

Optimizing Your Room

The Problem

Simply put, all rooms dramatically alter the sound of any loudspeaker that is used within them, in ways that cannot be anticipated by nor compensated for by the designer of the loudspeaker.

In short, were you to place a “perfect” loudspeaker in any normal domestic living space, it would no longer be perfect. In fact, even the most basic performance measurement (frequency response) is often altered by 20 dB or more, a factor of 100 times. In addition, the many reflections of the speaker’s output off the room’s various surfaces introduce more confusion to the sound, degrading the performance of even the highest-quality systems.

These problems occur across the entire range of audible frequencies, although the worst problems usually occur below approximately 300 Hz. (To give you some perspective, a piano’s middle C is about 262 Hz.)

Historically, people who love music have gone to great lengths to minimize the audible damage their rooms impart on their music. Symphony orchestras have spent fortunes remodeling their concert halls for better acoustics (not always to good effect). Audiophiles have endlessly sought incremental improvements in various components while the largest problem was literally right in front of them: their room. Some of these same audiophiles made their listening rooms look like recording studios in an effort to tame their rooms’ poor acoustics.

Unfortunately, people who were unwilling to turn their living spaces into sonic laboratories have often been forced to live with a lower level of performance — with the result that they often spend less time actually enjoying the gift of music in their lives.

Wisdom Audio and Room Correction

Wisdom Audio has a rich heritage in high performance, no-compromise audio, having designed some of the finest (and most costly) loudspeakers ever sold. Since its inception in 1996, almost all loudspeaker systems sold by Wisdom Audio have included parametric equalization as part of the basic system design, in recognition of the fact that all rooms must be dealt with on some level. No other loudspeaker company has had such a strong and consistent commitment to dealing with the loudspeaker/room interface.

The problem with parametric EQ is that it takes an extremely sophisticated understanding of how both sound and the EQ electronics work in order to optimize the results. It is not as simple as “just making everything flat” on a spectrum analyzer. Consequently, most Wisdom Audio systems were set up and calibrated by factory personnel.

Recent technological advances in acquiring and analyzing high-resolution acoustic information in a home environment have made it possible to achieve even better results, without the necessity of having factory personnel on site. Specifically, beginning with the introduction of our Sage Series, we have chosen Audyssey MultEQ® XT room correction technology for that portion of our system design.

But first, let’s look at a comprehensive approach for achieving the best possible performance in your home.

A Multi-tiered Solution

Choosing Excellent Loudspeakers

There is simply no replacement for a high quality loudspeaker that accurately converts its incoming electrical signal to sound. While there are many things that can be done to minimize the losses caused by the room, you must have something good to start with or the game is largely over before it has begun.

Your dealer can help you in selecting loudspeakers that are appropriate for your room. A site inspection is invaluable to someone with the experience to understand what they are seeing (and hearing). Ideally, the speaker you select should exhibit the following characteristics:

- **Smooth, consistent response.** True, equalization can flatten some of the “bumps in the road.” But the room will often present many challenges all by itself. The speaker should not add to these problems even before you get started.
- **Wide (lateral) dispersion.** This ensures that everyone who is listening hears everything they should hear, even if they are sitting off to one side.
- **Excellent detail.** The ability of the loudspeaker to reproduce subtle details clearly, even during loud or complex passages, is something that is innate to the speaker design. It is either there, or lost before the first note is played. Make sure it is there — it will yield huge dividends in enjoyment for years to come.
- **Superb dynamics.** Many people confuse “dynamics” with the ability to play loudly. While everyone enjoys getting rowdy on occasion, the two are not the same. Dynamics is the ability for the speaker to respond instantly to changes in the size of the incoming signal, in either direction. This occurs on both a large and a small scale, and both are equally important. Whether a jazz soloist has just gone from *piano* to *pianissimo*, or a movie goes from someone whispering to a sudden explosion, changes in volume convey much of the excitement and emotional content in sound — whether subtle or dramatic.

Optimizing Placement of Speakers and Listener

Within any given room, the placement of both loudspeakers and the listener(s) has a profound effect on how the speaker sounds.

Obviously, there are often practical constraints that need to be considered (aesthetics, the location of the video display in home theater situations, architectural features like fireplaces, etc.). But to whatever degree that makes sense in your situation, proper placement of the speakers and the listening area is still important. Often, even minor placement adjustments will make a significant difference.

A full treatment of this topic goes well beyond the scope of this paper. Your dealer's experience and training is invaluable in this regard. However, there are a few general rules that can be mentioned briefly:

- **Don't sit against a wall.** If your couch is flat up against the wall, your ears will be in a zone of excessive bass. Even moving away from the wall by a couple feet may make the difference between boomy, congested sound and something wonderful.
- **Be approximately equidistant from the left & right speakers.** The primary listening position should be nearly equidistant to the left and right speakers, if possible. While today's surround processors offer delays that can compensate for different distances, most systems will perform better with a certain degree of symmetry. Moreover, you'll probably be sitting in front of a video display of some sort; flanking the screen with the left and right speakers only makes sense.
- **Size your screen properly.** The optimum seating distance from a good HDTV display is about 1.4 times the width of the screen. Conversely, if you know where the screen is going to go, try to make its width about 70% of the distance from the seating area. If you do this, the screen will take up a 40° angle in front of you, which is optimum for maximum involvement in your movies and concert videos. It also matches the available resolution of a 1080p display nicely.
- **L/R speakers closer to each other than to you.** While the presence of a center channel allows the left and right speakers to be somewhat further apart than they might otherwise be, many people spread them too far apart. When this happens, what should be a seamless front image falls apart into distinct regions around each speaker's location, ruining the you-are-there quality of both music and film soundtracks. You can usually avoid this problem by making sure that the left and right speakers are somewhat closer to each other than they are to the primary listening position. If you imagine lines drawn from the left and right speaker to your primary listening chair, the included angle between the lines should be closer to 45° than to 60°.
- **Surround speakers should be somewhat above you.** A good rule of thumb is to make sure that the tweeters of the surround speakers are at least two feet above your ears when you are seated and listening. Higher than that is fine if you want to tuck them up and (more or less) out of sight.

- **Surrounds to the sides; backs to the rear.** If you have one pair of surround speakers, the best locations for them are either directly to the sides or slightly behind you (90° - 115° away from the center channel, as seen from above). If you have the luxury of two pairs of surround speakers, the surrounds would usually be closer to 90° (directly to the sides) while the rear speakers are more nearly behind you. The best location for your rear speakers will depend somewhat on the processing you have available (e.g., Home THX's Advanced Speaker Array processing). Your dealer can help determine the optimal arrangement for your room.

Treat the Room (if possible)

Some rooms are extremely "live" while others are "dead." A "live" room reflects the sounds that occur within it for a long time; a "dead" room absorbs them almost immediately.

A typical high school gymnasium is a large, live room. The hardwood floor and the other hard, reflective surfaces ensure that sounds bounce around for quite some time before they die out. The result is poor intelligibility and an unpleasantly bright, echoing quality. The same thing happens in smaller rooms with lots of hard surfaces, except that the echoes are spaced so tightly together that they are not perceived as discrete echoes.

A room with thick carpeting, heavy, insulated drapes, and an abundance of plush, overstuffed furniture can become too "dead," absorbing sounds almost before they develop. Subjectively, this type of room robs the music (and film soundtrack) of much of its life and dynamic impact.

As with so many things in life, the best-sounding rooms strike a sensible middle ground. Carpeting is generally good, as it tends to mitigate the hard, reflective quality of most ceilings. Irregularities in the room (bookcases, furniture, etc.) tend to break up and scatter what might otherwise be strong reflections. Heavy drapes over windows both block excessive light during the day and absorb what might otherwise be an unwanted reflection.

If you have some leeway in the room's design and want to do something to improve the sound, the most important areas to make either absorptive (soft/plush) or diffusive (irregularly shaped, as with bookcases) are the points of "first reflections" of your speakers. If you had someone slide a small mirror along the walls while you were sitting in the normal listening area, any location in which you could see a speaker in the mirror would be a candidate for some form of treatment.

Sophisticated Room Correction EQ

Even good-sounding rooms that are properly set up still distort the sound rather dramatically. This is especially true below about 300 Hz. In every real-world installation we have ever seen, the performance of the system can be markedly improved by appropriate room correction.



Wisdom Audio

We have selected the Audyssey MultEQ® XT room correction system because it is the most advanced and sophisticated room correction system available on the market today. MultEQ was developed over five years with \$6 million of University-based research to discover how to build an advanced automatic system that can measure the acoustics of the room and correct audible sound distortion throughout the entire listening area, not just in one spot. It addresses both the amplitude domain (frequency response) and the time domain (transient response) — something other systems cannot do.

As implemented in Wisdom Audio systems, it includes the ability for your installer to take up to 32 separate measurements in the room. The MultEQ Pro software then analyzes all the response curves for patterns and similarities. Logically enough, the problems that are most characteristic of the room receive priority treatment, while problems that might exist at only a single location in the room receive less attention. In this way, the sound is improved everywhere in the room — something simpler systems fail to do.

Wisdom Audio requires its dealers to provide a professional calibration of the system. Every Wisdom Audio dealer is trained in the professional calibration of these fine instruments and owns specialized calibration equipment so as to ensure that every Wisdom Audio owner receives maximum value from their investment in fine audio equipment.

Summary

The Sage series was developed to deliver completely consistent, reliable, high performance in the widest possible variety of situations. Unsurprisingly, this process must begin with state of the art loudspeakers that have tremendous intrinsic value. However, even a great speaker does not ensure great results in the real world.

Since 1996, virtually all Wisdom Audio loudspeaker systems have included some form of room correction. Most of these systems were installed and calibrated by Wisdom Audio factory personnel, giving us a vast wealth of experience in achieving exceptional results under real-world conditions.

Working closely with its dealers, Wisdom Audio takes a comprehensive approach to the task of delivering an unsurpassed auditory experience. The combination of innovative, high performance speaker technologies, sophisticated electronics that includes room correction, and the highly trained professional Wisdom Audio dealer network enables us to provide consistently excellent results in the only place that matters: your home.