



Audio System Design and Calibration

You wouldn't settle for driving a Ferrari with the engine out of tune and the transmission unable to go into top gear. You wouldn't realize the full performance capabilities your car was designed to deliver.

Home Theatre performance is no different.

The sound we hear in a room is the result of complex interactions between the quality of the electronics, the quality and placement of the loudspeakers, the hearing ability and placement of the listener, the room dimensions, and the acoustical nature of the rooms boundary surfaces and contents.

Consumers and retailers are generally aware that room acoustics play a role in sound quality but rarely give it the attention it needs. Instead, emphasis is placed entirely on the quality of the loudspeakers and the supporting equipment. The room is forgotten. Your listening environment, equipment setup and the fine tuning within this environment has the biggest influence on the sound you here. Often, spending more money on better equipment does not achieve satisfaction and only exposes the acoustic flaws of the listening room even more. This is why spending your money on expensive components without calibration can be a terrible waste of money. **Design and Calibration is not optional; it is an integral part of the sound system.**

Professional Audio system Calibration Summary:

Benefits of Audio calibration

- Optimize speakers, subwoofer(s) and seating positions within the room
- Precision speaker level, delay, polarity, and phase adjustments
- Precision speaker and subwoofer optimization
- Acoustic treatment and electronic parametric tuned solutions
- Achieve smooth response (rooms often distort base response by +/-20dB)
- Experience clarity
- Improve envelopment
- Analyze, locate and reduce ambient noise distortions.
- Documented improvements (before and after calibration reports provided)



What is audio calibration and why do I need it?

Audio calibration is the process of balancing your system's loudness, frequency response, and the interaction between all speakers in the system and the room in which it is contained. If we look at the response of your system, any deviation from a smooth response results in audible distortion. Some distortions are more palatable than others but all are unwanted. The calibration process is designed to eliminate each distortion, ultimately producing an end sonic result faithful to the original recording. The industry has standards that are designed to make sure the product produced in the studio sounds the same in the cinema and in your home theatre. The calibration process ultimately aligns the home theatre with the original post-production room where the sound of the movie was crafted.

Why should I calibrate my system?

No other element of your home audio system can affect performance as much as its acoustical design and proper calibration.

Defining the Calibration process

Step one – Acoustic Design Review (ADR)

The ADR is a simple and relatively inexpensive review of a system based on the standards of the AV industry. The calibrator reviews every relevant element of system in the context of desired acoustical goals. The ADR is designed to make sure the client's expectations of sound quality will be met for a proposed system or how to improve the design of an existing one. The final report is a concise list of recommendations by the calibrator in a graded format called a System Performance Report.

Step Two – The System/Room Analysis and Measurement (SAM)

The System/Room Analysis and Measurement (SAM) is a quantitative measurement of performance. The SAM is performed by the calibrator using a real-time analyzer (RTA) and an Energy Time Analyzer (ETA). A SAM also involves critical listening to judge performance. The analysis is used as an objective review of the actual performance of a system and room. Used in conjunction with the ADR, it is the second half of a complete system review.

Simply put, there is no point searching for acoustical problems in a design without making sure all components are functioning properly and correctly wired and installed. The SAM process is required to properly calibrate the system providing an objective

profile. Before and after system performance is documented in an Acoustic Calibration Report.

Step Three:

After completing the ADR and SAM, if significant changes are required, a further proposal can be created – the Advanced Calibration Plan. This plan, in effect, becomes a new design crafted to reduce or perhaps even eliminate a sonic objection. Basic calibration involves minor adjustments and changes.

Advanced calibration involves larger changes designed to correct room acoustics or equipment shortfalls. We can usually achieve good results with basic calibration techniques despite most common system or room limitations. Given the client's priorities and budget, the Advanced Calibration Plan, designed to tackle larger issues, specifies the cost of any major system redesign or more sophisticated calibration procedures.

Conclusion

The reason anyone buys an audio system is plain enough; we love music and movies. Taking our system to the next level though, can seem like an exercise for the terminally detail-oriented. The truth is many people are not enjoying their sound systems despite the fact that they have high quality gear. Plainly said, the systems do not sound good and in many cases are even annoying to listen to. It is easy to see that most people depend too much on the quality of their audio equipment to provide high-end results without regard for the proper set-up and calibration. The Home Acoustics Alliance has a mission; it is to make every audio buyer aware that proper setup and calibration of audio equipment is essential for good results. This is true despite the perception enabled by many factions in our own AV industry that says the best way to solve a sound problem is to buy more expensive equipment. HAA's alliance of Dealers, Manufacturers, and Consumers aims to teach the science of good sound and bring it home to clients.

Experience Home Theatre is an HAA Level II Certified Dealer Calibrator.