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Lesson 4

Basic Microphone Design

Q & A

1. Please give several examples of a transducer. (page 37-38)
   Suggested answers: human ear , mic , speaker , phonograph cartridge , guitar pick up , analog tape head , record head .

2. Dynamic mics are of two types: Moving Coil Dynamic and Ribbon . (page 112-113)

3. Most condenser microphones can be powered by phantom power from your audio input device or a larger professional console. (page 117-118).

4. Define the "good rule" in detail. (page 111) A music track will only be as good as its performer, instrument, mic placement and the mic itself.

5. What is the most common microphone used for recording a loud electric guitar speaker or a snare drum in a room with several other instruments playing at the same time? Shure SM57. (page 173)

6. What is the most common microphone used to overdub a vocal or instrument in an isolation booth? Condenser. (page 178)

7. An omni-directional microphone can be changed to a cardioid microphone by the **use of the** ~~polar pattern~~ rear port. (page 121)

8. A bass-boosting characteristic of a cardioid pattern microphone is known as its _____ proximity effect. (page 124-125)

9. The front of the microphone is where the microphone captures the sound most accurately. The side and rear areas are not as accurate; these areas have a poor ~~timbre~~ off axis coloration (coloration) frequency response. (page 123)

10. The way a microphone's output is shown as to its frequency response versus direction is known as it's frequency response curve. (page 119-122)

11. The softening of sounds that are not in the front of the microphone is known as the ~~pop filter~~ front to back discrimination (page 121)

12. Now discuss and list your studios rules of using microphones.
Some to keep in mind are; No phantom power to a ribbon microphone; Always be searching for the best sound possible.

Make sure that the right cables are connected to the mics
Make sure that mic cable lines are wrapped around the stand to avoid noise and congestion
You want the artist to be comfortable with the mic
Mic placement is important (high / low)
Don't put phantom power on a ribbon mic

MANDATORY SUPPLEMENTAL READING

Lesson 4 – Microphone Placement for Specific Instruments.

This lesson is about learning micing techniques specific to a single instrument.

Which instrument this pertains to is totally up to you. Each of the instruments listed below are described in detail in your textbook, **Modern Recording Techniques**.

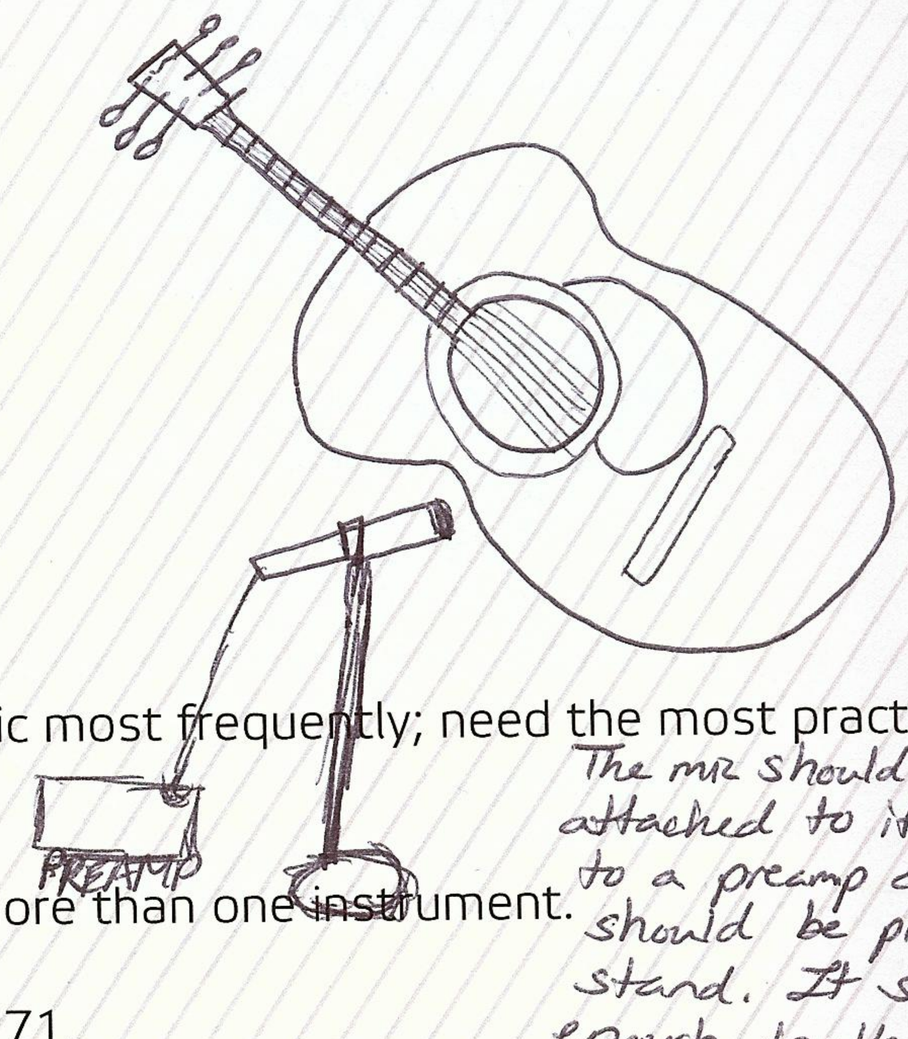
On your answer page, include:

Picture / diagram of the instrument

Diagram of microphone(s) and placement

50 words on how to mic the instrument

Page number(s), for reference.



The mic should have a cable attached to it that connects to a preamp and the mic should be placed on a stand. It should be close enough to the guitar to get the authentic sound.

Figure 4.38 on pg 143

Suggestion: Select an instrument you would mic most frequently; need the most practice with or simply interests you the most.

ALSO, feel free to complete this exercise for more than one instrument.

Modern Recording Techniques, pages 150 – 171.

- o Drum Set
- o Kick Drum
- o Snare Drum
- o Overheads
- o Rack-Toms
- o Floor-Tom
- o Hi-Hat
- o Congas and Hand Drums
- o Xylophone, Vibraphone, and Marimba
- o Clarinet
- o Flute
- o Saxophone
- o Harmonica
- o Trumpet
- o Trombone
- o Tuba
- o French Horn
- o Acoustic Guitar
- o Electric Guitar
- o Electric Bass Guitar
- o Violin and Viola
- o Cello
- o Double Bass
- o Grand Piano
- o Upright Piano
- o Electronic Keyboard
- o Voice

NOTES:

Sound information exists as patterns of air pressure; the mic changes this information into patterns of electric current
At the heart of any mic is the diaphragm (acoustical energy is converted to electrical voltage)
Mics are classified by the distinct way the energy is converted
Dynamic mics are used generally for several musicians in the same room all playing together
It is important to remember that the motion of the diaphragm causes the current, and the amount of current is determined by the speed of that motion; this kind of mic is known as velocity sensitive
Certain mics are used for loud sounds vs quiet sounds and vice versa
Condenser mics should be used for overdubbing (best used to add voice to a song w/ back vocals already on it)
In a condenser mic, the amount of current is essentially proportional to the displacement of the diaphragm, and is so small that it must be electrically amplified before it leaves the mic
A common variant of this design uses a material (electret - a kind of plastic) with a permanently imprinted charge for the diaphragm
Condenser types require batteries or power from the mixing console to operate (phantom power), and dynamics require shielding from stray magnetic fields, (which makes them a bit heavy)
The most important factors in choosing the right mic are Sensitivity, Overload Characteristics, Frequency Response, and Noise
Sensitivity - Is a measure of how much electrical output is produced by a given sound (vital when recording tiny sounds)
Overload Characteristics - occasionally there's a switch on the mic for different situations (high sensitivity and high overload)
Frequency Response - problems are often encountered mostly with sounds originating behind the mic
Noise - Very sensitive designs require elastic shock mountings and mics held in hand have mountings built inside the shell
The most common source of noise for a mic is the wire connecting the mic to the console or computer; a mic preamp is like a radio receiver
Surround the wires w/ a flexible metallic shield or lift the ground to prevent an antenna noise
Fewer than 10ft of ~~Cable~~ is recommended to prevent noise
There are 6 types of mics: Carbon, Crystal, Dynamic/Moving Coil, Dynamic Ribbon, Condenser, and Electret-Condenser
The condenser mic in Europe is also called a capacitor mic
Features of design for a condenser mic: needs phantom power (+48 VDC) - usually supplied by console, high output, very sensitive to vibration/shock, pad built in most, great transparent response, and a percussive waveform
A pattern is the relatively sensitivity of a mic as it rotates away from the sound source