

# M72/M78 "HOP" AUDIO

M72 EVT

## CHANGE LIST (CHANGES FROM M51)

- 23OCT06  
 1. CHANGED CODEC TO QFN, ADDED 4 AND 5 PIN FLAT SPEAKER CONNECTORS.  
 2. DELETED 4 PIN MICROPHONE CONNECTOR  
 3. ADDED 8 PIN MICROPHONE CONNECTOR  
 4. DELETED OPTIONAL STUFF PATH FOR LINE INPUT TO CDIN OF CODEC, ADDED VARIOUS I/O LABELS
- 24OCT06  
 4. DELETED C6517, C6501, C6617, C6601 (TOO LARGE CAPS ON SPEAKER AMPLIFIERS)  
 5. CHANGED R6302, C6690 TO 220UF FROM 470UF (NO NEED FOR THAT MUCH BULK)  
 6. DELETED R6302/R6306 AS THEY ARE UNNEEDED IN SINGLE-ENDED SPEAKERS  
 7. CHANGED CODEC AVDD CAPS TO 2UF (NOT DRIVING A HIGH CURRENT LOAD)  
 8. ADDED R6750, 1.0V VOLTAGE REGULATOR TO GENERATE 1.2V AVDD  
 9. REMOVED R6570/R6670 0.005 OHM RESISTORS THAT WERE EXPENSIVE AND NO LONGER NEEDED.  
 10. REPLACED C6502, C6602 WITH MORE APPROPRIATE CAPACITORS (35380608) AS THE OTHERS WERE RARE
- 15NOV06  
 11. DELETED ALL FERRITE BEADS ON OUTPUT SIDE OF T FILTER  
 12. DELETED 4 PIN STATIC ZAP DIODES  
 13. REPLACED ALL OUTPUT T FILTER CAPACITORS WITH VARISTERS (100PF CAP PLUS ZAP PROTECTION)  
 14. CHANGED DETECT TRANSISTORS TO SOT-253 FROM SOT-163 FOR SMALLER PACKAGE  
 15. CHANGED TOP AND BOTTOM RESISTORS FOR LI DETECT SO THAT IT WILL OPERATE PROPERLY
- 28NOV06  
 16. CHANGED BOARD TO BOARD CONNECTOR TO APN 516S0564 (22 PIN)  
 17. ADDED SYSTEM LED  
 18. ADDED DECOUPLING AROUND BRD TO BRD CONNECTOR  
 19. CHANGED BOARD TO BOARD CONNECTOR TO PADS WHICH IS APN 998-1569
- 29NOV06 AUDIOHW/SW/EFT DESIGN REVIEW HELD (1PM SONNY ROLLINS)  
 20. CHANGED L6201/L6202 TO CHEAPER 220 OHM FERRITE BEADS  
 21. ADDED NET NAMES TO U6200 PINS 1, U6201 PINS 1, 5, 8, ADDED AUD\_ TO BEEP, JDREF, VREF ON PAGE 62  
 22. CHANGED R6308 TO 28K ON PAGE 63  
 23. CHANGED R6410 TO 0 OHMS, CHANGED NOTES FROM LINE OUTPUT TO HEADPHONES ON PAGE 64  
 24. CHANGED L6505, L6506, L6507, L6508, L6605, L6606, L6607, L6608 TO 0402 PACKAGES PAGES 65 AND 66  
 25. CHANGED ALL CHASSIS NET NAMES TO THE SAME (GND CHASSIS AUDIO EXTERNAL) PAGE 67  
 26. CHANGED NET NAME ON J6702 PINS TO NC 16702, ADDED CHASSIS GND'S TO PINS 3, 6, J6701, PINS 6, 7, J6702  
 27. NOSTUFFED DZ6702 AND DZ6705 AS THEY SHOULD NEVER BE NEEDED DUE TO LOCATION OF PIN DEEP INSIDE CONNECTOR  
 28. CHANGED REFERENCES TO LINE OUTPUT ON PAGE 68 TO BE REFERENCES TO HEADPHONES
- 6DEC06  
 29. FIXED ONE SINGLE PIN NET ON CHASSIS GND NEAR XW6700  
 30. ADDED MIN LINE WIDTH PROPERTY TO AUDIO GND'S  
 31. DELETED ALL ALIASED NETS (+) SIGNS TO ELIMINATE AMBIGUITY  
 32. FIXED THE MIN NECK/MIN LINE WIDTH PROPERTIES ON GND  
 33. COMBINED 12V POWER AND GROUND FOR BOTH SPEAKER AMPLIFIERS TO AID IN PLANE POURING AND ROUTING
- 7DEC06  
 34. FIXED A COUPLE OF LINE WIDTH MINIMUMS FOR ROUTING
- 8DEC06  
 35. ADDED M72/M78 AUDIO IN/OUT CONNECTORS  
 36. CHANGED R6303/08 TO 100K FROM 28K AS WE DO NOT NEED THE PULL DOWN FUNCTION FOR DETECT  
 37. ADDED R6720/L6781 TO LI TYPE DETECT LINE AS WE ARE NOW GOING TO USE IT  
 38. CHANGED NET NAME FOR LI DETECT TO END WITH L  
 39. DELETED DETECT TRANSISTORS AS THE CONNECTORS WILL NOW TAKE THAT FUNCTIONALITY
- 11DEC06  
 40. ADDED STANDOFFS, FIXED NET PROPERTIES IN HEADPHONES CIRCUIT
- 12DEC06  
 41. MODIFIED PORT CONNECTIONS TO MATCH M75/M76 WHERE POSSIBLE  
 42. MODIFIED SOME MIN LINE/MIN NECK WIDTHS ON GROUNDS FOR I/O
- 13DEC06  
 43. ADDED GPIO1 FUNCTIONALITY FOR M72/M78 SELECTION  
 44. VREF\_A NOW MUTES LINE OUTPUT
- 14DEC06  
 45. CHANGED J9900 TO 998-1580 (20 PIN VERSION)
- 15DEC06  
 46. ADDED RESISTOR STUFF OPTIONS TO PLATED HOLES TO CONNECT TO RELEVANT GROUNDS  
 47. CHANGED MICROPHONE SHIELD SHORT TO 0 OHM RESISTOR IN CASE WE NEED TO REMOVE A GROUND LOOP  
 48. ADDED PROPER HOLES FOR AUDIO BOARD (860-8893)  
 49. CHANGED PINOUT OF 20 PIN CONNECTOR TO REDUCE CROSSTALK BETWEEN SIGNALS
- 18DEC06  
 50. ADDED PROPER SIZED HOLES  
 51. CHANGED 220UF CAPS FROM 126S0087 TO HIGHER TEMP, 126S0110 (ALSO ADDS A SUPPLIER FOR GSM)  
 52. CHANGED C6300, C6301, C6304, C6305 TO COMPLIANT 127S0050 CAPS  
 53. ADDED 128S0106 AS ALTERNATE FOR C6202, C6203  
 54. CHANGED L6505/06/07/08, L6605/06/07/08 TO APN 155S0137 TO MATCH PARTS ON OTHER PAGES (SAME PART WITH DIFFERENT PART NUMBER)
- 10JAN07  
 55. FOUND SERIOUS ERRORS IN DETECT CIRCUITRY, REDESIGNED DETECTS
- 11JAN07  
 56. CHANGED J6701/J6704 TO VERTICAL CONNECTORS PER PD
- 23JAN07  
 57. CHANGED U6200 TO LOFP  
 58. ADDED 20 PIN ZIF CONNECTOR J9901, HOOKED UP  
 59. DELETED ZT9901
- 24JAN07  
 60. PLACED QFN CODEC BACK ONTO SCHEMATIC (U6200)  
 61. MODIFIED PIN OUT FOR J9900 TO PLACE DGND BETWEEN TWO POWERS  
 62. CHANGED PULL DOWN RESISTORS ON OUTPUT OF MAX9722 TO 2.2K FROM 1K TO AID IN THD+N
- 29JAN07  
 63. CHANGED Q6500 TO MATCH Q6800-Q6802 (BOM COMSOLIDATION)  
 64. DELETED R6203 AND HW SDFE NET (NOT REQ'D PER DEREK DICARLO AND LAURA METZ)  
 65. DELETED R6217 AND NO CONNECTED GPIO\_1 (NOT REQ'D PER RADAR 4880571)
- 29JAN07  
 65. DELETED R6217 AND NO CONNECTED GPIO\_1 (NOT REQ'D PER RADAR 4880571)
- 9 FEB 07  
 66. UPDATED PORT LABEL TABLE TO INCLUDE VREF\_A AS MUTE FOR HEADPHONES AMPLIFIER  
 67. CHANGED L6280 TO 220 OHM FERRITE (SAME AS M70/75/76) AND CHANGED C6202/C6203 TO 150 UF FROM 33UF TO IMPROVE THD+N ON HEADPHONES OUTPUT.
- 13 FEB 07  
 68. ADDED DUAL ANALOG MIC SUPPORT
- 13 MAR 07  
 69. CHANGED VREF CAP ON CODEC (C6205) TO 3.3UF FROM 10UF TO ENSURE THAT THE VREF IS FULLY CHARGED WHEN SPKR AND HP AMPS ARE UNMUTED  
 70. CHANGED HF COMPILING CAPS (C6400, C6401) TO 3.3UF FROM 10UF TO REDUCE POP  
 71. ADDED NO-STUFFED R6854 TO CONNECT L AND R CHANNELS TOGETHER FOR MONO MIC IMPLEMENTATION
- 14 MAR 07  
 71. BACKED OUT CHANGES FOR MULTIPLE MICROPHONE SUPPORT ON THIS SCHEMATIC (MOVED CHANGES TO NEW 951-0619 TEST SCHEMATIC.


**AUDIO: CODEC**

SYNC\_MASTER=AUDIO SYNC\_DATE=08/04/2006

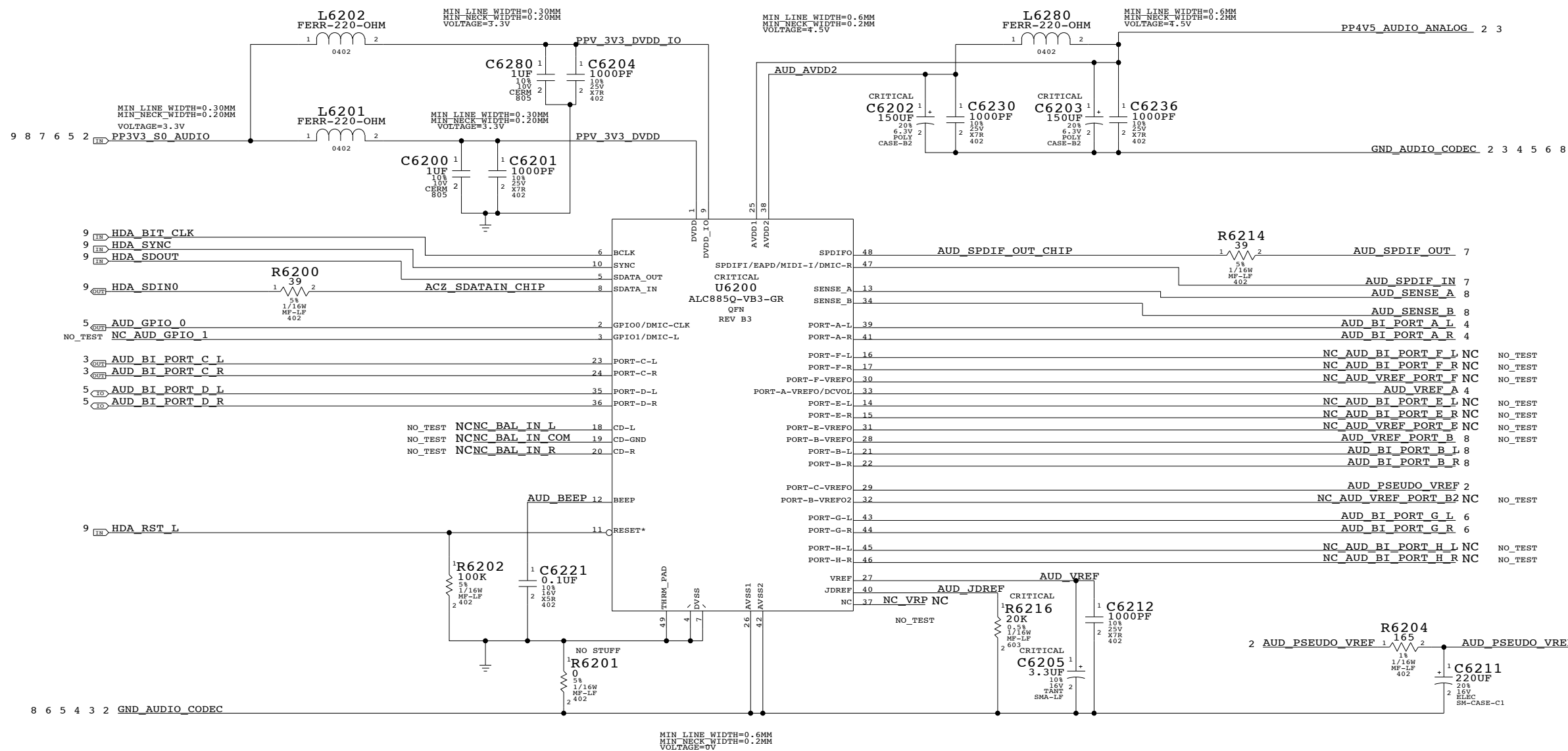
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# AUDIO CODEC APPLE P/N 353S1538

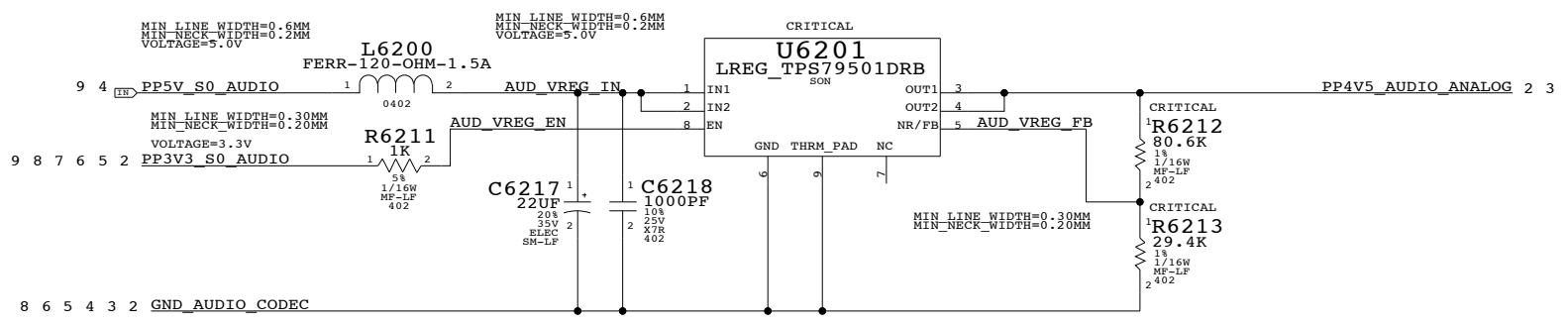


**4.5V POWER SUPPLY FOR CODEC AND LINE IN AMP**  
 $V_{OUT} = 1.2246 \times (1 + (80.6K/29.4K)) = 4.58V$

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS
12880106	12880079		C6202,C6203	GSM REQUEST

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
820-2136	1	PCB, FAB, AUDIO, M72/M78	MLB1		



**AUDIO: CODEC**  
 SYNC\_MASTER=AUDIO SYNC\_DATE=08/04/2006  
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5

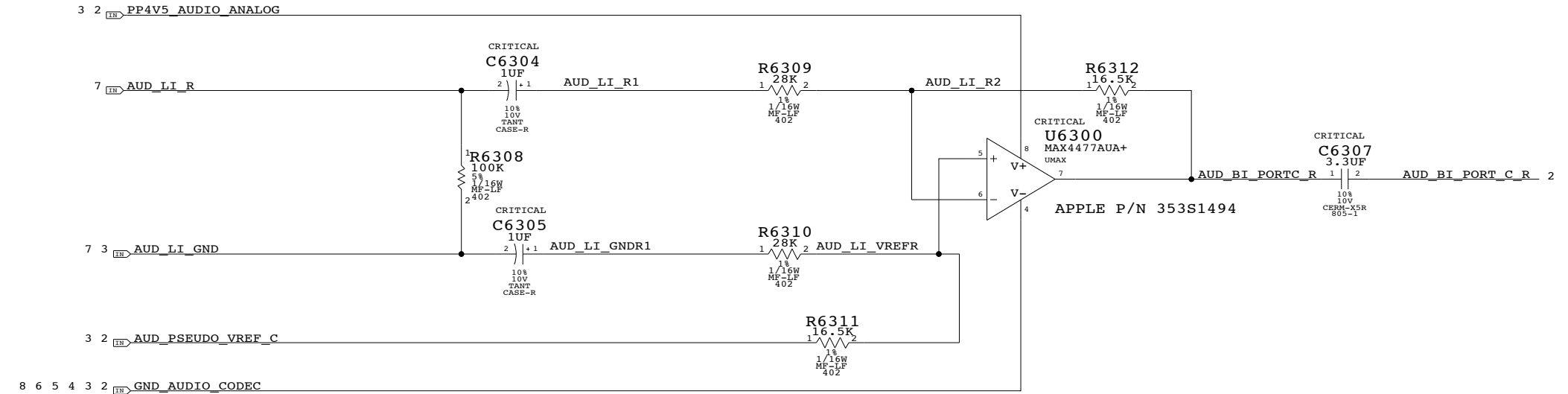
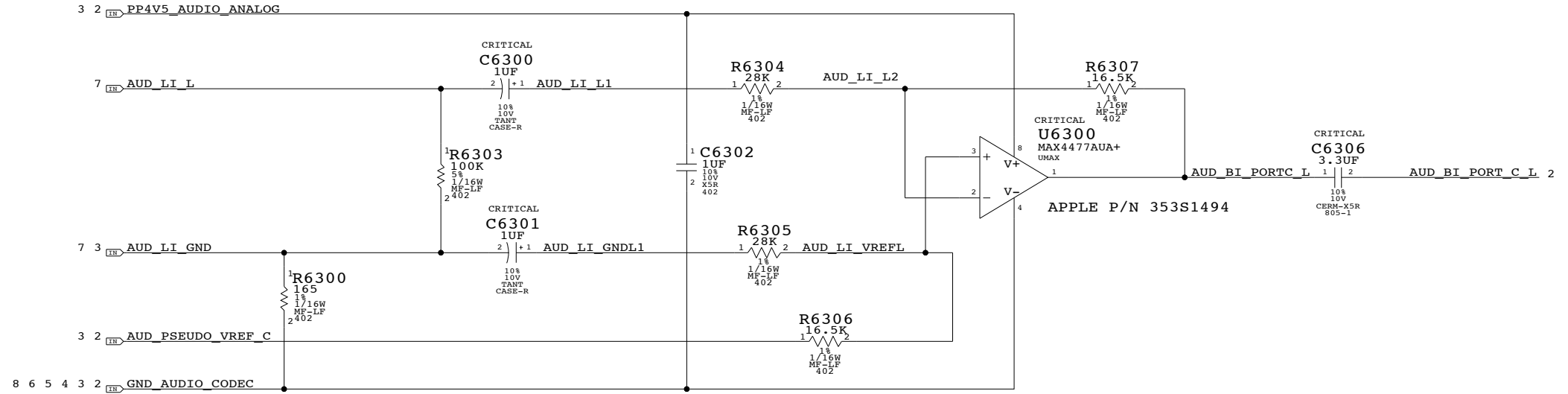
4

3

2

1

LINE IN PSEUDO-DIFFERENTIAL AMP  
 $A_V = 0.59$   
 $F_C = 5.7 \text{ HZ}$



AUDIO: LINE INPUT AMP

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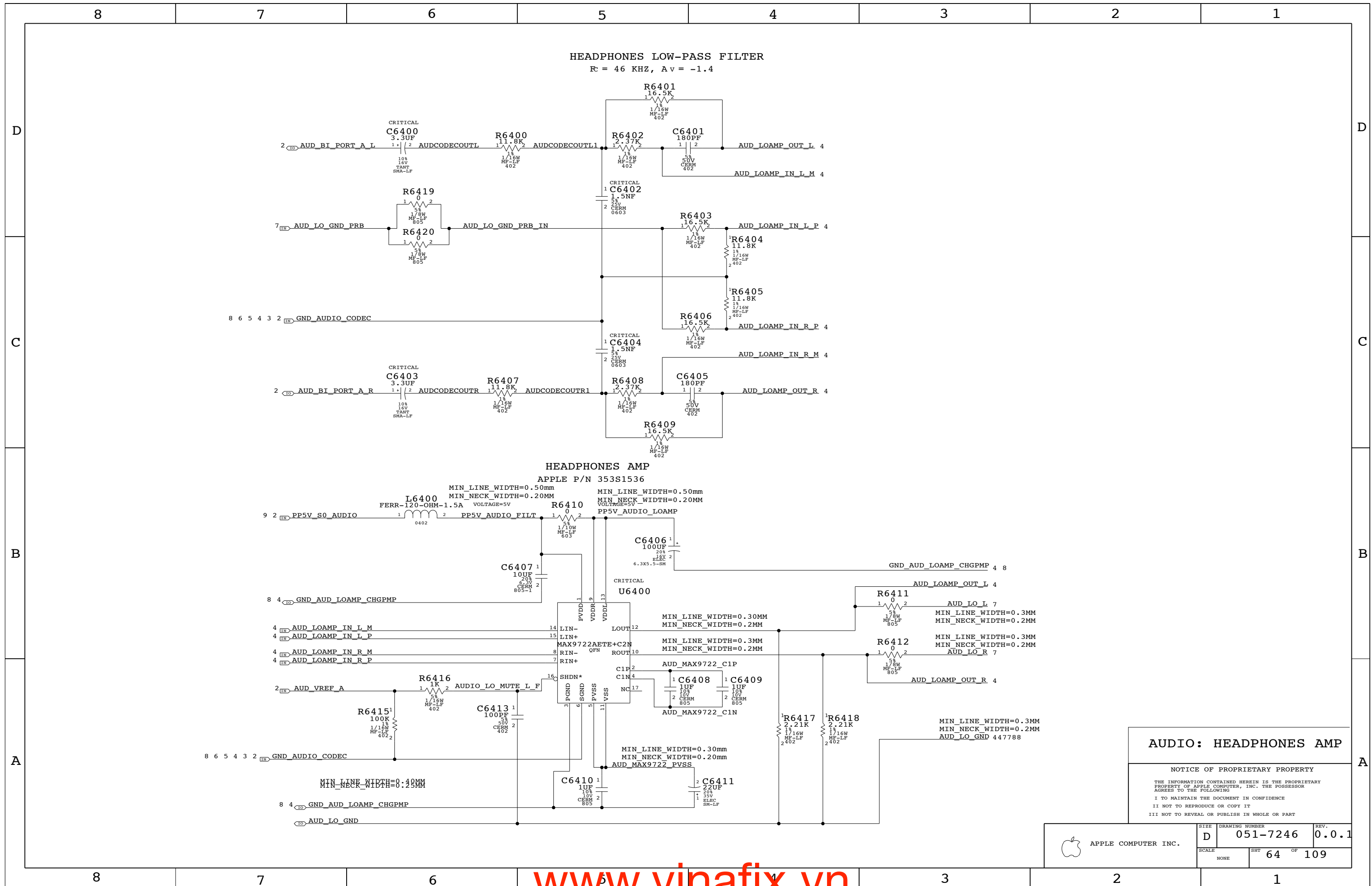
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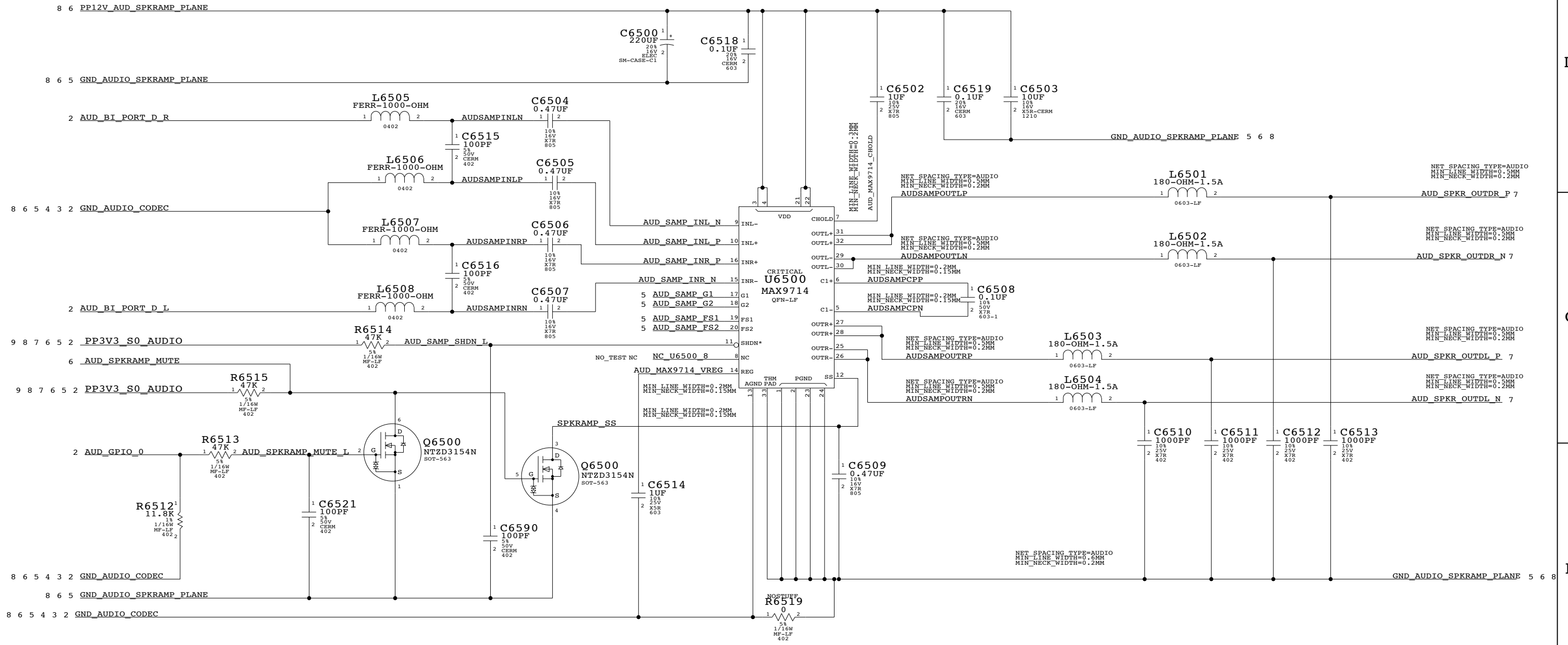
**AUDIO: HEADPHONES AMP**

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NONE	64	109	

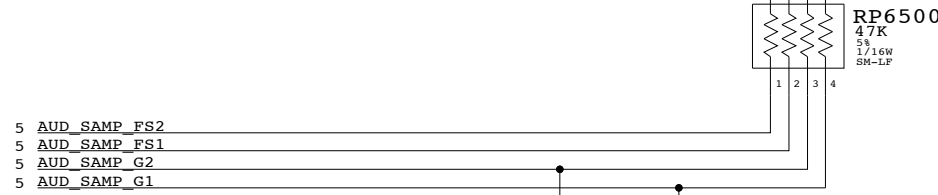
**SPEAKER AMP**  
APPLE P/N 353S1156

NET SPACING TYPE=AUDIO  
MIN\_LINE\_WIDTH=0.6MM  
MIN\_NECK\_WIDTH=0.2MM  
VOLTAGE=12V



GAIN SETTINGS: +16DB  
MODULATION SETTING: LOW EMI  
GAIN AND SWITCHING FREQUENCY STUFF OPTIONS

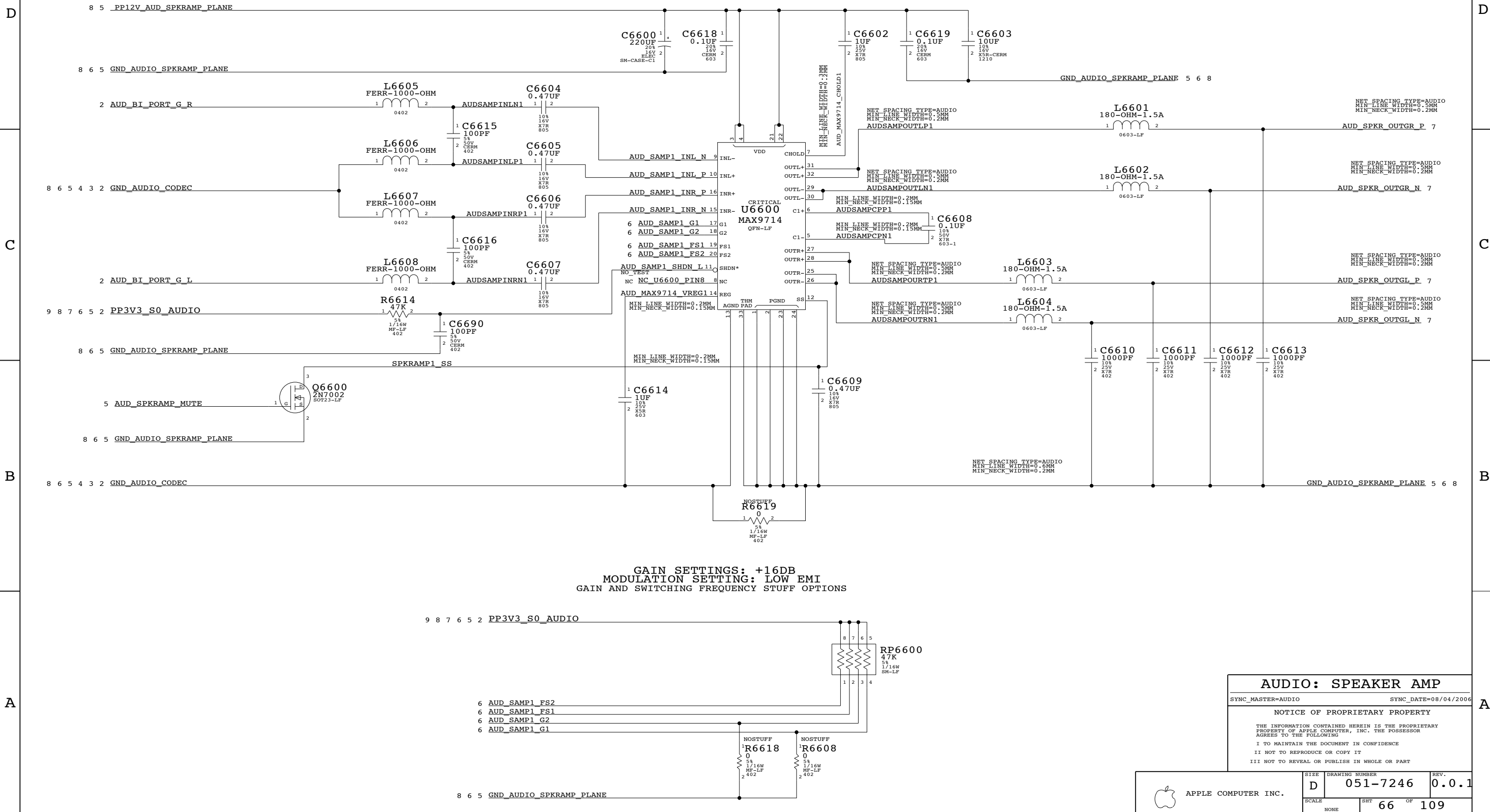
9 8 7 6 5 2 PP3V3\_S0\_AUDIO



**AUDIO: SPEAKER AMP\_1**  
SYNC\_MASTER=AUDIO SYNC\_DATE=08/04/2006  
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SCALE	NONE	SHT	65 OF 109

## SPEAKER AMP APPLE P/N 353S1156



**GAIN SETTINGS: +16DB**  
**MODULATION SETTING: LOW EMI**  
**GAIN AND SWITCHING FREQUENCY STUFF OPTIONS**

**AUDIO: SPEAKER AMP**  
SYNC\_MASTER=AUDIO      SYNC\_DATE=08/04/2006

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	SCALE	SHT NONE	OF	109

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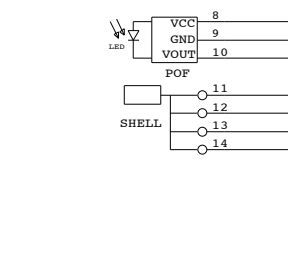
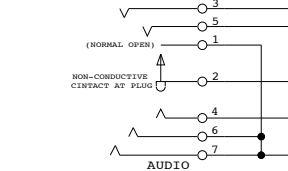


**COMBO IN JACK**  
APPLE P/N 514-0402

CRITICAL

**J6700**  
AUDIO-IN-M72

F-ANG-TH

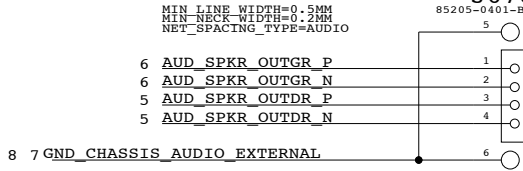


8 7 GND\_CHASSIS\_AUDIO\_IO

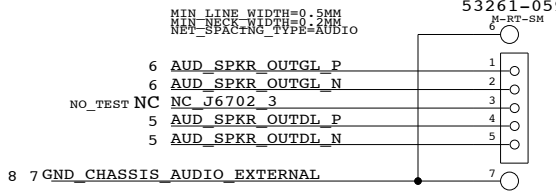
**SPEAKER CABLE CONNECTORS**

APPLE P/N 518S0191  
APPLE P/N 518S0326

PROPERTIES FOR ALL SPKR NETS



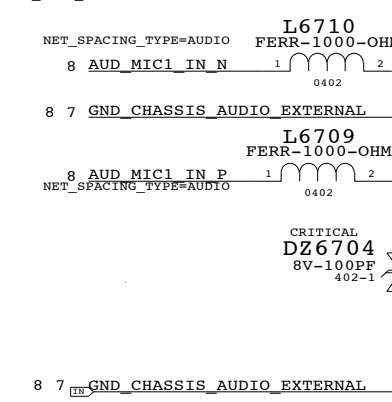
PROPERTIES FOR ALL SPKR NETS



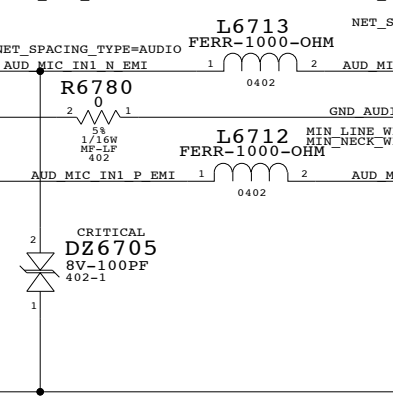
**INTERNAL MIC CON**

APPLE P/N 518S0314

MIN LINE WIDTH=0.2MM  
MIN\_NECK\_WIDTH=0.2MM



MIN LINE WIDTH=0.2MM  
MIN\_NECK\_WIDTH=0.2MM



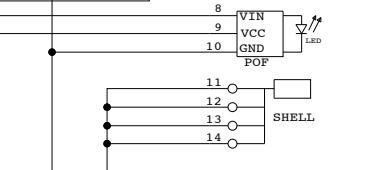
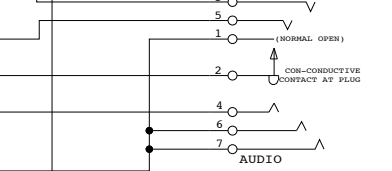
8 7 GND\_CHASSIS\_AUDIO\_EXTERNAL

**LINE OUT JACK**

APPLE P/N 514-0403

**J6703**  
AUDIO-OUT-M72

F-ANG-TH



MIN LINE WIDTH=0.25MM  
MIN\_NECK\_WIDTH=0.2MM

AUD\_SPDIF0\_GND NC NO\_TEST



**AUDIO: CONNECTORS**

SYNC\_MASTER=AUDIO SYNC\_DATE=08/04/2006

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SCALE	SHT	OF	
NONE	67	109	

CODEC OUTPUT SIGNAL PATHS

FUNCTION	VOLUME	DAC	PIN COMPLEX	MUTE CONTROL
HEADPHONES	0X0D	0X03	0X15 (A)	VREF A
SPKR AMP (M72/M78)	0X0C	0X02	0X14 (D)	GPIO 0
SPKR AMP (M72/M78)	0X0E	0X04	0X16 (G)	GPIO 0
SPDIFOUT		CONVERTER=0X06	PIN=0X1E	
		DETECT DELEGATE PIN	0X1BH (E)	

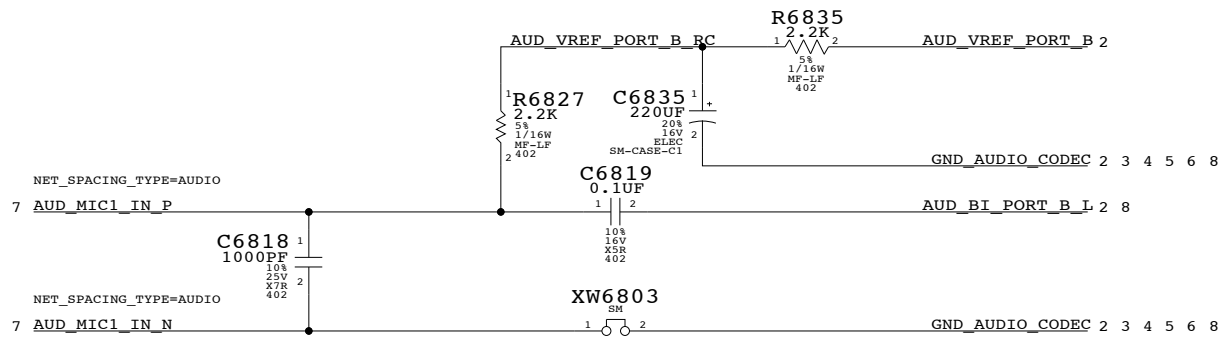
CODEC INPUT SIGNAL PATHS

FUNCTION	ADC	MIXER	PORT	VREF
MIC INPUT	0X07	0X24	0X18 (B)	80%
LINE INPUT	0X08	0X23	0X1A (C)	50%
SPDIFIN	CONVERTER=0X0A		PIN=0X1F	

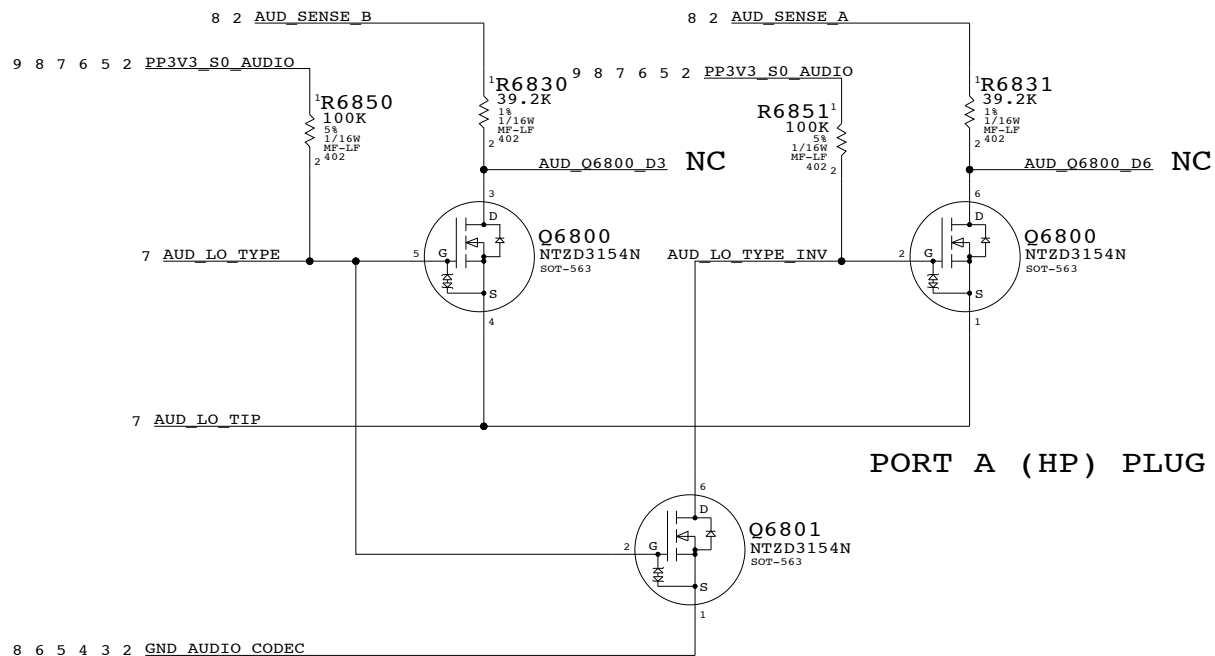
OPTIONAL RESISTOR TO COMBINE L/R SIGNALS FOR MONO MIC



MICROPHONE IMPEDANCE MATCHING CIRCUIT

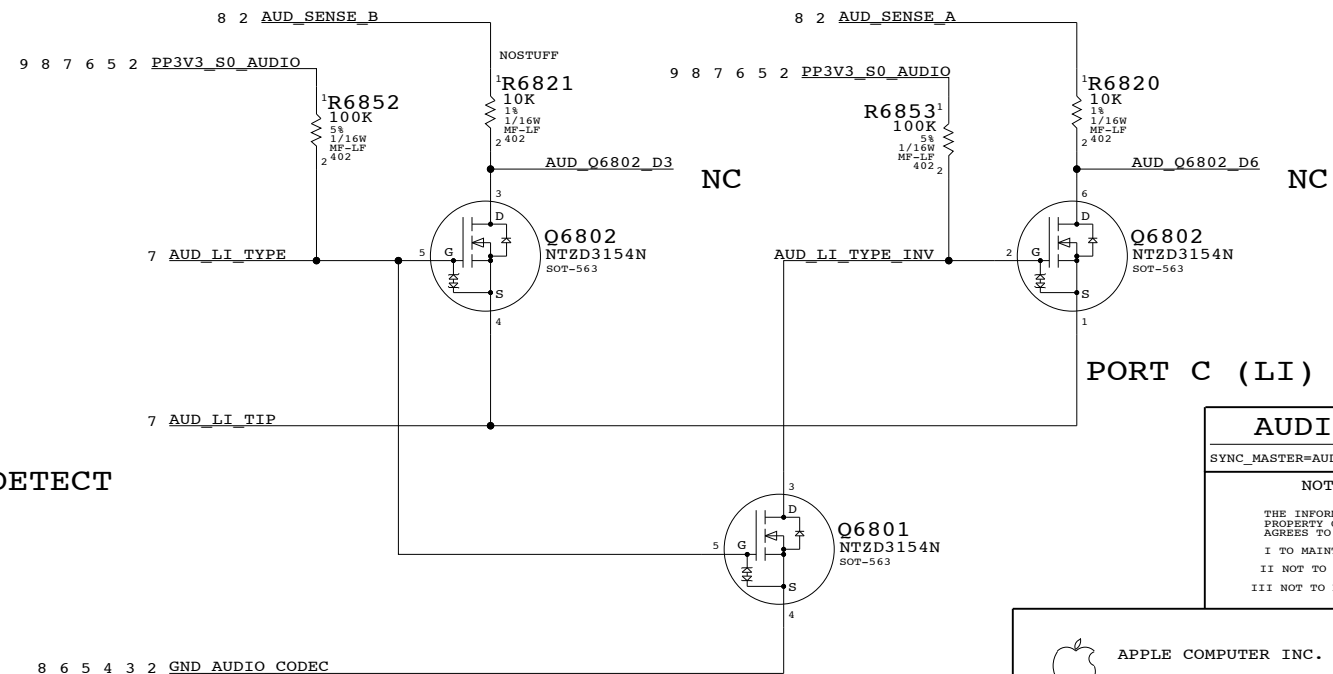


PORT A DIGITAL OUT DETECT DELEGATE



PORT A (HP) PLUG DETECT

PORT C (LI) DIG DET DELEGATE



PORT C (LI) INSERT DETECT

**AUDIO: POWER SUPPLIES**

SYNC\_MASTER=AUDIO SYNC\_DATE=08/04/2006

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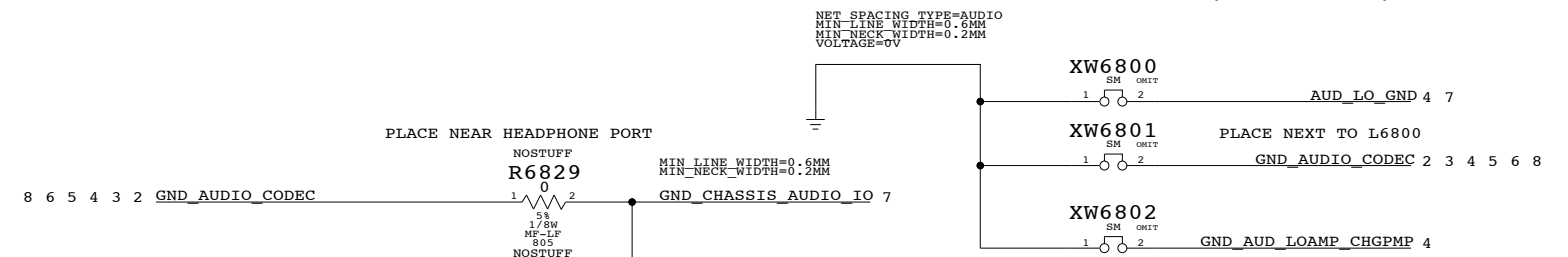
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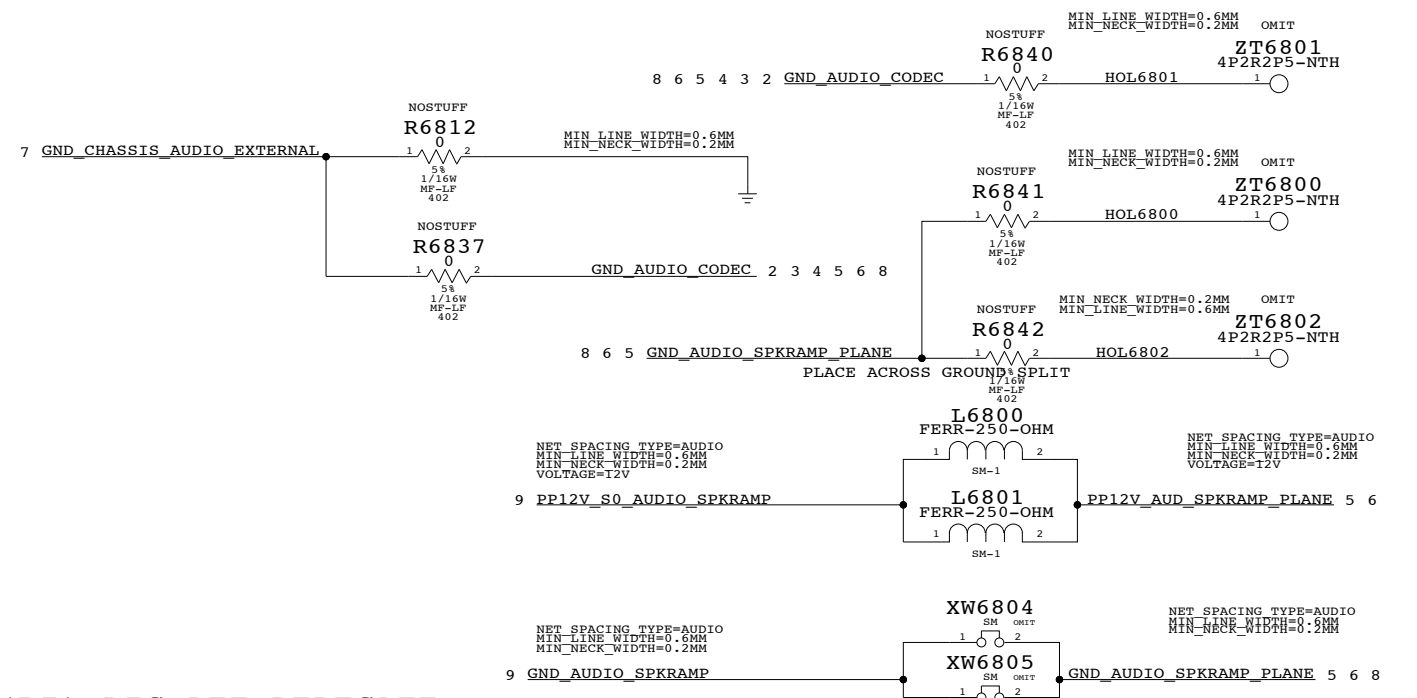
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SCALE	SHT	OF	
NONE	68	109	

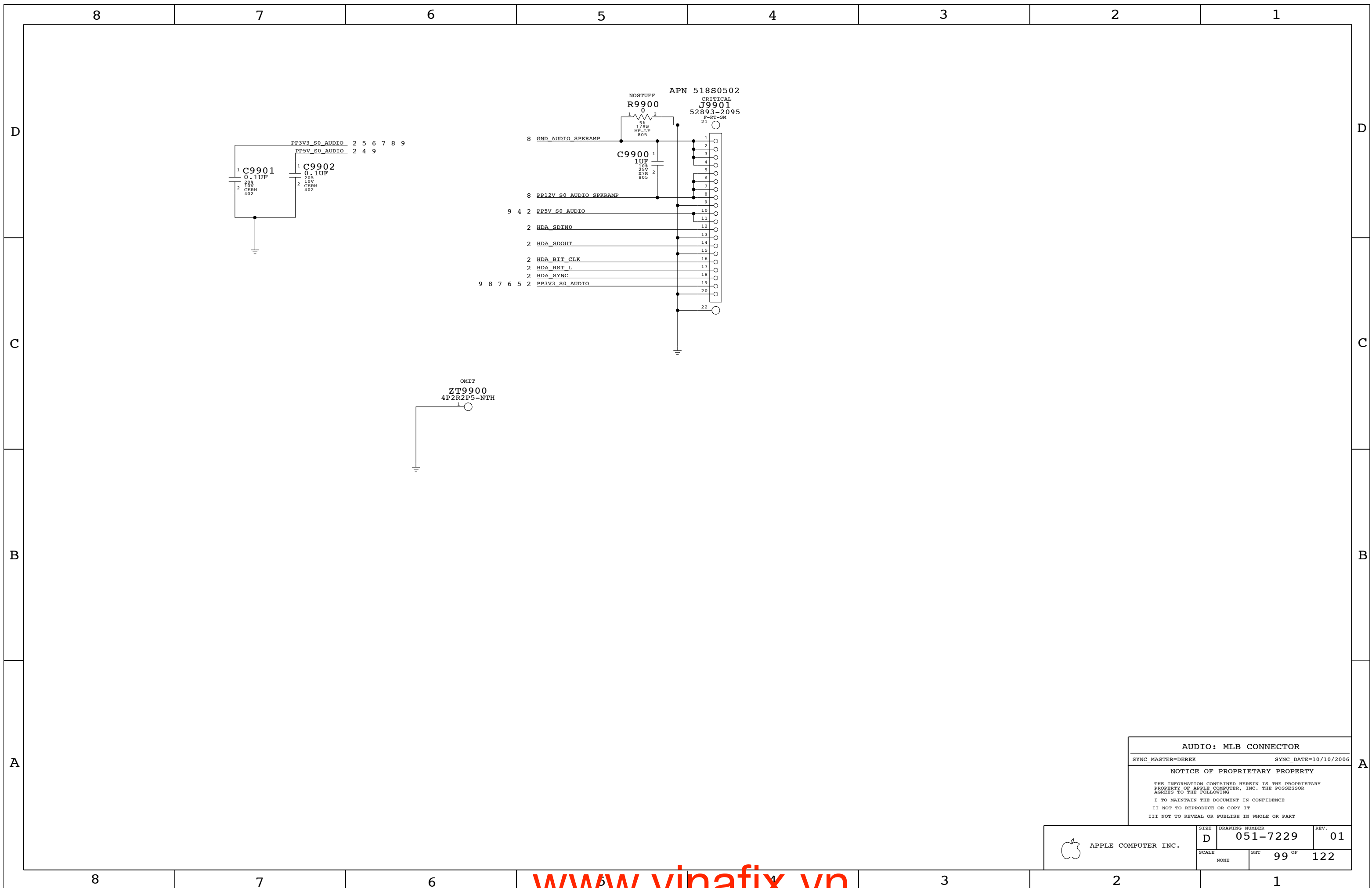
AUDIO GROUND RETURNS



AUDIO MTG HOLES







**AUDIO: MLB CONNECTOR**  
 SYNC\_MASTER=DEREK SYNC\_DATE=10/10/2006  
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	SCALE NONE	SHEET <b>99</b> OF	TOTAL SHEETS <b>122</b>

	8	7	6	5	4	3	2	1	
D	<pre> Title:      Basenet Report Design:    hop Date:      Oct 23 12:30:13 2006  Base nets and synonyms for hop_lib.HOP(@hop_lib.hop(sch_1)) Base Signal      Synonyms      Location((Zone)(dir))  12V_S5_SPKRAMP    12V_S5_SPKRAMP - @hop_lib.HOP      5D7 12V_S5_SPKRAMP1  12V_S5_SPKRAMP1 - @hop_lib.HOP     6D7 =PP3V3_S0_AUDIO  =PP3V3_S0_AUDIO - @hop_lib.HOP     2D7 5A6 5C8 5C8 6A6 6C8 =PP5V_S0_AUDIO   =PP5V_S0_AUDIO - @hop_lib.HOP     7B8 8A4 8B4 8B7 9C4 =PP12V_S5_AUDIO_SPKRAMP =PP12V_S5_AUDIO_SPKRAMP - @hop_lib.HOP 5D8 6D8 9D4 AMP              @hop_lib.HOP AC2_BITCLK      AC2_BITCLK - @hop_lib.HOP         2D7 9D6 AC2_RST_L       AC2_RST_L - @hop_lib.HOP          2C7 9C6 AC1_SDATAIN&lt;O&gt;  AC1_SDATAIN&lt;O&gt; - @hop_lib.HOP     2C7 9C6 AC1_SDATAIN_CHIP AC1_SDATAIN_CHIP - @hop_lib.HOP    2C6 AC1_SDATAOUT    AC1_SDATAOUT - @hop_lib.HOP       2D7 9C6 AC2_SYNC        AC2_SYNC - @hop_lib.HOP           2D7 9C6 AUDCODECOUTL   AUDCODECOUTL - @hop_lib.HOP       4D6 AUDCODECOUTL1  AUDCODECOUTL1 - @hop_lib.HOP      4D5 AUDCODECOUTR   AUDCODECOUTR - @hop_lib.HOP       4C6 AUDCODECOUTR1  AUDCODECOUTR1 - @hop_lib.HOP      4C5 AUDIO_LO_MUTE_L_F AUDIO_LO_MUTE_L_F - @hop_lib.HOP 4A6 AUDLINDETH     AUDLINDETH - @hop_lib.HOP         8B7 AUSAMPFCRN     AUSAMPFCRN - @hop_lib.HOP         5C4 AUSAMPFCRN1    AUSAMPFCRN1 - @hop_lib.HOP        6C4 AUSAMPFCFP     AUSAMPFCFP - @hop_lib.HOP         5C4 AUSAMPFCFP1    AUSAMPFCFP1 - @hop_lib.HOP        6C4 AUSAMPINLN     AUSAMPINLN - @hop_lib.HOP         5D6 AUSAMPINLN1    AUSAMPINLN1 - @hop_lib.HOP        6D6 AUSAMPINLP     AUSAMPINLP - @hop_lib.HOP         5C6 AUSAMPINLP1    AUSAMPINLP1 - @hop_lib.HOP        6C6 AUSAMPINRN     AUSAMPINRN - @hop_lib.HOP         5C6 AUSAMPINRN1    AUSAMPINRN1 - @hop_lib.HOP        6C6 AUSAMPINRF     AUSAMPINRF - @hop_lib.HOP         5C6 AUSAMPINRF1    AUSAMPINRF1 - @hop_lib.HOP        6C6 AUSAMPPOURTP   AUSAMPPOURTP - @hop_lib.HOP       5C4 AUSAMPPOURTP1  AUSAMPPOURTP1 - @hop_lib.HOP      6C4 AUSAMPPOUTLN   AUSAMPPOUTLN - @hop_lib.HOP       5C4 AUSAMPPOUTLN1  AUSAMPPOUTLN1 - @hop_lib.HOP      6C4 AUSAMPPOUTLP   AUSAMPPOUTLP - @hop_lib.HOP       5C4 AUSAMPPOUTLP1  AUSAMPPOUTLP1 - @hop_lib.HOP      6C4 AUSAMPPOUTRN   AUSAMPPOUTRN - @hop_lib.HOP       5C4 AUSAMPPOUTRN1  AUSAMPPOUTRN1 - @hop_lib.HOP      6C4 AUD_BI_PORTA_L AUD_BI_PORTA_L - @hop_lib.HOP      3C3 AUD_BI_PORTA_R AUD_BI_PORTA_R - @hop_lib.HOP      3B3 AUD_BI_PORT_A_L AUD_BI_PORT_A_L - @hop_lib.HOP     2C2 3C2 AUD_BI_PORT_A_R AUD_BI_PORT_A_R - @hop_lib.HOP     2C2 3B2 AUD_BI_PORT_B_L AUD_BI_PORT_B_L - @hop_lib.HOP     2C2 6C8 AUD_BI_PORT_B_R AUD_BI_PORT_B_R - @hop_lib.HOP     2C2 5C8 AUD_BI_PORT_C_L AUD_BI_PORT_C_L - @hop_lib.HOP     2C7 6D8 AUD_BI_PORT_C_R AUD_BI_PORT_C_R - @hop_lib.HOP     2C7 5D8 AUD_BI_PORT_D_L AUD_BI_PORT_D_L - @hop_lib.HOP     2C7 4D7 AUD_BI_PORT_D_R AUD_BI_PORT_D_R - @hop_lib.HOP     2C7 4C7 AUD_BI_PORT_F_L AUD_BI_PORT_F_L - @hop_lib.HOP     2B3 2C2 8C5 AUD_BI_PORT_F_R AUD_BI_PORT_F_R - @hop_lib.HOP     2B2 2C2 AUD_GPIO_0      AUD_GPIO_0 - @hop_lib.HOP         2C7 5B8 AUD_GPIO_1      AUD_GPIO_1 - @hop_lib.HOP         2C7 4A7 AUD_LI_DET_EMI  AUD_LI_DET_EMI - @hop_lib.HOP     7D6 AUD_LI_DET_H    AUD_LI_DET_H - @hop_lib.HOP       7D4 8B7 AUD_LI_DET_JACK AUD_LI_DET_JACK - @hop_lib.HOP     7D7 AUD_LI_GND      AUD_LI_GND - @hop_lib.HOP         3B7 3C7 7D4 AUD_LI_GNDL1    AUD_LI_GNDL1 - @hop_lib.HOP       3C5 AUD_LI_GNDR1    AUD_LI_GNDR1 - @hop_lib.HOP       3B5 AUD_LI_GND_EMI  AUD_LI_GND_EMI - @hop_lib.HOP     7D6 AUD_LI_GND_JACK AUD_LI_GND_JACK - @hop_lib.HOP     7D8 AUD_LI_L        AUD_LI_L - @hop_lib.HOP           3D7 7D4 AUD_LI_L1       AUD_LI_L1 - @hop_lib.HOP          3D5 AUD_LI_L2       AUD_LI_L2 - @hop_lib.HOP          3D4 AUD_LI_L_EMI    AUD_LI_L_EMI - @hop_lib.HOP       7D5 AUD_LI_L_JACK   AUD_LI_L_JACK - @hop_lib.HOP      7D7 AUD_LI_R        AUD_LI_R - @hop_lib.HOP           3B7 7D4 AUD_LI_R1       AUD_LI_R1 - @hop_lib.HOP          3B5 AUD_LI_R2       AUD_LI_R2 - @hop_lib.HOP          3B4 AUD_LI_R_EMI    AUD_LI_R_EMI - @hop_lib.HOP       7D6 AUD_LI_R_JACK   AUD_LI_R_JACK - @hop_lib.HOP      7D7 AUD_LI_VREFL    AUD_LI_VREFL - @hop_lib.HOP       3C4 AUD_LI_VREFR    AUD_LI_VREFR - @hop_lib.HOP       3B4 AUD_LOAMP_IN_L_M AUD_LOAMP_IN_L_M - @hop_lib.HOP    4B7 4D4 AUD_LOAMP_IN_L_P AUD_LOAMP_IN_L_P - @hop_lib.HOP    4A7 4C4 AUD_LOAMP_IN_R_M AUD_LOAMP_IN_R_M - @hop_lib.HOP    4A7 4C4 AUD_LOAMP_IN_R_P AUD_LOAMP_IN_R_P - @hop_lib.HOP    4A7 4C4 AUD_LOAMP_OUT_L AUD_LOAMP_OUT_L - @hop_lib.HOP    4B3 4D4 AUD_LOAMP_OUT_R AUD_LOAMP_OUT_R - @hop_lib.HOP    4A3 4C4 AUD_LO_DET1     AUD_LO_DET1 - @hop_lib.HOP       7B8 8A4 AUD_LO_DET1_1   AUD_LO_DET1_1 - @hop_lib.HOP     8A2 8A4 AUD_LO_DET1_EMI AUD_LO_DET1_EMI - @hop_lib.HOP    7B7 AUD_LO_DET1_INV AUD_LO_DET1_INV - @hop_lib.HOP    8A3 AUD_LO_DET1_JACK AUD_LO_DET1_JACK - @hop_lib.HOP   7B4 AUD_LO_DET2     AUD_LO_DET2 - @hop_lib.HOP       7B8 8B4 AUD_LO_DET2_1   AUD_LO_DET2_1 - @hop_lib.HOP     8B4 AUD_LO_DET2_EMI AUD_LO_DET2_EMI - @hop_lib.HOP    7B7 AUD_LO_DET2_JACK AUD_LO_DET2_JACK - @hop_lib.HOP   7B4 AUD_LO_GND      AUD_LO_GND - @hop_lib.HOP        4A3 4A7 7A8 8D2 AUD_LO_GND_EMI  AUD_LO_GND_EMI - @hop_lib.HOP    7A7 AUD_LO_GND_JACK AUD_LO_GND_JACK - @hop_lib.HOP    7B4 AUD_LO_GND_FRB  AUD_LO_GND_FRB - @hop_lib.HOP    4C7 7A8 AUD_LO_GND_FRB_IN AUD_LO_GND_FRB_IN - @hop_lib.HOP 4C6 AUD_LO_L        AUD_LO_L - @hop_lib.HOP          4B3 7B8 AUD_LO_L_EMI    AUD_LO_L_EMI - @hop_lib.HOP      7B7 AUD_LO_L_JACK   AUD_LO_L_JACK - @hop_lib.HOP     7B4 AUD_LO_R        AUD_LO_R - @hop_lib.HOP          4A3 7A8 AUD_LO_R_EMI    AUD_LO_R_EMI - @hop_lib.HOP     7A7 AUD_LO_R_JACK   AUD_LO_R_JACK - @hop_lib.HOP     7B4 AUD_MAX9714_CHOLD1 AUD_MAX9714_CHOLD1 - @hop_lib.HOP 5C4 AUD_MAX9714_VREG1 AUD_MAX9714_VREG1 - @hop_lib.HOP 6C5 AUD_MAX9722_C1N AUD_MAX9722_C1N - @hop_lib.HOP    4A5 AUD_MAX9722_C1P AUD_MAX9722_C1P - @hop_lib.HOP    4A5 AUD_MAX9722_PVSS AUD_MAX9722_PVSS - @hop_lib.HOP   4A5 AUD_MIC_IN_N    AUD_MIC_IN_N - @hop_lib.HOP      7C6 8C8 AUD_MIC_IN_N_CONN AUD_MIC_IN_N_CONN - @hop_lib.HOP 7C4 AUD_MIC_IN_N_EMI AUD_MIC_IN_N_EMI - @hop_lib.HOP 7C5 AUD_MIC_IN_P    AUD_MIC_IN_P - @hop_lib.HOP      7C6 8C8 AUD_MIC_IN_P_CONN AUD_MIC_IN_P_CONN - @hop_lib.HOP 7C4 AUD_MIC_IN_P_EMI AUD_MIC_IN_P_EMI - @hop_lib.HOP 7C5 AUD_MIC_P1      AUD_MIC_P1 - @hop_lib.HOP        8C7 AUD_PORT_A_DET_L AUD_PORT_A_DET_L - @hop_lib.HOP 8B6 AUD_PORT_D_DET_L AUD_PORT_D_DET_L - @hop_lib.HOP 8B2 AUD_PORT_G_DET_L AUD_PORT_G_DET_L - @hop_lib.HOP 8B1 AUD_PSEUDO_VREF AUD_PSEUDO_VREF - @hop_lib.HOP    2B3 2C2 </pre>		<pre> AUD_PSEUDO_VREF_F AUD_PSEUDO_VREF_F - @hop_lib.HOP 2B2 3A7 3C7 AUD_SAMP1_FS1     AUD_SAMP1_FS1 - @hop_lib.HOP     6A6 6C5 AUD_SAMP1_FS2     AUD_SAMP1_FS2 - @hop_lib.HOP     6A6 6C5 AUD_SAMP1_G1      AUD_SAMP1_G1 - @hop_lib.HOP     6A6 6C5 AUD_SAMP1_G2      AUD_SAMP1_G2 - @hop_lib.HOP     6A6 6C5 AUD_SAMP1_INL_N   AUD_SAMP1_INL_N - @hop_lib.HOP   6C5 AUD_SAMP1_INL_P   AUD_SAMP1_INL_P - @hop_lib.HOP   6C5 AUD_SAMP1_INR_N   AUD_SAMP1_INR_N - @hop_lib.HOP   6C5 AUD_SAMP1_INR_P   AUD_SAMP1_INR_P - @hop_lib.HOP   6C5 AUD_SAMP1_SHDN_L  AUD_SAMP1_SHDN_L - @hop_lib.HOP 6C5 AUD_SAMP_FS1      AUD_SAMP_FS1 - @hop_lib.HOP     5A6 5C5 AUD_SAMP_FS2      AUD_SAMP_FS2 - @hop_lib.HOP     5A6 5C5 AUD_SAMP_G1       AUD_SAMP_G1 - @hop_lib.HOP      5A6 5C5 AUD_SAMP_G2       AUD_SAMP_G2 - @hop_lib.HOP      5A6 5C5 AUD_SAMP_INL_N    AUD_SAMP_INL_N - @hop_lib.HOP    5C5 AUD_SAMP_INL_P    AUD_SAMP_INL_P - @hop_lib.HOP    5C5 AUD_SAMP_INR_N    AUD_SAMP_INR_N - @hop_lib.HOP    5C5 AUD_SAMP_INR_P    AUD_SAMP_INR_P - @hop_lib.HOP    5C5 AUD_SAMP_SHDN_L   AUD_SAMP_SHDN_L - @hop_lib.HOP   5C6 AUD_SENSE_A       AUD_SENSE_A - @hop_lib.HOP      2C2 8B4 8B7 AUD_SENSE_B       AUD_SENSE_B - @hop_lib.HOP      2C2 8B4 AUD_SPDIFIN_JACK  AUD_SPDIFIN_JACK - @hop_lib.HOP 7D7 AUD_SPDIF_GND     AUD_SPDIF_GND - @hop_lib.HOP    7A3 7D8 AUD_SPDIF_IN      AUD_SPDIF_IN - @hop_lib.HOP     2C2 7D4 AUD_SPDIF_OUT     AUD_SPDIF_OUT - @hop_lib.HOP    2D2 7B8 AUD_SPDIF_OUT_CHIP AUD_SPDIF_OUT_CHIP - @hop_lib.HOP 2D4 AUD_SPDIF_OUT_JACK AUD_SPDIF_OUT_JACK - @hop_lib.HOP 7B5 AUD_SPKRAMP_MUTE  AUD_SPKRAMP_MUTE - @hop_lib.HOP 5C8 6B8 AUD_SPKRAMP_MUTE_L AUD_SPKRAMP_MUTE_L - @hop_lib.HOP 5B7 AUD_SPKR_OUTBL_N  AUD_SPKR_OUTBL_N - @hop_lib.HOP 6C1 7D2 AUD_SPKR_OUTBL_P  AUD_SPKR_OUTBL_P - @hop_lib.HOP 6C1 7D2 AUD_SPKR_OUTBR_N  AUD_SPKR_OUTBR_N - @hop_lib.HOP 5C1 7C2 AUD_SPKR_OUTBR_P  AUD_SPKR_OUTBR_P - @hop_lib.HOP 5C1 7C2 AUD_SPKR_OUTCL_N  AUD_SPKR_OUTCL_N - @hop_lib.HOP 6C1 7D2 AUD_SPKR_OUTCL_P  AUD_SPKR_OUTCL_P - @hop_lib.HOP 6C1 7D2 AUD_SPKR_OUTCR_N  AUD_SPKR_OUTCR_N - @hop_lib.HOP 5C1 7C2 AUD_SPKR_OUTCR_P  AUD_SPKR_OUTCR_P - @hop_lib.HOP 5C1 7C2 AUD_TTYPE_DET_EM  AUD_TTYPE_DET_EM - @hop_lib.HOP 8B3 AUD_VREF_PORT_F   AUD_VREF_PORT_F - @hop_lib.HOP 2C2 8C5 AUD_VREF_PORT_F_RC AUD_VREF_PORT_F_RC - @hop_lib.HOP 8C6 BAL_IN_COM        BAL_IN_COM - @hop_lib.HOP       2C7 3B3 BAL_IN_L          BAL_IN_L - @hop_lib.HOP        2C7 3D3 BAL_IN_R          BAL_IN_R - @hop_lib.HOP        2C7 3C3 BEEP              BEEP - @hop_lib.HOP           2C6 GND_AUDIO         GND_AUDIO - @hop_lib.HOP       8D4 GND_AUDIO_CODECC GND_AUDIO_CODECC - @hop_lib.HOP 2B7 2D2 3A7 3C7 4A7 4C7 GND_AUDIO_CODECC EMI1 GND_AUDIO_CODECC_EMI1 - @hop_lib.HOP 7A7 GND_AUDIO_MIC_CONN GND_AUDIO_MIC_CONN - @hop_lib.HOP 7C4 GND_AUDIO_SPKRAMP GND_AUDIO_SPKRAMP - @hop_lib.HOP 5B1 6B1 9C4 GND_AUDIO_SPKRAMP1_P GND_AUDIO_SPKRAMP1_PLANE - @hop_lib.HOP 6A6 6B2 6B8 6B8 6D2 6D8 LANE              @hop_lib.HOP GND_AUDIO_SPKRAMP_PL GND_AUDIO_SPKRAMP_PLANE - @hop_lib.HOP 5A6 5B2 5B8 5D2 5D8 ANE              @hop_lib.HOP GND_AUD_LOAMP_CHGMP GND_AUD_LOAMP_CHGMP - @hop_lib.HOP 4A7 4B3 4B7 8D2 GND_CHASSIS_AUDIO_EX GND_CHASSIS_AUDIO_EXTERNAL - @hop_lib.HOP 7A8 7C8 8C4 8D2 TERNAL           @hop_lib.HOP GND_CHASSIS_AUDIO_IN GND_CHASSIS_AUDIO_INTERNAL - @hop_lib.HOP 7C6 TERNAL           @hop_lib.HOP JDREF            JDREF - @hop_lib.HOP          2B4 NC_AUD_BI_PORT_E_L NC_AUD_BI_PORT_E_L - @hop_lib.HOP 2C2 NC_AUD_BI_PORT_E_R NC_AUD_BI_PORT_E_R - @hop_lib.HOP 2C2 NC_AUD_BI_PORT_G_L NC_AUD_BI_PORT_G_L - @hop_lib.HOP 2C2 NC_AUD_BI_PORT_G_R NC_AUD_BI_PORT_G_R - @hop_lib.HOP 2C2 NC_AUD_BI_PORT_H_L NC_AUD_BI_PORT_H_L - @hop_lib.HOP 2C2 NC_AUD_BI_PORT_H_R NC_AUD_BI_PORT_H_R - @hop_lib.HOP 2C2 NC_AUD_LI_TYPE_JACK NC_AUD_LI_TYPE_JACK - @hop_lib.HOP 7D7 NC_AUD_VREF_PORT_B NC_AUD_VREF_PORT_B - @hop_lib.HOP 2C2 NC_AUD_VREF_PORT_C NC_AUD_VREF_PORT_C - @hop_lib.HOP 2C2 NC_AUD_VREF_PORT_D NC_AUD_VREF_PORT_D - @hop_lib.HOP 2C2 NC_AUD_VREF_PORT_E NC_AUD_VREF_PORT_E - @hop_lib.HOP 2C2 NC_J7302_3       NC_J7302_3 - @hop_lib.HOP      7C2 NC_VRP           NC_VRP - @hop_lib.HOP          2B4 PP3V3_AUDIO_SPDIF_EM PP3V3_AUDIO_SPDIF_EMI - @hop_lib.HOP 7B7 @hop_lib.HOP PP3V3_AUDIO_SPDIF_JA PP3V3_AUDIO_SPDIF_JACK - @hop_lib.HOP 7B5 7D8 CK              @hop_lib.HOP PP4V5_AUDIO_ANALOG PP4V5_AUDIO_ANALOG - @hop_lib.HOP 2B3 2D2 3B7 3D7 PP5V_AUDIO_FILT  PP5V_AUDIO_FILT - @hop_lib.HOP 4B6 PP5V_AUDIO_LOAMP PP5V_AUDIO_LOAMP - @hop_lib.HOP 4B5 PP12V_AUD_SPKRAMP1_P PP12V_AUD_SPKRAMP1_PLANE - @hop_lib.HOP 6D5 LANE            @hop_lib.HOP PP12V_AUD_SPKRAMP_PL PP12V_AUD_SPKRAMP_PLANE - @hop_lib.HOP 5D5 ANE            @hop_lib.HOP PPV_3V3_DVDD     PPV_3V3_DVDD - @hop_lib.HOP     2D6 PPV_3V3_DVDD_IO  PPV_3V3_DVDD_IO - @hop_lib.HOP 2D6 SPKRAMP_SS       SPKRAMP_SS - @hop_lib.HOP      6B6 SPKRAMP_SS       SPKRAMP_SS - @hop_lib.HOP      5B6 VREF            VREF - @hop_lib.HOP        2C4 </pre>						
	B								
A									

	8	7	6	5	4	3	2	1				
D	Title: Cref Part Report Design: hop Date: Oct 23 12:30:13 2006		SM		R6827 RES_402 hop[8C6] R6829 RES_805 hop[8D3] R6830 RES_402 hop[8B1] R6831 RES_402 hop[8B2] R6835 RES_402 hop[8C5] RP6500 RPAK4F_SM-LF hop[5A4] RP6600 RPAK4F_SM-LF hop[6A4] U6200 AUDIO_ALC885B2_QFN_Q hop[2D5] FW U6300 OPAMP_MAX4477_UMAX hop[3B4 3C4] U6400 MAX9722_QFN hop[4B5] U6500 MAX9714_QFN-LF hop[5C5] U6600 MAX9714_QFN-LF hop[6C5] XW6501 SHORT_SM hop[5B2] XW6502 SHORT_SM hop[5B2] XW6601 SHORT_SM hop[6B2] XW6602 SHORT_SM hop[6B2] XW6700 SHORT_SM hop[7C5] XW6800 SHORT_SM hop[8D3] XW6801 SHORT_SM hop[8D3] XW6802 SHORT_SM hop[8D3] XW6803 SHORT_SM hop[8C6]							
	C			L6200 IND_0402 hop[2B5] L6201 IND_0402 hop[2D6] L6202 IND_0402 hop[2D6] L6400 IND_0402 hop[4B6] L6500 IND_SM-1 hop[5D6] L6501 IND_0603-LF hop[5C2] L6502 IND_0603-LF hop[5C2] L6503 IND_0603-LF hop[5C3] L6504 IND_0603-LF hop[5C3] L6505 IND_0603 hop[5D6] L6506 IND_0603 hop[5C6] L6507 IND_0603 hop[5C6] L6508 IND_0603 hop[5C6] L6522 IND_SM-1 hop[5D6] L6600 IND_SM-1 hop[6D6] L6601 IND_0603-LF hop[6C2] L6602 IND_0603-LF hop[6C2] L6603 IND_0603-LF hop[6C3] L6604 IND_0603-LF hop[6C3] L6605 IND_0603 hop[6D6] L6606 IND_0603 hop[6C6] L6607 IND_0603 hop[6C6] L6608 IND_0603 hop[6C6] L6622 IND_SM-1 hop[6D6] L6700 IND_0603-LF hop[7D6] L6701 IND_0603-LF hop[7D6] L6702 IND_0603-LF hop[7D6] L6703 IND_0603-LF hop[7D6] L6704 IND_0603-LF hop[7D5] L6705 IND_0603-LF hop[7D5] L6706 IND_0603-LF hop[7D5] L6707 IND_0603-LF hop[7D5] L6709 IND_0603-LF hop[7C6] L6710 IND_0603-LF hop[7C6] L6712 IND_0603-LF hop[7C4] L6713 IND_0603-LF hop[7C4] L6714 IND_0603-LF hop[7B7] L6715 IND_0603-LF hop[7B7] L6716 IND_0603 hop[7B7] L6717 IND_0603-LF hop[7A7] L6718 IND_0603-LF hop[7B7] L6719 IND_0603-LF hop[7B7] L6720 IND_0603-LF hop[7A7] L6723 IND_0603-LF hop[7B5] L6724 IND_0603-LF hop[7B5] L6725 IND_0603-LF hop[7A5] L6726 IND_0603-LF hop[7B5] L6727 IND_0603-LF hop[7B5] L6728 IND_0603-LF hop[7A5] L6780 IND_0603-LF hop[7A7] L6781 IND_0603-LF hop[7A5] Q6500 TRA_2N7002DW_SOT-363 hop[5B6 5B6] Q6600 TRA_2N7002_SOT23-LF hop[6B7] Q6800 TRA_2N7002DW_SOT-363 hop[8B3 8A3] Q6801 TRA_2N7002_SOT23-LF hop[8B6] Q6802 TRA_2N7002DW_SOT-363 hop[8B1 8B2]								
B				R6200 RES_402 hop[2C7] R6201 RES_402 hop[2B6] R6202 RES_402 hop[2C6] R6203 RES_402 hop[2D3] R6204 RES_402 hop[2B2] R6210 RES_402 hop[2B5] R6216 RES_402 hop[2B4] R6300 RES_402 hop[3C6] R6303 RES_402 hop[3C5] R6304 RES_402 hop[3B4] R6305 RES_402 hop[3C4] R6306 RES_402 hop[3C4] R6307 RES_402 hop[3D3] R6308 RES_402 hop[3B5] R6309 RES_402 hop[3B4] R6310 RES_402 hop[3B4] R6311 RES_402 hop[3A4] R6312 RES_402 hop[3B3] R6313 RES_402 hop[3D5] R6314 RES_402 hop[3C5] R6315 RES_402 hop[3B4] R6400 RES_402 hop[4D6] R6401 RES_402 hop[4D5] R6402 RES_402 hop[4D5] R6403 RES_402 hop[4C4] R6404 RES_402 hop[4C4] R6405 RES_402 hop[4C4] R6406 RES_402 hop[4C4] R6407 RES_402 hop[4C6] R6408 RES_402 hop[4C5] R6409 RES_402 hop[4B5] R6410 RES_603 hop[4B5] R6411 RES_805 hop[4B3] R6412 RES_805 hop[4A3] R6415 RES_402 hop[4A6] R6416 RES_402 hop[4A6] R6417 RES_402 hop[4A4] R6418 RES_402 hop[4A4] R6419 RES_805 hop[4D6] R6420 RES_805 hop[4C6] R6508 RES_402 hop[5A4] R6512 RES_402 hop[5B7] R6513 RES_402 hop[5B7] R6514 RES_402 hop[5C6] R6515 RES_402 hop[5C7] R6518 RES_402 hop[5A5] R6519 RES_402 hop[5B4] R6570 RES_1206 hop[5D7] R6608 RES_402 hop[6A4] R6614 RES_402 hop[6C6] R6618 RES_402 hop[6A5] R6619 RES_402 hop[6B4] R6670 RES_1206 hop[6D7] R6702 RES_402 hop[7A3] R6705 RES_402 hop[7C8] R6706 RES_402 hop[7D5] R6800 RES_402 hop[8B4] R6804 RES_402 hop[8B7] R6805 RES_402 hop[8B6] R6807 RES_402 hop[8A3] R6808 RES_402 hop[8A4] R6809 RES_402 hop[8A4] R6812 RES_402 hop[8C3] R6813 RES_402 hop[8B4] R6820 RES_402 hop[8B7] R6825 RES_402 hop[8C7] R6826 RES_402 hop[8C7]								
	A			C6200 CAP_805 hop[2D6] C6201 CAP_402 hop[2D6] C6202 CAP_P_SM-CASE-C1 hop[2D4] C6203 CAP_P_SM-CASE-C1 hop[2D3] C6204 CAP_402 hop[2D6] C6205 CAP_P_SMA-LF hop[2B4] C6210 CAP_P_SMA-LF hop[2B3] C6211 CAP_P_SM-CASE-C1 hop[2B2] C6212 CAP_402 hop[2B4] C6221 CAP_402 hop[2C6] C6230 CAP_402 hop[2D4] C6236 CAP_402 hop[2D3] C6280 CAP_805 hop[2D6] C6300 CAP_805-1 hop[3D5] C6301 CAP_805-1 hop[3C5] C6302 CAP_402 hop[3C5] C6304 CAP_805-1 hop[3B5] C6305 CAP_805-1 hop[3B5] C6306 CAP_805-1 hop[3C2] C6307 CAP_805-1 hop[3B2] C6400 CAP_P_4X5.5-SM hop[4D6] C6401 CAP_402 hop[4B4] C6402 CAP_0603 hop[4D5] C6403 CAP_P_4X5.5-SM hop[4C6] C6404 CAP_0603 hop[4C5] C6405 CAP_402 hop[4C4] C6406 CAP_P_6.3X5.5-SM hop[4B5] C6407 CAP_805-1 hop[4B5] C6408 CAP_805 hop[4A5] C6409 CAP_805 hop[4A4] C6410 CAP_805 hop[4A5] C6411 CAP_P_SM-LF hop[4A4] C6412 CAP_402 hop[4A6] C6413 CAP_402 hop[4A5] C6500 CAP_P_10X10-SM hop[5D5] C6501 CAP_1210 hop[5D5] C6502 CAP_805 hop[5D4] C6503 CAP_1210 hop[5D3] C6504 CAP_805 hop[5D6] C6505 CAP_805 hop[5C6] C6506 CAP_805 hop[5C6] C6507 CAP_805 hop[5C6] C6508 CAP_603-1 hop[5C4] C6509 CAP_805 hop[5B4] C6510 CAP_402 hop[5B3] C6511 CAP_402 hop[5B2] C6512 CAP_402 hop[5B2] C6513 CAP_402 hop[5B2] C6514 CAP_603 hop[5B5] C6515 CAP_402 hop[5D6] C6516 CAP_402 hop[5C6] C6517 CAP_P_10X10-SM hop[5D6] C6518 CAP_603 hop[5D5] C6519 CAP_603 hop[5D4] C6520 CAP_402 hop[5B7] C6521 CAP_402 hop[5B7] C6590 CAP_402 hop[5B6] C6600 CAP_P_10X10-SM hop[6D5] C6601 CAP_1210 hop[6D5] C6602 CAP_805 hop[6D4] C6603 CAP_1210 hop[6D3] C6604 CAP_805 hop[6D6] C6605 CAP_805 hop[6C6] C6606 CAP_805 hop[6C6] C6607 CAP_805 hop[6C6] C6608 CAP_603-1 hop[6C4] C6609 CAP_805 hop[6B4] C6610 CAP_402 hop[6B3] C6611 CAP_402 hop[6B2] C6612 CAP_402 hop[6B2] C6613 CAP_402 hop[6B2] C6614 CAP_603 hop[6B5] C6615 CAP_402 hop[6C6] C6616 CAP_402 hop[6C6] C6617 CAP_P_10X10-SM hop[6D6] C6618 CAP_603 hop[6D5] C6619 CAP_603 hop[6D4] C6690 CAP_402 hop[6C6] C6700 CAP_402 hop[7D6] C6701 CAP_402 hop[7C5] C6702 CAP_402 hop[7D5] C6703 CAP_402 hop[7C5] C6711 CAP_402 hop[7A7] C6712 CAP_402 hop[7A6] C6713 CAP_402 hop[7A6] C6714 CAP_402 hop[7A7] C6715 CAP_402 hop[7A6] C6717 CAP_402 hop[7B4] C6718 CAP_805 hop[7B4] C6721 CAP_402 hop[7C5] C6722 CAP_402 hop[7C5] C6723 CAP_402 hop[7A6] C6726 CAP_402 hop[7C7] C6780 CAP_402 hop[7A7] C6800 CAP_402 hop[8B4] C6801 CAP_402 hop[8B7] C6802 CAP_402 hop[8A4] C6818 CAP_402 hop[8C7] C6819 CAP_402 hop[8C6] C6835 CAP_P_SM-CASE-C1 hop[8C6] DZ6700 SUPPR_TRANSIENT_4P1_ hop[7C7] 0405 DZ6701 SUPPR_TRANSIENT_4P1_ hop[7A5] 0405 DZ6702 SUPPR_TRANSIENT_4P1_ hop[7A4] 0405 DZ6703 SUPPR_TRANSIENT_4P1_ hop[7C7] 0405 DZ6704 SUPPR_TRANSIENT_4P1_ hop[7C4] 0405 J6700 CON_F9ANG_S4MT_TH3_F hop[7D8] -ANG-TH J6701 CON_M4RT_S2MT_SM_M-R hop[7D1] T-SM J6702 CON_M5RT_S2MT_SMA_M- hop[7C1] RT-SM J6703 CON_F9ANG_S4MT_TH2_F hop[7B3] -ANG-TH J9900 CON_F14ST_D_SM_F-ST- hop[9D5]								
		8	7	6	5	4	3	2	1			