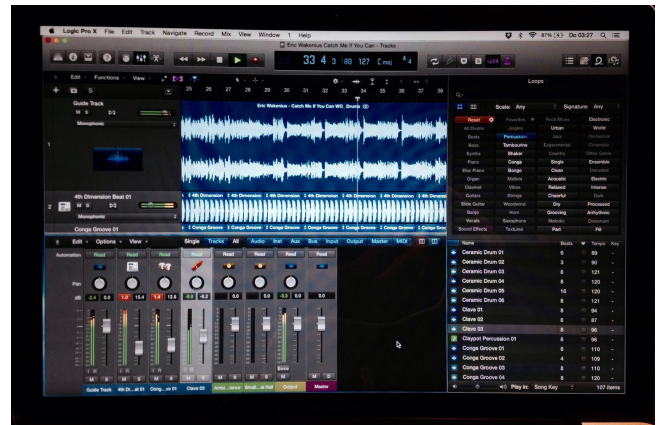


Workshop "How to record & mix your drumtrack"

door: Juan van Emmerloot

12 Maart 2016



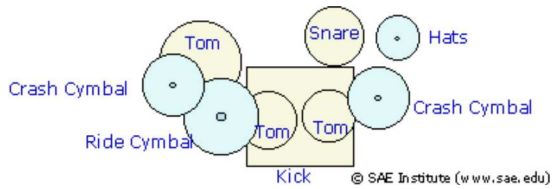
Onderwerpen:

1. microfoon soorten & opstellingen doornemen
2. How to make a patchsheet
3. Line check & soundcheck
4. Lead sheet
5. Recording
6. Rough mixing & bouncing

[Home \(.../Index.html\)](#)[Audio \(fullindex.htm\)](#)[Film \(#\)](#)[Multimedia \(#\)](#)[Games \(#\)](#)[Animation \(#\)](#)

Microphone Placement

Let's take a look at a standard drum kit.



Looking from the top this is the standard layout of right handed drummer. What we have to do now is Mike it! So let's start by putting two mikes over the top (generally called the "Overheads"). But where? We have to start thinking in terms of a **stereo image** right from the start.

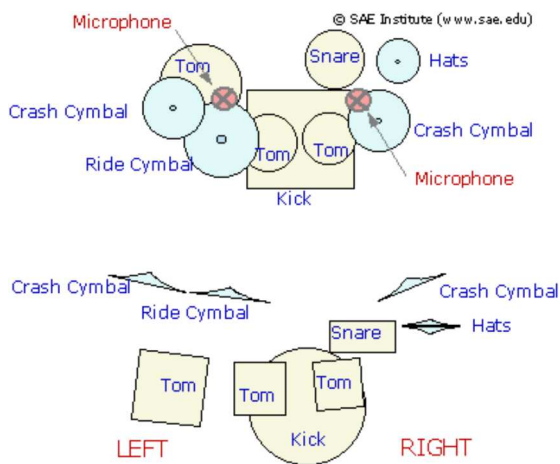
The **stereo image** is the picture of sound created between the two speakers. When a signal is placed equally in each speaker the sound appears to come from a phantom centre speaker, this is what we call the **stereo centre**. All balancing is based around this point - e.g. the bass, kick

and snare are normally panned in the centre whilst the hihats, toms and cymbals are spread across the speakers from left to right. The easiest way to experience the stereo spread is to listen through headphones where the effect is more obvious.

The standard panning setup in drum recordings is:

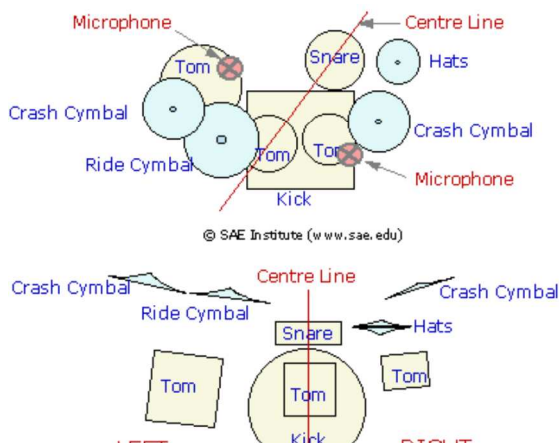
- » Kick - Centre
- » Snare Centre
- » Hats - Half right/right
- » Cymbals - left - right
- » Toms - left - centre - right.

But if you look at a kit it isn't really setup like it should sound. The snare is to the right, the toms have no spread etc. In fact if you were to put up two overheads left and right the stereo image would have the kick centre and the snare to the right and the toms going from centre to left.



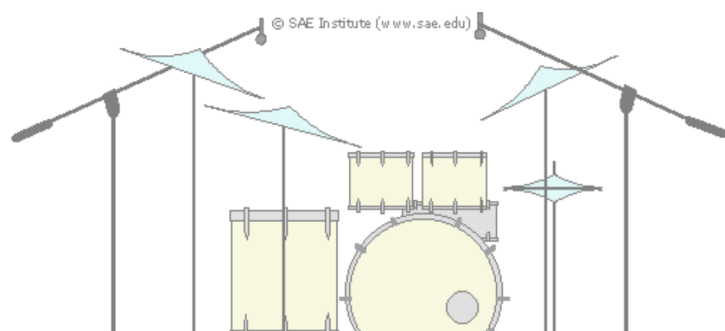
Sound Picture Created

Yet on recordings if you imagine looking at the kit from the front it looks (sounds) like the snare is centre and the toms spread from left to right. (You will notice that I refer to the imaging as a picture - well that's what it is!) So can we get the overheads to paint a picture like this? Have a look at this setup which is based around drawing an imaginary line through the kit which lines up the kick and snare etc.

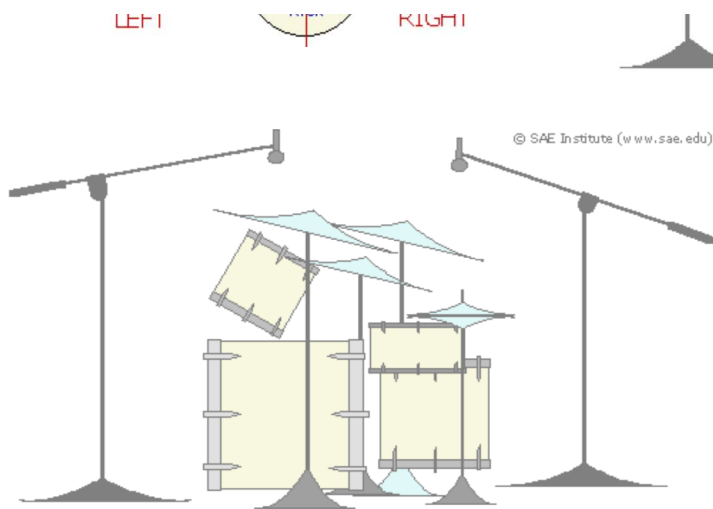


The microphone placement places a stereo image similar to where you want to go as far as the placement of the different components.

The mic placement will look like this:



You can now start to hear a



stereo image of the kit as you will want to hear it in the mix. If you were to put the mikes together in a stereo pair but aimed each side of the dividing line you would get a stereo image but a narrow one. The width increases as you move the two mikes away from each other. The placement in the drawings above are about normal with enough spread to make the kit have some width. With practice and careful placement of these two mikes you should be able to get a good balance of the kit. If you added a kick drum you would have a real, open sound of the kit.

The next step is to mike the individual components so that their position and individual sound can be emphasised.

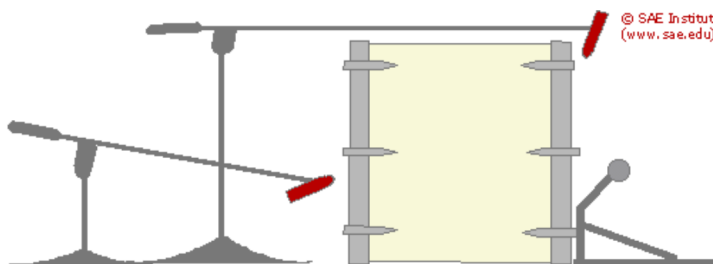
Kick Drum

There are three ways of setting up a kick drum

- » Front and rear skins on.
- » Front skin with rear skin with hole in it
- » Front skin only.

These three set-ups create three differing sounds. First you must tune the kick as per the directions in the [tuning drums \(Tuning.htm\)](#) page.

The first setup with both skins is a thick, solid, round sound with a decay as the drum decays. I believe the best way to mike up this setup is to use two mikes. One over the pedal and one at the other end like this.



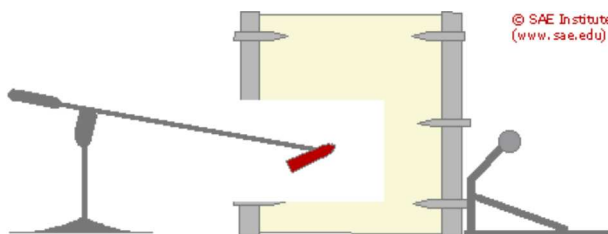
This setup allows you to balance the attack sound of the beater with the decay of the front skin. This miking setup also brings up an important factor in recording:

Microphone Phase Relationships (Microphones.htm#phase)

So which mike should you phase reverse???. If you look at the microphone over the beater it is pointing downwards like all the other microphones on the kit will do whereas the microphone on the front skin of the kick drum is facing the opposite way. Therefore the front skin mike should have the phase reversal. As you can see it is a good idea to reverse the phase of your kick mike even when you are not using two of them as the normal kick mike setup places the kick mike out of phase to the rest of the kit mikes.

Similarly, when we get into miking toms and snares top and bottom the bottom mike will require a phase reversal.

The next setup is where the kick drum has a front skin on with a hole in it. Because of the hole you can access the front skin - thus the attack sound - without having to use a beater mike.



Here the mike is placed inside the drum pointing to where the beater hits so as to get the full impact of the beater. Note that the mike is still out of phase to all the downward facing mikes on the kit so a phase reversal is preferred. The mike is also placed off centre within the shell.

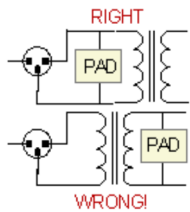
Another factor effecting the kick sound is the beater the drummer uses. Beaters vary from soft to hard. Hard beaters (usually wood) have more impact sound than the softer beaters. Experiment with each and you will hear the difference. How close to the centre of the skin the beater is placed also varies the sound. Similarly the size of the drum sticks the drummer uses will also effect the sound - thin sticks aren't going to go boof! no matter how much you EQ them.

Sound Pressure Level:

It should be noted here that the SPL (Sound Pressure Level) created by drums is extreme so you must [select a microphone \(Microphones.htm\)](#) that can handle high SPL and even then it will output a high voltage into the console. Therefore a Microphone PAD should be inserted in the console to prevent the front end of the microphone preamplifier distorting. If your console doesn't have a mike pad switch you should insert one in the microphone lead. Like the phase reversal plug you can purchase mike pad plugs from your local dealer. A pad of anywhere from 10db - 20db will be required.

A note here about mike pads.

When purchasing a console check that the microphone pad is in the proper section of the circuit. Some manufacturers put the pad after the transformer and before the preamp. Unless the transformer is an extremely high quality one it will distort so make sure the pad is before it in the circuit.

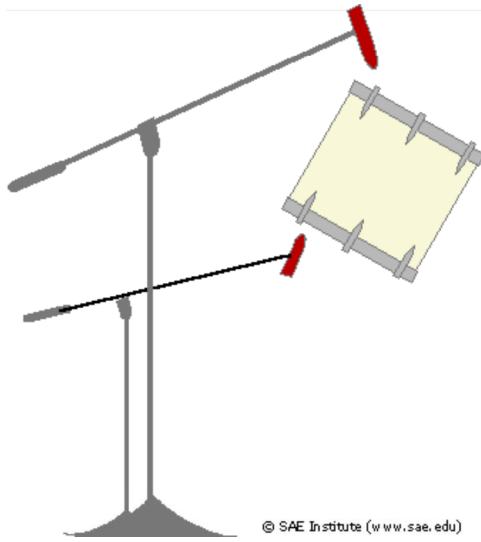


Here's a circuit diagram for all you techo freaks who understand circuit diagrams. Nowadays all the front ends are electronically balanced circuits that are capable of handling the high voltages that modern mikes produce but if you are into **retro equipment** its worth checking your old console out because a lot were made with the pad in the wrong place.

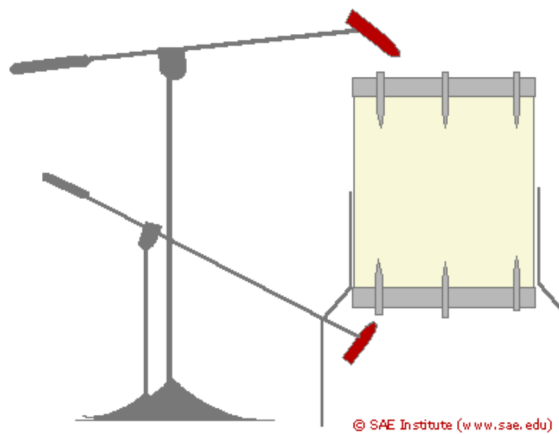
Toms

The toms are similar to the full kick drum miking in that there is a mike on the impact skin that gets the full attack of the stick when it hits the drum plus you can also add another optional bottom mike to get the hang of the the drum. You must again remember the phase relationships here. If you wish to add a bottom mike to the toms you must reverse it's phase.

Rack Toms



Floor Toms



If your drummer doesn't have a bottom skin on the toms you can use either a top mike or both mikes or you can opt for just one **under mike** with a phase reversal naturally. The advantage here is that the under mike is inside the tom which isolates the mike from the other drum sounds and improves separation.

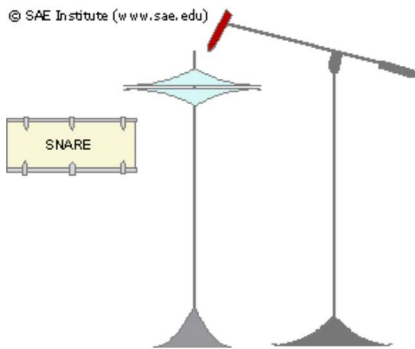
Cymbals and Hihats

The Cymbals

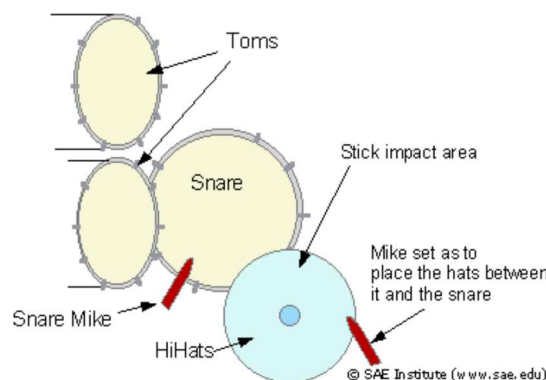
These are basically covered by the overheads but you might find that the ride cymbal needs a mike of it's own if the drummer rides it a lot through the chorus. Basically you want the crash cymbals to have a loose sound yet the ride often is the main drive as it replaces the hihat for the 8 a 16 feels. You must consider this factor when setting up the overheads. Drummers also accent using the bell of the ride cymbal that can be extremely loud so beware of miking too close to the bell of the ride cymbal or it will dominate the sound field. Some engineers mike the ride from underneath. In a complex drum setup with lots of splash and crash cymbals you might like to spot mike certain cymbals but I reckon that if you've setup your overheads correctly they should cover the full cymbal range.

The Hihats

Like the overheads the hihat also requires a mike with a clean top end so it's usually a condenser mike. I like to hide the hihat mike from the snare by placing it in a position that is pointed at where the drummer impacts it with his stick but the hihat is physically between the hihat mike and the snare.



Good separation between the hihat and the snare is desirable so consider the snare when you place the the hihat mike. Another factor of the hihat is the sound made when they are snapped together. I like to aim the mike so it is pointing at a point that gets the stick impact as well as the pointing at the edge of the hats as that is where the closing sound emanates. N.B. If you get too close you will get wind distortion from the hats as they close.



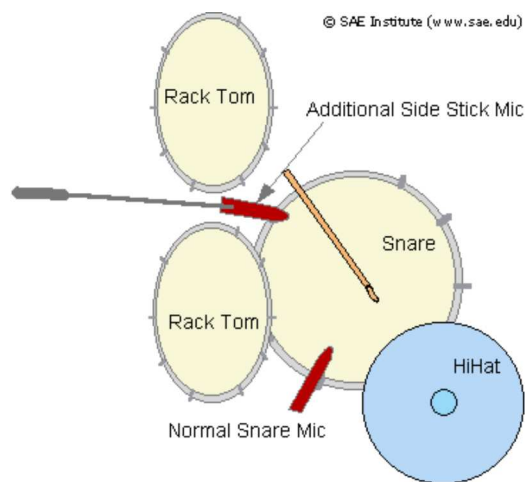
One of the problems you can get is where the drummer has the hihat low to the snare and the toms also low to the snare. This creates separation problems as well as making it hard to isolate the snare from the tom. There's not much you can do other than ask the drummer to change. This is not as awesome as it sounds, some drummers have never considered this aspect of their kit layout and on making the change actually say it's OK and find they easily got used to it and now prefer it. The same problem can occur with the ride cymbal - some drummers have their ride cymbal almost touching the floor tom which makes separation hard - I recently had a drummer like that and when I mentioned it he agreed to change. After the

session he remarked that he actually liked the change and would do it in future. Moral of this story? - don't be afraid to ask!!

Snare Drum

Once again, the snare can be miked from the top and the bottom, in fact it is one most often double miked. The bottom mike on a snare can give the snare more depth but it also gives you control over how much snare crack sound is in the overall sound. (The **snare** is actually the stretched wires across the bottom skin and gives the snare it's sound - otherwise it's just another tom). The snare mike is normally squeezed in between the hihat and the first rack tom and like the tom mikes is aimed at the main impact area in the centre of the snare.

Side Stick: Often you have a drummer playing a lot of side stick. I have used a separate mike specifically for the side stick. The side stick action is for the drum stick to hit the rim of the snare drum and the main impact is on the right side of the snare. As your normal snare mike is placed on the left side it doesn't always pick up the side stick clearly. Not only does this give you a mike closer to the side stick action it also allows for different EQ and effects for the side stick sound. You can either track it to a different recording track or you can watch the drummer and switch mikes during record.



Ambience Mikes

Drums miked close-up don't actually sound very real as their real sound is a combination of various factors. You actually have to get away from them to get the full sound. A close mike on a snare doesn't really sound like a snare drum (thus the importance of the overheads) so some engineers add Ambience mikes to allow the freedom to add the distance sound of the kit when mixing. Naturally the drums must be in their own room for this system to be used or the ambience mikes will pick up everyone else in the room. Basically ambience mikes are a stereo pair of mikes placed at a distance (room size limited) from the kit. They can be setup as a crossed pair or moved apart to gain a more ambient spread. You might like to try using a [MS Stereo \(Microphones.htm#ms\)](#) mike setup. Ambience mikes can also be [Gated \(Compression.htm#gates\)](#) - so they only open when the snare is hit for example- and you must have plenty of recording tracks to allow for another stereo pair. Ambience mikes effect all the kit and push the drum kit back in the sound field so if you want a round tight kick sound and an ambient snare sound you have to gate them so they are closed for the kick and open for the snare. An engineer I know used to hang a very directional shotgun mike high above the kit aimed at the snare and use the under snare mike to trigger a gate that opened it whenever the snare was hit. He would then mix it in with the snare sound and it gave the snare a natural ambience and was extremely effective.

So now we have set up all the mikes we are ready to start [balancing and equalising them \(Balance.htm\)](#)

Microphones for drums

- » **The Kick.** What are we looking for in a kick drum mike? Firstly and most importantly it must be capable of withstanding high sound pressure levels!! When a mike is only inches away from a kick drum beater the sound pressure levels are extremely high at low frequencies. The kick drum mike must be capable of handling the extreme transients involved. Secondly it must be capable of reproducing very low frequencies. The two most popular kick mikes are - The AKG D12 and the Beyer M88. The M88 is my favourite. Both these mikes have an extended bottom end response and can handle the high sound pressure levels associated with kick drums. On the other hand if the drummer is not hitting too hard you can't beat the Neuman U87 or 49, which are high quality condenser and have large diaphragms (good for low frequencies) and smooth low end response. Other mikes are the Shure SM57/58 and the old RE20 which are both capable of withstanding the load.
- » **The Snare.** Here we are looking for a mike that will withstand extreme high end transients and has a tight pattern so as to keep out the high hats and the adjacent toms. The most common snare mikes would have to be the Shure SM57 and the Sennheiser MD421, followed by the Neuman U87/89 and the AKG 414EB. Others are the Sennheiser MD441 or the Neuman KM84. I'm always amazed at how many engineers still use the Shure SM57 even though there are lots of other mikes around. The main advantage of the SM57 is that it's a tight mike with a tight pattern that keeps out the spill from the hi/hat and the toms. They are also extremely reliable and don't mind being hit by a wayward drummer. I should note here that the difference between the SM57 and the SM 58 is that the SM58 has a permanent wind shield - the microphone section is identical. You can buy a wind shield for the SM57 (Note the two microphones next time you see a press conference from the White House.)
- » **The Toms.** The two main mikes used for toms are the Sennheiser 421 and the Shure SM57. In the studio I like to use Neuman U87's as they have a beautiful warm bottom end. The Shure SM 57's don't have a lot of bottoms but if you're tight miked the proximity effect compensates for it and as with the snare their tight pattern helps.
- » **Overheads.** Good condenser mikes make the best overheads. There are three main overhead mikes, the Neuman U87 for warmth, the AKG 414EB and the AKG 451 for crystal clarity. The AKG C1000 and the Roden are also a good budget condenser overhead mike except I find that both have a slightly tinny top end compared with the more expensive models. I would say the AKG 451 with a CK1 capsule and 10db pad is the most popular overhead mike.
- » **Hihats.** Condenser mikes with a tight pattern make the best Hihat mikes like the AKG 451 or the Neuman KM84. Both have a 10db pad option which is handy as the high end transients from a hihat are extreme.
- » **Ambience Microphones.** Usually high quality condenser mikes are used here.

Navigation

[Home \(../index.html\)](#)

[Alphabetical Index \(Audio\)](#)

([fullindex.htm](#))

Alphabetical Index (Film) (#)

***Alphabetical Index
(Multimedia) (#)***

***Alphabetical Index (Games)
(#)***

***Alphabetical Index
(Animation) (#)***

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