

**9A ANNOUNCEMENT SYSTEM**

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**1. GENERAL**

**1.01** This section covers the general operation and transmission features of the 9A Announcement System. This is a "heavy duty" recorded announcement system designed for continuous operation with a large number of connected lines. The system is suitable for such services as news or weather announcements sponsored by a subscriber or by the telephone company. When the service is sponsored by a subscriber, the announcements will ordinarily originate at the sponsor's premises and be recorded and reproduced by remote control on equipment located in a central office. This section is reissued to reorganize the information to include miscellaneous changes and additions. Due to the extensive changes and rearrangements, the usual indicating marks have been omitted.

**1.02** The 9A system is arranged for subcentering. In this arrangement, the announcements may be distributed from a number of subcenters connected to the main center containing the recording and reproducing equipment. In addition, subcenters may be operated in tandem, if desired. Each main center and subcenter may be equipped to handle up to 1100 simultaneously connected lines.

**1.03** The 9A Announcement System may be used in any No. 1 or No. 5 crossbar, crossbar tandem, step-by-step, panel, or manual office. It is capable of handling a large amount of traffic without adverse effect on the normal message traffic of the office.

**1.04** The reproducer is arranged to give the calling customer either one or two complete announcements before disconnection. Incoming calls to the machine may be connected either on a "barge-in" or on a "synchronized" basis. On "synchronized" operation, calls are connected only at the beginning of a message, audible ringing being returned on the line during the waiting interval. Busy indication is given when all system connections are in use or when the equipment fails or is removed from service.

**1.05** When an outside sponsor controls the service, the input to the recording and reproducing equipment is located on his premises and control equipment enables him to dictate, monitor, and change the announcement at will. Maximum announcement length is adjustable and may vary from 12 seconds to 4 minutes. Up to the preset maximum limit, the actual length of a particular announcement is automatically set by the duration of the recording. Dead time between announcements varies from 2 to 8 seconds.

**1.06** The recorder-reproducer equipment located in the distribution center delivers the announcement to a distribution bus. This bus connects directly to incoming subscribers and also, over permanently connected tandem trunks, to one or more subcenter locations. At each subcenter, the announcement is amplified and distributed over another distribution bus to incoming subscribers, or to other subcenters operating in tandem.

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**1.07** Each main center and subcenter may be equipped for a capacity of 1100 simultaneously connected lines. However, because of the greater electrical load of a trunk connection, each tandem trunk is equivalent to seven customer lines and the net capacity is reduced accordingly. The distribution bus is equipped with idle circuit terminations for each customer line termination, so that the system load is practically constant with variations in number of connected customers.

**1.08** Where greater reliability is required, dual trunks may be used between the main center and a subcenter. In this arrangement, the circuit at the subcenter includes a resistive bridge arrangement with two amplifiers. A maximum of four subcenters may be connected in tandem if single trunks are used, but only two with the dual arrangement. When possible, alternate routes should be used for dual trunk applications.

**1.09** The 9A system may be installed with either single or dual recorder-reproducer equipment. When only one unit is used, the announcement message will go out live to those customers connected to the bus while the announcement is being recorded. When dual equipment is provided, a coupling unit will transfer either machine on or off the distribution network. In normal operation, one machine is on the line and one on standby. New recordings are made on the standby machine, monitored for correctness of message, and the machine switched to the network. When the standby machine is switched to the line, the other machine becomes standby, and the new message is automatically recorded on it during the second announcement cycle. In case of trouble in the equipment, the standby machine is automatically switched to the line and an alarm operated. A still higher degree of reliability may be obtained by provision of a third machine that can be manually switched in so that regular and standby operation can be continued while trouble in either of the regular machines is being cleared.

**1.10** General design considerations discussed in Section 852-520-100 also apply to the 9A Announcement System.

## 2. EQUIPMENT INFORMATION

**2.01** The arrangement of the various units of a 9A Announcement System is shown in Fig.

1. More detailed information is included in Section AA388.094.

**2.02** Wire limitations which are necessary for proper operation of the system will affect the location of the equipment in the office. These limitations are discussed in the section mentioned in 2.01. The resistance limits are also noted on SD-95254-01 and SD-95255-01.

## 3. CONTROL POINT

**3.01** Either of two types of control may be used. When the input equipment is in the distribution center building or close to it, "local-remote" control is used. In this system, resistance between input equipment and the recorder-reproducer is limited to a conductor resistance of 200 ohms for single channel operation but as little as 50 ohms for certain conductors in dual channel operation. Detailed limits for various equipment arrangements are given on SD-95254-011 and SD-95255-011. "Remote control" used for more distant input locations permits a maximum conductor loop resistance of 1640 ohms. Each control system requires a different coupling unit to the recorder-reproducer and a different number of conductors to the input equipment.

**3.02** The control equipment usually located at the sponsor's premises consists of a wall-mounted amplifier cabinet and a desk-mounted operator control unit. The desk unit is equipped with a special handset for recording and monitoring, having a dynamic-type moving-coil microphone and a standard receiver unit. A headset receiver may also be supplied for monitoring. An input jack is provided for recording messages from a tape recorder or other external source. The control cabinet is equipped with a volume indicator connected across the outgoing line to the main center equipment. (See Fig. 2.) The meter face has a green-colored region between  $-5$  and  $0$  vu. The amplifier cabinet contains a constant loudness amplifier and switching and control equipment.

**3.03** In recording an announcement at the input equipment, the operator attempts to keep the peaks of the needle swings on the volume indicator in the green area of the scale. This results in an average level meter reading of about  $-2$  vu. The term "level meter reading" as used in this section should be understood to mean the actual reading of the meter scale. No correction

is applied here for the impedance of the circuit at the various points where the meters may be bridged so that the "meter reading" may not be the true vu level of the signal.

**3.04** The constant loudness amplifier in the input equipment will, in general, hold the speech input level within a variation of 5 db. However, extremely loud or soft talkers may force the level beyond this point, so it is important that an effort be made to record in such a way as to hold the indicator swings in the green scale area.

**3.05** When recording from an external source such as a tape recorder, the source should be capable of delivering a level of +6 vu into a 600-ohm load. When this source is used, the AVC amplifier is bypassed so that an external volume control must be provided and care taken to avoid excessive peaks as indicated by the volume indicator.

**3.06** The general arrangement of the input equipment at the control point is shown in Fig. 2.

#### 4. CONTROL CIRCUIT DESIGN

**4.01** A speech level reading of  $-30$  vu is desired at the input to the record-reproduce amplifier. With an average level reading of  $-2$  vu at the input equipment and an 8-db flat loss in the coupling equipment, a maximum loop loss of 20 db is permissible. An attenuator in the coupling unit permits adjustment for loops of less than this maximum loss. Subscriber sponsored systems will usually make use of a standard subscriber line from the subscriber's premises, with the distribution center located in the serving office. With proper exchange design, the control circuit loss should not exceed about 8 db.

**4.02** When recording directly at the distribution center with an external speech source, the input must be adjusted to give this  $-30$  vu level into a 600-ohm load. When used in this manner, the input attenuator is bypassed so adjustment must be made in the external source. Also, no volume limiting is provided in this connection so care must be exercised to avoid excessive speech peaks. When recording at main center with the 52-type operator set, an attenuator is available to permit obtaining the  $-30$  vu level to the recorder.

#### 5. MAIN CENTER

**5.01** The main center equipment includes the recorder-reproducer, amplifier, coupling unit, and distribution unit. The exact type of coupling unit varies somewhat depending on whether "local-remote" or "remote" operation is used and whether dual equipment is provided.

**5.02** Two input jack circuits are provided in the coupling unit. One of these is for local recording and monitoring, using a 52-type headset, and the other is for recording from a tape recorder or other external source. A volume indicator, included in the coupling unit, is bridged across the record-reproduce amplifier. This is used to indicate recording level for local recording and also indicates the announcement bus level during normal reproducing operation. The volume indicator is also used to set the reproducer gain and voice alarm controls and in other maintenance procedures.

**5.03** Announcement trunk circuits from the distribution bus (Fig. 3) are of two types having 1000-cycle losses of 8 or 14 db. The high loss circuit is intended to be used for connections to local subscribers served by the main center or for connections over interoffice trunks of less than 4 db. The 8-db trunk circuits are used for all higher loss connections. Connections to calling subscriber lines are made through either repeating coils or isolating capacitors depending on the type of office.

**5.04** Subcenter trunk circuits from the distribution bus to subcenters (Fig. 3) differ somewhat depending on whether single or dual arrangements are to be used. Impedance matching options are available for loaded and nonloaded facilities or short-haul carrier facilities.

**5.05** The recording arrangement with single channel operation is shown in Fig. 3. The monitor and reproduce arrangement is shown in Fig. 4. The record and monitor arrangements with dual channel operation are shown in Fig. 5 and Fig. 6.

**5.06** With one reproducer on the line and the other unit in standby condition, the sponsor can monitor the operation of the system. The arrangement is shown in Fig. 7.

**5.07** The level reading on the distribution center bus is adjusted to 0 vu. The gains of the

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subcenter amplifiers are adjusted only after the distribution center equipment is properly adjusted.

**5.08** With the pads provided in the trunk circuits (Fig. 3), this will provide an input announcement level to local subscriber lines and short interoffice trunks of  $-14$  vu measured across a 600-ohm load. For interoffice trunks of 4 db or more loss, an input level of  $-8$  vu is provided. Input levels to tandem trunks will depend on the type of trunk used and the trunk circuit.

### 6. SUBCENTERS

**6.01** Equipment at a subcenter consists of one or two amplifiers and a distribution bus with announcement trunks (Figures 8 and 9). If dual amplifiers are provided, a resistance bridge circuit is used, one leg of which is the distribution bus. A variable resistor is bridged across this leg to maintain the bus impedance at approximately 1.6 ohms. A volume indicator is provided to monitor the level at the distribution bus and the output of the amplifiers.

**6.02** Terminations of the trunks at the subcenter depend on the type of facilities used. (See Figures 8 and 9.) A reasonably flat response characteristic on nonloaded facilities is obtained by deliberately mismatching the termination impedance.

**6.03** When dual subcenter trunks are used, the two subcenter amplifiers (Fig. 9) are each adjusted to a 0-vu output (as measured across each amplifier) when connected to the bridge. This results in a 0-vu bus level if the amplifiers are properly poled. The failure of either amplifier or associated trunk will cause a 6-db decrease in the bus level. The adjustable resistor across the bus tends to hold the bus impedance to about 1.6 ohms regardless of the number of connected subscribers and helps to keep the bridge balanced.

**6.04** Level adjustments at the subcenter should always be made after any changes in alignment at the distribution center. Transmission levels into subscriber lines and loading considerations are the same as for the distribution center.

### 7. SUBCENTER TRUNK DESIGN

**7.01** Provision is made for the use of loaded or nonloaded cable facilities and short-haul carrier channels. If single channel arrangements

are used, up to four trunks may be operated in tandem. If dual facilities are used, only two trunks are permitted in tandem.

**7.02** Tandem trunks should not exceed 12 db in loss. The loss at 3000 cycles should not exceed the loss at 1000 cycles by more than 1 db.

**7.03** If dual channels are used, special precautions should be taken to be sure the channels are properly matched. The requirements are discussed in Section 852-520-100.

### 8. OTHER TRANSMISSION FACTORS

#### A. Frequency Response

**8.01** The overall frequency response of the system, less connecting trunks, is essentially flat over the voiceband. This response includes the sponsor's constant loudness amplifier, the remote control coupling unit, the recorder-reproducer and associated input, and bus amplifiers.

**8.02** Since the frequency response of the equipment is essentially flat, the overall quality will depend largely on the response of the trunk facilities. Loaded facilities should be used whenever possible. Overall quality will be satisfactory if subcenter trunk design is in accordance with Part 7.

#### B. Noise

**8.03** The overall reproduced noise should be at least 35 db below the maximum undistorted 1000-cycle signal when measured on a 3A noise meter using 3-kc flat noise weighting.

#### C. Return Loss

**8.04** The impedance of the announcement trunk circuit consists of two 424-ohm resistors and two 4-mf capacitors in series. Computed against a 900-ohm plus 2-mf hybrid network, singing return loss is 34 db at 200 cycles and 33 db at 3000 cycles. Echo return loss over the frequency band from 500 to 2500 cycles is about 33 db.

#### D. Talk-Through Suppression

**8.05** Talk-through suppression, or the loss between any two simultaneously connected subscribers, depends on the subscriber loop and trunk losses and the bus impedance. The bus impedance is

the parallel combination of the trunk terminations and the internal output impedance of the amplifier. These impedances are such that the minimum loss between subscribers on zero loops is at least 55 db.

**E. Flutter**

**8.06** There should be no noticeable effect on speech quality from flutter or overloading in the recorder-reproducer system.

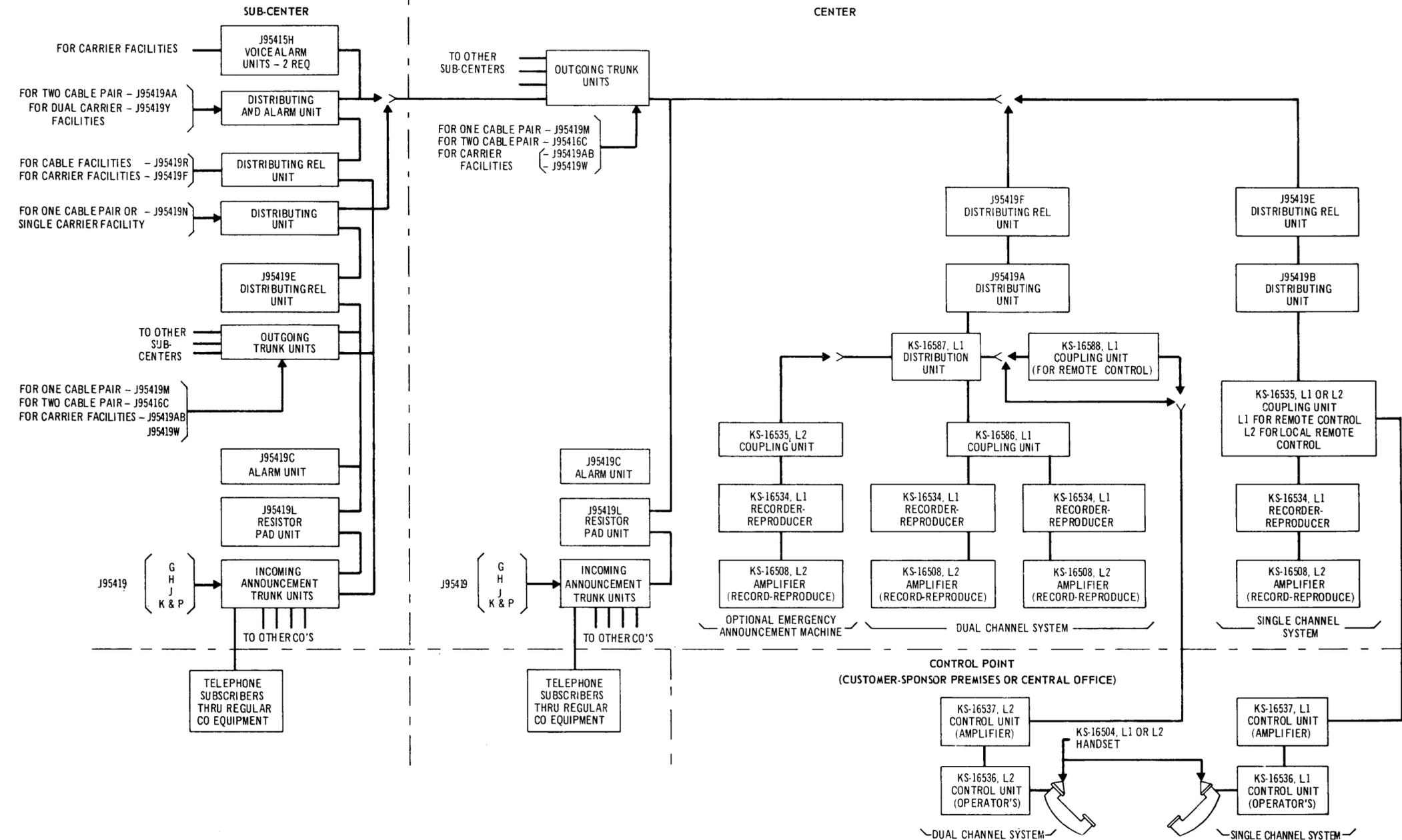


Fig. 1-9A Announcement System Equipment Arrangements

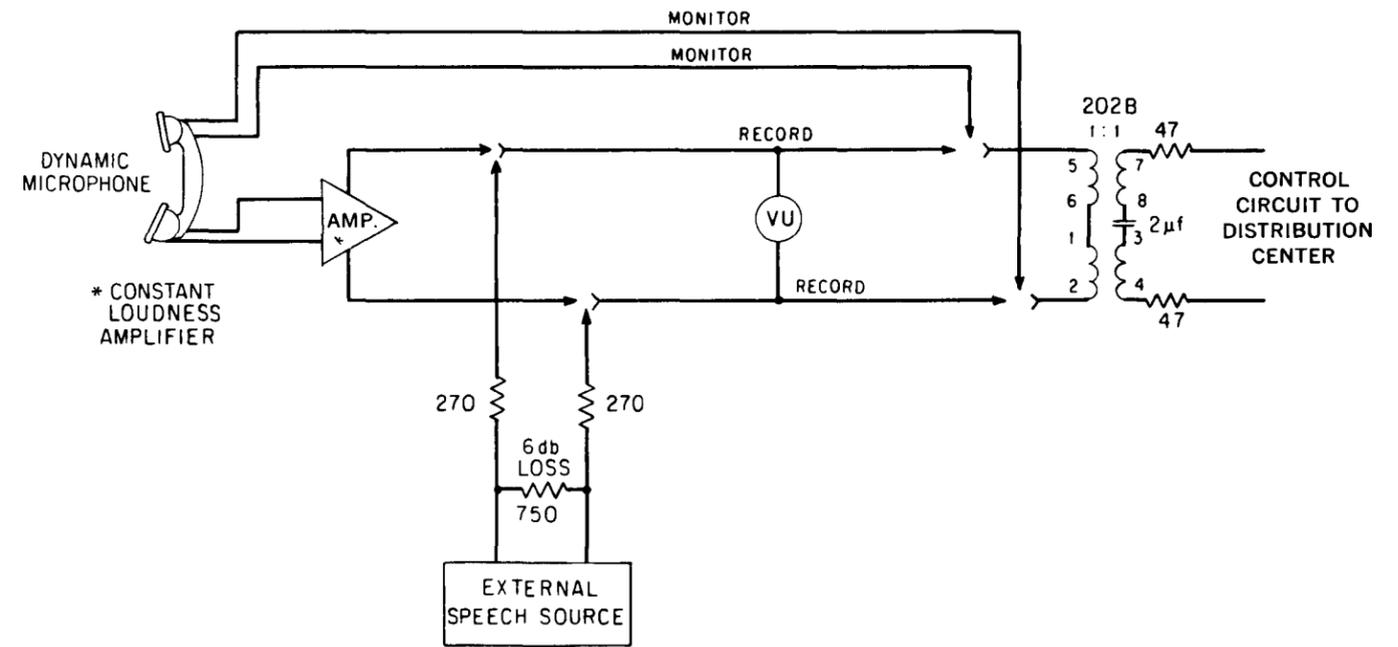
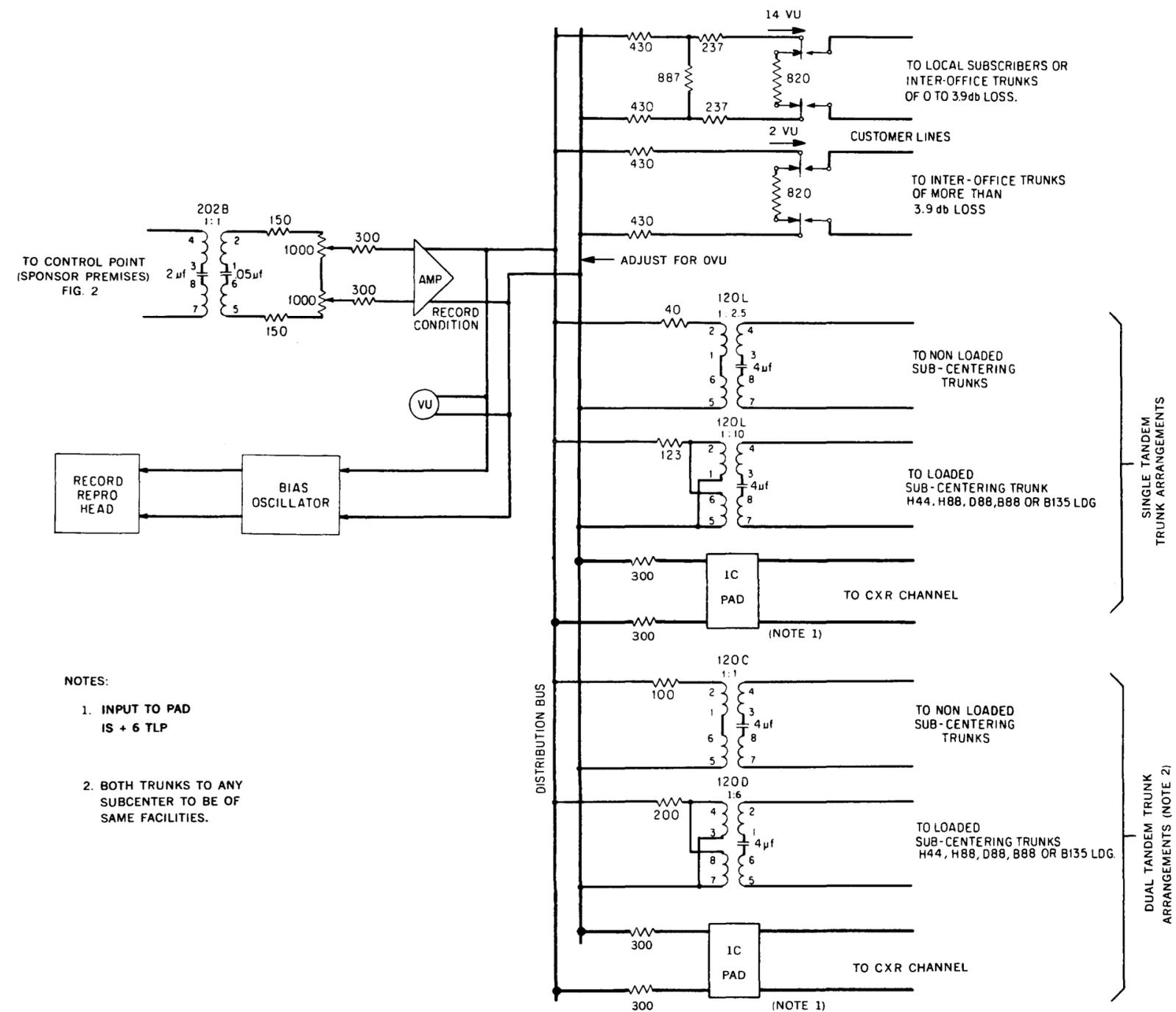


Fig. 2—Input Equipment—Control Point—Record and Monitor



- NOTES:
1. INPUT TO PAD IS + 6 TLP
  2. BOTH TRUNKS TO ANY SUBCENTER TO BE OF SAME FACILITIES.

Fig. 3—Main Center—Single Channel Operation—Record

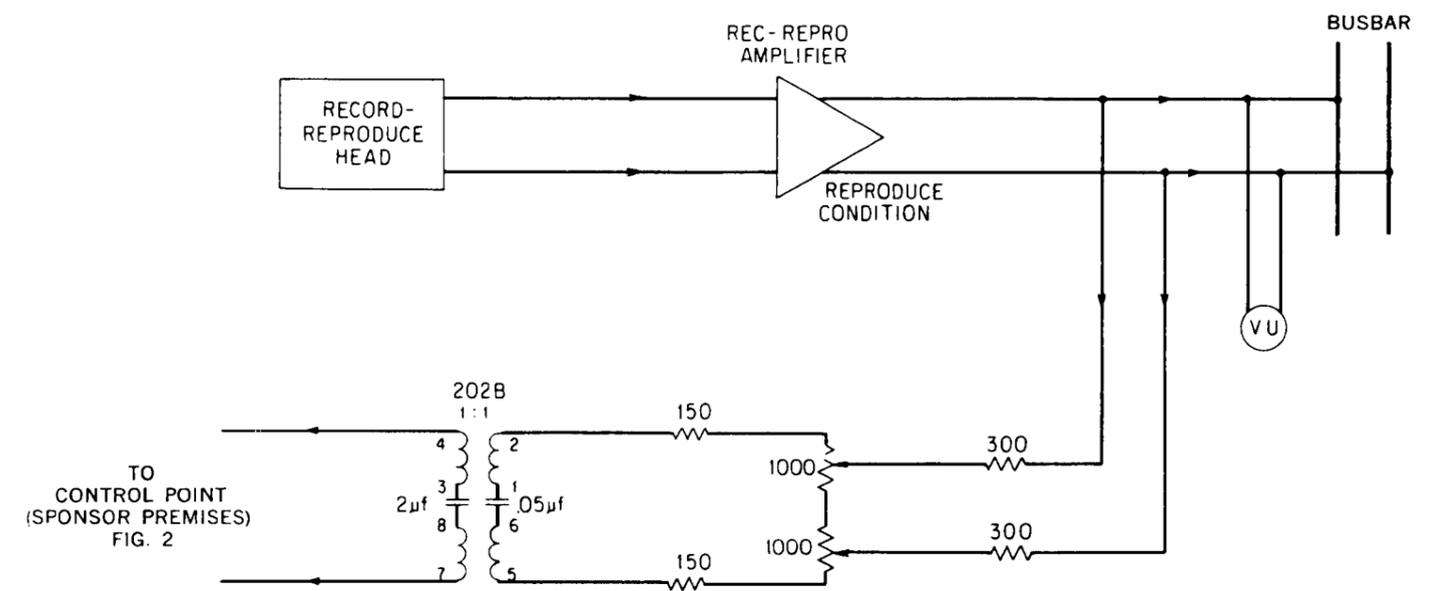


Fig. 4—Main Center—Single Channel Operation—Monitor and Reproduce

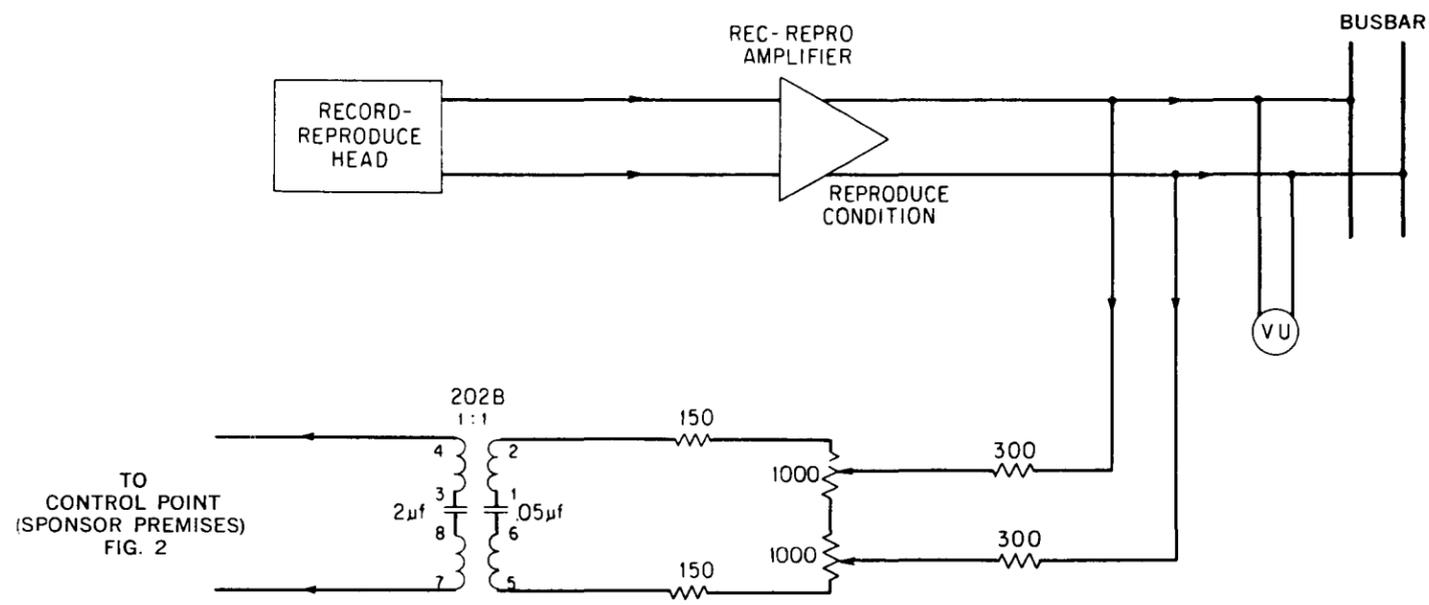


Fig. 4—Main Center—Single Channel Operation—Monitor and Reproduce

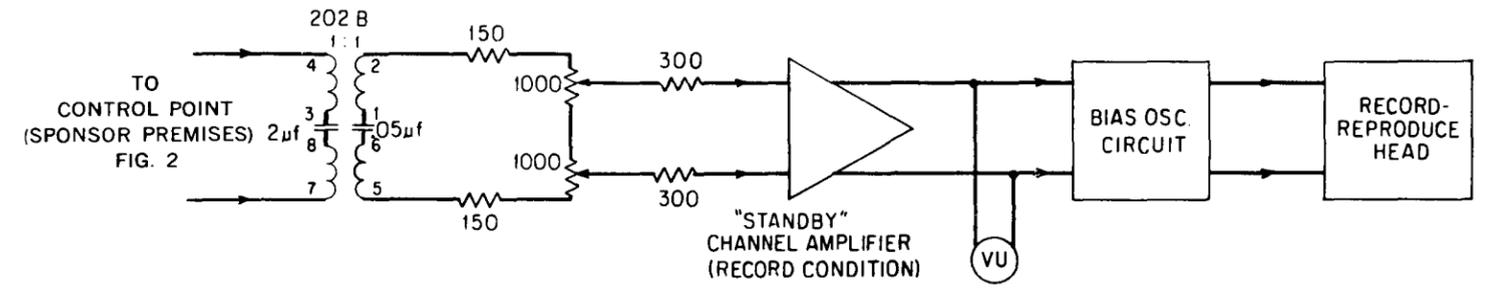


Fig. 5—Main Center—Dual Operation—Record

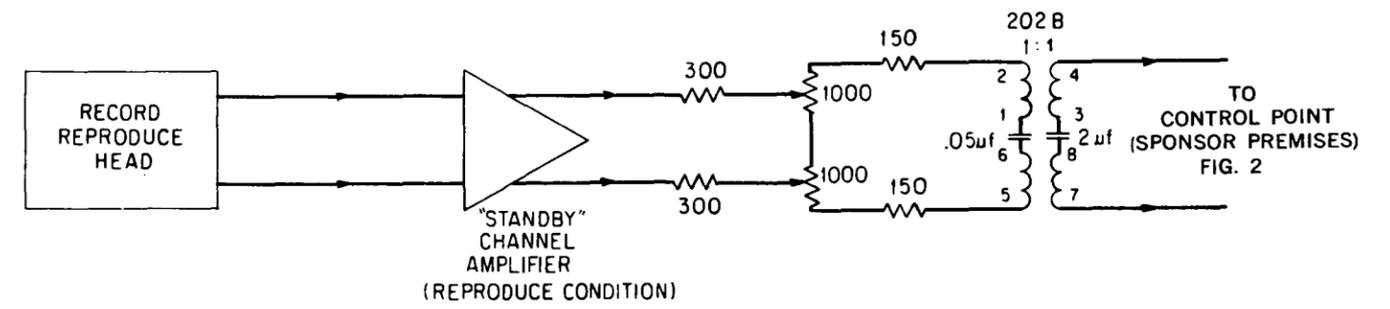


Fig. 6—Main Center—Dual Operation—Monitor

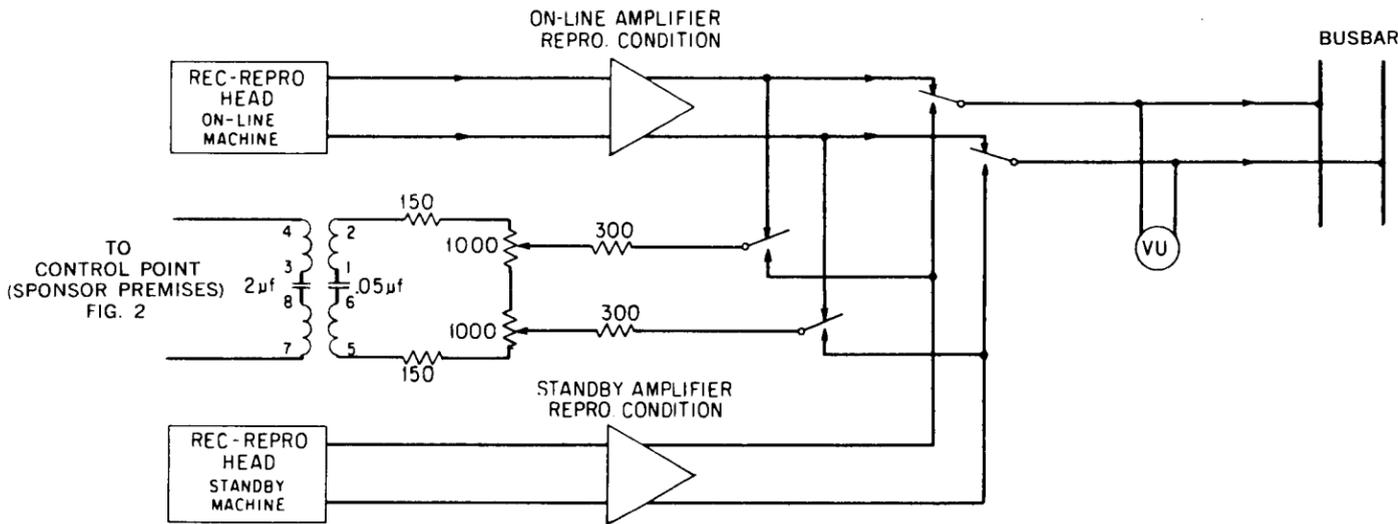
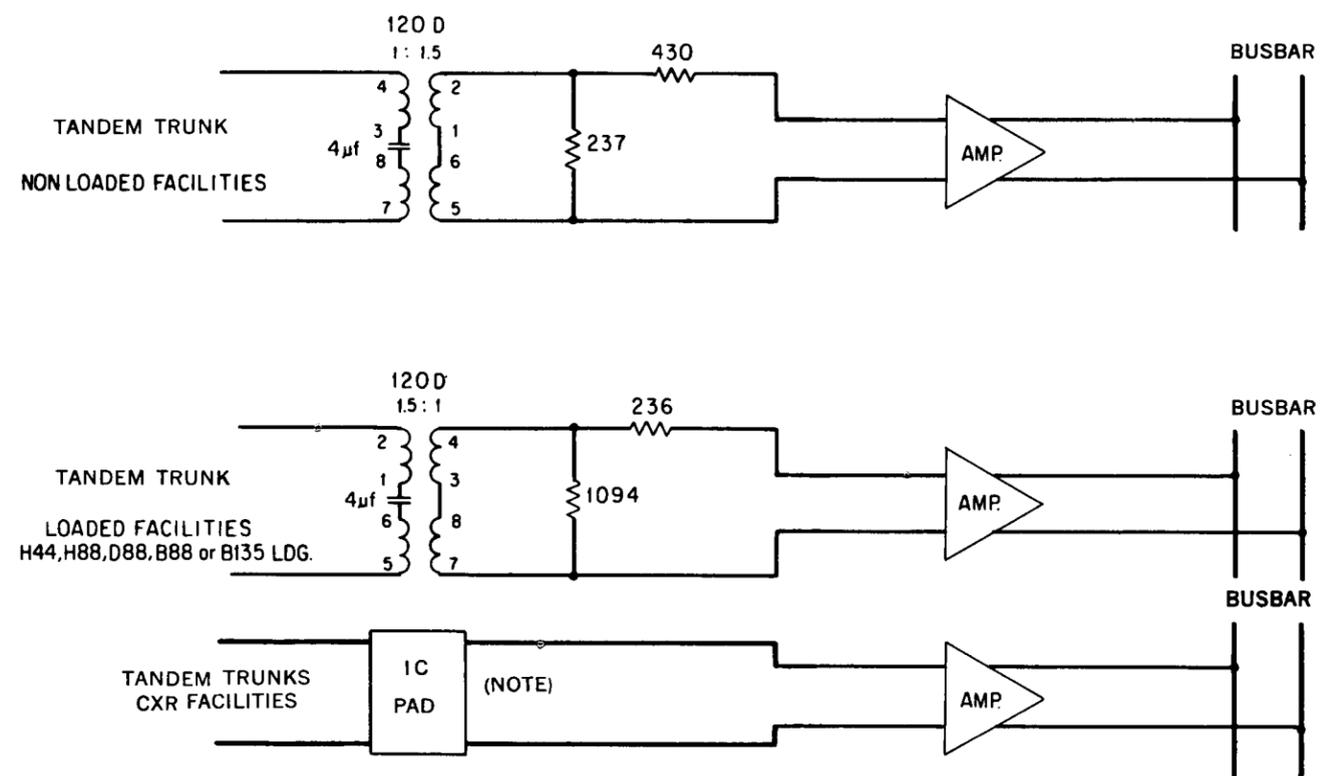
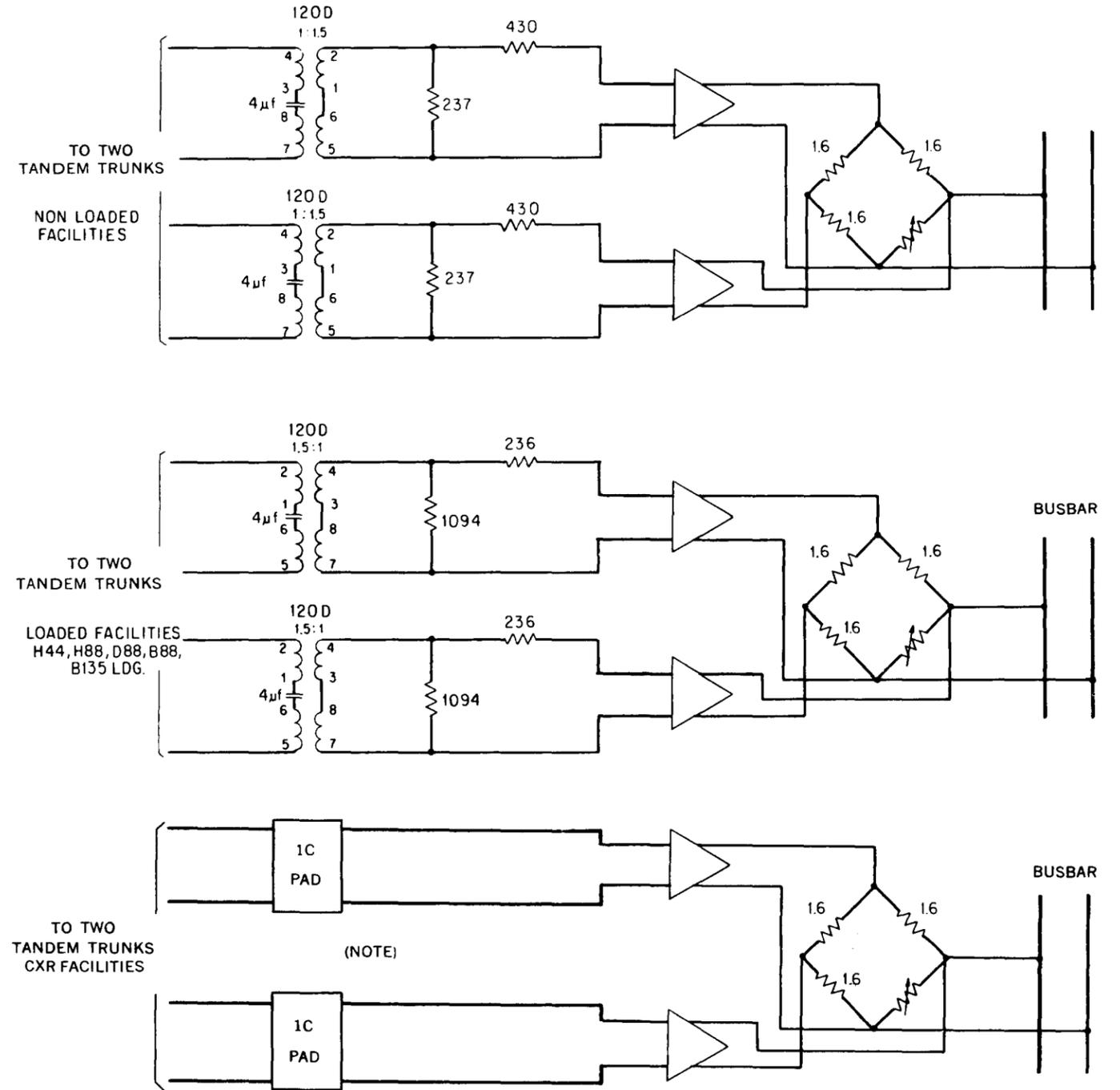


Fig. 7—Main Center—Dual Operation—Reproduce and Monitor



NOTE -  
 PADS MAY BE REQUIRED ON LONG  
 WIRING RUNS TO REDUCE  
 CROSSTALK TO OTHER FACILITIES.

Fig. 8—Subcenter—Single Trunk Arrangement



NOTE:  
PADS MAY BE REQUIRED  
ON LONG WIRING RUNS TO  
REDUCE CROSSTALK TO  
OTHER FACILITIES.

Fig. 9—Subcenter—Two Trunk Arrangement