KS-16617, L1 AMPLIFIER — DESCRIPTION

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1. GENERAL

1.01 This practice provides descriptive information on the KS-16617, L1 Amplifier. The amplifier is designed for use in central offices to provide two-way communication between the local test desk or cable test desk and the main distributing frame.

1.02 The schematic circuit drawing for this amplifier is SD-95259-01. The detailed circuit description is in CD-95259-01.

1.03 Fig. 1 shows a photograph of the front view of the amplifier with the cover mat assembled. Fig. 2 shows a photograph of the rear view of the amplifier without the electron tubes. The tubes are not furnished with the amplifier and should be ordered separately.

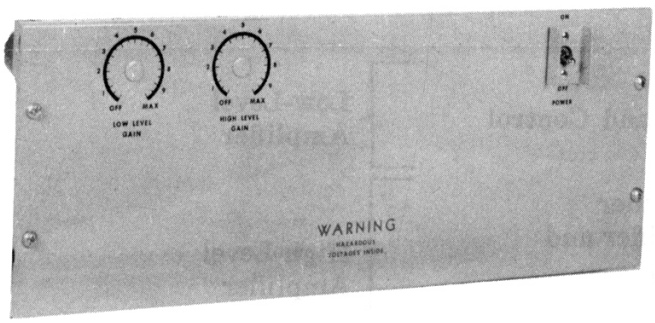

Fig. 1 — Front View With Cover Mat Assembled

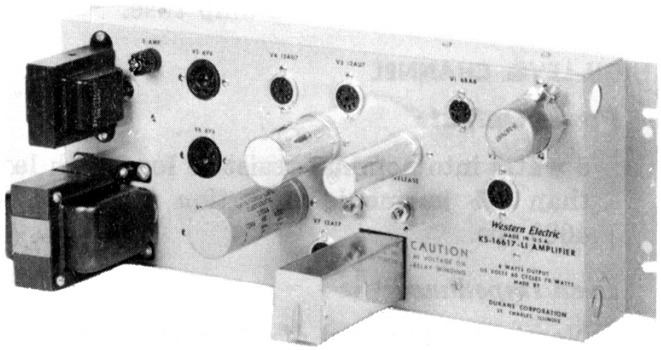

Fig. 2 — Rear View

1.04 The KS-16617, L1 Amplifier provides two independent channels and a voice-operated relay. One channel has an output of 8 watts and is designed for use in the direction of transmission from the local test desk or cable test desk to the main distributing frame where loudspeakers are located. The second channel provides transmission in the opposite direction and contains a low level amplifier.

1.05 The low level amplifier, which obtains its input from microphones located at the distributing frame, is equipped with an automatic output level control. The output of this channel is connected to the test desk man's head receiver.

1.06 The voice operated relay operates when the output of the loudspeaker amplifier (other channel) exceeds a predetermined level. When the relay operates, it inserts a resistor (2400 ohms, 1/2W) in series with the low level amplifier. This reduces the sidetone level in the test desk receiver which would otherwise be excessive. The resistor is included as part of the paging system and may be mounted externally to the amplifier. It should be wired to terminals 6 and 7 of terminal board TB1 of the amplifier.

2. ELECTRICAL CHARACTERISTICS

2.01 The nominal electrical characteristics of the amplifier are as follows:

Power Supply:

110 to 130 volts, 60 cps ac; 70 watts at 115 volts. Fused with 2-amp fuse.

HIGH-LEVEL CHANNEL

Power Output:

8 watts into nominal resistive load with less than 5% harmonic distortion from 100 to 4000 cps.

Load Impedance:

Nominal rated load of 4 and 600 ohms.

Input Circuit:

Unbalanced, 0.25 megohm gain control.

Gain:

Approximately 53 db from 600-ohm source.

Frequency Response:

See Fig. 3.

Output Noise:

−35 dbm maximum (unweighted and maximum gain).

LOW-LEVEL CHANNEL

Power Output:

+6 dbm into 600-ohm resistive load with less than 5% harmonic distortion from 100 to 5000 cps.

Load Impedance:

600 ohms.

Input Circuit:

Transformer, 50-ohm source impedance.

Gain:

Approximately 70 db at output levels below point at which limiting starts (about −3 dbm). At higher input levels the gain is automatically reduced to limit output level. Within limiting range compression ratio is about 5 to 1.

Frequency Response:

See Fig. 3.

Output Noise:

−50 dbm maximum (unweighted and maximum gain).

3. MECHANICAL CHARACTERISTICS

3.01 The mechanical characteristics of the amplifier are as follows:

Mechanical:

Width: 19" (arranged for standard 19" relay rack mounting.)

Height: 6-31/32"

Depth: 7-1/2" (6-3/4" behind mounting flange.)

Weight: 15 pounds

Mounting: Held in place by four No. 12-24 screws.

Finish: Light gray enamel

Electron Tubes:

The electron tube complement (not furnished with amplifier) is as follows:

TUBE DESIGNATION	CODE	FUNCTION	
V1	6BA6	Control Stage	Low-Level Amplifier
V2	12AT7	Second Stage and Control Rectifier	
V3	12AU7	Voltage Amplifier	High-Level Amplifier
V4	12AU7	Voltage Amplifier and Phase Inverter	
V5	6V6	Output) Push	
V6	6V6	Output) Pull	
V7	12AT7	Control, Voice Operated Relay	
V8	5Y3	Rectifier	

4. MOUNTING AND MECHANICAL ARRANGEMENTS

4.01 The amplifier is designed to mount on a standard 19" relay rack. The front cover (cover mat) should be removed so that the unit can be fastened to the rack.

4.02 The front cover is held in place by four screws which fit in clearance holes in the chassis. When the cover is removed, the wiring side of the amplifier is accessible.

4.03 The amplifier should be mounted in the bay so that the apparatus side of the chassis is "in the wiring side" of the bay. This will put the front of the amplifier (wiring side of the unit) in the apparatus side of the bay. The controls will then be readily accessible for adjustment.

4.04 The gain controls and power switch are accessible from the front. The gain controls are stenciled LOW LEVEL GAIN and HIGH LEVEL GAIN and are protected with snap buttons to prevent accidental adjustment. The power switch is also protected by means of a guard to prevent accidental operation.

4.05 The end of the gain control shafts are slotted for screwdriver adjustment. After the levels are properly adjusted the snap buttons should be reinserted in the holes provided for this purpose.

4.06 Two holes 13/16" in diameter are provided on the left side of the chassis and one on the right side. In addition to these, one 7/8" hole is provided on the right side of the chassis. All holes are equipped with spun eyelets.

4.07 The terminal boards for the external connections are located on the wiring side of the chassis. They are designated TB1, TB2 and TB3.

4.08 The amplifier should operate satisfactorily in normal ambient room temperatures. However, if the ambient is above 100°F, trouble may be experienced if the amplifier is operated continuously.

5. EXTERNAL CONNECTIONS

5.01 All external connections should be made in accordance with local wiring codes. The ac power leads should be brought into the amplifier through the lower right-hand entrance hole (viewed from the front). The grounded side of the power should be connected to TB3 in accordance with Table I. The other side (hot side) should be connected to the terminal designated AC-COM of TB3.

TABLE I

TERMINAL DESIGNATION	AC VOLTAGE RANGE
115V-AC	110 to 120
125V-AC	120 to 130

5.02 The external connections to the input terminal board TB1 should be brought in through the entrance holes at the left end of the chassis. The connections to the output terminal board TB2 should be brought into the chassis through the upper right-hand entrance hole. The type of wire to be used is specified on the system drawings.

5.03 Table II gives the input and output connections for the amplifier:

TABLE II

TERM. BOARD	TERM. NO.	EXTERNAL CONNECTION
TB1	1	High-level input — High Side
TB1	2	High-level input — Ground Side
TB1	3 and 4	Low-level input
TB1	5	Low-level output through Voice-Operated Relay
TB1	6	Low-level output — Ground Side
TB1	7	Low-level output — High Side
TB1	8	Ground
TB2	9	Ground
TB2	10 and 12	4-ohm output
TB2	11	Center tap of 4-ohm output
TB2	13 and 14	600-ohm output (70 volts)
TB2	15	Not Used
TB2	16	Not Used

5.04 If it is desirable to use this amplifier in applications other than which it was intended, the input connections to the low-level channel (TB1, terminals 3 and 4) should be made with shielded twisted pair with insulation

over the shield. The output connections to the low-level channel (TB1, terminals 6 and 7) should be either a twisted pair or an insulated coaxial cable with the shield used as the low-side conductor.

5.05 In the same situations, as above, the input to the high-level channel (TB1, terminals 1 and 2) should be a low capacitance coaxial cable such as type RG-58/U. The high-level output should be twisted pair.

5.06 A satisfactory building ground is important so as to minimize noise. The ground wire should be connected to terminal No. 9 of TB2.

6. TRANSMISSION INFORMATION

6.01 Fig. 3 shows the frequency response of the KS-16617, L1 Amplifier. The figure shows the characteristics of both the high-level and low-level channels.

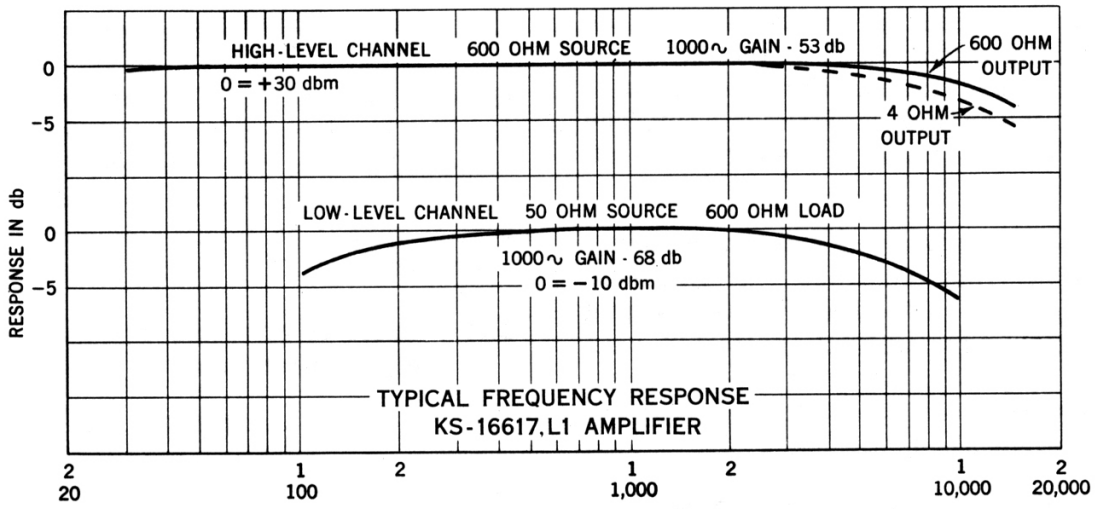

Fig. 3 – Frequency Response

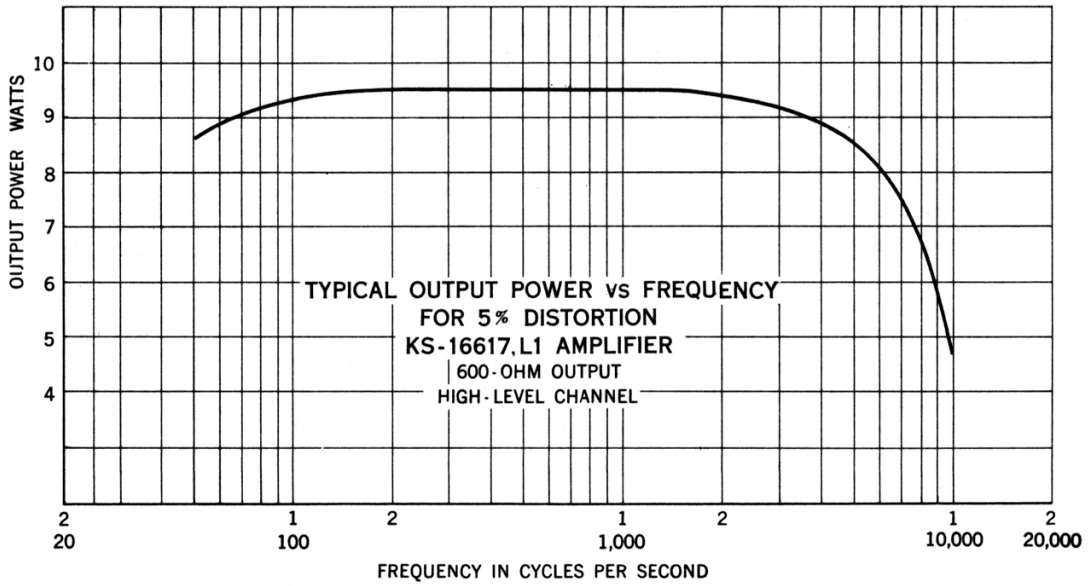

Fig. 4 – High-Level Channel Output — Power vs. Frequency

6.02 Fig. 4 shows the output power versus frequency for the high-level channel with 5% distortion.

6.03 Fig. 5 shows input—output characteristics of the low-level channel. The figure also shows the input versus distortion characteristics of the same channel.

6.04 Fig. 6 shows the harmonic distortion versus output level for the high-level channel.

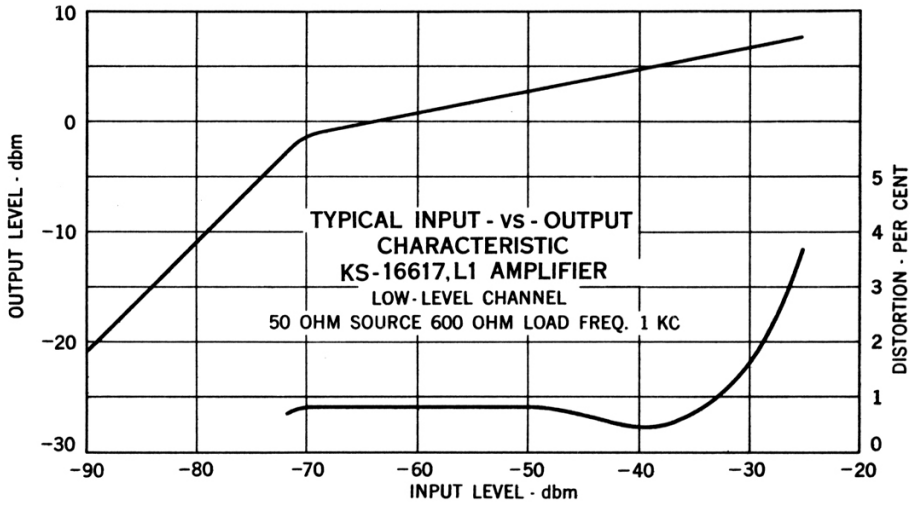

Fig. 5 – Low-Level Channel — Input vs. Output and Distortion

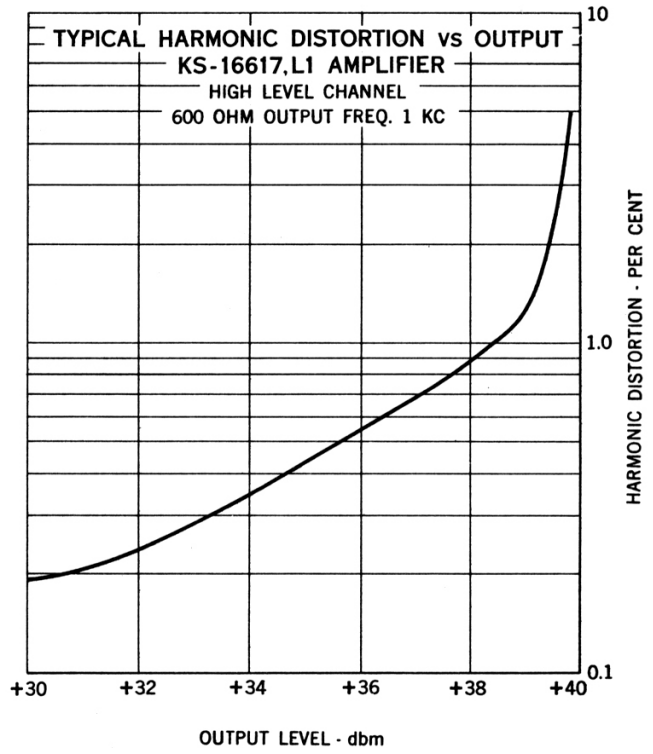

Fig. 6 – High-Level Channel — Output vs. Distortion