

Stuck in the middle with you!

Sub-bass often receives all of the attention when it comes to car audio systems however, without a firm basis in the mid-ranges, many could be missing out on quality listening. Here we attempt to explain why.

Bass is exciting, dramatic and emotive but it occupies only a small part of the audio spectrum. A well-recorded piece of music contains a lot of information and extracting it from whatever medium you are listening to and presenting it to your ears is an art. It is quite natural for humans to have a preference for certain frequencies and equally a dislike for some. I have always disliked harsh high frequencies. I used to work in a workshop repairing TV's when they screamed like banshees – Line whistle from cathode ray tubes (around 15kHz) drove me completely crazy and I could at one point walk into a house and tell you the brand and size of TV that was on just from the line whistle I could hear – Well maybe not, but some tellies were much worse than others. Fortunately, CRT's are a thing of the past. Too late for me but good for the young!

Music tends to be busiest at frequencies between 80 Hz and 4 kHz. This is where the fundamental frequencies of most musical instruments sit and although sub-bass and high frequencies are vital, if the mid range is not right in a system then we are unlikely to get the full effect of a recording. Unfortunately, linear reproduction of these middle frequencies is exactly what the majority of factory-fitted car audio systems lack. In order to demonstrate, take a piece of well-known rock music and play it in your car. Does the snare drum cut through the guitars and keyboards? Can you hear the tambourine? Can you tell what parts are being played by low guitar from those played high up on a bass guitar or on a keyboard? – I would think probably not, particularly when your car is in motion. Then take a piece of live orchestral music. Can you tell where the first violins are? Could you close your eyes (not while driving obviously) and draw a picture of where each group of instruments sits? If not,

your system needs some work. In my experience, you may get uplifted high frequencies and boosted bass in a standard car but everything in the middle is total mush. Your brain however, will do its best to unscramble the midrange porridge it is presented with and leave you feeling exhausted when listening for any amount of time.

The most common comment I hear from those who have recently upgraded is that they can hear things on recordings that they have never heard before. Music reproduction at its best allows the listener to pick out each sound source, whether a quiet hi-hat or a throbbing bass line. These sounds should sit happily alongside each other and one should not be completely swamped by the other. But this is just the beginning. If a truly perfect balance is achieved and your source is of good enough quality, you should be able to pick out reverb on a vocal or other instrument even though this effect will be very subtle. Music is supposed to be subtle. Even the heaviest rock bands in the world are recorded with subtlety and there is a lot going on that is intended to be heard. If you travel back to the early 70's there are also sounds that you should be able to hear that were perhaps not desirable at the time but add intrigue for the listener. Regular readers will have heard me waxing lyrical about the sound of a toggle switch being activated by John Lennon on a Beatles tune or an array of Marshall amps humming during the quiet passages of a Jimmy Page guitar solo. One of my favourite sounds is the squeaky kick drum pedal on Led Zeppelin III's "Since I've Been Loving You". This last one is my favourite demonstration. People who have lived with this track all of their lives are astounded when I point it out to them in response to the usual "but it can't sound as good as my 17-speaker system in my [insert car brand here] can it?"

People find it very easy to be convinced about sound by the marketing that surrounds it. Most lack the confidence of their own convictions and a lot of audio trickery is brought to bear when asking about the audio system in a car they are about to buy. If you want to be certain then take along some tracks that you know very well and listen out for the elements that you particularly like about them. Just because a hapless young car sales person tells you a car has 17 speakers fitted to it and pumps out 4.5 million watts of power, doesn't mean they know anything about music at all! – Customers should also take their own music when visiting a car audio specialist. In fact a FOUR MASTER will try to insist that you bring your own tracks along although they will have many that they themselves use to judge how good a job they have made of your install. If you are beginning your journey into music appreciation, you may rely more heavily on your installers test tracks and I often hear people tell me that they have purchased music specifically to get the track that they were demonstrated in store – This is a good thing! I become increasingly irritated and bored by blind music genre fanatics who only buy certain types of music. Music is not football, you don't need to decide at an early age who you are going to support and follow them for life even when they are not very good (as a lifelong Man City fan, I know what I am talking about!) To do so is to deny oneself whole worlds of fun and enjoyment.

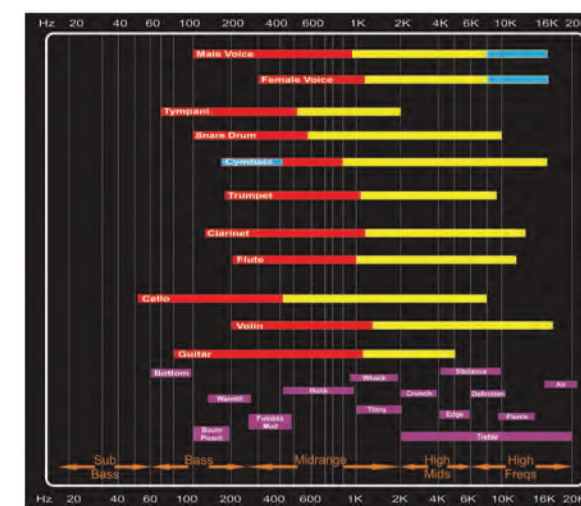
It is all well and good for me to pontificate about the importance of mid-range frequencies and how they allow me to enjoy my music but now I am afraid it is time to get just a little technical. The squeamish among you may wish to take a short break before continuing!

Many different definitions of mid-range frequencies exist. For the purposes of this piece I have taken the frequency range between 80Hz and 4kHz as a fairly average definition. This is based mainly on a working knowledge of musical instruments and the notes they produce. For instance a guitar in standard tuning produces fundamental notes ranging from 83Hz to 1.3(ish) kHz while a piano reaches down to 27.5Hz and up to 4.2kHz. Percussive instruments like cymbals for instance will also

have a fundamental frequency but also generate many overtones and harmonics that define the characteristics of their sound. The same can be said for all musical instruments and in fact this is an extremely important fact to recognise. It explains why you can't have a musical system containing just bass speakers for instance as without the mids and highs all sounds will begin to homogenise into the same noise. Consider an acoustic guitar for a moment. As well as the fundamental notes reproduced there are many other accompanying noises that help you recognise it as a guitar. For instance the notes will decay and as they do so their content will change as some frequencies decay before others. Similarly the attack of the sound will be affected by technique as well as the construction of the guitar and the way it is recorded. When moving a hand up and down the fret board, there is often an accompanying squeak caused by the player's fingers travelling along the roughness of wound strings. I read somewhere, that there is no actual name for this effect but I have adopted the term "seagulls" which I believe was coined by sound engineers in a studio in Wales and works for me!

Some of these characteristics of an instrument, whether guitar, trumpet or kazoo are produced as a result of very high frequencies interacting with the fundamental or even other harmonics of a sound. The point of this explanation is that if you tune a system in a car or home to reproduce fundamental frequencies alone, you will not get a realistic reproduction of the sound recorded. Take our guitar example. If we listened to just the fundamental frequencies it is able to produce (83Hz to 1.3(ish)kHz), it wouldn't sound anything like a guitar. Ideally, we need to balance all frequencies to achieve perfection with respect to the listening environment but if this is not an option due to budget then I would strongly recommend that a strong foundation around the middle frequency range would be a better place to start rather than swamping everything with very loud sub-bass.

Fortunately, you don't really have to have an in-depth understanding of this subject as your FOUR MASTER (other specialists are available) will have and will be there to advise you.



“Even the heaviest rock bands in the world are recorded with subtlety”

Top The chart above lays out the fundamental frequency range of specific instruments