

# ProSoundWeb EXPERT SERIES



## TECHNIQUES FOR MIKING DRUM KITS

*Chapter 1 of 6: Drum Microphone Expert Series*

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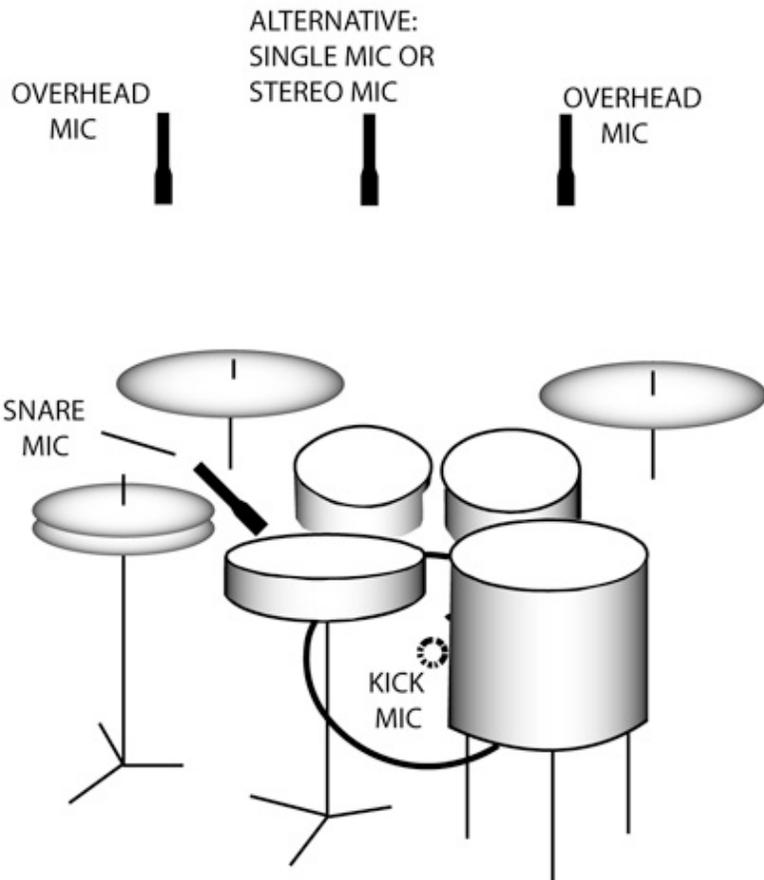
## FROM SIMPLE TO COMPLEX: AN OVERVIEW OF DRUM KIT MICROPHONE TECHNIQUES

By Bruce Bartlett

A drum kit can be viewed as a single instrument. Like an orchestra, it can be captured with a pair microphones in a stereo configuration (or a single stereo mic). Or, it can be viewed as a collection of individual instruments, picked up with numerous close mics.

A minimal approach (**Figure 1**), also sometimes called area miking, uses only one or two mics overhead (or maybe a stereo mic), another in the kick, and maybe one on the snare. The mics pick up the set as a whole, and the balance among the drum kit pieces depends more upon the drummer. Area miking tends to work best with acoustic jazz and other types of acoustic music.

Typically, overhead mics are placed about 2 feet above the “front” of the



**Figure 1: A minimal mic approach.**

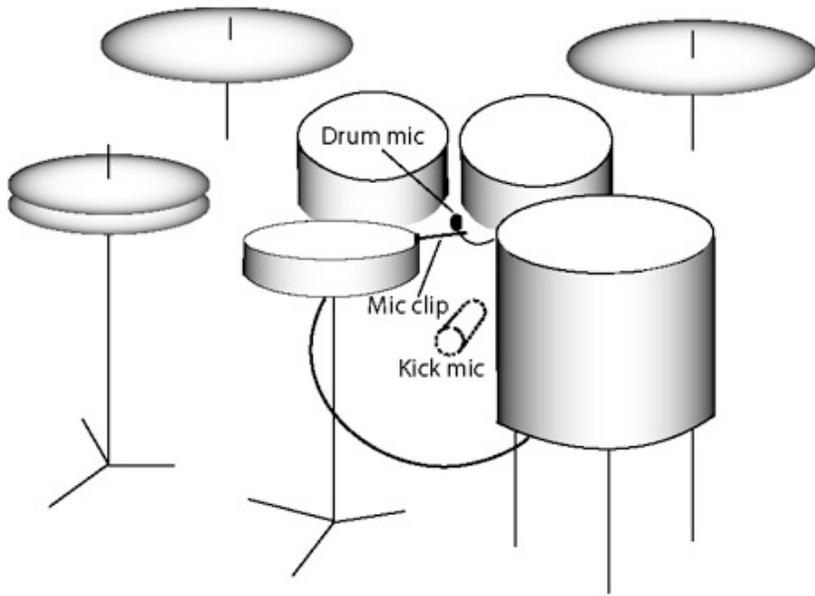
cymbals, while the snare mic is a couple of inches over the rim aiming at the center of the head, and the kick mic is inside, near the beater. For traditional jazz, where the kick drum is often tuned to be intentionally resonant – even a bit boomy – the mic is more commonly placed by the front head of the drum. Something to try: reverse the polarity of the kick mic to see which polarity sounds best for your application.

Condenser models are a good choice for overheads because they provide a sharp transient response that accurately reproduces the cymbals. Large-diaphragm condensers tend to capture the fullness of the toms better than small-diaphragm units. Also don't be afraid to try dynamic mics. Many classic rack tom and floor tom sounds can be captured with models with them.

### **The Ol' XY**

An overhead stereo pair can be coincident, near-coincident or spaced. The coincident-pair (XY) stereo technique yields a narrow stereo spread with sharp image focus, while the spaced-pair method provides a wide spread with more diffuse images. If the cymbals are too loud relative to the toms and snare, raise the overhead mics, lower the cymbals.

Since the mics are relatively far from the kit, they also pick up room acous-



**Figure 2: A single mini omnidirectional mic plus one for the kick.**

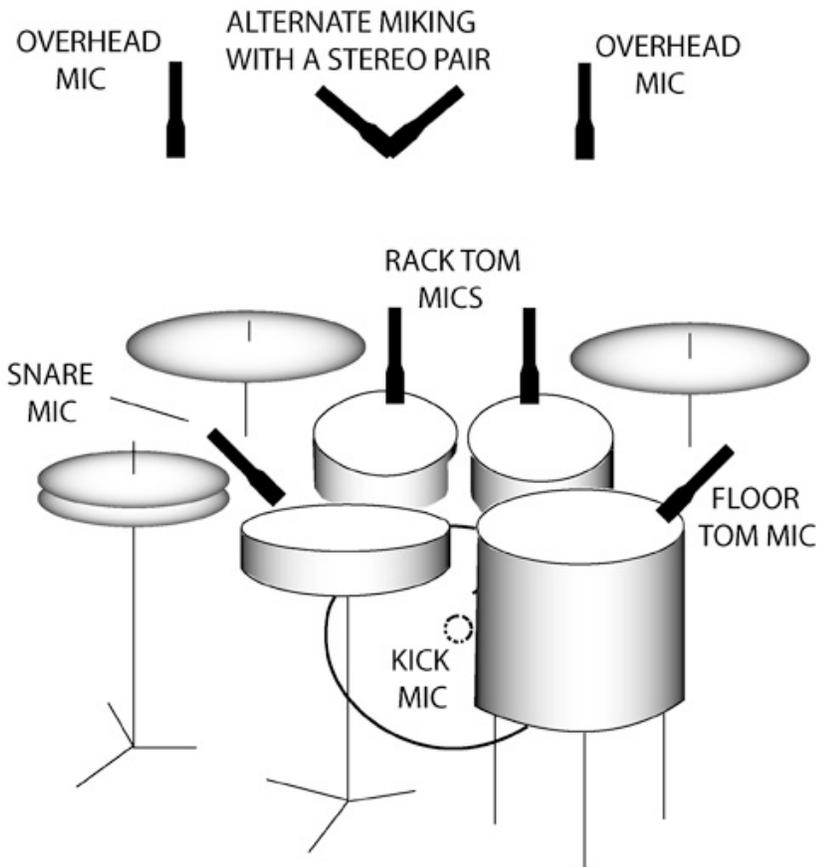
tics and sometimes other instruments. Room reflections can make the sound a little distant and muddy. This can be good or bad; depending on the type of music, the sound you're going for, and so on.

Careful placement (particularly moving the kit away from walls) can minimize or eliminate the problem. In churches (and some clubs), it's common to see a plexiglass barrier placed around the drum kit, intended to keep the acoustic sound of the drums from overpowering the vocals and other instruments. When lowering the overhead mics, exercise caution or the cymbals can easily become too loud.

Another approach is to place the mics near each side of the drummer's head, so that they "hear" the kit in stereo pretty much as the drummer hears it. Apply EQ as needed to compensate for Fletcher-Munson loudness contours (how the ear hears different frequencies at different levels).

A nifty "minimalist" technique that can work with a small kit is clipping a mini omnidirectional condenser mic to the right side of the snare drum rim, a few inches over the rim, over the drummer's knee (**Figure 2**). It will pick up the snare, toms and cymbals all around it, and the resulting sound is tight and full, somewhat like that of multiple mics. To adjust the balance among the drum-kit parts, position the mic toward or away from the toms, and raise or lower the cymbals.

The single-omni method limits what can be done with EQ. Boosting the higher frequencies (2 kHz and up) to bring out the toms' attack can add an unwanted harsh or metallic effect to the cymbals. It's better to use subtractive EQ in the low frequencies, roughly 100 Hz for the toms and 200 Hz for the snare.



**Figure 3: Multiple miking.**

### Mic Multiplicity

With a multiple-mic approach (**Figure 3**), one mic is placed close to each drum and cymbal. That provides extra control of the EQ and effects for each drum independent of the others, resulting in a tighter, more present sound. Toms, in particular, benefit from individual miking, for a richer and more distinctive sound. Multiple miking is the norm for rock and fusion.

A common snare mic is a cardioid dynamic type with a presence peak in the frequency response. Bring the mic in from the front of the set on a boom and place it a couple inches over the rim aiming at the center of the head. The sound will be full with the mic near the top head, and thins out and becomes brighter as you move the mic toward the rim and down the side of the drum.

Some engineers like to mike the snare drum top and bottom. If this approach is taken, reverse the polarity of the bottom mic to prevent phase cancellations. The bottom (snare) head moves out when the top (batter) head moves in, so the heads are in opposite polarity and can cancel out each other's sound if you mix their signals.

Some snare drums make an ugly ringing sound at a particular frequency. To eliminate it with EQ, insert a high-Q, narrow peak in the 200 Hz to 600 Hz

range. Sweep the frequency up and down until you exaggerate the ring frequency, then apply cut.

Here are some suggestions to prevent hi-hat leakage into the snare mic: mike the snare closely; bring the snare mic's boom in under the hi-hat and aim the mic away; use a piece of foam or pillow to block sound from the hi-hat; and consider using a de-esser on the snare.

For toms, a good choice is a cardioid dynamic mic with a presence peak and a deep low end. Place the mic about 2 inches over the rim and 1 inch inward, angled down to aim at the center of the head. The usual EQ is a cut around 400 Hz to 600 Hz to remove the unwanted artifacts, as well as a boost around 5 kHz for attack. Another boost around 80 Hz to 100 Hz adds fullness.

It's common to gate the toms to reduce the low rumble of vibrating heads and to prevent leakage, resulting in a tighter sound. To do this, solo a tom track, insert a gate in the track, and then while the tom is playing, gradually turn up the gate's threshold until the gate cuts off the sound between tom hits but does not cut off the hits themselves. Finally, set the gate's hold time to 0 to 100 milliseconds, whatever sounds good.

## **Highs & Lows**

Place overhead mics about 2 feet over the cymbals, and if possible, use condenser or ribbon types with a frequency response that is flat to 15 kHz or even 20 kHz. This characteristic captures the delicate, beautiful "ping" of the cymbal hits, while a peak in the highs tends to sound harsh.

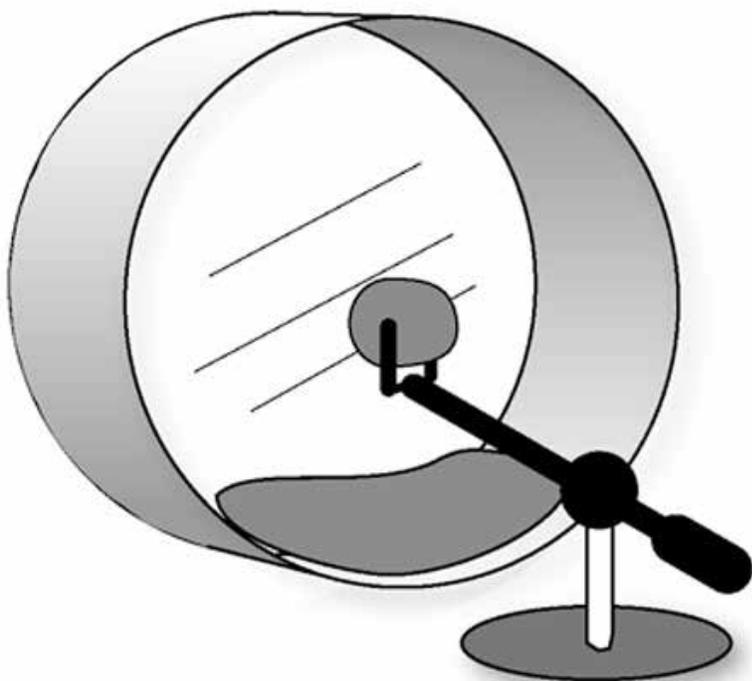
Usually the snare mic, overheads, or room mic pick up enough hi-hat. But if you want to mike it separately, aim a condenser mic down about 8 inches over the edge farthest from the drummer. Apply a high-pass filter at 500 Hz or higher to reduce snare leakage and to remove the low "gong" sound that close miking would otherwise pick up.

You might apply a high-pass (low-cut) filter to the overhead mics that capture the cymbals to remove frequencies below 500 Hz to 1 kHz. This will reduce drum leakage and room reverb in the cymbal mics, which is especially helpful if the room acoustics are poor.

## **GOING LOW**

Kick drum is largely a matter of experimentation. Some place a blanket or folded towel inside the drum, pressing against the beater head to dampen the vibration and tighten the beat. The blanket shortens the decay portion of the kick-drum envelope. To emphasize the attack, use a wood or plastic beater – not felt – and tune the drum low.

For starters, place the kick mic inside on a boom, a few inches from where



**Figure 4: Positioning the kick mic.**

the beater hits (**Figure 4**), if the front head has been removed. Mic placement close to the beater picks up a hard beater sound; off-center placement picks up more skin tone, and farther away picks up a boomier shell sound.

Current practice among many drummers is to use a front head with a small open sound hole, in which case the mic should be placed directly in front of the opening. Kick drums are usually tuned quite low for a sharp attack sound used in pop or rock, and much higher for traditional jazz.

To create a “tight” rock-type kick sound – almost like a dribbling basketball – cut several dB around 400 Hz and boost around 2 kHz to 4 kHz. Mics designed for the kick drum usually have that characteristic built in. If the kick drum does not have a hole in the front head, just mike the front head and boost around 2 kHz to 4 kHz to add attack if needed. A popular microphone design for kick drum is a large-diameter, cardioid dynamic type with an extended low-frequency response.

Finally, when miking drums on stage, you don’t want a forest of unsightly mic stands and booms. I suggest “banquet style” mic stands and short mic holders that clip onto drum rims and cymbal stands. Another option is to use mini drum mics with built-in clamps and goosenecks.

Drum miking can be simple or complex. As with all things audio, it depends. One thing that really helps is being as familiar with the sound of as many aspects of the drum kit as possible. This means a lot of listening to a wide range of styles and different types of players. Those who play very hard with

heavy sticks present challenges that are quite different from those who play more quietly, or with a greater dynamic range.

The bottom line is that the drum sound can enhance or degrade an entire mix, so be sure to pay it due diligence.

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*AES and SynAudCon member Bruce Bartlett is a recording engineer, audio journalist, and microphone engineer. His latest books are "Practical Recording Techniques 5th Edition" and "Recording Music On Location."*

**About Audix Corporation**

*Audix is a U.S. manufacturer of high-quality dynamic and condenser microphones, as well as wireless microphone systems for the live sound, recording, and installation markets. From concept to completion, Audix's on-site research and development team combined with an in-house manufacturing facility, enable them to proudly provide products from their headquarters in Wilsonville, Oregon.*

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