

Audyssey Setup Guide – One Step at a Time

Created (compiled) by giomania

The below step-by-step instructions are based on information collected from the Audyssey FAQ, located here: <http://www.audyssey.com/faq/index.html> and the AVS Forum Official Audyssey thread, located here: <http://www.avsforum.com/avs-vb/showthread.php?t=795421>

Disclaimer: The following procedures may not work in all cases, as there are too many variables to account for in this document. If you feel further assistance is required, please visit the AVS Forum Official Audyssey thread, linked above.

I. Room Setup

- A. Lower the noise floor of the room (<45dBA) by turning off the HVAC system, projector, etc.

II. Subwoofer Setup

- A. Determine the optimal placement of the subwoofer within your room using common accepted practices. (location, location, location)
 - 1. Here are some useful references for subwoofer setup:
 - a. Audioholics subwoofer placement article: <http://www.audioholics.com/tweaks/get-good-bass/subwoofer-placement-the-place-for-bass-part-1>
 - b. Harman multiple subwoofer placement white paper: <http://www.harman.com/wp/pdf/multsubs.pdf>
- B. Disable the Low-Pass Filter (LPF) on the subwoofer, if allowed.
 - 1. Disabling the LPF will result in more accurate subwoofer distance measurements.
 - 2. If the LPF cannot be disabled, set it to the highest frequency allowed.
- C. Ensure the subwoofer(s) are at least 3 – 5 inches (7 – 13 cm) from the wall.
 - 1. Reverberating walls may result in inaccurate subwoofer distance measurements.
- D. Set the subwoofer polarization (0 or 180 degrees) using common accepted practices.
 - 1. If you have two subwoofers, ensure their polarization settings are the same.
- E. If the subwoofer has a phase control (in addition to the polarization control), set it at “0”
 - 1. Phase controls on subwoofers apply "delay" at one frequency rather than the needed group delay that is frequency independent. So, it is best to just leave them at “0”.
- F. If the sub has an EQ system, you can use it to tame large peaks (see item 1 below) before calibrating with Audyssey, but this is generally not recommended. Most of these EQ systems measure only in one position, and therefore are only correcting the amplitude (volume) for one seating position. Audyssey adds the benefit of measuring in the time domain for multiple seating positions to create an acoustic bubble.
 - 1. Narrow peaks or dips in the response below 100 Hz that are 1/3 or 1/6 of an octave wide can be improved—but not eliminated—by Audyssey Mult EQ XT.
 - a. In these situations, the built-in subwoofer EQ systems might be useful.
- G. Calibrate the subwoofer volume
 - 1. Set the volume control on the subwoofer at the middle of the adjustment range allowed.
 - a. Please note this “starting point” may not work with all subwoofers.

2. Place the microphone at the first measurement position (see guidance in section V.) and run through the calibration process for the first measurement—until all speakers have been measured once.
 3. After the first measurement process is complete, select "Calculate", then "Save" or "Store", then go to "Check Parameters".
 - a. Audyssey will calculate the speaker distances and trim levels from this first measurement.
 - b. Each manufacturer has a slightly different interface, so the terminology may not exactly match.
 4. Check the subwoofer trim levels in the receiver / processor menu.
 - a. If the subwoofers' trim level is at the maximum limit of the cut (-) or boost (+) adjustment range allowed, you need to adjust the volume control on the subwoofer and repeat step #2. Specific instructions will follow.
 - b. Trim adjustments are a tool used to achieve the goal of producing the same Sound Pressure Level (SPL) from each speaker / subwoofer in the system.
 - c. For example, Denon receivers have a trim adjustment range from -12dB to +12dB.
 5. If the subwoofer trim level is at the maximum boost (+), turn up the subwoofer volume—on the subwoofer—slightly and repeat step #2.
 6. If the subwoofer trim level is at the maximum cut (-), turn down the subwoofer volume—on the subwoofer—slightly and repeat step #2.
 7. A suggestion for tweekers is to set the subwoofer trim level in the range of ± 3 dB.
 - a. This is only a suggestion for the tweeker who likes to play around.
 - b. Audyssey's position is to perform steps 4 to 6 above.
- **Note:** This process is for checking the trim levels only. After you have completed the subwoofer setup, be sure to start the measurement process over, following the guidance in section V to use all six or eight measurement positions available.

III. Dual mono (LFE) Subwoofer Setup

- A. A few receiver and processor models are able to apply individual Audyssey equalization curves to multiple subwoofers simultaneously. If you do not own one of these units, the SVS AS-EQ1 will apply individual Audyssey equalization curves to two subwoofers simultaneously. Alternatively, you can follow the below advice to have two subwoofers share one Audyssey equalization curve.
- B. Place the subwoofers symmetrically within the room, if at all possible.
- C. Place the subwoofers at identical distances from the primary listening position, if at all possible.
 1. When two subwoofers are driven as one unit, proper time alignment is critical.
 2. The two subwoofers will not be properly time aligned unless they have the same physical distance from the primary listening position.
 3. Adjusting the physical distance of the two subs effectively adjusts their *time delay*.

- D. The above advice applies only to sealed rectangular rooms without any openings.
- E. Follow the steps in subwoofer setup (section II.) for each subwoofer.
- F. As an alternative to locating the subs at equal distances from the main listening position, you may insert an electronic device between the receiver / processor and the nearest subwoofer.
 - 1. This device should introduce a time delay such that its output sound reaches the main listening position at the same time as the farthest subwoofer.
- G. Attempt to match the output level of both subwoofers.
 - 1. Use the receiver / processor internal LFE test tone while adjusting the volume control on the subwoofer to perform the following:
 - 2. Turn on one subwoofer and adjust the output level to 80 dB using an SPL meter.
 - a. Ensure the SPL meter is located where the first Audyssey measurement position will be taken (see section V.).
 - b. If you do not have an SPL meter, adjust the level by ear.
 - 3. Turn off the first subwoofer, turn on the second subwoofer, and repeat the procedure.
 - 4. Turn on both subwoofers and calibrate with Audyssey.

IV. Microphone Setup

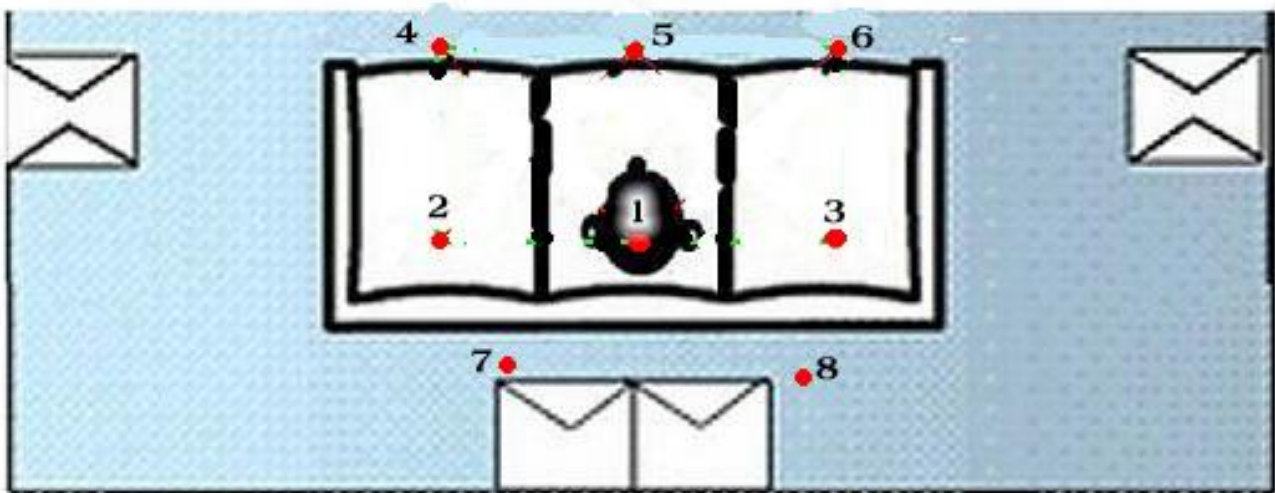
- A. Use the microphone that came with the unit.
 - 1. Use of a microphone from another make or model will cause incorrect frequency response measurements because of different internal calibration.
- B. If you feel the urge to use another microphone, re-read section A.
- C. Mount the microphone on a tripod.
- D. Point the microphone at the ceiling.
- E. Place the microphone at ear height when seated. Throughout the measurement process, do not vary the height of the microphone more than a few inches relative to the first measured position.
- F. If the seat back is higher than ear height, ensure the microphone is raised above the seat back.
 - 1. Positioning the microphone above the seat back will eliminate additional reflections.

V. Microphone Placement (Measurement Positions)

- A. Use the maximum amount of measurement positions allowed by the Audyssey version.
 - 1. If you are using MultEQ or MultEQ XT you should use all six or eight measurement positions available.
- B. Avoid taking measurements too far off to the side and / or outside the front Left and Right loudspeakers, even if seats are located there.
 - 1. Frequency response in these locations will exhibit reduced high frequencies.
 - 2. Audyssey would adjust the room correction filters according to this measured response, resulting in unnecessary compensation.
- C. Avoid taking measurements too close to the back wall, even if the only seating is located there.
 - 1. Move the microphone at least 1 foot (30 cm) from the back wall before measuring.
- D. Measure behind the main seating area, if you can.
 - 1. If the main seating area is out in the room, and you can measure behind the seating area while keeping the microphone at least 1 foot (30 cm) from the back wall, you should do it. The idea is to "surround" the center of the listening area with measurements.
- E. For the first measurement, place the microphone in the primary listening position, where the listener's head would be positioned.
 - 1. Audyssey uses the first measurement position to calculate the speaker / subwoofer level and distance settings, so the microphone should be placed in the primary seating position.
 - 2. Distance measurements are really time measurements that ensure temporal coherence. It is a critical part of calibration because—without it—you have frequencies arriving at different times: This is called non-constant group delay, and is a form of distortion. The distances are calculated so the sounds from all speakers and subwoofers arrive at the first measurement position at the same time.

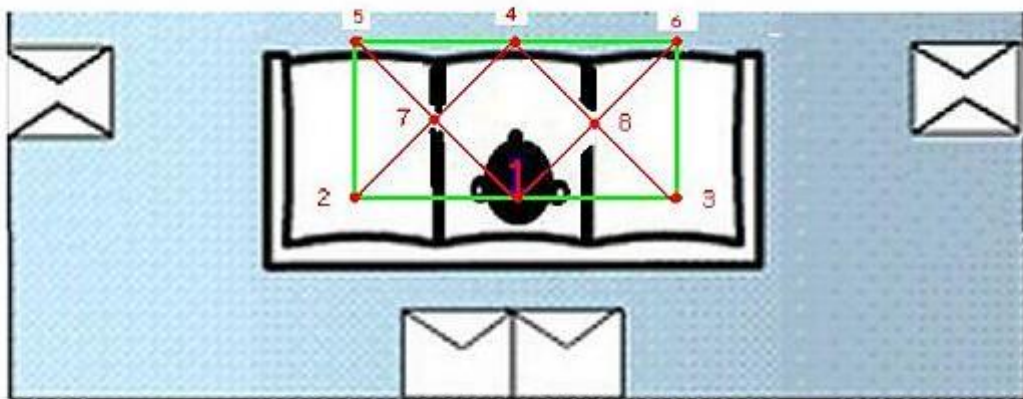
F. Most seating configurations can utilize the following microphone placement methodology:

1. The first microphone position (#1) must always be where your head is positioned.
2. For the remainder of the measurements, use the approximate pattern in the below diagram to surround your listening area, while ensuring you follow the guidance above.
3. After the first measurement, the order in which you make the subsequent measurements does not matter: The diagram below only serves to ensure each location is measured.
4. The distance between the measurement positions is variable, and they do not require measurement. The basic idea is to surround the listening area with measurements.
5. In general, Audyssey does not recommend putting the microphone in "every seat", except (possibly) in a dedicated theater with rows. In typical living rooms, some seats are positioned either off-axis, too close to a room boundary, or both.
6. The most common problem with EQ systems is their data collection is based on a single point in the room, which usually results in very poor performance outside that single measurement point.



Drawing by Pers1, Modded by pepar

7. If your seating area is close to or up against the rear wall of your room, use the following diagram for suggested microphone positioning.



Drawing by Pers1

Visualisation from text at <http://www.audyssey.com/faq/index.html>

8. If you have additional microphone placement questions, please visit the Official Audyssey thread on AVS Forum, linked at the top of this document.

VI. During Calibration

- A. Do not make any noise during the “chirp” measurements.
 - a. Audyssey measures for a few milliseconds (ms) after each “chirp” is finished, but then has to wait for the DSP to calculate, so the microphone is not active until a few ms before the next set of chirps.
- B. Do not stand in between the speaker and the microphone or anywhere that the sound is either reflected off of you or absorbed by you.
 1. The natural room acoustics must not be substantially affected.
- C. Be prepared for the “chirp” measurements, as they are quite loud, and can startle you.
- D. If a phase warning is shown, check the speaker wiring, and press “Skip” to continue with the calibration.

VII. After Calibration

- A. Raise the speaker crossover settings, if desired.
 1. Raising the crossover frequency from the calibrated setting does not affect the channel correction implemented by Audyssey.
 2. Lowering the crossover frequency from the calibrated setting is not recommended.
 - a. Audyssey will not provide correction to the satellite speakers lower than the frequency it measures as the -3 dB point.
 3. Setting the speakers to “Small” with a 60 Hz – 80 Hz crossover is a good starting point, assuming the calibrated crossover setting is 60 Hz or lower.
 4. For additional details about the speaker setting process, see “**Note 1**” below.
- B. Raise the low-pass filter setting (usually incorrectly identified as a crossover) of the LFE subwoofer in the receiver / processor to 120Hz, if allowed.
- C. If the satellite speaker distance settings (excluding the subwoofer) were not measured accurately, and are markedly different from what you get with a tape measure, start all over.
 1. Incorrect distance measurements for the satellite speakers indicate a procedural error, and the associated EQ results are likely to be poor.
- D. Do not change the distance setting of the subwoofer.
 1. Inaccurate subwoofer distance settings are the result of measured delays between the time when the receiver outputs the test tone and it is received at the microphone.
 - a. Any filters and/or active circuitry in subwoofers can delay this signal.
 - b. Audyssey simply measures the time delay and compensates for differences in the arrival time of sound from the various speakers and the subwoofer. It is best to compensate for these differences regardless of why they occur.
 2. The subwoofer / satellite speaker time alignment blend is based on this measurement.
 3. Inaccurate subwoofer distance measurements usually occur when the subwoofer’s Low-Pass Filter (LPF) is not disabled, or when using subwoofer equalization systems.

- a. The LPF, by nature of its design, introduces additional delay to the signal; Audyssey detects and corrects for this delay.
- E. Disable any Night Modes, DRC (Dynamic Range Compression), and D. Comp (Dynamic Compression) in the receiver / processor as well as the DVD / BD player.
 1. If these features are not disabled, they could possibly cause adverse interaction with Dynamic EQ and Dynamic Volume.
 2. You may need to temporarily turn off MultEQ to access these parameters in your receiver / processor.
 3. You may also need to select a specific soundtrack type before a given parameter will appear in the menu for adjustment; check the manual to be certain.
- F. If your receiver / processor has the THX Loudness Plus feature, turn it off if you plan to use Dynamic Volume.
- G. Select one of the target curves created by Audyssey.
 1. In a THX system, the “Flat” curve should be used when THX post-processing is on, and the “Reference” curve should be used when THX post-processing is off.
 2. In other systems, the “Audyssey” curve should be used for listening to movies, and the “Flat” curve should be used for listening to music.
- H. If desired, trim level adjustments can be made in the receiver / processor to boost subwoofer levels for those who prefer more bass output. Some users make trim level adjustments so that all speakers measure at 75 dB with an SPL meter (set at “C” and “Slow”) using the internal test tones. See “**Note 2**” below.
 1. Audyssey will monitor these changes.
 2. The changes are monitored so that Audyssey and its features (Room correction curves, Dynamic EQ and Dynamic Volume, etc.) work as designed.
 3. If you were to make changes to the settings on a subwoofer amplifier, Audyssey would have no knowledge of this, and those features would not operate as designed.

Note 1: Audyssey does not set the crossovers; it simply measures the -3dB frequency point of each speaker. This information is passed to the receiver / processor for calculation of the speaker settings and crossover points, if applicable. Unfortunately, Audyssey does not report the -3dB frequency point measured for each speaker. The only information available to you is whether or not the speaker was designated “Large” or “Small”, and any crossover point selected for “Small” speakers.

Receiver / processor manufacturers use a specific Frequency Decision Point (FDP) to classify speakers as “Large” (full-range) or “Small” (less than full-range). The selection of the FDP varies among manufacturers, and may be 40 Hz, 80 Hz, or another frequency. If the -3 dB frequency measured by Audyssey is below the FDP, the speaker is classified as “Large”. If the -3 dB frequency measured by Audyssey is above the FDP, the speaker is classified as “Small”, and a crossover frequency is selected.

Each receiver / processor has various crossover points from which to choose. Typically, the first crossover setting above the -3 dB point measured by Audyssey is chosen. For example: If your receiver has crossover settings of 40, 60, 80, 100 and 120 Hz, and the speaker is set to “Small” with an 80 Hz crossover, that is an indication the - 3dB point is somewhere between 60 and 80 Hz.

Note 2: Before adjusting the trim settings, please understand that producing a calibrated setting other than 75 dB SPL results in reference level being achieved with the master volume set to something other than “0”. Further, Audyssey microphones are specified with a ± 2 dB maximum sensitivity tolerance. So, in the worst case scenario, the Audyssey microphone would be 2 dB “off”, which is more accurate than most popular consumer-level SPL meters. Consumer-level SPL meters are usually very inaccurate when measuring subwoofers; you have been warned.