What the thock is clack? – A Discussion on Switch Sound
-ThereminGoat, 1/2/22

You suck at talking about the sound of switches.

That's it. There's really no preface needed to this one, except to maybe carve off a bit of the edge in the tone by caveating that statement with the fact that it's probably not entirely your fault.

Entering now the something-th year of the COVID-19 pandemic, it's completely impossible to ignore just how much the mechanical keyboard community has grown in such a short period of time. While the ever-present, classic entryway into the hobby of the r/mechanicalkeyboards subreddit demonstrates this well enough by its traffic alone, it recently passed a huge milestone in 1,000,000 subscribers. This is even further surprising considering there was a similar post about passing 300,000 subscribers only a short two years ago. While these two years may seem like a relatively long time for those who joined within that window, its merely a blip on the radar in the grand scheme of the over decade-long history of the mechanical keyboard hobby. What makes these two years in particular rather interesting, though, is how drastically the platforms on which the community operates on (over here in the west, at least). Long gone are the days of just GeekHack and Reddit going back and forth about u/Ripster55 and his 'charismatic' ways – now platforms like Twitch, YouTube, and even TikTok are driving swarms of new enthusiasts to plan, buy, wait for, and eventually build their first mechanical keyboards.

Figure 1: The glory days of Ripster, otherwise known as the dark age of switch science.

With this shift in 'go-to' platforms for mechanical keyboard related content, though, it's also worth noting just how much times have changed with respect to what is available for beginners. Speaking only for myself, since everyone's journey throughout the hobby is a bit different, the entry level boards of my day were nothing like they are now. Fancying myself a well-read beginner, I overlooked traditional classics like Ducky or DAS Keyboards in order to pick myself up an Obins Anne Pro II with Gateron Browns, of course, given that there were only a small handful of switch options and I wanted something nice to type on. This decision wasn't reached lightly but ultimately left me a bit underwhelmed, leading me to read nearly everything I could from Deskthority, Geekhack, and the relatively new keyboard Discord servers at the time in search for an endgame. Nowadays, though, users often come into the hobby by way of Twitch Streams or typing tests on YouTube, searching for GMMK Pros or Keychrons which fit their various desired traits. Options for switches and keycaps are effectively infinite in terms of pricing, quality, and availability relative to that of when I started. Knowing damn well that there is no such thing as endgame out of the gate, these new hobbyists seek out more information largely via the swarms of Discord servers that exist nowadays but are also following further increasing numbers of creators on the audio-visual platforms mentioned above.

One of the more subtle, and albeit entirely subjective trends which I've begun to notice in parallel with this shift in popular keyboard content platforms is that of a change in what newer hobbyists are looking for in a keyboard. Back when I first had started, it seemed as if discussions on keyboards were primarily focus on either the layouts of the boards or on the specific, in-hand feeling they'd have. For example, the 'layout' category would be focused on board layouts, typing angle, keycap profile, keycap material, and some other less important details. 'Feeling', on the other hand, focused on combinations of plate materials and switches, keyboard mounting styles, and comparisons between the very few switches at the time. While all of the details are still certainly considered today, the newer audiences seem to have supplanted the primary points of focus of 'Layout' and 'Feeling' with that of 'Aesthetics'. Color schemes, bold design choices with OLED or rotary knobs, brand recognition, thematic elements tying together components, and strangely *sound* all seem to be the major topics of discussion under this general 'aesthetic' umbrella. To someone who has been around a bit longer than this two-year wide window, this is especially epitomized in the surge of YouTube videos about mechanical keyboards that seem to maximally focused on one or more of the aforementioned aesthetic points.

Figure 2: I'm just going to pre-emptively blame this in good faith now and get it over with.

This tango of 'content' and 'consumer' inevitably does open up a chicken and egg style argument as to whether or not it is the behavior of content driving consumers or the behavior of consumers driving the content. From an origin perspective, I don't think this can ever quite be answered as I definitely didn't notice these subtle trends starting in my first couple of years. From a current perspective, though, it's not farfetched to think that the existing glut of 'aesthetic' based content on these platforms will be the focus of people first being introduced to the hobby through these media. In a broader sense, this certainly isn't a bad thing as it still does draw in more individuals to the hobby. However, for the sake of this article though, this type of content and particularly the damn near fervor amongst beginners for the 'sound' of

keyboards as a result of this content is detrimental in the long run. In particular, the yin and yang of this hyper-fixation on sound can be summarized in two words that physically pain me to type out:

'Thock' and 'Clack'

There, I said it. These two extremely ambiguous, and infinitely defined words are now being used not only to describe keyboards, but switches, plate materials, keyboard modifications, and quite literally anything that makes any form of noise in a keyboard. In fact, these two words have become so ingrained amongst the community (and yet are still so ill-defined) that many content creators have had substantial amounts of their content solely dedicated to pivoting every sentence about a keyboard around these words. While 'thock' and 'clack' may be fun references to sprinkle in here and there in names of things, using these ubiquitously vague terms to describe sound in keyboards has led us literally nowhere as a community. In fact, I would argue that it's actually caused a relative backsliding in terms of communication about sound and want to point to this singular instance from Reddit two weeks ago as proof. (It may or may not be the straw that broke this goat's back and made him write this entire article out.)

Figure 3: AAAAAAAAAAAAAAAAAHHHHHHHHHHHHHHHHHHHHHHHHH

Unfortunately, though, no matter how often I point out the glaring vagueness of these terms to new users, they very often don't seem drop these from their common descriptions of keyboards. While it might lead to them rewording their sentence so they can ask me yet again to help them pick out the "best switches" for their very narrow build via a very awkward DM message, it doesn't seem to register with them *why* these words are problematic. So, while I would like to wage an extremely personal war on these two words alone, making sure to reference every time I've been asked about them explicitly, I don't think it would be entirely productive. Instead, lets walk through why sound in keyboards at large is a very difficult concept and perhaps you can improve you description both of them, and their most important component in switches.

Why Keyboard Sound is Difficult

In order to start out this section with a bit of style, I'm going to promise you (sans evidence) that trying to perfectly guess the sound of an entire mechanical keyboard without the components physically being in front of you is borderline impossible. The improvement of those odds simply only happens with experience and *in person* exposure to a wide array of keyboards, though even then I'd argue the guesses are still quite flawed more often than not. (We'll get to why sound tests also suck in just a little bit.) In

order to really demonstrate why this is the case, let's go ahead and look at a relatively basic spread of components which are likely to be in a mechanical keyboard:

Switches
Stabilizers
Keycaps
Plate
PCB
Case

This seems simple enough, right? One might initially think that knowing the exact sound or even rough sound qualities of each of these components might be sufficient enough to narrow in an accurate guess on how a build in total might sound. For boards which are relatively common, e.g. a GMMK Pro with GMK Keycaps and Glorious Pandas, this might hold true and I don't want to pretend as if that's not the case. But stepping anywhere outside of these well-worn keyboard paths though, subtle sound-altering details begin to need greater and great consideration with each of these components. Suddenly, this list quite drastically increases into something as such:

Switches: Type of switch, Top housing material, Bottom housing material, Housing thickness, Stem material, Stem design, Spring weighting, Lubrication of the housing/stem, Lubrication of the spring, Leaves, Films (if added), Clicking mechanisms (Bars or Jackets)

Stabilizers: Type of stabilizer mount used, Number of stabilizers used, Stabilizer housing material, Stabilizer wire material, Stabilizer tuning, Stabilizer lubrication amount and type used, Dampening modifications

Keycaps: Profile of keycap, Keycap material type, O-Rings (if that's still a thing)

Plate: Plate material, Plate thickness, Plate shape (full or half plate), Plate mounting style, Flex cuts in the plate, The amount/position of stab cuts in the plate, Plate foam

PCB: PCB thickness, PCB mounting, PCB flex cuts, Tape modification, If the PCB even exists (e.g. handwired)

Case: Case material, Case external design, Case internal design, Presence of mounting stations or standoffs, Gaskets, Weights, Blockers, Case foam, etc.

While this once simple list of details to consider has now drastically become a monster of its own, I want to further add to the complexity by pointing out that these are only the lists of *intrinsic* keyboard factors that affect sound. In addition to these, things external to your keyboard such the size of the room it's being used in, whether or not deskmat(s) are used, the desk material and design it's being used on, and an infinite number of details spiraling out of this. Suddenly, even the sounds of the most explored and well understood keyboard builds are reduced to just as much of a guess as any super-customized, entirely unique mechanical keyboard out there. Do I think it's still possible to make good, educated guesses about the sound of a keyboard build without the components in hand and keeping all of these details in mind? Sure, but I also think that it becomes significantly more complicated for anyone who has built less than say a hundred keyboards in their time in the hobby. (That includes me too!)

Figure 4: Pictured is me with my trusty three keyboards that have written pretty much every article I've ever posted on this website.

Taking a step back to address the earlier statement I made stressing the importance of experience when it comes to guessing the sound of a keyboard build, I can already hear the complaints being formed on the other side of this screen. "But Goat, you just don't get it! I don't need to try out keyboards or leave my house to go to a meetup because there's literally thousands of typing tests on YouTube that I can watch right now!!1!" That's fair; I too am guilty of enjoying a sound test or two myself after a long day of doing homework or classes. However, I think that typing tests of keyboards are pretty damn worthless as anything other than simple entertainment. Now before you go for the pitchforks, let me break down the reasons that typing tests are not all that different from the components list example broken down above.

At the most fundamental level, a typing test is relatively simple in that it is either an audio-visual or strictly audio recording of someone typing on a keyboard of specific design. User flairs can be added such as clapping or snapping prior to establish a sound 'baseline' or a specific testing of just the keys with stabilizers afterwards. However, let me go ahead and break this idyllic mental picture by asking one simple question: How do you know that the typing test that you're listening to does not have edited sound? While you could point to sound tests from your favorite content creator who you've interacted with and trusted with for a long time as a valuable source, what about all the other sound tests out there? I can promise you that there have been (and almost guaranteed still are) content creators out there who have edited sound tests prior. At just this level of inquiry, alone, it becomes really hard to trust the vast majority of sound tests as there's effectively no way of verifying their legitimacy.

Say, however, you could verify with perfect accuracy which sound test out there were legitimate, and which were not. Aside the fact that James Randi's ghost would be haunting you until you fess up that you can't, there are still other issues that make the sound of a typing test not truly representative of the keyboard being tested. Starting with the user doing the test, at every single digital interchange between them and you, the sound in the video is ultimately affected in one way or another. Things such as the recording software being used, the audio compression of the platform it is being hosted on, and even the quality of the setup that you are using to listen to the test do significantly impact the sound of a keyboard in a typing test. Piling this on top of both the intrinsic and extrinsic factors that we've already discussed that affect the sound of keyboards, we're effectively left with an impossible to replicate sound. Are you able to get close to that if you're very careful and deliberate? Sure, but again I'd argue this is a lot harder to do and especially so the less experience you have in the matter. With all these things in mind, trying to figure out how Novelkeys Creams may sound in your random keyboard setup based on that one, singular TFue keyboard typing test that everyone has heard by now doesn't even really seem feasible.

On top, the keyboard uses rare NovelKeys Cream switches, which feature a light and hypnotizing click sound not unlike that of a spray can being shaken, as one astute commenter and Taeha Types fan pointed out

THE VERGE

Figure 5: Hell, this writer couldn't even get the *type* of switch right from the entire video, so what does that tell you about just the typing test?

As a whole, the mechanical keyboard community pays entirely too much attention to sound tests and puts entirely too much stock in them. While they may be useful forms of entertainment, or a great cap to the end of an entire Twitch build stream, the numerous details in the actual keyboard, its components, and how the typing test is being made make it damn near impossible to be a useful tool for trying to determine the sound of specific keyboard components. It is simply not feasible to either listen to sound tests in order to determine how a specific plate material or switch sounds in all other keyboards, nor is it feasible to try and use sound tests as an aspirational tool when planning on a build of your own. In the event that none of that has really sunk in nor feels true to you right now, allow me to provide you a singular typing test that should shatter your understanding of how components affect the sound of a keyboard. Is it edited? I have no idea, but it really does put a nice bow on this discussion about the sound of keyboards.

https://www.youtube.com/watch?v=sVInBOLSqoM&ab_channel=flurples

Given that that is quite possibly my longest, non-switch specific diatribe that I've ever published before, many of you are probably wondering when this circles back around to the sound of switches. While perhaps a bit verbose as always, the discussion of sound with respect to the entirety of keyboards is very necessary to talk about before diving deep into the sound of switches. Most notably, this is relevant as all of the details regarding intrinsic, extrinsic, and recording-based factors which affect sound are all directly applicable to switches as well. Furthermore, many people within the community use typing tests as a means by which they can find out the sound of switches while completely disregarding every other factor about the board in the video. While this may be due to the fact that a lot of people view switches in a relatively simple light compared to the rest of keyboard components, I don't necessarily think everyone needs to be out there with analyses like mine that take up 20 written pages. At the same time though, 'Thock' and 'Clack' simply do not suffice to accurately describe the sound of switches. So, let's talk about how you *should* talk about switch sound instead.

A Better Way to Discuss Switch Sound

Simply put, the first and most important thing you should do when describing the sound of switches is to *stop using the words 'thock' and 'clack'*. See, it's extra important because I emphasized it there with italics and here with a fourth wall break. In the beginning, these words were almost certainly a

well-intentioned pair of onomatopoeias (words which describe sound directly) that would supplement a description of a switch's sound. Loosely corresponding to 'deep' versus 'not-deep' respectively, the vague words of 'thock' and 'clack' soon took over literally all discussion of switches, engulfing every other term associated with sound underneath it. As a result, once complicated descriptions of sound focused around pitch, volume, scratchiness, etc. have seemingly all become lumped under the binary of 'thock' and 'clack'.
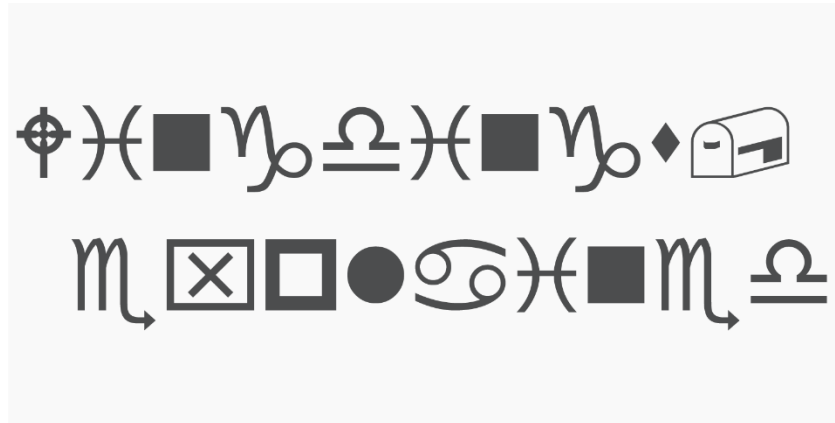
Figure 6: These might as well be the definitions of 'thock' and 'clack' at this point.

To put it lightly, this increasing vagueness surrounding these buzzword marketing phrases are detrimental to the hobby at large. Not only is it confusing for those of us who have been around for some time and have a different understanding of these phrases than where the meta-definition is now, but it's even further dangerous to new individuals entering into the hobby who barely have any grasp on the phrases to start with. So, instead of simply binning all of switch sounds into the words 'thock' or 'clack', here is how I would recommend categorizing and talking about the various sounds of switches and switch components:

Volume

The overall volume of any mechanical keyboard switch is by far the easiest concept for me to explain in this incredibly subjective topic. This simply corresponds to how loud a switch is both in hand as well as within a keyboard build, keeping in mind that any build design is going to modify the volume of a switch as discussed above. To provide some sort of context to this metric though, as well as all of the ones that will follow it, allow me to provide a brief in-hand scale of where switches may fall ranging from 'Quiet' to 'Loud' in terms of volume:

Figure 7: Comparative linear switch scale of 'quiet' to 'loud' going left to right.
(L-R: Alpaca V2, Cherry MX Black, Gateron Yellow, Tealio V2)
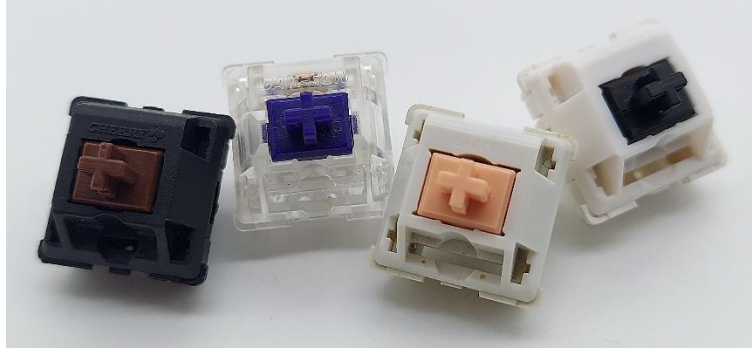
Figure 8: Comparative tactile switch scale of 'quiet' to 'loud' going left to right.
(L-R: Cherry MX Brown, Zealio V2 (78g), Invyr Holy Panda, Moyu Black)

Figure 9: Comparative clicky switch scale of 'quiet' to 'loud' going left to right.
(L-R: Cherry MX Blue, Greetech Chroma Razer Green, Gateron Green, Kailh Box Navy)

Generally speaking, volume is the easiest to compare between switches when you're comparing between different broad types of switches. For example, clicky switches with clickbars such as Kailh Box Jades or Box Navies are almost always louder than any stock linear switch you can find. However, comparing your average Gateron Yellow or Cherry MX Red to that of a clicky switch isn't exactly useful from a discussion standpoint. It should also be noted that these scales are almost entirely comparative and not in any way, shape, nor form absolute. The Moyu Black switch on the far right of Figure 9, for example, is by no means the loudest switch in all of tactile switch history, but it is louder than the others and provides a qualitative feel for this trend. Below this, and in all of the other categories following, I've attached a list of some higher-level trends that I've noticed over the years of testing to further help out:

- Silent Tactiles and Silent Linears are almost always more quiet than their respective Tactile and Linear counterparts. While this may seem fairly obvious to most people in the hobby, those who've never heard of these switches much less tried them may not know this for a fact.

- Lubing of switches does tend to very marginally decrease the overall volume of a switch. While I can't comment on what thickness of lube leads to more sound dampening than others, generally the more lube one uses, the more they dampen the sound of a switch.

- Clicky switches with clickbars (Kailh Box Jades, Kailh Box Navies, etc.) tend to be louder than that of clickjacket style clicky switches (Cherry MX Blue, Gateron Ink Blue, etc.).

- Housings which are made of nylon or nylon mixes tend to be quieter than that of housings made with polycarbonate or polycarbonate mixes. It is important to note, though, that housing thickness

as well as the manufacturer making these switches plays a *heavy* role in the overall volume of the housing collisions as well and should really be considered in discussion.

Pitch

I don't really know how else I can introduce this one. Unless you quite literally are tone deaf, the concepts of high- and low-pitched sounds are something that I'm pretty certain most humans are familiar with. I have basically negative musical ability and even I'm aware enough of these terms to be able to write pages and pages about them, so I assume your understanding of them as well. What I would like to note before showing the example ranges below is that in my experience, the word 'clacky' has vaguely seemed to correspond with 'high pitched' sounds in switches based on the innumerable questions I have had about this phrase.
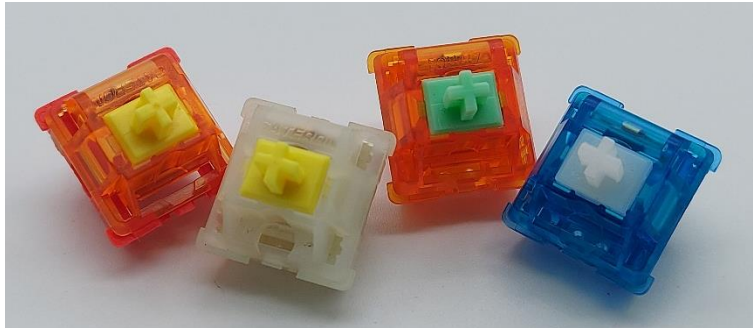
Figure 9: Comparative linear switch scale of 'low pitched' to 'high pitched' going left to right.
(L-R: Gateron Vermilion Bird, Gateron Milky Yellow, C3 Equalz Tangerine V2 (62g), Original Aspiration)
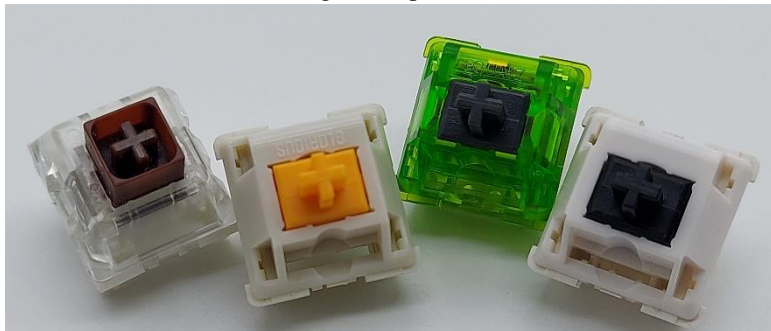
Figure 8: Comparative tactile switch scale of 'low pitched' to 'high pitched' going left to right.
(L-R: Kailh Box Brown, Glorious Panda, C3 Equalz Kiwi, Moyu Black)

Figure 12: Comparative clicky switch scale of 'low pitched' to 'high pitched' going left to right.
(L-R: Cherry MX Blue, Novelkeys x Kailh Sherbet, Kailh Box Navy, Kailh Box Jade)

Generally speaking, the pitch of a switch is actually more narrow of a category than what it may seem at the outset. In switches other than clickies, and therefore the vast majority of switches out there today, the pitch of a switch is almost always tied to the topping out and bottoming out collisions as well as the material of the housings used in these switches. While tactile bumps may also produce sounds that have a 'pitch' to them, they often tend to be relatively quiet compared to the housing collisions and are not what people necessarily think about when discussing the sound of these switches. (This is of course not as true with respect to the ultra-tactile realm of switches.) As well, it is incredibly important to stress that this is a great example of a category which is not just a binary – there is an entire range of pitches between 'high' and 'low' pitched, and you should absolutely use this to your advantage when comparing switches. Below you will again find some unorganized trends that I've noticed with respect to pitch which may serve as helpful examples:

- Clickbar switches (Kailh Box Jade, Kailh Box Navy, etc.) tend to be higher pitched than that of clickjacket switches (Cherry MX Blue, Gateron Ink Blue, etc.). This may also be noted in how the clickbars sounds much more "pure" and 'sharp' than that of the usually clunky sounding clickjackets.

- Switches which have polycarbonate or polycarbonate mixed housings tend to have higher pitched sounds in their housing collisions than that of nylon or nylon mixed housings. I unfortunately do not think there are enough POM nor UHMWPE housings out there relative to polycarbonate or nylon options with which I can form a trend here in good faith.

- Switches which have long-pole stems tend to produce slightly higher pitched bottoming out sounds than that of short-pole stems. I would imagine this has to do with the lesser contact area at the point of collision.

- In general, top housing collisions tend to be slightly higher pitched than that of the bottom housing collisions. While I have yet to hear any singular definitive explanation as to why this is the case, it's my best guess that this is likely due to a difference in thickness of housings assuming that they are of the same material type.

Depth of Sound

Coming off the tails of the 'Pitch' category, this category may seem a bit hard to separate from it. And while I will agree that that is certainly a valid argument, I do want to state out in the open, again, that describing the sound of switches is far from an exact, objective science. The reason that I separated out the 'Depth of Sound' category from the 'Pitch' category is because I often consider two different scales within this category that don't seem to fit well under pitch:

A scale of 'thin' to 'thick' sounding
A scale of 'sharp' to 'dull' sounding

The scale of thinness to thickness has always been how I've envisioned the difference between tapping on a super thin sheet of metal versus something like a solid brick of metal would sound. Given that switch housings are made not only of various different materials with different densities, but also come in different mechanical thicknesses, having a way to describe how these details impact the sound is incredibly important and very subtle as well. Going hand in hand with this, the sharpness to dullness scale is often derived from how stems in switches interact with these housing features. As discussed above in the 'Pitch' category for long-pole stems, the area of contact between stems, leaves, clicking mechanisms, and housings all produce sounds which range from a very pointed or 'sharp' sound to that of a flattened,

'dull' sound. Let me go ahead and provide some examples below as to what I mean for each of these scales:
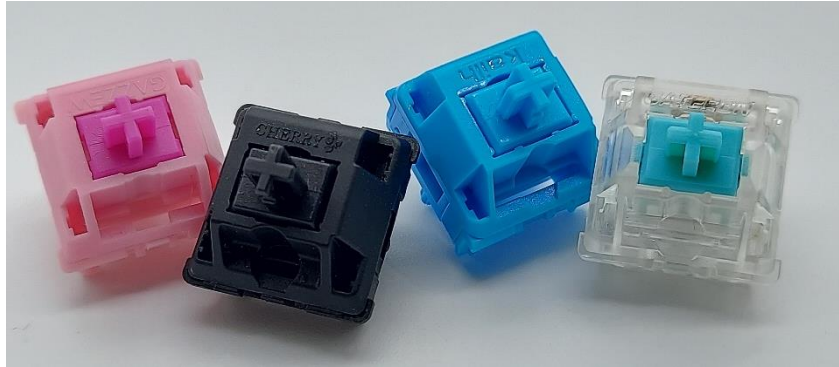

Figure 10: Comparative scale of 'thick' to 'thin' sound going left to right.
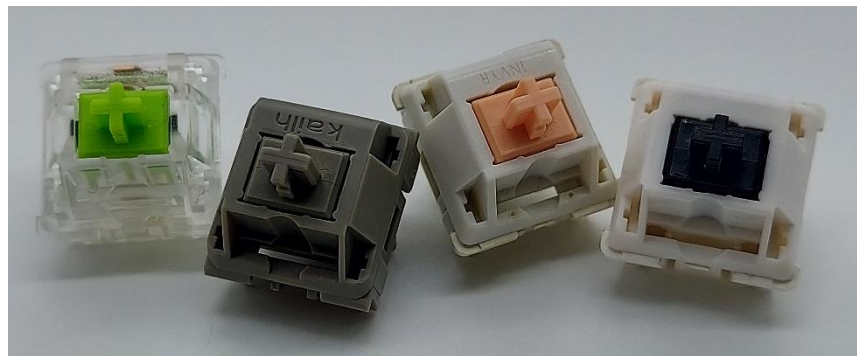(L-R: Gazzew Bobagum, Cherry MX Black, Novelkeys Launch Cream, Tealio V2)

Figure 11: Comparative scale of 'dull' to 'sharp' sound going left to right.
(L-R: Keebwerk Tacit V1, Novelkeys Cream Tactile, Invyr Holy Panda, Moyu Black)

If those scales feel a little bit vague and hard to differentiate, I can completely understand why you may feel this way. Keeping in mind that there are people out there who talk about switch sound in terms other than 'clack' and 'thock', these are subtle points that many of those people have a hard time addressing about switches as a whole. Generally speaking, these features tend to be highlighted more often in the tactile bumps and bottoming outs of switches which have design intent to specifically highlight those points of contact. Switches that are ultra-tactile, long-pole, or perhaps marketed on their specific bottom housing material are where these descriptions are most often seen about switches. With respect to some general trends that I have noticed over time:

- People seem to generally associate 'thock' with that of thick, dull bottoming out sounds when describing switches. When comparing this to 'clack' which seems to be oriented more towards the pitch of switches in my experience, you can understand how these phrases feel confusing and inadequate to describe the complete sound of switches.

- Long pole stems tend to produce sharper and thinner sounding bottoming outs than that of regular pole stems. I suspect this is very much due to the same reasons pointed out above in the 'Pitch' category with respect to area of collisions of the stems.

- Housings which are made of nylon and nylon mixes tend to have thicker and duller sounding housing collisions than those of polycarbonate and polycarbonate mixed housings. Extending this beyond just housing materials, brands like Cherry and Gateron seem to especially have thicker

and duller sounding nylon housings than that of newer brands such as Durock/JWK and Tecsee in my experience.

- Clickbar switches (Kailh Box Jade, Kailh Box Navy, etc.) produce sharper, thinner sounding clicky sounds than those of clickjacket switches (Cherry MX Blue, Gateron Ink Blue, etc.)

- Silent Tactiles and Linears not only tend to have a slightly thicker and duller sounding set of housing collisions than normal switches, but they *also* tend to produce a sort of muted, 'squishy' like sound due to the use of rubber dampening pads which is also touched on below.

- These categories can also often be used to describe the sound of tactile bumps. Additionally, its not uncommon to see these terms lumped under 'rounded' and 'sharp' phrases with respect to discussions of tactile bumps as the length of the tactile bump relative to the overall stroke length plays a big role here too.

Smoothness

Much like with the 'Volume' category, this is another fairly easy concept with which most people even brand new to the hobby can resonate with. While it is a bit of a meme in my reviews that the sound of switches mimics that of the push feeling of them, this is because it is very much true. The smoothness of switches, both in stock and modified form especially, all change the general sound of a switch. While aftermarket modifications such as lubing also affect all of the other categories as mentioned above, I felt the need to separate this out as it is a rather ubiquitous feature in keyboard switches which make for great sound comparisons. Example a trend in smoothness can be seen below:
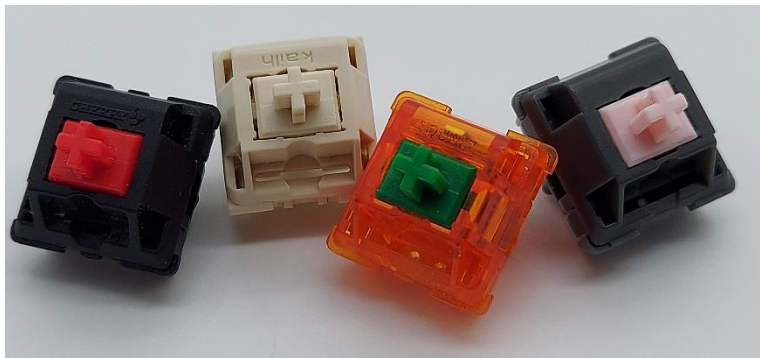

Figure 12: Comparative scale of 'scratchy' to 'smooth' sound going left to right.
(L-R: Cherry MX Red, Novelkeys Cream, C3 Equalz Tangerine V2 (67g), Alpaca V2)

Scratchy switches sound scratchy. Lubed switches sound lubed. However, much like everything else in this article, it's not quite that simple. It's entirely possible to have switches that *sound* smooth while simultaneously *feeling* scratchy. As well, the degree to which a switch is lubricated also plays a role in this. Thinner applications of lubricants with thinner viscosity allow for more of the "original character" of the switch to be heard whereas increasing viscosities and applications of lubricants tend toward a muted, frictionless 'overlubed' sound. As one increases the viscosity or application amount, scratch sounds reduce, the overall volume decreases, and the pitch drops with a rise in 'thickness' of the sound of a switch. Moreover, though, the switches simply sound 'more smooth' than that of their stock form, and this is why I included this as a separate category. Here are some general trends I've noted about smoothness in sound over the years:

- Switches which have polished stems or polished slider rails are an excellent example of switches that sound smooth but have a slightly scratchy feeling to them in their stock form. It should be noted that this is definitely not applicable to *all* instances of this, but that it's a trend I've noticed in many of them.

- Switches that are entirely made of POM are a great example of switches which just sound scratchy in stock form, smoother when lubed, and an entirely different level of smooth when they are lubed and broken in over time. These, alone, deserve a case study on how their sound changes over time and I'm making a note here to myself to maybe attempt this in the future.

- Generally speaking, the smoothness of the sound of a switch is more often than not something discussed only in linear switches. While tactile and clicky switches can both sound scratchy and smooth, the focus of these switches are around their tactile bump and click sounds to the extent that other features often tend to get ignored.

- Inconsistencies in factory lubing, in which stems or housings have alternating wet/dry spots or more lube in some places than others are a great example yet again of how the 'smoothness' of a switch is not a simple binary of smooth or scratchy.

Erroneous Sounds

Aside the fact that 'erroneous' is quite possibly one of my favorite words to pronounce out loud, this is by far everyone's favorite area of sound to focus on in keyboard switches. While it may be really hard parsing apart two rather impressive performing and sounding linear switches, everyone can tell when something is *wrong*. This category briefly encapsulates all the negative aspects in switch sounds which people notice:

Ping

Figure 13: A pair of notorious pingy switches in stock form.
Left is a Moyu Black, Right is an Original Aspiration.

Ping refers to the often high-pitched, metallic sounds that come from switches which have 'improper' spring or leaf/stem interactions. Often due to a lack of lubrication of either of these points of contact, these are one of the most common reasons people modify switches via aftermarket lubrication or spring-swapping. Switches which are described as 'pingy' tend to have this sound emphasized in cases which allow for more sound to travel within them, with plates which carry sound vibrations more such as copper or brass, and with keycaps that have larger volumes to bounce around the sound of the switch, such as SA or MT3 style keycaps.

Rattle

Figure 14: A pair of notoriously rattly clickjacket switches. Left is a Cherry MX Blue, Right is a Kailh Razer Green.

Quite a bit rarer than 'ping', rattle refers to the rattling of components within a switch without having to actually activate the switch. Switches with poor seating for springs, extremely wobbly stems with poor tolerancing, or loose internal components all produce a sort of distinctive rattle that can be heard when activating a switch. A great example of a loose internal component where this is most often seen is in that of the clickjacket switches such as Cherry MX Blues, though this mechanism is becoming seemingly less popular by the day. All in all, this is quite rare in modern switches today, but definitely something worth noting in a semi-exhaustive discussion on sound.

Material Sounds

Figure 15: A rubbery silent tactile on the left in Keebwerk Tacit V1s and a plasticky linear switch on the right in Konpeitous.

This category effectively refers to any sounds that are generated as a result of the material being used either in the housings or in the stems of a switch. Specifically, this category was distinguished based on two sounds in particular: rubbery and plasticky sounds. Rubbery sounds have already been touched on briefly in this article, and refer to Silent Linear and Silent Tactile switches whose bottoming or topping outs are rather impacted by their rubber pads used to dampen the sound. Plasticky sounds, on the other hand, seem to be a relatively new phenomena and correspond to polycarbonate and polycarbonate mixed top housings from newer manufacturers that take on a truly 'plasticky' tone in addition to the high pitched and sharp tones discussed above. It should be noted that not all polycarbonate top housings sound

plasticky, nor are all plasticky sounding top housings polycarbonate either. The majority of the switches which have plasticky sounding topping out tones, though, do tend to be switches with polycarbonate top housings which were manufactured more recently.

<u>Grinding</u>

Figure 16: A Durock/JWK Taro Ball switch - one of the rare few in which I've identified this 'grinding' phenomena.

Much like with the 'Rattle' section above, this is a fairly rare sound amongst modern produced mechanical keyboard switches. Seen sometimes in poor quality vintage switches due to dirt and dust within their more complex mechanisms, I've occasionally noticed this when testing wobble in a very small number of modern switches. Simply moving the stem in a circle within the housing leads to a grinding or crunching type sound as if components are colliding or there is excessive plastic in the housing that is being ground off upon movement. This does not appear to affect the overall sound of the switches in use in my experience, but still felt it was worth noting here.

<u>Popping</u>

The final erroneous switch sound is one that arises almost entirely as a result of improper aftermarket lubrication by new or inexperienced users. Popping refers to the suction-like sound that occurs when too much lube is applied to a switch or in inappropriate areas. This is especially seen in which lube either accidentally enters the center hole in the bottom of the bottom housings leading to a suction like sound when the stem pole enters and leaves it or in tactile switches in which an overlubing of the leg/leaf interface to reduce ping leads to a popping sound.

Final Conclusions

Well, there you have it – several thousand words and a handful of photographs all in the hopes of extinguishing the existence of just two tiny, five-lettered words. All jokes aside, a discussion about the sound of switches and some of the more finely tuned details that I think more people should be considering has been an article topic that I've wanted to cover for some time now. With the ever-increasing popularity of typing tests and with the growth of my platform with those new to the hobby, I

couldn't think of a better way to really dig into it all than starting with keyboards broadly before working my way down to the best, most important part of the keyboard in switches. Does that necessarily mean that my writing here is the objective, go-to, and ultimate authority on sound in both keyboards and switches? Absolutely not, and extremely far from it. Much like with reviews or discussions about anything in this hobby, the best way for anyone to improve their understanding and further sharpen their opinion is through in person exploration and testing of these things for themselves. I'm not here trying to tear typing tests off of the internet completely nor argue that anyone who has ever used the words 'thock' or 'clack' are wrong. Instead, I figured I'd give my take on why discussions surrounding sound in the community right now aren't all that great, and maybe toss in some considerations that I think you all might benefit from hearing. It certainly was good experience for me to sit down and actually formalize this all out, and I think about the sound of switches literally every single time I do scorecards or reviews.

Sponsors/Affiliates

Mechbox.co.uk
- A wonderful UK based operation which sells singles to switches that I've used above in my comparisons for collectors and the curious alike. Matt has gone out of his way to help me build out big parts of my collection, and buying something using this link supports him as well as my content!

KeebCats UK
- A switch peripheral company based out of the UK which sells everything switch adjacent you could ask for, they've been a huge help recently with my film and lube supply for personal builds, and they want to extend that help to you too. **Use code 'GOAT' for 10% off your order when you check them out!**

Proto[Typist] Keyboards
- An all-things keyboard vendor based out of the UK, proto[Typist] is a regular stocker of everything from switches to the latest keyboard and keycap groupbuys. While I've bought things from the many times in the past, they also are a sponsor of my work and allow me to get some of the great switches I write about!

MKUltra Corporation
- We may have stolen a few government secrets to get this one together. MKUltra is a US vendor that truly fills all the gaps other vendors simply don't offer and is continuing to expand their switch and switch related peripherals by the day. **Use code 'GOAT' for 5% off your order when you check them out!**

Divinikey
- Not only do they stock just about everything related to keyboards and switches, but they're super friendly and ship out pretty quick too. Divinikey has been a huge help to me and my builds over the last year or two of doing reviews and they'll definitely hook you up. **Use code 'GOAT' for 5% off your order when you check them out!**

ZealPC
- Do they really need any introduction? Zeal and crew kicked off the custom switch scene many years ago with their iconic Zealios switches and the story of switches today couldn't be told without them. **Use code 'GOAT' (or click the link above) for 5% off your order when you check them out!**