

GENELEC®

W371A
SAM Woofer System

Operating Manual



Introduction

Thank you for choosing Genelec! Fulfilling dreams by offering people the most truthful sound reproduction possible has been the source of our enthusiasm since 1978. There's already over one million Genelec monitors around the world - welcome to our story!

Genelec monitors are designed to last. They are hand-built in Iisalmi, Finland, using certified sustainable methods. They are individually tested and calibrated and have long support for spare parts. They are designed for low power consumption, in use and during automatic standby.

Please register your monitor at
<http://www.community.genelec.com/>.

By registering you receive an extended three-year warranty for spare parts in addition of the standard two-year warranty for parts and labour. For more information about our service and technical support, please visit
<http://www.genelec.com/customer-service>.

System Characteristics

The Genelec W371A is an advanced low frequency loudspeaker system with novel signal processing enabling variable acoustic radiation of low-frequency audio.

The W371A is suitable for professional monitoring applications calling for very high acoustic precision and reliability. They combine with The Ones monitors, offering many remarkable Genelec technologies to provide point source audio benefits with directivity control over an extraordinarily wide audio bandwidth.

The W371A offers steerable acoustic directivity at low frequencies, enabling the user to select the low frequency directivity characteristics optimal for the combination of his/her listening room characteristics, and loudspeaker and listening locations. The W371A is unique in that it enables a flat and neutral frequency response at low frequencies in acoustically challenging rooms when placed at locations typically resulting in significant acoustic notching (cancellations) at certain frequencies.

The W371A is not a simple traditional subwoofer. It is an adaptive low frequency loudspeaker system, offering much wider operating frequency range and much better envelopment than subwoofers. Using the W371A can preserve stereo imaging at the low frequencies.

The W371A is intended to be placed under or very near the main monitor it is combined with. Frequently, W371A is used in a free-standing position where the loudspeaker and the W371A are placed at some distance from acoustically hard walls.

The W371A is comprised of two woofer units. The top woofer unit is a closed box woofer system and the bottom unit is a bass reflex ported woofer system. Each unit is driven by its dedicated 400 W amplifier and controlled by a digital signal processing unit. For more details, see the functional block diagram in this document.

The benefits of the W371A are fully realized after performing an acoustic calibration with the monitor paired with it. This calibration is provided using Genelec's GLM software.

One W371A is used with one main monitor.

Using the Genelec GLM loudspeaker management software, W371A output is matched with the monitor by taking acoustic measurements at the listening location. After this, the W371A becomes an integral extension of the monitor, expanding the frequency range coverage and increasing the maximum SPL and dynamic capacity of the monitor. W371A works with



Figure 1. The W371A construction with a 8351B monitor

Genelec 8341A, 8351B and 8361A coaxial "The Ones" three-way monitors, allowing ideal point-source monitoring also at large listening distances, outside the traditional nearfield monitoring range.

Packing Content

Each W371A is supplied with a GLM User Kit, one mains power cable, one 5-meter GLM network cable and this operating manual.

Operational Modes

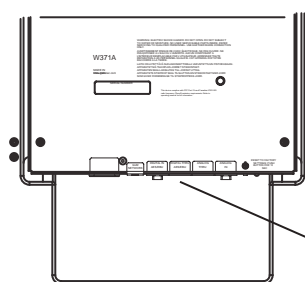
The W371A can radiate low frequencies in several different ways. The most suitable mode depends on application, room and requirements for the size of the sweet spot.

The user can select and run the setup of W371A in all the modes and audition to determine the preferred mode for his situation.

To indicate the quality of the final alignment, GLM software displays a flatness score and a correlation score after the calibration. These scores can be used to gauge the best choice for the operational mode given the system placement in the room. However, subjective evaluation by listening to the calibrated system is highly recommended in order to evaluate the final setup choices.

The operating modes are:

Complementary mode where the two woofers operate independently to implement a flat frequency response; this is the default operating mode.



Connector panel:

- Mains power
- GLM Network
- Digital In
- Digital Thru
- Analog Thru
- Analog In
- ON/OFF switch

Figure 2. Connectors and controls on the back panel of the W371A



Figure 3. Connector panel detail

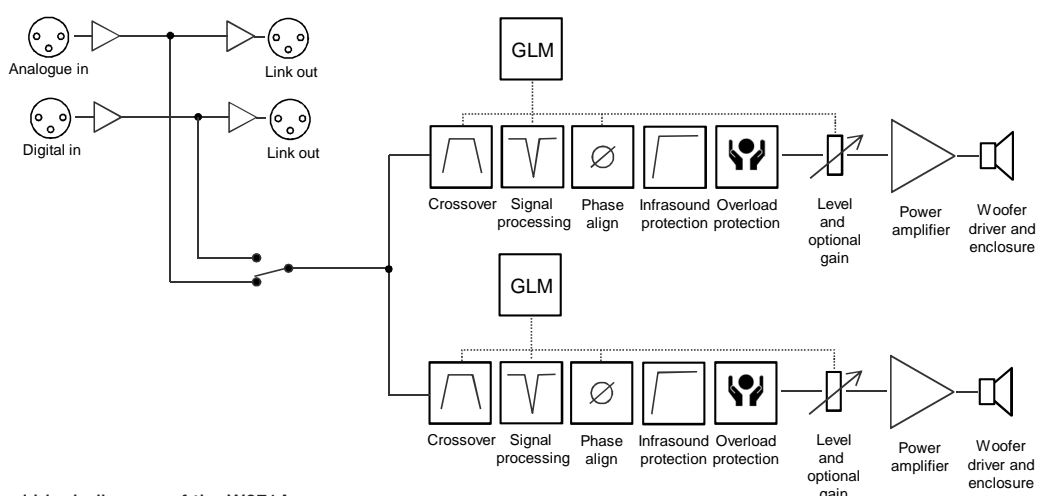


Figure 4. Functional block diagram of the W371A

Directive mode uses the two woofers simultaneously to create continuous directivity matching with The One three-way coaxial monitoring loudspeaker; this mode enables the system to maintain constant directivity down to very low bass frequencies.

Null-steering modes use the two woofers simultaneously to enable a directive mode where the direction of minimum output (null) is set toward a problematic orientation in the room – enabling this mode reduces back wall, side wall or floor reflections.

Genelec Loudspeaker Manager™ (GLM™) Software and GLM User Kit

The GLM software gets the most out of the W371A and tailors it to your room. Genelec recommends always using the GLM software to set up a W371A.

GLM is available for download free of charge at www.genelec.com/glm. Check in from time to time or consider using the cloud-based version to take advantage of new features.

A GLM User Kit comprising the necessary hardware, including the GLM Adapter and measuring microphone is needed for setup as well as managing and operating the GLM network. The GLM Kit is included with the W371A.

Smart Active Monitor (SAM™)

Genelec SAM technology can improve the reliability and accuracy of monitoring. Smart Active Monitors have several parametric notch and shelving filters that can be tuned automatically using the Genelec Loudspeaker Manager (GLM) software to exactly compensate for colorations generated by room acoustics. This enables SAM monitors to sound neutral and achieve accurate stereo imaging in all acoustical environments. The W371A extends the SAM capability at low frequencies.

Audio Inputs

The audio inputs on the W371A integrate with all professional environments, supporting balanced line-level analog audio and AES/EBU digital audio. The maximum analog input level is +25 dBu (13.7 Vrms or 19.5 V peak). Set to the maximum sensitivity, an analog input signal of -6 dBu produces a 100 dB SPL sound level at one meter in free space. A -30 dBFS digital audio input level produces a level of 100 dB SPL at one meter in free space. Note that 0 dBFS refers to the largest possible digital input value.

The ANALOG OUT male XLR connector carries an unaltered copy of the analog input signal and is intended for connecting to the paired main monitor when analog audio is used.

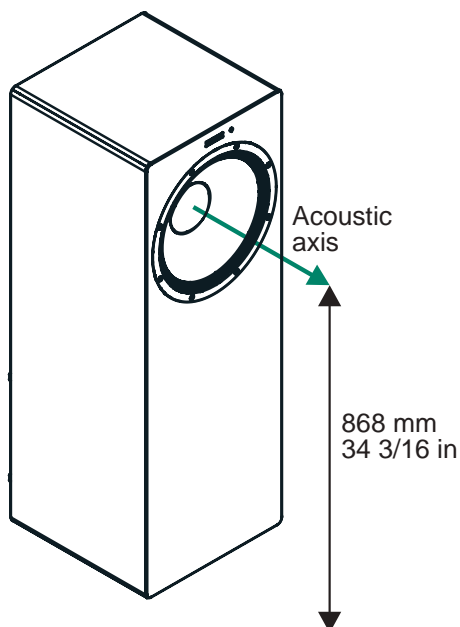


Figure 5. Location and orientation of the acoustic axis

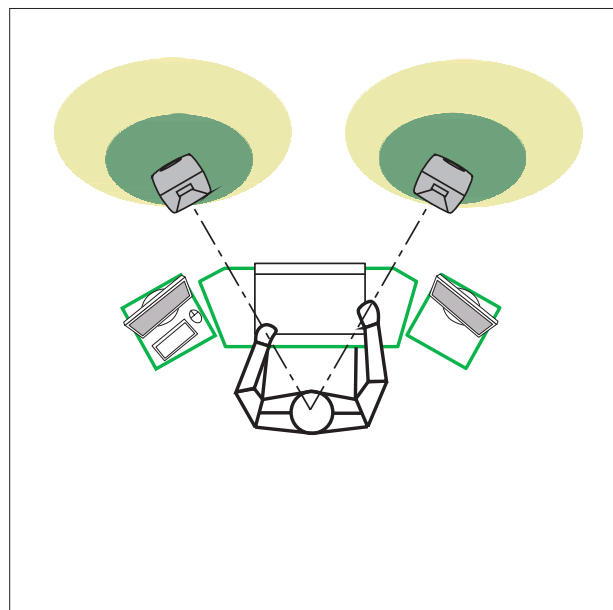


Figure 6. Guidelines for placement of the W371A relative to the monitors. Green area is recommended, yellow acceptable

The analog input is selected when the AES/EBU signal input is not connected. The AES/EBU format digital audio input is selected automatically when a valid digital audio signal is present. Please note that this digital audio signal may be silent. This automatic input selection can be overridden when the W371A is controlled with the GLM network, enabling flexible selection of either input.

The AES/EBU input supports two channels of audio in a single cable. The DIGITAL OUT male XLR connector carries an unaltered copy of the digital input signal and is intended to be connected to the paired main monitor as well as to the next W371A system.

Power Management

The W371A mains power input supports any mains voltage globally (100-240 VAC, 50-60 Hz). It can be plugged in anywhere in the world and will always deliver the maximum output power to the drivers even when the mains voltage fluctuates. If mains power is provided with a generator, inverter or lower-quality UPS device, we recommend filtering out harmonics from the mains power.

The energy saving function Intelligent Signal Sensing (ISS™) puts the monitor automatically into a standby mode when no input signal is present. The device then consumes less than two Watts of power. Upon sensing an input signal, the monitor automatically awakens. The standby time until entering the power saving state can be configured using the GLM software. When ISS is active, you can leave your monitors on at all times and have the monitoring system immediately ready for action.

Placement of the W371A

The W371A enables free-standing placement. Ideally the W371A is placed at the same location as the main monitor with the main monitor on top of the W371A (see fig. 6). It is possible to place the W371A behind or to the side of the main monitor.

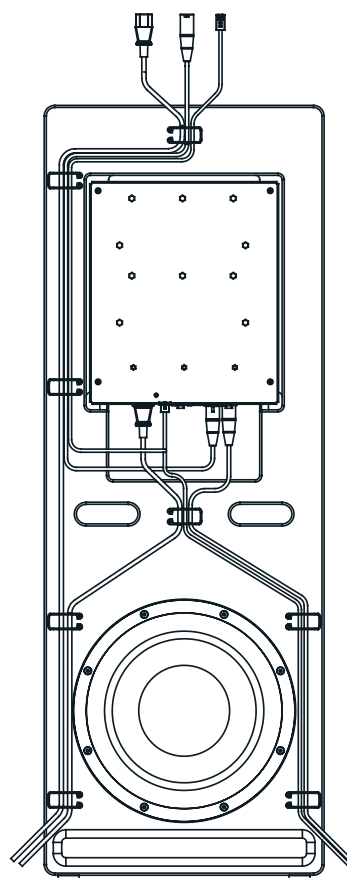


Figure 7. Examples of routing cables using the provided cable management clips. Do not run cables over the woofer transducer.

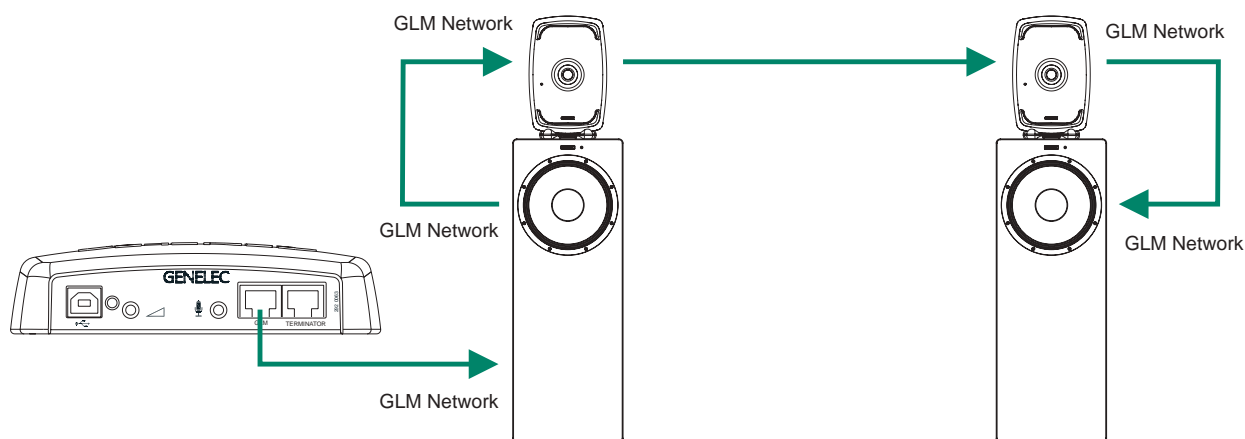


Figure 8. Cabling example for GLM management network; GLM network uses the provided 5-meter CAT cables

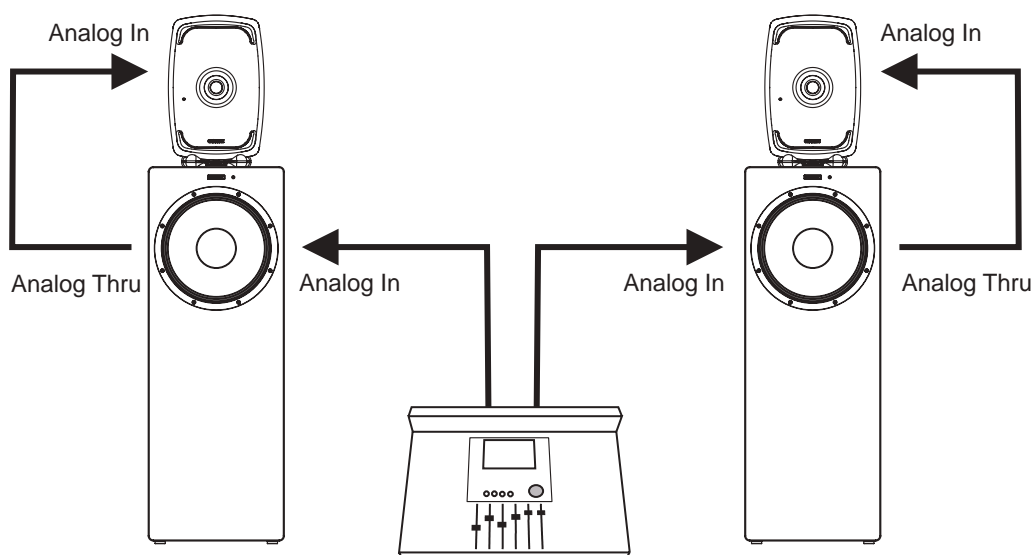


Figure 9. Cabling for analogue stereo audio

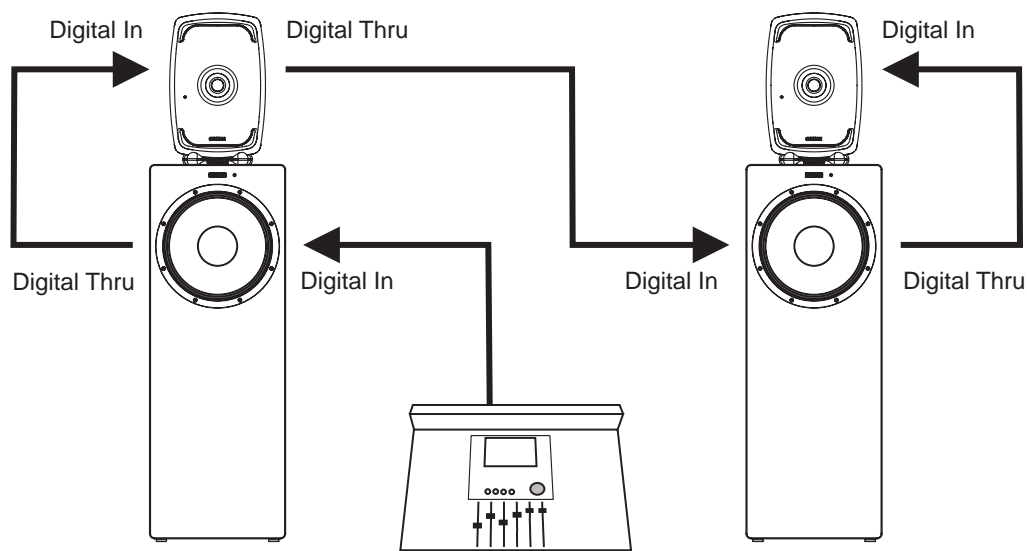


Figure 10. Cabling for AES/EBU digital audio

Do not place the W371A very far from the monitor. Place the W371A more than 10 cm (4 in) from the wall behind in order to enable air flow for the amplifier and reflex port. Aim the acoustic axis toward the listening position, similar to the monitor. As with main monitor placement, left-right symmetrical placement in the room is highly recommended.

Cabling the W371A and The One Monitor

The W371A offers cable management clips to ensure that cables are kept away from the drivers and electronics in order to avoid rattling noises. M4x10 mm screws are provided. Use a size 20 Torx screwdriver. The correct tightening torque is 2 Nm. Do not overtighten the screws.

Setup Using The GLM™ Control Network

A system of W371A and SAM series active monitors can only be configured and calibrated using GLM software, running on PC or MAC. You can find a detailed description of the setup and the use in the GLM System Operating Manual.

The GLM software and the proprietary Genelec monitor control network offer automated acoustic equalization and alignment for any reproduction system from mono and stereo to very complex 3D immersive audio setups, including also one or more subwoofers. GLM includes AutoCal, an expert algorithm for automatically measuring and calibrating monitoring systems, built using data collected from thousands of professional listening rooms.

Setup with the GLM User Kit consists of the following steps:

- Connect a CAT5 (RJ45) cable between each monitor and adaptive woofer system and finally to the control network input of the GLM Adapter device (see Figure 8).
- Connect the GLM Adapter device to a computer USB connector.
- Using a microphone stand, place the Genelec measurement microphone at the listening location with the microphone pointing upwards and the microphone top at the height of the engineer's ear. The microphone is a part of the GLM User Kit.
- Connect the microphone cable to the microphone input in the GLM Adapter device.
- Download the GLM software from the Genelec web site (www.genelec.com). Install the GLM software and follow the instructions in the software to measure and set up your monitors.
- If you do not plan to use a computer for daily control of the monitors, use the GLM software to write the settings into the monitors (use Menu tab Group > "Store Group Settings...").

The GLM network may be used for monitor control during daily use, such as switching between sets of loudspeakers, soloing and muting audio channels, invoking calibrated playback levels and so on. In that case, the computer remains connected to the GLM network with the GLM software running.

The settings can also be permanently stored inside all monitors when the calibration and the setup is intended to remain fixed. Then, the computer is only needed during the setup.

The CONTROL NETWORK RJ-45 connectors and standard CAT cables are used for the GLM network. The GLM control network is not Ethernet LAN compatible. Do not connect to an Ethernet LAN.

Colour	Indication
Solid green	Normal state, normal operation
Blinking green	GLM is interrogating the monitor
Blinking green every 10 sec.	Monitor is in an ISS power saving sleep state
Blinking red	Power amplifier overload protection is active (audio is modified because of protection)
Solid red	Monitor is muted
Solid yellow	Monitor is not in the active (playing) group
Blinking yellow	Overheat protection is active (audio is modified because of protection)

Table 1. Monitor front panel light indications summary

Tips for Calibration and Use

A system combines the W371A and a monitor that typically sits on top of W371A.

The acoustic calibration is divided into two parts. First, monitors are measured and calibrated. Once you Confirm the monitor calibration these values are stored into monitors and become the references for the W371A calibration procedure. Select the W371A calibration and follow instructions to pair and calibrate W371A woofers.

To understand the full benefit of W371A woofers, you may want to create an additional Group to play the monitors alone, without W371A woofers. To do this, Duplicate your Group, and in the Group define page, title this duplicate Group suitably, for example "Monitors Only". Remove the W371A woofers from this Group by double-clicking each W371A icon so it turns yellow. Confirm Group and then follow instructions to calibrate.

To save all calibrations, once calibrations are done, Confirm Calibration and Save Setup.

Building Monitoring Systems

Manual editing of the automatically generated acoustic calibrations is not required but instructions for manual editing are presented here to demonstrate the flexibility of GLM. In order to manually edit the acoustic settings, you may want to take a copy of the automatic settings and then edit the copy. In the Group tab, the menu item Duplicate Group copies the current setup including all the calibration settings. To adjust settings in individual monitors, double-click on a monitor icon on the main GLM page to enter the Acoustic Editor.

Confirm each Acoustic Editor window at the bottom right of each page when you are done. This returns you to the main GLM page.

After having manually edited the acoustic setting in the monitors, you will need to recalibrate the W371A woofers in the current Group.

From the Group tab select Edit Group. At this stage, you can edit the Group name to indicate your changes. Then, ensure the W371A woofers are included in the Group. Add the W371A woofers into the Group by double-clicking on yellow W371A icons making them green. After doing this Confirm Group. This brings you to the AutoCal page for monitor loudspeaker calibration. Because you manually edited the acoustics, you do not want to re-calibrate. Press Skip AutoCal. This will carry forward the edited monitor loudspeaker calibration values to the W371A calibration.

Then, follow the instructions on the Woofer Cal page to pair W371A with a monitor, choose the W371A Mode you wish to use, select the crossover frequency range (or use the default) and finally double-click the microphone icon. This launches the calibration process for W371A. Frequency sweeps are audible on the W371A, one woofer at a time, followed by the main monitor sweep. After this, the calculation process starts. The progress of the calculation is shown on the GLM page.

This section is only needed when you wish to manually edit the monitor loudspeaker acoustic calibrations before calibrating the W371A woofers to work with the loudspeakers. Normally, this process is not necessary.

Evaluating Modes

To evaluate different W371A directive mode options, go to the Group tab and select Duplicate Group. Then, in the duplicated Group, double-click the microphone icon to re-run AutoCal. Press Skip AutoCal. After this, on the Woofer Cal page, double-click on the microphone icon to re-run the W371A calibration selecting your desired directivity options.

For example, you may wish to have four Groups for testing: monitor alone, monitor + W371A in the Complementary Mode, monitor + W371A in the Directive Mode, monitor + W371A in one of the Null Steering Modes. When auditioning, notice that it can take a relatively long time (up to a week) before all the qualities of each mode may be fully appreciated.

Frequency Response Trim

The calibration procedure provides state-of-the-art flat frequency response suited for critical reference listening. Depending on the application and your previous listening experience, a slightly downwards tilted system frequency response may be considered relevant by certain users. The frequency response of each monitor Group may easily be tilted using the Sound Character Profiler found under the Group menu in GLM. When the monitoring loudspeakers are used without having a computer connected, select the Store settings after trimming to make the trimming permanent. Re-storing the setup file in a computer saves your trimming for the situation where a computer running GLM is used in daily work.

Selecting Crossover Regions

W371A calibration enables selecting the crossover frequency ranges. Your selections of the ranges are affected by room acoustics, W371A and listening locations. You may want to avoid notches in the monitor response. The default crossover range is 150-250 Hz. You can select a higher range up to 300 Hz and no narrower than 50 Hz wide. The measurement curves and subjective evaluations may guide your preferences as well as your choice of the W371A operating mode. When the W371A is positioned behind a large console obscuring the upper front woofer, a low crossover range below 250 Hz is advisable.

Operating Environment

This product is designed for indoor use only. The permissible ambient temperature is 15-35 degrees Celsius (50-95°F) and relative humidity 20% to 80% (non-condensing). To prevent condensation of humidity, after the product has been stored or transported in a cool environment and is then taken into a warm room, wait 0.5-1 hours before opening the packaging and connecting to the mains power.

Sufficient cooling around the W371A must be ensured. The minimum clearance behind and on both sides of the monitor is 10 cm (4 in). The product is not designed to be installed in a recess.

Front Panel Light

Normally, the light on the front panel is green, indicating normal operational mode. Red and yellow colours are used to indicate special situations. See Table 1.

Maintenance

There are no user serviceable parts inside the monitor. Maintenance or repair must only be done by Genelec certified service personnel. The monitor enclosure must not be opened. Opening the monitor may lead to loss of the individual monitor factory calibration and damage to components.

Safety Considerations

Although the W371A has been designed in accordance with international safety standards, to ensure safe operation and to maintain the monitor under safe operating conditions, the following warnings and precautions must be observed:

- Servicing and adjustment must only be performed by certified Genelec service personnel. The monitor 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 monitor 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 monitor loudspeaker or the mains outlet.
- Free flow of air behind and around the monitor is necessary to maintain sufficient cooling. Do not obstruct airflow around the monitor.

WARNING!

The W371A is capable of producing sound pressure levels in excess of 85 dB, which may cause hearing damage. Sound exposure level integrated over an 8 hour working day should be limited to 80 dB(A) to reduce the risk of permanent hearing damage. For each 3 dB increase in the sound exposure the acoustic energy is doubled, and the exposure time should be halved to maintain the same risk level.

Guarantee

The Genelec W371A is guaranteed for two years against manufacturing faults or defects altering performance. In addition to this, you can get additional three years of guarantee that covers spare part costs by registering your product at www.genelec.com. Refer to the reseller for full sales and guarantee terms.

Compliance to FCC Rules

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.

Specifications

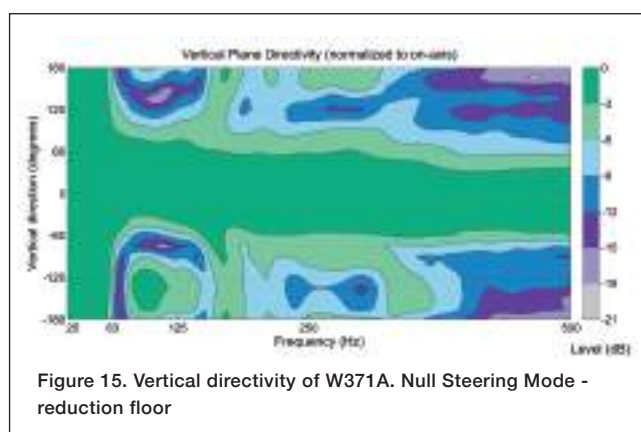
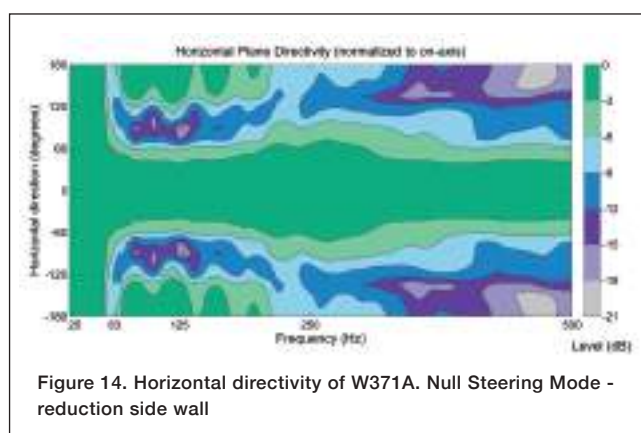
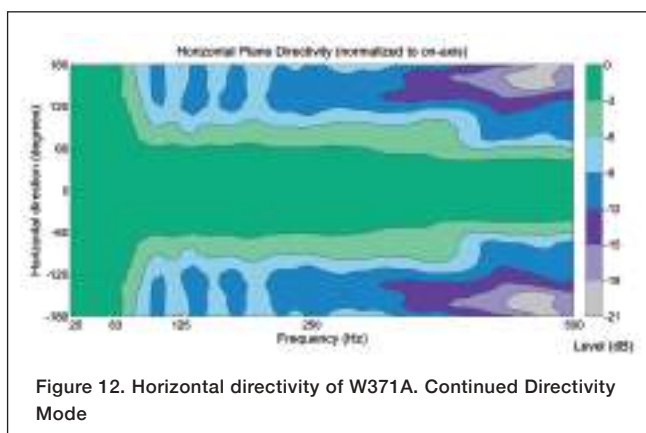
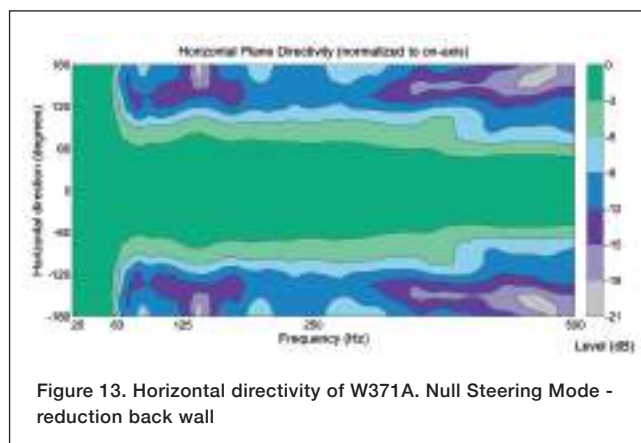
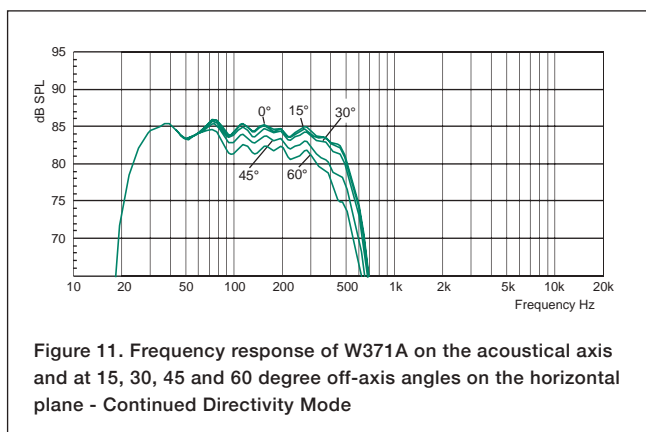
SYSTEM SPECIFICATIONS	W371A
Lower cut-off frequency -6 dB (anechoic, continued directivity mode)	23 Hz*
Upper cut-off frequency -6 dB (anechoic, continued directivity mode)	500 Hz**
Accuracy of frequency response (anechoic, continued directivity mode)	± 3 dB (25 Hz - 450 Hz)
Drivers	Front 356 mm (14 in), Rear 305 mm (12 in)
Harmonic distortion at 1 m on axis in half space, 30 to 100 Hz	2nd ≤ 3% @ 100 dB SPL 3rd ≤ 2% @ 100 dB SPL
Harmonic distortion at 1 m on axis in half space, >100 Hz	< 0.5% @ 95 dB SPL
Maximum short term sine wave SPL output averaged 30 Hz to 100 Hz, measured in half space at 1 meter	≥117 dB SPL
Maximum short term sine wave SPL output averaged 100 Hz to 500 Hz, measured in half space at 1 meter	120 dB SPL
Maximum peak SPL output with pink noise, measured in half space at 1 meter. (Long term output is limited by driver unit protection circuitry)	≥123 dB SPL
Self generated noise level in free space at 1 m on axis (A-weighted)	≤15 dBA
Weight	61 kg (134 lb)
Dimensions	
Height without feet	1100 mm (43 5/16 in)
Height with feet	1108 mm (43 5/8 in)
Width	400 mm (15 3/4 in)
Depth	400 mm (15 3/4 in)

* In-room LF roll-off -6 dB target is 19 Hz

** HF roll-off is determined by operating mode and in-room responses. Values from 150 Hz to 300 Hz are possible

SIGNAL PROCESSING SECTION	W371A
Analogue signal input connector XLR female, balanced 10 kOhm	pin 1 gnd, pin 2 non-inverting, pin 3 inverting
Maximum analogue input signal	+25.0 dBu
Analogue input sensitivity (100 dB SPL at 1 m)	-6 dBu
Adjustment range	+48 dBu to -6 dBu
Digital signal input connector XLR female 110 Ohm	AES/EBU Single wire
Digital signal output / Thru connector XLR male 110 Ohm	AES/EBU Single wire
Digital audio input	
Word length	16 - 24 bits
Sample rate	32 - 192 kHz
Digital input sensitivity (100 dB SPL at 1 m)	-30 dBFS
Digital input maximum attenuation	48 dB
Positive input gain selection (via GLM)	(+6, +12, +18 dB)
Control network	
Type	Proprietary GLM network
Connection and cable	2 RJ45, standard CAT5 cable or later
System calibration	AutoCal
Input/output connections	1 x analog XLR input / 1 x analog thru, 1 x XLR digital AES/EBU input / 1 x digital thru

AMPLIFIER SECTION	W371A
Short-term amplifier output power (Long-term output power is limited by driver unit protection circuitry)	400 + 400 W
Amplifier system THD at nominal output	<0.01 %
Mains voltage	100-240 VAC 50/60 Hz
Power consumption	
Standby, ISS active	<2 W
Idle	40 W
Full output, peak	600 W



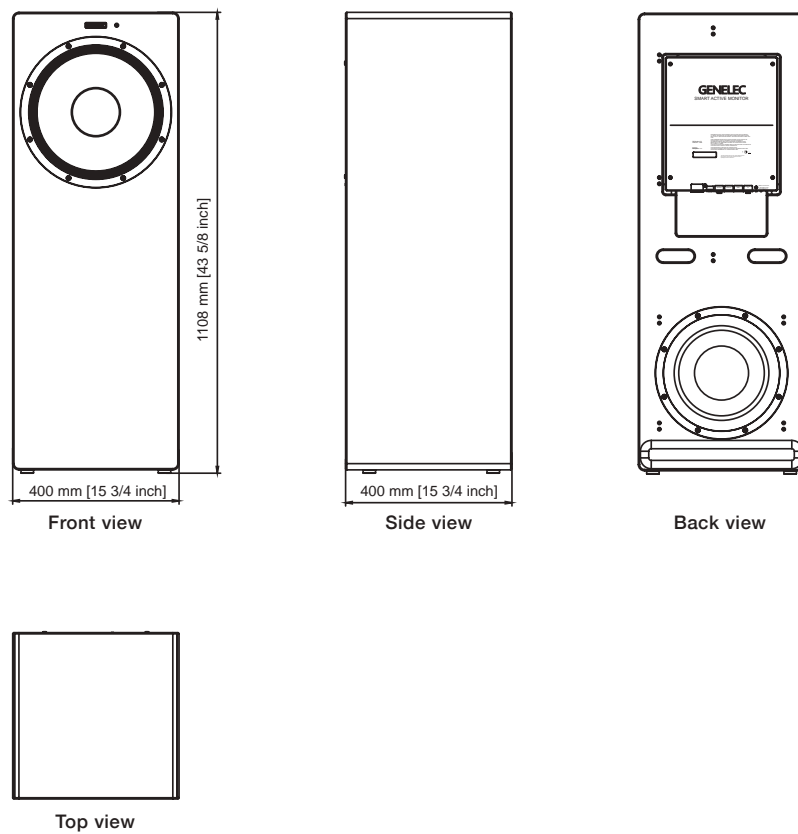


Figure 16. Dimensions of the W371

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