Operating Manual

Genelec Loudspeaker Manager

GLM™ 3 System

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the sonic reference

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Introduction

Congratulations and thank you for purchasing Genelec Smart Active Monitoring (SAM^{TM}) systems. Take a moment to familiarize yourself with the contents of this manual. While the use of the products is intuitive, there are many options and suggestions in this manual with regards to different types of installations and applications.

For support contact your local dealer or support@genelec.com

Glossary

Abbreviation or term	Explanation
12xx	Family of large three-way SAM monitors
72xx	Family of digital audio input SAM subwoofers
73xx	Family of analog and digital input SAM subwoofers
82xx	Family of two-way and three-way SAM monitors
83xx	Family of two-way and three-way SAM monitors with extended room compensation capability
9301	Multichannel AES/EBU Interface to use with 73xx subwoofers. Sums upto 8 channels to one AES/EBU cable.
Adapter (8300-416)	Genelec Network Adapter. GLM adapter is the device that connects the GLM network to the computer USB port and acts as the stand alone master and measurement microphone interface
Analog IN	XLR analog line input
Analog OUT	XLR analog line output
AutoCal	Genelec automatic room response calibration method
AutoPhase	Genelec automatic phase calibration method
Digital IN	AES/EBU digital audio input on XLR
Digital OUT	AES/EBU digital audio output on XLR
GLM	Genelec Loudspeaker Manager. Software for setup, automatic calibration, and management of a monitoring system.
GLM Network	Genelec's proprietary monitoring system control network enabling automatic system setup, calibration, and control
Layout grid	A grid on the GLM user interface where monitor and subwoofer icons are placed; automatically creates friendly names and assigns digital audio subframe settings
Group	Collection of monitors and subwoofers playing at one time; each group has its own settings, including AutoCal calibration
Layout	Graphically shows the number of monitors/subwoofers on the GLM network and their physical locations
SAM	Smart Active Monitoring
SE7261	Genelec SAM subwoofer that acts as a centralized processing unit for 8130 digital input monitors (non-SAM monitors)
Stack	Software window displaying a collection of unassigned monitors icons that are initially on this stack from where they are moved onto the Layout Grid

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System Components

SAM Monitors

Smart active monitors (SAM) are supported on Genelec's GLM control network. Genelec has a very large selection of SAM monitors, ranging from compact two-ways to large three-way main monitors.

SAM Subwoofers

Smart active subwoofers are supported Genelec's GLM control network. Genelec has a wide selection of subwoofers supporting multichannel analog inputs and multichannel digital audio inputs for all monitoring applications.

Genelec Network Adapter

Genelec GLM network adapter (8300-416) connects SAM systems to the USB interface in a computer, and operates as the interface for the measurement microphone, and as the master for the stand-alone volume control.

Genelec Loudspeaker Manager Software

Genelec Loudspeaker Manager (GLM) software enables setup, automatic calibration, and continuous control of all monitors and subwoofer in the control room.

Download the Genelec Loudspeaker Manager (GLM) software from Genelec website at www.genelec.com/glm.

For more details on monitors and subwoofers installations and system setups, see the section 'Getting Started'.

NOTE: GLM installation packages will be updated regularly to include the latest microphone calibration data. To make sure that you have the microphone correction data download and install software after you have received GLM kit.

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Getting Started

To take full advantage of your Smart Active Monitoring (SAM) system it is important to become familiar with all the components in the system.

To set up a monitoring system you will need monitors and subwoofers, audio signal cables, GLM control network cables, GLM network adapter, GLM measurement microphone, and GLM 3 software.

To set up a Genelec SAM system,

- place SAM subwoofers and monitors in the monitoring room

- run audio cables to the SAM subwoofers and monitors

- run GLM network cables from the GLM adapter to all SAM subwoofers and monitors

- download and install the GLM computer software

- create a system setup in the GLM software

Placing SAM monitors and subwoofers in the monitoring room

Try to place monitors and subwoofers in optimum locations in relation to surfaces reflecting audio. Aim each SAM monitor towards the listening position. This becomes your System Layout.

1. Select listening position so that distances from side walls (B) are equal.

2. Place monitors so that distances to the listening position are equal, and distances to the monitors are equal from side walls (A).

3. Place a subwoofer at the front wall and a slightly left or right from the room centre axis.

4. Aim monitors towards the listening position.
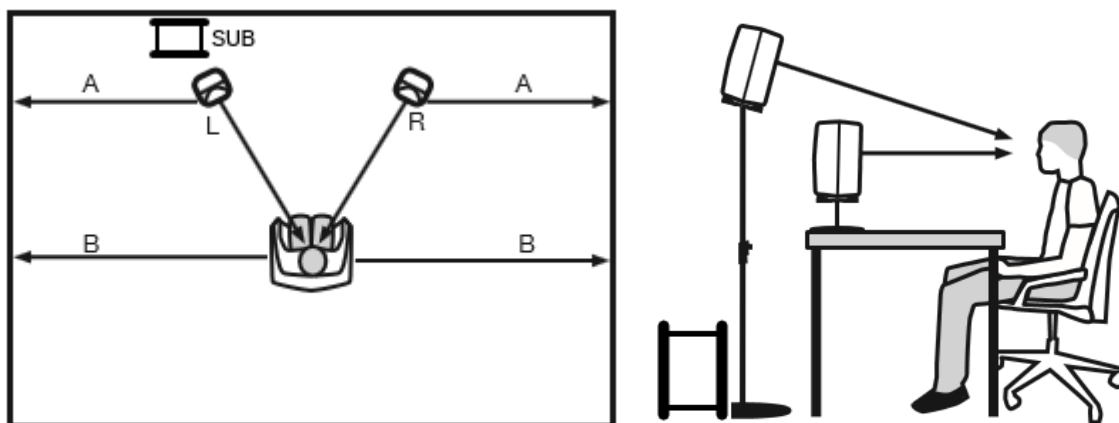
Figure 1. Place monitors symmetrically relative to the walls. Point the acoustical axes towards the listening position.

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Cabling for Audio Signals

Run all audio cables from the audio source to the monitors. When a subwoofer is used, run the same signal to the monitor and the subwoofer. We recommend running the signal to the subwoofer first. The subwoofer has output connectors to facilitate onward connection to the monitor.

Those audio channels that are not going to be bass managed can be run directly to the monitors and do not need to run to the subwoofer. Bass management means using a subwoofer to reproduce the low frequencies for any or all channels.

When you need both analog and digital audio cabling, it is possible to populate both analog and digital inputs and outputs on SAM products. GLM allows Group configuration to be either analog or digital. Note that the 8320 features analog input only.

The most common audio cablings are introduced next.

Analog Stereo Example

Before cabling, turn off the power in all monitors.

- connect audio cables from the audio source to the monitor ANALOG IN
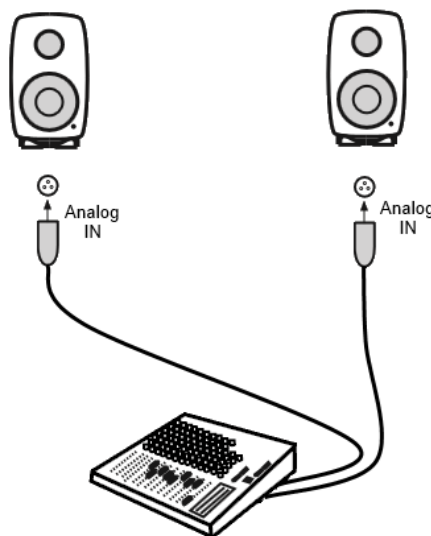
Figure 2. Analog stereo cabling.

Analog Stereo with a Subwoofer Example

Before cabling, turn off the power in all monitors and subwoofers.

- connect an audio cable from the source to the subwoofer connector ANALOG IN 1. This can be the Left channel, for example.

- connect a cable from subwoofer ANALOG OUT 1 to left monitor ANALOG IN.

- connect (Right) audio cable from audio source to subwoofer ANALOG IN 2.

- connect (Right) audio cable from Subwoofer ANALOG OUT 2 to right monitor ANALOG IN

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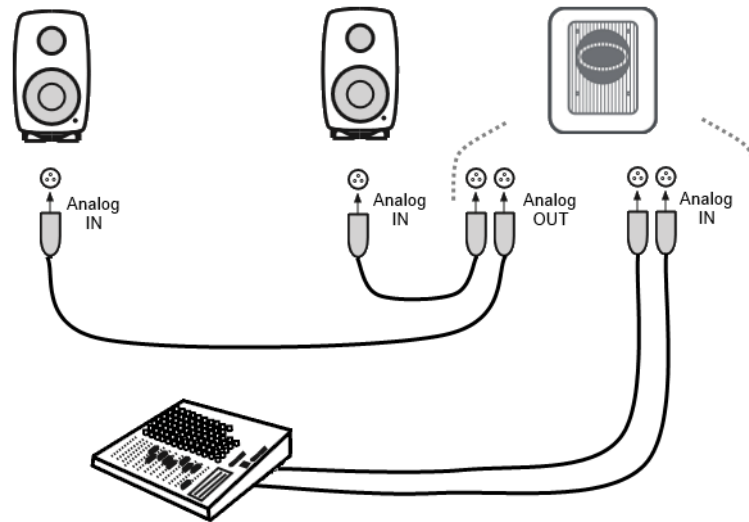
Figure 3. Analog stereo cabling with a subwoofer

Analog 5.1 Surround Example

Before cabling, turn off the power in all monitors and subwoofers.

- connect an audio cable from the audio source to the subwoofer ANALOG IN 1

- continue from the subwoofer ANALOG OUT 1 to the monitor ANALOG IN

- continue connecting all remaining audio input cables to the subwoofer inputs ANALOG IN 2 through to ANALOG IN 5, and from the respective analog outputs to the relevant monitors

- finally, connect the LFE channel from the audio source to the subwoofer LFE IN
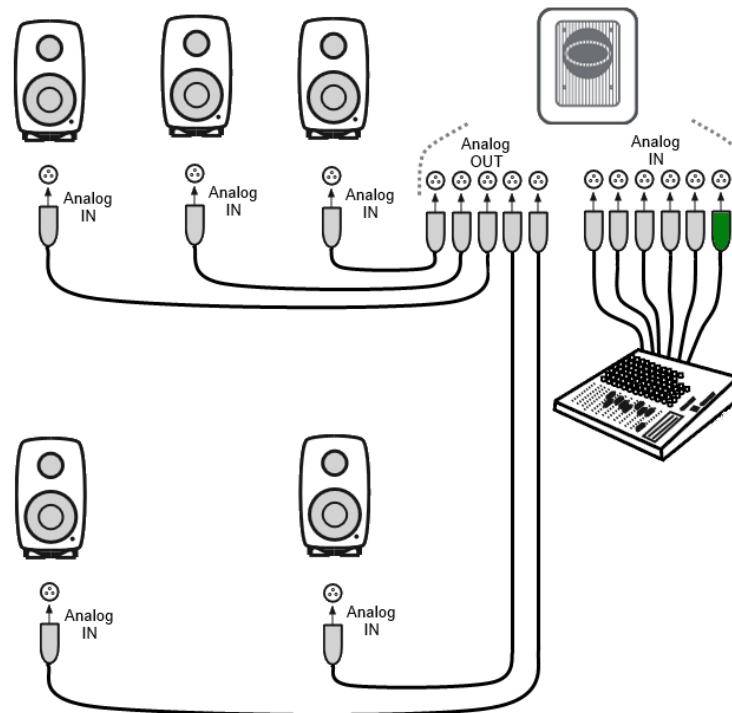
Figure 4. An example of analog 5.1 system cabling

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Digital Audio, Stereo with a Subwoofer Example

Before cabling, turn off the power in all monitors and subwoofers. An example of the audio cabling for AES/EBU digital audio is shown in Figure 5.

Connect the following XLR digital audio cables:

- from the AES/EBU output of the audio source to the subwoofer DIGITAL IN input connector

- from the subwoofer DIGITAL OUT to the right monitor DIGITAL IN

- from the right monitor DIGITAL OUT to left monitor DIGITAL IN
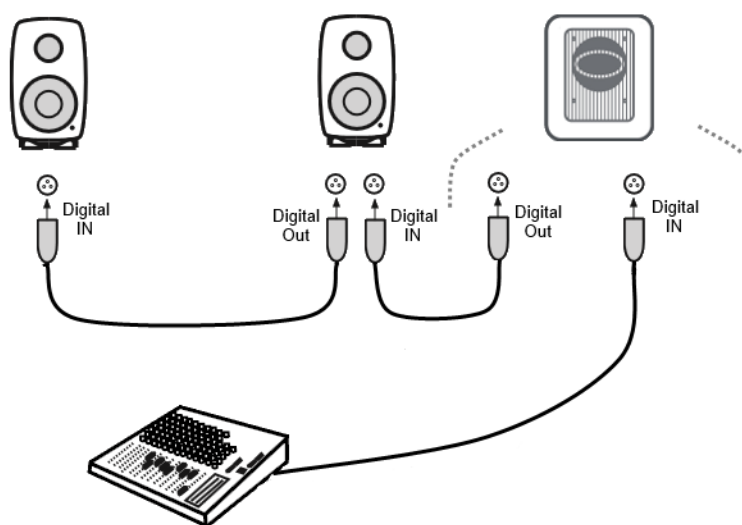
Figure 5. An example of an AES/EBU digital audio stereo cabling

Digital Audio 5.1 with a 7300 Series Subwoofer and 9301 Example

Before cabling, turn off the power in all monitors and subwoofers. 7300 series subwoofers have only one (stereo) input for AES/EBU digital audio, 9301 Multichannel AES/EBU Interface is needed. An example of the audio cabling for AES/EBU digital audio is shown in Figure 6. An example of an AES/EBU digital audio surround cabling with 7300 series subwoofer and 9301.

Connect the following XLR digital audio cables:

Left/Right channel pair

- from the AES/EBU output of the audio source to the 9301's AES IN 1 connector

- from the 9301's AES OUT 1 to the right monitor DIGITAL IN

- from the right monitor DIGITAL OUT to left monitor DIGITAL IN

Surround Left/Right channel pair

- from the AES/EBU output of the audio source to the 9301's AES IN 2 connector

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- from the 9301's AES OUT 2 to the surround right monitor DIGITAL IN

- from the surround right monitor DIGITAL OUT to surround left monitor DIGITAL IN

Center/LFE channel pair

- from the AES/EBU output of the audio source to the 9301's AES IN 4 connector

- from the 9301's AES OUT 4 to the center monitor DIGITAL IN

Sum signal

- from the 9301's SUBWOOFER LINK output to the 7300 series subwoofer DIGITAL IN connector

NOTE: AES/EBU Digital input mode of 73xx subwoofer needs to be in Multichannel mode. See Group setting specific to a single subwoofer (73xx Series) **for more details.**
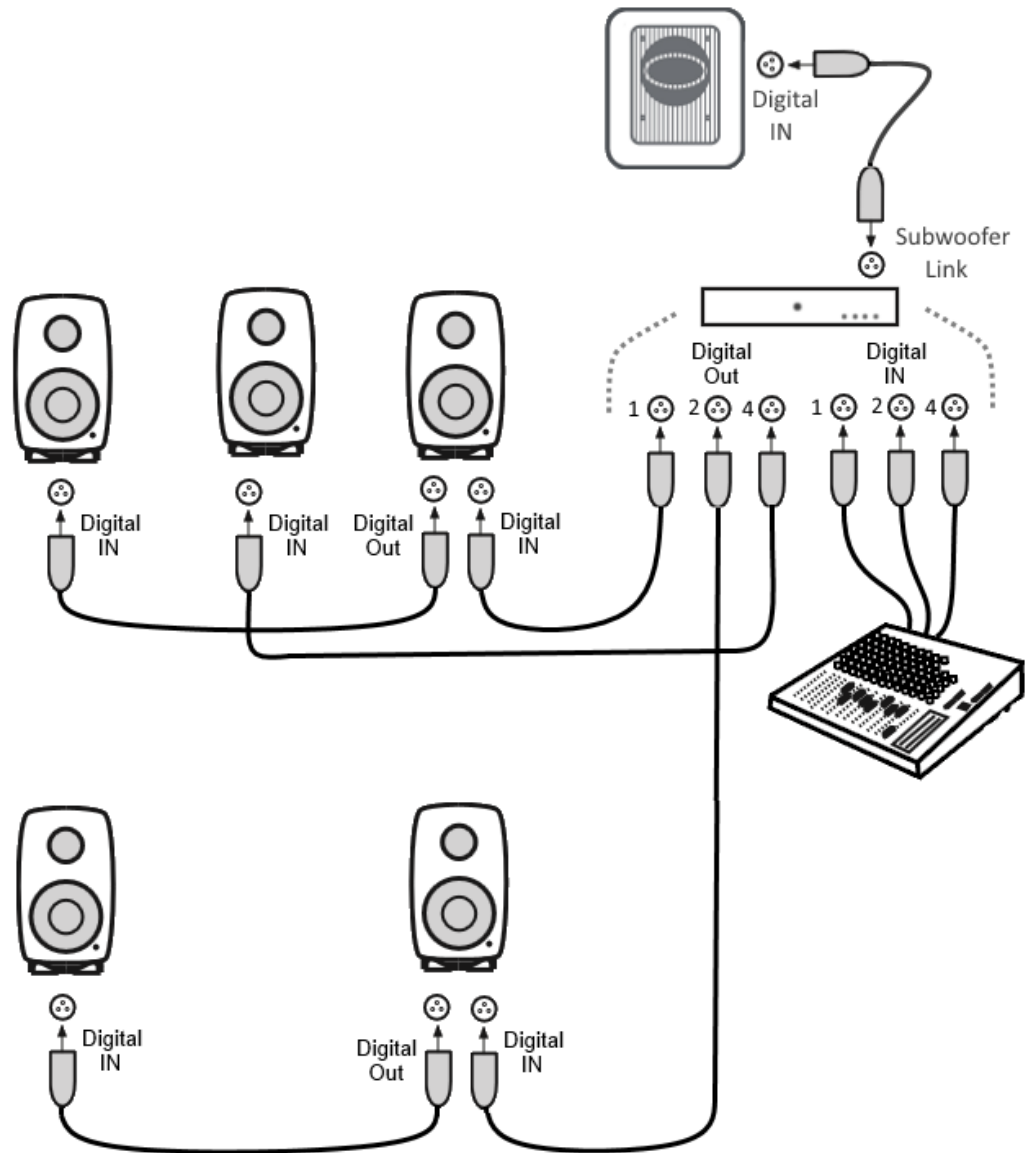
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Figure 6. An example of an AES/EBU digital audio surround cabling with 7300 series subwoofer and 9301.

Digital Audio 5.1 with 7200 Series Subwoofer Example

Before cabling, turn off the power in all monitors and subwoofers. An example of the audio cabling for AES/EBU digital audio is shown in Figure 7. Any cable carrying the LFE channel can only be connected to the subwoofer input 4.

Connect the following XLR digital audio cables:

Left/Right channel pair

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT1 connector

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- from the subwoofer DIGITAL OUTPUT1 to the right monitor DIGITAL IN

- from the right monitor DIGITAL OUT to left monitor DIGITAL IN

Surround Left/Right channel pair

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT2 connector

- from the subwoofer DIGITAL OUTPUT2 to the surround right monitor DIGITAL IN

- from the surround right monitor DIGITAL OUT to surround left monitor DIGITAL IN

Center/LFE channel pair

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT4 connector

- from the subwoofer DIGITAL OUTPUT4 to the center monitor DIGITAL IN

Figure 7. An example of an AES/EBU digital audio surround cabling with 7200 Series subwoofer

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Digital Audio, Stereo with a SE7261 Subwoofer Example

Before cabling, turn off the power in all monitors and subwoofers. An example of the audio cabling for AES/EBU digital audio is shown in Figure 8. Note that the AES/EBU digital audio channels reproduced have to be selected on each monitor. The figure below also shows the dip switches position for the required A or B channel selection.

Connect the following XLR digital audio cables:

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT1 input connector

- from the subwoofer DIGITAL OUTPUT to the right monitor DIGITAL IN

- from the right monitor DIGITAL OUT to left monitor DIGITAL IN

Select the following digital audio channels for the monitor:

- on the left monitor turn ON digital audio channel A

- on the right monitor turn ON digital audio channel B
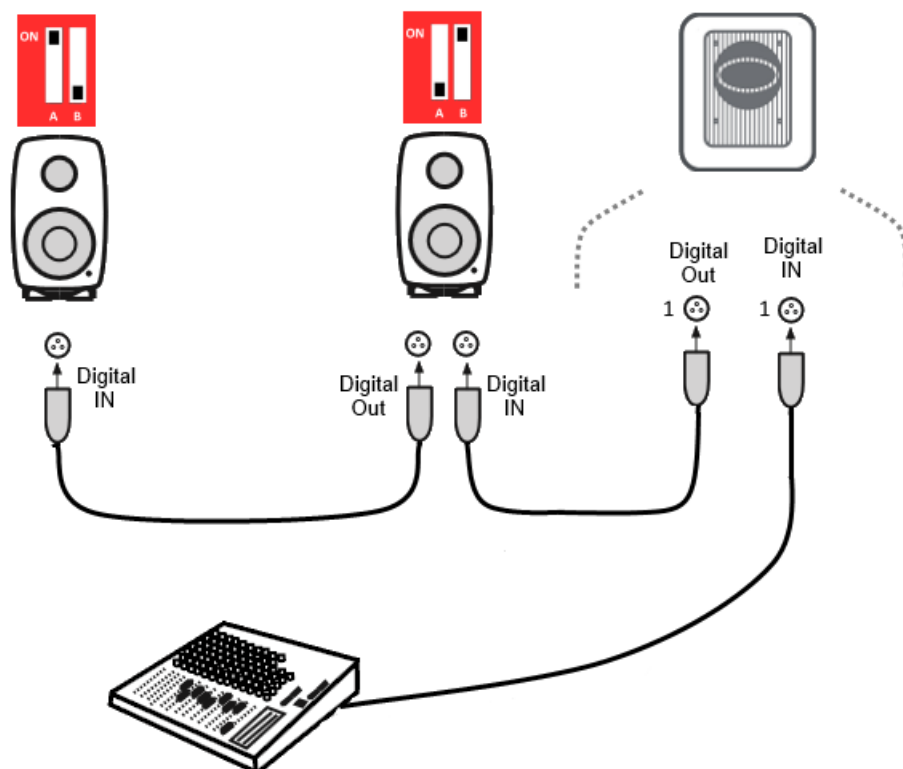
Figure 8. An example of an AES/EBU digital audio stereo cabling with SE7261 and digital channel selections for each monitor.

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Digital Audio 5.1 with a SE7261 Subwoofer Example

Before cabling, turn off the power in all monitors and subwoofers. An example of the audio cabling for AES/EBU digital audio is shown in Figure 9.

Connect the following XLR digital audio cables:

Left/Right channel pair

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT1 connector

- from the subwoofer DIGITAL OUTPUT1 to the right monitor DIGITAL IN

- from the right monitor DIGITAL OUT to left monitor DIGITAL IN

Surround Left/Right channel pair

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT2 connector

- from the subwoofer DIGITAL OUTPUT2 to the surround right monitor DIGITAL IN

- from the surround right monitor DIGITAL OUT to surround left monitor DIGITAL IN

Center/LFE channel pair

- from the AES/EBU output of the audio source to the subwoofer DIGITAL INPUT4 connector

- from the subwoofer DIGITAL OUTPUT4 to the center monitor DIGITAL IN

Select the following digital audio channels for the monitor

- on the left monitor turn ON digital audio channel A

- on the right monitor turn ON digital audio channel B

- on the surround left monitor turn ON digital audio channel A

- on the surround right monitor turn ON digital audio channel B

- on the center monitor turn ON digital audio channel A

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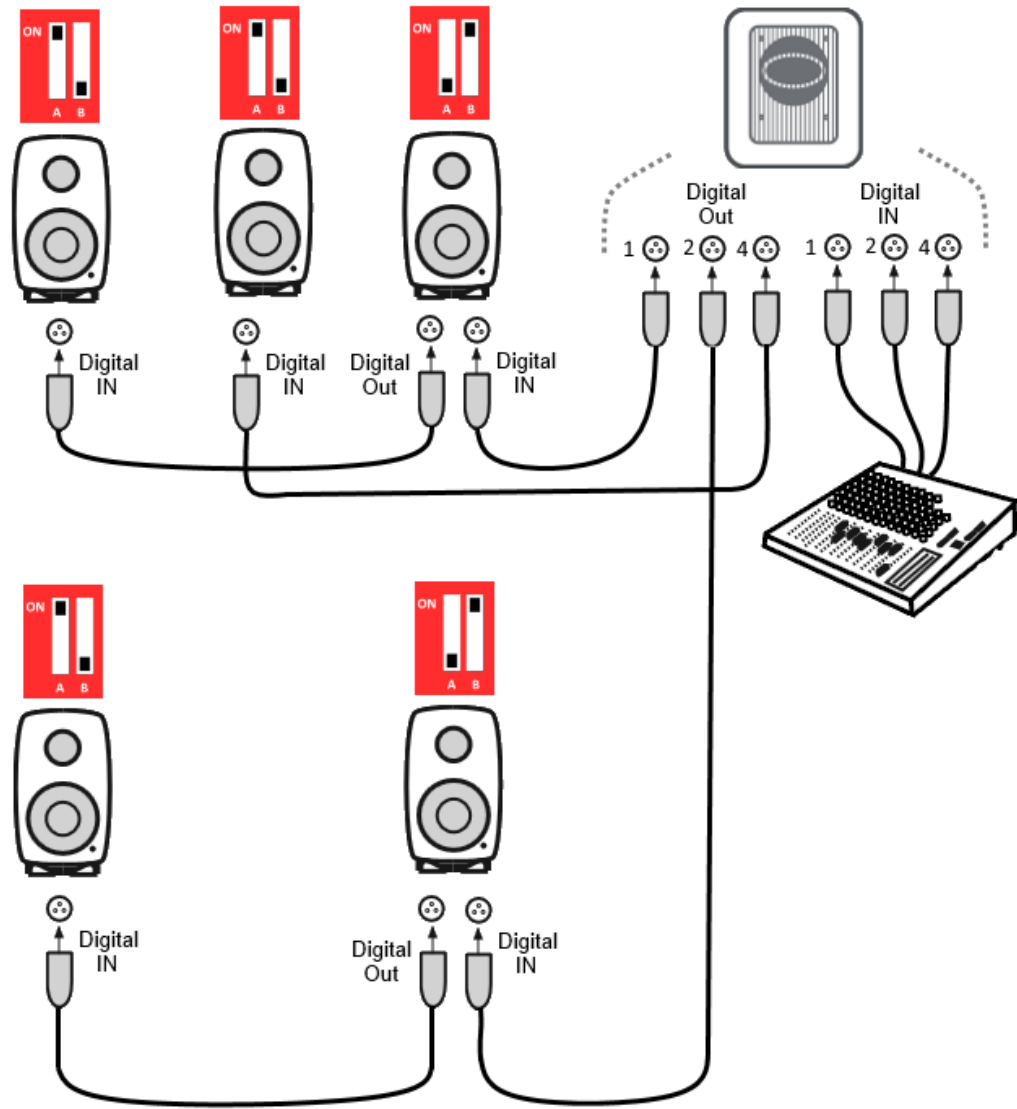
Figure 9. An example of an AES/EBU digital audio surround cabling with SE7261 and digital channel selections for each monitor.

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Cabling of the Control Network

The GLM control network cabling is very easy. Connect the computer USB port to the GLM adapter. Connect the GLM adapter to all SAM monitors and subwoofers in daisy-chain fashion (Figure 10) using the GLM network cables supplied with each monitor and subwoofer. You can connect in any order. Just be sure to connect all monitors and subwoofers.

Table 1. Connections on the GLM adapter (from left to right)

Connector	Use
USB (type B)	Connects the GLM adapter to a computer USB interface or USB power supply (stand-alone volume control)
Volume (3.5 mm jack)	Connection for Genelec volume controller
Microphone (3.5 mm jack)	Connection for Genelec calibration microphone
GLM Net (RJ45)	GLM control network connection
Terminator (RJ45)	Return termination for the GLM control network from the last monitor, in case of network cabling being greater than 100 meters.
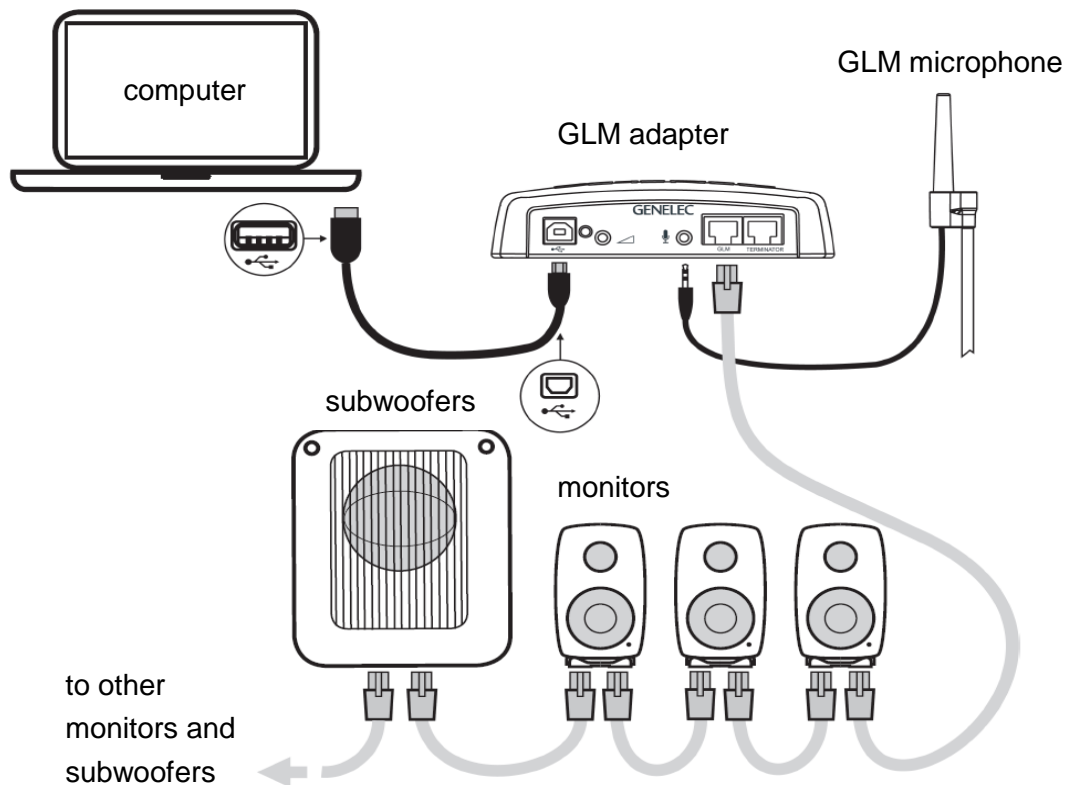
Figure 10. Connections of GLM control network, measurement microphone, and computer

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Downloading and Installing GLM Software

The GLM software calibrates and controls Genelec SAM systems. The software can be downloaded at www.genelec.com/glm.

You must have sufficient rights to install the software in your computer. Install the software following the instruction given by the software during the installation process. We recommend you install the software on the local hard drive. There is no need to make any special destination folders, GLM creates these automatically.

Figure 11. GLM software download

Creating a System Layout and Calibrating a System

Before launching the GLM software after installation, stop or mute the audio source, ensure that all monitors and subwoofers are connected to the GLM network and are powered on.

The steps to create a GLM System Setup with a system layout and calibration are

1. create a SAM monitoring system layout

2. define one or more SAM monitoring groups

3. run GLM AutoCal automatic calibration

4. run GLM AutoPhase automatic phase calibration for subwoofers (AutoPhase is only available when a subwoofer is included in a group)

Creating a SAM Monitor Layout

To create a layout all monitors and subwoofer must be powered and GLM network connections be made.

A layout defines your monitors and their locations in the room. An example in Figure 14 shows a stereo system with a subwoofer. On the left you see the GLM layout definition page and on the right you see the actual monitoring system in the room.

A new system layout is created when the GLM user interface starts the first time. You can always create a new layout by selecting the 'File | New' menu item.

When the creation of a new layout starts, initially all monitors and subwoofers are stacked on the left side of the page.

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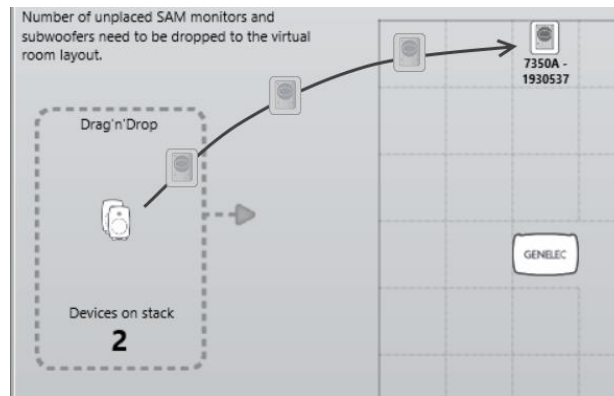
Figure 12. Drag and drop the monitor icons onto the layout grid to build a system layout

Use your mouse to drag and drop monitors or subwoofers onto the layout. Drag a monitor or subwoofer icon from the stack to the layout grid on the right and drop it to the position that matches its position in the room. Continue this until the stack is empty.

Note: monitors and subwoofers are automatically named by the location information, e.g. when the monitor is dropped on the left side, it is named as 'Left 8330A'. If a monitor has AES/EBU digital input it will also get a default AES/EBU subframe to be reproduced in the digital group, e.g. when the monitor is dropped to the left side, it gets subframe A selected as default. In the acoustic calibration the placement information is used to define front left/front right monitor pairs for the equal room filter designs. The equal room filter design is possible when front left and front right monitors are placed symmetrically to the grid (see Figure 13) and checking the 'Each front Left-Right pair shares the same equalizer settings' box in the acoustic calibration page.
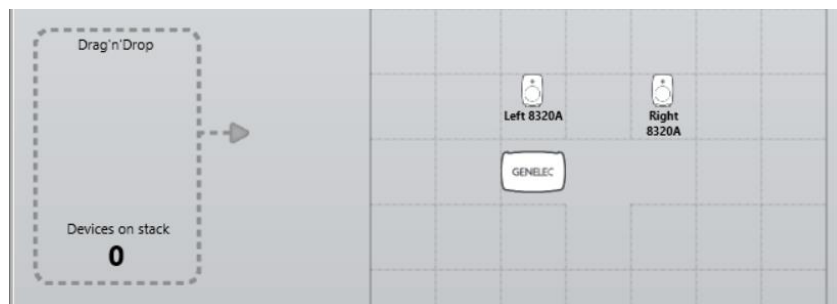
Figure 13. An example of an empty monitor stack

When you drag, the real monitor plays an identification tone and flashes the front panel LED. The identification tones depend on the SAM product type and the tones can vary between products in the same setup.

After all monitors and subwoofer have been moved to the layout, click on the 'Confirm Layout' to continue.
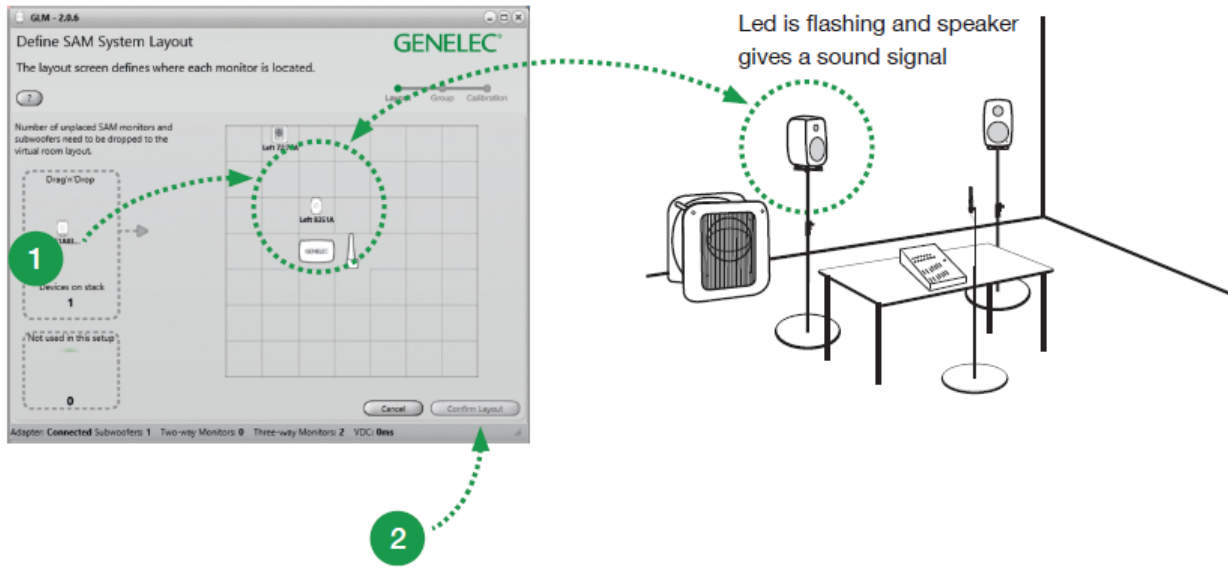
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Figure 14. The steps of creating a SAM system layout

The additional display box **'Not used in this setup'** is primarily used with Small Environment (SE) systems (SE7261). It defines the number of unused 8130s with the SE7261 subwoofer.

For example, the SE7261 can support up to 8 x 8130s and the system setup starts with 8 SE channels on the Stack. They are labeled 1A, 1B all the way through 4B. However, if your SE system only has 2 channels being used in input/outputs 1 for stereo (1A and 1 B), you would take the next 6 (2A thru 4B) off the Stack and place them into the "Not used in this setup" bin.

Note: any SAM monitor that is placed into the "Not used in this setup" bin (Figure 15) cannot be used as part of the current Setup and in creating other Groups. You will need to create a new Setup using the File/New syntax in order to use them.
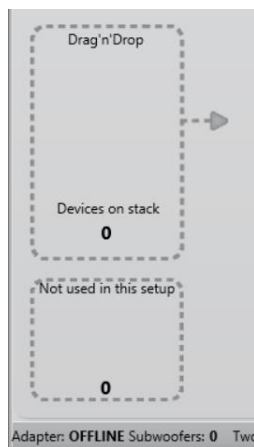
Figure 15. Location of the 'Not used in this setup' bin.

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Creating a SAM Monitor Group

A SAM monitoring group is a set of monitors and subwoofers that reproduce audio together. A group contains settings that can optimize every monitors and subwoofers.

To define a monitoring group:

- give the group a name (1) that describes it (e.g. Analog Stereo)

- select the input signal (2) for the group (Analog or AES/EBU)

- click on each monitor and subwoofer, then edit/check the setting (3) (for more information, see the GLM Advanced Settings); the monitor with a green halo is active; monitors with yellow halo are not part of the group

- confirm the group settings by clicking on the 'Confirm Group' button (4)

For more detailed information on using and setting up Groups, see the section 'GLM Advanced Use'.
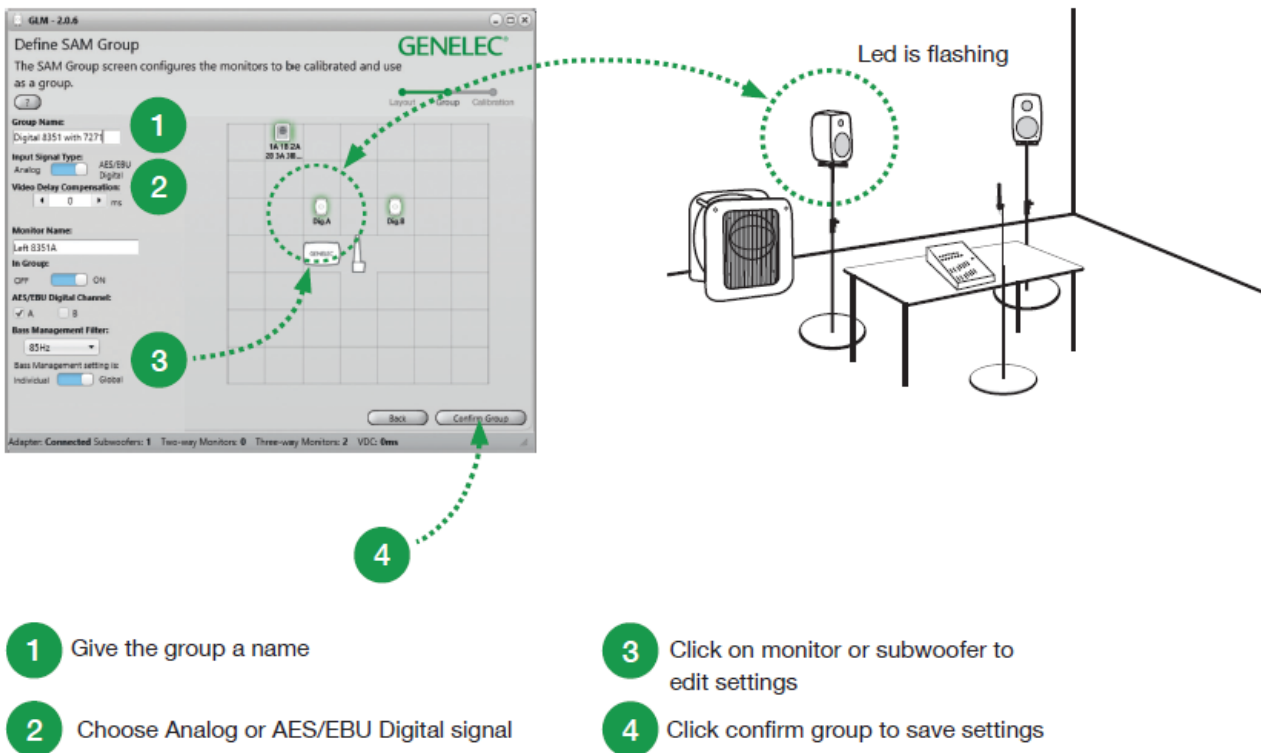
Figure 16. Group definition window; the monitors with a green halo is active; monitors with a yellow halo are not part of the active group

Automatic Calibration Using GLM AutoCal

GLM AutoCal is a powerful monitoring system calibration algorithm running inside the GLM software. Sweeps are generated by each monitor in a group. Responses are recorded with the GLM measurement microphone into your computer.

The computer analyzes the sweeps and calculates the frequency responses for all monitors and subwoofers, then optimizes level and delay to compensate for differences between monitors, and sets equalization for the individual room responses to remove colorations caused by the room and the location where the monitors have been installed. The end result is to have sound from all monitors arriving at the listening position at the same time, same level, and compensated for the effects of the room acoustics, resulting in very accurate imaging and reliable monitoring.

Each monitor group has its own acoustic settings. This is one of the important features of GLM.

Each setup file can contain several monitoring group definitions each with different AutoCal calibration settings.

Even with the same set of monitors you can determine several listening positions by applying calibration in several locations and defining each location as a new group. For example, one group can be 'Engineer Position' and another 'Producer Position'. Each can have its own calibration. Then, selecting the group in the GLM software quickly loads all acoustic settings specific for each microphone position.

To calibrate a monitoring group

- connect the measurement microphone to the GLM network adapter

- check the serial number of the measurement microphone (each specific measurement microphone calibration file is stored in the software)

- select either a single location measurement (SinglePoint) or measurements of multiple listening positions (MultiPoint)

- select if the optimization is done locally or in the cloud, the cloud optimization requires network connection, check "Use Autocal Cloud" checkbox to use the cloud optimization

- specify whether a pair of stereo front monitors should receive different calibration filters (tickbox 'unselected' – example: useful for unsymmetrical setups where one monitor is in a corner and the other free-standing), or if the same calibration filters should be applied to both monitors (tickbox 'selected')

- place the microphone at the listening position, at ear height

- double-click on the measurement microphone icon to start the measurement

- wait while AutoCal measures all monitors and subwoofers and then optimizes each monitor and subwoofer

- click 'Confirm Calibration' to accept and save the settings

- if there is a subwoofer in the group, the next step of the process is the automatic adjustment of the phase (AutoPhase)

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See section Advanced use of AutoCal for more detailed information on the calibration process.
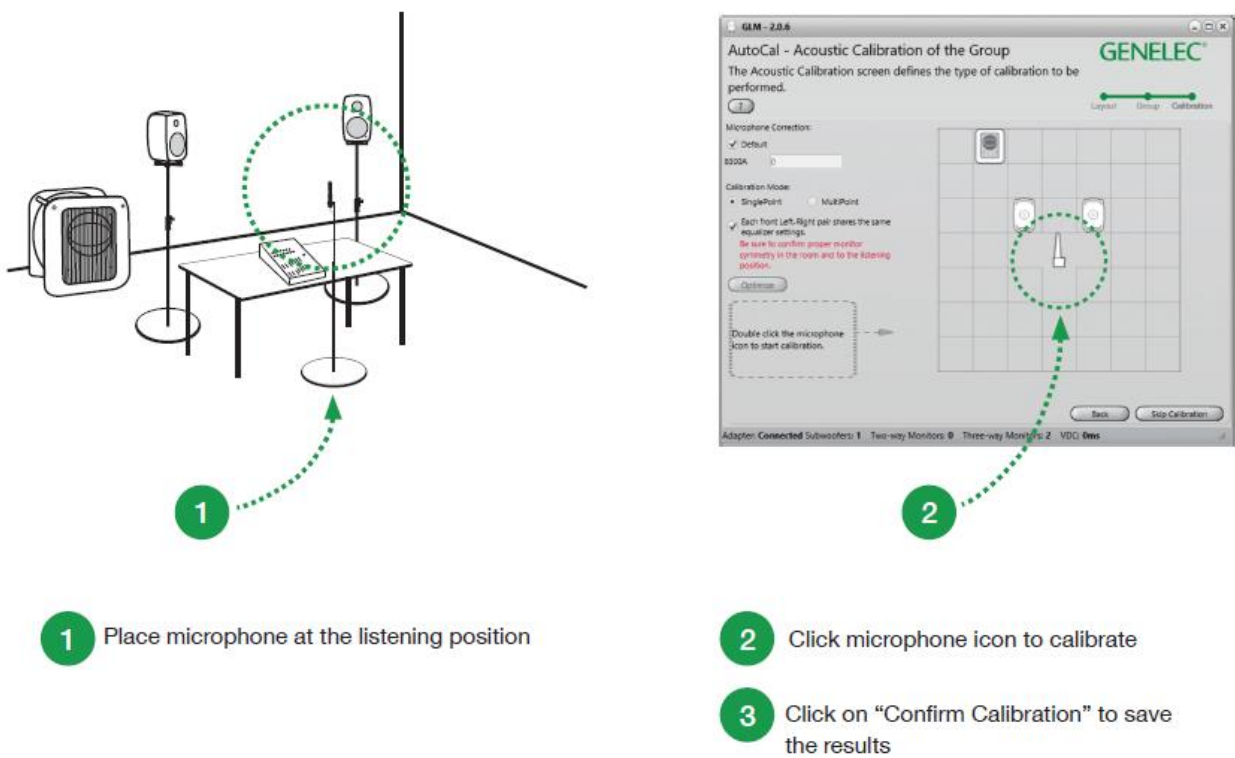
Figure 17. Steps in running the AutoCal automatic system calibration process

Aligning Subwoofer Phase with GLM AutoPhase

The purpose of GLM AutoPhase is to set the subwoofer phase at the crossover frequency in relation to a selected monitor so that the combined response of the subwoofer-monitor system is flat across the crossover region.

1 Place microphone at the listening position

2 Follow the procedure listed on the left of the screen

3 Click on "Confirm Calibration" to save the results
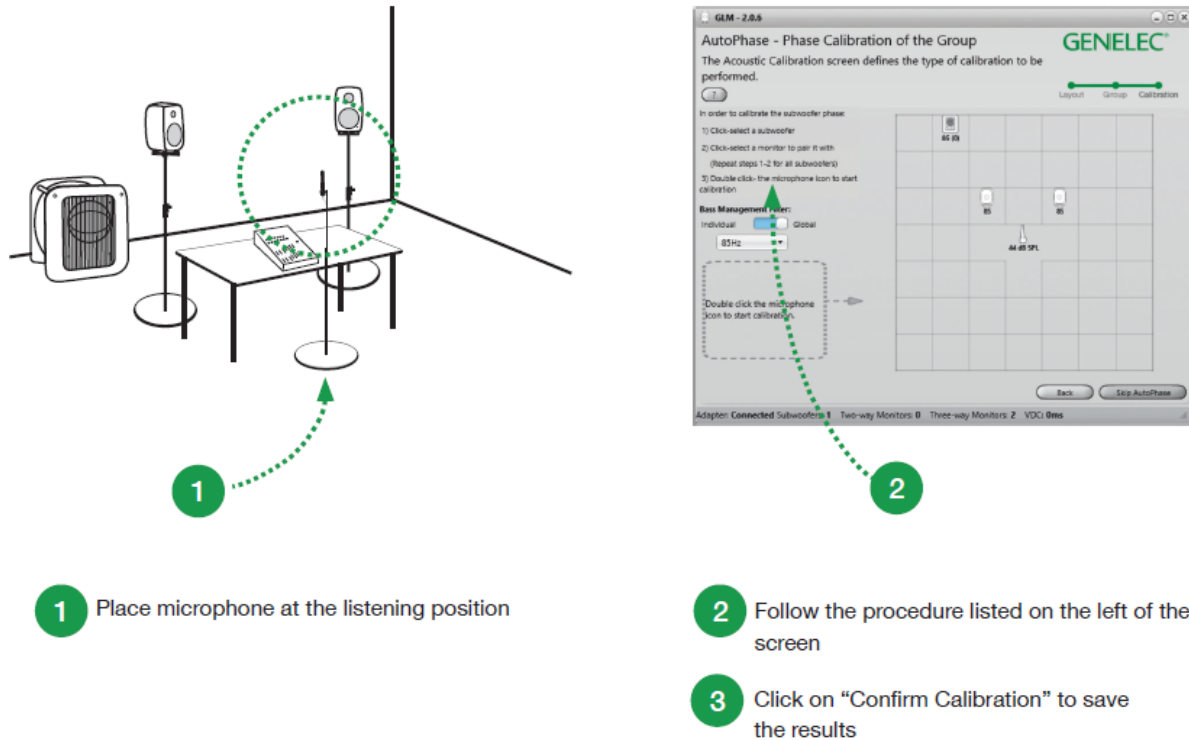
Figure 18. Steps in running the AutoPhase automatic phase calibration process

The steps to run AutoPhase automatic subwoofer phase calibration include

- connect the calibration microphone to the GLM adapter

- place the microphone at the listening position

- define the monitor to be aligned with the subwoofer by single clicking on the subwoofer icon first and then the monitor icon; this is done for each subwoofer in the group; if there are several subwoofers in the group, associate every subwoofer with a monitor before proceeding to the AutoPhase calibration

- start the AutoPhase measurement process by clicking on the calibration microphone icon

- wait until the AutoPhase calibration is completed

- click 'Confirm Calibration' button to accept and save the calibration

- if there are several subwoofers in the group, the AutoPhase will move to the next subwoofer automatically.

- click 'Confirm Calibration' to save the settings

For more detailed information, see the section on Advanced use of AutoPhase.

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Basic Use of GLM

The main page of the GLM software offers the basic monitoring system controls (Figure 19)

- system level

- selection and activation of Groups using group tabs

- status indications and feedback of the SAM subwoofers and monitors

- mute, dim, and level preset selections

These features are also available in the main window, but we will discuss these in more detail in the section 'Advanced Use of the GLM'.

- Cal. Level button for the standard loudness SPL calibration

- Bass Management Bypass button (when a subwoofer is used) to drive low frequencies to all monitors instead of sending them to a subwoofer

- 'Bypass AutoCal' to quickly evaluate the effects of AutoCal calibration

- quick access to monitor and subwoofer settings, by double-clicking on the monitor and subwoofer icons

- quick access to GLM Adapter information, by double-clicking on the adapter icon.

- quick access to rerun AutoCal automatic calibration, by double clicking on the microphone icon

- system management menu commands
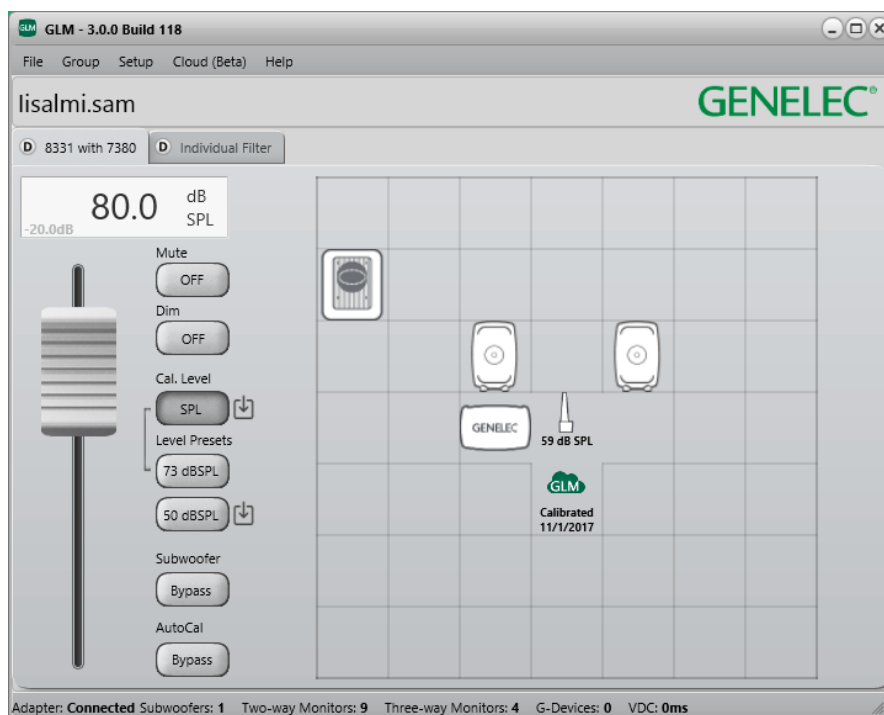
Figure 19. GLM software main page.

Group Tabs

A group is activated by clicking on the group tab. When the group tab is selected,

- monitors and subwoofers belonging in the group are activated

- all the acoustic settings defined in this group for monitors and subwoofers are loaded

- the monitoring level is set to the level saved for this group

- the audio input (analog, AES/EBU) that has been defined for this group is selected

- the bass management settings defined for the group are activated, determining if a subwoofer is used, and what bass management settings are set in the subwoofer

System Level Control

System Level is controlled with the master level fader.

The system level is controlled separately for each group. The system levels are stored for each group in the system setup file so that the levels set before saving the system setup file resume when the system setup file is opened.

The Level Preset buttons do not change the system level fader setting. When a Level Preset button is released, the level setting returns the value set in the fader.

Mute, Dim, Level Preset, and Bass Management Bypass Buttons

The states of these buttons are retained for each group.

The Mute button mutes the monitoring system.

The Dim button lowers the level of the current group. While the Dim is active the level is reduced by 20 dB.

Level Preset buttons activate a level preset. Level Presets are a quick way to recall a calibrated system level. When these buttons are active, the system level fader is overridden. Releasing the preset resumes the system level to the value set in the fader.

A level preset can be set to a desired value as follows

- adjust the system level fader to the wanted level

- click the set icon next to Level Preset button

A set icon

Figure 20. Level Presets.

Advanced Use of GLM

GLM is the most powerful tool available to calibrate and control a Genelec SAM monitoring system. The following chapters introduce advanced use of the GLM.

Standard Loudness SPL Calibration

The new Standard Loudness SPL feature allows calibration of the listening level in accordance with digital loudness standards such as ATSC A/85 and EBU R128. Calibrated listening level is important to judge e.g. speech intelligibility, spectral balance, platform compatibility etc.

The in-situ frequency response compensation and system alignment should be followed by the absolute SPL listening level calibration. Note: Digital monitor interfacing should be used to reduce uncertainty and tolerances.

- Before SPL calibration, first perform the other calibration functions to compensate frequency response, time of flight, level difference between channels and sub phase. You would typically do this by creating a new "Group", using the Add Group command; or by editing an existing "Group", using the Edit Group command.
- If you require a frequency response different than flat, for instance a HF roll-off such as x-curve, now make those adjustments. To edit all channels at once, consider using the Sound Character Profiler. Per channel, select and edit individual monitors.
- SPL calibration should be the final item: Click the 'set' icon next to the 'Cal. Level' key on the main page. The Standard Loudness SPL Calibration window opens.

Figure 21. Entering to the Standard Loudness SPL Calibration page.

- Select level calibration standard from the dropdown list.
- Select which monitor to base the calibration on. Any channel would normally be ok.
- Place the Genelec calibration microphone at the listening position.
- Double click the microphone icon to start the calibration process. Note that the test signal may be loud. If the background noise in the room is more than 65 dB SPL, the loudness preset cannot be calibrated. Reduce the noise and calibrate again.

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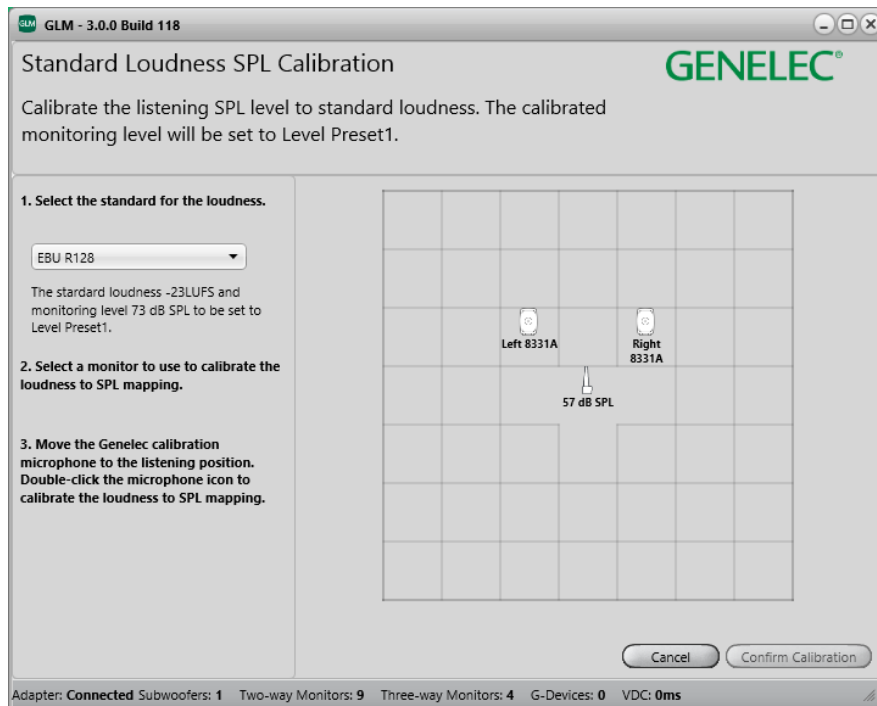
Figure 22.The standard loudness SPL calibration.

- After calibration, click the 'Confirm Calibration' key to save the results and return to the main page.

After SPL calibration, the main page shows the master level in dB SPL units, and the Level Preset 1 is set at the standard level, e.g. 73 dBSPL for EBU R128. (Notice the graphical link-line between the Cal. Level and Level Preset 1 keys).

After SPL calibration, you can use the Cal. Level key to toggle between displaying levels in dB SPL (absolute) or in dB (relative).
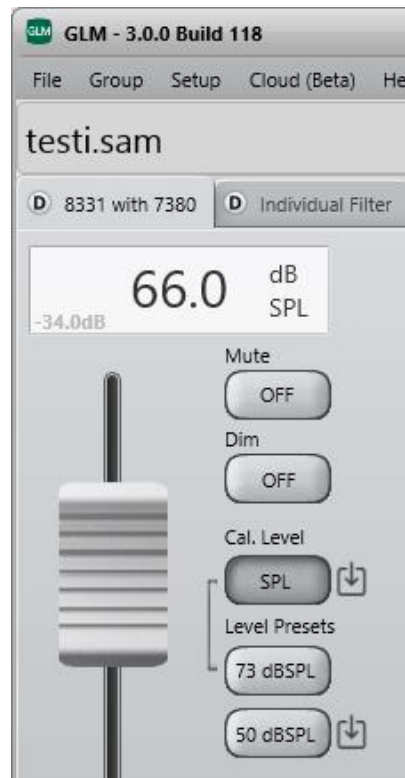
Figure 23. Calibrated SPL level.

Maximum Number of Groups

Each system setup file can contain up to ten (10) groups. You can create new groups with the 'Group | Add Group' menu command or the 'Group | Duplicate Group' menu command.

If you need more than ten group definitions, we recommend creating a second system setup file for more groups. You can move between system setup files using the 'File | Open' menu command.

Creating a New System Setup File

A new system setup file is created by selecting the 'File | New' menu command. This starts the system definition process where you create new groups and then run the AutoCal calibration for the new groups. Finally, you can store the new system setup file on your computer hard drive with any suitable name.

To create a new system setup file, you can alternatively save a copy of the current system setup with the 'File | Save as…' command, and then edit this new copy as needed.

Solo and Mute Pop-Up Window Controls

Solo means that only the soloed monitors reproduce audio while others are muted. Mute means that the selected monitors are muted and do not play audio.

Solo and mute can be activated for each monitor and subwoofer. A pop-up menu for these controls opens when right-clicking a monitor or subwoofer icon. Solo and Mute states can be cleared in the menu by selecting 'Play all'. Solo and Mute states are also cleared when the group is changed.

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Bass Management Bypass Button

When this button is active the low frequencies are driven to monitors instead of being sent to a subwoofer. This enables you to understand the impact of using the bass management and driving the low frequencies to the subwoofer. Bass Management bypass can be used to check how mixes behave when the subwoofer is bypassed.

The Bass Management Bypass button is visible if there is a subwoofer in the group.

Menu Commands

The GLM main window contains a set of menu commands enabling system management. The GLM main window enables you to manage the monitoring system.

File

The File menu saves and opens system setup files.

'**New**' starts system setup creation from the system layout definition.

'**Open**' popups the open dialog window to load system setup files.

'**Open Recent**' stores recently opened system setup files for quick access.

'**Open from Cloud**' popups the open dialog window to load system setup files from Cloud (Must be logged in to GLM Cloud).

'**Save**' saves changes to the current system setup file.

'**Save As…**' popups the save dialog window to save the current system setup with a different name.

'**Exit**' closes the GLM application.

Group

The Group menu is used to control settings in group level.

'**Add Group**' adds a new group to the system setup and opens the Group definition page.

'**Duplicate Group**' adds a new group to the system setup by copying settings of the currently active group.

'**Edit Group**' opens the Group definition page of the currently active group to edit the group settings.

'**Delete Group**' deletes the currently active group from the system setup.

'**Edit Acoustic All**' opens the acoustic editors for all monitors and subwoofers active in the currently active group.

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'**Sound Character Profiler**' opens the Sound Character Profiler page to tune the currently active group.

'**Store Group Settings to SAM Monitors**' stores acoustic settings to all monitors and subwoofers active in the currently active group. The previous ISS settings and Startup Level stays unchanged.

'**Store Group Settings and Current Level to SAM Monitors**' stores acoustic settings and current level to all monitors and subwoofers active in the currently active group. The previously stored ISS settings and Startup Level stays unchanged.

'**Store Group Settings to SAM Monitors (Mix for 8430)**' stores acoustic settings to all monitors and subwoofers active in the currently active group. This menu is visible if 8430's are connected to the GLM network. Stores input selection for 8430 to be mixed; analog and AES67 input signals are reproduced by monitor. The previously stored ISS settings and Startup Level stays unchanged.

'**Store Factory Settings to SAM Monitors**' stores default acoustic settings of all monitors and subwoofers active in the currently active group. All filters, levels, delays, ISS and Startup Level will have their parameters set to zero.

Setup

The Setup menu is used to control settings of the whole system.

'**ISS Power Saving**' sets the ISS go-to-sleep waiting time and can also disable the ISS function (All monitors and subwoofers do not have the ISS functionality). Sensitivity of ISS can be selected between High, Medium and Low. High means that a smaller signal level required keep a monitor ON or wakes up. Low means that bigger signal level required to keep a monitor ON or wake up. The previously stored acoustic settings and Startup Level stays unchanged.

'**SAM System Power**' -menu can be used to power up and shut down SAM system. In default GLM will send a wake up command, 'Automatically Wake Up System with GLM' menu is checked, to the GLM network when application is launched and all SAM monitors and subwoofer will be powered ON. When GLM application is closed SAM monitors and subwoofers will continue to play audio as default. It's possible to turn OFF whole system when GLM is closed by checking 'Automatically Shut Down System with GLM' menu, selection will send a shut down command to the GLM network when GLM is closed. These two menu items are stored to each GLM setup.

'**Store Startup Level (used without GLM)**' – menu can be used to set SAM monitor's start up level. '**Use Maximum (0dB – default)**' -menu sets the startup level back to the maximum (default). '**Use Current Level**' -menu sets the current master level as the startup level to all online monitors and subwoofers. In both cases the previously stored acoustic settings and ISS stays unchanged.

'**GLM Level Maximum**' -menu can be used to set level maximum of GLM. It's normally used to avoid accidental high system output level. The maximum can be set by selecting the desired maximum level with the main level fader and clicking the '**Set Maximum to Current Level**' -menu item in the '**Setup | GLM Level Maximum**' -menu. After setting the maximum, the system level will not exceed this maximum. When the maximum is reached the 'Level Max' text appears in the level

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reading box. To remove the level maximum, select the '**Remove Level Maximum**' from '**Setup | GLM Level Maximum**' menu item.

'**Enable USB Controller**' Enables Griffin USB Powermate to control level and mute.

'**View Info**' enables display of data set or measured in the monitors and subwoofers.

'**Show Level Panel**' enables the Level control panel to be shown top of other windows.

'**Edit Layout**' enables to edit existing system layout. Used also to replace/remove monitor or subwoofer from to system.

Cloud

The Cloud menu is used to access the cloud related functions.

'**Logout : yyyyy**' menu shows the username if logged in to the Genelec Cloud. The status is 'Not Logged' if not logged in.

'**Cloud Account Login** popups the GLM Cloud Account form to log in to (or log out from) GLM Cloud. The log in status is 'show in 'Logged : yyyyy' -menu.

'**Get Support**' menu can be used to contact to Genelec team.

Help

'**GLM Help**' opens GLM pdf manual.

'**Export Setup to Desktop**' creates zip –file to the desktop.

'**Get Support**' popups the GLM Support Request window to describe the problem and send it to Genelec support team (Must be logged in to GLM Cloud, see 'File : Cloud Account' menu).

'**About**' show information about GLM, including the software version information.

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Cloud Account Login

GLM Cloud version requires an user account to the Genelec Community. It can be created in www.community.genelec.com. With the valid user account log in is possible from Cloud: Cloud Account Login menu.

Log in

To log in to the Genelec Cloud, valid user name and password to the Genelec community.

Figure 24. Login to Genelec Community window.

User information / Logout

To logout from the GLM Cloud, click the Logout or Cloud Account Login from Cloud menu. When using Cloud Acoount Login, GLM Cloud Account window will be opened. Click the Log Out button to finish log out.
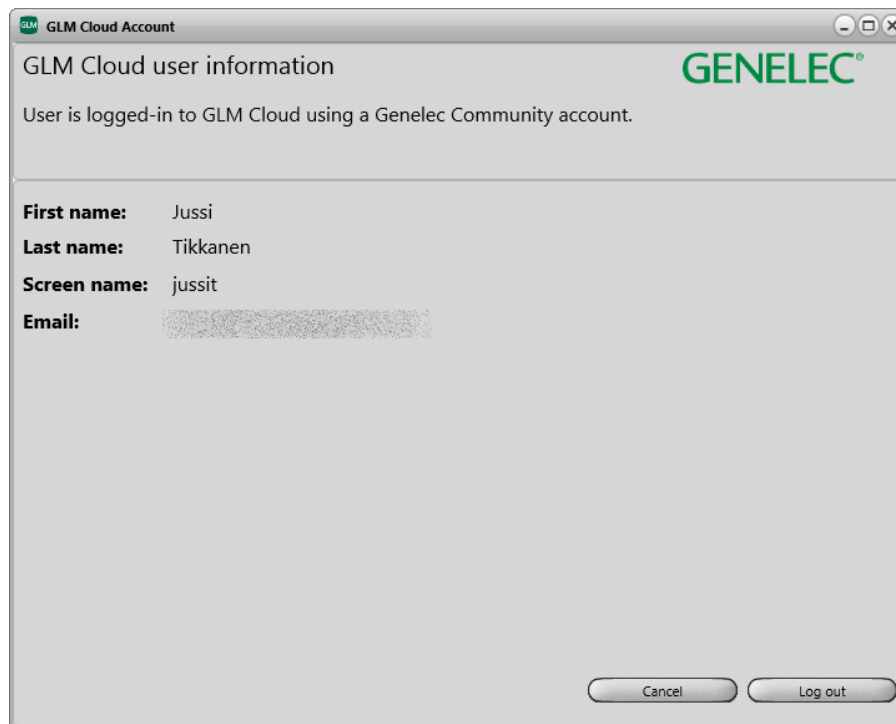
Figure 25. User information and Log out window.

Startup Level

By default, SAM monitors start up at maximum level. This is the output level you get also by adjusting the master level setting to the maximum (0 dB) in the GLM user interface.

It is possible to set the startup level to a different value. This is done by first adjusting the master level setting to the desired level and then storing this level permanently into the monitors and subwoofer using a menu command.

Early SAM models (like 8240A, 8250A etc.) need a firmware update before the Startup level can be stored. Startup Level is overridden by GLM and when using the adapter with the potentiometer.

Setting Startup level (sets a specified output level for all online devices):
1. Adjust the master level fader to the desired value.
2. Store this level as the Startup level by clicking the 'Use Current Level' option in the 'Setup' > 'Store Startup Level (used without GLM)' menu.

Clearing Startup level (sets full output level for all online devices):
1. Clicking the option 'Use maximum (0dB - default)' in the menu item 'Setup' > 'Store Startup Level (used without GLM'" menu.

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NOTE 1: When you select the option 'Store Group Settings and Current Level to SAM Monitors' (in Group menu) this can reduce the maximum output of SAM monitors and subwoofers. This happens if you set the level to low value before selecting this option.

NOTE 2: The monitor or subwoofer can become very quiet if you set the 'Startup Level' to a low value by setting the level to a low value and using the 'Use Current Level'.

NOTE 3: Your monitor or subwoofer can become very quiet if you combine the actions described in NOTE 1 and NOTE 2. This happens because the level settings created by actions described in NOTE 1 and NOTE 2 add, and this can result in much lower system level you intended.

Displaying monitor and subwoofer data in GLM

Several types of information can be displayed in the GLM main window. These include

- input signal level at the monitor and subwoofer inputs [1]

- output level [1]

- temperature inside a monitor or subwoofer [1]

- the digital audio subframe selected for reproduction

- monitor and subwoofer name

- bass management crossover frequency

[1] All models won't support the feature and shows 'N/A' if information type is not supported.

You can turn on the display of these data items using the menu item 'Setup | View Info'. You can select to display a certain information item or you can select the 'roll info' option that shows all the information in a repeating sequence.

Monitor data display can be useful in many ways. To give an example, when you have the digital audio input selected and want to know how much signal is seen by the monitor input, you can turn on the input level display.

Bypass AutoCal Button

When this is active, all AutoCal optimized acoustic settings are bypassed. Using the AutoCal bypass is a way to evaluate the benefits of using AutoCal calibration.

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The influence you hear during bypass is complex because all these settings are temporarily set to default values where they have no effect

- equalization to reduce and remove room colorations

- level calibration for the listening position

- time-of-flight compensations for the differences in monitor distances to the listening position

- system delay compensation (system delay is an additional delay applied to all monitors and subwoofers)

GLM Level Panel

GLM Level panel will show the current master level, the microphone level and current group name. This panel can be enabled from 'Setup | Show Level Panel' menu. The Level Panel also shows following states as text:

MUTED	= System level muted
DIM	= System level dim activated (-20dB)
Sub Bypass	= Subwoofer bypassed
AutoCal Bypass	= All filters, level and delay correction bypassed

Figure 26. GLM Level Panel.

Access to Monitor and Subwoofer Settings

Access to monitor and subwoofer acoustical calibration and settings is available by double-clicking on the monitor and subwoofer icons from the GLM Main page. You can also use the 'Group' system menu items to access monitor and subwoofer acoustical settings.

The rapid way to open simultaneously windows to show all the acoustical settings in a system is available in the menu item 'Group | Edit Acoustics All'. This can give a rapid overview to understand the corrections and alignments done in the current group. For a large system, opening all the windows will take few seconds.

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Access to GLM Adapter Information

Access to GLM Adapter information is available by double-clicking on the adapter icon from the GLM Main page.

Rerunning AutoCal Automatic Calibration

A quick access to rerun AutoCal automatic calibration is available by double clicking on the microphone icon. This brings up the AutoCal window and starts the calibration process again.

You can rerun the AutoCal automatic calibration

- to ensure the calibration is still valid

- when there have been significant structural changes in the room (tables or other furniture have been moved or there has been structural changes to the walls, ceiling, or floor)

- when the listening position has changed

- when the locations of items close to the monitors or close to the listening position have changed

It is usually a good idea to take a copy of the current setup file and perform the recalibration in the copy instead of doing it the original setup file. This retains both and enables evaluation of the recalibration outcome. You can take a copy of your setup file with the 'File | Save as…' menu command.

Group Settings, Advanced Use

A SAM group is the set of monitors and subwoofers reproducing the audio presentation together. Groups are presented as tabbed pages in the GLM main window. You can start using a group simply by clicking on the group tab. This brings the tab to the top and sends all the settings for this group to all monitors and subwoofers included in the group.
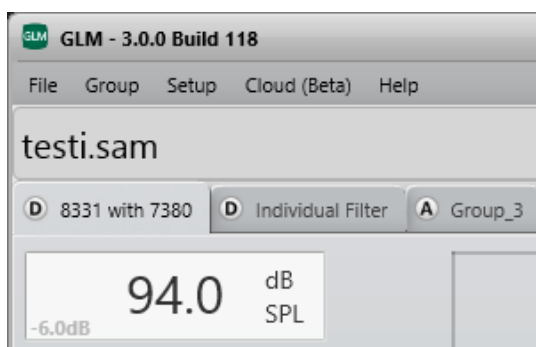
Group tab icons

(A) = Analogue audio group

(D) = Digital audio group

Figure 27. An example of a GLM system setup having three monitoring groups
.

Each group contains group-specific settings. These settings can optimize the performance of SAM monitors and subwoofers for different situations and purposes. Settings unique for each group include

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- group name

- audio signal type, analog or AES/EBU digital

- monitors and subwoofers in the group (playing when this group is selected) and the ones that are not used in this group

- the acoustic calibrations that are applied when this group is playing for all monitors and subwoofers

- monitoring level setting for the group (this can be used e.g. as a monitoring level preset for the group)

- system delay (this can delay the whole reproduction system, for example to synchronize the whole group/audio system with a video presentation)

Access to group settings

To access or edit the settings common to a group, use the menu command 'Group | Edit Group'. This displays an editing window where the group settings and the settings for individual monitors and subwoofers can be edited. The group settings are shown when you enter the editor. You will see the monitor and subwoofer settings once you single-click on any of the monitors and subwoofers in your layout.

Caution: if you double click, GLM interprets this as a quick command to remove that monitor from the Group.
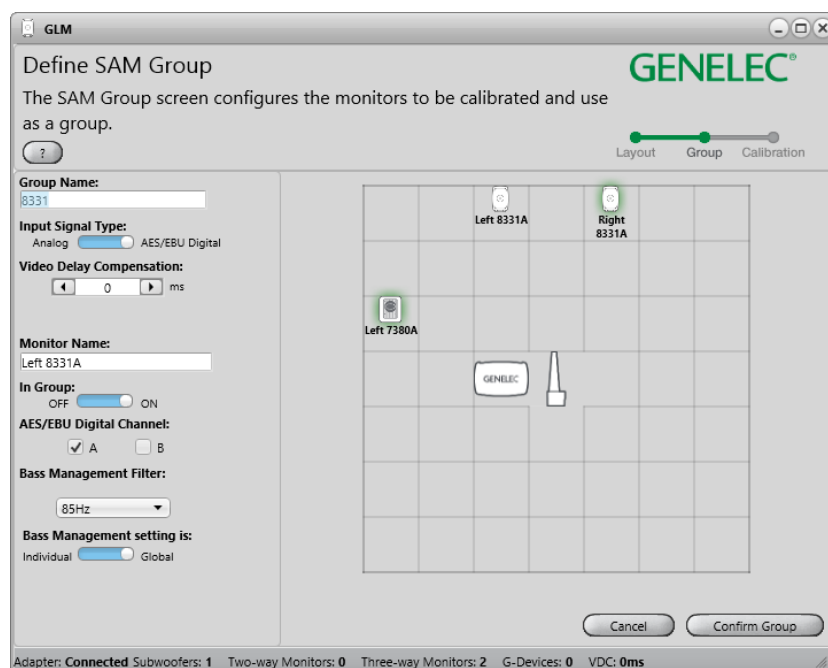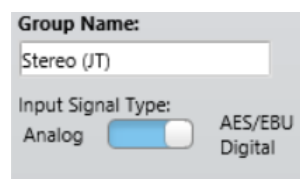

Figure 28. Common settings for a SAM group are presented on the left side of the SAM group definition display.

Table 2. Group level settings

Setting	Description	View
Group Name	A Group has a name. The name may tell what kind of SAM Group is playing (e.g. 'stereo') or describe the listening location (e.g. 'mixing position' or 'producer').	**Group Name:** Stereo (JT) **Input Signal Type:** Analog ⬤ AES/EBU Digital
Input Signal Type	A group is configured for analog or AES/EBU digital audio. Certain products only have analog or AES/EBU digital inputs (e.g. 8320 and 7270). You cannot include products in a group reproducing selected audio type (analog or digital), if these specific products do not have the correct input type available.	

Group Signal Type

A group is configured for analog or AES/EBU digital audio. Certain products only have analog or AES/EBU digital inputs. You cannot include products in a group reproducing selected audio type (analog or digital), if these specific products do not have the correct input type available. If a selected audio signal type is not supported by a monitor or subwoofer, it will be automatically marked as not belonging to the group (we call this Group OFF and indicate it with a yellow glow around the product in the GLM window and a yellow LED color showing on the actual product (Note: If using SE7261 and 8130 monitors (non-SAM monitors), 8130 monitors indicates valid digital signal with yellow LED).
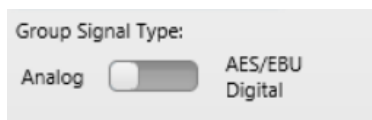
Group Signal Type:

Analog ⬤ AES/EBU Digital

Figure 29. Group signal type selection.

AES/EBU subframe A and B selections

For AES/EBU digital audio, the channel assignment needs attention. Typically AES/EBU cables carry two channels of audio, called subframes A and B. In a stereo system the subframe A is usually assigned to the left channel and the subframe B to the right channel. A multichannel audio presentation, using more than one digital audio cable, will split the channels into cables. The correct selection is needed for each monitor and subwoofer.

GLM defaults to the common AES/EBU channel assignments (subframe A is left, B is right).

To edit specific group settings for individual monitor or subwoofer, single-click on the monitor or subwoofer icon. The icon starts to blink. Also the monitor blinks its green LED. A settings panel opens. You can

- rename the monitor to facilitate easy recognition

- include or exclude a monitor in the group using the 'Active In Group' selection

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- determine if the subwoofer crossover frequency is globally the same for the whole group or specific to the product (monitor or subwoofer) only

When using SE7261, digital AES/EBU subframe A and B must be selected from the back panel of the 8130 monitors.

For subwoofers, you can also

- set the subwoofer crossover frequency

- set the LFE channel gain (0 or +10 dB)

Group setting specific to a single monitor (83xx Series)

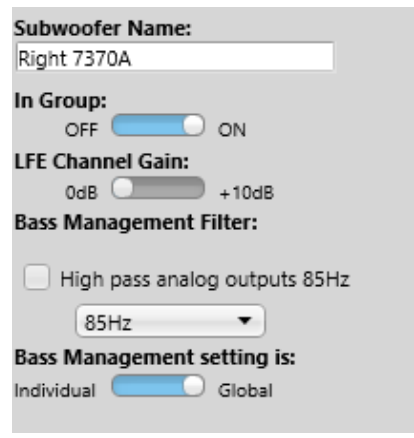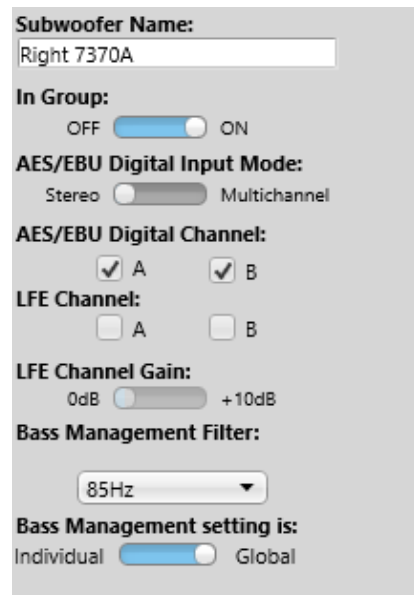This section explains the group-specific controls available for monitors.

Table 3. Group settings for monitors (83xx Series)

Setting	Description	View
Monitor Name	Name that helps you identify this monitor	
In Group	When the setting is ON this monitor belongs to the current group. When the setting is OFF this monitor is not in the group and will not play audio.	
Bass Management Filter (frequency)	This monitor applies the bass management crossover frequency (global) or a customized crossover frequency (individual). When 'Bass Management Bypass' is active, subwoofer frequencies are reproduced by the monitors.	
Bass Management setting is (individual or global)	When 'global' is selected all monitors and subwoofers follow the same settings for bass management. This is the default setting and the normal method of using bass management. When 'individual' is selected, every monitor and subwoofer can be individually set to the desired bass management settings. These settings can be different for every monitor and subwoofer. This is only recommended for special acoustic requirements and is not typically used.	

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Group setting specific to a single subwoofer (73xx Series)

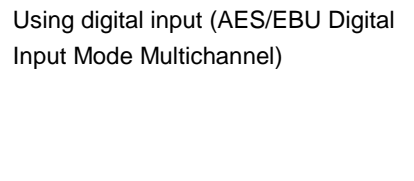This section explains the group-specific controls available for SAM subwoofers having analog and digital audio inputs.

Table 4. Group settings for subwoofer (73xx Series)

Setting	Description	View
Subwoofer Name	Name tag to help identify this subwoofer	Using analog input
In Group	When this setting is ON this subwoofer belongs to the current group. When this setting is OFF, the monitor is not in the group and will not play audio.	**Subwoofer Name:** Right 7370A **In Group:** OFF ⬤ ON **LFE Channel Gain:** 0dB ⬤ +10dB **Bass Management Filter:** ☐ High pass analog outputs 85Hz 85Hz ▼ **Bass Management setting is:** Individual ⬤ Global
AES/EBU Digital Channel (only when AES/EBU is used)	This control selects the A and B subframes to be reproduced. You can also assign these as the main channel input or an LFE channel input.	
LFE Channel Gain	LFE input can be boosted by +10dB, when this gain is not applied in the audio source.	
Bass Management filter (frequency)	This subwoofer applies the bass management crossover frequency (global) or a customized crossover frequency (individual). When 'Bass Management Bypass' is active, subwoofer frequencies are reproduced by the monitors.	Using digital input (AES/EBU Digital Input Mode Stereo) **Subwoofer Name:** Right 7370A **In Group:** OFF ⬤ ON **AES/EBU Digital Input Mode:** Stereo ⬤ Multichannel **AES/EBU Digital Channel:** ☑ A ☑ B **LFE Channel:** ☐ A ☐ B **LFE Channel Gain:** 0dB ⬤ +10dB **Bass Management Filter:** 85Hz ▼ **Bass Management setting is:** Individual ⬤ Global
Bass Management setting is (individual or global)	When 'global' is selected all monitors and subwoofers follow the same settings for bass management. This is the default setting and the normal method of using bass management. When 'individual' is selected, every monitor and subwoofer can be individually set to the desired bass management settings. These settings can be different for every monitor and subwoofer. This is only recommended for special acoustic requirements and is not typically used.	Using digital input (AES/EBU Digital Input Mode Multichannel)

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		Subwoofer Name: Right 7370A **In Group:** OFF ⬤ ON **AES/EBU Digital Input Mode:** Stereo ⬤ Multichannel **AES/EBU Digital Input has been selected to be multichannel input. Please select channels from Multichannel AES/EBU Interface.** **LFE Channel Gain:** 0dB ⬤ +10dB **Bass Management Filter:** 85Hz ▼ **Bass Management setting is:** Individual ⬤ Global

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Group setting specific in subwoofers having only digital inputs (72xx Series)

This section explains the group-specific controls available for SAM subwoofers having only digital audio inputs. These subwoofer are fully compatible with GLM but naturally cannot accept any analog input directly. You can use these subwoofers with analog signals using a separate analog-to-digital converter.

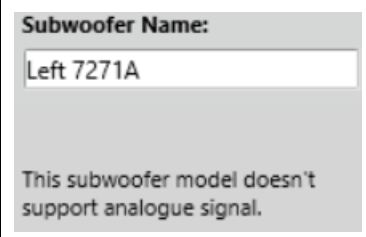Table 5. Group settings for legacy subwoofer, with analog input (72xx Series)
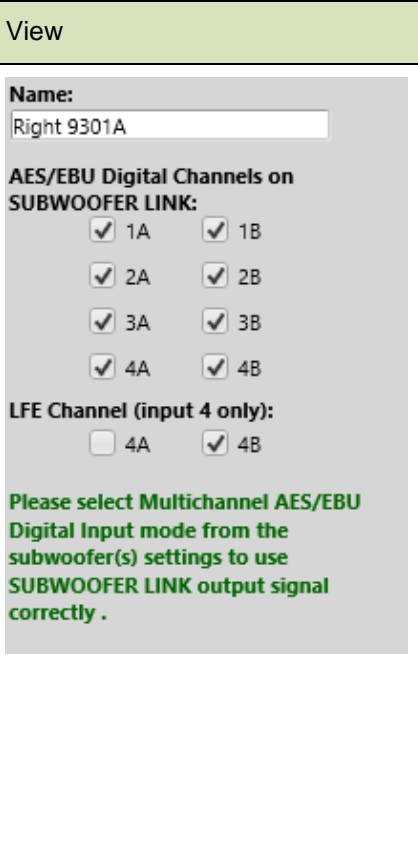
Setting	Description	View
Subwoofer Name	Name tag to help identify subwoofer	**Subwoofer Name:** Left 7271A
(note)	This subwoofer model has only digital inputs and cannot be used with analog signals.	This subwoofer model doesn't support analogue signal.

Table 6. Group settings for legacy subwoofer, with digital audio input (72xx Series)

Setting	Description	View
Subwoofer Name	Name tag to help identify subwoofer	
In Group	When this setting is ON the subwoofer belongs to the current group. When the setting is OFF the subwoofer is not in the group and does not play audio.	
AES/EBU Digital Channel	These controls select the subframes that the subwoofer reproduces. Subframes of input 1 are on the first row, subframes of input 2 are on the second, and so on.	
LFE Channel	This control selects the subframe in input 4 for the input of the LFE channel.	
LFE Channel Gain	The LFE can be boosted by +10dB, when this boost is not done in the audio source.	
Bass Management filter (frequency)	This subwoofer applies the bass management crossover frequency (global) or a customized crossover frequency (individual). When 'Bass Management Bypass' is active, subwoofer frequencies are reproduced by the monitors.	
Bass Management setting is (individual or global)	When 'global' is selected all monitors and subwoofers follow the same settings for bass management. This is the default setting and the normal method of using bass management. When 'individual' is selected, every monitor and subwoofer can be individually set to the desired bass management settings. These settings can be different for every monitor and subwoofer. This is only recommended for special acoustic requirements and is not typically used.	
Pass Through Mode	The 'Pass Through Mode' setting defaults to ON for compatibility with SAM systems. You can force the subwoofer AES/EBU outputs to be high-pass filtered by setting 'Pass Through Mode' to OFF.	

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Table 7. Group settings for 9301 Multichannel AES/EBU Interface.

Setting	Description	View
Name	Name tag to help identify 9301	**Name:** Right 9301A **AES/EBU Digital Channels on SUBWOOFER LINK:** ☑ 1A ☑ 1B ☑ 2A ☑ 2B ☑ 3A ☑ 3B ☑ 4A ☑ 4B **LFE Channel (input 4 only):** ☐ 4A ☑ 4B **Please select Multichannel AES/EBU Digital Input mode from the subwoofer(s) settings to use SUBWOOFER LINK output signal correctly .**
In Group	When this setting is ON the subwoofer belongs to the current group. When the setting is OFF the subwoofer is not in the group and does not play audio.	
AES/EBU Digital Channel on SUBWOOFER LINK	These controls select the subframes that the 9301 will sum together to be passed through SUBWOFER LINK. Subframes of input 1 are on the first row, subframes of input 2 are on the second, and so on.	
LFE Channel (input 4 only)	This control selects the subframe in input 4 for the input of the LFE channel.	
NOTE	**AES/EBU Digital Input Mode of 7300 series subwoofer need to be set to Multichannel mode to reproduce the sum signal properly.**	

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Group setting specific to a single SE monitor (8130)

This section explains the group-specific controls available for 8130 monitors.

Table 8. Group settings for SE Monitor (8130) with analog input (available with SE7261)
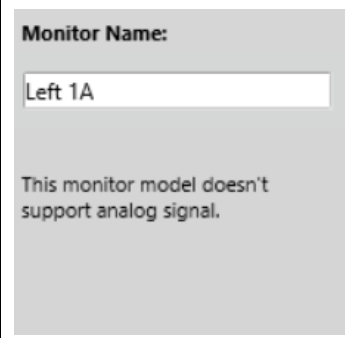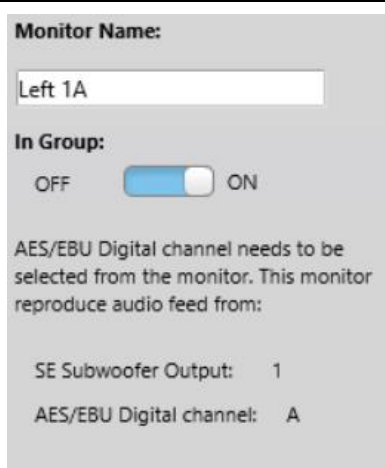
Setting	Description	View
Monitor Name	Name tag to help identify monitor	**Monitor Name:**
(note)	8130 monitors controlled with SE7261 and GLM cannot be used with analog signals as SE7261 supports only AES/EBU digital audio.	Left 1A This monitor model doesn't support analog signal.

Table 9. Group settings for SE Monitor (8130) with digital audio input (available with SE7261)

Setting	Description	View
Monitor Name	Name tag to help identify monitor	**Monitor Name:**
In Group	When this setting is ON the monitor belongs to the current group. When the setting is OFF the monitor is not in the group and does not play audio.	Left 1A **In Group:** OFF ON AES/EBU Digital channel needs to be selected from the monitor. This monitor reproduce audio feed from:
AES/EBU Digital Channel	AES/EBU subframe A and B must be selected from the back panel of the 8130 monitors. SE Subwoofer Output provide an output number where digital audio cable comes and AES/EBU Digital channel provide a channel that must be selected from the 8130 monitor.	SE Subwoofer Output: 1 AES/EBU Digital channel: A

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Group setting specific in SE7261 having only digital inputs

This section explains the group-specific controls available for SE7261 having only digital audio inputs. This subwoofer is fully compatible with GLM but naturally cannot accept any analog input directly. You can use these for analog signal with a separate analog-to-digital converter.
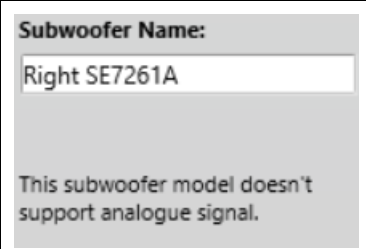
Table 10. Group settings for SE7261 with analog input

Setting	Description	View
Subwoofer Name	Name tag to help identify subwoofer	**Subwoofer Name:** Right SE7261A This subwoofer model doesn't support analogue signal.
(note)	SE7261 cannot be used with analog signals as SE7261 supports only AES/EBU digital audio.	

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Table 11. Group settings for SE7261 with digital audio input

Setting	Description	View
Subwoofer Name	Name tag to help identify subwoofer	**Subwoofer Name:** Right SE7261A **In Group:** OFF ⬤ ON
In Group	When this setting is ON the subwoofer belongs to the current group. When the setting is OFF the monitor is not in the group and does not play audio.	**AES/EBU Digital Channel:** ☑ 1A ☑ 1B ☑ 2A ☑ 2B ☑ 3A ☑ 3B ☑ 4A ☑ 4B
AES/EBU Digital Channel	These controls select the subframes that the subwoofer reproduces. Subframes of input 1 are on the first row, subframes of input 2 are on the second, and so on.	**LFE Channel (input 4 only):** ☐ 4A ☐ 4B
LFE Channel	This control selects the subframe in input 4 for the input of the LFE channel.	**LFE Channel Gain:** 0dB ⬤ +10dB
LFE Channel Gain	The LFE can be boosted +10dB, when this boost is not done in the audio source.	**Bass Management Filter:** 85Hz ▾
Bass Management filter (frequency)	This subwoofer applies the bass management crossover frequency (global) or a customized crossover frequency (individual). When 'Bass Management Bypass' is active, subwoofer frequencies are reproduced by the monitors.	**Bass Management setting is:** Individual ⬤ Global **Pass Through Mode:** OFF ⬤ ON
Bass Management setting is (individual or global)	When 'global' is selected all monitors and subwoofers follow the same settings for bass management. This is the default setting and the normal method of using bass management. When 'individual' is selected, every monitor and subwoofer can be individually set to the desired bass management settings. These settings can be different for every monitor and subwoofer. This is only recommended for special acoustic requirements and is not typically used.	
Pass Through Mode	The 'Pass Through Mode' setting defaults to ON for compatibility with SAM systems. You can force the subwoofer AES/EBU outputs to be high-pass filtered by setting 'Pass Through Mode' to OFF.	

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Using Bass Management Filter Settings

The Bass Management Filter (subwoofer crossover frequency) is normally set in the subwoofer group settings. When the Bass Management setting is marked 'global', the Bass Management Filter setting is applied to all monitors in the group.

In certain special cases you may want to turn off the bass management for certain monitors, for example when you do not want to bass-manage rear monitors in a room having a subwoofer located in the front of the room.

To turn off the bass management for a specific monitor

- select the monitor by clicking on its icon

- set 'Bass management setting' to 'individual'

- set 'Bass management filter' switch to 'OFF'

We recommend using the 'global' setting for all normal applications. In certain exceptional cases there can be acoustical reasons for setting the Bass Management Filter to 'individual' in a monitor. This enables you to set the Bass Management Filter individually for this monitor to a value that differs from the rest of the system. Using the 'individual' setting is an expert feature as the Bass Management Filter for this monitor no longer tracks the selection made in the subwoofer settings.

Advanced use of AutoCal

AutoCal automatic calibration offers you the possibility of using multiple microphone positions (MultiPoint) in order to determine the system calibration instead of one microphone position located, for example, at the main listening position (SinglePoint).

MultiPoint calibration uses up to four spatially averaged microphone positions. The first microphone position is the primary position. Timing and level are calibrated to the primary microphone position. Put the microphone first to the primary position.

MultiPoint calibration

The steps of a MultiPoint calibration are

- select 'MultiPoint' in the AutoCal window (additional microphone positions appear in the layout grid)

- place the microphone in the primary listening position

- press the center position microphone icon (the others are grayed out)

- wait until the measurement sweeps occur and all products are measured

- move the microphone to the next position

- press the next microphone icon

- measurements are taken for this position

- once all the positions have been measured (either 2, 3, or 4) press the 'Optimize' button to start the calculation process

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- reposition the measurement microphone to the primary listening position

- review the result by clicking on the monitor and subwoofer icons

- continue to AutoPhase when there is a subwoofer in the system

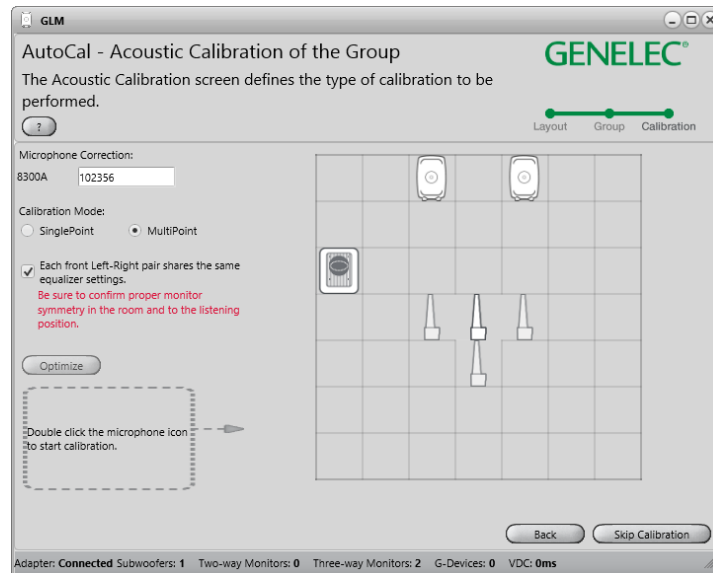- accept the calibration result with the 'Confirm Calibration' button

Figure 30. Microphone layout for MultiPoint calibration

Reviewing the AutoCal result

After the AutoCal measurement and calculation process has completed, you can review and evaluate the resulting frequency response compensations. A miniature system layout is shown under the frequency response graph. Click on each monitor and subwoofer to review the measurements (red curve), corrections (blue curve), and compensated (green curve) responses in the graph window.

Note that for standard stereo setups placed in a symmetrical manner (equilateral triangle), it often makes sense to manually set to '0' the values for the time-of-flight correction and the level adjustments. Usually, some small correction values appear simply because the measurement microphone is not perfectly and accurately positioned in relation to each monitor. In such cases, deleting such small correction values can improve the stereo imaging and its stability.
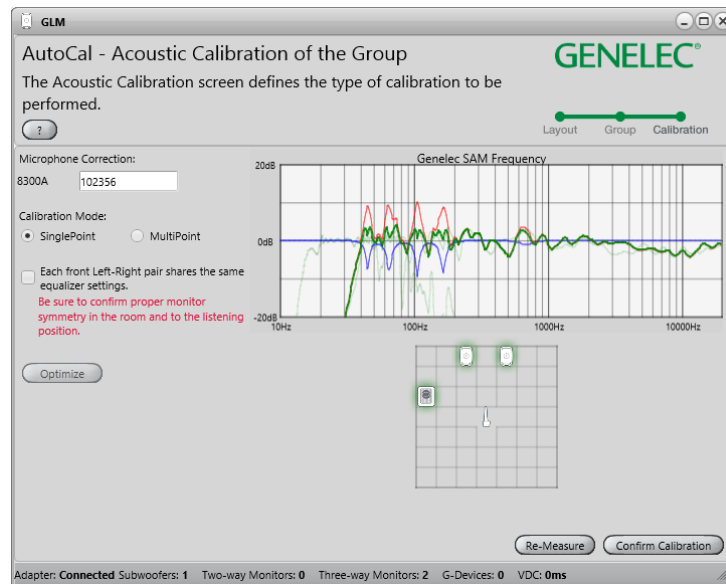
Figure 31. Reviewing the corrections by clicking on the monitor and subwoofer icons

Advanced use of AutoPhase

AutoPhase uses the selected Bass Management Filter frequency setting together with the selected monitor. The purpose of AutoPhase is to align the subwoofer phase with the reference monitor so that the frequency response across the bass management crossover is flat.

Acoustical reasons for selecting the crossover frequency

Select a crossover frequency for the group that makes acoustical sense. A good crossover frequency is one that shows good output from at least the subwoofer and the reference monitor. Even better is when there is sufficient output from all monitors at the crossover frequency. The output is sufficient when the level in the equalized frequency response is similar to the midrange level and there is no notch in the frequency response close to the crossover frequency.

The steps to run AutoPhase

The steps to run AutoPhase are

- before you start, select the Bass Management Filter frequency (see group settings)

- select the subwoofer to be AutoPhased by clicking on the subwoofer icon

- select the reference monitor by clicking on a monitor icon (the monitor will be highlighted, and the monitor's LED will flash)

- click 'AutoPhase'

- wait until the measurement process completes

- accept the phase setting by clicking 'Confirm Calibration'

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Editing Acoustic Calibrations

Acoustic Editors

Acoustic settings editor opens with several methods

- double-click on a monitor or subwoofer icon in the main window

- right-click on the icon and select 'Edit Acoustics' menu

- select the 'Group | Edit Acoustics All' menu command (opens settings of all monitors and subwoofers)

Measured frequency responses are shown in the editor if the group has been calibrated. The data is color coded. The red curve is the measured room response. The blue curve is the room equalization filter response. The green curve is the equalized room response.

The equalized room response is recalculated whenever room calibration filters are manually adjusted.

The sound of the monitor or subwoofer changes immediately when the room calibration filters are manually adjusted. This enables audible evaluation of any changes.

The acoustical editor has a scroll bar to give access to all settings inside the monitors and subwoofers.
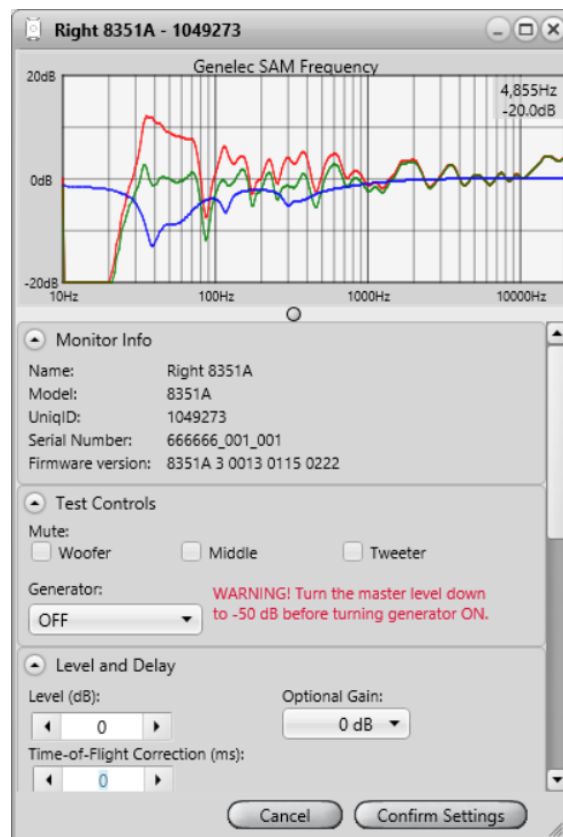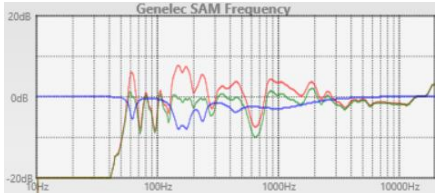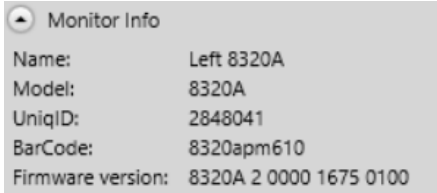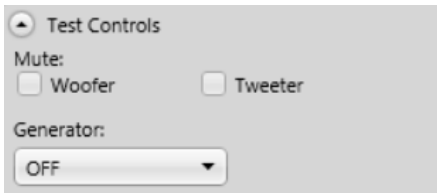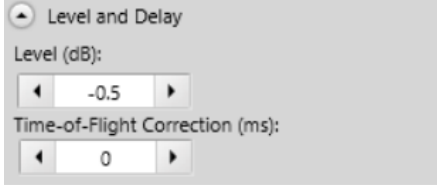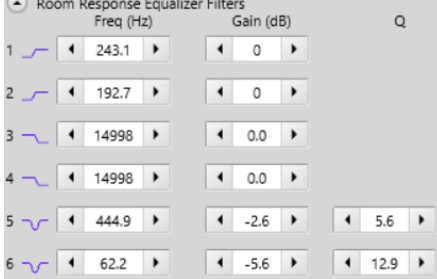
Figure 32. Example of the acoustical calibration editor window

Descriptions of the Acoustical Settings

Table 12. Acoustical settings

Setting	Description	View
Frequency response graphs	Measured frequency response (red), room calibration filter (blue), compensated room frequency response (green).	
Monitor Info	Information about the monitor	
Test Controls	Controls to turn on and off the drivers and the test signal generators	
Level and delay	Sensitivity adjustment (level). Time-of-Flight compensation.	
Room Response Equalizer Filters	Low frequency shelving filters (1-2). High frequency shelving filters (3-4). Parametric notch filters (5-20). The number of filters depends on the product. For example 82xx Series monitors have a different number of parametric filters (5-11).	

Level and time-of-flight correction Controls in Monitors and Subwoofer

SAM monitors contain adjustment of the input sensitivity. This is called the level setting. The input sensitivity can by adjusted from the nominal maximum (0 dB) down to – 60 dB.

The time-of-flight compensation is needed when the monitors are at different distances from the listening position. The adjustment range for the time-of-flight is from 0 ms (no additional delay) to 45…200 ms, depending on the product. This range enables complex reproduction system with

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monitors at different distances from the listening positions to be calibrated for the same level and time-of-flight for audio at the listening position.
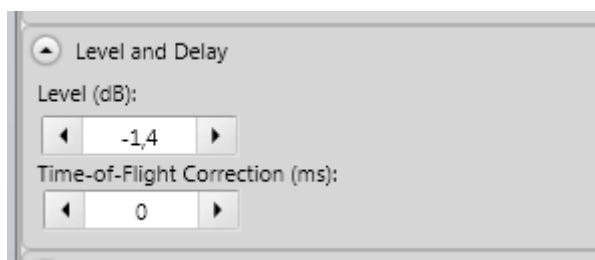

Figure 33. Level and time-of-flight correction controls

Room Response Equalizer Controls

Each SAM monitor and subwoofer contains a set of tools to compensate for the acoustical influences of the room. These tools include high frequency shelving filters (filters 1 and 2), low frequency shelving filters (filters 3 and 4), and parametric notch filters (filters 5 to 20). The number and type of room calibration filters depends on the product. For example, subwoofers contain parametric notch filters, only.

The room response equalization filters are normally set automatically by GLM AutoCal, but all settings are available for manual review, evaluation, and editing if necessary.

The parameter values can be toggled with the arrow buttons. A value can be directly written into the parameter value field. Also the keyboard up/down or left/right arrow buttons can adjust a parameter value once it has been selected with a mouse.

When the room response calibrations are adjusted, the outcome is shown in the measurement graph window and also becomes immediately audible in the sound output of the monitor and subwoofer.
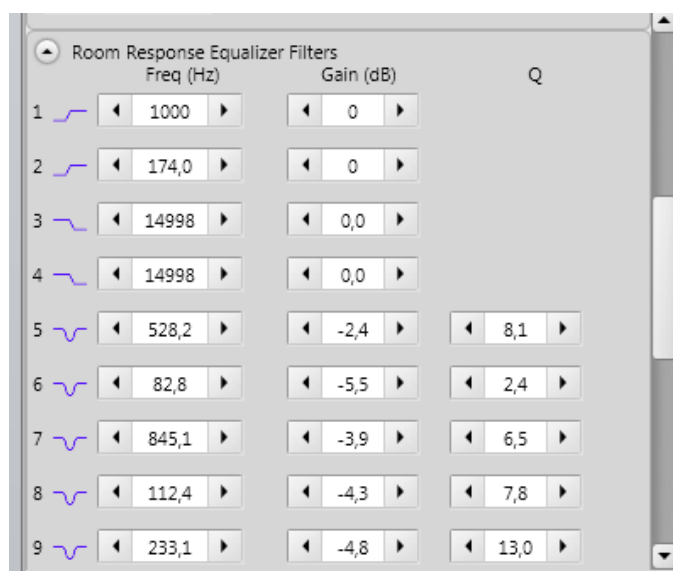
Figure 34. Room response equalizer controls

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Sound Character Profiler tool

If you feel the *overall* spectral balance of your system needs adjustment, i.e. making it generally darker or brighter, the Sound Character Profiler found in the Group pull-down menu is a quick place to start. The two parameters, 'Extension' and 'Strength', influence all SAM monitors in a Group and their effect can be seen on the shelving filters for each monitor in the selected Group.

Individual shelving filters may be further adjusted on the Acoustic Settings page, if so desired. However note that any further modifications to the high-frequency (HF) Shelving filters negates the established "profile" for that particular monitor and has no effect on the remaining monitors in the Group.

The Sound Character Profiler tool (SCP) can be accessed via the 'Group | Sound Character Profiler' menu. The 'Extension' parameter is used to select an effective frequency bandwidth of the SCP tool and the 'Strength' parameter is used to set the strength of the SCP tool.
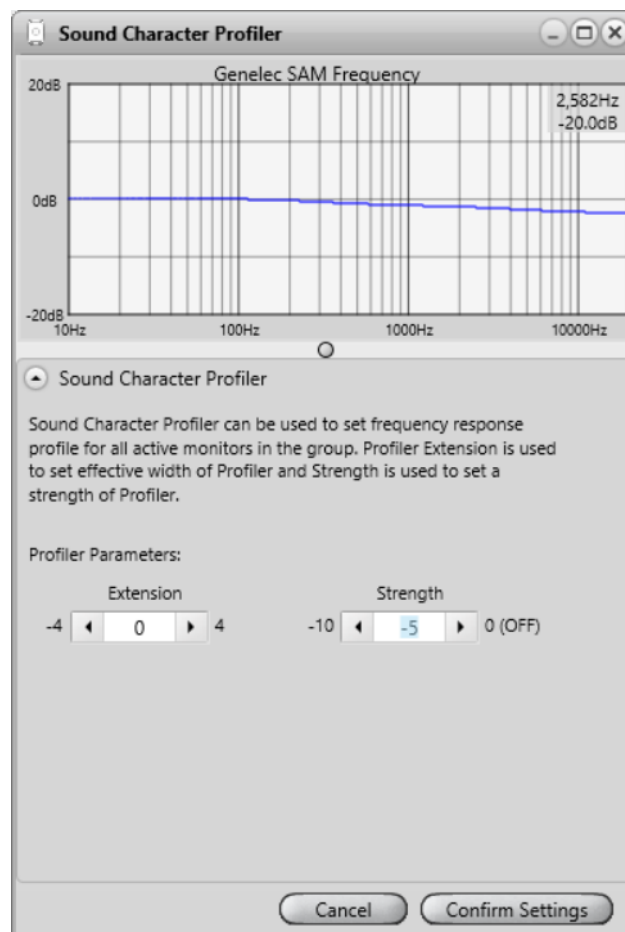
Figure 35. Sound Character Profiler tool

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Stand-Alone Operation

SAM monitors and subwoofers are set up and calibrated using GLM control network and GLM user interface software.

After setup, monitors, subwoofers and the GLM adapter can also operate without having a computer connected to the GLM adapter. This is called stand-alone operation. The functions related to stand-alone mode include

- storing all calibration settings permanently into monitors and subwoofers

- using the GLM adapter as a volume control interface

Storing values permanently in monitors and subwoofers

SAM monitors and subwoofers retain their settings after storing the settings inside the monitors and subwoofers. In some models the 'Stored Controls' switch need to be turned ON!

Storing is done with the menu command 'Store'. There are three options

- '*Store Group Settings and Current Level to SAM monitors*' enabling the current volume setting and the acoustic calibration settings to be stored permanently in the monitors and subwoofers

- '*Store Group Settings to SAM monitors*' enabling the acoustic calibration settings to be stored permanently in the monitors and subwoofers

- '*Store Factory Settings to SAM monitors*' enables the factory settings to be restored and the removal of any custom settings in all monitors and subwoofers

Level Control with GLM Volume Controller

The monitoring level can be controlled without a computer. A GLM volume controller is available for this and connects to the GLM adapter.

When the volume controller has been connected to the GLM adapter and the computer is connected, the system level fader disappears in the GLM main window and is replaced with the icon of the volume knob. The system level is controlled only with the volume knob as long as it is connected to the GLM adapter.

Figure 36. Hardware level controller

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Connecting the GLM Volume Controller

The volume controller is connected to the GLM adapter via 3.5 mm jack showing a level control triangular sign. See the bottom of the GLM adapter for more information.

Caution: Be sure to turn the volume controller fully counter-clockwise (level down) before connecting the volume controller to the GLM Network Adapter.

Figure 37. GLM Network Adapter connections from left to right, USB to computer or to USB power supply, hardware level controller input, GLM measurement microphone input, GLM network and terminator connectors.

Using a USB power supply

The hardware volume controller can also be used for adjusting the sound level when the computer is detached from the GLM adapter. When this is done, the GLM adapter must be powered with a standard USB power supply. The voltage output of the USB supply is 5 VDC.

To use an external USB power supply, remove the USB cable from the computer and attach the cable to a USB power supply, as shown below.

Wireless Volume Controller

A wireless volume controller is available for adjusting the sound level. The wireless volume controller uses radio frequency communication and does not need a line of sight to the GLM

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adapter. The typical operating range is 30 meters. The wireless controller works with the GLM adapter after pairing. The pairing happens during the first 10 seconds after powering up the adapter. To pair GLM Adapter and RF remote first press and hold '+' button and then press and hold '-' button.

The wireless controller can increase and decrease the sound level and turn the system on and off. For more information on the wireless volume controller, consult your Genelec sales representative.
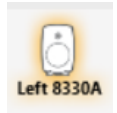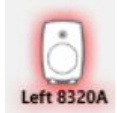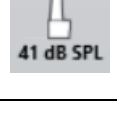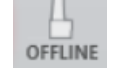

Figure 38. Wireless volume controller

Additional Information

GLM display indications summary

Table 13. Display indications summary

Icon	Icon action	Device LED action	Meaning and solution
Left 8330A	Steady green	Steady green	Device is working normally and passes audio
Left 8330A	Flashing green	Flashing green	Device is working normally and it is selected (under attention) in the GLM
Left 8330A	Steady yellow	Steady Yellow	Device is not part of the group – audio does not pass through
OFFLINE	Flashing Red with text OFFLINE	n.a.	Device cannot be found, it may be turned OFF or the network is not working.
Left 8320A	Steady red	Steady Red	Device is muted, audio is not passing through.
GENELEC Connected		Network adapter is connected.	
GENELEC OFFLINE	steady red	Network adapter is not found	Check USB cabling and status of LED. Try to connect to different USB port.
41 dB SPL		Microphone is connected to the network adapter	Microphone is showing measurements of the sound level
OFFLINE		Microphone is not connected	Check that the microphone is connected to the Mic in connector.

Monitor and subwoofer LED light indications summary

Table 14. Monitor and subwoofer LDE indications summary

Device LED action	Meaning
Steady green	Normal state
Slowly blinking green	Normal ISS power saving state
From yellow to green	Normal operation during device startup
Steady yellow	Monitor or subwoofer is not part of the group
Steady red	Muted from GLM
Flashing red	Signal clip (analog)
Flashing red	Bit errors in the incoming AES/EBU digital audio
Flashing red	Digital signal potential clip (digital audio is very close to 0 dB FS)
Flashing yellow	Protection

NOTE: When using the SE7261 subwoofer with digital input monitors (8130), the monitors' LED are not following the actions listed above.

For example: for the 8130, Steady yellow means that the monitor receives a valid digital signal and automatically reproduces this digital signal. Steady green means that the monitor automatically reproduces an analog audio signal because a valid digital signal does not exist.

GLM Diagnose View

The Diagnose view can be accessed from the layout page. This can be shown by pressing the 'Diagnose' button. It shows the number of monitors and subwoofers found on the GLM network with a large number. This is useful when trying to find network problems from a distance. There is also a 'Green Flashing' button that can be used to check which monitors and subwoofers receive GLM commands.
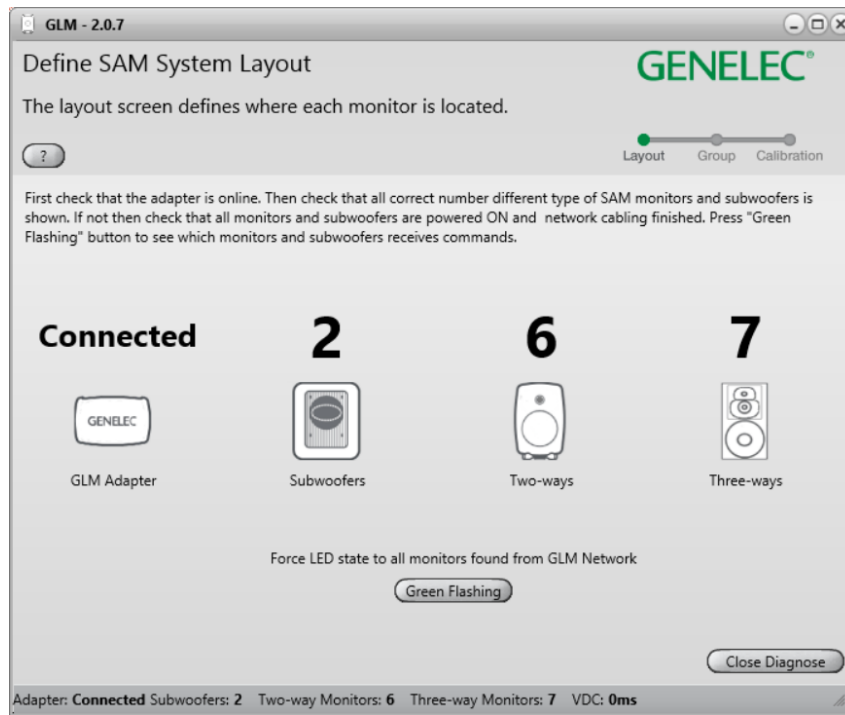
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Figure 39. GLM Diagnose View.

Griffin Powermate USB Controller

Griffin Powermate USB Controller can be used when GLM application is running. To enable the use of Griffin Powermate USB Controller with GLM application there is no need to install drivers. Griffin Powermate functions can be enabled from Setup / Enable USB Controller menu. A Powermate setting is individual for each GLM setup file.

Griffin Powermate functions with GLM are:

Rotate Clockwise	- Increase Level
Rotate Anti-clockwise	- Decrease Level
Press	- Toggle Level Mute

Figure 40. Griffin Powermate USB controller

Frequently Asked Questions

Why do ID tones vary in different system configurations?

Different SAM monitors generate different identification tones. The identification tones are listed in the table below.

Table 15. Identification tones

SAM Systems	Used ID tone
82xx Series SAM monitors	Pink noise
83xx Series SAM monitors	Pink noise (SAM system ID tone was used earlier)
72xx Series SAM subwoofers	Low frequency sinewave
73xx Series SAM subwoofers	Low frequency sinewave (SAM system ID tone was used earlier)
12xx Series SAM monitors	Pink noise

How to duplicate a Group?

A Group can be duplicated. This is a safe way to manually edit acoustic settings.

Choose a Group to be duplicated. From the 'Group' menu choose 'Duplicate Group'. This creates a full copy of the selected Group with all acoustic settings included.
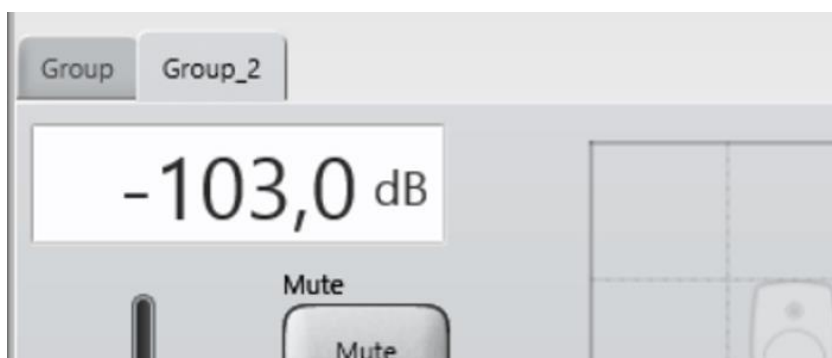
Figure 35. GLM Group tabs.

How to compare a calibrated and uncalibrated SAM system?

A) Using the Autocal Bypass button located on the main page. One can evaluate the benefits of using AutoCal calibration. When the Bypass button is active, all AutoCal optimized acoustic settings are bypassed.

The influence you hear during bypass is complex because all these settings are temporarily set to default values where they have no effect

- equalization to reduce and remove room colorations

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- level calibration for the listening position

- time-of-flight compensations for the differences in monitor distances to the listening position

- system delay compensation (system delay is an additional delay applied to all monitors and subwoofers)

B) After a Group has been calibrated and the calibration has been confirmed, the acoustic settings are set for the Group and stored in a setup file.

An uncalibrated Group can be created as follows: select a calibrated Group, then use the menu item 'Group | Add Group' and select 'Confirm Group'. Then click 'Skip Calibration'. This operation retains the Group configuration but clears all the acoustic settings and restore the factory settings.

How to calibrate SAM systems for different listening positions?

Groups can be used to calibrate SAM systems for different listening positions (sweet spots). First, create a group and calibrate it to the first listening position. Then, choose this group and choose menu command 'Group | Add Group'. Name the new group and make the necessary edits to it and click the 'Confirm Group' button. Next, place the Genelec calibration microphone at the second listening position and run calibration by double-clicking on the measurement microphone icon.

After both groups are created and calibrated, the location-specific calibration for each listening position can easily be selected by selecting the corresponding group tab in the main GLM window.

Can analog and digital signal sources be mixed?

Yes and no. One type of signal can be used in one group. However, it is easy to create two groups, one for analog input and another for digital audio input. After this, switching from one group to the other will select the input signal type.

How to switch between analog and digital signal?

Groups can be defined to select analog or digital input signal. Both types of signals can be connected to Genelec SAM monitors.

The group definition contains the selection of analog or digital audio input signals. The selection applies to all monitors and subwoofers in the group.

Note that a digital signal cable carries typically two channels of audio. For this reason the channel to be reproduced needs to be selected for each SAM monitor by selecting the subframe A or B. The GLM software offers default values that cover the most common channel pairings (for example, in digital stereo, the subframe A is selected for the left monitor and the subframe B is selected for the right monitor).

What does ISS mean?

ISS a Genelec trade mark and it means Intelligent Signal Sensing. ISS will put monitor or subwoofer to a low power consumption state if there is not audio or control signal detected for a certain period. When monitors and/or subwoofer go into ISS state, they will wake up from it if audio or control signal is detected again.

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Why are my monitors not going to ISS state?

The reason could be also that the monitors are sensing the analog signal. It's possible to change ISS power saving sensitivity. ISS Power Saving sensitivity can be selected between three level, High Sensitivity (default), Medium Sensitivity and Low Sensitivity. High Sensitivity means that smaller analog audio signal needed to wake up / keep active the monitor or subwoofer. Low Sensitivity means that a bigger analog audio signal needed to wake up / keep active the monitor or subwoofer. (ISS; Intelligent Signal Sensing)

Notes:

- GLM network communication and AES/EBU digital audio clock will wake up / keep active the SAM monitor or subwoofer.
- Some older SAM models won't support ISS (8240, 8250, 8260, 1238CF, 7260, SE7260, 7270, 7271) and some models requires a firmware update (8351, 12xx with version 'xxxx x xxxx 0152 xxxx' or older).
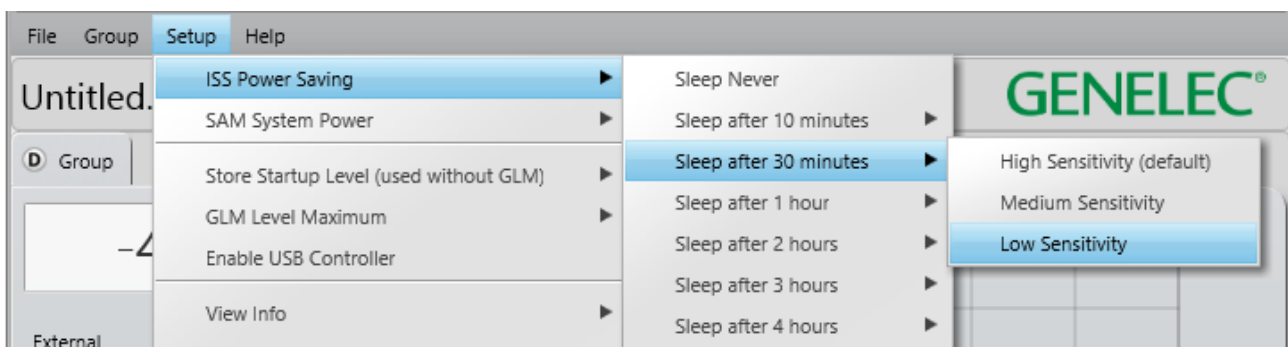
Can I power up and shut down the SAM system with GLM?

Yes, '**SAM System Power**' -menu can be used to power up and shut down a SAM system.

By default, GLM will send a wake-up command to the GLM network when application is launched, '**Automatically Wake Up System with GLM**' menu is checked, and all SAM monitors and subwoofers will power up.

When the GLM application is closed, SAM monitors and subwoofers will continue to play audio by default. It's possible to turn off whole system when the GLM application closes. Select this functionality by checking '**Automatically Shut Down System with GLM**' in the menu. This selection sends a shut/down command to the GLM network when the GLM application is closes.

These two menu items are stored for each GLM setup file.

'**Send Wake Up All**' and '**Send Shut Down All**' menu items command GLM network once. These can be used to e.g. wake up monitors that have been powered down by using the power push button on the monitor.

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Notes:

- Some older SAM models won't support ISS (8240, 8250, 8260, 1238CF, 7260, SE7260, 7270, 7271) and some models requires a firmware update (8351, 12xx with version 'xxxx x xxxx 0152 xxxx' or older).
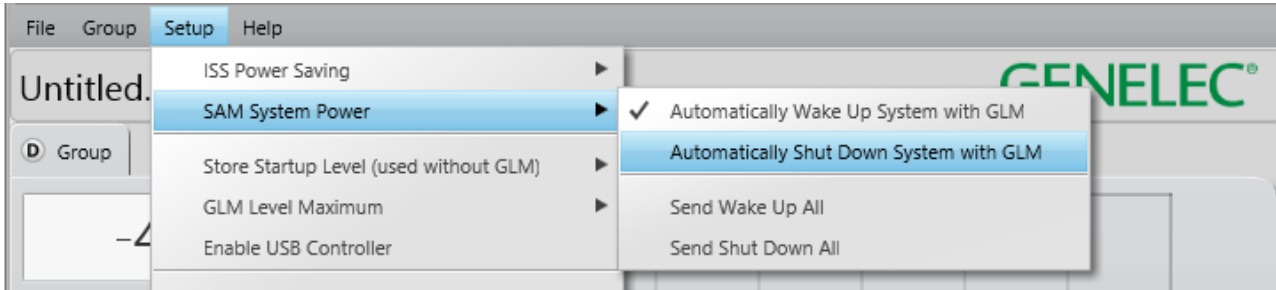
What is the "Not used in this setup" bin in the Layout page?

This bin, or box, is typically used to place unused 8130 channels when defining the number of monitors connected to a SE7261 subwoofer. For example if 2 x 8130 are connected to input / output #1 on the SE7261, 8130 monitor channels 1A and 1B will come off the Stack and be placed onto the Layout Grid. The unused monitor channels 2A thru 4B (total of 6) should be dragged into the 'Not used in this setup' bin.

How I replace a monitor with a new one?

This bin, or box, is typically used to place unused 8130 channels when defining the number of monitors connected to a SE7261

Can I use 73xx subwoofers with non-SAM monitors?

With GLM, the 7360, 7370 and 7380 subwoofers can be used under the control and calibration available with GLM and AutoCal with non-SAM monitors.

Since the 7360, 7370 and 7380 have the built-in 85Hz analog HP filters that are regularly available in Manual mode using the panel dip switches, there is a feature in GLM that enables the 85Hz High Pass outputs and AutoCal filters as well as phase control available for optimization.

Making New Setup with GLM

1. Launch GLM and make File>New

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2. Drag the 7360, 7370 or 7380 off the Stack and place in on the Grid. Press "Confirm Layout"
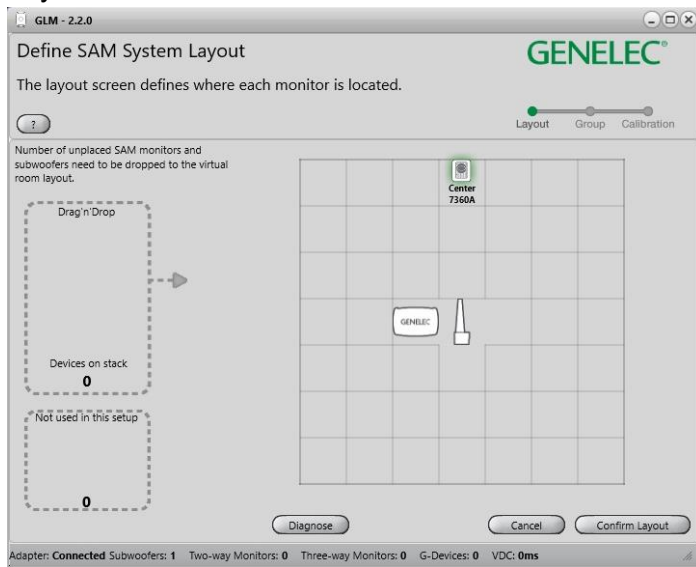
3. Then on the Group Define page check the box marked "High Pass analog outputs 85Hz". "Confirm Group"
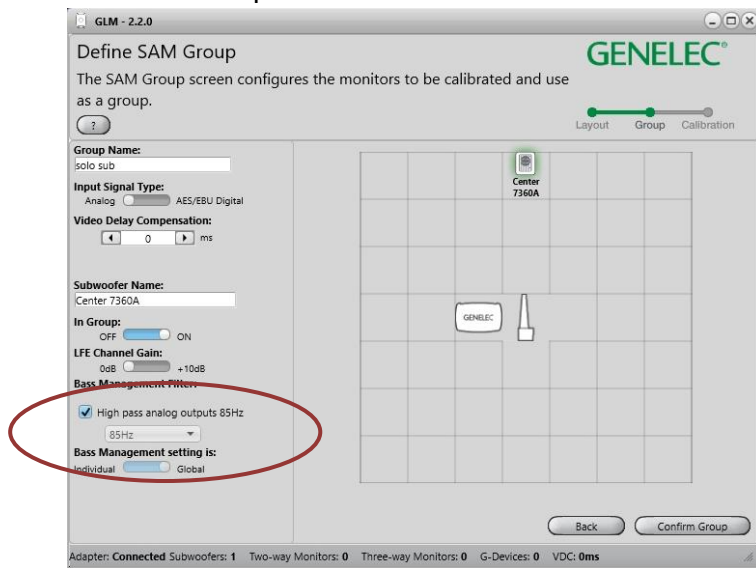

4. On the Calibration Page make all the checks for mic placement and serial number entry. Double click the mic icon and do the AutoCal calibration for the subwoofer. Confirm Calibration and
5. Skip **AutoPhase**
6. Save the Setup and return to Main Screen

Setting Manual Phase In Hybrid Mode From the Main Page

1. Increase GLM Master Fader to -0dB (Full up)
2. Double click the sub icon. The Acoustic Settings page will appear. Move it to the left or right of the GLM Main Page.

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3. Scroll down to Generator and select **Sine Wave Test out 1 or 2 depending on which L or R monitor you want to phase align to**.
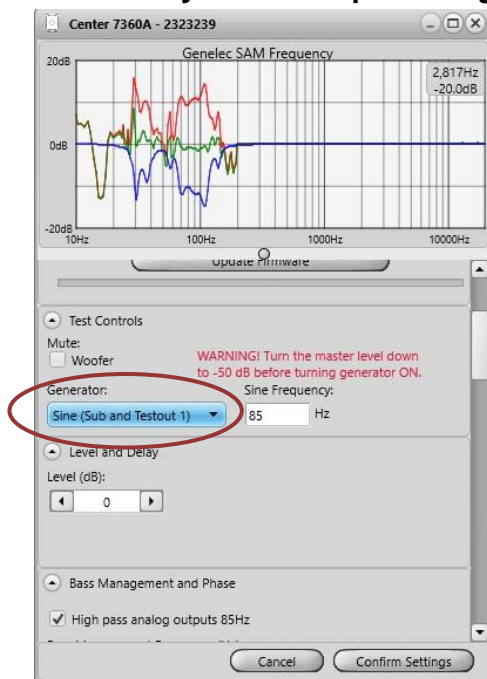
4. Using the mic SPL reading slowly change **Phase setting** using the < or > keys. We suggest you start at -180 then click > stopping at -135, -90, -45, 00, +45, +90, +135, +180 and then noting which setting is the loudest SPL on the mic. Do this slowly (about 4 seconds secs) as the mic uses a slow update rate. Then Choose Confirm Settings.
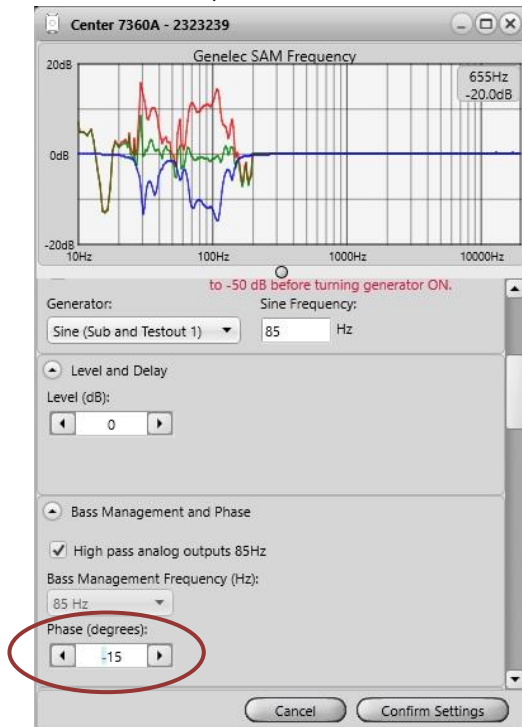

Adjusting level with Mains

It is possible, with significant subwoofer eq bass reduction in AutoCal (see acoustic traces above), that the Main speakers may need attenuation in order to level match the compensated sub. This may require a bit of experimentation and can be confirmed by Bypassing the Bass Manager 85Hz filter as well as adjusting the sensitivity on the main monitor inputs.

1. Press the Subwoofer Bypass button On, then Off to make this comparison.
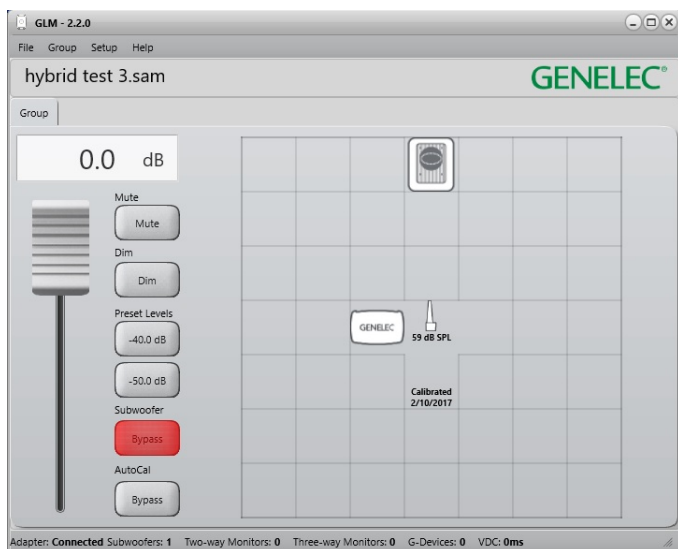
Can I use SAM monitors in 3D Immersive Audio Systems?

Yes. The immersive audio systems are very easy to setup and calibrate with SAM monitors and subwoofers. Here is an example of how to create Dolby Atmos 7.1.4 system layout in GLM. Configuration of the system in the room is shown below. The green tags are ear-level surround monitors and the blue tags are overhead monitors (top layer).
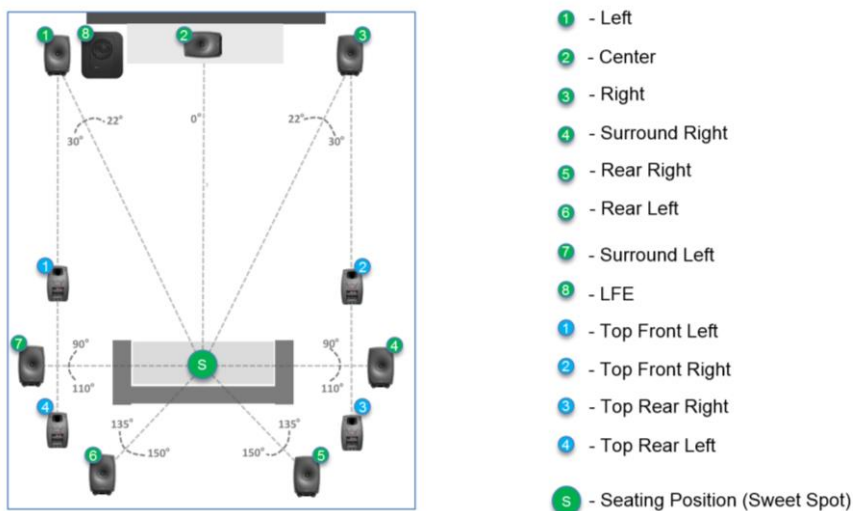
Defining a system layout in GLM: Start by dragging monitors/subwoofers from the Drag'n'Drop box to the grid. Each monitor and subwoofer plays an ID tone when dragged and that helps to identify which monitor is handled. For example, when dragging a subwoofer it plays a sine tone and can be placed to the grid. Next page shows an example where each monitor is placed to match an Atmos layout. Note that monitors may not appear in the same order as in these examples.
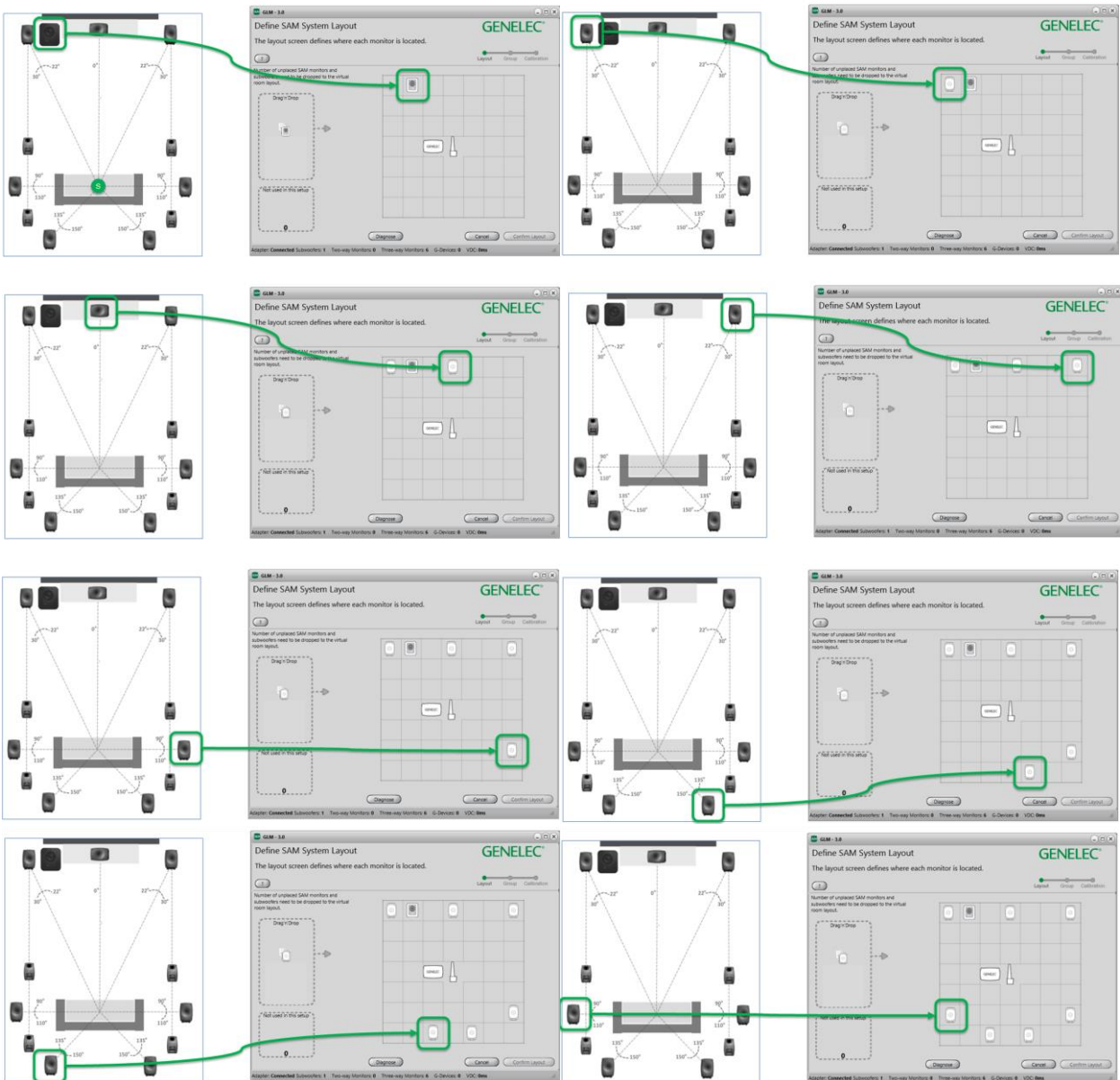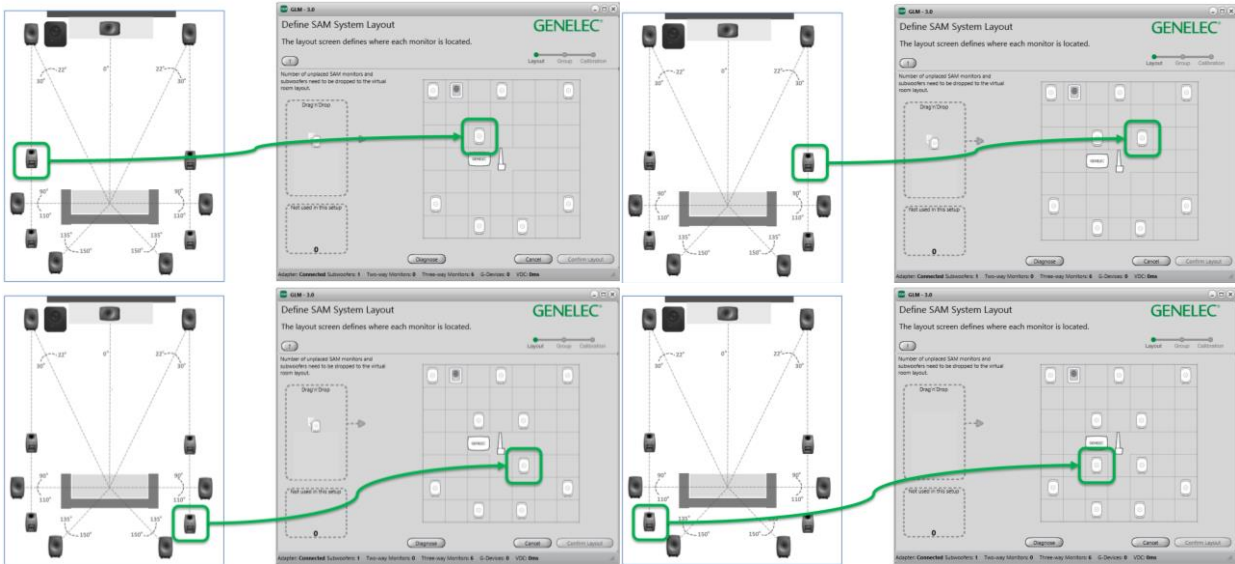
After all monitors and subwoofers are placed in the grid, confirm the layout by clicking the 'Confirm Layout' key. After confirmation, monitors should be shown comparable to the picture below. GLM assigns default names to monitors and 'Top Front Left' in Atmos system is named "Left". To rename, click the 'Top Front Left' monitor icon (Blue 1 tag) and change the name.
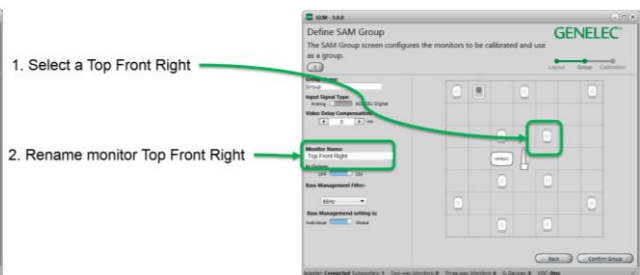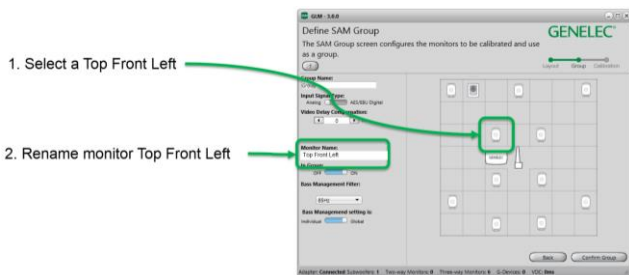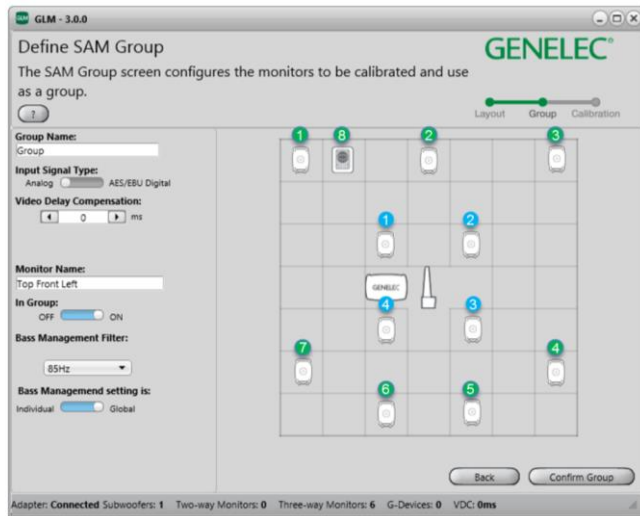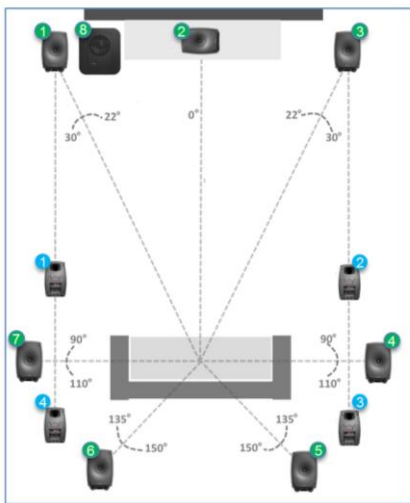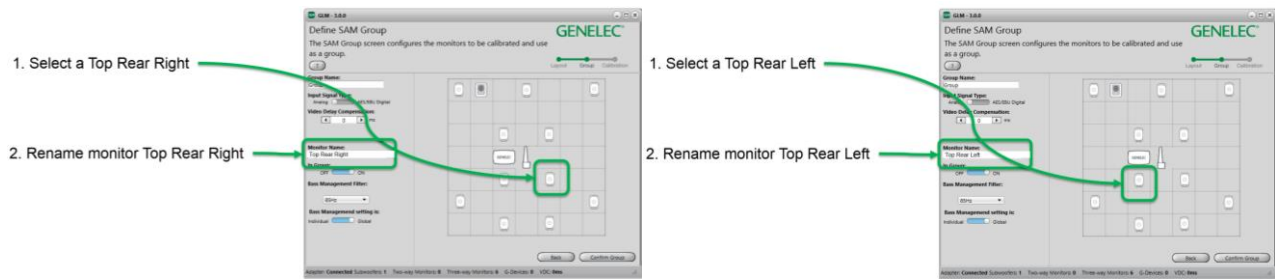
Atmos works like other multichannel or immersive systems, so no special operations are needed in GLM. Autocal compensates room responses, level and time of flight differences automatically; and SPL level calibration is performed as the last step as described previously.

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