KS-16534 RECORDER-REPRODUCER AND ASSOCIATED AMPLIFIER AND CONTROL FACILITIES GENERAL DESCRIPTIVE INFORMATION

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1. GENERAL DESCRIPTION

A. Purpose

1.01 The KS-16534 recorder-reproducer and associated amplifier and control facilities, hereafter referred to as the announcement equipment, constitute a completely integrated voice recording and reproducing system. It is designed principally to furnish recorded announcements in systems such as the 3A (Weather), 8A (Line Terminal), and 9A (Network) announcement systems but may be employed for other similar applications. This announcement equipment provides good quality voice reproduction and exceptionally long service life (approximately 5 years before requiring any major overhaul activity). It is also suitable for operation by either telephone company personnel or outside customers.

B. Equipment Elements

1.02 The principal component of the announcement equipment is the KS-16534 recorder-reproducer, a magnetic drum type of recording and reproducing machine. This machine is used in conjunction with a record-reproduce amplifier and various control and coupling units as described in Parts 2 and 3.

1.03 The announcement equipment is available in either a single channel or dual channel arrangement. A channel is defined as a recorder-reproducer and its associated record-reproduce amplifier. The single channel arrangement employs one recorder-reproducer and amplifier. The coupling unit associated with this arrangement is provided in two versions: one for recording at the machine (local) or in the same or a nearby building (local-remote) and the other for more distant (remote) recording. Remote control apparatus consisting of an operator control unit (with a handset for recording and reproducing) and an associated wall-mounted amplifier control unit are provided for local-remote or remote control. These units are generally located either at a quiet area in the central office or PBX, or at an outside customer's premises.

1.04 The dual channel arrangement employs two recorder-reproducers and amplifiers. A different coupling unit from that used in the single channel arrangement is provided which generally performs the functions of the single channel unit in addition to those required for dual channel operation. Also provided are a distribution unit and an optional remote control coupling unit for more distant (remote) recording. Remote control apparatus is also available for the dual channel arrangement and is provided in the same manner as described in 1.03 for single channel operation.

1.05 The over-all configuration of the single and dual channel arrangements is shown in Fig. 1. Photographs of the equipment elements are shown in Fig. 2 through 7.

1.06 The recorder-reproducer, amplifier, coupling units, and distribution unit are designed for relay rack mounting (19 inch) panels and are generally located in a central office or a PBX equipment room. The single channel arrangement occupies about 3 feet of relay rack space in a single bay while the dual channel requires about 3.5 feet of relay rack space in each of two bays.

C. Single and Dual Channel Features

1.07 The single channel system is arranged for "live dictate" operation, that is, the message is made available to the connected trunk circuits, hereafter referred to as the "line", as it is being dictated. This avoids interruption of service while recording a new announcement. The dual channel arrangement provides improved continuity of service because when one channel is connected to the line (on-line), the other channel (the standby channel) is available for recording a new announcement or for transferring to the line in event of failure of the on-line channel. The dual channel arrangement also permits listening to, or checking, the new announcement before it is connected to the line. It also avoids the need for recording while also going out "live" on the line as with the single channel arrangement. The two channels are used alternately to equalize wear and to provide a continuing over-all check on the operation of both channels.

1.08 The single channel arrangement requires two conductor pairs (cable, open wire, etc) to the remote control equipment and the dual channel arrangement requires three conductor pairs. The maximum loop resistance of each pair is 1640 ohms. For local-remote control, nine conductors (maximum 200 ohms each) are required for the single channel arrangement. Sixteen conductors (maximum 100 ohms each except for three of these leads which are 50 ohms maximum) are required for the dual channel arrangements.

D. Local and Remote Control Features

1.09 The announcement equipment may be controlled locally, that is, recording and checking (listening to the current or recently recorded announcement) functions may be performed at the machine itself. This form of operation is termed local control and is generally reserved for maintenance use. Normally, recording and checking will be performed at some quiet location remote from the machine. If this location is in the same or a nearby building, operation is termed local-remote. Where the recording location is further removed from the machine, operation is called remote control. Remote control apparatus is provided for use when recording and checking are performed at a location away from the machine. This apparatus consists of an operator control unit (with a handset for recording and reproducing) and an associated wall-mounted amplifier control unit (containing amplifier and relay equipment).

E. Power Requirements

1.10 The recorder-reproducer and record-reproduce amplifier require nominal 115 volts, 60 cycles ac, and 48 volts dc for their operation. The coupling and distribution units require 48 volts dc only. The remote control units operate from the customer's commercial 115-volt 60-cycle ac power main.

2. ANNOUNCEMENT EQUIPMENT IN SWITCHROOM

A. Recorder-Reproducer

2.01 The KS-16534 recorder-reproducer consists of two major components, a magnetic drum-type recorder-reproducer mechanism and a mechanism control unit. An important feature

of this equipment is the variable cycle arrangement which automatically presets the length of the reproduce cycle so that it corresponds to the length of the recording. This minimizes silent intervals during recycling between announcements. The machine is also arranged for either start-stop operation where the magnetic drum is in motion only in response to a call, or for continuous operation. Either type of operation can be selected by strapping terminals in the coupling unit.

2.02 Other features of the machine consist of (1) a fixed limit switch by means of which the maximum length of the recording cycle may be preset from a minimum of about 12 seconds to a maximum of approximately 4 minutes in increments of drum revolutions of approximately 6-1/2 seconds, (2) a "start dictate" signal to indicate that erasure of the recording medium has been completed and that the machine is ready to accept a new recording, and (3) an adjustable flash-enabling switch to start a lamp flashing at the control location to serve as a warning of the approach of the end of available recording time.

2.03 The recorder-reproducer also provides cut-through pulses which permit the connected trunk circuits to provide a predetermined number of announcements to callers. These pulses are also used to connect an incoming call to the announcement equipment at the start of an announcement in systems arranged for synchronized, or nonbarge-in, operation.

B. Amplifier (Record-Reproduce)

2.04 The KS-16508 amplifier is an electron tube recording-reproducing amplifier designed for use with announcement machines having magnetic recording media. This amplifier is used for both recording and reproducing and includes a transfer relay for switching between these functions on command from the announcement equipment. It contains a bias oscillator for recording and its output level and low internal output impedance permit it to function with a large number of trunks.

2.05 A voice operated relay is provided to detect voice failure and initiate central office alarm indications.

C. Coupling Unit (Single Channel)

2.06 The KS-16535 coupling unit is the control center for the single channel arrangement. It also acts as the point of connection to (1) the various system trunk circuit arrangements which distribute the announcement and which provide means for connecting to central office and PBX alarm systems, and (2) the remote control equipment described in Part 3. Keys, lamps, and jacks are provided so that an announcement can be recorded or checked locally at the announcement equipment. These are provided primarily for routine maintenance and "trouble shooting."

2.07 The coupling unit furnishes means for enabling control locally or from a distance. When local control is required, a 52-type head telephone set or the equivalent can be employed for recording and checking. A volume indicating meter is provided to enable the attendant to check speech level during recording and reproducing.

2.08 Means are provided for initiating the local dictate function on either a barge-in basis (interruption of the announcement cycle in progress to record a new announcement) or a delayed basis (completion of the announcement in progress before access to the recorder-reproducer is obtained).

2.09 The coupling unit provides a lamp which lights when a recording cycle is being initiated as a signal that the erase cycle of the recording drum in the recorder-reproducer is completed and that actual recording should start. This lamp remains on during the recording process and also provides an "end-of-recording-time" warning signal by flashing on-off as the end of the available recording time is approached. Lamps are also provided to indicate the presence of a calls waiting signal and to indicate an alarm condition caused by a voice or limit switch alarm signal from the recorder-reproducer.

2.10 Means are provided in the coupling unit for disconnecting the amplifier output leads from the trunks, and shorting these leads together during the silent interval between announcements to prevent talk-through between simultaneously connected trunk circuits.

2.11 Provision is made for taking the equipment out of service. A guard lamp is provided as an indication of this condition.

D. Coupling Unit (Dual Channel)

2.12 The KS-16586 coupling unit is the control center of the dual channel arrangement. Its broad functions are to furnish local control of the individual channels and the various functions peculiar to dual channel operation such as automatically transferring channels in the event of trouble and recording from one machine to the other. In general, all the features which are provided in the single channel coupling unit are similarly furnished in the dual channel unit. Additional features furnished for dual channel operation are as follows.

(1) To facilitate maintenance, means are provided for locking either channel to the remote control equipment and to the line. Under this condition, "live" dictate (single channel) conditions are established for the selected channel, all dual channel functions are canceled, the remote control equipment is connected to the on-line channel, and the local control keys of the alarmed channel are enabled.

(2) Lamps are provided to indicate minor and major alarm conditions. The MINOR ALARM lamp lights to indicate a "live" dictate condition due to failure of one of the channels. The MAJOR ALARM lamp indicates a failure in both channels or in the locked-on-line channel.

(3) A TRANSFER PENDING lamp is provided as a signal that the operator at the remote location has completed dictation. When the TRANSFER key is operated, this lamp extinguishes and a TRANSFER lamp lights indicating that the former standby channel is in the process of being transferred to the line. These signals serve to alert central office personnel who may be preparing to work on the announcement equipment.

(4) A DUBBING lamp lights to indicate the beginning of the dubbing cycle (recording of the newly dictated announcement from the on-line channel to the standby channel). Dubbing starts after the channel with the newly dictated announcement has been put on line.

(5) Local, manual transfer of the standby channel to the line, may be performed by operation of a key. Transfer may be on a barge-in basis (immediate transfer of the standby channel to the line) or a delayed basis (occurring at the completion of the on-line channel announcement). Dubbing may also be performed manually at the announcement equipment by means of a DUBBING key.

(6) A REMOTE DICTATE PENDING lamp lights when the operator at the remote location is preparing to record an announcement. This serves as a warning to central office personnel who are preparing to work on the announcement equipment that a new announcement is being initiated.

E. Remote Control Coupling Unit (Dual Channel)

2.13 The KS-16588 coupling unit is provided when the remote control method of operation is required. This unit reduces the number of leads required for connecting the recording location to the announcement machine from the 16 conductors normally required for local-remote control to three conductor pairs with greater resistance limits for control from a more distant location. This unit may also be provided for local-remote operation where the distance between the recording location and the machine is such that the savings in conductor leads outweighs the cost of this unit.

F. Distribution Unit (Dual Channel)

2.14 The KS-16587 distribution unit interconnects the remote control equipment, the announcement equipment, and the connecting distribution equipment. Two manually operated switches are furnished to transfer the remote control equipment and the distribution equipment from the main announcement equipment to the emergency announcement equipment when the latter is provided. These switches may be operated independently so that remote control circuits, for example, may be connected to either main or emergency facilities regardless of the connection to the distribution equipment.

2.15 To facilitate repairs on alarmed announcement equipment, means are provided in the distribution unit for disconnecting the minor and major alarm leads outgoing to the central office alarm equipment.

2.16 A jack is provided for checking the outgoing announcement. This jack connects to the point at the output of the announcement equipment that "feeds" all of the connecting trunk facilities.

2.17 Means are provided for taking the announcement equipment out of service.

3. REMOTE CONTROL EQUIPMENT FEATURES

A. Operator Control Unit (Single Channel)

3.01 The KS-16536, L1 operator control unit (Fig. 6) contains all the controls and indicators needed for local-remote and remote control of the announcement equipment. The KS-16504 handset, which is used for recording and checking, connects to this unit.

3.02 The control unit may be positioned for DICTATE and CHECK functions or switched to OFF position by means of a 3-position rotary switch. The DICTATE position enables the dictate function by making the DICTATE key operative when placed in the TEST LEVEL and DICTATE positions and by permitting the DICTATE and REPEAT DICTATE lamps to light when necessary. With the switch in the CHECK position, an announce start signal is transmitted continuously to the announcement equipment and the DICTATE key and lamp are disabled. The OFF position of the switch disables the DICTATE key and shorts the speech circuits outgoing to the handset. The OFF position of the function selector switch does not affect the operation of the central office equipment.

3.03 The nonlocking DICTATE key is provided which transmits a start signal to the announcement equipment when operated to the DICTATE position. When released, the record function is terminated and the length of the reproduce cycle is automatically adjusted to coincide with the completed recording. After the DICTATE key has operated and after erasure of the previous recording is completed, the associated DICTATE lamp lights to indicate that the system is ready to accept speech for a new recording. This lamp also flashes off and on as the end of available recording time is approached.

3.04 The attendant may test the adequacy of his speech level prior to starting the recording process by operation of the DICTATE key to TEST LEVEL position. A RECORDING LEVEL indicator with three ranges indicated by red and green markings on the scale is provided to assist in maintaining proper recording level. Speech level is adequate when the indicator is deflected to the green range and either too low or too high when deflected to the near or far end of the red ranges, respectively.

3.05 A REPEAT DICTATE lamp is provided as a signal that the announcement must be redictated due to an alarm condition in the system.

3.06 The control unit is provided with a headset jack for connection of an optional headset for checking.

B. Operator Control Unit (Dual Channel)

3.07 The KS-16536, L2 operator control unit (Fig. 7), is similar to the single channel operator control unit with additional features provided for dual channel operation. These include (1) a "live" DICTATE lamp which indicates when dictation is "live", that is, when the attendant's voice is being transmitted directly out over the line while recording a new announcement when one channel has failed, (2) a TRANSFER READY lamp which serves as a reminder to the attendant to transfer the newly recorded channel to the line after dictation, (3) a TRANSFER switch which transfers the newly recorded channel to the line when recording is completed, and (4) a key which permits the attendant to check the announcement on either the standby or on-line channel.

C. Amplifier Control Unit

3.08 The KS-16537, L1 (single channel) and KS-16537, L2 (dual channel) amplifier control units (Fig. 6 and 7, respectively) are wall-mounted boxes containing preamplifier, power supply, and control relays required for control of the announcement equipment. There are no exposed controls or indicators.

3.09 The amplifier control unit incorporates an automatic loudness-controlled preamplifier to maintain an adequately uniform level on the outgoing speech circuits. The preamplifier

is on a printed-wiring card which plugs into the chassis of the amplifier control unit.

4. OPERATING PROCEDURES

A. Local Control

Single Channel

4.01 Local control of the announcement equipment is established by operation of the LOCAL CONTROL-REMOTE CONTROL key in the coupling unit to the local control position. A 52-type operator head telephone set plugged into jacks at the coupling unit is used for recording and checking.

4.02 Either of two dictating procedures can be employed, barge-in or delayed. Barge-in enables the attendant to interrupt the announce cycle in progress and record a new announcement. Delayed dictate permits the announce cycle to go to completion before control of the recorder-reproducer is established.

4.03 After the DICTATE key is operated and after the erase cycle of the recording drum (approximately 6 seconds) is completed, the DICTATE lamp lights to indicate that recording should start. This lamp remains on during recording. A short interval before the end of available recording time, it starts to flash off-on as a warning signal.

4.04 The attendant observes the deflections of the needle of the volume indicating meter while dictating the announcement to check for proper speaking level.

4.05 Checking the recorded announcement at the announcement equipment is done by means of an operator headset plugged into operator headset jacks. The announce key is operated to start the machine.

Dual Channel

4.06 Procedures for local recording and checking in the dual channel arrangement are similar, in general, to single channel procedures. A choice of the channel to be controlled is made by operation of the LOCAL CONTROL key to either channel 1 or 2. Local controls for both channels function identically.

4.07 When one channel is in an alarm condition, a MINOR ALARM lamp lights; when both channels are in an alarm condition, a MAJOR ALARM lamp indication is given.

4.08 Local manual transfer of channels is performed by a TRANSFER key. Transfer may be either barge-in or delayed. Barge-in transfer permits the standby channel to break in on the current announcement and transfer immediately to the line. Delayed transfer allows the on-line announcement to be completed before the standby channel takes over. Dubbing of the on-line channel to the standby channel may also be performed manually by operation of the DUBBING key.

B. Local-Remote or Remote Control

Single Channel

4.09 To record at a distant control location, the attendant turns the function switch of the operator control unit to DICTATE, operates the DICTATE key to TEST LEVEL position, and starts to speak. When the speech level is adequate, as indicated by deflection of the RECORDING LEVEL indicator well into the green region (with an occasional peak beyond into the red region), the attendant is ready to record. This is done by operating and holding the DICTATE key in the dictate position while speaking into the handset. At the end of the announcement, the DICTATE key should be immediately released. If the attendant approaches the end of the available preset maximum recording time, the DICTATE lamp flashes off and on as a warning signal to finish the announcement before the DICTATE lamp extinguishes. If the recording exceeds the allowable length, the REPEAT DICTATE lamp will light indicating that the recording procedure must be repeated. The repeat dictate condition also occurs if the recording speech level is too low. The attendant then releases the DICTATE key, the REPEAT DICTATE lamp extinguishes, and the announcement is dictated again. Upon release of the DICTATE key, the variable cycle feature of the announcement equipment adjusts the duration of subsequent announce cycles to correspond closely to the duration of the dictation just completed. To check the announcement, the attendant turns the function switch to CHECK. If the recording is satisfactory, the attendant turns the switch to OFF.

Dual Channel

4.10 The procedure for recording and checking at the remote location in a dual channel system is generally similar to that in the single channel arrangement. The attendant dictates on the standby channel. After checking the announcement and finding it satisfactory, the attendant transfers the newly recorded channel to the line by means of the TRANSFER switch. Transfer of the standby channel to the line is on a delayed basis, occurring at the end of the current announcement of the on-line channel. Transfer from the remote location is allowed only once following the recording of a new announcement. The dubbing cycle, that is, the recording of the announcement from the on-line channel to the standby channel, is automatically initiated after transfer. However, the dubbed channel should be checked to make sure that dubbing actually occurred. Thereafter, the announcement may be checked on either channel at any time.

4.11 In normal operation, with the equipment in remote control, local recording is not permitted. Operation of the "locked-on-line" key in the coupling unit, however, enables complete local control of the standby channel to facilitate maintenance. The remote control equipment is connected to the on-line channel for live dictate operation.

5. EMERGENCY ANNOUNCEMENT FACILITIES

5.01 Should a trouble condition develop in the dual channel system which prevents both channels from delivering an announcement, facilities for manual switching to optional single channel announcement equipment is provided in the distribution unit to restore service. The system then functions as a single channel system. No provision is included for emergency manual announcements.

6. MAINTENANCE

6.01 A 3000-cycle tone source of −30 dbm is required to adjust the magnetic recording head tangency. This is done at installation or when replacement of the head is required. A 1000-cycle tone source is required to adjust the voice-operated alarm circuits and for system alignment. Other than this, no special facilities in addition to standard switchroom maintenance equipment are required.

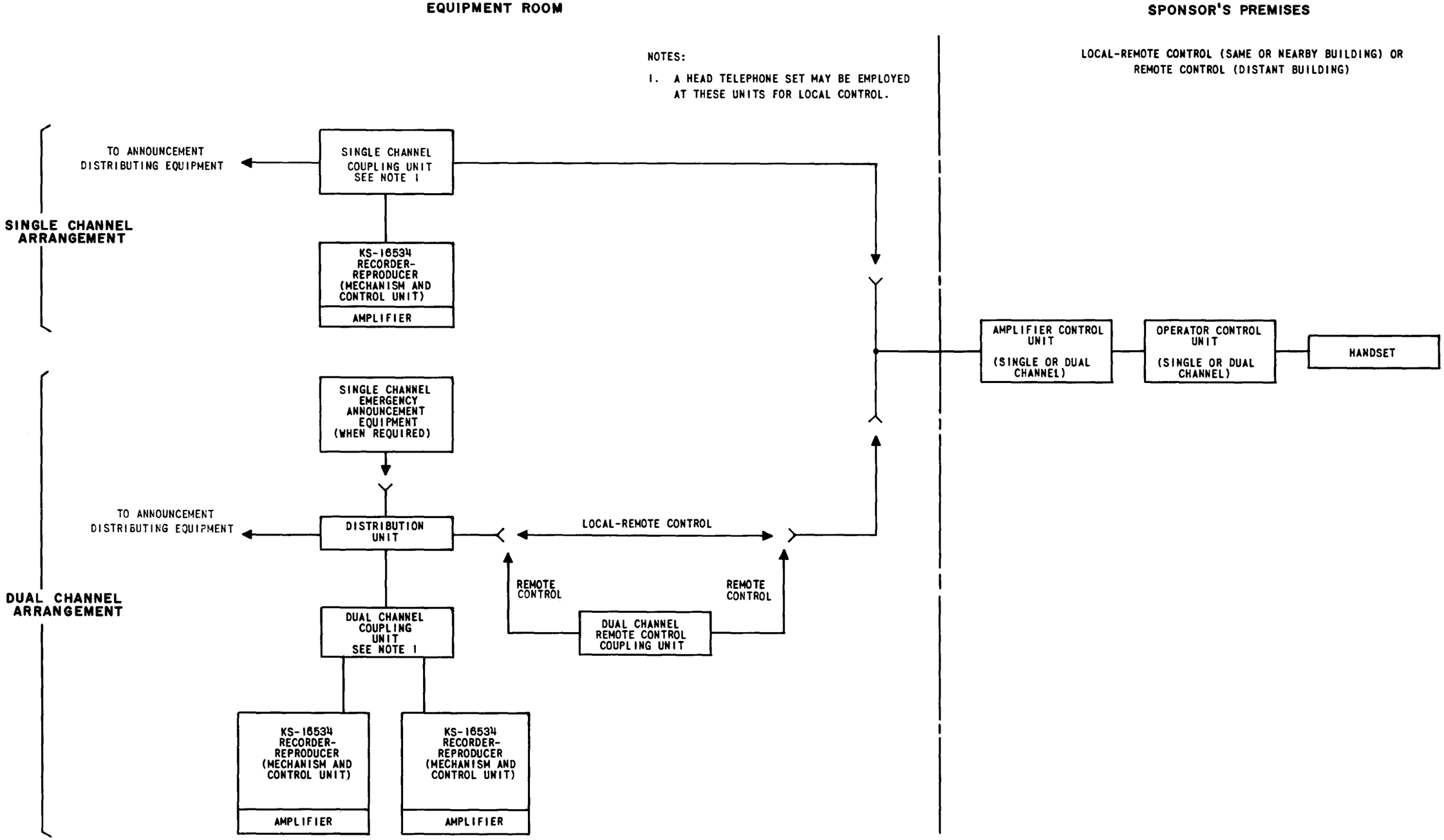

Fig. 1 – KS-16534 Recorder-Reproducer and Associated Amplifier and Control Facilities

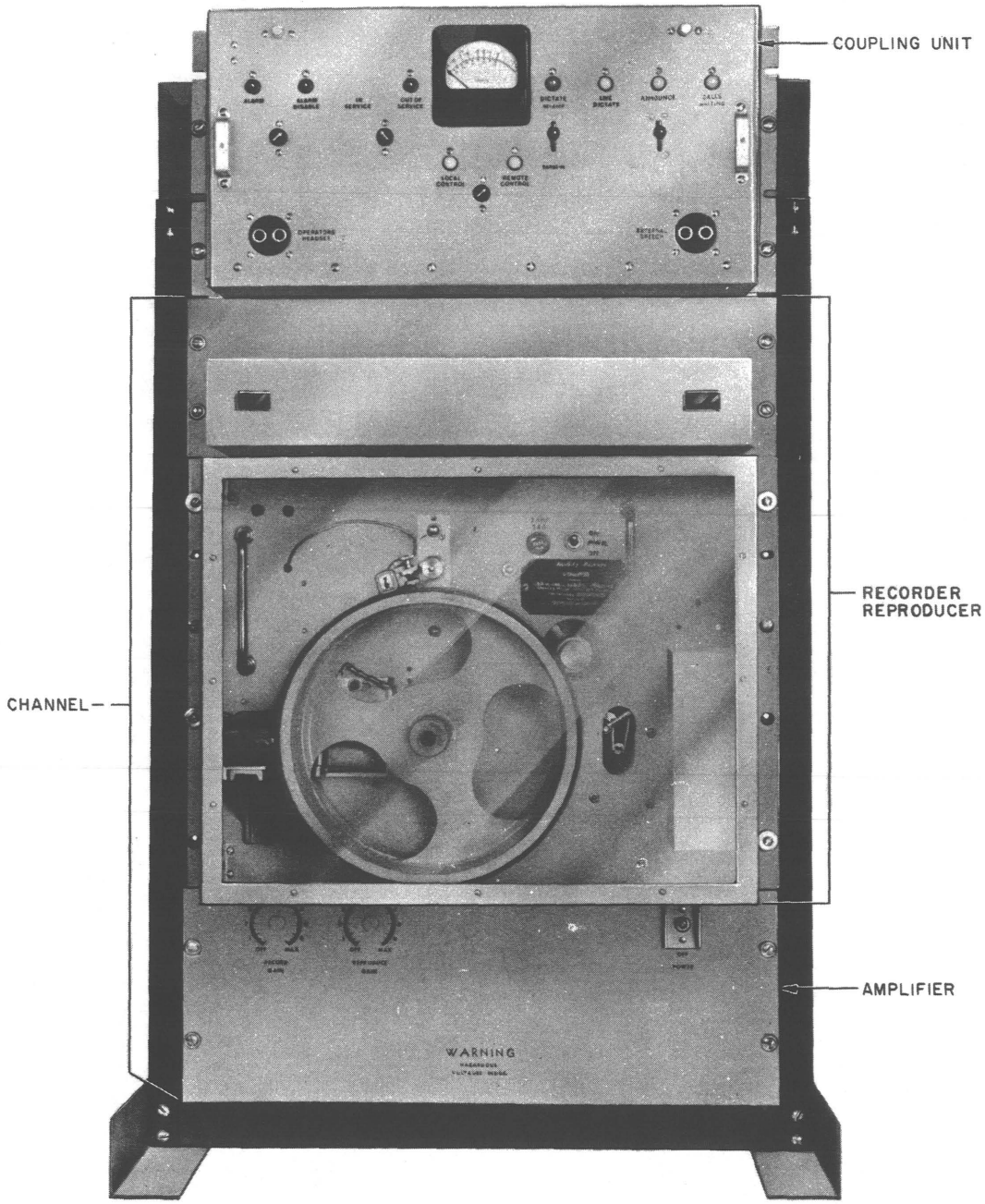

Fig. 2 – Announcement Equipment — Single Channel (Front View)

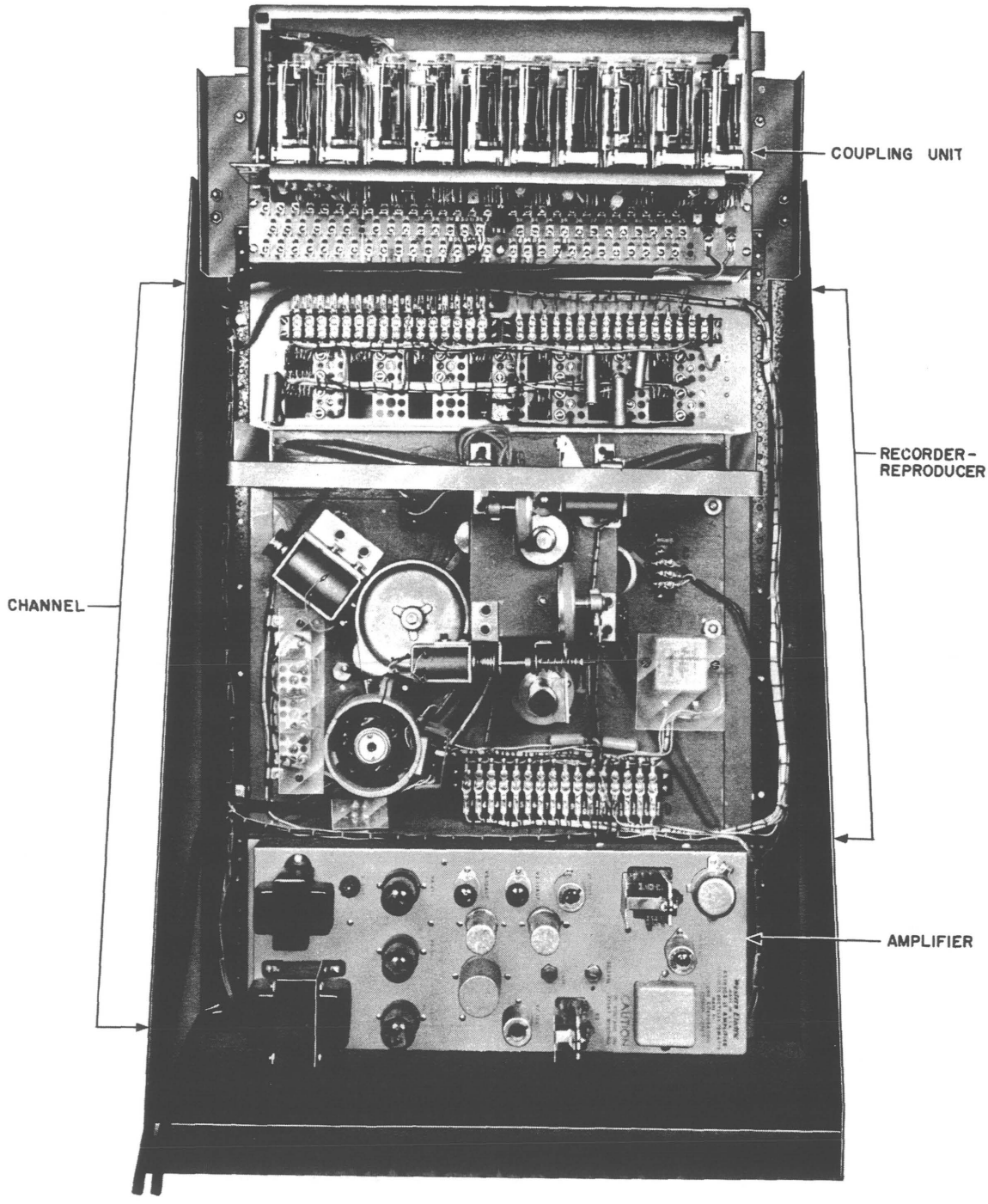

Fig. 3 – Announcement Equipment — Single Channel (Rear View)

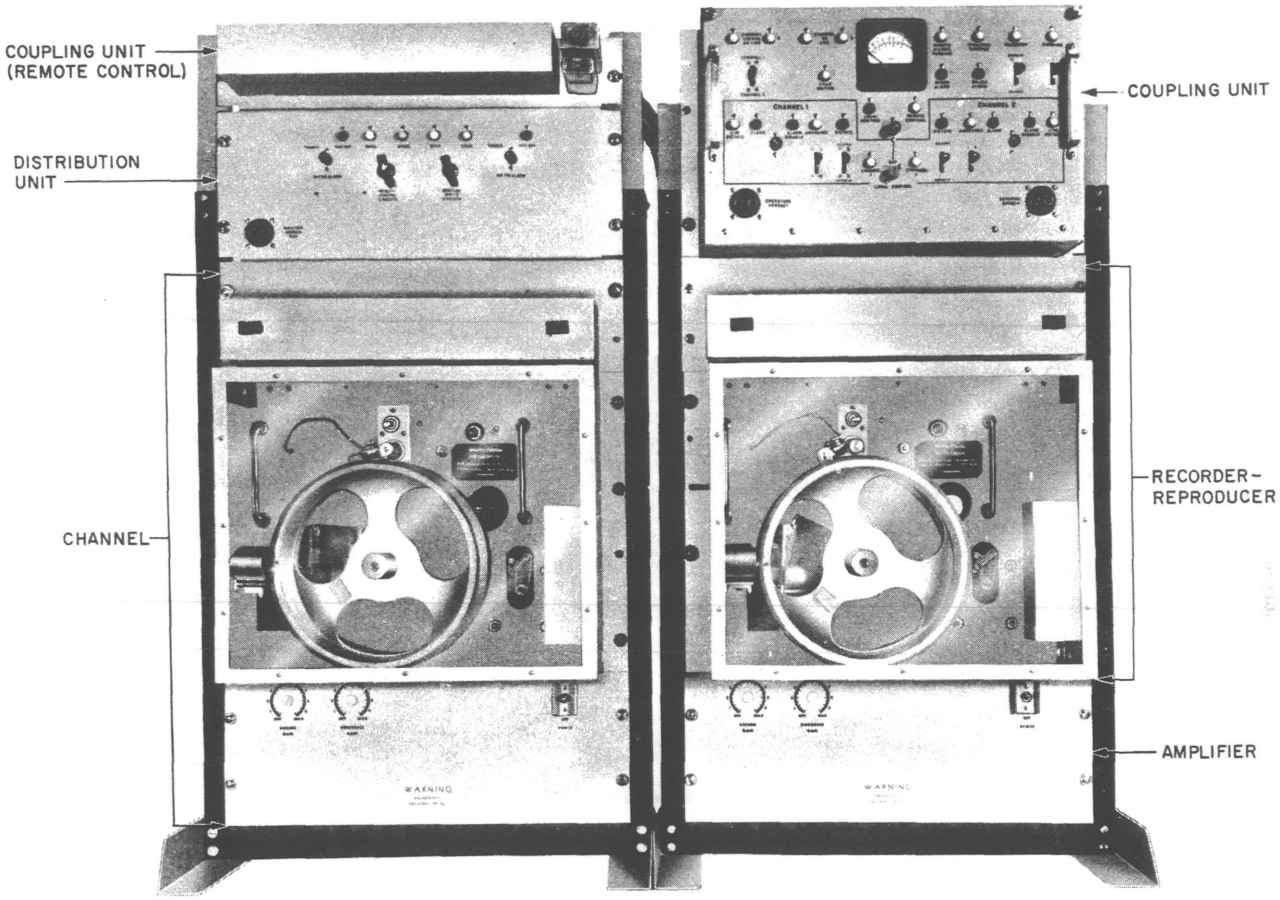

Fig. 4 – Announcement Equipment — Dual Channel (Front View)

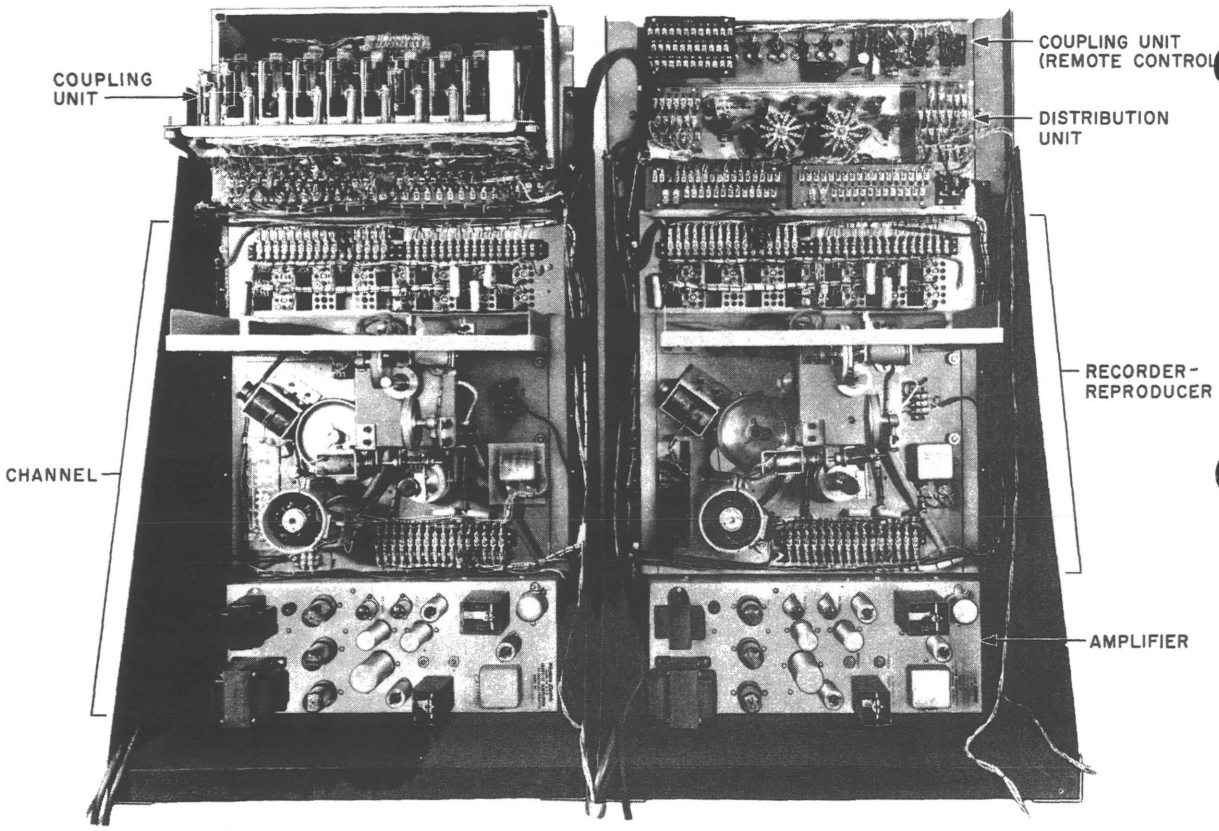

Fig. 5 – Announcement Equipment — Dual Channel (Rear View)

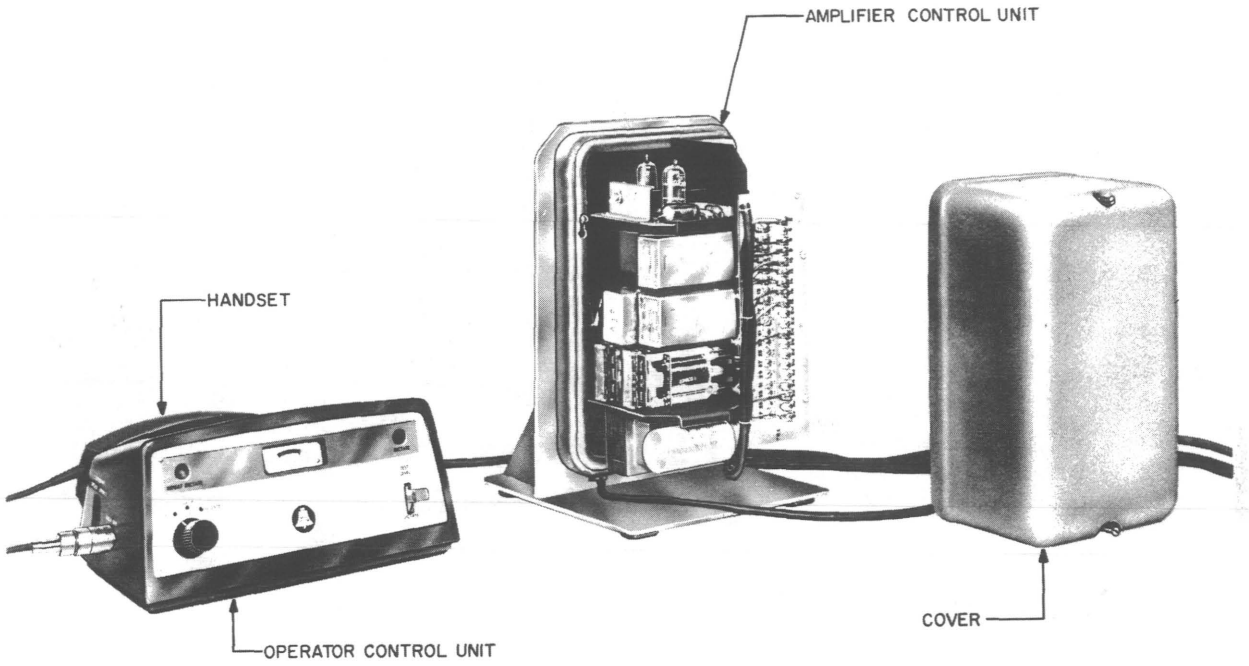

Fig. 6 – Remote Control Equipment — Single Channel

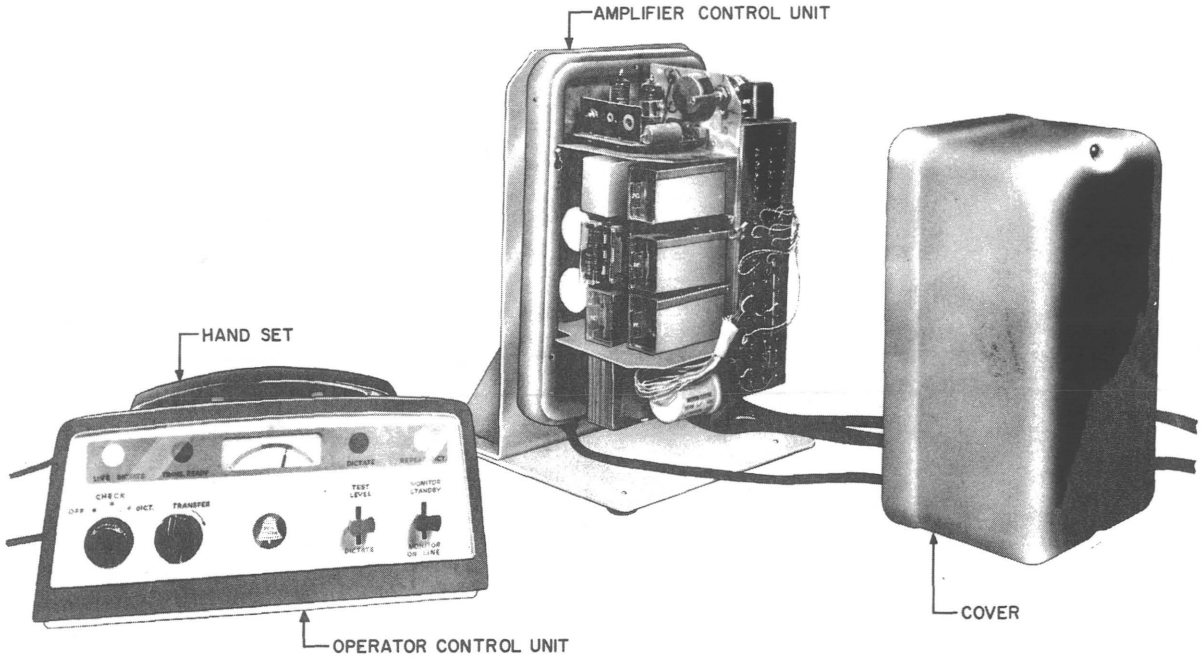

Fig. 7 – Remote Control Equipment — Dual Channel