

# BROADCAST AUDIO EQUIPMENT

LEVEL DROPS  
ARE GARB tubes:  
2-12AY7

## Type BC-5B Audio Console



RADIO CORPORATION OF AMERICA  
COMMERCIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.

IB-24783-2

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Then It Was Stolen From...

[www.SteamPoweredRadio.Com](http://www.SteamPoweredRadio.Com)

## EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have (a) inspected the containers for visible signs of damage and (b) counted the containers and compared with the amount shown on the shipping papers. If a shortage or if evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage **WITHIN 15 DAYS** after receipt.

Report all shortage and damages to RCA, Broadcast Marketing Section, Camden 2, N. J.

Radio Corporation of America will file all claims for loss and damage on this equipment so long as the inspection report is obtained. Disposition of the damaged item will be furnished by RCA.

## REPLACEMENT PARTS

When ordering replacement parts, please give symbol, description, and stock number of each item ordered.

The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part. However, it will be a satisfactory replacement differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment.

The following tabulations list service parts and electron tube ordering instructions according to your geographical location.

### SERVICE PARTS

LOCATION	ORDER SERVICE PARTS FROM:
Continental United States, Alaska and Hawaii	Service Parts Order Service, Bldg. 60, 19th & Federal Sts., Camden 5, New Jersey or through your nearest RCA Regional Office. Emergency orders may be telephoned, telegraphed, or teletyped to RCA Emergency Service, Bldg. 60, Camden, N. J. (Telephone: WO 3-8000).
Dominion of Canada	RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office.
Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada	RCA International Division, Clark, N. J., U.S.A. or through your local Sales Representative.

### ELECTRON TUBES

LOCATION	ORDER ELECTRON TUBES FROM:
Continental United States, Alaska and Hawaii	Local Tube Distributor.
Dominion of Canada	RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office.
Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada	Local Tube Distributor or from: Tube Department RCA International Division 30 Rockefeller Plaza New York 20, New York, U.S.A.

If for any reason, it is desired to return tubes, please return them to the place of purchase.

**PLEASE DO NOT RETURN TUBES DIRECTLY TO RCA WITHOUT AUTHORIZATION AND SHIPPING INSTRUCTIONS.**

It is important that complete information regarding each tube (including type, serial number, hours of service and reason for its return) be given.

When tubes are returned, they should be shipped to the address specified on the Return Authorization form. A copy of the Return Authorization and also a Service Report for each tube should be packed with the tubes.

### LIST OF RCA REGIONAL OFFICES

<p><i>Atlanta 3, Georgia</i> 1121 Rhodes-Haverty Bldg. 134 Peachtree St. N.W. JACKSON 4-7703</p>	<p><i>Boston 16, Mass.</i> Room 2301, John Hancock Bldg. 200 Berkley St. HUBBARD 2-1700</p>	<p><i>Chicago 54, Ill.</i> 1186 Merchandise Mart Plaza DElaware 7-0700</p>	<p><i>Cleveland 15, Ohio</i> 1600 Keith Bldg. CHerry 1-3450</p>
<p><i>Dallas 35, Texas</i> 7901 Freeway #183 FLeeewood 2-3911</p>	<p><i>Hollywood 28, Calif.</i> RCA Bldg., 1560 N. Vine St. HOLLYWOOD 9-2154</p>	<p><i>Kansas City 6, Missouri</i> 340 Dierks Bldg. HARRISON 1-6480</p>	<p><i>New York 20, New York</i> 36 W. 49th St. JUdson 6-3800</p>
<p><i>Branch—San Francisco 2, Calif.</i> 420 Taylor St. ORdway 3-8027</p>			

RC4977

# BROADCAST AUDIO EQUIPMENT

## INSTRUCTIONS

# Type BC-5B Audio Console

MI-11637-A

RADIO CORPORATION OF AMERICA  
COMMERCIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.

Printed in U.S.A.  
DU 5107





Figure 1—Type BC-5B Consolette MI-11637-A

## TECHNICAL DATA

### Power Required

100-130 V 50-60 cps  
150 Watt

### Amplifiers

6 RCA Preamplifiers 5AR1 thru 5AR6 (two used as boosters)  
1 RCA Program Amplifier 5AR7  
1 RCA Monitor Amplifier 5AR8  
1 RCA Power Supply 5PS1

### Inputs

4 Microphones	37.5/150/600 ohms
2 Turntables	37.5/150/600 ohms
1 Network Line	600 ohms
2 Remote Lines	600 ohms
1 External Monitor	150 ohms

### Output Lines

1 Program Line	600 ohms	18 dbm
2 Remote Line Cue	600 ohms	18 dbm
2 Monitor Speakers	16 ohms	3 W each
1 External Monitor	600 ohms	— 6 dbm
1 Turntable Cue	50,000 ohms	1 V

### VU Meter

One 4-inch illuminated, VU meter with type B scale.

### Channels

Program and Audition

### Signal to Noise Ratio

With MIXER, MASTER and MON GAIN controls set to 10 and a —50 dbm reference signal applied to the microphone or turntable inputs, or 16 dbm applied to the network or remote line inputs, hum and noise:  
68 db below reference at program line output  
66 db below reference at monitor output

### Gain

Microphone and turntable to program line	108 db
Network or remote lines to program line (includes 30 db loss in pad)	42 db
Microphone to External Monitor	84 db
Microphone to Remote Line (Cue)	106 db
Microphone to Speaker (Audition)	124 db
Network to Speaker (Audition)	56 db
Microphone to Speaker (Program)	144 db
Network to Speaker (Program)	78 db

### Frequency Response

Program Channel: $\pm 1.5$ db	30 to 15000 cps
Audition Channel: $\pm 2.0$ db	30 to 15000 cps

### Harmonic Distortion

Program (18 dbm output) 1% at 30 cps, 0.75% at 50 cps; 0.5% 100 to 15000 cps  
Monitor (6 Watt total) 1.5% at 50 to 15000 cps

### Tube Complement (MI-11483-A)

#### (Not Supplied)

1 5R4-GY  
2 12AU7  
2 6V6GT  
2 12AX7  
6 12AY7  
5 MI-11299 (selected 12AY7)

### Dimensions and Weight

Width — 19½ inches  
Height — 11½ inches  
Depth — 21½ inches

Weight — 66 pounds  
Finish — two-tone umber gray

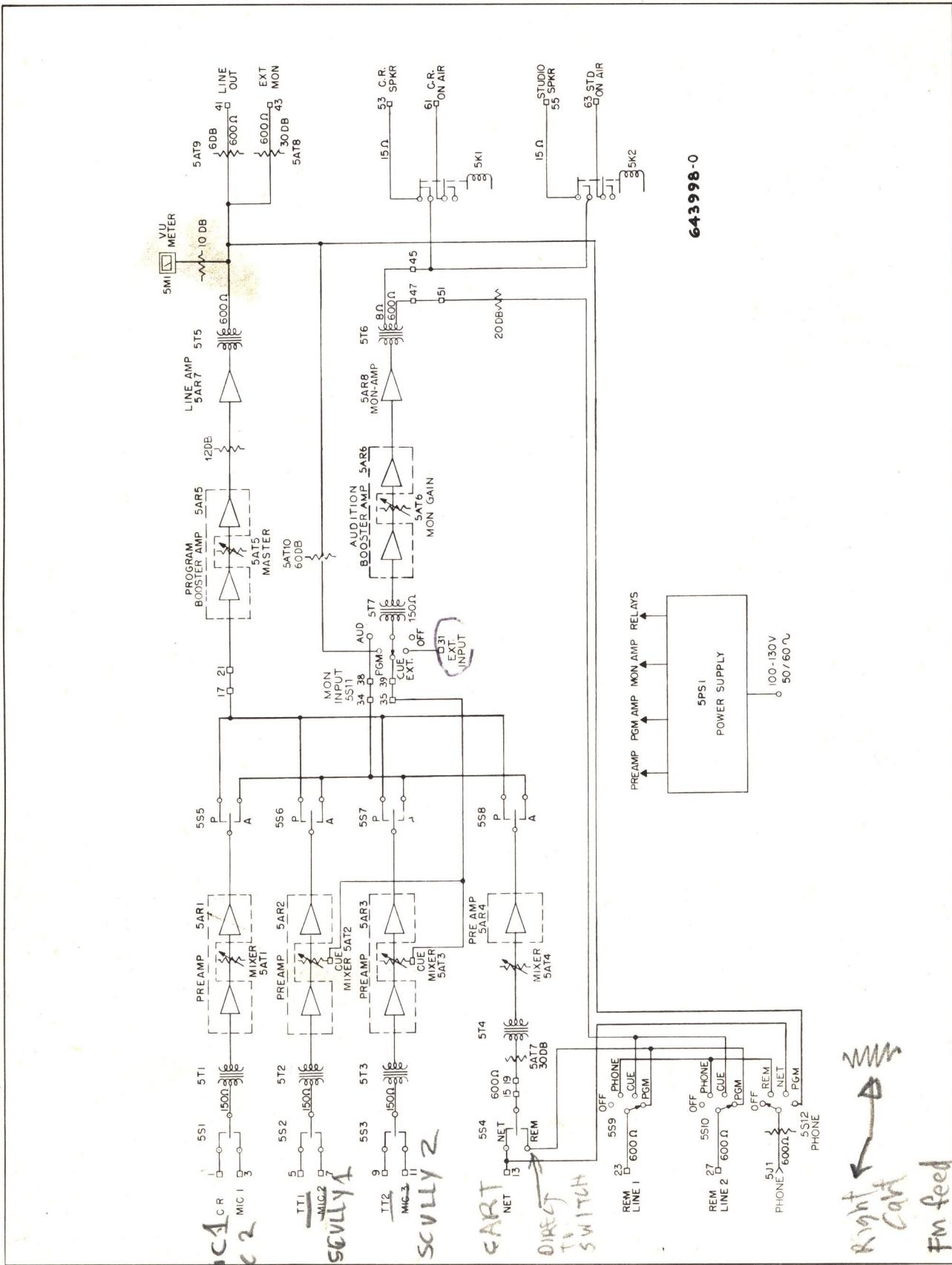
## DESCRIPTION

The Type BC-5B Audio Console, MI-11637-A, provides audio amplification, the switching control and monitoring facilities for the operation of a small Radio or TV Broadcast station. The console is self-contained with the power supply for both amplifiers and relays mounted in the unit.

As shown in figure 1, the console housing is compact and designed to match the styling of other RCA Audio Consoles such as the BC-3C, BC-6B, and TV control and monitoring units. All these units are designed to be mounted on a flat desk or surface. The newest feature is the use of etched wiring for all amplifiers as shown in figures 3, 4, 7, and 8. These printed circuits greatly reduce the size and weight of the console and contribute to producing a neater and more uniform product. Fixed pads are also arranged as printed circuits. Refer to the figure 23.

The front panel tilts forward easily, protected from dropping by the supports. Refer to figure 14. The louvred top cover must be removed to service the units or replace components in the console. Input and output connections are made to the terminal block at the back of the console. Three knockout holes, 1½/16 inch in diameter, are provided in the rear panel and three in the bottom of the console housing for the terminating conduits. The housing is finished in two-tone umber gray.

Three mixing channels are available for low level microphones and turntable inputs and one high level mixing channel, for network and remote line inputs. Nine input channels may be selected; the output of each mixing channel may be switched to either a program or audition bus. The VU meter is a standard four-inch model with illuminated dial.



64398-0

Figure 2—Block Diagram of Type BC-5B Console

Right Car FM feed  
Beepin PR 10

By combining two BC-5B consolettes the facilities may be doubled and dual channel operation set up. All information and diagrams for this doubling are presented in the Installation section. Tubes are shipped packed separately as a separate MI-11483-A Kit; they are not supplied with the consolettes.

**Loudspeakers**

A number of necessary associated equipment items may be selected from the RCA catalogs. A separate sheet of instructions is packed with each unit. However, in regard to the speakers for the consolette, a maximum of two speakers may be connected to each console. The loudspeaker should have a voice coil impedance of 15 ohms, or an impedance matching transformer such as MI-11731 must be provided.

**Warning Lights**

The MI-11706 series of studio warning lights are recommended for the studio and control room, and also the announce booth which may be included when two consoles are installed for dual channel operation. The lights which are available, with inscription, are listed in the following table:

ON AIR	MI-11706-1
REHEARSAL	MI-11706-2
AUDITION	MI-11706-3

STAND-BY MI-11706-4

SILENCE MI-11706-5

**Circuit Description**

The consolette amplifiers are constructed on individual etched circuit boards. External connections are made through turret type terminals on each board. The boards are secured with standard hardware to a metallic chassis and are easily removed to gain access to the etched wiring.

**Preamplifiers 5AR1 to 5AR4**

The circuit of the microphone preamplifiers is shown in the schematic diagram of figure 4. The input signal is derived from an unloaded step-up transformer which is mounted under the preamplifier mounting shelf and is applied to the grid of the input stage. This stage is RC coupled to the second stage, with negative feedback from the plate of the second stage applied to the cathode of the input stage. This minimizes distortion at high input levels. A MI-11299 tube which is a 12AY7 selected for low noise is used in this stage. The output of the second stage is connected through the coupling capacitor IC2 to a potentiometer type gain control and hence to the grid of the third stage. The output of this stage is capacitively coupled to the cathode follower out-

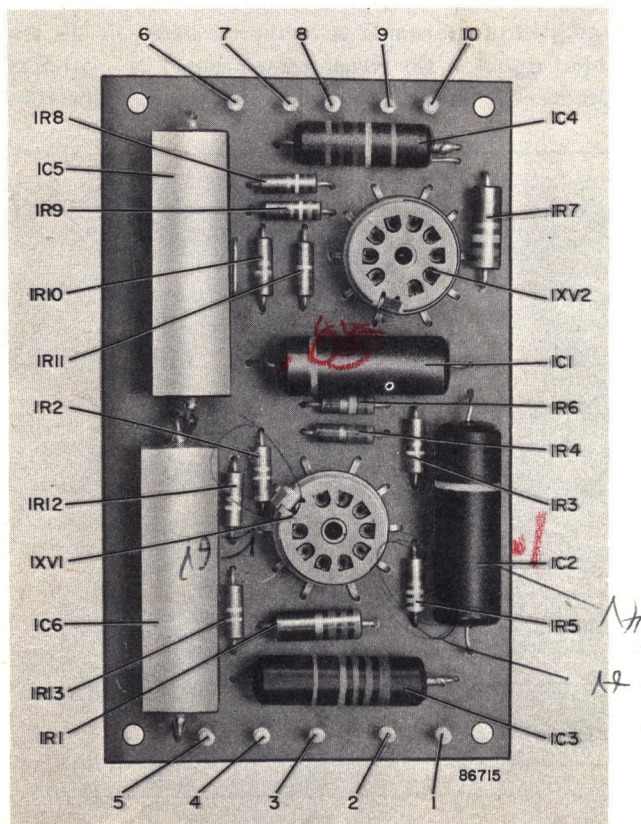


Figure 3—Preamplifier (5AR1 thru 5AR4) Printed Circuit Board

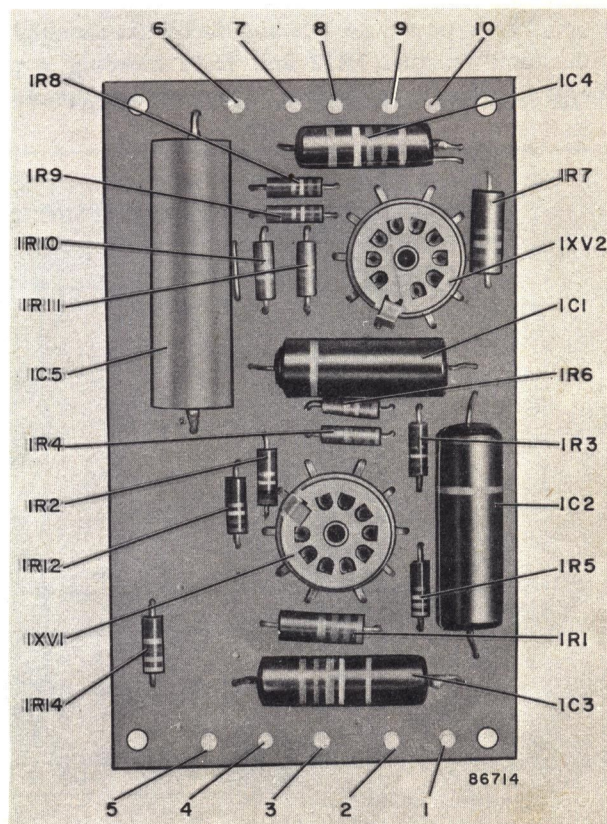


Figure 4—Preamplifier (5AR5, 5AR6) Printed Circuit Board

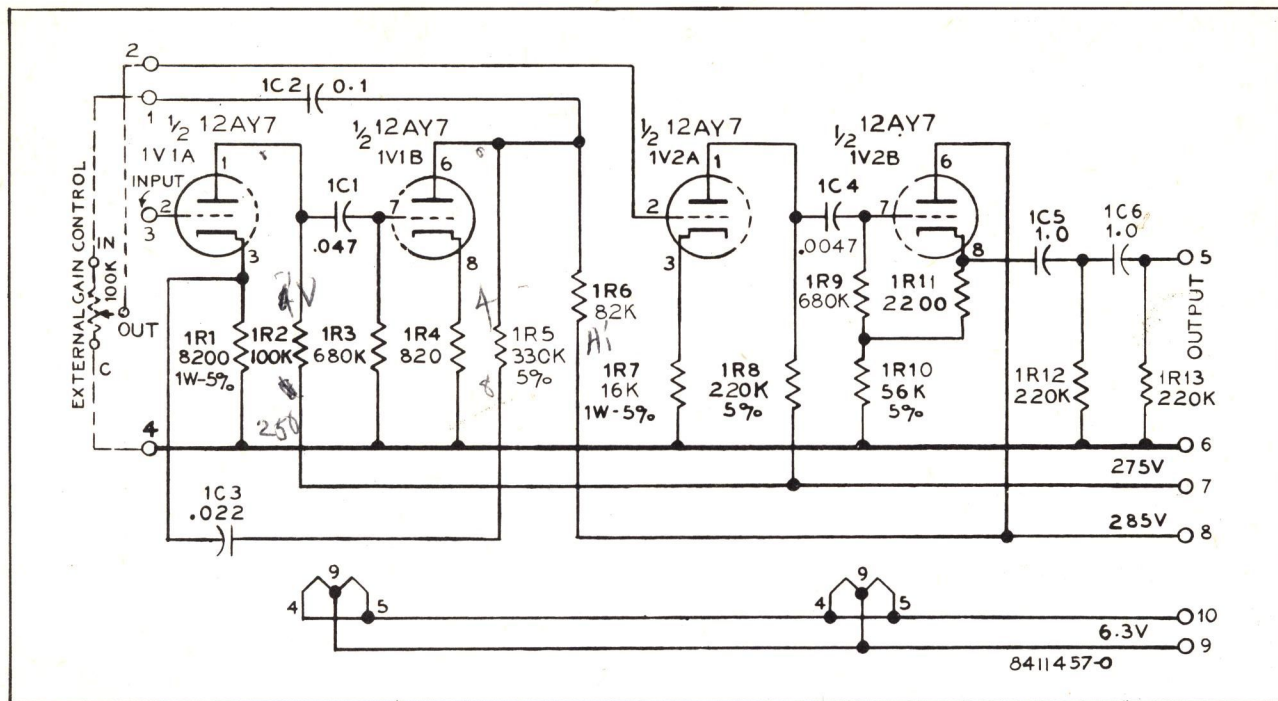


Figure 5—Schematic Diagram for Preamplifiers 5AR1, 5AR2, 5AR3 and 5AR4

put stage. A 12AY7 tube is used here. To eliminate any d-c output voltage which could produce switching clicks, two capacitors 1C5 and 1C6 are connected in series between the cathode and the output terminal with shunt resistors 1R12 and 1R13 bleeding any charge to ground. In the case of the network/remote

line preamplifier 5AR4, the first and second stages are not required and the signal is fed directly from the transformer to the mixer gain control. The voltage gain of the amplifier is approximately 46 db. An input signal to the transformer primary of  $-50$  dbm produces an output signal of approximately one volt.

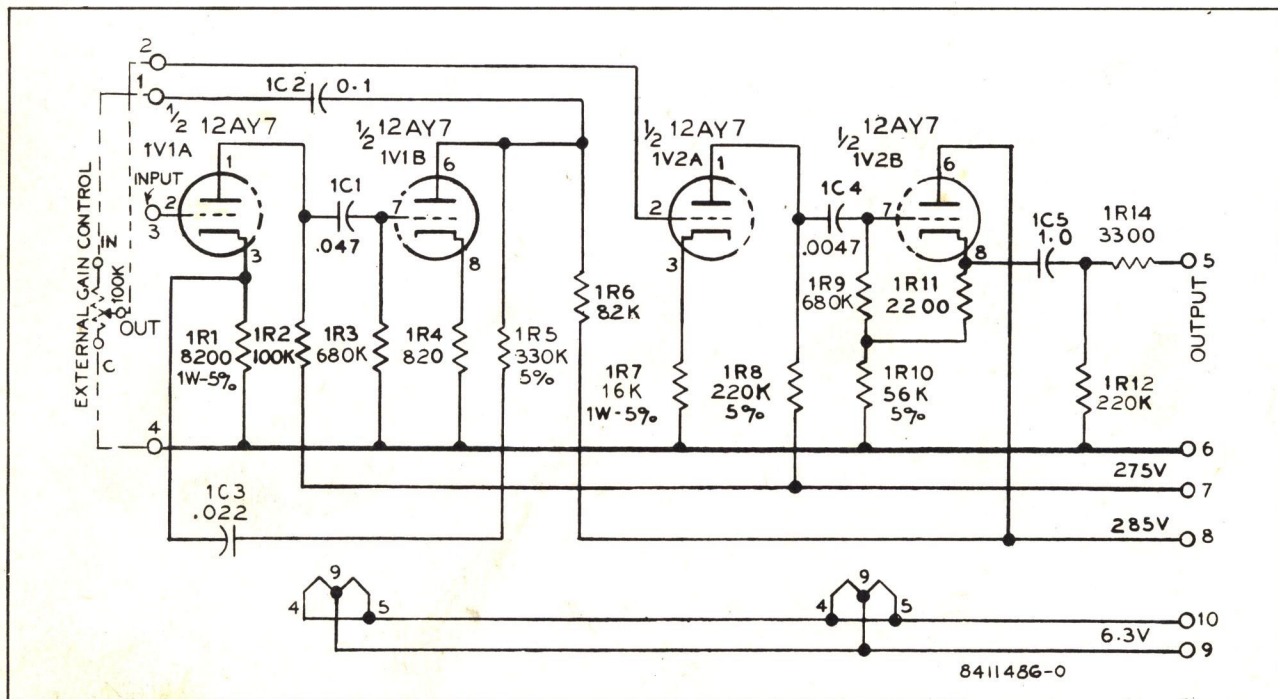


Figure 6—Schematic Diagram for Preamplifiers 5AR5 and 5AR6



**Booster Preamplifiers 5AR5 and 5AR6**

As shown in figure 4, this amplifier is similar to the one described above. Since no switching is performed in the output, the second output capacitor 1C6 and shunt resistor 1R13 are omitted. A series resistor 1R14 is added to roll off of the high frequency response above 15 kc.

**Program Amplifier 5AR7**

The etched wiring board, figure 7, contains all the electrical components except the output transformer 5T5 which is mounted on the chassis directly in front of the 5AR7 amplifier. A 12AX7 twin triode is used for the input and phase inverter stages, driving two 12AU7 twin triodes which are connected in push pull parallel. Negative feedback is derived from a tertiary winding on the output transformer. An input voltage of approximately 1.35 volt is required to obtain an output of 30 dbm. Refer to figure 9.

**Monitor Amplifier 5AR8**

The circuit and construction of the monitor amplifier are similar to the program amplifier. To obtain rated output level of 6 watts, a pair of 6V6-GT tubes are used in a pushpull output stage. Approximately 1.32 volts input are required to obtain 1 watt output. The transformer secondary has taps for 600/150/16/8/4 ohm loading. See figures 8 and 10.

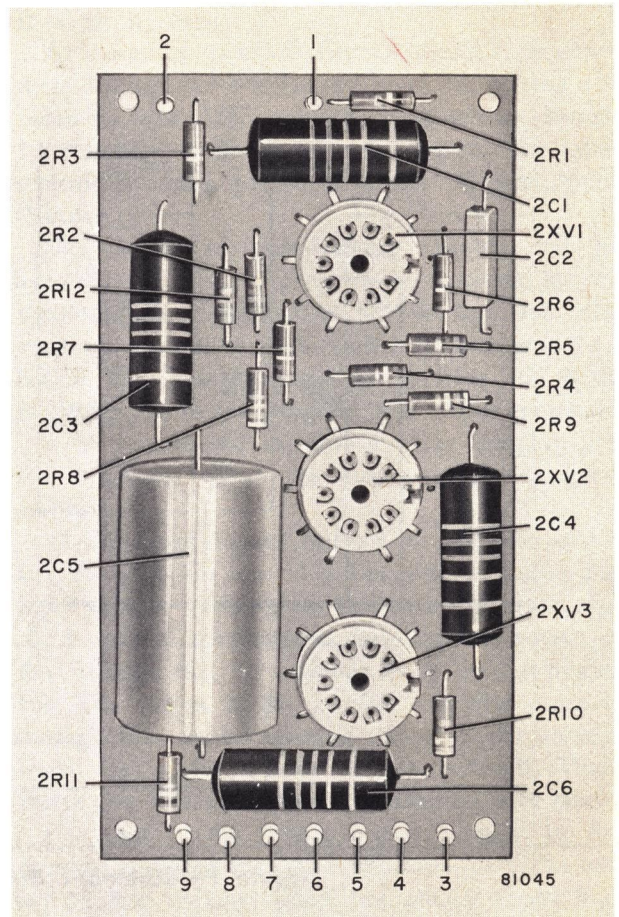


Figure 7—Program Amplifier 5AR7 Printed Circuit Board

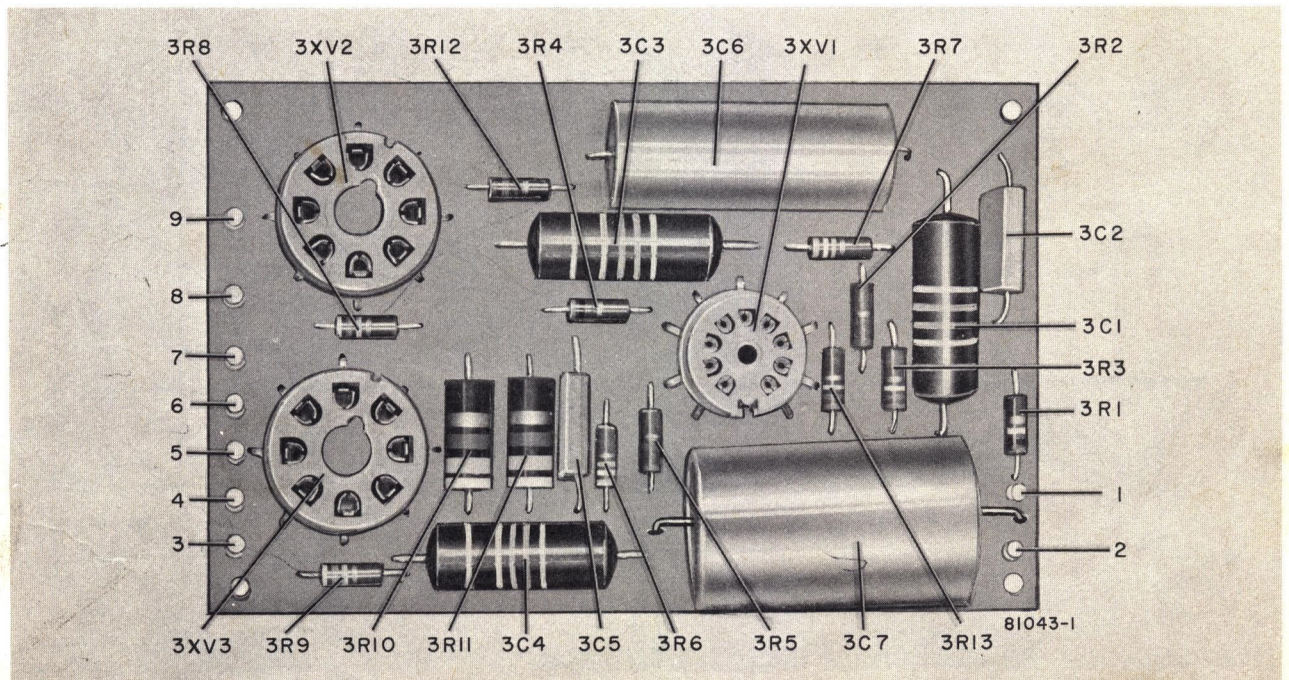


Figure 8—Monitor Amplifier 5AR8 Printed Circuit Board

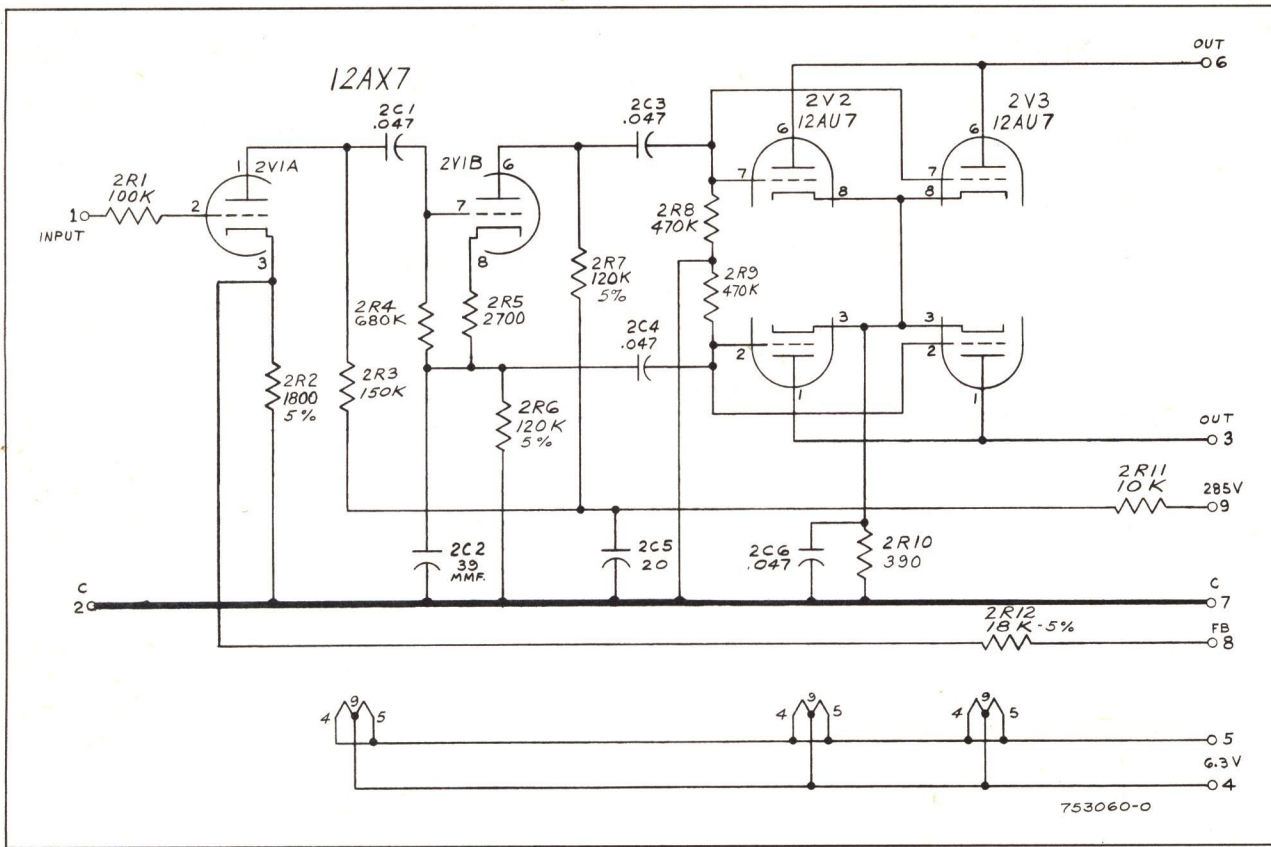


Figure 9—Schematic Diagram for Program Amplifier

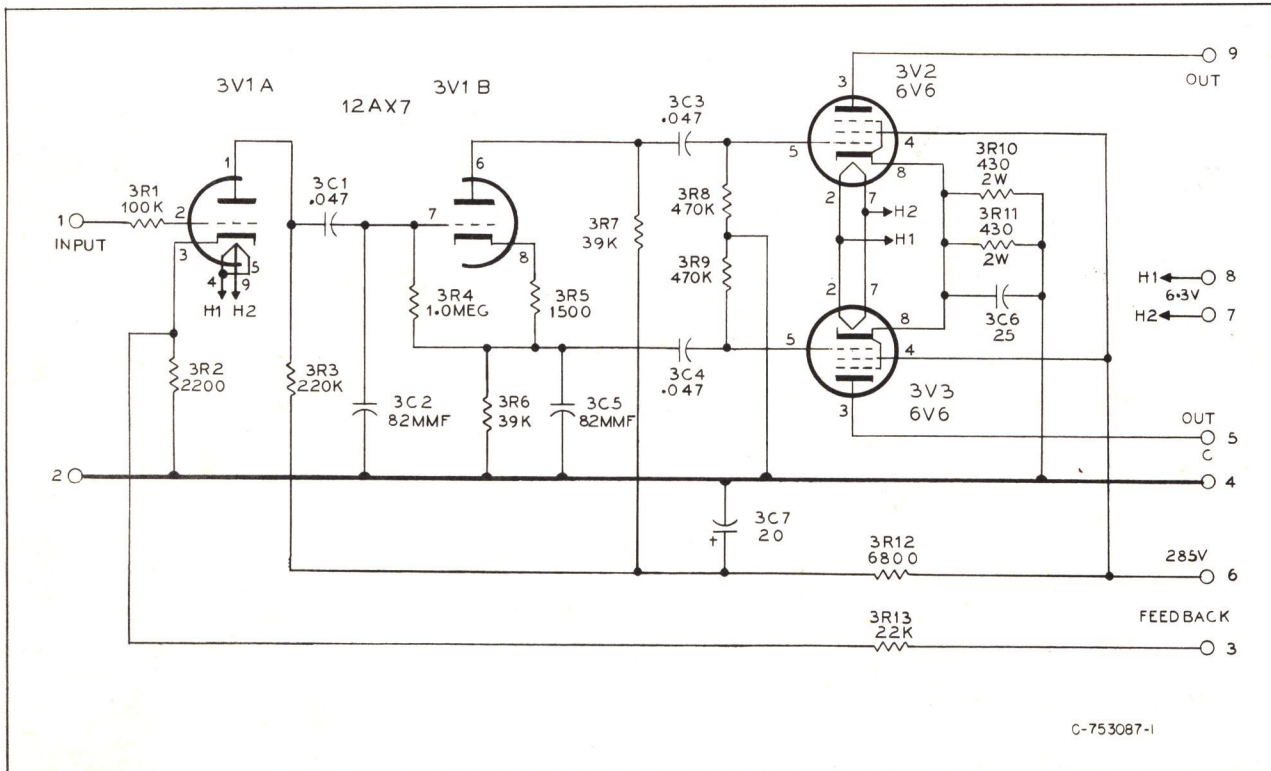


Figure 10—Schematic Diagram for Monitor Amplifier

### Power Supply 5PS1

The power supply is designed for operation from 100-130 V, 50/60 cps power line. Transformer primary taps are available for nominal line voltage of 105, 115 and 125 volt. The plate supply voltages are obtained from a 5R4-GY full-wave rectifier tube and filtered by several stages of RC network which provide both isolation and sufficiently low ripple for the various amplifier stages. The 6.3 v heater winding connects through a hum adjustment potentiometer to a positive bias voltage to minimize hum due to heater to cathode leakage. A full wave bridge type selenium rectifier supplies dc power to the speaker muting relays. A tap is provided on the transformer winding to compensate for ageing of the rectifier. Refer to the photograph figure 11 and to figures 12 and 13 for the schematic and connection diagrams.

### Fixed Pads

Etched wiring techniques are employed in the construction of certain fixed attenuators. The same basic board accommodates various circuit configurations and resistance values. The line input pad 5AT7 is balanced, center-tapped H type having a loss of 30 db. The line output pad 5AT9 is balanced H type having a loss of 6 db. The external monitor pad 5AT8 is of the balanced L type having a loss of 30 db. The internal monitor pad 5AT10 is of the balanced H type having a loss of 60 db.

### Overall System

As shown in the block diagram, figure 2, there are three mixing channels for low level microphone and turntable inputs and one high level mixing channel for the network and remote line inputs. The input selector switches permit a choice of nine input channels.

The output of each mixing channel may be switched to either a program or audition bus by means of the key switches 5S5 through 5S8. The program bus connects through a booster amplifier, master gain control, program amplifier and 6 db isolation pad to the program line output terminals. The VU meter and external monitor bridging pad are connected across the output of the program amplifier.

The monitor channel consists of a booster amplifier, monitor gain control and monitor amplifier. The input selector switch gives the choice of monitoring the output of the program amplifier, the output of the audition bus, an external input or a turntable cue. The output of the monitor amplifier connects through the speaker muting relays to the control room and studio speaker output terminals. These relays also actuate the ON AIR warning light relays.

Cue feed to the remote line is supplied by the monitor amplifier through an isolation pad. The two remote line switches select headphone monitoring, cue feed and program receive functions.

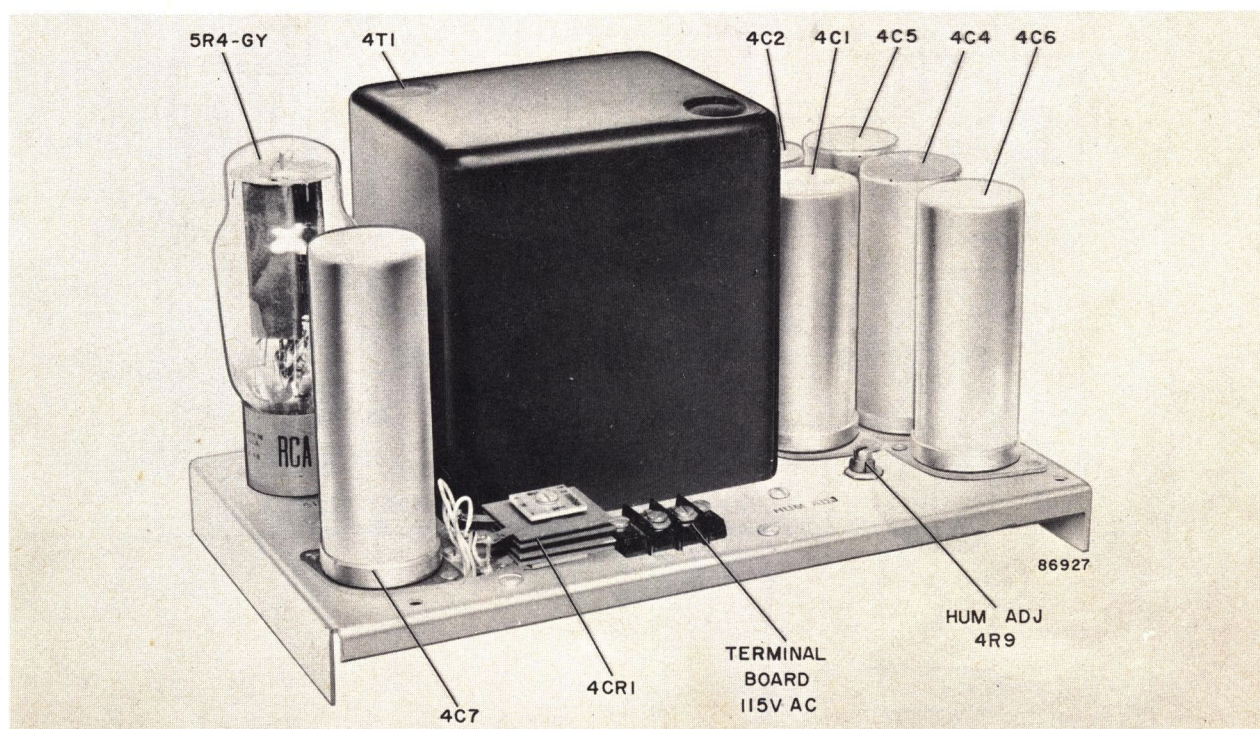
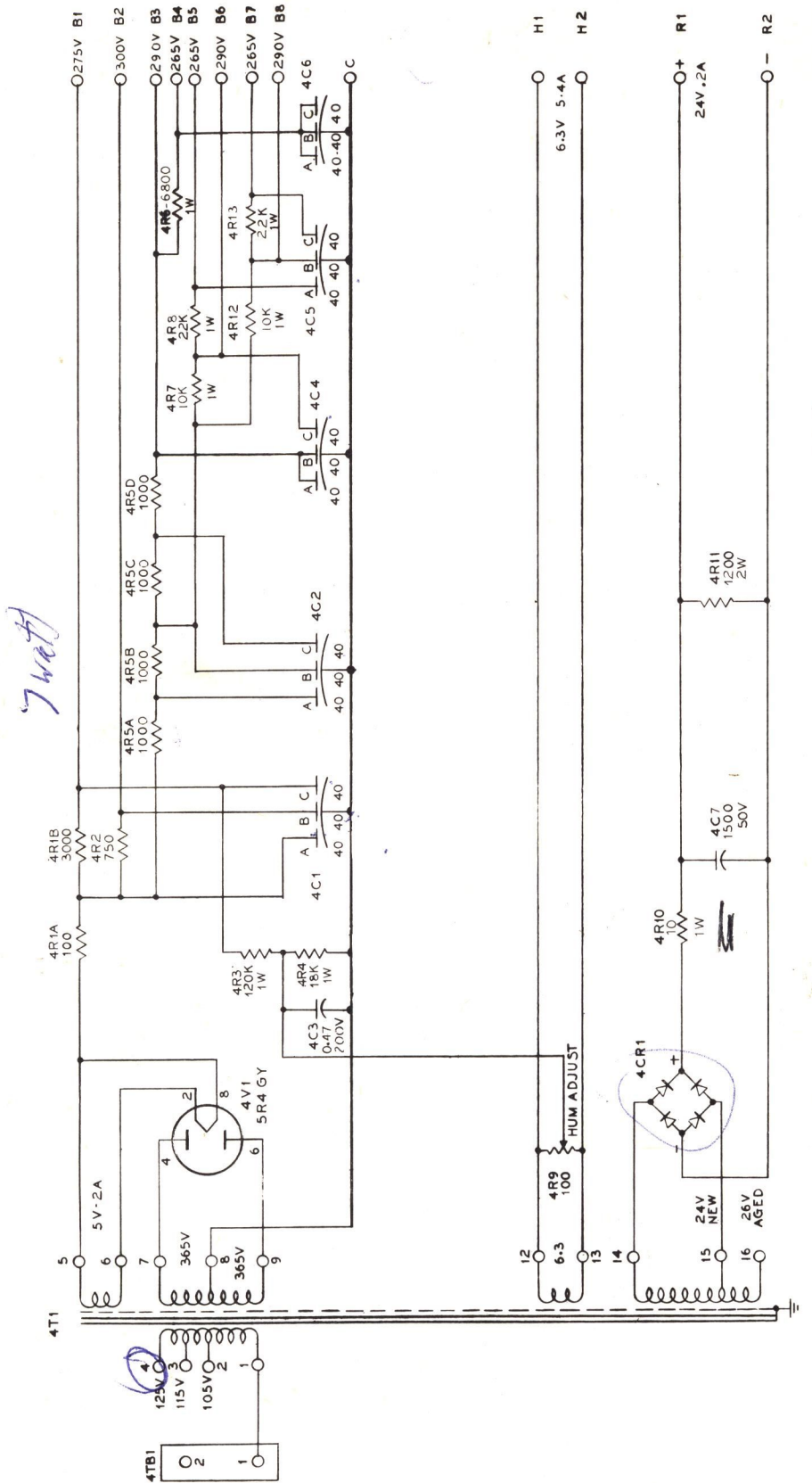


Figure 11—Power Supply 5PS1



ALL RESISTOR VALUES IN OHMS &  
ALL CAPACITOR VALUES IN MICRO-FARADS  
UNLESS OTHERWISE SPECIFIED.

D-643264

Figure 12—Schematic Diagram for Power Supply

WIRE TABLE		PARTS LIST 8905257-502	
WIRE NO. IN THIS WIRE	WIRE	P.S. OR D.C. NO.	ITEM NO. OPEN NOS
1-11	TINNED COPPER .032 DIA.	805-57	50
20-22	WHITE - RED	70126	51
30-31	RED/YEL	70126	52
40	RED/BLK	70126	53
50	BLACK	7010	54
60-62	YELLOW		55
80	BROWN		57
90	BRN/BLK.		58
100	ORANGE		59
110	RED/BLUE		60
120-124	RED/GRN.		61
131-133	RED/YEL.		62
140	WHITE - YEL/GRN/7010	805-6	64
150-151	SLEEVING, BLK. .042 I.D.		6
170-176	SLEEVING, .133 I.D.		8
190			4.4

- NOTES
- THE FOLLOWING WIRES ARE TWISTED PAIRS.  
120 & 121  
20 & 30  
90 & 100
  - SOLDER ALL ELECTRICAL CONNECTIONS USING ITEM 67
  - BEND TERMINALS OF 4R5 TOWARD BOTTOM OF CHASSIS.

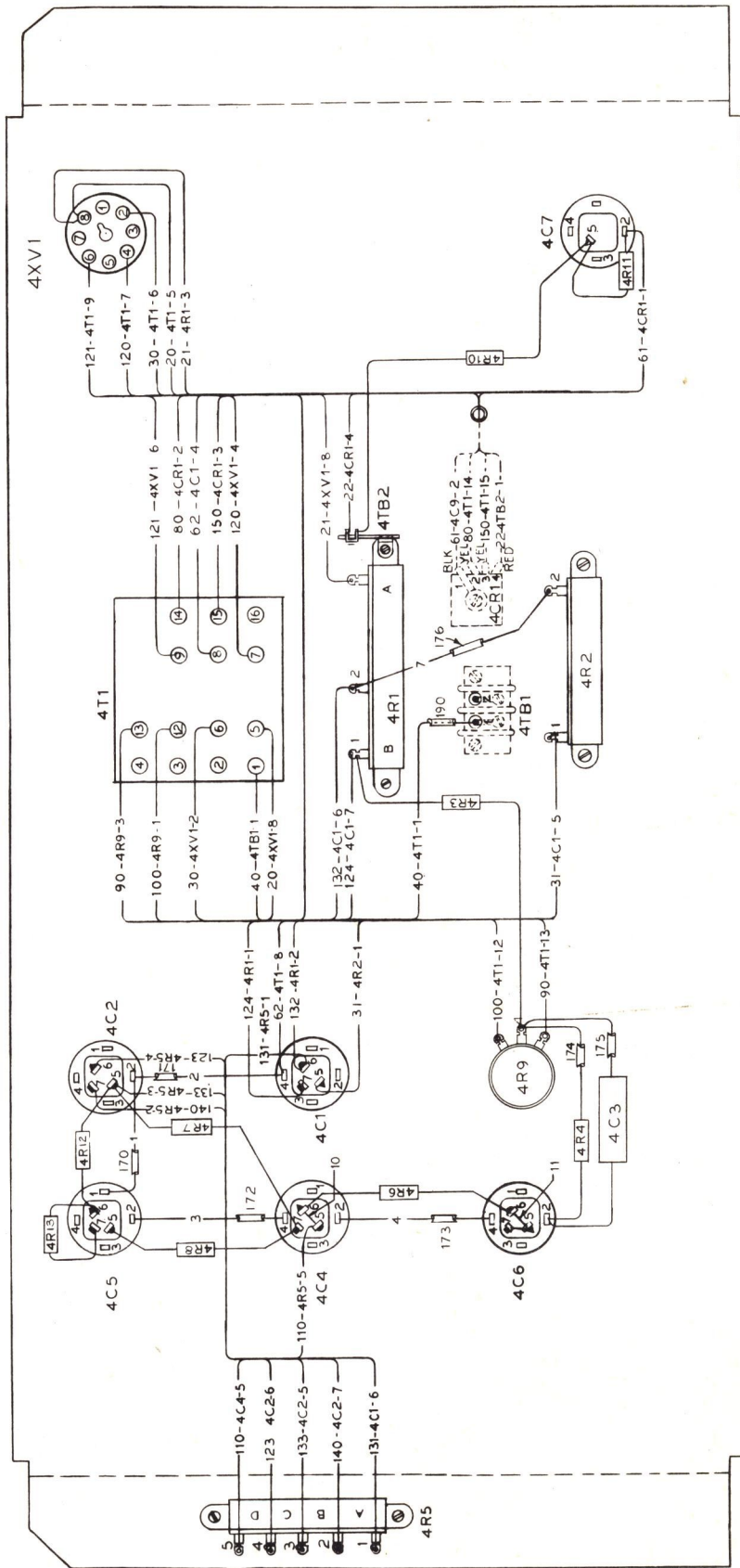


Figure 13—Connection Diagram for Power Supply

## INSTALLATION

### Location of Consolelette

The consolelette may be installed on any flat desk or table of suitable size. A minimum of 1/2-inch clearance should be allowed between the rear of the consolelette and a wall. Refer to the outline dimensional drawing, figure 16.

### Type of Installation

A typical broadcast installation for a single studio system using the Audio Consolelette type BC-5B is shown in figure 17. Typical two-studio installations are shown in figures 18 and 19. Three possible combinations are explained under Dual Channel Installation.

### Removal of Shipping Bolts

Remove the nuts and lockwashers located between preamplifiers 5AR1 and 5AR2 as well as 5AR5 and 5AR6. Remove the shipping screws by pulling through holes in the underside of consolelette housing. Removal of this shipping hardware permits the preamplifier mounting shelf to float freely on its rubber vibration mounts.

### Tube Installation

Tubes are not supplied with the consolelette and must be ordered separately as MI-11483-A. Insert the tubes in the sockets as called for by the stencil. Install the selected 12AY7 (MI-11299) tubes in the sockets nearest the front (or top) of the preamplifier and booster amplifier printed wiring boards. Slip the shields over the tubes on these circuit boards making certain that the ground strap is wedged between the tube envelope and the shield.

## WARNING

Do not remove top cover or open front panel with power turned on unless thoroughly familiar with this equipment. High voltages appear on the etched wiring boards and terminal blocks. Caution must be exercised when replacing tubes or servicing this equipment with power turned on.

### Power Supply 5PS1 Connections

The consolelette is shipped with the power transformer connected for power line voltage of 110 to 120 volts. If the line voltage is outside this range, remove the four screws in each corner of the power supply chassis (5PS1). Turn the power supply upside down. Remove the wire leading to terminal 3 of the power transformer 4T1. If the line voltage is between 100 and 110 volts, connect this wire to terminal 2; if it is between 120 and 130 volts, connect the wire to terminal 4. Replace the power supply. Connect the ac power line to the barrier type terminal block 4TB1 directly behind the power transformer. For convenience, a power switch may be provided externally to turn the consolelette on and off.

### External Connections

Audio wiring should be segregated into low level (microphone and turntable inputs) and high level (line input and output) cables or conduits. Low level audio lines should be shielded twisted pairs with shields preferably insulated and grounded at one end only. Low level audio wiring should be kept away from AC power and signal light circuits. Con-

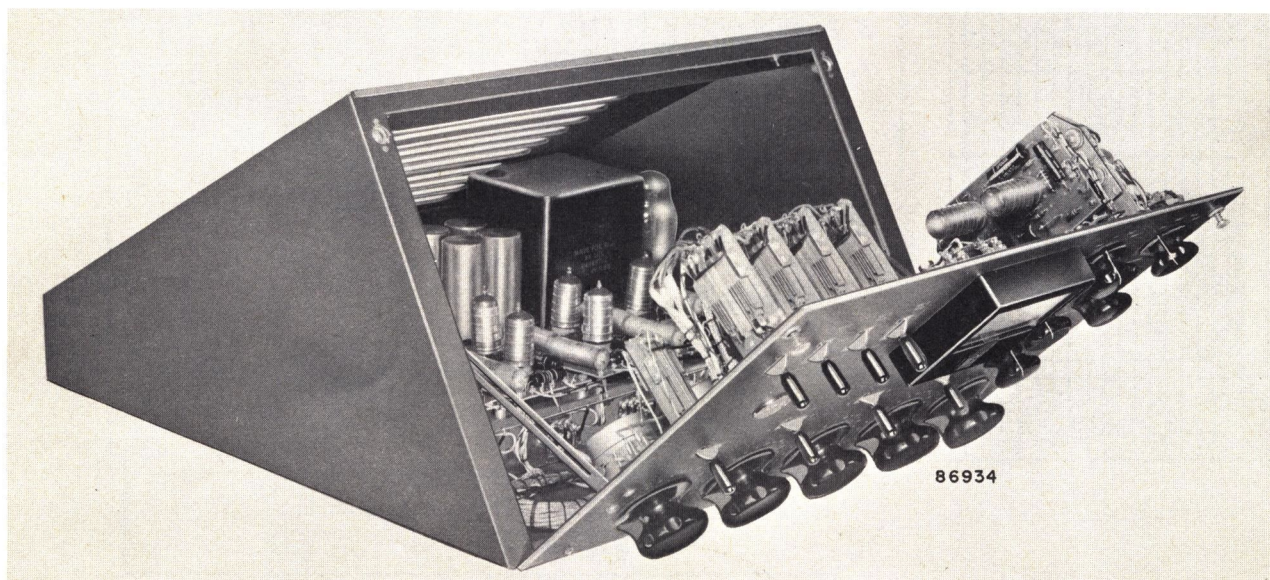


Figure 14—Type BC-5B Consolelette with Panel Open

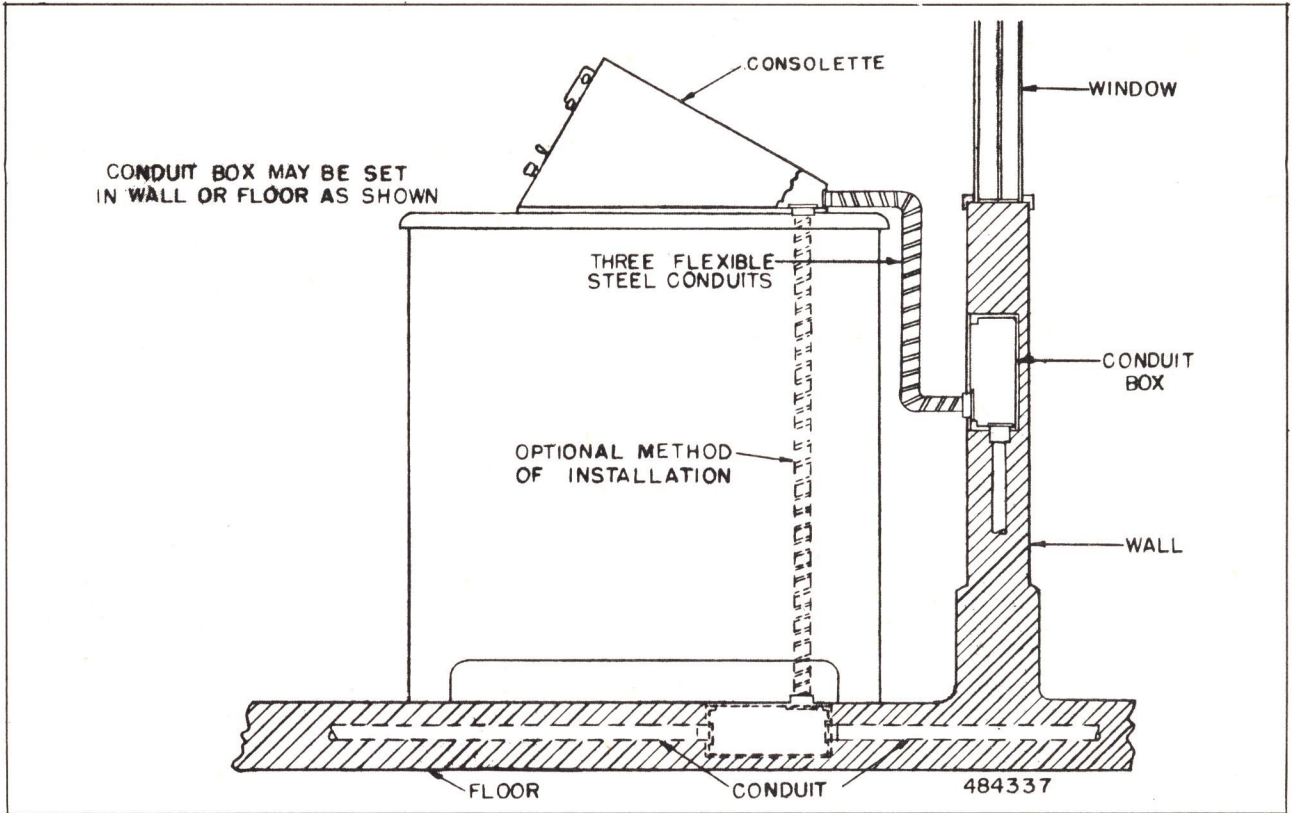


Figure 15—Typical Installation Showing Cable Installation for Consolette

nect a ground to the heavy bus wire adjacent to the audio terminal block.

**Microphones and Turntables**

Connect microphones and turntables according to the table of connections on 5TB1. All microphones installed in the same studio should be phased alike. The input transformers 5T1 to 5T3 are connected for a balanced 150-ohm input. If a 600-ohm input is desired, reconnect as shown for 5T4 by removing jumper between terminals 1-3 and 4-6; jumper 3-4.

Remove the center tap ground wire from terminal 5 and connect it to terminal 4.

If a 37.5 ohm input is desired, remove the jumpers between terminals 1-3 and 4-6 and jumper 1-5 and 2-6. A center tap is not available for this impedance.

Turntables with unbalanced equalizers, such as the MI-4975, MI-11887 and MI-11888, may be connected to the balanced turntable inputs of the BC-5B consolette with no change in performance provided that no input or output terminal of the equalizer is grounded.

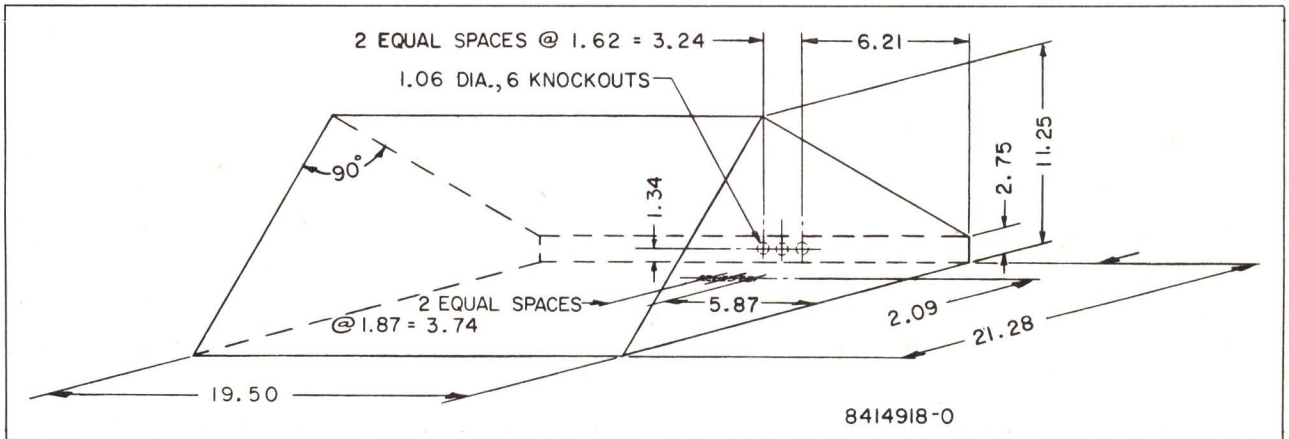


Figure 16—Installation Dimensions

**Remote Line and Network Inputs**

A 600/600 ohms pad 5AT7 having a loss of 30 db is inserted ahead of the input transformer 5T4. This part may be modified or removed if so desired. The input transformer 5T4 is connected for 600-ohm input. If desired it may be reconnected for 150 ohms by arranging jumpers as shown in the schematic and wiring diagrams for 5T1.

**Line Equalizer**

An Equalizer, such as MI-11752, for compensating the frequency response of the Remote and Network Lines may be connected to terminals 15 and 16.

**Program Line**

The program output line is connected to terminals 41 and 42. A 6 db isolation pad having the impedance of 600 ohms is provided within the console.

**Output to External Monitor Amplifier**

An external monitor amplifier may be connected to a built-in bridging pad 5AT8 having an output impedance of 600 ohms by making connections to terminals 43 and 44.

**External Input to Monitor Amplifier**

The 600-ohm impedance output of an off-air tuner may be connected to terminals 31 and 32 for off-air monitoring of program.

**Warning Lights**

Studio warning lights MI-11706 Series may be operated from the speaker muting relay. It is advisable to use a MI-11702A Warning Light Relay with each warning light. The Control Room signal light circuit connects to terminals 61 and 62, the studio circuit to 63 and 64.

CONNECTIONS AT TERMINAL BLOCK 5TB1	
Control Room Microphone	1-2
Studio Microphone 1	3-4
Turntable 1	5-6
Studio Microphone 2	7-8
Turntable 2	9-10
Studio Microphone 3	11-12
Network	13-14
Line Equalizer in (optional)	15-16*
Program Bus Out	17-18*
Line Equalizer Out (optional)	19-20*
Program Booster Input	21-22
Remote Line 1	23-24
No Connection	25-26
Remote Line 2	27-28
No Connection	29-30
External Monitor Input	31-32
No Connection	33
Audition Bus—Output	34*
Turntable Cue Out	35-36*
No Connection	37
No Connection	38
Turntable Cue Monitor Input	39-40*
Program Line Output	41-42
External Monitor Output	43-44
Monitor Amplifier—8 ohm Output	45-46*
Monitor Amplifier—600 ohm Output	47-48*
No Connection	49-50
Remote Cue Pad Input	51-52*
Control Room Speaker Output	53-54 <i>blg</i>
Studio Speaker Output	55-56 <i>white</i>
Control Circuit	57-58*
Control Circuit	59-60*
Control Room ON AIR	61-62
Studio ON AIR	63-64
Relay Supply	65-66*

\* External connections not normally required.

**RELAY, SPEAKER AND WARNING LIGHT OPERATION**

INPUT SELECTORS	MIXERS				LOUDSPKR.		LIGHTS		SPK. RELAYS	
	5S5	5S6	5S7	5S8	CR	STD	CR	STD	CR	STD
5S1 OFF	O				ON	ON	OFF	OFF	OPEN	OPEN
5S1 CR MIC	P				OFF	ON	ON	OFF	CLOSED	OPEN
5S1 MIC 1	P				ON	OFF	OFF	ON	OPEN	CLOSED
5S2 TT1		P			ON	ON	OFF	OFF	OPEN	OPEN
5S2 MIC 2		P			ON	OFF	OFF	ON	OPEN	CLOSED
5S3 TT2			P		ON	ON	OFF	OFF	OPEN	OPEN
5S3 MIC 3			P		ON	OFF	OFF	ON	OPEN	CLOSED
5S4 REM				P	ON	ON	OFF	OFF	OPEN	OPEN
5S4 NET				P	ON	ON	OFF	OFF	OPEN	OPEN
5S1 CR MIC	A				OFF	ON	ON	OFF	CLOSED	OPEN
5S1 MIC 1	A				ON	OFF	OFF	ON	OPEN	CLOSED
5S2 TT1		A			ON	ON	OFF	OFF	OPEN	OPEN
5S2 MIC 2		A			ON	OFF	OFF	ON	OPEN	CLOSED
5S3 TT2			A		ON	ON	OFF	OFF	OPEN	OPEN
5S3 MIC 3			A		ON	OFF	OFF	ON	OPEN	CLOSED
5S4 REM				A	ON	ON	OFF	OFF	OPEN	OPEN
5S4 NET				A	ON	ON	OFF	OFF	OPEN	OPEN



### To Increase Gain of Remote Line and Network Input Channel

The high level remote line network input channel may be converted to a low level microphone or turntable input channel by making a few simple changes. First, remove the wire joining terminals 3 and 4 of 5T4. Remove the wires from terminals 1 and 6 of 5T4. Remove the 100K ohm resistor 5R31 connected between terminals 8-9 of 5T4. Remove the shielded pair of wires (#408) from terminals 1 and 2 of 5AT7 and connect to terminals 1 and 6 of 5T4. Connect at 5T4 terminals 1 to 3 and 4 to 6. Remove the wire #228 from 5T4-9 and connect to terminal 1 of 5AR4. Connect 5AR4-3 to 5T4-9. Allow sufficient length to permit tilting of etched wiring board about right edge. Change the 560 ohm resistor 5R4 to 150 ohm.

If this channel is to be used for a studio microphone input, complete interlock circuits as follows:

- Connect 5S4—13 to 5S3—13
- 5S4—16 to 5S3—16
- 5S4—14 and 15 to 5S8—8 and 9
- 5S8—7 and 10 to 5S7—10

Insert a selected 12AY7 (MI-11299) tube in the socket (1XV1) nearest the front of 5AR4. A shield may be obtained from replacement parts, Stock #211035.

### Loudspeaker Connections

The control room speaker is connected to terminals 53 and 54 and the studio speakers to terminals 55 and 56. The loudspeakers should have a voice coil impedance of 15-16 ohms. For other voice coil impedances, a matching transformer is suggested. It is also possible to use speakers having a voice coil impedance of 6-8 ohms replacing the 15-ohm load resistors 5R23 and 5R24 with 6-8 ohms, 5 w resistors. Reconnect the wire leading to terminal 10 of the monitor output transformer 5T6 to terminal 9.

### Hum Adjustment

Before placing the console in operation, make the following adjustment:

1. Set the input selector switches 5S1 to 5S4 to the center OFF position.
2. Set the mixer output switches 5S5 to 5S9 to program position P.

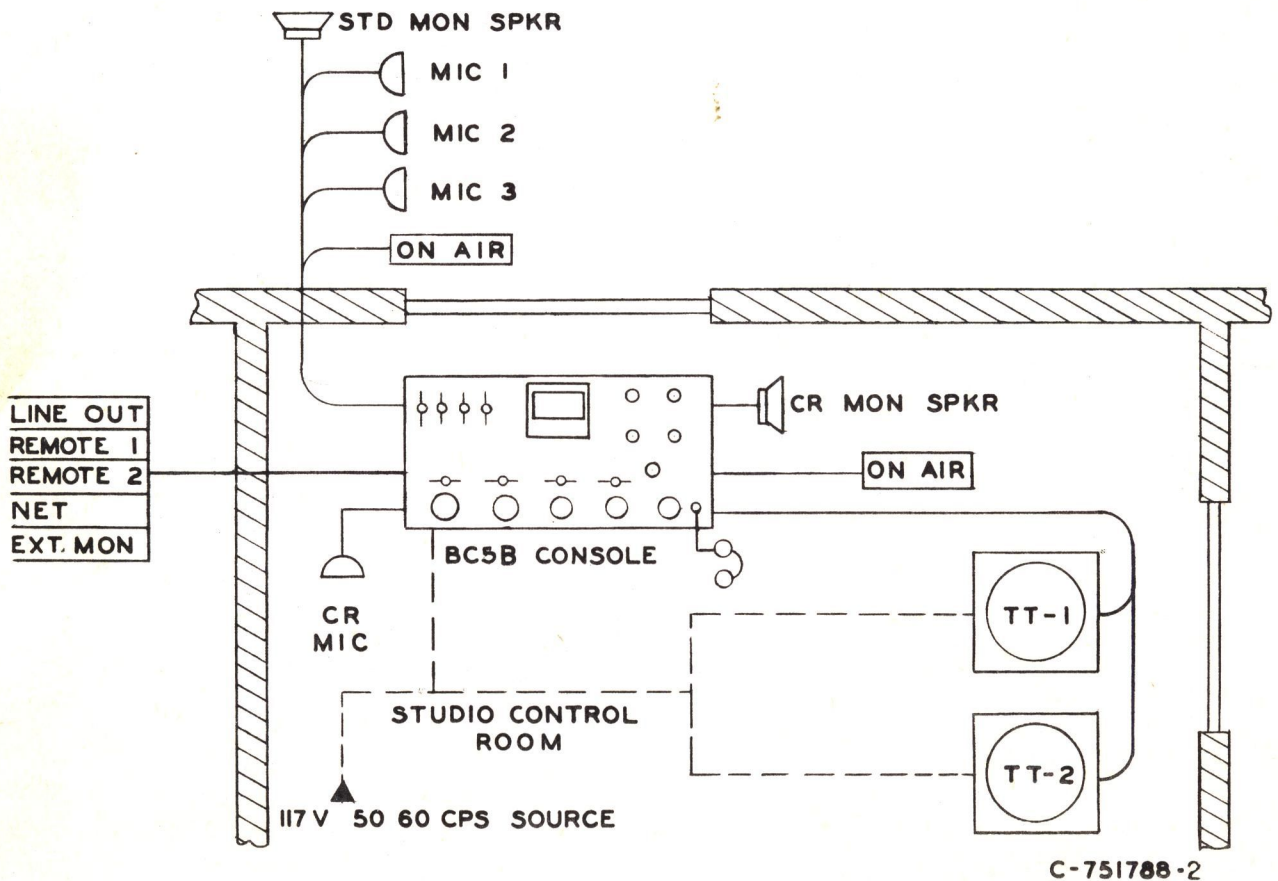


Figure 17—Typical Layout for One-Studio Operation

3. Set mixer and master attenuators 5AT1 to 5AT5 to maximum clockwise position.
4. Adjust the hum control 4R9 on the power supply chassis for minimum hum in the output to the program line.

**Cue Switches on Mixer Gain Controls**

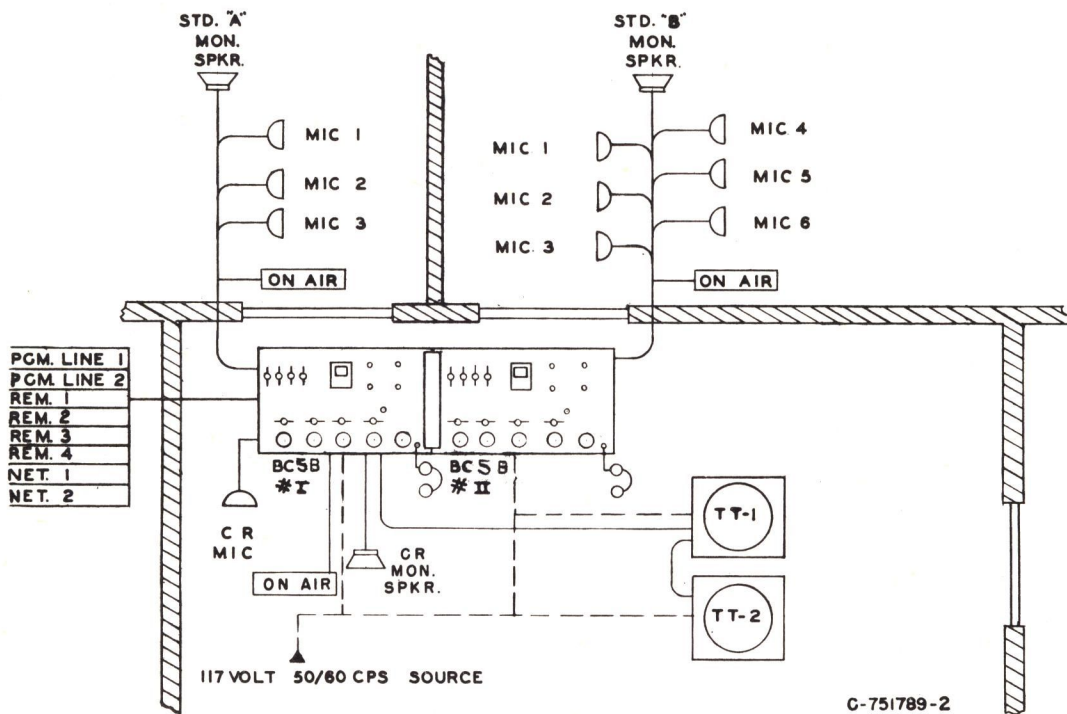
The mixer attenuators 5AT2 and 5AT3 in the turntable channels are provided with switches which connect the output of the first two stages of the pre-amplifiers to the terminal #35 of 5TB1 and hence to the TT CUE position of the Monitor Input Selector switch in the maximum counterclockwise position of the attenuators. This permits one to cue one turntable while the other is feeding program.

If it is desired to have cue switches on the other mixer controls, attenuators with built-in cue switches may be obtained from Replacement Parts by ordering Stock #211003.

**VU Meter Attenuator**

The VU meter attenuator is designed to give a meter reading of 100% (0 to VU scale) with an output of 8 dbm delivered to a 600-ohm load connected to the program output terminals. If it is desired to have the meter read 100% at another output level, replace resistors 5R28, 5R29, and 5R30 with the values contained in the table shown below:

Output Level (DBM)	5R28 ohms	5R29 ohms	5R30 ohms
-2	3600	0	omit
0	4047	447	16790
2	4482	883	8180
4	4896	1296	5220
6	5279	1679	3690
8	5626	2026	2741
10	5934	2334	2091
12	6203	2603	1621
14	6433	2833	1268



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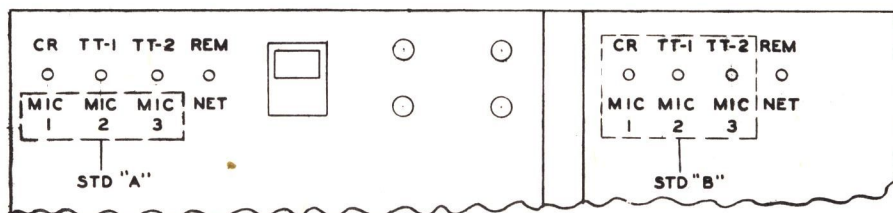


Figure 18—Typical Layout for Two-Studio Operation with Control Room and Announce Booth

**Installation for Dual Channel Operation**

Two BC-5B Consolettes may be installed side-by-side to double the available facilities.

The many different ways of operation which are possible indicate the flexibility of the BC-5B Consolette. These possibilities are described below. All combinations offer two independent program output and monitor channels and differ only in the arrangement of microphone inputs and speaker outputs. The program and audition busses of these two consolettes are paralleled as follows:

Let the Consolette on the left be for the Audition ("A") Line output channel and the consolette on the right be for the Program ("P") Line output channel. Designate "A" consolette as Consolette I, and "P" as Consolette II.

Remove the 5600-ohm resistors 5R17 and 5R20 from both consolettes. Connect a shielded pair of wire from 5TB1-17 and 18 of the Consolette I to the same terminals of the Consolette II.

At the terminal block 5TB1 of the Consolette I remove the jumper wire between terminals 17-21 and 34-38. Connect terminal 21 to 34 and 17 to 38. At switch 5S11, interchange wire leading to terminals 4 and 5, also 10 and 11. Now connect terminals 34 to 34 of the two consolettes by means of shielded single conductor wires.

**1. Control Room, Two Studios, One Announce Booth**

In this installation, illustrated in figure 19, the control room and Studio A microphones and speakers are operated from Consolette I as are the two turntables and one of the remote line-network input

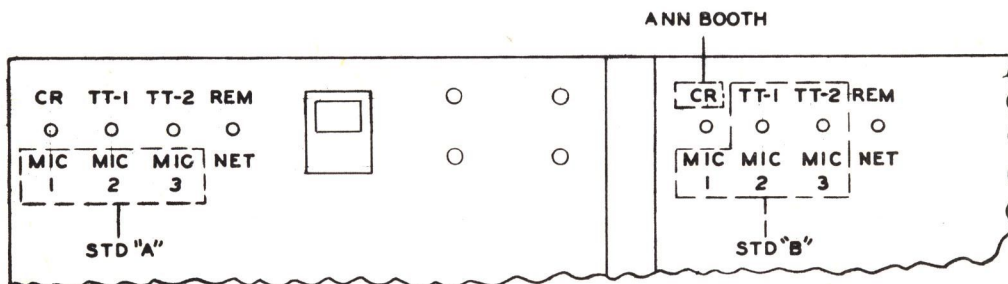
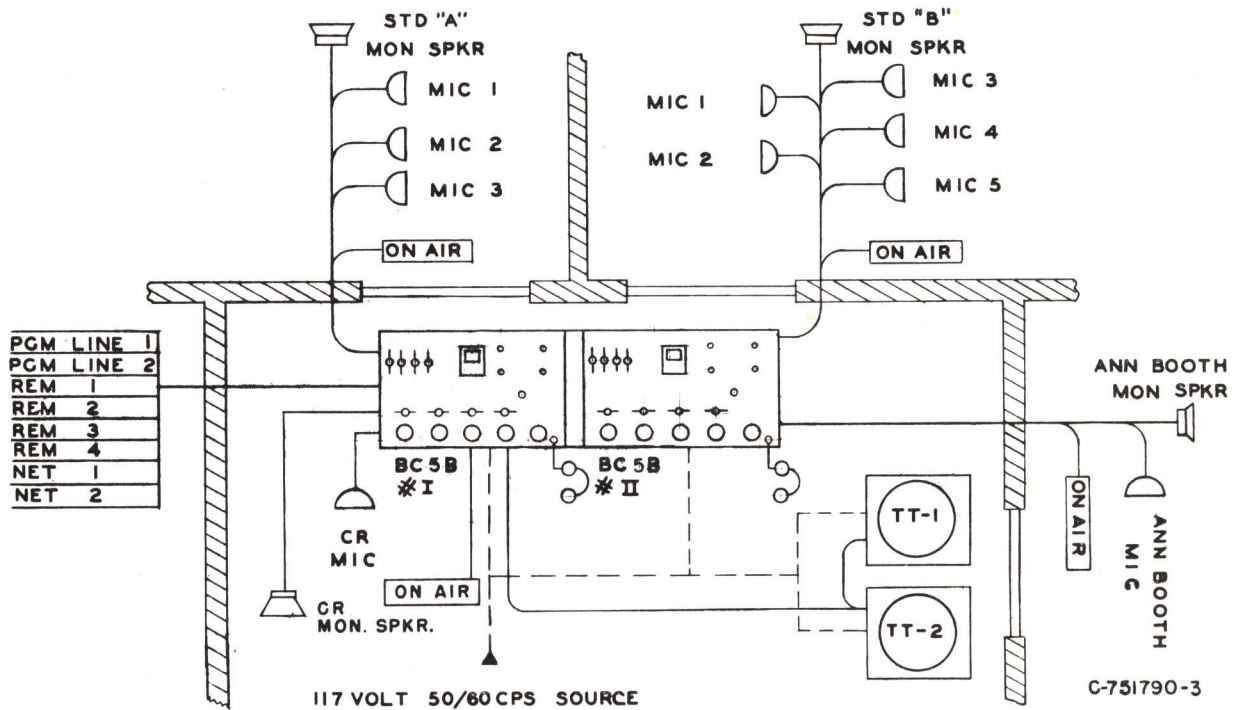


Figure 19—Typical Layout for Two-Studio Operation Control Room

channels. The announce booth and Studio B microphones and speakers and the other remote line and network channels are operated from Console II.

Make connections to Console I just as in the case of the single unit installation. At Console II, connect terminals 59 to 58 and 60 of 5TB1. Connect the announce booth microphone to terminals 1-2 of 5TB1. Connect the Studio B microphones to terminals 3-4, 5-6, 7-8, 9-10 and 11-12. Connect the announce booth speaker to 53-54 and warning light to 61-62. Connect the Studio B speaker to 55-56 and warning light circuit to 63-64. Under these conditions, the announce booth will be picked-up in the CR MIC position of Console II. The TT1 and TT2 positions of Console II will pick-up additional microphones in Studio B.

## 2. Control Room and Two Studios

In this type of installation, illustrated in figure 19, the CR MIC of Console II is available for an additional microphone input for Studio B.

Make connections as instructed in the paragraph above, except at Console II connect terminals

57-58-59 and 60 of 5TB1; remove and tape end of wire leading to terminal 1 of 5K1. Connect the additional Studio B microphone to terminals 1-2 of 5TB1.

## 3. Control Room, One Studio, One Announce Booth

Make connections as in the first layout given above. At Console II make the following changes:

Remove and tape end of wire leading to terminal 1 of 5K2. Connect terminals 58-59-60 of Console II to terminal 58 of Console I. The control room and studio speaker as well as the warning lights are connected to Console I terminals only. Connect terminals 65 and 66 of Console I to terminals 65 and 66, respectively, of Console II.

The announce booth microphone, speaker and warning light are connected to the control room terminals of Console II.

NOTE: Use the monitor amplifier and associated controls of Console I for monitoring Control Room and Studio A. Use the same facilities of Console II for monitoring in the Announce Booth and Studio B.

## OPERATION

Refer to the Block Diagram, figure 2, to the picture of the Control Panel, figure 20 and to the chart Control Functions for identification and function of all controls and switches on the control panel of the BC-5B Console.

### Precautions

1. Preset the selector key switches, then adjust the corresponding mixer switch and mixer attenuators.

2. When operating the remote input, select the input on REM 1 (5S9) or REM 2 (5S10) first; then place 5S4 in the REM position.

3. Adjust the MON GAIN control to a desired listening level.

4. When a "twin" installation for dual channel operation has been setup, the location of the inputs, Studio A, B or Control Room, and the controls, panels I or II, varies according to the station layout. Three typical dual channel layouts are given with complete information as to wiring changes. Refer to figures 18 and 19.

### Routine Procedure

1. Select the input desired.
2. Move corresponding A-o-P mixer switch to the desired function, Audition or Program.
3. Turn corresponding mixer attenuator up. The mixer attenuators 5AT2 and 5AT3 should not be turned counterclockwise past the detent stop unless it is desired to cue this input channel.

4. Turn MASTER control to level desired. (Adjust MASTER and MIXER controls to approximately the same setting.)

5. Check level on the VU meter; the meter pointer should not swing over the red line on the VU scale.

6. Monitor the selected input by turning MON INPUT to selected function. The NET or REM inputs and program output may be monitored through headphones plugged into the jack 5J1 by selecting the proper position on the PHONE switch 5S12.

7. Program may be monitored from an off-air tuner by turning the MON INPUT switch 5S11 to EXT. With the MON GAIN control 5AT6 adjust the volume of the loudspeakers as required.

### To put a local program on the air

1. Select the microphone or turntable inputs desired, 5S1, 5S2, 5S3 or all three.
2. Move corresponding mixer switches, as required, to P.
3. Turn MON INPUT switch 5S11 to PGM.
4. Turn up MIX 1, MIX 2, MIX 3, as required and adjust to obtain desired balance of output from the microphones.
5. Adjust MASTER gain control to the desired level on the VU meter.
6. The program may be monitored over both loudspeakers, except that, the Control Room speaker

is muted when the CR Microphone is in use and the studio speaker is muted when a studio microphone is in use. With the MON GAIN control 5AT6, adjust the volume of the loudspeakers as required.

#### To audition a program

1. Select the inputs desired, 5S1, 5S2, 5S3 or all three.
2. Move corresponding mixer switches to A.
3. Turn MON INPUT switch 5S11 to AUD.
4. Turn up corresponding MIX 1, 2, and 3.
5. The audition may be heard as when monitoring program.

#### To put network program on the air

1. Move key switch 5S4 to NET.
2. Move mixer switch 5S8 to P.
3. Turn MON INPUT switch 5S11 to PGM.
4. Turn up MIX 4.
5. Adjust MASTER gain control to obtain the desired output level as indicated on the VU meter.

6. Network Program may be heard over both loudspeakers. With the MON GAIN control 5AT6, adjust the volume of the loudspeakers as required.

#### To audition a network program

1. Move key switch 5S4 to NET.
2. Move mixer switch 5S8 to A.
3. Turn MON INPUT switch 5S11 to AUD.
4. Turn up MIX 4.
5. Network audition may be heard over both loudspeakers. With the MON GAIN control 5AT6, adjust the volume of the loudspeakers as required.

#### To monitor a network program

Plug headphones into the PHONE jack and set the PHONE selector switch 5S12 to Net to monitor program as received from the network.

#### To talk-back to studio

To talk to the studio, set the input selector switch 5S1 to CR MIC and set the mixer switch 5S5 to A

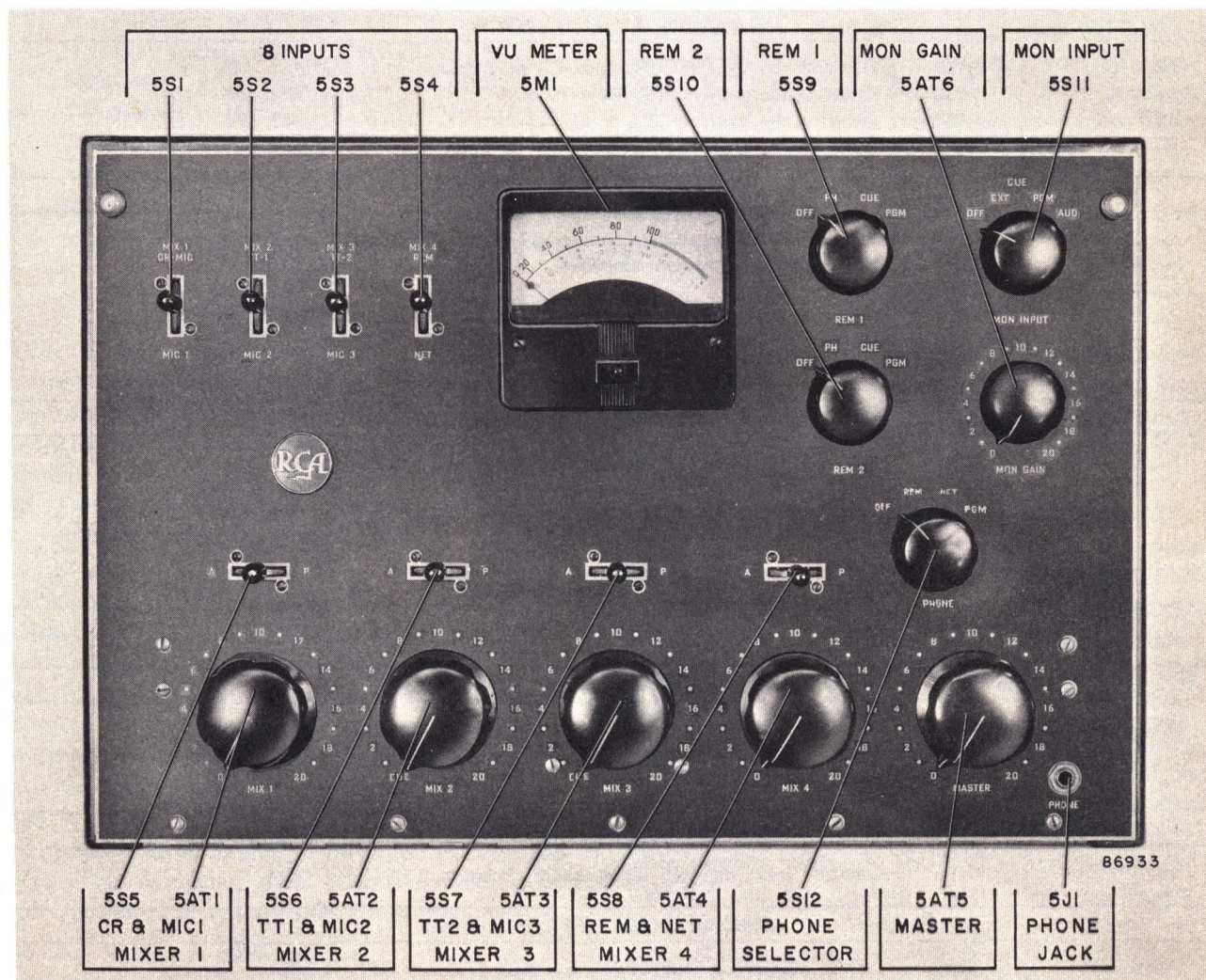


Figure 20—Control Panel of Type BC-5B Consolette

and 5S11 to AUD. Turn up the mixer gain control 5AT1 and adjust the monitor gain control 5AT6 to desired level.

Talk-back will be heard in the studio unless a studio microphone is in use.

#### Remote Talk-Back (REM 1 or REM 2)

1. Select CR MIC with key switch 5S1.
2. Move corresponding mixer switch (5S5) to A and turn up MIX 1.
3. Turn MON INPUT switch 5S11 to AUD position.

## CONTROL FUNCTIONS

<i>Panel Designation</i>	<i>Symbol</i>	<i>Function</i>	<i>Coordinated with</i>
<b>INPUT SELECTOR SWITCHES</b>			
CR MIC	5S1	Selects control room microphone or MIC 1 in the studio	5AT1, 5S5
MIC 1			
TT1	5S2	Selects turntable 1, or microphone 2 in the studio	5AT2, 5S6
MIC 2			
TT2	5S3	Selects turntable 2 or MIC 3 in the studio	5AT3, 5S7
MIC 3			
NET	5S4	Selects network program	5AT4, 5S8
REM		Selects remote program	5AT4, 5S9, 5S10
<b>MIXER ATTENUATORS</b>			
MIX 1	5AT1	Controls the gain of MIC 1 or CR microphone	5S1, 5S5
MIX 2	5AT2	Controls the gain of TT1 or MIC 2	5S2, 5S6
MIX 3	5AT3	Controls the gain of TT2 or MIC 3	5S3, 5S7
MIX 4	5AT4	Controls the gain of NET or REM lines	5S4, 5S8, 5S9, 5S10
<b>MIXER SWITCHES</b>			
A-o-P	5S5	When in the P position, connects the mixer controls to the input of the program amplifier	5AT1, 5S1
A-o-P	5S6		5AT2, 5S2
A-o-P	5S7		5AT3, 5S3
A-o-P	5S8		5AT4, 5S4, 5S9, 5S10
<b>REMOTE LINE SELECTOR SWITCHES</b>			
REM 1	5S9	Selects remote line #1 for cue, headphone and program	5S4, 5S8
REM 2	5S10	Selects remote line #2 for cue, headphone and program	5AT4, 5S12
<b>MASTER GAIN CONTROL</b>			
MASTER	5AT5	Controls gain of program channel	
<b>MONITOR INPUT SELECTOR SWITCH</b>			
MON INPUT	5S11	This switch has five positions, OFF, EXT MON, CUE, PGM, AUD; monitors over the Control Room loudspeaker and studio loudspeaker	S5 thru S8 CUE position on 5AT2, 5AT3
<b>MONITOR GAIN CONTROL</b>			
MON GAIN	5AT6	Controls level required for speakers. Position 0-20	5S11
<b>PHONE SELECTOR SWITCH</b>			
PHONE	5S12	Selects source for headphones; has four positions OFF, REM, NET, PGM	5J1

4. Turn REM 1 switch 5S9 (REM 2, 5S10) to CUE position. The operator in the control room can now talk to the "remote" operator.

5. Plug headphones into the PHONE jack, set the PHONE selector switch to REM, and turn REM 1 (REM 2) to PH position. The control room operator can now listen to the "remote" operator. By switching the remote line switch (REM 1, 5S9 or REM 2, 5S10) between the CUE and PH positions, the console operator has a talk-back communication system with the remote operator. This remote talk-back may be operated when a program is on the air.

#### **To feed cue to remote line (REM 1, REM 2)**

Turn switch REM 1 (5S9) or REM 2 (5S10) to the CUE position. Cue will be automatically fed over remote line from the Monitor output.

#### **To put a remote program on the air**

1. Switch REM 1, 5S9 (or REM 2, 5S10) is normally at CUE position before remote operation. Then turn to PGM position to program on the air.

2. Move the key switch 5S4 to REM position.

3. Move the corresponding mixer switch 5S8 to P.

4. Turn MIX 4 up and adjust MASTER gain control to desired level.

5. Turn MON INPUT switch 5S11 to PGM.

6. Adjust speaker levels by MON GAIN control.

#### **To audition a remote program**

1. Select a remote program according to the above

procedure except the mixer switch 5S8 is moved to A or the audition position.

2. Turn the MON INPUT switch 5S11 to AUD.

3. Adjust the loudspeaker level by means of the MON GAIN control.

#### **To cue turntables TT1/TT2**

1. Preset key switches 5S2 or 5S3 to TT1 or TT2 respectively.

2. Turn MIX 2 or MIX 3, whichever corresponds to the selected input, counterclockwise to the CUE position. Do not turn these controls counterclockwise past the detent stop if not cuing turntable.

3. Turn MON INPUT switch 5S11 to CUE position, and adjust the speaker level with MON GAIN control.

4. Cue may be heard on both the control room and the studio loudspeakers.

#### **PHONE Monitoring**

Plug the headphones into the PHONE jack on the front panel. Select the desired output by the PHONE selector switch which has four positions, OFF-REM-NET-PGM. The outgoing program may be monitored by setting the control to the PGM position; the remote or network inputs may be monitored by setting the control to the REM or NET positions respectively. This permits convenient cuing when shifting from a live show to a remote or network or vice versa.

## **MAINTENANCE**

The BC-5B Audio Console may be easily serviced without disturbing the installation. The top cover is fastened to the console by four Camloc fasteners, which can be easily removed. The front panel is hinged at the bottom and secured at the top by two Camloc fasteners. The front panel is held at an angle by two fall supports.

#### **Tubes**

The tubes of the amplifiers and power supply should be checked periodically either in a tube tester or by measuring the socket voltages. Refer to the Tube Socket Voltage chart. The values shown are measured with a voltmeter having a resistance of 20,000-ohms-per-volt. Slight variations may be due to component tolerances.

#### **Fuse**

A power fuse is located at the right front of the preamplifier mounting shelf. This fuse should be replaced only with a type 3AG, 3 amp time lag fuse.

#### **Care of Variable Attenuators**

To remove the attenuator cover, press the latch under the cover and remove it by twisting the cover

counterclockwise. Apply Davenoil to the contacts and rotate the knob several times. Wipe the contacts clean using a soft cloth and apply a thin film of Davenoil. Replace attenuator cover. A bottle of Davenoil is packed with the Console.

#### **Care of Switches, Relays and Sockets**

The switches and relay contacts do not require periodic maintenance and should not be tampered with. Contacts of the tube sockets are cleaned best by pulling tubes in and out of the socket several times.

#### **Replacement of Input Transformers 5T1 to 5T4 and Fuseholder 5XF1**

To gain access to the input transformers and fuseholder, the preamplifier mounting shelf must be loosened. Remove the top cover and open the front panel if desirable. Remove the four screws and hardware located between the 5AR1 and 5AR2 and between the 5AR4-5AR5 amplifier circuit boards. This hardware is visible in figure 23. Loosen the cable clamp holding the cable along the front of the console. Lift the shelf up from the front and tilt it backwards to expose the transformers and fuseholder.

It should not be necessary to loosen any of the leads to the amplifier circuit boards when servicing the transformers and fuse holder.

**Replacement of Output Transformers 5T5 and 5T6 and Attenuators 5AT8 and 5AT9**

To gain access to the mounting on connection of the output transformers and pads 5AT8 and 5AT9, the mounting shelf of the program and monitor circuit boards must be tilted up. Remove the four

screws from each corner. No leads need to be removed from the circuit boards to service these arrangements.

**Power Supply**

The power supply chassis is secured to the console cabinet by the four screws, one in each corner. To gain access to the components and wiring underneath the chassis, remove the screws and carefully turn the power supply upside down. The intercon-

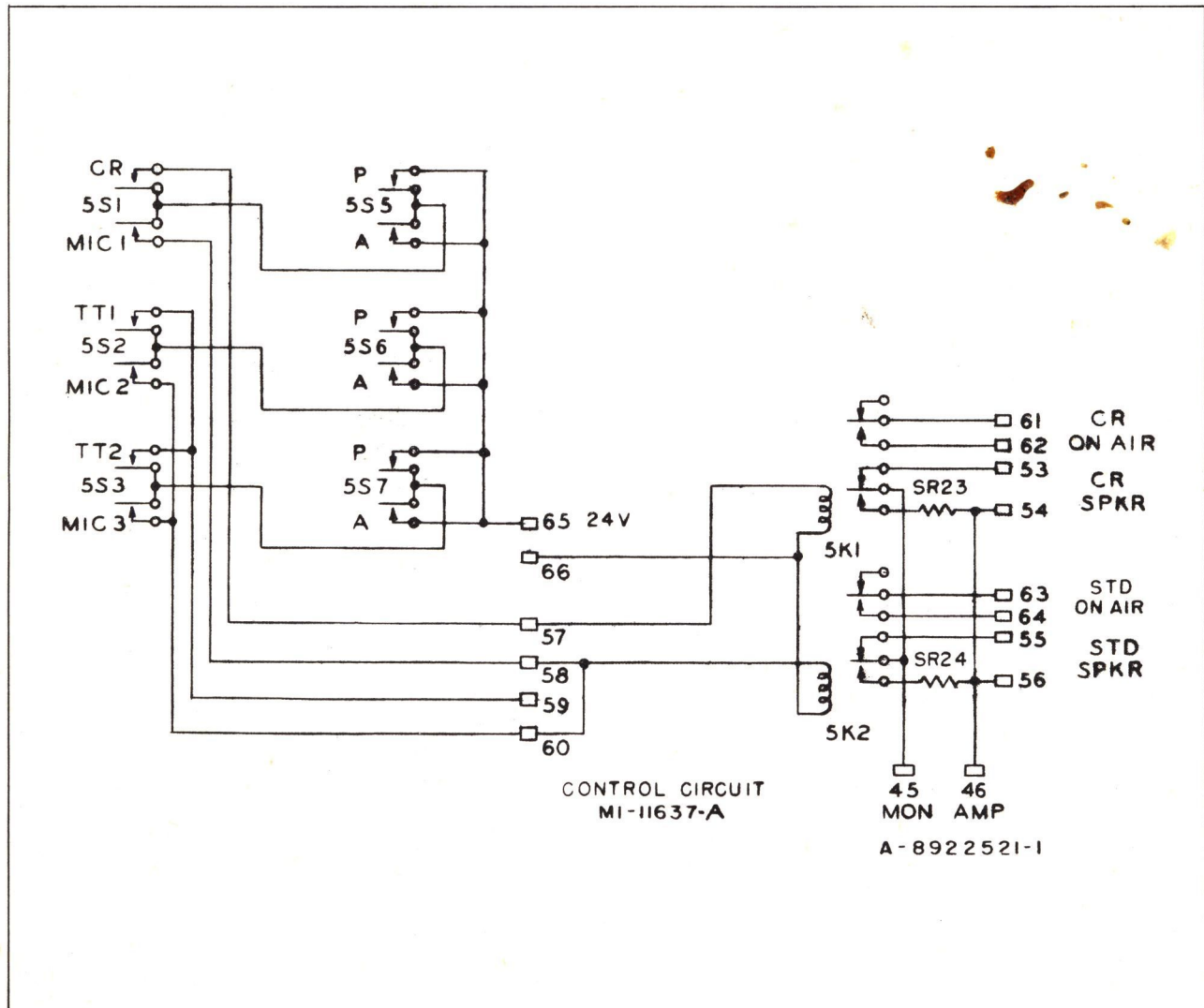


Figure 21—Control Circuit



necting leads are long enough to permit this change in position without disconnecting them.

### Servicing of the Etched Wiring Board Assemblies

The etched wiring boards are made of .062 inch thick paper base phenolic laminate to one side of which is bonded a thin sheet of copper. The conductor pattern is formed by an etching process. Component leads are threaded through holes which are punched into the board. The ends of the leads extending through the board are bent over against the copper conductors. The complete assembly is subsequently dip-soldered.

Components may be replaced easily by following these simple instructions. Care should be observed not to break or crack the board by undue stress or to damage the bonding adhesive by applying too much heat during soldering.

#### 1. Tools Required

1. A small (35 watt or less) pencil type soldering iron
2. A pair of small diagonal cutters
3. A pair of small long nose pliers
4. A scribe or pick
5. A small knife

#### 2. Emergency Repairs

If it is known which compound is defective, it may be replaced without removing the board from its mounting.

- a. In the case of a small component, such as a  $\frac{1}{2}$  or 1 watt resistor, cut the component in half using diagonal pliers. Crush the body

by means of the long nose pliers. This is done to obtain extra lead length. In the case of larger components, clip the leads as close as possible to the component body.

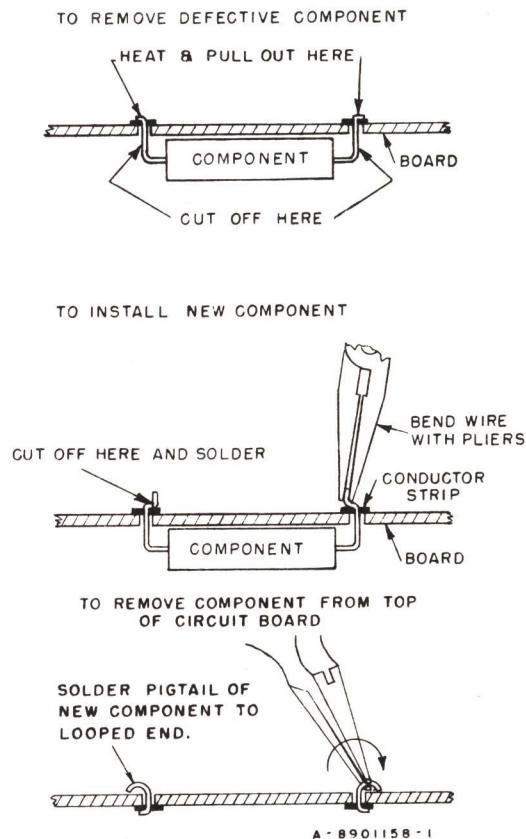


Figure 22—Replacement of Components in Printed Circuits

## TUBE SOCKET VOLTAGES

Tube Socket	1	2	3	4	5	6	7	8	9
<b>PRE-AMPLIFIER (5AR1-5AR6)</b>									
1XV1	195-239	0	4.2-5.0	*	*	112-138	0	1.4-1.8	**
1XV2	262-272	0	4.2-6.0	*	*	285	—	75-93	**
<b>PROGRAM AMPLIFIER (5AR7)</b>									
2XV1	130-150	0	1.15-1.40	*	*	180-210	—	55-65	**
2XV2	280	0	10-12	*	*	280	0	10-12	**
2XV3	280	0	10-12	*	*	280	0	10-12	**
<b>MONITOR AMPLIFIER (5AR8)</b>									
3XV1	125-145	0	1.10-1.30	*	*	225-250	—	38-48	**
3XV2	—	*	285-290	290	—	—	**	15-18	—
3XV3	—	*	285-290	290	—	—	**	15-18	—
<b>POWER SUPPLY (5PS1)</b>									
4XV1	—	380***	—	365 AC	—	365 AC	—	380***	—

5 VAC between points marked \*\*\*.

6.3 VAC between terminals marked by \* and \*\*.

- b. Using long nose pliers, form a loop of the lead ends as shown in figure 22.
  - c. Thread the leads of the new components through these loops. Cut off the excess lead, crimp and solder the connection.
3. *Permanent Repairs*
- a. Remove the hardware fastening the board to the chassis and tilt board up.
  - b. Isolate the defective component. If it is necessary to disconnect a component from the circuit for test, heat the junction of the component lead and the etched wiring with the soldering iron. The heat should be concentrated on the component lead rather than the etched wiring pattern. Pry up and straighten the bent-over portion of the component lead with a knife blade, then pull lead through the hole with pliers.
  - c. To remove the defective component, snip the leads off at the component side of the board. See figure 22.
  - d. Using a small soldering iron (35 watt or less) heat the leads and remove them from the printed wiring side of the board. Be careful not to apply too much heat or force to avoid damage to the thin copper conductors.
  - e. Clean and preform the leads of the new component and insert through the holes until the component body is tight against the board.
  - f. On the circuit side, grasp the component lead and bend it over in the direction of the circuit pattern.
  - g. Crimp the wire tightly against the board (see figure 22), and cut off the excess component lead. Leave about 1/16 inch of wire protruding from the edge of the hole.
  - h. Heat the lead and apply rosin core solder. **DO NOT USE PASTE OR ACID FLUX.** Remove excess rosin from the joints with alcohol.
  - i. Replace the circuit board, using the original hardware.
4. *Replacement of Tube Socket*
- Heat each socket terminal lead and pry up and straighten with knife blade. Pull socket out applying heat to terminal leads, if necessary. Clean holes free of solder. Prepare new socket for installation as follows: If tube shield ground strap (stock #210773) is required, insert strap from top of socket in slot provided until firmly seated. Small ridges on strap must point outward. Bend lead terminal of strap radially outward.
- Using the old socket as a guide, bend terminal leads at right angles to fit mounting holes provided in board. Insert socket terminals through holes making sure that socket terminal numbers correspond to the numbers etched on the board near the tube socket mounting holes. Bend socket terminals radially inward. If necessary, clip off excess length to prevent short circuit with adjacent conductors. Solder terminals to the etched wiring.

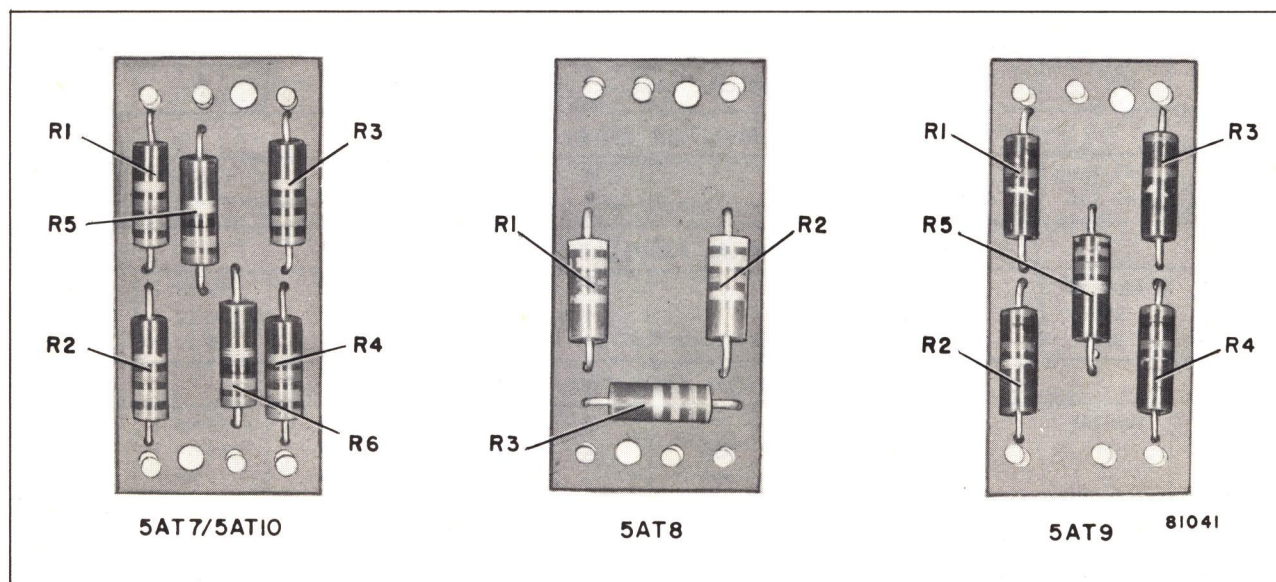


Figure 23—Fixed Pads for Type BC-5B Consolelette (5AT7, 5AT8, 5AT9, 5AT10)

## LIST OF PARTS

Symbol No.	Description	Stock No.	Symbol No.	Description	Stock No.
5AR1 to 5AR4	Pre-Amplifier: circuit board assembly complete with 6 capacitors, 13 resistors, 2 tube sockets and 2 ground straps. (Components listed under Pre-Amplifiers)	215365	5R7	Resistor: fixed, composition, 4700 ohms, $\pm 10\%$ , $\frac{1}{2}$ w. Same as 5R5	502247
5AR5, 5AR6	Pre-Amplifier: circuit board assy., complete with 5 capacitors, 13 resistors, 2 tube sockets and 2 ground straps. (Components listed under Pre-Amplifiers)	215366	5R8	Resistor: fixed, composition, 47,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502347
5AR7	Program Amplifier: circuit board assembly complete with 6 capacitors, 12 resistors and 3 tube sockets. Components listed under Program Amplifier	211000	5R9 to 5R16	Resistor: fixed, composition, 22,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502322
5AR8	Monitor Amplifier: circuit board assembly complete with 7 capacitors, 13 resistors and 3 tube sockets. (Components listed under Monitor Amplifier)	211001	5R17	Resistor: fixed, composition, 5600 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502256
5AT1	Resistor: variable, attenuator, 100,000 ohms, pot, 20 steps, 2 DB per step, last step tapered to infinity	211002	5R18	Resistor: fixed, composition, 270 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502127
5AT2, 5AT3	Resistor: variable, attenuator, 100,000 ohms, pot, 20 steps, 2 DB per step, last step tapered to infinity, with cue switch	211003	5R19	Resistor: fixed, composition, 820 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502182
5AT4, 5AT5	Resistor: variable, attenuator, 100,000 ohms, pot, 20 steps, 2 DB per step, last step tapered to infinity. Same as 5AT1	211002	5R20, 5R21	Resistor: fixed, composition, 150 ohms, $\pm 10\%$ , $\frac{1}{2}$ w. Same as 5R1	502115
5AT6	Resistor: variable, composition, 100,000 ohms, $\pm 10\%$ , 2 w.	211914	5R22	Resistor: fixed, composition, 100,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502410
5AT7	Fixed Pad: (parts listed under fixed pads)		5R23, 5R24	Resistor: fixed, wire wound, 15 ohms, $\pm 10\%$ , 5 w.	97441
5AT8	Fixed Pad: (parts listed under fixed pads)		5R25	Resistor: fixed, composition, 1500 ohms, $\pm 5\%$ , 1 w.	512215
5AT9	Fixed Pad: (parts listed under fixed pads)		5R26	Resistor: fixed, composition, 820 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502182
5AT10	Fixed Pad: (parts listed under fixed pads)		5R27	Resistor: fixed, composition, 1500 ohms, $\pm 5\%$ , 1 w. Same as 5R25	512215
5C1, 5C2	Capacitor: fixed, paper, 0.47 mf., $\pm 20\%$ , 200 v.	73787	5R28	Resistor: fixed, composition, 5600 ohms, $\pm 5\%$ , $\frac{1}{2}$ w. Same as 5R17	502256
5C3	Capacitor: fixed, paper, 220 mmf., 500 v.	39636	5R29	Resistor: fixed, composition, 2000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502220
5F1	Fuse: 3 amp., 125 v., slow-blow type	99164	5R30	Resistor: fixed, composition, 2700 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502227
5J1	Jack: open circuit (Head phone)	53401	5R31	Resistor: fixed, composition, 100,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502410
5K1, 5K2	Relay: DPDT	205255	5R32	Resistor: fixed, composition, 56,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502356
5M1	Meter: VU	205249	5R33	Resistor: fixed, composition, 18,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502318
5PS1	Power Supply: (parts listed under Power Supply)		5R34	Resistor: fixed, composition, 6200 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502262
5R1 to 5R3	Resistor: fixed, composition, 150 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502115	5R35	Resistor: fixed, composition, 27,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502327
5R4	Resistor: fixed, composition, 560 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502156	5S1 to 5S4	Switch: key lever, 2 "A" and 4 "D" type contacts, 2 way locking	211019
5R5	Resistor: fixed, composition, 4700 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502247	5S5 to 5S8	Switch: key lever, 2 "A" and 2 "D" type contacts, 2 way locking	211020
5R6	Resistor: fixed, composition, 560 ohms, $\pm 10\%$ , $\frac{1}{2}$ w. Same as 5R4	502156	5S9, 5S10	Switch: rotary, wafer type, 2 circuit, 1 section, 4 position, non-shorting contacts	211021
			5S11	Switch: rotary, 2 circuit, 1 section, 5 position	215367
			5S12	Switch: rotary, wafer type, 2 circuit, 1 section, 4 position, non-shorting contacts. Same as 5S9	211021
			5T1 to 5T4	Transformer: audio, input	205326
			5T5	Transformer: audio, output	209281
			5T6	Transformer, audio, output	207434
			5T7	Transformer: input	211017
			5XF1	Holder: fuse	205914

Symbol No.	Description	Stock No.
<b>MISCELLANEOUS</b>		
	Board: terminal, 80 terminals	211032
	Clamp: cable, aluminum with rubber cushion, 3/4" ID	211033
	Clamp: cable, white nylon, 1/8" ID	209653
	Clamp: cable, white nylon, 3/16" ID	209652
	Clamp: cable, white nylon, 1/4" ID	211034
	Clamp: cable, white nylon, 3/8" ID	210391
	Fastener: receptacle, silicon, bronze	94641
	Fastener: stud, steel, with retaining ring	96145
	Knob: control, black with white filled pointer, 2" dia.	17269
	Knob: control, black with white filled pointer, 1-7/16" dia.	17268
	Knob: control, red with white filled pointer, 2" dia.	94446
	Grommet: rubber	37396
	Mounting: shock, isolator	94978
	Oil: attenuator	20752
	Ring: retaining for fastener	98480
	Shield: tube, 53/64" ID x 1 3/8" ht., aluminum	211035
	Support: fall, single link, 6 1/4" lg. with 5/2" slot	94647
<b>PRE-AMPLIFIER 5AR1-5AR6</b>		
1C1	Capacitor: fixed, paper, 0.047 mf., ±10%, 400 v.	73553
1C2	Capacitor: fixed, paper, 0.1 mf., ±10%, 400 v.	73551
1C3	Capacitor: fixed, paper, 0.022 mf., 400 v.	73562
1C4	Capacitor: fixed, paper, 0.0047 mf., 600 v.	73920
1C5, 1C6	Capacitor: fixed, paper, 1.0 mf., 200 v. (1C6 used in 5AR1 to 5AR4 only)	211741
1R1	Resistor: fixed, composition, 8200 ohms, ±5%, 1 w.	512282
1R2	Resistor: fixed, composition, 100,000 ohms, ±10%, 1/2 w.	502410
1R3	Resistor: fixed, composition, 680,000 ohms, ±10%, 1/2 w.	502468
1R4	Resistor: fixed, composition, 820 ohms, ±10%, 1/2 w.	502182
1R5	Resistor: fixed, composition, 330,000 ohms, ±5%, 1/2 w.	502433
1R6	Resistor: fixed, composition, 82,000 ohms, ±10%, 1/2 w.	502382
1R7	Resistor: fixed, composition, 16,000 ohms, ±5%, 1 w.	512316
1R8	Resistor: fixed, composition, 220,000 ohms, ±5%, 1/2 w.	502422
1R9	Resistor: fixed, composition, 680,000 ohms, ±10%, 1/2 w. Same as 1R3	502468
1R10	Resistor: fixed, composition, 56,000 ohms, ±5%, 1/2 w.	502356
1R11	Resistor: fixed, composition, 2200 ohms, ±10%, 1/2 w.	502222

Symbol No.	Description	Stock No.
1R12, 1R13	Resistor: fixed, composition, 220,000 ohms, ±10%, 1/2 w. (1R13 used only in 5AR1 to 5AR4)	502422
1R14	Resistor: fixed, composition, 3300 ohms, ±10%, 1/2 w. (Used in 5AR5 and 5AR6 only)	502233
1XV1, 1XV2	Socket: tube, 9 contact miniature (Less ground stop) Strap: ground, for miniature tube socket	209284 210773
<b>PROGRAM AMPLIFIER 5AR7</b>		
2C1	Capacitor: fixed, paper, 0.047 mf., ±10%, 400 v.	73553
2C2	Capacitor: fixed, mica, 39 mmf., ±10%, 500 v.	39618
2C3, 2C4	Capacitor: fixed, paper, 0.047 mf., ±10%, 400 v. Same as 2C1	73553
2C5	Capacitor: electrolytic, 20 mf., +50 —10%, 450 v.	99149
2C6	Capacitor: fixed, paper, 0.047 mf., ±10%, 400 v. Same as 2C1	73553
2R1	Resistor: fixed, composition, 100,000 ohms, ±10%, 1/2 w.	502410
2R2	Resistor: fixed, composition, 1800 ohms, ±5%, 1/2 w.	502218
2R3	Resistor: fixed, composition, 150,000 ohms, ±10%, 1/2 w.	502415
2R4	Resistor: fixed, composition, 680,000 ohms, ±10%, 1/2 w.	502468
2R5	Resistor: fixed, composition, 2700 ohms, ±10%, 1/2 w.	502227
2R6, 2R7	Resistor: fixed, composition, 120,000 ohms, ±5%, 1/2 w.	502412
2R8, 2R9	Resistor: fixed, composition, 470,000 ohms, ±5%, 1/2 w.	502447
2R10	Resistor: fixed, composition, 390 ohms, ±5%, 1/2 w.	502139
2R11	Resistor: fixed, composition, 10,000 ohms, ±10%, 1/2 w.	502310
2R12	Resistor: fixed, composition, 18,000 ohms, ±5%, 1/2 w.	502318
XV1 to XV3	Socket: tube, 9 contact miniature	209284
<b>MONITOR AMPLIFIER 5AR8</b>		
3C1	Capacitor: fixed, paper, 0.047 mf., ±10%, 400 v.	73553
3C2	Capacitor: fixed, mica, 82 mmf., ±10%, 500 v.	203411
3C3, 3C4	Capacitor: fixed, paper, 0.047 mf., ±10%, 400 v. Same as 3C1	73553
3C5	Capacitor: fixed, mica, 82 mmf., ±10%, 500 v. Same as 3C2	203411
3C6	Capacitor: electrolytic, 25 mf., +250 —10%, 25 v.	52518
3C7	Capacitor: electrolytic, 20 mf., +50 —10%, 450 v.	99149
3R1	Resistor: fixed, composition, 100,000 ohms, ±10%, 1/2 w.	502410

Symbol No.	Description	Stock No.
3R2	Resistor: fixed, composition, 2200 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502222
3R3	Resistor: fixed, composition, 220,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502422
3R4	Resistor: fixed, composition, 1 meg. $\pm 10\%$ , $\frac{1}{2}$ w.	502510
3R5	Resistor: fixed, composition, 1500 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502215
3R6, 3R7	Resistor: fixed, composition, 39,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502339
3R8, 3R9	Resistor: fixed, composition, 470,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502447
3R10, 3R11	Resistor: fixed, composition, 430 ohms, $\pm 5\%$ , 2 w.	522143
3R12	Resistor: fixed, composition, 6800 ohms, $\pm 10\%$ , $\frac{1}{2}$ w.	502268
3R13	Resistor: fixed, composition, 22,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	502322
3XV1	Socket: tube, 9 contact, miniature	209284
3XV2, 3XV3	Socket: tube, octal	207707
<b>FIXED PAD 5AT7</b>		
R1, R2, R3, R4	Resistor: fixed, composition, 270 ohms, $\pm 5\%$ , 1 w.	512127
R5, R6	Resistor: fixed, composition, 18 ohms, $\pm 5\%$ , 1 w. Board: circuit, etched, with 6 terminals	59486 211018
<b>FIXED PAD 5AT8</b>		
R1, R2, R3	Resistor: fixed, composition, 4700 ohms, $\pm 5\%$ , 1 w. Resistor: fixed, composition, 620 ohms, $\pm 5\%$ , 1 w. Board: circuit, etched, with 6 terminals	512247 59488 211018
<b>FIXED PAD 5AT9</b>		
R1, R2, R3, R4, R5	Resistor: fixed, composition, 100 ohms, $\pm 5\%$ , 1 w. Resistor: fixed, composition, 820 ohms, $\pm 5\%$ , 1 w. Board: circuit, etched, with 6 terminals	512110 512182 211018
<b>FIXED PAD 5AT10</b>		
R1	Resistor: fixed, composition, 11,000 ohms, $\pm 5\%$ , 1 w.	512311

Symbol No.	Description	Stock No.
R2	Resistor: fixed, composition, 62 ohms, $\pm 5\%$ , 1 w.	512062
R3	Resistor: fixed, composition, 11,000 ohms, $\pm 5\%$ , 1 w. Same as 4R1	512311
R4	Resistor: fixed, composition, 62 ohms, $\pm 5\%$ , 1 w. Same as 4R2	512062
R5, R6	Resistor: fixed, composition, 10 ohms, $\pm 5\%$ , 1 w. Board: circuit, etched, with 6 terminals	512010 211018
<b>POWER SUPPLY 5PS1</b>		
4C1A/C, 4C2A/C	Capacitor: electrolytic, 40/40/40 mf., $\pm 50$ —10%, 450 v.	211022
4C3	Capacitor: fixed, paper, 0.47 mf., $\pm 10\%$ , 200 v.	73787
4C4A/C to 4C6A/C	Capacitor: electrolytic, 40/40/40 mf., $\pm 50$ —10%, 450 v. Same as 4C1A/C	211022
4C7	Capacitor: fixed, dry electrolytic, 1500 mf., 50 v.	98180
4CR1	Rectifier: selenium, bridge	215368
4R1A, B	Resistor: tapped, wire wound, 100/3000 ohms, $\pm 10\%$ , 7.6/5.4 w.	211024
4R2	Resistor: fixed, wire wound, 750 ohms $\pm 10\%$ , 10 w.	211025
4R3	Resistor: fixed, composition, 120,000 ohms, $\pm 10\%$ , 1 w.	512412
4R4	Resistor: fixed, composition, 18,000 ohms, $\pm 10\%$ , 1 w.	512318
4R5A/D	Resistor: tapped, wire wound, 1000/1000/1000 ohms, 4 w.	215369
4R6	Resistor: fixed, composition, 6800 ohms, $\pm 10\%$ , 1 w.	512268
4R7	Resistor: fixed, composition, 10,000 ohms, $\pm 10\%$ , 1 w.	512310
4R8	Resistor: fixed, composition, 22,000 ohms, $\pm 10\%$ , 1 w.	512322
4R9	Resistor: variable, wire wound, 100 ohms, $\pm 10\%$ , 2 w.	45390
4R10	Resistor: fixed, composition, 10 ohms, $\pm 10\%$ , 1 w.	512010
4R11	Resistor: fixed, composition, 1200 ohms, $\pm 10\%$ , 2 w.	522212
4R12	Resistor: fixed, composition, 10,000 ohms, $\pm 10\%$ , 1 w. Same as 4R7	512310
4R13	Resistor: fixed, composition, 22,000 ohms, $\pm 10\%$ , 1 w. Same as 4R8	512322
4T1	Transformer: power	215370
4XV1	Socket: tube, octal	68590

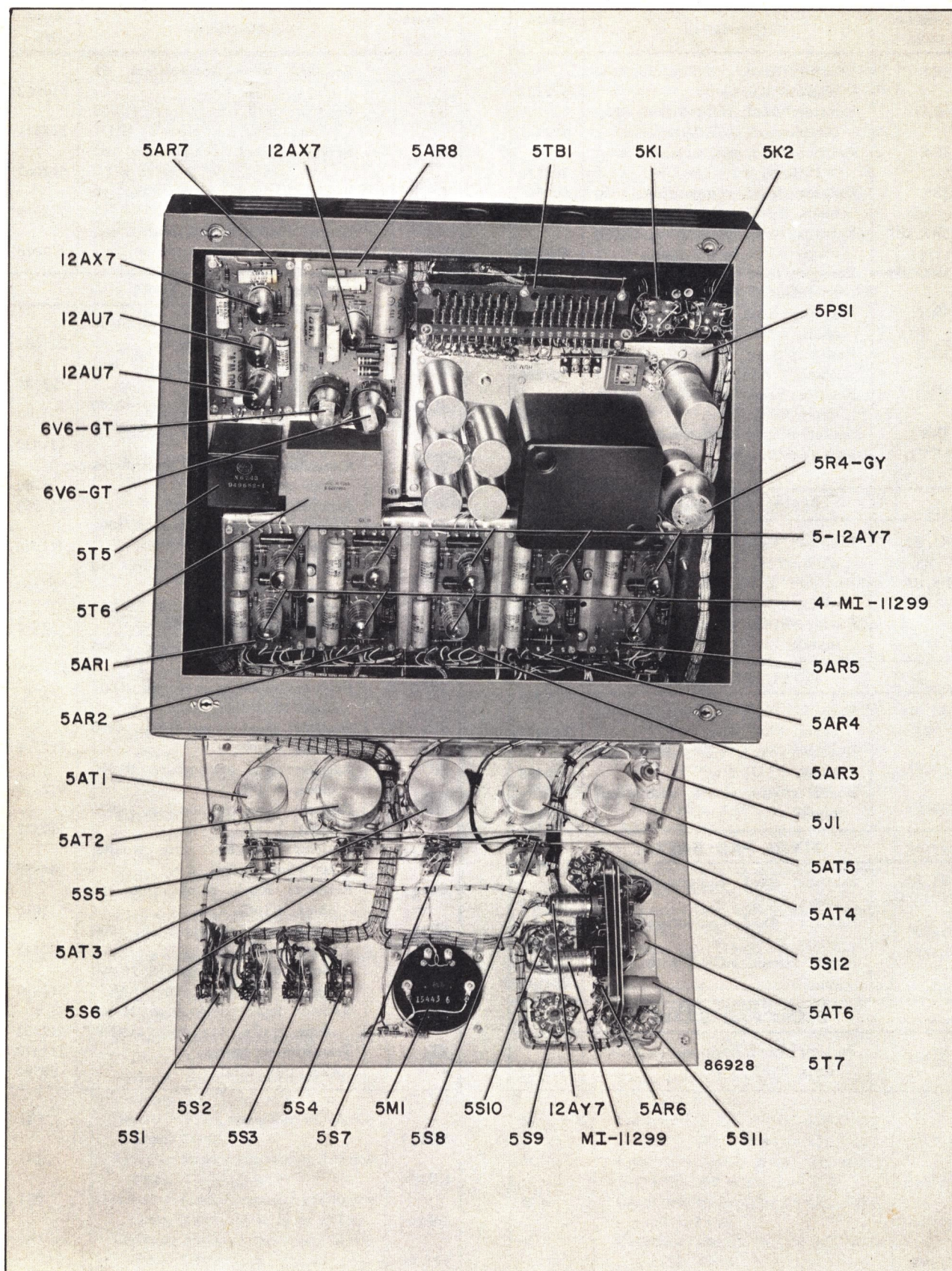
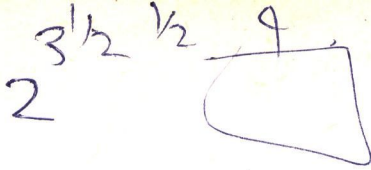


Figure 24—Internal View of Console

NOTES



NOTES

TELEPHONE BEEPER  
RECORDER CONNECTOR

CANNON PLUG SK-M7-21C 1/2"

PIN CONNECTIONS

1 & 6 - 120 VOLTS

3 & 4 - AUDIO OUT SHIELD

2 & 7 - SWITCH

1V

30V

300-2 100K

300 2000 1000 3

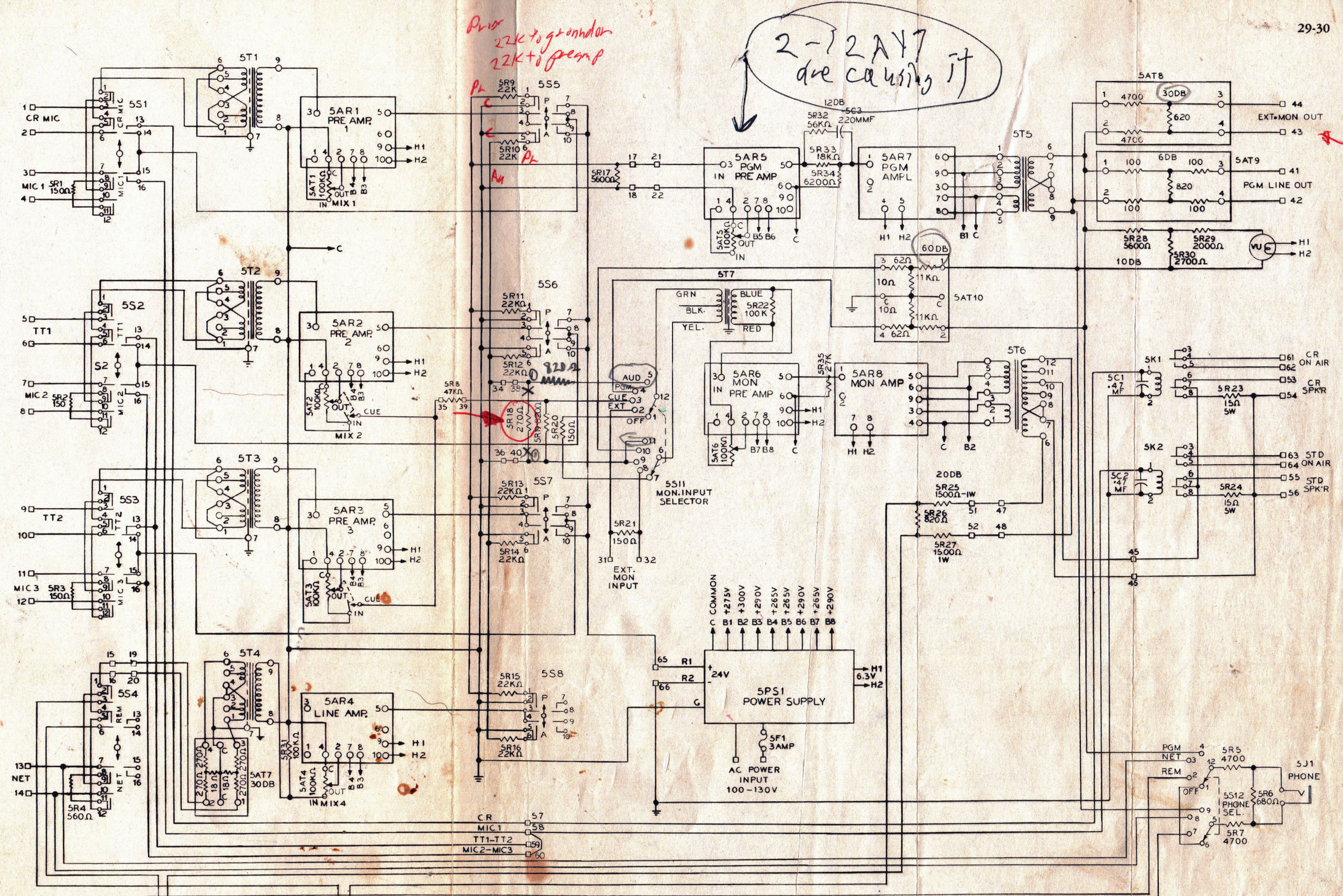
100 30

100 23

300

100

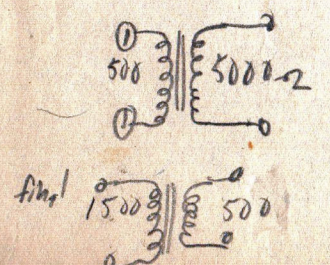




Prior  
22K to ground  
22K to preamp

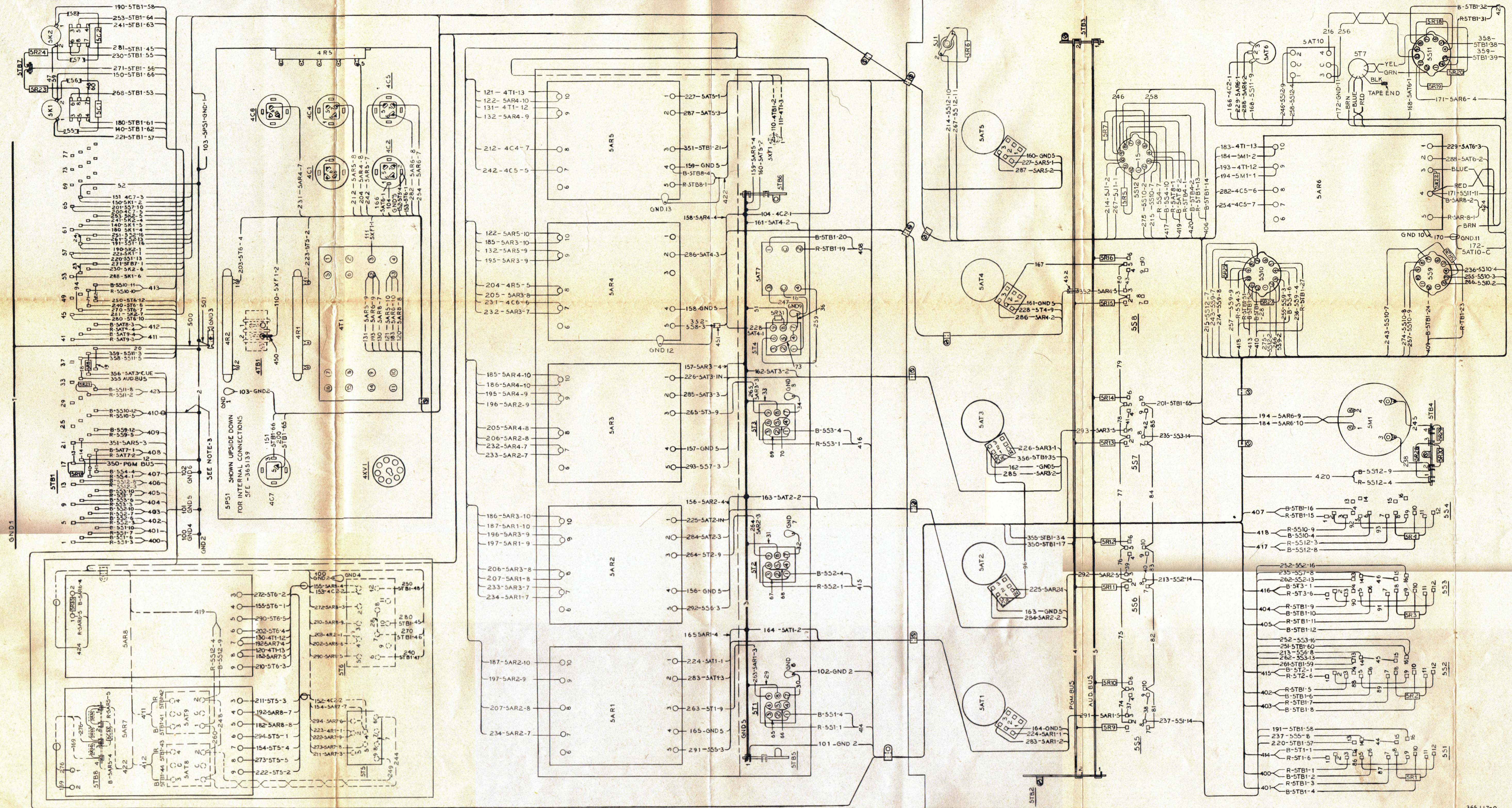
2-2AY7  
due causing it

365113-0



212  
8994

Figure 25—Overall Schematic Diagram



WIRE NO.	DESCRIPTION	DWG. OR PT. NO.	LIST OF PTS. NO. 5
1-5	WIRE TINNED COPPER .061 DIA.	105	112
10-52	WIRE TINNED COPPER .032 DIA.	105	113
55-60	SLEEVING COPPER .042 I.D.	8	114
55-98	WIRE SOLID BLACK .032 DIA.	805-57	115
100-104	WIRE WHIT-BLACK 19/092	805-8	116
110-111	WIRE 4 RED/BLUE		117
120-122	WIRE BROWN		118
130-132	WIRE BRN/BLK. 19/092	805-8	119
140	WIRE WHITE	805-6	120
150-172	WIRE BLACK		121
180-187	WIRE BROWN		122
190-197	WIRE BRN/BLK.		123
200-207	WIRE RED		124
210-215	WIRE RED/BLUE		125
220-229	WIRE ORANGE		126
230-238	WIRE YELLOW		127
240-248	WIRE YEL/BLK.		128
249-260	WIRE YEL/RED		129
261-268	WIRE GREEN		130
270-276	WIRE GRN/BLK		131
280-288	WIRE GRN/RED		132
290-294	WIRE WH/BLU	7/010	133
350-360	SHIELDED SINGLE, RED	705-B1	134
400-424	SHIELDED PAIR RED/BLK	705-A2	135
450-452	SLEEVING, BLK. 1/6 I.D.	8	138
500-501	CABLE BRAIDED 1/4"	499-57	139

FOR LIST OF PARTS FOR ABOVE WIRE TABLE SEE DWG. 890 52 41-501.

NOTES

- 1- SOLDER ALL ELECTRICAL CONNECTIONS USING ITEM 136
- 2- CABLE AND THEN LACE WIRES WHERE NECESSARY, USING LACING CORD ITEM 137.
- 3- SOLDER ALL THE ENDS OF THE SHIELDS OF THE SHIELDED CABLES ON STB1 TO GROUND BUS (GND 2)
- 4- THE FOLLOWING WIRES ARE TWISTED PAIRS  
110 120 121 122 182 183 184 185 186 187 169 111, 130, 131, 132, 192, 193, 194, 195, 196, 197, 276  
240 244 270 271 215 216 246 248  
250, 249, 280, 281, 275, 256, 258, 260.
- 5- ON TERMINAL BLOCK STB1, CONNECT JUMPER WIRES & RESISTORS ON SIDE FACING REAR. CONNECT ALL OTHER WIRES ON SIDE FACING FRONT.

FRONT PANEL



RADIO CORPORATION OF AMERICA  
COMMERCIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.