Mobile Files

Special Thanks!

130877
TRALOL
weaver
wins200786
QueenSoft
Mihail_tm
abraziff

iPad 2

Professional Schematic!

A1395,A1396,A1397(k94ap)

Wites OM Tesla

GSM-FORUM

Special Thanks!

..::Neo::..
~AhmedLeO~
Gecko UK
Mobileinfo
Hobson
Noobfix
DataRus
Kostelectronics
diesel57

Don't Forget To Donate!!!

Wites OM Tesla
READ BEFORE PROCEED!

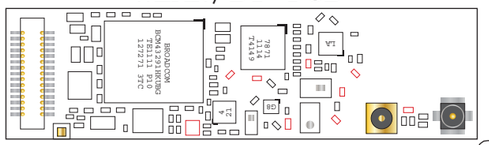
PRINTS MARKED WITH COPER ARE NC,EMPTY!

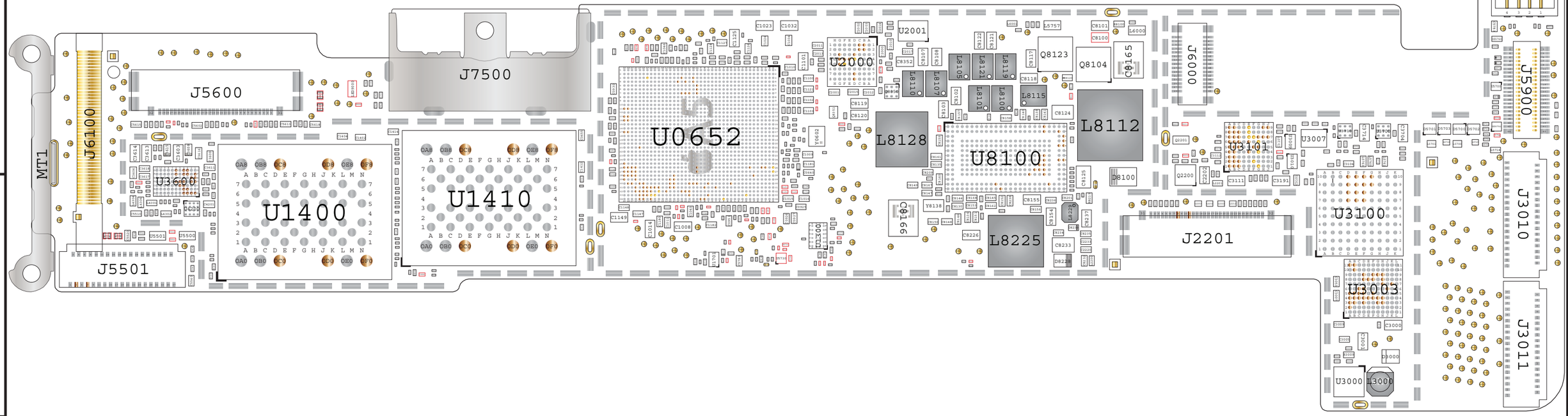
PRINTS MARKED WITH GOLD ARE CONNECTED ONLY TO TEST POINTS NO OTHER CIRCUIT!

IF YOU REBALL U3100 LOOK CAREFUL IF B9 AND B10 THAT LOOK LIKE A JUMPER IS REMOVED TOUCH WILL NOT WORK IF SO HAPPEN MAKE A JUMPER ON THE IC!

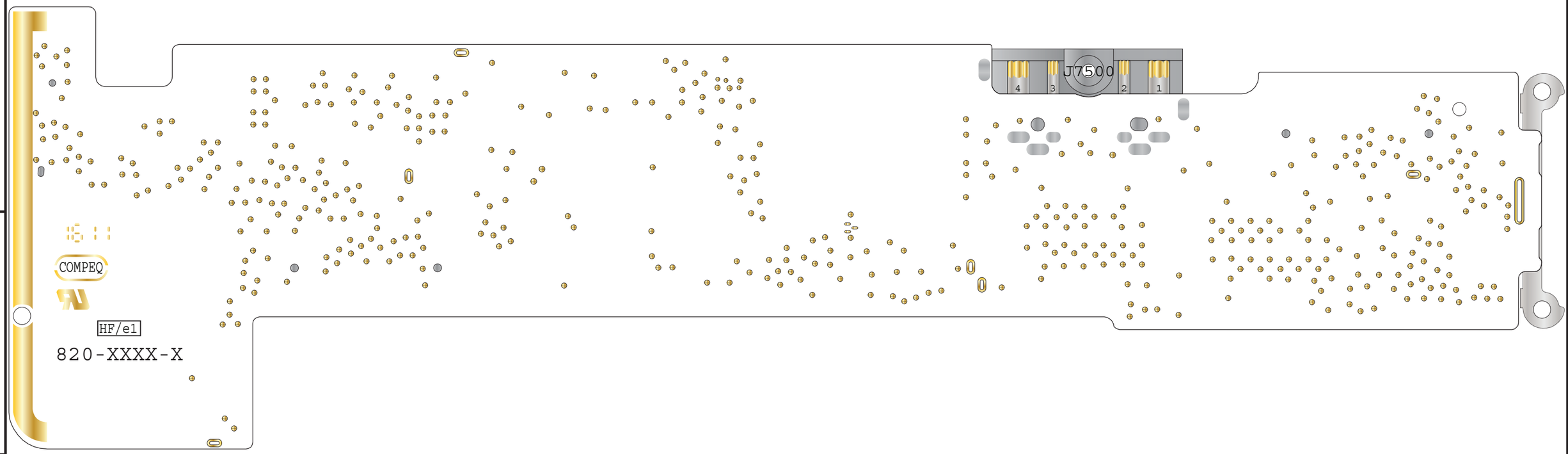
NOSTUFF COMPONENTS JUST LOOK ON BOARD THEY ARE NOT MOUNTED(MISSING)!

WLAN/BT PCB





820-2875-05 MLB TOP PCB



820-2875-05 MLB BOTTOM PCB

1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.

K94 CHOPIN MLB

PVT

REV. A

LAST_MODIFIED=Mon Jan 10 13:11:06 2011

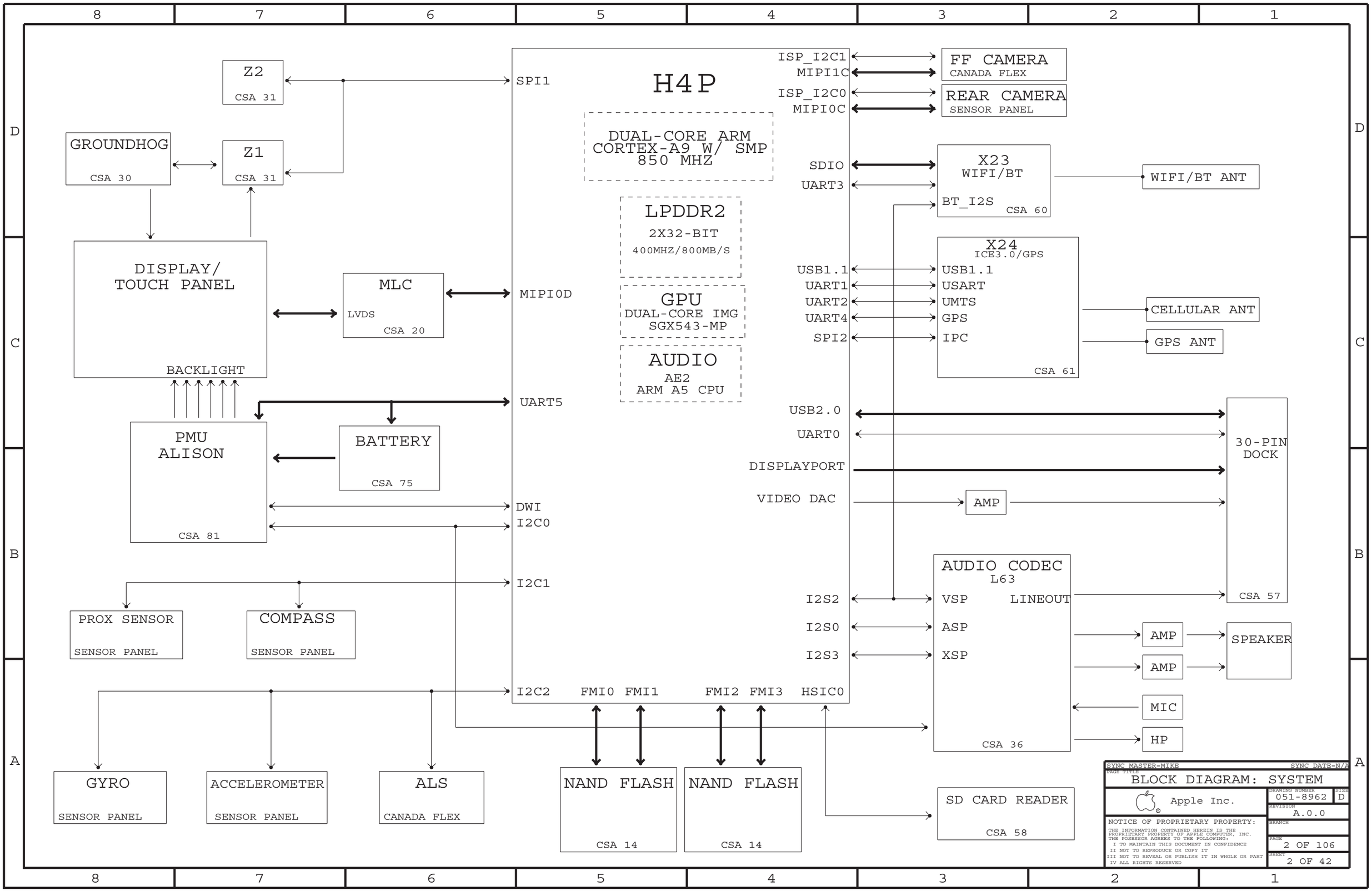
REV	ECN	DESCRIPTION OF REVISION	CK APPD / DATE
A	0001052699	PRODUCTION RELEASED	2011-01-10

DRAWING
TITLE=BACH
ABBREV=DRAWING

DRAWING TITLE: CHOPIN MLB

Apple Inc.

DRAWING NUMBER: 051-8962 | SIZE: D
REVISION: A.0.0
BRANCH:
PAGE: 1 OF 106
SHEET: 1 OF 42



SYNC MASTER=MIKE
SYNC DATE=N/A
PAGE TITLE
BLOCK DIAGRAM: SYSTEM

Apple Inc.

DRAWING NUMBER 051-8962
SIZE D
REVISION A.0.0
BRANCH
PAGE 2 OF 106
SHEET 2 OF 42

Page Notes

Power aliases required by this page:
(NONE)

Signal aliases required by this page:
(NONE)

BOM options provided by this page:

ALL AVAIL BOM OPTIONS

COMMON
ALTERNATE

16GB_PROD
32GB_PROD
64GB_PROD

BKLT_PLL

DEVELOPMENT_JTAG
DEVELOPMENT_JTAG_TAP
JTAG_DAP
JTAG_TAP_NOT

SPEAKER
INTERNAL_MIC

PORTRAIT_DOCK

MLC_DEV
MLC_PROD

K93
K94

BOM GROUP	BOM OPTIONS
BASIC	COMMON,ALTERNATE

ADD DEVELOPMENT AND OTHER BOMS ONCE YOU GET BOM NUMBERS

BOM OPTIONS

PROGRAMMABLE PARTS

SCH AND BOARD P/N

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-8962	1	SCH,CHOPIN_AUDIO,MLB,K94	SCH1	
820-3069	1	PCBF,CHOPIN_AUDIO,MLB,K94	PCB1	

PD PARTS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
806-1396	1	FENCE,GRAPE,MLB,K93/K94	FENCE1	
806-1397	1	CAN,GRAPE,MLB,K93/K94	CAN1	NOSTUFF
806-1398	1	FENCE,CPU,MLB,K93/K94	FENCE2	
806-1399	1	CAN,CPU,MLB,K93/K94	CAN2	NOSTUFF
806-1400	1	FENCE,NAND,MLB,K93/K94	FENCE3	
806-1401	1	CAN,NAND,MLB,K93/K94	CAN3	NOSTUFF

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

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7651	1	EEEE FOR 639-1180 (K93 16G)	DH36	CRITICAL	EEEE_K93_16G
825-7651	1	EEEE FOR 639-1426 (K93 32G)	DH37	CRITICAL	EEEE_K93_32G
825-7651	1	EEEE FOR 639-1428 (K93 64G)	DG99	CRITICAL	EEEE_K93_64G
825-7651	1	EEEE FOR 639-1112 (K94 16G)	DFC4	CRITICAL	EEEE_K94_16G
825-7651	1	EEEE FOR 639-1181 (K94 32G)	DFC5	CRITICAL	EEEE_K94_32G
825-7651	1	EEEE FOR 639-1182 (K94 64G)	DFC6	CRITICAL	EEEE_K94_64G
825-7651	1	EEEE FOR 639-1430 (K95 16G)	DH3C	CRITICAL	EEEE_K95_16G
825-7651	1	EEEE FOR 639-1427 (K95 32G)	DH3D	CRITICAL	EEEE_K95_32G
825-7651	1	EEEE FOR 639-1429 (K95 64G)	DG9C	CRITICAL	EEEE_K95_64G

BOTTOM LABEL TYPE 1

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7639	1	631- B/C LABEL	LBL1	CRITICAL	
825-7639	1	639- B/C LABEL	LBL2	CRITICAL	

BOTTOM LABEL TYPE 2

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-7640	1	MATRIX LABEL	LBL3	CRITICAL	
825-7640	1	631- MATRIX LABEL	LBL4	CRITICAL	

SYNC MASTER=MIKE SYNC DATE=N/A

PAGE TITLE
BOM TABLE

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D
REVISION A.0.0
BRANCH
PAGE 5 OF 106
SHEET 3 OF 42

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:

NEED TO ADD BOM TABLE FOR ALT P/N OF HYNIX (?)

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION

U0652
H4P-512MB
BGA
SYM 11 OF 12
SC58940X01-A030

AU14 AU15 AU16 AU17 AV1 AV2 AV3 AV4 AV5 AV6 AV7 AV8 AV9 AV10 AV11 AV12 AV13 AV14 AV15 AV16 AV17 AV29 AV33 AV34 AW1 AW2 AW4 AW23 AW33 AW34 AY1 AY2 AY3 AY4 AY20 AY22 AY24 AY30 AY31 AY32 AY33 AY34 B1 B2 B7 B9 B10 B12 B13 B15 B17 B18 B20 B22 B23 B28 B30 B32 B33 B34 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C23 C27 C29 C32 C33 D1 D3 D5 D7 D9 D11 D13 D15 D16 D23 — VSS

D27 D32 E1 E2 E3 E4 E6 E8 E10 E12 E14 E16 E17 E18 E19 E20 E21 E22 E23 E25 E26 E27 E28 E30 E31 E32 E34 F1 F2 F3 F5 F19 F20 F21 F22 F23 F25 F26 F29 F30 F31 F32 G1 G3 G4 G7 G8 G9 G10 G12 G13 G14 G15 G16 G17 G18 G19 G20 G21 G22 G25 G28 G29 G30 H1 H2 H3 H5 H7 H8 H10 H12 H14 H16 H18 H20 H22 H24 H25 H29 H30 J1 J2 J3 J4 J7 J9 J11 J13 J15 J17 J19 — VSS

=PP1V1_PLL_H4 → R0620 0.00 (0% 1/32W MF 01005) → TPR40 → C0651 0.01UF (10% 6.3V X5R 01005) → PP1V1_PLL4_F
VOLTAGE=1.1V
MIN_LINE_WIDTH=0.2MM
MIN_NECK_WIDTH=0.1MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

R0621 0.00 → TPR41 → C0648 0.01UF → PP1V1_PLL3_F
R0622 0.00 → TPR42 → C0646 0.01UF → PP1V1_PLL2_F
R0623 0.00 → TPR43 → C0644 0.01UF → PP1V1_PLL1_F
R0624 0.00 → TPR44 → C0608 0.01UF + C0660 56PF (5% 6.3V NPO-COG 01005) → PP1V1_PLL0_F

=PP1V1_USB_H4 → C0643 0.22UF (20% 6.3V X5R 0201)
=PP1V2_HSIC_H4 → C0642 0.01UF + C0641 0.01UF (10% 6.3V X5R 01005)

JTAGSEL
0 - PARALLEL
1 - DAISY-CHAIN (FOR USE WITH 5-WIRE JTAG)
PER RADAR #6755237

=PP1V8_H4 → R0645 100K → JTAG_AP_TCK
R0646 100K → JTAG_AP_TMS
R0647 100K → JTAG_AP_TDI
TPR45 TPR46 TPR47

DEVELOPMENT_JTAG_TAP → R0662 100K (=PP1V8_H4) → AP_JTAG_SEL

=PP3V3_USB_H4 → R0617 10K (1% 1/32W MF 01005) → R0632 100K → RST_AP_L (IN)

NOSTUFF XW0604 SHORT-01005 → RST_AP_1V8_L → AP_CFSB
R0688 42.2K (1% 1/32W MF 01005) + C0618 1000PF (10% 16V X7R 201)
NOSTUFF XW0605 SHORT-01005 → AP_DDR1_CKEIN_1V2 → AP_DDR1_CKEIN
R0689 82.5K (1% 1/32W MF 01005)

TP_HSIC1_AP_DATA	A26	HSIC1_DATA
TP_HSIC1_AP_STB	A27	HSIC1_STB
NC_HSIC2_AP_DATA	C26	HSIC2_DATA
NC_HSIC2_AP_STB	D26	HSIC2_STB
AP_JTAG_SEL	N31	JTAG_SEL
NC_JTAG_AP_RTCK	M30	JTAG_TRTCK
JTAG_AP_TRST_L	N29	JTAG_TRST*
JTAG_AP_TDO	M31	JTAG_TDO
JTAG_AP_TDI	M32	JTAG_TDI
JTAG_AP_TMS	N32	JTAG_TMS
JTAG_AP_TCK	N30	JTAG_TCK
AP_TESTMODE	P29	TESTMODE
	M28	FUSE1_FSRC
AP_TST_STPCLK	P33	TST_STPCLK
TP_AP_TST_CLKOUT	P34	TST_CLKOUT
AP_FAST_SCAN_CLK	T32	FAST_SCAN_CLK (FOR IC TESTER)
AP_HOLD_RESET	P31	HOLD_RESET (0=NORMAL)
	P32	RESET*
AP_CFSB	W30	CFSB
AP_DDR1_CKEIN	G11	DDR0_CKEIN
	R7	DDR1_CKEIN

SYM 1 OF 12
U0652
H4P-512MB
BGA

HSIC_VDD121 D25 (17MA) · HSIC_VDD122 D24 (17MA) · HSIC_DVDD F24 (7MA) · PLL0_AVDD11 C19 · PLL1_AVDD11 C20 · PLL2_AVDD11 C23 · PLL3_AVDD11 C25 · PLL4_AVDD11 C27 · PLL_USB_AVDD11 C29 · MIPI0D_VDD11_PLL AR20 · MIPI1D_VDD11_PLL AT14 (2.5MA EACH, 6.5MA) · USB_DVDD C28 (5MA) · USB_VDD330 H27 (28MA)

HSIC_VSS121 C25 · HSIC_VSS122 C24 · HSIC_DVSS E24 · PLL0_AVSS11 D19 · PLL1_AVSS11 D20 · PLL2_AVSS11 D21 · PLL3_AVSS11 D18 · PLL4_AVSS11 D17 · PLL_USB_AVSS11 D22 · MIPI_VSS_0 AN10 · MIPI_VSS_1 AN11 · USB_DVSS D28 · USB_VSSA0 H26 · USB_VSSAC J26

VOLTAGE=1.1V
MIN_LINE_WIDTH=0.2MM
MIN_NECK_WIDTH=0.1MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

PP1V1_PLL_USB_F → C0652 0.01UF → R0625 0.00 → =PP1V1_USB_H4

PP1V1_MIPID_PLL_F → C0661 56PF (5% 6.3V NPO-COG 01005) + C0654 0.1UF (10% 6.3V X5R 201) + C0655 1UF (10% 6.3V CERM 402) → FL0610 80-OHM-0.2A-0.4-OHM (0201-1) → =PP1V1_MIPI_PLL_H4

=PP1V1_USB_H4 → C0627 0.01UF (10% 6.3V X5R 01005)

=PP3V3_USB_H4 → C0640 1UF (10% 6.3V CERM 402) + C0630 0.01UF (10% 6.3V X5R 01005)

WDOG P30 → RST_PMU_IN (PMU)

XI0 A18 ← XTAL_24M_I
R0655 1.00M (1% MF 01005/1/32W)
R0640 22 (5% 1/32W MF 01005)
XO0 A19 → XTAL_24M_O
CRITICAL Y0602 SM-2 24.000MHZ-16PF-60PPM
C0613 22PF (5% 16V CERM 01005) · C0607 22PF (5% 16V CERM 01005)

USB11_DP A22 ↔ USB_FS_D_P (BB) · USB11_DM A23 ↔ USB_FS_D_N (BB)
USB_DP A29 ↔ USB_D_P (BB) · USB_DM A28 ↔ USB_D_N (BB)

USB_ANALOGTEST G26 ← NC_USB_ANALOGTEST
USB_VBUS F27 ← USB_AP_VBUS
USB_ID F28 ← NC_USB_ID
USB_BRICKID G27
USB_REXT A21 ← USB_REXT
R0642 44.2 (1% 1/20W MF 201)
NOTE: PAGE 4608 H4P UM V0.83

DZ0600 GDZT2R5.1B (GDZ-0201) ← USB_AP_VBUS
R0651 100K (5% 1/32W MF 01005) → PPVBUS_USB
USB_BRICKID → (PMU)

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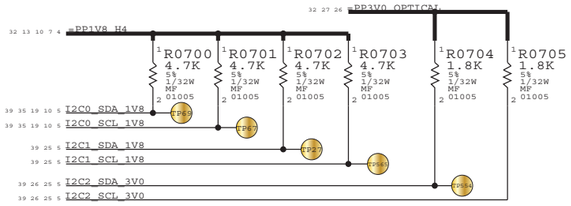
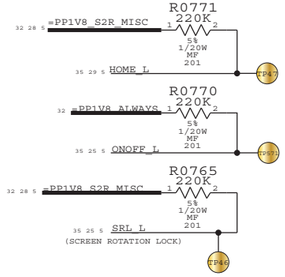
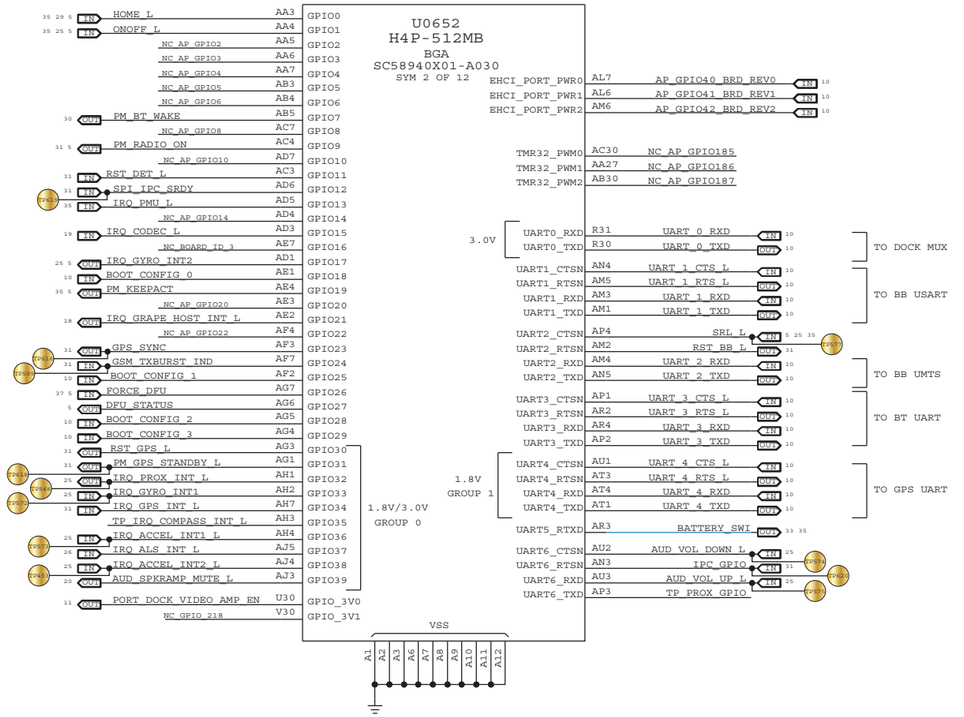
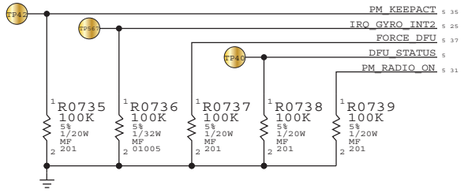
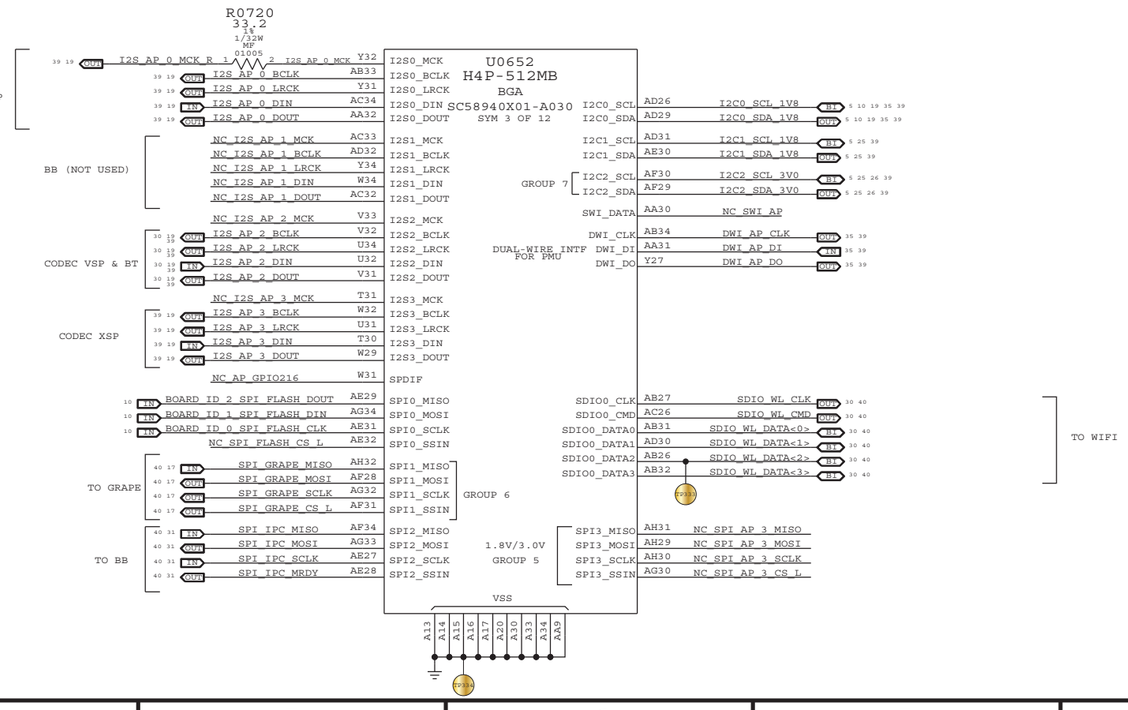
PAGE TITLE	AP: MAIN
Apple Inc.	DRAWING NUMBER 051-8962 · SIZE D
	REVISION A.0.0
	BRANCH
	PAGE 6 OF 106
	SHEET 4 OF 42











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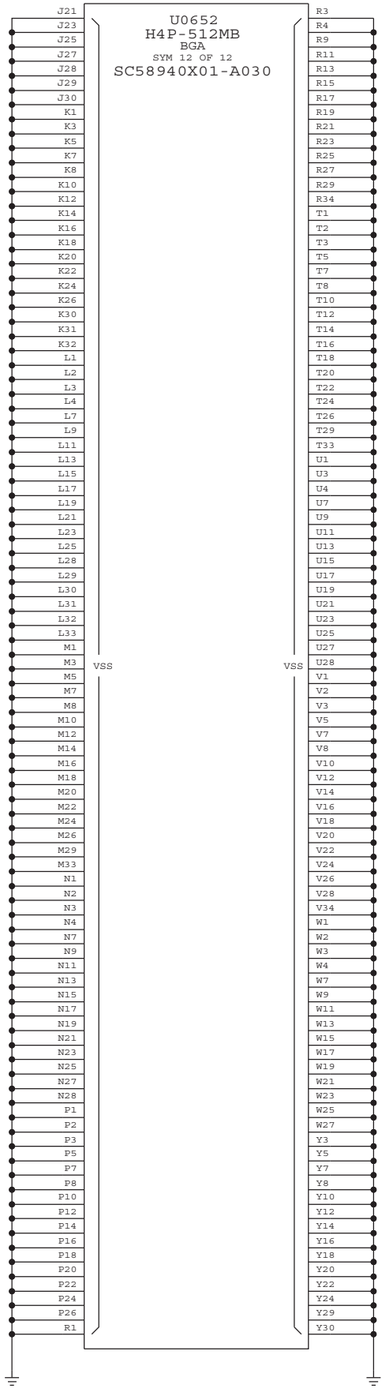
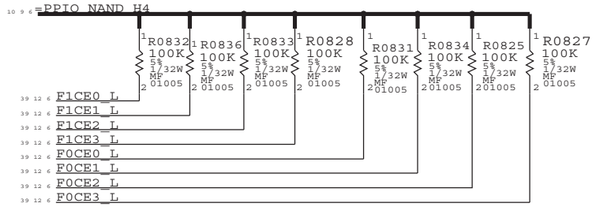
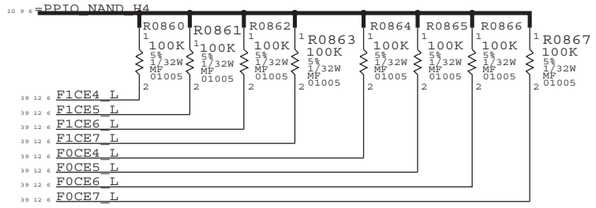
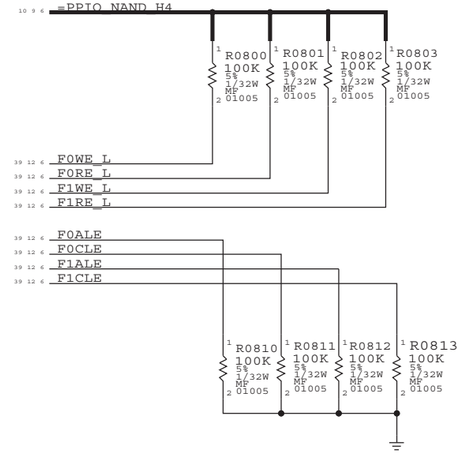
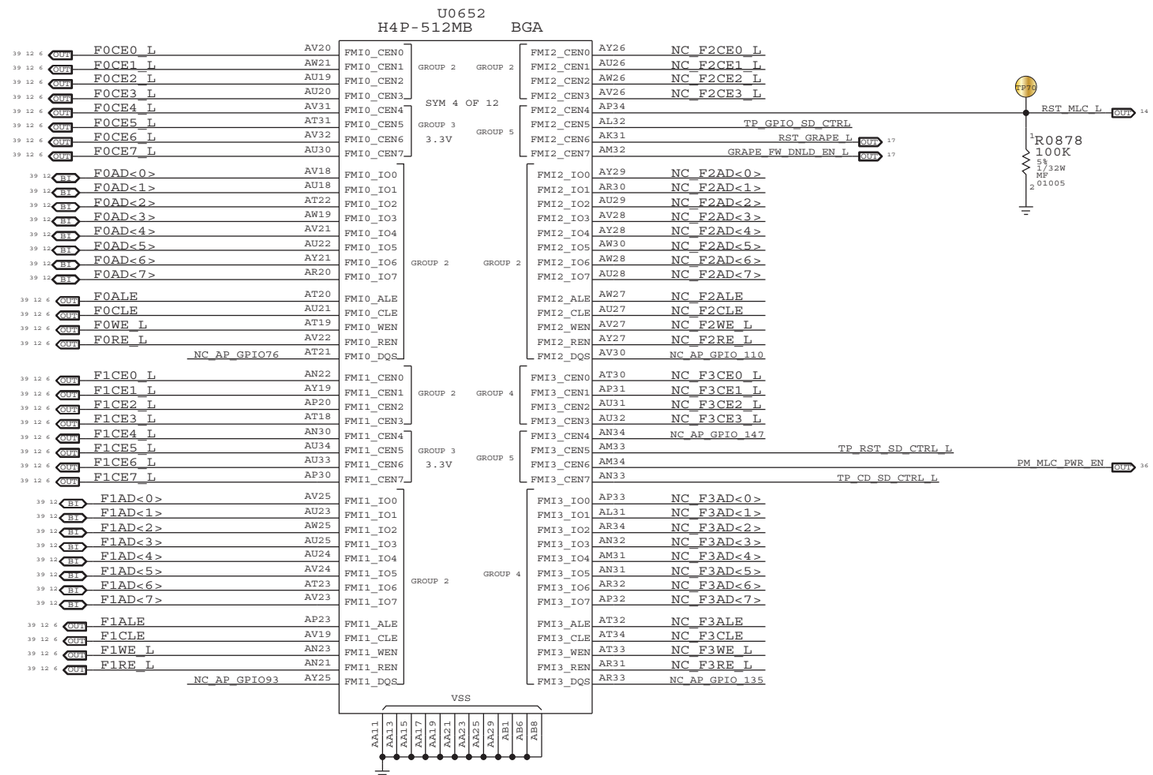
Apple Inc.	DRAWING NUMBER 051-8962 SIZE D
	REVISION A.0.0
	BRANCH
	PAGE 7 OF 106
	SHEET 5 OF 42











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PAGE TITLE: AP: NAND

Apple Inc.

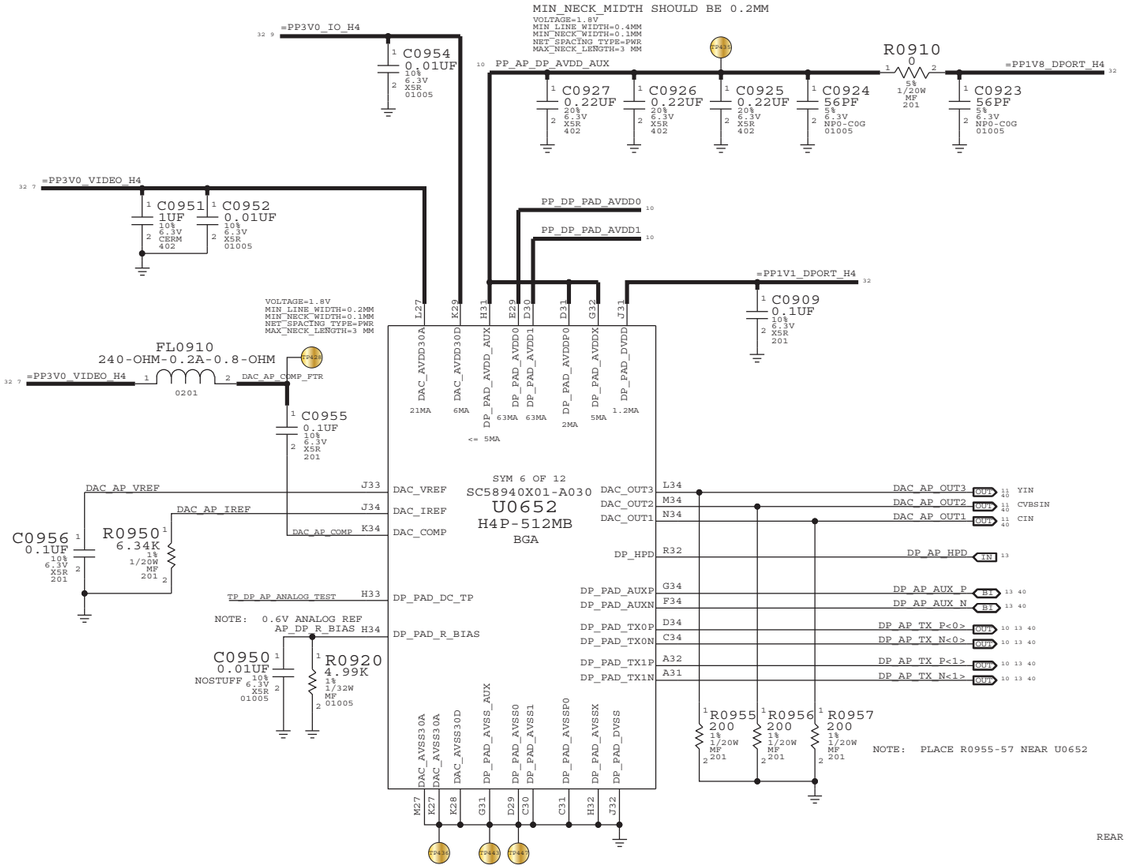
DRAWING NUMBER: 051-8962 SIZE: D

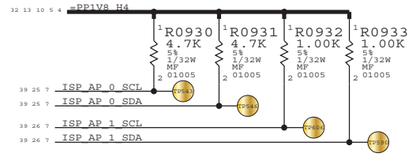
REVISION: A.0.0

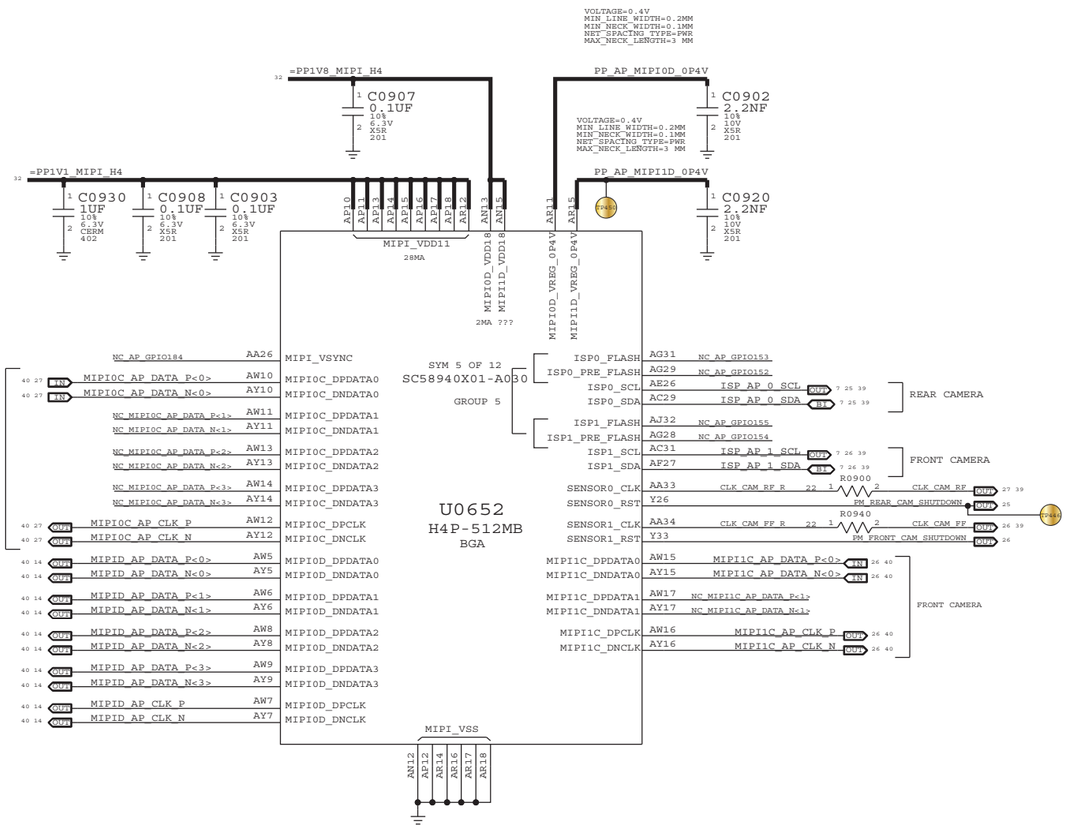
BRANCH:

PAGE: 8 OF 106

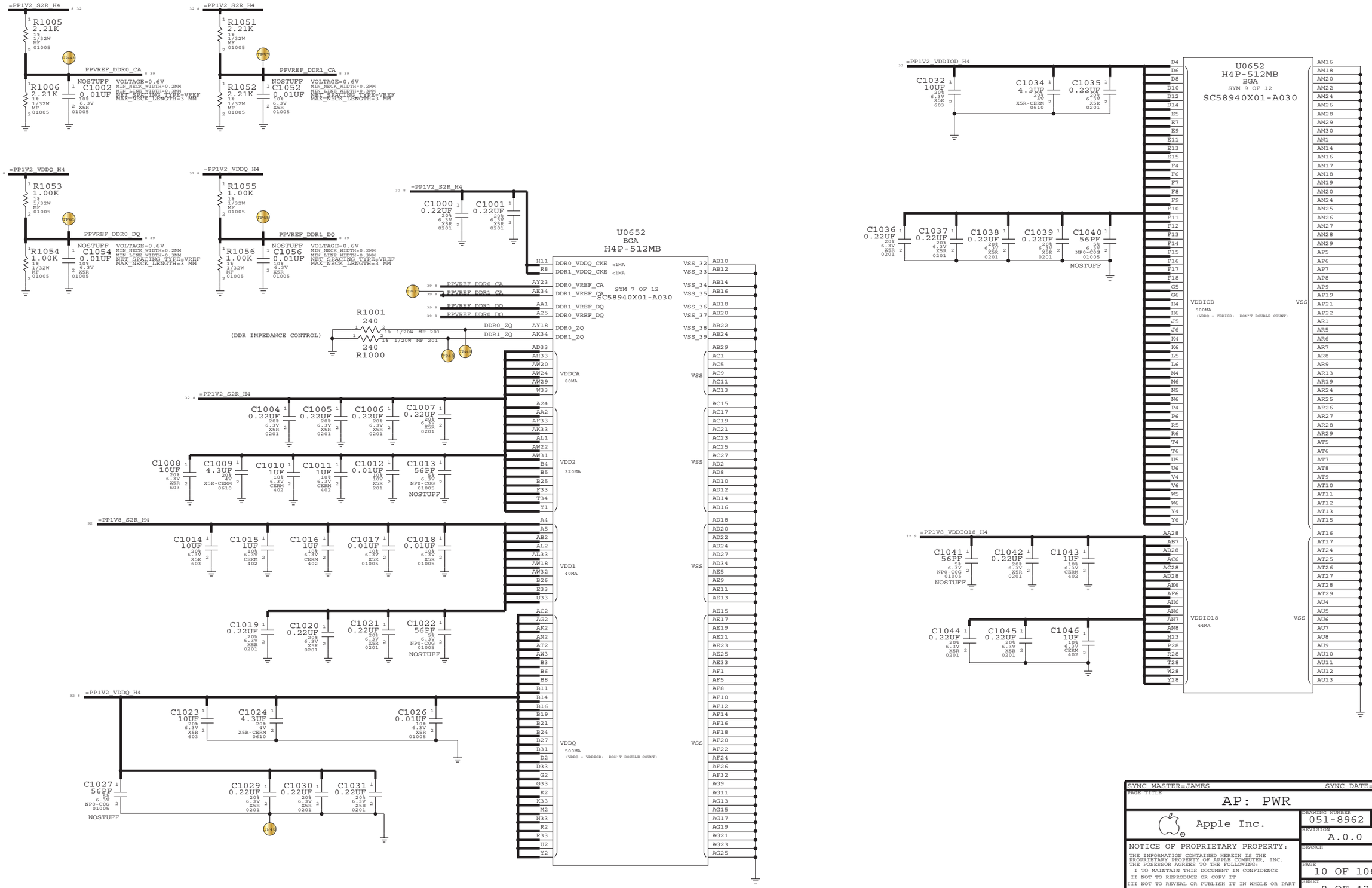
SHEET: 6 OF 42







SYNC_MASTER=JAMES	SYNC_DATE=N/A
PAGE TITLE	AP: TV,DP,MIPI
Apple Inc.	DRAWING NUMBER 051-8962 · SIZE D
	REVISION A.0.0
	BRANCH
	PAGE 9 OF 106
	SHEET 7 OF 42



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PAGE TITLE: AP: PWR

Apple Inc.

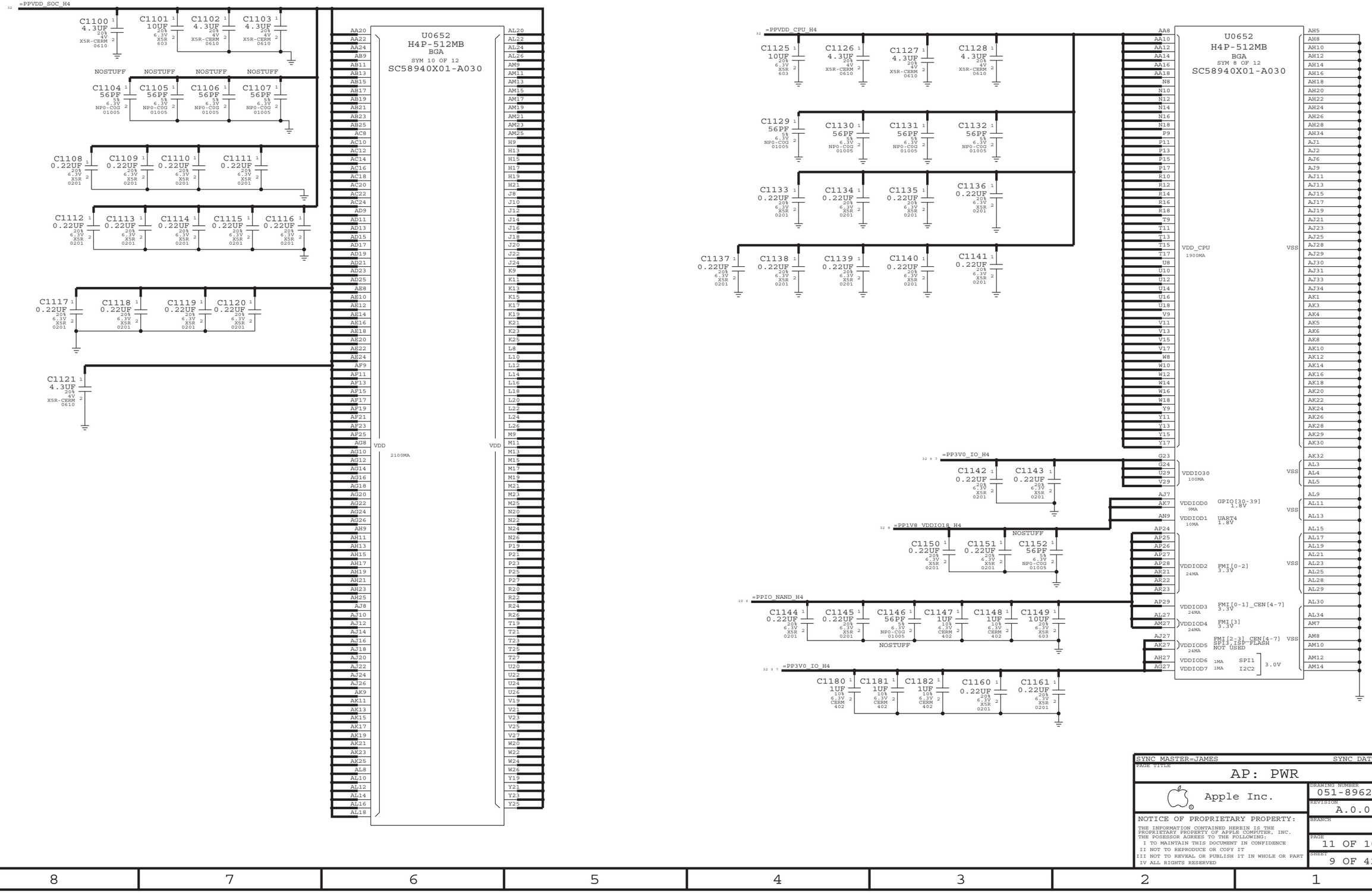
DRAWING NUMBER: 051-8962 SIZE: D

REVISION: A.0.0

BRANCH:

PAGE: 10 OF 106

SHEET: 8 OF 42



SYNC MASTER=JAMES SYNC DATE=N/A

PAGE TITLE

AP: PWR

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

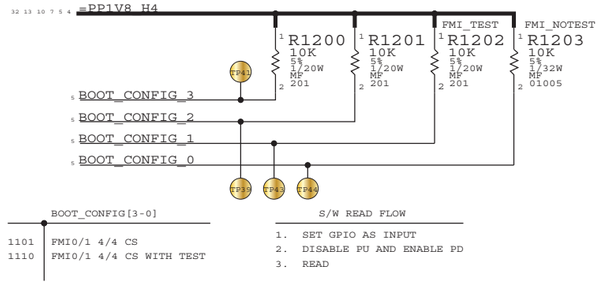
REVISION A.0.0

BRANCH

PAGE 11 OF 106

SHEET 9 OF 42

BOOT CONFIG ID

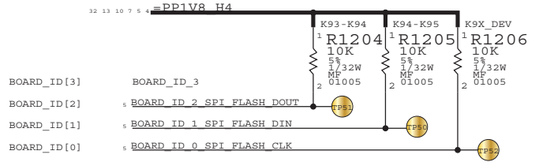


BOOT_CONFIG[3-0]	
1101	FMI0/1 4/4 CS
1110	FMI0/1 4/4 CS WITH TEST

S/W READ FLOW

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

BOARD ID

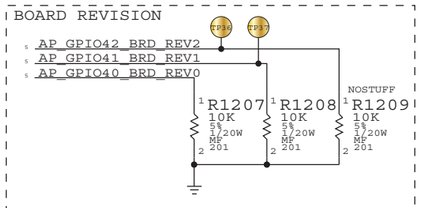


BOARD_ID[3-0]	
0100	K93 AP
0101	K93 DEV
0110	K94 AP
0111	K94 DEV
0010	K95 AP
0011	K95 DEV

S/W READ FLOW

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

BOARD REVISION



BRD_REV[2-0]	
000	PROTO 1
001	PROTO 2
010	EVT
011	EVT2
100	DVT

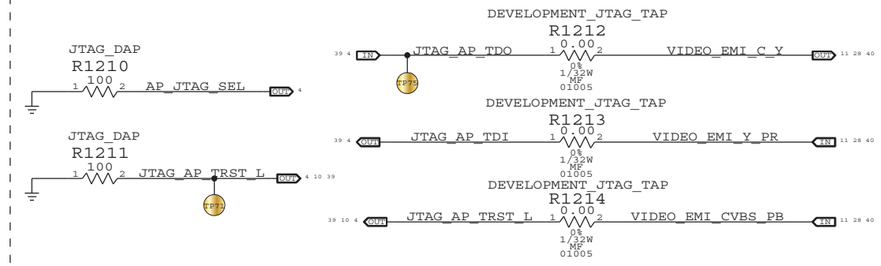
S/W READ FLOW

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

FOR REFERENCE

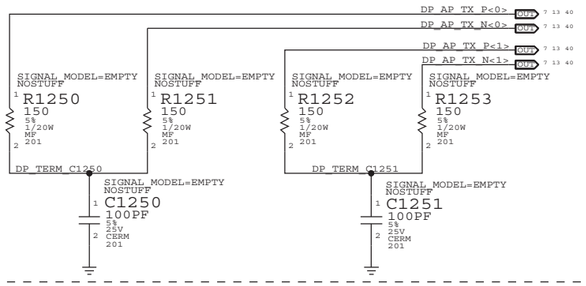
BOOT_CONFIG[3:0]	
0000	SPI0
0001	SPI3
0010	SPI0 W/TEST
0011	SPI3 W/TEST
0100	FMI0 2CS
0101	FMI0 4CS
0110	FMI0 4CS W/TEST
0111	RESERVED
1000	FMI1 2 CS
1001	FMI1 4 CS
1010	FMI1 4CS W/TEST
1011	RESERVED
1100	FMI0/1 2/2 CS
CURRENT SETTING -> 1101	FMI0/1 4/4 CS
1110	FMI0/1 4/4 CS W/TEST
1111	RESERVED

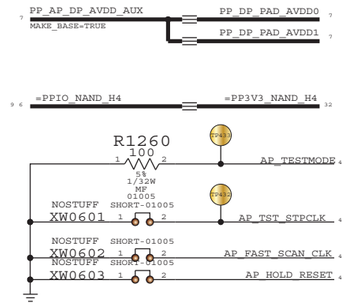
JTAG

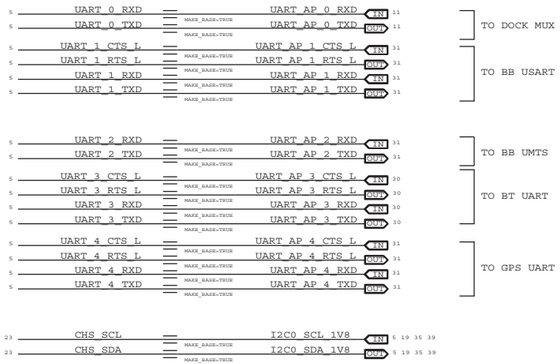


2-WIRE DAP	SCAN DUMP	PRODUCTION
DEVELOPMENT_JTAG JTAG_DAP	DEVELOPMENT_JTAG DEVELOPMENT_JTAG_TAP	JTAG_DAP

PLACEMENT NOTE: NEAR U0652







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PAGE TITLE

AP: MISC & ALIASES

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

REVISION A.0.0

BRANCH

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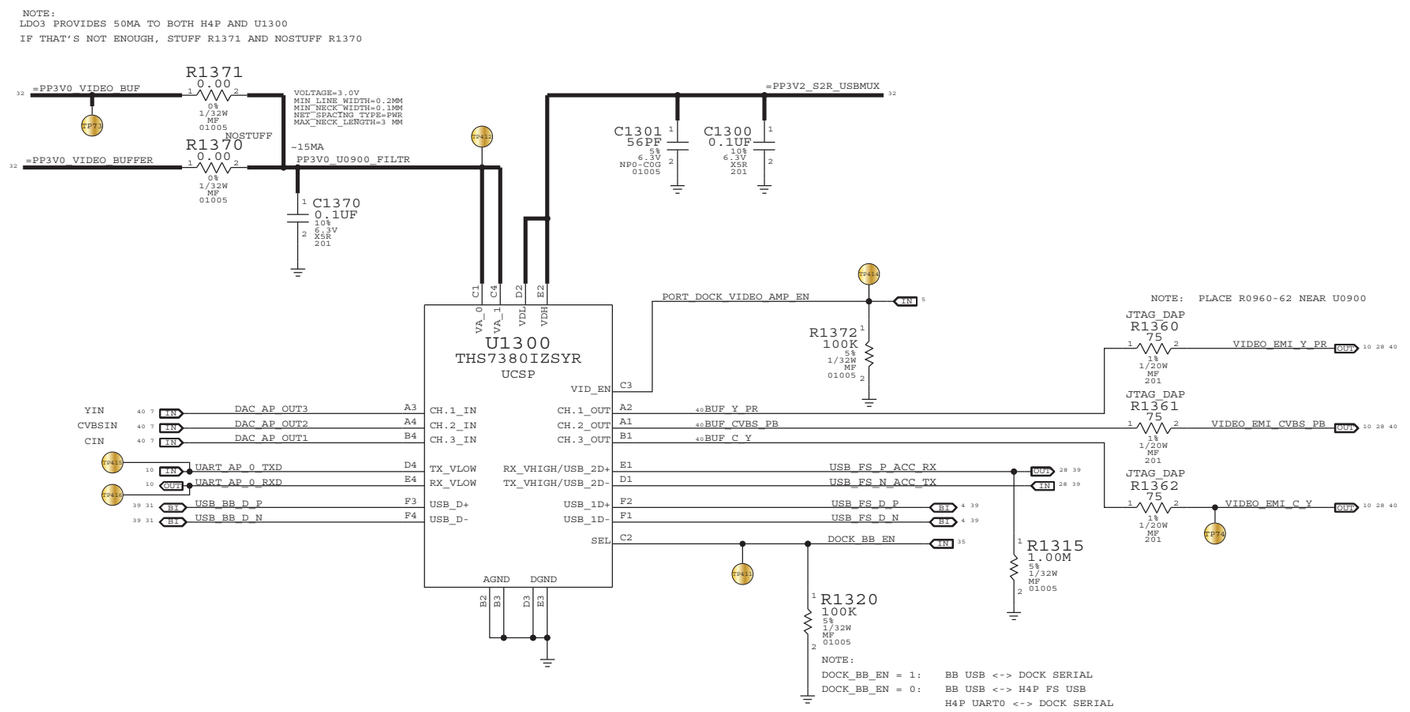
SHEET 10 OF 42



SYNC_MASTER=JAMES SYNC_DATE=N/A

PAGE TITLE

AP: VIDEO BUFFER,BB USB MUXES

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

REVISION A.0.0

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16GB FLASH CONFIGURATIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
335S0701	1	TOSHIBA 32NM 16GB RAW	U1400	16GB_PROD

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0682	335S0701	16GB_PROD	U1400	SAMSUNG 35NM 16GB RAW
335S0790	335S0701	16GB_PROD	U1400	SAMSUNG 27NM 16GB RAW
335S0781	335S0701	16GB_PROD	U1400	HYNIX 26NM 16GB PPN

32GB FLASH CONFIGURATIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
335S0701	2	TOSHIBA 32NM 16GB RAW	U1400,U1410	32GB_PROD

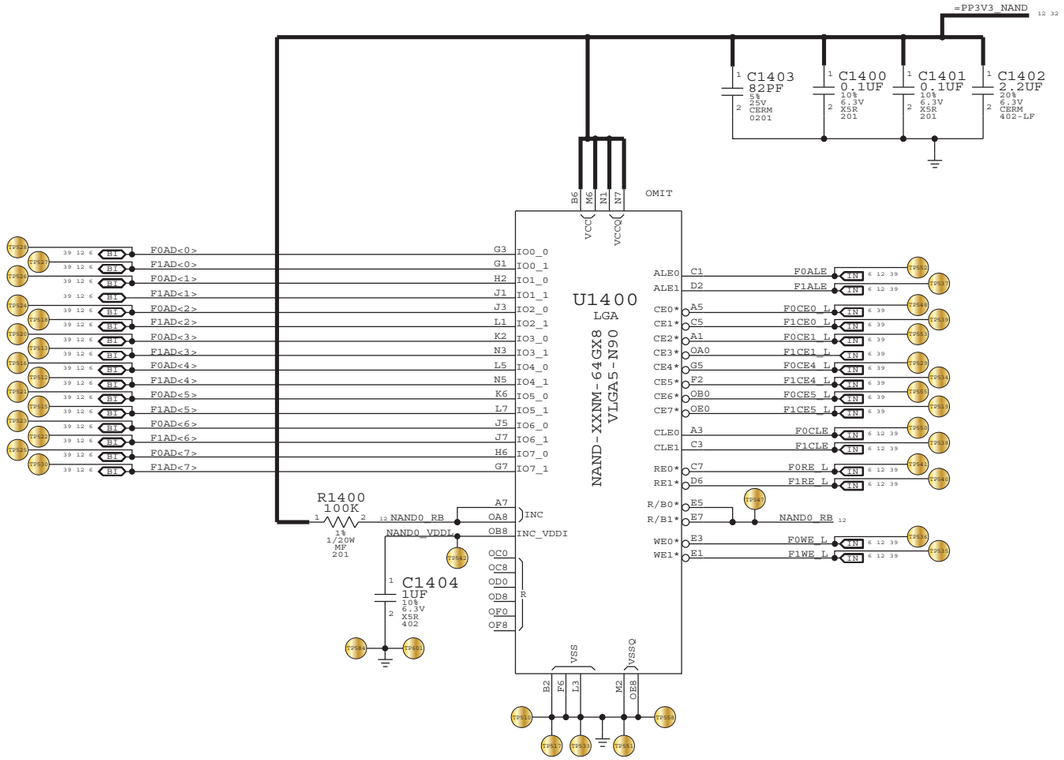
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0682	335S0701	32GB_PROD	U1400,U1410	SAMSUNG 35NM 16GB RAW
335S0790	335S0701	32GB_PROD	U1400,U1410	SAMSUNG 27NM 16GB RAW
335S0781	335S0701	32GB_PROD	U1400,U1410	HYNIX 26NM 16GB PPN

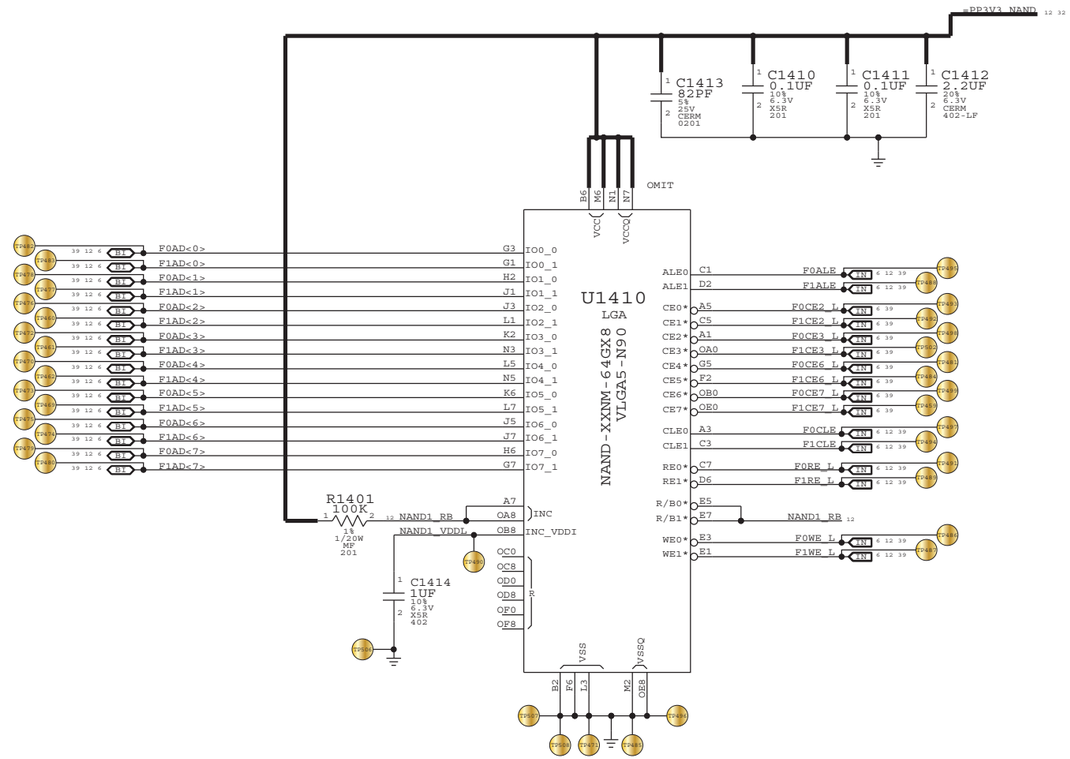
64GB FLASH CONFIGURATIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
335S0702	2	TOSHIBA 32NM 32GB RAW	U1400,U1410	64GB_PROD

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0665	335S0702	64GB_PROD	U1400,U1410	SAMSUNG 35NM 32GB RAW
335S0791	335S0702	64GB_PROD	U1400,U1410	SAMSUNG 27NM 32GB RAW
335S0722	335S0702	64GB_PROD	U1400,U1410	SANDISK 32NM 32GB RAW
335S0782	335S0702	64GB_PROD	U1400,U1410	HYNIX 26NM 32GB PPN

128GB FLASH CONFIGURATIONS





SYNC_MASTER=JONATHAN SYNC_DATE=N/A

PAGE TITLE

NAND

Apple Inc.

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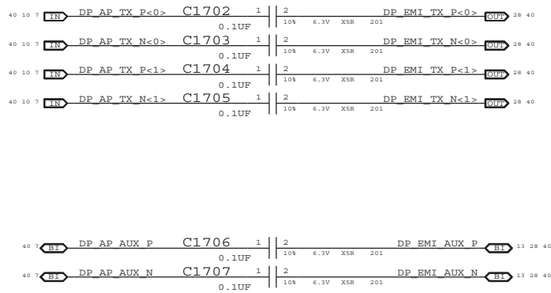
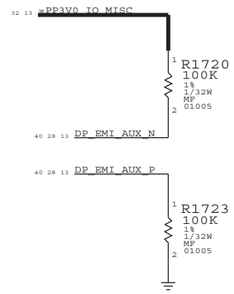
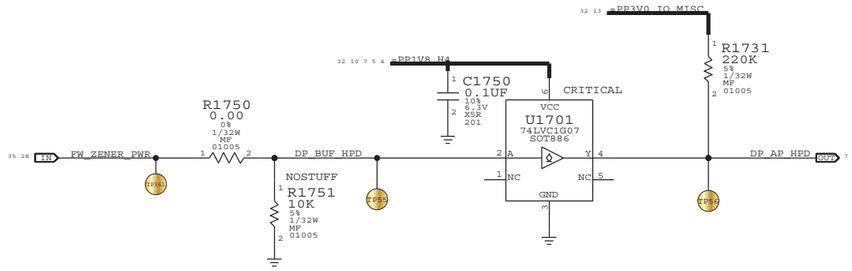
DISPLAYPORT AC COUPLING





DISPLAYPORT HOT PLUG DETECT



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
311S0536	311S0341		U1701	RADAR:8481319

SYNC_MASTER=JAMES SYNC_DATE=N/A

PAGE TITLE
VIDEO: DISPLAY PORT

Apple Inc.

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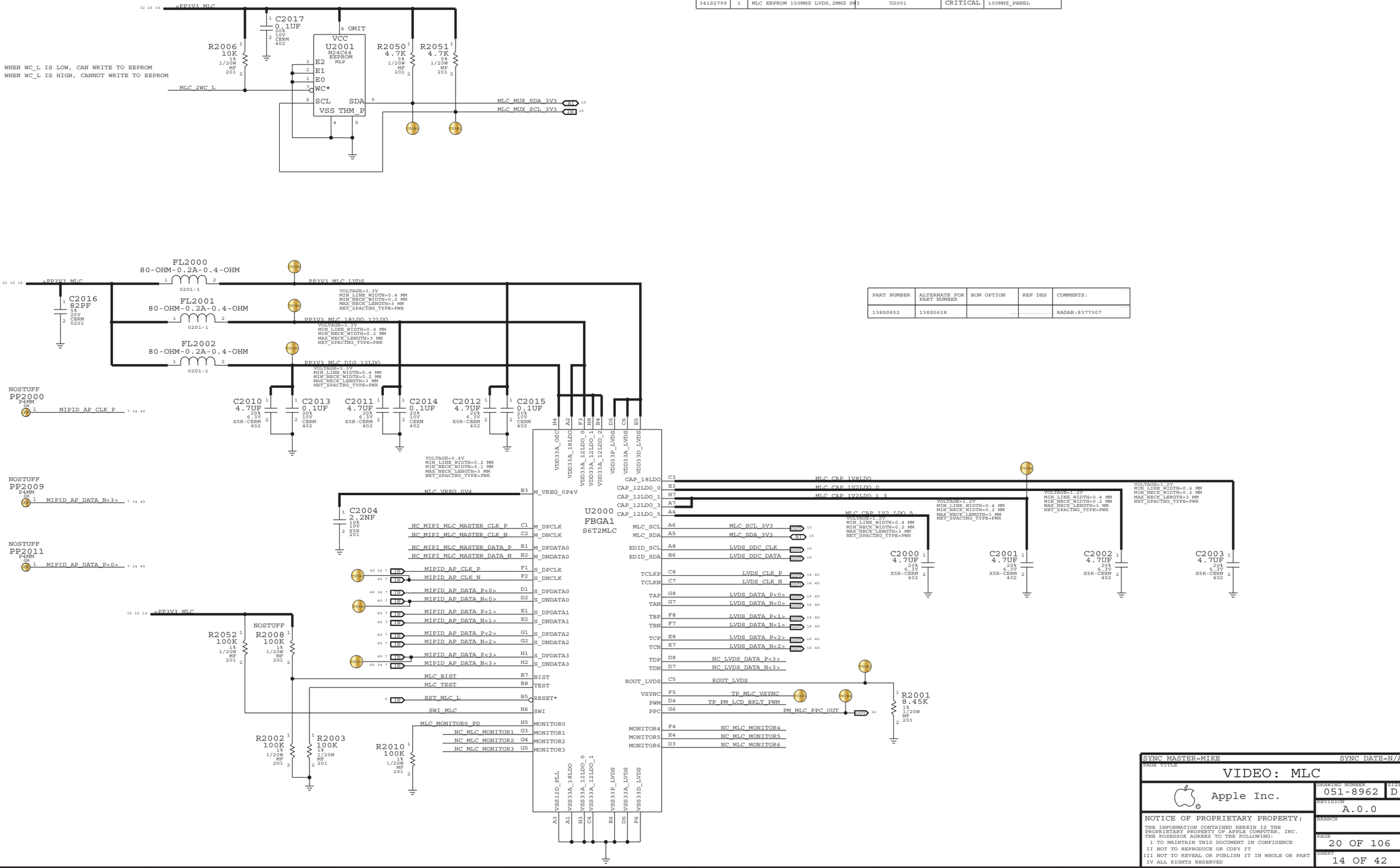
MLC EEPROM:RAW APN 335S0661

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
341S2799	1	MLC EEPROM 100MHZ LVDS,2MHZ SWI	U2001	CRITICAL	100MHZ_PANEL

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S0652	138S0618			RADAR:8377307



SYNC_MASTER=MIKE SYNC_DATE=N/A

PAGE TITLE

VIDEO: MLC

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14 MLC_SDA_3V3 ═══ MLC_MUX_SDA_3V3 14
14 MLC_SCL_3V3 ═══ MLC_MUX_SCL_3V3 14

SYNC_MASTER=MIKE SYNC_DATE=N/A

PAGE TITLE
VIDEO: MLC ALIASES

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D
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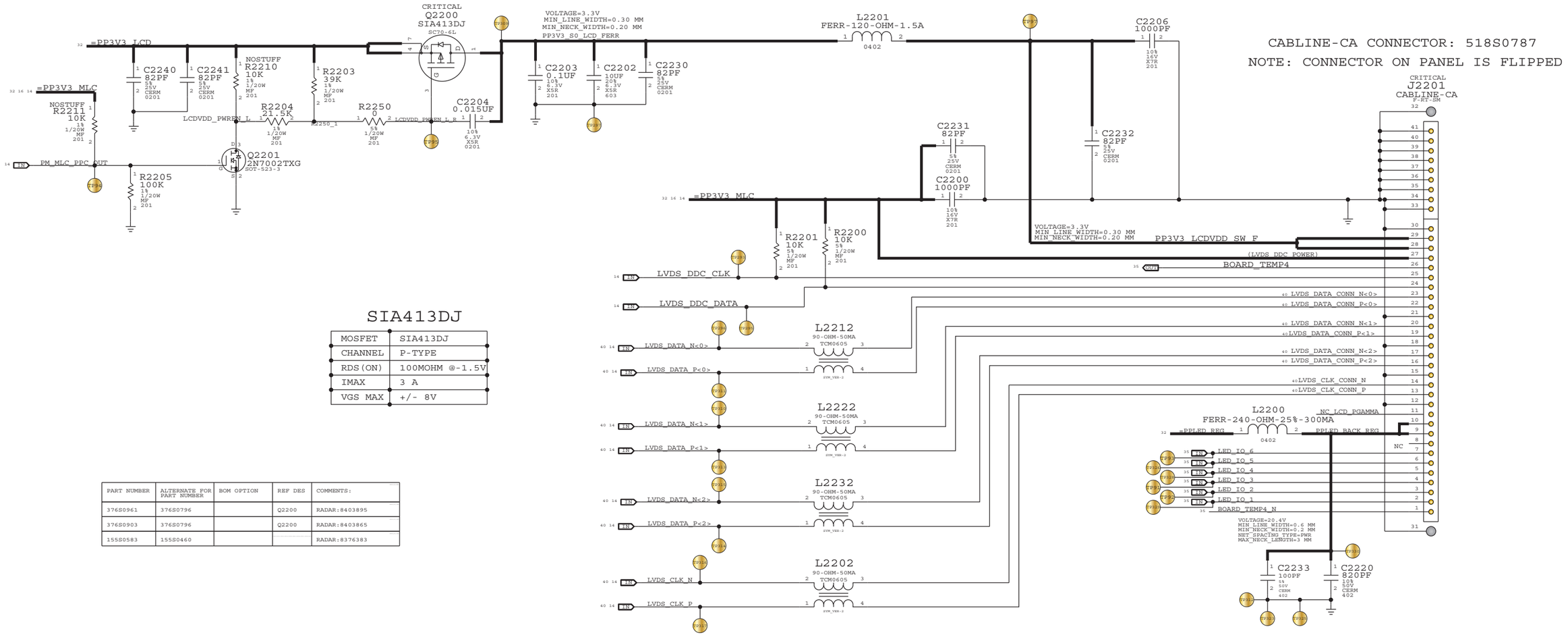
LVDS (LCD) CONNECTOR



CABLINE-CA CONNECTOR: 518S0787

NOTE: CONNECTOR ON PANEL IS FLIPPED

SIA413DJ

MOSFET	SIA413DJ
CHANNEL	P-TYPE
RDS(ON)	100MOHM @-1.5V
IMAX	3 A
VGS MAX	+/- 8V

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0961	376S0796		Q2200	RADAR:8403895
376S0903	376S0796		Q2200	RADAR:8403865
155S0583	155S0460			RADAR:8376383

NOSTUFF RESISTORS ARE THERE TO INVESTIGATE POSSIBILITY OF REMOVING THE CHOKE

SYNC_MASTER=ALEX SYNC_DATE=N/A

PAGE TITLE: VIDEO: LVDS CONNECTOR

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DRAWING NUMBER: 051-8962 SIZE: D

REVISION: A.0.0

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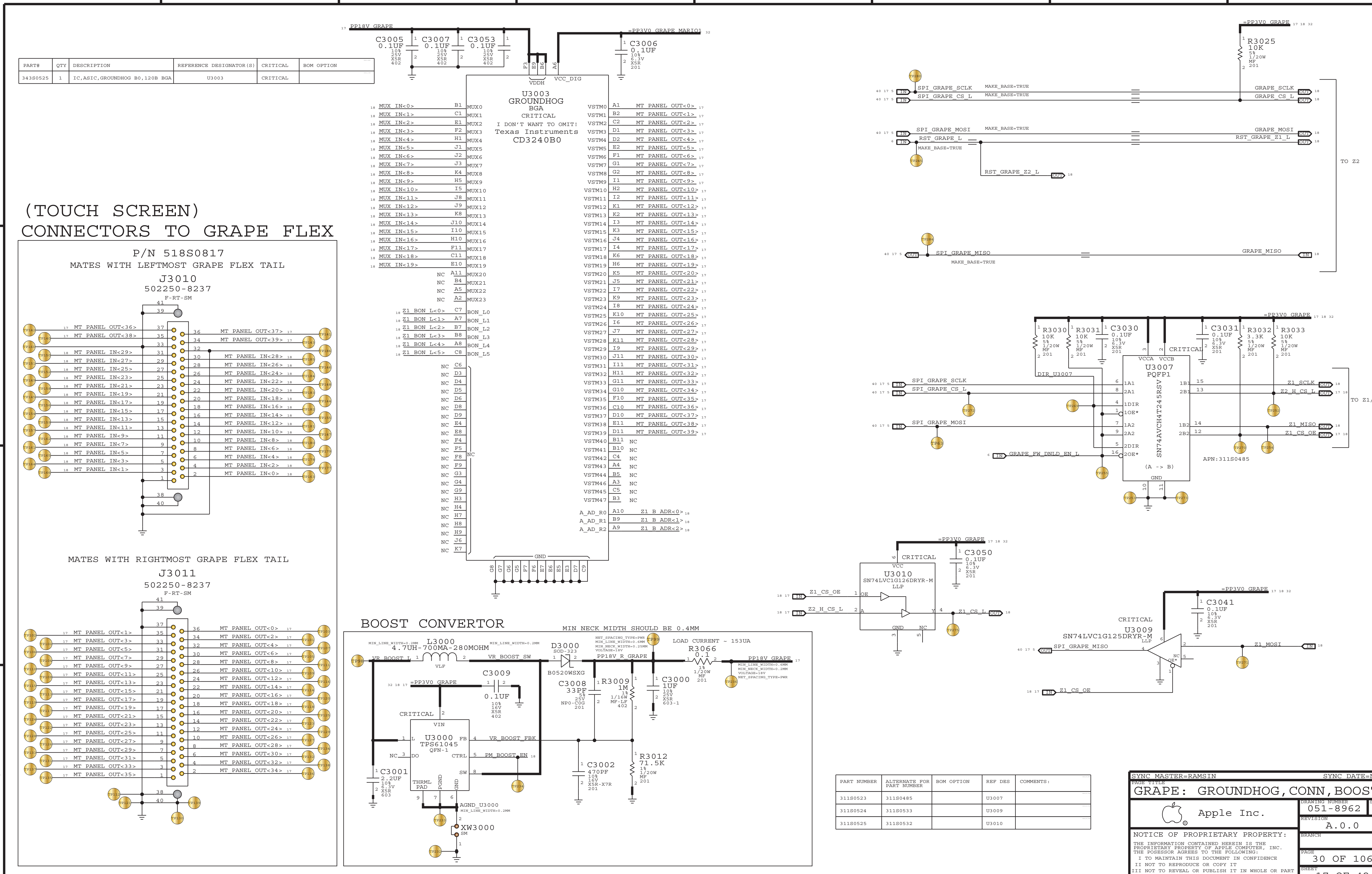

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S0525	1	IC,ASIC,GROUNDHOG B0,120B BGA	U3003	CRITICAL	

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
311S0523	311S0485		U3007	
311S0524	311S0533		U3009	
311S0525	311S0532		U3010	

SYNC_MASTER=RAMSIN SYNC_DATE=N/A

PAGE TITLE

GRAPE: GROUNDHOG,CONN,BOOST

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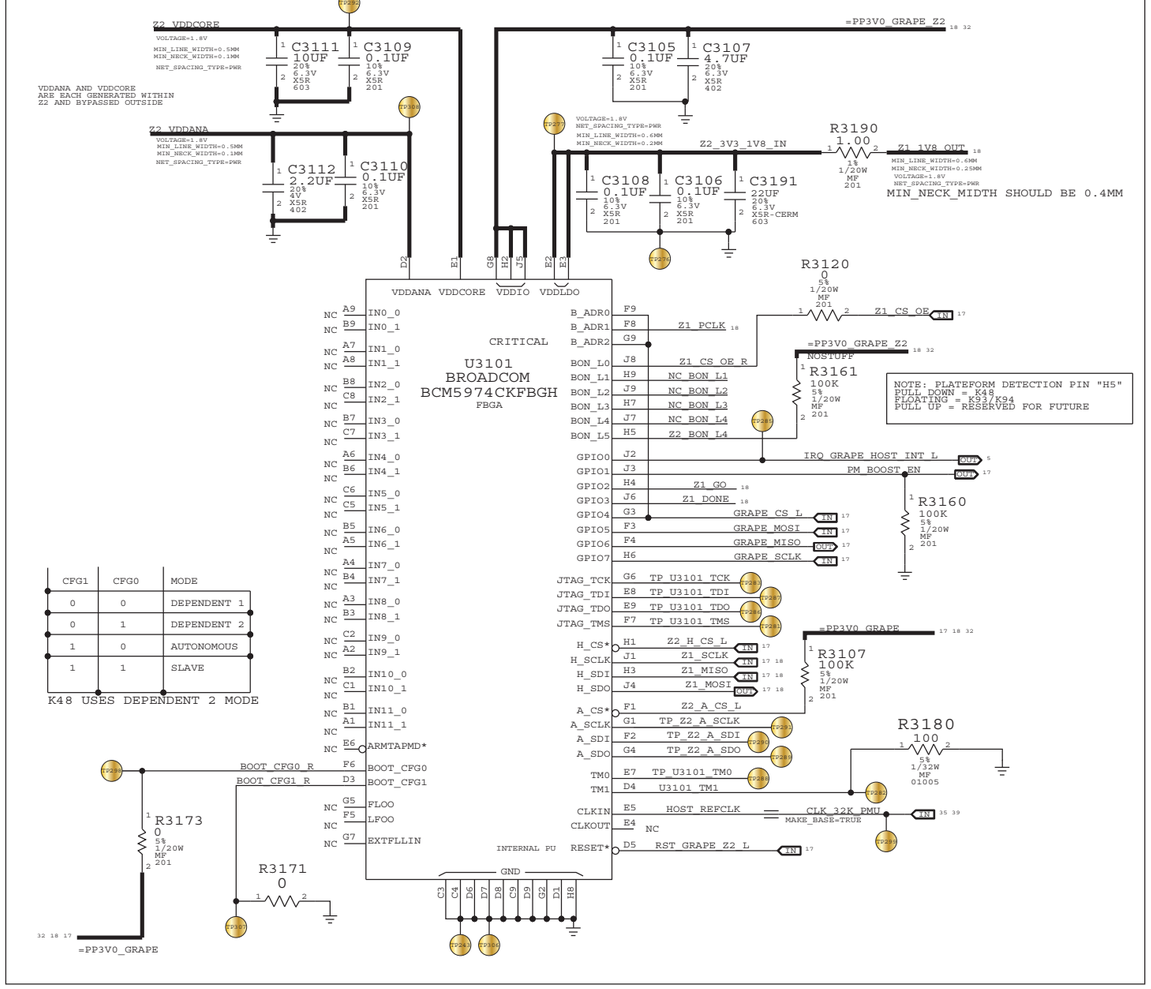
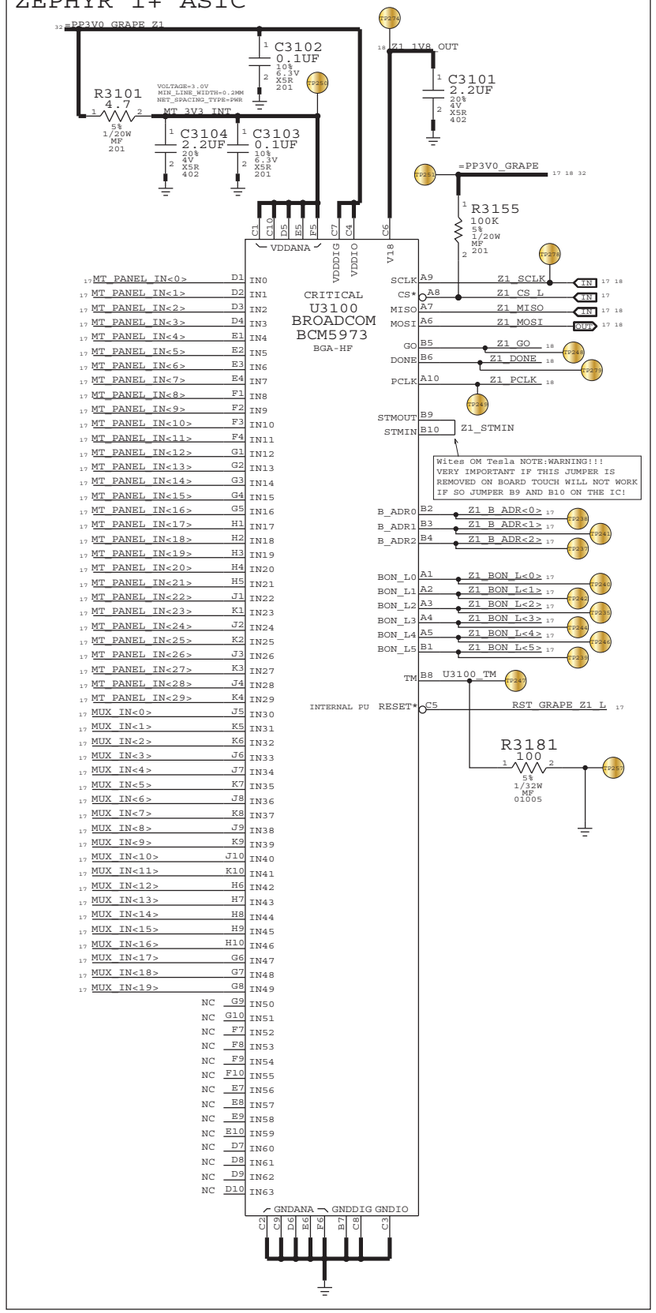
BRANCH

ARM9 MCU (Z2 BASED)



ZEPHYR 1+ ASIC



PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
138S0652	138S0648		C3107	RADAR:8392120
138S0618	138S0648		C3107	BOM CONSOLIDATION

SYNC_MASTER=RAMSIN SYNC_DATE=N/A

PAGE TITLE: GRAPE: Z1, Z2

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DRAWING NUMBER: 051-8962 SIZE: D

REVISION: A.0.0

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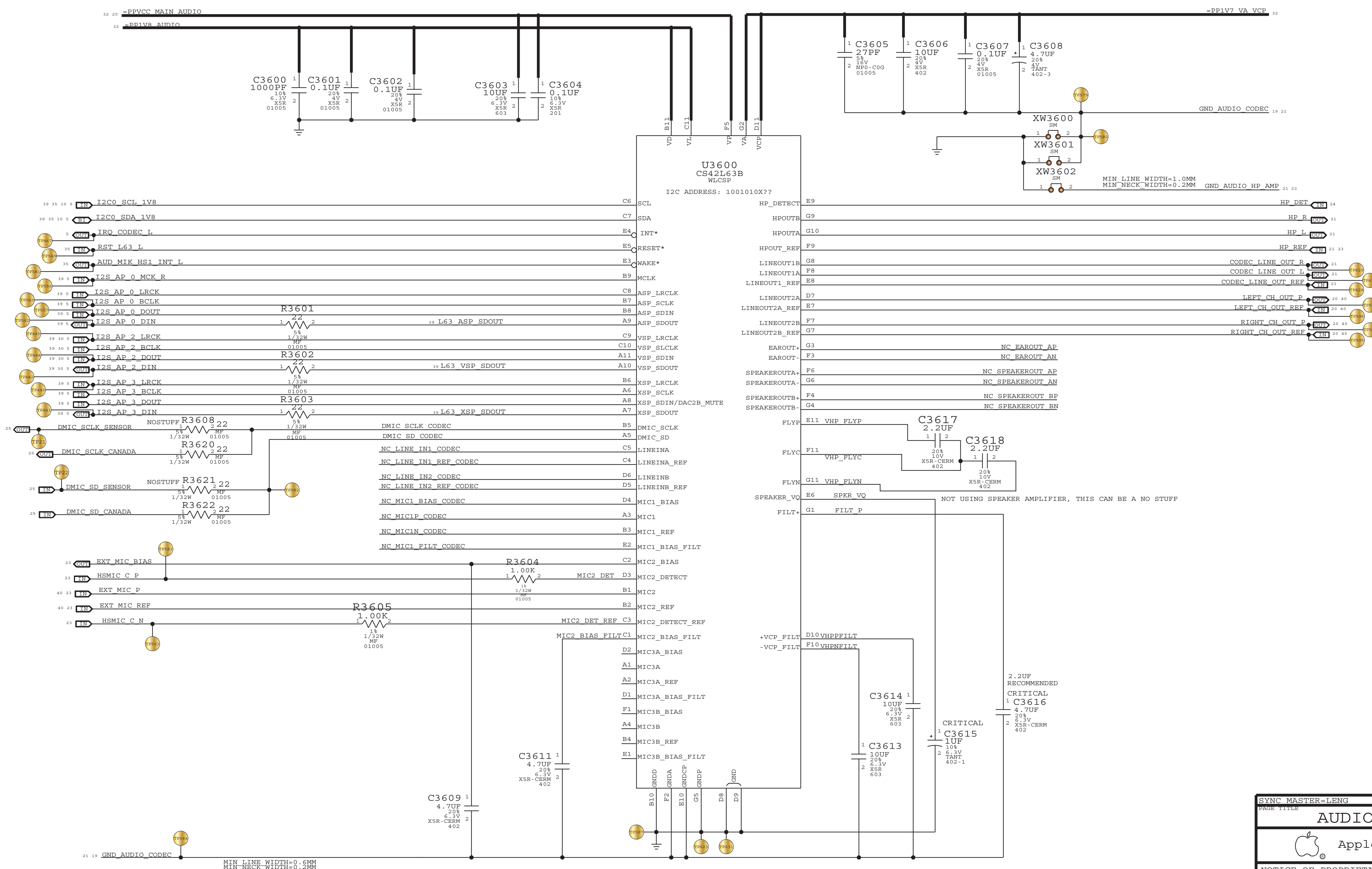
L63 AUDIO CODEC

APN:338S0940



=PPVCC_MAIN_AUDIO
=PP1V8_AUDIO
=PP1V7_VA_VCP
C3600 1000PF 10% 6.3V X5R 01005
C3601 0.1UF 20% 4V X5R 01005
C3602 0.1UF 20% 4V X5R 01005
C3603 10UF 20% 6.3V X5R 603
C3604 0.1UF 10% 6.3V X5R 201
C3605 27PF 5% 16V NP0-C0G 01005
C3606 10UF 20% 4V X5R 402
C3607 0.1UF 20% 4V X5R 01005
C3608 4.7UF 20% 4V TANT 402-3
GND_AUDIO_CODEC
XW3600 SM
XW3601 SM
XW3602 SM
MIN_LINE_WIDTH=1.0MM
MIN_NECK_WIDTH=0.2MM
GND_AUDIO_HP_AMP
U3600
CS42L63B
WLCSP
I2C ADDRESS: 1001010X??
VD VL VP VA VCP
SCL SDA INT* RESET* WAKE* MCLK
ASP_LRCLK ASP_SCLK ASP_SDIN ASP_SDOUT
VSP_LRCLK VSP_SLCLK VSP_SDIN VSP_SDOUT
XSP_LRCLK XSP_SCLK XSP_SDIN/DAC2B_MUTE XSP_SDOUT
DMIC_SCLK DMIC_SD LINEINA LINEINA_REF LINEINB LINEINB_REF
MIC1_BIAS MIC1 MIC1_REF MIC1_BIAS_FILT
MIC2_BIAS MIC2_DETECT MIC2 MIC2_REF MIC2_DETECT_REF MIC2_BIAS_FILT
MIC3A_BIAS MIC3A MIC3A_REF MIC3A_BIAS_FILT MIC3B_BIAS MIC3B MIC3B_REF MIC3B_BIAS_FILT
GNDD GNDA GNDCP GNDP GND
HP_DETECT HPOUTB HPOUTA HPOUT_REF
LINEOUT1B LINEOUT1A LINEOUT1_REF LINEOUT2A LINEOUT2A_REF LINEOUT2B LINEOUT2B_REF
EAROUT+ EAROUT- SPEAKEROUTA+ SPEAKEROUTA- SPEAKEROUTB+ SPEAKEROUTB-
FLYP FLYC FLYN SPEAKER_VQ FILT+ +VCP_FILT -VCP_FILT
I2C0_SCL_1V8
I2C0_SDA_1V8
IRQ_CODEC_L
RST_L63_L
AUD_MIK_HS1_INT_L
I2S_AP_0_MCK_R
I2S_AP_0_LRCK
I2S_AP_0_BCLK
I2S_AP_0_DOUT
I2S_AP_0_DIN
I2S_AP_2_LRCK
I2S_AP_2_BCLK
I2S_AP_2_DOUT
I2S_AP_2_DIN
I2S_AP_3_LRCK
I2S_AP_3_BCLK
I2S_AP_3_DOUT
I2S_AP_3_DIN
R3601 22 5% 1/32W MF 01005
R3602 22 5% 1/32W MF 01005
R3603 22 5% 1/32W MF 01005
L63_ASP_SDOUT
L63_VSP_SDOUT
L63_XSP_SDOUT
DMIC_SCLK_SENSOR
NOSTUFF R3608 22 5% 1/32W MF 01005
DMIC_SCLK_CANADA
R3620 22 5% 1/32W MF 01005
DMIC_SD_SENSOR
NOSTUFF R3621 22 5% 1/32W MF 01005
DMIC_SD_CANADA
R3622 22 5% 1/32W MF 01005
DMIC_SCLK_CODEC
DMIC_SD_CODEC
NC_LINE_IN1_CODEC
NC_LINE_IN1_REF_CODEC
NC_LINE_IN2_CODEC
NC_LINE_IN2_REF_CODEC
NC_MIC1_BIAS_CODEC
NC_MIC1P_CODEC
NC_MIC1N_CODEC
NC_MIC1_FILT_CODEC
EXT_MIC_BIAS
HSMIC_C_P
EXT_MIC_P
EXT_MIC_REF
HSMIC_C_N
R3604 1.00K 1% 1/32W MF 01005
R3605 1.00K 1% 1/32W MF 01005
MIC2_DET
MIC2_DET_REF
MIC2_BIAS_FILT
C3609 4.7UF 20% 6.3V X5R-CERM 402
C3611 4.7UF 20% 6.3V X5R-CERM 402
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
MAX_NECK_LENGTH=75 MM
HP_DET
HP_R
HP_L
HP_REF
CODEC_LINE_OUT_R
CODEC_LINE_OUT_L
CODEC_LINE_OUT_REF
LEFT_CH_OUT_P
LEFT_CH_OUT_REF
RIGHT_CH_OUT_P
RIGHT_CH_OUT_REF
NC_EAROUT_AP
NC_EAROUT_AN
NC_SPEAKEROUT_AP
NC_SPEAKEROUT_AN
NC_SPEAKEROUT_BP
NC_SPEAKEROUT_BN
VHP_FLYP
VHP_FLYC
VHP_FLYN
SPKR_VQ
FILT_P
C3617 2.2UF 20% 10V X5R-CERM 402
C3618 2.2UF 20% 10V X5R-CERM 402
NOT USING SPEAKER AMPLIFIER, THIS CAN BE A NO STUFF
VHPPFILT
VHPNFILT
C3614 10UF 20% 6.3V X5R 603
C3613 10UF 20% 6.3V X5R 603
CRITICAL
C3615 1UF 10% 6.3V TANT 402-1
2.2UF RECOMMENDED
CRITICAL
C3616 4.7UF 20% 6.3V X5R-CERM 402

SYNC_MASTER=LENG SYNC_DATE=N/A

PAGE TITLE: AUDIO: L63 CODEC

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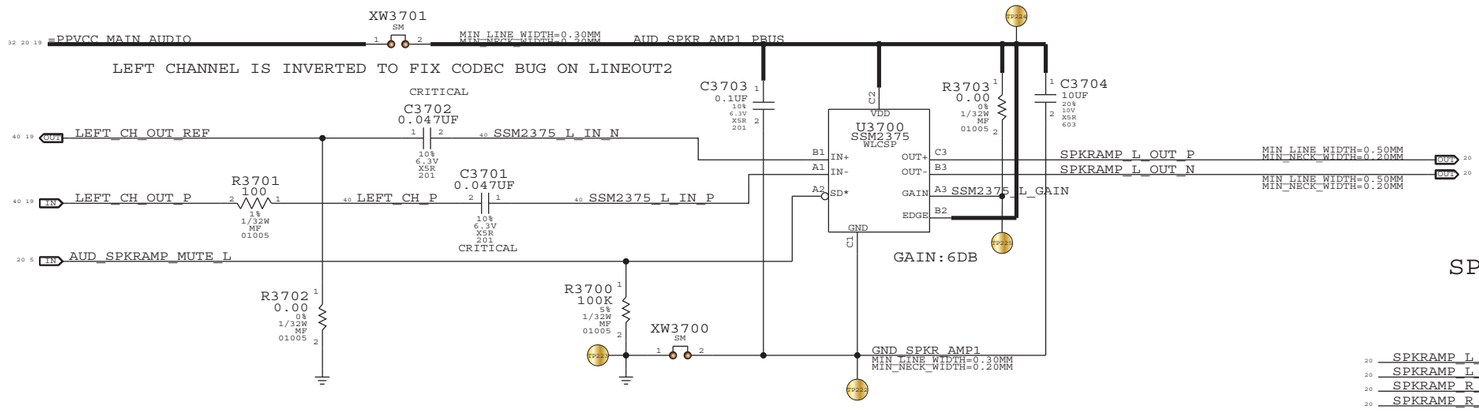
GAIN	VDD	GND
12DB	47K	NC
9DB	NC	47K
6DB	SHORT	NC
3DB	NC	NC
0DB	NC	SHORT

SPEAKER AMPLIFIER 1

APN:353S2958

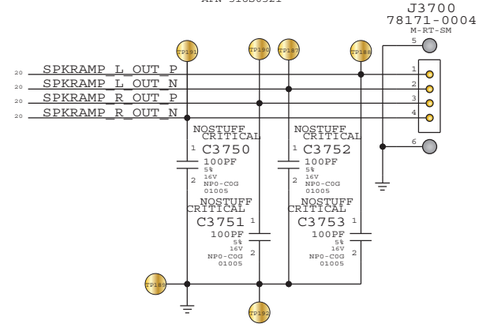
TURN ON TIME: 7.5MS

80HZ +/- XXX% TURN ON DELAY: 20MS



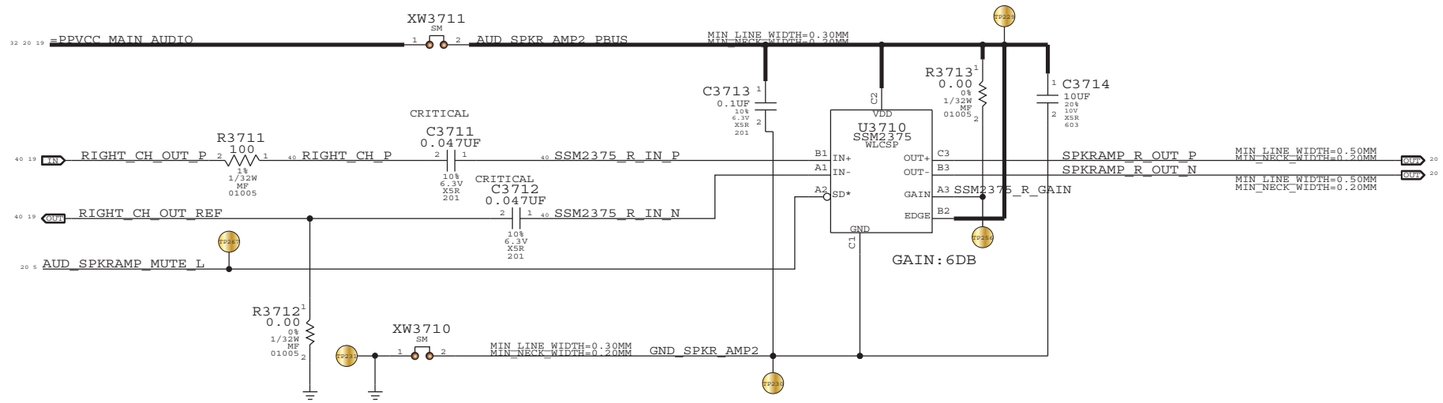
SPEAKER CONNECTOR

APN 518S0521



L63 LINEOUT2A IS CONNECTED TO U3700
L63 LINEOUT2B IS CONNECTED TO U3710

SPEAKER AMPLIFIER 2



SYNC MASTER=LENG	SYNC DATE=N/A
PAGE TITLE: AUDIO: SPEAKER AMP	
Apple Inc.	DRAWING NUMBER: 051-8962 SIZE: D
	REVISION: A.0.0
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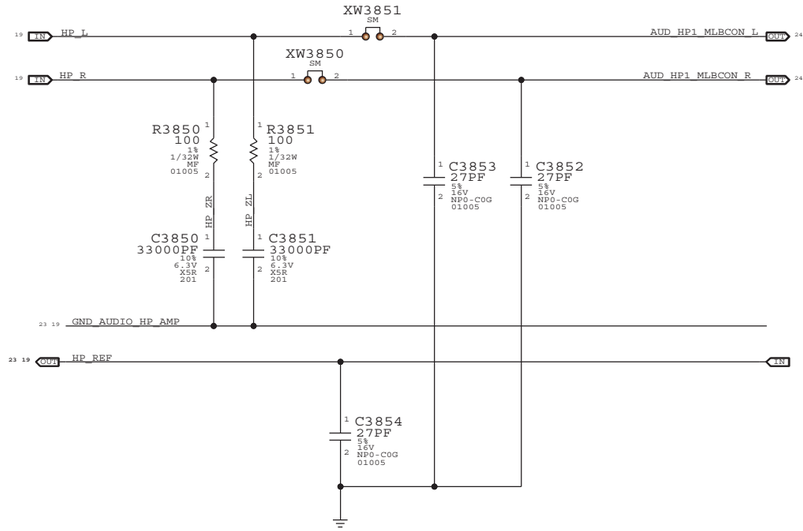
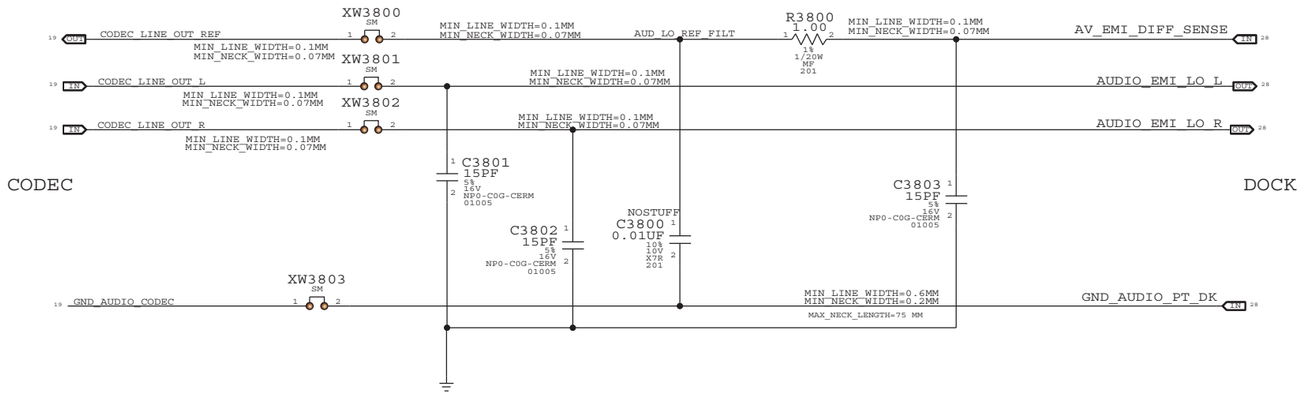
HEADPHONE OUTPUT ZOBEL NETWORK



DOCK LINE OUTPUT



SYNC_MASTER=LENG SYNC_DATE=N/A

PAGE TITLE
AUDIO: HEADPHONE OUT

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

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SYNC_MASTER=LENG SYNC_DATE=N/A

PAGE TITLE

AUDIO: BLANK

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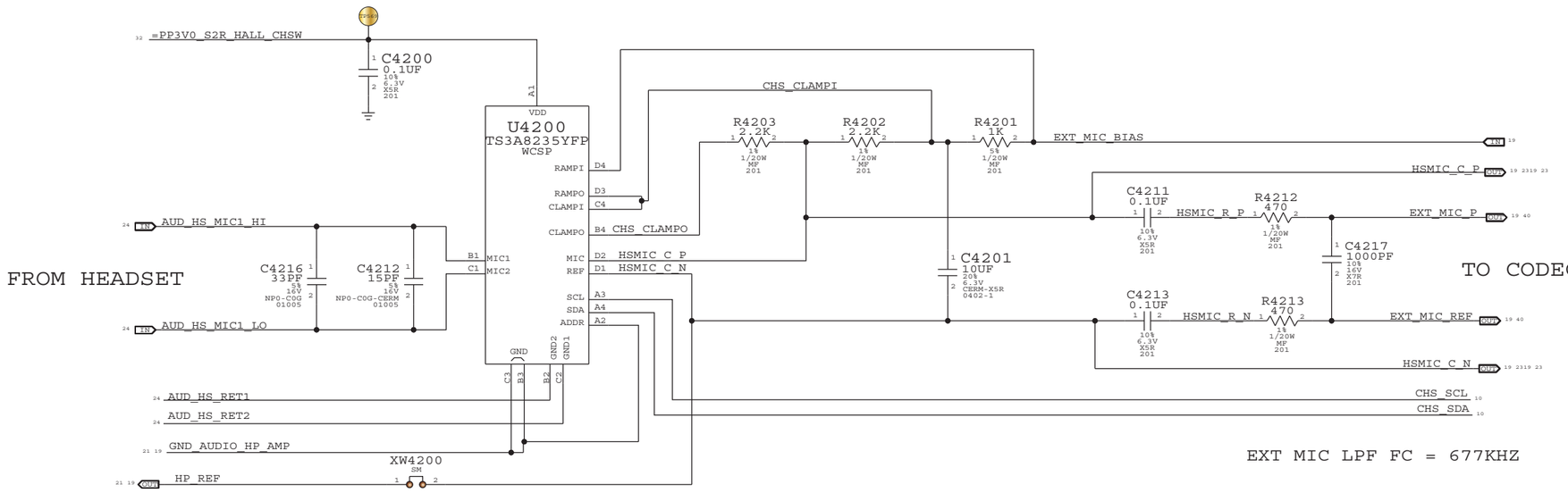
EXTERNAL (HEADSET) MIC INPUT CIRCUITRY



EXT MIC LPF FC = 677KHZ

SYNC_MASTER=LENG SYNC_DATE=N/A

PAGE TITLE
AUDIO: DETECT/MIC BIAS

Apple Inc.

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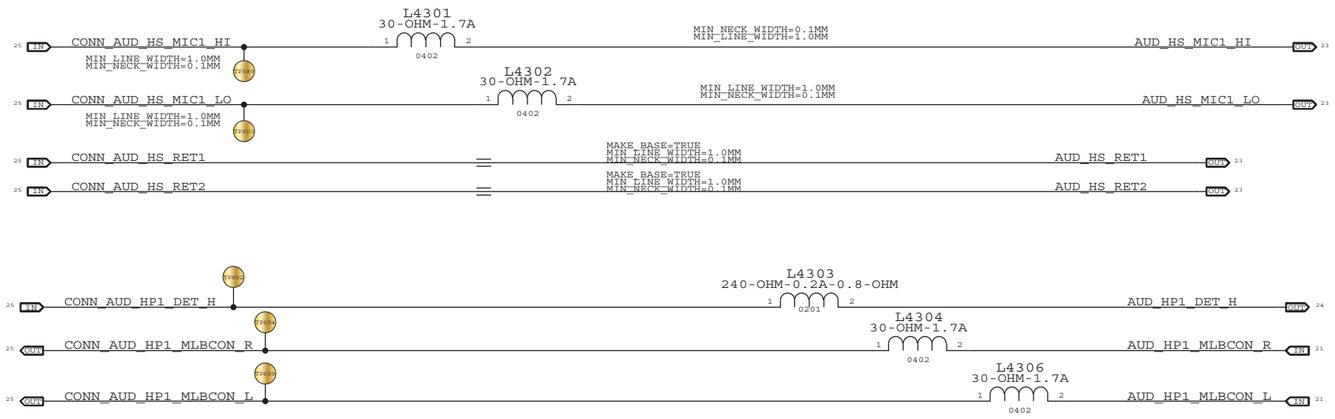
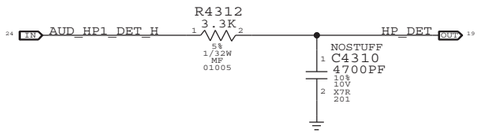
HEADPHONE JACK CONNECTION IS ON FRONT PANEL FLEX, CSA 55/PDF 29
PLACE ALL COMPONENTS NEAR J5501



HEADSET JACK INSERTION DETECT



SYNC MASTER=LENG
SYNC DATE=N/A

PAGE TITLE
AUDIO: HP/MIC FILTERS

Apple Inc.

DRAWING NUMBER 051-8962
SIZE D
REVISION A.0.0
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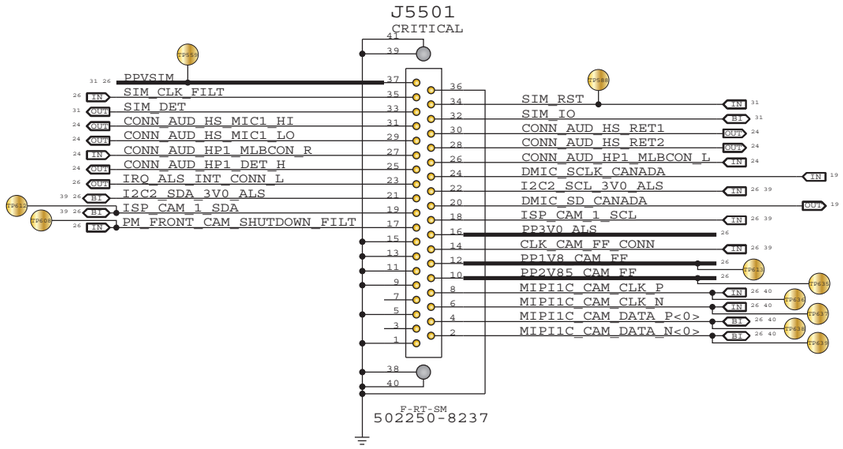
CANADA FLEXES CONN.

APN: 518S0817



SENSOR BOARD CONN ALIASES

39 27	CLK_CAM_RF_FILT	MAKE_BASE=TRUE	CONN_CLK_CAM_RF_FILT	27
40 27	MIPI0C_CAM_DATA_N<0>	MAKE_BASE=TRUE	CONN_MIPI0C_CAM_DATA_N<0>	27
40 27	MIPI0C_CAM_DATA_P<0>	MAKE_BASE=TRUE	CONN_MIPI0C_CAM_DATA_P<0>	27
		MAKE_BASE=TRUE		
40 27	MIPI0C_CAM_CLK_N	MAKE_BASE=TRUE	CONN_MIPI0C_CAM_CLK_N	27
40 27	MIPI0C_CAM_CLK_P	MAKE_BASE=TRUE	CONN_MIPI0C_CAM_CLK_P	27
7	PM_REAR_CAM_SHUTDOWN	MAKE_BASE=TRUE	CONN_PM_REAR_CAM_SHUTDOWN	27
27	PP1V8_SENSOR_FILT	MAKE_BASE=TRUE	CONN_PP1V8_SENSOR_FILT	27
27	PP2V85_CAM_REAR	MAKE_BASE=TRUE	CONN_PP2V85_CAM_REAR	27
19	DMIC_SD_SENSOR	MAKE_BASE=TRUE	CONN_DMIC_SD_SENSOR	27
19	DMIC_SCLK_SENSOR	MAKE_BASE=TRUE	CONN_DMIC_SCLK_SENSOR	27
39 7	ISP_AP_0_SCL	MAKE_BASE=TRUE	CONN_ISP_AP_0_SCL	27
39 7	ISP_AP_0_SDA	MAKE_BASE=TRUE	CONN_ISP_AP_0_SDA	27
39 26 5	I2C2_SCL_3V0	MAKE_BASE=TRUE	CONN_I2C2_SCL_3V0	27
39 26 5	I2C2_SDA_3V0	MAKE_BASE=TRUE	CONN_I2C2_SDA_3V0	27
5	IRQ_ACCEL_INT1_L	MAKE_BASE=TRUE	CONN_IRQ_ACCEL_INT1_L	27
5	IRQ_ACCEL_INT2_L	MAKE_BASE=TRUE	CONN_IRQ_ACCEL_INT2_L	27
5	IRQ_GYRO_INT1	MAKE_BASE=TRUE	CONN_IRQ_GYRO_INT1	27
5	IRQ_GYRO_INT2	MAKE_BASE=TRUE	CONN_IRQ_GYRO_INT2	27
39 5	I2C1_SCL_1V8	MAKE_BASE=TRUE	CONN_I2C1_SCL_1V8	27
39 5	I2C1_SDA_1V8	MAKE_BASE=TRUE	CONN_I2C1_SDA_1V8	27
35	IRQ_HALL	MAKE_BASE=TRUE	CONN_IRQ_HALL	27
5	IRQ_PROX_INT_L	MAKE_BASE=TRUE	CONN_IRQ_PROX_INT_L	27
27	PP3V0_S2R_HALL_FILT	MAKE_BASE=TRUE	CONN_PP3V0_S2R_HALL	27
35 5	ONOFF_L	MAKE_BASE=TRUE	CONN_ONOFF_FTR_L	27
35 5	SRL_L	MAKE_BASE=TRUE	CONN_SRL_FTR_L	27
5	AUD_VOL_UP_L	MAKE_BASE=TRUE	CONN_AUD_VOL_UP_FTR_L	27
5	AUD_VOL_DOWN_L	MAKE_BASE=TRUE	CONN_AUD_VOL_DOWN_FTR_L	27
		MAKE_BASE=TRUE		
27	PP3V0_OPTICAL_SENS	MAKE_BASE=TRUE	CONN_PP3V0_OPTICAL_SENS	27

SYNC_MASTER=MARK B. SYNC_DATE=N/A

PAGE TITLE

CONNECTOR: CANADA FLEX CONN,SENSOR PANEL ALIASES

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

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BRANCH

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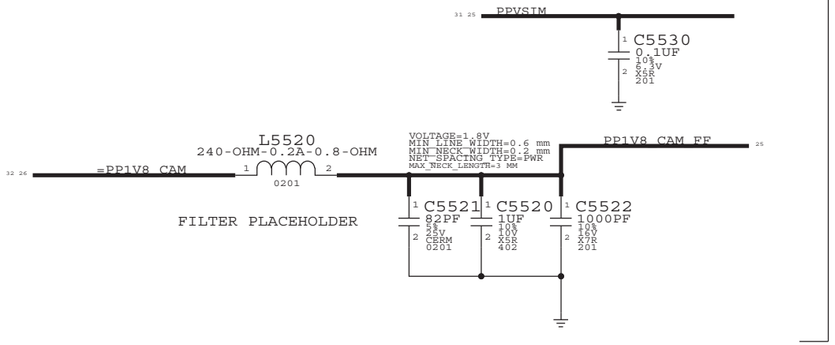
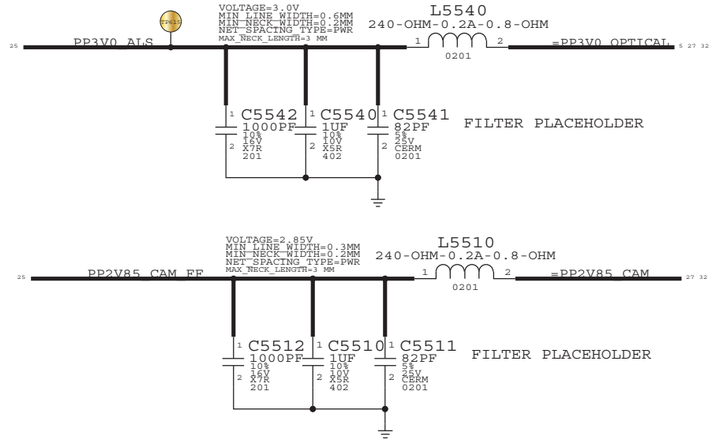
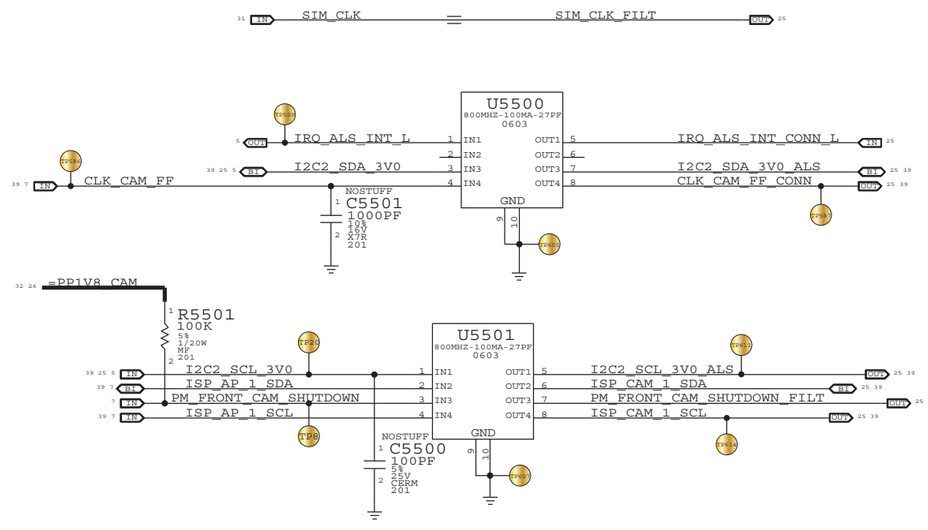
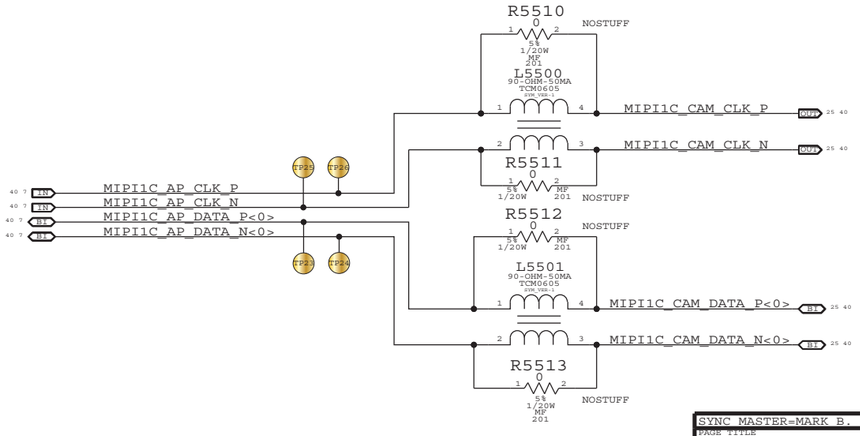


CANADA FLEX CONN ON PG 54



CANADA FLEX SIGNAL FILTERS





SYNC_MASTER=MARK_B. SYNC_DATE=N/A

PAGE TITLE
CONNECTOR: CANADA FLEX FILTERS

Apple Inc.

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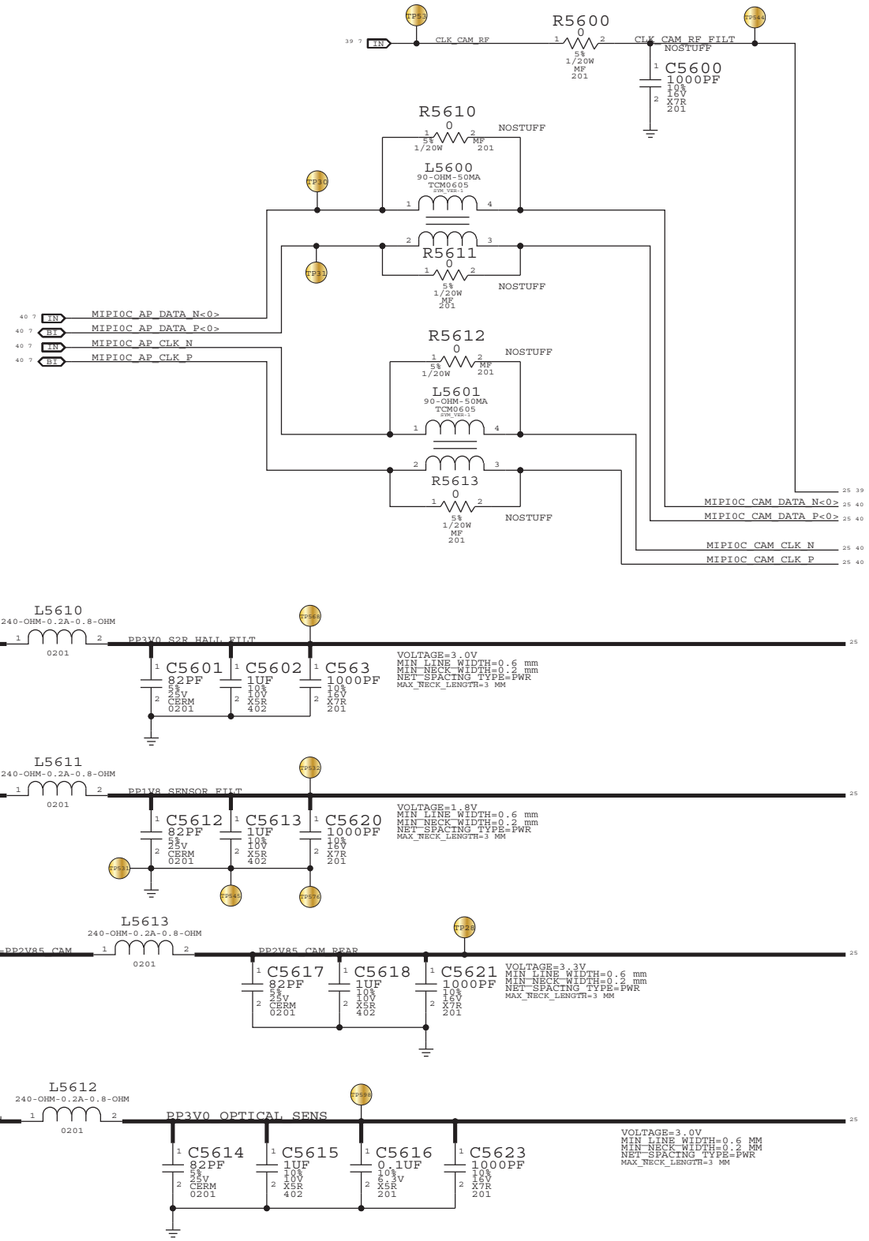
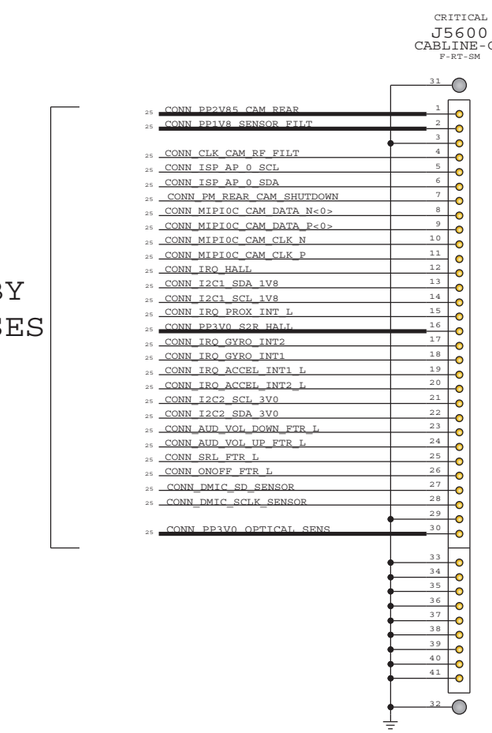


SENSOR PANEL CONNECTOR

CABLINE-CA CONNECTOR: 518S0787

CONNECTED BY
PG 54 ALIASES



SYNC MASTER=MARK B. SYNC DATE=N/A

PAGE TITLE

CONNECTOR: SENSOR PANEL CONNECTOR

Apple Inc.

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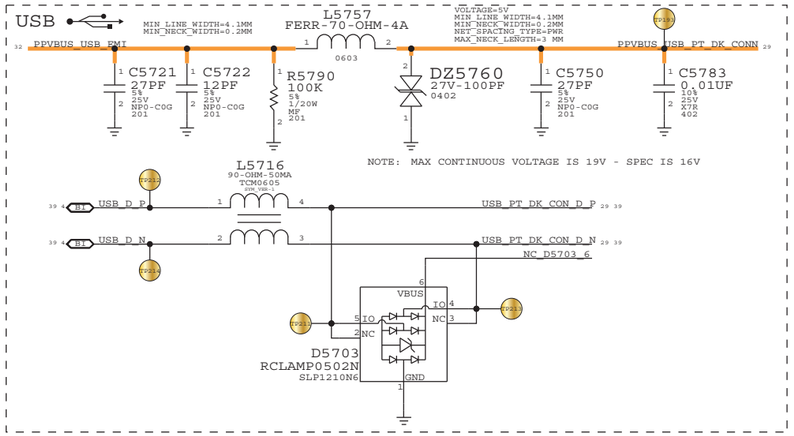

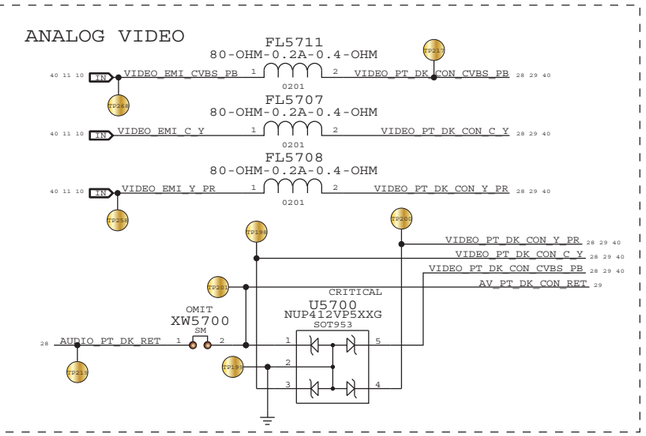

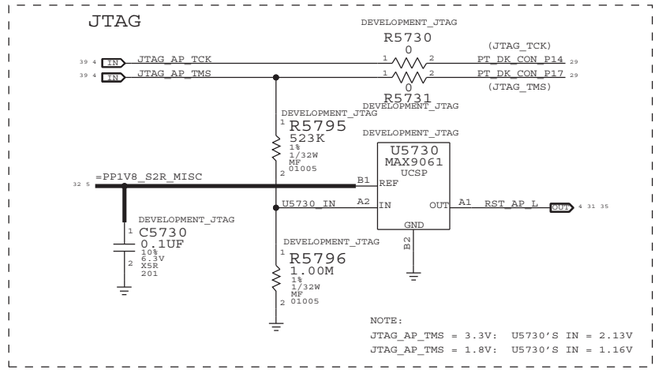

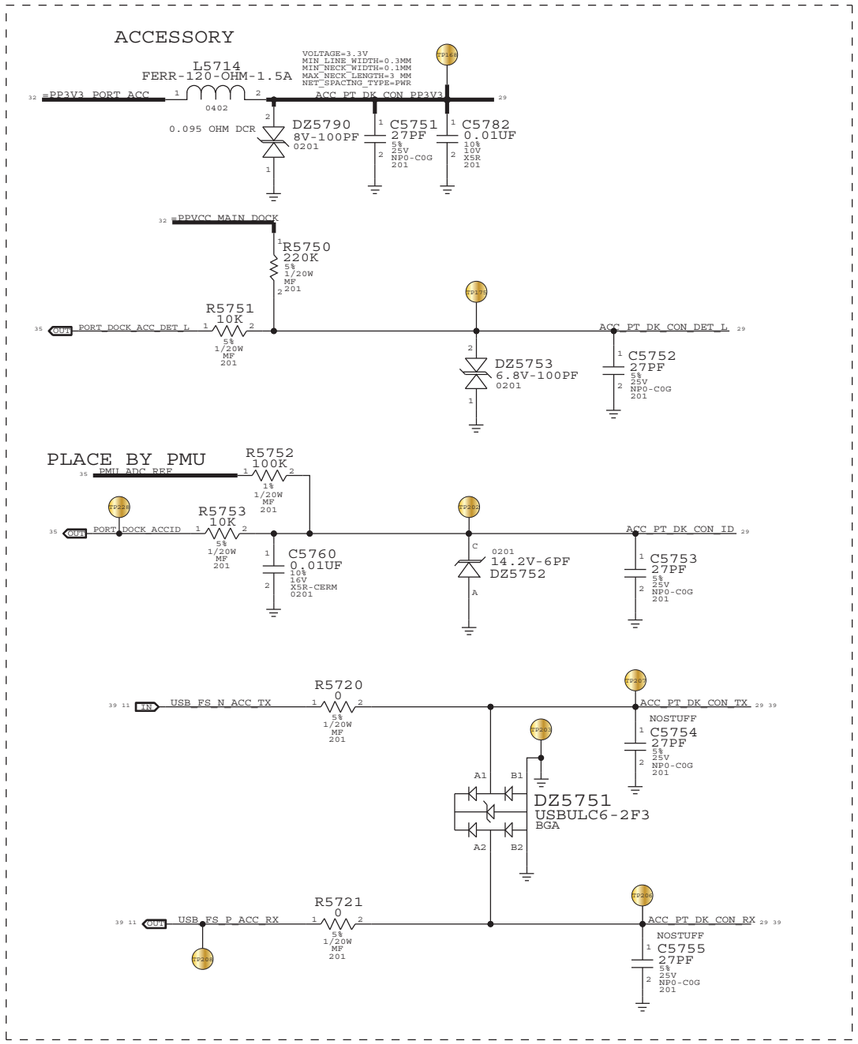

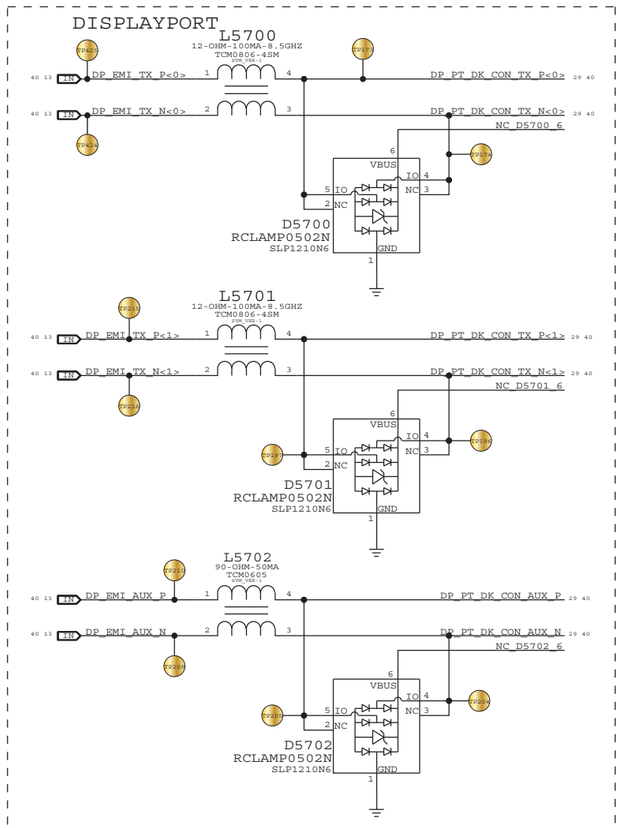

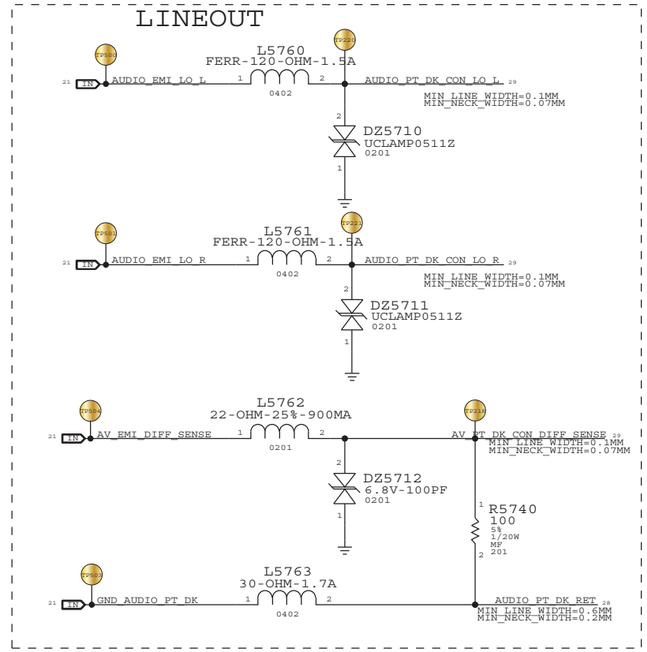

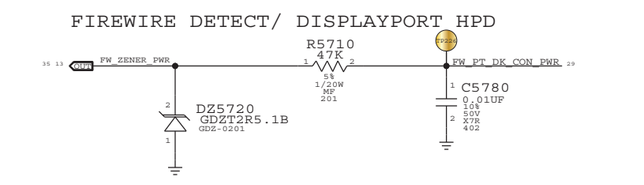

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
377S0090	377S0081		DZ5751	?
377S0111	377S0099		DZ5710,DZ5711	RADAR:8379541
377S0107	377S0066		DZ5700,DZ5701,DZ5702,DZ5703	RADAR:8289785
155S0625	155S0559		L5700,L5701	RADAR:8423156

SYNC_MASTER=JAMES SYNC_DATE=N/A

PAGE TITLE

IO FLEX: DOCK COMPONENTS

Apple Inc.

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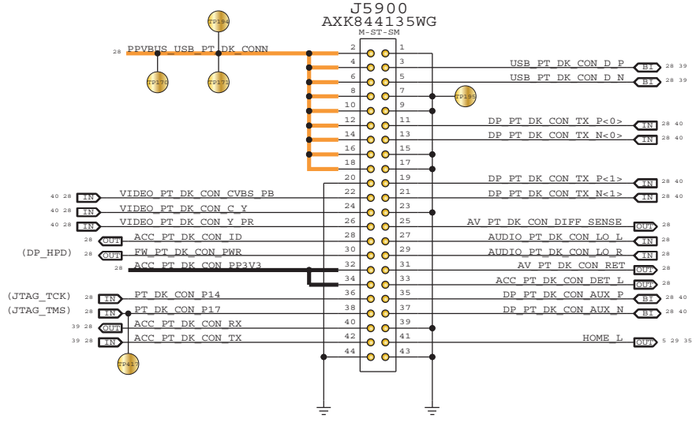
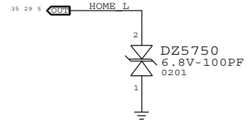
DOCK CONNECTOR

PN 516S0817 (PLUG - MALE)

CRITICAL

J5900
AXK844135WG
M-ST-SM





SYNC_MASTER=JAMES SYNC_DATE=N/A

PAGE TITLE
IO FELX: B2B Connector

Apple Inc.

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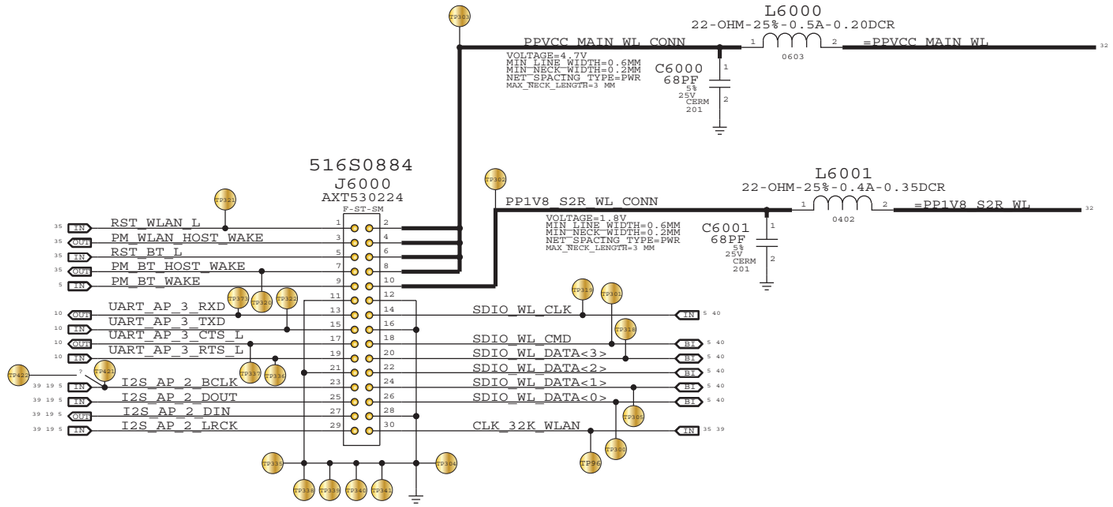
X23 WIFI/BT CONNECTOR



SYNC_MASTER=MIKE	SYNC_DATE=N/A
PAGE TITLE: CONNECTOR: X23 WIFI/BT	
Apple Inc.	DRAWING NUMBER: 051-8962 SIZE: D
	REVISION: A.0.0
	BRANCH:
	PAGE: 60 OF 106
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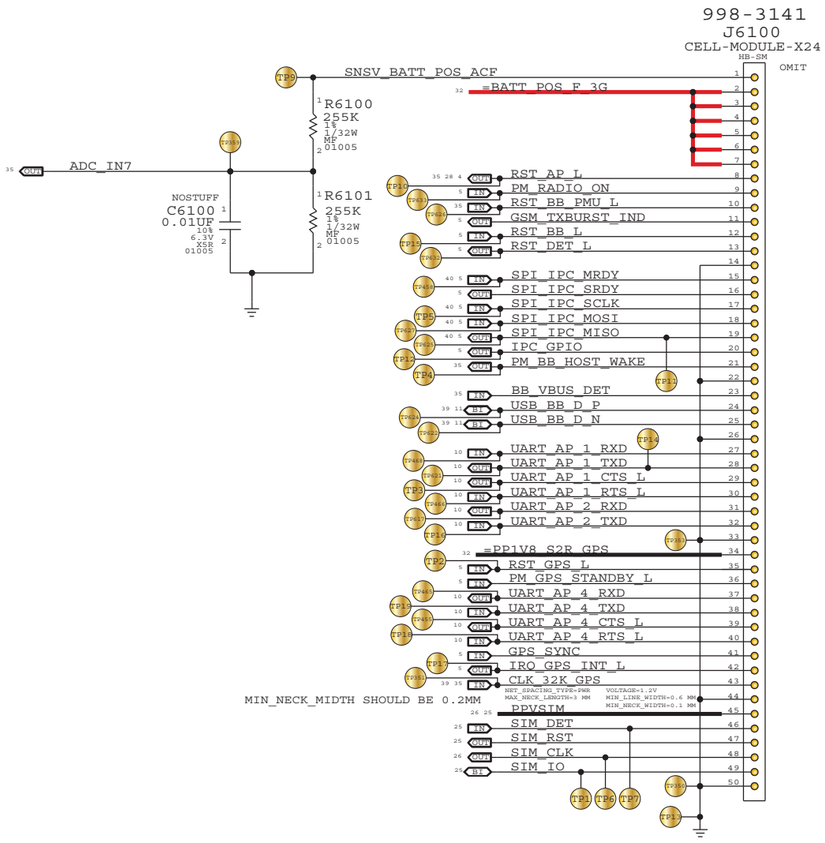
X24 CELLULAR/GPS CONNECTOR



SYNC_MASTER=MIKE SYNC_DATE=N/A

PAGE TITLE

CONNECTOR: X24 CELLULAR/GPS

Apple Inc.

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POWER CONN / ALIAS

LDO RAILS

PROGRAMMABLE ON/OFF

PP3V0_S2R_HALL
MAKE_BASE=TRUE
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V0_S2R_HALL
= =PP3V0_S2R_HALL_CHSW

PP1V7_VA_VCP
MAKE_BASE=TRUE
VOLTAGE=1.7V
MIN_LINE_WIDTH=0.4MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP1V7_VA_VCP

PP3V0_VIDEO
MAKE_BASE=TRUE
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V0_VIDEO_BUFFER
= =PP3V0_VIDEO_H4

PP3V0_OPTICAL
MAKE_BASE=TRUE
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V0_OPTICAL

PP3V2_SD
MAKE_BASE=TRUE
VOLTAGE=3.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM

PP3V3_ACC
MAKE_BASE=TRUE
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V3_PORT_ACC

PP3V0_VIDEO_BUF
MAKE_BASE=TRUE
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V0_VIDEO_BUF

PP3V2_S2R_USBMUX
MAKE_BASE=TRUE
VOLTAGE=3.2V
MIN_LINE_WIDTH=0.4 MM
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V2_S2R_USBMUX

PP3V0_IO
MAKE_BASE=TRUE
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V0_IO_H4
= =PP3V0_IO_MISC

PP2V85_CAM
MAKE_BASE=TRUE
VOLTAGE=2.85V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP2V85_CAM

PP3V0_GRAPE
MAKE_BASE=TRUE
VOLTAGE=3.0V
MIN_LINE_WIDTH=0.6 mm
MIN_NECK_WIDTH=0.2 mm
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V0_GRAPE
= =PP3V0_GRAPE_Z1
= =PP3V0_GRAPE_Z2
= =PP3V0_GRAPE_MARIO1

PP1V1
MAKE_BASE=TRUE
VOLTAGE=1.1V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
= =PP1V1_PLL_H4
= =PP1V1_MIPI_H4
= =PP1V1_DPORT_H4
= =PP1V1_USB_H4
= =PP1V1_MIPI_PLL_H4
MIN_NECK_MIDTH SHOULD BE 0.2MM

PP1V8_ALWAYS
MAKE_BASE=TRUE
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.3 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP1V8_ALWAYS

BUCK RAILS

PP1V2_SOC
MAKE_BASE=TRUE
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.1 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
MIN_NECK_MIDTH SHOULD BE 0.2MM
= =PPVDD_SOC_H4

PP1V2_CPU
MAKE_BASE=TRUE
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.1 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
MIN_NECK_MIDTH SHOULD BE 0.2MM
= =PPVDD_CPU_H4

PP1V2_S2R
MAKE_BASE=TRUE
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.1 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
MIN_NECK_MIDTH SHOULD BE 0.2MM
= =PP1V2_S2R_H4

PP1V8_S2R
MAKE_BASE=TRUE
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP1V8_S2R_H4
= =PP1V8_S2R_WL
= =PP1V8_S2R_GPS
= =PP1V8_S2R_MISC

PP1V8
MAKE_BASE=TRUE
VOLTAGE=1.8V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.1MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
MIN_NECK_MIDTH SHOULD BE 0.2MM
= =PP1V8_CAM
= =PP1V8_SENSOR
= =PP1V8_AUDIO
= =PP1V8_H4
= =PP1V8_VDDIO18_H4
= =PP1V8_MIPI_H4
= =PP1V8_DPORT_H4

PP3V3_OUT
MAKE_BASE=TRUE
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.1MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
MIN_NECK_MIDTH SHOULD BE 0.2MM
= =PP3V3_NAND
= =PP3V3_USB_H4
= =PP3V3_MLC_HI
= =PP3V3_LCD
= =PP3V3_NAND_H4

PPLED_OUT
MAKE_BASE=TRUE
VOLTAGE=20.4V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PPLED_REG

PP3V3_MLC_OUT
MAKE_BASE=TRUE
VOLTAGE=3.3V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.2 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=3 MM
= =PP3V3_MLC

PP1V2
MAKE_BASE=TRUE
VOLTAGE=1.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.1 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=0.8 MM
MIN_NECK_MIDTH SHOULD BE 0.2MM
= =PP1V2_VDDQ_H4
= =PP1V2_VDDIOD_H4
= =PP1V2_HSIC_H4

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

CHARGER MAIN

PPVCC_MAIN
MAKE_BASE=TRUE
VOLTAGE=4.7V
MIN_LINE_WIDTH=0.6MM
MIN_NECK_WIDTH=0.2MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=1 MM
= =PPVCC_MAIN_AUDIO
= =PPVCC_MAIN_WL
= =PPVCC_MAIN_DOCK
= =PPVCC_MAIN_LED

BATTERY

PPBATT_VCC
MAKE_BASE=TRUE
VOLTAGE=4.2V
MIN_LINE_WIDTH=0.6 MM
MIN_NECK_WIDTH=0.15 MM
NET_SPACING_TYPE=PWR
MAX_NECK_LENGTH=1.7 MM
= =BATT_POS_F_3G
= =BATT_POS_CONN

USB POWER INPUT

PPVBUS_USB_EMI = PPVBUS_USB_DCIN
MAKE_BASE=TRUE

SYNC_MASTER=YOSH SYNC_DATE=N/A
PAGE TITLE
POWER: ALIASES

Apple Inc.

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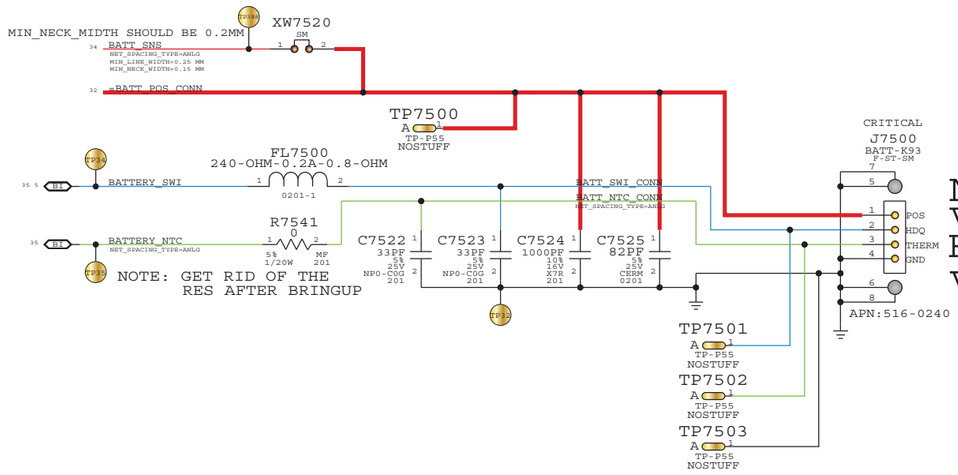

NOTE:
VERIFY PINOUT OF
BATTERY CONNECTOR
VERIFY MOUNTING CONN TO GND

SYNC MASTER=YOSH SYNC DATE=N/A

PAGE TITLE
POWER: BATTERY CONNECTOR

Apple Inc.

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PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
343S0542	1	IC,PMU,ALISON,D1946A2,OTPXX,UFBGA292	U8100	CRITICAL	

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

USB REVERSE VOLTAGE PROTECTION

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

NOSTUFF R8116 470K 1% 1/20W MF 201

CRITICAL Q8123 FDMC6676BZ MLP3.3X3.3

DZ8120 BZT52C10LP LLP CRITICAL NOTE: 10V ZENER

R8130 220K 1% 1/20W MF 201

PPVBUS_USB_DCIN NET_SPACING_TYPE=PWR MAX_NECK_LENGTH=3 MM VOLTAGE=6V

PPVBUS_PROT MIN_LINE_WIDTH=0.60MM MIN_NECK_WIDTH=0.25MM NET_SPACING_TYPE=PWR MAX_NECK_LENGTH=3 MM VOLTAGE=6V

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

CRITICAL C8124 2.2UF 10% 25V X5R-CERM 805

LAYOUT NOTE: PLACE RIGHT AT THE PIN

XW8114 SHORT-0201 NOSTUFF

C8125 10UF 10% 25V X5R 805 CRITICAL

LAYOUT NOTE: PLACE RIGHT AT THE PIN

CRITICAL L8112 2.2UH-3.5A-54M-OHM PIME061E-SM DCR=54MOHM MAX

D8100 SOD-123W PMEG4030ER CRITICAL

CRITICAL Q8104 FDMC6683 MLP3.3X3.3

RDSON=0.0136@VGS=-2.5V ID=12.0A

PPBATT_VCC

ACT_DIO MIN_LINE_WIDTH=0.2 MM MIN_NECK_WIDTH=0.1 MM NET_SPACING_TYPE=ANLG

SW_CHGA MIN_LINE_WIDTH=0.6 MM MIN_NECK_WIDTH=0.25 MM NET_SPACING_TYPE=SWITCHNODE DIDT=TRUE

NC_CHGB

BATT_SNS

PPVCC_MAIN

PP1V8_S2R

PPVCC_MAIN PP1V2_S2R

NOTE: FOR NO BATTERY SITUATION

NOSTUFF CRITICAL C8100 22UF 20% 6.3V X5R-CERM 603

CRITICAL C8101 22UF 20% 6.3V X5R-CERM 603

R8100 0.5 1% 1/16W MF 402

BATT_POS_RC MIN_LINE_WIDTH=0.20MM MIN_NECK_WIDTH=0.20MM NET_SPACING_TYPE=PWR MAX_NECK_LENGTH=3 MM VOLTAGE=4.6V

C8135 1UF 10% 6.3V CERM 402

C8136 1UF 10% 6.3V CERM 402

CRITICAL Y8138 32.768K-20PPM-12.5PF PMU_XTAL PMU_EXTAL 2012

NET_SPACING_TYPE=CRYSTAL

C8142 18PF 5% 25V NP0-C0G 201

C8143 18PF 5% 25V NP0-C0G 201

This bull shits from APPLE have OMIT manufacturer of the PMIC and not only!

U8100 ALISON-A0-OTPXX D1946A0-110-00 UFBGA (SYM 2 OF 3)

G24	CHG_A_LX		
G25	CHG_B_LX		
H24			
H25	VBAT		
L25	IBAT_S		
P25			
N17	IBAT		
P17			
N18			
P18			
P24	ACT_DIO		
F24			
P25	VCENTER_A		
A22			
A23	VBUS_A		
B24	VBUS_A_OV_N		
J24			
J25	VCENTER_B		
P22			
P23	VBUS_B		
N22	VBUS_B_OV_N		
A10			
B10	VDD_BUCK0		
A3			
B3			
B7	VDD_BUCK2		
B6			
A17	VDD_BUCK3		
A13			
B13	VDD_BUCK4		
E1			
E2	VDD_BUCK5		
G1			
G2	VDD_BUCK5_BYP		
H2			
G22	VCC_MAIN_S		
N19			
P19			
N20	VCC_MAIN		
P20			
K2	VDD_LDO1_6		
L4	VDD_LDO2		
N9	VDD_LDO3_5_8		
N4	VDD_LDO4_7		
N10	VDD_LDO9		
N6	VDD_LDO10		
L2	VDD_LDO11		
N7	VDD_LDO12		
P1	XTAL1		
P2	XTAL2		

USB/BAT | BUCK | VCC-MAIN | LDO | LDO INPUT | SWITCH POWER | XTAL

BUCK0_LXL	A11		
BUCK0_LXM	A9		
BUCK0_FB	D9		
BUCK2_LXL	A7		
	B8		
BUCK2_LXM	A6		
BUCK2_LXR	A4		
BUCK2_FB	D7		
BUCK3_LX	A16		
BUCK3_FB	D16		
BUCK4_LXL	A14		
BUCK4_LXM	B11		
BUCK4_FB	D14		
BUCK5_LX	F1		
	F2		
BUCK5_BYP	H1		
	J1	(BYPASS RON=0.14 OHM MAX)	
	J2		
BUCK5_FB	G4		
VLDO1	L1	(150MA; 2.5-3.55V)	PP3V0_GRAPE
VLDO2	P3	(100MA; 1.65-1.805V; BUCK3)	PP1V7_VA_VCP
VLDO3	P9	(50MA; 2.5-3.3V)	PP3V0_VIDEO
VLDO4	N5	(100MA; 1.8-3.3V)	PP3V0_OPTICAL
VLDO5	P10	(300MA; 2.5-3.6V)	PP3V2_SD
VLDO6	K1	(150MA; 2.5-3.6V)	PP3V3_ACC
VLDO7	P4	(50MA; 1.5-3.3V)	PP3V0_VIDEO_BUF
VLDO8	P8	(10MA; 2.0-3.55V)	PP3V2_S2R_USBMUX
VLDO9	P11	(300MA; 1.2-3.0V)	PP3V0_IO
VLDO10	P5	(200MA; 2.5-3.55V)	PP3V0_S2R_HALL
VLDO11	M1	(200MA; 1.7-3.0V)	PP2V85_CAM
VLDO12	P6	(150MA; 0.6-1.3V)	PP1V1
ON_BUF	M2		PP1V8_ALWAYS
VBUCK4	B17		
CPU1V2_SW	A18	(RON=0.1 OHM MAX)	
DSP_SW	B20	(RON=1 OHM MAX)	
VBUCK3	A19		
CPU1V8_SW	A20	(RON=0.2 OHM MAX)	
WDIG_SW	B19	(RON=0.5 OHM MAX)	
VBUCK0_SW0_G	B21	NC_PMU_VBUCK0_SW0_G	
VBUCK0_SW0_S	A21	NC_PMU_VBUCK0_SW0_S	
VPUMP	B18	PMU_VPUMP	

C8137 0.01UF 10% 6.3V X5R 01005 MIN_LINE_WIDTH=0.30MM MIN_NECK_WIDTH=0.20MM NET_SPACING_TYPE=PWR MAX_NECK_LENGTH=3 MM VOLTAGE=4.6V

CRITICAL L8100 2.2UH-20%-1.85A-80MOHM PST25201B-SM

CRITICAL L8101 2.2UH-20%-1.85A-80MOHM PST25201B-SM

XW8103 NOSTUFF

CRITICAL L8105 2.2UH-20%-1.85A-80MOHM PST25201B-SM

CRITICAL L8107 2.2UH-20%-1.85A-80MOHM PST25201B-SM

CRITICAL L8110 2.2UH-20%-1.85A-80MOHM PST25201B-SM

XW8113 2SM NOSTUFF

CRITICAL L8115 2.2UH-20%-1.85A-80MOHM PST25201B-SM

XW8117 2SM NOSTUFF

CRITICAL L8119 2.2UH-20%-1.85A-80MOHM PST25201B-SM

CRITICAL L8121 2.2UH-20%-1.85A-80MOHM PST25201B-SM

XW8126 2SM NOSTUFF

CRITICAL L8128 2.2UH-20%-3.3A-0.064OHM PIME051E-SM DCR=64MOHM MAX

XW8132 2SM NOSTUFF

CRITICAL C8102 22UF 20% 6.3V X5R-CERM 603

CRITICAL C8103 22UF 20% 6.3V X5R-CERM 603

ADDITIONAL DISTRIBUTED 25UF (NO DE-RATING)

CRITICAL C8107 22UF 20% 6.3V X5R-CERM 603

CRITICAL C8108 22UF 20% 6.3V X5R-CERM 603

ADDITIONAL DISTRIBUTED 30UF (NO DE-RATING)

CRITICAL C8117 22UF 20% 6.3V X5R-CERM 603

CRITICAL C8118 22UF 20% 6.3V X5R-CERM 603

ADDITIONAL DISTRIBUTED 14UF (NO DE-RATING)

CRITICAL C8121 22UF 20% 6.3V X5R-CERM 603

CRITICAL C8122 10UF 20% 6.3V X5R 603

ADDITIONAL DISTRIBUTED 20UF (NO DE-RATING)

CRITICAL C8119 22UF 20% 6.3V X5R-CERM 603

CRITICAL C8120 22UF 20% 6.3V X5R-CERM 603

ADDITIONAL DISTRIBUTED 47UF (NO DE-RATING)

CRITICAL C8138 1UF 20% 10V X5R 0201

CRITICAL C8140 1UF 10% 6.3V CERM 402

CRITICAL C8139 1UF 10% 6.3V CERM 402

CRITICAL C8141 1UF 10% 6.3V CERM 402

TP8133 TP-P55 NOSTUFF

TP8101 TP-P55 NOSTUFF

ADDITIONAL DISTRIBUTED:
PP1V2: 30UF (NO DE-RATING)
PP1V8: 6UF (NO DE-RATING)

LDO BYPASS

CRITICAL C8150 2.2UF 10% 6.3V X5R 402

CRITICAL C8149 2.2UF 10% 6.3V X5R 402

CRITICAL C8148 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8146 2.2UF 10% 6.3V X5R 402

CRITICAL C8145 2.2UF 10% 6.3V X5R 402

CRITICAL C8144 10UF 20% 6.3V CERM-X5R 0402

CRITICAL C8147 2.2UF 10% 6.3V X5R 402

CRITICAL C8169 0.22UF 20% 6.3V X5R 0201

CRITICAL C8168 2.2UF 10% 6.3V X5R 402

CRITICAL C8167 2.2UF 10% 6.3V X5R 402

CRITICAL C8153 2.2UF 10% 6.3V X5R 402

CRITICAL C8152 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8151 1UF 10% 6.3V CERM 402

VCC_MAIN BYPASS

TOTAL CAPS = ~400UF (DISTRIBUTED AND NO DE-RATING)

(PLACE ONE 1UF CAP AT EACH VDD INPUT)

PLACEMENT_NOTE=PLACE NEAR L8225.1

CRITICAL C8166 150UF-0.035OHM 20% 6.3V POLY-TANT CASE-B15G-SM

CRITICAL C8165 150UF-0.035OHM 20% 6.3V POLY-TANT CASE-B15G-SM

CRITICAL C8154 10UF 20% 6.3V X5R 603

CRITICAL C8155 10UF 20% 6.3V X5R 603

CRITICAL C8156 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8157 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8158 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8159 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8160 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8161 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8162 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8130 4.7UF 20% 6.3V X5R-CERM1 402

CRITICAL C8131 1.0UF 20% 6.3V X5R 0201-MUR

CRITICAL C8163 82PF 5% 25V CERM 0201

C8164 18PF 5% 25V NP0-C0G 201

PPVCC_MAIN

NOTE: CONCERNED ABOUT ESR > 20MOHM

SYNC_MASTER=YOSH SYNC_DATE=N/A

PAGE TITLE

POWER: PMU

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

REVISION A.0.0

BRANCH

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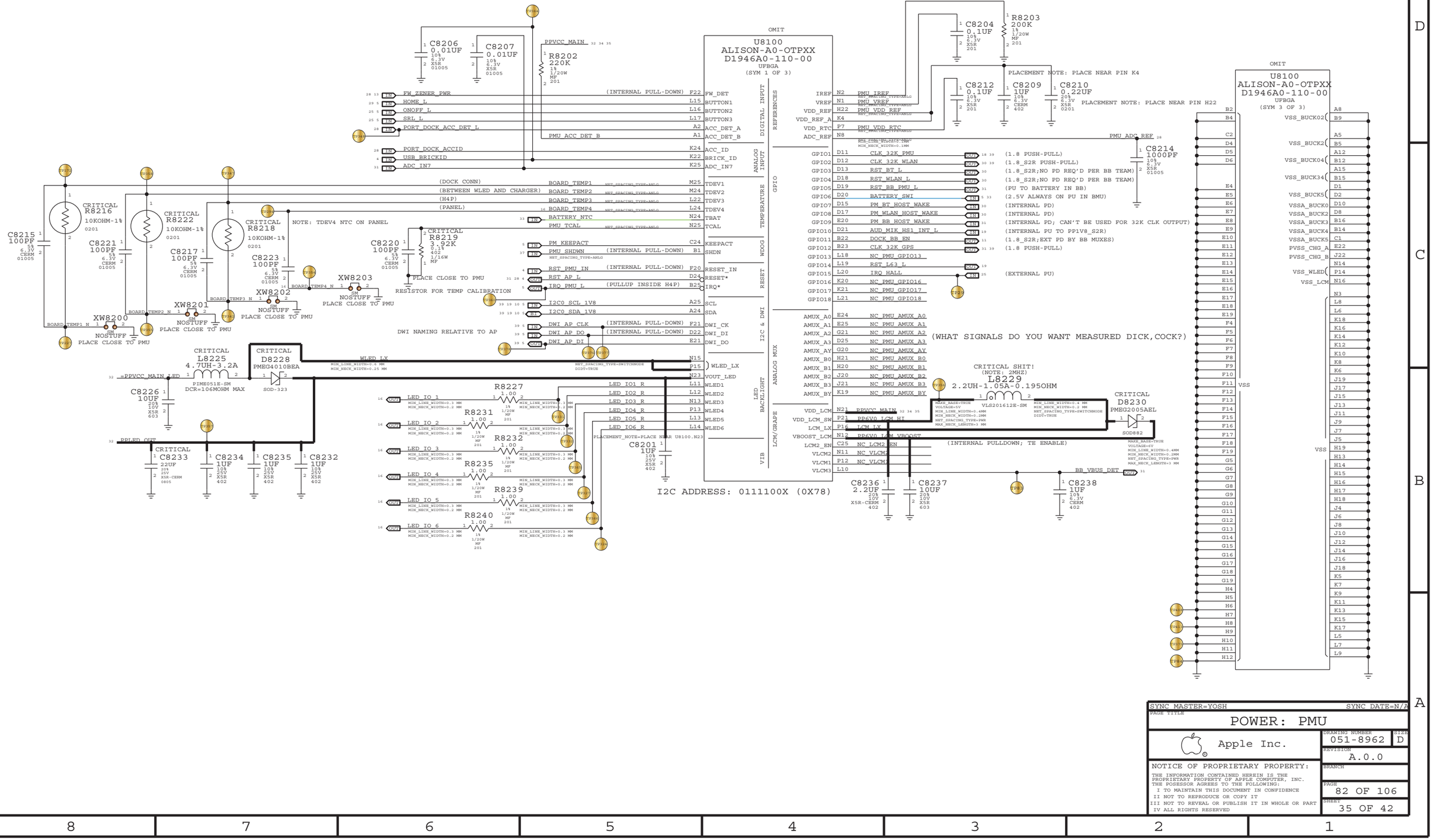
SHEET 34 OF 42


U8100
ALISON-A0-OTPXX
D1946A0-110-00
UFBGA
(SYM 1 OF 3)
OMIT
U8100
ALISON-A0-OTPXX
D1946A0-110-00
UFBGA
(SYM 3 OF 3)
OMIT
PPVCC_MAIN
R8202 220K
C8206 0.01UF
C8207 0.01UF
C8204 0.1UF
R8203 200K
C8212 0.1UF
C8209 1UF
C8210 0.22UF
PLACEMENT NOTE: PLACE NEAR PIN K4
PLACEMENT NOTE: PLACE NEAR PIN H22
C8214 1000PF
PMU_ADC_REF
FW_ZENER_PWR
HOME_L
ONOFF_L
SRL_L
PORT_DOCK_ACC_DET_L
PMU_ACC_DET_B
PORT_DOCK_ACCID
USB_BRICKID
ADC_IN7
(DOCK CONN)
(BETWEEN WLED AND CHARGER)
(H4P)
(PANEL)
BOARD_TEMP1
BOARD_TEMP2
BOARD_TEMP3
BOARD_TEMP4
BATTERY_NTC
PMU_TCAL
NOTE: TDEV4 NTC ON PANEL
PM_KEEPACT
PMU_SHDWN
SHDN
RST_PMU_IN
RST_AP_L
IRQ_PMU_L
RESET_IN
RESET*
IRQ*
I2C0_SCL_1V8
I2C0_SDA_1V8
SCL
SDA
DWI_AP_CLK
DWI_AP_DO
DWI_AP_DI
DWI_CK
DWI_DI
DWI_DO
DWI NAMING RELATIVE TO AP
WLED_LX
VOUT_LED
WLED1
WLED2
WLED3
WLED4
WLED5
WLED6
PLACEMENT_NOTE-PLACE NEAR U8100.N23
C8201 1UF
I2C ADDRESS: 0111100X (0X78)
CRITICAL R8216 10KOHM-1%
CRITICAL R8222 10KOHM-1%
CRITICAL R8217 10KOHM-1%
CRITICAL R8218 10KOHM-1%
CRITICAL R8219 3.92K
C8215 100PF
C8221 100PF
C8223 100PF
C8220 100PF
XW8200
XW8201
XW8202
XW8203
NOSTUFF
PLACE CLOSE TO PMU
RESISTOR FOR TEMP CALIBRATION
CRITICAL L8225 4.7UH-3.2A
PIME051E-SM
DCR=106MOHM MAX
CRITICAL D8228 PMEG4010BEA
SOD-323
=PPVCC_MAIN_LED
PPLED_OUT
C8226 10UF
C8233 22UF
C8234 1UF
C8235 1UF
C8232 1UF
LED_IO1_R
LED_IO2_R
LED_IO3_R
LED_IO4_R
LED_IO5_R
LED_IO6_R
R8227 1.00
R8231 1.00
R8232 1.00
R8235 1.00
R8239 1.00
R8240 1.00
REFERENCES
DIGITAL INPUT
ANALOG INPUT
GPIO
TEMPERATURE
WDOG
RESET
I2C & DWI
ANALOG MUX
LED BACKLIGHT
LCM/GRAPE
VIB
GPIO1 D11 CLK_32K_PMU (1.8 PUSH-PULL)
GPIO2 D12 CLK_32K_WLAN (1.8_S2R PUSH-PULL)
GPIO3 D13 RST_BT_L (1.8_S2R;NO PD REQ'D PER BB TEAM)
GPIO4 D18 RST_WLAN_L (1.8_S2R;NO PD REQ'D PER BB TEAM)
GPIO5 D19 RST_BB_PMU_L (PU TO BATTERY IN BB)
GPIO6 D20 BATTERY_SWI (2.5V ALWAYS ON PU IN BMU)
GPIO7 D15 PM_BT_HOST_WAKE (INTERNAL PD)
GPIO8 D17 PM_WLAN_HOST_WAKE (INTERNAL PD)
GPIO9 E20 PM_BB_HOST_WAKE (INTERNAL PD; CAN'T BE USED FOR 32K CLK OUTPUT)
GPIO10 D21 AUD_MIK_HS1_INT_L (INTERNAL PU TO PP1V8_S2R)
GPIO11 B22 DOCK_BB_EN (1.8_S2R;EXT PD BY BB MUXES)
GPIO12 B23 CLK_32K_GPS (1.8 PUSH-PULL)
GPIO13 L18 NC_PMU_GPIO13
GPIO14 L19 RST_L63_L
GPIO15 L20 IRQ_HALL (EXTERNAL PU)
GPIO16 K20 NC_PMU_GPIO16
GPIO17 K21 NC_PMU_GPIO17
GPIO18 L21 NC_PMU_GPIO18
AMUX_A0 E24 NC_PMU_AMUX_A0
AMUX_A1 E25 NC_PMU_AMUX_A1
AMUX_A2 G21 NC_PMU_AMUX_A2
AMUX_A3 D25 NC_PMU_AMUX_A3
AMUX_AY G20 NC_PMU_AMUX_AY
AMUX_B0 H21 NC_PMU_AMUX_B0
AMUX_B1 H20 NC_PMU_AMUX_B1
AMUX_B2 J20 NC_PMU_AMUX_B2
AMUX_B3 J21 NC_PMU_AMUX_B3
AMUX_BY K19 NC_PMU_AMUX_BY
(WHAT SIGNALS DO YOU WANT MEASURED DICK,COCK?)
CRITICAL SHIT! (NOTE: 2MHZ) L8229 2.2UH-1.05A-0.195OHM
VLS201612E-SM
CRITICAL D8230 PMEG2005AEL
SOD882
(INTERNAL PULLDOWN; TE ENABLE)
BB_VBUS_DET
C8236 2.2UF
C8237 10UF
C8238 1UF
VDD_LCM
VDD_LCM_SW
LCM_LX
VBOOST_LCM
LCM2_EN
VLCM2
VLCM1
VLCM3
PPVCC_MAIN
PP6V0_LCM_HI
NC_LCM2_EN
NC_VLCM2
NC_VLCM1
PP6V0_LCM_VBOOST
VSS
SYNC_MASTER=YOSH
SYNC_DATE=N/A
PAGE TITLE
POWER: PMU
Apple Inc.
DRAWING NUMBER 051-8962
SIZE D
REVISION A.0.0
BRANCH
PAGE 82 OF 106
SHEET 35 OF 42
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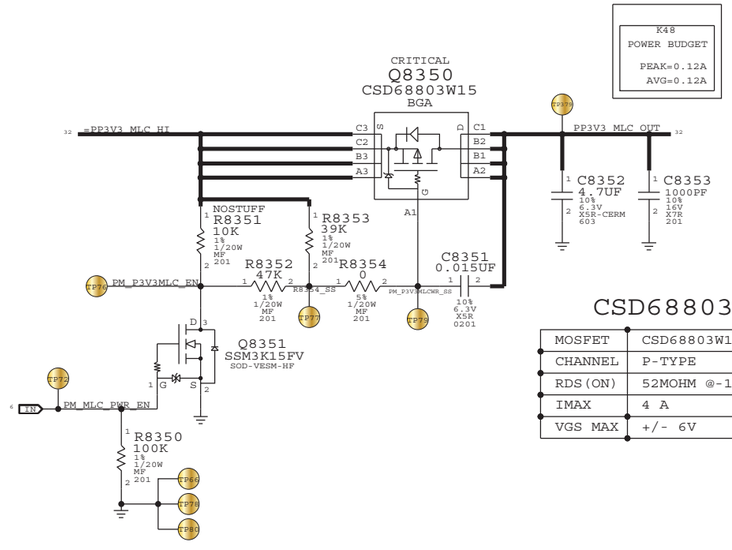

K48
POWER BUDGET
PEAK=0.12A
AVG=0.12A

CSD68803

MOSFET	CSD68803W15
CHANNEL	P-TYPE
RDS(ON)	52MOHM @-1.8V
IMAX	4 A
VGS MAX	+/- 6V

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
376S0972	376S0612		Q8351	RADAR:8537160

SYNC MASTER=YOSH
SYNC DATE=N/A

PAGE TITLE
POWER: 3.3V MLC & 1.2V VR

Apple Inc.

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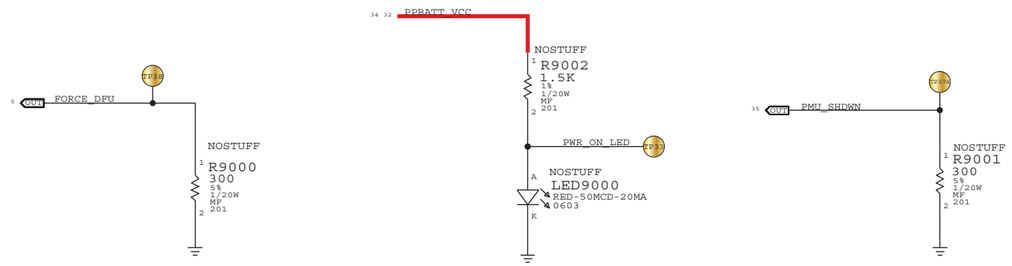
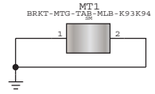
DEBUG RESET ACCESS

PLACE OUTSIDE OF CAN?



LEFT AND RIGHT MOUNTING TABS



SYNC_MASTER=MIKE SYNC_DATE=N/A

PAGE TITLE
DEBUG AND MISC

Apple Inc.

DRAWING NUMBER 051-8962 SIZE D

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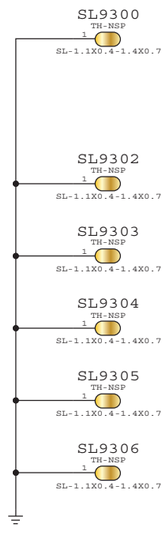
PLATED THROUGH HOLES

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



SYNC MASTER=MIKE SYNC DATE=N/A

PAGE TITLE
FCT/ICT TEST/BRACKETS

Apple Inc.

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BRANCH
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Clock Signal Constraints

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
CLK_50S	*	50_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
CLK	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
J63	CLK_50S	CLK	CLK_32K_PMU 18 35
J162	CLK_50S	CLK	CLK_32K_WLAN 30 35
J61	CLK_50S	CLK	CLK_32K_GPS 31 35
J88	CLK_50S	CLK	CLK_CAM_FF 7 26
J80	CLK_50S	CLK	CLK_CAM_FF_FILT
J95	CLK_50S	CLK	CLK_CAM_FF_CONN 25 26
J96	CLK_50S	CLK	CLK_CAM_RF 7 27
J94	CLK_50S	CLK	CLK_CAM_RF_FILT 25 27
J130	CLK_50S	CLK	I2S_AP_0_MCK 5
J132	CLK_50S	CLK	I2S_AP_0_MCK_R 5 19
J155	CLK_50S	CLK	CLK_CAM_FF_R 7
J156	CLK_50S	CLK	CLK_CAM_RF_R 7

NAND

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
NAND_50S	*	50_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
NAND	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
J150	NAND_50S	NAND	F0AD<7..0> 6 12
J145	NAND_50S	NAND	F0CE0_L 6 12
J148	NAND_50S	NAND	F0CE1_L 6 12
J147	NAND_50S	NAND	F0CE2_L 6 12
J146	NAND_50S	NAND	F0CE3_L 6 12
J142	NAND_50S	NAND	F0CE4_L 6 12
J144	NAND_50S	NAND	F0CE5_L 6 12
J140	NAND_50S	NAND	F0CE6_L 6 12
J165	NAND_50S	NAND	F0CE7_L 6 12
J141	NAND_50S	NAND	F0CLE 6 12
J152	NAND_50S	NAND	F0ALE 6 12
J143	NAND_50S	NAND	F0RE_L 6 12
J164	NAND_50S	NAND	F0WE_L 6 12
J137	NAND_50S	NAND	F0WP_L
J149	NAND_50S	NAND	F1AD<7..0> 6 12
J151	NAND_50S	NAND	F1CE0_L 6 12
J152	NAND_50S	NAND	F1CE1_L 6 12
J153	NAND_50S	NAND	F1CE2_L 6 12
J154	NAND_50S	NAND	F1CE3_L 6 12
J167	NAND_50S	NAND	F1CE4_L 6 12
J160	NAND_50S	NAND	F1CE5_L 6 12
J166	NAND_50S	NAND	F1CE6_L 6 12
J170	NAND_50S	NAND	F1CE7_L 6 12
J155	NAND_50S	NAND	F1CLE 6 12
J156	NAND_50S	NAND	F1ALE 6 12
J157	NAND_50S	NAND	F1RE_L 6 12
J158	NAND_50S	NAND	F1WE_L 6 12
J159	NAND_50S	NAND	F1WP_L 6 12
J100	NAND_50S	NAND	F2AD<7..0>
J102	NAND_50S	NAND	F2CE0_L
J106	NAND_50S	NAND	F2CE1_L
J108	NAND_50S	NAND	F2CE2_L
J107	NAND_50S	NAND	F2CE3_L
J109	NAND_50S	NAND	F2CLE
J110	NAND_50S	NAND	F2ALE
J111	NAND_50S	NAND	F2RE_L
J131	NAND_50S	NAND	F2WE_L
J112	NAND_50S	NAND	F2WP_L
J114	NAND_50S	NAND	F3AD<7..0>
J115	NAND_50S	NAND	F3CE0_L
J116	NAND_50S	NAND	F3CE1_L
J117	NAND_50S	NAND	F3CE2_L
J118	NAND_50S	NAND	F3CE3_L
J119	NAND_50S	NAND	F3CLE
J120	NAND_50S	NAND	F3ALE
J121	NAND_50S	NAND	F3RE_L
J122	NAND_50S	NAND	F3WE_L
J123	NAND_50S	NAND	F3WP_L

JTAG

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
JTAG	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
K16		JTAG	JTAG_AP_TCK 4 28
K15		JTAG	JTAG_AP_TMS 4 28
K14		JTAG	JTAG_AP_TDI 4 10
K13		JTAG	JTAG_AP_TDO 4 10
K20		JTAG	JTAG_AP_TRST_L 4 10

I2C

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
I2C_50S	*	50_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
I2C	*	*	1.5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
J1	I2C_50S	I2C	I2C1_SDA_1V8 5 25
J2	I2C_50S	I2C	I2C1_SCL_1V8 5 25
J3	I2C_50S	I2C	I2C0_SDA_1V8 5 10 19 35
J4	I2C_50S	I2C	I2C0_SCL_1V8 5 10 19 35
K91	I2C_50S	I2C	I2C2_SDA_3V0 5 25 26
K92	I2C_50S	I2C	I2C2_SCL_3V0 5 25 26
K98	I2C_50S	I2C	ISP_AP_0_SCL 7 25
K99	I2C_50S	I2C	ISP_AP_0_SDA 7 25
K100	I2C_50S	I2C	ISP_AP_1_SCL 7 26
K101	I2C_50S	I2C	ISP_AP_1_SDA 7 26
K105	I2C_50S	I2C	I2C2_SCL_3V0_ALS 25 26
K104	I2C_50S	I2C	I2C2_SDA_3V0_ALS 25 26
J124	I2C_50S	I2C	ISP_CAM_1_SCL 25 26
J125	I2C_50S	I2C	ISP_CAM_1_SDA 25 26

XTAL

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
CRYSTAL	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
K92		CRYSTAL	XTAL_24M_I 4
K90		CRYSTAL	XTAL_24M_O 4
K93		CRYSTAL	24M_O 4

VREF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
VREF	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
J133		VREF	PPVREF_DDR0_CA 8
J134		VREF	PPVREF_DDR0_DQ 8
J135		VREF	PPVREF_DDR1_CA 8
J136		VREF	PPVREF_DDR1_DQ 8

USB

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
USB_90D	*	90_OHM_DIFF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
USB	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
J5	USB_90D	USB	USB_D_P 4 28
J6	USB_90D	USB	USB_D_N 4 28
J7	USB_90D	USB	USB_PT_DK_CON_D_P 28 29
J8	USB_90D	USB	USB_PT_DK_CON_D_N 28 29
J82	USB_90D	USB	USB_BB_D_P 11 31
J83	USB_90D	USB	USB_BB_D_N 11 31
J84	USB_90D	USB	USB_FS_D_P 4 11
J85	USB_90D	USB	USB_FS_D_N 4 11
J129	USB_90D	USB	USB_FS_N_ACC_TX 11 28
J128	USB_90D	USB	USB_FS_P_ACC_RX 11 28
J127	USB_90D	USB	ACC_PT_DK_CON_TX 28 29
J126	USB_90D	USB	ACC_PT_DK_CON_RX 28 29

I2S

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
I2S_90S	*	45_OHM_SE

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

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
K10	I2S_50S	I2S	I2S_AP_0_BCLK 5 19
K11	I2S_50S	I2S	I2S_AP_0_LRCK 5 19
K12	I2S_50S	I2S	I2S_AP_0_DIN 5 19
K13	I2S_50S	I2S	I2S_AP_0_DOUT 5 19
K10	I2S_50S	I2S	L63_ASP_SDOUT 19
K10	I2S_50S	I2S	I2S_AP_2_BCLK 5 19 30
K11	I2S_50S	I2S	I2S_AP_2_LRCK 5 19 30
K12	I2S_50S	I2S	I2S_AP_2_DIN 5 19 30
K13	I2S_50S	I2S	I2S_AP_2_DOUT 5 19 30
K10	I2S_50S	I2S	L63_VSP_SDOUT 19
K11	I2S_50S	I2S	I2S_AP_3_BCLK 5 19
K12	I2S_50S	I2S	I2S_AP_3_LRCK 5 19
K13	I2S_50S	I2S	I2S_AP_3_DIN 5 19
K10	I2S_50S	I2S	I2S_AP_3_DOUT 5 19
K11	I2S_50S	I2S	L63_XSP_SDOUT 19

DWI

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
DWI	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
K10		DWI	DWI_AP_CLK 5 35
K11		DWI	DWI_AP_DI 5 35
K12		DWI	DWI_AP_DO 5 35

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ANALOG VIDEO CONSTRAINTS

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
VID_50S	*	Y	=50_OHM_SE	=50_OHM_SE	=50_OHM_SE	=STANDARD	=STANDARD

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
ANALOG_VIDEO	*	*	5:1_SPACING
ANALOG_VIDEO	ANALOG_VIDEO	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E213	VID_50S	ANALOG_VIDEO	DAC_AP_OUT1 7 11
E214	VID_50S	ANALOG_VIDEO	DAC_AP_OUT2 7 11
E215	VID_50S	ANALOG_VIDEO	DAC_AP_OUT3 7 11
E216	VID_50S	ANALOG_VIDEO	BUF_C_Y 11
E217	VID_50S	ANALOG_VIDEO	BUF_CVBS_PB 11
E218	VID_50S	ANALOG_VIDEO	BUF_Y_PR 11
E219	VID_50S	ANALOG_VIDEO	VIDEO_EMI_CVBS_PB 10 11 28
E220	VID_50S	ANALOG_VIDEO	VIDEO_EMI_C_Y 10 11 28
E221	VID_50S	ANALOG_VIDEO	VIDEO_EMI_Y_PR 10 11 28
E222	VID_50S	ANALOG_VIDEO	VIDEO_PT_DK_CON_CVBS_PB 28 29
E223	VID_50S	ANALOG_VIDEO	VIDEO_PT_DK_CON_C_Y 28 29
E224	VID_50S	ANALOG_VIDEO	VIDEO_PT_DK_CON_Y_PR 28 29

LVDS

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
LVDS_100D	*	90_OHM_DIFF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
LVDS	*	*	4:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E236	LVDS_100D	LVDS	LVDS_DATA_P<2..0> 14 16
E237	LVDS_100D	LVDS	LVDS_DATA_N<2..0> 14 16
E238	LVDS_100D	LVDS	LVDS_DATA_CONN_P<2..0> 16
E239	LVDS_100D	LVDS	LVDS_DATA_CONN_N<2..0> 16
E240	LVDS_100D	LVDS	LVDS_CLK_P 14 16
E241	LVDS_100D	LVDS	LVDS_CLK_N 14 16
E242	LVDS_100D	LVDS	LVDS_CLK_CONN_P 16
E243	LVDS_100D	LVDS	LVDS_CLK_CONN_N 16

MIPI

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
MIPI_100D	*	90_OHM_DIFF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
MIPI	*	*	4:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E91	MIPI_100D	MIPI	MIPID_AP_DATA_P<0> 7 14
E92	MIPI_100D	MIPI	MIPID_AP_DATA_N<0> 7 14
E93	MIPI_100D	MIPI	MIPID_AP_DATA_P<1> 7 14
E94	MIPI_100D	MIPI	MIPID_AP_DATA_N<1> 7 14
E95	MIPI_100D	MIPI	MIPID_AP_DATA_P<2> 7 14
E96	MIPI_100D	MIPI	MIPID_AP_DATA_N<2> 7 14
E97	MIPI_100D	MIPI	MIPID_AP_DATA_P<3> 7 14
E270	MIPI_100D	MIPI	MIPID_AP_DATA_N<3> 7 14
E97	MIPI_100D	MIPI	MIPID_AP_CLK_P 7 14
E98	MIPI_100D	MIPI	MIPID_AP_CLK_N 7 14
E331	MIPI_100D	MIPI	MIPI0C_AP_DATA_P<0> 7 27
E332	MIPI_100D	MIPI	MIPI0C_AP_DATA_N<0> 7 27
E333	MIPI_100D	MIPI	MIPI0C_AP_CLK_P 7 27
E334	MIPI_100D	MIPI	MIPI0C_AP_CLK_N 7 27
E343	MIPI_100D	MIPI	MIPI0C_CAM_DATA_P<0> 25 27
E344	MIPI_100D	MIPI	MIPI0C_CAM_DATA_N<0> 25 27
E345	MIPI_100D	MIPI	MIPI0C_CAM_CLK_P 25 27
E346	MIPI_100D	MIPI	MIPI0C_CAM_CLK_N 25 27
E347	MIPI_100D	MIPI	MIPI1C_AP_DATA_P<0> 7 26
E348	MIPI_100D	MIPI	MIPI1C_AP_DATA_N<0> 7 26
E349	MIPI_100D	MIPI	MIPI1C_AP_CLK_P 7 26
E350	MIPI_100D	MIPI	MIPI1C_AP_CLK_N 7 26
E351	MIPI_100D	MIPI	MIPI1C_CAM_DATA_P<0> 25 26
E352	MIPI_100D	MIPI	MIPI1C_CAM_DATA_N<0> 25 26
E353	MIPI_100D	MIPI	MIPI1C_CAM_CLK_P 25 26
E354	MIPI_100D	MIPI	MIPI1C_CAM_CLK_N 25 26

DISPLAYPORT

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
DP_100D	*	90_OHM_DIFF

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
DP	*	*	5:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E249	DP_100D	DP	DP_AP_TX_P<0> 7 10 13
E249	DP_100D	DP	DP_AP_TX_N<0> 7 10 13
E248	DP_100D	DP	DP_AP_TX_P<1> 7 10 13
E250	DP_100D	DP	DP_AP_TX_N<1> 7 10 13
E251	DP_100D	DP	DP_AP_AUX_P 7 13
E252	DP_100D	DP	DP_AP_AUX_N 7 13
E273	DP_100D	DP	DP_EMI_TX_P<0> 13 28
E274	DP_100D	DP	DP_EMI_TX_N<0> 13 28
E275	DP_100D	DP	DP_EMI_TX_P<1> 13 28
E276	DP_100D	DP	DP_EMI_TX_N<1> 13 28
E277	DP_100D	DP	DP_EMI_AUX_P 13 28
E272	DP_100D	DP	DP_EMI_AUX_N 13 28
E327	DP_100D	DP	DP_PT_DK_CON_TX_P<0> 28 29
E326	DP_100D	DP	DP_PT_DK_CON_TX_N<0> 28 29
E328	DP_100D	DP	DP_PT_DK_CON_TX_P<1> 28 29
E329	DP_100D	DP	DP_PT_DK_CON_TX_N<1> 28 29
E330	DP_100D	DP	DP_PT_DK_CON_AUX_P 28 29
E332	DP_100D	DP	DP_PT_DK_CON_AUX_N 28 29

AUDIO/SPEAKER

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
AUDIO	*	1:1_DIFFPAIR
SPEAKER	*	SPEAKER

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
AUDIO	*	*	3:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E189	AUDIO	AUDIO	LEFT_CH_OUT_P 19 20
E188	AUDIO	AUDIO	LEFT_CH_OUT_REF 19 20
E186	AUDIO	AUDIO	LEFT_CH_P 20
E187	AUDIO	AUDIO	SSM2375_L_IN_P 20
E185	AUDIO	AUDIO	SSM2375_L_IN_N 20
E224	AUDIO	AUDIO	RIGHT_CH_OUT_P 19 20
E225	AUDIO	AUDIO	RIGHT_CH_OUT_REF 19 20
E223	AUDIO	AUDIO	RIGHT_CH_P 20
E226	AUDIO	AUDIO	SSM2375_R_IN_P 20
E227	AUDIO	AUDIO	SSM2375_R_IN_N 20
E172	AUDIO	AUDIO	EXT_MIC_P 19 23
E173	AUDIO	AUDIO	EXT_MIC_REF 19 23

SDIO

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
SDIO_50S	*	50_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
SDIO	*	*	2:1_SPACING
SDIO_CLK	*	*	4:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E690	SDIO_50S	SDIO_CLK	SDIO_WL_CLK 5 30
E689	SDIO_50S	SDIO_CLK	SDIO_WL_CLK_R
E691	SDIO_50S	SDIO	SDIO_WL_CMD 5 30
E692	SDIO_50S	SDIO	SDIO_WL_DATA<3..0> 5 30

SPI

NET_PHYSICAL_TYPE	AREA_TYPE	PHYSICAL_RULE_SET
SPI_50S	*	45_OHM_SE

NET_SPACING_TYPE1	NET_SPACING_TYPE2	AREA_TYPE	SPACING_RULE_SET
SPI	*	*	2:1_SPACING

ELECTRICAL_CONSTRAINT_SET	NET_TYPE PHYSICAL	NET_TYPE SPACING	
E166	SPI_50S	SPI	SPI_GRAPE_MISO 5 17
E164	SPI_50S	SPI	SPI_GRAPE_MOSI 5 17
E163	SPI_50S	SPI	SPI_GRAPE_SCLK 5 17
E162	SPI_50S	SPI	SPI_GRAPE_CS_L 5 17
E160	SPI_50S	SPI	SPI_IPC_MISO 5 31
E161	SPI_50S	SPI	SPI_IPC_MOSI 5 31
E159	SPI_50S	SPI	SPI_IPC_SCLK 5 31
E167	SPI_50S	SPI	SPI_IPC_MRDY 5 31

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MLB CONSTRAINTS

BOARD LAYERS	BOARD AREAS	BOARD UNITS (MIL or MM)	ALLEGRO VERSION
TOP,ISL2,ISL3,ISL4,ISL5,ISL6,ISL7,ISL8,ISL9,BOTTOM	NO_TYPE,BGA,BGA06-06	MM	15.2

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,ISL3,ISL8,ISL9	Y	0.055 MM	0.055 MM	3.0 MM		
45_OHM_SE	ISL4,ISL5,ISL6,ISL7	Y	0.060 MM	0.060 MM	3.0 MM		
45_OHM_SE	*	N	0.060 MM	0.060 MM	3.0 MM		

50 OHMS

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	0.050 MM	0.050 MM	3.0 MM		

50 OHMS - CLEAR ON LAYER 2 AND 5

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_RF	TOP	Y	0.240 MM	0.240 MM	3.0 MM		
50_OHM_SE	ISL4	Y	0.060 MM	0.060 MM	3.0 MM		

50 OHMS - CLEAR ON TOP AND BOTTOM

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	ISL2,ISL9	Y	0.090 MM	0.090 MM	3.0 MM		

DIFFERENTIAL PAIR PHYSICAL RULES
100 OHMS

PHYSICAL_RULE_SET	LAYER	ALLOW ROUTE ON LAYER?	MINIMUM LINE WIDTH	MINIMUM NECK WIDTH	MAXIMUM NECK LENGTH	DIFFPAIR PRIMARY GAP	DIFFPAIR NECK GAP
100_OHM_DIFF	TOP,BOTTOM	Y	0.076 MM	0.076 MM		0.210 MM	0.210 MM
100_OHM_DIFF	N	Y	0.057 MM	0.057 MM	=STANDARD	0.300 MM	0.300 MM

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,BOTTOM	Y	0.095 MM	0.095 MM		0.200 MM	0.200 MM
90_OHM_DIFF	ISL2,ISL3,ISL8,ISL9	Y	0.054 MM	0.054 MM	=STANDARD	0.200 MM	0.100 MM
90_OHM_DIFF	ISL4,ISL5,ISL6,ISL7	Y	0.060 MM	0.060 MM	=STANDARD	0.200 MM	0.100 MM

AUDIO 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	0.3 MM	0.19MM	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	0.060 MM	0.060 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	*	=DEFAULT	?

REGULAR SPACING RULES

SPACING_RULE_SET	LAYER	LINE-TO-LINE SPACING	WEIGHT
1:1_SPACING	*	0.060 MM	?
0P08_SPACING	*	0.080 MM	?
1.5:1_SPACING	*	0.090 MM	?
2:1_SPACING	*	0.120 MM	?
2.5:1_SPACING	*	0.150 MM	?
3:1_SPACING	*	0.180 MM	?
4:1_SPACING	*	0.240 MM	?
5:1_SPACING	*	0.300 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	900
GND_P1SPACING	*	0.1 MM	950
SWITCHNODE	*	0.5 MM	1000
SWITCHNODE	TOP,BOTTOM	0.2 MM	1000

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

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