
# The right monitors. The correct setup. Perfect sound.

Monitor setup guide

GENELEC®

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# Genelec key technologies

Active electronic crossover operating at low signal levels.

Optimized amplifiers. Each transducer is driven by its own optimized amplifier.

Protection circuitry. Sophisticated drive unit protection circuitry for safe operation.

Room response controls. Precise room response controls for optimizing in-room performance.

Directivity Control Waveguide DCW for flat on- and off- axis response.

# What is a monitor?

## Monitoring

What is a monitor?

*A person or a device that observes, checks, controls, warns or keeps continous record of something.*

An audio monitor is much more than just a loudspeaker that sounds good. It is a surveillance device of the process of either recording or mixing or transmitting, or any situation where critical audio work is performed.

What is a reference monitor?

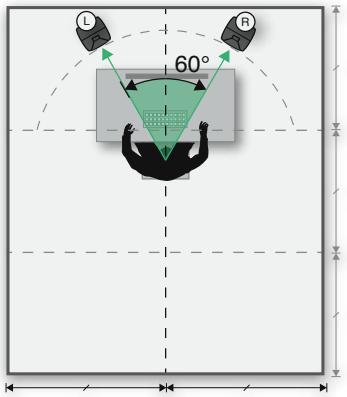
Add the word *reference* to the word *monitor* and we get the *reference monitor*. What does it take for a monitor to become a reference monitor? It needs to be reliable and well known but also we need to know the frequency response at the listening position so that we are able to calibrate the monitor as flat as possible. Only then we can call it a reference monitor.

Select the right Genelec monitor to serve as a perfect tool for your situation at www.genelec.com/learning-center/speaker-selection

# Basics of system setup.

## Monitor placement

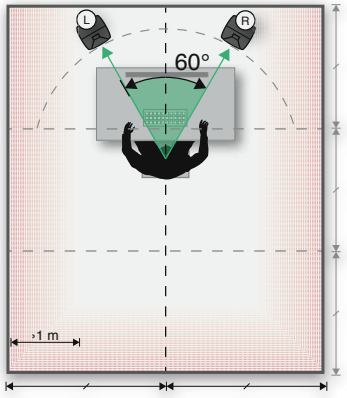
Step 1 Identify your listening area. Try to have the listening position within the front 1/3 of the room. Place the monitors in 60° angle and point them towards the listening position.




Step 1

Step 2 Avoid listening position closer than 1 m from any wall.

Step 3 Find the left-right symmetry axis of your room. Establish the symmetrical listening position.



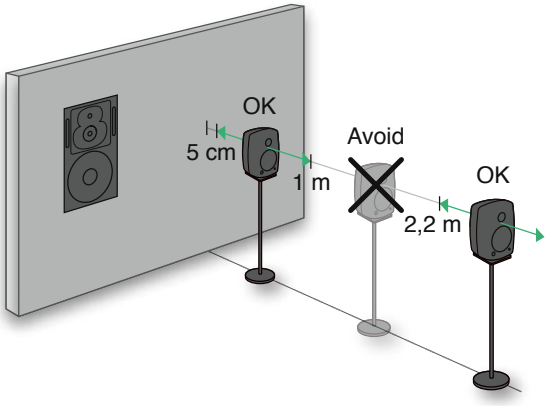

Step 2

Step 4 Every monitor has a listening distance recommendation. Place the monitor accordingly. (see page 25 et seq.).

Step 5

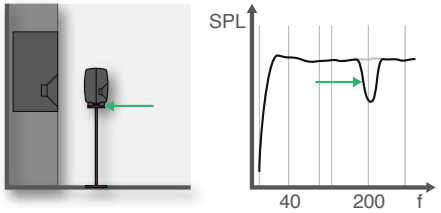
Avoid placing the monitors between 1-2.2 m from the wall due to wall cancellation.

Speaker distance to the front wall

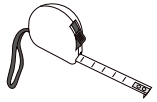



When you move the speaker closer to the wall, the cancellation moves higher in frequency range.

Cancellation frequency and wall behind the speaker

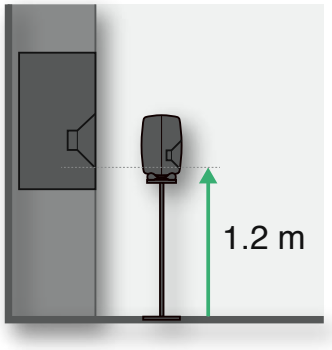



*You can easily find the cancellation frequencies with the Genelec AcoustiTape. Ordercode MAI-0079.*



Step 6

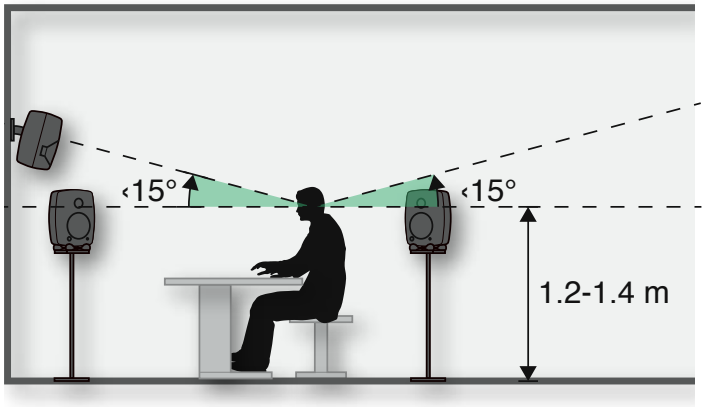
A monitor should not be placed closer than 1.2 m from the floor.




Step 7

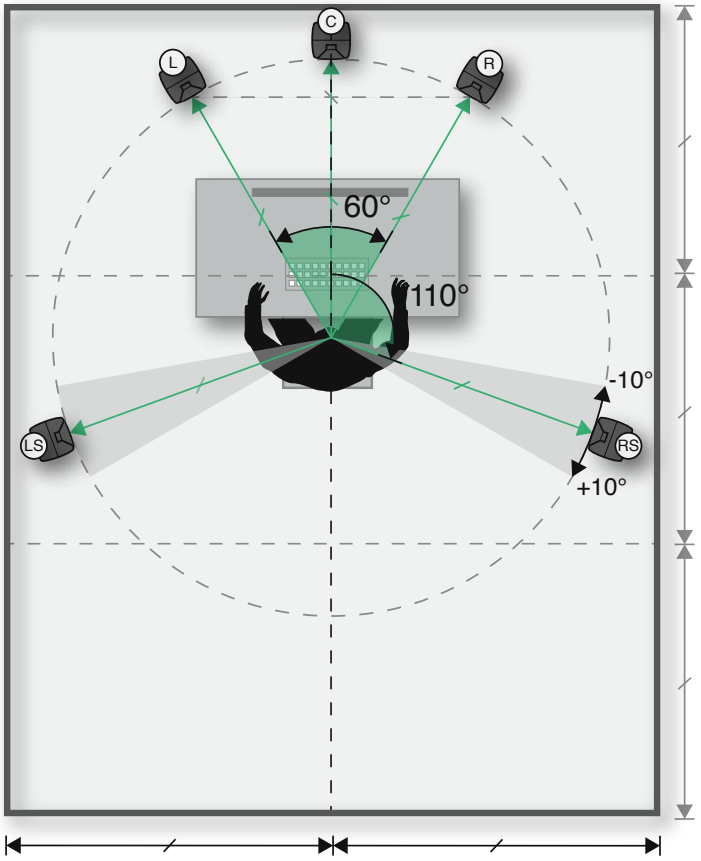
Point the monitors towards your listening position, do not tilt more than 15 degrees.
Normal listening position height is between 1.2 and 1.4 m.

Monitor heights (ITU-R BS.775-1 standard)



Correct monitor placement

An ideal 5.1 setup.

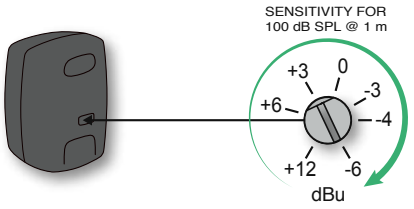



# Monitor settings

Step 1

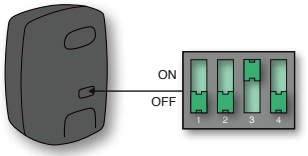
Set the sensitivity control on all speakers clockwise to full (-6 dBu) to begin with.
More information can be found in the operating manual of your product.

Input sensitivity control




Step 2

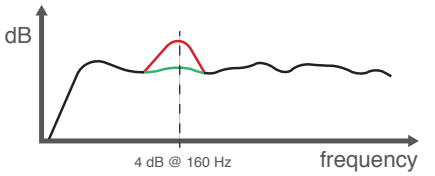
If you use an acoustic measurement device like RoomEQ Wizard, measure ear height at the listening position. Analyse the results and adjust DIP-switches to achieve as flat and similar frequency response as possible in each monitor.

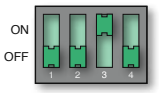



Step 3

If you have a large horizontal surface in front of the monitors, a boost around 160 Hz boost typically occurs. Some Genelec monitors have a desktop control DIP switch, which compensates the 160 Hz boost by -4 dB.

Desktop control DIP switch

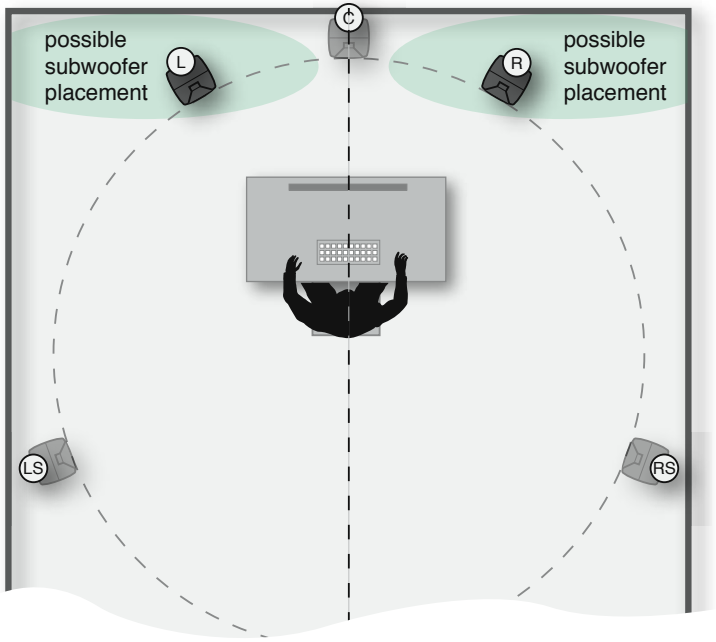


# Subwoofer placement

Step 1 Finding a subwoofer position can be difficult. Try to find a location between left-center or center-right area at the front wall. Avoid exact center position, where the room modes may cause problems.

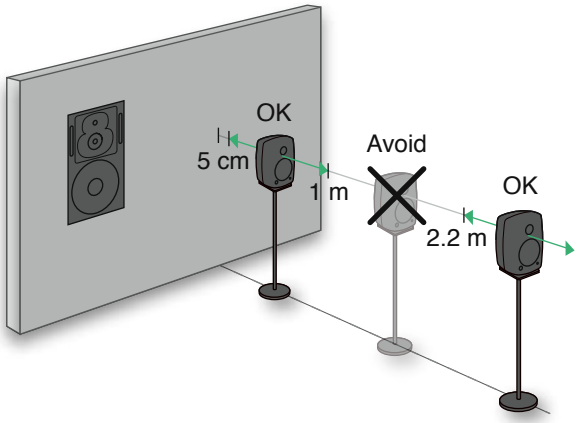
Subwoofer placement



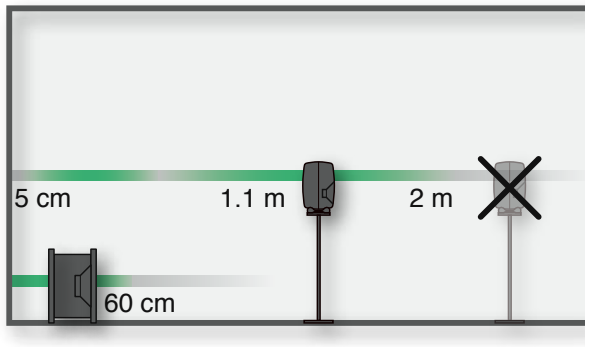

Step 2 Placing the subwoofer to a corner or near the front wall boosts the bass. Use sensitivity control to compensate the bass boost.

A Genelec subwoofer reproduces the frequencies up to 85 Hz and the monitors reproduce the frequencies above 85 Hz. The LFE channel in the subwoofer reproduces frequencies up to 120 Hz.

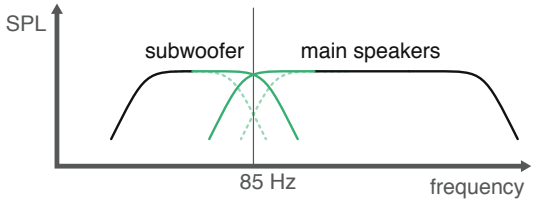
Recommended distance from front wall (without subwoofer)




Speaker and subwoofer distance from the front wall




Step 3 Adjust the subwoofer phase and level according to the procedure described in the operating manual.



# Room improvements.

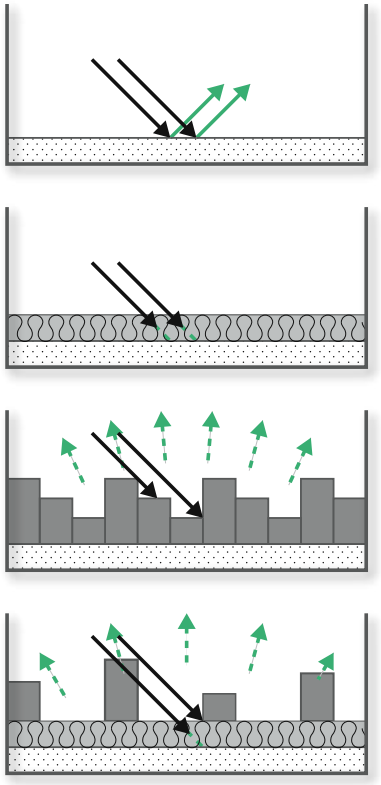
## Adjusting the listening space

## Room treatments

Calibration doesn't necessarily give best results if the room is not acoustically properly treated. Some improvements can be made quite easily. There is plenty of information in the Internet and many acoustic professionals to help you out with room issues.

Wall surfaces, ceilings and floors can be reflective, diffusive or absorptive. Combinations of these are often used.

Diffusion and absorption



Hard surfaces such as glass, concrete, dry wall or MDF reflect the sound.

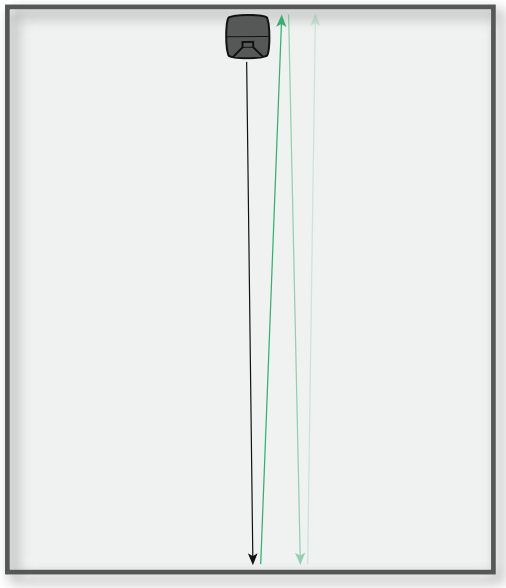
Soft materials such as rock/mineral wool, carpets and curtains absorb the sound. The thicker the layer is, better is the absorption.

Irregular surfaces such as diffusers or bookshelves diffuse and spread the sound around.

Combination of diffusive and absorptive surface.

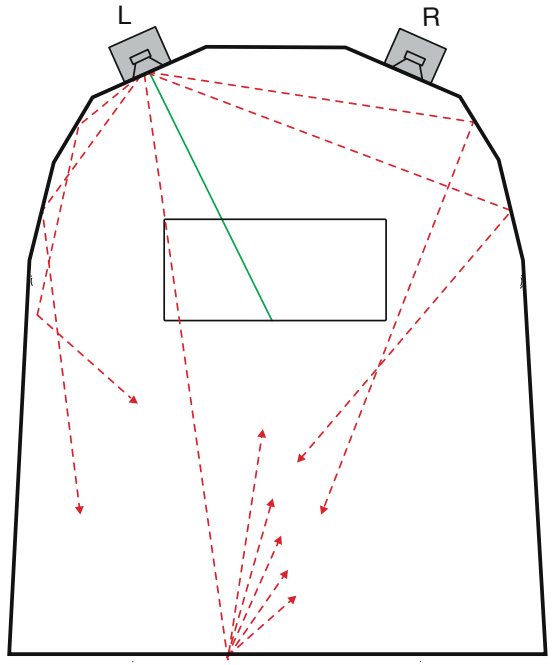
Two opposite, parallel surfaces in a room sustain the sound energy bouncing back and forth causing flutter echo, standing waves or cancellation dips.

Flutter echo



Reflections can also occur between three or more surfaces. Optimal acoustic situation is when you receive a natural direct sound from the speakers to your listening position (a.k.a. sweet spot) without the room reflections coloring the sound and the stereo imaging.

Multiple reflections



# Acoustic improvements

Improve the acoustics in your room by following these steps:

Step 1 Cut the corners, use MDF or drywall and fill the empty space with mineral wool.

Step 2 Use damping material on the front wall surfaces.

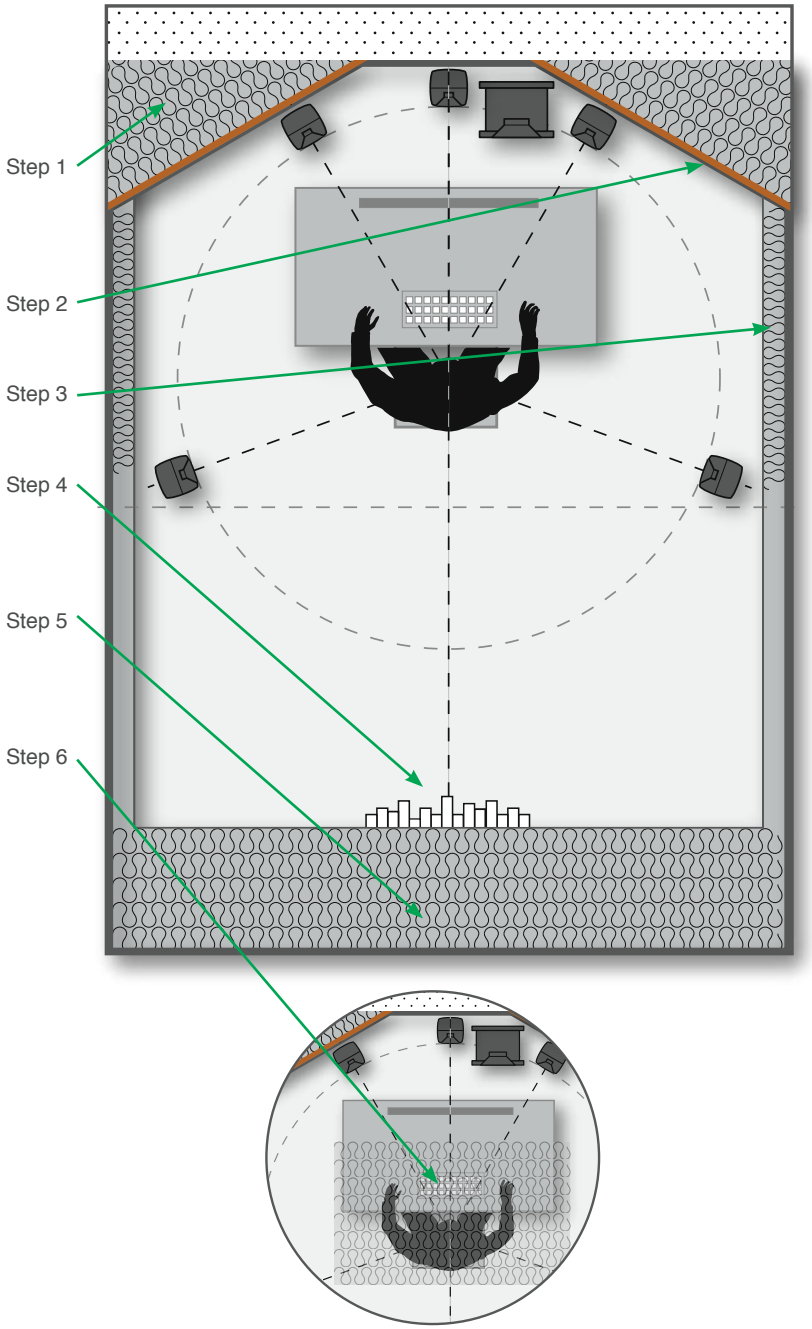
Step 3 Use damping material on the side walls.

Step 4 Use diffusive element(s) on the back wall. This can be e.g. a simple bookself.

Step 5 Massive layer of damping material at the back of the room, up to 40-50 cm or more is okay.

Step 6 Use damping and diffusive material above the listening position.

The picture shows a 5.1 system. The same rules apply to a stereo setup.



# Fundamentals.

## Basics of sound

Sound travels approximately 340 m/s. It takes 3 ms to travel 1 meter.

Ideally the sound volume drops by 6 dB when the distance doubles.

| | | |
|---|---|---|
| 1 m | 100 dB | 0 dB |
| 2 m | 94 dB | -6 dB |
| 4 m | 88 dB | -12 dB |

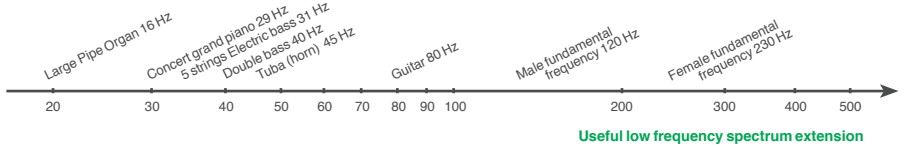
Sound volume increases 3 dB when the power doubles.

| | | |
|---|---|---|
| 100 W | 85 dB | 0 dB |
| 200 W | 88 dB | +3 dB |
| 400 W | 91 dB | +6 dB |

Industry standard SPL for cinema mixing work is 85 dB at the listening position.

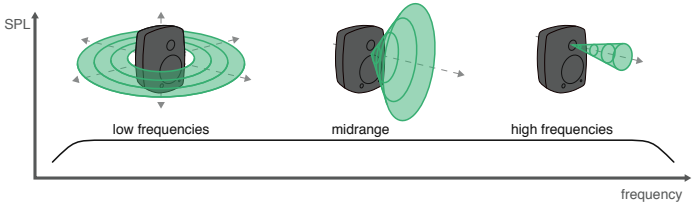
Common definitions of Frequency spectra:

| | | |
|---|---|---|
| Subsonic frequencies | 1 Hz - 20 Hz | Not audible to humans. |
| Very low frequencies | 20 Hz - 40 Hz | Lowest audible octave to humans. |
| Low frequencies | 40 Hz - 160 Hz | Music low frequencies, here are the kick drum, bass and low register of grand piano. |
| Middle low frequencies | 160 Hz – 400 Hz | Middle C of piano is here. |
| Middle frequencies | 400 Hz - 2.5 kHz | Low-order harmonics of most instruments. |
| Middle high frequencies | 2.5 kHz - 5 kHz | Ear most sensitive to this range. Presence, voice frequencies are here. |
| High frequencies | 5 kHz - 10 kHz | Brightness and harmonics are here. |
| Very high frequencies | 10 kHz - 20 kHz | Highest harmonics are here. |



## Sound radiation

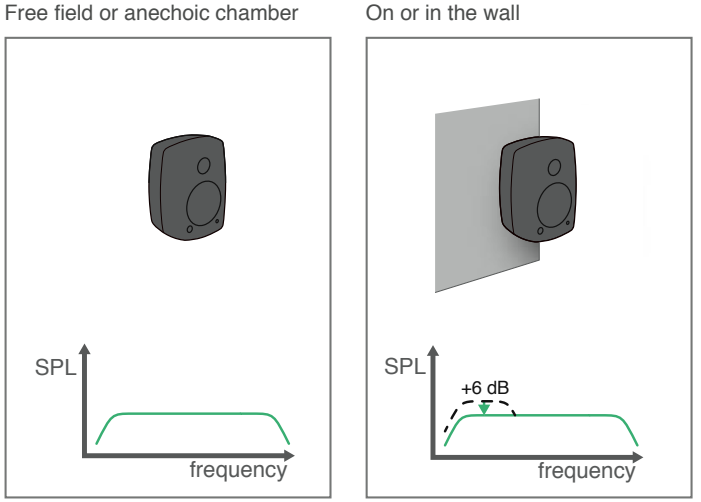
The monitor radiates omnidirectionally at low frequencies. At higher frequencies, the energy radiated becomes increasingly directional: midrange frequencies radiate in a hemispherical pattern and high frequencies in a beam- or ray-like pattern. All this sound energy reflects from the walls around and should be controlled.

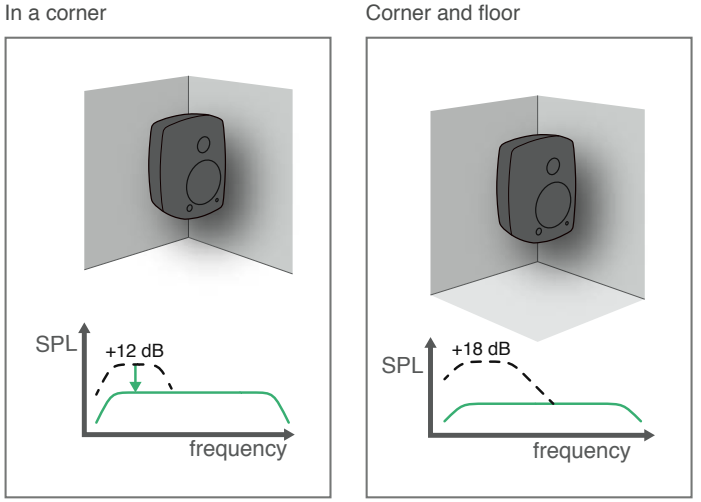



## Radiation load

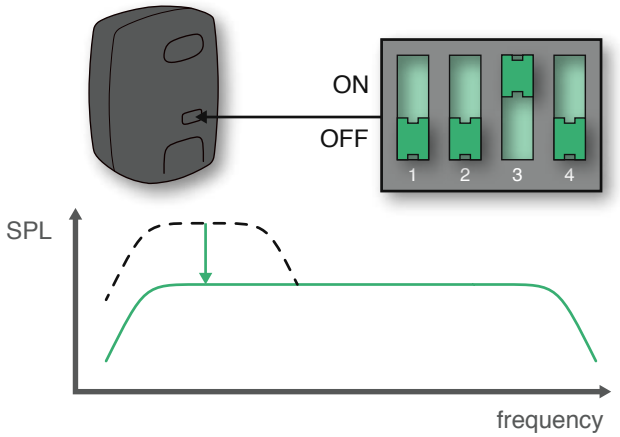
Ideally, free standing monitor has a flat frequency response. Placing the monitor near the wall boosts the low frequencies; one wall up to +6 dB, a two-wall corner (or wall and desk) up to +12 dB and a two-wall corner with floor, desk (or even ceiling) boosts up to +18 dB. Genelec speakers come with DIP switches which are designed to compensate this boundary load effect. (AutoCal in DSP systems.)

## Wall proximity gives low frequency boost



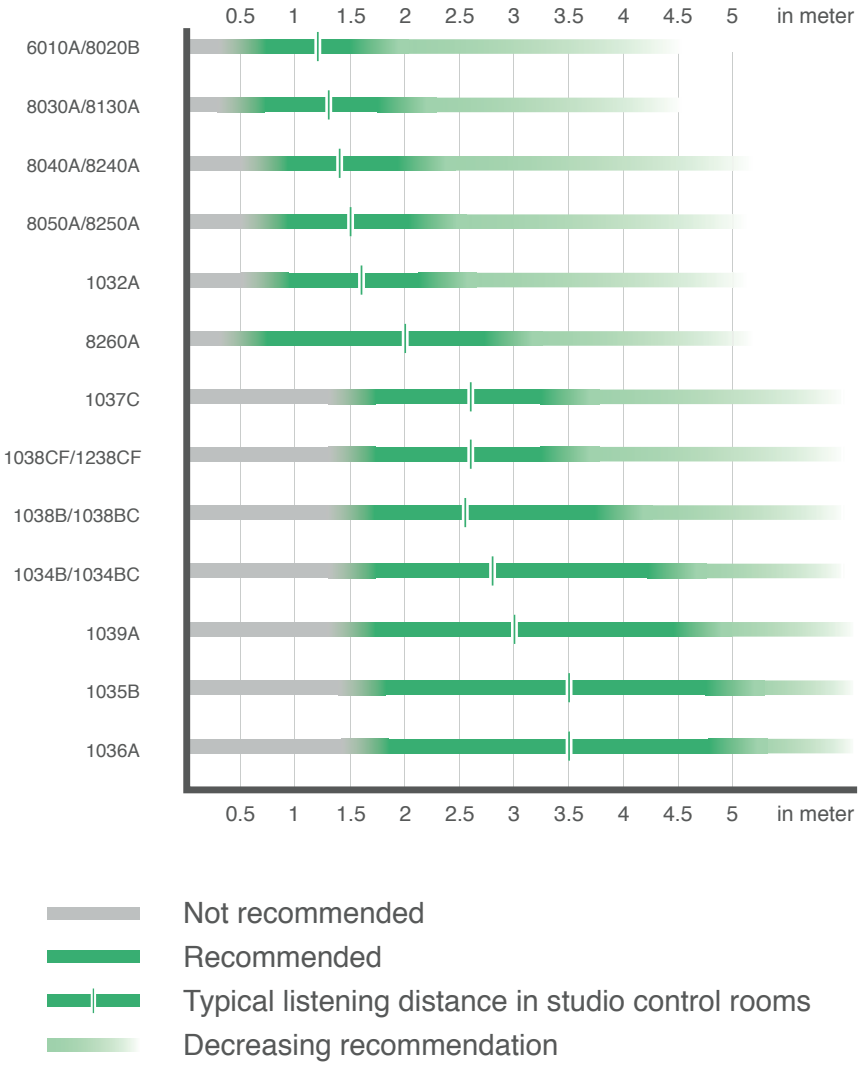
Low frequency boost correction




The ideal situation is to have the room, the speaker and the listener in a good harmony.

Each room is different and behaves differently when the speaker is placed in the room. Speaker calibration minimizes the coloration caused by the room. Ideal calibration results in a flat frequency response, with minimum boosts/bumps, dips/notches or ripples across entire frequency response.

## Monitor listening distance recommendations



| Monitors | -3 dB LF extension | SPL short term RMS @ 1 m *) |
|---|---|---|
| 6010A | 73 Hz | 93 dB |
| 8020B | 66 Hz | 95 dB |
| 8030A / 8130A | 55 Hz | 100 dB |
| 8040A / 8240A | 45 Hz | 105 dB |
| 8050A / 8250A | 35 Hz | 110 dB |
| 1032A | 40 Hz | 113 dB |
| 8260A | 26 Hz | 113 dB |
| 1037C | 35 Hz | 116 dB |
| 1038CF / 1238CF | 55 Hz | 118 dB |
| 1038B | 33 Hz | 120 dB |
| 1034B | 32 Hz | 123 dB |
| 1039A | 29 Hz | 126 dB |
| 1035B | 29 Hz | 131 dB |
| 1036A | 19 Hz | 131 dB |

*) Maximum short term sine wave acoustic output on axis in half space, averaged from 100 Hz to 3 kHz @ 1m

| Room volume up to | Subwoofers for 2-channel (Stereo) | Subwoofers for 5-channel (Surround) |
|---|---|---|
| 55 $m^3$ | 5040A | 5040A |
| 65 $m^3$ | 7050B | 7050B |
| 75 $m^3$ | 7050B | 7060B / 7260A |
| 85 $m^3$ | 7060B / 7260A | 7070A / 7270A |
| 95 $m^3$ | 7070A / 7270A | 7071A / 7271A |
| 100 $m^3$ | 7070A / 7270A | 7071A / 7271A |
| 115 $m^3$ | 7071A / 7271A | 7071A / 7271A |
| 125 $m^3$ | 7071A / 7271A | 7073A |
| 125 $m^3$ | 7071A / 7271A | 7073A |
| 170 $m^3$ | 7071A / 7271A | 7073A |
| 200 $m^3$ | 7073A | 2 x 7073A |
| 240 $m^3$ | 7073A | 2 x 7073A |
| 400 $m^3$ | 2 x 7073A | 3 x 7073A |
| 400 $m^3$ | 2 x 7073A | 3 x 7073A |

| Subwoofers | Frequency +/-3 dB | SPL short term RMS @ 1 m |
|---|---|---|
| 5040A | 35 - 85 Hz | 96 dB |
| 7050B | 25 - 85 Hz | 100 dB |
| 7060B / 7260A | 19 - 85 / 120 Hz | 108 dB |
| 7070A / 7270A | 19 - 85 / 120 Hz | 112 dB |
| 7071A / 7271A | 19 - 85 / 120 Hz | 118 dB |
| 7073A | 19 - 85 / 120 Hz | 124 dB |

# 8000 Series – The perfect monitoring loudspeaker

The Genelec 8000 Series represents the culmination in two-way active monitor design with several groundbreaking innovations combined into one single product. With the 8000 Series, Genelec introduced the Minimum Diffraction Enclosure™ (MDE™) with its rounded edges curving gently and seamlessly into the shape of the Advanced Directivity Control Waveguide (DCW™) and the rear-mounted reflex port. Made out of die-cast aluminium, the 8000 Series enclosures offer excellent vibration damping and sturdy structure with thin walls to maximize the internal volume.

## Designed to perform

The rounded edges in the 8000 Series products are there not just for the fancy looks, they also give the loudspeakers several acoustical benefits. The curved MDE™ cabinet significantly contributes to the product's unsurpassed frequency and power responses. The minimized cabinet edge diffraction yields superb imaging qualities. The long, curved reflex tube is flow optimized to increase the woofer's low frequency extension and SPL capacity. Low distortion drivers combined with carefully designed filters improve resolution and minimize listening fatigue over the entire audio spectrum.

Every Genelec 8000 Series loudspeaker comes with an elastic Iso-Pod™ (Isolation Positioner/Decoupler™) which prevents coloration caused by conduction of unwanted vibration to the mounting surfaces. The Iso-Pod™ also features adjustable speaker tilt for precise aiming of the acoustical axis.

All 8000 Series models are now available in the new Mystic Black finish in addition to the White, Matt Black and Polished Aluminium finishes.

White

Polished Aluminium

Matt Black

Mystic Black

## A sound investment

Quality and long lasting value have been hallmarks of Genelec active monitors for more than thirty years. Our products are built to last, which has been road-proven throughout all these years. We also offer extensive support services through our sales network and with on-line tools. With the Genelec 8000 Series you can experience the best sound quality for decades. The Genelec Community at www.genelec.com/community is a place to meet fellow Genelec users or discuss about your loudspeaker set-up directly with us.

The latest development in our Community site is the possibility to register your Genelec products for an extended warranty. All products that are registered under your Community user account are eligible for two-year warranty extension.


## 8020B

95 dB per loudspeaker @ 1m
66-20000 Hz ± 2.5 dB
Bass 4” + Treble 3/4”, metal dome + DCW™
Bass 20 W + Treble 20 W
H x W x D  242 x 151 x 142 mm with Iso-Pod™
3.7 kg

## 8030A

100 dB per loudspeaker @ 1m
58-20000 Hz ± 2.0 dB
Bass 5” + Treble 3/4”, metal dome + DCW™
Bass 40 W + Treble 40 W
H x W x D  299 x 189 x 178 mm with Iso-Pod™
5.6 kg

## 8040A

105 dB per loudspeaker @ 1m
48-20000 Hz ± 2.0 dB
Bass 61/2” + Treble 3/4”, metal dome + DCW™
Bass 90 W + Treble 90 W
H x W x D  365 x 237 x 223 mm with Iso-Pod™
8.6 kg

## 8050A

110 dB per loudspeaker @ 1m
38-20000 Hz ± 2.0 dB
Bass 8” + Treble 1”, metal dome + DCW™
Bass 150 W + Treble 120 W
H x W x D  452 x 286 x 278 mm with Iso-Pod™
12.7 kg

sound passion

441 859

Genelec Oy
Olvitie 5 · 74100 Iisalmi · Finland
T +358 17 83 881
F +358 17 81 2267
e-mail: genelec@genelec.com



www.genelec.com

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