Beosound Theatre

Fine-tuning the surround experience

October 2023

Index

Adjusting for different listening scenarios

The starting point for this document is creating a Listening Position using the RoomSense microphone. What follows are descriptions of settings and tips on how to adjust the sound exactly to your preference.

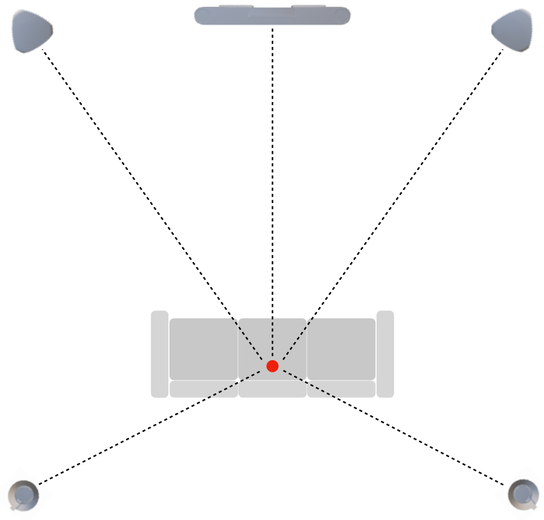
RoomSense will set speaker roles, levels and distances for each speaker in relation to where the microphone is placed. It also creates a Room Compensation filter for this exact position.

RoomSense gives a great starting point - and for most users no further tweaking is necessary. But in certain scenarios you may want to make fine-tunings.

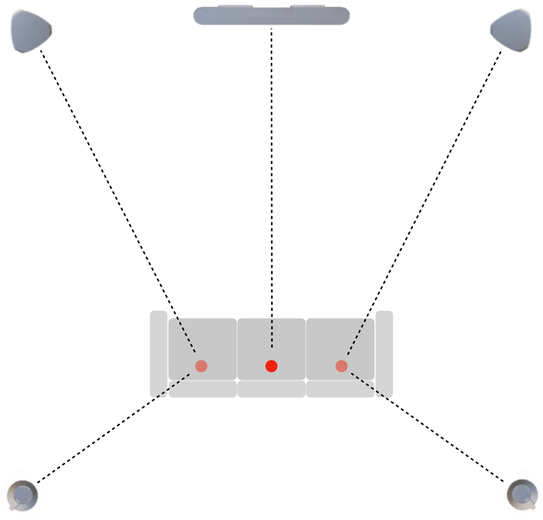
When creating a Listening Position, place the microphone in the listening position and run RoomSense (see setup 1). This result is optimised for the exact position the microphone was placed in when running the RoomSense measurement.

If creating a Listening Position for multiple listeners (see setup 2), the general recommendation is to place the microphone in the middle of the two outer points. Then fine-tune distances and levels to ensure that the sound of the nearest external speakers does not reach the ear of the person sitting in the outer position, before the sound from the centre channel does. See page 5 and 6 on how to adjust levels and distances.

Setup 1:
Symmetrical setup
One listener



Setup 2:
Symmetrical setup
Multiple listeners



Check speaker roles

RoomSense will try to automatically determine all speaker roles in relation to the selected Listening Position, but you also have the freedom to adjust the individual speaker outputs to any role at a later time.

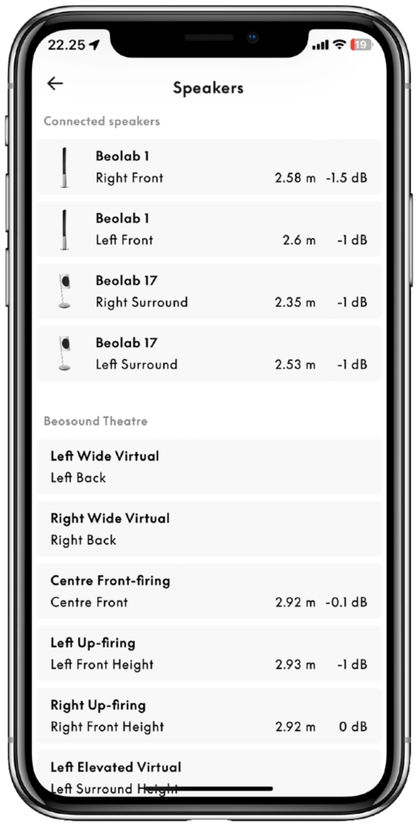
One thing to notice is that RoomSense **only measures in the horizontal plane**. Therefore, if physical height channels are installed in the ceiling, these will not be detected as height speakers by RoomSense, but instead as a non-height role.

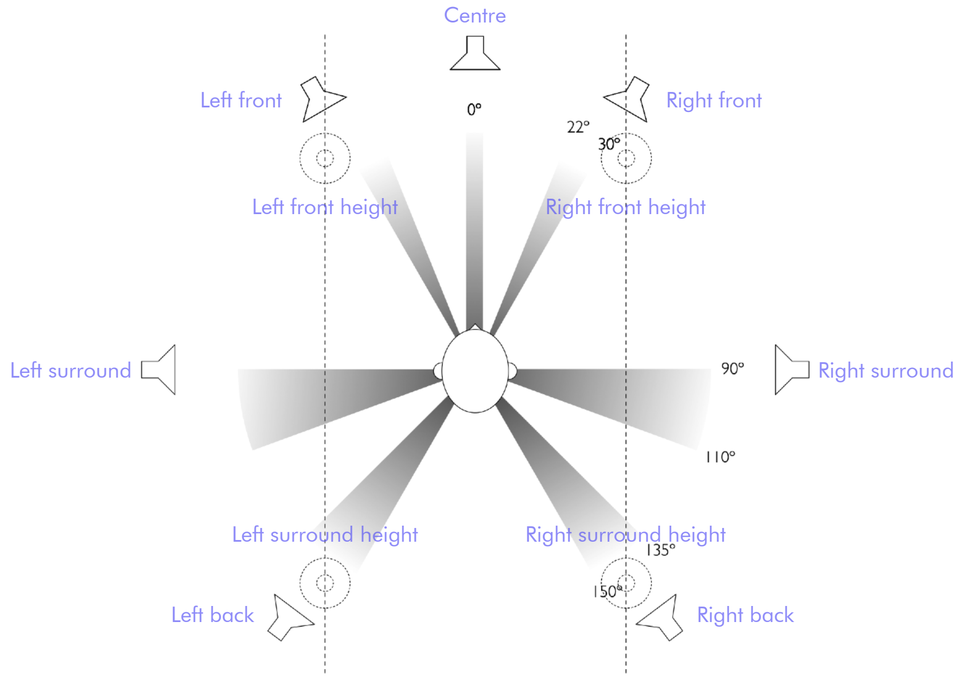
As a result of this, Beosound Theatre will set the internal Left and Right Up-firing speakers to Front Height roles.

It is important to adjust the ceiling-mounted speakers' speaker role in the Listening Position to the correct Height role. At the same time, it is also important that you disable the Height roles from Left and Right Up-firing speakers, unless there is a very specific use-case.

In most cases it is recommended to have only **one representation of a specific role**. E.g. if you add external front speakers, you want to make sure that you disable the internal Left and Right Front-firing channels.

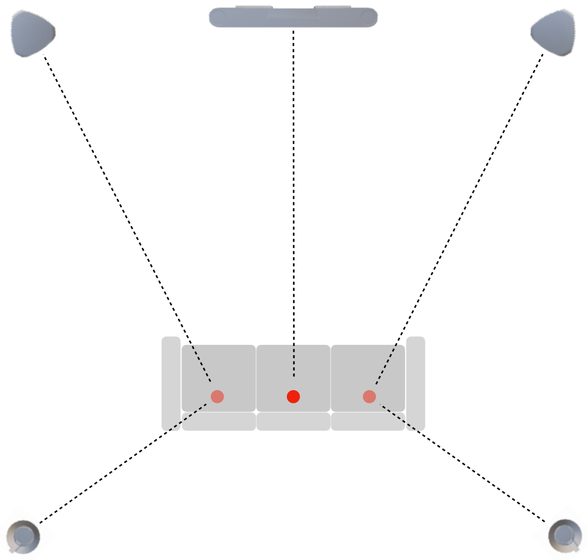
Also, apart from the centre channel, you should add speakers in pairs. For example, do not set only one Surround channel and one Back channel.



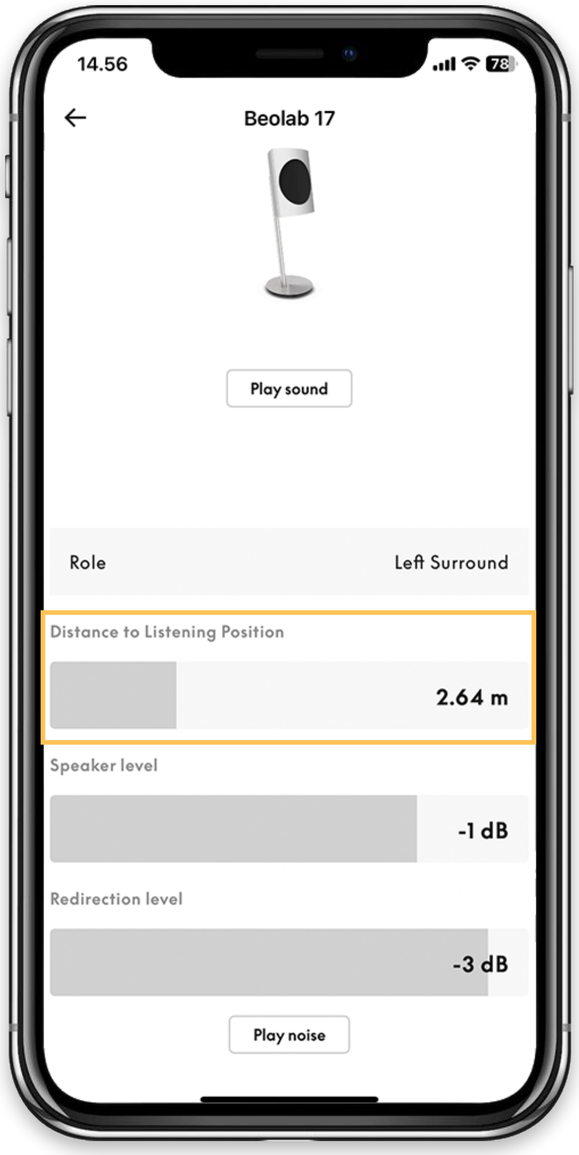


Adjust distances

1. Measure from the outer points of the listening position using a laser distance meter or measuring tape.
   This setup is intended for more than one person, so we measure from the left and right seat in the sofa to the front of the speaker you wish to adjust.
   This also applies if physical height speakers are installed in the ceiling.



2. Measure from ear-height in the listening position to the front of the speaker you wish to adjust
3. Adjust accordingly for each speaker output in the Bang & Olufsen app



Adjust levels

If you need to modify the level of one or more outputs, we suggest to use the Front-firing Centre channel as reference.

If adjusting the listening position for multiple listeners, follow the same principle as on the previous page; measure levels from the outer positions of the sofa to the closest front-, surround-, back- and height speakers. Repeat for the other side.

Navigate to the Listening Position you wish to edit, and go to the settings for the **Front-firing Centre channel**. In this example, RoomSense has already been completed. We will leave the resulting Speaker Level as-is on the Front-firing Centre channel and adjust later if necessary.

1. Ensure the room is quiet and have your SPL meter or app ready in the listening position at ear-height.
2. Tap the "Play noise" button (see Figure 1). Use **Vol + / -** on your remote control until you have a 65dB* (C-weighted) reading on your SPL meter. This volume level is now your reference to measure all the other channels, so it is important that you do not change the volume on Beosound Theatre until all adjustments are finalised.
3. Continue to measure all other outputs that you wish to include in the Listening Position. Tap the "Play noise button and adjust the "Speaker level" slider (see Figure 2) on each output until you have a 65dB* (C-weighted) reading on your SPL meter.

* In some cases it may be necessary to set the reference level to 70dB (C-weighted). This could be in a room with an HVAC system increasing the noise floor.

Figure 1

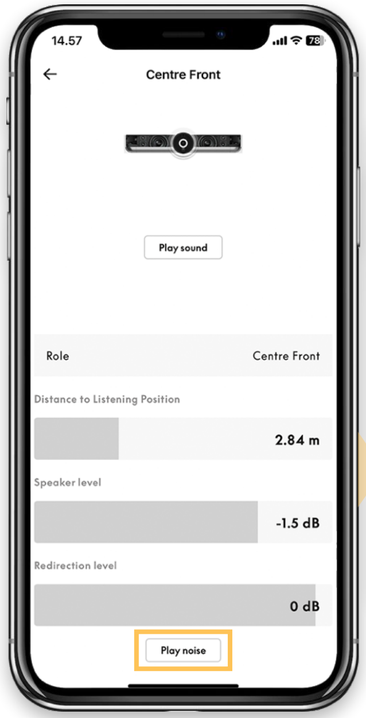
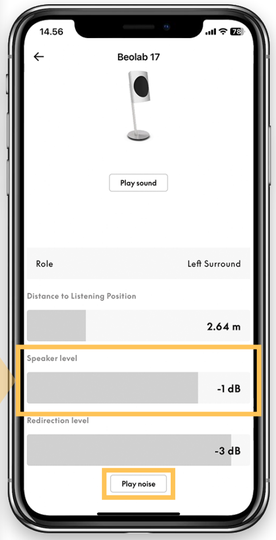
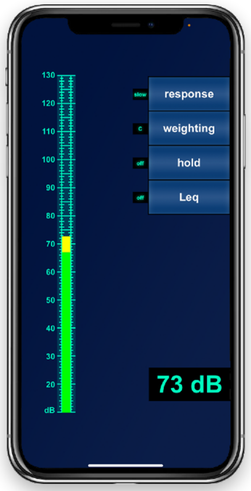


Figure 2



Adjust speaker level on all other speakers to the reference volume

Set reference volume by measuring Centre Front- firing speaker



Settings:
C-weighted
Slow

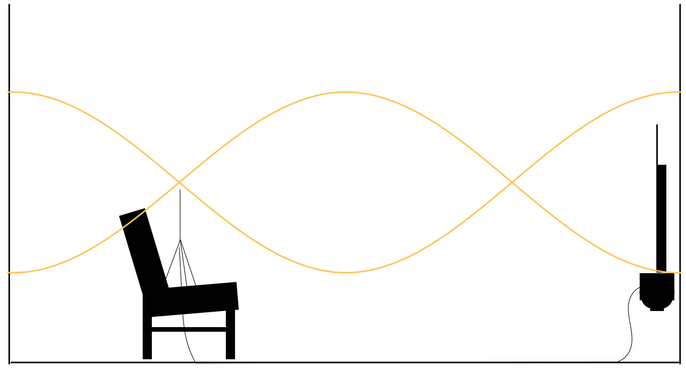
Room compensation

First of all, it is important to differentiate RoomSense and room compensation. RoomSense is the process that measures distances, levels, speaker role and creates a room compensation filter.
It is possible to delete a room compensation filter without deleting the other parameters, and it is possible to run a new room compensation without changing the already measured parameters.

You can delete the room compensation filter per Listening Position by navigating to the settings of the Listening Position and scrolling down to “Room compensation”. Here it is possible to:

1. Toggle the room compensation off temporarily, allowing you to hear the difference with and without room compensation.
2. Optional: Delete the applied filter by tapping “Delete room compensation filter”.
3. Optional: Create a new filter by pressing “Rerun room compensation”. The previous filter will be overwritten. Distances, levels and roles will not be affected by this.

All rooms have resonance frequencies, and Room compensation is, as the name suggests, trying to compensate for these. However, in rare cases you risk placing the microphone in a so-called “null” or a peak that causes the algorithm to either massively increase or decrease that specific frequency.



If you experience that a setup sounds bad (bass, primarily), start by temporarily disabling the Room Compensation filter to identify if it sounds better or worse without.

From there, you can either delete the Room compensation filter, or try to run the calibration in a slightly different position in the room. Remember, it is only the room compensation filter that is recalibrated.

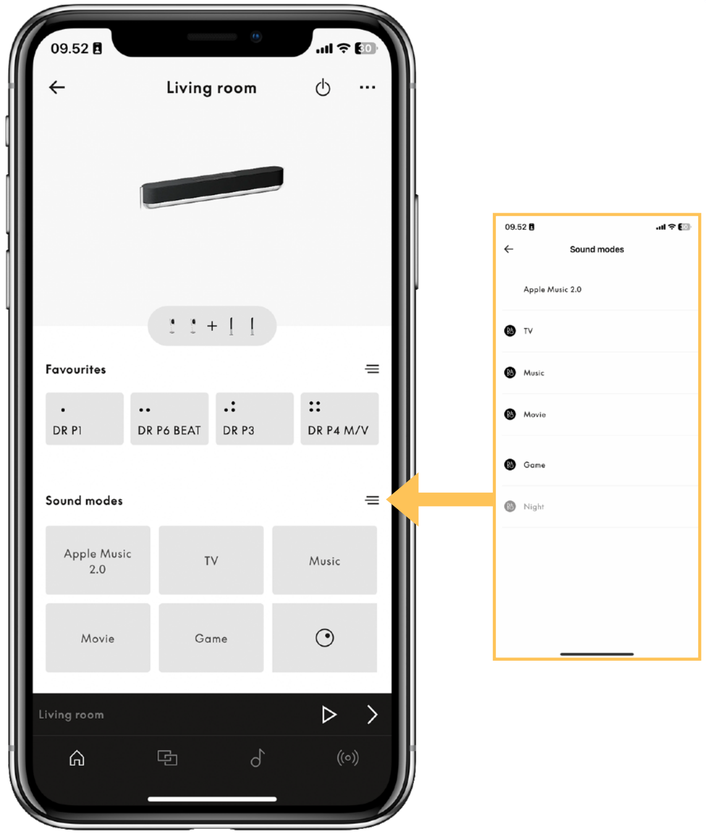
Sound modes

Sound modes are useful for customising sound profiles for different content.

You may prefer different settings for listening to music than for watching a movie, even if all the same speakers are in use.

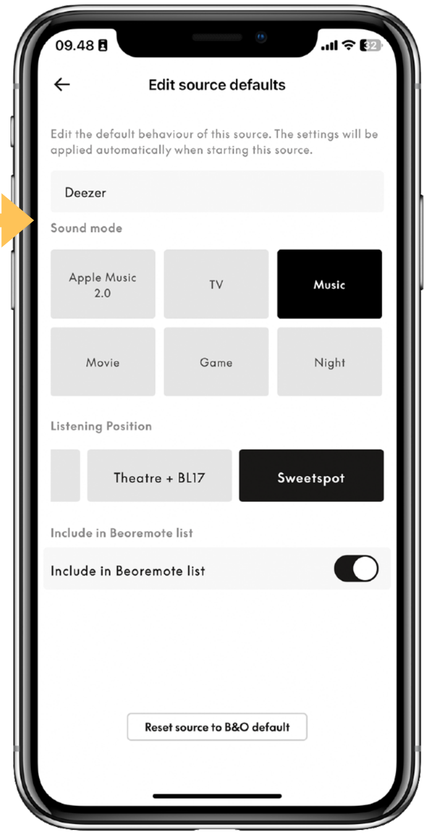
There are 5 pre-defined Sound modes, that can be activated from the list of Beoremote One or in the Bang & Olufsen app. Pre-defined does not mean that they cannot be modified.

It is also possible to create more Sound modes. The product page in the app will show 5 Sound modes. Tap the 3 lines on the right to see all available Sound modes.



It is also possible to assign a specific Sound mode (and Listening Position) to a specific source:

- Go to Product Settings / Source startup behaviour and select the source you wish to modify.
- Set the Sound mode and Listening Position you wish to activate when selecting the source.



Pre-defined Sound modes

Movie

The Movie Sound Mode is designed for use when watching movies, either from local media (such as DVD or Blu-ray), streaming sources, or television broadcasts. Timbral settings are flat and bass management is on. The True Image processing is on and all of its controls are set to the middle position, which will result in a moderate amount of upmixing of two-channel materials to the Centre Front Speaker Role. **Dynamic range compression is off** to ensure that you experience the full dynamic range of the movie's audio signal.

Music

The Music Sound Mode is designed for use for music sources, either with or without accompanying video.
Note that this mode is not designed as a 'purist' setting. However, it is intended to have a minimal effect on the audio signals, while still up- or down-mixing to all loudspeakers in your current Listening Position. Changing the Spatial Processing to 'Direct' will modify the Sound Mode to ensure that the up- and down-mixing is disabled, if preferred.
Almost all parameters for the Music mode are **identical to the Movie mode**. The only differences are a slightly reduced value for the **Frequency Tilt** parameter and an **increased value for the Width parameter**, which will result in less content in 2.0-channel recordings being upmixed to the Center Front output, thus maintaining an impression of spaciousness in music recordings that contain it.

TV

The TV Sound Mode is designed primarily for use when watching television shows either via broadcast or streaming.
Timbral settings are flat and bass management is on. The True Image processing is on and all of its controls are set to the middle position. **Dynamic range compression is set to medium to** reduce the level changes encountered during advertising breaks for broadcast materials.

Game

The Game Sound Mode is designed for use for audio with game consoles.
The Frequency Tilt and Sound Enhancement settings give **a slight bass and treble enhancement** and bass management is on. The True Image processing is on and its controls are set to **elevate the image and give an increased impression of envelopment and surround**. Dynamic range compression is off to ensure that you experience the full dynamic range of the game.

Night Listening

The Night Listening Sound Mode is designed for situations where it is desirable to hear all components of the audio signal without large jumps in dynamics or bass. Consequently, in this mode, the Beosound Theatre's dynamic range compression is set to maximum and the Speech Enhancementment is increased slightly.

Sound mode settings

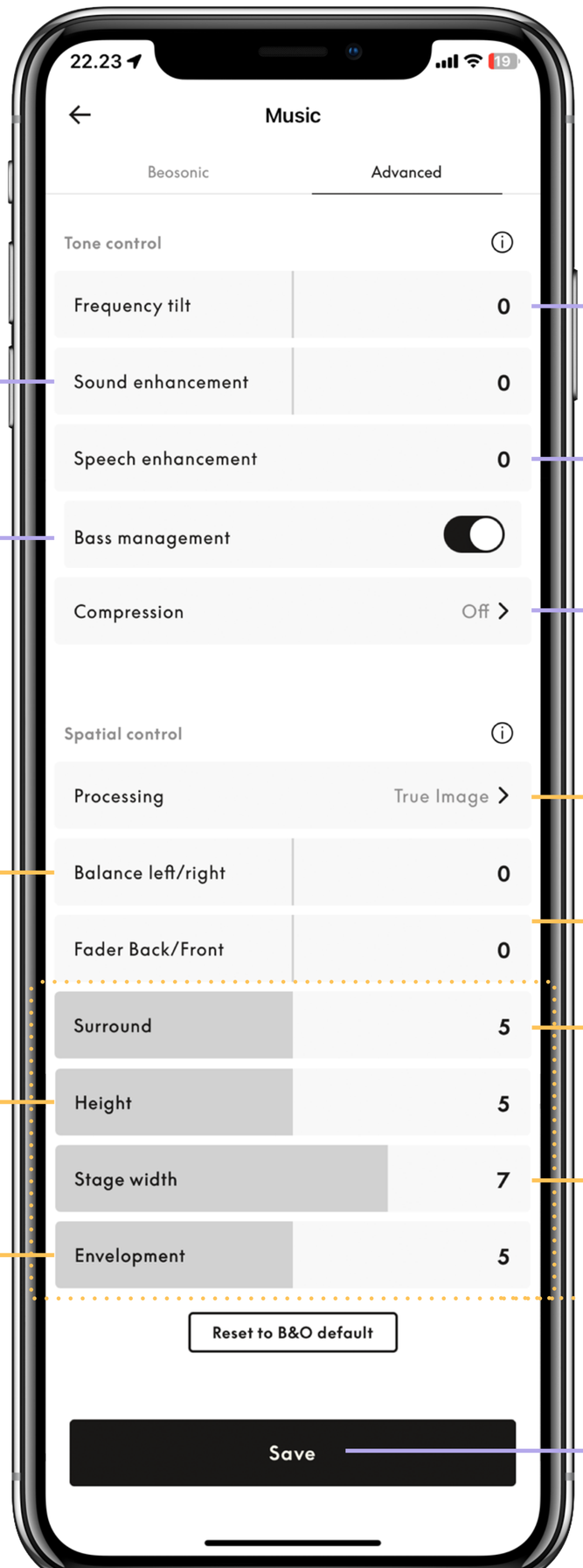
Increasing the Sound Enhancement value will **increase the level of the bass and treble bands while reducing the midrange**. Decreasing the Sound Enhancement value will have the opposite effect.

The Bass Management processing can be turned on and off as part of the settings for the Listening Modes. Default setting is 'on'.

The Balance slider adjusts the balance between all Left and Right speakers.

This setting **determines the level of the signals sent to all loudspeakers in your configuration with a 'Height' Speaker Role**. If the setting is 0, then no signal will be sent to the Height speakers.

The Envelopment setting allows you to set the desired amount of **perceived width or spaciousness from your surround and back loudspeakers**. At its minimum setting, the surround information will appear to collapse to a centre back phantom location. At its maximum setting, the surround information will appear to be very wide.



When Frequency Tilt is set lower than 0, the low frequency content of your audio signal is increased, and the level of the high frequency content is reduced. If the Frequency Tilt is set to higher than 0, then the opposite will be true. When set to 0, it will have no effect on the audio signal.

The Speech Enhancement setting allows you to **increase the intelligibility of dialogue**, making speech and voices easier to understand. Will have no effect on the audio signal when at its lowest setting.

The Compression processing can be used to **reduce the dynamic range** of audio signals. This will reduce the difference in level between the quietest and loudest portions of the music.

The selected processing of the incoming signal. Set to True Image by default. Please see Technical Sound Guide (page 8, Spatial Control) for an in-depth explanation.

The Fader adjusts the balance between Surround/Back and Front speakers.

The Surround slider will **adjust levels for Surround/Back speakers only**. Can be used to fine-tune the surround-effects without having to go to fine-tune the already calibrated speaker level for each Surround/Back speaker in the Listening Position.

The Stage width slider defines the relation between the Centre channel and the Left and Right Front. Move the slider towards 0 to direct most of the signal to the Centre channel. **Move the slider towards 10 to distribute the signal to the Front speakers. This is useful if the Centre channel sounds 'shouty'.**

All settings in this square only have an effect when Processing is set to **True Image**

Press Save when things are set as desired. You will get the choice to save to the existing preset, or create a new preset.

Beosound Theatre stand-alone

If you set up a Beosound Theatre without external speakers and run a RoomSense calibration, by default the Virtual Channels will not have any speaker roles assigned to them.

The reason being that while Virtual Channels are very convincing as e.g., height channels, they only really work for the person sitting in the exact same position as the microphone was placed in when running RoomSense.

However, if you have a setup, e.g. in a store or at a customer, where the listening position is constant, you can benefit from adding the Virtual Channels to the Listening Position.

The suggested configurations (see Table 1) will give you a 7.0.4 setup suitable for Dolby Atmos content with Beosound Theatre stand-alone.

Configuration 1: Beosound Theatre stand-alone for Dolby Atmos content

Theatre channels	Role (Suggestion A)	Role (Suggestion B)
Centre Front-firing	Centre	Centre
Left Front-firing	Left Front	Left Front
Right Front-firing	Right Front	Right Front
Left Side-firing	Left Surround	Left surround
Right Side-firing	Right Surround	Right Surround
Left Up-firing	Left Front Height	Left Front Height
Right Up-firing	Right Front Height	Right Front Height
Left Wide Virtual	Left Back	Left Back
Right Wide Virtual	Right Back	Right Back
Left Elevated Virtual	Left Surround Height	Not included
Right Elevated Virtual	Right Surround Height	Not included

For content that does not include height-channels, you can create a Listening Position without any height-roles. This may be preferable. See Table

Configuration 2: Beosound Theatre stand-alone for 2.0, 5.1 and 7.1 content

Theatre channels	Role (Suggestion A)	Role (Suggestion B)
Centre Front-firing	Centre	Centre
Left Front-firing	Left Front	Left Front
Right Front-firing	Right Front	Right Front
Left Side-firing	Not included	Left Surround
Right Side-firing	Not included	Right Surround
Left Up-firing	Not included	Not included
Right Up-firing	Not included	Not included
Left Wide Virtual	Left Surround	Left Back
Right Wide Virtual	Right Surround	Right Back
Left Elevated Virtual	Not included	Not included
Right Elevated Virtual	Not included	Not included

Beosound Theatre with a single pair of speakers

Similarly, we have created some suggestions for a setup where a single pair of Beolab 28's has been added. In general, you should ensure that each role is only represented once..

Please note that all these suggestions (Table 1-4) are exactly that: suggestions. You should be the judge of whether you like the sound or not.

Table 3: Beosound Theatre with e.g. Beolab 28 surrounds for Dolby Atmos content

Theatre channels	Role (Suggestion A)	Role (Suggestion B)
Centre Front-firing	Centre	Centre
Left Front-firing	Left Front	Left Front
Right Front-firing	Right Front	Right Front
Left Side-firing	Not included	Left Back
Right Side-firing	Not included	Right Back
Left Up-firing	Left Front Height	Left Front Height
Right Up-firing	Right Front Height	Right Front Height
Left Wide Virtual	Left Back	Not included
Right Wide Virtual	Right Back	Not included
Left Elevated Virtual	Left Surround Height	Left Surround Height
Right Elevated Virtual	Right Surround Height	Right Surround Height
Beolab 28	Left Surround	Left Surround
Beolab 28	Right Surround	Right Surround

Table 4: Beosound Theatre with e.g. Beolab 28 surrounds for 2.0, 5.1 and 7.1 content

Theatre channels	Role (Suggestion A)	Role (Suggestion B)
Centre Front-firing	Centre	Centre
Left Front-firing	Left Front	Left Front
Right Front-firing	Right Front	Right Front
Left Side-firing	Not included	Left Back
Right Side-firing	Not included	Right Back
Left Up-firing	Not included	Not included
Right Up-firing	Not included	Not included
Left Wide Virtual	Left Back	Not included
Right Wide Virtual	Right Back	Not included
Left Elevated Virtual	Not included	Not included
Right Elevated Virtual	Not included	Not included
Beolab 28	Left Surround	Left Surround
Beolab 28	Right Surround	Right Surround

Listening positions with Beolab 50 and 90

A new feature in the Bang & Olufsen app (from version 5.0) is the option to set the latency mode on Beolab 50 and 90 when creating a new Listening Position.

What does the latency mode do?

Beolab 50 and 90 offer a low and a high latency mode. Latency indicates how long the internal sound processing takes; the longer time the speaker gets to process the sound, the better the beam forming of especially the low frequencies works.

We recommend using the high latency mode for music content and the low latency mode for video content, because with high latency, the audio processing takes longer than we can delay the image, which will cause noticeable lip sync issues.

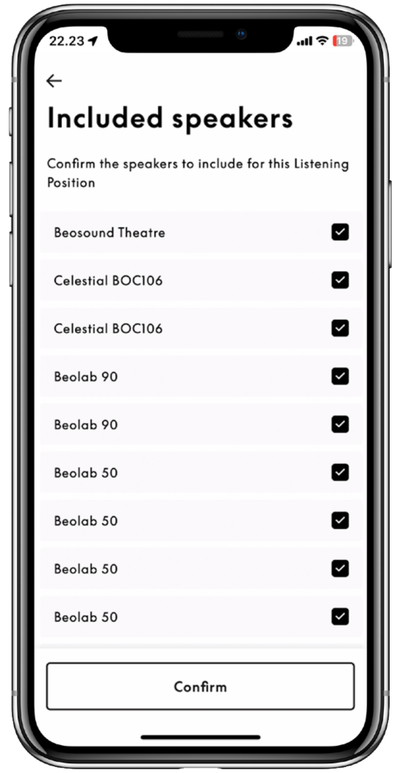
Having the ability to set the latency mode per Listening Position allows for the customer to enjoy stereo and Dolby Atmos music content from a video source, e.g. Tidal for Apple TV, in the highest quality possible.

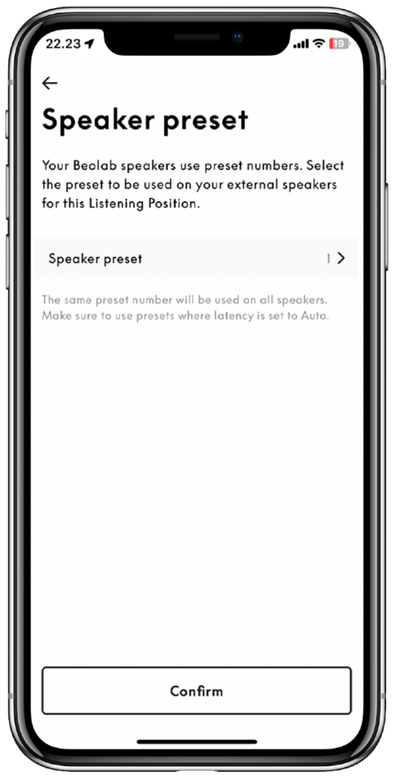
How do I use it?

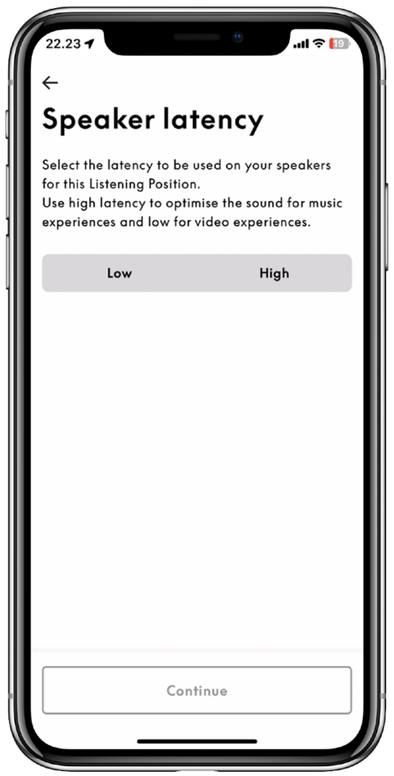
When creating a new Listening Position that includes Beolab 50 or 90, one step has been added to the setup wizard. See figure 3.

Important! The 'Latency Mode' in the speaker preset used on Beolab 50 and 90 must be set to 'Auto'. Otherwise, Beosound Theatre is unable to instruct the speaker to change mode when activating the Listening Mode, causing your speakers to be out of sync with each other.

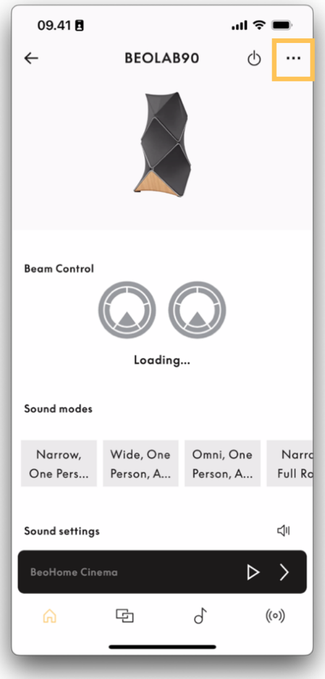
See how to set the Latency mode to 'Auto' on the next page.

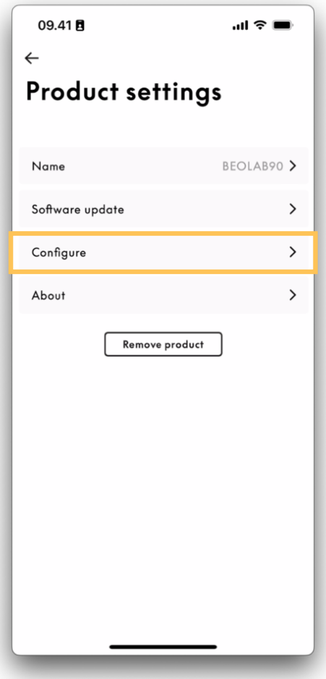


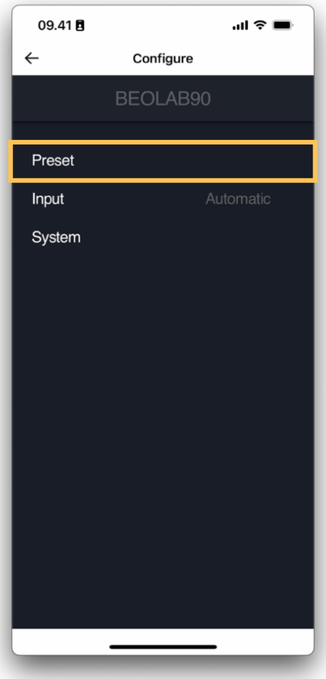


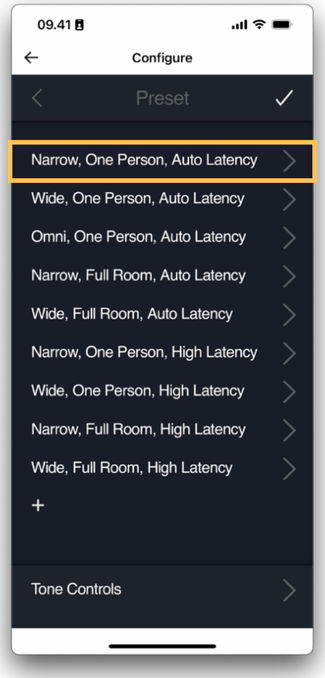


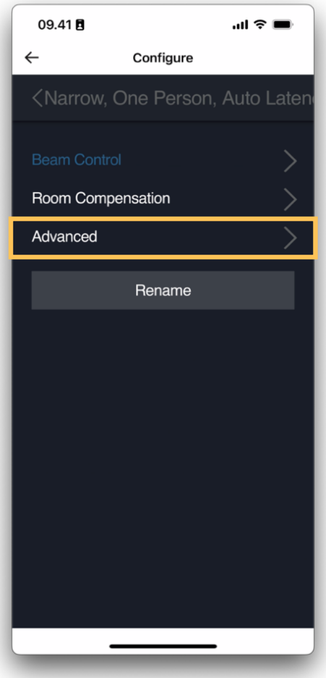
Setting Latency Mode: Auto on Beolab 50 and 90

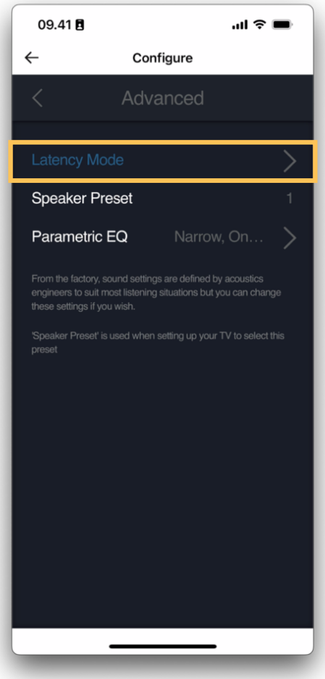


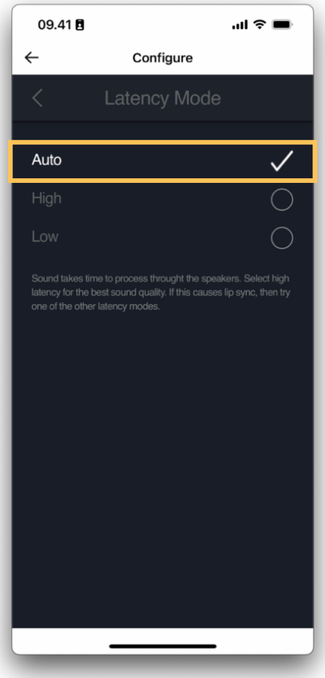




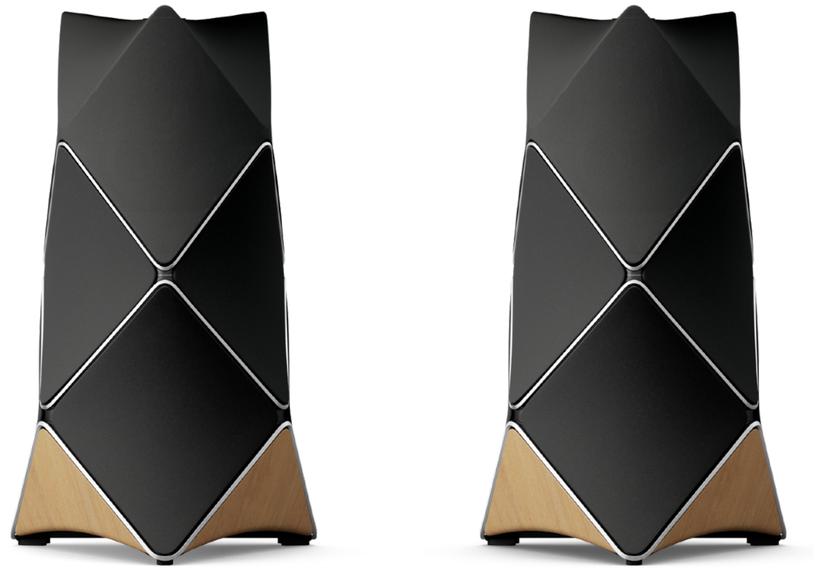








Room calibration considerations with Beolab 50 and 90



Some of our Beolab speakers, e.g Beolab 28, can make a Room compensation filter. They use a built-in microphone, placed on the speaker itself to correct any “misbehaving frequencies” in the speaker’s position.

Beosound Theatre uses a single measurement with an external microphone to measure all connected speakers from the listening position. This will in most cases result in better audio performance.

There are, however, two exceptions: Beolab 50 and 90s. These speakers have their own Room Calibration filters and are measured in 3 different spots in the room with an external microphone, this gives an even more precise measurement.

If Beolab 50 or 90’s are connected to Beosound Theatre, we suggest that you delete the Room Calibration filter in Beosound Theatre. Ensure that each connected pair of Beolab 50 and 90’s is calibrated via the configuration page for the speakers.

To delete the Room compensation filter in Beosound Theatre:

- Open the Bang & Olufsen app
- Select Beosound Theatre
- Select the Listening position you want to modify
- Select Speakers
- Scroll down and select Room compensation
- Select Delete Room Compensation