



Omni Application Guide

At Earthworks we are concerned that unfamiliarity with omni microphone use may be precluding some people from trying out our omnis. Before Earthworks, most of us never gave omnis a second look much less a serious listen simply because of their lack of directionality. They cause feedback, right? How do you get any separation? They pick up everything, don't they? And what about their imaging in stereo? It turns out that omnis do have very positive strengths for recording and even sound reinforcement applications. They sound great! They add very little phase distortion or coloration. You just have to know how to use them. Don't let the discussions of technical issues throw you off, skip ahead to the specifics that interest you.

Why omni? – Omnis have some inherent advantages over directional mics. They sample sound at a single point in space, capturing it exactly – directional mics use a combination of sounds sampled at several different points to achieve rear rejection, creating phase problems in the process. The omnis do not exhibit any proximity effect or off-axis coloration. They have extended accurate low frequency response.

Benefits of Earthworks Omnis – Earthworks omnis are designed for the best time-domain performance. Their impulse response is the most accurate of any recording microphones available on the market. They impose no coloration on the signal and have very high SPL handling capabilities, which makes it possible to position them very close to the source. Earthworks omnis have accurate and extended low frequency response (9Hz for TC30 or 4Hz for QTC40). It is not disproportionate or tweaked in any way, just accurate and full to an extent that may strain many people's credulity in a capsule so small. This is not at the expense of the top end which is flat and clean in the same way.

Ambient Room Miking – Earthworks omnis are great ambient room mics. In a studio situation ambient mics can tie things together and help to liven up the sound. For example, while recording a band live to four tracks – two tracks from the PA mixer and two from a spread pair of Earthworks TC30s a foot or so from the front line of vocal mics – bringing up the ambient tracks produced a striking realism. It was like being there (better, actually). Placing Earthworks mics at a distance from a group of background singers makes the singers sound like they are in the background. Adding in an ambient Earthworks mic makes a dry-sounding close-miked guitar amp come alive.

Find Sweet Spots – Many happy Earthworks users described this as their primary method of placing Earthworks mics. Simply listen around the room until you find a sweet spot – a location where you like the sound. Put a mic there. If you are recording in stereo keep the image you want in mind as you place the second mic. The mic will capture exactly what is occurring at this position– even acoustically challenged rooms may have sweet spots. This does not mean that you must spend endless hours worrying over exact placement. In fact, most users report spending a lot less time tweaking mic position when using Earthworks omnis. Generally, they are forgiving and musician-friendly.

The Microphone as a Paint Brush – Many recordists try to match the coloration of the microphone with the color they want from a source, like using the mic's presence peak to make a voice sparkle or the bass proximity effect to make an announcer's voice sound larger than life. In this way of thinking, Earthworks mics are transparent. What you get is the sound of the source. With Earthworks omnis you are looking broadly for the right balance with respect to the room – inside that you can choose from among the subtle variations in the sound generated by the source. There exists a whole range of sounds emanating from an instrument that are unavailable to a mic that exhibits the bass proximity effect. You will be amazed at the variety of sounds that an instrument gives off when you listen to it from very close. Experiment with different positions. Try miking very close. If you like what you hear, use it.

The Inverse Square Law – The inverse square law is your main tool to control the balance between the sound of the source and the sound of the room when using an omni. As you move away from a source of sound in free space the amplitude from that source decreases in an inverse square relationship with respect to distance. As you move closer to a source the amplitude from that source increases. The proportion of sound from other sources decreases very rapidly as you move the microphone closer to the primary source. To achieve separation an omni should be positioned as close to the source as possible. If the room sounds good – use it, but if it doesn't or if it contains unwanted sounds, try staying close to the source. An omni can have the same or even greater separation than a directional mic (cardioid) as long as it can be physically moved close to the source (no need to worry about the proximity effect). Positioning an omni at about a third the distance you would use for a cardioid will give you better separation without any coloration.

Near-Coincident Omni Miking – It is generally believed that near-coincident omnis don't image well. Apparently, Earthworks omnis don't image like other mics, even other omnis. One reviewer noted that they sounded farther apart than the B&Ks he was comparing them to. Closely placed Earthworks omnis image beautifully on solo instruments and small ensembles. You'll have to try it for yourself. Place two Earthworks mics with the tips close together (near-coincident, X/Y or crossed.) Position the pair six to eight inches from the sound hole of an acoustic guitar or in fairly close proximity to any instrument or small ensemble. Listen through headphones or speakers to compare the results with the original. Remember to check for mono compatibility.

To EQ or not to EQ? – The frequency response of Earthworks mics' is so smooth and accurate that we recommend you refrain from using EQ at all during tracking, unless you have a specific problem. If you need to EQ during tracking this probably indicates a problem at the source. Try to correct it there. You can always EQ the recorded track later.

Drums – Earthworks mics are great for overheads, kick drum, snare and percussion (claves, cow bells, triangle, tambourine and nearly everything else). For overheads try near-coincident or spaced omni pair. For kick drum place the mic anywhere you like. The sound of the room becomes more important as the distance from the source increases. If your space allows it, try using two or three Earthworks mics to record the whole kit. A stereo pair in front a percussionist's table is an easy solution for a difficult miking situation.

Guitar, acoustic – Our clients report very good results with placements anywhere from very close to very distant. Several people have mentioned exciting results with a near coincident pair 6 to 8 inches from the face. Others have mentioned placing one mic close and one ambient. I like two mics one near the top of the fret board to get the pick and strings, the other below the bridge to get more bass.

Guitar, Electric – Just put the mic in front of the amp. If you want more room sound back it up, if you want a more direct sound with more separation move it closer. Try one mic close and another distant if the room sounds good. Face the amp into a diffuser and mic that. Capturing the electric guitar sound is a complex undertaking that often leaves the artist dissatisfied and the recordist frustrated. With Earthworks omnis you can finally get the sound as it sounded in the room live.

Piano – You will need to experiment with placement to get the image you want of this large and variable instrument. For classical piano the mics are often placed 5 to 10 feet from the instrument or more, the idea being that the sound doesn't come together closer than that. A parallel QTC40 pair, 10 inches apart and 6 to 9 feet from the open lid works for classical piano in performance. For other styles of music the mics are usually placed much closer. Some prefer a spaced pair of mics 2 to 3 feet out from the opened lid. Some swear by one mic midway down the left hand (bass) part of the harp, the other over the middle of the upper strings. You can get the player's perspective by placing mics over their shoulders. Berklee College of Music gets excellent results with an pair of omnis 15 inches apart about 8 to 10 inches above the hammers. One engineer puts them in the holes in the harp within a half inch of the sound board.

Other Stringed Instruments – Plucked stringed instruments like banjo and mandolin can be treated like guitars, but do experiment. For violins and viola try recording close, but go with what sounds good. Violins can be screechy (too much rosin) up close so you may need to move back or try rotating the mic to 90° off axis. This will moderate the high frequency detail a bit. For cello try using one or two mics within 1 to 2 feet or closer. For double bass or standup try one or two mics within about 18" from the center of the body. You will not believe the evenness and detail of the sound. If the player is active an Earthworks mic can be wrapped in foam and stuck under the strings below the bridge. When recording a lap dulcimer try bringing two mics (or one) in very close. Hammered dulcimer – adjust a pair of mics for balance with respect to the room for the desired image. For harp try one mic on either side of the strings within 18", or a pair a foot or two in front of the instrument. Please call us if you want advice when recording any instruments not mentioned here.

Vocals – For close miking vocals you will need a windscreen or pop filter. If you are recording an exceptional voice and/or want to capture exactly what the voice sounds like you will not find a better mic than Earthworks. To moderate the incredible detail of Earthworks mics rotate the mic 90° so that the artist is singing across the element. Several engineers have reported using both their old favorite and an Earthworks omni and choosing between them (or mixing them together) during mixdown. One engineer told of a singer who just couldn't do the performance without an SM58 in his hands. The engineer gave the artist the SM58 and fed it to his phones but recorded him with an Earthworks mic placed unobtrusively in the isobooth. He gave a great performance and they got an extraordinary take. Ambient miking of voice can be very effective. Miking background singers from a distance will make them sound as if they are indeed in the background.

Location, Jazz and Pop – Place Earthworks mics as close as you like in front of the stage. Spread them as dictated by space and conditions. Try to get a wide image if you can. If you are using a PA for vocals you may need to place the mics to include that. If you can get the PA board mix and add in two Earthworks mics placed right in front of the stage, you will not be disappointed. The detail and imaging will amaze you.

Location, Classical – The QTC40 is as good as it gets for classical location recording. Try placing Earthworks mics closer than you are used to, they image differently from other mics. The classical tradition is to capture the sound of the best seat in the house. This usually means placing spaced omnis anywhere from 6 to 12 feet (or more) from a soloist or a small ensemble. A large choir or orchestra might be miked from even farther away. There is no accounting for taste and all halls are individual.

Rehearsals and Gigs – For students of classical voice (or an instrument), Earthworks mics will reveal exactly what they sound like. They hide nothing. This transparency can help in the development of timbre, balance, timing, moderation and ensemble. Gigs or recitals can be taped for review so that you can hear what they sounded like to the audience.

Sound Reinforcement – Omnis are limited by feedback in sound reinforcement applications. Sources that don't go through the monitors, like drum overheads, can be amplified in the FOH mix. The inverse square law provides separation and allows gain for sources that you can get very close to like guitar amps, kick drum and snare. Several live sound engineers have used our omnis to amplify piano by close-miking with the lid closed. They are very useful as ambient mics for in-ear monitoring.

Preamps and Electronics – Earthworks mics are very fast and sensitive, capable of producing very high voltages. Make sure that the preamp's inputs can handle at least +20 dBu. They require true 48V phantom power and consume more current than most other phantom-powered mics. The extended high-frequency response of Earthworks omnis may trigger oscillations or RF problems if the preamp's input circuits are not designed properly. Contact us with any questions regarding compatibility of our mics:

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