Composition: Electronic Media I
Fall 2010
Microphones

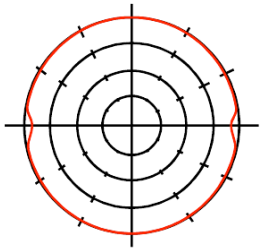
1. Microphones
   a. Microphones are the first device in the recording chain.
   b. Microphones convert acoustic vibrations (sound waves) into electronic signals so that they can be amplified or recorded.
   c. There are two major types of microphones: dynamic and condenser microphones.

2. Dynamic Microphones
   a. In a dynamic microphone, sound waves cause the movement of a metallic coil within a magnetic field, which causes electrical current to flow.
   b. Dynamic microphones require no external power to operate
   c. The frequency response of dynamic microphones falls off above about 10kHz
   d. Dynamic microphones have a resonant frequency (frequency that is emphasized), typically somewhere from 1 to 4 kHz
   e. Dynamic microphones may have a less accurate transient response in comparison to condenser microphones.
   f. Dynamic microphones are insensitive to changes in humidity.
   g. Dynamic microphones are robust, durable, and can be relatively inexpensive.

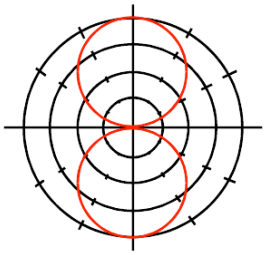
3. Condenser Microphones
   a. Condenser microphones operate via circuit capacitance; sound waves set two internal plates into motion
   b. Requires external powering (+48 V Phantom power)
   c. Condenser microphones generally have excellent high frequency response, but they can also have excellent low frequency response.
   d. The transient response of condenser microphones is excellent.
   e. Humidity and temperature can affect the performance of condenser microphones.
   f. Condenser microphones are fragile in comparison to dynamic microphones.
   g. Condenser microphones are moderately to very expensive.

4. Polar Patterns (Directional Response)
   a. The polar pattern, or directional response of a microphone is the way in which the microphone responds to sounds coming from different directions.
   b. A microphone's polar pattern can determine its usefulness in different applications.
   c. There are three polar patterns commonly found in microphone design: omnidirectional, bidirectional, and cardioid.
   d. The directional response of a microphone is recorded on a polar diagram which represents the microphone's sensitivity to direction over 360 degrees.

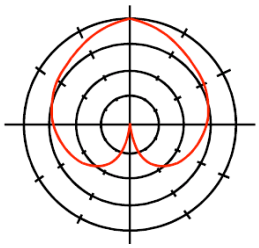
5. Omnidirectional
   a. An omnidirectional microphone picks up sound equally from all directions, regardless of the sound's location.



6. Bidirectional (Figure-8)
    a. Bidirectional microphones pick up sound equally in the front and back, but nearly nothing on the sides.
    b. Because the sensitivity on the sides is so low, bidirectional microphones are often used when a high degree of rejection is required.



7. Cardioid
    a. Cardioid microphones have a strong pickup on axis (in front) of the microphone, but reduced pickup off-axis (to the side and to the back).
    b. This provides a somewhat heart-shaped pattern, hence the name “cardioid.”



8. Proximity Effect
    a. Bidirectional and cardioid microphones experience low frequency buildup the closer you get to the mic, which is known as proximity effect.

9. Microphone Placement
    a. There are no hard rules for microphone placement. Don’t hesitate to experiment in order to get a sound that best suits your personal tastes.