



Principal Characteristics of the Different Microphone Types

Shotgun Microphones

Certain types of recording are frequently made with shotgun microphones. SCHOEPS has never offered this type of microphone, and we are often asked why not. We agree that good shotgun microphones have their uses, but we suggest that their peculiarities be well understood; shotguns may not be the optimal choice as often as people suppose.

A shotgun microphone contains a directional transducer (e.g. a supercardioid capsule) and an "interference tube." The tube causes any sound energy arriving from the sides to undergo partial cancellation before it can reach the capsule. The exact degree of this cancellation depends greatly on the wavelength of the sound. For wavelengths longer than the tube – at low and midrange frequencies – the tube has little effect except, unfortunately, to distance the capsule further from the sound source than it would otherwise be. (The transducer is located behind the tube – not at the front end of the microphone.)

Thus throughout much of the audio range, a shotgun microphone has no greater rejection of off-axis sound than the capsule on which it is based. At higher frequencies the pickup pattern becomes narrower, but with great variations in response for different angles and frequencies. The result is a much more complex directional characteristic than ordinary polar diagrams (drawn only at certain "spot" frequencies) can indicate directly.

A shotgun microphone must therefore be well aimed at the intended sound source, and that source must fit within the microphone's front pickup angle. Otherwise, comb-filter-like effects will result from any reflected sound, off-axis sound sources, or motion of the direct sound source (or of the microphone itself, if it is used in a reverberant space). If an actor moves across a room while speaking or singing, his or her motions can no doubt be followed – but sound from any other actors nearby, and any sound reflections within the room, will be picked up with varying coloration. Conditions in which there is little reflected sound energy (e.g. outdoor recording) and limited off-axis sound in general are thus best for shotgun microphones. In a diffuse sound field (i.e. at significant distances indoors) they are less effective than one might wish, and they tend toward a harsher sound quality.

Stereophonic recording with shotgun microphones can be awkward (how does one set up an X/Y pair of shotguns?) and fraught with compromise because of their irregular polar patterns. However, M/S recording is possible with a shotgun "M" microphone (see the Colette accessory KM5C) for sound sources that are not too wide.

A small directional microphone with smooth off-axis response, such as the SCHOEPS CCM 41, can often be placed closer to a sound source than a shotgun microphone and still stay outside the frame for film or video production. It is also simpler to provide any needed shock mounting or wind screens for small microphones. A trial comparison between a good small supercardioid and a shotgun can be surprising and enlightening; the pickup quality can be substantially improved in many cases. Thus we propose that in any given situation, users should consider carefully whether using a supercardioid rather than a shotgun might yield equal or better results.