

Enhancing Low-frequency Musical Articulation in a Room Using Electronic Bass Trap

A small room is used to evaluate how DEICON's patent pending active acoustic damping technology, called '**electronic bass trap**' enhances low-frequency musical articulation in that room. The rectangular room has a dominant coloration due to the 32 Hz standing wave that shapes up along its length. Electronic bass trap is used to add damping to the first low frequency acoustic standing wave, i.e., the 32 Hz mode, of the room. Figure 1 shows the frequency response functions of the room without and with the electronic bass trap

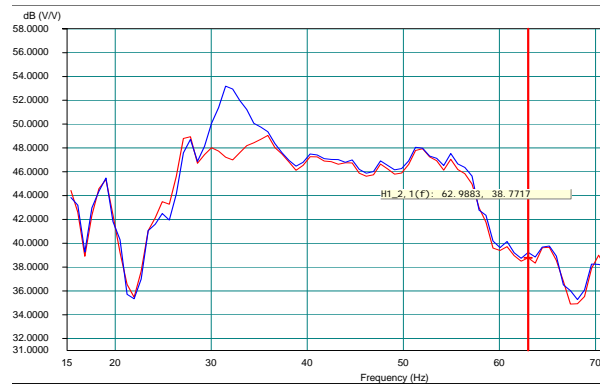


Figure 1 frequency response functions of the room without and with the electronic bass trap

In the musical articulation test performed in the small room equipped with DEICON's electronic bass trap, 11 bursts of sinusoids covering the frequency range of 29-40 Hz with the frequency increment of 1 Hz are used to excite the room. The reason for the choice of this limited frequency range is that the first standing wave of the room, the one targeted for damping, lies in this frequency range. The duration of each burst is 0.5 sec followed by 0.5 sec of silence with the total test duration of 11 sec. Provisions are made to be able to turn the electronic bass trap on or off and thus add damping to (by turning the system on) or not modify the acoustics of room (by turning the system off).

Musical articulation test, developed by Acoustic Sciences Corp (http://www.asc-hifi.com/about_asc.htm) is commonly used to evaluate the articulation of a listening room (or an studio). The test is done by recording the playback of a carefully selected set of tones designed to evaluate the way in which a loudspeaker or an acoustic treatment system performs in a listening

Figures 2 shows the recording of the signal with the electronic bass trap 'off', the blue trace, and 'on', the red trace, indicating that the addition of active acoustic damping (bass trap on) makes the pressure at the frequencies in the vicinity of the first acoustic mode (the one targeted for damping), not to linger in the room; note that the ringing of the pressure with the bass trap on is by far less than that with the bass trap off.

Clearly the active bass trap has smoothed out the uniformity of level, as well as improved the articulation in this 30 to 40 Hz range. The articulation is evidenced by the increased clarity of tone bursts, i.e., less ringing when each burst is turned off.

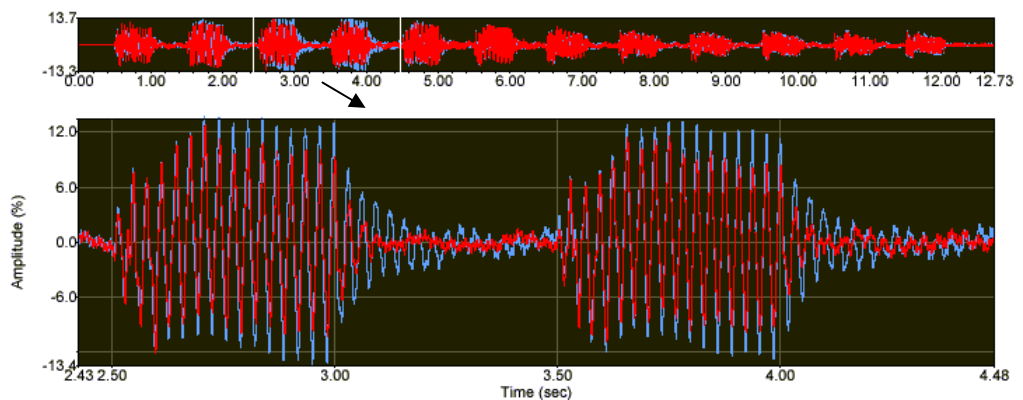


Figure 2 Pressure at the room corner with the controller off (blue) and on (red)