

MR-II, MR-III and MR-IV

Service Manual



**MICMIX AUDIO
PRODUCTS, INC.**

9990 Monroe Drive — Suite 222 Dallas, Texas 75220

U. S. A.

Forward

If any damage to the shipping container is apparent upon receipt, the delivering driver should be requested to note such damage on all copies of the freight bill. This is for your protection should the material inside be damaged.

The equipment should be unpacked immediately, examined for damage, and tested. If it fails to operate properly, or is damaged in any way, a claim should be filed within forty-eight hours after receipt, if possible, or during a period not to exceed fifteen days.

While it is extremely remote, the possibility exists that concealed damage may occur during the shipment and handling of a Master-Room by a carrier. If you have any doubts about the performance characteristics of your unit, the test described on the following page may be performed to determine if a Master-Room is operating properly.

A full report of such damage should be obtained from the claim investigator, who will call upon you. For the purpose of this report, the shipping container and all packing materials should be retained for the investigator to examine.

The investigator's report should then be forwarded to:

MICMIX AUDIO PRODUCTS, INC.

9990 MONROE DRIVE, SUITE 222 • DALLAS, TEXAS 75220

Include model number and serial number when referring to the Master-Room for any reason.

Arrangements for repair or replacement will be made and you will be advised regarding the disposition of the equipment.

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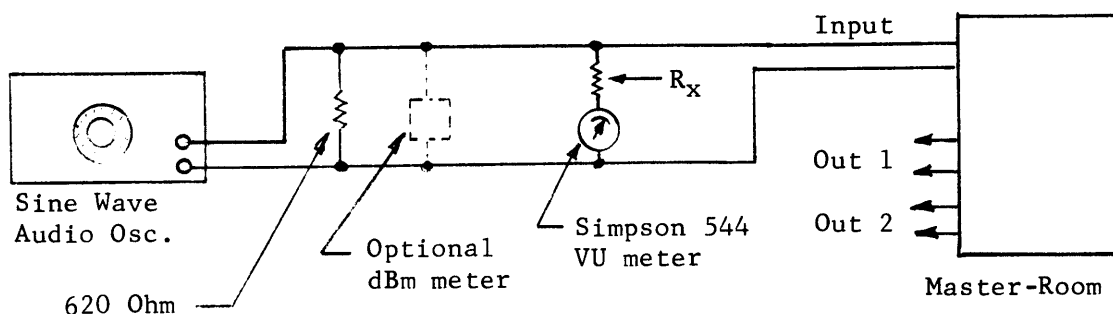
Operational Test

Equipment required for the test:

- a) A continuously variable sine wave audio oscillator capable of at least 10 volts rms across a 600 ohm load (or coupled through an amplifier which will produce that amount of output).
- b) A Simpson Model 544 meter (or a dBm meter).
- c) A 620 ohm, $\frac{1}{2}$ watt resistor.
- d) A $\frac{1}{2}$ watt resistor (R_x) of the value shown below to match the input level of your Master-Room. Determine the input level from the nameplate.

<u>Input Level*</u>	<u>R_x</u>
+4	20K ohms
-15	- 0 -

Connect the equipment to the Master-Room input as shown below. Connect each Master-Room output to an amplifier or to the echo return of your console and monitor the audio output.



Set the oscillator for 500 Hz sine wave and adjust the output level upward until the Master-Room begins to overload and has audible break-up in the monitored output. This should be at approximately +2 on the VU meter when the meter is connected in series with R_x as shown (or approximately +18 on the dBm meter).

Reduce the oscillator output by approximately 2 VU (or 2 dB) or until it is just below the break-up threshold. Slowly vary the oscillator frequency downward to 50 Hz. If any significant metallic sound is heard from the Master-Room output, concealed damage may have occurred during transportation.

*For -0- or +6 dBm levels, use values given for +4 dBm

Specifications

ALL MODELS

Input Impedance	10K Ohms*			
Output Impedances	150 Ohms*			
Input Level	(0 VU) +4 dBm**			
Output Level	(0 VU) +4 dBm**			
Saturation Level	(Peak) +18 dBm			
Noise	-66 dB			
Acoustic Susceptibility	120 dB SPL			
Base Dimensions	5 3/4 x 9 3/4 in.			
MODEL MR-	II	III	IV	
Equiv. Room Volume	4	200	750	KFt ³
Decay Time (Nominal)	2	5	7	Sec
Height	38	47	57	in.
Weight	22	25	29	lb.
Power	105-125 volts, 50/60 Hz or 210-250 volts, 50/60 Hz			

*Standard (unbalanced). Options include 600 ohm balanced outputs with either 600 ohm or 5K ohm balanced inputs.

**Standard. Unbalanced input level options from -15 dBm to +6 dBm. Balanced input level options from -0- dBm to +6 dBm.

Operation

INTRODUCTION

Your MICMIX Master-Room is a reverberant field synthesizer which provides the acoustical equivalent of a well-balanced room or auditorium. The Brilliance control allows adjustment of the Master-Room's 'character' to best fit the type of sound being produced.

Constructed of the finest in materials and craftsmanship, your Master-Room does not require any special set-up or adjustment at the time of installation, nor should it require any in the future, under normal usage.

WARRANTY

Your Master-Room is covered by the enclosed standard MICMIX warranty. Validate your warranty by filling out the Warranty Registration Card and mailing it within ten (10) days after receipt of your Master-Room.

INSTALLATION

Although the MICMIX Master-Room will withstand high external sound levels without acoustic feedback, it should be located in a separate area if monitor loudspeakers are operated at very high levels when the Master-Room is in use.

The Master-Room may be placed on any surface, but optimum operation will result if a cushioning pad is placed between it and a hard floor to eliminate transfer of structural vibrations in the building.

INPUT IMPEDANCE

A 10K ohm (bridging) input indicates that the input may be connected across any low-impedance source of 600 ohms or less with practically no effect on the normal load of that source. For optimum operation, it should not be connected across a non-loaded output (use a resistor load if necessary). The 10K bridging input is an unbalanced type, having one side at ground potential. It may therefore be necessary to reverse the polarity of the cable connections at one end if one of the source terminals is also grounded. The 10K type input is not intended for use with long cables which may cause hum pickup.

A 600-ohm (balanced) transformer input unit is designed for exclusive connection to a 600-ohm source and is intended primarily for applications where the Master-Room must be located more than 25 feet (cable length) from the source.

OUTPUT IMPEDANCE

Outputs marked as 150 ohms are the unbalanced type and will drive any termination having an impedance of 500 ohms or greater at the level specified. Polarity of the cable connections may require a reversal at one end if one side of the termination is also grounded.

The 600-ohm output units are a balanced transformer drive and are intended for longer cable length requirements.

A 10K/150-ohm unit is factory convertible into a 600/600-ohm unit at any time.

SIGNAL LEVELS

Levels for input and outputs are specified on the nameplate. Exceeding these levels will reduce allowable headroom and may cause distortion on peak signals.

Input and output design levels are factory changeable if required at some future date.

BRILLIANCE CONTROL

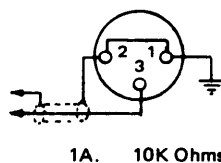
The Brilliance control permits adjustment of the 'character' of the Master-Room to best fit the type of sound being produced. The control may be rotated between the equivalent of a very 'bright' room and one with a relatively 'heavy' response characteristic.

EQUALIZATION

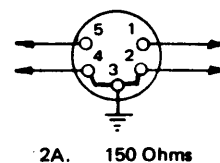
Any EQ must be added at the output of the Master-Room, not at the input.

CONNECTIONS

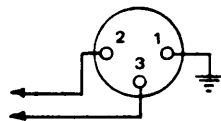
Mating connectors are supplied. Terminate wires to the connectors as shown in Figures 1 & 2 for the specified input/output impedances of the unit.



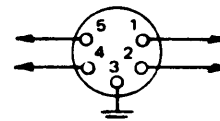
1A. 10K Ohms



2A. 150 Ohms



1B. 600 Ohms



2B. 600 Ohms

Fig. 1 — Input

Fig. 2 — Outputs

Circuit

Input stage for the Master-Room consists of Q3, an operational amplifier, which drives Q7 and Q8. Resistor R9 establishes the input sensitivity level for optimum operation, and may vary between 27K ohms (for -15 dBm input level) to 1000 ohms (+4 dBm input level). While a Master-Room will operate at a input level which does not match the value of R9, undesirable hiss or distortion may result. R5 determines the high frequency roll-off characteristics and is varied between models in the Master-Room series to balance response curves of the different units. Q7 and Q8 form the driver stage for the sound columns and resistors R19 and R20 establish their quiescent currents to eliminate crossover distortion. Q7 and Q8, together with Q3, are mounted on a heatsink sub-chassis attached to the printed circuit board.

Two sound columns are used in a Master-Room, each containing special delay lines and associated components for the particular series unit. In combination with the other electronic components on the printed circuit board, these columns function to provide a decaying echo pattern. Each sound column is hermetically sealed.

Q4 forms the preamplifier stage and is a high gain, low noise operational amplifier having equalization to establish low frequency response. Resistors R28 and R30 are varied between models in the Master-Room series to balance the low frequency characteristics. Resistors R29 and R31 establish system gain and balance between the two perspective-stereo channels. Nominal voltage gain of this stage is 30 dB. The resistor matrix in the output of the preamplifier mixes the output signals in the two channels to provide a perspective stereo-pair signal. If a monaural output only type signal is desired, a jumper wire between locations GG and HH on the printed circuit board is suggested.

The output stage consists of Q5 and Q6 which are operational amplifiers having nominal gains of 20 dB. Resistors R46 and R48 limit the maximum output current and protect against accidental damage to the operational amplifiers due to accidental shorting of wires in the external cables to the unit.

Q1 is an integrated circuit voltage regulator and Q2 is the pass transistor forming a regulated power supply having current foldback to protect both the supply and its load. Resistor R50 establishes current limiting at approximately 300 milliamperes. Output voltage is set by the ratio of R1 and R2. R1 is adjusted by paralleling two resistors to obtain an output voltage between 28 volts minimum and 30 volts maximum.

CR7 is in units incorporating the MRT-1 power transformer to prevent excessive transient voltages on components.

Maintenance

CAUTION: Service of the Master-Room should not be performed without proper test equipment.

To dis-assemble a Master-Room, first un-plug the power cord from the power source. Remove the (4) screws and washers located on the lower sides of the case and lift the case vertically off of the base and chassis.

Facing the front of the chassis, the right hand chassis cover may be removed to expose the printed circuit board components which are mounted on the left hand chassis cover. If the unit includes the 600-ohm option, the transformers are mounted on the right hand cover.

WARNING: High voltage (power line) is present inside chassis. Un-plug the power cord before removing either chassis cover.

To service the components on the printed circuit board, first remove the Brilliance control knob and retaining nut. Remove the right hand chassis cover. Un-plug the (4) connectors (non-twist, straight pull) at the Sound Columns. Remove the (6) screws holding the left hand chassis cover to the chassis. The printed circuit board/cover assembly is now accessible for service.

CAUTION: The Sound Column cable connectors should be insulated with tape or other means to prevent accidental shorting during servicing. Shorting of connector pins to ground will cause catastrophic failure of Q3, Q7, and Q8 when the unit is powered.

The unit may be powered with the printed circuit board assembly exposed. Care must be taken to avoid contact with high voltage areas. All DC Test Point voltages may be verified with the Sound Columns disconnected. The cables must be re-connected to the Sound Columns before verifying any AC Test Point voltages.

With the printed circuit board/cover removed from the chassis, the Sound Columns may be removed from the chassis. Remove (4) nuts from the studs on each Sound Column. There are no field-serviceable components inside a Sound Column. Each column is hermetically sealed and all repairs are performed at the factory only. Contact the nearest MICMIX dealer/or the factory regarding replacement of Sound Columns.

The Master-Room is reassembled by reversing the order of disassembly. The connectors to the Sound Columns are installed with the 3-prong connectors toward the rear of the unit and the 4 prong toward the front. The small screw in the cable connector body will normally be toward the right-hand front corner of the Master-Room chassis.

Before installing the case over the chassis and Sound Columns, remove the two foam pads inside the case. Place one pad over each of the Sound Columns and lower the case over the unit. With pressure on the top of the case to compress the pads, install the four side screws.

CAUTION: Do not over-tighten the screws.

Testing

The printed circuit (PC) board of the Master-Room contains eight marked test points (TP-1 through TP-8) and TP-9, the collectors of Q7 and Q8. TP-1 is the negative side of the power supply and provides the reference point for all other test point information.

TP-2, TP-3 and TP-8 are DC-only test points. TP-4 through TP-7 are both DC and AC test points, and TP-9 is an AC-only test point. The DC tests alone usually provide complete trouble-shooting information while AC test are required only for adjustments following replacement of a component.

DC Tests

TP-2 is a check-point for rectifiers CR1 through CR4 and filter capacitor C1. Voltage at TP-2 should be approximately 40 volts DC and ripple should not exceed 150 millivolts.

Master-Room DC current requirements are approximately 35 ma from rectifiers CR1 through CR4, or 30 ma when measured from EE to FF on the PC board (substituting a milliamperemeter for the existing jumper wire).

TP-3 is the emitter of power supply pass transistor Q2 and permits a check on operation of both Q1 and Q2. Voltage at TP-3 should be +28 to +30 volts DC.

TP-4 and TP-5 provide a check-point on the operation of Q4 and voltage at each of these test points should be one-half of the voltage measured at TP-3 (+14 to +15 volts DC). TP-6 and TP-7 provide a check-point on the operation of Q5 and Q6, respectively. Voltage at each of these two test points should also be one-half of the voltage measured at TP-3.

TP-8 provides a check-point on the operation of the integrated circuit Q3 and transistors Q7 and Q8 located on the heatsink above the PC board. Voltage at TP-8 should be +14 to +15 VDC.

Adjustments

For optimum performance, only genuine MICMIX parts should be used for replacement purposes. All integrated circuits and transistors are factory selected from standard devices for special performance parameters. A non-selected standard device may not provide satisfactory performance in the Master-Room.

CAUTION: No adjustment of potentiometers on the PC board should be required unless a component on the PC board is replaced. Do NOT adjust potentiometers without proper test equipment.

R19 and R20 permit adjustment of the current drawn from the power supply and balancing of the current in each channel. Replacement of Q3, Q7, or Q8 or associated components may require re-adjustment of R19 and R20. These potentiometers are adjusted such that the total current from EE to FF on the PC board (remove jumper and insert milli-ampere meter) is 30 ma.

CAUTION: The wiper orientation on potentiometers R19 and R20 must be approximately the same. Use insulated screwdriver for this adjustment.

R-29 and R31 are used to adjust the two outputs of the Master-Room for level and balance. Apply a pink noise source* to the input (do NOT use a sine or square wave) at the input level specified on the nameplate.

Note: Occasionally units are modified to the field for a different input level without changing the nameplate information. If in doubt, resistor R9 on the PC board may be examined to determine the input level.

<u>R9 value (ohms)</u>			
<u>Model</u>	<u>+4 Input</u>	<u>+6 Input</u>	<u>-15 Input</u>
MR-II	1,000	820	27K
MR-III	1,000	820	27K
MR-IV	1,800	1,500	**

* General Radio Model 1382 or equivalent

** Not manufactured in this version.

If the input impedance is 10K bridging, load the pink noise source with a 620 ohm resistor and set at +4 dBm. Connect a 1000 ohm resistor across each of the two Master-Room output terminals (to ground) and measure each output independently using a vacuum tube voltmeter (VTVM) or a dBm meter. Adjust R29 for the output of Channel 1 and adjust R31 for the output of Channel 2. Set each output for a reading of zero dBm (0.8 volts AC).

Note: Pin 1 of the output connector is Channel 1, pin 2 is Channel 1 return. Pin 5 of the output connector is Channel 2, and pin 4 is Channel 2 return. If the outputs are not the 600-ohm balanced option, pins 2 & 4 are connected in common to ground.

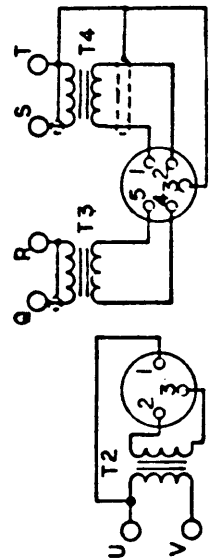
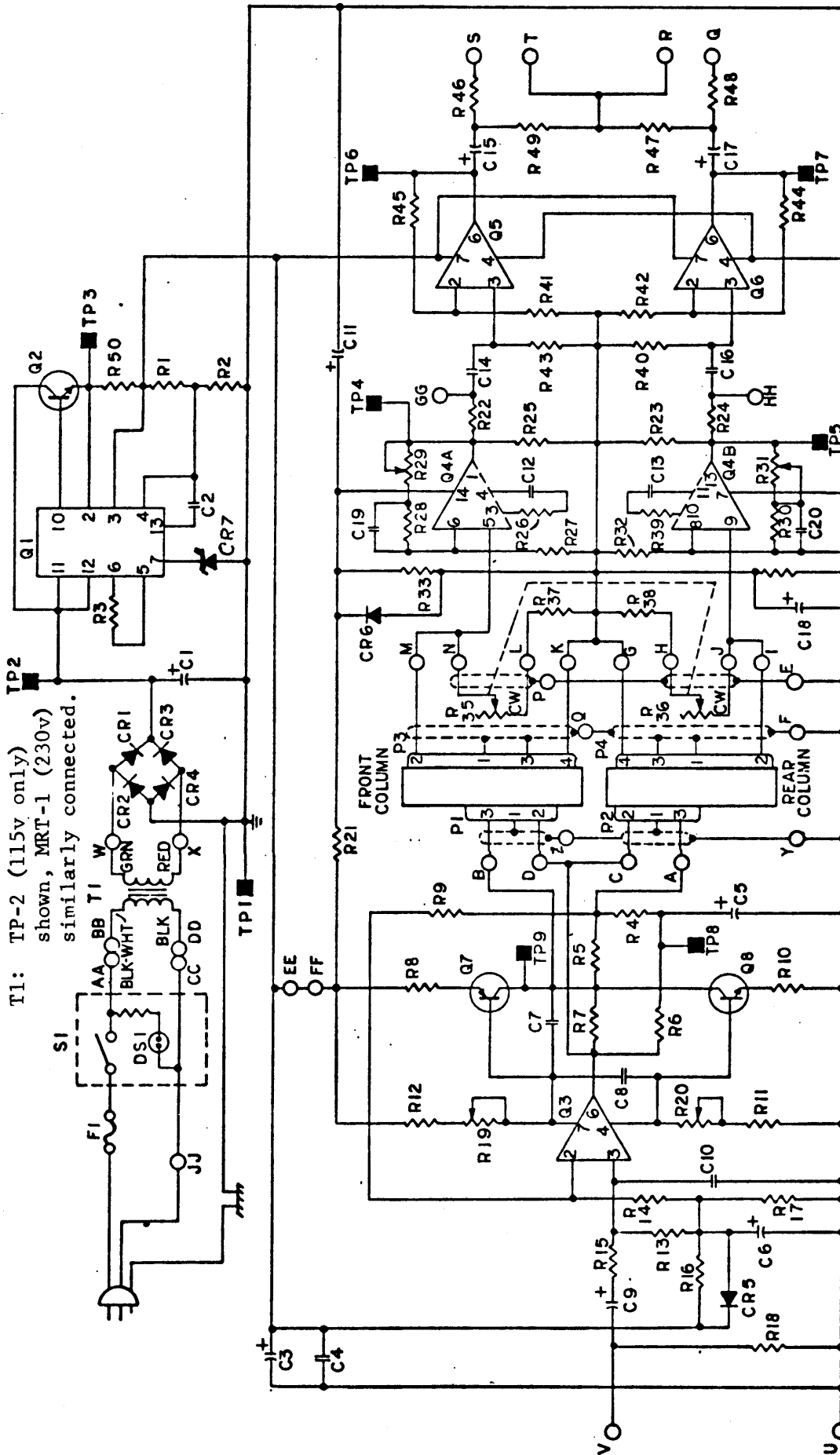
Pin 3 of the input connector is high and pin 2 is low (or ground on non-600-ohm option units).

This completes adjustment of the Master-Room. The following test point measurements are furnished for information in the event of difficulty. With a pink noise input as described above, the AC voltages listed below should be present at the specified test points:

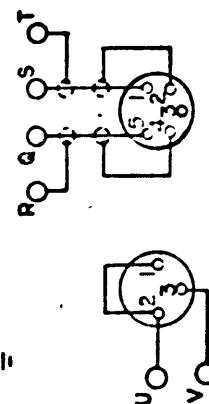
TP-4 and TP-5	0.12 V	(nominal)
TP-6 and TP-7	0.88 V	(nominal)
TP-9	5.20 V	(nominal)*

*This measurement must be made with a wide-bandwidth VTVM or dBm meter.

T1: TP-2 (115v only)
shown, MRT-1 (230v)
similarly connected.



J5 INPUT
BALANCED 600 OHM (OPT)



J5 INPUT
UNBALANCED (STD)

SCHEMATIC
MASTER - ROOM



Parts List

CAUTION: For optimum performance, only genuine MICMIX parts should be used for replacement purposes. All integrated circuits and transistors are factory selected from standard devices for special performance parameters. A non-selected standard device may not provide satisfactory performance in the Master-Room and may cause additional circuit or Sound Column damage. Unauthorized repairs or use of non-MICMIX replacement parts in such instances may void the warranty.

Capacitors

C1	1100uf, 50v
C2	.0056uf, 100v
C3, C11	50 uf, 50v
C4	.02uf, 50v
C5	200uf, 25v
C6, C18	100uf, 25v
C7	200pf, 50v
C8, C14, C16	.1uf, 100v
C9	2uf, 25v
C10	.0033uf, 100v
C12, C13	.047uf, 100v
C15, C17	35uf, 25v
C19, C20	.0068uf, 100v

Diodes

CR-1 thru CR-6	1N4001
CR-7	1N961A

Resistors (Ohms, K = 1000)

R1, R18	27K
R2	6800
R3	47
R4, R8, R10	4.7*
R5	220 (II), 330 (III), 470 (IV)
R6	220
R7, R14	2200
R9	See text
R11, R12	Jmpr
R13	3300
R15, R22, R24, 10K	
R37, R38, R47, R49	
R16, R17, R33, 4700	
R49	
R19, R20	500 (potentiometer)
R21	100*
R23, R25, R44, 20K	
R45	
R26, R39	10
R27, R32, R41, 2000	
R42	
R29, R31	100K (potentiometer)
R28, R30	27K (II), 18K (III), 1200 (IV)
R46, R48	150
All $\frac{1}{4}$ -watt, 5% except (*) $\frac{1}{2}$ -watt	

Transistors & Integrated Circuits

Q1	MR723
Q2	MR4910
Q3, Q5, Q6	MR741
Q4	MR739
Q7	MR4898
Q8	MR4910A

Transformers

T1 (115v, 50/60 Hz)	TP-2 or MRT-1
(230v, 50/60 Hz)	MRT-1

Switches

S1	MRS-1
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Fuses

F1	(115v) Type AGC-1/4
	(230v) Type AGC-1/8

WARRANTY

MICMIX Audio Products, Inc. (hereinafter referred to as 'MICMIX') warrants to the original Purchaser that all new equipment manufactured by MICMIX for delivery hereunder shall conform to the published specifications and shall be free from defects in material, workmanship, and title.

THE FOREGOING WARRANTY IS EXCLUSIVE OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL, OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE.

The Warranty period is as follows: sealed transducer assemblies (sound columns) — five years; printed circuit assemblies containing both active and passive components — two years; all other items except fuses, pilot lamps, and non-rechargeable batteries which are warranted to be operable on arrival — 90 days. The warranty period shall commence upon date of shipment from the factory.

If Purchaser notifies MICMIX during the warranty period of a defect under this warranty, MICMIX will correct any defect by (at its option) either repairing any defective part or making a repaired or replacement part available at MICMIX's factory.

Purchaser shall promptly advise MICMIX of such defect and, upon obtaining prior authorization of MICMIX, ship the defective equipment to MICMIX. Purchaser shall bear all expenses incurred in shipping such equipment to MICMIX and MICMIX shall bear the expense of shipping the repaired or replaced equipment to Purchaser, within the continental United States, unless such equipment was not defective, in which case the Purchaser shall bear all reasonable expenses incurred in inspecting, testing, and returning the equipment. Purchaser shall bear the risk of loss or damage during transit.

A service handling charge of ten dollars (\$10.00) and any applicable freight costs will be billed Purchaser for each item returned as defective or inoperable that is instead found to be in good working order and in conformance with published specifications.

Unless specifically noted otherwise in writing, return of equipment constitutes the Purchaser's authorization for MICMIX to repair equipment and to invoice Purchaser for any and all reasonable cost of repair labor, parts, and freight on items not covered by the terms of the warranty. Such authorization includes charges for handling of returned goods not found defective.

MICMIX shall not be obligated to repair or replace equipment rendered defective, in whole or in part, by causes external to the equipment such as, but not limited to, catastrophe, power failure or transients, overvoltage on interface, environmental extremes, and improper use, maintenance, or application of the equipment.

Equipment and accessory items not manufactured by MICMIX carry the standard warranty of the manufacturer thereof.

MICMIX's liability arising from the sale or use of the equipment, whether on warranty, contract, or negligence shall not exceed the cost of correcting such defects as provided herein and all such liabilities will terminate upon expiration of the warranty period or upon resale of the equipment by the original Purchaser, whichever comes first.

The foregoing constitutes Purchaser's sole and exclusive remedy for the furnishing of non-conforming or defective goods and MICMIX shall not in any event be liable for the cost of any labor expended on such goods or for any special, direct, indirect, or consequential damages by reason of the fact that such goods shall have been non-conforming or defective.

MICMIX Audio Products, Inc., 9990 Monroe Drive - Suite 222, Dallas, Texas 75220