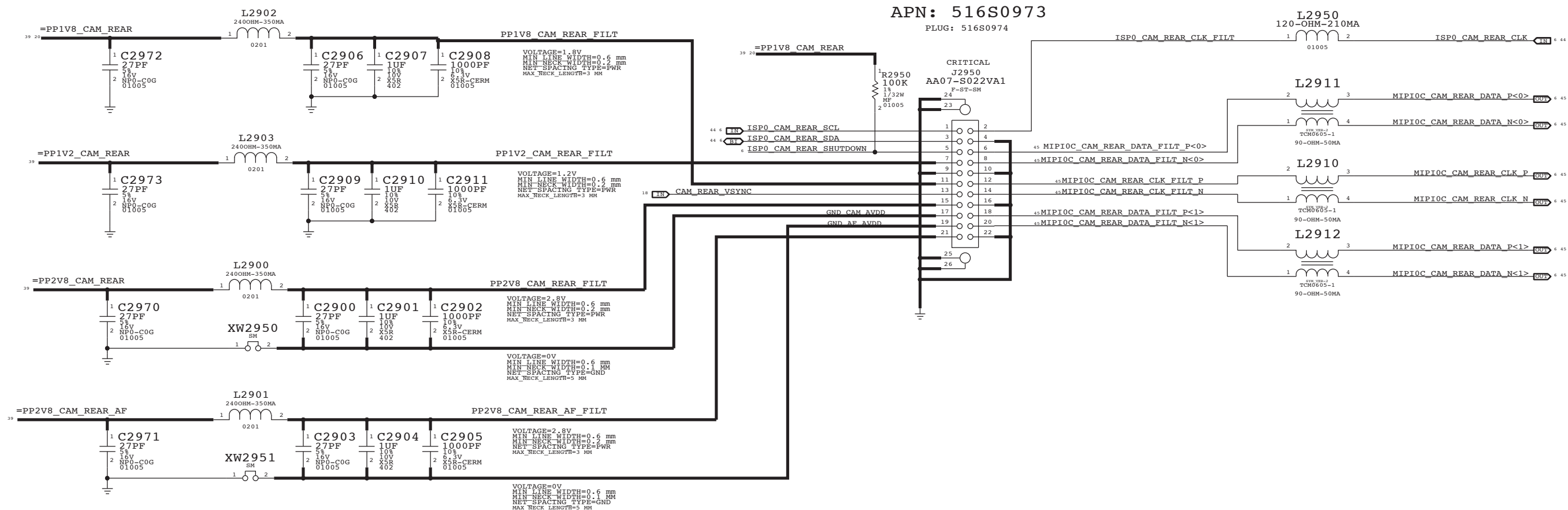
CHOSE CIN NUMBERS FOR LAYOUT EASE

|                                                                                                                                                                                                                                                                                                                           |  |                |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|-----------|
| SYNC MASTER=N/A                                                                                                                                                                                                                                                                                                           |  | SYNC DATE=N/A  |           |
| PAGE TITLE                                                                                                                                                                                                                                                                                                                |  |                |           |
| PROX SENSOR                                                                                                                                                                                                                                                                                                               |  |                |           |
|  Apple Inc.                                                                                                                                                                                                                          |  | DRAWING NUMBER | 051-9374  |
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|                                                                                                                                                                                                                                                                                                                           |  | PAGE           | 28 OF 102 |
|                                                                                                                                                                                                                                                                                                                           |  | SHEET          | 19 OF 46  |

# REAR CAMERA CONNECTOR

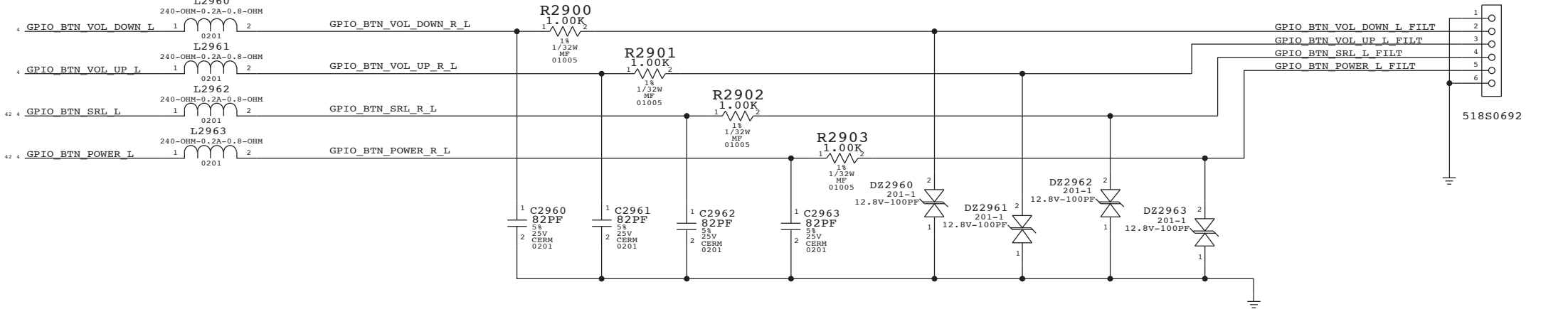
APN: 516S0973

PLUG: 516S0974



# BUTTON CONNECTOR

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



|                                                                                                                   |  |               |  |
|-------------------------------------------------------------------------------------------------------------------|--|---------------|--|
| PAGE TITLE                                                                                                        |  | SYNC DATE=N/A |  |
| DRAWING NUMBER                                                                                                    |  | SIZE          |  |
| 051-9374                                                                                                          |  | D             |  |
| REVISION                                                                                                          |  | BRANCH        |  |
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# AP INTERFACE & DEBUG CONNECTOR

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

## AP CONNECTIONS

|    |    |    |    |    |    |    |                      |   |                      |         |
|----|----|----|----|----|----|----|----------------------|---|----------------------|---------|
| 34 | 33 | 31 | 30 | 29 | 23 | 21 | PP BATT VCC CONN     | = | PPBATT VCC RF        | 39      |
| 25 |    |    |    |    |    |    | TX GTR THRESH        | = | GPIO_BB_GSM_TXBURST  | 4       |
| 24 | 23 | 21 |    |    |    |    | BB_RST_L             | = | GPIO_BB_RST_L        | 4       |
|    |    |    |    |    |    |    | RESET_DET_L          | = | GPIO_BB_RST_DET_L    | 4       |
| 25 | 21 |    |    |    |    |    | RADIO_ON_L           | = | GPIO_BB_RADIO_ON_L   | 4       |
| 23 | 21 |    |    |    |    |    | RESET_PMU_L          | = | PMU_GPIO_BB_RST_L    | 42      |
| 25 | 21 |    |    |    |    |    | BB_WAKE_HOST         | = | PMU_GPIO_BB_WAKE     | 42      |
| 21 |    |    |    |    |    |    | RF_RESET_L           | = | RST_SYSTEM_L         | 3 10 42 |
| 25 | 21 |    |    |    |    |    | PBL_RUN_BB_HSIC1_RDY | = | GPIO_BB_HSIC_DEV_RDY | 4       |

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

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

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

|    |  |  |  |  |  |  |                   |   |                  |       |
|----|--|--|--|--|--|--|-------------------|---|------------------|-------|
| 37 |  |  |  |  |  |  | PP_WLAN_MAIN_VCC  | = | PPBATT_VCC_WL    | 39    |
| 25 |  |  |  |  |  |  | PP_SYNC           | = | GPIO_BB_GPS_SYNC | 4     |
| 37 |  |  |  |  |  |  | PP_WL_BT_VDDIO_AP | = | PP1V8_S2R_WL     | 39    |
| 37 |  |  |  |  |  |  | CLK32K_AP         | = | PMU_CLK_32K_WLAN | 42 44 |

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

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

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

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

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

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

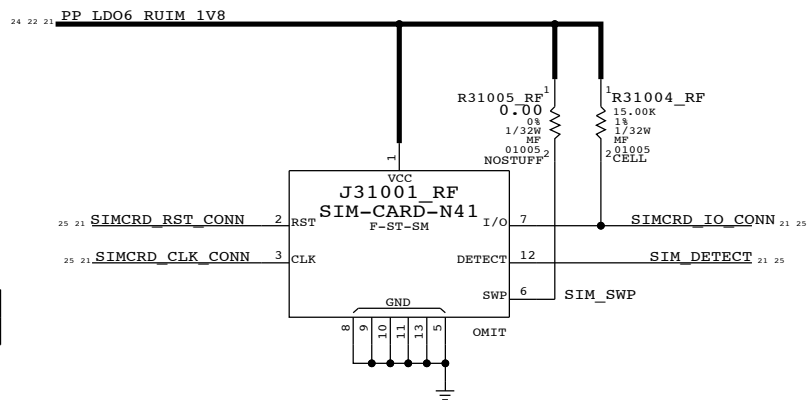
|            |      |    |   |                      |       |
|------------|------|----|---|----------------------|-------|
| PP31007_RF | P4MM | SM | 1 | BB_ERROR_FLAG        | 25    |
| PP31001_RF | P4MM | SM | 1 | SLEEP_CLK_32K        | 23 24 |
| PP31006_RF | P4MM | SM | 1 | PMIC_SSB_I           |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

|            |      |    |   |               |       |
|------------|------|----|---|---------------|-------|
| PP31013_RF | P4MM | SM | 1 | BT_UART_TXD   | 21 37 |
| PP31014_RF | P4MM | SM | 1 | BT_UART_RXD   | 21 37 |
| PP31015_RF | P4MM | SM | 1 | SPI_DATA_MOSI | 25    |
| PP31016_RF | P4MM | SM | 1 | SPI_DATA_MISO | 25    |
| PP31017_RF | P4MM | SM | 1 | SPI_CS_L      | 25    |
| PP31018_RF | P4MM | SM | 1 | SPI_CLK       | 25    |

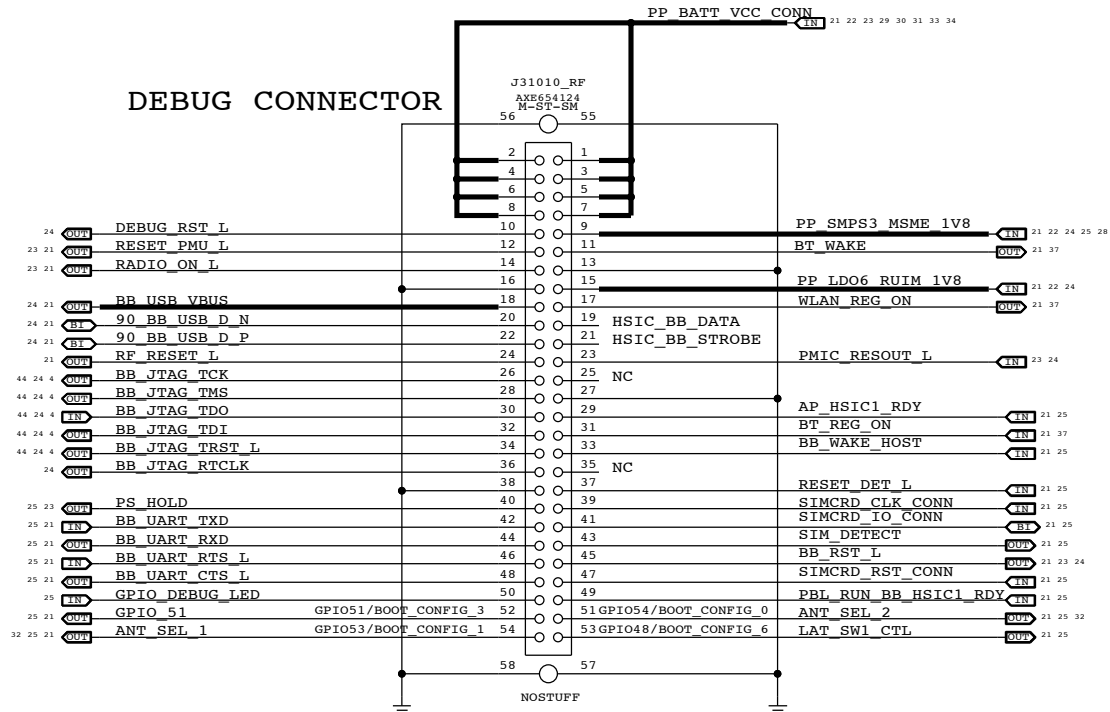
## BT UART

## BB NOR SPI

## SIM CARD CONNECTOR



## DEBUG CONNECTOR



| BOOT OPTIONS           | BOOT_CONFIG<br>SW REGISTER<br>VALUE | GPIO/BOOT_CONFIG CONFIGURATION |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |
|------------------------|-------------------------------------|--------------------------------|----|----|----|----|----|----|----|----|---|---|---|---|---|---|---|
|                        |                                     | 47                             | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| BOOT_DEFAULT_OPTION    | 0X00                                | X                              | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | X |   |   |   |   |   |   |
| BOOT_NAND_OPTION       | 0X01                                | X                              | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | X |   |   |   |   |   |   |
| BOOT_HSIC_OPTION       | 0X02                                | X                              | 1  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | X |   |   |   |   |   |   |
| BOOT_USB_OPTION        | 0X03                                | X                              | 1  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | X |   |   |   |   |   |   |
| ENABLE_SAHARA_PROTOCOL | 0X08                                | X                              | 1  | 0  | 0  | 0  | 1  | 0  | X  | X  | X |   |   |   |   |   |   |

R R104  
C CXXX  
XWXW206  
DZDZ101  
U U101

| PAGE TITLE                                                                                                        |  |                | SYSTEM & DEBUG CONNECTORS |      |
|-------------------------------------------------------------------------------------------------------------------|--|----------------|---------------------------|------|
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BASEBAND PMU (1 OF 2)

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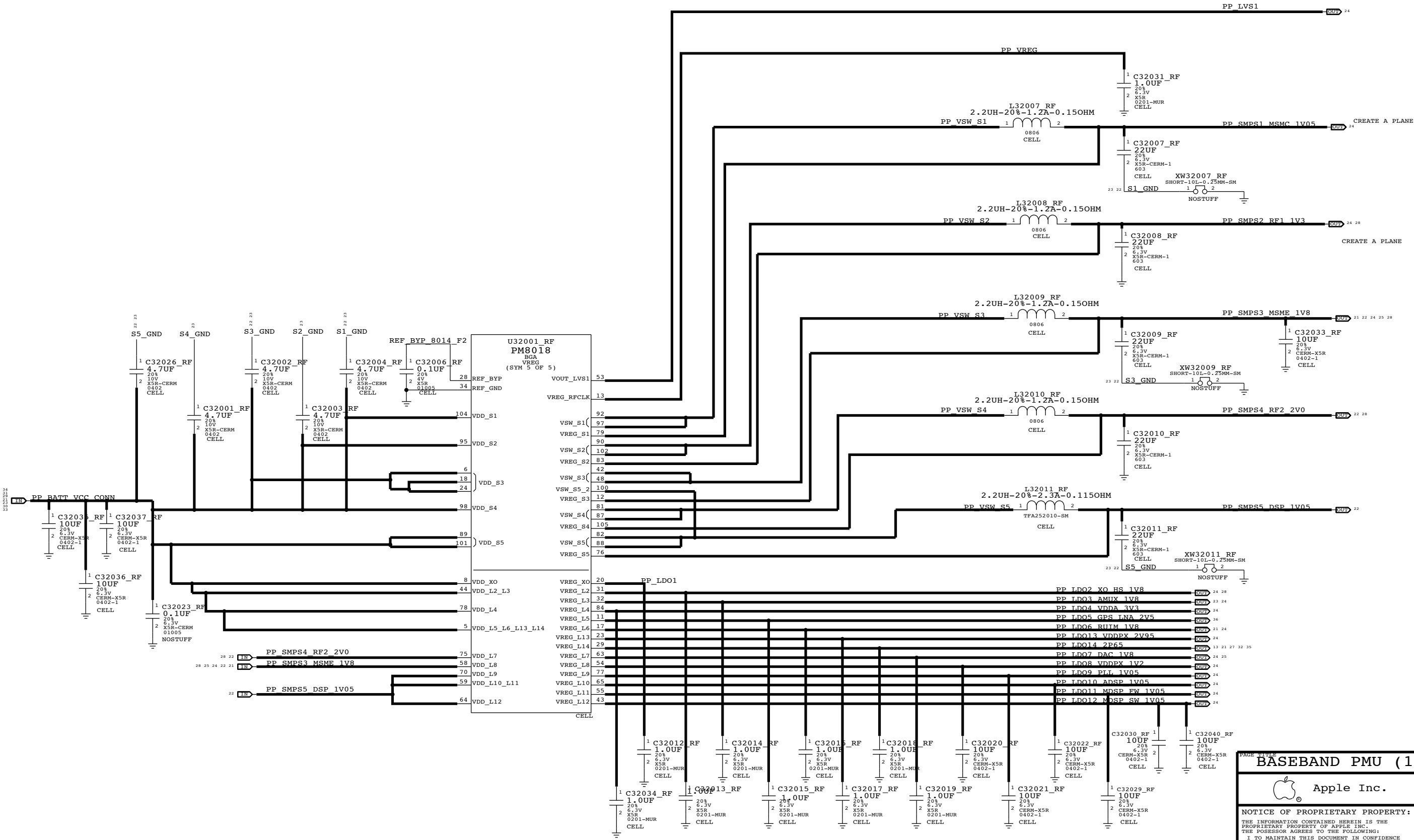
A

D

C

B

A



R R207  
C C237  
L L211  
U U201

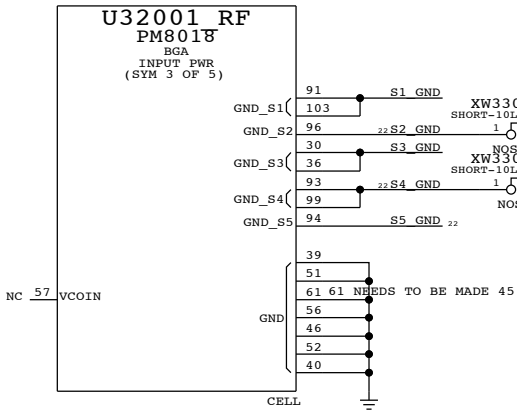
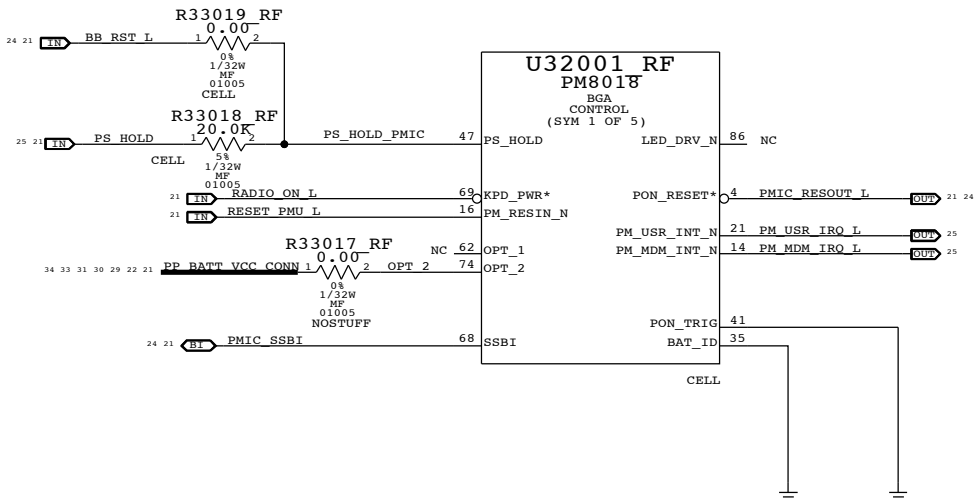
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------|
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| Apple Inc.                                                                                                                                                                                                                                                                                                        |  | DRAWING NUMBER<br>051-9374 |
| REVISION<br>13.0.0                                                                                                                                                                                                                                                                                                |  | SIZE<br>D                  |
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# BASEBAND PMU (2 OF 2)

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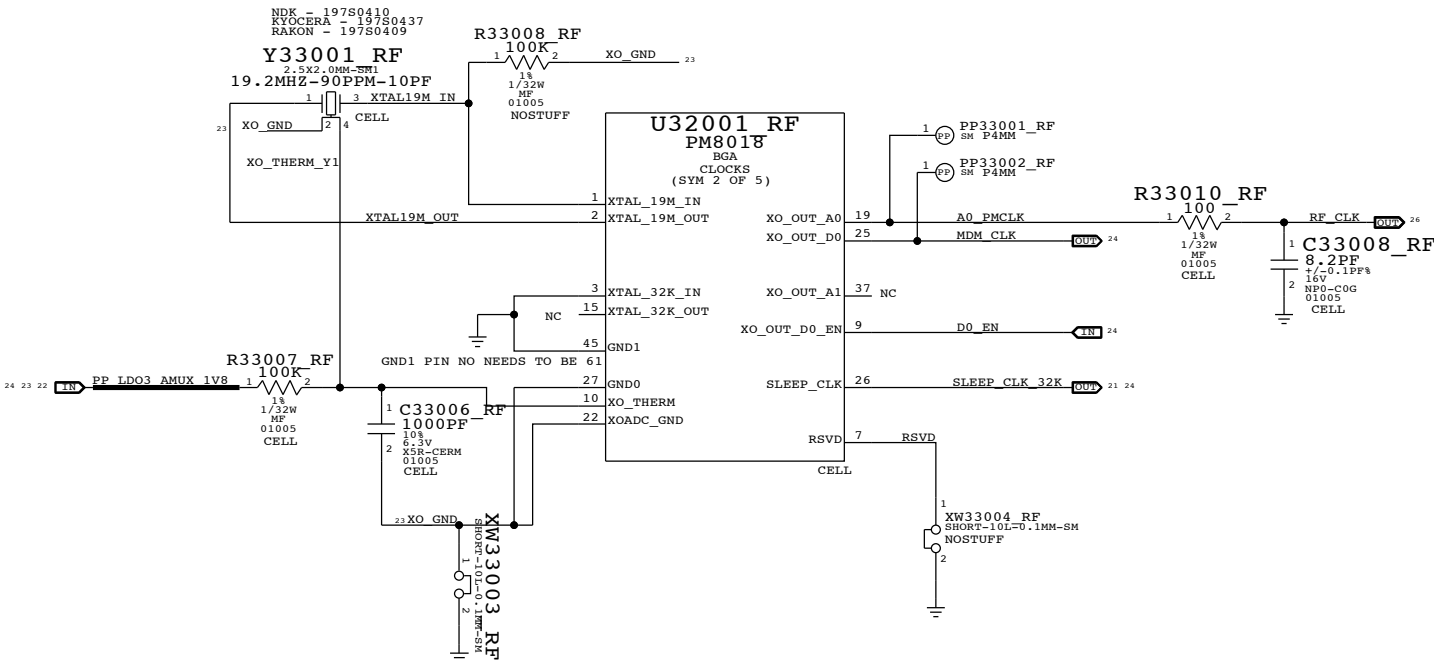
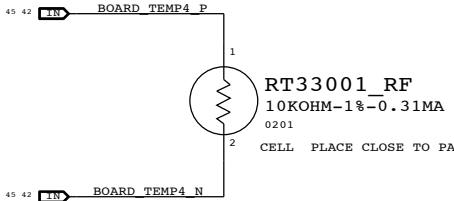
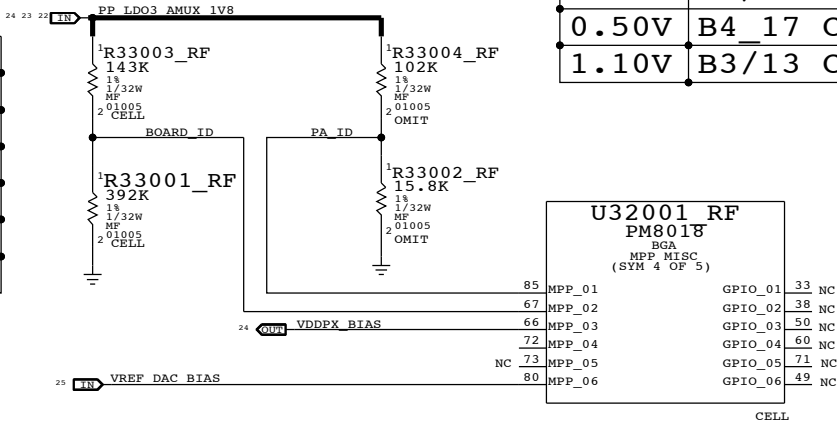
| BOARD_ID | REVISION                   |
|----------|----------------------------|
| 0.25V    | N41 PROTO 1                |
| 0.50V    | N41 PROTO 2, X122 RF DEV 1 |
| 0.70V    | N41 PROTO 3, X122 PROTO 0  |
| 0.90V    | N41 EVT 1, X122 PROTO 1    |
| 1.10V    | N41 EVT 2, X122 EVT        |
| 1.30V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

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



## ALTERNATES

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



## BOM OPTIONS

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

R R317  
C C309  
L LXXX  
U U301  
XW XW305

| PAGE TITLE                                                                                                        |  |                         |
|-------------------------------------------------------------------------------------------------------------------|--|-------------------------|
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D

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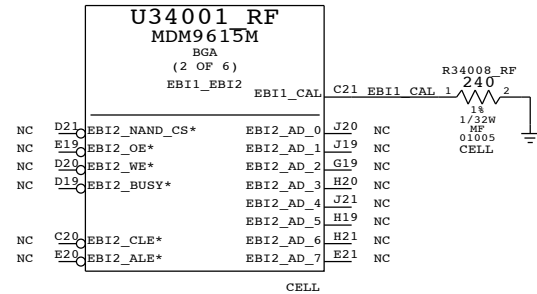
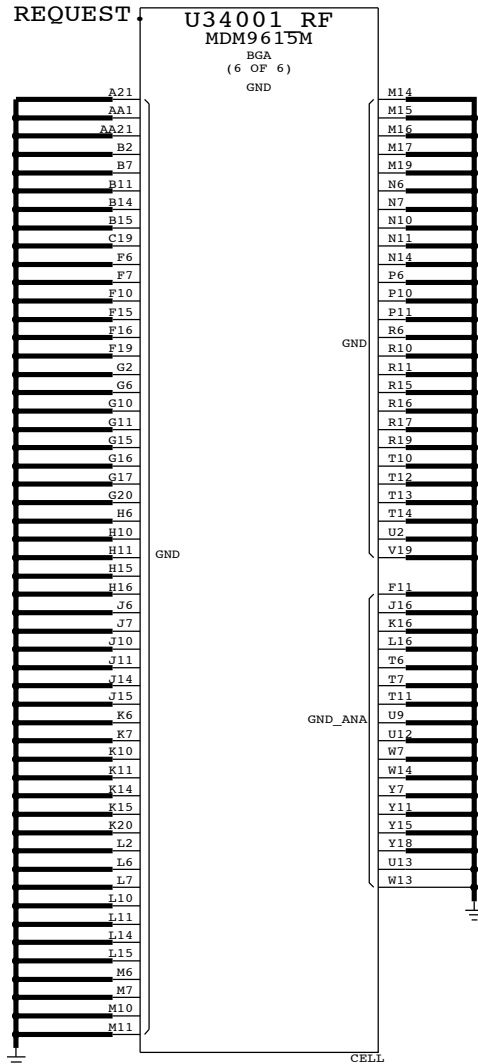
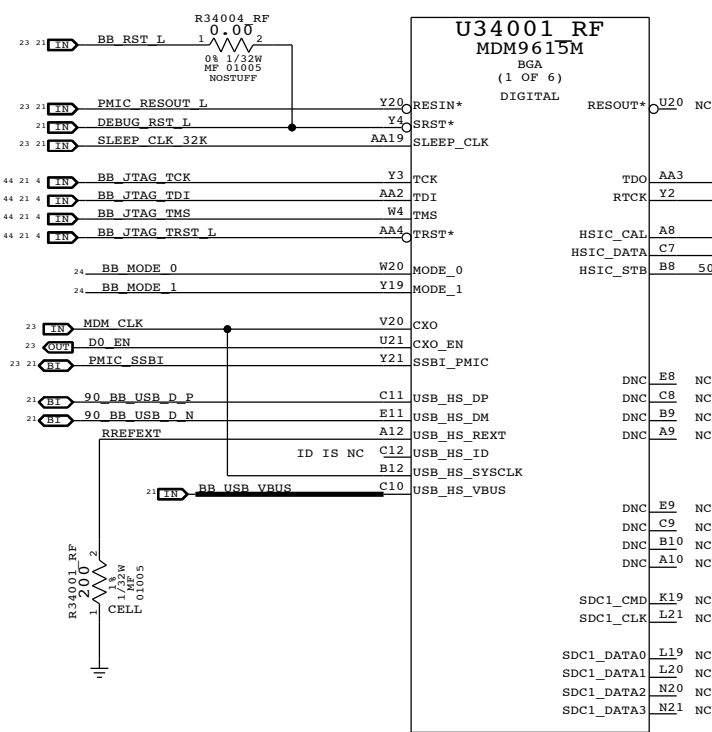
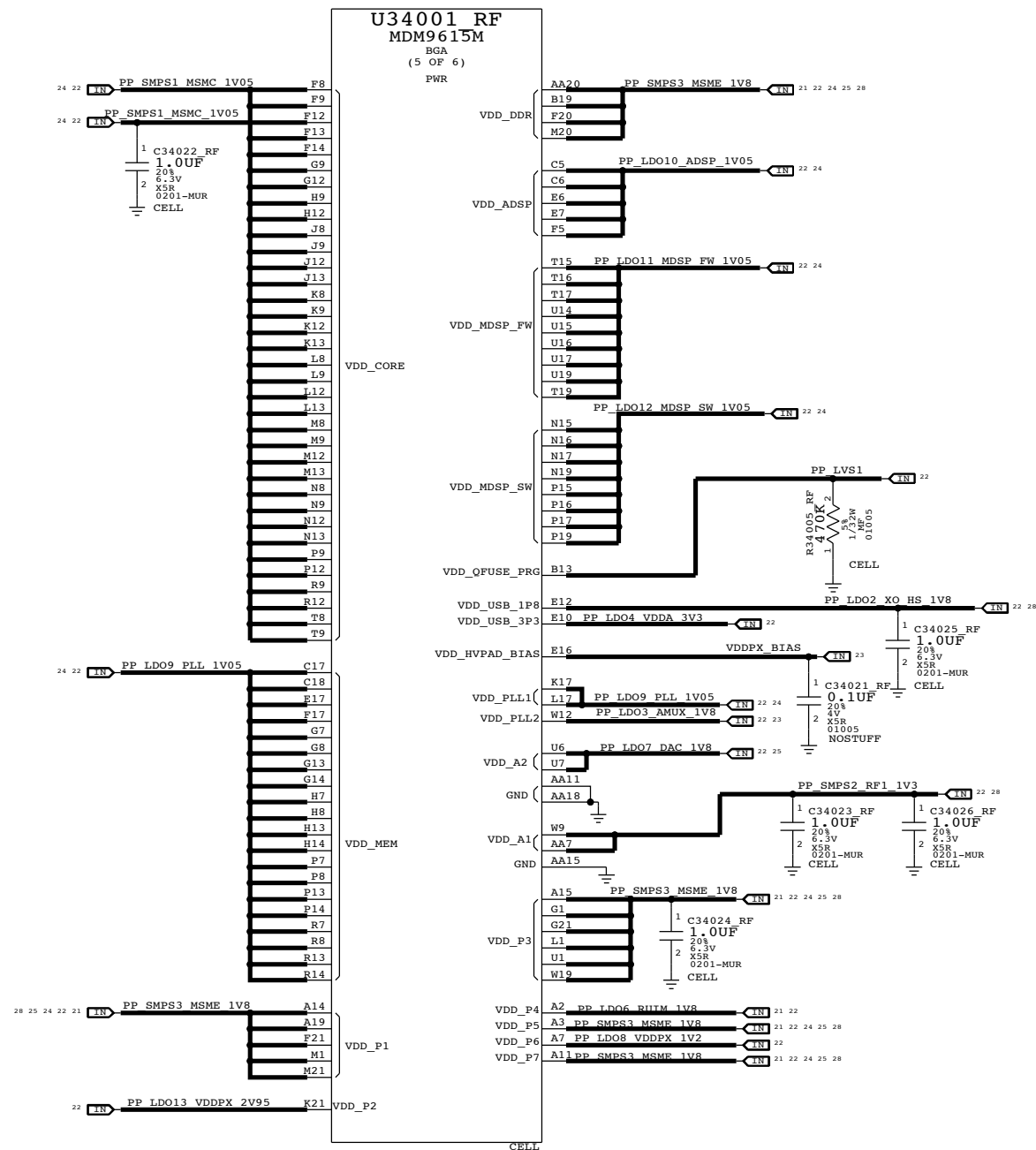
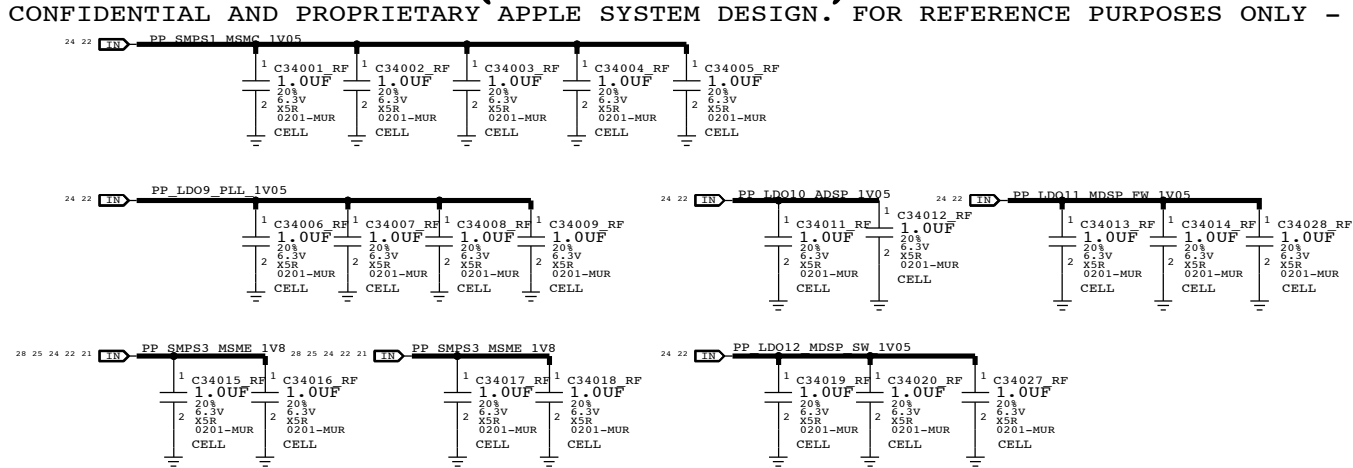
C

B

B

A

A

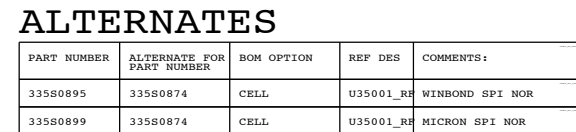



R R502  
C C528  
L LXXX  
U U501

|                                                                                                                                                                                                                                                                                                                   |                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| PAGE TITLE                                                                                                                                                                                                                                                                                                        |                            |
| BASEBAND (1 OF 2)                                                                                                                                                                                                                                                                                                 |                            |
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| BRANCH                                                                                                                                                                                                                                                                                                            | PAGE<br>34 OF 102          |
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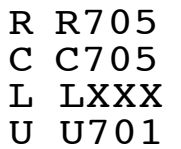


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|                                                                                                                                                                                                                                                                                                                             |                |                            |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------|--------|
| PAGE TITLE                                                                                                                                                                                                                                                                                                                  |                | MOBILE DATA MODEM (2 OF 2) |        |
|  Apple Inc.                                                                                                                                                                                                                            | DRAWING NUMBER |                            | SIZE   |
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|                                                                                                                                                                                                                                                                                                                             | PAGE           |                            |        |
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## D

C



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R RXXX
C C37007
L L803
U U801
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
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| PAGE TITLE                                                                                                        |  | DRAWING NUMBER |  | SIZE |  |
| RF TRANSCEIVER                                                                                                    |  | 051-9374       |  | D    |  |
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## D



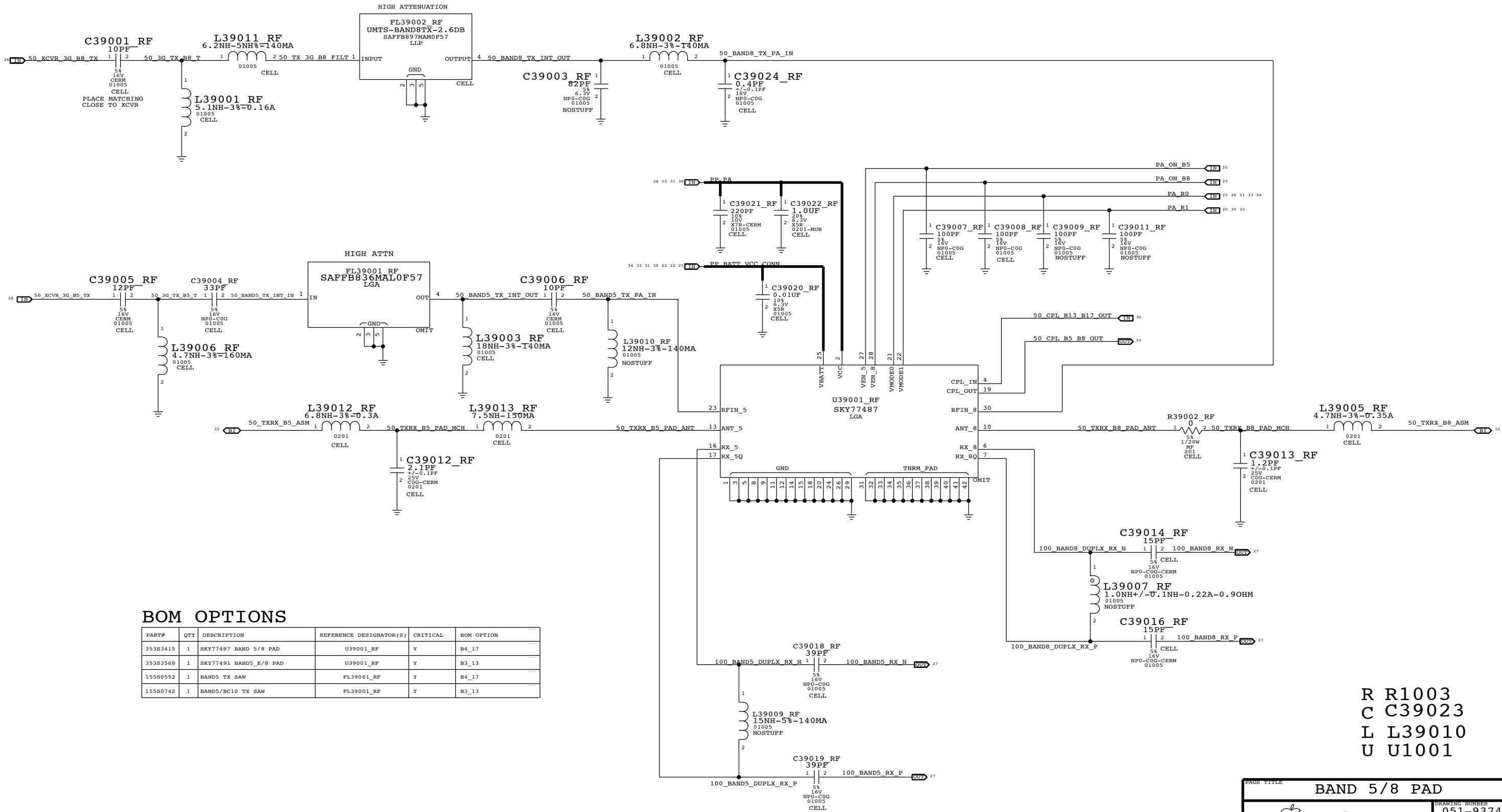
D




|                                                                                                                                                                                                                                                                                    |  |                |  |           |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|--|-----------|--|
| PAGE TITLE                                                                                                                                                                                                                                                                         |  | DRAWING NUMBER |  | SIZE      |  |
| RF TRANSCEIVER (3 OF 3)                                                                                                                                                                                                                                                            |  | 051-9374       |  | D         |  |
|  Apple Inc.                                                                                                                                                                                   |  | REVISION       |  | 13.0.0    |  |
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# BAND 5/8 PAD

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| PAGE TITLE                                                                                                                                                                                                                                                                                                        |                |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|
| BAND 5/8 PAD                                                                                                                                                                                                                                                                                                      |                |           |
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|                                                                                                                                                                                                                                                                                                                   | PAGE           | 39 OF 102 |
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|                                                                                                                                                                                                                                                                                                                   |                |           |

# B13/17 INTERSTAGE, PA, AND DUPLEXER

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D

D

C

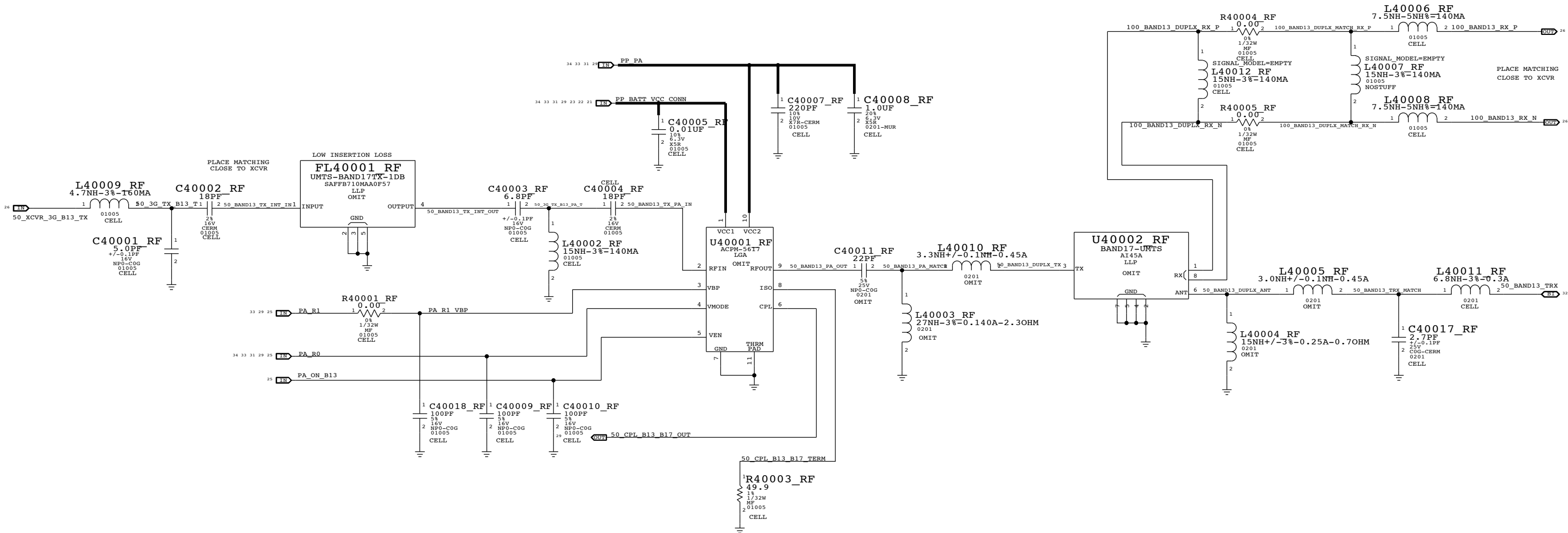
C

B

B

A

A




## 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      |

## PA POWER MODES

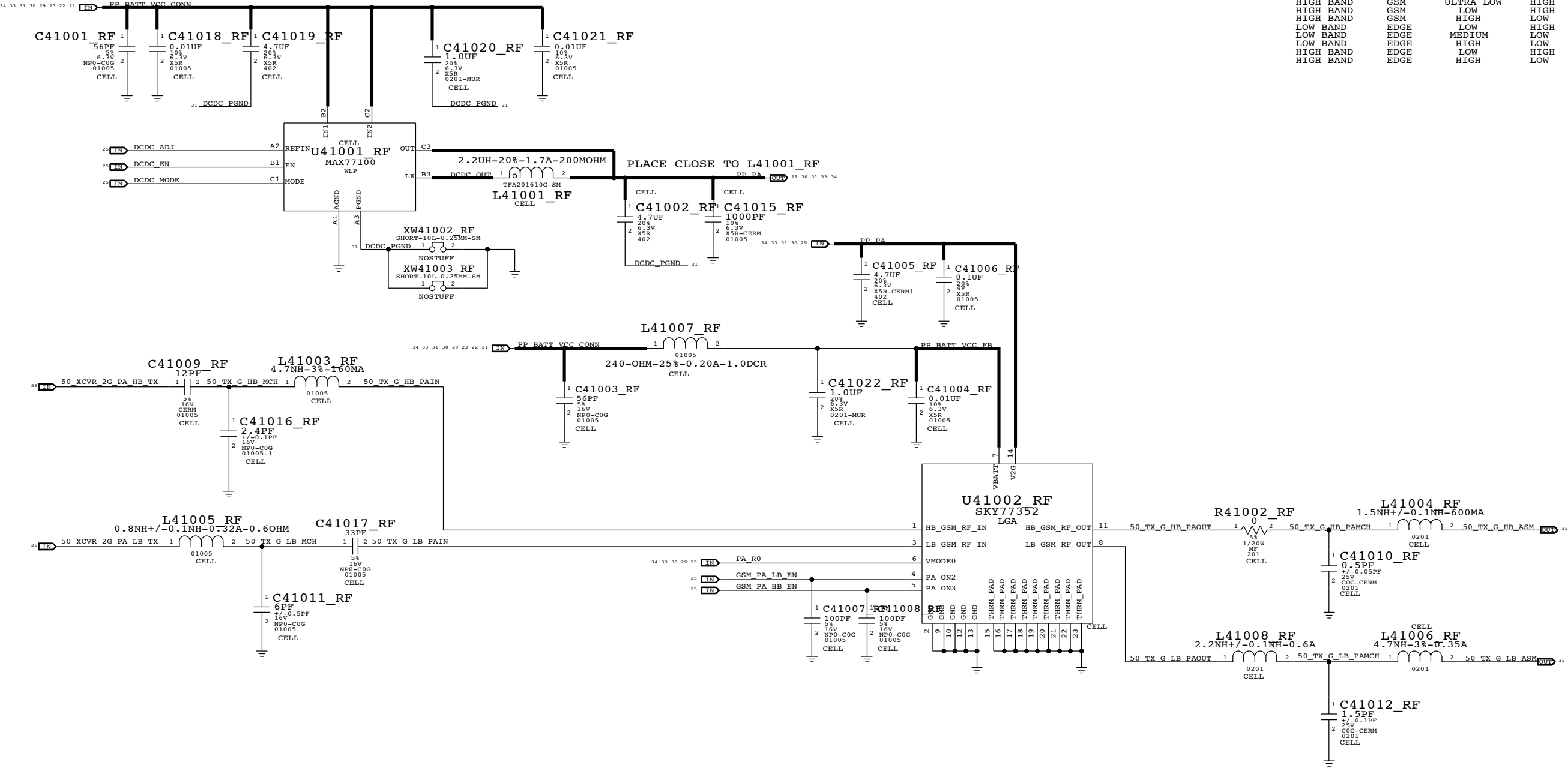
| MODE   | PA_R0 | PA_R1 |
|--------|-------|-------|
| LOW    | HIGH  | HIGH  |
| MEDIUM | LOW   | HIGH  |
| HIGH   | LOW   | LOW   |

FLFL1101  
R R1102  
C C1118  
L L1108  
U U1102

| PAGE TITLE                                                                                                        |                |           |
|-------------------------------------------------------------------------------------------------------------------|----------------|-----------|
| BAND 13 PA                                                                                                        |                |           |
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# 2G PA, PA DC/DC CONVERTER

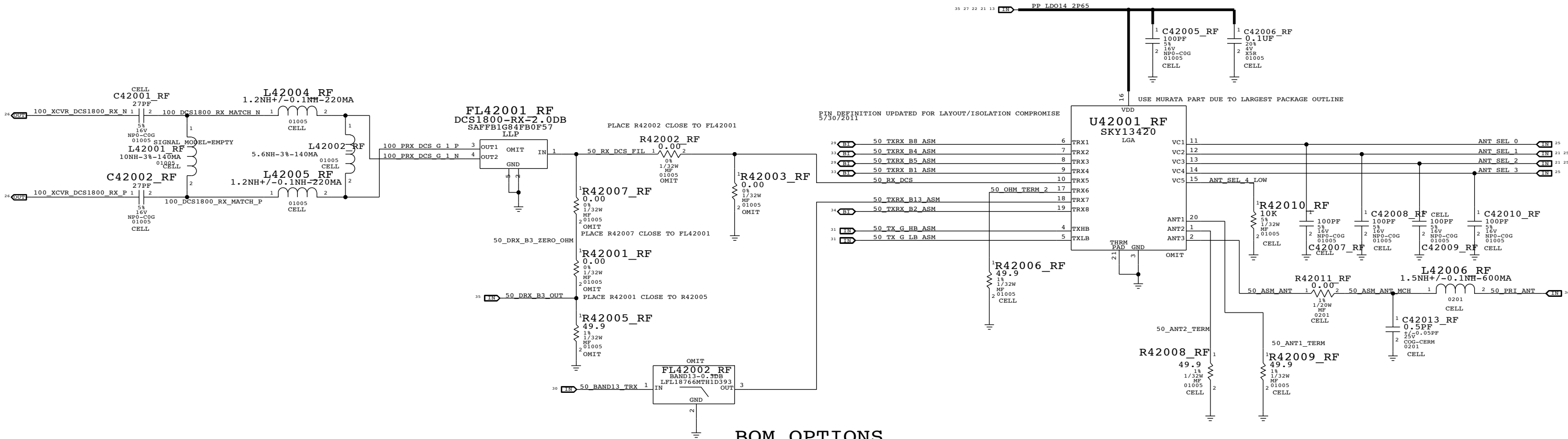
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R R1209  
C C1215  
L L41007  
U U1202

# ASM, DCS RX


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## BOM OPTIONS

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

R R42011  
C C42013  
L 42006  
U U1301  
FL FL1302

| PAGE TITLE                                                                                                                                                                                                                                                                                                        |                |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|
| DCS RX, ASM                                                                                                                                                                                                                                                                                                       |                |           |
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|                                                                                                                                                                                                                                                                                                                   | PAGE           | 42 OF 102 |
|                                                                                                                                                                                                                                                                                                                   | SHEET          | 32 OF 46  |



## D

C



## A

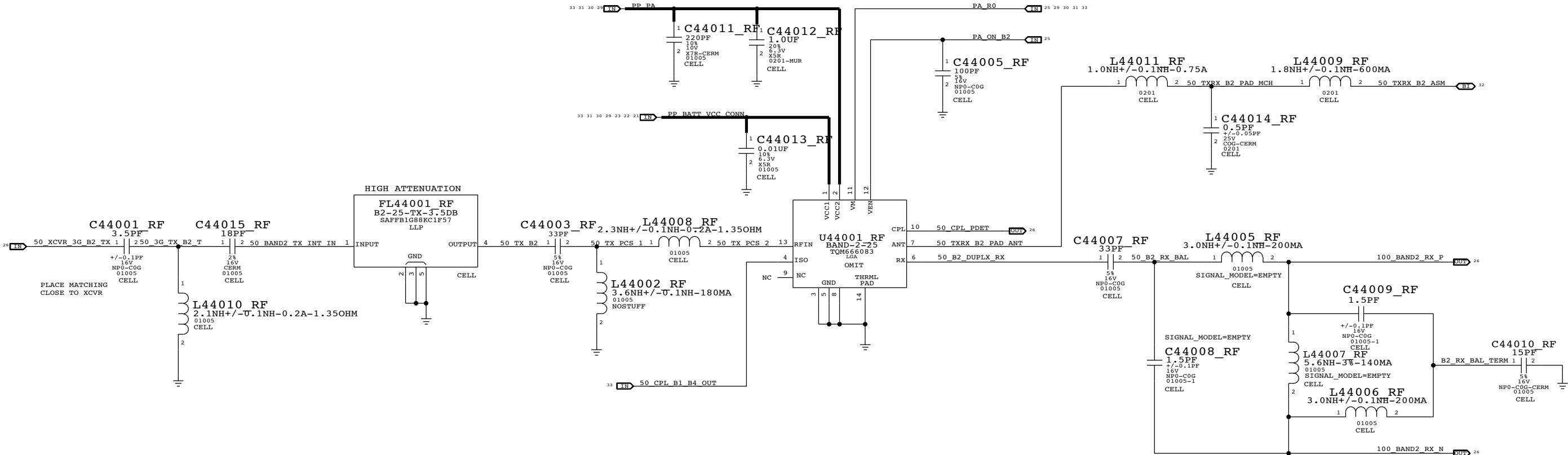
## BOM OPTIONS

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

1

# BAND2 PAD


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## BOM OPTIONS

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

R R1501  
C C44014  
L L1509  
U U1501  
FL FL1501

| PAGE TITLE                                                                                                                                                                                                                                                                                                        |                |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|
| BAND2 PAD                                                                                                                                                                                                                                                                                                         |                |           |
|  Apple Inc.                                                                                                                                                                                                                  | DRAWING NUMBER | 051-9374  |
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|                                                                                                                                                                                                                                                                                                                   | PAGE           | 44 OF 102 |
|                                                                                                                                                                                                                                                                                                                   | SHEET          | 34 OF 46  |

## A

A



A

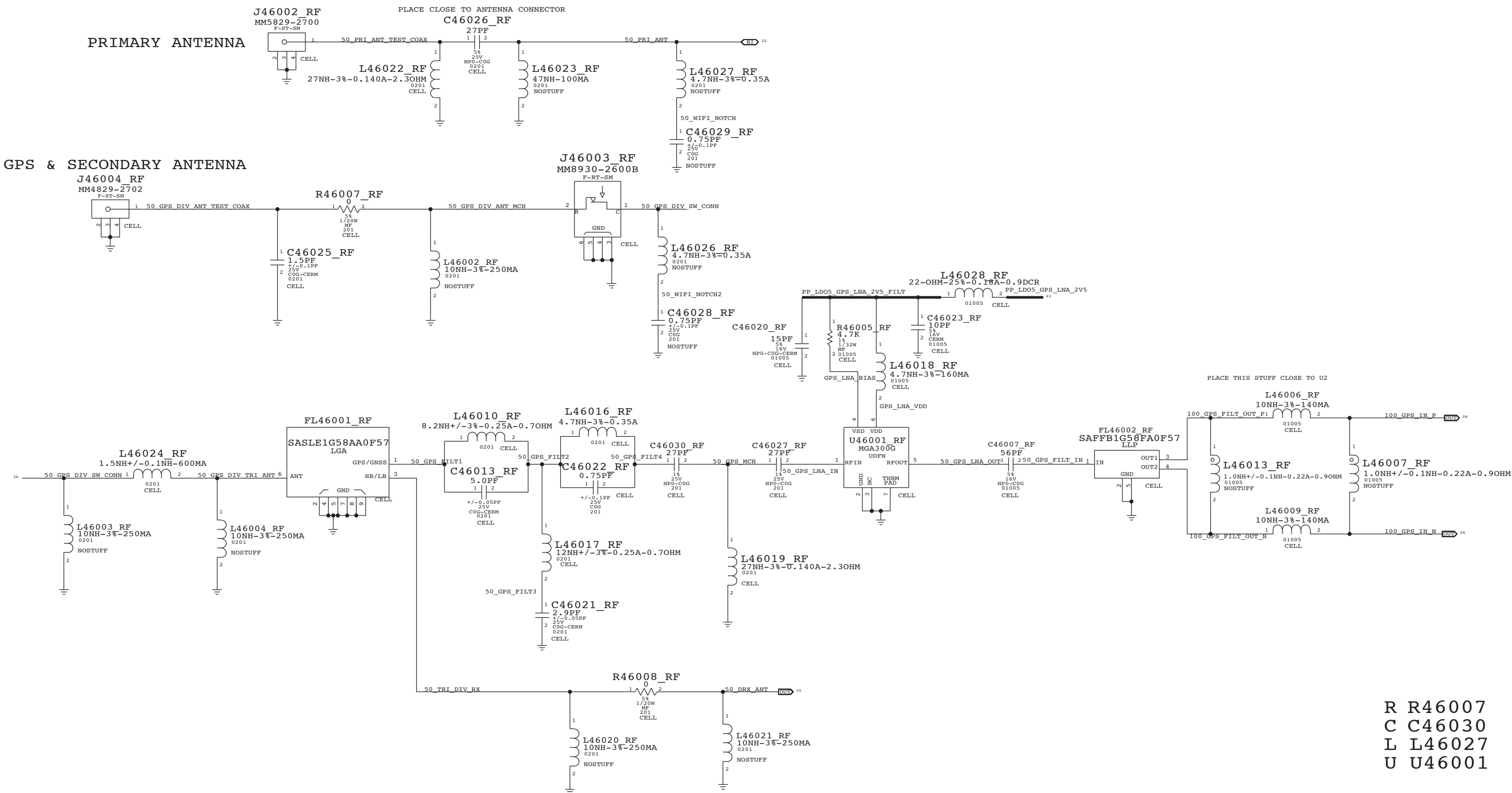
A

## A


AA

A

# GPS

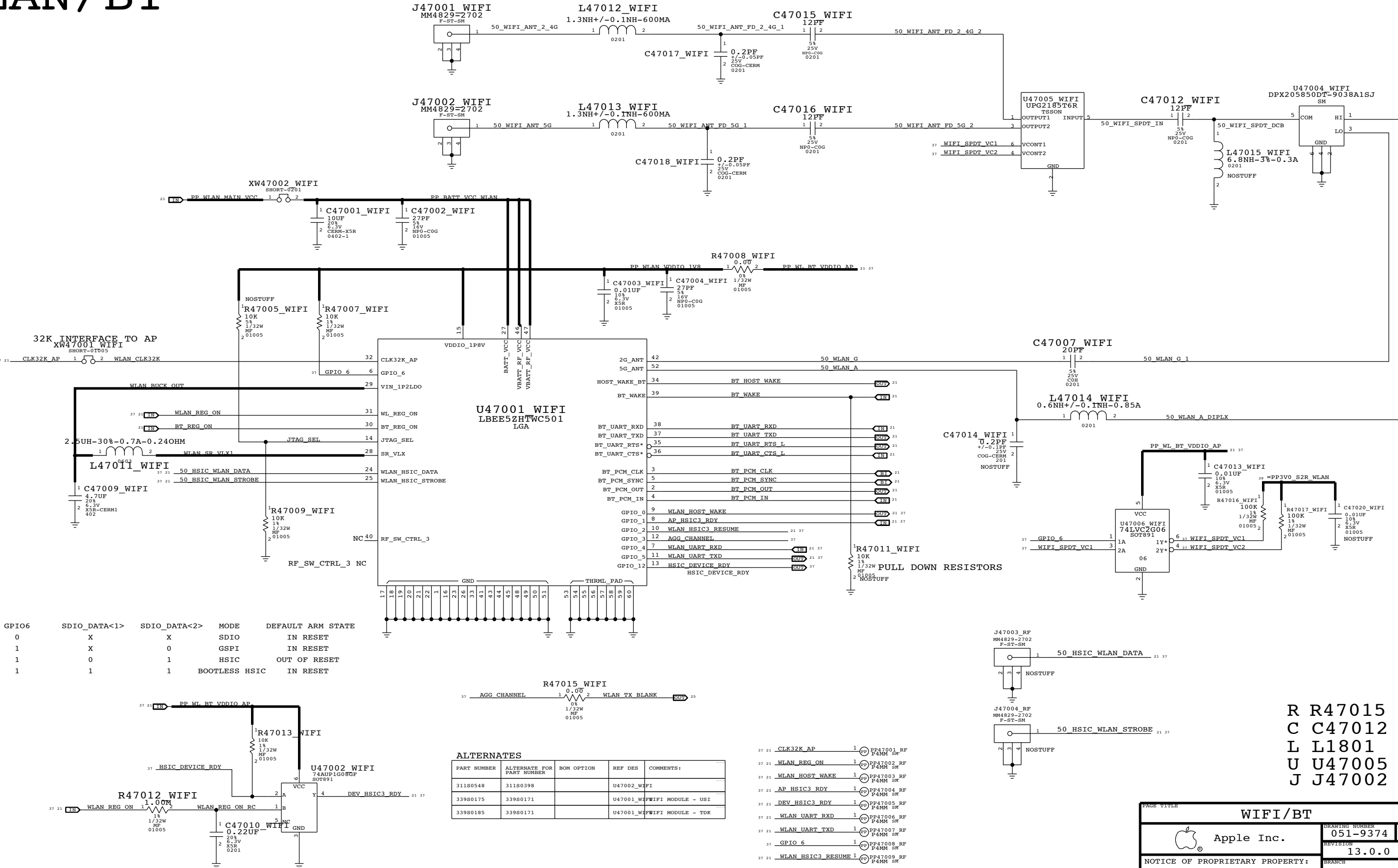


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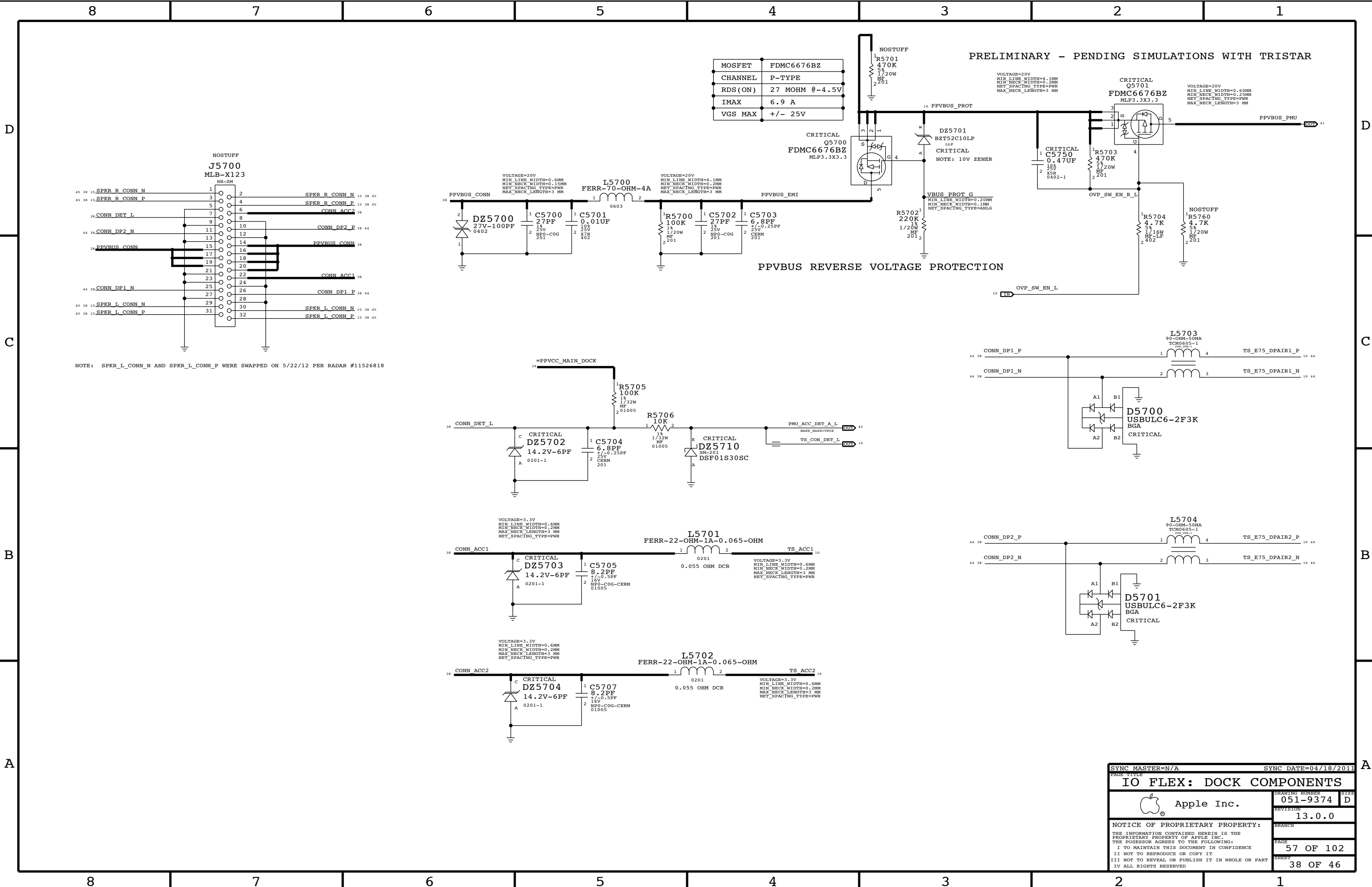
| GPS                                                                                                               |                |           |
|-------------------------------------------------------------------------------------------------------------------|----------------|-----------|
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# WLAN/BT

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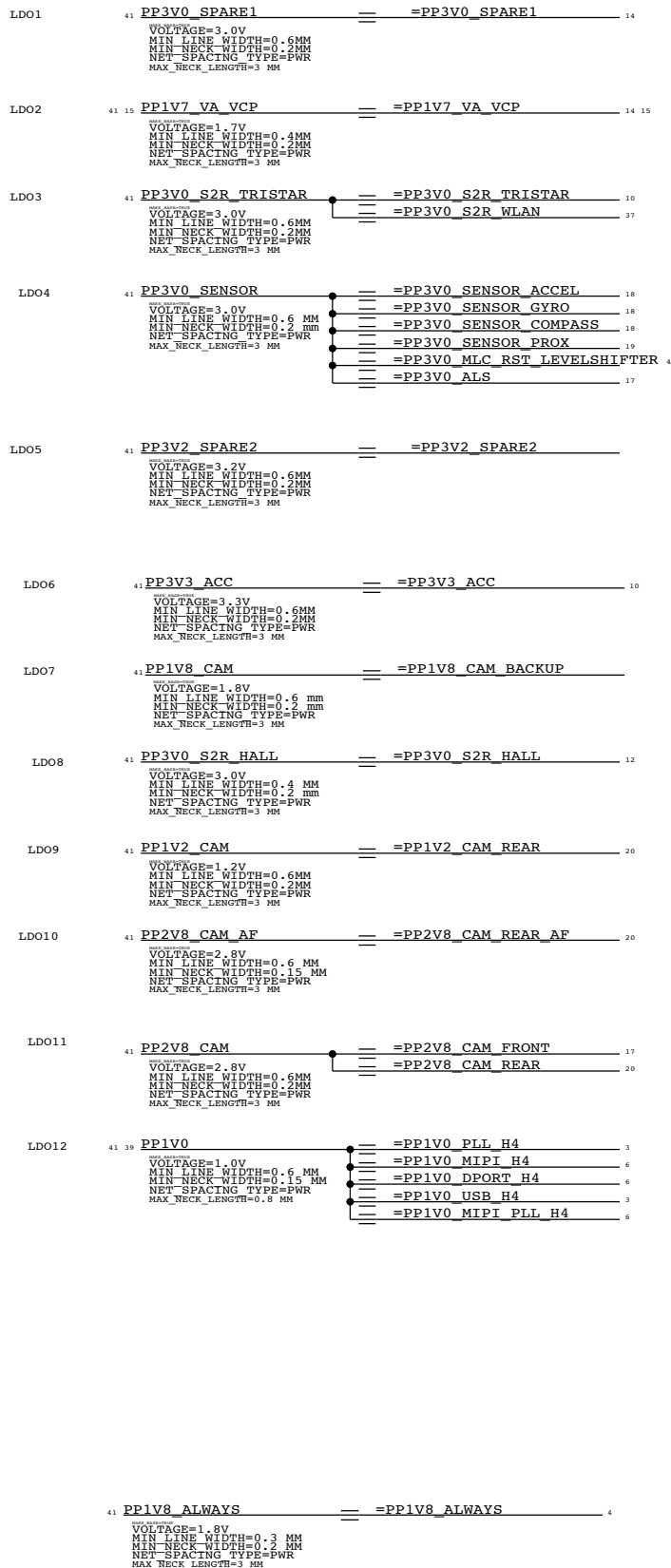
R R47015  
C C47012  
L L1801  
U U47005  
J J47002



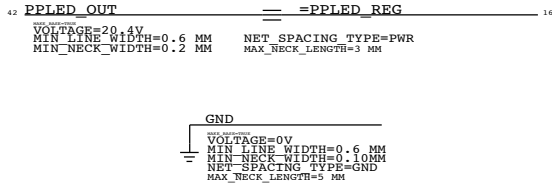
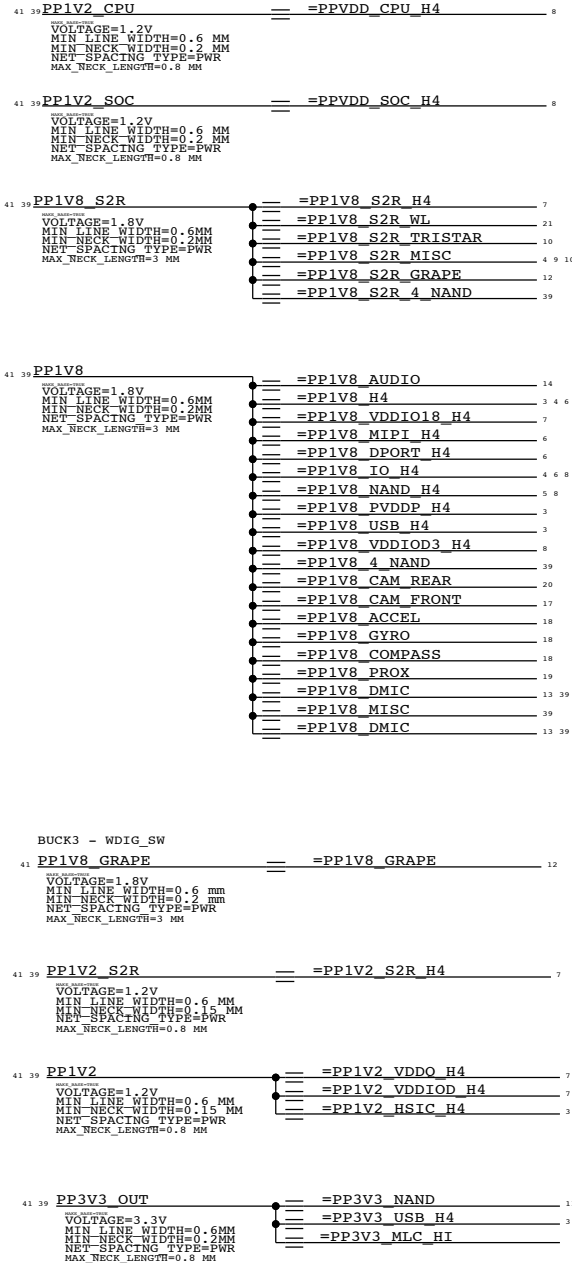
# POWER CONN / ALIAS

## LDO RAILS

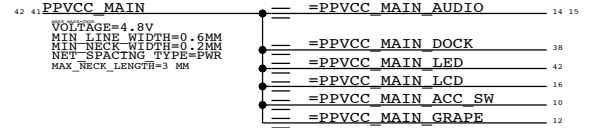
PROGRAMMABLE ON/OFF



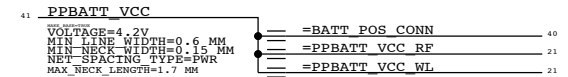
## BUCK RAILS



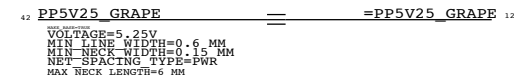
## CHARGER MAIN



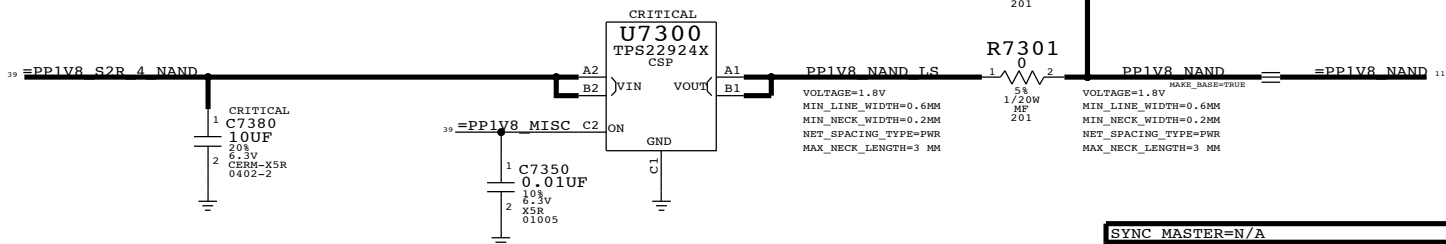
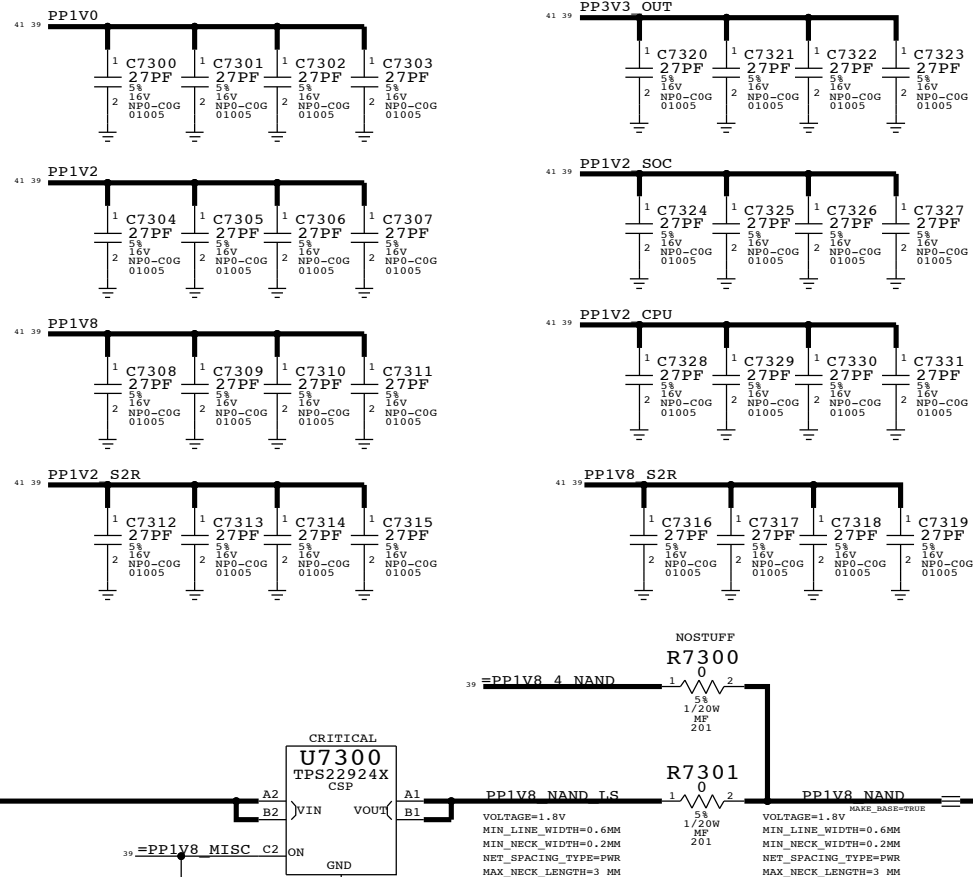
## BATTERY



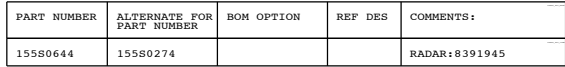
## BOOST->LDOS




## DESENSE CAPS



|                                                                                                                                                                                                                                                                                                                   |  |               |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------|--|
| SYNC MASTER=N/A                                                                                                                                                                                                                                                                                                   |  | SYNC DATE=N/A |  |
| PAGE TITLE                                                                                                                                                                                                                                                                                                        |  |               |  |
| Power: Aliases                                                                                                                                                                                                                                                                                                    |  |               |  |
| Drawing NUMBER                                                                                                                                                                                                                                                                                                    |  | SIZE          |  |
| 051-9374                                                                                                                                                                                                                                                                                                          |  | D             |  |
| REVISION                                                                                                                                                                                                                                                                                                          |  | BRANCH        |  |
| 13.0.0                                                                                                                                                                                                                                                                                                            |  |               |  |
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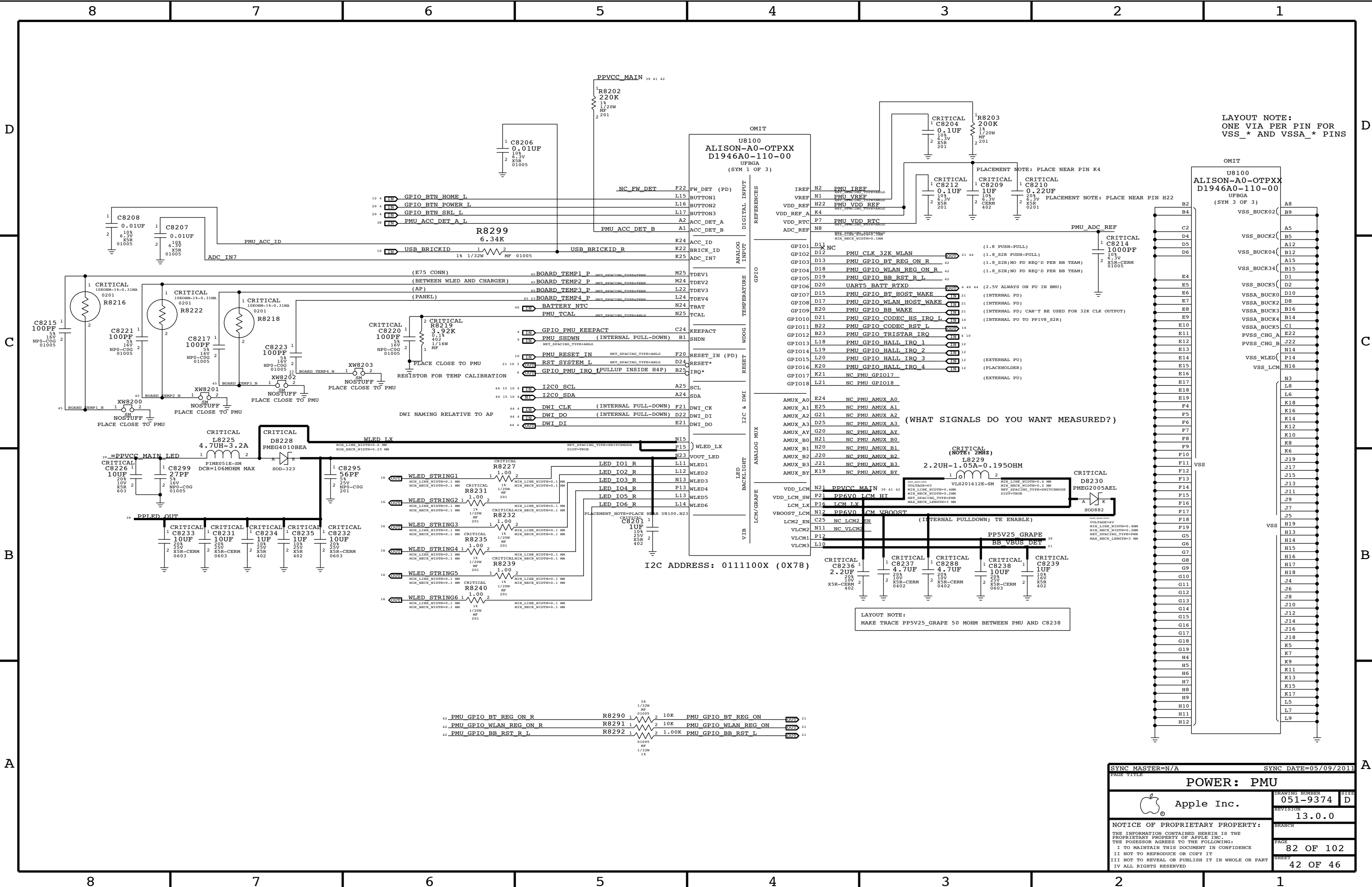


FL7500,L1700,L1701,L1702,L1800,L1920,L2600,L2601,L2602,L2700,L2701,L2702,L2800,L2900,L2901,L2902,L2903,L2960,L2961,L2962,L2963

|                                                                                                             |  |                            |  |
|-------------------------------------------------------------------------------------------------------------|--|----------------------------|--|
| SYNC MASTER=N/A                                                                                             |  | SYNC DATE=N/A              |  |
| PAGE TITLE                                                                                                  |  |                            |  |
| POWER: BATTERY CONNECTION                                                                                   |  |                            |  |
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|                                                                                                             |  | SIZE<br>D                  |  |
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# MECHANCIAL PARTS

## PD PARTS

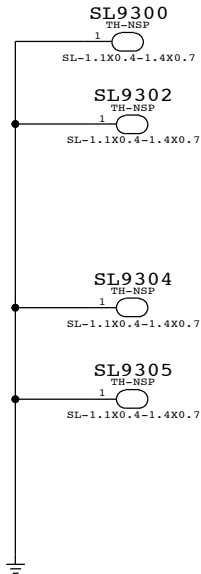
| PART#    | QTY | DESCRIPTION                 | REFERENCE DESIGNATOR(S) | BOM OPTION |
|----------|-----|-----------------------------|-------------------------|------------|
| 806-4017 | 1   | FENCE,MAIN,MLB,YYY          | FENCE_MLB               |            |
| 806-3782 | 1   | CAN,MAIN,MLB,WIFI,YYY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

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

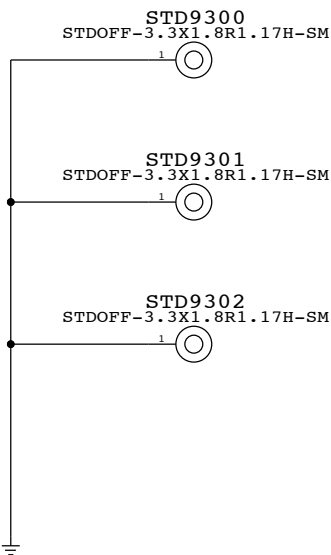
| PART#    | QTY | DESCRIPTION                      | REFERENCE DESIGNATOR(S) | CRITICAL | BOM OPTION        |
|----------|-----|----------------------------------|-------------------------|----------|-------------------|
| 825-7639 | 1   | EEEE FOR 639-3251 (X123 ENTRY)   | DWNV                    |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

## PLATED THROUGH HOLES

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



## STANDOFFS: P/N 860-1542



|                                                                                                                   |  |                |  |
|-------------------------------------------------------------------------------------------------------------------|--|----------------|--|
| SYNC MASTER=N/A                                                                                                   |  | SYNC DATE=N/A  |  |
| PAGE TITLE                                                                                                        |  | DRAWING NUMBER |  |
| MECHANICAL PARTS                                                                                                  |  | 051-9374       |  |
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|                                                                                                                   |  | 43 OF 46       |  |

## D

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                          |
|---------------------------|----------|---------|--------------------------|
|                           | PHYSICAL | SPACING |                          |
| <b>003</b>                | CLK_50S  | CLK     | AP_CLK_32K_CUMULUS 4 12  |
| <b>040</b>                | CLK_50S  | CLK     | PMU_CLK_32K_WLAN 21 42   |
| <b>001</b>                | CLK_50S  | CLK     | ISP0_CAM_REAR_CLK_R 6    |
| <b>009</b>                | CLK_50S  | CLK     | ISP0_CAM_REAR_CLK 6 20   |
| <b>005</b>                | CLK_50S  | CLK     | ISP1_CAM_FRONT_CLK_R 6   |
| <b>006</b>                | CLK_50S  | CLK     | ISP1_CAM_FRONT_CLK 6 17  |
| <b>020</b>                | CLK_50S  | CLK     | ISP1_CAM_FRONT_CLK_F 17  |
| <b>030</b>                | CLK_50S  | CLK     | I2S0_CODECD_ASP_MCK 4 14 |
| <b>037</b>                | CLK_50S  | CLK     | I2S0_CODECD_ASP_MCK_R 4  |
| <b>030</b>                | CLK_50S  | CLK     | I2S1_SPKAMP_MCK 4 15     |
| <b>040</b>                | CLK_50S  | CLK     | I2S1_SPKAMP_MCK_R 4      |

## C

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |               |
|---------------------------|----------|---------|---------------|
|                           | PHYSICAL | SPACING |               |
| 5610                      | NAND_50S | NAND    | FM10_AD<7..0> |
| 5611                      | NAND_50S | NAND    | FM10_CE0_L    |
| 5612                      | NAND_50S | NAND    | FM10_CLE      |
| 5613                      | NAND_50S | NAND    | FM10_ALE      |
| 5614                      | NAND_50S | NAND    | FM10_RE_N     |
| 5615                      | NAND_50S | NAND    | FM10_WE_L     |
| 5616                      | NAND_50S | NAND    | FM10_DQS_P    |
| 5617                      | NAND_50S | NAND    | FM11_AD<7..0> |
| 5618                      | NAND_50S | NAND    | FM11_CE0_L    |
| 5619                      | NAND_50S | NAND    | FM11_CLE      |
| 5620                      | NAND_50S | NAND    | FM11_ALE      |
| 5621                      | NAND_50S | NAND    | FM11_RE_N     |
| 5622                      | NAND_50S | NAND    | FM11_WE_L     |
| 5623                      | NAND_50S | NAND    | FM11_DQS_P    |

## B

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                 |       |
|---------------------------|----------|---------|-----------------|-------|
|                           | PHYSICAL | SPACING |                 |       |
| ES                        | USB_90D  | USB     | SOC_USB_D_P     | 3 10  |
| ES                        | USB_90D  | USB     | SOC_USB_D_N     | 3 10  |
| EN                        | USB_90D  | USB     | USB_BB_D_P      | 10 21 |
| EN                        | USB_90D  | USB     | USB_BB_D_N      | 10 21 |
| EP2                       | USB_90D  | USB     | TS_E75_DPAIR1_P | 10 38 |
| EP2                       | USB_90D  | USB     | TS_E75_DPAIR1_N | 10 38 |
| EP2                       | USB_90D  | USB     | TS_E75_DPAIR2_P | 10 38 |
| EP2                       | USB_90D  | USB     | TS_E75_DPAIR2_N | 10 38 |
| DP1                       | USB_90D  | USB     | CONN_DP1_P      | 38    |
| DP1                       | USB_90D  | USB     | CONN_DP1_N      | 38    |
| DP2                       | USB_90D  | USB     | CONN_DP2_P      | 38    |
| DP2                       | USB_90D  | USB     | CONN_DP2_N      | 38    |

## A

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                      |
|---------------------------|----------|---------|----------------------|
|                           | PHYSICAL | SPACING |                      |
| HSIC1                     | HSIC_50S | HSIC    | HSIC1_BB_STB 3 21    |
| HSIC2                     | HSIC_50S | HSIC    | HSIC1_BB_DATA 3 21   |
| HSIC3                     | HSIC_50S | HSIC    | HSIC2_WLAN_STB 3 21  |
| HSIC4                     | HSIC_50S | HSIC    | HSIC2_WLAN_DATA 3 21 |

1

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                 |        |
|---------------------------|----------|---------|-----------------|--------|
|                           | PHYSICAL | SPACING |                 |        |
| E10                       | JTAG_50S | JTAG    | JTAG_SOC_TCK    | 3 1    |
| E15                       | JTAG_50S | JTAG    | JTAG_SOC_TMS    | 3 10   |
| E14                       | JTAG_50S | JTAG    | JTAG_SOC_TDI    | 3      |
| E19                       | JTAG_50S | JTAG    | JTAG_SOC_TDO    | 3 9    |
| E20                       | JTAG_50S | JTAG    | JTAG_SOC_TRST_L | 3 9    |
| E22                       | JTAG_50S | JTAG    | BB_JTAG_TCK     | 4 21 2 |
| E17                       | JTAG_50S | JTAG    | BB_JTAG_TMS     | 4 21 2 |
| E18                       | JTAG_50S | JTAG    | BB_JTAG_TDI     | 4 21 2 |
| E19                       | JTAG_50S | JTAG    | BB_JTAG_TDO     | 4 21 2 |
| E19D                      | JTAG_50S | JTAG    | BB_JTAG_TRST_L  | 4 21 2 |

I2

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                      |            |
|---------------------------|----------|---------|----------------------|------------|
|                           | PHYSICAL | SPACING |                      |            |
| <b>I2C0</b>               | I2C_50S  | I2C     | I2C0_SDA             | 4 10 15 22 |
| <b>I2C1</b>               | I2C_50S  | I2C     | I2C0_SCL             | 4 10 15 22 |
| <b>I2C2</b>               | I2C_50S  | I2C     | I2C1_SDA             | 4 18 19    |
| <b>I2C3</b>               | I2C_50S  | I2C     | I2C1_SCL             | 4 18 19    |
| <b>I2C4</b>               | I2C_50S  | I2C     | I2C2_SDA             | 4 17 18    |
| <b>I2C5</b>               | I2C_50S  | I2C     | I2C2_SCL             | 4 17 18    |
| <b>I2C6</b>               | I2C_50S  | I2C     | I2C2_SDA_F           | 17         |
| <b>I2C7</b>               | I2C_50S  | I2C     | I2C2_SCL_F           | 17         |
| <b>ISPD0</b>              | I2C_50S  | I2C     | ISPD0_CAM_REAR_SCL   | 6 20       |
| <b>ISPD1</b>              | I2C_50S  | I2C     | ISPD0_CAM_REAR_SDA   | 6 20       |
| <b>ISPD2</b>              | I2C_50S  | I2C     | ISP1_CAM_FRONT_SCL   | 6 17       |
| <b>ISPD3</b>              | I2C_50S  | I2C     | ISP1_CAM_FRONT_SDA   | 6 17       |
| <b>ISPD4</b>              | I2C_50S  | I2C     | ISP1_CAM_FRONT_SCL_F | 17         |
| <b>ISPD5</b>              | I2C_50S  | I2C     | ISP1_CAM_FRONT_SDA_F | 17         |
| <b>MLC</b>                | I2C_50S  | I2C     | MLC_SDA_3V3          |            |
| <b>MLC</b>                | I2C_50S  | I2C     | MLC_SCL_3V3          |            |
| <b>LVDS</b>               | I2C_50S  | I2C     | LVDS_DDC_DATA        |            |
| <b>LVDS</b>               | I2C_50S  | I2C     | LVDS_DDC_CLK         |            |

## Y131

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                  |
|---------------------------|----------|---------|------------------|
|                           | PHYSICAL | SPACING |                  |
| DDR0                      |          | VREF    | PPVREF_DDR0_CA 7 |
| DDR0                      |          | VREF    | PPVREF_DDR0_DQ 7 |
| DDR0                      |          | VREF    | PPVREF_DDR1_CA 7 |
| DDR0                      |          | VREF    | PPVREF_DDR1_DQ 7 |

## 115:

| NET_SPACING_TYPE1 | NET_SPACING_TYPE2 | AREA_TYPE | SPACING_RULE_SET |
|-------------------|-------------------|-----------|------------------|
| DWI               | *                 | *         | 2+1_SPACING      |

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |         |   |    |
|---------------------------|----------|---------|---------|---|----|
|                           | PHYSICAL | SPACING |         |   |    |
| U500                      | DWT_45S  | DWT     | DWT CLK | 4 | 42 |
| U500                      | DWT_45S  | DWT     | DWT DI  | 4 | 42 |
| U500                      | DWT_45S  | DWT     | DWT DO  | 4 | 42 |

## D

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                           |
|---------------------------|----------|---------|---------------------------|
|                           | PHYSICAL | SPACING |                           |
| U2S0                      | T2S_45S  | T2S     | I2S0_CODEC_ASP_BCLK 4 14  |
| U2S0                      | T2S_45S  | T2S     | I2S0_CODEC_ASP_LRCK 4 14  |
| U2S0                      | T2S_45S  | T2S     | I2S0_CODEC_ASP_DOUT 4 14  |
| U2S0                      | T2S_45S  | T2S     | I2S0_CODEC_ASP_DIN 4 14   |
| U2S0                      | T2S_45S  | T2S     | I2S0_CODEC_ASP_SDOUT 4 14 |
| U2S1                      | T2S_45S  | T2S     | I2S1_SPKAMP_BCLK 4 15     |
| U2S1                      | T2S_45S  | T2S     | I2S1_SPKAMP_LRCK 4 15     |
| U2S1                      | T2S_45S  | T2S     | I2S1_SPKAMP_DOUT 4 15     |
| U2S1                      | T2S_45S  | T2S     | I2S1_SPKAMP_DIN 4 15      |
| U2S2                      | T2S_45S  | T2S     | I2S2_CODEC_XSP_BCLK 4 14  |
| U2S2                      | T2S_45S  | T2S     | I2S2_CODEC_XSP_LRCK 4 14  |
| U2S2                      | T2S_45S  | T2S     | I2S2_CODEC_XSP_DOUT 4 14  |
| U2S2                      | T2S_45S  | T2S     | I2S2_CODEC_XSP_DIN 4 14   |
| U2S2                      | T2S_45S  | T2S     | I2S2_CODEC_XSP_SDOUT 4 14 |
| U2S3                      | T2S_45S  | T2S     | I2S3_BT_BCLK 4 21         |
| U2S3                      | T2S_45S  | T2S     | I2S3_BT_LRCK 4 21         |
| U2S3                      | T2S_45S  | T2S     | I2S3_BT_DOUT 4 21         |
| U2S3                      | T2S_45S  | T2S     | I2S3_BT_DIN 4 21          |

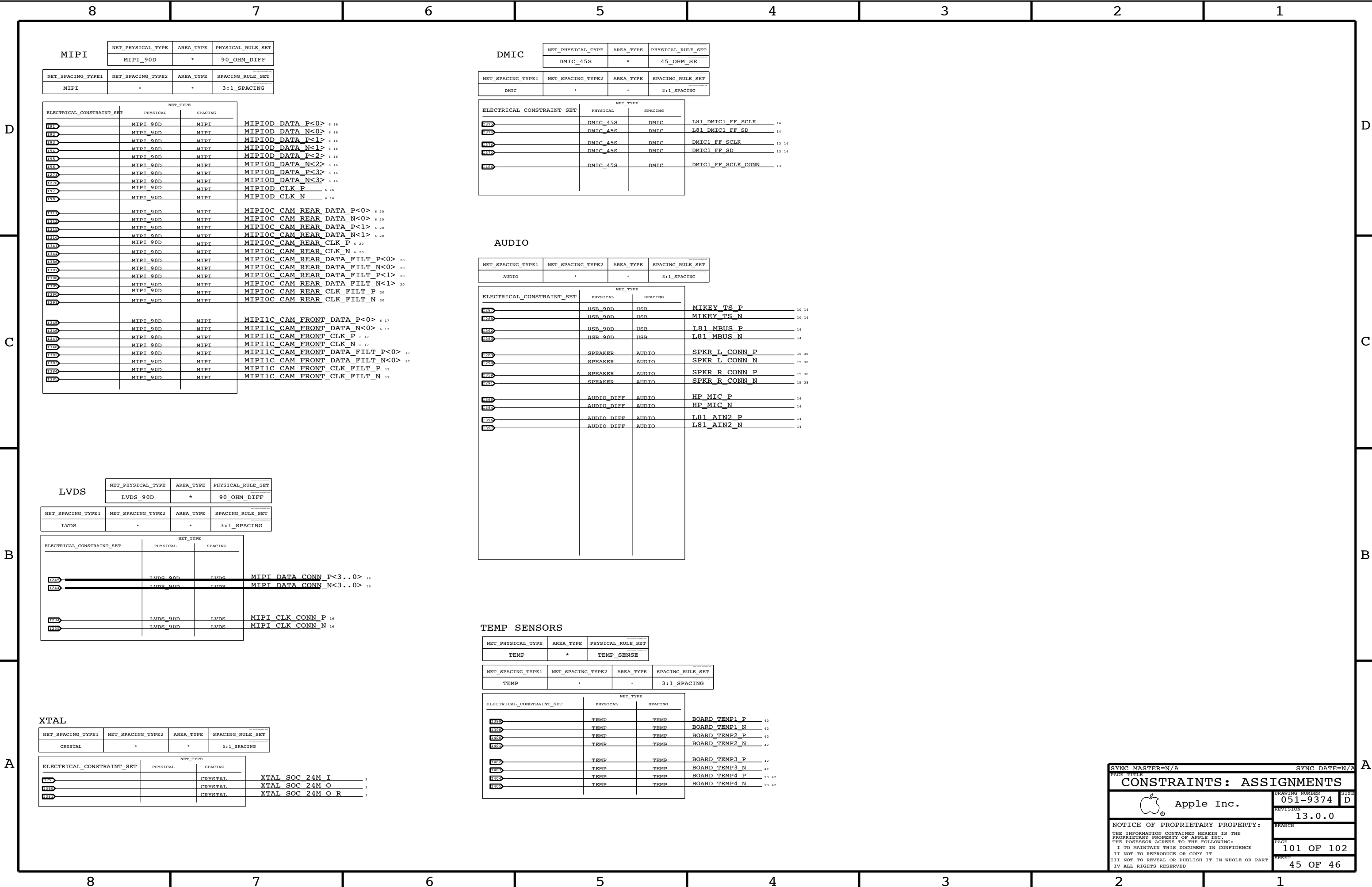
## C

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                 |    |       |
|---------------------------|----------|---------|-----------------|----|-------|
|                           | PHYSICAL | SPACING |                 |    |       |
| U200                      | UART_4SS | UART    | UART0_DEBUG_RXD | 4  | 10    |
| U201                      | UART_4SS | UART    | UART0_DEBUG_TXD | 4  | 10    |
| U202                      | UART_4SS | UART    | UART1_BT_RXD    | 4  | 21    |
| U203                      | UART_4SS | UART    | UART1_BT_TXD    | 4  | 21    |
| U204                      | UART_4SS | UART    | UART1_BT_RTS    | L  | 4 21  |
| U205                      | UART_4SS | UART    | UART1_BT_CTS    | L  | 4 21  |
| U206                      | UART_4SS | UART    | UART2_ACC_RXD   | 4  | 10    |
| U207                      | UART_4SS | UART    | UART2_ACC_TXD   | 4  | 10    |
| U208                      | UART_4SS | UART    | UART3_WLAN_RXD  | 4  | 21    |
| U209                      | UART_4SS | UART    | UART3_WLAN_TXD  | 4  | 21    |
| U210                      | UART_4SS | UART    | UART4_BB_RXD    | 4  | 10 21 |
| U211                      | UART_4SS | UART    | UART4_BB_TXD    | 4  | 10 21 |
| U212                      | UART_4SS | UART    | UART4_BB_RTS    | L  | 4 21  |
| U213                      | UART_4SS | UART    | UART4_BB_CTS    | L  | 4 21  |
| U214                      | UART_4SS | UART    | UART5_BATT_RTXD | 4  | 40 42 |
| U215                      | UART_4SS | UART    | BATT_SWI_CONN   | 40 |       |

## B

| ELECTRICAL_CONSTRAINT_SET | NET_TYPE |         |                      |
|---------------------------|----------|---------|----------------------|
|                           | PHYSICAL | SPACING |                      |
| <b>E221</b>               | SPT_45S  | SPT     | SPI1 GRAPE MISO 4 12 |
| <b>E222</b>               | SPT_45S  | SPT     | SPI1 GRAPE MOST 4 12 |
| <b>E223</b>               | SPT_45S  | SPT     | SPI1 GRAPE SCLK 4 12 |
| <b>E223</b>               | SPT_45S  | SPT     | SPI1 GRAPE SCLK_R 12 |
| <b>E224</b>               | SPT_45S  | SPT     | SPI1 GRAPE CS_L 4 12 |
| <b>E225</b>               | SPT_45S  | SPT     | SPI2 CODEC MISO 4 14 |
| <b>E226</b>               | SPT_45S  | SPT     | SPI2 CODEC MOST 4 14 |
| <b>E227</b>               | SPT_45S  | SPT     | SPI2 CODEC SCLK 4 14 |
| <b>E228</b>               | SPT_45S  | SPT     | SPI2 CODEC CS_L 4 14 |

A



## MLB CONSTRAINTS

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

## PHYSICAL CONSTRAINTS

| PHYSICAL_RULE_SET | LAYER | ALLOW_ROUTE_ON_LAYER? | MINIMUM LINE WIDTH | MINIMUM NECK WIDTH | MAXIMUM NECK LENGTH | DIFFPAIR PRIMARY GAP | DIFFPAIR NECK GAP |
|-------------------|-------|-----------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| DEFAULT           | *     | Y                     | =45_OHM_SE         | =45_OHM_SE         | 30 MM               | 0 MM                 | 0 MM              |
| STANDARD          | *     | Y                     | =DEFAULT           | =DEFAULT           | 12.7 MM             | =DEFAULT             | =DEFAULT          |

### SINGLE-ENDED PHYSICAL RULES 45 OHMS

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

### 50 OHMS – CLEAR ON LAYER 2 AND 9

| PHYSICAL_RULE_SET | LAYER       | ALLOW_ROUTE_ON_LAYER? | MINIMUM LINE WIDTH | MINIMUM NECK WIDTH | MAXIMUM NECK LENGTH | DIFFPAIR PRIMARY GAP | DIFFPAIR NECK GAP |
|-------------------|-------------|-----------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| 50_OHM_SE         | TOP, BOTTOM | Y                     | 0.085 MM           | 0.085 MM           | 3.0 MM              |                      |                   |
| 50_OHM_SE         | *           | N                     | 0.085 MM           | 0.085 MM           | 3.0 MM              |                      |                   |

### DIFFERENTIAL PAIR PHYSICAL RULES 90 OHMS

| PHYSICAL_RULE_SET | LAYER      | ALLOW_ROUTE_ON_LAYER? | MINIMUM LINE WIDTH | MINIMUM NECK WIDTH | MAXIMUM NECK LENGTH | DIFFPAIR PRIMARY GAP | DIFFPAIR NECK GAP |
|-------------------|------------|-----------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| 90_OHM_DIFF       | TOP        | Y                     | 0.089 MM           | 0.089 MM           |                     | 0.150 MM             | 0.150 MM          |
| 90_OHM_DIFF       | ISL2, ISL9 | Y                     | 0.051 MM           | 0.051 MM           | =STANDARD           | 0.120 MM             | 0.120 MM          |
| 90_OHM_DIFF       | ISL4, ISL6 | Y                     | 0.052 MM           | 0.052 MM           | =STANDARD           | 0.120 MM             | 0.120 MM          |
| 90_OHM_DIFF       | *          | N                     | 0.089 MM           | 0.089 MM           | =STANDARD           | 0.150 MM             | 0.150 MM          |

### AUDIO/MISC PHYSICAL RULES

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

### BGA AREA PHYSICAL RULES

| NET_PHYSICAL_TYPE | AREA_TYPE | PHYSICAL_RULE_SET |
|-------------------|-----------|-------------------|
| *                 | BGA       | BGA_PHY           |

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

## SPACING CONSTRAINTS

### DEFAULT/BGA SPACING RULES

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

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

#### NOTES:

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


### REGULAR SPACING RULES

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

\*NOTE: ASSUMING 0.060MM DIELECTRIC THICKNESS

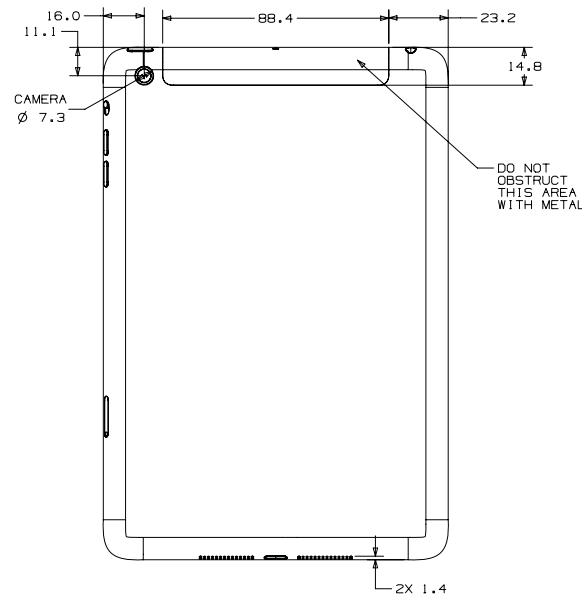
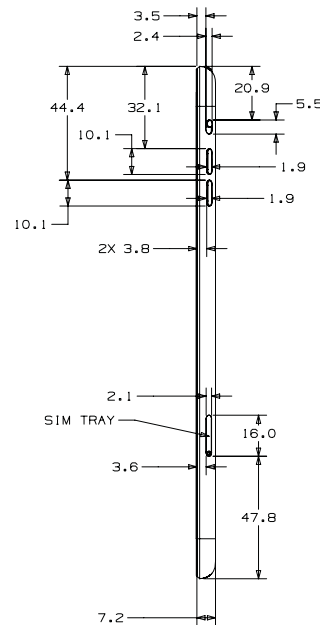
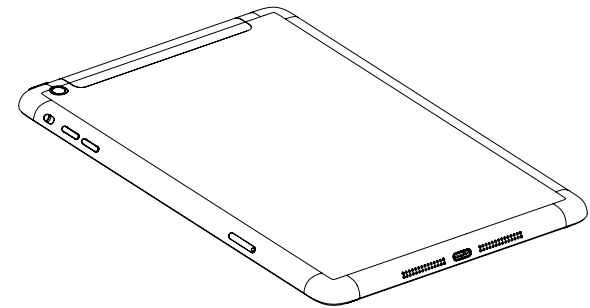
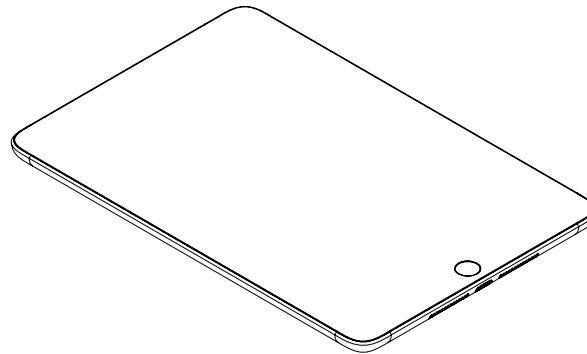
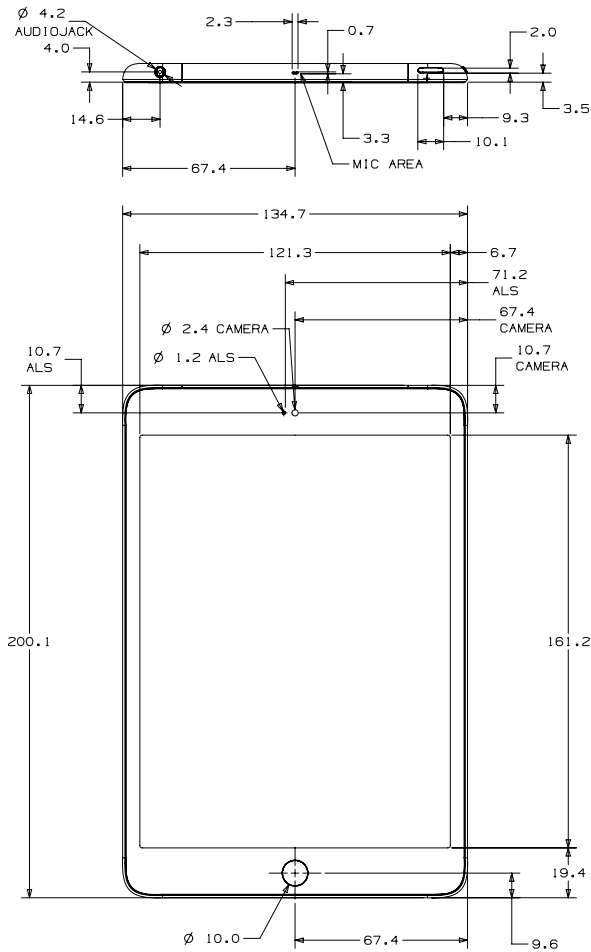
### POWER/GND SPACING RULES

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

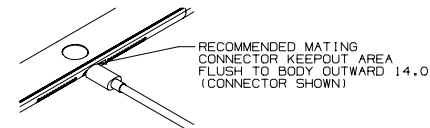
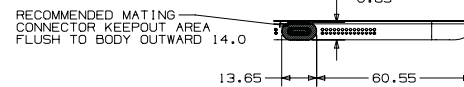
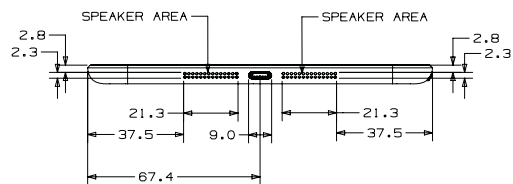
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