



# Achieving Good Audio for Video Recording: Basic Principles

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*(Note – The main ideas of this paper were originally presented by the author at a session of the Minnesota Professional Videographers Association (MPVA), in February 2009. This information is intended for readers with a similar background who need introductory information on the topic of audio, and for House of Worship technical volunteers who are sorting out how to achieve good quality audio on their video recordings.)*

## Introduction

Getting a good audio track with your video recording might sometimes happen “by accident.” However, if you want to get consistent, reliable, intentional results, you need to give this matter some careful attention. The art of your video shots may be more fun, but poor audio can be a major distraction, and spoil the visual impact. The following is a simple summary of the main points to consider for audio in the domain of video recording, followed by a list of useful references for more information on some of the details.

## Basic Principles

1. **Good Microphone Quality is Essential.** Don't rely on a camcorder's built-in mic, even if it's useful in some limited situations. And don't waste money on cheap microphones. For professional results, you need professional microphones.
2. **Microphone Type & Placement must be well-suited to the purpose.** Consider which type of microphone will work best in your specific situation. Choose from handheld, lavalier (e.g. lapel clip-on mic, either omni or directional), shotgun, boom, & boundary types of microphones. Also consider wired vs. wireless (e.g. Sennheiser ew112 or ew100ENG wireless sets have portable battery powered receivers that can be mounted on a camera or tri-pod). For live events with a presenter and an audience, an earset mic (e.g. Countryman e6 type) or a double-ear headset mic (e.g. DPA 4066 omni / 4088 directional, or Sennheiser HSP2 omni / HSP4 directional), or a high quality lavalier (e.g. DPA 4060 omni) are the usual ways to get both good live sound and a good audio recording, while using a low-visibility mic. In every situation, use a microphone that allows you to put it where needed to give a strong audio signal, taking into account whether it can be visible or not in the video shot, and whether low-visibility (i.e. an earset or lavalier mic) is okay. For any microphone type, it should exhibit low electronic noise (using a too-low gain setting can make this worse) and good tonal quality for the placement method. It should also minimize pick-up of unwanted sounds, but at the same time it should preferably give a desired sense of the surrounding space (e.g. not “too dry”) and a nice blend of desirable ambient sounds in balance with the primary audio source. Sometimes an omni mic on the presenter is useful in achieving these goals (as long as it doesn't increase feedback issues for the live sound). Or use additional mics for ambience pickup, such as laughing, clapping, or other audience reactions when recording a presentation, or audience singing during a worship service.)
3. **Balanced Cables for Audio are Very Important.** (Especially long cables, i.e. those longer than 10 – 15 feet.) This type of cable most commonly uses XLR connectors. Also make sure all cables are in good condition, including short patch cables. Longer un-balanced audio cables exhibit more electronic noise, and often are the source of unprofessional “hum” and “buzz” in audio recorded for video.

4. Isolate & Match Audio Signals, with an adapter device, or use balanced audio cables through-out. An isolation/signal-matching device is a unit that adapts pro microphones & balanced cables to prosumer camcorder audio connectors (e.g. BeachTek or similar devices). Otherwise, use a camcorder or video recording unit with “native” XLR inputs so that all your audio cables can be balanced type. It is becoming common-place for even prosumer camcorders to have XLR audio input connectors, so take advantage of this. (On a somewhat related note, there is an adapter device known as a DI, or direct box, that can be useful for connecting an unbalanced audio source, such as a computer audio output, through a long cable to your audio mixer, or even as a way to isolate the computer and the mixer, to avoid hum and buzz issues.).
5. Correctly Adjust Gain & Signal Levels for the Input Source. Set the input switches correctly for mic or line input, depending on the signal level you’re feeding to it, and adjust the input gain and/or volume for a strong recording level, but without peaking (which causes distortion). If the input gain is too low, the recording will exhibit too much white noise when the volume is turned up to a useful level during playback. Distortion during playback indicates the gain was too high, so make sure you check for peaking during the loudest sounds that you are recording to avoid this problem.
6. Monitor the Audio Level, and adjust as needed as the session proceeds. Use headphones and the camera’s audio level meter. Make sure the audio level recorded is strong, but not peaking, for the entire session.
7. Mix Audio Specifically for Video. It’s best to use a dedicated audio mixer (or a dedicated mix on a house console that allows this) if you are recording more than one audio source.
8. Mixer Channel EQ Controls are Useful. Take advantage of these to achieve good tonal characteristics on the recording. Dynamics processing (e.g. compressors & gating, or gain-sharing processors that auto-mix) can also be extremely useful for good quality audio, when used appropriately. Again, the best possible results for the audio recording can be achieved when channel EQ & dynamics are controlled separately for the recording (i.e. a dedicated mix & processing).

#### References:

1. <http://www.videouniversity.com/audio2.htm> Audio for Video – Part 2, Microphones & Techniques; Hal Robertson, 1998
2. <http://www.videouniversity.com/audio3.htm> Audio for Video – Part 3, Audio Production Techniques; Hal Robertson, 1998
3. <http://www.videomaker.com/article/9520/> Microphone Jungle; Tip McPartland, July 2003
4. [http://en.wikipedia.org/wiki/Direct\\_box](http://en.wikipedia.org/wiki/Direct_box) Wikipedia definition for Direct (DI) Boxes used in pro audio
5. [www.beachtek.com](http://www.beachtek.com) Product information on audio adapter devices for video camcorders; see question & answer section for explanation of key concepts
6. [www.sennheiserusa.com](http://www.sennheiserusa.com) Wireless microphone systems for video camera, with portable receivers and transmitters, at an affordable price (ew112PG2, ew100ENGG2); also, short shotgun or supercardioid mic with integrated camcorder mount (MKE400, MKE300), and pro short shotgun mic (ME66) suitable for boom or fish-pole usage (appropriate shock-mount also needed, and consider windscreen)
7. <http://www.rane.com/note110.html> “Sound System Interconnection”, RaneNote 110; 1985 (Rev 07)