CONTROL ROOM CONSOLE

COLLINS

DO NOT THROW AWAY

INSTRUCTION BOOK

for

MODEL 212B-2 BROADCAST SPEECH INPUT CONSOLE

Property of KGMO

Williams M. Bradley

SAVE

COLLINS RADIO COMPANY CEDAR RAPIDS, IOWA, U.S.A.

INSTRUCTION BOOK

for

MODEL 212B-2 BROADCAST SPEECH INPUT CONSOLE

Manufactured By

Collins Radio Company, Cedar Rapids, Iowa

SAVE SAVE SAVE SAVE

DO NOT DESTROY THIS PAPER....It lists color codes for multiconductor.

11 Pair, cloth covered(Black)			11 pair rubber covered(Gray)
1 Purple and white	2	Sta. #1 and 2	1 blue and red 2
3 white and blue	4	#3 and 4	3 black and blue 4
5 white and yellow	6	#5 and 6	5 black and yellow 6
white and green — HI WAY PATROL			black and green — HIWAY PATROL
11 brown and white	7	(~~Amp. out~~) +6 VDC	11 red and green 7
white and lite brown	20	(~~Program feed~~)	black and brown 20
black and white			black and white
gray and white			black and red
white and orange (Low impedance police audio)			black and orange
pink and white			red and yellow
13 red and white	12	(D.C. voltage)	13 red white 12

Lower in audio

Common

SAVE SAVE SAVE SAVE

THERE IS NOTHING UNDER OR

ON BACK OF THIS SHEET!

LEAVE IT ATTACHED!

TABLE OF CONTENTS

Paragraph		Page
	SECTION I - GENERAL DESCRIPTION	
1.	General	1-1
2.	Reference Data	1-2
	a. Table of Units in Complete Equipment	1-2
	b. Number of Channels	1-2
	c. Gain	1-2
	d. Input Impedance	1-2
	e. Output Impedance	1-2
	f. Input Level	1-3
	g. Output Level	1-3
	h. Noise Level	1-3
	i. Power Input	1-3
3.	Vacuum Tube Complement	1-3
	SECTION II - THEORY OF OPERATION	
1.	Electrical Theory	2-1
	a. General	2-1
	SECTION III - INSTALLATION AND INITIAL ADJUSTMENTS	
1.	Installation	3-1
	a. Preliminary	3-1
	b. Installation Procedure	3-1
	c. Connections to the Type 212B Console	3-2
2.	Initial Adjustments	3-4
	a. General	3-4
	b. Control Functions	3-4
	SECTION IV - OPERATION	
1.	General	4-1
2.	Routine Operation	4-1
	a. Supply Line Switches	4-1
	b. Mixing Controls	4-1
	c. Master Gain Controls	4-1
	d. Remote Line Selector	4-1
	e. Use of Remote Cue Circuit	4-1
	f. Talkback Circuits	4-2
	g. Monitor Input	4-2
	h. Outgoing Line Selector	4-2
3.	Metering Circuit	4-2

TABLE OF CONTENTS

Paragraph — Page

SECTION V - MAINTENANCE

1. General 5-1
2. Periodic Inspection 5-1
   a. Attenuators 5-1
   b. Key Switches 5-1
   c. Wiring 5-1
   d. Replacement of Meter Lamps 5-1
3. Tube Replacement 5-1
   a. Precautions for Satisfactory Tube Life 5-1
   b. Tube Replacement Precautions 5-2
   c. Replacement of Tubes 5-2
4. Fuse Replacement 5-2
5. Trouble Shooting 5-2
   a. General 5-2
   b. Voltage and Resistance Measurements 5-3
   c. Distorted Audio Frequency Response 5-7
   d. Noise 5-8
   e. Replacement Parts 5-9

SECTION VI - PARTS LIST

1. Introduction 6-1
Type 6Q-1 Pre-amplifier Assembly 6-4
Type 6N-1 Program Amplifier 6-12
Type 6V-1 Monitor Amplifier 6-19
Type 274D Relay Unit Chassis Assembly 6-26
Type 409U Power Supply Chassis Assembly 6-31
Type 274D Relay Control Unit Chassis Assembly 6-37
Type 212B Speech Input Console 6-40
List of Manufacturers 6-56

SECTION VII - MISCELLANEOUS DRAWINGS

LIST OF ILLUSTRATIONS

Figure	Title
1-1	Type 212B Broadcast Speech Input Equipment
1-2	Type 212B Console, Top Open
1-3	Type 212B Console, Unit Tilted
1-4	Type 274D-2 Relay Control Unit
1-5	Type 274D-5 Relay Control Unit
1-6	Type 409U-1 Power Supply
1-7	Type 409U-2 Power Supply
2-1	Functional Block Diagram
2-2	Primary Power Circuits
2-3	Pre-amplifier Circuits
2-4	Mixer Circuits
2-5	Program Line Amplifier Circuits
2-6	Monitor Input Circuits
2-7	Monitor Amplifier Circuits
2-8	Studio Speaker and Light Control Circuits
2-9	Metering Circuits
3-1	
3-2	Type 212B Console, Outline and Mounting Dimensions
3-3	Type 409U-1 Power Supply, Outline and Mounting Dimensions
3-4	Type 274D-2 Relay Control Unit, Outline and Mounting Dimensions
3-5	Type 409U-2 Power Supply, Outline and Mounting Dimensions
3-6	Type 274D-5 Relay Control Unit, Outline and Mounting Dimensions
3-7	Installation Wiring Schematic
3-8	Type 212B Console Unit, External Connections
3-9	Type 274D Relay Control Unit, External Connections
3-10	Tube Locating Diagram
3-11	Control Locations
4-1	Routine Operating Controls
5-1	Type 6Q-1 Pre-amplifier, Parts Arrangement - Top
5-2	Type 6Q-1 Pre-amplifier, Parts Arrangement - Bottom
5-3	Type 6N-1 Program Line Amplifier, Parts Arrangement - Top
5-4	Type 6N-1 Program Line Amplifier, Parts Arrangement - Bottom
5-5	Type 6V-1 Monitor Amplifier, Parts Arrangement - Top
5-6	Type 6V-1 Monitor Amplifier, Parts Arrangement - Bottom
5-7	Type 409U Power Supply Parts Arrangement
5-8	Type 409U Power Supply Parts Arrangement
5-9	Type 274D Relay Control Unit, Parts Arrangement
7-1	Type 6Q-1 Pre-amplifier Assembly Wiring Schematic
7-2	Type 6N-1 Program Line Amplifier Wiring Schematic
7-3	Type 6V-1 Monitor Amplifier Wiring Schematic
7-4	Type 212B Console Wiring Schematic
7-5	Type 274D Relay Control Unit Wiring Schematic
7-6	Type 409U Power Supply Unit Wiring Schematic
7-7	Type 212B Console Unit Mechanical Details, Sectional View
7-8	Transformer and Reactor Details

GUARANTEE

The equipment described herein is sold under the following guarantee:

Collins agrees to repair or replace, without charge, any equipment, parts or accessories which are defective as to design, workmanship or material, and which are returned to Collins at its factory in Cedar Rapids, Iowa, transportation prepaid, provided that the foregoing shall not be applicable to.

(a) Equipment or accessories as to which notice of the claimed defect is not given Collins within one year from date of delivery;

(b) Equipment and accessories manufactured by others than Collins, tubes and batteries, all of which are subject only to such adjustment as Collins may obtain from supplier thereof;

(c) Equipment or accessories which shall fail to operate in a normal or proper manner due to exposure to excessive moisture in the atmosphere or otherwise after delivery, any such failure not being deemed a defect within the meaning of the foregoing provisions.

Collins further guarantees that any radio transmitter described herein will deliver full radio frequency power output at the antenna lead when connected to a suitable load, but such guarantee shall not be construed as a guarantee of any definite coverage or range of said apparatus.

The guarantee of these paragraphs is void if equipment is altered or repaired by others than Collins.

Notice of any claimed defect must be given to Collins prior to return of any item. Such notice must give full information as to nature of defect and identification (including part number if possible) of part considered defective. Upon receipt of such notice, Collins will promptly advise respecting return of equipment. Failure to secure our advice prior to the forwarding of goods for return may cause unnecessary delay in the handling of such merchandise.

No other warranties, expressed or implied, shall be applicable to said equipment, and the foregoing shall constitute the Buyer's sole right and remedy under the agreements in this paragraph contained. In no event shall Collins have any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any cause.

HOW TO ORDER REPLACEMENT PARTS

When ordering replacement parts, you should direct your order as indicated below and furnish the following information insofar as applicable:

Address: Collins Radio Company
Sales Service Department
Cedar Rapids, Iowa

Information Needed:

(A) Quantity required
(B) Part number of item
(C) Item number (obtain from Parts List or Schematic Diagram)
(D) Type number of unit
(E) Serial number of unit
(F) Serial number of equipment

HOW TO RETURN MATERIAL OR EQUIPMENT

If, for any reason, you should wish to return material or equipment, whether under the guarantee or otherwise, you should notify us, giving full particulars including the details listed below, insofar as applicable. Upon receipt of such notice, Collins will promptly advise you respecting the return. Failure to secure our advice prior to the forwarding of the goods or failure to provide full particulars may cause unnecessary delay in handling of your returned merchandise.

Address: Collins Radio Company
Sales Service Department
Cedar Rapids, Iowa

Information Needed:

(A) Date of delivery of equipment
(B) Date placed in service
(C) Number of hours in service
(D) Part number of item
(E) Item number (obtain from Parts List or Schematic Diagram)
(F) Type number of unit from which part is removed
(G) Serial number of unit
(H) Serial number of the complete equipment
(I) Nature of failure
(J) Cause of failure
(K) Remarks

1930

Figure 1-1 Type 212B Broadcast Speech Input Equipment

SECTION I

GENERAL DESCRIPTION

1. GENERAL.

a. This instruction book is intended to serve as a guide to the proper installation, adjustment, operation and maintenance of the Collins 212B-2 Speech Input Console.

b. The Collins Type 212B-2 equipment is designed primarily for the smaller station where operational facilities are not so complex, or for single studio control in large stations. It provides complete control over simultaneous auditioning and broadcasting from any combination of two studios, a control room announce microphone, two transcription units and nine remote lines.

c. EQUIPMENT DESCRIPTION. - The Type 212B-2 equipment consists of a desk mounting console, a separate relay control unit and a separate power supply unit. This arrangement isolates any mechanical vibrations or alternating magnetic fields which might affect the low level circuits.

(1) The console cabinet is constructed of heavy gauge aluminum in accordance with the best principles of advanced styling and modern engineering design. The panel controls are positioned from both the viewpoint of dynamic styling and physical convenience. Fingertip switching permits the desired combination of circuits to be set up. A tilting arrangement allows full access to all components and wiring, while the unit is in operation. Housed in this unit are five subchassis; three type 6Q-1 preamplifier assemblies, a type 6N-1 program line amplifier and a type 6V-1 monitor amplifier. Refer to figures 1-2 and 1-3. Each sub chassis is mounted on four shear type rubber shockmounts. All external electrical connections are made at a screw type terminal strip at the base of the unit.

The power supply unit and relay control unit are furnished either in wall mounting cabinets or as rack mounting units at the option of the purchaser. The Type 274D-2 relay control unit is shown in figure 1-4 and the Type 274D-5 unit is shown in figure 1-5. All connections for loudspeakers and studio signal lights terminate in this unit. The Type 409U-1 wall mounting power supply unit is shown in figure 1-6 and the rack mounted type 409U-2 unit is shown in figure 1-7. The power supply utilizes an inverted type chassis allowing maximum access to all wiring and circuit components. Adequate ventilation of tubes and components is assured by proper use of convection air currents.

(2) The 212B-2 has six low level input channels, two studio A microphone lines, a studio B microphone line, two transcription inputs and a control room microphone line each having an individual preamplifier. A remote input channel is, also, provided. Loudspeakers in both studios may be operated from the monitor amplifier with selective talkback circuits interlocked to prevent program interruption. Talkback from the control room to either of the two studios or into the remote lines is

controlled by a key switch. The operating condition of any of the amplifier circuits may be quickly checked by an integral metering circuit.

2. REFERENCE DATA.

a. The units which constitute the complete equipment with the overall dimensions and weights of all major units are tabulated below.

Collins Type No.	Description	Overall Dimensions	Weight
212B-1	Speech Input Console	11-1/4" x 17-1/2" x 31"	98 lbs.
409U-1	Power Supply Unit	20-3/4" x 15-5/8" x 10-17/32"	65 lbs.
409U-2**	Power Supply Unit	19" x 9-15/16" x 14"	70 lbs.
274D-2	Relay Control Unit	10-11/16" x 11" x 20-3/4"	13 lbs.
274D-5**	Relay Control Unit	19" x 5-9/16" x 7"	7-1/2 lbs.
520 9308 00	Instruction Book		
** Units supplied in wall mounting cabinet.			

This list does not necessarily designate equipment shipped with this order.

b. NUMBER OF CHANNELS. - Seven; four microphone input channels
two high level transcription input channels
one remote line input channel

c. GAIN. - Maximum, microphone to line, 100 db; line to line, 50 db

d. INPUT IMPEDANCE. - Mircophone: 30/50 or ~~200/250~~ 50 ohms
Remote line: ~~150~~ or 600 ohms 600
Transcription: 50 or 250 ohms

e. OUTPUT IMPEDANCE. - Program lines: 600 ohms balanced 600
Speaker: each 600 ohms unbalanced

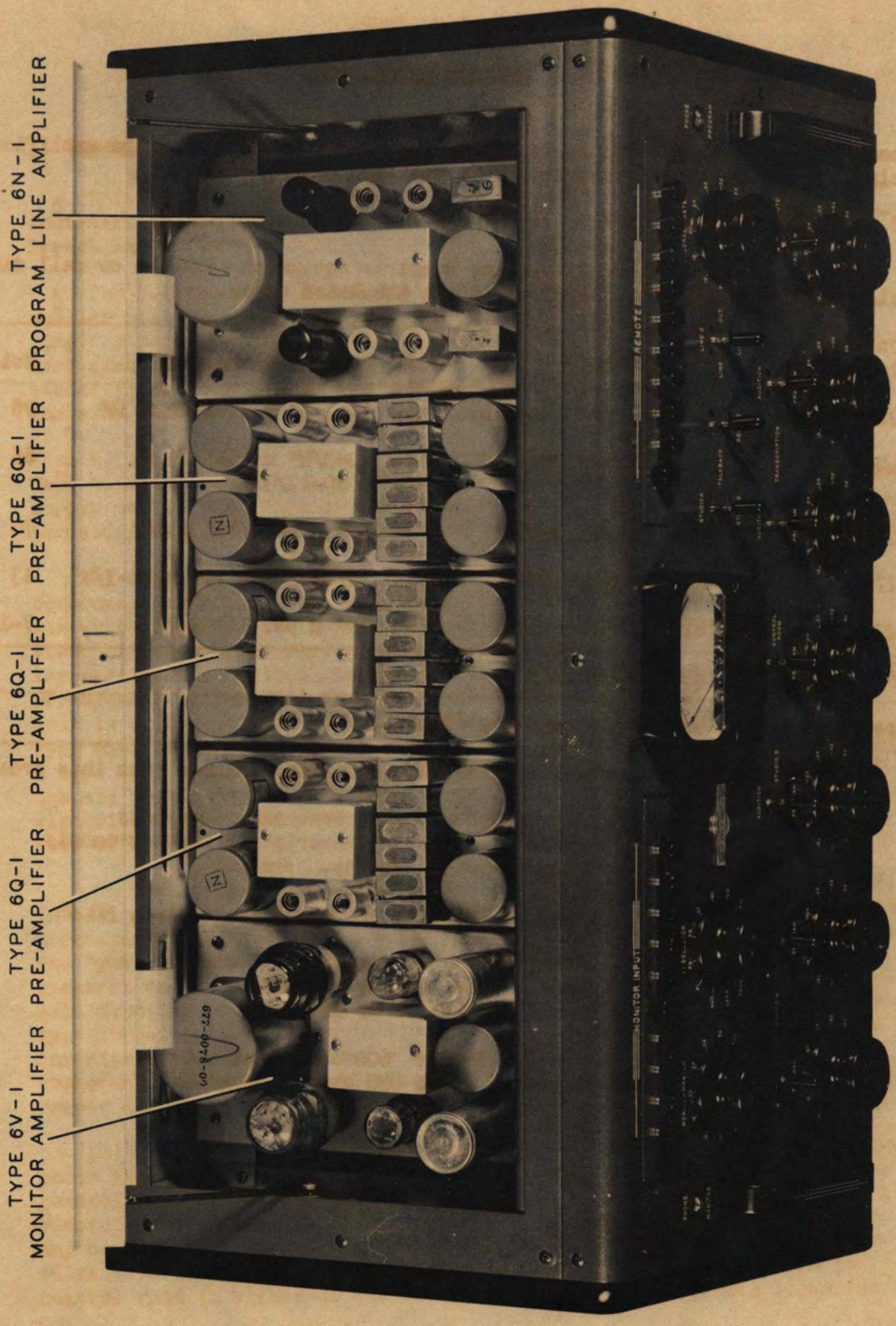


Figure 1-2 Type 212B Console, Top Open

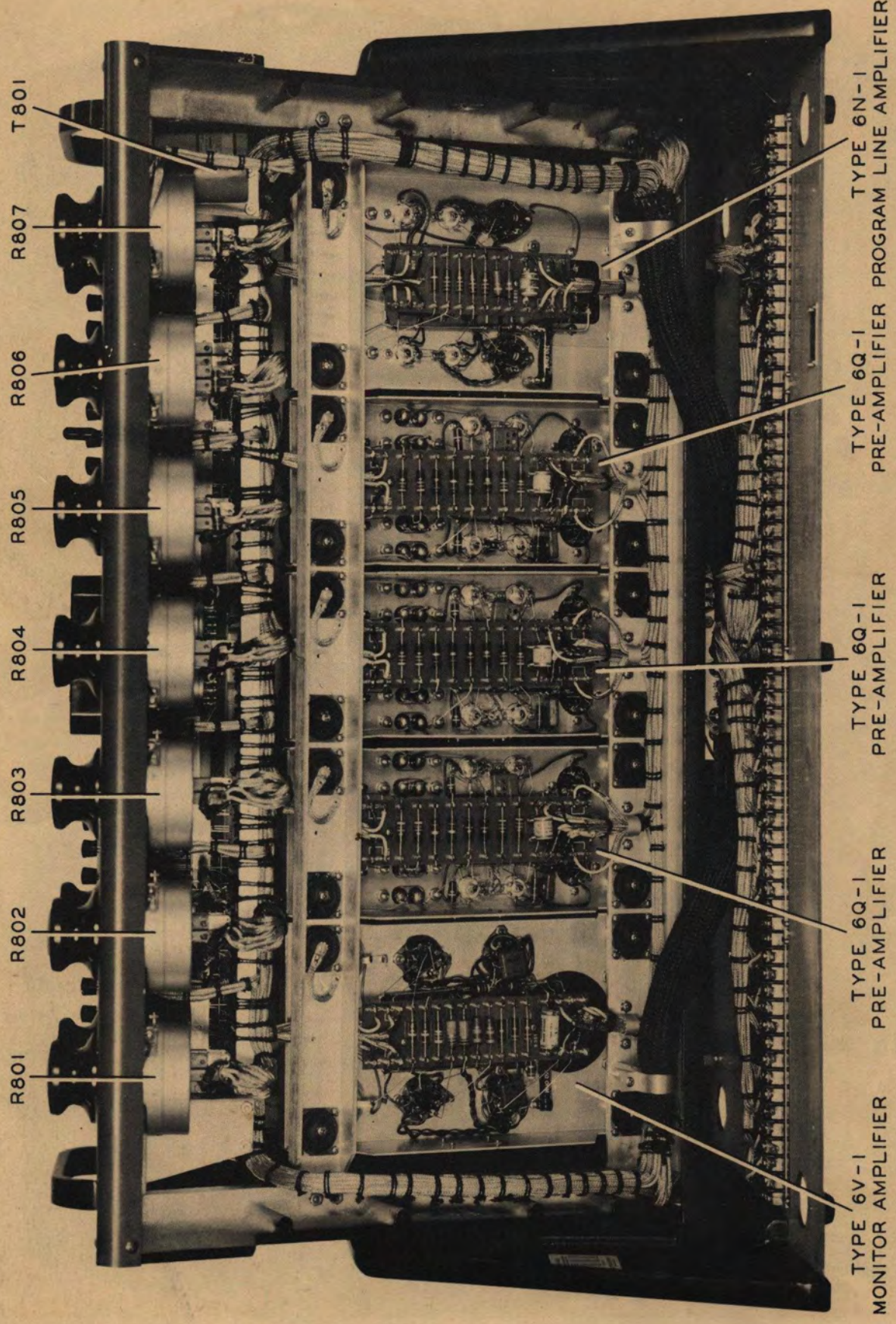


Figure 1-3 Type 212B Console, Unit Tilted

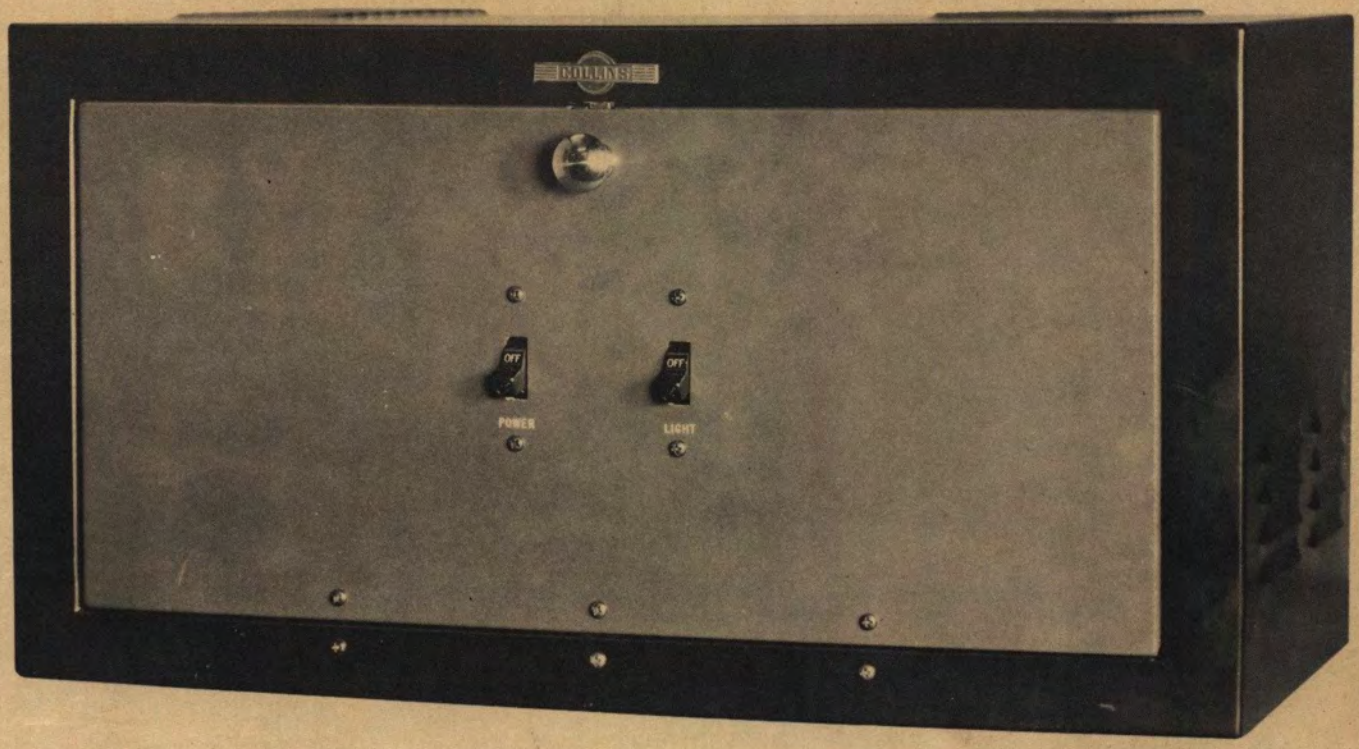


Figure 1-4 Type 274D-2 Relay Control Unit

Figure 1-5 Type 274D-5 Relay Control Unit

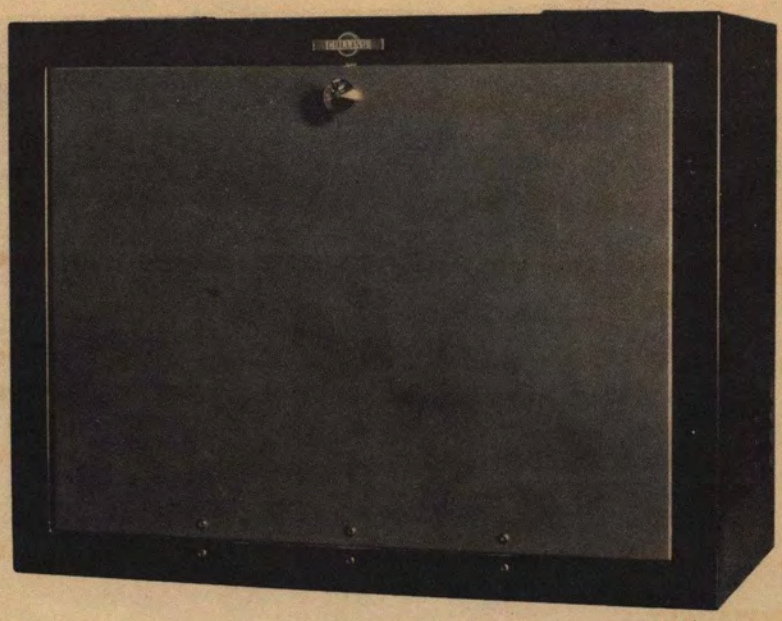


Figure 1-6 Type 409U-1 Power Supply

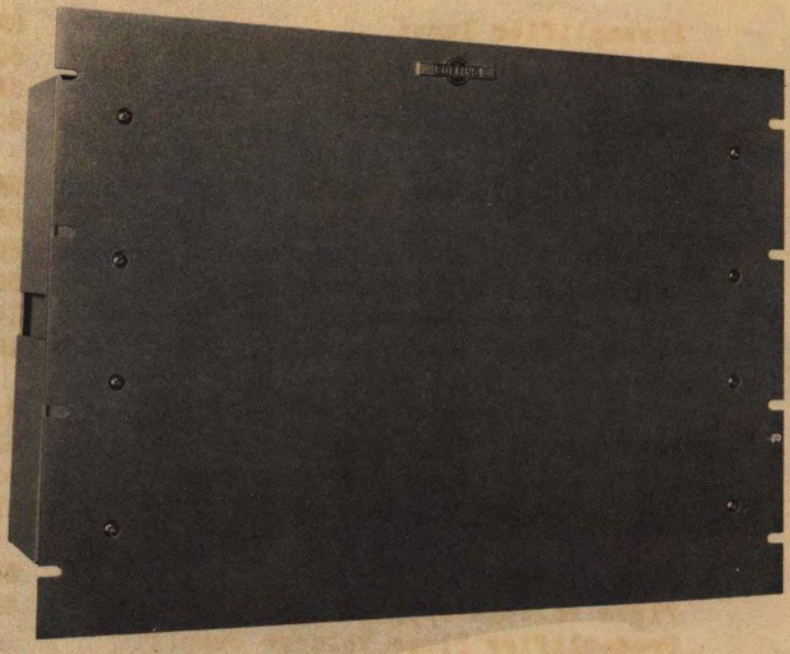


Figure 1-7 Type 409U-2 Power Supply

f. INPUT LEVEL: Input (-60 db) and with 12 dbm* output

g. OUTPUT LEVEL: Program line output; adjustable -4 to +26 dbm* in one db steps

h. NOISE LEVEL: with the gain control adjusted for normal operation with a low level microphone input and with 12 dbm* output, but with the input terminated in an equivalent resistance, the combined hum and noise in the program output is at least 65 db down.

i. POWER INPUT. - 105-125 volts, 50 or 60 cycles, 250 watts, single phase.

3. VACUUM TUBE COMPLEMENT.

A complete tube complement for the Type 212B Console and 409U Power Supply consists of the following: 8 Type 6AQ6, 8 Type 6C4, 2 Type 1621, one Type 6SL7, one Type 6SN7, two Type 6L6G, one Type 6X5GT, and two Type 5R4GY. The following table lists only the tubes that are used in each different type of unit.

Symbol Designation	Function	Tube Type
V101	Preamplifier Input	6AQ6
V102	Preamplifier Output	6C4
V103	Preamplifier Input	6AQ6
V104	Preamplifier Output	6C4
V201	Program Amplifier Input	6AQ6
V202	Program Amplifier Input	6AQ6
V203	Program Amplifier Interstage	6C4
V204	Program Amplifier Interstage	6C4
V205	Program Amplifier Output	1621
V206	Program Amplifier Output	1621
V301	Monitor Amplifier Input	6SN7
V302	Monitor Amplifier Interstage	6SL7
V303	Monitor Amplifier Output	6L6G
V304	Monitor Amplifier Output	6L6G
V501	Plate Voltage Supply Rectifier	5R4GY
V502	Plate Voltage Supply Rectifier	5R4GY
V503	Preamplifier Plate Voltage Supply Rectifier	6X5GT

* One milliwatt, 600 ohm base.

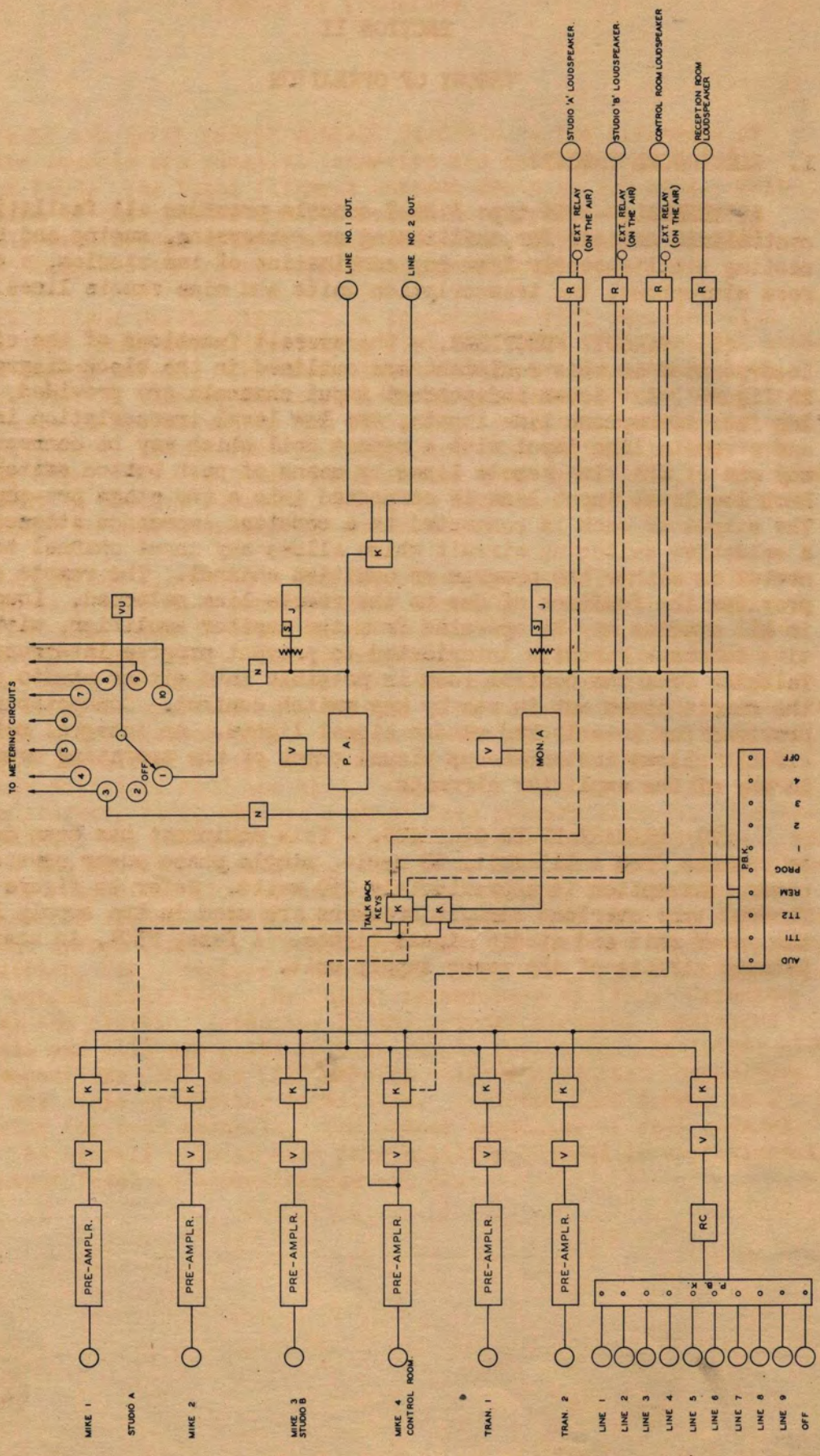


Figure 2-1 Functional Block Diagram

SECTION II

THEORY OF OPERATION

1. ELECTRICAL THEORY.

a. GENERAL. - The type 212B-2 console provides all facilities for centralized control for auditioning or rehearsing, cueing and broadcasting simultaneously from any combination of two studios, a control room microphone, two transcription units and nine remote lines.

(1) CIRCUIT FUNCTIONS. - The overall functions of the circuits incorporated in this equipment are outlined in the block diagram shown in figure 2-1. Seven independent input channels are provided, including four microphone line inputs, two low level transcription inputs and a remote line input with a repeat coil which may be connected to any one of the nine remote lines by means of push button switching. Each low level input line is connected into a two stage pre-amplifier. The output of each is connected to a constant impedance attenuator and a selective switching circuit which allows any input channel to be connected to either the program or audition channel. The remote channel provides the feedback of cue to the remote line selected. Loudspeakers in all studios may be operated from the monitor amplifier, with selective talkback circuits interlocked to prevent program interruption. Talkback from the control room is possible into either studio or into the remote lines not in use by key switch control. Connections are provided for interlocked studio signal lights. An integral metering circuit allows instantaneous visual check of the operating conditions in any of the amplifier circuits.

(2) PRIMARY POWER CIRCUITS. - This equipment has been designed to operate from a 115 volt, 60 cycle, single phase power source. The power consumption is approximately 250 watts. Refer to figure 2-2. Thermal type overload circuit breakers are used in the supply line to the power unit and studio signal lights. A fuse, F501, is used in the primary circuit of the power supply unit.

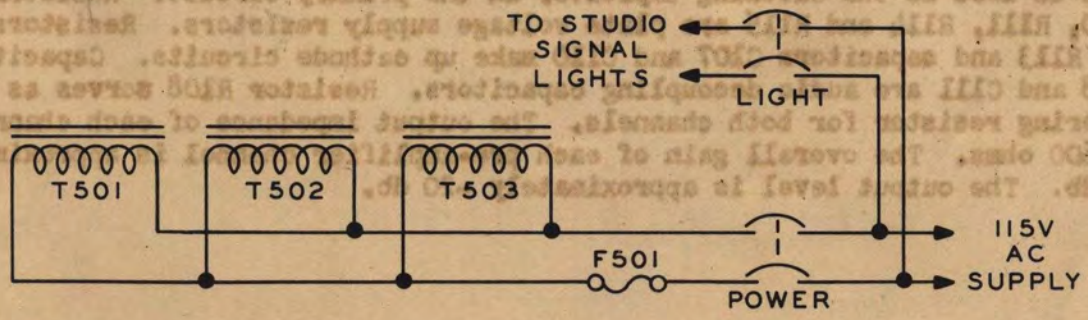


Figure 2-2 Primary Power Circuits

(3) FILAMENT AND RELAY SUPPLY VOLTAGE CIRCUITS. - The filaments of all tubes in the console are parallel connected and operate from a 6.3 volt winding of T503. The total filament current drain is 5.6 amps. Voltage for operation of the speaker control relays is supplied by a winding on T503. A full wave bridge type selenium rectifier, CR501, and filter capacitor, C505 complete the relay supply voltage circuit.

(4) PLATE VOLTAGE SUPPLY CIRCUITS. - Transformer T501 supplies high voltage to the type 5R4GY rectifier tubes, V501 and V502. Two parallel tubes provide a wide safety margin. The choke input filter is composed of L501, C501, L502 and C502. A bleeder resistor R501 is connected across the output. The output voltage is approximately 325 volts dc. A separate supply is used for the preamplifiers. Transformer T502 supplies high voltage to the type 6X5GT rectifier tube, V503. A choke input filter made up of L503, C503, L504 and C504 is used. A bleeder resistor, R502, is connected across the output. The output voltage is approximately 140 volts dc.

(5) PRE-AMPLIFIER CIRCUITS. - Two separate pre-amplifier channels are incorporated in each type 6Q-1 pre-amplifier assembly. Refer to figure 2-3. The low level incoming line is transformer coupled by T101 to the grid circuit of a type 6AQ6 tube, V101. The primary winding of T101 is provided with taps to accommodate lines of 50 or 250 ohms nominal impedance. The input amplifier, V101, is operated as a triode. The cathode circuit is composed of resistor R101 and capacitor C101. The plate circuit is coupled by capacitor C103 to the grid circuit of a type 6C4 tube, V102. Plate voltage for V101 is supplied through resistors R102 and R103. Capacitor C102 is used for decoupling. The output transformer, T102, employs a shunt feed primary circuit. The arrangement eliminates the possibility of direct current core saturation. Capacitor C106 is a d-c blocking capacitor. Resistors R106 and R107 supply plate voltage to V102. Capacitor C105 is used for decoupling. The second pre-amplifier channel is identical with the one just described with the exception of the component symbol numbers. Transformer T103 is used for input coupling. The input amplifier, V103, employs a type 6AQ6 tube. The type 6C4 tube V104, serves as the output amplifier. The output transformer is T104. Capacitor C112 is used as the blocking capacitor in the primary circuit. Resistors R110, R111, R114 and R115 are plate voltage supply resistors. Resistors R109 and R113 and capacitors C107 and C110 make up cathode circuits. Capacitors C108 and C111 are audio decoupling capacitors. Resistor R108 serves as a metering resistor for both channels. The output impedance of each channel is 600 ohms. The overall gain of each pre-amplifier channel is approximately 40 db. The output level is approximately -20 db.

(6) MIXER CIRCUITS. - Refer to figure 2-4. Seven independent input circuits are incorporated in the console. Four are low level microphone inputs (approx. -60 db) each having an individual two stage per mixer amplifier. Two are transcription inputs and are connected through

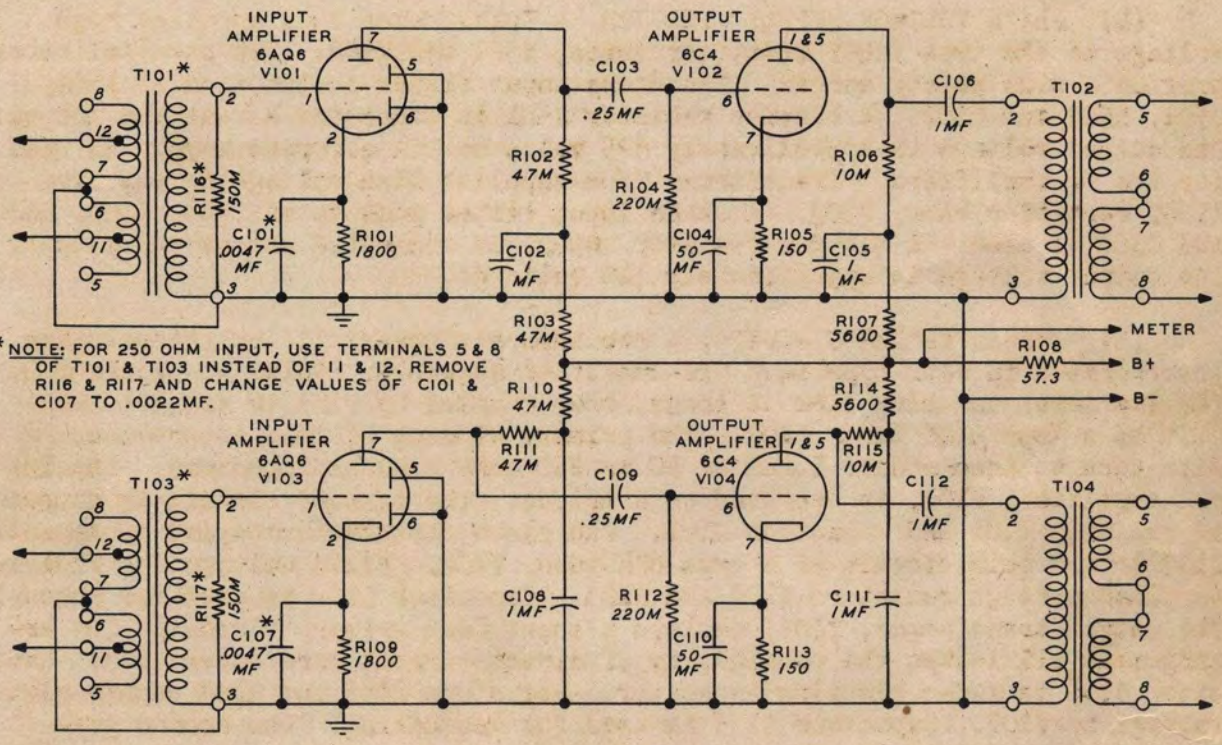


Figure 2-3. Preamplifier circuit.

repeat coils to the mixer. A line level input circuit, which operates through a repeat coil is also provided for the remote lines. Any one of nine remote lines may be selected by switch S801. The mixing circuit is so designed that correct impedance relations are maintained at all times, and the volume levels in the various circuits are independent of mixing and switching operations in other circuits. Attenuators R802 through R807 control the input levels to the mixing circuits. Each is a constant impedance type using a 600 ohm/600 ohm T network configuration. Resistors R808 through R813 are series line pad resistors. The key switches S807 through S813 will connect any of the input circuits to the PROGRAM CHANNEL or the AUDITION CHANNEL. When the key switch is in the center position the input

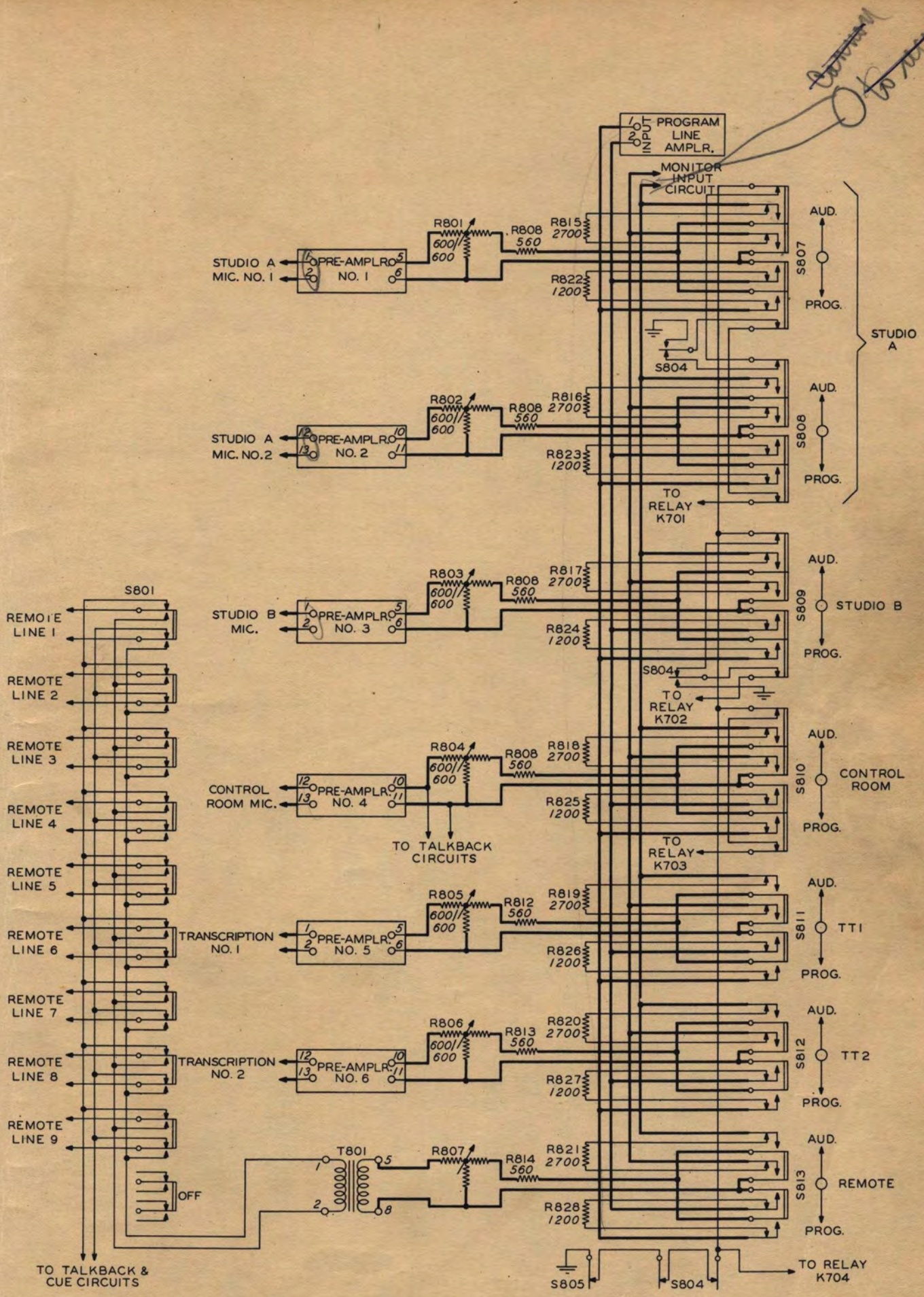


Figure 2-4 Mixer Circuits

circuit is connected across a terminating resistance. Resistors R815 through R828 serve as terminating resistors for the input circuits not in use. Contacts on the key switches complete a 12 volt d-c circuit to operate the speaker control relays K701, K702, K703 and K704. Mixer controls and terminations introduce approximately 14 db loss. The studio signal lights are also operated from the same relays. The talkback control switches S804 and S805 are interlocked with the speaker control relay circuits to prevent program interruption.

(7) PROGRAM LINE AMPLIFIER CIRCUITS. - Refer to figure 2-5. The type 6N-1 program amplifier is a three stage push pull amplifier. The input impedance is 600 ohms. The input operating level is approximately -20 dbm. The output impedance is 600 ohms. The maximum overall gain is approximately 70 db. The input voltage amplifier stage employs two push pull type 6AQ6 tubes V201 and V202 operating as triodes. The interstage amplifier utilizes two push pull type 6C4 triodes V203 and V204. The output amplifier stage uses two push pull type 1621 tubes V205 and V206, connected as triodes. The mixer circuits are coupled to the grids of the input amplifier tubes V201 and V202 by transformer T201. An attenuator R829 located in the grid circuit serves as the master gain control. Capacitors C202 and C203 couple the plate circuit to the grid circuit of the interstage amplifier tubes V203 and V204. Capacitor C204 and resistor R207 are used in the cathode circuit. The plate circuit is coupled to the grids of the output amplifier stage V205 and V206 by capacitors C206 and C207. Capacitor C208 and resistor R213 make up the cathode circuit. Transformer, T202, is the output coupling transformer. Resistors R202, R203, R204, R208, R209 and R210 are plate resistors. Resistor R214 is used in the plate metering circuit. Resistors R205, R206, R211 and R212 are used in the grid circuits.

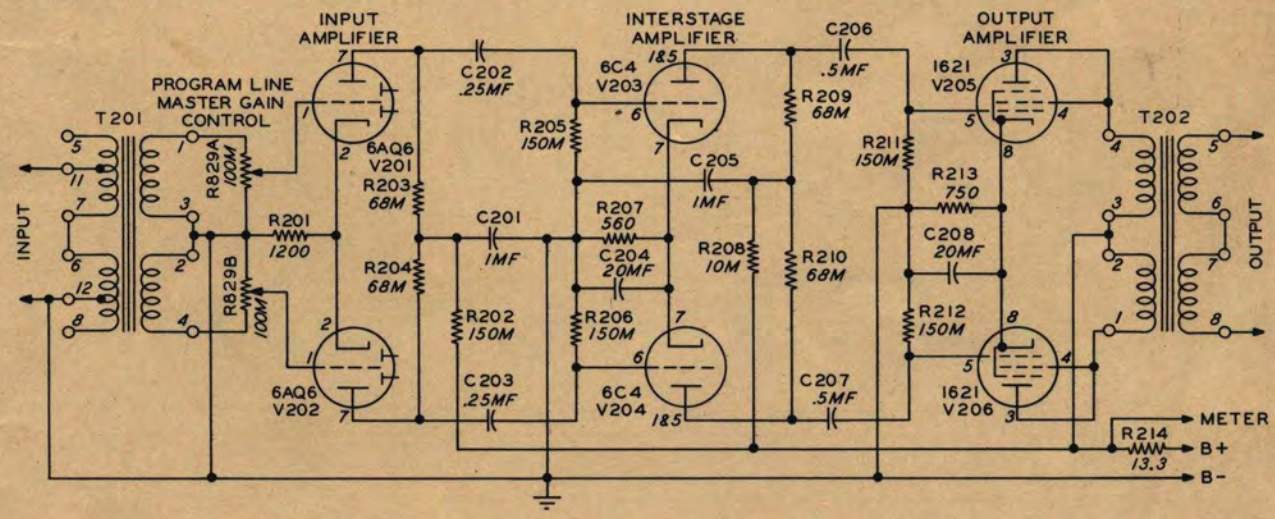


Figure 2-5 Program Line Amplifier Circuits

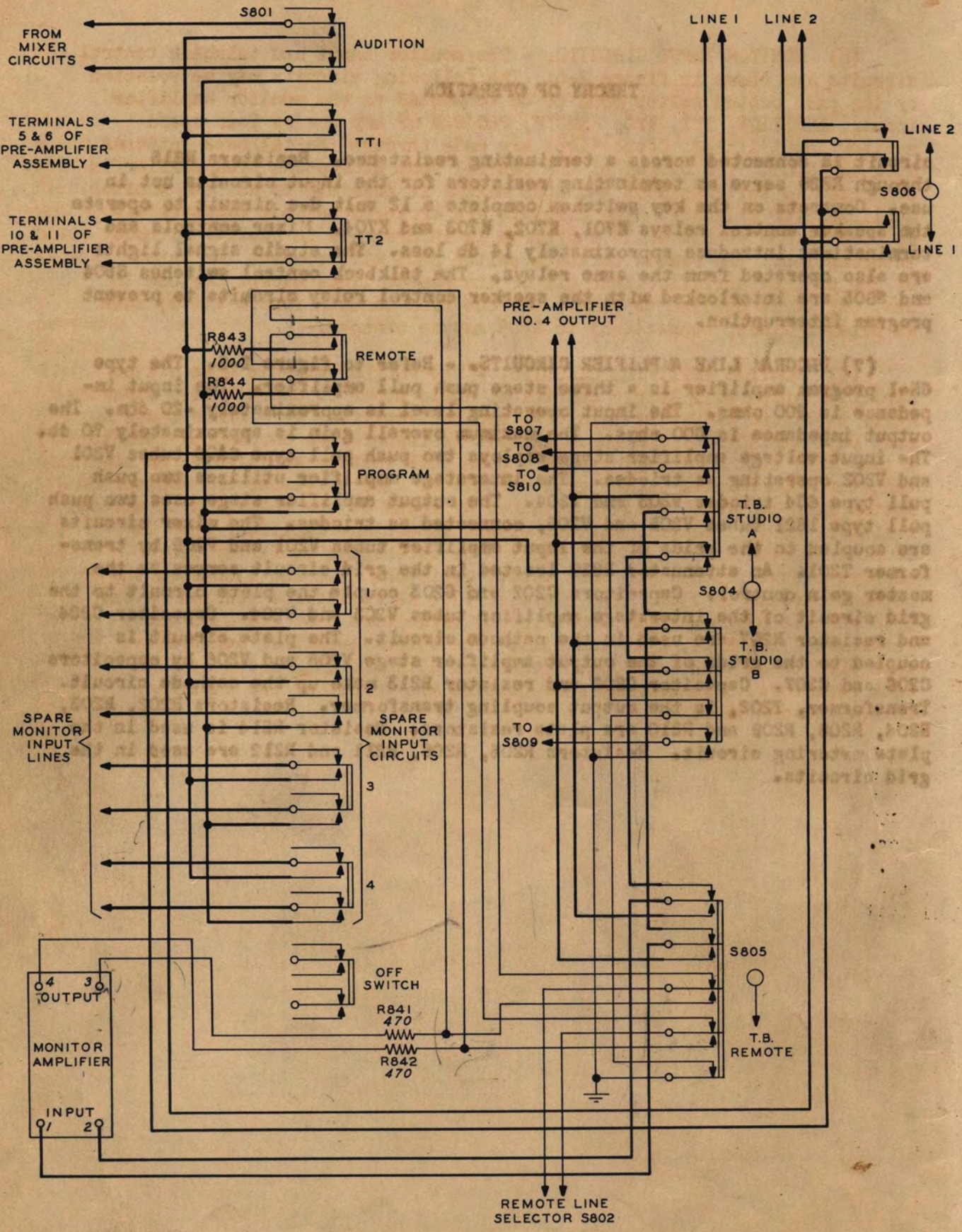


Figure 2-6 Monitor Input Circuits

(8) MONITOR INPUT CIRCUITS. - The monitor input and talkback control circuits are shown in figure 2-6. The following circuits may be selected by the push button switch S801 to be connected to the monitor amplifier input: AUDITION, TT1, TT2, REMOTE, PROGRAM or any one of four spare monitor input lines. Connections are made through the talkback switches S804 and S805. The output of the control room microphone preamplifier is connected to switches S804 and S805 making it possible to use the monitor amplifier for talkback. The circuits are arranged so that talkback may be used in one studio while a program is in progress in another without interruption. The remote talkback switch S805 will connect the output of the monitor amplifier into all of the remote lines except the one in use. If it is desired to remove the cue from certain remote lines, such as network lines, connections to S805 may be changed.

(9) MONITOR AMPLIFIER CIRCUITS. - The monitor circuit uses a line amplifier which will supply sufficient audio power to operate five speakers. Refer to figure 2-7. The type 6V-1 monitor amplifier is a three stage push pull amplifier. The input circuit is transformer coupled by T301 to a type 6SN7 tube V301 employed as a push pull voltage amplifier. An attenuator R840 located in the grid circuit of V301 serves as the monitor master gain control. Bias is obtained by means of the voltage drop across resistor, R302. The grid circuit of the interstage amplifier V302 is coupled by capacitors C303 and C304. The interstage amplifier V302 employs a dual triode type 6SL7 tube. Resistors R307 and R308 form the cathode circuit of V302. The plate of V302 is resistance coupled to the grid circuit of the output amplifier by capacitors C305 and C306 and resistors R310, R311, R312 and R313. The output amplifier employs two type 6L6G tubes V303 and V304. Resistors R314 and R315 serve as feedback resistors. Transformer T302 couples the output of the amplifier into a 600 ohm line.

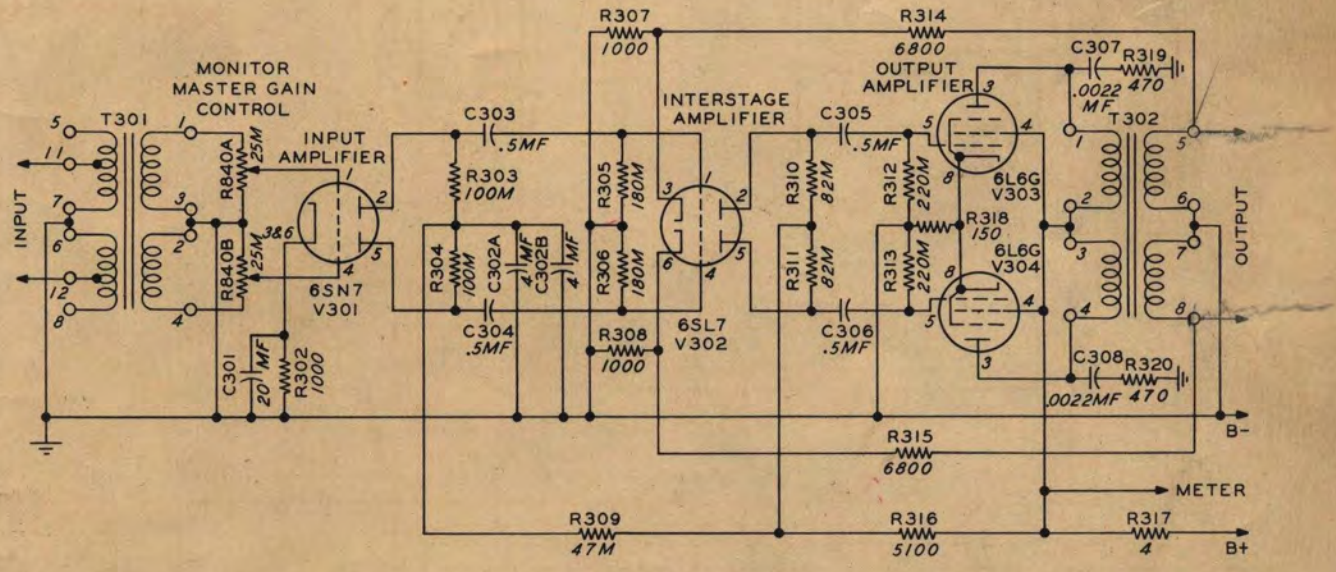


Figure 2-7 Monitor Amplifier Circuits

12839-1

(10) STUDIO SPEAKER AND LIGHT CONTROL CIRCUITS. - Refer to figure 2-8. The relays K701, K702, K703 and K704 are operated from a 12 volt d-c source which is controlled by the mixer circuit key switches S807, S808, S809 and S810. The four speakers are operated from the output of the monitor amplifier. The output impedance is 600 ohms. Resistors R701, R702, R703 and R704 are used as terminating resistors for the audio output when a speaker is removed from the circuit. The OFF AIR and ON AIR lights operate from 115 volts a-c.

(11) METERING CIRCUITS. - A comprehensive metering circuit arrangement provides a continuous visual indication of operating conditions. Refer to figure 2-9. The meter M801 may be connected to give an indication of proper operation of any one of the following by use of the metering selector switch S803: (PROG) Program Channel audio level. (OFF) OFF position (AUD) audition Channel audio level, (P1) pre-amplifier plate current, (P3) pre-amplifier plate current, (P5) pre-amplifier plate current, (L) program amplifier plate current, (M) monitor amplifier plate current (DC) 140-VOLT plate supply (6.3V) filament supply voltage. Resistors R101, R108, R214, R217 operate as shunt resistors. Resistors R836 and R837 are series multipliers for the voltage indications. The meter should read $\pm$1 db of ZERO for any of the amplifier current or voltage positions. The T pads R838 and R839 are connected across the audio circuits.

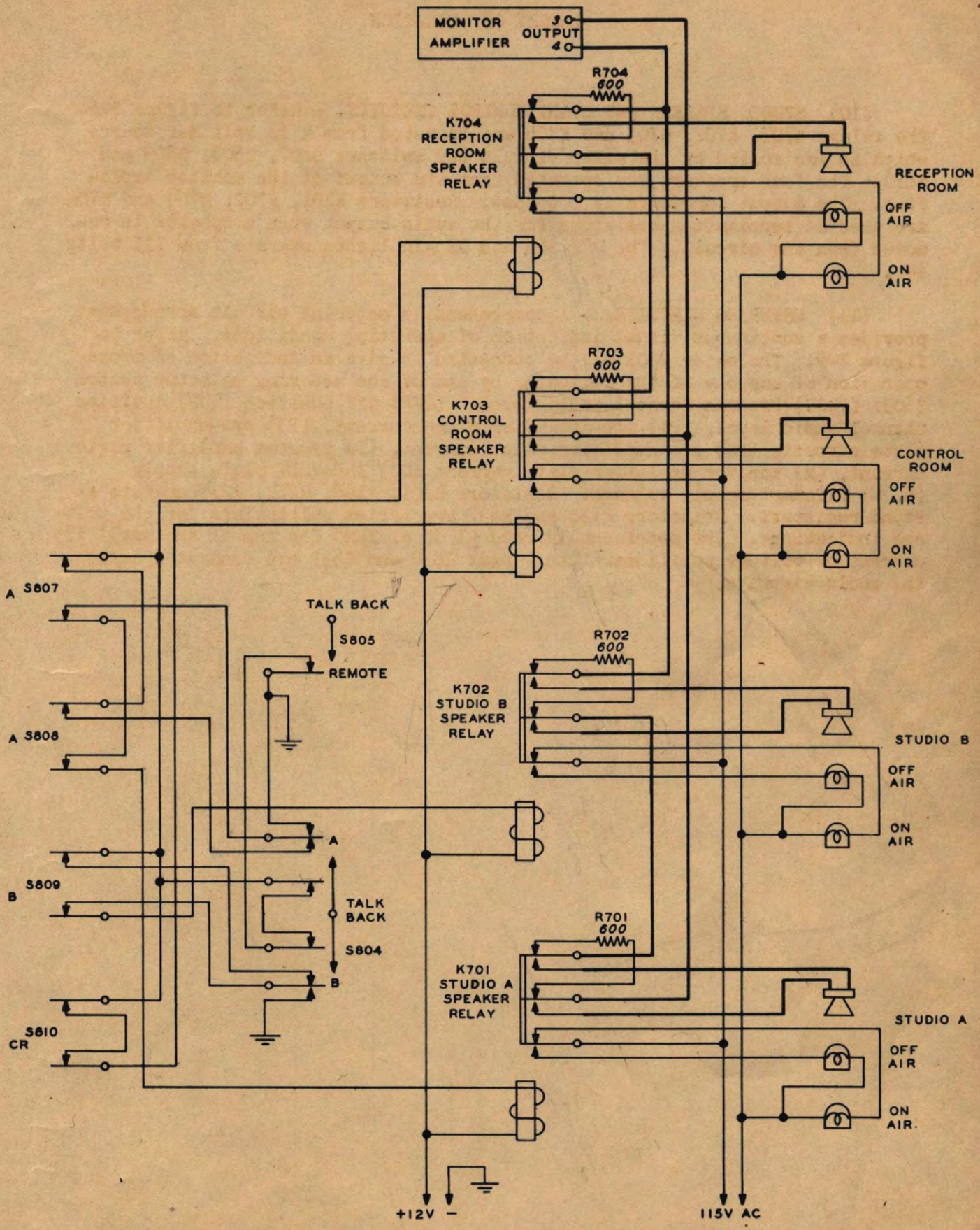


Figure 2-8 Studio Speaker and Light Control Circuits

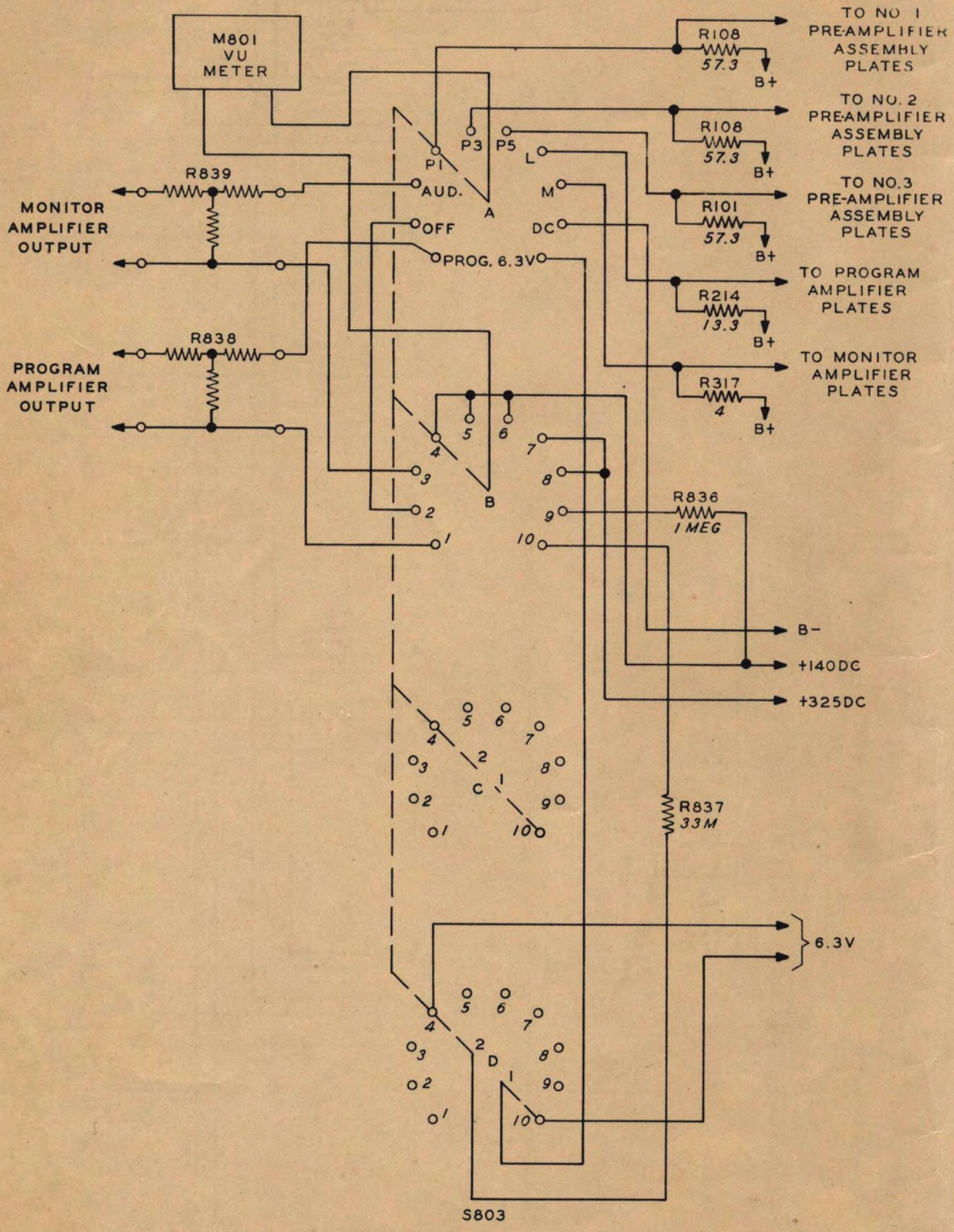


Figure 2-9 Metering Circuits

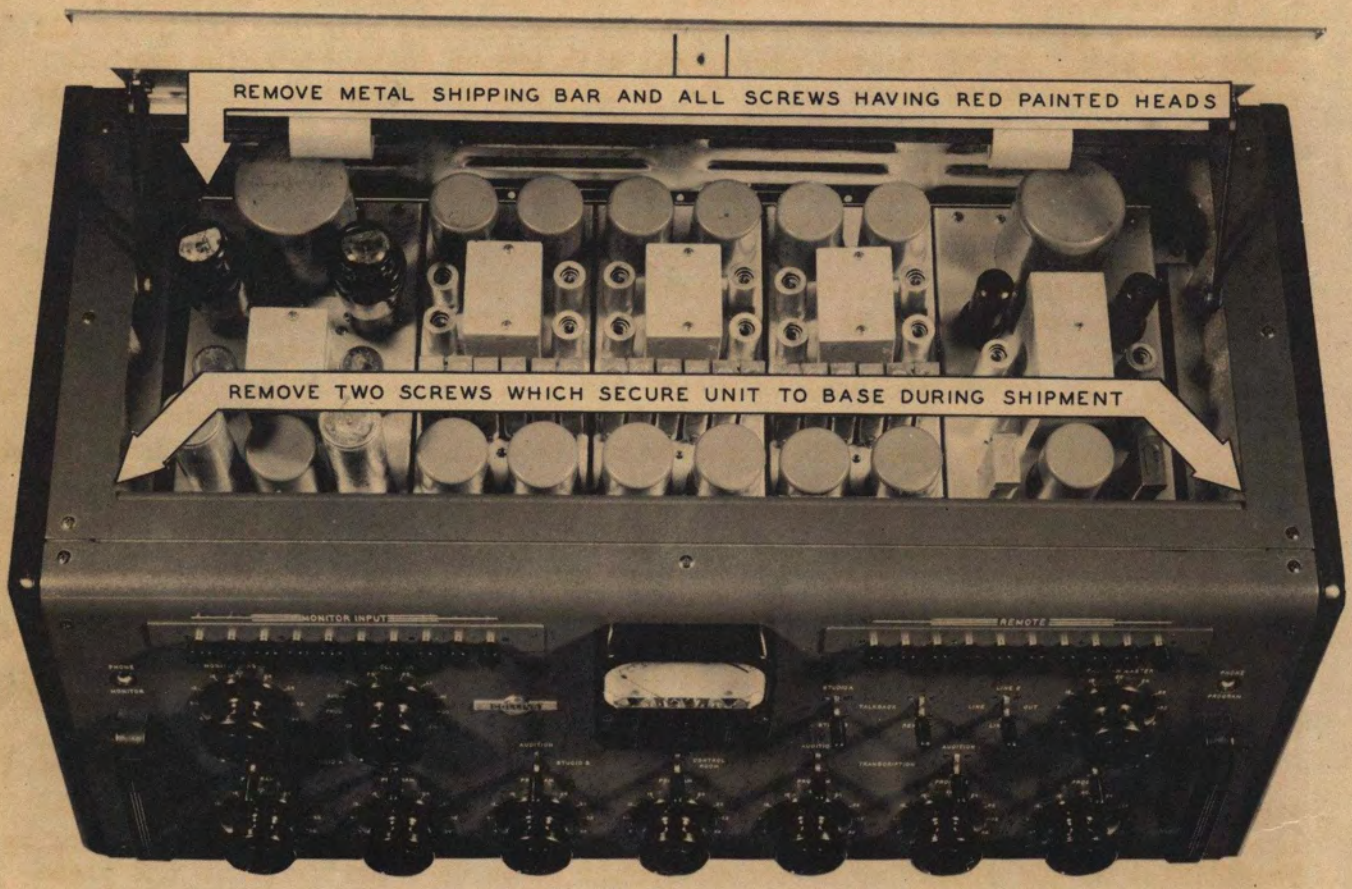


Figure 3-1 Location of Shipping Hardware

SECTION III

INSTALLATION AND INITIAL ADJUSTMENTS

1. INSTALLATION.

a. PRELIMINARY.

(1) UNPACKING. - Refer to the table of equipment supplied in Section I, paragraph 2. a. of this instruction book and the packing slip for a list of all units supplied. If the crates are marked with arrows to indicate the upright position, remove crate cover only. Use a nail puller to remove nails; a bar or hammer may damage the equipment within. Remove all packing material and lift each unit out carefully. Search all of the packing material for small packages. Inspect each unit for loose screws or bolts. Be certain all controls such as knobs, switches, etc., work properly. All claims for damage should be filed promptly with the transportation company. The console unit is shipped with four small wood blocks under each of the shockmounted sub chassis and a metal bar across the top of all five to hold them in place during shipment. After these have been removed, each amplifier chassis should float freely upon its rubber mountings. Two screws are used to secure the unit against tilting during shipment. Refer to figure 3-1. After removal of these screws the unit should be free to tilt upon its base. These screws may be replaced to prevent unauthorized personnel from tilting the unit.

b. INSTALLATION PROCEDURE.

(1) EQUIPMENT MOUNTING POSITION. - The exact location of the equipment in a particular installation will be determined by the arrangement of studio and control room facilities. The placement of equipment and wiring should be carefully planned before any installation work is started.

(a) The type 212B console unit may be placed against a window, wall or other obstructing surface without sacrificing maintenance accessibility. Outline and mounting dimensions of the console are shown in figure 3-2. The working convenience of the operating personnel should serve as a criterion in the placement of the console unit.

(b) The type 274D relay control unit and the type 409U power supply should be placed adjacent to each other and within twenty feet of the console unit if possible. If wall mounting cabinets have been selected for these units, sufficient clearance should be maintained to allow the doors to open fully for maintenance purposes. The outline and mounting dimensions of the wall mounting type of units are shown in Figures 3-3 and 3-4. If rack mounted units are used, refer to figures 3-5 and 3-6 for outline and mounting dimensions.

(2) PLACING AND SECURING UNITS.- After the location of the equipment and wiring has been determined the desk and console unit should be put in place and

wiring conduits installed. Two 1-11/32" diam holes are provided on the left hand side of the base plate, looking at the unit from the front, either of which may be used for the low level audio lines. Two 1-11/32" diam holes are provided on the right hand side of the base plate either of which may be used to pass the power and control wires from the 274D relay unit.

(a) If a rack mounting relay control unit, type 274D-5 and power supply, type 409U-2 are used, the unit should be placed in position in a Collins Type 19G Cabinet or similar standard relay rack cabinet.

1. Secure the units with hexagon head screws and flat washers. The oval head screws and cupped washers often used are not satisfactory.

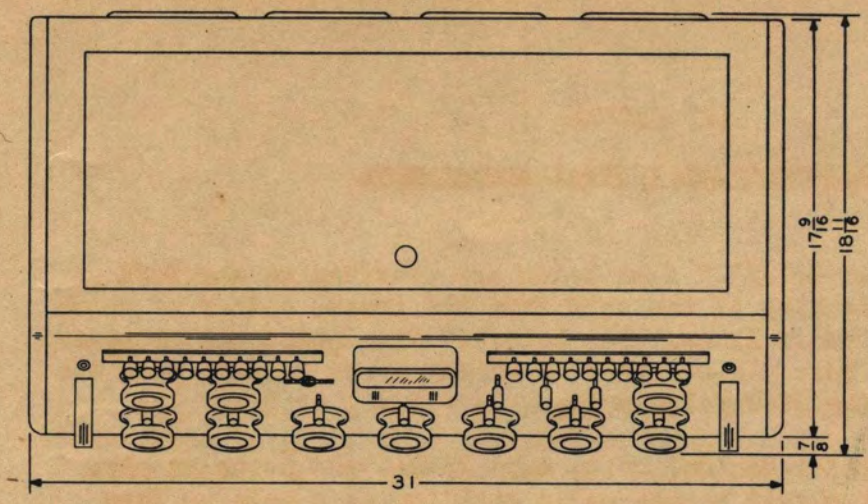
(b) If the relay control unit, type 274D-2 and power supply unit, type 409U-1 are supplied in wall mounting cabinets, the cabinets should be securely fastened in the selected mounting position.

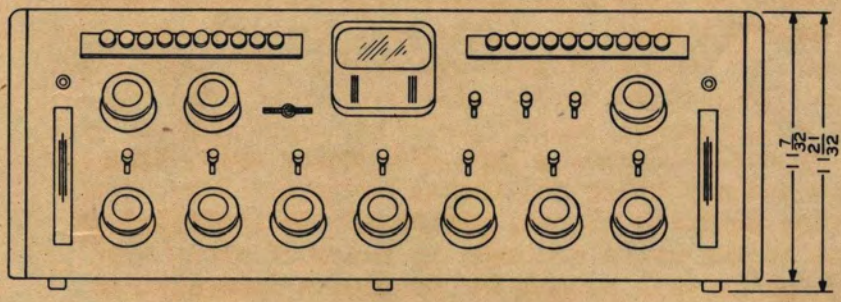
(3) INSTALLATION WIRING.

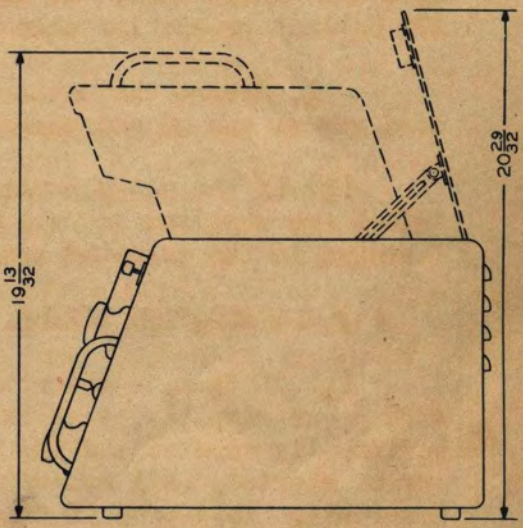
(a) GENERAL. - After the type 212B Console, Type 274D relay unit, Type 409U power supplies, jack strips and any other additional equipment have been permanently mounted and the wiring conduits placed, wiring of the installation may be started. All connections to the units are made by means of screw type terminals. This type of connection is well suited for broadcast installation where reliability and accessibility are the most important considerations. All wiring should be made with twisted shielded pairs. All low level audio lines should be kept separate from the power and control wires. Audio lines should be approximately No. 20 AWG twisted pair shielded. Filament circuits connections should be made with a No. 12 AWG twisted shielded pair. Studio signal lights circuit connections should be made with No. 16 AWG twisted shielded pair.

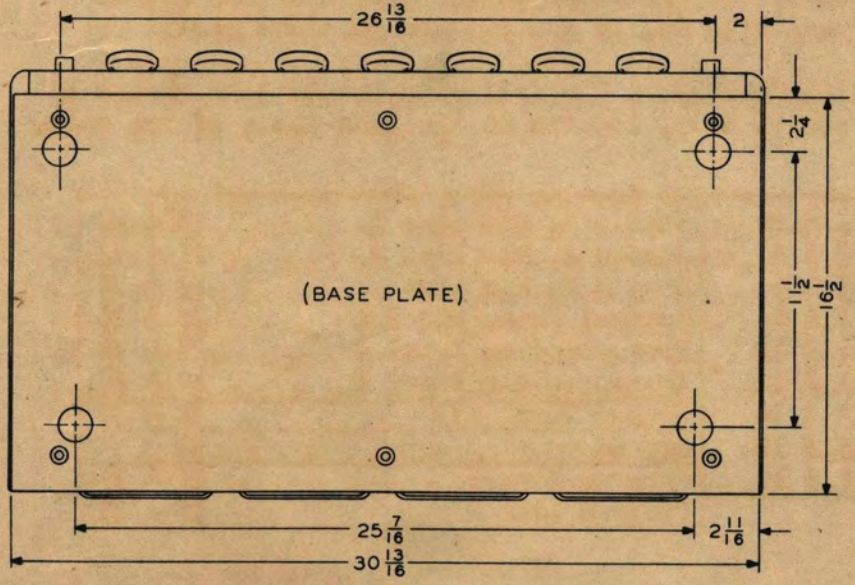
b. CONNECTIONS TO THE TYPE 212B CONSOLE. - The following connections should be made to the numbered terminal strip, E801, located on the base plate of the unit. Refer to figure 3-8.

Remote Line 1	1 & 2	Studio A, Mic Line 1	19 & 20
Remote Line 2	3 & 4	Studio A, Mic Line 2	21 & 22
Remote Line 3	5 & 6	Studio B, Mic Line	23 & 24
Remote Line 4	7 & 8	Control Room, Mic Line	25 & 26
Remote Line 5	9 & 10	Transcription Input 1	27 & 28
Remote Line 6	11 & 12	Transcription Input 2	29 & 30
Remote Line 7	13 & 14	Unused Terminals	31 & 32
Remote Line 8	15 & 16	Ground	33
Remote Line 9	17 & 18	Program Line 1	34 & 35
		Program Line 2	36 & 37



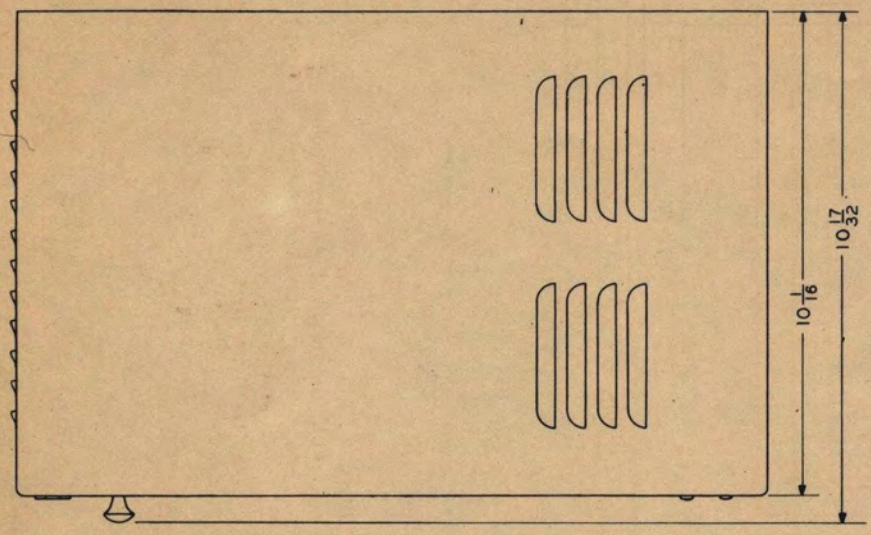




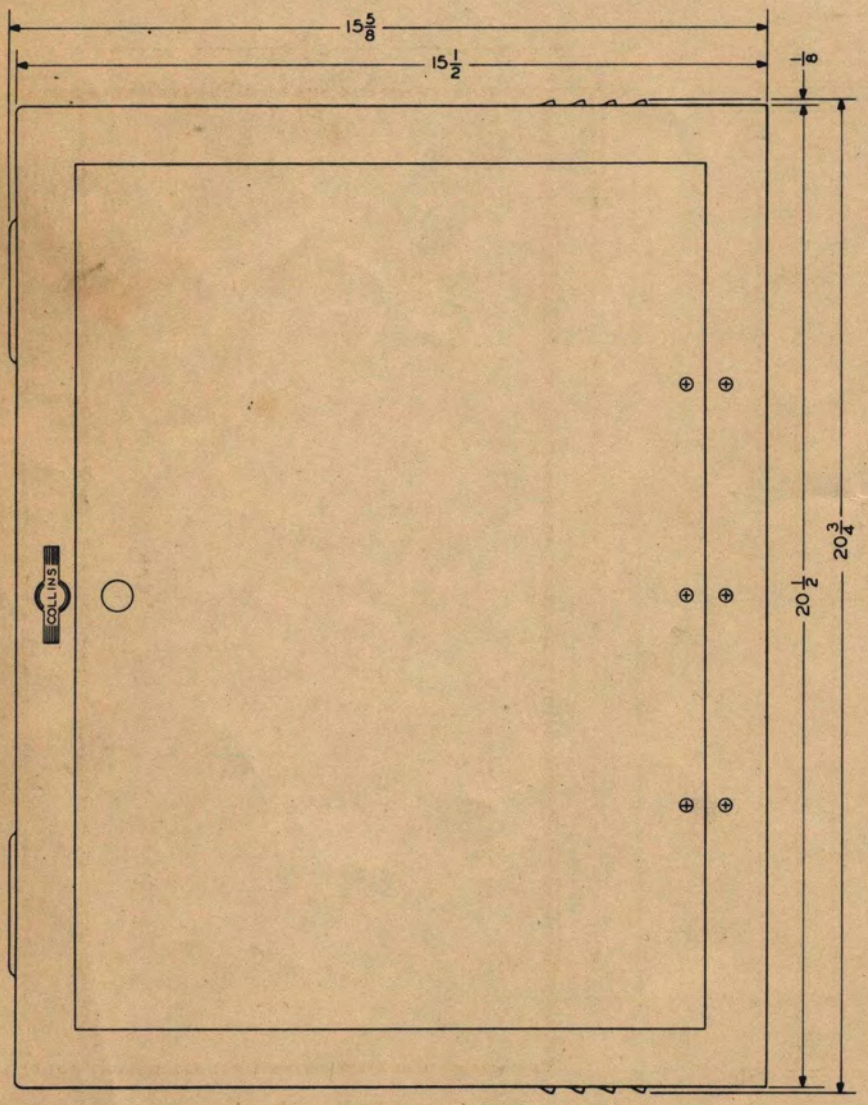


NOTE:
ALL DIMENSIONS ARE GIVEN IN INCHES.
WEIGHT OF UNIT - 98 LBS.

Figure 3-2 Type 212B Console, Outline and Mounting Dimensions



NOTE:
ALL DIMENSIONS ARE IN INCHES.
ALLOW 13 INCHES IN FRONT OF UNIT
FOR DOOR CLEARANCE.



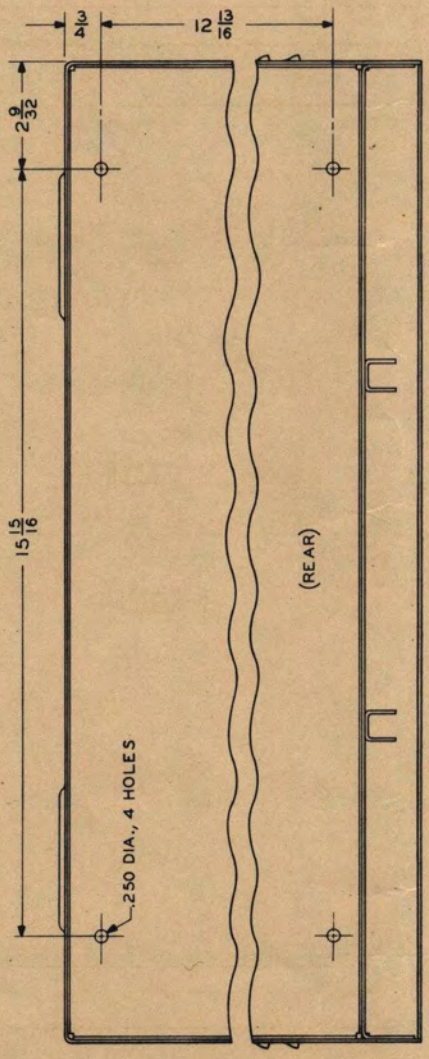


Figure 3-3 Type 409U-1 Power Supply, Outline and Mounting Dimensions

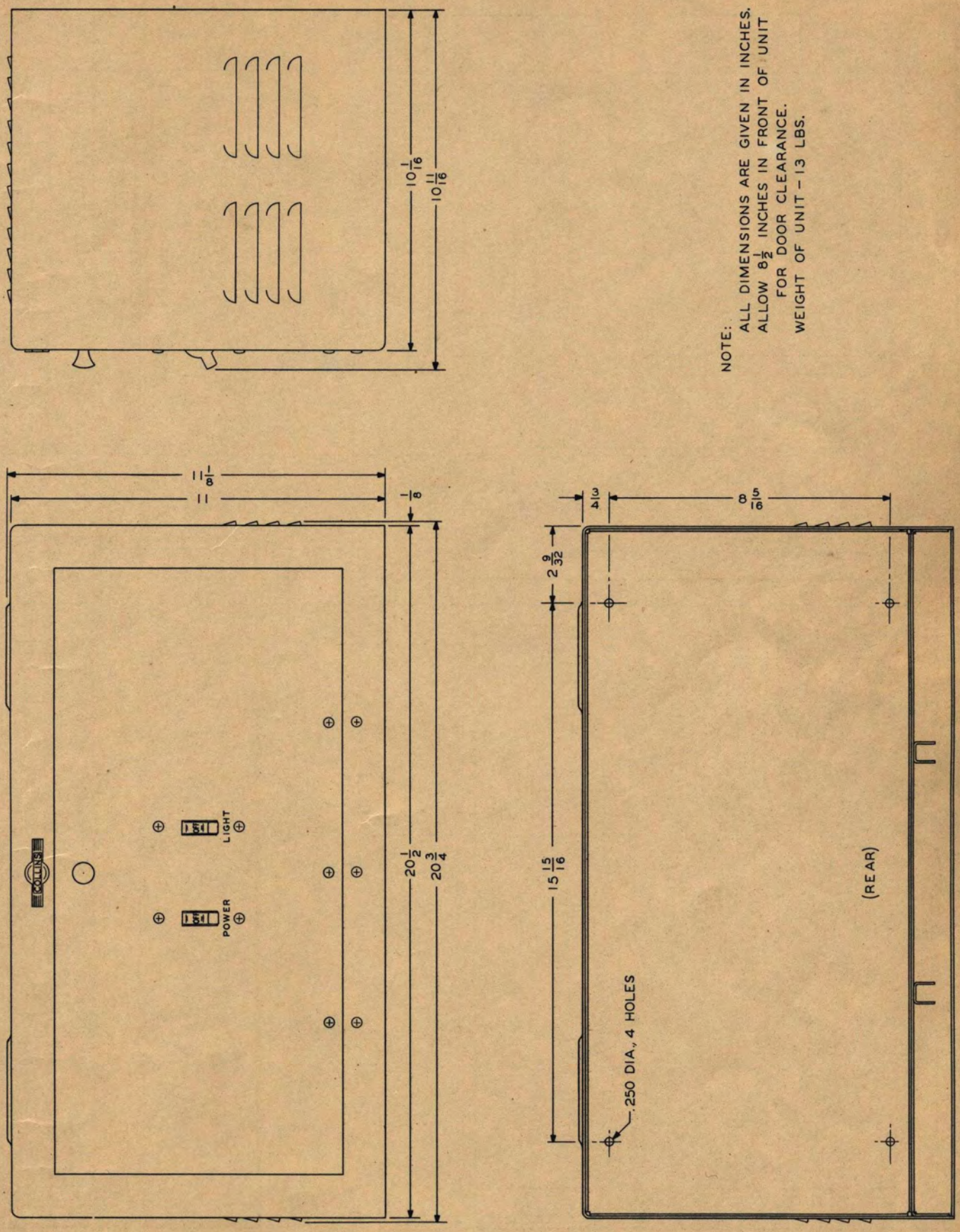
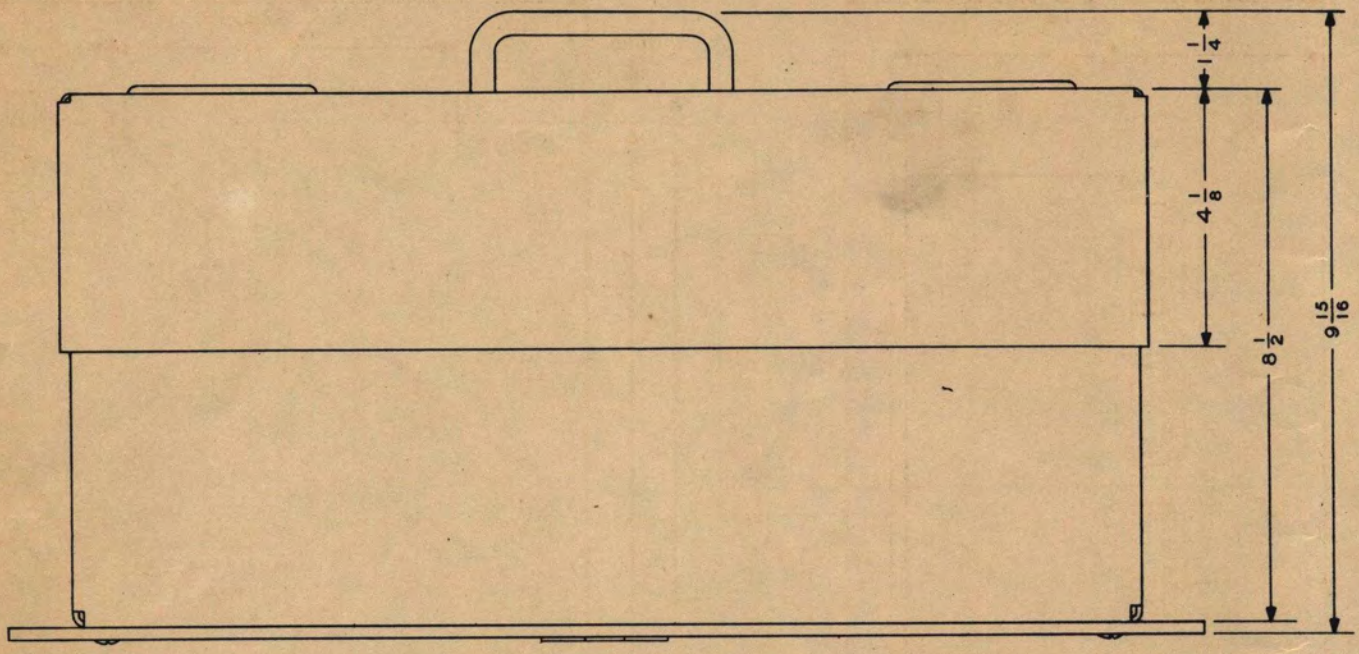


Figure 3-4 Type 274D-2 Relay Control Unit, Outline and Mounting Dimensions



NOTE: ALL DIMENSIONS ARE GIVEN IN INCHES.
WEIGHT OF UNIT - 70 LBS.

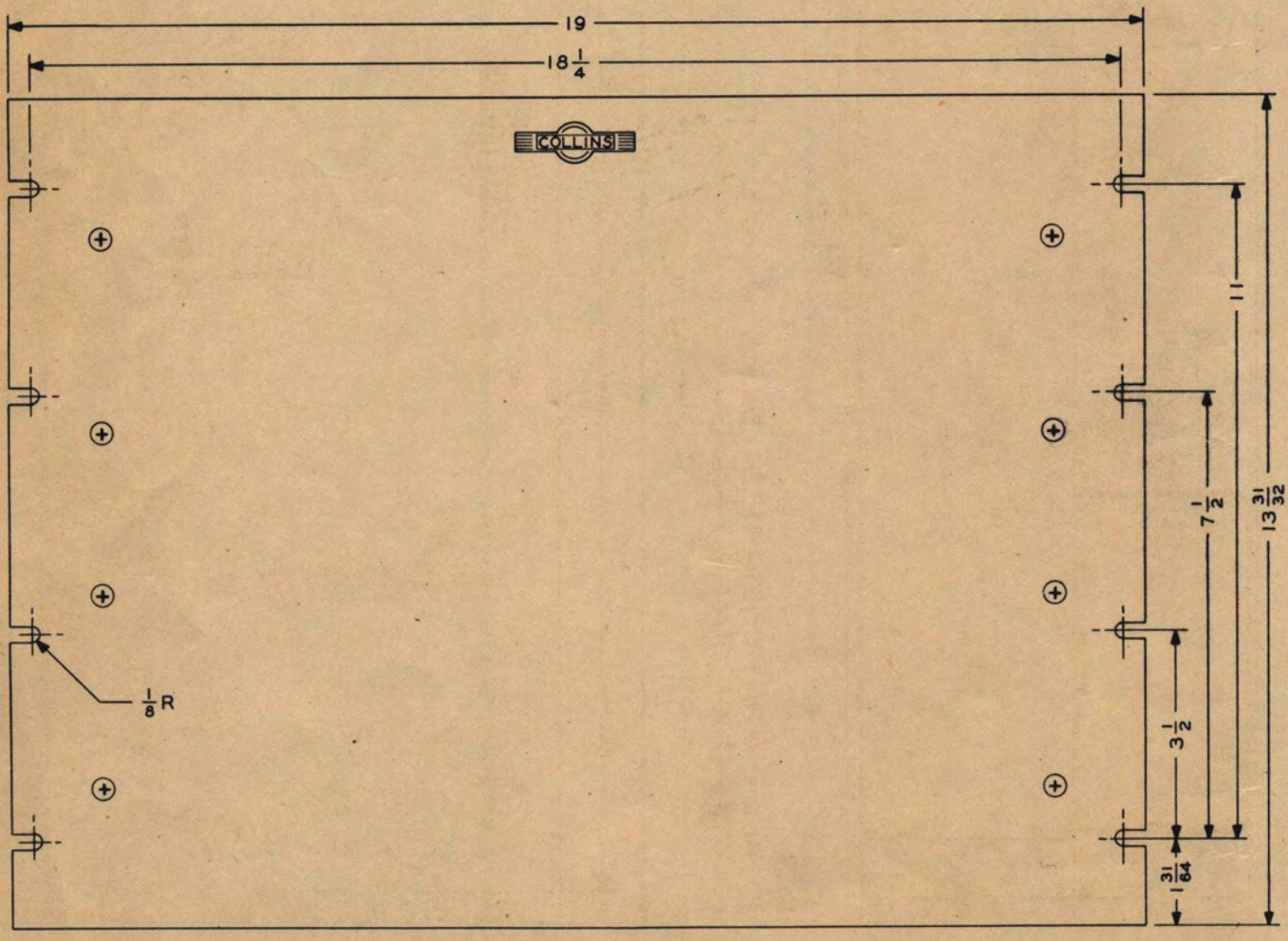


Figure 3-5 Type 409U-2 Power Supply, Outline and Mounting Dimensions

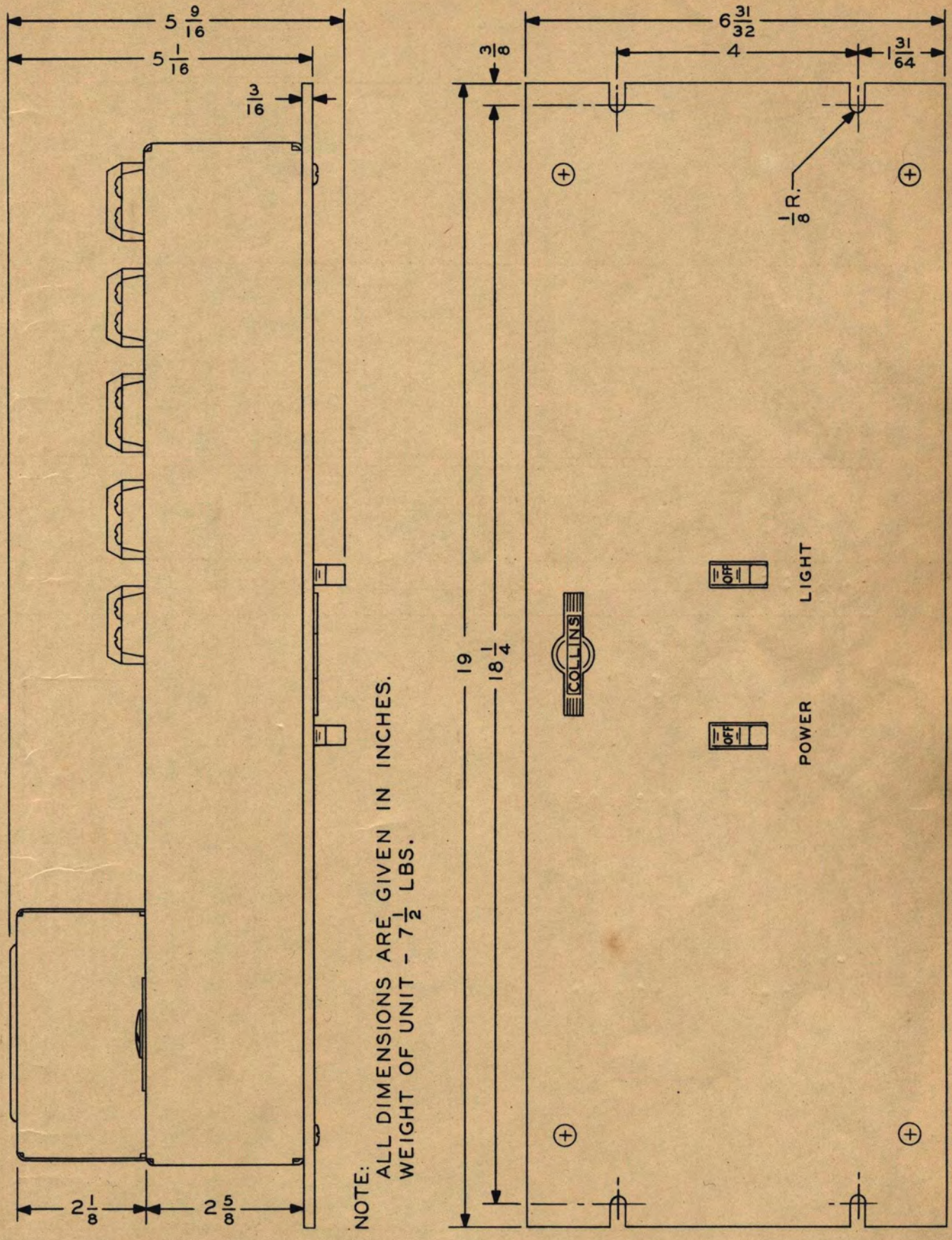


Figure 3-6 Type 274D-5 Relay Control Unit, Outline and Mounting Dimensions

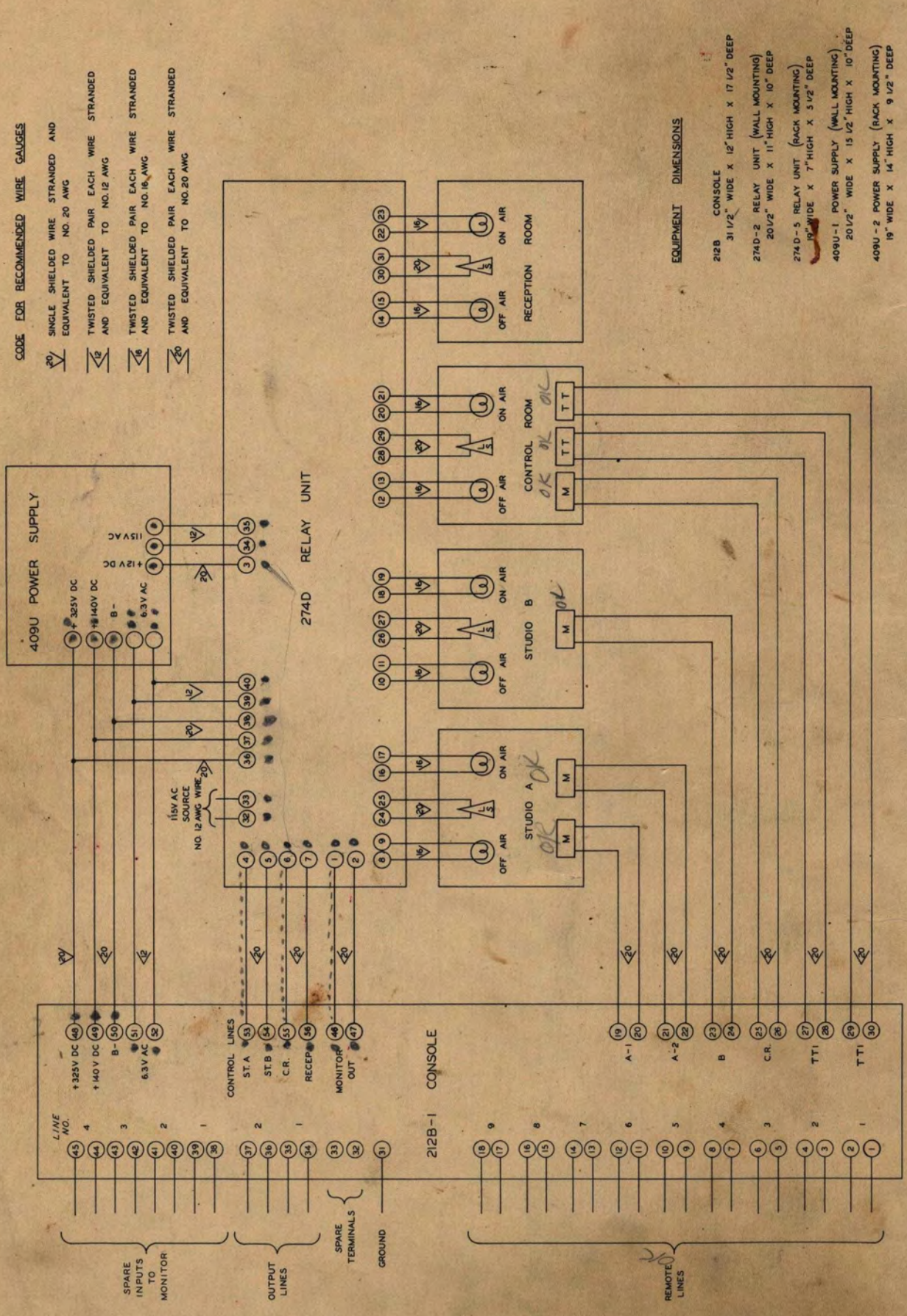


Figure 3-7 Installation Wiring Schematic

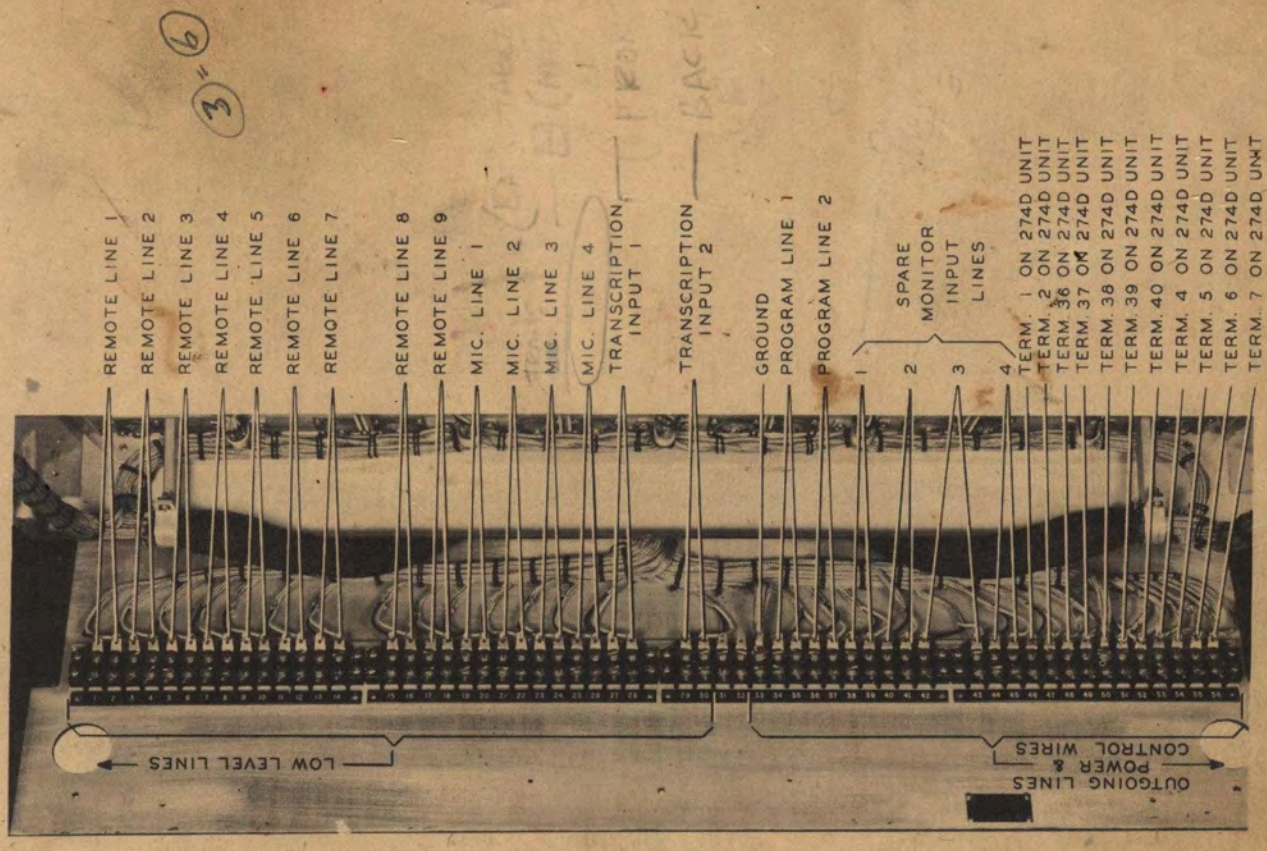


Figure 3-8 Type 212B Console Unit, External Connections

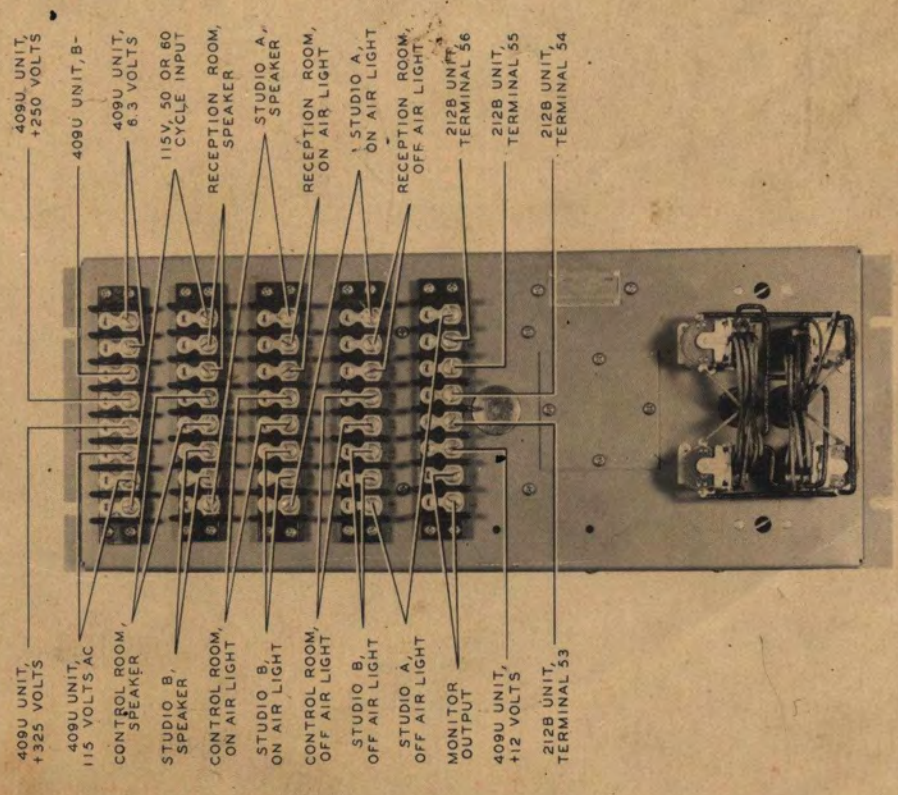


Figure 3-9 Type 274D Relay Control Unit, External Connections

Spare Monitor Input Line 1	38 & 39	Studio A Control	53
Spare Monitor Input Line 2	40 & 41	Studio B Control	54
Spare Monitor Input Line 3	42 & 43	C R Control	55
Spare Monitor Input Line 4	44 & 45	Reception Room Control	56
Monitor Output	46 & 47		
Plate Voltage Supply + 325	48		
Preamplifier Plate Voltage Supply +140	49		
Plate Voltage Supply B-	50		
Filament Supply Voltage 6.3	51 & 52		

It is desirable to terminate all audio lines in external jack strips to facilitate expedient interchange of circuits for maintenance or emergency operation.

1. CHANGING INPUT IMPEDANCE. - The type 212B Console is normally shipped with the microphone line inputs connected for 50 ohms impedance, the transcription inputs 600 ohms and for 600 ohm remote lines. If it is desired to change the microphone line impedance from 50 to 250 ohms two wires must be reconnected on transformers T101 and T103 of each preamplifier assembly and the values of C101 and C107 must be changed from .0047 mf to .0022 mf. Four .0022 capacitors are supplied with the equipment. Also remove resistors R116 and R117. The wires connected to terminal No. 11 should be connected to terminal No. 5 and the wire connected to terminal No. 12 should be connected to terminal No. 8. The remote line input impedance may be changed from 600 to 150 ohms by changing two wires on the primary of the repeat coil T801. The wire connected to terminal 1 should be moved to terminal 9 and the wire connected to terminal 4 should be connected to terminal 10.

(c) TYPE 274D RELAY CONTROL UNIT CONNECTIONS. - The following connections should be made at the numbered terminal strip located on the relay control unit chassis. Twisted shielded pairs of approximately No. 12 AWG should be used for control wires. Power and Filament Circuit connections should be made with a twisted shielded pair approximately No. 12 AWG. Refer to figure 3-9.

	Terminal Number
Monitor Output	1 & 2
Studio A Control	4
Studio B Control	5
C R Control	6
Reception Room Control	7
Off Air Light, Studio A	8 & 9
Off Air Light, Studio B	10 & 11
Off Air Light, C R	12 & 13
Off Air Light, Reception Room	14 & 15

On Air Light, Studio A	16 & 17
On Air Light, Studio B	18 & 19
On Air Light, C R	20 & 21
On Air Light, Reception Room	22 & 23
Speaker, Studio A	24 & 25
Speaker, Studio B	26 & 27
Speaker, C R	28 & 29
Speaker, Reception Room	30 & 31
115 v 50 or 60 cy input	32 & 33

Power Supply Connections	
115 v ac input	34 & 35
+325	36
+250	37
B-	38
6.3	39 & 40
+12	3

(d) TYPE 409U POWER SUPPLY UNIT CONNECTIONS. - All of the wires from the power supply units terminate at the 274D relay control unit. The terminals are clearly identified on the power supply terminal strip, E501. The following connections should be made at each of the power supply units,+12, -12, +325, +140, B-, 6.3, 115 v ac.

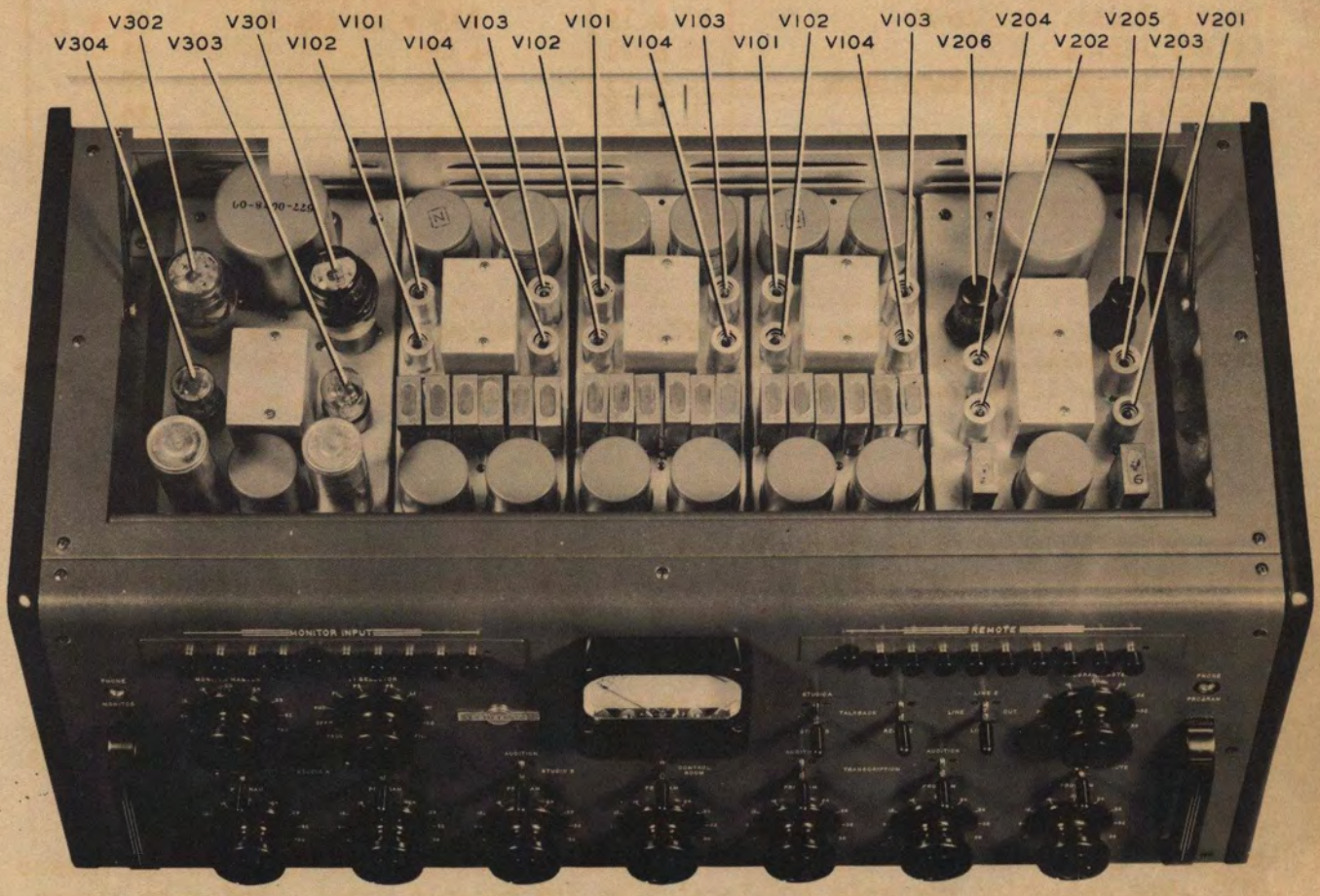
2. INITIAL ADJUSTMENTS.

a. GENERAL. - After the installation and wiring have been completed the equipment is ready for operational adjustments. The following paragraphs explain the functions of the controls and the adjustments necessary in placing the equipment in operating condition.

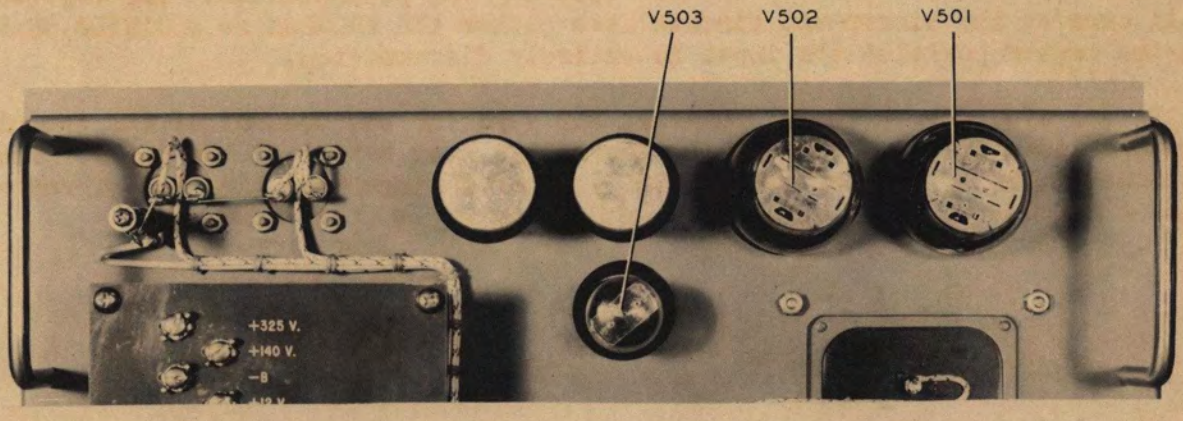
b. CONTROL FUNCTIONS. - The panel of the type 212B Console is arranged for simple and convenient operation. In general, the control functions are similar to that of other speech input systems. All attenuators operate in the conventional manner with minimum attenuations (maximum output) being obtained in the extreme clockwise position, marked (40). Attenuation can be varied in 2 db steps to a maximum of 40 db. Complete cutoff is obtained in the position marked OFF. The following controls are located on the console panel. Refer to figure 3-11.

(1) MICROPHONE INPUT CONTROLS. - The four microphone line inputs operate into individual preamplifiers. Each microphone input channel has a constant impedance attenuator and key switch following the preamplifier. The key switch will connect the microphone circuit into either the PROGRAM or AUDITION CHANNEL. In the center position the input is entirely disconnected.

(a) STUDIO A. - The attenuators and keys for the control of the two microphone lines are located near the lower left hand corner of the panel. The attenuator, R801, and key switch, S807, control microphone line 1. Microphone line 2 is controlled by attenuator, R802, and key switch, S808.



212B CONSOLE UNIT



409U POWER SUPPLY

Figure 3-10 Tube Locating Diagram

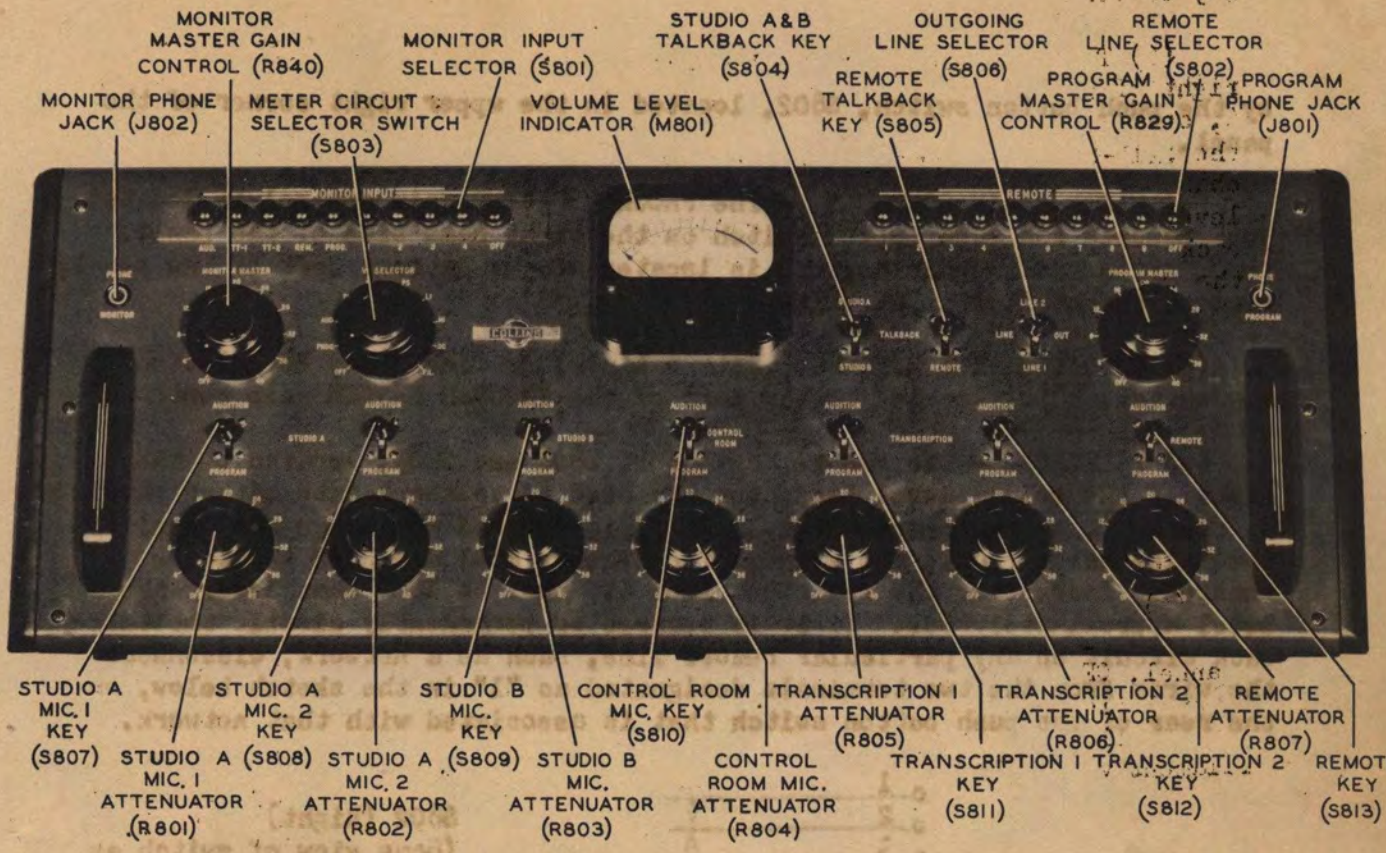


Figure 3-11 Control Locations

(b) STUDIO B. - Attenuator, R803, and key switch, S809, control the microphone line. These controls are located adjacent to the Studio A Controls.

(c) CONTROL ROOM. - The control room announce microphone is controlled by attenuator R804 and key switch S810. These controls are located just beneath the volume level indicator booth controls.

(2) TRANSCRIPTION CONTROLS. - The transcription input circuits are wired for high level input, approximately -15 db. The second and third groups of controls from the right hand side of the panel are the transcription input controls. Attenuator R805 and key switch S811 are connected in transcription line 1, while attenuator R806 and key switch S812 are connected in transcription line 2.

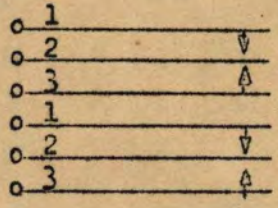
(3) REMOTE LINE CONTROLS. - The attenuator, R807 and key switch, S813 located near the lower right corner of the panel control the remote line selected

by the push button switch, S802, located in the upper right corner of the panel.

(4) MASTER GAIN CONTROLS. - The PROGRAM MASTER gain control is located just beneath the push button switch on the right hand side of the panel. The MONITOR MASTER gain control is located at the extreme left of the panel, beneath the monitor input selector.

(5) OUTGOING LINE SWITCH. - Either Line 1 or Line 2 may be selected by key switch, S806, located to the left of the PROGRAM MASTER gain control.

(6) TALKBACK. - The two key switches, S804 and S805, located to the right of the volume level indicator are used to talkback into either studio A, studio B, or the remote lines. If it is desired to change the level of the talk-back circuit, the values of resistors R841 and R842 should be changed. Increasing the resistors from 470 ohms to 1000 ohms lowers the level approximately 6db. If it is desired to permanently disable the talk-back circuit on any particular remote line, such as a network, disconnect the wires from the two terminals designated as "1" in the sketch below, on the rear of the push button switch that is associated with that network.



S802 (Right)
(Same view of switch as shown on figure 7-4).

(7) METERING CIRCUIT SELECTOR, - The switch, S803, will connect the volume level indicator in the following circuit as an operational check; PROGRAM Channel, OFF position, AUDITION CHANNEL, preamplifier 1 & 2 plate supply, preamplifier 3 & 4 plate supply, preamplifier 5 & 6 plate supply, (if used), line amplifier plate supply, monitor amplifier plate supply; dc voltage or filament voltage. It is located adjacent to the monitor master gain control.

(8) MONITOR INPUT. - The MONITOR INPUT selector, S801, is located in the extreme upper left hand corner of the panel. The following monitor input circuits may be selected by push button control AUDITION, TT1, TT2, REMOTE, PROGRAM or any one of four additional monitor inputs.

(9) METER ATTENUATOR. - Referring to the schematic, figure 7-4, the upper right hand corner, it will be noted that each of the T pads shown is designated with a number. This number indicates the number of db attenuation obtained by connecting the T pad in the circuit. The resistor designated as "IN" gives 4 db of attenuation. Thus, as connected by dotted lines, 16 db of attenuation is obtained, 4 by the "IN" resistor, 4 by the resistor designated as "4" and 8 by the resistor designated as "8".

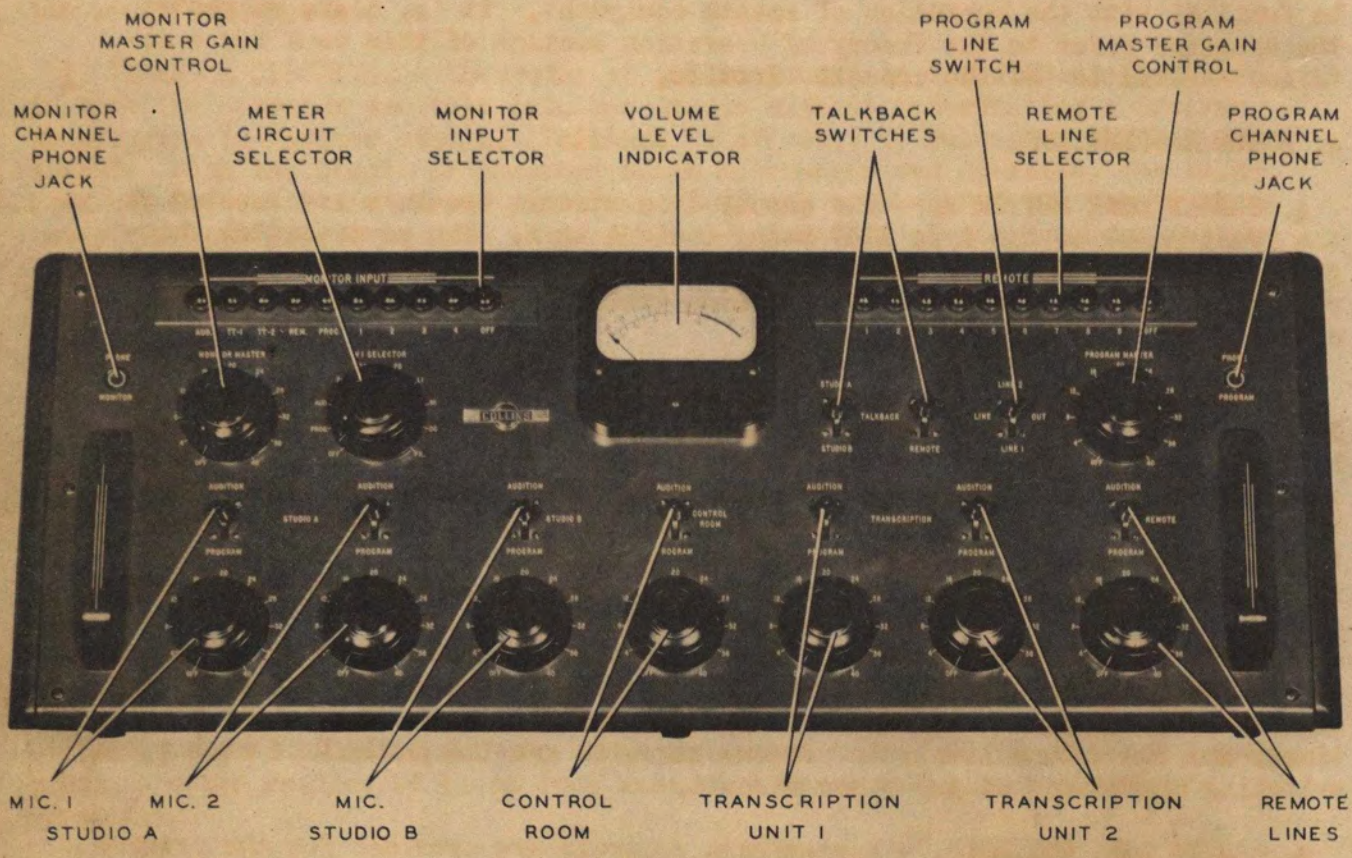


Figure 4-1 Routine Operating Controls

SECTION IV

OPERATION

1. GENERAL.

The control panel of the type 212B Console is arranged for simple and convenient operation. In general, the functions are similar to that of other speech input systems, and anyone familiar with equipment of this type should require no further instructions. A detailed description of the functions of each control will be given, however, for the benefit of any users who may not be familiar with the operation of speech equipment. It is, also, suggested the operator refer to the Theory of Operation section of this book for a detailed explanation of the console circuits.

2. ROUTINE OPERATION.

a. SUPPLY LINE SWITCHES. - The supply line circuit breakers are located on the front panel of the type 274D relay control unit. The power switch energizes the type 409U power supply unit which supplies filament, plate and relay voltage to the console. The LIGHT switch controls the power to the studio signal lights.

b. MIXING CONTROLS. - The seven groups of input channel mixing controls are located along the lower edge of the panel. Each group is clearly identified by the engraving adjacent to it. Refer to figure 4-1. An attenuator and key switch comprise the individual mixing circuit. The attenuators operate in the conventional manner with minimum attenuation (maximum output) being obtained in the extreme clockwise position, marked forty (40). Complete cutoff is obtained in the position marked zero (0). Two (2) db attenuation per step is introduced into the circuit. The key switch will connect the input into either the PROGRAM Channel or AUDITION Channel. When the key switch is in the center position the input is entirely disconnected. The mixing and switching circuit is so designed that correct impedance relations are maintained at all times, and the volume levels in various circuits are independent of mixing and switching operations in any other circuit.

c. MASTER GAIN CONTROLS. - Master gain controls are provided for the program line amplifier channel and the monitor amplifier channel. These controls are of the high resistance step by step potentiometer type, but its direction of rotation and attenuation per step are the same as the mixing controls described in the preceding paragraph.

d. REMOTE LINE SELECTOR. - Any one of nine remote lines may be selected by the group of pushbuttons located at the right hand side of the panel. The remote mixing controls are located beneath it on the same side of the panel. The line selected is connected through a repeat coil to the mixer. The remote inputs operate at line level.

e. USE OF REMOTE CUE CIRCUIT. - The remote cue circuit incorporated in the 212B is useful in cases where order lines are not available, and where the remote line program circuits do not include one way repeaters. The circuit is arranged in such a way that a signal from the monitor amplifier is fed to the remote line when the REMOTE Monitor input pushbutton is in the OUT position. Operation of this pushbutton removes this cue before the line is connected to the amplifier input.

f. TALKBACK CIRCUITS. - The system of talkback used in the 212B is flexible in that the operator can talk into one studio without interrupting a program in progress in another studio. Talkback is effected by releasing the key associated with the studio or announce booth microphone and operating the talkback key switch to the proper position. Talkback into any of the remote lines except one carrying a program is possible by operation of the talkback switch to the REMOTE position. Studio speakers are interlocked with the microphone input circuits to prevent program interruption.

g. MONITOR INPUT. - A push button selector located on the left hand side of the panel may be used to connect the program, audition, transcription, remote or any of four spare inputs to the monitor input circuits.

h. OUTGOING LINE SELECTOR. - This switch connects the outgoing program into either LINE 1 or LINE 2.

3. METERING CIRCUIT.

The metering circuit incorporated in the 212B permits a check of the operation of all amplifier tubes and plate and filament voltage. The currents and voltages are read on the volume level indicator. Individual circuits are selected by the VI SELECTOR switch. When connected in any of the following circuits, a meter reading of ±1 db from zero will be an indication of proper operation.

Switch Position	Circuit Being Metered
P1	Studio A preamplifiers, plate current
P3	Studio B preamplifier, and Control Room Preamplifier, plate current
P5	Transcription Preamplifier, plate current
L	Program Line Amplifier, plate current
M	Monitor Amplifier plate current
DC	Plate Supply Voltage
6.3V	Filament Supply Voltage

SECTION V

MAINTENANCE

1. GENERAL.

This radio equipment has been constructed of materials consider to be the best obtainable for the purpose, and has been carefully inspected and adjusted with accurate test equipment at the factory. Very little trouble will be experienced. However, should trouble arise competent personnel is a valuable asset. A new operator should endeavor to become familiar with the circuit functions and the mechanical layout as rapidly as possible.

2. PERIODIC INSPECTION.

a. ATTENUATORS. - It is necessary that the attenuators be cleaned occasionally to avoid the possibility of noisy operation. The following procedure will serve as a guide in cleaning an attenuator.

(1) Loosen the knurled nut which secures the dust cover.

(2) Remove dust cover.

(3) Using a piece of cheesecloth saturated with carbon-tetrachloride, carefully wipe each contact and the contact arm.

(4) Apply a very thin film of contact lubricant such as Davenoil or an equivalent.

(5) Replace and secure dust cover.

b. KEY SWITCHES. - Like the attenuators, the key switches should be cleaned occasionally. The contacts should be cleaned by using a burnisher designed specifically for telephone work. Be very careful not to bend any of the leaf springs, as these switches are difficult to readjust properly.

c. WIRING. - The wiring may need occasional attention; check the solder joints and connector strips and be sure the screws are tight on the lugs.

d. REPLACEMENT OF METER LAMPS. - The lamps in the volume level indicator meters may be easily replaced and are accessible from the front. The front section of the bakelite case may be removed by taking out the two screws just below the meter face. A description of the correct replacement lamp may be found in the parts list, section six of this instruction book.

3. TUBE REPLACEMENT.

a. PRECAUTION FOR SATISFACTORY TUBE LIFE.

(1) Before any tube is removed from its socket, make certain the power switch is in the OFF position.

(2) Operate all of the tubes within 5% of the rated voltages.

(3) Do not exceed rated plate current of any of the tubes during normal operation of the equipment.

b. TUBE REPLACEMENT PRECAUTIONS.

(1) All tubes are removed by pulling straight out of the sockets.

(2) Before a tube is replaced, make certain that the type of tube is correct for the socket into which it is being placed.

(3) When replacing the tubes, properly orient the tube pins with respect to the socket and push into place.

c. REPLACEMENT OF TUBES. - Before a tube is discarded, make certain that the tube is at fault and that the trouble is not a loose or broken connection in the equipment. When a tube is known to be defective it should be disposed of immediately so that the tube will not become mixed with good tubes from general stock. Discard all tubes with open heaters, shorted or noisy elements, low emission or any other defect which would cause faulty operation of the equipment. If the tubes in the equipment have been continually in use for a year, replace all the tubes. A marked improvement in performance of the equipment is usually noticeable after the weak tubes have been replaced. The tubes furnished with this equipment have been carefully checked at the factory for low noise level and uniform characteristics. If replacements are made it is advisable to check the new tubes for correct characteristics.

4. FUSE REPLACEMENT.

The type 409U power supply has a fuse F501 mounted in an extractor post fuse holder. The correct replacement fuse is 5 amp, 250 volt type 3AG.

5. TROUBLE SHOOTING.

a. GENERAL. - The electrical design and mechanical layout of the Type 212B equipment is such that the location and repair of trouble which may develop is greatly simplified. The entire unit may be tilted, while in operation, making all components and wiring on the underside of the chassis accessible. Although persons familiar with audio equipment would have no trouble in locating faults when trouble appears, a complete discussion of faults, and the manner of testing for them is given in the following paragraphs. In case of failure or

improper operation of the console, an attempt should be made to localize the fault. In many cases the defect will result in abnormal plate current or voltage measurements, and these readings may give a clue to the source of trouble. By means of systematic checking, the trouble can be narrowed down to a single stage, after which inspection and localized checking with test instruments can be used to isolate the fault.

b. VOLTAGE AND RESISTANCE MEASUREMENTS. - The following tables give the voltages measured at all important points in the circuit during normal operation. All d-c voltages are measured between ground and the point indicated using the highest readable range on a 20,000 ohm-per-volt meter. The negative terminal of the meter is connected to ground. All readings are for a line voltage of 115 volts a-c. Proportionate corrections must be introduced for other values of line voltage. Resistance measurements are given between the socket terminal and ground with the tubes in sockets and power switch in the OFF position.

Tube	Terminal No.	Voltage	Resistance to Ground
6Q-1 PREAMPLIFIER			
V101 (6AQ6)	1		6000
	2	.75	1800
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		0
	6		0
	7	80	100,000
V102 (6C4)	1	60	24,000
	2		
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		
	6		220,000
	7	.65	1800
V103 (6AQ6)	1		6000
	2	.75	1800
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		0
	6		0
	7	80	100,000

Tube	Terminal No.	Voltage	Resistance to Ground
V104 (6C4)	1	60	24,000
	2		
	3	6.3 v ac	
	4	6.3 v ac	
	5		
	6		220,000
	7	.65	150
6N-1 PROGRAM AMPLIFIER			
V201 (6AQ6)	1		0 (Gain control - Off)
	2	1.1	1000
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		0
	6		0
	7	95	220,000
V202 (6AQ6)	1		0 (Gain control - Off)
	2	1.1	1000
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		0
	6		0
	7	95	220,000
V203 (6C4)	1	77	100,000
	2		
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		100,000
	6		
	7	2.4	500
V204 (6C4)	1	77	100,000
	2		
	3	6.3 v ac	.1
	4	6.3 v ac	.1
	5		100,000
	6		
	7	2.4	500

Tube	Terminal No.	Voltage	Resistance to Ground
V205 (1621)	1		0
	2	6.3 v ac	.1
	3	270	24,000
	4	270	24,000
	5		150,000
	6		
	7	6.3 v ac	.1
	8	26	750
V206 (1621)	1		0
	2	6.3 v ac	.1
	3	270	24,000
	4	270	24,000
	5		50,000
	6		
	7	6.3 v ac	.1
	8	26	750

6V-1 MONITOR AMPLIFIER

V301 (6EN7)	1		0 (Gain Control - Off)
	2	55	170,000
	3	2.3	1,000
	4		0 (Gain Control - Off)
	5	55	170,000
	6	2.3	1000
	7	6.3 v ac	.1
	8	6.3 v ac	.1
V302 (6SL7)	1		170,000
	2	150	100,000
	3	1.2	850
	4		170,000
	5	150	100,000
	6	1.2	850
	7	6.3 v ac	.1
	8	6.3 v ac	.1

Tube	Terminal No.	Voltage	Resistance to Ground
V303	1		0
(6L6G)	2	6.3 v ac	.1
	3	290	22,000
	4	295	22,000
	5		220,000
	6		470
	7	6.3 v ac	.1
	8	20	150
V304	1		0
(6L6G)	2	6.3 v ac	.1
	3	290	22,000
	4	295	22,000
	5		220,000
	6		470
	7		.1
	8	20	150

NOTE: Filament voltages measured at the tube socket are normally within 5% of the rated voltages for the tube. Voltages differing greatly from this value constitute an abnormal condition and should be investigated.

(1) NO VOLTAGE ON TUBES. - If the tube filaments do not light after installation is completed according to Section III of this book, check first to be sure that power from the 115 volt a-c line is actually being supplied to terminals No. 51 and 52 of the Type 274D relay control unit. If so, check to see if the filaments of the 5R4 rectifier tubes in the Type 409U power supply are lighted. If not, the trouble is due to an open connection in the primary circuit of the power transformer. This may be caused by a broken connection in the interconnecting cable, poorly soldered connections at the terminal strips on the 274D or 409U, or defective power switch.

(2) NO PLATE VOLTAGE IN THE 212B CONSOLE. - If no plate voltage is found on any tubes in the 212B measure the voltage between terminals No. 48 and 50 of connector strip E801. If no voltage is found here, check for voltage across the terminals marked B- and +325 on the 409U power supply. Voltage here indicates an open connection in the interconnecting cable or defective contacts on the power supply changeover relay in the Type 274D relay control unit. Lack of voltage at this point indicates a defective 5R4 rectifier tube, open circuited filter choke, shorted filter condenser, defective high voltage winding on the power transformer or a poorly soldered connection.

(3) NO PLATE VOLTAGE ON ONE TUBE ONLY. - Lack of plate voltage on one tube only will be caused by an open circuited resistor or transformer, by an open circuited decoupling resistor, or by a short circuited plate decoupling condenser. Lack of plate voltage at only one of a pair of push-pull tubes indicates that one half of the output transformer primary is open, or that there is a poor connection to the tube or socket or in associated wiring. A continuity test can be used to locate the fault.

(4) INCORRECT VOLTAGES. - Check first to be sure the line voltage is actually correct. Low plate voltages throughout the circuit can be caused by a defective rectifier tube, by partially shorted filter condensers, or by grounded condensers or resistors in the plate supply circuit to any of the tubes. If it is suspected that the trouble is in the 212B the following test may be made.

(a) Check the voltage between terminals No. 48 and No. 50 of connector strip E801 with the 212B console in operation. This voltage should be approximately 325 volts. Now remove the wire from terminal No. 48 and measure the voltage between it and terminal No. 50. The voltage should rise to approximately 440 volts. If it does, the Type 409U power supply is operating correctly and the fault lies in the 212B console. The resistance between terminals No. 48 and 50 on 212B console connector strip, E801, should be very high. If the resistance is below 20,000 ohms, with the tubes cold, there is leakage in wiring or filter condensers which may account for the low voltage reading throughout the equipment. The leakage may be located by continuity testing.

c. DISTORTED AUDIO FREQUENCY RESPONSE. - If all operating voltages are correct, but the audio frequency response is unsatisfactory the following suggestions may serve as a guide in locating the trouble.

(1) Determine first if the poor response is the same from all microphones and transcription inputs. If so, the fault lies in either mixer or program amplifier channel.

(2) Before undertaking to locate the trouble in the 212B be very certain that the trouble is not actually due to the characteristics of the microphone or pickup units used. If possible, a variable frequency audio oscillator should be fed into one of the input circuits and a frequency response curve taken. This will indicate whether or not the fault lies in the 212B. The following input levels should be used in making frequency runs.

Input to	Level
Microphone Channel	-54 db balanced to ground
Transcription Input	-54 db, one terminal grounded
Remote Line Input	0 db, balanced to ground

NOTE

It is important to use an oscillator with a balanced output when making frequency runs on microphone channels. If this precaution is not observed, half the input transformer primary will be shorted out, resulting in excessive hum and improper indication of the normal frequency response.

(3) If a poor response is obtained under all conditions in the above paragraph, the output of the oscillator should be fed into the input of the program amplifier, which is thought to be at fault and the frequency response measured. If the response is still poor, connect the oscillator to the grids of the input stage and re-run the curve. If the results are still discouraging the oscillator may be fed into the second stage. A poor response at this point indicates that the fault lies in one of the last two stages.

(4) If it is found that there is distortion in the 6V-1 monitor amplifier and none in the program amplifiers, the same procedure may be followed step-by-step to locate the fault.

(5) Once the fault has been localized, it will be necessary to find the exact point of defect by a careful check of circuit components and wiring. Since practically all parts of the system have some bearing on the performance, it is not practicable to give a detailed cause and effect table. Service work of this nature should only be undertaken by a competent engineer.

d. NOISE. - Any noise present in the 212B can be classified under one of the following headings: (1) Microphonics, (2) Hum, (3) Hiss or (4) Intermittent noises other than the three listed above. Of these, the first three are present in some degree in any amplifying system. Their magnitude depends on circuit design. In the Collins 212B these undesirable effects have been reduced to a negligible value, even at full gain. The following paragraphs present some of the probable causes for the different types of noises.

(1) Microphonics are caused by vibration of circuit components, especially tubes. Vibrations in the tubes have been satisfactorily eliminated by mounting each unit chassis on shear type rubber shockmounts. The other circuit components have been firmly mounted on a strong chassis made from heavy gauge sheet metal. Should microphonics be encountered in the 212B, the trouble will usually be found in the tubes and can be eliminated easily by replacing the troublesome tube or tubes.

(2) Hum can be caused by induction, by defective tubes, by improper grounding, by incomplete shielding of the input leads, or by a defective power supply.

(3) Hiss can also be caused by defective tubes as well as by an open circuit in a low level stage. In either case, it is not likely that a signal will pass through the defective stage, and this point should be checked first. The defective stage can be located most easily by progressively checking the output of each stage.

(4) Intermittent noises are usually caused by faulty connections either in circuit wiring or any circuit component. A good procedure to follow in locating such trouble is to listen to the noise in headphones while removing first the input signal to the amplifier, then the tubes in the input stage, then the tubes in each stage until the noise stops. It is quite likely that the noise is associated with the apparatus or wiring connected with the last tubes or connector removed. The associated apparatus or wiring should be checked closely and, if necessary, parts thought to be defective should be replaced by others known to be in good working order.

Should the Type 212B console develop difficulties which cannot be handled in the field, the factory should be notified. However, it is difficult to suggest possible solutions unless complete information is given as to symptoms and behavior of the equipment.

e. REPLACEMENT PARTS. - The detailed tabular parts list which follows in the next section of this instruction book will aid in the choice of correct replacement parts.

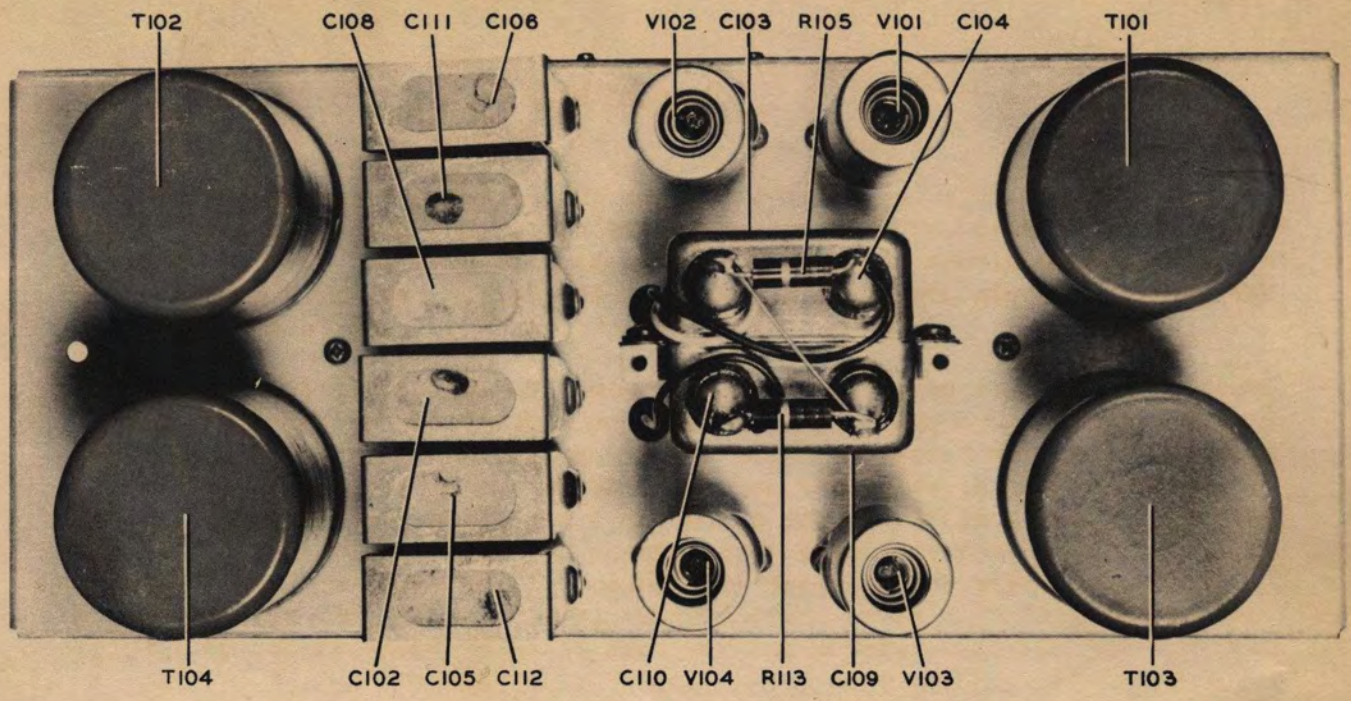


Figure 5-1 Type 6Q-1 Pre-amplifier, Parts Arrangement - Top

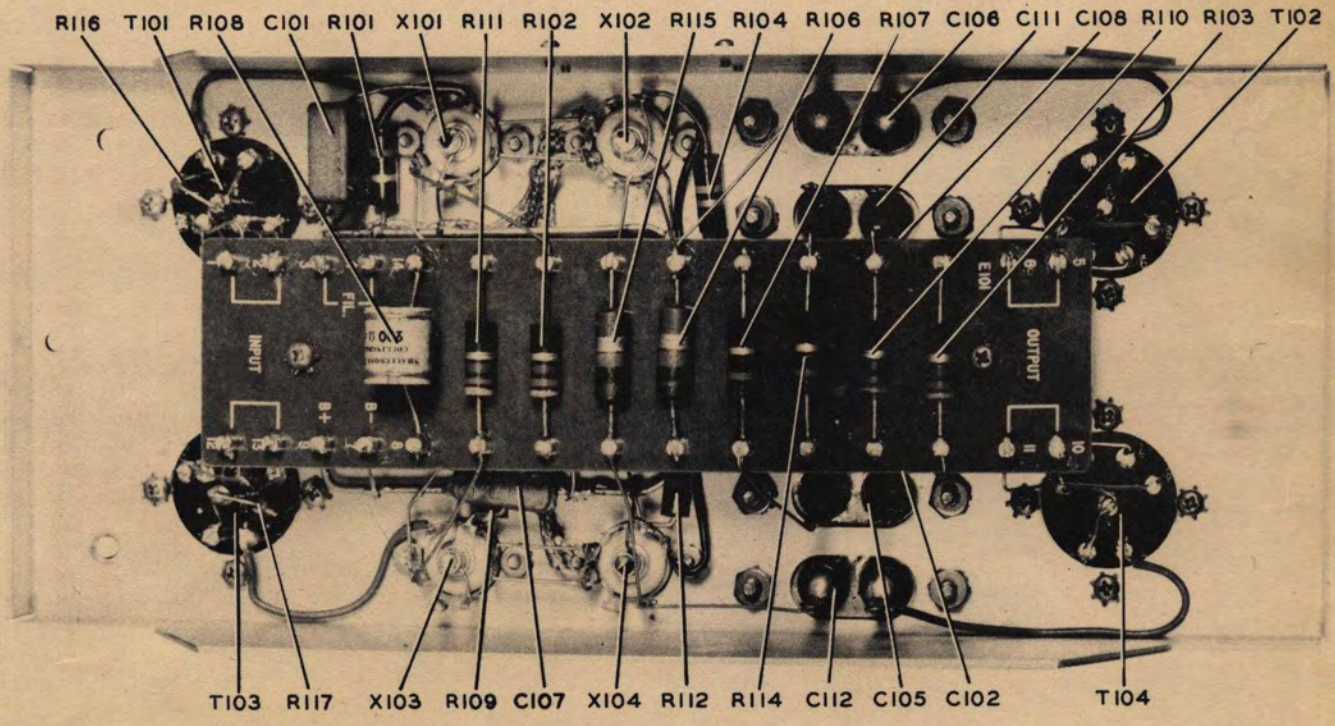


Figure 5-2 Type 6Q-1 Pre-amplifier, Parts Arrangement - Bottom

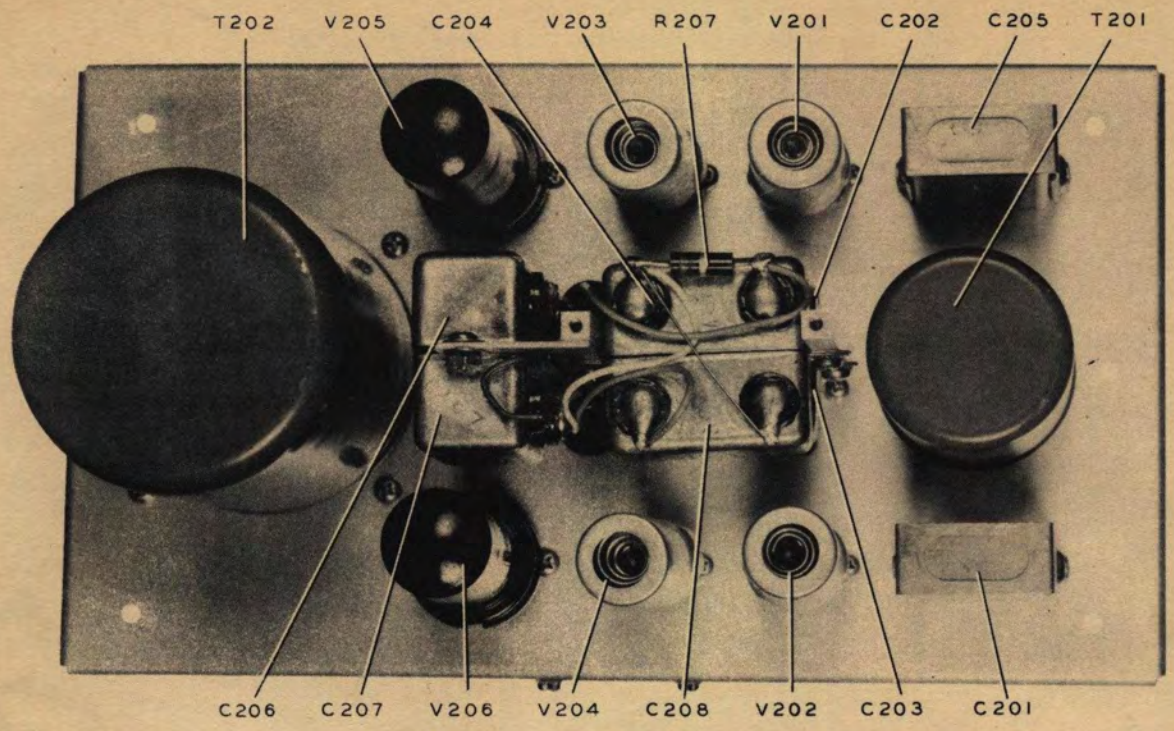


Figure 5-3 Type 6N-1 Program Line Amplifier, Parts Arrangement - Top

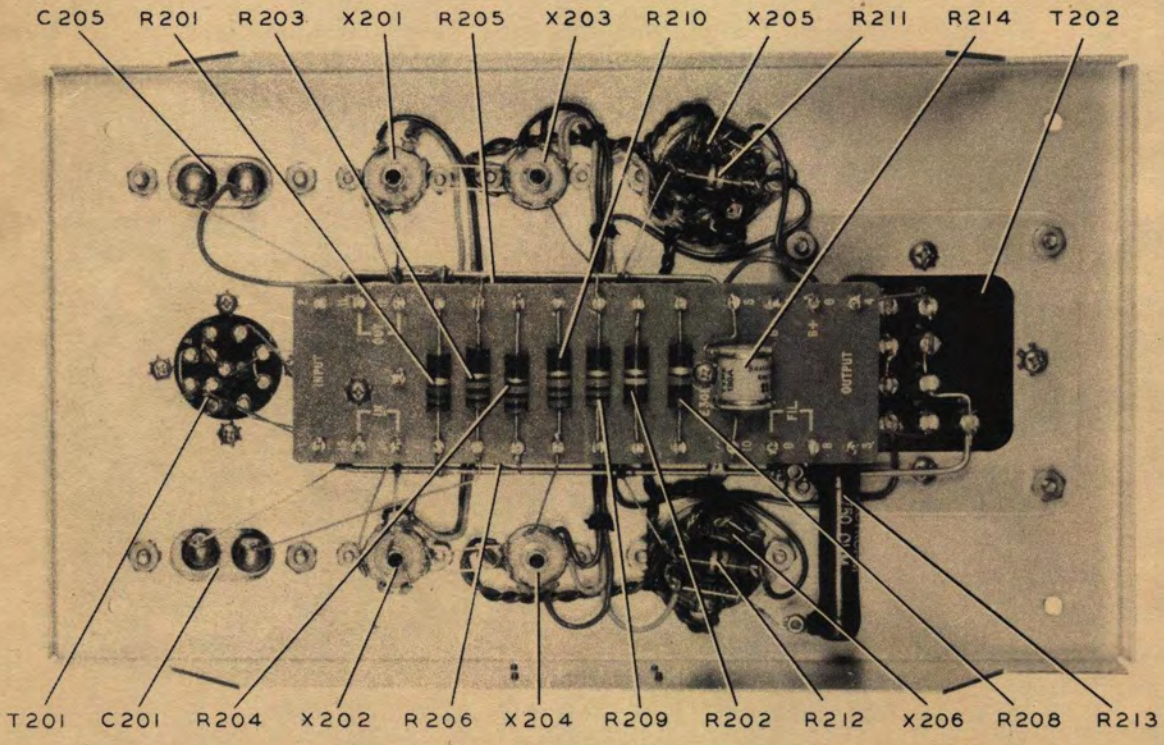


Figure 5-4 Type 6N-1 Program Line Amplifier, Parts Arrangement - Bottom

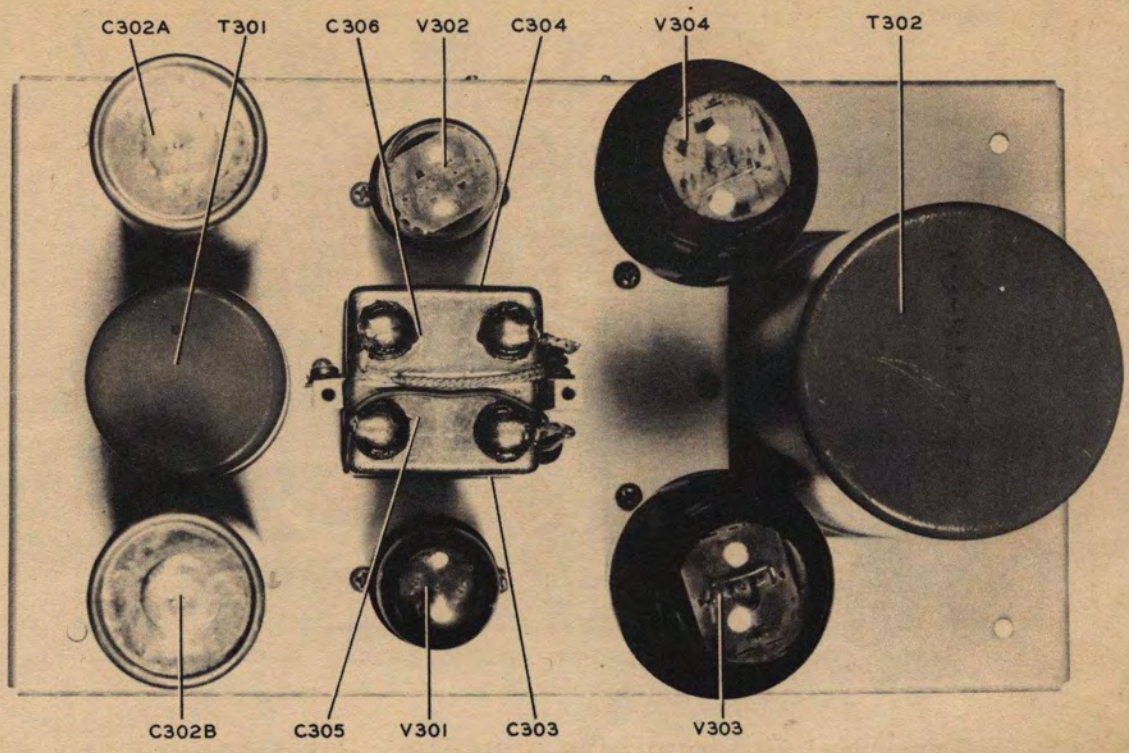


Figure 5-5 Type 6V-1 Monitor Amplifier, Parts Arrangement - Top

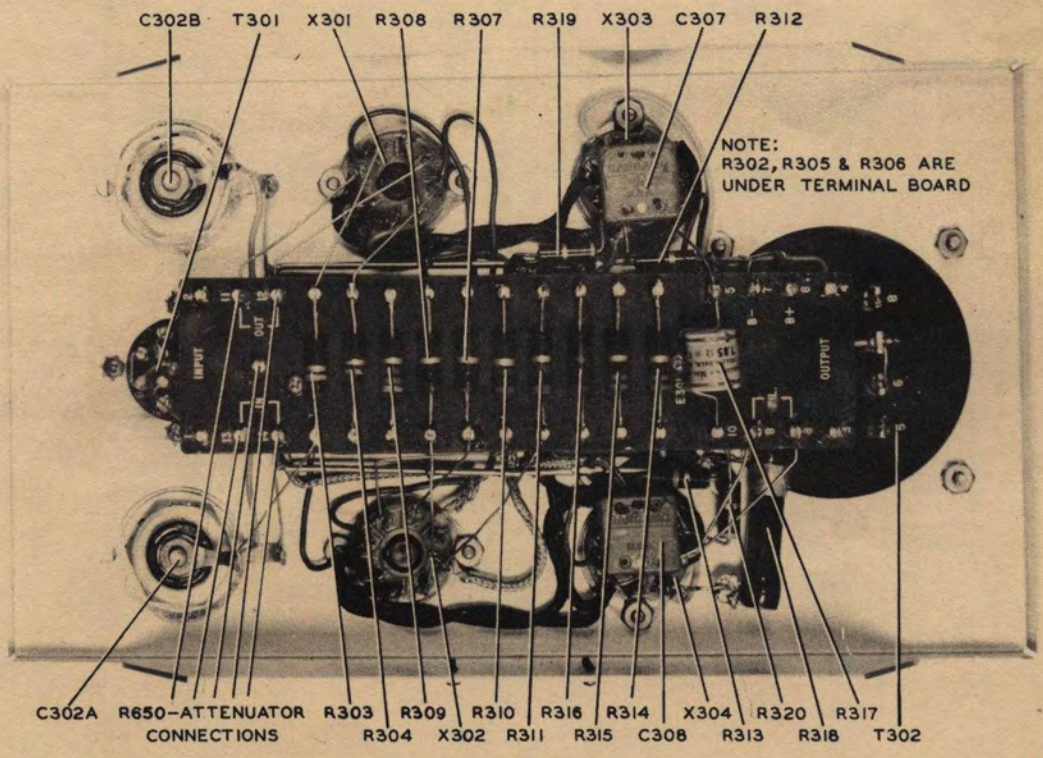


Figure 5-6 Type 6V-1 Monitor Amplifier, Parts Arrangement - Bottom

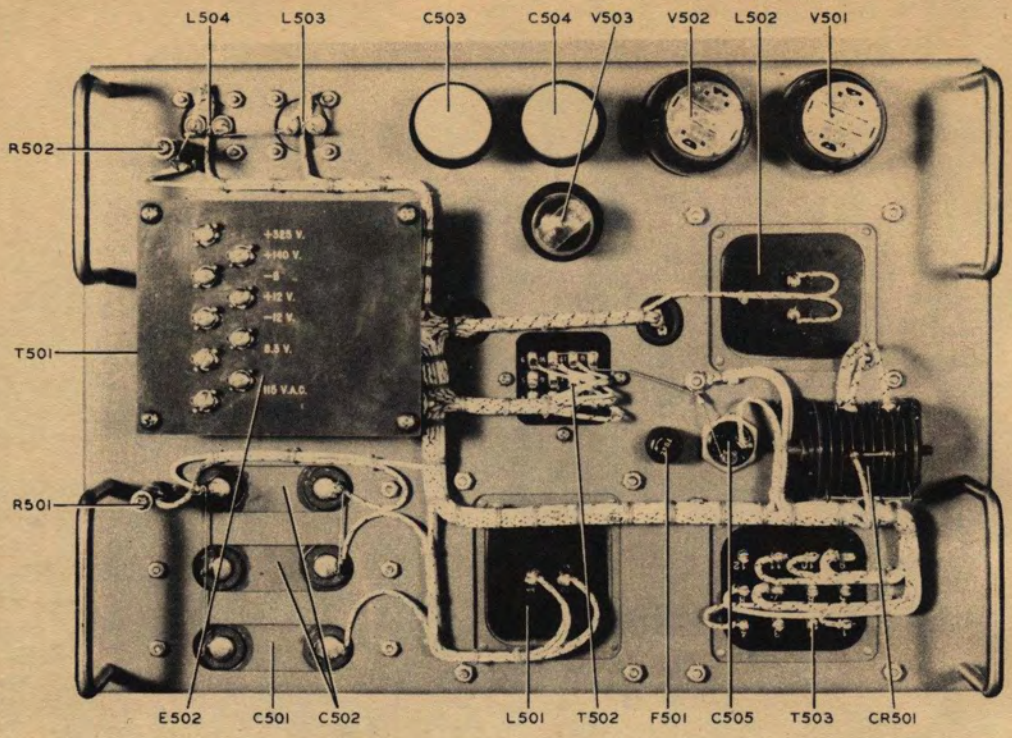


Figure 5-7 Type 409U Power Supply Parts Arrangement

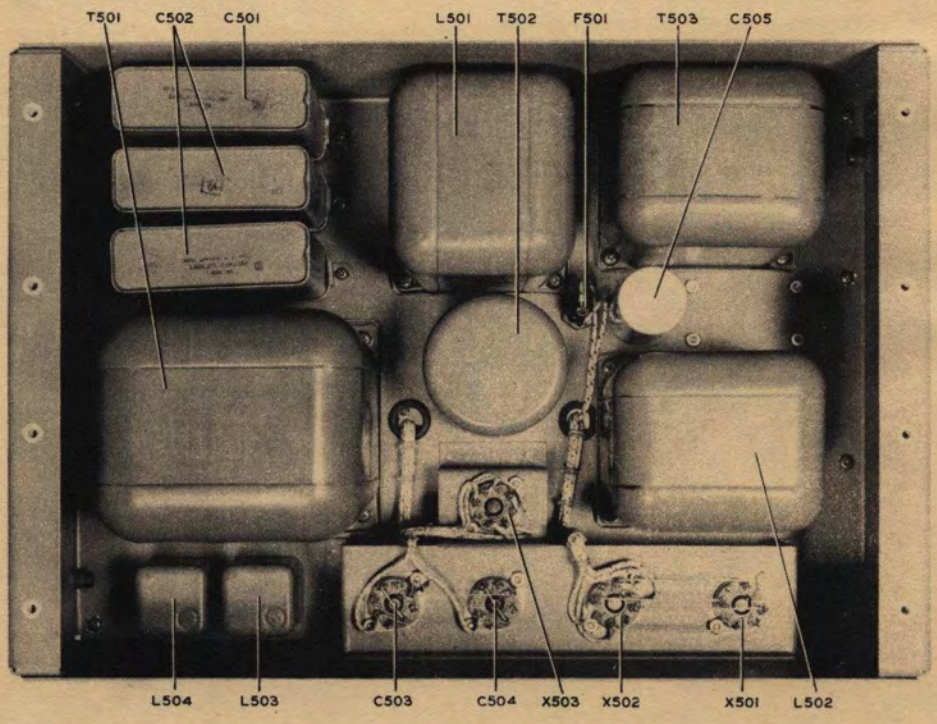


Figure 5-8 Type 409U Power Supply Parts Arrangement

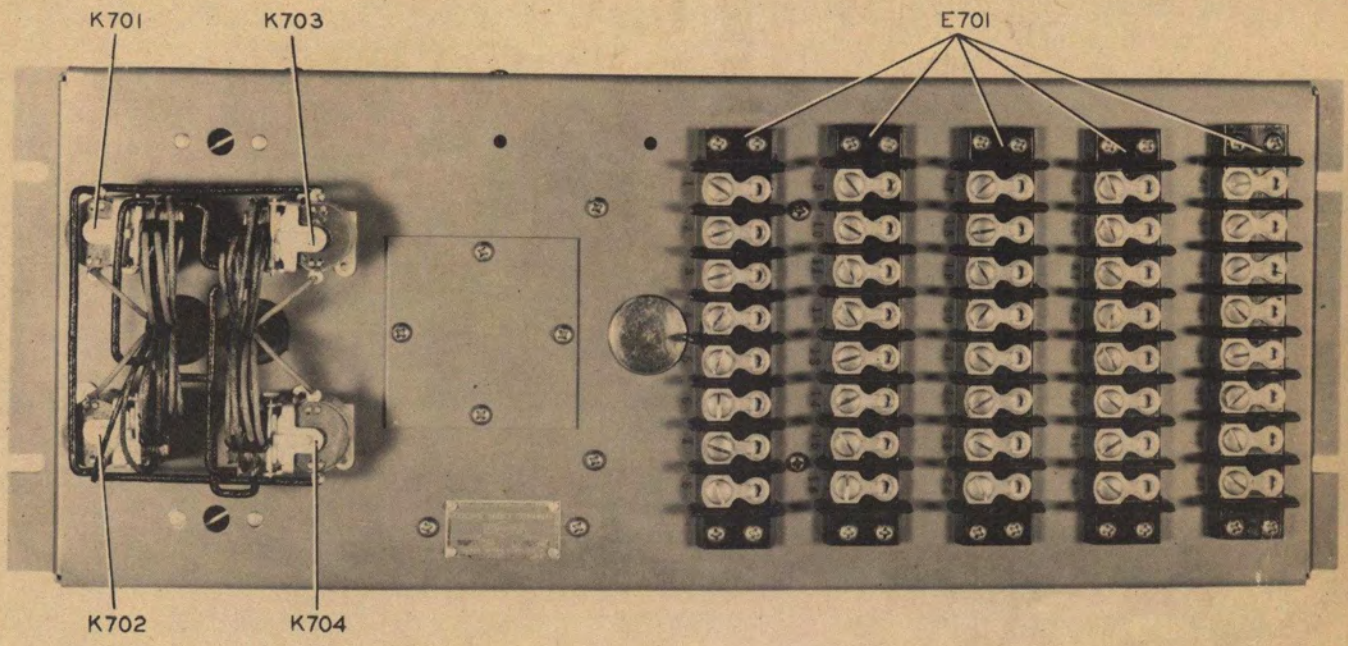


Figure 5-9 Type 274D Relay Control Unit, Parts Arrangement

SECTION VI

PARTS LIST

1. INTRODUCTION.

Component parts of the equipment are identified by means of symbol designations. Wherever it is required to reference a component, the same symbol designation is used. Thus, a part appearing on a simplified schematic, a complete circuit diagram, a wiring diagram, photograph or layout drawing, will always be identified by means of the same symbol designation. These symbol designations identify the various component parts which appear in the following parts lists.

Only one Symbol Designation is assigned to cover component parts with multiple electrical or mechanical characteristics. However, since at times it is desirable to identify certain electrical or mechanical sections of these component parts, suffix letters are added when necessary. Thus, C121A, C121B, and C121C identify each section of triple capacitor C121.

The alphabetical portion of symbol designations have been selected from the following list in accordance with the classification of the component part concerned.

(A) Structual parts, panels, frames, castings, etc.

(B) Motors and other prime movers, self-synchronous motors, etc.

(C) Capacitors of all types.

(CR) Dry disc rectifiers.

(D) Dynamotors.

(E) Miscellaneous electrical parts: Insulators, knobs, brushes, etc.

(F) Fuses.

(G) Generators, exciters, etc.

(H) Hardware, screws, bolts, studs, pins, snapslides, etc.

(I) Indicating devices (except meters and thermometers), pilot lamps, etc.

(J) Jacks and receptacles (stationary).

(K) Contactors, relays, circuit breakers, etc.

(L) Inductors, RF and AF.

(M) Meters of all types, gauges, thermometers, etc.

(N) Name plates, dials, charts, etc.

(O) Mechanical parts, bearings, shafts, couplings, gears, ferrules, flexible shafts, housings, etc.

(P) Plugs.

(Q) Diaphragms, (microphone, telephone, projector, etc.)

(R) Resistors, fixed and variable, potentiometers, etc.

(S) Switches, interlocks, thermostats.

(T) Transformers, RF, AF and power.

(U) Hydraulic parts.

(V) Vacuum and gaseous discharge tubes.

(W) Wires, interconnecting cables, without plugs.

(X) Sockets.

(Y) Mechanical oscillators, crystals, magnetestriction tubes, etc.

(Z) Filters, IF transformers, compound tuned circuit assemblies, etc., in a common container.

The numerical portion of the symbol designation has been assigned to identify the component part with a particular major unit assembly. The numerical portion of symbol designations begin with 101 for the first component part in each class (i.e., component part in each alphabetical class as described above) and run consecutively for the remaining component parts in a particular class. A different numerical series of numbers is used for each major unit of the equipment. The series 101 to 199 is reserved for the first major unit. The series 201 to 299 is reserved for the second major unit. The series 301 to 399 is reserved for the third major unit. In this manner, each major unit of the entire equipment is identified with a series of numerals to be used for the designation of component parts.

PARTS LIST

The List of Major Units, below, gives a complete list of symbol designation numbers in correlation with the major units.

Symbol Group	Collins Type No.	Collins Part No.	Name of Unit
101-199	6Q-1	520 2990 00	Pre-amplifier Assembly
201-299	6N-1	520 2996 00	Program Amplifier
301-399	6V-1	520 3003 00	Monitor Amplifier
501-599	409U	520 3019 00	Power Supply Unit
701-799	274D	520 3018 00	Relay Control Unit
801-899	212B-1	520 2920 00	Console Unit

TYPE 6Q-1 PRE-AMPLIFIER ASSEMBLY 520 2999 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C101	Input amplifier, V101 cathode by-pass for 50 ohm impedance inputs	CAPACITOR: Fixed; mica dielectric; .0047 ±20%; 500 WV; 1/4" x 3/4" x 3/4" rectangular low-loss molded bakelite case; axial wire leads 1-1/4" long.	9110	1R	935 2104 00
	Input amplifier, V101 cathode by-pass for 250 ohms impedance inputs	CAPACITOR: Fixed; mica dielectric; 2200 mmf ±20%; 500 WV; 1/4" x 3/4" x 3/4" rectangular low-loss molded bakelite case; axial wire leads 1-1/4" long.	9110	1R	935 2090 00
C102	Input amplifier, V101 plate decoupling.	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; hermetically sealed metal case; 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg; solder lug terminals.	44620	OM- 1	930 0022 00
C103	Audio coupling capacitor	CAPACITOR: Fixed; paper dielectric; .25 mf +40% -15%; 600 WV; rectangular sealed metal case; 3/4" x 1" x 2-1/2" excluding mtg lugs & terminals; two mtg lugs each having a .187" hole on 2-1/2" mtg/c; solder lug connectors on side of case.	9110 44620		961 4023 00
C104	Output amplifier, V102, cathode by-pass	CAPACITOR: Fixed; electrolytic; 50 mf +150% -10%; 25 WV; sealed metal case; 15/16" x 1" x 1-13/16"; two mtg ears each having 3/16" hole on 2-1/8" mtg/c; solder lug connectors on side of case.	9110 30300 42100		184 6502 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT.NO.	COLLINS PART NUMBER
C105	Output amplifier, V102, plate decoupling	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; hermetically sealed metal case; 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg; solder lug terminals.	44620	OM-601	930 0022 00
C106	Output amplifier, V102, Plate blocking	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; hermetically sealed metal case; 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg; solder lug terminals.	44620	OM-601	930 0022 00
C107	Input amplifier, V103, cathode by-pass	CAPACITOR: Fixed; mica dielectric; .0047 ±20%; 500 WV; 1/4" x 3/4" x 3/4" rectangular low-loss molded bakelite case; axial wire leads 1-1/4" long.	9110	1R	935 2104 00
		CAPACITOR: Fixed; mica dielectric; 2200 mmf ±20% 500 WV; 1/4" x 3/4" x 3/4" rectangular low-loss molded bakelite case; axial wire leads 1-1/4" long.	9110	1R	935 2090 00
C108	Input amplifier, C108, plate decoupling	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; hermetically sealed metal case; 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg; solder lug terminals.	44620	OM-601	930 0022 00

PARTS LIST

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C109	Input-output amplifier coupling	CAPACITOR: Fixed; paper dielectric; .25 mf +40% -15%; 600 WV; rectangular sealed metal case 3/4" x 1" x 2-1/2" excluding mtg lugs & terminals; two mtg lugs each having a .187" hole on 2-1/2" mtg/c; solder lug connectors on side of case.	9110 44620		961 4023 00
C110	Output amplifier cathode	CAPACITOR: Fixed; electrolytic; 50 mf +150% -10%; 25 WV; sealed metal case 15/16" x 1" x 1-13/16"; two mtg ears each having 3/16" hole on 2-1/8" mtg/c; solder lug connectors on side of case.	9110 30300 42100		184 6502 00
C111	Output amplifier plate by-pass	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; hermetically sealed metal case; 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg; solder lug terminals.	44620	OM-601	930 0022 00
C112	Output amplifier, V104, plate blocking	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; hermetically sealed metal case; 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg; solder lug terminals.	44620	OM-601	930 0022 00
E101	Connector strip and resistor mounting board	STRIP: Terminal; 30 terminal; silver plated staked terminals; 1-1/4" x 6-7/8" x 3/32" laminated phenolic.	8300		520 3151 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
E102	Tube shield	SHIELD: Tube; for tall miniature tubes; cadmium plated steel; .915" diam, 1-3/4" high max overall.	25700	27[illegible]B	141 0002 00
R101	Input amplifier, V101, cathode by-pass	RESISTOR: Fixed; composition; 1000 ohms ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3096 00
R102	Input amplifier, V101, plate	RESISTOR: Fixed; composition, 47,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3155 00
R103	Input amplifier, V101, plate	RESISTOR: Fixed; composition, 47,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3155 00
R104	Output amplifier, V102, grid	RESISTOR: Fixed; composition; 220,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3183 00
R105	Output amplifier, V102, cathode	RESISTOR: Fixed; composition; 220 ohms ± 5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3057 00
R106	Output amplifier, V102, plate	RESISTOR: Fixed; composition; 10,000 ohms ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3127 00
R107	Output amplifier, V102, plate	RESISTOR: Fixed; composition; 5600 ohms ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3118 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT.NO.	COLLINS PART NUMBER
R108	Plate metering	RESISTOR; Fixed; wire-wound 57.3 ohm ±1%; 1 watt, non-inductive; ceramic form; 37/64" diam x 9/16" long max overall; solder lug connectors.	23600 41300		721 5736 00
R109	Input amplifier, V103, cathode	RESISTOR: Fixed; composition; 1800 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3096 00
R110	Input amplifier, V103, plate	RESISTOR: Fixed; composition, 47,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3155 00
R111	Input amplifier, V103, plate	RESISTOR: Fixed; composition, 47,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3155 00
R112	Output amplifier, V104, grid	RESISTOR: Fixed; composition; 220,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3183 00
R113	Output amplifier, V104, cathode	RESISTOR: Fixed; composition; 220 ohms ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3057 00
R114	Output amplifier, V104, plate	RESISTOR: Fixed; composition; 5600 ohms ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900		745 3118 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R115	Output amplifier, V104, plate	RESISTOR: Fixed; composition; 10,000 ohms ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3127 00
R116		RESISTOR: Fixed; composition; 150,000 ohms ±10%; 1/2 watt; .249" diam, .468" long axial wire leads; 1.625" long.	900 23600		745 1177 00
R117		RESISTOR: Fixed; composition; 150,000 ohms ±10%; 1/2 watt; .249" diam, .468" long axial wire leads; 1.625" long.	900 23600		745 1177 00
T101	Input coupling transformer	TRANSFORMER: High fidelity audio; Pri: 50 or 250 ohm; each C T; Sec; 50,000 ohm, 1000 TV insulation; ±0.5 db 30-15,000 cps; sealed metal case 1-15/16" diam x 2-1/2" overall, excluding terminals; four 4-40 thd mtg inserts on 1-5/16" diam; solder post connectors.	44500	T-49975	677 0318 00
T102	Pre-amplifier output transformer	TRANSFORMER: High fidelity audio; Pri: 15,000 ohm; Sec: 600 ohm CT; 500 TV insulation; freq response ±0.5 db 30-15,000 cps; sealed metal case 1-13/16" diam x 2-1/2" long excluding terminals; four 4-40 thd mtg inserts on 1-5/16" diam; solder post connectors.	44500	T-50071A	677 0109 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
T103	Input, coupling transformer	TRANSFORMER: High fidelity audio; Pri: 50 or 250 or 600 ohm; each CT; Sec: 50,000 ohm, 1000 TV insulation; ±0.5 db 30-15,000 cps; sealed metal case 1-15/16" diam x 2-1/2" overall, excluding terminals; four 4-40 thd mtg inserts on 1-5/16" diam; solder post connectors.	44500	T-49975	677 0318 00
T104	Pre-amplifier output transformer	TRANSFORMER: High fidelity audio; Pri: 15,000 ohm; Sec: 600 ohm CT; 500 TV insulation; freq response ±0.5 db 30-15,000 cps; sealed metal case 1-13/16" diam x 2-1/2" long excluding terminals; four 4-40 thd mtg inserts on 1-5/16" diam; solder post connectors.	44500	T-50071A	677 0109 00
V101	Input amplifier	TUBE: 6AQ6 duplex-diode high mu triode.	38110		257 0023 00
V102	Output amplifier	TUBE: 6C4 power triode	38110		257 0036 00
V103	Input amplifier	TUBE: 6AQ6 duplex-diode high mu triode	38110		257 0033 00
V104	Output amplifier	TUBE: 6C4 power triode	38110		257 0036 00
X101	Socket for V101	SOCKET, TUBE: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00

REF.	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
X102	Socket for V102	SOCKET, TUBE: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00
X103	Socket for V103	SOCKET, TUBE: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00
X104	Socket for V104	SOCKET, TUBE: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C201	Input amplifier plate decoupling	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; sealed metal case; 41/64" x 1-5/16" x 2-1/4" mounted with external clamp; solder lug terminals.	44620	OM-601	930 0022 00
C202	Input amplifier plate coupling	CAPACITOR: Fixed; paper dielectric; .25 mf +40% -15%; 600 WV; rectangular sealed metal case 3/4" x 1" x 2-1/2" excluding mtg lugs and terminals, two mtg lugs each having a .187" hole on 2-1/2" mtg/c; solder lug connectors on side of case.	9110 44620		961 4023 00
C203	Input amplifier plate coupling	CAPACITOR: Fixed; paper dielectric; .25 mf +40% -15%; 600 WV; rectangular sealed metal case 3/4" x 1" x 2-1/2" excluding mtg lugs and terminals, two mtg lugs each having a .187" hole on 2-1/2" mtg/c; solder lug connectors on side of case.	9110 44620		961 4023 00
C204	Interstage amplifier cathode by-pass	CAPACITOR: Fixed; electrolytic; 20 mf +150% -10%; 150 WV; rectangular sealed metal case 15/16" x 1" x 1-13/16" overall; two mtg ears each with 3/16" mtg hole on 2-1/8" mtg/c; solder lug terminals on side of case.	9110		184 6509 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT.NO.	COLLINS PART NUMBER
C205	Interstage amplifier plate decoupling	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; sealed metal case; 41/64" x 1-5/16" x 2-1/4" mounted with external clamp; solder lug terminals.	44620	OM-601	930 0022 00
C206	Output amplifier grid coupling	CAPACITOR: Fixed; paper dielectric; .5 mf ±10% 600 WV; sealed metal case 7/8" x 1" x 1-3/16"; two mtg lugs, each with 3/16" diam hole on 2-1/8" mtg/c; two solder lug terminals on side of case.	9110 42100 16400	DYR-6050 XDMR-.5 A7178	956 0006 00
C207	Output amplifier grid coupling	CAPACITOR: Fixed; paper dielectric; .5 mf ±10% 600 WV; sealed metal case 7/8" x 1" x 1-3/16"; two mtg lugs, each with 3/16" diam hole on 2-1/8" mtg/c; two solder lug terminals on side of case.	9110 42100 16400	DYR-6050 XDMR-.5 A7178	956 0006 00
C208	Output amplifier cathode by-pass	CAPACITOR: Fixed; paper dielectric; 20 mf +150% -10%; 150 WV; rectangular sealed metal case 15/16" x 1" x 13/16" overall; two mtg ears each with 3/16" mtg hole on 2-1/8" mtg/c; solder lug terminals on side of case.	9110		184 6509 00
E201	Connector strip	STRIP: Terminal;	8300		520 3157 00
E202	Tube shield	SHIELD: TUBE; for tall miniature tubes; cadmium plated steel; .915" diam, 1-3/4" high max overall.	25700	278B	141 0002 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT.NO.	COLLINS PART NUMBER
R201	Input amplifier cathode	RESISTOR: Fixed; composition; 1200 ohm ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3090 00
R202	Input amplifier plate voltage dropping	RESISTOR: Fixed; composition; 150,000 ohm ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3177 00
R203	Input amplifier, V201, plate	RESISTOR: Fixed; composition 68,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3162 00
R204	Input amplifier, V202, plate	RESISTOR: Fixed; composition 68,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3162 00
R205	Interstage amplifier, V203 grid	RESISTOR: Fixed; composition; 150,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3176 00
R206	Interstage amplifier, V204 grid	RESISTOR: Fixed; composition; 150,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3176 00
R207	Interstage amplifier cathode	RESISTOR: Fixed; composition; 560 ohm ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3076 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R208	Interstage amplifier plate voltage dropping	RESISTOR: Fixed; composition; 10,000 ohm ±10%; 1 watt, .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3128 00
R209	Interstage amplifier, V203, plate	RESISTOR: Fixed; composition; 68,000 ohm ±5%; 1 watt, .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3162 00
R210	Interstage amplifier, V204, plate	RESISTOR: Fixed; composition; 68,000 ohm ±5%; 1 watt, .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3162 00
R211	Output amplifier, V205, grid	RESISTOR: Fixed; composition; 150,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3176 00
R212	Output amplifier, V206, grid	RESISTOR: Fixed; composition; 150,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3176 00
R213	Output amplifier, cathode	RESISTOR: Fixed; composition; 750 ohm ±10% viterous enameled; 13/32" diam, 1-3/4" long; radial lug connectors.	34500	Brown Devil	710 1750 20
R214	Program amplifier plate metering	RESISTOR: Fixed; wirewound; 13.3 ohm ±1% noninductive wound 3-7/16" x 9/16" max overall excluding leads.	23600 30123 41300		721 3133 60

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
T201	Input amplifier coupling	TRANSFORMER: High fidelity audio; Pri: 20,000 ohm tapped at 600 ohm, CT; Sec: 50,000 ohm CT; 500 rms TV insulation; freq response ± 0.5 db. 30-15,000 cps; sealed metal case 1-13/16" diam x 15/16" excluding terminals; four 4-40 thd mtg inserts spaced 90° on 1-5/16 diam; solder post connectors.	44500	T-50213	677 0107 00
T202	Program amplifier output coupling	TRANSFORMER: High fidelity audio; Pri: 20,000 ohm CT; Sec: 600 ohm CT; 1000 TV insulation; freq response; ±0.5 db 30-15,000 cps; sealed metal case 2-29/32" diam x 3-1/2" long excluding terminals; four 6-32 NC-2 thd mtg inserts spaced 90° on 2-1/8" diam, solder post connectors.	44500	T-50107	677 0113 00
V201	Input amplifier	TUBE: 6AQ6 duplex-diode high mu triode	38110		257 0023 00
V202	Input amplifier	TUBE: 6AQ6 duplex-diode high mu triode	38110		257 0023 00
V203	Interstage amplifier	TUBE: 6C4 power triode	38110		257 0036 00
V204	Interstage amplifier	TUBE: 6C4 power triode	38110		257 0036 00
V205	Output amplifier	TUBE: 1621 power amplifier pentode	38110		257 0039 00
V206	Output amplifier	TUBE: 1621 power amplifier pentode	38110		257 0039 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NO.
X201	Socket for V201	SOCKET: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00
X202	Socket for V202	SOCKET: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00
X203	Socket for V203	SOCKET: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00
X204	Socket for V204	SOCKET: Miniature shielded; ceramic insulation; two 1/8" mtg holes on 7/8" mtg/c; requires 5/8" chassis cutout; .77" x 1-7/16" x 1-3/8" max overall size.	25700	277B	220 1003 00
X205	Socket for V205	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c, round bakelite body 1-3/16" diam x 1/2" h excluding terminals, phosphor bronze; cad. plated contacts.	2000		220 1850 00

PARTS LIST

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
X206	Socket for V206	SOCKET: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c, round bakelite body 1-3/16" diam x 1/2" h excluding terminals, phosphor bronze; cad. plated contacts.	2000		220 1850 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C301	Input amplifier cathode by-pass	CAPACITOR: Fixed; electrolytic; 20 mf +150% -10%; 150 WV; rectangular sealed metal case 15/16" x 1" x 13/16" overall; two mtg ears each with 3/16" mtg hole on 2-1/8" mtg/c; solder lug terminals on side of case.	9110		164 6509 00
C302A	Input amplifier plate decoupling	CAPACITOR: Fixed; paper dielectric; 4 mf ±20%; 600 WV; sealed tubular metal case 1-1/2" diam x 4-1/2" long max overall excluding terminals; solder lug terminals.	44620	OMT-602	930 3400 00
C302B	Input amplifier plate decoupling	CAPACITOR: Fixed; paper dielectric; 4 mf ±20%; 600 WV; sealed tubular metal case 1-1/2" diam x 4-1/2" long max overall excluding terminals; solder lug terminals.	44620	OMT-602	930 3400 00
C303	Input-interstage amplifier coupling	CAPACITOR: Fixed; paper dielectric; .5 mf ±10%; 600 WV; sealed metal case 7/8" x 1" x 1-3/16" diam hole on 2-1/8" mtg/c; two solder lug terminals on side of case.	9110 42100 16400	DYR-6050 XDMR-.5 A7178	956 0006 00
C304	Input-interstage amplifier coupling	CAPACITOR: Fixed; paper dielectric; .5 mf ±10%; 600 WV; sealed metal case 7/8" x 1" x 1-3/16" diam hole on 2-1/8" mtg/c; two solder lug terminals on side of case.	9110 42100 16400	DYR-6050 XDMR-.5 A7178	956 0006 00

PARTS LIST

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C305	Interstage-output amplifier coupling	CAPACITOR: Fixed; paper dielectric; .5 mf ±10%; 600 WV; sealed metal case 7/8" x 1" x 1-3/16" diam hole on 2-1/8"mtg/c; two solder lug terminals on side of case.	9110 42100 16400	DYR-6050 XDMR-.5 A7178	956 0006 00
C306	Interstage-output amplifier coupling	CAPACITOR: Fixed; paper dielectric; .5 mf ±10%; 600 WV; sealed metal case 7/8" x 1" x 1-3/16" diam hole on 2-1/8"mtg/c; two solder lug terminals on side of case.	9110 42100 16400	DYR-6050 XDMR-.5 A7178	956 0006 00
C307	Feedback capacitor	CAPACITOR: Fixed; mica dielectric; 2200 mmf ±2%; 500 WV; rectangular low loss molded bakelite case 9/32" x 53/64" x 53/64"; axial wire leads 1-1/8" long.	9110		935 4123 00
C308	Feedback capacitor	CAPACITOR: Fixed; mica dielectric; 2200 mmf ±2%; 500 WV; rectangular low loss molded bakelite case 9/32" x 53/64" x 53/64"; axial wire leads 1-1/8" long.	9110		935 4123 00
E301	Connector strip and resistor board	BOARD TERMINAL: 35 terminal; silver plated; staked terminals; 1-1/4" x 6-7/8" x 3/32" laminated phenolic.	8300		520 3154 00
R302	Input amplifier cathode	RESISTOR: Fixed; composition; 1000 ohm ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3086 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT.NO.	COLLINS PART NUMBER
R303	Input amplifier plate	RESISTOR: Fixed; composition; 100,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3169 00
R304	Input amplifier plate	RESISTOR: Fixed; composition; 100,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3169 00
R305	Interstage amplifier grid	RESISTOR: Fixed; composition; 180,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3180 00
R306	Interstage amplifier grid	RESISTOR: Fixed; composition; 180,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3180 00
R307	Interstage amplifier cathode	RESISTOR: Fixed; composition; 1000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3085 00
R308	Interstage amplifier cathode	RESISTOR: Fixed; composition; 1000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3085 00
R309	Input amplifier plate voltage dropping	RESISTOR: Fixed; composition; 47,000 ohm ±10%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3156 00
R310	Interstage amplifier plate	RESISTOR: Fixed; composition; 82,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3166 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R311	Interstage amplifier plate	RESISTOR: Fixed; composition; 82,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3166 00
R312	Output amplifier grid	RESISTOR: Fixed; composition; 220,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire lead connectors.	900 23600		745 3183 00
R313	Output amplifier grid	RESISTOR: Fixed; composition; 220,000 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire lead connectors.	900 23600		745 3183 00
R314	Output amplifier feedback	RESISTOR: Fixed; composition; 6800 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3120 00
R315	Output amplifier feedback	RESISTOR: Fixed; composition; 6800 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3120 00
R316	Interstage amplifier plate voltage dropping	RESISTOR: Fixed; composition; 5100 ohm ±5%; 1 watt; .28" diam x .75" long; two axial wire leads 1.625" long.	900 23600		745 3116 00
R317	Monitor amplifier plate metering	RESISTOR: Fixed; wire wound; 4 ohm ±1%; non-inductive wound; 37/64" diam; 9/16" long max overall; radial wire leads.	23600 41300		722 0004 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT.NO.	COLLINS PART NUMBER
R318	Output amplifier cathode	RESISTOR: Fixed; wire wound; 150 ohm ±20%; 10 watt; vitreous enameled; 13/32" diam x 1-3/4" long max overall excluding terminals; radial lug connectors with wire leads.	34500		710 1150 00
R319		RESISTOR: Fixed; composition; 470 ohm ±10%; 1 watt .28" diam x .75" long; axial wire leads 1.625" long.	900 23600		745 3072 00
R320		RESISTOR: Fixed; composition; 470 ohm ±10%; 1 watt .28" diam x .75" long; axial wire leads 1.625" long.	900 23600		745 3072 00
T301	Input coupling transformer	TRANSFORMER: High fidelity audio; Pri: 20,000 ohm tapped at 600 ohm, CT; Sec; 50,000 ohm CT; 500 rms TV insulation; freq response ±0.5 db 30-15,000 cps; sealed metal case 1-13/16"diam x 1-15/16" excluding terminals; four 4-40 thd mtg inserts spaced 90° on 1-5/16" diam; solder post connectors.	44500	T-50213	677 0107 00
T302	Output coupling transformer	TRANSFORMER: High fidelity audio; Pri: 5000 ohm CT; Sec: 600 ohm CT; 1500 TV insulation; freq response ±0.5 db 30-15,000 cps sealed metal case 3" diam x 3-3/4" excluding mtg flange and terminals; 4 - .169" mtg holes on 2.37" x 2.37" mtg/c; solder post terminals.	46320	96045	677 0112 00

PARTS LIST

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
V301		TUBE: 6SN7 twin triode amplifier	38110		255 0033 00
V301A	Interstage amplifier	Section of V301			
V301B	Interstage amplifier	Section of V301			
V302		TUBE: 6SL7 twin triode amplifier	38110		255 0040 00
V302A	Interstage amplifier	Section of V302			
V302B	Interstage amplifier	Section of V302			
V303	Output amplifier	TUBE: 6L6G beam power amplifier	38110		255 0038 00
V304	Output amplifier	TUBE: 6L6G beam power amplifier	38110		255 0038 00
X301	Socket for V301	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c, round bakelite body 1-3/16" diam x 1/2" h excluding terminals, phosphor bronze, cad. plated contacts.	2000		220 0185 00
X302	Socket for V302	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c, round bakelite body 1-3/16" diam x 1/2" h excluding terminals, phosphor bronze, cad. plated contacts.	2000		220 0185 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
X303	Socket for V303	SOCKET, TUBE: Octal;one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c, round bakelite body 1-3/16" diam x 1/2" h excluding terminals, phosphor bronze, cad. plated contacts.	2000		220 0185 00
X304	Socket for V304	SOCKET, TUBE: Octal;one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c, round bakelite body 1-3/16" diam x 1/2" h excluding terminals, phosphor bronze, cad. plated contacts.	2000		220 0185 00

TYPE 409U POWER SUPPLY CHASSIS ASSEMBLY 520 3019 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C501	Plate voltage supply filter	CAPACITOR: Fixed; paper dielectric; 10 mf ±10%; 600 WV; oil impregnated; sealed metal case 1-1/4" x 3-3/4" x 4-5/8" max overall excluding terminals; solder lug terminals.	9110	KGU-3100	930 1120 01
C502	Plate voltage supply filter	CAPACITOR: (two required) fixed; paper dielectric; 10 mf ±10%; 600 WV; oil impregnated; sealed metal case 1-1/4" x 3-3/4" x 4-5/8" max overall excluding terminals; solder lug terminals.	9110	KGU-3100	930 1120 01
C503	Preamplifier plate voltage supply filter	CAPACITOR: Fixed; electrolytic; double section 60 mf and 30 mf -10% +250%; 450 WV metal case 1-3/8" diam x 4-1/4" long excluding connector base; std octal base.	9110		184 9001 00
C504	Preamplifier plate voltage supply filter	CAPACITOR: Fixed; electrolytic; double section 60 mf and 30 mf -10% +250%; 450 WV; metal case 1-3/8" diam x 4-1/4" long excluding connector base; std octal base.	9110		184 9001 00
C505	Relay voltage supply filter	CAPACITOR: Fixed; electrolytic; 1100 mf -10% +250%; max imped at 120 cycles 4.6 ohms; sealed metal case 1-3/8" diam x 3-3/4" long excluding terminals; mtg stud 7/8-16 thd; solder lug terminals.	300 9110		184 2000 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
CR501	Relay voltage	RECTIFIER: Selenium dry disc; output 12 volts at 1.2 amps; four mtg slate on 1.156" x 2-3/16" mtg/c; 1-3/4" x 2-3/16" x 2-1/2" max overall.	16520	B1CLX2	353 2700 00
E501	Holder for F101	HOLDER, FUSE: For 1/4" x 1-1/4" fuse; bakelite with knob for extracting fuse 25/32" diam; 2-3/8" max overall; solder lug connector.	29200	1075	265 2020 00
E502	Terminal board	BOARD, Terminal; 9 8-32 screw type terminals; 4 mtg holes on 3-3/4" x 4-1/2" mtg/c; laminated bakelite board 4-1/4" x 5" x 3/32" max excluding terminals.	8300		503 1398 002
F501	Power line fuse	FUSE: Cartridge; 5 amp; 250 v; type 3 AG; glass enclosed 1/4" diam; 1-1/4" long max overall.	29200	1358	264 4090 00
L501	Input filter choke	REACTOR: Filter; 6.3 hy +50%-15%; .250 amp; 2500 TV; sealed metal case 3-3/4" x 4-1/4" x 4-13/16" max overall excluding terminals; four .187 mtg holes on 3.12" x 3.62" mtg/c; solder lug terminals.	44500	T-50198	678 0125 00
L502	Output filter choke	REACTOR: Filter; 6.3 hy +50% -15%; .250 amp; 2500 TV; sealed metal case 3-3/4" x 4-1/4" x 4-13/16" max overall excluding terminals; four .187 mtg holes on 3.12" x 3.62" mtg/c; solder lug terminals.	44500	T-50198	678 0125 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
L503	Preamplifier plate voltage supply filter	REACTOR: Filter, 15 hy +20%; -0%; 60 ma 1500 TV; sealed metal case 1-1/2" x 1-1/2" x 2-1/8" max overall excluding terminals; four 6-32 NC-2 mtg studs on 1" x 1" mtg/c; solder lug terminals	7800		678 0082 00
L504	Preamplifier plate voltage supply filter	REACTOR: Filter, 15 hy +20%; -0%; 60 ma 1500 TV; sealed metal case 1-1/2" x 1-1/2" x 2-1/8" max overall excluding terminals; four 6-32 NC-2 mtg studs on 1" x 1" mtg/c; solder lug terminals	7800		678 0082 00
R501	Plate voltage supply bleeder	RESISTOR: Fixed; wire wound; 25,000 ohms ±10%; 10 watt; vitreous enameled; 13/32" diam, 1-3/4" long max overall excluding terminals; radial lug connector with wire leads	34500	B-D	710 1254 20
R502	Plate voltage supply bleeder	RESISTOR: Fixed; wire wound; 25,000 ohms ±10%; 10 watt; vitreous enameled; 13/32" diam; 1-3/4" long max overall excluding terminals; radial lug connector with wire leads	34500	B-D	710 1254 20

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NO.
T501	Rectifier plate and filament	TRANSFORMER: Power; Pri: 105, 110, 115, 120 125 v; 50/60 cps, 135 VA; Sec #1: 900 v; CT; .180 A; Sec #2: 5 v; CT 4.0 A; 2500 TV insulation; sealed metal case; 4-9/16" x 5-3/8" x 5-3/4" max overall excluding terminals; four .250"diam mtg holes on 3.75" x 4.56" mtg/c; solder post terminals	44500		672 0121 00
T502	Rectifier plate and filament	TRANSFORMER: Power; Pri: 105,110, 115, 120, 125 volts; 50/60 cps; Sec #1: 6.3 v, 1A; Sec #2: 750 v, CT; .05A; 2700 TV insulation; 2-29/32" diam x 3-1/2" high max overall excluding terminals; four 6-32 NC-2 mtg inserts spaced 90° on 2-1/8" diam	44500	T-50508	672 0151 00
T503	Filament and relay power	TRANSFORMER: Filament; Pri: 105,110,115,120, 125 volts;50/60 cps; 66 VA; Sec #1:7 v,CT, 8A; Sec.#2: 12.6 CT, 1A; 2500 TV insulation; sealed metal case 3-3/4" x 4-5/16" x 4-13/16" max overall excluding terminals; four .187" diam mtg holes on 3.125" x 3.625" mtg/c; solder post terminals	44500	T-50197	672 0120 00
V501	Plate supply voltage rectifier	TUBE: 5R4GY full wave rectifier	38110		254 0099 00
V502	Plate supply voltage rectifier	TUBE: 5R4GY full wave rectifier	38110		254 0099 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
V503	Preamplifier plate supply voltage rectifier	TUBE: 6X5GT, full wave rectifier	36110		255 0037 00
X501	Socket for V501	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c; round bakelite body 1-3/16" diam, 1/2" high excluding terminals; phosphor-bronze; cad plated contacts	2000		220 1850 00
X502	Socket for V502	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c; round bakelite body 1-3/16" diam, 1/2" high excluding terminals; phosphor-bronze; cad plated contacts	2000		220 1850 00
X503	Socket for V503	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c; round bakelite body 1-3/16" diam, 1/2" high excluding terminals; phosphor-bronze; cad plated contacts	2000		220 1850 00
X504	Socket for C503	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c; round bakelite body 1-3/16" diam, 1/2" high excluding terminals; phosphor-bronze; cad plated contacts	2000		220 1850 00

PARTS LIST

[illegible]	[illegible] FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	CLLINS PART NUMBER
X505	Socket for C504	SOCKET, TUBE: Octal; one piece saddle mtg; two .156" diam holes on 1-5/16" mtg/c; round bakelite body 1-3/16" diam, 1/2" high excluding terminals; phosphor-bronze; cad. plated contacts.	2000		220 1850 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NO.
E701	Connector strip	STRIP: Terminal; (five required) 8 terminal, barrier type; lugs for back connection; black phenolic; 1-5/16" x 5-1/2" x 5/8" max overall excluding terminals; four .209 mtg holes on 1/2" x 5-1/16" mtg/c.	8100	142-Y	367 0039 00
E702	Connector strip	STRIP: Terminal; 8 terminal; staked solder post type terminal; 3" x 1-1/4" x 3/32" laminated bakelite strip; 2 mtg holes on 2-1/2" mtg/c	8300		503 0932 002
K701	Speaker control relay No. 1	RELAY: Circuit control; contact arrangement 3C; coil 12 volts dc; coil R_{dc} 87 ohms ±10%; pure silver contacts; phenolic insulation; 1-1/8" x 1-5/8" x 1-3/8" max overall; two mtg holes tapped 4-40 NC-2 on .531" x .843" mtg/c; solder lug terminals	2870	R45	970 1139 00
K702	Speaker control relay No. 2	RELAY: Circuit control; contact arrangement 3C; coil 12 volts dc; coil R_{dc} 87 ohms ±10%; pure silver contacts; phenolic insulation; 1-1/8" x 1-5/8" x 1-3/8" max overall; two mtg. holes tapped 4-40 NC -2 on .531" x .843" mtg./c solder lug terminals	2870	R45	970 0011 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
K703	Speaker control relay No. 3	RELAY: Circuit control; contact arrangement 3C; coil 12 volts dc; coil R_{dc} 87 ohms ±10%; pure silver contacts; phenolic insulation; 1-1/8" x 1-5/8" x 1-3/8" max overall; two mtg holes tapped 4-40 NC-2 on .531" x .843" mtg/c; solder lug terminals	2870	R45	970 1011 00
K704	Speaker control relay No. 4	RELAY: Circuit control; contact arrangement 3C; coil 12 volts dc; coil R_{dc} 87 ohms ±10%; pure silver contacts; phenolic insulation; 1-1/8" x 1-5/8" x 1-3/8" max overall; two mtg holes tapped 4-40 NC-2 on .531" x .843" mtg/c; solder lug terminals	2870	R45	970 011 00
R701	Line terminating	RESISTOR: Fixed; wire wound; 600 ohms; ±10%; 10 watt; vitreous enameled; 3/16" diam; 1-3/4" long; radial lug connectors with wire leads	34500	B-D	710 1600 20
R702	Line terminating	RESISTOR: Fixed; wire wound; 600 ohms; ±10%; 10 watt; vitreous enameled; 3/16" diam; 1-3/4" long; radial lug connectors with wire leads	34500	B-D	710 1600 20

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R703	Line terminating	RESISTOR: Fixed; wire wound; 600 ohms; ±10%; 10 watt; vitreous enameled; 3/16" diam; 1-3/4" long; radial lug connectors with wire leads	34500	B-D	710 1600 20
R704	Line terminating	RESISTOR: Fixed; wire wound; 600 ohms; ±10%; 10 watt; vitreous enameled; 3/16" diam; 1-3/4" long; radial lug connectors with wire leads	34500	B-D	710 1600 20
S101	Power supply circuit breaker	SWITCH: 2 pole normally open; manual starting; thermal overload; two slots for No. 6 mtg screws on 3-9/16" mtg/c. Following heater links may be used.	18880	4983960	260 4540 00
		Link: 3.02 - 3.45 amps	18880	81D81	260 4544 81
		Link: 5.05 - 5.56 amps	18880	81D85	260 4544 85
		Link: 6.48 - 7.00 amps	18880	81D87	260 4544 87
		Link: 7.9 - 8.8 amps	18880	81D89	260 4544 89
S102	Studio control lights circuit breaker	SWITCH: 2 pole normally open; manual starting thermal overload; two slots for No. 6 mtg screws on 3-9/16" mtg/c. The following heater links may be used.	18880	4983960	260 4540 00
		Link: 3.02 - 3.45 amps	18880	81D81	260 4544 81
		Link: 5.05 - 5.56 amps	18880	81D85	260 4544 85
		Link: 6.48 - 7.00 amps	18880	81D87	260 4544 87
		Link: 7.9 - 8.8 amps	18880	81D89	260 4544 89

TYPE 212B SPEECH INPUT CONSOLE 520 2920 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
C801	Transient filter	CAPACITOR: Fixed; paper dielectric; 2 mf +40% -15%; 600 WV; sealed metal case 1-3/16" x 1-3/16" x 2-1/4" max overall excluding terminals; solder lug terminals	44620	OMT-602	930 0023 00
C802	Transient filter	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; sealed metal case 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg solder lug terminals	44620	OM-601	930 0022 00
C803	Transient filter	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; sealed metal case 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg solder lug terminals	44620	OM-601	930 0022 00
C804	Transient filter	CAPACITOR: Fixed; paper dielectric; 1 mf +40% -15%; 600 WV; sealed metal case 41/64" x 1-5/16" x 2-1/4" max overall excluding terminals; external clamp type mtg solder lug terminals	44620	OM-601	930 0022 00
E801	External connector strip	STRIP: Terminal (four required) 14 terminal; 6-32 x 1/4 terminal screws; black bakelite insulation; four mtg holes on 7/16" x 6-9/16" mtg/c; 1/2" x 1-1/8" x 6-7/8" max overall	8100	14-141	367 4140 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NO.	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
E802	Attenuator knob	KNOB: Molded bakelite; black; 2-1/4" diam; 1-7/16" thick max overall; .25" diam shaft; two set screw holes 90 degrees apart; tapped 10-32 NF-2.	8300		502 9138 002
H801	Sub-chassis anti-vibration mounting	SHOCKMOUNT: Shear type; rated load for 1/16" deflection 2 lbs; four .141" mtg holes on 1" mtg/c; .166" mtg hole in center; monel metal plate; 13/32" x 1-1/4" x 1-1/4" max overall;	29300	100P-2	200 2020 00
H802	Console tilting	BEARING: Needle; housing bore .437"; roll size; No. 15, .0655; ID .25; OD .4375; length .4375	44700	B-47	309 6020 00
H803	Rubber bumper	BUMPER: Rubber; black canvassed backed; 3/16" recess for mtg screw 3/4" diam; 7/16" thick max over-all	28500	113	200 5010 00
I801	Meter illumination	BULB: Pilot lamp; 6-8 volts, .150 A; miniature bayonet base; frosted glass bulb	18880		262 3230 00
J801	Program phones	JACK: Phone; two circuit for .25" diam plugs; 9/16" x 27/32" x 3-1/2" max overall; .45" diam sleeve; solder lug terminals	30300	XP2B	360 1010 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
J802	Monitor phones	JACK: Phone; two circuit for .25" diam plugs; 9/16" x 27/32" x 3-1/2" max overall; .45" diam sleeve; solder lug terminals	30300	XP2B	360 1010 00
M801	Volume level indicator	METER: Volume level indicator; -20 to +3 VU; 99% of normal deflection in 0.3 seconds; pointer over swing between 1 and 1.5%; freq error less than 0.2 db up to 10,000 cycles; temperature error less than 0.2 db; illuminated by two 6.3 volt, .15 A lamps, Part No. 262 3230 00	49100	862	456 6000 00
R801	Studio A microphone line 1 attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/ 600 ohms nominal impedance; clock wise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding terminals; solder lug terminals	10900	T-321-G	378 0017 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R802	Studio A microphone line 2 attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/600 ohms nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding terminals; solder lug terminals	10900	T-321-G	378 0017 00
R803	Studio B microphone line attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/600 ohms nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding terminals; solder lug terminals	10900	T-321-G	378 0017 00
R804	Control room microphone attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/600 ohms nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4"	10900	T-321-G	378 0017 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
		diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding terminals; solder lug terminals			
R805	Transcription input 1 attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/600 ohms nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding terminals; solder lug terminals	10900	T-321-G	378 0017 00
R806	Transcription input 2 attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/600 ohms nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall; excluding terminals; solder lug terminals	10900	T-321-G	378 0017 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	PART NUMBER
R807	Remote line attenuator	ATTENUATOR: Variable "Tee" network; 2 db attenuation per step; 20 steps, tapered last 3 steps, last step infinity; 600 ohms/600 ohms nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type T-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding terminals; solder lug terminals	10900	T-321-G	378 0017 00
R808	Studio A microphone line 1 pad	RESISTOR: Fixed composition; 560 ohms ±5%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00
R809	Studio A microphone line 2 pad	RESISTOR: Fixed composition; 560 ohms ±5%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00
R810	Studio B microphone line pad	RESISTOR: Fixed composition; 560 ohms ±5%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00
R811	Control room microphone line pad	RESISTOR: Fixed composition; 560 ohms ±5%, 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R812	Transcription input 1 pad	RESISTOR: Fixed composition; 560 ohms ±5%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00
R813	Transcription input 2 pad	RESISTOR: Fixed composition; 560 ohms ±5%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00
R814	Remote line pad	RESISTOR: Fixed composition; 560 ohms ±5%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3075 00
R815	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00
R816	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00
R817	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00
R818	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00
R819	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R820	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00
R821	Preamplifier output terminating resistor	RESISTOR: Fixed composition; 2700 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3103 00
R822	Preamplifier output	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00
R823	Repeat coil terminating resistor	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00
R824	Repeat coil terminating resistor	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00
R825	Repeat coil terminating resistor	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00
R826	Repeat coil terminating resistor	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R827	Remote line terminating resistor	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00
R828	Remote line terminating resistor	RESISTOR: Fixed composition; 1200 ohms ±10%; 1 watt; .280" diam x .750" long; two axial wire leads	900 23600		745 3090 00
R829	Program amplifier master gain control	ATTENUATOR: Variable; dual attenuator; 2 db attenuation per step; 20 steps; linear characteristic; last step infinity; 100,000 ohms per section nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type DCP-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam x 2-5/32" max overall excluding shaft; solder lug terminals	10900	DCP-320-T	378 0014 00
R830	Program line monitor input equalizing resistor	RESISTOR: Fixed; composition; 8200 ohms ±10%; 1/2 watt; .249" diam; .655" long; axial wire leads	900 23600		745 2125 00
R831	Program line monitor input equalizing resistor	RESISTOR: Fixed composition; 8200 ohms ±10%; 1/2 watt; .249" diam; .655" long; axial wire leads	900 23600		745 2125 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R832	Program line phone jack bridging resistor	RESISTOR: Fixed; composition; 10,000 ohms ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3128 00
R833	Program line phone jack bridging resistor	RESISTOR: Fixed; composition; 10,000 ohms ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3128 00
R834	Monitor line phone jack bridging resistor	RESISTOR: Fixed; composition; 18,000 ohm ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3139 00
R835	Monitor line phone jack bridging resistor	RESISTOR: Fixed; composition; 18,000 ohm ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3139 00
R836	Preamplifier plate voltage metering resistor	RESISTOR: Fixed; composition; 1 megohm ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3212 00
R837	Filament voltage metering resistor	RESISTOR: Fixed; composition; 33,000 ohms ±5%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3148 00
R838	Program line volume level indicator pad	ATTENUATOR: Fixed network; a combination of a 3600 ohm resistor and five 3900/3900 "Tee" networks; accuracy 5%; single .140" diam mtg hole; sealed metal case 1-3/8" diam; 7/8" thick excluding terminals; solder post connectors	10900	1031	379 0001 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R839	Monitor line volume level indicator pad	ATTENUATOR: Fixed network; a combination of a 3600 ohm resistor and five 3900/3900 "Tee" networks; accuracy 5%; single .140" diam mtg holes; sealed metal case 1-3/8" diam; 7/8" thick excluding terminals; solder post connectors	10900	1031	379 0001 00
R840	Monitor amplifier master gain control	ATTENUATOR: Variable dual poteniometer; 2 db per step; 20 steps; linear characteristics; last step infinity; 25,000 ohms per section nominal impedance; clockwise rotation decreases attenuation; contact spacing 15°; frame type DCP-320; 1/4" diam shaft; two mtg holes on 3/4" radius tapped 8-32; 2-3/4" diam, 2-5/32" max overall excluding shaft; solder lug terminals	10900	1031	378 0022 00
R841	Remote line talkback circuit pad	RESISTOR: Fixed composition; 470 ohms ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3072 00
R842	Remote line talkback circuit pad	RESISTOR: Fixed composition; 470 ohms ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3072 00
R843	Equalizing resistor	RESISTOR: Fixed; composition; 1000 ohms ±10%; 1 watt; .280" diam, .750" long; axial wire leads	900 23600		745 3086 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
R844	Equalizing resistor	RESISTOR: Fixed; composition; 1000 ohms ±10%; 1 watt; .280" diam; .750" long; axial wire leads	900 23600		745 3086 00
R845	Equalizing resistor	RESISTOR: Fixed; composition; 1000 ohms ±10%; 1 watt; .280" diam; .750" long; axial wire leads	900 23600		745 3086 00
S801	Monitor input circuit selector	SWITCH: Push button, telephone type; 10 position; contact arrangement each position 2C; black buttons; .998" x 9-1/8" x 3-3/8" max overall excluding buttons; two mtg holes tapped 8-32 NC-2 on 8-3/4" mtg/c; solder lug terminals	8300		503 0287 003
S802	Remote line selector	SWITCH: Push button, telephone type; 10 position; contact arrangement;each position 2C; black buttons; .998" x 9-1/8" x 3-3/8" max overall excluding buttons; two mtg holes tapped 8-32 NC-2 on 8-3/4" mtg/c; solder lug terminals	8300		503 0287 003
S803	Meter circuit selector	SWITCH: Rotary; 6 circuit; non-shorting 12 position; 4 deck with detent, no stops; coin silver rotor blades and spring silver alloy clips; shaft collar mtg tapped 3/8-32 NS-2; 1-17/32" x 1-7/8" x 4-3/8" max overall			259 0023 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
S804	Talkback switch studio A and B	SWITCH: Lever; two position; both positions locking; contact arrangement upper: left 2 C, 1b, right 2 C; lower: left 2 C, 1b; right 2 C; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-7/8" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0020 00
S805	Talkback switch remote	SWITCH: Lever; two positions; both positions locking; contact arrangement upper: left 2 C, 1b; right 2 C; lower: left 2 C, 1b; right 2 C; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-7/8" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0020 00
S806	Program line selector	SWITCH: Lever; two position; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors.	8160		375 0017 00

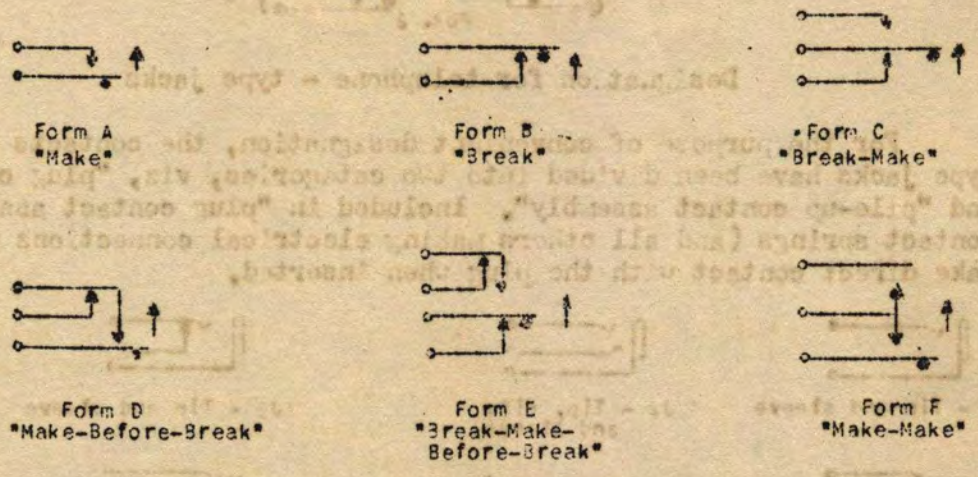
ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
S807	Studio A, line 1 program or audition selector switch	SWITCH: Lever, two position; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0017 00
S808	Studio A, line 2 program or audition selector switch	SWITCH: Lever; two positions; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0017 00
S809	Studio B, program or audition selector switch	SWITCH: Lever; two position; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0017 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR. CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
S810	Control room program or audition selector switch	SWITCH: Lever; two position; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors.	8160		375 0017 00
S811	Transcription unit 1 program or audition selector switch	SWITCH: Lever; two position; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0017 00
S812	Transcription unit 2 program or audition selector switch	SWITCH: Lever; two position; both positions locking; contact arrangement, upper: left 2 C; right 2 d; lower: left 2 C; right 2 d; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-1/2" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	8160		375 0017 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	MFR.CODE NUMBER	MFR. TYPE or CAT. NO.	COLLINS PART NUMBER
S813	Remote line audition or program selector switch	SWITCH: Lever; two position; both positions locking; contact arrangement, upper: left 2 C, 1b; right 2 C; lower: left 2 C, 1b; right 2 C; four 3-48 NC-2 mtg holes on .531" x .8125" mtg/c; 7/8" x 1-7/8" x 4-9/16" max overall; extends 3-1/8" behind panel; solder lug connectors	81607		375 0020 00
T801	Remote line matching transformer	TRANSFORMER: High fidelity audio matching line to line; Pri: 600 ohms; tapped at 150 ohm, ct; Sec: 600 ohm, tapped at 150 ohm ct; freq response ±.4 db 30 - 15,000 cps; phase shift through transformer less than 5 degrees; sealed metal case 1-13/16" diam, 2-1/2" high max overall excluding terminals; four 4-40 th'd mtg inserts on 21/32" radius; solder post terminals	44500	T-50013	677 0108 00

DESIGNATION OF CONTACT ARRANGEMENT FOR SWITCHES, RELAYS AND TELEPHONE-TYPE JACKS USING CONTACT SPRING ASSEMBLIES

Circuit control components such as switches, relays and telephone type jacks of the contact spring assembly (pile up) type used in audio and speech input equipment are manufactured with many different contact arrangements. However, in all cases they may be resolved into combinations of the following six basic forms



To determine the proper contact arrangement designation for switches and relays the following procedure should be followed.

(1) Determine the number of pile-up contact assemblies involved;

(2) Determine the type and quantity of each basic form used to make up each pile-up contact assembly.

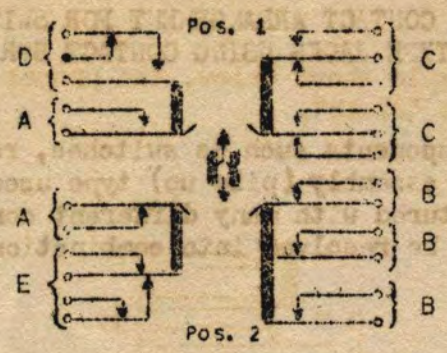
Thus, in the figure below, the two position lever-type switch contains a total of four pile-up contact assemblies; two in position #1 and two in position #2. In position #1, one pile-up contact assembly uses one form A and one form D contact, while the other uses two form C contacts. Similarly in position #2, one assembly uses one form A and one form E contact while the other uses three form B contacts.

The proper designation for the contact arrangement for this switch is therefore:

Position #1 - 1A1D and 2C; Position #2 - 1A1E and 3B

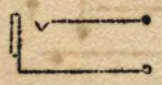
NOTE

The order in which the basic forms are listed is from the heel piece out; or, in the case of two-position switches, from the center out.

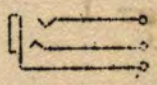


Designation for telephone - type jacks

For the purpose of convenient designation, the contacts on telephone - type jacks have been divided into two categories, viz, "plug contact assembly" and "pile-up contact assembly". Included in "plug contact assembly" are those contact springs (and all others making electrical connections with them) which make direct contact with the plug when inserted.

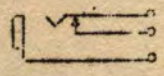


J1 - Tip and sleeve

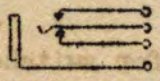


J2 - Tip, Ring and Sleeve

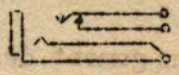
J3 - Tip and Sleeve



J4 - Tip and Sleeve

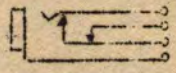


J5 - Tip and Sleeve

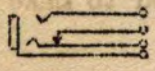


J6 - Tip, Sleeve and extra Sleeve contact

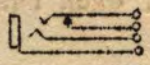
J7 - Tip, Ring and Sleeve



J8 - Tip and Sleeve

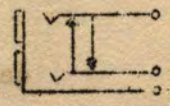


J9 - Tip, Ring and Sleeve

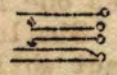


J10 - Tip, Ring and Sleeve

J11 - Tip and Sleeve



J12 - Double Jacks, Tips and Sleeves



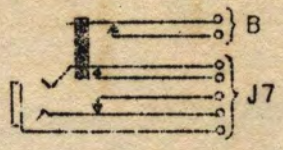
J - Tip and Sleeve, E. .a Sleeve Contact

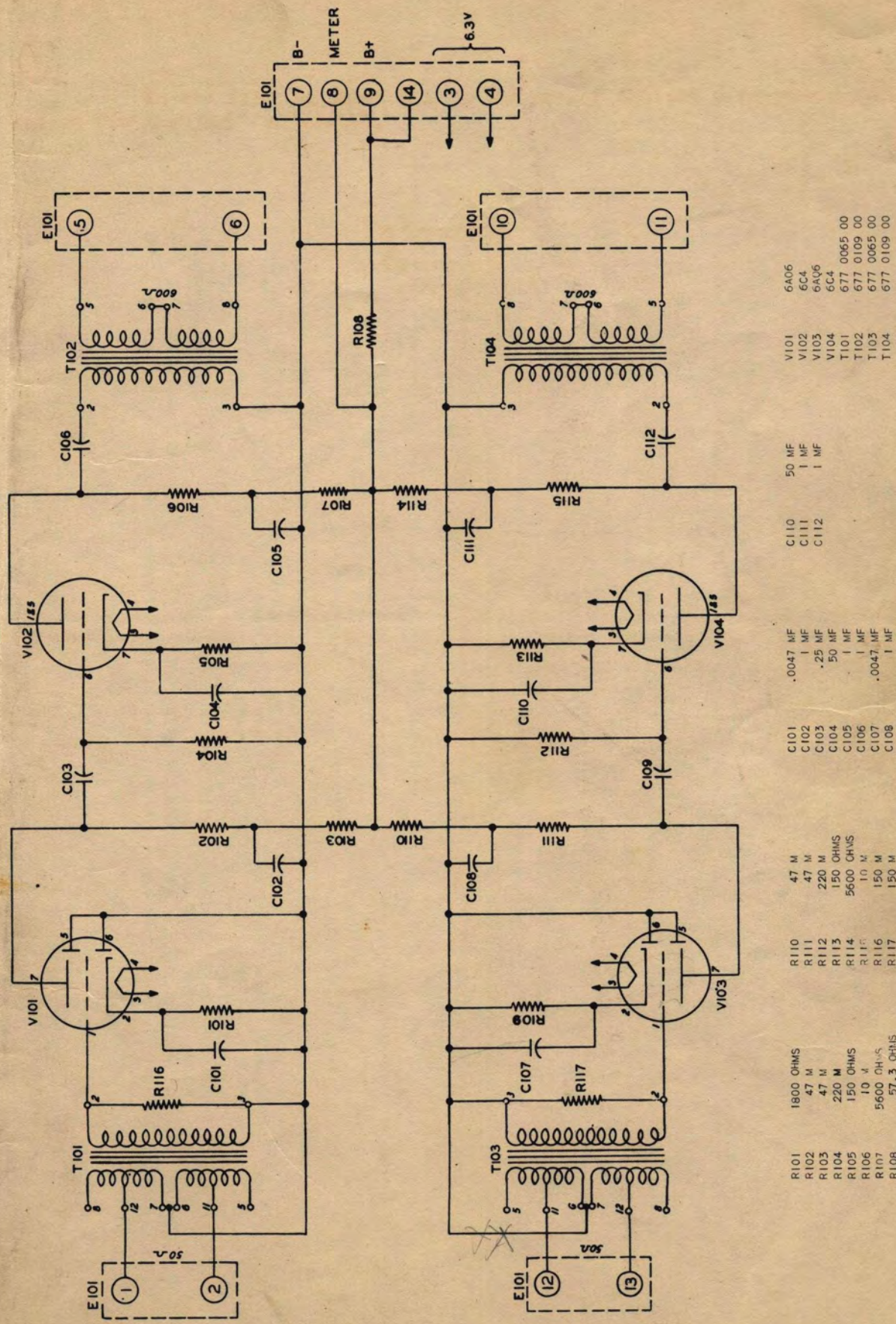
To determine the proper contact arrangement for jacks, the following procedure should be followed:

1. Distinguish between the "plug contact assembly" and the "pile-up contact assembly" and determine the proper code designation from the illustration above.

2. Determine the type and quantity of each basic form used to make up the pile-up contact assembly.

In the example shown below, the proper contact arrangement designation for the jack is "J7-1B".

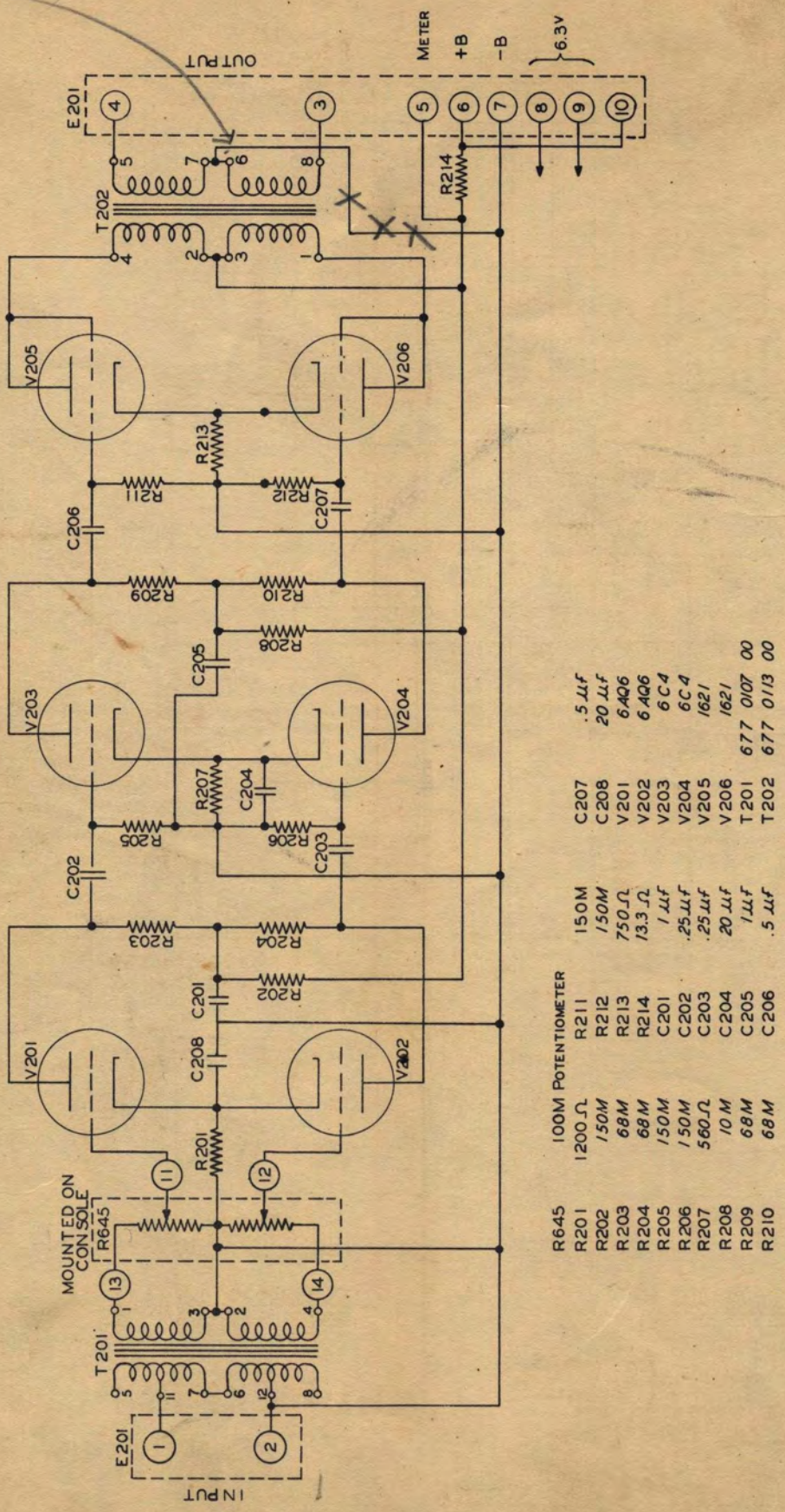




R101	1800 OHMS	R110	47 M	C101	.0047 MF	C110	50 MF	V101	6A06
R102	47 M	R111	47 M	C102	1 MF	C111	1 MF	V102	6C4
R103	47 M	R112	220 M	C103	.25 MF	C112	1 MF	V103	6AQ6
R104	220 M	R113	150 OHMS	C104	50 MF			V104	6C4
R105	150 OHMS	R114	5600 OHMS	C105	1 MF			T101	677 0065 00
R106	10 M	R115	10 M	C106	1 MF			T102	677 0109 00
R107	5600 OHMS	R116	150 M	C107	.0047 MF			T103	677 0065 00
R108	57.3 OHMS	R117	150 M	C108	1 MF			T104	677 0109 00
R109	1800			C109	.25 MF				

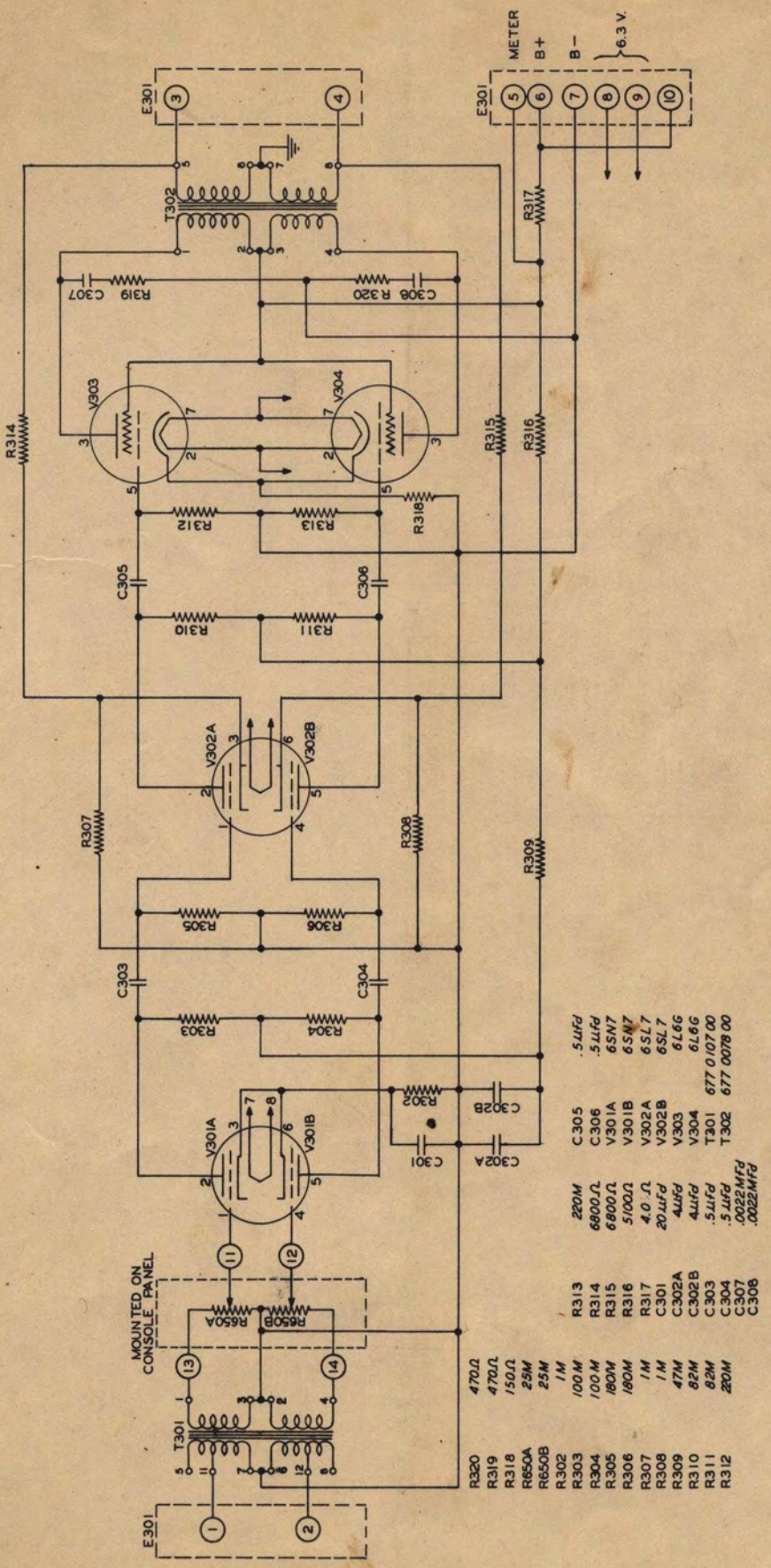
NOTE: FOR 250 OHM INPUT, USE TERMINALS 5 AND 8 OF T101 AND T103 INSTEAD OF 11 AND 12. REMOVE R116 AND R117 AND CHANGE VALUES OF C101 AND 107 TO .0022 MFD.

Figure 7-1 Type 6Q-1 Pre-amplifier Assembly, Wiring Schematic



R645	100M Potentiometer	R211	150M	C207	.5 μf		
R201	1200Ω	R212	150M	C208	20 μf		
R202	150M	R213	750Ω	V201	6AQ6		
R203	68M	R214	13.3Ω	V202	6C4		
R204	68M	C201	1 μf	V203	6C4		
R205	150M	C202	.25μf	V204	6C4		
R206	150M	C203	.25μf	V205	1621		
R207	560Ω	C204	20 μf	V206	1621		
R208	10M	C205	1 μf	T201	677 0107 00		
R209	68M	C206	.5 μf	T202	677 0113 00		
R210	68M						

Figure 7-2 Type 6N-1 Program Line Amplifier Wiring Schematic



R320	470Ω	R313	220M	C305 .5 Mfd
R319	470Ω	R314	6800Ω	C306 .5 Mfd
R318	150Ω	R315	6800Ω	V301A 6SN7
R650A	25M	R316	5100Ω	V301B 6SN7
R650B	25M	R317	4.0 Ω	V302A 6SL7
R302	1M	C301	20 Mfd	V302B 6SL7
R303	100M	C302A	4 Mfd	V303 6L6G
R304	100M	C302B	.5 Mfd	V304 6L6G
R305	180M	C303	.5 Mfd	T301 677 010700
R306	180M	C304	.0022 Mfd	T302 677 007800
R307	1M	C307	.0022 Mfd	
R308	1M	C308		
R309	47M			
R310	82M			
R311	82M			
R312	220M			

Figure 7-3 Type 6V-1 Monitor Amplifier Wiring Schematic

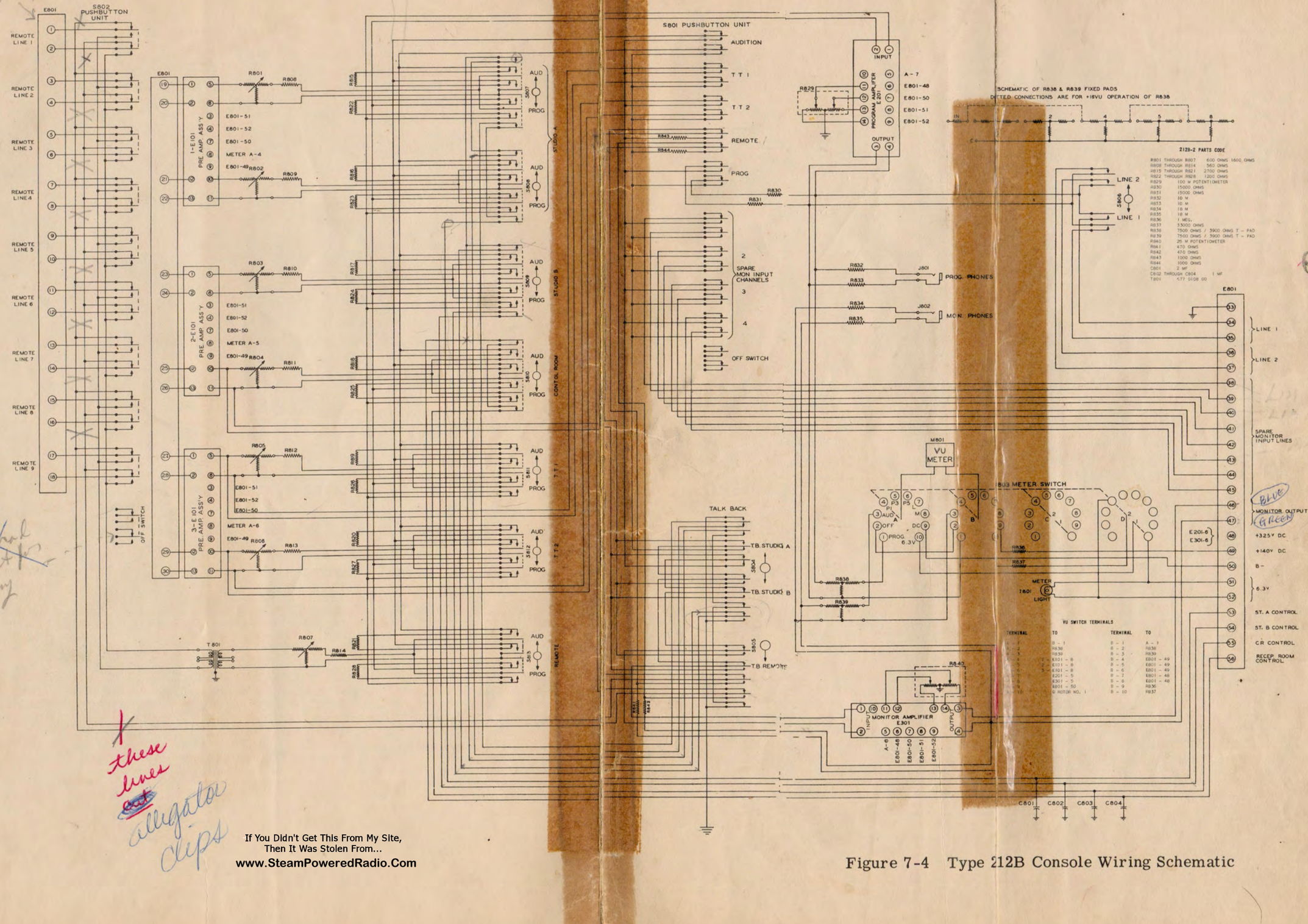


Figure 7-4 Type 212B Console Wiring Schematic

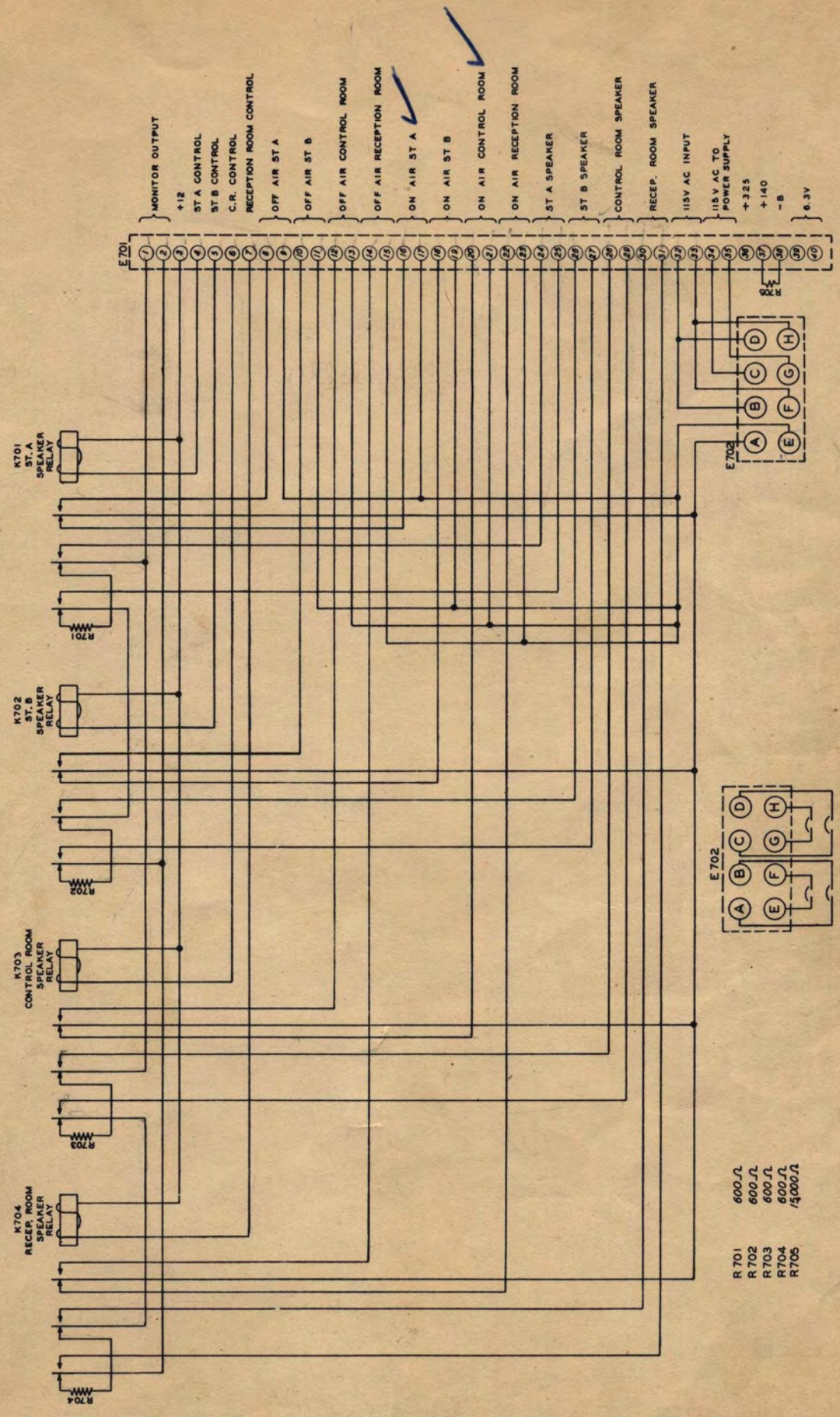
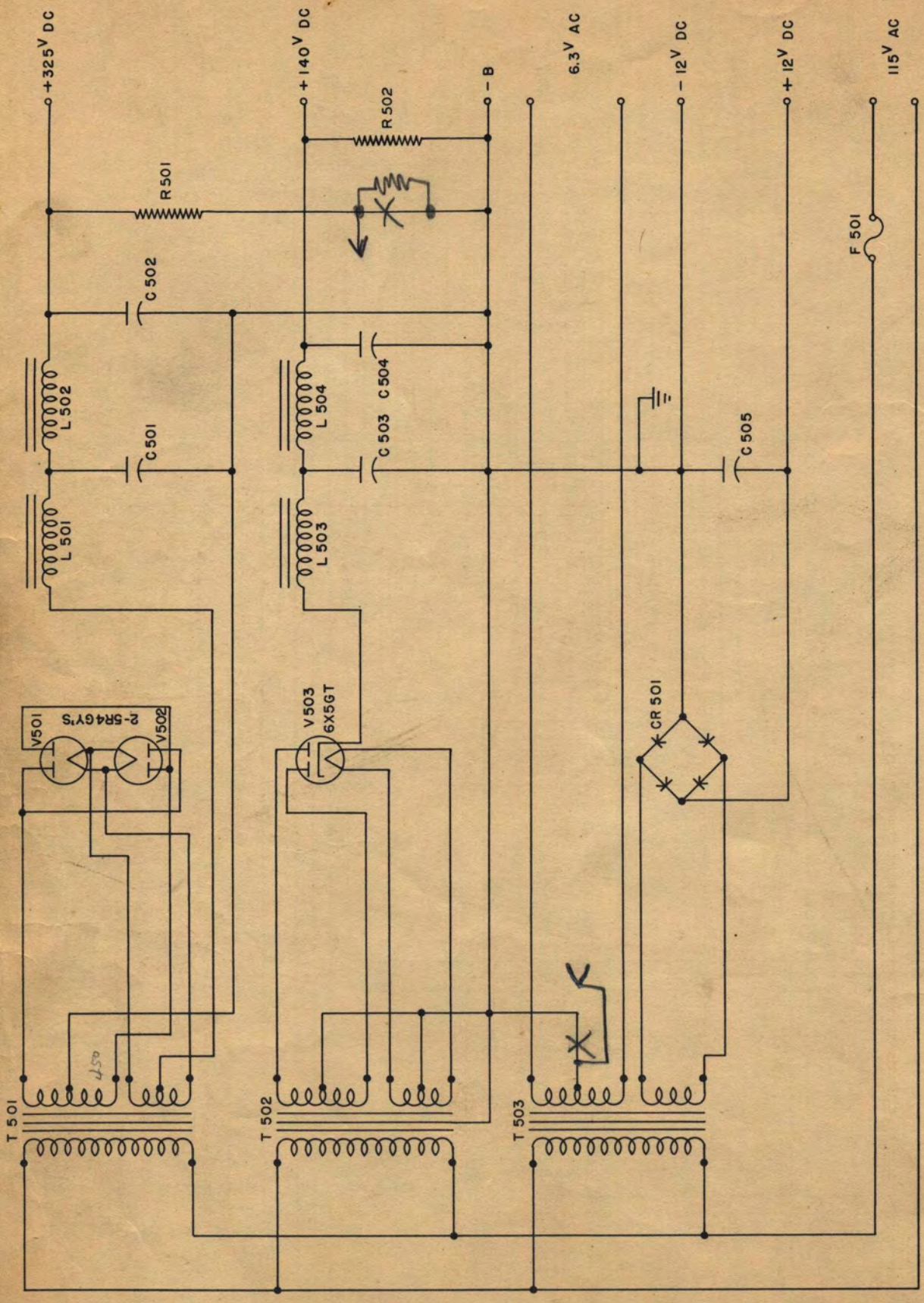


Figure 7-5 Type 274D Relay Control Unit Wiring Schematic



CR 501	353-2700-00	T 503	672-0120-00	L 501	6H 678-0125-00
V 501	5R4GY	C 501	10 M, 600 V	L 502	6H 678-0125-00
V 502	5R4GY	C 502	20 M, 600 V	L 503	15H 678-0082-00
V 503	6X5GT	C 503	90 M, 150 V	L 504	15H 678-0082-00
T 501	672-0121-00	C 504	90 M, 150 V	R 501	25M 710 1254 20
T 502	672-0151-00	C 505	1100 M, 25 V	R 502	25M 710 1254 20

Figure 7-6 Type 409U Power Supply Unit Wiring Schematic

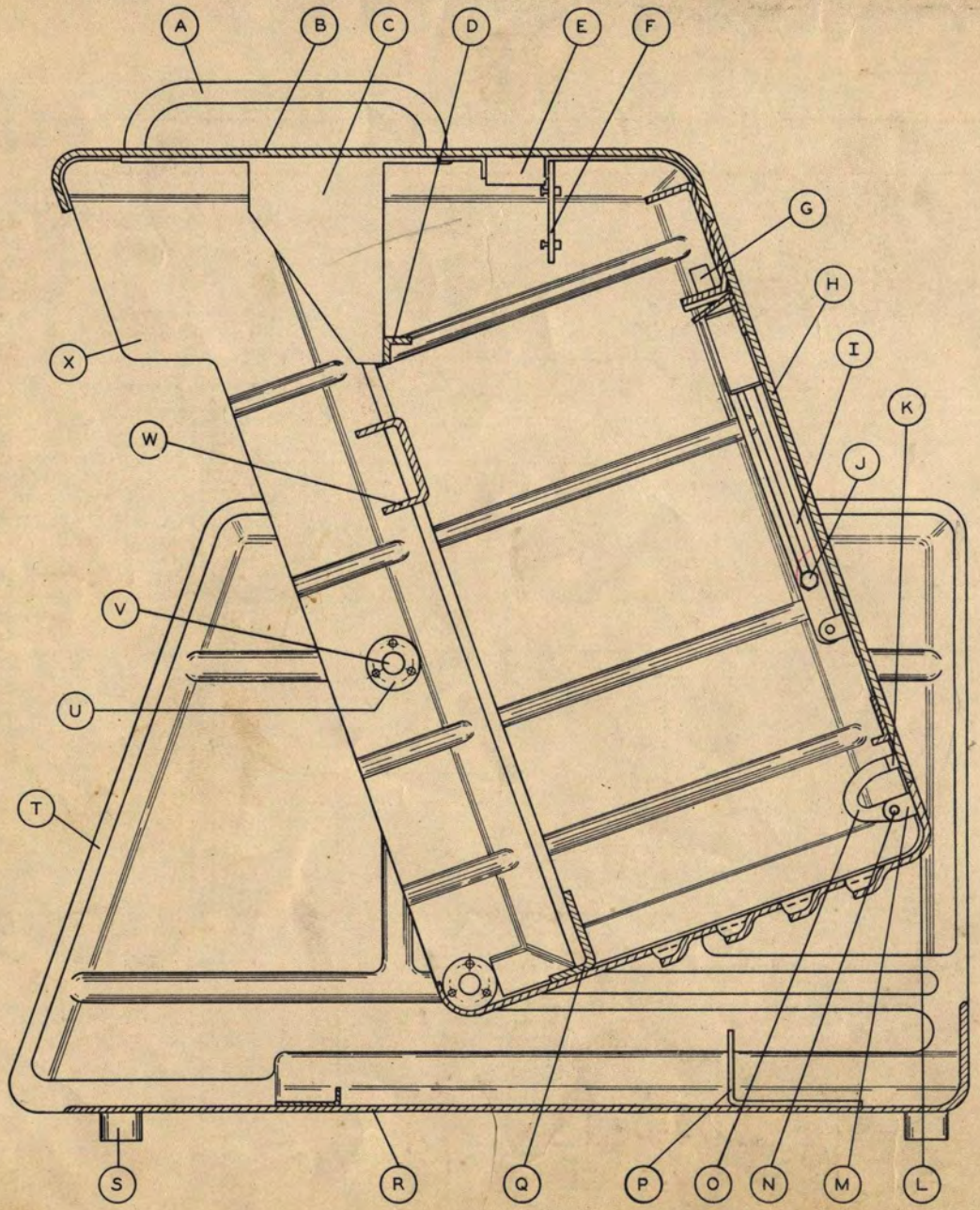


Figure 7-7 Type 212B Console Unit Mechanical Details, Sectional View

SYMBOL	DESCRIPTION	COLLINS PART NO.
A	Console handle	503 0997 002
B	Console panel	
C	Mounting platform	
D	Cable support angle	
E	Jack mounting block	
F	Jack resistor board	503 0991 001
G	Spring catch	015 0019 00
H	Lid	
I	Lid support - right	015 0025 00
I	Lid support - left	015 0026 00
J	Lid support screw	503 1003 002
K	Filler block	503 0992 002
L	Top and rear panel	
M	Hinge bracket	503 0995 002
N	Pivot pin	503 0993 002
O	Special hinge	503 0994 002
P	Condenser mounting bracket	503 1006 002
Q	Chassis mounting bracket #1	
R	Base plate	
S	Rubber feet	200 5300 00
T	Outside end casting	
U	Needle bearing	309 6020 00
V	Bearing shaft	503 0996 002
W	Chassis mounting bracket #2	
X	Inside end casting	

Figure 7-8 Transformer and Reactor Details