Microphones

Microphone types

There are a number of different design principles on which a particular microphone may be based, each with its own range of application.

Condenser
Sensitive, capable of capturing transient and quiet sounds. Requires power either from a+48v phantom supply from the mixer/recorder or from an internal battery depending on the model

Dynamic
Generally robust, inexpensive, resistant to moisture and can handle sounds with heavy attacks, such as gunshots and snare drums with ease. Less sensitive than condensers and do not require a power supply.

Lobar (shotgun)
In short, long, mono or stereo varieties shotgun microphones have a very tight lobar polar pattern, meaning they are apt to reject sound sources from behind and to the sides of the capsule, allowing the recordist to focus in on a particular sound. They are often also condenser microphones.

Lavalier
Their small size and specific voicing are designed to capture voice attached to or hidden in clothes close the body.

Stereo
Designed to capture a stereo image using a standard XY pattern, MS (mid/side) or matched pair configuration. Good for ambience and sound effects when required in stereo format

Contact
Translate the vibrations at an objects surface into electrical singnal, normally by way of a piezo-electric crystal. Not susceptible to the same acoustical problems as normal microphones, having however other problems such as sounding unatural.

Hydrophone
Designed to record sounds in water.

Binaural
A stereo technique that simulates the conditions in which a person would hear a sound, typically by using a dummy ‘head’ and two microphone ‘ears’.

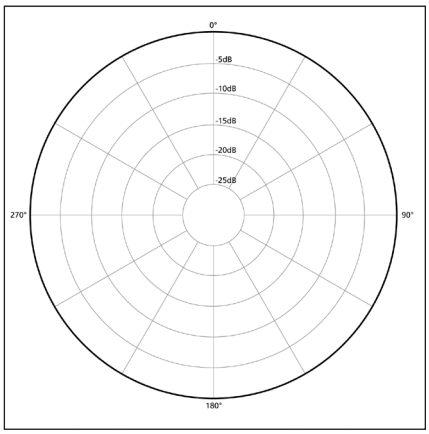
Surround
Have four or more capsules placed in an array within the microphone body to capture sound from multiple directions.

Polarity patterns

A polarity pattern describes the directional frequency response of a given microphone

Omni-directional

Designed to be pressure rather than velocity senstive and therefore has an near-equal frequency response at all angles.

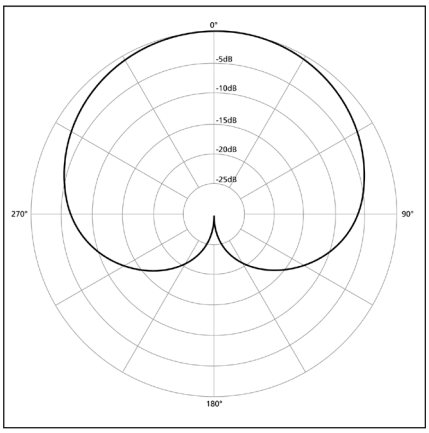


Omni-directional polar pattern

- » Natural sound and good if the room or space ambience is desirable.
- » Less susceptible to popping from plosive ‘p’ and ‘b’ vocal sounds.
- » Little to no proximaity effect (an increase in lower frequencies when used close to a sound source).
- » Less susceptible to wind noise.
- » Can often be small in size.

Cardioids

Sensitive to sound arriving from the front of the mic and much less from the rear. Named after its heart-shaped pattern and should be used if a more isolated pick-up is desired.

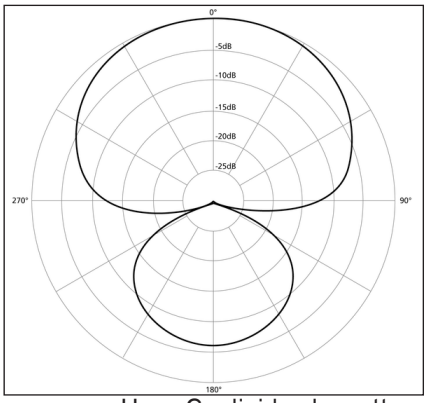


Cardioid polar pattern

- » The sound field can be differentiated to some extent between desired sound coming from the source and undesired sound from an angle of 180 degrees.
- » Not as tight a pattern as hyper- and super-cardioids.
- » Exhibits proximity effect
- » Susceptible to popping and wind noise.

Super/hyper-cardioids

Cardioids have variants such as the super-cardioid and hyper-cardioid. These have a very focused pattern from the front at the expense of a sensitive lobe at 180 degrees.



HyperCardioid polar pattern

- » Good when the source is far away or there is a lot of ambient noise or reverberation to deal with.
- » The source of noise can be placed in the null zone between 110 to 126 degrees from the front (e.g. towards a noisy camera) while the desired source is on axis (e.g. an actor).

Figure of Eight

Rejects sound sources from the sides of the microphone. Often composed of two Cardioids facing away from each other, or is a ribbon microphone, a subset of dynamic microphones that use a thin metal strip instead of a diaphram to transduce sound.

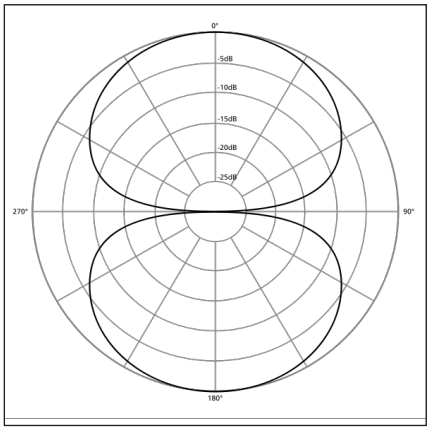
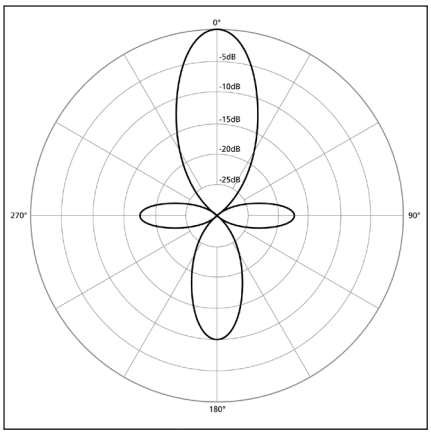


Figure of eight polar pattern

- » Useful for recording two people speaking while they are facing each other with a single microphone.
- » Useful for recording two instruments with the null points at 90 and 270 degrees facing unwanted sound.
- » Normally have a pronounced proximity effect.

Short lobar

For greater discrimination against reverberation and noise at higher frequenecies, this effect tapering off as you move down the frequency spectrum. The most often used boom microphone.



Lobar polar pattern

Long lobar

For the greatest discrimination against off-axis sound over a wider frequency range than the short shotgun.

- » Outdoors, for wide shots, dolly shots and when the sound source is further away than normal
- » Indoor use is not generally recommended because the interaction of the complex polar pattern of this mic type with room acoustics leads to coloration of the sound.

Microphones at the Slade

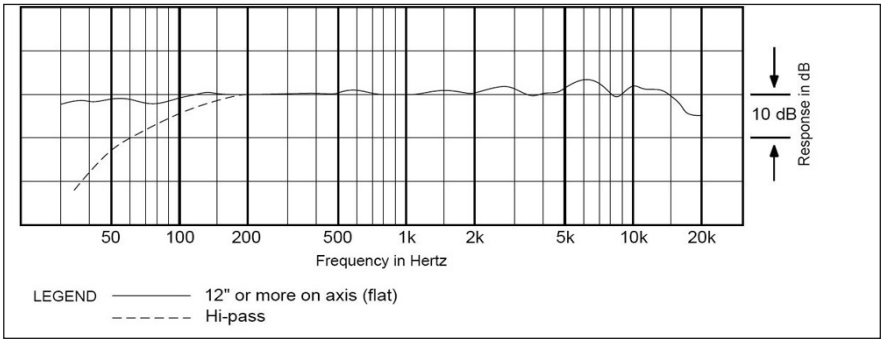
Audio Technica AT4033a

Usually found in the small sound studio in Edit 4

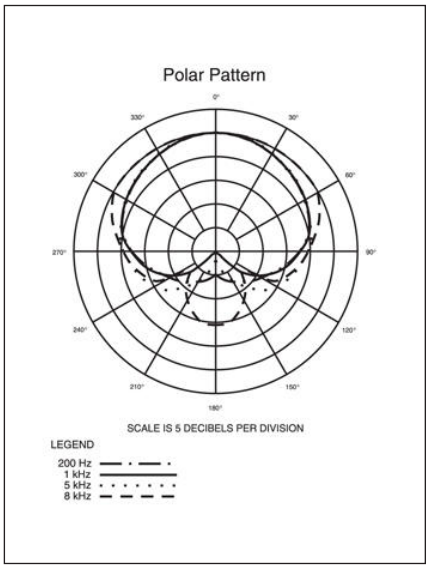

Audio Technica AT4033a

- » Element: Condenser
- » Polar Pattern: Cardioid
- » Frequency Response: 30-20,000 Hz
- » High Pass Filter: 80 Hz
- » Fairly flat frequency response, warm sound.

» Good for: vocals, instruments, ambient recording



AT4033a Frequency Response



AT4033a Polar Pattern

Rode NT2-A

Usually found in the vocal booth of the large sound studio.

Rode NT2-A

» Element: Condenser

» Polar Pattern: Cardioid, Omni and Figue of Eight

» Frequency Response: 20-20,000 Hz

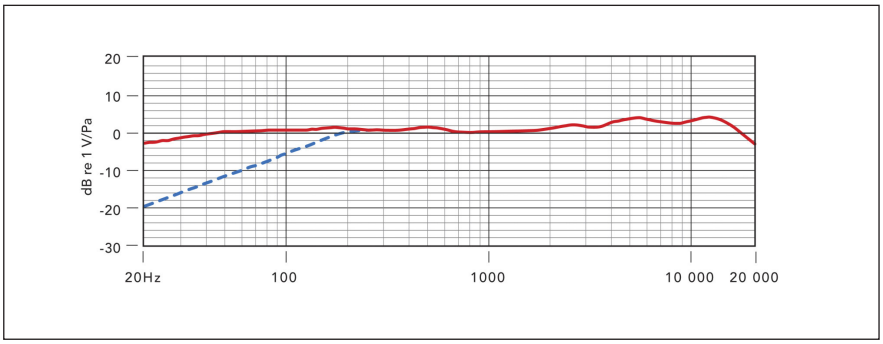
» High Pass Filter: 40Hz and 80 Hz

» Very flat frequency response

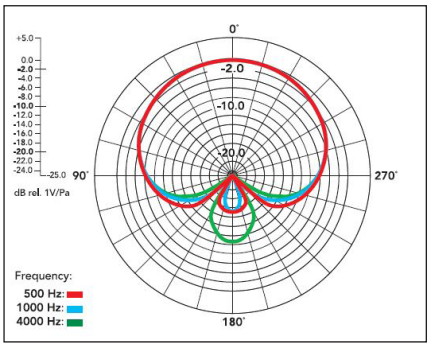
» Versatile 3 pattern microphone

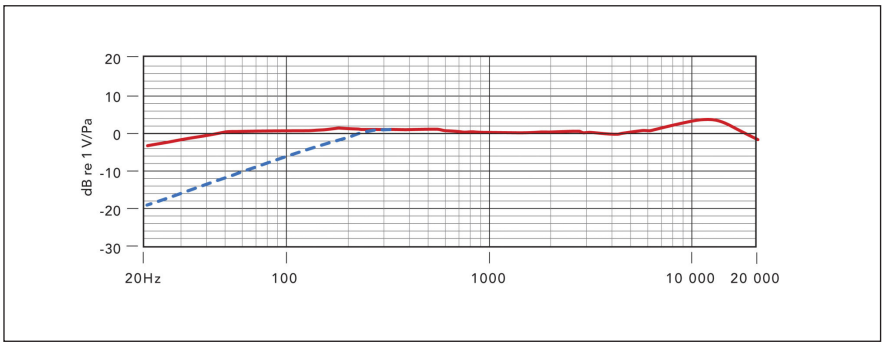
» Good for: vocals, instruments, ambient recording.

NT2-A Polar Pattern (Cardioid)

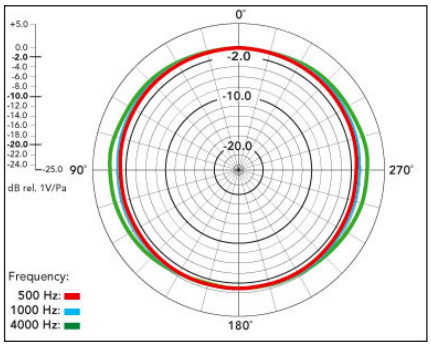


NT2-A Frequency Response (Cardioid)





NT2-A Frequency Response (Omni)



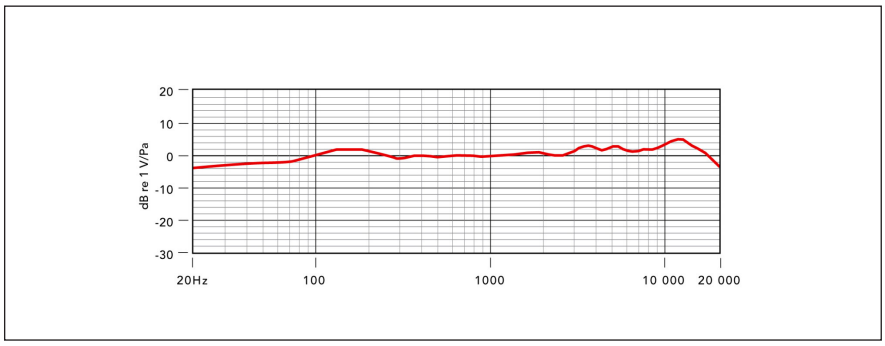
NT2-A Polar Pattern (Omni)

Rode NT1-A

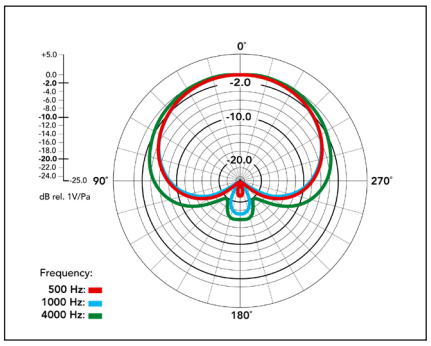
Available from the store.

- Element: Condenser
- Polar Pattern: Cardioid
- Frequency Response: 20-20,000 Hz
- High Pass Filter: None
- Fairly flat frequency response
- Good for: vocals, instruments, ambient recording

Rode NT1-A



NT1-A Frequency Response

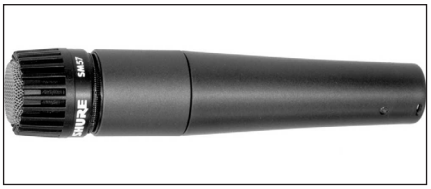


NT1-A Polar Diagram

Shure SM57

Available from the store.

- Element: Dynamic
- Polar Pattern: Cardioid



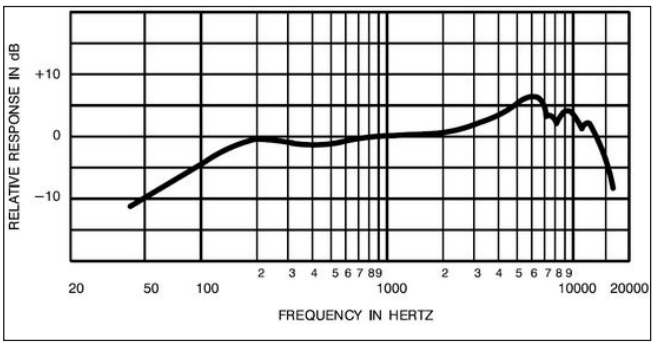
Shure SM57

» Frequency Response: 40-15,000 Hz

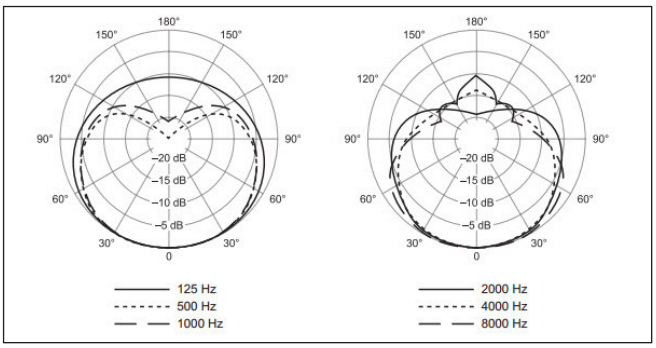
» High Pass Filter: None

» Prescence rise can help the recorded source cut through a mix

» Good for: guitar amps, drums, brass instruments.



SM57 Frequency Response



SM57 Polar Diagram

Shure VPA64

Available from the store.

Shure VPA64

» Element: Dynamic

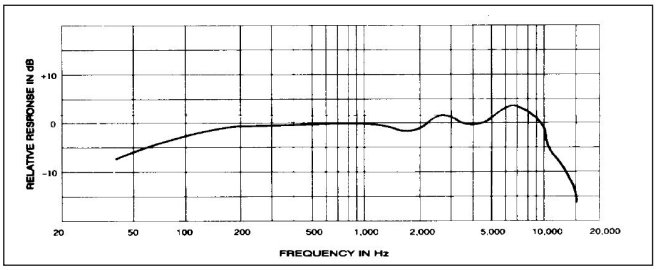
» Polar Pattern: Omni-directional

» Frequency Response: 50-12,000 Hz

» High Pass Filter: None

» Mid-range presence rise for optimum speech clarity

» Good for: speech and on-camera microphone mounting.



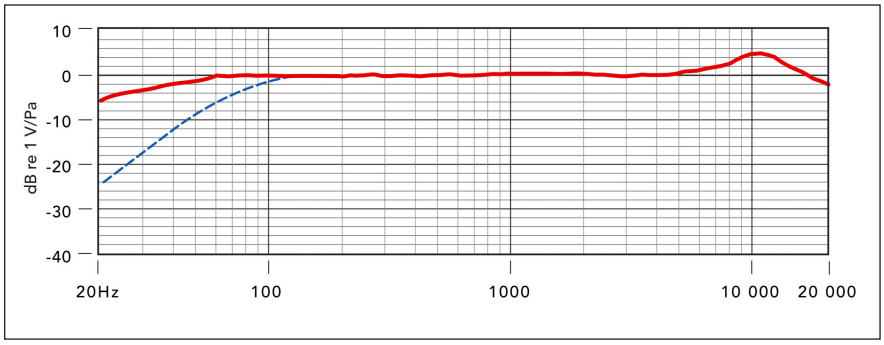
VPA64 Frequency Response

Rode VideoMic

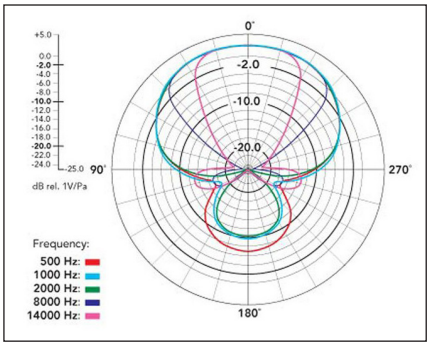
Available from the store.

Rode VideoMic

- Element: Condenser
- Polar Pattern: Cardioid
- Frequency Response: 40-20,000 Hz
- High Pass Filter: 80Hz
- Very flat frequency response
- Directional at higher frequencies
- Good for: recording speech and ambient sound as a better quality replacement for the internal microphone of a video camera or DSLR.



Rode VideoMic Frequency Response



Rode VideoMic Polar Diagram

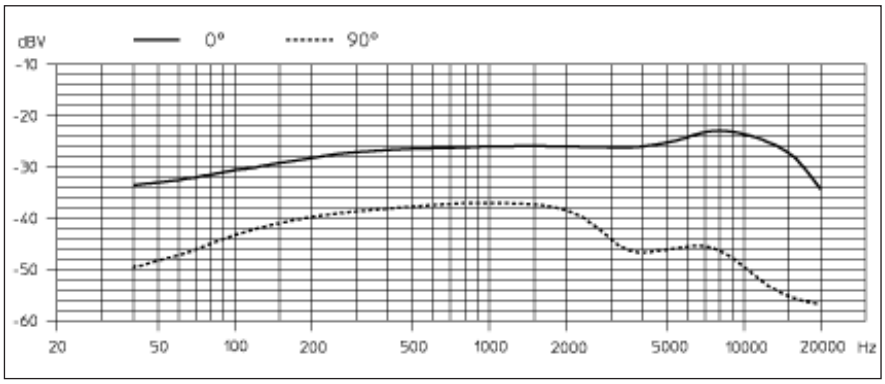
Sennheiser ME66

Available from the store.

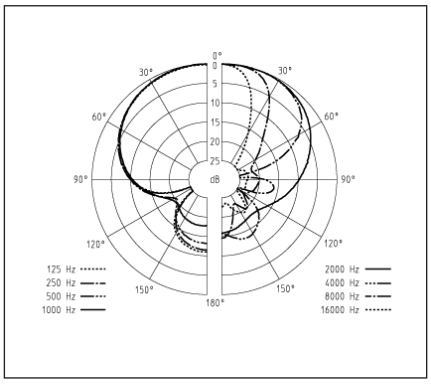
Sennheiser ME66

- Element: Condenser
- Polar Pattern: Super-cardioid/lobar
- Frequency Response: 40-20,000 Hz
- High Pass Filter: 80Hz
- Very directional at higher frequencies
- Can be battery operated in the absence of +48v source.

» Good for: speech, film and video location applications, descriminating against background noise.



ME66 Frequency Response



ME66 Polar Diagram

TOA WM-4310

Available from the store.

» Element: Condenser

» Polar Pattern: Cardioid

» High Pass Filter: None

» Wireless lavalier microphone

» Good for: speech recording for film and video

TOA WM-4310