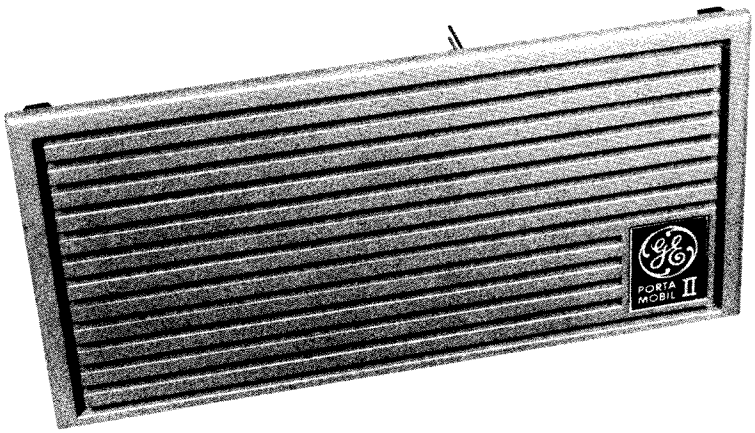
MOBILE RADIO

Porta-Mobil II™

AUDIO POWER AMPLIFIER 19C321258G1, G3 AND G4



SPECIFICATIONS *

USED WITH:	PMII
PL NUMBER	AUDIO POWER OUTPUT
19C321258G1&G4	10 Watts (@ rated audio)
19C321258G3	1/2 Watt (@ rated audio)
AUDIO POWER INPUT	500 milliwatts (@ rated audio)
SPEAKER IMPEDANCE	8 ohms
FREQUENCY RESPONSE	300 to 3000 Hz ±4 dB (1000 Hz reference)
DISTORTION	Less than 10%

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

Maintenance Manual LBI-30098A
DATAFILE FOLDER - DF-8397

AUDIO POWER AMPLIFIER 19C321258G1, G3 AND G4

GENERAL ELECTRIC

TABLE OF CONTENTS

WARNING

Although the highest DC voltage in PORTA-MOBIL II™ Equipment is supplied by a portable or vehicular battery, high currents may be drawn under short circuit conditions. These currents can possibly heat metal objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits! High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns upon contact. Keep away from these circuits when the transmitter is energized!

DESCRIPTION

Audio Power Amplifier 19C321258 groups 1, 3 and 4, is constructed in the front cover for the PMII case assembly. Amplifier groups 1 and 4 provide 10 Watts audio power output, and group 3 provides 1/2 Watt audio power output. Amplifier groups 1 and 4 consist of a power amplifier circuit, audio mute circuit and a 7.5 volt regulator circuit. Group 3 consists of a 7.5 volt regulator and a speaker.

CIRCUIT ANALYSIS

Amplifier

Receiver audio output interfaces with the audio power amplifier through the system board and connects to P1501-4 (AUD IN HI). Receiver audio is coupled through transformer T1 to the base of power transistors Q3 and Q4. Power transistors Q3 and Q4 are part of a class B common emitter amplifier circuit with a transformer input and a transformer output. Thermistor RT1 in the emitter bias circuit provides temperature compensation for audio power output stability. The collector output is coupled through audio power transformer T1501. Transformer T1501 has a tap for 10 Watts operation connected to P1501-8 (AUD OUT HI 10 W).

Audio Mute

The audio mute circuit consist of transistors Q1 and Q2. Transistor Q2 completes the negative path for the primary and secondary of transformer T1. When a positive DC voltage level from the receiver audio PA is present at P1501-7 (AUD SQ. MUTE) and coupled through Q1 to the base of Q2, Q2 conducts completing the negative path and full audio is heard from the speaker. When the DC voltage level at P1501-7 drops, Q2 stops conducting as hard and the audio is muted.

7.5 Volt Regulator

The 7.5 Volt Regulator circuit provides a continuous and keyed 7.5 volts for the operation of the transmitter, receiver, and tone and control options. The regulator circuit consists of pass transistor Q5 and regulator module A1. A typical regulator circuit is shown in Figure 1.

The 10-Volt supply is connected to P1501-12 and is applied to the emitter of pass transistor Q5. The collector voltage of Q5 is held at 7.5 Volts by regulator transistors Q1 and Q2. If the collector voltage of Q5 starts to increase above 7.5 Volts, Q2 will conduct harder causing the bias on the base of Q1 to decrease. Q1 will conduct less causing Q5 to conduct less to hold the collector voltage at 7.5 Volts. If the collector voltage of Q5 starts to decrease below 7.5 Volts, Q2 will conduct less causing Q1 to conduct harder. Q1 conducting harder causes Q5 to conduct harder to again hold the collector voltage of Q5 at 7.5 Volts.

Transistors Q3 and Q4 provides a keyed +7 Volts for the transmitter power control circuit. When the PTT switch is pushed the

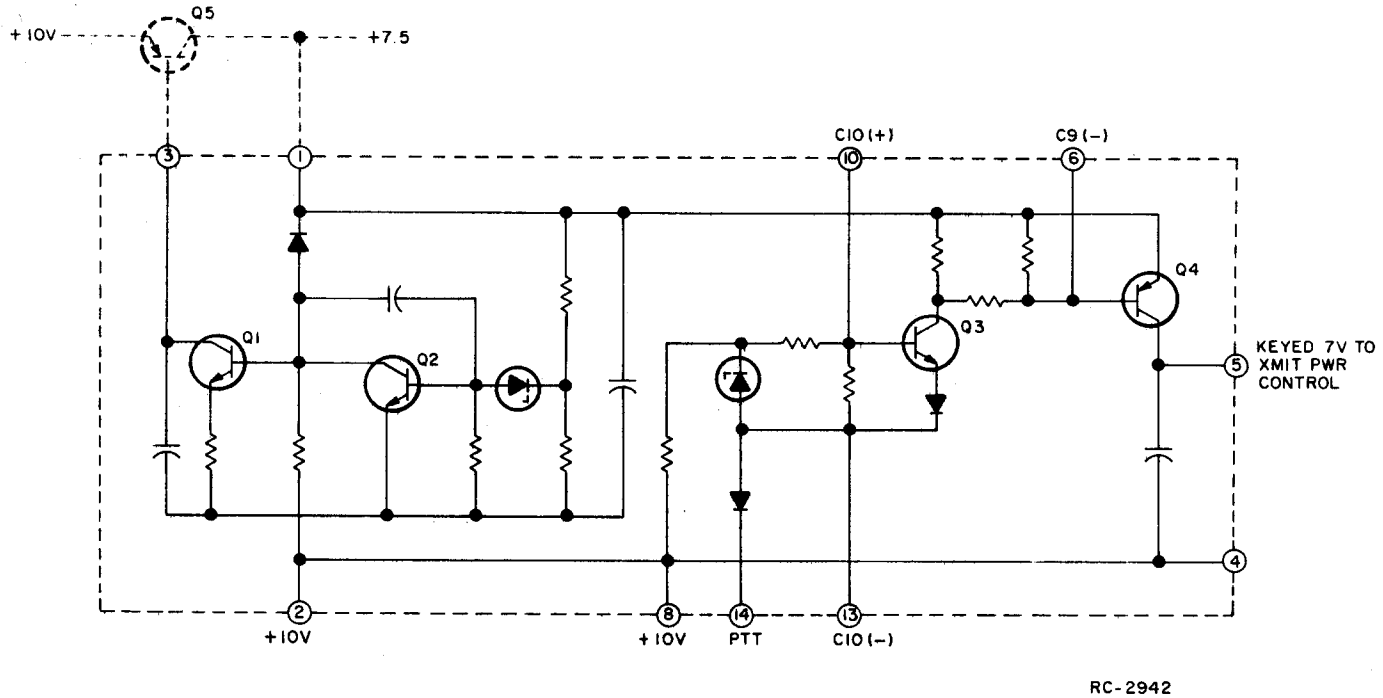


Figure 1 - Typical Regulator Circuit

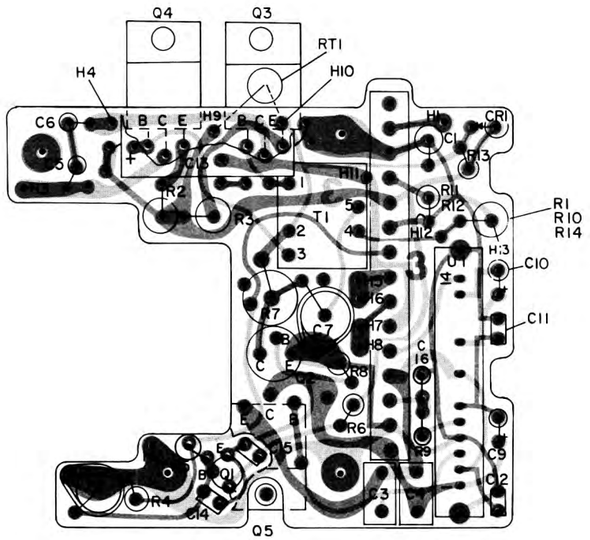
emitter circuit of transistor Q3 is completed and Q3 conducts. Q3 conducting causes the bias on the base of NPN transistor Q4 to go low. The bias on Q4 going low causes Q4 to conduct. Q4 conducting places regulated +7 Volts on Pin 5 of the regulator module and P1501-13 (7.5 V Tx KEYED).

TROUBLESHOOTING

Should a service problem arise, the following Quick-Checks can assist the service technician.

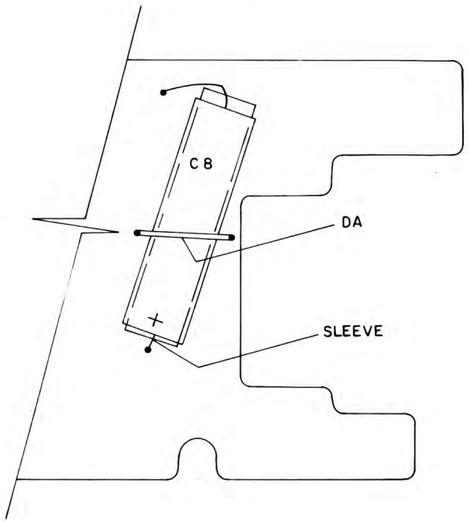
SYMPTOM	CHECK FOR:
1. No Audio	1. +10 Volts at P1501-5. 2. Receiver audio at P1505-4. 3. Defective power transistor Q3 or Q4.
2. Low Audio	1. DC voltage at P1505-7. 2. Defective audio mute transistors Q1 and Q2. 3. Defective C1, C2 or C7.
3. No regulated 7.5 Volts	1. +10 Volts at P1501-12. 2. Defective C8, C9 or C10. 3. Defective Q5. 4. Defective A1.

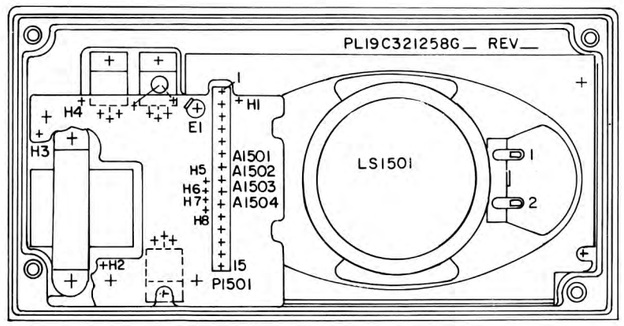
COMPONENT SIDE

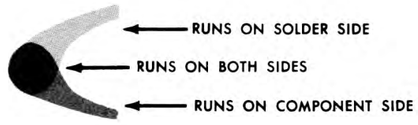


(19D417579, Sh. 2, Rev. 3)
(19D417579, Sh. 3, Rev. 3)

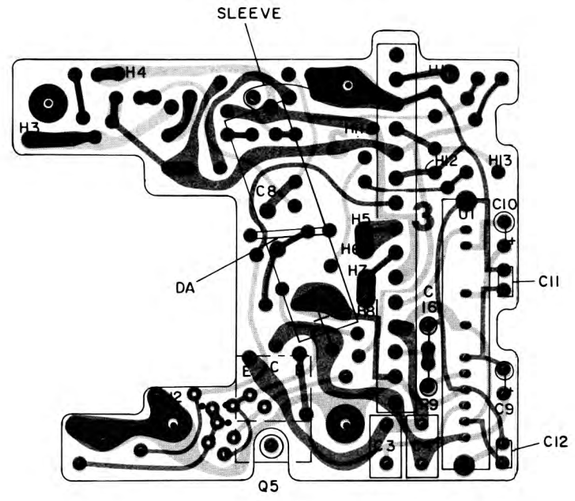
SOLDER SIDE







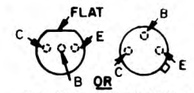
A1503
COMPONENT SIDE



(19D424032, Rev. 1)

(19D417579, Sh. 2, Rev. 3)
(19D417579, Sh. 3, Rev. 3)

LEAD IDENTIFICATION
FOR Q1 & Q2



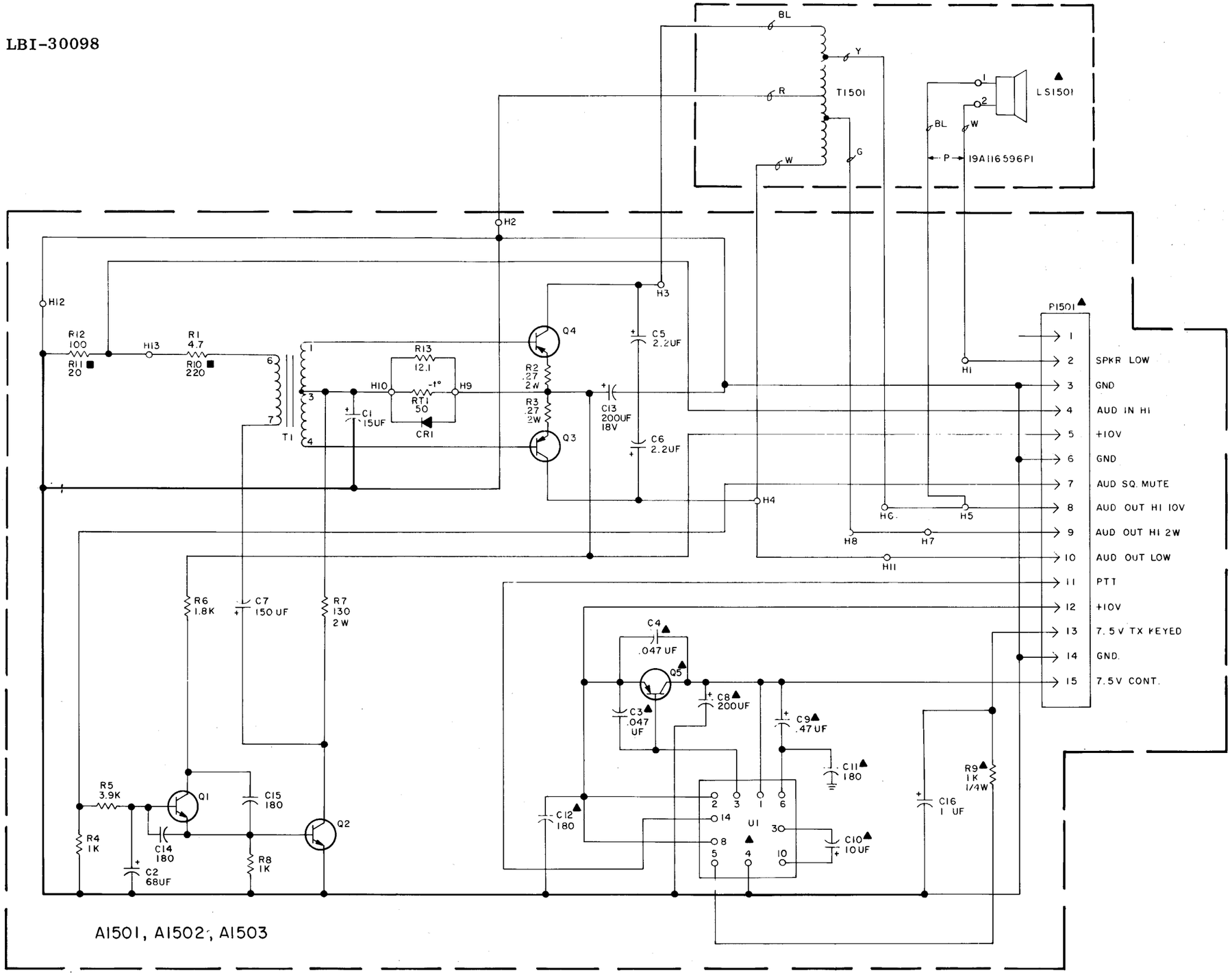
TOP VIEW

NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

OUTLINE DIAGRAM

AUDIO POWER AMPLIFIER

Issue 2



NOTES:

1. COMPONENTS MARKED THUS "▲" ARE USED WITH ALL OTHER COMPONENTS TO MAKE UP GROUPS 1 & 2, BUT ARE ONLY ONES PRESENT IN GROUP 3.
2. ADD JUMPERS BETWEEN HOLES 6 & 13 AND HOLES 11 & 12 IN GROUP 3 ONLY.
3. "■" USED IN GROUP 2 ONLY.

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H= HENRYS.

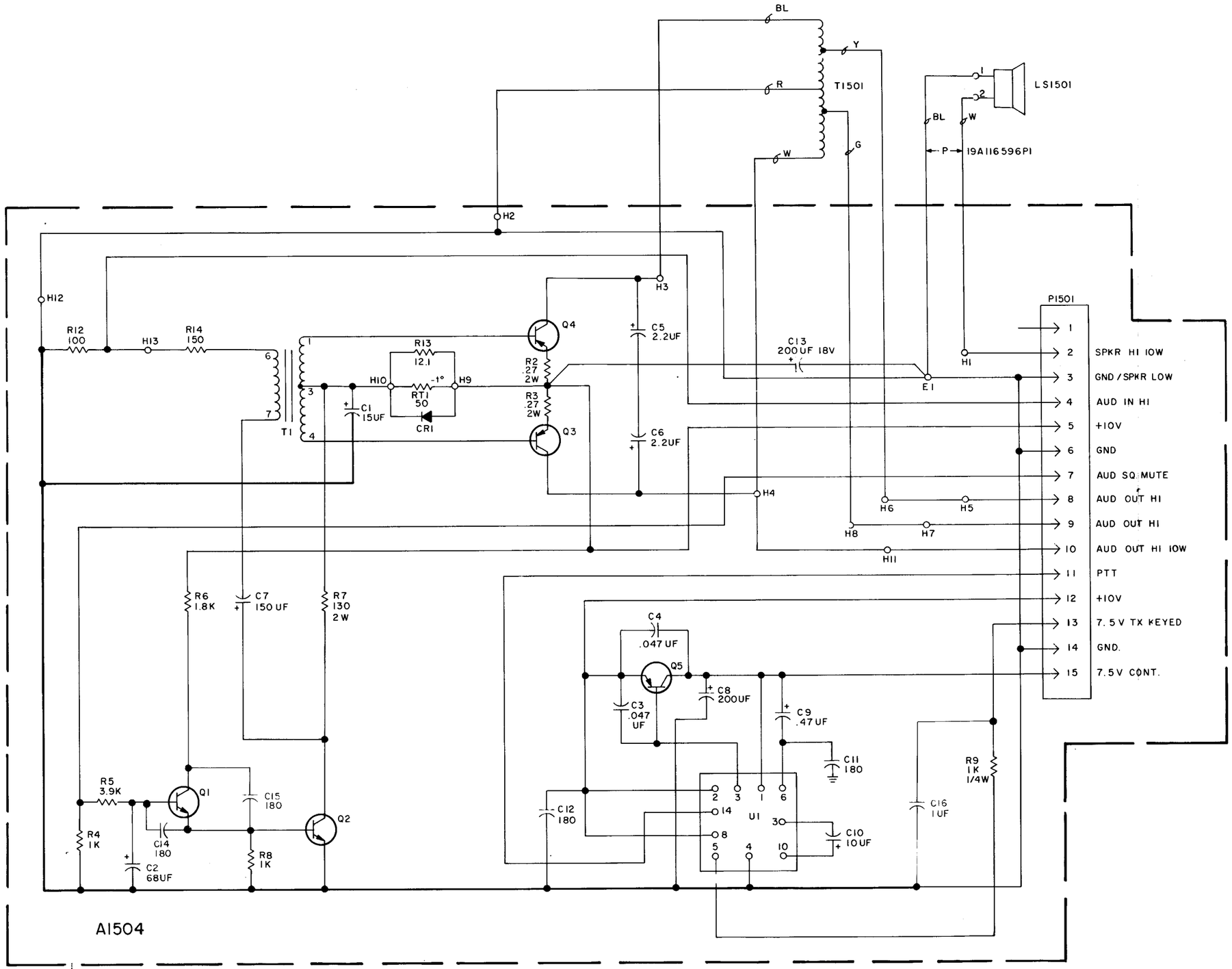
IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

MODEL NO.	REV LETTER
PLI9C321258G1	
PLI9C321258G2	
PLI9C321258G3	
PLI9C321265G1	A
PLI9C321265G2	A
PLI9C321265G3	A

SCHEMATIC DIAGRAM

AUDIO POWER AMPLIFIER
19C321258G1 & G3

(19D423051, Rev. 4)



(19D423656, Rev. 3)

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

MODEL NO.	REV LETTER
PL19C321258G4	
*L19C321265G4	A

SCHEMATIC DIAGRAM

AUDIO POWER AMPLIFIER 19C321258G4

PARTS LIST

LBI-30099A

FRONT COVER
AND
AUDIO AMPLIFIER BOARD
19C321258G1, G3, G4

SYMBOL	GE PART NO.	DESCRIPTION
A1501, A1503, A1504		AUDIO AMPLIFIER BOARD A1501 19C321265G1 A1503 19C321265G3 A1504 19C321265G4
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C2	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C3 and C4	19A116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
C5 and C6	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C7	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C8	19A115680P26	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TTX.
C9	5491674P27	Tantalum: .47 µf ±20%, 35 VDCW; sim to Sprague Type 162D.
C10	5491674P37	Tantalum: 10 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C11 and C12	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM.
C13*	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TTX. Added to G1 by REV A.
C14* and C15*	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM. Added by REV A.
C16*	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D. Added by REV A.
		- - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1	4037822P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q2	19A115300P4	Silicon, NPN.
Q3	19A130324G2	Silicon, PNP. (Includes RT1).
Q4 and Q5	19A116942P1	Silicon, PNP.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	7147161P13	Composition: 4.7 ohms ±5%, 1/2 w.
R2 and R3	19B209022P101	Wirewound: .27 ohm ±10%, 2 w; sim to IRC Type BWH.
R4	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R5	3R77P392J	Composition: 3900 ohms ±5%, 1/2 w.
R6	3R77P182K	Composition: 1800 ohms ±10%, 1/2 w.
R7	3R79P131J	Composition: 130 ohms ±5%, 2 w.
R8	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R9	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w.
R12	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R13	19C314256P31219	Metal film: 12.1 ohms ±1%, 1/2 w.
R14	3R77P151J	Composition: 150 ohms ±5%, 1/2 w.
RT1	5490828P54	- - - - - - - - - - THERMISTORS - - - - - - - - - - Thermistor: 50 ohms ±10%, color code blue; sim to Carborundum Type B0807J-16. (Part of Q3).
T1	19A134159P1	- - - - - - - - - - TRANSFORMERS - - - - - - - - - Audio freq: 300- 4000 Hz, Pri: 5.7 ohms ±15%, Sec: 10.7 ohms max.
U1	19D417627G1	- - - - - - - - INTEGRATED CIRCUITS - - - - - - - - Regulator: 7.5 volt.
E1	7878455P2	- - - - - - - - - - TERMINALS - - - - - - - - - - Terminal, lug.
P1501	19A116659P70	- - - - - - - - - - - - PLUGS - - - - - - - - - - Connector, printed wiring: 15 contacts.
T1501	19A134167P1	- - - - - - - - - - TRANSFORMERS - - - - - - - - - Audio freq: 300- 4000 Hz, 0.33 ohms DC res at 25 ±3°C non-operating.
		FRONT COVER 19C321253G1
LS1501	19B209541P1	- - - - - - - - - - LOUDSPEAKERS - - - - - - - - - - Permanent magnet: 3 x 5 inch, 8 ohms ±10% imp, at 0.5 watt input; sim to Oaktron T-4014.
	19A121175P29	- - - - - - - - - - MISCELLANEOUS - - - - - - - - - - Insulator. (Used with C8).
	4036555P1	Insulator, washer: nylon. (Used with Q2).
	4032574P4	Cover gasket.
	19D417614P1	Grille plate.
	19B226409P1	Spacer.
	NP279872	Nameplate. (GE MONOGRAM).
	19A134343P1	Washer, non metallic.
	19B226372P1	Clip. (Secures LS1501).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - Audio Amplifier Board 19C321265G1

To make compatible for motorcycle application. Added C13, C14, C15 and C16.

REV. A - Audio Amplifier Board 19C321265G3

To make compatible for motorcycle application. Added C16.

REV. A - Audio Amplifier Board 19C321265G4

To make compatible for motorcycle application. Added C14, C15 and C16.

END OF DOCUMENT