

Application Note

Bass Management User Guide

Centralized & Distributed Architectures

December 2015

A close-up, low-angle photograph of a black speaker grille. The grille features a series of vertical slats. A small, rectangular logo with the word 'GENELEC' in white capital letters is visible on the lower right portion of the grille. The lighting is dramatic, with strong highlights and deep shadows, creating a sense of depth and texture.

GENELEC®
the sonic reference

Genelec Bass Management User Guide

Centralized & Distributed Architectures

The purpose of this Application Note is to provide further insights into centralized and distributed bass management architectures as well as to provide a practical user guide about the inter-compatibility between various Genelec Smart Active Monitor (SAM) systems.

The terminology used in this document is as follows:

- **Legacy monitors** featuring Non-Distributed Bass Management (**N-DBM**) include the following SAM products: 8240, 8250, 8260 1238CF
 - **Legacy subwoofers** include the following SAM products: 7260, 7270, 7271. They feature Centralized Bass Management (CBM), meaning the subwoofer defaults to High Pass filtering its outputs. Legacy subwoofers have the additional possibility to be set to a “Pass-Through Mode” while the Low Pass crossover is engaged. This function is most often used when linking multiple subwoofers together, but is also important when subwoofers are combined with DBM monitors.
 - **Latest monitors and subwoofers** featuring Distributed Bass Management (**DBM**) include the following SAM products: 8230, 8330, 8351, 1237, 1238, 1238AC, 1234, 1236, 7350
-

Table of Contents:

- A. The principle of Bass Management
- B. Centralized Bass Management Architecture (CBM)
- C. Distributed Bass Management Architecture (DBM)
- D. Subwoofer Models and Bass Management Architectures
- E. SAM Subwoofer – System Settings User Guide

A. The principle of Bass Management

The term Bass management means that full bandwidth audio channels are low-pass filtered and combined in order to be reproduced by one or more subwoofers. Additionally in the multichannel audio realm, an additional LFE (low frequency effects) channel can also be combined with the low frequency content.

A Bass Management system uses either analogue electronic circuitry or software-based DSP filtering which will filter low frequency information from the main channels and route that information to one, or more, subwoofer feed.

The outputs of the bass management system are directed to two directions: the subwoofer as mentioned above and the main monitors.

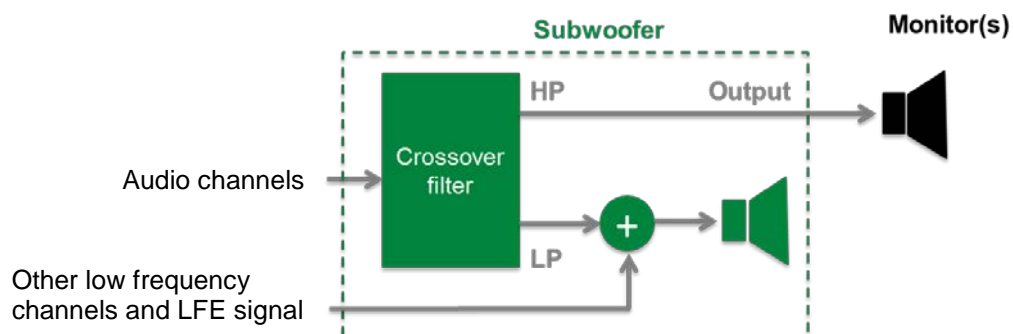
Bass management provides several benefits:

- The subwoofer extends the system frequency response down to the lower limit of the audible range
- The monitors can produce a higher maximum sound level when not reproducing low frequencies
- It is possible to optimize the low frequency reproduction by selecting an adequate subwoofer location in the room
- The monitors can be placed with more freedom to control the acoustical environment and to improve the quality of the audio reproduction
- The subwoofer's output is aligned in level and phase with the monitors allowing flat and accurate reproduction down to 19 Hz and across the crossover point
- The LFE channel output level (0 or +10 dB re. main channels) can be selected for accurate reproduction depending on the final encoded audio format
- The ability to bypass the subwoofer allows evaluation of the audible impact of the subwoofer

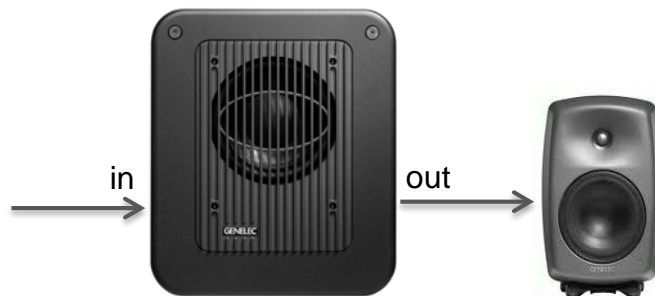
B. Centralized Bass Management Architecture (CBM)

The so-called centralized bass management architecture places all audio signal filtering resources in one central location, the subwoofer bass management unit. This means that all bass-managed subwoofer outputs provide filtered audio signals:

- A low-pass-filtered signal output to the subwoofer driver
- A number of high-pass-filtered outputs for each individual monitor(s)



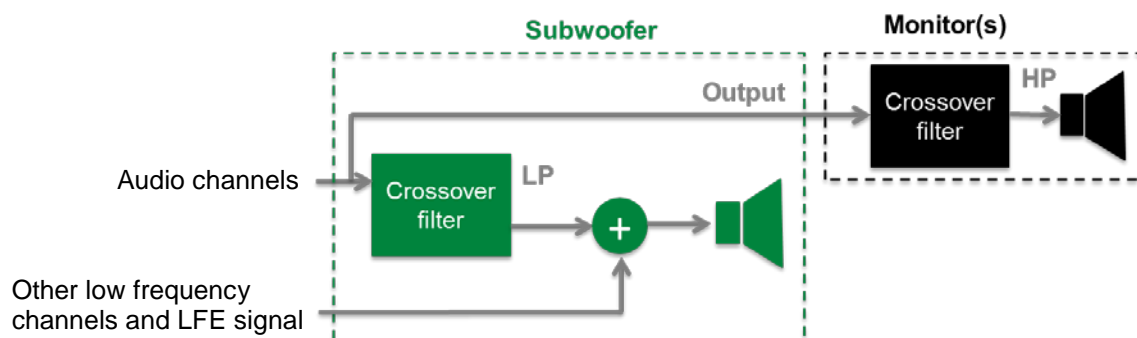
One consequence of using the centralized bass management architecture is that it is mandatory that all audio signal cabling must first go to the subwoofer containing the bass management unit. Then, each respective audio signal cable will go to each relevant monitor input.



C. Distributed Bass Management Architecture (DBM)

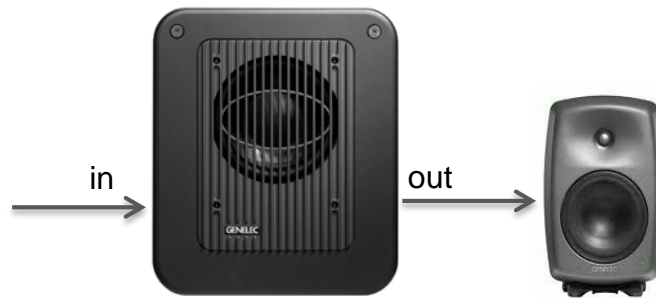
The so-called distributed bass management architecture shares the audio signal filtering resources between the filtering occurring in the subwoofer bass management unit and the filtering occurring in each individual monitor. This means that each monitor and subwoofer filter locally and individually the necessary signal using, of course, the same nominal crossover frequency.

- The subwoofer filter provides only a low-pass-filtered signal output for the subwoofer driver
- The output from the subwoofer is not modified, but is an exact copy of the input signal and this applies to both the analog and AES/EBU inputs
- Each monitor applies a high-pass filter to its input signal

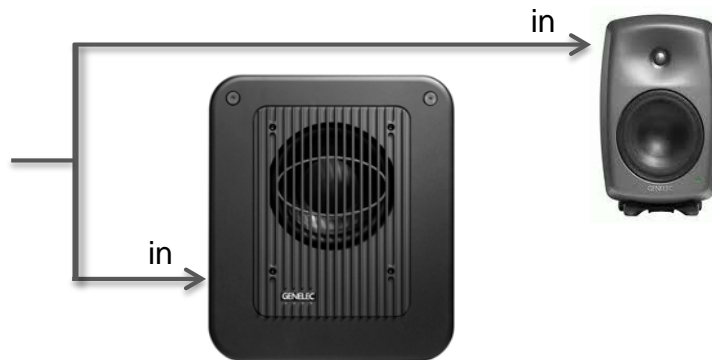


The distributed bass management architecture allows the audio signal cabling to go:

- a) First to the subwoofer and then feed all output signals to the respective monitor(s) – (Genelec default cabling scheme recommendation).



- b) In parallel via a split cable to feed both the subwoofer and each appropriate monitor.



D. Subwoofer Models and Bass Management Architectures

Subwoofer model	Centralized BM	Distributed BM
7040		
7060		
7070	X	
7071		
7073		
7050		X
7350 SAM		X
7260 SAM		X
7270 SAM	X	X
7271 SAM		(pass through mode)

Table 1. Subwoofer bass management architectures.

E. SAM Subwoofer – System Settings User Guide

The combination of Legacy monitors (N-DBM), Legacy subwoofers and Latest monitors and subwoofers (DBM) present some challenges in connectivity, cabling and GLM 2.0 software system settings.

The following user guide aims to provide a simple checklist chart covering all possible combinations and scenarios. The terminology used in the table below is:

Crossover setting (individual or global):

Forces the same crossover frequency setting in all monitors and subwoofers (setting 'global'). When 'global' is selected and the subwoofer bass management settings are changed, all monitors with 'global' selected will follow the changes. When 'individual' is selected in a subwoofer or monitor, it will not follow changes made to the subwoofer bass management settings at any other part of the system.

Pass Through Mode:

The 'Pass Through Mode' setting defaults to OFF. You can force the subwoofer AES/EBU outputs to 'Pass Through Mode' ON. This sends a bit accurate AES/EBU copy to all outputs.



Subwoofer / Monitor Combination	What to do in the Subwoofer Edit Panel	What to do in the Legacy Monitor (N-DBM) Edit Panel	What to do in the Latest Monitor (DBM) Edit Panel
Latest Monitors (DBM): Compact SAM (7350, 8320, 8330)	Nothing. (Subwoofer Crossover is defaulted to Global).	N/A.	Nothing.
Legacy Subwoofer with any Latest monitors (DBM)	Subwoofer Crossover is defaulted to Global. Pass Through Mode button should be set to ON .	N/A.	Nothing.
Legacy Subwoofer together with Legacy Monitors (N-DBM) and Latest Monitors (DBM). Example: 7270 with 1237s (LCR) and 8240/8250 (RL/RR)	First set Subwoofer Crossover from Global to Individual . Pass Through Mode set to OFF (default).	Nothing. (High pass is provided by the subwoofer).	Set each Latest Monitor (DBM) Crossover to " Full Band ". The meaning "Full band" indicates there is no DBM filter activated and that the Latest monitor is ready to accept a Legacy Sub High-pass signal.
<u>Special Case:</u> Legacy Subwoofer together with Legacy Monitors (N-DBM) and 8330s (DBM). Example: 7260 with 8240s (LCR) and 8330s (RL/RR).	Leave Subwoofer Crossover defaulted to Global . Pass Through Mode set to OFF (default).	Nothing. (High pass is provided by the subwoofer).	When 8330s are used with Legacy Subwoofers, you must wire digital audio signals first to the 8330s and then loop their outputs to the Legacy Sub.

Table 2. Subwoofer bass management user guide.



Genelec Oy
Olvitie 5
FI-74100 Iisalmi
Finland

T +358 17 83 881
F +358 17 81 2267

genelec@genelec.com
www.genelec.com