

Microphone Set Up for Conference Room

Many people wrongly believe that the audio processors such as mixers can produce good sound quality and ignore the importance of the input's sound quality. The truth is the mixers can only enhance the sound quality, but it cannot fix the sound with poor quality. Hence, the most important thing to do is to make sure the input's sound quality is good.

Cables and connectors

A balanced (or differential) input is sensitive only to the difference between the two signals and ignores any part of the signal which is the same in each conductor.

An unbalanced output signal is carried on a single conductor (plus a shield). An unbalanced input is sensitive to any signal on that conductor. Noise or hum which is picked up by the cable will be added to the original microphone signal and will be amplified along with it by the unbalanced input. For this reason, unbalanced microphones and cables are never recommended for long cable runs, or in areas of high electrical noise.

Cables should be flexible and durable.

Microphone cables should be handled and maintained carefully for long life: 1) position them away from electrical sources to prevent hum or other noise pickup; 2) allow them to lie flat when in use to avoid snagging; 3) use additional cable(s) if necessary to avoid stress; 4) do not tie knots in cables; 5) coil loosely and store when not in use; and 6) periodically check cables visually and with a cable tester.

XLR connectors is more preferred than 1/4" phone jacks or 3.5mm mini-phone jacks.

Microphones

The microphone setting is a very challenging task, since microphones cannot distinguish between wanted and unwanted sound. The aim for the setting is to:

1. pick up talker's voice as clear possible
2. reduce the amount of noise that enters to the microphone as much as possible.

Pick up as much talker's voice as possible

1. place the microphone close to the talker. As the distance increases, the direct sound level decreases while the ambient sound level stays the same.
2. The critical distance is the distance from the sound source at which the level of direct sound has fallen to the level of the ambient sound. *In practice, microphones must be placed much closer than the critical distance to get an acceptable ratio of direct-to-ambient sound.*
3. use high sensitivity condenser microphone

4. Use low impedance microphone (similar to electrical resistance) for long cable run.
5. For speech, use microphone with 'shaped' response which is more sensitive to human voice frequency.
6. Avoid using ceiling microphone
7. If a wireless microphone is used, make sure there is nothing blocks the radio transmission between transmitter and receiver, especially metal.

Reduce the amount of noise enter to the microphone

1. place the microphone further away from the noise (e.g. building noise from air conditioning, buzzing light fixtures, noise from meeting participants, sounds from street or air traffic, etc.)
2. place the microphone further away from speakers to avoid feedback that cause by the sound re-enter to the microphone.
3. use unidirectional microphone which only sensitive to the front and avoid noise from the other sides. The most common type is cardioid pattern.
4. use the three-to-one rule to prevent comb filtering interference: for multiple microphones, the microphone-to-microphone distance should be at least three times the source-to-microphone distance.
5. To minimize reflective interference, avoid using microphones near acoustically reflective surfaces.
6. Always use the minimum number of microphone. The more number of microphone are used, the more likely to have feedback.
7. Reduce ambient noise by minimizing reflective surfaces and implementing absorptive surfaces.

What are acceptable speech to noise ratios?

Fundamental psycho-acoustic research states that intelligibility is a function of speech to background noise ratio.

- If speech level is 0dB to 10dB above background noise level, intelligibility will be unacceptable to poor.
- If speech level is 10dB to 20dB above background noise level, intelligibility will be poor to fair.
- If speech level is 20dB to 30dB above background noise level, intelligibility will be fair to good.
- If speech level is 30dB to 50dB above background noise level, intelligibility will be good to excellent.

The Case Against Ceiling Microphones

First of all, ceiling microphones are far beyond the Critical Distance for most rooms, making voices sound hollow and distant.

Second, ceilings almost always contain air vents which produce noise, and air ducts which cause the ceiling to rumble and vibrate. Ceiling microphones are closer to these undesired sounds than they are to the talkers.

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