

## KS-16754, L1, L2, L3 AND L4 AMPLIFIERS — DESCRIPTION

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### 1. GENERAL

1.01 This section provides descriptive information on the KS-16754, L1, L2, L3 and L4 Amplifiers. These transistorized speech amplifiers are used in such applications as FAA circuits, the KS-16765 Announcement Set, in various coded announcement systems and the No. 12 Service Observing circuits used with the toll volume rating plan. This section is reissued to correct the output terminal numbers.

1.02 These amplifiers are designed to operate from a 24V or 48V dc supply or commercial 120V-60 cycle ac when using the J87202, L1 Rectifier or the KS-16831, L4 Power Supply. The amplifiers have an output of approximately 0.5 watt. The amplifiers include a plug-in, printed circuit-type amplifier (KS-16728, L1) and are arranged for relay rack mounting. They are also equipped with screw and solder-type terminals.

1.03 The List 1 and 2 Amplifiers are rated "MFR DISC" and are replaced by the List 3 and 4 Amplifiers, respectively. The latter amplifiers are the same as the discontinued units except they have a different output transformer which provides one additional impedance.

1.04 The List 1 Amplifier is a compression type amplifier designed for use with the 300-type Switching System for the FAA. The ampli-

fier is also used in the 7A Announcement System and the 100A Telephone Answering System when a 12-ohm output impedance is required. When the amplifier is used for the latter applications the automatic output level control feature should be disabled. This is done by removing the strap normally provided on terminals 18 and 20 on the terminal strip. Normally, the List 4 Amplifier should be used for future applications in these systems. The List 1 or 3 Amplifier may be used in public address systems where it is desirable to compress input levels to power amplifiers. The circuitry used for compression is mounted on a printed wiring board assembly.

1.05 The List 2 or 4 Amplifier is designed for use in the toll volume rating plan, the Group Alerting System, the Emergency Announcement System, etc, where compression is not required.

1.06 The transistor amplifier circuitry of all the amplifiers is included on a printed wiring board assembly and is coded the KS-16728, L1 Amplifier. The printed board plugs into the main chassis by means of a plug and jack arrangement.

1.07 Figs. 1 and 2 show the assembled and unassembled amplifiers. All units appear the same in the mounting case and mount in the same manner. Fig. 2 shows the KS-16728, L1 Amplifier (printed circuit board) and the compression circuit.

1.08 The application schematic, SD-95281-01, provides connecting information as well as the circuit details of the amplifiers. The mounting arrangement is shown on ED-69404-01. These drawings are not attached.

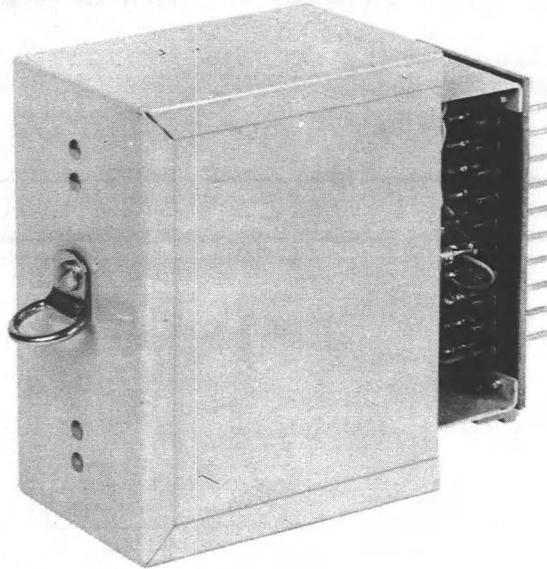


Fig. 1 - View of Amplifier Assembled in Cover

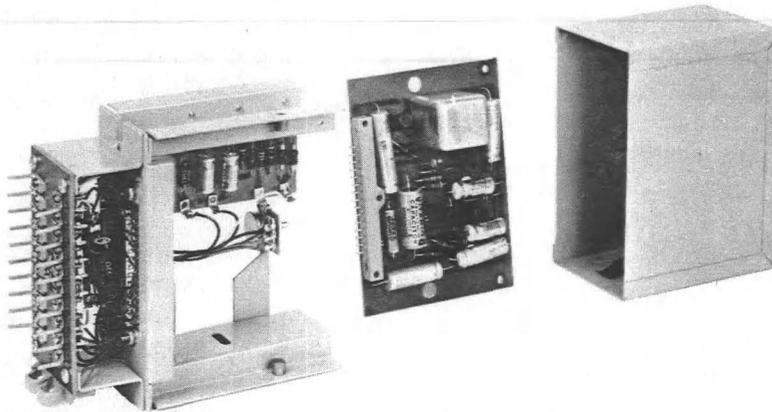


Fig. 2 - View of L1 and L3 Amplifiers with Cover Removed

## 2. ELECTRICAL AND MECHANICAL CHARACTERISTICS

2.01 The typical electrical and mechanical characteristics of the KS-16754, L1, L2, L3 and L4 Amplifiers are outlined below.

### Gain:

66 db between nominal source and load impedances.

### Power Output:

0.5 watt into rated resistive load for maximum of 5% total harmonic distortion (rms).

### Automatic Output Level:

*This feature is provided in the List 1 and List 3 Amplifiers only.* With maximum gain, the automatic output level control (compression) starts at an input level of -42 dbm. A change of 35 db in the input level

changes the output level 3 db (from +20 to +23 dbm). The level at which compression starts can be raised (higher level) by reducing the gain of the amplifier.

**Maximum Permissible Input Level:**

+18 dbm — use external input pad for higher levels to prevent over-loading of input transformer. The List 2 and 4 Amplifiers have an input pad for a 10,000-ohm bridging input. The input level can be +30 dbm for this connection.

**Frequency Response:**

200 to 6000 cycles: Within  $\pm 2$  db of 1000 cps.

**Output Noise:**

Signal-to-noise ratio 62 db minimum; noise level 55 dbrn flat weighting (independent of input gain control setting).

**Input Impedances:**

List 1, 2, 3 and 4 Amplifiers have a nominal source and input impedance of 1.5, 600 and 2400 ohms. The input circuit is normally balanced, but may be operated with one side grounded (terminal 4). The input circuit is not designed to carry dc. The List 2 and 4 Amplifiers have a 10,000-ohm balanced bridging input available with a blocking condenser.

**Output Impedances:**

The nominal load impedances are:

- List 1 Amplifier — 3.2 and 12 ohms
- List 2 Amplifier — 3.2 and 600 ohms
- List 3 and 4 Amplifiers — 3.2, 12 and 600 ohms

The internal impedances are approximately 50 per cent of the nominal load impedances.

**Gain Control:**

Screwdriver-type gain control. Terminals are provided for disabling the control provided with the amplifier so that an external gain control can be used at a remote console.

**Operating Temperature Range:**

0 to 125°F ambient.

**External Connections:**

Screw and solder-type terminals are provided on terminal board TB1 for all external connections.

**Mechanical:**

Width: 2-9/16 inches

Depth: 5-1/4 "

Height: 6-1/2 "

Weight: 2-1/2 Pounds

Finish: Gray Enamel

Mounting: Eight amplifiers can be mounted on 41K451 Mounting Bars in 23" Bay

**3. POWER REQUIREMENTS**

**3.01** The KS-16754 Amplifiers can be powered from local 24V or 48V dc supplies, if desired. They may also be powered from commercial nominal 120V-60 cycle ac power using the J87202, L1 Rectifier or the KS-16831, L4 Power Supply. These power supplies are mounted external to the amplifiers. Fig. 3 shows an assembled view of the J87202, L1 Rectifier and Fig. 4 shows a view of the KS-16831, L4 Power Supply.

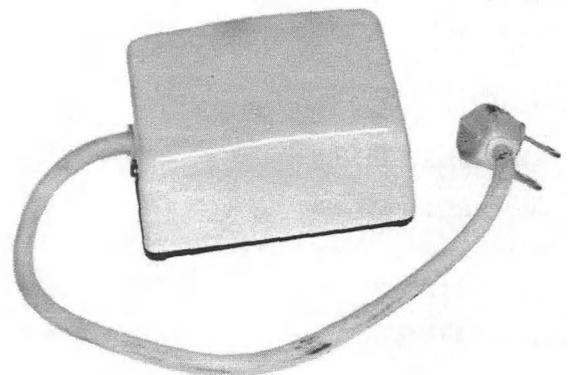
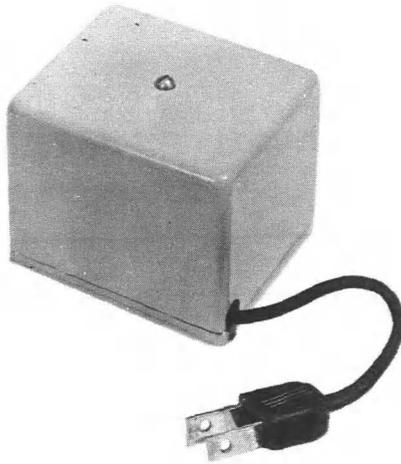


Fig. 3 — J87202, L1 Rectifier



**Fig. 4 – KS-16831, L4 Power Supply**

**3.02** When the amplifiers are mounted in a central office, it is desirable to power the units from 24V or 48V central office talking battery. This will provide the best continuity of service and require no rack space for power supplies.

**3.03** When the amplifiers are mounted at the customer's premises, either of the ac operator power supplies can be used if 24V or 48V dc is not available from another source. The J87202, L1 Rectifier is designed for use with the KS-16754, L1, L2, L3 and L4 Amplifiers. Its characteristics are shown below:

**Input:**

115V, 60 cycles — approximately 5 watts at full load.

**Output:**

12V dc at 75 ma.

30V dc at 45 ma.

Negative is common to voltages.

**Ripple Voltage:**

11V unfiltered — 0.5V or less.

30V — approximately 1.0V or less.

**Size:**

Length: 3-9/16 inches

Width: 2-13/16 "

Height: 1-3/4 "

**Weight:**

Approximately 1 pound.

**Color:**

Beige

**Mounting:**

(a) On wall or baseboard.

(b) In 4-11/16 inch square outlet box.

**Connections:**

AC power connections are made by attached cord 10 inches long or by wiring directly to power line. The metal cover has a slot at each end so ac and dc wiring can be brought out from opposite sides of the cover. A J87202, L2 Cord 6 feet long can be ordered, if required.

**3.04** The KS-16831, L4 Power Supply, while designed for other applications, can be used with the KS-16754 Amplifiers to derive the dc operating voltage. The characteristics of this power supply are shown below:

**Input:**

120V — 60 cycles — Approximately 5 watts.

**Output:**

24V dc at 100 ma.

48V dc at 100 ma.

**Ripple Voltage:**

24V or 48V dc — 0.09 volts or less.

**Size:**

Length: 2-7/8 inches

Width: 2-9/16 "

Height: 2-5/16 "

**Weight:**

Approximately 1-3/4 pounds.

**Color:**

Light gray enamel.

**Mounting:**

On backboard or baseboard.

**Connections:**

AC connections are made by attached power cord 6 inches long. Screw terminals are provided for the dc connections. A metal cover with a slot on each side is provided for the ac and dc connections.

**4. EXTERNAL CONNECTIONS**

4.01 The external connections to the amplifiers are made to the terminal board as indicated below. Connections to the amplifiers may be screwed down or wrapped, whichever is desired.

**Input (all amplifiers):**

IMPEDANCE	TERMINAL NO.
2400 ohms	1 and 4
600 ohms	2 and 4
1.5 ohms	3 and 4

**Output:**

KS-16754 AMPLIFIER	IMPEDANCE (OHMS)	TERMINAL NO.
L1, L2	3.2	17 and 19
→ L3, L4	3.2	17 and 19
L1, L3, L4	12.0	15 and 19
L2	600	15 and 19
→ L3, L4	600	22 and 19

**Strapping Normally Provided:**

AMPLIFIERS	TERMINALS	OPTION
L1 thru L4	5 to 7	V
L1 thru L4	6 to 8	V
L1 and L3	18 to 20	T

**Power (all amplifiers):**

VOLTAGE	TERMINAL NO.
+12V (J87202, L1 Rect.)	16 and 12*
+30V (J87202, L1 Rect.)	9 and 12
+24V	13 and 12
+48V	11 and 12

\*Terminal No. 12 is negative side of power.

**Strapping:**

POWER SUPPLY USED	STRAP ON AMPLIFIER
J87202, L1 Rectifier	None
KS-16831, L4 Power Supply	None
24V dc	10 to 12 and 14 to 16
48V dc	10 to 12 and 14 to 16

**Grounds (all amplifiers):**

TYPE	TERMINAL NO.
Chassis	21
Circuit (neg.)	12

**5. GROUNDING**

5.01 When a grounded power supply is used, either polarity of the 24V or 48V supply may be grounded. When the 12V and 30V supply is used (J87202, L1 Rectifier), the negative side only should be grounded. The amplifier may also be operated from a nongrounded power supply. Terminal 21 of the amplifier should be connected to the grounded side of the power supply or to the negative side of the nongrounded supply.