2- NEARFIELD MONITORS

This is the type of speaker that we will find in almost every studio, they have a very neutral and linear frequency response and add little to no colouration or warmth to the sound. This gives us a very true representation of what our audio sounds like. It's common to have two sets of nearfield speakers, and as we mentioned earlier, some popular speakers are Yamaha's, KRK's and Genelec's.

These speakers will give us around 4 hours of mixing without causing ear fatigue and we should be aiming to use these for around 40 percent of our allotted mixing time.

This speaker needs to be able to respond well to transients and also have a wide bandwidth to be able to accurately reproduce the full frequency range. They are designed to be fairly close to the listener, at head height, in an equilateral triangle formation. Speaker setup will be explained shortly.

3 - SUB WOOFER

When using nearfields, we are aware many models have the drawback of a relatively poor bass response due to their size. The frequency response of many smaller nearfields drops off below around 40Hz. We can add a subwoofer to our arsenal to help recreate these frequencies, to aid us in the mix process.

Issues we will need to consider, when using a subwoofer are:

- Where we should place it
- At what frequencies should it crossover with the monitors
- Is it in phase with the nearfield monitors?
- Is the level set correctly in relation to the nearfields?

If we cannot accommodate a subwoofer, then try a professional set of monitoring headphones that can really help for listening and balancing bass frequencies when we don't have the luxury of an acoustically treated room.

4 – HIGH END STUDIO SPEAKERS

Finally we have the top of the range speakers that we can find in high-end studios. These are often built into the walls of the studio, or are large floor standing speakers.

Other than to show off to clients, These speakers will help us to pick out the extremely fine details In a mix, for making micro changes that we wouldn't be able to notice on a set of nearfields or radio speaker.

We can also use them for precise surgical EQing, as well as getting our extreme low, and high-end tonal and volume balance adjusted correctly. We should not listen on these speakers for any more than an hour. The final 10% of our mixing time can be done on these speakers.

Our audience will not have the luxury of listening back to the mix on these speakers, so its important to understand the concept of getting our mix to sound good on systems that consumers are likely to use, rather than an expensive studio sound system. This is especially prevalent in the bass frequencies, where we may need to add extra harmonics to a sub-bass, so that it can be heard through speakers with smaller drivers.

SPEAKER SWITCHING & SET LEVELS

Many of us will monitor at loud listening volumes during the compositional, creative and arrangement stages of our production, to help us get inspired, and build a vibe into our track.

This is absolutely fine, but when we are mixing we need to adhere to a different set of rules. By the mixing stage, all of the compositional decisions should have been made. Many producers will render their tracks to audio to commit to the mixing stage; this also prevents any further tweaking.

When we are mixing, we are generally not adding anything extra to the track other than FX. Our job is to work with, and improve what is already there, to make it sound as good as it possibly can. For this reason, we need to monitor at low volume levels.

Ideally, we should always be able to hold a conversation over our monitoring levels. If possible, keep it on the lowest setting possible, whilst still being able to mix. This will pay dividends when we eventually turn the mix up later on.

As we monitor at louder volumes, our mind gets satisfaction from the increase in volume, tricking our brain into thinking that the mix sounds better, or punchier than it actually does, when in reality the

only change is volume. Try this test with a reference track to see for yourself.

Getting the mix right at a lower level will help it to sound much more well rounded and fuller when played at louder levels due to the way the human ear perceives music at different volumes. (The Fletcher-Munson curve)

We are fully aware that it is unlikely that everyone will have the willpower to abide by these rules, So we have allowed some flexibility for when its okay to listen at loud volume levels:

- In any other stage of production, other than mixing or mastering
- At the very end of the mixing session
- At the very end of the day before we go to sleep
- Before we go for extended breaks from mixing

Also remember what has been said about dividing our mixing time between the different speaker types.

50% of the mixing session should be done on the radio speaker. This is for the big decisions and the majority of our balancing and tonal sculpting

40% should be done on our nearfields, for further in-depth mixing & fine tuning that requires a higher quality driver.

The final 10% should be done on high-end studio speakers for any fine-tuning and extreme low & high-end adjustment if necessary.

Remember to A-B between different speaker types to see how the parts that we're working on translate in different speakers.

THE LISTENERS PERSPECTIVE

End consumers aren't going to be sat in a studio every day with the luxury of a beautiful set of speakers. The chances are, they will hear our track in a car, on a radio, on their iPod docking station, or on headphones.

For these reasons its important to get the mix sounding perfect on a poor sound system at low levels. That way, if we can get the kicks to punch, and the vocals to sit right throughout the track at a low level, when Joe Bloggs walks past a house party from outside, he is still going to be able to hear the important elements of the track.

A good test is to turn our speakers up fairly loud, go outside the room and shut the door. How does our track compare to our reference tracks from outside of the room? This is also a very useful technique for checking the kick and bass balance.

A final reason for monitoring at low volumes is because at loud volumes the ear can actually create its own harmonic distortion and make up sounds that aren't actually there.

For example; if we play a 1KHz sine wave at low volumes, then it sounds like a 1KHz sine wave as expected. However, if we begin to play it louder, we can start to hear a combination of harmonics as well, such as 2KHz and 3KHz sine waves.

This also works the other way round, so if we have the harmonics, but not the fundamental, we can trick our ears into thinking that the fundamental note is actually there. This psychoacoustic trick is used in small speaker systems that can't reproduce low frequencies to make sounds more bass heavy than they actually are. This is known as the missing fundamental. This technique is employed in certain bass enhancing plugins such as Maxxbass and Rbass from Waves.

Waves RBass

REFERENCE LOCATIONS

Reference your tracks in unusual places, where the consumer is likely to hear your track, such as in a car. Not only do most cars have good audio systems, but they are also useful places for checking the imperfections of our mix;

- There's a high chance that we are fairly well acquainted with the sound of our car's audio system.
- It gets us away from the studio
- A cars interior is usually soft, which means it will be absorbing a lot of the reverberated sound, this coupled with the lack of parallel walls make it a good listening environment

SPEAKER ORIENTATION

When setting up our speakers, we should avoid mounting them on our desk or table, because this may cause vibrations that could cause further acoustic issues.

If we must have them on the table, then make sure they are isolated from vibrations, by using rubber or foam mats.

Speakers should be placed on speaker stands, most speaker stands will have some form of spike between the bottom of the stand and the floor to help isolate the vibrations, We should also have a set of cones between the speaker and the stand. If this is not possible, rubber or foam will suffice.

Ensure that your speakers are the right way around. This may sound silly at first, but speakers are designed to project the frequencies in a certain way. By having the speakers in the wrong orientation, or upside down, they may sound different. Most speakers are designed so that the tweeters will be above the main driver.

The angle at which the speakers are set, as well as the height, will affect the colour and stereo imaging of your music. Generally nearfield monitors are designed to point directly towards the listener with the tweeters at ear level.

SPEAKER POSITIONING

We should set our speakers up using a few simple and effective guidelines:

- Set the speakers up in an equilateral triangle to the listener
- The speakers should be facing directly towards the listener
- A rough guide for distance would be a 3ft gap between each speaker and the listener. This is subject to the desk, speakers and room

Any closer than this, and we would perceive a very narrow stereo image, causing us to compensate by over-widening. Likewise, if the speakers are too far apart, we will experience a wider stereo image with a hole in the centre.

Ensure that our speaker gain pots are set correctly on the back of the speakers, having one knob set slightly different to the other one will create an unbalanced or lopsided listening environment. Many gain knobs on the back of monitors will have a default position at 0dB's, which will click into place.

MONITORING SUMMARY & KEY POINTS

- The main component of a studio are, monitors, amplifier, D-A converter, mixing console, workstation/computer and the room itself
- Look for monitors with a flat frequency response
- Ensure the monitors can accurately reproduce the sub bass frequencies
- Speakers with drivers of below 8" will usually require support from a sub-woofer
- Reference & monitor the mix through multiple sound sources
- There is a significant difference in perceived loudness between 70 - 90 dBs SPL
- Monitor at a level where normal talking can still be heard over the music
- Monitoring at loud levels will increase ear fatigue and the risk of permanent hearing damage
- Take regular breaks when working on a track to allow the ears to reset
- Use a DIM switch to alternate between set volumes when mixing
- Be aware of monitoring at different levels and the effect of the fletcher-Munson curve
- There are occasions when it's okay to listen at louder volumes, such as during compositional tasks, at the end of the day, or before going on a long break
- Use a basic radio speaker for the majority of big decisions (50% of the mix process)
- Use the nearfields for 40% of the mix process
- Use larger professional studio speakers for the final 10% if you have them

- Always have the end consumer and how they will hear your track in mind when mixing
- Speakers should be placed on speaker stands or on the desk
- Use rubber isolators/de-couplers to prevent speaker vibrations
- Ensure speaker orientation is correct
- Tweeters should be at eye level
- Nearfields are designed to face the listener directly
- The speakers should be equal distance apart (around 3ft)
- Place speakers in an equilateral triangle from the listener