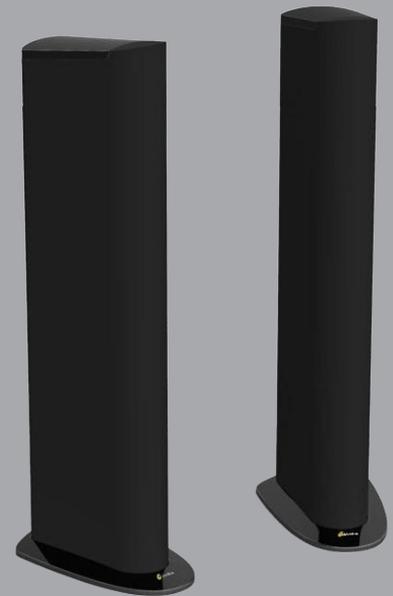


Setting Speakers to “Large” or “Small” in Your Receiver or Pre/Pro

We don't mean to sound like the Large or Small Police, The Setup Sheriff or Bass Management Mavens in this newsletter, but the information below is based on our collective experience setting up and evaluating thousands of stereo and multi-channel audio systems. Many were set up according to the following guidelines and resulted in reproduction that was impressively natural, highly believable and very involving. Others were set to, oh, let's call it *different “standards”*, and in most cases suffered greatly compared to systems configured as per these guidelines. We believe if you've spent significant amounts of hard earned cash to get quality components and put together a great system, dropping the ball during set up would be a shame.

Some caveats ...

1. Our recommendations here are based upon our experience, generally accepted engineering standards and input from industry experts (Believe it or not, we didn't use Wikipedia!).
2. There really is an audio industry-wide, generally accepted way to set this stuff up and that's the basis for our recommendations in these newsletters. However, based on your room circumstances, the need for Enhanced Domestic Tranquility (EDT?) or your preference for a particular sound characteristic you get by utilizing different settings, configure your system up as you see fit. By all means, do whatever makes you happy, but try not to select settings that could lead to system damage, like setting very small satellite speakers to “Large” or cranking the subwoofer beyond “11” to *MegaWhumpThud*.
3. **GoldenEar** separates our speakers into 3 groups; full range floor standers (Triton Series), full range compact models (Aon Series) and satellites (SuperSat Series and the SuperCinema 3D Array). We'll detail specific recommendations concerning them below ...



LARGE

Is it Large or is it Small? How much does size really matter?

Utilizing the Bass Management menu in your surround sound electronics to set an individual speaker to Large or Small determines whether or not that speaker gets sent the bass signals originally placed in that channel by the recording engineer. Essentially, if you set a speaker to Large you're saying it can produce thunderous levels of very deep bass. (See the info in the next few paragraphs for a good example of thunderous levels of very deep bass.) Sandy and the engineering team worked hard to ensure that GoldenEar full range speakers deliver bass performance that belies their size and

price (if you own 'em you already know this). And there's an outside chance other brands of speakers you may have mixed into your system might produce decent bass too. So why would you set any speaker that seems to make OK bass to "Small"?



SMALL

Before we give you those reasons we'd like you to be aware of how much deep bass it can take to re-create that "you're in the action" experience, particularly for cinema special effects. Perhaps the best example is the original THX™ home theater standard which calls for a woofer system capable of generating 105dB at 20Hz at the listening position, in a 3000 cubic foot space. As a frame of reference, a room 18' by 21' by 8' is just over 3000 cubic feet.

That's 20Hz!

At 105dB!!

How loud is 105dB? Sitting in the front row at a rock concert is in the 105dB range. The onset of actual pain at the human ear's most sensitive frequency of 2750Hz is at that level too. Note that these 105dB peaks in soundtracks are not sustained and the vast majority of residential listeners may not be listening at levels that would allow 105dB peaks anyway. But when Arnold Schwarzenegger blows up half a city block in a film you can pretty much assume that it's intended to reach a 105dB peak level in the theater.

Creating this kind of powerful sound picture in your room will undoubtedly make movie watching more enjoyable and involving. But trust us, generating 105dB in the deep bass in an average size room ain't so easy. In fact, very few residential "full range" speaker systems on the market are capable of producing anywhere near this level of deep bass output. For that matter, not that many powered subs can either... only the biggest, baddest powered subs are capable of this kind of output (like our ForceField 5, for example).

Reasons for utilizing bass management

As noted above, the requirements for movie soundtrack special effects bass can be far more demanding than those for music reproduction (rap/hip-hop excluded, perhaps), so this discussion is most pertinent to Home Theater systems. The 20Hz/105dB THX standard noted above was developed by Lucasfilm™ based upon their goal of bringing home the theater experience. Properly utilizing the bass management capabilities in your surround electronics will go a long way towards achieving that goal. Here are some of the benefits of using bass management:

1. Eliminating the need for your surround sound receiver/amplifier to produce the deep bass by letting the subwoofer amplifier handle it frees up LOTS of extra amplifier power to reproduce the mids and highs. So taking the bass burden away from your receiver/amplifier lets it perform like a much more powerful unit, by increasing its headroom (the reserve power available for demanding midrange/high frequency passages) and greatly improving perceived dynamics..
2. Taking the bass away from your surround sound receiver/amp also reduces certain forms of internal amplifier distortion (most notably IM, Inter-Modulation distortion, where the presence of one tone impacts the sound of other tones, i.e. they inter-modulate each other). At the very least this alone will result in enhanced midrange and high frequency playback fidelity.

3. The above benefits hold true for speakers as well. Removing the burden of generating lots of deep bass lets most speakers perform better in the mids and highs with reduced IM as a side benefit too. (Note that the Triton 2 and 3 with their powered low frequency sections will deliver superb mid and high frequency performance while rocking out lots of powerful, deep bass without these concerns.) Kind of like having their own “bass management”.
4. Speakers that are not designed to produce bass frequencies (like our SuperSat speakers) can be damaged if the bass is not directed away from these “Small” Speakers to the powered subwoofer or large Triton Towers. Directing the bass away from smaller speakers also allows them to play MUCH louder.
5. Woofer location in typical residential rooms is critical to good deep bass reproduction, especially if you’re concerned about bass performance in more than one seat. In many cases, ideal subwoofer locations turn out not to be the best places to put the mid-range/high frequency speakers or vice versa. By using one or more subwoofers you can place the subs for best in-room performance and the satellite speakers to optimize their sound and imaging. Properly configured bass management makes this possible.



Stereo vs. multi-channel

If you have a high performance stereo system you've probably set the system up for a small "sweet spot" to optimize listening. And in such a situation, you can most likely get decent bass combined with good midrange and high frequency sound and imaging by adjusting the speakers and listening position. But when you're trying to get multiple good sonic locations in the room, especially for deep bass, while at the same time optimizing mid and high frequency imaging and performance, it's often easier to do it with separate satellites and subwoofers. (We'll discuss this in more detail when we talk about standing waves in a future newsletter.)

The Low Frequency Effects Channel (LFE)

Lots of folks have heard of this channel but many don't really understand what it does. It's the ".1" channel in a surround sound mix like 5.1 or 7.1. The sound recording engineer takes the low frequency special effects (big explosions, crashes, etc.) and puts them in their own dedicated channel. Typically this channel is sent to the system's subwoofer(s). In a multi-channel home theater, if you set the L/R speakers to "Large" and tell the electronics there's "No" subwoofer, it redirects the LFE channel to the L/Rs. This is the standard TritonCinema configuration.



When you set any speakers in the system to "Small", the bass that would normally be reproduced by those speakers is redirected to the system's subwoofer (or the L/R speakers, if you've set them to Large and have no separate sub) as well. So the bass sent out from your receiver/processor to the sub can consist of the LFE channel only or the LFE channel plus the re-directed bass from any channel that you've set the speakers to "Small". This is what bass management is all about.

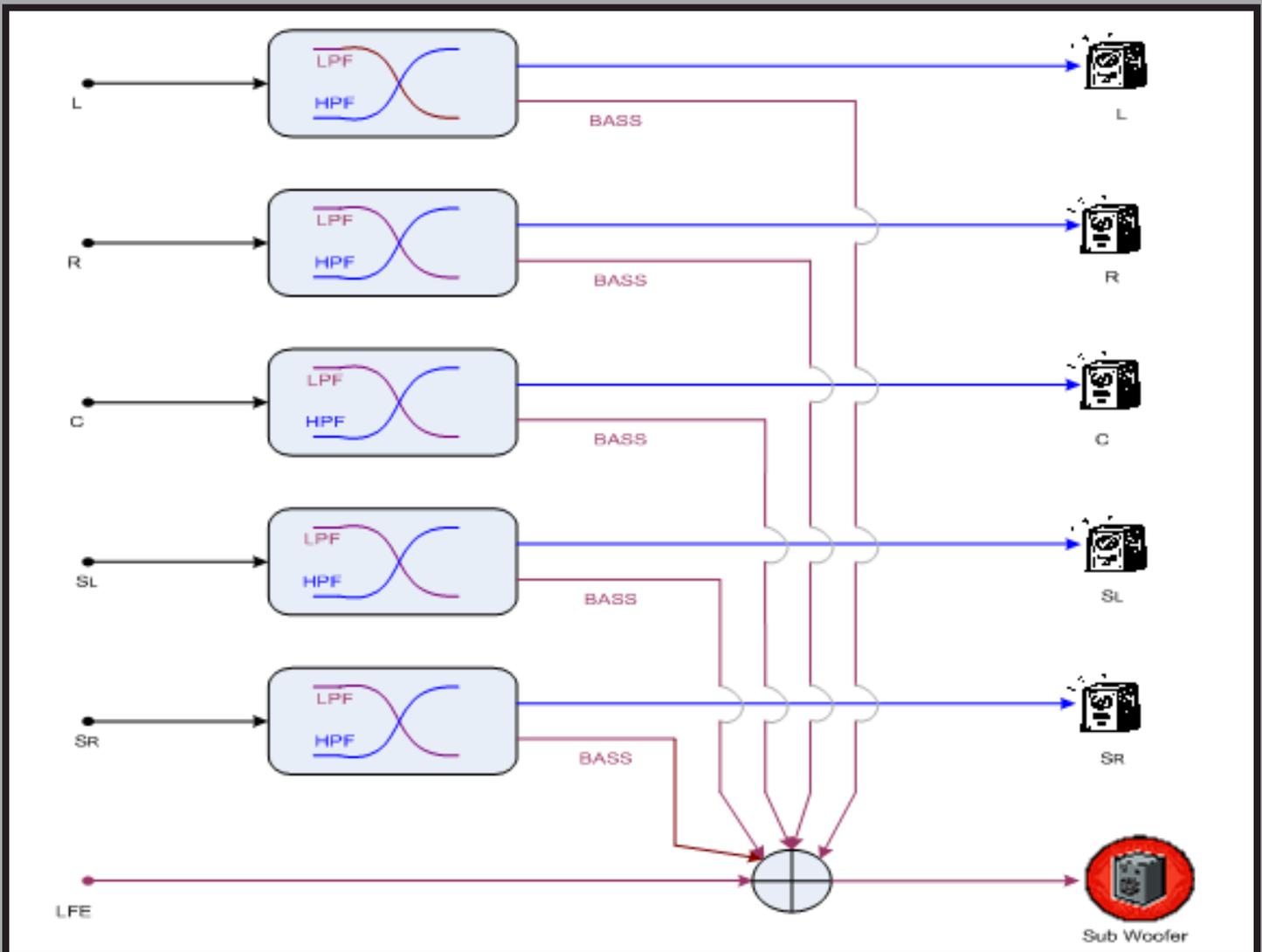
GoldenEar Recommendations

Triton Two and Three - The bass sections of these models are more than simple subwoofers. They crossover to the midrange drivers much higher than a typical subwoofer crossover and are therefore an integral component in ALL the low frequencies these speakers produce. Think of the Triton 2 or 3 as full range three-way speaker systems with self-powered bass sections. Since these powered bass sections are capable of reproducing in room response as low as 20Hz, you probably are wondering "Can they replace a separate subwoofer?"

The short answer is that in most systems in most rooms, the Tritons are capable of delivering all the bass impact you'd want, even for movie special effects. Each Triton Three bass section is pretty much equivalent to one ForceField 3 sub and each Triton Two is equivalent to a ForceField 4 sub. So a Triton based Cinema with two Triton 2 or 3 towers has the equivalent of a PAIR of ForceField subs! Still, if you wanted to get the most bass impact you can, you could send the LFE (Low Frequency Effects) channel to one or more separate subwoofers, carefully placed to minimize standing wave issues in the room. The benefits typically will include better bass impact and more good "bass seats" around the room. It would also raise the overall playing ceiling of the system as the burden of LFE reproduction would be removed from the Tritons. This is an especially good approach for very large rooms.

Aon 2 and 3 - these two models are essentially full range. They both deliver significant bass impact in most rooms, fully satisfying for typical music playback situations, however they don't go as deep or play as loud as the Tritons towers. The quality of GoldenEar bass is similar throughout the line, it's just the quantity that's available that varies. In smaller rooms these models will deliver full range sound for both stereo and home theater applications. We do recommend that for maximum output and best bass impact in Home Theater applications, and/or in larger rooms, the addition of one or more powered subwoofer(s).

SuperSat Series and the **3D Array** soundbar - these models have been designed to be used with bass augmentation. They should be combined with a subwoofer and bass management must be applied (set to "Small") as per their owner's manuals. They are not designed to be used without a sub in any application.



A flow chart for the Bass Management most often found in better quality contemporary receivers and pre/pros