

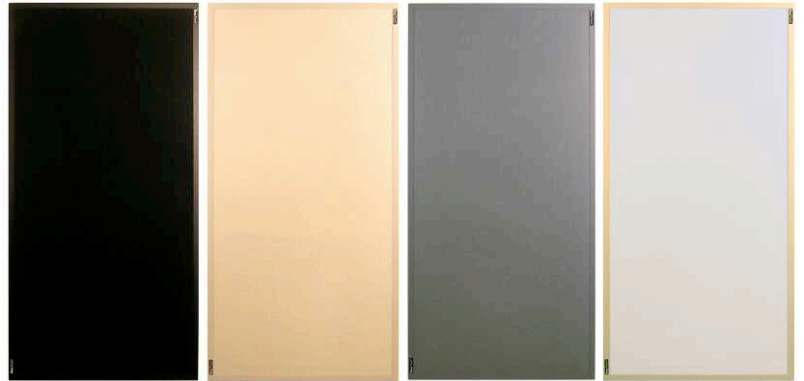
Affordable\$\$Audio

Issue Fourteen: February 2007

They're Invisible! Real Traps Room Acoustic Treatments By Warner

You cannot see what affects the sound of your system more than any amp, preamp, dac or cable, yet can do serious damage to even the most expensive audio system. Most people don't give them a second thought and until the last four years the audio press has given them little attention. Room acoustics have a profound effect on a recording and the sound quality of your system.

Imagine allowing a five year old child to randomly adjust a graphic equalizer in your system for you. That's what your room acoustics do to your sound. The average room has peaks of 6-8db and nulls of 25-30db. As a matter of fact a child couldn't do as much damage to your sound with a 12 band graphic equalizer as your room most likely does.



Sound waves travel in lengths. For example a 20hz wave length is 60' long, a 1khz wave length is 1.12' long and at 10khz is 0.1125'. If you have walls, you have acoustic problems. The worst problems are in the bass range due to the long wavelengths. The dimensions of your room will determine at what frequencies the problems occur. You may download modecalc for Windows on the RealTraps site to find where your problems are in your room. Here is the link:

<http://www.realtraps.com/modecalc.htm>

Modal ringing as well as large peaks and dips in the bass region can be effectively dealt with. If you add bass traps to absorb bass in your room you will end up with cleaner, tighter bass as well as extra clarity in the midrange. For example many rooms have an 8' ceiling. This dimension is half a wave length of 70hz. That's why many rooms have a boom here.

The bass sound bounces back and forth augmenting itself creating an unnatural peak. This also works the other way, sound waves can bounce into each other and cancel themselves out to one degree or another depending on where you're at in the room. This is why some bass notes sound weak and others sound boomy. Now you end up with a lot of bass with little articulation or definition. What's worse is that the midrange is muddied by this problem. I suspect most of us thought the sound we hear from our systems as normal until we hear how much better it should sound.

Recently I received an email from a friend and will quote exactly an excerpt:

“Room treatments on the other hand were huge. I have 14 XYZ panels in the room now and the improvements were easy to hear, mostly in the bass. Where I really had none at all, it is pretty damn good now. The room has no slap echo now and I am sure that tightened up the soundstage and also helped tame the high frequencies also. If I had the time and energy to do it, it would be interesting to pull all the panels out of the room to help remember what it sounded like before.

The panels cost me probably about the same as what I spent on the XYZ cables, so it's pretty easy to say which one made the biggest difference for me.”

The reason I bring this up is three fold. One had been because he had “no bass”. Two because it ended up taking 14 panels to get great bass. The third reason because this person went through a lot of equipment trying to get bass in his room.

There is a lot of talk on the internet forums on fixing sonic problems. Many will suggest a different amp or cable, neither of which will make much difference because the problem had been the persons room, not their equipment. Most people are shocked the first time they measure their room and seeing an amplitude variation that is huge. Fortunately it's normal and can be remedied to a substantial degree.

My friend didn't want to spend much money and therefore didn't buy quality traps. He started with 4, heard how much that helped and kept adding more. Btw he has a very highly regarded sub that cost 2k. Many people think that absorbing bass would make it weaker when the opposite is true. Bass waves cancel themselves out due to the reflections in your room. Remember: Reflections were NOT on the recording and are the source of huge sonic aberrations.

You get what you pay for. I've seen these foam pieces called bass traps and they're worthless at bass frequencies. This has been measured. In my opinion RealTraps has possibly the best traps for the money. They're certainly excellent as owners of many world class recording studios use them. Here you can see a room measured with and without bass traps:

As you can see the room with effective bass traps has a much smoother and controlled response. Please note the mountains come forward with over time. The narrowness of the peaks without the traps makes the peaks even more damaging, and contributes to the effect commonly known as “one note bass.” The improvements you will hear as a dramatic increase in bass quality and quantity making for a much more accurate reproduction of the recording. Bass traps will also eliminate modal ringing which makes the bass note hang due to the long decay time.

As I stated earlier reflections were not on the recording. First reflections will also blur the image due to the time it takes them to get to your ear compared to the direct sound from your speakers. To improve imaging damping first reflection points at both sides as well as the ceiling and floor will sharpen the soundstage. The reason is because your brain will combine the later reflected signal with the direct signal blurring the image. The reflections create a set of peaks and nulls which are highly position dependent causing comb filtering. The response is different for each ear further causing a loss of left right balance.

If you're like me you want the best sound quality for your money. Let me assure you that your room acoustics are almost as important as your speakers. Tests have been conducted where the room acoustics proved to make more difference than changing speakers! Trying different electronics or cables cannot make the huge improvements room treatments and bass traps do. Where would you rather spend your money?

I find it an injustice that this subject has garnered so little attention considering the impact of the sound quality. Room acoustics should be the first priority in setting up a system if at all possible. Cables should be considered last. The cost for traps and treatments are a bargain for the improvement in sound quality you receive.

The improvements are audible and measureable. You don't need to do a DBT when the audibility is obvious. By just adding a minimum of two bass traps, preferably in corners, and treating first reflection points your system will reach another level of quality you probably didn't think had been possible. We can and will take room acoustics further. A system in a good acoustic environment that costs 2k will sound better than a 10k system in the typical room!

We'll delve into room acoustics more in depth next month. In the meantime for those interested you can find a gold mine of information, DIY trap designs as well as videos at Ethan Winer's RealTraps site. Another excellent site for DIY types with good pictures of various bass trap designs is: <http://home.comcast.net/~thomasw-2/SubwooferSetupandEQpage9.html>.

My greatest thanks must go to Ethan Winer of RealTraps. He has donated his time to help with this article. Ethan regularly takes his time to help numerous people with acoustic problems on the internet at no charge and must be commended for his effort. Thanks must go to Thomas of Htguide.com for his DIY traps site as well as the help he gives DIYers at Htguide.com. Finally thanks to Scott of Obsession Audio who can design plans to give your room WAF friendly quality acoustics treatments and traps.

Finally I'd like to invite audiophiles from the Portland/Vancouver area to my home to hear how a well treated room will make your speakers sound. If your speakers are portable and you're curious how good acoustics would benefit you you're welcome to email me for a time to come over. You're welcome to bring any other gear as my system is easy to make swaps in. If you've never heard how much a good acoustical environment affects the sound presentation of your system you're in for a treat!

Thanks for reading

Copyright 2007 Affordable\$\$Audio www.affordableaudio.org. Used by permission.