001 Beat Construction

What defines a good beat? Well, there is a term we use quite extensively when describing the overall ‘drive’ element of a track: ‘The Nod’. If you can nod to the rhythm of a song, then the beat works. The Nod actually refers to the flow of the beat, and the drive element constitutes the drum beat and bass line together. Because this book is about constructing beats, we will eliminate the bass from the equation. Bass, in itself, is a vast topic that I will cover at a later date when dealing with the low end of a track.

Most producers believe that a well-constructed beat, which has the Nod factor, comes down to two ingredients: the timing information of the whole beat and its constituents, and the dynamics of the individual components. In fact, there is far more to it than that. There are many factors that influence the flow of a drum beat and I will cover the most important ones.

I am Armenian, born in Iran, and have lived in other equally wondrous and safe havens like Lebanon and Kuwait. As a child I had an obsession with sound, not exclusively music, but sound in its entirety. The diverse cultures to which I was exposed have afforded me the benefit of experiencing some exotic time signatures, dynamics, and timing elements. I always believed that the East held the title for advanced timing variations in music and obscure pattern structures, and for a while this was true. Today, we are blessed with a fusion of cultures and artistic practices. None are more infused with cross-cultural influences as the drum beats we incorporate in modern music.

Let’s break down the different areas that, collectively, form ‘**The Nod’**.

The Sounds

In dance based music the choice of drum sounds is critical, and we have come a long way from processing live, acoustic kits into workable sounds that can live alongside a fast and driving BPM (beats per minute). Instead, we use drum samples and, in many cases, layer these samples with other samples *and* acoustic sounds. In the case of urban music, and the more defined and extreme sub-genre Hip Hop, we tend to go with samples from famous drum modules and drum samplers like the Emu SP1200, Roland TR808/CR78, and the MPC range—most notably the earlier versions such as the MPC60/3000.

The drum samples that we layer and process within a beat must meet very specific requirements. These include: topping and tailing, mono/stereo, acoustic/noise/ tonal, and pitch/duration specifications. Let me briefly explain, ahead of the longer discussions later in this book:

- ***Topping and Tailing***: This process entails truncating a sample (removing dead space before and after the sample) and then normalising it (using Peak Normalisation to bring the sample’s amplitude/level up to 0dB). We do this for

a number of reasons. Crucial considerations include sample triggering, aligning samples on a timeline, and referencing gains within a kit or beat.

- ***Mono/Stereo***: A drum sample that displays the same information on both channels is a redundant requirement *unless* the dual channel identical information is required when layering using the 'flip and cancel' method. (Watch my video *Art of Drum Layering Advanced*, or read the article I wrote for *Sound On Sound* magazine entitled 'Layers of Complexity' for more information.) The only other instance where a stereo drum sample would be used is if the left and right channel information varies, as would be the case if a stereo effect or dynamic process were applied, or if the sample were recorded live using multi microphones, or if we were encoding/decoding mid/side recordings with figure-8 setups. We try to keep kick samples, in particular, in mono. This is because they remain in the centre channel of the beat and, ultimately, the mix. For other samples like snares, claps, and so on, stereo can be very useful because we can then widen and creatively process the sample to taste.

- ***Acoustic/noise/tonal***: Acoustic drum sounds will invariably have been tuned at the playing and recording stages but will need to be re-tuned to the key of the track in which the beat lies. Tonal drum samples, like the legendary 808 kick drum, will also have to be tuned. More importantly, the frequency content of the sample will determine what type of dynamic processing can be applied. A sine-wave based tonal kick will have no harmonics within the waveform and will therefore be reliant on innovative dynamic processing techniques. Noise-based samples contain little or no tonal information, so require a different form of processing because the frequency content will be mainly atonal.

- ***Pitch and Duration***: Ascertaining and tuning atonal drum sounds is a nightmare for many, and this area is covered extensively in later chapters using specific tools and processes. Extending duration with pitch changes, altering pitch without altering duration, using time-stretching, and modulating pitch and/or duration using controllers and automation: all these are excellent forms of pitch manipulation.

Timing

- Producers spend more time using the nudge feature and timeline of their DAW, refining timing information for beats, than on other time variant process. We have access to so many time variant tools today that there really is no excuse to be unable to create either a tight and strict beat, or a loose and wandering beat, exactly as required. In fact, we have some nice workarounds and 'cheats' for those that have problems with timing issues, and I will cover these in more detail later.

- Great timing in beat construction requires understanding several phenomena and techniques that I will explain in this book—BPM and how it relates to realistic timings for 'played' rhythms; Quantize, both in terms of divisions and how to alter these divisions; Ghost Notes and how they relate to perception;

and Shadowing Beats, including the use of existing loops and beats to underlie, accent, and support the main beat. For example, if your drum beat is too syncopated and has little movement, you can reach for a Groove Quantize template in your DAW, or use other funky tools such as matching slice and hit points to existing commercial breaks.

- The perception of a timing variance can be achieved in more than one way. Strangely enough, this leeway has been exhausted to death by Akai with the original Linn-designed pads and contacts. After the MPC 60 and 3000, Akai had no more timing variances in their hardware that could be attributed to 'the MPC swing and sound'. Far from it. The timing of their DSP is rock solid. The timing of the pad's initial strike, processed as channel pressure, note on/off and velocity curves, is what adds to the timing 'delay'. This can be emulated on any pad controller that is sample based, because it is not hardware-specific. To further understand the perceptual formula, we need to look at the sample playback engine of all the top players. Bottom of the list lies Akai with their minimum sample count requirement, which demands so many cycles that if you truncate to a zero point sample start, the unit simply cannot cope with it. Add this 'dead space' requirement before a sample can be truthfully triggered to a pad that has inherent latency (deliberately designed by the gifted Roger Linn), and you end up with the 'late' and 'loose' feel of the MPCs. The sample count issue has now been resolved, and in fact was corrected from the 2500 onwards. I bring this up so that you are aware that there are very few magic boxes out there that pull out a tight yet loose beat. Nope. They all rely on physics to work. Yet, because of that requirement, we can work around the limitations and actually use them to our advantage. The MPCs have explored and exhausted these limitations quite successfully.

- I love using pads to trigger drum sounds as it makes me feel more in touch with the samples than a mouse click or keyboard hit. The idea that drums must be 'hit' is not new, and the interaction that exists in the physical aspect of 'hitting' drum pads is one that makes the creative writing process far more enjoyable and 'true' to its origins. After all, the Maya didn't have keyboard controllers. For this book I will be using the QuNeo to trigger samples, but occasionally I will also trigger via the keyboard (Novation SLMK2), because spanning templates can be a little confusing for those that do not understand the manufacturers' default GM templates.

- Early and late processes in aligning beat elements are also a creative and clever workaround for improving static syncopated beats. Simple movements of individual hits using grid subdivisions can add motion to strict 4/4, 3/4 and 6/4 beats, which are the common signatures used in modern music.

Dynamics

- Although we think of our brains as really smart organs, they are not actually that smart when it comes to deciphering and processing sight and sound. If you were to snap your fingers in front of your face, the sound would reach your brain via the ears before the visual information reaches your brain via the

eyes. That may sound strange because light travels faster than sound, but it isn't that strange when you take into account the time it takes the brain to decipher the different sensory input. In addition, the brain does not recognise frequency or volume without a reference. This is what memory is for: referencing. The brain has an instinctual response to already referenced frequencies and can turn off like a tap in a hurry when confronted with the same frequencies at the same amplitudes. However, when presented with the same frequencies at varying amplitudes the brain has to work to decipher and reference each new amplitude. This keeps the brain active and therefore interest is maintained. Next time you decide to compress your mix into a square wave because you think it will better 'carry your mix' across to listeners by rattling their organs, think twice. A narrow banded dynamic mix simply shuts the brain down, which then goes into 'irritation mode' because it has already referenced the constant amplitude for the frequency content in your track. The same processes take place when dealing with drum beats. The most interesting drum beats have acres of dynamic movement and do not rely on a single static amplitude for all the frequencies in the beat. Simple tasks, like altering the individual note velocities or amplitudes, will add huge interest to your beats. I would be surprised if Clyde Stubblefield maintained the same 127 velocity across all his hits whilst playing the drums.

Layering

- Individual drum sounds can be layered to give both depth and width, resulting in a texture that can be both dynamic and interesting. If you need to delve into this area in more detail please refer to my book *Art of Drum Layering,* or the *Advanced Drum Layering* video which explores very specific layering techniques using phase cancellation, mid/side, and so on. But *don't* confine yourself to drum sounds for layering. I have sampled and used kitchen utensil attacks, edited from individual amplitude envelope components, for the attack part of my snares and hi hats, cardboard boxes close miked with a large diaphragm capacitor to capture the boom for kick bodies, and tapping on the head of a directional mic for some deep, breathy samples with which to layer my entire beats, and so on. If you can sample it, hell, use it!

- Whole drum loops, treated as layers, can add vibrancy and motion to a static drum beat. Layering loops under a beat not only helps in acting as a guide for those that are not very good at drumming or creating grooves, but also allows for some interesting new rhythms that will make the listener think you have incredible insight into beat making.

- Layering tones beneath drum beats is an old and trusted method of adding low end. However, simply throwing a sine-wave under a beat doesn't make it 'have low end'. You need to edit the waveform both in terms of frequency (pitch) and dynamics (in this instance: duration and velocity) and take into account the interaction between the low frequency content of the beat and sine-wave along with the bass line. Many a Prozac has been consumed during the mix-down of this type of scenario.

Modulation

- Using modulators to create both motion and texture in a drum beat is not as hard as it may seem at first. The trick, as with all these processes, is to understand the tools and their limitations and advantages. For example: a low frequency oscillator (LFO) triggering the filter cut-off using a fast ramp waveform shape can add a lovely squelchy effect to a clap sample. Another technique that I have often used is assigning a sine-shaped LFO at a low rate with filter resonance as its destination to run through the entire beat. I then layer this ‘effected’ version with the original dry beat. This gives the perception of tonal changes throughout the beat, even though it is not random.

Drum Replacement/Ripping Beats

- Creative beat construction techniques using drum replacement and ripping beats include: substituting your own drum samples for drum sounds within a beat; using the timing information from an existing drum beat as a Quantize or groove template for your own beats; ripping both MIDI and dynamic data from an existing drum beat; and using two beats at different tempos, matching their data to create a new beat that combined drum elements from both beats.