

**BEFORE PROCEEDING WITH COMPLETE UNPACKING AND SETUP,
READ THE SECTION ON UNPACKING AND INSPECTION**

**1650 SERIES
1680 SERIES
1690 SERIES
BROADCAST CONSOLES**



**UREI Incorporated
8400 BALBOA BOULEVARD
NORTHRIDGE, CA. 91325-4100 U.S.A.
PHONE: (818) 895-UREI (895-8734)
FAX: (818) 891-5475**

PREFACE

Thank you for purchasing this UREI Stereo Broadcast Console. The manual you are now reading contains complete information on how to install, adjust and maintain it. We recommend that you study the applicable portions of this manual carefully before you begin any of the above operations. Even if you are very experienced, you may find some information which will be useful to you.

We welcome your comments and suggestions on our products and on this manual.

1690 SERIES CONSOLE
ADDENDUM

The UREI 1690 Series Stereo Broadcast Consoles are in most respects similar to the 1650 and 1680 Series Consoles for which this manual was written. The exceptions are as follows:

- 1) The console has a total of 12 input mixing positions.
- 2) The console has a total of 3 auxiliary input switches.
- 3) The note on the drawing on page 38 describing the wire colors for the channel enable circuits is incorrect. The correct colors are:

CHANNEL	COLOR	CHANNEL	COLOR	CHANNEL	COLOR
1	Brown	5	Green	9	White
2	Red	6	Blue	10	Orange/white
3	Orange	7	Violet	11	Brown/white
4	Yellow	8	Gray	12	Yellow/white

12/85

TABLE OF CONTENTS

	PAGE
<u>SECTION I INTRODUCTION</u>	
1.1 DESCRIPTION.....	1
1.2 ELECTRICAL SPECIFICATIONS.....	4
1.3 CONTROLS.....	5
1.4 PHYSICAL SPECIFICATIONS.....	6
1.5 ACCESSORIES.....	6
 <u>SECTION II INSPECTION AND INSTALLATION</u>	
2.0 GENERAL.....	7
2.1 UNPACKING AND INSPECTION.....	7
2.2 CONSOLE LOCATION.....	8
2.3 CONSOLE WIRING -- GENERAL.....	9
2.4 OPENING THE CONSOLE.....	10
2.5 POWER SUPPLY CONNECTION.....	10
2.6 MODULE REMOVAL AND INSERTION.....	11
2.7 CONSOLE GROUND.....	12
2.8 IMPEDANCE AND TERMINATION.....	12
2.9 MICROPHONE INPUT CONNECTION.....	13
2.10 LINE INPUT CONNECTIONS.....	14
2.11 AUXILIARY INPUT SWITCH WIRING.....	14
2.12 AIR AND EXTERNAL MONITOR INPUT CONNECTIONS.....	14
2.13 OUTPUT CONNECTIONS.....	15
2.14 MONITOR/CUE MUTING.....	15
2.15 ON/OFF PUSHBUTTONS AND REMOTE START/STOPS.....	16
2.16 MONITOR SPEAKER CONNECTION.....	17
2.17 HEADPHONE CONNECTION.....	17
2.18 EXTERNAL CUE SPEAKER CONNECTION.....	18
2.19 CONNECTION OF MONITOR PREAMPLIFIER OUTPUT.....	18
2.20 CUE ON MICROPHONE INPUT.....	18
2.21 LINE INPUT TRANSFORMER INSTALLATION.....	18
2.22 COPY STAND.....	19
2.23 PHONO PREAMPLIFIER, MODEL 1101.....	19
2.24 MIC PREAMPLIFIER PROCESSOR LOOP.....	20
FIGURE 2-1 BALANCED INPUT.....	23
FIGURE 2-2 UNBALANCED INPUT.....	23
FIGURE 2-3 MONO SOURCE INTO TWO INPUTS.....	23
FIGURE 2-4 MUTE 1 - 3, REMOTE START/STOP.....	24
FIGURE 2-5 REMOTE ON/OFF.....	24
FIGURE 2-6 COPY STAND SIDE VIEW.....	25
FIGURE 2-7 COPY STAND REAR VIEW.....	25
FIGURE 2-8 MIC PREAMP PROCESSOR LOOP.....	26

SECTION III SETUP INSTRUCTIONS

3.0	GENERAL.....	27
3.1	VU METER CALIBRATION.....	27
3.2	MICROPHONE GAIN ADJUSTMENT.....	28
3.3	LINE LEVEL INPUT.....	28
3.4	OVERLOAD LEVEL INDICATOR ADJUSTMENT.....	29
3.5	AIR AND EXTERNAL MONITOR LEVEL TRIM ADJUSTMENT.....	30
3.6	ON AIR SOURCE SWITCH.....	30

SECTION IV THEORY OF OPERATION

4.0	GENERAL.....	32
4.1	MICROPHONE PREAMPLIFIER.....	32
4.2	LINE LEVEL INPUT.....	32
4.3	PROGRAM/AUDITION AMPLIFIERS.....	33
4.4	MONITOR AMPLIFIERS.....	34
4.5	ON-AIR SOURCE SWITCH.....	34
4.6	METERS.....	35
4.7	LOGIC CIRCUITRY.....	35
4.8	ON-AIR OVERLOAD DETECTOR.....	36
4.9	HEADPHONE/CUE AMPLIFIERS.....	37
4.10	POWER SUPPLY.....	37
	FIGURE 4-1 LOGIC CIRCUIT DIAGRAM.....	38

SECTION V MAINTENANCE

5.0	GENERAL.....	39
5.1	REPAIRS AND WARRANTY.....	39
5.2	RF INTERFERENCE AND WHAT TO DO ABOUT IT.....	40
5.3	THE CURSE OF CARBONATED BEVERAGES.....	41
5.4	CLEANING.....	42
5.5	CONDUCTIVE PLASTIC POTS.....	43
5.6	ROTARY ATTENUATORS.....	43
5.7	SLIDE ATTENUATORS.....	44
5.8	LAMP REPLACEMENT.....	45
5.9	ROCKER SWITCHES.....	46
	FIGURE 5-1 PENNY & GILES ATTENUATOR.....	49
5.10	PARTS LIST.....	50
5.11	INDEX OF SCHEMATICS.....	62

SECTION I INTRODUCTION

1.1 DESCRIPTION

The UREI 1650 and 1680 Series Stereo Broadcast Consoles are an all-new line of six on-the-air boards with the features most requested by engineers and consultants and with full UREI quality, yet priced within the budget of the small-market station.

These consoles offer a choice of five or eight mixers and a choice of attenuator types as well. There is ample provision for customization to fit individual station requirements, but no accessories are required to put them on the air -- each board is ready to operate as supplied from the factory.

The Series 1650 and 1680 Consoles have unusually high output capability: +24 dBm into 600 ohm loads, so that today's dynamic program material can be safely handled without clipping. A peak overload indicator LED is located between the VU meters, and its threshold can be internally adjusted to alert the operator that a downstream device, such as an STL, may be clipping.

These consoles are also very quiet: the signal to noise ratio of the microphone channel, from input to console output, is better than 70 dB with -50 dBm input and +4 dBm output, or better than 90 dB referenced to maximum output. Distortion is extremely low, as well. At the full output level of +24 dBm into 600 ohms, the THD of both Program and Audition channels is less than 0.25% over the range of 30 Hz to 15 kHz; at normal +4 or +8 dBm operating level, the THD is typically less than 0.02%.

Three different types of attenuators are available to fit individual station requirements and budgets. Models 1651 (5-mixer) and 1681 (8-mixer) are fitted with smooth, reliable conductive plastic rotary attenuators. Models 1652 and 1682 utilize Shallco precision stepped rotary attenuators, which have been field-proven for many years. Models 1653 and 1683 feature the latest Penny & Giles straight-line attenuators which are internally protected against contaminants. Replacement attenuators are available in case of need.

Each mixer position has two inputs selectable with a rocker switch. In addition, two banks of four pushbutton switches may be connected to any mixer input for use with additional sources such as remote or network feeds. For maximum reliability and long life, all audio switch contacts are gold filled.

All channel On/Off switching is performed by reliable, noise-free FET switches activated by illuminated push buttons. These push buttons have extra switch contacts which may be used for activating cartridge machines, turntables or similar equipment.

The 1650 Series consoles are supplied with one monaural, transformer isolated microphone input preamplifier and four stereo line input preamplifiers; the 1680 Series units come with one microphone preamplifier and seven line preamplifiers. All preamplifiers are interchangeable in all positions, so that additional microphone preamplifiers may be substituted and installed in any mixer position.

The console line inputs can accept nominal +4 dB or +8 dB professional sources, and internal gain trims on each line input amplifier allow connection of audio equipment with nominal output levels of -10 dB without upsetting the overall gain structure of the console. The line inputs feature active balanced inputs which, unlike other so-called "balanced" differential inputs, are AC-referenced to ground. Optional line input transformers are available if required.

The Program and Audition outputs are identical, and include output transformers. A front panel transfer switch allows the exchange of Program and Audition outputs in the unlikely event of a program amplifier failure.

Monitoring the audio with the UREI consoles is simple, yet flexible. A four-position pushbutton selector connects Program, Audition, Air or an external input to an internal 8 W stereo power amplifier. Three pairs of speaker outputs are available, each pair with its own mute circuitry. A line level output is available for a larger external amplifier. Another four-position selector sends Program, Audition, Air or Cue to an internal 1 W headphone amplifier and two stereo phone jacks, one on either end of the console front edge, so that operator personal preferences can be accommodated. A cue loudspeaker with its own 1 W amplifier is built in and is automatically muted whenever Mute Buss 1 is activated; an external cue speaker may be used if desired. Two illuminated VU meters can be switched to either Program or Audition outputs and may be internally adjusted to read 0 VU from 0 to +10 dBm output levels.

The UREI consoles have excellent mute flexibility. There are three independent muting busses, and each mixer position may be configured to operate any or all of the busses. Each of the busses may drive one of the three mute relays, and each of these relays has a spare SPST contact for activating external low-current indicator lamps or relays. Mute Buss 1 electronically mutes the cue amplifier and speaker, but does not affect the cue feed in the headphone output.

The UREI Model 1101 Stereo Phono Preamplifier is available as an optional accessory for the Series 1650 and 1680 Broadcast Consoles. This top-quality preamp takes its power from the console and is designed for mounting close to the turntable, to avoid problems with hum and RF pickup from long, unbalanced Hi-Z phono wiring. The Model 1101's frequency response is within ± 0.5 dB of RIAA/NAB/IEC specifications, and includes the latest recommended infrasonic rolloff. To accommodate individual differences in phono cartridges, trimmers are provided to adjust the response up to ± 5 dB at 50 Hz and 10 kHz. The 1101 is quiet, too: noise is 70 dB below a 10 mV input at 1 kHz (15.7 kHz noise bandwidth).

Installation of the UREI consoles is quick and easy, thanks to barrier strips with clear, easy to read designations, internal troughs for convenient cable routing and mechanical tie points adjacent to the wire entry holes for strain relief of the wiring. No special tools are required. RF interference problems are minimal, thanks to "Buss in a Box"TM internal construction -- all sensitive runs are in shielded housings and extensive use of ground planes on the circuit boards keep RF out of the audio. To add that finishing touch, an optional plexiglass copy stand fits over the meter housing to eliminate the need for do-it-yourself carpentry.

The Series 1650 and 1680 consoles are designed to last and to keep looking good as well. Highest quality electronic components, heavy-duty fiberglass circuit boards, and extensive testing of individual subassemblies as well as complete systems assure that the UREI consoles, like all other UREI products, will work when they are first powered up and will continue to work for thousands of hours. Heavy steel and aluminum construction will stand up to hard use, and durable finish with polycarbonate overlays allow marks on the console surface to be easily cleaned. Maintenance is quick and easy, as well. Both the meter box and the front panel are hinged to allow rapid access to all interior circuitry, and silkscreened circuit boards allow quick component identification. All integrated circuits are socketed, and a spares kit is available for convenience.

NOTE: Throughout this manual, 0 dB is defined as 0.775 V, and, thus, a 600 ohm load is assumed for levels referenced to 0 dBm (1 mW).

1.2 ELECTRICAL SPECIFICATIONS

Models 1651 & 1681 feature rotary conductive plastic attenuators;
 Models 1652 & 1682 feature Shallco precision rotary attenuators;
 Models 1653 & 1683 feature Penny & Giles straight line attenuators.

INPUTS:

	1650 Series	1680 Series
Mixers	5	8
Inputs per Mixer	2	2
	(plus two 4-position input selector banks assignable to any input position.)	
Preamplifiers Supplied		
Microphone	1 (monaural)	1 (monaural)
Line	4 (stereo)	7 (stereo)
	(mic or line preamplifiers may be placed in any mix position.)	
Input Impedance		
Microphone	Bridging for 150 ohm source, transformer isolated, symmetrical, floating.	
Line	10k ohm balanced, 5k ohm unbalanced differential amplifier; input transformer optional.	
Outputs		
Program	+24 dBm, transformer isolated, symmetrical, floating.	
Audition	Identical to Program Outputs.	
Monitor	8 W/channel into 8 ohm load.	
Headphone	1 W/channel into 8 ohm load.	
Cue	1 W into 8 ohms; built-in cue speaker.	
Frequency Response		
Program & Audition	±1 dB, 20 Hz - 20 kHz.	
Distortion		
Program & Audition	< 0.25% THD, 30 Hz - 15 kHz @ +24 dBm; Typically < 0.02% @ +4 dBm.	
Gain		
Mic In to Pgm Out	Nominal 54 dB with input mixer at -15 and master at "0" level mark; Maximum gain 79 dB ±1 dB.	
Line In to Pgm Out	Nominal unity gain with input mixer at -15 and master at "0" level mark; Internal trim allows gain increase of up to 20 dB; Maximum gain typically 45 dB.	

Signal to Noise Ratio
Program & Audition

Better than 70 dB below +4 dBm output with -50 dBm microphone input; equivalent input noise better than -124 dBm, 15.7 kHz noise bandwidth.

1.3 CONTROLS

Monitor

4-position pushbutton selector of Program, Audition, Air and External inputs; Air and Auxiliary inputs are 10k ohm balanced or 5k ohm unbalanced impedance with internal gain trims.

Headphone

4-position pushbutton selector of Program, Audition, Air and Cue inputs; 2 stereo 1/4 in. (6.3 mm) phone jack outputs on front edge of console.

Muting

3 independent muting busses; each mixer position may be independently assigned to any or all of the busses; each buss may drive one of the 3 mute relays. Cue output is electronically muted from Mute Buss 1. Each of the 3 relays has an extra SPST contact for activation of external low current indicator lights or relays.

Meters

2 (left and right); switchable to either Program or Audition outputs; sensitivity control in meter amplifier allows 0 VU to correspond to +4 or +8 dBm; back-lighted with long-life lamps operated at decreased voltage for extended service.

Output Transfer Switch

Allows immediate interchange of Program and Audition outputs in case of program amplifier failure.

Overload Indicator

LED on meter panel; flashes to indicate short duration peak signals which may not be indicated on VU meters but which may cause clipping of downstream devices such as STLs; threshold level internally adjustable.

Power Supply

Provides ± 18 V DC for low-level audio circuits, ± 14 V DC for power amplifier circuits, ± 26 V DC for logic, lamps and relays; regulated ± 18 V DC available on terminal strip for powering accessory Model 1101 Phono Preamplifiers.

Power Requirements 120 V AC, 60 W; approx. 5 ft (1.5 m) captive 3-wire U-ground power cord, and 5 ft (1.5 m) 5 wire cable to console.

1.4 PHYSICAL SPECIFICATIONS

	Series 1650	Series 1680
Dimensions (HxWxD):		
Console	7 x 29 x 15 in (178 x 737 x 381 mm)	7 x 33 x 15 in (178 x 838 x 381 mm)
Power Transformer		
Chassis	3 1/4 x 4 x 6 1/4 in (83 x 102 x 159 mm)	

1.5 ACCESSORIES

Model 1101 Stereo Phono Preamplifier

Input Impedance	47k ohms.
Output Impedance	100 ohms.
Frequency Response	Within ± 0.5 dB of RIAA/NAB/IEC specification, with recommended infrasonic rolloff.
Controls	
Lo Frequency Trim	± 5 dB @ 50 Hz.
Hi Frequency Trim	± 5 dB @ 10 kHz.
Signal to Noise Ratio	70 dB below 10 mV input @ 1 kHz, 15.7 kHz noise bandwidth.
Required Power	± 18 V DC, 15 mA regulated, supplied by console.
Dimensions	1 1/2 x 5 21/32 x 5 5/16 in (38 x 144 x 135 mm)

Monaural Microphone Preamplifier, Plug-in	Part No. 10-13952
Stereo Line Preamplifier, Plug-in	Part No. 10-13958
Line Input Transformer	Part No. 16-13951
Copy Stand, Plexiglass	Part No. 10-13959
Spares Kit	Part No. 10-13960
Rotary Conductive Plastic Attenuator, replacement for Models 1651 and 1681	Part No. 10-13961
Shallco Precision Rotary Attenuator, replacement for Models 1652 and 1682	Part No. 10-13962
Penny & Giles Straight Line Attenuator, replacement for Models 1653 and 1683	Part No. 10-13963

SECTION II INSPECTION AND INSTALLATION

2.0 GENERAL

The UREI 1650/80 Broadcast Consoles are designed for quick, convenient installation with a minimum of tools. There are, however, many factors that affect a successful console installation other than the choice of the correct screwdriver. Console installation can, in some respects, be considered an art -- one in which certain specific techniques are perfected and then used to achieve successful results, both electrically and aesthetically.

WE RECOMMEND THAT YOU READ THE APPLICABLE PORTIONS OF THIS MANUAL THOROUGHLY BEFORE YOU BEGIN THE CONSOLE INSTALLATION. ALL OF THE SOUNDS OF YOUR STATION WILL GO THROUGH THIS CONSOLE, AND IF IT IS INCORRECTLY INSTALLED OR IMPROPERLY SET UP, THE RESULTS MAY NOT MEET PROFESSIONAL EXPECTATIONS.

If you are an experienced installer, much of what follows may repeat information you already have. Nevertheless, we suggest that you review this manual to determine how the equipment was intended to be installed and adjusted. If you are less experienced, this manual should provide the information you require to understand the console's mechanical as well as electrical design and to accomplish a neat, clean installation.

2.1 UNPACKING AND INSPECTION

Your UREI Stereo Broadcast Console was carefully packed at the factory, and the containers were designed to protect the unit from rough handling. Nevertheless, we recommend careful examination of the shipping carton and its contents for any sign of physical damage which could have occurred in transit.

If damage is evident, do not destroy any of the packing material or the carton, and immediately notify the carrier of a possible claim for damage. Shipping claims must be made by the consignee. (That's legalese for the person or firm which receives the shipment.)

The larger carton should contain:

The Stereo Broadcast Console.

UREI Instruction Manual (this book).

Two-part Warranty Card.

The smaller carton should contain a separate chassis containing the power transformer and a package with a spare fuse and lamps.

2.2 CONSOLE LOCATION

Before the console can be wired, it must be physically placed in the position where it will be used. The console is intended to be installed on a desk or table top which is approximately 30 inches (762 mm) high. We suggest that the console be placed in the intended position and that several factors be checked before the console is fastened down:

- 1) Is the console far enough forward that the controls are easily operated?
- 2) Is the console far enough back that there is table space in front for pencils, papers, log sheets, etc., according to your operational needs?
- 3) Is there enough room behind the console so that the meter box can be opened completely for service? If not, can the console be moved forward without impairing the amount of space needed for logs, etc.?

While the circuitry in the console is shielded from moderate hum fields, it is good practice to keep AC wiring, motors, transformers or other devices which generate an electromagnetic field as far from the console and its signal wiring as possible.

After the console has been precisely located, open the meter box and front panel, following the instructions in Section 2.4. Note that the console shell has three 2 inch (50 mm) diameter holes on the bottom, which are for wire entry and exit.

Remove the four screws which fasten the output transformer circuit board to the console bottom, and move it away from the holes. The circuit board may remain unfastened to facilitate wiring but must be reattached before power is applied to the console.

Use the console as a template and mark the holes for cutting. Additionally, there are four small holes intended for #8 (4 mm) wood or sheet metal screws to fasten the console onto the desk or table. These holes may be marked at this time for drilling pilot holes. After the holes have been precisely marked, remove the console from its mounting surface and drill the mounting and wire entry holes, then replace the console and fasten it securely to the surface.

2.3 CONSOLE WIRING -- GENERAL

The UREI Stereo Broadcast Console has been designed for convenient and neat wiring. There are three 2 inch (50 mm) holes located on the bottom of the chassis for wire entrance and exit, wiring troughs to guide the cables and locations for cable ties to insure a neat, workmanlike installation. Additionally, all input and output wiring connections are made to barrier strips, requiring only a standard screwdriver to attach the wires. We recommend that you initially wire in your monitors and one or two inputs, then turn the console on and check that things seem to be happening according to plan. Check for signal path, ground loops and RFI BEFORE you wire the entire console incorrectly!

Specific instructions for wiring of individual inputs, outputs and control wiring are given in later sections. It is intended that input cables should be brought in through one or another of the large holes in the bottom of the console, through a wire tie attached to the wiring trough adjacent to that hole, along the wiring trough to a point approximately beneath the appropriate input barrier strip on the mother board (or the appropriate auxiliary input switch), then (after allowing a small service loop in the cable) up through the nearest slot at the rear of the printed circuit mother board, and either forward to the input barrier strip or upward to an auxiliary input board and its barrier strips.

Program and audition outputs and monitor outputs are taken from the output circuit card in the center bottom of the console. The circuit card may be moved by removing the four screws attaching it to the bottom shell, but the card must be reattached before applying power to the console.

Good wiring practice dictates grouping of cables as much as is possible and practical. Cables with similar signal levels should be grouped together, while cables with greatly differing signal levels should be kept separate. For example, we recommend that the microphone input to the console should be brought into the console through the left hand wire entrance, power and remote control wiring through the right hand wire entrance, output and monitor through the center wire entrance, and other wiring as signal level, convenience and space dictate.

Remote control wiring should be run in the wiring trough on the right hand end of the console from the wire entrance to the front pushbuttons. Access to the pushbutton switches for wiring is gained by removing the two screws on the front extrusion next to the headphone jacks. The extrusion and switch panel may then be pulled forward and separated and the switch panel inverted for access to the printed circuit wiring traces. The panel and extrusion are remounted by reversing the above procedure, taking care that no wires are pinched.

2.4 OPENING THE CONSOLE

To open the console for installation or service:

- 1) Remove the copy stand, if it has been previously installed.
- 2) Unscrew (by hand!) the two 1/4 turn fasteners on the meter box and tilt the meter box back.
- 3) Unscrew (by hand!) the two 1/4 turn fasteners at the lower left and right of the control panel and tilt the panel up. Make certain that the support latch on the left side is locked.
- 4) To close the console, reverse this procedure.

If access is not needed to the meter box or to the top of the mother board, the meter box may remain fastened to the front panel and the panel and box can be raised as a unit. BE CERTAIN THAT THE METER BOX IS SECURELY FASTENED TO THE PANEL BEFORE LIFTING THEM UP!

2.5 POWER SUPPLY CONNECTION

The console power transformer is located in a separate chassis which connects to the console with a five wire cable and to the AC mains with a three wire U-ground cable. Push the seven-pin connector through the large hole at the right rear of the console and plug it into the connector header on the underside of the motherboard. The connector from the power transformer has seven pins with the end pins blocked. It is designed to mate with the connector header in only one direction. Attach a wire tie to the wiring trough and around the power supply cable and cinch it tight to avoid the possibility of pulling the connector loose during any subsequent access to the console interior.

Mount the power transformer chassis on the wall or on the floor in a convenient spot that is sufficiently out of the way to avoid being stepped on or kicked and is as far from the console as practical, to avoid any hum being induced into the console, but sufficiently accessible that turning off the power switch or changing the fuse is not impossible. The chassis may be attached with two #8 (4 mm) wood or sheet metal screws.

To comply with most electrical codes, the separate power supply chassis is fitted with a captive three wire power cord, the grounding pin of which is connected to the chassis. In some installations, this may create ground loop problems. Ground loops can result in hum and buzz if a significant potential

difference exists between the AC conduit ground and the grounded metal enclosure in which the chassis is installed. If hum is experienced, one may check for the possibility of ground loops by using a three-prong to two-prong AC adapter between the power cord and the mains supply, ungrounding the AC plug temporarily. This ungrounds the console and may cure the hum or buzz, but is not a substitute for proper system grounding. Be aware that unless the console is AC grounded, a safety hazard can exist. UREI accepts no responsibility for legal actions or for direct, incidental or consequential damages that may result from violation of any electrical codes.

Note that the power transformer chassis is not connected to console ground. See Section 2.7 for connection of console ground.

Unless a tag on the line cord specifies otherwise, the console was shipped ready for operation with nominal 120 V AC power mains. The power supply uses one Type 3AG 1 ampere slow blow fuse. For use with mains voltages other than 110-120 V AC, the power transformer must be changed. Contact your UREI distributor or UREI Customer Service for details.

2.6 MODULE REMOVAL AND INSERTION

REMOVAL:

- 1) Turn off the console power.
- 2) Raise the control panel and secure the side latch.
- 3) Grasp the module at the front and rear and pull it straight away from the mother board.
- 4) (Input modules only) Disconnect the mix control leads from the module by removing the connector at the front of the board.

INSERTION:

- 1) Turn off the console power and raise the control panel, as above.
- 2) (Input module only) Attach the mix pot connector at the front of the module, making certain that the pins are correctly lined up.

3) Grasp the module at the front and rear. Without inserting the pins, align the pin at the rear of the board first, and then bring the front of the board up so that all of the connecting pins line up. Press the board toward the mother board to fully seat the contacts. Carefully inspect the connector to make certain that the pins are, in fact, correctly inserted and that all terminals are seated.

4) Close cover before striking.

2.7 CONSOLE GROUND

The console makes extensive use of ground planes and "Buss in a Box"TM construction -- the sensitive signal busses are completely enclosed in a box made up of the front panel of the console and the underside of the motherboard used as a ground plane. Console ground for attachment to the outside world is by a 1/4-20 (6.3 mm) bolt and washers located adjacent to the right hand wire access hole.

2.8 IMPEDANCE AND TERMINATION

Audio engineering had its roots in the telephone industry, and "600 ohm circuits" (together with their predecessors, "500 ohm circuits") are carryovers from telephone transmission practices. Long audio transmission lines, like their video counterparts, must be properly sourced from and terminated in equipment which matches their characteristic impedance if optimum frequency response and noise rejection are to be achieved.

However, transmission line theory and techniques are not only unnecessary but impractical within modern broadcast studios and other local audio systems where transmission circuits are seldom more than several hundred feet in length. The advent of negative feedback circuitry and solid-state electronics has spawned modern audio amplifiers and other signal processing devices having source impedances of only a few ohms. They are essentially indifferent to load impedances and, by varying their output current inversely to changes in load impedance, maintain the same output voltage into any load impedance above a rated minimum, with no change in frequency response.

Modern audio systems, therefore, utilize amplifiers and other active devices which have very low output impedances and high (10k to 50k) input impedances. These products may thus be cascaded (operated in series), or many inputs may be connected to a single output of a preceding device, without regard to impedance "matching." Switching, patching, etc. is simplified because "double loads" and "unterminated" bugaboos are essentially eliminated. "Floating" (ungrounded) transformer outputs minimize

ground loop problems, and differential transformerless circuitry (or input transformers) minimize common mode noise or interference which may be induced into the interconnecting wires or cables.

Where audio must be transmitted through cables or wire pairs of more than several hundred feet in length, however, transmission line termination practices should still be observed.

The microphone input of the console is transformer isolated, symmetrical and floating (ungrounded), and is designed for use with a 150 ohm microphone. The line inputs have a 10k ohm impedance when used in a balanced, differential configuration, and have a 5k ohm impedance when used unbalanced (one side grounded). The line inputs are, therefore, suitable for use with any nominal source impedance, low or high. A source termination resistor will only be required when the line inputs are connected to a source which requires a low impedance termination (such as a 600 ohm transmission line or older vacuum-tube type equipment).

2.9 MICROPHONE INPUT CONNECTION

As supplied from the factory, the console is fitted with one monaural microphone preamplifier card, Part No. 10-13952, located in input position #1. The input is transformer isolated, symmetrical and floating, and is intended to bridge a nominal 150 ohm source. The card may be relocated to any other input position if desired, and additional microphone preamplifier cards may be installed in place of any line preamplifier card.

Connections are made to the barrier strip on top of the mother board, at the "A LEFT" or "B LEFT" input. The high side of the line is connected to the terminal marked "+," the low side to the terminal marked "COM," and the shield to the "SHIELD" terminal. If the microphone is unbalanced, connect the hot or signal lead to "+" and the shield to both "COM" and "SHIELD." The preamplifier does not accept signals from high impedance microphones.

As supplied from the factory, Mute Circuit #1 is actuated upon turning ON Mix Position #1 to prevent monitor speaker feedback into the microphone. Section 2.15 contains information on reconnecting and modifying the muting buss assignments, should this be desirable.

It is possible to insert an external processing device, such as a compressor or equalizer, into the microphone circuit. The procedure for this installation is discussed in Section 2.24.

2.10 LINE INPUT CONNECTIONS

The stereo line inputs, as supplied from the factory, are installed in Mix Positions #2 and higher. These preamplifiers, Part No. 10-13958, are supplied with 10k ohm balanced bridging differential amplifier inputs, which may also be connected as 5k ohm unbalanced inputs. Optional line input transformers, Part No. 16-13951, may be installed on each plug-in preamplifier, converting the inputs to symmetrical, floating configuration. See Section 2.21 for information on installation of these transformers.

Input connections are made to the input barrier strips on the top of the mother board. There are two stereo pairs, marked "A" and "B," associated with each input position. Balanced input connections are shown in Fig. 2-1; unbalanced connections are shown in Fig. 2-2. A monaural source feeding both channels is shown in Fig. 2-3. Note that the terminal labeled " \pm " is considered as the high side of the line for maintaining correct stereo polarity or phasing.

2.11 AUXILIARY INPUT SWITCH WIRING

The console is equipped with two auxiliary input switches mounted in the meter box. These have not been pre-assigned to any input position; their use and connection is left to the user and his or her particular needs. Typical uses might be for remote lines and infrequently used signal sources.

The switch is configured to accept four stereo inputs and has one stereo output, but may be connected in reverse, with one stereo input and four stereo outputs. Wiring is the same as for the line inputs as shown in Figs. 2-1, 2-2 and 2-3. The printed circuit board on which the switch is mounted also holds five barrier strips, one each for the four inputs and one output. The board is labeled to indicate which barrier strip connects to each pushbutton position.

2.12 AIR AND EXTERNAL MONITOR INPUT CONNECTIONS

In addition to being able to monitor program and audition channels, provision is made to connect two additional stereo signals to the monitor system. These are labeled AIR (presuming the use of a modulation monitor audio output or tuner to provide a check of program quality off the air) and EXTERNAL (for use with any other source desired). The inputs are available on barrier strips on the top right side of the motherboard and are connected in the same manner as the line inputs shown in Figs.

2-1, 2-2 and 2-3. Internal gain trim adjustments are provided to match the levels of these inputs to the program and audition monitor levels. See Section 3.5 for the adjustment procedure.

2.13 OUTPUT CONNECTIONS

The Program (Air) and Audition outputs of the console appear on barrier strips located on the Output PC Board, which is mounted on the bottom of the console. The outputs are transformer isolated, symmetrical and floating, and are designed to operate into loads of 600 ohms or higher. Symmetrical ("balanced") outputs are connected as shown in Fig. 2-1. Note that the "+" terminal is the high side of the line -- a positive voltage on any input terminal marked "+" will result in a positive voltage on the corresponding "+" output terminal. Unbalanced output connections are shown in Fig. 2-2.

If long lines are to be connected to the console, a 620 ohm 1/2 watt resistor should be placed across the input of the following piece of equipment, provided, of course, that it does not have a 600 ohm input impedance. See Section 2.8 for a discussion of impedance and termination.

2.14 MONITOR/CUE MUTING

The UREI Stereo Broadcast Console contains three independent circuits which may be used to mute monitor and cue speakers and to activate On-Air or other tally lights or equipment. Any input Mix Position may activate any or all of the mix busses.

As supplied from the factory, Mix Position #1 is wired to activate Mute Buss #1, Mix Position #2 activates Mute Buss #2 and Mix Position #3 is connected to Mute Buss #3. Each mute buss activates a relay on the output board which disconnects any monitor speakers connected to the appropriate barrier strip. In addition, each relay has a set of normally open contacts which are connected to the barrier strip. These contacts are rated at maximum 1 ampere AC or DC; if heavier loads are to be switched, these contacts should activate an appropriately rated external relay which is, in turn, connected to that load. The relays should NEVER be used to switch AC mains power because of the strong likelihood of inducing hum and/or noise into the signal paths of the console.

Mute Buss #1 actuates a solid state switch to mute the cue output. This buss should, therefore, be used for the mix position that corresponds to the control room microphone. Note, however, that the cue feed to the headphones is not muted.

2.15 ON/OFF PUSHBUTTONS AND REMOTE START/STOPS

Each mix position has two pushbutton switches for on/off control of that position. Depressing the green button activates solid state logic circuitry which turns the channel ON. Depressing the red button turns the channel OFF.

Each mix position may also activate any or all of the mute busses by programming of resistors on the switch circuit board at the front of the console. The procedure is as follows:

- 1) Turn off the power to the console.
- 2) Remove the two screws holding the front extrusion, located next to the headphone jacks.
- 3) Pull the extrusion and switch panel forward and separate them, then turn the switch panel upside down so that the bottom of the printed circuit board is accessible.
- 4) Refer to Fig. 2-4. Note that each mix position has locations for three resistors on the underside of the board -- one for each mute buss. These resistors will be referred to as R1, R2 and R3. As supplied from the factory, resistor R1 is placed in Mix Position 1 to activate Mute Buss 1; R2 is located in Mix Position 2 to activate Mute Buss 2; and R3 is located in Mix Position 3 to activate Mute Buss 3. The resistor values are 10k ohm $\pm 10\%$ 1/2 watt.
- 5) To change the mute buss activation, install or remove resistors as required. Use a soldering iron with maximum 25-50 watts of heat and solder quickly, but carefully, to avoid damage to the circuit traces.
- 6) To replace the switch panel and extrusion, reverse Steps 2 and 3, making sure that no wires are pinched between the panel or extrusion and the chassis.

An additional set of normally open contacts are included on all of the pushbutton switches to allow remote control start/stop of turntables, cartridge or reel-to-reel tape machines, etc. Wiring for these is shown in Fig. 2-4. Maximum current capacity of these switch contacts is 500 mA; larger currents should be controlled by external relays which may be fired by these push-buttons. Shielded cable should be used for all remote start/stop wiring because of the possibility of radiating switching pulses into the console's audio circuitry.

In some circumstances, it may be desirable to remotely control the turn-on and turn-off of a mix position. This may be done by installing remote switches wired in parallel with the console pushbuttons, as shown in Fig. 2-5. As above, shielded cable is recommended.

2.16 MONITOR SPEAKER CONNECTION

Monitor loudspeakers are connected to the barrier strip on the output board located in the bottom center of the console. Provisions are made for connection of up to three sets of speakers which may be separately muted via mute relays K601, K602 and K603. Normally, the Monitor 1 output will be chosen in "combo" style operation, where the microphone is located in the same room as the console and is connected to Mix Position 1. This will result in control room and cue speaker muting when the microphone is turned on, actuating Mute Buss #1. Monitor 2 output is muted upon actuation of Mute Buss #2, and Monitor 3 output mutes when Mute Buss #3 is activated.

The minimum recommended speaker connecting wire size is 18 AWG (1.75 mm) to avoid loss of power and deterioration of damping factor; wire runs longer than about 50 feet (15 meters) should use at least 16 AWG (2.0 mm) wire.

Note that the console monitor amplifiers are rated for a minimum load of 8 ohms/channel. THE COMBINED IMPEDANCE OF ALL LOUDSPEAKERS SIMULTANEOUSLY CONNECTED TO THESE AMPLIFIERS MAY NOT BE LOWER THAN 8 OHMS.

2.17 HEADPHONE CONNECTION

Two standard 3 conductor 1/4 inch (6.3 mm) phone jacks are provided at the left and right front edges of the console for connection of standard stereo headphones with an impedance of 8 ohms or greater. Many headphones have a single cable leading from one earpiece, normally the left. For this reason, minimum interference between the cable, the operator and the controls will result if the headphone is connected to the left jack. Two sets of headphones may be simultaneously connected, provided that their total combined impedance is not lower than 8 ohms.

If the console is to be operated as a monaural unit with only one channel active, and monaural headphones with two conductor phone plugs are to be connected, integrated circuit IC502 should be removed from its socket on the headphone/cue amplifier circuit board to avoid continuously shorting its output.

2.18 EXTERNAL CUE SPEAKER CONNECTION

If an external cue loudspeaker is to be connected in place of the speaker installed in the console, disconnect the existing cue speaker wires from the barrier strip on the top right hand side of the motherboard, and connect the external speaker leads to these terminals. Alternately, the input of an external power amplifier may be directly connected to these terminals if additional power is required to drive an external speaker; no attenuation is needed. In either case, the cue level control and muting will be functional. (NOTE: This is a monaural signal and is derived by summing the left and right input signals.)

2.19 CONNECTION OF MONITOR PREAMPLIFIER OUTPUT

A low level, unmuted monitor signal is available on a barrier strip on the top right half of the motherboard. The signal at this point is selected by the monitor source switch and is a nominal +3 dB when the console output level is a nominal +8 dBm. The output impedance is 2.2k ohms.

2.20 CUE ON MICROPHONE INPUT

The 1650/80 Series consoles feature cue switches on each mix pot. However, the cue signal is not connected on the microphone input module, to avoid feedback when the console is used in a "combo" operation. If the cue function on the microphone input is desired, add a 100k ohm $\pm 10\%$ 1/2 watt resistor at location R101 on the microphone preamplifier card.

2.21 LINE INPUT TRANSFORMER INSTALLATION

Line input transformers, UREI Part No. 16-13951, which are available as an accessory, may be mounted on the line input cards to convert them to fully floating 10k ohm symmetrical bridging inputs, as follows:

- 1) Remove the line input card.
- 2) Note the outlined locations for transformers T201 and T202. Within the outlines are four wire jumpers. Unsolder the jumpers and clean any excess solder from the holes.
- 3) Install the two transformers into their locations on the circuit board. Note that these are 1:1 transformers and thus will fit and operate correctly when mounted in either

direction in which they fit. Make sure that they are fully seated on the board. Bend the transformer mounting tabs which have come through the board to insure reliable mechanical mounting, and solder the pins to the board.

- 4) Replace the card in the console.

2.22 COPY STAND

The UREI Plexiglass Copy Stand, Part No. 10-13959, is an optional accessory to the 1650 and 1680 Series Stereo Broadcast Consoles. The carton should contain the following unassembled parts:

Quantity	Description	UREI Part No.
1	Plexiglass Copy Stand	25-13923
1	Wooden Copy Rest	25-13924
2	Steel Retainer Bracket	25-13920
4	Screw, Wood, #6 x 7/8" Type B	30-0128
4	Flat Washer, #6	--
4	Screw, Machine, 6-32 x 1/4"	--

To assemble and mount the stand:

- 1) Attach the wooden copy rest to the plexiglass, using the four 7/8 inch (22 mm) wood screws and the four flat washers. Pilot holes have been provided in the copy rest for ease of assembly. See Fig. 2-6.
- 2) Loosely attach the two retainer brackets to the rear of the meter box, using the four 6-32 x 1/4 inch (6 mm) screws. The open ends of the brackets face each other. See Fig. 2-7. Do not tighten the brackets yet.
- 3) Slide the copy stand down into the brackets until the wooden rest is against the top of the meter box. After the stand is firmly seated, tighten the bracket screws until the copy stand is securely in place.

2.23 PHONO PREAMPLIFIER, MODEL 1101

The UREI Model 1101 is a stereo preamplifier for magnetic phono cartridges. It is designed as an accessory to the UREI 1650 and 1680 Series Stereo Broadcast Consoles, and receives its DC power directly from the console. It may also be used independently of a UREI console with ± 15 to ± 18 V DC @ 15 mA supplied from an external power supply (user furnished).

The preamplifier is housed in a rugged steel box and is intended to be placed adjacent to the turntable. It may be mounted in virtually any position with two #8 (4 mm) wood or sheet metal screws. Leads from the turntable to the preamplifier should be as short as possible. The ground lead from the turntable connects to the ground post adjacent to the input jacks.

Outputs from the preamplifier are on the barrier strip. These are unbalanced and should be connected to the console with shielded wire. The DC inputs to the preamplifier are also on the barrier strip and should be connected to the corresponding terminals on the console barrier strip on the right hand mother board. BE CERTAIN THAT THESE CONNECTIONS ARE IN CORRECT ORDER AND POLARITY BEFORE APPLYING POWER TO THE MODEL 1101. IF THESE ARE INCORRECT, SEVERE DAMAGE MAY OCCUR.

The Model 1101 may be treated in the same manner as any unbalanced -10 dB line level device for connections to and level adjustment of a line input module, detailed in Sections 2.10 and 3.3 of this manual. Level adjustment may be made using any of the standard test records available from sources such as the NAB, CBS Records, Denon, Shure Brothers, etc.

The 1101 contains circuitry for standard NAB/RIAA disc playback. In addition, high and low frequency trims allow ± 5 dB of shelving equalization at 50 Hz and 10 kHz. These adjustments may be made using the same record used for setting level.

2.24 MIC PREAMPLIFIER PROCESSOR LOOP

In many instances, the on-air microphone may benefit from some type of signal processing. Such processing may include equalization, compression, reverberation, etc. The microphone preamplifier may be modified to allow for a processor loop following the first preamplifier stage. This section covers the modification procedure and the connection to the external processor. Please read the complete procedure before you begin so that you understand what is required.

Modification of the mic preamplifier card is as follows:

- 1) Remove the card from the console as described in Section 2.6.
- 2) Refer to Fig. 2-8 and the schematic for the mic preamplifier. You will note that a printed circuit trace connects capacitor C104 to pins 1 & 2 of connector J101 and continues past to an unused pad at the narrow end of the PC board.

- 3) Cut the short section of the trace which connects to pins 1 & 2 of J101, leaving the capacitor connected to the unused pad. Make sure that the trace is completely cut through and that no small pieces of the cut traces can short across or become dislodged to fall into inconvenient places.
- 4) Install two wire jumpers in the positions at the small end of the board. One of these jumpers connects C104 to pin 5 of J102. The other jumper connects pins 1 & 2 of J101 to pin 4 of J102.
- 5) Re-install the circuit board into the console.

With a modified microphone preamplifier card, the output of the first amplifier stage comes from J102, pin 5, goes through the input selector switch and appears at the A or B RIGHT COM input terminal for that channel, depending on the input switch position. The return to the card feeds through the A or B RIGHT \pm input terminal, depending on the input switch position, then through the switch and into J102, pin 4 of the card. A wire jumper between RIGHT \pm and COM restores the module function to normal.

The send signal to an external device is nominally -5 dB (0.44 V RMS), unbalanced, and will drive a load of 600 ohms or greater. The unbalanced return is either 600 ohms or 10k ohms, depending on the type of mixer controls in the console. The 1652 and 1682 use 600 ohm controls, hence the return input impedance is 600 ohms. The other 1650/80 Series consoles use 10k ohm controls, and the return input impedance is 10k ohms. The return signal level should also be nominally -5 dB to allow the mix control to operate at its normal setting.

Other external processing equipment may have been designed to operate in different level environments than just described. It is best to match that environment if possible for best signal-to-noise ratio and distortion performance. The gain of the preamplifier input stage may be varied somewhat to match to an external device. For example, some devices are best operated in a higher level environment, such as +4 or +8 dB. These devices should be matched to the return by using a series resistor of appropriate value to reduce the signal level to the point where the mix control operates in its normal range. This resistor may be placed on the preamplifier card in place of the jumper at the extreme narrow end of the board.

Several variations of input switching may occur:

1) The instructions above cover connection of one microphone always assigned to a particular input and to the external processing loop.

2) Two microphones may alternately be switched into use with the input selector. If both are to use the external processor, a jumper wire must be installed on the barrier strip between A RIGHT COM and B RIGHT COM; a second jumper wire must be installed on the barrier strip between A RIGHT \pm and B RIGHT \pm . If only one mic is to use the external processor, a jumper will be necessary on the barrier strip between COM and \pm on the RIGHT terminals of the input that does not use the processor.

3) One microphone may be used with switch-selectable external processing by installing jumper wires between A LEFT \pm and B LEFT \pm , and between A LEFT COM and B LEFT COM. Install a third jumper between RIGHT \pm and RIGHT COM for either A or B (but not both), depending on whether switch position A or B bypasses the external processor. In this mode, it is important that the nominal level of both send and receive be set at approximately -5 dB at the board terminals to avoid objectionable level shifts when switching between processed and unprocessed signals.

One last note: after you have completed the modification and the system is functioning correctly, modify any and all other mic cards you have so that they will be plug-in replacements into this microphone position. We further suggest that you mark each modified card with a stick-on label (perhaps on top of the input transformer) indicating that the card has been modified and the date. Also, mark the schematic to show that this work has been done to ensure that all maintenance personnel in the future will know what has been done to the card.

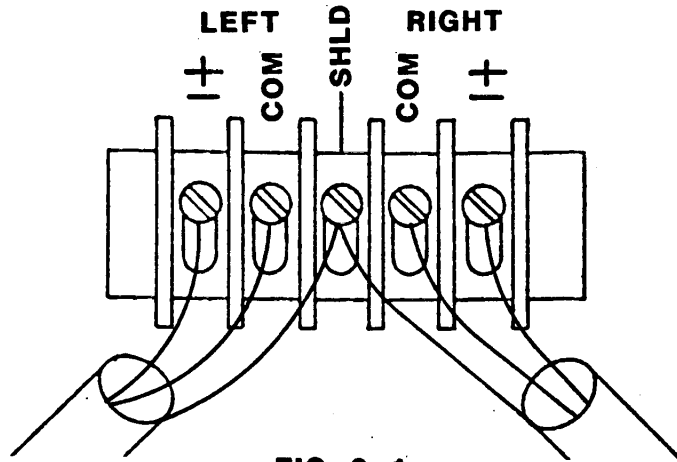


FIG. 2-1

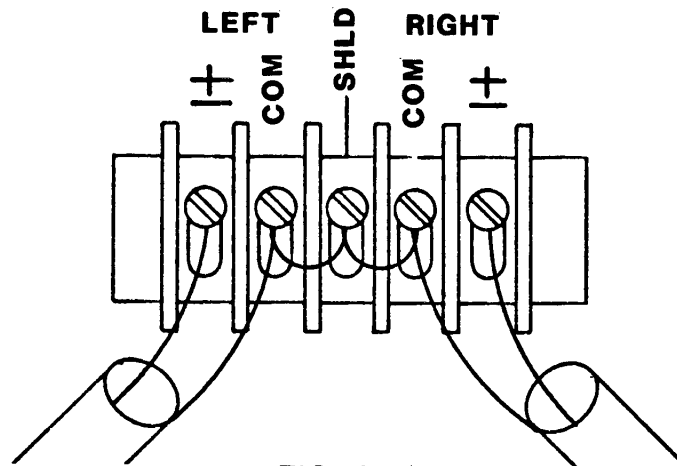


FIG. 2-2

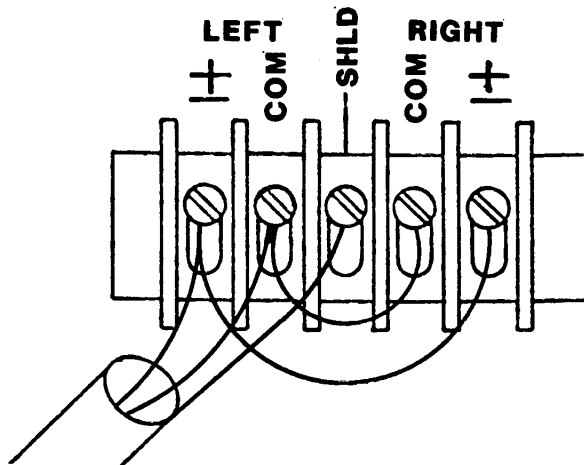


FIG. 2-3

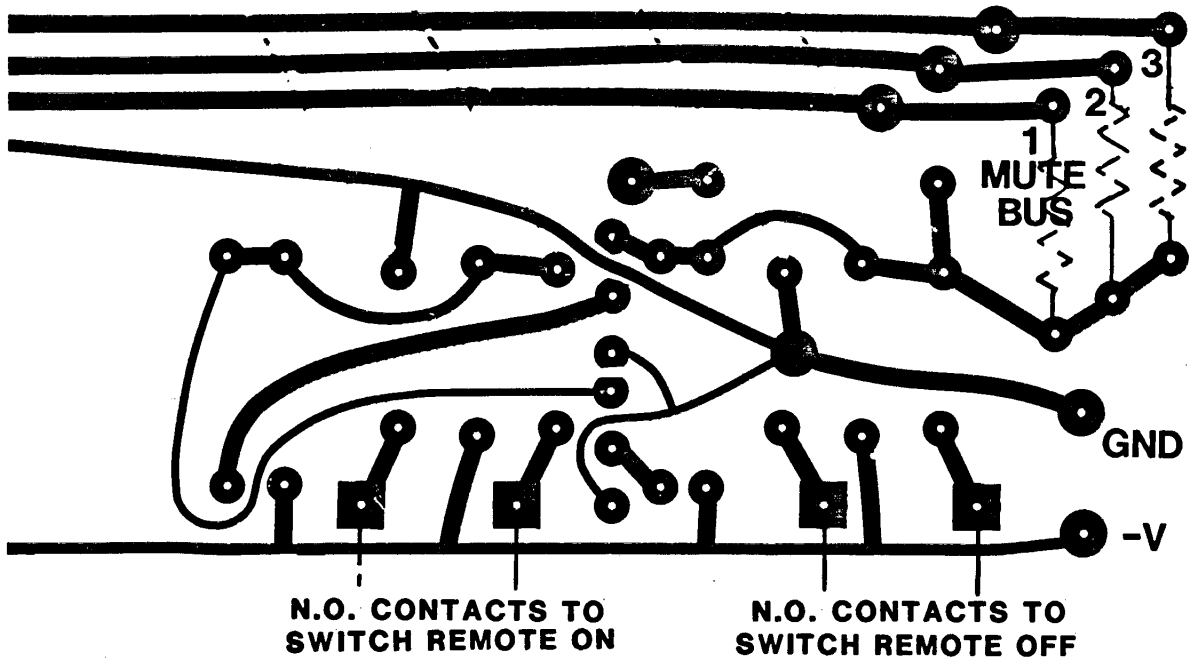


FIG. 2-4

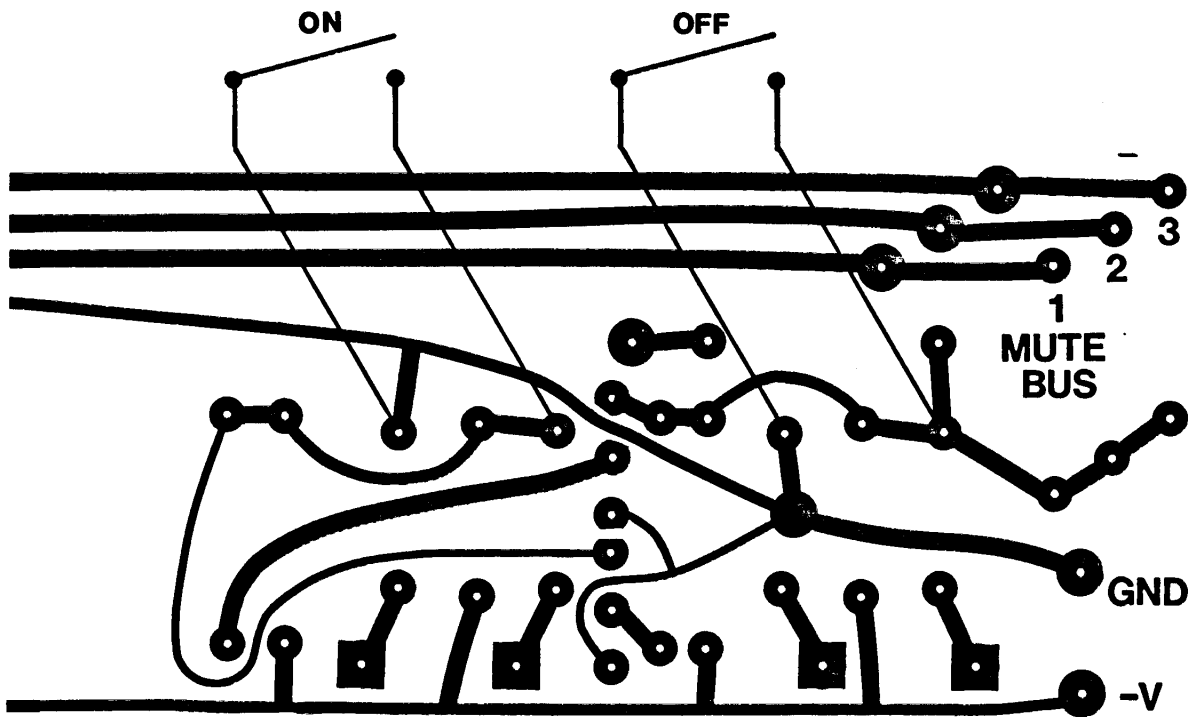


FIG. 2-5

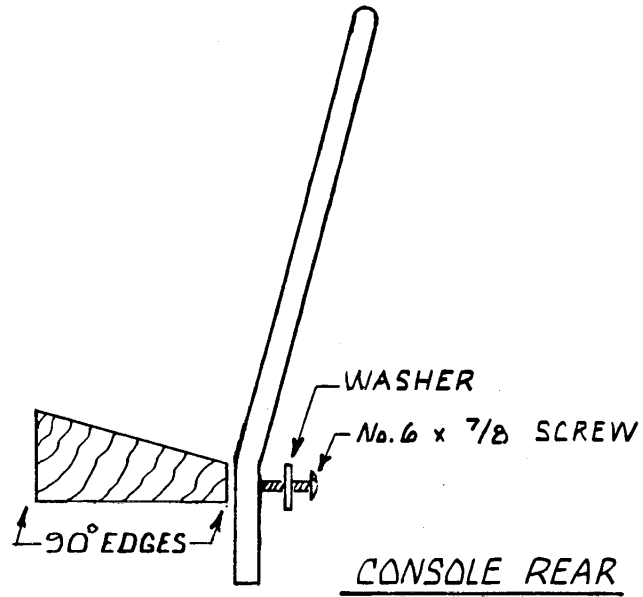


FIG. 2-6

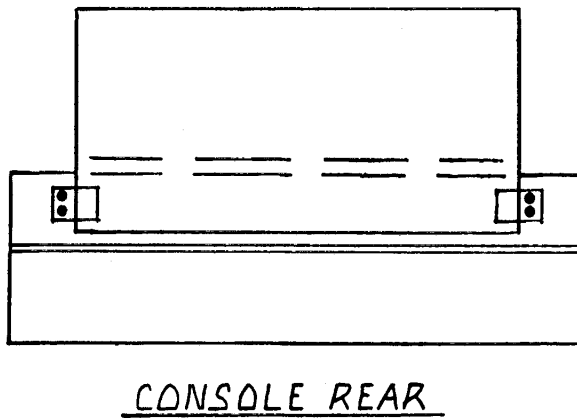


FIG. 2-7

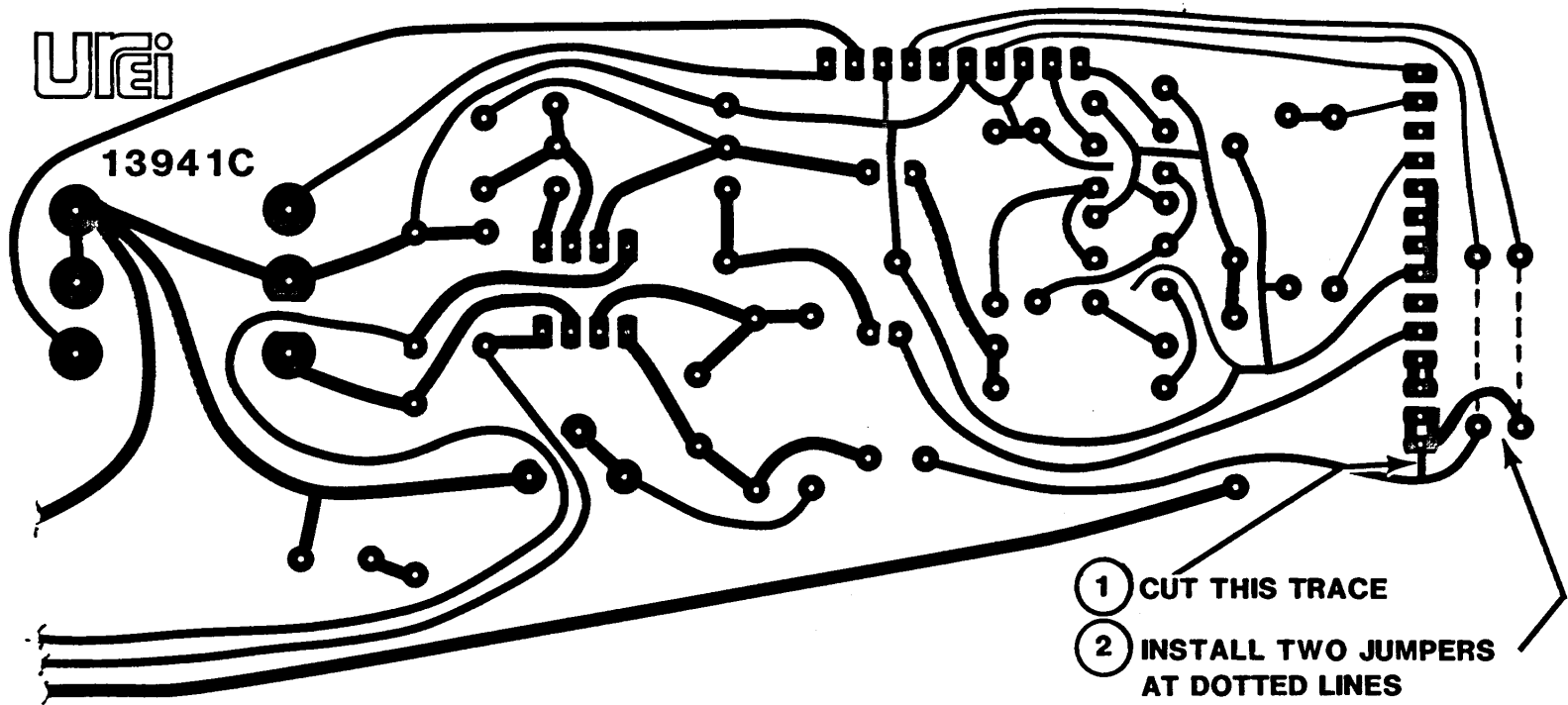


FIG. 2-8

SECTION III SETUP INSTRUCTIONS

3.0 GENERAL

Before the console is put on the air, the following adjustments and checks should be performed to optimize its operation to the input signal levels, various switching modes and output levels. This will assure best signal to noise ratio and safe functioning under various operating conditions.

3.1 VU METER CALIBRATION

As supplied from the factory, the VU meters on the console are adjusted to read "0 VU" with the console feeding +8 dBm (1.95 V) into a 600 ohm line. A sensitivity adjustment in the meter driver amplifier allows the "0" reference to be varied from approximately 0 dBm (0.775 V) to approximately +10 dBm (2.45 V). If your studio uses other than +8 dBm as an operating level or if the control has been inadvertently misadjusted, the following procedure may be used to set the meter reference:

- 1) With the console power off, adjust the mechanical setting of the VU meter zero with a small screwdriver in the adjustment screw on the front face of the meter. The meter needle should rest on the dial line on the far left. If it is below the line, turn the adjustment screw clockwise until it does. If the needle is above the line, turn the screw counterclockwise until it is below the line, then clockwise until it is correctly positioned.
- 2) Turn the console power on. Connect the actual loads to the console outputs or, alternatively, connect load resistors which have equivalent values to the actual loads.
- 3) Apply a 2 kHz sine wave to the microphone input of the console. Turn the microphone channel on and increase the level of the mix control until the console output level equals the reference level as measured on an external AC voltmeter.
- 4) If the meters do not read "0 VU," they may be adjusted with trim controls located on the Headphone/Cue circuit board. Trim control R507 adjusts the left meter, and control R503 adjusts the right meter.

3.2 MICROPHONE GAIN ADJUSTMENT

The microphone preamplifier gain may be adjusted with a trim control on the preamplifier card, in order to optimize signal to noise performance, input headroom and mix pot level setting. The procedure for adjustment of the gain trim is as follows:

- 1) Set the front panel controls:
 - a) PROGRAM MASTER level at "0" mark,
 - b) ON AIR SOURCE to PGM,
 - c) METER SWITCH to PGM,
 - d) Microphone mix control to "6 1/2" (15 dB below maximum),
 - e) Microphone output switch to PGM,
 - f) Microphone input source switch to "A" or "B" as appropriate,
 - g) Microphone channel ON (push the green button below the microphone mix control).
- 2) Monitor the audio through headphones, depressing the PGM button of the headphone selector switch and adjusting the headphone volume level appropriately.
- 3) Talk into the microphone at a level consistent with normal practice for your station. The VU meters should read in the middle to upper half of the scale, with occasional peaks above "0 VU."
- 4) If the level is too high or too low, adjust the gain trim pot, R114, on the microphone preamp card to set the proper level.

3.3 LINE LEVEL INPUT

The line input modules are set at the factory for a +8 dB (1.95 V) line level input. With +8 dB applied to the line input, the Program Master level control at the "0" mark (10 dB below full gain), and the input mix control at 6 1/2 (15 dB below full gain), the console output will be +8 dBm (unity gain). The gain may be adjusted by trim controls on the input module to optimize signal to noise performance, input headroom and mix pot control settings for nominal input levels as low as -10 dB, as follows:

- 1) Set the front panel controls:
 - a) Program Master level to "0" mark,
 - b) ON-AIR SOURCE switch to PGM,
 - c) Meter switch to PGM,
 - d) Line Input mix control to "6 1/2" (15 dB below maximum),
 - e) Mix OUTPUT switch to PGM,
 - f) Input switch to "A",
 - g) Line input channel ON (push the green button below the mix control).
- 2) Apply a 2 kHz signal with the nominal level expected at that input (-10 dB, +4 dB, +8 dB, etc.).
- 3) Monitor the console output with an AC voltmeter.
- 4) If necessary, adjust the gain with the trim controls on the line input card. Trimmer R214 adjusts the right channel, and trimmer R215 adjusts the left.

3.4 OVERLOAD LEVEL INDICATOR ADJUSTMENT

Short duration peak signals may be of much greater amplitude than indicated on the console VU meters. Such signals can, in fact, result in output clipping in the console and can possibly overdrive subsequent pieces of equipment in the transmission chain. For this reason, an overload detector circuit has been included in the ON AIR output of the console. This circuit senses the output voltage of both channels and flashes a front panel LED, located below the VU meters.

The threshold of this circuit is adjustable to flash the LED as output signals exceed approximately +10 dBm to +24 dBm (console clipping). Nominal factory setting is +24 dBm. To change the threshold setting:

- 1) Apply an input signal of 2 kHz to the input of the console and adjust the output level to achieve the desired level at which the LED should just start flashing.
- 2) Adjust trim control R517, located on the headphone/cue board, so that the LED barely flashes.

3.5 AIR AND EXTERNAL MONITOR LEVEL TRIM ADJUSTMENT

If the nominal level of the sources feeding the AIR and EXTERNAL monitor inputs do not match the level of the PROGRAM and AUDITION amplifiers, it will be necessary to adjust the gain trim controls located on the Program/Audition card, as follows:

- 1) Put a 2 kHz signal through the console and adjust the output level to read "0 VU" on the meter.
- 2) Push the PGM button on the monitor source switch and adjust the monitor level control to a convenient output setting. Measure this level with an AC voltmeter.
- 3) Put a 2 kHz tone into the AIR or EXTERNAL input at the normal level to be expected from that source.
- 4) Push the AIR or EXT button of the monitor source switch and, without adjusting the monitor level control, measure the monitor output level with an AC voltmeter.
- 5) If the measured level in Step 4 differs from that measured in Step 2, adjust the internal gain trims so that they match. AIR left is adjusted by trim control R335 and AIR right by R336. EXT left is adjusted by trimmer R334 and EXT right by R333.

It may be difficult to match levels with tones in cases where, for example, extensive transmitter signal processing makes the AIR signal subjectively louder than the PGM monitor feed. This adjustment may be performed using program material instead of tones and/or ears instead of meters, so that the subjective level from all sources is approximately the same as the monitor switch is changed back and forth.

3.6 ON AIR SOURCE SWITCH

The ON AIR SOURCE switch allows for transfer of the output amplifiers in case of failure. Normally, the switch will be in the PGM position, which routes the Program amplifier to the Program output transformers and to the PROGRAM (AIR) barrier strip.

If the Program amplifier should fail, the ON AIR SOURCE switch allows the Audition amplifier to feed the Program transformers and the program lines. The procedure is:

- 1) Switch the ON AIR SOURCE switch to the AUD position.
- 2) Switch MONITOR, METER and HEADPHONE SOURCE switches to AUD.
- 3) Switch the mix positions you are using from PROGRAM to AUDITION.
- 4) Remember that the AUDITION MASTER GAIN control should be set to the same position as the PROGRAM MASTER.

SECTION IV THEORY OF OPERATION

4.0 GENERAL

The following sections outline the theory of operation of the console and its subsystems. Reference should be made to the appropriate schematic drawings and/or the console block diagram included at the rear of this manual.

4.1 MICROPHONE PREAMPLIFIER

Input to the monaural microphone preamplifier is from the left input on the input barrier strips, through the input selector switch on the mother board and to the plug-in preamplifier card through connector J102. Transformer T101 provides a balanced bridging input for nominal 150 ohm microphones. The secondary voltage is 13 dB greater than the primary voltage due to the transformer turns ratio. The secondary of T101 couples to integrated circuit IC101 Section A with a nominal factory set gain of 26 dB. Trim control R114 allows approximately 20 dB of additional gain.

The output of IC101 Section A connects to the front panel mix pot through connector J101. The output of the pot feeds buffer amplifier IC101 Section B, which has a gain of 10 dB. Its output, through summing resistors R104 and R105, feeds the FET switch and leaves the card through connector J102, connecting to the PGM/AUD switch and the summing busses on the mother board. Operation of the FET switch is covered in Section 4.7.

It is possible to insert an external processing device, such as a compressor or equalizer, before the mix pot. Modification to the printed circuit card and connection of the external processor are covered in Section 2.24.

4.2 LINE LEVEL INPUT

Input to the stereo line level preamplifier is through the barrier strips on the mother board, through the input selector switch and to the plug-in preamplifier card through connector J202. Positions exist for two optional input transformers, T201 and T202, which may be installed by the user to achieve fully floating symmetrical 10k ohm bridging inputs. As supplied from the factory, the inputs go through wire jumpers on the board and feed IC202 Sections A and D for left channel and IC202 Sections B and C for right channel. These sections are configured as active

balanced 10k ohm bridging differential amplifiers. The inputs may also be wired unbalanced, as described in Section 2.10 and Figure 2-2.

The gain of the differential amplifiers is set to -8 dB at the factory, presuming a nominal input signal level of +8 dB. Trim pots R215 and R214 adjust the gains of the left and right channels, respectively. Gain may be reduced to 0 (no signal) or raised by as much as 20 dB to allow use of nominal -10 dB (250 mV) sources such as consumer or "semi-professional" cassette or reel-to-reel tape recorders.

The outputs of the differential amplifiers connect to the front panel mix pot through connector J201. The wipers of the mix pot feed buffer amplifiers IC201B (left) and IC201A (right) which have 10 dB of gain. The outputs go through summing resistors R212 (left) and R209 (right), feed the FET switches, then exit the card via connector J202 and feed the PGM/AUD switch and the summing busses on the mother board. Operation of the FET switches is covered in Section 4.7.

A separate switched monaural cue output is derived by summing the outputs of the differential amplifiers through resistors R201 and R202. The cue output is switched on when the mix pot is turned or pulled fully down into the detented position. Cue output feeds the cue summing buss and the cue summing amplifier located on the headphone/cue board.

4.3 PROGRAM/AUDITION AMPLIFIERS

Program and audition summing busses on the mother board feed through connector J301 into unity gain summing amplifiers located on the program/audition card. Program left summing amplifier is IC301C; program right is IC301A. Audition left is IC301B; audition right is IC301D.

Outputs from the summing amplifiers are taken off the card via J301 to the Program and Audition master controls, and return through J301 to the output amplifiers. Each amplifier consists of an operational amplifier and a complementary pair of current boosting output transistors. The operational amplifier for program left is IC302B, and the output transistors are Q303 and Q304. For program right, IC302A, Q301 and Q302 are used. For audition left, IC303A, Q305 and Q306 are utilized; IC303B, Q307 and Q308 are used in audition right.

The outputs of the program/audition amplifiers leave the card via J302 and route to several locations:

- 1) The on-air transfer switch, the output transformers and on-air overload detector circuit.
- 2) The meter source selector switch.
- 3) The monitor source selector switch on the monitor amplifier card.
- 4) The headphone source selector switch on the headphone/cue card.

Two stereo differential input amplifiers are also located on the program/audition card. These serve the AIR and EXT monitor inputs. IC305A and IC305D are the left channel AIR input amplifiers, with gain adjusted by R335; IC305B and IC 305C are the right channel AIR input amplifiers, with gain adjusted by R336. IC304B and IC304C are the left channel EXT monitor input amplifiers, with gain adjustment through R334; IC304A and IC304D are the right channel EXT input amplifiers, with gain adjustment through R333. These controls may be used to balance levels from these external sources against the program and audition levels for monitoring purposes as described in Section 3.5. Outputs from these differential amplifiers leave the card via J302, the AIR signal going to both the headphone and monitor cards, the EXT signal going only to the monitor card.

4.4 MONITOR AMPLIFIERS

The monitor source switch on the monitor circuit board selects from four possible stereo sources and routes the chosen signal via J402 to and from the monitor level control. The signal then feeds the integrated circuit power amplifiers IC401 and IC402. Gain of each of the amplifiers is set at 26 dB. Outputs from the power amplifiers leave the card through J402 and are routed to the output board and the monitor muting relays. The output of the monitor source selector switch is also available at a barrier strip connector on the right mother board. This unmuted signal is isolated by 2.2k ohms and is at approximately +3 dB (1.1 V RMS) level into a 10k ohm load when the console output is +8 dBm.

4.5 ON-AIR SOURCE SWITCH

Under normal circumstances, the on-air signal will be taken from the output of the program amplifiers, and the audition amplifiers will be available for any other purpose. As with all things wrought by man, however, it is possible that the program amplifiers may fail. It is for that moment that the On-Air Source switch was included in the console. The switch routes signals from the outputs of the program and audition amplifiers

to the primaries of the output transformers. Moving the switch position from PGM to AUD reverses the program and audition outputs, so that by using the audition channels, the show (program?) may go on. This means that appropriate mix positions will have to be switched from PGM to AUD and that monitoring and metering will also have to be done off of the audition lines. The necessary repair to the program amplifiers may then be done at some more convenient time.

4.6 METERS

The two VU meters on the console may monitor either the program or audition lines, as determined by the position of the meter selector switch. The output from the switch is routed to the VU meter driver amplifiers, located on the headphone/cue card. Gain is adjustable, using trimmers R503 and R507, to allow a 0 VU reading over a range of approximately 0 dBm to +10 dBm console output level. Calibration instructions are in Section 3.1.

4.7 LOGIC CIRCUITRY

The channel on-off logic circuitry is comprised of a flip-flop circuit operated by the action of the ON and OFF pushbutton switches located at the front edge of the console. The flip-flop is a simple resistor-transistor logic (RTL) design featuring stable operation and high noise immunity. Figure 4-1 shows a typical flip-flop circuit and its connection to the rest of the console.

To understand the operation of the circuit, assume that the ON button is depressed. This shorts the collector to emitter of the "on" transistor (Q2) and turns it on. Through the cross-coupling resistor R_A , the other transistor (Q1) is turned off and a voltage returns to the base of the "on" transistor through R_B to insure that it stays on. The circuit is then stable and retains this state until the OFF button is depressed, shorting the "off" transistor (Q1) and reversing the whole sequence.

Indicator lights DS1 (off) and DS2 (on) are illuminated appropriately with the action of the flip-flop. Resistors R_C and R_D provide a current path to ensure continued operation of the flip-flop in the event of lamp burnout.

The output voltage of the flip-flop is either 0 V DC (on) or approximately -20 V DC (off). This voltage, through a 1 megohm resistor (R_E), activates the FET switches located on the individual preamplifier cards. The flip-flop output may also be connected to one or more of the mute busses through user supplied 10k ohm resistors (R1, R2 and/or R3) installed on the logic

board. These resistors limit the current used to drive the bases of Q601, Q602 or Q603 on the output circuit board. These NPN transistors are turned on to energize relays K601, K602 or K603 and mute monitor 3, 2 or 1, respectively.

An output from mute circuit 1 is routed to the headphone/cue board to activate the cue mute FET circuit. Again, 0 V DC turns the circuit on (signal is allowed to pass), and approximately -20 V DC turns the FETs off, causing cue mute.

4.8 ON-AIR OVERLOAD DETECTOR

The on-air overload detector consists of operational amplifier IC501D and associated components located on the headphone/cue board. Circuit operation is as follows: under no-signal conditions, current is applied to the inverting input of the operational amplifier. This current is derived from the -18 V DC power supply through resistors R516 and R517. Diode CR501 keeps the voltage at a maximum of -0.6 V DC. The output of the amplifier is forced to the positive power supply rail by the negative voltage on the inverting input and the high open loop gain of the amplifier. The voltage through current-limiting resistor R515 is applied to the LED overload indicator DS501 but, because the other end of the LED is connected to the positive power supply rail, the voltage across the LED is low and the LED does not illuminate.

Under signal conditions, the voltage present on the on-air lines are sampled by diodes CR9 and CR10 located on the mother board. These diodes form an OR circuit with the highest voltage producing current through resistor R514 to the inverting input of the operational amplifier. This current is opposite in polarity to that derived through resistors R516 and R517, and when it becomes slightly greater than the latter current, it causes the output of the amplifier to change polarity to negative. The point at which this occurs is referred to as the threshold and is a function of the voltage being sensed and the amount of current being drawn through R516 and R517. Variation in current with adjustment of R517 will result in a greater or lesser current through R514 being required to achieve threshold. R517 will vary the threshold to correspond to output signal levels from approximately +12 dBm to +24 dBm, depending on its setting.

When the output of the amplifier transitions to the negative rail, a pulse is conducted through R13 and C504 to the non-inverting input of the amplifier. This negative voltage holds the amplifier output stable until the capacitor discharges through R512. The negative voltage on the output of the amplifier illuminates the LED, which remains on until C504 discharges and the circuit resets. Under sustained overload conditions, the LED blinks on and off. The more the signal level exceeds the threshold, the faster the LED blinks.

4.9 HEADPHONE/CUE AMPLIFIERS

The headphone source switch selects from four sources and routes the chosen signal first through a voltage divider consisting of R529 and R531 (right), and of R530 and R532 (left) for gain adjustment, and then off the card through J501 to the headphone volume control. Signal returns to the card through J502 to the integrated circuit power amplifiers for the headphones. IC502 is the left headphone amplifier, and IC503 is the right amplifier.

The cue summing amplifier is an active combining network receiving signals from the input modules as they are switched into cue with the mix pots. Feedback resistor R501 sets the gain to achieve a level which will approximately match the levels of the other three signals which may be selected by the headphone source selector switch. In addition to feeding signal to that switch, the output of the summing amplifier is routed through resistor R528 and off the board through J501 to the cue level control R812. These two resistors form a voltage divider to set the output level of the cue amplifier.

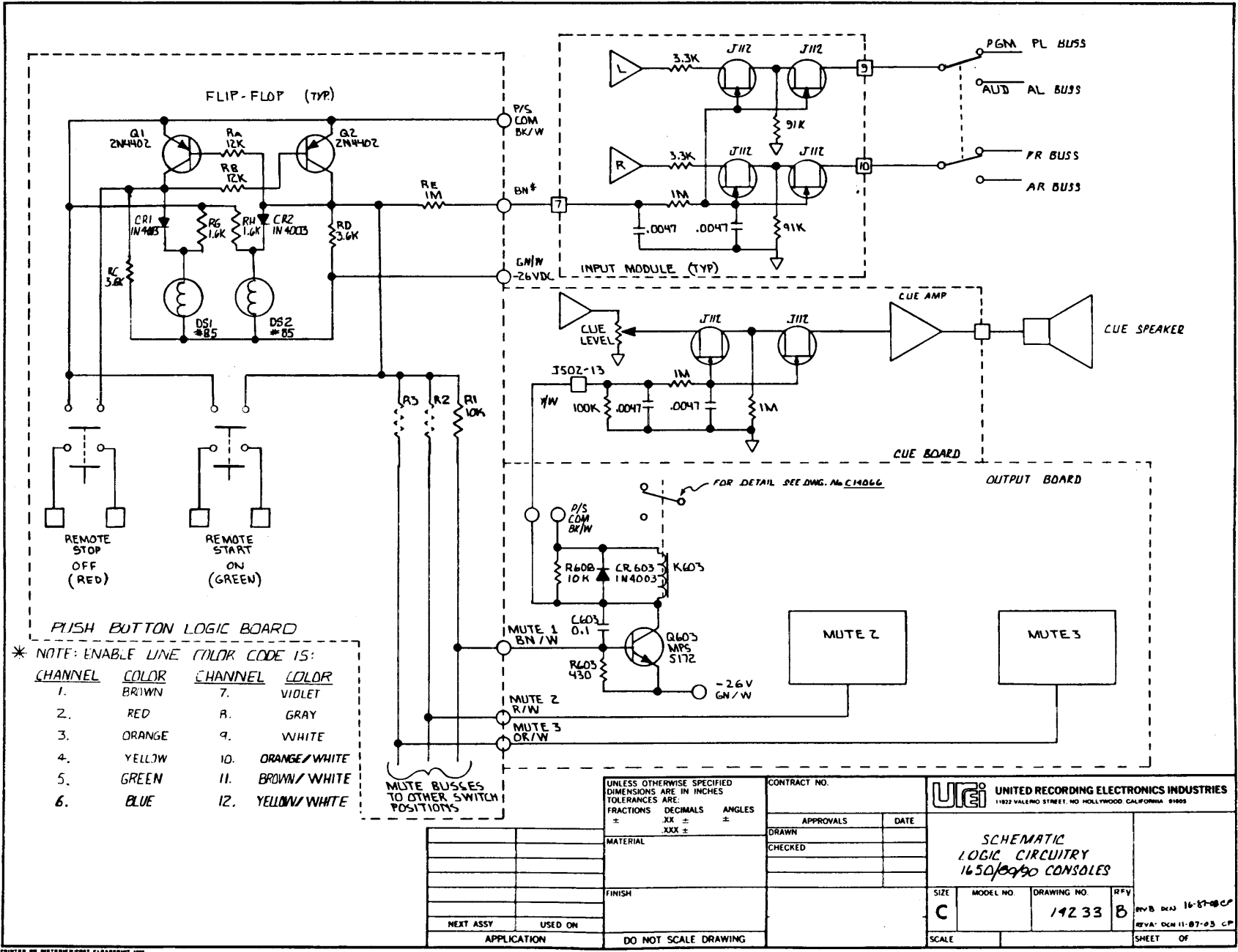
The signal returns to the card via J502 and through the CUE MUTE FET's to the cue amplifier. Operation of the FET switch is discussed in Section 4.7. Integrated circuit IC504 is the cue amplifier. Output from the cue amplifier leaves the card through J502 and terminates at a barrier strip on the mother board. The internal cue speaker is connected to the barrier strip but may be disconnected as described in Section 2.18.

4.10 POWER SUPPLY

The console power transformer is housed in a separate steel chassis and connects to the console with a 5-conductor cable which plugs into the mother board. The power transformer chassis also contains a power ON/OFF switch and a line fuse.

There are several power supply voltages derived and used in the console. First, the basic audio circuitry is operated from ± 18 V DC derived from bridge rectifier CR1 - 4, filter capacitors C81 and C82, integrated circuit voltage regulators VR1 and VR2 and output capacitors C77 and C78. The voltages going into the regulators are approximately ± 26 V DC. In addition, the $+26$ V is used to power the meter lamps; the -26 V is used to operate the logic circuitry, the lamps in the channel on/off switches and the monitor mute relays.

A separate transformer winding feeds bridge rectifier CR5 - 8, filter capacitors C79 and C80, and provides ± 14 V for the monitor power amplifiers and $+14$ V for the headphone and cue amplifiers.



-38-

FIG. 4-1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS .XX ± DECIMALS .XXX ± ANGLES ±		CONTRACT NO.		UNITED RECORDING ELECTRONICS INDUSTRIES 11822 VALENO STREET, NO HOLLYWOOD, CALIFORNIA 91605	
MATERIAL		APPROVALS		DATE	
FINISH		DRAWN		CHECKED	
NEXT ASSY		SIZE		MODEL NO	
USED ON		C		14233	
APPLICATION		SCALE		REV B DCH 16-87-00 CP REV A DCH 11-87-03 CP	
DO NOT SCALE DRAWING				SHEET OF	

SCHMATIC LOGIC CIRCUITRY 1650/80/90 CONSOLES

SIZE: C MODEL NO: 14233 REV: B

DATE: 11-87-03 CP

SECTION V MAINTENANCE

5.0 GENERAL

The Model 1650/80 is an all solid state unit, ruggedly constructed with the highest quality components. As such, it should provide years of trouble free use with normal care. All parts used are conservatively rated for their application, and workmanship meets UREI's rigid standards.

5.1 REPAIRS AND WARRANTY

This product is warranted by the factory to the original purchaser against defects in material and workmanship for one year after initial purchase. We suggest that you retain a copy of your dated sales receipt for proof of warranty status should that be necessary. Should a malfunction ever occur, the dealer from whom the unit was purchased will be glad to handle return for factory repair. If a fault can be traced to a module which can be removed from the console, it is only necessary to send that particular module in for repair.

If you wish to return the unit directly to the factory, please call or write to the Customer Service Department at the Service address listed on the title page of this manual for a Return Authorization Number (RA). All products returned to the factory must be accompanied by a Return Authorization number, and must be shipped prepaid. COD shipments will not be accepted.

For prompt service, ship the unit to the factory with the RA number marked on the shipping label. Be sure that it is well packed in a sturdy carton, with shock-absorbing material such as urethane foam, styrofoam pellets or "bubble pack" completely filling the remaining space. Pay particular attention to protecting the controls, switches, etc. Shipping damage caused by inadequate packing is not covered by the UREI warranty. Tape a note to the top of the unit describing the malfunction, include your phone number where we may contact you if necessary, and give us instructions for returning the product. We will pay one-way return surface shipping costs on any repair covered under the terms of this warranty.

Customers outside the USA should contact their local JBL/UREI Professional Products dealer for warranty assistance. Do not return products to the factory for repair unless you have been given specific instructions to do so.

Field repairs are not normally authorized during the warranty period, and repair attempts by unqualified personnel may invalidate the warranty.

5.2 RF INTERFERENCE AND WHAT TO DO ABOUT IT

RFI (Radio Frequency Interference) can be a problem whenever audio devices are used in a strong electromagnetic RF field. Common RF-induced audio problems include general sound degradation (distortion), blocking (severe RF overload allowing little or no audio output), "Air Monitor" signals coming out of every amplifier, regardless of the amplifiers' source connections, and VU meters which read incorrectly.

The UREI consoles are designed to minimize RFI susceptibility. Among the measures taken are the use of double-sided circuit boards having a continuous ground plane, factory installed bypass capacitors on all inputs and outputs, shielded summing busses ("Buss in a Box"TM), and the use of low impedance circuits wherever possible.

Despite all of these attempts to build an RF-proof console, problems may arise at some stations due to close proximity of a strong RF field.

The most effective way to eliminate RFI is to keep it out of the console. This can be done most easily by effectively shielding the audio wiring as well as grounding the console chassis and everything else in the studio. This technique usually involves attaching 1/2 inch (12 mm) braided flat copper cable between all units with another cable wired back to the station ground (usually in the transmitter room). A ground post for attaching the cable is provided inside the console chassis on the right side of the rear panel. See Section 2.7. The thicker the cable is, the better the ground will be.

All wires going in and out of the board should be dressed in bundles and kept low relative to the station's ground plane or, alternatively, should be enclosed in grounded conduit or troughs. Wires strung around the room should be avoided, since they can act as antennas. Note that AC power line grounds are not RF grounds -- in fact, they can be good antennas.

If connecting all of the chassis in the audio system induces measureable hum, the straps between offending devices and ground can be cut and a .01 uF to .1 uF capacitor inserted in series with the ground wire to provide an open line at low (audio) frequencies which is shorted at radio frequencies. A great deal of experimentation is often required to quiet an RFI problem. The best ground is the one that works.

The grounding techniques described here may require modification depending on the effectiveness of the existing station ground. Also, the large difference in frequency between North American AM and FM broadcast channels dictate different solutions to the problems. A good ground at 1 MHz may be a good antenna at 100 MHz. Often, just the physical location of the console and interconnected equipment will affect the RFI susceptibility at FM frequencies when a good ground is not available.

In severe cases of RFI, drastic measures are often the only cure. These include installing extra wide 1 - 3 inch (25 - 75 mm) copper ground straps between equipment, extra bypassing installed on all audio leads in and out of the studio equipment, and room shielding.

A word or two about bypassing: the most effective bypassing is accomplished outside of a chassis. Once an audio cable is brought inside a unit, any RF on the cable will radiate internally. This signal may not get into the amplifier to which the cable is connected, but it may affect other, unrelated circuits inside the chassis. Therefore, an extra box with internal capacitors and inductors for bypassing to the box's ground can be a most effective filter. This box should be attached to the chassis, near the input of the device in question, with short leads going to the input connection. Ideally, the box will be drilled and mounted over the input connectors. This is a useful technique applied to tape cartridge machines, turntable preamplifiers and jack bays.

Ferrite beads are frequently misused for RF decoupling. In general, RF beads are ineffective in the 0.5 - 1.6 MHz (AM broadcast) band because of their insignificant inductance. They can be effective at FM frequencies (88 - 108 MHz) if an RF path is known to exist where they are installed and the bead is immediately followed by an effective RF shunt (usually a small value capacitor connected to a ground plane or chassis). Often a 20 ohm resistor will do the same job. Merely installing ferrite beads on audio wires or on circuit components is usually a waste of time and money.

5.3 THE CURSE OF CARBONATED BEVERAGES

There may well be no more potentially harmful substance which is so frequently in proximity to audio equipment than the dreaded bottle of soda pop. In its proper place, it is a seemingly innocent refreshment -- a reminder of good times had and of those yet to come -- an accompaniment to the work of the day. But if cola or other soft drinks or coffee with lots of sugar come into immediate contact with audio equipment, the results can be disastrous. The problems are twofold:

- 1) Sugar causes the liquid to be trapped in locations where short circuits may develop, and
- 2) Carbonated beverages may actually be corrosive to some materials.

Sugary liquids spilled into electrical equipment may cause short circuits on printed circuit boards. If spilled into switches and potentiometers, they can destroy the contact surfaces and any lubrication used by the manufacturer, resulting in sticky controls. If allowed to remain, these substances corrode the protective finishes which are applied to metal surfaces, causing them to rust in mere hours. A case in point involves a music recording studio in the Los Angeles area which had to replace each and every switch and potentiometer in its massive 24-track console when someone spilled an entire bottle of some liquid on the console.

But enough of horror stories. The point we are making is that drinks and electronic equipment don't mix. Two things can be done in an effort to minimize the chance of damage from this cause. First, be sure that operating personnel are aware of the potential problem and that drinking materials are NEVER allowed where they might accidentally be spilled onto equipment. Second, be sure that if such an accident does occur, maintenance personnel are notified immediately. To prevent possible corrosive damage, the affected area should be cleaned with as little delay as possible. A solution of detergent and water is an effective cleansing agent and should be used liberally and diligently. Distilled water should be used to rinse thoroughly. Naturally, this should all be done with power disconnected from the equipment.

5.4 CLEANING

The metal and plastic surfaces of the console may be cleaned with a damp cloth. In case of heavy dirt, a household cleaner such as Formula 409 or Fantastik may be used. DO NOT SPRAY CLEANER DIRECTLY ONTO THE CONSOLE, AS IT MAY DESTROY THE LUBRICANTS USED IN THE SWITCHES AND CONTROLS! Spray onto a cloth and then use the cloth to clean the console. Avoid getting cleaner onto the wood end panels. Before using any material to clean the clear plastic surfaces of the VU meters or the copy stand, be certain that the cloth and cleaner are non-abrasive and that the cleaner will not cloud the plastic. It is your responsibility to determine this. Use a similar piece of material, or perhaps the area of the copy stand which is not visible, as a test surface.

5.7 SLIDE ATTENUATORS

The slide attenuators in the Models 1653 and 1683 may be removed from the console and cleaned if necessary. Please read the following procedure carefully before you begin the job and refer to Figure 5.1, which shows an exploded view of the attenuator and its component parts. Please note that the wire exit may not match the drawing.

1. Remove the attenuator from the console by unplugging it from the module, disconnecting the black ground lead by unsoldering it from the solder lug, and unscrewing the two Phillips head screws holding the attenuator to the front panel.
2. Remove the end washer from the low end of the fader (the end closest to the detent spring). Remove the square nut and slide the black metal "shed" out through the semi-circular hole in the end block.
3. Remove the screw at the bottom of the end block of the high end (away from the detent spring) of the fader. Grasp the end block and pull it away from the rest of the fader. Carefully withdraw the slider/guide rod/end block assembly from the outer casing in a straight line. Take very great care not to damage the wiper fingers.
4. If the unit you are disassembling has the wires exiting through the open end of the case, pull gently on the wires and withdraw the two printed resistive elements (tracks) from the case. If the wires exit the opposite (bottom) end of the case, first remove the screw, ground wire and end block, and then remove the resistive tracks.
5. Rinse the parts under a tap with clean, warm water to remove contaminants. If necessary, use a soft brush, taking care not to damage the wiper fingers. Do not scrub or use any abrasive materials on the resistive tracks.
6. Dry all of the parts thoroughly by placing in a warm, dry atmosphere or by use of a warm air blower or hair dryer. CAUTION: Do not use high temperature blowers designed for shrink tubing, paint removal or other such applications.
7. Slide the tracks back into the case. Make sure that the wires are not cut or crimped. If the bottom end block was removed, re-attach it now, feeding the wires out through the two slots. Again, be certain that the wires are not crimped. Re-install the Phillips head screw and ground lug.

8. Put one drop of light oil, such as Dow Corning Silicone Fluid Type DC501/50CS on the guide rod and work the slider to distribute it evenly. There should be only a very thin film of oil on the rod. Remove any excess with an absorbent tissue.

9. Ensure that the wiper fingers are undamaged and are approximately parallel to the guide rod. Gently slide the slider/guide rod/end block assembly back into the case. Be sure that the slider is properly located in the central casing slot. If the wires exit through this end of the case, make sure that they are feeding out the two slots provided and are not being crimped by the end block. Re-attach the end block with the Phillips head screw.

10. Check that slider action is smooth, light and not jerky. Check that the detent action works well. Slide the "shed" back through the semi-circular hole in the bottom end block and through to the identical groove in the upper end block. Re-install the square nut and end washer and fasten with the small panhead screw.

11. To clean the detent mechanism, remove the spring and the actuating pin from the back. Clean with methyl alcohol, turpentine or paint thinner. Re-grease the pin with Dow Corning Silicone Grease Type 4 or equivalent and re-insert. Re-install the spring and check for good action.

12. Re-install the attenuator in the board by reversing Step 1 of this procedure.

5.8 LAMP REPLACEMENT

The VU meter lamps are standard Type 387 28 V units. These are long life versions of the somewhat more common Type 327 lamps. There are two lamps in each meter, which are replaced from the rear of the meter after tilting the meter box back. Push the tab holding the lamp sideways to allow the old bulb to be removed. Insert the new bulb and push the tab back over the back end of the lamp. There is a small dimple in the tab which matches up with the rear contact on the lamp base to hold the tab in place.

The pushbutton lamps are Type 85, which are replaced from the front of the switch. Grasp the red or green colored lens cap and lift it straight up and out, then grasp the lamp and pull it up and out. A soda straw or piece of shrink tubing may be used as a tool to pull the lamp out. Alternately, take a piece of masking tape about 1 inch (25 mm) long and place it over the lamp so that the tape covers the top and sides. Gently grasp the tape-covered lamp with a pair of long nose pliers and pull it up

and out. The tape provides a good friction hold on an otherwise slippery surface. Take care not to squeeze too tightly, as this may cause the lamp to shatter. Replace the lamp, pressing it firmly all the way down in its socket. Finally, replace the lens, with the long protruding pieces of the cap inserted at the top and bottom of the switch.

5.9 ROCKER SWITCHES

Holes are provided in the motherboard so that the rocker switches may be cleaned with an aerosol contact cleaner equipped with an extension tube. Push the tube through the hole and up to the switch. Spray the contacts, then actuate the switch back and forth several times to thoroughly clean the contacts.

We recommend Cramolin Spray R-5 for contact lubrication and cleaning. This product is available from its manufacturer:

Caig Laboratories
1175-O Industrial Ave.
P. O. Box J
Escondido, CA 92025-0051
USA
Telephone: (619) 743-7143

Should it be necessary to replace a rocker switch, the following procedure may be used:

- 1) Turn off the power to the console.
- 2) Remove the knobs from the mixer controls and the monitor, headphone and cue pots.
- 3) Open the top of the console and unplug all mix pots from their respective circuit cards. On 1653 and 1683 consoles, unsolder the pot ground wires.
- 4) Remove all of the plug-in circuit boards.
- 5) Detach the headphone, cue and monitor pots from the front panel and cut the plastic cable ties that hold the wiring to the front panel and to the circuit card guide.

6) Remove the front panel from the printed circuit motherboard by removing the hex nuts attaching the panel to the left and right side mother board spacer extrusions (total of four nuts); removing the hex nuts along the front edge of the motherboard and the hex head sheet metal screws from the front edge of the motherboard and the center of the motherboard. The front panel should no longer be attached to the motherboard and may be removed. Latch the motherboards in the raised position. NOTE: Take special care not to allow the connector headers on the underside of the motherboard to be bent or damaged.

7) Remove the defective switch by unsoldering it from the motherboard. Use a solder-absorbing braid or a solder suction device to remove all solder from the holes. Use a soldering iron of 30 - 50 watts and avoid overheating the traces on the circuit board.

8) Thoroughly remove all solder and excess flux from the holes and from the area around them. Insert the replacement switch into the holes and seat it fully down to the PC board. Check the switch action to make sure it is not binding. Then solder the switch in place. Some of the traces connect on the top side of the board and, although the holes are plated through, it may be necessary to apply solder to the top side while heating on the underside to ensure a solid connection.

9) Check the switch action again to insure that the switch has not become twisted in any manner during installation. If the switch is binding, reheat the connections, one by one, to allow each terminal to achieve its normal relaxed position. Check the switch action with an ohmmeter before replacing the front panel.

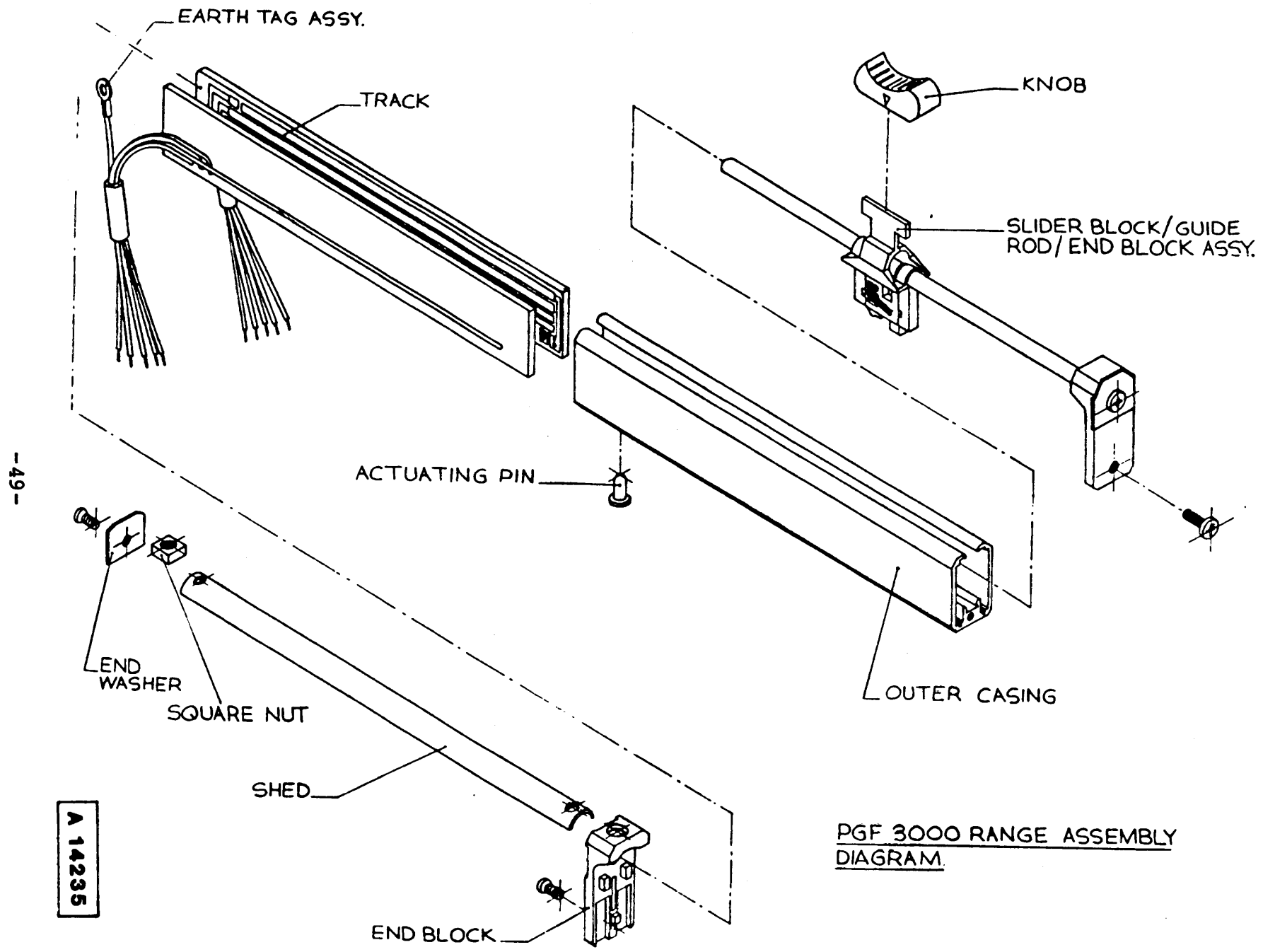
10) Re-attach the front panel. Install all of the 6-32 hex KEPS nuts and sheet metal screws but do not tighten them at this time. Install the program/audition card, monitor card and headphone/cue card, and install an input module in the #1 (left-hand) position, according to Section 2.6. Move the panel if necessary to avoid having any rocker switches bind or the buttons on the monitor and headphone selector switches hang up.

11) Tighten a few of the nuts and then tilt the panel down and make sure that it drops all the way down to its normal operating position without hitting the pushbutton switch panel. If it does, loosen the nuts and move the front panel so that it does not hit. The correctly aligned position of the front panel will not bind any of the switches or buttons, does not cause the plug-in cards to be warped and fully seats to the operating position without hitting the pushbutton switch panel. Tighten all of the screws and nuts holding the front panel to the PC boards.

12) Remove the program/audition, monitor and headphone/cue amplifier cards. Re-install the headphone, cue and monitor pots to the front panel and install new plastic wire ties to hold them in place against the front panel and circuit card guide.

13) Re-install all of the plug-in cards according to the procedure in Section 2.6. In a 1653 or 1683 console, solder the potentiometer ground wires to the solder lugs from which they were removed earlier.

14) Re-install and align all of the knobs, inspect your work, lower the front panel and turn on the console.



PGF 3000 RANGE ASSEMBLY
DIAGRAM.

FIG. 5-1

-49-

A 14235

5.10 PARTS LIST

The following list includes all of the replaceable component parts of the console. Parts are listed under the appropriate assembly and are indexed by designation number where possible. Unless otherwise noted, all resistor values are in ohms and all capacitor values are in uF with rated voltage after a slash mark. For example, a 22,000 ohm resistor will be listed as 22k; a .0047 uF, 100 V capacitor will be listed as .0047/100. In general, mounting and fastening hardware has not been included in the list.

All components used in the console, whether listed or not, are available for replacement or repair purposes. Contact your UREI authorized dealer or the UREI Customer Service Department to obtain any parts required. Please be prepared to give your console serial number (which is located on the rear panel of the console) and exact description of the part and its location.

Under UREI's policy of continuing product review and improvement, product revisions are made on a continuing basis and incorporated into production as rapidly as possible. Consequently, it is possible that not all components will be accurately reflected in this parts list. If you have any questions about apparent discrepancies between the following list and your console, please contact the UREI Customer Service Department.

MICROPHONE PREAMPLIFIER ASSEMBLY 10-13952, Revision D

REF #	DESCRIPTION	UREI P/N	OTHER P/N
R101	-- Optional - see Section 2.20	--	
R102	--	--	
R103	Resistor, 1 M $\pm 5\%$ 1/2 W Carbon Film	182-01004-00	
R104	" 3.3k " " " "	182-03301-00	
R105	" 3.3k " " " "	182-03301-00	
R106	" 91k " " " "	182-09102-00	
R107	" 91k " " " "	182-09102-00	
R108	" 1k " " " "	182-01001-00	
R109	" 2.2k " " " "	182-02201-00	
R110	--	--	
R111	" 100 " " " "	182-01000-00	
R112	" 22k " " " "	182-02202-00	
R113	" 47k " " " "	182-04702-00	
R114	Trimpot, 1k Upright	15-0243	
R115	Resistor, 6.8k $\pm 5\%$ 1/2 W Carbon Film	182-06801-00	
R116	" 100k " " " "	182-01003-00	
R117	" " " " " "	182-01003-00	
R118	" " " " " "	182-01003-00	
C101	Capacitor, Box Mylar, .0047/100	14-0472	
C102	" Radial Electrolytic, 10/35	14-0505	
C103	" " " 10/35	14-0505	
C104	" " " 100/25	14-0486	
C105	" Disc, 100 pF	14-0010	
C106	" " 330 pF	14-0337	
C107	" Box Mylar, 0.1/100	14-0426	
C108	" " " 0.1/100	14-0426	
C109	" Disc, 470 pF	14-0420	
C110	" Radial Electrolytic, 10/35	14-0505	
C111	" " " 10/35	14-0505	
C112	" Box Mylar, .0047/100	14-0472	
C113	" Radial Electrolytic, 22/16	14-0421	
C114	" " " 22/16	14-0421	
Q101	Transistor, FET	13-0276	J112
Q102	" "	13-0276	J112
Q103	" "	13-0276	J112
Q104	" "	13-0276	J112
IC101	IC, Dual Op Amp	13-0276	5532N
J101	Connector, 14 Pin Header	27-0289	
J102	" 10 Pin Rt. Angle	27-0281	
J103	" " " " "	27-0281	
T101	Transformer, Audio Input	16-14016	

LINE PREAMPLIFIER ASSEMBLY 10-13958, Revision A

REF #	DESCRIPTION	UREI P/N	OTHER P/N
R201	Resistor, 100k $\pm 5\%$ 1/2 W Carbon Film	182-01003-00	
R202	" 100k " " " "	182-01003-00	
R203	" 91k " " " "	182-09102-00	
R204	" 91k " " " "	182-09102-00	
R205	" 1k " " " "	182-01001-00	
R206	" 47k " " " "	182-04702-00	
R207	" 47k " " " "	182-04702-00	
R208	" 1k " " " "	182-01001-00	
R209	" 3.3k " " " "	182-03301-00	
R210	" 2.2k " " " "	182-02201-00	
R211	" 2.2k " " " "	182-02201-00	
R212	" 3.3k " " " "	182-03301-00	
R213	" 1M " " " "	182-01004-00	
R214	Trim Pot, 25k Upright	15-0245	
R215	" " 25k " "	15-0245	
R216	Resistor, 4.7k $\pm 5\%$ 1/2 W Carbon Film	182-04701-00	
RN201	Resistor Network, 5.1k	13-0218	
C201	Capacitor, Box Mylar, .0047/100	14-0472	
C202	" Radial Electrolytic, 10/35	14-0505	
C203	" " " 10/35	14-0505	
C204	" " " 10/35	14-0505	
C205	" " " 10/35	14-0505	
C206	" Disc, 470 pF/1 kV	14-0420	
C207	" " 470 pF/1 kV	14-0420	
C208	" Radial Electrolytic, 100/25	14-0486	
C209	" " " 100/25	14-0486	
C210	" Box Mylar, 0.1/100	14-0426	
C211	" " " 0.1/100	14-0426	
C212	" Disc, 100 pF	14-0010	
C213	" " 100 pF	14-0010	
C214	" " 100 pF	14-0010	
C215	" " 100 pF	14-0010	
C216	" Box Mylar, .0047/100	14-0472	
C217	" Radial Electrolytic, 10/35	14-0505	
C218	" " " 10/35	14-0505	
Q201	Transistor, FET	13-0270	J112
Q202	" " "	13-0270	J112
Q203	" " "	13-0270	J112
Q204	" " "	13-0270	J112
IC201	IC, Dual Op Amp	13-0304	TL072CP
IC202	IC, Quad Op Amp	13-0217	TL084CN
J201	Connector, 14 Pin Header	27-0289	
J202	" 10 Pin Rt. Angle	27-0289	
J203	" " " " "	27-0281	

PROGRAM/AUDITION BOARD ASSEMBLY 10-13989, Revision A
Page 1 of 2

REF #	DESCRIPTION	UREI P/N	OTHER P/N
R301	Resistor, 3.3k $\pm 5\%$ 1/2 W Carbon Film	182-03301-00	
R302	--	--	
R303	Resistor, 3.3k $\pm 5\%$ 1/2 W Carbon Film	182-03301-00	
R304	--	--	
R305	--	--	
R306	Resistor, 3.3k $\pm 5\%$ 1/2 W Carbon Film	182-03301-00	
R307	--	--	
R308	Resistor, 3.3k $\pm 5\%$ 1/2 W Carbon Film	182-03301-00	
R309	" 4.7k " " " "	182-04701-00	
R310	" 15 " " " "	182-11500-00	
R311	" 15 " " " "	182-11500-00	
R312	" 4.7k " " " "	182-04701-00	
R313	" 22k " " " "	182-02202-00	
R314	" 220k " " " "	182-02203-00	
R315	" 22k " " " "	182-02202-00	
R316	" 22k " " " "	182-02202-00	
R317	" 22k " " " "	182-02202-00	
R318	" 220k " " " "	182-02203-00	
R319	" 4.7k " " " "	182-04701-00	
R320	" 15 " " " "	182-11500-00	
R321	" 15 " " " "	182-11500-00	
R322	" 4.7k " " " "	182-04701-00	
R323	" 4.7k " " " "	182-04701-00	
R324	" 15 " " " "	182-11500-00	
R325	" 15 " " " "	182-11500-00	
R326	" 4.7k " " " "	182-04701-00	
R327	" 220k " " " "	182-02203-00	
R328	" 220k " " " "	182-02203-00	
R329	" 4.7k " " " "	182-04701-00	
R330	" 15 " " " "	182-11500-00	
R331	" 15 " " " "	182-11500-00	
R332	" 4.7k " " " "	182-04701-00	
R333	Trim Pot, 25k Upright	15-0245	
R334	" " 25k " "	15-0245	
R335	" " 25k " "	15-0245	
R336	" " 25k " "	15-0245	
RN301	Resistor Network, 5.1k	13-0218	
RN302	" " 5.1k	13-0218	
C309	Capacitor, Radial Electrolytic, 10/35	14-0505	
C310	" " " 10/35	14-0505	
C311	" " " 10/35	14-0505	
C312	" " " 10/35	14-0505	
C313	" Disc, 5 pF/1 kV	14-0347	
C314	" " 5 pF/1 kV	14-0347	
C315	" " 5 pF/1 kV	14-0347	

PROGRAM/AUDITION BOARD ASSEMBLY 10-13989, Revision A
Page 2 of 2

REF #	DESCRIPTION	UREI P/N	OTHER P/N
C316	Capacitor, Disc, 5 pF/1 kV	14-0347	
C317	" " 100 pF	14-0010	
C318	" " 100 pF	14-0010	
C319	" " 100 pF	14-0010	
C320	" " 100 pF	14-0010	
C321	" " 100 pF	14-0010	
C322	" " 100 pF	14-0010	
C323	" " 100 pF	14-0010	
C324	" " 100 pF	14-0010	
C325	" Radial Electrolytic, 100/25	14-0486	
C326	" " " 100/25	14-0486	
C327	" Box Mylar, 0.1/100	14-0426	
C328	" " " 0.1/100	14-0426	
CR301	Diode, Silicon Rectifier	13-0005	1N4003
CR302	" " "	13-0005	1N4003
CR303	" " "	13-0005	1N4003
CR304	" " "	13-0005	1N4003
CR305	" " "	13-0005	1N4003
CR305	" " "	13-0005	1N4003
CR306	" " "	13-0005	1N4003
CR307	" " "	13-0005	1N4003
CR308	" " "	13-0005	1N4003
Q301	Transistor, Silicon PNP	13-0149	2N6728
Q302	" " NPN	13-0148	2N6716
Q303	" " NPN	13-0148	2N6716
Q304	" " PNP	13-0149	2N6728
Q305	" " NPN	13-0148	2N6716
Q306	" " PNP	13-0149	2N6728
Q307	" " NPN	13-0148	2N6716
Q308	" " PNP	13-0149	2N6728
IC301	IC, Quad Op Amp	13-0217	TL084CN
IC302	" Dual " "	13-0304	TL072CP
IC303	" " " "	13-0304	TL072CP
IC304	" Quad " "	13-0217	TL084CN
IC305	" " " "	13-0217	TL084CN
J301	Connector, 15 Pin Rt. Angle	27-0283	
J302	" 10 Pin " "	27-0281	
J303	" 12 Pin " "	27-0282	

MONITOR AMPLIFIER ASSEMBLY 10-13988, Revision B

REF #	DESCRIPTION	UREI P/N	OTHER P/N
R401	Resistor, 2.2k $\pm 5\%$ 1/2 W Carbon Film	182-02201-00	
R402	" 2.2k " " " "	182-02201-00	
R403	" 47k " " " "	182-04702-00	
R404	" 47k " " " "	182-04702-00	
R405	" 1.5k " " " "	182-01501-00	
R406	" 30k " " " "	182-03002-00	
R407	" 2.7 " " " "	182-22700-00	
R408	" 1.5k " " " "	182-01501-00	
R409	" 2.7 " " " "	182-22700-00	
R410	" 30k " " " "	182-03002-00	
C401	Capacitor, Radial Electrolytic, 10/35	14-0505	
C402	" " " 10/35	14-0505	
C403	" " " 10/35	14-0505	
C404	" " " 10/35	14-0505	
C405	" " " 10/35	14-0505	
C406	" " " 10/35	14-0505	
C407	" Box Mylar, 0.1	14-0426	
C408	" " " 0.1	14-0426	
C409	" Disc, 100 pF/1 kV	14-0010	
C410	" " 100 pF/1 kV	14-0010	
C411	" Radial Electrolytic, 10/35	14-0505	
C412	" " " 10/35	14-0505	
C413	" " " 100/25	14-0486	
C414	" " " 100/25	14-0486	
S401	Switch, 4 Pole 4 Position Interlocked Button, Black	15-13872 24-0095	
IC401	IC, Power Amplifier	13-0331	TDA 2006
IC402	" " " "	13-0331	TDA 2006
	Heat Sink	36-0377	
	Connector, 10 Pin Rt. Angle	27-0281	
	" 17 Pin " "	27-0284	

HEADPHONE/CUE AMPLIFIER ASSEMBLY 10-13990, Revision A

Page 1 of 2

REF #	DESCRIPTION	UREI P/N	OTHER P/N
R501	Resistor, 130k $\pm 5\%$ 1/2 W Carbon Film	182-01303-00	
R502	--	--	
R503	Trim Pot, 5k Upright	15-0329	
R504	Resistor, 4.7k $\pm 5\%$ 1/2 W Carbon Film	182-04701-00	
R505	" 3.6k " " " "	182-03601-00	
R506	" 4.7k " " " "	182-04701-00	
R507	Trim Pot, 5k Upright	15-0329	
R508	Resistor, 4.7k $\pm 5\%$ 1/2 W Carbon Film	182-04701-00	
R509	" 3.6k " " " "	182-03601-00	
R510	" 4.7k " " " "	182-04701-00	
R511	" 1M " " " "	182-01004-00	
R512	" 220k " " " "	182-02203-00	
R513	" 220k " " " "	182-02203-00	
R514	" 33k " " " "	182-03302-00	
R515	" 1.8k " " " "	182-01801-00	
R516	" 47k " " " "	182-04702-00	
R517	Trim Pot, 250k Upright	15-0289	
R518	Resistor, 2.7 $\pm 5\%$ 1/2 W Carbon Film	182-22700-00	
R519	" 4.7k " " " "	182-04701-00	
R520	" 4.7k " " " "	182-04701-00	
R521	" 2.7 " " " "	182-22700-00	
R522	" 100k " " " "	182-01003-00	
R523	--	--	
R524	Resistor, 1M $\pm 5\%$ 1/2 W Carbon Film	182-01004-00	
R525	" 1M " " " "	182-01004-00	
R526	" 2.7 " " " "	182-22700-00	
R527	" 10k " " " "	182-01002-00	
R528	" 100k " " " "	182-01003-00	
R529	" 4.7k " " " "	182-04701-00	
R530	" 4.7k " " " "	182-04701-00	
R531	" 1k " " " "	182-01001-00	
R532	" 1k " " " "	182-01001-00	
R533	" 4.7k " " " "	182-04701-00	
C501	--	--	
C502	Capacitor, Disc, 22 pF/1 kV	14-0179	
C503	" Radial Electrolytic, 10/35	14-0505	
C504	" Box Mylar, 0.1/100	14-0426	
C505	" Radial Electrolytic, 470/40	14-0487	
C506	" Box Mylar, 0.1/100	14-0426	
C507	" Disc, 470 pF/1 kV	14-0420	
C508	" Radial Electrolytic, 100/25	14-0486	
C509	" " " 100/25	14-0486	
C510	" " " 10/35	14-0505	
C511	" " " 470/40	14-0487	
C512	" Box Mylar, 0.1/100	14-0426	
C513	" Radial Electrolytic, 10/35	14-0505	

HEADPHONE/CUE AMPLIFIER ASSEMBLY 10-13990, Revision A
Page 2 of 2

REF #	DESCRIPTION	UREI P/N	OTHER P/N
C514	" Disc, 470 pF/1 kV	14-0420	
C515	Capacitor, Radial Electrolytic, 100/25	14-0486	
C516	" " " 470/40	14-0487	
C517	" Box Mylar, .0047/100	14-0472	
C518	" Radial Electrolytic, 100/25	14-0486	
C519	" Box Mylar, 0.1/100	14-0426	
C520	" " " .0047/100	14-0472	
C521	" Radial Electrolytic, 10/35	14-0505	
C522	" Disc, 470 pF/1 kV	14-0420	
C523	" Box Mylar, 0.1/100	14-0426	
C524	" Radial Electrolytic, 100/25	14-0486	
CR501	Diode, Silicon Signal	13-0135	1N914B
Q501	Transistor, FET	13-0270	J112
Q502	" "	13-0270	J112
IC501	IC, Quad Op Amp	13-0217	TL084CN
IC502	" Amplifier	13-0330	LM380N
IC503	" "	13-0330	LM380N
IC504	" "	13-0330	LM380N
J501	Connector, 17 Pin Rt. Angle	27-0284	
J502	" 25 Pin " "	27-0285	
S501	Switch, 4 Pole 4 Position Interlocking Button, Black	15-13872 24-0095	

AUXILIARY INPUT SWITCH BOARD ASSEMBLY 10-13987

REF #	DESCRIPTION	UREI P/N	OTHER P/N
	Capacitor, Disc, 150 pF	14-0336	
	Switch, 4 Pole 4 Position Interlocked	15-13872	
	Button, Black	24-0095	
	Barrier Strip, 5 Pin	27-0270	

PUSHBUTTON SWITCH ASSEMBLIES

REF #	DESCRIPTION	UREI P/N	OTHER P/N
S701-	Switch, Pushbutton	15-0367	
	Switch Cap, Red	24-0110	
	Switch Cap, Green	24-0111	
	Lamp	44-0012	#85
R701-	Resistor, 1.8k $\pm 5\%$ 1/2 W Carbon Film	182-01801-00	
	" 10k " " " "	182-01002-00	
	" 12k " " " "	182-01202-00	
	" 1M " " " "	182-01004-00	
Q701-	Transistor, Silicon PNP	13-0329	2N4402
CR701-	Diode, Rectifier	13-0005	1N4003

OUTPUT BOARD ASSEMBLY 10-13986, Revision A

REF #	DESCRIPTION	UREI P/N	OTHER P/N
R601	Resistor, 430 $\pm 5\%$ 1/2 W Carbon Film	182-04300-00	
R602	" 430 " " " "	182-04300-00	
R603	" 430 " " " "	182-04300-00	
R604	" 1.8k " " " "	182-01801-00	
R605	" 1.8k " " " "	182-01801-00	
R606	" 1.8k " " " "	182-01801-00	
R607	" 1.8k " " " "	182-01801-00	
R608	" 10k " " " "	182-01002-00	
C601	Capacitor; Box Mylar, 0.1/100	14-0426	
C602	" " " 0.1/100	14-0426	
C603	" " " 0.1/100	14-0426	
C604	" Disc, 470 pF	14-0420	
C605	" " " "	14-0420	
C606	" " " "	14-0420	
C607	" " " "	14-0420	
C608	" " " "	14-0420	
C609	" " " "	14-0420	
C610	" " " "	14-0420	
C611	" " " "	14-0420	
CR601	Diode, Silicon Rectifier	13-0005	1N4003
CR602	" " " "	13-0005	1N4003
CR603	" " " "	13-0005	1N4003
Q601	Transistor, Silicon NPN	13-0287	MPS5172
Q602	" " " "	13-0287	MPS5172
Q603	" " " "	13-0287	MPS5172
K601	Relay, 3PDT	15-0368	
K602	" " " "	15-0368	
K603	" " " "	15-0368	
	Socket, Relay	27-0274	
	Barrier Strip, 5 Pin	27-0270	
T601	Transformer, Output	16-12614	
T602	" " " "	16-12614	
T603	" " " "	16-12614	
T604	" " " "	16-12614	

MOTHERBOARD ASSEMBLY

REF #	DESCRIPTION	UREI P/N	OTHER P/N
VR1	I.C., Voltage Regulator, +18 V	13-0206	7818
VR2	" " " -18 V	13-0207	7918
	Shoulder Washer (Regulator Mounting)	36-0363	
	Mica Washer " "	13-0307	
	Capacitor, Disc, 470 pF/1 kV	14-0420	
C77*	" Axial Electrolytic, 10/63	14-0208	
C78*	" " " 10/63	14-0208	
C79	" " " 4700/16	14-0539	
C80	" " " 4700/16	14-0539	
C81	" " " 2200/35	14-0011	
C82	" " " 2200/35	14-0011	
CR1	Diode, Silicon Rectifier	13-0005	1N4003
CR2	" " "	13-0005	1N4003
CR3	" " "	13-0005	1N4003
CR4	" " "	13-0005	1N4003
CR5	" " "	13-0119	1N5404
CR6	" " "	13-0119	1N5404
CR7	" " "	13-0119	1N5404
CR8	" " "	13-0119	1N5404
CR9	" " Signal	13-0135	1N914B
CR10	" " "	13-0135	1N914B
	Switch, DPDT Rocker (PGM-AUD)	15-0365	
	" " " (METER)	15-0365	
	" 4PDT " (INPUT)	15-0364	
	" " " (ON AIR)	15-0364	
	Barrier Strip, 5 Pin	27-0270	
	Connector, 10 Pin Male Header	27-0276	
	" 12 Pin " "	27-0277	
	" 15 Pin " "	27-0278	
	" 17 Pin " "	27-0279	
	" 5 Pin Header (Power Supply)	27-0292	

* First production models used 10 uF/35 V radial capacitors for C77 and C78; UREI Part No. 14-0505.

POWER SUPPLY ASSEMBLY 10-14004, Revision A

REF #	DESCRIPTION	UREI P/N	OTHER P/N
T1	Transformer, Power, 120 V AC	16-13967	
	Line Cord	36-0221	
S1	Switch, Slide DPDT	15-0192	
F1	Fuse, 3AG 1 A SB (for 120 V)	15-0374	
	Fuse Holder	15-0318	
	Connector, 7 Pin Housing	27-0329	
	Connector Pin	27-0135	

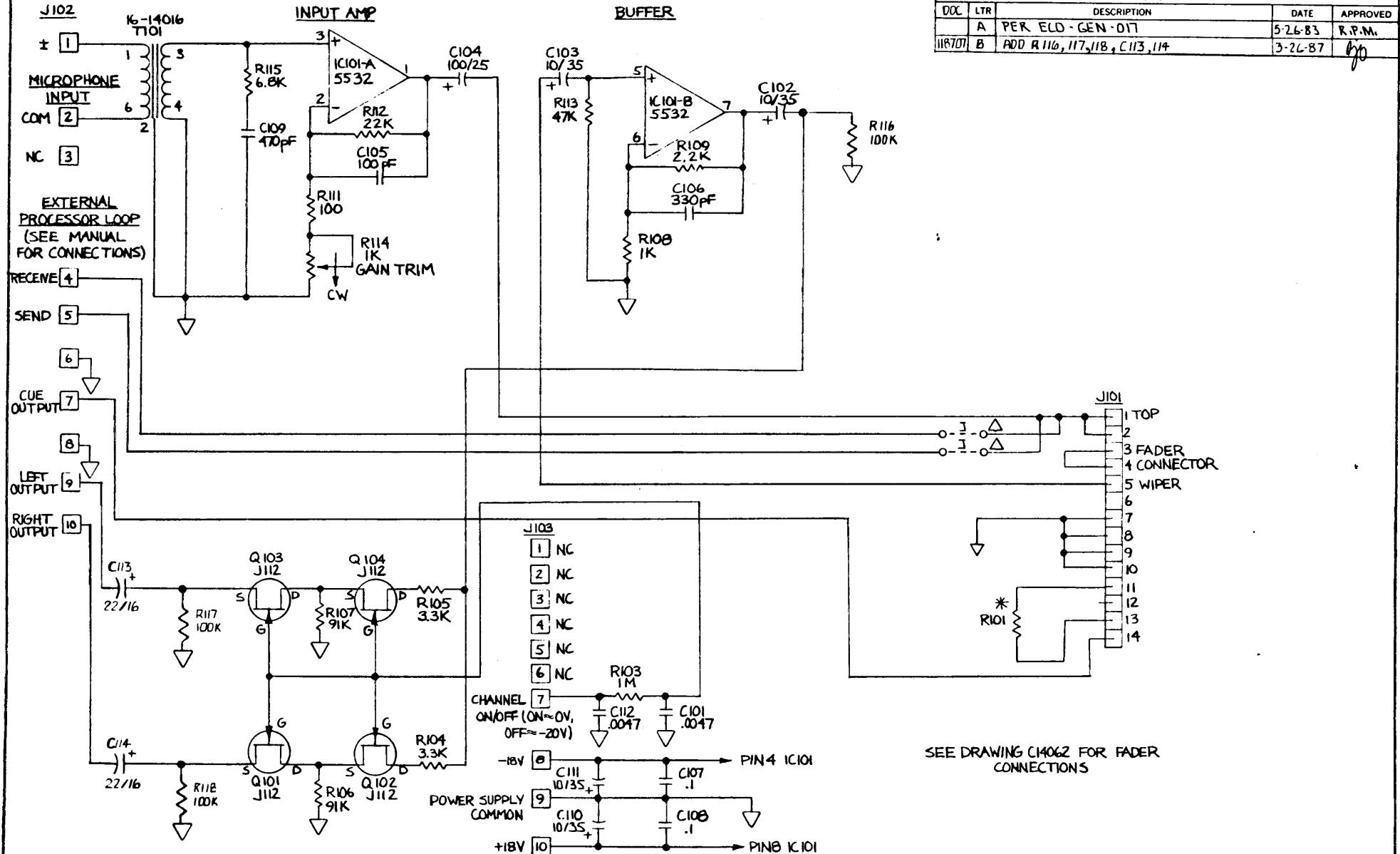
CONSOLE MISCELLANEOUS PARTS

REF #	DESCRIPTION	UREI P/N	OTHER P/N
	Fastener, 1/4 Turn	36-0374	
	Knob, Large Round (not on 1653, 1683)	24-0114	
	" Small Round	24-0113	
	Conductive Plastic Pot Assembly (1651, 1681)	10-13961	
	Rotary Attenuator Assembly (1652, 1682)	10-13962	
	Slide Pot Assembly (1653, 1683)	10-13963	
	Potentiometer, Dual 10k (Master, Monitor, Cue, Headphone)	15-0372	
	Bumper, Polyurethane (Meter Box Rear)	36-0298	
	LED, Red (Overload)	13-0263	
	LED Diffuser Clip	36-0375	
	Lamp, Meter	44-0005	#387
	Meter, VU, 2 1/2 Inch	40-0026	
	Phone Jack, 3 Conductor 1/4 Inch	27-0273	
	Latch, 10 Inch Scissors	36-0380	
	Loudspeaker, Cue	45-0083	

5.11 INDEX OF SCHEMATICS

Mono Mic Input Card.....	C14060
Stereo Line Level Input Card.....	C14061
Fader Wiring.....	C14062
Program/Audition Amplifier.....	D14063
Headphone/Cue Amplifier.....	D14065
Monitor Amplifier Board.....	C14064
Output Board.....	C14066
Power Supply.....	C14234
Pinouts, Plug-in Cards.....	B14145
Block Diagram.....	D14106
Phono Preamplifier, Model 1101.....	C14107

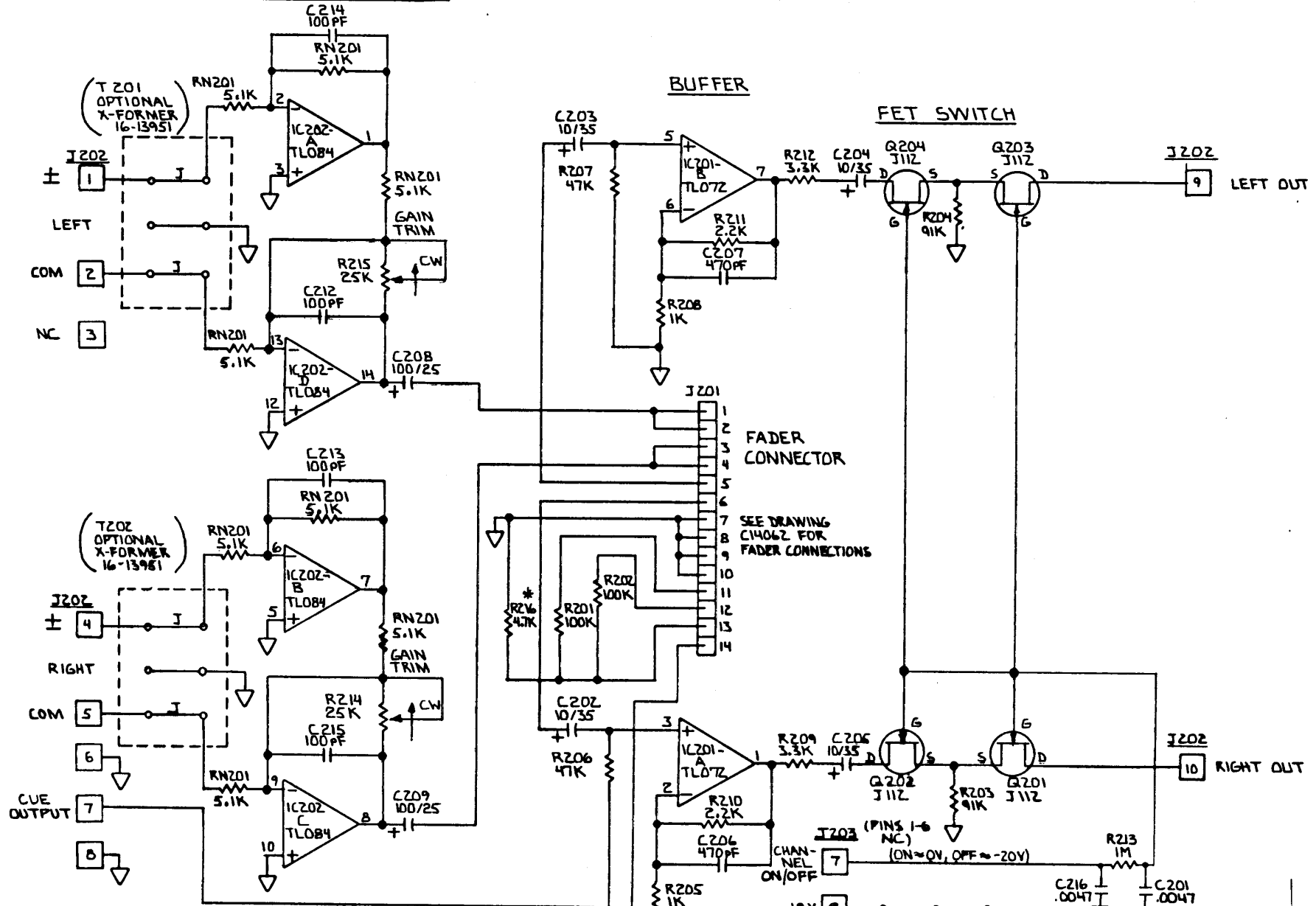
REVISIONS				
DOC	LTR	DESCRIPTION	DATE	APPROVED
	A	PER ELD - GEN - 011	5-26-83	R.P.M.
118707	B	ADD R116, 117, 118, C113, 114	3-26-87	bjp



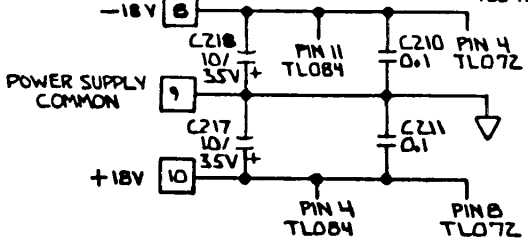
- 7. Δ INSTALL JUMPERS FOR EXTERNAL PROCESSOR LOOP. SEE MANUAL.
 - 6. CW INDICATES CLOCKWISE ROTATION.
 - 5. # INDICATES CONNECTOR PIN NUMBER.
 - 4. * INDICATES R101 NOT INCLUDED ON PC BOARD MAY BE ADDED TO ALLOW CUE, SEE MANUAL.
 - 3. ∇ INDICATES CIRCUIT GROUND.
 - 2. CAPACITOR VALUES ARE IN MICROFARADS.
 - 1. RESISTOR VALUES ARE IN OHMS $\pm 5\%$ 1/2W.
- NOTES: UNLESS OTHERWISE SPECIFIED

SEE DRAWING C14062 FOR FADER CONNECTIONS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
\pm	.XX \pm	\pm	
	.XXX \pm		
MATERIAL		APPROVALS	DATE
		DRAWN MF	3/22/83
FINISH		CHECKED	
NEXT ASSY USED ON			
APPLICATION		DO NOT SCALE DRAWING	
		UNITED RECORDING ELECTRONICS INDUSTRIES 11822 VALERIO STREET, NO HOLLYWOOD, CALIFORNIA 91605	
		SCHEMATIC MONO MIKE INPUT CARD	
SIZE	MODEL NO	DRAWING NO.	REV.
C	1650 1680	C14060	B
SCALE			SHEET 1 OF 1



- 6. * R216 NOT USED ON 1LS2, 16B2.
 - 5. CW INDICATES CLOCKWISE ROTATION.
 - 4. # INDICATES CONNECTOR PIN NUMBER.
 - 3. ▽ INDICATES CIRCUIT GROUND.
 - 2. CAPACITOR VALUES ARE IN MICROFARADS.
 - 1. RESISTOR VALUES ARE IN OHMS ± 5% 1/2 W
- NOTES: UNLESS OTHERWISE SPECIFIED

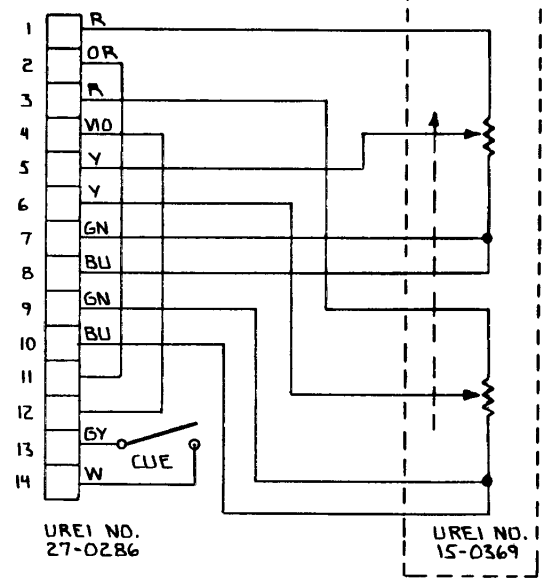


UNITED RECORDING ELECTRONICS INDUSTRIES		SCHEMATIC STEREO LINE LEVEL INPUT CARD	
MODEL 1LS0-16B0	DATE 2-15-83	DEPARTMENT	ISSUE
LOS ANGELES CALIFORNIA	CHECKED R.P. MARIN	APPROVED	C14061A

ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			

WIRING FOR SLIDE POT
(1653, 1683)

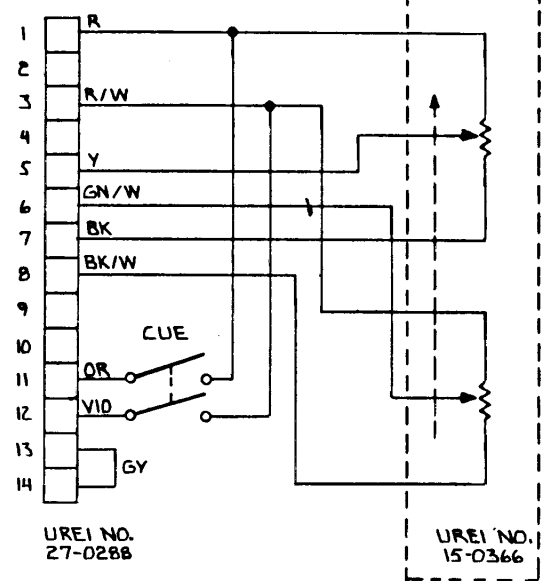
ASSY. # 10-13963



NOTE: ALL WIRES CUT TO 6-1/2" LENGTH EXCEPT ORANGE AND VIOLET JUMPERS WHICH ARE 1-1/2" 24 AWG PVC.

WIRING FOR ROTARY ATTENUATOR
(1652, 1682)

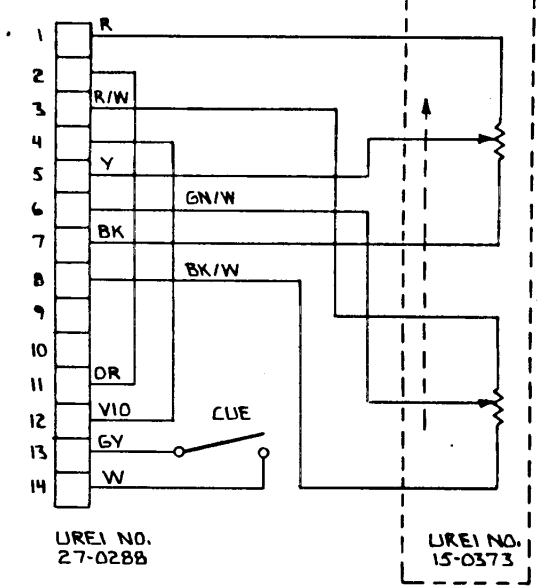
ASSY. # 10-13962



NOTES: ALL WIRES CUT TO 6" LENGTH EXCEPT GRAY JUMPER WHICH IS 1-1/2" 24 AWG PVC.

WIRING FOR ROTARY POT
(1651, 1681)

ASSY. # 10-13961



NOTES: ALL WIRES CUT TO 6" LENGTH EXCEPT ORANGE AND VIOLET JUMPERS WHICH ARE 1-1/2" 24 AWG PVC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
+ .XX ± ±
XXX ±

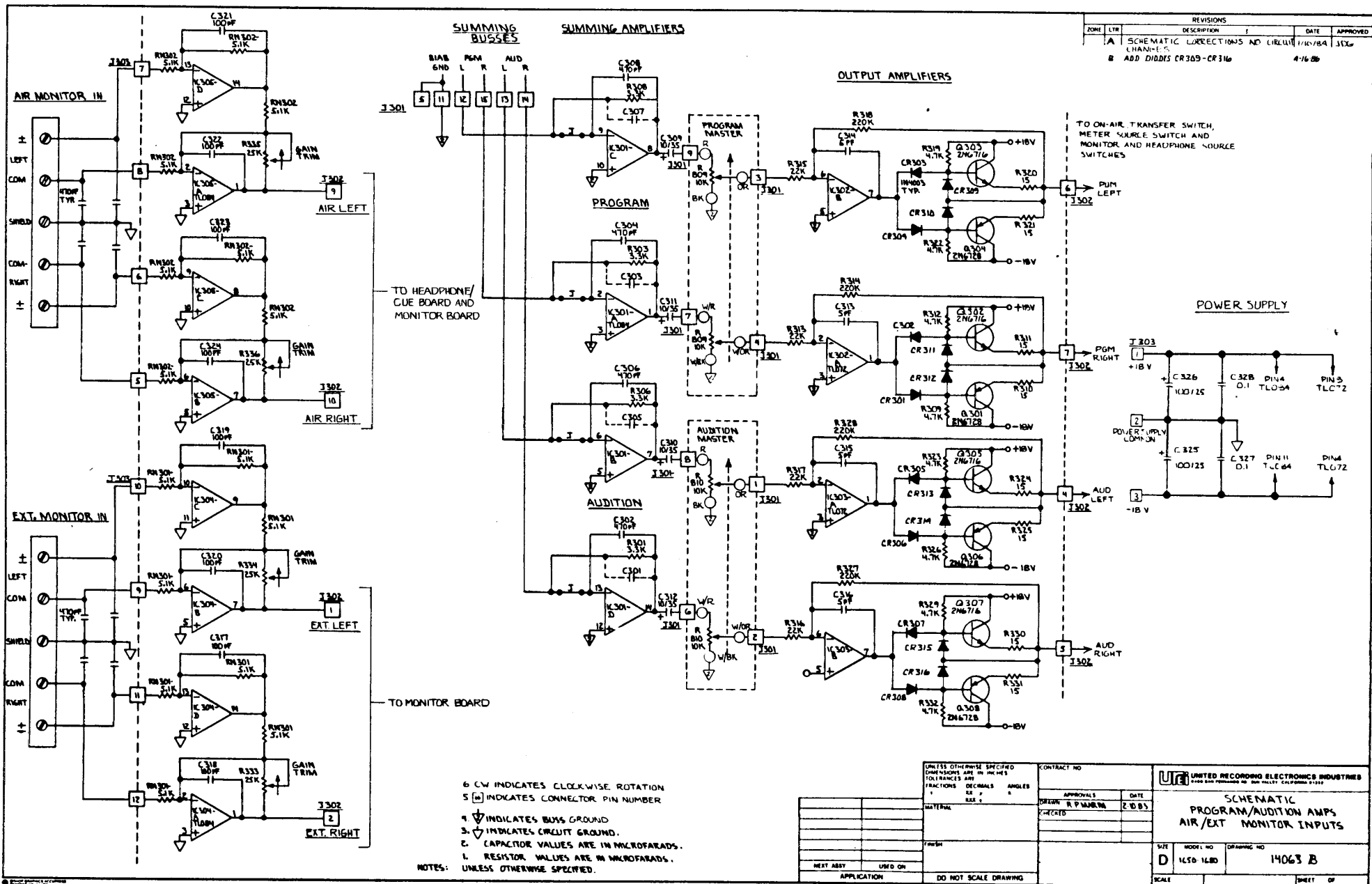
CONTRACT NO.	
APPROVALS	DATE
DRAWN R. P. MARIN	2-15-83
CHECKED	

UREI UNITED RECORDING ELECTRONICS INDUSTRIES
11922 VALERIO STREET, NO. HOLLYWOOD, CALIFORNIA 91605

FADER WIRING
1650 / 1680 SERIES

MATERIAL	
FINISH	
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

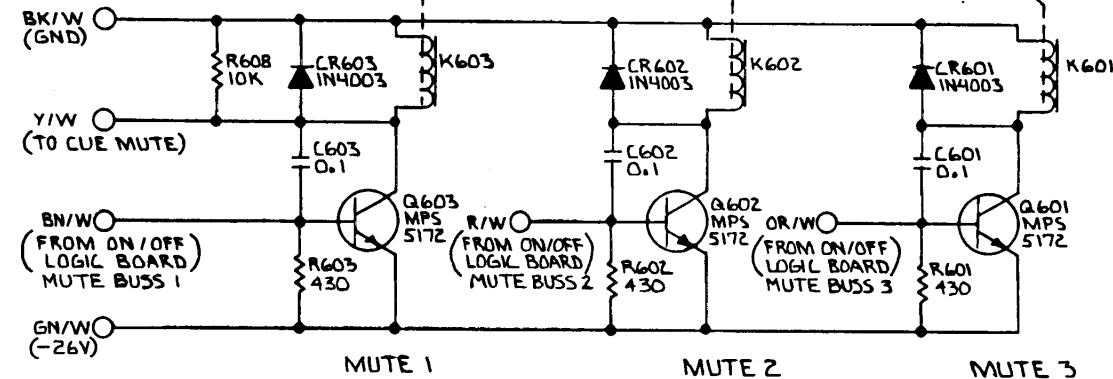
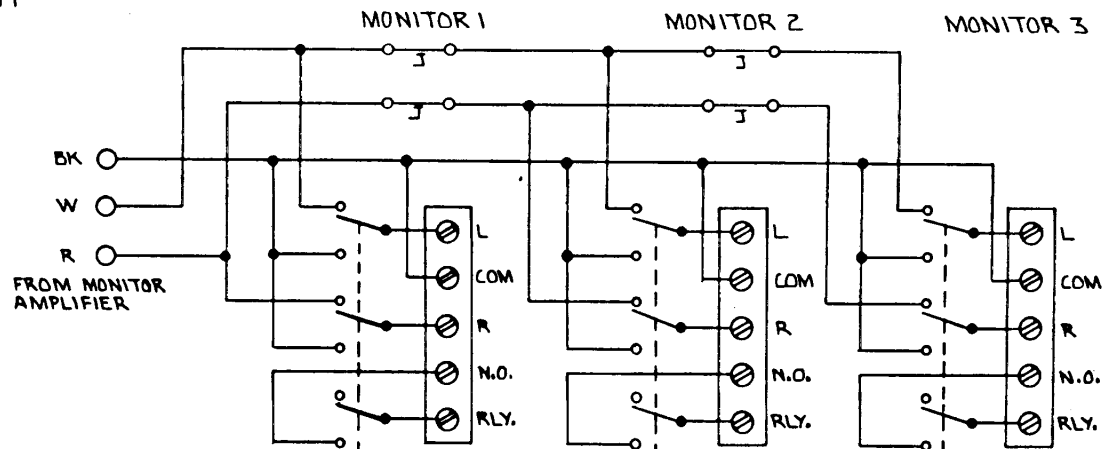
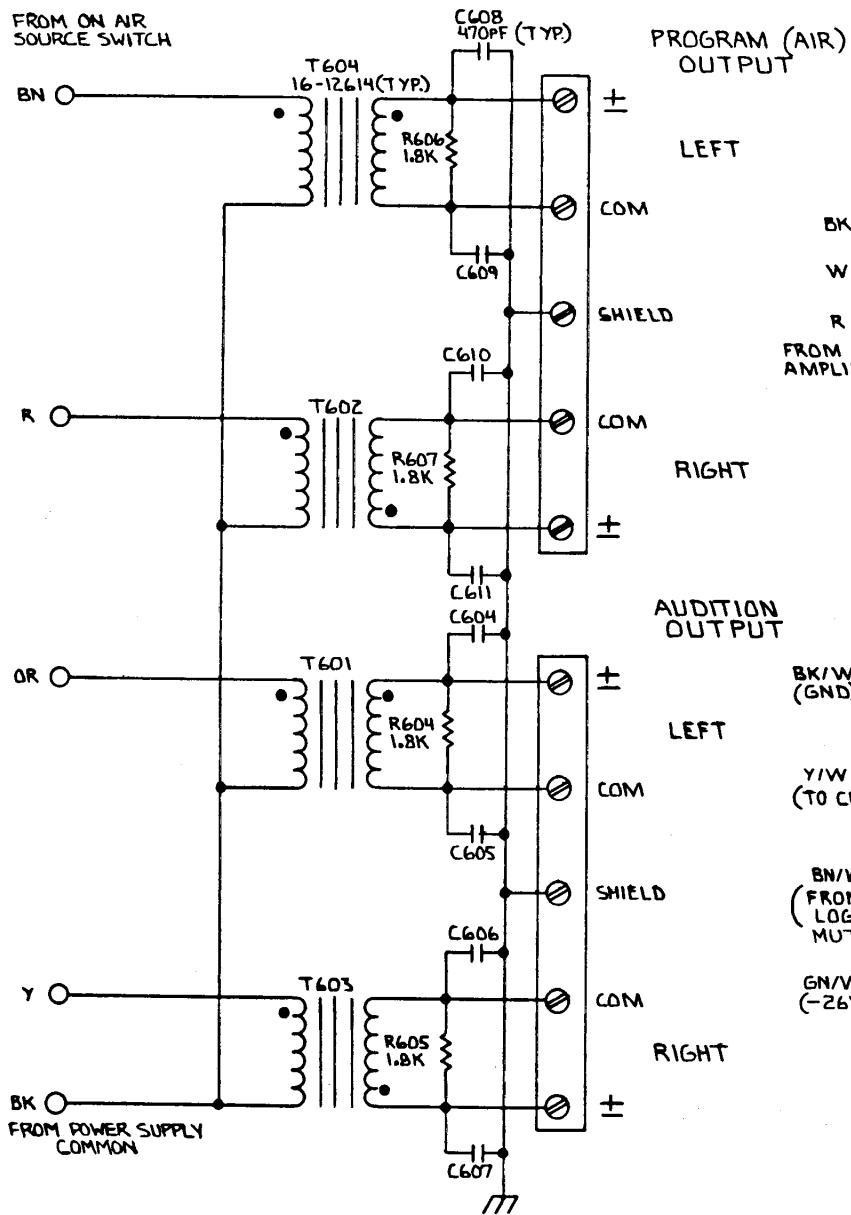
SIZE	MODEL NO	DRAWING NO.
C	1650 AND 1680 SERIES	14062
SCALE		SHEET OF



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		SCHEMATIC CORRECTIONS AND CIRCUIT CHANGES	1/16/78	JDL
B		ADD DIODES CR305-CR316	4/16/80	

- NOTES:
- 6 CW INDICATES CLOCKWISE ROTATION
 - 5 (u) INDICATES CONNECTOR PIN NUMBER
 - 4 ∇ INDICATES BUSY GROUND
 - 3 ∇ INDICATES CIRCUIT GROUND.
 - 2. CAPACITOR VALUES ARE IN MICROFARADS.
 - 1. RESISTOR VALUES ARE IN MICROFARADS.
 - UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED COMPONENTS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES		CONTRACT NO.		UNITED RECORDING ELECTRONICS INDUSTRIES <small>2000 SAN FRANCISCO BLVD. SAN FRANCISCO, CALIFORNIA 94133</small>	
MATERIAL		APPROVALS		DATE	
DRAWN		R. P. MARRAS		2/10/83	
CHECKED					
TITLE		SIZE		MODEL NO.	
NEXT ASBY		D		1450 1480	
APPLICATION		DO NOT SCALE DRAWING		DRAWING NO.	
				14063 B	
		SCALE		SHEET OF	



3. INDICATES CHASSIS GROUND.

2. CAPACITOR VALUES ARE IN MICROFARADS.

1. RESISTOR VALUES ARE IN OHMS \pm 5% 1/2W

NOTES: UNLESS OTHERWISE SPECIFIED.

REVISIONS	
UNITED RECORDING ELECTRONICS INDUSTRIES	SCHMATIC OUTPUT BOARD
MODEL 1650-1680 DEPARTMENT	DATE 2-15-83
LOS ANGELES CALIFORNIA	CHECKED R.P.MARR
	APPROVED C14066

MIC PRE-AMP

J 103

- 1 — N.C.
- 2 — N.C.
- 3 — N.C.
- 4 — N.C.
- 5 — N.C.
- 6 — N.C.
- 7 — CHANNEL ON/OFF
- 8 — -18V DC
- 9 — P/S COM
- 10 — +18V DC

J102

- 1 — INPUT ±
- 2 — INPUT COM
- 3 — N.C.
- 4 — PROC. LOOP RECEIVE
- 5 — PROC. LOOP SEND
- 6 — GND
- 7 — CUE BUSS
- 8 — GND
- 9 — LEFT OUT
- 10 — RIGHT OUT

LINE INPUT

J 203

- 1 — N.C.
- 2 — N.C.
- 3 — N.C.
- 4 — N.C.
- 5 — N.C.
- 6 — N.C.
- 7 — CHANNEL ON/OFF
- 8 — -18V DC
- 9 — P/S COM
- 10 — +18V DC

J202

- 1 — INPUT ± } LEFT
- 2 — INPUT COM }
- 3 — N.C.
- 4 — INPUT ± } RIGHT
- 5 — INPUT COM }
- 6 — GND }
- 7 — CUE BUSS }
- 8 — GND }
- 9 — LEFT OUT
- 10 — RIGHT OUT

PGM /AUD

J 303

- 1 — +18V DC
- 2 — P/S COM
- 3 — -18V DC
- 4 — N.C.
- 5 — AIR MON. IN COM } RIGHT
- 6 — AIR MON. IN ± }
- 7 — AIR MON. IN ± }
- 8 — AIR MON. IN COM } LEFT
- 9 — EXT MON. IN COM }
- 10 — EXT MON. IN ± } LEFT
- 11 — EXT MON. IN ± } RIGHT
- 12 — EXT MON. IN COM }

J 302

- 1 — EXT MON. OUT LEFT
- 2 — EXT MON. OUT RIGHT
- 3 — N.C.
- 4 — AUD LEFT OUT
- 5 — AUD RIGHT OUT
- 6 — PGM LEFT OUT
- 7 — PGM RIGHT OUT
- 8 — N.C.
- 9 — AIR MON. OUT LEFT
- 10 — AIR MON. OUT RIGHT

J 301

- 1 — TO AUD MASTR WIPER LEFT
- 2 — TO AUD MASTR WIPER RIGHT
- 3 — TO PGM MASTR WIPER LEFT
- 4 — TO PGM MASTR WIPER RIGHT
- 5 — BUSS GND
- 6 — TO AUD MASTR TOP RIGHT
- 7 — TO PGM MASTR TOP RIGHT
- 8 — TO AUD MASTR TOP LEFT
- 9 — TO PGM MASTR TOP LEFT
- 10 — N.C.
- 11 — BUSS GND
- 12 — PGM LEFT SUM BUSS
- 13 — AUD LEFT SUM BUSS
- 14 — AUD RIGHT SUM BUSS
- 15 — PGM RIGHT SUM BUSS

MONITOR

J 402

- 1 — } P/S COM
- 2 — }
- 3 — } +14V DC
- 4 — }
- 5 — } -14V DC
- 6 — }
- 7 — N.C.
- 8 — N.C.
- 9 — LEFT MON OUT
- 10 — N.C.
- 11 — TO MON. MASTR WIPER LEFT
- 12 — BUSS GND
- 13 — RIGHT MON. OUT
- 14 — BUSS GND
- 15 — TO MON. MASTR WIPER RIGHT
- 16 — TO MON. MASTR TOP LEFT
- 17 — TO MON. MASTR TOP RIGHT

J 401

- 1 — MON. PREAMP OUT RIGHT
- 2 — MON. PREAMP OUT LEFT
- 3 — EXT MON IN RIGHT
- 4 — EXT MON IN LEFT
- 5 — AUD RIGHT
- 6 — AUD LEFT
- 7 — PGM RIGHT
- 8 — PGM LEFT
- 9 — AIR RIGHT
- 10 — AIR LEFT

HEADPHONE /CUE

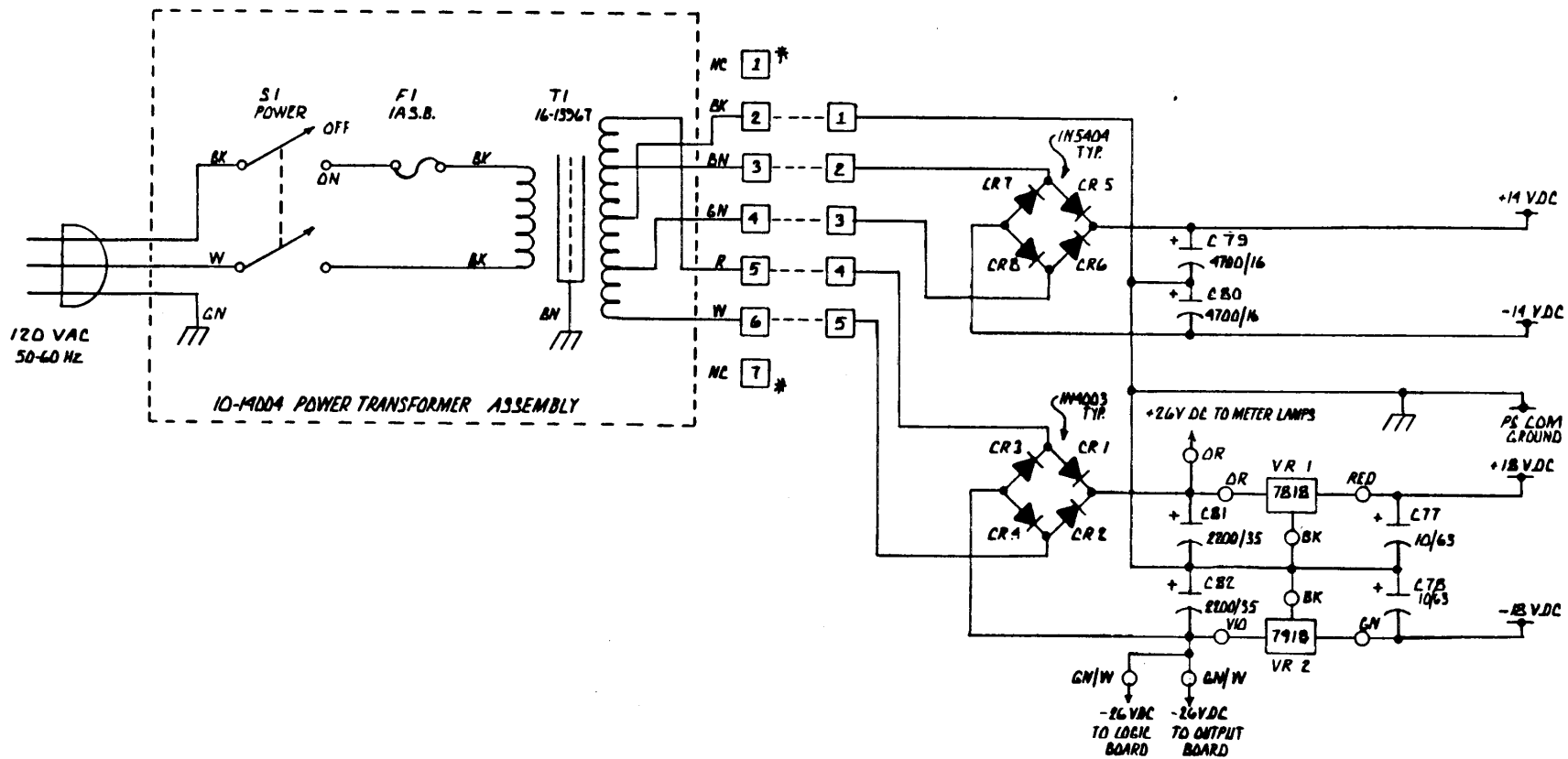
J 502

- 1 — N.C.
- 2 — N.C.
- 3 — TO CUE POT WIPER
- 4 — }
- 5 — } +14V DC
- 6 — N.C.
- 7 — N.C.
- 8 — -18V DC
- 9 — N.C.
- 10 — +18V DC
- 11 — }
- 12 — } P/S COM
- 13 — CUE MUTE
- 14 — TO CUE SPKR
- 15 — N.C.
- 16 — TO HEADPHONE POT WIPER RIGHT
- 17 — TO HEADPHONE POT WIPER LEFT
- 18 — }
- 19 — } BUSS GND
- 20 — }
- 21 — } TO HEADPHONE JACKS RING (RIGHT)
- 22 — }
- 23 — } TO HEADPHONE JACKS TIP (LEFT)
- 24 — N.C.
- 25 — TO OVERLOAD LED.

J 501

- 1 — INPUT TO D.I. DETECTOR
- 2 — TO HEADPHONE POT TOP RIGHT
- 3 — TO HEADPHONE POT TOP LEFT
- 4 — INPUT TO VU AMP LEFT
- 5 — VU LEFT TO METER
- 6 — TO CUE POT TOP
- 7 — INPUT TO VU AMP RIGHT
- 8 — VU RIGHT TO METER
- 9 — N.C.
- 10 — CUE SUM BUSS
- 11 — BUSS GND
- 12 — AUD LEFT
- 13 — AUD RIGHT
- 14 — PGM LEFT
- 15 — PGM RIGHT
- 16 — AIR RIGHT
- 17 — AIR LEFT

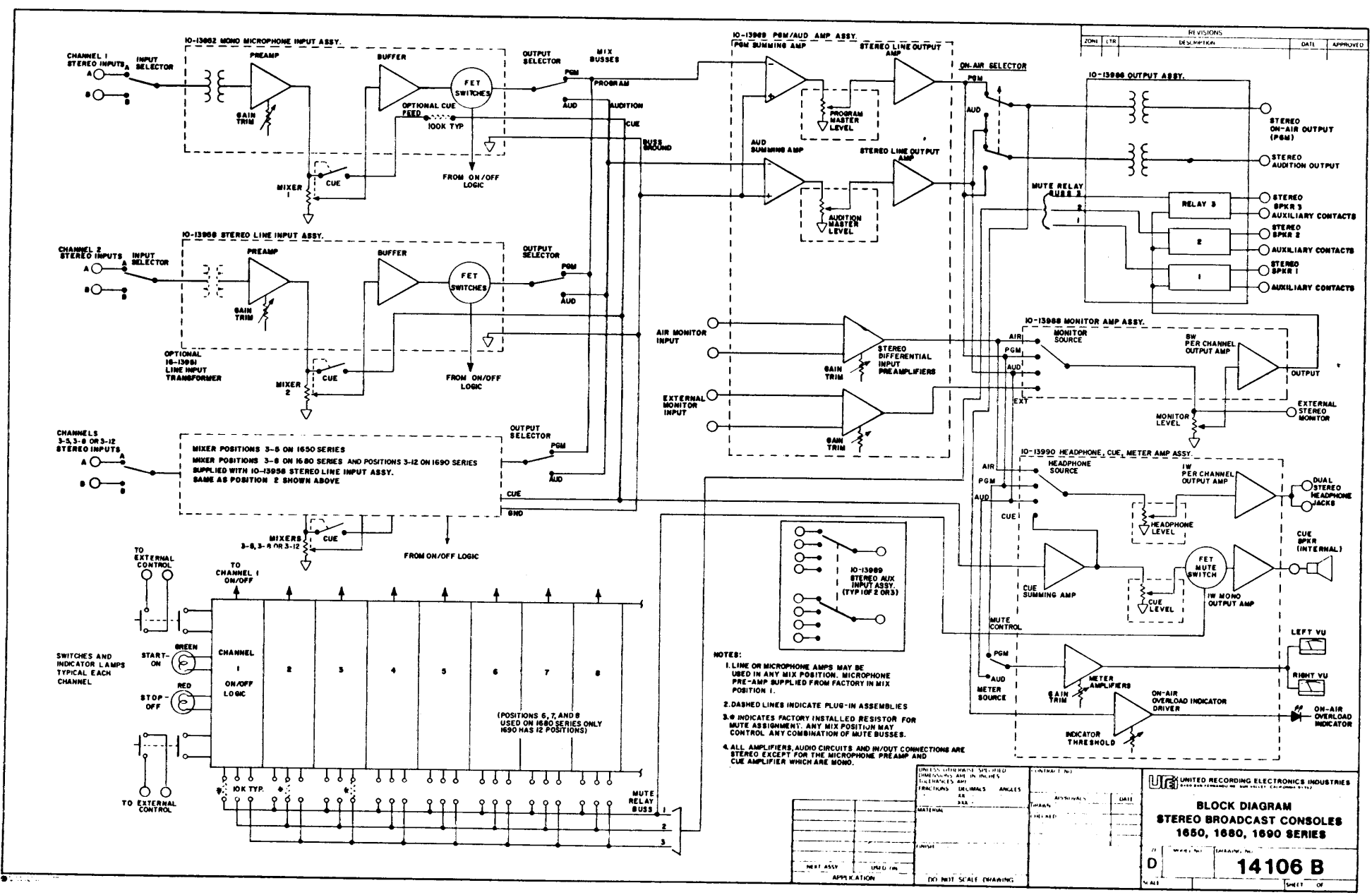
MODEL 1650 / 1680	DATE 6-28-83	ISSUE PIN OUTS PLUG IN CARDS
DEPARTMENT LOS ANGELES CALIFORNIA	CHECKED R.P. MARIN	APPROVED B14145



2. * PINS 1 AND 7 OF CONNECTOR ARE BLOCKED TO PREVENT INCORRECT INSERTION.
 1. CAPACITORS IN MICROFARADS

NOTES:

UNITED RECORDING ELECTRONICS INDUSTRIES		CONSOLE POWER SUPPLY SCHEMATIC	
DEPARTMENT		DATE 11-4-83	C14234
LOS ANGELES CALIFORNIA		APPROVED M.R. MARTIN	



- NOTES:**
1. LINE OR MICROPHONE AMPS MAY BE LIRED IN ANY MIX POSITION. MICROPHONE PRE-AMP SUPPLIED FROM FACTORY IN MIX POSITION 1.
 2. DASHED LINES INDICATE PLUG-IN ASSEMBLIES
 3. Ⓢ INDICATES FACTORY INSTALLED RESISTOR FOR MUTE ASSIGNMENT. ANY MIX POSITION MAY CONTROL ANY COMBINATION OF MUTE BUSES.
 4. ALL AMPLIFIERS, AUDIO CIRCUITS AND IN/OUT CONNECTIONS ARE STEREO EXCEPT FOR THE MICROPHONE PRE-AMP AND CUE AMPLIFIER WHICH ARE MONO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO.	
DATE	DESIGNED BY	APPROVAL	DATE
MATERIAL	EX.	DESIGNED	
FINISH			
NET ASSY	USED IN		
APPLICATION	DO NOT SCALE DRAWING	UNITED RECORDING ELECTRONICS INDUSTRIES STEREO BROADCAST CONSOLES 1650, 1660, 1690 SERIES 14106 B	

