

## Knowing the Overall Sound

**The Genre:** Over a period of time the overall tonality, dynamics & loudness of music has evolved and become somewhat standard for one type of music or Genre. In order to avoid the music to not sound weirdly different and non-contextual it always makes sense to know what Genre it closely belongs to and also a reference benchmark should be provided. Once this is clear in the head of the artist, it is also advised to know beforehand, which layers will be dominating the mix and which ones will be supporting.

## Loudness

Loudness is a very tricky concept and is extremely dependent upon the way we hear. *Human ears are least sensitive to Bass and High end (Treble), it is most sensitive to Mids.* This is the reason why in a typical music piece you see bass has always higher level and also normally we like boosting bass & treble. A relatively higher bass and treble sounds balanced to ears. Another dimension to this is the *dynamic range* which is the difference between the lowest level sound and highest level sound, a wider dynamic range music, like some ballads and jazz, appear less louder, note that they appear less louder, technically they might not be, whereas contemporary Pop, Hip-Hop & Rock etc, sound louder, one reason being the excessive compression used in these genres. Compression boosts the lower level signals contributing to the apparent increase in loudness which was earlier relatively providing the breathing/resting period to ears letting the mind relax.

For an artist, it makes sense to do a cross compare especially vocals in various genres and identify her personal taste and communicate to the sound engineer.

## Soundstage & Depth

Soundstage refers to the *spatial position of various instruments*. Typically all bass heavy instruments & vocals are at the center image of the overall sound and supporting instruments are panned sideways. Modern over processing however in many cases ignore the phase aspect of sound which has to do with our sense of hearing which is very sensitive to phase, that's how we locate objects by listening to sound almost instantly and subconsciously. An over processed instrument or vocal may sound extremely unreal and doesn't lead to auditory satisfaction which happens sub consciously. Think about those vintage music pieces, those days there weren't even 10% of resources or tools available which we have now, though by modern standard they sound lo-fi but there is a soul in them, some human element which makes them timeless. It should also be kept in mind that logically *every single change or alteration done on the recorded piece will incrementally distort and takes away the originality*, as the saying goes, **"Record like there is no Mixing and mix like there is no mastering"**. A minimalist approach taking care of fundamentals of how a sound should sound like maintaining the originality is the key to having a class mix.

Modern sound systems commercially available are poorly designed dominated by mass production methods and commercial orientation, making it very hard for a common man to appreciate the nuances in music. However, an artist must listen to the music piece keeping an attention to the spatial spread and depth (straight distance from the listener) of various instruments in the overall sound. This should also be kept in mind while arranging the music, recording it and preparing for final mixing.

## Reference for Artists

Ironically despite so much of technical revolutions, till today there is not a single audio system or a speaker which can be termed as the best. The reason being, there are too many variables starting from the electronic equipment, the listening room to environmental variables which govern the sound we hear. Perhaps this is true for any measuring instrument as well. This is the reason why for all instruments in the world, its always specified the %error in measurement and other limitations. It makes the task of a sound engineer very difficult when the artists who is relatively less informed and is biased by her own experiential judgments when it comes to evaluating the tonality and other aspects of the mix. It therefore makes sense for the artist to know the limitations of her own system (audio amplifier/speaker) and keep the same in mind while evaluating. The point here is "there is no point of having a scale which is not calibrated to measure something and the user is un-informed about it" - this leads to circular iterations yielding random sub-optimal results.

## Knowing own Ears

Over decades of my experience in sound engineering I haven't come across a more fundamentally overlooked and ignored area as this. *How well do we know our own ears?* We judge everything on daily basis using our ears. Human audible range is 20Hz to 20,000 Hz. Most people hear between 30Hz to 18,000 Hz. However its not what matters, many people over the range hear some frequency range relatively more or less than others due to the way ears develop or mature. It makes sense for at least artists to get their ear frequency profile checked and plotted to know how they are. This will dramatically improves making an informed decision.

## Instruments & their Tonality

Countless mixes are there in today's modern times where you just pay little attention then you'll realize for example, a piano is spread all over the soundstage, a rhythm guitar sounding like a pad etc. Though they might sound "nice" but they definitely don't sound genuine. *Each instrument in a music piece has a purpose and that purpose is there because of the identity of that instrument in the way it sounds and expresses the musical intent.* One shouldn't force an instrument to do some other instrument's job as that'll be pure cannibalization of both originality and justice.

## Know the DAW

One cannot ignore the fact that there IS definitely some MAGIC associated with vintage tapes/vinyls that is just not there in modern digital downloads, however there isn't a metric or a mathematical formula to measure, quantify and term that difference or property or attribute. The answer to this perhaps lies in some basic physics!

Any digital system works on converting an analog (natural, all of our senses can perceive only analog not digital) to digital signal. This is done by converting an infinite amount of information inherently present in analog to a finite amount of information which can be handled by computer which has finite processing ability. This very first step is indeed an approximation of information, music in this case. Almost 90% of work happening in the software uses a tool called filter, whether it is EQ, Compression, Effect, Reverb, etc., filters are always present. *By design a digital filter introduces harmonics and other distortions,* hence an over use of processing in a daw can lead to a sterile & soul-less result. A minimalist approach is again a key to avoid such situations.

## Fundamentals of Professional Sound Recording

Just for the benefit of a Non-Technical artist, it is imperative to shed some light on some basis physics.

Sound which we hear is always a sine wave, more precisely it is the mixture of many sine waves of varying frequencies and levels. Each instrument has a typical profile of these mixes thus they sound the way they do and its called Timbre. Also note that in a sine wave the peak occurs at quarter distance from the zero level, so obviously at that point it vibrates to the extreme end, this is related to the attribute called wavelength. One should remember that, sound has a speed of about 330 meters per second in air. Any sound or a wave have three interlinked attributes, that is, **Speed/Frequency = Wavelength or Speed/Wavelength = Frequency.**

Have you ever experienced while standing near the closed door of a theatre, you only hear the bass thumps, not the high end, why? Lets explore this to understand the above formula at work.

The lowest bass frequency we can hear is 20Hz, that means the wavelength will be,  $330/20$ , close to 15 meters. This means that the 20Hz sine wave will have the peak at  $1/4$ th distance, which is  $15/4$ , close to 4 meters, this means that you need at least a 4 meter thick wall to absorb the 20Hz frequency, else it will jump out. Lets do the other way, assuming that the wall is 1 meter thick, this means it can capture 4 times larger wave, thats 4 meter, this means  $330/4$  close to 80Hz. This means all frequencies below 80 Hz(bass) will come out of the wall. Thats why you hear only bass outside. Same principle is applied to speakers as well, the physical size of the enclosure has a significant say on which frequencies it can transmit, here also the distance of speaker from the surrounding walls come into play. After each reflection the sound wave reverses and interacts with directly emitted sound from the speaker and at different places in the room, it either reinforces or cancels out sound creating various nodes. If you happen to sit at these nodes you'll perhaps not hear some parts of the sound at all.

## Final Thoughts

*Sound Engineering is perhaps only of its kind which has a very delicate, sensitive & significant blend of art and science which demands an open mind and attitude to learn and appreciate fundamental nuances, musicality and originality.*

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