SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF MECHANICAL ENGINEERING

Consumer Electronics

Guess Today's Topic????

Characteristics of microphone

A microphone is a transducer that converts acoustic energy into electric energy.

The two most common types of microphones are:

Dynamic Microphones

Condenser Microphones

Characteristics of microphone

Dynamic Microphones

- Also called moving-coil mic.
- This classification includes ribbon mics (velocity mics).
- Simple construction, economical.
- Rugged, resistant to hand noise.
- Require no batteries or power supply.
- Standard equipment used by musical performers.
- Handle extremely high sound levels.

1. Sound waves strike the diaphragm.
2. Diaphragm vibrates in response.
3. The voice coil, attached with the diaphragm, vibrates with it.
4. The voice coil is surrounded by a magnetic field created by the magnet.
5. The motion of the voice coil in this magnetic field generates the electrical signal.

Characteristics of microphone

Condenser Microphones

- Also called capacitor or electret condensor mic.
- More complex than dynamics, tend to be costly.
- Not as rugged as dynamic mics.
- Can be affected by extreme temperature and humidity.
- Require batteries or power supply.
- Standard equipment used by film production.
- Higher sensitivity, provides a smoother, more natural sound, particularly at higher frequency.

1. Sound waves strike the diaphragm.
2. Diaphragm vibrates in response, changing the space between itself and the metal or metal-coated-ceramic backplate.
3. The variation of this spacing, due to the motion of the diaphragm relative to the backplate, produces the electrical signal.

Characteristics of microphone

Electrical Impedance / Low-Z & High-Z Mics

- After a microphone changes acoustic energy into electric energy, the electric energy flows through a circuit as voltage.
- Whatever resistance that voltage encounters in the circuit is called impedance.
- Impedance is expressed in ohms.
- Less resistance means lower impedance.

- Low-impedance (low-Z): 600 ohms or less.
- High-impedance (high-Z): 10,000 ohms or higher.
- Professionals prefer low-impedance mics.
- Much less susceptible to hum and electric noise, such as static from motors and fluorescent lights.
- Can be connected to long cables (over 1000 feet, so says Shure) with negligible loss of sound quality.
- High-impedance mics usually begin to sound muffled due to a loss of high frequencies when used with a cable longer than 20 feet.

Characteristics of microphone

Directionality: Pickup Pattern

- Omnidirectional
- Bidirectional
- Unidirectional (Cardioid)

1. Cardioid
2. Super Cardioid
3. Hyper Cardioid

Characteristics of microphone

Omnidirectional Mics

•Equal output or sensitivity at all angles.
•It will pick up maximum amount of ambient sound.
•Should be placed close to the sound source to pick up a useable balance between direct sound and ambient sound.
•Cannot be aimed away from undesired sources such as PA speakers which may cause feedback!

Characteristics of microphone

Bidirectional Mics

- Maximum sensitivity at both 0 degrees (front) and 180 degrees (back).
- Least amount of output at 90 (and/or 270 degree) angles (sides).
- Used for picking up two opposing sound sources, such as a vocal duet.

Characteristics of microphone

Unidirectional Mics: Cardioid

•Maximum sensitivity at both 0 degrees (on-axis).
•Least sensitive at the rear (180 degrees off-axis)
•Effective coverage or pickup angle: about 130 degrees.
•Picks up about one-third as much ambient sound as an omni.
•Isolate the desired on-axis sound from both unwanted off-axis sound and from ambient noise.

Unidirectional Mics: Super/Hyper Cardioid

•Maximum sensitivity at both 0 degrees (on-axis).
•Least sensitive direction: 126/110 degrees off-axis.
•Effective coverage or pickup angle: about 115/105 degrees.
•Greater rejection of ambient sound than cardioid mics.
•Picks up sound directly from the rear: the rear lobe.

Frequency Response

•The output level or sensitivity of the microphone over its operating range from lowest to highest frequency.
•A microphone whose output is equal at all frequencies has a flat frequency response.

Thank you