SHURE
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TWX: 910-231-0048 TELEX: 72-4349
MICROPHONES AND ELECTRONIC COMPONENTS

DATA SHEET

MODELS M64 AND M64-2E STEREO PREAMPLIFIERS

GENERAL

The Shure Models M64 and M64-2E Stereo Preamplifiers are designed to furnish the voltage gain and equalization necessary to operate magnetic phono cartridges (such as the Shure DYNETIC® Cartridges), and tape playback heads with audio amplifiers that have no equalization. In addition, the units may be used without equalization for microphones or as buffer amplifiers.

Typical Applications:

- Conversion of stereo record playing systems from ceramic to magnetic cartridges.
- Preamplifier for microphones.
- Low gain buffer amplifier where long cable lengths are extended to a preamplifier input.

Advantages include complete freedom from microphonics, extremely low noise, the ability to use 15m (50 ft) or more of output cable, and years of maintenance-free performance. The operating temperature range is from 7°C (20°F) to 57°C (135°F).

The Model M64 operates on 108-132 volts, 50/60 Hz power line, or from an auxiliary 24 to 36 volt dc supply such as the Shure Model A67B Battery Power Supply. The M64-2E is identical to the M64 except that it operates on a line voltage of 216-264 volts, 50/60 Hz.

The Model M64 and M64-2E feature a single 3-position slide switch for selecting equalization for Phono, Tape, or Flat. The Phono position provides the Standard RIAA Equalization for phono records. The Tape position provides the Standard 7½ IPS NAB Equalization for tape, and the Flat position provides a flat amplifier for microphones or as a buffer amplifier for magnetic phono cartridges when long lines or switching systems are necessary between the turntable and main equalized preamplifier. (NOTE: When used as a buffer amplifier, the Low Level Outputs should be used). The input and output jacks will accept standard phono plugs. There are input jacks for Channel 1 and Channel 2; output jacks for Ch. 1 High Level, Ch. 1 Low Level, Ch. 2 High Level, and Ch. 2 Low Level.

SPECIFICATIONS

Gain

Gain measured at 1 kHz with input through 680 ohms and output terminated in 47 kilohms.

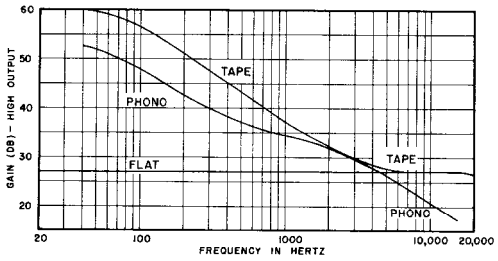
Equalization Switch Position	High Level output	Low Level output
Flat	+27.5 dB	+ 4.0 dB
Phono	+34.5 dB	+11.0 dB
Tape	+37.0 dB	+13.5 dB

Frequency Response

Flat: ± 2 dB from 20 Hz to 20 kHz

Phono: ± 2 dB of the Standard RIAA curve from 40 Hz to 15 kHz

Tape: ± 2 dB of the 7½ IPS NAB curve from 50 Hz to 15 kHz



TYPICAL FREQUENCY RESPONSE
FIGURE 1

Distortion

Under 1% total harmonic distortion for an output of 2 volts at 1 kHz in Phono, Tape or Flat positions. In the Phono position the total harmonic distortion is less than 1% at 30 Hz with 2 volts output.

Clipping Level

The minimum input clipping levels at 1 kHz are:

Flat: 250 mV
Phono: 100 mV
Tape: 80 mV

Channel Separation

50 dB or better at 1 kHz

Channel Balance

Channels matched within 2 dB at 1 kHz

27A2076 (DB)
Printed in U.S.A.

Hum and Noise

Phono: Better than 71 dB below 10 millivolt input from 20 Hz to 20 kHz

Flat: Better than 64 dB below 10 millivolt input from 20 Hz to 20 kHz

Operating Voltage

M64: 120 volts ± 10%, 50/60 Hz or 30 volts ± 20% dc. Listed by Underwriters' Laboratories, Inc. (Applies to Model M64).

M64-2E: 240 volts ± 10%, 50/60 Hz or 30 volts ± 20% dc

Battery Operation

The M64 and M64-2E may be powered by three Eveready 216 Batteries in series or equivalent power source connected to 30 V.D.C. jacks. Battery life is over 100 hours. The Shure Model A67B power supply, or power jacks on Shure's Models M63, M67, or M68, may be connected to the 30 V.D.C. jacks to power the M64 or M64-2E. These jacks, which provide 29 Vdc (26 Vdc at 5 mA max.), can also be used to power external equipment.

Input Impedance

Resistance is 50,000 ohms at 1 kHz
Capacitance is 350 pF

Output Impedance

High Level: Less than 1000 ohms at 1 kHz (minimum recommended load is 22,000 ohms)

Low Level: 600 ohms (any load on Low Level output will not affect input clipping level)

Dimensions

See Figure 2

Weight

794 grams (1¾ lb)

Power Consumption

5 watts

Temperature Range

Operating: -7°C to 57°C (20°F to 135°F)
Storage: -29°C to 71°C (-20°F to 160°F)

INSTALLATION

To reduce the risk of fire or electric shock do not expose this appliance to rain or

The M64 and M64-2E Preamplifier may be mounted to an amplifier chassis or cabinet by means of screws passed through mounting slots at base of M64 and M64-2E Preamplifier chassis. The Preamplifiers can be mounted in any position for normal operation, but for best results, the Preamplifiers should be located away from motors or other hum producing power sources and away from intense heat sources. Should hum be a problem in a given system or installation, one or more of the power plugs may be reversed to reduce hum. If the turntable has a grounding wire, this wire may be connected to the "ground" screw on the Preamplifier to reduce hum pickup.

WARNING

The use of the M64 and M64-2E Stereo Preamplifier with power amplifiers of the transformerless (ac-dc) type may result in a shock hazard. A suitable power line isolation transformer should be used with such equipment.

OPERATION

Connections:

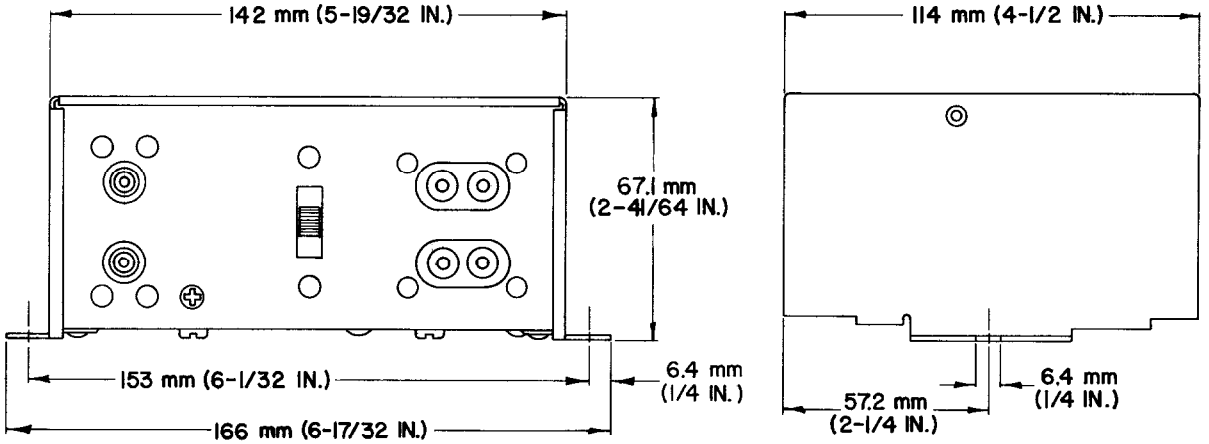
a. Set selector switch to the desired function. This automatically selects the proper equalization (frequency response) for both channels.

b. For the equalized Phono (RIAA) or Tape (NAB) position, connect the signal leads from the phono cartridge or tape head to the jacks marked "Channel 1 Input" and "Channel 2 Input." * For the Flat position using two separate high-impedance microphones, connect the cable from one high-impedance microphone to jack marked "Channel 1 Input." The cable from the other high-impedance microphone should be connected to the jack marked "Channel 2 Input." For single high-impedance microphone applications connect to either Channel 1 or Channel 2. NOTE: If low-impedance microphones are to be used, a suitable input transformer such as the Shure Model A95 Series should be used. Attention must be given to information contained in the data sheets of the phono cartridges, tape heads, or microphones regarding their connections, phasing and grounding.

c. Connect Ch. 1 and Ch. 2 (High Level or Low Level) output jacks to the corresponding input jacks of the power amplifier, preamplifier, tape recorder or mixer.† If it is found necessary to ground the M64 or M64-2E Preamplifier chassis, ground connection may be made

* The Flat position may be used for high-impedance microphones, or for phono cartridge or tape head buffering applications in which the output of the M64 or M64-2E is connected to an equalized amplifier input.

† The High Level outputs may be connected to high-level auxiliary inputs, and the Low Level outputs may be connected to low-level microphone inputs (or equalized phono or tape head inputs in buffering applications).



OVERALL DIMENSIONS
FIGURE 2

to the "Ground" screw on the Preamplifier chassis.

d. If ac power operated, insert the M64 or M64-2E power line cord into a proper power outlet, preferably one controlled by the power amplifier's On-Off switch. Be sure power switch on M64 or M64-2E is in the "On" position when remotely turned "On" & "Off".

WARNING

Voltages in this equipment are hazardous to life. Refer servicing to qualified service personnel.

Balanced Line Output:

For professional low-impedance balanced line use, such as broadcast systems or recording consoles, an external line matching transformer (Shure Model A95 Series) may be added to each High Level output of the M64 or M64-2E. The resultant output level will be approximately -32 dBm. If a higher output level is necessary (-20 dBm) the following change can be made by qualified service personnel only, which will increase the output level by approximately 12 dB.

1. Unplug the ac line cord before removing cover.
2. Remove the three large Phillips head screws that hold the case cover in place.
3. Lift off cover.
4. Remove printed circuit board assembly from nylon fasteners by squeezing upper protruding tab on circuit board side inward and sliding board outward and off the fastener.
5. Lift the printed circuit board assembly straight up until 1 k resistors R13 and R14 are accessible. (See bottom illustration on page 4) Note R13 and R14 are raised on longer leads than the other resistors for ease of identification.
6. Solder 330 ohm ¼ watt resistors across (in parallel with) the extended lead wires of R13 and R14 (330 ohm resistor across the 1000 ohm resistor). The extra lead length of R13 and R14 makes this very easy and it is not necessary to alter the printed circuit board or its components.
7. Remount the printed circuit board assembly and replace the cover, being careful not to pinch any wires when closing up the unit.

NOTE: This change will decrease the input clipping level of the preamplifier to about 25 mV so that if high-output cartridges or very highly modulated records are used the preamplifier may tend to clip on loud passages. If the gain increase desired is less than 12 dB, the following resistors can be used in parallel with R13 and R14 instead of the 330 ohm resistors.

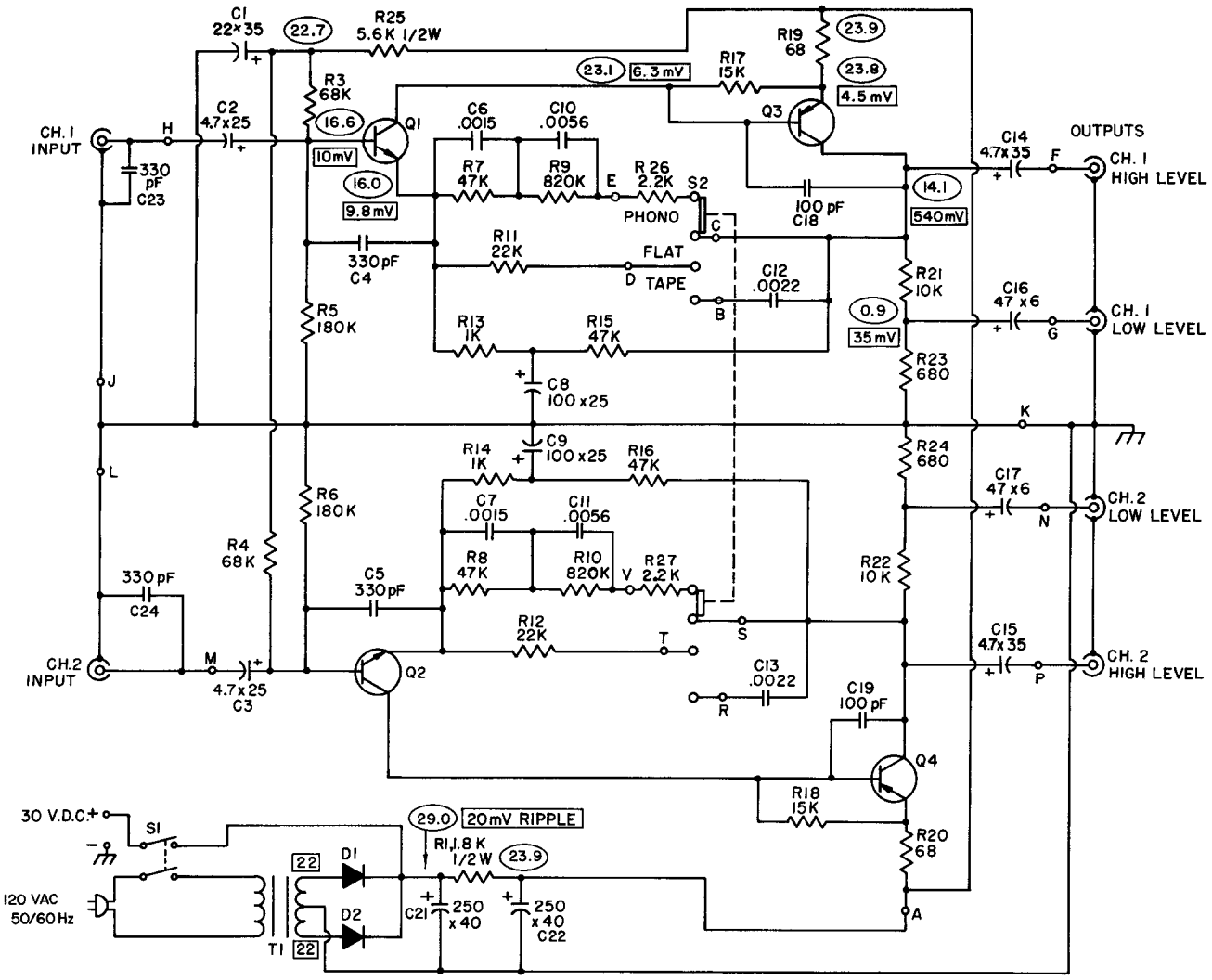
for 3 dB, use 2.2 kilohms
for 6 dB, use 1 kilohm
for 9 dB, use 560 ohms

FULL ONE-YEAR WARRANTY

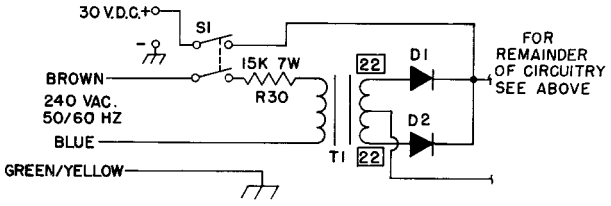
Shure Brothers Incorporated ("Shure"), 222 Hartrey Avenue, Evanston, Illinois 60204, warrants to the owner of this product that it will be free, in normal use, of any defects in workmanship and materials for a period of one year from date of purchase. You should retain proof of date of purchase. Shure is not liable for any consequential damages. If this Shure product has any defects as described above, carefully repack the unit, have it insured, and return it prepaid to:

Shure Brothers Incorporated
Attention: Service Department
222 Hartrey Avenue
Evanston, Illinois 60204

If you are not in the United States, return the unit to your dealer or Authorized Service Center for repair. The unit will be repaired or replaced and returned to you promptly, and if it cannot be repaired or replaced, you may elect to receive a refund.



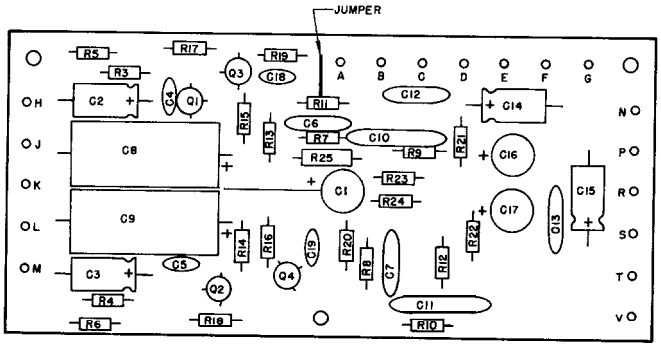
MODEL M64 CIRCUIT



MODEL M64-2E CIRCUIT

NOTES:

1. ALL CAPACITORS IN MFD AND 100 VOLTS OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN MFD x VOLTS.
2. ALL RESISTORS 10%, 1/4 WATT UNLESS OTHERWISE SHOWN.
3. THE FOLLOWING SYMBOL WITH LETTER DESIGNATION DENOTES A TERMINAL ON PRINTED CIRCUIT BOARD ASSEMBLY.-
4. ▭ DENOTES A.C. VOLTAGES
   ⬭ DENOTES D.C. VOLTAGES
   ALL VOLTAGES MEASURED WITH A.C. LINE = 120V., 60HZ, PHONO EQUALIZATION, INPUT TO CHANNEL 1 = 10 MV RMS AT 1000 HZ. D.C. VOLTAGES MEASURED WITH 11 MEGOHM VTVM. A.C. VOLTAGES MEASURED WITH I MEGOHM VTVM. VOLTAGES ARE TYPICAL AND MAY VARY ±20%. CHANNEL I VOLTAGES ONLY SHOWN. CHANNEL 2 IS SIMILAR.



PRINTED CIRCUIT BOARD

PARTS LIST				
ITEM	SHURE PART NO.	SHURE KIT NO.	QTY. IN KIT.	DESCRIPTION
D1, D2	86A404	RKC21	4	DIODE, SILICON, IN4002 OR EQUIVALENT
Q1, Q2	86A336	RKC12	1	NPN TRANSISTOR, SILICON, T.I. TIS97
Q3, Q4	86B348	——	1	PNP TRANSISTOR, SILICON, SIMILAR TO MOTOROLA 2N5087
T1	51A252	——	1	TRANSFORMER, POWER
S1	55B103	——	1	SWITCH, SLIDE, DPDT
S2	55A62	——	1	SWITCH, SLIDE, DPTT