Drums

Recording drums can be a tedious and daunting experience. With such a large and overbearing instrument one can get easily flustered when put to the task. It can get even more stressful with factors like time constraints, songs that are not completely fleshed out, and a drummer who’s slamming the kick drum while you’re setting up the mic right next to it. That’s why it’s important to understand the fundamentals of drum mic’ing.

When you know the basics, problems will still arise but your understanding of the process will help you remain calm. With these helpful tips, you will be able to quickly diffuse any situation and get the session back on track.

To begin our guide, let’s review what pieces comprise a drum set and how you should record each piece.
# Table of Contents

**Drums**..........................................................................................................................1

**The Kick Drum** ..................................................................................................................3

**The Snare Drum** ...............................................................................................................5

**The Tom Drums** ...............................................................................................................7

**The Hi-Hat** ........................................................................................................................9

**Close Mic’ing/Far Mic’ing** ................................................................................................10

**The Overheads** ...............................................................................................................11

**Room Mics** ....................................................................................................................14

**Mono Overheads/Trash Mic** ............................................................................................16

**Final Actions/Mixing** ......................................................................................................17
The kick drum is one of the most important pieces of the drums. A good kick drum is deep and thick, but also has a powerful punch, though there are many opinions on what a kick drum should sound like. Give yourself options when recording, and capture two distinct types of sound. For starters, kick drums should just about always have a deep, subby low-end sound. To get this, place a mic on the resonant head of the drum like so, shown below in Figure 3. The resonant head is the skin on the side of the drum that is not struck. It instead amplifies the sound by allowing the air within to vibrate back and forth creating thickness and sustain.

Featured in Figure 3 is a Shure KSM32, and standard condenser microphone known for its acceptance of low-end. Low-end is a term to describe frequencies within the sound spectrum that are around 20Hz to around 250Hz. In layman’s terms, it’s all the deep, bass-y sounds we hear in music.
This isn’t the only sound the makes up a kick drum. Lots of times a powerful kick drum will have an almost poppy or clicky sound associated with it. That will help it cut through the mix. To do this, try and record the sound of the beater hitting the other side of the kick. You can do this many different ways, by either cutting a hole in the reso-head or taking the reso-head off completely to put the mic inside the drum, or with the way I’ve chosen - recording beater-side. In Figure 4 I am using a dynamic microphone, also known for low-end, called the **AKG D112**. This microphone is dynamic because unlike the other more subby sound, the beater-side hit is less detailed and requires a less detailed mic.

![Figure 4](image)

These mics are both about 4 inches away from the kick drum and slightly off-axis. Off-axis means that they are not pointed directly at the sound they are capturing. See how the D112 is at an angle. This is because with a huge sound like the kick drum a lot of air is being pushed out. This air will take up valuable space on the frequency spectrum that could be otherwise occupied by sound. If it was straight on the drum, it would sound muddy and less powerful.
The Snare Drum

Figure 5

The **snare** is another one of the most important pieces of the kit. Along with the kick drum, it is usually panned right down the middle. Panning is a term to describe where sounds exist within a stereo spread. In other words, are they to the left, the right, or the center? The snare sound should have a thick, fat bottom end and crack in the top-end.

Figure 6

As you can see in Figures 5 and 6, the snare has two heads: the batter head and the resonant head, respectively. The batter is the head where most of the sound comes from. The resonant head doesn’t produce much but the snare-wires under that head do make a nice crispy high-end crack.

When it comes to mic’ing, the snare does not require an incredibly detailed mic. Most of the sparkle and sound of a snare will come from additional mics described later. This mic is therefore being used more for the thickness and overall power of the drum.
In Figure 7 I am using an SM57, one of the most popular mics ever produced. Just about every snare drum I’ve ever seen mic’ed has a SM57 on it, but any kind of dynamic mic will do the trick. Notice how the mic is also off-axis, at around a 45 degree angle pointed directly at the center of the snare. This off-axis technique also comes in handy when mic’ing drums, as mics right over the snare would definitely get in the way.

![Figure 7](image)

For the under-snare I am also using a SM57. The sound of the snare wires is very abrasive and an overly detailed microphone would just be pointless. The SM57 is a fine choice, but you can use just about any small-diaphragm dynamic mic.

![Figure 8](image)

I usually blend in the sound of the under-snare in the mix depending on how cracky I want the snare to sound. In other words, there is the option to blend in more high-end. High-end, is basically the opposite of low-end, and contains frequencies from 4 to 20kHz. It is all the sparkly and higher sounds we hear in music. In some tracks, I might only use the smallest amount of bottom-snare, and in some cases I don’t even record it. It all depends on the track.
The Tom Drums

The **tom drums** are a pretty diverse facet of the drum set. Oftentimes, lots of care goes in to capturing a great tom sound - but it’s also the case that the toms are sometimes not even recorded. It really comes down to the type of sound the band wants from the drums and how the toms fit into the song. Regardless, it’s good to have options when I’m recording and I therefore mic up the toms almost every time I record drums. What is most important to a great drum sound is the tuning of these drums. It is an easy thing to forget, but when done correctly it really helps make the sound of the drums so much better.

When tuning the toms, it’s important to remember that they are in tune with each other and with the song. To tune a tom drum, adjust the legs around the skin so that the tension all around is exactly the same. Make sure both sides are in tune with each other, and then make each tom works with each other tom.

The tom drums are very similar to the snare in that they have two heads. However, I usually find myself only mic’ing up the top, beater side of the drum. I usually use a microphone that is very similar to the mics used on the snare drum, like the **MD421**. It is a very directional large-diaphragm dynamic mic with a great acceptance for loudness and low-end. They capture the powerful “umph” of a tom drum really well. Like the snare, they should be placed close to the drum - maybe 3-6 inches away - and at a slight angle.
You can also use the mics directionality to cancel out bleed from things like the cymbals and snare. The mic doesn’t record from the sides so you can position it so that it points at the center of the tom. Rotate it to make the sides in line with the cymbals next to it.
The Hi-Hat

Recoding the *hi-hat* is a lot like the tom drums in the sense that you don't have to record it. But, if you can, why not? It usually only requires one mic and will definitely give you options later on when mixing. In Figure 13, I’ve placed a SM7B on the outside edge of the hi-hat. This mic has a great propensity for hi-end, but is warm enough that the incredibly crunchy and unpleasant sound of the cymbal doesn’t becoming too annoying. If you move the mic further towards the bell you will get a tighter sound, and further away a more thick, loose sound. Again, keep it off-axis and far enough away from the hi-hat that the drummer doesn’t hit the mic when playing.
So far, the drum set looks like this. A mixture of different mics for different individual pieces. However, if you think about how we hear drums in a live setting or when we’re playing them, we don’t hear each piece right up next to it, with it completely isolated. No, we hear the entire drum set as a whole. This is where the difference between close mic’ing and far mic’ing becomes incredibly important when we record drums.
Along with the kick and the snare, these two stereo paired microphones - known as the *overheads* - are essential to any kind of drum sound. They are two microphones, ideally the exact same make and model, that are processed the same way. Their main responsibility is recording the cymbals for the drum kit, but can do so much more. Most of the time, the snare sound comes from the close snare mic, which captures that whack and impact of the snare, and these *overheads*, that give the snare clarity and a more descriptive sound. Also, when there aren’t enough mics or inputs to record each tom drum, the *overheads* will record enough of the toms to make close mics for them not necessary.

In general, if you have enough equipment to both close mic everything and use *overheads* you should do that. But if you’re in a pinch, a great basic sound for a drum kit is a snare mic, a kick mic, and two *overheads*. 
For this session I am using two **AKG C414** condenser microphones. Condenser mics work great as overheads because they have a large frequency range and can record lots of detail. They also have more acceptance for hi-end and the cymbals have a lot of that. Also, with condensers you can change the pickup pattern of the microphone to record either just the front of the mic, or 360 degrees around it. With an omnidirectional polar pattern, the drums will sound large and roomy.

Another way to hone in on a particular sound is to move the height and position of the overheads. Overheads closer to the kit will create a tight punchy kit, whereas overheads farther up will create a large, roomy kit. You can also determine the wideness of the kit with how far apart you spread the mics.

Furthermore, the two overheads in Figure 16 are in what’s called a spaced-pair pattern. There are a many different patterns that create all different sounds. Do you want a thicker kit? Try Glyn Johns’ technique, with a mono overhead and the other one to the right of the kit looking in from the floor tom. Do you want a narrow, mono-compatibly kit? Try the XY pattern, where the mics are placed right next to each
other, facing opposite angles. In general, I like the Spaced Pair pattern because I find it the easiest and is the most flexible. It does have its challenges though.

In Figures 17 and 18, I am checking the distance between the two microphones. I am doing so with a guitar cable, with one end held at the center of the snare drum and the other end used to measure. When placing overheads, it’s important to confirm that each mic is exactly the same distance from the center point of the kit, the snare drum. The reason for this is something called phase cancellation. Phase cancellation is an acoustic phenomenon that occurs when the two microphones record the same sound but at slightly different times - due to the slight difference in their distance from the sound source. This causes the two signals to overlap in a way that some frequencies become cut. With both mics at the same distance the sound will be a full, complete stereo field of the set.
In the same vein as using mics as overheads, another great way to make drums sound more realistic is to use different mics as **room mics**. A lot of the time, we hear drums in a room and along with the drum sound there are natural reverberations associated with the drums. These mics give the impression that the drums in a definitive space and when processed correctly can make the drums sound much bigger and fuller.
I like the use the rooms to make the sound wider as well, so I often use two of the same microphones - like I am recording overheads - but placing them incredibly far away from the drums. These two mics are **RE20** which are actually great bass and kick drum mics. However, when used as room mics they record the thickness of the kit and room really well. These mics can also be mixed to be over-compressed, which brings out the punch of the kit.

Again, make sure they are the same distance from the kit, in the same way we checked the overheads.
The mono overhead mic is very much like a room mic, in that it is not necessary, but can really help when mixing. When two overheads are spaced really far apart, they can create a nice wide drum sound. But, in some songs there still needs to a real punch right down the middle. That’s why a single overhead mic right in the middle can be really useful.

You can use any large diaphragm mic as their sound and detail doesn’t really matter when paired with the overheads. It’s just there to add a little more flavor to the sound.

Furthermore, I usually use this mic less as another overhead and more a “trash” mic. This is a mic that is intentionally over-compressed and distorted to add a bunch of thickness and power to the kit. I usually place it right in front of the kit but it can be placed anywhere in the room, be it in the corner or down the hall from wherever you’re recording. It doesn’t really matter how it sounds because it should not be the main focus of the sound, but instead used sparingly for flavor.
Final Actions

After the drum set is completely mic’ed up, plug in all the cables to the interface and map the inputs to the correct tracks within whatever music recording software you are using. When ascertaining gain in the mic pre-amps, remember to leave headroom, so that when played the track still has about 10dBs of gain until it clips. This way when the drums reach the loudest point within the song they won’t clip and ruin the take.

Also, while you’re setting the gain levels for the pre-amps, remember to check the phase. Most pre-amps have a “flip-phase” button which inverts the soundwave by 180 degrees. If the snare, or kick drum is sounding weak try flipping phase. If that still doesn’t fix the problem, then adjust the microphone.

For most songs, it is also best to record drums with a “Click” track. This is a metronome track that the performer can follow so he remains in time throughout the song. That way, when you add more instruments later, everything will match up to the bars and beats grid within Pro Tools, making your life far easier.
After you’ve tracked and got yourself a good enough take, there are still many things you can also do. Often, I like to record multiple takes of the drums and save them in Pro Tools’ “playlist” mode. That way, I can comb through all the different takes and take the best parts from each, comping them into one full take.

After all of this comes the mixing stage. This is where you input things like equalizers and compressors – tools that shape the frequencies and volumes of a sound – to mold the drum sound into the mix of the song. Remember, no amount of mixing will fix a poorly recorded or performed drum take. Always make sure your drums sound good on the way in, so they can sound even better on the way out.

To get ideas on how to mix drums, there are thousands of videos on YouTube and Lynda.com that go over drum mic’ing and mixing. A lot of them have some very creative practices that shed new light on how drums are mixed together. However, no matter how many videos or guides you read, the best practice is always to just go out and try it yourself. Experiment, make mistakes and learn from them, and have fun!