“Home Studio Acoustical Treatments on a Budget” by Gavin Haverstick

Digital technology in the recording industry has evolved and expanded greatly over the years, allowing high quality/low cost recording gear to be widely available to the general public. Due to this fact, hundreds of home studios are either being converted from existing bedrooms, dens and basements or constructed as a separate room of a home. Hobbyists and part-time musicians that typically do not have the advantage of a large recording budget operate the majority of these studios.

Along with digital equipment, acoustical treatment has become more affordable over the years giving many musicians the opportunity to write, record and produce ideas, demos, and even entire albums in the comfort of their own home without having to sacrifice acoustical quality along the way. Acoustical treatment such as absorption, diffusion and bass trapping are often implemented to reduce the effects of issues such as flutter echo, excessive reverberation and bass build-up, among others.

The purpose of this article is to highlight the issues and challenges faced by hobbyist and professional musician alike in creating a home studio on a limited budget. We have selected five Auralex customers and asked them to offer their opinions of the acoustical treatment suggested through our **Personalized Product Application Support** Service. Quotes will be taken from their responses in order to illustrate various points throughout the article. These customers range from hobbyist to full-time musician and each spent between $700 and $1600 on acoustical treatment for their rooms.

When preparing to analyze and thus acoustically treat a studio, many Acoustical Engineers and Consultants will consider the following terms in their analysis process: Impulse Response, Mode Analysis, Bonello Criterion, Comb Filtering, Noise Criterion, Reverberation Time (RT), Initial Time Delay Gap, Time Delay Spectrometry (TDS), Fast Fourier Transform (FFT), Maximum Length Sequence (MLS), Haas Effect, and Harmonic Distortion among numerous others. All of these terms can be quantified, defined or implemented in measurements and theory in order to reach the desired goal of creating a room that meets the customer’s acoustical needs. As with any job, the customer’s goals can vary from project to project and thus as Auralex Application Specialists, we must be flexible enough to be able to tailor each specific situation and desired result.

Those who do not understand the technical side of acoustics often refer to acoustics as a myth or “black magic”. It is often difficult to understand something that cannot be seen, and acoustics is no different.

> **“Acoustical treatment is not something that you can put your hands on and work with, such as a reverb unit. It is, however, the single most important aspect of any room – bar none!”**
>
> - **Scott Wilson, Part-Time Musician**

Scott makes a very valid point – there are no knobs or buttons on acoustical treatment panels in order to adjust the “gain” or “attack” between “takes”. Acoustics is based on physics and even though technology has changed vastly over the years, the fundamentals of acoustics do not change - the speed of sound is still approximately 1,130 feet per second at normal temperature and air pressure, whether you are using a $5.00 or $5,000.00 microphone.

There are many resources and websites available for the public to educate themselves on the topic of acoustics and much progress has been made in recent years. The fact still remains that many people do not realize they need acoustical treatment until A) someone tells them that they do or B) they experience the benefits of an acoustically treated environment for themselves.

> **"I couldn't have articulated the problems very well before I installed the treatment. I would have said that the sound was somewhat indistinct and muddy. It sounded like the room sound was being run through a bad reverb algorithm. I really didn't know what a good room sounded like."**
>
> **- Tom Wilhelm, Hobbyist**

There is a very fine line that we as Auralex Application Specialists must walk when trying to merge the technical side of acoustics with the highly subjective nature of sound itself. Often times we must translate acoustic theory and calculations in to terms that can be understood by the average home studio musician. This is not to say that home studio musicians are unable to understand the technical side of acoustics, but Auralex Acoustics exists because musicians would rather focus their time and energy on creating in the form of songwriting, rehearsing, recording and producing, and leave the acoustic design to us.

We all know that audio is a largely subjective topic. One microphone can be revered by one musician and despised by another. Room acoustics is no different. This subjective trend in audio is translated throughout the entire creative process. The manufacturer of musical equipment will make subjective decisions of what materials, shapes, sizes, and colors are put into the design of a guitar, keyboard, processor, etc. Each music store then subjectively decides upon which lines to carry in their store and offer to the songwriter who makes a subjective decision when purchasing his/her gear. Once the song is written (utilizing once more subjective decisions of chords, melodies and rhythms), other musicians, each with their own opinion of how the song should sound, are brought in for the recording process. The producer also has to make decisions based on experience and opinions. Once the final product is sent to a record company or label, decisions are made regarding which bands to sign, what singles to release, what image and sound they feel the public wants, etc. To some extent, the media, such as radio and television programs, further narrows the possibilities that will eventually reach the general public – and the general public are the ones that offer subjective feedback that will start the process all over again. Needless to say, subjectivity is a huge part of the music business and when treating a room, how the end result sounds subjectively when finished can often be more important than the measurements and numbers.

We at Auralex have a tendency to focus on equations and theories, when many musicians make decisions based on terms such as: Warmth, Clarity, Brilliance, Definition, Resonance, Intimacy, Boominess, Balance, Liveness, Sonority, Reverberence, Shimmering, Fullness of Tone, and Blend, to name a few. These subjective terms are often used by musicians to describe various acoustical issues and/or desired results. At Auralex, it is easy to relate to these terms and have an understanding of what these subjective terms mean due to the fact that the majority of us at Auralex are musicians ourselves. However, how does this relate to acoustics in an analytical sense? How do you objectively measure things such as shimmering and intimacy? There is not a measurement tool in the world that will plot "Brilliance vs. Boominess" on a graph. These are unit-less terms and thus cannot be entered into a spreadsheet or acoustical modeling software. For this reason, in order to truly

serve the general public, we must set subjective goals and achieve these goals in the technical realm.

Not only will acoustical treatment improve the sound quality of your room, but it will most likely save you time, which can often be even more valuable for extremely busy studios or even the hobbyist who does not have a lot of time to devote to his/her craft. Whether it is time saved during microphone placement, mixing or mastering, acoustical treatment will pay for itself in a matter of months if not days.

> **"I am drastically more confident and faster because I know what the mix sounds like the first time around instead of burning CDs, listening to them on other systems, making notes, going back to the studio to make changes, burn another CD, and repeating myself over and over until I am satisfied."**
>
> **- Phil Bright, Part-time Musician**

Acoustical Treatment can often result in the best "bang for your buck" when it comes to studio upgrades. Treatment will often be less expensive than a new top of the line condenser microphone, upgrading your monitors, or purchasing a new instrument, yet acoustical treatment can yield an even greater improvement to one's studio. Also, acoustical treatment can make these other upgrades sound the way they are meant to be heard.

> **"The investment that I made for acoustic treatment was less money than many other purchases that I've made to improve my sound. However, the acoustic treatment made the other purchases sound their best."**
>
> **- Tom Wilhelm, Hobbyist**

Auralex strives to continually educate the public on the importance of acoustics – both subjectively and technically. Visit the Auralex family of websites to further your knowledge of the intriguing and rewarding topic of acoustics. Also, the "Book Referral" page will give you other sources of valuable information.

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