

**SHURE****MICROPHONES AND ELECTRONIC COMPONENTS**

AREA CODE 312/328-9000 • CABLE SHUREMICRO

**MODELS M64 AND M64-2E  
STEREO PREAMPLIFIERS**

News Room

**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.

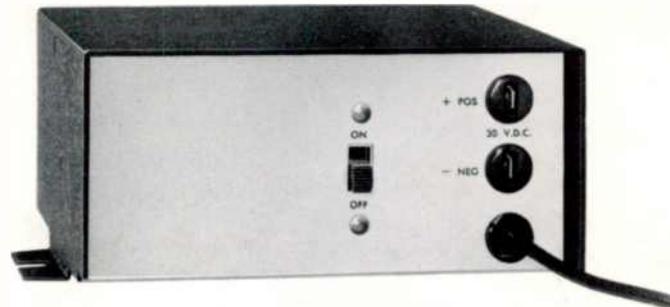
**Typical Applications:**

- 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 50 feet or more of output cable, and years of maintenance-free performance. The operating temperature range is from 20°F (−6.7°C) to 135°F (57.2°C).

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 K ohms:

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

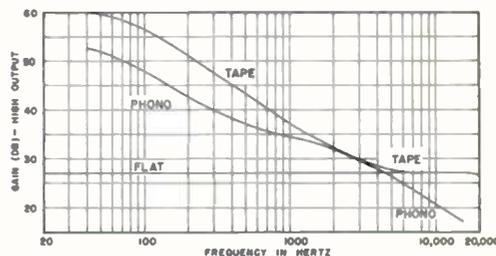
**Frequency Response:**

(See Typical Frequency Response Table—Figure A)

Flat:  $\pm 2$  db from 20 Hz to 20 KHz

Phono:  $\pm 2$  db of the Standard RIAA curve from 40 Hz to 15 KHz

Tape:  $\pm 2$  db of the 7½ IPS NAB curve from 50 Hz to 15 KHz



FREQUENCY RESPONSE  
FIGURE A

**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 maximum input levels at 1 KHz without clipping are:

Phono and Tape: 100 mv  
Flat: 250 mv

**Channel Separation:**

50 db or better at 1 KHz

**Channel Balance:**

Channels matched within 2 db at 1 KHz

**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  $\pm$  10%, 50/60 Hz or 30 volts  $\pm$  20% DC. The M64 is UL and CSA approved for use in commercial applications.
- M64-2E: 240 volts  $\pm$  10%, 50/60 Hz or 30 volts  $\pm$  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.

**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 B

**Weight:**

1 $\frac{3}{4}$  pounds (794 grams)

**Power Consumption:**

5 watts

**Temperature Range:**

- Operating: 20°F to 135°F
- Storage: -20°F to 160°F

**Installation:**

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.

**CAUTION:**

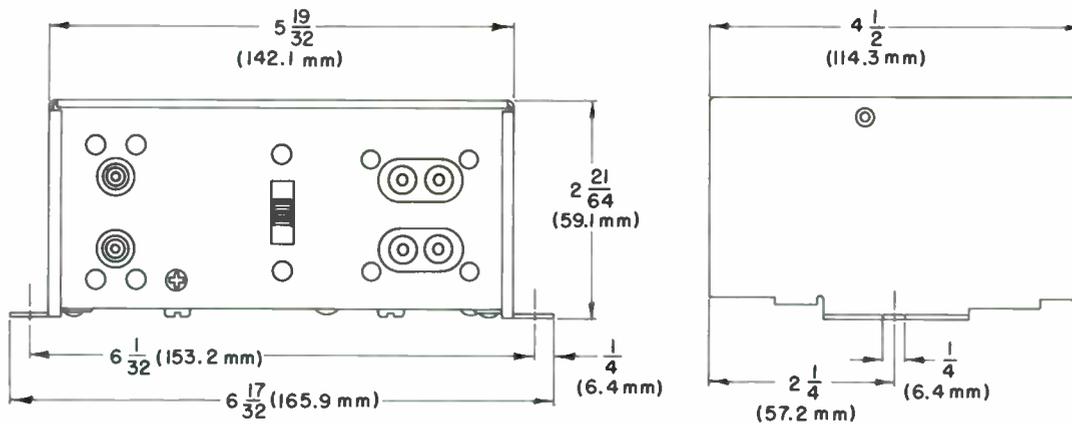
The use of the M64 and M64-2E Stereo Preamplifier with power amplifiers of the transformerless (AC-DC) type may result in a shock hazard. A suitable power line isolation transformer should be used with such equipment.

**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 A95A 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 to the "GROUND" screw on the Preamplifier chassis.

\* 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 B

- 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".

**Balanced Line Output:**

For professional low impedance balanced line use, such as broadcast systems or recording consoles, an external line matching transformer (Shure Model A95A) 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 the two smaller Phillips screws that hold the internal shield and the printed circuit board in place.
5. Lift the printed circuit board assembly straight up until 1 K resistors R13 and R14 are accessible. (See Figure C) Note R13 and R14 are raised on longer leads than the other resistors for ease of identification.
6. Solder 330 ohm 1/4 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.

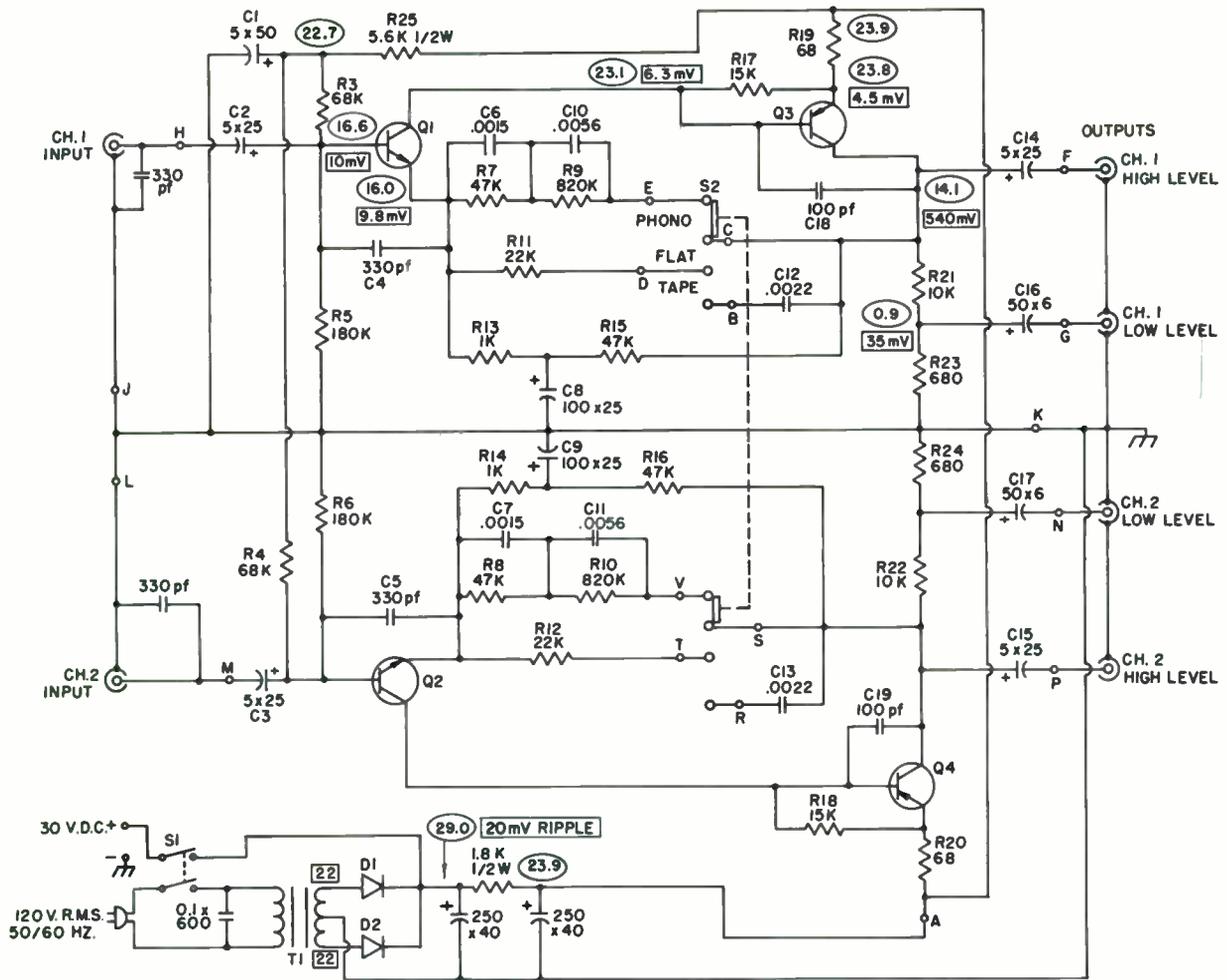
NOTE: This change will decrease the input clipping level of the preamplifier to about 25 mv so that if high output cartridges or very highly modulated records are used the pre-amplifier may tend to clip on loud passages. If the gain increase desired is less than 12 db, the following resistors can be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

- for 3 db, use 2.2 K ohms
- for 6 db, use 1 K ohms
- for 9 db, use 560 ohms

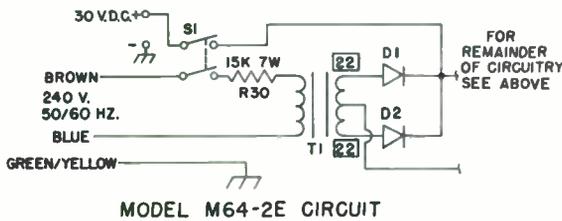
**Guarantee:**

The Shure Model M64 and M64-2E Stereo Preamplifiers are guaranteed to be free from electrical and mechanical defects for a period of one year from date of shipment from the factory, provided all instructions are complied with fully. In case of damage, it is essential to carefully repack the unit and return it to the factory, or, if outside the United States, to your dealer or authorized Shure Service Center for repair. Our guarantee is voided if the basic assembly has been modified other than so suggested in this sheet or the unit has been subjected to unreasonably rough handling.

(See page 4 for Circuitry Diagram)



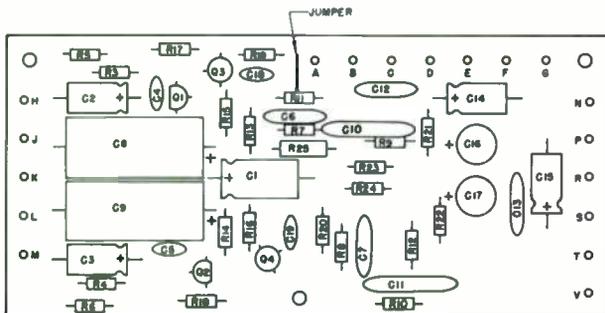
MODEL M64 CIRCUIT



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 1 MEGOHM VTVM. VOLTAGES ARE TYPICAL AND MAY VARY ±20%. CHANNEL 1 VOLTAGES ONLY SHOWN. CHANNEL 2 IS SIMILAR.



PRINTED CIRCUIT BOARD

PARTS LIST		
ITEM	SHURE PART NO.	DESCRIPTION
D1, D2	86A404	DIODE, SILICON, IN4002 OR EQUIVALENT
Q1, Q2	86A336	NPN TRANSISTOR, SILICON, T.I. TIS97
Q3, Q4	86A348	PNP TRANSISTOR, SILICON, CONTINENTAL DEVICES CS43079 OR MOTOROLA 2N5087
T1	51A212	TRANSFORMER, POWER
S1	55A67	SWITCH, SLIDE, DPDT
S2	55A62	SWITCH, SLIDE, DPDT

FIGURE C