



Case Study: GBT Studios

Auralex Acoustics, Inc. recently provided acoustical consulting services and acoustical treatment products for the new GBT Studios facility near Nashville, Tennessee. Auralex was originally contacted in the Fall of 1999 by the owners—award-winning and chart-topping producer and engineer Brian Tankersley and Mark Miller, lead singer for the multi-platinum *Sawyer Brown*—when the studio was in the planning stages. The Auralex design team reviewed preliminary sketches of the studio layout and made suggestions for small changes. Construction was completed by Danny Parker and Mark Tankersley, who also contributed to much of the design.

1. **Good acoustical separation*** between Recording Stations for effective performances.
2. **Good acoustical separation*** between Recording Stations and the Mix Position for good tracking.
3. **Early reflections and effective bass traps** in the Main Room for precise mixing.

*There cannot be true acoustical isolation between these spaces without walls or other barriers between them.

Auralex was brought on to help minimize any acoustical problems that the design might have. The final layout is shown in **Figure 1**.

The main idea is an open recording/mixing environment in which musicians and engineer can communicate more effectively than in a traditional studio. The need for headphones is minimized through the use of nearfield monitors and digital monitoring

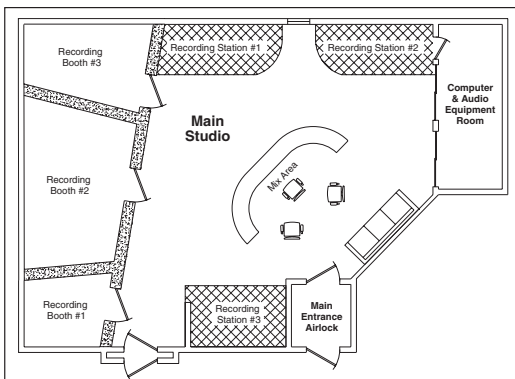


Figure 1: GBT Studios Layout

Acoustical Isolation

The isolation of the room took on various forms. Isolation from the outside world was aided by the fact the site is remote – located roughly 30 miles outside Nashville city limits. Therefore, bothering neighbors was a non-issue, as were problems associated with highway noise and air traffic. Just to be safe, though, the interior walls between studio rooms were constructed of concrete blocks filled with sand. The interior ceiling is framed more than a foot below the actual roof. The interior walls all have several layers of material over the concrete block, including a layer of **SheetBlok**. The extra layers add mass and stiffness and therefore increase sound transmission loss. The floor is hardwood over slab on grade – the remote site and the stand-alone building negated the need for a “floating” floor. The doors were all purchased from the *Industrial Acoustics Company* (IAC) – a leader in providing soundproof doors. Most audio hardware, including the computer hard drives, was stored behind well-sealed, sliding-glass doors.

The computers are stored in their own Iso-Boxes™ from *Sound Construction and Supply* to further combat hard drive and computer fan noise. These efforts yielded a measured noise floor below NC-15 (see **Figure 2**).

To facilitate the need for isolated drum recording, as well as isolation for amplifiers, etc., three on-site isolation booths were built to accommodate drums, vocals or small instruments and three off-site booths (in an adjacent building) were built to accommodate guitar stacks, Leslie™ amps, etc. The on-site Booths are each treated such that the wall panels are completely movable. A custom aluminum track system was installed and **Studiofoam** panels were mounted in custom aluminum frames (see **Figure 3**). The acoustics in each Booth can be varied to suit the type of recording. The corners are trapped with either **LENRD Bass Traps** or **Sunburst Males**. The ceiling in Booths #1 and #3 are treated with 2”



Figure 3: Customized, Removable Studiofoam Panels

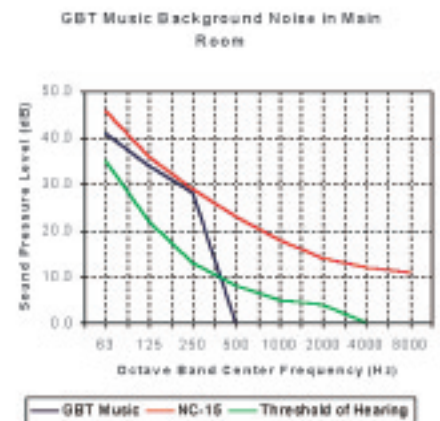


Figure 2: Background Noise in Main Room

Studiofoam Pyramids and the ceiling of Booth #2 is treated with a customized Quadratic Residue Diffusor designed by Auralex. The off-site booths are treated with various materials from Auralex.

The isolation between Recording Stations is excellent. The use of high-quality nearfield monitors with a low level of rear-projected sound, the heavy absorption (**2" Studiofoam Pyramids** and **3" Studiofoam Wedges**) around the Stations and angled partitions between the stations all combine to provide 20+ dB of isolation between the areas. This means that musicians at each station can customize their monitoring mix and not be worried about hearing different mixes from adjacent spaces or from the main mix area.

Acoustical Room Treatments

Auralex proposed various acoustical treatments to be incorporated into the construction of the room to help guarantee minimal acoustical problems



Figure 4: Unfinished Bass Trap above Recording Station

with the completed space. For example, bass traps were built into the Recording Stations. An empty, 12" deep cavity was built above each Station. The cavity was filled about 75% full of fiberglass insulation. The face of the cavity was covered with ported plywood. Acoustically transparent fabric was then stretched over the plywood. **Figure 4** shows the face of one of the bass traps without the black fabric cloth. Three of these large bass traps effectively control the low frequency response in the finished room. The low frequency response of the finished room from 50 to 250 Hz is shown in **Figure 5**.

Brian's intention with the mix position was to be able to move the control desk around until the perfect spot in the room was found. Initial testing before the completion of the room indicated very strong mid and high frequency reflections arriving in the vicinity of the mix position from various flat surfaces in the room, including the ceiling. We used **3" Studiofoam** treatments on the walls and movable, acoustical "clouds" on the ceiling to minimize reflections. The key to the ceiling treatments turned out to be absorption on *both* sides of the panels – **1" Studiofoam** on the side facing the floor (covered with acoustically transparent cloth) and **2" Studiofoam** on the ceiling side. The heavy **2" Studiofoam Pyramid** and **3" Studiofoam Wedge** treatments in the Stations effectively eliminated any late reflections at the mix position.

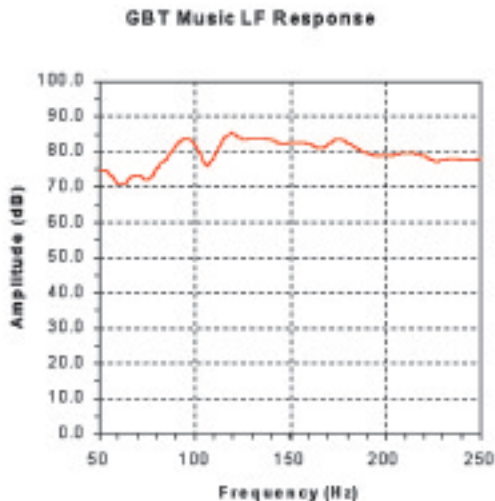


Figure 5: Low Frequency Response in Main Room

The Energy vs. Time measurement from a location approximately at the mix position, after the room was completely treated, is shown in **Figure 6**. There is no "reverb" in the room after roughly 100 ms. While this is contrary to many "dry but not dead" designs currently en vogue, the accuracy of playback cannot really be denied. There is a small reflection off the console early on and a burst of energy around 25 ms from the sliding-glass doors behind and to the right of the mix position. The reflection from the console surface is about 13 dB down and the reflections from the sliding glass doors are more than 25 dB down. Therefore, neither should affect critical listening.

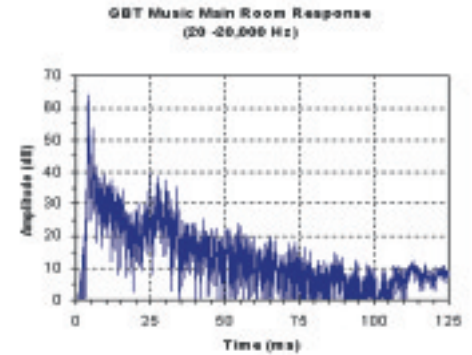


Figure 6: Energy vs. Time from 20 to 20,000 Hz in Main Room

Conclusions

The finished studio is a truly wonderful mixing and tracking environment. Acoustically, the stereo imaging is phenomenal and the "sweet spot" (a.k.a., the "reflection free zone" or "RFZ") is large (Brian commented that you could mix from the couch against the wall behind the mix position if you wanted to). The accuracy of the room allowed Brian to find flaws in some of his reference recordings that had not been apparent in any other room he had ever used. Brian said of the Main Room, "It is, hands down, by a large margin, the best room I have ever mixed in."

GBT Studios is a state-of-the-art facility with all the latest in hard disk and digital recording technology (the custom-built Paris™ system from EMU/Ensoniq™ is the only 128 track, completely hard-disk/CPU based system on the planet!). However, unlike many of the studios being built these days, the design is a throwback to the old days of open recording. Communication between musicians and engineer is maximized. The ability for each musician to control their own monitoring mix aids in maximizing their performances.

The Brian Tankersley / Mark Miller studio design is a new frontier for recording studios around the world and we expect copies of the design to start popping up. Auralex was happy to be a main contributor and looks forward to the many great recordings that are sure to hit the charts from GBT Studios!

For more information about Auralex products and services –

www.auralex.com.

For more information about GBT Studios – 615-377-0226.

For more information about IAC doors and windows –

www.industrialacoustics.com.

For more information about Iso-Box or custom furniture from

Sound Construction and Supply – www.iso-box.com.

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