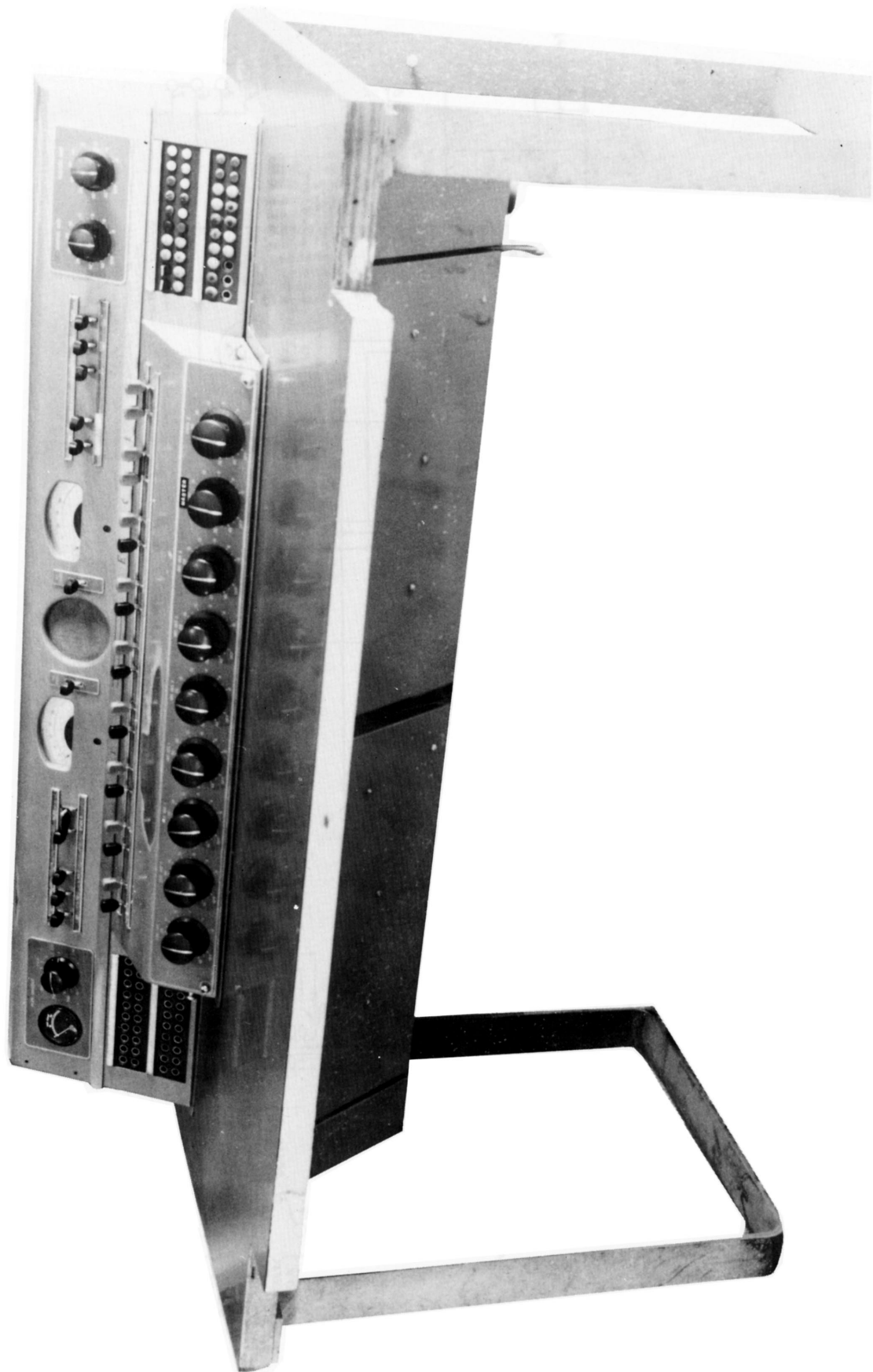


Western Electric Company

No.25-B SPEECH INPUT EQUIPMENT



No.25-B SPEECH INPUT EQUIPMENT

SECTION 1 — GENERAL DESCRIPTION

The 25B Speech Input Equipment is a complete AC operated console type, program production unit for the amplification, control, and monitoring of programs originated by microphones, transcriptions, remote inputs, or equivalent sources. It has two main program channels, capable of simultaneous operation on separate programs without interference. In addition, it has an independent monitoring channel for loudspeaker listening to programs being transmitted through either of the two main channels, or direct from incoming lines or cue circuits. The monitor channel may also be used to feed cue program back to the remote line circuits, or talkback to one or the other of two studio loudspeakers.

Other facilities provided are an audition, or sound reinforcement output with volume control, two VI meters, headset monitoring jacks, and studio light and signalling control circuits; jack termination for 4 other lines in addition to those mentioned above. In addition to provision for use of an external talkback microphone, a mounting is also provided in the console for such a microphone.

The equipment has a 7 channel parallel mixer. Four of these mixer volume controls are associated with four preliminary amplifiers provided in the equipment for operation from a maximum of eight connected microphones (4 simultaneously), or equivalent low level sources. The other three mixers are associated with higher level inputs which may be incoming program lines. By the use of three externally mounted preamplifiers, three additional microphones or other low level inputs may be operated into these mixers. Any combination of the seven simultaneous inputs may be con-

nected to either one or the other of the two main amplifier channels.

A functional schematic diagram showing these facilities and indicating the operation of the equipment, is given on Figure 1. This diagram also shows levels at various points in the system based on a +8 VU level into a 600 ohm outgoing line. It should be noted, however, that the input levels shown are based on minimum loss in the volume controls and that normal input levels will be higher than those shown. A maximum net gain of about 100 db is provided from the low level input terminals to the output line terminals, about 38 db from the high level lines, and about 58 db from the utility inputs to the outgoing line. The monitor amplifier has a gain of about 50 db.

The 25B Speech Input Equipment consists of four principal units. The main unit is a desk style Control Console mounted on a table; this unit contains all the amplifiers and the controls. The table top stands 27½ inches from the floor and is about 55 inches long by about 28 inches deep. The console occupies about 13½ inches in depth at the rear of the table top, and the amplifiers are housed in hinged tray type enclosures below the table top. The over-all height of the console on the table is 36 inches. The control and amplifier enclosures are hinged so that complete and easy access is obtained to all internal wiring and components. The second unit is a wall mounted cabinet containing the filament transformers and plate supply rectifiers. This unit is about 28 inches wide by 10 inches deep by 16½ inches high.

Two flush type wall mounting connection or junction boxes also form part of the equipment. These are furnished with terminal strips

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to which the permanent connections are made. Extending from the front of the boxes are flexible cables terminated in plug-in connectors, with which all connections to the control con-

sole may be made. Outline dimensions are shown on Figure 2; the construction and other equipment characteristics are described in more detail below:

SECTION 2—LIST OF EQUIPMENT

The 25B Speech Input Equipment consists of the following separate components:

2-1. List of Components

40A Control Console
KS-10284 Table
7A Junction Box
7B Junction Box
12A Power Supply

Vacuum Tube Designation	40A Console	Number Required	
		12A Power Supply	Total for Equipment
349A	4	—	4
351A	—	1	1
313C	—	1	1
300B	—	1	1
274A	—	2	2

Outline dimensions of this equipment are shown on Figure 2.

2-2. Vacuum Tubes

The following vacuum tubes are required for operation of this equipment but are not furnished with it and they should be specifically called for on the order:

Vacuum Tube Designation	40A Console	Number Required	
		12A Power Supply	Total for Equipment
1603	6	—	6
348A	8	1	9

Where the recommended tubes are not available, certain substitutes may be employed. These are listed in the particular referenced instruction books which cover the amplifiers and rectifiers which form part of the 25B Speech Input Equipment, in accordance with the following.

Unit of 25B S.I.E.	Component of Unit
40 A Console	129A Amplifier
	130B Amplifier
	131A Amplifier
12A Power Supply	18B Rectifier
	20B Rectifier

SECTION 3—OTHER ACCESSORY EQUIPMENT

The following accessory equipment not furnished as part of the 25B Speech Input Equipment is recommended:

3-1. Patching Cords

The 40A Console is equipped for 3 incoming high level remote program lines and 3 utility inputs which feed through jacks. Also 4 additional line inputs are terminated in jacks on the control console. The use of the P-2AA Cord, 1 foot long, equipped with 241A (black) plugs, or 241B (red) plugs is recommended for patching purposes.

3-2. Monitoring Headset

Jacks connected across the outputs of each of the two main amplifier channels are provided for headset monitoring. These are high impedance (100,000 ohms) outputs. A suitable headset is the D-97690 (high quality) Headset equipped with D-90944 Cord and 47B Plug. The 1002F Headset may also be used.

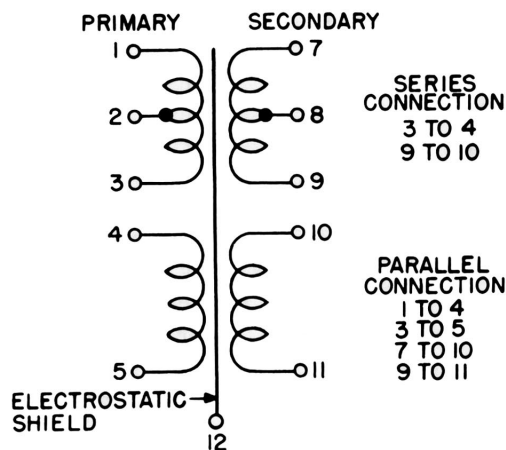
3-3. Repeating Coils

Comments on the use of repeating coils for providing impedance matching or for changing from balanced to unbalanced circuits are given

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in more detail elsewhere in this bulletin. The Western Electric Company No. 177C Repeating Coil is a general purpose coil designed for high quality program circuits and specifically for use with the 25B Speech Input Equipment; brackets and mounting plates for mounting 8 such coils are provided in the 40A Console. Space is available for adding additional brackets to mount 5 more coils if desired.

Winding data on the 177C Repeating Coil is shown below:



All windings are identical except that windings 1-3 and 7-8 have a mid-tap (terminals 2 and 8 respectively). These may be used to provide a mid-ground point for the parallel connection; for the series connection terminals 3 and 9 may, of course, be used. The following connections should be used for impedances between 25 ohms and 600 ohms:

<i>Windings</i>		<i>Operating Impedance Ratios</i>
<i>Primary</i>	<i>Secondary</i>	
Series	Series	600 ohms to 600 ohms or 150 ohms to 150 ohms
Parallel	Parallel	25 ohms to 25 ohms
Series	Parallel	150 ohms to 25 ohms

Terminal 12 is the insulated electrostatic shield. The coil is also equipped with an electromagnetic shield. For severe electromagnetic exposures, an additional shield (No. 42A) may be added externally.

Both repeating coils and shields should be ordered separately as required.

Additional coil mounting brackets and plates may be ordered as follows:

- 2 Brackets per BA-73883
- 1 or 2 Coil Mounting Plates per BA-73884

3-4. 12 Volt Signal Power Supply

The 25B Speech Input Equipment includes all plate rectifier supplies, filament supply transformers, and voltage supply for the three loud-speaker relays provided in the 131A Amplifier. No supply is provided however, for the 12-volt signal and lamp circuits provided in the 40A Console. The KS-7593 Rectifier which will supply up to 1.2 amperes at 12 volts can be ordered for this purpose.

If a 24-volt supply is wanted, the KS-5653 List 3 Rectifier may be employed. In this case the 12-volt signal lamps in the 40 A Console would have to be changed to 24 volts.

3-5. External Pre-Amplifiers

For use of the "Utility" inputs for additional microphone or low level transcription sources, pre-amplifiers mounted externally may be provided. The following equipment is available for this purpose.

For 19" Relay Rack or Cabinet Mounting, the following apparatus is recommended.

3-120B Amplifiers	} or {	1-129A Amplifier
1-177 Type Mounting Plate		1-190 B Mounting Plate
1-296 Type Panel (Face Mat)		1-296 Type Panel (Face Mat)

For mounting in a 21A Cabinet the following apparatus is recommended:

- 1-21A Cabinet
- 1-Terminal Strip per BA-44609 (has 3 terminals)
- 2-Terminal Strips per BL-44607 (each has 10 terminals)
- 1-190A Mounting Plate
- 3-120B Amplifiers, or 1-129A Amplifier
- 1-Mounting Plate per BO-74389 (for mounting up to 4-177C repeating Coils in 21A Cabinet)

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The three external 120B Amplifiers, or one 129A Amplifier, may be operated from the 20B Rectifier in the 12A Power Supply in addition to the 129A Amplifier and 130B Amplifier it operates in the 40A Console. The 20B Rectifier will be more heavily loaded by this addition, however, and rectifier tube life will be reduced to some extent.

The instruction sheets on the 21A Cabinet and 190 type Mounting Plate should be referred to for assembly of this apparatus.

3-6. Talkback Microphone

The 40A Console includes a mounting for a 633A Microphone but the microphone itself is not furnished and should be ordered separately.

SECTION 4—DESCRIPTION OF OPERATION AND TECHNICAL DATA

The operation of the 25B Speech Input Equipment will be described in some detail to assist in the installation, use, and maintenance of the equipment.

4-1. Audio Circuits

The functional schematic diagram, Figure 1, is a simplified version of the complete signal audio schematic shown on Figure 3. Initial reference to Figure 1 will be helpful in following through the more detailed circuits of Figure 3; Figure 4 showing the actual location of the various keys, jacks, volume controls, etc., on the console may also be of interest in this connection. Control designations, K for keys, etc., are the same on all diagrams.

Low Level Inputs to Mixer Circuit. Each of the four microphone keys (K7, K9, K11 or K13) provide a means of selecting either of two microphones, one in Studio A or the other in Studio B, and connecting this source to a preliminary amplifier, one of which is associated with each microphone key. In the mid-position of these keys, the sources and the amplifier inputs are short circuited and grounded. The output of each preliminary amplifier is connected to a 600:600 ohm ladder type mixer volume control (P4 to P7 inclusive).

In addition to the audio circuits on these keys, contacts are provided in the loudspeaker relay control circuit so that when the keys are thrown to the "STUDIO" position the loudspeaker in the studio is cut off, preventing operation of a loud-speaker with a live microphone. Operation of this circuit is described in more detail under "Talkback".

All these circuits are identical, except that the

Talkback Key (K22), is interposed between the key (K7), for microphone No. 1, and the input of preliminary amplifier No. 1.

Line Inputs and Utility Inputs to Mixer. Connections for 7 incoming lines are provided. Four of these are terminated in jacks on the control console. The other three are each normalled through a set of jacks, a 600 ohm to 600 ohm repeating coil (T1 to T3 inclusive) to the "cue-line mixer" keys, (K19, K20 and K21). In the normal or mid-position of these keys, the lines are shorted and the other circuits connected to these keys are open.

In the "line-mix" position of these keys (K19, K20 or K21) the line input is connected through a pad of 20 db loss to the "line-utility" keys. In the "CUE" position of these keys, cue is fed to the line as discussed in more detail later.

The "line-utility" keys (K1, K3 and K5) provide a means for transferring the input to the 3 line mixers (P1, P2 and P3) either to a "line" or a "utility" source. The arrangement of the "utility" input circuits, contemplates levels comparable with the output of the microphone preliminary amplifiers and by use of externally mounted preliminary amplifiers 3 additional microphone inputs or low level transcriptions, are provided for.

The patching jacks associated with the line and utility inputs provide means for substitution of inputs in a variety of combinations.

Seven Channel Mixer. Each of the mixer volume controls (P1 to P7) inclusive, is associated with an individual mixer transfer key, (K2, K4, K6, K8, K10, K12 and K14), which provides means for connecting the output of each mixer to

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either of the two line or main amplifier channels, in any desired combination.

Resistance of 1100 ohms (R1, R3, etc.) are substituted across the line amplifier input in place of each actual mixer volume control output when it is off, or when it is connected to the other line amplifier, so that each amplifier input is always terminated in approximately 150 ohms, i.e., the equivalent of 7 mixer volume controls. The 600 ohm ladder mixer volume controls are built out to 1100 ohms by series resistance R58, R59, etc., to provide proper impedance terminations.

As indicated in Figure 1, a loss of about 16 db is incurred in the mixer network.

Line Amplifier to Output Lines. Two simultaneous programs may be handled separately by the two line amplifiers, each channel being governed in over-all level by separate master gain controls (P8 and P9), between the 1st and 2nd stages of each line amplifier channel.

Output line keys (K15 for Line 1 and K17 for Line 2) provide means for connecting either of the two channels to either or both of the two outgoing lines.

In any combination of positions of the output line keys, both amplifiers and lines are always terminated in 600 ohms by the output network, made up of resistances R15 to R20 inclusive and R41 to R46 inclusive.

Keys K16 and K18, mechanically coupled to Keys K15 and K17 respectively, provide additional contacts for operation of signals, described in more detail below.

Monitor Output. A monitor output is provided in each channel of the 130B Line Amplifier. This output is isolated electrically by 20 db from the program output through a separate winding on the output transformer, and the input level to the monitor amplifier circuit is that much lower than program level.

Audition Channel. Audition key (K30) provides a means of feeding the output of either main program channel to a separate local amplifier system external to the 25B Speech Input Equipment for audition circuits or sound reinforcement in large audience studios.

Monitor Channel. The monitor key, (K29), permits the output of either main program channel to be fed through a volume control, (P10), to the monitor amplifier input (131A Amplifier). Referring to Figure 7, which is a partial schematic showing the talkback control circuits, the monitor amplifier output is normally connected to the loudspeakers in the control room, Studio A and Studio B, except under the following conditions:

- (1) When the talkback keys, (K22 and K23), are operated to Studio A or B thus operating relay S1 in the 131A Amplifier and cutting off the control room loudspeaker, or
- (2) When any microphone key (K7, K9, K11, or K13) is operated to Studio A or B, operating relay S2 or S3 (respectively) thus cutting off Studio A or B loudspeakers as indicated on Figure 7.

Operation of these circuits is further discussed below in connection with the talkback facilities.

Talkback. Talkback to either of the two studios is provided through the use of one of the 4 preliminary amplifiers (preliminary amplifier associated with microphone No. 1), either one of the line amplifier channels and the monitor amplifier. The audio circuit is indicated in simplified form on Figure 1. Transmission from the studio to the control room is through normal monitoring means as already described above. As already described, the operation of the microphone key on the console to connect the studio microphone, disconnects the studio loudspeaker as indicated on Figure 7.

In talking back to the studio from the control room, the talkback key (K22 and K23) is operated from its normal position to the Studio A or Studio B position. In either position, the operation of the talkback key opens the circuit to Studio microphone No. 1, short-circuits and grounds all other microphones in that studio, and connects the control room talkback microphone to the input of preliminary amplifier No. 1. Also, referring to Figure 7, it removes the relay operating voltage from the relay control contacts of the microphone keys for Studio A or B (depending upon the position to which the talkback key is thrown), thus removing the

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operating voltage from relay S2 or S3. This reconnects the studio loudspeaker to the output of the monitor amplifier. At the same time, operation of the talkback key to either Studio A or B position, operates relay S1, cutting off the control room loudspeaker to prevent feedback.

Cue Circuits. Line-cue programs can be fed to the studio and control room loudspeakers (operation of which is automatically prevented in the same room as a live microphone as described above), by operation of a line-key (K19, etc.) to the "cue" position, and the cue key (K28) to the "line" position, with the monitor key (K29) on normal.

Air cue is fed to the monitor loudspeakers with the cue key (K28) to "air cue," with the monitor key on normal, and also to the incoming lines if the line keys (K19, etc.) are operated to the "cue" position.

Also in the normal position of the cue-key (K28) monitor output can be fed to the incoming lines.

VI Circuits. Two volume indicator meters are provided, one connected across each program output. A range key (K24 and K25) for each meter is provided, whereby the sensitivity can be decreased or increased by 5 db. Normally with the 10 db pad in, the meter reads "0" VU when +8 VU is being delivered to the output line. Cutoff keys (K33 and K34) are also provided for each meter.

4-2. Signal and Light Control Circuits

The signal and control circuits provided in the 40A Console consist of keys K26, K27, K16 and K18 (the last two being mechanically coupled to the output line keys K15 and K17 respectively), K31 and K32, signal lamps E1 to E14 inclusive, and associated terminals. these circuits may be used for signalling between the control room and master control, for operating relays or energizing signal indicators at master control, and for operating light signals in the studios. Signal facilities are provided for dispatch of two simultaneous programs.

These facilities may be employed in a number of ways depending upon the method of operation. This, however, is beyond the scope of this

Instruction Bulletin, and this discussion will be confined to the operation of the controls in the 40A Console and a description of the control and signal voltages made available for operation of the external circuits. In many cases, some or all these facilities will not be used.

The signal or control circuits in the 40A Console may be broken down into 3 separate functions, described in turn below. Reference should be made to FIG. 3 in connection with this description.

Studio Light Controls. The "Studio A" and/or "Studio B" keys (K26 and K27 respectively) are thrown to the position "CHANNEL 1" or "CHANNEL 2" depending upon the studio channel assignment.

In either position of the "STUDIO A" key, operating voltage is placed on terminal 130 to operate a "Ready" or "Standby" light in Studio A. Similarly, operating voltage is placed on the "Ready" or "Standby" light circuit for STUDIO B when the STUDIO B key is operated, (terminal 134).

Operation of keys K26 and K27 also cause signal lamps E11 to E14 (one for each of the 4 possible key positions) to light, indicating the position of these keys; i.e., E11 (Channel 1 Studio A) lights with the "STUDIO A" key (K26) in the "Channel 1" position, etc.

The studio "ON AIR" light circuits (terminals 131, 132, 135 and 136) are energized through contacts on the studio keys, K26 and K27, but only if the output line keys (K15 and 16, and K17 and 18) are operated. This is because operating voltage for these circuits is fed through the "STUDIO" and "OUTPUT LINE" keys in series. It will be noted that two "ON AIR" light circuits are provided for each studio to indicate which output line is being fed from the studio.

Signalling Control Room to Master Control. Signal lamps E3, E1, and key K31 provide a signal arrangement for output line No. 1, and corresponding circuit elements for output line No. 2. Key K31 (for output line No. 1) applies the 12-volt signal voltage to terminal 107 and may be used to transmit a signal to master control. At the same time with the strap be-

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tween terminals 107 and 108, lamp E1 is lighted. As provided, this lamp merely indicates that key K31 has been operated so as to make contact. The strap between terminals 107 and 108 may be removed and this circuit wired through circuits at Master Control, if desired. Circuits associated with K-32 and E6 provide similar facilities for output line No. 2.

When voltage is applied to terminal 104 from master control, lamp E3 is lighted. Terminal 124 and lamp E8 function similarly for line No. 2.

Signal or Control voltage is applied to terminals 101, 102 and 103 (associated with output line No. 1) depending upon the position of output line key (K15 and K16) as follows:

<i>Terminal</i>	<i>Condition</i>
101	Output line 1 connected to Channel 2
102	Output line 1 connected to Channel 1
103	Output line 1 not connected

Signal and Control voltages are produced at terminals 121, 122 and 123 similarly, corresponding to the position of the output line key (K17 and K18) for line No. 2.

Output Line Signals at 40A Console and Studio On Air Light Controls. Operation of the output line keys also controls signal lamps on the 40A Console and the Studio "On AIR" light controls. This will be described for circuits associated with output line No. 1.

Operating voltage is fed through a strap connection, terminal 106 to terminal 105, to the output line key for line No. 1 (K16). Signal lamp indication on the 40A Console for the three positions of the key are as follows:

<i>Circuit Condition</i>	<i>Lamp Indication</i>
Line to Channel 1	E4 (Channel 1, Line 1) lighted
Off or Mid-Position of Key	E2 (Go Ahead 1) lighted
Line to Channel 2	E5 (Channel 2, Line 1) lighted

It will also be seen from FIG. 3 that with the output line key operated to either channel that voltage is fed to the contacts of keys K26 and

K27, in such a way that with these latter keys operated, output line indication is furnished on the Studio "ON AIR" light circuits.

The above operation is obtained when the strap between terminals 105 and 106 is in place. By removing this strap and wiring the circuits to master control, the above operation can be made dependent upon control circuits at master control.

Similar facilities are provided for output line No. 2.

4-3. Power Supply Circuits

The schematic of the power supply circuits is shown on Figure 8. Filament and plate voltages for the 131A Amplifier in the 40A Console are supplied from the 18B Rectifier in the 12A Power Supply, and filament and plate voltages for the 129A and 130B Amplifiers in the 40A Console are supplied from the 20B Rectifier in the 12A Power Supply. Loudspeaker cutoff relays in the 131A Amplifier obtain their operating voltages from the 18B Rectifier through circuits in the amplifier (see Instruction Bulletin of 131A Amplifier). The illuminating lamps for the VI meters operate from the 6.3-volt AC filament supply in the 20B Rectifier.

It has recently been determined that biasing the center tap of the filament transformer (either positive or negative) with respect to ground results in noise improvement in some 1603 vacuum tubes. The method used to obtain this bias voltage in the 25B Speech Input Equipment is to strap from terminal 8 of transformer T1 in the 20B Rectifier to terminal 10 of the terminal strip TS1 of the 20B Rectifier, and removing the straps from terminals 6 and 7, and 9 and 10 of TS1 of the 20B Rectifier. The connection from terminal 3 of the 12A Power Supply and terminal 84 of the 7A Junction Box is also removed.

This change was not made in early production of the 25B Speech Input Equipments and can readily be made at the time of installation. Before adding the connection from terminal 8 of the transformer T1 to terminal 10 of TS1 of the 20B Rectifier, make sure the straps from terminals 6 and 7, and 9 and 10 are removed. Also, if this change in wiring is made, no con-

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nection should be made from terminal 3 of the 12A Power Supply to terminal 84 of the 7A Junction Box or to terminal 84 of the 40A Console Control Unit, or to any other ground. Unless such ground is avoided damage to the 313C Vacuum Tube (V5), the reference voltage vacuum tube of the 20B Rectifier, or to other circuit elements of this rectifier may result.

4-4. Technical Data

The functional schematic shown on Figure 1, indicates the system levels when all gain and volume controls are set for minimum loss, i.e., complete clockwise rotation of the control. Insertion losses of the mixer networks, pads, volume controls, etc. may be readily determined from this data. Detailed data on component amplifier and rectifier units will be found in the separate instruction bulletins covering these components. The principal characteristics of the 25B Speech Input Equipment are as follows: All data are typical.

Typical Frequency Response.

Within 1 db—50 cycles to 15,000 cycles per second.

Signal to Noise Ratio

Normally the 40A Console will be operated with about a total of 30 db attenuation divided between the mixer volume controls and the master gain control giving a normal operating overall gain from microphone input to line output of about 70 db. With a peak signal, or single frequency output level of +18 dbm into the line as a reference, the signal to noise ratio is about 70 db, unweighted. For noise levels of individual amplifiers, refer to the amplifier Instruction Bulletins.

Distortion

Less than 1.0 percent for single frequency fundamentals from 50 to 15,000 cycles at a normal output level of +8 dbm. When allowing for a ten db peak factor, less than 1.0 percent for single frequency fundamentals from 100 to 7,500 cycles and less than 1.5 percent for fundamentals from 50 to 15,000 cycles at an output level of +18 dbm.

Source Impedances

Microphone Inputs.....	} 30 ohms nominal. See 129A Amplifier Instruction Bulletin for other input impedances available.
Line Inputs.....	} 600 ohms, nominal.
Utility Inputs.....	} 600 ohms, nominal.
Air Cue Input.....	} 600 ohms, nominal.

Load Impedances

Line Outputs.....	} 600 ohms, nominal.
Audition Output.....	} 600 ohms, nominal.
Monitor Amplifier Outputs.....	} Furnished adjusted for loudspeaker impedances of 3 to 10 ohms. May be adjusted to a wide range of impedances. See Instruction Bulletin on 131A Amplifier. Cue output circuit is 600 ohms.

Over-All Gains

Microphone Inputs to Line Outputs.....	} Approximately 100 db maximum gain.
Remote Line Inputs to Line Outputs.....	} Approximately 38 db maximum gain.
Utility Inputs to Line Outputs.....	} Approximately 58 db maximum gain.
Cue Input to Monitor Output Loudspeakers.....	} Approximately 38 db maximum.
Air Cue to Remote Line.....	} Approximately 6 db maximum.

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Sectional Gains and Network Losses (Refer to Figure 1)

Microphone Input to Mixer Input (Gain of 129A Amplifier Channel).....	41 db gain, maximum.
Line Input to Mixer Input.....	21 db loss, approximately.
Utility Input to Mixer Input.....	0 db loss.
Mixer Network Loss.....	Approximately 16 db (mixer volume control on minimum loss).
Mixer Volume Controls (600 ohms to 600 ohms ladder type attenuator).	20 steps total; 34 db loss in steps of 2 db, then tapered to "infinity" in 3 steps (one of about 8 db and one of about 10 db and last step to off).
Mixer Output to Line Amplifier Output (130B Amp.).	81 db gain maximum.
Master Gain Control (100,000 ohm potentiometer).	Has same steps as mixer volume control.
Line Amplifier Output to Line Output (Network Loss).	6 db loss.

SECTION 5 — INSTALLATION

The 7A and 7B Junction Boxes, and the 12A Power Supply are completely assembled equipments and are shipped ready for installation. The 40A Console, and the KS-10284 Table and the two table legs are shipped separately and are required to be assembled.

5 1. Assembly and Handling Precautions

An assembled view of the equipment is shown in Figure 2. Parts required to assemble the table and console are furnished as follows:

With KS-10284 Table:

12 RHM Screws $\frac{1}{4}$ "—20 \times $1\frac{1}{4}$ " long.....	} For securing legs to table.
12 Washers $\frac{1}{4}$ " \times $1\frac{1}{8}$ " \times $\frac{1}{16}$ ".....	
2 Straps (BA-71660).....	} For tying table legs to rear of console.
2 RHM Screws $\frac{1}{4}$ "—20 \times $\frac{7}{8}$ " long.....	
2 Washers $\frac{1}{4}$ " \times $1\frac{1}{8}$ " \times $\frac{1}{16}$ ".....	} For fastening straps to rear of legs.
2 Hex Nuts $\frac{1}{4}$ "—20.....	

With 40A Console:

2 Washers $\frac{1}{4}$ " \times $1\frac{1}{8}$ " \times $\frac{1}{16}$ ".....	} For attaching table leg straps to cabinet.
2 RHM Screws $\frac{1}{4}$ "—20 \times $\frac{1}{2}$ " long.....	
2 Hex Nuts $\frac{1}{4}$ "—20.....	
5 RHM Screws $\frac{1}{4}$ "—20 \times $1\frac{1}{4}$ " long.....	} For securing console cabinet to table top.

5-11. Assembly of Console and Table. To assemble the KS-10284 Table proceed as follows: The legs are assembled to the underside of the Table top as shown in Figure 2 (view C) by means of 6— $\frac{1}{4}$ "—20 \times $1\frac{1}{4}$ " long round head machine screws and 6— $\frac{1}{4}$ " \times $1\frac{1}{8}$ " \times $\frac{1}{16}$ " washers for each leg. These screws should

be screwed up tightly into the threaded inserts in the table top.

The 40A Console may now be placed to fit into the cut-out portion of the table top by sliding it in from the rear.

The two bend straps should now be attached to

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the rear of the legs and to the cabinet as shown in Figure 2 (view B). To secure the screws and nuts holding the straps, and to fasten the console to the table top, the console should be opened up.

5-12. Internal Access to Console. To accomplish this, loosen the 2 Phillips Head Screws (one of each are at the lower corners of the mixer panel on the console) see view A Figure 2. Lift up the top, using the two knobs at the ends of the mixer panel, making sure the stay hinges lock in place.

The amplifier trays may now be lowered. **PRECAUTION:** First make sure that the trays are locked in place by inspecting the latching handles inside the console. One handle is provided for each tray inside the console at the rear. When the handle is parallel to the back of the cabinet, the tray is locked in place. Each tray is also held in place by two thumb screws underneath the tray at the rear (see figure 2, view A). These should be loosened. By grasping the latch handles inside the cabinet and turning the handle clockwise, the trays may be lowered. Each tray is provided with two hooks, one at each side. By lifting up the tray from the front and engaging the hooks with strike plates underneath the table top, the trays may be held in the open position (see end view A, Figure 2). Normally the thumb screws are not needed to hold the amplifier trays in the closed position and the inside latches are all that are necessary. To restore the trays, the hooks in front are disengaged, and the trays are lifted into place by reaching inside the opened top of the console and grasping the latch handles.

5-13. Assembly of Console and Table Top.

With the console opened up as described above the console cabinet may be secured to the table top from the inside with 5 round head machine screws ($\frac{1}{4}$ —20 \times 1 $\frac{1}{4}$ "') as shown on Figure 2 (views C and D).

5-2. Location of 40A Console and 7A and B Junction Boxes.

It is intended that the wiring permanently installed in conduit be terminated in the 7A and 7B Junction Boxes. From the junction boxes connections are made to the console by means of flexible shielded cables terminated in connectors which plug

into receptacles on the ends of the 40A Console, as shown in view A, Figure 2. This illustration indicates which plug connects to which receptacle. The plugs and receptacles are so chosen that it is impossible to plug into the wrong receptacle.

Due to the fixed length of the cables (approximately 34 inches) the choice of location of the 7A and 7B Junction Boxes relative to the console is limited. These limitations are indicated in views E and F, Figure 2. View E shows the location if the boxes are located outside of the table legs (as in view A), and view F, the location of the boxes, if located inside the legs.

The optimum location is either inside or outside the legs but as close to the legs as possible. From the appearance standpoint the junction boxes should be located within the legs.

The 7A Junction Box should be located at the left end of the console and the 7B at the right end of the console. The boxes differ only in terminal designations, wiring and the fact that the 7B Box has one more cable than the 7A Box. As indicated in view G, the 7A Box handles the incoming circuits (microphones, remote lines, transcription inputs, etc.) and the 7B junction box is used for outgoing circuits, power, and signal circuits.

5-3. Installation of Junction Boxes.

PRECAUTION: While the cables of the junction boxes will withstand many flexings in normal use, the shields have a definite minimum bending radius, and forcing beyond this point may result in breakage of the shield. Owing to the length of the cables it is possible to exert considerable leverage on the joint at the 90° elbow entrance to the junction boxes, and care must be exercised in handling the boxes to avoid excessive strain on the cables.

The terminal strips, associated wiring, and the cables may be completely removed from the box as a subassembly, when the boxes are installed in the wall. This may be done by removing the upper front cover, removing the two screws which hold the tops of each of the brackets, on which the terminal strips are fastened, to the box. The screws holding the lower portion of the front cover on the box are

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then removed, and the cables and terminal strips can then be removed entirely as a complete unit.

The 7A & 7B Junction Boxes are given only a primer coat of paint so that after installation they may be finished by the customer to match the wall or as desired.

5-4. Installation of 12A Power Supply. The 12A Power Supply, consisting of the rectifiers for plate supply and transformers for filament supply, is contained in a wall mounted box shown on Figure 2. A front door hinged on the right gives access to the vacuum tube and apparatus side, and the terminal connections. The rectifiers are mounted on a hinged rack inside the box. Loosening the screws at the top of the upright mounting flanges allows the rectifiers to be hinged down for access to the wiring side and for access to the mounting holes in the back of the box. The box should be secured to the wall with 4— $\frac{1}{2}$ " or $\frac{3}{8}$ " bolts, or equivalent. Washers should be provided underneath the heads of the bolts inside the box. Mounting dimensions, location of terminal strips, clearance requirements for opening the door, and hinging out the rectifiers, are indicated in Figure 2.

5-5. Conduit Layout. The conduit layout will be determined largely by individual studio requirements. In general, however, various types of circuits should be segregated in separate conduits following the same segregation scheme as used in the cables of the 7A and 7B Junction boxes. This is shown on Figures 5 and 9 where the segregation of circuits is indicated by the cable plug and receptacle designation. Additional conduits will, of course, be necessary to provide the desired conduit runs to different locations. A typical arrangement is listed below: Figures 5 and 9 should be referred to in this connection:

Conduits from 7A Junction Box

1. Microphone Inputs
2. Incoming Lines
3. Utility Inputs

Conduits from 7B Junction Box

4. Outgoing Lines
5. Loudspeaker Circuits
6. Warning Light and Signal Control Circuits
7. Audition Output
8. Air Cue
9. Filament Supply (From 12A Power Supply)
10. Plate Supply (Supply)

Conduits from 12A Power Supply

9. Filament Supply
10. Plate Supply
11. 115 V 60 Cycles AC

5-6. Wiring Audio Circuits. All audio circuits in the 25B Speech Input Equipment (with the exception of the line side of the remote line inputs) have one side of the circuit grounded. The advantages of utilizing input circuits with one side grounded in assembled equipments where the method of grounding is controlled by design, have long been recognized. These advantages are: Freedom from radio frequency disturbances, control of the high frequency response of the system, relative simplicity of switching circuits where such circuits are necessary, low and controlled crosstalk in two channel systems, and lower maintenance particularly as to switching and control elements. Furthermore, input circuits having no ground or a center tap ground may be achieved by the use of a suitable repeating coil. Such measures are, of course, only essential where (1) long input circuits on which longitudinal noise may exist, are used; (2) where jack circuits are used in inputs and care is not exercised in proper insertion of plugs; or (3) where care is not exercised in the installation of microphone input wiring to insure shield continuity and segregation of the shield from the input circuit, except at the one point where it connects to the system ground. Ordinarily, except for incoming circuits involving telephone lines, the input sources for studio audio facilities are close to the equipment and the wiring from them is subject to controlled installation. In the 25B Speech Input Equipment all audio

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circuits are of the unbalanced type with one side grounded with the exception of incoming (remote) lines Nos. 1 to 7, inclusive. Lines 1, 2 and 3 are ungrounded on the input side of the repeating coils provided in each of these three lines; on the equipment side of these lines the circuits have one side grounded. Incoming lines 4, 5, 6 and 7 terminating in jacks, are also ungrounded.

In some operating conditions, particularly where lines 1, 2 or 3 are heavily equalized for transmission over a wide frequency range, the gain from the incoming telephone lines may not be sufficient for maximum operating ease. As much as 14 db of additional gain is available by replacing the resistors making up the pads associated with these three incoming lines. The maximum amount of attenuation should be used at all times, with a minimum of 6 db, to avoid the possibility of overloading the first stage of the 130B Amplifier.

The following is a list of resistors for alternate pads for three amounts of attenuation:

	<i>Series</i>		<i>Shunt</i>
6 db	200 ohms	}	750 ohms
10 db	300 ohms		430 ohms
15 db	430 ohms		220 ohms
		R21 to R26	R55, R56 and R57

All resistors are carbon type, and values should be $\pm 5\%$ RMA Standard.

As described in more detail later, mounting facilities are provided, in the 40A Console for mounting up to 8 Western Electric No. 177C Repeating Coils for providing balanced circuits if desired. Additional brackets may be ordered and added to the equipment to mount 5 more coils.

For the external audio wiring, twisted shielded pairs should be employed and the shield should be well insulated so it may be grounded at the 25B Speech Input Equipment only.

The following illustrations will be of assistance in wiring the system:

Fig. 3 Signal and Audio Schematic

Fig. 5 Wiring and Circuit Assignment Information

Fig. 8 Power Supply Schematic

Fig. 9 Power Supply Wiring Diagram

Fig. 10 Wiring Diagram 7A Junction Box

Fig. 11 Wiring Diagram 7B Junction Box

Fig. 12 Wiring Diagram 40A Console

Fig. 13 Wiring Diagram 12A Power Supply

Figures 5 and 9 consolidate this information with respect to external wiring. Figures 5 and 9 are based on the use of the 7A and B Junction Boxes, but the 7A and 7B Junction Boxes need not be used if they do not fit the installation. In this case, the receptacles J51, J52, J53, J54, and J55 in the 40A Console may be removed and connections may be made directly to the terminal strips in the 40A Console. It should be noted that the terminals in the junction boxes are designated the same as the terminals in the 40A Console, and terminals with the same number have the same circuit function.

Figure 9 shows the power supply wiring required between the 12A Power Supply and the 7B Junction Box.

5-7. Wiring Control Circuits. In devising and installing the control and signal lamp circuits, the description in Section 4-2 should be referred to and the following precautions should be noted:

12 Volt DC Supply. A 12 volt signal supply should be used. A 24 volt supply may be used, however, if the 2F lamps (12 volts) in the 40A Console are changed to 2U lamps, or similar 24 volt lamps. All switching contacts in the control circuits are from the "Ground" side of the 12 volt supply connected to terminal 138. It should be noted that all signal circuits in the 40A Console obtain both sides of the 12 volt DC supply from the supply connected to terminals 137 and 138 in the 7B Junction Box (or 40A Console), with the exception of lamps E3 and E8 which are energized by connection to the "Ground" of the supply at master control.

Key Contact Ratings. The control circuits should not be used to operate signal lamps directly (unless having low current requirements) and the current through any key contact should not exceed 0.25 ampere. The Studio "ON AIR"

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and "Ready" lights should therefore be operated through relays, with one side of the relay connected to the circuits from the 40A Console (or 7B Junction Box) and the other side of the relays wired to the side of the 12 volt supply which is connected to terminal 137 in the console. "Spark Killer" filters consisting of a condenser and resistance in series should be connected across all inductive circuits.

Conduit. The control circuits should be run as single conductors in a separate metallic conduit from the 7B Junction Box.

Studio Light Controls. As indicated above these lights should be operated through relays. The "ON AIR" light controls provide for 2 light circuits to indicate the output line in use. If only one such light is desired, 2 relays with their contacts paralleled and their windings connected separately to the signal circuits should be employed. Otherwise false operation of signal lamps in the 40A Console may be obtained. For example, if terminals 131 and 132 are connected together to operate a single relay, operation of, say, the output line key for line 1 applies voltage to terminal 132, and through the cross connection, to terminal 131 also, which would energize the signal lamp for output line No. 2, as well as output line No. 1.

5-8. Adjustments and Special Features. Certain special features and adjustments required before placing the equipment in operation are described below:

5-81. Talkback Microphone. An external microphone connected to terminals 17 and 18 may be employed, or a Western Electric No. 633A Microphone may be added to the 40A Console. A mounting for such a microphone is provided between the two volume indicator meters. A single conductor shielded (red-green) lead connected to the 40A Console terminals 19 and 20 at one end and taped up at the other end near the microphone mounting, is provided for connection to a microphone in the 40A Console. Terminals 17 and 19, and 18 and 20 are strapped together at the terminal strip in the 40A Console to provide a parallel connection of the microphones.

To install a 633A Microphone in the 40A

Console, the rear end of the microphone housing should be removed to expose the terminals, and this part of the housing should be left off, since sufficient clearance is not otherwise available inside the 40A Console. The microphone housing in the console includes a cylindrical rubber pad and a clamp. The screw, by which the clamp is tightened, should be loosened and the microphone inserted within the rubber pad until it is felt to touch the metal screen which closes the opening in the cabinet. It should then be withdrawn about $\frac{1}{8}$ " so that it does not touch the screen and the clamp tightened to hold the microphone in place.

5-82. Balanced Inputs. As mentioned above, the audio circuits (with the exception of incoming lines) have one side grounded. Un-grounded, or balanced inputs can be employed if repeating coils are added. Brackets are provided inside the 40A Console for adding up to 8 No. 177C Repeating Coils. Circuit and wiring modifications required for the microphone inputs are shown on Figure 6.

The repeating coil brackets are located inside the cabinet on the left hand side on the rear wall of the cabinet. Coils on the upper bracket should be mounted with their terminals down and coils on the lower bracket with their terminals up.

Figure 6 shows the electrostatic shield connected to the shield of the input wiring. Other possible connections include connection to the shield of secondary wiring or to the repeating coil primary mid tap, when a mid tap ground is used, etc. The connection giving minimum noise should be employed.

Additional brackets may be ordered as described elsewhere in this bulletin and installed in the 40A Console for additional repeating coils if desired in other output and input circuits.

5-83. Talkback Circuit and Loudspeaker Cut-Off Relays. In order to operate the studio and control room loudspeaker cut-off relays, terminals 69 to 78 should be strapped together as required at the terminal strips in the 40A Console. The description of the operation of this circuit and note 3 on Figure 7, should be referred to in this connection.

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5-84. Loudspeakers. As supplied, the 131A Amplifier is wired to operate loudspeakers having impedances of about 3 to 10 ohms. If the loudspeakers have other impedances, it will be necessary to change the connections and substitute resistance loads in the 131A Amplifier. The bulletin covering the 131A Amplifier should be referred to in this connection.

5-85. VI Meter Sensitivity. Referring to Figure 3, the VI meters are provided with a range key (K24 and K25) such that there are 3 selections of meter sensitivity differing by 5 db, i.e., an increase in sensitivity of 5 db or a decrease of 5 db. In the normal or mid-position of the VU Range Key, and with a +8 VU level into the output line, the line amplifier output level is +14 VU, and loss in the meter circuit and the meter sensitivity is such that the meter reads "O VU". The VU Range Keys then provide a means to also obtain a "O VU" reading with either +13 VU into the line or +3 into the line.

The circuit associated with this meter may be changed to provide other sensitivity adjustments if desired by changing the loss in the pads associated with keys K24 and K25. The proper meter characteristics are obtained when the resistance of the circuit external to it matches its own resistance, i.e., 3900 ohms. Hence when operating across a 600 ohm line, 3600 ohms should be connected in series with

the meter so that the meter looks back at 3900 ohms. The sensitivity of the meter with this series resistance is such that with a level of +4 VU in the 600 ohm circuit, the meter reads "100%" or "O VU". With a +14 VU level at the line amplifier output (+8 VU at the output line), a 10 db loss in a pad is therefore required for "O VU" meter reading.

New resistance pad values for any desired loss, can be calculated by determining the series and shunt arms of a symmetrical T pad having the desired loss for matched input and output impedances of 3900 ohms. A resistance of 3600 ohms is then added to the series arm which is connected to the amplifier output. As a result the combination looks like 7500 ohms from the amplifier.

5-86. AC Line Voltage Adjustments. Adjustments may be required for the AC line voltage in the 18B Rectifier (part of 12A Power Supply), and the instruction bulletin on this rectifier should be referred to.

5-87. Input Impedances. As described in the Bulletin for the 129A Amplifier microphone input impedances of 250 ohms and 600 ohms nominal are also available by changing the terminal connections in the 129A Amplifier. If any changes are made, however, and repeating coils are used, a different connection of the repeating coil may also be necessary.

SECTION 6—OPERATION

After wiring is complete and before putting AC power on the system, vacuum tubes should be placed in the component amplifiers and rectifiers which are listed below in accordance with the instructions given in the individual instruction books covering these units.

129A Amplifier (in left hand tray of 40A Console).

130B and 131A Amplifiers (in right hand tray of 40A Console).

18B and 20B Rectifiers (in 12A Power Supply).

The vacuum tube sockets in these units are marked with the designation of the tubes required.

Also before applying power for the first time all volume controls on the 40A Console should be turned to minimum volume, i.e., full counter-clockwise position, so that in event excessive input exists on any of the inputs, damage will not be done to the VI meters, etc.

6-1. Application of AC Power. A power switch controlling the AC power to the 18B and 20B Rectifiers is located on the front of the 12A Power Supply. In addition the 18B and 20B Rectifiers each has an individual power supply switch which is located on the wiring side of the rectifier units. A check should be made to make sure that these switches are "ON".

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Also, before turning on the power, the potentiometer P1 on the 20B Rectifier should be adjusted as described in the instruction book covering this rectifier.

The main power switch on the front of the 12A Power Supply may now be turned to "ON". The lamps illuminating the VI meters in the 40A Console should light. The plate voltage of the 20B Rectifier may now be adjusted to 275 volts as described in its Instruction Bulletin.

6-11. Plate Current Readings. After this adjustment has been made, the plate currents of the tubes in the amplifiers in the 40A Console may be checked by means of the plate current meter located on the left hand side of the console. A rotary switch associated with the meter permits all plate currents (except for the 131A Amplifier) to be read in turn. Switch positions and the tubes whose plate currents are indicated, are as follows, starting from the "OFF" position of the switch:

<i>Switch Position</i>	<i>Designation</i>	<i>Amplifier</i>	<i>Tube</i>	<i>Channel</i>
1	PM-1-1	129A	V1A	Preamplifier No. 1
2	PM-1-2	"	V2A	Preamplifier No. 1
3	PM-2-1	"	V3A	Preamplifier No. 2
4	PM-2-2	"	V4A	Preamplifier No. 2
5	PM-3-1	"	V1B	Preamplifier No. 3
6	PM-3-2	"	V2B	Preamplifier No. 3
7	PM-4-1	"	V3B	Preamplifier No. 4
8	PM-4-2	"	V4B	Preamplifier No. 4
9	LN-1-1	130B	V1A	Line Amp. No. 1
10	LN-1-2	"	V2A	Line Amp. No. 1
11	LN-1-3	"	V3A	Line Amp. No. 1
12	LN-2-1	"	V1B	Line Amp. No. 2
13	LN-2-2	"	V2B	Line Amp. No. 2
14	LN-2-3	"	V3B	Line Amp. No. 2

The meter is of the percentage type and normal reading of all tubes is 100%. A variation of $\pm 15\%$ from this reading may be considered normal, and an even greater deviation does not necessarily indicate trouble. For actual plate currents and further comments, the individual amplifier and rectifier bulletins should be referred to.

After application of power as described above the 25B Speech Input Equipment is ready for operation.

6-2. Operating Precautions. It is important that the operator have a thorough understanding of the operation and functioning of all controls as described in this bulletin.

6-21. Normal Volume Control Settings. For normal average input levels, the system

gain from microphone input to line output will be about 70 db., i.e., there will be about 30 db loss in the volume controls.

For optimum operation with respect to noise and range of control, this total should be about equally divided between the master gain control and the mixer volume controls, say about a setting of 16 db in the master gain control and 14 db in the mixer volume controls. This will give a working range of about ± 14 to 16 db in each control.

6-22. Overloading. The preliminary amplifiers are designed with adequate margin so that they are not liable to be overloaded by any input source or condition normally encountered. It is possible, however, that with a dispropor-

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tionate setting of controls and with a high line level that the first amplifier stage in the line amplifier (130B) may be overloaded.

Overloading of the last stage of the line amplifier may be avoided by observing the VU meters. It is usual to operate at a VU level not exceeding about 10 db below the single frequency load carrying capacity of the amplifier. In the 25B Speech Input Equipment, this corresponds to about +12 VU at the output terminals. For peaks 10 db higher than this the amplifier output stage would introduce about 1% harmonic distortion (on the peaks

only, however,); comparable additional distortion would be introduced in the line amplifier input stages for levels of about -29 VU or higher at the input.

From the amplifier gain and network loss data, it can be determined that such an input level would exist if, with a +12 VU output level, the master gain control was set for about 34 db loss or more. Hence, danger of overloading exists on signal peaks, at output line levels of more than about +12 VU, or if the sum of the line level in VU plus the master gain control loss setting in db exceeds a figure of about 44.

SECTION 7—MAINTENANCE

In addition to this bulletin, reference should also be made to the bulletins covering the 129A, 130B and 131A Amplifiers and those covering the 18B and 20B Rectifiers.

Normal maintenance will consist of a check of plate current readings at regular intervals as directed under operation, and replacement of vacuum tubes when required. At longer intervals key, jack and relay contacts may require cleaning and potentiometers may require cleaning and lubrication.

7-1. Contacts. Carbon tetrachloride applied with a toothpick may be used to clean relay and key contacts. If this does not clear up noise or poor contact, the contacts should be burnished using a Western Electric 374A Tool.

7-2. Potentiometers. Cleaning of contacts with a cloth moistened with light mineral oil is recommended. A slight film of oil should be left to provide lubrication.

7-3. Location of Trouble. Trouble in the 25B Speech Input Equipment is readily traced and localized by means of the normal operating controls and switches, etc. For example, if the trouble is in one of the two channels of the 130B Amplifier, transfer of all inputs and the output to the other channel would clear the trouble and indicate that the trouble is in the other channel. Similar lines of reasoning apply

to tracing down trouble in other parts of the system.

Schematics and wiring diagrams of the 40A Console, the 7 type Junction Boxes and 12A Power Supply needed for maintenance of this equipment form part of this instruction bulletin. Similar information on the component amplifiers and rectifiers is included in the separate bulletins on these units.

Attention is called to the DC Voltage Data given on the schematic diagrams included in the instruction books on the 129A, 130B and 131A Amplifiers and the 18B, and 20B Rectifiers. In event of trouble a check of the operating voltages will assist in tracing the defect.

Access to the wiring of the component amplifiers is obtained by opening the console and hinging out the amplifier trays. Removal of the cover plates on the bottom of the trays will give access to the amplifier wiring.

CAUTION: Voltages of 275 volts exist at the terminals in the 7B Junction Box, the 40A Console 12A Power Supply (including component rectifiers) and on the wiring side of the amplifiers in the 40A Console.

7-4. Replacement Parts. If replacement parts are required they may be procured through the nearest distributor. Apparatus lists giving ordering information for all component parts of the equipment are shipped with the apparatus.

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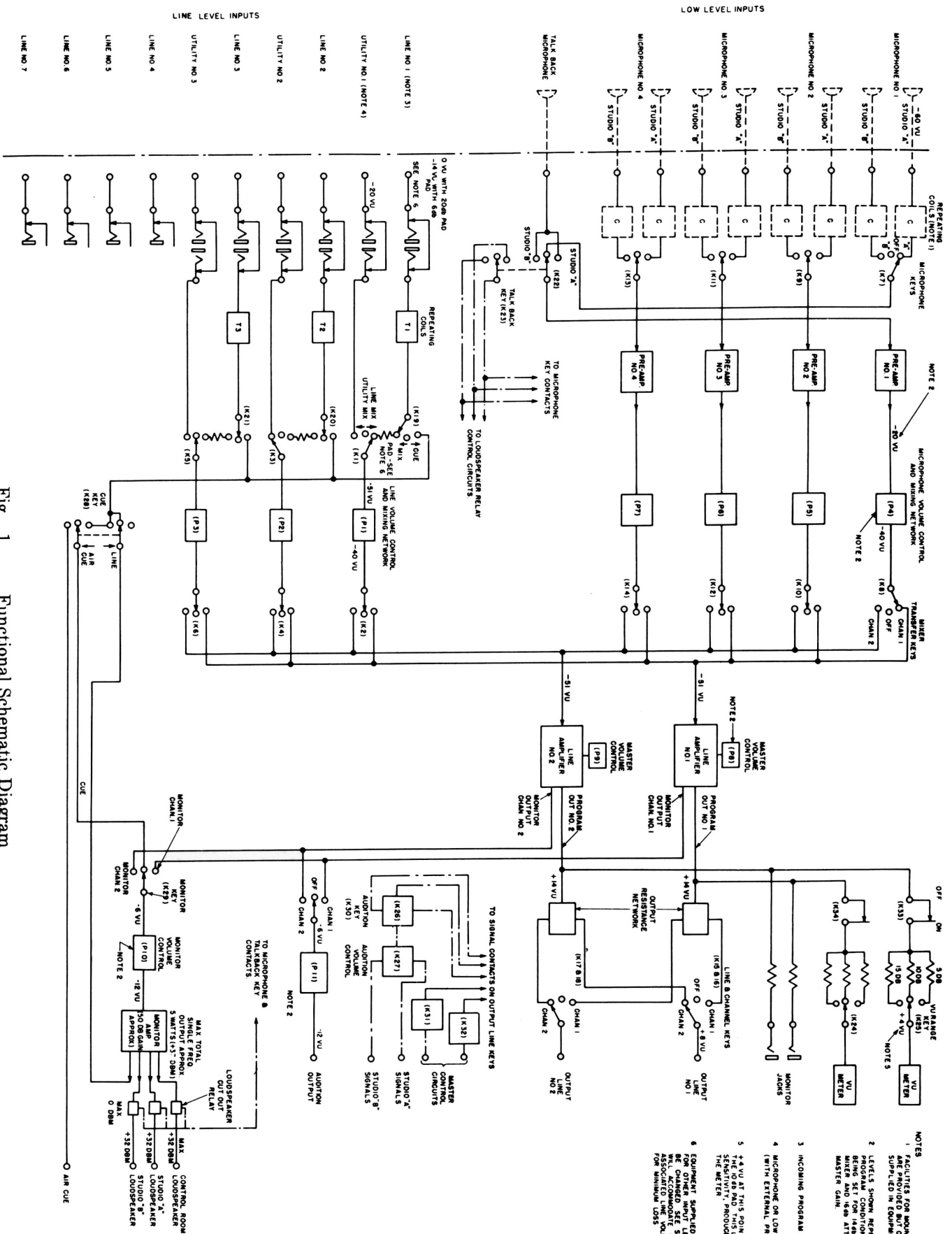
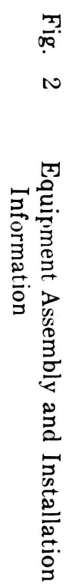
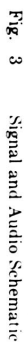


Fig. 1 Functional Schematic Diagram

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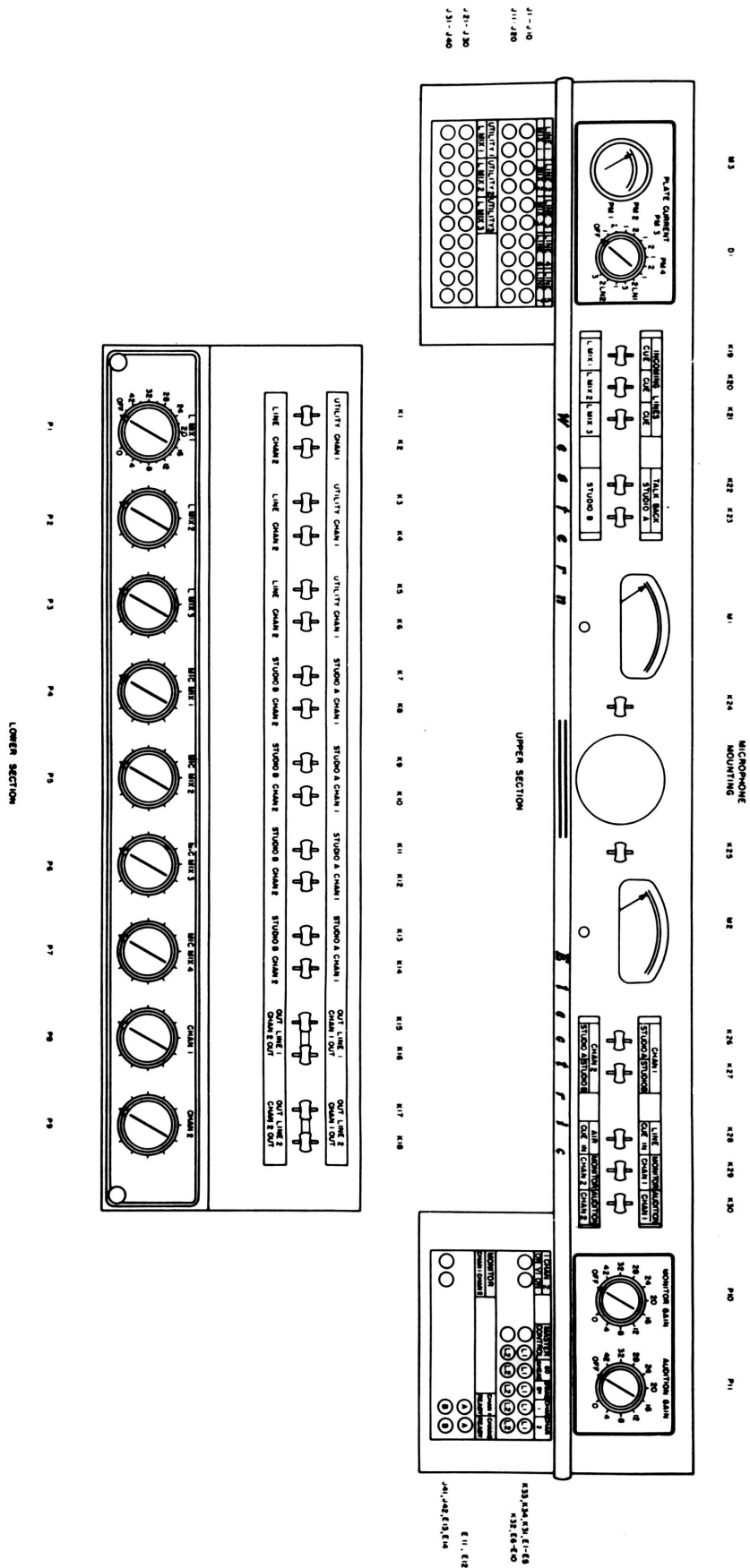


Fig. 4 Control Layout on 40A Console

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INPUT WIRING (SEE NOTE 1)				WIRING INFORMATION	
INPUTS		TERMINALS (NOTE 1)		TERMINALS (NOTE 2)	
MICROPHONE		JUNCTION BOX NO.	TERMINAL NO.	JUNCTION BOX NO.	TERMINAL NO.
NO 1	A	1	-V	7A JUNCTION BOX	1
	B	9	-M		2
	A	10	-L		3
	A	3	-T		4
NO 2	B	4	-S	7A JUNCTION BOX	5
	A	11	-K		6
	B	12	-J		7
	A	5	-R		8
NO 3	A	6	-Q	7A JUNCTION BOX	9
	B	13	-H		10
	A	14	-G		11
	B	7	-P		12
NO 4	A	8	-N	7A JUNCTION BOX	13
	B	15	-F		14
	A	16	-E		15
	B	17	-C		16
TALK BACK CONTROL ROOM	A	18	-D	7A JUNCTION BOX	17
	B	19	-C		18
LINE LEVEL		TERMINALS (NOTE 1)		TERMINALS (NOTE 2)	
INCOMING LINES	LINE NO 1	41	-G	7A JUNCTION BOX	41
	LINE NO 2	42	-H		42
	LINE NO 3	43	-J		43
	LINE NO 4	44	-K		44
	LINE NO 5	45	-L		45
	LINE NO 6	46	-M		46
	LINE NO 7	47	-N		47
UTILITY	NO 1	48	-P	7A JUNCTION BOX	48
	NO 2	49	-R		49
	NO 3	50	-S		50
	NO 4	51	-T		51
	NO 5	52	-U		52
AIR CUE	NO 1	53	-V	7A JUNCTION BOX	53
	NO 2	54	-W		54
	NO 3	55	-X		55
	NO 4	56	-Y		56

OUTPUT WIRING				WIRING INFORMATION
OUTPUT	TERMINALS (NOTE 1)	TERMINALS (NOTE 2)	TERMINALS (NOTE 2)	
JUNCTION BOX NO.	TERMINAL NO.	TERMINAL NO.	TERMINAL NO.	
LINE NO 1	61	-D	61	
	62	-E	62	
	63	-F	63	
	64	-G	64	
ADDITION OUTPUT	78	-H	78	
	65	-J	65	
SPEAKER OUTPUTS	78	-K	78	
	66	-L	66	
	67	-M	67	
	68	-N	68	

NOTE 1. TERMINAL NUMBERS IN 40A CONSOLE AGREE IN WIRING AND CIRCUIT FUNCTION WITH SAME NUMBERED TERMINALS IN JUNCTION BOX.

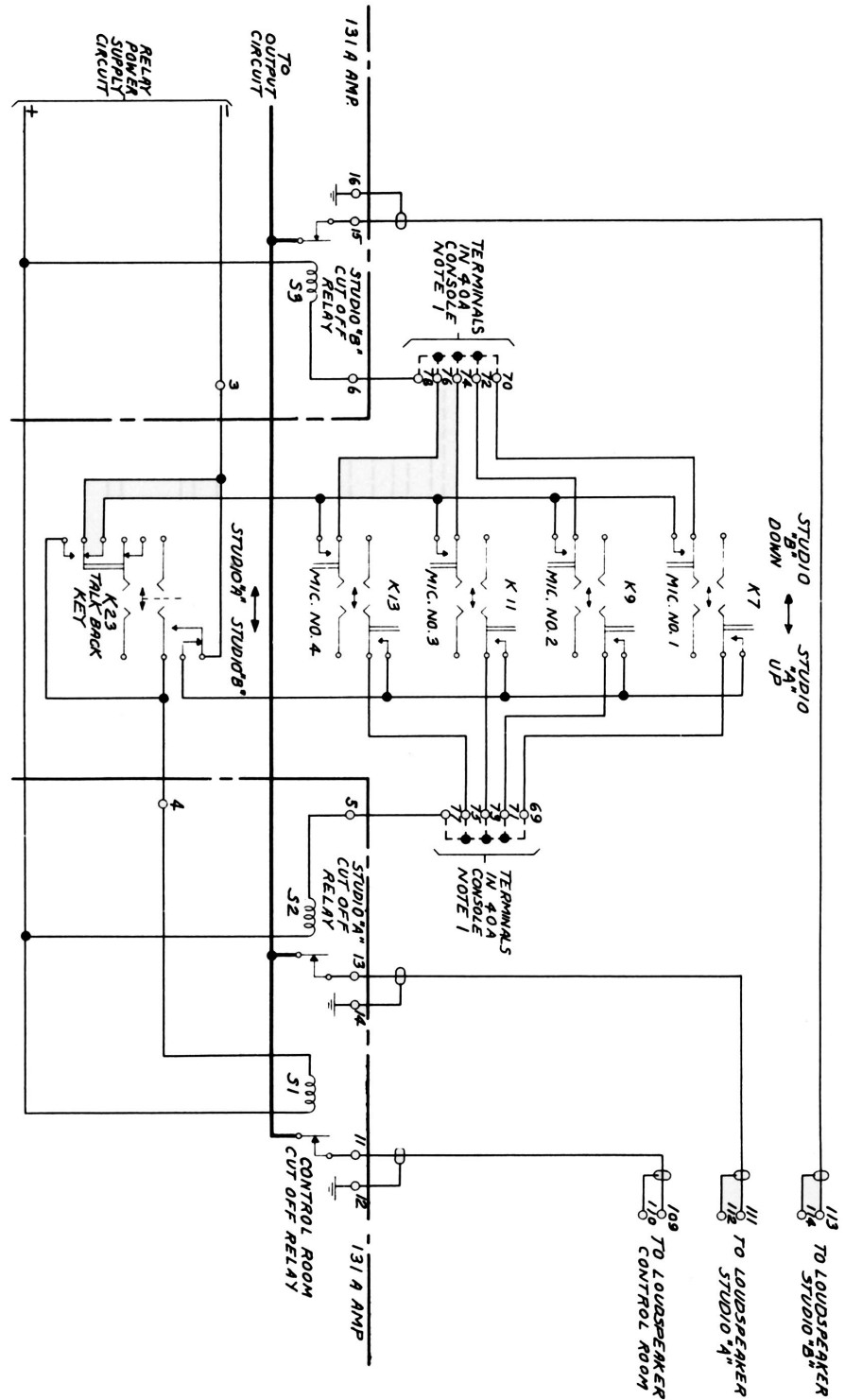
NOTE 2. THIS INFORMATION NOT NECESSARY TO INSTALL EXTERNAL WIRING AND IS INCLUDED ONLY TO ASSIST IN MAINTENANCE.

NOTE 3. SHIELD INDICATES SHIELDED TWISTED PAIR. THE SHIELD SHOULD BE INSULATED FROM GROUND.

NOTE 4. FOR POWER SUPPLY WIRING SEE FIG. 8

Fig. 5 Wiring and Circuit Assignment Information

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NOTE:
1. WITH STRAPPING OF TERMINALS AS SHOWN, ALL LOUDSPEAKER CUTOFF RELAYS OPERATE AS INDICATED BY CIRCUIT CONNECTIONS WHEN KEYS K23, K7, K9, K11, OR K13 ARE OPERATED. STRAPPING SHOULD BE ALTERED AS REQUIRED TO FIT INPUT ASSIGNMENTS. FOR EXAMPLE, IF MICROPHONE 2 STUDIO "B" INPUT IS ACTUALLY A LOW LEVEL TRANSCRIPTION INPUT IN THE CONTROL ROOM, TERMINAL 72 IS NOT INCLUDED IN THE STRAPPING.

Fig. 7 Schematic Loudspeaker Cutoff Circuits in 40A Console

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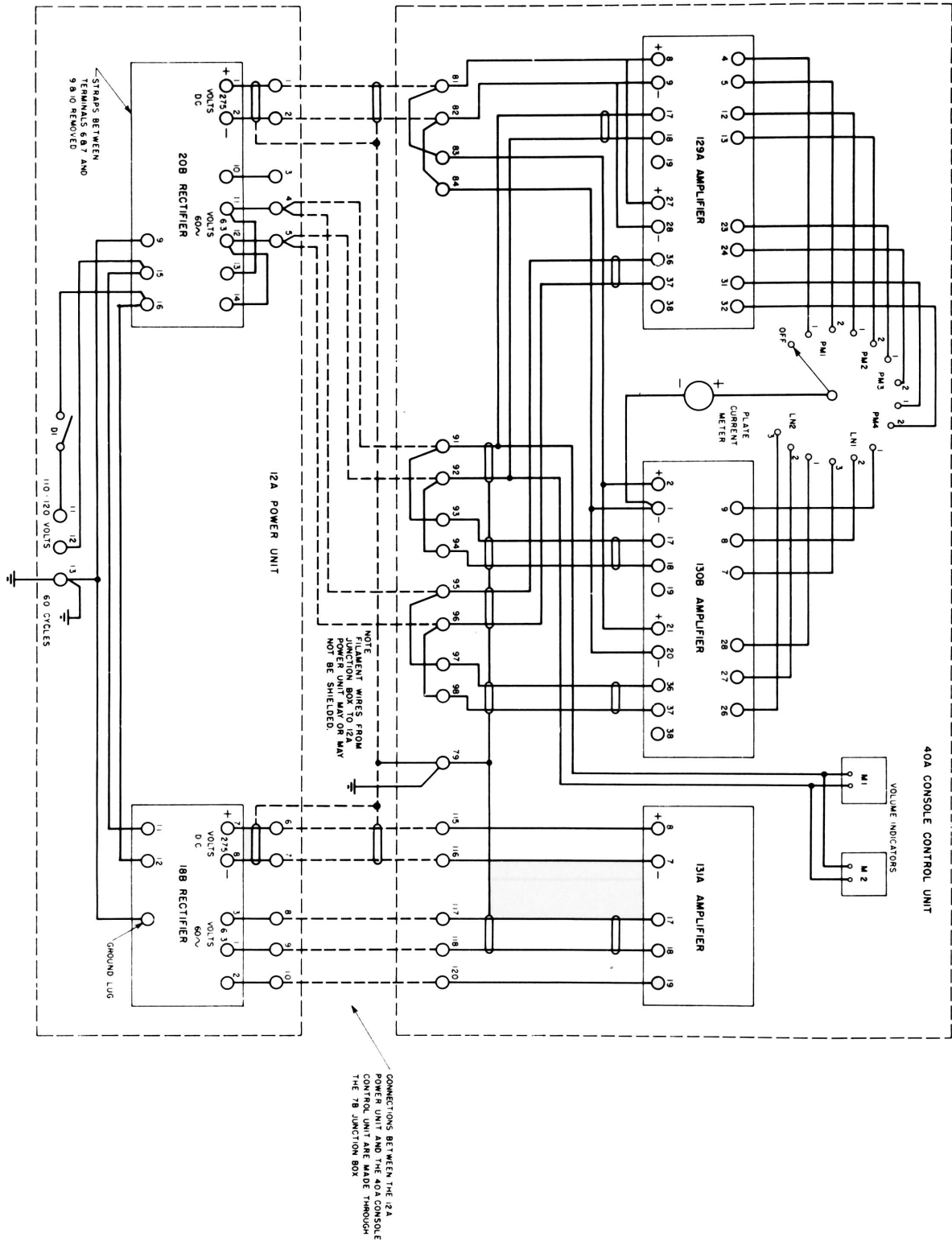


Fig. 8 Power Supply Schematic



No.25-B SPEECH INPUT EQUIPMENT

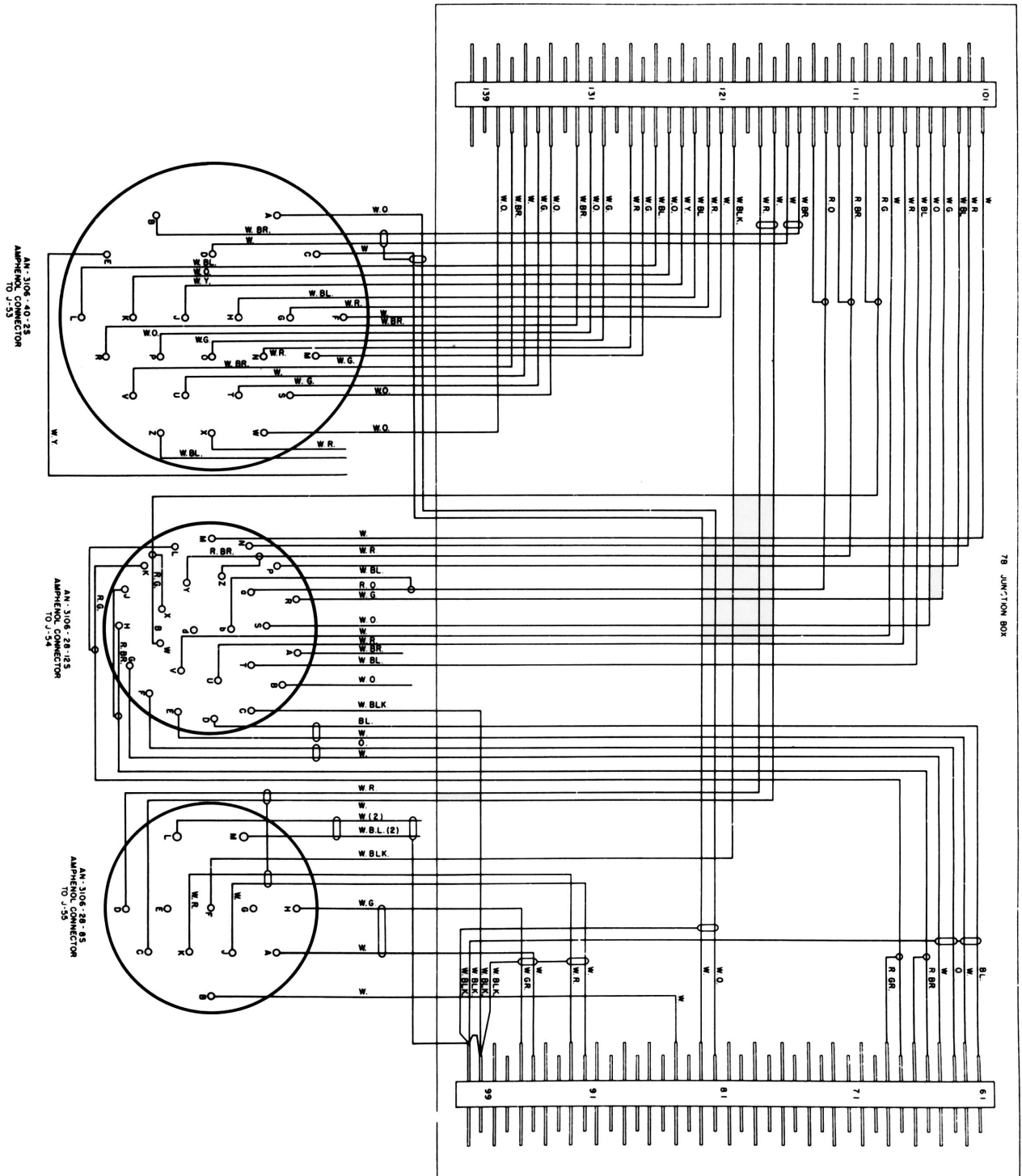


Fig. 11

Wiring Diagram 7B Junction Box