


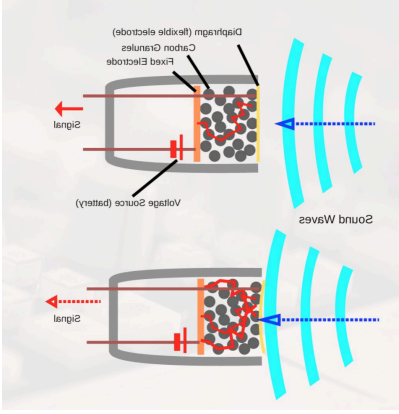

<b>Writer:</b> Bernard Johnson	<b>Presenter:</b> Bernard Johnson
<b>Estimated time:</b> 5:00 minutes	<b>Status:</b> Currently in Production
<b>Microphone Types &amp; Characteristics</b>	<b>Revised:</b> 12/11/2016

**Production notes:** All media sources will be finalized and imported from source to Apple I-Movie for timeline edits and bounce. VO Script will be provided on separate page corresponding to scene number. FPS: 29.97 Sample Rate:48khz

**Tools:** GoAnimate, I-Movie, WIDEO, Apple Logic Pro X, Rode Podcast Condenser Microphone, SE Reflexion Filter, Apple Macbook Pro.

<u>Scene</u>	<u>Source</u>	<u>Topic</u>	<u>Elements</u>	<u>EFX 1</u>	<u>EFX 2</u>	<u>Transition</u>
<b>1</b>	Go Animate (Classroom)	Topic Introduction (Instructor)	VO, Animated Characters,	None	None	Dissolve
<b>2</b>	Go Animate (Classroom)	Topic Introduction (Student Questions)	VO, Animated Characters	None	None	Fade IN/OUT
<b>3</b>	JPEG/PNG	Microphone Types/Carbon Mic	VO	None	None	Dissolve
<b>4</b>	Movie/WIDEO	Carbon Mic	Animation	Animation	None	Dissolve
<b>5</b>	JPEG/PNG	Condenser Microphone	Pic of Mixer, VO	Ken Burns	None	Dissolve
<b>6</b>	Movie/WIDEO	Condenser Microphone	Animation	Animation	None	Dissolve
<b>7</b>	JPEG/PNG	Popular Condenser Microphone	Pic of U87, VO	Ken Burns	None	Dissolve
<b>8</b>	JPEG/PNG	Popular Condenser Microphone	Pic of C414, VO	Ken Burns	None	Fade IN/OUT
<b>9</b>	JPEG/PNG	Dynamic Microphone	Pic of Signal Characteristics, VO	PIP	None	Cut
<b>10</b>	JPEG/PNG	Dynamic Microphone	Pic of Dynamic Essential Components, VO	Ken Burns	None	Dissolve
<b>11</b>	Movie/WIDEO	Dynamic Microphone	Animation	Animation	None	Dissolve
<b>12</b>	JPEG/PNG	Popular Dynamic Microphones	Pic of SM57/58, VO	Ken Burns	None	Cut
<b>13</b>	JPEG/PNG	Popular Dynamic Microphones	Pic of Senheiser MD 421, VO	Ken Burns	None	Cut

<b>Scene</b>	<b>Source</b>	<b>Topic</b>	<b>Elements</b>	<b>EFX 1</b>	<b>EFX 2</b>	<b>Transition</b>
<b>14</b>	JPEG/PNG	Popular Dynamic Microphones	Pic of Shure SM7B, VO	Ken Burns	None	Fade IN/OUT
<b>15</b>	JPEG/PNG	Ribbon Microphones	Ribbon Microphone Diagram, VO	None	None	Dissolve
<b>16</b>	JPEG/PNG	Ribbon Microphones	Pic of RCA 77D Microphone, VO	Ken Burns	Filter	Cut
<b>17</b>	JPEG/PNG	Ribbon Microphones	Pic of Royer 121 Microphone	Filter		Fade IN/OUT
<b>18</b>	Go Animate (Classroom)	Microphones Conclusion	VO, Animated Characters	Animation		Fade IN/OUT
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Scene	Narration	Illustration
1	Go Animate (Classroom)	 <p>EDT 631 Introduction Created by noizefactorystudios Last modified: 5 December 2016 - 9:04am</p>
2	Go Animate (Classroom)	
3	<p><b>Carbon Microphones</b></p> <p>The head of the microphone family tree is the carbon microphone. Carbon mics were the first electronic device that made transmission/reproduction of sound possible. The carbon microphone has two plates separated by granules of flexible electrode carbon. The outward facing plate is usually made from a thin substance that reacts to the sound waves that are being transmitted into it. As a steady direct current is passed between the plates, the varying resistance results in a modulation of the current at the same frequency of the sound waves hitting the diaphragm. Check out the animation we have made to help paint a more clear picture.</p> <p>Carbon microphones were an efficient solution to early microphone applications because of high level output, using a little</p>	
4	Movie/WIDEO	<p>Movie 5.3 - Carbon Microphone</p> 

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If the mic uses a voltage from the mixing board that voltage has been standardized at 48 volts. We call this voltage phantom power. Most consoles large and small will have a button to engage phantom power clearly marked. The backplate of the condenser mic retains a negative charge, the front plate or diaphragm, maintains a positive charge and an electric field is created between the two. Because the diaphragm is made of pliable, sensitive material the smallest of sound waves can affect the difference in space between the two plates. This change in space between the two plates causes changes in the voltage at the same frequencies of the sound wave. This voltage is then transferred to the output of the microphone down the mic cable.



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Movie/WIDEO

Movie 5.4 - Condenser Microphone



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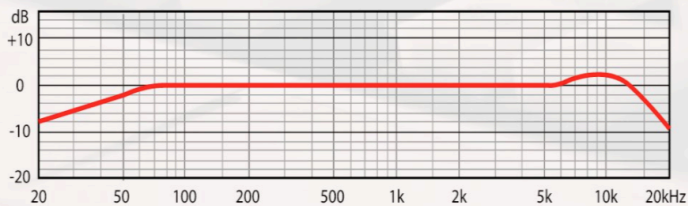
### Popular Condenser Mics:



**Neumann U87** - The Neumann U87 is arguably one of the best known and most widely used studio microphones in the world. The Neumann U87 is a large diaphragm condenser microphone. The mic offers three pickup patterns via a switch mounted below the headbasket. Cardioid, Omni, and Figure8 patterns are



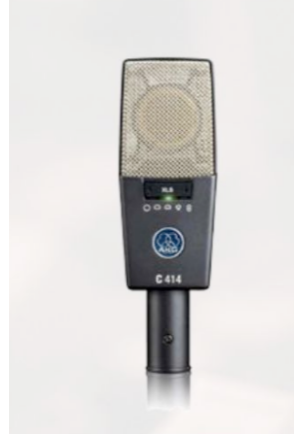
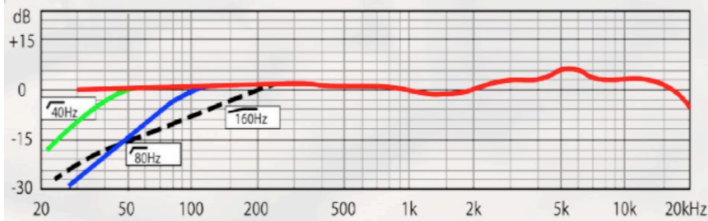
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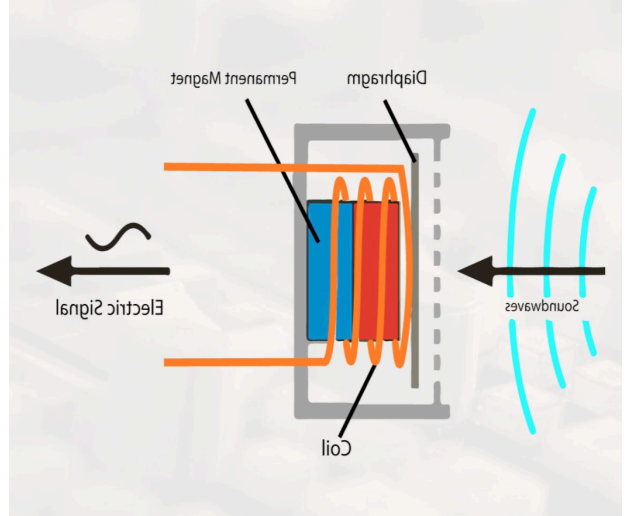
**AKG C414** - The five-pattern C 414 has been one of the most universal and versatile large diaphragm microphones for decades. Widely used for accurate, exquisitely detailed pickup of acoustic instruments, It features nine pickup patterns, three filters, and a pad. The 414 also has a peak hold LED light that lets the user know when overload has occurred. The 414 has an incredible 153dB dynamic range making it a versatile choice for all applications.



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### Dynamic (Moving Coil) Microphone

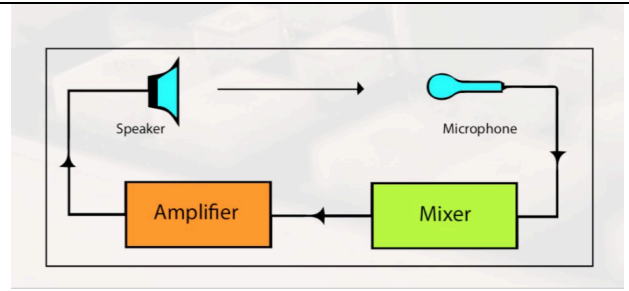
Dynamic microphones use the principle of electromagnetic induction. Like a loudspeaker, dynamic microphones work on the movingcoil principle, only in reverse. Dynamic mics contain a diaphragm that is fixed to a moving coil. The coil is positioned in a static magnetic field generated by a permanent magnet. As the sound waves hit the microphone, they set up vibrations in the diaphragm, which are transferred to the coil. The movement of the coil in the magnetic field induces a signal voltage at the same frequencies of the sound source. Check out this animation of how a dynamic mic works.



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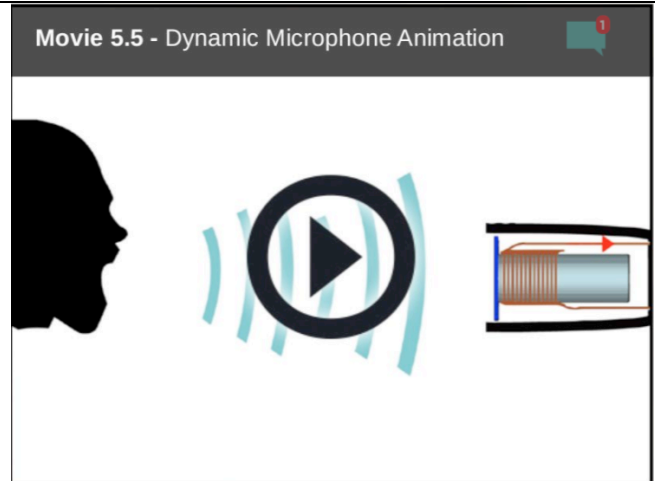
Dynamic microphones do not need a power supply. They can tolerate very high sound pressure levels and are also extremely durable and reliable, so are ideal for use in harsh environmental conditions. The nature of the electronic components used in creating dynamic microphones lend themselves to needing higher gain levels before feedback happens. Therefore dynamic mics are a good choice for live sound applications as well as studio environments.

Feedback describes a situation in which a microphone's pick up pattern is in the field of a speaker's output area. The result is the microphone picks up the signal it is sending and that signal becomes exponentially magnified. This is referred to as a feedback loop. The resulting sound can be painful, and the increase in amplitude can result in damaging amplifiers and speakers.



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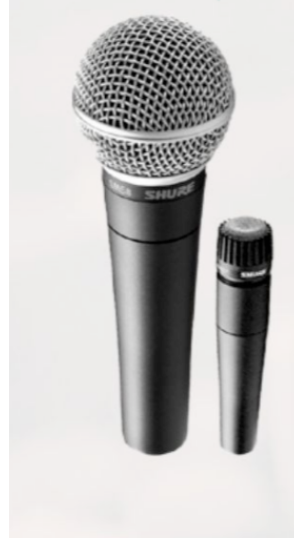
Movie/WIDEO



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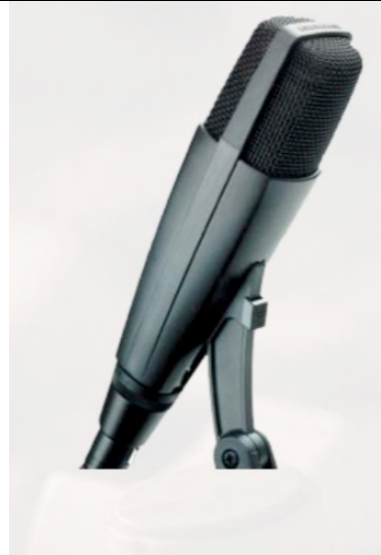
## Popular Dynamic Mics:

**Shure SM57/58** - The SM57/58 is a unidirectional (“cardioid”) dynamic mic design that has been used in some respect on 75% of the recordings in your collection — from snare drum to vocals to guitar cabs to, well, just about anything and everything. It is known for sounding pretty good on everything, and more specifically for its “carefully contoured presence rise,” sometimes less charitably called “midrange honk.” The 57/58 is a utility mic, usable on just about any source in any context and is probably the most popular microphone in history. The SM57 and the SM58 have exactly the same components however the SM58 comes with a pop filter making it more suitable for vocals.



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**Sennheiser MD 421** - The MD 421 has been a fixture in recording studios since its introduction in 1960. The MD421 has a 5 position bass rolloff switch. The switch is not marked with specific frequencies or amounts (dB) of cut. The “flat” position is marked M for Music; the other extreme is marked “S” for Speech and cuts the low end by approximately 6dB below 500 Hz. Three intermediate positions are provided. Notoriously good on drums (tom mic of choice for many engineers), the MD 421, like the 57 is versatile and sounds good on everything!



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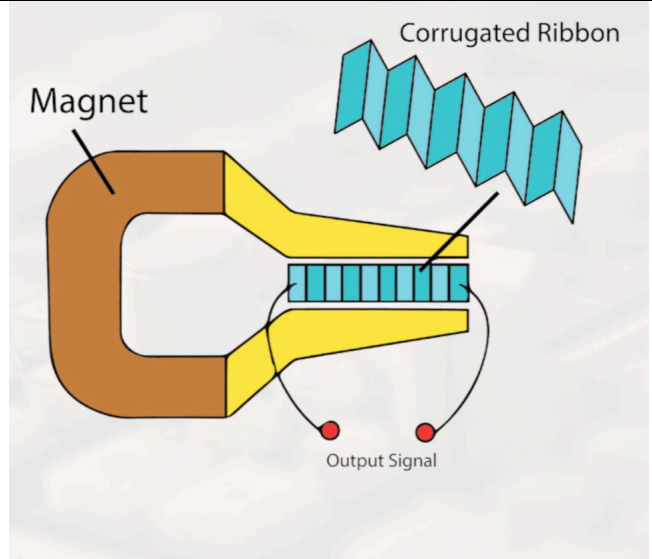
**Shure SM7B** - The Shure SM7B is an industry standard dynamic microphone. It has been the flagship of Shure's dynamic mic product line for years and has a reputation for being a go-to studio mic for numerous sources, including vocals. The SM7B has a high pass filter, and a "presence Boost" that changes its frequency response. Often underrated, the quality of this mic has made it the choice for vocals over some heavy hitters! The SM7B was most famously used by Michael Jackson on the album Thriller! The only note with the SM7B is that it has a low sensitivity rating which means that you have to get more gain from your preamp. This means more noise in your signal. However when paired with the right preamp this mic is an excellent choice for a lot of applications!



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### Ribbon Microphone

The last microphone type we will discuss will be the ribbon mic. Many years ago, ribbon microphones gained much popularity because they reproduced signals more like the signals produced by the condenser microphones, but they were still of a simple dynamic design. The dynamic designation is because a ribbon, like a moving coil, uses a magnet and works because of a magnetic field. Ribbon Microphones use a thin, usually corrugated metal ribbon suspended in a magnetic field. The ribbon is electrically connected to the microphone's output, and its vibration within the magnetic field generates the electrical signal. Ribbon microphones are similar to moving coil microphones in the sense that both produce sound using magnetic induction. Basic ribbon microphones detect sound in a bidirectional (also called figure-eight pattern), meaning both sides of the corrugated ribbon can perceive changes in pressure.





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**Royer R121** - The Royer R121 is a passive ribbon microphone with an innovative offset ribbon placement that gives the two sides of the microphone distinct features and sound. The ribbon element is made of pure aluminum and is 2.5 microns thick, and is tuned to about 40Hz. It is offset toward the front side of the microphone case, which among other features provides a highSPL capability of 135 dB on the front side. The rear side is equally sensitive but brighter (and less able to handle high SPL). Royer bills this feature as “two mics in one.” This innovation was patented in 1999.



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