

GENELEC®

Operating Manual
8240A and 8250A 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 and 8250A 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

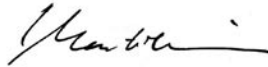
This is to certify that Genelec 8240A and 8250A DSP loudspeakers conform to the following standards:

Safety: EN 60065: 2002 / IEC 60065:2001 7th Edition

EMC: EN 55020 : 2002 + A1 : 2003, EN 55013: (2001), EN 61000-3-2 (2000) and EN 61000-3-3 (1995)

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

Signed:



Ilpo Martikainen

Position: Chairman of the Board

Date: 20-February-2006

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.

SYSTEM

Genelec 8240A and 8250A 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 and 8250A 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™) and advanced Directivity Control Waveguide™ (DCW™) technologies provide excellent frequency balance even in difficult acoustic environments.

Drivers

The bass driver dimensions are 165 mm (6 1/2") and 205 mm (8") for 8240A and 8250A respectively. The long, flow optimized reflex tube has a large cross sectional area and terminates with a wide flare at the back of the enclosure. The high frequency driver is a 19 mm (3/4") metal dome on the 8240A and a 25 mm (1") metal dome on the 8250A. All drivers are magnetically shielded.

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 8240A AND 8250A IN STAND-ALONE MODE

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

When the 8240A and 8250A 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.”

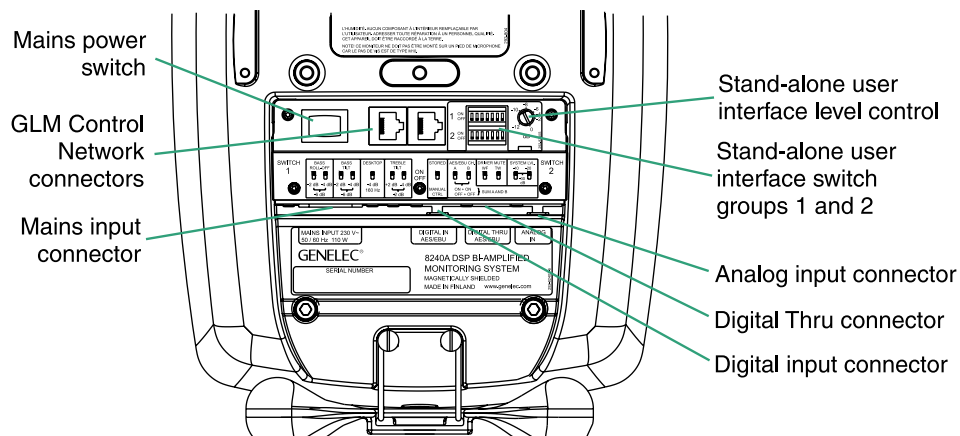
This manual concentrates on using the 8240A and 8250A without the control network. All issues concerning use with the network are explained in detail in the System Operating Manual provided with the GLM™ Loudspeaker Manager software kit.

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 analog input level is +18.5 dBu peak.

If the “Level” control on the 8200 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. Once the analog signal reaches +18.5 dBu, it attains the value “digital 1” or 0 dBFS.

“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.

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.

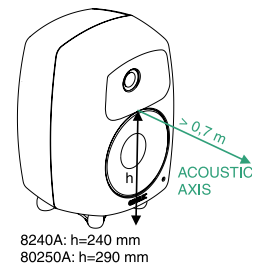
MOUNTING CONSIDERATIONS

Align the loudspeakers correctly

Always place the loudspeakers so that their acoustic axes are aimed towards the listening position. 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.



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.

Minimum clearances

Sufficient cooling for the 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 amplifier 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 and 8250A 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 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.

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. 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

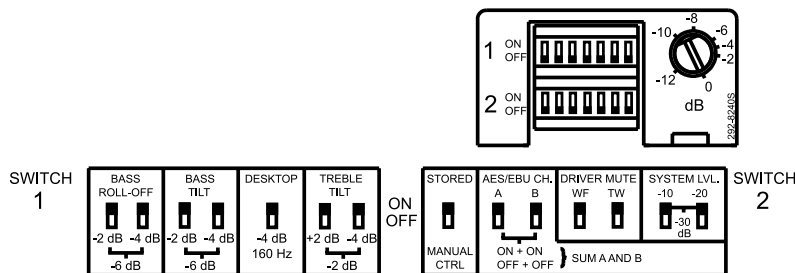
Bass Roll-Off control (switches 1 and 2) affects the low frequency roll-off of the loudspeaker and attenuates its output near the cut-off frequency. Attenuation levels of -2 dB (sw. 1 ON), -4 dB (sw. 2 ON) or -6 dB (both switches ON) can be selected.

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.

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. The table below shows some typical settings in various situations.

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 below for some typical settings in various situations. 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.

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

Functions on 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. Note that setting the selector to “STORED” overrides all back panel switches except “DRIVER MUTE”. These switches only have effect when the selector is set to “MANUAL CTRL”.

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.

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 main loudspeakers.

- Connect the GLM Control Network to the main loudspeakers.
- Make a System Setup in GLM. It will consist of main 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 85Hz. 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.

Safety considerations

Although the 8240A and 8250A 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:

1. Servicing and adjustment must only be performed by qualified service personnel. The loudspeaker enclosure must not be opened.
2. 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.
3. 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.
4. 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.
5. Free flow of air behind the loudspeaker is necessary to maintain sufficient cooling. Do not obstruct airflow around the loudspeakers.

WARNING!

Genelec 8240A and 8250A loudspeakers are capable of producing sound pressure levels in excess of 85 dB, which may cause permanent hearing damage.

Guarantee

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

8240A Accessories

Order code	Description
8000-408	Floor stand (K&M 26740-000-58)
8000-401B	Wall mount, black (K&M 24180-000-55)
8000-401W	Wall mount, white (K&M 24180-000-57)
8000-402B	Wall bracket, black (K&M 24475-000-55)
8000-402W	Wall bracket, white (K&M 24475-000-57)
8000-406	Table stand (K&M 23310-370-55)
8040-408	Stand plate for 8040 Iso-Pod (K&M 19624-300-55)
8000-415B	Ceiling mount, black (K&M 24490-000-55)
8000-417B	Truss mount kit, black (K&M 24495-000-55)
8000-419B	Adapter for 36 mm tube, black (K&M 24521-300-55)
8000-418B	Security wire, (K&M 24521-901-55)
8040-420	Soft carrying bag for two loudspeakers
8040-450	Flush mount kit

8250A Accessories

Order code	Description
8000-408	Floor stand (K&M 26740-000-58)
8000-402B	Wall bracket, black (K&M 24475-000-55)
8000-402W	Wall bracket, white (K&M 24475-000-57)
8050-408	Stand plate for 8050 Iso-Pod (K&M 19625-300-55)
8000-415B	Ceiling mount, black (K&M 24490-000-55)
8000-417B	Truss mount kit, black (K&M 24495-000-55)
8000-419B	Adapter for 36 mm tube, black (K&M 24521-300-55)
8000-418B	Security wire, (K&M 24521-901-55)
8050-420	Soft carrying bag for one loudspeaker
8050-450	Flush mount kit

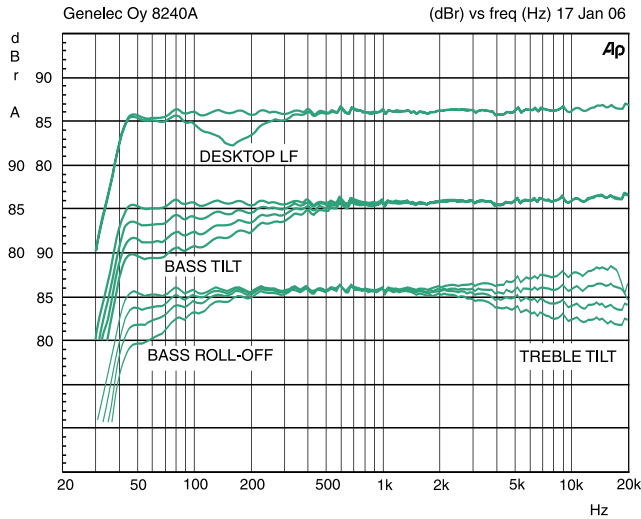
Not all accessories available in all regions. Consult region specific website or your local distributor/dealer for complete list of 8200 Accessories in your country.

SPECIFICATIONS

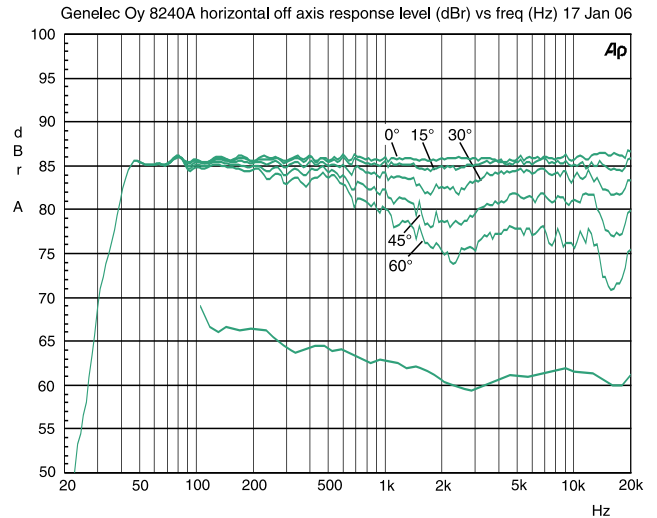
	8240A	8250A
Lower cut-off frequency, -3 dB	≤ 45 Hz	≤ 35 Hz
Upper cut-off frequency, -3 dB	≥ 21 kHz	≥ 21 kHz
Free field frequency response of system (± 1.0 dB)	48 Hz - 20 kHz	38 Hz - 20 kHz
Maximum short term sine wave acoustic output on axis in half space, averaged from 100 Hz to 3 kHz		
@ 1 m	≥ 105 dB SPL	≥ 110 dB SPL
@0.5 m	≥ 111 dB SPL	≥ 116 dB SPL
Maximum long term RMS acoustic output in same conditions with IEC weighted noise (limited by driver unit protection circuit) @1 m	≥ 99 dB SPL	≥ 101 dB SPL
Maximum peak acoustic output per pair above console top, @1 m from the engineer with music material	≥ 115 dB SPL	≥ 120 dB SPL
Self generated noise level in free field @1m on axis (A-weighted)	≤ 10 dB	≤ 10 dB
Harmonic distortion at 90 dB SPL @1m on axis		
50 to 100 Hz	< 2 %	< 2 %
> 100 Hz	< 0.5 %	< 0.5 %
Drivers:		
Bass	165 mm (6 1/2")	205 mm (8")
Treble	19 mm (3/4")	25 mm (1")
Both drivers are magnetically shielded	metal dome	metal dome
Weight:	9,4 kg (20,8 lbs)	14,6 kg (32 lbs)
Dimensions:		
Height (without Iso-Pod table support)	350 mm (13 13/16")	433 mm (17 1/16")
Height (including Iso-Pod table support)	365 mm (14 3/8")	452 mm (17 13/16")
Width	237 mm (9 3/8")	286 mm (11 1/4")
Depth	223 mm (8 13/16")	278 mm (10 15/16")

	8240A	8250A
Analog audio input connector	XLR female, pin 1 gnd, pin 2 +, pin 3 -	
Analog audio input impedance	10 kOhm balanced	
Input level for maximum short term output of 100 dB SPL @ 1m	Adjustable from +6 to -6 dBu	
Crossover frequency, Bass/Treble	3.0 kHz	1.8 kHz
Treble Tilt control operating range in 2 dB steps	+2 to -4 dB & MUTE @ 15 kHz	+2 to -4 dB & MUTE @ 15 kHz
Desktop low frequency control operating range	-4 dB @ 160 Hz	-4 dB @ 160 Hz
Bass Roll-Off control operating range in 2 dB steps	0 to -6 dB @ 45 Hz	From 0 to -6 dB @ 35 Hz
Bass Tilt control operating range in 2 dB steps	0 to -6 dB & MUTE @ 100 Hz	0 to -6 dB & MUTE @ 100 Hz
	The 'CAL' position is with all tone controls set to 'off' and the input sensitivity control to maximum (fully clockwise)	

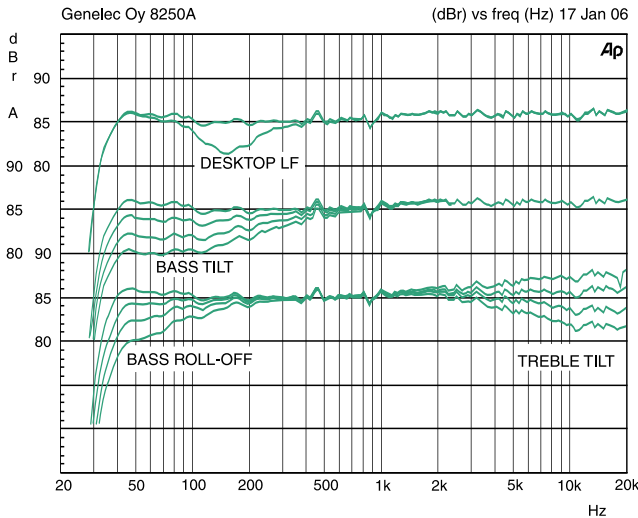
	8240A	8250A
Digital audio input connector	XLR female	
Digital audio input impedance	110 Ohm	
Digital audio Thru output connector	XLR male	
Digital audio Thru output impedance	110 Ohm	
Digital audio format	AES/EBU (AES3-2003) Can also be used with S/P-DIF and AES3id signals when impedance converters are used	
Digital audio word length	16 bits, maximum 24 bits. Fixed point, AES/EBU format	
Digital audio sample rate	32 kHz, maximum 192 kHz Supports single-wire and dual-wire AES signals.	
AD conversion dynamic range	122 dB Gain-ranging operation in two gain ranges; converter dynamic range 112 dB typical	



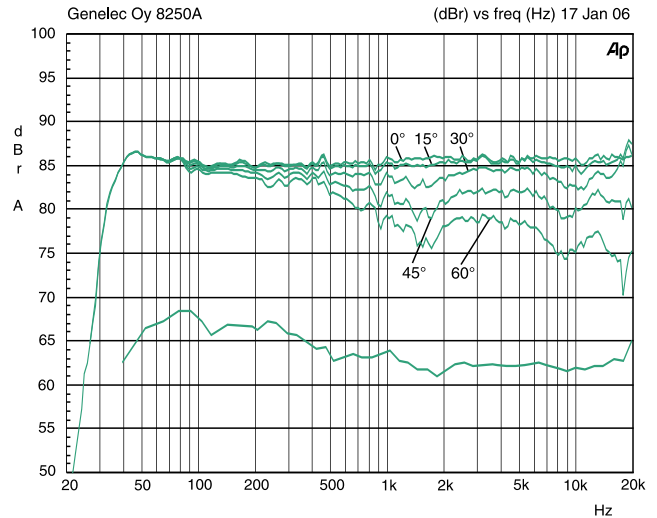
The curves above show the effect of the "Bass Tilt", "Treble Tilt", "Desktop Low Frequency" and "Bass Roll-Off" controls on the free field response of the 8240A.



The upper curve group shows the horizontal directivity characteristics of the 8240A measured at 1 m. The lower curve shows the system's power response.



The curves above show the effect of the "Bass Tilt", "Treble Tilt", "Desktop Low Frequency" and "Bass Roll-Off" controls on the free field response of the 8250A.



The upper curve group shows the horizontal directivity characteristics of the 8250A measured at 1 m. The lower curve shows the system's power response.



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