

Case Study: OVATION

High-End Home Theater Demo Room



Auralex Acoustics provided acoustical treatment products for an authorized Auralex dealer's in a High-End Home Theater Demo Room located in their Residential Design Center. The Auralex team evaluated the condition of the untreated room and determined the following problems would require attention:

- Excessive decay due to hard wall and ceiling surfaces.
- High-frequency flutter echo problems.
- Inconsistent low frequency response.

Measurements

Auralex performed an impulse response measurement in the room. This was determined to be the most useful measurement since it would provide information about the time and frequency domain responses in the room before and after treatment. A 48-second logarithmic sweep from 20 to 20,000 Hz was played through a powered loudspeaker placed at the front of the room.

A microphone placed at a representative listening position was connected through a solid-state preamplifier to record the signal directly into a laptop running Sony Media's Sound Forge program. Using the "Acoustic Mirror" plug-in in Sound Forge, the impulse response is obtained by de-convolving the recorded sweep with the test file.

Having obtained a WAV file of the impulse response, SIA's SMAART Acoustic Tools was used to post-analyze the files. The three main audible problems were easily investigated using the SMAART software:

- Decay time evaluation in octave bands
- Energy-time curves to evaluate flutter echo problems
- Frequency response curves to evaluate low frequency problems.

The process was repeated after treating the room and the results of the above three evaluations were compared.

Treatments

The side and rear walls are structurally finished with gypsum board, as is the ceiling. The ceiling has four (4) large cavities built-in for indirect, ambient lighting. The front wall consists of the screen and main loudspeakers (including the subwoofers) and is largely finished with fabric and wood trim. The floor is carpeted. Five (5) large, leather theater chairs occupy the finished room and no other furnishings are present.

The side and rear walls were treated using the Auralex CFS™ (Custom Fabric System). The CFS treatments consisted of 1" absorption on the front half of the side walls and a mixture of 1" absorption and 1" diffusion on the rear half of the side walls and the rear wall.

The corners were beveled at 45° to accommodate low frequency corner "traps." Seven (7) large columns to accommodate surround loudspeaker, and to otherwise add to the aesthetics of the finished room, were spaced out around the room.

These columns provided ample space for deep low frequency absorption on the walls.

Figure 1 shows the finished room with columns and angled corners.



Figure 1



Results

With a very high-end residential system being used in the room, accurate sound was very important. The above treatments resulted in the minimization of the audible problems encountered in the untreated room.

Figure 2 shows the change in decay (RT_{60}) time. A ideal RT_{60} , along with minimum and maximum range lines is shown. The treated room resulted in a smooth decay curve with an ever-so-slight rise in the low frequencies, which is very desirable for high-end listening rooms. The treatments have tamed the decay in the room to an exceptional degree.

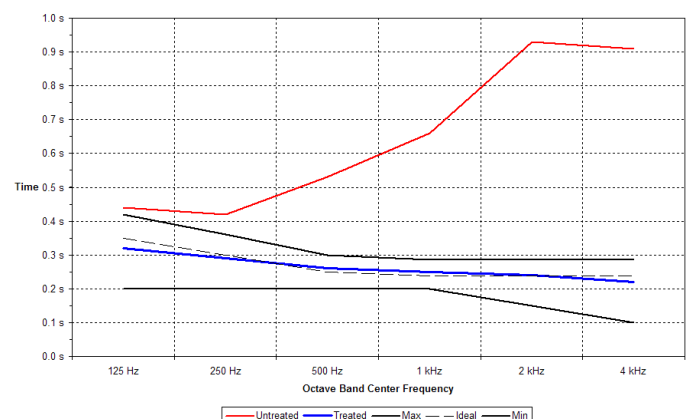


Figure 2