

Microphones

Two condenser microphones are shown from a top-down perspective, facing each other. They have a dark, woven mesh grille and a light-colored band around the middle. The background is dark and slightly blurred.

Condenser vs. dynamic

Condensers and Dynamics

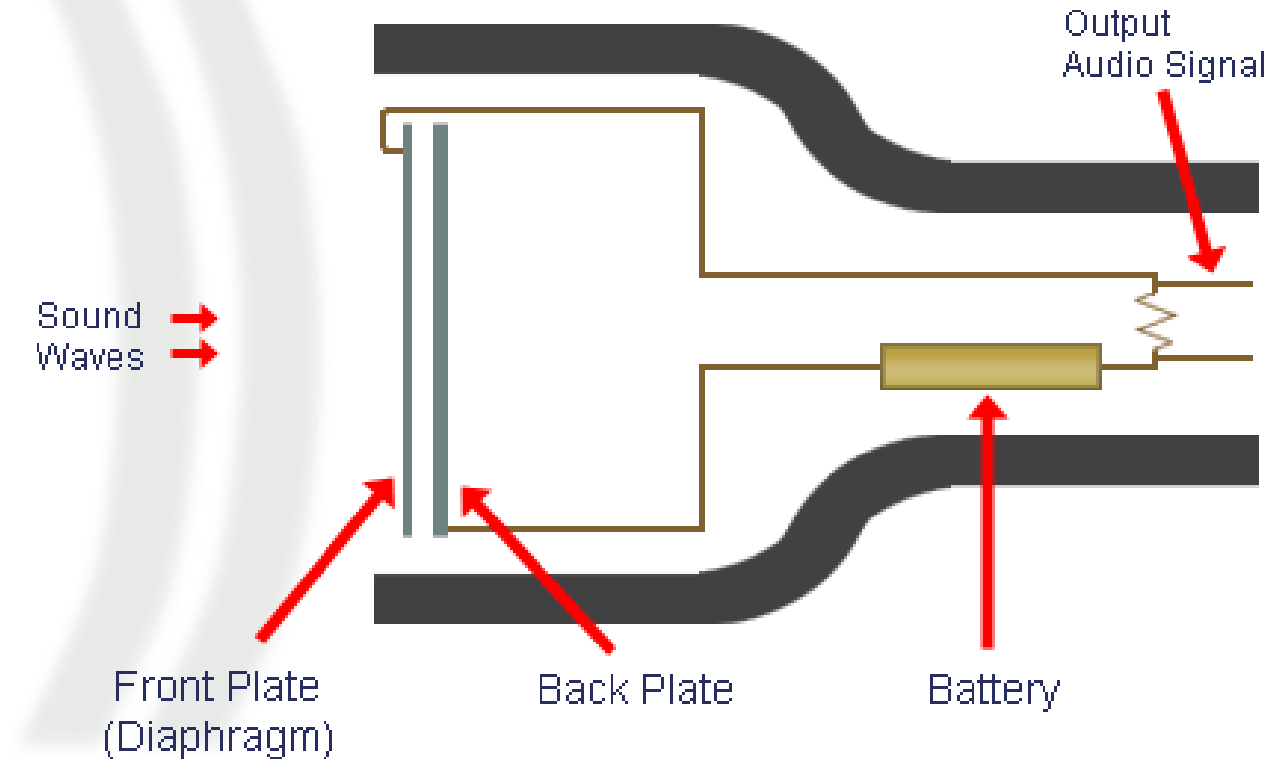
- First, before we go deeper, we need to know that these are two different topics, although they are related in some aspects, they are completely different.

Introduction

- To begin we need to understand that each of the two types of microphones are for a specific purpose and we need to be clear that each of them has specific characteristics to work with.
- Although there are a extend variety of microphones each of them works in its own way and has a specific work where it's the best option to use.
- Microphones can be divided according to what you need, but mainly there are two principal groups condenser microphone and dynamic microphone.

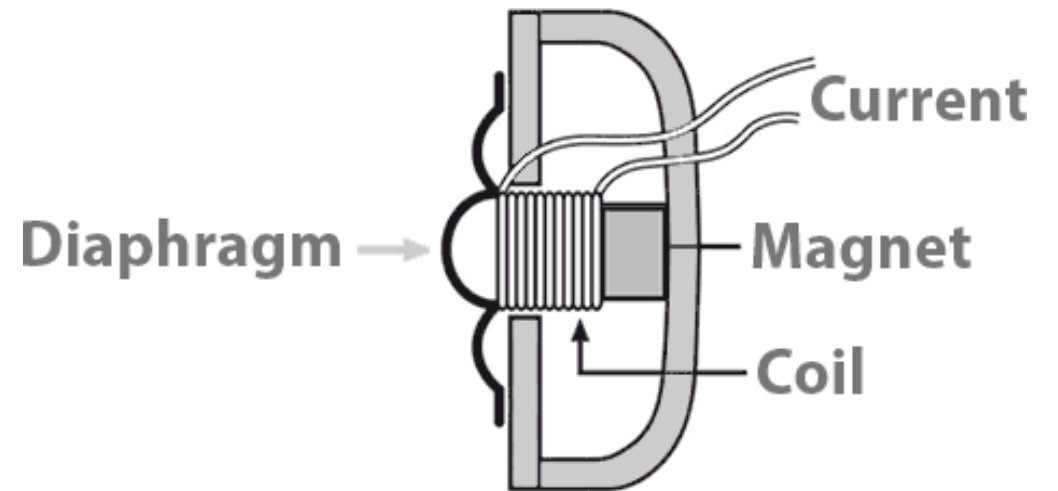
Condenser (Capacitor) Microphones

- This types of microphones are best used to identify and capture vocals and high frequencies; it is also the most used microphone for most of the studio applications.
- They are characterized due to their detail and accuracy, this is achieved due to the structure and components of this microphone, it is built with a **lightweight diaphragm** which is suspended by a fixed plate, then sound waves cause pressure against the diaphragm, which causes it to move.
- Due to the thin and light weight diaphragm in this microphones, they are mostly used to pick up delicate sounds, this high-output sound is achieved due that it uses a 9v battery which gives to it an extra amount of power.
- Although this type of microphones are great for capturing acoustic guitars, vocals, and high notes, its structure and components makes it a terrible recorder for big booming sounds, like bass, beats, etc.



Dynamic Microphone

- As the opposite of the condenser microphone, the dynamic microphones are best used to record and handle booming sounds, deep and powerful vocals.
- In difference with the condenser mic the dynamic mic, uses a wire coil to amplify signal picked up by the diaphragm, as a result, the output of the dynamic is lower than the one in the condenser.
- They are also far more resistant than the condenser mic, due to its component and how it works its far more unlikely to break the dynamic microphone by dropping it straight into the ground, this makes it to be more wanted around the musicians.
- Dynamic Microphone doesn't need battery or phantom power which is one of the advantages over the condenser mic.





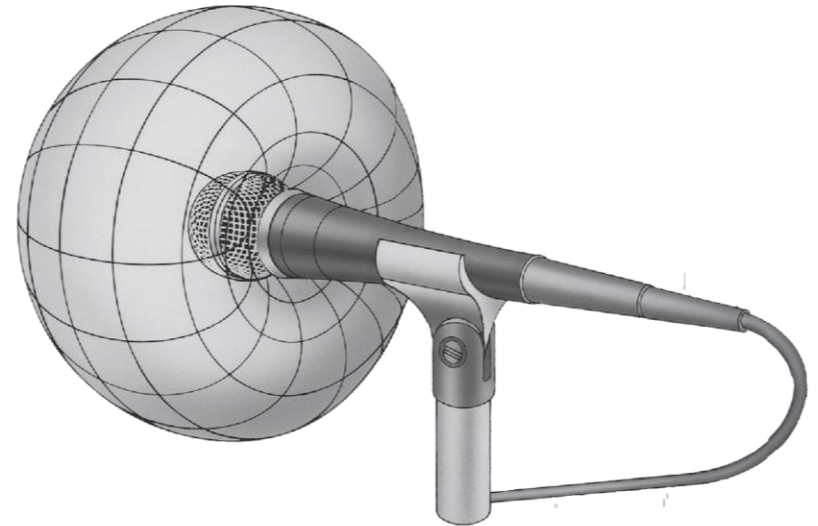
AUDIO SAMPLES

Polar Patterns

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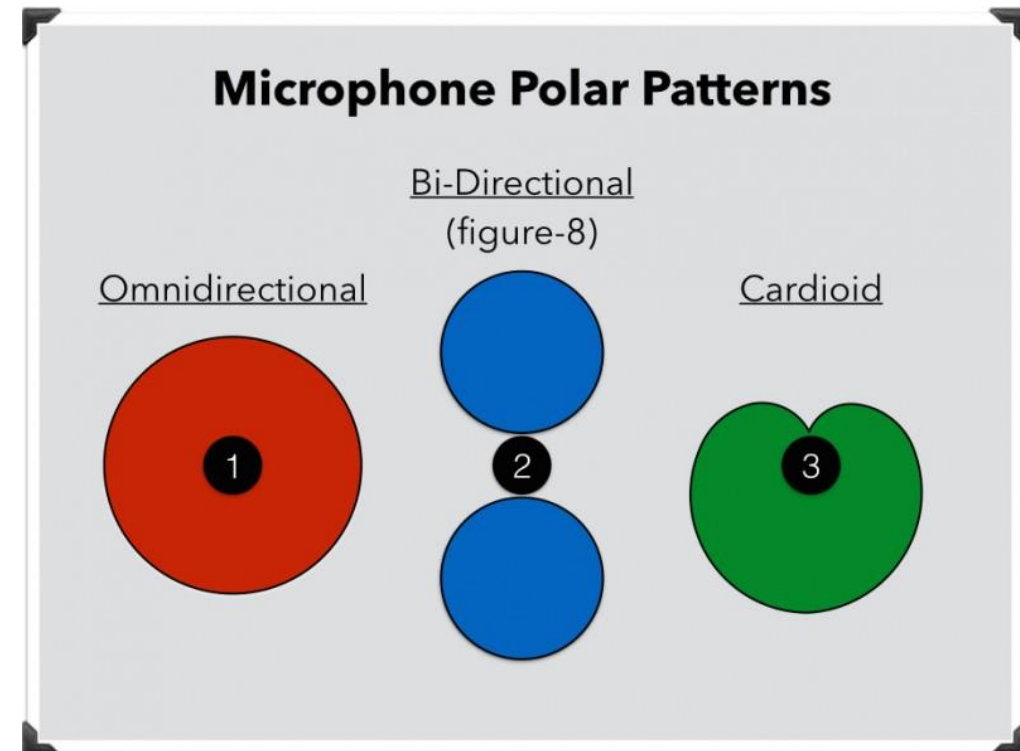
Polar Patterns

- Every microphone has a type of polar pattern, it is an essential aspect.
- A polar pattern describes the microphone's sensitivity to different sounds that may come through different angles to the center where the sounds are sampled.
- It is, in other words, the space that is most sensitive to sound.



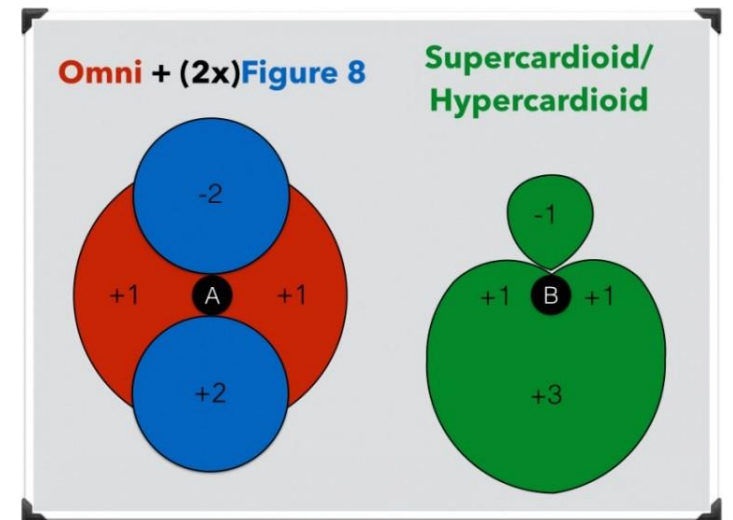
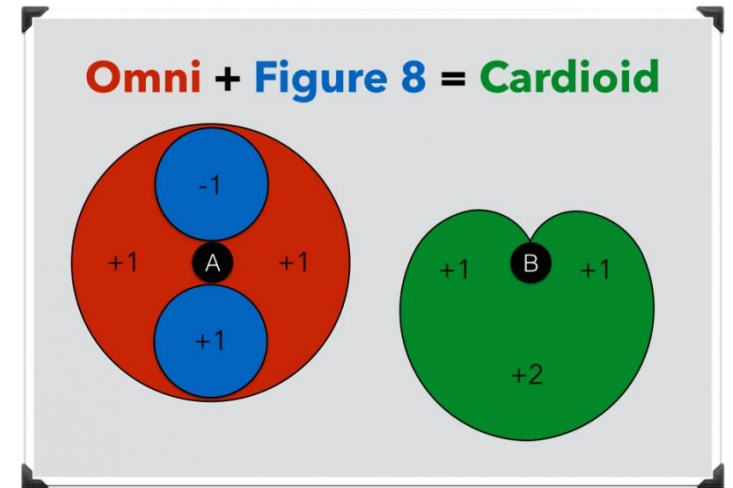
Polar Patterns: Designs

- Because of it, there are three basic patterns that we are going to discuss: omnidirectional, figure-8 and cardioid; although complex sounding, they are quite simple.
- The omnidirectional pattern surrounds the entirety of the microphone, which means that they are equally sensitive to all of the sound input given.
- The figure-8 pattern, is sensitive to only the front and rear of the microphone, there is sensitivity only for the front of it and its back, in the other sides it's almost deaf.
- The cardioid microphone, is the most common and most probably the one you are using right now; its sensitivity focuses almost only in the front and its surroundings.



Polar Patterns: Variations

- Both the omnidirectional and figure-8 microphones were the first ones to be invented, their design was relatively simpler. The cardioid microphones were later created as a combination of the past designs; an 8-figure and omnidirectional microphone were combined on its sensitivities to form the cardioid pattern.
- That way to combine designs, was later used to create two other designs: the super cardioid pattern; it's a variation of the cardioid were two 8-figure patterns were used instead of one.



Polar Patterns: Applications



Obviously, each microphone design has different applications and usages;

The omnidirectional patterns are used to record the sound of a room, an orchestra, a grand piano, a choir and a moving target among others.

The cardioid is the most popular pattern since it's the most practical and easy to use; it can be used too, for live performances, in some cases a drum kit and in rooms that weren't designed for acoustics.

The figure-8 pattern is used mostly for opposing sounds (a duet of singers most commonly) and stereo recordings; it's not that common to use this pattern: only in specific situations.

Bonus:

- As a bonus, there are microphones that can change their polar patterns; they have more complex designs; but still they exist. The polar pattern switching microphones have different pattern designs in it, but according to the user's desire, the voltage that power them can be switched on or off; those microphones integrate different patterns in its design; the possibility to combine them exists.





Audio Samples:

Directional Shotgun

A **shotgun** microphone is a highly **directional** microphone that must be pointed directly at its target sound source for proper recording. ... The 180° reference point is when the microphone is facing completely away from the sound source, pointing in the opposite **direction**.

<https://www.youtube.com/watch?v=NOMk1WbamTM>



Bidirectional

In this case the bidirectional mic, as the name said, it is a receptor with 2 entrance wictch captivate the sound and makes a type of wave <https://www.youtube.com/watch?v=AdOx7t-J2ek>



Omnidirectional

- Omnidirectional microphones are microphones that pick up sound with equal gain from all sides or directions of the microphone. This means that whether a user speaks into the microphone from the front, back, left or right side, the microphone will record the signals all with equal gain. This is in contrast to unidirectional microphones, which pick up sound with high sensitivity only from a specific side.
- <https://www.youtube.com/watch?v=AdOx7t-J2ek>

