

- WHAT IS "FAST" AUDIO?

At High Emotion Audio (hereinafter HEA), we refer to our low-frequency reproducing systems as "FastWoofers". What does this mean?

- IT IS A DESCRIPTION OF WHAT YOU FEEL

First we must recognize the existence of "meta-language". By this we mean that certain sensory stimuli are described in certain ways irrespective of culture or training. If reproduced music has a strong sense of pace and rhythm, i.e. it makes you tap your toe, then it is generally described as "fast".

So we call our woofers "FastWoofers" because they are lively and tuneful and they make you tap your toe. They are rhythmically engaging.

- BUT THERE'S MUCH MORE TO "FAST"

We listen to music (and other sounds) along a perceptual continuum from purely cognitive (cerebral) to highly emotional (limbic). The limbic brain is our "animal". It is the atavistic leftover which responds to threat or danger. The only senses which connect directly to the limbic brain are olfaction (smell) and audition (hearing).

- COGNITIVE vs. EMOTIONAL

An example of cognitive listening is when we are judging a loudspeaker or other equipment by paying explicit attention to the describable aspects of the reproduced sound. An example of limbic response is when we get past the cognitive and allow the music to engage us emotionally, often by evoking previous emotional moments in our lives. All actual listening is done somewhere along this continuum.

We believe that it is important to activate the emotional response in order to obtain the complete experience of the music. Because that response is linked to the primitive part of our brain, we need to consider what activates it. Clearly, from a survival aspect it is important to react to the onset of sudden sounds. The "snap" of a twig may be a matter of life and death. More generally, the ability to quickly identify a sound is what matters.

- IDENTIFICATION = TIMBRE

In musical terms, the identity of a sound is called timbre. The ability to quickly identify timbre shortcuts the cognitive requirement and allows us to rapidly reach the emotional content. The beginning of sounds, their leading edge, is fundamental to the quick recognition of timbre. As the sound decays, the timbre has already been identified, so the decay is not as important as the attack.

The structure of the leading edge of sounds must be accurately presented. It is not enough for the woofer to be "fast", the mids and highs need to all be in-time with the bass. In technical terms this would be called uniform group-delay.

- WOOFERS AND MUSICAL BASS

Turning specifically to the FastWoofer; it needs to be recognized that all of Western music is harmonically built upon the bass. If the bass is out-of-time with the rest of the sound the harmonic rhythm becomes distorted. This is a more common problem than you might think. The easiest way to make a woofer respond to very low frequencies is to make the moving parts quite heavy. This lowers the natural resonance frequency of the woofer which is important, because in a conventional woofer all the useful response is above the resonance. Unfortunately this makes the woofer slow. The lighter moving components of the midrange and tweeter parts allows them to respond quickly. The result is that the group delay is not uniform. The bass is now out-of-time with the rest and the result is that it seems inarticulate and sluggish, the opposite of fast.

In our FastWoofer approach we take advantage of modern technology which allows the woofer transducers to be optimized for speed and then equalized for the desired frequency response. This permits a vast reduction in group delay distortion and restores the correct harmonic rhythm of the music. You tap your toe.

- OTHER ELEMENTS AND MUSIC

The earliest parts of the attack are reproduced by the midrange and tweeter, so they have to be fast too.

The tweeter is the biggest problem. The reproduction of high frequencies requires very quick motions. So quick that a tweeter dome which weighs only a few grams is like pushing a rock. Our patented, proprietary Leading Edge Transducer (LET) does not try to push a rock. Instead it works more like the cracking of a whip. Instead of moving the mass of the entire diaphragm, we simply launch a bending wave motion in a film which is shaped for the best coupling to the air. The manufacture of such a transducer is not simple, so it is rarely done; but we do it.

The midrange driver is the heart of the system. Most of what you hear comes from the midrange driver. This is a cone type loudspeaker which is superficially like many others. The performance objectives we have set are different from what is usual. We want accuracy of timbre, which requires great speed. This leads to unusual cone material, a very high-force magnetic system and so forth. All the pieces and parts are known "in the art" but the complete recipe is what accomplishes our objective.

The glue which binds the system together is the crossover which not only divides the frequencies and directs them to the appropriate speaker, but also preserves the time relationships. This conforms to our objective of uniform group delay.

- BOXES

The enclosure of a loudspeaker system is much more than just a box to hold all the parts. The shape of the box affects how the sound is radiated into the room. The size of the box should be as small as possible so it doesn't "get in the way of itself" acoustically. The quality of construction and selection of materials governs whether the box adds a "voice" of its own (which we certainly don't want).

So we address all these considerations and others through the use of proprietary damping materials, adhesives, precision machining (yes, machining), geometry and material selection.

- ONLY FROM HIGH EMOTION AUDIO

All of these elements are uniquely ours. We design and manufacture all our drivers, enclosures and crossover networks. You won't find them anywhere else. Most speaker system manufacturers use off-the-shelf drivers, or slightly modified ones. Their designs are therefore constrained in ways ours are not. You can hear the difference.