

INSTRUCTIONS  
*for*  
RCA SPEECH INPUT CONSOLETTTE  
TYPE 76-B2  
(MI-11613-A)

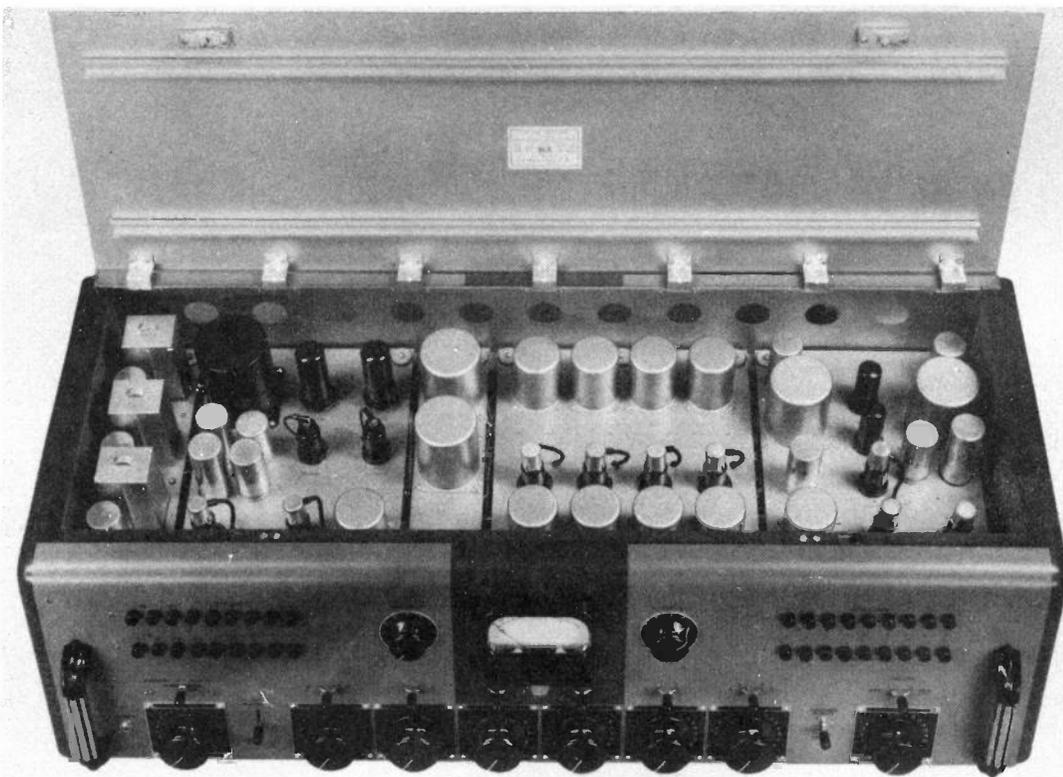


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RCA Manufacturing Company, Inc.

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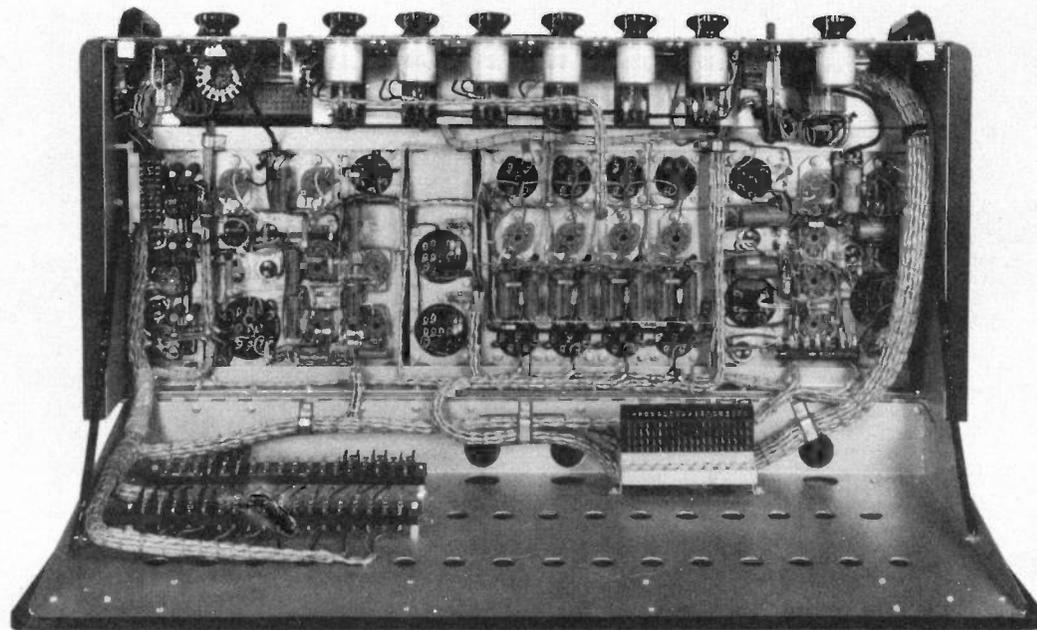
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R3711

FIGURE 1 - TOP VIEW OF TYPE 76-B2 CONSOLETTTE WITH DOOR OPEN.



R3712

FIGURE 2 - BOTTOM VIEW OF TYPE 76-B2 CONSOLETTTE WITH CHASSIS RAISED.

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## PART I - INSTALLATION

### I. TECHNICAL DATA

#### POWER REQUIRED

(A) 1 MI-11301-A Power Unit, or,

(B) a-c - d-c Supply:

(1) Plate (d-c):

<u>Term. #</u>	<u>Volts</u>	<u>Milliamperes</u>
116	345	60.0
115	185	1.5
114	290	5.5
104	280	43.0
105	205	4.8
106 Reg.	235	17.0
Emg.	195	14.0

(2) a-c Filament:

<u>Terminals</u>	<u>Volts</u>	<u>Amperes</u>
#112 & #113	6.2	2.7
#109 & #110	6.2	1.6
#107 & #108	6.2	0.3
#101 & #102	6.2	2.4

(3) d-c Relay:

<u>Terminals</u>	<u>Volts</u>	<u>Milliamperes</u>
#117 & #118	60	110

#### RADIOTRONS

- 11 RCA-1620 (Metal) or \*11 RCA-6J7
- 2 RCA-1621 (Metal) or \* 2 RCA-6F6
- 2 RCA-1622 (Metal) or \* 2 RCA-6L6

\* May be used when maximum uniformity of characteristics, and minimum of microphonics, hum, and distortion are not required.

#### GAIN

(A) Microphone Input to Line Output:  
112 db

(B) Transcription Input to Line Output:  
82 db

#### GAIN (continued)

(C) Line Input to Line Output:  
55 db

(D) Microphone Input to Monitor Output:  
110 db

(E) Transcription Input to Monitor Output: 81 db

(F) Line Input to Monitor Output: 54 db

(G) Cue Input to Monitor Output: 34 db

(H) Talk-Back Input to Monitor Output:  
96 db

(I) Line Output to Monitor Output:  
30 db

(J) Microphone Input to Emergency Line Output: 90 db

(K) Remote Line Through Override:  
29 db (approximately)

#### LINE OUTPUT LEVEL

Normal, +16 db\*\* with 0.5% r.m.s. Harmonic Distortion from 50 to 7,000 Cycles

Maximum, +26 db\*\* with 1.0% r.m.s. Harmonic Distortion from 50 to 7,000 Cycles

#### INPUTS

(A) Six 30/250-ohm microphone inputs  
(Balanced)

(B) Six 150/300/600-ohm line inputs  
(Balanced)

(C) Two 250-ohm transcription inputs  
(Unbalanced)

(D) One 250-ohm talk-back microphone  
(Balanced)

(E) Five 20,000-ohm monitor cue lines  
(Balanced)

\*\* Note: 0 db = 0.001 Watts

TRADEMARK "RADIOTRON" REG. U. S. PAT. OFF. BY RCA MFG. CO., INC.

## OUTPUTS

- (A) One 500/600-ohm line
- (B) Three 15-ohm monitor lines
- (C) One high-impedance headphone output  
(2,000 to 5,000-ohms)

## LINE OUTPUT NOISE LEVEL

At Normal (72 db) Gain  
60 db below Normal Output (+16 db\*\*)

## DISTORTION

- (A) Microphone Input to Line Output:  
0.5% r.m.s. Harmonic Distortion  
from 50 to 7,000 cycles, with normal  
output of +16 db\*\*
- (B) Microphone Input to Monitor Output:  
4.0% r.m.s. Harmonic Distortion from  
50 to 7,000 cycles, with 8.0 watts  
output.

## FREQUENCY RESPONSE

- (A) Microphone Input to Line Output:  
 $\pm 2.0$  db 30 to 15,000 cycles.
- (B) Microphone Input to Monitor Output:  
 $\pm 2$  db from 30 to 15,000 cycles  
(Audition Channel)

## MONITOR POWER OUTPUT

- (A) 4.0 Watts (+36 db\*\*) with 2% r.m.s.  
Harmonic Distortion from 50 to 7,000  
cycles.
- (B) 8.0 Watts (+39 db\*\*) with 4% r.m.s.  
Harmonic Distortion from 50 to 7,000  
cycles.

## PHYSICAL SPECIFICATIONS

(Overall)

- Width - 39 Inches
- Depth - 17 Inches
- Height - 10½ Inches
- Weight - 135 Pounds (Unpacked)

## 2. GENERAL DESCRIPTION

The Type 76-B2 Console has been designed for use in Broadcast Speech Input Installations to provide a complete and flexible system in one conveniently arranged control cabinet. All the necessary functions of switching, mixing, and amplifying the audio outputs of microphones, transcription turntables, or remote lines, auditioning, and monitoring are accomplished in a single console.

The Type 76-B2 Console consists of a cabinet containing the amplifiers, relays, transformers, etc. mounted on a hinged chassis, and a sloping panel on which are mounted a large type vu meter, attenuators, switches, controls, jacks, etc. The vu meter is also used in connection with the "Tube Check" switch for checking the condition of the Radiotrons.

The Radiotrons are easily accessible for inspection and servicing by raising the lid of the Console. Two spring catches are made flush with the lid and are operated by turning through 90 degrees with a thin coin or small screwdriver.

The entire upper section of the Console is hinged along the back and may be raised for reaching the terminal boards, or for servicing the amplifiers and other components. Three terminal boards for external connections are provided, and the high level audio terminals are separated from the low level terminals. See Figure 2.

Metal tubes are used throughout, and in order to secure minimum vibration, the high gain tubes are rubber shock-mounted on their respective mounting plates. These tubes are actually double shock-mounted since the mounting plates are also shock-mounted.

Five rubber-cushioned mounting plates are located on the hinged chassis as follows (left to right):

- (1) Relay Mounting Plate, on which are mounted the three relays, capacitors, resistors, etc. Two Terminal Boards used for easy change over from two (or three) studio to single studio operation are also located under this plate.

- (2) Monitor Amplifier Mounting Plate, on which are mounted the components of the monitor amplifier and monitor amplifier booster stage.
- (3) Line Transformer Mounting Plate, on which are mounted the two line transformers and associated resistors.
- (4) Pre-Amplifier Mounting Plate, on which are mounted the four pre-amplifiers.
- (5) Program Amplifier Mounting Plate, on which are mounted the components of the program amplifier and the program amplifier booster stage.

### 3. AUXILIARY EQUIPMENT

The additional apparatus required to provide complete operation of this equipment will depend partly, of course, on the individual installation, including the number and arrangement of studios and booths, etc. The type of installation described in this book has been designed to fulfill as completely as possible the average requirements of a broadcasting station for which the equipment is intended. These instructions will also serve as a guide to the customer in case his installation is not exactly as described herewith.

- (A) *Microphones.* This equipment will normally handle two microphones in each of two studios, a fifth microphone (for announcing) in the control room, and, if desired, a sixth microphone for an announce or transcription booth. Terminals #9-10, and #47-48 may be connected in parallel when the same microphone is used for control room announcing and talk-back. It is recommended that RCA 44-BX, 74-B, 77-B1, or 77-C1 Ribbon Type Microphones be used for program pickup. The RCA 88-A Pressure Microphone will generally be found satisfactory for control room announce purposes. An RCA MI-6226-A Aerodynamic Microphone and MI-6227 Table Stand are suggested for the talk-back circuit.

- (B) *Microphone Stands.* The quality and type of stands required depend on the number and type of microphones to be used. The most suitable program type floor stand for use with all the above mentioned microphones is the RCA-Type 90-A. However, a lower priced stand (MI-4068-A) is also available for use with all except the 44-BX Microphones.

The Type 91-A Announce Type Desk Stand should be used with the 44-BX Microphone, and the Type 91-B Desk Stand is recommended for use with the other microphones.

- (C) *Transcription Turntable.* RCA Type 70-C Transcription Turntables are recommended. The Type 72-C Recording Attachment and 71-C Vertical Pickup Attachment may be used with the Type 70-C Transcription Turntable.
- (D) *Type 73-A Deluxe Recorder.* If the highest quality recordings are desired the Type 73-A Deluxe Recorder is recommended.
- (E) *Recording Amplifier.* The Type 82-B, 82-C, or 94-D Amplifiers are recommended for driving either the Type 73-A or 72-C Recorders.
- (F) *Loudspeakers.* The RCA Type 64-B (MI-4410 Speaker Mechanism in MI-4400 Cabinet) Loudspeaker should be used in the control room, lobby, studios, and listening rooms where the greatest fidelity is required. Type UZ-4309 Loudspeaker Units mounted on suitable baffle boards are also satisfactory for high quality reproduction. In the event that high-fidelity reproduction is not required for the studios, and announce booth, the RCA MI-6261 with MI-6294 Cabinet is recommended.
- (G) *Studio And Announce Booth Light Relays.* See Section 5 on "Addition of Signal Lights" on page 10.

- (H) *Announce Booth Speaker Relay And Power Supply.* See Figure 14 "Announce Booth Operation" on page 19 . The MI-11703 Relay is complete with capacitor and resistors. A Type 79-A Power Supply may be used.
- (I) *76-B2 Power Supply.* The MI-11301-A Power Supply Unit. See Section 1 - "Technical Data".
- (J) *Conduit Terminating Box.* See Figure 7 "Installation Diagram" on page 14 . In many cases the conduit terminating box is fabricated by the electrician, or made up on special order. In such cases, the mounting flanges may be turned outward, instead of inside, as shown by Figure 7 .
- (K) *6 DB Pad For Telephone Line.* See Figure 3 on this page. This 600-600-ohm pad is placed between the output of the Type 76-B2 Console and line jacks in order to permit the Type 76-B2 Console to operate into a constant impedance at all times.

The resistors comprising this pad may be ordered as follows:

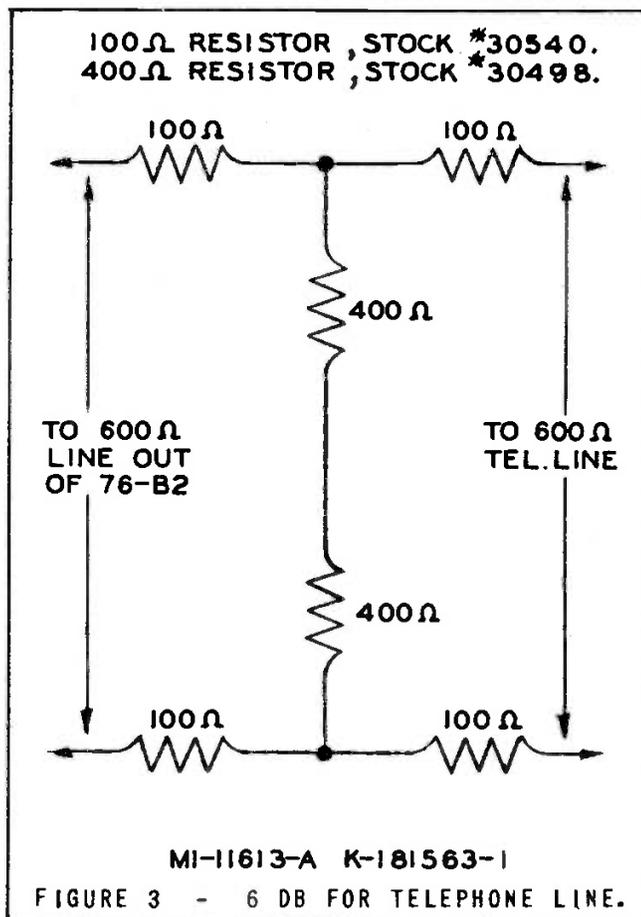
- 100-ohm Resistor, Stock #30540, (4 required)
- 400-ohm Resistor, Stock #30498, (2 required)

When this 6 db pad is inserted in the telephone line the V.I. Meter will read the output of the Type 76-B2 Console to the pad and not the program level to the line. In order to read the actual program line level it will be necessary to subtract 6 db for the loss in the pad. This may be done by changing the connections to the V.I. attenuator as shown in Figure 9 page 15 .

- (L) *Type 9-AJX Rack Or MI-11500 Wall Box.* See Figure 11 "Typical Station Conduit Layout". The line jacks, line equalizers, and 6 db telephone line pad may be mounted in an MI-11500 Wall Box, or on a Type 9-AJX Rack if more space is required than provided on the MI-11500 Wall Box. The MI-11500 Wall Box will accommodate up to 4 MI-4645 (Type 33-A) or 6 MI-4646 (Type 33-B) Jack Panels and 1 MI-4162 Type 56-E Line Equalizer.

- (M) *Radiotrons.* The types and number of each required are listed under section 1 "Technical Data" on page 5 .

- (N) *Wall & Floor Outlets, For Microphones, Signal Lamps, Loudspeakers, And Turntables.* Refer to Figure 11 "Typical Conduit Layout" on page 16 . The outlets and boxes recommended are listed in Figure 11 .



#### 4. LOCATING AND CONNECTING EQUIPMENT

- (A) *Location Of Equipment.* Because of the flexibility of the Type 76-B2 Equipment, suggestions only can be offered in this respect. See Figure 11 "Typical Conduit Layout" on page 16. The Type 76-B2 Console, the MI-11301-A Power Supply, the talk-back microphone, and the monitoring loudspeaker are normally located in a control room between the studios, with glass windows between the control room and studios so that the control operator can observe the action in the studios. The transcription turntables are usually located in the announce and transcription booth, but in certain cases may be located in the control room. The Console is normally located on a desk or table, the power supply being mounted on the wall of the room. The exact location and layout of the equipment depend on the architectural arrangement of the station and other conditions of the specific installation.
- (B) *Wiring To Type 76-B2 Console.* All external wiring should be connected to the Console through the three terminal blocks on the base of the cabinet and which are available by lifting the chassis. The audio terminal board with solder type terminals is at the right and rear of the base (when facing from the front), and the two power terminal boards with solder and screw type terminals are on the left hand side of the base. The audio and power leads should be kept as far apart as possible at all times.

Refer to Figure 7 "Installation of Type 76-B2 Console" and Figure 8 "Location of Conduit Holes in Type 76-B2 Console". Four 1-5/8 inch diameter conduit holes are located in the rear of the Console, and four similar holes are located in the base. Referring to the typical installation in Figure 7, the four flexible conduits run from the base (or rear) of the Console to the Conduit Terminating Box located in the floor (or wall). Four 1-5/8 inch diameter holes are drilled in a section of the junction box and the conduits terminated to this section. The leads can then be pulled through the other opening in the conduit box.

**IMPORTANT:** All shielded leads to the Console should not be cut at the junction box, but should be pulled through in a continuous piece to the Console.

Connection information is provided by Figure 12 "Conduit List". Figure 12 also lists the lead sizes to be used and the conduits in which the leads should be run. For example: Conduit #2 runs from the power box to terminals #21 and #22 of the 76-B2 Power Supply (MI-11301-A). This circuit is the AC supply and 1 pair of 600-volt stranded shielded twisted leads is used.

Care should be exercised when attaching conduits to the rear of the Console to avoid damaging the shielded cables of the Console. If necessary, the hold-down clamps may be loosened and the shielded cables moved slightly in order to facilitate adding the fittings to the conduits. The clamps should then be replaced.

Refer to Figure 10 and Figure 13. These figures contain information for terminal strapping for 1, 2, or 3 studios. As shipped from the factory, the Console is connected for 2 studio operation, and the terminal strapping for these two terminal boards must be changed as shown in Figures 10 and 13 if 1 or 3 studios are used.

- (C) *Wiring To Auxiliary Equipment.* All conduits are arranged so that AC power leads are not run in the same conduit with audio leads, and that low level audio leads are not run in the same conduit with high level audio leads or loudspeaker field supply leads. The power for 1, 2, or 3, 100-volt, 1,000-ohm, 10-watt loudspeaker fields may be obtained from the MI-11301-A Power Supply. The instructions in the Power Supply Instruction Book should be carefully followed. If other speakers which have different field voltages and power ratings are used, a separate field supply unit (or units) such as the RCA Type 79-A, or similar, must be provided.

- (D) *Audio Input Connections:* The audio input terminals of the Consolette are normally connected for microphone and input line impedances of 250-ohms, and the input terminals are connected to the 250-ohm terminals (terminals 1 and 6) of the transformers T-1, T-2, T-3, and T-4. Should it be desired to use 30-ohm microphones or lines, the input terminals must be disconnected within the Consolette from the 250-ohm primaries of the input transformers T-1, T-2, T-3, and T-4, (terminals 1 and 6), and connected to the 30-ohm primary terminals (2 and 5).

As indicated on Figure 16 page 21 (Schematic Diagram) terminals #1, #3, #5, and #7 of the inputs should be connected to similar terminals of RCA microphones for proper phasing.

On many types of remote lines, the frequency response of the line can be improved with or without equalizers by operating them into 150-ohms. This can be done by reconnecting T-9 and T-10 for 150-ohms on their inputs. (Remove the ground wire and jumper between 3A and 1B and reconnect 3A to 3B and 1A to 1B).

- (E) *Audio Output Connections.* The line-out terminals (#79 and #80) of the Consolette are designed to operate into a 500-600-ohm telephone line. On some types of telephone lines it is advantageous to insert a 6 db pad between terminals #79 and #80 and the telephone line (See Section 3-K).

## 5. ADDITION OF SIGNAL LIGHTS

### (A) *STUDIO "ON AIR" AND "AUDITION" SIGNAL LIGHTS*

- (1) *EQUIPMENT REQUIRED:* For the typical layout shown in Figure 11, the following equipment is required for the two studios:

- 4 MI-11702 Relays and Capacitors
  - 2 Mounting Boxes. See Figure 6.
- Studio light equipment; type to be selected by customer to harmonize with the architectural treatment of the studio

Note: The 0.5 Mfd. capacitors are not required on the 4 relays.

- (2) *LOCATION, MOUNTING, AND WIRING.* The relays should be mounted in metal boxes as shown in Figure 6 and located near the respective studios. Conduits #1, #5, #11, and #33 are the studio lights. Figure 16 provides connection information. The relays energizing voltages are obtained from the MI-11301-A Power Supply through the following terminals on the Consolette:

- #124 Common Terminal for Studio "A" "On Air" and "On Audition" relays
- #125 For Studio "A" "On Air"
- #123 For Studio "A" "On Audition"
- #127 Common Terminal for Studio "B" "On Air" and "On Audition" relays
- #126 For Studio "B" "On Air"
- #128 For Studio "B" "On Audition"

### (B) *CONTROL ROOM "ON AIR" SIGNAL LIGHT*

- (1) *EQUIPMENT REQUIRED:* If the control room "On Air" light, shown in Figure 11, is to be installed the following equipment is required in addition to that above.

- 1 MI-11702 Relay and Capacitor
- 1 Mounting Box. See Figure 6.
- 1 Resistor, 175-ohms, 10-watts

- (2) **LOCATION, MOUNTING, AND WIRING.** The relay should be mounted in metal box as shown in Figure 6, and located near the control room. Conduits #43 and #45 shown in Figure 11 are for the control room light.

The relay energizing voltage is supplied by the voltage drop across the 175-ohm, 10-watt resistor connected in series with the high side of the relay supply circuit from the MI-11301-A Power Supply. See Figure 13.

Connections should be made as follows:

1. Connect the high side of the relay supply circuit from the MI-11301-A Power Supply to terminal #122 instead of #118 on Consolette.
2. Connect terminal #118 to #121.
3. Connect the 175-ohm, 10-watt resistor across the control room "On Air" light relay.
4. Connect control room light relay to terminals #121 and #122 on Consolette.

### **(C) CONSOLE SIGNAL LIGHTS**

Plug buttons (one at either side of the meter) are mounted in the front panel and wiring is provided to facilitate the addition of two signal lamp jacks. Signal lights, such as "Pre-Set" and "On Air", which can be operated from the master control room in large studio installations can thus be used. Terminals #67, #68, #69, and #70 are provided for external connections (See Figure 16). The following equipment is recommended:

- (a) Lamp Jack, RCA Catalog #26562 (Two required)
- (b) Lamp, RCA Catalog #26563 (Two required)
- (c) Lamp Cap (Red), RCA Catalog #17930 (One required)
- (d) Lamp Cap (Green), RCA Catalog #17931 (One required)

## **6. INSTALLATION OF ANNOUNCE BOOTH SPEAKER AND "ON AIR" SIGNAL LIGHT**

### **(A) EQUIPMENT REQUIRED:**

- 1 MI-11702 Relay and Capacitor
- 1 MI-11703 Relay and Capacitor
- 1 Mounting Box. See Figure 6.

**(B) LOCATION, MOUNTING, AND WIRING.** Refer to Figure 14 which provides connection information. The relays may be mounted in steel boxes as shown in Figure 6. The relay energizing voltages are obtained from the Type 79-A Power Supply, and controlled through terminals #75 and #76 of the Consolette. The booth speaker audio power is obtained through terminals #135 and #136 of the Consolette. The 15-ohm, 5-watt, resistor replaces the loudspeaker voice coil when the loudspeaker is "Off". The filters across the relays reduce clicks. Conduits #6, #17, and #32 are for the announce booth speaker and "On Air" light.

## **7. INSTANTANEOUS RECORDER**

The RCA Type 72-B or 72-C Instantaneous Recorder, or 73-A Deluxe Recorder may be used with the Type 76-B2 Consolette for recording auditions, broadcasts, etc. The recording terminals #41 and #42, which are for bridging, may be used for recording in the following manners. (See Figure 4):

(A) EQUIPMENT REQUIRED:

(1) SEE FIGURE 4-A.

- One pad, consisting of two 120-ohm (Stock #30189), and one 560-ohm (Stock #5164) resistor.
- One Type 87-A (MI-11215) Booster Amplifier.
- Two 120-ohm (Stock #30189) resistors.
- One Type 82-B (MI-11205) Monitor Amplifier with Volume Control.

(2) SEE FIGURE 4-B.

- One pad, consisting of two 120-ohm (Stock #30189), and one 560-ohm (Stock #5164) resistors.
- One Type 82-C (MI-11209) Monitor Amplifier.

(B) CONNECTIONS:

Connect above equipment as shown in Figure 4.  
Connect to the Type 76-B2 Console as shown by the Schematic Diagram, Figure 16.

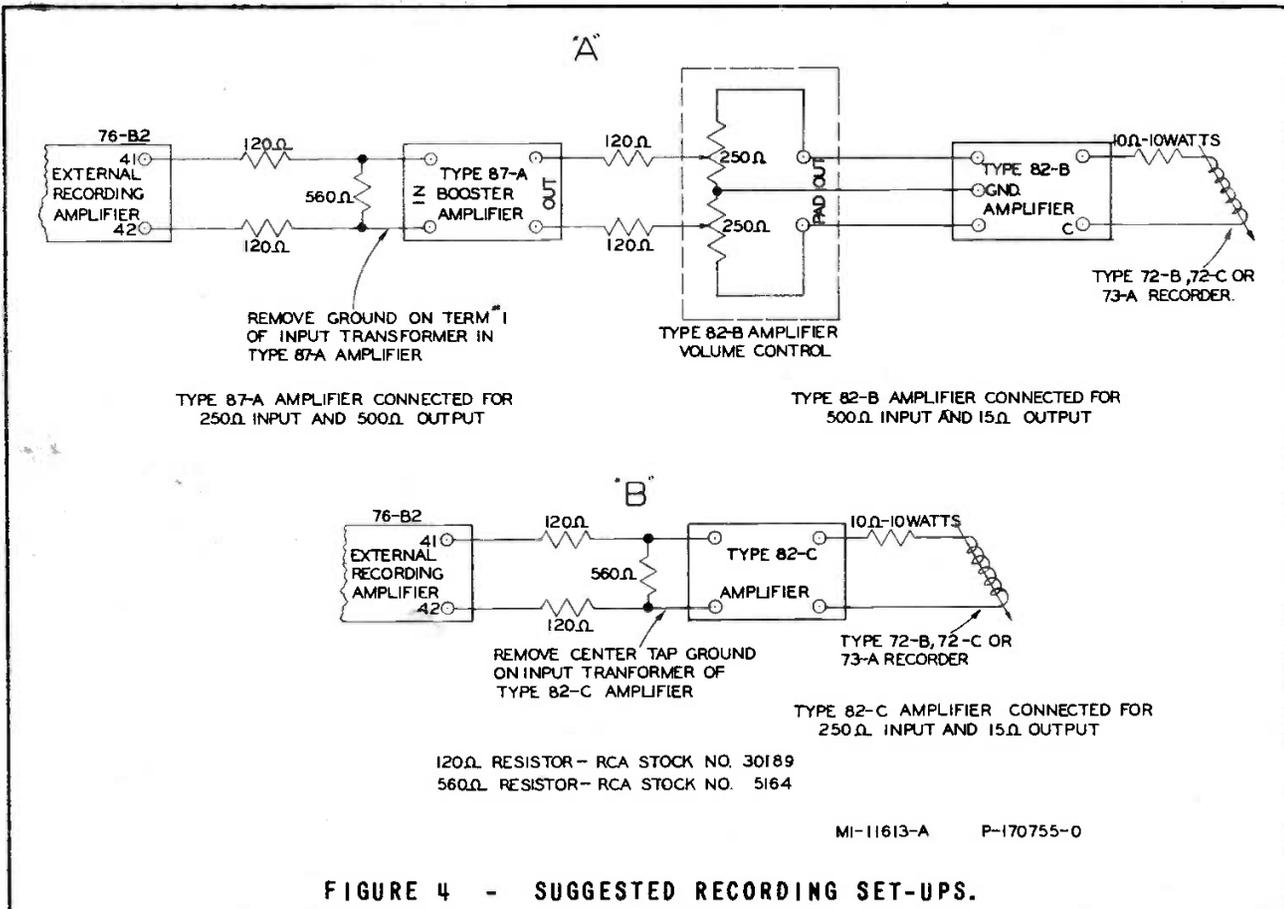


FIGURE 4 - SUGGESTED RECORDING SET-UPS.

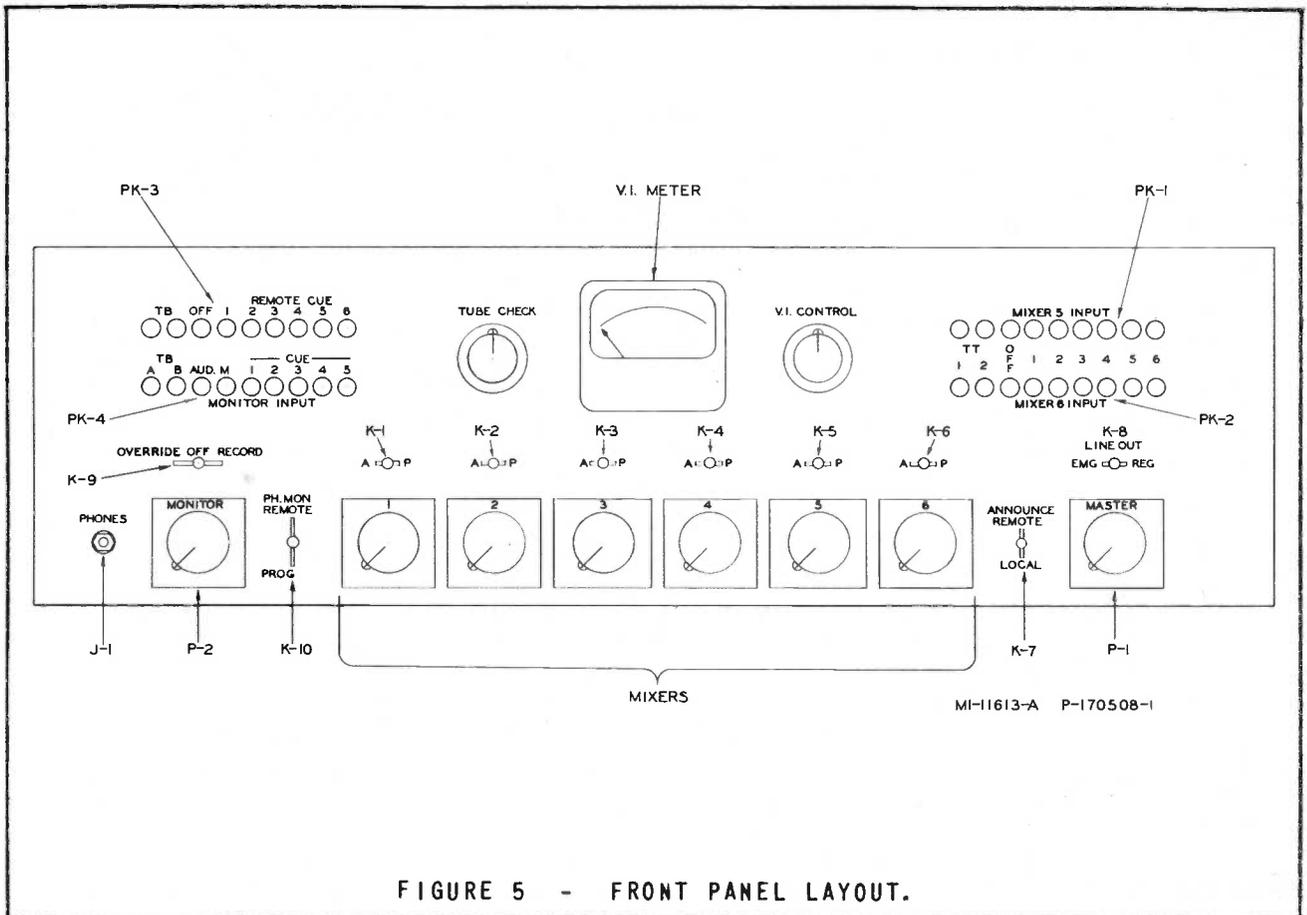
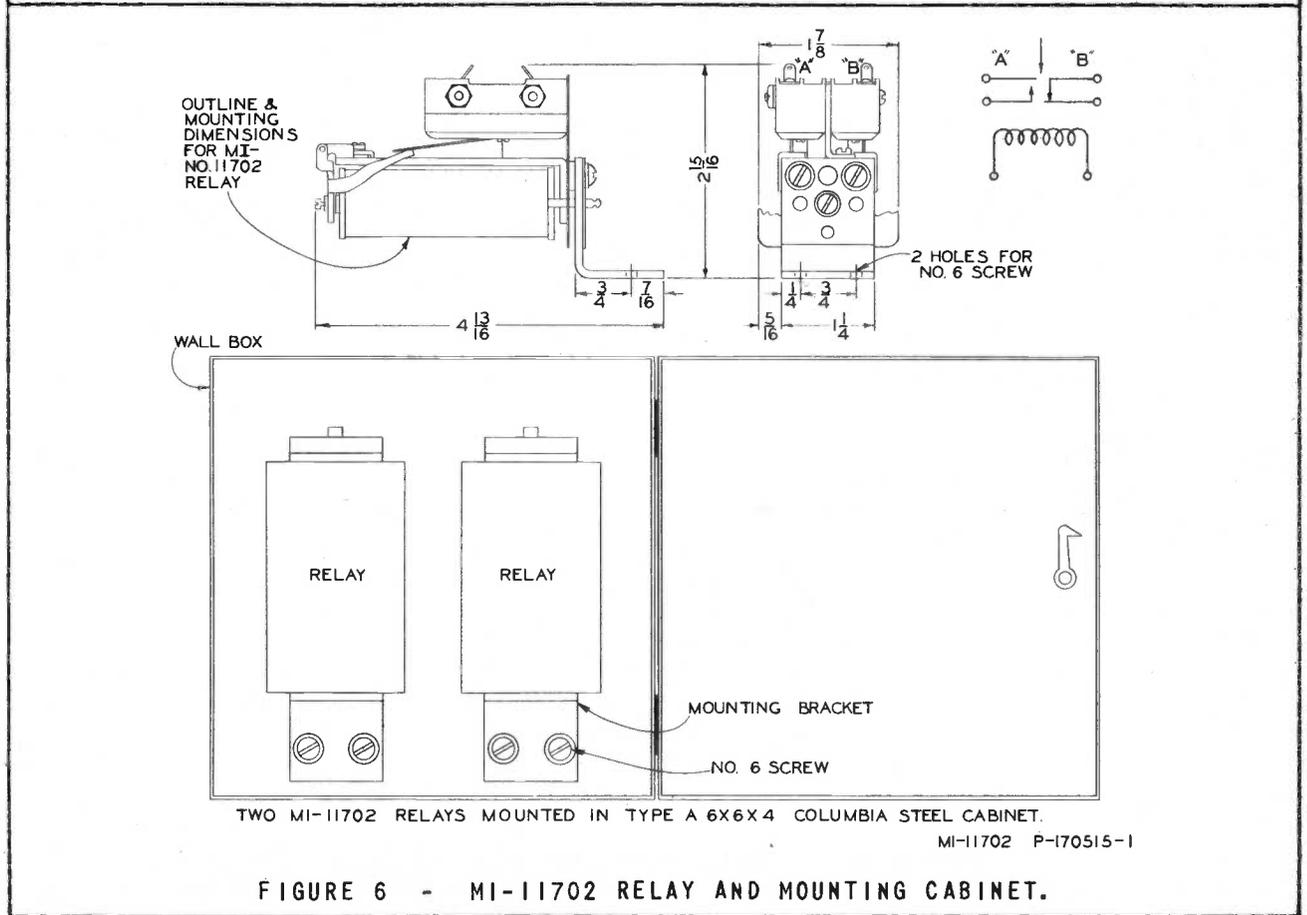


FIGURE 5 - FRONT PANEL LAYOUT.



TWO MI-11702 RELAYS MOUNTED IN TYPE A 6X6X4 COLUMBIA STEEL CABINET.  
MI-11702 P-170515-1

FIGURE 6 - MI-11702 RELAY AND MOUNTING CABINET.

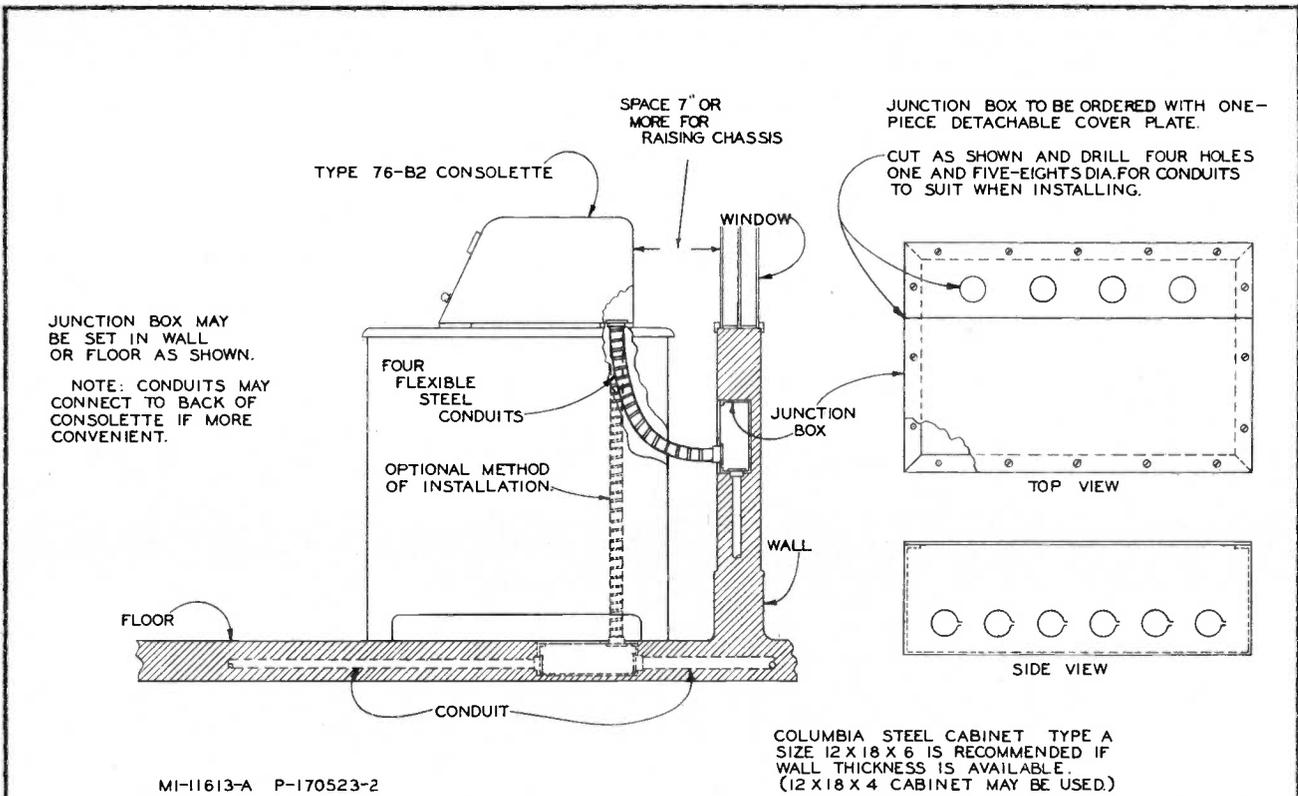


FIGURE 7 - INSTALLATION OF TYPE 76-B2 CONSOLETTA.

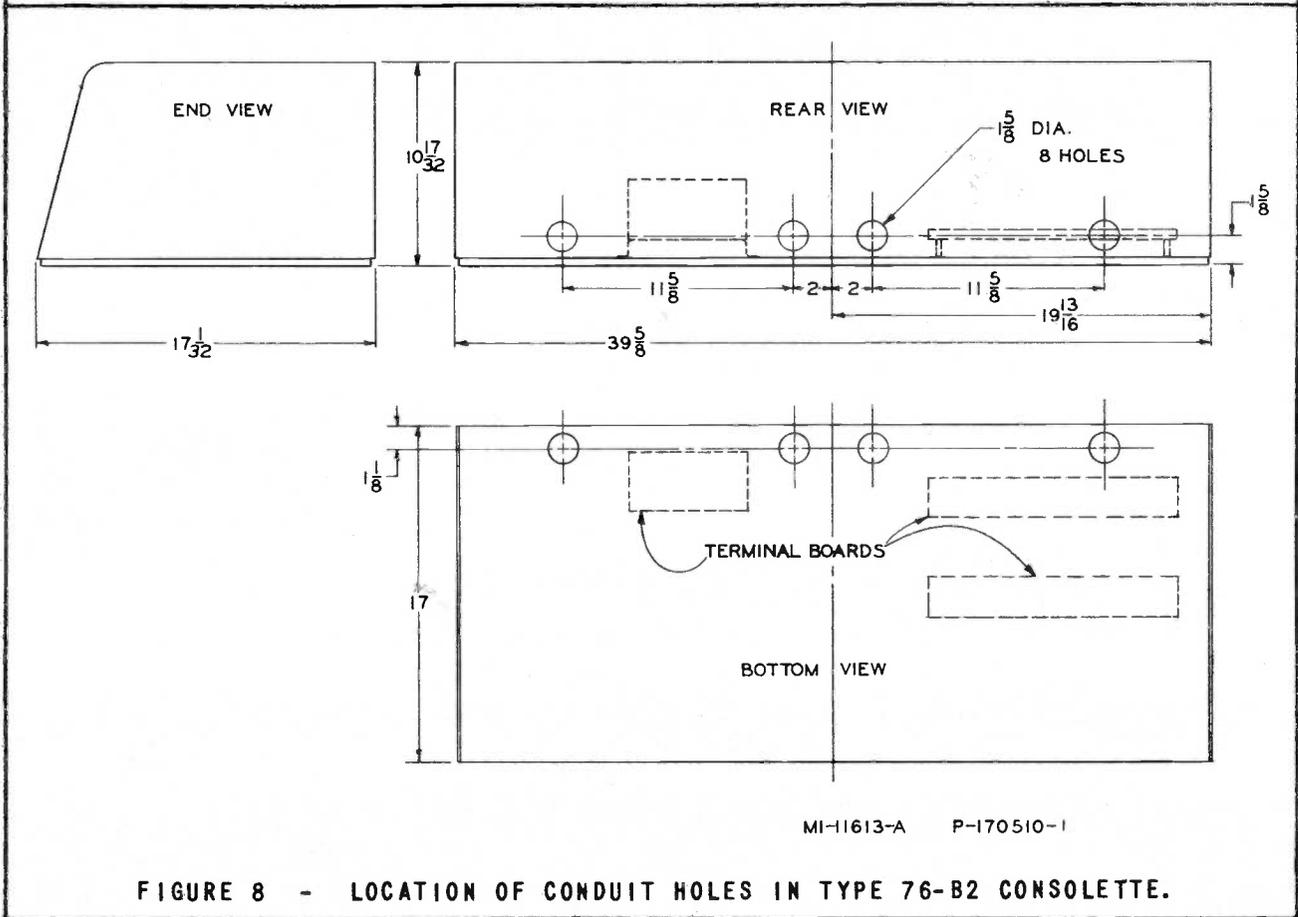
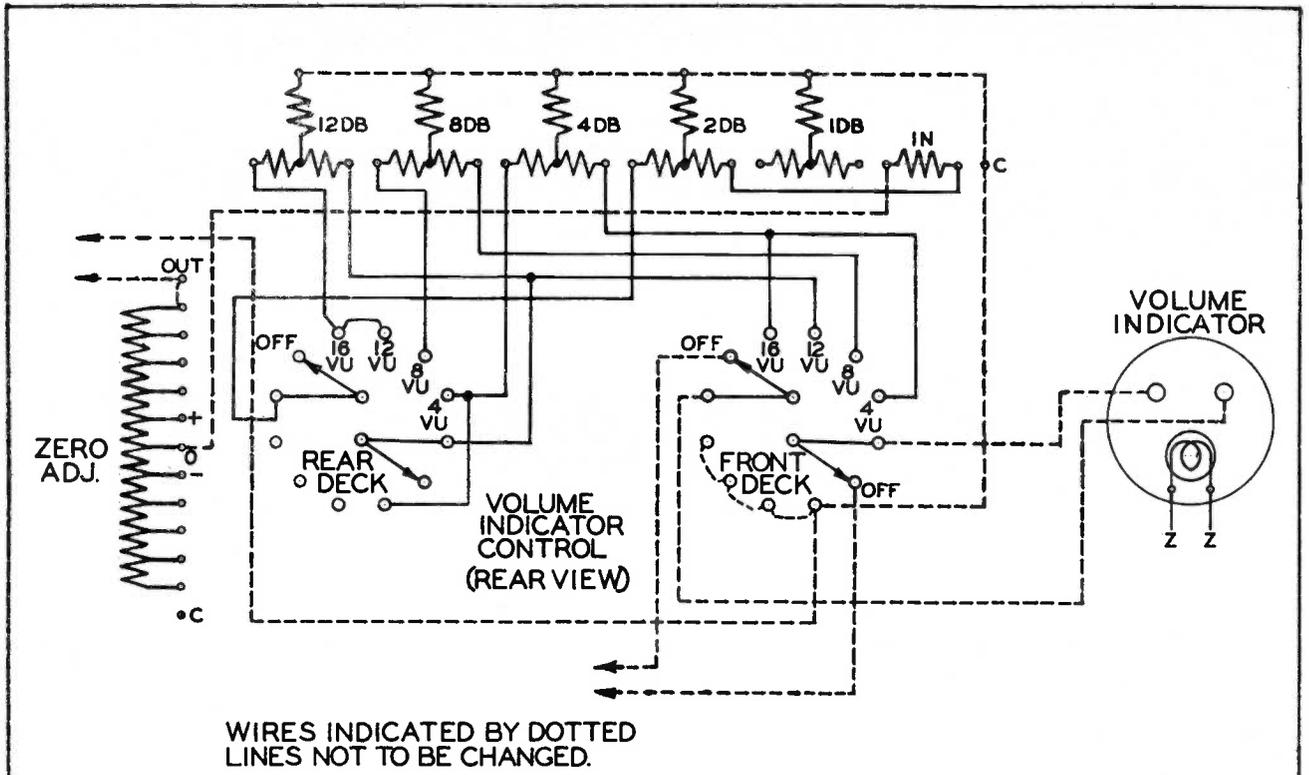


FIGURE 8 - LOCATION OF CONDUIT HOLES IN TYPE 76-B2 CONSOLETTA.

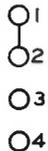


MI-11613-A M-140853-0

FIGURE 9 - SCHEMATIC OF VU METER SWITCH AND PAD TO INCLUDE AN EXTRA 6 DB LOSS.

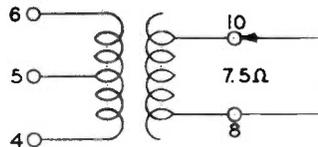
(A) FOR SINGLE STUDIO OPERATION

\* STRAP TERMINALS 1 & 2:



(2-15 Ω SPEAKERS):

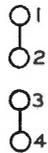
\*\* CONNECT T-15 AS SHOWN:



\* THESE TERMINALS ARE LOCATED ON A SMALL 4-TERMINAL BOARD ON THE BOTTOM OF THE RELAY MOUNTING PLATE.

(B) FOR TWO STUDIO OPERATION

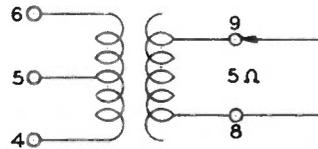
\* STRAP TERMINALS 1 & 2, AND 3 & 4:



(SEE NOTE NO. 1)

(3-15 Ω SPEAKERS):

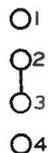
\*\* CONNECT T-15 AS SHOWN:



\*\* WHEN MAKING OR CHANGING CONNECTIONS TO T-15, DO NOT DISTURB THE CONNECTIONS TO TERMINALS NO. 1, 3, 7, 8, & 12 T-15 (K-90104) IS LOCATED ON THE MONITOR AMPLIFIER MOUNTING PLATE.

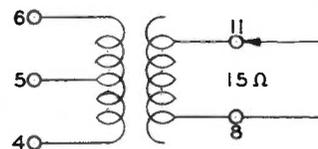
(C) FOR THREE STUDIO OPERATION

\* STRAP TERMINALS 2 & 3:



(4-15 Ω SPEAKERS):

\*\* CONNECT T-15 AS SHOWN:



MI-11613-A P-170519-1

NOTE NO. 1: THE CONSOLETTA IS CONNECTED AT THE FACTORY AS SHOWN IN PART B.

FIGURE 10 - LOUDSPEAKER CONNECTIONS FOR 1, 2, OR 3 STUDIO OPERATION.

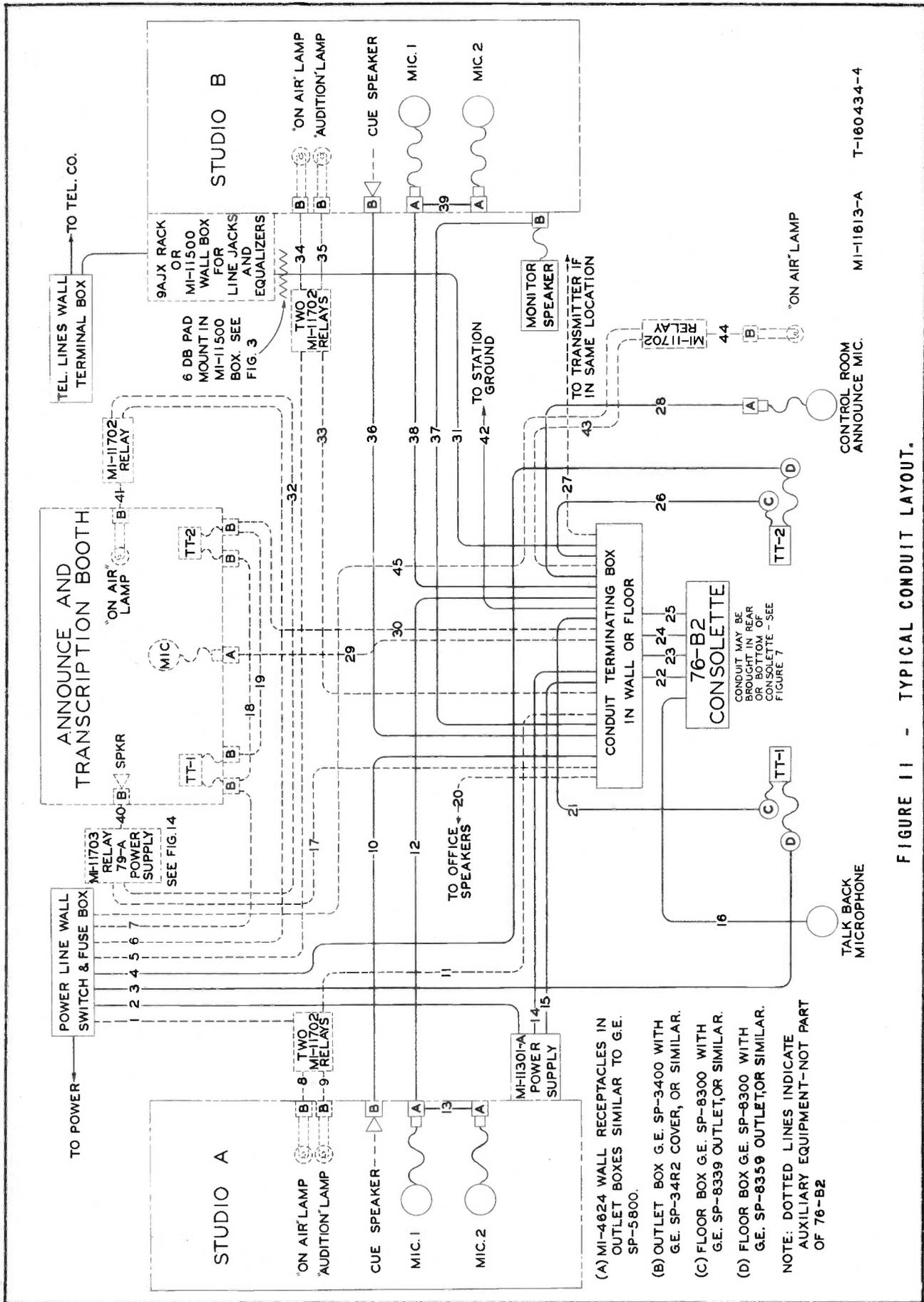


FIGURE 11 - TYPICAL CONDUIT LAYOUT.

MI-11613-A T-160434-4

- (A) MI-4624 WALL RECEPTACLES IN OUTLET BOXES SIMILAR TO G.E. SP-5800.
- (B) OUTLET BOX G.E. SP-3400 WITH G.E. SP-34R2 COVER, OR SIMILAR.
- (C) FLOOR BOX G.E. SP-8300 WITH G.E. SP-8339 OUTLET, OR SIMILAR.
- (D) FLOOR BOX G.E. SP-8300 WITH G.E. SP-8359 OUTLET, OR SIMILAR.

NOTE: DOTTED LINES INDICATE AUXILIARY EQUIPMENT-NOT PART OF 76-B2

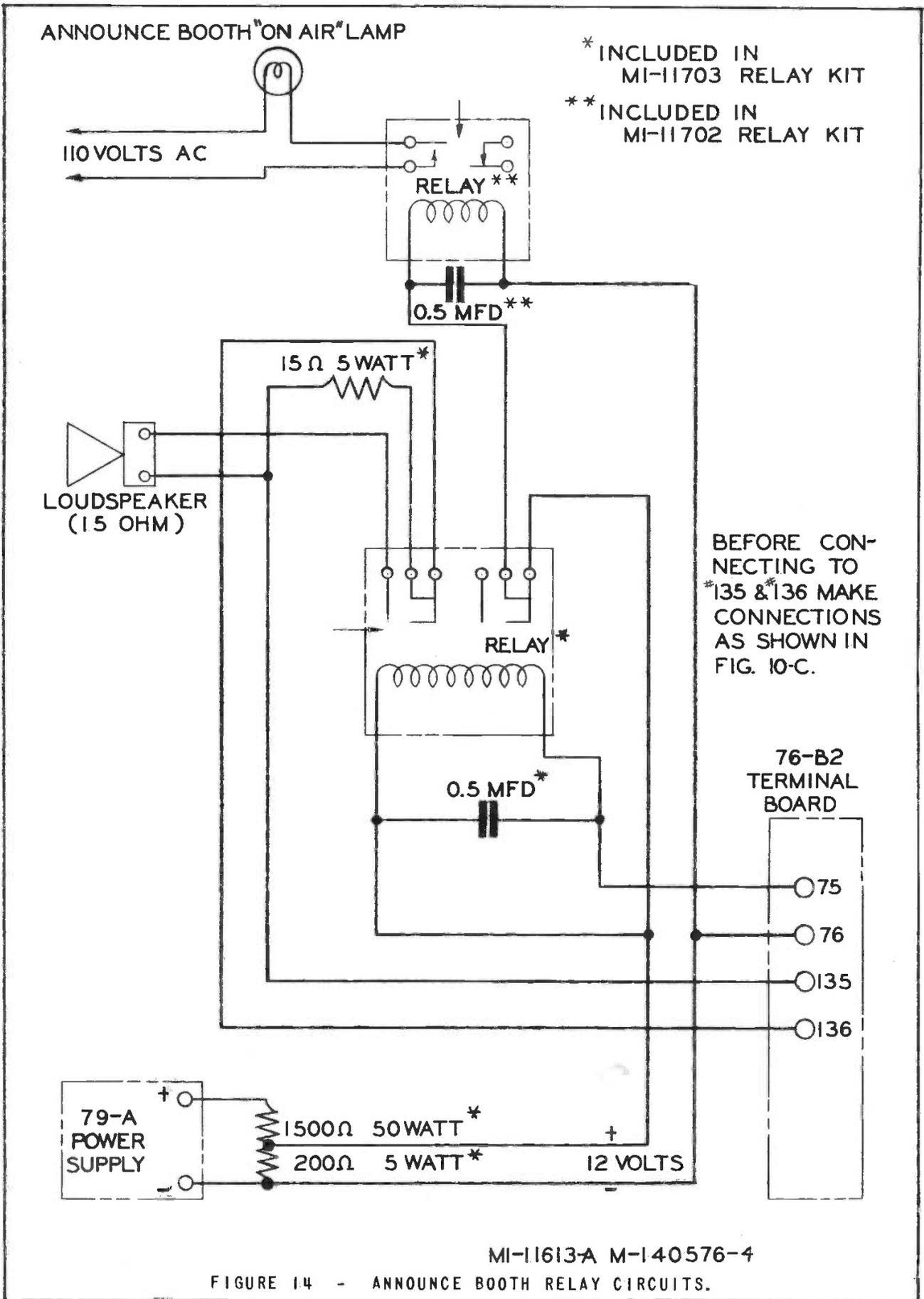
**Conduit List for Type 76-B2 Console**

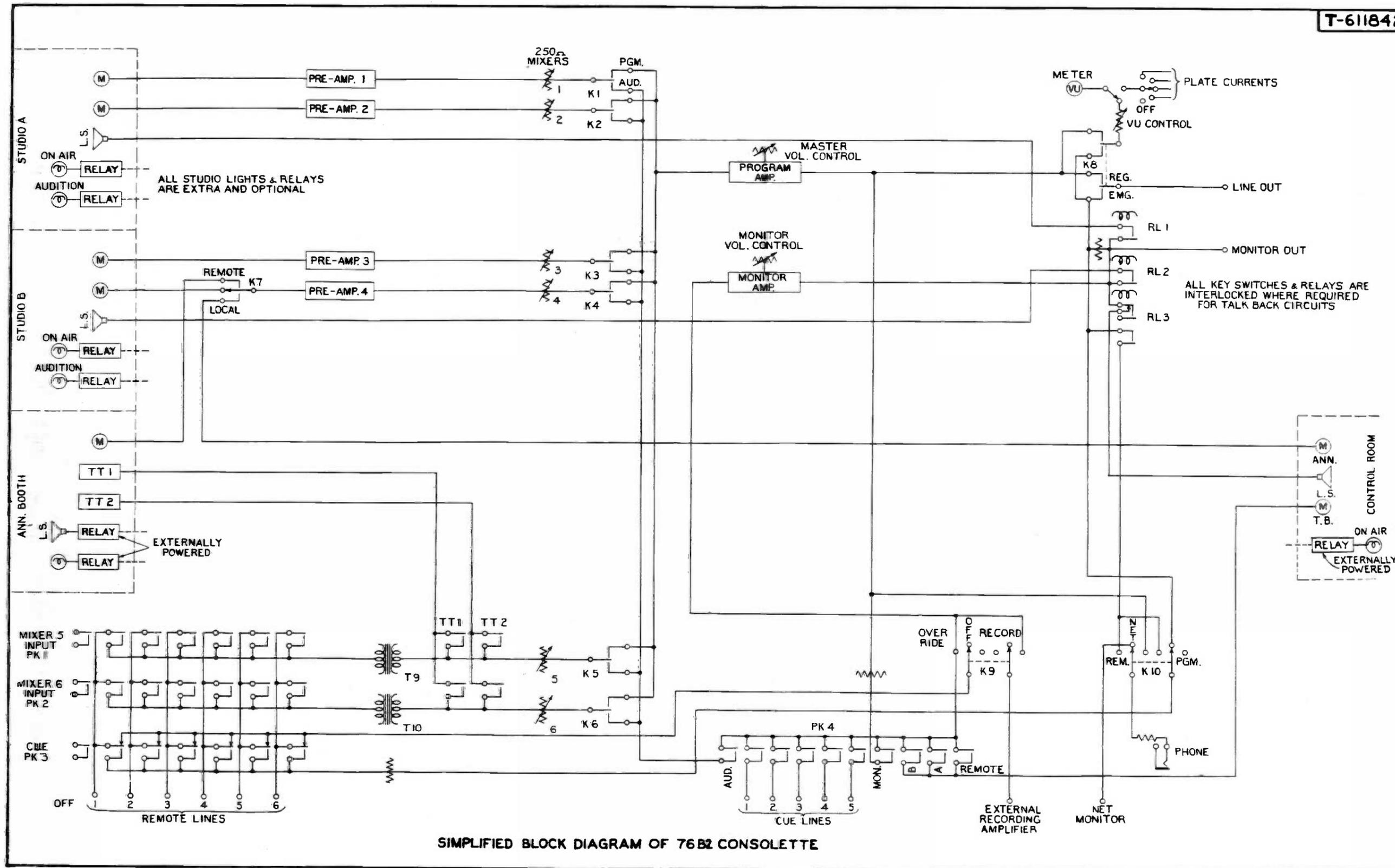
K-181565-1

- Note #1:** Refer to Conduit Layout (Figure 11).  
**Note #2:** Terminals underlined are located on Type 76-B2 Power Supply (MI-11301-A).  
**Note #3:** Asterisks (\*) indicate optional equipment - not part of 76-B2 (Shown dotted on Figure 11).  
**Note #4:** Wire - A = MI-64 (#20 AWG Stranded - 300-volt shielded twisted pair).  
                   B = MI-65 (#16 AWG Stranded - 600-volt shielded twisted pair).  
                   C = Pair #14 Lead Covered  
**Note #5:** Group wires as follows from conduit box to 76-B2:  
 (a) Include in Conduits 22 and 23 wires from filament, plate, d-c to relay, audio to speakers, station ground.  
 (b) Include in Conduits 24 and 25 wires from microphones, turntables, remote lines, cue lines, line out.

CONDUIT	SIZE	FROM	TO	WIRE	CIRCUIT	TERMINALS
*1	1/2	Power Box	MI-11702 Relays	1-C	AC Supply	AC
2	1/2	Power Box	76-B2 Power Supply	1-C	AC Supply	<u>21-22</u>
3	1/2	Power Box	TT-1	1-C	AC Supply	AC of TT-1
4	1/2	Power Box	TT-2	1-C	AC Supply	AC of TT-2
*5	1/2	Power Box	MI-11702 Relays	1-C	AC Supply	AC
*6	1/2	Power Box	MI-11702 Relays	1-C	AC Supply	AC
*7	1/2	Power Box	TT-1 (Booth)	1-C	AC Supply	AC
*8	1/2	MI-11702 Relay	"On Air" Light Studio A	1-C	AC	AC
*9	1/2	MI-11702 Relay	"Audition" Light Studio A	1-C	AC	AC
10	1/2	76-B2 76-B2 Power Supply	Cue Speaker Studio A	1-B	Speaker Audio	133-134
11	1/2	76-B2	Studio A Light Relays	1-B 2-A	Speaker Field DC to Relays	[ <u>19</u> and one side of Studio B Speaker Field 124-125 "On Air" 123-124 "On Audition"
12	1/2	76-B2	Studio A Microphones	2-A	Microphone	1-2, 3-4
13	1/2	Mic 1 Studio A	Mic 2 Studio A	1-A	Microphone	-----
14	1 1/2	76-B2 Power Supply	76-B2 76-B2 Conduit Box	4-B 1-B	Filament Supply Speaker Fields	[ <u>1-2</u> and 101-102, <u>7-8</u> and 107-108, <u>9-10</u> and 109-110, <u>12-13</u> and 112-113 <u>19-20</u>
15	1 1/2	76-B2 Power Supply	76-B2	1-B 4-B	Relay Plate Supply	<u>17-18</u> and 117-118** [ <u>15-16</u> and 115-116 <u>4-5</u> and 104-105 <u>6-11</u> and 106-111 <u>3-14</u> and 103-114
16	None	76-B2	Talk-Back Mic	Cord	1-A Microphone	47-48
*17	1/2	76-B2	Announce Booth Relay	1-B 1-A	Audio to Booth Relay Control	135-136 75-76
*18	1/2	Booth TT-1	Booth TT-2	1-C	AC	AC of TT's
*19	1/2	Booth TT-1	Booth TT-2	1-A	Audio	Audio of TT's
*20	1/2	76-B2	Office Speakers	1-B	Audio	135-136
21	1/2	76-B2	TT-1 Audio (Control Room)	1-A	Audio	23-24
22	1 1/2	See Note #5 above				
23	1 1/2	See Note #5 above				
24	1 1/2	See Note #5 above				
25	1 1/2	See Note #5 above				
26	1/2	76-B2	TT-2 Audio (Control Room)	1-A	Audio	25-26
27	1/2	76-B2	Line Out	1-A	Audio	79-80
28	1/2	76-B2	Control Room Announce Mic	1-A	Microphone	9-10
*29	1/2	76-B2	Booth Mic	1-A	Microphone	11-12
*30	1/2	76-B2	Booth TT's	2-A	Audio	23-24 and 25-26
31	1 1/2	76-B2	Remote Lines Cue Lines Line Out	6-A 5-A 1-A	Remotes Cue Audio	[29-30, 31-32, 33-34 35-36, 37-38, 39-40 53-54, 55-56, 57-58 59-60, 61-62 79-80
32	1/2	Booth Relay (MI-11702)	Booth Relay (MI-11703)	1-C	AC	AC terminals of relays
33	1/2	76-B2	Studio B Light Relay	2-A	DC to Relays	[126-127 "On Air" 127-128 "On Audition"
34	1/2	Studio B Light Relay	Studio B "On Air" Light	1-C	AC	-----
35	1/2	Studio B Light Relay	"Audition" Light	1-C	AC	-----
36	1/2	76-B2 Conduit Box	Studio B Cue Speaker	1-B 1-B	Audio Speaker Field	131-132 [One side of Studio A Spkr. Field and 1 side of Monitor Speaker Field
37	1/2	76-B2 76-B2 Power Supply	Monitor Speaker	1-B 1-B	Speaker Audio Speaker Field	129-130 [One side of studio B Spkr. Field and <u>20</u>
38	1/2	76-B2	Studio B Microphones	2-A	Microphone	5-6, 7-8
39	1/2	Mic 1, Studio B	Mic 2, Studio B	1-A	Microphone	-----
*40	1/2	Announce Booth Speaker	MI-11703 Relay	1-B	Audio	-----
*41	1/2	Booth "On Air" Lamp	MI-11702 Relay	1-C	AC	-----
42	1/2	76-B2	Station Ground	1-C	Ground	103
*43	1/2	76-B2	Control Room Light Relay	1-A	DC to relay	121 and 122
*44	1/2	MI-11702 Relay	"On Air" Light Control Room	1-C	AC	AC
*45	1/2	Power Box	MI-11702 Relay	1-C	AC Supply	AC

\*\* NOTE: If conduits 43, 44, and 45 are used refer to Section 5-B, page 10 for connections to terminal #118.





SIMPLIFIED BLOCK DIAGRAM OF 76B2 CONSOLETTTE

FIGURE 15 - BLOCK DIAGRAM.



**Speaker And Light Relay Operation  
of  
Type 76-B2 Consolette**

K-181540

**OPERATION OF SPEAKER INTERLOCK**

Controlled by the following switches:

- Studio A Speaker: K-1, K-2, K-8, TB-A button, TB-B button, and Remote TB button.  
 Studio B Speaker: K-3, K-4, K-7, K-8, TB-A button, TB-B button, and Remote TB button.  
 Control Room Speaker: K-7, TB-A button, TB-B button, and Remote TB button.

Switching	Studio A Speaker	Studio B Speaker	Control Room Speaker
1) Switches normal _____	On	On	On
2) Studio A - (a) K-1 and/or K-2 to Prog. or Aud. _____	Off	On	On
(b) Same as (a) and TB-A pressed _____	On	Off	Off
(c) K-1 and/or K-2 to Prog. and K-8 to Regular _____	Off	On	On
(d) Same as (c) and TB-A pressed _____	Off	Off	Off
3) Studio B - (a) K-3 and/or K-4 to Prog. or Aud. with K-7 normal _____	On	Off	On
(b) Same as (a) and TB-B pressed _____	Off	On	Off
(c) K-3 and/or K-4 to Prog., K-7 normal and K-8 to Regular _____	On	Off	On
(d) Same as (c) and TB-B pressed _____	Off	Off	Off
4) Announce Mic. - (a) K-7 to Local position _____	On	On	Off
(b) K-7 to Remote position _____	On	On	On
(c) K-7 to Local, K-3 Off, K-4 On _____	On	On	Off
(d) K-7 to Remote, K-3 Off, K-4 On _____	On	On	On
5) Remote Talk-Back - Remote TB buttons pressed _____	Off	Off	Off
6) K-8 to Emergency position _____	Off	Off	On

**OPERATION OF LIGHT RELAY INTERLOCK**

Controlled by the following switches:

- Studio A "On Air" Light Relay: K-1, K-2, and K-8  
 Studio A "Audition" Light Relay: K-1, K-2, K-8, Audition button and TB-A button  
 Studio B "On Air" Light Relay: K-3, K-4, K-7, and K-8  
 Studio B "Audition" Light Relay: K-3, K-4, K-7, K-8, Audition button and TB-B button.

Switching	Studio A		Studio B	
	"On Air"	"Audition"	"On Air"	"Audition"
1) Switches normal _____	Off	Off	Off	Off
2) Studio A - (a) K-1 and/or K-2 to Program position and K-8 to Regular position _____	On	Off	Off	Off
(b) K-1 and/or K-2 to Audition position and audition button pressed _____	Off	On	Off	Off
(c) Same as (b) and TB-A button pressed _____	Off	Off	Off	Off
3) Studio B - (a) K-3 and/or K-4 to program position, K-7 to normal, and K-8 to Regular _____	Off	Off	On	Off
(b) K-3 off and K-4 to Program position, K-7 to either "Local" or "Remote", K-8 to "Regular" _____	Off	Off	Off	Off
(c) K-3 and/or K-4 to Aud. position, K-7 to normal, and Aud. button pressed _____	Off	Off	Off	On
(d) Same as (c) and TB-B pressed _____	Off	Off	Off	Off
(e) K-3 off and K-4 to "Aud.", K-7 either "Local" or "Remote" and Aud button pressed _____	Off	Off	Off	Off
4) K-8 to Emergency position _____	On	Off	On	Off

- Note #1: K-7 to remote has contacts to control a signal light Speaker Relay for an announcer's booth.  
 Note #2: If control room "On-Air" light is used, this "On-Air" light is On only when the control room speaker is off.

**FIGURE 17 - SPEAKER AND LIGHT RELAY OPERATION (2 OR 3 STUDIO).**

**Speaker And Light Relay Operation  
of  
Type 76-B2 Console  
For Single Studio Operation**

K-181541

OPERATION OF SPEAKER INTERLOCK

Controlled by the following switches:

Studio A Speaker: K-1, K-2, K-3, K-4, K-7, K-8, TB-A button, and Remote TB button.

Control Room Speaker: K-7, TB-A button, and Remote TB button

Switching	Studio A Speaker	Control Room Speaker
1) Switches normal _____	On	On
2) Studio A - (a) K-1 and/or K-2, K-3, or K-4 to Prog. or Aud., K-7 to normal _____	Off	On
(b) Same as (a) and TB-A pressed _____	On	Off
(c) K-1 and/or K-2, K-3, or K-4 to Prog., K-7 normal and K-8 to regular _____	Off	On
(d) Same as (c) and TB-A pressed _____	Off	Off
3) Announce Mic. - (a) K-7 to Local position _____	On	Off
(b) K-7 to Remote position _____	On	On
4) Remote Talk-Back - Remote TB buttons pressed _____	Off	Off
5) K-8 to emergency position _____	Off	On

OPERATION OF LIGHT RELAY INTERLOCK

Controlled by the following switches:

Studio A "On Air" Light Relay: K-1, K-2, K-3, K-4, K-7, and K-8

Studio A "Audition" Light Relay: K-1, K-2, K-3, K-4, K-7, K-8, Audition button, and TB-A button

Switching	Studio A "On Air"	"Audition"
1) Switches normal _____	Off	Off
2) Studio A - (a) K-1 and/or K-2, K-3, K-4, to Prog. position, K-7 normal, and K-8 to regular position _____	On	Off
(b) K-4 to Prog. position, K-8 to regular, and K-7 to either Local or Remote _____	Off	Off
(c) K-1 and/or K-2, K-3, K-4 to Audition position, K-7 normal, and Audition button pressed _____	Off	On
(d) Same as (c) and TB-A button pressed _____	Off	Off
(e) K-4 to Audition position, Audition button pressed, and K-7 to either Local or Remote _____	Off	Off
(f) K-1 and/or K-2, K-3, K-4 to Audition position, Audition button pressed, and K-8 to Emergency _____	On	Off
(g) K-8 to Emergency Position _____	On	Off

Note #1: K-7 to "Remote" has contacts to control a Signal Light Speaker Relay for an announcer's booth.

Note #2: If control room "On-Air" light is used, this "On-Air" light is On only when the control room speaker is Off.

**FIGURE 18 - SPEAKER AND LIGHT RELAY OPERATION (SINGLE STUDIO).**

## PART II - OPERATION

### 8. GENERAL DESCRIPTION

Refer to Block Diagram, Figure 15. This is a typical setup for use in a small station, to handle two studios from a single control room. The equipment can be used, of course, for single studio operation in larger stations.

A total of 6 mixer controls are provided in a group near the base of the sloping control panel. The first two of these are associated with the two microphones in Studio "A", the second two with Studio "B", and the last two with two sets of push keys for selecting any two of six remote lines or two transcription inputs.

Ahead of the four microphone mixers are four pre-amplifier stages which amplify the outputs of the four studio microphones. A switch on the input of the fourth pre-amplifier allows switching to a fifth microphone which may be used as an announce microphone, in the control room, or a sixth remote microphone at some other point (such as a transcription booth).

The two sets of push keys ahead of the fifth and sixth mixers are used with two line transformers and resistor attenuating networks in such a manner that both the remote lines and the transcription turntables are properly terminated and matched to the mixing pads. Each set of push keys consist of nine buttons interlocked so that only one button is used at a time. Six buttons can be connected to six incoming remote lines, two to transcription turntables, and the final button is an "OFF" button. The two sets of push keys are electrically interlocked so that a single incoming remote signal or a single transcription output cannot be placed on both mixers. #5 mixer and associated push keys have priority over #6.

The output of the six mixers feeds (through mixing resistors) into six program-audition switches. When these switches are in the normal position, the outputs of the mixers are open while loading resistors are placed across both the program and audition busses.

When a program-audition switch is thrown to the program position, the output of a corresponding mixer is placed on the program bus. Likewise, when a switch is thrown to the audition position, the signal is placed on the audition bus.

#### **(A) PROGRAM CHANNEL**

The program bus is connected to the input of the program amplifier, which consists of a booster amplifier and a three-stage studio amplifier. The "MASTER" volume control is located between the booster and the studio amplifier.

After leaving the program amplifier, the signal passes to the "LINE-OUT" switch. The "LINE-OUT" switch has in addition to its normal (or off) position a Regular and an Emergency position. When in the normal position, a load is placed across the output of the program amplifier. Across this circuit is the volume indicator.

When the "LINE-OUT" switch is in the "REGULAR" position, the output of the program amplifier is fed into the outgoing line, with load removed and the volume indicator still across the circuit. The function of the "LINE-OUT" switch when in the emergency position is described later.

A phone jack provides for headphone monitoring of the program channel with the Phone-Mon. switch to "Prog."

#### **(B) AUDITION CHANNEL**

The audition bus of the Type 76-B2 Consolette is connected to one of the buttons of a set of push keys at the input of the monitor amplifier.

The monitor amplifier is provided with a volume control. The output of the monitor amplifier feeds into three relays, the operation of which is described later. The outputs of these three relays feed into the control room speaker and the studio speakers.

The set of push keys on the input of the monitoring amplifier permits the following functions to be performed:

1. MONITORING. One button connects the input of the monitoring amplifier, through proper bridging resistors, across the output of the program amplifier. A program on the air may be monitored in this manner.
2. AUDITIONING. One button as mentioned above feeds the output of the audition bus into the monitoring amplifier, permitting the carrying on of an audition in one studio while the other studio is on the air.
3. CUEING. A total of five buttons are provided for selecting any one of five monitoring or cueing lines. These five buttons and the monitor and audition buttons are mechanically interlocked so that only one is on at a time. Pressing any one button releases the button previously depressed.
4. TALK BACK. Two buttons, associated with the seven buttons above but not mechanically interlocked with same are used for talk-back, one for talk-back into Studio "A" and the other for Studio "B". Pressing either button connects the talk-back microphone to the input of the monitor amplifier. Depending on which button is pressed will determine which studio speaker will be turned on. This is more fully explained below. These two buttons, although not mechanically interlocked with the other seven buttons on the input of the monitor amplifier are electrically interlocked so that the talk-back microphone will always be placed on the input of the monitor amplifier, when either button is pressed. When the button is released, the connection previously made is restored.

#### **(C) REMOTE LINE CUE AND PHONE**

The fourth set of interlocked push keys are used as follows:

1. CUE. Six buttons on this set of push keys connect to the six incoming remote lines. The output of the six buttons are normally connected to the output of the monitoring amplifier. Pressing any one of the six buttons will feed the signal output of the monitoring amplifier into the corresponding remote line, provided that the corresponding button of the push keys on the input of mixers #5 and #6 (mentioned above) is not in use.
2. PHONE. The phone jack allows listening to any one of the six remote lines by placing the Phone-Mon. switch in the "Remote" position. Talking to the remote line can be done by pressing either one of two push buttons associated with the six remote cue push buttons. When these two buttons are pressed, the talk-back microphone is connected to the input of the monitoring amplifier and the output of the monitoring amplifier is connected to the output of the remote cue buttons. Thus, a conversation can be carried on with any of the six remote lines by throwing the Phone-Mon. switch to "Remote", and holding down the remote line talk-back buttons. The two buttons are not mechanically interlocked with the six remote line cue buttons. A ninth button interlocked with the six buttons is used as an "Off" position.

#### **(D) OVER-RIDE SWITCH**

When this switch (K-9) is thrown to the over-ride position, a signal on any of the six remote lines (not in use) will be heard over the monitor speaker.

## 9. EMERGENCY PROGRAM CHANNEL

If, for some reason, the program amplifier of the Type 76-B2 Consolette should fail, the monitoring amplifier can be used as a program channel.

When the output switch is thrown to the "EMERGENCY" position, the outgoing line is connected, through a bridging resistor to the output of the monitoring amplifier. Thus, by placing the program signal on the audition bus and pressing the audition button at the input of the monitoring amplifier, the monitoring-amplifier will feed the outgoing line. Throwing the "LINE-OUT" switch to the "EMERGENCY" position also transfers the volume indicator to the monitor output so that the level can be properly adjusted.

## 10. EMERGENCY "B" SUPPLY

An emergency "B" supply for the four pre-amplifiers is also provided in the Consolette. Should the B+ power fail that normally is obtained from the program amplifier rectifier, a switch on the MI-11301-A Power Unit can be thrown so that the B+ power is obtained from the monitoring amplifier rectifier.

## 11. RELAY OPERATION

A system of interlocking is used which provides the necessary function of controlling the output of the monitoring amplifier into the three speakers, and the supplementary function of controlling signal light equipment. The speaker relays are part of the Type 76-B2 Equipment, while signal light relays, although not furnished, can be easily connected as described previously. Four light relays are provided for, power for which may be obtained from the MI-11301-A Power Unit.

## 12. SPEAKER RELAY INTERLOCK

Three speaker relays are used, one each for the control room speaker, Studio "A" speaker, and studio "B" speaker. The three relays are controlled by the following switches:

- Announce Key
- Four Program-Audition Keys (on output of microphone pre-amplifiers)
- Line-Out Key
- Talk-Back Buttons of Monitor Input Push Keys
- Remote Talk Back Buttons of Remote Line Cue Push Keys

The sequence of operation is outlined as shown by Figure 17. Note that although the control room speaker is normally "ON", the control room speaker relay is normally "OFF". Thus, if the speaker relay power should fail for any reason, the control room speaker will normally be "ON". When the control room speaker is "OFF", that is, disconnected from the monitor amplifier output, the control room speaker relay is actually "ON", or actuated. The two studio speaker relays are "ON" when the speakers are "ON", and are "OFF" when the speakers are "OFF", so that if the relay power fails the studio speakers will remain "OFF".

Other combinations of speakers "ON" or "OFF" can be obtained by operating the above mentioned switches in various combinations, but the basic operation is as outlined in the table.

If an announce booth speaker and "On Air" light are used as shown in Figure 11, the speaker relay is controlled by the Announce-Remote switch, K-7, and the speaker operation is as follows:

When the announce booth speaker is "On" the announce booth speaker relay is "On", and when the speaker is "Off" the relay is "Off", so that if the relay power fails the announce booth speaker will remain off.

### 13. LIGHT RELAY INTERLOCK

As noted previously, the MI-11301-A Power Unit will supply DC power to four (4) signal light relays, as follows: (Control room "On Air" light relay may be added. See Section 5-B, Page 10 ).

- (1) Studio A "On Air"
- (2) Studio A "On Audition"
- (3) Studio B "On Air"
- (4) Studio B "On Audition"

These light relays are not supplied with the Type 76-B2 Equipment, but terminals are provided for connecting the relays to the interlock switching of the Console. The four relays are controlled by the following switches:

- (1) Four Program-Audition Keys (at the output of the microphone pre-amplifier)
- (2) Talk-Back Buttons and Audition Buttons of the monitor input push keys.
- (3) Line-Out Key
- (4) Announce Key

The sequence of operation is outlined as shown by Figure 17. Like the speaker relays, other combinations of light relays "ON" and "OFF" can be obtained by various combinations of the above switches. However, only one light can be on in a studio at one time. The "ON-AIR" light takes priority over the "ON AUDITION" light.

It will be noted that all desired functions of relay are on at the same time, and no combination of switching will place more than three relays on at the same time.

If an announce booth speaker and "ON AIR" light are used as shown in Figure 11, the "ON AIR" light relay is controlled by the speaker relay which in turn is controlled by the Announce-Remote Switch, K-7. The "ON AIR" light operation is as follows:

When the announce booth speaker is "ON" the "ON AIR" light is "OFF", and when the speaker is "OFF" the light is "ON".

When a control room "ON AIR" light is used (section 5-B) this light relay is operated by the control room speaker relay, which in turn is controlled by the switches listed in section 12. The control room "ON AIR", light is "ON" only when the control room speaker is "OFF".

### 14. SUGGESTED OPERATING PROCEDURE

#### **(A) TO PLACE A PROGRAM ON THE AIR:**

The following procedure may be used. (Assume that microphone #1 in Studio "A" is to be used).

- (1) With all the switches in their normal positions, press the proper "CUE" line or "MON" push-key and regulate the monitor volume control to give the desired volume from the studio and control room speakers.
- (2) Throw microphone switch "A-P" #1 to the "P" position.
- (3) Adjust the "Master" attenuator to approximately step "13".
- (4) Adjust mixer #1 to determine the proper level setting as indicated by the V1 meter. This setting should be approximately step "15" when a normal signal is being put into the microphone. Now return mixer #1 to "0".

- (5) Throw the "LINE-OUT" switch to the "REG" position at the moment when the microphone is to go on the air. (The cue signal is removed from the studio speaker when this switch is thrown). Adjust the mixer control to the previously determined setting.
- (6) Press the monitor push-key which is marked "M", and adjust the monitor volume control as may be necessary.

If any other input is to be used, the above procedure should be followed except that the switches and mixers to be operated are changed as noted in the tabulation below:

<u>INPUT</u>	<u>SWITCH</u>	<u>MIXER</u>
Microphone 1, Studio "A"	Mic. "A-P" #1 to P	1
Microphone 2, Studio "A"	Mic. "A-P" #2 to P	2
Microphone 1, Studio "B"	Mic. "A-P" #3 to P	3
Microphone 2, Studio "B"	Mic. "A-P" #4 to P	
	and "ANNOUNCE" switch to normal	4
Remote Lines	Mic. "A-P" #5 or #6 to P, and cor-	
	responding input PK-1 or PK-2	5 or 6
Transcription TT-1	SW-5 or SW-6 to P, and TT-1	5 or 6
Transcription TT-2	SW-5 or SW-6 to P, and TT-2	5 or 6

**(B) TO AUDITION STUDIO "B" WHILE STUDIO "A" IS ON THE AIR:**

- (1) With the talk-back and the monitor push keys in the normal (off) positions, press the "AUD" push-key and throw the microphone switch "A-P" #3 to the "A" position.
- (2) Adjust mixer #3 and the monitor volume control to obtain suitable output from the control room loudspeaker.

**(C) TO CUE STUDIO "B" FROM STUDIO "A" AND THEN PLACE STUDIO "B" ON THE AIR:**

(Assume that microphone #1 in Studio "A" is in use and it is desired to use microphone #1 in Studio "B").

- (1) Since the Studio "B" loudspeaker is receiving the signal from Studio "A", it is necessary only to perform the following operations at the moment when Studio "B" is to go on the air:
  - (a) Close mixer #1.
  - (b) Throw microphone switch "A-P" #3 to the "P" position.
  - (c) Adjust mixer #3 to the proper level as indicated by the V1 meter.

**(D) TO CUE STUDIO "B" FROM A CUE LINE AND THEN PLACE STUDIO "B" ON THE AIR:**

(Assume that microphone #1 is in use in Studio "A" and that Studio "A" is on the air).

- (1) Press the proper "CUE" line push-key and regulate the monitor volume control to give the desired volume from the Studio "B" speaker. The cue line may be monitored by the control room speaker.
- (2) At the moment when Studio "B" is to go on the air, perform the following operations in quick succession:
  - (a) Close mixer #1.
  - (b) Throw the microphone switch "A-P" #3 to the "P" position. (Assuming microphone #1 in Studio "B" is to go on the air).

(c) Adjust mixer #3 to the proper level as indicated by the VI meter.

**(E) TO TALK-BACK TO EITHER STUDIO "A" OR STUDIO "B":**

- (1) Press the talk-back push-key "A" or "B" corresponding to the studio desired, and talk into the talk-back microphone. (This cannot be done when either studio is on the air, because the "LINE-OUT" switch interlocking electrically prevents the studio speaker relay from coming "ON".)

Note: By using Microphone #4 (see Figure 16) Studio "B", it is possible to throw the announce-key and allow Studio "B" to hear the announcement and then be returned to the air.

**15. EMERGENCY USE OF MONITOR AMPLIFIER**

In case of failure of the program amplifier during a broadcast, the monitor amplifier may be used pending repair of the program amplifier in the following manner: Assuming that microphone 1A is "on the air" when the trouble occurs, quickly throw the "A-P" switch #1 to the "A" position, press the "AUD" push-key, and throw the "LINE-OUT" switch to the "EMG" position.

**16. NETWORK-MONITOR FEATURE**

When the Phone-Monitor switch K-10 is in the mid (normal) position and terminals #27 and #28 are connected to the network, or other outside signal, the operator may listen to this signal over the headphones.

**PART III - MAINTENANCE**

**17. INSPECTION AND CHECKING**

Particular attention has been paid in the design of the Type 76-B2 Consolette to provide maximum ease in reaching and servicing the component parts. The lid of the Consolette is hinged so that the tubes are easily accessible for inspection and servicing by turning two spring catches through 90 degrees with a thin coin or small screwdriver. The terminals and components are reached by merely raising the upper section of the cabinet.

For any piece of equipment that is subject to continuous use, as is most broadcast equipment, a regular routine of inspection should be set up and followed in order to avoid time off the air due to failure of tubes, noisy circuits due to accumulation of dirt on terminals and switches, corroded plugs, etc. It is advisable to carry one complete set of spare tubes in case of emergency.

In the event that the hum level of the equipment increases due to changing the tubes, the potentiometers on the MI-11301-A Power Unit should be adjusted for minimum hum.

The regular inspection should include checking of the tubes. The Type 76-B2 Consolette is provided with a rotary selector switch at the left of the meter which is used, together with the VI meter for checking the bias voltages of all the tubes used in the program channel. The bias voltage provides an indication of the flow of plate current and therefore gives an indication of the operation of the tubes. The normal meter readings of the tubes is as follows: These readings were taken under the conditions of an AC line voltage of 115 volts, and the power transformers of the MI-11301-A Power Unit connected for the 115-volt operation.

<u>Selector Switch At:</u>	<u>Tube</u>	<u>Meter Readings:</u>
1	RCA-1620, in Pre-Amplifier #1	70 ± 10
2	RCA-1620, in Pre-Amplifier #2	70 ± 10
3	RCA-1620, in Pre-Amplifier #3	70 ± 10
4	RCA-1620, in Pre-Amplifier #4	70 ± 10
5	RCA-1620, 1st Stage of Prog. Amp.	70 ± 10
6	RCA-1620, 1st Stage of Mon. Amp.	70 ± 10
7	RCA-1620, 2nd Stage of Prog. Amp.	70 ± 10
8	RCA-1620, 3rd Stage of Prog. Amp.	70 ± 10
9	RCA-1621, Output Stage of Prog. Amp.	70 ± 10
10	RCA-1621, Output Stage of Prog. Amp.	70 ± 10

In order to obtain bias voltage readings, the volume indicator switch must be first turned to the "Off" position.

The tube socket and Radiotron cap contacts should be cleaned with carbon tetrachloride or crocus cloth every three months to insure noiseless operation.

The mixer and master control contacts should be cleaned by applying "Davenoil" to the contacts, rotating the knob, and if any dark streaks appear, wiping off the contacts. Repeat this procedure until absolutely clean, then lubricate with a thin film of "Davenoil" included as part of this equipment. IMPORTANT: The Davenoil is provided for cleaning and lubricating the contacts of the mixers and volume controls; and no other cleaning agent such as carbon tetrachloride, should be used.

## 18. CARE OF CONTROL SWITCHES

Cleaning and lubrication of the push button switches should not be necessary during their normal life. The contacts are heavily silver plated, and because of the wiping contact, should give no trouble for noise or poor contact.

However, if for some reason it should become necessary to clean and lubricate the push button switches, proceed as follows:

To clean use a small amount of carbon tetrachloride or Energine and apply very carefully with a small brush. Relubricate using the small tin of special grease provided. Apply very sparingly with a small brush to eliminate the possibility of picking up floating dust and dirt in the air. Do not lift contacts to clean or lubricate.

Only in rare instances, or in case of damage due to tampering, should it become necessary to adjust the contacts of the push button switches. A small tool such as is used to adjust relay or key switch contacts will be required. The contact fingers should be formed near the insulation to increase the tension. Never bend the contact finger in the middle or near the contact "dimple". These switches are quite easily removed from the front panel by removing the screws at the extremes of the buttons.

As shipped from the factory the various key switch contacts have been properly adjusted to give the proper sequence of circuit connections when they are operated, so that a microphone and speaker will not be on at one time in the same studio and in this way cause acoustic feedback. In case a replacement key switch is installed or if feedback trouble is encountered, the contacts should be adjusted using a standard key switch or relay contact bending tool. When adjusting the switches the following desired sequence of operations should be kept in mind. THE RELAY CONTACTS MUST OPERATE FIRST AND THE AUDIO CIRCUITS TRANSFER LAST. This is accomplished by relieving the tension of the center spring of the form D contacts controlling the relays, and increasing the tension of the center spring of the form D contacts carrying audio. Care should be taken that the spring shape is not altered or the contact pressure reduced so much as to cause poor contact or short circuits. To remove the key switch

shield it is only necessary to remove the two screws in contact "pile-ups" of the switches at the ends of the shield, and carefully pull the shield directly away from the switches.

Due to the fact that the loudspeaker cut-off is accomplished with relays it cannot be instantaneous and so for quiet operation the key switches should be operated smoothly, and should not be abruptly snapped into position.

## 19. VOLTAGE MEASUREMENTS

Following are the tube operating voltages for the Pre-Amplifiers Program Amplifier, and Monitor Amplifier. To obtain the values listed below all except heater voltages should be measured to ground using a d-c voltmeter with a meter resistance of 5,000-ohms per volt. The a-c line voltage should be 115-volts. The voltages listed are nominal and readings taken should not vary more than about 5% of the values given.

CAUTION: If the voltmeter used has a meter resistance more or less than 5,000-ohms per volt, most readings taken will vary accordingly, the amount of variation depending upon the circuit in which the meter is connected.

### EACH PRE-AMPLIFIER

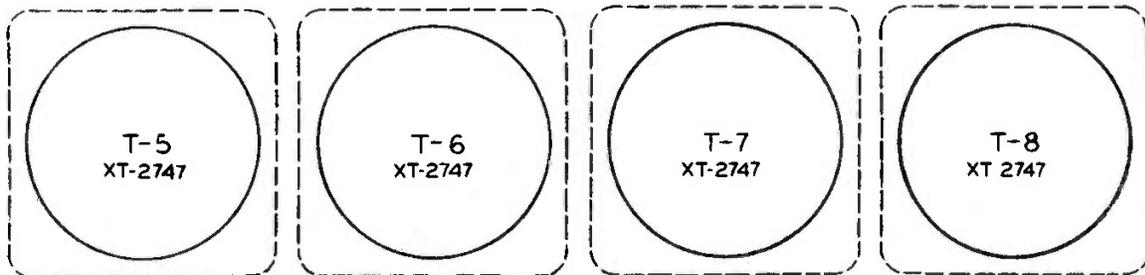
<u>TUBE ELEMENT</u>	<u>RCA-1620</u>
Plate (d-c)	220
Cathode (d-c)	8.3
Heater (a-c)	6.2

### PROGRAM AMPLIFIER

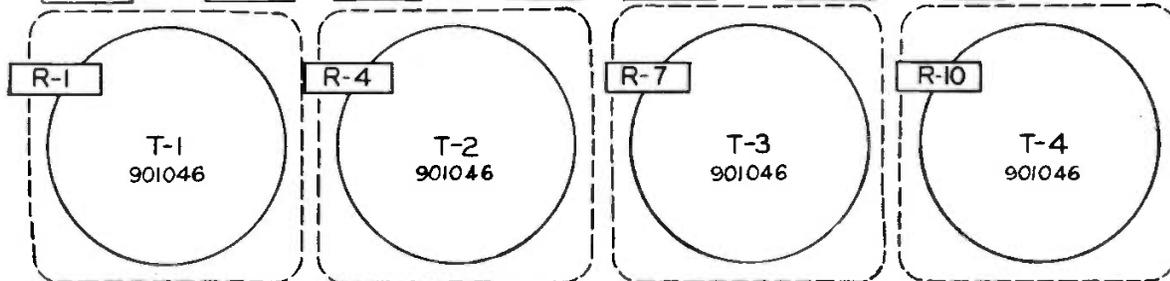
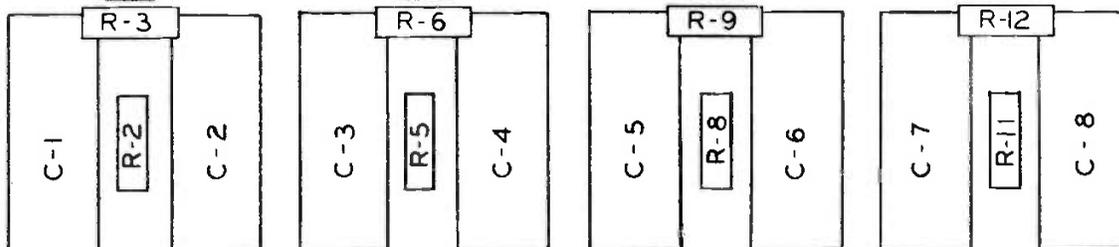
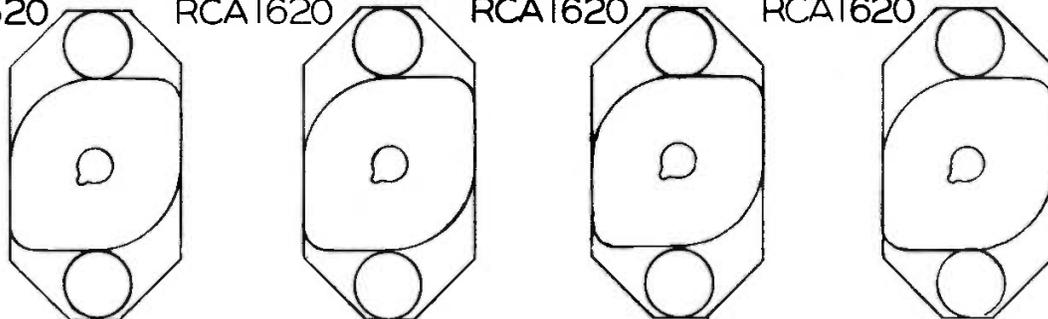
<u>TUBE ELEMENT</u>	<u>1st RCA-1620</u>	<u>2nd RCA-1620</u>	<u>3rd RCA-1620</u>	<u>EACH RCA-1621</u>
Plate (d-c)	155	80	85	270
Screen (d-c)	--	70	--	--
Cathode (d-c)	6.0	1.9	2.2	23
Heater (a-c)	6.2	6.2	6.2	6.2

### MONITOR AMPLIFIER

<u>TUBE ELEMENT</u>	<u>1st RCA-1620</u>	<u>2nd RCA-1620</u>	<u>EACH RCA-1620</u> <u>(PHASE INVERTER STAGE)</u>	<u>EACH RCA-1622</u>
Plate (d-c)	155	115	140	340
Screen (d-c)	--	--	--	180
Cathode (d-c)	5.8	4.3	5.0	12
Heater (a-c)	6.2	6.2	6.2	6.2



RCA 1620      RCA 1620      RCA 1620      RCA 1620



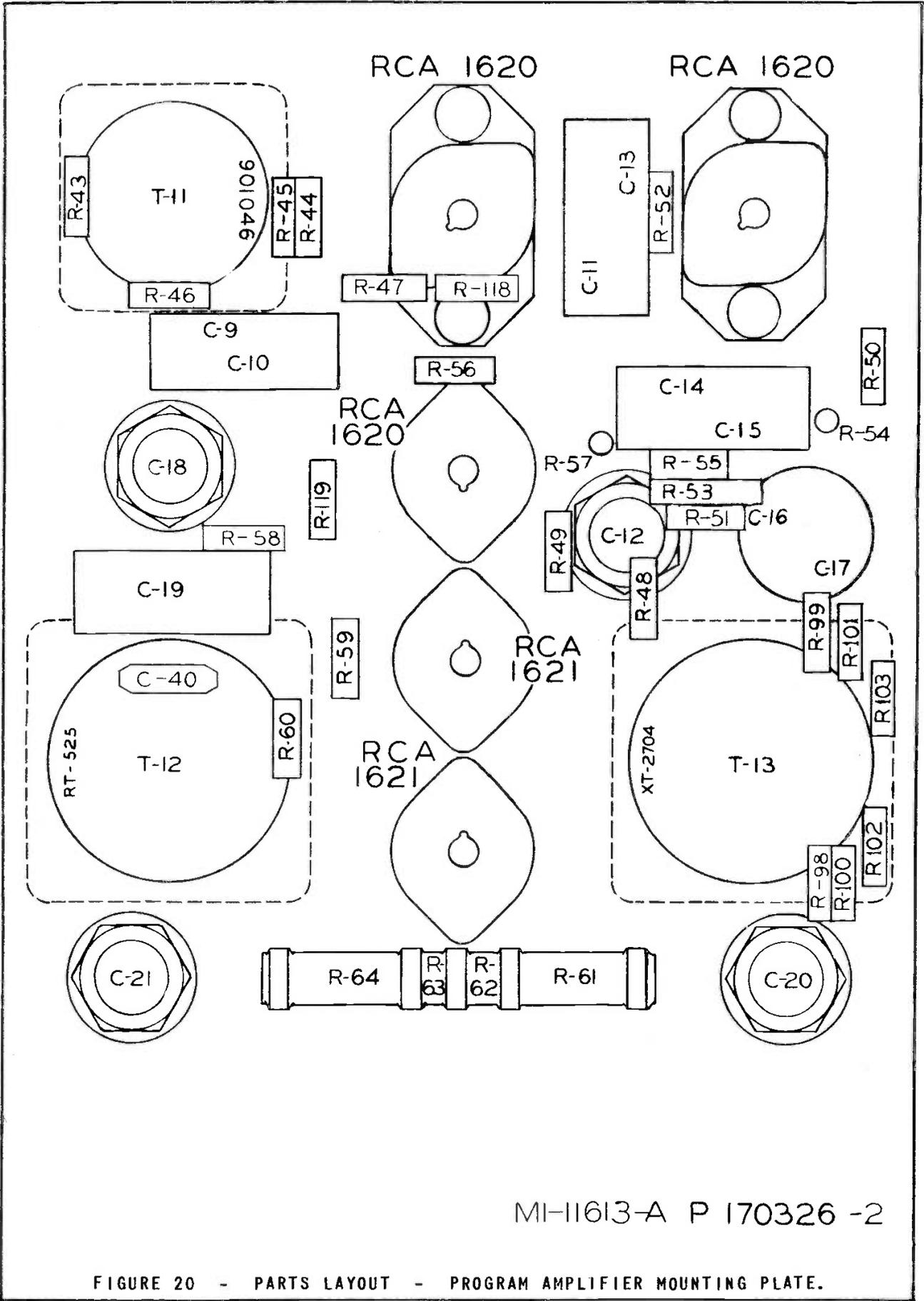
MI-11613-A P-170325-2

FIGURE 19 - PARTS LAYOUT - PRE-AMPLIFIER MOUNTING PLATE.

**PART IV - REPLACEMENT PARTS LIST**

The following list is included to provide proper identification when ordering replacement parts. When ordering, specify the item by its Stock Number and Description.

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>STOCK NO.</u>
20. ITEMS LOCATED ON THE PRE-AMPLIFIER MOUNTING PLATE:		
C-1 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-2 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-3 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-4 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-5 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-6 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-7 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-8 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
R-1 . . . . .	Resistor - 100,000-0hms . . . . .	3252
R-2 . . . . .	Resistor - 560-0hms . . . . .	5164
R-3 . . . . .	Resistor - 2,200-0hms . . . . .	3526
R-4 . . . . .	Resistor - 100,000-0hms . . . . .	3252
R-5 . . . . .	Resistor - 560-0hms . . . . .	5164
R-6 . . . . .	Resistor - 2,200-0hms . . . . .	3526
R-7 . . . . .	Resistor - 100,000-0hms . . . . .	3252
R-8 . . . . .	Resistor - 560-0hms . . . . .	5164
R-9 . . . . .	Resistor - 2,200-0hms . . . . .	3526
R-10 . . . . .	Resistor - 100,000-0hms . . . . .	3252
R-11 . . . . .	Resistor - 560-0hms . . . . .	5164
R-12 . . . . .	Resistor - 2,200-0hms . . . . .	3526
T-1 . . . . .	Transformer - Input transformer . . . . .	43569
T-2 . . . . .	Transformer - Input transformer . . . . .	43569
T-3 . . . . .	Transformer - Input transformer . . . . .	43569
T-4 . . . . .	Transformer - Input transformer . . . . .	43569
T-5 . . . . .	Transformer - Output transformer . . . . .	17595
T-6 . . . . .	Transformer - Output transformer . . . . .	17595
T-7 . . . . .	Transformer - Output transformer . . . . .	17595
T-8 . . . . .	Transformer - Output transformer . . . . .	17595
---	Socket - Socket for RCA-1620 . . . . .	33084



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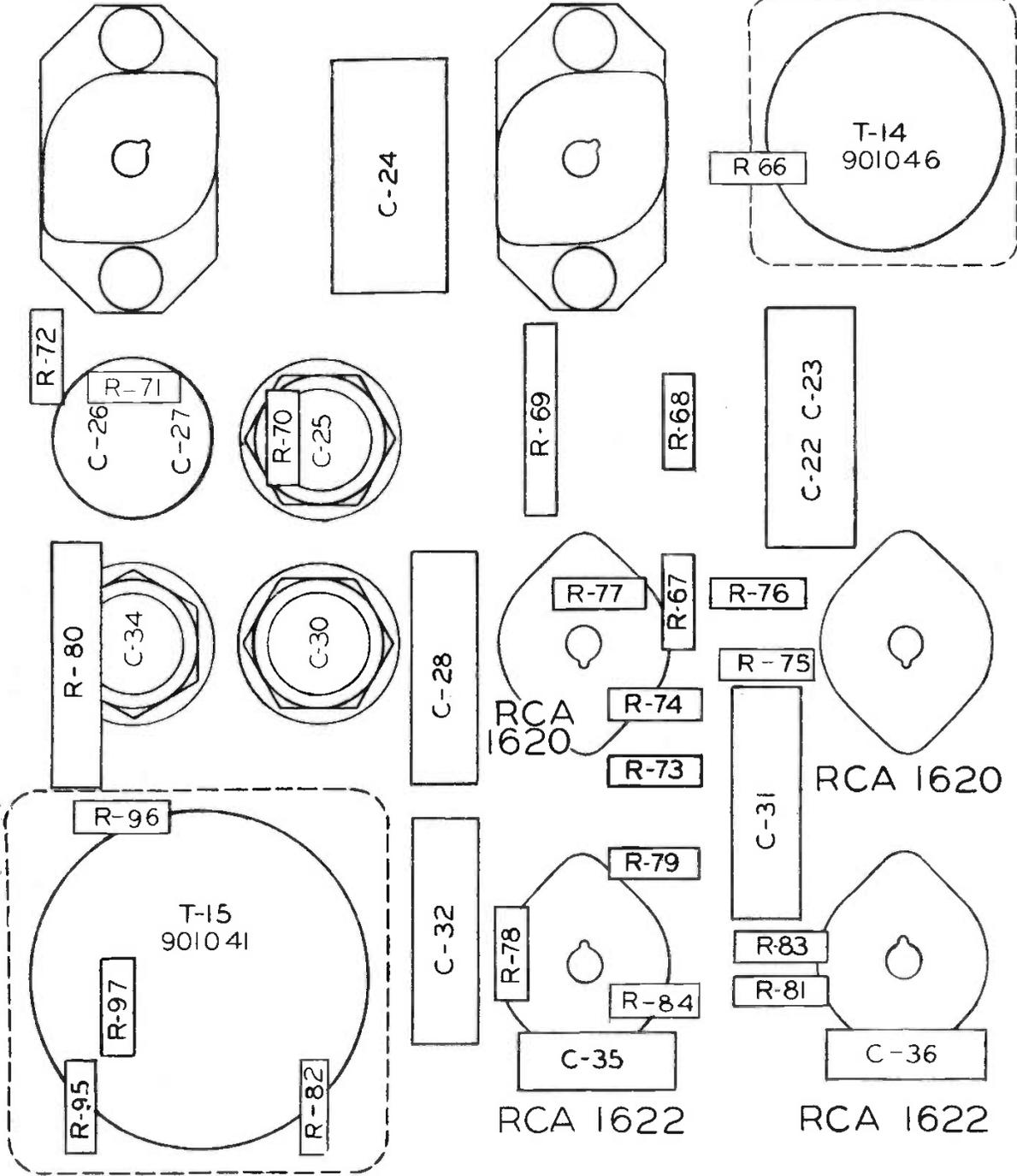
FIGURE 20 - PARTS LAYOUT - PROGRAM AMPLIFIER MOUNTING PLATE.

## REPLACEMENT PARTS LIST (Cont'd.)

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>STOCK NO.</u>
21. ITEMS LOCATED ON THE PROGRAM AMPLIFIER MOUNTING PLATE:		
C-9, C-10 . . . . .	Capacitor - 0.5 Mfd. . . . .	30860
C-11 . . . . .	Capacitor - 0.25 Mfd. . . . .	18388
C-12 . . . . .	Capacitor - 25 Mfd. . . . .	26410
C-13, C-14, C-15 . . . . .	Capacitor - 0.25 Mfd. . . . .	30849
C-16, C-17 . . . . .	Capacitor - 8/8 Mfd. . . . .	17432
C-18 . . . . .	Capacitor - 25 Mfd. . . . .	26410
C-19 . . . . .	Capacitor - 0.25 Mfd. . . . .	30849
C-20, C-21 . . . . .	Capacitor - 25 Mfd. . . . .	26410
C-40 . . . . .	Capacitor - 1,000 Mmfd. . . . .	12635
R-43 . . . . .	Resistor - 132-ohms . . . . .	18232
R-44 . . . . .	Resistor - 100,000-ohms . . . . .	3252
R-45 . . . . .	Resistor - 820-ohms . . . . .	30158
R-46 . . . . .	Resistor - 2,200-ohms . . . . .	3526
R-47 . . . . .	Resistor - 12,000-ohms . . . . .	30436
R-48 . . . . .	Resistor - 820-ohms . . . . .	30158
R-49 . . . . .	Resistor - 270-ohms . . . . .	30929
R-50 . . . . .	Resistor - 39,000-ohms . . . . .	13206
R-51, R-52 . . . . .	Resistor - 100,000-ohms . . . . .	3252
R-53 . . . . .	Resistor - 10,000-ohms . . . . .	13097
R-54 . . . . .	Resistor - 22,000-ohms . . . . .	30492
R-55 . . . . .	Resistor - 10,000-ohms . . . . .	8043
R-56 . . . . .	Resistor - 33,000-ohms . . . . .	30685
R-57 . . . . .	Resistor - 68,000-ohms . . . . .	14138
R-58 . . . . .	Resistor - 270-ohms . . . . .	30929
R-59 . . . . .	Resistor - 56,000-ohms . . . . .	17440
R-60 . . . . .	Resistor - 27,000-ohms . . . . .	30409
R-61, R-62, R-63, R-64 . . . . .	Resistor - 985-75-75-985-ohms . . . . .	17606
R-98, R-99 . . . . .	Resistor - 10,000-ohms . . . . .	3078
R-100, R-101 . . . . .	Resistor - 120-ohms . . . . .	30189
R-102, R-103 . . . . .	Resistor - 10-ohms . . . . .	32184
R-118 . . . . .	Resistor - 27,000-ohms . . . . .	13477
R-119 . . . . .	Resistor - 680-ohms . . . . .	31024
T-11 . . . . .	Transformer - Input transformer . . . . .	43569
T-12 . . . . .	Transformer - Interstage transformer . . . . .	17427
T-13 . . . . .	Transformer - Output transformer . . . . .	17567
---	Socket - Socket for RCA-1620 and RCA-1621 . . . . .	33084

RCA 1620

RCA 1620

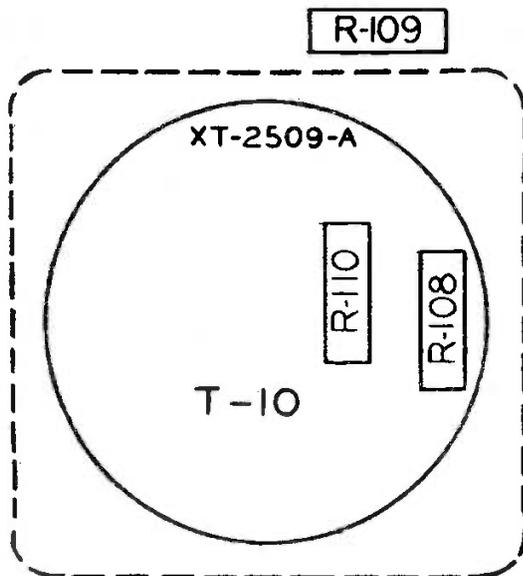
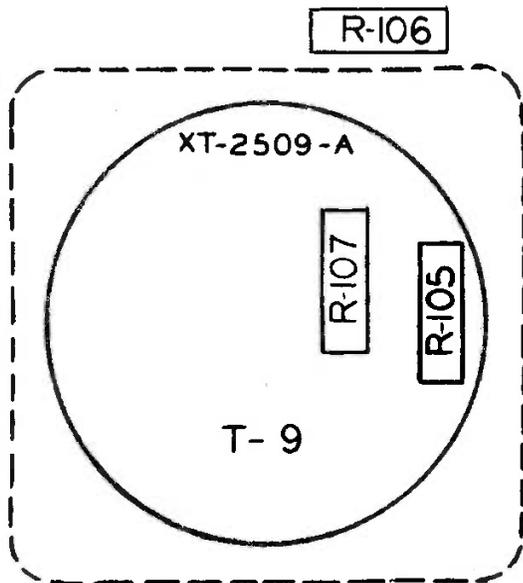


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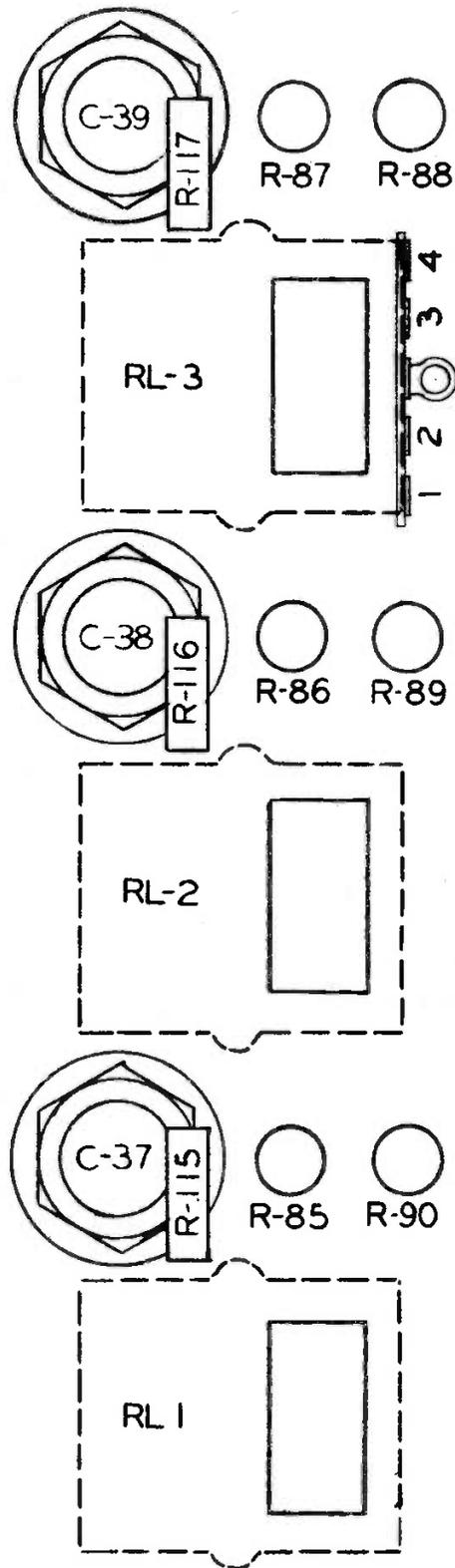
FIGURE 21 - PARTS LAYOUT - MONITOR AMPLIFIER MOUNTING PLATE.

**REPLACEMENT PARTS LIST (Cont'd.)**

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>STOCK NO.</u>
22. ITEMS LOCATED ON THE MONITOR AMPLIFIER MOUNTING PLATE:		
C-22, C-23	Capacitor - 0.5 Mfd.	30860
C-24	Capacitor - 0.25 Mfd.	30849
C-25	Capacitor - 25 Mfd.	26410
C-26, C-27	Capacitor - 8/8 Mfd.	17432
C-28	Capacitor - 0.1 Mfd.	30848
C-30	Capacitor - 10 Mfd.	13222
C-31, C-32	Capacitor - 0.1 Mfd.	30848
C-34	Capacitor - 25 Mfd.	26410
C-35, C-36	Capacitor - 0.0025 Mfd.	30850
R-66	Resistor - 100,000-ohms	3252
R-67	Resistor - 2,200-ohms	3526
R-68	Resistor - 820-ohms	30158
R-69	Resistor - 39,000-ohms	30434
R-70	Resistor - 2,700-ohms	30730
R-71	Resistor - 15,000-ohms	12759
R-72	Resistor - 100,000-ohms	3252
R-73	Resistor - 1 Megohm	30652
R-74, R-75	Resistor - 2,700-ohms	30730
R-76, R-77	Resistor - 82,000-ohms	8064
R-78	Resistor - 100,000-ohms	3252
R-79	Resistor - 8,200-ohms	14250
R-80	Resistor - 200-ohms	30287
R-81	Resistor - 100,000-ohms	3252
R-82	Resistor - 27,000-ohms	30409
R-83, R-84	Resistor - 470-ohms	30681
R-95, R-96	Resistor - 1,200-ohms	30731
R-97	Resistor - 680-ohms	31024
T-14	Transformer - Input transformer	43569
T-15	Transformer - Output transformer	43679
	Socket - Socket for RCA-1620 and RCA-1622	33084



MI-11613-A P-170328-2  
 FIGURE 22 - PARTS LAYOUT  
 TRANSFORMER MOUNTING PLATE



MI-11613-A P-170324-2  
 FIGURE 23 - PARTS LAYOUT  
 RELAY MOUNTING PLATE

## REPLACEMENT PARTS LIST (Cont'd.)

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>STOCK NO.</u>
23. ITEMS LOCATED ON THE RELAY MOUNTING PLATE:		
G-37, C-38, C-39 . . . . .	Capacitor - 25 Mfd. . . . .	26410
R-85, R-86, R-87 . . . . .	Resistor - 1,400-ohms . . . . .	18235
R-88, R-89, R-90 . . . . .	Resistor - 15-ohms . . . . .	18236
R-115, R-116, R-117 . . . . .	Resistor - 120-ohms . . . . .	30189
RL-1, RL-2 . . . . .	Relay . . . . .	19186
RL-3 . . . . .	Relay . . . . .	18292
24. ITEMS LOCATED ON THE TRANSFORMER MOUNTING PLATE:		
R-105 . . . . .	Resistor - 560-ohms . . . . .	5164
R-106 . . . . .	Resistor - 220-ohms . . . . .	5201
R-107 . . . . .	Resistor - 39-ohms . . . . .	11956
R-108 . . . . .	Resistor - 560-ohms . . . . .	5164
R-109 . . . . .	Resistor - 220-ohms . . . . .	5201
R-110 . . . . .	Resistor - 39-ohms . . . . .	11956
T-9, T-10 . . . . .	Transformer - XT-2509-A . . . . .	18230
25. ITEMS LOCATED ON THE FRONT PANEL ASSEMBLY (see figure 5):		
J-1 . . . . .	Jack - "Phones" . . . . .	16999
K-1 . . . . .	Switch - "A-P" #1 . . . . .	18290
K-2 . . . . .	Switch - "A-P" #2 . . . . .	18290
K-3 . . . . .	Switch - "A-P" #3 . . . . .	18290
K-4 . . . . .	Switch - "A-P" #4 . . . . .	18290
K-5 . . . . .	Switch - "A-P" #5 . . . . .	17910
K-6 . . . . .	Switch - "A-P" #6 . . . . .	17910
K-7 . . . . .	Switch - "ANNOUNCE" . . . . .	19432
K-8 . . . . .	Switch - "LINE OUT" . . . . .	18291
K-9 . . . . .	Switch - Override - Off - Record . . . . .	19573
K-10 . . . . .	Switch - "PHONE-MON" . . . . .	19573
PK-1 . . . . .	Push Key #1 (9-Key Assmblly) . . . . .	18317
PK-2 . . . . .	Push Key #2 (9-Key Assembly) . . . . .	18318
PK-3 . . . . .	Push Key #3 (9-Key Assembly) . . . . .	19572
PK-4 . . . . .	Push Key #4 (9-Key Assembly) . . . . .	18320
R-13 . . . . .	Resistor - 285-ohms (at Mixer #1) . . . . .	18231
R-14 . . . . .	Resistor - 285-ohms (at Mixer #2) . . . . .	18231
R-15 . . . . .	Resistor - 285-ohms (at Mixer #3) . . . . .	18231
R-16 . . . . .	Resistor - 285-ohms (at Mixer #4) . . . . .	18231
R-17 . . . . .	Resistor - 285-ohms (at Mixer #5) . . . . .	18231
R-18 . . . . .	Resistor - 285-ohms (at Mixer #6) . . . . .	18231
R-19, R-20 . . . . .	Resistor - 750-ohms (at Switch K-1) . . . . .	3382
R-21, R-22 . . . . .	Resistor - 750-ohms (at Switch K-2) . . . . .	3382
R-23, R-24 . . . . .	Resistor - 750-ohms (at Switch K-3) . . . . .	3382
R-25, R-26 . . . . .	Resistor - 750-ohms (at Switch K-4) . . . . .	3382
R-27, R-28 . . . . .	Resistor - 750-ohms (at Switch K-5) . . . . .	3382
R-29, R-30 . . . . .	Resistor - 750-ohms (at Switch K-6) . . . . .	3382

REPLACEMENT PARTS LIST (Cont'd.)

SYMBOL	DESCRIPTION	STOCK NO.
25. ITEMS LOCATED ON THE FRONT PANEL ASSEMBLY (see figure 5) (cont'd.)		
R-31, R-32, R-33,		
R-34, R-35, R-36 . . . . .	Resistor - 560-ohms (at PK-3) . . . . .	5164
R-38 . . . . .	Resistor - 560-ohms (at PK-2) . . . . .	5164
R-39 . . . . .	Resistor - 560-ohms (at PK-1) . . . . .	5164
R-40, R-41 . . . . .	Resistor - 270-ohms (at PK-2) . . . . .	30929
R-42 . . . . .	Resistor - 560-ohms (at Switch K-7) . . . . .	5164
R-65 . . . . .	Resistor - 132-ohms (at Switch K-6) . . . . .	18232
R-91, R-92 . . . . .	Resistor - 10,000-ohms (at PK-4) . . . . .	3078
R-93, R-94 . . . . .	Resistor - 120-ohms (at PK-4) . . . . .	30189
R-104 . . . . .	Resistor - 12,000-ohms (at "V1-CONTROL") . . . . .	30436
R-111 . . . . .	Resistor - 4,700-ohms (at Jack J-1) . . . . .	30494
R-121, R-122 . . . . .	Resistor - 5,600-ohms (at Switch K-9) . . . . .	30734
R-123 . . . . .	Resistor - 560-ohms (at Switch K-9) . . . . .	5164
R-124, R-125, R-127,		
R-128, R-130, R-131		
R-133, R-134, R-136		
R-137, R-139, R-140 . . . . .	Resistor - 10,000-ohms (at PK-3) . . . . .	3078
	Attenuator - (#1, #2, #3, #4, #5, or #6) . . . . .	17644
	Attenuator - "MASTER" . . . . .	17643
	Attenuator - "MONITOR" . . . . .	17604
	Knob - Knob for Attenuators (#1, #2, #3, #4, #5, #6, #7, or #8) . . . . .	17269
	Knob - Knob for "TUBE CHECK" or "V1" Switches . . . . .	17268
	Lamp - Lamp for #18631 VU Meter . . . . .	19153
	Meter - VU and Tube Check . . . . .	18631
	Oil - Attenuator oil . . . . .	20752
	Pad - Zero adjusting network (800-ohm) . . . . .	19327
	Pad - Multiple Pad (7100/3900-ohm) . . . . .	19328
	Switch - "TUBE-CHECK" . . . . .	19571
	Switch - "V1 CONTROL" . . . . .	19570
	Special Grease - Lubricant for Push Button Switches . . . . .	44275