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Model M267 User Guide

GENERAL

The Shure Model M267 is a microphone mixer-remote amplifier specifically designed for professional applications. The excellent performance, versatility and features of this complete, compact console make it an ideal choice for studio, remote, or sound reinforcement use, and as an add-on mixer for expanding existing facilities. It is also ideally suited for use with audio and video tape recorders to provide multiple microphone inputs.

Features:

- Wide, flat frequency response and extremely low distortion up to +18 dBm output
- Extremely low noise and RF susceptibility
- Four switchable microphone- or line-level balanced-line inputs with individual gain controls and low-frequency roll-off switches. MUMETAL shielding on input transformers
- Feedback-type input gain controls for maximum clipping levels and dynamic range
- Output switchable for line or microphone level
- Built-in switchable peak limiter cuts output overload distortion, adapts to power supply voltage
- LED indicator shows limiter operation or overload with limiter defeated
- Externally adjustable limiter threshold (-4 to +18 dBm)
- VU meter calibrated for +4 and +8 dBm with range switch. Illuminated with ac operation
- Ac or built-in battery operation. Noiseless automatic switchover to battery in case of ac line failure. Battery test without program interruption
- Front-panel headphone level control and monitor jack drives almost any stereo or mono headphones; output can be additional unbalanced line feed to drive a tape recorder or power amplifier
- Direct mix bus for stacking units
- Automatic muting prevents speaker damage during turn-on and -off
- Low distortion, high-stability tone oscillator for line test and level checks

- All connections phased. Line output terminals phase-indicated
- Compact and lightweight, with rugged, abrasion-resistant case
- Internally selectable 120 or 240 Vac, 50/60 Hz operation
- Underwriters' Laboratories Listed and Canadian Standards Association listed as Certified

SPECIFICATIONS

Frequency Response

30 Hz to 20,000 Hz, ± 2 dB

Voltage Gain (at 1,000 Hz)

(Outputs terminated: line 600 Ω , microphone 150 Ω , mix bus 3.3 k Ω , headphone 200 Ω , tip-sleeve and ring-sleeve)

Input	OUTPUT		
	Line	Microphone	Mix Bus
Low-Impedance Microphone (150 Ω)	91 dB	41 dB	24 dB
Line	40 dB	-9 dB	-27 dB
Mix Bus	55 dB	5 dB	--

Inputs

Input	IMPEDANCE		Input Clipping Level
	Designed for Use With	Actual (Internal)	
Microphone	19 to 600 Ω	1 k Ω	-32 dBV to -5 dBV* (25 mV to 0.56 V)
Line	Less than 10 k Ω	66 k Ω	+20 dBV
Mix Bus	3.5 k Ω	3.5 k Ω	+7 dBV (2.2 V)

*Depending on input control setting

Outputs

Output	IMPEDANCE		Output Clipping Level
	Designed for Use With	Actual (Internal)	
Microphone	Any low impedance microphone input	0.5 ,	-34 dB (20 mV)
Mix Bus	3.5 k,	3.5 k,	-8 dBV (400 mV)
Head-phones	8 - 2000 , 200 , recommended	400 , Ω 3 k, **	+10 dBV (3.3 V)
Line	600 ,	150 ,	+18 dBm (6.2 V)

**Depending on level control setting

Noise

Equivalent Input Hum and Noise: -126 dBV (low impedance microphone, 150 , - 20-20,000 Hz) into a 600 , load at full gain

Output Noise: -75 dBV (master control fully counter-clockwise), -53 dBV (master fully clockwise), (input controls down, 300-20,000 Hz)

Output Hum and Noise: -70 dBV (master control down), -51 dBV (master control up) (input controls down, 20-20,000 Hz)

Distortion

0.35% or less THD from 30 to 20,000 Hz at +15 dBm output; 0.5% or less IM distortion up to +15 dBm output level

Common Mode Rejection

65 dB minimum with input of -20 dBV at 100 Hz

Control Interaction

Less than 1 dB with any control combination

Overload and Shorting Protection

Shorting the outputs, even for prolonged periods, will cause no damage; microphone inputs will not be damaged by signals up to 3 volts

Lo-Cut Filters

6 dB/octave rolloff at 150 Hz

Limiter

Threshold: +15 dBm (line output level; adjustable from -4 to +18 dBm)

Attack Time: 3 msec typical

Recovery Time: 500 msec typical

Peak Indicator

Lights 6 dB below clipping or at onset of limiter action

Headphone Output Clipping Level

3.16V (+10 dBV) into 200 ,

Tone Oscillator

1,000 Hz, 1.5% or less THD

Phantom Power

30 Vdc open-circuit, 3.3 k, series resistance, input switches in MIC position only

Operating Voltage

Ac Operation: 120 or 240 volts \pm 10%, 50/60 Hz, 9.5W, internally switchable†

Dc Operation: 27 volts nominal at 15 mA typical no-signal, 18 mA typical at 0 VU (+4 dBm) output with headphone load; 21.5 volts minimum

Battery life: approximately 20 hours with alkaline batteries at +4 dBm output in continuous use; three 9-volt batteries, type NEDA 1604A (Duracell MN1604 recommended)

† Supplied wired for 120 Vac operation (See Service section for 240 Vac operation)

Temperature Range

Operating: -18° to 57° C (0° to 135° F)

Storage: -29° to 71° C (-20° to 160° F)

Dimensions

See Figure 1

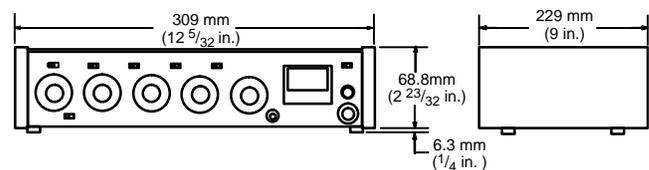


FIGURE 1

Weight

Net: 2.3 kg (5 lb 2 oz)

Packaged: 3.2 kg (7 lb 2 oz)

Certifications

Listed by Underwriters' Laboratories, Inc., and listed by Canadian Standards Association as Certified

CONTROLS AND CONNECTORS

WARNING

This apparatus must be earthed (grounded)! The M267 power supply is energized when the unit is connected to an ac source; disconnect mains (power) plug from supply when not in use.

Inputs

The four inputs are professional three-pin female XLR audio connectors located on the rear panel and designated INPUT 1 through INPUT 4. The inputs are balanced (internal transformer, MUMETAL shielded); pins 2 and 3 are “hot”, and pin 1 is “ground”. For microphone operation, the switches labeled LINE/MIC (directly above the input connectors) must be in the MIC position; for line level inputs, the switches must be in the LINE position. For impedance, clipping and operating signal levels, refer to the SPECIFICATIONS section.

Outputs

The rear-panel connector labeled OUTPUT is a professional three-pin male XLR audio connector. With the adjacent LINE/MIC switch in the MIC position, the OUTPUT connector is used to feed a low-impedance microphone line or a low-impedance microphone input. With the LINE/MIC switch in the LINE position, the OUTPUT connector feeds the line-level input of an amplifier, tape recorder, or another mixer. The OUTPUT connector is a balanced output with the LINE/MIC switch in either position; pin 1 is ground, pins 2 and 3 are “hot”, and the connector is in phase with the corresponding pins of the input connectors.

The rear-panel binding-post connector designated LINE OUTPUT is in parallel with the OUTPUT connector and can be used as a line-level output feed simultaneously with the OUTPUT connector. The terminals are numbered 2 and 3 and are in phase with the corresponding pins of the input connectors. While the line outputs can be used to drive various impedance lines, the VU meter is calibrated for use with a 600 Ω line.

The line output transformer will operate properly with up to 100 mA dc in the line. This feature permits the use of standard “dialed-up” telephone lines with dc across them. (Since a slight distortion increase may occur at high output levels with maximum dc current, operation with the VU RANGE switch at +4 dBm is recommended.)

Input Gain Controls

The front-panel controls designated 1 through 4 are the individual active gain controls for correspondingly numbered inputs. Note that the input connectors are located on the rear panel directly behind their corresponding gain control. The controls set the preamplifier gain and provide preamplifier output attenuation. As the gain is reduced, the preamplifier input clipping level is increased for that channel.

Input control 1 serves an additional function as the level control for the tone oscillator when the INPUT 1/OCS 1 switch is in the OSC 1 position.

IMPORTANT: For optimum signal-to-noise ratio, the individual input controls should be operated at as high a setting as possible, consistent with maintaining adequate control range and input clipping level.

Master Gain Control

The front-panel control designated MASTER is the master gain control which sets the overall output level of the mixed sources (including signals applied to the MIX BUS input).

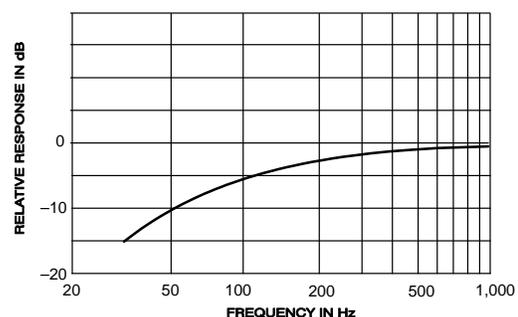
Limiter

The front-panel LIMITER IN/OUT switch turns on a fast-acting, peak-responding limiter circuit that cuts overload distortion during loud program intervals without affecting normal program levels. When the LIMITER switch is IN (operating), the mixer output is limited to approximately +15dBm. Increasing the individual or MASTER gain controls will increase the average output and the amount of limiting. The limiter threshold can be reset to any other output between -4 and +18 dBm if desired. With the limiter switched OUT and tone oscillator activated, adjust INPUT 1 and MASTER level controls to produce an output 0.5 dB higher than desired. Switch the limiter IN and set the LIMITER THRESHOLD ADJUST control (accessible through the bottom of the chassis) for the desired level.

The front-panel PEAK LED indicator shows limiter operation with the limiter in, and operates when program levels approach overload with the limiter out. The indicator is much faster than a meter and will be activated by the shortest transient peak, but it remains on long enough to provide easy recognition.

Low-Cut Filters

The low-cut filters provide a low-frequency rolloff to the response curve as shown in Figure 2. The filters are activated by the LO-CUT IN/OUT switch above each individual input gain control and can be used individually with each control to reduce wind noise or undesirable low-frequency signals such as from condenser microphones or turntable rumble.



LOW-CUT FILTER ACTION
FIGURE 2

Mix Bus

Direct access to the mixing bus is provided through the rear-panel MIX BUS phono pin jack. This provision is made primarily to facilitate stacking or “multing” M267s to achieve additional input capacity without losing any inputs. With two M267s, for example, the two mixing buses are directly connected, providing two independent master gain controls and two isolated line amplifiers with eight individually controlled inputs. Since the buses are directly paralleled, a 6 dB drop in gain will occur; and the master or input controls must be increased to compensate. Noise specifications are not adversely affected by this interconnection. Mix bus interconnection can also be made with other Shure mixers, such as the M268, FP42. etc.

VU Meter

The VU meter is factory-calibrated for use with a 600 Ω terminated line. The VU RANGE switch on the rear panel selects either a +4 or +8 dBm output at 0 VU meter indication. (This switch changes the meter indication but does not change the actual output level.) Microphone output levels are 50 dB below line output. The +4 range is recommended for normal use to provide approximately 14 dB of headroom from operating level to clipping level.

The VU meter is illuminated by two No. 86 lamps operating well under their normal ratings for a life expectancy of greater than 10,000 hours. The lamps are only lit during ac operation. Consequently, the illumination serves as a visual alarm if the ac is interrupted and the unit has switched to battery.

The VU meter is connected on the primary side of the output transformer to assure protection from any dc level on a telephone line.

Headphones

The headphone outlet appears at the front-panel jack panel designated PHONES. The two-circuit phone jack will accommodate most stereo or mono headphones. The output level is sufficient to provide high volume for use in noisy environments.

Note that the headphone output level is also high enough to use as an auxiliary unbalanced line feed to drive a tape deck or a power amplifier.

The tip and ring connections of the headphone plugs are in phase with pin 3 of all input and output connectors, and with the tip of the MIX BUS jack.

Tone Oscillator

The highly stable, low-distortion tone oscillator provides for line test and level checks. The oscillator is instantly activated by the front-panel INPUT 1/OSC 1 switch; its level can then be controlled by the INPUT 1 gain control on the front panel. The tone oscillator frequency is 1,000 Hz, and the signal appears on both the line and microphone outputs, as well as the headphone and mix bus connectors.

The oscillator should be switched off (INPUT 1 position) when not in use.

Phantom Power

The rear-panel PHANTOM OFF/ON switch controls the application of phantom power for condenser microphones, such as the Shure SM81 and SM85, to all inputs. With the switch on and the rear-panel MIC/LINE switches in the MIC positions, +30 Vdc is applied to pins 2 and 3 of each input connection. Series current-limiting resistance is 3.3 k Ω for each input. When using other condenser microphones with the M267, verify that the voltage and resistance requirements are compatible.

Note that the phantom power cannot normally be applied to the inputs with the MIC/LINE switches in the LINE position.

IMPORTANT: Do *not* turn the PHANTOM switch on when using *unbalanced* low-impedance microphones; objectionable hum will result. Turn off the PHANTOM switch when condenser microphones are not being used.

Use only high-quality cable. Intermittent shorts between broken shield wires and balanced conductors will cause offensive noise transients in the system.

BATTERY OPERATION AND EXTERNAL POWERING

In addition to ac operation, the M267 can be operated from an internal battery pack. Current drain is typically 17 mA at +8 dBm output level and typically 15 mA at +4 dBm. Battery power is recommended both for remote, on-location operation, and as an emergency backup source in case of failure of the ac power.

Access to the battery compartment is provided at the bottom of the chassis. Three 9-volt alkaline batteries power the M267 at full rated output. Use alkaline batteries for maximum life. Duracell MN1604A or Eveready 522 are recommended. Battery life is approximately 20 hours at +4 dBm continuous use. Note that battery operation with phantom power loads and high level headphone monitoring will increase battery drain.

With batteries in the battery compartment, the M267 will automatically and silently switch to battery operation should the ac voltage fall below a suitable level. If the ac power fails completely, the VU meter lamps will go out, providing a visual indication of line failure.

Battery condition can be determined by using the BATT CHECK switch on the front panel. Activate the BATT CHECK switch and observe the VU meter. A new set of batteries will give about a +2 VU indication. Battery condition is good if the reading is above 0 VU; a lower reading means that new batteries are required for proper operation. Note that the M267 power switch must be turned on to check battery condition.

Telephone Interconnection

When using the M267 connected directly to a telephone line, check to see whether the local telephone company requires an interface coupler between the M267 and the

telephone line. If a coupler is required, make certain the coupler selected and the wiring arrangement are in compliance with the telephone company regulations.

When direct connection to a telephone line is not possible, acoustic coupling to a telephone handset may be used. A Shure Model 50AC Telephone Acoustic Coupler can be connected to the 600 Ω line or headphone output of the M267 and attached to most telephone handsets.

Telephone Line Surge Protection

When using the M267 connected directly to a telephone line subject to lightning-induced voltage surges, the following commercially available part can be installed across the LINE OUT terminals to provide additional protection for output circuit components:

Metal Oxide Varistor, General Electric Co., Type No. V22ZA1

ACCESSORIES

A268R Rack Panel Kit. The Model A268R Rack Panel Kit includes a 19 in. x 3-1/2 in. (483 mm x 89 mm) precut rack panel and necessary hardware for rack-mounting the M267 (with its cover in place and end caps removed) in a standard 19 in. (483 mm) rack panel.

RKC169 Rack Panel Bracket Kit. The Model RKC169 Rack Panel Bracket Kit enables owners of the Shure A68R Rack Panel Kit (originally designed for the M67 and M68 Mixers) to rack-mount the M267 with the A68R.

SERVICE

WARNING

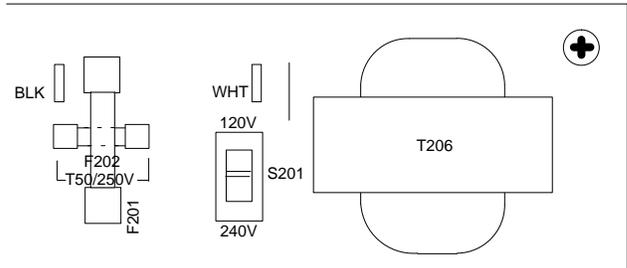
Voltages in this equipment are hazardous!
Refer servicing to qualified service personnel.

240 Vac Operation

To change the M267 operating voltage from 120 Vac to

240 Vac, follow these steps:

1. Disconnect the M267 from the ac line.
2. Remove the end caps and cover.
3. Locate the voltage selector switch (S201) at the right rear of the main printed circuit board (Figure 3). Move SD201 to the 240V position (toward the front panel).



240 V WIRING
FIGURE 3

4. Remove fuse F201 (0.1A, 250V, time lag) and replace it with the supplied fuse F202 (0.05A, 250V, time lag). Note that the F202 fuse holder is at right angles to the F201 fuse holder.
5. Replace the ac line cord (if necessary) with one designed for the 240 Vac source. If the M267 is to be used outside the U.S. and Canada, local regulations may require replacing the line cord with one having wire insulation colors as follows:

	“Live” or “Hot”	Neutral	Earth or Ground
U.S., Canada	Black	White	Green
Europe	Brown	Blue	Green/ Yellow

6. Replace the cover and end caps, and mark the rear panel to reflect the new operating voltage.