



ACOUSTOLOGY 10/2003

by Jeff D. Szymanski, Chief Engineer

This month: *Low Frequency Devices ("Bass Traps"), Part 1 – LENRDs*

Hello again, folks! I have been under the gun for this month's installment. Between the *AES Show* in New York and several other rather extended trips around the country, I am sad to say that this installment will be somewhat short. But that doesn't mean it won't be very, very helpful!

Having gone through a good chunk of the science behind low frequency behavior in small rooms, I feel it's about time to move on to some specific product application stuff. (Translation: If I don't start mentioning *Auralex* products, the people writing my paycheck might get a little perturbed! :-)

So, I am going to start with *LENRDs*. If you haven't heard of *LENRDs* by now, where exactly have you been? Just in case you've been in the proverbial hole in the ground, here are some *LENRD* facts:

- LENRD[®] is the original acoustical foam "bass trap."
- LENRD is designed specifically to be installed in room corners.
- LENRDs work in any corner: wall/wall, wall/ceiling and even wall/floor. (More on good placement shortly.)
- LENRD is an acronym for "Low-End Node Reduction Device." As is mentioned in our literature, this is a slight misnomer, but the marketing people love it. (In fact, the LENRD name was debated on one of the pro audio online discussion groups not too long ago. Some great comments came out of it and we thank Auralex users for their unsolicited comments and advice!)
- The design of the LENRD makes it the best performing acoustical foam corner "trap" on the market. Nothing else comes close. (Not even our own designer-LENRDs have quite matched the Original LENRD's fantastic performance!)
- The frequency range where LENRDs are most effective when placed in corners is from 75-80 Hz to about 200-300 Hz.
- The LENRD is a passive, broadband device. This means it is not tuned to any specific range of frequencies.
- Finally, LENRDs are the place to start if you are considering acoustical treatments, but have limited funds.

LENRDs work by absorbing the low frequency energy build-up in the corners of the room. This is especially effective with the numerous tangential modes and some of the higher order axial modes. Once that energy is

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absorbed, the cancellations and build-ups in other parts of the room are smoothed out. The end result is a smoother, flatter, truer bass response at the mixing, listening, or microphone position(s).

So where should you put them? Well, we have often said that no amount of “bass trapping” can be considered “too much.” If you were to “trap” each and every corner in the room with LENRDs, you would only be treating roughly 15% to 20% of the room. This is actually our minimum coverage for most small rooms. This also would produce the best possible low frequency response in the room down to roughly 75 Hz.

But where should you start if you’re short on cash? Well, we normally suggest starting in wall/wall corners at the ceiling and working down to or slightly past ear level. Why? Because:

1. The largest low frequency problems will occur in the top corners of the room where there is (usually) nothing to otherwise break up the sound – like couches, equipment, etc.
2. Working down or slightly past ear level keeps treatment in the lateral listening plane. This listening plane is a key area to treat due to psychoacoustic phenomena that I might go into in a future installment. 😊

The above both lend themselves to getting the most “bang for your buck.” Obviously, should you be advantageous enough to “trap” each and every corner, by all means! But most of us do not. Personally, I have eight bass traps spread around in wall/wall and wall/ceiling corners in my 11’x10’x8’ room. I basically have them placed wherever I can fit them. This gets me great control down to around 80 Hz or so. Only my most critical recording or mixing requires any additional low frequency help.

To end, I will elaborate a little on this whole “75 or 80 Hz” thing. The size, shape and foam composition of LENRDs allow it to work well down to this “cutoff.” This is appropriate for most applications where:

- a. Listening or mixing is performed on a decent set of “bookshelf” size reference loudspeakers. These types of loudspeakers usually have a good response down into the LENRD range, but typically do not have much to offer any lower than that.
- b. Recording of most acoustic instruments and vocals will not require treatment below about 80 Hz or so.
- c. Recording of amplifiers – while the devices can produce frequencies below 80 Hz – are usually close-miked. This means that – on a budget – you should be able to experiment with the placement of the cabinet or amp and associated microphone around different parts of the room to get the best recorded low frequency content. Unless you have plans (and money) for larger low frequency devices, this is still the best approach for getting good recordings between 40 and 80 Hz.

Next month: *“I’m your Venus...”*

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8851 Hague Road • Indianapolis IN 46256-1284 • 317.842.2600 • Fax: 317.842.2760 • 1.800.95.WEDGE • Website: www.auralex.com • Email: auralex@auralex.com