

## Setting Your System Speaker Levels Using a Sound Pressure Level Meter or App

Properly checking and setting the volume levels for all its channels is one of the most misunderstood yet simplest things you can do to your surround sound system to improve or, at the very least, verify its performance. We say improve because (as we've drummed into you in past issues) humans have a natural tendency to enjoy exaggeration in much of what we experience. Whether it's the larger-than-life color intensity of Kodachrome slides, over-the-top, retina frying TV's set to "Vivid", or asphalt cracking car stereo Mega-Bass, we just tend to like everything larger than life. And that's OK, as long as you understand that there's an alternative too. An alternative that reduces the exaggeration and sets the performance levels based upon the goals of the movie director or music producer.

The benefits? More accurate reproduction of recorded sound throughout your listening room, deeper involvement in the experience, more sense of "being there" with easier "suspension of disbelief".

What follows are the preliminary things you'll need to do before you can perform a manual system setup using an SPL meter or app. Next edition we'll give you step by step "how to do it" instructions that will take you to surround sound nirvana, bring joy to all your friends and family

and maybe even cure seasonal allergies. (This statement has not been evaluated by the Food and Drug Administration or Lucasfilm . Proper system setup is not designed to cure any known medical conditions but has been known to generate a syndrome called "excess smiling" among viewers and listeners.)

There's a lot of information in here. **Please take the time to carefully read each instruction.** You'll be rewarded with excellent system performance if you do.



## What are We Trying to Accomplish?

The audio surround field (what's placed in the surround speakers) in movies and TV shows consists almost entirely of the environmental sounds associated with the action up on the screen. Wind rustling through forest trees, city street sounds, people eating in a restaurant sounds, waves crashing on the shore, etc. A well set up system creates a fairly non-localizable\* surround field at a volume consistent with the sounds being reproduced, to draw you into the experience without being distracted by these sounds. Because if you were constantly distracted by the surround field there's much less chance that you'd "get lost in the experience".

As a side note, with surround music mixes all bets are off as to what information gets sent to which speaker. Sometimes you'll be placed in the audience, like you're at the concert. Sometimes you'll be placed up on the stage, surrounded by the musicians instead of in the audience. Purists often find this kind of music "mix" disconcerting because it isn't consistent with the visual you're seeing on the screen. None-the-less it's done on a regular basis. Therefore, for music videos, the surround speakers may be more effective if they're aimed directly at your ears as noted in the footnote below.

Surround speakers aimed directly at your ears aren't ideal for that diffuse movie/TV surround information as noted in the footnote too. So we'd recommend that you consider your surround speaker placement based to a degree upon whether you mostly listen to music or movie/TV surround tracks. Primarily movies and TV? Non-localizable is best. Lots of music? Directly aimed at your ears may be best for you.

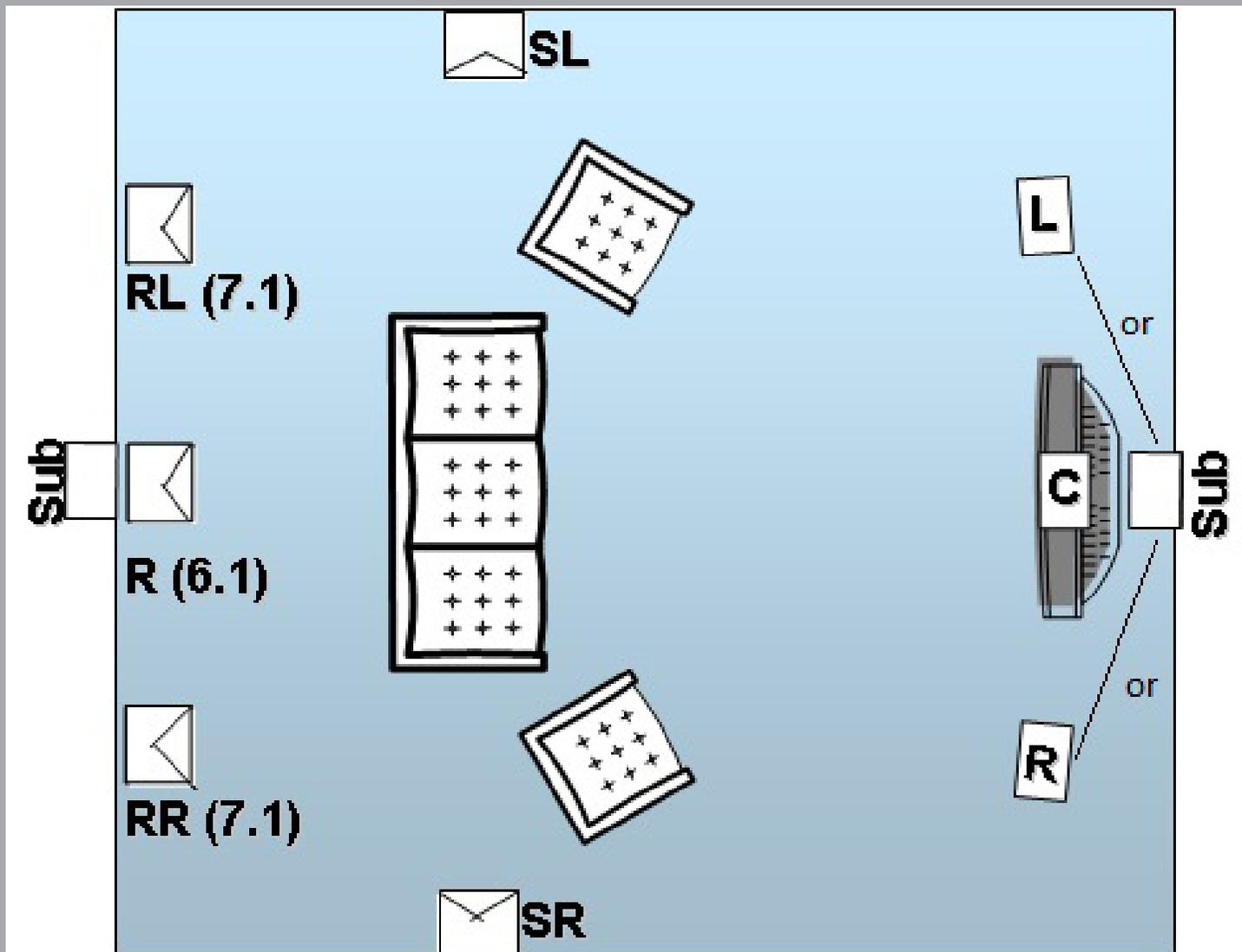
If it's a toss up, we've found the best compromise tends to be the non-localizable surround field. If you have a 6.1 or 7.1 system, the secondary (rear) surrounds should be placed like the primary surrounds, but behind you. The "6th" channel should go in the center of the rear wall, or the two "7" channel rear speakers should be placed on the rear wall approximately a third of the way from the nearest side wall and no more than 6 feet apart. In either setup they should all be located at least two feet above seated ear height. Of course, any of the surrounds can be high-quality in-wall or in-ceiling speakers like GoldenEar's Invisas, and the Invisa MPX is a particularly good choice.

### 5.1, 6.1, 7.1, Oh My! Just for Clarity's Sake ...

5.1 Channel Surround = Front Left, Center and Right, Left Surround, Right Surround (those are the "5" in 5.1) and LFE (Low Frequency Effects) channel for bass special effects (that's the ".1" in 5.1). Note that when "Small" speakers are used, the crossed over low frequencies from those channels are sent to the subwoofer(s) along with the LFE channel. Note that you can enjoy very involving and satisfying surround sound with a well set up 5.1 channel system.

6.1 Channel Surround = Adds a rear, center speaker to the above setup to help position rear surround effects, like a space cruiser flying in over your head. Also may be used to create a more enveloping environmental surround field (e.g. wind in the trees, street noises, etc.). There are a very limited number of 6.1 channel soundtracks available. A well engineered 6.1 (and 7.1) channel soundtrack can enhance the surround sound experience.

7.1 Channel Surround = Adds Left and Right Rear channels, reproduced by two speakers instead of one as above in 6.1. This is quickly becoming the standard for many new movies released on BluRay Disc (and video games too) with two discrete rear surround channels. In a 5.1 system these channels are blended into the Surrounds speakers, in a 6.1 combined into a single channel.



This would be an excellent system set up. In a TritonCinema, the front center sub shown would instead be replaced by the subs in the L/R pair of Triton Two's or Three's. The rear wall sub would be directly below the 6.1 surround speaker. Placing the subs like this will reduce their overall output compared to corner positions but make for smoother bass throughout the room.

## Setting Speaker Levels

The information below is provided with limited explanation for clarity and brevity. If you have questions concerning any of it, please e-mail us at [info@goldenear.com](mailto:info@goldenear.com).

Setup procedure **before** using an SPL meter or SPL application for your hand held device (Apple/Android). You should go into your system menus and familiarize yourself with this stuff, but don't make the changes to the settings until you have the next issue of our newsletter with the step-by-step instructions and an SPL meter or app ready to use:

1. Turn on your system components and ensure that you can see the receiver's or pre-pro's on-screen menu on the TV.
2. If your system has already been set up, go through all the speaker settings in the menus (speaker sizes, crossover frequencies, level settings, distances settings) and write them down so you can go back to them if you desire. If an auto set up program was used, you can simply re-run the program if you wish to return to those settings.

3. Go to the receiver's/pre-pro's speaker set up menu and be sure that all the speakers are set as follows:
  - a. For **SuperSat**, **Aon** and **SuperCinema 3D Array** systems with separate subwoofer: Set all speakers to Small (or Limited Bass). No matter what you've seen or heard from other sources we'd strongly recommend you set your system this way to optimize its performance, dynamic capability and to prevent speaker damage.



Typical speaker set up menus (NAD example).

- b. For **TritonCinema** systems: The **Triton Two™** or **Triton Three™** towers are true full range speakers and should be set to Large (or Full Range/Full Band). The other speakers in your system (SuperSats or Aons) must be set to Small. In Triton based systems the subwoofer would be set to None - unless a separate outboard LFE-only subwoofer is in the system.

4. Most contemporary surround electronics allow you to set the crossover frequencies for the speakers that are set to Small in the system. Try to avoid crossing speakers over any higher than 150Hz. If you do, there's a good chance deep male voices will start to be heard coming from the subwoofer - not a desirable thing. The higher you set the crossover point for the L/C/R speakers the more important it is to have the front subwoofer centrally located among them. Go through the electronics' speaker setup menu and set the crossovers appropriately for each speaker in your system.



Crossover frequency selection, Denon example.

5. If you're using a GoldenEar sub, run an RCA cable from the receiver/pre-pro Sub Out jack to the subwoofer's LFE input, which bypasses the sub's internal crossover. Since this is a mono input you only need to run a single cable to from the receiver/processor. If the sub you're using doesn't have a dedicated LFE input, connect to its low level, RCA input jack(s) and look for a Crossover Bypass or Crossover Defeat setting on the sub's control panel. If there isn't a crossover defeat or bypass setting, adjust the subwoofers' crossover control to the highest frequency available. *DO NOT SET THE SUBWOOFER CROSSOVER TO THE SAME FREQUENCY YOU'VE SET IN THE RECEIVER OR PRE-PRO.*
6. Measure the distance from the baffle (the speaker's front panel, where the drivers are mounted) of each the speaker in the system to where your head is positioned at the primary listening position. Set these distances in the electronics' Speaker Distance set up menu, rounding up or down as necessary. If you're using bi-polar or di-polar (with speaker drivers on both the front and back of the cabinet) for surrounds/rears we recommend setting the distance to these speakers the same as the distance to the front L/R speakers (so no additional delay is added). After all the other settings described below are done you should listen for a cohesive sound field across the three front speakers and smooth integration with the subwoofer and surrounds.
7. Set the volume control on the subwoofer to its half way point. When you run the system setup test tone, if the subwoofer measures very low or very high on the SPL meter compared to the other speakers, adjust this volume control to get it closer to the others. Then you can make the final adjustments using the receiver/pre-pro's controls.
8. These are the preliminary steps you'll have to take in order to do a manual system level setup. Please go to the next **GoldenEar** Newsletter issue which contains the continuation of these setup instructions.

#### \*Footnotes:

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**Non-localizable:** Means it's tough to tell exactly where the sound's coming from. Just like the sounds in an actual restaurant, city street, office, you're surrounded and immersed in an environmental soundfield. This is why most experts will tell you to locate the primary surrounds directly at the sides or behind the listener. If you can avoid it, never locate the surrounds forward of the listening area in a 5.1 system. Properly located in-wall or in-ceiling speakers can also do a great job of reproducing surround effects and, of course, in-ceiling speakers like our Invisa 7000s also do a great job with front main channel applications as well as surround performance. If everything is properly positioned and balanced, you should feel like you are immersed in the action that is taking place on the screen, not just aware of sounds coming from all around you. If you are constantly aware of sound coming from the surround speakers, you'll be distracted from the action on the screen and there's little chance you'll "get lost in the experience".

To be fair, in terms of the aiming of the surrounds, there is some debate whether they should be aimed at the listeners or not, as this is not something which is black or white. This actually depends on the particular speakers and their dispersion pattern (wide dispersion, natural sounding speakers are happier being aimed right at the listeners, than beamy, peaky forward sounding speakers), the particular program material and mix, the room acoustics, channel balancing and, of course, personal taste. In the end, we suggest going with what sounds best to you.