



ACOUSTOLOGY 01/2004

by Jeff D. Szymanski, Chief Engineer

This month: *Low Frequency Devices (“Bass Traps”), Part 3 – “Mega-“ Bass Traps and other low frequency control methods, techniques and tips.*

So this should be the last installment for a while on the topic of low frequency control. New stuff always comes up, so I’m sure we’ll be revisiting in the future.

“Mega” Traps

We offer two “super sized” bass traps: *MegaLENRDs*® and *MegaMAX-Wall*™. Each has its good points. The only major drawback to either of them is their size: It may simply be impossible to fit them in your room. Both are great at absorbing down to the 30 to 40 Hz range.

MegaLENRDs

The size of a normal LENRD® is 24” high and 12” deep along each flat edge. The MegaLENRDs are the same height – 24” – but are 24” deep along each flat edge. If you have room to stack them, it’s the easiest way to use them in your room. Gluing them can be quite challenging. We had one customer who built shelves in each corner on which he stacked the MegaLENRDs.

As for their effectiveness at low frequencies, we had a unique opportunity at Klipsch’s corporate HQ in Indianapolis to test stacks of MegaLENRDs spaced at different distances from the vertical corners of a room. The results were telling: [click here](#) to go to the case study PDF on our website.

MegaMAX-Wall

Standard MAX-Wall™ panels are 20” high, 48” wide (with end pieces in place) and roughly 4.25” thick. MegaMAX-Wall panels are 24” high, 48” wide and about 8.5” thick. They have no end pieces. They are probably the most versatile low frequency absorber available. By placing them in different parts of a room, you have the ability to target specific axial mode problems in the room. Some experimentation is usually required. I.e., it is best to move the MegaMAX-Walls around the room until you find where they help you the most.

I have used MegaMAX-Walls when mixing. I have a small room I use for a “studio” at home that’s roughly 11’x10’x8’. I have a nasty front-to-back axial mode at around 110 Hz. (The “A” string on a guitar.) When I placed MegaMAX-Wall roughly halfway between where I sit and the rear wall, I was able to cut the offending build-up by about 10 dB. This made mixing songs with heavy acoustic guitar sections much more tolerable, not to mention more accurate.

Other Low Frequency Control Techniques, Devices, etc.

Airspaces

Want to increase the low frequency control of your 2” Studiofoam? Easy. (If you haven’t already treated your room.) Simply follow this procedure:

1. Place 1” furring strips (usually “1x1’s” or “1x2’s”) on the walls spaced so that your Studiofoam panels will fit over them.
2. (Optional) Glue the Studiofoam to a thin backing panel. Masonite, pegboard, thin plywood, even posterboard.
3. Whether or not the optional backing is used, mount the Studiofoam over the furring strips.

The added airspace behind the Studiofoam will increase the low frequency absorption. The same technique can be used whether you’re using 2” Wedges, 4” Pyramids, your own fabric-wrapped glass fiber panels, whatever. (There is even a

World-Class Acoustic Products • Consultation • Facility Design



competing manufacturer out there now that sells “traps” that are nothing more than 3” or 4” thick absorber panels that they instruct you to space 3” or 4” off the wall. Talk about marketing!)

Resonators and Diaphragmatics and Couches...Oh My?

There are several other ways to control low frequencies. Up to now, we have been talking about *passive* low frequency devices. In other words, they are not tuned to any specific frequency. There are two types of *tuned* devices:

1. *Helmholtz resonators*. The simplest example of a Helmholtz device is a cola bottle. By carefully blowing into the opening, you can hear a tone being generated. If you have enough of these types of devices in a room, they will actually absorb that frequency. Now, if you imagine a huge cola bottle, you can imagine a device tuned for lower frequencies. The problems with these devices are as follows:
 - a. To absorb more than a single tone, they are often filled partially with sound absorbing material. This has the effect of widening the range of frequencies that are absorbed, but the actual absorption coefficient decreases across this range.
 - b. Based on this decrease in what is already a fairly low absorption coefficient, many of these devices are usually required to make any sort of difference in the room. So many, in fact, that it is not likely you will have the space for them.
2. *Diaphragmatic absorbers* (aka, “panel” or “membrane” absorbers). These devices are based on the acoustic principle that a fixed membrane over an air space will resonate at a certain frequency. Usually, a frame is built and a panel such as plywood is rigidly affixed to the frame. This device will resonate like a drum. By themselves, these devices are nothing special. Gypsum wallboard (“drywall”) over studs has much the same effect. However, fill the airspace with sound absorbing material and – unlike the Helmholtz resonators – the frequency range will decrease and the absorption will increase. Unfortunately, this tuning is a very tricky process. Many prefabricated devices will not work as intended. (This statement is based on an independent study of LF devices, the details of which are available in [AES Preprint](#) number 5944 entitled *Low Frequency Absorbers – Applications and Comparisons* by Dirk Noy. If you are not a member of AES, this document will cost you \$10. For members, it is \$5.) Most devices you build yourself will have to be tuned throughout the construction process to ensure nothing goes awry. This is because dramatic changes can occur with the design frequencies with as little as 1/64” variation in the thickness of the panel or the airspace.
3. *Stuff*. That’s right, “stuff”! Check this out: Couches can be fairly decent LF control devices. For an informal study of couches as treatment, [click here](#). Other “stuff” can include:
 - a. Large pieces of furniture. Items would have to be large enough to break up low frequency waves – i.e., a desk chair is *not* a bass trap.
 - b. Open closet doors. This only works when the closet is filled with clothes or other “soft stuff.”
 - c. A large open window or sliding glass door. This is, of course, challenging if you live anywhere north of Miami.

All of these Acoustology installments on low frequency control should help you make some very well-educated decisions concerning treatment. I would encourage you to [contact us](#) any time if you would like to discuss your LF alternatives. We answer *all* our e-mail.

I will leave you all with one final preview: Auralex will be debuting many new products in 2004. Among them will be some fantastic low frequency devices and packages. So stay tuned – we haven’t forgotten about your low end and neither should you!!!

Next month: *What’s that noise?*

World-Class Acoustic Products • Consultation • Facility Design