Audio devices

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- Which audio device should I use?
- Important concepts in audio
- Supported microphones

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Main topics

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Which audio device should I use?

The appropriate audio device depends on your setup. Take the following rules of thumb into account:

- For room settings, use one omnidirectional ceiling microphone.
- For meetings around a table, use one boundary layer table microphone.
- For usability research behind the computer, use a microphone close to the test participant, for example a wireless microphone or boundary layer table microphone.
- For very good audio quality for more than one test-participant, use a wireless microphone for each person.
- Audio quality strongly depends on the room settings. An expensive audio device does not by itself guarantee good audio. If the devices are not placed correctly, or if the acoustics in the room is bad, audio quality will be suffer.
- Do not place the microphone cables in the vicinity of 230 V electricity cables. If you, for example, route microphone cables in electrical conduits, the electricity can interfere with the audio.
- Use sound absorbing material, like curtains, to avoid echoes on audio recordings.

Important concepts in audio

Preamplifiers

The signal from a microphone is of low voltage. This signal needs to be amplified prior to further processing, like mixing or recording. This is done with a preamplifier. The strength of the signal that is amplified this way, is called line-level. When you subsequently connect the preamplifier to the sound card of your computer, select Line in when a message pops up that a new devices is detected.

The unamplified signal is very sensitive to noise. Therefore the preamplifier should be positioned as close to the microphone as possible.

When you use a digital video device and connect the audio directly to the sound card of the computer, the sound card of the computer functions as a preamplifier. So for recordings with digital devices, you can connect the microphone directly to the computer. When a message pops up that a new device is detected, select Mic-in as input source.

Balanced cables

In professional audio, a balanced line or balanced signal pair is a transmission line consisting of two conductors of the same type. Both lines have equal impedances along their lengths and equal impedances to ground and to other circuits. Both lines are twisted together and then wrapped with a third conductor (foil or braid) that acts as a shield. Common balanced cables are cables with XLR connectors. Balanced cables are the opposite of unbalanced cables. A coaxial cable is an example of an unbalanced cable.



The main advantage of the use of balanced lines is good rejection of external noise. Because the signal between the microphones and preamplifier is most sensitive to noise, it is most important to use balanced lines there.

Phantom power

Phantom power, often indicated with P48, is a method to supply condenser microphones with power through microphone cables. Condenser microphones give better audio quality than other types of microphones, but they are more sensitive to noise. Preamplifiers and mixers can often supply microphones with phantom power.

Gain

The gain of a preamplifier is the degree to which the amplifier magnifies the low-level input signal compared to its output signal. It is the ratio of the output voltage divided by the input voltage and is expressed in decibels (dB). The formula to calculate gain is 20 x Log (Voltage output/Voltage input). A gain of 6 dB doubles the voltage 2 times and a gain of 20 dB gives a 10 fold increase in the signal.

Gain trim

For some amplifiers the gain can be selected in ranges. For example a LOW gain, gives a range from 18 to 38 dB. With the switch Gain trim, you can select the actual gain.

High pass filter

A high-pass filter (HPF) is a device in a preamplifier that passes high frequencies. Therefore it reduces the amplitude of frequencies lower than its cutoff frequency. It is sometimes called a low-cut filter or bass-cut filter.

Supported microphones

Ceiling microphone

Ceiling microphones are omni directional and are suitable for both speech as other sounds. MediaRecorder supports the following ceiling microphone:

Sennheiser MKE2-60-Gold-C (can also be used as table microphone)

The microphone needs 12-48V phantom power.

Table microphone

Table microphones are acoustically optimized for picking up speech. They are designed for use on conference tables, altars and lecterns. MediaRecorder supports the following table microphones:

- Sennheiser ME35
- Sennheiser ME36
- Sennheiser MKE2-60-Gold-C (can also be used as ceiling microphone)
- Sennheiser e 912 S BK

These microphones need 12-48V phantom power.

- Nikon ME-W1

Wireless microphone

MediaRecorder supports the Sennheiser EW 312 G3 B series wireless microphone set. Use this wireless microphone set when there is more than one test participant, and/or the participants are moving. The microphone set comes with a clip-on microphone and a receiver.

The wireless microphone receiver continuously switches between antennas, checks which antenna picks up the strongest signal and selects this one. This means that the antennas can be mounted at different places. If for example the reception is poor when the wireless microphone is in the experiment room, you could decide to install one antenna in this room. If the quality of the received signal is bad, for example if the signal has to go through a wall, you can use the special coax cable for extending the antennas (50?). In general you want both antennas to use the same cable length. It is recommended to position the two antennas at an angle of 90º.

No phantom power is needed for the wireless microphone. The signal that comes from the receiver is preamplified.

MediaRecorder also supports the Nikon ME-W1 microphone. This microphone has been tested in a portable lab set-up with a Dell 3551 notebook and Axis P1375 cameras. For more information see Recording devices.

Audio mixer

With an audio mixer you can adjust the audio streams before they go to MediaRecorder. Furthermore, you can combine the audio streams from two or more microphones. MediaRecorder supports the following audio mixers:

- Extron DMP 64
- Extron DMP 128