Genelec HT312B and HT315B
Active 3-Way Speaker Systems

Operating Manual
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System
The Genelec HT312B and HT315B are three-way active home theater loudspeaker systems including drivers, multiple power amplifiers and active crossovers. The systems are designed for room volumes up to 175 m³/6200 ft³ (HT312B) or 250 m³/8800 ft³ (HT315B) with maximum listening distances up to 6.1 - 7.6 meters (20-25 ft). They are designed to perform well both as free-standing or flush mounted into the wall structure.

The unique Directivity Control Waveguide™ (DCW™) Technology developed by Genelec provides stable and extremely accurate imaging and frequency balance even in difficult acoustic environments. Designed as active loudspeakers, each system contains an individually matched amplifier unit with multiple power amplifiers, active crossover filters and protection circuitry. The fast, low distortion amplifiers are capable of driving a stereo system to peak output levels in excess of 124 dB SPL at 2 m (HT315B) or 123 dB SPL at 2 m (HT312B) with music material. Versatile crossover controls allow for precise matching of the loudspeakers to different acoustic conditions.

Drivers and cabinet construction
On the HT315B the low frequencies are reproduced by an 385 mm (15") bass driver loaded with a 110 liter vented box. The -3 dB point is 33 Hz and the low frequency response extends down to 29 Hz (-6 dB). The HT312B features a 305 mm (12") bass driver in a 65 liter vented box with the -3 dB point at 35 Hz and -6 dB at 32 Hz.

Both models share the same midrange and high frequency driver layout with a proprietary 130 mm (5") direct radiating cone for the MF and a 25 mm (1") metal dome for the HF loaded by proprietary Directivity Control Waveguide. All drivers are magnetically shielded.

Amplifiers
The amplifiers, crossover filters and power supply of the HT312B and HT315B are integrated into a 19" 3U RAM4/5 rack module.

The bass, midrange and treble amplifiers of the RAM4 amplifier powering the HT312B produce 180 W, 120 W and 120 W of short term power. Respectively, the RAM5 amplifier provided with the the HT315B produces 400 W, 120 W and 120 W. The amplifiers are designed to operate at very low THD and IM distortion values and incorporate special circuitry for driver overload protection and amplifier thermal protection.

Neutrik Speakon connectors are included to facilitate wiring and system connection at customer facilities. Each amplifier is factory calibrated with the individual loudspeaker they are shipped with in order to eliminate the effects of component tolerances and ensuring consistent quality and long term reliability.

Crossover filters
The active crossover network consists of three parallel bandpass filters. The crossover frequencies are 410 Hz and 3.0 kHz on the HT315B and 420 Hz and 3.2 kHz on the HT312B. Bass, midrange and treble Level controls with 1 dB steps are included in the crossover to obtain uniform frequency balance in different acoustic conditions. The low frequency Tilt and Roll-Off controls both have four 2 dB steps to allow refined low frequency response tailoring. The crossover network is driven by an active balanced input stage, fed by a 3 pin XLR connector. Variable input sensitivity allows for accurate level matching to the signal source output.

Installation
Each loudspeaker is supplied with an amplifier unit, a mains cable, Neutrik Speakon connectors and an operating manual. Once unpacked place the loudspeaker in its required listening position, taking note of the line of the acoustical axis (see Figure 1).

Sufficient cooling for the RAM4/5 amplifier must be ensured. The cooling fan on the amplifier back panel draws air through the filter on the left side panel and blows the warmed air to the space behind the amplifier. The airflow must not be obstructed. Note also that the space behind 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).

Before connecting up, ensure that the mains switch is off (see Figure 2). Check that the mains voltage selector is correctly set to your local voltage.

Connections
Each system is delivered with two 8-pole and two 4-pole Speakon cable connectors for constructing signal cables of desired length.

Measure the required lengths of 8-pole and 4-pole cable and secure the connectors on them pin to pin. See Table 1 below for recommended cable thicknesses. The whole cable should have an outside diameter of 8 to 20 mm (5/16" to 13/16") to fit in the Speakon connector.

Alternatively, pre-terminated lengths of cable are available from Genelec.

Be sure not to mix the amplifier/loudspeaker pairs when installing multiple loudspeakers at the same time. Each amplifier and loudspeaker delivered together are marked with the same identification number and calibrated together for optimal performance.

Audio input is made via a 10 kOhm balanced XLR connector, but unbalanced leads may be used as long as pin 3 is grounded to pin 1 of the XLR. Once connection has been made, the loudspeakers are ready to be powered-up.

Access to the front panel controls
The decorative front panel of the amplifier is held in place by guide pins and two magnets. To remove the panel, pull it straight out.

Setting the input sensitivity
Adjustment of the input sensitivity of each loudspeaker can be made to match the output of the decoder or other signal source by use of the input sensitivity control on the amplifier front panel. A small screwdriver is needed for the adjustment. The manufacturer default setting for this control is -6 dBu (fully clockwise) which gives an SPL of 100 dB.

<table>
<thead>
<tr>
<th>Cable gauge</th>
<th>Max. length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 mm² (14 AWG)</td>
<td>30 m (100 ft)</td>
</tr>
<tr>
<td>3.3 mm² (12 AWG)</td>
<td>40 m (130 ft)</td>
</tr>
<tr>
<td>5.3 mm² (10 AWG)</td>
<td>60 m (200 ft)</td>
</tr>
</tbody>
</table>

Table 1. Recommended cable thicknesses for different lengths of cable
Setting the tone controls

The acoustic response of the system may also have to be adjusted to match the acoustic environment. The adjustment is done by setting the five tone control switch groups ‘bass tilt’, ‘bass roll-off’, ‘bass level’, ‘midrange level’ and ‘treble level’ on the control panel of the amplifier. The manufacturer’s default settings for these controls are ‘All Off’ to give a flat anechoic response. See Table 2 for suggested tone control settings in differing acoustic environments. Figures 7 and 8 show the effect of the controls on the anechoic response. Always start adjustment by setting all switches to the ‘OFF’ position. Then set only one switch per group to the ‘ON’ position to select the response curve required. If more than one switch is set to ‘ON’ (within one switch group) the attenuation value is no longer accurate.

Vertical / horizontal mounting

The loudspeakers are delivered either for vertical or horizontal mounting. In the horizontal mounting position the bass drivers should point inwards to obtain better low frequency coupling. If the loudspeaker positioning needs to be changed, the DCW plate can be rotated so that the midrange driver remains always located at the bottom of the DCW. Remove the four corner screws of the DCW and pull the plate carefully out without stressing the wires and the gasket. Rotate the plate 90 degrees in the appropriate direction and remount the screws.

Flush mounting

The HT312B and HT315B can be used flush mounted into the wall structure, which offers some acoustical benefits. No cabinet edge diffraction will occur, resulting in an improved response, especially at midrange frequencies. Low frequency reflections from the wall behind the loudspeaker can be avoided, which improves the low frequency response and efficiency and allows the loudspeaker to work in half space conditions. In terms of installation and orientation, the loudspeaker’s acoustical axis (See Figure 1.) should also point directly to the reference listening position. The loudspeakers should be vertically aimed so that the acoustical axis of the loudspeakers meet around ear height at the reference listening position. In the horizontal plane the loudspeaker should be positioned according to the standard stereophonic (60 degrees between left-right channels) or multichannel (ITU-R BS.775-1) placement recommendation.
The ceiling, side walls and especially the rear wall should be acoustically absorbent at low frequencies. The wall in which the loudspeakers are mounted should have a high acoustical mass to properly implement a low frequency radiation condition into half space and be angled so that the loudspeakers are correctly aimed. However, the loudspeakers should not be mounted too high as this increases the required vertical tilt of the loudspeaker (maximum tilt angle < 20 degrees) and reduces the optimum listening area. Great care should be taken over how the loudspeaker is mounted into the wall. Note the following:

A space 50 to 100 mm (2 to 4") wide can be left around the loudspeaker. Cover the space around the loudspeaker with a facing panel that should be fixed to the wall. Fill this gap with a soft rubber gasket to allow for possible cabinet movement (see Figure 6).

Regardless of the type of front wall construction the loudspeaker cabinet should be mounted on vibration isolators, with a resonant frequency between 2 to 8 Hz, to prevent vibrations from being transmitted to the wall and impairing the low frequency performance.

If a heavy wooden front wall construction is used, the space around the cabinet should be filled with absorbent mineral wool or sand bags (see Figure 4).

The wall can also be constructed of a combination of materials to achieve high acoustical structural mass that will disable low frequency sound propagation and provide high LF sound isolation (see Figure 5). Acoustic consultants will be able to provide details and design these structures.

Ensure that the cabinet is flush with the surface of the wall. Discontinuities in the loudspeaker mounting wall will cause diffraction, which leads to inferior frequency response and imaging. So, if a decorative cloth frame is used to cover the wall, make sure that the edges adjacent to the loudspeaker are less than 20 mm (¾") deep. The cloth must be very thin Tricot or an acoustically transparent material otherwise the high frequency response of the system will be adversely affected. Genelec approved cloth grilles are available.

Mode indicator LED

The loudspeaker is provided with a three-colour indicator LED on the DCW™ panel. When the LED is green, it indicates that the loudspeaker is ready for use. Standby mode is indicated by yellow colour. Amplifier clipping is indicated by a blinking red light and thermal protection mode by a constant red light. If clipping is indicated reduce the signal level so that the LED stops blinking. If the red LED stays on constantly, switch off the loudspeaker and the audio source and let the amplifier cool down. Check that the ventilation around the amplifier is not blocked. There should be a clearance of more than 100 mm (4") between the amplifier back panel and any solid surface at the back. If the red light does not come off, contact authorised Genelec service.

The LED can be deactivated if you find it disturbing in a darkened room by turning both the "POWER LED" and "STANDBY LED" switches on the amplifier panel to "OFF".

Maintenance

The air filter on the left side of the RAM4/5 amplifier must be cleaned every six months. Remove the decorative front plate and pull the filter out. Check the filter and replace it with a new one if any damage or brittleness can be found. If the filter is in a good condition, carefully clean it with compressed air.

No other serviceable parts are to be found within the loudspeaker enclosure or the amplifier unit. Any maintenance or repair should only be undertaken by qualified service personnel.
Safety considerations
Although the HT312B and HT315B loudspeakers have been designed in accordance with international safety standards, to ensure safe operation and to maintain the instrument under safe operating conditions, the warnings and cautions listed overleaf must be observed:

1. Servicing and adjustment must only be performed by qualified service personnel. The amplifier must not be opened.
2. Do not use the loudspeakers with an unearthed mains cable or unearthed mains connection as this may lead to personal injury.
3. These loudspeakers are capable of producing sound pressure levels in excess of 85 dB, which may cause permanent hearing damage.
4. Free flow of air around the amplifier is necessary to maintain sufficient cooling. Do not obstruct airflow around the amplifier.
5. 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 or near the loudspeaker or the amplifier.
6. Note that the amplifier is not completely disconnected from the AC mains service unless the mains cable is removed from the amplifier or the mains outlet.

Guarantee
These products are supplied with two year guarantee against manufacturing faults or defects that might alter their performance. Refer to supplier for full sales and guarantee terms.
**HT312B and HT315B Operating Manual**

### SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>HT312B</th>
<th>HT315B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower cut-off frequency, -3 dB</td>
<td>&gt;35 Hz</td>
</tr>
<tr>
<td>Upper cut-off frequency, -3 dB</td>
<td>&gt;22 kHz</td>
</tr>
<tr>
<td>Free field frequency response of system</td>
<td>&gt;37 Hz - 21 kHz (±2.5 dB)</td>
</tr>
<tr>
<td>Maximum short term sine wave acoustic output on axis in half space, averaged from 100 Hz to 3 kHz</td>
<td>@ 1 m &gt;116 dB SPL</td>
</tr>
<tr>
<td>Maximum long term RMS acoustic output in same conditions with IEC-weighted noise (limited by driver unit protection circuit)</td>
<td>@ 1 m &gt;107 dB SPL</td>
</tr>
<tr>
<td>Maximum peak acoustic output per pair in half space with music material</td>
<td>@ 2 m &gt;123 dB SPL</td>
</tr>
<tr>
<td>Self generated noise level in free field</td>
<td>&lt;15 dB (A weighted)</td>
</tr>
<tr>
<td>Harmonic distortion at 95 dB SPL at 1 m on axis:</td>
<td>freq. &lt;100 Hz &lt;1%</td>
</tr>
<tr>
<td></td>
<td>freq. &gt;100 Hz &lt;0.5%</td>
</tr>
<tr>
<td>Drivers</td>
<td>Bass</td>
</tr>
<tr>
<td></td>
<td>Treble</td>
</tr>
<tr>
<td>Weight</td>
<td>33 kg (73 lb)</td>
</tr>
</tbody>
</table>

### AMPLIFIER SECTION

<table>
<thead>
<tr>
<th>RAM4 (HT312B)</th>
<th>RAM5 (HT315B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bass amplifier short term output power</td>
<td>180 W (4 Ohm load)</td>
</tr>
<tr>
<td>Midrange amplifier short term output power with an 8 Ohm load</td>
<td>120 W</td>
</tr>
<tr>
<td>Treble amplifier short term output power with an 8 Ohm load</td>
<td>120 W</td>
</tr>
<tr>
<td>Slew rate</td>
<td>80 V/jus</td>
</tr>
</tbody>
</table>

### CROSSOVER SECTION

<table>
<thead>
<tr>
<th>HT312B</th>
<th>HT315B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input connector XLR female</td>
<td>pin 1 gnd</td>
</tr>
<tr>
<td></td>
<td>pin 2 +</td>
</tr>
<tr>
<td></td>
<td>pin 3 -</td>
</tr>
<tr>
<td>Input impedance</td>
<td>10 kΩ</td>
</tr>
<tr>
<td>Input level for 100 dB SPL output at 1 m</td>
<td>variable from -6 to -6 dBu</td>
</tr>
<tr>
<td>Input level for maximum short term output</td>
<td>variable from +22 to +10 dBu for 116 dB SPL at 1 m</td>
</tr>
<tr>
<td>Subsonic filter</td>
<td>18 dB/octave below 35 Hz</td>
</tr>
<tr>
<td>Ultrasonic filter</td>
<td>12 dB/octave above 25 kHz</td>
</tr>
<tr>
<td>Crossover frequency</td>
<td>420 Hz</td>
</tr>
<tr>
<td>Bass</td>
<td>Midrange</td>
</tr>
<tr>
<td>Treble</td>
<td>below 33 Hz</td>
</tr>
<tr>
<td>Mid/Treble</td>
<td>12 kHz</td>
</tr>
<tr>
<td>Crossover acoustical slopes</td>
<td>410 Hz</td>
</tr>
<tr>
<td>Crossover control operating range in 1 dB steps</td>
<td>3 kHz</td>
</tr>
<tr>
<td>Bass</td>
<td>from 0 to -6 dB</td>
</tr>
<tr>
<td>Mid</td>
<td>from 0 to -6 dB</td>
</tr>
<tr>
<td>Treble</td>
<td>from 0 to -6 dB</td>
</tr>
<tr>
<td>Bass rolloff control in 2 dB steps</td>
<td>from 0 to -8 dB @35 Hz</td>
</tr>
<tr>
<td>Bass tilt control in 2 dB steps</td>
<td>from 0 to -8 dB @33 Hz</td>
</tr>
</tbody>
</table>

The ‘CAL’ position is with all tone controls set to ‘off’ and input sensitivity control to maximum.

### EC Declaration of Conformity

This is to certify that the Genelec HT312B and HT315B Active 3-Way Speakers conform to the following standards:

- Safety:
  - EN 61000-3-3 (1995)
- EMC:
  - EN 55013: (2001)
  - EN 61000-3-2 (2000)
  - EN 61000-3-2 (1995)


Signed: Ilpo Martikainen
Position: Chairman of the Board
Date: 12-May-2008

GENELEC®

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