Microphones and Their Role in Radio Production

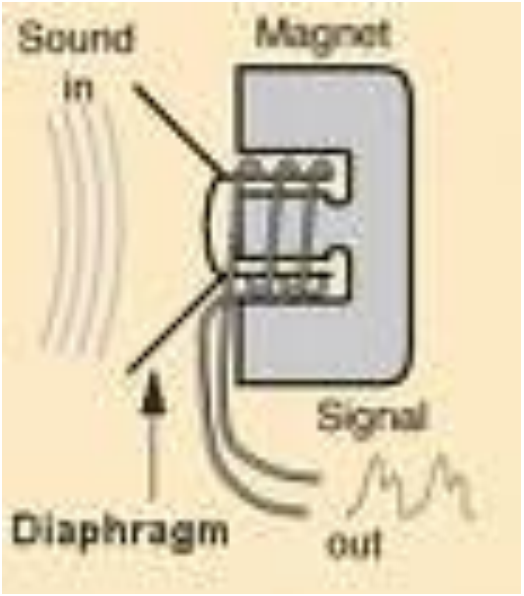
Microphones as Transducers

- Transducers change one form of energy into another.
- Before it goes into the microphone, it's "sound."
- When microphone converts it to electrical energy, it's "audio."
- Two distinct types: dynamic and electrostatic (condenser).

Dynamic Microphones

- Two main types: moving coil (dynamic) and ribbon.

Dynamic microphone explained



Dynamic microphones

- Parts: diaphragm, moving coil, magnet (see 3.1).
- Voice moves the diaphragm (like your eardrum), and causes the coil to move through the magnetic field, creating a low-voltage electrical signal.

Dynamic microphone applications

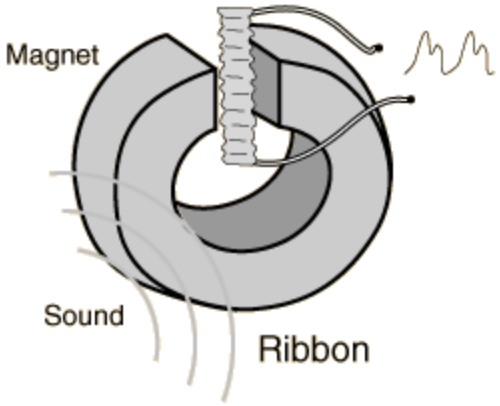
- Rugged, can withstand adverse environments, high-sound pressure. (EV 635 & EV RE20)

- Generate little electrical noise or “hiss.”

- Announcers like to work close for “proximity effect.”

Ribbon microphones

- Popular, “old-fashioned.”
- Metal ribbon is suspended vertically between two poles of a magnet. Ribbon vibrates with sound (like diaphragm on a dynamic microphone, see 3.3.).
- Wider frequency range than dynamic mikes; “warm,” natural sound.



Ribbon microphone characteristics

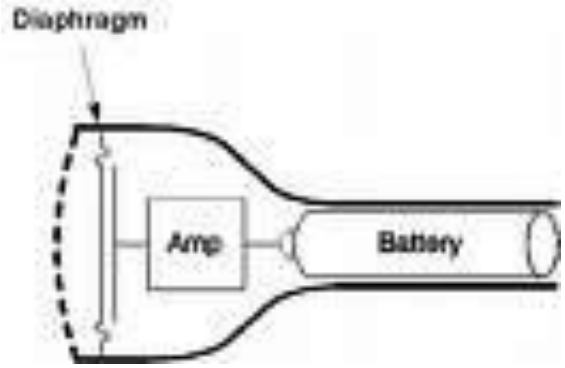
- Ribbons in old ribbon mikes are very fragile. Never blow into any mike, but <u>especially</u> ribbon mikes.
- Do not take ribbon mikes outside unless in a case.
- Ribbons make great voice microphones; they greatly emphasize the “proximity effect” (return to p. 47).

Ribbon mic compared to condenser mic (next in outline)

Electrostatic Microphones

- Better known as “condenser” microphones.

How a condenser microphone works



Parts: very thin diaphragm and rigid back plate separated by small air space (condenser). Voltage in the air space changed by movement of diaphragm.

Preamplifier required to amplify signal. Power required for the preamplifier, usually from battery or “phantom power” supply, which comes from the control board or mixer (see 3.5).

Electret-Condenser Microphones

- Best known examples are lavalier microphones.
- Slightly different in design from other condenser mikes, but still require a battery to operate the preamp.
- Also known as “body mikes.”

Condenser microphone characteristics

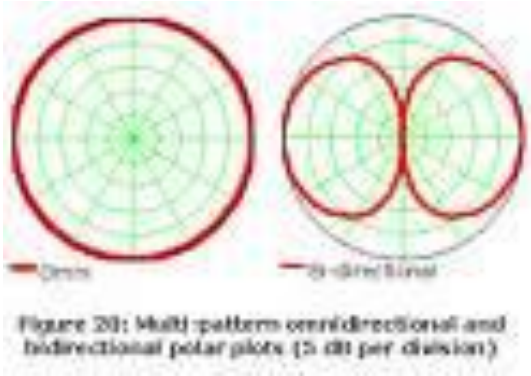
- Very sensitive, accurate sound reproduction.
- Announcers usually back off at least one foot.
- May pick up the sound of air conditioning, control board switches, floor vibrations.

Dynnamic vs. condenser mics Dynamic vs. condenser 2

Microphone Pickup or Directional Patterns

Five Basic Microphone Directional Patterns:

Microphone patterns



- Omindirectional: 360 degree sensitivity (see 3.8). Often used by radio-news people.
- Bidirectional (Figure 8): Most sensitive in front and rear; least sensitive to the sides (see 3.9) .

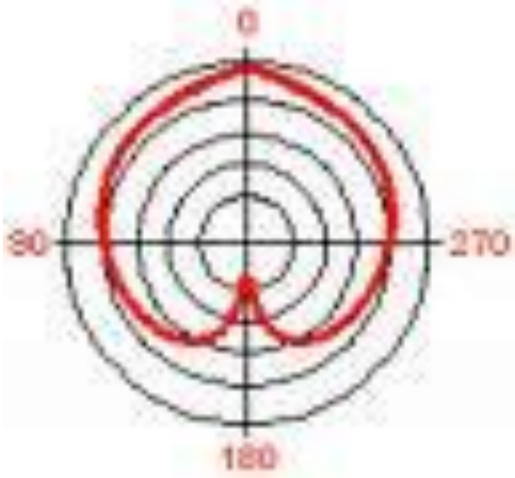
Microphone Directional Patterns (continued)

- Cardioid: shaped like a heart.

Also called “Unidirectonal.”

Most sensitive in front, least to the rear (see 3.10).

Strongly directional patterns blocks unwanted sound.



- Super-cardioid: narrower side sensitivity (see 3.12)
- Hyper-cardioid: highly directional, “shotgun” mike (see 3.13).

Microphone Placement

Microphone Myths and the Science Behind Microphone Placement

- Microphones do not “reach out” to capture sound; no working distance in feet and inches; depends on sound-pressure of source and background sound.
- Directional (cardioid) microphones do not enhance sound waves from in front of the mike. They reject sound from sides.
- Hyper-cardioid (shotgun) mikes do not “zoom in” on sounds; extreme rejection of sound from the sides.

Microphone Connectors

- XLR (cannon) connectors. Have three metal pins inside a cylindrical housing (See 3.33).

- Quarter-inch (TRS -- tip, ring, and sleeve) connectors. Not as often used in radio.

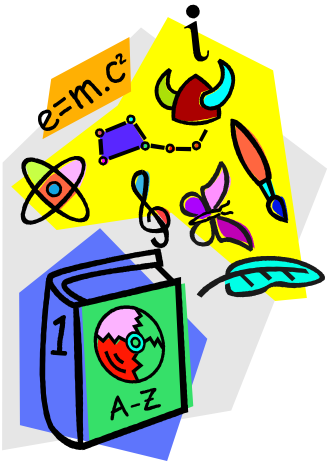
Microphone cable care

- Use natural looping of the cable.
- Never wrap cable around your bent arm or in a tight figure eight pattern.

- Avoid twists and kinks that damage the cable or keep it from laying flat.

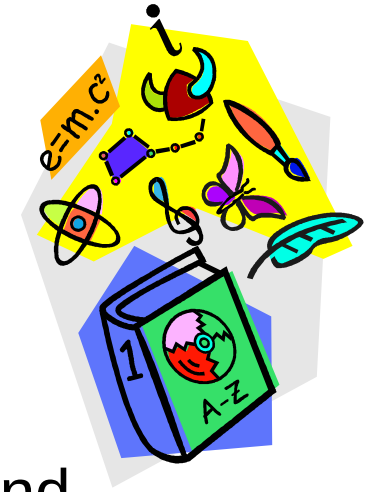
Rolling cable 1 Rolling cable 2

Pro Speak



- Audio – sound converted to electric energy.
- Cardioid – heart-shaped microphone pattern. Directional.
- Condenser mic – requires power to generate voltage and for preamplifier.
- Critical distance – ideal area for microphone pickup.
- Dynamic (moving-coil) microphone – common in radio. Requires no power supply.

Pro Speak (cont.)



- Omindirectional – picks up in 360 degree pattern.
- Proximity effect – working close to a cardioid microphone emphasizes resonance (bass) of announcer's voice.
- Ribbon mic – uses thin metal ribbon for sound pickup. Classic "old-fashioned" style.
- XLR connector – common microphone connector in radio. Three metal pins in a cylindrical housing.