

OPERATING INSTRUCTIONS

INSTRUCTION MANUAL

MOD ONE BROADCAST CONSOLES



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UNITED RECORDING ELECTRONICS INDUSTRIES

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MOD ONE

AM & FM BROADCAST CONSOLES

MODELS
110 MONO,
210 STEREO



Mod One is all that the name implies: The **one** MODERN, MODULAR broadcast audio console system. While utilizing design concepts developed for contemporary recording studio consoles, Mod One is specifically radio oriented — physically, electronically and humanly engineered for AM and FM broadcasting.

Modular, printed circuit board construction provides extreme flexibility at lowest cost. All solid-state-of-the-art, Mod One exceeds all FCC proof-of-performance requirements. Plug-in modules and

amplifiers make format changes simple — start with only the modules you need, and expand or change to meet new requirements.

Basic console housing and printed-circuit mother-board is identical for all configurations. A wide selection of input modules and plug-in amplifier cards permits customizing your Mod One to exactly suit your present or future requirements — AM or FM, monaural, stereo or quadraphonic.

Compare features — compare specifications — compare prices. Look into the future with Mod One!

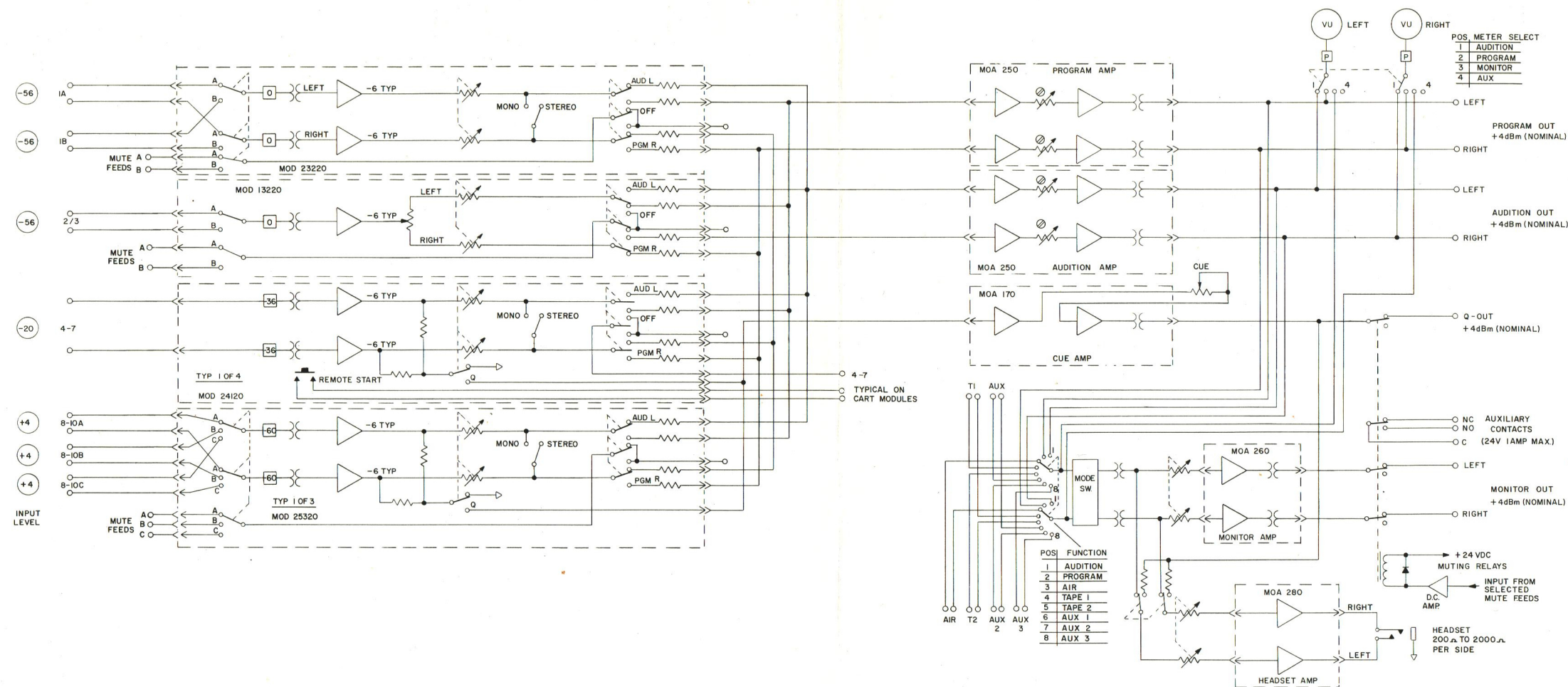


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TELEX 65-1389

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Above is a functional block diagram of a stereo configuration of the Mod One console, as pictured on the front of this brochure. Four different types of input modules are illustrated, and these are available in either monaural or stereo configuration. Any input module may be plugged into the housing in any of 10 positions — all interfacing between the module and the console housing is via a single printed circuit edge connector on the module which mates with any of 10 identical sockets on the console mother board. Program, audition, monitor booster, cue booster and headphone amplifiers are plug-in cards located under the hinged top of the meter panel.

All input and output connections to the console are made to numbered solder terminals inside the rear of the cabinet. Convenient provision has been made for the installation of the input pads indicated on the block schematic. Two pairs of terminals (plus shield ground) are provided for each input of each module position. An external source is connected to one pair of terminals, and 1/4 watt resistors are installed between terminals in accordance with a pad loss chart and instructions furnished with the console. Pads may subsequently

be changed, if desired, without disturbing the external wire pairs. For ease of wiring, the hinged top above the meter panel, and a portion of the rear cabinet and metal chassis may be removed in one piece by removing four machine screws.

The Mod One console is all steel, with solid walnut trim. When all module spaces are filled (either by input modules or blanks) complete RF shielding is effected. All inputs and outputs are balanced and transformer isolated for best hum and RFI rejection. External power supply is furnished, and DC connection is through a Jones-type plug in the rear of the console. Monitor and cue power amplifiers not included.

The Mod One may be installed on top of a 30" deep table top, leaving 10 inches of table space in front for log keeping and arm rest.

Module width is 2 1/8", and represents an optimum compromise between the usual 2 1/2" to 3" spacing required on broadcast consoles using rotary attenuators, and the 1 1/2" spacing which has become standard on recording consoles using vertical faders. Total console width is only 24 3/4 inches,

FEATURES:

- Up to 10 input modules. Will provide maximum of 30 inputs, high level or microphone, monaural or stereo.
- Silent action switches for all on-air functions. Illuminated PGM-OFF-AUDITION lever switches.
- Longlife conductive plastic vertical faders, with detented cue position (line & cartridge modules.)
- Automatic muting of monitor & cue speakers
- Monitor Select Switch with aux. & tape inputs.
- VU meter switching
- Built-in headphone amplifier
- Highest quality components throughout for troublefree service
- Easy installation — easily expandable.
- Modern, attractive styling.

permitting location of turntables or cartridge players within easy reach. Height is less than 10 inches, allowing a copy board to be placed comfortably without obscuring meters or controls.

Program and Audition outputs are identical in specification and levels, so that the "audition" channels may be used for tracks 3 and 4 in Quadraphonic broadcasting. (Special Quad meter panels with four meters are available on special order.)

Only the meter panel layout differs between the standard MOH 110 (monaural) and MOH 210 (stereo) console housings. In the MOH 110, the right-hand meter is always PROGRAM, and is not switchable. The left-hand meter is switchable between AUDITION and MON. and the MODE switch is omitted.

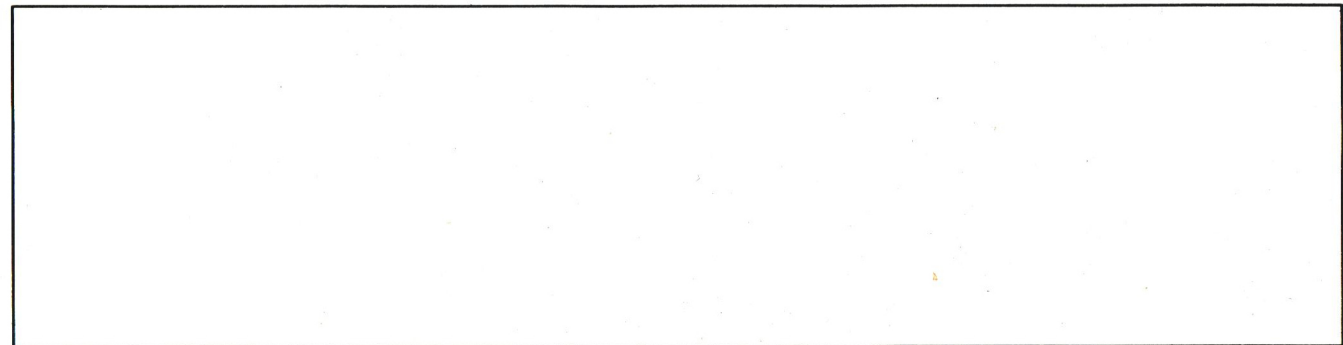
System electrical specifications are listed on Page 4, and represent worst-case condition, with all 10 input modules operative.

Details and specifications of the various optional input modules and plug-in amplifiers are on separate data sheets.

SPECIFICATIONS

Input Levels	:	— 50 to +4 dBm (selectable by input pads at each input).
Nominal Gain	:	54 dB (allowing "normal" settings faders & submasters).
Maximum Gain	:	80 dB, (faders & submasters maximum).
Output Levels	:	All channels +4 dBm nominal (may be optionally +8).
Frequency Response	:	± 1 dB 30 Hz to 20 kHz.
Distortion (THD)	:	Less than 0.5%, +20 dBm, 30 Hz to 20 kHz.
Signal-to-noise ratio	:	Better than 70 dB (15.7 kHz Noise Bandwidth).
Cross Talk (stereo)	:	60 dBm (minimum) to 10 kHz, 50 dB to 20 kHz.
Power Supply	:	± 24 VDC (bi-polar) 1.5 A maximum (actual current depends on number and type of amplifiers and modules). Operates from 110-120 VAC mains, 50/60 Hz.
Dimensions	:	Width 24.75 inches. Depth 19.75 inches. Height 9.40 inches.

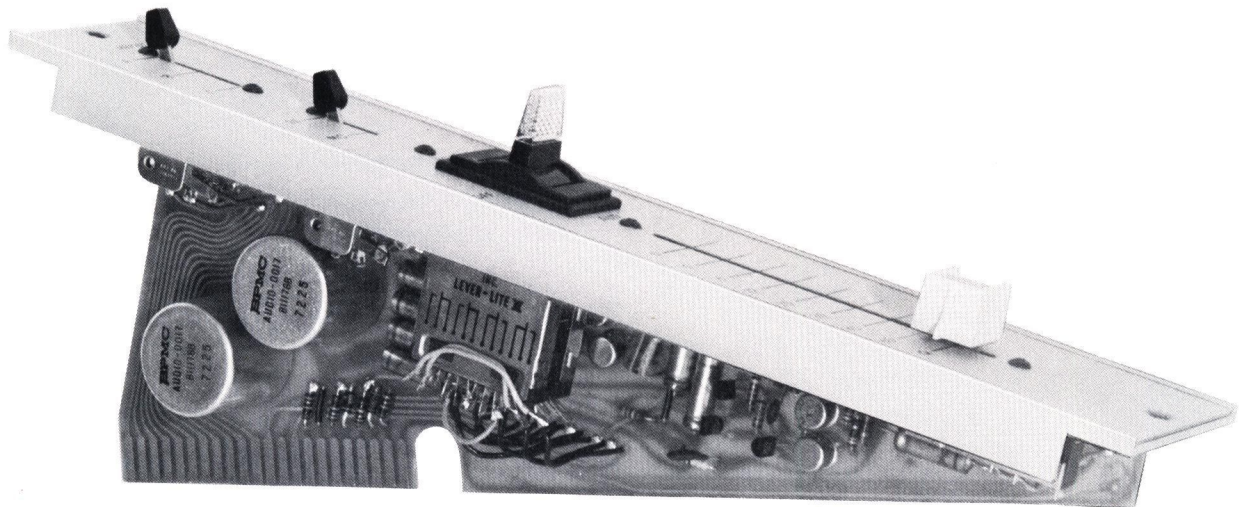
Option: On special order, at additional cost, meter panel is available with four meters. In this Quad configuration two meters are permanently assigned to PROGRAM outputs; the other two are switchable between AUDITION output and the remaining meter functions.



MOD ONE

INPUT MODULES

FOR MOH 110, MOH 210
BROADCAST CONSOLES



The modern, modular design of UREI's Mod One broadcast consoles provides a wide choice of plug-in input modules to meet specific requirements in AM and FM broadcasting. All modules mate automatically in any of the 10 module positions of the MOH-110 or MOH-210 consoles, allowing optional organization of console functions with minimum installation labor. Blank modules may be installed in unused positions, and used for custom controls, etc., or future expansion.

All modules have a rugged extruded aluminum frame, overlaid with a pale green vinyl-clad steel faceplate. Designations are permanent black. Circuitry is on military-grade glass-epoxy printed cir-

cuit boards, with gold plated edge contacts which mate with a gold-plated connector on the console mother board. Two Allen-head screws attach the module to the chassis frame.

Switches are silent-action. PGM-OFF-AUD switches are illuminated Switchcraft Lever-Lite type. Vertical faders are long-life, smooth, conductive plastic, with cue switches (where applicable) operated when the fader is below the detented OFF position.

All modules have high quality input transformer isolation for balanced (floating) or unbalanced sources.

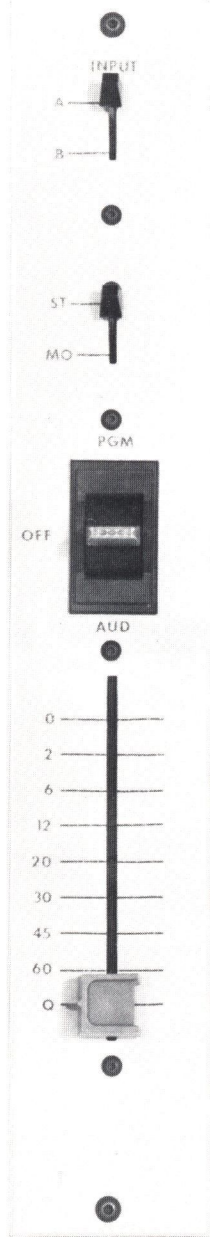


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FOR
MOH 110,
MOH 210



MOD 23220 — Stereo Microphone Module

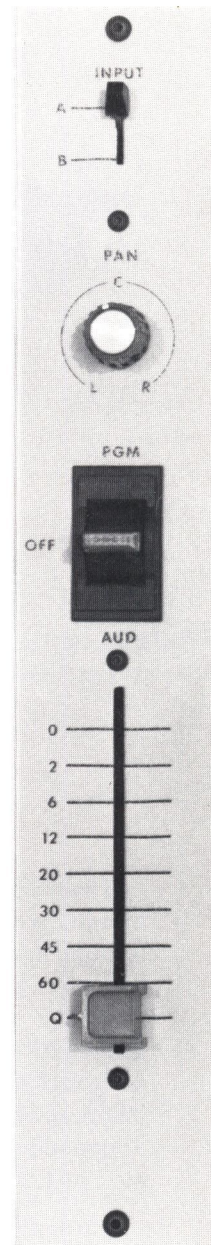
- Input selector switch for two alternate stereo microphone pairs (dual). Both pairs may be padded at console input terminals for high output mikes, or line.
- PGM-OFF-AUD. Switch, with muting contacts brought out to console terminals. Can supply NO/NC contacts or 24 vdc for external relay.
- Floating transformer inputs.
- Vertical fader (no cue switch).
- MONO/STEREO switch. Feeds both inputs to both outputs for single microphones.

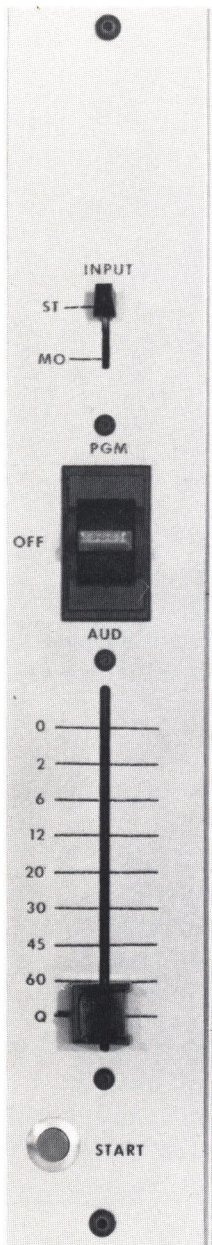
MOD 13210 — Monaural Microphone Module

- Same as 23220, except all functions monaural.
- No MONO/STEREO switch.

MOD 13220 — Monaural Microphone Module with Stereo Panpot

- Input selector switch for two monaural microphone inputs.
- Panpot — pans module output across two (stereo) buses. —3 dB on each bus at pot center, to full signal at either left or right.
- PGM-OFF-AUD switch. (Same as 23220)
- Floating transformer input.
- Vertical fader (no cue switch).
- No MONO/STEREO switch.





**MOD 24120 —
Stereo Cartridge Module**

- One stereo input only (no input switch). May be padded at console input terminals for any level -50 to $+4$ dBm, to terminate or bridge any stereo source.
- PGM-OFF-AUD switch. (Same as 23220)
- Floating transformer inputs.
- Vertical fader with cue switch.
- Momentary contact push button for remote start of source player. (N/O contacts brought out to console terminals.)
- MONO/STEREO switch (Same as 23220).

**MOD 14110 —
Monaural Cartridge Module**

- Same as 24120, but all functions monaural.
- No MONO/STEREO switch.

**MOD 25320 —
Stereo Triple-Line Module**

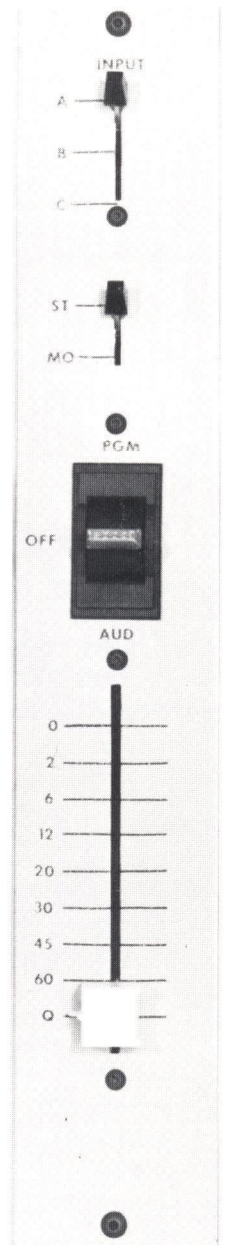
- Input selector switch for three stereo inputs. (All inputs may be padded at console input terminals for any level -50 to $+4$ dBm.)
- MONO/STEREO switch. (Same as 23220)
- PGM-OFF-AUD switch. (Same as 23220)
- Floating transformer inputs.
- Vertical fader with cue switch.

**MOD 15310 —
Monaural Triple-Line Module**

- Same as 25320 except all functions monaural.
- No MONO/STEREO switch.

MOD 00000 — Blank Module

- Occupies unused positions in MOH-110 or MOH-210 console housings.
- May be used for custom additions.



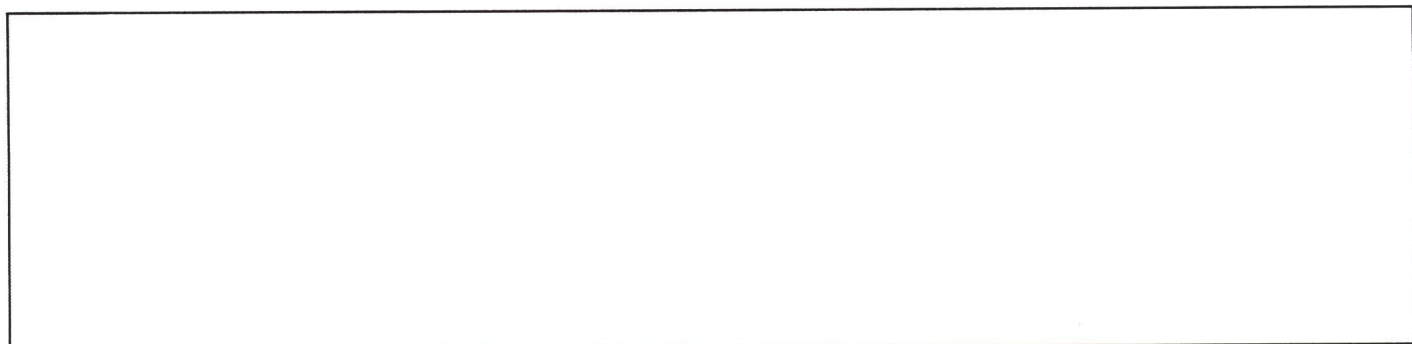
GENERAL ELECTRICAL SPECIFICATIONS

Source Impedance	: 150 ohms bridging.
Input Configuration	: Balanced — transformer coupled.
Input Sensitivity	: --54B — nominal (—64 dB maximum).
Frequency Response	: ± 1 dB, 30 Hz to 20 kHz.
Distortion	: Less than 0.25%, 30 Hz to 20 kHz.
Noise Generation	: —124 dBm equivalent input signal.
Power Required	: ± 24 VDC @ 80mA (Supplied by Console).

All modules have identical specifications, but different switching functions.

USER OPTIONS

All MOD input modules have identical gain structure. **Any** model may be used for various combinations of mic/line inputs. For example, MOD-15310 (monaural, triple-line) might be optionally used for one microphone and two line inputs, or vice-versa. "Microphone" modules may be ordered with cue switches, at extra cost, for optional line input usage.



MOD ONE

PLUG-IN AMPLIFIER CARDS

Patents Pending

**MOA -- SERIES
FOR MOH-110 AND
MOH-210 BROADCAST
CONSOLES**

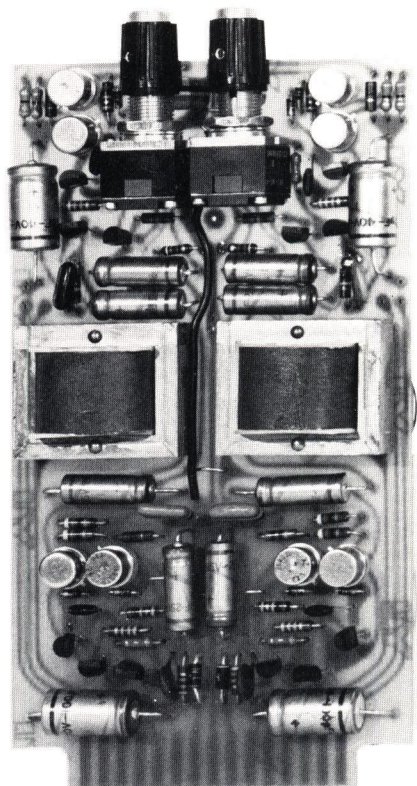
MOD ONE modular broadcast audio consoles from UREI employ all solid-state circuitry for ultimate reliability and performance. All active circuits are on plug-in printed circuit cards, or within the plug-in Input Modules — no active components are part of the console housing.

Various plug-in circuit cards are furnished with a Mod One console, or available as spares, or to modify your console for specific applications, whether Monaural, Stereo or Quadraphonic. Basic requirements for a complete MOH-110 (Monaural) or MOH-210 (Stereo) console are: 2 line amplifiers, 1 monitor booster amplifier, 1 cue amplifier and 1 headphone amplifier. Model numbers and specifications for each are listed below:

MOA-150 MONAURAL LINE AMPLIFIER

Used for Program and Audition output amplifiers in MOH-110 console (2 required). Sub-master gain control provided on card for establishing optimum console gain structure. Specifications:

Input Impedance:	Less than 10 ohms — designed as active summing amplifier, to operate from 10 k summing resistors.
Gain:	20 dB nominal, 36 dB maximum.
Frequency Response:	± 0.5 dB, 30 Hz to 20 kHz.
Noise Generation:	Less than -124 dBm equivalent input signal.
Distortion:	Less than 0.5% THD @ $+20$ dBm output, 30 Hz to 20 kHz.
Output Impedance:	Designed to work into 600 ohm load. Transformer isolated (floating).
Output Level:	$+4$ dBm, nominal.



MOA-250 STEREO LINE AMPLIFIER

Used for Program and Audition output amplifiers in MOH-210 Stereo console (2 required).

Specifications:

Same as MOA-150, except dual channels
Stereo separation: Better than 60 dB, to 20 kHz

MOA-170 MONAURAL CUE BOOSTER AMPLIFIER

Used for cue output of MOH-110 (Monaural) and MOH-210 (Stereo) consoles, to feed external cue speaker power amplifier, (1 required).

Specifications:

Same as MOA-150 Monaural Line Amplifier, except no internal gain control. Leads brought out through PC connector for Cue gain control in console front panel.



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FOR
MOH 110,
MOH 210

MOA-160 MONAURAL MONITOR BOOSTER

Used for monitor output of MOH-110 console (Monaural), to feed external speaker power amplifier (1 required).

Specifications:

Input Impedance:	Designed to bridge 600 Ω source through 10K series resistor (unbalanced).
Voltage Gain:	26 dB (fixed).
Frequency Response:	± 0.5 dB, 30 Hz to 20 kHz.
Noise:	At least 98 dB below +4 output.
Distortion:	Less than 0.25% THD @ +20 dBm, 30 Hz to 20 kHz.
Output Impedance:	Designed to work into 600 ohm load. Transformer isolated (floating).
Output Level:	+4 dBm, nominal.

MOA-260 STEREO MONITOR BOOSTER

Used for monitor outputs of MOH-210 console (Stereo), to feed external speaker power amplifiers (1 required).

Specifications:

Same as MOA-160, except dual channels
Separation: Better than 60 dB to 20 kHz.

MOA-180 MONAURAL HEADPHONE AMPLIFIER

Used as headphone driver amplifier in MOH-110 (Monaural) console, (1 required).

Specifications:

Input Impedance:	To bridge 600 ohm source (unbalanced).
Voltage Gain :	12 dB.
Frequency Response:	± 0.5 dB, 30 Hz to 20 kHz.
Signal-to-noise:	Greater than 80 dB @ 1 watt output.
Output :	1 watt max. into 8 ohms, when bridging 600 ohm source @ +4 dBm.
Output Impedance :	To work into 8 ohm to 600 ohm load.

MOA-280 STEREO HEADPHONE AMPLIFIER

Used as headphone drive amplifier in MOH-210 (Stereo) console, (1 required).

Specifications:

Same as MOA-180, except dual channels.
Separation: Greater than 60 dB to 20 kHz.

TYPICAL REQUIREMENTS AND ORDERING INFORMATION:

FOR MOH-110 CONSOLE (Monaural)

2 MOA-150 (Pgm., audition outputs)
1 MOA-160 (Monitor booster)
1 MOA-170 (Cue booster)
1 MOA-180 (Headphone amplifier)

FOR MOH-210 CONSOLE (Stereo)

2 MOA-250 (Pgm and audition outputs)
1 MOA-170 (Cue booster)
1 MOA-260 (Monitor booster)
1 MOA-280 (Headphone amplifier)

INSTRUCTION MANUAL

MOD ONE BROADCAST CONSOLES



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SECTION I

GENERAL INFORMATION

1.1. DESCRIPTION. The MOD ONE AM-FM Broadcast Console is a modern approach to the needs of the broadcast industry for a high quality, versatile console at a reasonable cost. The MOD ONE is a modular console which consists of a basic console housing, to which all input and output wiring is connected, and plug in input and output modules which allow the owner to "custom design" the configuration of the console to suit his particular requirements.

The console is available as a monaural version (MOH-110) and as a stereo version (MOH-210). The console accepts up to 10 plug in input modules and may be fitted with up to 5 line amplifiers to feed program, audition, cue, monitor, and headphone outputs.

1.2. CONSOLE ELECTRICAL SPECIFICATIONS.

INPUTS	: 150 ohm, balanced, transformer isolated.
INPUT LEVELS	: Will accept input levels between -54dBm and +4dBm.
INPUT SENSITIVITY	: -54dB nominal.
GAIN	: 54dB nominal (with module level control set for 10dB loss and submaster level control set for 16dB loss).
MAXIMUM GAIN	: 80dB.
OUTPUT	: 600 ohm transformer isolated; +4dBm nominal, +20dBm maximum.
FREQUENCY RESPONSE	: ± 1 dB 30 Hz to 20 kHz.
DISTORTION	: Less than 0.5% THD +20dBm 30 Hz to 20 kHz.
SIGNAL-TO-NOISE	: Greater than 70dB below +4dBm output with -50dB microphone input. Noise bandwidth: 30 Hz - 15.7 kHz.
CROSSTALK	: 60dB to 10 kHz, 50dB to 20 kHz.
POWER REQUIREMENTS	: 110-120 VAC 50/60 Hz
POWER SUPPLY	: Bipolar ± 24 VDC 1.5A maximum. Externally mounted from console.

1.3. MECHANICAL SPECIFICATIONS.

CONSOLE DIMENSIONS:

Width : 24.75 inches
Depth : 19.75 inches (Power connector extends an additional 2.5" behind console)
Height : 9.40 inches
Weight : 70 pounds (approximately)

MODULE DIMENSIONS:

Length : 12.0 inches
Width : 2.25 inches
Weight : 1-1/2 pounds

POWER SUPPLY DIMENSIONS:

Length : 11 inches
Width : 6-1/2 inches
Height : 3-1/2 inches
Weight : 12-1/2 pounds

SECTION II

INSTALLATION

2.1. UNPACKING AND INSPECTION. The MOD-ONE is shipped in two cartons. Carton number one contains the console fully assembled as specified by the customer with all modules in place. Carton number two contains the console power supply. Carefully examine the contents of the shipping cartons for any signs of physical damage which could have occurred in transit. Though your console was carefully packed at the factory, and the container has been designed to protect the unit through rough handling, accidents do happen.

IF DAMAGE IS EVIDENT, DO NOT DESTROY ANY OF THE PACKING MATERIAL OR CARTON, AND IMMEDIATELY NOTIFY THE CARRIER OF A POSSIBLE CLAIM FOR DAMAGE. THE SHIPPING DAMAGE CLAIMS MUST BE MADE BY THE CON-SIGNEE.

You should verify that all modules and plug in amplifiers are as specified on your purchase order. In addition to the console and power supply you should verify that the shipment contained the following:

- a. This instruction manual.
- b. A two-part warranty card, bearing the same serial number as the unit. Complete the warranty card, and mail the return portion immediately to activate your one-year warranty. (No postage required).
- c. A large blueprint of the wiring layout for the console. This blueprint is intended as a work sheet for wiring of the console. During final test of the console at our factory notes will be made on any specific work which has been done to equip the console to specific customer requirements.

2.2. INPUT WIRING. Each of the ten input positions on the console has available six input wiring positions. These are input A left (AL), A right (AR), B left (BL), B right (BR), C left (CL), and C right (CR). Each input position consists of four solder terminal posts. The two posts closer to the front of the console are the inputs to the individual module switch position, and the other two are available for construction of any necessary input pads.

The MOD-110 monaural version of the MOD-ONE console utilizes only the left inputs. The MOD 13220 panpot module uses inputs AL and BL. The MOD 24120 stereo cartridge module uses inputs CL and CR.

To connect a typical low impedance, balanced dynamic microphone to the console the lead is brought in from the rear and the shield connected to the shield buss closest to the appropriate input terminals. The two balanced line conductors are then connected directly to the amplifier input terminals. Note that the left terminal, as you face the console from the front, is marked with a dot on the mother board to indicate that this terminal should be considered the high side of the line for phasing purposes.

All MOD-ONE input modules have the same input sensitivity and all are designed for 150 ohm source. This allows great flexibility in input configuration since by selection of appropriate pad resistors it is possible to feed any input module input position with any level from mic level to line level. Refer to the accompanying pad chart for various applicable pad configurations and resistance values for most common applications. The pad values are selected to bridge a source and transform the impedance to 150 ohms.

2.3. MONO-STEREO INPUTS. In some installations it is possible that monaural sources may be used to feed a stereo system. If this is done it should be done by paralleling the Left and Right inputs of the module. This should be done prior to the input pads to avoid loading the inputs. The MONO-STEREO switch should be used only to combine a stereo signal to monaural, if best signal-to-noise ratio is to be realized.

2.4. RELAY WIRING. Relay muting of MONITOR loudspeakers and CUE loudspeakers may be accomplished from any desired input position. There is a mute terminal for each of the inputs as selected by the Input Selector Switch. These terminals labeled A, B, and C corresponding to the switch position should be connected as necessary to the terminal labeled MUTE just to the left front of Relay K101. If a number of inputs are to be so connected they may be bussed together. An additional NO/NC contact allows operation of additional externally mounted relays as, for example, "ON-AIR" lights.

2.5. OUTPUT WIRING. The PROGRAM and AUDITION channel outputs appear on terminal posts adjacent to the respective amplifier cards. The outputs also appear on the Monitor Switch Board and the Meter Select Switch which may be more convenient for wiring. The terminals on the Monitor Select Board are labeled and the wires which appear on the Meter Select Switch are: Program Right-126, Program Left-127, Audition Right-128, Audition Left-129. The outputs are 600 ohm, balanced, and transformer isolated. They should be connected to a terminating load. If the equipment into which the console works is bridging the line, a 600 ohm one watt resistor should be placed across the input terminals of that piece of equipment. The loads on the PROGRAM output and the AUDITION output should be the same so that levels

may be preset using the meters on the AUDITION channel. If the following piece of equipment has an unbalanced input the feed from the MOD-ONE should be unbalanced at that following piece of equipment by connecting the low side wire of the balanced output pair to ground. The CUE BOOSTER AMP and MONITOR BOOSTER AMP outputs are found between the Relays K101 and K102 and the amplifier cards. They are 600 ohm balanced and transformer isolated, and are designed to feed directly the power amplifiers feeding those speakers.

2.6. HEADPHONE CONNECTION. Headphones with a standard 3-conductor 1/4 inch phone plug may be connected to the PHONE jack in the lower right corner of the console. Never connect mono headphones with a 2-conductor plug to a stereo board. Level control to the HEADPHONES is by the control immediately above the jack. Source selection is by the two position switch above the level control.

2.7. METER SWITCH. The METER SOURCE switch on the MOH 210 stereo console is a four position rotary which, in order, monitors AUDITION amplifier output, PROGRAM amplifier output, MONITOR amplifier input, and has an AUXILIARY vacant position for monitoring any 600 ohm +4dBm line which you may wish to connect.

2.8. MONITOR SOURCE SWITCH. The MONITOR SOURCE switch selects between AUDITION amplifier output, PROGRAM amplifier output, and six other 600 ohm line level sources which may be connected to the terminals located on the Monitor Board Assembly. These are labeled AIR, T1, T2, A1, A2, and A3.

2.9. REMOTE START FUNCTION. MOD 24120 and MOD 14110 Cartridge Modules have a push-to-start switch for remote machine start. The normally open contacts of the switch appear on terminals B and C next to the appropriate input module edge connector. If your equipment needs a normally closed connection, you may rewire the switch in the module by moving the wire from terminal A to terminal B of the switch. If this is done, we suggest that some note be affixed to the module to eliminate confusion during any subsequent maintenance.

A function similar to the Cart-Start switch may be achieved by using the Mute switch wiring from the Program-Off-Audition switches to function as a single pole--single throw switch. Pin M next to the edge connector would be one side of the switch and pin A, B, or C would be the other side of the switch (depending, of course, on which input position is being used).

This function should be used only with a low-voltage/low current control circuit and should NOT carry 115 volts to supply the machine directly.

2.10. INPUT PADS. There are several considerations that govern the value of the resistors chosen for use in the input pads. These are:

1. The impedance of the circuit which is feeding the pad.
2. The impedance of the circuit which the pad is feeding.
3. The loss desired to be taken through the pad.

This section describes the construction of several different input loss pads specifically designed for use with the MOD ONE.

The MOD ONE console inputs are transformer isolated and designed to bridge a 150 ohm line. The specification for the console states a -54dB Nominal Input Sensitivity and a -64dB Maximum Sensitivity. This translates to the following: A -50dB input of 150 ohms source impedance will drive the console to a +4dBm output with the input channel level control adjusted for a setting loss of 10dB and the submaster controls on the PROGRAM or AUDITION line amps set to normal operating level which is 16dB below maximum. These settings give a Nominal Gain of 54dB (50dB + 4dB). With the input potentiometer fully on the sensitivity is increased to -64dB. Turning the submaster controls on the PROGRAM and AUDITION line amplifiers to full on adds 16dB to the previous numbers and the Gain is then 80dB. Note that the MOD 13220 Panpot Module has a gain which is the same as all other modules when the panpot is at center position, but is 3dB greater when the panpot is rotated to its extreme position.

The MOD series input modules are conservatively designed and are capable of handling input signal levels of up to 30dB above nominal which translates to -24dB on a 150 ohm line (-18dB, if read on a standard A.C.V.T.V.M. calibrated for 1mW in 600 ohms). It should therefore rarely be necessary to pad microphone level inputs from dynamic microphones to prevent console input overload. It may, however, be desirable to pad the input so that the Input Level Control may be operated in a more convenient range. The pads for 10dB and 20dB attenuation as listed in the accompanying chart will bridge microphones with impedances of 50 to 250 ohms. Note that the pads are center-tapped to ground. This is important to ensure maximum attenuation of RF energy and other common-mode signals on the input line. However, this input configuration cannot be used with certain condenser microphones which simplex a DC voltage through the audio leads from the microphone. In such systems the electrical center of the balanced pair is fed from a DC voltage and were we to wire the input attenuator with the center tap to ground, the DC voltage would be shorted out. If you are using such a microphone ignore the center tap.

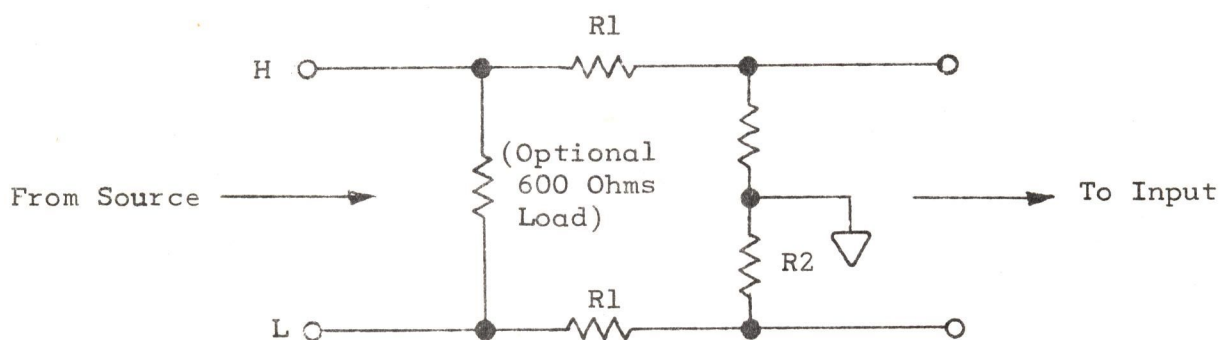
The pads listed for 30, 40, 50, and 60dB attenuation are all designed to bridge a 600 ohm line. An additional 600 ohm 1/2 watt resistor should be placed across the input terminals of the pad for those sources which are not otherwise terminated.

Unbalanced inputs may have the R1 series resistor on the Low side of the input omitted and the input line connected between the High side of the line and ground. The 600 ohm resistor is also connected High to ground.

An optional method of padding the Input Modules is to locate the pads in the module rather than on the Mother Board. This would be advantageous if it can be determined that all input positions for a particular module will be fed from sources of the same impedance and signal level which would mean that all of the pads would be of the same value. In such a case, one set of pads may be located between the Input Selector switch and the transformer to serve all inputs. The procedure would be as follows:

1. At the wide end of the Input Module circuit board, locate R116 and R117. Insert the 1/4 watt resistors calculated for R2 in these positions.
2. Remove the two jumpers which are in the positions R118 and R119. Replace them with the resistors calculated for R1. This completes the pad for the Right Channel.
3. For the Left or Mono Channel pad, locate the positions for R120 and R121 and here locate the resistors calculated for R2.
4. The other two resistors calculated for R1 replace jumpers between the printed circuit board and the Input Selector switch. R123 is located at the extreme upper end of the circuit board next to the panel face and R122 replaces the jumper wire between the trace marked "4" and the switch. (Cart input modules have no Input switch, therefore, R122 and R123 are located slightly differently. R122 replaces the jumper between traces marked "4" and "5" and R123 replaces the jumper between the holes marked "R123" and "1".)

2.10.1 INPUT PAD CHART. Balanced Bridging Pads would be of the following configuration:



<u>Pad Loss</u>	<u>Nominal Level</u>	<u>R1</u>	<u>R2</u>
10dB	(-44)	300 ohm	300 ohm
20dB	(-34)	820 ohm	180 ohm
30dB	(-24)	2.4k ohm	160 ohm
40dB	(-14)	7.5k ohm	75 ohm
50dB	(-4)	22k ohm	75 ohm
60dB	(+6)	75k ohm	75 ohm

2.11. VU METER MODIFICATION TO +8 LINE. Unless otherwise specified, the meters on the MOD ONE have been padded for a "0" VU indication with a +4dBm level on a 600 ohm line. If it is desired to change this to accommodate use on a +8dBm line, the 2.7k ohm resistors on the VU Meter Board Assembly should be changed to 6.8k ohm. The meter indication should then be re-calibrated by adjusting the console output for a +8dBm level as measured on an AC VTVM and adjusting the meter trimpot for a "0" VU reading. Later versions of the MOD ONE have changed the value of the trimpot to 10k ohms from 2k ohms making the resistor change unnecessary.

2.12. POWER SUPPLY. The DC Power Supply for the console is intended to be mounted near the console but not immediately adjacent to it. The supply connects to the console through a multi-pin Jones connector and to the AC line with a standard U-ground connector. The supply may be fastened firmly to a shelf or wall. If the supply is to be mounted vertically, it should be done in a manner such that the convection cooling fins allow air to pass from bottom to top with no obstruction. The supply is protected against overload and short circuit and against thermal overload. It is important, therefore, that the supply be located in a location such that freely circulating air may cool it. The supply should not be located adjacent to equipment whose correct operation might be adversely affected by the moderate hum field generated from the internal power transformers.

The supply has been conservatively rated to supply adequate current for the console. If absolutely necessary, it can be used to supply an additional 100mA of DC to some additional function in the studio, but should not be required to power devices in excess of this limit.

2.13. LINE AMP LEVEL ADJUST. The PROGRAM and AUDITION Line Amplifiers have a gain of 36dB. The submaster controls are normally adjusted to have approximately a 16dB loss and are adjusted according to the following procedure:

1. Adjust signal generator for -16dBm output across 600 ohms at 1 kHz.
2. Inject signal into input module edge connector through 10 k ohm resistor and adjust level control on line amplifier for +4dBm output.
3. Input to pgm left via pin #8.
Input to pgm right via pin #6.
Input to aud left via pin #2.
Input to aud right via pin #4.
Input to cue via pin #10.
4. This adjusts the console to "normal" operating levels. Obviously, if an extremely low level input device is used which does not provide sufficient signal to the input of the console, it is permissible to readjust the level controls. Approximately 15dB more gain is available by turning up these controls.

2.14. SYSTEM GROUNDING. Correct System Grounding is as important for achieving high quality performance from an audio system as anything that is done in the installation process. Any of the problems that can occur with audio systems (noise, distortion, crosstalk, bad frequency response, RFI, etc.) can be caused by or aggravated by poor grounding techniques. This section is not intended as the definitive discussion on System Grounding. It only briefly covers a few of the major points of generally accepted practice.

1. The House Ground should be as solid and reliable as can be made. The Ground should not be taken from the end of a long piece of electrical conduit. It should rather be totally independent of any other set of ground wires in the building. All Audio Grounds should radiate from the Main Ground in as short a path as possible. The ground system should not "loop" from one room to another.

2. Two Ground Systems are normally used: Mechanical Ground and Audio (shield) Ground. They are maintained as separate systems until they connect together at Main Ground. The Mechanical Ground connects together all of the chassis of all of the system components.

The Shield Ground system connects together all of the shields of the interconnecting cabling in the studio in a manner such that they connect to ground only once and in some logical pattern. Several patterns are used and the best one in any situation is that one which for one reason or another is the easiest to employ or work with. Examples of different possible systems of Shield Grounding are:

- a. Shields connected to Ground at Inputs of equipment.
- b. Shields connected to Ground at Outputs of equipment.
- c. Shields connected to Ground at some central point such as a Console or Jack Bay and radiating outward from there.

2.15. SUPPRESSION OF RADIO FREQUENCY INTERFERENCE. It is not possible to write the definitive answer to the problem of Radio Frequency Interference in audio equipment. Each instance of its occurrence is a special case which solution may be unlike any other. The MOD ONE Console is designed to be relatively immune to RF, but interference can happen and we hope that the guidelines which we offer in this section will lead to the solution of any problems which may occur. The solution to the problem will be somewhat a matter of trial and error guided by a logical, thoughtful approach to the situation. If logic fails the non-logical approach may be successful.

The first and most important thing to do when working to solve an RF problem is to ensure that the studio grounding system is adequate. Make sure that the Main Ground is secure, that no corrosion exists on any connections, that all solder connections to ground are good, and that there is in fact only one connection to ground for the entire audio system. If your radio station has Studio and Transmitter at the same location in most cases it is best that the ground buss from the studio and the transmitter ground are not "looped" around but are taken separately to ground. It is important to isolate the problem, if possible, to a particular area of the console. Ask yourself some questions like: "Does the problem exist with all inputs switched off?" If yes, the problem is probably in the Output Amplifier or perhaps the Power Supply lines. The Power Supply lines may be bypassed with disc capacitors of 0.01 - 0.1 microFarad. Connect one capacitor between +DC and Chassis and one between -DC and Chassis at the Power Supply Connector at the rear of the chassis. The Program Output lines from the console may be bypassed with 0.001 - 0.01 microFarad disc capacitors.

If the problem appears to be in an input section make sure that the grounding on that input is good. If a pad is used make sure that the center tap is taken to ground. Make sure that the Shield wire is continuous to the Source, but is not connected at both Source and Console unless Source is a microphone. Use either braided shield wire or aluminized Mylar shield. DO NOT USE SPIRAL WRAP SHIELD CABLE. If

necessary bypass the input signal leads to Ground at the input terminals with 0.001 microFarad disc capacitors.

As stated previously nothing is certain and no rules inviolate when dealing with RFI. The capacitor values we have suggested may be ineffective in some situations. Cable shields may have to be connected at both ends. Cable shields may want to be bypassed to Ground at the end of the cable where they are not connected to Ground. One of the most effective methods of isolating RF problems is to begin by disconnecting all external devices one at a time until the RFI goes away. Then re-connect them one by one dealing with each unit which exhibits a problem on an individual basis.

When RFI problems are solved in an installation it should be remembered that any re-wiring, modification, or addition to the system wiring may cause the RFI to re-occur and all such modifications should be checked out very carefully to be sure that they are not inducing RF into the system.

Finally, if you have tried to get rid of an RF problem and failed, call us. We may be able to help.

SECTION III

THEORY OF OPERATION

3.1. GENERAL. The MOD ONE console consists of a basic housing, up to five plug in line amplifiers, up to ten plug in input modules and an external power supply. This section covers the operational characteristics of the individual sections and describes how they function as part of the system.

3.2. CONSOLE HOUSING. The MOD ONE console housing contains a large printed circuit Mother Board which interconnects all of the portions of the console. Along the front of the Mother Board are ten printed circuit edge connectors into which are plugged the input modules. Terminals appear on the board for connection of input sources and extra terminals are available on each input for connection of loss pads as necessary. Along the center rear of the Mother Board are located five printed circuit edge connectors into which are plugged in order (1) Program Line Amplifier, (2) Audition Line Amplifier, (3) Cue Booster Amplifier, (4) Monitor Booster Amplifier, and (5) Headphone Amplifier. The Mother Board also contains muting relays for the Monitor and Cue Amplifier outputs. The outputs of the relays are available as solder terminal connections on the Mother Board.

The extreme right end panel of the console contains source switching for Monitor Headphones along with a Headphone level control and 1/4-inch phone jack. The source switch selects between the CUE buss and the output of the MONITOR SELECT switch which is located on the VU Meter Panel. The level control for the external CUE amplifier is located immediately above the Headphone Source Switch.

The VU Meter Panel is the only section of the console housing which is different between the Monaural and Stereo versions of the MOD ONE. The Stereo version has two 4-1/2 inch VU meters which are fed via the METER SOURCE switch from the AUDITION amplifier outputs, the PROGRAM amplifier outputs, the MONITOR system inputs and from an AUXILIARY source.

The MONITOR SOURCE switch is an eight-position rotary switch which determines the feed to the MONITOR amplifiers and HEADPHONES. It selects between AUDITION, PROGRAM, and six other sources which may be connected via a terminal board next to the switch.

The MONITOR MODE switch also serves both MONITOR amplifiers and HEADPHONES and selects LEFT channel signal to both MONITOR channels, LEFT and RIGHT channel signal to both, STEREO signal in which the LEFT channel signal goes only to the LEFT MONITOR and RIGHT channel signal goes only to the RIGHT MONITOR, and RIGHT channel signal to both. Note that the METER SOURCE switch when in the MONITOR position is seeing the output of the MONITOR SOURCE switch and is unaffected by the position of the MONITOR MODE switch and the Monitor Level Control.

The monaural version of the MOD ONE also has two VU meters. The right hand meter is always connected to the PROGRAM line, and only the left hand meter is switchable by the METER SELECT switch. The MONITOR MODE switch is omitted on the monaural MOD ONE.

3.3. OPERATIONAL AMPLIFIER. The MOD ONE console utilizes a single discrete differential input operational amplifier circuit throughout. It is connected for differing amounts of gain by choice of feedback components. The amplifier schematic is drawn out in Drawing B-12034 and in all other amplifier schematics is drawn as a basic amplifier block with appropriate gain setting feedback components around it.

Positive voltage applied to the base of Q2 causes increased conduction resulting in the collector voltage becoming less positive. This causes transistor Q2 to conduct more resulting in its collector becoming more positive. Increased positive voltage at the base of Q4 of the push-pull output stage causes it to conduct resulting in a positive voltage at the output terminal. Negative voltage applied to the base of Q2 likewise decreases the conduction of Q2, decreases the conduction of Q3 resulting in a more negative voltage at the collector of Q3. This causes Q5 to conduct resulting in a negative voltage at the output.

Positive voltage applied to the base of transistor Q1 causes increased conduction through it resulting in a more positive voltage at the emitter of Q1 and Q2. Q2 sees this as a decrease in the base/emitter voltage which is the same thing which happens when a negative voltage is applied to the base of Q2. Therefore a positive voltage at the base of Q1 results in a negative voltage at the output terminal.

Resistors R1 and R2 set the bias point for the input stage. Diodes D1, D2, and resistor R3 set the bias point for the output stage and resistors R4 and R5 supply local degeneration in the output transistor. Capacitor C1 controls the high frequency gain of the amplifier to avoid oscillation and suppress RF.

An external resistor between the output terminal and the negative input provides negative feedback and sets the gain of the amplifier. A capacitor from the output terminal to the negative input will conduct more signal at higher frequencies resulting in a roll-off of frequencies beyond the audio range. An R-C network from the negative input to ground acts as a voltage divider for the negative feedback and causes the amplifier to roll-off the low frequencies as the capacitive reactance increases with lower frequency causing the resistance of the shunt leg to increase. This results in more voltage being returned to the negative input of the amplifier and improves DC stability.

3.4. INPUT MODULES.

3.4.1. GENERAL. All input modules are of essentially the same physical and electrical configuration differing only in input selection and

output routing function. The modules utilize the same discrete operational amplifier as has been previously discussed. The following chart enumerates the exact functional differences between the modules.

Figure 3.4.1

Module Type	Number of Inputs	Q Position	Mono-Stereo Switch*	Mute Facility	Start Button
PAN	2 Mono	No	NO--has panpot	Yes	No
DUAL	2	No	Yes	Yes	No
CART	1	Yes	Yes	Yes	Yes
TRIPLE	3	Yes	Yes	Yes	No

* Monaural modules do not have Mono-Stereo switches.

3.4.2. INPUT SELECT SWITCH. The INPUT SELECT switch (SW1) on all except the Cartridge Module allows the module to be sourced from two or three different inputs which may be of widely differing levels with appropriate matching pads installed on the terminals of the Mother Board. If all of the inputs are of the same level and need the same value of matching pad resistors these may be placed between the switch and the Input Transformer as described in the section dealing with input pads.

The switch has an additional single-pole section which selects for MUTE function and is described later in this section.

3.4.3. INPUT TRANSFORMER. The balanced 150 ohm primary/15k ohm secondary has a voltage gain of 20dB.

3.4.4. OPERATIONAL AMPLIFIER. The discrete operational amplifier circuit which is used throughout the console is set for a gain of 30dB by the ratio of resistor R103, (R109)** and R101 (R107). Capacitor C102 (C107) and C103 (C108) form a bandpass network to restrict the amplifier to the audio frequency range. Capacitor C104 (C109) and resistor R104 (R110) are an additional high frequency roll-off filter which reduce

** Component value in parentheses are in the right channel and are omitted in monaural units.

any chance for the amplifier to go into oscillation. Capacitor C105 (C110) is DC blocking. Resistor R124 (R125) provides a series resistance to prevent one channel from driving the output of the other with the module MONO-STEREO switch in MONO. A loss of 2dB is taken through the resistors.

3.4.5. STRAIGHT-LINE ATTENUATOR. The Straight-line attenuator is of the conductive plastic type and operates an integral S.P.D.T. CUE switch on the Triple Input and Cartridge Modules.

3.4.6. MONO-STEREO SWITCH. The MONO-STEREO switch (SW3) in stereo modules is a two position wafer switch which, in the MONO position, connects together the wipers of the stereo level control.

3.4.7. PROGRAM-OFF-AUDITION SWITCH. The PROGRAM-OFF-AUDITION switch (SW4) is an 8-pole Switchcraft Lever-Lite type which routes the amplifier output to PROGRAM or AUDITION channels through a 10k ohm build out resistor. When the switch is in the OFF position with respect to a particular output buss the switch side of the 10k ohm resistor is connected to GROUND. The switch also performs the MUTING function. Adjustment procedures for this switch are covered in the maintenance section of this manual.

3.4.8. MUTING. MUTE circuitry is described elsewhere in this manual. MUTE DC voltage is applied to pin M of the module, routes through the PROGRAM-OFF-AUDITION switch mute contacts to the mute contacts of the INPUT SELECT switch (if any) and back out of the board on pin 11, 9, and K for MUTE A, B, or C respectively.

3.4.9. CUE SIGNAL. CUE signal is taken through resistors R105 and R111 which respectively connect to the junction of C105-R124 and C110-R125. Signal routes through the CUE switch (SW2) located on the bottom of the module gain control. When the CUE switch is in the "OFF" position (i.e. with the gain control not in full down detented position) the intersection of the two 10k ohm resistors is switched to GROUND.

3.4.10. POWER INPUT. DC power input to the module is bipolar with the connections as follows:

Pin 3	+24V
Pin 5	-24V
Pin 7	COMMON

The module is protected against power supply reversal by diodes D101 and D102. Capacitors C111 and C112 provide additional power supply filtering on the input module. Pilot Lamp I-1 is connected with series resistor R126 between +DC and -DC. The lamp is a type 387.

3.4.11. CARTRIDGE MODULE MOD 14110 MOD 24120. The Cartridge Modules have only one input source and no INPUT SELECT switch. Input is through positions CL and CR (CL only on mono modules). MUTE circuitry is jumpered

to allow MUTE function to take place in the absence of the INPUT SWITCH wiring. MUTE function uses terminal A. The Cartridge Module has a momentary contact push button for remote start of a cartridge tape player or other input source. The contacts come out on pins 9 and K which connect to terminals B and C adjacent to the module connector on the Mother Board.

3.4.12. PANPOT MODULE MOD 13220. The Panpot Module utilizes a different output circuit to enable a single input source to be directed to two channels of program in differing amounts. The degree of level which is sent to one channel or the other is determined by variable resistor R116 which is part of a voltage divider which also consists of resistors R117 and R118. The build out resistors R112-R115 are reduced to 5.1k ohms to accommodate the loss in level through the pan circuit.

3.5. PLUG-IN AMPLIFIERS.

3.5.1. GENERAL. Sockets are provided along the rear edge of the Mother Board for up to five plug-in line amplifiers to serve as Program Amplifier, Audition Amplifier, Cue Buss Amplifier, Monitor Amplifier, and Headphone Amplifier. Monaural amplifiers are constructed on the same printed circuit boards as their respective stereo counterparts but use only the LEFT channel side of the board.

3.5.2. MOA 250/MOA 150 PROGRAM AND AUDITION LINE AMPLIFIERS. The MOA 250/MOA 150 Line Amplifiers are active combining amplifiers with a Maximum Voltage Gain of 36dB when sourced from the 10k ohm combining resistors located in the Input Modules. The input is applied to pin 1 (15)* through DC blocking capacitor C101 (C110) to the negative input of the operational amplifier. Resistor R101 (R108) sets the Gain of the amplifier for 12dB. The output of the amplifier is sent through DC blocking capacitor C103 (C112) to the submaster level control R103 (R110) which is normally adjusted for 16dB of loss. The signal passes through coupling capacitor C105 (C114) to the positive input of another operational amplifier. The gain of this amplifier is set by the ratio of resistors R106 (R113) and R104 (R111) and is 27dB. The output, through DC blocking capacitor C108 (C117), is fed to transformer T1 (T2), which has an insertion loss of 2dB, and out of the board on pins 2 and 3 (13 and 14). Capacitors C102 (C111) and C107 (C116) are high frequency roll-off. RC networks R102-C104 (R109-C113) and R107-C109 (R114-C118) are RF bypass. R105 (R112) provides DC bias to the base of Q2 in the second amplifier stage. Diodes D101, D102 provide reverse-polarity protection and capacitors C119 and C120 provide additional power supply filtering on the amplifier card.

3.5.3. MOA 260/MOA 160 MONITOR LINE AMPLIFIER. The MOA 260/MOA 160 Monitor Line Amplifiers are basic line amplifiers with a fixed voltage gain of 26dB. Input is applied to pin 1 (15) through capacitor C101 (C106) to the positive input of the single operational amplifier. Resistors R103 (R107) and R101 (R105) set the gain of the amplifier. The output is taken through DC blocking capacitor C105 (C110) to transformer T1 (T2) and out of the board on pins 2 and 3 (14 and 13). Capacitors C103 (C108) and C102 (C107) form a bandpass network for the amplifier. Resistor R102 (R106) provides bias to the base of transistor Q2. RC network R104-C104 (R108-C109) is RF bypass. Diodes D101, D102 provide reverse-polarity protection and capacitors C111 and C112 provide additional power supply filtering on the card.

3.5.4. MOA 170 CUE BOOSTER AMPLIFIER. The MOA 170 Cue Booster Amplifier is very similar to the MOA 250/MOA 150 Line Amplifiers with the differences being only that the Level control is external to the card and the Voltage Gain of the amplifier is 20dB. The input to the card is at pin 1 through capacitor C101 to the negative input of the operational amplifier. Resistor R107 provides ground return for the amplifier in the absence of CUE signal input. Resistor R101 sets the gain of the first

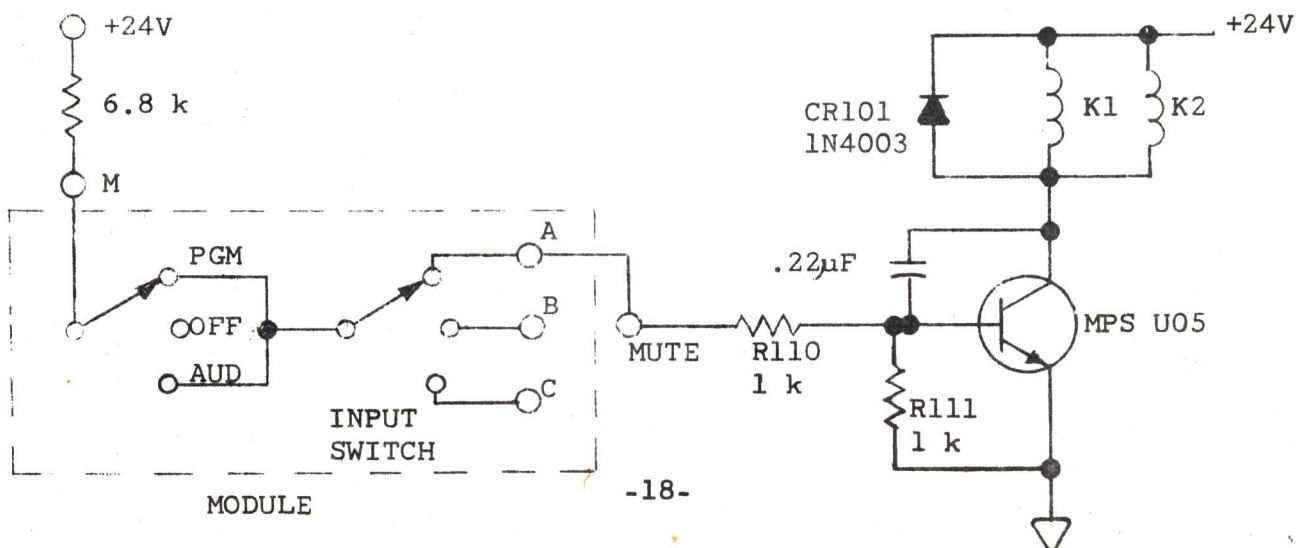
* Component value in parentheses are in the right channel and are omitted in monaural units.

amplifier stage to unity gain. The output of the first amplifier is taken through capacitor C103 to pin 13 of the card. Return and Ground from the external Level control are to pins 14 and 15 respectively. The signal passes through capacitor C105 to the positive input of the amplifier. Resistors R103 and R104 set the gain of the amplifier at 20dB. The output is through capacitor C109 to transformer T1. Capacitors C101, C102, C106, and C107 bandpass limit the amplifiers. R105 provides DC bias to the base of Q2 in the second amplifier stage. RC networks R102-C104 and R106-C108 are RF bypass. Diodes D101 and D102 provide reverse polarity protection and capacitors C110 and C111 provide power supply filtering on the card.

3.5.5. MOA 280/MOA 180 HEADPHONE AMPLIFIER. The MOA 280/MOA 180 Headphone Amplifier utilizes the same operational amplifier circuit as all the other amplifier cards but with some modification to allow its use as a power amplifier for headphones. Input to the card is to pin 1 (15) through capacitor C101 (C107) to the positive input of the operational amplifier. Resistors R103 (R107) and R102 (R106) set the gain of the amplifier at 12dB. The output is taken through DC blocking capacitor C105 (C111) to pin 3 (13). Capacitors C103 (C109) and C102 (C108) limit the passband of the amplifier. Resistor R101 (R105) provides DC bias to the base of Q2. R-C network R104-C104 (R108-C112) provides RF bypass. Diodes D101 and D102 provide reverse-polarity protection and capacitors C106 and C110 provide additional power supply filtering on the card. Resistors R1 and R3 in the Operational Amplifier are changed in value to achieve the greater power output required from the card. Heatsinks are installed on transistors Q4 and Q5.

3.6. RELAYS. The MOD ONE contains two muting relays; one mutes the two channels of MONITOR and the second mutes the output of the CUE amplifier. In addition, the second relay offers contacts for control of additional relays to serve additional functions such as on-air lights, second studio muting, et cetera.

3.6.1. RELAY CIRCUIT DIAGRAM.



3.6.2. CIRCUIT OPERATION. Operation of the circuit is as follows:

24 vdc is applied to pin M of the module to be muted through the 6800 ohm current limiting resistor. The voltage routes through the PGM-OFF-AUD switch and through the input selector switch to pins A, B, and C. Connection is made between whichever of the input positions it is desired to mute and the MUTE terminal.

This voltage causes the transistor to go into saturation bringing the voltage at the collector almost to 0V. This causes the relays to turn on. The capacitor slows the circuit down to minimize switching transients and contact bounce. Diode CR101 further suppresses switching transients.

SECTION IV

MAINTENANCE

4.1. GENERAL. The MOD ONE has been designed for flexibility of use and ease of maintenance. The following section describes recommended regular care and preventive maintenance procedures.

4.2. CARE AND FEEDING OF SWITCHCRAFT LEVER-LITE SWITCHES.

Replacement of the lamp in the switch is easily accomplished from the front of the module. Place the switch in the "OFF" position and grasp the lever with two fingers. Pull toward you. The lever assembly and escutcheon plate will snap out. The lamp may be removed by grasping it from the rear with your fingernails and pulling it out. We recommend relamping with type 387 lamps rather than the more commonly used 327 as the 387 has a rated life of 25,000 hours versus 7,000 hours for the 327. Replacement of the lamp lever assembly and escutcheon is only a matter of reversing the steps taken in removal. Note that the lever assembly and escutcheon will only insert in one direction.

Some users of the MOD ONE may wish to customize their consoles further by changing the color chips in the switch. If such is the case in your facility, Switchcraft makes available a Color Filter Kit Part No. K-131 which includes 3 filters each of colors: amber, blue, green, red, white, and yellow. The list price of the unit is 50 cents. It may be obtained from your local Switchcraft dealer.

The switches perform two functions: OUTPUT assignment and MUTING. The switches are adjusted before installation into the modules to ensure that the MUTING contacts make before the PROGRAM contacts do, to guard against acoustic feedback occurring because the microphone is turned on before the speakers are turned off. Occasionally it may be necessary to readjust these contacts. The following procedures should be followed:

1. The cover on the side of the switch away from the circuit board is pried off with a small screwdriver to gain access to the contacts. After the cover plate is removed the individual contact groups are free to be removed for replacement should this ever become necessary.

2. To adjust the MUTING contacts hold the contact assemblies fully into the switch to prevent them from moving while adjustments are made. Actuate the switch from OFF to PROGRAM and observe the contact sequence. The MUTING contacts, which are the ones closer to the edges of the switch, should make contact before the PROGRAM contacts do. If this does not occur, the MUTING contacts must be bent closer together with a pair of long nose pliers or a soldering aid. The PROGRAM contacts should not be adjusted to correct MUTING sequence problems. Repeat with the AUDITION MUTING contacts.

On modules which utilize the MUTE function it is also important that the signal contact not lift off of Ground until MUTE contact has been made. If this occurs the Ground contact should be bent toward the Signal output.

If it is necessary to adjust a switch because a channel contact is not being made at all, it should be noted that the side of the switch AWAY from the printed circuit board governs the Left Channel and the side nearest the board governs the Right Channel. If the Right Channel contacts are not making contact, it may be necessary to remove the switch from the module to gain access to the contacts. The following procedure should be employed:

1. Unsolder the 620 ohm resistor from the lamp contact. Unsolder the long black wire which runs over to the potentiometer ground.
2. Unsolder the ten colored wires which connect to the printed circuit board. Unsolder them from the board rather than from the switch. Note that the wire colors follow the EIA color code in order.
3. Remove the Lever Assembly and Escutcheon. Unscrew the two screws which are inside the switch next to the lamp contacts. These screws do not unscrew totally but only enough to allow the switch to be pulled forward out of the module.
4. The entire switch now being free, access to the other contacts is easily made.
5. Re-installation of the switch is simply a matter of reversing the steps taken during removal. Note that the switch must be mounted so that the side with more contacts used is AWAY from the circuit board.
6. Always be certain to check the module for correct MUTING contact sequence after making any adjustment to the channel contacts. Check that MUTE contacts have not been adjusted too closely so that they "hang up".

4.3. REPLACEMENT OF VU METER LAMPS. The VU Meter Lamp Assemblies are removed from the rear of the VU Meter Panel by removing the hex nuts which hold them and the meter in place. Replacement is with type 335 (7000 hour) or 399 (25,000 hour) lamp. When retightening the hex nuts check that both meters are mechanically aligned with each other. Do not over-tighten.

4.4. INSERTION AND REMOVAL OF MODULES.

4.4.1. The console power supply should be turned off before insertion or removal of modules or plug-in amplifiers.

4.4.2. INSERTION OF MODULES. The module should be lowered straight down into its appropriate input position and the printed circuit board "fingers" gently aligned with the edge connector on the Mother Board. Then press down firmly at both top and bottom of the module to seat the

module into the connector. DO NOT press down on the switch shafts or the knob of the straight line attenuator. Fasten the module into place with the screws provided.

4.4.3. REMOVAL OF MODULES. Unfasten the hold down screws at top and bottom of module. With one hand reach through the top cover of the console and press upward on the top underside of the module escutcheon while guiding the module out with the other hand. If difficulty is encountered in this operation the switch handle may be removed from the Input Selector Switch of modules so equipped and the shaft grasped with a pair of pliers. Pull the module firmly straight up and out of the console.

4.4.4. LUBRICATION OF EDGE CONNECTOR. The gold contact fingers on the modules should be lubricated with a non-conducting silicone lubricant such as Dow Corning 4 Compound to ease insertion and removal of the modules. This is done at the factory and should be repeated only if difficulty is experienced.

4.5. POWER SUPPLY. The Power Supply needs no periodic maintenance. It has no fuses to replace and is provided with internal short circuit protection. If a continual short circuit is applied to the DC Output a Thermal Overload protection circuit shuts off the Power Supply. If the situation exists for an extended period of time it may be necessary to disconnect the AC input to the supply for 2 or 3 minutes to allow the protection circuit to reset.

4.6. THE CURSE OF CARBONATED BEVERAGES. There may well be no more potentially harmful a substance which is so frequently in proximity to audio equipment than the dread 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 in it comes into immediate contact with audio equipment the results can be disastrous for the equipment. The problems are twofold:

1. Sugar causes the liquid to be trapped in locations where short circuits may develop.

2. Carbonated beverages may actually be corrosive to some materials.

If sugary liquids are spilled into electrical equipment they may cause short circuits on printed circuit boards. If spilled into switches and potentiometers they may destroy the contact surfaces and any lubrication used by the manufacturer, resulting in sticky controls. If allowed to remain, these substances can 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, so much for horror stories. The point we wish to make 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 spill onto equipment. Second, be sure that if such an accident does occur that 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 be done with power disconnected from the equipment.

4.7. ADJUSTMENT OF CUE LEVEL TO HEADPHONES. The Headphone feed is taken through a two position lever switch which selects between CUE and MONITOR feeds. Under most circumstances the levels in the two switch positions should be similar. If a significant level difference is noted it is possible to adjust the level of CUE feed to make it balance to the MONITOR level. This is done by changing the value of the two build out resistors which lead from the External Cue Level control to the Q/MON Select Switch. These are nominally 4.7k ohms and if made larger will decrease the CUE level to the headphones and if made smaller will increase CUE level.

4.8. SWITCH CLICK. If a "pop" is heard in the Program line when a module is switched on it is most likely that the output coupling capacitor on the module has become leaky. It should be replaced by another of at least equivalent value. If an exact substitute cannot be had substitution may be made with larger values only. The method for determining if the capacitor has become leaky is as follows: with power applied to the module but no signal input check the DC voltage at the positive end of the 25uF coupling capacitor (47uF on Panpot Modules). The voltmeter will probably show a few tenths of a volt. Now check the negative side of the capacitor. The voltage should be essentially zero. DC voltage at this point will be impressed on the switch contacts and cause switching noise. It will also drive the input of the summing amplifier causing a click to be heard.

4.9. MONITOR MODE SWITCH. Figure 4.9.1 is a Truth Table for the Monitor Mode switch used on stereo versions of the MOD ONE. Apply an input signal of +4dBm 1 kHz to one of the auxiliary monitor inputs. Switch the MONITOR MODE switch to L+R. Connect an ACVTVM to the MONITOR output of the board and adjust the MONITOR level for a reading of +4dBm.

Signal levels will change according to the chart as different inputs, outputs, and switch position are used.

4.9.1. MONITOR MODE TRUTH TABLE.

Switch Position	IN	L	IN	R
	Out L	Out R	Out L	Out R
L	+4	+4	-	-
L + R	+4	+4	+4	+4
ST	+10	-	-	+10
R	-	-	+4	+4

Figure 4.9.1

4.10. DISCONNECTING CUE FUNCTION FROM A MODULE. Occasionally, due to changing production demands it may be necessary to disconnect the CUE function from a module in which it already exists. It is important that the following steps be taken or performance of the system may be degraded.

1. Remove the wire between the center lug of the CUE switch and the printed circuit board. This disconnects the CUE feed out of the module.

2. Either remove the 10k ohm resistors R105 and R111 or, if the module is likely to need the CUE function again, install a jumper between the two end lugs of the CUE switch. This maintains ground potential at the junction of the two resistors and eliminates the possibility that if the control was actually placed in the CUE position that there might be some increased level of interchannel crosstalk.

4.11. FACTORY WARRANTY.

All U.R.E.I. products are warranted to be free from defects of material and workmanship for a period of one year from date of delivery to the original user. Within that period, repair or replacement will be made at no cost for material or labor to the possessor. This warranty is void if the product has been subjected to abuse, unauthorized modification and/or repair, or if it has not been operated in accordance with instructions.

In-warranty units should be returned prepaid to U.R.E.I. and U.R.E.I. will return prepaid to customer. Out-of-warranty repairs: minimum charge \$15. Prices subject to change without prior notice.

SECTION V

MODIFICATION NOTES

5.1. GENERAL. From time-to-time U.R.E.I. will issue Modification and Application Notes for its products. To ensure that you receive all such notes you should return the Warranty Card supplied with the equipment or write your name and address on a post card and the request that your name be added to the mailing list for this product. Include the Serial Number of the product. Send the card to:

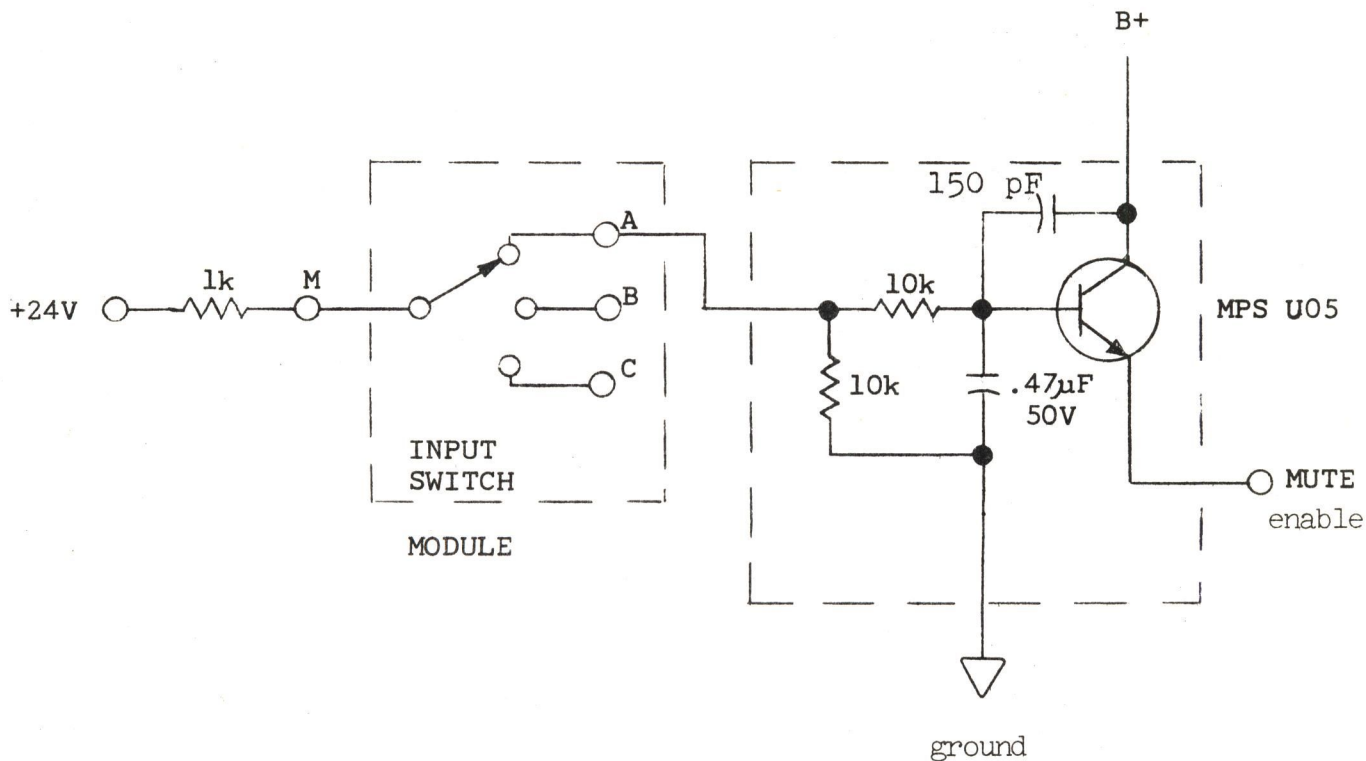
U.R.E.I.
11922 Valerio Street
North Hollywood, CA 91605
Attn: Engineering Dept.

5.2. MOD ONE WIRING MODIFICATION TO REDUCE CLICK WHEN USING MUTE FUNCTION. This modification note which applies to consoles with serial number 112 and lower describes a modification to the MUTE circuitry to reduce a "click" sound which may be heard in the Program signal when the MUTE relay is energized and de-energized. This circuit acts to limit the amount of current required to be taken through the switch contacts to operate the MUTE function. Note that the maintenance section describes two other possible reasons for a "click" to be heard when entering MUTE mode and it is necessary to determine which problem needs to be solved.

5.2.1. Page 26 shows a circuit which must be constructed on vector board and installed in a location near the MUTE relay. Four wires connect to the circuit. They are:

- a. B+ to trace 3 under the modules on the Mother Board between modules 6 and 7.
- b. GROUND to trace 7 under the modules on the Mother Board between modules 6 and 7.
- c. MUTE COMMAND from the junction of the two 10K ohm resistors to the MUTE terminals of the appropriate modules.
- d. MUTE ENABLE to the MUTE terminal next to the MUTE relays.

5.2.2. DC power to the MUTE function should be applied to the module through a 1k ohm resistor rather than the 47 ohm originally installed. Eliminate the 47 microFarad capacitor to Ground from the MUTE terminal of the module.



(See Pgh. 5.2.1)

5.3. MOD ONE WIRING MODIFICATION TO REDUCE CROSSTALK BETWEEN PROGRAM AND AUDITION CHANNELS. This modification note applies to consoles with serial number 112 and lower. The following procedure should be employed.

1. Cut circuit trace on Mother Board between pin 8 of PROGRAM amplifier connector and pin 8 of AUDITION amplifier connector.
2. Install a length of insulated wire from pin 8 of the AUDITION amplifier to the power supply GROUND trace where it connects to the large decoupling capacitors. Install a similar piece of wire from pin 8 of the PROGRAM amplifier. These pieces of wire should be of 18 guage wire size or greater.
3. Install another 18 guage wire from the capacitor GROUND point to trace #7 of the Input plug strip. (Pin #1 is located closest to the FRONT of the console.)
4. Install another similar wire to connect trace #7 of the Left Mother Board to trace #7 of the Right Mother Board.

SECTION VI

PARTS LIST

6.1. GENERAL . The following parts lists are provided as a guide for replacement purposes. All Components are available from U.R.E.I. Certain components are factory selected to meet requirements of the system. When ordering spare or replacement parts please be as specific as possible in your order. If possible give us the part identification, U.R.E.I, part number, and specific location of the part in your unit.

LINE AMPLIFIER/MOA-250/150

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>MOA-250</u>	<u>MOA-150</u>	
<u>RESISTORS</u>				
R1,R101,R108	33 k Ohm $\frac{1}{4}w$ 5%	6	3	18-3330
R2	47 k Ohm $\frac{1}{4}w$ 5%	4	2	18-4730
R3,R115,R116	10 k Ohm $\frac{1}{4}w$ 5%	6	3	18-1030
R4,R5	47 Ohm $\frac{1}{4}w$ 5%	8	4	18-4700
R102,R107,R109, R114	10 Ohm $\frac{1}{4}w$ 5%	4	2	18-1000
R104,R111	4.7 k Ohm $\frac{1}{4}w$ 5%	2	1	18-4720
R105,R106,R112, R113	100 k Ohm $\frac{1}{4}w$ 5%	4	2	18-1040
R103,R110	100 k Ohm var. Lin. 2w Allen Bradley 70m4NO48S103A	2	1	15-0233
<u>CAPACITORS</u>				
C1	5 pfd 100v 20% Disc ceramic	4	2	14-0347
C102,C107,C111, C116	33 pfd 100v 20% " "	4	2	14-0047
C101,C110,C108, C117	100 Mfd, 25v Electrolytic Amperex	4	2	14-0097
C103,C105,C106 (*C112,C114,C115), C119,C120	25 Mfd, 25v Electrolytic Amperex	*8	5	14-0178
C105,C109,C113, C118	.015 Mfd, 100v Film	4	2	14-0227
<u>DIODES</u>				
D1,D2	Alternate 1N914B UREI 86-5037-3	8	4	13-0135
D101,D102	1 N 4003	2	2	13-0005

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
<u>TRANSISTORS</u>		<u>MOA-250</u>	<u>MOA-150</u>	
Q1,Q2	2 N 5210 Motorola	8	4	13-0158
Q3	2 N 5087 Motorola	4	2	13-0131
Q4	2 N 3053	4	2	13-0022
Q5	2 N 4036	4	2	13-0134
T1, T2	Transformer, 600/600 ohms output	2	1	16-12018
X	PC. Board per AW 12020	1	1	12-12020
	Pad, Transistor	8	4	13-0077
	Guide, P.C. Board A12033	1	1	25-12033

MONITOR AMPLIFIER/MOA-260/160

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
<u>RESISTORS</u>		<u>MOA-260</u>	<u>MOA-160</u>	
R1	33 k Ohm $\frac{1}{4}w$ 5%	2	1	18-3330
R2	47 k Ohm $\frac{1}{4}w$ 5%	2	1	18-4730
R3,R109,R110	10 k Ohm $\frac{1}{4}w$ 5%	4	2	18-1030
R4,R5	47 Ohm $\frac{1}{4}w$ 5%	4	2	18-4700
R102,R106	100 k Ohm $\frac{1}{4}w$ 5%	2	1	18-1040
R103,R107	68 k Ohm $\frac{1}{4}w$ 5%	2	1	18-6830
R104,R108	10 Ohm $\frac{1}{4}w$ 5%	2	1	18-1000
R101, R105	3.3 k Ohm $\frac{1}{4}w$ 5%	2	1	18-3320

CAPACITORS

C1	5 pfd 100v 20% Disc ceramic	2	1	14-0347
C103,C108	33 pfd 100v 20% Disc ceramic	2	1	14-0047
C101,C102,C111, C112(*C106,C107)	25 Mfd/25v Electrolytic	*6	4	14-0178
C105,C110	100 Mfd 25v Electrolytic	2	1	14-0098
C104,C109	.015 Mfd 100v Film	2	1	14-0227

DIODES

D1,D2	Alternate 1N914B	4	2	13-0135
	UREI 86-5037-3			
D101,D102	1 N 4003	2	2	13-0005

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
<u>TRANSISTORS</u>		<u>MOA-260</u>	<u>MOA-160</u>	
Q1,Q2	2 N 5210 Motorola	4	2	13-0158
Q3	2 N 5087 Motorola	2	1	13-0131
Q4	2 N 3053	2	1	13-0022
Q5	2 N 4037	2	1	13-0134
T1,T2	Transformer 600/600 output B12018	2	1	16-12018
	PC Board per AW 12021	1	1	12-12021
	Guide, P.C. Board	1	1	25-12033
	Pad, Transistor	4	2	13-0077

Q-AMPLIFIER/MOA-170

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>
<u>RESISTORS</u>			
R1	33 k Ohm $\frac{1}{4}$ W 5%	2	18-3330
R2	47 k Ohm $\frac{1}{4}$ W 5%	2	18-4730
R3,R101,R104, R107	10 k Ohm $\frac{1}{4}$ W 5%	5	18-1030
R4,R5	47 Ohm $\frac{1}{4}$ W 5%	4	18-4700
R102,R106	10 Ohm $\frac{1}{4}$ W 5%	2	18-1000
R103,R105	100 k Ohm $\frac{1}{4}$ W 5%	2	18-1040
<u>CAPACITORS</u>			
C1	5 pfd 100v Disc ceramic	2	14-0377
C107	33 pfd 100v Disc ceramic	1	14-0047
C103,C105,C106, C110,C111	25 Mfd 25v Electrolytic Amperex	5	14-0178
C101,C109	100 Mfd 25v Electrolytic (Amperex)	2	14-0097
C104,C108	.015 Mfd 100v Film	2	14-0227
C102	270 pfd	1	14-0179
<u>DIODES</u>			
D1,D2	1 N 914 (Alternate 1N914B) UREI 86-5037-3	4	13-0135
D101,D102	1 N 4003	2	13-0005

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>
<u>TRANSISTORS</u>			
Q1,Q2	2 N 5210 (Motorola)	4	13-0158
Q3	2 N 5087 (Motorola)	2	13-0131
Q4	2 N 3053	2	13-0022
Q5	2 N 4037	2	13-0134
T1	Transformer 600/600 output	1	16-12018
	PC Board per AW 12020	1	12-12020
	Guide, P.C. Board	1	25-12033
	Pad, Transistor	4	13-0077

HEAD PHONE AMPLIFIER/MOA-280/180

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
<u>RESISTORS</u>		<u>MOA-280</u>	<u>MOA-180</u>	
R1	15 k Ohm $\frac{1}{4}W$ 5%	2	1	18-1530
R2	47 k Ohm $\frac{1}{4}W$ 5%	2	1	18-4730
R3	2.2 k Ohm $\frac{1}{4}W$ 5%	2	1	18-2220
R4,R5	47 Ohm $\frac{1}{4}W$ 5%	4	2	18-4700
R103,R107	33 k Ohm $\frac{1}{4}W$ 5%	2	1	18-3330
R102,R106,R107, R109,R110	10 k Ohm $\frac{1}{4}W$ 5%	5	3	18-1030
R101,R105	100 k Ohm $\frac{1}{4}W$ 5%	2	1	18-1040
R104,R108	10 Ohm $\frac{1}{4}W$ 5%	4	2	18-1000
<u>CAPACITORS</u>				
C1	5 pfd 100v 20% Disc ceramic	2	1	14-0347
C103,C109	33 pfd 100v 20% Disc ceramic	2	1	14-0047
C105,C111	1500 Mfd, 6.3v Electrolytic (Amperex)	2	1	14-0384
C101,C2,C6,C10, (*C107,C108)	25 Mfd, 25v Electrolytic (Amperex)	*6	4	14-0178
C104,C112	.015 Mfd, 100v Film	2	1	14-0227
<u>DIODES</u>				
D1,D2	1 N 914 B (UREI 86-5037-3)	4	2	13-0135
D101,D102	1 N 4003	2	2	13-0005

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
<u>TRANSISTORS</u>		<u>MOA-280</u>	<u>MOA-180</u>	
Q1,Q2	2 N 5210 (Motorola)	4	2	13-0158
Q3	2 N 5087 (Motorola)	2	1	13-0131
Q4	2 N 3053	2	1	13-0022
Q5	2 N 4037	2	1	13-0134
	Heatsink (IERC)	4	2	36-0005
	Guide P.C. Board	1	1	25-12033
	P.C. Board per AW 12022	1	1	12-12022
	Pad, transistor	4	2	13-0027

INPUT MODULE MOD 23220/13210

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>23220</u>	<u>13210</u>	
	Input Module Assembly (D12050)			10-12050
	P.C. Board Sub-Assy. <u>Stereo</u> (D12053-2)	1	1	10-12053-2
	P.C. Board Sub-Assy. <u>Mono</u> (D12059-1)	0	1	10-12059-1
R106	Pot. Slider 10 k Dual (Duncan 220DA10K0)	1	0	15-0229
*S1,S3	Switch, Inp. Sel. /Mode (Oak 5-55544-315)	*2	1	15-0225
S4	Switch, Output (Switchcraft 84324L)	1	1	15-0235
	Channel, Mtg. (B12012)	1	1	25-12012
	Dress Panel (B12014-1)	1	0	25-12014-1
	Dress Panel (B12014-2)	0	1	25-12014-2
XR106	Knob, Mixer (McNabb 506-510)	1	1	24-0059
R106	Pot. Slider 10 k (Duncan 220SA10K)	0	1	15-0231

INPUT MODULE MOD24120/14110

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>24120</u>	<u>14110</u>	
	Input Module Assembly			
	P.C. Board Sub-Assy. <u>Stereo</u>	1	0	10-12053-1
	P.C. Board Sub-Assy. <u>Mono</u>	0	1	10-12059-1

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>24120</u>	<u>14110</u>	
R106, S2	Pot. Slider 10 k Dual w/"Q" Switch (Duncan 220-593)	1	0	15-0228
R106, S2	Pot. Slider 10 k Single w/"Q" Switch (Duncan 220SAQ10K)	0	1	15-0230
S3	Switch, Mode (Oak 5-55544-315)	1	0	15-0225
S4	Switch, Output	1	1	15-0235
	Channel, Mtg. (B12012)	1	1	25-12016
	Dress Panel (B12015-1)	1	0	25-12015-1
	Dress Panel (B12015-2)	0	1	25-12015-2
XR106	Knob, Mixer (McNabb 506-510)	1	1	24-0059
S1	Push Button Switch (Switchcraft 903)	1	1	15-0059

INPUT MODULE MOD-25320/15310

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>25320</u>	<u>15310</u>	
	Input Module Assembly			
	P.C. Board Sub-Assy. <u>Stereo</u> (D12053-1)	1	0	10-12053-1
	P.C. Board Sub-Assy. <u>Mono</u> (D12059-1)	0	1	10-12059-1
R106	Pot, Slider. 10 k Dual w/"Q" Switch (Duncan 220-593)	1	0	15-0228
R106	Pot, Slider. 10 k Single w/"Q" Switch (Duncan 220SAQ10K)	0	1	15-0230
S1,S3	Switch, Input Sel./Mode (Oak 5-55544-315)	2	1	15-0225
S4	Switch, Output (Switchcraft 84324L)	1	1	15-0235
	Channel, Mtg. (B12012)	1	1	
	Dress Panel (B12016-1)	1	0	
	Dress Panel (B12016-2)	0	1	
XR106	Knob, Mixer (McNabb 506-510)	1	1	24-0059

INPUT MODULE MOD-13220 PAN-POT

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>
	P.C. Board Sub Assembly (D-12059-2)	1	
R106	Resistor, variable, 10 k Ohm (Duncan 220DA10K)	1	15-0229
R116	Resistor, variable, 1 k Ohm (Allen Bradley JA1N056S1020A)	1	15-0264
S1	Switch, Input Sel. (Oak 5-555440315)	1	15-0225
S4	Switch, Output (Switchcraft 84324L)	1	15-0235
	Channel, Mtg. (B12012)	1	25-12012
	Panel, Dress (B12013)	1	25-12013
	Knob, Mixer	1	24-0059
	Knob, Pan Pot (Griffith 527)	1	24-0057

PRINTED CIRCUIT BOARD ASSY. MONO INPUT MODULES (D-12059)

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>-1</u>	<u>-2</u>	
<u>RESISTORS</u>				
R1	33 k Ohm $\frac{1}{4}W$ 5%	1	1	18-3330
R2	47 k Ohm $\frac{1}{4}W$ 5%	1	1	18-4730
(*R3),R105,R112, R113,R114,R115	10 k Ohm $\frac{1}{4}W$ 5%	*6	1	18-1030
R4,R5	47 Ohm $\frac{1}{4}W$ 5%	2	2	18-4700
R127,R101	3.3 k Ohm $\frac{1}{4}W$ 5%	2	2	18-3320
R104	10 Ohm $\frac{1}{4}W$ 5%	1	1	18-1000
R112,R113,R114, R115	5.1 k Ohm $\frac{1}{4}W$ 5%	0	4	18-5120
R124,R125	910 Ohm $\frac{1}{4}W$ 5%	0	2	18-9110
R124	2.2 k $\frac{1}{4}W$ +5%	1	0	18-2220
R126	620 Ohm 1W +5%	1	1	18-6212
<u>CAPACITORS</u>				
C1	5 pfd 100v 20% Disc ceramic	1	1	14-0347
C103	22 pfd 100v 20% Disc ceramic	1	1	14-0179
C102,C105,C111, C112	25 Mfd. 25v Electrolytic	4	4	14-0178
C104	.015 Mfd. 100v Film	1	1	14-0227
<u>TRANSFORMERS</u>				
T1	Input (B11178)	1	1	16-11178 B
<u>DIODES</u>				
D1, D2	Alternate 1N914 (UREI 86-5037-3)	2	2	13-0135
D101,D102	1 N 4003	2	2	13-0005
<u>TRANSISTORS</u>				
Q1,Q2	2 N 5210 (Motorola)	2	2	13-0158
Q3	2 N 5087 (Motorola)	1	1	13-0131
Q4	2 N 3053	1	1	13-0022
Q5	2 N 4037	1	1	13-0134
	PC Board per AW 12024	1	1	12-12024
	Pad, Transistor	2	2	13-0077

PRINTED CIRCUIT BOARD ASSY. STEREO INPUT MODULES (D-12053)

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
<u>RESISTORS</u>		<u>-1</u>	<u>-2</u>	
R1	33 k Ohm $\frac{1}{4}W$ 5%	2	2	18-3330
R2	47 k Ohm $\frac{1}{4}W$ 5%	2	2	18-4730
R3,(*R105,R111), R112,R113,R114, R115	10 k Ohm $\frac{1}{4}W$ 5%	*8	6	18-1030
R4,R5	47 Ohm $\frac{1}{4}W$ 5%	4	4	18-4700
R101,R107,R127, R128	3.3 k Ohm $\frac{1}{4}W$ 5%	4	4	18-3320
R103,R109	100 k Ohm $\frac{1}{4}W$ 5%	2	2	18-1040
R104,R110	10 Ohm $\frac{1}{4}W$ 5%	2	2	18-1000
R126	620 Ohm <u>+5%</u> 1W	1	1	18-6212
R124,R125	2.2 k Ohm <u>+5%</u> $\frac{1}{4}W$	2	2	18-2220
 <u>CAPACITORS</u>				
C1	5 pfd 100v 20% Disc ceramic	2	2	14-0347
C103,C108	22 pfd 100v 20% Disc ceramic	2	2	14-0179
C102,C105,C107 C110,C111,C112	25 Mfd. 25v Electrolytic	6	6	14-0178
C104,C109	.015 Mfd. 100v Film	2	2	14-0227
 <u>TRANSFORMERS</u>				
T1,T2	Input (B11178)	2	2	18-11178 B
 <u>DIODES</u>				
D101,D102	1 N 4003	2	2	13-0005
D1,D2	1 N 914 (Alternate) (UREI 86-5037-3)	4	4	15-0135
 <u>TRANSISTORS</u>				
Q1,Q2	2 N 5210 (Motorola)	4	4	13-0158
Q3	2 N 5087 (Motorola)	2	2	13-0131
Q4	2 N 3053	2	2	13-0022
Q5	2 N 4037	2	2	13-0134
	P.C. Board per AW 12024	1	1	12-12024
	Pad, Transistor	4	4	13-0077

HARNESS BOARD, LEFT (12051)

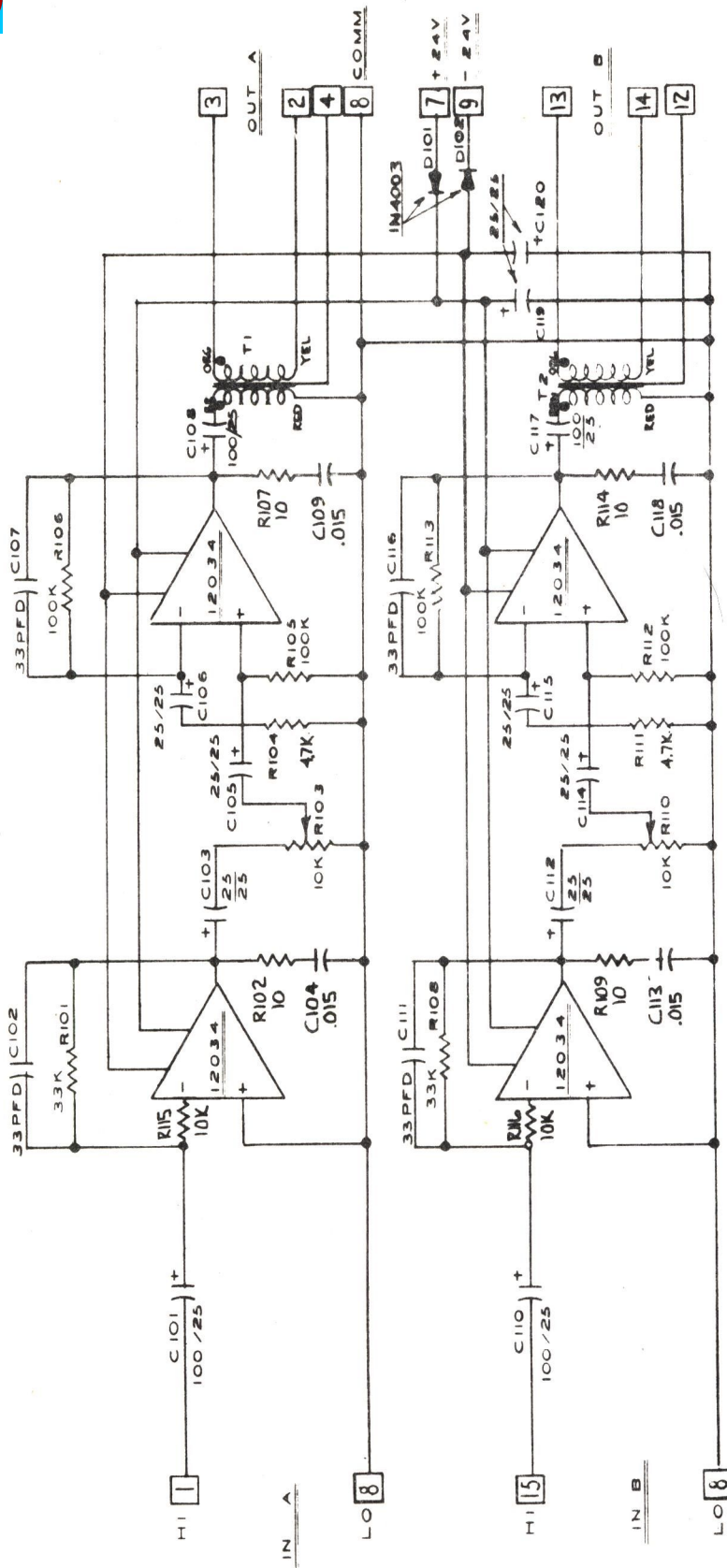
<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>
	Harness Board Assembly (D12051)		10-12051
	P.C. Board (C12028)	1	12-12028
	Connector 22 Pin (Cinch 50-44B-10)	5	27-0062
	Connector 15 Pin (Cinch 50-3013-10)	2	27-0085
C101,C102	Capacitor, Elect. 400 Mfd. 40v	2	14-0306
R114,R115	Resistor, Carb. 10 Ohm +5% $\frac{1}{2}w$	2	18-1001
	Shield, P.C. Board (B-12032)	2	25-12032
R100,R104	Resistor, Carb. 6.8 k +5% $\frac{1}{2}w$	5	18-6821

HARNESS BOARD, RIGHT (12052)

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>
	Harness Board Assembly (12052)		10-12052
	P.C. Board (C12027)	1	12-12027
	Connector 22 Pin (Cinch 50-44B-10)	5	27-0062
	Connector 15 Pin (Cinch 50-30B-10)	3	27-0085
C104.5	Capacitor Elect. 400 Mfd. 40v	2	14-0306
C105	Capacitor, Mylar .22 Mfd.	1	14-0196
R110	Resistor 10 k Ohm +5% $\frac{1}{2}w$	1	18-1031
R111	Resistor 1 k Ohm +5% $\frac{1}{2}w$	1	18-1021
CR101	Diode 1N4003	1	13-0005
	Transistor MPS U05	1	13-0148
	Relay, 4PDT Plug-in (Allied T154-4C)	2	15-0240
	Socket, Relay (Allied 30055-6)	2	27-0104
	Shield, Circuit Board (B12032)	3	25-12032
R112,R113	Resistor, Carbon 10 Ohm +5% $\frac{1}{2}w$	2	18-1001
R105,R109	Resistor, Carbon 6.8 k Ohm +5% $\frac{1}{2}w$	5	18-6821

MISCELLANEOUS REPLACEABLE PARTS-MOH-110/MOH-210

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>		<u>PART NUMBER</u>
		<u>MOH-210</u>	<u>MOH-110</u>	
T1,T2	Transformer, Isolation (UTC 0-19)	2	1	16-0236
	Shield For Item #1 (UTC 0-17)	2	1	41-0015
R5,R6	Resistor, Variable 10 k Dual	2	2	15-0232
	Monitor Level			
	Headphone Level			
	(70P4NO48F103A Allen Bradley)			
SW1	Switch, Monitor Select	1	1	15-0226
	(Oak 5-24141-726)			
SW2	Switch, Monitor Mode	1	0	15-0227
	(Oak 5-24551-727)			
R1,R2,R3,R4	Resistor, 5.1 k Ohm $\frac{1}{4}W$ $\pm 5\%$	4	2	18-5120
	Power Connector, 10 Contact,	1	1	27-0103
	Chassis Mount			
	(Jones P-310-AB)			
	Power Connector, 10 Contact,	1	1	27-0102
	Cable End			
	(Jones S-310-CCT)			
	VU Meter w/illumination kit	2	2	40-0025
	(Dixson 330)			
	Switch, VU Select	1	1	15-0239
	(Centralab PA 2027)			
	Knob, Round, Pointer	1	1	24-0053
	(Griffith B-505)			
	Knob, Round, Single Bar	3	2	24-0049
	(Briffith B-505-1)			
	Hole Plug	0	1	
	(Heyco P-375)			
	Resistor, Variable 10 k	1	1	15-0233
	Cue Level			
	(Allen Bradley 70M4NO48F103A)			
	Switch, Lever	1	1	15-0237
	(Switchcraft 41206L)			
	Phone Jack	1	1	27-0101
	(Switchcraft N112B)			
	Knob, Round, Pointer	2	2	24-0056
	(Griffith 525)			
	Resistor, 4.7 k Ohm $\frac{1}{4}W$ $\pm 5\%$	2	2	18-4720
	Lamp, POA Switch - Each Module	A/R	A/R	44-0005
	(Chicago Lamp 387)			
	Power Supply 24 vdc 2 ampere	2	2	45-0013
	Lamp, VU Meter	4	4	
	(Chicago Lamp 334)			



**UNITED
RECORDING
ELECTRONICS
INDUSTRIES**

SCHEMATIC
DUAL LINE AMP.

DATE	4.FEB.73	ISSUE
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CHECKED	HCREL	412	B-1
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5 REFERENCE P.C. BOARD ASSEMBLY B1Z044

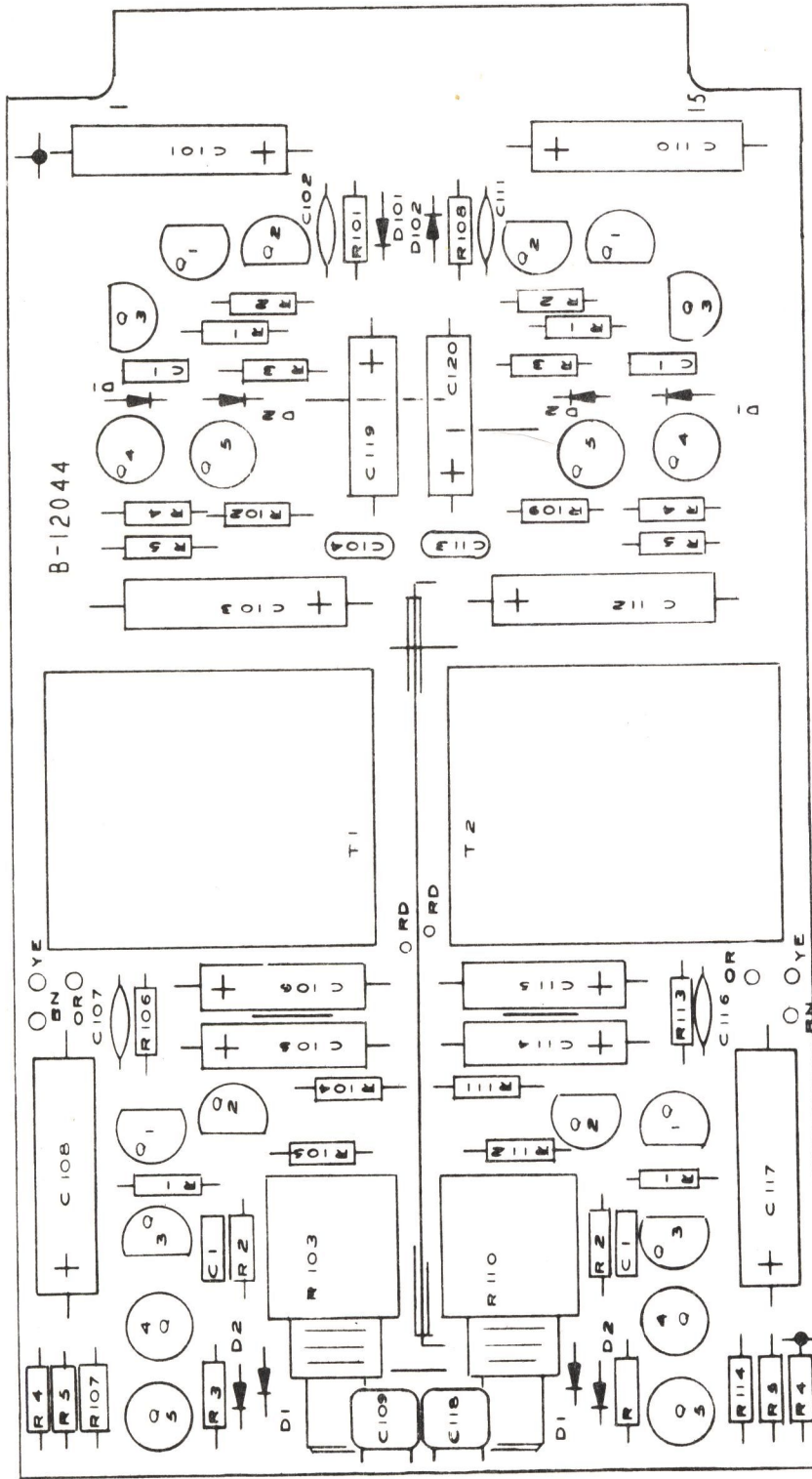
4. FOR MONO AMPLIFIER (MOA-150) USE CHANNEL A

3 NUMBERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS

2. CAPACITOR VALUES ARE IN MICROFARADS

1. RESISTOR VALUES ARE IN OHMS, $\pm 5\%$, 1/4W

NOTES:



REVISIONS

**UNITED
RECORDING
ELECTRONICS
INDUSTRIES**

COMPONENT ASS'BL'Y.

MOA-250/150

DATE	ISSUE
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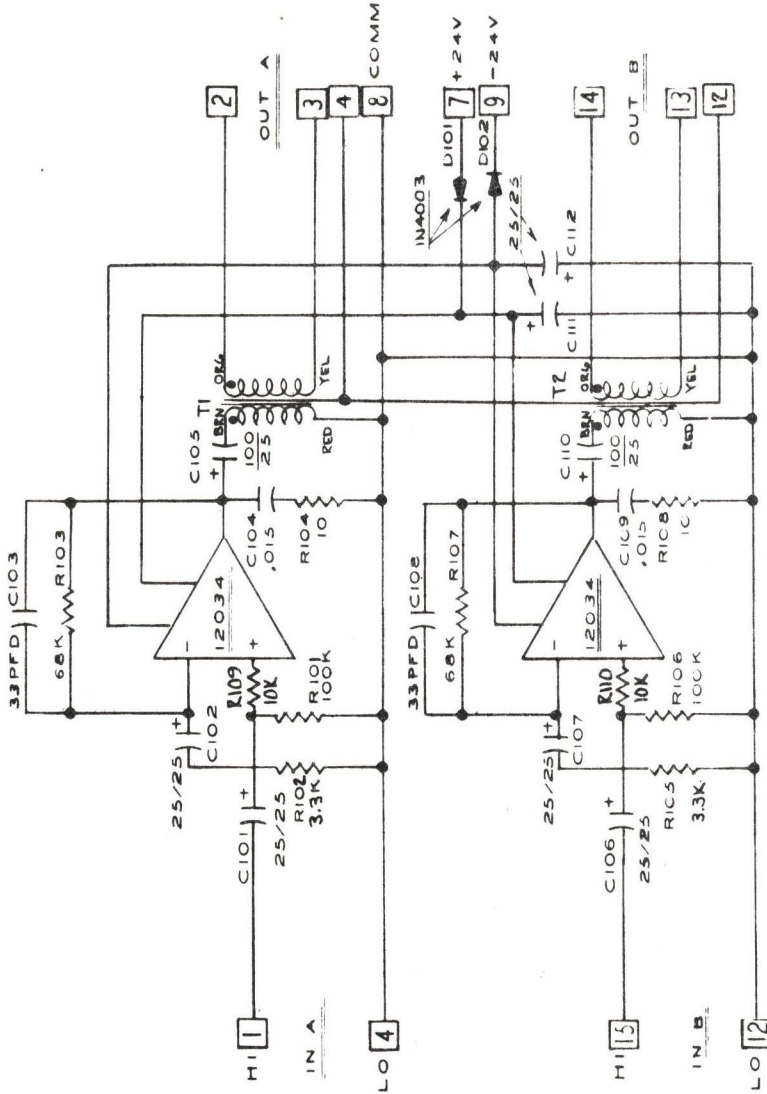
9. APR. 73

CHECKED	RECEIVED
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LOS ANGELES
CALIFORNIA

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BOARD ——— AW-12020
SCHEMATIC — B-12037



A. ADDED R109, I10
PER E0 0079
7-30-74 L.E.

5. REFERENCE P.C. BOARD ASSEMBLY B12045

4. FOR MONO AMPLIFIER (MOA-160) USE CHANNEL A

3. NUMBERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS

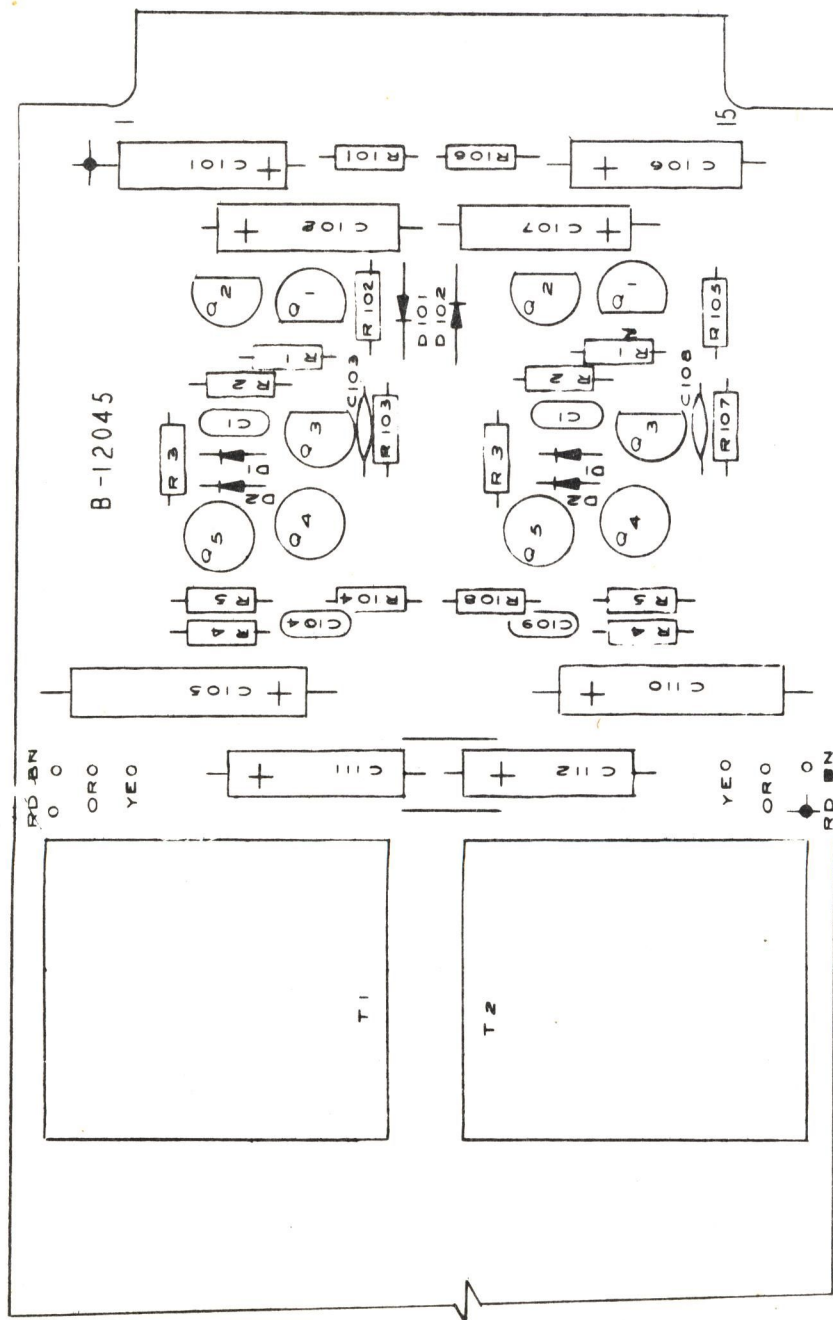
2. CAPACITOR VALUES ARE IN MICROFARADS

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

NOTES:

UNITED RECORDING ELECTRONICS INDUSTRIES	SCHEMATIC MONITOR LINE AMP.	DATE 3.FEB.73	ISSUE B-12038A
MOA-160	CHECKED HCREL		
MOA-260			
LOS ANGELES CALIFORNIA			

www.SteamPoweredRadio.Com



COMPONENT ASS' BLY.

- 260 / 160

1981B

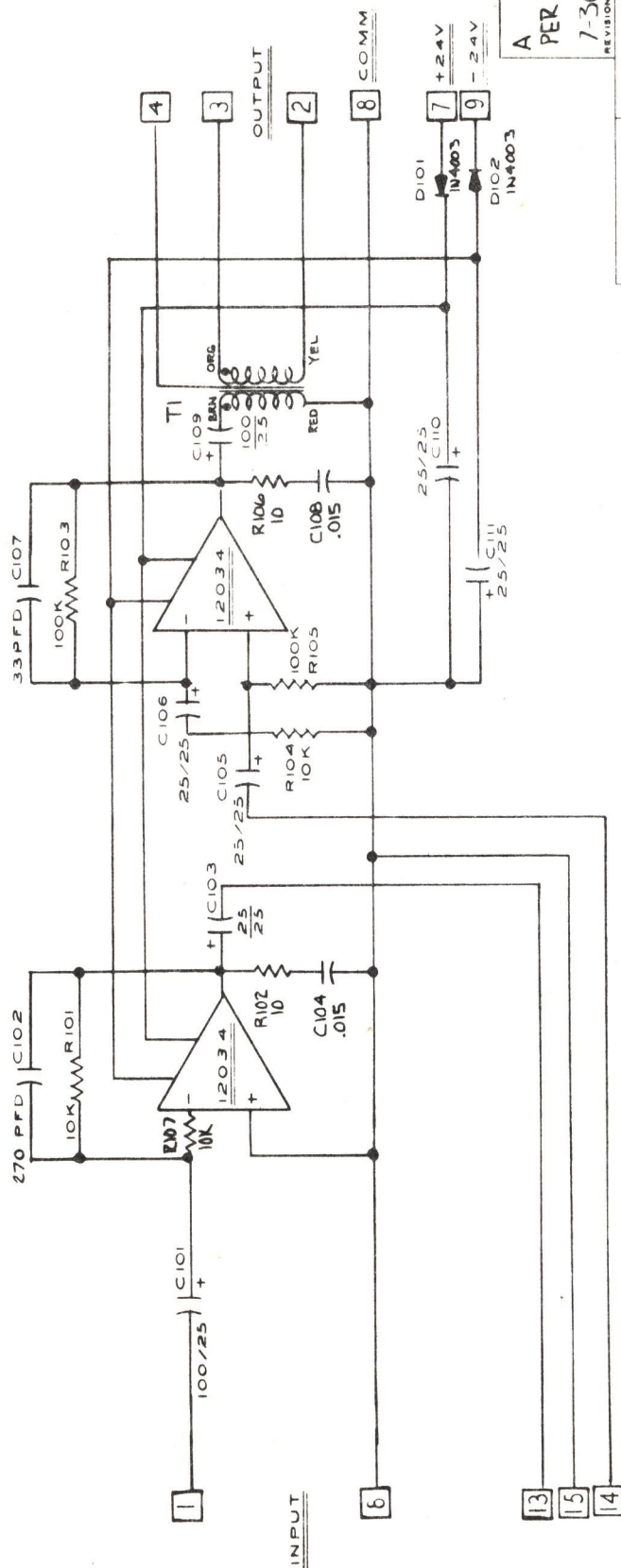
000 73

	21.5
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B-13045A

7 12043A

BOARD ——— AW-12021
SCHEMATIC — B-12038



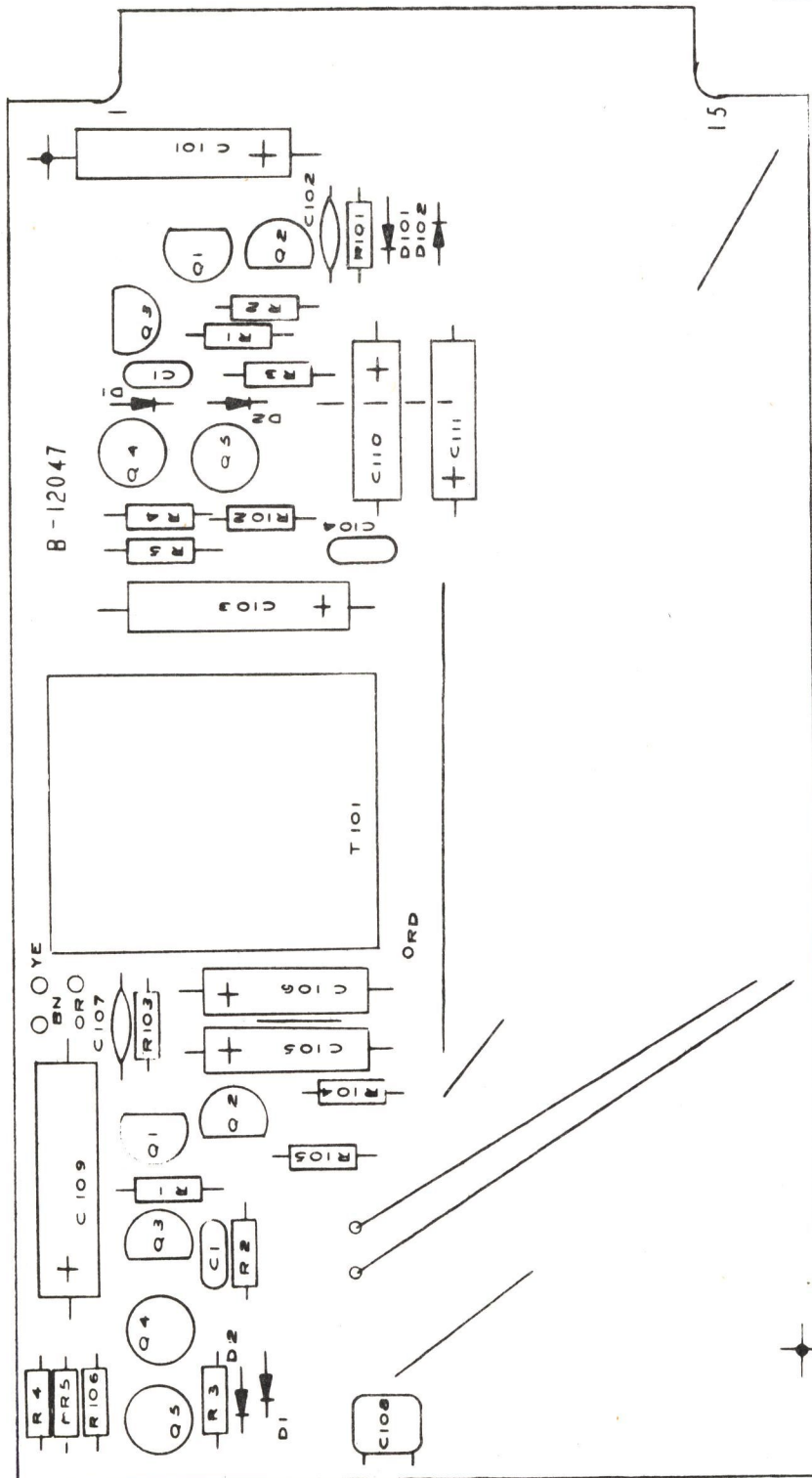
A PER ED 0080
7-30-74 L.E.

UNITED RECORDING ELECTRONICS INDUSTRIES	SCHEMATIC Q-AMPLIFIER	
	DATE	ISSUE
MCA-17C	27, FEB. 73	
LOS ANGELES CALIFORNIA	CHECKED HCREL	REVISIONS B-12039A

4. REFERENCE P.C. BOARD ASSEMBLY B12047
3. NUMBERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS
2. CAPACITOR VALUES ARE IN MICROFARADS
1. RESISTOR VALUES ARE IN OHMS, $\pm 5\%$, $1/4W$

NOTES:

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REVIEWS

COMPONENT ASS' BLY.

MOA-170

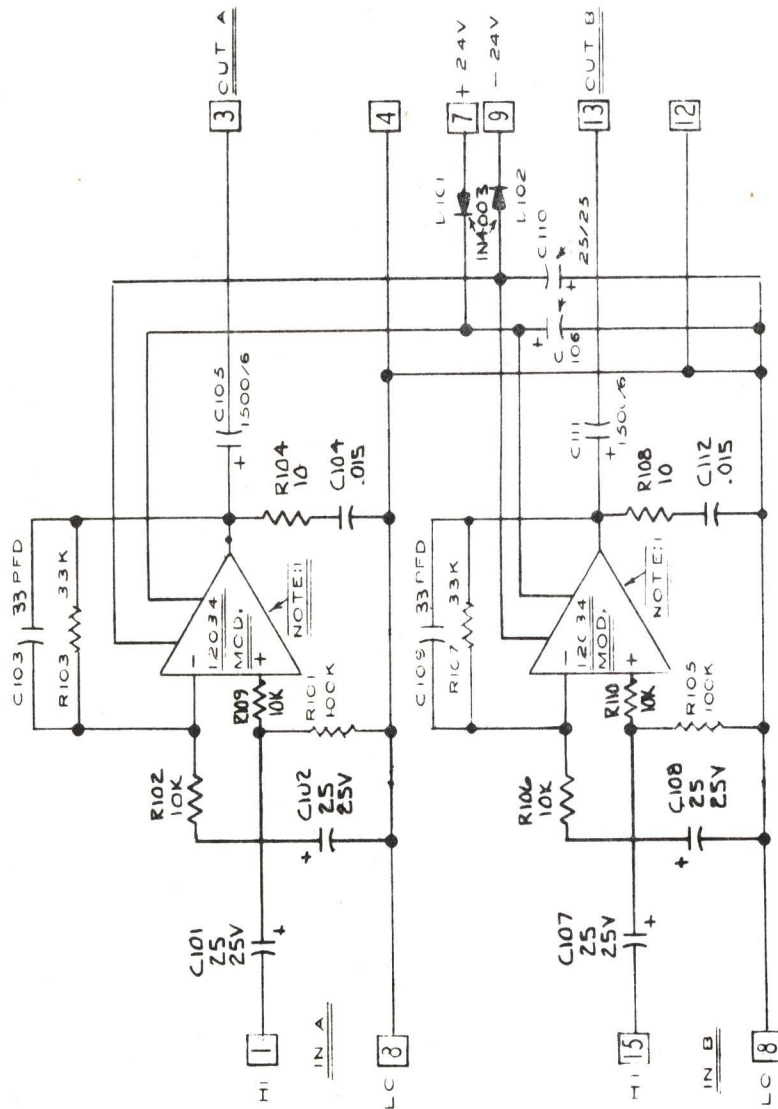
ISSUE	
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9.APR.73

DEPARTMENT
LOS ANGELES
CALIFORNIA

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BOARD — AW-12020
SCHEMATIC — B-12039

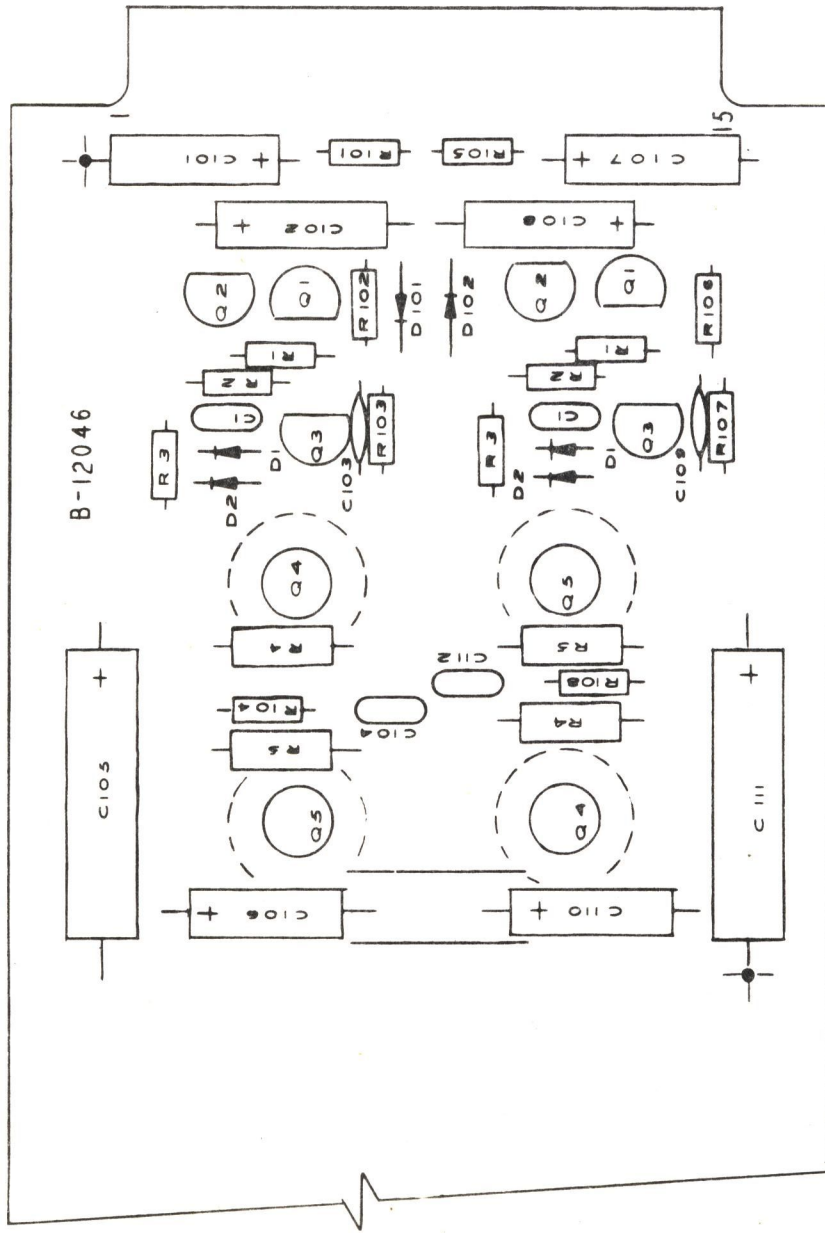


- 5 REFERENCE P.C. BOARD ASSEMBLY B12046
4. FOR MONO AMPLIFIER (MOA-180) USE CHANNEL A
- 3 NUMBERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS
2. CAPACITOR VALUES ARE IN MICROFARADS
1. RESISTOR VALUES ARE IN OHMS, $\pm 5\%$, 1/4W
- NOTES:

Q4/5: INST. HEAT SINK
R3: 2.2K Ω
R1: 15K Ω

A ADDED R109,110
PER EO 0078
7-30-74 L.E.

UNITED RECORDING ELECTRONICS INDUSTRIES	SCHEMATIC		REVISIONS	
	HEADPHONE AMP.			
MOA-180 MOA-280 REWORKED	DATE	11, APR. 73	ISSUE	
LOS ANGELES CALIFORNIA	CHECKED	HCRE	APPROVED	B-12049A

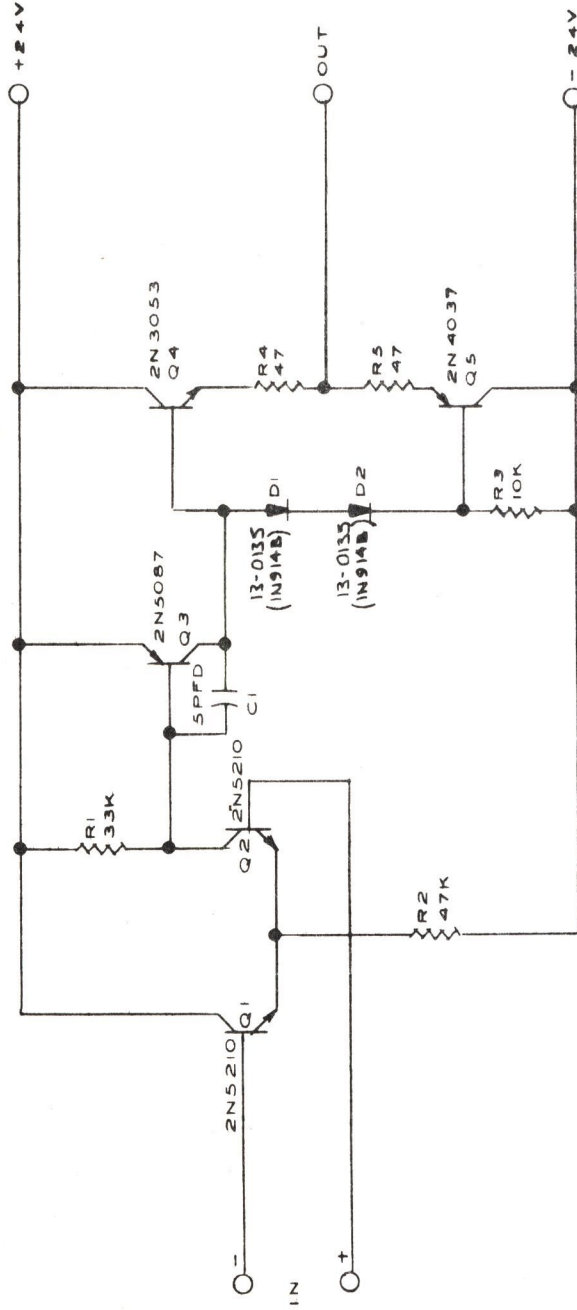


A PER ED 0078
7-10-74 LE.
REVISIONS

UNITED RECORDING ELECTRONICS INDUSTRIES	COMPONENT ASS'BLY.	
	MOA-280 / 180	
DEPARTMENT LOS ANGELES CALIFORNIA	DATE	ISSUE
	10. APR. 73	
CHECKED	APPROVED	
	B-12046A	

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BOARD — AW-12022
SCHEMATIC — B-12049



REVISIONS

UNITED
RECORDING
ELECTRONICS
INDUSTRIES

SCHEMATIC
OPERATIONAL
AMPLIFIER

DATE
20, JAN, 73

DEPARTMENT
LOS ANGELES
CALIFORNIA

ISSUE
2

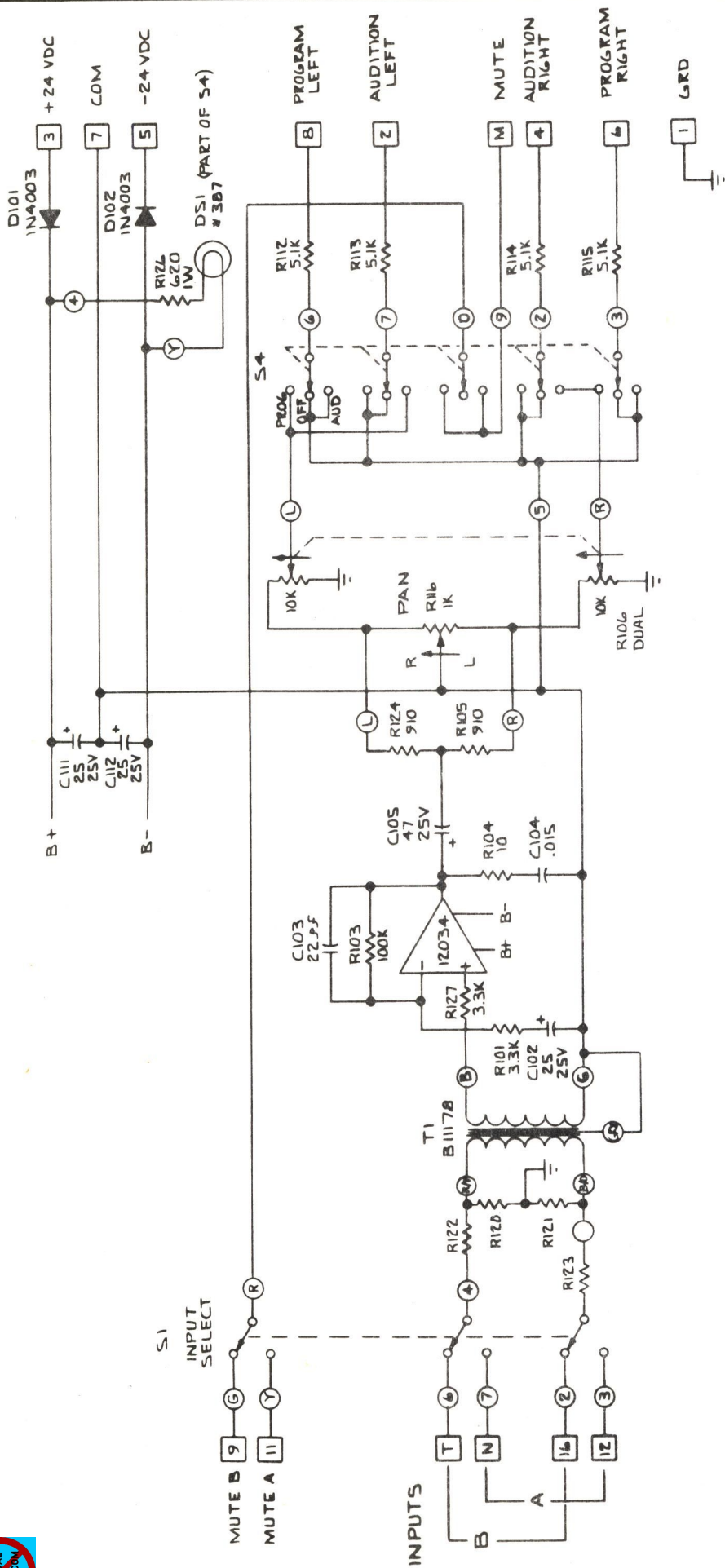
CHECKED
HCREL

APPROVED
B-12034

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2. CAPACITOR VALUES ARE IN MICROFARADS
1. RESISTOR VALUES ARE IN OHMS, $\pm 5\%$, 1/4W

NOTES:



6. REFERENCE P.C. BOARD ASSEMBLY D12059-2 AND MODULE ASSEMBLY D12056

5. R101 THRU R123 ARE POSITIONS FOR INPUT PADDING

R106 R117 R120 R121 ARE NORMALLY OMITTED

R118 R119 R122 R123 ARE NORMALLY JUMPED

4. NUMBERS OR LETTERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS

3. NUMBERS OR LETTERS IN CIRCLES ARE WIRE TERMINATION POINTS ON P.C. BOARD

2. CAPACITOR VALUES ARE IN MICROFARADS

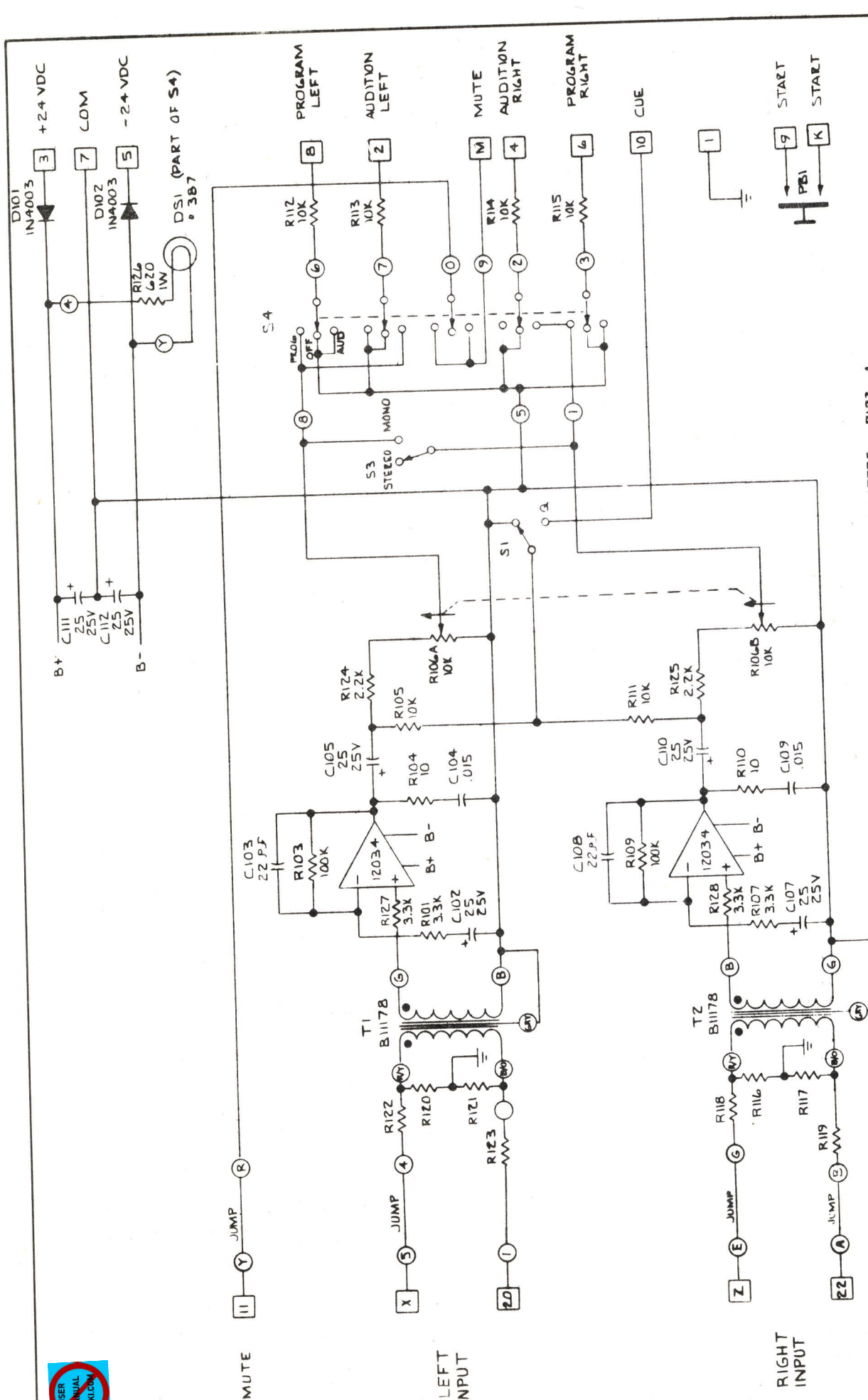
1. RESISTOR VALUES ARE IN OHMS, 15%, 1/4W

NOTES:

A ADDED R127
PER EO 0082
REVISION 7-30-74 L.E.

UNITED
RECORDING
ELECTRONICS
INDUSTRIES
SCHEMATIC, MONO
MICROPHONE WITH
STEREO PANPOT

DATE 5-23-74
DEPARTMENT LOS ANGELES
CHECKED L.E.
ISSUED CALIFORNIA
C12040



JUMPERS - R123-1
A-B
4-5
E-G
R-Y

- 5. R116 THRU R123 ARE POSITIONS FOR INPUT PADDING
R116 R117 R120 R121 ARE NORMALLY OMITTED
R118 R119 R122 R123 ARE NORMALLY JUMPED
- 4. NUMBERS OR LETTERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS
- 3. NUMBERS OR LETTERS IN CIRCLES ARE WIRE TERMINATION POINTS ON P.C. BOARD
- 2. CAPACITOR VALUES ARE IN MICROFARADS
- 1. RESISTOR VALUES ARE IN OHMS, 1/4 W

NOTES:

UNITED
RECORDING
INDUSTRIES

SCHEMATIC
CARTRIDGE INPUT
MODULE

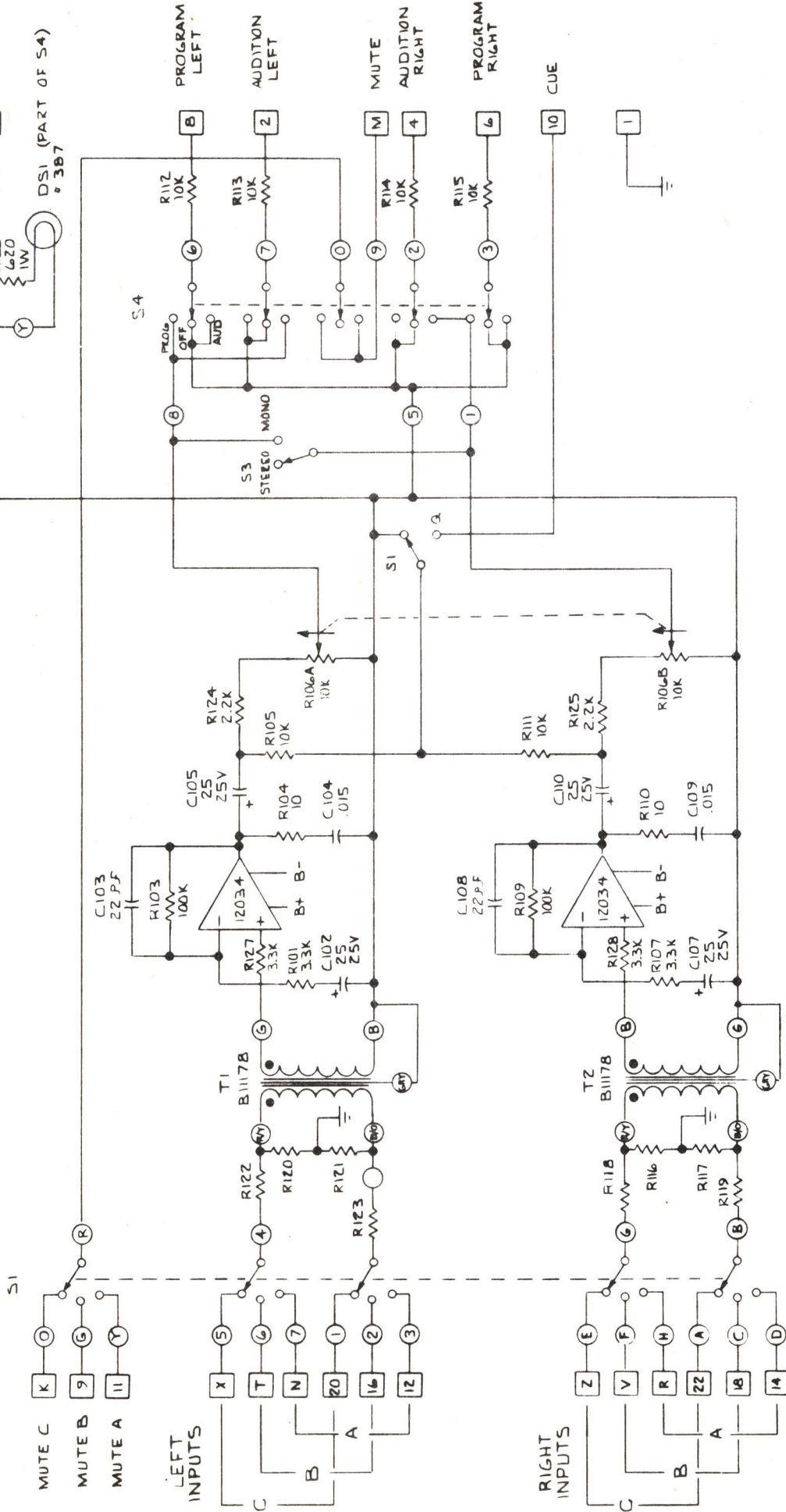
MOD-24120
DATE
6-5-74
DEPARTMENT
LOS ANGELES
CALIFORNIA

REVISIONS
7-30-74 L.E.

DATE
6-5-74
CHECKED
L.E.
C12042

A ADDED R122, R123
PER ED 0001

REVISED 7-30-74 L.E.



5. R116 THRU R123 ARE POSITIONS FOR INPUT PADDING.
R116 R117 R120 R121 ARE NORMALLY OMITTED
R118 R119 R122 R123 ARE NORMALLY JUMPED

- 4. NUMBERS OR LETTERS IN SQUARES ARE P.C. BOARD EDGE CONNECTOR PINS
- 3. NUMBERS OR LETTERS IN CIRCLES ARE WIRE TERMINATION POINTS ON P.C. BOARD
- 2. CAPACITOR VALUES ARE IN MICROFARADS
- 1. RESISTOR VALUES ARE IN OHMS, 5%, 1/4W

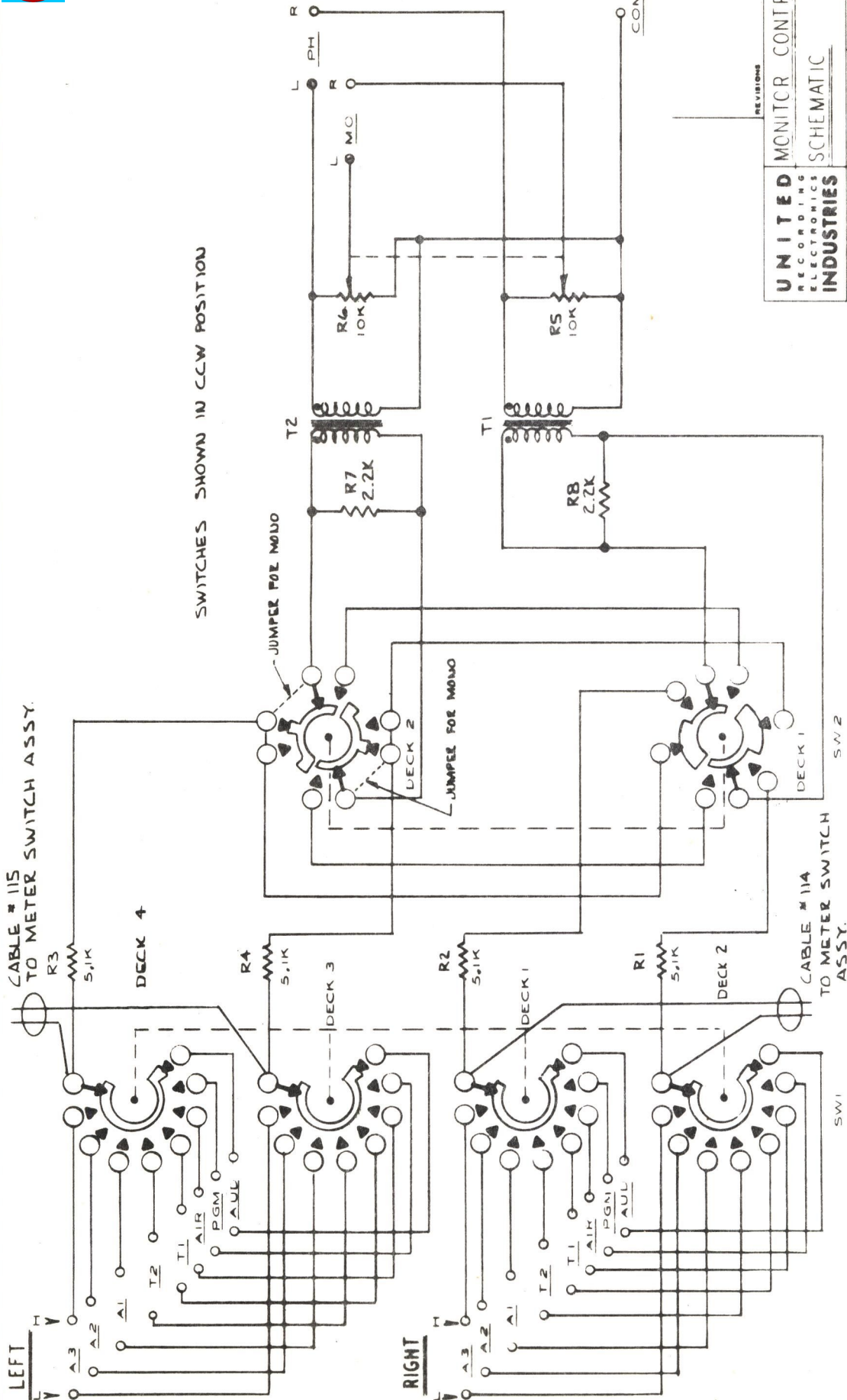
NOTES:

A ADDED R121 R128
PER ED 0082
REV. 11.008 7-30-74 LG

UNITED RECORDING
ELECTRONICS
INDUSTRIES
MOD-25320
MOD-15310
DATE 6-5-74
CHECKED L.E.
LOS ANGELES
CALIFORNIA
C12041 A

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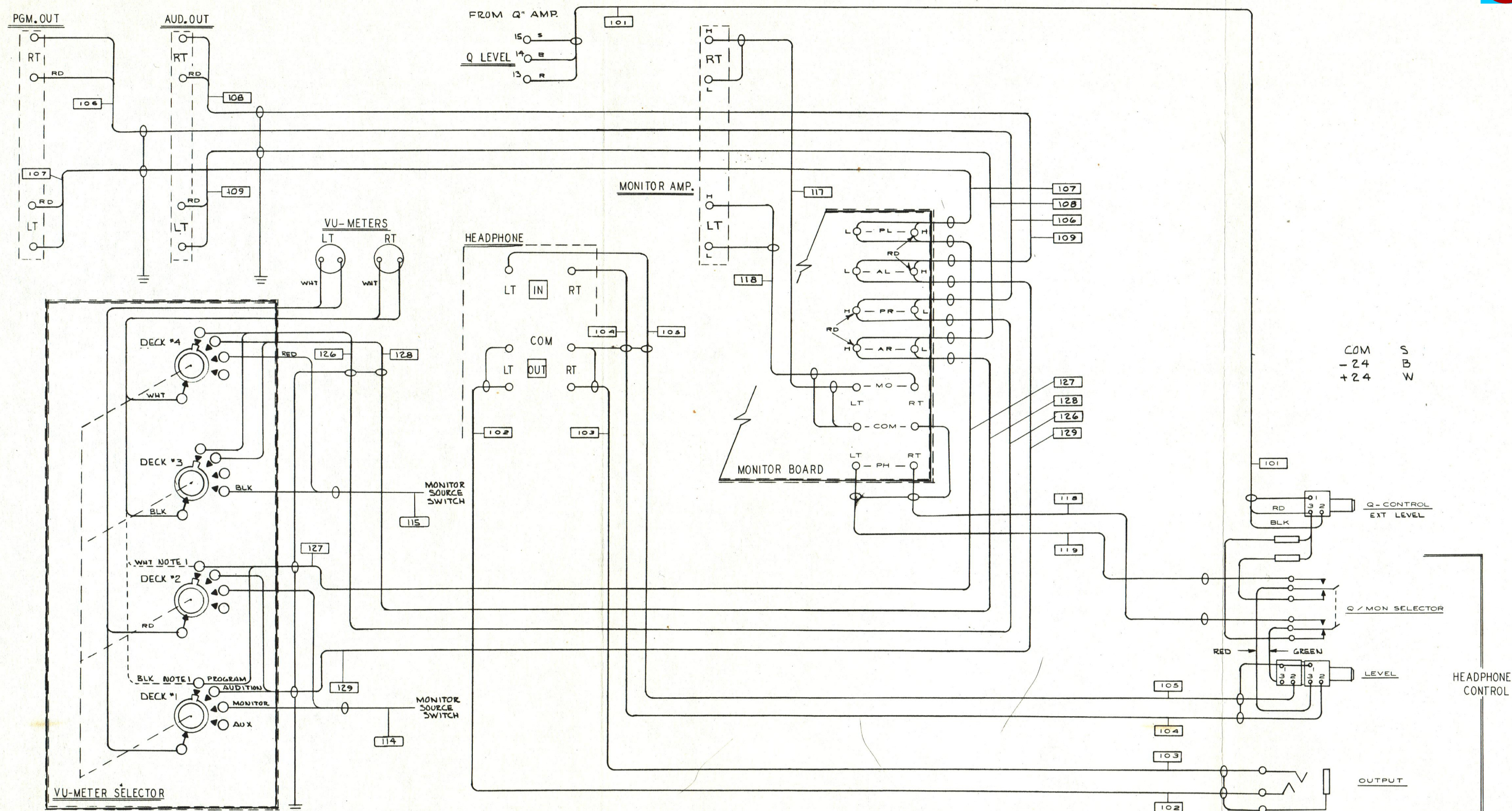
CABLE # 115
TO METER SWITCH ASSY.



3. REFERENCE THIS SCHEMATIC WITH P.L.B. ASSY 12054
2. ON MONO UNITS SW 2 AND T1 ARE NOT PRESENT
1. RESISTOR VALUES ARE IN OHMS $\pm 5\%$ $\frac{1}{4}W$

NOTES:

UNITED RECORDING ELECTRONICS INDUSTRIES	MONITOR CONTROL SCHEMATIC	DATE 8 JUL 73	CHECKED HCREL <i>WJZ</i>	APPROVED B-12055
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NOTE

1. FOR MONO CONSOLES REMOVE WHITE WIRE FROM WIPER OF VU SWITCH DECK 4 AND CONNECT TO NO.1 POSITION OF DECK 2. REMOVE BLK WIRE FROM WIPER OF DECK 3 AND CONNECT TO NO.1 POSITION OF DECK 1.

UNITED RECORDING ELECTRONICS INDUSTRIES		WIRING - DIAGRAM MOD-ONE (STAND CONF)	
DEPARTMENT	LOS ANGELES CALIFORNIA	DATE	16 JULY 73
CHECKED	HCREL	APPROVED	D-12062