Making Over a Home Studio Space

How to use acoustic materials to turn a spare room into a mix room

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We all love our toys, but one aspect of the studio that often gets overlooked is the room itself. Your listening environment influences every decision you make about recording and mixing, from how much low end the kick drum needs to how loud the tambourine should be in the chorus. Sadly, many people ignore this fact of life: The room is the most important component in the monitoring chain.

The *Electronic Musician* editors challenged me to a duel, posing the question: How would you turn a spare room into a usable mix room? Lucky for me, they said "mix room" and not "live recording room." Creating a space for recording live instruments would mean serious construction and materials to ensure that the neighbors wouldn't be calling the cops.

A mix room, however, doesn't necessarily require that sort of isolation between internal and external sound, provided you don't plan to monitor at excessive SPLs, and that your neighbors don't have a thrash metal band in their living room. A mix environment does require thoughtful placement of speakers, the listening position, and room treatment. Don't confuse room treatment with isolation. Room treatment addresses the way sound behaves *inside* a room; it does not affect the isolation of sound.

The *Electronic Musician* editors know about my collection of Star Wars action figures, and the spare room where they live. This will be the mix room. The spare room is rectangular, 14 feet, 2 inches long x 11 feet, 9 inches wide, with a ceiling height of 7 feet 9.25 inches. Without making your eyes glaze over, I'll just note that this is fairly good geometry. We want to avoid rooms that are cubes, or where one or two dimensions are the multiple of another (for example, 10x20x10 feet).

Figure 1 shows the empty room and Figure 2 shows placement of some of the gear. You'll see two large windows on one side, and hard surfaces all around. The entire "wall" behind the mixing position is a closet with mirrored doors. Don't blame me—they were there when I moved in. Monitors are a pair of Focal Alpha 80s, and while the speakers are capable of sounding very good, the room is not. There are tons of reflections and —in spite of the room's small size—I measured a reverb time in the vicinity of 1.3 seconds. It's tough to hear what the speakers are producing because you hear *way* too much room. Raising the volume of the speakers makes matters worse.

Room treatments to the rescue! We turned to our friends at GIK Acoustics (gikacoustics.com) to help us tame this beast. The folks at GIK made suggestions for speaker placement as well as for the type and quantity of treatment that would help improve the sound of the room.

FINDING THE SWEET SPOT

Generally, your listening position should be centered between the side walls, roughly 38 percent of the room's depth from the front wall (the front

Fig. 1. The blank canvas, with many reflective surfaces.

Fig. 2. Gear is placed in the room. The monitors are Focal Alpha 80s.

Fig. 3. Room treatments from GIK Acoustics are brought in to help tame the reflections.

Fig. 4. Placing GIK 244 bass traps behind the speakers cleans up our low mids a great deal.

defined as where the speakers will be placed). In this case, that's about 65 inches. We want to avoid placing the listening position in the middle of the room because that's where room 'modes' tend to be more pronounced (see "In Treatment" below). The speakers and listening position should form an equilateral triangle, with the apex about a foot behind your head. If you have access to an RTA (real-time analyzer), make measurements at the listening position. (One affordable acoustic analysis program is the FuzzMeasure tool ($99), available at supermegaultragroovy.com/products/fuzzmeasure/). Make additional measurements closer to and farther from the speakers in increments of six inches. Observe if the frequency response changes for the better; you want to listen at the spot where the response is flattest. If you don't have access to an RTA, use your ears: Listen to familiar recordings for balance across the spectrum, with no frequency range emphasized.

IN TREATMENT

Every room has fundamental acoustic issues and they typically start in the corners where low-frequency sounds collect. When the wavelength of a sound coincides with a room dimension, a "room mode" or resonance develops and there will be peaks and dips in the volume of that frequency at certain locations in the room. If you happen to be sitting in one of those areas, you will misjudge the balance of your mix. This problem is pronounced where two boundaries meet (like a wall and the floor) and even worse where three boundaries meet (e.g. two walls and a ceiling).

It's probably not an exaggeration to say that *all* corners require treatment. In this room, I started with six of GIK's Tri-Trap Corner Bass Traps (47 high x 23.5 wide x 16.5 inches deep). The front corners of the room are critical; in Figure 3, you'll see two Tri-Traps, one atop the other in each corner (just made it under the ceiling!). Behind the listening position we have one Tri-Trap in each corner; eventually we'll stack two more as per the front. The Tri-Traps target absorption in the low end but also provide absorption up to 5,000 Hz so that the room's frequency response is not skewed toward the high end.

The next issue is dealing with early reflections from nearby boundaries that smear the stereo image and hinder our ability to judge ambient content. They also cause comb filtering because the

reflections can be out of phase with the direct sound. We don't quite want each ear hearing *only* its respective speaker (that's a bit unnatural, sort of like listening on headphones), but we want to greatly reduce the "crosstalk" by creating a reflection-free zone (RFZ) at the listening position.

To accomplish this, we need treatment for the side walls and ceiling. Side wall treatments are GIK's 2-inch FreeStand Acoustic Panels, 24 wide x 60 high x 2 inches deep. They have feet, making it easy to adjust their location. Where to place them? Use the age-old trick: Get a friend and a mirror. Sit at the listening position while your friend slides the mirror along the side wall. When you see the reflection of a speaker in the mirror, mark the wall using a black Sharpie. (Your spouse will love that.) Basically, you need to place panels anywhere you can see the reflection of either speaker from the listening position. In Figure 3, you can see four 2-inch FreeStands, two on either side of the listening area. Note that they rise higher then the top of the speakers.

Tape the mirror to a broomstick and use the same technique to place ceiling treatment. In this room, I needed at least two of GIK's 244 Bass Traps with FlexRange Technology mounted as a "cloud" above the listening position. This will be part of phase two: The old tile ceiling won't support the Clouds, plus the ceiling fan's gotta go, so we'll be putting in a new ceiling. But in the interim, GIK suggested we place the 244s directly behind the speakers (see photo 4), with the speakers as close to the wall as possible.

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This made a huge improvement in the low-mids, cleaning them up considerably.

Two GIK 4-inch FreeStand Bass Traps behind the listening position kill the reflections from those pesky mirrored doors (no friend required this time. I knew those ugly mirrors would come in handy!). An option down the line is to add two more 4" FreeStands, or frame out the closet, fill it with insulation, and turn it into a giant bass trap.

THE SOUNDS OF SILENCE

Here's an oxymoron for you: With the room treated, I can now hear the silence in my recordings and mixes. I can hear when instruments and voices *stop* sounding because the room reflections no longer unnaturally extend the decay time of recorded sounds (particularly in the low end).

Treating the room made numerous other improvements: Previously, the room suffered from "one-note bass," but now it's easy to hear pitch in bass and bass synths. RTA measurements made before and after treatment show improvements in the frequency response, notably at 63, 80, and 100 Hz (13, 9, and 7 dB flatter, respectively). Stereo imaging is greatly improved—when an instrument is panned, its location is clearly defined, and the center image is rock-stable. Making decisions regarding reverb and delays is easier, and translates to other systems with consistency. Dynamics have more impact, and the overall listening quality is heads and tails above the non-treated room. ■