MICROPHONE TYPES

SUITABILITY AND CHARACTERISTICS OF MICROPHONES

What is a Microphone?

- A microphone is a **transducer**
  - Converts sound energy (variations in air pressure) into electrical energy
- Different types of microphone will capture sound using different methods

Condenser
(Røde NT5) (AKG C414)

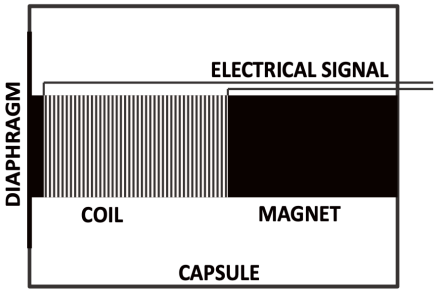
Dynamic
(Shure SM58)

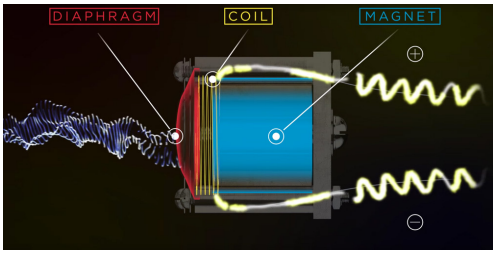
Ribbon
(AEA R44C)

- Transducers are devices that convert energy from one form to another
- In a microphone, the sensitive transducer element is called a capsule

Dynamic Microphones

- Use **electromagnetic induction** to capture sound
- Incoming sound causes the diaphragm to vibrate
  - This allows the coil to move in the magnetic field
- This induces an electrical current in the coil
- Well suited for use in live settings



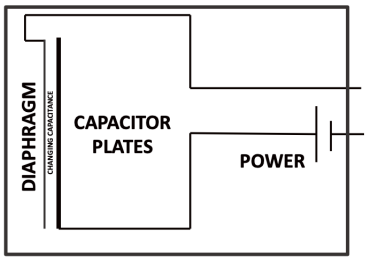


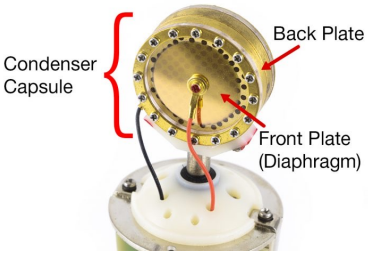
Also known as 'moving coil microphones'

- A movable coil is placed inside a magnetic field and attached to the diaphragm
- The diaphragm is a thin piece of material that moves in response to the change in air pressure
- The amplitude of the electrical current is proportional to the disturbance of the diaphragm (how much has the diaphragm moved)

Condenser Microphones

- Use a **capacitor** to capture sound
- The diaphragm acts as one of the plates of the capacitor
  - Incoming sound causes the diaphragm to vibrate
  - As it moves, it changes the capacitance of the circuit allowing a current to flow
- Condenser microphones require an external power source
- Well suited for use in studio settings

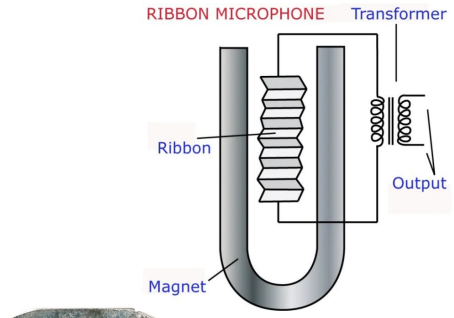


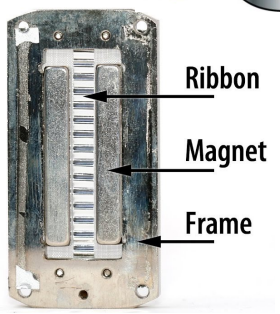


- The movement of the diaphragm changes the distance between the two capacitor plates
- The external power source supplies a current to the capacitor plates
  - When the diaphragm moves, it causes a change in capacitance which allows a current to flow
    - Capacitance is the ability to store an electrical charge within a capacitor

Ribbon Microphones

- Like dynamic mics use **electromagnetic induction** to capture sound
- Incoming sound causes a metallic ribbon to vibrate
  - This generates a voltage proportional to that of the ribbon's movement
- Do not need an external power source
  - Supplying ribbon mics (especially older ones) 48v can cause the ribbon to distort and even destroy it





- The metal ribbon is suspended in a magnetic field to achieve electromagnetic induction

1. Define the word transducer
2. What process to dynamic microphones use to capture sound?
3. What device do condenser microphones use to capture sound?
4. Why should ribbon microphones not be given an external power source?
5. Describe the process dynamic microphones undergo to capture sound