AMPLIFIER KS-19219 L1

TRANSMISSION TESTS

1. GENERAL

1.01 This section outlines the transmission tests to be performed on the KS-19219 L1 Amplifier. This amplifier is used in the recorder-reproducer type announcement systems.

1.02 This section is reissued to change a resistor value in Part 2 and to change test requirements in Part 3.

1.03 The transmission tests outlined in this section should be performed on the service order. Routine or scheduled transmission tests are not required on the amplifier. However, when the announcement system in which the amplifier is used is tested, the amplifier performance should also be checked by measuring the audio output power and frequency response in accordance with the procedure outlined in this section.

1.04 For these tests, the input and output external connections to the amplifier should be removed. The power connections should remain on terminal board TB1 and the supply voltage should be 48 volts dc, ±2 volts.

2. RECOMMENDED TEST EQUIPMENT

2.01 The following testing equipment is satisfactory for use in making these amplifier tests. If equipment is available which is electrically equivalent to an item in this list, it will be satisfactory for use.

TMS — 21A or equivalent

Oscilloscope — Dumont 304 or equivalent

Attenuator — 5A

VTVM — HP 400D or equivalent

Volt-Ohm-Milliammeter — KS-14510 or equivalent

Repeating Coil — 111C or equivalent

Resistor — 4 ohm, ±1%, 10 watt

Resistor — 600 ohm, W. E. 145A or equivalent

Resistor — 100 ohm, W. E. 145A or equivalent

Resistor — 5,600 ohm, ±10%, 1/2 watt carbon

Resistor — 39,000 ohm, ±10%, 1/2 watt carbon

Capacitors (2) — 430 mmf, disc ceramic

Inductor — W. E. 1595A, .120 hy

Appropriate test cords and clips

2.02 The test equipment should be checked and calibrated in accordance with appropriate practices before starting tests. The sets should be allowed ample time to warm up and stabilize.

3. AMPLIFIER TESTS

3.01 The setups of the test equipment for testing the amplifier are shown in Fig. 1, 2, and 3. For these tests, potentiometers R1 and R6 on the amplifier and R109 on the voice-operated relay should be in the maximum counterclockwise (ccw) position and capacitor C3 shorted except as noted in the tests.

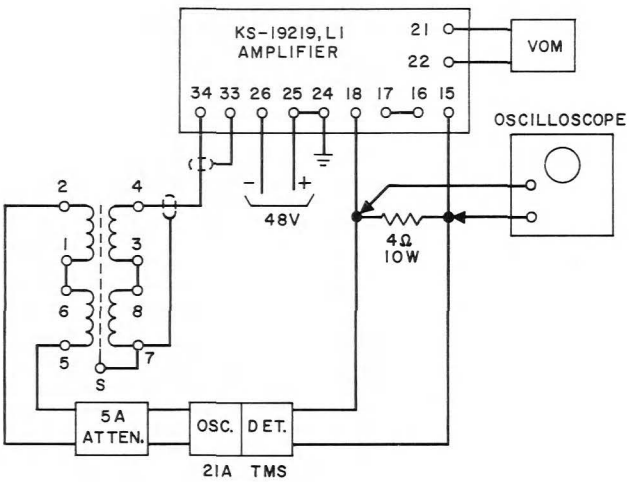


Fig. 1 — Tests of Reproduce Channel

3.02 ***Tests of Reproduce Channel:*** Connect the amplifier as shown in Fig. 1 and proceed with the following instructions:

(1) Test equipment shall be stabilized and calibrated as specified in associated practices.

(2) Rotate the gain control R6 on the preamplifier to its maximum cw position.

(3) Adjust the oscillator and attenuator to provide an ***indicated*** output of +8 dbm at 1000 cps as indicated by the detector.

(4) Determine the input to the amplifier from the oscillator output, attenuator setting, and coil loss. (Example: −40 dbm −25 db −0.8 db = −65.8 dbm)

→ ***Requirement:*** Specified amplifier output of +8 → dbm at 1000 cps shall be obtained with an input of −62 dbm to −70 dbm.

(5) Adjust the gain control at R6 to provide an ***indicated*** output of +8 dbm with an input of −60 dbm at 1000 cps.

(6) Adjust the input to −60 dbm at 200 cps. Measure the output.

Requirement: Indicated output shall be within +6 dbm to +8 dbm.

(7) Adjust the input to −60 dbm at 5000 cps. Measure the output.

Requirement: Indicated output shall be within +6 dbm to +8 dbm.

(8) With the input signal disconnected from 33 and 34 and a 600-ohm resistor connected across 33 and 34, measure the ***indicated*** noise output with the 21A detector.

Requirement: Indicated noise output shall be lower than −35 dbm.

(9) With the amplifier adjusted as in step (5) and the 600-ohm resistor removed and coil reconnected at 33 and 34, temporarily disconnect the short circuit across capacitor C3 on the rear of the amplifier. Measure the apparent gain again at 200 cps, 1000 cps, and 5000 cps.

Requirement: Gain shall not vary from the previous tests by more than the following:

200 cps	+5.5 ±1.5 db
1000 cps	+0.9 ±0.3 db
5000 cps	−0.1 ±0.1 db

(10) With the amplifier adjusted as in step (5), adjust the input at 1000 cps to provide an ***indicated*** output of +11 dbm. Temporarily → disconnect the 4-ohm output resistor and measure the increase in ***indicated*** output. Repeat the test with an oscilloscope connected across the output.

Requirement: Increase in ***indicated*** output shall → not exceed 3.2 db. A clean sine wave shall be displayed on the oscilloscope under both conditions with no sign of instability when the load resistor is disconnected.

(11) With the amplifier adjusted as in step (5), rotate potentiometer R109 on the relay card cw until relay K101 just operates as indicated by a short circuit between terminals 21 and 22.

(12) Increase the oscillator output 2 db (−58 dbm). Now reduce the amplifier output by increasing the setting of the 5A attenuator 9 db. Measure the release time of K101 with release control R113 in both its maximum and minimum positions. Any second indicating watch may be used.

Requirements: Release times shall be within the following limits:

Minimum — 8 ±3 seconds

→ Maximum — 15 to 50 seconds

3.03 ***Tests of the Record Channel:*** Connect the amplifier as shown in Fig. 2 and proceed with the following instructions:

(1) Straps between terminals 37 and 25 and 38 and 26 are placed to operate relay K1. Remove the oscillator and voice-operated relay card from its socket.

(2) Set the gain control R3 at its maximum cw position. Adjust the input to the amplifier until the ***indicated*** output is +8 dbm at 1000 cps.

(3) Measure the input level.

Requirement: The input level shall be −27 dbm ±2 db.

(4) Measure the gain at 200 cps and 5000 cps with the same input level as in step (3).

Requirement: The gain at both frequencies shall not vary from the 1000 cps value by more than 0 to −2 db.

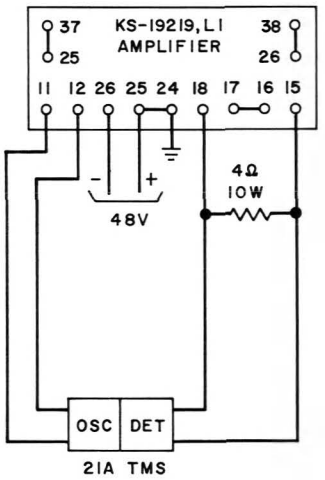


Fig. 2 — Tests of Record Channel

3.04 ***Tests of the Bias and Erase Oscillator:*** Replace the oscillator and voice-operated relay, connect the amplifier as shown in Fig. 3, and proceed with the following instructions:

(1) Adjust the oscillator near 20 kc until the pattern on the oscilloscope reduces to a single circle. At this point the oscillator of the 21A TMS is at the same frequency as the amplifier oscillator.

Requirement: Oscillator frequency should be 20 kc ±2 kc.

Note: If the frequency is above 20 kc, adjust the 21A TMS near 10 kc for a 2:1 lissajou figure on the oscilloscope.

(2) Disconnect the oscilloscope and 21A oscillator. ←

(3) Connect a 600-ohm resistor across terminals 11 and 12. Connect the TMS detector across this resistor.

(4) Measure the output of the oscillator.

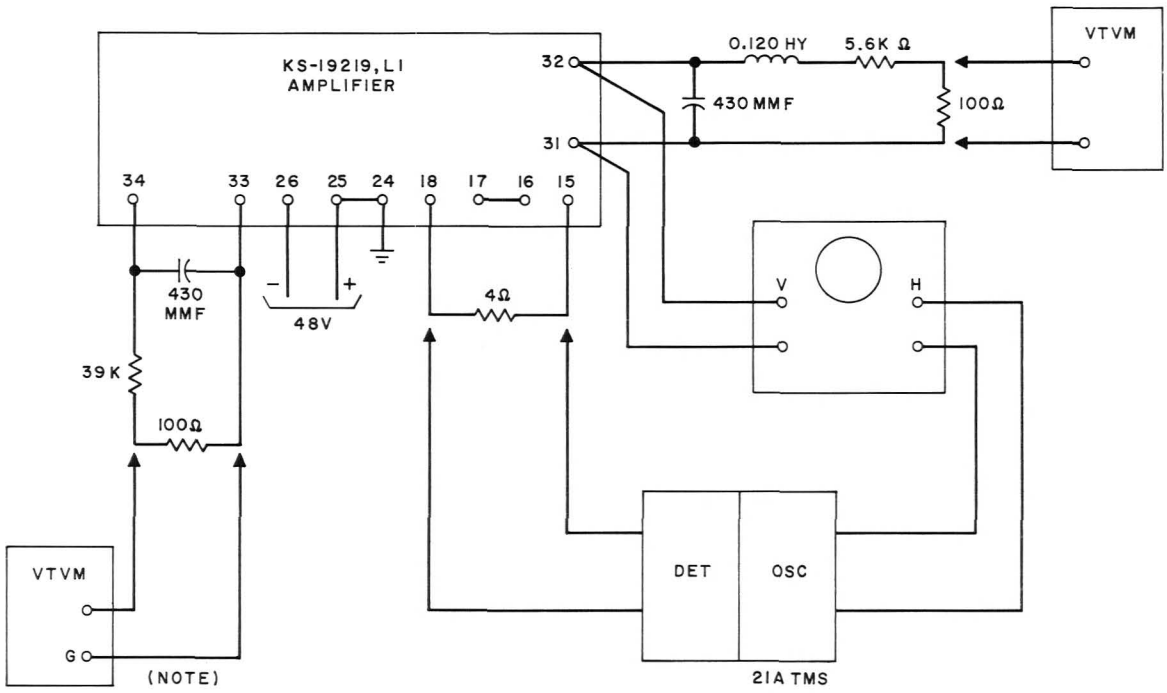
Requirement: The ***indicated*** output as measured across the 4-ohm load resistor shall not exceed −24 dbm.

(5) Connect a VTVM equipped with 100-ohm shunt resistor to the circuit applied to terminals 34 and 33 as shown in Fig. 3. Measure the output voltage.

Requirement: Voltage shall be between 0.045 and 0.075 volts.

(6) Connect a VTVM equipped with 100-ohm shunt resistor to the circuit applied to terminals 32 and 31 (Gnd) as shown in Fig. 3. Measure the output voltage.

Requirement: Voltage shall be between 0.8 and 1.2 volts.



NOTE:

THIS IS A −48V POINT BLOCK BATTERY WITH A 4MF CAPACITOR.

Fig. 3 — Tests of Oscillator