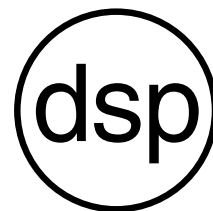


GENELEC®

Operating Manual

8260A, 8250A and 8240A
DSP Loudspeakers



Introduction

Congratulations and a thank-you for the purchase of this Genelec 8200 Series DSP Loudspeaker. These systems are designed to integrate easily into the digital production environment. There are several ways to configure and operate the DSP loudspeakers for a wide variety of high quality audio applications. The loudspeakers also have analog inputs, making them versatile and intelligent replacements for analog loudspeakers.

This manual addresses setting up and using the 8240A, 8250A and 8260A DSP loudspeakers in stand-alone mode without the Genelec Loudspeaker Manager GLM™ and the proprietary Genelec loudspeaker control network. Use with the GLM™ is described in the DSP System Operating Manual.

EC Declaration Of Conformity

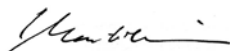
This is to certify that Genelec 8240A, 8250A and 8260A DSP loudspeakers conform to the following standards:

Safety: EN 60065:2002 + A1:2006 + A11:2008 / IEC 60065: 2001 7th Edition

EMC: EN 55020: 2007 EN 55013: 2001 + A1: 2003, EN 61000-3-2: 2006 and EN 61000-3-3: 1995 + A1: 2001 + A2: 2005

The products herewith comply with the requirements of The Low Voltage Directive 2006/95/EC EMC Directive 2004/103/EC and Energy related Products Directive 2009/125/EC.

Signed:



Ilpo Martikainen

Position:

Chairman of the Board

Date:

23-February-2011

Compliance to FCC Rules

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning

the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

Safety Considerations

Although the 8240A, 8250A and 8260A have been designed in accordance with international safety standards, to ensure safe operation and to maintain the loudspeaker under safe operating conditions, the following warnings and precautions must be observed:

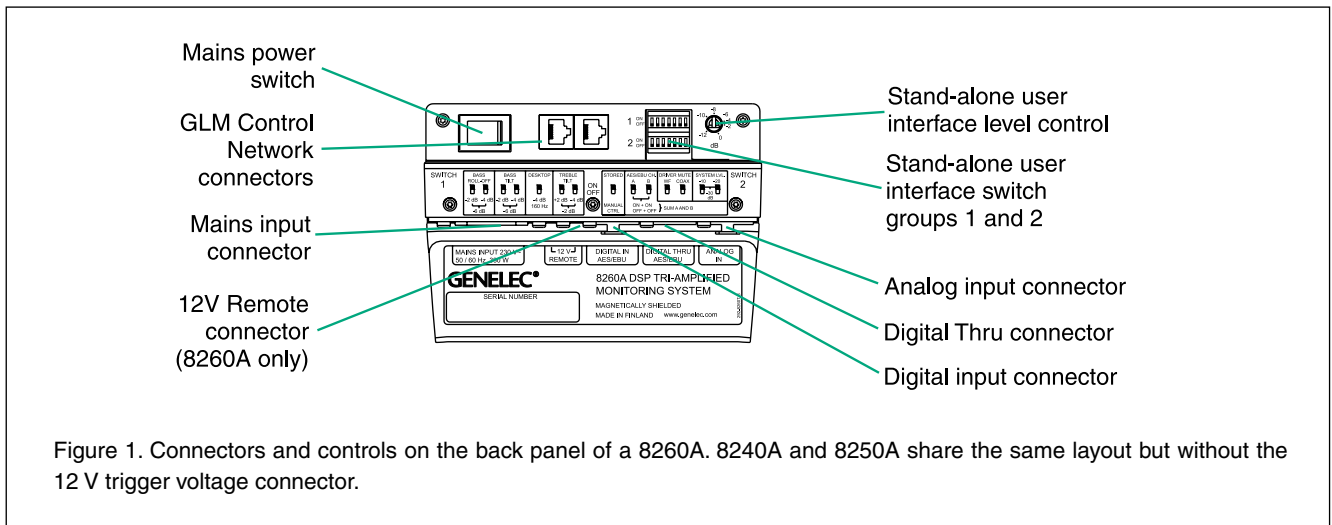
- Servicing and adjustment must only be performed by qualified service personnel. The loudspeaker enclosure must not be opened.
- Do not use this product with an unearthed mains cable or a mains connection without the protective earth contact as this may lead to personal injury.
- To prevent fire or electric shock, do not expose the unit to water or moisture.
- Do not place any objects filled with liquid, such as vases on the loudspeaker or near it.
- 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.
- Free flow of air behind the loudspeaker is necessary to maintain sufficient cooling.
- Do not obstruct airflow around the loudspeakers.

WARNING!

All Genelec 8200 Series loudspeakers are capable of producing sound pressure levels in excess of 85 dB, which may cause permanent hearing damage.

System

Genelec 8240A, 8250A and 8260A DSP Loudspeakers are designed for precise monitoring of 24 bit/192 kHz AES/EBU digital audio signal or line level analog audio signal. They are fully compatible with Genelec Loudspeaker Manager GLM™ and the proprietary Genelec loudspeaker control network, and Genelec 7260A, 7270A and 7271A DSP Active Subwoofers, but can also be used independently of these. The 8240A, 8250A and 8260A



feature high SPL output, low colouration and broad bandwidth in a small enclosure size. They are suitable for a wide variety of tasks, such as near field monitoring, mobile vans, broadcast and TV control rooms, surround sound systems and home studios. The Minimum Diffraction Enclosure™ (MDE™), advanced Directivity Control Waveguide™ (DCW™) and Minimum Diffraction Coaxial (MDC™) technologies provide excellent frequency balance even in difficult acoustic environments.

Amplifiers

The amplifier unit is mounted in the rear of the loudspeaker enclosure. The unit incorporates special circuitry for driver thermal overload protection. Variable input sensitivity allows accurate level matching to console output section.

Using the Loudspeakers in Stand-Alone Mode

The 8240A, 8250A and 8260A accept both analogue line level input signals and AES/EBU formatted digital input signals.

When the loudspeakers are not connected to Genelec loudspeaker control network, they operate in the stand-alone mode. However, settings made with the Genelec Loudspeaker Manager software can be saved into each loudspeaker and applied even when the network is disconnected by setting switch 1 “STORED/MANUAL CONTROL” on switch group 2 of each loudspeaker to position “STORED.”

This manual concentrates on using the loudspeakers without the control network. All issues concerning use with the network are explained in detail in the System Operating Manual provided with the GLM™ Loudspeaker Manager software kit.

Connections

Each loudspeaker is supplied with a mains cable, one 5 m GLM network cable and an operating manual. Before connecting up, ensure that the mains switch is off.

“MAINS INPUT” Connector

Connect the mains supply to this connector.

“DIGITAL IN AES/EBU” Connector

Use this female XLR connector for AES/EBU formatted digital audio input signals. This input is selected automatically when a valid digital audio signal is present, and overrides the analogue input.

Depending on the digital hardware, transmission of a 192 kHz sample rate is achieved using a double speed, single channel/cable interface. This is called dual-wire mode. In this case one cable per channel is used and no channel selection is required. Dual-wire mode is automatically detected by the input stage.

If the digital source device has a digital level monitor pot or graphical volume fader that controls the digital level, it may be advantageous to lower the level control either on the computer interface or the loudspeaker’s back panel controls, which in turn will force the use of more of the digital [bit] resolution in the volume control.

If the digital inputs are used, all audio outputs are referenced to 0 dBFS (digital Full Scale, the largest level that may be represented in the AES/EBU signal). Genelec DSP loudspeakers produce 100 dB SPL at 1 meter in free space for a digital input signal of –30 dB FS. It is advantageous to keep the digital level as high as possible.

“DIGITAL THRU AES/EBU” Connector

This male XLR carries an unaltered copy of the digital signal fed into the “DIGITAL IN AES/EBU” connector. It can be used for daisy-chaining up to four loudspeakers together.

“ANALOG IN” Connector

Use this connector for analog audio signals. When operating an 8200 Digital system in the analog mode the A/D converter must not be overloaded, otherwise distortion will be heard. The maximum input level is +7.0 dBu RMS on models 8240A and 8250A and +22.0 dBu RMS on model 8260A. When A/D converter input clip occurs the front panel light turns momentarily red, indicating the overload condition.

If the “Level” control on the back panel is reduced (turned counter-clockwise), the acoustic output will be reduced. This control decreases the output from the D/A converters. Ideally the Level control should be set to force the use of more of the input range of the A/D converter without overloading it. Remember, there is no headroom above the maximum input to the A/D conversion.

“CONTROL NETWORK” Connectors

Use these RJ-45 sockets to connect the loudspeaker to the proprietary Genelec Loudspeaker Manager™ (GLM™) network only. This connector is not Ethernet LAN compatible. Do not connect to Ethernet LAN.

“12 V REMOTE” Connector (8260A only)

You can set up remote controlled powering up and down of the 8260A's with 12 V trigger voltage connected to this connector. The minimum current needed to actuate this function is 70 mA.

Front Panel Warning Light

Normally the light on the front panel of an 8200 loudspeaker is green, indicating that the loudspeaker is in normal operational mode.

The overload light (red) is activated by several events:

- exceeding the maximum input range of the analog input
- exceeding the maximum input range of the digital input with large probability
- exceeding the output capacity of the power amplifier (clipping in the power amplifier) and thermal overload of the power amplifier or loudspeaker drivers (thermal protection has activated)
- if an error is detected in the AES/EBU audio data

If a red warning light appears, turn the analog source down! If the levels are already modest and a digital signal is being used, ensure that there are no bit errors in the AES/EBU digital audio data.

Mounting Considerations

Align the Loudspeakers Correctly

Always place the loudspeakers so that their acoustic axes are aimed towards the listening position (see Figure 2). Vertical placement is preferable, as it minimises acoustical cancellation problems around the crossover frequency.

Maintain Symmetry

Check that the loudspeakers are placed symmetrically and at an equal distance from the listening position. If possible, place the system so that the listening position is on the centerline of the room and the loudspeakers are placed at an equal distance from the centerline (See Figure 3).

Minimise Reflections

Acoustic reflections from objects close to the loudspeakers like desks, cabinets, computer monitors etc. can cause unwanted colouration and blurring of the sound image. These can be minimised by placing the loudspeaker clear of reflective surfaces. For instance, putting the loudspeakers on stands behind and above the mixing console usually gives a better result than placing them on the meter bridge. Symmetrical positioning of the reflective objects is also important in order to maintain a balanced soundstage (See Figure 3).

Low Frequency Cancellations

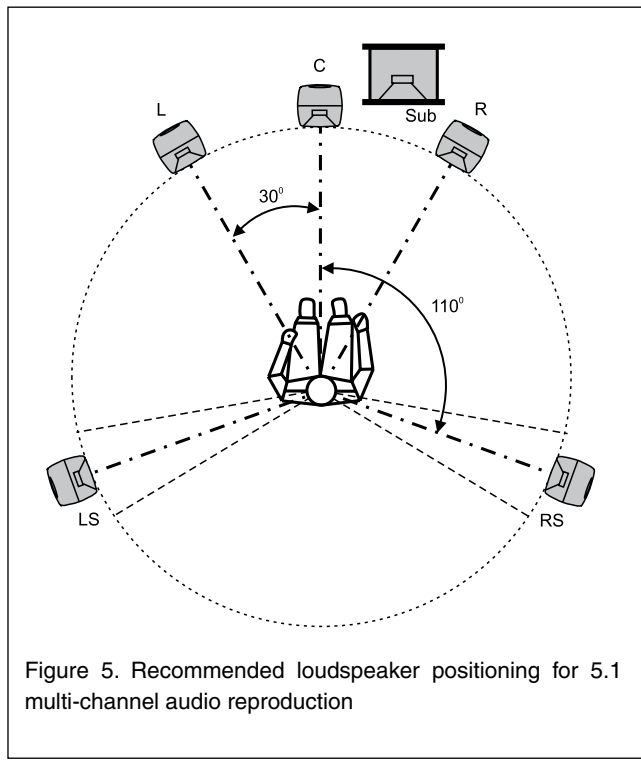
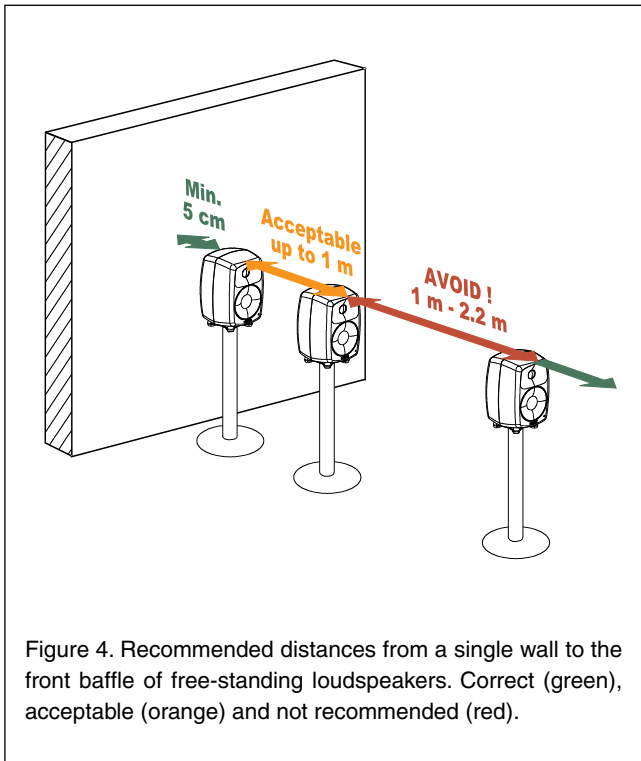
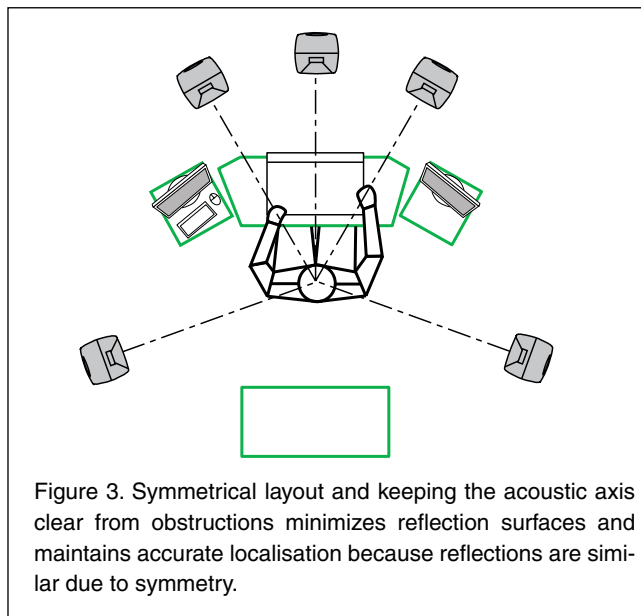
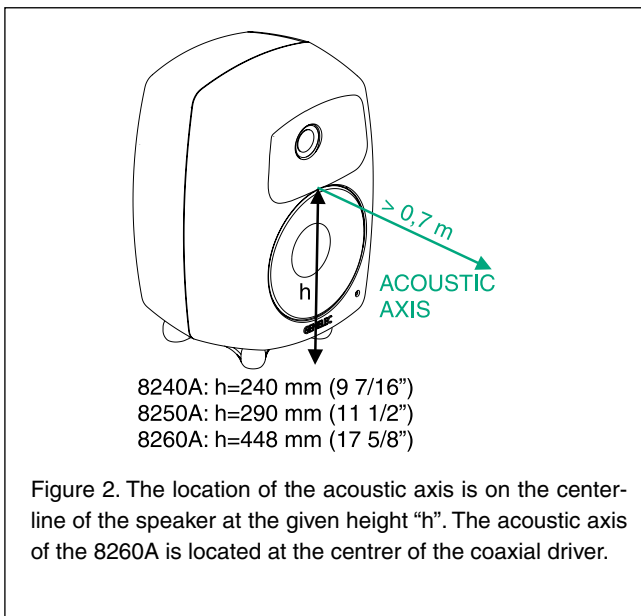
In general, when a loudspeaker's front baffle is more than 0.3 meters (1 foot) away from the wall behind the loudspeaker, a reflection from this wall can cause a cancellation of low frequencies and hence reduction of bass output. Translating this into distance recommendations shows that loudspeakers can be placed close to a wall (see above) at a distance less than 1 meter (3 ft.). Distances between 1 and 2.2 meters (3-7 ft.) should be avoided (See Figure 4).

Loudspeakers placed more than 2.2 meters (7 ft.) away from walls may suffer from cancellations around the low frequency cut-off of the loudspeaker limiting low frequency bandwidth. As a rule of thumb, the lower the low frequency cut-off the further away the loudspeaker must be placed from the wall in order to avoid this phenomenon.

Distances to the ceiling and other walls may be shorter than the distance to the wall behind a loudspeaker. Reflections from these surfaces may be important and should also be considered

Minimum Clearances

Sufficient cooling for the integrated amplifier and functioning of the reflex port must be ensured if the loudspeaker is installed in a restricted space such as a cabinet, or integrated into a wall structure. The surroundings of the loudspeaker must always be open to the listening room with a minimum clearance of 5 centimeters (2”) behind, above and on both sides of the loudspeaker. The space adjacent to the loudspeaker must either be ventilated or



sufficiently large to dissipate heat so that the ambient temperature does not rise above 35 degrees Celsius (95°F).

Mounting Options

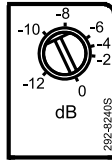
The vibration insulating Isolation Positioner/Decoupler™ (Iso-Pod™) table stand allows tilting of the loudspeaker for correct alignment of the acoustic axis. The stand can be attached to three mounting points allowing vertical and symmetrical horizontal positioning.

Genelec 8240A, 8250A and 8260A can be fitted to König & Meyer loudspeaker mounts on two sets of M6x10 mm threaded holes on the back of the enclosure. On the base of the enclosure is an M10x10 mm threaded hole (not on the 8260A) which can be used for securing the loudspeaker to its base. Do not use this thread for mounting the loudspeaker on a microphone stand which has a 3/8" UNC thread. A wide variety of ceiling and wall mounts is available through your Genelec dealer.

Setting the Input Sensitivity

The loudspeaker level sensitivity functions for both analog and digital input. The sensitivity can be matched by adjusting the rotary Level control together with the System Level switches located in the switch group 2. (switches 6 and 7). The switches provide attenuation levels of -10 dB (sw. 6 ON), -20 dB (sw. 7 ON) and -30 dB (both switches ON) The combined attenuation ranges from 0 to -42 dB.

Figure 6. System Level rotary control



Functions On Switch Group 1 (Tone Controls)

Switch group 1 (the upper switch group) comprises the tone controls that can be used to adjust the frequency response of the system in stand-alone mode to match the acoustic environment.

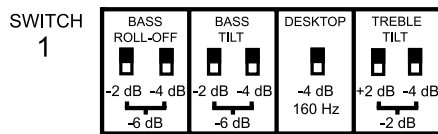


Figure 7. Switch Group 1

Please note that the GLM Loudspeaker Controller allows a much more versatile and precise set of controls to be used and supports the fully automatic system alignment feature, the Genelec AutoCal. Use the tone control switches on the loudspeaker only if a GLM is not available for for calibrating the system.

The controls are labelled “TREBLE TILT”, “BASS TILT”, “BASS ROLL-OFF” and “DESKTOP”. The factory settings for these controls are all “OFF” to give a flat anechoic response. Note that these controls have no effect when switch 1 “STORED/MANUAL CONTROL” on switch group 2 is set to “STORED” or when the loudspeaker is connected to the Genelec loudspeaker control network.

Bass Roll-Off Control

Bass Roll-Off control (switches 1 and 2) affects the low frequency roll-off of the loudspeaker and attenuates its output near the cut-off frequency. Attenuation levels of -2 dB (sw. 1 ON), -4 dB (sw. 2 ON) or -6 dB (both switches ON) can be selected.

Bass Tilt Control

The Bass Tilt control switches (switches 3 and 4) offer three attenuation levels for the bass response below 800 Hz, usually necessary when the loudspeakers are placed near room boundaries. The attenuation levels are -2 dB, -4 dB and -6 dB.

Loudspeaker Mounting Position	Treble Tilt	Bass Tilt	Bass Roll-Off	Desktop
Flat anechoic response	None	None	None	None
Free standing in a damped room	None	-2 dB	None	None
Free standing in a reverberant room	None	-4 dB	None	None
Near field on a reflective surface	None	-2 dB	None	-4 dB
In a corner	None	-4 dB	-4 dB	None

Table 1. Suggested Tone Control settings for some typical loudspeaker placement positions.

Desktop Low Frequency Control

The desktop low frequency control (switch 5) attenuates the bass frequencies around 160 Hz by 4 dB. This feature is designed to compensate for the boost often occurring at this frequency range when the loudspeaker is placed upon a meter bridge, table or similar reflective surface.

Treble Tilt Control

Treble Tilt control (switches 6 and 7) allows adjusting the treble response above 5 kHz by +2 dB, -2 dB or -4 dB, which can be used for correcting an excessively bright or dull sounding system or to compensate for high frequency level loss if the loudspeaker is placed behind a screen.

An acoustic measuring system such as MLSSA or WinMLS is recommended for analyzing the effects of the adjustments, however, careful listening with suitable test recordings can also lead to good results if a test system is not available. Always start adjustment by setting all switches to “OFF” position. Measure or listen systematically through the different combinations of settings to find the best frequency balance. See Table 1 for some typical settings in various situations.

Functions On Switch Group 2

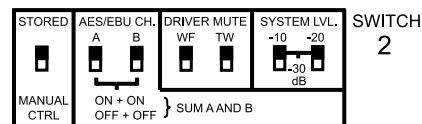


Figure 8. Switch Group 2

Stored / Manual Ctrl

This allows the selection between two basic methods of controlling the loudspeaker in the stand-alone mode. “MANUAL CTRL” refers to controlling the loudspeaker using the controls on the loudspeaker’s back panel. The “STORED” refers to using settings stored inside the memory of the loudspeaker. These settings are made using the GLM and the GLM Control Network. There is additional functionality compared to that offered by the room response correction switches on the back panel.

AES/EBU CH

This selects the audio channel(s) available on the AES/EBU cable to be reproduced by the loudspeaker. Turning both switches on reproduces the sum of the two channels on the AES/EBU cable. Turning both switches off has the same effect which has been done deliberately to avoid the situation where no input channel is selected and the loudspeaker is effectively muted. When two channels are selected, 6 dB of attenuation is automatically applied to avoid overloading the loudspeaker.

If the AES/EBU cable is operated in dual-wire mode (typically 192 kHz sampling frequency) one AES/EBU cable carries only one audio channel. The loudspeaker detects this situation automatically and the channel selection switches have no effect.

Driver Mute

These two switches allow you to mute the treble driver (marking TW) and bass driver (marking “WF”) independently. This may be useful to diagnose if a transducer is faulty.

On the 8260A the marking “TW” is replaced with “COAX” and this switch mutes both the treble and midrange parts of the coaxial driver unit.

System Lvl

These switches allow scaling down of the loudspeaker output. The signal sent to the “Thru” output connector is not affected. The switches are additive, for example, “-30 dB” attenuation is achieved by turning on the “-10 dB” and “-20 dB” switches. The effect of these switches is combined with the effect of the rotary level adjustment control. This results in total possible attenuation of 42 dB, 30 dB by the system level switches and another 12 dB by the rotary control.

Using 7000 Series Analog Subwoofers with 8200 Series DSP Loudspeakers

Please follow the steps below to integrate an analog subwoofer into a system of DSP loudspeakers:

- Connect cables carrying analog audio to the 7000 Series analogue subwoofer first.
- Connect the subwoofer outputs to the analog inputs of the 8200 Series DSP loudspeakers.
- Connect the GLM Control Network to the loudspeakers.
- Make a System Setup in GLM. It will consist of only loudspeakers as this is all the network can see, so suitable Rapid Cabling Presets are “Stereo Pair (Analog)” and “5.0 Surround System (Analog)”.
- Run AutoCal and review the results to check for large dips at or above 85 Hz. Move the loudspeakers and repeat AutoCal if there is a problem.
- Press “Finish”, then in the Main Page select “Menu | Store Acoustic Settings to All Online Loudspeakers” and close GLM.

- For each DSP loudspeaker, turn it off, select “Stored” on the back of each loudspeaker to enable the internal Acoustic Settings, and then turn it on again.
- To set the phase control on the subwoofer, connect the Center channel output of the subwoofer to the loudspeaker to be used to align phase.
- Follow the instructions in the subwoofer user manual for setting phase and level.

Maintenance

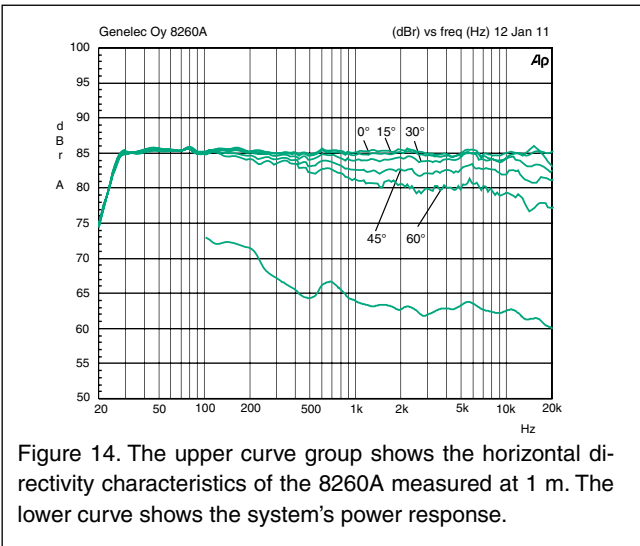
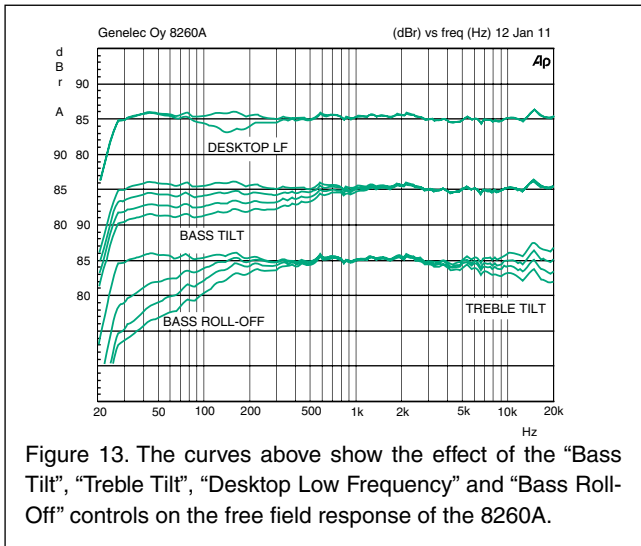
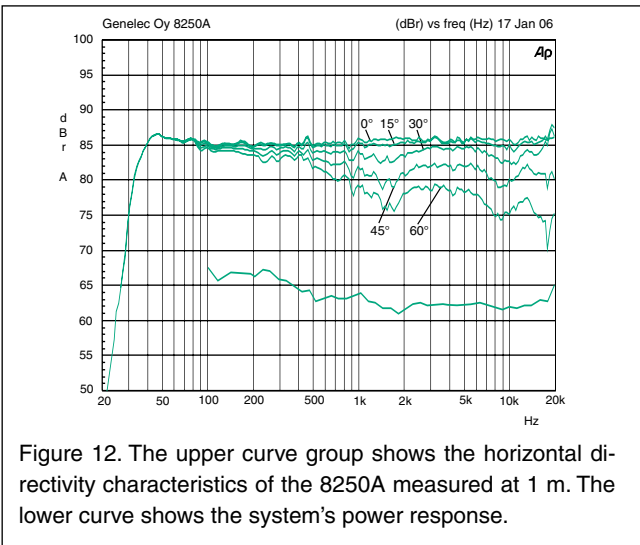
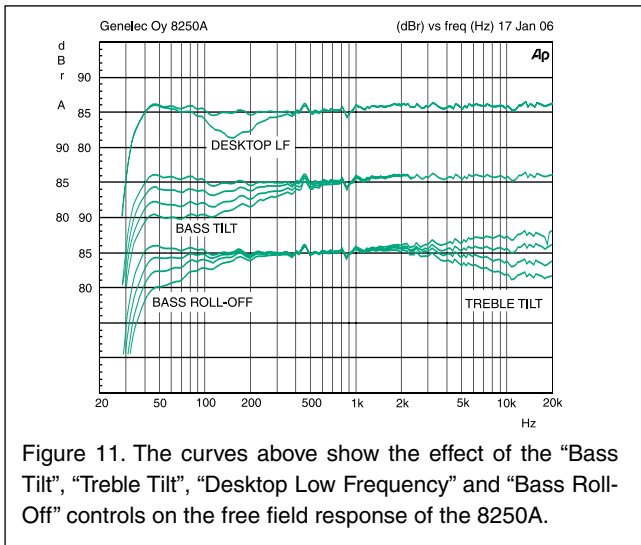
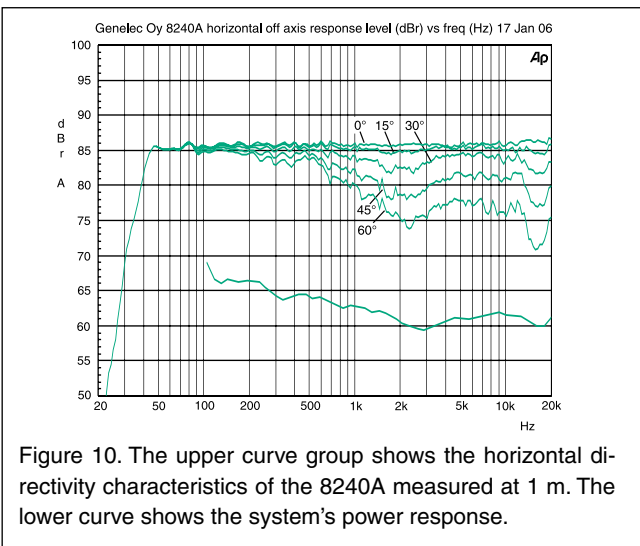
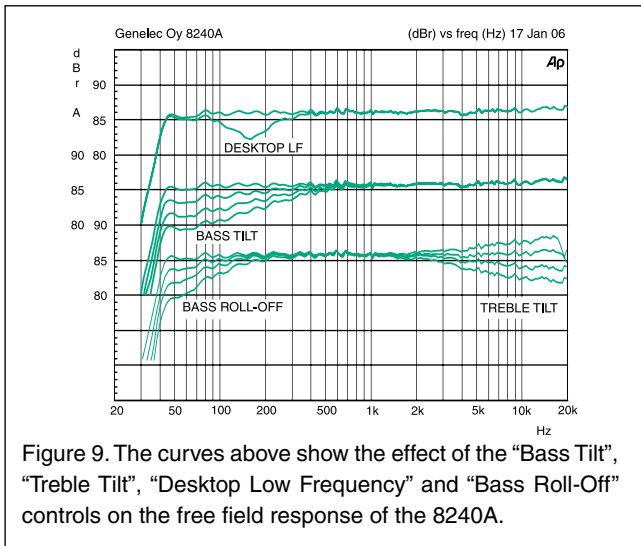
No user serviceable parts are to be found within the loudspeaker enclosure. Any maintenance or repair of the loudspeaker should only be undertaken by qualified service personnel.

Guarantee

Genelec 8240A, 8250A and 8260A are supplied with a two year guarantee against manufacturing faults or defects that might alter the performance of the loudspeakers. Refer to supplier for full sales and guarantee terms.

Accessories

A wide selection of accessories is available for Genelec loudspeakers. Consult the Accessories Catalogue on www.genelec.com or your local distributor/dealer for up-to-date information.



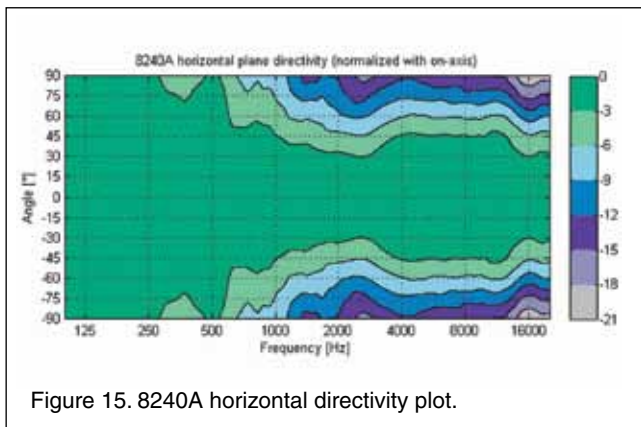


Figure 15. 8240A horizontal directivity plot.

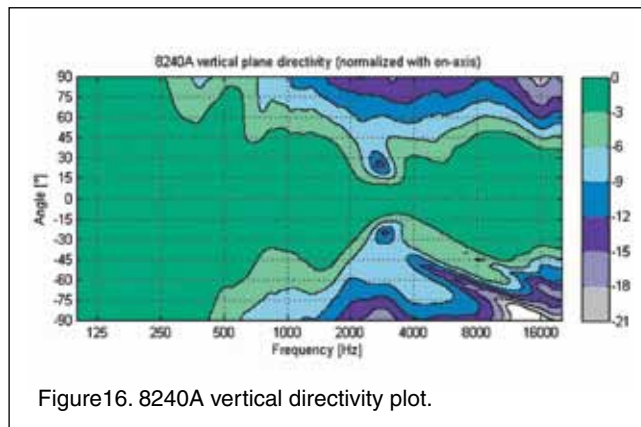


Figure 16. 8240A vertical directivity plot.

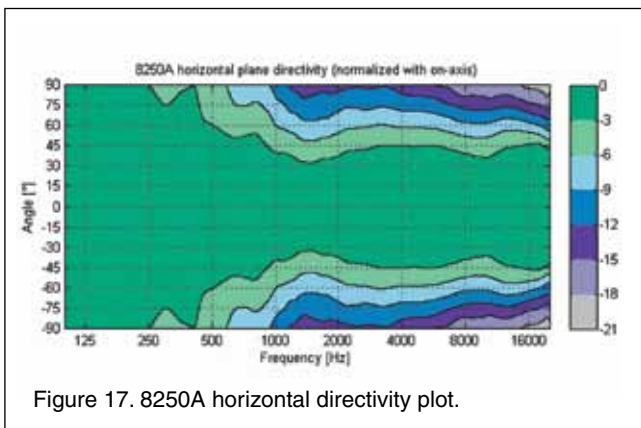


Figure 17. 8250A horizontal directivity plot.

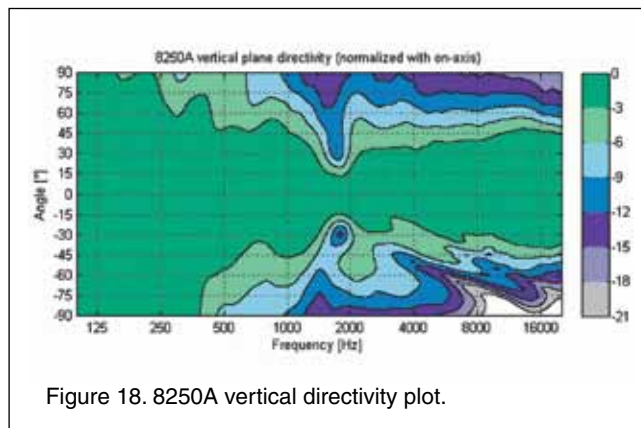


Figure 18. 8250A vertical directivity plot.

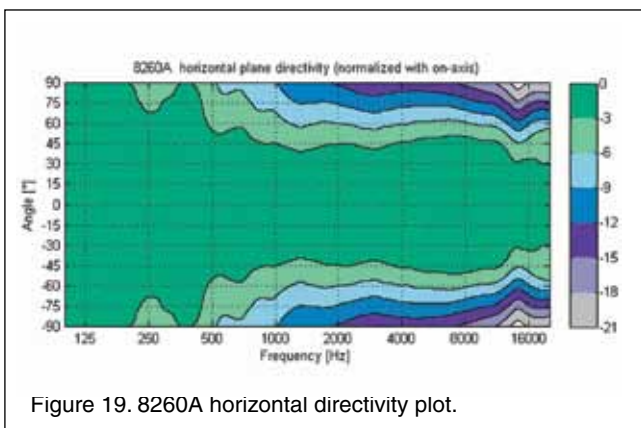


Figure 19. 8260A horizontal directivity plot.

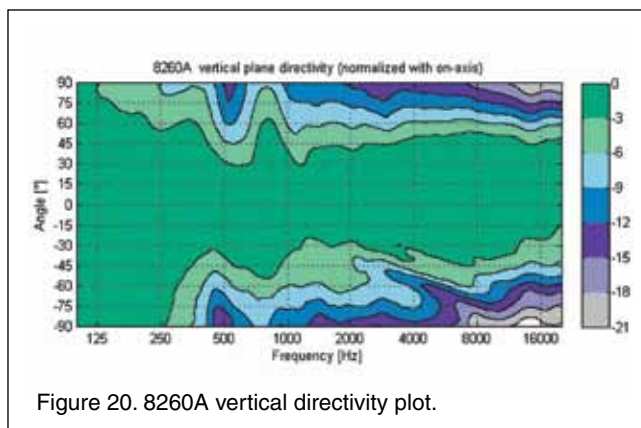


Figure 20. 8260A vertical directivity plot.

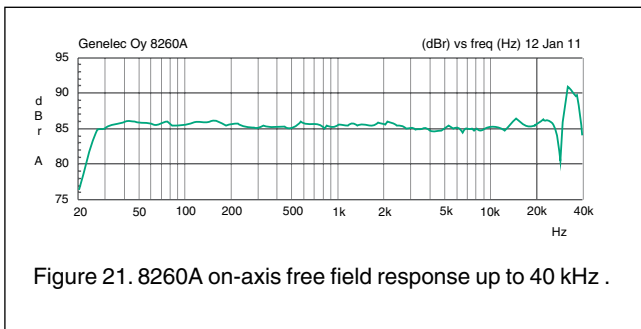


Figure 21. 8260A on-axis free field response up to 40 kHz .

SPECIFICATIONS

	8240A	8250A	8260A
Drivers			
Bass	165 mm (6.5")	205 mm (8")	255 mm (10")
Midrange	n/a	n/a	120 mm Coax AI-cone
Treble	19 mm (3/4") metal dome	25 mm (1") metal dome	19 mm (3/4") Coax AI-dome
Free field frequency response of system	48 Hz - 20 kHz (± 1 dB)	38 Hz - 20 kHz (± 1 dB)	29 Hz - 21 kHz (± 1 dB)
Maximum peak SPL output per pair on top of console @ 1 m with music material	≥ 115 dB SPL	≥ 120 dB SPL	≥ 123 dB SPL
Maximum short term sine wave SPL output @ 1 m on axis in half space, averaged as specified	(from 100 Hz to 3 kHz) ≥ 105 dB SPL	(from 100 Hz to 3 kHz) ≥ 110 dB SPL	(from 100 Hz to 3 kHz) ≥ 113 dB SPL
Crossover frequency	3 kHz	1.8 kHz	490 Hz, 2.6 kHz
Self generated noise level in free field @ 1 m on axis (A-weighted)	≤ 10 dB	≤ 10 dB	≤ 5 dB
Harmonic distortion at 90 dB SPL @ 1 m on axis			
Freq: 50...100 Hz	< 2 %	< 2 %	< 1 %
> 100 Hz	< 0.5 %	< 0.5 %	< 0.5 %
Input signal			
Analog	1 XLR female	1 XLR female	1 XLR female
AES/EBU (single wire and dual wire)	1 XLR female	1 XLR female	1 XLR female
Output / Thru signal			
AES/EBU (single wire and dual wire)	1 XLR male	1 XLR male	1 XLR male
Digital audio			
Word length	16 - 24 bits	16 - 24 bits	16 - 24 bits
Sample rate	32 - 192 kHz	32 - 192 kHz	32 - 192 kHz
Control network			
Type	proprietary GLM™ network	proprietary GLM™ network	proprietary GLM™ network
Connection	2 RJ45, CAT5 cables	2 RJ45, CAT5 cables	2 RJ45, CAT5 cables
GLM™ software frequency response adjustment*			
Notch filters	2 LF and 2 HF	2 LF and 2 HF	4 LF and 2 HF
Shelving filters	2 LF and 2 HF	2 LF and 2 HF	2 LF and 2 HF
System calibration *	AutoCal™, GLM™ manual, Stand-alone	AutoCal™, GLM™ manual, Stand-alone	AutoCal™, GLM™ manual, Stand-alone
Bass amplifier output power	90 W	150 W	150 W
Midrange amplifier output power	n/a	n/a	120 W
Treble amplifier output power	90 W	120 W	120 W
(Long term output power is limited by driver protection circuitry)			
Power consumption			
Idle	14 VA	17 VA	26 VA
Full output	110 VA	170 VA	330 VA
Dimensions			
Height	350 mm (13 ¹³ / ₁₆ " ^u)	433 mm (17 ¹ / ₁₆ " ^u)	570 mm (22 ⁷ / ₁₆ " ^u)
Width	237 mm (9 ³ / ₈ " ^u)	286 mm (11 ¹ / ₄ " ^u)	357 mm (14 ¹ / ₁₆ " ^u)
Depth	223 mm (8 ¹³ / ₁₆ " ^u)	278 mm (10 ¹⁵ / ₁₆ " ^u)	347 mm (13 ⁵ / ₈ " ^u)
Height with Iso-Pod™	365 mm (14 ³ / ₈ " ^u)	452 mm (17 ¹³ / ₁₆ " ^u)	593 mm (23 ³ / ₈ " ^u)
Weight	9.4 kg (20.8 lb)	14.6 kg (32 lb)	27.5 kg (60.5 lb)

* The notch and shelving filters adjustments, AutoCal™ and GLM™ manual system calibration features are part of the Genelec Loudspeaker Manager (GLM™) software

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