SM81

a new standard of reliability & applicability

FLAT (−)
ROLLOFF
CUTOFF (−)

Cardioid Condenser Professional Microphone
The Shure Model SM81 Unidirectional Condenser Microphone

Although condenser microphones have earned a reputation for high quality, it has often been at the expense of mechanical and environmental ruggedness. This is why their use has been primarily limited to studio applications. Now, however—thanks to Shure’s new SM81 Condenser Microphone—this is no longer the case.

The SM81 is a high-performance condenser microphone that is not only a superb instrument in the studio, but highly reliable for location recording as well. This new microphone is the product of years of operational testing during which Shure engineers sought— and found—new solutions to the common problems, which until now have restricted the use of condenser microphones. To achieve a microphone suitable for use in virtually any professional application, testing was conducted in an exceptionally wide range of studio and field situations involving extremes in temperature, humidity, and physical punishment.

Ruggedness

Shure engineers improved and refined the design every step of the way, meeting the requirements uncovered during strenuous environmental and application tests. As a result, the SM81 is capable of withstanding extreme physical abuse, while at the same time maintaining the high quality performance expected of a studio condenser microphone. For example, the SM81 is built to withstand a minimum of six random drops from 1.8 m (6 feet) onto a hardwood floor without any significant alteration of the electroacoustical performance or damage to the microphone case. All components have been especially selected to insure long-term stability over a wide temperature range of -29°C to 57°C (-20°F to 135°F) with relative humidity from 0 to 95% and up to 74°C (165°F) with up to 50% relative humidity.

Reach, Separation, Versatility

Similarly, the electroacoustical performance characteristics of the Shure SM81 are the result of exhaustive application testing. The SM81 is a singular microphone! A new breed! It is designed to provide superior performance in a wide variety of acoustic environments. The high signal-to-noise ratio and directional pattern offers outstanding reach (the ability to pick up distant sound while reducing unwanted noise); unparalleled separation (the ability to reject unwanted acoustical disturbances); unmatched durability; ultra-flat frequency response; and a versatility far beyond most other professional microphones in any category. The SM81 excels at reproducing both low and high level sound sources with accuracy, precision, and with every subtlety rendered intact. It'll never let you down!
SM81's Total Harmonic Distortion... Exceptionally low up to Clipping Point

Measured at 1 kHz and 15 kHz. The SM81 exhibits remarkably low total harmonic distortion below its clipping point... significantly below that of other professional condenser microphones (curves A, B, C, and D).

Built-in... Low Frequency Response Switch

The SM81 features a three-position low-frequency response switch right on the handle. The switch is recessed to avoid accidental movement, but can be conveniently adjusted without tools or disassembly. Depending on where you set it, you have the option of a flat response, a low-frequency rolloff of 6 dB per octave below 100 Hz, or a low-frequency cutoff of 18 dB per octave below 80 Hz. As noted in the chart below the low-frequency response switch can be used to compensate for proximity effect at a 6 inch working distance.

Built-in Attenuator

The SM81 has a switchable 10 dB attenuator built into the head of the microphone to prevent high sound pressure levels from overloading the microphone's internal electronics. In the "0" position, the output of the microphone is reduced by 10 dB, increasing the maximum sound pressure level at clipping by 10 dB.
Specifications

Signal-to-Noise Ratio: 78 dB (IEC 179) at 94 dB SPL

Overvoltage and Reverse Polarity Protection:
- Max. External Voltage Applied to Pins 2 and 3 with Respect to Pin 1: +50 Vdc
- Reverse Polarity Protection: 200 mA max. (diode-clamped)

Phasing: Positive pressure on diaphragm produces positive voltage on pin 2 relative to pin 3.

Cartridge Capacitance: 54 pF

LF Response Switch: Flat, -6 dB/octave below 100 Hz, -18 dB/octave below 80 Hz

Attenuator Switch: 0 or 10 dB

Power:
- Supply Voltage 12 to 48 Vdc, positive pins 2 and 3
- Current Drain: 1.25mA (12V) to 1.75 mA (48V)

Environmental Conditions:
- Relative Humidity 0 to 50%: -29° to 74° C
- Relative Humidity 0 to 95%: -29° to 57° C

Connector: Professional three-pin male audio.

Case: Steel construction with metallic vinyl paint finish.

Dimensions: See Figure 3.

Weight:
- Net: 230 grams (8 oz.)
- Packaged: 1.5 kilograms (3 lbs., 6 oz.)

Cable: 7 ft (25 ft.), two-conductor, shielded, TRIPLE-FLEX® with professional three-pin male and female audio connectors. **

S/N ratio is difference between microphone output at 94 dB SPL and microphone self-noise A-weighted.

**Designated to mate with Cannon XL series, Switchcraft A3 (Q.G.) series, or equivalent connectors.
SM81 Puts it ALL together

- EXTREMELY WIDE-RANGE FLAT FREQUENCY RESPONSE for exceptionally accurate recording, broadcast, and critical sound reinforcement applications.
- WIDE DYNAMIC RANGE—low noise and high output clipping level characteristics.
- QUIET—low handling noise, low internal electrical noise.
- PRECISE CARDIOID polar pattern, uniform with frequency and symmetrical about axis, to provide maximum rejection and minimum coloration of off-axis sounds.
- SUPERIOR LOW DISTORTION characteristics (right up to the overload point) over the entire audio spectrum for a wide range of load impedances.
- VERY LOW RF SUSCEPTIBILITY.
- SELECTABLE LOW-FREQUENCY RESPONSE: FLAT; 6 dB/octave rolloff at 100 Hz compensates for proximity effect; 18 dB/octave cutoff at 80 Hz reduces effects of low-frequency disturbances with minimal effect on wide-range program material.
- 10 dB ATTENUATOR for operation at high sound pressure levels, up to 145 dB SPL—accessible without disassembly, lockable in either position.
- FIELD-USABLE over a wide range of temperature and humidity conditions.
- DEPENDABLE DESIGN—Temperature and humidity stabilized diaphragm construction, unique backplate structure designed to maximize signal-to-noise ratio and insure long-term charge stability.
- RUGGED CONSTRUCTION for outstanding reliability.
- WIDE-RANGE SIMPLEX POWERING includes DIN 45592 voltages of 12 and 48 Vdc. In addition, it will operate over a wide range of power supply impedances.

The inside story...Quality, Innovation, Precision

For optimum performance and dependability, highest quality materials and manufacturing techniques are utilized to produce the SM81. The revolutionary transducer is fabricated with unique, proprietary equipment to extremely close tolerances. For example, to insure dependable operation at high temperature and humidity, the special, low-mass, high-strength diaphragm material is coated with gold on both sides and stabilized prior to assembly by a special thermal cycling process.

The backplate of the SM81 also represents a significant engineering achievement. To produce the high signal-to-noise ratio of this microphone, this portion of the condenser transducer has been fabricated using selective gold deposition techniques as well as a unique lamination process to establish an extremely stable charge layer. These processes maximize the output of the transducer and at the same time keep the capacitance as high as possible for low noise.

Model SM81

Features
Furnished Accessories with SM81 | Windscreen: 49A41
| Swivel Adapter: A57D
| Attenuator Lock: 34A830

OPTIONAL ACCESSORIES
Simplex Power Supplies | PS1, PS1E2

Heavy-Duty Windscreen | A81WS
This is a unique windscreen, specially designed for the SM81. Special dual density construction overcomes even high wind noise without significantly affecting frequency response. Two distinctly different layers of material are used, each with complementary acoustical properties. Hear the remarkable difference between this and ordinary windshields!

Tripod Microphone Stand (4.3m-14 ft.) | S15
Rugged and stable...yet portable and lightweight. Tripod legs provide an excellent base, even when the stand is fully extended to 14 feet. (Stand may be used at any height between 14 feet and 3-1/2 feet.) Five telescoping sections. Convenient vinyl bag and cable strain relief included.

Stereo Microphone Adapter | A27M
Permits the mounting of two microphones on one stand (such as the S15). Either microphone can be independently swiveled in a full circle, facilitating numerous microphone angles for stereo applications.

Isolation Mount | A53M
A breakthrough in noise isolation. Reduces mechanical and vibration noises by more than 20 dB. For desk, floor stand and fishpole use. N°-27 Female thread with 180° swivel action.

The Shure Models PS1 and PS1E2 are ac power supplies that provide simplex (phantom) power for one or two Shure SM81, SM82, or other condenser microphones. They contain a power switch, power-on indicator, and two three-pin Male and Female professional audio connectors.

The PS1 and PS1E2 are identical except that the PS1 is designed to operate from 90 to 132 Vac, 50/60 Hz, and the PS1E2 operates from 90 to 125 Vac or 180 to 250 Vac, 50/60 Hz (switch-selectable). In addition to the voltage selector switch and ac fuse, the PS1E2 is supplied with a detachable ac line cord (without power plug).

The PS1 (only) is listed by Underwriters’ Laboratories, Inc. and is listed by Canadian Standards Association as certified.

Model Features:
- Simplex power for one or two SM81, SM82, or similar condenser microphones.
- Low noise, hum and RF susceptibility.
- Short-circuit-proof operation.
- Handles both microphone and line level signals.
- Operates over wide ac voltage range.
- Three-pin professional audio connectors.
- Light weight.
- Rugged construction.
- Listed by Underwriters’ Laboratories, Inc. and Canadian Standards Association (PS1 only).

Power Supply Specifications
Type: All transistor linear power supply.
Open Circuit Supply Voltage: 21.5 ± 1.5 Vdc, regulated.
Supply Voltage Polarity: Positive (+) on Female microphone connectors (pin 2 and 3), negative (-) on pin 1 and case.
Typical Supply Operating Conditions (each channel): 20V at 1.5 mA (with Shure Model SM81); 10V at 8 mA (with Shure Model SM82).

Boom Mount Assembly | A53B
A complete assembly that provides excellent support, control and noise isolation. Small size minimizes shadows, makes it ideal for either large or small booths. Mounts easily on booms, and permits quick microphone removal. Includes Model A53M Isolation Mount and Model A53C Isolation Cable. (Model A81WS Windscreen should be used when very fast boom movements or outdoor applications are expected.)

Boom Extension Pipe | A53E
Rugged 508 mm (20 in.) boom extension pipe with A53C Isolation Cable preinstalled. Provides the same noise isolation as the A53C Cable, while it lowers the microphone 508 mm (20 in.) below boom to reduce shadows and lighting problems.

Isolation Cable | A53C
Isolates and minimizes vibration and mechanical noises induced or transmitted by cable when using A53M Isolation Mount.

Low-Profile Microphone Stand | S53P
A breakthrough in microphone placement technique. Minimizes the “hollow sound” caused by floor reflections usually associated with distant microphone pickup techniques. Holds the microphone just a fraction of an inch above the floor for better sound quality in “footlight” type placement for recording or sound reinforcement of choral, orchestral or ensemble musical events and dramatic presentations. Effectively isolates mechanical noises.

Power Supply Resistors: 1.69k ± 1% (two per channel).
Frequency Response: +0/-0.2 dB, 20 to 20,000 Hz (with SM81 microphone and 1k load).
Maximum Operating Level: Greater than +24 dBm.
Short Circuit Supply Current: 25 mA each channel (pins 2 and 3 to pin 1).
Hum and Noise (20 Hz to 20 kHz, unweighted):
- Common Mode: -90 dBV max.
- Differential Mode: -115 dBV max.
- Noise (300 Hz to 20 kHz, unweighted):
  - Common Mode: -100 dBV max.
  - Differential Mode: -115 dBV max.
- Crosstalk: -115 dB or less.
- Phasing: Corresponding pins of all connectors are in phase.

Operating Voltage: PS1—90 to 132 Vac, 50/60 Hz ac only;
PS1E2—90 to 125 Vac or 180 to 250 Vac, 50/60 Hz ac only; Power consumption—3 watts max.

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

Connectors: Three-pin professional audio, male (OUTPUT) and female (MICROPHONE).
Dimensions: 60.3 mm H x 152 mm W x 175 mm D (23/8 in. x 6 in. x 61/8 in.)
Weight: 1.25 kg (2 lbs., 12 oz.)
Construction: Aluminum chassis with steel cover; finished in gray enamel.
Certifications: Listed by Underwriters’ Laboratories, Inc.; listed by Canadian Standards Association as certified (PS1 only).