

7050B

Operating Manual
Genelec 7050B
Active Subwoofer

GENELEC®





Genelec 7050B Active Subwoofer

General description

Genelec 7050B active subwoofer is a very compact low frequency loudspeaker, designed to extend the bass reproduction of Genelec 8020A active loudspeakers in stereo or surround applications and models 8030A or 8130A in stereo applications. Adding the 7050B to these loudspeakers creates a compact nearfield monitoring system capable of a flat frequency response from 25 Hz to 20 kHz (± 3 dB). The 7050B should not be used in surround applications with the 8030A or 8130A due to their greater SPL capacity.

Driver

The 7050B contains a single 205 mm (8") magnetically shielded low frequency driver, housed in a Genelec Laminar Spiral Enclosure™ (LSE™) bass reflex cabinet.

Crossover

The crossover contained within the amplifier has a fixed 85 Hz low pass filter for the five main channels. However, the signal passing through the "OUT" connectors is full bandwidth, i.e. not filtered. Because of this, the "BASS ROLL-OFF" switch (switch 2) on the main loudspeakers must be switched on to avoid unwanted overlapping of the frequency

bands between the subwoofer and main loudspeakers. Due to this and the input sensitivity of the 7050B subwoofer, it can only be used with Genelec 8020A, 8030A, 8130A, 1029A, 2029A and 2029B active loudspeakers. The LFE input has a selectable 85/120 Hz low pass filter and selectable 0/+10 dB input sensitivity. The overall input sensitivity of the subwoofer can be reduced from -6 dB to +12 dB for easy level matching with the main loudspeakers.

Amplifier

The amplifier produces 70 W of output power, with very low THD and IM distortion. Driver overload protection and power-on signal muting is included in the amplifier circuitry. The amplifier also incorporates thermal overload and short circuit protection.

Installation

The subwoofer is supplied with a mains cable and this operating manual. Once unpacked inspect the subwoofer to ensure that it has not been damaged in transport. Check that the mains voltage marking on the back panel matches your local mains voltage. Ensure that both the subwoofer and the main loudspeakers are switched off before making any connections.

Audio connections are made with balanced XLR cables. The 7050B has IN/OUT connector pairs for five main channels and a dedicated LFE input connector for the LFE channel. Connect the signal cables from your source to the female XLR "IN" connectors on the lower connector row. Next connect XLR cables from the corresponding "OUT" male XLR connectors on the upper row to the input connectors of each main loudspeaker. Turn the volume control knob on all main loudspeakers fully clockwise and switch the "BASS ROLL-OFF" dip switch (switch 2) on all main loudspeakers to "ON". This switch actuates an 85 Hz highpass filter on the main loudspeakers matching them to the main channel lowpass filter of the subwoofer.

Alternatively, you can connect a stereo pair of loudspeakers by routing the signal cables from the source to the input connectors of the main loudspeakers and another pair of cables from the main loudspeakers' output connectors to the "IN" connectors on the 7050B. In this configuration the volume controls on the main loudspeakers affect the playback level of the 7050B, too. The "BASS ROLL-OFF" switch on the main loudspeakers must be switched to "ON".

Use the "LFE IN" connector for the LFE or

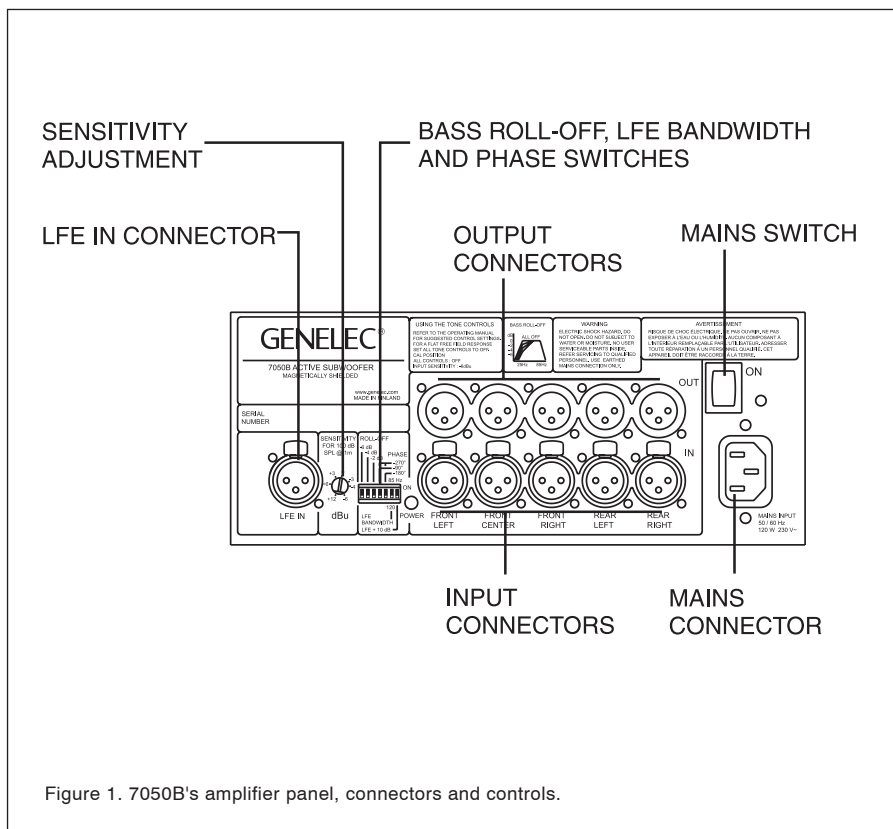


Figure 1. 7050B's amplifier panel, connectors and controls.

.1 output channel of a 5.1-channel discrete surround sound source.

Once all connections have been made, the subwoofer and main loudspeakers are ready to be powered up.

Positioning in the room

The placement of the subwoofer in the room affects the overall frequency response and sound level of the system dramatically, as at low frequencies the effects of the room are strong. Even a slight change in the subwoofer's location can make a marked difference in the frequency balance and often patient and methodical experimentation and testing is needed to find the optimum placement. The placement will affect the phase difference between the main loudspeakers and the subwoofer and the bass roll-off rate.

First place the subwoofer slightly offset from the center of the front wall. The recommended distance to the wall is less than 60 cm / 24" measured from the subwoofer's driver. This position gives increased acoustic loading (and SPL) due to the proximity of the front wall and floor. Cancellations from the front wall and floor are also avoided. Front wall cancellation for the 85 Hz high pass filtered main speakers can be eliminated by

placing them at least 110 cm / 43" away from the front wall (see Figure 2).

If the frequency balance does not seem right, try moving the subwoofer slightly to the left or right so that different room modes are excited at different levels. Positioning the subwoofer close to a corner will boost the bass level at lower frequencies and may cause asymmetrical spatial imaging.

Although the 7050B is magnetically shielded, it may cause colour distortion if placed near to very sensitive video loudspeakers or computer displays. Move the subwoofer further away or try turning the driver side of the subwoofer away from the screen.

Minimum clearances to walls or other objects

Do not cover the driver side of the subwoofer or place the subwoofer so that there is less than 10 cm (4") of free space in front of the grille.

Make sure that the space underneath the subwoofer is clear from obstructions. Thick carpets may block the ventilation clearance needed for cooling the electronics.

The reflex port side (opposite of the connector panel side) should always have a clearance of at least 7,5 centimeters (3") to

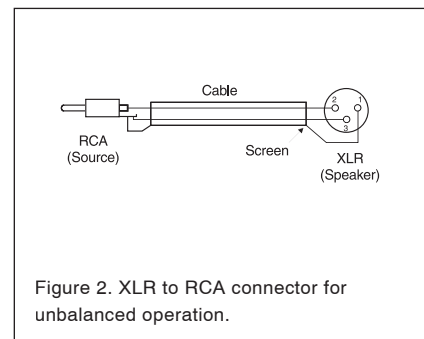


Figure 2. XLR to RCA connector for unbalanced operation.

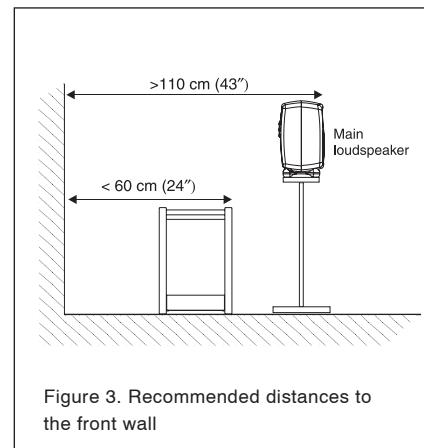


Figure 3. Recommended distances to the front wall

any objects to ensure proper functioning of the reflex port.

Flush mounting the subwoofer

If the subwoofer is flush mounted into a wall or a cabinet, it is important to ensure amplifier cooling and unrestricted airflow from the reflex port. This can be done by making the recess 7,5 centimeters (3") wider than the subwoofer. Place the subwoofer into the right end of the recess with the driver side facing the room. This leaves sufficient 7,5 centimeters (3") of free space on the reflex port side. The height and depth of the recess should not be any bigger than is needed to fit the subwoofer flush with the wall surface.

Sensitivity adjustment

The subwoofer requires input sensitivity alignment to the source to obtain a correctly balanced system. The input sensitivity control is located on the connector panel of the subwoofer. An input voltage of -6 dBu with a -6 dBu input sensitivity setting will produce 100 dB SPL @ 1 m in free field.

Setting the phase control

Incorrect phase alignment between the main loudspeakers and subwoofer causes

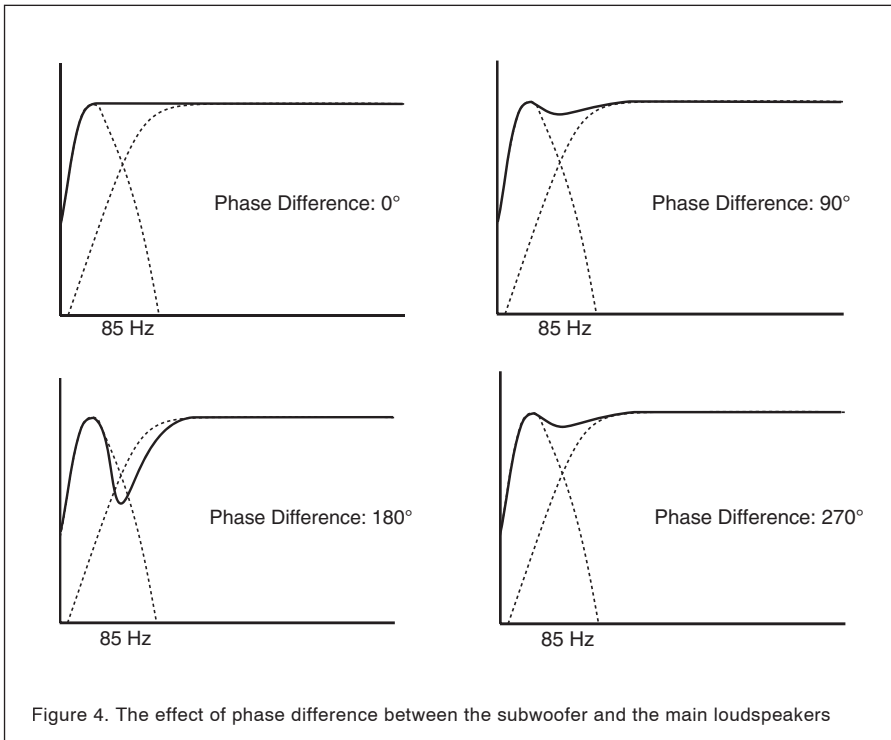


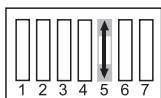
Figure 4. The effect of phase difference between the subwoofer and the main loudspeakers

a drop in the frequency response of the whole system at the crossover frequency. The graphs above (Fig. 4) show the effect of phase difference to the frequency response.

The phase difference between the main loudspeakers and subwoofer at the listening position is dependent upon the position of the subwoofer, so the phase adjustment should be done only after the preferred position is found. Acoustic measuring equipment is required for accurate system alignment. If this equipment is not available, the following coarse phase matching can be applied.

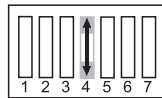
Coarse phase adjustment method

Connect an audio frequency signal generator to the "FRONT CENTER" input of the 7050B and set it to feed a 85 Hz signal to the system. Alternatively, you can use a 85 Hz signal from a suitable audio test recording. Make sure you connect (even temporarily) a main loudspeaker to the "FRONT CENTER" output, so that the test signal is properly reproduced by both subwoofer and main loudspeaker.

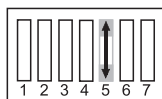


Toggle the -180° phase switch (DIP 5 from left) "ON" and "OFF", and set it

to the position which gives the lowest sound level at the listening position.



Next toggle the -90° phase switch (DIP 4) "ON" and "OFF", and again set it to the position which gives the lowest sound level.



Finally, set the -180° phase switch (DIP 5) to the opposite setting and deactivate the test signal.

Phase correction method with test equipment

The following procedure matches the phase between the subwoofer and the main loudspeakers using a frequency analyser and a pink noise generator. Connect a high grade measuring microphone to the analyser and feed pink noise into the "CENTER IN" input of the subwoofer. Position the microphone at the listening position and adjust the input sensitivity of the subwoofer until frequencies below and above 85 Hz are reproduced at equal level. Then adjust the phase control switches for the maximum dip of at least -6 dB at the crossover frequency (85 Hz).

Subwoofer placement	Bass Roll-Off setting
Near to a wall	-2 dB
In a corner	-6 dB
Flush mounted	-2 dB

Table 1. Suggested Bass Roll-Off settings

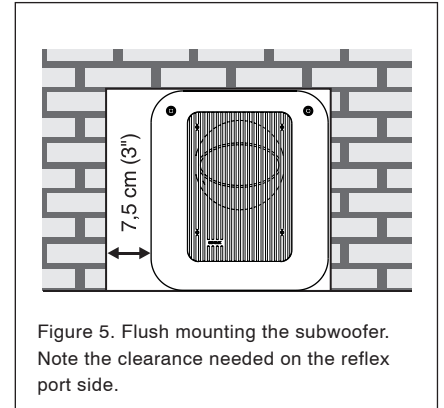


Figure 5. Flush mounting the subwoofer. Note the clearance needed on the reflex port side.

Change the -180° switch to the opposite setting. The phase should now be set correctly and the frequency analyser should show a smooth response around 85 Hz.

Using the LFE Bandwidth and LFE +10 dB functions

The "LFE BANDWIDTH" switch allows you to select the upper cutoff frequency of the LFE channel between 85 and 120 Hz. Limiting the LFE bandwidth to 85 Hz can be used to simulate the effect of some consumer decoders that do not replay information above 80 Hz on the LFE channel when the bass management is used. Checking the multichannel mix with this setting on lets you know how it translates in systems with this limitation.

The 120 Hz LFE bandwidth setting complies with the replay systems of movie theaters and cinemas. 35 mm movie soundtracks use the LFE channel to reproduce a bandwidth of 20 - 120 Hz through dedicated subwoofers. In this case the LFE and main channel bandwidths overlap between 85 and 120 Hz, which may create unwanted acoustical summing if the same signal is present in both channels. To avoid this, the LFE content should be kept completely different (de-correlated) from the low frequency content of

the main channels when mixing music and sound effects for film release.

In Dolby Digital and DTS encoding formats the LFE channel has to be monitored with +10 dB gain in relation to the main channels. The object is to increase the recording head-room of the LFE channel. Consumer and theatrical decoders automatically add +10 dB of LFE gain to restore the level balance.

The "LFE +10 dB" function on the 7050B subwoofer is designed to add the +10 dB gain to the LFE channel in the production stage, if it is not already done in the output matrix of the mixing console. The function is activated by switching the "LFE +10 dB" dip switch on the subwoofer to "ON". The "LFE +10 dB" function should **not** be used in following cases:

- If the +10 dB LFE gain is already implemented by another device.
- When producing an audio format that does not require the use of +10 dB gain on the LFE channel, such as DVD-Audio (MLP), SACD (DSD) etc.
- When monitoring a decoded Dolby Digital or DTS soundtrack. The decoder will automatically provide +10 dB LFE gain.

Safety considerations

Genelec 7050B subwoofer has been designed in accordance with international safety standards. However, to ensure safe operation and maintain the unit in safe operating condition, the following warnings and cautions must be observed:

- Servicing and adjustment must only be performed by qualified service personnel. The subwoofer cabinet or electronics unit must not be opened.
- Do not use this subwoofer with an unearthened mains cable or an unearthened mains connection as this may compromise electrical safety.
- Do not expose the subwoofer to water or moisture. Do not place any objects filled with liquid, such as vases on the subwoofer or near it.
- This subwoofer is capable of producing sound pressure levels in excess of 85 dB, which may cause permanent hearing damage.
- Free flow of air around the subwoofer is necessary to maintain sufficient cooling.

Do not obstruct airflow around the subwoofer.

- Note that the amplifier is not completely disconnected from the AC mains service unless the mains power cord is removed from the amplifier or the mains outlet.

Warning!

This subwoofer is capable of delivering sound pressure levels in excess of 85 dB, which may cause permanent hearing damage.

Maintenance

No user serviceable parts are inside the subwoofer. Any maintenance of the unit must only be performed by qualified service personnel.

Guarantee

This product is supplied with a ONE year guarantee against manufacturing faults or defects that might alter the performance of the unit. Refer to supplier for full sales and guarantee terms.

EC Declaration of Conformity

This is to certify that Genelec 7050B Active Subwoofer conform to the following standards:

Safety:

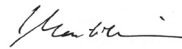
EN 60065 / IEC 60065:1998 6th Edition

EMC:

EN 55020 : 2002 + A1 : 2003
 EN 55020: (1994), A11: (1996), A12: (1999),
 A13: (1999), A14: (1999)
 EN 61000-3-2 (2000)
 EN 61000-3-3 (1995)

The product herewith complies with the requirements of The Low Voltage Directive 73/23/EEC, EMC Directive 89/336/EEC and 93/68/EEC

Signed:



Ilpo Martikainen

Position: Managing Director

Date: 3-May-2005

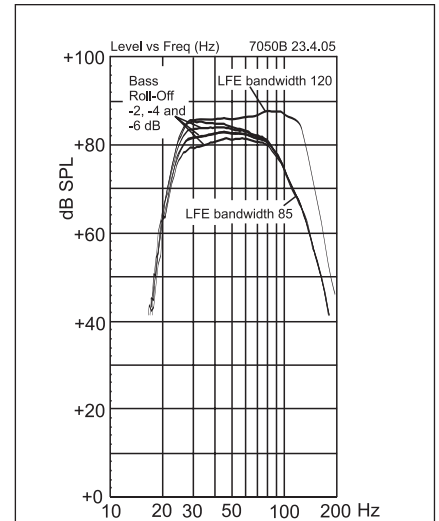


Figure 6. The free field frequency response of the 7050B subwoofer at different Bass Roll-Off settings

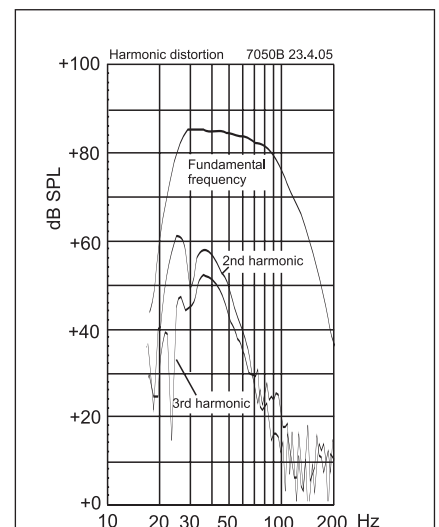


Figure 7. The curves above show the harmonic distortion analysis of the 7050B in free field. In half space the SPL will be 6 dB higher.

7050B Operating Manual

SYSTEM SPECIFICATIONS	
	7050B
Free field frequency response (± 3 dB)	25 Hz...85 Hz LFE 85/120 Hz
Maximum short term sine wave SPL output averaged from 30 to 85 Hz, measured in half space at 1 meter	100 dB
Self generated noise level in half space at 1 m on axis (A-weighted)	≤ 15 dB
Harmonic distortion at 90 dB SPL at 1 m on axis in half space 30... 85 Hz	
2nd	$\leq 4\%$
3rd	$\leq 1\%$
Driver, magnetically shielded	205 mm (8")
Weight	18 kg (39.6 lb)
Dimensions	
Height	410 mm (16 ¹ / ₈ ")
Width	350 mm (13 ³ / ₄ ")
Depth	319 mm (12 ⁹ / ₁₆ ")

CROSSOVER SECTION	
	7050B
Subsonic filter (18 dB/octave) below	25 Hz
Input channels	5 main + LFE
Low pass frequency for 5 main channels	85 Hz
LFE cutoff frequency	85 or 120 Hz selectable
Midband rejection >400 Hz	≥ 50 dB
Bass Roll-Off control in 2 dB steps	0 to -6 dB @ 26 Hz
Phase matching control in 90° steps	0 to -270°
Input sensitivity control	+12 to -6 dBu
LFE input sensitivity control	0 or +10 dB selectable

AMPLIFIER SECTION	
	7050B
Amplifier short term output power (Long term output power is limited by driver unit protection circuitry)	70 W
Amplifier system THD at nominal output	$\leq 0.08\%$
Mains voltage	100, 120 or 230 V
Power consumption (average)	
Idle	11 VA
Full output	120 VA

INPUT SECTION	
	7050B
Input connectors XLR female	
pin 1	gnd
pin 2	+
pin 3	-
Input impedance	10 kohm balanced
Input level for 100 dB SPL output @ 1 m	Variable from +12 to -6 dBu

OUTPUT SECTION	
	7050B
Input connectors XLR male	
pin 1	gnd
pin 2	+
pin 3	-
Main loudspeaker Out gain	0 dB

Main loudspeaker Out connectors carry an unfiltered copy of the signal arriving into their respective Input connectors.