PACIFIC RESEARCH & ENGINEERING

RADIOMIXER
RADIOMIXER
RADIOMIXER

RMX

Technical Manual

PR&E Document #75-25

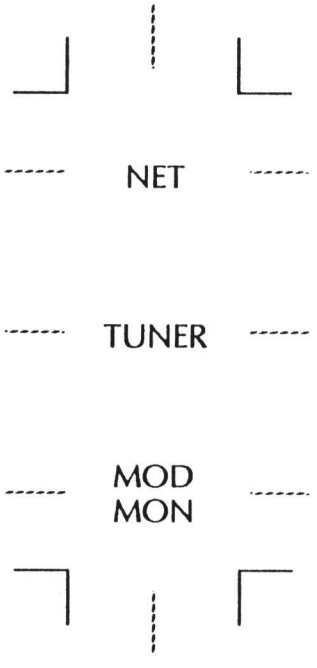
2070 Las Palmas Drive Carlsbad, CA 92009
Tel: 619.438.3911 Fax: 619.438.9277 E-Mail: support@pre.com

INSTRUCTIONS:

1) Using the horizontal and vertical guidelines to locate button centers, write/type the legends onto the legend strips, as illustrated in the example below.

2) Using the corner guidelines and a straight edge and razor blade, carefully cut out the legend strips and legend strip protectors.

3) Place the legend strips and protectors into the appropriate legend panels by sliding them into the tops of the legend panels. The legend strips and protectors will remain in place by virtue of their convex configuration, as illustrated in the figure below.



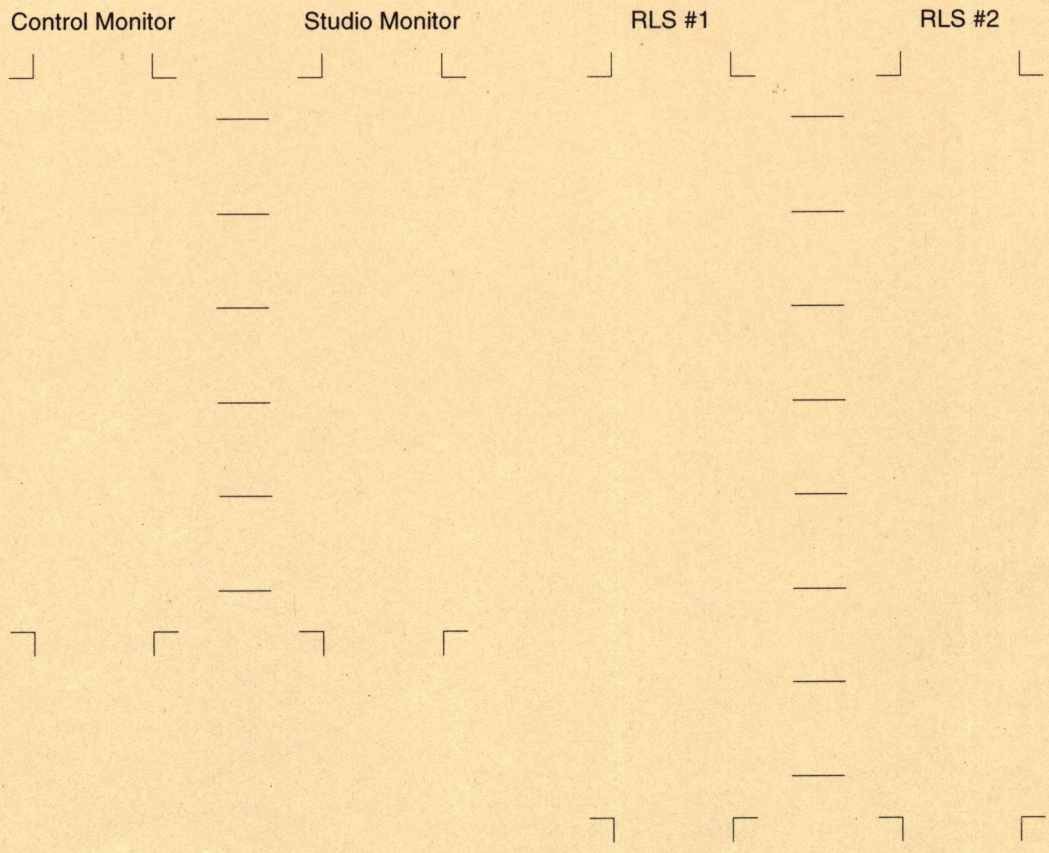
LEGEND PANEL
(END VIEW)

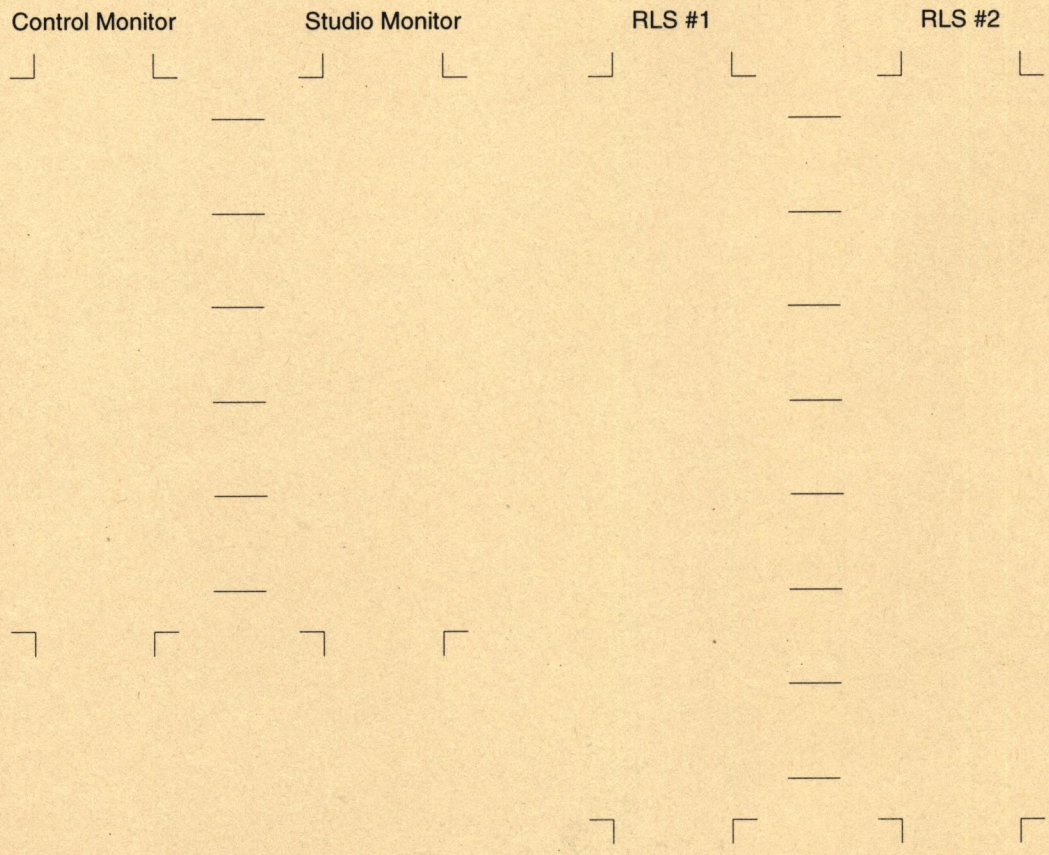
LEGEND STRIP
AND PROTECTOR

2070 Las Palmas Drive
Carlsbad, California
92009 USA

Telephone: 619.438.3911
Facsimile: 619.438.9277
E-Mail: info@pre.com

RadioMixer Legends





PR&E DOCUMENT #75-25
STATUS PAGE
(Revision D - March 1996)

This listing provides a reference of current pages of this document, and their revision numbers (i.e., A.1, A.2, etc.). When a revision to this document is received from PR&E, simply replace the old pages with the new ones, discard the old pages, and post the new status page in the front of this manual (**NOTE**: It may be desirable to retain replaced status pages in order to have a record of document changes). If deemed necessary by PR&E's Engineering Department, comment information relating to any change may also be included on this page.

Page No.	Revision	Comments
ALL	A	New Release.
ALL	B	Separated pages by section, incorporated new power supply and clock/timer descriptions and drawings, incorporated 28 input version.
ALL	C	Updated all drawing and schematics to latest revision.
ALL	D	Corporate name change.

TABLE OF CONTENTS

RADIOMIXER BROADCAST CONSOLE TECHNICAL MANUAL

1.0 GENERAL INFORMATION

This chapter contains an introduction to the Radiomixer Broadcast Console Technical Manual, an overview of the Radiomixer's features, specifications and warranty information.

1.1 INTRODUCTION

Congratulations on your decision to join the growing ranks of Pacific Research & Engineering Corporation (PR&E) broadcasters. PR&E is in the business of supplying the finest audio systems to the world's leading broadcast facilities. Your decision to go with PR&E means that you expect more than simple working hardware. Please be assured that it is our strong desire to provide each of our customers with the kind of products, systems, documentation and support that we would specify if we were in your position.

We invite your comments and suggestions for improvement of this document, and of all our services. By constant attention to our customer's needs, we will continue to earn our reputation for excellence, and to refine our understanding of the requirements of the marketplace.

This manual is designed to provide the information required to understand, install, operate, and maintain the Radiomixer Broadcast Console. It is assumed that the reader has a working knowledge of audio control consoles, systems, and installation practices. The Radiomixer is a sophisticated console with an extensive range of features and capabilities. To obtain the maximum benefit of the console's capabilities, it is strongly recommended that the Installation, Operation, and Equipment Description chapters of this manual be read thoroughly prior to installing the unit.

Each Radiomixer is specifically configured to the customer's requirements, thoroughly tested, and "burned-in" prior to packing for shipment. Should you encounter any difficulty during installation or initial operation, we recommend that you contact PR&E for assistance.

1.2 OVERVIEW

The Radiomixer Broadcast Console is designed with the capacity to accomplish almost any type of stereo audio control task in a radio broadcast facility. The highest quality components and circuit designs are used throughout the Radiomixer, and the gain structure of the console has been designed so that normal operation is easily achieved without any danger of internal clipping (when operating the amplifiers at optimum signal to noise conditions).

While incorporating many of the features which make PR&E's BMX and AMX series of consoles

industry standards, the Radiomixer is a new design, featuring an "off-line" Telco Mix System which is one of the most flexible yet easy to use mix-minus systems ever designed for a standard radio broadcast console (reference Section 3.4).

The Radiomixer is currently being produced in three mainframe sizes, which will accommodate 12, 20, or 28 input modules. The input modules accept the range of input levels normally found in broadcast operations, without the use of external pads or amplifiers. A patch point is provided for 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.

All console inputs and program outputs are balanced, for best noise rejection and simplified system grounding. When properly installed using the information contained in this manual, the Radiomixer is free of internal pops, clicks and RFI.

The separately packaged power supply is fully regulated, and is protected with a magnetic circuit breaker, as well as electronic safeguards against excessive current and line voltage fluctuations. The power supply provides four separate voltage outputs. Two of these outputs (±16 volts) are used to power the audio circuitry. The third output (+13 volts) is used to power the logic control circuitry, lamps and relays. The fourth output (+48 volts) is used for the phantom powering of condenser microphones connected to the Microphone Input Modules.

1.3 SPECIFICATIONS

Following is a list of specifications for the Radiomixer Broadcast Console:

MICROPHONE INPUTS

Source Impedance	150 ohms.
Input Impedance	30K ohms minimum, balanced.
Input Level Range	Adjustable from -70 dBu to -35 dBu.
Input Headroom	Greater than 30 dB above nominal input.

HIGH LEVEL INPUTS

Source Impedance	600 ohms or less.
Input Impedance	Greater than 40K ohms, balanced.
Input Level Range:	
Line Input Module	Adjustable from -12 dBu to +9 dBu.
Patch Return Inputs	Nominal -10 dBu.
Monitor Inputs	Fixed at the system operating reference level (+4 dBu or +8 dBu).
Input Headroom	Greater than 30 dB above nominal input.

MAIN OUTPUTS

Load Impedance	600 ohms minimum.
Source Impedance	80 ohms, balanced.
Nominal Output Levels:	
Program and Monaural	+4 dBm to +8 dBm, adjustable.
Telephone Mix-Minus	Nominal 0 dBu.
Tape Mix-Minus	Fixed at the system operating reference level (+4 dBu or +8 dBu).
Maximum Output Levels:	
Program and Monaural	+26 dBm, 600 ohm load.
Telephone Mix-Minus	+24 dBm, 600 ohm load.
Tape Mix-Minus	+24 dBm, 600 ohm load.

MONITOR OUTPUTS

Main Outputs:	
Load Impedance	600 ohms or greater.
Source Impedance	40 ohms, unbalanced.
Output Level	0 dBu nominal, +20 dBu maximum.
Headphone Outputs:	
Load Impedance	8 ohms or greater.
Source Impedance	100 ohms.
Output Level	0 dBu nominal, +20 dBu maximum.

FREQUENCY RESPONSE

Mic Input to Program Output	+0 dB, -0.7 dB, from 20 Hz to 20 kHz.
Line Input to Program Output	+0 dB, -0.7 dB, from 20 Hz to 20 kHz.

NOISE

Microphone Input Amplifier	-128 dBu equivalent input noise, 150 ohm source, 20 kHz bandwidth.
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth.
Output Noise with one microphone ON, fader at 0 dB, input sensitivity at -50 dBu	75 dB below output, reference +8 dBu, 150 ohm source, 20 kHz bandwidth.
Output Noise with one line ON, fader at 0 dB, input sensitivity at +8 dBu	80 dB below output, reference +8 dBu, 600 ohm source, 20 kHz bandwidth.

Output Noise with no input channels ON	82 dB below output, reference +8 dBu, 20 kHz bandwidth.

DISTORTION, T.H.D.

Mic Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, -32 dBu input, +24 dBm output into a 600 ohm load, 80 kHz meter bandwidth.
Line Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, +24 dBu input, +24 dBm output into a 600 ohm load, 80 kHz meter bandwidth.

DISTORTION, I.M.D.

Mic Input to Program Output	Less than 0.01%, -32 dBu input, +24 dBm output into a 600 ohm load.
Line Input to Program Output	Less than 0.01%, +24 dBu input, +24 dBm output into a 600 ohm load.

BUS CROSSTALK

Program-1 to Program-2	Less than -85 dB at 1 kHz; Less than -75 dB at 20 kHz.
Program-2 to Program-1	Less than -85 dB at 1 kHz; Less than -75 dB at 20 kHz.

STEREO SEPARATION

Program Outputs	Less than -80 dB at 1 kHz; Less than -60 dB at 20 kHz.

POWER REQUIREMENTS

Fully configured Radiomixer-12	350 watts @120 VAC, ±8%, 50/60 Hz.
Fully configured Radiomixer-20	425 watts @120 VAC, ±8%, 50/60 Hz.
Fully configured Radiomixer-28	500 watts @120 VAC, ±8%, 50/60 Hz.

NOTES:

A) These specifications are for the basic signal paths, per channel, with 600 ohm loads connected to the program outputs.

B) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

C) Noise specifications are for one fully loaded Radiomixer-12. Noise specifications are based upon a 20 kHz measurement bandwidth; the use of a meter with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Research & Engineering Corporation reserves the right to change specifications without notice or obligation.

1.4 WARRANTY INFORMATION

This product carries a manufacturer's warranty which is subject to the following guidelines and limitations:

A) Except as expressly excluded hereinafter, Pacific Research & Engineering Corporation ("Seller") warrants equipment of its own manufacture against faulty workmanship or the use of defective materials for a period of one (1) year from date of shipment to Buyer. The liability of the Seller under this Warranty is limited to replacing, repairing or issuing credit (at the Seller's discretion) for any equipment, provided that Seller is promptly notified in writing within five (5) days upon discovery of such defects by Buyer, and Seller's examination of such equipment shall disclose to its satisfaction that such defects existed at the time shipment was originally made by seller, and Buyer returns the defective equipment to Seller's place of business in Carlsbad, California, packaging and transportage prepaid, with return packaging and transportage guaranteed.

B) Equipment furnished by Seller but manufactured by another shall be warranted only to the extent provided by the other manufacturer.

C) Thermal filament devices such as lamps and fuses are expressly excluded from this warranty.

D) The warranty period on equipment or parts repaired or replaced under warranty shall expire upon the expiration date of the original warranty.

E) This Warranty is void for equipment which has been subject to abuse, improper installation, improper operation, improper or omitted maintenance, alteration, accident, negligence (in use, storage, transportation or handling), operation not in accordance with Seller's operation and service instructions, or operation outside of the environmental conditions specified by Seller.

F) This Warranty is the only warranty made by Seller, and is in lieu of all other warranties, including merchantability and fitness for a particular purpose, whether expressed or implied, except as to title and to the expressed specifications contained in this manual. Seller's sole liability for any equipment failure or any breach of this Warranty is as set forth in subparagraph A) above; and Seller shall not be liable or responsible for any business loss or interruption, or other consequential damages of any nature whatsoever, resulting from any equipment failure or breach of this warranty.

2.0 INSTALLATION

This chapter provides instruction in the proper installation of the Radiomixer Broadcast Console. Included are sections outlining general installation guidelines, cable preparation, mainframe configuration, grounding and shielding, power connection, patch point connection, audio and logic connection, remote control capabilities, and module internal option switches.

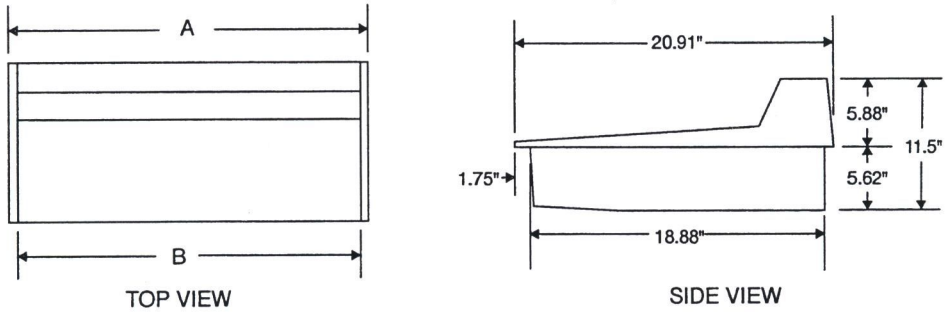
2.1 GENERAL GUIDELINES

The Radiomixer should be carefully unpacked and inspected for any shipping damage. If the inspection reveals any damage, file a claim with the delivering carrier. The packing material should be kept as evidence of mishandling, as well as to allow return of the equipment to the factory, if necessary.

Included with the console are the tool and spare parts kits (reference Sections 6.4 and 6.5), and the appropriate connector kit, which contains all of the Molex connector housings and pins necessary to prepare the audio input/output and logic cables, as described in Section 2.2.

The console mainframe is installed by setting it into a cutout in the work surface of the studio cabinetry (console and cutout dimensions are provided in Figure 2.1). Prior to installing the mainframe, a final check should be made to confirm that the cutout dimensions are correct. Also, be sure that the cabinetry is in its proper position and leveled, as it is unlikely that the cabinetry can be moved, squared or leveled once the weight of the Radiomixer has been added.

NOTE: The cabinetry in which the Radiomixer is to be mounted must be of sufficiently sturdy construction to support the console.



DIMENSION TABLE			
CONSOLE	A	B	C
RMX-12	32"	30.5"	30.75"
RMX-20	44"	42.5"	42.75"
RMX-28	56"	54.5"	54.75"

FIGURE 2.1 CONSOLE DIMENSIONS

The mainframe is supported by the hardwood end panels, and is actually suspended between these two panels, with the front hardwood piece serving only as trim molding.

NOTE: Care should be taken to avoid locating the console within six feet of any intense electromagnetic hum fields, such as those produced by large power transformers and motors. Likewise, cables to and from the console should be routed to achieve maximum practical distance from AC mains power wiring. Particular attention should be paid to some of the low-cost, supposedly "professional", power amplifiers which have appeared in the marketplace. In many cases the low cost has been partially achieved through the use of small core power transformers operating at or on the edge of saturation. While these units may operate to their own specifications, the electromagnetic fields they radiate may impair the performance of the Radiomixer or neighboring equipment such as tape recorders, cassette decks and cartridge machines.

Signal, logic, and power connections are made to the connector panel located on the underside of the mainframe (reference Figure 2.6).

The power supply is usually installed in the console support cabinetry using 7-inch EIA standard rack rails. Adequate ventilation must be provided for the proper dissipation of heat. The power supply is designed for convection cooling by the two rectifier/regulator heat sinks located on opposite sides of the chassis. Large heat sinks were chosen over the use of fans to eliminate the problems of dust circulation, noise, and potential mechanical failure associated with fan cooling.

Install legend strips by sliding them into the tops of the legend panels. Monitor legend strips are .62 inch wide by 2.85 inches high (15.75 mm by 72.5 mm); Remote Line Selector legend strips are .62 inch wide by 3.83 inches high (15.75 mm by 97.5 mm). Vertical switch spacing is .49 inch (12.5 mm).

Setting the console clock requires the use of the small magnet tool (PR&E #90-151) to operate the Hall-effect switches located immediately behind the clock's front panel lens. These switches are centered beneath the three pairs of digits, as shown in Figure 2.2.

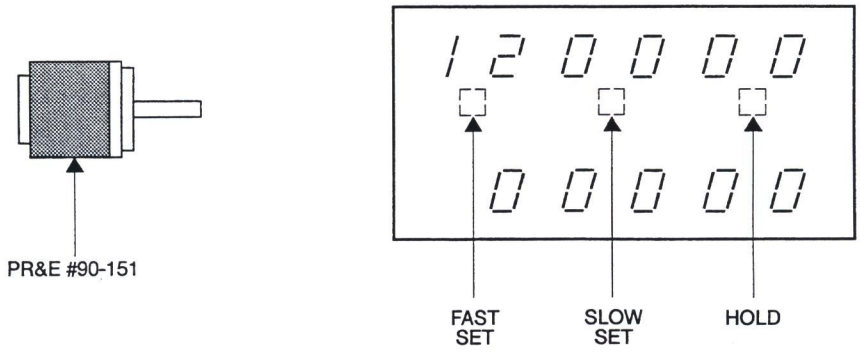


FIGURE 2.2 SETTING THE CONSOLE CLOCK

To adjust the clock, place the end of the adjusting magnet against the panel in the appropriate area. Use the FAST SET switch to advance the hours, and the SLOW SET switch to advance the minutes. The HOLD switch will cause the hours, minutes and seconds to stop and hold at their current setting.

2.2 CABLE PREPARATION

Before beginning the installation, a plan should be drawn up showing how the system will be interconnected (use the module pin-out information contained in Section 2.7). All cables and connectors should be tagged with numbers and/or legends, and logged.

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

Strip the cable insulation jacket and foil shield back about 1-1/2 inches, and sleeve the shield drain wire with heat-shrink tubing, leaving about 3/16 inch of the wire exposed. Then, strip the insulation of each signal wire back about 3/16 inch, and sleeve the shield (at cable ends) with heat-shrink tubing.

NOTE: It is very important to sleeve the shield drain wire and the shield (at cable ends) with heat-shrink tubing. This is the only means of assuring an installation according to recommended grounding procedures.

The Molex pins are designed so that the short tab "ears" are crimped onto the stripped wire to make the electrical connection, while the long "ears" are crimped over the insulated section of the wire to help support the connection.

In order to crimp, insert the short ears of the Molex crimp pin into notch "B" of the crimping tool (PR&E #70-3), with the ears pointing toward the letter "B". Insert the wire into the terminal so that the stripped portion is between the short crimp ears, and the insulation is between the long crimp ears. Crimp the short ears.

Now place the long ears of the pin into tool notch "A", with the ears pointing toward the letter "A". Crimp the long ears over the insulated section of wire. See Figure 2.3 for an example of a properly crimped Molex pin.

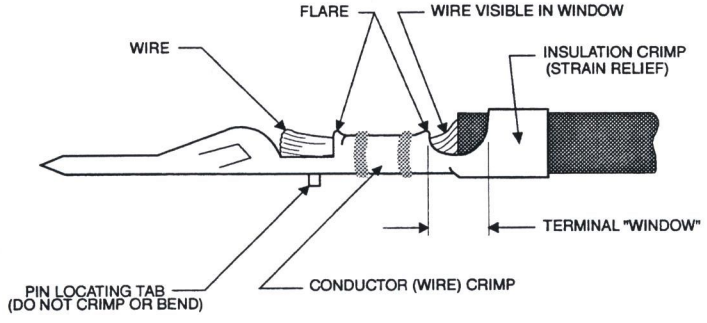


FIGURE 2.3 MOLEX CRIMP PIN

NOTE: When using Molex Crimping Tool #HTR-1719-C (PR&E #70-5), place a pin into slot "B" with the long ears on the "B" side of the tool and pointing toward the letter "B". Place the wire into the tool from the "B" side, and then crimp the pin.

Logic control cables should be fabricated in a similar manner using 22 gauge multiple conductor, non-shielded, jacketed cable. The number of conductors required will be determined by application.

Once the pins are crimped, they may be inserted and locked into the nylon connector housing in accordance with the pin-out diagrams contained in section 2.7. A click can be felt indicating that the locking ears on the pin have set. If a pin is inserted in the wrong connector position, or it is desired to make a circuit change, use the connector pin extractor tool (PR&E #70-4) to release the pin and press it out of the connector housing.

2.3 MAINFRAME CONFIGURATION

Each Radiomixer mainframe is factory configured to the customer's order by the installation of microphone input, line input and other modules in their specified and/or dedicated locations. This section contains descriptions of the Radiomixer mainframe's control panel, meter panel and connector panel.

2.3.1 Control Panel

Figure 2.4 illustrates the control panel layout of the 12-input Radiomixer mainframe. The positions identified by module names are dedicated to those modules only, and will not accept any other type of plug-in module. The positions indicated by shading are "optional", and blank panels will be installed in these positions when no modules are present. The control panel layout of the 20-input Radiomixer mainframe is identical, except for the eight additional input module positions.

NOTE: The "optional" module positions labeled A through D are provided for the installation of machine remote control panels. The remote control panel cable assemblies are routed to corresponding REMOTE CONTROL cutouts on the connector panel (reference Figure 2.6).

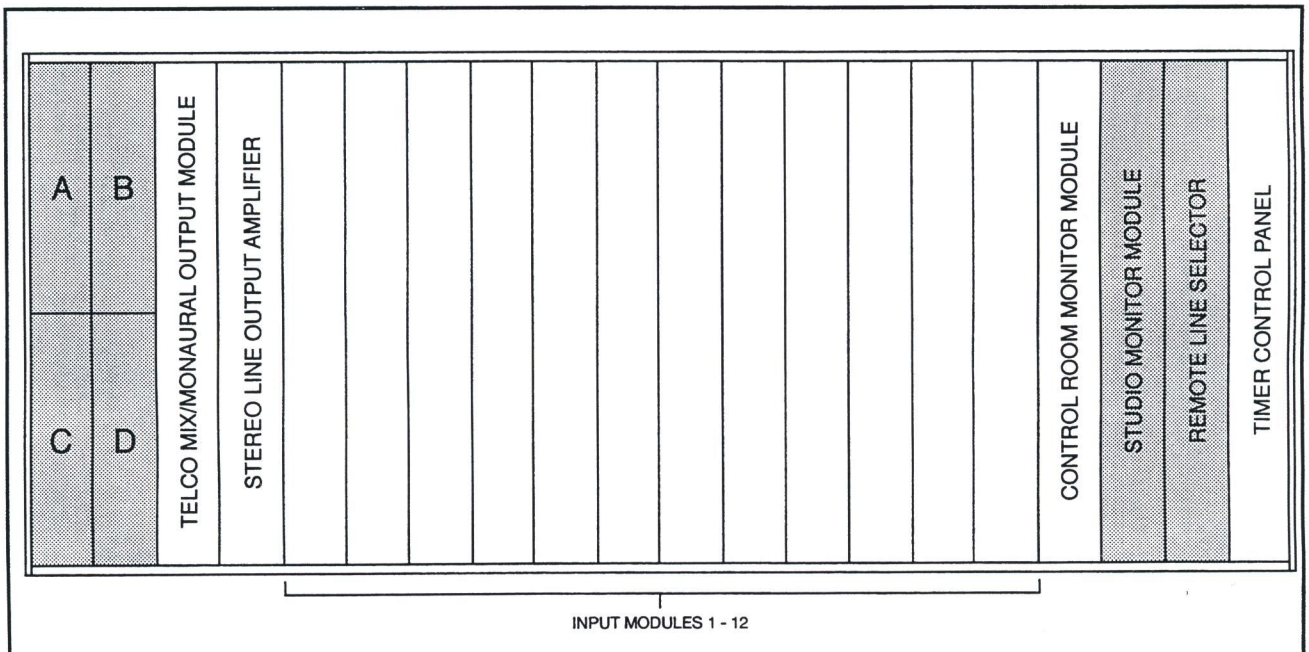


FIGURE 2.4 CONTROL PANEL LAYOUT

2.3.2 Meter Panel

Figure 2.5 illustrates the meter panel layout for the Radiomixer's 12- and 20-input mainframe sizes. Separate sets of VU meters are provided for monitoring PROGRAM 1 and PROGRAM 2. The shaded position is occupied by the console Cue speaker.

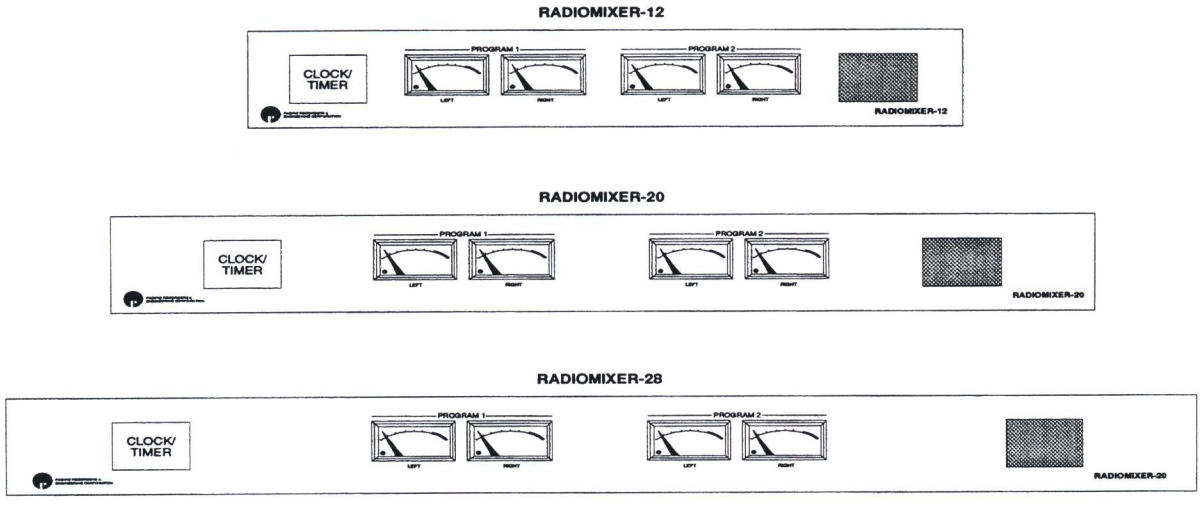


FIGURE 2.5 METER PANEL LAYOUT

2.3.3 Connector Panel

Figure 2.6 (on the following page) illustrates the Molex connector panel for the Radiomixer-12 console, and is intended to provide the installer with a map to the location of the various groups of connectors on the panel. As a general rule, the connectors for any given module are located on the panel below that module's position in the mainframe.

The cutouts labeled REMOTE CONTROLS are provided for the insertion of the 24-pin Molex connectors which accompany the optional machine remote control panels.

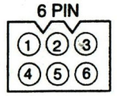
NOTE: Audio and logic pin assignment information is provided in Figure 2.6 as a quick reference only. It is highly recommended that the complete information contained in Section 2.7 be used when connecting the console.

MOLEX CONNECTORS (REAR VIEW)

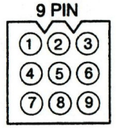
2 PIN

4 PIN

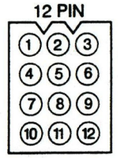
6 PIN



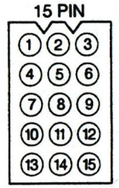
9 PIN

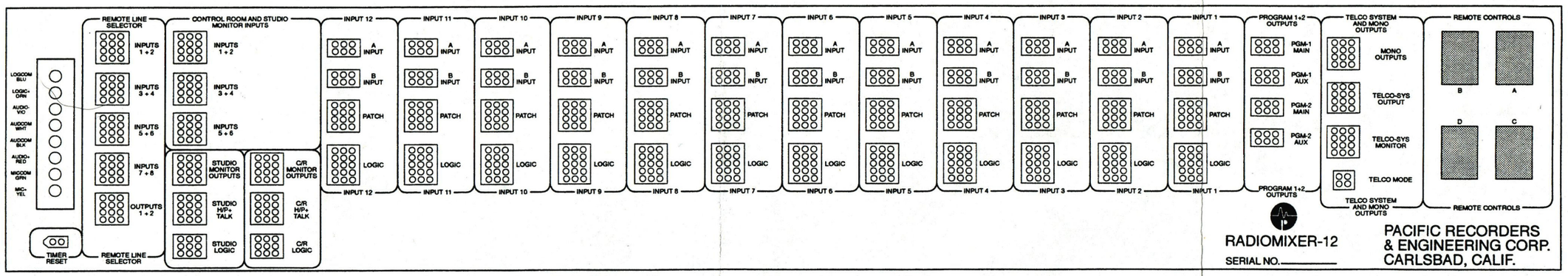


12 PIN



15 PIN





RADIOMIXER-12

SERIAL NO._____

PACIFIC RECORDERS & ENGINEERING CORP. CARLSBAD, CALIF.

TIMER RESET LOGIC PIN ASSIGNMENT

Function	Pin Number
Logic Common	1
RESET EXTERNAL TIMER Command ⌐└	2

REMOTE LINE SELECTOR AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Input 1/Left	INPUTS 1+2	1	2	3
Input 1/Right	"	4	5	6
Input 2/Left	"	7	8	9
Input 2/Right	"	10	11	12
Input 3/Left	INPUTS 3+4	1	2	3
Input 3/Right	"	4	5	6
Input 4/Left	"	7	8	9
Input 4/Right	"	10	11	12
Input 5/Left	INPUTS 5+6	1	2	3
Input 5/Right	"	4	5	6
Input 6/Left	"	7	8	9
Input 6/Right	"	10	11	12
Input 7/Left	INPUTS 7+8	1	2	3
Input 7/Right	"	4	5	6
Input 8/Left	"	7	8	9
Input 8/Right	"	10	11	12
Output 1/Left	OUTPUTS 1+2	1	2	3
Output 1/Right	"	4	5	6
Output 2/Left	"	7	8	9
Output 2/Right	"	10	11	12

MONITOR INPUT AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Input 1/Left	INPUTS 1+2	1	2	3
Input 1/Right	"	4	5	6
Input 2/Left	"	7	8	9
Input 2/Right	"	10	11	12
Input 3/Left	INPUTS 3+4	1	2	3
Input 3/Right	"	4	5	6
Input 4/Left	"	7	8	9
Input 4/Right	"	10	11	12
Input 5/Left	INPUTS 5+6	1	2	3
Input 5/Right	"	4	5	6
Input 6/Left	"	7	8	9
Input 6/Right	"	10	11	12

STUDIO MONITOR MODULE AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Main Monitor Output/Left	STU MON OUT	1	2	3
Main Monitor Output/Right	"	4	5	6
Direct Monitor Output/Left	"	7	8	9
Direct Monitor Output/Right	"	10	11	12
Headphone Output/Left	STU H/P+TALK	1	2	3
Headphone Output/Right	"	4	5	6
Talk to Studio Output	"	7	8	9
-No Connection-	"	10	11	12

STUDIO MONITOR LOGIC PIN ASSIGNMENT

Function	Pin Number
Logic Common	1
Logic +12 VDC	2
-No Connection-	3
-Not Used-	4
MUTE STUDIO	5
TALK TO STUDIO Command ⌐└	6
-No Connection-	7
STUDIO WARNING Tally ⌐┌	8
-No Connection-	9

CONTROL ROOM MONITOR AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Main Monitor Output/Left	C/R MON OUT	1	2	3
Main Monitor Output/Right	"	4	5	6
Direct Monitor Output/Left	"	7	8	9
Direct Monitor Output/Right	"	10	11	12
Headphone Output/Left	C/R H/P+TALK	1	2	3
Headphone Output/Right	"	4	5	6
Talk to C/R Output	"	7	8	9
Auxiliary Cue Input	"	10	11	12

CONTROL ROOM MONITOR LOGIC PIN ASSIGNMENT

Function	Pin Number
Logic Common	1
Logic +12 VDC	2
-No Connection-	3
DIM C/R	4
MUTE C/R	5
TALK TO C/R Command ⌐└	6
-No Connection-	7
C/R WARNING Tally ⌐┌	8
-No Connection-	9

MIC INPUT MODULE AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Microphone A	A INPUT	1	2	3
-No Connection-	"	4	5	6
Microphone B	B INPUT	1	2	3
-No Connection-	"	4	5	6
Patch Send	PATCH	1	2	3
-No Connection-	"	4	5	6
Patch Return	"	7	8	9
-No Connection-	"	10	11	12

MIC INPUT MODULE LOGIC PIN ASSIGNMENT

Function	Pin Number
"A" Logic Common	1
Logic +12 VDC	2
ON	3
OFF	4
ON Tally ⌐┌	5
OFF Tally ⌐┌	6
COUGH	7
TALK TO CONTROL ROOM	8
-No Connection-	9
-No Connection-	10
-No Connection-	11
-No Connection-	12
-No Connection-	13
-No Connection-	14
"B" Logic Common	15

LINE INPUT MODULE AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Input A/Left	A INPUT	1	2	3
Input A/Right	"	4	5	6
Input B/Left	B INPUT	1	2	3
Input B/Right	"	4	5	6
Patch Send/Left	PATCH	1	2	3
Patch Send/Right	"	4	5	6
Patch Return/Left	"	7	8	9
Patch Return/Right	"	10	11	12

LINE INPUT MODULE LOGIC PIN ASSIGNMENT

Function	Pin Number
"A" Logic Common	1
Logic +12 VDC	2
ON	3
OFF	4
ON Tally ⌐┌	5
OFF Tally ⌐┌	6
READY	7
AUDIO RESET TO OFF	8
CUE	9
START PULSE ⌐┌┐└	10
STOP PULSE ⌐┌┐└	11
CUE Tally ⌐┌	12
-No Connection-	13
-No Connection-	14
"B" Logic Common	15

OUTPUT AMPLIFIER AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Program 1 Main Output/Left	PGM-1 MAIN	1	2	3
Program 1 Main Output/Right	"	4	5	6
Program 1 Aux Output/Left	PGM-1 AUX	1	2	3
Program 1 Aux Output/Right	"	4	5	6
Program 2 Main Output/Left	PGM-2 MAIN	1	2	3
Program 2 Main Output/Right	"	4	5	6
Program 2 Aux Output/Left	PGM-2 AUX	1	2	3
Program 2 Aux Output/Right	"	4	5	6

TELCO MIX/MONO OUTPUT MODULE AUDIO PIN ASSIGNMENT

		Pin Number		
Signal	Connector	Shield	Low	High
Main Mono Output	MONO OUTPUTS	1	2	3
Monitor Mono Output	"	4	5	6
Auxiliary Mono Output 1	"	7	8	9
Auxiliary Mono Output 2	"	10	11	12
To Caller 1	TELCO-SYS OUT	1	2	3
To Caller 2	"	4	5	6
To Tape - Mixed	"	7	8	9
To Tape - Callers	"	10	11	12
Monitor To Tape - Mixed	TELCO-SYS MON	1	2	3
Monitor To Tape - Callers	"	4	5	6
Telco Monitor, Fixed	"	7	8	9
Telco Monitor, Variable	"	10	11	12

TELCO MODE LOGIC PIN ASSIGNMENT

Function	Pin Number
#1 Logic Common	1
#1 ON Tally Input	2
#2 Logic Common	3
#2 ON Tally Input	4

NOTE: Audio and logic pin assignment information is provided here as a quick reference only. It is highly recommended that the complete information contained in Section 2.7 be used when connecting the console.

FIGURE 2.6
CONNECTOR PANEL LAYOUT

2.4 GROUNDING AND SHIELDING

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

The shield pins on each console connector are connected directly to the console mainframe ground, and the only location where the console mainframe ground meets the console's "audio common" point is the power terminal strip on the console mainframe. Therefore, the station's "technical ground" should be connected to either of the two screw terminals labeled "AUDIO COMMON" on the **console** power terminal strip.

NOTE: Do not connect the station's "technical ground" to any terminals on the power supply terminal strip.

A preferred method of connecting the line shields in a system is to connect **both** ends of every shield to **all** affiliated equipment. However, this method is only satisfactory if every component shares a common earth ground. This can be accomplished using isolated ground receptacles tied to the station's "technical ground".

If isolated ground receptacles are not available when grounding the Radiomixer, observe the following guidelines:

A) Shields of cables connecting the console to auxiliary equipment should be connected at the console end only, and should not be terminated to the ground of the auxiliary equipment.

B) Ensure that the auxiliary equipment is connected to a "clean" ground by its power cord assembly, or by the addition of a separate ground wire connected between the chassis of the auxiliary equipment and the station's "technical ground".

NOTE: Buzz pickup is generally electrostatic, due to capacitive pickup between an audio line and a power line. When shielded lines are used this should be no problem, unless the audio lines are run in the same wire-way or area as a power line. Radio-frequency interference can also manifest itself as a buzz in the program audio. RF interference is minimized by the extensive RF bypassing and ground-plane techniques used in the Radiomixer, and the shielded lines external to the unit.

2.5 POWER CONNECTION

The power outlet for the Radiomixer power supply should be assigned to the Radiomixer exclusively. Confirm that the outlet supplies 120 VAC, ± 8%, 50/60 Hz, and that the voltage does not sag under a load of up to 5 amperes. The third pin "U-ground" on the power connector must be left intact and connected to a properly installed three-way AC outlet. For safety, the "U-ground" wire is connected to the chassis of the power supply and the cores of the power transformers.

WARNING: Do not defeat the safety ground in any way. To do so may provide a potentially dangerous condition to the operator.

NOTE: The DC outputs of the power supply are not referenced to the power supply chassis and, therefore, are completely floating from the AC safety ground.

The AC mains cord should be kept away from low level audio wiring to avoid the possibility of inducing hum into that wiring. Also, even though the power transformers were designed for very low radiated magnetic fields, the power supply should not be placed unnecessarily close to tape playback units or other sensitive equipment.

Console connection to the power supply is made with the supplied six foot multi-conductor cable. This cable carries only regulated DC power, and will not radiate hum into adjacent audio wiring. The cable is color-coded, and the corresponding color names are printed adjacent to the terminals on the console and the power supply.

Should it be necessary to install 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 twenty feet may be fabricated using 14 gauge wire. Cables longer than 20 feet are not recommended.

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. Once the power supply is turned on, the meter lamps will illuminate. Use an accurate DC voltmeter to verify the operating voltages at the test terminals on the front panel of the power supply.

NOTE: For information on the Redundant Power Supply Coupler Unit (PR&E #99-76), see Section 8.2.

2.6 PATCH POINT CONNECTION

Each Radiomixer input 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 also be connected to provide a very flexible processing/patching facility.

The output at each patch point is unbalanced, and designed to operate into low-impedance (600 ohm or higher) loads. The patch return is balanced, 40K ohm impedance.

The level at all patch points is -10 dBu nominal. This level was determined to provide optimum headroom within the console, as well as a good compatibility match with currently available processing equipment. See Section 2.7 for pin assignment.

2.7 AUDIO AND LOGIC CONNECTION

Good wiring practice calls for care in making each connection and in neatness of cable layout. Complete information relative to module input, output and logic terminations is contained in the connection reference drawings included in this section.

A standard connection theme is used throughout all PR&E console designs - the use of 3, 6, and 12 pin Molex connectors for audio wiring. The Standard pin-out sequence is as follows:

Pin #1	Shield of monaural or left channel signal pair.
Pin #2	Low of monaural or left channel signal pair.
Pin #3	High of monaural or left channel signal pair.
Pin #4	Shield of right channel signal pair.
Pin #5	Low of right channel signal pair.
Pin #6	High of right channel signal pair.
Pin #7	Shield of left channel signal pair.
Pin #8	Low of left channel signal pair.
Pin #9	High of left channel signal pair.
Pin #10	Shield of right channel signal pair.
Pin #11	Low of right channel signal pair.
Pin #12	High of right channel signal pair.

This system of pin assignment takes advantage of the three pin per row design of the Molex connectors. As viewed from the top of the connector panel, the shields are always connected to the left pins, the low wires (black) to the center pins and the high wires (red) to the right pins. While this inspection will not indicate if a connector is in the correct position, it will verify proper shield and polarity connection.

Each Radiomixer input module offers a comprehensive set of logic functions, as outlined in Section 2.8. These functions are brought out from each of the module positions to the 15-pin Molex connectors labeled LOGIC, and are designed to drive interface relays and/or opto-isolators to control auxiliary equipment.

Fabrication of interface systems is straightforward. However, should the installer prefer to use prefabricated units, interface devices and cable assemblies are available from PR&E to control most professional grade tape decks, cartridge machines and turntables. Information on these interfaces is provided in Chapter 8.

NOTE: The logic functions are referenced to the console logic power supply, and, as such, should never be directly connected to auxiliary equipment control logic power supplies and/or grounds.

The Radiomixer 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.

Connection of the control circuitry requires an understanding of the logic nomenclature and symbols. These are outlined below:

Control Outputs:

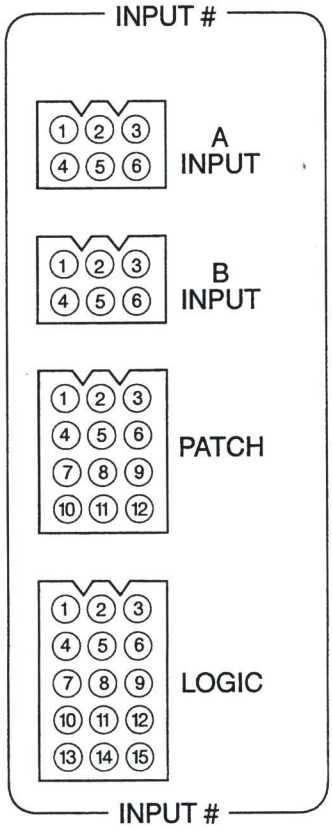
Tally (light)		Provides a +12 VDC continuous source when activated.
Pulse		Provides a +12 VDC pulse source when activated.
Sink		An open collector that provides a connection to LOGIC COMMON when activated.

Control Inputs:

Control	$\overline{\text{ON}}$	A line above the word indicates that the function is activated when a connection to LOGIC COMMON is made.

NOTE: When connecting Microphone Input and Stereo Line Input Module logic, it may be desirable to have separate logic control for **both** "A" and "B" inputs. This can be accomplished by wiring the logic connector in a "Y" configuration, as described in Sections 2.8.1 and 2.8.2, respectively.

2.7.1 Microphone Input Module Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Microphone A	A INPUT	1	2	3
-No Connection-	"	4	5	6
Microphone B	B INPUT	1	2	3
-No Connection-	"	4	5	6
Patch Send	PATCH	1	2	3
-No Connection-	"	4	5	6
Patch Return	"	7	8	9
-No Connection-	"	10	11	12

NOTES:

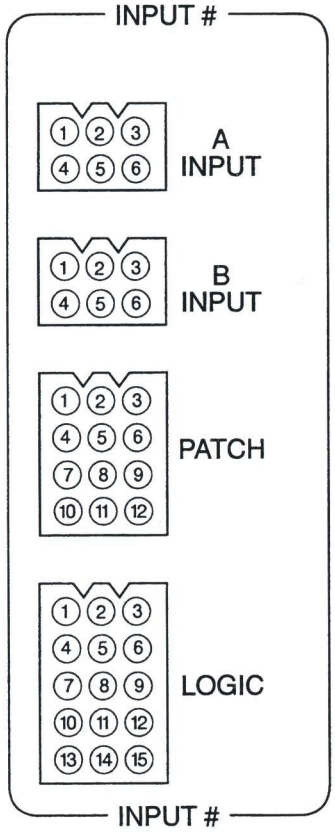
A) The Patch Send is unbalanced; the Patch Return is balanced.

B) The PATCH connector must be wired so that the Patch Send is connected through to the Patch Return. If no external processing or patch bay equipment is connected, a mating connector with jumpers from pins #2 to #8 and #3 to #9 must be installed.

LOGIC PIN ASSIGNMENT	
Function	Pin Number
"A" Logic Common	1
Logic +12 VDC	2
$\overline{\text{ON}}$	3
$\overline{\text{OFF}}$	4
ON Tally ⌐	5
OFF Tally ⌐	6
$\overline{\text{COUGH}}$	7
$\overline{\text{TALK TO CONTROL ROOM}}$	8
-No Connection-	9
-No Connection-	10
-No Connection-	11
-No Connection-	12
-No Connection-	13
-No Connection-	14
"B" Logic Common	15

NOTE: Consult Section 2.8.1 when connecting Microphone Input Module remote controls.

2.7.2 Stereo Line Input Module Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Input A/Left	A INPUT	1	2	3
Input A/Right	"	4	5	6
Input B/Left	B INPUT	1	2	3
Input B/Right	"	4	5	6
Patch Send/Left	PATCH	1	2	3
Patch Send/Right	"	4	5	6
Patch Return/Left	"	7	8	9
Patch Return/Right	"	10	11	12

NOTES:

A) When connecting a monaural line level source (such as a Telco hybrid) to a Stereo Line Input Module, connect the signal to the left input channel, and insert jumpers between pins #1 and #4, #2 and #5, and #3 and #6.

B) The Patch Sends are unbalanced; the Patch Returns are balanced.

C) The PATCH connector must be wired so that the Patch Sends are connected through to the Patch Returns. If no external processing or patch bay equipment is connected, a mating connector with jumpers from pins #2 to #8, #3 to #9, #5 to #11 and #6 to #12 must be installed.

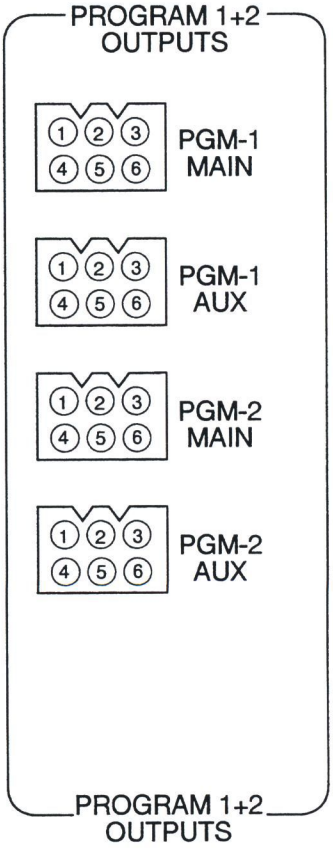
LOGIC PIN ASSIGNMENT	
Function	Pin Number
"A" Logic Common	1
Logic +12 VDC	2
$\overline{\text{ON}}$	3
$\overline{\text{OFF}}$	4
ON Tally ⌐‾	5
OFF Tally ⌐‾	6
$\overline{\text{READY}}$	7
$\overline{\text{AUDIO RESET TO OFF}}$	8
$\overline{\text{CUE}}$	9
START PULSE ⌐‾⌐	10
STOP PULSE ⌐‾⌐	11
CUE Tally ⌐‾	12
-No Connection-	13
-No Connection-	14
"B" Logic Common	15

NOTES:

A) Consult Section 2.8.2 when connecting Stereo Line Input Module remote controls.

B) On Stereo Line Input Modules assigned as Telco hybrid inputs, connect the ON Tally control outputs to the Telco Mix Module's ON Tally Inputs, as shown in Section 2.8.3.

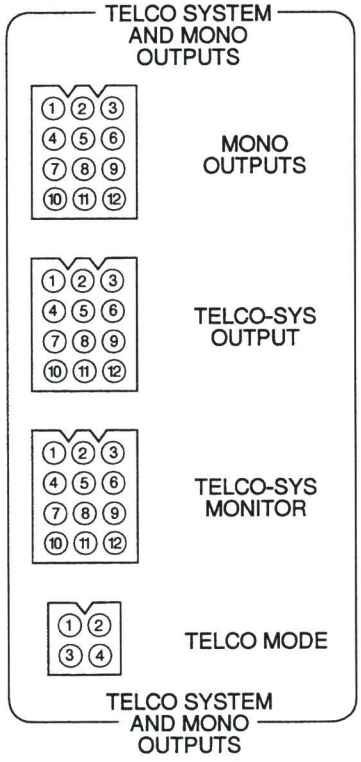
2.7.3 Stereo Line Output Amplifier Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Program 1 Main Output/Left	PGM-1 MAIN	1	2	3
Program 1 Main Output/Right	"	4	5	6
Program 1 Aux Output/Left	PGM-1 AUX	1	2	3
Program 1 Aux Output/Right	"	4	5	6
Program 2 Main Output/Left	PGM-2 MAIN	1	2	3
Program 2 Main Output/Right	"	4	5	6
Program 2 Aux Output/Left	PGM-2 AUX	1	2	3
Program 2 Aux Output/Right	"	4	5	6

NOTE: The Main and Auxiliary outputs are balanced.

2.7.4 Telco Mix/Monaural Output Module Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Main Mono Output	MONO OUTPUTS	1	2	3
Monitor Mono Output	"	4	5	6
Auxiliary Mono Output 1	"	7	8	9
Auxiliary Mono Output 2	"	10	11	12
To Caller 1	TELCO-SYS OUT	1	2	3
To Caller 2	"	4	5	6
To Tape - Mixed	"	7	8	9
To Tape - Callers	"	10	11	12
To Tape Monitor - Mixed	TELCO-SYS MON	1	2	3
To Tape Monitor - Callers	"	4	5	6
Telco Monitor, Fixed	"	7	8	9
Telco Monitor, Variable	"	10	11	12

NOTES:

A) Monaural amplifier outputs are balanced.

B) Connect the To Caller 1 and To Caller 2 outputs to their respective telco hybrids.

C) The To Tape - Callers and To Tape Monitor - Callers outputs are identical, and are caller only outputs.

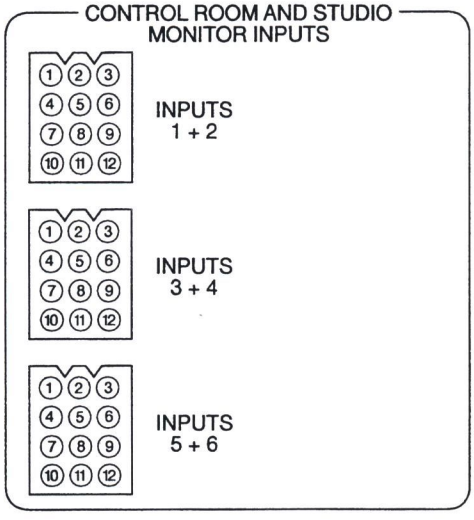
D) The To Tape - Mixed and To Tape Monitor - Mixed outputs are identical, and consist of all line and mic input modules assigned to the OFF LINE MIX. Callers may be added to the these outputs by means of an internal option switch (reference Section 2.9.3).

E) The Telco Monitor outputs are caller only outputs. Line input modules assigned to OFF LINE MIX may be added to these outputs by means of an internal option switch (reference Section 2.9.3).

LOGIC PIN ASSIGNMENT	
Function	Pin Number
Telco 1 Logic Common	1
Telco 1 ON Tally Input	2
Telco 2 Logic Common	3
Telco 2 ON Tally Input	4

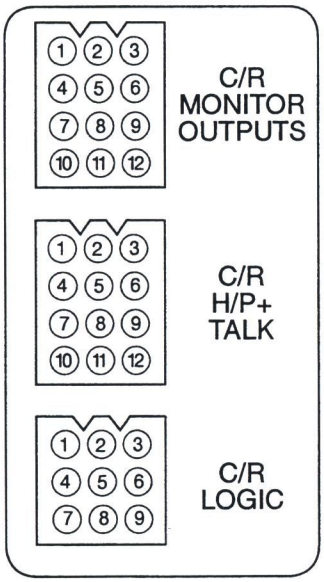
NOTE: The On Tally Inputs are connected to the ON Tally control outputs of those Stereo Line Input Modules assigned as Telco hybrid inputs (i.e., Telco Input 1 and Telco Input 2), as shown in Section 2.8.3. These inputs control the switching status of the Telco System when the Telco Mix Module AUTO SELECT button is engaged, as described in Section 3.4.

2.7.5 Monitor Module Input Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Input 1/Left	INPUTS 1+2	1	2	3
Input 1/Right	"	4	5	6
Input 2/Left	"	7	8	9
Input 2/Right	"	10	11	12
Input 3/Left	INPUTS 3+4	1	2	3
Input 3/Right	"	4	5	6
Input 4/Left	"	7	8	9
Input 4/Right	"	10	11	12
Input 5/Left	INPUTS 5+6	1	2	3
Input 5/Right	"	4	5	6
Input 6/Left	"	7	8	9
Input 6/Right	"	10	11	12

2.7.6 Control Room Monitor Module Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Main Monitor Output/Left	C/R MON OUT	1	2	3
Main Monitor Output/Right	"	4	5	6
Direct Monitor Output/Left	"	7	8	9
Direct Monitor Output/Right	"	10	11	12
Headphone Output/Left	C/R H/P+TALK	1	2	3
Headphone Output/Right	"	4	5	6
Talk To C/R Output	"	7	8	9
Auxiliary CUE Input	"	10	11	12

NOTES:

A) The Direct Monitor Output consists only of the source selected on the eight-station Monitor Input switch.

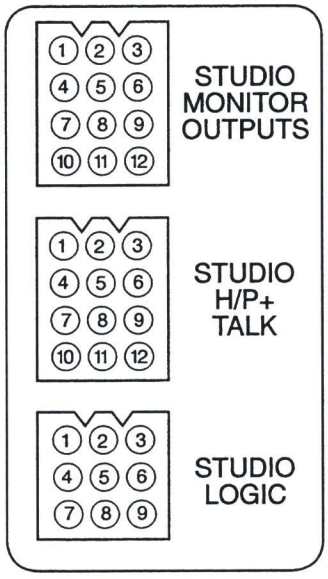
B) The Talk To C/R Output consists of any Talk To Control Room signals, and is provided for connection to self-contained headphone and/or monitor systems, if desired.

C) The Auxiliary CUE Input is a line level input provided for the connection of an external source (such as a two-way transceiver, EBS receiver, etc.) to the console CUE system, if desired. This input may or may not follow the muting status of the Control Room monitors, as determined by an internal option switch (reference Section 2.9.4).

LOGIC PIN ASSIGNMENT	
Function	Pin Number
Logic Common	1
Logic +12 VDC	2
-No Connection-	3
$\overline{\text{DIM C/R}}$	4
$\overline{\text{MUTE C/R}}$	5
TALK TO C/R Command ⌐	6
-No Connection-	7
C/R WARNING Tally ⌐	8
-No Connection-	9

NOTE: Consult Section 2.8.4 when connecting Control Room Monitor Module remote controls.

2.7.7 Studio Monitor Module Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Main Monitor Output/Left	STU MON OUT	1	2	3
Main Monitor Output/Right	"	4	5	6
Direct Monitor Output/Left	"	7	8	9
Direct Monitor Output/Right	"	10	11	12
Headphone Output/Left	STU H/P+TALK	1	2	3
Headphone Output/Right	"	4	5	6
Talk to Studio Output	"	7	8	9
-No Connection-	"	10	11	12

NOTES:

A) The Main Monitor Output may be fixed or variable, as determined by an internal option switch (reference Section 2.9.5.

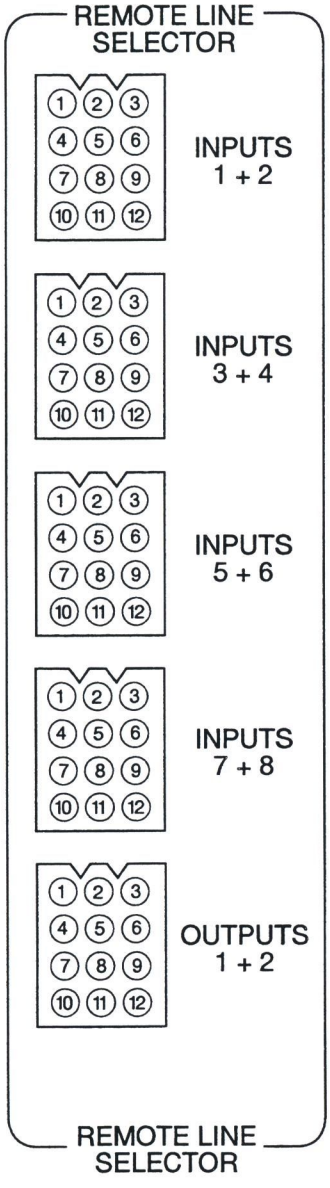
B) The Direct Monitor Output consists only of the source selected on the eight-station Monitor Input switch.

C) The Talk To Studio Output consists of any Talk To Studio signals, and is provided for connection to self-contained headphone and/or monitor systems, if desired.

LOGIC PIN ASSIGNMENT	
Function	Pin Number
Logic Common	1
Logic +12 VDC	2
-No Connection-	3
-Not Used-	4
$\overline{\text{MUTE STUDIO}}$	5
TALK TO STUDIO Command ⌐	6
-No Connection-	7
STUDIO WARNING Tally ⌐	8
-No Connection-	9

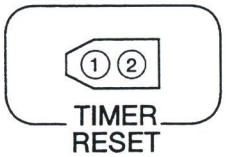
NOTE: Consult Section 2.8.5 when connecting Studio Monitor Module remote controls.

2.7.8 Remote Line Selector Connection



AUDIO PIN ASSIGNMENT				
		Pin Number		
Signal	Connector	Shield	Low	High
Input 1/Left	INPUTS 1+2	1	2	3
Input 1/Right	"	4	5	6
Input 2/Left	"	7	8	9
Input 2/Right	"	10	11	12
Input 3/Left	INPUTS 3+4	1	2	3
Input 3/Right	"	4	5	6
Input 4/Left	"	7	8	9
Input 4/Right	"	10	11	12
Input 5/Left	INPUTS 5+6	1	2	3
Input 5/Right	"	4	5	6
Input 6/Left	"	7	8	9
Input 6/Right	"	10	11	12
Input 7/Left	INPUTS 7+8	1	2	3
Input 7/Right	"	4	5	6
Input 8/Left	"	7	8	9
Input 8/Right	"	10	11	12
Output 1/Left	OUTPUTS 1+2	1	2	3
Output 1/Right	"	4	5	6
Output 2/Left	"	7	8	9
Output 2/Right	"	10	11	12

2.7.9 Timer Reset Connection



LOGIC PIN ASSIGNMENT	
Function	Pin Number
Logic Common	1
RESET EXTERNAL TIMER Command ⌐	2

NOTE: This output is provided for the control of an external "slave" timer.

2.8 MODULE REMOTE CONTROL CAPABILITIES

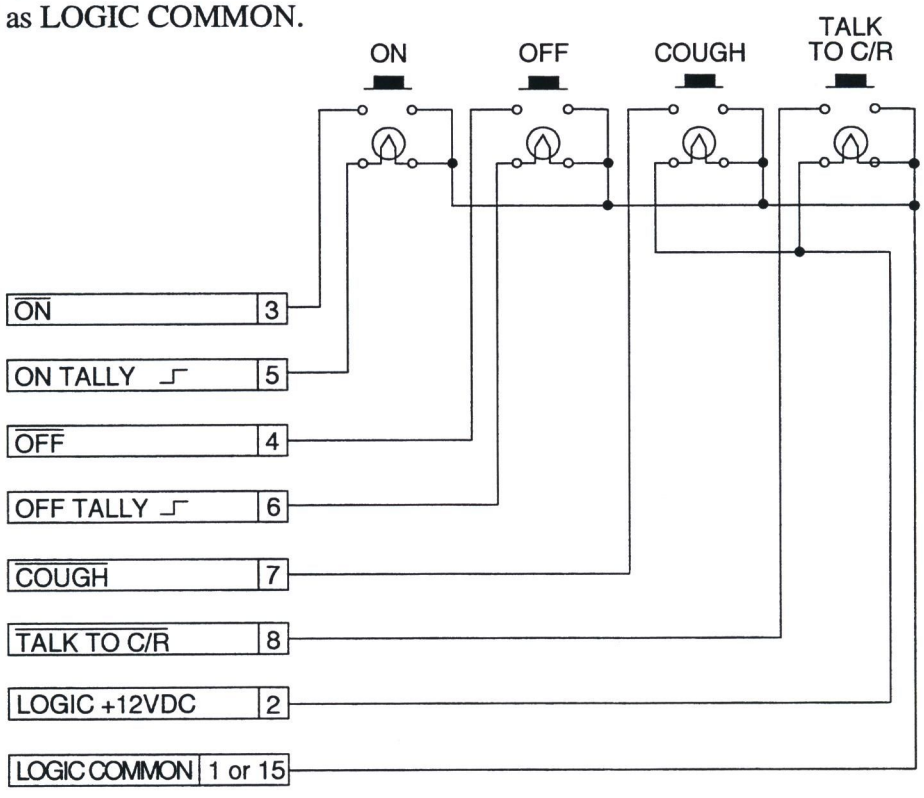
This section outlines Radiomixer module remote control capabilities. Included are descriptions of Microphone Input, Stereo Line Input, Telco Mix/Monaural Output, Control Room Monitor, and Studio Monitor Module remote controls.

2.8.1 Microphone Input Module Remote Control

There are two methods of connecting Microphone Input Module remote controls - single input, which allows for the logic connection of one microphone (either A or B), or dual input, which allows for the simultaneous logic connection of two microphones (one A and one B). Both configurations are described in this section.

SINGLE INPUT CONFIGURATION

The schematic below illustrates the full remote control capability of the Microphone Input Module's A and B inputs. The single input configuration allows for the logic connection of either the A or B input. When connecting A input logic, pin #1 is used as LOGIC COMMON; when connecting B input logic, pin #15 is used as LOGIC COMMON.



NOTES:
A) Button switches are momentary-action.
B) Lamps are 12-14 volt, 80 mA.
C) When COUGH and TALK TO CONTROL ROOM tallies are connected as shown above, switch lamps will be illuminated at all times.

The TALK TO CONTROL ROOM command routes the microphone signal to the Talk To Control Room bus, regardless of the ON/OFF status of the module. When the module is ON, this command functions much like the COUGH command in that it will take the microphone off-air as well.

DUAL INPUT CONFIGURATION

In the dual input configuration, separate logic wiring for both A and B inputs is connected simultaneously, and is enabled for these respective inputs by the module A/B selector. This is accomplished by wiring the single logic connector in a "Y" configuration, using the Radiomixer A/B Logic "Y" Cable (PR&E #99-580). In this configuration, the single logic connector becomes two (one A and one B), with each fully capable of accommodating microphone logic connection per the schematic on the previous page.

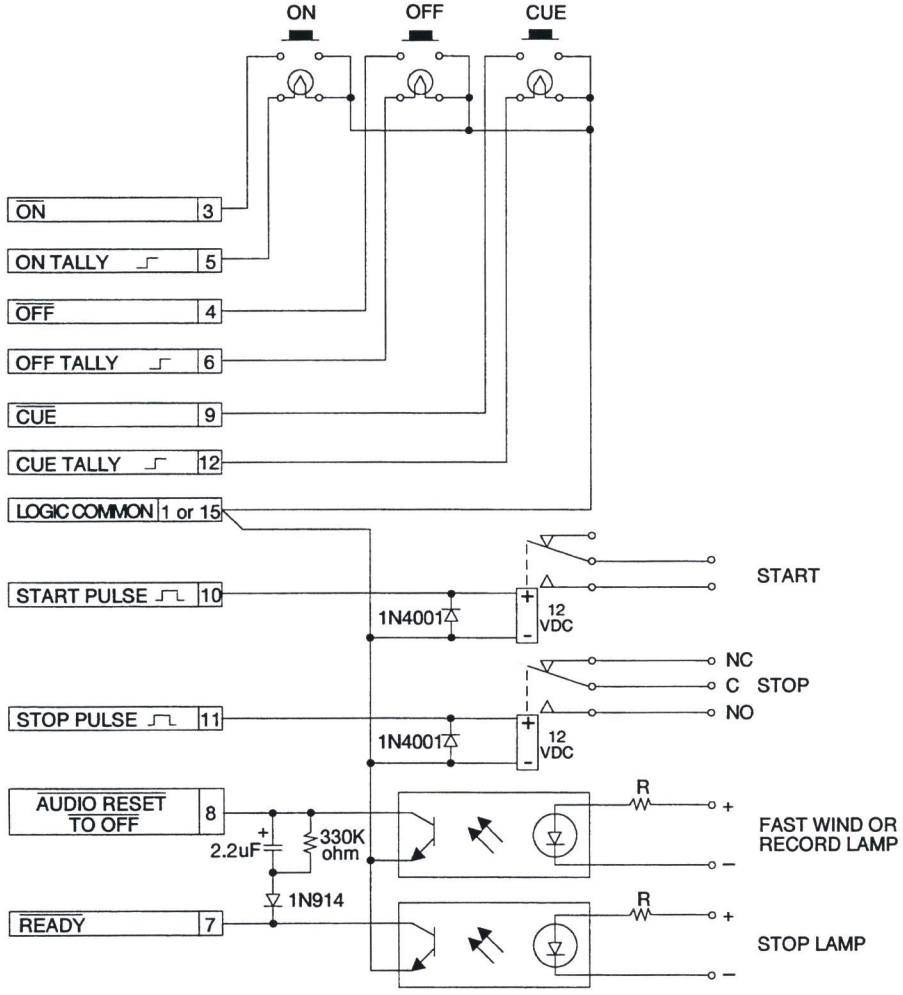
Connect A input microphone logic to connector J1, and B input microphone logic to connector J2, as defined in Section 8.4.17.

2.8.2 Stereo Line Input Module Remote Control

There are two methods of connecting Stereo Line Input Module remote controls - single input, which allows for the logic connection of one source (either A or B), or dual input, which allows for the simultaneous logic connection of two sources (one A and one B). Both configurations are described in this section.

SINGLE INPUT CONFIGURATION

The schematic below illustrates the full remote control and machine interface capability of the Stereo Line Input Module's A and B inputs. Typical applications include providing cartridge input ON and OFF buttons at co-host or news turret positions, and ON, OFF and CUE buttons adjacent to turntables and tape recorders. The single input configuration allows for the logic connection of either the A or B input. When connecting A input logic, pin #1 is used as LOGIC COMMON; when connecting B input logic, pin #15 is used as LOGIC COMMON.



NOTES:
A) Button switches are momentary-action.
B) Lamps are 12-14 volt, 80 mA.
C) Relays are 12 volt DC, 100 mA maximum.
D) Opto-isolators are Motorola MCT-2 or equivalent.

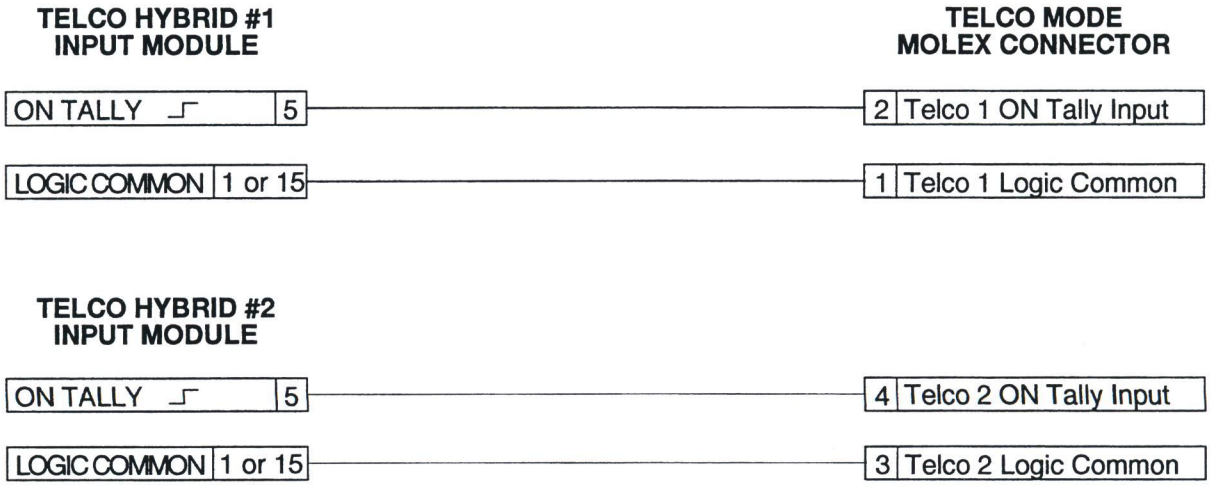
DUAL INPUT CONFIGURATION

In the dual input configuration, separate logic wiring for both A and B inputs is connected simultaneously, and is enabled for these respective inputs by the module A/B selector. This is accomplished by wiring the single logic connector in a "Y" configuration, using the Radiomixer A/B Logic "Y" Cable (PR&E #99-580). In this configuration, the single logic connector becomes two (one A and one B), with each fully capable of accommodating source logic connection per the schematic on the previous page.

Connect A input source logic to connector J1, and B input source logic to connector J2, as defined in Section 8.4.17.

2.8.3 Telco Mix Module Remote Control

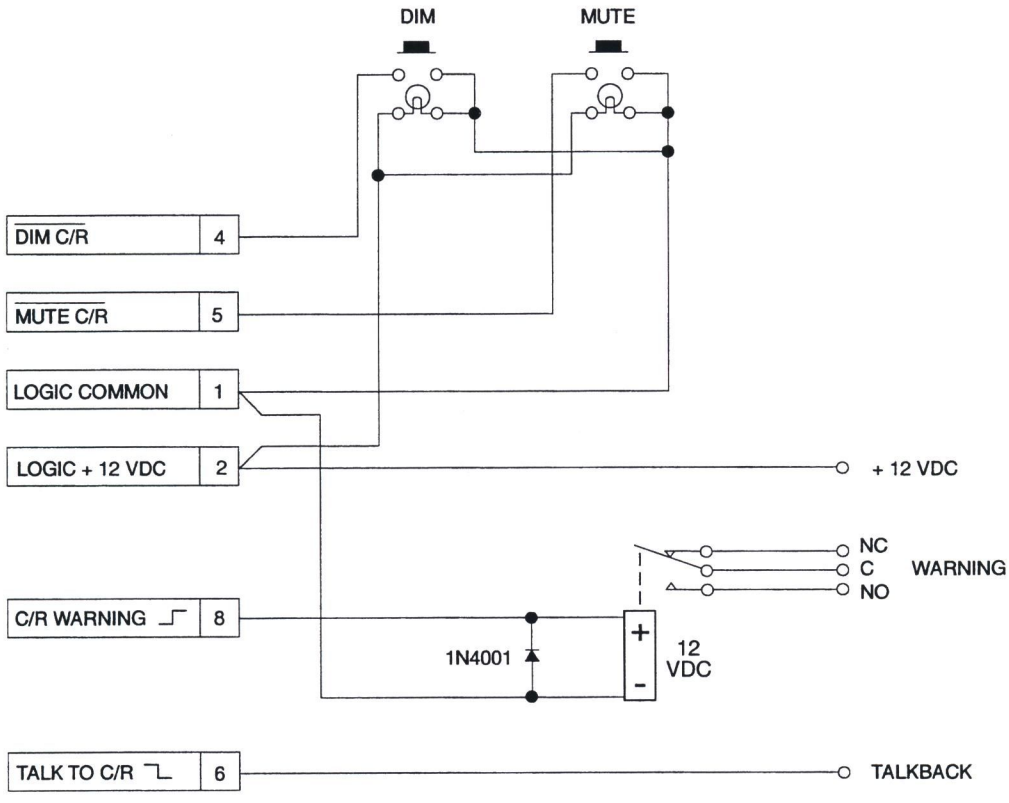
The Telco Mix Module is equipped with a logic function which allows the system to toggle between on-air (PGM 1) and off-air (OFF LINE MIX) operation, as determined by the ON/OFF status of the Stereo Line Input Modules assigned as Telco hybrid inputs. This function is controlled by the ON Tally control outputs of these modules, which are connected to the TELCO MODE logic connector as shown below. If the "A" input is the Telco input, pin 1 is used as logic common and if the "B" input is Telco, pin 15 is used as logic common.



When the Telco Mix Module AUTO SELECT button is engaged, and the connected Stereo Line Input Modules are OFF, the Telco System remains in the OFF LINE MIX mode and the selected OFF LINE MIX input signals are fed to the callers. Once either input module is turned ON, the Telco System automatically toggles to the PGM 1 mode, and the selected PROGRAM 1 input signals are fed to both callers. Telco System operation is explained in greater detail in Section 3.4.

2.8.4 Control Room Monitor Module Remote Control

The schematic below illustrates the full remote control capability of the Control Room Monitor Module.



NOTES:
A) Button switches are alternate-action.
B) Lamps are 12-14 volt, 80 mA.
C) Relay is 12 volt DC, 100 mA maximum.
D) When DIM and MUTE tallies are connected as shown above, switch lamps will be illuminated at all times.

While it is unlikely that a "typical" installation will utilize all of these facilities, it is important to understand what is available, along with the potential applications.

The DIM C/R control input may be used to remotely control the dim function of the Control Room Monitor Module. Typical applications include equipping the Control Room door with a "door open" switch, or a telephone set with an "off-hook" switch to automatically dim the Control Room speakers whenever the door opens or the telephone is picked up.

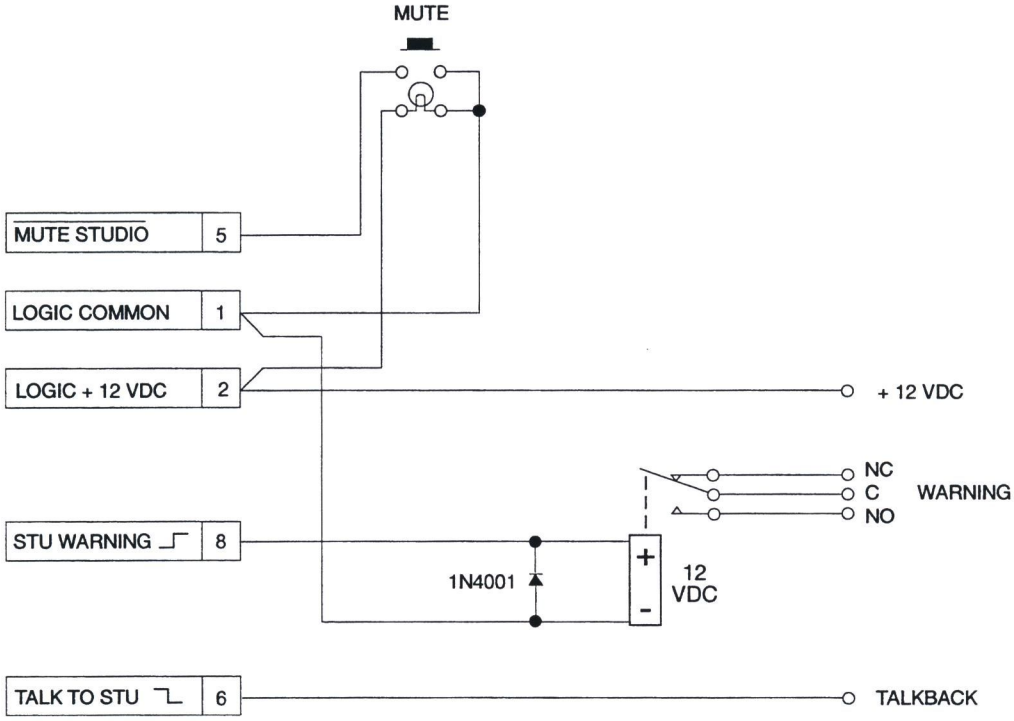
The MUTE C/R control input may be used to remotely control the mute function of the Control Room Monitor Module. Typical applications include operations where two "on-air" consoles are used in the same room, such as a second console for news and/or sports programming.

The C/R WARNING tally is a 12 VDC, 100 mA (maximum), source output for connection to a magnetic or solid-state relay unit for driving the Control Room entry warning light(s).

The TALK TO C/R control output is a current-sinking open collector, which is active (low) whenever the Control Room is receiving Talkback from another location. This command is intended for connection to active, self-contained, headphone and monitor systems, and is used to switch the Talk to Control Room signals into the headphone and monitor circuits. Such headphone and/or monitor systems are usually provided to co-host and news positions in a Control Room.

2.8.5 Studio Monitor Module Remote Control

The schematic below illustrates the full remote control capability of the Studio Monitor Module.



NOTES:
A) Button switch is alternate-action.
B) Lamp is 12-14 volt, 80 mA.
C) Relay is 12 volt DC, 100 mA maximum.
D) When the MUTE tally is connected as shown above, the switch lamp will be illuminated at all times.

While a "typical" installation may not utilize all of the Studio Monitor Module's logic facilities, it is important to understand what is available, along with the potential applications.

The MUTE STUDIO control input may be used to remotely control the mute function of the Studio Monitor Module. A typical application would be to provide a host with a Monitor Mute button in those installations where a monitor volume control is not provided in the Studio itself.

The STUDIO WARNING Tally command is a 12 VDC, 100 mA (maximum), source output for connection to a magnetic or solid-state relay unit for driving the Studio entry warning light(s).

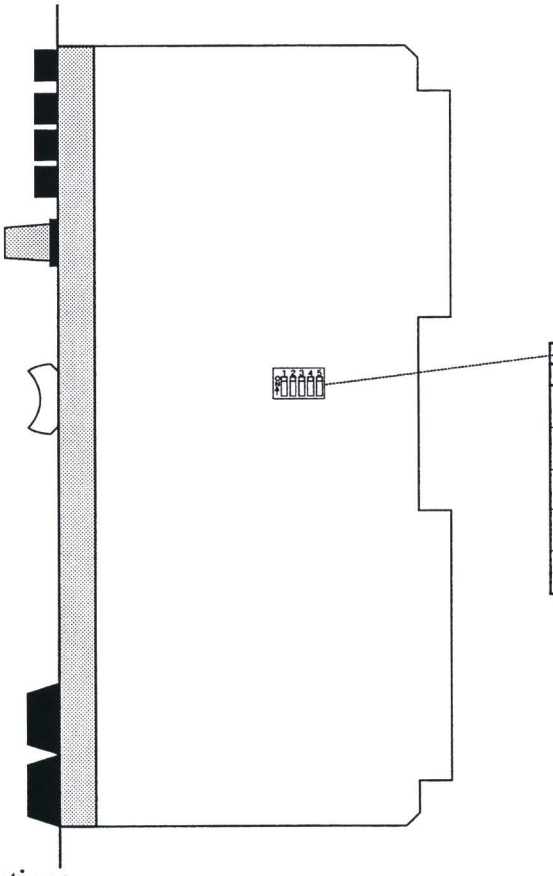
The TALK TO STUDIO control output is a current-sinking open collector, which is active (low) whenever the Studio is receiving Talkback from another location. This command is intended for connection to active, self-contained, headphone and monitor systems, and is used to switch the Talk to Studio signals into the headphone and monitor circuits. Such headphone and/or monitor systems are usually provided to the host and co-host.

2.9 MODULE INTERNAL OPTION SWITCHES

Some Radiomixer modules are equipped with internal option switches, which can be set to enable or disable selected module functions. This section provides the location of these switches on the module printed circuit assemblies, and their functions. Included are descriptions of the Microphone Input, Stereo Line Input, Telco Mix/Monaural Output, and Control Room and Studio Monitor Module option switches.

2.9.1 Microphone Input Module Option Switch

The illustration below provides the location of the Microphone Input Module internal option switch, and



S5, Logic Assignment Selector

#	Input	Function
1	B	ON (CLOSED): Control Room monitors mute. OFF (OPEN): No mute function.
2	A	ON (CLOSED): Control Room monitors mute. OFF (OPEN): No mute function.
3	B	ON (CLOSED): Studio monitors mute. OFF (OPEN): No mute function.
4	A	ON (CLOSED): Studio monitors mute. OFF (OPEN): No mute function.
5	A/B	ON (CLOSED): Local COUGH function enabled. OFF (OPEN): No local COUGH function.

defines its functions.

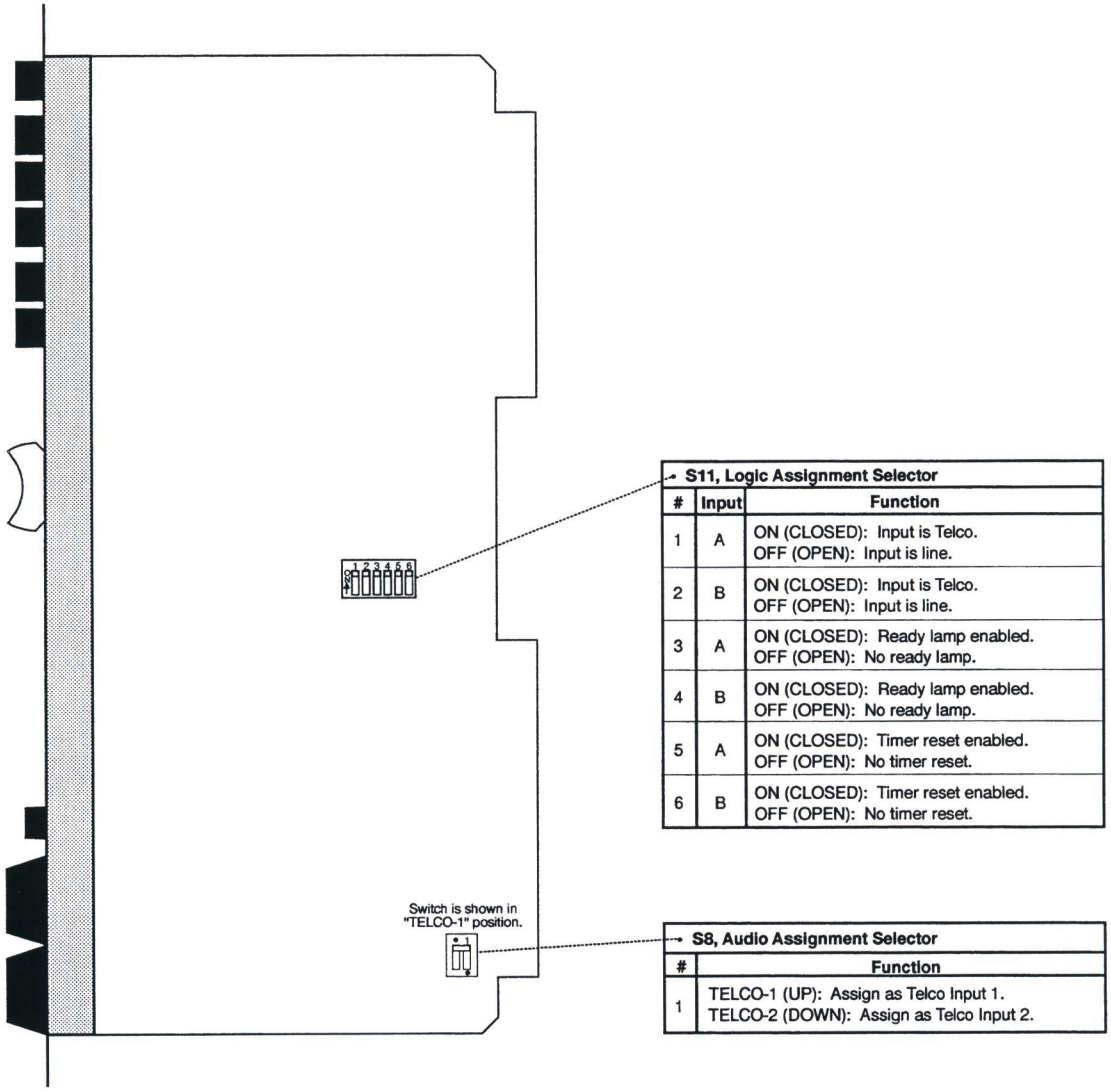
Switch S5 is a five-station switch. Stations 1 through 4 determine Control Room and Studio monitor mute status. When mute is selected, the Control Room or Studio monitors mute whenever the module is turned ON.

NOTE: There is a 50 millisecond delay in microphone turn-on to allow room reverb to decay off-mic.

Station 5 enables the local cough function for both inputs, allowing the module ON button to function as a COUGH button. When this function is enabled and the module is turned ON, the ON button mutes channel audio whenever it is held depressed.

2.9.2 Stereo Line Input Module Option Switches

The illustration below provides the locations of the Stereo Line Input Module internal option switches,



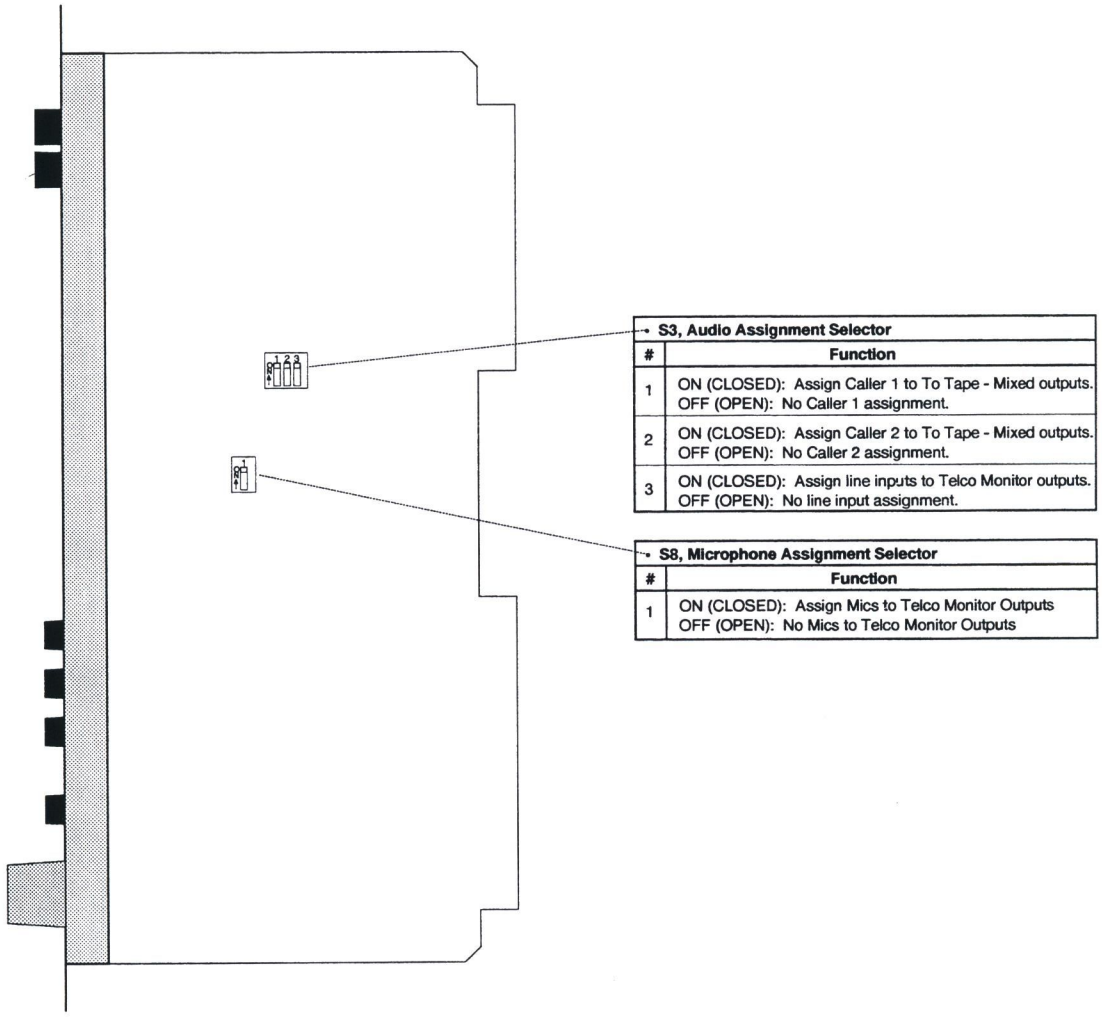
and defines their functions.

When a telephone hybrid is connected to a module input (A or B), station 1 or 2 of switch S11 assigns that input as a Telco Input. Once this is accomplished, switch S8 determines whether it is assigned as Telco Input 1 or Telco Input 2. Input modules being used as Telco inputs must be assigned in this manner in order to maintain Telco System mix-minus integrity (i.e., the caller does not hear himself). This assignment prevents caller audio from being fed back to the originating telephone hybrid.

Ready lamp and timer reset status for each input is determined by stations 3 through 6 of switch S11. When the ready lamp function is enabled, the module OFF lamp functions as a ready lamp, following the status of the connected machine's (cart, tape, etc.) ready status indicator. When the timer reset function is enabled, the console timer will reset whenever the input module is turned ON.

2.9.3 Telco Mix/Monaural Output Module Option Switches

The illustration below provides the location of the Telco Mix/Monaural Output Module internal option



switches, and defines their functions.

Switch S3 is a three-station switch. Stations 1 and 2 allow for the assignment of Caller 1 and/or Caller 2 to the To Tape - Mixed and To Tape Monitor - Mixed outputs of the module.

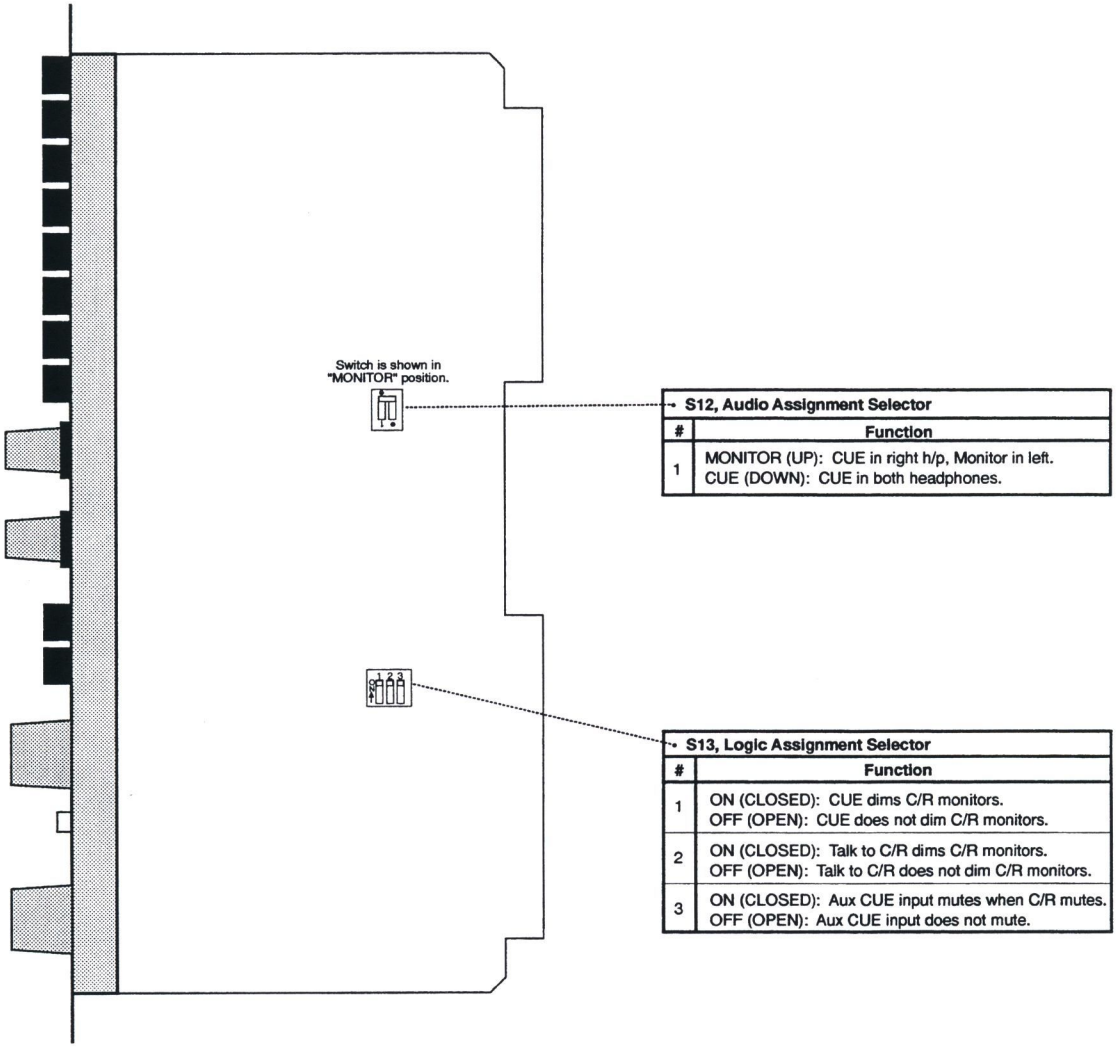
Station 3 allows for all Line Input Modules assigned to OFF LINE MIX to be added to the Telco Monitor Outputs.

Switch S8 allows for all Microphone Input Modules assigned to be added to the Telco Monitor Outputs. If this switch is closed, depression of the Telco CUE button will mute the Control Room speakers.

(Switch S8 is present only on Radiomixers manufactured after May 1991.

2.9.4 Control Room Monitor Module Option Switches

The illustration below provides the locations of the Control Room Monitor Module internal option switches, and defines their functions.



S12, Audio Assignment Selector

#	Function
1	MONITOR (UP): CUE in right h/p, Monitor in left. CUE (DOWN): CUE in both headphones.

S13, Logic Assignment Selector

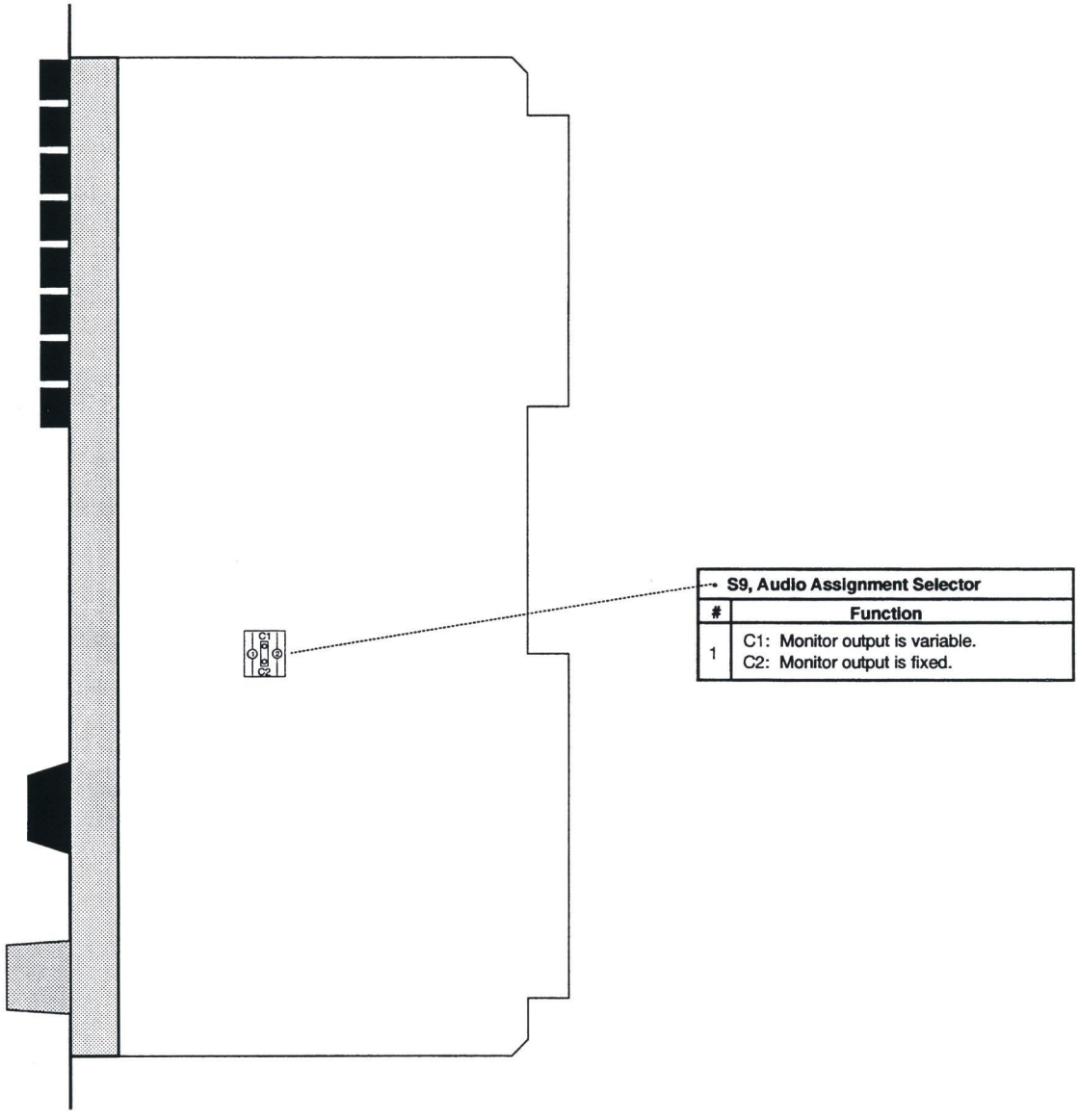
#	Function
1	ON (CLOSED): CUE dims C/R monitors. OFF (OPEN): CUE does not dim C/R monitors.
2	ON (CLOSED): Talk to C/R dims C/R monitors. OFF (OPEN): Talk to C/R does not dim C/R monitors.
3	ON (CLOSED): Aux CUE input mutes when C/R mutes. OFF (OPEN): Aux CUE input does not mute.

Switch S12 determines the CUE monitor mode of the console headphones when the module front panel AUTO CUE button is engaged. With S12 in the MONITOR position, the left headphone monitors the Control Room Monitor source, while the right headphone monitors CUE audio. With S12 in the CUE position, both headphones monitor CUE audio.

Switch S13 is a three-station switch. Station 1 determines whether the Control Room monitors dim when the console CUE system is activated. Station 2 determines whether the Control Room monitors dim when the Control Room is receiving Talkback. Station 3 determines whether or not the Auxiliary CUE Input mutes when the Control Room monitors are muted.

2.9.5 Studio Monitor Module Option Switch

The illustration below provides the location of the Studio Monitor Module internal option switch, and defines its function.



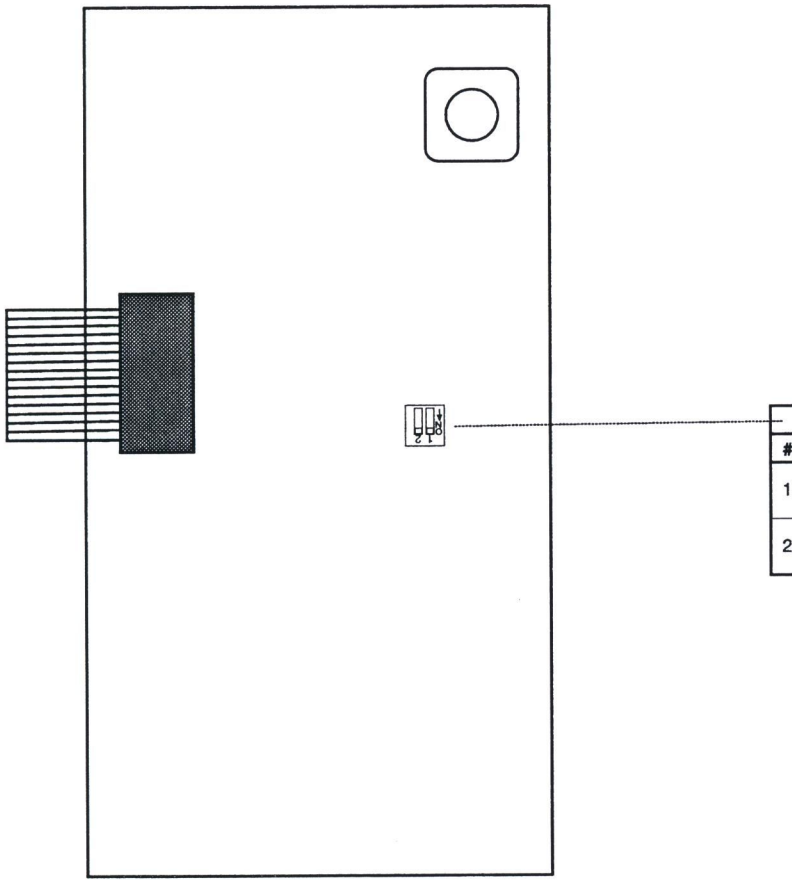
S9, Audio Assignment Selector

#	Function
1	C1: Monitor output is variable. C2: Monitor output is fixed.

Switch S9 determines if the Main Studio Monitor Output is fixed or variable (variable monitor output levels are controlled by the Studio Monitor Module front panel MONITOR level control).

2.9.6 Clock/Timer Mode Switch

The illustration below provides the location of the Clock/Timer internal option switch and defines its functions.



• S1, Clock/Timer Modes

#	Function
1	ON (CLOSED): Internal Clock Enabled OFF (OPEN): ESE Slave Mode
2	ON (CLOSED): "Tenths" Display Blanked when running OFF (OPEN): "Tenths" Displays always

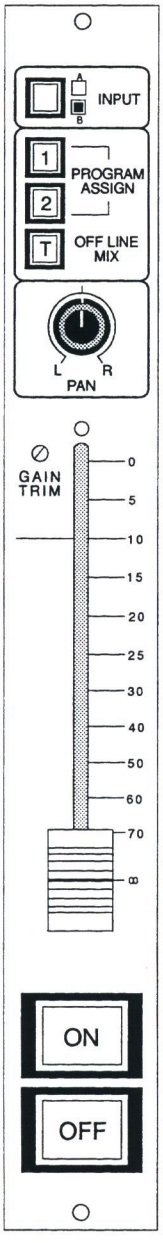
Switch S1 is a 2 station switch. Station 1 determines if the clock is to be used as an ESE slave or a stand-alone clock. Station 2 enables or disables the "tenths" display on the timer while it is running. (This drawing describes clock/timers manufactured after January 1991.)

3.0 OPERATION

This chapter describes Radiomixer module operation. Included are sections describing the Microphone Input Module, Stereo Line Input Module, Telco Mix/Monaural Output Module, Stereo Line Output Amplifier, Control Room Monitor Module, Studio Monitor Module, Remote Line Selector and Timer Control Panel. Each section contains an illustration of the module's front panel controls, accompanied by descriptions of the function(s) of each.

3.1 MICROPHONE INPUT MODULE

This section contains a figure illustrating the Microphone Input Module's front panel controls, along with a description of the function(s) of each.

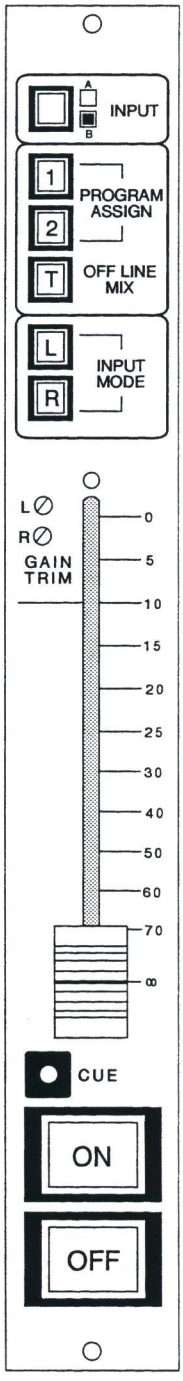


- The INPUT button selects between microphones connected to the A and B inputs of the module.
- The PROGRAM ASSIGN buttons provide the ability to assign the module input to any combination of the PROGRAM 1 and PROGRAM 2 output buses.
- The OFF LINE MIX button provides the ability to assign the module input to the Telephone System off line mix.

  NOTE: When the input module OFF LINE MIX button is engaged, the input signal is sent to the Telephone System regardless of the ON/OFF status of the module.
- The PAN control allows positioning of the microphone signal in the stereo image.
- The recessed GAIN TRIM control adjusts the microphone preamplifier gain for both inputs.
- The mixing fader is a stepless, infinite resolution control with a reference line at the 10 dB point. This reference is the nominal position for a properly adjusted input level to achieve "0" VU on the console meters.
- The ON button turns the module on and initiates the appropriate muting commands as programmed during installation. In addition, the ON button may be optionally set to provide a momentary cough function when held depressed (reference Section 2.9.1)
- The OFF button turns the module off and cancels the muting commands.

3.2 STEREO LINE INPUT MODULE

This section contains a figure illustrating the Line Input Module's front panel controls, along with a description of the function(s) of each.

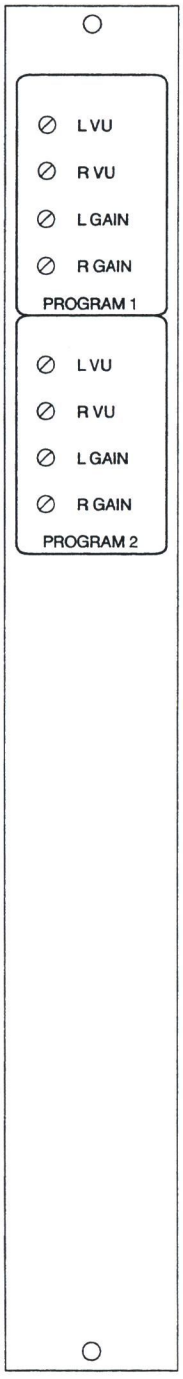


- The INPUT button selects between stereo sources connected to the A and B inputs of the module.
- The PROGRAM ASSIGN buttons provide the ability to assign the module input to any combination of the PROGRAM 1 and PROGRAM 2 output buses.
- The OFF LINE MIX button provides the ability to assign the module input to the Telephone System off line mix.

  NOTE: When the input module OFF LINE MIX button is engaged, the input signal is sent to the Telephone System regardless of the ON/OFF status of the module.
- The INPUT MODE switch determines the module mode as follows: with both buttons disengaged, the mode is stereo; pressing the L button alone sends the left source to both channels; pressing the R button alone sends the right source to both channels; and pressing both buttons sums the left and right input signals and sends the monaural result to both channels.
- The recessed L and R GAIN TRIM controls adjust the gain of the left and right preamplifiers.
- The mixing fader is a stepless, infinite resolution control with a reference line at the 10 dB point. This reference is the nominal position for a properly adjusted input level to achieve "0" VU on the console meters.
- The electronic alternate-action CUE button with LED indicator routes the pre-fader signal to the console CUE speaker. The LED is illuminated whenever the CUE button is engaged.
- The ON button turns the module on and initiates machine start and timer reset commands, as programmed during installation.
- The OFF button turns the module off and initiates machine stop commands. In addition, the OFF tally may be set to act as a machine ready status indicator (reference Section 2.9.2).

3.3 STEREO LINE OUTPUT AMPLIFIER

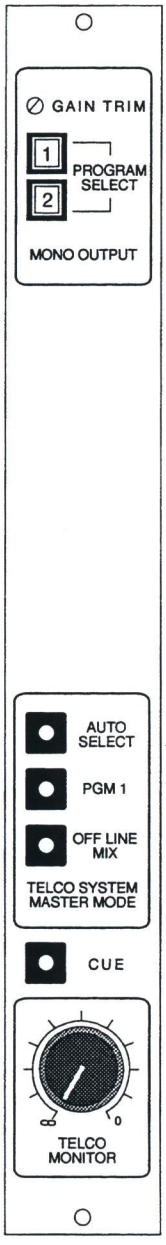
This section contains a figure illustrating the Stereo Line Output Amplifier's front panel controls, along with a description of the function(s) of each.



- This module provides two separate sets of recessed controls, one for PROGRAM 1 and one for PROGRAM 2, which function identically. The L and R VU controls adjust the console meter levels. The L and R GAIN controls adjust the gain of the line output distribution amplifiers.

3.4 TELCO MIX/MONAURAL OUTPUT MODULE

The Telco Mix/Monaural Output Module consists of two separate sections, Telco Mix and Monaural Output, which function independently. This section contains a figure illustrating the module's front panel controls, along with a description of the function(s) of each. Also contained in this section is a description of Telco System operation.



MONAURAL OUTPUT SECTION

- The recessed GAIN TRIM control adjusts the gain of the monaural line output distribution amplifier.
- The PROGRAM SELECT buttons allow for the selection of any combination of the PROGRAM 1 and PROGRAM 2 output buses to be summed as the monaural output.

TELCO MIX SECTION

- The three TELCO SYSTEM MASTER MODE buttons with LED indicators allow for the assignment of the Telco System as follows:

  PGM 1 - Feeds PROGRAM 1 to the callers.

  OFF LINE MIX - Feeds all selected OFF LINE MIX input signals to the callers.

  AUTO SELECT - Automatically switches the Telco System between the PGM 1 and OFF LINE MIX modes, as determined by the ON/OFF status of the caller's input module(s).

- The electronic alternate-action CUE button with LED indicator routes the pre-fader Telco Monitor Output signal to the console CUE speaker. The LED is illuminated whenever the CUE button is engaged.
- The TELCO MONITOR level control adjusts the level of the Variable Telco Monitor Output.

TELCO SYSTEM OPERATION

The Radiomixer Telco System has two separate and switchable modes, one for on-air (PGM 1) and one for off-air (OFF LINE MIX) operation. In both modes, Caller 1 and Caller 2 mix-minus integrity is maintained throughout the Telco System (i.e., the caller does not hear himself).

When placing callers on-air, select the PGM 1 mode to feed the callers PROGRAM 1 audio. This allows the callers to hear and interact with everything that is being broadcast on-air (such as music, microphones, commercials, traffic reports, remote feeds, etc.).

When recording or conversing with callers off-air (i.e., contest call recording, speaker phone operation, etc.), select the OFF LINE MIX mode to feed the callers only those inputs that are necessary for off-air operation (such as operator and guest microphones, contest carts, etc.). This mode allows for off-air conversation with the callers exclusive of PROGRAM 1 operation.

Each mode is configured independently, using the controls provided on the Telco Mix and console input modules, as described below.

On-Air (PGM 1) Telco Operation

The Radiomixer is configured to allow on-air Telco operations to take place on the PROGRAM 1 bus. In this mode, assign all Microphone and Stereo Line Input Modules which are to be incorporated into the PROGRAM 1 signal, including those being used as Telco hybrid inputs, to the PROGRAM 1 bus (note that PROGRAM 1 feeds are only active when the input modules are turned ON). Select PGM 1 on the Telco Mix Module to feed the callers PROGRAM 1 audio. Turn the Telco hybrid input module ON to place the caller on-air.

NOTE: Caller 1 and Caller 2 mix-minus integrity is maintained throughout the Telco System (i.e., the caller does not hear himself).

Off-Air (OFF LINE MIX) Telco Operation

In this mode, assign all desired Microphone and Stereo Line Input Modules, including those being used as Telco hybrid inputs, to the OFF LINE MIX bus (note that OFF LINE MIX feeds are always active, regardless of the ON/OFF status of the module). Select OFF LINE MIX on the Telco Mix Module to feed the callers OFF LINE MIX audio.

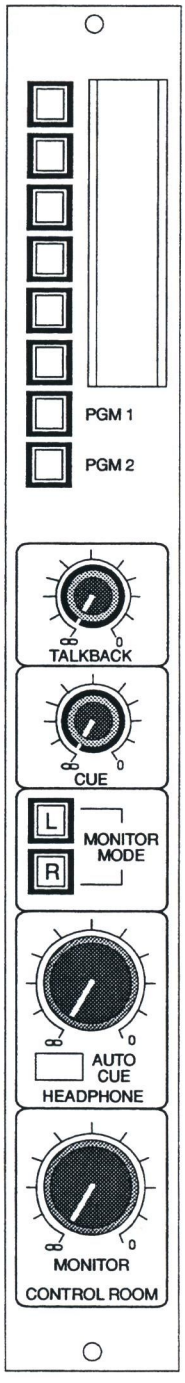
NOTE: Caller 1 and Caller 2 mix-minus integrity is maintained throughout the Telco System (i.e., the caller does not hear himself).

Telco System AUTO SELECT

The Telco System is also equipped with an AUTO SELECT function, which allows the system to toggle between the two modes of operation automatically, as determined by the ON/OFF status of the Stereo Line Input Modules being used as Telco hybrid inputs. This function is connected as defined in Section 2.8.3, and is enabled by engaging the Telco Mix Module AUTO SELECT button.

3.5 CONTROL ROOM MONITOR MODULE

This section contains a figure illustrating the Control Room Monitor Module's front panel controls, along with descriptions of the function(s) of each.



- The eight-station MONITOR INPUT switch selects the monitor source from the PROGRAM 1 or PROGRAM 2 bus, or any one of six external sources.

  NOTE: Legend strip dimensions are provided in Section 2.1.

- The TALKBACK control adjusts the level of Talkback communication received in the Control Room via the console CUE speaker.

- The CUE control adjusts the level of the console CUE speaker.

- The MONITOR MODE switch determines the module monitor mode as follows: with both buttons disengaged, the mode is stereo; pressing the L button alone sends the left source to both monitors; pressing the R button alone sends the right source to both monitors; and pressing both buttons sums the left and right input signals and sends the monaural result to both monitors.

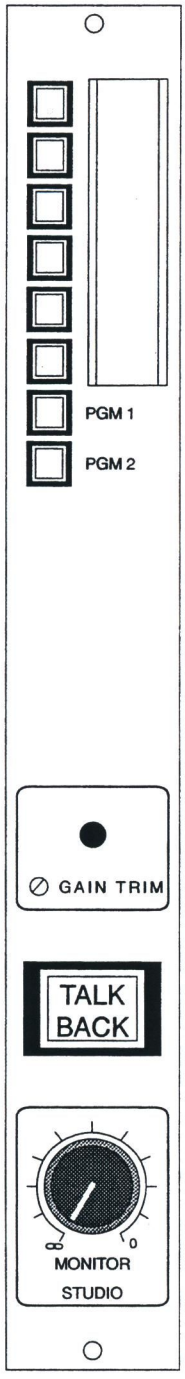
- The HEADPHONE control adjusts the level of the console operator's headphones.

- The headphone AUTO CUE button enables the Automatic Cue switching system for the console operator's headphones. With the AUTO CUE button disengaged, the headphones follow the MONITOR SOURCE switch. With the AUTO CUE button engaged, whenever an input module CUE button is depressed, the operator's headphones switch from stereo monitor to one of two selectable modes - monitor in the left headphone and CUE in the right, or CUE in both headphones. Which mode is determined by an internal option switch (reference Section 2.9.4).

- The MONITOR level control adjusts the level of the Variable Control Room Monitor Output.

3.6 STUDIO MONITOR MODULE

This section contains a figure illustrating the Studio Monitor Module's front panel controls, along with descriptions of the function(s) of each.



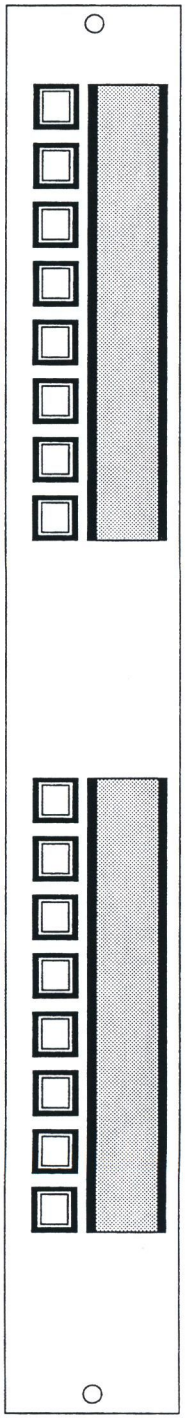
- The eight-station MONITOR INPUT switch selects the monitor source from PROGRAM 1 or PROGRAM 2 bus, or any one of six external sources.

  NOTE: Legend strip dimensions are provided in Section 2.1.

- The built-in electret microphone is the Control Room Talkback source.
- The recessed GAIN TRIM control adjusts the level of the Talkback microphone.
- The TALKBACK button activates the module electret and engages the module Talkback circuitry.
- The MONITOR level control adjusts the level of the Variable Studio Monitor Output.

3.7 REMOTE LINE SELECTOR

This section contains a figure illustrating the Remote Line Selector's front panel controls, along with descriptions of the function(s) of each.

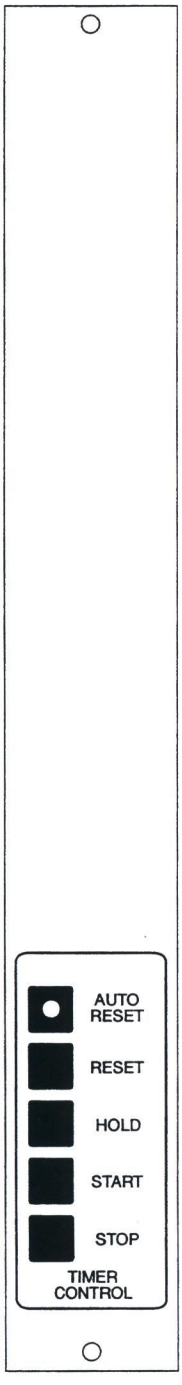


- This module consists of two eight-station selector switches which can select from any of the eight common Remote Line Selector inputs. The stereo output of each switch is then brought out to the connector panel for routing to console input positions, tape recorder inputs, etc.

  NOTE: Legend strip dimensions are provided in Section 2.1.

3.8 TIMER CONTROL PANEL

This section contains a figure illustrating the Timer Control Panel's front panel controls, along with descriptions of the function(s) of each.



- When the maintained-action AUTO RESET button is engaged, the timer will reset and restart whenever a Stereo Line Input Module with the timer reset function enabled (reference Section 2.9.2) is turned ON. The LED illuminates when the button is engaged.
- The RESET button resets the timer to zero.
- The HOLD button will hold the timer display at the present time count while the running time count continues internally. Releasing the HOLD button will display the running time count.
- The START button starts the timer.
- The STOP button stops the timer.

4.0 EQUIPMENT DESCRIPTION

This chapter describes the various components incorporated in the Radiomixer and its associated modules. Included are sections describing the mainframe, Microphone Input Module, Stereo Line Input Module, Telco Mix/Monaural Output Module, Stereo Line Output Amplifier, Control Room Monitor Module, Studio Monitor Module, Remote Line Selector, Timer Control Panel, and power supply assembly.

Mainframe and module circuitry information is provided in the console block diagram and the module schematics and printed circuit assembly (PCA) drawings located in Chapter 7 of this document.

4.1 MAINFRAME

All of the Radiomixer's interconnections are accomplished through a single mother board. The input modules plug into edge connectors mounted on the top side of the mother board, while the Molex connectors are mounted on the underside of the mother board.

The mother board contains virtually no components other than the connectors themselves, thereby isolating most of the active components to removable modules. This design approach minimizes system "down time" and greatly enhances troubleshooting by providing the option of simply replacing any defective module with a "spare" module, per the procedure outlined in Section 6.2.

For an overview of the console circuitry, and the relationship of the various modules, see the Radiomixer functional block diagram and the mother board schematic, located in Sections 7.1 and 7.2, respectively.

4.2 MICROPHONE INPUT MODULE

The Microphone Input Module accommodates a wide range of input levels to permit the use of all contemporary microphones. The input preamplifier is an active differential design configured on a plug-in board, and its gain is adjustable over the nominal input level range of -70 dBu to -35 dBu by means of the front panel GAIN TRIM control. The modules have been set-up at the factory to allow for phantom powering of condenser microphones connected to either of the two inputs (reference Section 5.1).

The A/B INPUT selector allows for the selection of microphones connected to the A or B inputs of the module, and the PROGRAM ASSIGN buttons provide the ability to assign the module to either or both of the console output buses. The module may also be assigned to the OFF LINE MIX system for Telco operations. The PAN control allows for positioning of the signal in the stereo image. The fader controls a differential-mode VCA and associated circuitry, which maintains optimum headroom throughout the control range.

The logic connector makes it possible to utilize standard PR&E remote control panels and cable assemblies. Remote control of module ON and OFF, COUGH and TALK TO CONTROL ROOM functions is provided (reference Section 2.8.1).

A five station internal DIP switch controls muting functions for the Control Room or Studio monitors, depending on microphone location, and enables the local cough function (reference Section 2.9.1). The mute circuitry incorporates an automatic 40 millisecond delay before the microphone is turned on, allowing room reverb to decay off mic.

For circuitry information, refer to the Microphone Input Module schematic and the PCA drawing located in Sections 7.3 and 7.4, respectively.

4.3 STEREO LINE INPUT MODULE

The Stereo Line Input Module accommodates nominal input levels from -12 dBu to +9 dBu. Left and right GAIN TRIM controls adjust module input sensitivity.

The A/B INPUT selector allows for the selection of stereo sources connected to the A or B inputs of the module, and the PROGRAM ASSIGN buttons provide the ability to assign the module to either or both of the console output buses. The module may also be assigned to the OFF LINE MIX system for Telco operations.

The INPUT MODE selector determines the signal mode. When both the L and R switches are released, the mode is stereo; when the L is depressed, the left input signal is sent to both channels; when the R is depressed, the right input signal is sent to both channels; and when both buttons are depressed, a monaural sum of the left and right input signals is sent to both channels.

The CUE button routes the pre-fader signal to the console CUE system.

The fader controls a stereo pair of differential-mode VCAs and associated circuitry, which maintain optimum headroom throughout the control range.

The logic connector makes it possible to utilize standard PR&E remote control panels and cable assemblies. In addition to the remote control of module ON, OFF and CUE functions, machine START and STOP output commands and READY and AUDIO RESET (to OFF) control inputs are also provided (reference Section 2.8.2).

A six station internal DIP switch (S11) enables the ready lamp and timer reset functions of the module, as well as assigning the A or B input to the Telco Mix System (when the input is coming from a telephone hybrid). An additional DIP switch (S8) assigns a Telco Mix System input to either Telco Mix Bus #1 or #2 (reference Section 2.9.2). For a more complete description of Telco Mix System operation, see Section 3.4.

For circuitry information, refer to the Stereo Line Input Module schematic and the PCA drawing located in Sections 7.5 and 7.6, respectively.

4.4 STEREO LINE OUTPUT AMPLIFIER

The Stereo Line Output Amplifier contains the mixing and distribution amplifiers for both console

PROGRAM outputs, as well as the buffer amplifiers for the PROGRAM 1 and PROGRAM 2 VU meters. The module supplies four active balanced distribution outputs, one Main and one Auxiliary, for each PROGRAM bus, with each output capable of supplying up to +26 dBm.

Front panel PROGRAM 1 and PROGRAM 2 GAIN controls have sufficient range to adjust output amplifiers for +4 dBm or +8 dBm operating levels. There are also front panel gain trim controls for adjusting console VU meter levels.

For circuitry information, refer to the Stereo Line Output Amplifier schematic and the PCA drawing located in Sections 7.7 and 7.8, respectively.

4.5 TELCO MIX/MONAURAL OUTPUT MODULE

The Telco Mix/Monaural Output Module consists of two independent sets of circuitry. The Monaural Output section supplies four summed PROGRAM 1 or PROGRAM 2 monaural outputs, as determined by the front panel PROGRAM SELECT buttons. Each active balanced output is capable of supplying up to +26 dBm, and the front panel GAIN TRIM control has sufficient range to adjust output amplifiers for +4 dBm or +8 dBm operating levels.

The Telco Mix section sums caller and selected input module signals and produces six unique outputs: To Caller 1; To Caller 2; To Tape - Mixed; To Tape - Callers; and Telco Monitor, Fixed and Variable. The To Tape and Telco Monitor outputs are versatile, and are described in detail in Section 2.7.4. In addition, there are two To Tape Monitor outputs, which are identical to the To Tape outputs and allow for the connection of an additional tape machine, monitor system, etc.

The To Caller 1 and To Caller 2 outputs are routed to the telephone hybrids, and may consist of either the PROGRAM 1 or OFF LINE MIX signals , plus any caller except the caller himself (i.e., mix-minus).

The Telco Mix section is also equipped with a logic function which allows the system to toggle between on-air (PGM 1) and off-air (OFF LINE MIX) modes of operation, as determined by the ON/OFF status of the Stereo Line Input Modules assigned as Telco hybrid inputs (reference Section 2.8.3). The PGM 1 and OFF LINE MIX operating modes can best be understood by reviewing the Telco System Operation description contained in Section 3.4.

For circuitry information, refer to the Telco Mix/Monaural Output Module schematic and the PCA drawing located in Sections 7.9 and 7.10, respectively.

4.6 CONTROL ROOM MONITOR MODULE

The Control Room Monitor Module allows for the monitoring of PROGRAM 1, PROGRAM 2, or up to six external sources, as determined by the monitor selector. The module is also equipped with level controls for both TALKBACK and CUE. The TALKBACK level control adjusts the level of Talkback communication received via the console CUE speaker only. Headphone Talkback levels are adjusted by the front panel HEADPHONE control.

The headphone AUTO CUE button enables the Automatic Cue switching system for the console operator's headphones. The Automatic Cue mode is then engaged whenever a module CUE button is pressed, switching the console operator's headphones from stereo monitor to one of two modes - monitor in the left headphone and CUE in the right, or CUE in both headphones, as determined by a module internal option switch (reference Section 2.9.4).

The MONITOR MODE switch selects the monitor and headphone modes of the module. When both the L and R switches are released, the mode is stereo; when the L is depressed, the left source signal is sent to both channels; when the R is depressed, the right source signal is sent to both channels; and when both buttons are depressed, a monaural sum of the left and right source signals is sent to both channels. The MONITOR level control adjusts the volume of the Control Room monitors.

For circuitry information, refer to the Control Room Monitor Module schematic and PCA drawing located in Sections 7.11 and 7.12, respectively.

4.7 STUDIO MONITOR MODULE

The Studio Monitor Module was designed for applications where a separate voice booth or Studio is required, and provides for the monitoring of PROGRAM 1, PROGRAM 2, or up to six external sources, as determined by the monitor selector. It also provides Talkback facilities, allowing the Control Room to talk to the Studio by means of the built-in electret microphone.

Pressing the module TALKBACK button activates the Talkback microphone and dims the Studio monitors. Talkback microphone gain is adjusted by the front panel GAIN TRIM control.

When the Main Studio Monitor Output is selected as variable by the module internal option switch (reference Section 2.9.5), the MONITOR level control adjusts the volume of the Studio monitors.

For circuitry information, refer to the Studio Monitor Module schematic and PCA drawing located in Sections 7.13 and 7.14, respectively.

4.8 REMOTE LINE SELECTOR

The dual Remote Line Selector provides for selection of up to eight stereo input signals switched to two outputs. Typical applications include use as a line pre-selector ahead of an input or monitor module. The output of the selector is routed to a rear panel connector for user connection to the appropriate line or monitor input position.

The module consists of two eight-station stereo selector switches fed from eight common stereo remote inputs. The switch used is equipped with a mechanical lockout mechanism to prevent pushing two or more buttons simultaneously.

For circuitry information, refer to the Remote Line Selector schematic located in Section 7.15.

4.9 TIMER CONTROL PANEL

The Timer Control Panel is mounted in the far right position of the console mainframe, and controls the reset, hold, start and stop functions of the console timer. There is also an AUTO RESET function, which allows the timer reset function to be controlled by the console timer reset bus. When this function is engaged, the button LED will be illuminated, and the timer will reset whenever a Stereo Line Input Module with the timer reset function enabled (reference Section 2.9.2) is turned ON.

For circuitry information, refer to the Timer Control Panel schematic located in Section 7.16.

4.10 POWER SUPPLY ASSEMBLY

The regulated power supply is installed in the rack in the console support cabinetry. The supply uses three integrated circuits and plug-in, adjustable regulators to provide the required bi-polar audio and mono-polar logic supply voltages.

The power supply assembly provides the power for all audio and logic circuits in the Radiomixer. The design employs a straightforward regulator design. The logic, audio and phantom power supplies are protected against AC mains faults by a magnetic circuit breaker. This circuit breakers also function as the main power switch for the supply. The power supply is protected against load faults by power and current limiting internal to the IC regulators.

For circuitry information, refer to the schematic located in Section 7.19.

Note: Power supplies manufactured prior to 1991 employed individual circuit breakers for Audio, Logic, and Phantom. These supplies did not use a toroidal transformer, but contained several "E" core transformers for audio and logic. The schematic for the older supply is located in Section 7.19.

4.11 CLOCK/TIMER ASSEMBLY

The clock/timer assembly used in the Radiomixer uses a microprocessor and some very flexible software to control clock and timer functions. There is a DIPswitch which can be set to blank the "tenths" display on the timer and another DIPswitch which will allow the clock to be configured as an ESE slave or a stand-alone clock. If the clock is in the ESE slave mode and the ESE master fails for any reason, the microprocessor keeps time by automatically switching to its free running clock and flashes an LED on the display to indicate the failure. The internal clock is accurate to within 3 seconds per month due to the use of a crystal oven to stabilize the crystal frequency.

For circuitry information, refer to the Clock/Timer schematic located in Section 7.17.

Note: Clock/Timer boards manufactured prior to January, 1991 did not contain the microprocessor or the ability to slave to ESE timecode. The schematic for the older clock/timer is located in Section 7.17.

5.0 OPTIONS AND MODIFICATIONS

This chapter describes available Radiomixer options and modifications. Included are sections describing phantom microphone powering and +4 dBu to +8 dBu conversion.

5.1 PHANTOM MICROPHONE POWERING

The Radiomixer is equipped with a +48 volt "phantom" power supply for the powering of condenser microphones connected to the Microphone Input Modules. All necessary modifications to the Microphone Input Modules have been accomplished at the factory (see note below), so condenser microphones may be connected just like any other microphone.

NOTE: For "phantom" powering of microphones connected to either the A or B input, a jumper wire has been installed between points E4 and E5 on the Microphone Input Module PC assembly (reference the schematic located in Section 7.3).

5.2 OUTPUT LEVEL CONVERSION (+4 dBu to +8 dBu)

All consoles are set for a +4 dBu output level at the time of factory test, unless a +8 dBu level is specified at the time of order. In order to convert a +4 dBu console operating level to +8 dBu, it will first be necessary to modify the Control Room and Studio Monitor, and the Telco Mix/Monaural Output Module PCAs as follows:

1. On the Control Room Monitor Module PCA, install 26.7K ohm, 1% resistors (PR&E #1-2672; provided in the spare parts kit) at R42 and R52.

2. On the Studio Monitor Module PCA, install 26.7K ohm, 1% resistors (PR&E #1-2672; provided in the spare parts kit) at R8 and R20.

3. On the Telco Mix/Monaural Output Module PCA, remove 68.1K ohm, 1% resistors R5 and R26.

Once these changes have been made, align the console to the +8 dBu operating level in accordance with the following procedures:

OUTPUT AMPLIFIERS

Apply a 1 kHz test signal at -10 dBu (600 ohm source) to the Patch Return of a Stereo Line Input Module. Turn the input module ON and set the fader at the 10 dB reference level. Adjust PROGRAM 1 and PROGRAM 2 left and right output amplifier GAIN TRIM controls for a +8 dBu output into 40K ohm bridging load. Adjust left and right VU meter GAIN TRIM controls for a 0 VU meter reading.

MICROPHONE INPUT MODULES

Apply a 1 kHz test signal at -50 dBu (150 ohm source) to the module input. Set the fader at the -10 dB reference mark. Adjust module GAIN TRIM controls for a +8 dBu console output into a 40K ohm bridging load.

LINE INPUT MODULES

Apply a 1 kHz test signal at +8 dBu (600 ohm source) to both the left and right module inputs. Set the fader at the -10 dB reference mark. Adjust module GAIN TRIM controls for a +8 dBu console output into a 40K ohm bridging load.

TELCO INPUT/MONAURAL OUTPUT MODULE

Apply a 1 kHz test signal at -10 dBu (600 ohm source) to the Patch Return of a Stereo Line Input Module. Turn the input module ON and set the fader at the 10 dB reference level. Select PROGRAM 1 as the MONO OUTPUT source. Adjust the GAIN TRIM control for a +8 dBu monaural output into a 40K ohm bridging load.

6.0 MAINTENANCE AND ALIGNMENT

This chapter contains sections describing routine maintenance, troubleshooting, level alignment, the installation and servicing tool kit, the spare parts kit, and replacement parts for the Radiomixer.

6.1 ROUTINE MAINTENANCE

Routine maintenance is usually limited to checking button switches for proper operation and keeping panel surfaces clean. The panel surfaces are finished with a baked polyurethane paint and may be cleaned with a weak solution of dishwashing detergent. The procedures for checking power supply voltages, lamp replacement, button replacement, and collet knob removal are described below.

NOTE: The Penny & Giles faders used in Radiomixer input modules (PR&E #24-136) are not field serviceable.

6.1.1 Checking Power Supply Voltages

The Radiomixer power supply is designed to provide very low noise power to the console. Each output should be within 0.5 volts of its specified DC voltage. The outputs should also be checked periodically for ripple and noise using a sensitive AC voltmeter. The reading should be less than 350 microvolts RMS.

6.1.2 Lamp Replacement

NOTE: When replacing a lamp, replace it with an identical type. Do not substitute lamps of different voltage or current ratings.

Meter lamp replacement is accomplished by squeezing the mounting ears on the lamp socket to remove the socket from the rear of the lamp bracket assembly. Replace the wedge based lamp with PR&E #12–22, and re-install the socket in the lamp bracket assembly.

Module ON, OFF and TALKBACK lenses are removed by hand by lifting them straight up out of the switch housing, and are unique in that they unseat and withdraw the lamp with them. Install the wedge based replacement lamp (PR&E #12-20) into the socket in the switch housing, and re-install the lens.

Remote control panel switches are EAO series 31, and the procedure for lamp replacement is as follows:

1. Remove the lens by using the tong-shaped EAO Lens Removal Tool (PR&E #70-40) to grasp the top and bottom of the lens and pull it straight out of the button housing.

   NOTE: Failure to use this tool will probably result in damage to the lens' molded retaining notches.

2. Remove the defective lamp using the rubber EAO Lamp Removal Tool (PR&E #70-41).

3. Install the replacement 14 volt, .08 amp lamp (PR&E #12-51) into the switch, and carefully snap the lens back into the body of the switch.

6.1.3 Button Replacement

The square "winkeye" button caps can be removed by applying even pressure to the back of the cap to dislodge it from the switch shaft. This can be accomplished using a two-prong device, such as a needlenose pliers. It may take considerable force to remove the button, so exercise caution. Carefully snap the replacement button onto the switch shaft.

6.1.4 Collet Knob Removal

The knobs used for the module's rotary controls are attached to the pot and switch shafts with collets instead of set screws. The machined brass collets provide the advantages of true alignment and concentricity with the axis of rotation, no set screws to score the shaft , the ability to clutch slip when excessive force is applied, and no holes in the side of the knob for the set screws. To remove a collet knob, carefully pry off the top cap of the knob using a thin blade or similar tool, then use the appropriate end of PR&E tool #70-44 to loosen the nut on the collet (as shown in Figure 6.1).

Once the nut is loosened, the collet should release from the shaft. This nut should not need to be removed unless the collet refuses to release.

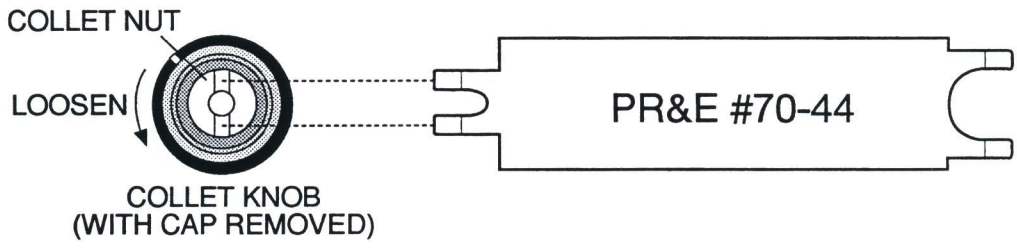


FIGURE 6.1 COLLET KNOB REMOVAL

6.2 TROUBLESHOOTING (MODULE REMOVAL)

The modular construction of the console greatly enhances troubleshooting, since module substitution will usually isolate any problem.

NOTE: An important feature when troubleshooting the Radiomixer is that modules may be removed or inserted with power applied to the console.

To remove a module from the mainframe, remove the black button head retaining screws from the top and bottom of the module, and the silver button head screws from the module face. Screw the Module Pull/Extractor Tools (PR&E #70-43) into the holes vacated by the silver button head screws, and then use both hands to extract the module from the mainframe.

NOTE: The Stereo Line Input and Microphone Input Modules have only one button head screw in the module face, and require that only one tool be used for extraction.

Once the module at fault has been identified, it is recommended that the schematic and PCA drawing for the module in question be referred to when troubleshooting that module. Use the appropriate optional extender board (PR&E #99-766 for input modules; PR&E #99-767 for the telco and output amplifier modules; and PR&E #99-768 for the line selector and monitor modules) or standard bench service techniques to isolate the problem.

NOTE: Most of the analog and logic components are socketed for ease of replacement.

WARNING: The CMOS logic devices are susceptible to destruction from static discharge while being handled. It is recommended that considerable caution be exercised when working with these parts.

6.3 LEVEL ALIGNMENT

All consoles are set for a +4 dBm output level unless another nominal output level is specifically requested. It is very important that the test levels are maintained exactly as specified to avoid a build-up of tolerance errors. The GAIN TRIM controls on the output amplifiers should not require trimming unless components which affect amplifier gain have been replaced.

Always set the mixing fader at the -10 dB reference mark before adjusting input module GAIN TRIM controls. This will ensure that the optimum gain structure (i.e. dynamic range, headroom and signal to noise ratio) is maintained. Input module GAIN TRIM controls should always be adjusted so that the input accommodates the signal level of the source equipment.

Radiomixer modules were level aligned at the time of factory test using the following procedures:

OUTPUT AMPLIFIERS

Apply a 1 kHz test signal at -10 dBu (600 ohm source) to the Patch Return of a Stereo Line Input Module. Turn the input module ON and set the fader at the 10 dB reference level. Adjust PROGRAM 1 and PROGRAM 2 left and right output amplifier GAIN TRIM controls for a +4 dBu output into 40K ohm bridging load. Adjust left and right VU meter GAIN TRIM controls for a 0 VU meter reading.

MICROPHONE INPUT MODULES

Apply a 1 kHz test signal at -50 dBu (150 ohm source) to the module input. Set the fader at the -10 dB reference mark. Adjust module GAIN TRIM controls for a +4 dBu console output into a 40K ohm bridging load.

LINE INPUT MODULES

Apply a 1 kHz test signal at +4 dBu (600 ohm source) to both the left and right module inputs. Set the fader at the -10 dB reference mark. Adjust module GAIN TRIM controls for a +4 dBu console output into a 40K ohm bridging load.

TELCO INPUT/MONAURAL OUTPUT MODULE

Apply a 1 kHz test signal at -10 dBu (600 ohm source) to the Patch Return of a Stereo Line Input Module. Turn the input module ON and set the fader at the 10 dB reference level. Select PROGRAM 1 as the MONO OUTPUT source. Adjust the GAIN TRIM control for a +4 dBu monaural output into a 40K ohm bridging load.

TALKBACK LEVELS

The Studio Monitor Module Talkback microphone GAIN TRIM control is set for a level of 0 dBu at the Studio Monitor output using a voice speaking at a "normal" level. This level may be readjusted as required upon completion of the installation.

6.4 TOOL KIT

The following installation and servicing Tool Kit (PR&E #76-725) is provided with each console:

DESCRIPTION	PR&E#
MOLEX connector pin crimp tool	70-3
MOLEX connector pin extractor tool	70-4
EAO nut wrench for series 31 button switch	70-39
EAO lens removal tool for series 31 button switch	70-40
EAO lamp removal tool for series 31 button switch	70-41
PR&E module pull/extractor tool (2)	70-43
Wrench for collet knobs	70-44
Magnet assembly for setting clock	90-151

6.5 SPARE PARTS KIT

The following Spare Parts Kit (PR&E #76-723) is supplied with each console. This initial kit is excluded from the limited warranty, and is provided to support initial installation only.

DESCRIPTION	QTY	PR&E#
Diodes		
1N4001	2	11-7
1N914B	2	11-13
Zener, 5.6 V, 1N4734A	2	11-41
Zener, 8.2 V, 1N4738A	2	11-42
Integrated Circuits		
Dual D flip-flop, 4013	2	21-43
Hex Inverter, 4584	2	21-46
Op Amp, Dual, LF353	2	20-32
Op Amp, Dual, 8-pin, 5532	2	20-53
Op Amp, DIP, 5534	2	20-28

DESCRIPTION	QTY	PR&E#
Op Amp, Dual, 8-pin, RC4227	2	20-80
Quad, 2-input, Nor, 4001	2	21-61
Quad, 2-input, Nand, 4093	2	21-4
Voltage Controlled Attenuator, 1001	2	20-79
Opto-Isolator	3	29-4
Lamps		
14V, .08A, 658	4	12-20
14V, .08A, 73	4	12-22
14V, .08A, 386	2	12-51
Relay, DPDT, 12VDC, 30mA, Polarized	1	28-5
Resistors		
13.3K ohm, 1/4W, 1%	6	1-1332
26.7K ohm, 1/4W, 1%	6	1-2672
43.2K ohm, 1/4W, 1%	4	1-4322
68.1K ohm, 1/4W, 1%	4	1-6812
Transistors		
FET, J-175	2	9-7
NPN, PN2222 or 2N2222	2	7-25
PNP, MPS-A63	2	8-4
Voltage Regulators		
Variable, 100mA, POS TL317C	2	20-72
Variable, 1.5A, Pos., LM317T	1	20-49
Variable, LT1038	1	20-76

This kit should provide sufficient support spares for the initial operating period. It is recommended that this kit be replenished and kept on hand for service use.

In applications where any system "down-time" is unacceptable, it is recommended that the following modules be kept on hand as spares:

DESCRIPTION	PR&E#
Power Supply Assembly	99-892
Microphone Input Module	99-752
Stereo Line Input Module	99-753
Stereo Line Output Amplifier	99-755
Control Room Monitor Module	99-756

6.6 REPLACEMENT PARTS

The components used are, wherever possible, standard items of general availability. However, should difficulty be encountered locating any of the items, PR&E maintains a stock of replacement parts.

The power supply transformer, "winkeye" button switches, Penny & Giles faders, engraved button caps, and VU meters are all manufactured or modified to custom design specifications, and are, therefore, available only from PR&E.

Following is a partial list of parts and assemblies used in the Radiomixer and its associated modules, and the PR&E part number for easy reference:

DESCRIPTION	PR&E#
Blank Panels	
6-inch Length	80-1104
12-inch Length	80-1105
Button Cap, Rectangular, White	25-771
Button Caps, Illuminating	
Rectangular, Red, "ON"	25-2-1
Rectangular, White, "TALKBACK"	25-8-2
Rectangular, Yellow, "OFF"	25-5-1
Button Caps, Self-Indicating ("Winkeye")	
Square, Blk-Org	25-769
Square, Blk-Org, "1"	25-769-3
Square, Blk-Org, "2"	25-769-4
Square, Blk-Org, "L"	25-769-9
Square, Blk-Org, "R"	25-769-10
Square, Blk-Org, "T"	25-769-11
Capacitors	
Ceramic Disc, .001µF, 1,000V	62-1
Electrolytic, 10µF, 25V, NP	60-84
Electrolytic, 10µF, 100V	60-41
Electrolytic, 22µF, 16V	60-55
Electrolytic, 22µF, 25V	60-85
Electrolytic, 22µF, 25V, Axial	60-11
Electrolytic, 22µF, 63V, Low Leak	60-97
Electrolytic, 100µF, 16V, NP	60-82
Electrolytic, 100µF, 63V	60-53
Electrolytic, 470µF, 80V	60-40
Electrolytic, 1000µF, 50V	60-98
Electrolytic, 8700µF, 40V, Low Leak	60-38
Electrolytic, 20,000µF, 40V, Low Leak	60-39
Metallized Polyester, .1µF, 100V	63-7
Metallized Polyester, 2.2µF, 50V	63-24
Monolythic, .01µF, 50V	62-4
Monolythic, .1µF, 50V	62-5
Monolythic, 1µF, 50V	62-6
Tantalum, 1.5µF, 35V	65-3

DESCRIPTION	PR&E#
Tantalum, 10µF, 20V	65-6
Trimmer, 3-40pF	68-2
Circuit Breaker	
For Power Supply	30-37
Connector Kits	
12-input	76-724-1
20-input	76-724-2
Cue Speaker, 4-inch Square, 3 Watt, 45 Ohm	23-2
Diodes	
1N4001	11-7
1N4003	11-8
1N4004	11-17
1N914B	11-13
Zener, 5.6V, 1N4734A	11-41
Zener, 8.2V, 1N4738A	11-42
Zener, 51V, 1N4757A	11-21
Diode Bridge, 100V, 25A, MDA-2501	11-15
DIP Switches	
1 DPDT	26-11
1 SPDT	26-14
3 SPST	26-9
5 SPST	26-17
6 SPST	26-2
Displays	
7-segment, Green	12-65
7-segment, Yellow	12-54
Fader, Single Element, 10K, Linear Taper	24-136
Function Modules	
Instrumentation Input	95-123
Microphone Preamplifier	95-270
Output Amplifier	95-119
Heatsinks	
Single Device, Black Anodized	31-203
With Two Mating Positions	80-202-2
Insulators	
For TO-3	31-2
For TO-220AB	31-3
Integrated Circuits	
Bi-Cont., 12 Stages, 4060	21-2
Microcontroller, clock/timer, 12 hour version (Standard)	21-122-1
Microcontroller, clock/timer, 24 hour version (Export)	20-122-2
Dual D flip-flop, 4013	21-43
Hex Inverter, 4584	21-46
Photo Coupler, Dual	29-8
Op Amp, Dual, LF353	20-32

DESCRIPTION	PR&E#
Op Amp, Dual, 8-pin, 5532	20-53
Op Amp, DIP, 5534	20-28
OpAmp, Dual, 8-pin, RC4227	20-80
Quad, 2-input, Nor, 4001	21-61
Quad, 2-input, Nand, 4093	21-4
Quad, 2-input, Nand, MM74C00N	21-12
Switch, Digital, Hall Effect, 3019	21-44
Triple, 3-input, NAND, MM74C10N	21-16
Up/Down Cont., 6 Dec., MK50397-DIP	21-9
Voltage Controlled Attenuator, 1001	20-79
IC Sockets	
8-pin	16-108
14-pin	16-114
18-pin	16-118
16-pin	16-116
24-pin	16-124
40-pin	16-140
Knobs	
11 mm, Grey, With Black Base Indicator	90-327-1
21 mm, Grey	32-138
Knob Caps	
Black (for 11 mm knob)	32-121
Orange (for 11 mm knob)	32-127
Red (for 21 mm knob)	32-139
Lamps	
14V, .08A, 658	12-20
14V, .08A, 73	12-22
14V, .08A, 386	12-51
LED, Red, Diffused, 20mA	12-7
Meter Assembly	99-772
Microphone Assembly, 3-Pin Wafer	90-637
Modules	
Control Room Monitor	99-756
Microphone Input	99-752
Output Amplifier	99-755
Remote Line Selector	99-758
Stereo Line Input	99-753
Studio Monitor	99-757
Telco Mix/Monaural Output	99-754
Module Extender Boards	
Input Module	99-766
Control Room and Studio Monitor Modules	99-768
Telco Mix/Mono Output and Output Amplifier Modules	99-767
PC Assemblies	

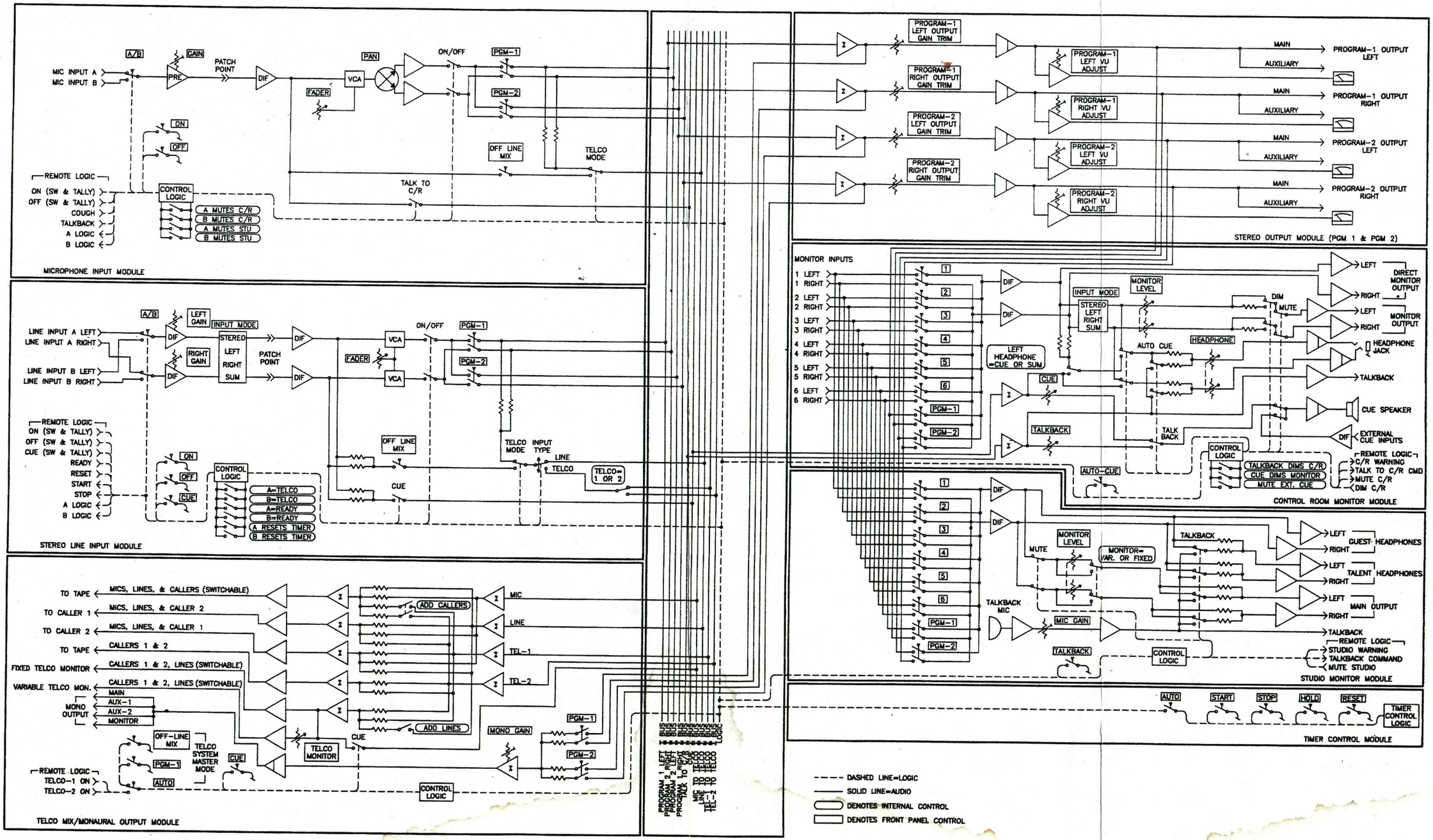
DESCRIPTION	PR&E#
Clock/Timer Display	95-895
Mother Board, Left, 12/20-input	95-762
Mother Board, Right, 12/20-input	95-763
Mother Board, Middle for 20/28-input	95-764
Potentiometers	
Single, 10K, CW Log	24-98
Single, 10K	24-111
Single, 10K, Linear	24-102
Dual, 10K, CW Log	24-101
Relay, DPDT, 12VDC, 30mA, Polarized	28-5
Resistor-Inductor Assembly, 40µH	90-91
Shield, Dual Capacitor	80-525
Spare Parts Kit	76-723
Switches	
1-station, Pushbutton, Momentary, SPST	25-102
1-station, Push-Push, 2PDT	25-757
1-station, Push-Push, 4PDT	25-775
1-station, Push-Push, 6DPT	25-801
8-station, 12.5 mm, 4PDT, Interlock	25-805
Maintained, Yellow Hi-Brite	25-807
Momentary, Non-Lighted	25-808
Momentary, Yellow Hi-Brite	25-806
Technical Manual	75-25
Tool Kit	76-725
Transformers	
Power for Audio Supply, 38V, 5.5A	48-1
Power for Logic Supply, 16V, 8A	48-2
Power for Microphone Supply, 88V, 120mA	48-7
Transistors	
FET, J-174	9-5
NPN, LM394H	10-2
NPN, MJE181	7-1
NPN, MPS-U45	7-7
NPN, PN3642-5	7-12
NPN, TIP112	7-23
NPN, MPSA06	
NPN, PN2222 or 2N2222	7-25
PNP, MJE171	8-1
PNP, MPS-A63	8-4
PNP, 2N3638A-5 or PN 3638A	8-8
Trimpots	
Multi-Turn, Cermet, 1K	24-135

DESCRIPTION	PR&E#
Multi-Turn, Cermet, 2K	24-137
Multi-Turn, Cermet, 10K	24-96
Multi-Turn, Cermet, 1,000K	24-138
Single-Turn, Cermet, 1K	24-51
Voltage Regulators	
Fixed, 12V, 5A, UA78H12ASC	20-31
Variable, 100mA, Positive, TL317C	20-72
Variable, 1.5A, Positive, LM317T	20-49
Variable, LT1038	20-76
VU Meter, Type R32F w/Rear Zero Adjust	46-12

7.0 DRAWINGS AND SCHEMATICS

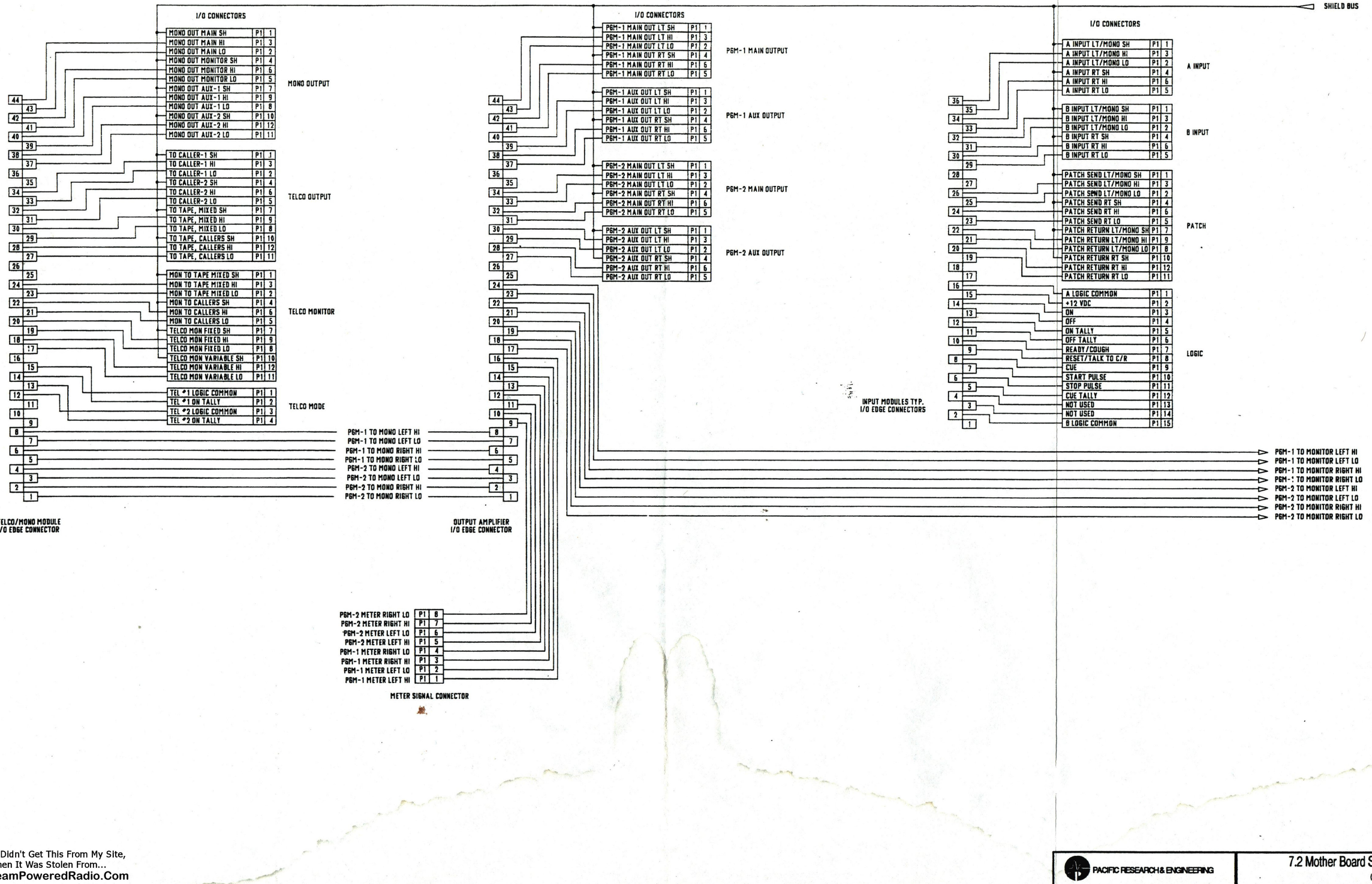
This chapter is made up of the following drawings and schematics:

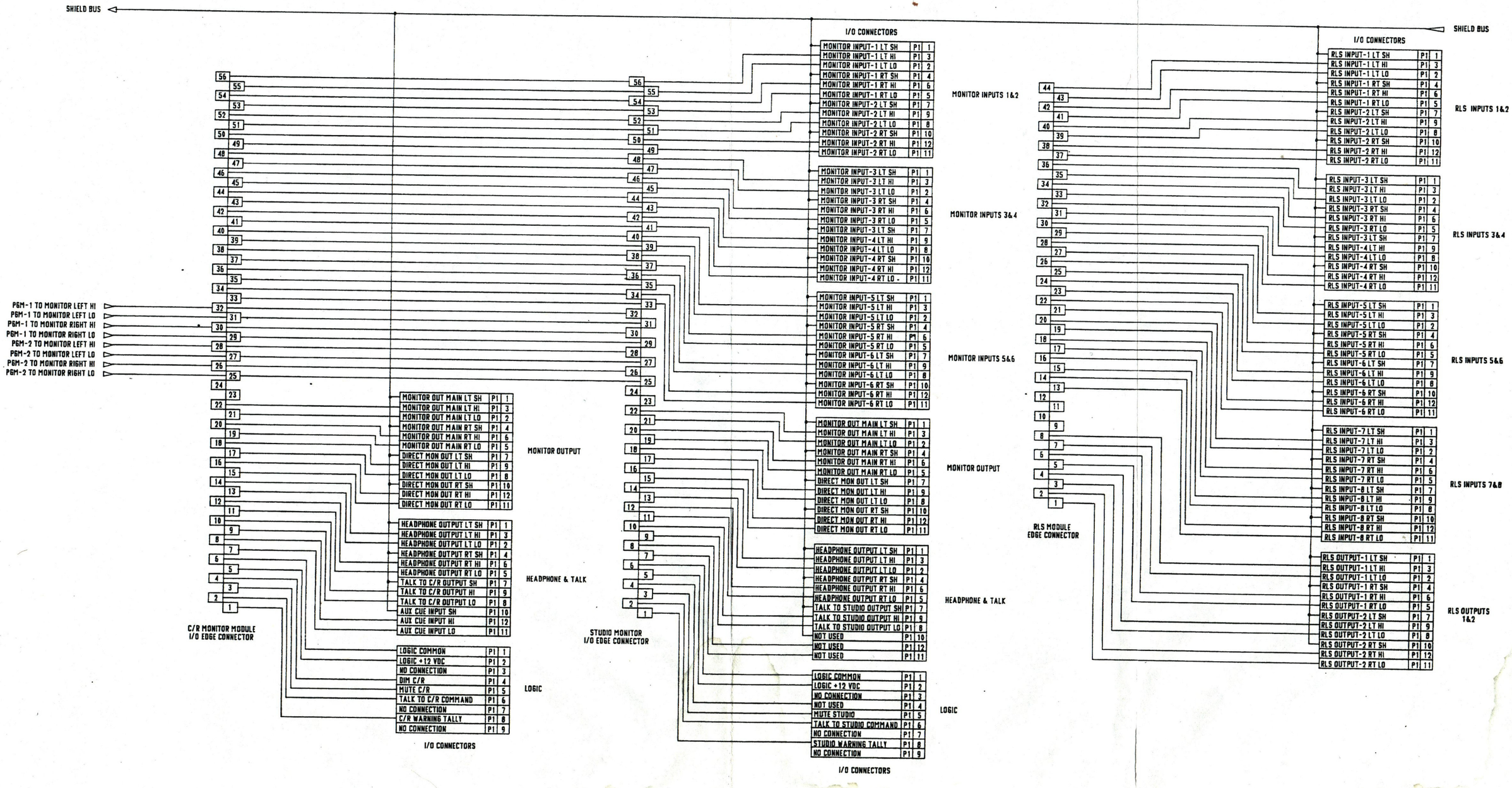
NOTE: On PR&E schematics, capacitor values are in microfarads (μF), unless otherwise specified, and resistors are 1/4 watt, 5%, unless otherwise specified.

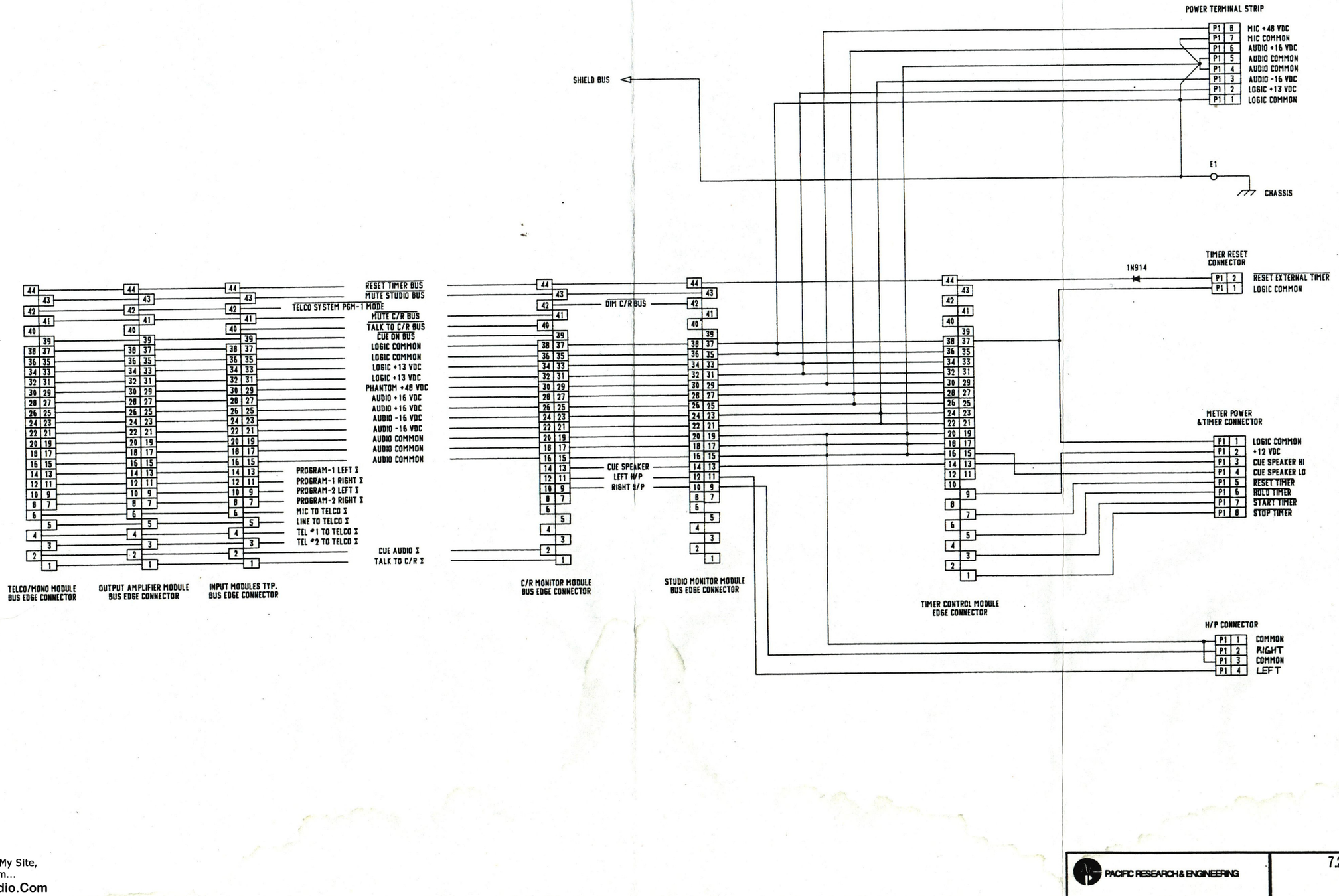


PACIFIC RESEARCH & ENGINEERING

7.1 Radiomixer Functional Block Diagram (83-750 B)

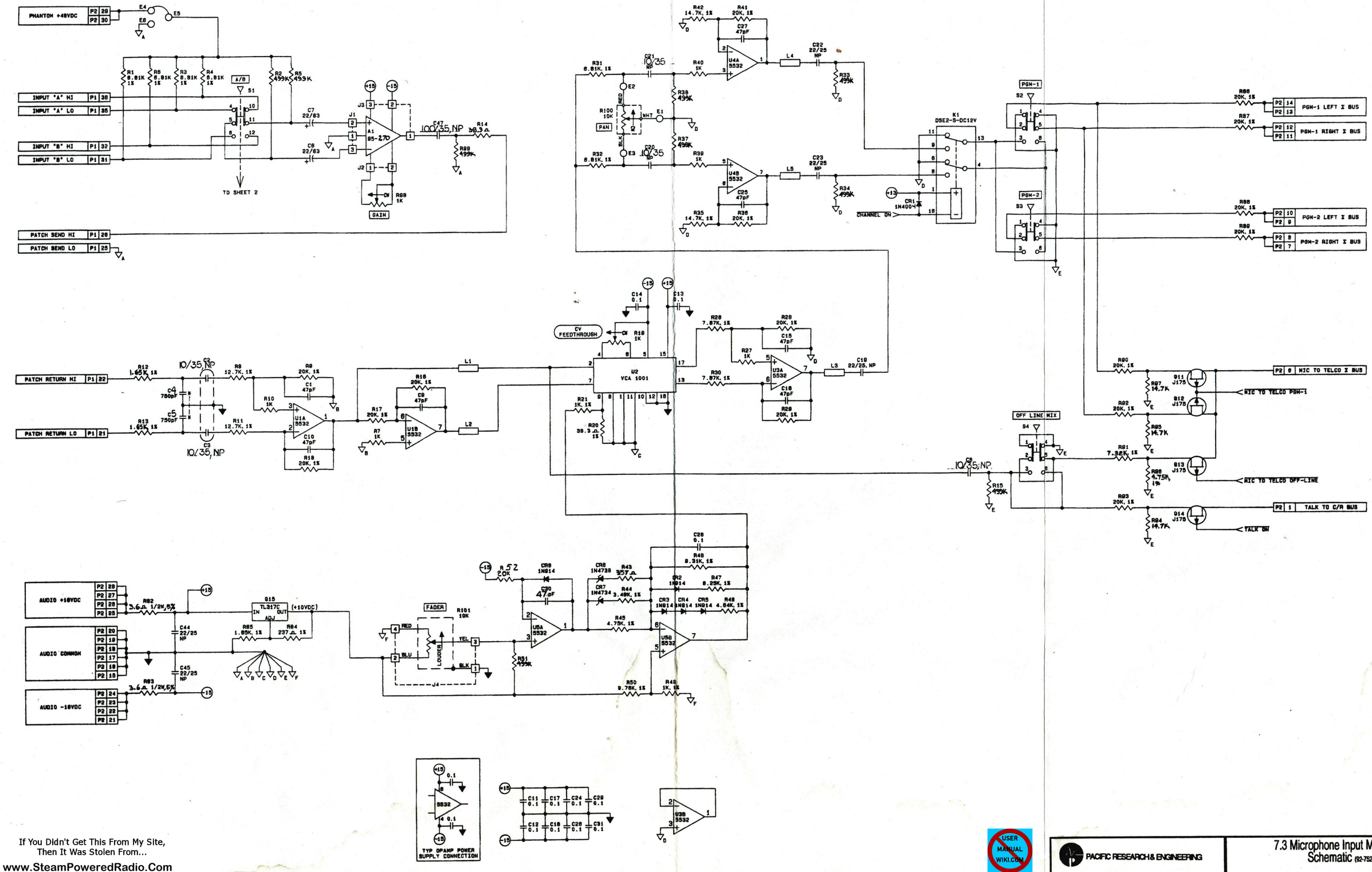






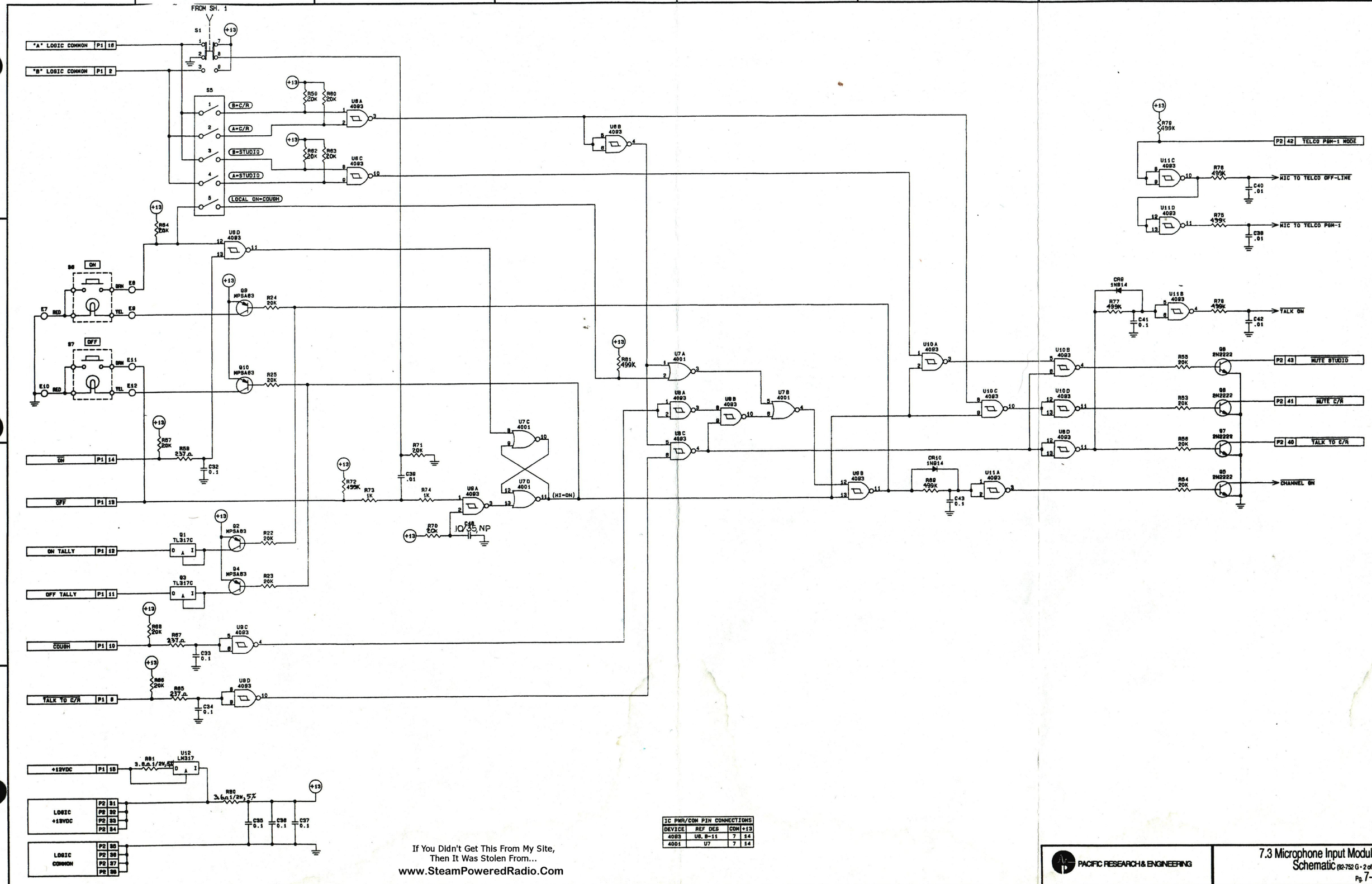
PACIFIC RESEARCH & ENGINEERING

7.2 Mother Board Schematic
(92-750 B • 3 of 3)

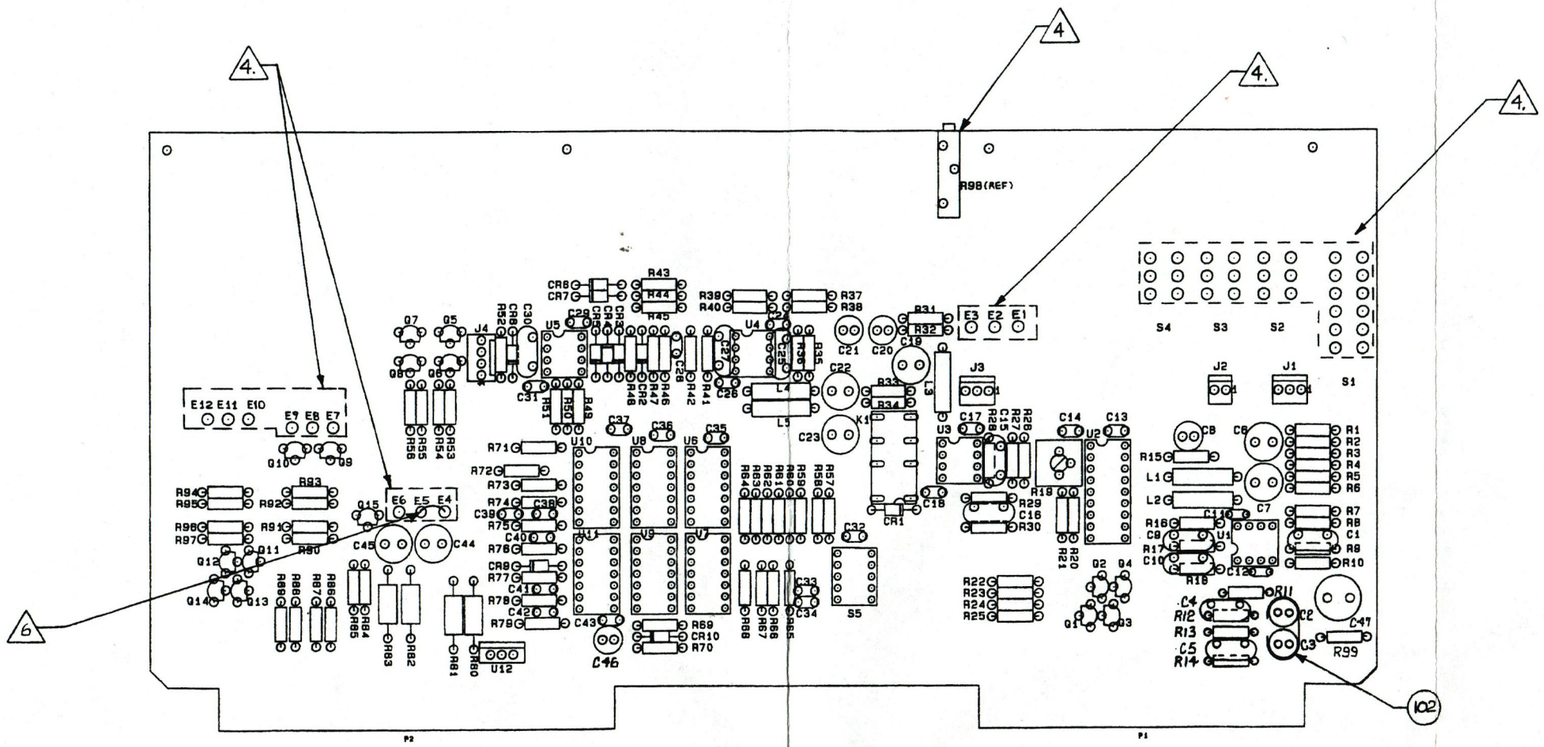


PACIFIC RESEARCH & ENGINEERING

7.3 Microphone Input Module Schematic (92-752 G • 1 of 2)



IC PWR/COM PIN CONNECTIONS			
DEVICE	REF DES	COM	+13
4093	U8, 9-11	7	14
4001	U7	7	14



6. INSTALL JUMPER FROM E4 TO E5 AS SHOWN.

5. DELETED NOTE

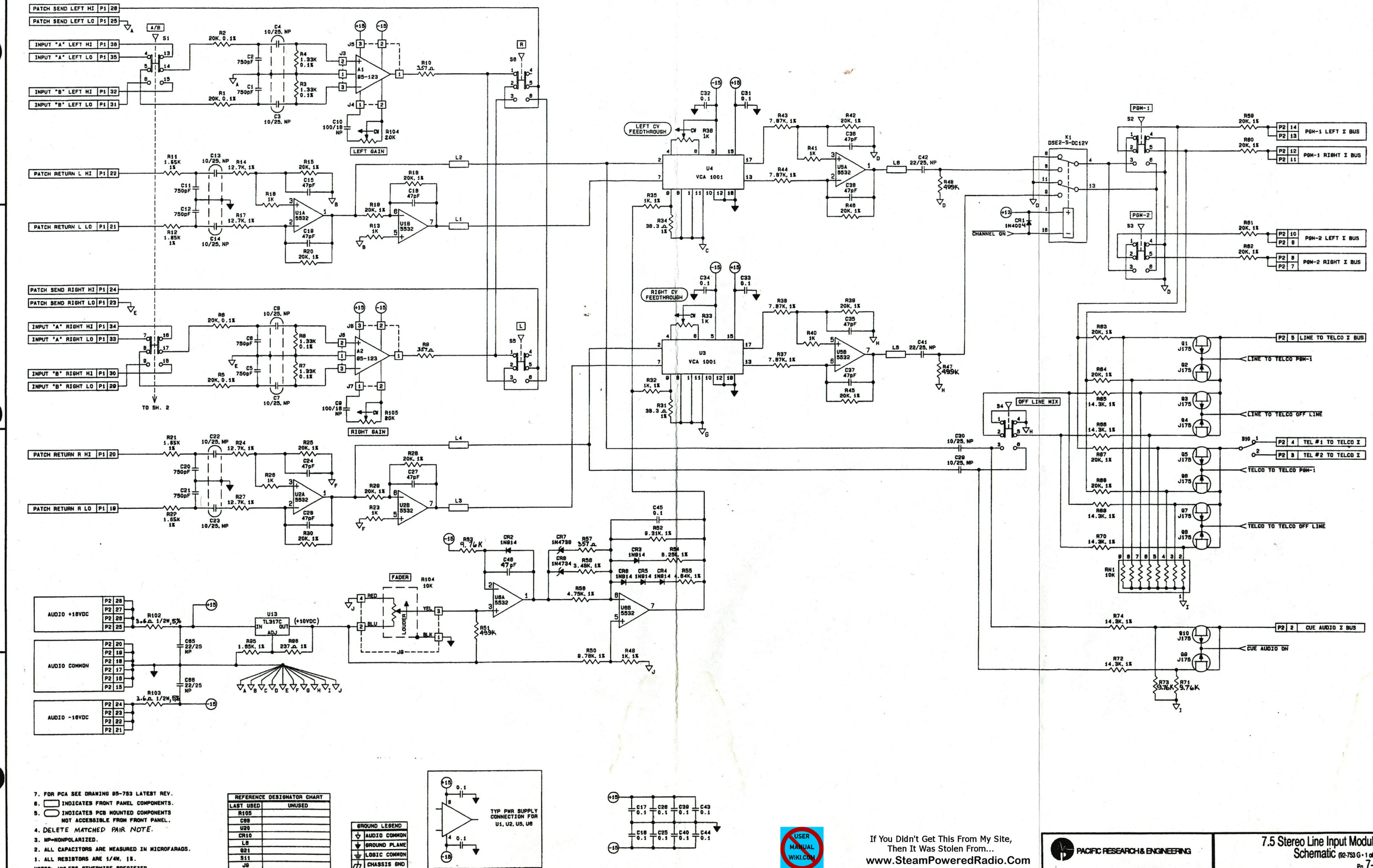
4. MASK ALL E-POINTS AND PADS FOR SWITCHES AND TRIMPOTS PRIOR TO SOLDERING PROCEDURE.

3. FOR SCHEMATIC DIAGRAM SEE DWG. 92-752

2. ○ INDICATES ITEMS LISTED ON THIS DRAWING.

1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.

NOTES: UNLESS OTHERWISE SPECIFIED.



7. FOR PCA SEE DRAWING 85-753 LATEST REV.
6. ▭ INDICATES FRONT PANEL COMPONENTS.
5. ⬭ INDICATES PCB MOUNTED COMPONENTS NOT ACCESSIBLE FROM FRONT PANEL.
4. DELETE MATCHED PAIR NOTE.
3. NP=NONPOLARIZED.
2. ALL CAPACITORS ARE MEASURED IN MICROFARADS.
1. ALL RESISTORS ARE 1/4W, 1%.

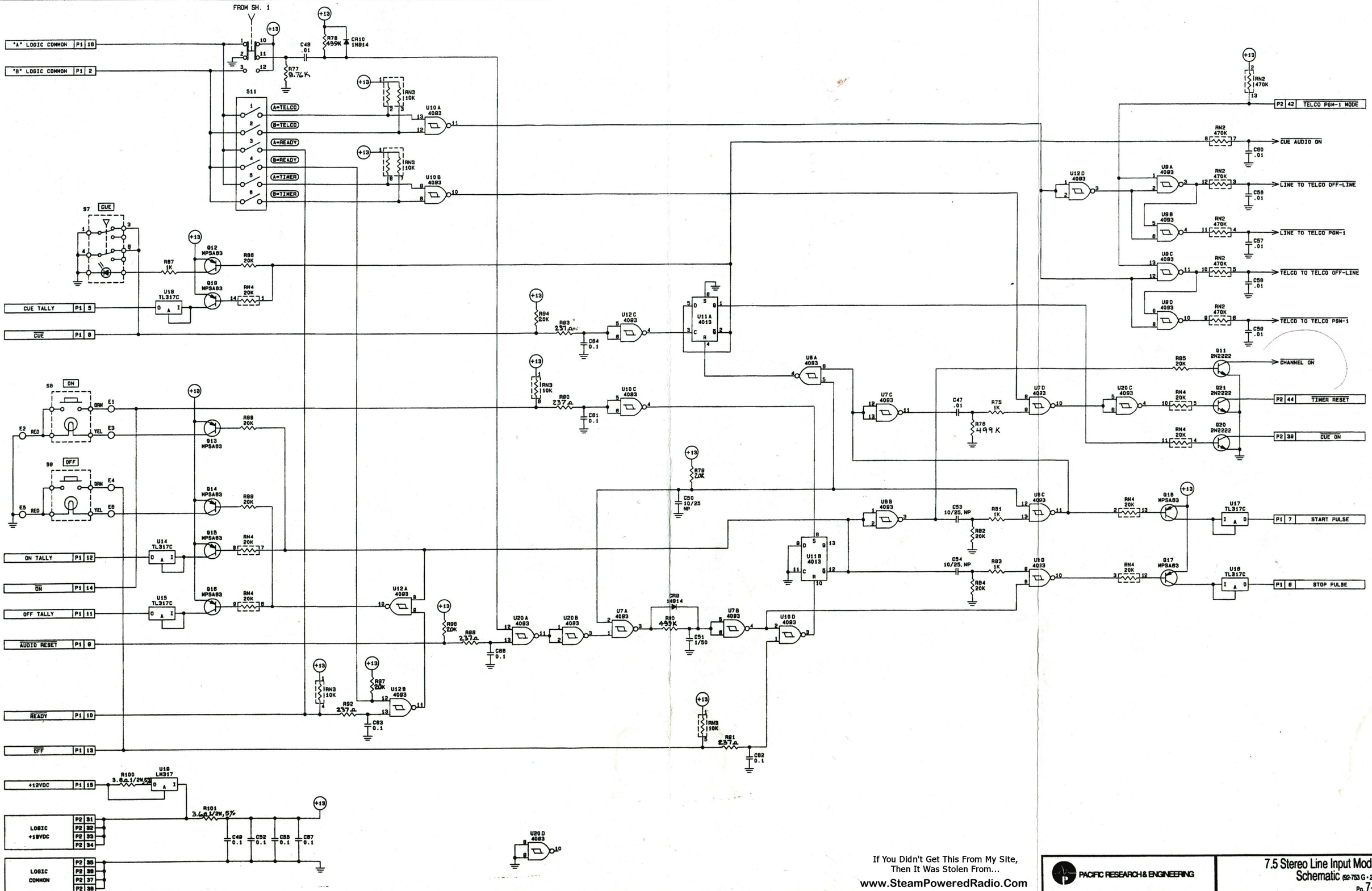
NOTES: UNLESS OTHERWISE SPECIFIED.

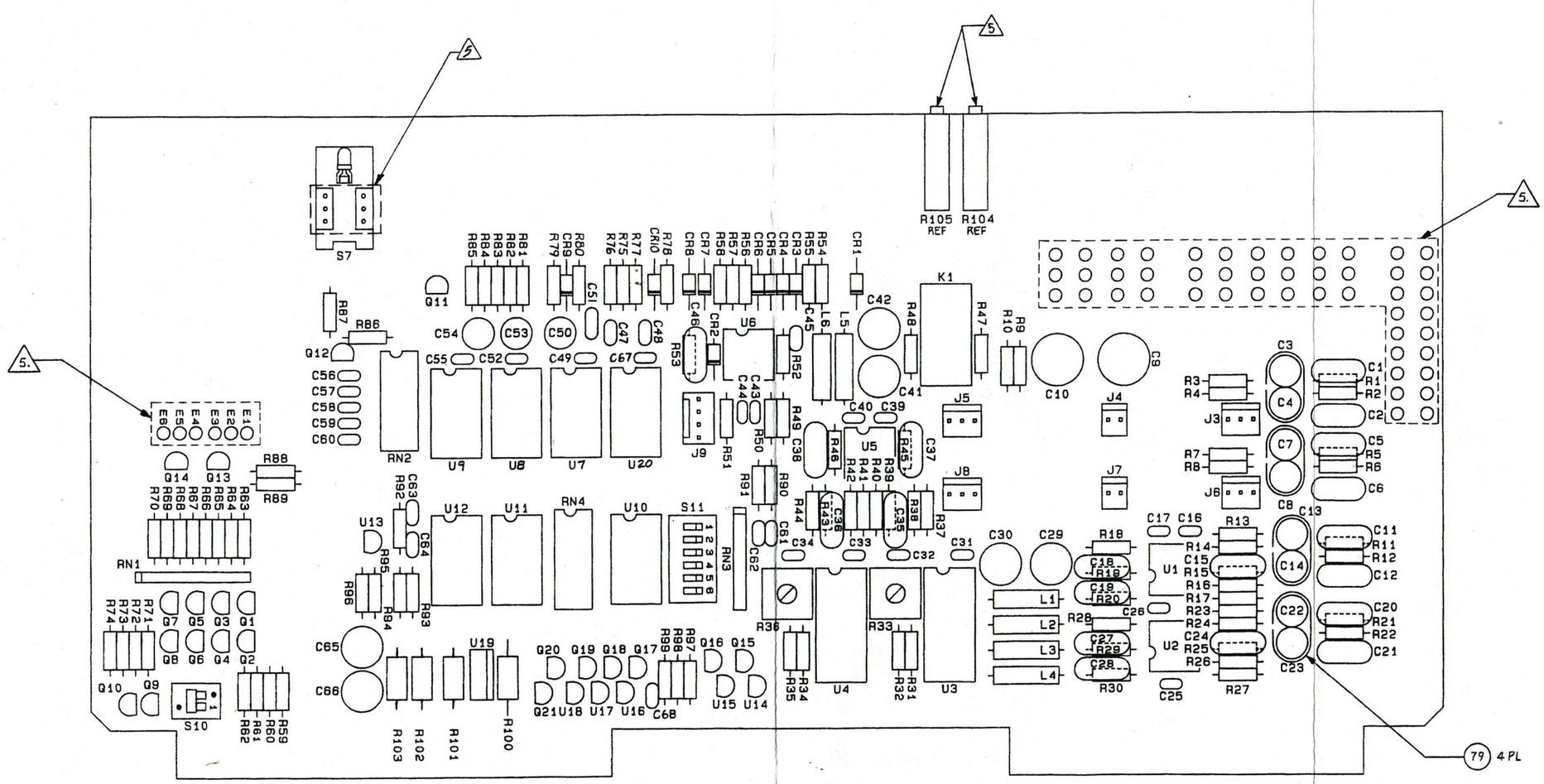
REFERENCE DESIGNATOR CHART	
LAST USED	UNUSED
R105	
C86	
U20	
CR10	
L6	
Q21	
S11	
J8	

GROUND LEGEND
AUDIO COMMON
GROUND PLANE
LOGIC COMMON
CHASSIS GND

PACIFIC RESEARCH & ENGINEERING

7.5 Stereo Line Input Module
Schematic (92-753 G • 1 of 2)





5. MASK INDICATED HOLES PRIOR TO WAVE SOLDERING.
4. FOR SCHEMATIC DIAGRAM SEE DWG. 82-753 LATEST REV.
3. DELETED NOTE
2. ○ INDICATES ITEMS LISTED ON THIS DRAWING.
1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.

NOTES: UNLESS OTHERWISE SPECIFIED.

PACIFIC RESEARCH & ENGINEERING

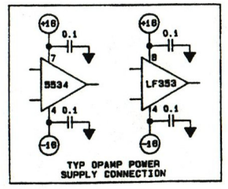
7.6 Stereo Line Input Module
PCA Drawing (85-753 N)

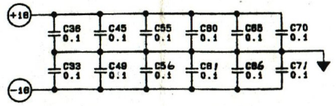
7. FOR PCA SEE DRAWING 85-755 LATEST REV.
6. ▭ INDICATES FRONT PANEL COMPONENTS.
5. ⬭ INDICATES PCB MOUNTED COMPONENTS NOT ACCESSIBLE FROM FRONT PANEL.
4. #---# INDICATES MATCHED PAIR.
3. NP=NONPOLARIZED.
2. ALL CAPACITORS ARE MEASURED IN MICROFARADS.
1. ALL RESISTORS ARE 1/4W, 1%.

NOTES: UNLESS OTHERWISE SPECIFIED.

REFERENCE DESIGNATOR CHART	
LAST USED	UNUSED
R88	
C62	
U8	
DS8	
L10	
J16	
A8	

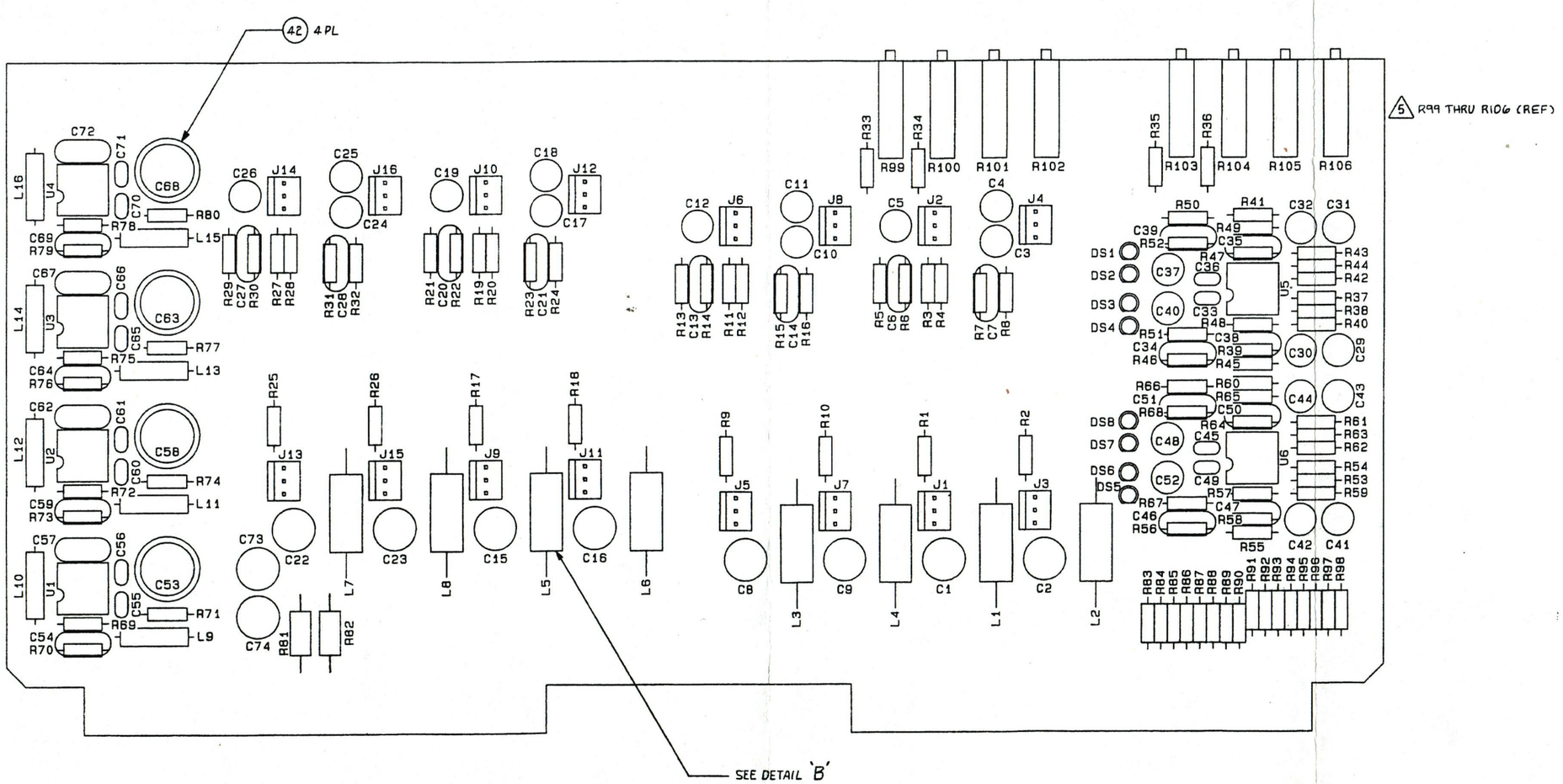
GROUND LEGEND
AUDIO COMMON
GROUND PLANE
LOGIC COMMON
CHASSIS GND

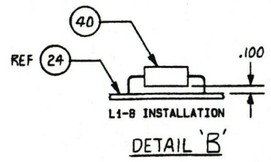




PACIFIC RESEARCH & ENGINEERING

7.7 Stereo Line Output Amplifier Schematic (92-755 E)



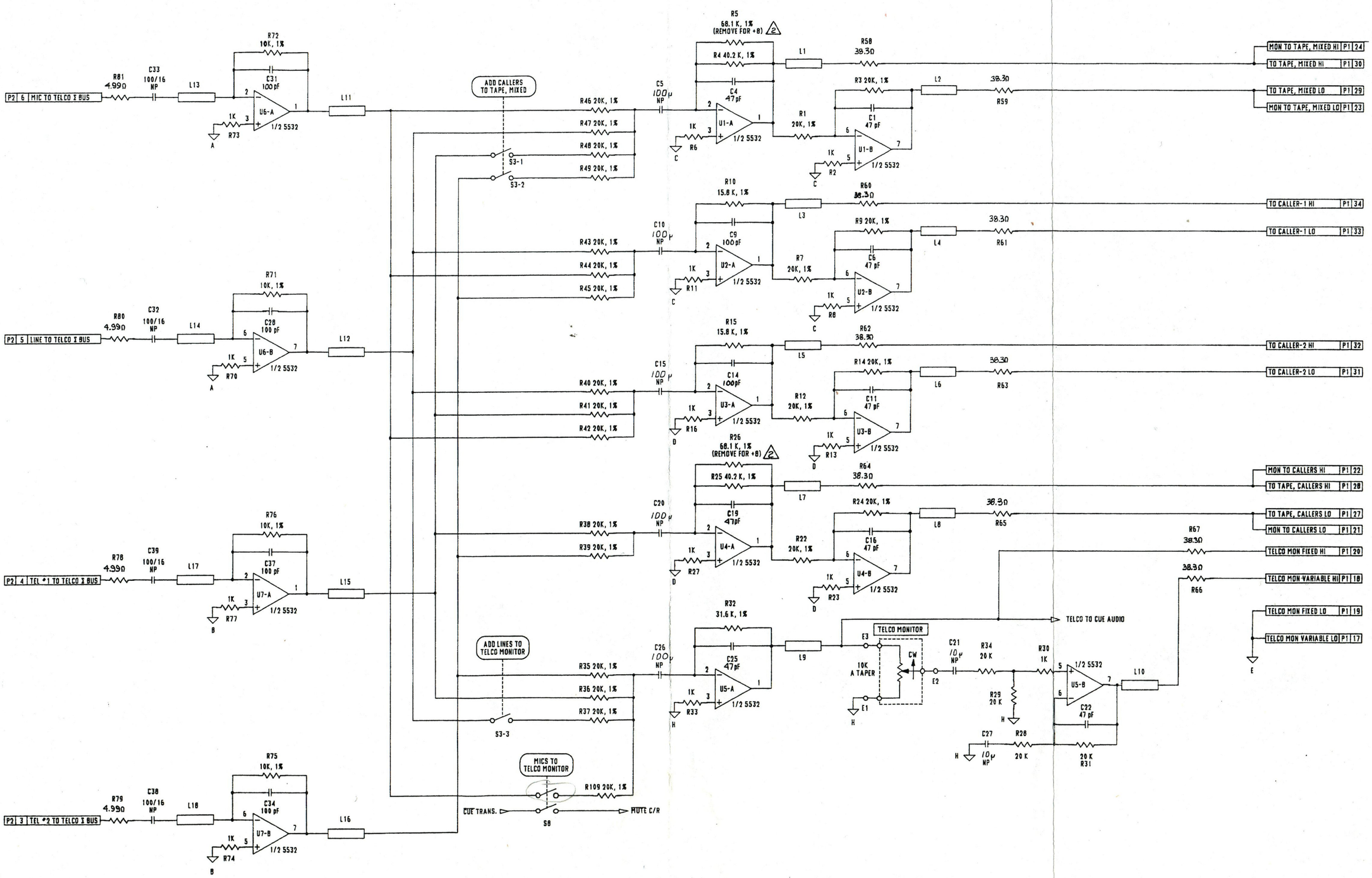


DETAIL 'B'

5 MASK INDICATED HOLES PRIOR TO WAVE SOLDERING.
4. FOR SCHEMATIC DIAGRAM SEE DWG. 92-755 LATEST REV.
3. ⊟—⊟ INDICATES MATCHED PAIRS.
2. ○ INDICATES ITEMS LISTED ON THIS DRAWING.
1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.
NOTES: UNLESS OTHERWISE SPECIFIED.

PACIFIC RESEARCH & ENGINEERING

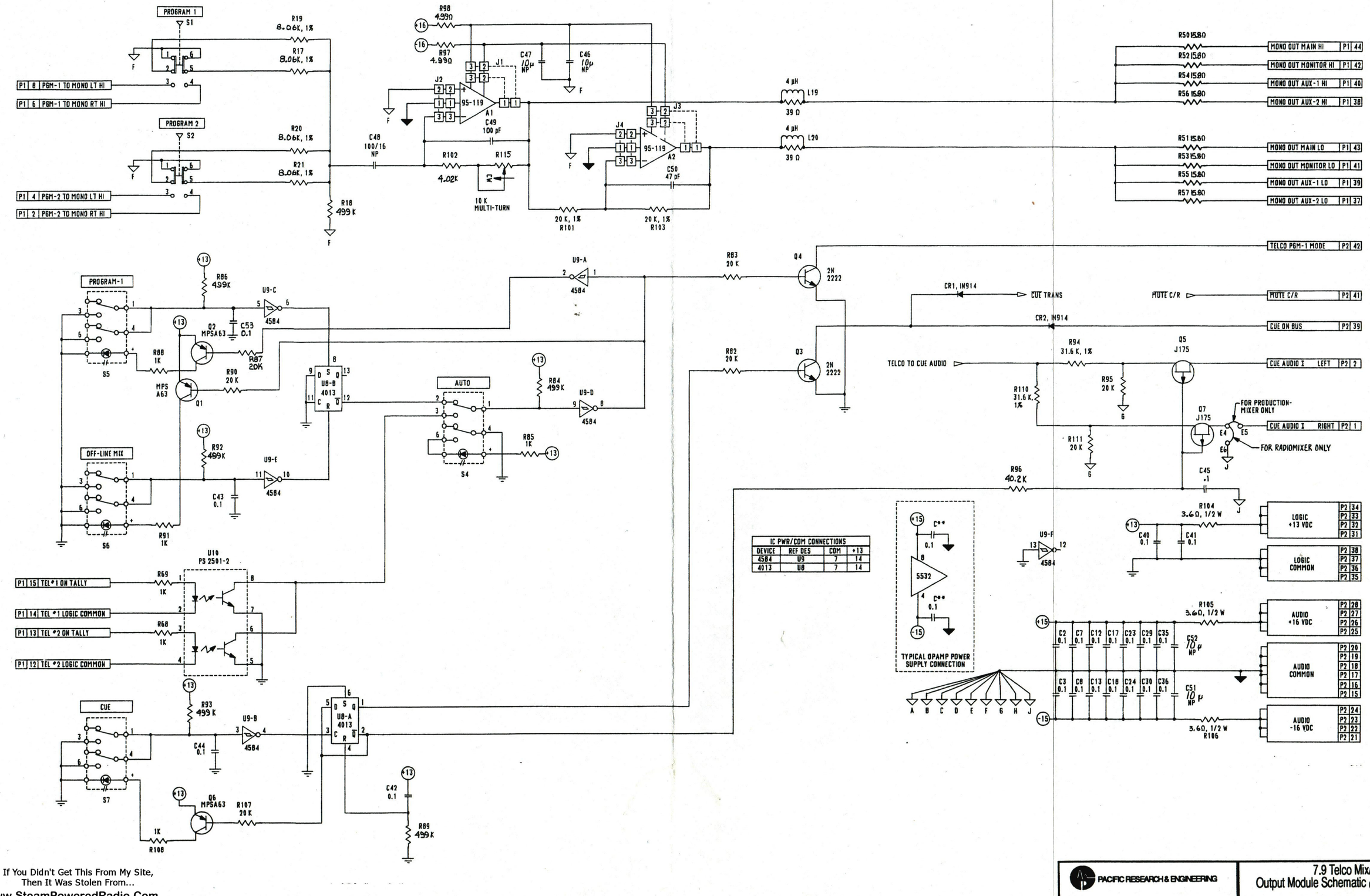
7.8 Stereo Line Output Amplifier
PCA Drawing (95-755 J)

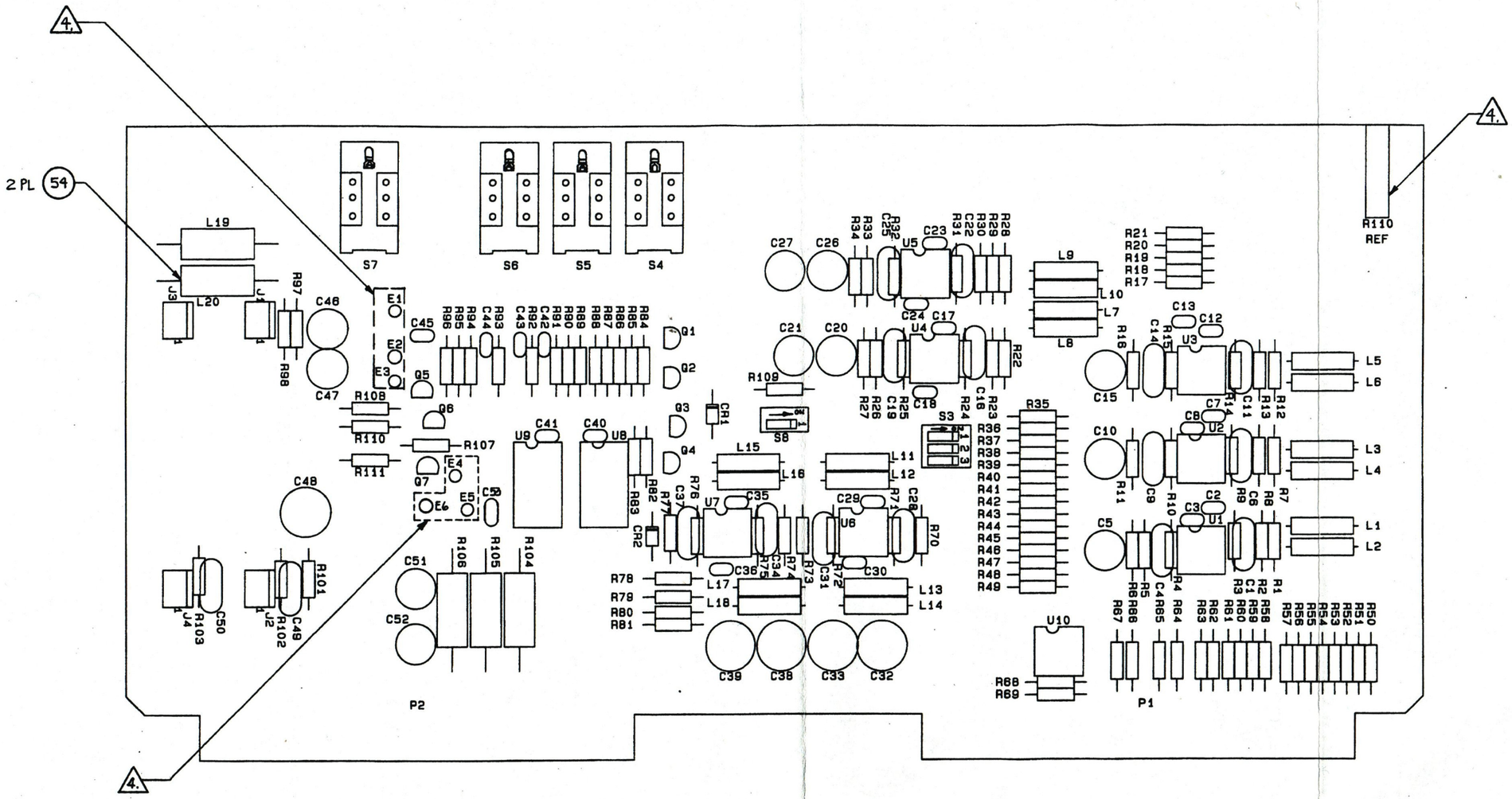


2 CHANGE R5,26 FROM 68.1K TO 26.7K FOR +0dBu

1. ALL RESISTORS ARE ¼W 1%.

NOTES: UNLESS OTHERWISE SPECIFIED

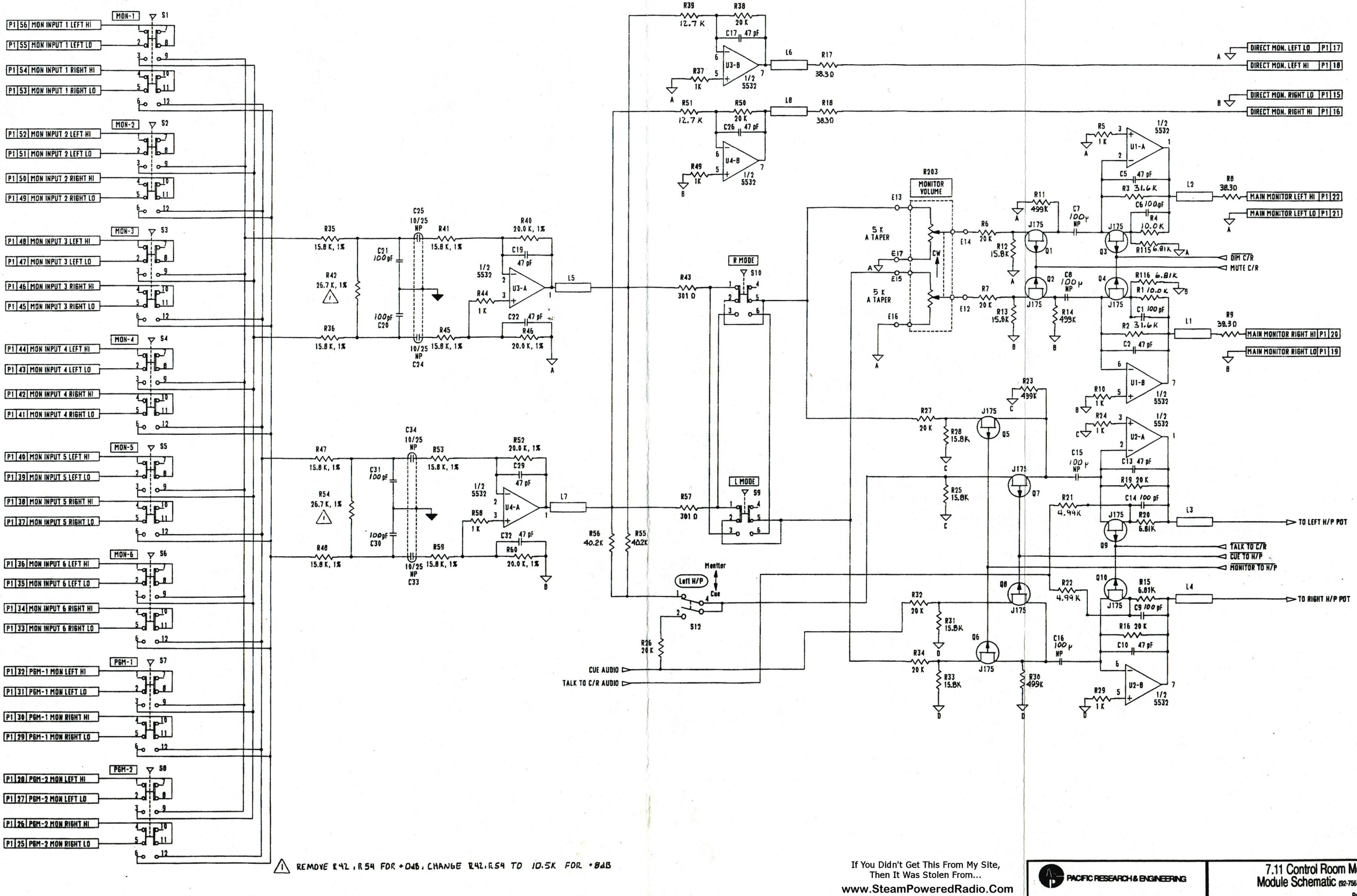




4. MASK INDICATED PADS PRIOR TO SOLDERING PROCESS.
3. FOR SCHEMATIC DIAGRAM SEE DNG. 92-754
2. ○ INDICATES ITEMS LISTED ON THIS DRAWING.
1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.
NOTES: UNLESS OTHERWISE SPECIFIED.

PACIFIC RESEARCH & ENGINEERING

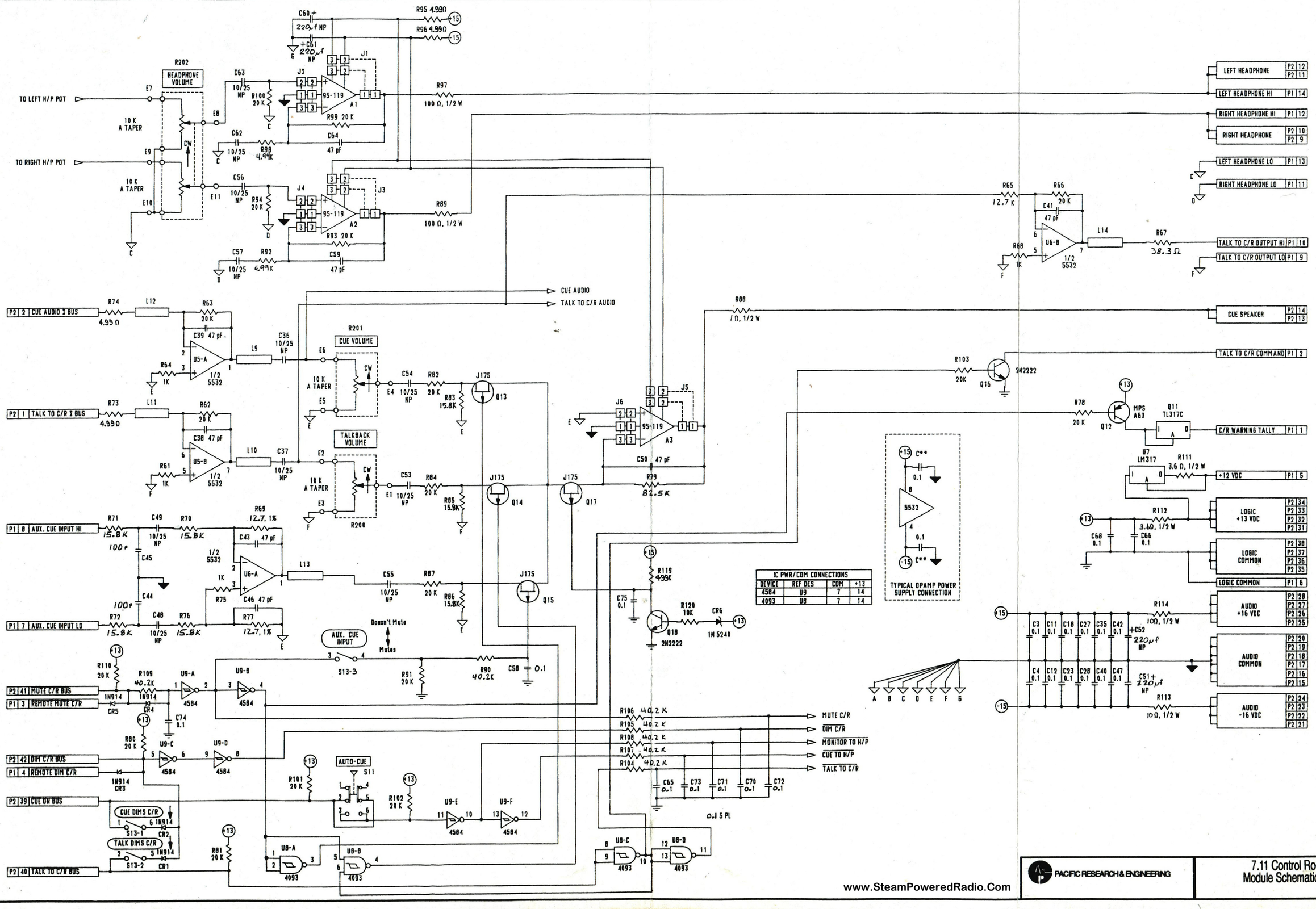
7.10 Telco Mix/Monaural
Output Module PCA Drawing (85-754 M)

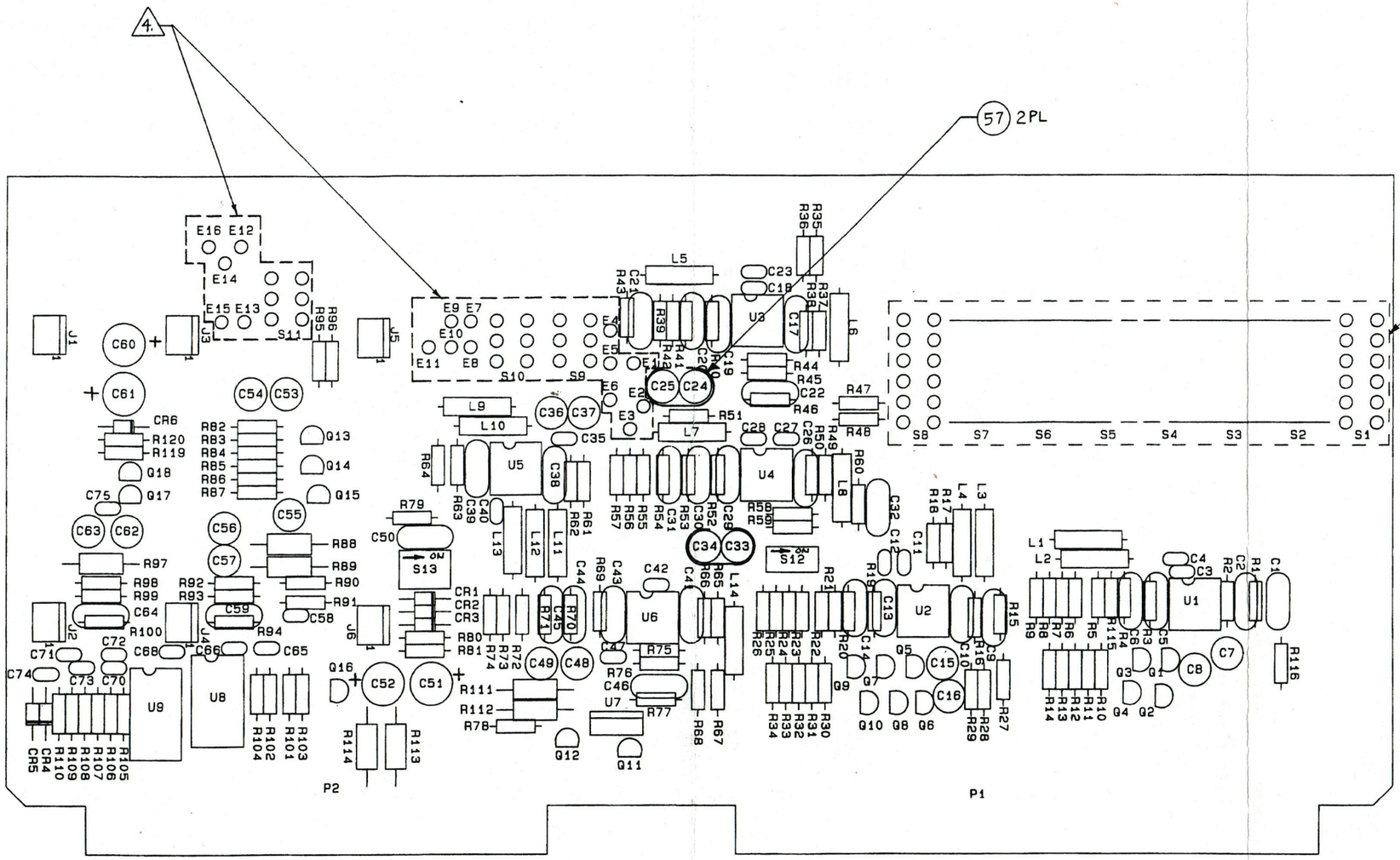


⚠ REMOVE R42, R54 FOR +0dB; CHANGE R42, R54 TO 10.5K FOR +8dB

PACIFIC RESEARCH & ENGINEERING

7.11 Control Room Monitor Module Schematic (92-756 L-1 of 2)

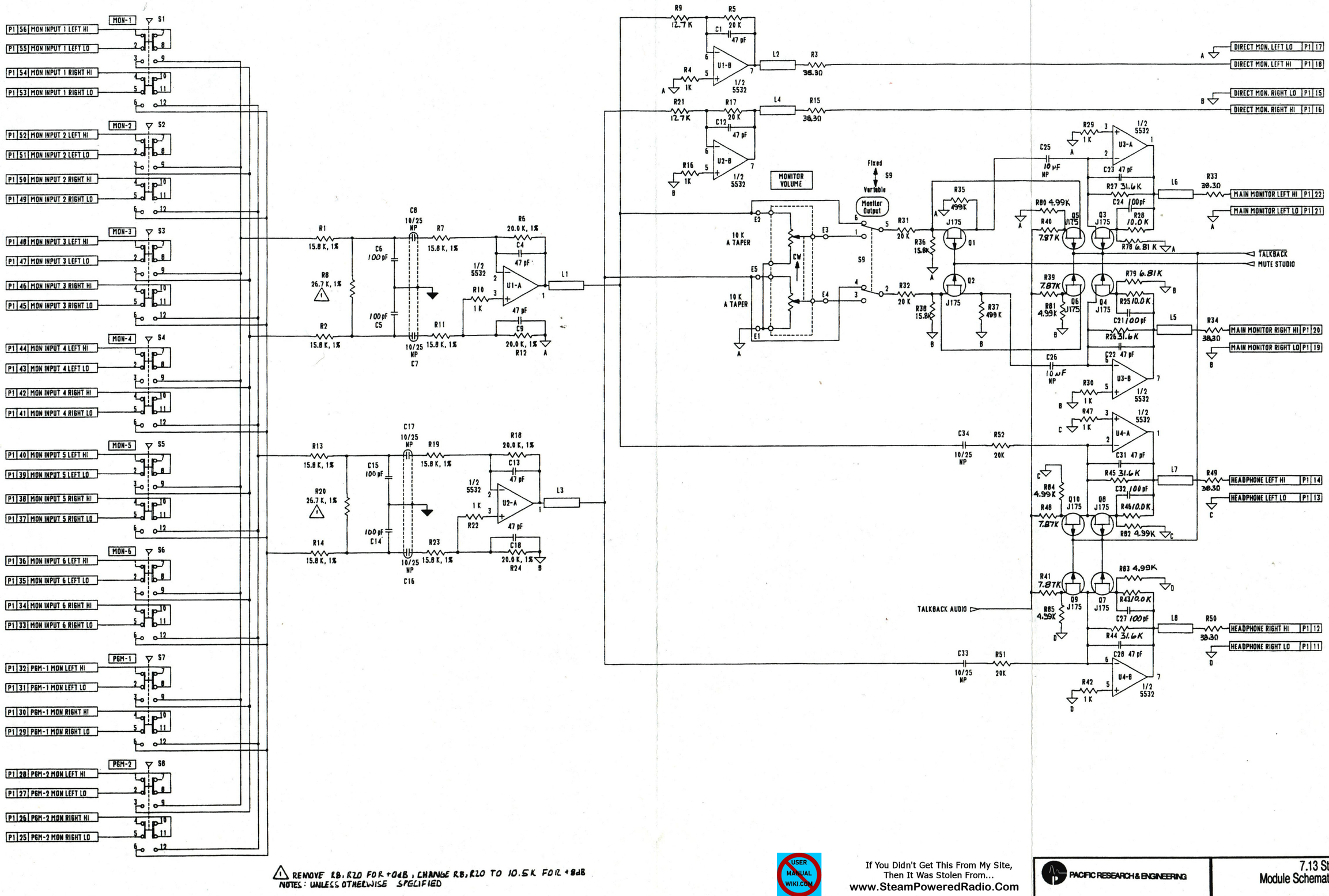

HEADPHONE VOLUME
TO LEFT H/P POT
TO RIGHT H/P POT
10 K A TAPER
R202
R95 4.99Ω
R96 4.99Ω
R97 100 Ω, 1/2 W
R89 100 Ω, 1/2 W
95-119
A1
A2
R99 20 K
R93 20 K
47 pF
LEFT HEADPHONE P2 12
LEFT HEADPHONE HI P1 14
RIGHT HEADPHONE HI P1 12
RIGHT HEADPHONE P2 10
LEFT HEADPHONE LO P1 13
RIGHT HEADPHONE LO P1 11
R65 12.7 K
R66 20 K
U6-B
1/2 5532
L14
R67 38.3 Ω
TALK TO C/R OUTPUT HI P1 10
TALK TO C/R OUTPUT LO P1 9
CUE AUDIO
TALK TO C/R AUDIO
P2 2 CUE AUDIO I BUS
P2 1 TALK TO C/R I BUS
R74 4.99 Ω
R73 4.99Ω
R63 20 K
R62 20 K
U5-A
U5-B
L9
L10
L11
L12
C36 10/25 NP
C37 10/25 NP
C38 47 pF
C39 47 pF
R64 1K
R61 1K
R201 CUE VOLUME
TALKBACK VOLUME
R200
R82 20 K
R83 15.8K
R84 20 K
R85 15.8K
C53 10/25 NP
C54 10/25 NP
J175
Q13
Q14
Q17
R88 1 Ω, 1/2 W
R79 82.5K
C50 47 pF
J5
J6
A3
CUE SPEAKER P2 14
P2 13
TALK TO C/R COMMAND P1 2
R103 20K
2N2222
Q16
R78 20 K
MPS A63
Q12
Q11 TL317C
C/R WARNING TALLY P1 1
U7 LM317
R111 3.6 Ω, 1/2 W
+12 VDC P1 5
R112 3.60, 1/2 W
C68 0.1
C66 0.1
LOGIC +13 VDC P2 34 P2 33 P2 32 P2 31
LOGIC COMMON P2 38 P2 37 P2 36 P2 35
LOGIC COMMON P1 6
R114 100, 1/2 W
C52 220µf NP
C51 220µf NP
R113 100, 1/2 W
AUDIO +16 VDC P2 28 P2 27 P2 26 P2 25
AUDIO COMMON P2 20 P2 19 P2 18 P2 17 P2 16 P2 15
AUDIO -16 VDC P2 24 P2 23 P2 22 P2 21
C3 C11 C18 C27 C35 C42 0.1
C4 C12 C23 C28 C40 C47 0.1
P1 8 AUX. CUE INPUT HI
P1 7 AUX. CUE INPUT LO
R71 15.8K
R72 15.8K
R70 15.8K
R76 15.8K
R69 12.7, 1%
R77 12.7, 1%
C43 47 pF
C46 47 pF
C45 100p
C44 100p
C48 10/25 NP
C49 10/25 NP
L13
R75 1K
U6-A
C55 10/25 NP
R87 20 K
R86 15.8K
Q15
AUX. CUE INPUT
Doesn't Mute
Mutes
S13-3
R91 20 K
R90 40.2K
C58 0.1
R119 499K
C75 0.1
R120 10K
CR6 IN 5240
Q18 2N2222
IC PWR/COM CONNECTIONS
DEVICE | REF DES | COM | +13
4584 | U9 | 7 | 14
4093 | U8 | 7 | 14
TYPICAL OPAMP POWER SUPPLY CONNECTION
R110 20 K
R109 40.2K
R80 20 K
U9-A
U9-B
U9-C
U9-D
U9-E
U9-F
4584
P2 41 MUTE C/R BUS
P1 3 REMOTE MUTE C/R
P2 42 DIM C/R BUS
P1 4 REMOTE DIM C/R
P2 39 CUE ON BUS
P2 40 TALK TO C/R BUS
IN914 CR5
IN914 CR4
IN914 CR3
C74 0.1
R101 20 K
R102 20 K
AUTO-CUE
S11
CUE DIMS C/R
S13-1
CR2
TALK DIMS C/R
S13-2
CR1
R81 20 K
U8-A
U8-B
U8-C
U8-D
4093
R106 40.2 K
R105 40.2 K
R108 40.2 K
R107 40.2 K
R104 40.2 K
MUTE C/R
DIM C/R
MONITOR TO H/P
CUE TO H/P
TALK TO C/R
C65 0.1
C73 0.1
C71 0.1
C70 0.1
C72 0.1
0.1 5 PL
A B C D E F G
www.SteamPoweredRadio.com
PACIFIC RESEARCH & ENGINEERING
7.11 Control Room Monitor Module Schematic (82-756 L-2 of 2)
Pg. 7-18

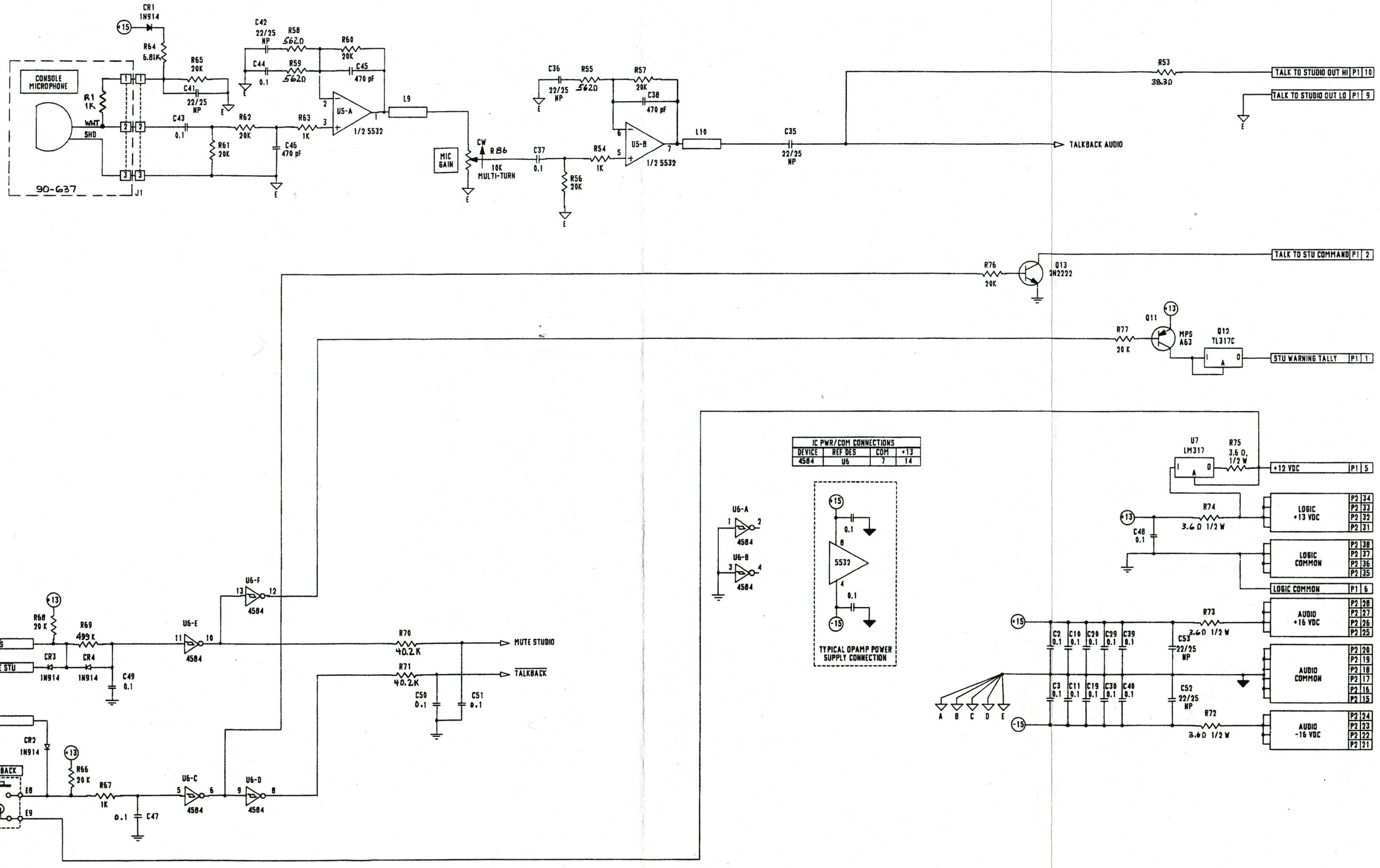


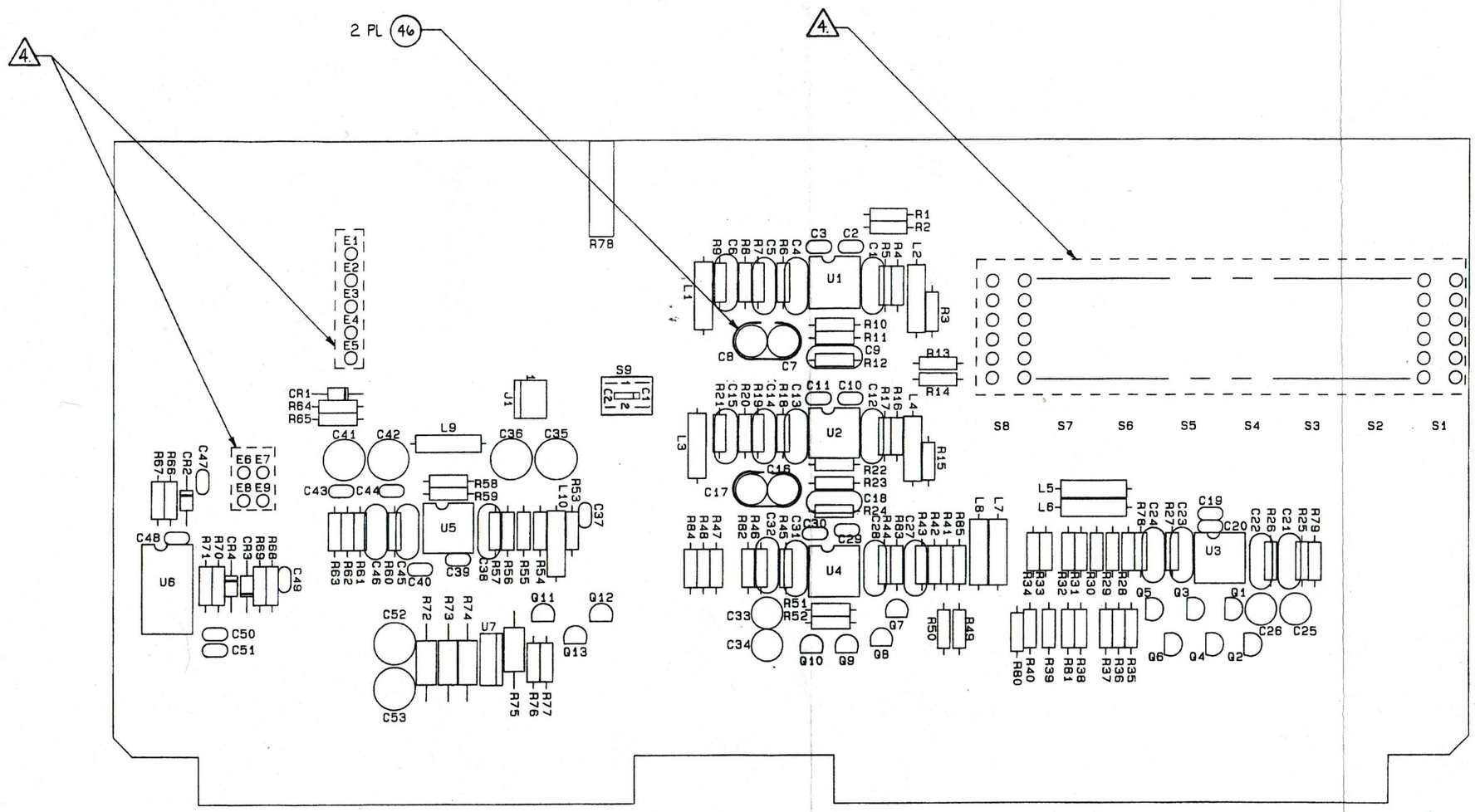
6. REMOVE R8, R20 FOR +0dB, CHANGE R8, R20 TO 10.5K FOR +8dB
5. DELETED NOTE
4. MASK INDICATED PADS PRIOR TO SOLDERING PROCESS.
3. FOR SCHEMATIC DIAGRAM SEE DWG. 92-756
2. ○ INDICATES ITEMS LISTED ON THIS DRAWING.
1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.
NOTES: UNLESS OTHERWISE SPECIFIED.

PACIFIC RESEARCH & ENGINEERING

7.12 Control Room Monitor Module
PCA Drawing (85-756 L)





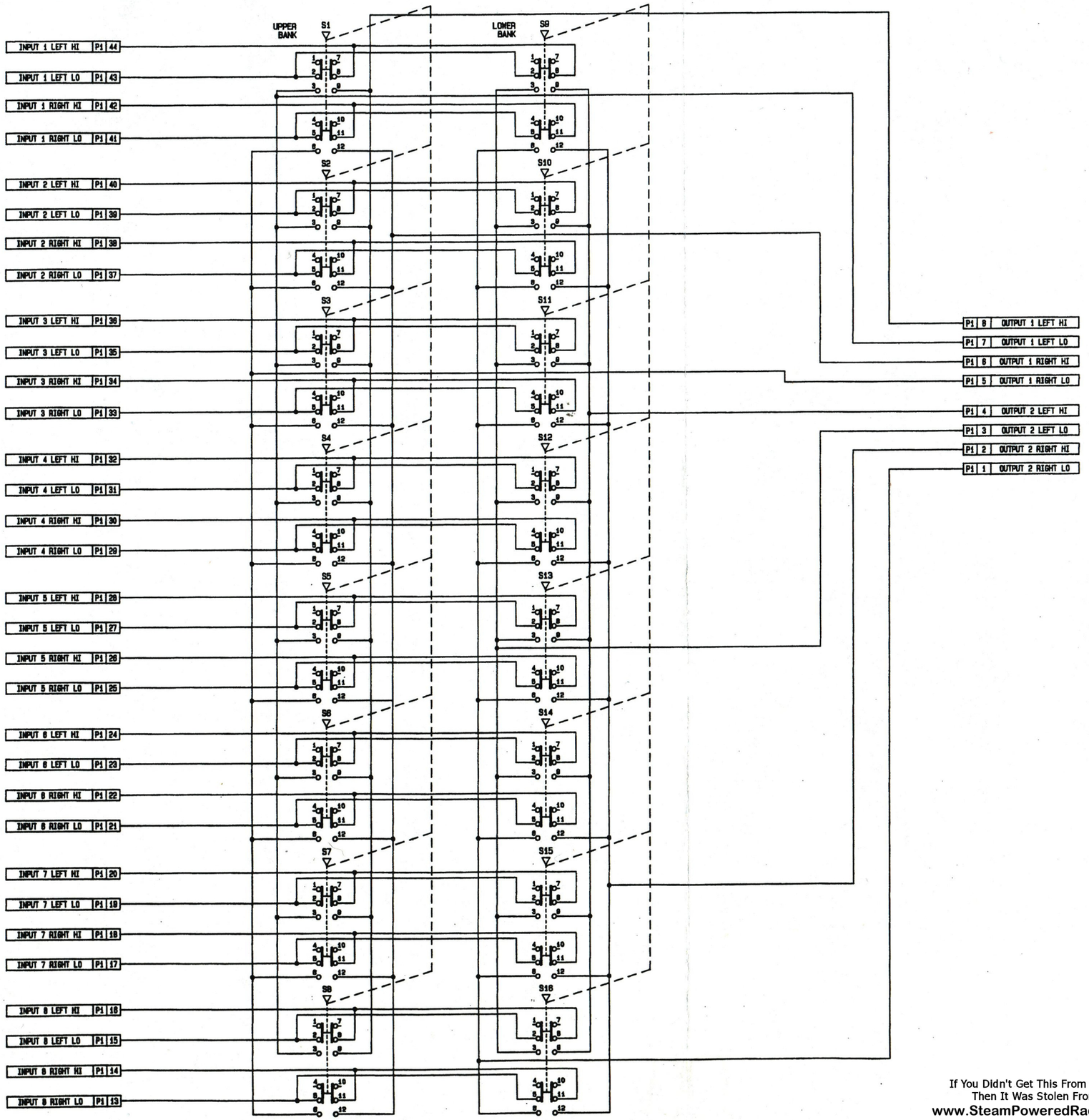


6. REMOVE R42, R54 FOR +0dB, CHANGE R42, R54 TO 10.5K FOR +8dB
5. DELETE NOTE
4. MASK INDICATED PADS PRIOR TO SOLDERING PROCESS.
3. FOR SCHEMATIC DIAGRAM SEE DWG. 92-757.
2. ◯ INDICATES ITEMS LISTED ON THIS DRAWING.
1. ◯ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.

NOTES: UNLESS OTHERWISE SPECIFIED.

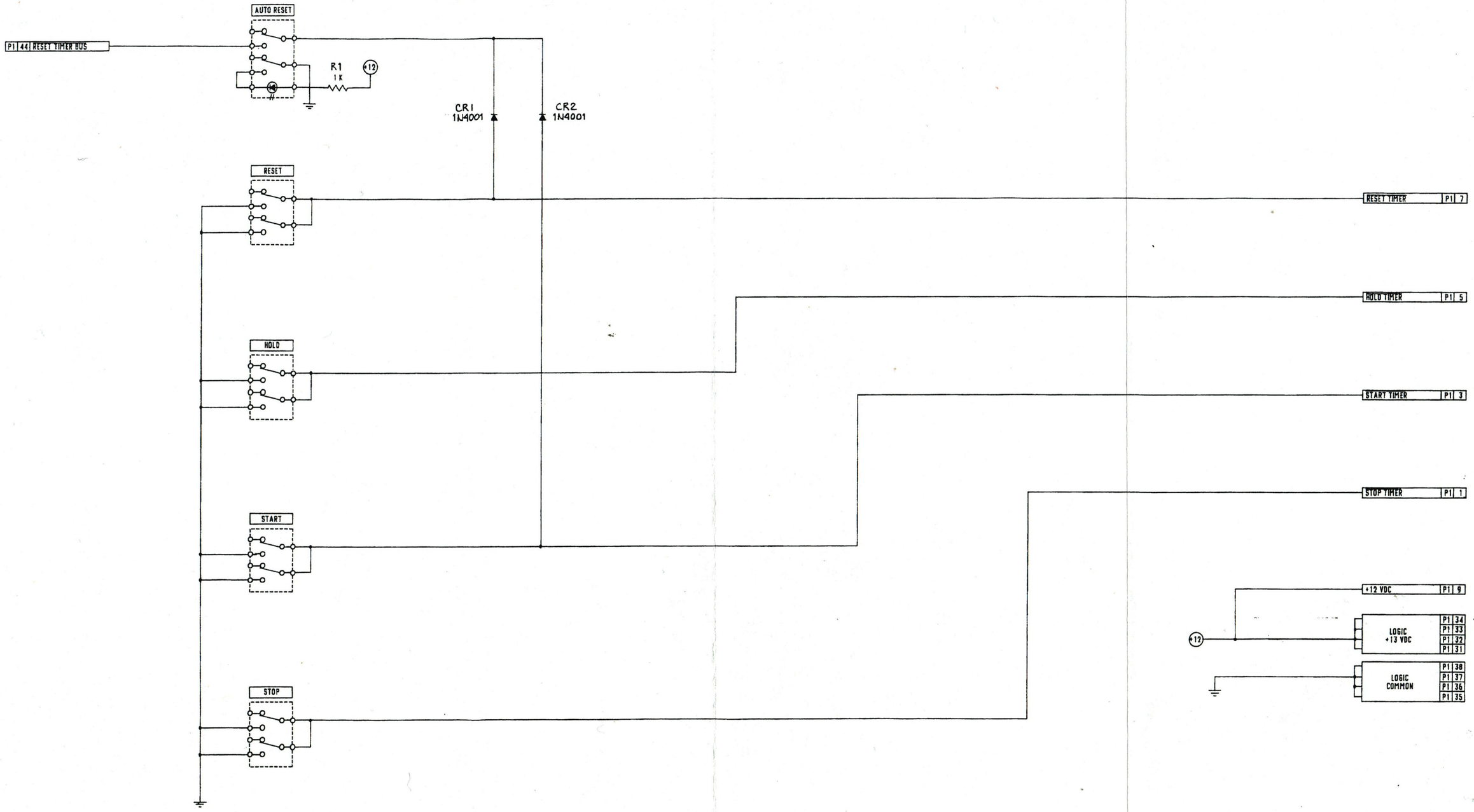
PACIFIC RESEARCH & ENGINEERING

7.14 Studio Monitor Module
PCA Drawing (85-757 K)



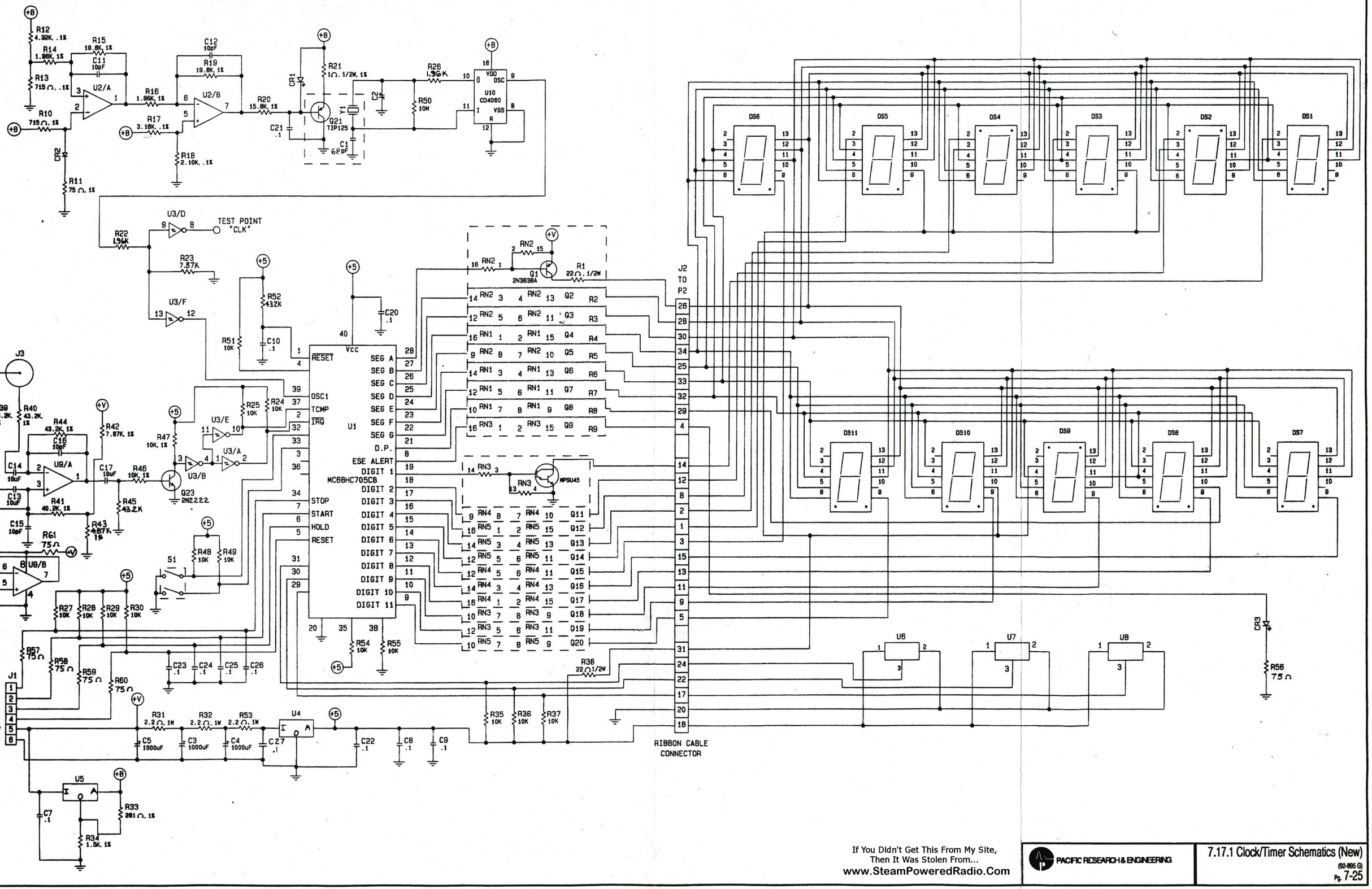
PACIFIC RESEARCH & ENGINEERING

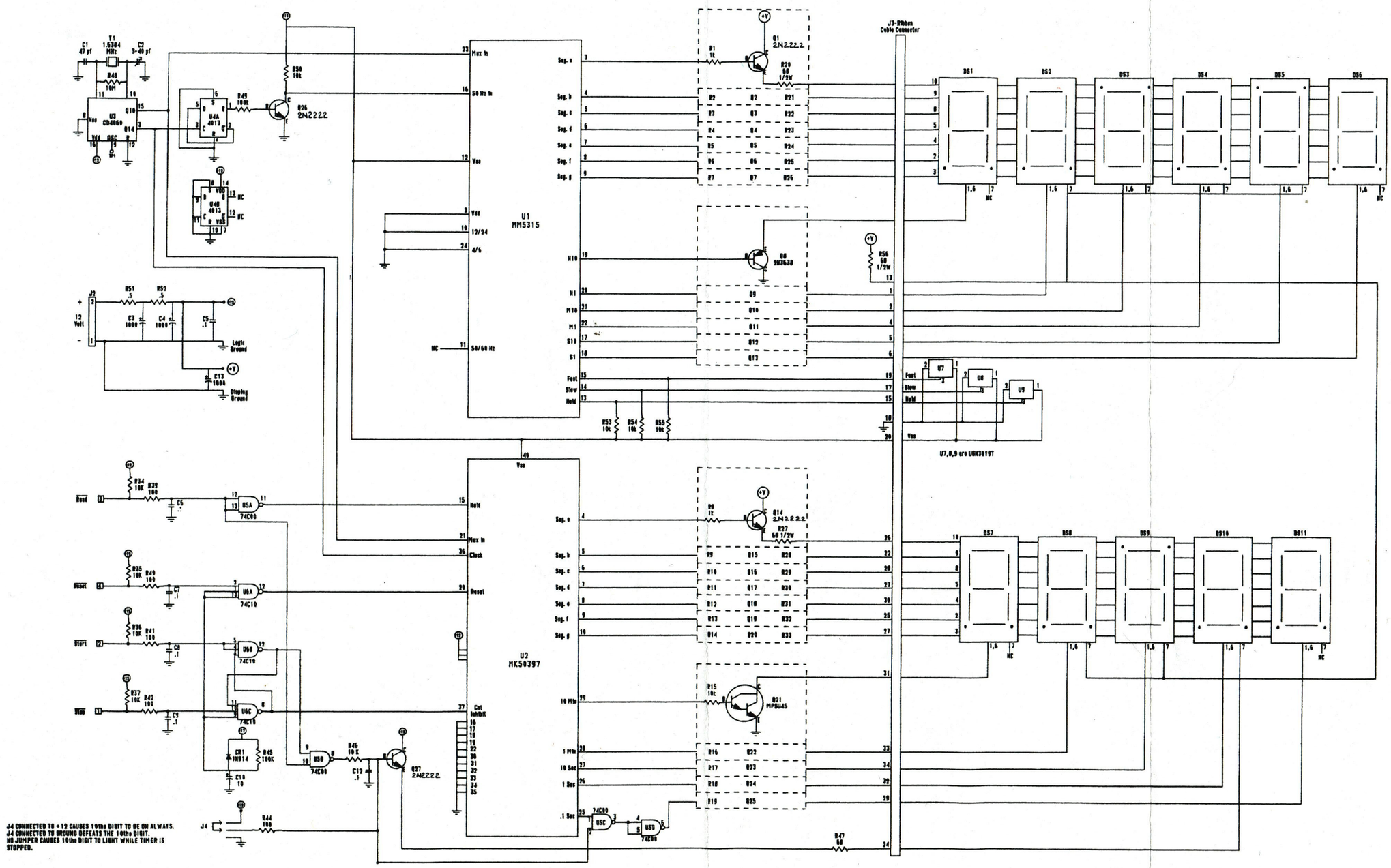
7.15 Remote Line Selector
Schematic (92-758 A)

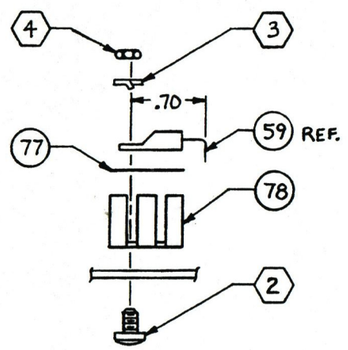


PACIFIC RESEARCH & ENGINEERING

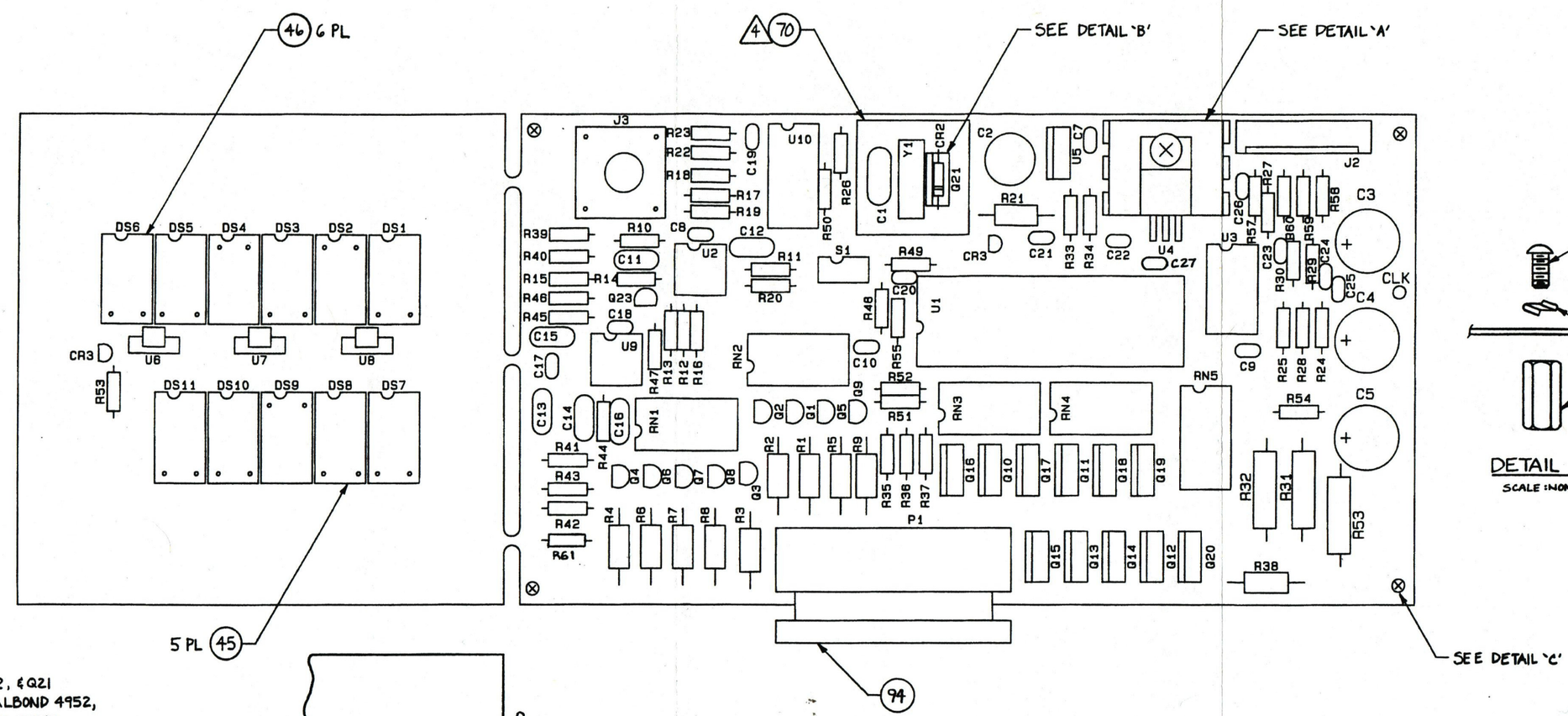
7.16 Timer Control Panel
Schematic (92-759 C)

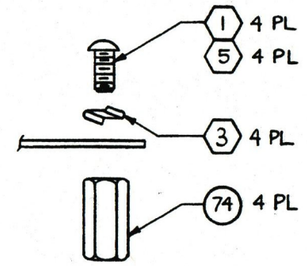




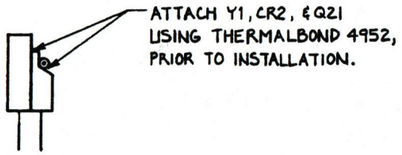


DETAIL 'A'
SCALE: NONE

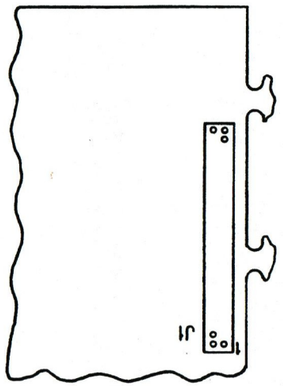




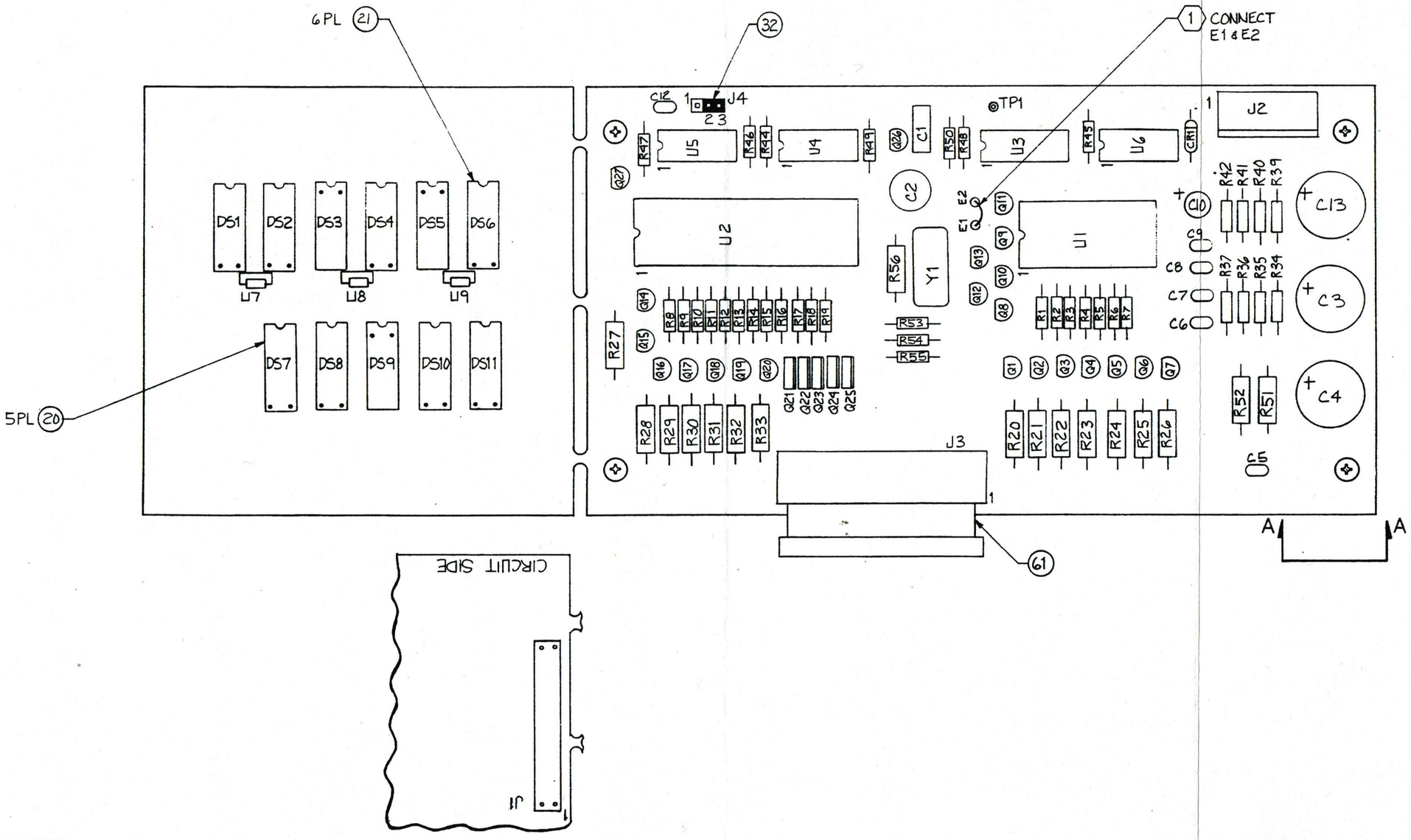
DETAIL 'C'
SCALE: NONE

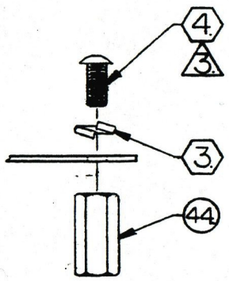


DETAIL 'B'
SCALE: NONE



4. GLUE ITEM 70 TO COMPONENT SIDE USING (5) SPARINGLY.
3. FOR SCHEMATIC DIAGRAM SEE DWG. 92-885
2. ○ INDICATES ITEMS LISTED ON THIS DRAWING.
1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.
NOTES: UNLESS OTHERWISE SPECIFIED.





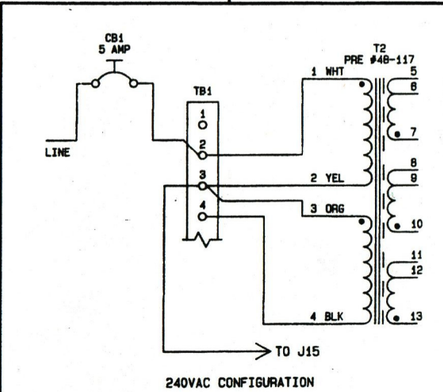
VIEW A-A
4 PL ON 45-775

⚠ INSTALL SCREW USING LOCTITE

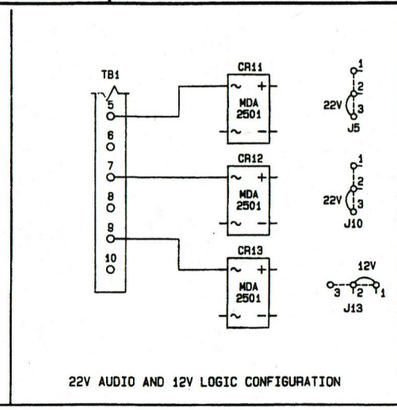
2. ⬡ INDICATES ITEMS LISTED ON THIS DWG.

1. ○ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.

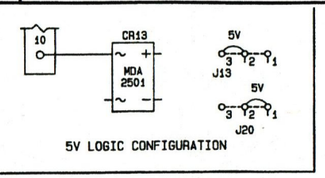
NOTES: UNLESS OTHERWISE SPECIFIED.



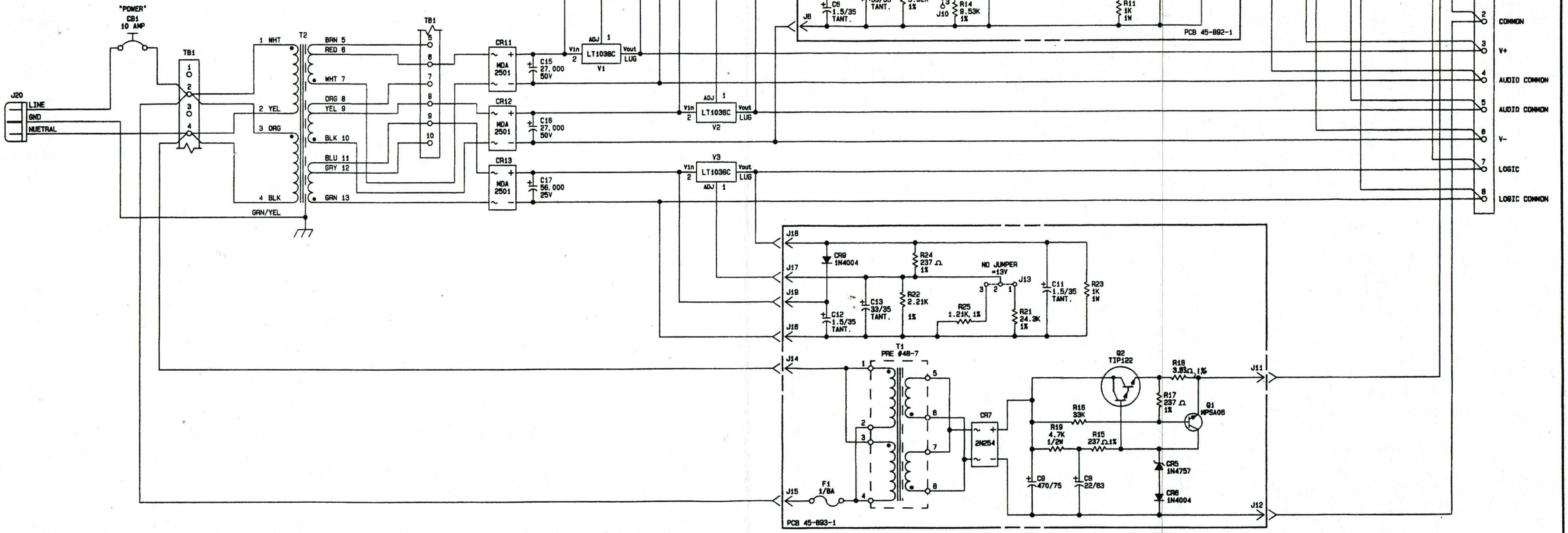
240VAC CONFIGURATION



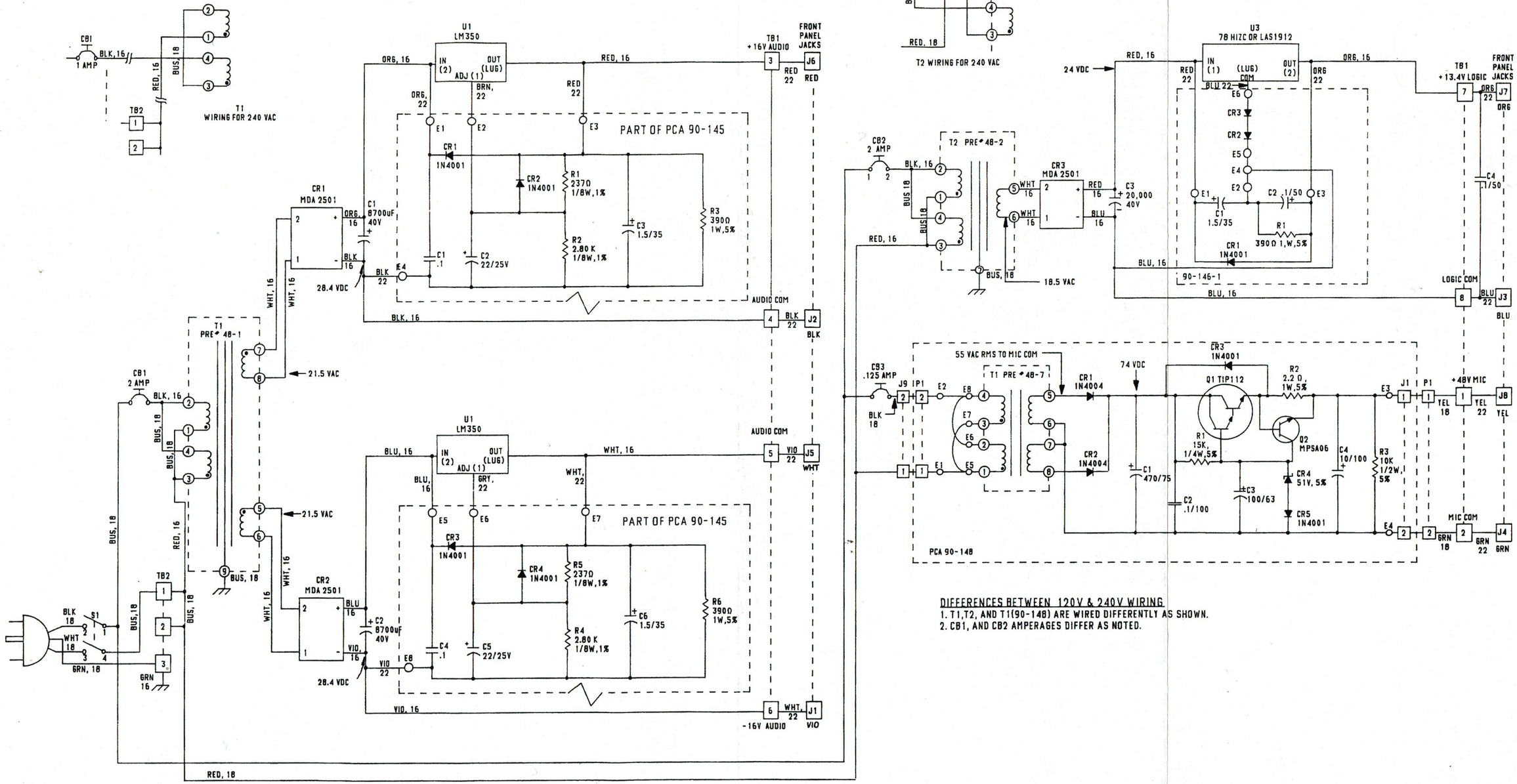
22V AUDIO AND 12V LOGIC CONFIGURATION



5V LOGIC CONFIGURATION



4.FOR PCA SEE DRAWING 95-892-1 LATEST REV.
3.120VAC, 16V AUDIO AND 13V LOGIC CONFIGURATION SHOWN.
2.ALL CAPACITORS ARE MEASURED IN MICROFARADS.
1.ALL RESISTORS ARE 1/4W, 5%.
NOTES ; UNLESS OTHERWISE SPECIFIED.



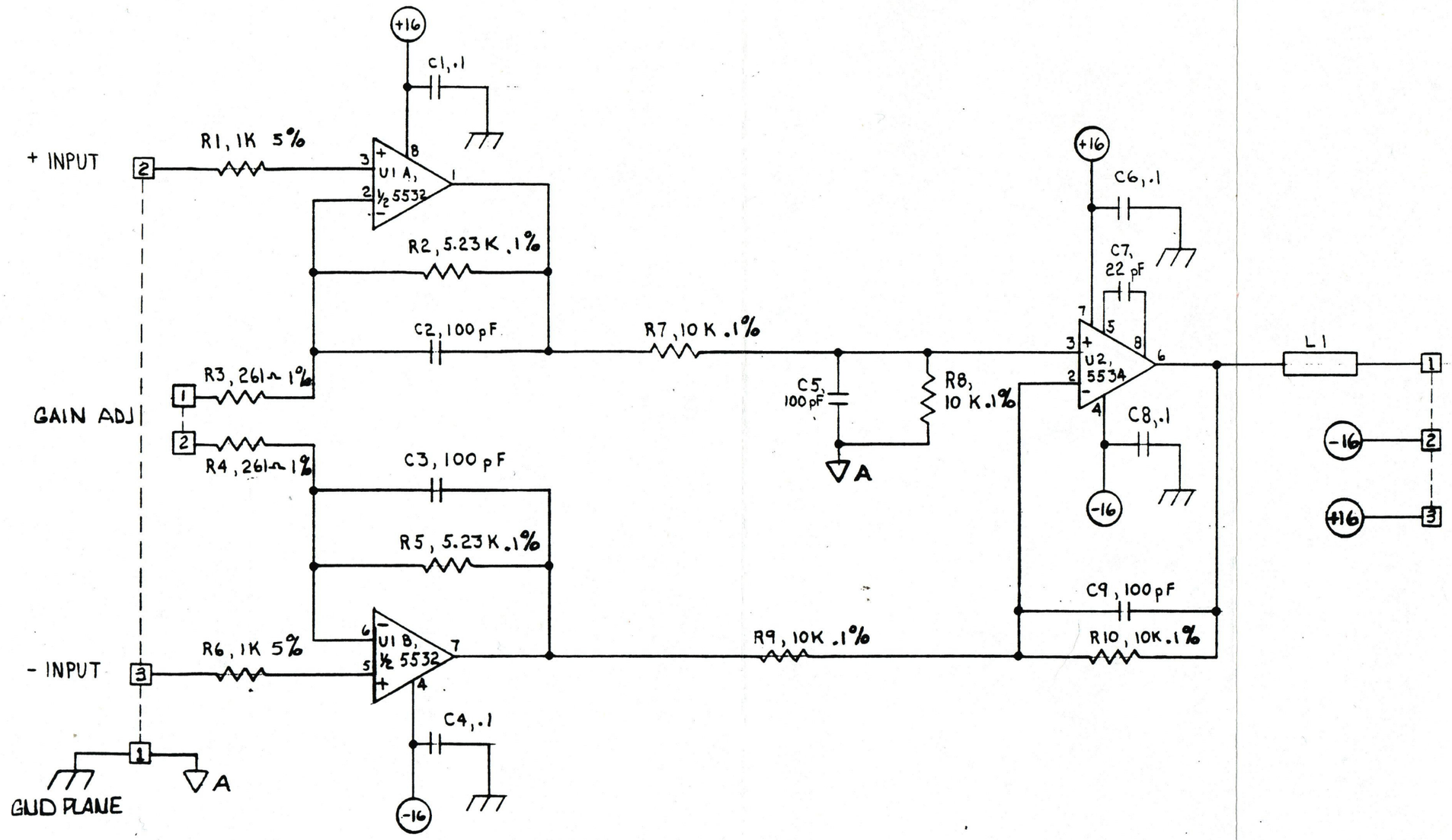
DIFFERENCES BETWEEN 120V & 240V WIRING

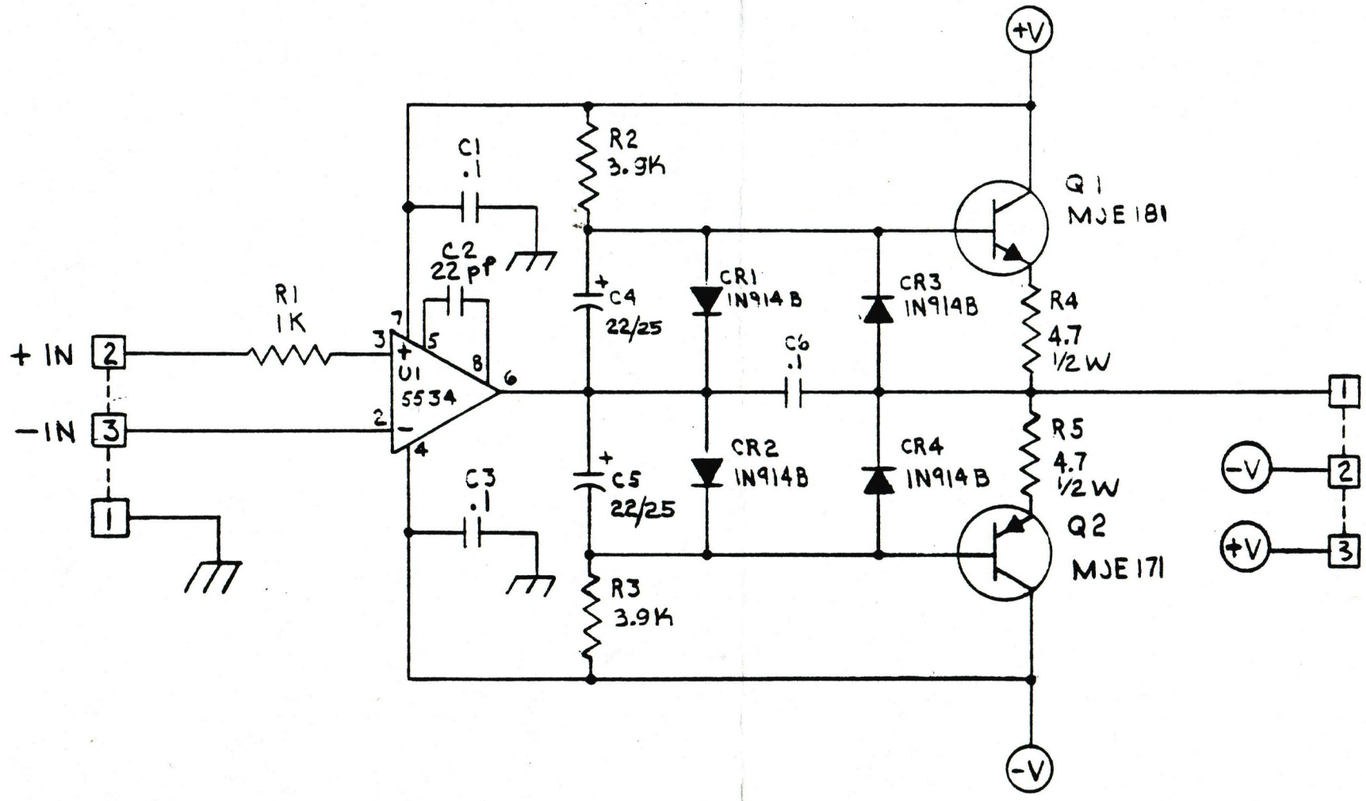
1. T1,T2, AND T1(90-148) ARE WIRED DIFFERENTLY AS SHOWN.
2. CB1, AND CB2 AMPERAGES DIFFER AS NOTED.

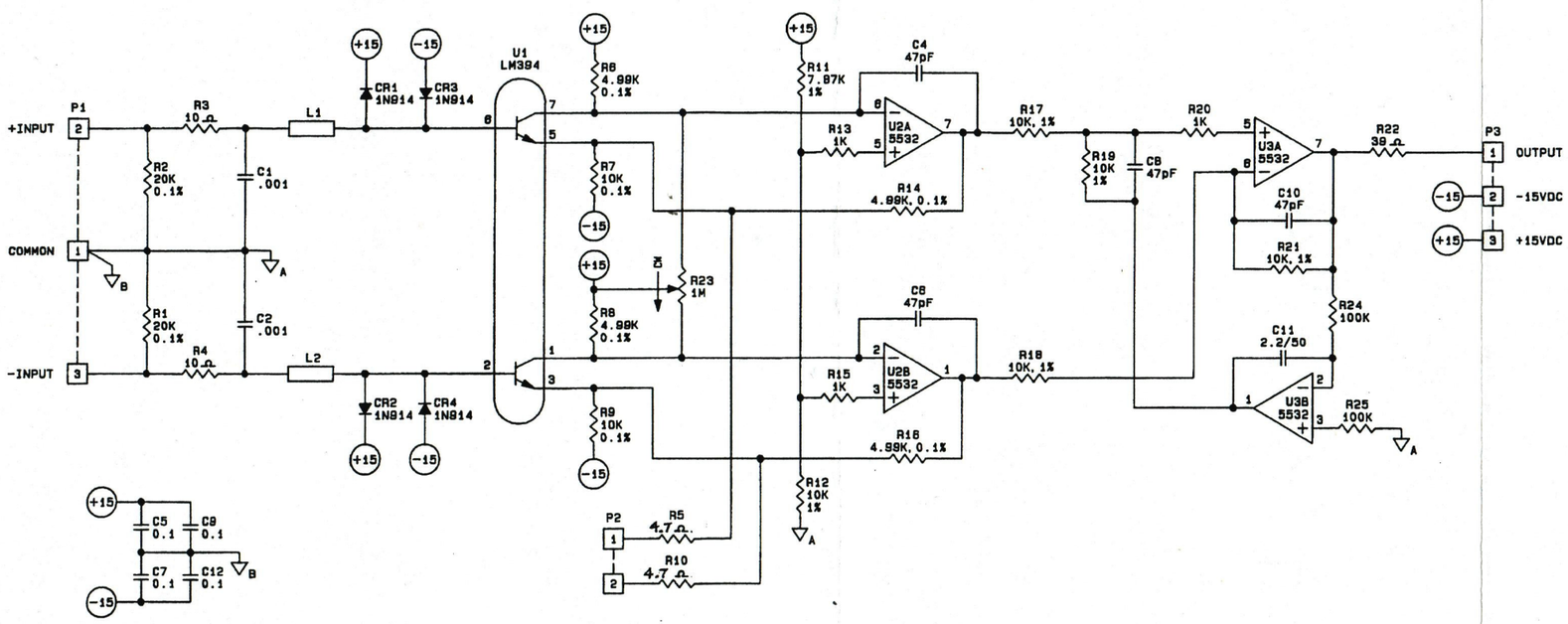
2. FOR 120VAC JUMPER E6 TO E7 AND E6 TO E8.
   FOR 240VAC JUMPER E6 TO E7.

1. ALL RESISTORS ARE MEASURED IN OHMS AND CAPACITORS ARE MEASURED IN MICROFARADS

NOTES: UNLESS OTHERWISE SPECIFIED.

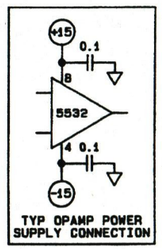




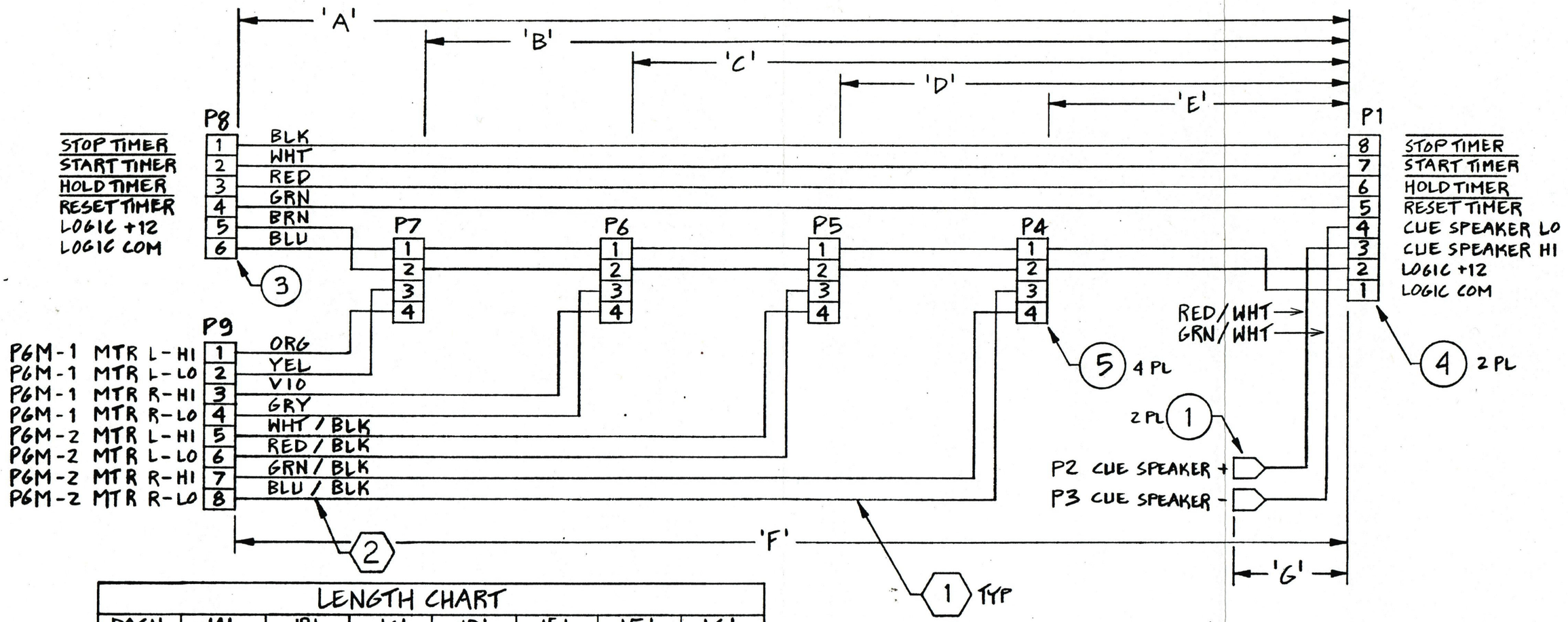


5. FOR PCA SEE DRAWING 95-270 LATEST REV.
4. NOT USED.
3. NP=NONPOLARIZED.
2. ALL CAPACITORS ARE MEASURED IN MICROFARADS.
1. ALL RESISTORS ARE 1/4W, 5%.

NOTES: UNLESS OTHERWISE SPECIFIED.



TYP OPAMP POWER SUPPLY CONNECTION



LENGTH CHART							
DASH	'A'	'B'	'C'	'D'	'E'	'F'	'G'
-1	45.00	39.00	33.00	26.00	20.00	60.00	20.00
-2	53.00	47.00	41.00	32.00	26.00	71.00	20.00
E -3	59.00	53.00	47.00	38.00	32.00	83.00	26.00

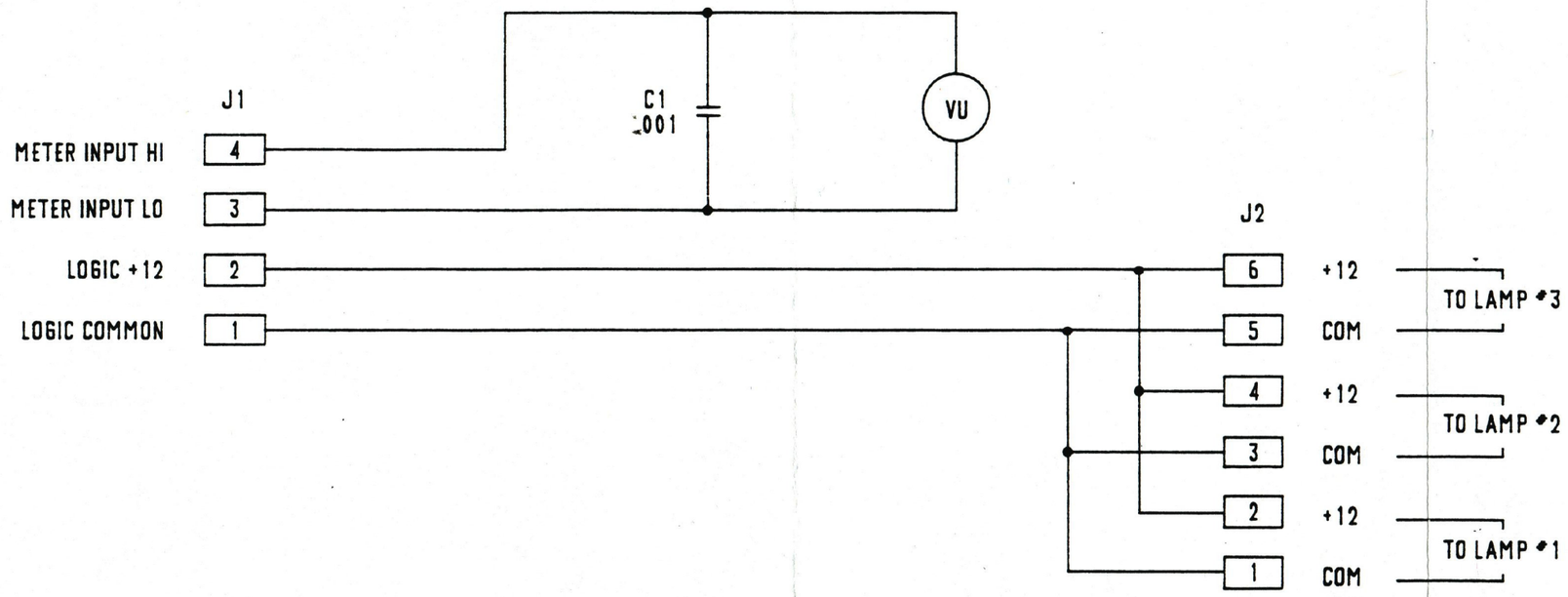
4 INDICATE P #'S ON CONNECTORS AS NOTED.

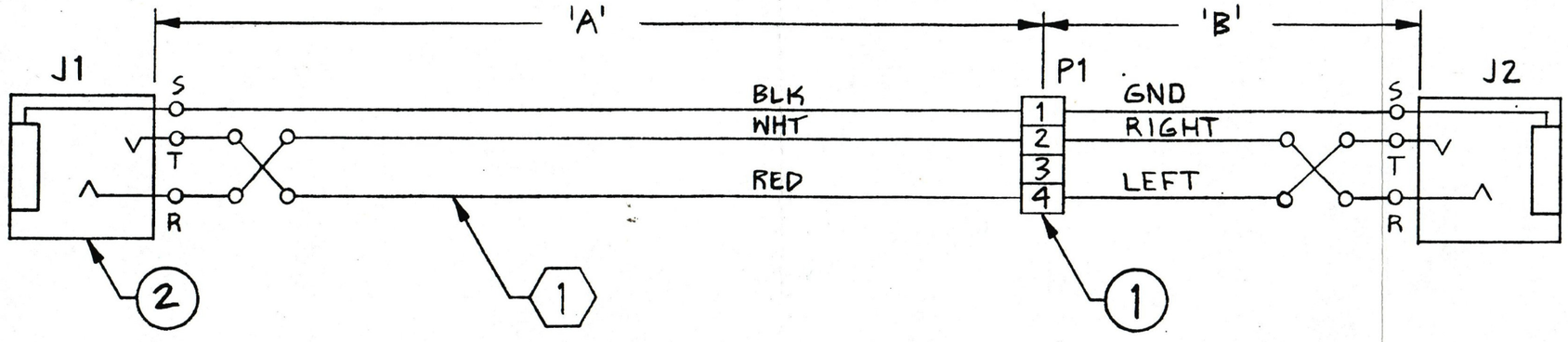
3 IDENTIFY BY BAG & TAG.

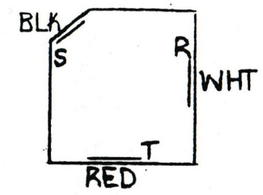
2 ⬡ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.

1 ⬡ INDICATES ITEMS LISTED ON THIS DWG.

NOTES: UNLESS OTHERWISE SPECIFIED.







TYP REAR VIEW
FOR J1 AND J2

LENGTH CHART			
	DASH	'A'	'B'
	-1	33.00	3.00
	-2	45.00	3.00
C	-3	57.00	3.00

4 INDICATE P & J #'S ON CONN. AS NOTED.

3 IDENTIFY BY BAG & TAG.

2 ⬡ INDICATES ITEMS LISTED ON SEPARATE PARTS LIST.

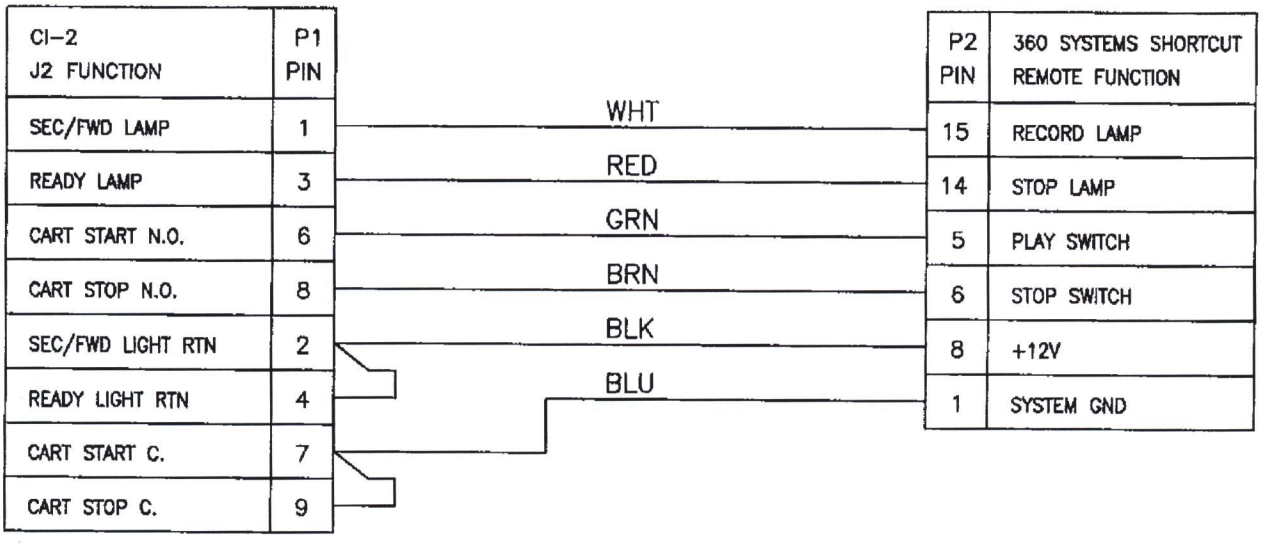
1 ⬡ INDICATES ITEMS LISTED ON THIS DWG.

NOTES: UNLESS OTHERWISE SPECIFIED.

P1: HOUSING, 9 PIN, MALE MOLEX #03-06-2092 (PR&E #15-604)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

P2: CONNECTOR, 15-PIN, MALE D-SUB, PR&E #15-868
HOOD: FOR 15 PIN D-SUB, PR&E #15-869

CABLE: 7 COND. BELDEN #9430 OR EQUIV.



	TITLE: CABLE, MACHINE, 360 SYSTEMS SHORTCUT, FOR CI-2 (99-125-0)				
PACIFIC RESEARCH & ENGINEERING CORPORATION	DRAWN: JT/rlm	DATE: 8-MAY-97	DWG. NO.: 71-653	REV.: A	
	SHEET: 1 OF 1	APVD.			

8.0 ACCESSORIES

This chapter contains descriptions of the various Radiomixer console accessories. Included are sections describing tape machine remote control panels, the Redundant Power Supply Coupler Unit, and logic interfaces. Section 8.4 contains schematics for the accessories described in this chapter. Contact PR&E for further details and price information.

8.1 TAPE MACHINE REMOTE CONTROL PANELS

There are two tape machine remote control panels available for use in the Radiomixer mainframe - one for cart recorders (PR&E #99-761-X) and one for cassette and reel-to-reel tape recorders (PR&E #99-760-X). Both consist of five momentary-action switches, and both are mounted in the mainframe positions labeled A through D, as shown in Figure 2.4.

Tape machine remote control panels operate in conjunction with input module remote controls, and connection to cart and tape recorders is accomplished by means of a "Y" cable located at the recorder, as shown in Figure 8.1. Pre-fabricated remote control "Y" cables for most commercial cart and tape machines are available from PR&E.

8.1.1 Cart Recorder Remote Control Panel

The cart recorder remote control panel (PR&E #99-761-X) can control the record, tertiary cue tone, secondary cue tone, play and stop functions of a connected cart recorder. For a schematic showing rear panel Molex connector pin assignment, and an illustration of the panel controls, see Section 8.4.

Presently, there are five different versions of this panel available from PR&E: #99-761-0, for use with cart machines with no lamp tallies; #99-761-1, for use with cart machines with 5 volt lamp tallies; #99-761-2, for use with cart machines with 14 volt lamp tallies; #99-761-3, for use with cart machines with 28 volt lamp tallies; and #99-761-4, for use with cart machines with a 5 volt record tally only.

8.1.2 Cassette And Tape Recorder Remote Control Panel

The cassette and reel-to-reel tape recorder remote control panel (PR&E #99-760-X) can control the record, forward, rewind, play and stop functions of a connected cassette or tape recorder. For a schematic showing rear panel Molex connector pin assignment, and an illustration of panel controls, see Section 8.6.

Presently, there are five different versions of this panel available from PR&E: #99-760-0, for use with tape machines with no lamp tallies; #99-760-1, for use with tape machines with 5 volt lamp tallies; #99-760-2, for use with tape machines with 14 volt lamp tallies; #99-760-3, for use with tape machines with 28 volt lamp tallies; and #99-760-4, for use with tape machines with a 5 volt record tally only.

8.2 REDUNDANT POWER SUPPLY COUPLER UNIT

The Redundant Power Supply Coupler Unit (PR&E #99-818) is used whenever redundant power is desired. When two power supplies are connected to the unit, the power supply voltages are diode-coupled, with the highest of the two voltages being supplied to the console. If there is a voltage failure, redundant power is instantaneously supplied to the console, and the Remote Power Fail Indicator on the coupler unit is illuminated.

The unit should be installed adjacent to the two console power supplies, and connected with the two prefabricated cables supplied. The connections to the supplies and to the console are made to the heavy–duty barrier strips on the rear of the coupler. The cables are color-coded, and the corresponding color names are printed adjacent to the terminal strips.

NOTE: The high-current diodes used in the coupler have very low forward voltage drop and, therefore, do not add significantly to the heat dissipation of the power supply system. However, the second power supply in a redundant system does add approximately 50 watts of heat, due to the excitation current consumed by the power transformers.

8.3 LOGIC INTERFACES

PR&E recommends the use of logic interface electronics between the console and any piece of auxiliary equipment to protect the console from hazardous voltages, and to prevent ground loops, such as those which occur when control circuitry is referenced to a different ground or power supply.

A variety of different interfaces is manufactured by PR&E to accommodate most types of cart, tape and cassette machines, turntables, and compact disc players. Cable assemblies connecting the console to the interface, and the interface to the auxiliary equipment are also produced by PR&E. For complete interface information, including all standard machine cable assemblies and machine "Y" cables, contact PR&E.

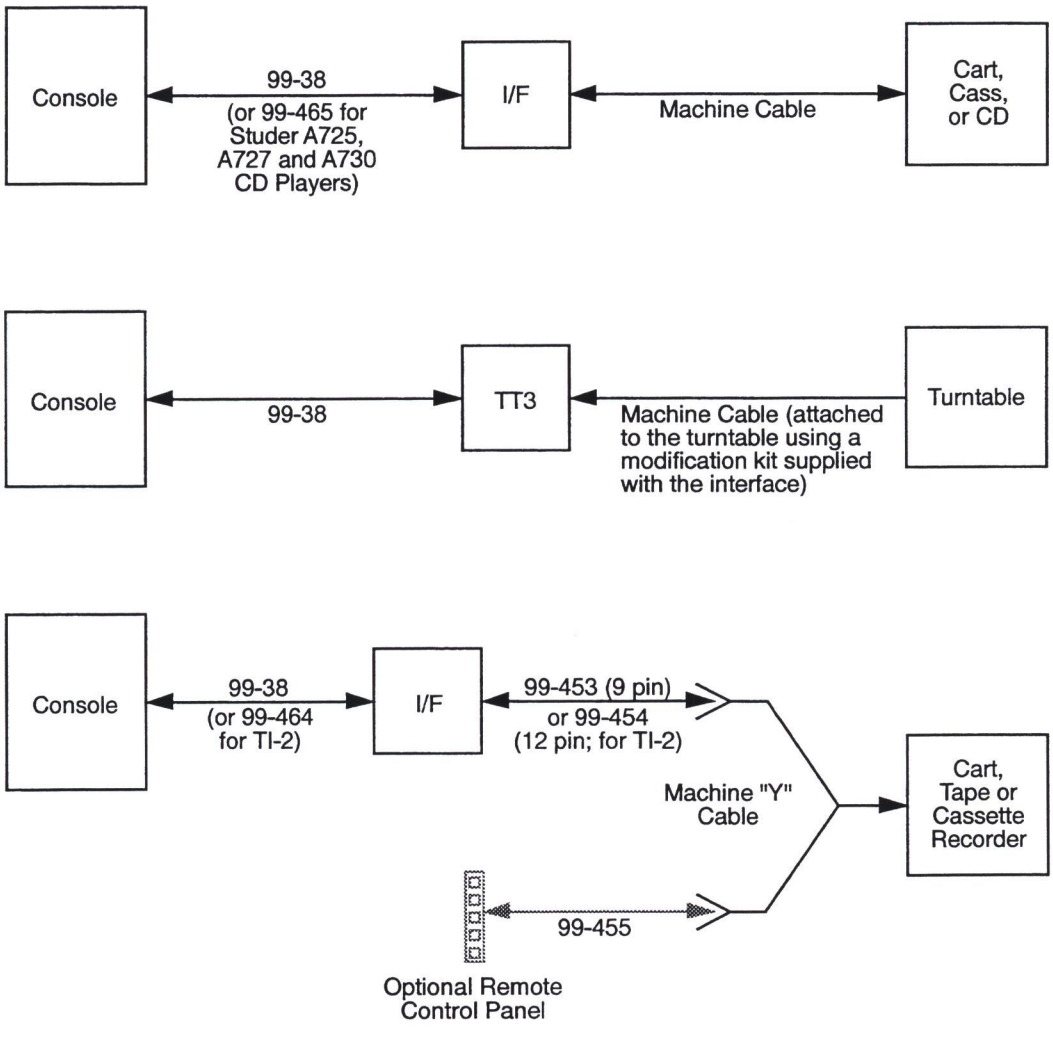
The table below provides a listing of the various interfaces described in this section, as well as their part numbers and a general description of their use.

Interface	PR&E P/N	For Use With
TCI-2A	99-165	PR&E TOMCAT, Micromax cart machines
CI-2	99-125-0	Cart machines, CD players and cassette machines w/12-28 V lamp tallies
CI-2 (5V)	99-125-1	Cart machines, CD players and cassette machines w/5 V lamp tallies
TI-2	99-111	Reel to reel tape machines w/12-28 V lamp tallies
TT-3	99-110	Turntables
WL-2	99-143	Studio and Control Room warning lights
Dual Relay	99-419	General purpose switching, mute contacts
Cassette Skimmer	99-410	Cassette recorders

Section 8.4 contains schematics of these interfaces, and diagrams of the three console to interface cables:

PR&E #99-464 (for use with the TI-2 Tape Interface; PR&E #99-465 (for use with the CI-2 Cart Interface when interfacing Studer A725, A727 and A730 compact disc players); and PR&E #99-38 (for use with all other interfaces).

While there are three console to interface cables, there is a variety of interface to machine cables, each with a configuration dependent upon the individual machine being connected. When a machine "Y" cable is used in an installation, only the "Y" cable (not the extender or remote control panel connecting cables) is machine dependent. Figure 8.1 provides an overview of the logic interface and cable system.



NOTES:

A) The addition of the optional cart or tape recorder remote control panel is made possible by the installation of the machine "Y" cable.

B) Pin assignment for the PR&E #99-38, #99-464 and #99-465 console to interface cables, and the #99-453, #99-454 and #99-455 control cables, is defined in Section 8.4.

FIGURE 8.1
LOGIC INTERFACE AND CABLE SYSTEM OVERVIEW

8.3.1 TCI-2A Cartridge Interface

The TCI-2A Cartridge Interface (PR&E #99-165) was specifically designed for use with PR&E TOMCAT and Micromax cart machines. Each TCI-2A can accommodate up to three reproducers or recorder/reproducers. For a schematic of this interface, as well as a diagram of the console to interface cable (PR&E #99-38), see Section 8.4.

NOTE: If you already have TCI-2 interfaces for TOMCAT, they may be modified slightly to work with both TOMCAT and Micromax cart machines, as follows:

1. Replace resistors R1, R3, R5, R7 and R9 with 750 ohm, 1/2 watt resistors (PR&E #3-751).

2. On the component side of the PC board, cut the trace going to J4 pin 4.

3. Add an insulated jumper wire between J4 pin 1 and the trace that previously went to J4 pin 4 (which was cut in step 2).

4. Verify that resistor R14 is a 10M ohm, 1/4 watt resistor (PR&E #2-106).

8.3.2 CI-2 Cartridge Interface (+12 to +28 Volt Logic)

The CI-2 Cartridge Interface (PR&E #99-125-0) was designed for use with those commercial cart machines which use +12 to +28 volt logic. The CI-2 uses dry relay contacts for start and stop functions, and also serves as a capable logic interface for CD players and cassette machines. The CI-2 also routes machine status indicator feedback to the console module "OFF" lamp, mimicking machine READY, PAUSE or STOP indicators.

Each CI-2 can accommodate up to three machines. For a schematic of this interface, as well as a diagram of the console to interface cable (PR&E #99-38), see Section 8.4.

8.3.3 CI-2 Cartridge Interface (+5 Volt Logic)

The CI-2 Cartridge Interface (PR&E #99-125-1) was designed for use with those commercial cart machines which use +5 volt logic feedback. Its function is identical to the CI-2 Interface for +12 to +28 volt logic. For a schematic of this interface, as well as a diagram of the console to interface cable (PR&E #99-38), see Section 8.4.

8.3.4 TI-2 Tape Interface

The TI-2 Tape Interface (PR&E #99-111) was designed for use with those commercial reel to reel tape machines which use +12 to +28 volt logic. Each TI-2 accommodates one machine. For a schematic of this interface, as well as a diagram of the console to TI-2 interface cable (PR&E #99-464), see Section 8.4.

NOTE: This interface may also be used with cartridge machines. In this event, use console to interface

cable #99-38 if the replay lockout function is desired.

8.3.5 TT-3 Turntable Interface

The TT-3 Turntable Interface (PR&E #99-110) was designed for use with most commercial turntables. Each TT-3 can accommodate up to two turntables. For a schematic of this interface, as well as a diagram of the console to interface cable (PR&E #99-38), see Section 8.4.

8.3.6 WL-2 Warning Light Interface

The WL-2 Warning Light Interface (PR&E #99-143) is an opto-isolated switched AC relay designed to illuminate external studio and/or control room warning lights. This interface has two inputs (STUDIO and CONTROL ROOM), which are activated by 12 volt DC commands. Each input has a corresponding AC output. For a schematic of this interface, see Section 8.4.

NOTE: The WL-2 inputs are polarity sensitive, and will not work unless connected correctly.

8.3.7 Dual Relay Interface

The Dual Relay Interface (PR&E #99-419) consists of two separately controlled relays, which can be used for audio or control circuitry. For a schematic of this interface, see Section 8.4.

8.3.8 Cassette Skimmer Interface

The Cassette Skimmer Interface (PR&E #99-410) is used to create cassette recordings of selected console microphone inputs. One to four Microphone Input Modules may be connected to the skimmer, which will toggle up to two cassette tape machines from the pause mode into the record mode the instant a connected mic module is turned ON. When the mic module is turned OFF, the cassette tape machines toggle from the record mode into the pause mode. In this way, a recording of a personality or personalities may be created for later review.

NOTE: When the mic module is turned OFF, there is a one-second delay in the cassette machine toggling from the record mode to the pause mode. This allows for the recording of the voice-to-music transition.

Another method of controlling this interface is to connect the Control Room Monitor Module MUTE command to the cassette skimmer. When this is accomplished, the tape machine will be placed in record whenever a Microphone Input Module in the Control Room is turned ON.

For a schematic of this interface, see Section 8.4.

8.4 ACCESSORY SCHEMATICS

This section contains schematics for the various accessories described in this chapter, as follows:

NOTE: On PR&E schematics, capacitor values are in microfarads (µF), unless otherwise specified, and resistors are 1/4 watt, 5%, unless otherwise specified.

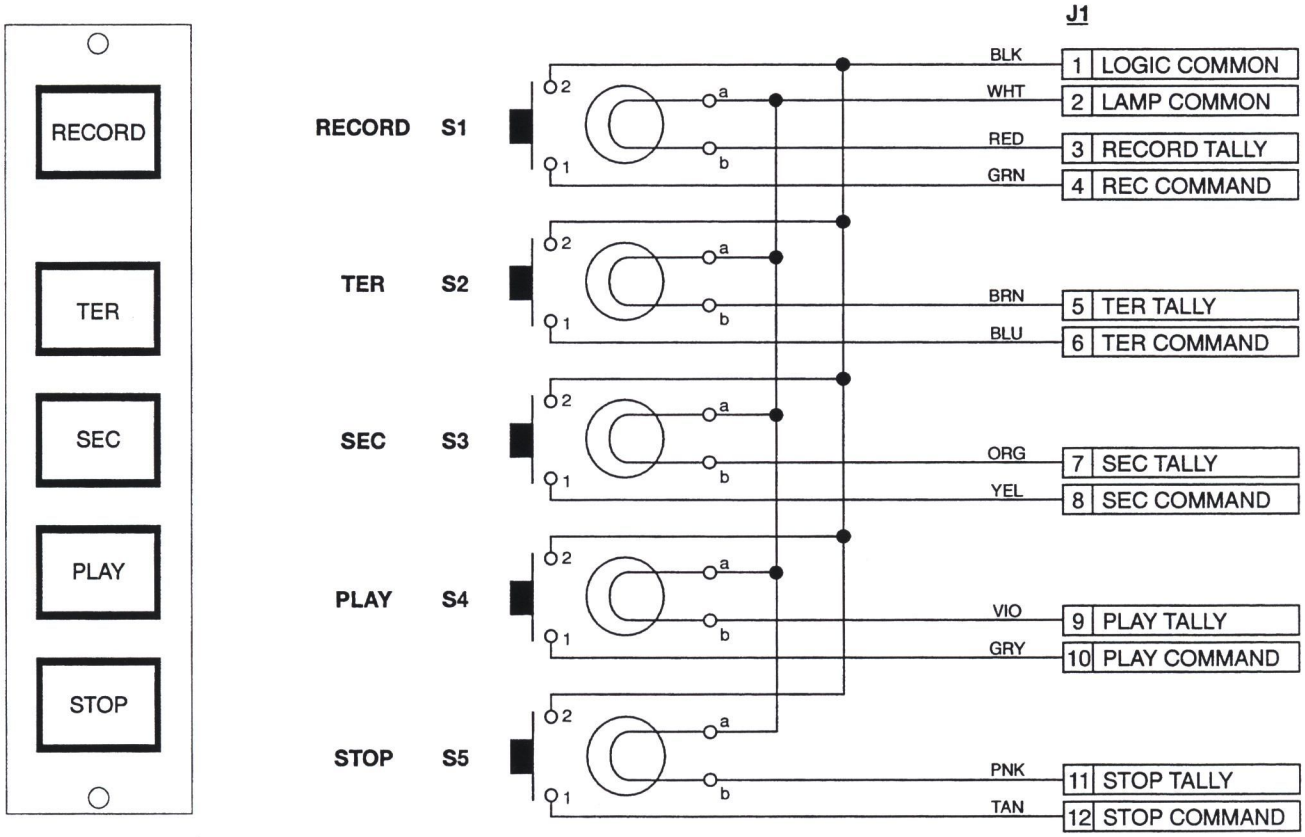
J1: HOUSING: 24-PIN FEMALE MOLEX #03-06-1242 (PR&E #15-715)
TERMINALS: FEMALE MOLEX #02-06-1103 (PR&E #15-2)

S1-5: SWITCH: EAO #31-423 (PR&E #25-119)

LAMPS: FOR -1: 5V, #7348 (PR&E #12-64)
FOR -2: 14V, #386 (PR&E #12-51)
FOR -3: 28V, #388 (PR&E #12-52)

LENSES: RECORD (PR&E #25-120-1); TER (PR&E #25-121-3); SEC (PR&E #25-121-2):
PLAY (PR&E #25-123-1); STOP (PR&E #25-122-1)

CABLE TYPE: 12-CONDUCTOR, BELDEN #8457 OR EQUIVALENT



8.4.1 CART RECORDER REMOTE CONTROL PANEL (PR&E #99-761-X)

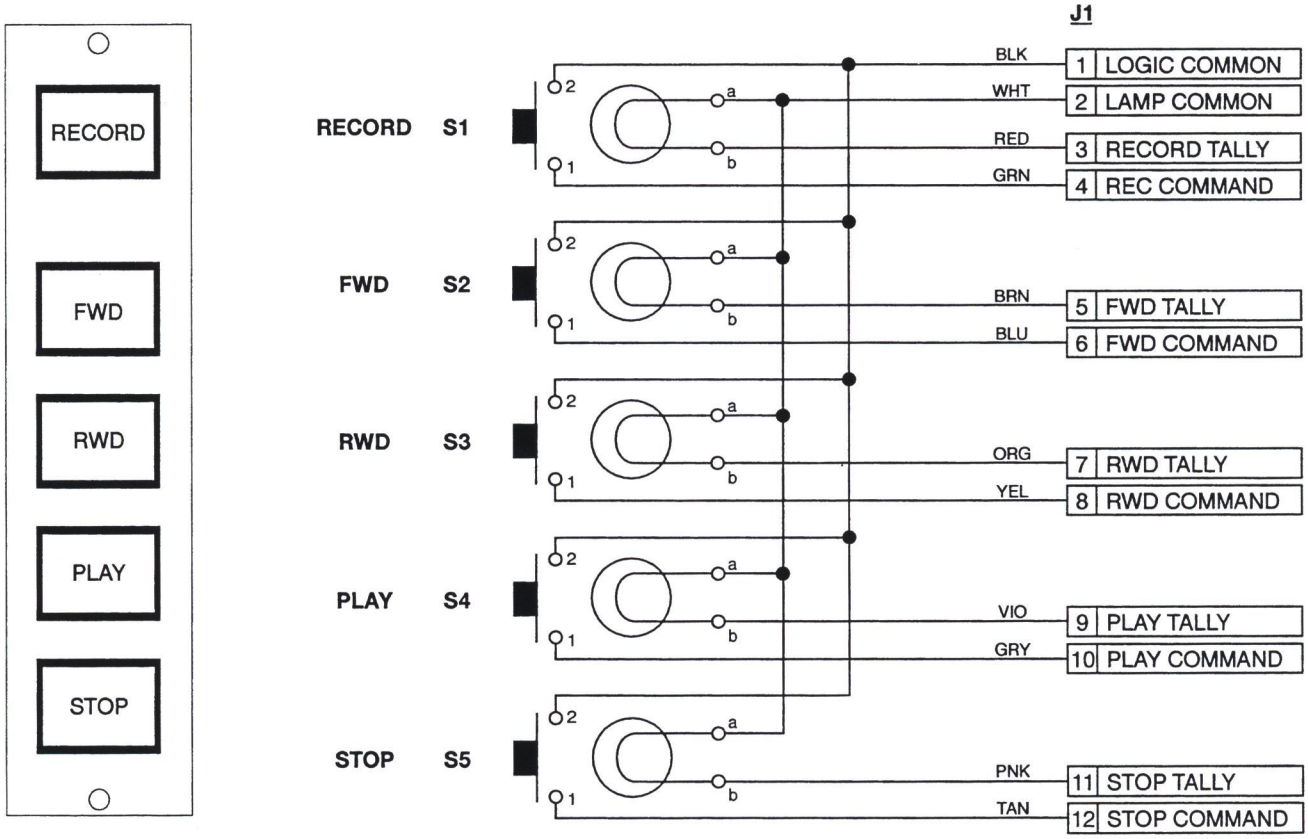
J1: HOUSING: 24-PIN FEMALE MOLEX #03-06-1242 (PR&E #15-715)
TERMINALS: FEMALE MOLEX #02-06-1103 (PR&E #15-2)

S1-5: SWITCH: EAO #31-423 (PR&E #25-119)

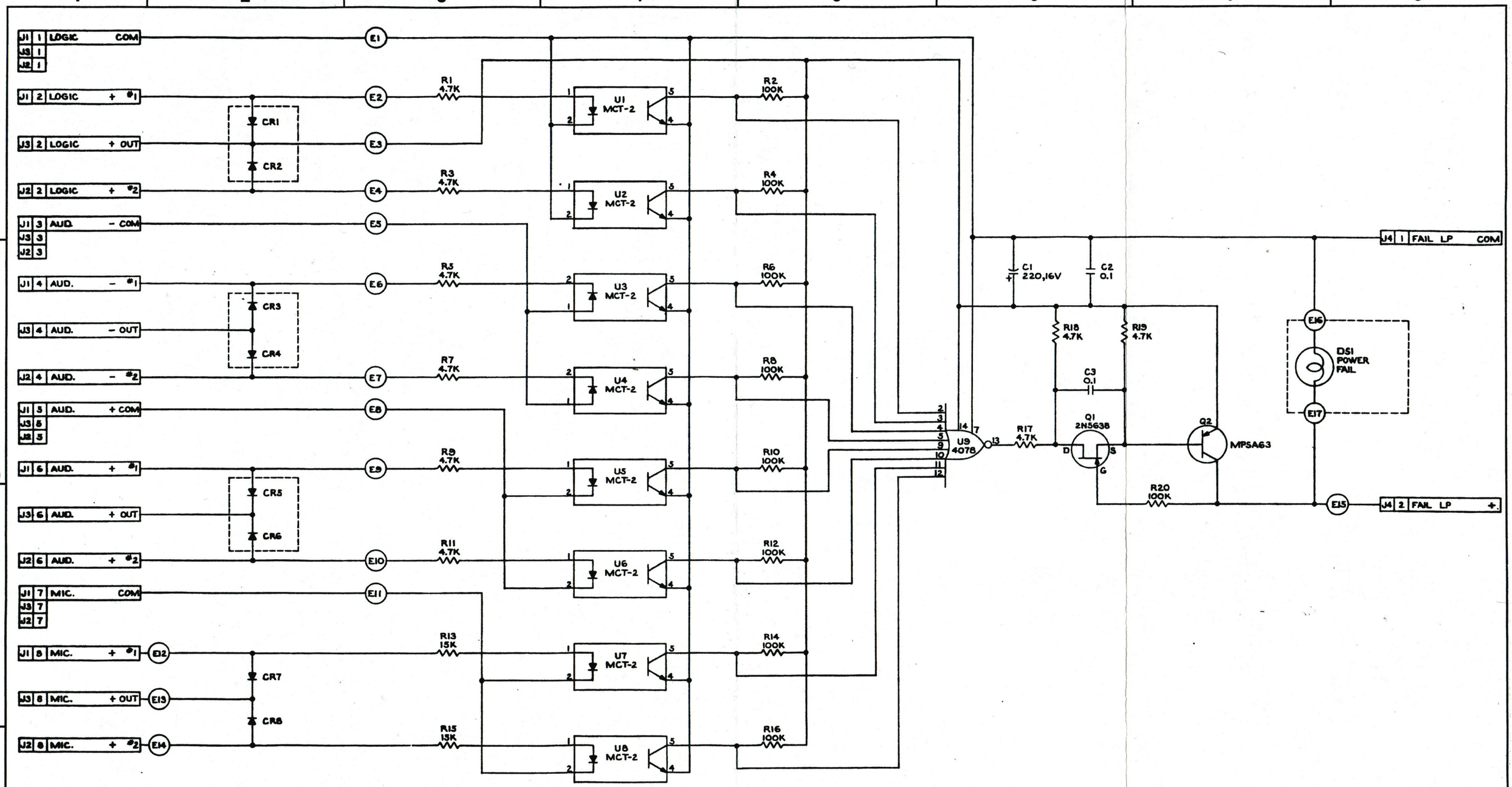
LAMPS: FOR -1: 5V, #7348 (PR&E #12-64)
FOR -2: 14V, #386 (PR&E #12-51)
FOR -3: 28V, #388 (PR&E #12-52)

LENSES: RECORD (PR&E #25-120-1); FWD (PR&E #25-125-6); RWD (PR&E #25-125-7):
PLAY (PR&E #25-123-1); STOP (PR&E #25-122-1)

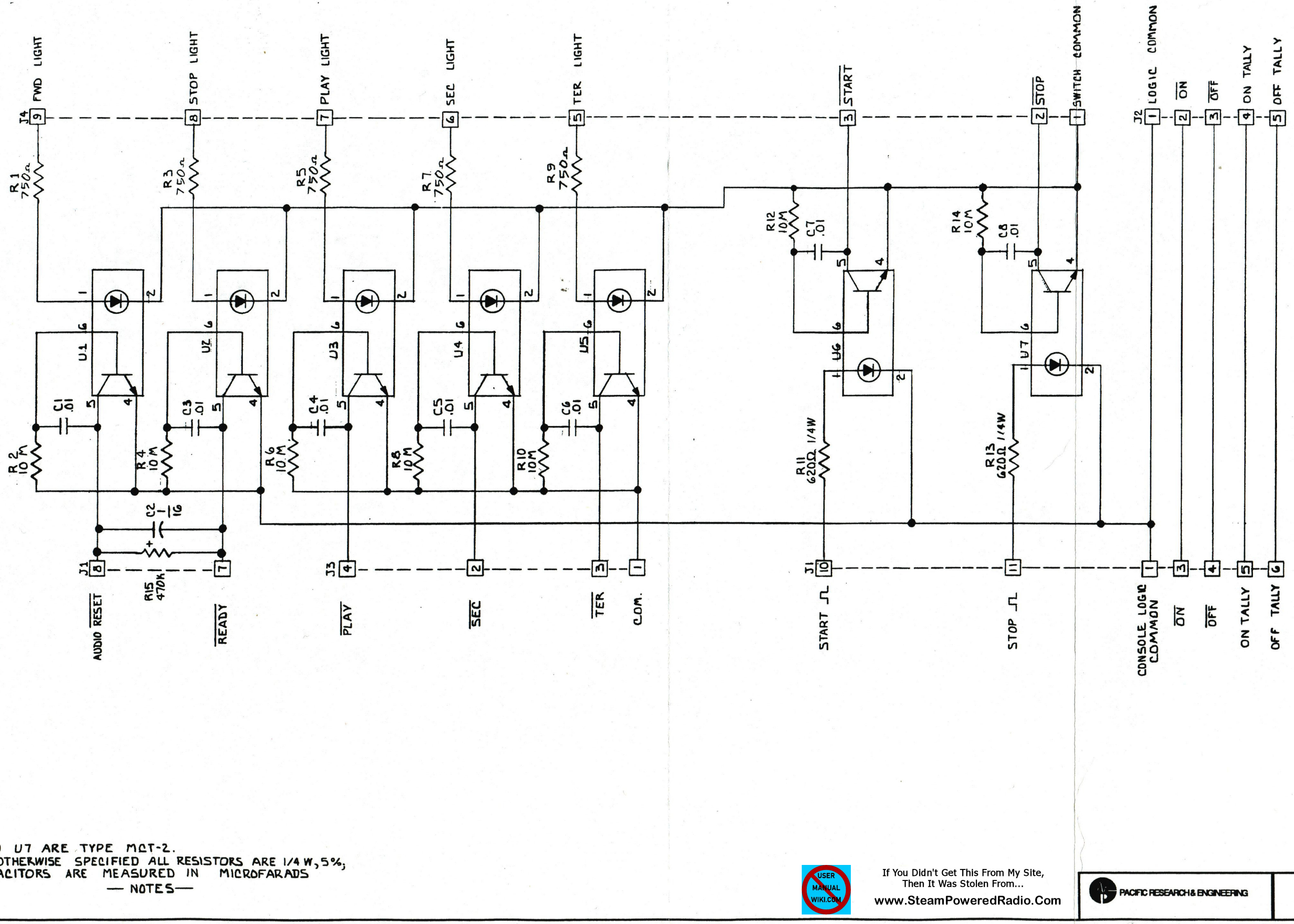
CABLE TYPE: 12-CONDUCTOR, BELDEN #8457 OR EQUIVALENT



8.4.2 CASSETTE AND TAPE RECORDER REMOTE CONTROL PANEL (PR&E #99-760-X)

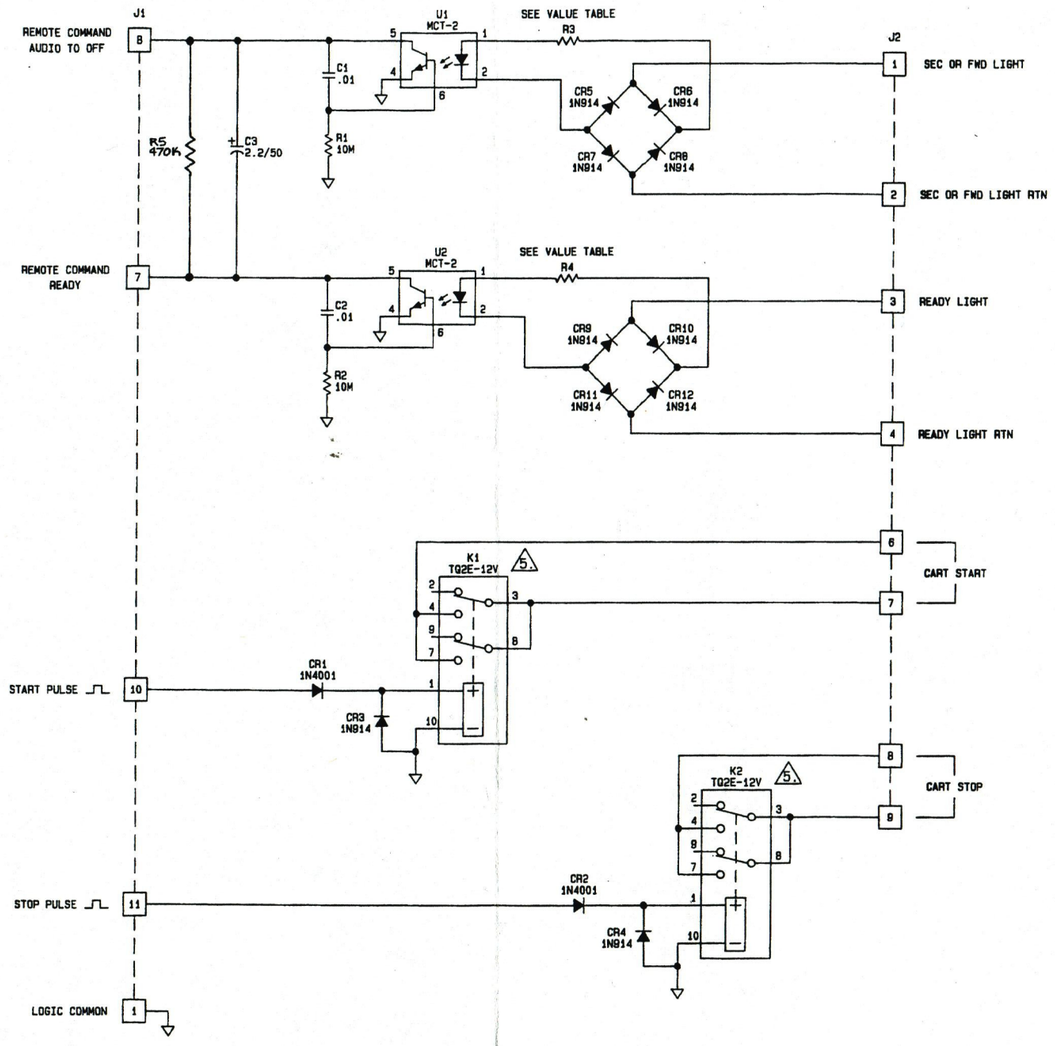


6. SHEET 2 DWG IS C SIZE.
5. ADDED SHEET 2.
4. CR7, CR8 ARE IN4001
3. CR1-CR6 ARE IN5824
2. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE MEASURED IN OHMS.
1. UNLESS OTHERWISE SPECIFIED ALL CAPACITORS ARE MEASURED IN MICROFARADS.



2. U1 THRU U7 ARE TYPE MCT-2.
1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE 1/4 W, 5%; ALL CAPACITORS ARE MEASURED IN MICROFARADS

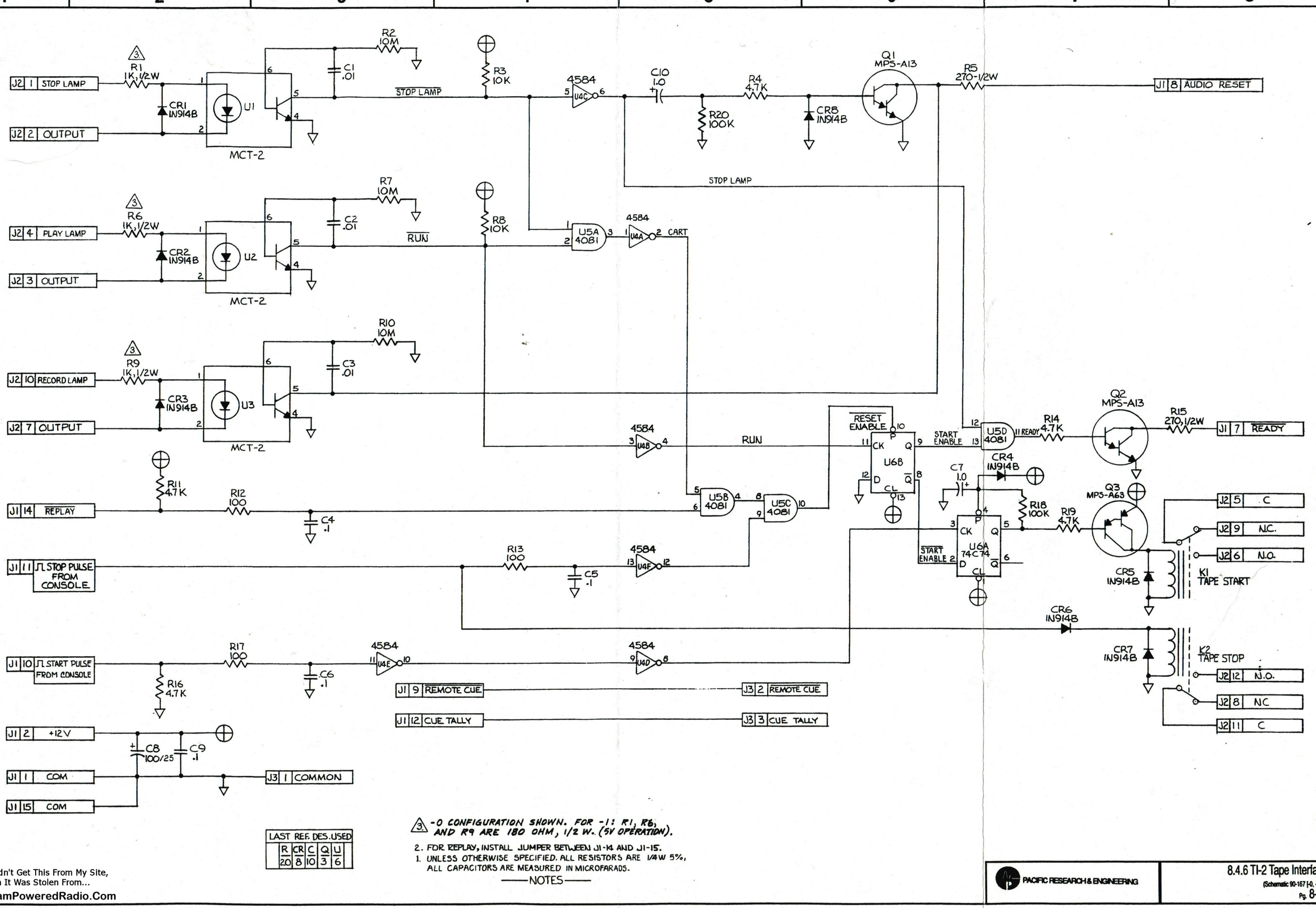
— NOTES —

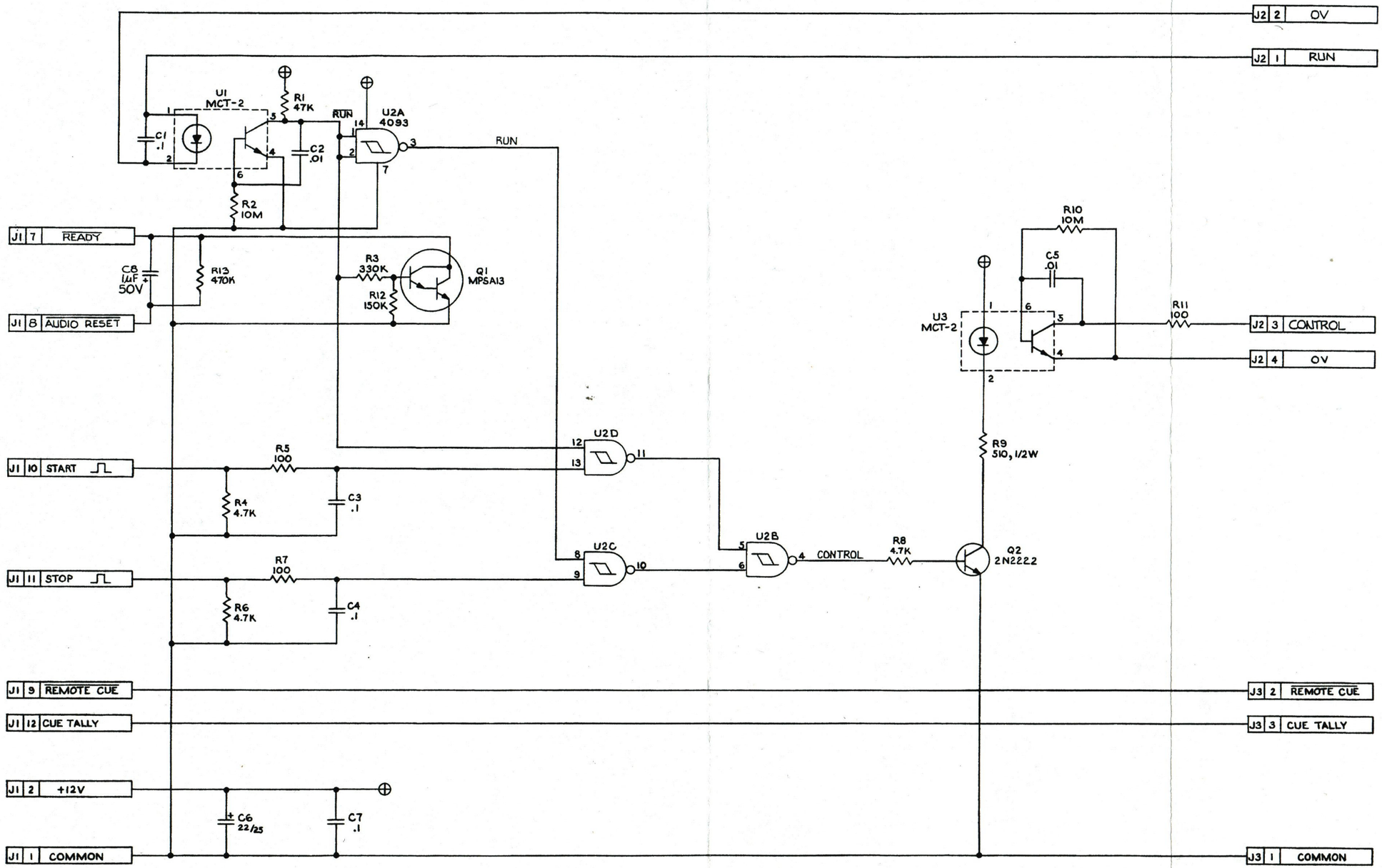


VALUE TABLE		
DASH No	REF DES	VALUE
99-125-0	R3	1K 1/2W
	R4	1K 1/2W
99-125-1	R3	100Ω 1/4W
	R4	100Ω 1/4W

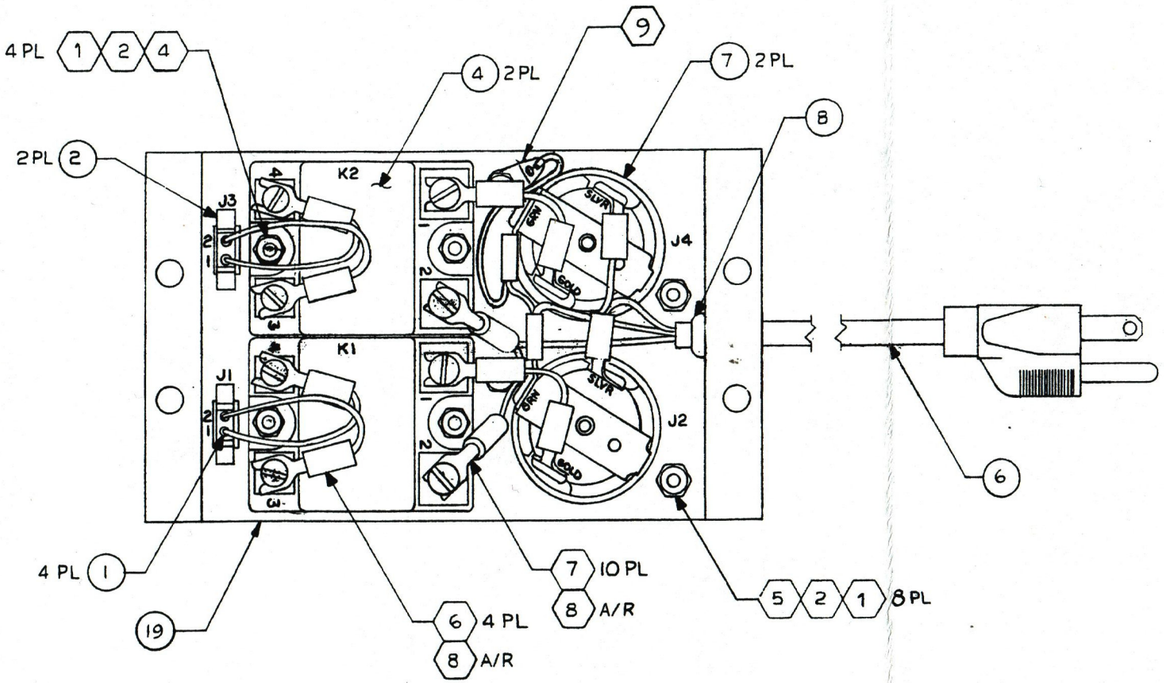
5. PC BOARDS WITH REV A & B USES AZ 530-09-2 RELAYS.
4. FOR PCA SEE DRAWING 90-170 LATEST REV.
3. NP=NONPOLARIZED
2. ALL CAPACITORS ARE MEASURED IN MICROFARADS.
1. ALL RESISTORS ARE 1/4W, 5%.

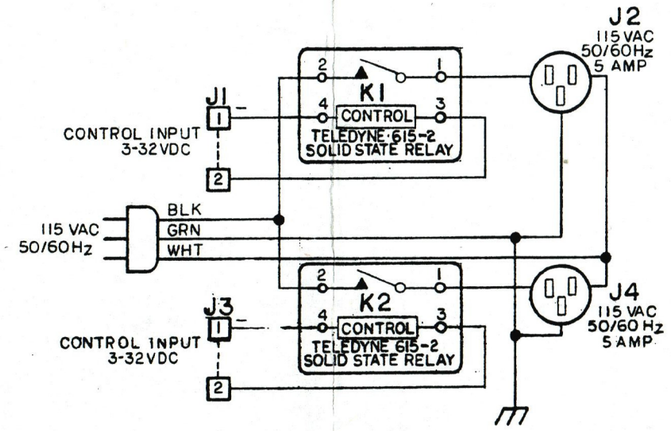
NOTES ; UNLESS OTHERWISE SPECIFIED.





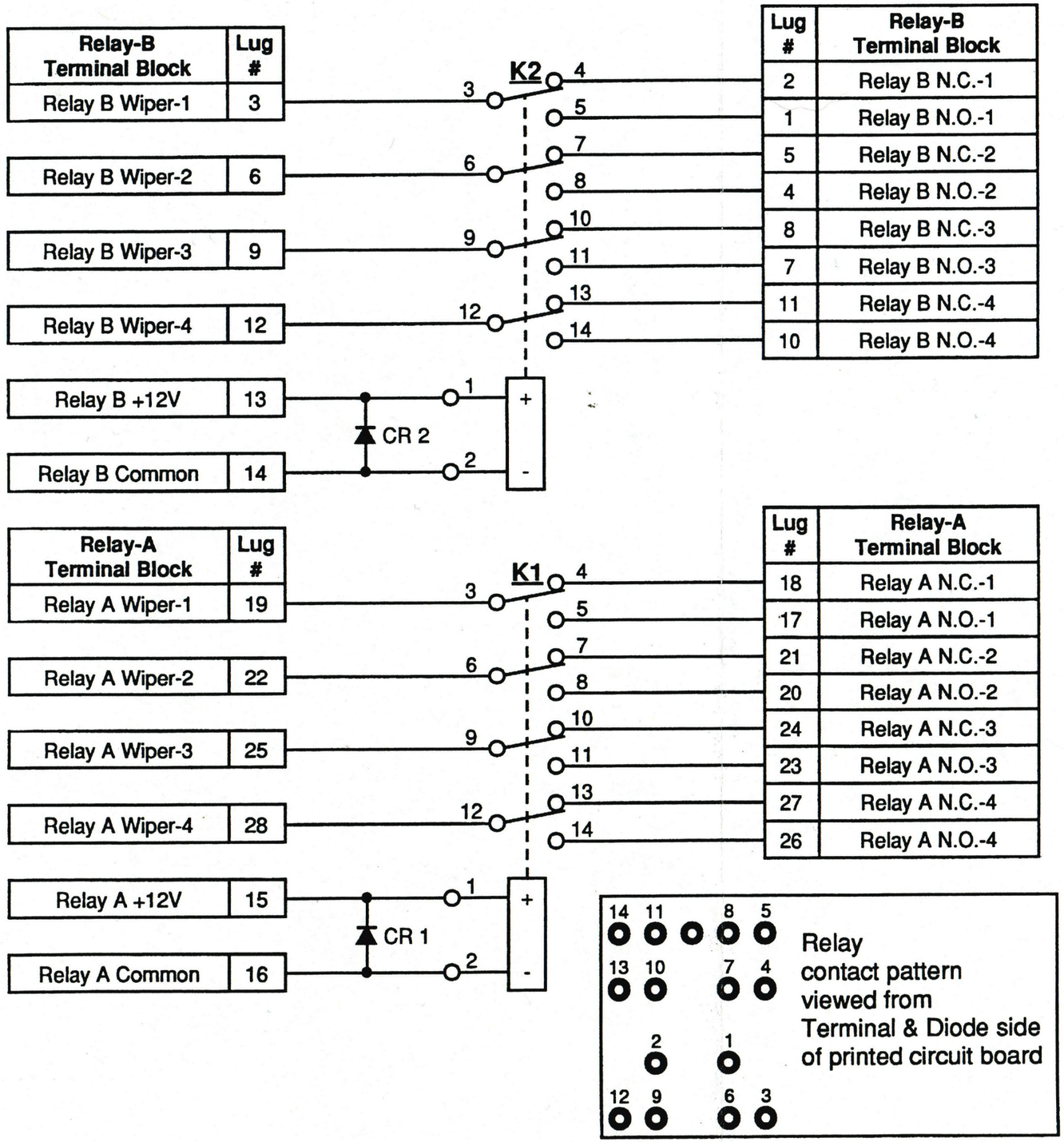
2. ALL CAPACITORS ARE MEASURED IN MICROFARADS
1. ALL RESISTORS ARE MEASURED IN OHMS, 1/4W, 5 %
NOTES: UNLESS OTHERWISE SPECIFIED

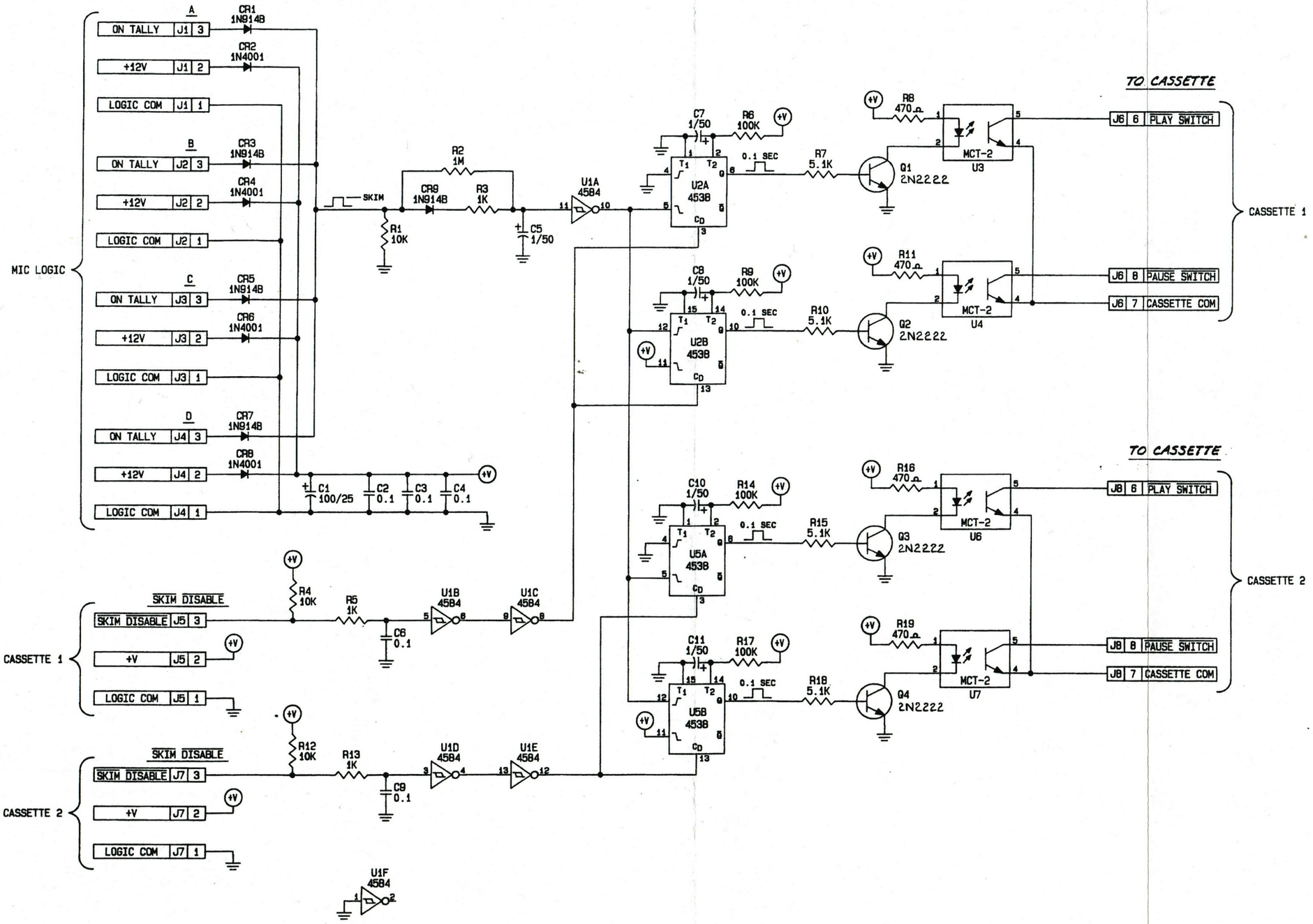




2. ⬡ INDICATES ITEMS FOUND ON ATTACHED PARTS LIST
1. ◯ INDICATES ITEMS FOUND ON SEPARATE PARTS LIST

NOTES: UNLESS OTHERWISE SPECIFIED





4. FOR PCA SEE DRAWING 95-410 LATEST REV.
3. +V = 11.4V.
2. ALL CAPACITORS ARE MEASURED IN MICROFARADS.
1. ALL RESISTORS ARE 1/4W, 5%.

NOTES: UNLESS OTHERWISE SPECIFIED.

REF DES	PIN No.	
	+V	COMM
U1	14	7
U2 U5	16	8

P1, P2: HOUSING: 15-PIN MALE MOLEX #03-06-2152 (PR&E #15-607)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

CABLE TYPE: 15-CONDUCTOR, BELDEN #8458 OR EQUIVALENT

CABLE LENGTH: DASH LEVEL X 3 FEET

P1	P2	WIRE COLOR
1	1	BLK
2	2	WHT
3	3	RED
4	4	GRN
5	5	ORG
6	6	BLU
7	7	WHT/BLK
8	8	RED/BLK
9	9	GRN/BLK
10	10	ORG/BLK
11	11	BLU/BLK
12	12	BLK/WHT
13	13	RED/WHT
14	14	GRN/WHT
15	15	BLU/WHT

P1, P2: HOUSING: 15-PIN MALE MOLEX #03-06-2152 (PR&E #15-607)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

CABLE TYPE: 15-CONDUCTOR, BELDEN #8458 OR EQUIVALENT

CABLE LENGTH: DASH LEVEL X 3 FEET

P1	P2	WIRE COLOR
1	1	BLK
2	2	WHT
3	3	RED
4	4	GRN
5	5	ORG
6	6	BLU
7	7	WHT/BLK
8	8	RED/BLK
9	9	GRN/BLK
10	10	ORG/BLK
11	11	BLU/BLK
12	12	BLK/WHT
13	13	RED/WHT

JUMPERS		
P1 14	P1 15	WHT JUMPER
P2 14	P2 15	WHT JUMPER

P1, P2: HOUSING: 15-PIN MALE MOLEX #03-06-2152 (PR&E #15-607)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

CABLE TYPE: 4 CONDUCTOR, BELDEN #8458 OR EQUIVALENT

P1*	P2*	WIRE COLOR
1	1	BLK
5	10	WHT
7	7	RED
8	8	GRN

***NOTE** : P1 IS THE CONSOLE CONNECTOR; P2 IS THE INTERFACE CONNECTOR

P1, P2: HOUSING: 9-PIN MALE MOLEX #03-06-2092 (PR&E #15-604)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

CABLE TYPE: 9-CONDUCTOR, BELDEN #9423 OR EQUIVALENT

CABLE LENGTH: DASH LEVEL X 3 FEET

P1	P2	WIRE COLOR
1	1	BLK
2	2	WHT
3	3	RED
4	4	GRN
5	5	BRN
6	6	BLU
7	7	ORG
8	8	YEL
9	9	VIO

P1, P2: HOUSING: 12-PIN MALE MOLEX #03-06-2122 (PR&E #15-605)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

CABLE TYPE: 12-CONDUCTOR, BELDEN #8457 OR EQUIVALENT

CABLE LENGTH: DASH LEVEL X 3 FEET

P1	P2	WIRE COLOR
1	1	BLK
2	2	WHT
3	3	RED
4	4	GRN
5	5	BRN
6	6	BLU
7	7	ORG
8	8	YEL
9	9	VIO
10	10	GRY
11	11	PNK
12	12	TAN

P1, P2: HOUSING: 24-PIN MALE MOLEX #03-06-2242 (PR&E #15-807)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

CABLE TYPE: 25-CONDUCTOR, BELDEN 8458 OR EQUIVALENT

CABLE LENGTH: DASH LEVEL X 3 FEET

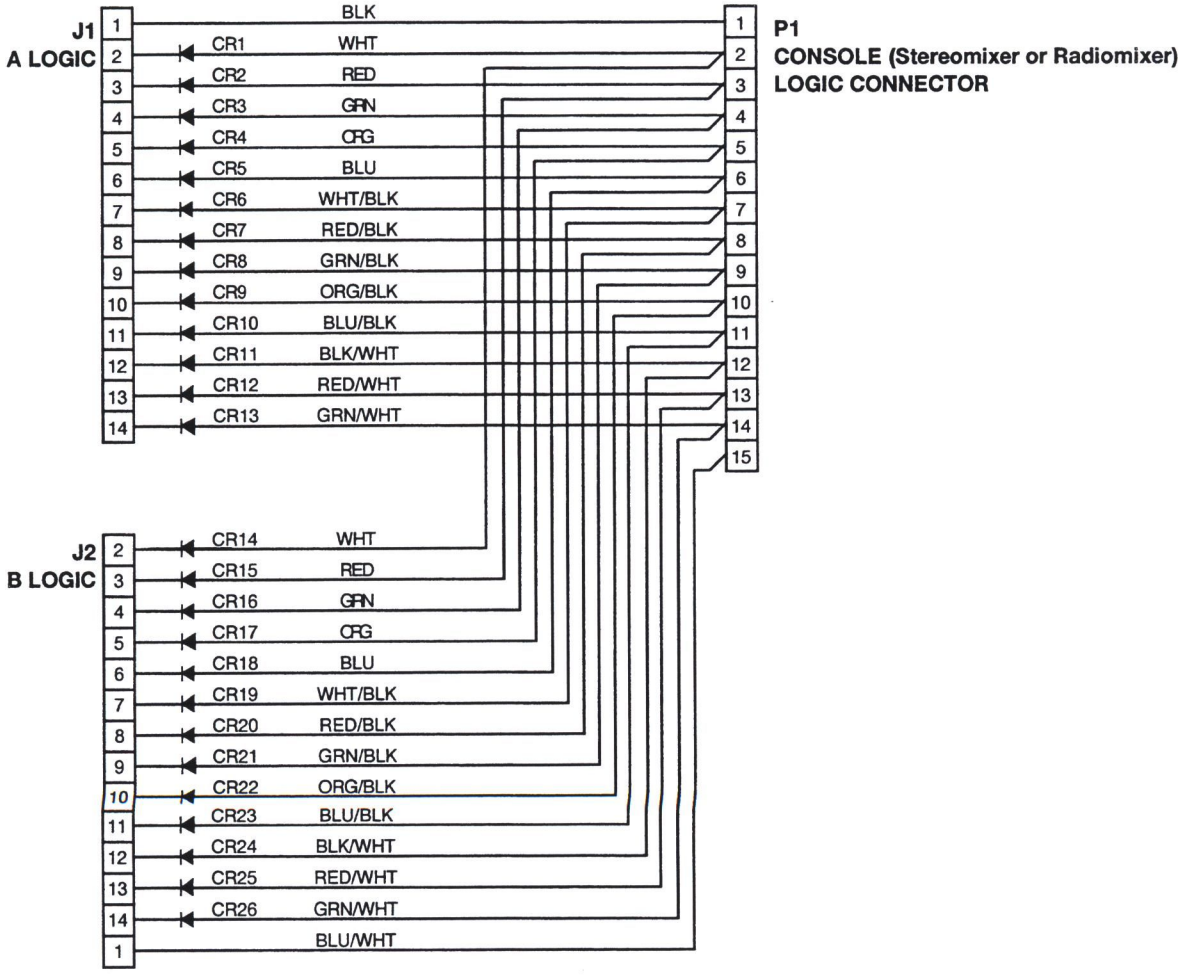
P1	P2	WIRE COLOR
1	1	BLK
2	2	WHT
3	3	RED
4	4	GRN
5	5	ORG
6	6	BLU
7	7	WHT/BLK
8	8	RED/BLK
9	9	GRN/BLK
10	10	ORG/BLK
11	11	BLU/BLK
12	12	BLK/WHT
13	13	RED/WHT
14	14	GRN/WHT
15	15	BLU/WHT
16	16	BLK/RED
17	17	WHT/RED
18	18	ORG/RED
19	19	BLU/RED
20	20	RED/GRN
21	21	ORG/GRN
22	22	BLK/WHT/RED
23	23	WHT/BLK/RED
24	24	RED/BLK/WHT

P1: HOUSING: 15 PIN MALE MOLEX #03-06-2152 (PR&E #15-607)
TERMINALS: MALE MOLEX #02-06-2103 (PR&E #15-3)

J1,J2: HOUSING: 15 PIN FEMALE MOLEX #03-06-1152 (PR&E #15-712)
TERMINALS: FEMALE MOLEX #02-06-1103 (PR&E #15-2)

CABLE TYPE: 15 COND., BELDEN #8458

DIODES: 1N4002 (PR&E #11-26)



NOTE: THE PR&E PART NUMBER FOR THIS ASSEMBLY IS 99-580.