INSTRUCTION MANUAL

Stereo "C" Series

MICMIX MASTER ROOM™

Standard and Equalized Models

MICMIX AUDIO PRODUCTS, INC.

INTRODUCTION

"C" Series Stereo Master-Room reverberation chambers are full two-channel models in which only the power supply is common to both channels. Equalized units differ from the standard "C" units only by the addition of equalization circuits and deletion of the remote control unit.

Master-Room chambers incorporate a built-in delay prior to the first 'echo' return and therefore do not require an additional delay device in front of them (although one may be used if desired). The amount of delay is primarily a function of the Sound Column employed, with a "-2" type providing approximately 15 milliseconds delay and a "-3" providing about 30 milliseconds delay.

The Decay controls permit independent variation of the reverberation decay on each channel, with the basic decay time also being a function of the particular type Sound Columns utilized. A "-2" type is a nominal 2-second decay and the "-3" type is a nominal second decay, with the variation capability being from 1 - 3 seconds on the former and from 2 - 4 seconds on the latter.

Master-Room chambers do not require any special set-up or adjustment at the time of installation, nor should they require any in the future under normal use.

CAUTION: To avoid the possibility of damage, TRANSPORT SOUND COLUMNS IN A HORIZONTAL POSITION.

WARRANTY

Master-Room units are covered by the standard MICMIX limited warranty printed elsewhere in this brochure. Validate the warranty by filling out and mailing the Warranty Registration Card within 10 days of purchase.

INSTALLATION

CAUTION: Units operate on either 115 or 230 volts, 50-60 Hz power as selected by an internal switch. If operating on 230 volts, remove cover and verify proper voltage selection before installation. A 100 volt tap is provided on the transformer for 100/200 volt operation.

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

Sound Columns are furnished with brackets to fit any suitable location within approximately eight (8) feet of the electronics unit. If this is not possible, a low impedance connection is required between the columns and the electronics. If the low impedance connection option was not furnished by the factory on the original order, consult the Factory regarding field modifications. LZA Sound Column Line Amplifiers must be installed at the column when the low impedance connections are utilized.

NOTE: Sound Columns must be in a vertical position when operated.

While Sound Columns are relatively immune to external ambient sound, they are susceptible to mechanical vibration which may be induced by monitor loudspeakers into the structure to which the columns are attached, or by vibrations in the building. Such vibrations generally will not cause damage to the columns but undesired noise may be introduced into the system Where this may be a problem, the column brackets should be mounted to some type of vibration isolator.

Either Sound Column may be connected to either channel of the electronics unit.

INPUT/OUTPUT SIGNALS

Standard input impedance is 5K ohms balanced and standard output impedance is suitable for driving 600 ohm loads. (22 ohm source impedance). Balanced line terminations provide floating connections.

Unless otherwise ordered from the factory, input level is factory set for a +4 dBm nominal level with the DIRECT control fully clockwise and the REVERB control fully anti-clockwise. The nominal level is controlled by internal adjustment and

may be re-set in the field for input levels from -10 dBm to +8 dBm. The output level is not changeable and, if a lower level is required, an external attenuator pad must be utilized.

INPUT/OUTPUT CONNECTIONS

All input/output (and remote control on standard "C" models) are made through an 18-pin blade type connector on the rear of the chassis on rack-mount units.

The upper row of terminals is signal high, the center row is signal low and the bottom (horizontally oriented) row is earth ground.

REMOTE CONTROL OPERATION (Standard "C" Models)

Switches on the front panel select local or remote control of REVERB gain. The remote controls are d-c type and may be removed from the remote control box for panel mounting in a console. Cutting of the plastic box at the cable entry permits removal of the controls as a unit.

OPERATING CONTROLS

Each stereo channel operates independently and the information below applies to each. Certain controls, which are included only on particular models, are noted.

DIRECT - The DIRECT control attenuates the dry signal output of the unit from the maximum input level pre-set internally (normally +4 dBm). If, with the DIRECT control in the full clockwise position (and the REVERB control in the full anti-clockwise position), a 1000 Hz sine wave at normally applied level from the driving equipment causes the Master-Room output to differ from +4 dBm by more than 2 dB, the internal level adjustment should be reset (or the drive level to the unit adjusted accordingly). Refer to the Maintenance Section of this manual for internal adjustment information.

With the input level correctly set, the DIRECT control permits the Master-Room reverberation chamber to perform an internal mix of the selected amount of direct (dry) signal with the internally generated reverberant signal to provide a combined signal at the output in any desired combination.

With the DIRECT control turned fully anti-clockwise, only the selected amount of reverberant signal appears at the output for subsequent mixing on the audio console.

REVERB - The REVERB control sets the amount of internally generated reverberant signal produced at the output connector for a full nominal level input signal. On consoles having reverb send controls, the REVERB control on the Master-Room should be set at its full clockwise position and desired signal attenuation performed at the console controls.

DECAY - The DECAY control electronically varies the amount of decay in the reverberant signal. It may be set at any point between minimum and maximum, or adjusted as desired during a recording or performance to instantly vary the reverberation decay.

REMOTE CONTROL SWITCH - Remote control switching is provided only on Standard "C" units, along with the remote control unit as previously mentioned. The panel switches permit independent selection of either local (panel) control or remote control of the reverb gain function. If existing console reverb send/return controls are utilized, the panel switches should be in the LOCAL position and the REVERB controls set accordingly on the panel.

OVERLOAD INDICATORS - Indicators show peak level at the output of each channel.

EQUALIZATION - Equalization controls are provided only on the equalized version and affect only the reverberant signal. There is no EQ effect on the direct (dry) signal output of the Master-Room. Three types of equalization are provided: high shelf, low shelf and selective frequency peak boost. With the shelf controls in mid-position and the peak boost full anti-clockwise, the response is flat within its bandpass.

HIGH SHELF EQ - The HI SHELF control provides a 10 dB boost or cut at a frequency of 10 kHz.

LOW SHELF EQ - The LO SHELF control provides approximately 15 dB boost or cut at a frequency of 150 Hz.

PEAK SELECT EQ - Five frequencies are selectable for peak boost equalization: 1.5, 2.2, 3.4, 4.5 and 6.0 kHz.

PEAK BOOST - The PEAK BOOST control provides up to 10 dB of boost at the selected peak frequency.

STEREO/MONO SWITCH - The STEREO/MONO switch is provided on equalized models only and combines the left and right channel inputs through a summing resistor. Each out still contains a diffenential in the timing pattern. Output may be paralleled for complete mono operation.

FUSE - A fuse holder is located on the rear panel and fuse values are marked adjacent to it for either 115 or 230 volt operation. When changing from one operating voltage to another or when replacing the fuse, use only the values marked.

CIRCUITS

Except for the power supply section, the reference designators referred to below are the same for both the right and left channels. The wiring harness area is the separation point between the two channels. Reference designator prefixes (300 and 400) are omitted in the paragraphs below.

In the power supply section, Q1 is an integrated circuit voltage regulator and Q2 is the pass transistor, forming a regulated supply with current foldback to protect both the supply and the load. Output voltage is set by the ratio of R3:R4. R3 is adjusted by paralleling two resistors (if required) to obtain an output voltage between 29 volts minimum and 32 volts maximum. Q3 is a unity gain operational amplifier supplying current for the center tap voltage.

In the amplifiers, the Sound Column driver consists of opamp Q21 which drives transistors Q22 and Q23. Potentiometer R23 is a divider across the input signal and sets the drive level of Q21 as well as the maximum level for R41 (front panel DIRECT control). R23 is the vertical mount (blue) trimpot located on the main circuit board adjacent to the wiring harness.

The output circuit consists of Q41 and transistors Q42 and Q43. Potentiometer R41 mixes direct (dry) signal with the reverberant signal up to the maximum permitted by the setting of R23. Trimmers R32 and R49 establish the quiescent current in Q22 - Q23 and Q42 - Q43, to eliminate crossover distortion.

Reverb gain is controlled through Q81, an OTA whose voltage gain can be controlled from cutoff to a closed loop gain determined by the ratio of R81 and R84.

The control signal is a current which varies from zero to approximately 30 ua, as determined by the setting of R113, R114 and the signal generated by Q102 (which are the reverb gain and decay control circuits). The decay circuits are on separate circuit boards in the Standard "C" models, and are included on the equalization circuit board in the EQ models.

In the decay circuits, Q101/201 drives phase splitter Q102/202 whose output is rectified to modify the OTA gain control stage (Q81) and provides shorter or longer decay in accordance with the setting of the DECAY control.
The optional VU meter circuits (available on Standard "C" models) are, with the exception of the channel selector switch, mounted on one of the decay boards. Potentiometer R201 adjusts the meter for Zero VU relative to the desired output level and the selector switch is connected to the outputs of the two stereo channels.

A modified circuit is utilized when the low impedance (-LZA) Sound Column Line Amplifier option is employed (for cables more than eight (8) feet long) between the electronics unit and the Sound Columns. The circuit provides the phantom power for the line amplifier.

The following operational test may be performed to determine if any internal damage has occurred in the Master-Room Sound Columns. The test consists of driving the Master-Room at a very high level just below the overload point and slowly varying the driving oscillator frequency while aurally monitoring the output of the Master-Room.

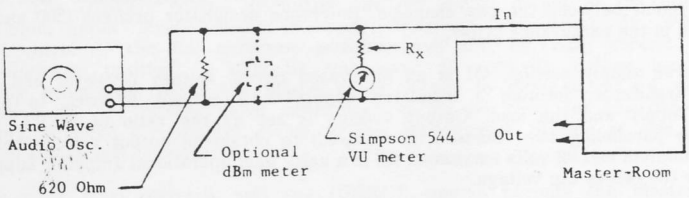
Equipment required for the test:

(a) A continuously variable sine wave audio oscillator capable of at least 10 volts rms into a 600 ohm load (or coupled through an amplifier to produce that amount of output).

(b) A Simpson Model 544 VU meter or a dBm meter.

(c) A 620 ohm, 1/2 watt resistor and a 20K ohm, 1/2 watt resistor if the VU meter is used.

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



This test applies to each channel individually on stereo units. Before starting the test:

(a) Turn the DIRECT control full anti-clockwise.
(b) Set the DECAY control in mid-position.
(c) Set the SHELF EQ controls in mid-position (Equalized Models).
(d) Turn the PEAK BOOST control full anti-clockwise (Equalized).
(e) Set the REVERB control full clockwise.

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 connected as shown (or approximately +18 on the dBm meter).

Reduce the oscillator by approximately 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.

NOTE: The above applies to units set for +4 dBm input. If the internal input control on the unit (refer to the Maintenance Section) has been set for a lower input lever, oscillator output will have to be reduced accordingly and the value of the 20K ohm resistor in the VU meter circuit will also change.

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 characteristics. A non-selected standard device will generally not provide satisfactory performance and may possibly cause additional circuit or Sound Column damage. Unauthorized repairs or use of non-MICMIX replacement parts in such instances may void the warranty. Integrated circuits and transistors of the same type number cannot be directly interchanged in the unit without affecting performance. Read the Maintenance Section of this manual before attempting any parts replacement.

RESISTORS (Ohms, 1/4 watt, 5% Unless Otherwise Noted)

No-Prefix Designators

R1	6800
R2	Jmpr
R3A	27K
R3B	24K
R4	15K
R5, 6	4700
R7	47
R8	75K
R9	3000 (LZA only)
R10	1000

Prefix 100 and 200

R1	2000
R2	10K trim
R3	1000
R4	20K
R5, 32	10K
R6, 7	910 (1/2 W)
R8, 9	3600
R10	3000 (1/2 W)
R11	3000
R12	470
R13	5K/10K pot.
R14	10K pot.
R21	620
R22, 23	750
R24	820
R25	1200
R26	2.5K pot.
R31, 33, 34	5100
R35	selected
R36, 37	50K pot.

Prefix 300 and 400

R23	10K trim
R24, 29, 47	2200
R25	3300
R26, 42, 53, 54, 88	10K
R27	12K
R28, 51	220
R30, 33, 44, 50	500 trim
R31, 48	47K
R32, 49	100K trim
R34, 35	4.7
R36	330 (1/2 W)
R37, 45, 52	10
R43	47K
R46	220
R81	selected
R82	120K
R83	1100
R84	100K
R85	27K
R86	not used
R87	220K
R89	330K

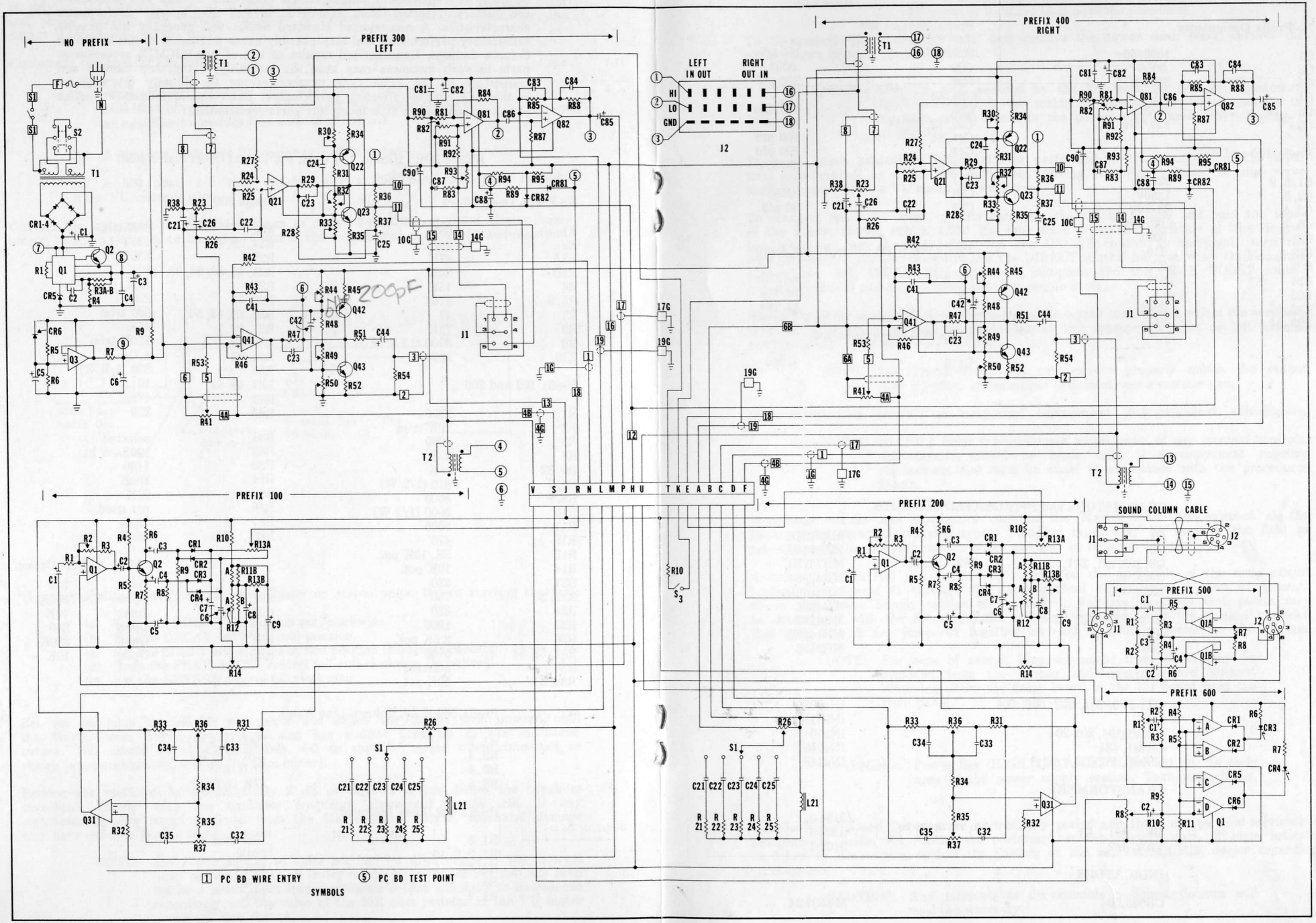
	STD	LZA Option
R90	Jmpr	240
R91	Open	560K
R92	Jmpr	10K
R93	Open	240
R94	Open	330K
R95	Open	10K

Prefix 500 (LZA Column Line Amp)

R1, 2	1000 (1/8 W)
R3, 4	10K (1/8 W)
R5, 6	47 (1/8 W)
R7, 8	47K (1/8 W)

Prefix 600 (Peak Indicator)

R1, 8	10K trim
R2, 3, 9, 10	220K
R4, 11	10K
R5	3300
R6, 7	1200



Equalized "C" Models

CAPACITORS (Mfd/100 Volt Unless Otherwise Noted)

No-Prefix Designators

C1	1000/50v
C2	.0056
C3	33/50v
C4	0.1
C5	22/35v
C6	100/25v

Prefix 100 and 200

C1, 8, 9	22/35v
C2, 5	1/50v
C3, 4	33/50v
C6, 7	100/25v
C21	.0082
C22	.015
C23	.022
C24	.047
C25	0.1
C32, 35	.0068
C33, 34	.01

Prefix 300 and 400

C21, 90	100/25v
C22	.0033
C23	200 pfd
C24, 86	0.1
C25	220/25v
C26, 42, 85, 88	1/50v
C41, 84	100 pfd
C43	390 pfd
C44, 82	33/50v
C81	.02
C83	.0056
C87	50 pfd

Prefix 500 (LZA Column Line Amp)

C1, 2	4.7/16v
C3	10/16v
C4	47/16v

Prefix 600 (Peak Indicator)

C1, 2	1/35v

TRANSISTORS and INTEGRATED CIRCUITS

Q1	MR723DC
Q2	MR4910A
Q3, 101,131, 201, 231, 321, 341, 382, 421, 441	MR741HC
Q322, 422	MR4898
Q323, 423	MR4910B
Q342, 442	MR4234
Q102, 202, 343, 443	MR4237
Q501	MR1458G
Q601	MR3403

DIODES

CR1-4, 6, 601, 602, 605, 606	IN4002G
CR5	IN961A
CR101-104, 201-204	IN270
CR381, 481	IN4148
CR382, 482 (LZA only)	IN4148

TRANSFORMERS

T1	3104-1
T301, 401	3103-1
T302, 402	3102-1

INDICATORS

CR603,604	MV53124

MAINTENANCE

CAUTION: Service of a Master-Room should not be performed without proper test equipment or by other than qualified personnel.

To dis-assemble the electronics unit, first remove the power cord. Next, remove the cover screws (front, back and bottom).

WARNING: With the unit powered by the line cord for test or adjustment, HIGH VOLTAGE (power mains) is present inside the chassis and on the main circuit board in the power supply area. Take necessary precautions.

The only minor adjustment which can be performed is the changing of the input level gain control to match the equipment driving the Master-Room. A sine wave oscillator and a dBm or VU meter are required.

To readjust the input level, operate only one channel at a time and feed the input of the Master-Room with a 1,000 Hz sine wave from the oscillator at the desired level, but not less than -10 dBm. Set the DECAY control at mid-point, turn the REVERB control full anti-clockwise and the DIRECT control full clockwise. On Equalized models, set both SHELF EQ controls at mid-point and the PEAK BOOST control full anti-clockwise and Stereo/Mono switch in stereo mode.

With a VU meter or equivalent connected across the output connections, adjust the vertically mounted (blue color) trimmer potentiometer of the appropriate right or left channel until the meter reads zero VU (+4 dBm).

NOTE: The Master-Room will not operate properly unless the output is at +4 dBm. If less output is desired, use a resistor pad.

Major maintenance consists of component replacement and attendant adjustments.

NOTE: DO NOT made indescriminate adjustments of any internal controls. Adjustments should be made only if a component requires replacement and must be made in accordance with the procedures herein.

Integrated circuits and transistors used in the Master-Room are selected at the factory from standard available types. Standard types may be used in the field as substitutes but overall performance of the unit may be reduced.

A total of fifteen (15) test points are marked on the underside of the main circuit board; Left channel #1 through #6, Right channel #1 through #6, and #7 through #9 on the Power Supply section of the board. Voltages at these test points may be determined with the Sound Column cables disconnected from the chassis, provided that pins 1 & 2 are jumpered together on each column connector on the chassis.

NOTE: For ease of access, the rack-mount front panel may be removed from the chassis and tilted forward without removing either the decay board or the EQ board from the front panel.

WARNING: Power line (HIGH VOLTAGE) is present on the main area of the power supply section. Take precautions.

Master-Room Sound Columns are hermetically sealed and there are no field-serviceable components inside. All repairs are performed at the Factory only. If tests indicate a defect in the column, contact the Factory or the nearest MICMIX dealer regarding replacement.

CAUTION: Any attempts to dis-assemble a Sound Column will void the warranty.

The circuit side of the main board is marked with the test points as previously mentioned. These markings correspond to the numbers below. Test points are also accessible from the component side of the board and may be located from the schematic. As a minimum, the following equipment is required to properly test and adjust a Master-Room.

A 50-volt, well-filtered, 100 ma DC power Supply
DC Voltmeter - 20k ohms/volt minimum
AC Voltmeter - high impedance VTVM)
Sine Wave Generator - minimum 10 volts rms into 600 ohms

All measurements are taken to earth ground unless otherwise noted. ALL CONTROLS must be in the positions previously stated for re-adjusting the input level.

For test under 115 or 230 AC power, the line voltage requirement is 110-120 or 220-240 volts (as selected), 50-60 Hz.

Test Point	Test	Nominal Reading	Limits Min	Limits Max	Notes
1	(a)	See Notes	+15.0	+16.0	DC voltage. Should be within ± 0.2 volts of test point (TP) #9.
1	(b)	2.0 VAC	1.8	2.2	Using 1 kHz sine wave input and generator set to provide +4 dBm at output of Master-Room.
2		See notes	+15.0	+16.0	Varies ± 0.1 volt as REVERB control is varied.
3		See notes	+15.0	+16.0	Should be within -0.2V of TP#9.
4		See notes	0	0.8	Varies with circuit parameters.
5		See notes	0	4.5	Varies with REVERB control.
6		See notes		-	Should be within ± 0.2V of TP #9.
7	(a)	+44 VDC	+42	+46	No load condition (no audio in).
7	(b)	+43 VDC	+41	+45	1 kHz sine wave as above.
8		+30 VDC	+30	+32	
9		+15 VDC	+15.0	+16.0	
10		+22.5 VDC	+22	+23	TP #10 located on EQ or on decay boards.

Two trimmer potentiometers (R32 and R49) are provided on each channel for quiescent current adjustment in their respective stages to eliminate cross-over distortion.

NOTE: Unless a transistor or the integrated circuit in these stages has been replaced, these potentiometers should not require any readjustment.

Adjustment of R32/R49 requires a 50 volt, well-filtered DC power supply having a 0 - 100 milliampere meter on the output.

DISCONNECT THE AC POWER CORD

Set the power supply for 40 ± 1 volts and the meter for 100 milliamperes full scale. Connect the negative lead of the power supply to chassis ground and the positive lead to either the cathode of CR3 or CR4, or to the collector (mounting hardware) of Q2 (location of test point TP #7). The steady state current with no audio input should be 90 to 92 ma for a Standard "C", and 94 to 96 ma for equalized models.

Remove Q21 from its socket. The power supply current should drop 8 ma. If it does not, adjust R32 such that removal and reinsertion of Q21 causes a change in current draw of 8 ma.

> CAUTION: Orient the tab on Q21 in accordance with the socket when reinserting. Turn power off when installing integrated circuits.

Remove Q41 from its socket. The power supply current should drop by 12 milliamperes. If it does not, adjust R49 such that removal and re-insertion of Q41 causes a change in current draw of 12 ma.

> CAUTION: Orient the tab on Q41 in accordance with the socket when re-inserting. Turn power off when installing integrated circuits.

TRANSISTOR or IC REPLACEMENT

Transistors and integrated circuits (IC's) used in the "C" Series Master-Room are selected from standard available types for particular performance parameters and cannot be interchanged indiscriminately. For optimum performance, replacements should be obtained from the factory.

In addition, some of the components in the "C" Series require special adjustments if they are replaced. The following information covers these adjustments.

The amplifiers formed by Q21, and Q23, and also by Q41, and Q43 are current sensitive and are dependent on the gain characteristics of the IC - transistor combination. Potentiometers R32 and R49 provide only a 15% adjustment in current drain, and compensation for large gain errors must be accomplished by adjusting resistor pairs R30/R33 and R44/R50 respectively.

For set-up, utilize the specified external power supply connections and voltage (40 + 1 volt). Remove Q21, Q41, Q81, Q82 and Q101 integrated circuits and Q102 transistor, Q101 and Q102 are located on the decay/equalization board. Before removal, mark each of these components for return to the same location.

The nominal gain of Q22, and Q43 is 35 to 75 10 ma. Other gains may be used provided the gains of each pair are closely matched, but gain values outside the range of 35 to 75 will require adjustments in the base circuits (R30/R33 or R44/R50). Using the external DC supply for power, determine that the voltages at TP #8 and TP #9 are correct. Quiescent current for the left channel (the channel adjacent to the power supply section) alone, should be 18 to 22 milliamperes when only Q22, Q23, Q42 and Q43

transistors are installed, plus an additional 4 to 6 milliamperes for the right channel section of the stereo unit with only the same Q22, Q23, Q42 and Q43 transistors installed on it.

NOTE: Remove Q101 and Q102 from the circuit of the second channel also, but leave decay/EQ board wired in to the main board. Add 4 ma for EQ.

Install Q21 and note the amount of current increase, which should be 8 ma. If a current change of 8 ma cannot be obtained by varying R32, as previously described, R30 and R33 must both be adjusted.

When replacing Q21 or associated components, it is possible that the current draw will be considerably more or less than the 8 milliampere requirement.

Repeat the above procedure for Q41, noting that the current change is 12 ma. The heatsinks (cooling fins) on Q42 and Q43 must be installed when making this test. Again, it may be necessary to substitute several integrated circuits for Q41, or to vary R44/R50 in order to obtain proper current draw for this stage.

With the addition of Q81, no change in current should be noted. The addition of Q82 should increase the current by 2 milliamperes.

The addition of Q101 should increase current draw by 2 ma, and the installation of Q102 should cause an additional 8 ma. of current draw.

Total current in the quiescent condition for the Main PC Board circuitry alone (with the EQ Board or the Decay Boards detached) should be 54 to 56 ma. Decay circuits add approximately 35 ma (Standard "C" Models) and the EQ Board approximately 40 ma. These values increase by 15 - 20 ma per channel under normal steady state output (1 kHz sine +4 dBm).

LIMITED WARRANTY

MICMIX Audio Products, Inc. warrants this product against defects in materials and workmanship under normal usage and service for a period of one year from date of delivery to the original purchaser.

Any defective product will be repaired, or replaced at our option, without charge if the product is returned transportation prepaid to the Factory Service Department at the address listed below. A packing slip should accompany all shipments and include the sender's name and address, date of purchase, and information describing any defect.

This warranty does not cover damages resulting from transportation, accident, alteration, misuse or abuse, incorrect wiring by others, or failure to follow operating instructions, nor does the warranty cover the cost of any inconveniece or any direct, indirect or consequential damage by reason of the fact that such product was non-conforming or defective.

The foregoing warranty is in lieu of all other warranties, expressed, written or implied, including any warranty of merchantability or fitness for purpose, and MICMIX Audio Products, Inc. neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its products.

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