MODEL WL83A AND SM83A OMNIDIRECTIONAL CONDENSER LAVALIER MICROPHONES

The SM83A Wired Lavalier Microphone with a supplied amplifier assembly, features a 12 dB/octave rolloff below 100 Hz to help reduce room noise and other undesirable low-frequency signals. The SM83A consists of the 83A microphone element and an amplifier assembly with an attached 3 m (10 ft) output cable terminated by a three-pin professional (XLR-type) audio connector.

The SM83A is powered either internally by a readily available 9-volt battery (not supplied) or externally by phantom power supplied by broadcast, sound reinforcement or recording equipment, or an external phantom supply. An automatic power switchover feature provides automatic switching from battery to phantom power. The SM83A operates over an extremely wide voltage range of 11 to 52 Vdc, covering both DIN and IEC phantom power standards. A dual-channel power supply (Shure Model PS1A) is available for providing phantom power to the SM83A.

Features
- Wide-range frequency response specially tailored for chest-worn microphone operation
- Very low susceptibility to RFI and electrostatic and magnetic hum
- Low distortion and wide dynamic range
- Tiny size, light weight and non-reflective finish for inconspicuous use
- Usable over wide range of temperature and humidity conditions
- Side-exit cable for sleeker appearance, lower cable noise transmission
- Rugged construction for outstanding reliability
- Versatile mounting accessories permit fast and simple user installation
- SM83A amplifier assembly or Shure wireless body-pack transmitter can be pocketed, strapped to the body, or clipped to belt or waistband
- Controlled low-frequency rolloff (SM83A) reduces low-frequency room noise
- Wide-range phantom powering (SM83A) accepts all commonly used voltages

![Frequency Response](image)

**FREQUENCY RESPONSE**

**FIGURE 1**

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**SPECIFICATIONS**

**WL83A MICROPHONE** (with standard test circuit—Figure 3)  
**SM83A MICROPHONE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Condenser (electret bias)</th>
</tr>
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<tbody>
<tr>
<td>Frequency Response (Figure 1)</td>
<td>50 to 20,000 Hz</td>
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<tr>
<td>Polar Pattern</td>
<td>Omnidirectional</td>
</tr>
<tr>
<td>Output Impedance</td>
<td>1200 Ω</td>
</tr>
<tr>
<td>Output Level (0 dB = 1 volt per μbar)</td>
<td>Open Circuit Voltage .... -63 dB (0.70 mV)</td>
</tr>
</tbody>
</table>
| Output Clipping Level (at 1,000 Hz) | -3 dBV (0.70 V) | 800 Ω Load ........... -13 dBV (0.22 V)  
150 Ω Load ................ -27 dBV (0.045 V) |
| Total Harmonic Distortion | Less than 1% (134 dB SPL at 1,000 Hz) |
| Maximum SPL | 134 dB |
| Dynamic Range (maximum SPL to A-weighted noise level) | 110 dB |
| Output Noise (equivalent SPL) | 24 dB typical, A-weighted | 24 dB typical, A-weighted  
28 dB, weighted per DIN 45 405 |
| Hum Pickup (electromagnetic) | N/A |
| Signal-to-Noise Ratio | 70 dB at 94 dB SPL (IEC 651) |
| Phasing | Positive pressure on microphone diaphragm produces positive voltage on pins 3 and 4 with respect to pin 1 (ground) |
| Recommended Operating Voltage | 1.5 to 6 V (pin 2 to pins 3 and 4) |
| Current Drain | 60 to 180 μA |
| Environmental Conditions | Operating Temperatures: -18°F to 60°C (0° to 140°F)  
Storage Temperatures: -25°F to 66°C (-20° to 150°F) |
| Cable | Microphone: 1.2 m (4 ft), attached, two-conductor, shielded terminated by Switchcraft TA4F type connector  
Amplifier: 3 m (10 ft) attached, two-conductor, shielded, TRIPLE-FLEX® with 3-pin (male) XLR-type professional audio connector |
| Case | Microphone: Brass construction with black finish and stainless-steel-mesh grille  
Amplifier: Black molded high-impact plastic with detachable belt clip |
| Net Weight | Microphone: 45 g (1.6 oz)  
Amplifier: 270 g (9.45 oz) including battery |

**Dimensions** (See Figure 2)

![WL83A STANDARD TEST CIRCUIT](image)

**WIND NOISE**

Lavalier microphones generally need no windscreen for proper operation. However, when used outdoors, an acoustic foam windscreen (supplied, Shure Model RK242WS) helps eliminate any unpleasant "rushing" noise.

**MOUNTING THE MICROPHONE**

The tie bar mount attaches to a blouse, shirt, coat or tie using the spring-loaded tie clasp. Snap the microphone into the mounting block and tuck the cable into the channel behind the microphone (Figure 4A). The mounting block permits the microphone to be mounted in four positions. The mounting
blocks provided can be used in the following mounting methods:

1. **Sewing.** The mounting block can be sewn like a button using the narrow channels in the block as guides for the thread (Figure 4B). Dark thread is recommended.

2. **Lanyard.** The narrow channels of the mounting block will accept a lavalier-type lanyard for mounting in the conventional lavalier manner (Figure 4C).

3. **Tape.** The mounting block can be fastened to almost any non-porous, flat surface with heavy-duty, double-stick foam mounting tape (Figure 4D).

4. **Acoustic Instruments.** The tie bar can secure the microphone to an acoustic guitar, a horn bell or other instrument. (Figure 4E).

**Caution:** The tie bar teeth can mar wood or metal. Protective material should be placed over the teeth in these applications.

The SM83A can also be mounted with hook-and-loop (i.e., VELCRO) fasteners, safety pins, or other items available in hardware and fabric stores.

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**POWERING THE 83A MICROPHONE**

The SM83A impedance conversion circuitry is designed to be powered, as shown in Figure 5, from a regulated +5 Vdc source provided at microphone connector pin 2 from a Shure wireless body-pack microphone transmitter or from the amplifier supplied with the SM83A. If the SM83A is to be used with any other wireless transmitter, either the microphone cable or the transmitter input may have to be rewired for proper operation and powering within the constraints of the Recommended Operating Voltage and Current Drain specifications.

![Wiring Diagram](image)

**NOTE:** The SM83A Microphone alone is not designed to be operated directly into the input of a mixer.

**POWERING THE SM83A AMPLIFIER**

**Phantom Powering**

The SM83A with supplied amplifier can be powered by virtually any microphone phantom supply providing 11 to 52 Vdc phantom voltage. The Shure Model PS1A Power Supply provides power to one or two SM83A microphones. Phantom powering uses the balanced audio cable pair to carry the supply current to the microphone; the cable shield is the ground return.

Use only high-quality cables. Intermittent shorts between broken shield wires and balanced conductors will cause objectionable noise transients in the system. A reliable ground path is essential for the same reason.

**Battery Powering**

The SM83A can also be powered by an internal 9-volt alkaline battery (Duracell MN1604 battery recommended). Under normal operating conditions, a fresh alkaline battery should provide approximately 1600 hours of operation. The SM83A is designed without an on-off switch. The amplifier is on whenever a "good" battery is installed, or phantom power is applied. The highly efficient circuit can operate for up to two months continuously with a fresh alkaline battery.

No current is drawn from the battery when a phantom voltage higher than the battery voltage is applied. Phantom power can be used whether or not a battery is in place.

**Microphone Amplifier Loading**

A load impedance of 800 Ω or greater should be used for maximum signal handling and minimum distortion. The load can be as low as 150 Ω, but a reduction in output clipping level will result. It should be noted that the power supply itself may add loading (3300 Ω in the Shure PS1A) to the microphone.

**INSTALLING THE BATTERY (SM83A)**

To install the battery, depress the ridged area of the case and swing the hinged door open. Insert the battery in the compartment, battery terminals toward the hinge with the positive terminal inward (the negative contact is marked inside the compartment). Depress the battery slightly and hook it under the "ledge" in the compartment. Close and lock the battery compartment door. (The door will not lock if the battery is inserted incorrectly.)

To prevent battery drain when the unit is not in use, remove the battery and store in the battery compartment upside-down (contacts upward) with the positive contact inward. If the unit is not used for longer periods, remove the battery to prevent damage from possible leakage.

**MOUNTING THE AMPLIFIER**

Most SM83A applications require that the amplifier be worn on the body. The spring-loaded belt clip will hold the amplifier to a belt, skirt or trouser waistband, or inside pocket.
The belt clip can be removed from the case and the amplifier placed on a nearby surface or worn in an inside pocket. To remove the clip, disassemble the case by removing two Philips screws in the case and two slotted screws in the connector collar.

**NOTE:** The "W"-shaped belt clip permits the power supply to be worn with the cable end either upward or downward, depending on the speaker's comfort and the particular application.

**TROUBLESHOOTING**
If problems arise with the SM83A microphone, take the following steps:
1. Check that battery voltage (or external voltage on pins 2 and 3 of amplifier cable output connector) is adequate.
2. If another SM83A is available, interchange microphones and amplifiers to attempt to localize the problem.
3. Check the microphone and amplifier cables for continuity.

**FURNISHED ACCESSORIES**
- Mounting Block ........................................ RK239MB
- Dual-Mount Tie Bar (SM83A Only) .......... RK241DB
- Windscren .................................................. RK242WS
- Single-Mount Tie Bar .............................. RK240SB

*Replacements furnished in multiples of 4

**SM83A AMPLIFIER CIRCUIT DIAGRAM**

<table>
<thead>
<tr>
<th>Reference Designation</th>
<th>Shure Part No.</th>
<th>Description</th>
<th>Commercial Alternate</th>
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<tr>
<td>A1</td>
<td>90A3837A</td>
<td>Printed Circuit Board Assy</td>
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<td>C7</td>
<td>86B651</td>
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<td>86B429</td>
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<td>Motorola 1N4148</td>
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<td>D2, D3</td>
<td>86A415</td>
<td>Diode, Computer, 75 V, 0.4 A</td>
<td>TI/GE 1N4148</td>
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<td>J1</td>
<td>95A8188</td>
<td>Connector, Receptacle Miniature 4-pin</td>
<td>Switchcraft TB4M</td>
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<td>80A253</td>
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<td>W1</td>
<td>90A3792</td>
<td>Cable and Connector Assy (Inc. P1)</td>
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