

MUZAK®

MA-200 POWER AMPLIFIER

OPERATING INSTRUCTIONS



OPERATION

Controls and Indicators

A primary power ON-OFF switch and pilot indicator are located on the front panel. A VOLUME control with cover cap is located on the rear of the chassis.

High-Pass Filter

A two-section high-pass filter is provided to protect driver loudspeakers from excessive low-frequency power demands. Filter use is indicated when high power output from the amplifier is applied to driver loudspeakers not equipped with protective crossover networks. The 3 dB frequency of the high-pass filter is 500 Hz.

A FILTER IN-OUT switch is located on the rear of the chassis (see Figure 1). The switch is placed in the OUT position when the MA-200 is shipped from the factory. An adjustable lock plate, secured by a single screw, is used to lock the filter switch in either the IN or OUT position.

INSTALLATION

Rack Mounting

The MA-200 requires a vertical space of 10½" for installation in a standard 19-inch equipment rack. Remove four screws securing the front panel. Open and lower the panel. Install the MA-200 in the equipment rack with appropriate four screws supplied. Close and secure the front panel, using the four screws previously removed.

Ventilation

The MA-200 generates moderate heat during normal use. Although the amount of heat is relatively low, the amplifier must be ventilated to prevent an excessive temperature rise. Air flow must not be impeded above or below the heat sink at the rear of the chassis. The MA-200 should not be placed too close to other heat-generating equipment or in areas where ambient temperature exceeds 55°C (131°F).

If the MA-200 is mounted in an equipment rack or cabinet with other heat-producing equipment mounted above and/or below, space must be provided between the units to prevent excessive temperature rise. A perforated panel is recommended for this purpose.

When several amplifiers or other heat-producing units are installed in a single rack or cabinet, acceptable air temperature may be in doubt. To determine temperature conditions, operate the system until temperature stabilizes, then measure air temperature with a bulb-type thermometer held at the bottom of the uppermost amplifier. Do not allow the thermometer bulb to touch metal, because the metal may be hotter than the ambient air. If air temperature exceeds 55°C (131°F), the equipment should be spaced farther apart or a blower should be installed to ventilate the cabinet.

Adequate ventilation of the MA-200 will enhance optimum function throughout the life of the amplifier, and prevent degradation or failure of output transistors, etc., due to prolonged operation at excessive temperatures.

120 Volt, 50/60 Hz Power Connections

Equipment supplied for domestic use is provided with the power transformer primary strapped for 120 volts (terminals 1 to 2 and 3 to 4 on TB3). The power input rating is on the rear of the chassis adjacent to the power cord (see Figure 2). Verify that line voltage is in accordance with the voltage rating *before* connecting the MA-200 to line power.

240 Volt, 50/60 Hz Power Connections

Export equipment is provided with the power transformer primary strapped for 240 volts (terminals 2 to 3 on TB3). The power input rating is on the rear of the chassis adjacent to the power cord (see Figure 2).

For a MA-200 previously wired for 120V ac primary power, use the following procedure to change wiring for 240V 50/60 Hz operation:

1. Remove four screws securing front panel; open and lower panel.

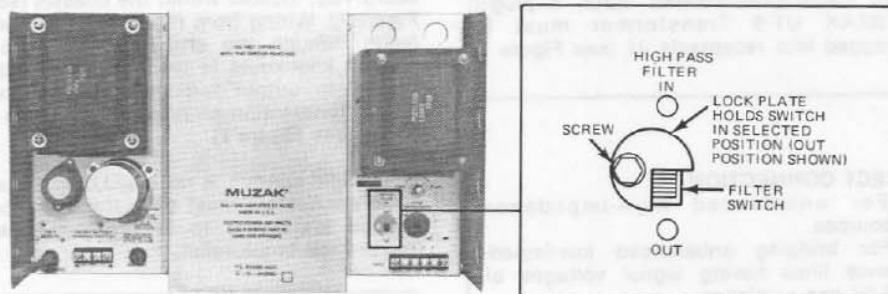


Figure 1. High-Pass Filter Switch

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Specifications and components subject to change without notice. Overall performance will be maintained or improved.

1000 Shames Drive, Westbury, New York 11590

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output wiring between knock-outs and TB2 does not exceed 9 inches in length. Strip 1/4" insulation from the wire ends and install the terminal clips. Twist stranded wire to assure that all strands properly enter the terminal clips. After male tabs of TB2. After wire connections are completed, check to assure the knurled clamp rings are securely tightened upon the connectors.

Speaker Power Distribution

The 25V and 70.7V output distribution system permits connections to a large number of speakers, each speaker to operate at a particular power level. Each speaker in the system is equipped with a transformer having a number of terminals rated in terms of power. Select the tap which designates the power desired for each particular speaker. The total power for all speakers combined should be equal to, or less than the rated power of the MA-200 (200 watts).

SERVICE AND MAINTENANCE INSTRUCTIONS

NOTICE

REPAIR PERFORMED BY OTHER THAN ALTEC FACTORY SERVICE SHALL VOID THE WARRANTY PERIOD OF THIS UNIT. TO AVOID LOSS OF WARRANTY, CALL ALTEC CUSTOMER SERVICE DIRECTLY AT (714) 774-2900, OR WRITE:

ALTEC Customer Service/Repair
1491 N. Main Street
Orange, California 92667

For factory service, ship the MA-200 prepaid to ALTEC Customer Service/Repair, 1491 N. Main Street, Orange, California 92667. For additional information or technical assistance, call (714) 774-2900 or Telex 65-5415.

CAUTION

Hazardous voltage may be encountered within the chassis. No user serviceable components inside. Refer to qualified service personnel.

Access

Remove four screws securing the front panel, then open and lower hinged panel for access to chassis interior.

Output Adjustment

Potentiometer R116 on the circuit board is factory adjusted for minimum distortion at 200 watts output at 1000 Hz. Should it

Output 'Q' Balance Adjustment

Output 'Q' Balance controls R135 and R136 on the circuit board are factory adjusted to balance the bias current of output transistors Q1 through Q8. Inadequate adjustment of these controls may result in distortion or excessive current drain from one or more output transistors. If adjustment is indicated (such as replacement of one or more output transistors), use the following recommended procedure:

1. Turn VOLUME control, located on chassis, fully counterclockwise to (0).
2. Remove four screws securing front panel, then lower panel for access to chassis interior.
3. Turn output 'Q' balance controls R135 and R136 fully counterclockwise.
4. Turn on power and allow a 5-minute warmup period for thermal stabilization.
5. Adjust R135 and R136 by one of the following methods. Method (a) is preferred.
 - a. Locate wire attached to terminal 1 of output transformer T2 (see schematic diagram). Connect a clamp-on dc milliammeter to this wire and adjust R135 for a 'Q' current of 65 mA. Change connection of milliammeter to wire attached to terminal 3 of output transformer T2 and adjust R136 for a 'Q' current of 65 mA. Remove clamp-on milliammeter.
 - b. Connect a dc millivoltmeter across resistor R9 (see schematic diagram), starting with the highest scale to protect meter. Adjust R135 for a meter reading of 10 mV dc. Change connection of dc millivoltmeter to read across resistor R10 and adjust R136 for meter reading of 10 mV dc. Remove millivoltmeter.

6. Close front panel and secure with four screws previously removed.

Fuses

and resealing fuse holder.

Pilot Lamp Replacement

The pilot lamp is located on the front panel. If replacement is required, unscrew the red pilot lamp shield to expose the bulb. Press the bulb inward and turn counterclockwise to remove. Install an identical bulb (see parts list) and the red pilot lamp shield.

Power Transistors

Power transistors Q1 through Q8 are installed on a heat sink, located beneath the heat sink shroud (see Figure 2). Turn off power to the amplifier before removing shroud.

CAUTION

DO NOT operate the MA-200 without the shroud in place or power transistors may overheat. The shroud is a vital requirement for adequate passage of air across the heat sink.

Remove four screws securing heat sink shroud to chassis; lift off shroud. Remove two screws which hold the heat sink assembly to standoff supports. The heat sink assembly (with power transistors) now may be lifted (unplugged) from the chassis.

When replacing or reinstalling power transistors on the heat sink, check that the following conditions are met:

1. Mica insulator is not damaged. If damaged, use new insulator.
2. No grit or metal particles are lodged between transistor and heat sink.
3. Both sides of mica insulator are covered with silicone grease or fluid.
4. Mounting screws of transistor are tight. Threads of transistor socket are not stripped.

Removal of Circuit Board

If the circuit board assembly must be removed for service, or for access beneath the board, remove the two screws securing the board to standoffs. Then carefully pull the circuit board assembly from the connector.

CAUTION

Do not warp, bend or twist the board, or conductor may fracture or lift from the board surface.

Table I. Connections and Strapping Requirements of TB2 for Rated Outputs to Speaker Systems

Output Voltage to Speaker System	Terminals of TB2 of MA-200	
	Speaker Connections	Strapping Requirements
25V	5 & 7	4 to 5; 6 to 7
70.7V	2 & 7	2 to 3; 6 to 7

PARTS LIST

MAIN CHASSIS

Reference Designator	Ordering Number	Name and Description
—	28-02-013526-01	Cap. Volume Control
—	24-04-100525-01	Knob, power, 3/4"
A1	27-01-042080-06	Circuit Board Assembly
C1	15-02-100087-01	Cap., 0.02 μ F $\pm$ 20%, 100V
C2	15-02-100307-01	Cap., 0.01 μ F $\pm$ 20%, 100V
C3	15-06-100157-01	Cap., 1 μ F $\pm$ 10%, 100V
C4	15-01-100284-01	Pap., 1000 μ F, 35V
C5	15-01-100299-02	Cap., 13500 μ F, 35V
CR1	48-01-107429-02	Stabistor, STB-568
CR2, 3	48-02-042787-01	Rect., silicon, 1A, 400 PIV
CR4	48-01-107271-01	Diode, Zener, 20V $\pm$ 5%, 2W
CR5	48-01-108576-02	Diode, Zener, 15V $\pm$ 5%, 2W
CR6, 7, 8, 9, 10	48-02-108690-01	Rect. 1N3492
F1	51-04-100469-01	Fuse, 4A, 125V, slo-blo
F2	51-04-121664-01	Fuse, 10A, 32V
PL1	39-03-100793-01	Lamp, DIALCO 95-9110-0931-102
Q1, 2, 3, 4, 5, 6, 7, 8	48-03-040934-05	Transistor, 2N6254, selected
R1	47-06-042509-01	Pot., 15K Ω $\pm$ 20%, audio
R2, 3	47-01-100635-01	Res., 22 Ω $\pm$ 10%, 1W
R4, 5, 7, 8, 9, 10	47-02-108691-01	Res., 0.3 Ω $\pm$ 10%, 5W
R6	47-01-100652-01	Res., 1.8K Ω $\pm$ 10%, 1W
R11, 12	47-02-108692-01	Res., 1 Ω $\pm$ 10%, 5W
R13	47-01-102551-01	Res., 470 Ω $\pm$ 10%, 1W
R14	47-02-100715-01	Res., 200 Ω $\pm$ 10%, 5W
R15	47-02-100713-01	Res., 47 Ω $\pm$ 10%, 5W
R16	47-01-102376-01	Res., 56K Ω $\pm$ 10%, 1/2W
R137, 138	47-01-102253-01	Res., 360 Ω $\pm$ 5%, 1/2W
S1	51-02-100992-01	Switch, DPST, rotary
S2	51-01-100988-05	Switch, DPDT
T1	56-08-007062-02	Transformer, power
T2	56-07-016802-02	Transformer, output
TB1, 2	21-04-121467-01	Terminal Board, 4-terminal
TB3	21-04-101013-02	Terminal Board, 5-terminal
TB4	21-04-121434-01	Terminal Board, 2-terminal

CIRCUIT BOARD ASSEMBLY

C101	15-01-100156-01	Cap., 1 μ F, 25V
C102	15-02-107470-01	Cap., 220 pF $\pm$ 10%, 100V
C103	15-02-107532-01	Cap., 330 pF $\pm$ 10%, 100V
C104, 105	15-01-108543-01	Cap., 5 μ F, 25V
C106, 107	15-06-102605-01	Cap., 0.47 μ F $\pm$ 10%, 100V
C108, 109	15-02-100305-01	Cap., 0.005 μ F $\pm$ 20%, 100V
C110, 111	15-02-100307-01	Cap., 0.01 μ F $\pm$ 10%, 100V
CR101, 102, 103, 104, 105, 106	48-01-107017-01	Diode, 1N456A
Q101, 103, 108, 109	48-03-101098-03	Transistor, 2N2712, selected
Q102	48-03-041440-02	Transistor, 2N3906, selected
Q104, 105	48-03-119140-02	Transistor, 2N5308, selected
Q106, 107	48-03-107447-03	Transistor, 2N5320, selected
R101	47-01-100479-01	Res., 680K Ω $\pm$ 10%, 1/4W
R102	47-01-102190-01	Res., 180K Ω $\pm$ 10%, 1/4W
R103, 106, 110	47-01-102171-01	Res., 4.7K Ω $\pm$ 10%, 1/4W
R104	47-01-102168-01	Res., 2.7K Ω $\pm$ 10%, 1/4W
R105	47-01-102167-01	Res., 2.2K Ω $\pm$ 10%, 1/4W
R107	47-01-100477-01	Res., 470K Ω $\pm$ 10%, 1/4W
R108, 109	47-01-102102-01	Res., 10K Ω $\pm$ 5%, 1/4W
R111, 112	47-01-102187-01	Res., 100K Ω $\pm$ 10%, 1/4W
R113	47-01-102105-01	Res., 13K Ω $\pm$ 5%, 1/4W
R114	47-01-102165-01	Res., 1.5K Ω $\pm$ 10%, 1/4W
R115, 117	47-01-102140-01	Res., 10 Ω $\pm$ 10%, 1/4W
R116, 135, 136	47-05-014697-01	Pot., 50 Ω $\pm$ 20%, 2W
R118, 199	47-01-102161-01	Res., 680 Ω $\pm$ 10%, 1/4W
R120, 123	47-01-100642-01	Res., 330 Ω $\pm$ 10%, 1W
R121, 122	47-01-102338-01	Res., 47 Ω $\pm$ 10%, 1/2W
R124	47-01-102147-01	Res., 47 Ω $\pm$ 10%, 1/4W
R125	47-01-102153-01	Res., 150 Ω $\pm$ 10%, 1/4W
R126, 127	47-01-102253-01	Res., 360 Ω $\pm$ 10%, 1/2W
R128	47-01-102148-01	Res., 56 Ω $\pm$ 10%, 1/4W
R129, 132	47-01-102081-01	Res., 1.3K Ω $\pm$ 5%, 1/4W
R130, 133	47-01-102174-01	Res., 8.2K Ω $\pm$ 10%, 1/4W
R131, 134	47-01-102177-01	Res., 15K Ω $\pm$ 10%, 1/4W
T101	56-07-015315-09	Transformer, output