KS-19601, LIST 1 AMPLIFIER
TRANSMISSION TESTS

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1. GENERAL

1.01 This section provides test procedures for checking the performance of the KS-19601, List 1 amplifier. This amplifier is designed for use in central offices to provide 2-way communication between the local test desk or cable test desk and the main distribution frame.

1.02 The transmission tests provided in this section should be performed at the direction of a service order or in case trouble is experienced. Routine or scheduled transmission tests should not normally be required since this amplifier is expected to have long life as well as stable operation.

1.03 It is the intent of the tests described in this section to determine whether the amplifier is performing satisfactorily. If trouble is indicated, the plug-in amplifier unit should be replaced. If this clears the trouble, the removed amplifier should be returned to a repair center. If replacing the plug-in amplifier unit or units does not clear the trouble, the entire amplifier should be returned to the repair center.

1.04 The amplifier should be removed from service before performing this test. The external input and output connections to the amplifier should be disconnected, or opened, at the most convenient point.

Note: Unless absolutely necessary, wire-wrap terminations should ***not*** be disturbed. The power connections should be retained. The supply voltage should be 48 ±2 volts.

2. RECOMMENDED TEST EQUIPMENT

2.01 The following test equipment and apparatus, or equivalent, is satisfactory for use in making the tests.

200CD Hewlett-Packard Oscillator

201C Hewlett-Packard Oscillator

J94021A Transmission Measuring Set (21A TMS)

Ballantine Model 300 Voltmeter

KS-14510 Volt-Ohm-Milliammeter (20k ohms/volt)

RCA Voltohmyst, Model Junior or Senior

304H Dumont Oscilloscope

400-Type Hewlett-Packard Vacuum Tube Voltmeter (VTVM)

5A Attenuator

111A or 119A Repeating Coil

Resistors, Patch Cords, and Clips, as required

2.02 All ac-operated test equipment should be allowed to warm up and stabilize before beginning the tests. This is important since it has a bearing on the accuracy of the tests. All test equipment should be calibrated before beginning these tests.

3. HIGH-LEVEL CHANNEL

A. Gain-Frequency Test

3.01 The test setup for measuring the high-level channel is shown in Fig. 1. Chart I gives the step procedure to be followed when making the test. The oscillator output in Step 6 of the procedure is measured to ensure that the amplifier will deliver the proper output with the minimum input voltage requirement. The procedure may vary slightly, depending on the testing equipment used.

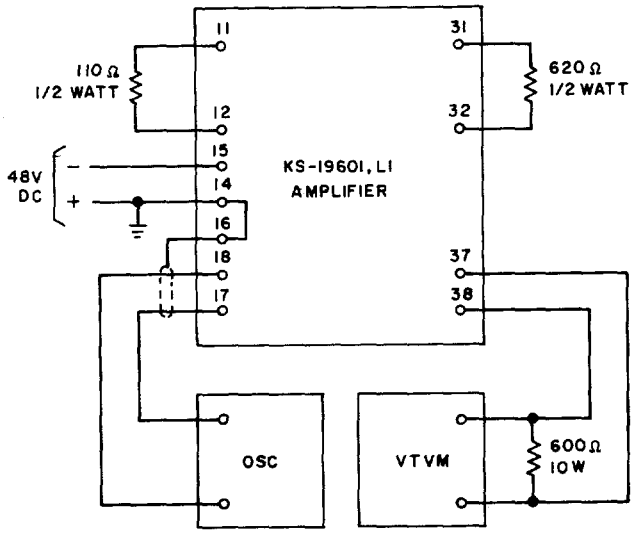

Fig. 1 — Test Setup for High-Level Channel Gain-Frequency Test

CHART I

HIGH-LEVEL CHANNEL — GAIN-FREQUENCY TEST

STEP	PROCEDURE
1	Connect VTVM and oscillator to ac power.
2	Connect test circuit as shown in Fig. 1.
3	Set oscillator to 1 kc.
4	Turn HIGH-LEVEL GAIN control of amplifier to maximum.
5	Adjust oscillator output level until VTVM reads +30 dbm (24.5 v).
6	With oscillator setting the same as in Step 5, patch oscillator to VTVM still shunted by 600-ohm resistor and read meter indication. ***Requirement:*** −19 dbm ±3 db.
7	Reconnect circuit as shown in Fig. 1. Do not change oscillator output setting.
8	Adjust oscillator for 100 and 5000 kc and record VTVM reading. ***Requirement:*** +30 dbm ±2 db (24.5 v).

B. Noise Test

3.02 The noise test on the high-level channel should be made in accordance with the test setup shown in Fig. 2. The unweighted noise requirements specified in this section are based on the use of a detector (21A TMS) or a VTVM. Chart II outlines the step procedure for making the noise test.

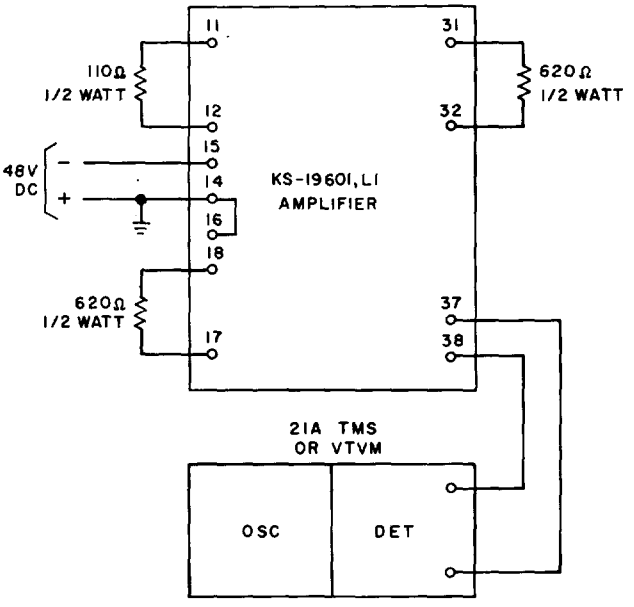

Fig. 2 — Test Setup for Measuring Noise of High-Level Channel

CHART II

HIGH-LEVEL CHANNEL — NOISE TEST

STEP	PROCEDURE
1	Connect 21A TMS or VTVM to ac power.
2	Connect equipment as shown in Fig. 2.
	Note: If VTVM is used to measure output, the VTVM should be shunted by a 600-ohm, 1/2-watt resistor.
3	Turn the HIGH-LEVEL GAIN control of the amplifier to maximum.
4	Read the 21A TMS or VTVM meter indication.
	Requirement: —40 dbm or quieter.

C. Distortion Test

3.03 The distortion test should be made using the test setup shown in Fig. 3. Chart III gives the step procedure to be followed for the test.

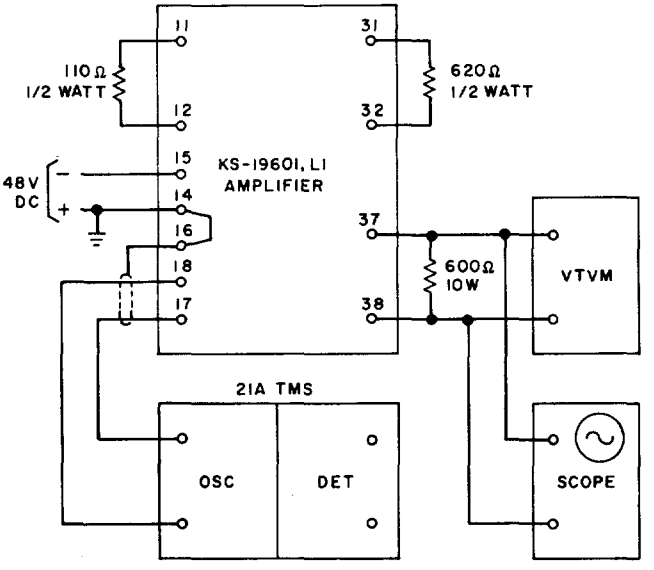

Fig. 3 — Test Setup for Observing Distortion of High-Level Channel

CHART III

HIGH-LEVEL CHANNEL — DISTORTION TEST

STEP	PROCEDURE
1	Connect test equipment to ac power.
2	Connect circuit as shown in Fig. 3.
3	Adjust oscillator for 1 kc.
4	Turn HIGH-LEVEL GAIN control of amplifier to maximum.
5	Adjust oscillator output to obtain an indication of 49 volts on the VTVM.
6	Observe output waveshape on the oscilloscope, then connect the oscilloscope to input and observe input waveshape. ***Requirement:*** The output waveshape shall appear the same as the input waveshape except for amplitude (see Fig. 4).

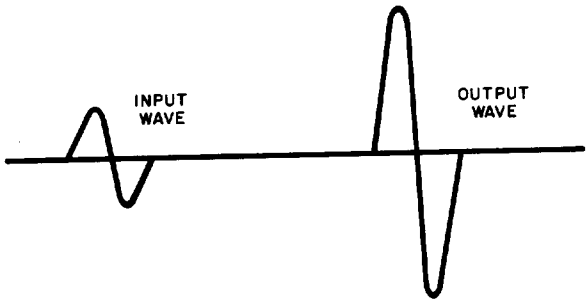

Fig. 4 — Comparison of Input and Output Waveshape (Distortion)

4. LOW-LEVEL CHANNEL

A. Gain-Frequency Test

4.01 The test setup for measuring the low-level channel is shown in Fig. 5. Chart IV gives the step procedure to be followed when making the test. The oscillator level is measured to ensure that the amplifier will deliver the proper output with a specified input voltage. The procedure may vary slightly, depending on the testing equipment used.

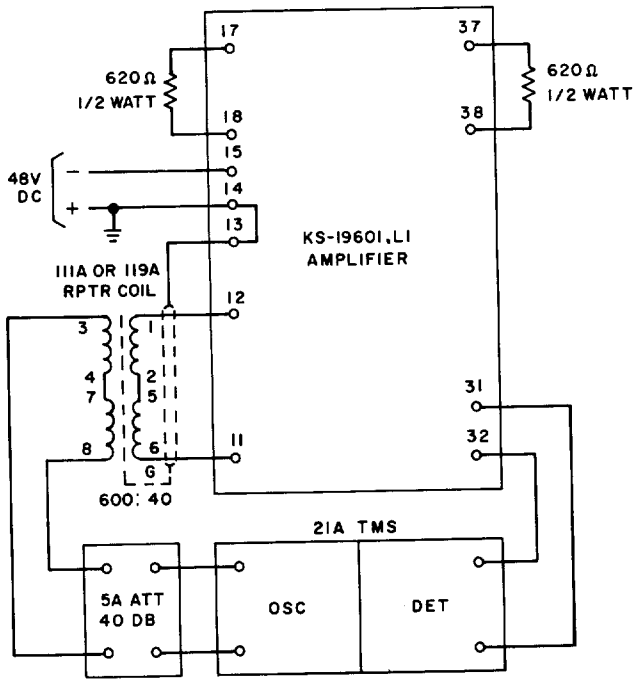

Fig. 5 — Test Setup for Low-Level Channel Gain-Frequency Test

CHART IV

LOW-LEVEL CHANNEL — GAIN-FREQUENCY TEST

STEP	PROCEDURE
1	Connect the 21A TMS to ac power.
2	Connect circuit as shown in Fig. 5.
3	Set oscillator to 1 kc.
4	Turn LOW-LEVEL GAIN control of amplifier to maximum.
5	Insert 40-db loss in 5A attenuator.
6	Adjust oscillator output until the 21A TMS reads −10 dbm.
7	With oscillator setting same as in Step 6, patch OSC OUT jacks to DET IN jacks of 21A TMS. Read the 21A TMS meter indication. ***Requirement:*** −31 dbm ±3 db.
8	Reconnect circuit as shown in Fig. 5. Do not change oscillator output setting.
9	Adjust the oscillator for 300 and 5000 kc. Record the 21A TMS meter indication at each frequency. ***Requirement:*** At 300 kc: −26.0 dbm ±3 db. At 5000 kc: −31.0 dbm ±3 db.

B. Noise Test

4.02 The noise test for the low-level channel should be made in accordance with the test setup shown in Fig. 6. Chart V gives the step procedure to be followed in making this test.

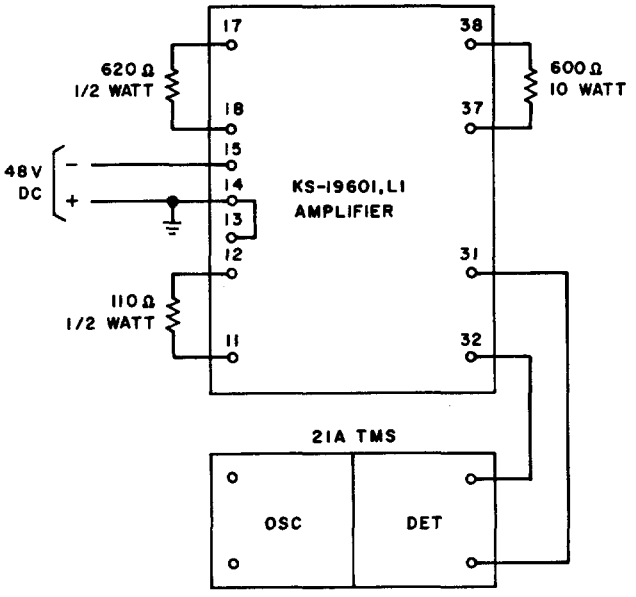

Fig. 6 — Test Setup for Measuring Noise of Low-Level Channel

CHART V

LOW-LEVEL CHANNEL — NOISE TEST

STEP	PROCEDURE
1	Connect the 21A TMS to ac power.
2	Connect circuit as shown in Fig. 6.
	Note: If the VTVM is used to measure output, the VTVM should be shunted by a 600-ohm, 1/2-watt resistor.
3	Turn LOW-LEVEL GAIN control of amplifier to maximum.
4	Read the 21A TMS meter indication.
	Requirement: —30 dbm or quieter.

5. SIDETONE SUPPRESSION CIRCUIT TEST

5.01 The test setup for measuring the sidetone suppression of the amplifier is shown in Fig. 7. Chart VI gives the step procedure to be followed when making this test.

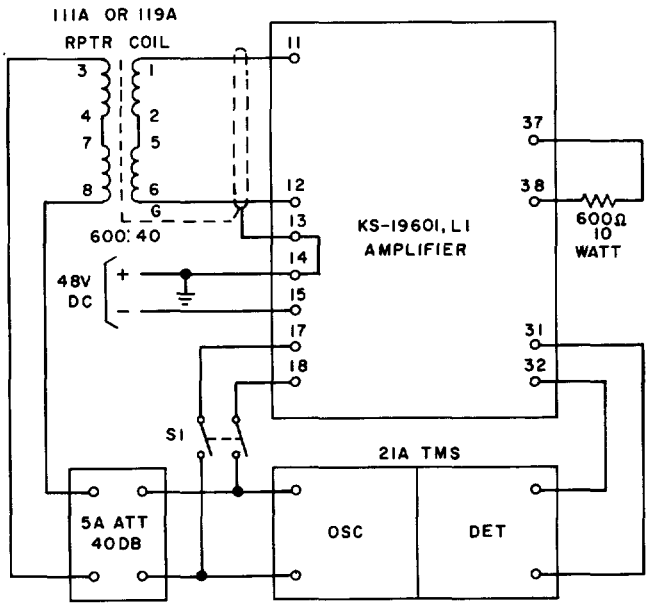

Fig. 7 — Test Setup for Measuring Sidetone Suppression of Low-Level Channel

CHART VI

SIDETONE SUPPRESSION CIRCUIT TEST

STEP	PROCEDURE
1	Connect test equipment to ac power.
2	Connect circuit as shown in Fig. 7.
3	Open switch S1.
4	Adjust the oscillator to 1 kc.
5	Turn HIGH-LEVEL GAIN control of amplifier to maximum.
6	Insert 40 db of attenuation in the 5A attenuator.
7	Adjust the oscillator output to obtain a reading of 0 dbm on the 21A TMS.
8	Patch the oscillator output to the detector input. ***Requirement:*** —14.5 dbm ±3 db.
9	Reconnect circuit as shown in Fig. 7. (Do not change OSC output.) Close switch S1 and read the 21A TMS. ***Requirement:*** —20 dbm ±5 db.