

INSTRUCTIONS OS-1138A

CONDENSER MICROPHONE
AND
THREE-STAGE AMPLIFIER

RADIO-VICTOR CORPORATION OF AMERICA

NEW YORK CITY, U. S. A.

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The user is cautioned against touching the diagram. IT SHOULD NEVER BE TOUCHED FOR ANY REASON. The screen cover is placed over it for protection.

The microphone may be tested for leakage by applying a potential of 250 volts d-c. with a low reading microammeter and resistor in series. The resistor is to protect the meter in case the microphone is shorted, and should be of a high enough value to keep the needle on scale if the microphone is shorted. Any continuous reflection is not considered satisfactory. There is of course a large deflection when the circuit is first closed, but this is a charging current and should not be confused with a continuous or leakage current.

The leads from the back plate of the microphone to the grid of the Radiotron to which it is connected should be well shielded. The polarizing resistance for the microphone and the grid leak of the first Radiotron should be of material which would insure very quiet operation. Any noise or pickup in this circuit will be amplified in the succeeding stages.

The condenser microphone is very sensitive and should always be protected from the direct rays of the sun. It should not be used at any place where the air temperature exceeds 130 deg. F.

PART II—THREE-STAGE AMPLIFIER, MODEL AA-4088

GENERAL

This unit is especially designed for use with the above condenser microphone. Its input circuit is designed to match the condenser microphone impedance.

The amplifier is contained in a cubical shaped case as shown in photograph 461962. The microphone is plugged into the front of this case.

The amplifier unit consists of the three Radiotrons; a catacomb containing all resistors, condensers, and the output transformer; and terminals for connecting to the cable. This unit is surrounded on all sides with sponge rubber pads and is completely shielded by the case.

RATING

The amplifier as sent out from the factory is connected for use with a 250-ohm load and 0.25 ampere filament supply. With this connection and when used with the 250-ohm load, the amplifier has a voltage amplification of approximately 5.5 or greater. With a sound pressure input to the condenser microphone of 10 dynes per sq. cm. the amplifier should give an output of approximately 0.275 volt at 1000 cycles per second. This represents a power level of approximately 35.2 D.B.

If the connections on the amplifier are changed for 0.5 ampere filament current as explained in section on "Connection," then a voltage amplification of 8 or more should be obtained using the 250-ohm load. With the same input as above, this will give an output of approximately 0.04 volt or approximately 32 D.B.

BATTERY SUPPLY

The following battery supplies are required for the amplifier:

- 180 volts—2 milliamperes.
- 90 volts—3 milliamperes.
- 6 volts—0.25 ampere (or 0.5 ampere if greater amplification is desired).

The "B" batteries should be replaced when their voltage drops 15 per cent. The filament current should not be allowed to drop more than 5 per cent or reduced amplification or distortion may occur.

No "C" battery is required with this amplifier as the bias is obtained from the drop across a resistor in the filament circuit.

CONNECTIONS

The microphone is normally furnished with a cable and plug termination. A wall outlet should be purchased from the R. C. A. for use with this plug. The connections on the wall outlet are numbered from 1 to 7. Following is a list of connections for the different points on the wall outlet and the plug:

1. Not used.
2. -6 volts.
3. 90 volts.
4. 180 volts.
5. Output.
6. Output.
7. 6 and ground, and -B.

The batteries should be connected to the wall outlet in accordance with the above table. If the amplifier is used with a very long cable, or if there is much chance of the voltage of the filament battery dropping, it would be better to use a slightly higher voltage than 6 volts and to use a rheostat in series with the -6 volt lead. A meter should also be connected in this lead and the current kept at 0.25 ampere by means of the rheostat. If this means is used to hold the filament current constant, a very long cable may be used successfully with the amplifier. The two output leads should be connected to the succeeding amplifier which should have an input impedance of 250 ohms to match the output impedance of this microphone amplifier.

RADIOTRONS

This amplifier uses three Radiotrons model UX-864. These are special non-microphonic Radiotrons which have a filament rating of 1.1 volts and 0.25 amperes. The amplifier should be used only with these Radiotrons.

OPERATION

In general, the amplifier will operate satisfactorily and require very little attention. It should give the normal output listed under "Rating." Following is a list of the different cur-

currents drawn from the battery supply:

180 volts—1.5 to 2.5 milliamperes.

90 volts—1.8 to 3 milliamperes.

6 volts—0.25 to 0.5 ampere, depending on connection.

The above are average values and amplifiers should not depart very much from them. The amplifier may be operated with either 0.25 amperes or 0.5 amperes filament current. As sent out from the factory, they are connected for 0.25 ampere filament current. If it is desired to change them for 0.5 ampere filament operation, all that is necessary is to remove the connections from between point 2 and point 3, and connect two straps, one between 1 and 2, and the other between 3 and 4. Refer to the wiring diagram for location of these parts. The amplifier gives greater amplification when the 0.5 ampere connection is used.

In case several of these amplifiers are connected in parallel to the same set of batteries, special precautions may be necessary in order to prevent howling or other feed-back troubles. It may even be necessary to use filters in the battery supply in order to prevent this. The same thing applies to the use of common batteries for the condenser microphone amplifier and the amplifier which follows it.

It is possible to use the condenser microphone amplifier with motor generator supply but this requires very special attention and current must be well filtered. The use of a motor generator is not recommended, although it may be used if enough filters are used.

In case of trouble the Radiotrons should first be tested. If new spare Radiotrons are on hand, the easiest way to test the Radiotrons is to put in new Radiotrons in the place of the ones which are doubtful. If the trouble is not in the Radiotrons, then all batteries should be checked and all connections on the batteries also. If these test satisfactory, then the back should be removed from the amplifier case and the voltages measured right on the terminals of the amplifier itself. Refer to the wiring diagram when making these measurements. If the voltages do not reach these terminals, then the trouble is either in the connection to the wall outlet receptacle or in the cable. If the cable is defective, a new one may be procured from the R.C.A. In case the voltages at the terminals of the amplifier are correct, however, and the Radiotrons are normal, then the amplifier unit itself must be defective. It is not recommended that the customer attempt to repair this unit as most of it is sealed in wax. It is rather recommended that the customer return the amplifier unit to the R.C.A. for repair. This may be done by writing to the R.C.A. for a "RETURNED APPARATUS" tag. Before doing this, however, the customer should make absolutely certain that the trouble is in the amplifier. In making this test, fresh batteries should be used and no other amplifier should be connected to this set of batteries. The Radiotrons should be known to be good. Also the customer should be certain that the trouble is not in the condenser microphone itself. This can be determined by installing a microphone which is known to be good, or by removing the microphone entirely and shielding the spring which makes contact with the back plate of the microphone. This spring is connected to the grid circuit of the first Radiotron and is very sensitive to electric fields and other impulses. To prevent it from picking up extraneous noises, a metal cup or other shield should be placed around it. With this grid lead well shielded, the microphone amplifier should operate silently. If the unit was noisy before and operates quietly with the microphone out, then this demonstrates that the microphone was noisy and this alone should be returned. However, if the trouble was no output or less than normal output, then the way to check the amplifier is to use a good microphone in it. If this is

not possible due to not having an extra microphone, then the voltage amplification of the amplifier may be measured. If the amplifier gives an amplification of less than 5, then the amplification is not normal and the unit should be returned for repairs. It is always well, however, to have a spare condenser microphone available for test purposes and for use in case the other one becomes inoperative. Sometimes trouble results from poor contact to the Radiotron prongs due to dirt or corrosion on the socket contacts or on the Radiotron prongs. These should be cleaned occasionally. When checking the amplifier for trouble, it is always well to measure the different battery currents in order to be certain that there is no high resistance connection in any of the battery circuits or in the Radiotron connections to the socket.

In using the amplifier, always be certain that the case is connected to the ground connection on the cable, as the ground connection for the condenser microphone is obtained through the case, and if this is not grounded, the unit will probably howl.

Low output may be due to Radiotrons which have limited emission after long use. These should of course be replaced.

The unit should always be operated with the back of the case on in order to shield the unit both electrically and acoustically.

MOUNTING

The amplifier may be mounted in several ways. The most common mounting is the concert or floor stand. This stand is adjustable as to height. The center of the condenser microphone may be located at any height from 50 in. to 75 in. above the floor. In order to operate the stand, the thumb screw should first be unscrewed. If it is desired to raise the microphone, all that is necessary is to lift it to the desired point and there it will lock itself automatically. Usually, it will remain fixed at this position unless there is vibration or the amplifier and stand are moved around. This moving may cause the stand to slowly slide downward. The thumb screw is provided in order to prevent this. However, if the microphone does not tend to creep, then it is not necessary to use this thumb screw. When it is desired to lower the microphone stand, the thumb screw should first be unscrewed, then the inner tube of the microphone stand should be raised slightly while pressing the small button which projects at the side of the locking device. This will release the lock and allow the microphone amplifier to be lowered to the desired position, at which point the button should be released and the stand will automatically lock itself. Then the locking nut may be tightened if desired.

If it is desired to use the amplifier for announce purposes, an announce stand may be purchased from R.C.A. This is a short stand for use on a table and brings the center of the condenser microphone to a height of approximately 11-1/2 in. above the table top.

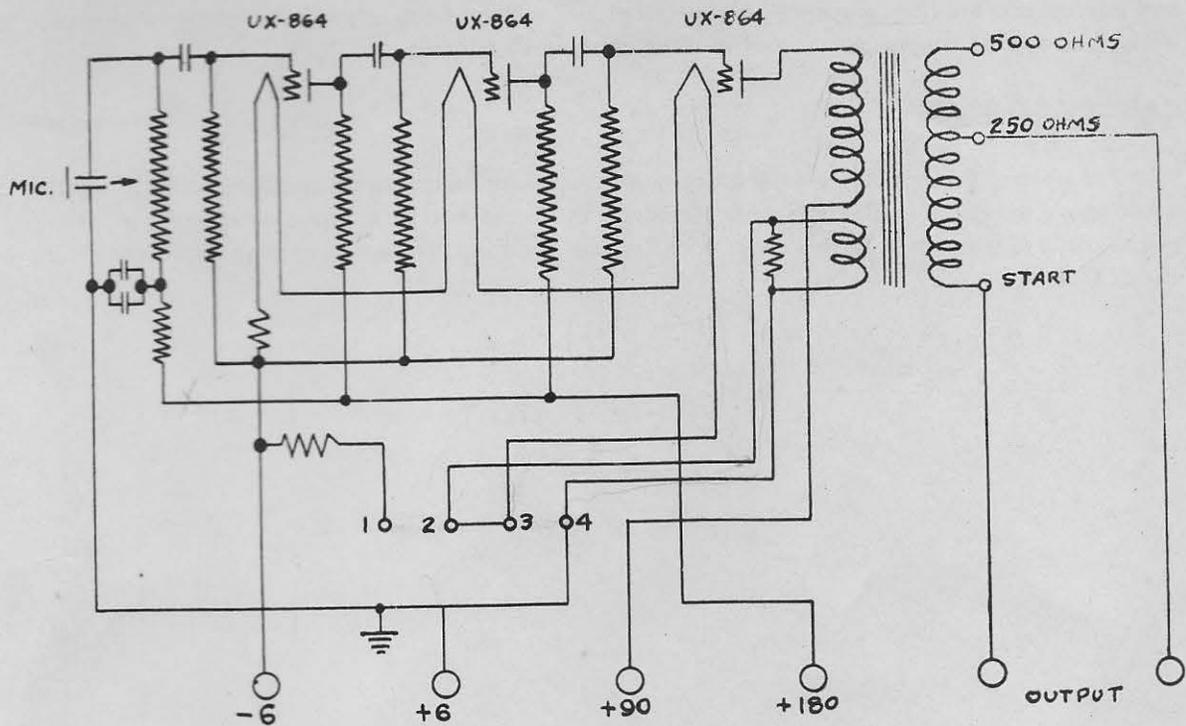
In some cases, it is desirable to suspend the microphone amplifier from overhead. For this use, an overhead suspension unit may be secured from the R.C.A. Screw holes are provided in the top of the amplifier case for attaching this fitting.

In some cases, it may be desirable to conceal the amplifier and expose only the condenser microphone. For uses of this kind, an extension fitting should be secured from the R.C.A. In order to use this, all that is necessary is to remove the condenser microphone from the amplifier case and plug the microphone into the cup provided on the other side of the cable. This cup

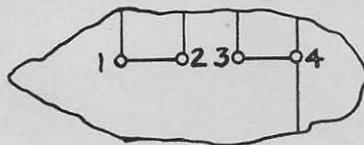
and microphone are then suspended by means of four springs from any regular microphone stand which has a large ring on the top of it. This cable is 10 ft. long.

CABLE AND PLUG

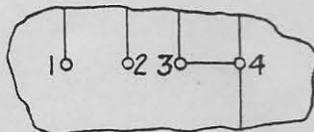
The special 5-conductor shielded cable used with the microphone amplifier will give quite satisfactory service if not mistreated. However, it should not be stepped upon nor put under strain while it is twisted. If this cable does become worn out, replacement may be secured from the R.C.A.



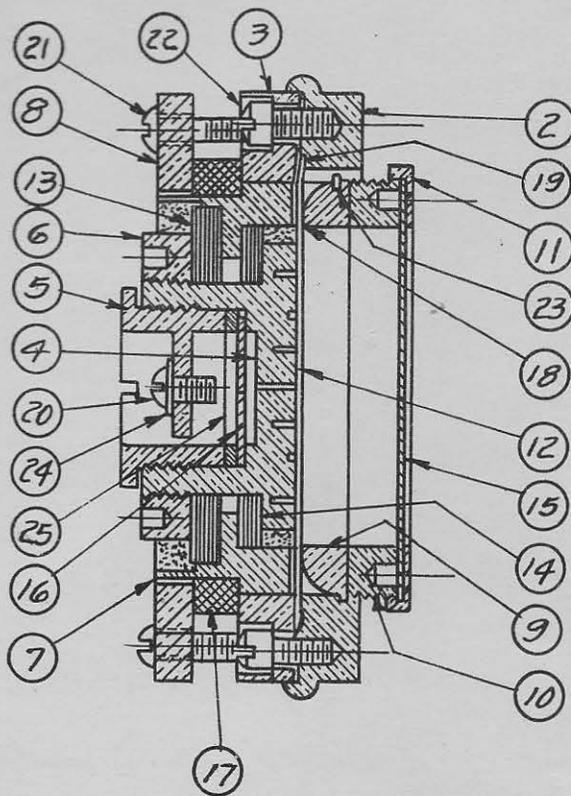
NOTE: Above connection is for 0.25-amp. filament supply.
 For 0.5-amp. fil. supply connect straps as shown below:



NOTE: Where filament supply is likely to be noisy, or where it is connected through resistance or filter systems which may cause oscillation, reconnect amplifier for no tertiary (0.25 amp.) as shown below:

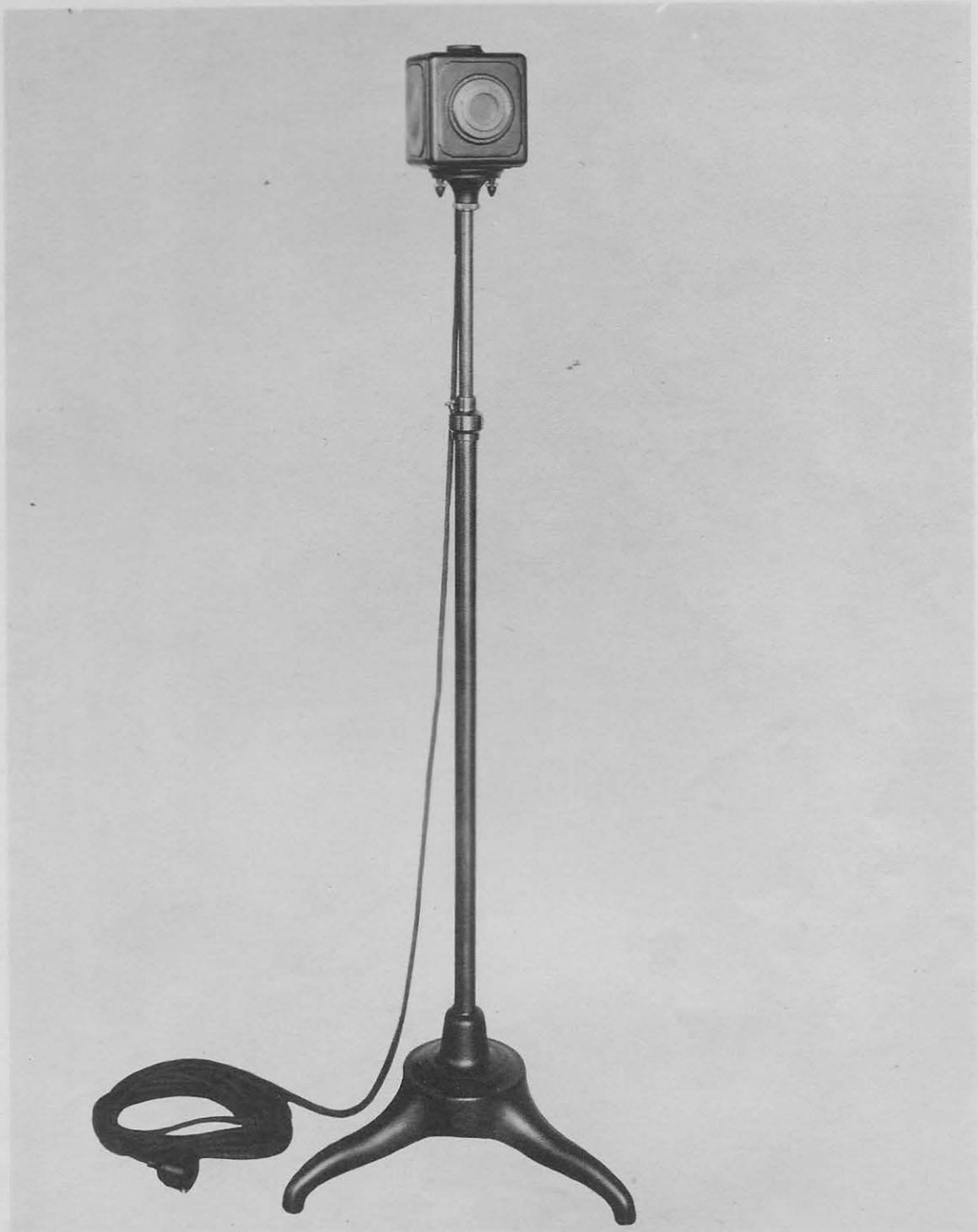


SCHEMATIC DIAGRAM



CONDENSER MICROPHONE

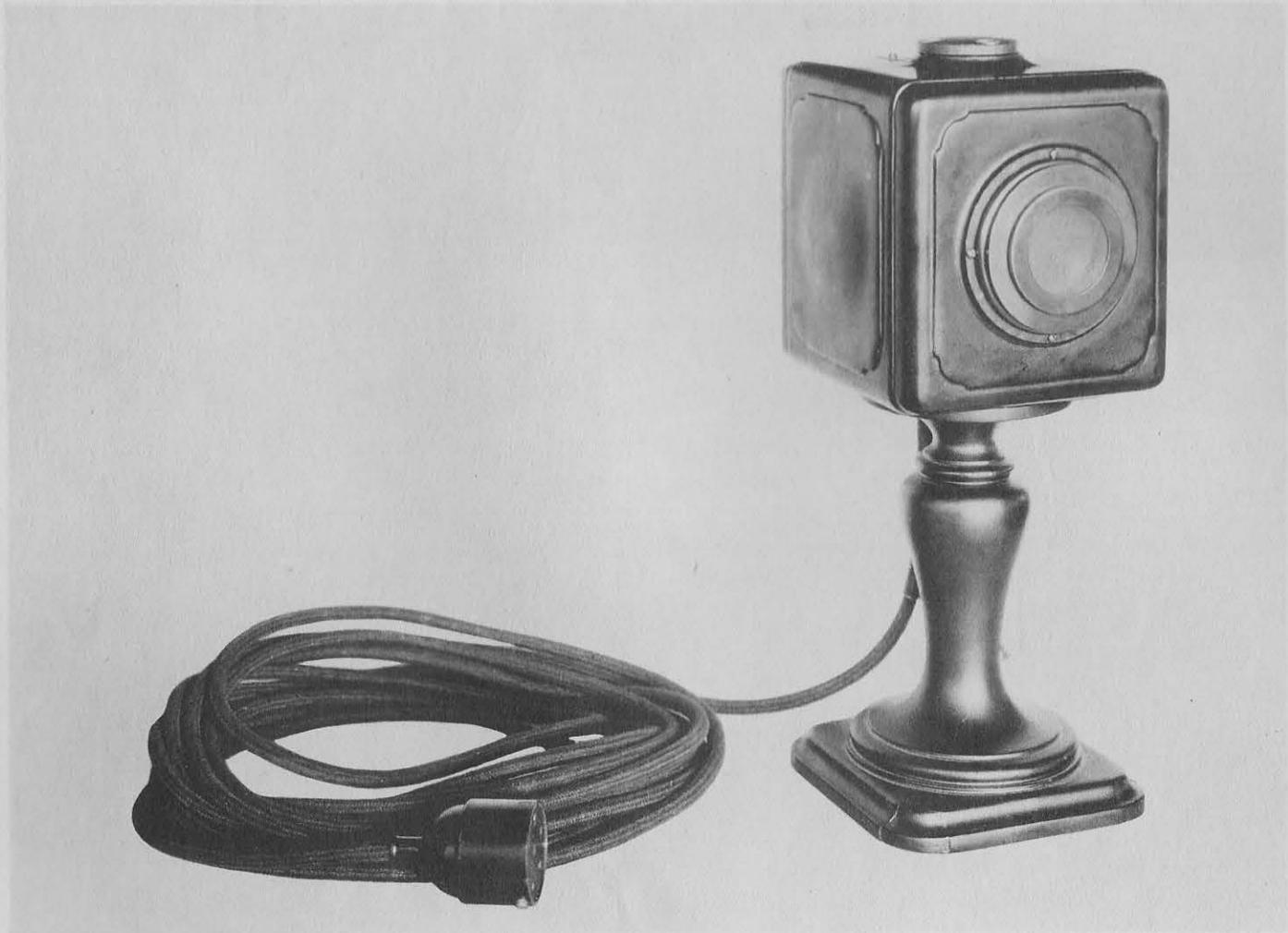
K-7851716



461962 CONDENSER MICROPHONE, AMPLIFIER, AND PROGRAM STAND, TYPE 4-AA,
DL-7550657G-2. WALL RECEPTACLE NOT SHOWN.

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461964

CONDENSER MICROPHONE, AMPLIFIER AND ANNOUNCE STAND, TYPE 3-A,
DL-7550657G1. WALL RECEPTACLE NOT SHOWN.

