UML·SRT
Unrestricted Microphones
as thoughtfully researched by
our good friend
Pat Drumm

your humble professor says,
“Thanks Pat”
Sennheiser MD409

Sennheiser proudly introduces the MD 409-U3 dynamic microphone. Unique in appearance, this stylish microphone is especially well suited for close proximity micing of high sound pressure levels. Capable of maintaining excellent acoustical separation of individual sound sources due to its tight cardioid characteristics, the MD 409 features a large transducer membrane which insures accurate transmission of powerful sound sources without distortion or coloration of the signal. Shock mounted to dampen handling noise and mechanical feedback, the MD 409 is an ideal mic for use in recording studios as well as on stage for sound reinforcement.

Dynamic, Microphone MD 409

Acoustical mode of operation: Pressure gradient transducer
Frequency response:
On-axis: 50...15000 Hz
Directional characteristics:
Cardioid
Rejection at 120° and 1000 Hz
24 dB-3dB
Open circuit output level
1.18 mV/Pa ±2.5dB
Electrical impedance at 1000 Hz
200 ohm
Minimum load
200 ohm

Inensitivity to magnetic field at 50 Hz
<5 μV/5μTelsa
Connection
3 Pin XLR
Microphone Dimensions:
55 x 34 x 134 mm
Weight:
6.3 oz.
Sennheiser MD421

Dynamic, Studio-Microphone MD 421

The MD 421 is a well known Sennheiser microphone of proven reliability and performance for many years now. Because of its excellent quality it is being used for almost all kinds of applications. The broadcast stations use it for radio and TV field work, the musician prefers it for stage work as well as the recording amateur for home and outdoor recordings. The studio cardioid microphone MD 421 features a wide frequency response from 30...17000 Hz. Its high sensitivity and slight increase in response towards high frequencies are responsible for its brilliant sound. Each microphone is custom calibrated and delivered with its own performance chart. Each individual frequency plot has to fall within the published limits of the standard performance curve. The cardioid directional characteristic of the MD 421 with its front-to-back ratio of approximately 18 dB is an important feature making the microphone suitable for use in sound reinforcement systems and all situations where it has to be used near loudspeakers. To prevent hum pickup by magnetic stray fields the MD 421 is fitted with a compensation coil.

Adjusting the Roll off Filter
When a directional microphone is spoken into from a close distance the lower frequencies are overemphasised. If this effect in not desired it is possible to counteract compensate for it by means of a roll off filter. From the diagram showing the influence of the roll off filter it can be seen that in position M (music) the frequency response curve is not altered to any way. In position S (speech) however, the frequencies below 500 Hz are reduced by appx. 6 dB/oct. Between the positions M and S the frequency response can be altered in three defined steps.

<table>
<thead>
<tr>
<th>Acoustical mode of operation:</th>
<th>Insensitivity to magnetic field at 50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure gradient transducer</td>
<td>&lt;5 μV / 5μTelsa</td>
</tr>
<tr>
<td>Frequency response:</td>
<td>Base attenuator switch</td>
</tr>
<tr>
<td>On-axis: 30...17000 Hz</td>
<td>5 steps</td>
</tr>
<tr>
<td>Directional characteristics:</td>
<td>Microphone Dimensions:</td>
</tr>
<tr>
<td>Cardioid</td>
<td>215x46x49 mm</td>
</tr>
<tr>
<td>Rejection at 190° and 1000 Hz</td>
<td>Weight:</td>
</tr>
<tr>
<td>18 dB-2dB</td>
<td>appx. 370g</td>
</tr>
<tr>
<td>Open circuit output level</td>
<td></td>
</tr>
<tr>
<td>2 mV/Pa ±3dB (1000 Hz ref. 1 V/10 μbar)</td>
<td></td>
</tr>
<tr>
<td>Electrical impedance at 1000 Hz</td>
<td></td>
</tr>
<tr>
<td>200 ohm</td>
<td></td>
</tr>
<tr>
<td>Minimum load</td>
<td></td>
</tr>
<tr>
<td>200 ohm</td>
<td></td>
</tr>
</tbody>
</table>

Dynamic, Studio-Microphone MD 421

[Graph showing frequency response and directional characteristics]
Sennheiser MD441

Dynamic, Studio-Microphone MD 441

High quality, dynamic microphone with supercardioid-shaped directional characteristic. Suitable for vocal trasmission and miking up instruments in all fields of live sound trasmission. Its features include:

Hints for use:
Roll-off filter and brilliance switch enable you to match the frequency response to the respective recording situation. As "sound" is judged individually only general recommendations for specific settings of both controls can be given:

- Roll-off filter position "M": Recording or transmission of music, vocals or speech at distances>=30 cm
- Roll-off filter position "S": Vocals and speech recording/transmission at distances<=10 cm.

Acoustical mode of operation:
- Pressure gradient transducer

Frequency reponse:
- On-axis: 30...20000 Hz

Directional characteristics:
- Supercardioid

Rejection at 130°:
- 20 dB-3dB

Open circuit output level at 1 kHz:
- 1.8 mV/Pa ±3dB (appx. -55 dBV)

Electrical impedance at 1000 Hz:
- 200 ohm

Minimum load impedance:
- 1000 ohm

Magnetic field interference factor:
- 5 μV / 5μ Telsa

Bass attenuator switch:
- 5 steps

Microphone Dimentions:
- 270x33x36 mm

Weight:
- appx. 450g
AKG C414

Transducer Principle:
Pressure gradient transducer with twin-condenser diaphragm and FET-preamplifier

Directional Characteristic:
Cardioid, omni-directional, figure-eight and hypercardioid (selectable directly on the mic)

Frequency response:
20...20000 Hz

Sensitivity at 1000 Hz
0.6 mV/μbar = 6mV/Pa = -64.4 dBV

Impedance at 1000 Hz
<= 150 ohms

Recommended Load Impedance
>= 500 ohms

Equivalent Noise Level:
20 dB SPL (measured with filter CCIT-C/DIN 45 405)

Unweighted Noise Level:
<=10μV (measured with filter CCIT-C/DIN 45 405)

Max. Sound Pressure Level for 0.5%
T.H.D.
at 1kHz and 10kHz= 138 dB SPL

Hum Sensitivity at 50 Hz.
6 μV/V5 μT appx.= 30 V/Vs/m squared

Climatic Conditions:
Temp. range: -10°C...+60°C

Microphone Dimensions:
5.6in. (H), 1.8in. (W), 1.4in. (D)

Weight:
14 ounces, 360g
AKG D-112

Large Diaphragm, Low frequency Microphone D112

Similar to large-capsule loudspeakers, large-diaphragm microphones reproduce bass frequencies with greater definition. However, low levels can still cause distortion problem if great care is not spent at the design stage. The D112 is built to handle SPL levels up to 168 dB without a problem. It is ideal for kick drum, bass guitar cabinets, trombone, and other low-frequency sources. Low bass is clean and powerful, plus mid- and high-frequency tailoring keep the instrument clearly distinguishable in the mix. A built-in windscreen and SA40 Stand Adapter are included.

Electric Guitar: To mike on a guitar amp, place the D112 close to the speaker. If your guitar sounds weak and thin through the PA, the D112 will restore the lacking punch and bass (e.g., of certain open-back combo amps with poor bass response).

Double Bass: The sound of a double bass amplified via a pickup can be improved by adding a microphone. The two signals are equalized separately and then mixed. Place the D112 about 4 to 8 inches away from the bridge for increased warmth and fullness of sound.

Bass Drum: Most engineers agree that it is beneficial to remove the front head when miking up the bass drum. A full drum sound is obtained by placing the microphone just outside the drum. The further inside, the drier and less boomy the sound and the better acoustic separation of the bass drum from the rest of the kit. Pointing the microphone right toward the beater produces a harder sound culminating in a "click" when the microphone is as close as 1 to 1.5 inches to where the beater strikes the head. Directing the microphone away from this point, toward the rim of the head, will mellow the sound.

Bass Guitar: Place the D112 up close to the bass speaker and aim it toward the center of the diaphragm to capture the high frequencies which are radiated over a very narrow angle only.

Transducer Principle: Dynamic pressure gradient transducer

Polar Pattern: Cardioid

Frequency response: 20...17000 Hz

Sensitivity at 1000 Hz 1.8 mV/Pa appx. = -75 dBV re 1 μVbar

Electrical impedance at 1000 Hz 210 ohms

Recommended Load Impedance >= 600 ohms

Max. Sound Pressure Level for 0.5% T.H.D. Unmeasurable

Hum Sensitivity at 50 Hz. 6 μV/5 μT appx. = 30 V/Vs/m squared

Climatic Conditions: Temp. range: -10°C...+70°C

Microphone Dimensions: 5.9in. (H), 2.8in. (W), 4.5in. (D)

Weight: 13.4 ounces, 380g
## Shure SM81

### Unidirectional, Condenser Microphone SM81

**Type:** Cardioid condenser (electret bias)

**Directional Pattern:** Cardioid (unidirectional)

**Frequency response:** 20...20000 Hz

**Sensitivity:**
- Open circuit voltage: -65 dB (0.56mV)
- re 1V/μbar
- Power Level: -40.5 dB re 1 mW/10μbar

**Rated impedance:** 150 ohms

**Minimum load impedance:** 800 ohms

**Total Harmonic Distortion:** < 0.5% (131 dB SPL at 250 Hz into 800 ohm load)

**Maximum SPL (at 1 kHz):** 128 dB (attenuator at 0); 138 dB (attenuator at 10) with 150 ohm load

### Hum pickup:
- 3 dB equivalent SPL in a 1 millionstesd field (60Hz)

### Output Noise:
- 16 dB typ., A-weighted
- 19 dB typ., weighted per DIN 45 405

### Signal-to-noise ratio:
- 78 dB (IEC 179) at 94 dB SPL

### LF response switch:
- Flat,
- -6 dB/ocatave below 100 Hz,
- -18 dB/ocatave below 80 Hz

### Attenuator switch:
- 0 to 10 dB (120 pF)

**Power:**
- Supply voltage: 11 to 52 Vdc, pos. pins 2&3
- Current drain: 1.0 mA to 1.2 mA

**Microphone Dimensions:** 32 x 157 mm

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1) S/N ratio is difference between mic output at 94 dB SPL and mic self-noise A-weighted
Shure SM57

Unidirectional, Dynamic Microphone SM57

<table>
<thead>
<tr>
<th>Type:</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directional Pattern:</td>
<td>Cardioid (unidirectional)</td>
</tr>
<tr>
<td>Frequency response:</td>
<td>40...15000 Hz</td>
</tr>
<tr>
<td>Sensitivity:</td>
<td>Open circuit voltage: -75.5 dB (0.17mV) re 1V/μbar</td>
</tr>
<tr>
<td></td>
<td>Power Level: -56.0 dB re 1 mW/10μbar</td>
</tr>
<tr>
<td>Rated impedance:</td>
<td>150 ohms</td>
</tr>
</tbody>
</table>

Microphone Dimensions: 32 x 157 mm
Weight: 284 g

Graph showing frequency response in dB over frequency in Hertz.
Shure SM58

Unidirectional, Dynamic Microphone SM58

Type: Dynamic
Directional Pattern: Cardioid (unidirectional)
Frequency response: 50...15000 Hz
Sensitivity:
Open circuit voltage: -75.5 dB (0.17mV)
re 1V/μbar
Power Level: -56.0 dB re 1 mW/10μbar
Rated impedance: 150 ohms

Microphone Dimensions:
51 x 162 mm
Weight:
298 g
Beyer M88N

Hypercardioid Moving Coil,
Microphone M88 Classic

Features:
- Highly defined hypercardioid polar characteristic
- Sensitive, accurate response
- Extended frequency range with rising high end and exceptional bass reproduction
- High SPL handling capability
- Integral -20 dB humbucking filter

Applications
The M 88 offers both a wide frequency response and rugged construction making an ideal combination for many applications. In the studio and live use its high SPL capability allows the microphone to be placed close to loud sound sources such as kick drum and bass guitar. It is also equally impressive as a vocal microphone or for brass and windwood instruments.

<table>
<thead>
<tr>
<th>Transducer Type / operating principle:</th>
<th>Nominal output impedance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic moving coil / Pressure gradient</td>
<td>200 ohms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency response:</th>
<th>Load impedance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>30...20000 Hz</td>
<td>&gt;1000 ohm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polar response:</th>
<th>Max. SPL for 0.5% THD at 1 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypercardioide</td>
<td>134 dB (144 dB with pre-attention)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open circuit voltage at 1 kHz</th>
<th>Net weight:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 mV/pa appx. = -53 dBV</td>
<td>approx. 336g</td>
</tr>
</tbody>
</table>
Neumann TLM-103

Large Diaphragm, Studio Condenser Microphone
TLM 103
The TLM 103 Condenser microphone is a studio microphone of the fet 100 series with a cardioid polar pattern.

The letters TLM stand for Transformerless Microphone.

<table>
<thead>
<tr>
<th>Acoustical operating principle:</th>
<th>Equivalent noise level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure gradient transducer</td>
<td>17.5 dB (DIN 45 590/DIN 45 405, CCIR 468-3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Directional Pattern:</th>
<th>A-weighted equivalent SPL due to inherent noise:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardioid</td>
<td>7 dB (DIN/IEC 651)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency response:</th>
<th>Max SPL for less than 0.5% THD</th>
</tr>
</thead>
<tbody>
<tr>
<td>20...20000 Hz</td>
<td>138 dB = 158 Pa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensitivity:</th>
<th>Maximum output voltage:</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 mV/Pa ±1 dB at 1000 Hz into 1 kohm impedance (1 Pa=94 dB SPL)</td>
<td>13 dBu = 3.5 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated impedance:</th>
<th>Phantom powering (P 48, DIN 45 596)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 ohms</td>
<td>48 V ±4 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated loaded impedance:</th>
<th>Current consumption per channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 ohms</td>
<td>3 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S/N ratio, related to Pa at 1kHz:</th>
<th>Microphone Dimentions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>76.5 dB (DIN 45 590/DIN 45 405, CCIR 468-3)</td>
<td>60 x 132 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A-weighted:</th>
<th>Weight:</th>
</tr>
</thead>
<tbody>
<tr>
<td>87 dB</td>
<td>approx. 500 g</td>
</tr>
</tbody>
</table>
AKG 451/452

Modular, Microphone Series C451 E

The C451 Series is the world's most successful modular microphone series, with a loyal following worldwide. There are two preamps, the C451E and the C451EB. The C451EB features the addition of a two-position bass roll-off switch, at 75 and 150 Hz. Capsules are available for most microphone directional patterns. The VR Tube Series allows the capsule to be located on a long, thin wand at a distance from the preamp for a professional appearance in sound reinforcement and broadcast applications. Other accessories include the A51 Swivel, allowing the capsule to be angled up to 90 degrees from the preamp, and the A50/10 and A50/20 pads, adding -10 and -20 dB pads before the preamp to prevent overload distortion.

Transducer Principle:
Pressure gradient transducer
Active diaphragm diameter
aprox. 15 mm

Max. Sound Pressure Level for 0.5% T.H.D.
Unmeasurable
Hum Sensitivity at 50 Hz.
6 μV/5 μT approx. = 30 V/Vs/m squared

Frequency response:
20...20000 Hz ±1 dB from standard curve

Climatic Conditions:
Temp. range: -10°C...+70°C

Sensitivity at 1000 Hz
9.5 V/Pa = 0.95 mV/μbar = -60 dBV on open circuit re 1 μbar

Microphone Dimensions:
5.9in. (H), 2.8in. (W), 4.5in. (D)

Nominal impedance
<= 200 ohms, transformer balanced

Weight:
13.4 ounces, 380g

Recommended Load Impedance
>= 500 ohms
### Suggested Microphone Placement

<table>
<thead>
<tr>
<th>Placement</th>
<th>Tone Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lips less than 15 cm (6 in.) away or touching the windscreen, on axis to microphone.</td>
<td>Robust sound, emphasized bass, maximum isolation from other sources.</td>
</tr>
<tr>
<td>15 to 60 cm (6 in. to 2 ft.) away from mouth, just above nose height.</td>
<td>Natural sound, reduced bass.</td>
</tr>
<tr>
<td>20 to 60 cm (8 in. to 2 ft.) away from mouth, slightly off to one side.</td>
<td>Natural sound, reduced bass and minimal &quot;s&quot; sounds.</td>
</tr>
<tr>
<td>90 cm to 1.8 m (3 to 6 ft.) away.</td>
<td>Thinner, distant sound; noticeable levels of ambient noise.</td>
</tr>
</tbody>
</table>

![Graphs showing frequency response and polar patterns of the SHURE Beta 58A microphone.](image)

**SHURE Beta 58A**

**Model Beta 58A® Supercardioid Dynamic Vocal Microphone**

**Graphs:**
- Relative response in dB versus frequency in Hz.
- Polar patterns at 250 Hz, 500 Hz, 1000 Hz, and 2500 Hz.
**SHURE Beta 57A**

### Application

<table>
<thead>
<tr>
<th>Application</th>
<th>Suggested Microphone Placement</th>
<th>Tone Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom–Toms</td>
<td>One BETA 57A on each tom, or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>between each pair of toms, 2.5</td>
<td>Medium attack,</td>
</tr>
<tr>
<td></td>
<td>to 7.5 cm (1 to 3 in.) above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>drum heads. Aim each mic at top</td>
<td></td>
</tr>
<tr>
<td></td>
<td>drum heads. On double head toms,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>you can also remove bottom head</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and place a mic inside, pointing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>up toward top head.</td>
<td>balanced sound.</td>
</tr>
</tbody>
</table>

| Snare Drum  | 2.5 to 7.5 cm (1 to 3 in.)   |
|             | above the rim of the top drum |
|             | head. Aim the mic at the drum   |
|             | head. If desired, place a second |
|             | mic just below rim of bottom    |
|             | head.                          | sound. |

| Guitar & Bass Amplifiers | 2.5 cm (1 in.) from speaker, on-axis with speaker cone. |
|                         | 2.5 cm (1 in.) from speaker, at edge of speaker cone. |
|                         | 15 to 30 cm (6 to 12 in.) away from speaker and on-axis with speaker cone. |
|                         | 2 to 3 ft. (60 to 90 cm) back from speaker, on-axis with speaker cone. |

| Vocals      | 2.5 to 15 cm (1 to 6 in.) from the vocalist’s mouth. |
|            | Rich, warm sound. |

| Brass & Woodwinds | Brass: 30 to 90 cm (1 to 3 ft.) away, on-axis with bell of instrument. |
|                  | Woodwinds: 2.5 to 15 cm (1 to 6 in.) away, on-axis with bell of instrument. |
|                  | Bell of the instrument 90° off-axis from the front of the mic. |

### Diagrams

- **Supercardioid Dynamic Performance Microphone**
- **250 Hz, 500 Hz, 1000 Hz**
- **2500 Hz, 6300 Hz, 10000 Hz**
- **Frequency Response Chart**
Shure Beta 98

MODEL BETA 98/S
SUPERCARDIOD CONDENSER MICROPHONE

Maximum SPL
(20 Hz to 20 kHz, less than 1% THD)
2.5 kΩ load ........................................ 160 dB
1 kΩ load .......................................... 156 dB

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>SUGGESTED MICROPHONE PLACEMENT</th>
<th>TONE QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom-Toms</td>
<td>Using the A98D drum mount, place one on each tom, or between each pair of toms, 1 to 3 in. (2.5 to 7.6 cm) above drum heads. Aim each mic at top drum heads. On double head toms, remove bottom head and place mic inside pointing up toward top drum head.</td>
<td>Medium attack; full, balanced sound.</td>
</tr>
<tr>
<td>Snare Drum</td>
<td>1 to 3 in. (2.5 to 7.5 cm) above rim of top head of drum. Aim mic at drum head. If desired, place a second mic just below rim of bottom head.</td>
<td>More “snap” from drumstick.</td>
</tr>
<tr>
<td>Hi-Hat Cymbals</td>
<td>Using the A98D drum mount, place the mic close to the cymbal, but far enough away that it doesn’t touch it when cymbal is struck.</td>
<td>Bright, with plenty of attack.</td>
</tr>
<tr>
<td>Reed Instruments</td>
<td>Place microphone a few inches from and aiming into bell.</td>
<td>Bright, minimizes feedback and leakage.</td>
</tr>
<tr>
<td>Guitar Amplifier</td>
<td>Place microphone 4 inches from grille at center of speaker cone.</td>
<td>Natural, well-balanced.</td>
</tr>
</tbody>
</table>

Lyrics Keeper

[Frequency response graph]

[Directivity pattern graphs]

[Impedance chart]
Technical Specifications

Transducer Principle:
dynamic pressure gradient transducer.

Polar Pattern:
cardioid.

Frequency Range:
30-15,000 Hz.

Sensitivity at 1000 Hz:
2.2 mV/Pa ± 74 dB V re 1 μbar.

Electrical Impedance at 1000 Hz:
260 ohms.

Recommended Load Impedance:
600 ohms.

Maximum SPL for 0.5% T.H.D:
50 Pa ± 128 dB SPL.

Hum Sensitivity at 50 Hz:
10 μV/5 ±T.

Climatic Conditions:
temp. range: -10°C to +70°C
rel. humidity at +20°C: 90%.
### Audio Technica 4050

**AT4050 Multi-Pattern Condenser**

- **Polar Pattern**: Cardioid, Omnidirectional, Figure-of-eight
- **Frequency Response**: 20-18,000 Hz
- **Low Frequency Roll-Off**: 80 Hz, 12 dB/octave
- **Open Circuit Sensitivity**: ~36 dB (15.8 mV) re 1V at 1 Pa
- **Impedance**: 100 ohms
- **Maximum Input Sound Level**: 149 dB SPL, 1 kHz at 1% T.H.D.; 159 dB SPL, with 10 dB pad (nominal)
- **Noise**: 17 dB SPL
- **Dynamic Range (typical)**: 132 dB, 1 kHz at Max SPL
- **Signal-to-Noise Ratio**: 77 dB, 1 kHz at 1 Pa
- **Phantom Power Requirements**: 48V DC, 4.2 mA typical

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**Frequency Response Diagrams**

- **Cardioid Polar Pattern and Frequency Response**
- **Figure-of-eight Polar Pattern and Frequency Response**

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**Graphs**

- **Frequency Response Graphs**: 50 Hz to 20 kHz

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**Legend**

- 12" or more on axis
- Pol-off

**Scale**

- 10 dB at 1 kHz

**Note:** All specifications are nominal unless otherwise stated.
Rode NT-1

Pickup Pattern:
Cardioid.

Frequency Response:
20 Hz ~ 20 kHz.

Output Impedance:
100 Ω.

Sensitivity:
-31.9 dB re 1 volt/pascal (25 mV @ 94dB SPL) +/- 2 dB

Equivalent Noise:
5 dBA SPL (per IEC651, IEC268-15)
Rode NT-2

**Frequency range:**
20 Hz - 20 000 Hz (see graphs over)

**Polar patterns:**
(See graphs over)

**Output impedance:**
200 Ω

**Signal/Noise ratio DIN/IEC 651:**
87 dB (1 kHz rel 1 Pa; per IEC651, IEC268-15)

**Equivalent noise:**
7 dBA SPL (per IEC651, IEC268-15)

**Maximum SPL:**
147 dB (@ 1% THD into 1 kΩ)
157 dB (@ 1% THD into 1 kΩ) - pad at maximum
**MXL 2001**

<table>
<thead>
<tr>
<th>Type</th>
<th>Condenser pressure gradient mic with large 25mm diaphragm capsule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>30Hz-20kHz</td>
</tr>
<tr>
<td>Polar Pattern</td>
<td>Cardioid</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>15mV/Pa</td>
</tr>
<tr>
<td>Impedance</td>
<td>200Ω</td>
</tr>
<tr>
<td>S/N Ratio</td>
<td>80dB (Ref. 1Pa A-weighted)</td>
</tr>
<tr>
<td>Equivalent Noise Level</td>
<td>18dB (A weighted IEC 268-4)</td>
</tr>
<tr>
<td>Max SPL for 0.5% THD</td>
<td>130dB</td>
</tr>
</tbody>
</table>

![Mic Diagram](image)
CAD E-100

Applications
Studio Vocals, Choir, Acoustic Instrument, Guitar Cabinets, Bass Cabinets, Strings, Piano, Cymbals/Overheads.

equitek e100 Specifications
Operating Principle: Condenser
Polar Pattern: Supercardioid
Frequency Response: 30Hz to 18KHz
Sensitivity: -38dBV (13mV) @ 1 Pa
Impedance: 200 ohms
Max SPL: 145dB, 1% THD, attenuator engaged
Self Noise: 20dBA
Hi-pass Filter: 80Hz, 6dB/oct
Attenuator: 20dB
Power Requirements: P48, 8mA

Amplitude vs. Angle
Amplitude vs. Frequency
EV RE-20

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
## MXL 2003

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Type:</strong></td>
<td>Condenser pressure gradient mic with large 27mm diaphragm capsule</td>
</tr>
<tr>
<td><strong>Frequency Range:</strong></td>
<td>20Hz-23kHz</td>
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<tr>
<td><strong>Polar Pattern:</strong></td>
<td>Cardioid</td>
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<tr>
<td><strong>Preattenuation Switch:</strong></td>
<td>0/-10dB</td>
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<tr>
<td><strong>Bass Cut Switch:</strong></td>
<td>6dB/octave @ 150Hz</td>
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<tr>
<td><strong>Sensitivity:</strong></td>
<td>16mV/Pa</td>
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<tr>
<td><strong>Impedance:</strong></td>
<td>150Ω</td>
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<tr>
<td><strong>S/N Ratio:</strong></td>
<td>76dB (Ref. 1Pa A-weighted)</td>
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<tr>
<td><strong>Equivalent Noise Level:</strong></td>
<td>18dB(A weighted IEC 268-4)</td>
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<tr>
<td><strong>Max SPL for 0.5% THD:</strong></td>
<td>130dB</td>
</tr>
<tr>
<td><strong>Max SPL with -10dB cut:</strong></td>
<td>140dB</td>
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</table>

![Frequency Response Graph](image1)

![Polar Response Graph](image2)