

KS-19221 L1 AMPLIFIER

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1. GENERAL

- 1.01 This section describes the KS-19221 L1 amplifier (SD-99725-01).
- 1.02 This section is revised to add capacitor C7 to the circuit schematic.
- 1.03 The KS-19221 L1 amplifier (see Fig. 1) is a plug-in type, transistorized, 2-stage, fixed gain power amplifier designed to provide amplification of audio-frequency signals. This amplifier has a high-impedance unbalanced input and a low-impedance unbalanced output. It is designed to operate into an impedance of 25 ohms and is normally coupled to the load through an external transformer. The amplifier requires 48 volts dc power for operation and is intended to operate from a central office talk battery.

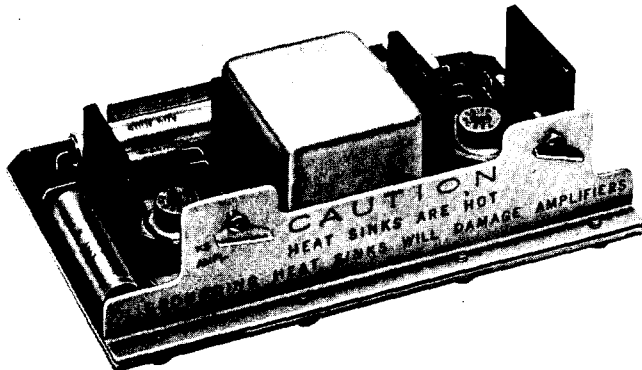


Fig. 1—KS-19221 L1 Amplifier

- 1.04 Some typical applications of the KS-19221 L1 amplifier are:
- (a) As an output section of the KS-19219 L1 amplifier
 - (b) As an output amplifier in the 400A tone generator
 - (c) As a high-level channel amplifier in the KS-19061 L1 amplifier
 - (d) As an output amplifier in the KS-19739 L1 amplifier.

2. ELECTRICAL CHARACTERISTICS

- 2.01 The typical electrical characteristics of the KS-19221 L1 amplifier are as follows:
- (a) **Power Requirements:** 48 volts dc, 55 ma at standby; 235 ma for 4 watts output. Either positive or negative side of the battery may be grounded.
 - (b) **Input Circuit:** Unbalanced, approximately 50,000 ohms. (When positive side of battery is grounded, low side of input circuit is at -48 volts dc).
 - (c) **Output Circuit:** Unbalanced, designed to operate into load impedance of 25 ohms; internal output impedance approximately 6 ohms. (When positive side of battery is grounded, low side of output circuit is at -48 volts dc).
 - (d) **Gain:** Approximately 1.25 volts in for 4 watts out into rated load at 1000 Hz.
 - (e) **Frequency Response:** At 150 Hz, response should be within 0 to -2 dB of 1000 Hz value. At 5000 Hz, response should be within ± 1.0 dB of 1000 Hz value.
 - (f) **Output Power:** Four watts into rated resistive load with less than 5 percent harmonic distortion from 200 to 5000 Hz.

- (g) **Output Noise:** Approximately 70 dB below full output.

3. EQUIPMENT DESCRIPTION

3.01 The KS-19321 L1 amplifier assembly (see Fig. 1) is a plug-in unit consisting of circuit components mounted on a printed wiring board, a connector plug, and a faceplate. The amplifier circuits are terminated in a multipin connector plug (KS-16345 L1). This enables the amplifier to be plugged into the various amplifier assemblies equipped with a mating connector jack (KS-16345 L2).

3.02 A metal faceplate is attached to the printed wiring board. This faceplate also serves as a mounting bracket and is equipped with two hand-operated pin latches which are designed to lock into an assembly bracket and hold the amplifier in place.

3.03 The unit is approximately 5-3/4 inches wide, 3-3/4 inches deep, and 1-1/2 inches high.

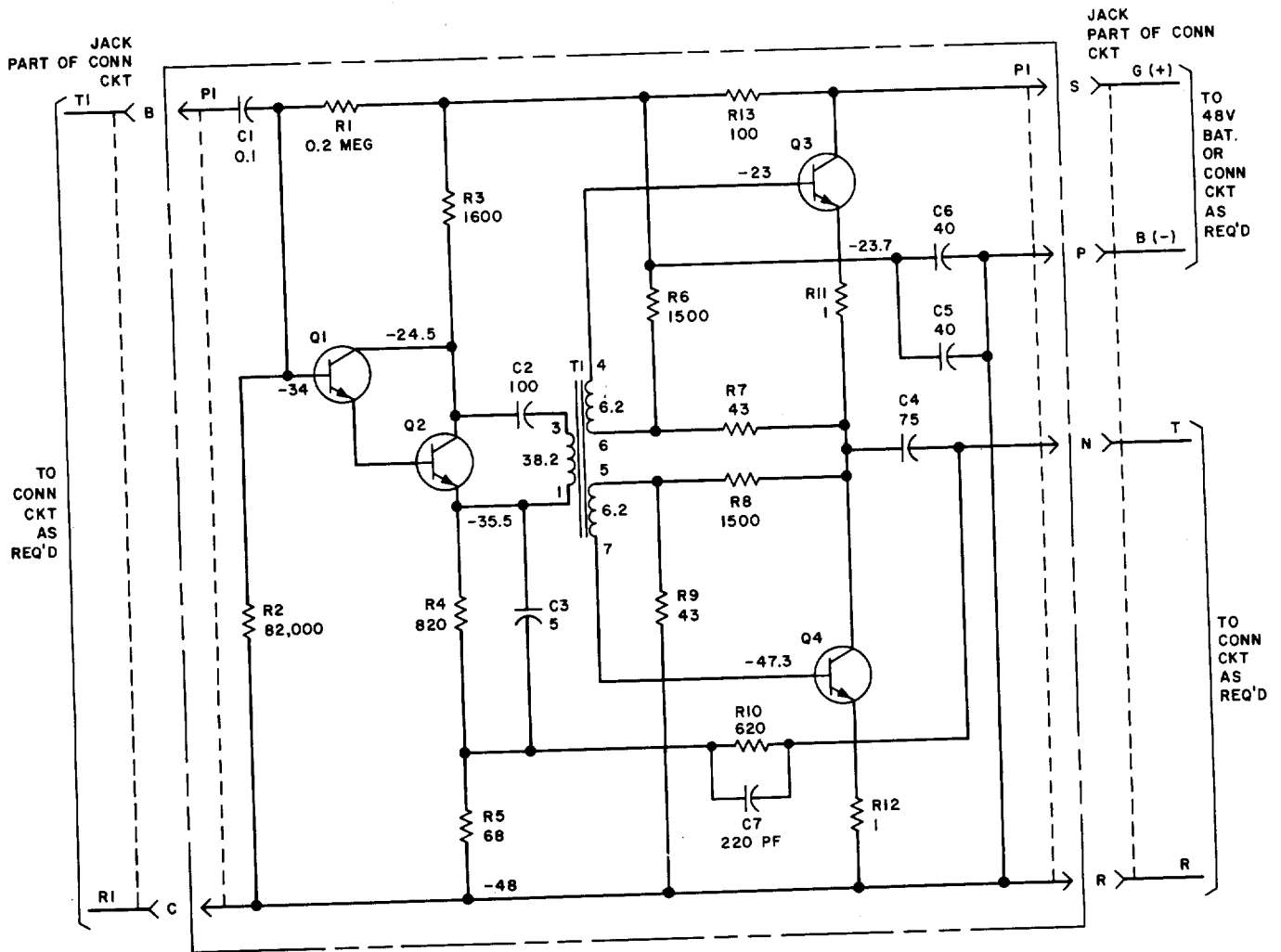
4. FUNCTIONAL DESCRIPTION

4.01 Figure 2 is a circuit schematic of the KS-19221 L1 amplifier. This amplifier is a 2-stage power amplifier with a push-pull class B output stage. The first stage uses two transistors, Q1

and Q2, in a Darlington configuration in order to obtain high input impedance and sufficient gain with two stages. The two amplifier stages are coupled through the driver transformer T1, which provides the correct impedance match and phase inversion for the push-pull output stage Q3 and Q4. Q3 and Q4 are selected transistors with specific beta characteristics.

4.02 Resistors R6, R7, R8, and R9 provide a small amount of forward bias to the output transistors in order to minimize crossover distortion. Resistors R11 and R12 provide a small amount of degeneration in the emitter circuits of the output transistors to improve the balance. The output coupling capacitors C4 and C5 provide dc isolation for the output circuit. Overall feedback is obtained through resistors R5 and R10 and capacitor C7.

4.03 When this amplifier is operated from a central office battery with positive ground, the low side of both the input and output circuit will be at -48 volts dc. Under this condition, the input of the amplifier must be operated from a source at the same potential or an external input transformer must be provided. The output should be connected through an external output transformer. A 2608A transformer has been designed for use with the amplifier to couple it to a 1-, 4-, or 600-ohm load.



NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY + (PLUS) OR - (MINUS) ARE IN VOLTS.

2. THE VOLTAGES SHOWN REPRESENT TYPICAL DC VALUES FOR A QUIESCENT CONDITION WITH AVERAGE TRANSISTORS AND NOMINAL SUPPLY VOLTAGE. THE VOLTAGES ARE MEASURED FROM POINTS SHOWN TO TERMINAL S USING A VOLTMETER HAVING A RESISTANCE OF 10 MEGOHMS (MINIMUM).

Fig. 2—KS-19221 L1 Amplifier—Circuit Schematic