

GATES  
STEREO 80

# TECHNICAL MANUAL



# STEREO 80 CONSOLE

**HARRIS  
INTERTYPE  
CORPORATION**

**GATES**<sup>®</sup>  
A DIVISION OF HARRIS-INTERTYPE



## **WARRANTY**

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Do not return any merchandise without our written approval and Return Authorization. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise. Custom built equipment or merchandise specially ordered for you is not returnable. Where return is at the request of, or for the convenience of the customer, a restocking fee of 15% will be charged. All returned merchandise must be sent freight prepaid and properly insured by the customer. When writing to Gates Radio Company about your order, it will be helpful if you specify the Gates Factory Order Number or Invoice Number.

## **WARRANTY ADJUSTMENTS**

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## **MODIFICATIONS**

Gates reserves the right to modify the design and specifications of the equipment shown in this catalog without notice or to withdraw any item from sale provided, however, that any modifications shall not adversely affect the performance of the equipment so modified.



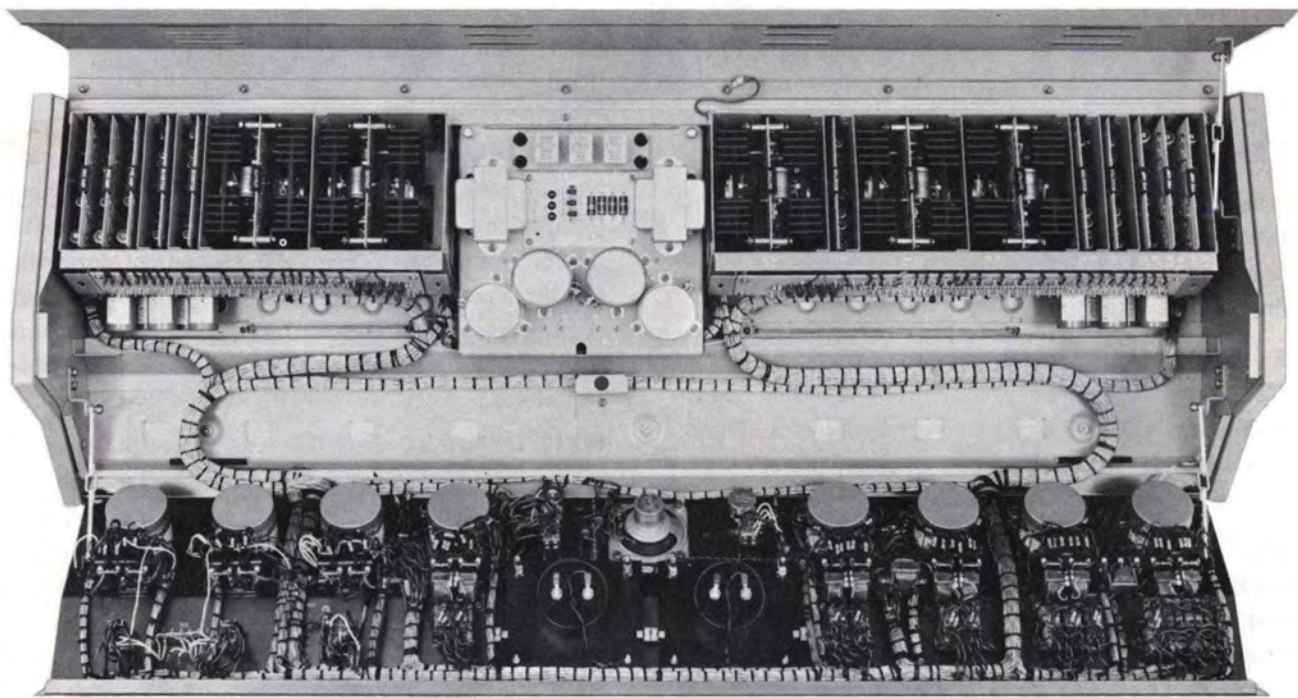


STEREO 80 CONSOLE

994 6867 001

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STEREO 80 CONSOLE  
INTERIOR VIEW

FIG. 1



**TECHNICAL MANUAL**

**STEREO 80 CONSOLE**

**994 6867 001**

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## **INTRODUCTION**

The Stereo 80 is a high quality stereophonic console which provides all necessary studio functions and facilities for the typical FM station that broadcasts stereophonic programs exclusively.

This Technical Manual provides the necessary information for application, installation, operation, and maintenance of the Gates Model 994 6867 001 Stereo 80 Console.

**888 1152 001**

Price: \$10.00

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STEREO 80 CONSOLE

994 6867 001

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## SECTION

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Gates Dwg. No. 815 4265 001, Relay and Muting Driver Board  
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815 4822 001, Inter-Connecting Cable  
815 4830 001, Console Installation Layout  
827 7491 001, Audio Output Card  
827 9272 001, Pre-Amplifier  
827 9310 001, Audio Booster  
828 0021 001, Installation Dwg., External Connections  
842 6555 001, Block Diagram, Stereo 80  
842 7179 001, Power Supply Panel  
852 6795 001, Overall Schematic, Stereo 80



## GATES STEREO 80 CONSOLE

### 1.0 GENERAL DESCRIPTION AND SPECIFICATIONS

1.1 The Stereo 80 console provides the typical FM radio station with all the necessary facilities required to program stereophonic programs exclusively.

This console makes use of plug-in, printed circuit modules for flexibility and ease of service.

Channels 1 and 2 are equipped with low noise preamplifiers, and are to be used with low impedance, broadcast-type microphones. Each of these channels may select from two different input signals by means of a front panel switch.

Channel 3 is equipped with low noise preamplifiers and also intended to be used with low impedance, broadcast-type microphones. This channel has a single input and is assigned to the control room since these microphones function as part of the talk-back system. Channels 4, 5, 6, and 7 are all medium level inputs and may be used with turntable preamplifiers, reel-to-reel tape, or cartridge machines. All channels have input transformers with center taps. They are supplied with the center taps ungrounded. A nominal level of  $-20$  dBm, or  $+4$  dBm at 600 ohms is required. Input pads for the  $+4$  dBm are provided on the various tape inputs.

Channel 8 is specifically designed to function with network and remote lines as sources. Various combinations of preview, talkback and program cue are possible using the front panel switches. A nominal input of  $-20$  dBm at 600 ohms is required.

Each channel may be switched to either the PROGRAM or AUDITION positions to permit independent monitoring or recording of any of the incoming sources without disturbing programming. Channels 4 through 8 have cue positions associated with the channel attenuators which provide signal to the amplified cue system. This signal can be monitored by an internal speaker or external headphones. On channels 1 and 2, the center position of the PROGRAM-AUDITION key switch provides a microphone cue signal to the cue selector switch. On channel 3, this position is used with the control room microphone for talkback.

A protective system of warning lights and relay muting is provided to prevent acoustic feedback and broadcasting of cue signals when "live" microphones are in use.

### 1.2 SPECIFICATIONS

MICROPHONE (Channels 1, 2, and 3 to Program Line Out)

|                     |  |
|---------------------|--|
| Maximum Gain:       | 100, $\pm 2$ dB  |
| Frequency Response: | $\pm 1$ dB, 20 to 20,000 Hz  |
| Distortion:         | Less than 0.5%, 20 to 20,000 Hz at $+24$ dBm output  |
| Noise:              | More than 75 dB below $+18$ dBm output with $-50$ dBm input. Equivalent input noise is better than $-125$ dBm, 20 to 20,000 Hz |

Crosstalk: Less than 10 dB above the noise, with normal levels and control settings at 15 kHz

Microphone Impedance: 150 ohms, balanced with C.T.  
37.5 ohms, balanced, no C.T.

#### MEDIUM LEVEL (Channels 4–7 to Program Line Out)

Maximum Gain: 60,  $\pm 2$  dB/36,  $\pm 2$  dB

Frequency Response:  $\pm 1$  dB, 20 to 20,000 Hz

Distortion: Less than 0.5%, 20 to 20,000 Hz at +24 dBm output

Noise: More than 80 dB below +18 dBm output with  $-10$  dBm input, 20 to 20,000 Hz

Crosstalk: Less than 10 dB above the noise, normal levels and control settings at 15 kHz

Input Impedance: 600 ohms, balance

#### NETWORK/REMOTES (Channel 8) to Program Line Out

Maximum Gain: 54,  $\pm 2$  dB/60,  $\pm 2$  dB

Frequency Response:  $\pm 1$  dB, 20 to 20,000 Hz

Distortion: Less than 0.5%, 20 to 20,000 Hz at +24 dBm output

Noise: More than 80 dB below +18 dBm output with  $-10$  dBm input, 20 to 20,000 Hz

Crosstalk: Less than 10 dB above the noise, with normal levels and control settings at 15 kHz

Input Impedance: 600 ohms, balanced

#### MONITOR CIRCUITS

Maximum Gain: Mic-Pgm-Mon Out 131,  $\pm 2$  dB  
Mic-Aud-Mon Out 131,  $\pm 2$  dB  
Med-Pgm-Mon Out 90,  $\pm 2$  dB  
Med-Aud-Mon Out 90,  $\pm 2$  dB  
Ext-Mon-Mod Out 59,  $\pm 2$  dB

Frequency Response:  $\pm 1$  dB, 30 to 15,000 Hz

Distortion: Less than 1%, 30 to 15,000 Hz at +40 dBm (10 Watts) output into 8 ohm load



Noise: More than 80 dB below +40 dBm  
(10 Watts) output, 30 to 15,000 Hz

Crosstalk: Less than 10 dB above the noise,  
with normal levels and control  
settings at 15 kHz

#### PHYSICAL SIZE

Console: 45 inches wide (114.3 cm)  
15.5 inches deep (39.37 cm)  
7.75 inches high (19.68 cm)

Console Weight: 105 lbs. (47.63 kg)

#### POWER SUPPLY (Panel Assembly)

##### Input Power Requirements:

Line Voltage and Frequency: 117 V (As supplied)/234 V, 50/60 Hz

Power Consumption: 120 Watts, maximum

Output Voltage: Four (4) outputs, 45 V DC  
at 2.25 Amps. each, one (1) output,  
unregulated, 65 V DC

Physical Size: 7.0 inches high (17.78 cm)  
19.0 inches wide (48.26 cm)  
7.75 inches deep (19.68 cm)

Weight: 21 lbs. (9.53 kg)

2.0 **INSTALLATION PROCEDURE**

2.1 **UNPACKING INSTRUCTIONS**

Carefully unpack the console and inspect it for shipping damage. All parts should be securely fastened to the cabinet or sub-chassis; any loose parts should be inspected for frayed or broken wires. If any damage is found, contact the carrier immediately.

The following main items will be enclosed:

- 1) Stereo 80 Console
- 2) Knob Decal Kit
- 3) Technical Manual
- 4) Cue and Program Phone Jacks, Qty of 3
- 5) Power Supply Panel Assembly

2.2 **INSTALLATION**

As supplied from the factory, the Stereo 80 has seven "bumper" feet for desk top mounting. These bumpers space the bottom of the console away from the desk surface to provide proper ventilation. If permanent, desk-top mounting is required, remove the hardware from the "bumper" feet and replace same with longer bolts or screws, but remount the bumpers in their original positions to allow the necessary air circulation beneath the console. All cable connections are made through the bottom of the console.

2.3 **POWER CONNECTIONS**

The separate power supply panel is normally mounted beneath the desk or table or in a rack close by and should be separated several feet from the console in a position which permits free air circulation around it. As shipped for domestic use, the power supply panel's transformer primary windings are parallel-connected for 117 V AC, 50/60 Hz operation. However, the four primary windings are accessible by removing the power supply panel front cover and then the P.C. board, and may be reconnected in series for 234 V AC, 50/60 Hz operation, if desired. These connections are illustrated in the Transformer Diagram, Fig. 2. Connect the power supply panel to the main console by interconnecting 2TB1 of the power supply panel to TB10 in the main console. The two terminal boards are connected like terminal numbers to like terminal number. That is, 2TB1-1 to TB10-1 or TB10-7 to 2TB1-7. See interconnecting drawing, 815 4822 001 of this book.

Cable length should not exceed 100 feet and twisted shielded wire should be used. A number of single twisted pairs (below No. 8451 or similar) may be used or a single cable with many internal twisted pairs (Beldon No. 8766 or similar) may be used. In either case, the interconnecting cable should be paired in the following manner:

| WIRE NO. | POWER SUPPLY TERMINAL NO. | CONSOLE TERMINAL NO. |
|----------|---------------------------|----------------------|
|          | 2TB1-                     | TB10-                |
| 1        | 1 & 2                     | 1 & 2                |
| 2        | 3 & 4                     | 3 & 4                |
| 3        | 5 & 6                     | 5 & 6                |
| 4        | 7 & 8                     | 7 & 8                |
| 5        | 9 & 10                    | 9 & 10               |



|    |         |         |
|----|---------|---------|
| 6  | 11 & 12 | 11 & 12 |
| 7  | 13 & 14 | 13 & 14 |
| 8  | 15 & 16 | 15 & 16 |
| 9  | 17 & 18 | 17 & 18 |
| 10 | 19 & 20 | 19 & 20 |
| 11 | 21 & 22 | 21 & 22 |

## 2.4 INPUT CONNECTIONS

The input cables should be soldered to the terminals of TB1 and TB2 which are located along the front surface of the module compartments. These cables should be 2-conductor shielded wire, with an overall vinyl jacket. The vinyl jacket prevents the shield from shorting to other building grounds, thus eliminating possible ground loops. See the Installation and Schematic/Wiring diagrams for input and output connections. Solder the input shields to the ground bus provided below TB1 and TB2. Connect left inputs to TB1 and right inputs to TB2.

**CAUTION:** *To prevent unwanted ground loops, all wiring connected to TB1 and TB2 should be free from ground connections in the source equipment (microphones, turntable, preamplifiers, tape recorders, etc.). An ohmmeter check is recommended to be certain each wire is not grounded before connecting it to the console input. If this check is made, those sources showing no grounds may exhibit lower noise if the input transformer center tap is grounded. The center taps should never be grounded if the source line has a ground.*

## 2.5 MICROPHONE INPUTS

Mic A, Ch 1 and Mic A, Ch 2 inputs are assigned (See Muting Assignments, Dwg. No. 815 4821 001) as Studio A microphone inputs. Mic B, Ch 1 and Mic B, Ch 2 inputs are assigned as Studio B microphone inputs. The inputs for Ch 3 are for the control room microphones.

The nominal level to these inputs is -60 dBm at 150 ohms. Microphones with impedances from 100 to 250 ohms may be used.

To use 30/50 ohm microphones, see the modification instruction under Section 4.0, MAINTENANCE.

## 2.6 MEDIUM LEVEL INPUTS

All medium level input channels, 4 through 7, are 600 ohm, balanced. Nominal input levels are -20 dBm for the turntable inputs and +4 dBm for all tape inputs. The input levels for the various tape inputs can be lowered to -20 dBm by removing the correct pad on TB1 and TB2. See main Schematic for resistor numbers. If specific input sources are free of grounds, the center taps of the corresponding input transformers may be grounded for lowest noise.

## 2.7 NETWORK/REMOTE INPUT

The Network/Remote inputs on Channel 8 are 600 ohm, balanced. The nominal input level is -20 dBm.

815 5675 001

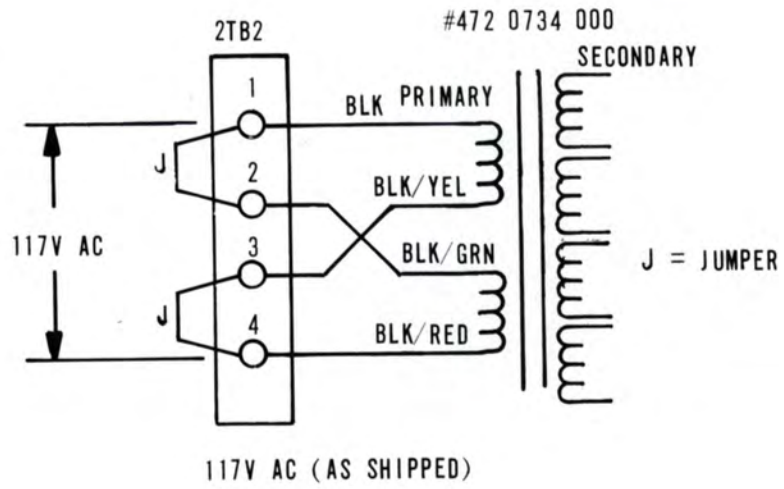


FIG. 2

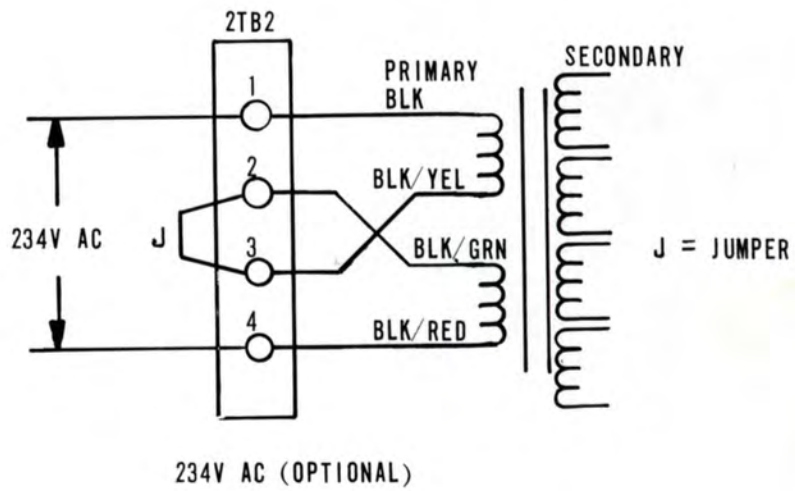
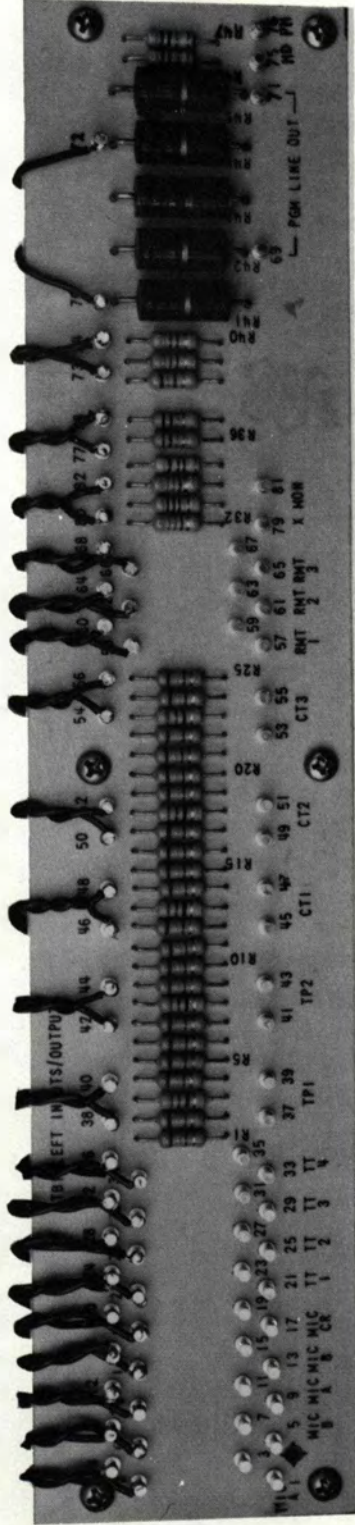


FIG. 2A

POWER TRANSFORMER PRIMARY CONNECTIONS  
STEREO 80 CONSOLE

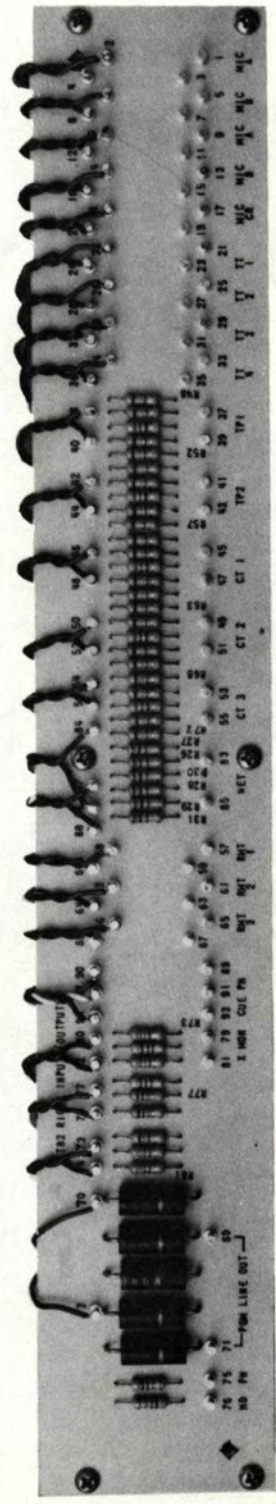
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TB1, LEFT INPUT/OUTPUT TERMINAL BOARD

FIG. 3



TB2, RIGHT INPUT/OUTPUT TERMINAL BOARD

FIG. 3A



## 2.8 EXTERNAL MONITOR INPUT

Each external Monitor Input presents a balanced bridging input to a 600 ohm source. The nominal input level is  $-20$  dBm. This value may be raised or lowered by adjusting the values of R32 and R34 on TB1 and R73 and R75 on TB2. (See main Schematic Dwg. No. 852 6795 001.)

## 2.9 OUTPUT CONNECTIONS

The left and right program line outputs are 600 ohm, balanced, and provide  $+8$  dBm output level when the VU meters read "0" VU. These outputs appear at terminals 69 and 71 of TB1 and terminals 69 and 71 of TB2. The maximum output level obtainable at these points is in excess of  $+30$  dBm into 600 ohms. This output level capability provides headroom to prevent clipping of the program signal peaks when operated at normal ( $+8$  dBm) level. A high impedance headphone output is available at terminals 75 and 76 of TB1 and TB2. These outputs are bridged across the program output line before the 6 dB line pad.

The cue headphone jack connection points are terminals 82, 84, and 86, and are intended for a switch-type phone jack. If this type jack is not used, a jumper must be used across terminals 82 and 84. Using this jumper, however, will not allow the inserted headphones to disable the internal cue speaker, which may be desirable. The cue headphone terminals are on TB2.

The connections for the monitor speakers are located on TB5 (Left) and TB6 (Right), underneath the swing-up transformer deck which is located between the two card guide assemblies. Loosening the two thumb screws at the rear of the deck will allow it to swing up toward the front panel, exposing TB5 and TB6. Terminals 1 and 2 are for the lobby speakers which are not muted. Terminals 3 and 4 are for the Studio A speakers, terminals 5 and 6 are for the Studio B speakers, and terminals 7 and 8 are for the control room speakers. These three locations are all muted. For these speakers, No. 22, or larger, twisted pair unshielded wire is recommended.

It is important to make certain that the total load on each monitor amplifier, from all speakers connected to it, does not fall below 8 ohms. If it does, the automatic protection system will operate and the output from the speakers may sound distorted, or garbled.

If several 8 ohm speakers are needed, use matching transformers listed under ACCESSORIES. If only two speakers are required, two 16 ohm units connected in parallel, or two 4 ohm speakers connected in series, to form the 8 ohm load, would be acceptable. These connections should be made with unshielded wire pairs, size No. 22, or larger. Any combination of speakers is satisfactory as long as the resultant load impedance is 8 ohms or higher.

The connections for the warning lights are on TB7, located underneath the swing-up transformer deck. Terminals 1 and 2 on TB7 are for the 117 V AC used to energize the warning lights. If possible, connect the neutral side of the line to terminal 2 and the hot side to terminal 1. Terminals 7 and 8, on TB7, are for Studio A, terminals 5 and 6 are for Studio B and terminals 3 and 4 are for the Control room. The warning lights should not be grounded except through the power line. The current drawn by the warning lights should not exceed 2 amperes.



## 2.10

### **MUTING**

As supplied from the factory, the Stereo 80 is arranged to mute in the following manner: Mic A, Ch 1 and Mic A, Ch 2 will mute the Studio A speakers. Mic B, Ch 1 and Mic B, Ch 2 will mute the Studio B speakers. The microphone on Ch 3 is intended for the Control room and will mute the Control room speakers and the internal cue speaker in the console. The assignment is arbitrary for Channels 1 and 2. Channel 3 is fixed and must remain as assigned. It is, however, easy to re-assign Channels 1 and 2 if the operation of the muting system is understood. It operates as follows: A control signal is derived from terminal 1 of the Relay and Muting Driver board. This signal is fed to each of the PROGRAM—AUDITION switches associated with a microphone (Channels 1, 2, and 3). In the case of Channel 3, if the key switch is placed in either the PROGRAM or AUDITION mode, this signal is then fed back to terminal 11 of the Relay and Muting Driver boards and mutes the Control room speakers. (See Muting Assignment, Dwg. No. 815 4821 001.) In the case of Channels 1 and 2, if the PROGRAM—AUDITION key is thrown, the drive signal is then fed to the wiper of the appropriate MIC A/MIC B selector switch. Depending upon what position the selector switch is in, the drive signal is then fed to terminals 1, 2, 5, or 6 of TB15 located between switches S1 and S2 on the rear of the front panel. Terminal 3 of TB15 is the receive point for the Studio A muting drive signal, and terminal 4 is the Studio B receive point.

With this information, it is possible to set up any muting configuration by adding or changing several jumpers on TB15.

#### FOR EXAMPLE:

MIC A/Ch 1, MIC A/Ch 2 to mute Studio A (As supplied):

Jump 1 to 3, and 5 to 3, on TB15

MIC A/Ch 1, MIC A/Ch 2 to mute Studio B:

Jump 1 to 4, and 5 to 4, on TB15

All MIC's to mute Studio A:

Jump 1 to 3, 2 to 3, 5 to 3, and 6 to 3, on TB15

## 2.11

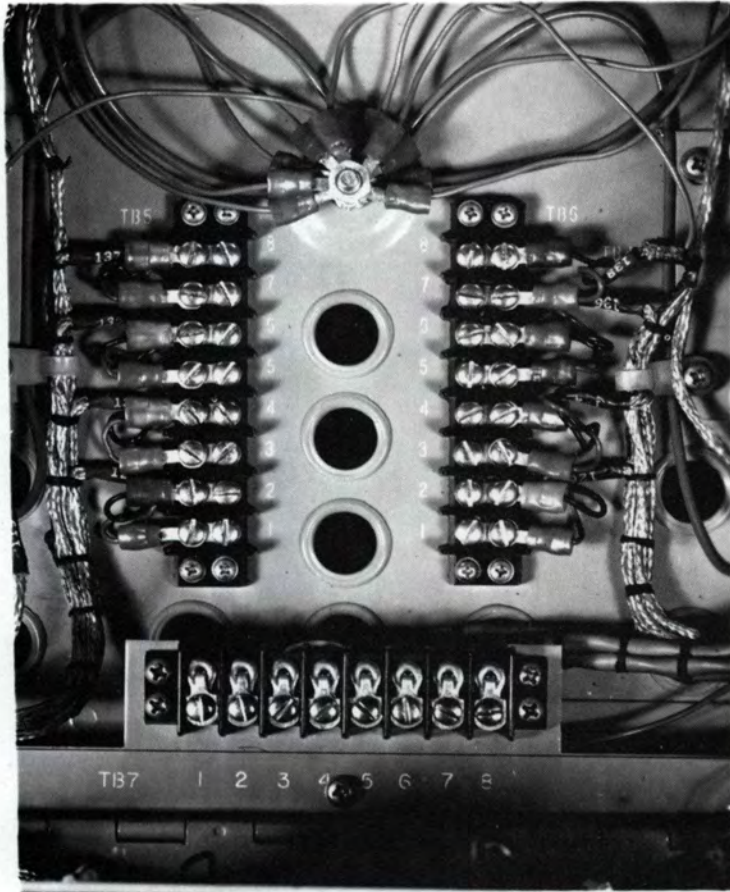
### **STATION GROUNDING**

The ground stud, located underneath the transformer deck at the center rear, should be connected to the station ground by means of a heavy copper wire or strap. THIS SHOULD BE THE ONLY GROUND CONNECTION TO THE STEREO 80 CONSOLE.

## 2.12

### **ACCESSORY**

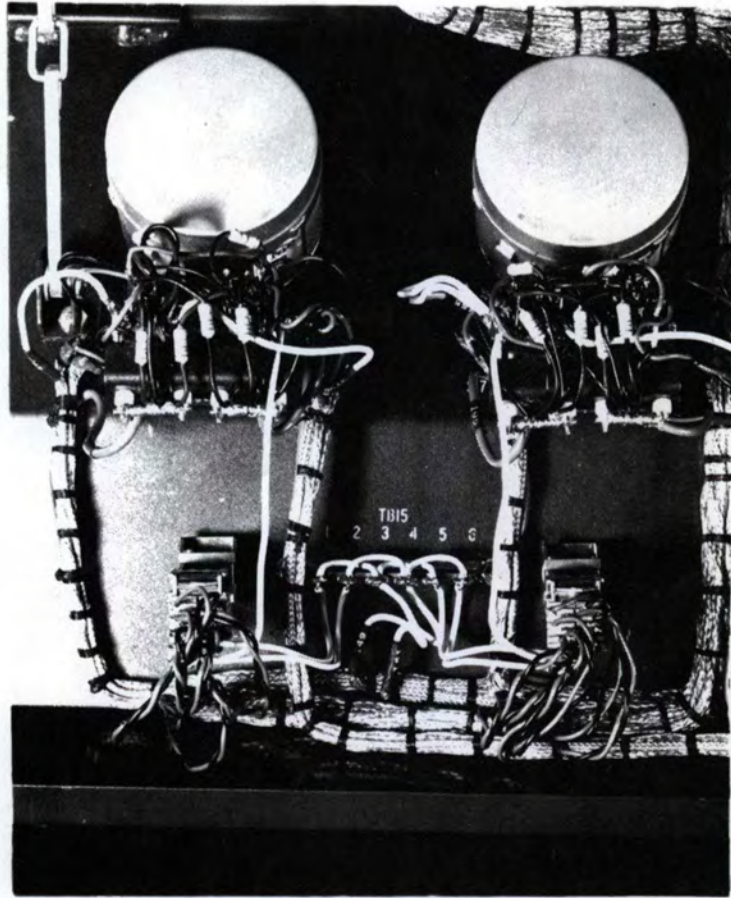
A 48/8 ohm Speaker Matching Transformer, Gates Part No. 478 0291 000 can be supplied on order, for use in studio monitoring wiring requirements.



TB5, TB6, TB7  
MONITOR SPEAKERS, WARNING LIGHTS  
STEREO 80 CONSOLE

FIG. 4





TB15, MUTING CONNECTIONS  
STEREO 80 CONSOLE

FIG. 5

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3.0

## OPERATION

3.1

### CONTROL ADJUSTMENTS

All gain adjustments should be made with the left and right master gain Controls set as calibrated at the factory. In this position, the master gain Controls insert 16 dB of attenuation. This setting provides a good balance in the monitor circuit when switching from PROGRAM to AUDITION. Also, it is the best choice in providing adequate operating margins of signal-to-noise and "headroom".

Set the cue and monitor gain Controls at mid-range and all channel attenuators at "12" on the dial (about 1:00 o'clock position). Apply power to the console and check to see that the VU meters are illuminated.

With a program signal on one of the Medium Level inputs (for example, TT1), throw the TT1 input selector to the Ch 4 position, and set the key switch for Channel 4 to the "P" (Program) position. The VU meters should respond to the program level variations. Adjust the program level at the source of the signal (Turntable) for peaks of 100 indicated on the VU meters.

Set the monitor selector switch to PGM and adjust the monitor gain Control for a comfortable level from the control room monitor speakers.

Operate the channel 4 key switch to the "A" (Audition) position to remove the signal from the program channel and connect it to the audition channel. Moving the monitor selector switch to AUD allows monitoring of the audition channel with the same monitor speaker level as before.

Set the TT1 input selector to the Ch 5 position, operate the key switch for channel 5 to the "P" position, and note that the VU meters are indicating program variations which are now controlled by the channel 5 attenuator. Monitor and audition operation will be the same as channel 4, described above.

Turn the channel 5 attenuator to the CUE position, and adjust the cue gain Control for a comfortable level from the cue speaker in the console or external headphones.

Similarly, operate the other Medium-Level inputs (TT2, TAPE 1, CT1, etc.), adjusting the program level at the source of the signal. This technique allows all channel attenuators to be used in approximately the same position ("12" on the dial) for normal VU meter indications.

Operate the Ch 1 microphone input selector MIC A and the Ch 1 key switch to "P" position. Speaking about one foot from the microphone should give a normal indication on the VU meters. The microphone signals may be switched to the audition channels by operating Ch 1 key switch to "A" position, and monitored in a normal manner. If the Muting Assignments are correct, monitoring speakers near the microphones should be muted, and the warning lights in that area should be "On".

Similarly, operate channel 2 and channel 3 to check levels and Muting Assignments. By leaving the channel 1 and 2 key switches in the center, or neutral position, and selecting MIC 1 or MIC 2 on the cue selector switch, you should be able to monitor these microphones through the cue system.

The center position of the channel 3 key switch is associated with the talk back system, and will be described later.



The sources feeding channels 4, 5, 6, and 7 are directed to the correct channel by using the input selector switch on the upper part of the front panel. When a given source selector is pressed downward, the signal is directed into the channel directly below the switch. When in the "Up" position, it goes to a different channel. Each input is clearly labelled above the input selector switch.

The four input selectors above the channel 8 attenuator are for the network feed and the remote lines. When in the "Down" position, the inputs mix into channel 8. The center position of the network switch provides a 600 ohm termination for the feed line, while the center position of the three remote switches provides a program cue to the remote location from the monitor amplifier in the console. In the "Up" position, the inputs can be previewed through the cue system. The three remote inputs also use this position for talk back.

**NOTE:** *The Network input selector key should never be in the "Up" position when the talk back feature is used.*

### 3.2 **TALK-BACK** (To remote location, prior to "On Air" broadcast)

Talk-back to the remote location is accomplished in the following manner: The correct input selector switch, RMT 1, RMT 2, or RMT 3, is placed in the "Up" (Preview-Talk-Back) position. The cue selector switch is placed in the BUS position and the control room, channel 3, PROGRAM-AUDITION key switch is placed in the center or neutral position.

The signal coming from the remote location is placed on the cue bus and is heard over the cue speaker or headphones. The level is controlled by the cue gain control. When you wish to talk to the remote location, talk into the control room microphone while holding down the white push-to-talk switch, located on the left side of the top front panel. In doing this, the output of the control room microphone preamplifier is fed directly to the cue amplifier, the output of which is then fed down the remote line. The level going to the remote position should be set by using the channel 3 attenuator. Use the push-to-talk switch only while talking.

## 4.0 MAINTENANCE

### 4.1 30/50 OHM MICROPHONE MODIFICATION

To use 30/50 ohm microphone, the following modification is necessary. Remove all modules from the card guides, noting their locations. Remove the screws which hold the sockets in place in the bottom of the card guides. Now, remove the screws which hold the card guide to the console chassis and tip the card guide forward, towards the rear side of the front panel. Locate the desired transformers, T1, T2, T3, T4, T5, and T6. Note that the primary leads go to terminals 7 and 12 of the associated socket. Insert a very small, flat screwdriver into the terminal 7 slot on the rear side of the socket, and pull on the blue wire; it should come out with only a slight amount of effort. If it doesn't, rock the screwdriver and then pull it out. Once it is out, tape up the terminal and then carefully attach a new terminal to the white wire. Once this is done, insert the terminal in the No. 7 space of the socket. Replace the card rack and then align the plastic sockets. Now fasten all sockets to the card rack and replace the modules.

**NOTE:** *Do not over-tighten the screws which hold the plastic sockets. These sockets must "float" in their mounting to allow self-alignment with the modules.*

### 4.2 TROUBLESHOOTING

In case of trouble, the first step is to attempt to isolate the problem to a particular channel or amplifier. This is done by noting which signal paths and controls affect the troublesome operation. Possibly, disconnecting certain input or output wiring will stop the malfunction, indicating a bad ground connection or shorted load condition.

If the trouble seems to be in the console, the next step is to measure the DC circuit voltages. The individual amplifiers are of the direct-coupled type, and proper biasing of each circuit is indicated by a single measurement at the output of each circuit: Six preamplifiers will indicate 21.4 volt at the positive of C8, five booster amplifiers will indicate 6.7 volts at the positive of C9, five output amplifiers will show 22.5 volts DC at R15. These measurements will indicate any amplifier circuit problems, except those due to "open" capacitors.

Since all signal circuits are connected to the regulated power supply panel (45 V DC at 2TB1-3, 7, 15, & 19), their voltages may be expected to be very constant. However, variations in the power line will cause proportionate variations in the voltages across filter capacitors 2C1, 2C2, 2C3, and 2C4 (64 V DC), and muting relays K1, K2, and K3.

### 4.3 BIAS ADJUSTMENT

Preamplifier: Use R10 to set the no-signal DC voltage across R17 to 25 mV,  $\pm 5$  mV.

Output Amplifier: Use R4 to set the no-signal DC voltage across R15 to 12 mV,  $\pm 2.5$  mV.

**NOTE:** *These measurements, and other general module testing, may be easily performed by using the P.C. extender board as supplied with the console. Remove the module, insert the extender board in its place, and plug the module into the extender board, maintaining the same orientation as the other modules. REVERSED ORIENTATION MAY DESTROY THE MODULE.*



**TROUBLESHOOTING GUIDE**

Nothing Operates:

- 1) Check the fuses on the power supply panel
- 2) Check the power supply panel input line cord
- 3) Check the 45 volt output of the four supplies 2TB1-3, 2TB1-7, 2TB1-15, and 2TB1-19

Program OK, No monitor or cue:

- 1) Check the monitor/cue power supply capacitors, 2C1 and 2C3 for 64 volts in power supply panel
- 2) Check output of monitor/cue power supply for 45 volts 2TB1-3, 2TB1-19
- 3) If not 45 volts, check power supply panel for defective part
- 4) If the power supply panel seems OK, check the problem by removing the cue and monitor boosters and cue and monitor output modules
- 5) If no change, check the wiring for shorts
- 6) If a change is noted and the voltage returns to 45 volts, locate the bad module and repair

Program/Monitor or Cue, signal goes on and off:

- 1) Check the power supply panel. If it is very hot, the thermostat switches may be operating to protect the power supplies. Check the modules and wiring for shorts as above

Cue Speaker will not work:

- 1) The switch portion of the headphone jack may not be operating
- 2) No jumper across terminals 82 and 84 of TB2, or wrong type of headphone jack used
- 3) Check whether the headset is plugged into the jack
- 4) Check for bad contacts on switch S25, or S26
- 5) Check the modules by the substitution method
- 6) Check the contacts to the modules
- 7) Check the muting assignment

Muting does not work:

- 1) Check the muting assignment
- 2) Check for voltage on pin 1 of relay and muting driver Board. With respect to ground, pin 1 should read Positive 64 volts

- 3) With all key switches off, measure the voltage at pins 9, 10, and 11. It should read 63.4 volts (0.6 volt less than pin 1 reading)
- 4) The same voltage should be on terminals 3 and 4 of TB15
- 5) Check to see if relays K1, K2, or K3 operate
- 6) Check for an open relay coil
- 7) Check diodes CR2, CR3, and CR4

High Frequency Oscillation:

- 1) Check inputs for extra grounds
- 2) Check outputs for extra grounds

Microphone Channel won't work, but Medium Level channels are OK:

On the suspected preamplifier module –

- 1) Check for +45 V DC on pin 9
- 2) Check DC voltages at Positive of C8
- 3) Check for a good ground connection on pin 10
- 4) Check for continuity between the module (pins 5 and 10) and its corresponding attenuator
- 5) Check the input wiring for signal on pins 6 and 11 of the plug
- 6) Check the transformer connections to pins 6, 7, 11, and 12

Meter Pointer not at Zero:

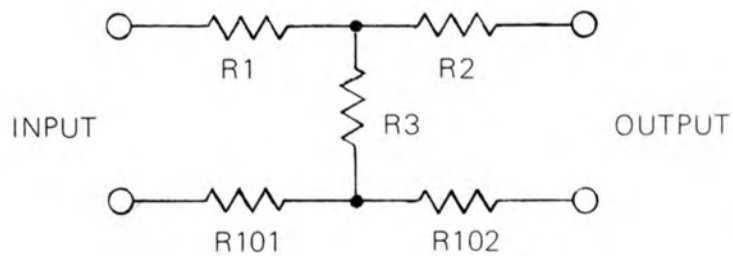
- 1) The pointer adjustment is on the rear surface of the meter case, between the terminals.



| 600/600 ohms "T" pads |               |            |
|-----------------------|---------------|------------|
| dB loss               | R1-R2<br>ohms | R3<br>ohms |
| 2                     | 68            | 2700       |
| 4                     | 130           | 1200       |
| 6                     | 200           | 820        |
| 8                     | 270           | 510        |
| 10                    | 330           | 390        |
| 15                    | 430           | 220        |
| 20                    | 470           | 120        |
| 25                    | 510           | 68         |

| 150/150 ohms "T" pads |               |            |
|-----------------------|---------------|------------|
| dB loss               | R1-R2<br>ohms | R3<br>ohms |
| 2                     | 18            | 750        |
| 4                     | 36            | 330        |
| 6                     | 51            | 200        |
| 8                     | 62            | 120        |
| 10                    | 82            | 100        |
| 15                    | 110           | 56         |
| 20                    | 120           | 30         |
| 25                    | 130           | 16         |

| 600/150 ohms "T" pads |            |            |            |
|-----------------------|------------|------------|------------|
| dB loss               | R1<br>ohms | R2<br>ohms | R3<br>ohms |
| 12 (min)              | 510        | 6.8        | 160        |
| 15                    | 510        | 51         | 110        |
| 20                    | 560        | 100        | 62         |
| 25                    | 560        | 120        | 33         |



**NOTE:** This chart may be used for H pads by halving R1 and making R101 equal to half of R1, and by halving R2 and making R102 equal to half of R2. For T pads, simply short out R101 and R102 and use R1 and R2 values directly.

LOSS PAD CHART

FIG. 6



# ELECTRICAL PARTS LIST

## STEREO 80 CONSOLE

994 6867 001

## BASIC STEREO 80 CONSOLE

994 6867 002

| SYMBOL             | DESCRIPTION                             | GATES | PART NO. | SYMBOL               | DESCRIPTION                                  | GATES | PART NO. |
|--------------------|---|-------|----------|----------------------|--|-------|----------|
| AT1<br>thru<br>AT3 | Attenuator<br>150/300,<br>2 dB, W/O Cue | 554   | 0281 000 | R89<br>thru<br>R108  | Res 620 ohm<br>½ W 5% L.N.                   | 540   | 1130 000 |
| AT4<br>thru<br>AT8 | Attenuator<br>150/300,<br>2 dB, W/ Cue  | 554   | 0280 000 | R109<br>thru<br>R124 | Res 240 ohm<br>½ W 5% L.N.                   | 540   | 1190 000 |
| AT11,<br>AT12      | Potentiometer<br>10K ohm, Locking       | 550   | 0379 000 | R125<br>thru<br>R156 | Res 560 ohm<br>½ W 5% L.N.                   | 540   | 1191 000 |
| AT13               | Potentiometer<br>Dual 10K ohm           | 550   | 0283 000 | R157,<br>R158        | Res 75 ohm<br>½ W 5% L.N.                    | 540   | 1148 000 |
| AT14               | Potentiometer<br>10K ohm                | 550   | 0215 000 | R163<br>thru<br>R172 | Res 62 ohm<br>½ W 5% L.N.                    | 540   | 1219 000 |
| C10,<br>C11        | Cap 2000 pF<br>500 V, 5%                | 500   | 0845 000 | R173,<br>R174        | Res 43 ohm<br>½ W 5% L.N.                    | 540   | 1218 000 |
| C12                | Cap .005 uF<br>GMV                      | 516   | 0075 000 | R175                 | Res 240 ohm<br>½ W 5% L.N.                   | 540   | 1190 000 |
| C13<br>thru<br>C20 | Cap .01 uF<br>600 V                     | 516   | 0080 000 | R176                 | Res 150 ohm<br>½ W 5% L.N.                   | 540   | 1117 000 |
| E5<br>thru<br>E49  | Standoff                                | 614   | 0347 000 | R177                 | Res 130 ohm<br>½ W 5% L.N.                   | 540   | 1220 000 |
| J1<br>thru<br>J16  | Receptacle                              | 612   | 0432 000 | R178                 | Res 200 ohm<br>½ W 5% L.N.                   | 540   | 1128 000 |
| LS1                | Speaker, 45 ohm                         | 722   | 0009 000 | R179                 | Res 47 ohm<br>2 W 5%                         | 540   | 0579 000 |
| M1,M2              | Meter<br>VU "B" Scale                   | 630   | 0140 000 | R180                 | Res 16 ohm<br>½ W 5% L.N.                    | 540   | 1174 000 |
|                    |   |       |          | R181,<br>R182        | Res 3.3K ohm<br>½ W 5% L.N.                  | 540   | 1165 000 |
|                    |   |       |          | R183                 | Res 1K ohm<br>½ W 5% L.N.<br>(Part of Cable) | 540   | 1116 000 |
|                    |   |       |          | R184                 | Res 10K ohm<br>½ W 5% L.N.                   | 540   | 1111 000 |
|                    |   |       |          | R190,<br>R191        | Res 390 ohm<br>2 W 5%                        | 540   | 0601 000 |



## ELECTRICAL PARTS LIST - CONT'D.

## STEREO 80 CONSOLE

994 6867 001

## BASIC STEREO 80 CONSOLE - CONT'D.

994 6867 002

| SYMBOL             | DESCRIPTION                        | GATES | PART NO. | SYMBOL               | DESCRIPTION                   | GATES | PART NO. |
|--------------------|------------------------------------|-------|----------|----------------------|-------------------------------|-------|----------|
| S1,S2              | Switch Lever<br>2 Pole             | 602   | 0097 000 | TB17                 | Terminal Board<br>6 Terminals | 614   | 0162 000 |
| S3<br>thru<br>S11  | Switch Lever<br>3 Pole             | 602   | 0096 000 | TB18                 | Terminal Board<br>1 Pos.      | 614   | 0129 000 |
| S12<br>thru<br>S15 | Switch Lever<br>3 Pole             | 602   | 0099 000 | TB19,<br>TB20        | Terminal<br>Strip             | 614   | 0127 000 |
| S16<br>thru<br>S23 | Switch Lever<br>3 Pole             | 602   | 0100 000 | TB21<br>thru<br>TB25 | Terminal<br>Board 5 pos.      | 614   | 0161 000 |
| S24                | Switch Lever<br>3 P.               | 602   | 0098 000 | TB26                 | Terminal<br>Board 2 Pos.      | 614   | 0158 000 |
| S25                | Switch Lever<br>2 P.               | 602   | 0082 000 |                      |                               |       |          |
| S26                | Switch Lever<br>3 P.               | 602   | 0080 000 |                      |                               |       |          |
| T1<br>thru<br>T6   | Transformer<br>Input, Mic          | 478   | 0308 000 |                      |                               |       |          |
| T7<br>thru<br>T16  | Transformer<br>Input, Medium Level | 478   | 0311 000 |                      |                               |       |          |
| T17                | Transformer<br>Remote Line         | 478   | 0312 000 |                      |                               |       |          |
| T19<br>thru<br>T22 | Transformer<br>Input, Mic          | 478   | 0308 000 |                      |                               |       |          |
| T27                | Transformer<br>Input, Medium Level | 478   | 0311 000 |                      |                               |       |          |
| TB1                | Input Terminal<br>Board (Left)     | 992   | 3424 001 |                      |                               |       |          |
| TB2                | Input Terminal<br>Board (Right)    | 992   | 3423 001 |                      |                               |       |          |
| TB3,<br>TB4        | Power Supply<br>Terminal Board     | 992   | 3407 001 |                      |                               |       |          |



ELECTRICAL PARTS LIST - CONT'D.

AUDIO OUTPUT CARD

994 6754 001

| SYMBOL                | DESCRIPTION                 | GATES PART NO. | SYMBOL        | DESCRIPTION                  | GATES PART NO. |
|-----------------------|-----------------------------|----------------|---------------|------------------------------|----------------|
| 2C1                   | Cap 100 uF 50 V             | 522 0394 000   | 2R1           | Res 39K ohm<br>½ W 5% L.N.   | 540 1185 000   |
| 2C2                   | Cap 25 uF 25 V              | 522 0242 000   | 2R2           | Res 10K ohm<br>½ W 5% L.N.   | 540 1111 000   |
| 2C3                   | Cap 56 pF<br>500 V 5%       | 500 0753 000   | 2R3           | Res 33K ohm<br>½ W 5% L.N.   | 540 1109 000   |
| 2C4                   | Cap 470 pF<br>500 V 5%      | 500 0835 000   | 2R4           | Potentiometer<br>500 ohm ¼ W | 552 0815 000   |
| 2C5                   | Cap 0.1 uF 100 V            | 508 0268 000   | 2R5           | Res 33K ohm<br>½ W 5% L.N.   | 540 1109 000   |
| 2C6                   | Cap 640 uF 25 V             | 522 0385 000   | 2R6           | Res 820 ohm<br>½ W 5% L.N.   | 540 1127 000   |
| 2C7                   | Cap 3.3 uF 25 V<br>Tantalum | 526 0090 000   | 2R7           | Res 100 ohm<br>½ W 5% L.N.   | 540 1102 000   |
| 2C8,<br>2C9           | Cap .05 uF<br>100 V         | 508 0266 000   | 2R8,<br>2R9   | Res 1K ohm<br>½ W 5% L.N.    | 540 1116 000   |
| 2C10                  | Cap .001 uF<br>1000 V ±10%  | 516 0054 000   | 2R10,<br>2R11 | Res 220 ohm<br>½ W 5% L.N.   | 540 1118 000   |
| 2CR1,<br>2CR2         | Diode<br>MZ2361             | 384 0256 000   | 2R12          | Res 270 ohm<br>½ W 5% L.N.   | 540 1188 000   |
| 2CR3,<br>2CR4         | Diode<br>MZ2360             | 384 0255 000   | 2R13          | Res 9.1K ohm<br>½ W 5% L.N.  | 540 1189 000   |
| 2CR5,<br>2CR6         | Diode Zener<br>1N4747A      | 386 0100 000   | 2R14,<br>2R15 | Res 0.51 ohm<br>2 W 5%       | 542 1072 000   |
| 2CR7<br>thru<br>2CR10 | Diode 1N2071                | 384 0020 000   | 2R16          | Res 9.1K ohm<br>½ W 5% L.N.  | 540 1189 000   |
| 2Q1                   | Transistor<br>2N5087        | 380 0112 000   | 2R17          | Res 270 ohm<br>½ W 5% L.N.   | 540 1188 000   |
| 2Q2                   | Transistor<br>2N4036        | 380 0045 000   | 2R18          | Res 10 ohm<br>1 W 5%         | 540 0563 000   |
| 2Q3                   | Transistor<br>2N3417        | 380 0111 000   | 2R19          | Res 10K ohm<br>½ W 5% L.N.   | 540 1111 000   |
| 2Q4                   | Transistor<br>2N2102        | 380 0127 000   | 2R20          | Res 49.9 ohm<br>¼ W 1%       | 548 0387 000   |
| 2Q5                   | Transistor<br>2N5088        | 380 0115 000   | 2R21          | Res 6.34K ohm<br>¼ W 1%      | 548 0388 000   |
| 2Q6                   | Transistor<br>2N5087        | 380 0112 000   | 2R22,<br>2R23 | Res 10 ohm<br>½ W 5% L.N.    | 540 1151 000   |
| 2Q7                   | Transistor<br>2N4036        | 380 0045 000   |               |                              |                |
| 2Q8                   | Transistor<br>2N4914        | 380 0128 000   |               |                              |                |
| 2Q9                   | Transistor<br>2N4905        | 380 0107 000   |               |                              |                |

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## ELECTRICAL PARTS LIST - CONT'D.

### AUDIO BOOSTER

**994 6755 002**

| SYMBOL             | DESCRIPTION                | GATES PART NO. | SYMBOL | DESCRIPTION                 | GATES PART NO. |
|--------------------|----------------------------|----------------|--------|-----------------------------|----------------|
| 3C1                | Cap 100 uF 50 V            | 522 0394 000   | 3R1    | Res 150 ohm<br>½ W 5% L.N.  | 540 1117 000   |
| 3C2                | Cap 12 uF 35 V<br>Tantalum | 526 0060 000   | 3R2    | Res 470K ohm<br>½ W 5% L.N. | 540 1198 000   |
| 3C3                | Cap 470 pF<br>1000 V +10%  | 516 0043 000   | 3R3    | Res 5.11K ohm<br>¼ W 1%     | 548 0394 000   |
| 3C4                | Cap 10 pF 500 V<br>+5%     | 500 0804 000   | 3R4    | Res 470K ohm<br>½ W 5% L.N. | 540 1198 000   |
| 3C5                | Cap 240 pF 500 V<br>5%     | 500 0830 000   | 3R5    | Res 22.1K ohm<br>¼ W 1%     | 548 0366 000   |
| 3C6<br>thru<br>3C9 | Cap 100 uF 50 V            | 522 0394 000   | 3R6    | Res 150 ohm<br>½ W 5% L.N.  | 540 1117 000   |
| 3C10               | Cap 10 pF 500 V<br>5%      | 500 0804 000   | 3R7    | Res 47K ohm<br>½ W 5% L.N.  | 540 1122 000   |
| 3C11               | Cap 300 pF 500 V           | 500 0784 000   | 3R8    | Res 150 ohm<br>½ W 5% L.N.  | 540 1117 000   |
| 3Q1,<br>3Q2        | Transistor                 | 380 0147 000   | 3R9    | Res 3.9K ohm<br>½ W 5% L.N. | 540 1137 000   |
|                    |                            |                | 3R10   | Res 3.3K ohm<br>½ W 5% L.N. | 540 1165 000   |
|                    |                            |                | 3R11   | Res 10K ohm<br>½ W 5% L.N.  | 540 1111 000   |

### AUDIO PREAMPLIFIER

**994 6911 001**

| SYMBOL           | DESCRIPTION                | GATES PART NO. | SYMBOL | DESCRIPTION                         | GATES PART NO. |
|------------------|----------------------------|----------------|--------|-------------------------------------|----------------|
| C1               | Cap 100 pF                 | 500 0759 000   | Q1,Q2  | Transistor<br>Selected TZ1218       | 380 0147 000   |
| C2               | Cap 240 pF                 | 500 0830 000   | Q3     | Transistor<br>MPS-U45<br>Darlington | 380 0179 000   |
| C3               | Cap 12 uF 35 V<br>Tantalum | 526 0060 000   | Q4     | Transistor<br>MPS-U95<br>Darlington | 380 0183 000   |
| C4<br>thru<br>C6 | Cap 50 uF 10 V<br>Tantalum | 526 0061 000   |        |                                     |                |
| C7               | Cap 100 uF 50 V            | 522 0394 000   | R1,R2  | Res 1 Megohm<br>½ W 5%              | 540 1162 000   |
| C8               | Cap 450 uF 50 V            | 522 0432 000   | R3     | Res 150 ohm<br>½ W 5%               | 540 1117 000   |
| C9               | Cap 15 pF                  | 500 0806 000   | R4     | Res 13K ohm<br>½ W 5%               | 540 1194 000   |
| CR1,<br>CR2      | Diode<br>MZ2361            | 384 0256 000   |        |                                     |                |

ELECTRICAL PARTS LIST - CONT'D.

AUDIO PREAMPLIFIER - CONT'D.

994 6911 001

| SYMBOL | DESCRIPTION                 | GATES PART NO. |          | SYMBOL  | DESCRIPTION           | GATES PART NO. |          |
|--------|-----------------------------|----------------|----------|---------|-----------------------|----------------|----------|
| R5     | Res 11K ohm<br>¼ W 1%       | 548            | 0282 000 | R11     | Res 10K ohm<br>½ W 5% | 540            | 1111 000 |
| R6     | Res 1K ohm<br>½ W 1%        | 548            | 0318 000 | R12     | Res 1K ohm<br>½ W 5%  | 540            | 1116 000 |
| R7     | Res 150K ohm<br>½ W 5%      | 540            | 1210 000 | R13     | Res 2K ohm<br>½ W 5%  | 540            | 1104 000 |
| R8     | Res 10K ohm<br>½ W 5%       | 540            | 1111 000 | R14     | Res 16K ohm<br>½ W 5% | 540            | 1195 000 |
| R9     | Res 3.9K ohm<br>½ W 5%      | 540            | 1137 000 | R15     | Res 100 ohm<br>½ W 5% | 540            | 1102 000 |
| R10    | Res Variable<br>10K ohm ¼ W | 550            | 0315 000 | R16,R17 | Res 10 ohm<br>½ W 5%  | 540            | 1151 000 |

OUTPUT/TRANSFORMER DECK

992 3422 001

| SYMBOL           | DESCRIPTION                      | GATES PART NO. |          | SYMBOL               | DESCRIPTION                   | GATES PART NO. |          |
|------------------|----------------------------------|----------------|----------|----------------------|-------------------------------|----------------|----------|
| C1,C2            | Cap 6000 uF 50 V<br>WO/INS. Case | 524            | 0171 000 | T18                  | Transformer<br>Monitor Remote | 478            | 0311 000 |
| C3,C4            | Cap 6000 uF 50 V<br>W/INS. Case  | 524            | 0150 000 | T23,<br>T24          | Transformer<br>Line           | 478            | 0310 000 |
| E1<br>thru<br>E4 | Standoff                         | 614            | 0347 000 | TB8                  | Terminal Board                | 927            | 8969 001 |
| K1<br>thru<br>K3 | Relay 4 PDT<br>48 V              | 574            | 0214 000 | TB11<br>thru<br>TB14 | Terminal Board                | 614            | 0160 000 |
| R185,<br>R186    | Res 82 ohm<br>½ W 5%             | 540            | 1225 000 |                      |                               |                |          |



**ELECTRICAL PARTS LIST - CONT'D.**

**PRINTED BOARD, RELAY DRIVER**

**992 3428 001**

| SYMBOL             | DESCRIPTION            | GATES PART NO. | SYMBOL           | DESCRIPTION                 | GATES PART NO. |
|--------------------|------------------------|----------------|------------------|-----------------------------|----------------|
| CR1                | Diode Zener<br>1N4732A | 386 0123 000   | R1<br>thru<br>R3 | Res 1000 ohm<br>½ W 5% L.N. | 540 1116 000   |
| CR2<br>thru<br>CR4 | Diode 1N2071           | 384 0020 000   | R4<br>thru<br>R6 | Res 820 ohm<br>2 W 5%       | 540 0609 000   |
| Q1<br>thru<br>Q3   | Transistor<br>2N4356   | 380 0151 000   | R7               | Res 10K ohm<br>2 W 5%       | 540 0635 000   |

**INPUT TERMINAL BOARD**

**TB1 (LEFT)**

**992 3424 001**

| SYMBOL             | DESCRIPTION                | GATES PART NO. | SYMBOL      | DESCRIPTION                  | GATES PART NO. |
|--------------------|----------------------------|----------------|-------------|------------------------------|----------------|
| R1,R2              | Res 270 ohm<br>½ W 5% L.N. | 540 1188 000   | R32         | Res 6.8K ohm<br>½ W 5% L.N.  | 540 1145 000   |
| R3                 | Res 75 ohm<br>½ W 5% L.N.  | 540 1148 000   | R33         | Res 150 ohm<br>½ W 5% L.N.   | 540 1117 000   |
| R4<br>thru<br>R7   | Res 270 ohm<br>½ W 5% L.N. | 540 1188 000   | R34         | Res 6.8K ohm<br>½ W 5% L.N.  | 540 1145 000   |
| R8                 | Res 75 ohm<br>½ W 5% L.N.  | 540 1148 000   | R35         | Res 150 ohm<br>½ W 5% L.N.   | 540 1117 000   |
| R9<br>thru<br>R12  | Res 270 ohm<br>½ W 5% L.N. | 540 1188 000   | R36,<br>R37 | Res 200K ohm<br>½ W 5% L.N.  | 540 1144 000   |
| R13                | Res 75 ohm<br>½ W 5% L.N.  | 540 1148 000   | R38         | Res 5.6K ohm<br>½ W 5% L.N.  | 540 1183 000   |
| R14<br>thru<br>R17 | Res 270 ohm<br>½ W 5% L.N. | 540 1188 000   | R39,<br>R40 | Res 6.2 K ohm<br>½ W 5% L.N. | 540 1106 000   |
| R18                | Res 75 ohm<br>½ W 5% L.N.  | 540 1148 000   | R41,<br>R42 | Res 100 ohm<br>2 W 5%        | 540 0587 000   |
| R19<br>thru<br>R22 | Res 270 ohm<br>½ W 5% L.N. | 540 1188 000   | R43         | Res 820 ohm<br>2 W 5%        | 540 0609 000   |
| R23                | Res 75 ohm<br>½ W 5% L.N.  | 540 1148 000   | R44,<br>R45 | Res 100 ohm<br>2 W 5%        | 540 0587 000   |
| R24,<br>R25        | Res 270 ohm<br>½ W 5% L.N. | 540 1188 000   | R46,<br>R47 | Res 10K ohm<br>½ W 5% L.N.   | 540 1111 000   |

ELECTRICAL PARTS LIST - CONT'D.

INPUT TERMINAL BOARD

TB2 (RIGHT)

992 3423 001

| SYMBOL             | DESCRIPTION                | GATES PART NO. |          | SYMBOL      | DESCRIPTION                 | GATES PART NO. |          |
|--------------------|----------------------------|----------------|----------|-------------|-----------------------------|----------------|----------|
| R26<br>thru<br>R31 | Res 100 ohm<br>½ W 5% L.N. | 540            | 1102 000 | R71,<br>R72 | Res 270 ohm<br>½ W 5% L.N.  | 540            | 1188 000 |
| R48,<br>R49        | Res 270 ohm<br>½ W 5% L.N. | 540            | 1188 000 | R73         | Res 6.8K ohm<br>½ W 5% L.N. | 540            | 1145 000 |
| R50                | Res 75 ohm<br>½ W 5% L.N.  | 540            | 1148 000 | R74         | Res 150 ohm<br>½ W 5% L.N.  | 540            | 1117 000 |
| R51<br>thru<br>R54 | Res 270 ohm<br>½ W 5% L.N. | 540            | 1188 000 | R75         | Res 6.8K ohm<br>½ W 5% L.N. | 540            | 1145 000 |
| R55                | Res 75 ohm<br>½ W 5% L.N.  | 540            | 1148 000 | R76         | Res 150 ohm<br>½ W 5% L.N.  | 540            | 1117 000 |
| R56<br>thru<br>R59 | Res 270 ohm<br>½ W 5% L.N. | 540            | 1188 000 | R77,<br>R78 | Res 200K ohm<br>½ W 5% L.N. | 540            | 1144 000 |
| R60                | Res 75 ohm<br>½ W 5% L.N.  | 540            | 1148 000 | R79         | Res 5.6K ohm<br>½ W 5% L.N. | 540            | 1183 000 |
| R61<br>thru<br>R64 | Res 270 ohm<br>½ W 5% L.N. | 540            | 1188 000 | R80,<br>R81 | Res 6.2K ohm<br>½ W 5% L.N. | 540            | 1106 000 |
| R65                | Res 75 ohm<br>½ W 5% L.N.  | 540            | 1148 000 | R82,<br>R83 | Res 100 ohm<br>2 W 5%       | 540            | 0587 000 |
| R66<br>thru<br>R69 | Res 270 ohm<br>½ W 5% L.N. | 540            | 1188 000 | R84         | Res 820 ohm<br>2 W 5%       | 540            | 0609 000 |
| R70                | Res 75 ohm<br>½ W 5% L.N.  | 540            | 1148 000 | R85,<br>R86 | Res 100 ohm<br>2 W 5%       | 540            | 0587 000 |
|                    |                            |                |          | R87,<br>R88 | Res 10K ohm<br>½ W 5% L.N.  | 540            | 1111 000 |

1152



ELECTRICAL PARTS LIST - CONT'D.

POWER SUPPLY PANEL ASSEMBLY

992 3421 001

| SYMBOL             | DESCRIPTION                   | GATES PART NO. | SYMBOL               | DESCRIPTION                                   | GATES PART NO. |
|--------------------|-------------------------------|----------------|----------------------|---|----------------|
| 2C1<br>thru<br>2C4 | Cap 900 uF<br>100 V           | 524 0146 000   | 2T25                 | Transformer<br>Gates Spec No.<br>815 5348 001 | 472 0734 000   |
| 2E1<br>thru<br>2E4 | Standoff                      | 614 0347 000   | 2TB1                 | Terminal Board                                | 927 8969 001   |
|                    |                               |                | 2TB2                 | Terminal Board<br>4 Terminals                 | 614 0160 000   |
| 2F1<br>thru<br>2F4 | Fuse                          | 398 0054 000   | 2XF1<br>thru<br>2XF4 | Fuse Holder                                   | 402 0119 000   |
| 2Q1<br>thru<br>2Q4 | Transistor                    | 380 0157 000   | 2XQ1<br>thru<br>2XQ4 | Socket, Transistor                            | 404 0294 000   |
| 2R1<br>thru<br>2R4 | Res 1 ohm<br>½ W 5%           | 540 1101 000   |                      |   |                |
| 2R5<br>thru<br>2R8 | Res 75K ohm<br>½ W 5% L.N.    | 540 1152 000   |                      |   |                |
| 2S1<br>thru<br>2S4 | Thermostat<br>Close at 100° C | 442 0021 000   |                      |   |                |

ELECTRICAL PARTS LIST - CONT'D.

POWER SUPPLY P.C. BOARD

992 3588 001

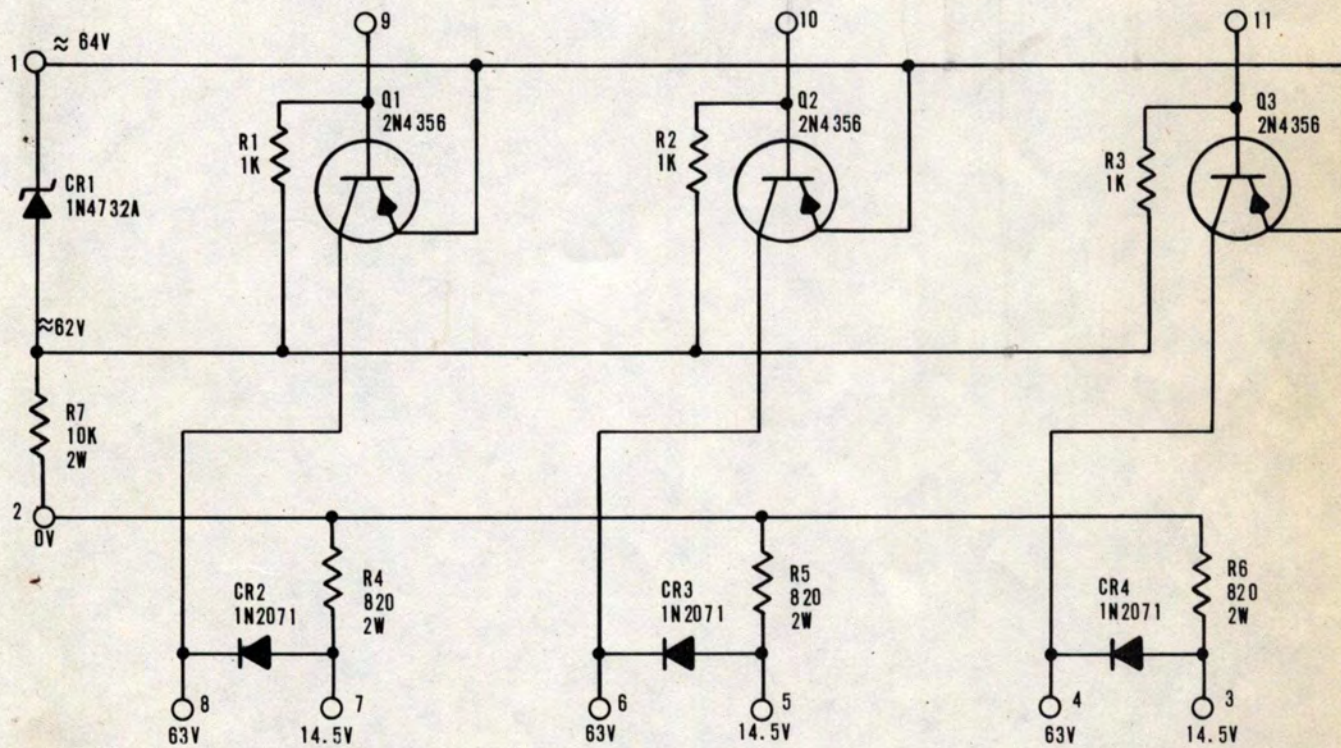
| SYMBOL               | DESCRIPTION         | GATES PART NO. | SYMBOL             | DESCRIPTION                 | GATES PART NO. |
|----------------------|---------------------|----------------|--------------------|-----------------------------|----------------|
| C1<br>thru<br>C4     | Cap .001 uF         | 516 0055 000   | R1<br>thru<br>R4   | Res 10 ohm<br>½ W 5% L.N.   | 540 1151 000   |
| C5<br>thru<br>C8     | Cap 100 pF          | 500 0759 000   | R5<br>thru<br>R8   | Res 100 ohm<br>½ W 5% L.N.  | 540 1102 000   |
| C9<br>thru<br>C12    | Cap 100 uF 50 V     | 522 0394 000   | R9<br>thru<br>R16  | Res 75K ohm<br>½ W 5% L.N.  | 540 1152 000   |
| C13<br>thru<br>C24   | Cap .01 uF          | 516 0082 000   | R17<br>thru<br>R20 | Res 1.3K ohm<br>½ W 5% L.N. | 540 1187 000   |
| C25                  | Cap 300 uF 100 V    | 522 0436 000   | R21<br>thru<br>R24 | Res 18K ohm<br>½ W 5% L.N.  | 540 1113 000   |
| C26<br>thru<br>C29   | Cap 470 pF          | 516 0043 000   | R25<br>thru<br>R32 | Res 3.0 ohm<br>10 W 5%      | 542 1162 000   |
| CR1<br>thru<br>CR24  | Diode 1N2071        | 384 0020 000   | R33<br>thru<br>R36 | Res 27 K ohm<br>½ W 5% L.N. | 540 1147 000   |
| CR25<br>thru<br>CR32 | Diode 1N3253        | 384 0282 000   | R37<br>thru<br>R40 | Potentiometer<br>10K ohm    | 550 0315 000   |
| CR33<br>thru<br>CR36 | Diode 1N5283        | 384 0305 000   | R41<br>thru<br>R44 | Res 3.3K ohm<br>½ W 5% L.N. | 540 1165 000   |
| CR37<br>thru<br>CR40 | Diode MZ2360        | 384 0255 000   | R45<br>thru<br>R48 | Res 7.5K ohm<br>½ W 5% L.N. | 540 1154 000   |
| CR41<br>thru<br>CR44 | Diode 1N4737        | 386 0106 000   | R49                | Res 12 ohm<br>1 W 5%        | 540 0286 000   |
| Q1<br>thru<br>Q4     | Transistor<br>40373 | 380 0156 000   | R50<br>thru<br>R53 | Res 10 ohm<br>½ W 5% L.N.   | 540 1151 000   |
| Q5<br>thru<br>Q16    | Transistor          | 380 0158 000   | R54<br>thru<br>R57 | Res 36 ohm<br>½ W 5% L.N.   | 540 1175 000   |

POWER SUPPLY TERMINAL BOARD

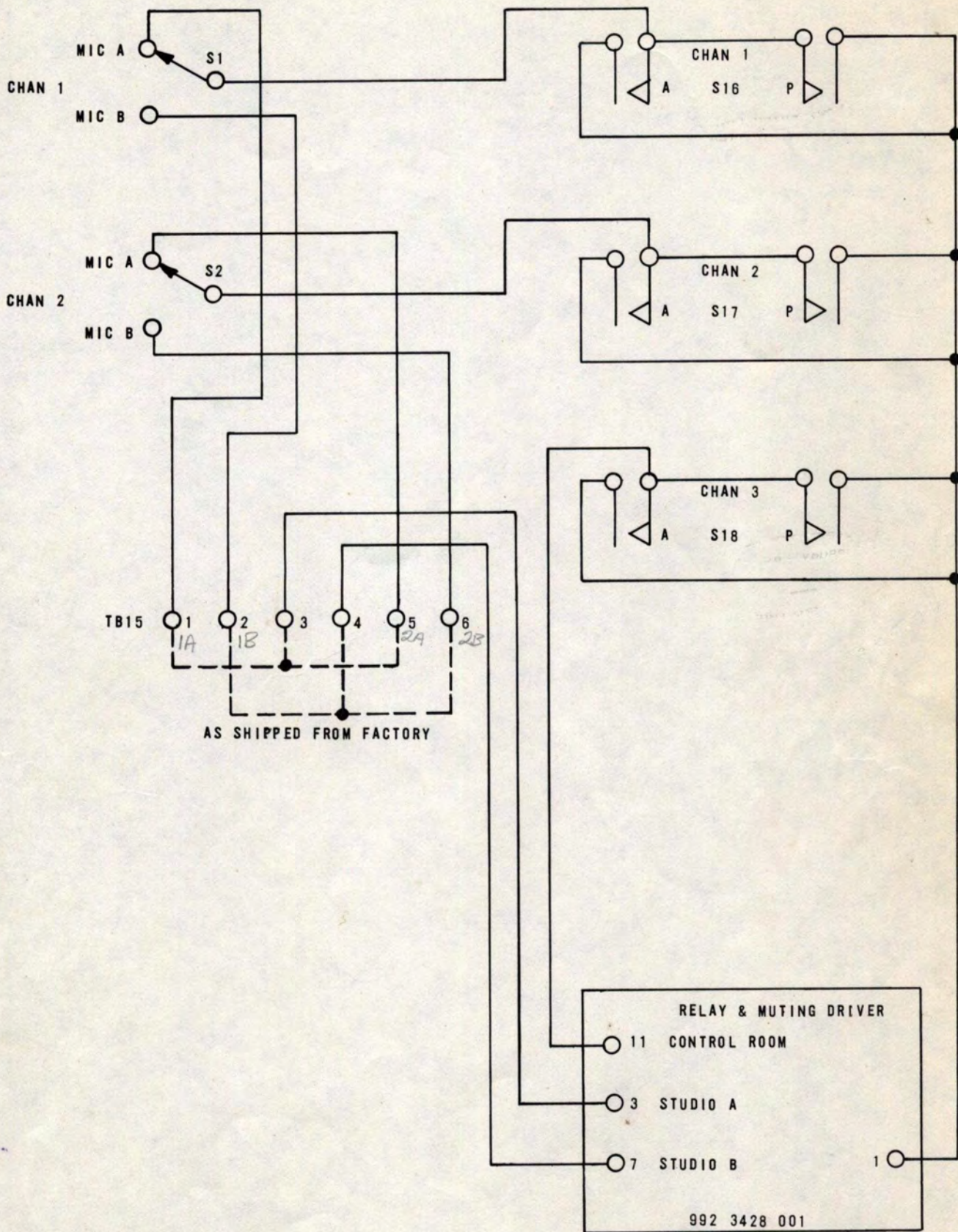
992 3407 001

| SYMBOL      | DESCRIPTION     | GATES PART NO. | SYMBOL | DESCRIPTION | GATES PART NO. |
|-------------|-----------------|----------------|--------|-------------|----------------|
| C3          | Cap 100 uF 50 V | 522 0394 000   |        |             |                |
| C24,<br>C25 | Cap 450 uF 50 V | 522 0432 000   |        |             |                |

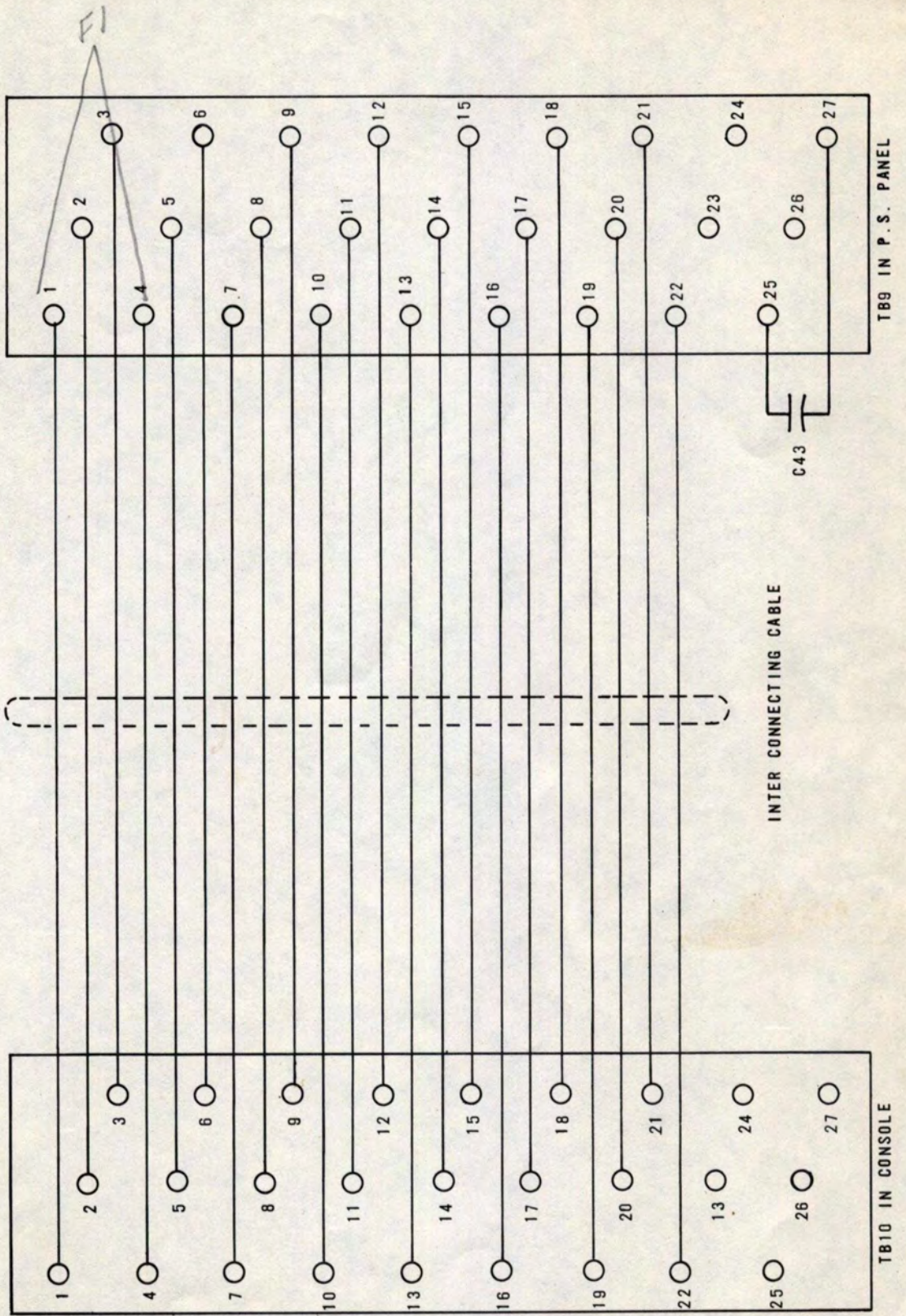




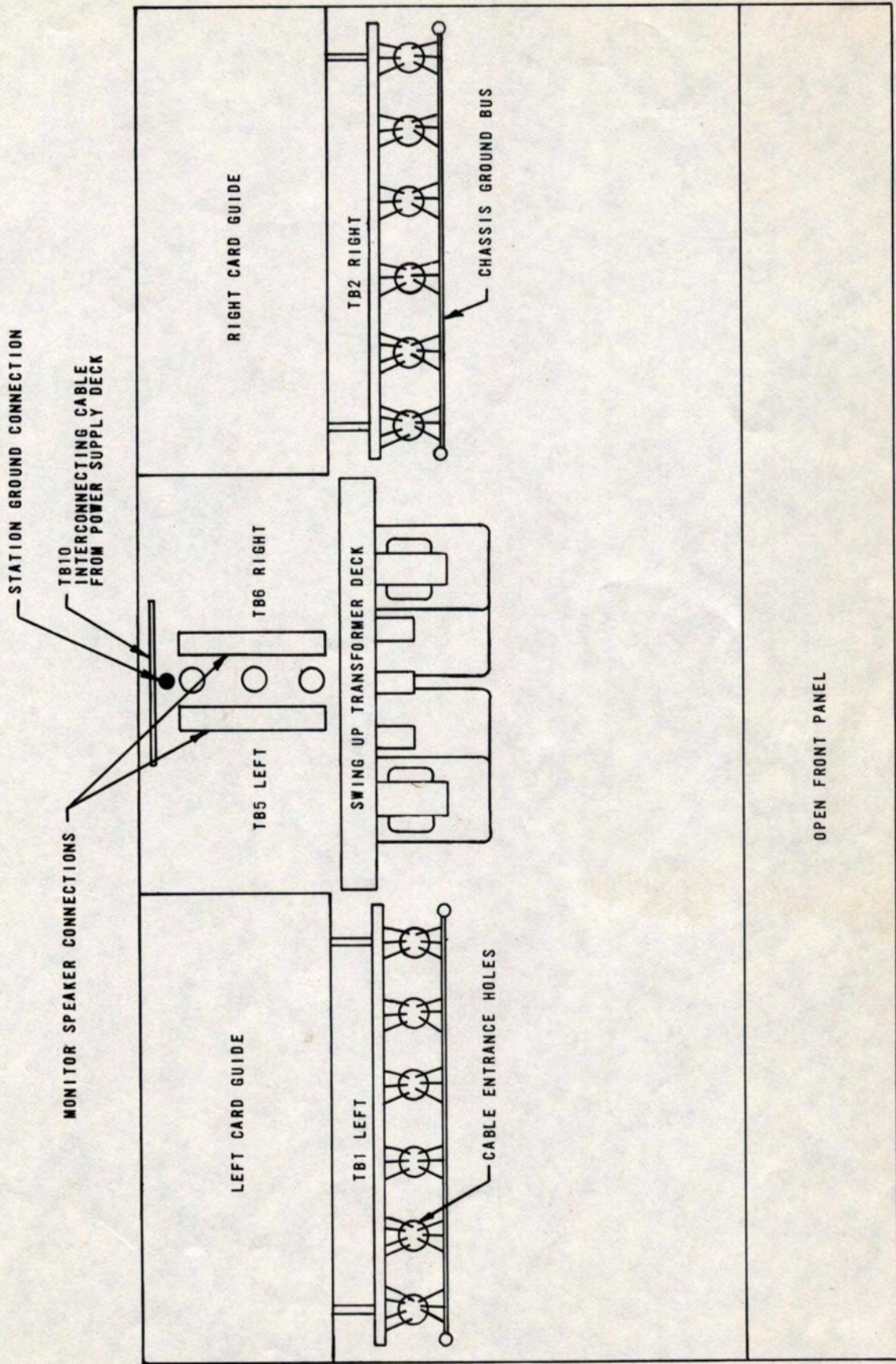








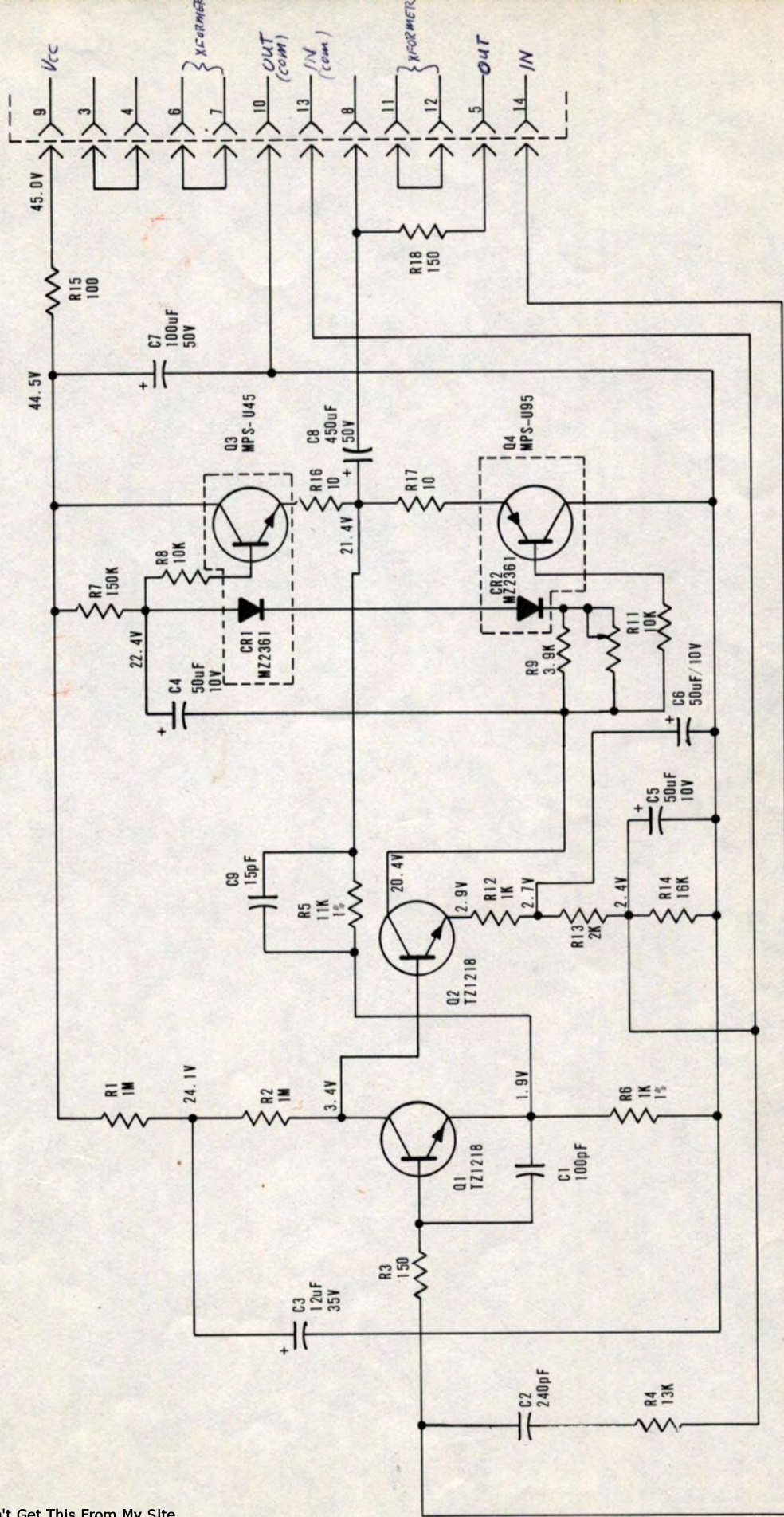












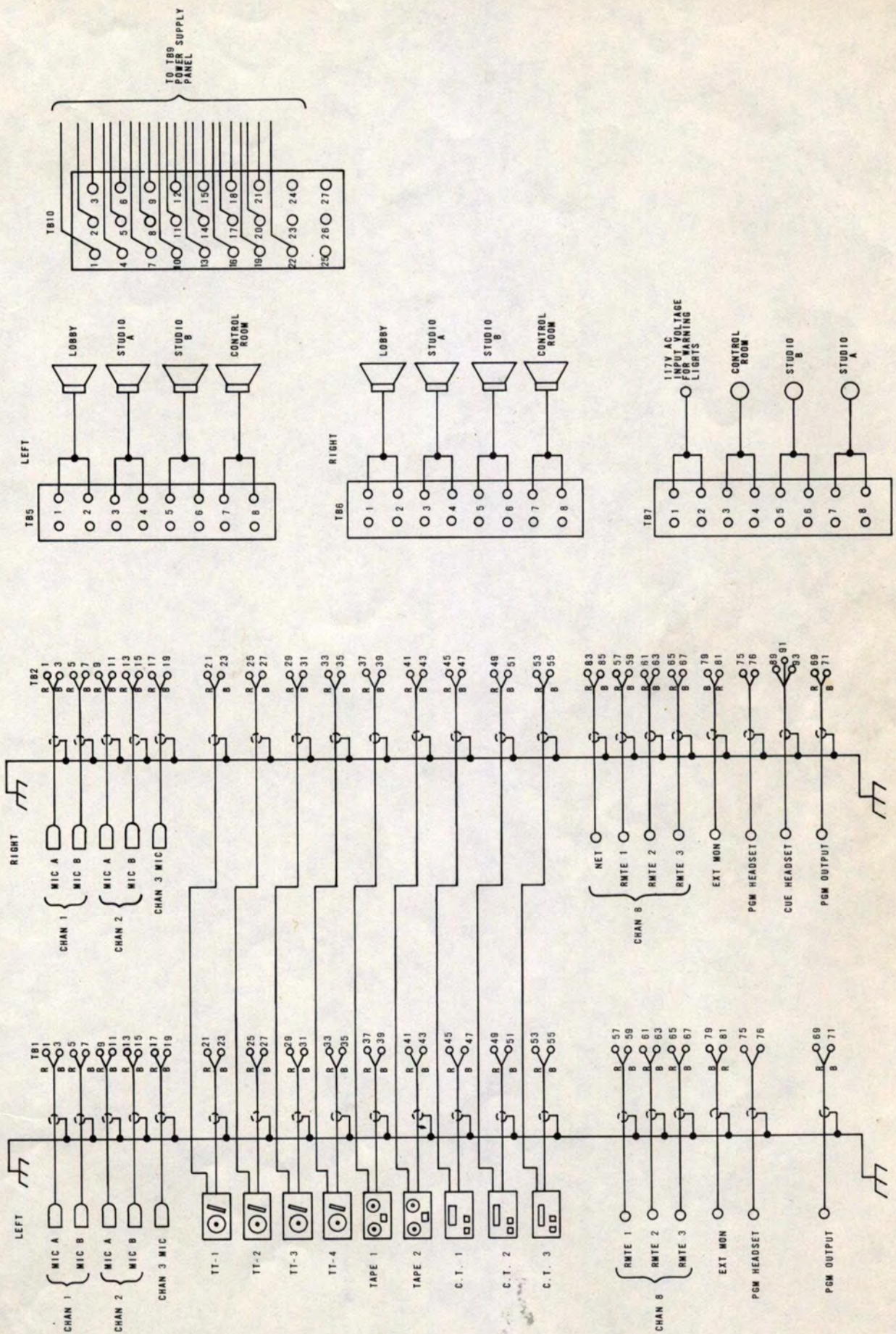
- 3. D. C. VOLTAGES ARE UNDER NO SIGNAL CONDITIONS
- 2. RESISTANCE IN OHMS
- 1. RESISTORS ARE 1/2 WATT 5% UNLESS OTHERWISE NOTED:

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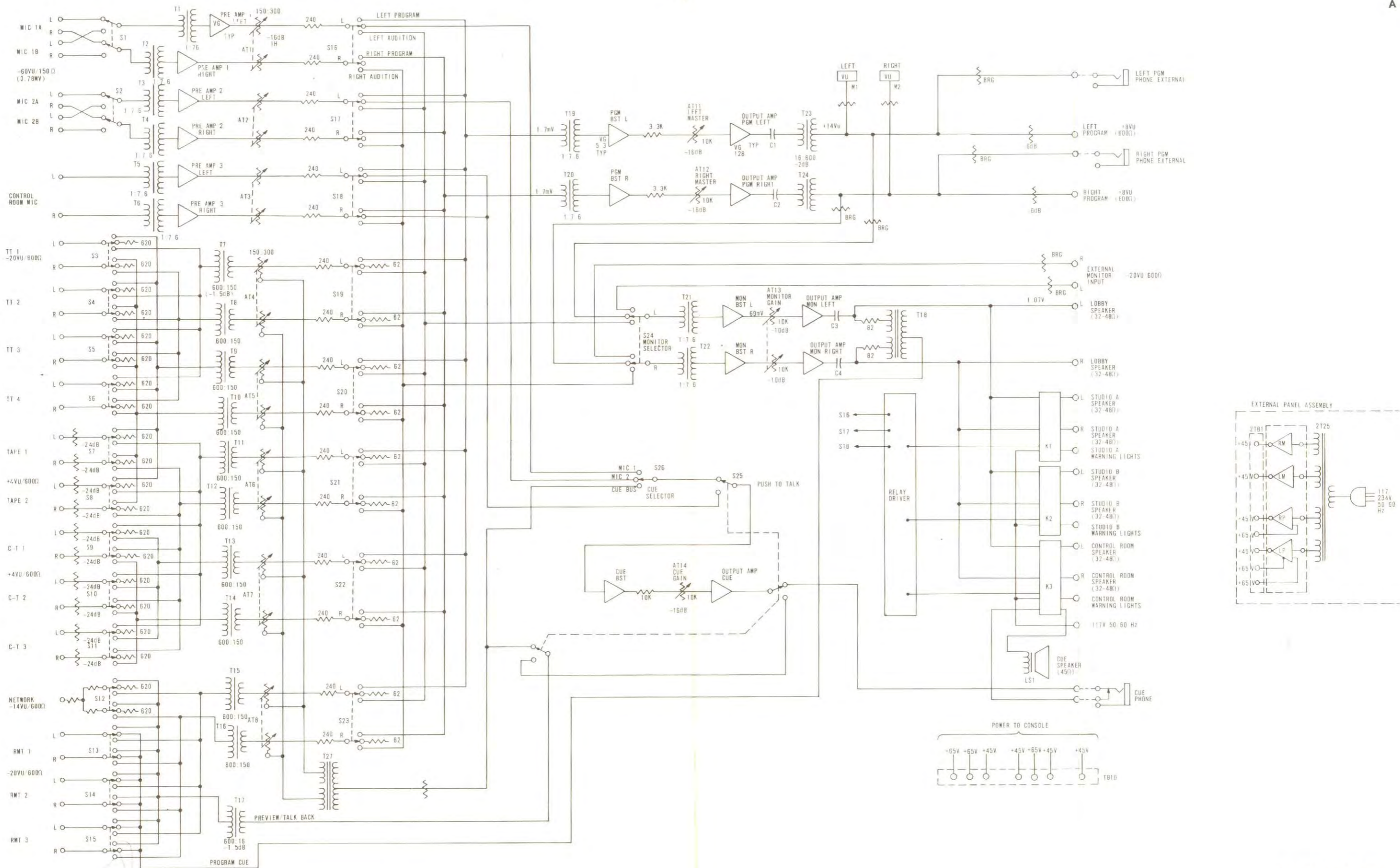










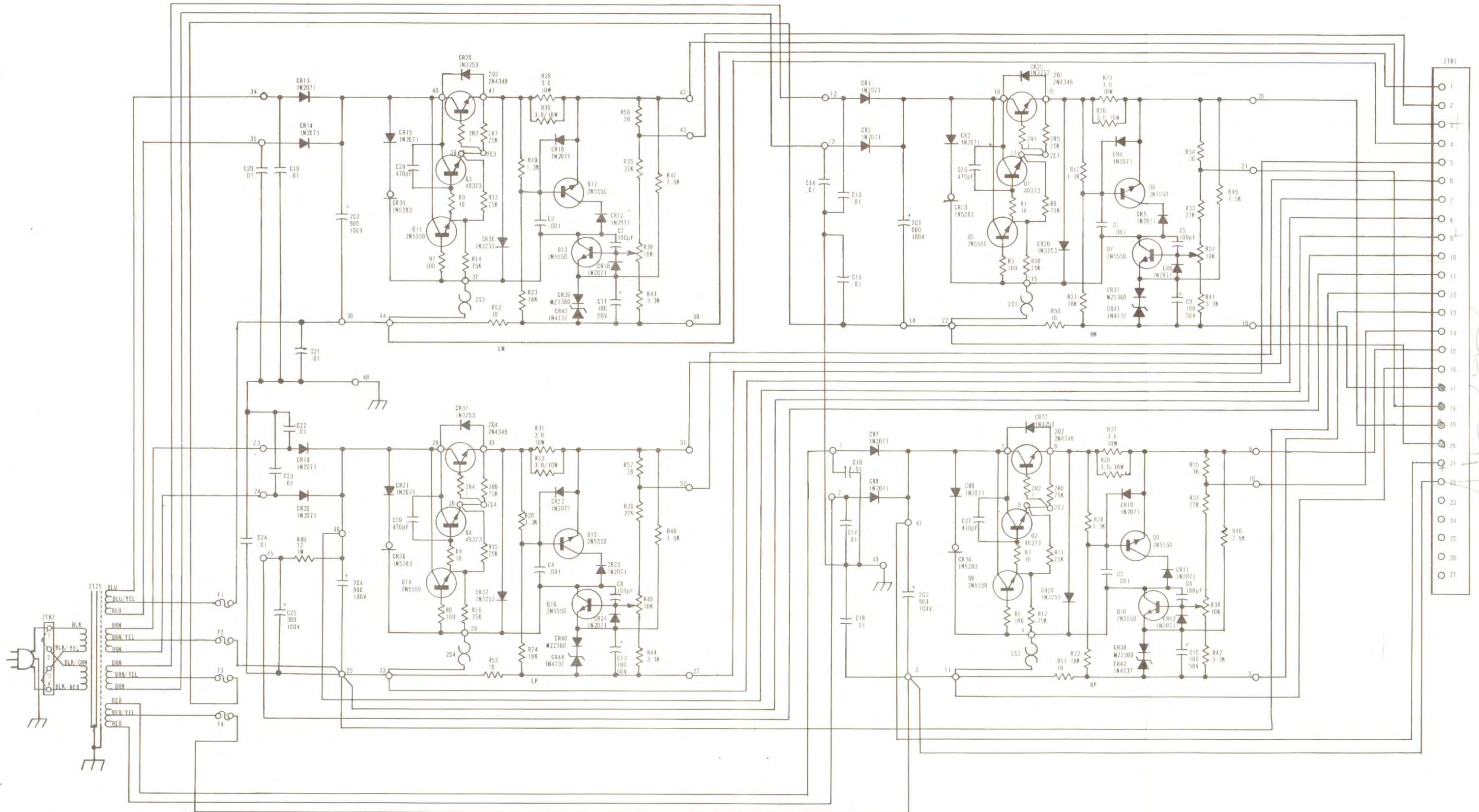


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BLOCK DIAGRAM  
 STEREO 80 CONSOLE  
 842 6555 001





3. CAPACITANCE IN  $\mu$ F  
 2. RESISTANCE IN OHMS  
 1. RESISTORS ARE 1/2 WATT 5%  
 UNLESS OTHERWISE NOTED:

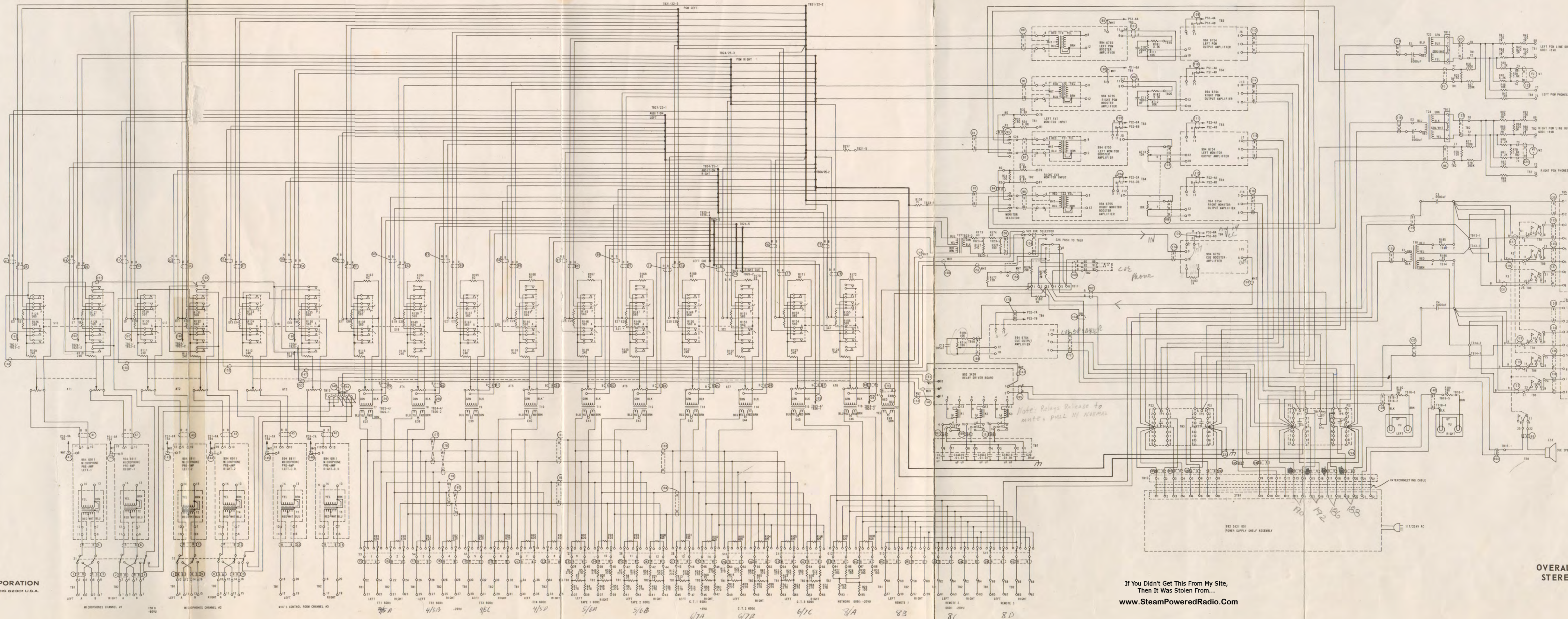
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POWER SUPPLY PANEL  
 STEREO 80  
 842 7179 001



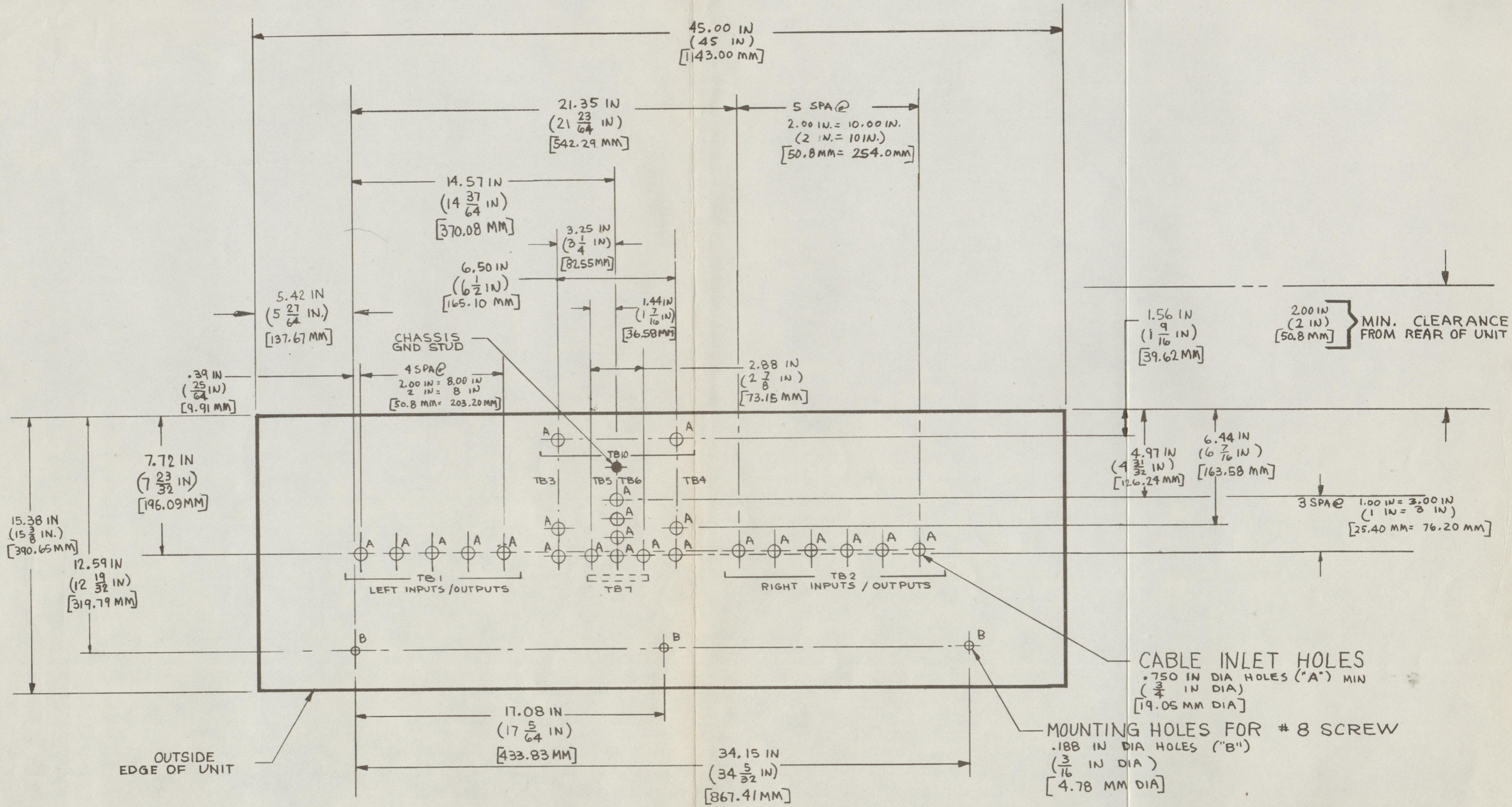
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OVERALL SCHEMATIC  
 STEREO 80 CONSOLE  
 852 6795 001





TOP VIEW

↓  
FRONT OF STEREO CONSOLE

- 3 NOTE: RACK MOUNTED POWER SUPPLY
- 2 SCHEMATIC 828-0021-00X MUST BE USED FOR SYMBOL REFERENCE
- 1 LAYOUT AND DRILL HOLES PER DIMENSIONS ABOVE. MAKE SURE THAT CLEARANCES FROM EDGE OF UNIT (AS SHOWN ABOVE) ARE MAINTAINED.

NOTES:

HARRIS CORPORATION Gates Broadcast Equipment Division  
123 Hampshire Street, Quincy, Illinois 62301

Warning, disconnect primary power prior to servicing.

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CABLE INLET AND MOUNTING DIMENSIONS  
STEREO 80 CONSOLE  
839 0728 001



ADDENDUM

STEREO 80 CONSOLE

TECHNICAL MANUAL 888 1152 001

INTRODUCTION

The Stereo 80 Console includes two new features, Studio Intercom and Audition Outputs, which are not documented in this Technical Manual. A revised Technical Manual will be available in November. A copy is reserved for you and will be supplied without charge upon request. Please forward your request for manual 888 1515 001 to the following address:

Engineering Records Dept.  
Harris Corporation  
Gates Broadcast Equipment Division  
123 Hampshire Street  
Quincy, Illinois 62301

STUDIO INTERCOM

The Studio Intercom feature permits talkback to Studio A and Studio B locations. The remote talkback capability is not affected by this modification and operates as described in the Technical Manual.

Installation. Connections for studio intercom speakers are provided on terminal boards TB-5 and TB-6. Using No. 22 twisted wire, or larger, connect the Studio A intercom speaker to terminals 9 and 10 on TB-5. Connect Studio B intercom speaker to terminals 9 and 10 on TB-6.

Operation. Talkback to Studio A and Studio B is accomplished as follows:

- a. Set input selector switches NET, RMT 1, RMT 2, and RMT 3 to PROGRAM CUE or MIX. This will prevent a studio conversation from going out on the remote or net lines.
- b. Set the CUE SEL switch to either MIC 1 or MIC 2, depending on the studio microphone assignment. This permits studio conversations to be heard through the console cue system. Use the console CUE GAIN control to adjust the level of the cue speaker.
- c. With the control room (CH. 3) Program-Audition key switch in the center position, place the TALKBACK switch in the TALK position and talk into the control room microphone. This conversation will be heard in both studios. Use the channel gain control (CH. 3) to adjust the level going out to the studios.



## AUDITION OUTPUTS

The audition outputs, which are independent of the monitor circuitry, provide a convenient source for recording and may be used for other purposes. This feature permits the operator to record from any channel selected for audition while simultaneously monitoring the channel selected for broadcast.

### Specifications for Audition Circuits.

|                     |  |
|---------------------|--|
| Maximum Gain:       | Mic-Aud Out (Channels 1,2,3) 48, $\pm 2$ dB<br>Med-Aud Out (Channels 4,5,6,7) 8, $\pm 2$ dB<br>Net-Aud Out (Channel 8) 2, $\pm 2$ dB |
| Frequency Response: | $\pm 1$ dB, 20 to 20,000 Hz  |
| Distortion:         | Less than 0.5%, 20 to 20,000 Hz  |
| Output Impedance:   | 600 ohms, balanced   |

Installation. The left and right audition outputs are 600 ohm, balanced, and provide a -26 dBm output level. The left audition output is available on terminals 95 and 97 of TB-1; the right audition output is available on terminals 95 and 97 of TB-2.

Operation. A signal is applied to the audition outputs when the Program-Audition key switch of any mixing channel (CH. 1-CH. 8) is placed in the Audition (A) position. Placing the MON. SEL. switch in the AUD. position also applies this signal to the monitor circuits.

The following paragraph replaces the fifth paragraph under 3.1, CONTROL ADJUSTMENTS:

"Operate the Channel 4 key switch to the "A" position to remove the signal from the program channel and connect it to the audition channel. There will be a signal present at the audition output terminals. Moving the monitor selector switch to the AUD position allows monitoring of the audition channel with the same monitor speaker level as before."



MINIMIZING RADIO-FREQUENCY  
INTERFERENCE IN AUDIO CONSOLES

In general, RFI at AM broadcasting frequencies may be eliminated by normal grounding and shielding techniques during installation of the console:

- a) Connecting the console ground stud to the station ground;
- b) Connecting the shields of the signal cables only to the ground busses in the console (one-point ground system);
- c) Keeping the console panel and cover closed.

RFI at FM/TV frequencies presents a special problem, and may be minimized or eliminated by making short connections and direct dressing of the cables during installation;

- a) Route the external cables through the individual holes in the bottom of the console which are closest to the required connections on the terminal boards.
- b) Connect each cable shield to the nearby heavy ground-bus wire where the cables pass this point.

Note - Cable shields should not protrude into the console cabinet for more than two inches. Each connection from the shield to the ground-bus wire should not be more than one inch long. Do not allow slack shielded cables to lie in the console cabinet.

- c) Twist the exposed (unshielded) portion of each pair of signal wires and dress them directly to their required connections on the terminal boards.

6/25/73

Gates Division  
Harris Intertype Corporation  
Quincy, Illinois



ADDENDUM

STEREO 80 CONSOLE

TECHNICAL MANUAL #888 1152 001

The overall schematic, drawing number 852-6795-001 is in error as follows:

1. The network input level should be -14 VU.
2. On TB17 wire #164 black should connect to terminal #4. A jumper wire should connect between terminals #3 and #6.
3. The power supply distribution board TB4 should be connected as follows:

Wire #186 red connects to PS1 terminal 2A.

Wire #186 black connects to PS1 terminal 5B.

Wire #188 red connects to PS1 terminal 5A.

Wire #188 black connects to PS1 terminal 5B.

Wire #190 red connects to PS2 terminal 2A.

Wire #190 black connects to PS2 terminal 5B.

Wire #192 red connects to PS2 terminal 5A.

Wire #192 black connects to PS2 terminal 5B.

6/25/73



## SAFETY NOTICE

WARNING: THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS AND UNDER CERTAIN CONDITIONS, COULD BE FATAL.

This Manual is intended as general guidance for trained and qualified installation, operating, maintenance and service personnel who are familiar with and aware of the dangers inherent to handling potentially hazardous electrical and/or electronic circuits. It is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

THE INSTALLATION, OPERATION, MAINTENANCE AND SERVICING OF THIS EQUIPMENT INVOLVES RISKS TO BOTH PERSONNEL AND EQUIPMENT, AND MUST BE PERFORMED ONLY BY PROPERLY TRAINED AND EXPERIENCED PERSONNEL EXERCISING DUE CARE. PERSONNEL MUST FAMILIARIZE THEMSELVES WITH SAFETY REQUIREMENTS, SAFE HANDLING AND OPERATING PRACTICE, AND RELATED FIRST-AID PROCEDURES (E.G., FOR ELECTRICAL BURNS AND ELECTRICAL SHOCK).

Gates shall not be responsible for injury or damage resulting from improper installation, operation, maintenance or servicing, or from the use of improperly trained or inexperienced personnel in the performance of such tasks, or from the failure of persons engaged in such tasks to exercise due care.

As with all electronic equipment, care should be taken to avoid electrical shock in all circuits where substantial currents or voltages may be present, either thru design or short circuit. Caution should also be observed in lifting and hoisting equipment, especially regarding large structures, during installation.

## LIABILITY LIMITATION

The procedures outlined in this Manual are based on the information available at the time of publication and should permit the specified use with minimum risk. However, the manufacturer cannot assume liability with respect to technical application of the contents and shall, under no circumstances, be responsible for damage or injury (whether to person or property) resulting from its use.

The manufacturer is specifically not liable for any damage or injury arising out of failure to follow the instructions in this Manual or failure to exercise due care and caution during installation, operation, maintenance and service of this equipment.

## CAUTIONARY NOTICE

Always disconnect power before opening covers, doors, enclosures, gates, panels or shields. Always use grounding sticks and short out high voltage points before servicing. Never make internal adjustments, perform maintenance or service when alone or when tired.

Never remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields. Keep away from live circuits, know your equipment and don't take chances. Proper training of experienced personnel and observing the above guidelines will help assure safe and continued operation of this equipment.

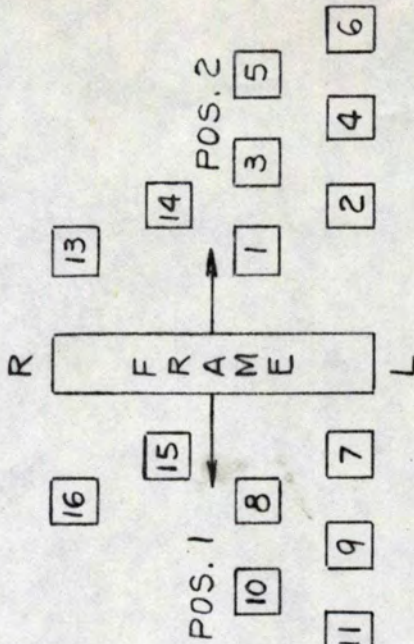
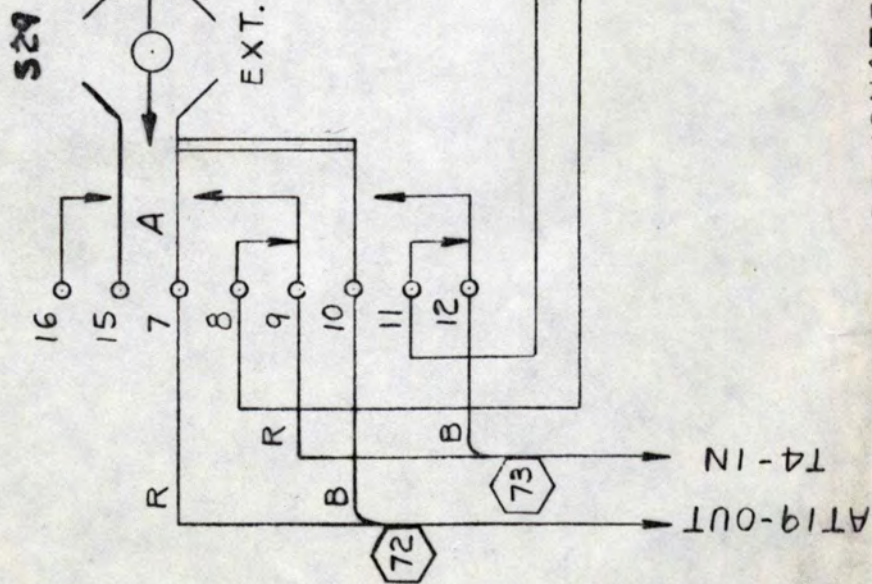


DRAWING NUMBER

A-11569

S29

EXT.



MOSSMAN SERIES 4800 SWITCH  
 POS. 1 LOCKING, L: 2 FORM "D"  
 R: 1 FORM "A"  
 POS. 2 LOCKING, L: 2 FORM "D"  
 R: 1 FORM "A"

DESIGNATES  
 WIRE NUMBER

WIRING DETAIL S29, FOR  
 M5236 DUALUX CONSOLE

UNLESS OTHERWISE SPECIFIED,  
 ALL TOLERANCES PER GATES  
 SPEC GS/M102.

DRAWING NUMBER

A-11569

MTL

PHL

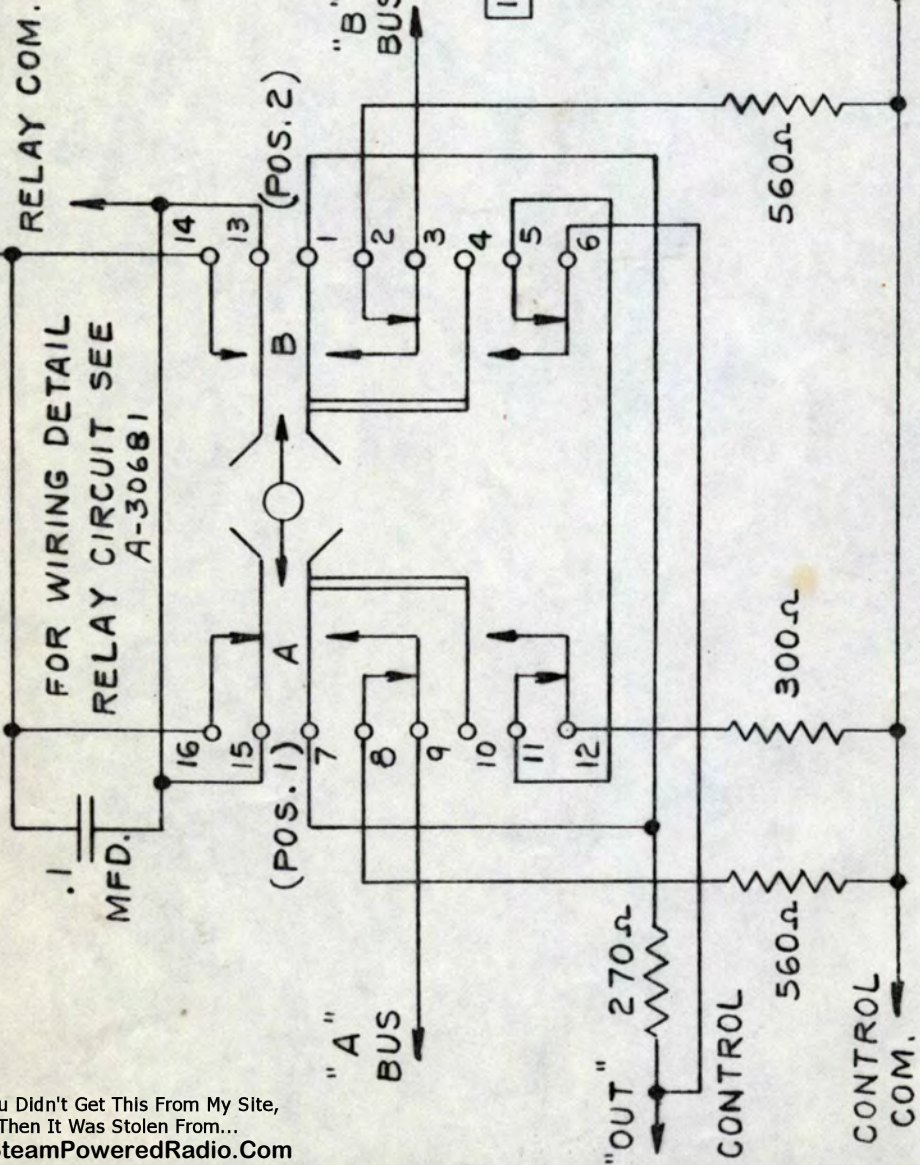
DR. BY D.L. CH. BY W.J.K. ENG. APR. 1958  
 DATE 3-13-56 DATE 3-15-56 DATE 3-15-56

PCN 4/2/58  
 AWC 4/3/58

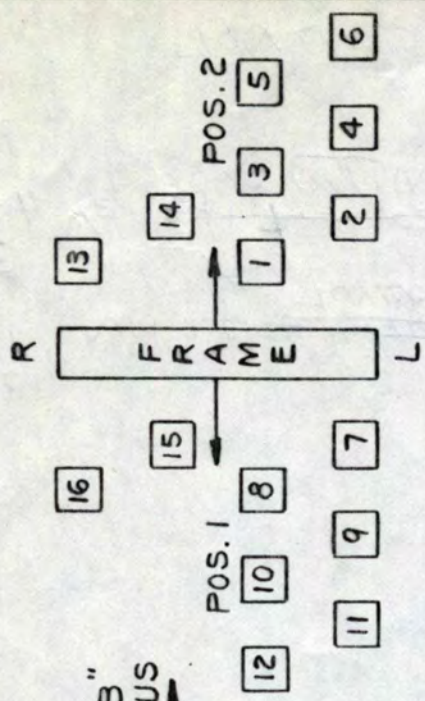
GATES RADIO COMPANY  
 QUINCY, ILLINOIS



RELAY



PART 1 AS SHOWN  
 PART 2 CONTACTS #13,14,15,  
 AND 16 NOT USED.



FOR WIRING DETAIL  
 RELAY CIRCUIT SEE  
 A-30681

SCHEMATIC, MIXING SYSTEM, ONE  
 SECTION M5236A DUAL CONTROL CONSOLE

MTL FIN.

DR. BY D.L. CH. BY W.J.K. ENG. APR. 1958  
 DATE 3-14-58 DATE 3-15-58

GATES RADIO COMPANY  
 QUINCY, ILLINOIS

UNLESS OTHERWISE SPECIFIED,  
 ALL TOLERANCES PER GAITES  
 SPEC GSMT02.

DRAWING NUMBER  
 A-31185

MOSSMAN SERIES 4800 SWITCH  
 POS.1 LOCKING L: 2 FORM "D"  
 R: 1 FORM "A"  
 POS. 2 LOCKING L: 2 FORM "D"  
 R: 1 FORM "A"

S30, 31, 32, 33, 34 - PART 1  
 S36, 37, 38, 39 - PART 2



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Phone: 222-8200, Area 217

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