

Microphones

Getting the right microphone is essential for sound engineering, there are many different types of microphones including wired and wireless and ones with different polar patterns (pick up areas). Microphones use magnetic induction (dynamic microphones) or capacitance change (condenser microphones) to change sound waves (air pressure vibrations) into electrical signals that are used through the process of preamps, analogue or digital desks and then loudspeakers where they are amplified. Condenser microphones are usually a lot smaller than dynamic microphones due to their coil being a lot lighter.

Polar patterns indicate what areas the microphone is best at picking sound up at; the most common are Omnidirectional, Figure of Eight (Bi-directional), Cardioid, Hyper-Cardioid and Line and Gradient (Shotgun). Each of these have different pick up areas and should be used for different sorts of things.

An Omnidirectional Microphone covers all areas and picks up sound in a 360 degrees radius; this makes them ideal for headset microphones, lapels and for simple handheld microphones. They are not sensitive to the wind and are less susceptible to popping noises (plosive sounds).

A Figure of Eight Microphone pick up sound from the front and back of the microphone and reject all sound that comes in from the side; this makes them ideal for duets, studio microphones and broadcasting.

Cardioid Microphones pick up sound within a 120 degrees radius from the direction they are facing; due to this, they help to reduce feedback but they are susceptible to wind and popping noises (plosive sounds). The Cardioid design is achieved by putting an Omnidirectional Polar Pattern with a Figure of Eight Pattern.

Hyper-Cardioid are very similar to Cardioid Microphones but pick up sound within a 100 degrees radius; this makes them extremely good at reducing feedback and have better side rejection than Cardioid Microphones. This makes them an ideal choice for a singer.

Line and Gradient (Shotgun) microphones use a highly complex directional polar pattern; it works by having an interference tube in front of the capsule with small slits in the tube. It picks up sound from one direction only by eliminating sound from the side due to Phase cancellation. The longer the interference tube, the tighter the polar pattern and therefore the more directional it is. Shotgun microphones are brilliant for film and TV works as they do not have to be right by the sound source and therefore can be kept out the way of the camera.

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