

# BMX

## Technical Manual



**PACIFIC RECORDERS AND ENGINEERING CORPORATION**  
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# **BMX TECHNICAL MANUAL**

## **Section 1 GENERAL INFORMATION**

- 1.1 Introduction
- 1.2 Description
- 1.3 Specifications
- 1.4 Dimensional Drawings

## **Section 2 INSTALLATION**

- 2.1 Introduction
- 2.2 Grounding
- 2.3 Cable Preparation
- 2.4 Power Supply Connection
- 2.5 Audio Circuits Connection
- 2.6 Logic Circuits Connection
- 2.7 Microphone Module Logic
- 2.8 Line Module Logic
- 2.9 Warning Command Logic

## **Section 3 SET UP AND OPERATION**

- 3.1 Operating Controls
- 3.2 Level Alignment
- 3.3 Audio Patch Facilities

## **Section 4 EQUIPMENT DESCRIPTION**

- 4.1 Mainframe
- 4.2 Power Supply
- 4.3 Microphone Input Module
- 4.4 Line Input Module
- 4.5 Stereo Output Module
- 4.6 Monaural Output Module
- 4.7 Control Monitor Module
- 4.8 Studio Monitor Module
- 4.9 Remote Switcher Module

## **Section 5 MAINTENANCE**

- 5.1 Routine Maintenance
- 5.2 Trouble Shooting
- 5.3 Spare Parts

## **Section 6 OPTIONS AND MODIFICATIONS**

- 6.1 Microphone Input Module
- 6.2 Line Input Module
- 6.3 Utility Mix Buss

## **Section 7 DRAWINGS, SCHEMATICS AND PARTS LISTS**

- 7.1 Stereo Block Diagram
- 7.2 Connector Panel Diagram
- 7.3 Mainframe Wiring
- 7.4 Microphone Input Module - Audio
- 7.5 Microphone Input Module - Logic
- 7.6 Line Input Module - Audio
- 7.7 Line Input Module - Logic
- 7.8 Control Room Monitor Module
- 7.9 Control Room Monitor module - Switching
- 7.10 Studio Monitor/Talkback Module
- 7.11 Studio Monitor/Talkback Module - Switching
- 7.12 Stereo Line Output Module
- 7.13 Monaural Line Output Module
- 7.14 Timer Control Panel
- 7.15 Remote Line Selector Module
- 7.16 Meter Buffer Amp
- 7.17 50-1 Power Supply
- 7.18 50-2 Power Supply
- 7.19 99-73 Power Supply
- 7.20 Parts List

## **Section 8 ADDENDUMS**



# **BMX TECHNICAL MANUAL**

## **Section 1 GENERAL INFORMATION**

### **1.1 INTRODUCTION**

This manual is designed to provide the necessary information required to understand, install, operate, and maintain the series BMX broadcast audio console. It is assumed that the reader has a working knowledge of audio control consoles, systems, and installation practices. The BMX series console, however, is a sophisticated device featuring many advanced technologies. Should you encounter any difficulty during installation or initial operation, we recommend that you contact the factory for assistance. Each BMX console is configured to the customer's specifications, thoroughly tested, and burned in for over one hundred (100) hours prior to shipment.

### **1.2 DESCRIPTION**

The BMX console is a high performance, compact, audio-control system designed to meet the most exacting on-air broadcast requirements. There are three BMX mainframe sizes available which will accommodate 14, 22 and 26 input modules. These mainframes feature identical output channel, monitoring, and remote line switching functions. In order to realize the maximum potential of a BMX console, it is important that the user fully acquaint himself with, not only the audio mixing and control functions, but also realize and appreciate the extensive logic functions designed to control and be controlled by the peripheral equipment. The accompanying block diagram shows, not only the audio signal flow, but also details the numerous control command inputs and outputs that are available to the user at both microphone and line input positions. Most of these logic control functions have not been previously available in an off-the-shelf console. Indeed, most of these features were developed in our System One series custom consoles and, therefore, have proved their utility, functionality, and reliability in major broadcast installations over the past four years. The block diagram presents a concise picture of the internal workings of the complete console system. This diagram can be very useful in determining how best to utilize your BMX console, as a reference to understanding the operating functions and features, and for use in trouble shooting.

The console has been designed functionally, mechanically, and electronically to provide the maximum in performance for cost of any currently available broadcast console. Highest quality components are used throughout the console. Glass epoxy P.C. Boards with gold-plated contact fingers mate with bifurcated gold-plated edge connectors. Potentiometers are low-noise, conductive plastic controls, and switches are wiping-action, low-noise, long-life units.

The gain structure of the console is such that normal operation is easily achieved without danger of internal clipping while operating the amplifiers at optimum signal to noise conditions. The standard input modules accommodate the range of input levels normally found in broadcast operations without the use of external pads or amplifiers. A patch point is provided at each input position after the input amplifier and before the fader. This is the optimum point at which to insert external processing devices such as limiters and equalizers. Patch points are also provided in each output channel after the mixing amplifier and before the line output amplifier.

All console inputs and program outputs are transformer isolated for best noise rejection, simplified system grounding, and maximum protection against auxiliary equipment failures. When properly installed, using the information in this manual, the BMX console is free of internal switching pops, clicks, and RFI.

The separately packaged power supply is fully regulated and is protected with fuses as well as electronic safeguards against excessive current and line-voltage fluctuations. The power supply provides three separate voltage outputs. Two of these outputs,  $\pm 16$  volts are used to power the audio circuitry. The third output, +12 volts, is used to power the logic control circuitry, lamps, and relays. An optional +48 volt output is available for the powering of condenser microphones connected to the console.

## 1.3 SPECIFICATIONS

### Microphone Input

Source Impedance	150 ohms
Input Impedance	10 times source impedance, balanced and floating
Input Level	Adjustable from -60dBv to -35dBv (Reference 0.775V)
Input Headroom	Greater than 30dB above nominal input level.

### High Level Input

Source Impedance	600 ohms
Input Impedance	10K ohms, balanced and floating
Input Level	Adjustable from -12dBm to +8dBm
Input Headroom	Greater than 30dB above nominal input level.

### Program, Audition, Monaural Outputs

Load Impedance	600 ohms
Source Impedance	Less than 95 ohms
Nominal Output Level	+8 dBm, adjustable
Maximum Output Level	+28 dBm, 600 ohm load
Output Headroom, above +8dBm	Greater than 20dB

### Monitor Outputs

<b>Main Output</b>	
Output Impedance	600 ohms, unbalanced
Load Impedance	5K ohms or greater
Output Level	0 dBm nominal, +20dBm Maximum
<b>Headphone Output</b>	
Output Impedance	75 ohms, resistor feed
Load Impedance	8 ohms or greater
Output Level	0 dBv nominal, +20 dBv maximum. (Reference 0.775V)
<b>Cue Output</b>	
Output Impedance	10 ohms
Load Impedance	45 ohms or greater
Output Level	0 dBv nominal, +20 dBv maximum. (Reference 0.775V)

### Frequency Response

<b>Microphone Input (150 ohm) to program output</b>	
20Hz to 15KHz	+0, -1dB
20Hz to 20KHz	+0, -1.5dB
<b>Line Input (600 ohm) to program output</b>	
20Hz to 15KHz	+0, -1dB
20Hz to 20KHz	+0, -1.8dB

### Noise

<b>Microphone Input Amplifier</b>	-127dBvRMS (reference 0.755V) equivalent input noise, 150 ohm source, 20KHz band width
<b>High Level Input Amplifier</b>	-112dBm RMS, equivalent input noise, 600 ohm source, 20KHz band width
<b>Output noise with one microphone channel ON, fader at -15dB attenuation, input sensitivity at -50dBv</b>	-75db below output, (reference +8dBm), 150 ohm source, 20KHz bandwidth
<b>Output noise with one Line channel ON, fader at -15dB attenuation, input sensitivity at +8dBm</b>	-82db below output, (reference +8dBm), 600 ohm source, 20KHz bandwidth
<b>Output noise with no input channels on</b>	-84dB below output, (reference +8dBm), 20KHz bandwidth

### Distortion, T.H.D.

<b>Microphone Input to program output</b>	Less than 0.025% at 1KHz, Less than 0.3% at +28dBm, 30Hz to 20KHz
<b>Line Input to program output</b>	Less than 0.015% at 1KHz, Less than 0.3% at 28dBm, 30Hz to 20KHz

### Distortion, I.M.

<b>Microphone Input to program output (+8dBm)</b>	Less than 0.02% SMPTE
<b>Line Input to program output (+8dBm)</b>	Less than 0.01% SMPTE

### Square Wave Response

<b>Microphone Input to program output</b>	Rise time less than 10 $\mu$ sec. Overshoot or ringing: None
<b>Line Input to program output</b>	Rise time less than 12 $\mu$ sec. Overshoot or ringing: None

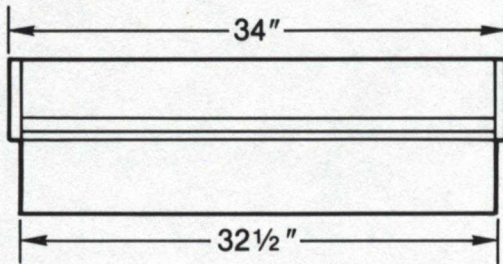
### Crosstalk

<b>Adjacent busses, all bus assignments on, all inputs on</b>	Less than -85 dB at 1 KHz Less than -75 dB at 20 KHz
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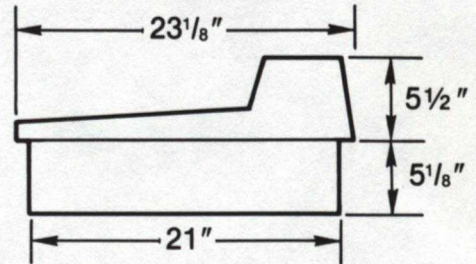


## 1.4 DIMENSIONAL DRAWINGS

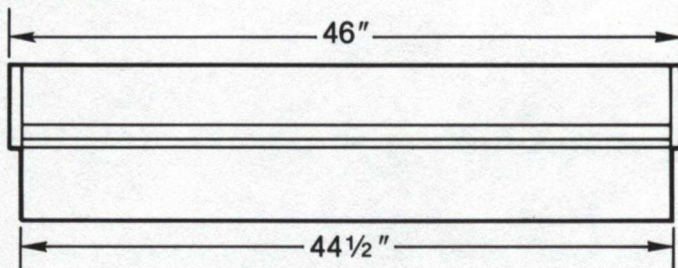
**BMX-14**



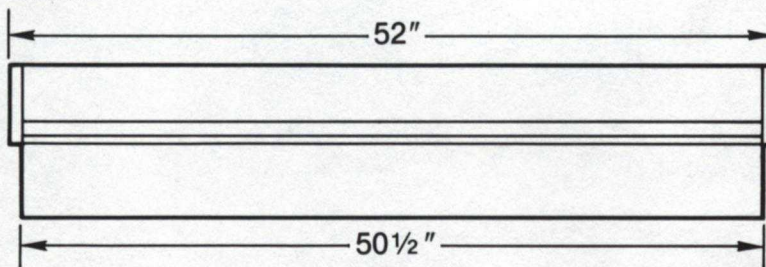
**ALL MODELS**



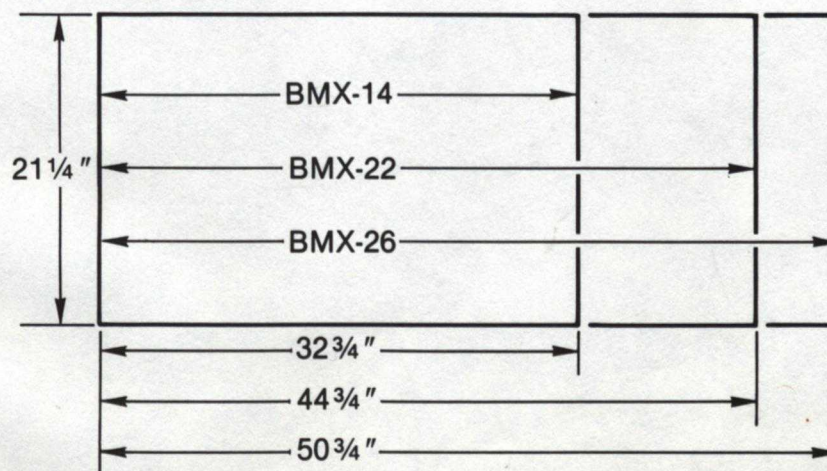
**BMX-22**



**BMX-26**



## CUTOUT DIMENSIONS



Section 2  
INSTALLATION

## Section 2 INSTALLATION

### 2.1 INTRODUCTION

Installation of the BMX is remarkably easy for a console of its sophistication. The console is physically installed by setting it into a cutout in the work surface of the studio cabinetry. Signal and power connection to the console is made to the connector panel located at the rear of the console. This panel is recessed to provide the broadcaster flexibility of wire routing in console installation. Care should be taken to avoid locating the console within six feet of any intense electromagnetic hum fields such as are produced by large power transformers and motors. Likewise, cables to and from the console should be routed to achieve maximum practical distance from AC power wiring.

Before beginning the installation, a plan should be drawn up showing how support equipment will be connected to the console. All cables and connectors should be tagged with legends and/or numbers, and logged.

### 2.2 GROUNDING

Grounding in modern broadcast consoles is more critical than older devices of more limited band-pass capabilities. Achieving low ground system impedance within a small piece of equipment is relatively easy. However, the problem becomes progressively more difficult as the system becomes larger. In designing the BMX, much thought was given to system grounding requirements and the elimination of DC path ground loops. The rules are simple and logical:

1. The shield pins on each console connector are connected directly to the console system ground.
2. Shields of cables connecting to any auxiliary equipment should not be terminated to the ground of that equipment.
3. A separate ground wire from the console and from each piece of auxiliary equipment should then be run to a system ground point in accordance with the station's grounding procedure.

### 2.3 CABLE PREPARATION

Only unspliced, preferably new, cables should be used in connecting the console. Audio connections should be made with two conductor insulated foil shielded cable with drain wire. This cable should be equivalent to Belden types 8451, 9451, or 8761.

The molex pins are constructed so that the short crimp ears attach to the non-insulated end of the wire and make electrical contact, while the long crimp ears attach to the insulated section of wire and help support the connection. Insulation and foil shield on cables should be stripped back about 1½ inches. Shield drain wire should be sleeved leaving about 3/16 inch wire exposed. Strip signal wire insulation back about 3/16 inch.

Insert molex crimp pin into tool notch "B" with short ears pointing toward the letter "B". Insert the wire into the terminal so that the stripped portion is between the

short crimp ears. Crimp the pin. Place the long ears of the pin into tool notch "A". Crimp the long ears over the insulated section of wire. Logic connections should be made with stranded 22 gauge, multiple conductor jacketed cable. The number of conductors should be determined by application.

Once the pins are crimped, they may be inserted and locked into the nylon connector housing; a click can be felt indicating that the locking ears on the pin have set. If a pin is inserted into the wrong connector position, or it is desired to make a circuit change, simply use the extractor tool supplied to release the pin and press it out of the connector housing.

## **2.4 POWER SUPPLY CONNECTION**

Connection to the power supply is made with the supplied six-foot cable to the barrier strips on the power supply and on the console.

Should it be necessary to mount the power supply at a distance further than permitted by the supplied cable, it is recommended that a new cable be made rather than splicing a longer length to the existing cable. Cable lengths up to ten feet may be fabricated using 16 gauge wire. Cable lengths up to 20 feet should be fabricated with 14 gauge wire. It is very important to check and double check the power supply connections prior to turn on. An error in wiring could result in damage to the power supply and/or console circuitry. The power supply may now be turned on, at which time, the meter lamps should illuminate. Use an accurate DC volt meter at the power supply front panel test points to verify supply voltages.

It will be noted that two wires, yellow and green, at the power supply end of the connecting cable are not connected to the power supply barrier strip. These wires are provided in the event the broadcaster wishes to connect a power supply for the phantom powering of condenser microphones. The console mainframe and microphone modules contain the necessary circuitry to apply powering voltage to microphone inputs.

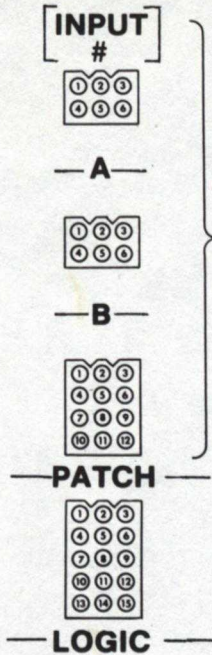
## **2.5 AUDIO CIRCUITS CONNECTION**

Complete information relative to console input, output, and logic terminations is contained on the interconnection reference drawing. Good wiring practice calls for care in making each connection, and in neatness of cable layout. It is very important to sleeve the cable shield drain wire and sleeve the shield at cable ends with heat shrink tubing. There is no other means of assuring an installation according to recommended grounding procedures.

Throughout the installation, considerable care should be exercised to maintain correct audio phasing. The wiring layout of the connector panel aids in achieving correct phasing by following a consistent wiring pattern. The shield or drain wire is always connected to the left connector pin; the low or common wire is connected to the middle connector pin; and the high or signal wire is connected to the right-hand pin. A simple visual inspection upon completion of installation should reveal any errors in wire phasing.

## 2.51 MICROPHONE INPUT WIRING

Typical for all microphone inputs



MOLEX CONNECTOR	PIN #		
	Shield	Low	High

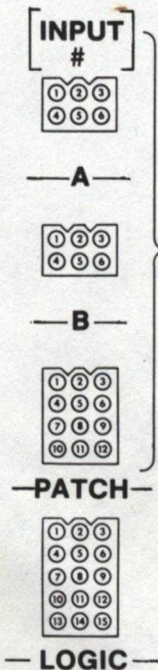
A-Input	A	1	2	3
B-Input	B	1	2	3
Preamp Output	PATCH	1	2	3
Fader Input	PATCH	7	8	9

Notes:

- Connector "A" and "B" pins #4, 5 & 6 are not used on microphone input modules.
- Patch connector pins #4, 5, 6, 10, 11, & 12 are not used on microphone input modules.
- The PATCH connector must be wired so that the preamp output is connected through to the fader input. If external signal processing or patch bay equipment is not connected here, a mating connector with a jumper from pins #3 to #9 must be installed.

## 2.52 LINE INPUT WIRING

Typical for all line inputs



MOLEX CONNECTOR	PIN #		
	Shield	Low	High




A-Input/Left	A	1	2	3
A-Input/Right	A	4	5	6
B-Input/Left	B	1	2	3
B-Input/Right	B	4	5	6
PATCH SEND/Left	PATCH	1	2	3
PATCH SEND/Right	PATCH	4	5	6
PATCH RETURN/Left	PATCH	7	8	9
PATCH RETURN/Right	PATCH	10	11	12

Notes:

- Signal from a monaural source should be wired to the LEFT input.
- In some installations, it may be operationally more convenient to connect a monaural source to both left and right inputs. The bridging-type inputs of the line modules allow them to be jumpered together without concern of double termination.
- The PATCH connector must be wired so that the PATCH SENDS are connected through to the PATCH RETURNS. If external processing or patch bay equipment is not connected here, a mating connector with jumpers from pins #3 to #9 and #6 to #12 must be installed.

## 2.53 OUTPUT WIRING

Typical for Program, Audition, and Utility (Mono) Outputs

[ OUTPUT NAME ]	MOLEX CONNECTOR	PIN #			
		Shield	Low	High	
<b>— MAIN —</b>					
	MAIN OUTPUT/Left	MAIN	1	2	3
	MAIN OUTPUT/Right	MAIN	4	5	6
<b>— AUX —</b>					
	AUX OUTPUT/Left	AUX	1	2	3
	AUX OUTPUT/Right	AUX	4	5	6
<b>— PATCH —</b>					
	PATCH SEND/Left	PATCH	1	2	3
	PATCH SEND/Right	PATCH	4	5	6
	PATCH RETURN/Left	PATCH	7	8	9
	PATCH RETURN/Right	PATCH	10	11	12

### Notes:

- The monaural output (optional) appears on the LEFT pins of the UTILITY connector.
- The PATCH connector must be wired so that the PATCH SEND are connected through to the PATCH RETURNS. If external processing or patch bay equipment is not connected here, a mating connector with jumpers from pins #3 to #9 and pins #6 to #12 must be installed.

**2.54 MONITOR WIRING—CONTROL ROOM and STUDIO**  
MONITOR modules.

MOLEX CONNECTOR	PIN #		
	Shield	Low	High
1 & 2	1	2	3
1 & 2	4	5	6
1 & 2	7	8	9
1 & 2	10	11	12
3 & 4	1	2	3
3 & 4	4	5	6
3 & 4	7	8	9
3 & 4	10	11	12
5 & 6	1	2	3
5 & 6	4	5	6
5 & 6	7	8	9
5 & 6	10	11	12
7 & 8	1	2	3
7 & 8	4	5	6
7 & 8	7	8	9
7 & 8	10	11	12

**CONTROL ROOM MONITOR MODULE**

OUTPUT/Left	OUTPUT	1	2	3
OUTPUT/Right	OUTPUT	4	5	6
HEADPHONE OUTPUT/Left	AUX	1	2	3
HEADPHONE OUTPUT/Right	AUX	4	5	6
CUE AMP OUTPUT	AUX	7	8	9
CUE SPEAKER INPUT	AUX	10	11	12








**STUDIO MONITOR MODULE**

OUTPUT/Left, w/Level control	OUTPUT	1	2	3
OUTPUT/Right, w/Level control	OUTPUT	4	5	6
OUTPUT/Left, direct w/muting	AUX	1	2	3
OUTPUT/Right, direct w/muting	AUX	4	5	6
OUTPUT/Left, direct w/o muting	AUX	7	8	9
OUTPUT/Right, direct w/o muting	AUX	10	11	12

Notes:

- All monitor units are bridging, 10k ohms impedance.
- All monitor inputs are common to both the Control Monitor and Studio modules.
- The Cue Amplifier to Cue Speaker connection is made with jumpers between pins #8 to #11 and pins #9 to #12 on the Control Room Aux connector.

## 2.55 REMOTE LINE SELECTOR WIRING

	MOLEX CONNECTOR	PIN #		
		Shield	Low	High
<b>1&amp;2</b> 				
<b>3&amp;4</b> 				
<b>5&amp;6</b> 				
<b>7&amp;8</b> 				
<b>9&amp;10</b> 				
<b>OUT-1</b> 				
<b>OUT-2</b> 				
<b>INPUTS</b>				
#1/Left	1 & 2	1	2	3
#1/Right	1 & 2	4	5	6
#2/Left	1 & 2	7	8	9
#2/Right	1 & 2	10	11	12
#3/Left	3 & 4	1	2	3
#3/Right	3 & 4	4	5	6
#4/Left	3 & 4	7	8	9
#4/Right	3 & 4	10	11	12
#5/Left	5 & 6	1	2	3
#5/Right	5 & 6	4	5	6
#6/Left	5 & 6	7	8	9
#6/Right	5 & 6	10	11	12
#7/Left	7 & 8	1	2	3
#7/Right	7 & 8	4	5	6
#8/Left	7 & 8	7	8	9
#8/Right	7 & 8	10	11	12
#9/Left	9 & 10	1	2	3
#9/Right	9 & 10	4	5	6
#10/Left	9 & 10	7	8	9
#10/Right	9 & 10	10	11	12
<b>OUTPUTS</b>				
#1/Left	OUT-1	1	2	3
#1/Right	OUT-1	4	5	6
#2/Left	OUT-2	1	2	3
#2/Right	OUT-2	4	5	6

Note:

All Inputs are common to both selectors.

## 2.6 LOGIC CIRCUITS CONNECTION





The microphone and line input modules in the BMX console each offer a comprehensive set of control logic functions. These functions are brought out from every input position to the 15 pin molex connector associated with each input. It should be noted, that the control commands and functions are referenced to the console logic power supply and, as such, should never be directly connected to auxiliary equipment logic control supplies, or grounds.

The logic commands are designed to drive interface relays and/or opto-isolators to control auxiliary equipment. Fabrication of interface systems is straightforward and simple. However, should the installer prefer to use prefabricated units, interface devices and cable assemblies are available from Pacific Recorders to control tape decks, cart machines and turntables.



Connection to the control circuits is very easy and requires only an understanding of the logic nomenclature.

### Control Outputs

Command		continuous voltage source
Command		continuous sink to common
Pulse		pulse voltage source
Pulse		pulse sink to common

### Control Inputs

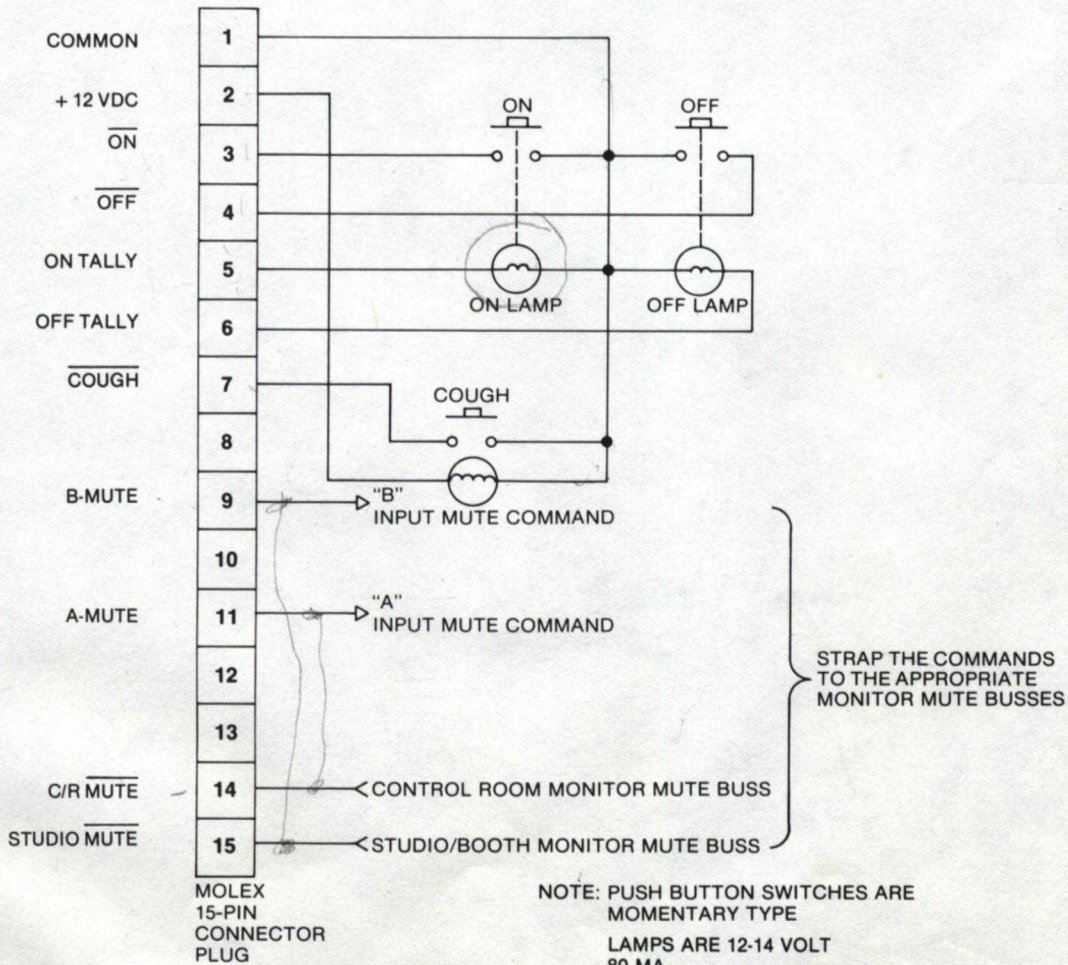
CONTROL

Line above word indicates function by connection to common.

It should be noted that the BMX uses "common" or "ground" switching for all of its control inputs, thus preventing the possibility of defective remote controls shorting out the logic power supply.

## 2.7 MICROPHONE MODULE LOGIC

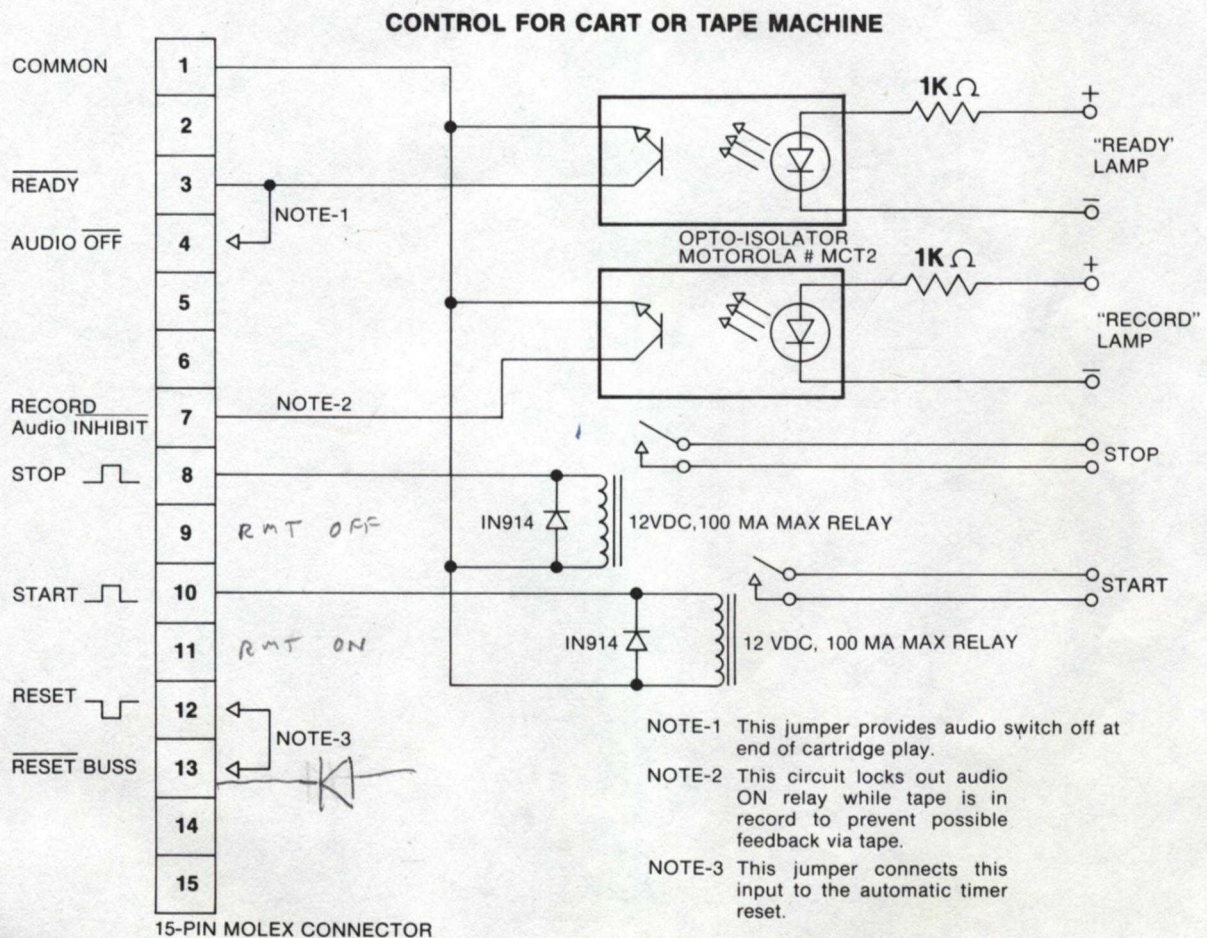
The schematic shown illustrates the full compliment of remote control available for a microphone input module.



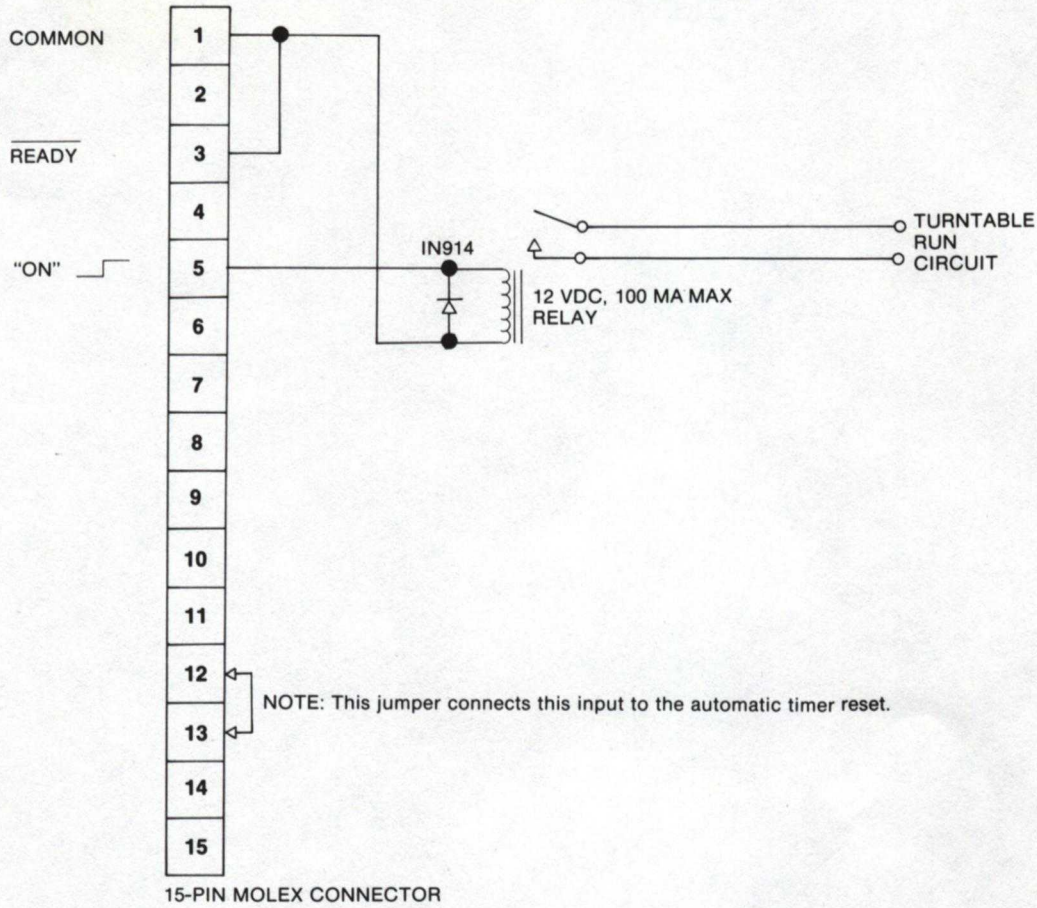
## 2.8 LINE INPUT MODULE LOGIC

The control logic for the line input module provides remote control functions for the "A" or primary input. When the "B" input is selected, the remote control logic is locked out to the equipment connected to the "A" input.

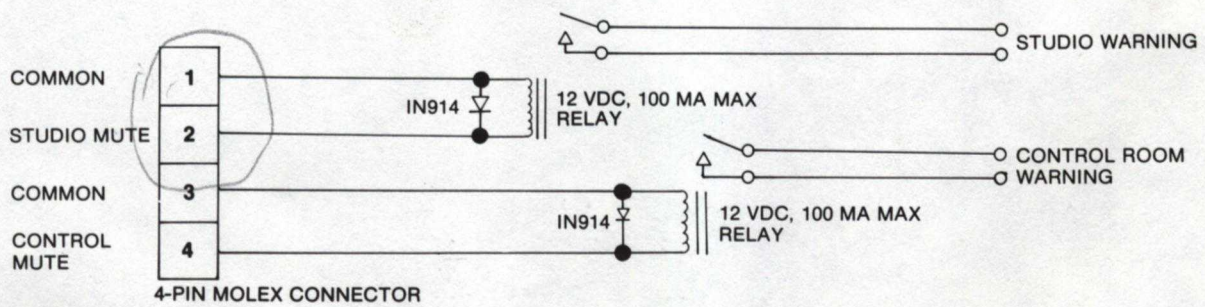
It will be noted that the "OFF" button does not illuminate when the "A" input is selected. This is because the "OFF" lamp is utilized as a tape or cart READY status indicator. To illuminate the "OFF" lamps on those inputs not used with cart or tape decks, simply install a jumper between pins #1 and #3 on the appropriate logic connectors.



### CONTROL FOR TURNTABLE



### 2.9 WARNING COMMAND LOGIC

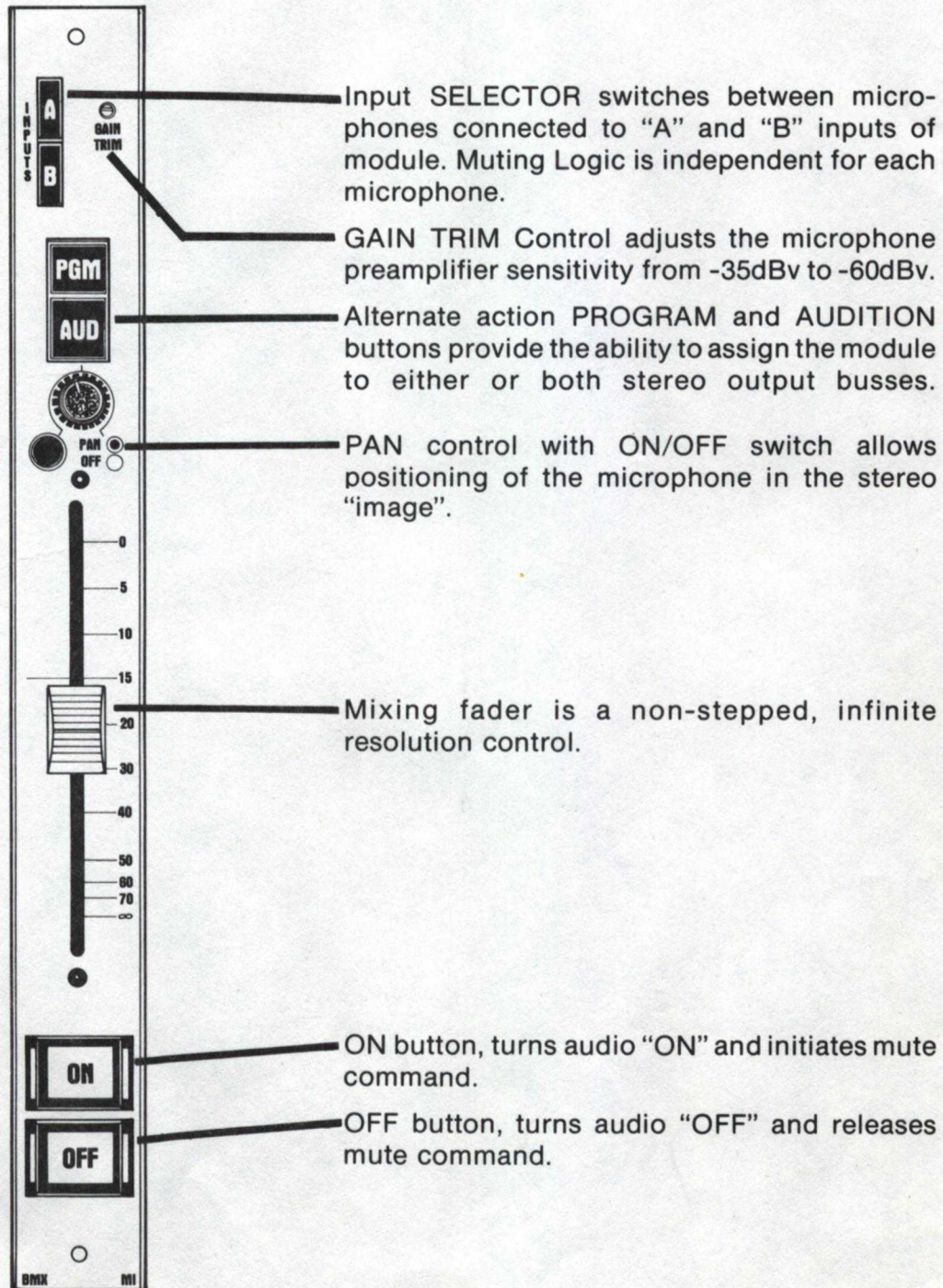




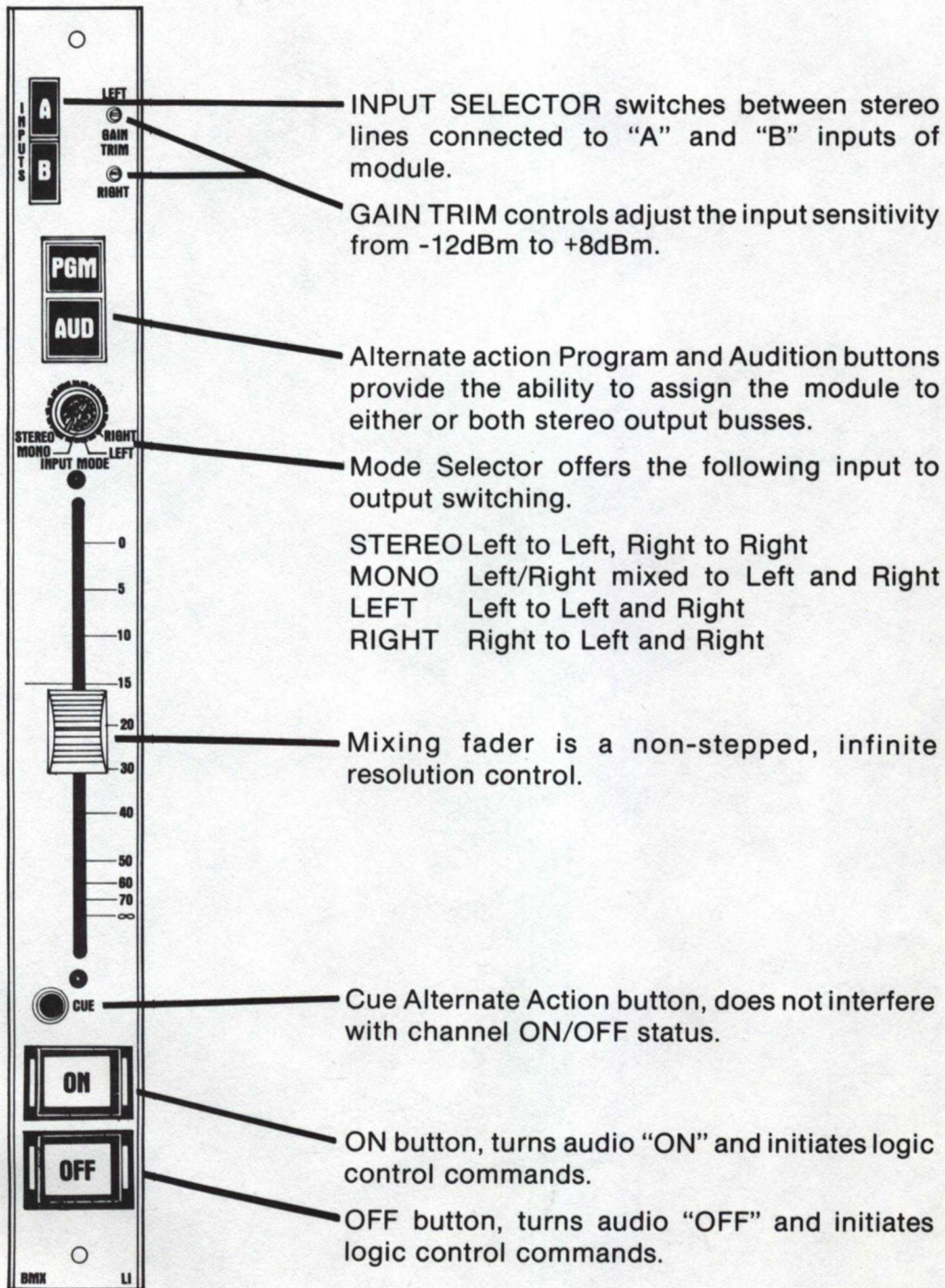
## Section 3 SET UP AND OPERATION

### 3.1 OPERATING CONTROLS

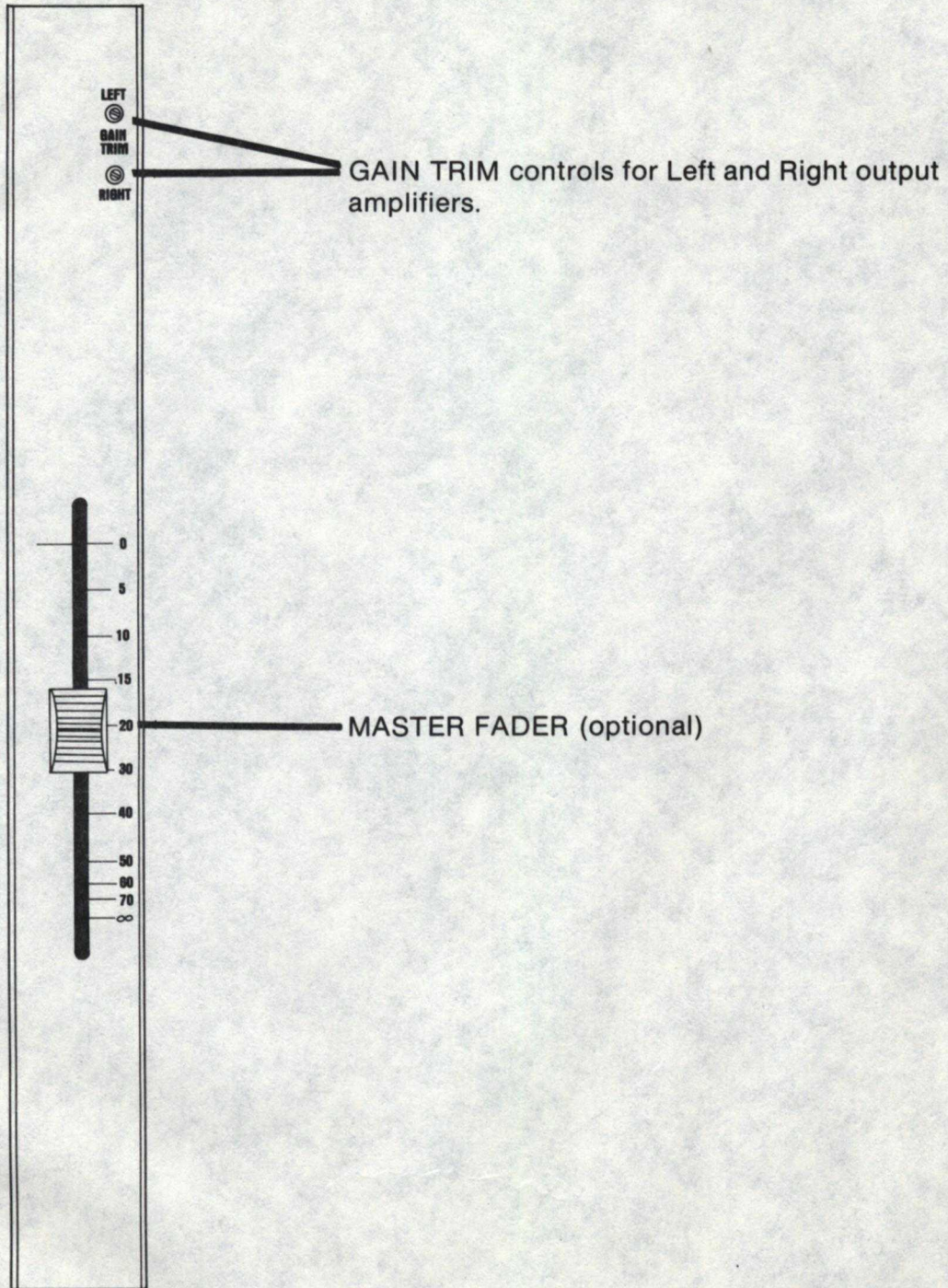
#### MICROPHONE MODULE



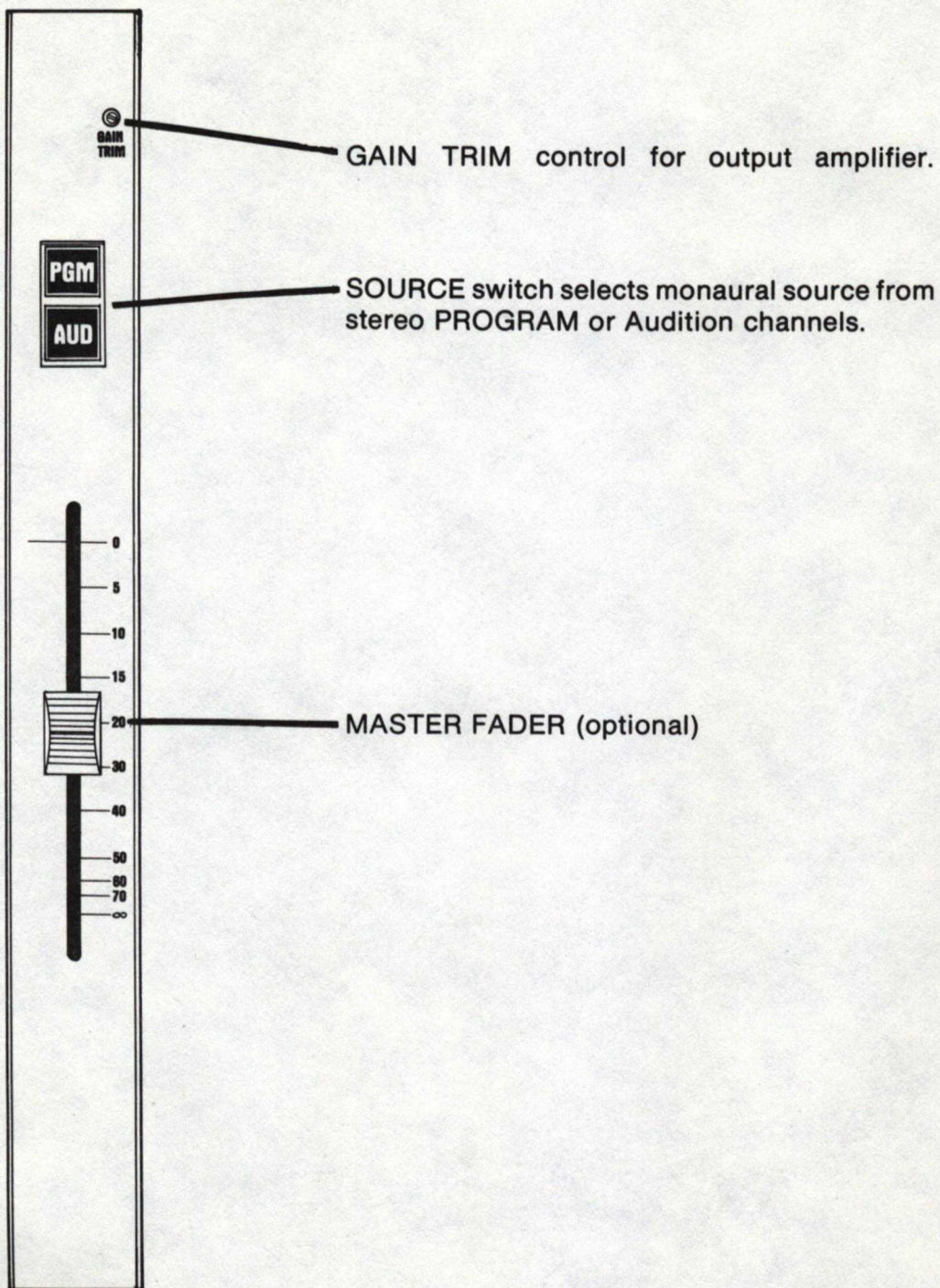
## LINE MODULE



# STEREO OUTPUT MODULE

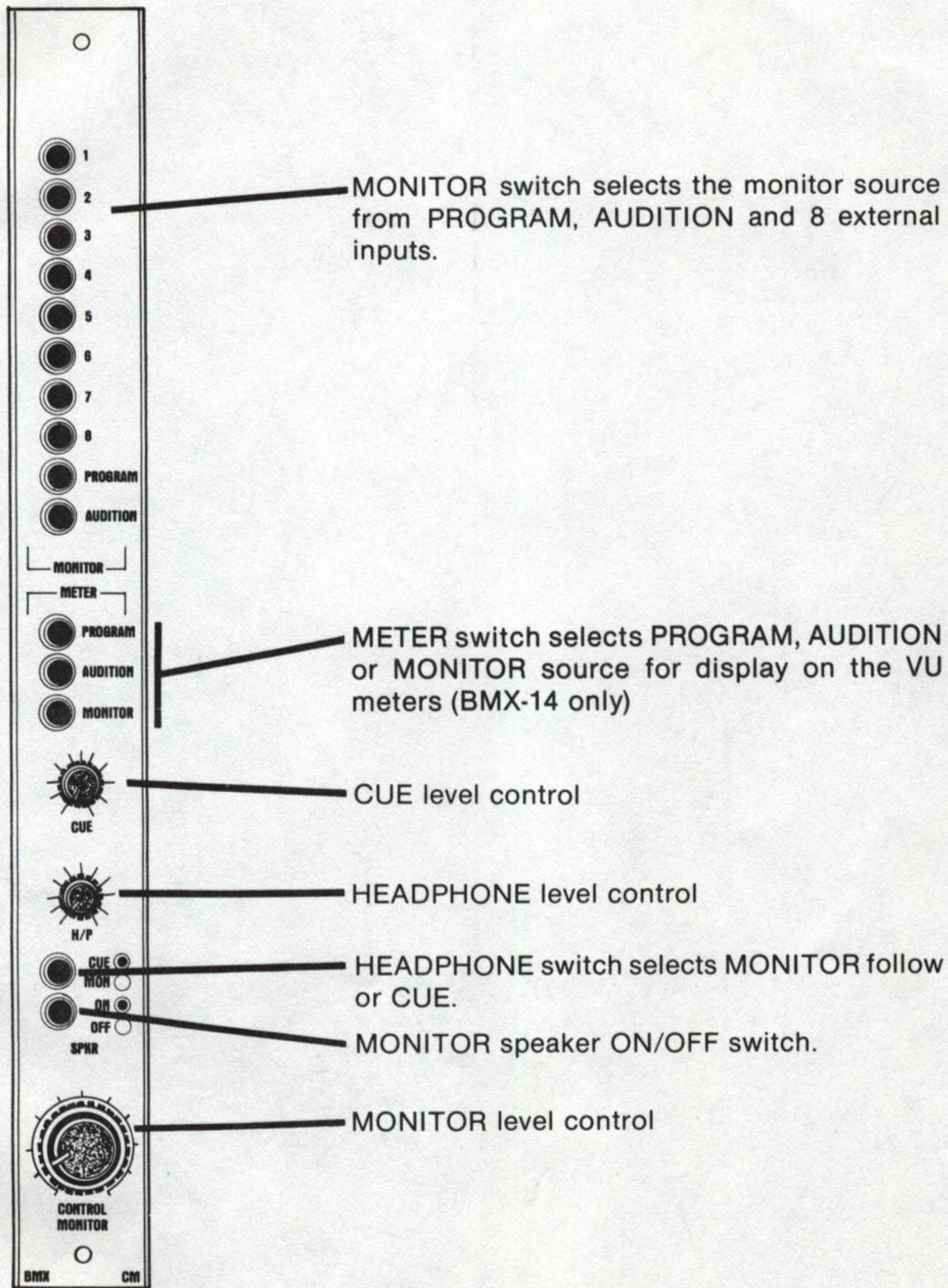


# MONAURAL OUTPUT MODULE

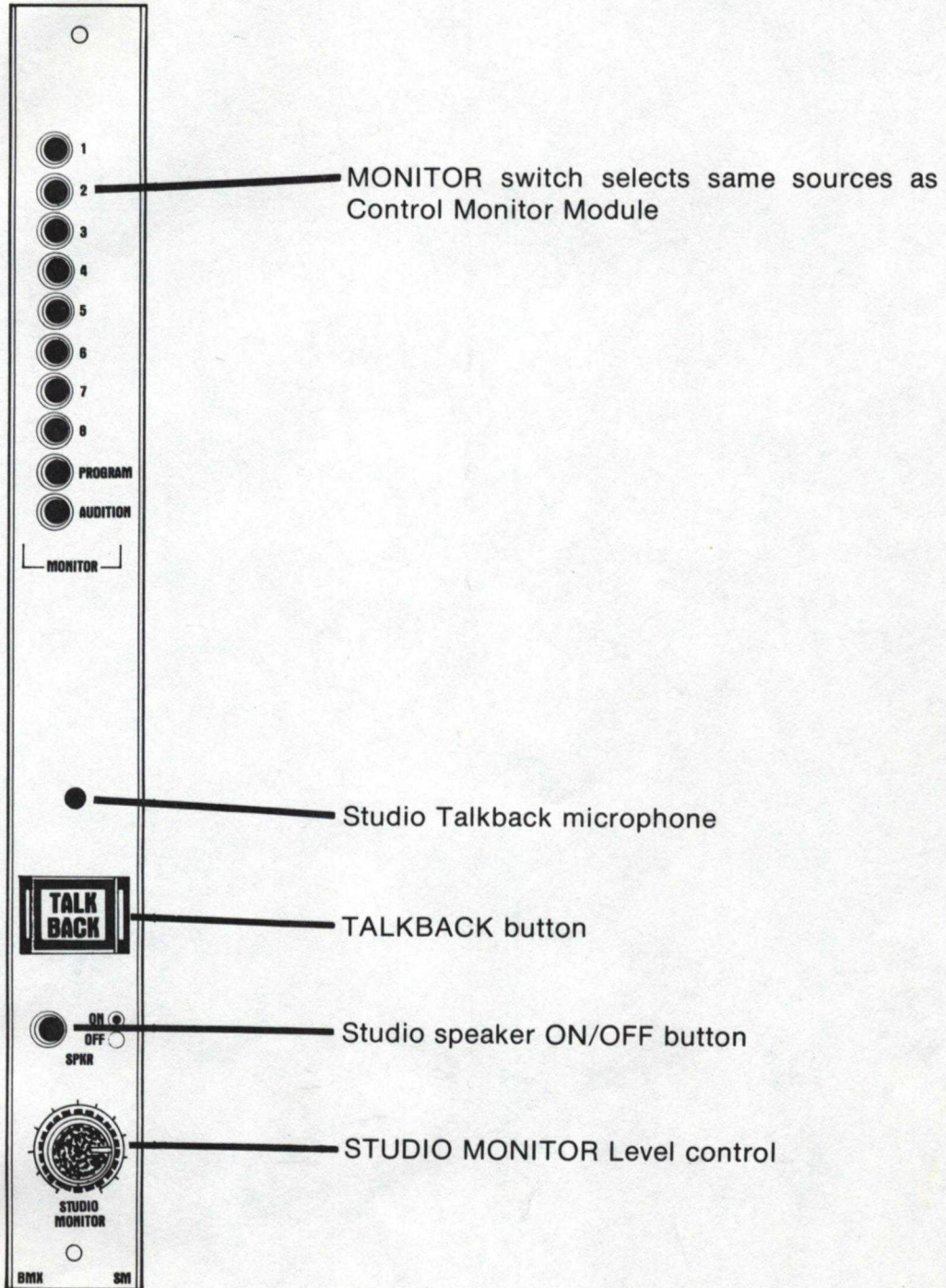




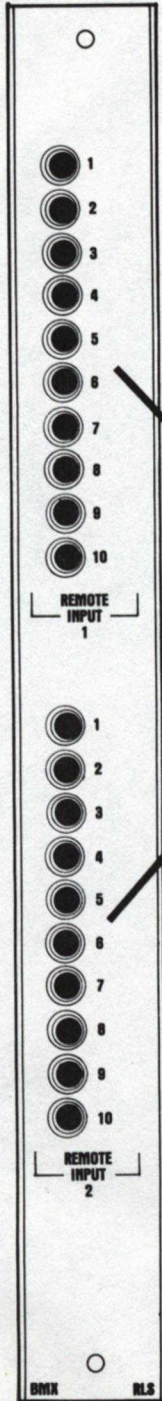
# CONTROL ROOM MONITOR MODULE



# STUDIO MONITOR MODULE



# REMOTE LINE SELECTOR



Two, Stereo, 10-station selector switches. Each switch bank accesses the same remote inputs. The outputs of each switch bank may be connected externally to any console input position.

### 3.2 LEVEL ALIGNMENT

The BMX console amplifiers were level aligned at the time of factory test as follows:

#### Stereo Output Amplifier Modules

1KHz test signal at -10dBm applied to patch return; GAIN TRIM controls adjusted to give +8dBm output into 600 ohm, 1% termination load.

Microphone Input Modules, Fader set at "-15" mark.

1 KHz test signal at -50dBv (Ref. 0.774v) to module input; GAIN TRIM control adjusted to give +8dBm console output into 600 ohm, 1% termination load.

Line Input Module, Fader set at "-15" mark.

1KHz test signal at +8dBm to both module left and right inputs; GAIN TRIM controls adjusted to give +8dBm console output into 600 ohm, 1% termination load.

#### Monaural Output Amplifier Module

Using test signal into Line Module above, select PROGRAM source on Monaural Module, and adjust GAIN TRIM control for a +8dBm output into a 600 ohm, 1% termination load.

Gain trim controls on the line output modules should not require retrimming unless components which affect amplifier gain have been replaced.

#### VU Meter Amplifiers

1KHz test signal at +8dBm console output level, meter amplifier trim control set for "O" VU meter indication.

Gain trim controls on the input modules should be adjusted so that the input accommodates the signal level from the source equipment. **IMPORTANT**, always set the mixing fader at the "-15" dB mark before adjusting the gain trim controls. This will insure that the optimum gain structure, i.e. headroom and signal to noise ratio, has been maintained.

Should additional input gain range accommodation be required than permitted by the GAIN TRIM controls, refer to Section 6, OPTIONS AND MODIFICATIONS.

### 3.3 AUDIO PATCH FACILITIES

Each BMX input and output module features an audio patch connector. These connectors provide the ideal point to connect external processing equipment such as equalizers, limiters, filters, etc. A patch bay system may be connected to these connectors to provide a very flexible processing/patching facility.

The output of each patch is unbalanced and designed to operate into low-impedance (600 ohm) or higher loads. The patch return is unbalanced, 5Kohm impedance.

The level at all patch points, microphones, line, and output is -10dBm nominal. This level was determined to provide optimum headroom within the console as well as a good compatibility match with currently available processing equipment.



## Section 4 EQUIPMENT DESCRIPTION

### 4.1 MAINFRAME

The console housing contains all the interconnection wiring required to accommodate a full complement of modules. Each input position is wired in a universal fashion and, therefore, will accept either a microphone or line input module. The three extreme left module positions are dedicated for the output amplifier modules, while the three extreme right positions are dedicated for the monitoring and switcher modules.

The mainframe itself does not contain active electronic components with the sole exception of the meter amplifier modules mounted in the meter panel. Access to the rear of the meter panel is provided by a removable panel attached with quarter-turn fasteners.

The meter panel assembly for the 14-input mainframe is supplied with a stereo pair of output meters and a cue speaker. The panel is pre-wired to accept an output meter for the optional monaural output module.

The meter panels for the 22 and 26 input mainframes are supplied with four output meters, a stereo pair each for Program and Audition and a cue speaker. These panels are also pre-wired for the optional monaural output meter. The remaining two spaces in all models may be used to install digital clocks, timers or other accessory items.

### 4.2 POWER SUPPLY

Two generations of power supplies exist for the console. Earlier consoles use the part #50-1 supply, later consoles use the part #50-2 supply. The two supplies are completely interchangeable.

Supply #50-1 uses three discrete power modules, two 16 volt and a 12 volt. Each module contains its own power transformer and regulator circuitry. Power is applied to each module by the front panel mounted master circuit breaker via independent fuse circuits. Voltage test points and adjustment trimmers for each supply are mounted on the front panel. Connection to the supply is made at the rear panel terminal strip. This supply assembly is designed for operation at 115VAC, 50/60Hz.

Supply #50-2 uses two discrete power modules, a bi-polar 16 volt and a 12 volt. Power is applied by a master circuit breaker to individual power switches, one for the 16 volt "Audio" supply, and one for the 12 volt "Logic" supply. Voltage test points for each supply are located on the front panel. Each supply module has a voltage adjustment trim control located on the module itself. Connection to the supply is made at the rear panel terminal strip. The supply is strappable for operation on 115VAC and 230VAC, 50/60Hz power mains.

### 4.3 MICROPHONE INPUT MODULE

AUDIO CIRCUIT DESCRIPTION: The transformer coupled microphone input preamplifier U3 utilizes variable feed-back control to provide an overall voltage gain range of 24dB to 50dB. The gain control is adjusted to provide a nominal

– 10dBv (Ref. 0.775v) output from the preamp to the patch send line. The mix fader “in hand” attenuation of 15dB reduces this level to – 25dBv. Fader buffer amplifier U2 recovers the fader attenuation with 16dB of voltage gain. The – 9dBv signal is routed to the channel ON/OFF relay. The relay feeds the PAN control and PAN/OFF switch. The PAN switch shunts R39 in the PAN mode, increasing the gain of U2 by 3dB, to accommodate the 3dB loss contributed by the PAN control. The signal is then routed to the mix busses by the PGM and AUD button switches.

**LOGIC CIRCUIT DESCRIPTION:** The first two sections of the CD4093B quad, 2-input NAND Schmitt trigger are configured as a bi-stable flip-flop. At power up, C21 being a larger value than C20, the circuit is forced into the “OFF” mode. The third section is an inverter and drives Q2, the “OFF” lamp driver. Pressing the “ON” button causes the flip-flop to change state, illuminating the “ON” lamp via Q1, initiating MUTE via Q4 and audio “ON” via delay circuit R36, R37, C23, gate U1 and transistor Q3. Pressing the “OFF” button resets the flip-flop state.

#### 4.4 LINE INPUT MODULE

**AUDIO CIRCUIT DESCRIPTION:** The stereo audio path consists of two identical sets of circuitry. For clarity, this description shall discuss the left channel only. Resistors R1, R2, R3 form a 24dB, 10Kohm to 600ohm pad in front of input transformer T1. This pad provides a true resistive input impedance to source equipment as well as a low source impedance to the bridging input transformer. The input transformer is a 10Kohm/10Kohm repeat coil. Input preamplifier U1 utilizes a variable feed-back control to provide pad input to amplifier output gain range of – 18dB to + 2dB. The gain control is adjusted to provide a – 10dBv (Ref. 0.775v) output to the patch send line. The mix fader “in hand” attenuation of 15dB loss reduces the signal level to – 25dBv. The 15dB gain of fader buffer U3 raises the signal level to – 10dBv and sends the signal to the MODE switch and on to the channel ON/OFF relay. The relay feeds the PGM and AUD assignment button switches.

**LOGIC CIRCUIT DESCRIPTION:** The logic is divided into two functional sections. The first controls the ON/OFF status of the module; the second generates the remote control logic commands. This second section functions only when the “A” audio input has been selected by the front panel button switch. The power up circuit R57, C42 via U5 and U6, sets the flip-flop, U7 output high. The “OFF” lamp is illuminated via inverter U5, AND gate U6 and transistor Q2. Pressing the “ON” button reverses the state of U7, illuminating the “ON” lamp via inverter U5 and transistor Q1, and turning on the audio via time delay circuit R62, R64, C45, AND gate U5 and transistor Q8. When the “A” input is selected, the LOGIC ENABLE line is low. In this state, the illumination of the “OFF” lamp in the “OFF” mode is controlled by the READY input line status via AND gate U6. The LOGIC ENABLE line also allows the D flip-flop U8 and U7 to generate START, STOP, and TIMER RESET PULSES via Q4, Q5, Q6, Q7 and Q3 respectively.

#### 4.5 STEREO OUTPUT MODULE

This module contains two identical sets of circuitry. For clarity, only the left channel will be described. Summing amplifier U1 operates at unity gain from the mix buss. Amplifier U3 serves as an isolation buffer for the summing amplifier and as

an inverter to correct the polarity inversion of the buss summing amplifier. U3 operates at unity gain and supplies the patch send line with a  $-10\text{dBv}$  (Ref.  $0.775\text{v}$ ) signal. Output amplifier U5 and associated discrete circuitry operates over the gain range of  $6.6\text{dB}$  to  $11.2\text{dB}$  as set by feed-back gain trim control R30. Output transformer T1 provides additional voltage gain due to the 1:3 winding ratio. Gain trim control R30 is set to provide an amplifier input to transformer output gain of  $18\text{dB}$ , the resulting output signal being  $+8\text{dBm}$ . Note the auxiliary mix outputs from U1 and U2. These Left and Right buss signals are returned to the mother board and routed to the monaural output amplifier module position.

#### **4.6 MONAURAL OUTPUT MODULE**

The mono source switch selects either the PGM or AUD stereo auxiliary outputs. The stereo signal is mixed to mono by amplifier U1. U1 operates at a gain of  $-6\text{dB}$  to accommodate the mixing gain of similar input signals. The output to the patch send line is  $-10\text{dBv}$  (Ref.  $0.775\text{v}$ ). Output amplifier U2 and associated discrete circuitry provides the nominal  $18\text{dB}$  gain to the  $+8\text{dBm}$  output line level. Gain trim R13 provides a  $5\text{dB}$  trim range for the output amplifier.

#### **4.7 CONTROL ROOM MONITOR MODULE**

This module consists of a monitor section, meter section, cue section and a headphone section. The monitor section takes the signal selected by the 10 station monitor switch and buffers it with the bridging amplifiers formed by T1, U1, and T2, U2. The input to output gain of each bridging amplifier is  $-8\text{dB}$ . This signal is routed to the HEADPHONE selector switch and to the monitor muting relay, K1. The relay feeds the MONITOR LEVEL control.

The METER switch selects which signal, PROGRAM, AUDITION or MONITOR is displayed by the output meters.

The cue section consists of summing amplifier U3 which feeds the HEADPHONE switch and cue mute relay K2. The relay routes the cue signal to CUE LEVEL control R27. Amplifier U7 and associated discrete circuitry provides the drive for the meter panel mounted cue speaker. The amplifier was designed to drive the  $45\text{ohm}$  speaker with a maximum power of  $750$  milliwatts.

The HEADPHONE switch selects between the monitor selection and the cue mix. HEADPHONE LEVEL control R26 feeds the headphone amplifiers U4 and U5. These amplifiers, with their associated circuitry, supply signals to the trim panel mounted headphone jack and to the rear connector. Monitor and cue muting relays K1 and K2 are driven by transistor Q1. Q1 conducts when its base is pulled low to logic common by a mute command from a microphone module. The collector of Q1 is also the source of the WARNING command and voltage.

#### **4.8 STUDIO MONITOR MODULE**

This module duplicates the control room monitor module selector and buffer amplifier section. The output of the buffers are routed through the mute and talkback relays to the MONITOR LEVEL control. The talkback circuit consists of an electret condenser microphone and preamplifier U3. The microphone signal level is set by R24 which feeds talkback relays K1 and K3. Actuating the TALK-BACK



button causes the control room monitor to mute via CR4, and the talk-back relay to switch as driven by Q2. Studio monitor mute is driven by Q1 when its base is pulled low. Warning command voltage is also supplied by the collector of Q1.

#### **4.9 REMOTE SWITCHER MODULE**

This module is simply two 10-station stereo selector switches fed from 10 stereo common remote inputs. The switch used is not available with a mechanical lock-out mechanism to prevent pushing two or more buttons in a switch assembly simultaneously. Therefore, the switches in each 10-station assembly have been wired in series to avoid the possibility of remote input lines being tied together through accidental depression of two or more buttons.



## Section 5 MAINTENANCE

### 5.1 ROUTINE MAINTENANCE

Routine maintenance is usually limited to cleaning the linear motion faders, checking all button switches for proper operation and keeping the panel surfaces clean. The panel surfaces are coated with a baked polyurethane paint and may be cleaned with a weak solution of dishwashing detergent.

The Penny & Giles faders are removed from the modules by unplugging the cables and unscrewing the two button-head panel screws. Remove the side cover; the track will now be accessible for cleaning. Rinse the fader under a tap with warm clean water. This will remove common contaminants such as coffee, soft drink or (?). If necessary, use a **SOFT** brush or cotton tipped swab to loosen heavy contamination. Take care to avoid damage to the wiper fingers. Dry the fader thoroughly by the use of an air jet or hair dryer. Replace side cover, re-install fader and cables.

Meter lamp replacement is achieved by removing the meter amplifier board from the rear of the meter and replacing the bayonet based lamps. Lamp replacement in panel button switches is achieved by removing the cap from the front of the switch. Be careful to replace any lamp with an identical type. **Do not substitute** lamps of different voltage or current.

Check power supply voltages monthly. Each should be within 0.5 volt of its specified output. Adjust if necessary, using an accurate voltmeter or digital multimeter. The supply is designed to provide very low noise power to the console. The outputs should be checked every six months for ripple and noise with a sensitive AC voltmeter. Readings should be less than 350 microvolts RMS.

### 5.2 TROUBLE SHOOTING

The modular construction of the console greatly enhances trouble shooting since module substitution will usually isolate any problem other than power supply failure. It is strongly recommended that the Equipment Description section be read thoroughly prior to trouble shooting. Once the module at fault has been identified, use the extender module or standard service bench techniques to isolate the problem. The extender board will accommodate all types of console modules except for the monitor and remote switcher modules. These modules should be bench serviced. Most of the active analog and digital components are socketed for ease of replacement.

### SPECIAL NOTE

The CMOS logic devices are susceptible to destruction from static discharge in handling. It is recommended that considerable caution be exercised when working with these parts.

### 5.3 SPARE PARTS

The following parts are supplied with each console as spares:

QUANTITY	PR&E P/N		DESCRIPTION
4	20-8	NE5534T	Low noise operational amp
4	20-9	TL082	J-FET operational amp
4	21-12	74COO	CMOS, QUAD 2-input NAND
4	21-27	74COO	CMOS, Dual D flip-flop
4	21-4	CD4093B	CMOS, QUAD 2-input NAND Schmitt trigger
2	8-8	2N3638A	transistor
2	8-1	MJE 171	transistor
2	7-1	MJE 181	transistor
2	7-11	MJE6560	transistor
4	7-7	MPS U45	transistor
6	8-6	MPS U95	transistor
4	11-13	IN914B	diode
4	11-7	IN4001	diode
4	12-20	658	lamp
2	12-21	756	lamp

This kit should provide sufficient spares for the initial operating period, however, it is recommended that this kit be replenished and kept on hand for emergency use. The components used are, wherever possible, standard items of general availability. However, should difficulty be encountered locating any of these items, Pacific Recorders and Engineering maintains a reasonable stock of replacement parts.

The following components are readily available only from Pacific Recorders and Engineering:

- Input, Output and Power Transformers
- Penny and Giles faders
- All potentiometers
- Schadow button switches

In applications where any down time is unacceptable, it is recommended that the following be kept on hand:

- Power Supply Unit
- Microphone Input Module
- Line Input Module
- Line Output Module
- Control Monitor Module



## Section 6 OPTIONS AND MODIFICATIONS

### 6.1 MICROPHONE INPUT MODULE

Phantom powering of condenser microphones via the console is accomplished by connecting a low noise 48 volt DC power supply to the designated terminals on the mainframe barrier strip and installing wire jumpers on the appropriate microphone input module. For microphones connected to the "A" input, connect a jumper from E25 to E27; for the "B" input, connect a jumper from E24 to E26.

### 6.2 LINE INPUT MODULE

An additional 24dB of input sensitivity is available for those applications such as low level telephone lines, which require more gain than provided by the gain trim controls. Remove the following input pad resistors R1, R2, R3, R4, R5, R6 and install wire jumpers at R1, R3, R4, and R5. The input sensitivity range of the module will now be from -36dBm to -16dBm.

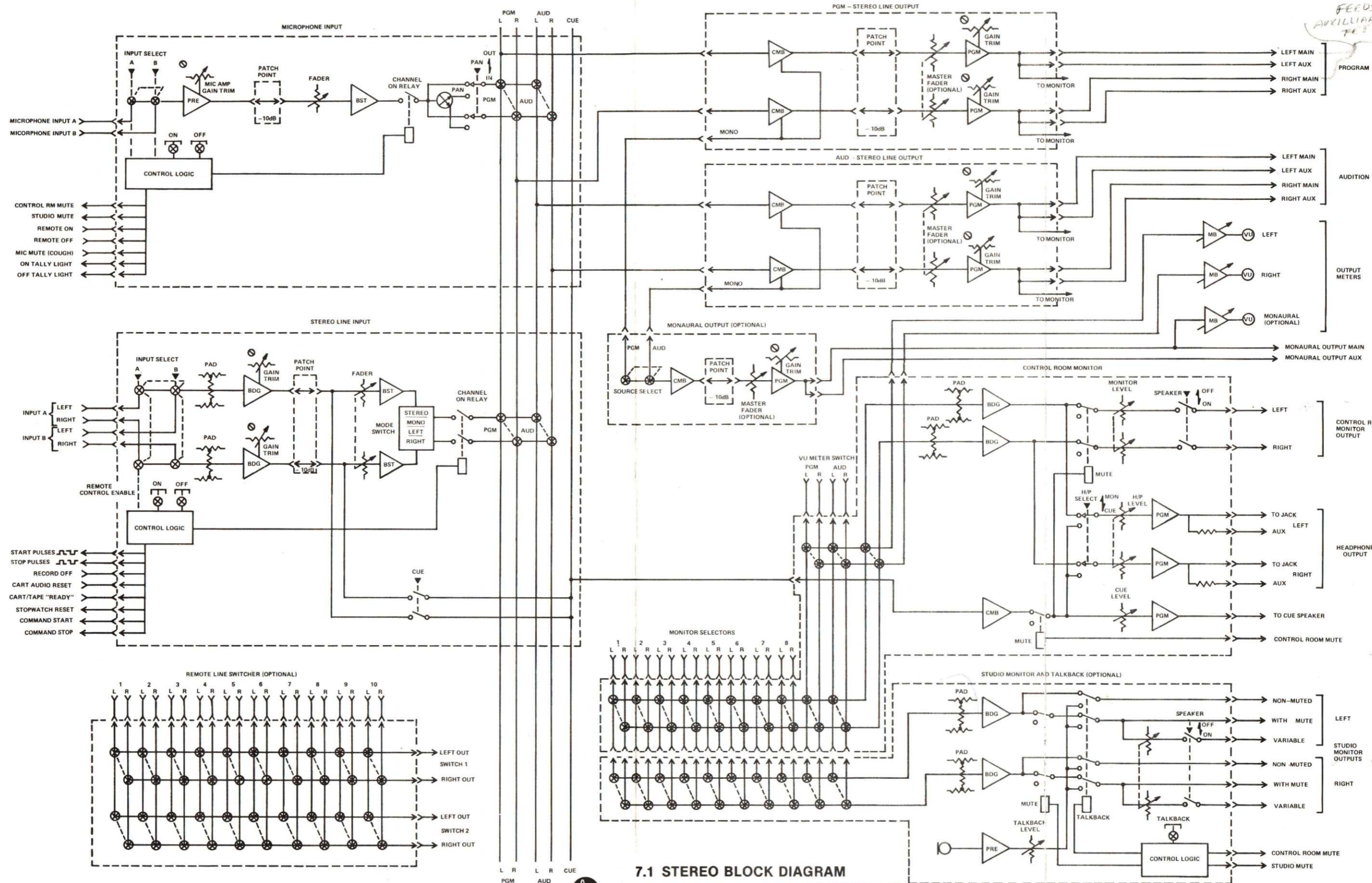
### 6.3 UTILITY MIX BUSSES

The console mainframe wiring assembly is equipped with a spare set of mixing busses called the UTILITY busses. These busses were designed to provide an additional stereo output capability as required. These busses terminate at the console position for the Monaural Output Module, and therefore, are not available if the Monaural Output is used.

The following procedure must be followed to access the UTILITY busses:

Refer to the schematic drawings of the Microphone and Line input modules. Note the "E" points E16 & 17 on the Microphone and E24 & 25 on the Line modules. These "E" points are the inputs to the UTILITY left and right mix busses. Refer to the schematic drawing of the stereo Line Output module. Remove resistors R7 and R9 from each of the output modules. These resistors are the signal feed source for the Monaural Output module. Install a Stereo Line Output module in the extreme left module position. The outputs and patch points for this module appear on the rear panel molex connectors labeled UTILITY. Applications for the UTILITY busses include split mixes for telco hybrid feed and three level mixes for separate processing of microphones, commercials and music.

Section /  
DRAWINGS, SCHEMATICS  
AND PARTS LISTS



**7.1 STEREO BLOCK DIAGRAM**

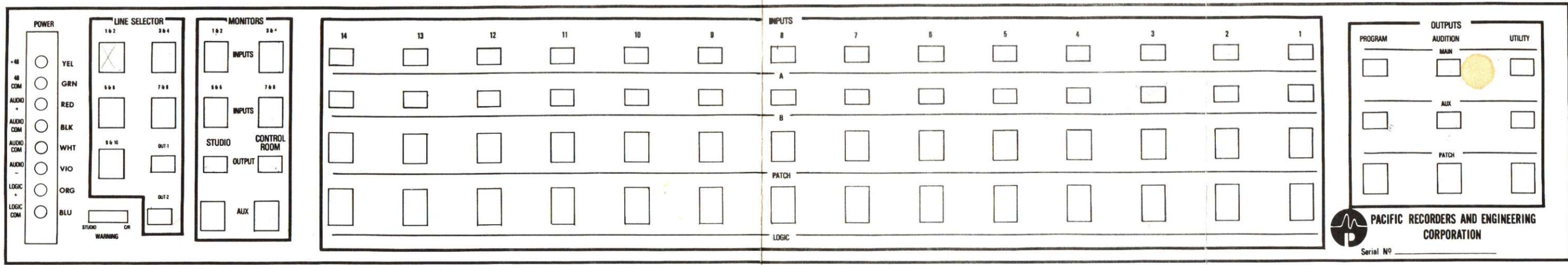
PACIFIC RECORDERS AND ENGINEERING CORPORATION

LEGEND: VARIABLE GAIN AMP SWITCHING FUNCTION METER STD. VOL. UNIT AUDIO LEVEL

BDG-BRIDGING AMP  
BST-BOOSTER AMP  
PGM-PROGRAM AMP  
CMB-COMBINING AMP  
PRE-PRE AMP  
MB-METER BUFFER



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



**PACIFIC RECORDERS AND ENGINEERING CORPORATION**  
Serial No. \_\_\_\_\_

**BMX-12 CONNECTOR PANEL**

AUDIO				
REMOTE LINE SELECTION INPUTS				
INPUTS	CONNECTOR	SHIELD	PIN#	
			LO	HI
1, LEFT	162	1	2	3
1, RIGHT	162	4	5	6
2, LEFT	162	7	8	9
2, RIGHT	162	10	11	12
3, LEFT	364	1	2	3
3, RIGHT	364	4	5	6
4, LEFT	364	7	8	9
4, RIGHT	364	10	11	12
5, LEFT	566	1	2	3
5, RIGHT	566	4	5	6
6, LEFT	566	7	8	9
6, RIGHT	566	10	11	12
7, LEFT	768	1	2	3
7, RIGHT	768	4	5	6
8, LEFT	768	7	8	9
8, RIGHT	768	10	11	12
9, LEFT	9610	1	2	3
9, RIGHT	9610	4	5	6
10, LEFT	9610	7	8	9
10, RIGHT	9610	10	11	12

LINE SELECTOR OUTPUTS				
OUTPUTS	CONNECTOR	SHIELD	PIN#	
			LO	HI
#1, LEFT	OUT-1	1	2	3
#1, RIGHT	OUT-1	4	5	6
#2, LEFT	OUT-2	1	2	3
#2, RIGHT	OUT-2	4	5	6

WARNING OUTPUT				
			PIN#	
STUDIO MONITOR			1	
LOGIC POWER SUPPLY COM			2	
COMMAND, +12 V				
CONTROL ROOM MONITOR			3	
LOGIC POWER SUPPLY COM				
COMMAND, +12 V			4	

AUDIO				
MONITOR SECTION INPUTS				
INPUTS	CONNECTOR	SHIELD	PIN#	
			LO	HI
1, LEFT	162	1	2	3
1, RIGHT	162	4	5	6
2, LEFT	162	7	8	9
2, RIGHT	162	10	11	12
3, LEFT	364	1	2	3
3, RIGHT	364	4	5	6
4, LEFT	364	7	8	9
4, RIGHT	364	10	11	12
5, LEFT	566	1	2	3
5, RIGHT	566	4	5	6
6, LEFT	566	7	8	9
6, RIGHT	566	10	11	12
7, LEFT	768	1	2	3
7, RIGHT	768	4	5	6
8, LEFT	768	7	8	9
8, RIGHT	768	10	11	12

MONITOR SECTION STUDIO:				
OUTPUTS	STUDIO CONNECTORS	SHIELD	PIN#	
			LO	HI
LEFT W/LEVEL CONTROL	OUTPUT	1	2	3
RIGHT W/LEVEL CONTROL	OUTPUT	4	5	6
LEFT, DIRECT, w/MUTE	AUX	1	2	3
RIGHT, DIRECT, w/MUTE	AUX	4	5	6
LEFT, DIRECT w/O MUTE	AUX	7	8	9
RIGHT, DIRECT w/O MUTE	AUX	10	11	12

CONTROL ROOM:				
OUTPUTS	CONTROL ROOM CONNECTORS	SHIELD	PIN#	
			LO	HI
LEFT	OUTPUT	1	2	3
RIGHT	OUTPUT	4	5	6
HEADPHONE, LEFT	AUX	1	2	3
HEADPHONE, RIGHT	AUX	4	5	6
CUE OUTPUT	AUX	7	8	9
SPKR INPUT	AUX	10	11	12

UTILITY BUS S R L

AUDIO				
INPUT SECTION - TYPICAL FOR ALL INPUTS				
INPUTS	CONNECTOR	SHIELD	PIN#	
			LO	HI
INPUT - A, LEFT	A	1	2	3
INPUT - A, RIGHT	A	4	5	6
INPUT - B, LEFT	B	1	2	3
INPUT - B, RIGHT	B	4	5	6
PATCH OUT, LEFT	PATCH	1	2	3
PATCH OUT, RIGHT	PATCH	4	5	6
PATCH IN, LEFT	PATCH	7	8	9
PATCH IN, RIGHT	PATCH	10	11	12

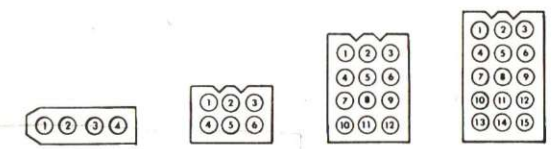
  

LOGIC				
			PIN#	
LOGIC POWER SUPPLY, COM			1	
LOGIC POWER SUPPLY, +12 VDC			2	
REMOTE CONTROL ON			3	
REMOTE CONTROL OFF			4	
"ON" TALLY LIGHT VOLTAGE, +12 VDC			5	
"OFF" TALLY LIGHT VOLTAGE, +12 VDC			6	
REMOTE CONTROL COUGT			7	
N/C			8	
MUTE COMMAND, B-INPUT			9	
N/C			10	
MUTE COMMAND, A-INPUT			11	
N/C			12	
TIMER RESET BUSS			13	
C/R MONITOR MUTE BUSS			14	
ST MONITOR MUTE BUSS			15	

LOGIC				
LINE MODULE				
			PIN#	
LOGIC POWER SUPPLY COM			1	
LOGIC POWER SUPPLY +12 VDC			2	
REMOTE COMMAND READY			3	
REMOTE COMMAND, AUDIO TO OFF			4	
"ON" COMMAND, +12 VDC			5	
"OFF" COMMAND, +12 VDC			6	
RECORD SENSE, AUDIO INHIBIT			7	
STOP PULSE, +12 VDC			8	
STOP PULSE, +12 VDC			9	
START PULSE, +12 VDC			10	
START PULSE, +12 VDC			11	
TIMER RESET PULSE, +12 VDC			12	
TIMER RESET BUSS			13	
C/R MONITOR MUTE BUSS			14	
ST MONITOR MUTE BUSS			15	

OUTPUT SECTION - TYPICAL FOR PROGRAM, AUDITION, UTILITY				
	CONNECTOR	SHIELD	PIN#	
			LO	HI
LEFT (OR MONO)	MAIN	1	2	3
RIGHT	MAIN	4	5	6
LEFT AUXILLIARY	AUX	1	2	3
RIGHT AUXILLIARY	AUX	4	5	6
LEFT PATCH OUT	PATCH	1	2	3
RIGHT PATCH OUT	PATCH	4	5	6
LEFT PATCH IN	PATCH	7	8	9
RIGHT PATCH IN	PATCH	10	11	12

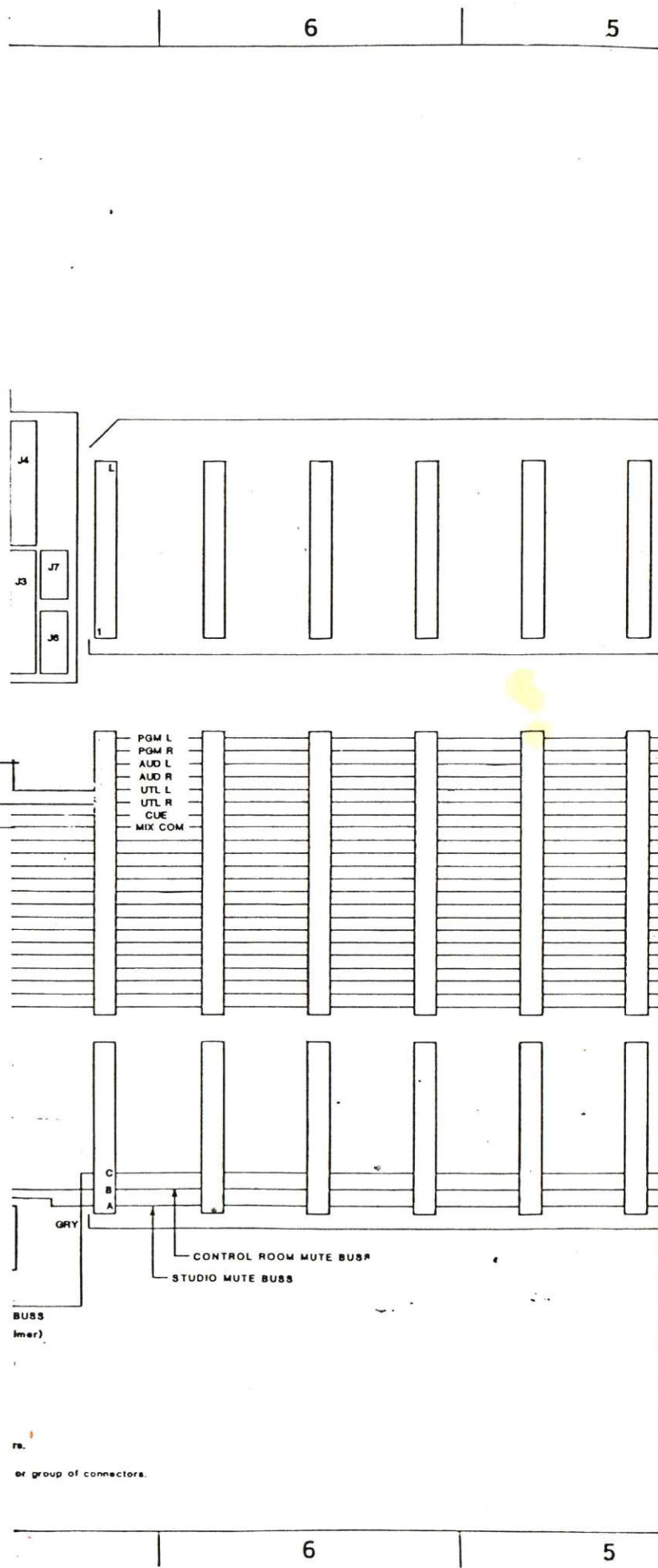
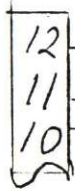


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**7.2 CONNECTOR PANEL DIAGRAM**  
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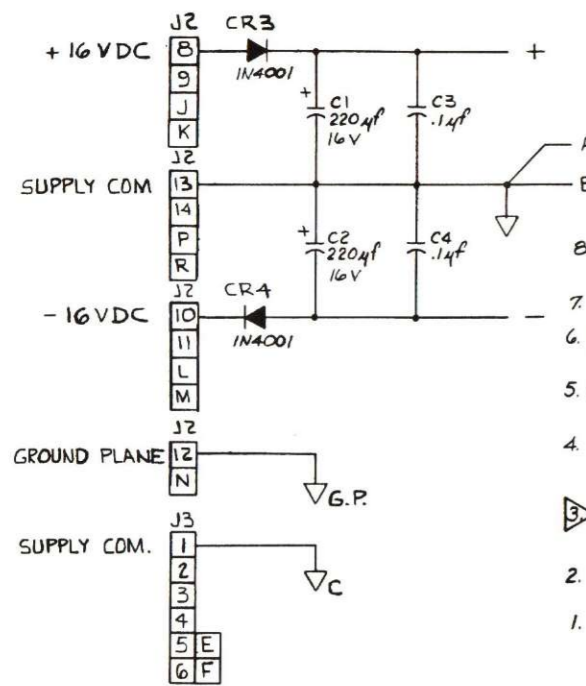
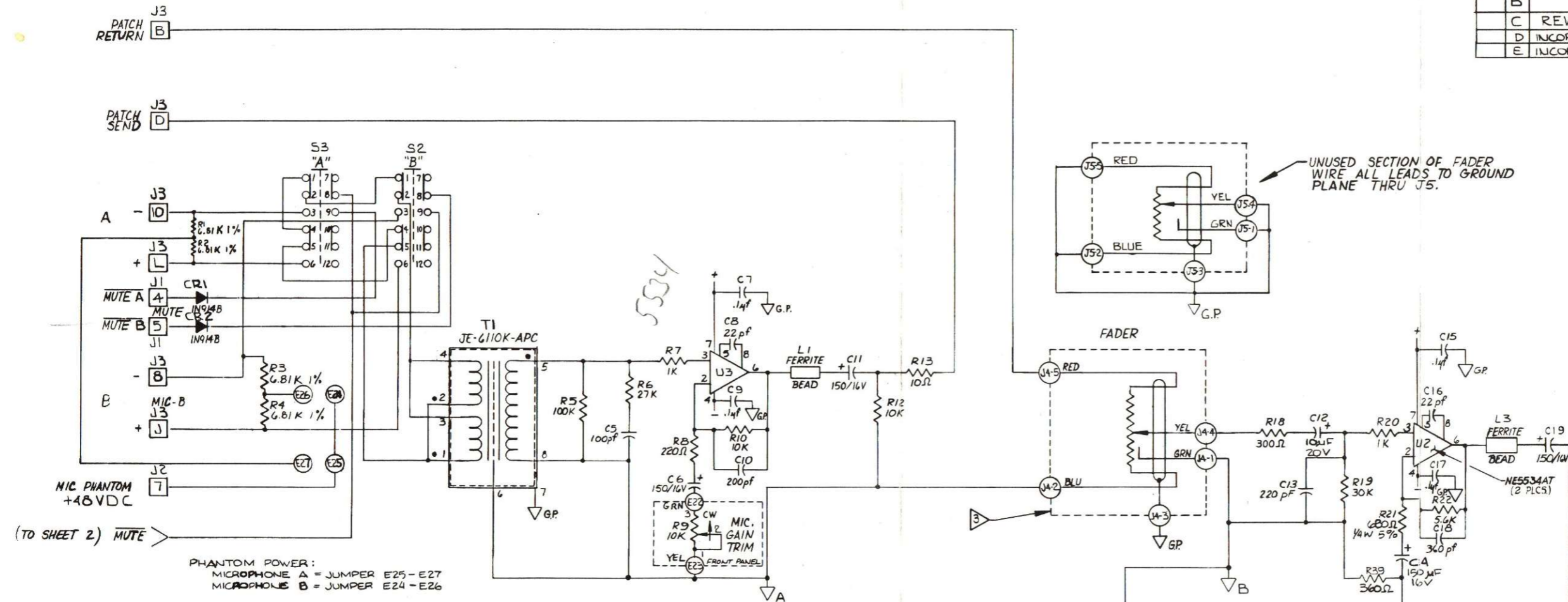
# BMX UTILITY BUSS ACCESS

CONTROL ROOM MONITOR BMX MOLEX (SPKR INPUT)

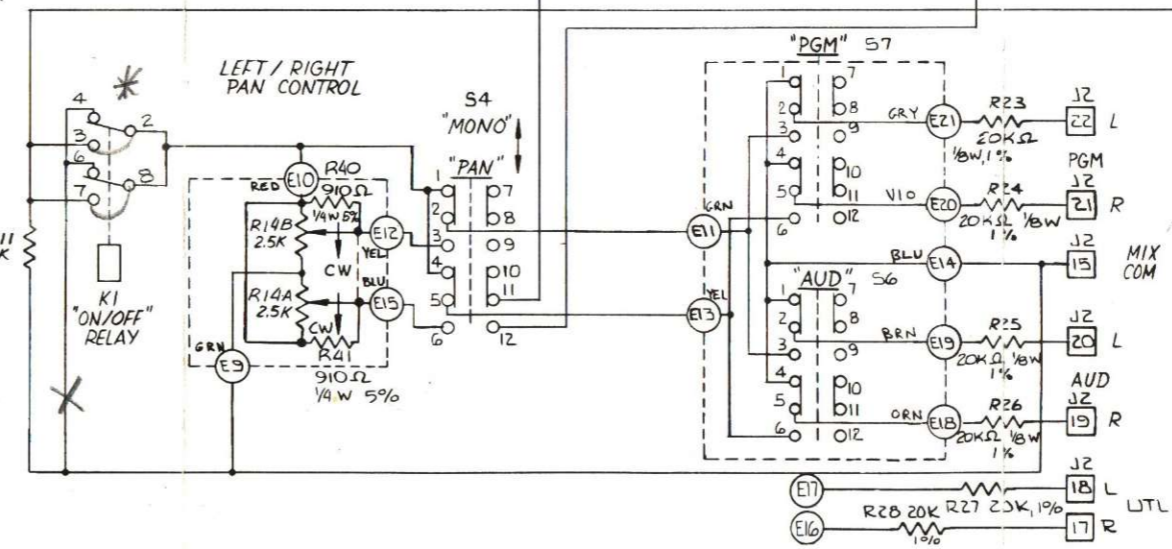


rs.  
or group of connectors.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	1-20-78	JKW
	B	REVISED	6-1-78	JKW
	C	REVISED	6-27-78	JKW
	D	INCORPORATE ECO-006	8-15-78	JKW
	E	INCORPORATE ECO-109	9-1-78	JKW



- 8. R40, R41, S4 SHOWN FOR -0, -1; DELETED AND JUMPER INSTALLED FROM E10 TO E11 AND E13 FOR -2, -3.
- 7. R9 IS MOUNTED ON PANEL FOR -0, -2; ON PCB FOR -1, -3.
- 6. ALL CAPS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
- 5. E1-4 LIE ON CORNERS OF A .500" SQUARE.
- 4. ALL RELAYS SHOWN IN UNENEGIZED STATE.
- 3. FADER WIRES ARE A FOUR-CONDUCTOR SHIELDED CABLE.
- 2. [ ] INDICATES FRONT PANEL LOCATION.
- 1. ALL RESISTORS ARE 1/4W, 5% UNLESS OTHERWISE SPECIFIED.



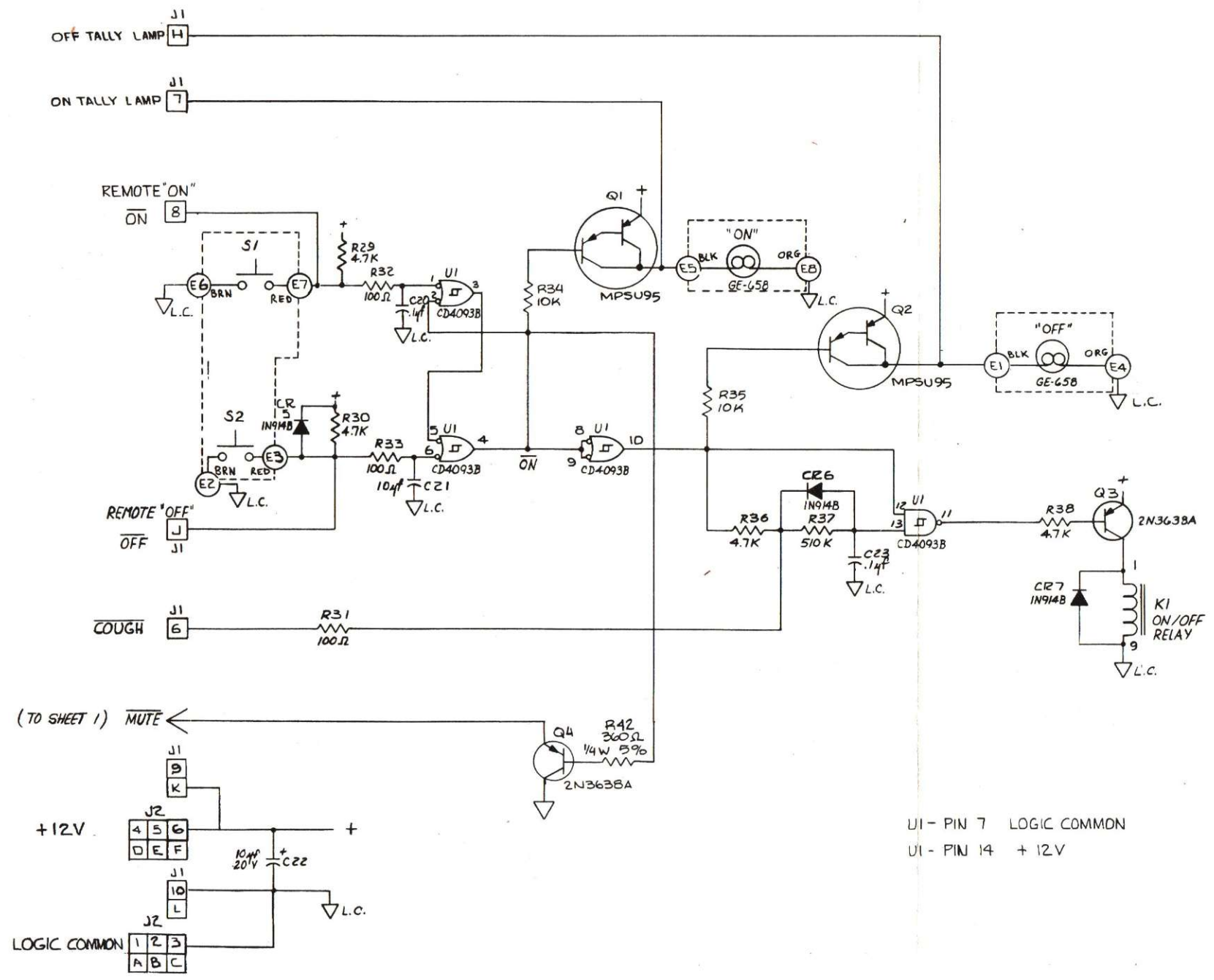
\* News mic mod.  
 (strip so audio always on break ground trace) when external mic relay is used.

- NOTES -

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**7.4 MICROPHONE INPUT MODULE - AUDIO**  
 PACIFIC RECORDERS AND ENGINEERING CORPORATION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
D		INCORPORATE ELO-CO's	8-15-78	<i>[Signature]</i>
E		SEE SHT 1	9-1-78	<i>[Signature]</i>



U1 - PIN 7 LOGIC COMMON  
 U1 - PIN 14 + 12V

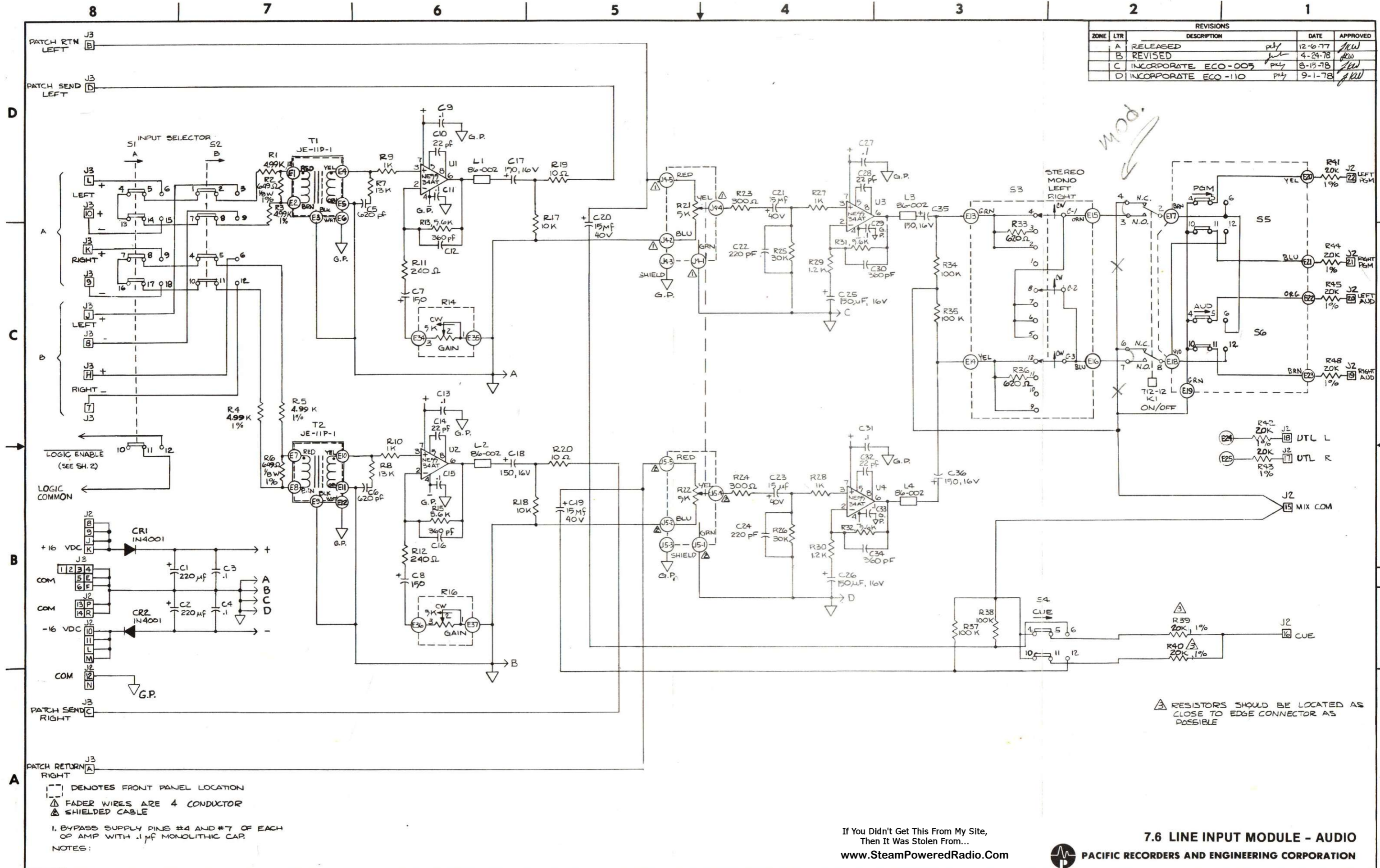
1. ALL GND'S ON THIS PAGE ARE TO LOGIC COMMON UNLESS OTHERWISE NOTED.

-NOTES-

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**7.5 MICROPHONE INPUT MODULE - LOGIC**  
**PACIFIC RECORDERS AND ENGINEERING CORPORATION**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	12-6-77	NW
B		REVISED	4-24-78	NW
C		INCORPORATE ECO-005	8-15-78	NW
D		INCORPORATE ECO-110	9-1-78	NW



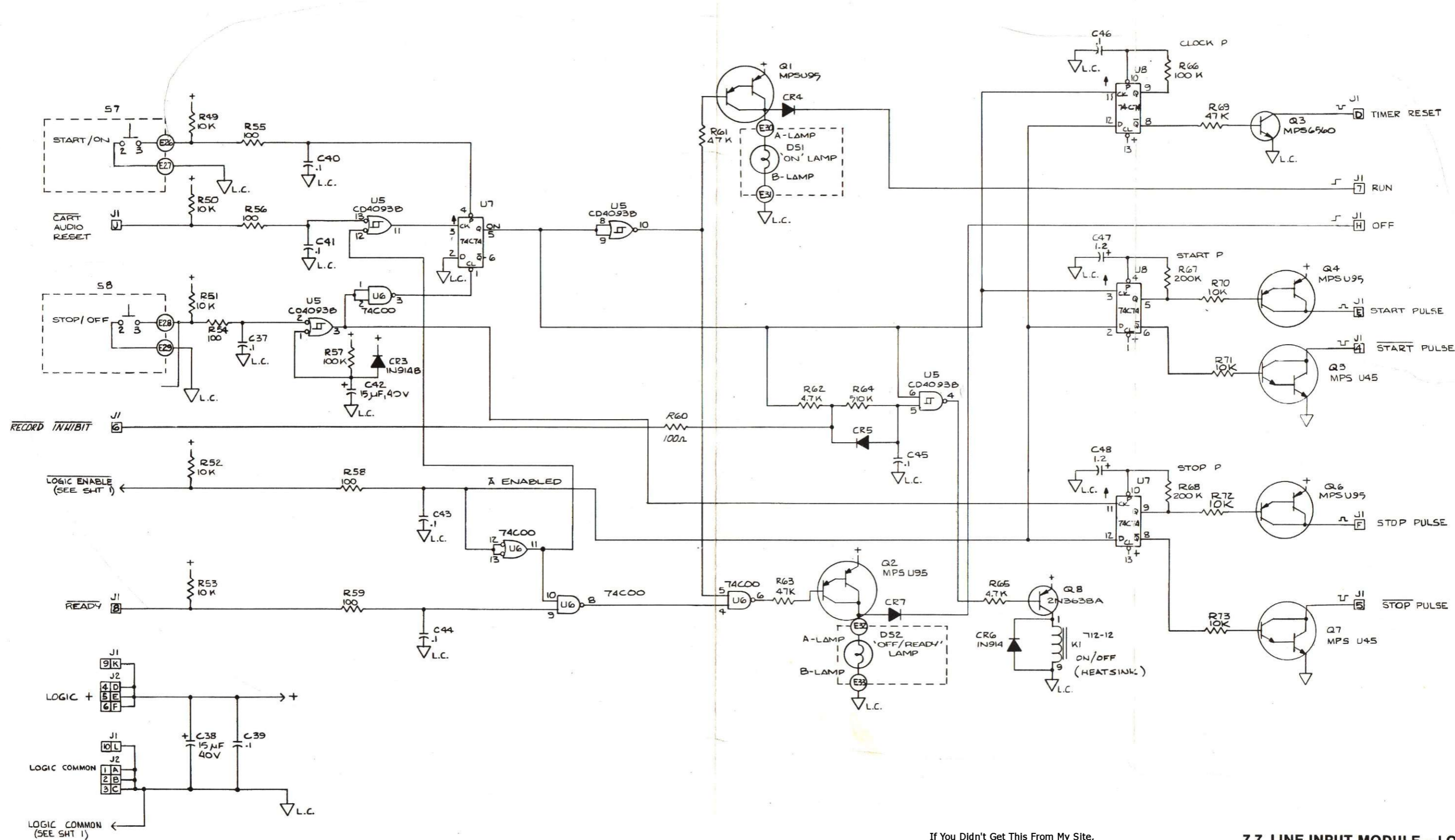
MOD.

RESISTORS SHOULD BE LOCATED AS CLOSE TO EDGE CONNECTOR AS POSSIBLE

[ ] DENOTES FRONT PANEL LOCATION  
 ▲ FADER WIRES ARE 4 CONDUCTOR  
 ▲ SHIELDED CABLE  
 1. BYPASS SUPPLY PINS #4 AND #7 OF EACH OP AMP WITH .1μF MONOLITHIC CAP.  
 NOTES:

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHT 1	9-26-78	fw

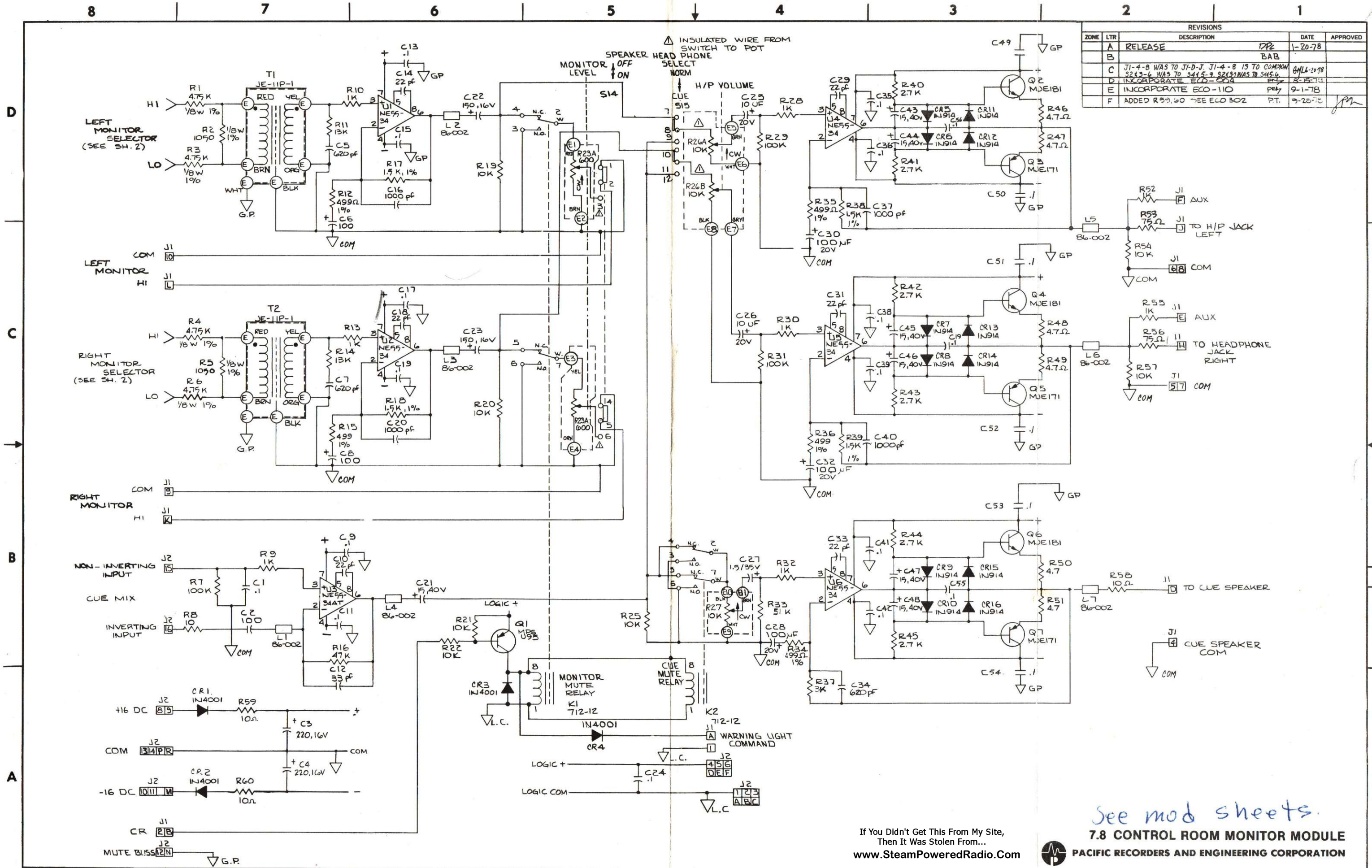


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**7.7 LINE INPUT MODULE - LOGIC**  
PACIFIC RECORDERS AND ENGINEERING CORPORATION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASE	DPZ	1-20-78
B			BAB	
C		J1-4-B WAS TO J1-D-J, J1-4-B IS TO COMMON		8/11/2078
D		5243-6 WAS TO 5415-9, 5243 WAS TO 5456		8-15-78
E		INCORPORATE ECO-110	pey	9-1-78
F		ADDED R59,60 SEE ECO 302	P.T.	9-28-78

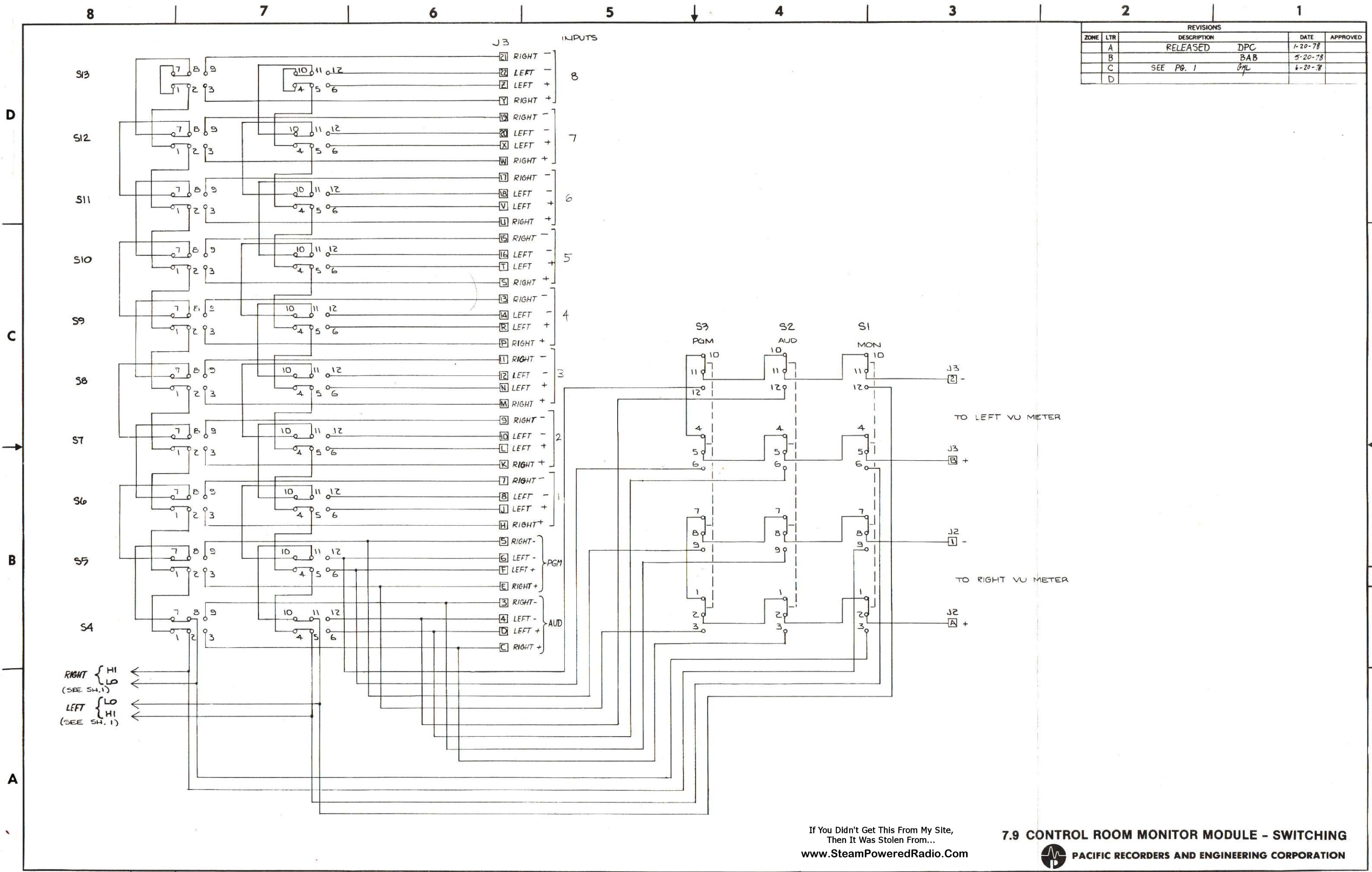


See mod sheets.

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**7.8 CONTROL ROOM MONITOR MODULE**  
PACIFIC RECORDERS AND ENGINEERING CORPORATION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	DPC	1-20-78
	B		BAB	5-20-78
	C	SEE PG. 1	GAL	6-20-78
	D			



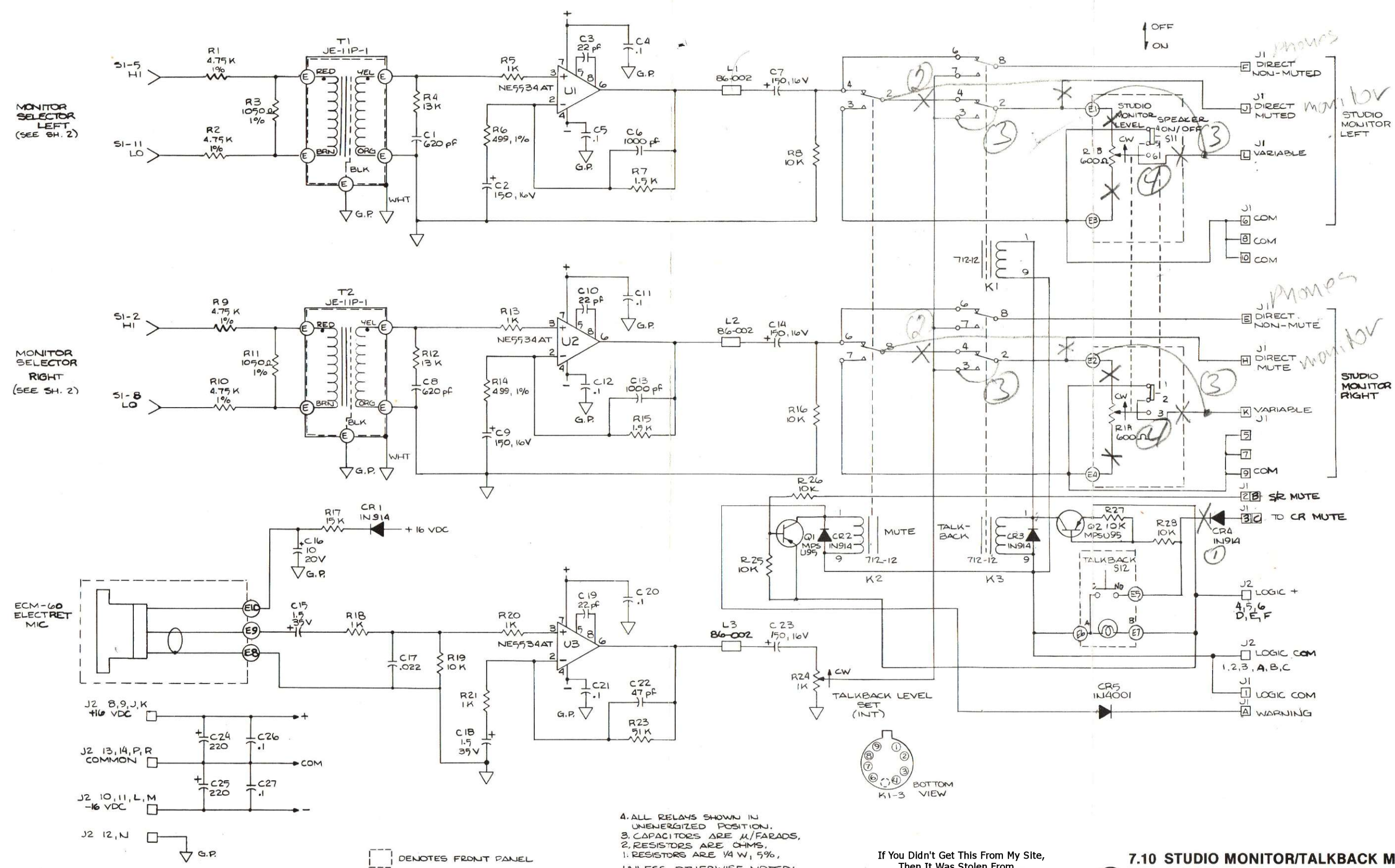
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**7.9 CONTROL ROOM MONITOR MODULE - SWITCHING**  

**PACIFIC RECORDERS AND ENGINEERING CORPORATION**



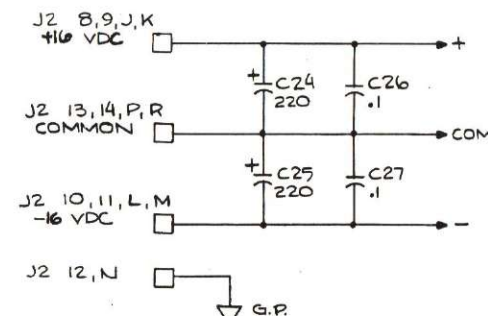
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASE	1-9-78	
	B	CHGD R21 FROM 510 TO 1K. REMOVED POT W/ R22	8-15-78	<i>ym</i>



MONITOR SELECTOR LEFT (SEE SH. 2)

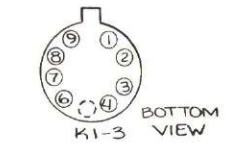
MONITOR SELECTOR RIGHT (SEE SH. 2)

ECM-60 ELECTRET MIC



□ DENOTES FRONT PANEL

4. ALL RELAYS SHOWN IN UNENERGIZED POSITION.  
3. CAPACITORS ARE μ/FARADS.  
2. RESISTORS ARE OHMS.  
1. RESISTORS ARE 1/4 W, 5%,  
UNLESS OTHERWISE NOTED:



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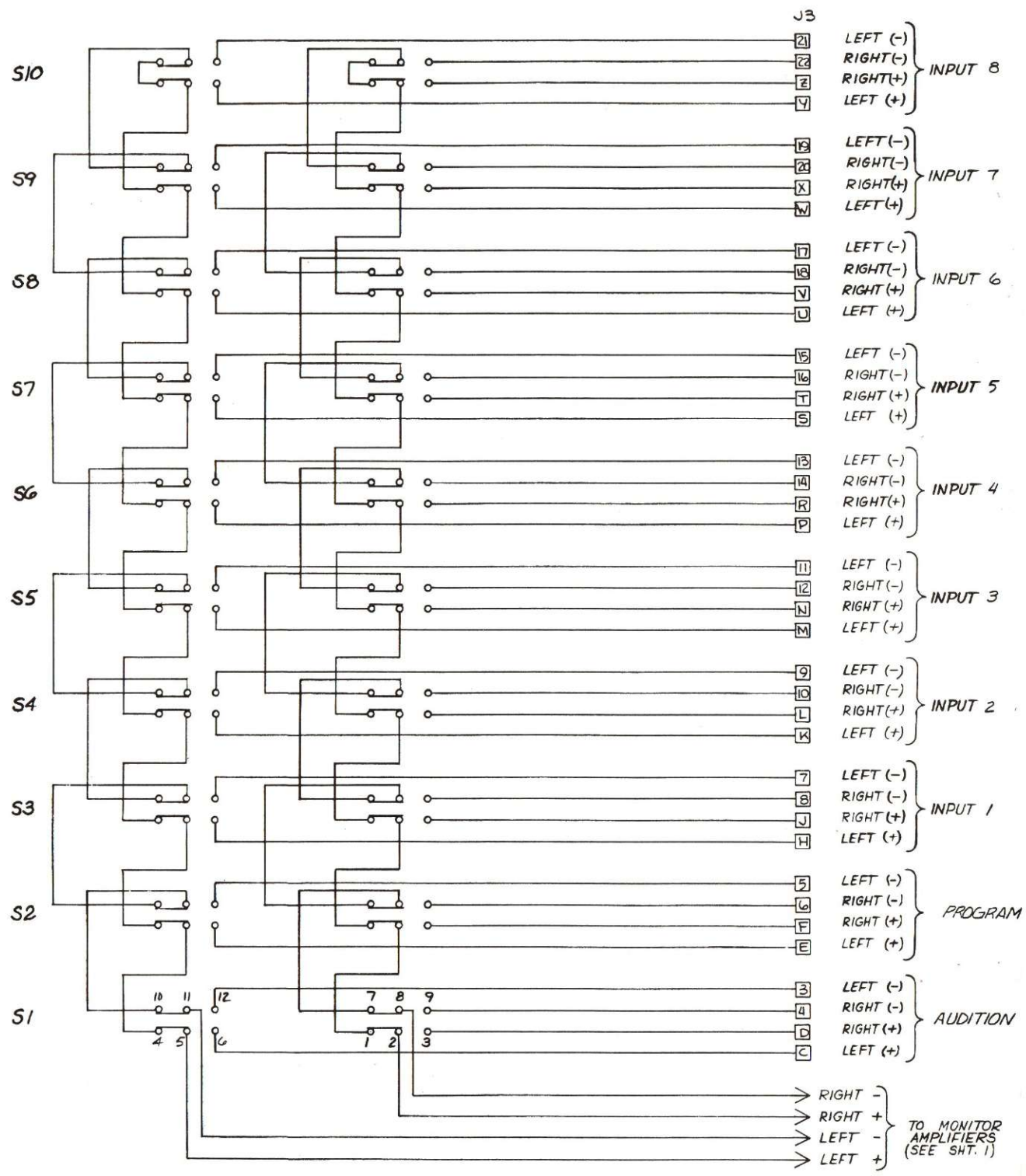
**7.10 STUDIO MONITOR/TALKBACK MODULE**  
PACIFIC RECORDERS AND ENGINEERING CORPORATION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

D  
C  
B  
A

D  
C  
B  
A



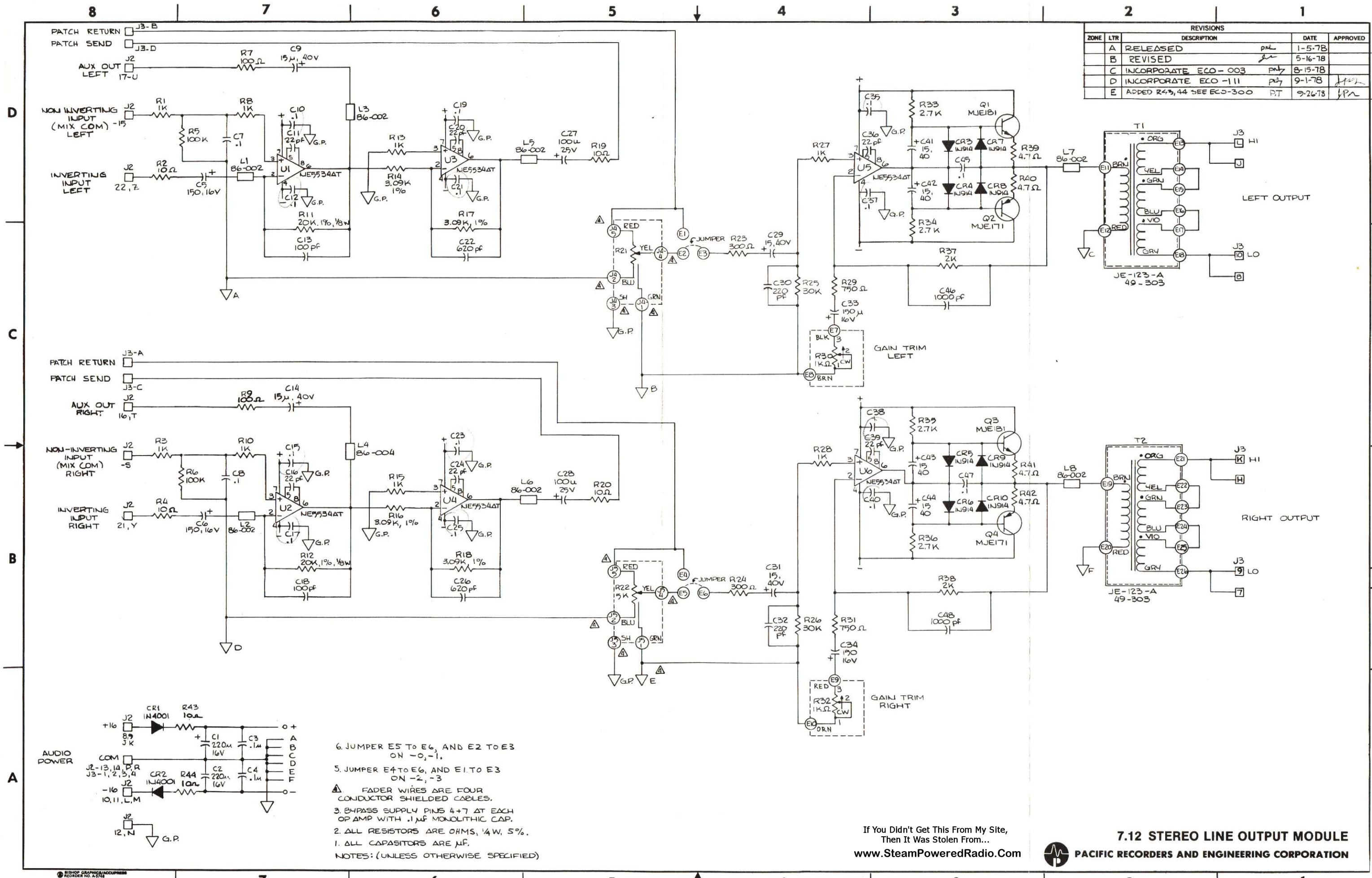
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7.11 STUDIO MONITOR/TALKBACK MODULE - SWITCHING



8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

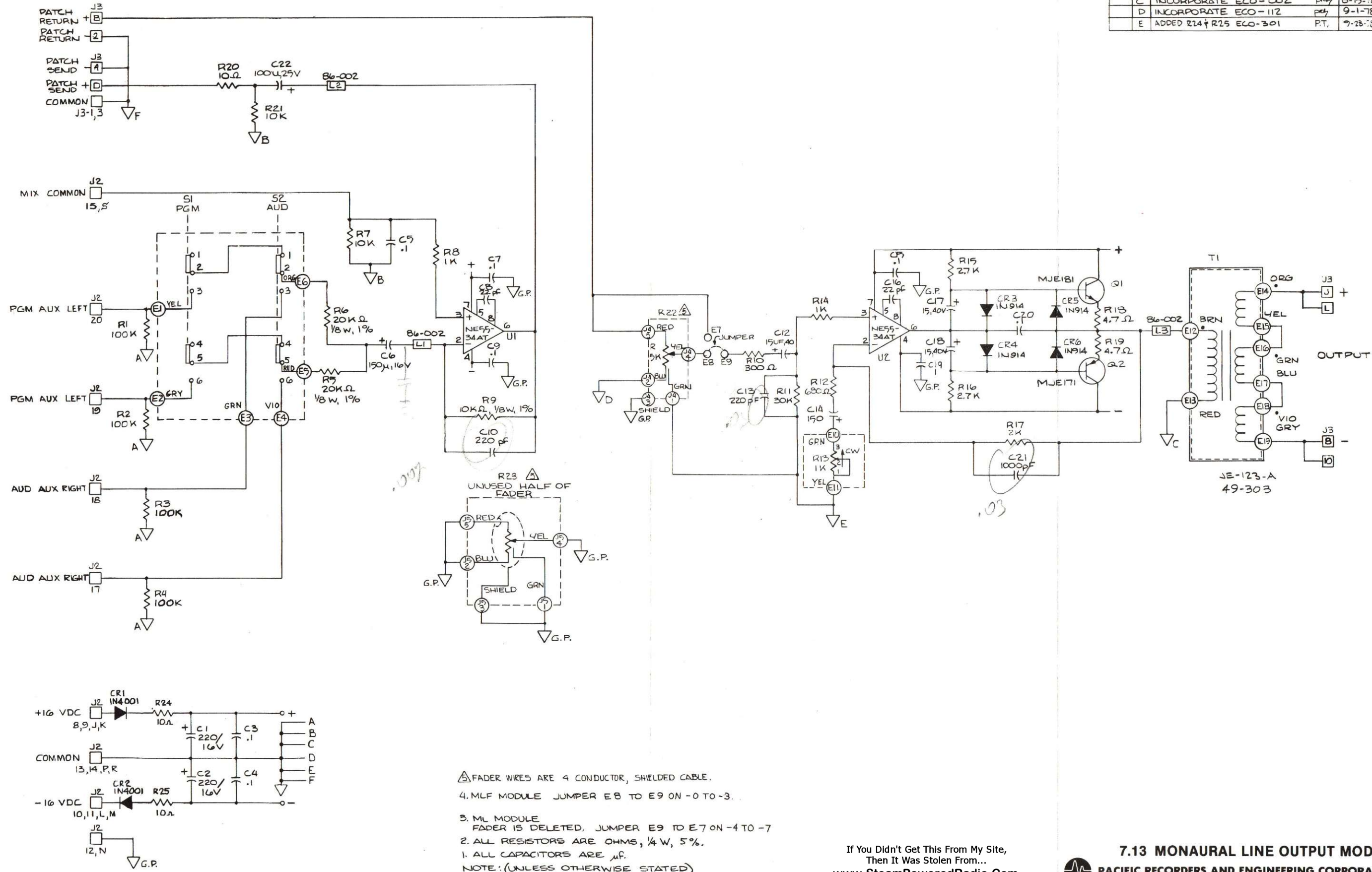
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	1-5-78	
B		REVISED	5-16-78	
C		INCORPORATE ECO-003	8-15-78	
D		INCORPORATE ECO-111	9-1-78	
E		ADDED R43, 44 SEE ECO-300	9-26-78	



6. JUMPER E5 TO E6, AND E2 TO E3 ON -0, -1.
5. JUMPER E4 TO E6, AND E1 TO E3 ON -2, -3.
- ▲ FADER WIRES ARE FOUR CONDUCTOR SHIELDED CABLES.
3. BYPASS SUPPLY PINS 4+7 AT EACH OP AMP WITH .1μF MONOLITHIC CAP.
2. ALL RESISTORS ARE OHMS, 1/4W, 5%.
1. ALL CAPASITORS ARE μF.
- NOTES: (UNLESS OTHERWISE SPECIFIED)

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASE	1-24-78	peh
B		REVISED	5-22-78	in
C		INCORPORATE ECO-002	8-15-78	peh
D		INCORPORATE ECO-112	9-1-78	peh
E		ADDED R24 & R25 ECO-301	7-28-78	P.T.



- △ FADER WIRES ARE 4 CONDUCTOR, SHIELDED CABLE.
- 4. MLF MODULE JUMPER E8 TO E9 ON -0 TO -3.
- 3. MLF MODULE FADER IS DELETED, JUMPER E9 TO E7 ON -4 TO -7
- 2. ALL RESISTORS ARE OHMS, 1/4 W, 5%.
- 1. ALL CAPACITORS ARE μF.
- NOTE: (UNLESS OTHERWISE STATED)

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**7.13 MONAURAL LINE OUTPUT MODULE**  
PACIFIC RECORDERS AND ENGINEERING CORPORATION

## 7.20 BMX CONSOLE PARTS LIST

PART DESCRIPTION	MANUFACTURER	PRE P/N
Button, Engraved		
Yellow OFF	Honeywell/PR&E	25-5-1
Red ON	Honeywell/PR&E	25-2-1
White TALKBACK	Honeywell/PR&E	28-8-1
PGM	Schadow/PR&E	25-13-1
AUD	Schadow/PR&E	25-13-2
A	Schadow/PR&E	25-14-1
B	Schadow/PR&E	25-14-2
Blue START	Dialco/PR&E	25-53-5
Blue STOP	Dialco/PR&E	25-53-6
Blue RESET	Dialco/PR&E	25-53-3
Blue HOLD	Dialco/PR&E	25-53-4
Blue AUTO	Dialco/PR&E	25-53-2
Button, Plain		
White	Honeywell	25-8-0
Red	Honeywell	25-2-0
Blue	Honeywell	25-7-0
Green	Honeywell	25-6-0
Yellow	Honeywell	25-5-0
Orange(Amber)	Honeywell	25-4-0
White	Dialco	25-53-0
Red	Dialco	25-49-0
Blue	Dialco	25-52-0
Green	Dialco	25-50-0
Yellow	Dialco	25-54-0
Orange	Dialco	25-51-0
Button, Clip	Honeywell	25-45
Bezel, Meter 3½", VU	Dixson	36-5
Connector, PC edge		
10 term, dual, solder	SAE	14-207
22 term, dual, solder	SAE	14-209
22 term, single, solder	SAE	14-208
10 term, dual, molex	Molex	14-21
22 term, dual, molex	Molex	14-22
Molex terminals	Molex	15-3

PART DESCRIPTION	MANUFACTURER	PRE P/N
Connector, "Molex" type		
4 term, chassis housing	Molex	15-709
4 term, square, chassis housing	Molex	15-19
6 term, chassis housing	Molex	15-702
12 term, chassis housing	Molex	15-704
15 term, chassis housing	Molex	15-707
Molex Female term. pins	Molex	15-002
4 term, cable-type housing	Molex	15-608
4 term, square cable-type housing	Molex	15-21
6 term, cable-type housing	Molex	15-603
12 term, cable-type housing	Molex	15-605
15 term, cable-type housing	Molex	15-607
Molex Male term. pins	Molex	15-003
9 term, cable-type housing	Molex	15-604
Diodes		
IN4001		11-7
IN914B		11-13
Fader, Linear Motion Assbly.	Penny & Giles/ PR&E	90-69
Integrated Circuits		
NE 5534 T	Signetics	20-8
CD 4093 B	RCA	21-4
74 C 00	Nat'l. Semiconductor	21-12
74 C 74	Nat'l. Semiconductor	21-27
TL082	Texas Instruments	20-9
Knobs		
Monitor level	Buckeye	32-101
Pan, Mode	Buckeye	32-102
Cue, Headphone	Buckeye	32-111
Fader, White	Penny & Giles	32-719
Fader, Black	Penny & Giles	32-710
Fader, Red	Penny & Giles	32-712
Fader, Yellow	Penny & Giles	32-714
Fader, Green	Penny & Giles	32-715
Fader, Blue	Penny & Giles	32-716
Lamps		
# 382	Chicago Miniature	12-16
# 658	Gen. Electric	12-20
# 756	Sylvania	12-21

<b>PART DESCRIPTION</b>	<b>MANUFACTURER</b>	<b>PRE P/N</b>
Meter, 3½" VU	Dixson	46-4
Microphone, Talkback	Primo	23-1
Parts Kit	PR&E	76-2
<b>Potentiometers</b>		
Pan	Clarostat	24-67
Monitor Level	Clarostat	<del>24-62</del> 24-88
Headphone Level	Clarostat	24-26
Cue Level	Clarostat	24-27
Gain Trim, Microphone	Clarostat	24-18
Gain Trim, Line Input	Clarostat	24-19
Gain Trim, Output	Clarostat	24-20
<b>Power Supply Assembly</b>		
Early	Micropower	50-1
Current	Micropower	50-2
Timer	Electronic Components	50-17
Relay	Teledyne	28-501
Speaker, Cue, 45 ohm	Oaktron/PR&E	90-83
<b>Sockets</b>		
Round, 8-pin	Augat	16-109
D.I.P., 8-pin	Texas Instrument	16-108
D.I.P., 14-pin	Texas Instrument	16-114
<b>Switches</b>		
ON, OFF	Honeywell	25-102
CUE, PAN	Schadow	25-602
10 Station	Schadow	25-714
Meter Select	Schadow	25-724
2 station, alternate action	Schadow	25-70
Timer, momentary	Dialco	25-57
Timer, alternate action	Dialco	25-68
Mode	Grayhill	27-327
<b>Transformers</b>		
Microphone Input	Jensen	49-102
Line Input	Jensen	49-310
Output	Jensen	49-303

PART DESCRIPTION	MANUFACTURER	PRE P/N
Transistors		
PN 3638A	Nat'l. Semiconductor	8-8
MPS U45	Motorola	7-7
MPS U95	Motorola	8-6
MJE 171	Motorola	8-1
MJE 181	Motorola	7-1
Tools		
Molex Crimp	Molex	70-3
Molex pin extractor	Molex	70-4
Molex crimp, fancy	Molex	70-5





## Section 8 ACCESSORIES

### 8.1 TIMERS AND CLOCKS

#### 8.1.1 DT-3 TIMER

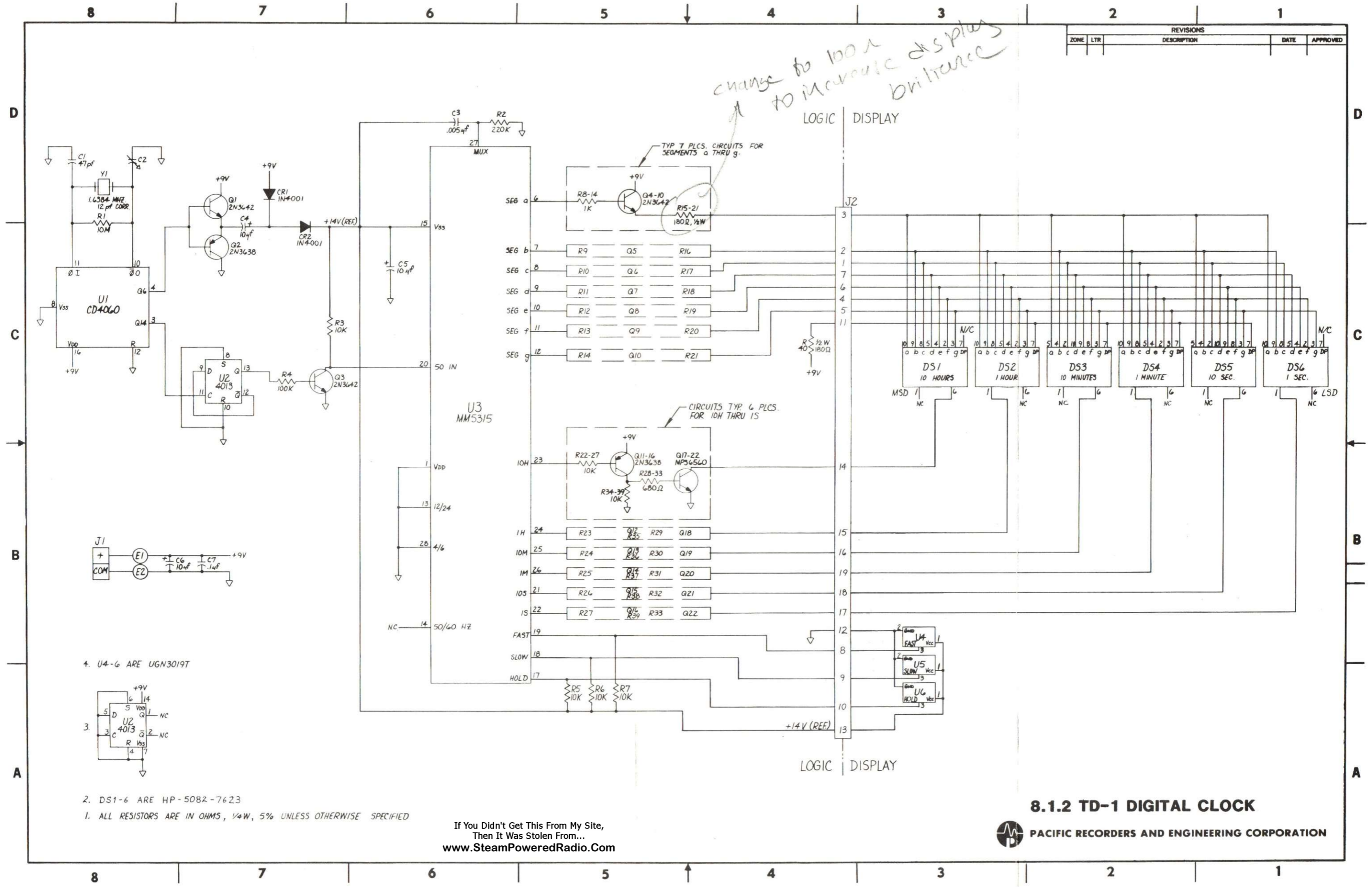
DT-3 CIRCUIT DESCRIPTION: The count up timer is designed around the MK50397 timer integrated circuit U4. Time base and multiplex frequency is supplied by oscillator/divider R1, R2, C3, C4, Y1, and U1. The segments of DS1-5 are selected by drivers Q1-7, and the digits are selected by drivers Q8-12. Power up reset circuit R13, CR1, and C9 via U2B resets U4 to zero, and sets the start/stop flip-flop U2A, C such that the NOT RUN line is high. An external START command via R7, R8, and C7 will set U2A, C such that the NOT RUN line is low, which enables U4 to count up. An external STOP command via R9, R10 and C8 will similarly set the NOT RUN line high. An external RESET command via R5, R6, C6, and U2B will reset U4 to zero. An external READ command via R3, R4, C5, and U3D will momentarily hold the display at the immediate time count (while the real time count continues). The READ command or the RUN line's low state via U3, R27, C11, U3B, and U3A enables the .1 SEC display, and via Q13, and R6 turns on the decimal point. Strapping J1-E to J1-F via R28 continuously enables the .1 SEC display and the decimal point. An external BLANK command via R11, R12, and C10 disables the display outputs of U4.

#### 8.1.2 TD-1 DIGITAL CLOCK

TD-1 CIRCUIT DESCRIPTION: The time of day clock is designed around the MM5315 digital clock integrated circuit U3. Time base is supplied by oscillator/divider circuit R1, C1, C2, Y1, U1, R3, R4, and Q3 to pin 20 of U3. The voltage doubler circuit Q1, Q2, C4, CR1, CR2, and C5 provides the high V<sub>ss</sub> required at pin 15 of U3. The multiplex frequency is established by C3 and R2. The segments of DS1-6 are selected by drivers Q4-10, and the digits are selected by invertors Q11-16 and drivers Q17-22. Hall effect switches U4-6 are magnetically activated to set the clock by respective FAST, SLOW, and HOLD functions.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

*change to 100 ohm to increase display brilliance*

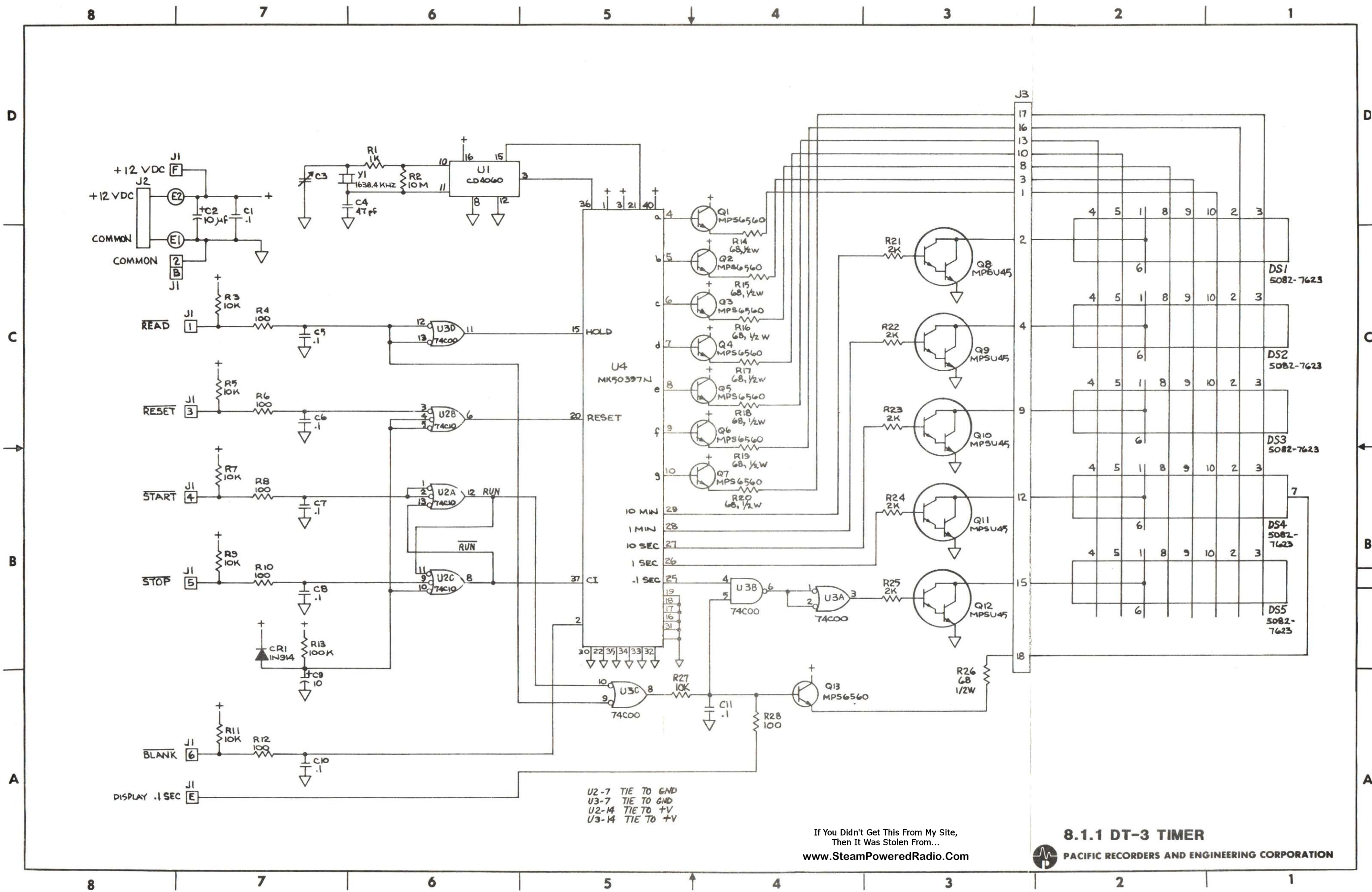


4. U4-6 ARE UGN3019T

2. DS1-6 ARE HP-5082-7623

1. ALL RESISTORS ARE IN OHMS, 1/4W, 5% UNLESS OTHERWISE SPECIFIED

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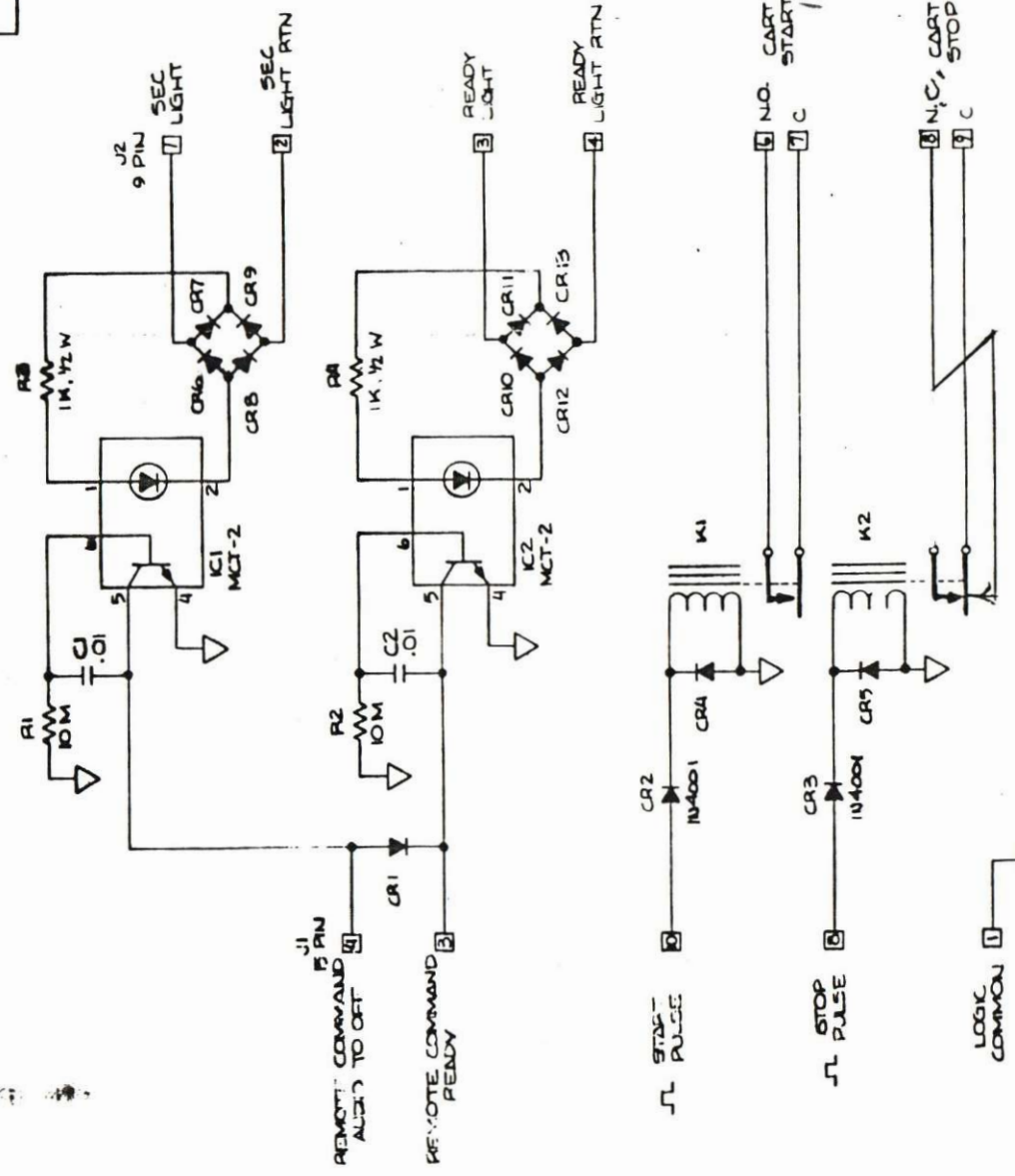
U2-7 TIE TO GND  
 U3-7 TIE TO GND  
 U2-14 TIE TO +V  
 U3-14 TIE TO +V

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**8.1.1 DT-3 TIMER**  
 PACIFIC RECORDERS AND ENGINEERING CORPORATION



ZONE	LTR	REVISIONS	DATE	APPROVED
A		RELEASED	11-9-78	[Signature]
B		RELOCATED CRI ON R.C.A.	1-2-79	[Signature]
C		ADDED 11/10/2	1-2-79	[Signature]
		2 PULSED SEC LIGHT SET TO ON ITEMS 5	1-2-79	[Signature]



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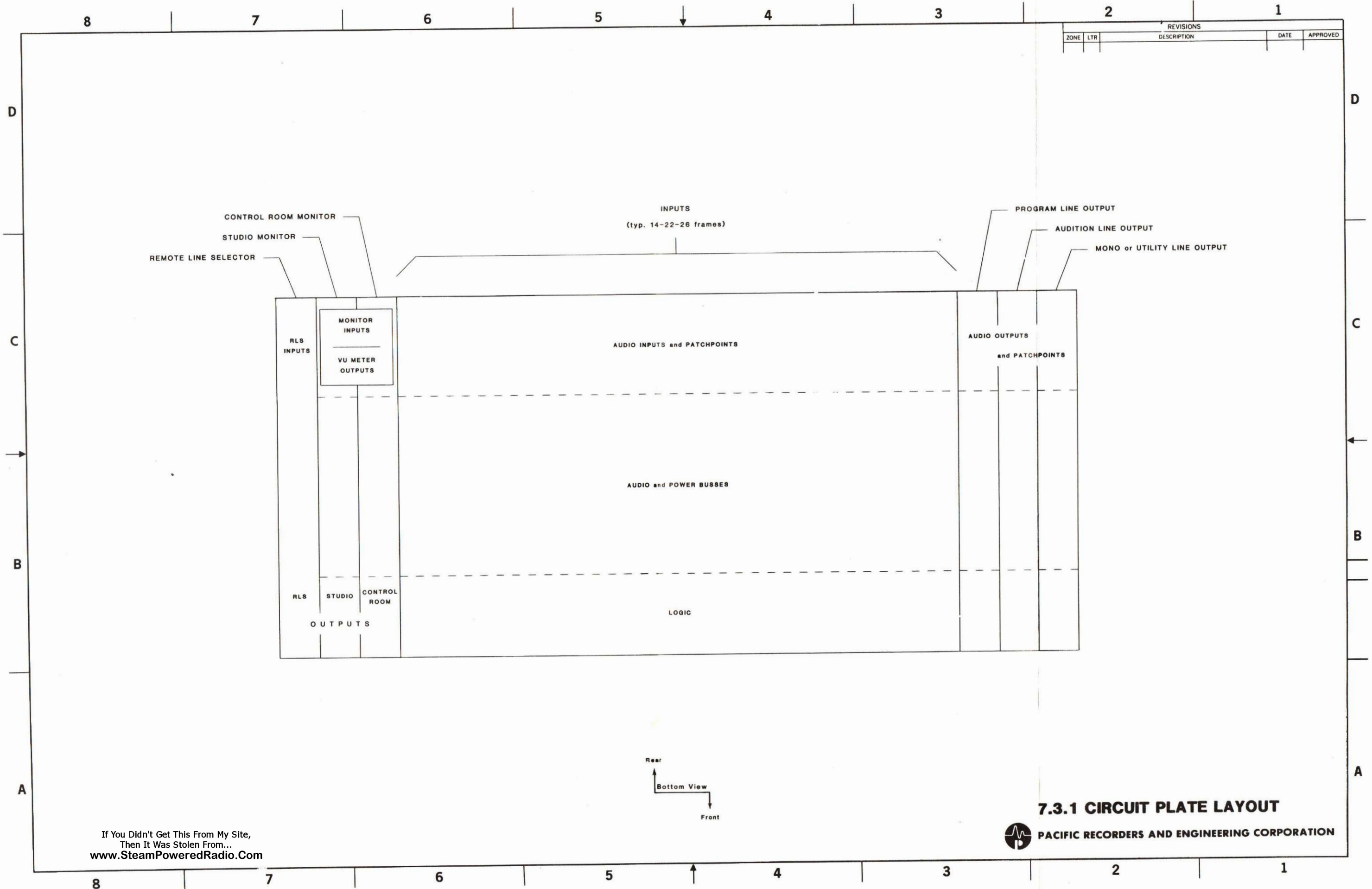
LAST USED		NOT USED		QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
C2							
RA							
CR13							
IC2							
99-43	CI-1						
	USED ON						
APPLICATION				DO NOT SCALE DRAWING			

PARTS LIST		NOMENCLATURE OR DESCRIPTION	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES		CONTRACT NO.	
APPROVALS	DATE	PACIFIC RECORDERS AND ENGINEERING CORP.	
DAVID P. HERRON	10-12-78	TAPINTERFACE II-1	
CHECKED: [Signature]	11-10-78	SIZE CODE (GHT NO.) DRAWING NO.	
MATERIAL		C	90-96
FINISH		SCALE	SHEET 1 OF 2

1. ALL DIODES ARE 1N4148  
NOTES: UNLESS OTHERWISE SPECIFIED

ZONE		LTR	REVISIONS	DESCRIPTION	DATE	APPROVED

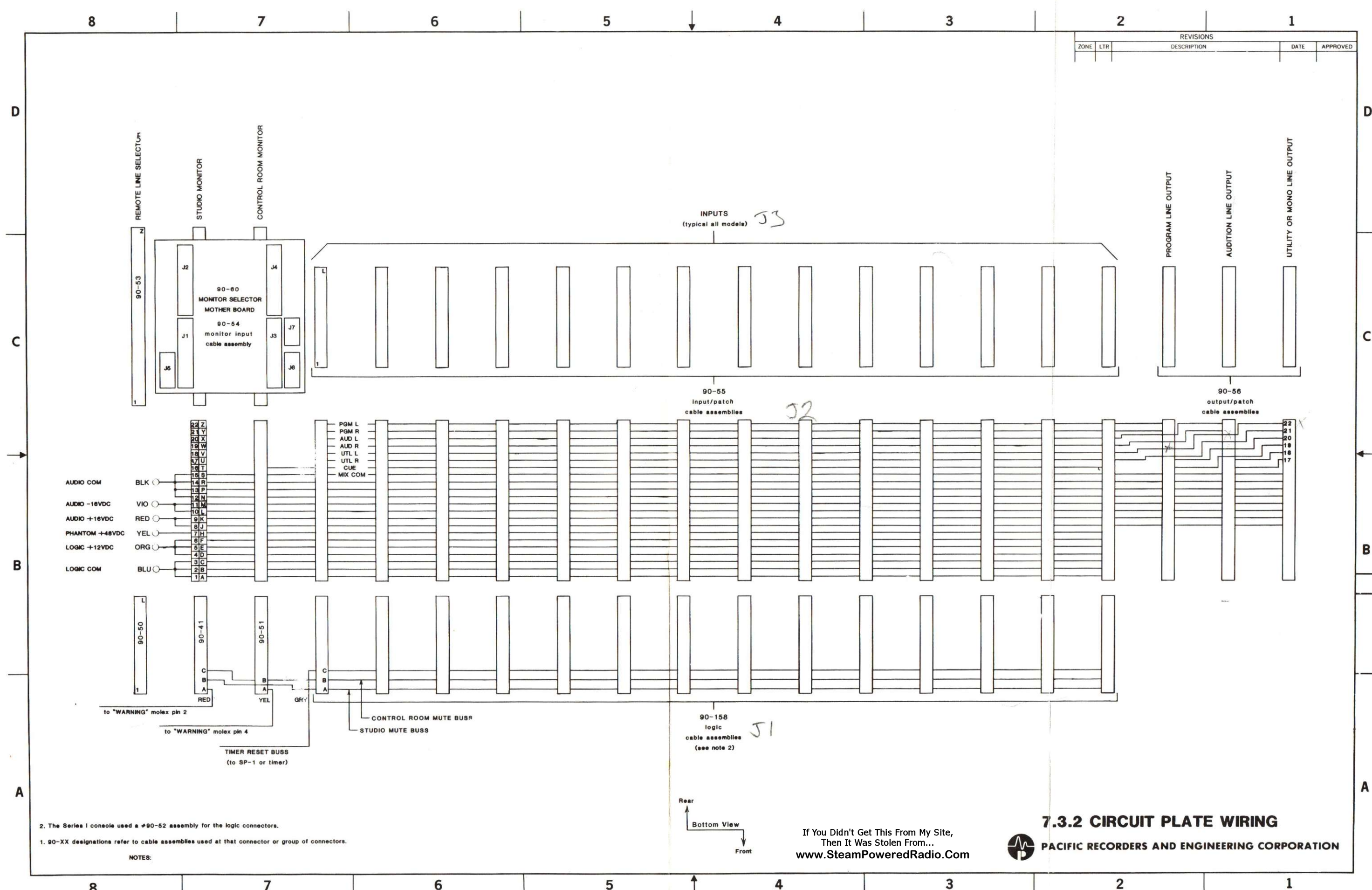


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### 7.3.1 CIRCUIT PLATE LAYOUT

 PACIFIC RECORDERS AND ENGINEERING CORPORATION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



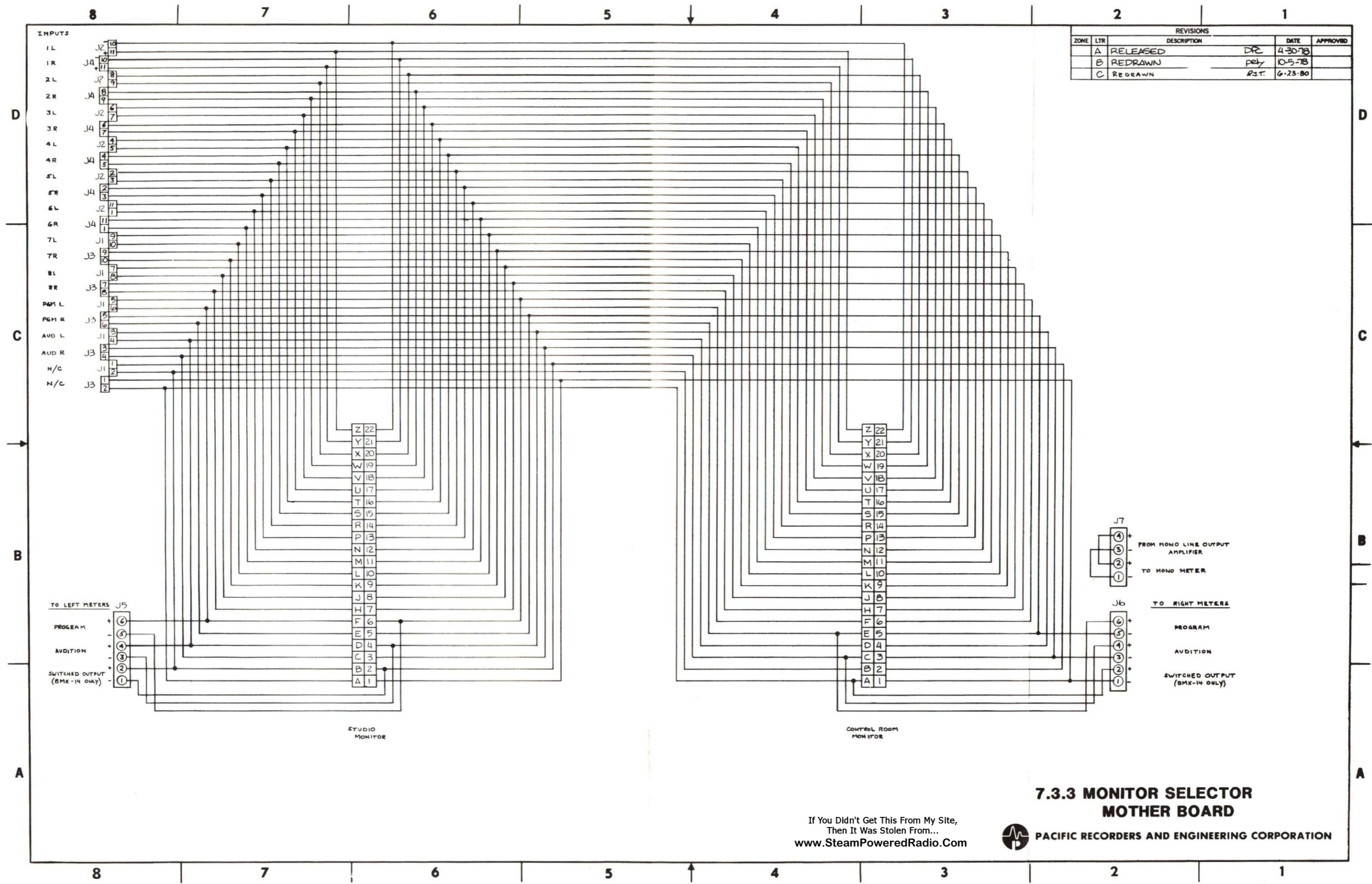
2. The Series I console used a #90-52 assembly for the logic connectors.  
 1. 90-XX designations refer to cable assemblies used at that connector or group of connectors.

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	4-30-78	DRZ
B		REDRAWN	10-5-78	pey
C		REDRAWN	6-23-80	RST



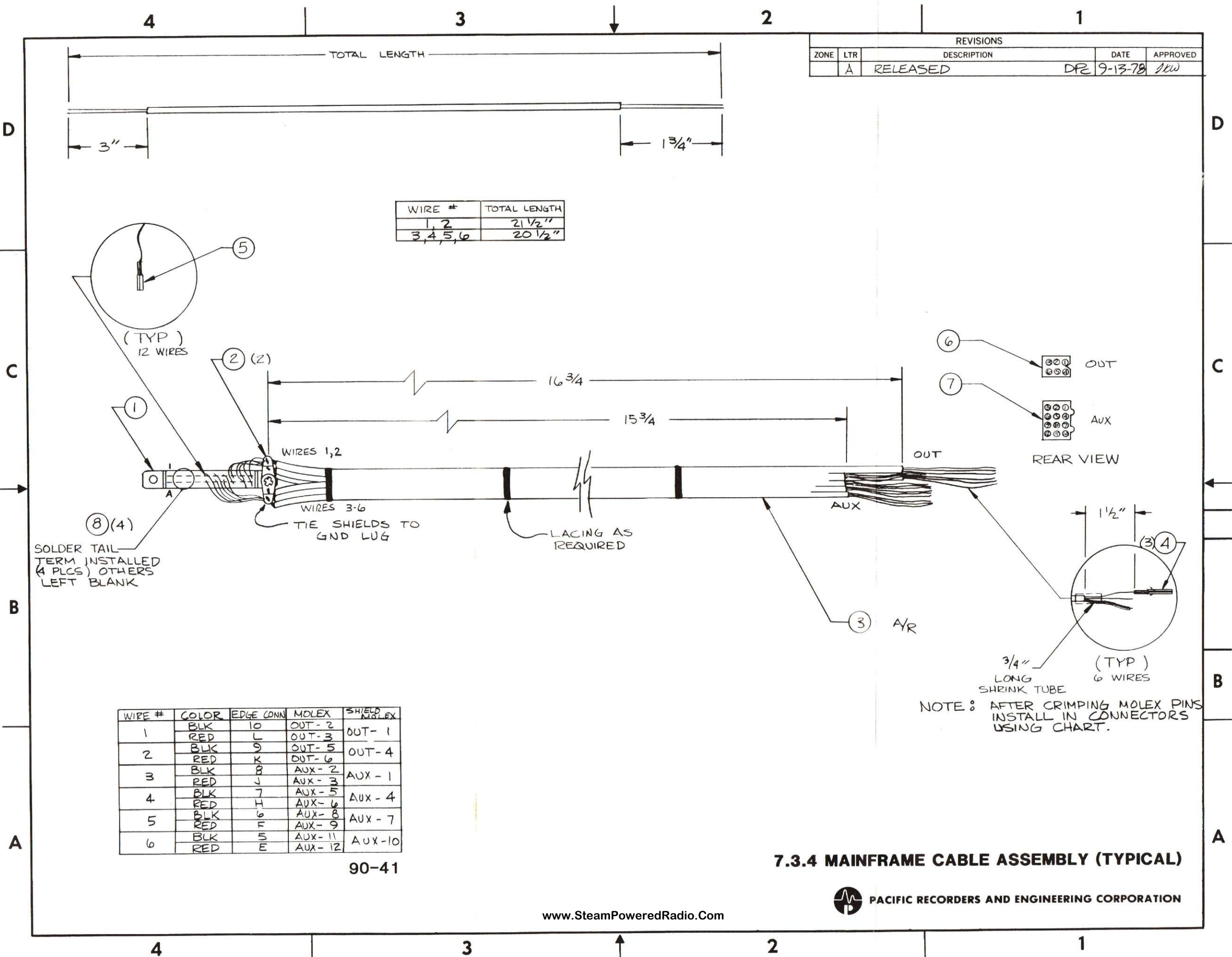
**7.3.3 MONITOR SELECTOR MOTHER BOARD**

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**PACIFIC RECORDERS AND ENGINEERING CORPORATION**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	DFE 9-13-78	JKW



WIRE #	TOTAL LENGTH
1, 2	21 1/2"
3, 4, 5, 6	20 1/2"

WIRE #	COLOR	EDGE CONN	MOLEX	SHIELD MOLEX
1	BLK	10	OUT-2	OUT-1
	RED	L	OUT-3	OUT-1
2	BLK	9	OUT-5	OUT-4
	RED	K	OUT-6	OUT-4
3	BLK	8	AUX-2	AUX-1
	RED	J	AUX-3	AUX-1
4	BLK	7	AUX-5	AUX-4
	RED	H	AUX-6	AUX-4
5	BLK	6	AUX-8	AUX-7
	RED	F	AUX-9	AUX-7
6	BLK	5	AUX-11	AUX-10
	RED	E	AUX-12	AUX-10

90-41

7.3.4 MAINFRAME CABLE ASSEMBLY (TYPICAL)



WIRE #	COLOR	EDGE CONNECTOR	REAR PANEL MOLEX
1	SHIELD	GND LUG	OUT 1 - 1
	BLK	10	OUT 1 - 2
	RED	L	OUT 1 - 3
2	SHIELD	GND LUG	OUT 1 - 4
	BLK	9	OUT 1 - 5
	RED	K	OUT 1 - 6
3	SHIELD	GND LUG	OUT 2 - 1
	BLK	8	OUT 2 - 2
	RED	J	OUT 2 - 3
4	SHIELD	GND LUG	OUT 2 - 4
	BLK	7	OUT 2 - 5
	RED	H	OUT 2 - 6

90-50

### 7.3.6 REMOTE LINE SELECTOR OUTPUT

WIRE #	COLOR	EDGE CONNECTOR	REAR PANEL MOLEX
1	SHIELD	GND LUG	OUT 1
	BLK	10	OUT 2
	RED	L	OUT 3
2	SHIELD	GND LUG	OUT 4
	BLK	9	OUT 5
	RED	K	OUT 6
3	SHIELD	GND LUG	AUX 1
	BLK	6	AUX 2
	RED	F	AUX 3
4	SHIELD	GND LUG	AUX 4
	BLK	5	AUX 5
	RED	E	AUX 6
5	SHIELD	GND LUG	AUX 7
	BLK	4	AUX 8
	RED	D	AUX 9

90-51

### 7.3.7 CONTROL ROOM MONITOR OUTPUT

WIRE #	COLOR	EDGE CONNECTOR	REAR PANEL MOLEX
		ALL SHIELDS CUT-OFF AT JACKET	
1	BLK	22	1 AND 2 - 2
	RED	Z	1 AND 2 - 3
2	BLK	21	1 AND 2 - 5
	RED	Y	1 AND 2 - 6
3	BLK	20	1 AND 2 - 8
	RED	X	1 AND 2 - 9
4	BLK	19	1 AND 2 - 11
	RED	W	1 AND 2 - 12
5	BLK	18	3 AND 4 - 2
	RED	V	3 AND 4 - 3
6	BLK	17	3 AND 4 - 5
	RED	U	3 AND 4 - 6
7	BLK	16	3 AND 4 - 8
	RED	T	3 AND 4 - 9
8	BLK	15	3 AND 4 - 11
	RED	S	3 AND 4 - 12
9	BLK	14	5 AND 6 - 2
	RED	R	5 AND 6 - 3
10	BLK	13	5 AND 6 - 5
	RED	P	5 AND 6 - 6
11	BLK	12	5 AND 6 - 8
	RED	N	5 AND 6 - 9
12	BLK	11	5 AND 6 - 11
	RED	M	5 AND 6 - 12
13	BLK	10	7 AND 8 - 2
	RED	L	7 AND 8 - 3
14	BLK	9	7 AND 8 - 5
	RED	K	7 AND 8 - 6
15	BLK	8	7 AND 8 - 8
	RED	J	7 AND 8 - 9
16	BLK	7	7 AND 8 - 11
	RED	H	7 AND 8 - 12
17	BLK	6	9 AND 10 - 2
	RED	F	9 AND 10 - 3
18	BLK	5	9 AND 10 - 5
	RED	E	9 AND 10 - 6
19	BLK	4	9 AND 10 - 8
	RED	D	9 AND 10 - 9
20	BLK	3	9 AND 10 - 11
	RED	C	9 AND 10 - 12

**NOTE:**

Shield pins 1, 4, 7, and 10 of the Remote Line Selector Input molex connectors are tied to chassis ground at the rear panel.

90-53

**7.3.9 REMOTE LINE SELECTOR INPUT**

WIRE #	COLOR	FROM REAR PANEL MOLEX CONNECTORS		TO #90-60 MONITOR SELECTOR MOTHER BOARD
		INPUT	PIN #	
1	BLK	8L	8	J1 - 7
	RED	8L	9	J1 - 8
2	BLK	7L	2	J1 - 9
	RED	7L	3	J1 - 10
3	BLK	6L	8	J1 - 11
	RED	6L	9	J2 - 1
4	BLK	5L	2	J2 - 2
	RED	5L	3	J2 - 3
5	BLK	4L	8	J2 - 4
	RED	4L	9	J2 - 5
6	BLK	3L	2	J2 - 6
	RED	3L	3	J2 - 7
7	BLK	2L	8	J2 - 8
	RED	2L	9	J2 - 9
8	BLK	1L	2	J2 - 10
	RED	1L	3	J2 - 11
9	BLK	8R	11	J3 - 7
	RED	8R	12	J3 - 8
10	BLK	7R	5	J3 - 9
	RED	7R	6	J3 - 10
11	BLK	6R	11	J3 - 11
	RED	6R	12	J4 - 1
12	BLK	5R	5	J4 - 2
	RED	5R	6	J4 - 3
13	BLK	4R	11	J4 - 4
	RED	4R	12	J4 - 5
14	BLK	3R	5	J4 - 6
	RED	3R	6	J4 - 7
15	BLK	2R	11	J4 - 8
	RED	2R	12	J4 - 9
16	BLK	1R	5	J4 - 10
	RED	1R	6	J4 - 11

90-54

**NOTE:**

Shield pins 1, 4, 7 and 10 of the Monitor Input molex connectors are tied to chassis ground at the rear panel.

**7.3.10 CONTROL ROOM AND STUDIO MONITOR INPUTS**

WIRE #	COLOR	EDGE CONNECTOR	REAR PANEL MOLEX
1	SHIELD	GND LUG	A-1
	BLK	10	A-2
	RED	L	A-3
2	SHIELD	GND LUG	A-4
	BLK	9	A-5
	RED	K	A-6
3	SHIELD	GND LUG	B-1
	BLK	8	B-2
	RED	J	B-3
4	SHIELD	GND LUG	B-4
	BLK	7	B-5
	RED	H	B-6
5	SHIELD	GND LUG	PATCH 1
	BLK	4	PATCH 2
	RED	D	PATCH 3
6	SHIELD	GND LUG	PATCH 4
	BLK	3	PATCH 5
	RED	C	PATCH 6
7	SHIELD	GND LUG	PATCH 7
	BLK	2	PATCH 8
	RED	B	PATCH 9
8	SHIELD	GND LUG	PATCH 10
	BLK	1	PATCH 11
	RED	A	PATCH 12

90-55

### 7.3.11 AUDIO INPUT

WIRE #	COLOR	EDGE CONNECTOR	TO # 90-60 MONITOR SELECTOR MOTHER BOARD
1	SHIELD	UTILITY GND LUG	CUT OFF AT JACKET
	BLK	UTILITY 10	J7 - 3
	RED	UTILITY L	J7 - 4
2	SHIELD	PGM GND LUG	CUT OFF AT JACKET
	BLK	PGM 10	J1 - 5
	RED	PGM L	J1 - 6
3	SHIELD	AUD GND LUG	CUT OFF AT JACKET
	BLK	AUD 10	J1 - 3
	RED	AUD L	J1 - 4
4	SHIELD	PGM GND LUG	CUT OFF AT JACKET
	BLK	PGM 9	J3 - 5
	RED	PGM K	J3 - 6
5	SHIELD	AUD GND LUG	CUT OFF AT JACKET
	BLK	AUD 9	J3 - 3
	RED	AUD K	J3 - 4
			TO REAR PANEL MOLEX CONNECTORS
6	SHIELD	PGM GND LUG	PGM MAIN 1
	BLK	PGM 10	PGM MAIN 2
	RED	PGM L	PGM MAIN 3
7	SHIELD	PGM GND LUG	PGM MAIN 4
	BLK	PGM 9	PGM MAIN 5
	RED	PGM K	PGM MAIN 6
8	SHIELD	PGM GND LUG	PGM AUX 1
	BLK	PGM 8	PGM AUX 2
	RED	PGM J	PGM AUX 3
9	SHIELD	PGM GND LUG	PGM AUX 4
	BLK	PGM 7	PGM AUX 5
	RED	PGM H	PGM AUX 6
10	SHIELD	PGM GND LUG	PGM PATCH 1
	BLK	PGM 4	PGM PATCH 2
	RED	PGM D	PGM PATCH 3
11	SHIELD	PGM GND LUG	PGM PATCH 4
	BLK	PGM 3	PGM PATCH 5
	RED	PGM C	PGM PATCH 6
12	SHIELD	PGM GND LUG	PGM PATCH 7
	BLK	PGM 2	PGM PATCH 8
	RED	PGM B	PGM PATCH 9
13	SHIELD	PGM GND LUG	PGM PATCH 10
	BLK	PGM 1	PGM PATCH 11
	RED	PGM A	PGM PATCH 12
14	SHIELD	AUD GND LUG	AUD MAIN 1
	BLK	AUD 10	AUD MAIN 2
	RED	AUD L	AUD MAIN 3
15	SHIELD	AUD GND LUG	AUD MAIN 4
	BLK	AUD 9	AUD MAIN 5
	RED	AUD K	AUD MAIN 6

WIRE #	COLOR	EDGE CONNECTORS	REAR PANEL MOLEX
16	SHIELD	AUD GND LUG	AUD AUX 1
	BLK	AUD 8	AUD AUX 2
	RED	AUD J	AUD AUX 3
17	SHIELD	AUD GND LUG	AUD AUX 4
	BLK	AUD 7	AUD AUX 5
	RED	AUD H	AUD AUX 6
18	SHIELD	AUD GND LUG	AUD PATCH 1
	BLK	AUD 9	AUD PATCH 2
	RED	AUD D	AUD PATCH 3
19	SHIELD	AUD GND LUG	AUD PATCH 4
	BLK	AUD 3	AUD PATCH 5
	RED	AUD C	AUD PATCH 6
20	SHIELD	AUD GND LUG	AUD PATCH 7
	BLK	AUD 2	AUD PATCH 8
	RED	AUD B	AUD PATCH 9
21	SHIELD	AUD GND LUG	AUD PATCH 10
	BLK	AUD 1	AUD PATCH 11
	RED	AUD A	AUD PATCH 12
22	SHIELD	UTL GND LUG	UTL MAIN 1
	BLK	UTL 10	UTL MAIN 2
	RED	UTL L	UTL MAIN 3
23	SHIELD	UTL GND LUG	UTL MAIN 4
	BLK	UTL 9	UTL MAIN 5
	RED	UTL K	UTL MAIN 6
24	SHIELD	UTL GND LUG	UTL AUX 1
	BLK	UTL 8	UTL AUX 2
	RED	UTL J	UTL AUX 3
25	SHIELD	UTL GND LUG	UTL AUX 4
	BLK	UTL 7	UTL AUX 5
	RED	UTL H	UTL AUX 6
26	SHIELD	UTL GND LUG	UTL PATCH 1
	BLK	UTL 4	UTL PATCH 2
	RED	UTL D	UTL PATCH 3
27	SHIELD	UTL GND LUG	UTL PATCH 4
	BLK	UTL 3	UTL PATCH 5
	RED	UTL C	UTL PATCH 6
28	SHIELD	UTL GND LUG	UTL PATCH 7
	BLK	UTL 2	UTL PATCH 8
	RED	UTL B	UTL PATCH 9
29	SHIELD	UTL GND LUG	UTL PATCH 10
	BLK	UTL 1	UTL PATCH 11
	RED	UTL A	UTL PATCH 12

90-56

### 7.3.12 AUDIO OUTPUT



WIRE #	COLOR	FROM		TO
		METER POSITION	CONNECTOR	
1	SHIELD	1	P2-1	#90-60 MONITOR SELECTOR MOTHER BOARD J5-J7
	BLK	1	P2-2	
	RED	1	P2-3	
2	SHIELD	2	P4-1	
	BLK	2	P4-2	
	RED	2	P4-3	
3	SHIELD	3	P6-1	
	BLK	3	P6-2	
	RED	3	P6-3	
4	SHIELD	4	P8-1	
	BLK	4	P8-2	
	RED	4	P8-3	
5	SHIELD	5	P10-1	
	BLK	5	P10-2	
	RED	5	P10-3	
METER POWER SUPPLY CONNECTIONS				
	ORG		+12VDC	
	BLU		COM	
	RED		+16VDC	
	BLK		COM	
	VIO		-16VDC	
SP-1 TIMER PANEL CONNECTIONS				
	BLU		COM	
	ORG		+12VDC	
	GRY		RESET BUSS	

90-89

### 7.3.13 VU METER HARNESS

WIRE COLOR	EDGE CONNECTOR	REAR PANEL MOLEX
	PIN #	PIN #
BLK	10,L	1
WHT	9 K	2
RED	8	3
GRN	J	4
ORN	7	5
BLU	H	6
WHT/BLK	6	7
RED/BLK	F	8
GRN/BLK	5	9
ORN/BLK	E	10
BLU/BLK	4	11
BLK/WHT	D	12
RED/WHT	—	13
GRN/WHT	—	14
BLU/WHT	—	15

### 7.3.15 SERIES I LOGIC CONTROL

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4

3

2

1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHT. 1		

D

D

C

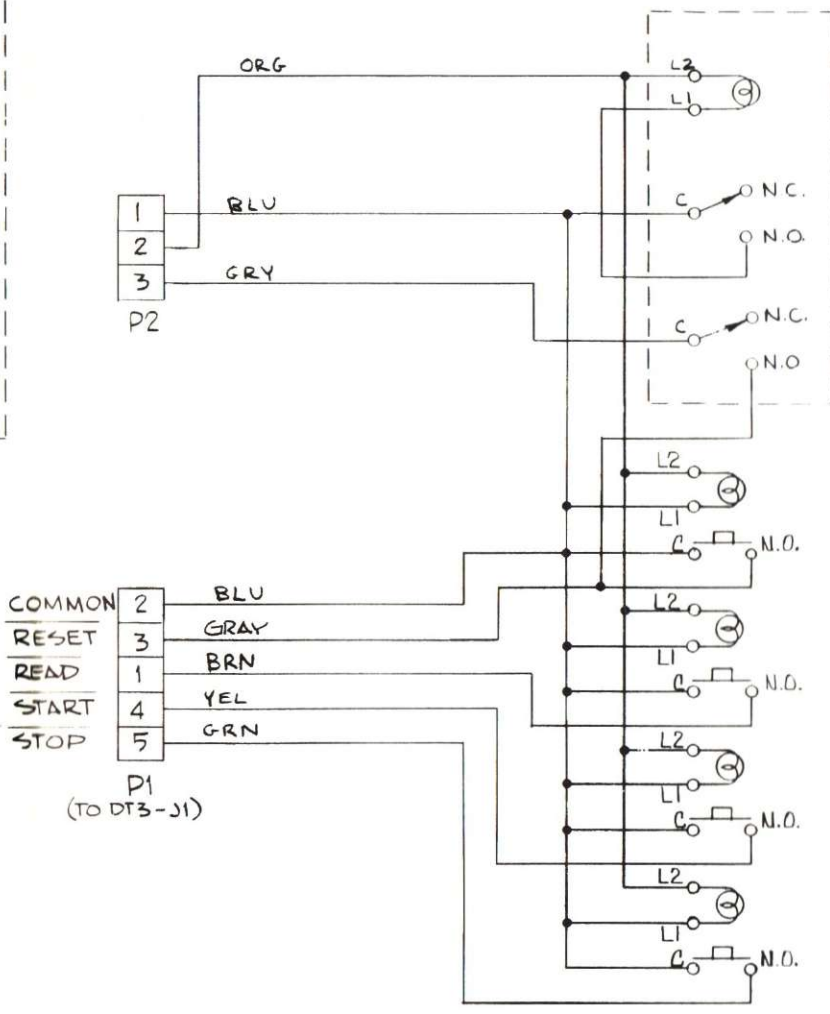
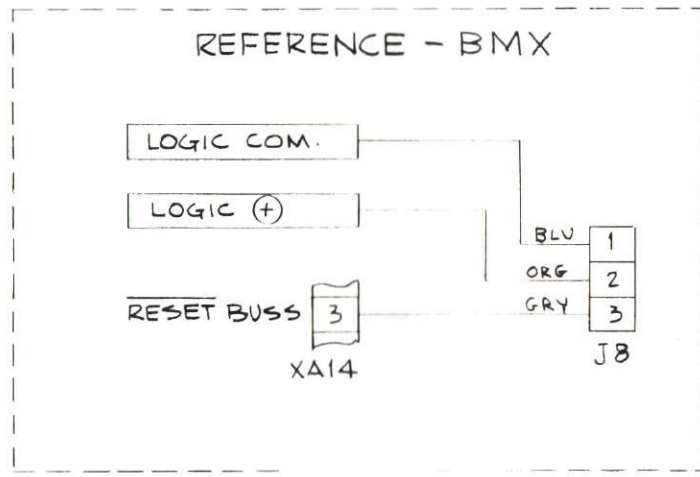
C

B

B

A

A



S1  
AUTO

S2  
RESET

S3  
HOLD

S4  
START

S5  
STOP

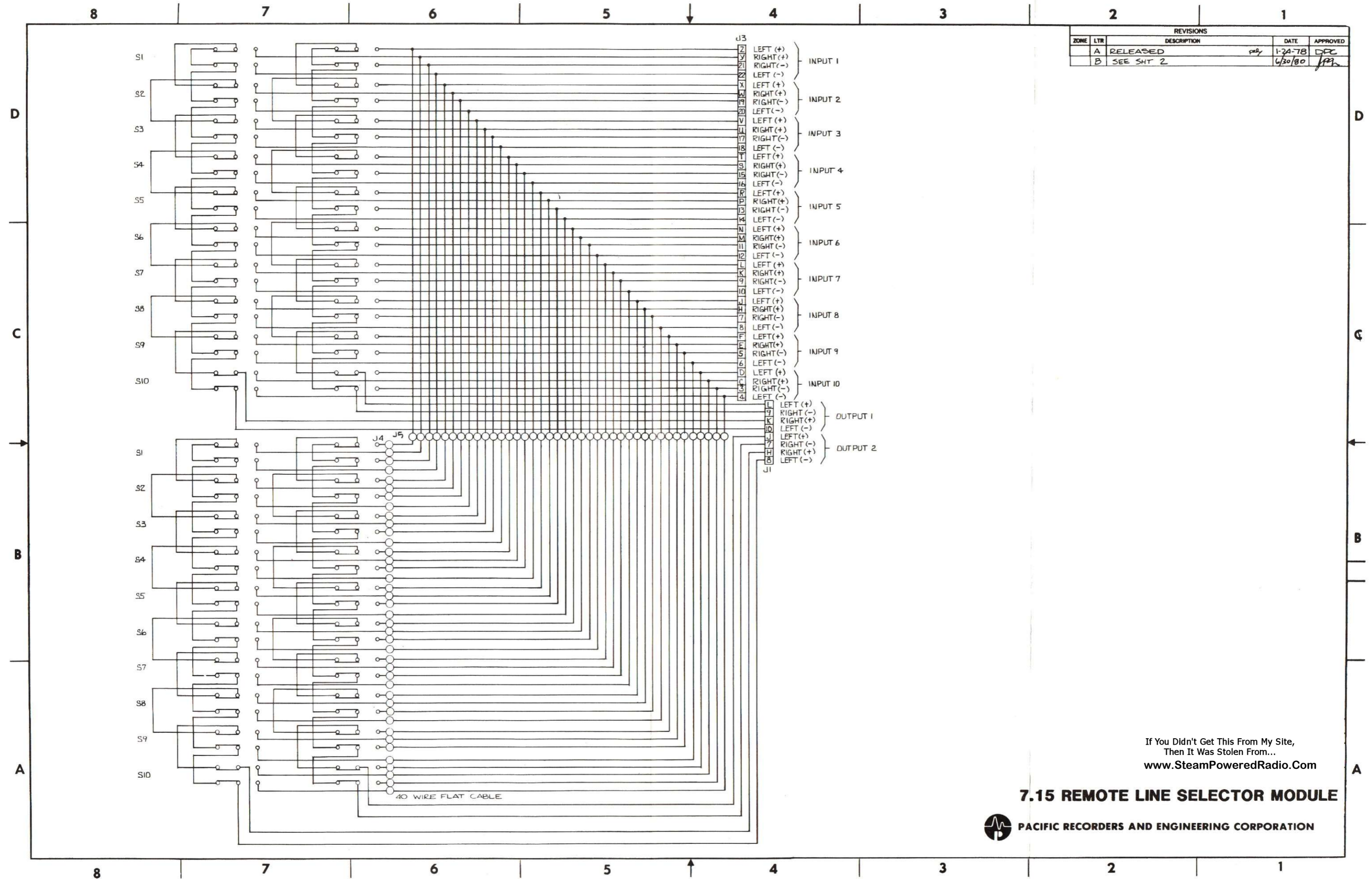
### 7.14 TIMER CONTROL PANEL



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A		RELEASED	1-24-78	DPC
B		SEE SHT 2	6/30/80	JPA

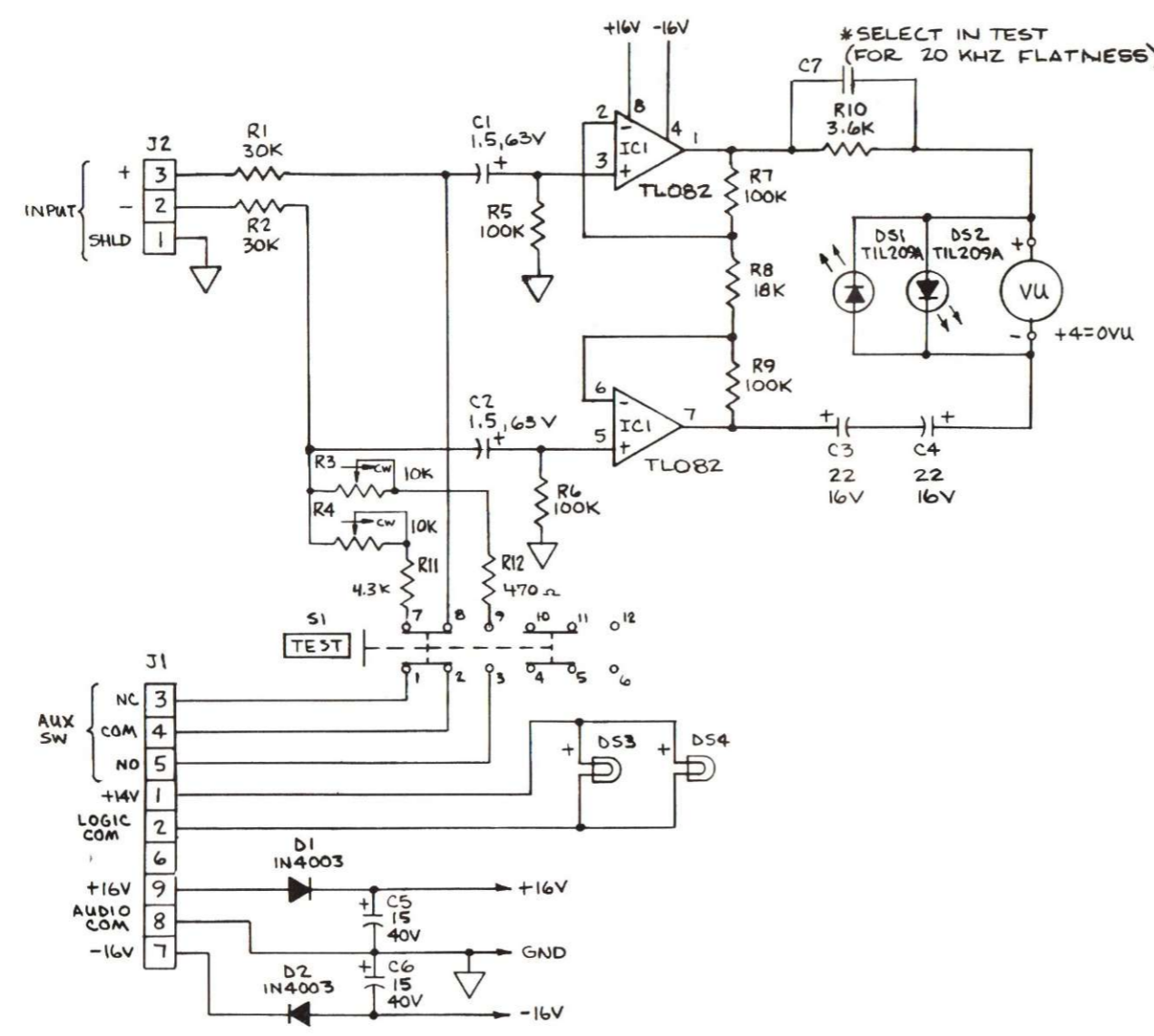


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### 7.15 REMOTE LINE SELECTOR MODULE

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	ADD C7 S.I.T.	1-27-77	dp
	A	CHANGED VALUE WAS 20K-50-009A R8 WAS 5.1K	11-4-77	DPC
	B	CHGD IC1 TO TLO82 (WAS 4558) CHGD C3-C4 TO 22/16V (WAS 25/15V)	11-30-77	DPC 12-2-77
	C	ADDED R11+12 CREATED O1 ASSY	PT. 10-16-78	1/2



2) ON -0 ASSY ONLY, R3, R12 + S1 ARE DELETED AND JUMPERS ARE ADDED ON S1 LOCATION FROM 1 TO 2 + 7 TO 8.

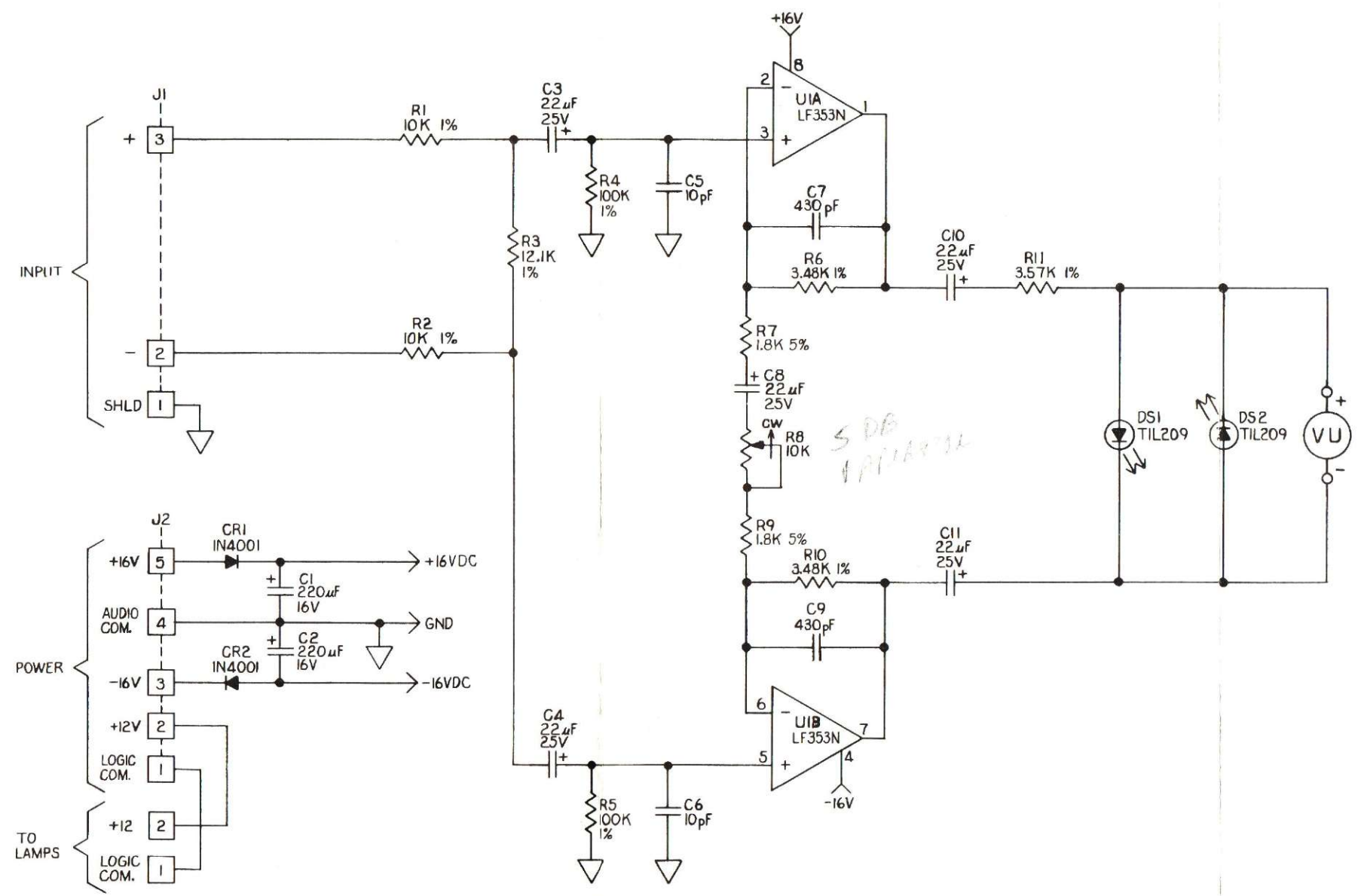
NOTES: 1) \* VALUE TYPICAL

### 7.16.1 METER BUFFER AMP FOR DIXSON METER

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	9-4-79	LEW
B		FINAL RESISTOR VALUES	10/10/79	LEW

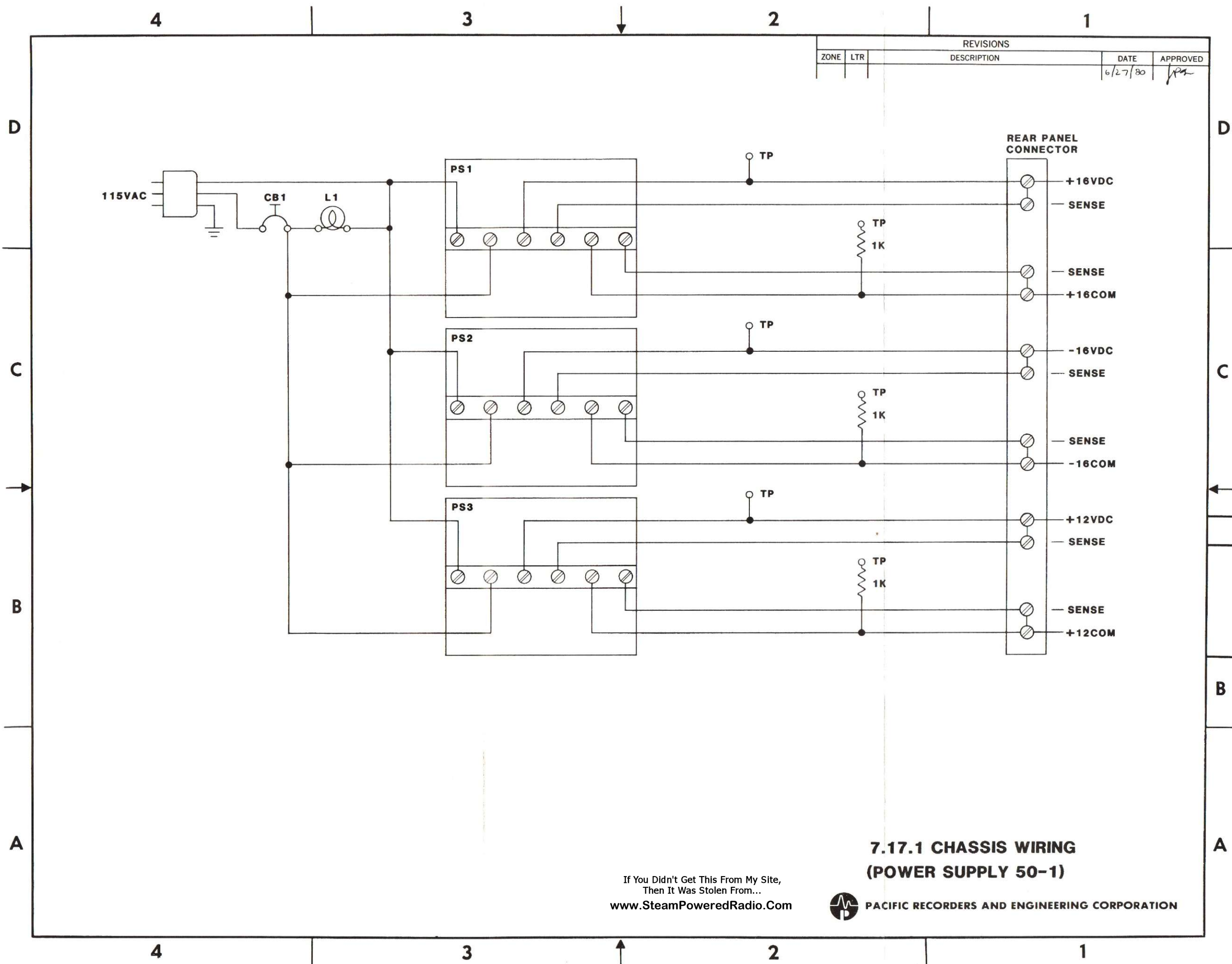


1. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4W 5%, ALL CAPACITORS ARE MEASURED IN MICROFARADS.

NOTES:

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**7.16.2 METER BUFFER AMP FOR CROMPTON METER**  
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
			6/27/80	<i>[Signature]</i>

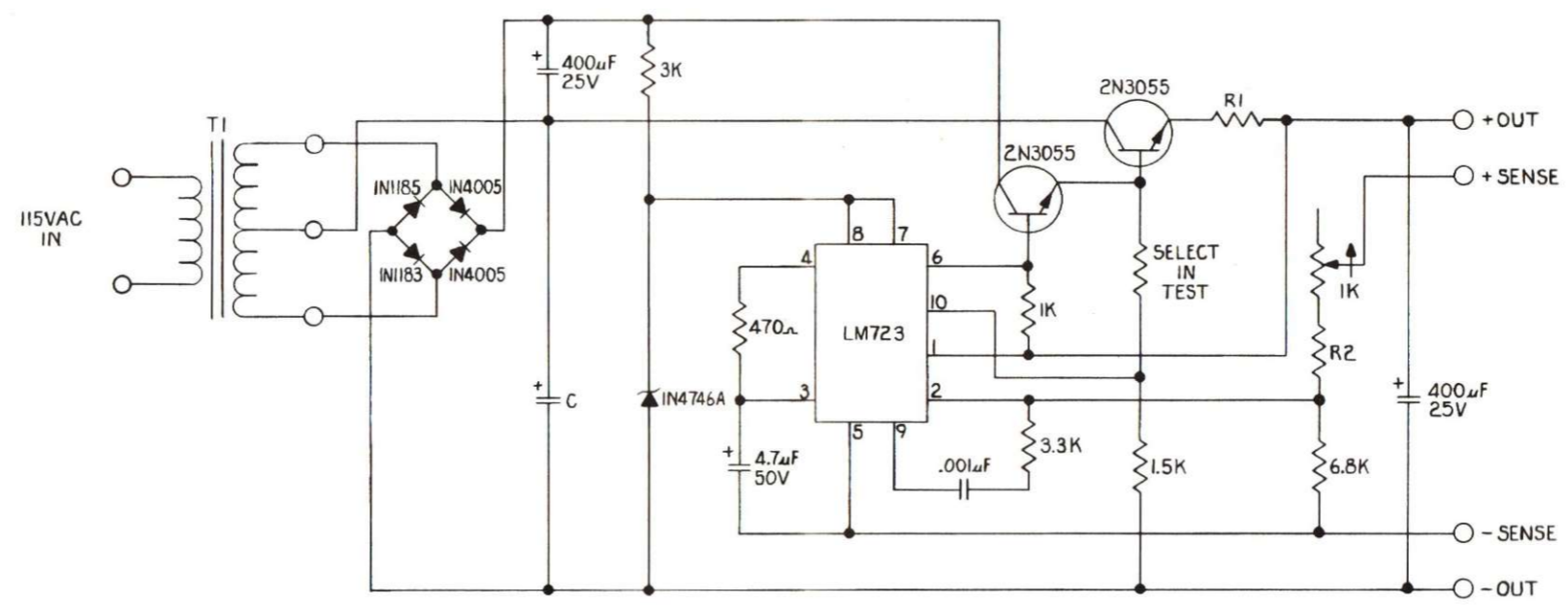
**7.17.1 CHASSIS WIRING  
(POWER SUPPLY 50-1)**

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



REFERENCE	12 VOLT SUPPLY	16 VOLT SUPPLY
T1	# 6163	# 6101
C	20,000µF/35VDC	2,500µF/25VDC
R1	.035Ω/5W	.1Ω/5W
R2	3.9K	6.2K

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4 W 5%, ALL CAPACITORS ARE MEASURED IN MICROFARADS.

NOTES:

**7.17.2 POWER MODULE SCHEMATIC (POWER SUPPLY 50-1)**

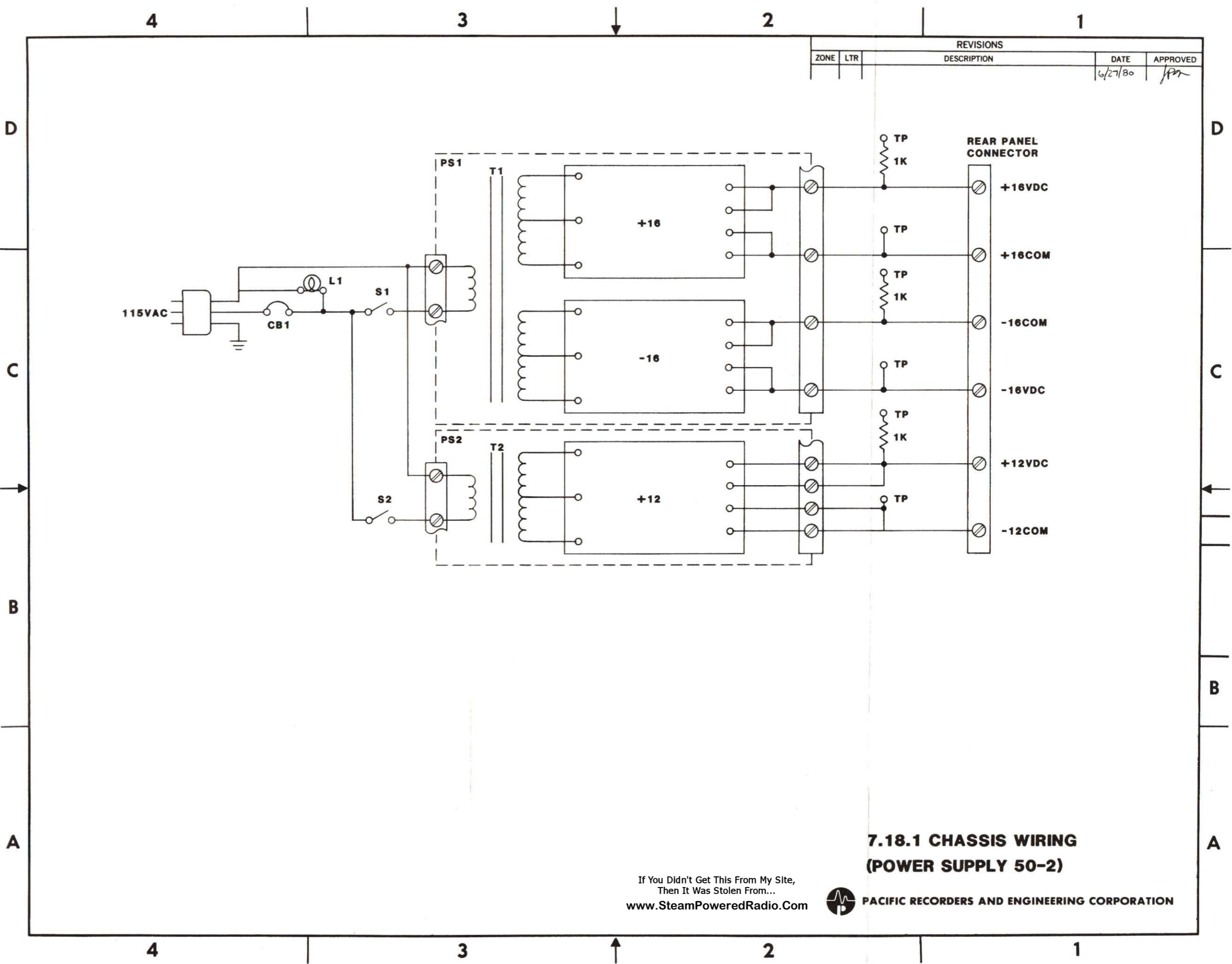
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
			6/27/80	<i>JPM</i>



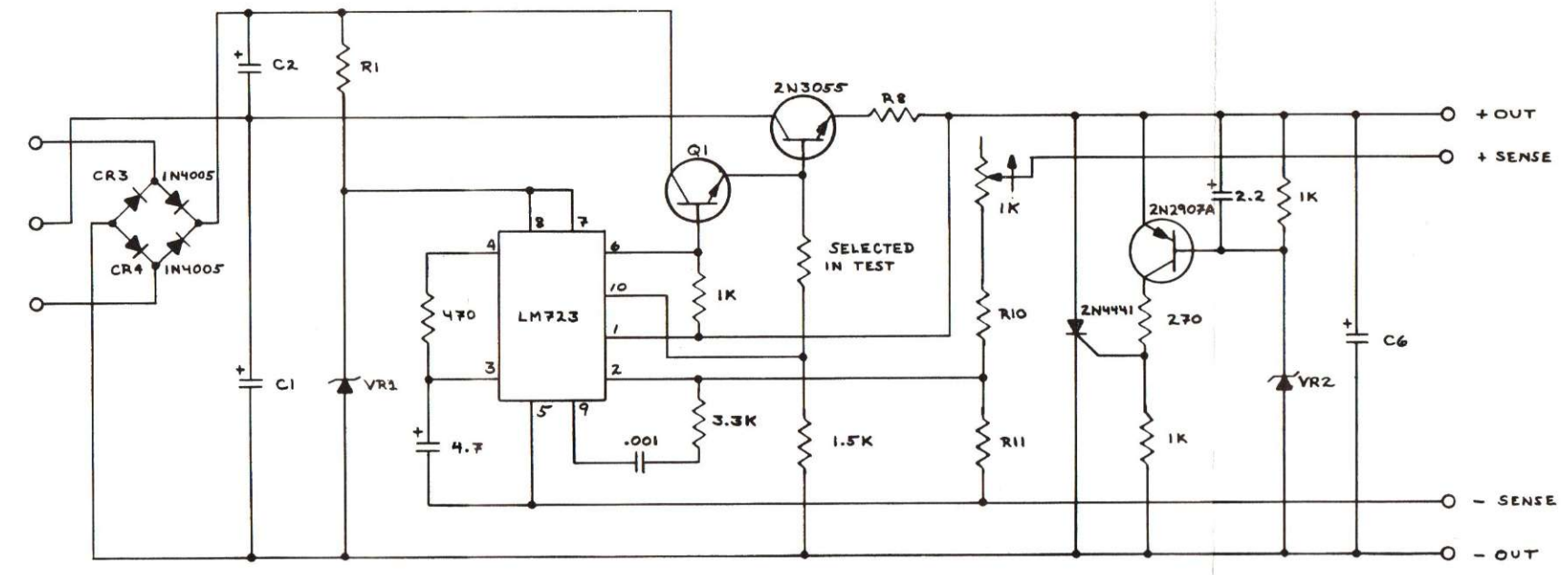
**7.18.1 CHASSIS WIRING  
(POWER SUPPLY 50-2)**

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	5.19.80	<i>JM</i>



REFERENCE	+12VDC SUPPLY	± 16VDC SUPPLIES
T1 (SEE SMT. 2)	# 6163	# 0001
R1	3K/1/2 W	1.5K/1/2 W
R8	.035/5W	.22/5W
R10	3.9K	1K
R11	6.8K	1.5K
CR3, CR4	1N1183	MOTOROLA 3051
VR1	1N4746A	1N4750
VR2	1N4753A	1N5246
Q1	2N3055	MOTOROLA MJE 3055
C1	24,000/25VDC	2500/25VDC
C2, C6	470/25VDC	600/25VDC

2. ALL CAPACITORS ARE IN MICROFARADS.  
 1. ALL RESISTORS ARE IN OHMS, 1/4 W, 5%, UNLESS OTHERWISE SPECIFIED  
 NOTES:

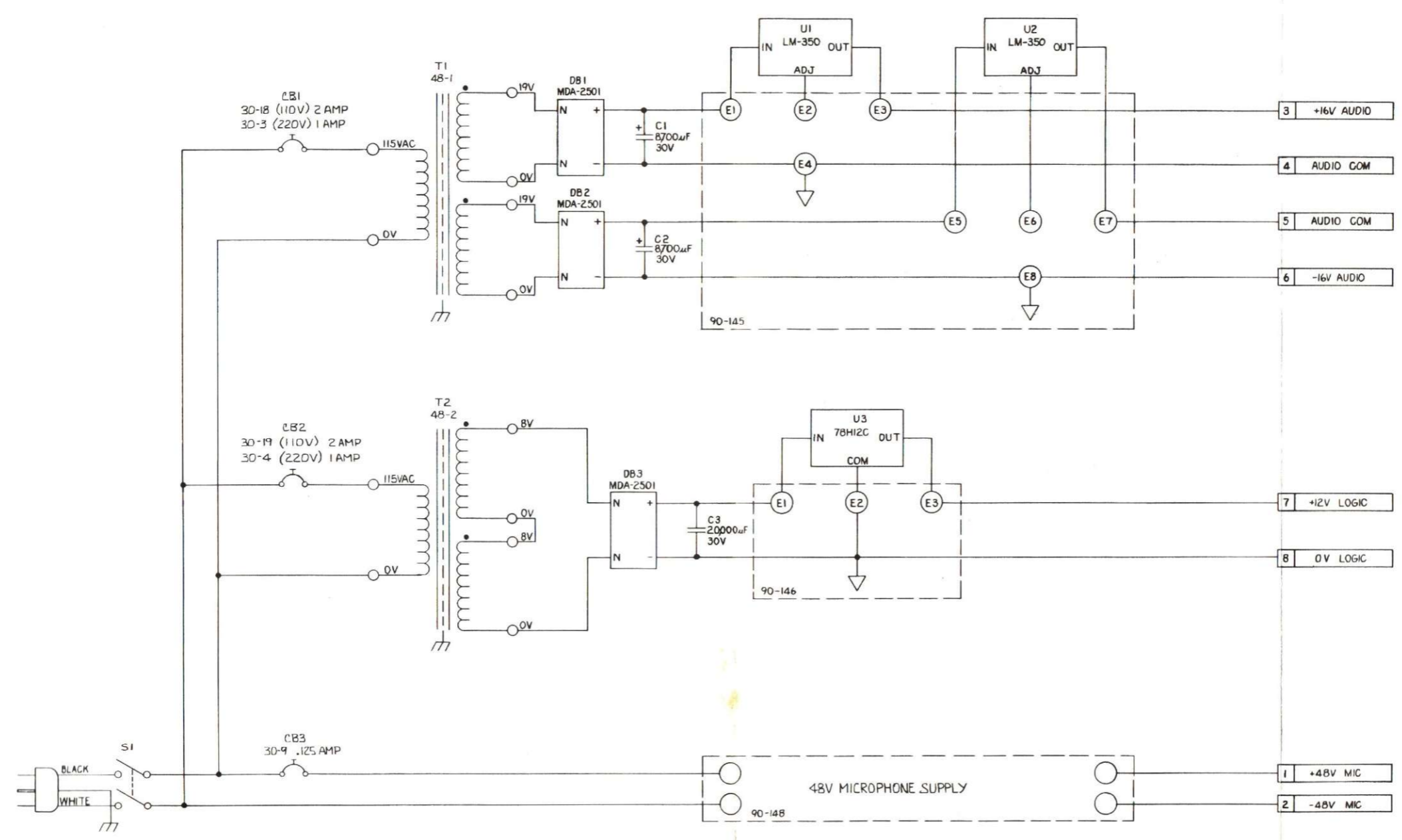
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**7.18.2 POWER MODULE SCHEMATIC  
 (POWER SUPPLY 50-2)**

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	12/11/79	[Signature]

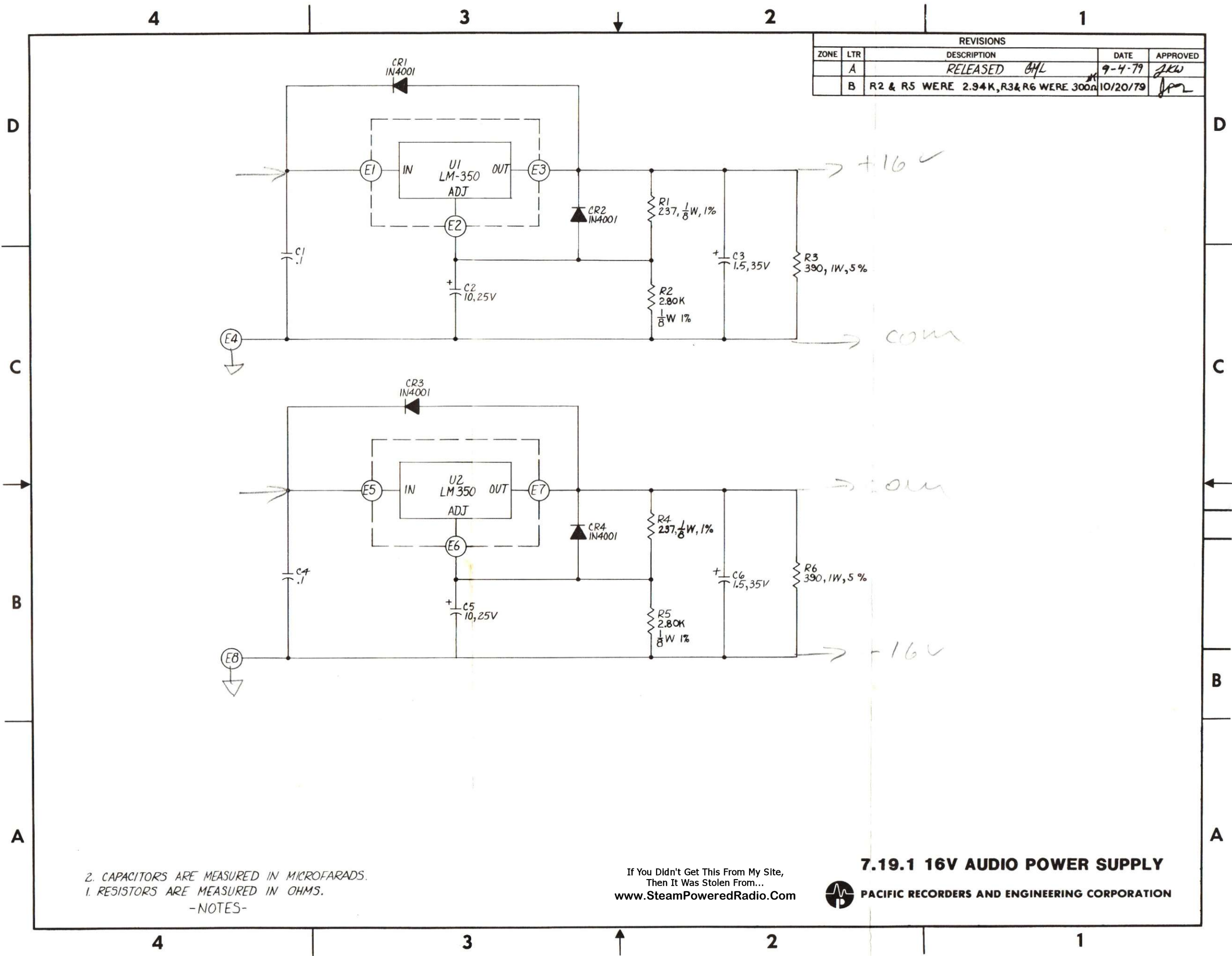


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**7.19 POWER SUPPLY 99-73**



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED <i>BYL</i>	9-4-79	<i>JKW</i>
	B	R2 & R5 WERE 2.94K, R3 & R6 WERE 300Ω	10/20/79	<i>JRW</i>

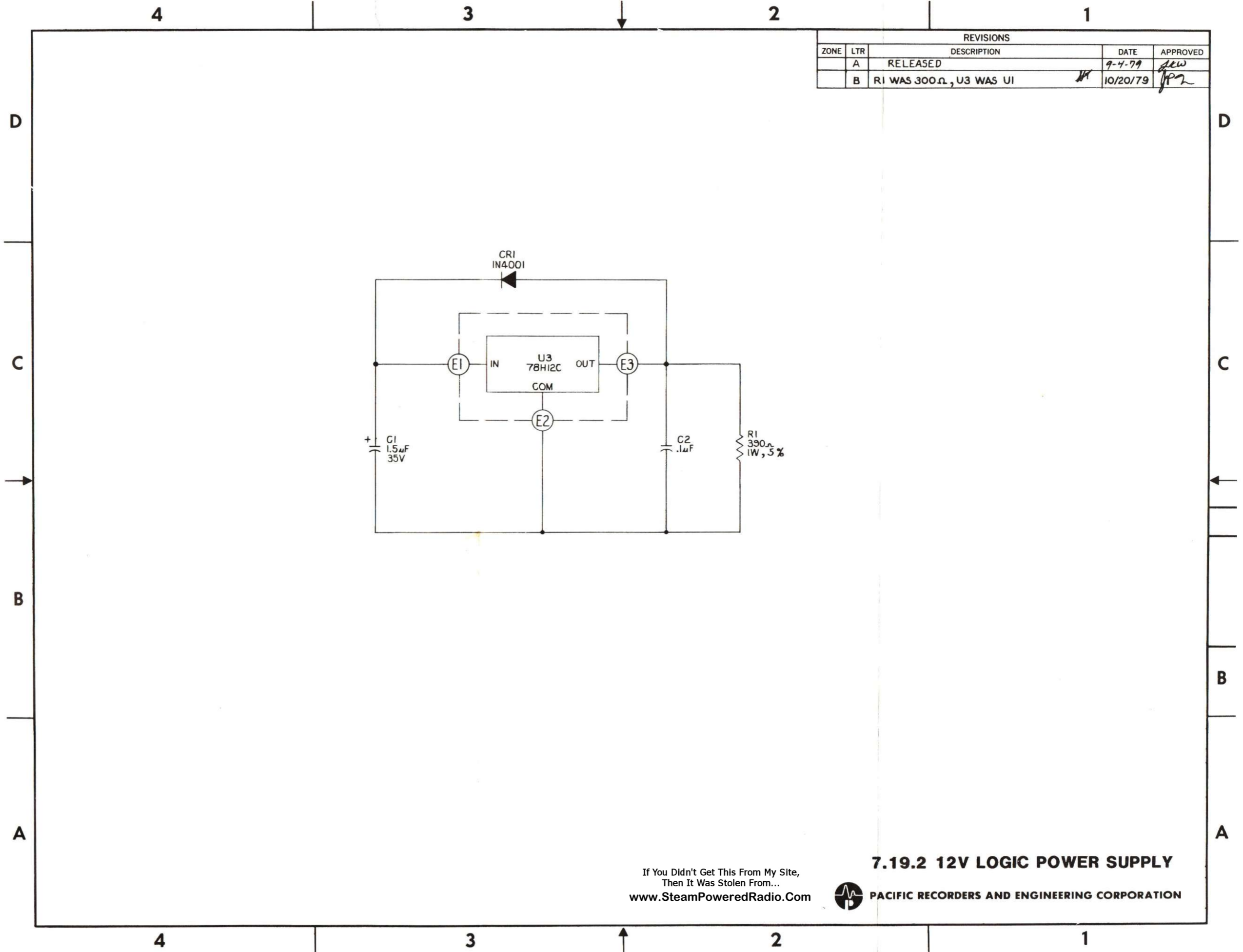
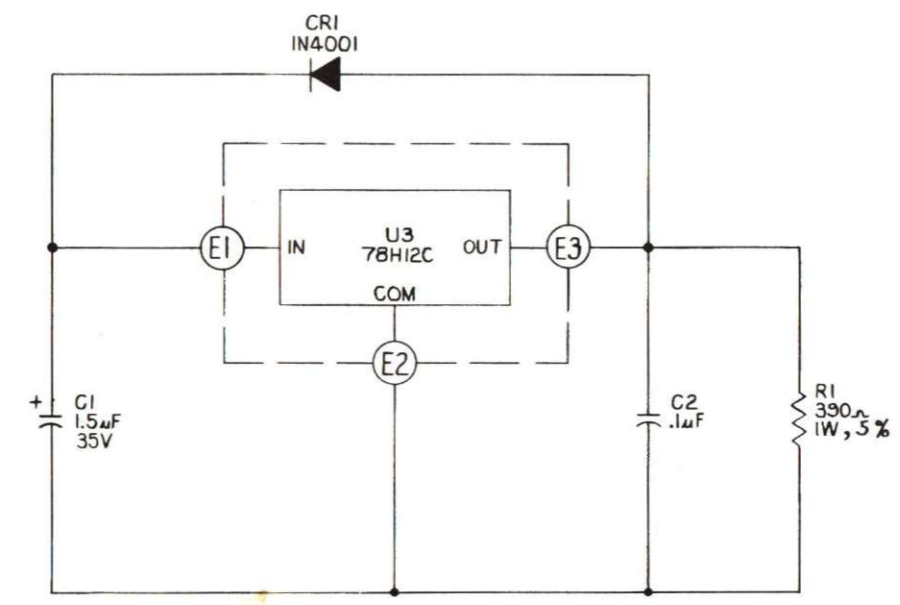


2. CAPACITORS ARE MEASURED IN MICROFARADS.  
 1. RESISTORS ARE MEASURED IN OHMS.  
 -NOTES-

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**7.19.1 16V AUDIO POWER SUPPLY**  
**PACIFIC RECORDERS AND ENGINEERING CORPORATION**

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	9-4-79	REW
	B	R1 WAS 300Ω, U3 WAS U1	10/20/79	JPR

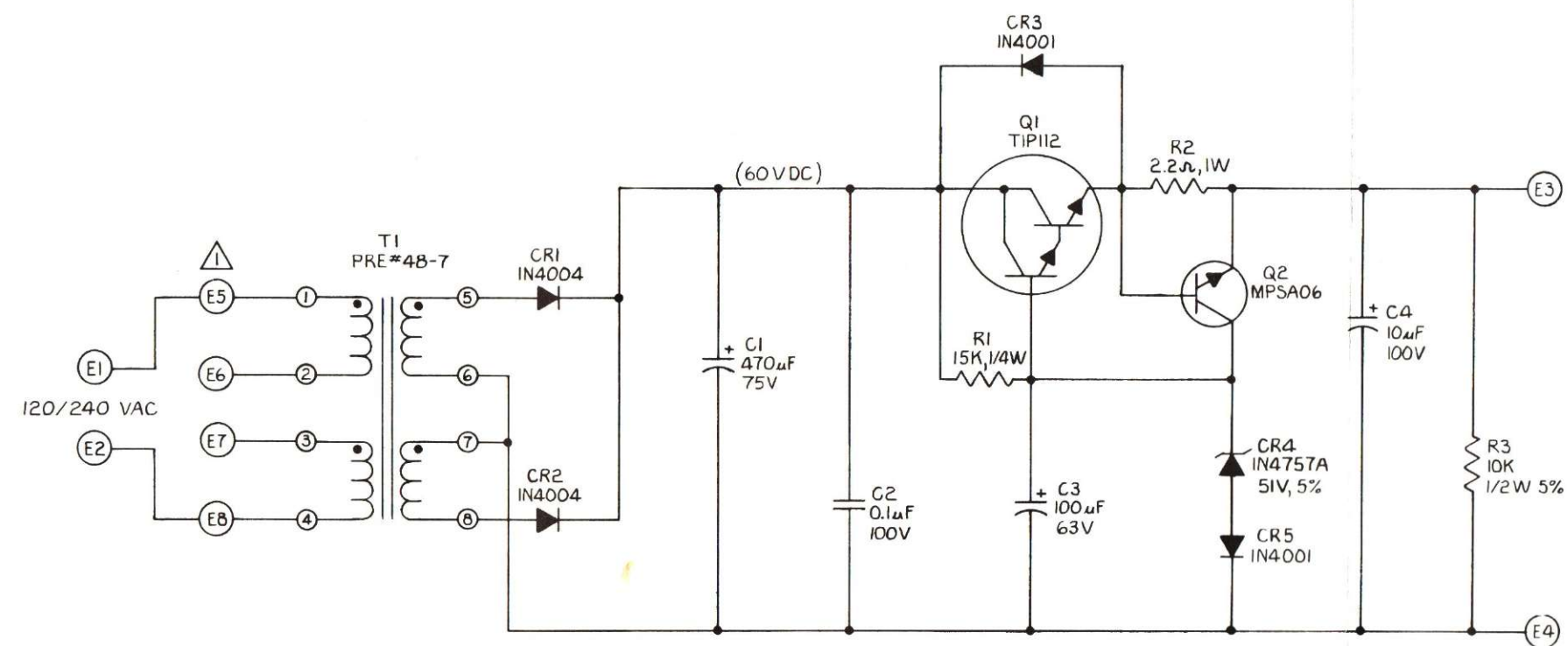


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**7.19.2 12V LOGIC POWER SUPPLY**  
PACIFIC RECORDERS AND ENGINEERING CORPORATION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
D-3	B	T1 WAS 48-3	4/22/50	<i>Jm</i>



⚠ FOR 120VAC (-1) JUMPER E5 TO E7 AND E6 TO E8.  
 FOR 240VAC (-2) JUMPER E6 TO E7.

— NOTES —

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**7.19.3 48V MICROPHONE POWER SUPPLY**

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