SM57 Cardioid Dynamic Microphone

Overview
An industry-standard, highly versatile cardioid dynamic microphone that can be found onstage and in studios around the world. The ideal choice for sound reinforcement and recording applications, the legendary SM57 is tuned for clean reproduction of amplified and acoustic instruments, targeting the main sound source while minimizing background noise.

Features
- Frequency response tailored for drums, guitars, and vocals
- Uniform cardioid pickup pattern isolates the main sound source while reducing background noise
- Pneumatic shock-mount system cuts down handling noise
- Extremely durable under the heaviest use
- Supplied break-resistant swivel adapter that rotates 180°
- Legendary Shure quality, ruggedness, and reliability

Available Models
- SM57-LC Includes Stand Adapter and Zippered Pouch
- SM57-LCE Includes 5/8-inch to 3/8-inch thread adapter for mounting on European stands, Swivel Adapter and a Zippered Pouch

Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Response</td>
<td>40 to 15,000 Hz</td>
</tr>
<tr>
<td>Polar Pattern</td>
<td>Cardioid</td>
</tr>
<tr>
<td>Sensitivity (at 1,000 Hz Open Circuit Voltage)</td>
<td>-56.0 dBV/Pa (1.6 mV)</td>
</tr>
<tr>
<td>Impedance</td>
<td>Rated impedance is 150Ω (310Ω actual) for connection to microphone inputs rated low impedance.</td>
</tr>
<tr>
<td>Polarity</td>
<td>Positive pressure on diaphragm produces positive voltage on pin 2 with respect to pin 3.</td>
</tr>
<tr>
<td>Case</td>
<td>Dark gray, enamel-painted, die-cast steel with a polycarbonate grille and a stainless steel screen.</td>
</tr>
<tr>
<td>Connector</td>
<td>Three-pin professional audio connector (male XLR type)</td>
</tr>
<tr>
<td>Net Weight</td>
<td>284 grams (10 oz)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>157 mm (6-3/16 in.) L x 32 mm (1-1/4 in.) W at the widest point</td>
</tr>
</tbody>
</table>

Optional Accessories and Replacement Parts

- A2WS Locking Windscreen
- A55M Isolation Mount
- C25F 7.6 m Cable (25 ft)
- A25D Microphone Clip
- A26M Dual Mount
- RK143G Screen and Grille Assembly
- R59 Cartridge
- S37A, S39A Desk Stand

Polar pattern

- 125 Hz
- 500 Hz
- 1000 Hz
- 2000 Hz
- 4000 Hz
- 8000 Hz

Frequency response
**Product Specifications**

**SM7B Cardioid Dynamic Microphone**

**Overview**

The SM7B is a selectable frequency response microphone that delivers warm and smooth audio in close-proximity studio and vocal applications. Optimized shielding from external electromagnetic hum, along with internal shock mounting, external windscreens and adjustable bass roll-off and mid-range emphasis response settings provide clean, consistent reproduction.

**Features**

- Flat, wide-range frequency response for exceptionally clean and natural reproduction of both music and speech
- Bass rolloff and mid-range emphasis (presence boost) controls with graphic display of response setting
- Improved rejection of electromagnetic hum, optimized for shielding against broadband interference emitted by computer monitors
- Internal “air suspension” shock isolation virtually eliminates mechanical noise transmission
- Highly effective pop filter eliminates need for any add-on protection against explosive breath sounds, even for close-up vocals or narration
- Now shipping with the A7WS detachable windscreen, designed to reduce plosive sounds and gives a warmer tone for close-talk vocals
- Yoke mounting with captive stand nut for easy mounting and dismounting provides precise control of microphone position
- Classic cardioid polar pattern, uniform with frequency and symmetrical about axis, to provide maximum rejection and minimum coloration of off-axis sound
- Rugged construction and excellent cartridge protection for outstanding reliability

**Available Models**

**SM7B**

Includes foam windscreen, close-talk windscreen, and locking yoke mount.

**Specifications**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Response</td>
<td>50 to 20,000 Hz</td>
</tr>
<tr>
<td>Polar Pattern</td>
<td>Cardioid</td>
</tr>
<tr>
<td>Electromagnetic Hum Sensitivity</td>
<td>60 Hz: 11 dB 500 Hz: 24 dB 1 kHz: 33 dB</td>
</tr>
<tr>
<td>Impedance</td>
<td>150 ohms for connection to microphone inputs rated at 19 to 300 ohms.</td>
</tr>
<tr>
<td>Output Level (at 1,000 Hz)</td>
<td>Open Circuit Voltage: – 59.0 dB (1.12 mV)</td>
</tr>
<tr>
<td>Switches</td>
<td>Bass rolloff and mid-range emphasis (presence boost) controls with graphic display of response setting</td>
</tr>
<tr>
<td>Cartridge Shock Mount</td>
<td>Internal air suspension shock and vibration isolator</td>
</tr>
<tr>
<td>Microphone Connector</td>
<td>Three-pin professional audio (XLR)</td>
</tr>
<tr>
<td>Swivel Assembly</td>
<td>Integrated, captive nut for ease of attachment to stand, fits 5/8 in.-27 thread</td>
</tr>
<tr>
<td>Polarity</td>
<td>Positive pressure on diaphragm produces positive voltage on pin 2 relative to pin 3</td>
</tr>
<tr>
<td>Case</td>
<td>Dark gray enamel aluminum and steel case with dark gray foam windscreen</td>
</tr>
<tr>
<td>Net Weight</td>
<td>765.4 grams (1 lb, 11 oz)</td>
</tr>
</tbody>
</table>

**Optional Accessories and Replacement Parts**

| SM7B | Includes foam windscreen, close-talk windscreen, and locking yoke mount. |
| A7WS | Large Close-Talk Windscreen |
| RPM106 | Replacement Cartridge |
| 537A | Desk Stand |
| RK345 | Microphone Windscreen |

**Polar pattern**

**Frequency response**
**General Description**

The MD 421 II is one of the best known microphones in the world. Its excellent sound qualities enable it to cope with the most diverse recording conditions and broadcasting applications. The five position bass control enhances its 'all-round' qualities. Colour: black.

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**Features**

- Rugged professional microphone
- Five position bass roll-off switch
- Effective feedback rejection
- Clear sound reproduction
- Easy handling due to pronounced directivity
- Delivery includes: 1 MD 421 II
  1 microphone clamp for 3/8" thread

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**Technical Data**

- **Pick-up pattern**: cardioid
- **Frequency response**: 30 – 17,000 Hz
- **Sensitivity (free field, no load, 1 kHz)**: 2 mV/Pa ± 3 dB
- **Nominal impedance**: 200 \(\Omega\)
- **Min. terminating impedance**: 200 \(\Omega\)
- **Dimensions**: 215 x 46 x 49 mm
- **Weight**: approx. 385 g

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**Profile**

Cardioid studio microphone, five-position bass control, frequency response 30 – 17,000 Hz, sensitivity (free field, no load) 2 mV/Pa ± 3 dB at 1 kHz, nominal impedance 200 \(\Omega\), min. terminating impedance 200 \(\Omega\), dimensions 215 x 46 x 49 mm, weight approx. 385 g.
MD 421-II


MERKMALE

• Gute Rückkopplungs- und Körperschalldämpfung
• Transparente Klangwiedergabe
• Ausgeprägte Richtcharakteristik mit weitem Öffnungswinkel
• Robust
• 5-stufiger Baßeinsteller
• Verriegelbare Stativhalterung

EMPFOHLENES ZUBEHÖR

Tischfüße: MZT 441, (Art.-Nr. 00799); MZT 100 (Art.-Nr. 01883).
Windschutze: MZW 40 (Art.-Nr. 01794); MZW 421: grau (Art.-Nr. 00536); blau (Art.-Nr. 01527); rot (Art.-Nr. 1530)

TECHNISCHE DATEN

Übertragungsbereich 30 - 17.000 Hz
Akustische Arbeitsweise Druckgradientenempfänger
Richtcharakteristik Niere
Max. Auslöschung bei 180º 18 dB - 2 dB
Feldleerlauf-Übertragungsfaktor 2 mV / Pa (= -54 dBV) ± 2,5 dB
Elektrische Impedanz 200 Ω
Minimale Abschlußimpedanz 200 Ω
Magnetfeldstörfaktor 50 Hz < 5 µV / 5 µT
Abmesungen in mm 215 x 46 x 49
Gewicht ca. 385 g
Lieferumfang 1 Mikrofon,
1 Stativhalterung
1 Adapter 3/8" → 5/8"

Änderungen vorbehalten.
MD 421-II

Dynamic microphone with cardioid-shaped directional characteristic. Suitable for vocal transmission and miking up instruments in all fields of live sound transmission.

ITS FEATURES

- Good feedback and handling noise rejection
- Transparent sound reproduction
- Pronounced directional characteristic
- Robust
- 5 step roll-off filter
- Lockable stand holder

RECOMMENDED ACCESSORIES

Desk stands: MZT 441, (art.-no. 00799); MZT 100 (art.-no. 01883).
Windscreens: MZW 40 (art.-no. 01794); MZW 421: grey(art.-no. 00536); blue (art.-no. 01527); red (art.-no. 01530)

TECHNICAL DATA

Frequency response 30 - 17,000 Hz
Acoustical mode of operation pressure gradient transducer
Directional characteristic cardioid
Max. rejection at 180° 18 dB - 2 dB
Open circuit output level 2 mV / Pa (= -54 dBV) ± 2,5 dB
Electrical impedance 200 Ω
Minimum load impedance 200 Ω
Insentivity to magnetic field at 50 Hz < 5 μV / 5 μT
Dimensions in mm 215 x 46 x 49
Weight approx. 385 g
Delivery 1 microphone,
1 stand holder
1 adaptor 3/8" → 5/8"

Subject to alterations.
MD 421-II

Microphone directionnel dynamique à directivité cardioïde. Prévu pour la transmission vocale et instrumentale dans tous les domaines de la technique de transmission de sons en direct.

SES CARACTÉRISTIQUES

• Suppression de bruits de maniement et de réaction acoustique efficace
• Reproduction du son transparente
• Directivité prononcé avec un angle d’ouverture large
• Robuste
• Réglage des graves à 5 positions
• Fixation sur pied à verrouiller

ACCESSOIRES RECOMMANDÉS

Pieds de table: MZT 441, (no. d’art. 00799); MZT 100 (no. d’art. 01883).
Bonnettes anti-vent: MZW 40 (no. d’art. 01794); MZW 421: gris (no. d’art. 00536); bleu (no. d’art. 01527); rouge (no. d’art. 1530)

CARACTÉRISTIQUES TECHNIQUES

Bande passante 30 - 17 000 Hz
Principe acoustique capteur de gradient
directivité cardioïde
Degré de directivité max. 180° 18 dB - 2 dB
Facteur de transmission à vide 2 mV / Pa (= -54 dBV) ± 2,5 dB
Impédance 200 Ω
Impédance minimale de charge magnétiques à 50 Hz 200 Ω
< 5 µV / 5 µT
Dimensions en mm 215 x 46 x 49
Poids env. 385 g
Livraison 1 microphone,
1 fixation sur pied
1 adaptateur 3/8" → 5/8"

Modifications réservées.
MD 421-II

Microfono diretivo dinamico con caratteristica a cardioide; di impiego universale in tutti i campi della trasmissione sonora (vocale, instrumentale).

CARATTERISTICHE

- Ottime caratteristiche anti-Larsen e di attenuazione dei rumori da contatto fisico
- Suono trasparente
- Accentuata caratteristica direttiva con ampio angolo di apertura
- Robusto
- Regolatore dei bassi a 5 posizioni
- Supporto stativo lucchettabile

ACCESSORI CONSIGLIATI

**Base da tavolo:** MZT 441, (art. n. 00799); MZT 100 (art. n. 01883).

**Cuffie antivento:** MZW 40 (art. n. 01794); MZW 421: grigio (art. n. 00536); azzurro (art. n. 01527); rosso (art. n. 1530)

DATI TECNICI

- Gamma di frequenza: 30 - 17 000 Hz
- Caratteristica acustica: transduttore a gradiente di pressione cardioide
- Direttività
- Cancellazione max. a 180°: 18 dB - 2 dB
- Coefficiente di trasmissione a vuoto: 2 mV / Pa (≈ -54 dBV) ± 2,5 dB
- Impedenza elettrica: 200 Ω
- Impedenza min. d’uscita: 200 Ω
- Coefficiente di disturbo in campo magnetico a 50 Hz: < 5 μV / 5 μT
- Dimensioni in mm: 215 x 46 x 49
- Peso: ca. 385 g
- Dotazione di fornitura: 1 microfono, 1 supporto stativo, 1 adattatore 3/8" → 5/8"

Con riserva di modifiche.
MD 421-II

Micrófono con característica direccional cardioide. Puede ser empleado para transmisión de lenguaje hablada o de canto, así como para sonido de instrumentos en todos los campos de la técnica de transmisión de sonido

CARACTERÍSTICAS

• buena amortiguación de la retroalimentación y de los ruidos corporales
• reproducción transparente del sonido
• característica acentuadamente direccional con ángulo de apertura amplio
• robusto
• reglaje de bajos con 5 stapas
• soporte para trípode enclavable

ACCESORIOS RECOMENDADOS

Pies de sobremsa: MZT 441, (Art.-Nr. 00799); MZT 100 (Art.-Nr. 01883).
Protección antiviento: MZW 40 (Art.-Nr. 01794); MZW 421: gris (Art.-Nr. 00536); azul (Art.-Nr. 01527); rojo (Art.-Nr. 01530)

DATOS TÉCNICOS

<table>
<thead>
<tr>
<th>Característica</th>
<th>Valor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respuesta</td>
<td>30 - 17 000 Hz</td>
</tr>
<tr>
<td>Funcionamiento acustico</td>
<td>receptor de gradiente de presión</td>
</tr>
<tr>
<td>Característica direccional</td>
<td>cardioide</td>
</tr>
<tr>
<td>Atenuación máxima 180°</td>
<td>18 dB - 2 dB</td>
</tr>
<tr>
<td>Factor de transmisión de campo an</td>
<td></td>
</tr>
<tr>
<td>circuito abierto</td>
<td>2 mV / Pa (= -54 dBV) ± 2,5 dB</td>
</tr>
<tr>
<td>Impedancia eléctrica</td>
<td>200 Ω</td>
</tr>
<tr>
<td>Impedancia terminal</td>
<td>200 Ω</td>
</tr>
<tr>
<td>Factor de interferencia magnética a 50 Hz</td>
<td>&lt; 5 μV / 5 μT</td>
</tr>
<tr>
<td>Dimensiones en mm</td>
<td>215 x 46 x 49</td>
</tr>
<tr>
<td>Peso</td>
<td>unos 385 g</td>
</tr>
<tr>
<td>Extensión del suministro</td>
<td>1 Micrófono,</td>
</tr>
<tr>
<td></td>
<td>1 soporte para trípode</td>
</tr>
<tr>
<td></td>
<td>1 adaptador 3/8&quot; → 5/8&quot;</td>
</tr>
</tbody>
</table>

Reservado el derecho a modificaciones.
MD 421-II

Dynamische richtmicrofoon met nierenkarakteristiek. Geschikt voor de overdracht van gezang/gesproken woord en instrumenten in alle bereiken van de geluidsoverdrachtstechniek.

KENMERKEN

- Goede demping van terugkoppeling en lichaamsakoestiek
- Transparante klankweergave
- Geprononceerde richtkarakteristiek met brede openingshoek
- Robuust
- 5-traps-basinstelling
- Vergrendelbare statiefhouder 3/8”

AANBEVOLEN ACCESSOIRES

**Tafelpoten:** MZT 441, (Art. Nr. 00799); MZT 100 (Art.Nr. 01883)

**Windscherm:** MZW 40 (Art. Nr. 01794); MZW 421: grijs (Art.Nr. 00536) blauw (Art.Nr. 01527); rood (Art.Nr. 01530)

TECHNISCHE GEGEVENS

- **Frequentieweergave**: 30-17.000 Hz
- **Akoestische werkwijze**: Drukgradiënt-ontvanger
- **Richtkarakteristiek**: Nier
- **Max. uitdoving bij 180°**: 18 dB-2dB
- **Onbelaste werking**
- **Frequentiefactor veld**: 2 mV/Pa (=54 dBV) +/- 2,5 dB
- **Elektrische impedantie**: 200W
- **Minimum afsluitimpedantie**: 200W
- **Magneetveld-Storingsfactor 50 Hz**: < 5 μV / 5 μT
- **Afmetingen in mm**: 215 x 46 x 49
- **Gewicht**: ca. 385 g
- **Leveromvang**: 1 microfoon
- **1 statiefhouder**
- **1 adapter 3/8" → 5/8"

Wijzigingen voorbehouden
Anschluß
Connecting the microphone
Connexion
Collegamento
Conexión
Aansluiting

Frequenzkurve
Frequency response
Réponse en fréquence
Risposta in frequenza
Respuesta en frecuencia
Frequentiekromme

Wirkung des Baßeinstellers
Effect of the roll-off filter
Effet du filtre roll-off
Effetto del filtro roll-off
Efecto del filtro roll-off
Werking van de basinstelling
Key Features:
- Favorite of broadcast show hosts and voice-over studios
- Ideal for instrument recording, especially kick drums and acoustic guitars
- Studio condenser response yet no powering required and immune to overloading
- Large Acoustalloy diaphragm and low-mass aluminum voice-coil
- Dual-ported, continuously Variable-D® with minimal proximity effect
- Steel case and hum-bucking coil provide exceptional magnetic shielding

General Description:
The Electro-Voice RE20 is a professional-quality dynamic cardioid microphone created specially for recording, broadcast and sound-reinforcement applications requiring essentially flat response over a very wide frequency range. The wide frequency response, coupled with excellent transient response, make the RE20 easily comparable to the finest condenser cardioid microphones and an easily operated “bass tilt down” switch corrects spectrum balance for use in long-reach situations or other applications where bass attenuation is needed.

A true cardioid microphone, the RE20 offers greatest rejection at 180° off axis - directly to the rear of the microphone. Pattern control is so consistent that the frequency response is nearly independent of angular location of the sound source, creating virtually no off-axis coloration, yet providing greatest possible rejection of unwanted sounds. An integral blast and wind filter covers each acoustic opening on the RE20. In recording sessions or on stage, singers can “close talk” the microphone, singing with their lips almost touching the grille screen with no worry of “P-pops” or excessive sibilance. Part of the filter also shock mounts the internal microphone element, reducing the transfer of vibrations from external sources. The exceptional performance of the RE20 is achieved by using a large Acoustalloy diaphragm in combination with an exceptionally low-mass aluminum voice coil. Using this diaphragm assembly, the RE20 is capable of reproducing extremely high sound pressure levels with no fear of the overload and distortion often experienced with phantom-powered condensers. The RE20 will also continue to function flawlessly in high humidity and elevated temperatures that would seriously degrade competitive condenser microphones. A massive steel housing and effective hum-bucking coil assure the RE20’s resistance to magnetically induced hum and noise. This means the RE20 can be used successfully in situations where other microphones would experience unacceptable levels of hum and buzz.

Technical Specifications:

<table>
<thead>
<tr>
<th>Element Type:</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Response:</td>
<td>45 Hz - 18,000 Hz</td>
</tr>
<tr>
<td>Polar Pattern:</td>
<td>Cardioid</td>
</tr>
<tr>
<td>Impedance:</td>
<td>150 ohms balanced</td>
</tr>
<tr>
<td>Sensitivity, Open Circuit Voltage, 1 kHz:</td>
<td>1.5 mV/pascal</td>
</tr>
<tr>
<td>Hum Pickup Level, typical (60 Hz/1 millioersted field):</td>
<td>-130 dBm</td>
</tr>
<tr>
<td>Polarity:</td>
<td>Pin 2 will be positive referenced to Pin 3 with positive pressure on diaphragm</td>
</tr>
<tr>
<td>Case Material:</td>
<td>Steel</td>
</tr>
<tr>
<td>Finish:</td>
<td>Fawn beige</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>Length = 8.53” (216.7 mm)</td>
</tr>
<tr>
<td></td>
<td>Widest Diameter = 2.14” (54.4 mm)</td>
</tr>
<tr>
<td></td>
<td>Body Diameter = 1.94” (49.2 mm)</td>
</tr>
<tr>
<td>Net Weight:</td>
<td>1 lb, 10 oz (737 g)</td>
</tr>
<tr>
<td>Shipping Weight:</td>
<td>3 lb, 4 oz (1474 g)</td>
</tr>
<tr>
<td>Accessories Included:</td>
<td>81715 stand clamp</td>
</tr>
<tr>
<td>Optional Accessories:</td>
<td>309A shock-mounted stand adapter for use with floor stand or recording boom</td>
</tr>
</tbody>
</table>

By exploiting the strength of its steel housing and employing a mechanical nesting concept, EV designers have created an exceptionally rugged microphone with superior handling noise rejection ideally suited for professional uses.
General Description (cont’):
The bass-boosting proximity effect common to most directional microphones when used close to the sound source, is eliminated in the RE20. This is accomplished via the application of the EV-exclusive Variable-D® technology. By controlling the effect of microphone proximity, the RE20 can be located very close to sound sources without a loss in clarity or definition making the RE20 ideal for tight vocals and challenging instruments. It can be used inside bass drums, on acoustic guitars, and is found in voice booths and broadcasting studios everywhere.

Architects’ and Engineers’ Specifications:
The microphone shall be a cardioid type with integral blast filter protecting all acoustic openings. The blast filter shall also serve as a shock mount for the internal microphone element. The microphone shall have a wide-range uniform frequency response from 45-18,000 Hz. An integral passive network shall be provided so that when the filter switch is in the “on” position, low-frequency response shall tilt down 4.5 dB from 400-100 Hz. With switch in “off” position, microphone shall be essentially “flat” from 80-6,000 Hz, with a broad 2.5 dB rise in response from 6,000-14,000 Hz, and nominally down 3 dB at 18,000 Hz. Response below 80 Hz shall be nominally down 3 dB at 45 Hz. Output level shall be 1.5mV/Pascal. Nominal impedance of 150 ohms. Response at any angular position away from the major axis shall be essentially similar to the response on the major axis, but attenuated uniformly at all frequencies by an amount appropriate to that angular position. Attenuation at frequencies from 45-10,000 Hz (refer to major axis signal value) shall exceed 15 dB at 180° from major axis in any plane. Attenuation above 10,000 Hz shall exceed 13 dB. Polar characteristics shall be sufficiently uniform in all planes so that it is, effectively, a cardioid of revolution. There shall be a shield to prevent dust and iron particles from reaching the diaphragm. The case shall be made of steel. The microphone shall have a maximum diameter of 54.4 mm (2.14 in.), a body diameter of 49.2 mm (1.94 in.) and a length of 216.7 mm (8.53 in.). Finish shall be a nonreflecting fawn beige. A stand adapter shall be supplied. The Electro-Voice RE20 is specified.

Dimension Drawing:

RE20 Part Numbers
• 16207816 RE20, Dynamic Cardioid Microphone
ENGINEERING DATA

- Dynamic ribbon microphone
- True hypercardioid characteristic
- Unique four stage integral blast filter
- Robust all metal case
- "Standard" setting specification consistency
- Lockable ON-OFF-switch with M 500 N(C)S

DESCRIPTION AND APPLICATIONS

The beyerdynamic model M 500 is a true hypercardioid dynamic ribbon microphone with wide range response and high output, created especially for the most exacting professional use. Emphasizing a major technological breakthrough in ribbon design technique, the M 500 is particularly suited for high level sound applications. The unique beyerdynamic ribbon used in the M 500 measures only 0.85" in length, and weighs only 0.00034 grammes. The transducer mass is, therefore, a mere fraction of that of the speech coil and diaphragm of a moving coil microphone, and this results in a demonstratively better transient response. An improved "no feedback" characteristic is also obtained, and this is particularly important in commercial sound applications.

The M 500 print out shows the rising high frequency response so essential to modern music artists and others, the result of months of research and design innovation. In this respect, the M 500 is unlike the standard beyerdynamic ribbon, which is essentially flat in response. A new and unique four stage integral blast filter permits hand held use with lips almost touching the microphone without danger of popping, hissing and breathing sounds.

The M 500 was primarily developed to cover the special needs of pop vocalists and instrumentalists, and records the true sound of the music in absolute fidelity. It combines the sharp attack of a condenser and the sturdy reliability of a moving coil with the unique presence of a ribbon. The M 500 is designed to withstand the rigors of professional use, will accept sound levels of more than 130 db and is completely unaffected by extremes of atmospheric conditions.
This polar pattern and frequency response curve correspond to typical machine run specifications from a standard M 500.

**SPECIFICATIONS**

**Operating principle:** pressure gradient

**Frequency response:** 40 - 18,000 Hz.

**Polar pattern:** hypercardioid

**Side attenuation at 120° and 1 kHz:** > 20 db

**Open circuit voltage at 1 kHz:** 1,2 mV/Pa ≤ -58 dB

**Output level:** ≤ -57 dbm (0 dbm = 1 mW/Pa)

**EIA Sensitivity rating:** -150 dbm

**Nominal impedance:** 200 ohms

**Load impedance:** > 1,000 ohms

**Diaphragm (ribbon):** pure aluminum

**Case:** aluminum

**Case finish:** matte black anodized

**Net weight (less cord):** 9.52 ounces (270 grams)

**Built-in male connector:** Cannon XLR or equivalent (wiring: 1 ground, audio 2+, 3-)

**OPTIONAL ACCESSORIES**

- **Cable:** type MVK N(C), 7.5 m, two conductor, shielded, broadcast type, synthetic rubber-jacketed. Professional three-pin female audio connector on microphone end (mates with Cannon XLR series or equivalent connector), but without connector at the equipment end of the cable, leads white (inphase) and blue.

- **Microphone clamp:** quick release clamp MKV 6

- **Pop screen:** PS 500

- **Gooseneck:** SH 15/400 N(C)

**FURNISHED ACCESSORIES**

- **Carrying case:** black de luxe leatherette presentation case

- **Swivel adapter:** MKV 8

**ARCHITECTS’ AND ENGINEERS’ SPECIFICATIONS**

The microphone shall be an unidirectional (dynamic) type microphone with a frequency range of 40 - 18,000 Hz. The generating element of this unit shall be a ribbon transducer. The microphone shall have a true hypercardioid polar characteristic with attenuation at 120° of 20 db. The microphone output shall be -57 dbm when 0 dbm = 1 mW/Pa respectively 1,2 mV/Pa. EIA sensitivity rating at 1,000 Hz shall be -150 dbm. Nominal impedance shall be 200 ohms. The case shall be made of aluminum. Case finish shall be matteblack anodized. The overall dimensions shall be: 7.28” (185 mm) in length, diameter of the head 2.22” (56.5 mm) and diameter of the conical shaft 1.34” (34 mm) / 0.95” (24 mm).

The microphone shall be available with a three-pin male audio connector (Cannon XLR or equivalent) version M 500 N(C) S with a lockable ON-OFF-switch. The beyerdynamic M 500 is specified.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 3-01-00</td>
<td>DIN Einbaustecker</td>
<td>Base plug assembly DIN</td>
</tr>
<tr>
<td>B 4-45-00</td>
<td>System mit Bändchen</td>
<td>System with ribbon</td>
</tr>
<tr>
<td>B 11-03-00</td>
<td>Schallführung</td>
<td>Sound system</td>
</tr>
<tr>
<td>B 13-16-00</td>
<td>Unterkorb</td>
<td>Lower basket</td>
</tr>
<tr>
<td>B 13.2-17-00</td>
<td>Oberkorb</td>
<td>Upper basket</td>
</tr>
<tr>
<td>BN 17-148/B</td>
<td>Gehäuse</td>
<td>Barrel</td>
</tr>
<tr>
<td>BN 18-02/H</td>
<td>Anschlußstück DIN</td>
<td>Base plug housing DIN</td>
</tr>
<tr>
<td>BN 18-16/E</td>
<td>Anschlußstück Cannon</td>
<td>Base plug housing Cannon</td>
</tr>
<tr>
<td>BN 21-23/A</td>
<td>Korbschraube</td>
<td>Basket screw</td>
</tr>
<tr>
<td>BN 35-144</td>
<td>Typenschild, aufgerollt „N“</td>
<td>Serial number band, rolled up „N“</td>
</tr>
<tr>
<td>BN 35-185</td>
<td>Typenschild, aufgerollt „C“</td>
<td>Serial number band, rolled up „C“</td>
</tr>
<tr>
<td>BN 41-45/A</td>
<td>Streifen</td>
<td>Strip</td>
</tr>
<tr>
<td>BN 74-01/A</td>
<td>Bändchen (1 Stück) geprägt</td>
<td>Ribbon (1 piece) ready to mount</td>
</tr>
<tr>
<td>M 1,4 x 3 DIN 964-5,8 Phr C</td>
<td>Linsensenschraube</td>
<td>Counter sunk screw</td>
</tr>
<tr>
<td>M 1,7 x 4 DIN 964-5,8 Phr C</td>
<td>Linsensenschraube</td>
<td>Counter sunk screw</td>
</tr>
<tr>
<td>B 1,5 x 0,7 DIN 40621, rot</td>
<td>Isolierringe</td>
<td>Insulated tubing, red</td>
</tr>
<tr>
<td>TR 45 BV 35888</td>
<td>Übertrager</td>
<td>Transformer</td>
</tr>
<tr>
<td>TR 45 BV 35876</td>
<td>Übertrager</td>
<td>Transformer</td>
</tr>
<tr>
<td></td>
<td>Verpackung M 500 N</td>
<td>Box M 500 N</td>
</tr>
<tr>
<td></td>
<td>Verpackung M 500 N (C)</td>
<td>Carrying case M 500 N (C)</td>
</tr>
</tbody>
</table>
Instruction manual
C

125 Hz
250 Hz
500 Hz
1,000 Hz
2,000 Hz
4,000 Hz
8,000 Hz
16,000 Hz

30°
0°
180°
120°
90°
60°
30°
150°
120°
90°
60°
30°

0, 1 m
0, 5 cm
Important safety information

• Please read this instruction manual carefully and completely before using the product.
• Make this instruction manual easily accessible to all users at all times.
• Always include this instruction manual when passing the product on to third parties.

Before operation

• Never open the housing of the product. If products are opened by customers in breach of this instruction, the warranty becomes null and void.
• Only use attachments, accessories or spare parts specified by Sennheiser.

During operation

• Liquids entering the product can short-circuit the electronics or damage the mechanics. Keep all liquids away from the product.
• Solvents or cleansing agents can damage the surface of the product. Only use a soft, slightly damp cloth to clean the product.
• Do not expose the product to extreme temperatures.

After operation

• Handle the product with care and store it in a clean, dust-free environment.

Intended use

Intended use includes:

• having read this instruction manual, especially the chapter “Important safety information”,
• using the product within the operating conditions and limitations described in this instruction manual.

“Improper use” means using the product other than as described in this instruction manual, or under operating conditions which differ from those described herein.
The e 604

A clip-on classic with character

Character instead of mainstream. Close to the attack, robust, easy to handle: the e 604 has long been a classic on the rims of tom-toms and snares the world over. Thanks to the practical clip-on microphone clamp, the microphone can be mounted in seconds and positioned however you choose.

Lightly emphasized in the upper mids and highs, the e 604 provides a forceful sound, open and clear in the lows. The snare receives a warm to dynamic presence; woodwind instruments also receive a marked spaciousness. This is no surprise since the sound design is based on the legendary MD 421 microphone.

Features

• Compact dynamic microphone
• Handles extreme sound pressure levels (over 160 dB) without distortion
• Impact-resistant fiberglass reinforced housing
• Extremely simple handling and flexible positioning
• Low sensitivity to handling noise
• Very low inherent self-noise
• Humbucking coil
• Integral stand mount

Package contents

1 microphone e 604
1 MZH 604 microphone clamp
1 pouch
1 instruction manual

Product overview A

1 Sound inlet basket
2 Microphone clamp
3 XLR-3 connector

• Diagrams can be found on the cover pages.
**Using the microphone**

**Positioning the microphone on a drum B**

- Use the microphone clamp to attach the e 604 to the rim of the drum.

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Resulting sound</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1</td>
<td>• More fundamental</td>
<td>Position on the drum:</td>
</tr>
<tr>
<td></td>
<td>• Little overtones</td>
<td>3 to 5 cm above the drumskin</td>
</tr>
<tr>
<td>B.2</td>
<td>• Less fundamental</td>
<td>The fundamental to overtones ratio can be adjusted by changing the angle of</td>
</tr>
<tr>
<td></td>
<td>• Many overtones</td>
<td>the microphone. The most balanced results are obtained at an angle of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 to 60°.</td>
</tr>
<tr>
<td>B.3</td>
<td></td>
<td>Use of a second 604 for picking up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the bottom of the drumskin and the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>snares.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NB: The lower microphone must</td>
</tr>
<tr>
<td></td>
<td></td>
<td>be phase-reversed to avoid phase-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cancellation effects due to the second</td>
</tr>
<tr>
<td></td>
<td></td>
<td>microphone being on the other side of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the drumskin.</td>
</tr>
</tbody>
</table>

**Positioning the monitor loudspeakers**

- To prevent feedback and crosstalk, position your monitor loudspeakers in the angle area of the highest cancellation of the microphone (approx. 135°).

**Cleaning and maintaining the e 604**

**Caution**

Liquids can damage the electronics of the product!

- Liquids entering the housing of the product can cause a short-circuit and damage the electronics.
- Keep all liquids away from the product.
- Do not use any solvents or cleansing agents.

- Only use a soft, slightly damp cloth to clean the product.
Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transducer principle</td>
<td>dynamic</td>
</tr>
<tr>
<td>Frequency response</td>
<td>40 ... 18,000 Hz</td>
</tr>
<tr>
<td>Pick-up pattern</td>
<td>cardioid</td>
</tr>
<tr>
<td>Sensitivity (free field, no load at 1 kHz)</td>
<td>1.8 mV/Pa</td>
</tr>
<tr>
<td>Nominal impedance (at 1 kHz)</td>
<td>350 Ω</td>
</tr>
<tr>
<td>Min. terminating impedance</td>
<td>1 kΩ</td>
</tr>
<tr>
<td>Connector</td>
<td>XLR-3</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Ø 33 x L 59 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>60 g</td>
</tr>
</tbody>
</table>

The polar diagram and the frequency response curve C can be found on the cover pages.

Connector assignment

![Connector assignment diagram]
Warranty

Sennheiser electronic GmbH & Co. KG gives a warranty of 24 months on this product.

For the current warranty conditions, please visit our website at www.sennheiser.com or contact your Sennheiser partner.

FOR AUSTRALIA ONLY

Sennheiser goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

This warranty is in addition to other rights or remedies under law. Nothing in this warranty excludes, limits or modifies any liability of Sennheiser which is imposed by law, or limits or modifies any remedy available to the consumer which is granted by law.

To make a claim under this warranty, contact Sennheiser Australia Pty Ltd, Unit 3, 31 Gibbes Street Chatswood NSW 2067, AUSTRALIA.

Phone: (02) 9910 6700, email: service@sennheiser.com.au.

All expenses of claiming the warranty will be borne by the person making the claim.

The Sennheiser International Warranty is provided by Sennheiser Australia Pty Ltd (ABN 68 165 388 312), Unit 3, 31 Gibbes Street Chatswood NSW 2067 Australia.

In compliance with the following requirements

- WEEE Directive (2012/19/EU)
- RoHS Directive (2011/65/EU)

Please dispose of this product at the end of its operational lifetime by taking it to your local collection point or recycling center for such equipment.

CE Declaration of Conformity

- RoHS Directive (2011/65/EU)

The declaration is available at www.sennheiser.com.
Key Features:
- Designed specifically for kick drum applications in live or studio environments
- Optimized sensitivity for the high sound pressure levels found in bass drum micing
- Extended low-frequency response
- No additional EQ required
- Rugged steel construction for exceptional durability

General Description:
The N/D868 is truly a top performer in any application. Whether in a live sound or studio environment, the N/D868 is able to handle incredibly high sound pressure levels without distortion or overriding the input mixer. With a response specifically designed to “kick” the N/D868 can be used “as is”—no additional EQ required. Electrovoice was the first to utilize the neodymium magnet structure, and it remains at the heart of our new N/DYM series of microphones. Experience the leader again for the first time and hear the difference.

Operation
The low frequency response of the N/D868 microphone varies with the distance from the sound source. Known as “proximity effect,” maximum bass response is produced in “close-up” use with the microphone 1/4 inch from the sound source. Normal bass response is experienced with working distances greater than 24 inches. Working close to the microphone will produce a more robust sound. Close up positioning of the microphone will also reduce the potential for feedback from the sound reinforcement system. Then, the bass-boost provides an increase in overall microphone output level. The mixer gain may be proportionately reduced, resulting in a reduction of the system’s sensitivity to feedback caused by sound entering the microphone from the loudspeakers.

Technical Specifications:

<table>
<thead>
<tr>
<th>Element</th>
<th>Dynamic N/DYM® magnet structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freq. Response, Close</td>
<td>20 Hz - 10,000 Hz</td>
</tr>
<tr>
<td>Polar Pattern</td>
<td>Cardioid</td>
</tr>
<tr>
<td>Sensitivity, Open Circuit Voltage @ 1 kHz</td>
<td>1.0 mV/pascal</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>144 dB</td>
</tr>
<tr>
<td>Polarity</td>
<td>Positive pressure on diaphragm causes positive voltage on pin2 ref. pin3</td>
</tr>
<tr>
<td>Impedance</td>
<td>150 ohms balanced (low-z)</td>
</tr>
<tr>
<td>Microphone Connector</td>
<td>3-pin, XLR-type</td>
</tr>
<tr>
<td>Finish</td>
<td>Non-reflecting black</td>
</tr>
<tr>
<td>Materials</td>
<td>Memraflex™ grille screen Steel Case</td>
</tr>
<tr>
<td>Accessories Included</td>
<td>320 Stand Adapter, Soft Zippered “Gig” Bag</td>
</tr>
<tr>
<td>Dimensions, Length</td>
<td>5.22” (132.6 mm)</td>
</tr>
<tr>
<td>Diameter</td>
<td>2.36” (60 mm)</td>
</tr>
<tr>
<td>Shank</td>
<td>1.0” (25.4 mm)</td>
</tr>
<tr>
<td>Net Weight</td>
<td>10.4 oz (295 g)</td>
</tr>
<tr>
<td>Shipping Weight</td>
<td>26.5 oz (750 g)</td>
</tr>
</tbody>
</table>
Microphone Use and Placement

Please note that micing techniques are a matter of personal preference. These are merely guidelines to assist in the placement of the microphone to gain optimal performance.

**Usage**

Kick Drum

**Optimal Placement**

Remove drum head and damp with a pillow or blanket. Position the mic on the pillow or blanket a few inches in front of the drum beater. As an alternative, position the mic on a small boom stand with the mic extended into the drum and at a 90° angle to the drum beater.

---

Standard Placement & Use Guidelines

1. Always point the microphone at the desired source of sound, and away from any unwanted sources.
2. The microphone should be located close to the sound source to minimize interference from other potential sound sources.
3. Use the 3-to-1 rule when using multiple microphones. Place each microphone three times farther from other microphones as from the desired sound source.
4. Minimize over-handling of the microphone to reduce unwanted mechanical noise.
5. Working close to the microphone will increase the bass tone and also provide increased gain-before-feedback.
AT4049b OMNIDIRECTIONAL CONDENSER MICROPHONE

• Specially engineered to meet the most critical acoustic requirements of professional recording, broadcast and sound reinforcement

• Direct-coupled, balanced output results in a clean signal even under high-output conditions

• Transformerless circuitry virtually eliminates low-frequency distortion and provides superior correlation of high-speed transients

• Switchable 80 Hz hi-pass filter and 10 dB pad

• Rugged turned-brass microphone housing for enduring dependability

• State-of-the-art design and manufacturing techniques ensure compliance with A-T's stringent consistency and reliability standards

The AT4049b is intended for use in professional applications where remote power is available. It requires 48V DC phantom power, which may be provided by a mixer or console, or by a separate, in-line source such as the Audio-Technica AT8801 single-channel or CP8506 four-channel phantom power supplies.

Output from the microphone’s XLRM-type connector is low impedance (Lo-Z) balanced. The signal appears across Pins 2 and 3; Pin 1 is ground (shield). Output phase is “Pin 2 hot” – positive acoustic pressure produces positive voltage at Pin 2.

To avoid phase cancellation and poor sound, all mic cables must be wired consistently: Pin 1-to-Pin 1, etc.

An integral 80 Hz hi-pass filter provides easy switching from a flat frequency response to a low-end roll-off. The high-pass position reduces the microphone’s sensitivity to popping in close vocal use. It also reduces the pickup of low-frequency ambient noise (such as traffic, air-handling systems, etc.), room reverberation and mechanically coupled vibrations.

The AT4049b consists of two modular subassemblies: an AT4900b-48 body and an AT4049b-EL head capsule (both available separately). Additional interchangeable capsules are available in cardioid (AT4051b-EL) and hypercardioid (AT4053b-EL).

Avoid leaving the microphone in the open sun or in areas where temperatures exceed 110° F (43° C) for extended periods. Extremely high humidity should also be avoided.

AT4049b SPECIFICATIONS†

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>Externally polarized (DC bias) capacitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLAR PATTERN</td>
<td>Omnidirectional</td>
</tr>
<tr>
<td>FREQUENCY RESPONSE</td>
<td>20-20,000 Hz</td>
</tr>
<tr>
<td>LOW FREQUENCY ROLL-OFF</td>
<td>80 Hz, 12 dB/octave</td>
</tr>
<tr>
<td>OPEN CIRCUIT SENSITIVITY</td>
<td>–34 dB (19.9 mV) re 1V at 1 Pa*</td>
</tr>
<tr>
<td>IMPEDANCE</td>
<td>50 ohms</td>
</tr>
<tr>
<td>MAXIMUM INPUT SOUND LEVEL</td>
<td>145 dB SPL, 1 kHz at 1% T.H.D.; 155 dB SPL, with 10 dB pad (nominal)</td>
</tr>
<tr>
<td>NOISE†</td>
<td>16 dB SPL</td>
</tr>
<tr>
<td>DYNAMIC RANGE (typical)</td>
<td>129 dB, 1 kHz at Max SPL</td>
</tr>
<tr>
<td>SIGNAL-TO-NOISE RATIO†</td>
<td>78 dB, 1 kHz at 1 Pa*</td>
</tr>
<tr>
<td>PHANTOM POWER REQUIREMENTS</td>
<td>48V DC, 4.8 mA typical</td>
</tr>
<tr>
<td>SWITCHES</td>
<td>Flat, roll-off; 10 dB pad (nominal)</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>130 g (4.6 oz)</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>155.0 mm (6.10”) long, 21.0 mm (0.83”) maximum body diameter</td>
</tr>
<tr>
<td>OUTPUT CONNECTOR</td>
<td>Integral 3-pin XLRM-type</td>
</tr>
<tr>
<td>ACCESSORIES FURNISHED</td>
<td>AT8405a stand clamp for 5/8”-27 threaded stands; windscreen; protective carrying case</td>
</tr>
</tbody>
</table>

†In the interest of standards development, A.T.U.S. offers full details on its test methods to other industry professionals on request.

*1 Pascal = 10 dynes/cm² = 10 microbars = 94 dB SPL
† Typical, A-weighted, using Audio Precision System One.

Specifications are subject to change without notice.

Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224
Audio-Technica Limited, Old Lane, Leeds LS11 8AG England
www.audio-technica.com
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AT4049b OMNIDIRECTIONAL CONDENSER MICROPHONE

Polar Pattern

1.5 kHz

12 kHz

3 kHz

6 kHz

20 kHz

180°

90°

-180°

-90°

LEGEND

5 kHz

1 kHz

8 kHz

12" or more on axis

Roll-off

Frequency Response

Response in dB
The Josephson Engineering C42 is an all-purpose cardioid condenser microphone suitable for multiple recording applications including spot miking acoustic and amplified instruments, drums and drum overheads, ensemble and choir pickups, concert recording, sound effects and vocals. Standard C42 microphones are satin machined stainless steel for years of rugged use.

C42 electronics feature a selected discrete FET driving a fully balanced symmetrical transformerless discrete class-A output stage. The output impedance is low enough that very long cable runs may be used without signal degradation. Although the microphone is specified for full P48 phantom power, it will function with phantom power as low as 24 volts, with some limitation in maximum SPL.

A stereo kit, the C42MP, includes a matched pair of C42 microphones in matte black chrome finish and a protective hard shell case.

**Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Level, mV/Pa</td>
<td>5.8</td>
</tr>
<tr>
<td>Frequency Response (at 60 cm)</td>
<td>40-20,000 Hz ±2 dB from curve</td>
</tr>
<tr>
<td>Equivalent Noise Level, A-weighted</td>
<td>≤21 dB</td>
</tr>
<tr>
<td>Maximum SPL (with P48 power)</td>
<td>135 dB</td>
</tr>
<tr>
<td>Output Impedance</td>
<td>50Ω (recommended load ≥1KΩ)</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>P48 phantom power, 4.5 mA</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-10°C to +50°C</td>
</tr>
<tr>
<td>Dimensions</td>
<td>21mm diameter, 98mm long</td>
</tr>
<tr>
<td>Weight</td>
<td>80 grams (≤ 3 ounces)</td>
</tr>
<tr>
<td>Connector</td>
<td>3 pin XLR type, pin 2 positive polarity</td>
</tr>
</tbody>
</table>

JOSEPHSON ENGINEERING, Inc. 329A Ingalls St., Santa Cruz CA 95060 (831) 420-0888 www.josephson.com
Thank you for selecting the KSM141.
Over 75 years of audio experience has contributed to making the KSM141 one of the finest microphones available.

If you have any questions not answered in this booklet, please contact Shure Applications Engineering at 847-600-8440, Monday through Friday, from 8:00 am to 4:30 pm, CST. In Europe, call 49-7131-72140. Our web address is www.shure.com.
FIGURE 1. KSM141 CONDENSER MICROPHONE

GENERAL DESCRIPTION

The Shure® KSM141 is an end-addressed condenser microphone with mechanically switching dual polar patterns (cardioid and omnidirectional). Designed for studio use, yet rugged enough for live applications, the KSM141 can withstand extremely high sound pressure levels (SPL). Its low self-noise and extended frequency response make it ideal for recording musical instruments.

FEATURES

• A mechanical polar pattern switch for highly consistent cardioid and true omnidirectional polar patterns. Provides flexibility in a wide variety of recording applications.
• Ultra-thin, 2.5 μm, 24 karat gold-layered, low mass Mylar® diaphragm for superior transient response.
• Class A, discrete, transformerless preamplifier for transparency, extremely fast transient response, no crossover distortion, and minimal harmonic and intermodulation distortion.
• Premium electronic components, including gold-plated internal and external connectors.
• Subsonic filter eliminates low frequency rumble (less than 17 Hz) caused by mechanical vibration.
• Three-position switchable pad (0 dB, 15 dB, and 25 dB) for handling extremely high sound pressure levels (SPLs).
• Three-position switchable low-frequency filter to reduce background noise and counteract proximity effect.
PERFORMANCE CHARACTERISTICS

- Extended frequency response.
- Low self-noise.
- Exceptional reproduction of low-frequency sounds.
- Can withstand high sound pressure levels (SPL).
- High output level.
- No crossover distortion.
- Uniform polar response.
- Superior common mode rejection and suppression of RFI (radio frequency interference).

MODEL VARIATIONS

<table>
<thead>
<tr>
<th>KSM141/SL</th>
<th>KSM141/SL ST PAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>One KSM141 Condenser Microphone</td>
<td>Two KSM141 Condenser Microphones</td>
</tr>
<tr>
<td>One A141C Carrying Case</td>
<td>One A141SPC Carrying Case</td>
</tr>
<tr>
<td>One A100WS Windscreen</td>
<td>Two A100WS Windscreens</td>
</tr>
<tr>
<td>One A57F Stand Mount</td>
<td>Two A57F Stand Mounts</td>
</tr>
<tr>
<td>One European-threaded adapter that mates the A57F to European-threaded microphone stands</td>
<td>Two European-threaded adapters that mate the A57F to European-threaded microphone stands</td>
</tr>
</tbody>
</table>

APPLICATIONS

The KSM141 produces superior results in any application requiring a high quality microphone. Typical applications include:

- Close miking of acoustic instruments such as piano, guitar, violins, drums, and percussion
- Overhead miking of drums and percussion instruments
- Electric guitar amplifiers
- Brass and woodwind instruments
- Room ambience pick-up (guitar amplifier or drums)
- Orchestras, choirs, wind ensembles
- Low-frequency instruments such as double bass and kick drum

NOTE: Sound quality is strongly affected by microphone location and room acoustics. To achieve the best overall sound for a particular application, it may be necessary to experiment with microphone placement and various room treatments.
USING THE KSM141

Mounting the Microphone
To secure the KSM141 to a floor stand or boom, thread the mount onto the microphone stand and insert the microphone into the microphone clip.

Power Requirements
This microphone requires phantom power and performs best with a 48 Vdc supply (IEC-268-15/DIN 45 596). It can operate on voltages as low as 11 Vdc, but headroom and sensitivity will be decreased slightly.

NOTE: Most modern mixers provide phantom power.

Cable Connections
Use a cable with XLR connectors at each end.

Load Impedance
Shure recommends a load impedance of at least 1000 Ω. When used with modern microphone preamplifiers rated at about 2500 Ω, the KSM141 provides higher maximum SPL capability and output clipping level. When the attenuation switch is set to the -25 dB position, it can handle up to 164 dB SPL, and can output +15 dBV into a load of 5000 Ω or greater.

Selecting a Polar Pattern
To select either the cardioid or omnidirectional polar pattern, rotate the knurled ring on the microphone in either direction until you feel a detent. The image of the desired polar pattern should be directly above the notch at the base of the ring.

NOTE: Operating the KSM141 in a non-detent position (no polar pattern selected) will produce an unpredictable polar pattern and may adversely affect frequency response.

Cardioid. When this pattern is selected, the microphone picks up sounds directly in front of the microphone and is least sensitive to those in back. This is the most commonly used pattern in studio recording and live-sound applications. See Figure 4.

Omnidirectional. Picks up sounds from all directions. This pattern is best for picking up room ambience and for miking several sources, such as an ensemble or multiple singers, simultaneously. The omnidirectional polar pattern exhibits no proximity effect. See Figure 4.

WARNING: Rotating the polar pattern switch produces mechanical noise which, when amplified, may damage the loudspeakers. Turn down any loudspeakers or mute the microphone at the mixing console before changing the polar pattern.
Setting Low-Frequency Response

A three-position switch on the KSM141 lets you adjust the low frequency response of the microphone. The low frequency filters can be used to reduce wind noise, room noise, or proximity effect. Refer to Figure 2.

Flat response. This setting provides the most natural sound reproduction in most applications.

Low-frequency cutoff. This setting provides an 18 dB-per-octave cutoff at 80 Hz. It helps eliminate floor rumble and low-frequency noise produced by heating and air conditioning systems. This setting may also be used to compensate for proximity effect or to reduce low frequencies that make an instrument sound dull or muddy.

Low-frequency rolloff. This setting provides a 6 dB-per-octave rolloff at 115 Hz. Use this setting to compensate for proximity effect or to reduce low frequencies that could make an instrument sound dull or muddy.

Setting Attenuation

The attenuation switch lets you reduce the signal level by up to 25 dB without altering frequency response. This can prevent extremely loud sounds from overloading the microphone. Set the switch to the desired attenuation levels as follows:

0 dB - Move the switch to this position for “quiet” to “normal” sound levels.

-15 dB - Move the switch to this position when the microphone is approximately 0.75 meters (2 feet) from sound sources such as a kick drum, snare drum, or electric guitar cabinet.

-25 dB - Move the switch to this position when the microphone is 4 inches (10 cm) or less from extremely loud sound sources such as kick drum, snare drum, or guitar cabinets.
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Cartridge Type</th>
<th>Permanently Biased Condenser</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency Response</strong></td>
<td>20-20,000 Hz (see Figures 3 and 5)</td>
</tr>
<tr>
<td><strong>Directional Polar Pattern</strong></td>
<td>Cardioid/Omnidirectional (see Figures 4 and 6)</td>
</tr>
<tr>
<td><strong>Output Impedance</strong></td>
<td>150 Ω (actual)</td>
</tr>
<tr>
<td><strong>Attenuation Switch</strong></td>
<td>0 dB, 15 dB, or 25 dB attenuation</td>
</tr>
<tr>
<td><strong>Low Frequency Response Switch</strong></td>
<td>Flat; -6 db/octave below 115 Hz; -18 dB/octave below 80 Hz</td>
</tr>
<tr>
<td><strong>Phantom Power</strong></td>
<td>48 Vdc± 4 Vdc (IEC-268-15/DIN 45 596), positive pins 2 and 3</td>
</tr>
<tr>
<td><strong>Current Drain</strong></td>
<td>4.65 mA typical at 48 Vdc</td>
</tr>
<tr>
<td><strong>Common Mode Rejection</strong></td>
<td>≥ 50 dB, 20 Hz to 20 kHz</td>
</tr>
<tr>
<td><strong>Polarity</strong></td>
<td>Positive pressure on diaphragm produces positive voltage on output pin 2 relative to pin 3</td>
</tr>
<tr>
<td><strong>Dimensions and Weight</strong></td>
<td>20 mm (0.8 in.) diameter, 145 mm (5.75 in.) long; 156 grams (5.5 oz.) (see Figure 7)</td>
</tr>
<tr>
<td><strong>Sensitivity (typical, at 1000 Hz; (1 Pa = 94 dB SPL)</strong></td>
<td>-37 dBV/Pa</td>
</tr>
<tr>
<td><strong>Self-noise (typical, equivalent SPL; A-weighted, IEC 651)</strong></td>
<td>14 dB</td>
</tr>
<tr>
<td><strong>Maximum SPL at 1 kHz</strong></td>
<td>145 (160, 170) dB</td>
</tr>
<tr>
<td>5000 Ω load (Attenuator on)</td>
<td>139 (154, 164) dB</td>
</tr>
<tr>
<td>2500 Ω load (Attenuator on)</td>
<td>134 (149, 159) dB</td>
</tr>
<tr>
<td>1000 Ω load (Attenuator on)</td>
<td></td>
</tr>
<tr>
<td><strong>Output Clipping Level</strong></td>
<td>15 dBV</td>
</tr>
<tr>
<td>5000 Ω load</td>
<td>9 dBV</td>
</tr>
<tr>
<td>2500 Ω load</td>
<td>3 dBV</td>
</tr>
<tr>
<td>1000 Ω load</td>
<td></td>
</tr>
<tr>
<td><strong>Dynamic Range</strong></td>
<td>131 dB</td>
</tr>
<tr>
<td>5000 Ω load</td>
<td>125 dB</td>
</tr>
<tr>
<td>2500 Ω load</td>
<td>120 dB</td>
</tr>
<tr>
<td>1000 Ω load</td>
<td></td>
</tr>
<tr>
<td><strong>Signal to Noise Ratio</strong></td>
<td>80 dB</td>
</tr>
</tbody>
</table>

*20 Hz to 20 kHz; THD < 1%. THD of the microphone preamplifier when applied input signal is equivalent to the cartridge output at specified SPL.

**S/N ratio is difference between 94 dB SPL and equivalent SPL of self-noise A-weighted.
CARDIOID RESPONSE GRAPHS

**FIGURE 3. CARDIOID FREQUENCY RESPONSE**

**FIGURE 4. CARDIOIDE POLAR PATTERNS**
OMNIDIRECTIONAL RESPONSE GRAPHS

FIGURE 5. OMNIDIRECTIONAL FREQUENCY RESPONSE

FIGURE 6. OMNIDIRECTIONAL POLAR PATTERNS

FIGURE 7. DIMENSIONS
CERTIFICATION
Eligible to bear CE Marking; Conforms to European EMC directive 89/336/EEC. Meets applicable tests and performance criteria found in European Professional Audio Products EMC Standard EN 55103 (1996); Part 1 (Emissions) and Part 2 (Immunity). The KSM141 is intended for use in environments E1 (residential) and E2 (Light Industrial) as defined in European standard EN 55103. EMC conformance is based on the use of shielded interconnecting cable.

FURNISHED ACCESSORIES
Case .............................................................. A141C
Case (Stereo Pair) .............................................. A141SPC
Windscreen ..................................................... A100WS
Microphone Clip ............................................. A57F

OPTIONAL ACCESSORIES
SHOCKSTOPPER™ Shock Mount. ......................... A53M
Popper-Stopper™ Windscreen .......................... PS-6

SERVICE
For additional microphone service or parts information, please contact the Shure Service Department at 1-800-516-2525. Outside the United States, please contact your Authorized Shure Service Center.
TLM 193 Condenser Microphone

1. A Short Description

The TLM 193 is a studio condenser microphone with a cardiod polar pattern. It has several important features:
- Especially low self-noise level combined with high output capability.
- Transformerless circuit.
- Extraordinarily true sound transmission free of coloration.

The microphone has a balanced, transformerless output.

2. TLM 193 Technical Specifications

- Frequency range: 20 Hz to 20 kHz
- Sensitivity: 11 mV/Pa + 1 dB
- Rated impedance: 50 ohms
- Rated load impedance: 1000 ohms
- S/N ratio: 63 dB (related to 1 Pa at 1 kHz, DIN 45 506, DIN 45 405, CCR 468.3)
- Equivalent noise level (DIN 45 405, DIN 45 406, CCR 468.3): 34 dB
- A-weighted equivalent SPL due to inherent noise (DIN/IEC 610): 10 dB
- Maximum SPL: 140 dB @ 200 Pa
- Phantom powering: 48 V ± 5 % T.H.D.
- Current consumption per channel: 2.4 mA
- Dimensions: 49 mm x 175 mm

3. Power Supply

The microphone is powered by 48 V ± 5 % T.H.D. (610) via the XLR connector.

4. TLM 193 Condenser Microphone

The TLM 193 Condenser Microphone is a studio microphone for the finest condenser series with a cardiod polar pattern. It is designed to provide a low-noise microphone with high output and coloration-free sound transmission.

5. Powering

Phantom powering is used to supply the microphone with power from the XLR connector. The microphone requires a constant voltage of +48 V ± 10 % T.H.D. to operate properly.

6. Accessories

Accessories for the TLM 193 include a protective case, a windscreen, and various stands and mounts.

7. Circuit Diagram

The circuit diagram of the TLM 193 shows the internal components and the signal flow from the microphone to the output connector.

8. Frequency Responses and Polar Patterns

The frequency response chart shows the frequency range and sensitivity of the microphone. The polar pattern diagram illustrates the directivity pattern of the microphone, indicating its cardioid polar pattern.

9. Power Supply

The microphone is powered by 48 V ± 5 % T.H.D. (610) via the XLR connector.

10. Summary

The TLM 193 is a high-quality condenser microphone with a cardiod polar pattern, designed for use in professional recording and broadcasting applications. It provides low noise, high output, and true sound transmission without coloration.
Product Information

U 87 Ai
Large Diaphragm Microphone
The U 87 is probably the best known and most widely used Neumann studio microphone. It is equipped with a large dual-diaphragm capsule with three directional patterns: omnidirectional, cardioid and figure-8. These are selectable with a switch below the headgrille.

A 10 dB attenuation switch is located on the rear. It enables the microphone to handle sound pressure levels up to 127 dB without distortion.

Furthermore, the low frequency response can be reduced to compensate for proximity effect.

Applications

The U 87 Ai condenser microphone is a large diaphragm microphone with three polar patterns and a unique frequency and transient response characteristic.

Users recognize the microphone immediately by its distinctive design. It is a good choice for most general purpose applications in studios, for broadcasting, film and television.

The U 87 Ai is used as a main microphone for orchestra recordings, as a spot mic for single instruments, and extensively as a vocal microphone for all types of music and speech.

Acoustic features

The U 87 Ai is addressed from the front, marked with the Neumann logo.

The frequency response of the cardioid and figure-8 directional characteristics are very flat for frontal sound incidence, even in the upper frequency range.

The microphone can be used very close to a sound source without the sound becoming unnaturally harsh.

By means of a high-pass filter interferences through subsonic and low frequencies are reduced remarkably.

Features

- Variable large diaphragm microphone
- Pressure-gradient transducer with double membrane capsule
- The studio microphone classic
- Three directional characteristics: omni, cardioid, figure-8
- Switchable low frequency roll-off
- Switchable 10 dB pre-attenuation
- Ideal as main and as support microphone in the most differing recording situations
Application Hints

- For universal use
- The classical studio mic for vocalists (soloists and background vocalists)
- Announcer’s mic for broadcasting, dubbing, voice-over
- Overhead
- Spot mic for
  - wind instruments
  - strings (especially cello and double bass)
  - piano
  - percussion
- Note: To record instruments with very high sound pressure levels we recommend our mics with TLM circuitry

These are just some of the most common applications. We recommend additional experimentation to gain maximum use from this microphone.

Delivery Range

Microphone U 87 Ai (mt)
Wooden box

Catalog No.
U 87 Ai ................................................................. ni ..... 07022
U 87 Ai mt .......................................................... blk ....... 07023

Selection of Accessories

Battery supply, BS 48 i................................ blk ....... 06494
Power supply, N 48 i-2 (230 V) .......... blk ....... 06500
Power supply, N 48 i-2 (117 V) .......... blk ....... 06502
Power supply, N 48 i-2
(without plug-in mains unit) ................. blk ....... 06504
Auditorium hanger, MNV 87 ................. ni ...... 06804
Auditorium hanger, MNV 87 mt .......... blk ....... 06806
Elastic suspension, EA 87 ................ ni ...... 07297
Elastic suspension, EA 87 mt ............. blk ....... 07298
Stand mount swivel, SG 367 mt .......... blk ....... 06145
Popscreen, PS 20 ................................. blk ....... 07346
Windscreen, WS 87 ............................... blk ....... 06753
Microphone cable, IC 4 mt
(with stand mount swivel) ................. blk ....... 06557

A complete survey and detailed descriptions of all accessories are contained in the accessories catalog.

Meaning of color codes:
blk = black
ni = nickel

Polar patterns

The dual-diaphragm capsule is elastically mounted and protected by a large headgrille.

A switch below the headgrille selects the three directional patterns: omnidirectional, cardioid and figure-8.

A window above this switch shows the symbol of the selected characteristic.

Electrical features

The letter A in the name indicates a more recent generation, as compared to the U 87 i microphones that were built from 1967 to 1986. Modifications apply to the electronic components of the microphone only; the capsule remained unchanged.

The present-day circuitry increases the operational headroom of the U 87 Ai by supplying the bias voltages for the capsule through a reduced resistance. The result is a higher sensitivity of 10 dB for identical sound pressure levels, and an improved S/N ratio of 3 dB.

Filter and attenuation

A switch located at the rear attenuates the sensitivity by 10 dB. When this switch is activated, the microphone accepts sound pressure levels up to 127 dB (equivalent to a sound pressure of 45 Pa) without distortion.

An additional switch at the rear allows to change the microphone’s cutoff frequency. This reduces low frequency interference directly at the input of the microphone amplifier.

This setting also compensates for the unavoidable bass boost that occurs with all pressure gradient transducers when they are used at close distance (proximity effect).

The cardioid characteristic maintains a smooth frequency response at a distance of 30 to 40 cm, the figure-8 characteristic even at a distance of 15 to 20 cm.
Technical Data

Acoustical operating principle ........................................ Pressure gradient transducer
Directional pattern ......................................................... Omnidirectional, cardioid, figure-8
Frequency range .............................................................. 20 Hz...20 kHz
Sensitivity at 1 kHz into 1 kohm ........................................ 20/28/22 mV/Pa*
Rated impedance ............................................................. 200 ohms
Rated load impedance ...................................................... 1000 ohms
Equivalent SPL CCIR 486-3 ............................................ 26/23/25 dB*
Equivalent SPL DIN/IEC 651 .......................................... 15/12/14 dB A*
S/N ratio CCIR 486-3 ..................................................... 68/71/69 dB*
S/N ratio DIN/IEC 651 .................................................... 79/82/80 dB*
Maximum SPL for THD 0.5% .......................................... 117 dB (cardioid)
Maximum SPL for THD 0.5% with preattenuation .......... 127 dB
Maximum output voltage ............................................... 390 mV
Dynamic range of the microphone amplifier DIN/IEC 651 105 dB
Supply voltage ............................................................... 48 V ± 4 V
Current consumption .................................................... 0.8 mA
Matching connector ......................................................... XLR3F
Weight ................................................................. 500 g
Diameter ................................................................. 56 mm
Length ................................................................. 200 mm

* Omni-directional / cardioid / figure-8

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