

SEAT TUNE CLEAR REPEAT

THE PSEUDOSCIENCE OF TUNING DRUMS

By Karl Chugg

When we hear powerful and exciting drums in the hot new single on the radio, few of us stop to consider how and why they sound the way they do. Beyond the fancy microphone techniques and all of the equalization, compression, and reverb contributing to the final project: the consensus with most engineer types is that **The first step to a great drum sound is a good drummer playing drums that are in tune.** A great drummer can make any kit sound good. A good drummer is hard to find, on the other hand tuning is not some sort of black magic and is easy with some practice.

CHOOSING THE RIGHT EQUIPMENT

Tuning can do a lot for a drum's sound, but know there are limitations to what a drum can and can't do. A drum definitely has a "sweet spot" in which the tuning sounds good. Better quality drums have larger tuning spots than lower quality ones and are easier to tune. If tuned too low, the drum will sound flabby and lifeless. If tuned too high, the drum will sound boingy and over resonant and will ring for days. For example a 10" tom can be tuned really low to sound like a 12", but cannot be tuned down to the same pitch as a 16" and have any sort of tone. At the same time a 16" tom tuned to the same pitch as a 10" will sound like a tympani (if it's bad enough like a basketball being dribbled). Also know that larger drums tuned higher will have a higher volume threshold (which is why marching drums are large and tuned very high) In an ideal situation all the drum sizes of a particular series would be at your disposal for mixing and matching of sizes and tones. Some quick notes on sizes – A bigger diameter is a lower pitch while more depth on a drum shell increases volume potential and

overtones. A standard bass drum is 22" and is 16-18" deep. Standard toms are 10-16" in diameter and rack toms are 7-9" deep while floor toms are 11-16" deep. Snares are commonly 14" (13" snares have gained some popularity) and the depth is anywhere from 5-7".

A damaged drum head cannot perform the same as a new head. Drum heads with divets, dents, dings, a rip (obviously), a non-intentional hole, or that have been stretched too far or unevenly should be discarded. As a rule of thumb, the drum head should produce a tone when tapped even off the drum.

Choosing the right drum head for the project is very important because drum head selection and tuning is 50-80% of the sound not contributed by the player. Double Ply or Single Ply, Ply thickness, Clear or Coated (or other textured), Center Dot or Internal Muffling Ring, and even the color of the plastic film all make a difference in the tone and intended use of that drum head (Refer to manufacturers websites for tone charts and recommended uses. www.remo.com is the website for the largest manufacturer).

Some popular drum head combinations (I'll use Remo models for reference): For the snare drum a *Coated Ambassador* or *Coated Controlled Sound* over *Snare Side Ambassador* (an extra thin head). For the tom drums a *Clear Pinstripe* or *Coated Emperor* over *Clear Ambassador* is pretty much standard. For the bass drum a *Powerstroke 3* on both sides – usually a "logo" head on the front with a port off center and a clear head on the beater side with an impact patch. (If the front bass drum head doesn't have a muffling ring, you can use a felt strip about an inch wide placed under the head to dampen it. The resonant head doesn't play a huge role in bass drum sound and some can last almost the life of a drum kit. Most drum shops carry felt strips but a fabric shop does too, and they're cheaper)

All drums are not created equal. Most drums are made of wood, while some snares are metal. A Maple drum will not sound the same as a Birch drum which sounds nothing like a cheap drum made of "Selected Hardwoods" (this difference really becomes apparent in snare drums). Metal

drums have a really metallic sound (bright, sharp). Two of the most common snare drums to see in a recording studio are aluminum and brass known as “workhorse” drums for their versatility.

The tone not being produced by the drum head has many factors. The drum being in a perfect circle is the largest factor, followed by the bearing edges (where the head meets the shell), the hardware (rims, lugs, suspension systems), and then the shell composition. As long as the drums are of professional quality and have not been damaged I would assume all of these things are in working condition. With vintage drums any of the imperfectness is a very important part of the “mojo” and should be expected.

A note about cymbals: while cymbals can be modified with tape, rivets or even stacked together to achieve a desired sound they really cannot be tuned by anyone who is not a professional cymbal smith. With cymbals you really do get what you pay for. Personal preference also plays a big role in cymbal selection as well as the intended usage, thus why many drummers have such large collections. Drummer tip, if your cymbals are too bright sounding (and not paiste, most of their cymbals ship with a lacquer coating) don't clean them, wipe your hands all over them at all times and keep them dirty. They'll eventually patina and mellow.

TOOLS NEEDED

One or two drum keys (two is faster)

Wax & Lithium Grease or Vaseline

Screwdriver or Wrench (to tighten hardware)

OPTIONAL ADD-ONS

Hole Template, Knife, & Measuring Tape

Black T-Shirt and Pillow (or 1 square of Auralex)

Cotton Balls, Moon Gels, Felt Strips

PREPARE THE DRUMS

Use your drum keys (or handy drum drill bit) to remove all the heads. Take this time to wipe down the drums, tighten any hardware that may have loosened, and to vacuum all the dust from your bass drum pillow- which should be small and not taking up most of the drum (I've seen whole

comforters inside of bass drums and then they ask me why the drum is so quiet and dull sounding). To make a bass drum pillow, I simply put a pillow inside a t-shirt and adjust it with tape until I am happy with the shape. (You can also install velcro onto the pillow to keep it in place during transit.) This would also be the perfect time to install the hole in your bass drum resonant (logo) head if you so choose to do so. A center hole will provide attack and an off center hole will save some of the resonance, don't go any bigger than 7” on a 22” bass drum or you might as well take it off completely; however, don't leave it off or the bass drum will go out of round. Snare wires are also an important part of your sound and do wear out, but typically get damaged from mishandling (If your straps that mount the snare break, go back to the fabric store and get a roll of grosgrain ribbon. That's what the manufacturers use.)

MOUNT AND SEAT THE HEAD EVENLY

While not totally necessary, I recommend taking the drum head in your hand and breaking down the collar to achieve a lower tone and make it easier to seat. Then put the head on the drum (after waxing or putting Vaseline on the edge to prevent friction) and align the logo (this looks nice, it's not really important). Then put the rim on (watch the gates for the snare wires to go through on the snare side. Keep them lined up with the strainer. Half of the time I have to take the snare head back off to fix this). Before inserting the tension rods, dip them in Vaseline or a bit of Lithium Grease to help keep the rods turning smooth. (Make sure to wipe off the excess after you're done or it will attract dirt) Finger tighten the lugs evenly around the head, don't even use the key yet. Then use your palm to stretch the head and conform the collar to the shape of the bearing edge (I stand on bass drums heads after removing my shoes). Know your strength so you don't cause a permanent palm print. (Also, don't stretch the snare side head because it's too thin and will pop.) Make sure the head is centered at this stage to aid in tuning. If the head is pulled to one side it will create a very dissonant set of overtones.

#2 Always start with the largest drum and tune up to the smallest. Smaller drums can be tuned high if you run out of range, but have difficulty with lower tunings. In fact, higher tunings of small drums provides resonance which was absent due to the smaller resonating chamber. The higher, more percussive tuning allows the small drum to have seemingly equal attack and sustain characteristics to the larger drums.

#3 Top and bottom head tuning is especially important for toms. I typically tune my resonant heads higher than my batter heads as this provides a pleasant pitch bend up. It is rare to see the bottom head tuned lower on toms as this creates an unpleasant downward bend. I use the top head for the "feel" (rebound) and use the bottom head to affect sustain (the further apart they are in pitch, the shorter the tone). Some drummers prefer to tune them both to the same pitch to allow for the maximum amount of sustain. For bass drums, I'll sometimes tune the front head lower for less resonance and more sub-low frequencies since the pitch bend in low sound becomes almost inaudible. For snare drums I always tune the bottom head for snare response which means it's tight enough to give me sensitivity of the wires, but not so tight that the snares ring uncontrollably when I hit my rack tom.

#4 Tune the drums to strong consonant intervals. I always end up tuning toms in a relationship of a fifth, fourth, or octave apart even though I don't tune to set pitches. (Thinking about pitches means you should have to retune for each song...) This provides stability in the drum sound as well as prevents you from having to worry about playing a chord (which happens often if you tune the drums in thirds giving a triadic effect). Generally, I use a fifth between two toms or a fourth when I have three or more in order to diminish the spread. For a 4 piece kit, I would have the bass drum at "tonic" (if it's tuned high enough to produce a pitch and not a thump) the floor an octave higher, the rack tom a fifth up from the floor and then the snare another fourth above the rack tom. (This unintentionally happens to be the first part of the harmonic sequence)

#5 Carve out a frequency for your snare to avoid rattling the wires every time you hit a tom. Tuning a snare to the same note as a tom will cause relentless snare rattle. I tend to tune the snare a fourth or fifth higher than my highest tom, but I also do not play with an 8". A suggestion I have read says that tuning your snare a whole step above or below a tom reduces the rattle. Again, avoid thirds.

#6 Adjust your snare wires correctly. Assuming your snare head is not too tight or too loose, you should be able to adjust the snares using the knob on the throw-off until it starts to bring the pitch up (this is the bottom head choking from the tension). Once the pitch rises, back off until you hear the drum return back to it's full pitch. Extra loose snare wires can also be a really cool effect in a ballad and give a "doosh" kind of sound.

#7 Bass drum head patches can add a lot of attack to a bass drum. The patches supplied with bass drum heads are usually Kevlar and provide maximum durability. I like to use an old big band drummer trick of using a piece of moleskin from the local drugstore to lessen the attack from the bass drum beater letting the sound bloom.

#8 If you have two bass drums, Don't try and tune them to the same pitch. This will make a big muddy mess when you try to play quick passages because hits from one drum will resonate the other. I always use two bass drums of different sizes if I choose to play with two. They usually end up around a fifth apart if you're looking for an interval. I usually tune the main bass drum higher to give it a little more punch in the parts where I don't use both, while the second drum adds the boom when I need it.

#9 Some drummers like to find the pitch of the drum shell. Everything has a vibrating pitch and tuning a drum to this pitch should theoretically help the drum to sustain longer. Drum Workshop prints these pitches into their drums when they match the shells together into a drum set. Trying to hear the pitch with hardware on the shell is difficult. Try hitting the shell with the side of your fist.

REPEAT, REPEAT, REPEAT

Tuning is really a huge game of trial and error. If you get frustrated or the drum sounds worse, don't be afraid to start over from finger tight. Sometimes this can be the best as it will "reset" your ear from the bad tuning.

The drum head will stretch over time and does need to be re-tuned before every session. Like any instrument, a little bit of tuning on a regular basis will help the drum to stay in tune and the heads will live a longer life. Under the hands of a hard hitter, a snare may need to be re-tuned every song and may even need some sort of Lug-Lock device to ensure it will stay in-tune.

MUFFLING

A little bit goes a long way when it comes to muffling. The drums will sound dead and lifeless if you go too far. Muffling an out of tune drum head will not magically tune it, but will make it sound worse in most situations. A good tool for muffling exists in "zero" rings which are cut out drum heads that sit inside the rim and will bounce up and land back down to dampen the drum. Moon Gels also work well as they stick to the drum head and dampen with their mass. The closer a Moon Gel gets into the center, the more dampening it causes. Don't be afraid to cut the gels down into $\frac{1}{2}$ or even $\frac{1}{4}$ sizes. Another option is to use Gaff Tape on the drum heads to dampen them more permanently. The key to using tape is to fold it into a shape that has "fins" to disperse the sound. These work on the principles of moon gels, and placement varies the effect greatly.

GENERAL SETUP TIPS

Setup the drums ergonomically. This applies more to the drummers themselves. Drums are a very physical instrument, and require a certain understanding of how our bodies work which is probably far too complicated to explain here. The big things to watch out for are extreme angles (make rebound very difficult), extreme distances between drums (just inefficient and slow), height of cymbals (tends to make you hit them harder), and height of throne (if the angle of your knee is

smaller than 90 degrees you will have an extremely difficult time playing with any bass drum volume or speed). Cymbals (especially china types) can be broken if played too hard on the edge so angle them slightly if possible.

SUGGESTIONS TO HELP A DRUMMER

Assuming the drummer is open to suggestions : If the bass drum sounds flabby or just awful, tell them to try not to bury the beater into the head (let it rebound). If there isn't enough attack in the bass drum, switch to a plastic or wood beater (with a patch so you don't break the head). If the cymbals are way too heavy in the mix and the microphones cannot be moved, hand them a lighter pair of sticks (this may change the playing style totally). If the snare sounds weak switch to playing rim-shots (which will also raise the pitch some and help differentiate the back-beats from other beats). Nylon or metal tipped sticks can also change cymbal definition and brightness.

HOT-RODDING YOUR DRUMS

Drums are designed to work as a system. The shell composition, hardware, and bearing edges all have a significant contribution into the total sonic picture of the drum. I have done quite a few modifications to entry level drums to try and make them sound like more expensive drums, some make extreme differences and some are totally irreversible so proceed with caution.

FREEBIES & COOL SOUNDS

Cotton-ball Floor Tom – This trick puts a couple of spread out cotton-balls inside your floor tom to gate the sound of the resonant head. When you hit the drum, the cotton bounces up and allows full resonance until they land quietly muting the head. This is a really cool trick.

Upside Down Head Snare – Take an old snare head and sit it on the snare upside down (for extra points take a knife and cut off the old rim). This works better with some heads and drums than others, but will create an instant FAT sound when played due to the muffling and pitch of the untuned head.

No Bottom Heads – an old 70's studio trick, this will make the toms sound deader, more focused. The real reason this was started was to get microphones up inside the toms to get more stick attack. If you plan on leaving the bottoms off, I recommend taking an old head and cutting all but the outer inch away. This protects the bearing edge, keeps hardware from rattling, and helps to keep the drum in round.

STAGE 1 - REVERSIBLE MODIFICATIONS

Unusual Drum head(s) & Combinations – Don't be afraid to experiment if need be, especially on snare drums. This is usually up to the drummer to find a unique voice, but it doesn't hurt to have some combinations lying around and some combinations can bring a drum to life. A couple of personal favorite tricks – A *Fiberskyn Diplomat* makes a killer snare batter head on a metal snare drum because it tames some overtones. A White Max head can sound awesome and tight on a normal snare drum (they're intended for marching snare use) just don't tune too high or the drum will likely bust from the tension. A *Controlled Sound Clear Black Dot* is an awesome head to add mid range clarity to toms by putting it on the bottom side.

Suspension Mounts – Many drums come with these, but some work better than others. These mounts work kind of like a suspension mount for a microphone. They isolate the toms from the stand (or floor), allowing the vibrations to stay in the drum and resonate instead of being dissipated. My favorite for rack toms are by Pearl, The Optimount. Pearl also make floor tom feet that suspend the drum from the floor that make a huge difference in tone. Other mounts exist if you don't like the Pearl style arms such as Gauger's *RIMS* which are a much more universal approach.

Hoops – Different hoops make very different sounds and affect the overtones. Many cheaper drums ship with thin hoops that bend with higher tunings. These are easy to replace with a head change to a better model. I personally like the sound of Die-cast hoops on snare drums which focus the sound and aid in tuning because of their rigidity.

Cymbal Stacks-- A really cool trick to lessen the sustain of a cymbal, simply stack another on top of it. This has been done by drummers for ages and usually becomes a large pile of all the broken cymbals they own. Another trick is to get some beaded chain (like the type on your ceiling fan pulls at home) and drape it over the cymbal to get a low cost sizzle effect. All of this is trial and error until you get a usable sound.

STAGE 2 - EXPERIMENTAL

Shell Interior Finish – to brighten up a really dead drum, you can seal the interior of the shell with a lacquer. This was done on many classic drums to seal the poor quality of the wood, but Gretsch maintains it is a vital part of the sound of those drums. The trade off is that if the paint adds weight to the shell, deadening it. If the shell is thicker, the sealing of the interior will also have a negligible effect. This is a job you could do at home if you're comfortable, but is totally irreversible and can ruin the resale of the drums. If the drums are too bright, you could also attempt to warm them up by sanding out interior finish if they had one, but know this will hurt the volume and projection of the drum as well.

Bearing Edge Re-cuts – a job that must be done by a professional, this involves leveling the old edge and cutting a whole new one. With a snare, this would also involve modifications to the snare bed. If your drums are sounding wonky, or just plain flat and or if you see damage on the edges call a local drum builder and see about getting them re-cut. Ask about your options and if the builder doesn't know call another one. This is a permanent change and will negatively effect resale on vintage drums but can modernize them immensely.

FOR QUESTIONS

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