

Bass Control, where did my bass go?

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1 Introduction

A common reaction to Bass Control with multiple subwoofers is the lack of bass you get after a calibration. This document will explain why this happens and how you get the bass back.

Glossary

Bass Control is a measurement based bass management where both speakers and subwoofers are viewed as a complete system.

bass management directs bass frequencies from all input channels to one or more subwoofers.

Dirac Live is a digital room correction technology that employs a sophisticated analysis of your speakers and listening room.

Room EQ Wizard is free room acoustics analysis software for measuring and analysing room and loudspeaker responses.

target curve is a tool for editing the timbre of a speaker in Dirac Live or editing the timbre of the summed response of a speaker and a set of subwoofer(s) in Dirac Live Bass Control.

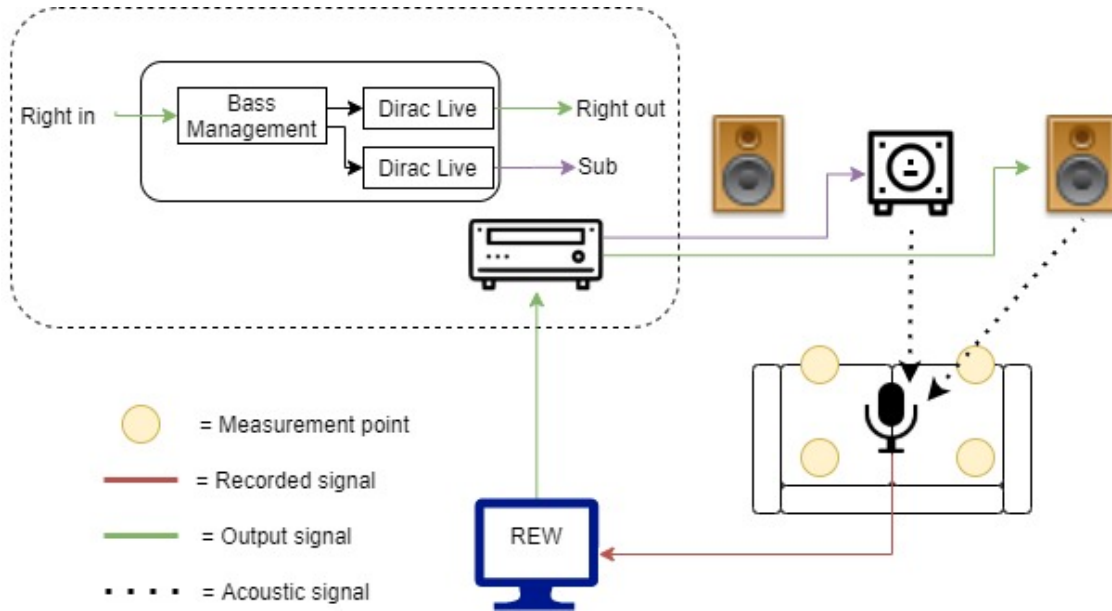
2 Dirac Live and bass management, no Bass Control

This section will go through what the output target curve is in Dirac Live and what it's describing. Three different speaker configurations will be shown with and without a standard Bass Management.

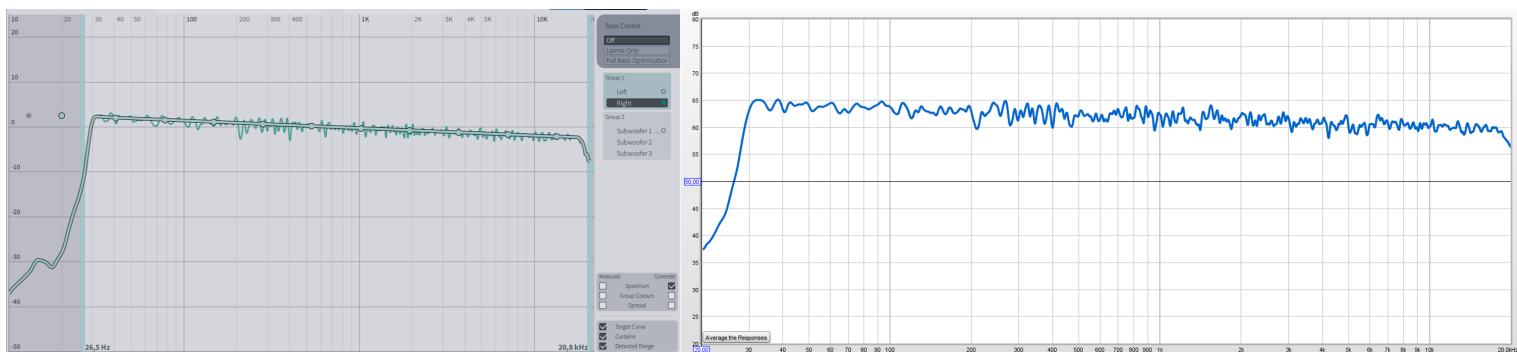
2.1 Dirac Live and the target curve

When you set the target curve for Dirac Live (Bass Control OFF), the target curve is set on a per speaker basis, which means that you set the target curve per speaker. Dirac Live will also adjust the gain and delay for each speaker, so the sound is equally loud and arrives at the same time to the sweet-spot position.

Now let's measure five points in a room and set a flat target curve and export a filter to the AVR. To validate the result, we can use Room EQ Wizard (REW) to measure the response in the same five positions and take the average of these points.

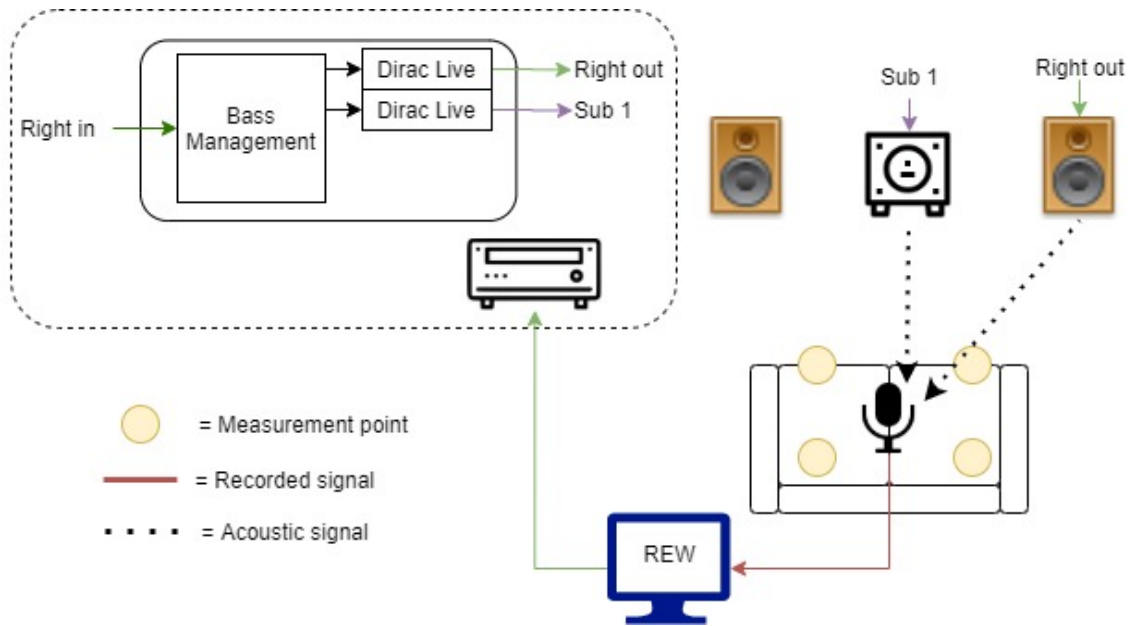


If we study the results from REW and the predicted outcome in Dirac Live we can see that they are the same. But what will happen if we introduce a subwoofer into the system and enable the built-in Bass Management?

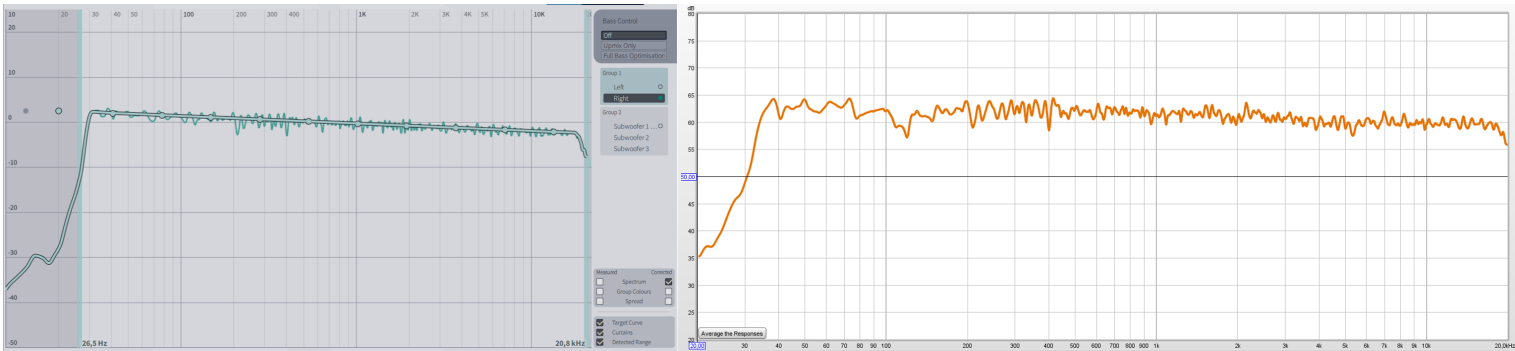


2.2 bass management and Dirac Live, no Bass Control

If we add a subwoofer to the system and set our front right speaker to Small 80 Hz in the AVR, our system will look something like the one below where the right input signal will be split up in the Bass Management module to both the subwoofer and right speaker:

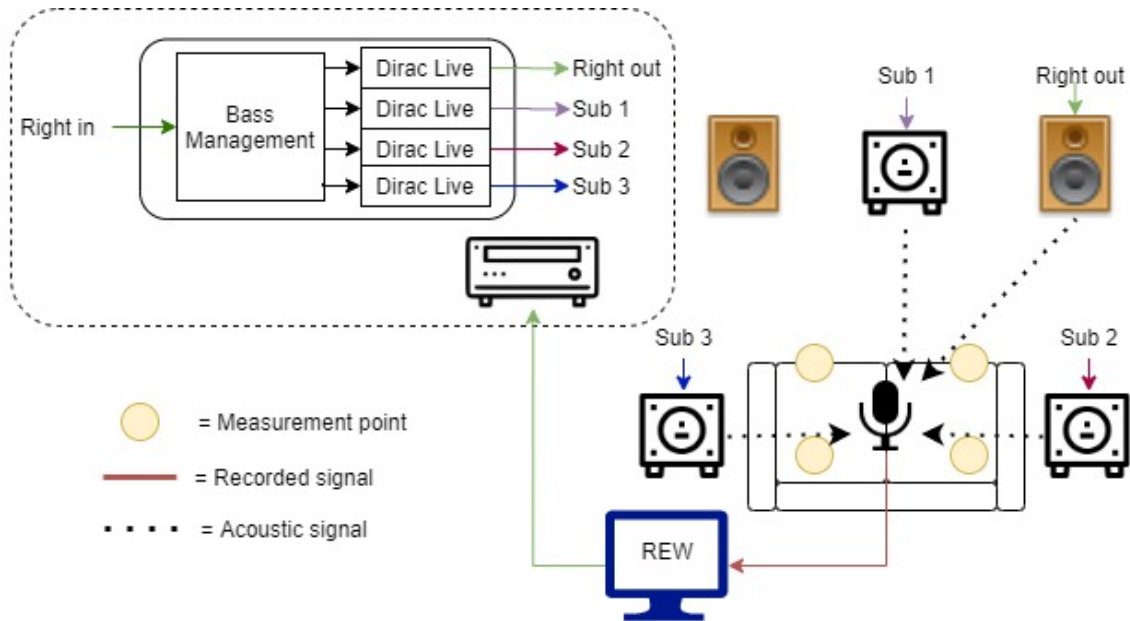


If we further measure the right input channel response with REW, we will get something that doesn't look like the result we predicted in Dirac Live. The reason why is that Dirac Live only shows the corrected result per speaker and does not consider the summed response between the subwoofer and the right channel.

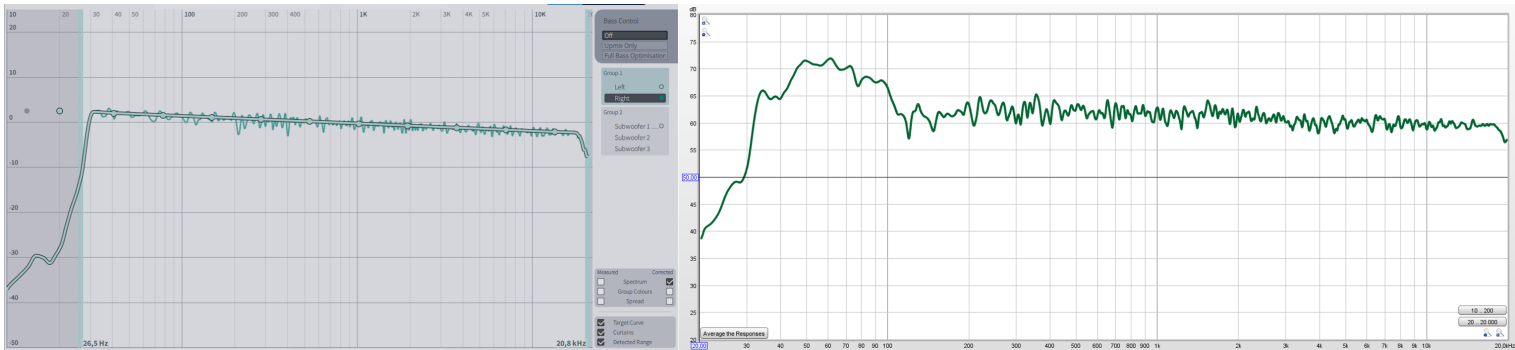


2.3 bass management and Dirac Live with 3 subwoofers

We can add another two subwoofers and measure the right input with REW, the system will now look something like this:



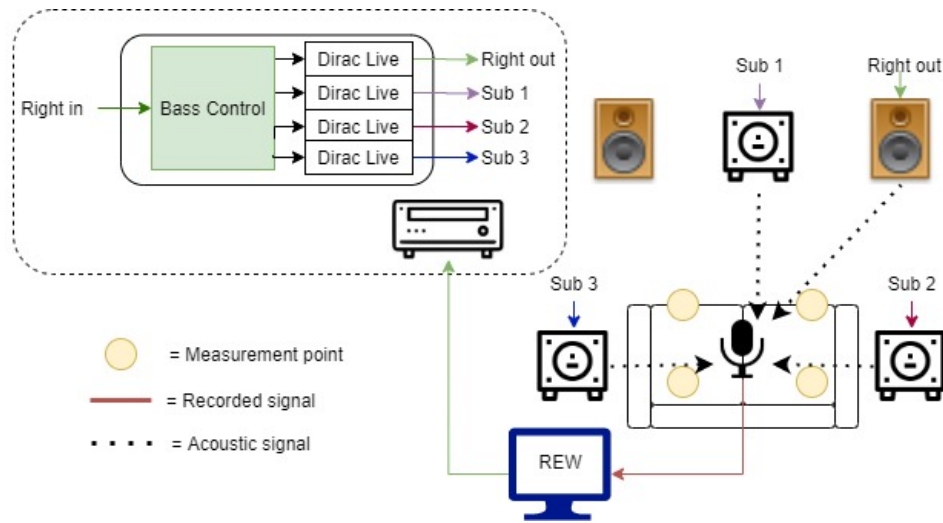
If we further study the measured result in REW, we can see that we have a lot of energy in the lower frequency. We can also see we have no control over this energy with Dirac Live since we have only corrected for each individual speaker.



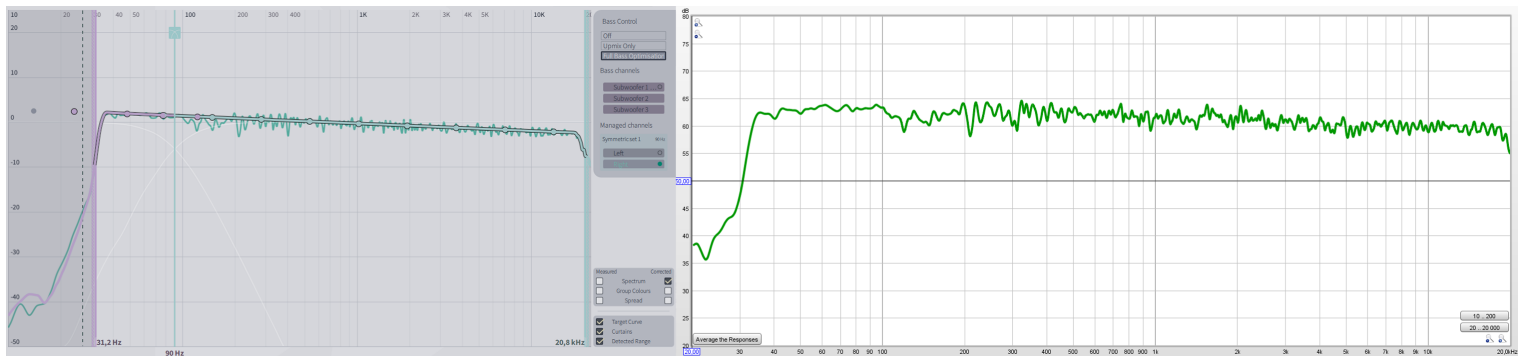
3 Dirac Live and Bass Control

3.1 Boring flat-target curve

Now let's see what happens when we use Bass Control instead of the standard Bass Management module. Our system will now look something like this:



Let's first apply a flat target curve in Bass Control, export the filter and then measures the result in REW. Note, the target curve shows the sum of the three subwoofer and the right front speaker which means that the gain of each subwoofer will be scaled to match the target curve. Raising the lower part of the target curve (below the crossover line) will raise the gain of each subwoofer.



3.2 Bring back the bass with Bass Control

Now let's edit the target curve so we can hear the explosion in Full Metal Jacket:

