

# Owners Manual and Set-up Guide: Genesis 6.1 Loudspeaker

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## A Message from Genesis

Congratulations! You are now the owner of one of the finest loudspeaker systems in the world. Based on technologies developed for our flagship Genesis 1, the Genesis 6.1 (G6.1) is designed for those of us who live in beautiful homes and still want an elegant loudspeaker that will deliver the best sound in its class.

So that it will fit into the décor of any home, the cabinet design is a combination of acoustic, furniture, interior design and architectural principles. Subtle angles and complex curves are used to create an optical illusion that makes the G6.1 look smaller and slimmer than it actually is. The veneers are also carefully chosen to reflect and enhance these curves and angles.

Sound structural engineering principles have been applied to make the G6.1 cabinet rigid and well-damped, with no detrimental vibrations. All construction and even internal braces have been “tongue and grooved” to ensure that the cabinet is the best environment on which to mount the transducers. This results in an absence of cabinet coloration, and excellent sound-staging and imaging.

More than just a full-frequency loudspeaker system, the G6.1 can also reproduce vital infrasonic and ultrasonic frequencies to deliver the emotive content of music. Hence, unlike speakers produced by other manufacturers, the G6.1 has a frequency response from 16Hz to 36kHz.

The G6.1 Cinema System can optionally include a full complement of matching surround speakers, center channel, and additional bass modules. Hence the G6.1 is equally at home in an audiophile two-channel music-only system and as a key component in a home theater/multi-channel music environment.

Please read this Owners Manual and Set-up Guide to get the maximum enjoyment out of your purchase. Also, check out our website at [www.genesisloudspeakers.com](http://www.genesisloudspeakers.com) for the latest updates, tips and tricks, and support for our owners.

## 1 A Quick Start Set-up Guide

Now that you have your new Genesis 6.1 loudspeaker system, we realize that you can't wait to hook it up and start playing! However, please read this quick set-up guide (even if your dealer is setting it up for you) before you proceed.

### 1.1 Unpacking

Your loudspeakers will come to you in two large shipping cartons. The cartons containing your speakers weigh over 160lbs (72.3kgs) each, so we suggest a minimum of two strong people to move the speaker cartons around. We will **not** be held liable for damage to either the speakers or your backs during unpacking and setting up.

The packaging is designed to ship the speakers vertically, and to be unpacked horizontally. Please observe the "This Side Up" signs when shipping and unpacking.

If the speakers have been shipped to you with the shipping sleeve on, you will receive the speakers vertically, standing on its end. In order to remove the sleeve, you will need a space with a 12 foot (3.7 metre) ceiling. Slide the sleeve up, and off, over the top of the carton.

With the shipping sleeve off, you will receive the speakers sitting on its back. The carton is designed to unfold to make it easy to remove the speakers. With a sharp knife, cut the tape on the top and two ends of the carton. The sides will fall apart revealing the speaker held in place by a back support box, and two pieces of foam holding on to the top and bottom of the speaker. You will also find the wire grill that will go on the front of the speaker.

Remove the foam on the bottom of the speakers, and slide the plastic and foam wrapping off. Now, tilt up the speaker until it is resting on its bottom. Remove the top piece of foam, and the wrapping. Repeat with the other speaker, and store the packaging in a dry, safe place – just in case you need to transport the speakers.

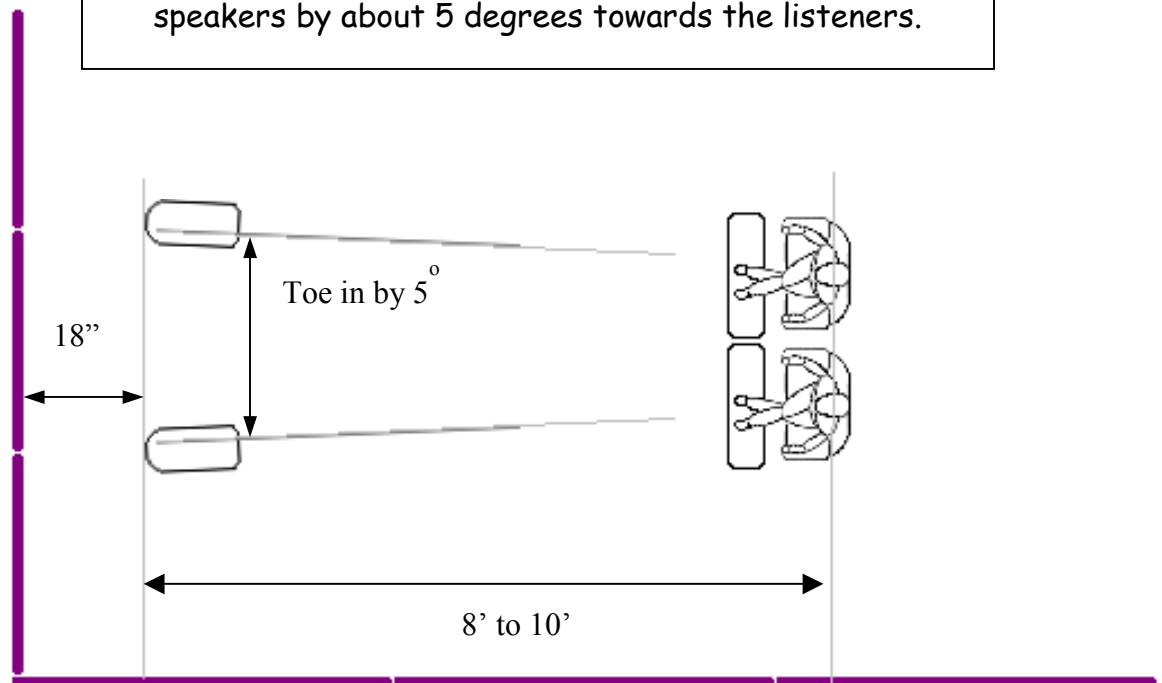
### 1.2 Room Placement

A good starting position for your G6.1 is about 18 inches (46cm) into the room as measured from the front wall (the wall you look at as you are seated listening to the speakers) to the back of the base of the speakers. Place the speakers about six feet (1.8 metres) apart with the tweeters closest together. Toe the speakers in slightly towards the listeners – by about 5 to 10 degrees – no more.

This is the best starting point for audiophile two channel stereo set-ups. If you are primarily using these speakers for home theatre enjoyment, the speakers can be placed nearer to the wall. If you are only going to use these speakers for stereo, you may want to pull them further away from the wall.

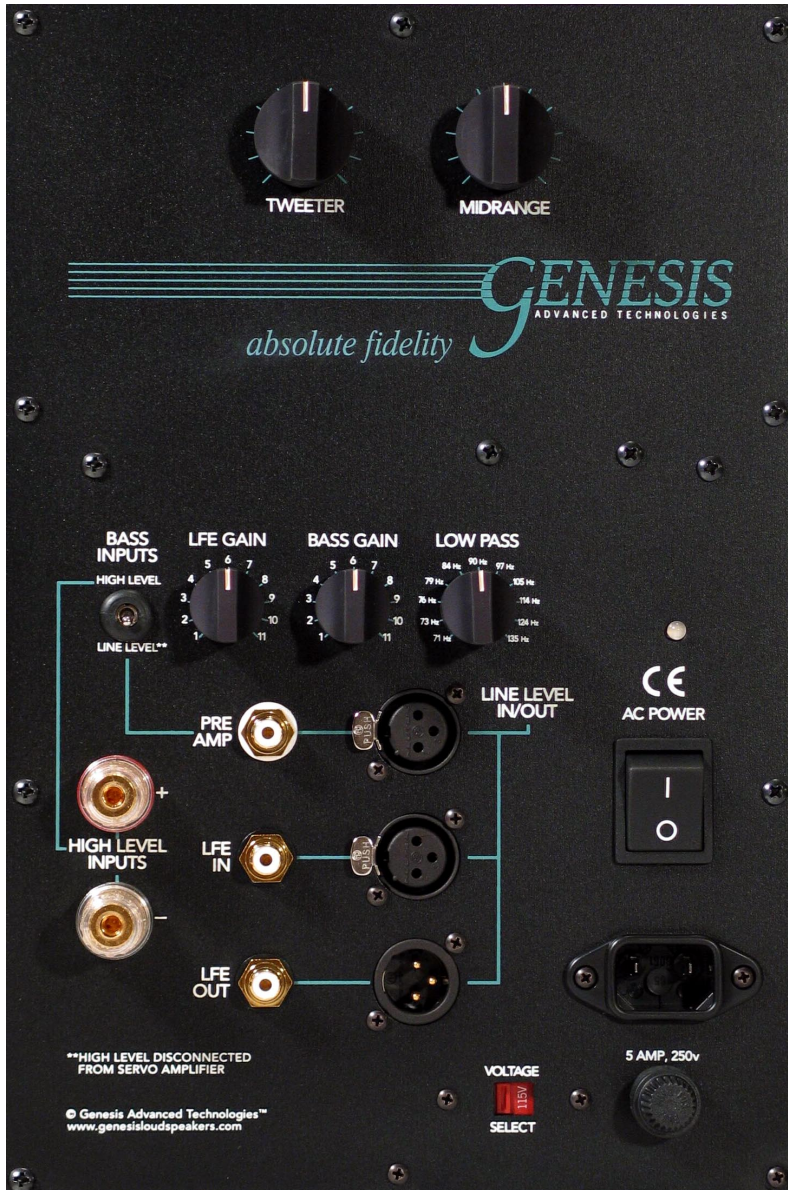
You will want to sit nine to twelve feet (three to four metres) away from the speakers. When sitting further away, you should place the speakers further apart.

Typical room placement: Place speakers about 18 inches into the room, the tweeters on the inside, 5 to 6 feet apart, and 8 to 12 feet from the listeners. Toe-in the speakers by about 5 degrees towards the listeners.



### 1.3 Power Requirements

The G6.1 has a bass section powered with a highly efficient 500W amplifier. Each speaker is capable of drawing over 5 amps at 110V or 2.5 amps at 240V. We recommend that *each* speaker be plugged directly into a dedicated power socket.



If you have no choice but to use an extension cord, make sure that it is a heavy-duty version that is capable of delivering the required current. If you use a power conditioner, we recommend that it is capable of delivering at least 10 amps.

### 1.4 Connections

For most applications, the speakers should be plugged directly into the output your power amplifiers using high quality speaker cables and the 5-way binding posts. Switch the bass inputs selector UP to “High Level”. If you are also using the speakers in a home theatre set-up, you should also plug the “LFE” or “Subwoofer” output from your home theatre processor into the LFE IN of the speaker.

### 1.5 Adjustments

Don't be too worried by all those knobs on the back of the G6.1. Just set all knobs to the 12 o'clock position. That is a good place to start. The G6.1 will sound great, straight out of the box, set-up like this. As you play your system for the next hundred hours or so, the speakers will settle in and break in.

Once you familiarize yourself with their performance, putting a little bit of additional effort in tuning the speakers properly into your system (which includes the room) will give you greater long-term enjoyment and benefits.



## 2 Complete Set-up Guide

### 2.1 Positioning

A good starting position for the G6.1 is about 18 inches (0.45m) into the room, as measured from the front wall (the wall you look at as you are seated listening to the speakers), to the back of the base of the speaker. Start with the speakers six feet apart with the tweeters placed closest together, and angled in (toed-in) towards the listener by about 5 degrees. You will want to sit 8 to 10 feet (2.4 to 3.0 metres) away from the speakers (if you have the space). We will experiment with moving the speakers around later.

As these speakers are dipolar, they are really room-friendly and you are free to move the speakers closer to, or further away from the front and side walls. We do recommend, however, that you give the speakers a little bit of breathing space behind them, so don't push them up tight against the wall.

If you have the speakers too close to the front wall, you will find that the image depth is not as good - the soundstage becomes a little two-dimensional. If you have the space to move the speakers away from the wall, do so. You will be rewarded with the deep, broad soundstage that this loudspeaker is capable of. You should be able to "see" the soundstage behind, as well as in front of, the loudspeakers. The sound stage will also extend outside the left and right sides of the speakers.

### 2.2 Power Connections

Connect the power cord to the built-in amplifier, check the voltage selection and then plug that into a power socket. A heavy-duty power cord is included with your speakers for this purpose. We do not recommend using an extension cord for the G6.1 due to the high power demands of the 500W amplifier. However, if you MUST use an extension cord, use an extremely heavy duty one used for professional construction equipment if you can find it.

**Before you plug the power cord in, please make sure that the voltage selector is set to the proper voltage.** Taiwan, Japan and North America will require the 115v setting. Most European countries and other Asian countries will require 230v. We recommend that you plug the G6.1 into an unswitched outlet, or a switched outlet that will always be left ON.

The built in amplifier can draw over 5 amperes at 110V or 2.5 amperes at 240V with source material that has extremely heavy bass. As many rooms North America are wired with only 20 amperes of current, you

might find that the power supply you have limits the amount of bass that your G6.1 can deliver.

You will know that your speakers are limited by the power supply if the lights dim when there is a heavy bass-drum whack. If you have the luxury of bringing a dedicated line in for your hifi system, we recommend a minimum of 30 amps.



There is an on/off switch for the power amplifier. This switch should always be left on unless the system will not be used for a long time (like if you are going on vacation). The built-in amplifier has an auto-sensing circuit that will automatically shut the amplifier off when there is no signal for around 10 minutes. It will immediately switch the amplifier on if there is a signal sensed.

## 2.3 Source Input Connections

### 2.3.1 Recommended Connections

Connect the speaker outputs of your power amplifier to the HIGH LEVEL INPUTS binding posts using a high-quality loudspeaker cable. This is recommended both sonically and for convenience. The BASS INPUTS selector switch should be in the up position – pointing to the high-level inputs being used.

Make sure that you have the correct polarity connected for both speakers – the plus(+), positive(+ve) or red terminal on the G6.1 should be

connected to the plus, positive, or red terminal on your power amplifier. The minus(-), negative(-ve) or black terminal should be connected to the amplifier's minus(-), negative(-ve) or black output.

### 2.3.2 Alternative Input Connection

You may wish to connect the bass section of the G6.1 directly to your preamplifier instead. You may wish to do this if you know that your power amplifier does not have a flat response down to below 20Hz.



There is no need to do this if you think that your power amplifier does not have the power to drive the woofers. This is because the G6.1 has a rising impedance below 150Hz, and the built-in amplifier off-loads your power amplifier for the bass.

If you choose to do this, use a good quality interconnect cable to connect the output of your preamplifier to the PREAMP level input RCA or balanced XLR connector on the back plate of the G6.1. The preferred is to use the balanced XLR input on the G6.1 if your preamplifier has balanced outputs.

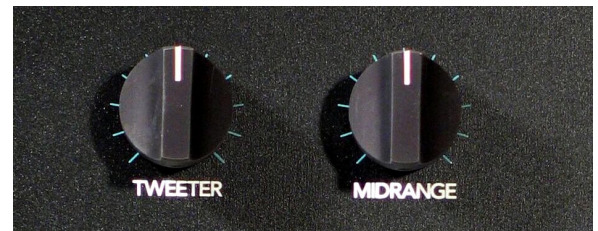
Switch the Bass Input Selector to the down (LINE LEVEL) position. This position will bypass the high-level input, and take the bass input for the built-in servo bass amplifier directly from the preamp.

Note: if you are connecting the G6.1's to a home theatre or multi-channel audio system, please see the multi-channel section of this user guide later.

## 2.4 Loudspeaker Controls

### 2.4.1 Tweeter and Midrange Controls

The two knobs at the top of the amplifier plate on the back of the speaker tailor the mid- and high-frequency response of the G6.1. They are subtle controls, but they can make a great difference in gaining that last bit of additional performance in tuning your speakers into the room that you are using them in. They can turn your system from very good to exceptional, so take the time to work through this process.



The top left knob marked TWEETER is a volume control for the front tweeter. Turning this control clockwise will increase the level of the tweeters. Use this control if you need a bit more treble, or to increase the apparent space of the soundstage. Too high a tweeter level, and you can feel that crashing cymbals are leaping out at you, and nylon stringed guitars sound steely. Start with this control at the 12 o'clock position. There is about a one dB range for this control.

The top right knob marked MIDRANGE is used to adjust the level of the midrange. Start at the 12 o'clock position. Turning the control anti-clockwise will make the midrange sound leaner, and turning it clockwise will make the midrange sound fuller. A fuller midrange can also can

make the soundstage more forward. There is about a one and a half dB range for this control.

#### 2.4.2 Bass Control

The knobs in the middle of the amplifier plate on the back of the speaker control the servo-controlled bass amplifier.



The knob in the middle marked BASS GAIN controls the volume of the built-in bass servo amplifier. Begin with this control at the 12 o'clock position (marked 6 on the scale). The knob on the right marked LOW PASS controls how high in the frequency range the woofer will play. At the extreme low of

71Hz, the woofer will play up to 71Hz, and then begin rolling off, or reducing its volume at 12dB per octave. The recommended beginning position for this control is 105Hz.

The knob on the left marked LFE GAIN is used for home theatre applications and will be addressed later in the Home Theater/ Multi-Channel section.

### 3 Tuning the system

Music is the best way to begin your set-up procedure. We suggest that video sources be used only after you have set-up the system to properly reproduce music. There is no “perfect” setting for the G6.1 loudspeaker. Every listening room is different, and we recommend that you take the time to carefully tune the system into the environment it is placed in.

Setting all the knobs at the “12 o’clock” position is “normal” and will be the position from which you can start tuning. With the controls in this position, it may not sound perfect, but your Genesis loudspeaker will sound great straight out of the box.

We suggest that you start with a single vocal with simple instrumental accompaniment because the sound of the human voice is more easily recognizable than many instruments and is a less complex sound to deal with. Use a good recording that you know has atmosphere and low bass content.

#### 3.1 Adjusting Bass Gain

Adjust the LOW PASS filter up to approximately 105 Hz. This is the point where the mid-bass couplers best crossover to the woofers in *most* listening rooms.

Turn the BASS GAIN control of the woofer amplifier up or down until the voice sounds correct. Whatever controls you use, turn them up and down only a little at a time, and then carefully listen to the change in the music.

Concentrate on the mid bass regions (as opposed to the very low bass in your recording) to achieve a natural blend. The voice and the music accompaniment should sound as if they were cut from one cloth, not separate.

If the voice sounds “thin” or does not have enough “chest” to its sound, turn the BASS GAIN up a little until it does. If you find that turning the gain up creates too much low bass, you will then need to work on the LOW PASS filter.

#### 3.2 Low Pass filter

This control will raise or lower the frequency cut-off point of the woofer. Turning the LOW PASS filter up to a higher number will extend the upper bass regions without affecting the low bass level. Some rooms that have lots of bass loss may require you to set the low pass filter up to 135Hz. Do not be afraid to increase this control to give the sound more body.

In rooms with solid concrete or brick walls and floors like in Asia and Europe which have very little bass loss, you may need to turn this down to 76Hz in order to reduce bass boominess.

Next, set the woofers using more than just a voice. Select some music that you know to have good deep bass. Set the gain on the woofers for a natural and powerful bass sound. Use a symphonic piece of music if you can, or use a natural bass instrument for your guide. Try to make it sound real. You may have to return to the vocal to make sure you have not gone too far in one direction.

At this point, if there is not enough mid bass, turn the LOW PASS control to a higher frequency or, alternately, position the main speakers closer together in order to achieve better mid bass coupling between the main speakers. If it sounds too "fat" turn the LOW PASS control down or adjust the BASS GAIN. At this point it is suggested to use the LOW PASS filter control until you get to the refinement stage.

### 3.3 Imaging and Soundstage

If your vocal selection is a well-recorded audiophile CD or LP with good image information in the recording, the performer should appear to come from behind the loudspeakers and be at the appropriate height for a standing person. If it is not, there are several remedies that will address this shortfall.

If the vocal appears to be larger than life, you should first check the system volume. Is it a volume that would be appropriate for someone actually singing in your room? If there is too much volume the artist will appear too big and the opposite is true for too little volume. If the volume is set correctly and the image is still too big, place the speakers closer together and re-listen. Place the speakers no less than 5 feet apart. If the image is still too big, toe the speakers in a slight amount.

Conversely, if the image is too small, move the speakers apart. The speakers should be no more than eight feet apart. Repeat this process until you have it right. If the voice is too low in height, turn the MIDRANGE control up (turning the knob clockwise) and the image of the voice will move upward slightly.

If you have the speakers 18 inches into the room, and you are not getting enough front to back depth (the singer not appearing behind the speaker enough) pull the speakers away from the front wall a little bit at a time. If you do not have them pulled far enough away, you may not have enough front to back depth. However, slightly more than

1/3 of the way into the room is about as far as you want to go. Pulling them half-way into the middle of the room is unlikely to help.

Find the best compromise for your room, your tastes and your space requirements. If you are not getting proper focus on the voice, you may angle the left and right speaker up to about 15 to 20 degrees (toe-in) towards your listening position until you have a properly defined center image. If the speakers are too far apart, the mid-bass will decouple and you will lose the side image, and if they are too close together you will have too small a center stage.

When properly set up, very little sound should appear to come directly from the speaker. Instead, the sound stage should extend far beyond the left and right edge of the loudspeakers and they should have tremendous front to back depth. When the recording is close-miked (when the instrument or performer is very close to the recording microphone), the music may appear to come directly from the loudspeaker. This is normal. Typically, however, the sound should appear to be detached from the loudspeakers.

A simple rule of thumb to follow is that focus will be achieved by placing the speakers closer together or farther apart, and front to back depth can be adjusted by the distance from the rear wall. Further, as the system “breaks in”, the depth and width of the soundspace will increase and so will the “smoothness” of the sound.

### **3.4 Further adjustments**

In some problematic rooms a resonance may develop at one or more frequencies, that is unnatural to the music. By moving the speakers closer to the front wall or farther from the front wall, the resonance may be reduced at the listener’s position. There are no absolute rules concerning problematic rooms, so do not be afraid to experiment with speaker placement to determine the best position of the speakers in your room.

Ultimately, it is all about balance. You have a number of controls at hand with which to adjust the bass response, the low-pass filter frequency and woofer volume. You can also move the speakers closer together (for better coupling), or further apart.



## 4 The Refinement stage

After following the set-up guide above, you may not be completely satisfied with the results. We share with you here some of our observations in setting up these loudspeakers.

### 4.1 One Change at a Time

One rule of thumb you should always keep in mind. Make one change at a time! Do not, for instance, change position of the speakers and make an adjustment to the amplifier all at once. Make each of these changes separately and note the difference - by listening with each adjustment, then make the next change.

### 4.2 Defining the Soundstage

A common problem we find with many set-ups is a tendency to separate the speakers too far from each other. This gives an unnaturally wide soundstage between the two speakers, and creates problems beyond the unnatural width of the center stage. The key problem is a lack of soundstage information beyond the left and right sides of the speakers.

If you find that the sound is not spacious enough or you are not getting enough front to back depth, pull the speaker away from the front wall. This is typically preferable to separating the two speakers too far, and will almost always give you better depth and soundstage information. A word of caution though: if you move the speakers too far from the front wall you may lose the focus of the image.

### 4.3 Appropriate Mid-bass Balance

Another problem is a lack of mid-bass energy. In order for the appropriate amount of mid-bass energy to be present, the speakers should be close enough together to achieve proper "coupling" of the midrange and the mid-bass couplers. Coupling is desirable in the lower frequencies from the mid-bass on down. This simply means that the left and right drivers "work together" as opposed to working separately.

If you find there isn't enough deep bass, your first remedy is the BASS GAIN control on the servo amplifier. This has limitations, though. First, turned up too high, you may get some distortion on very low frequencies or you may overheat the amplifier.

Secondly, you may make the mid-bass produced by the top range of the woofer out of proportion with the mid bass produced by the bottom of

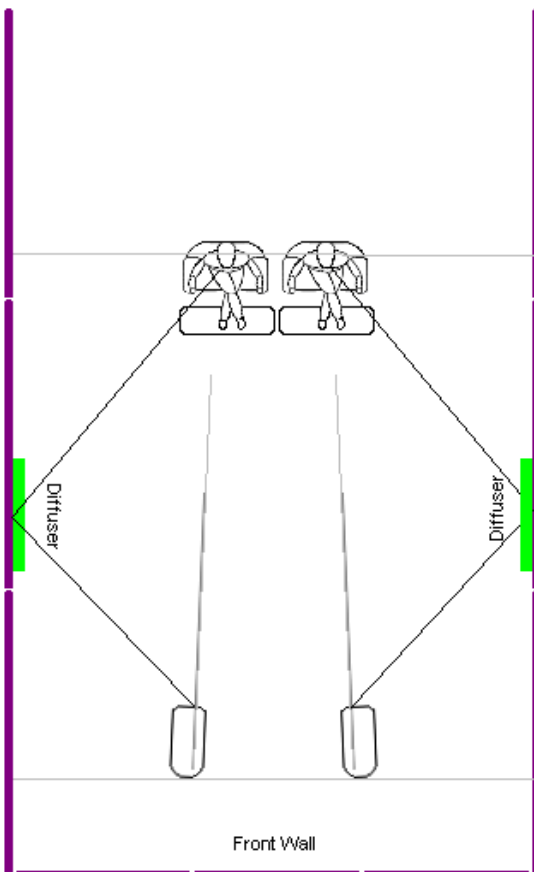
the midrange driver. This would tend to sound "boomy" in the mid bass regions.

Another good rule of thumb is to first set the BASS GAIN control of the woofer for proper mid-bass rather than low bass. The theory is that if the mid-bass is correct, then the low bass should be very close to correct.

A good balance between proper low bass extension and a deep and spacious soundstage needs to be established to optimize your new speaker's performance.

In order to achieve what the speaker is capable of we suggest you focus your efforts on a proper balance of soundstage elements that includes information beyond the left and right sides of the speakers, front to back depth well behind the speaker, excellent focus of instruments and voices with proper vertical information and mid bass fill.

A Genesis loudspeaker system correctly set up, can and should provide a soundstage that is wall to wall and with pinpoint focus, the speakers disappearing completely on a recording containing such information.



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#### 4.4 Room Treatment

No room is perfect. To optimize your sonic presentation it may be helpful to treat your room. Here are some guidelines:

**Front walls.** This loudspeaker is a dipole and therefore there is sound coming from both the front and the back of the speaker. How the front wall (the wall you face while listening) is treated or not treated is important. Generally speaking, the Genesis loudspeakers prefer a live (hard reflective) front wall to a dead (soft absorbent) front wall.

By these terms we mean the amount of reflection of sound. A typical wall of glass, brick, cement or drywall material is a reflective surface. A heavily curtained or sound-proofed wall would be considered a "dead wall" or a non-reflective wall. A normal thin curtain across a window causes only a small amount of absorption.

**Sidewalls.** Because the speaker is a dipole it is less sensitive to the sidewalls. However, as a rule of thumb it is a good idea to keep the speaker as far away from the sidewalls as is practical. In some rooms, it may be helpful to add some damping material or diffuser panels to the point of first reflection. This is a point on the sidewalls between the listener and the loudspeaker. It is where the sound from the loudspeaker first hits the sidewall, then bounces to the listener. This reflection is undesirable because it is slightly delayed from the original sound. This point on the sidewall can be easily determined with the help of a second person and a mirror.

Sitting in your listening position, have an assistant hold a mirror up on the sidewall. Move the mirror until you can see the tweeter. This is the point of first reflection. A diffuser (see your audio dealer), an absorptive material or even a piece of furniture can help break up this point of first reflection.

**Rear wall.** In many cases it will be unnecessary to do anything with the wall behind your listening position. However, you may want to experiment with diffusers or absorbers behind you for best sound. Absorption behind the listener is usually beneficial.

#### 4.5 Mastering the Refinements of the system

Fine tuning an audio system is an art that will take time and patience. It can be one of the more rewarding learning experiences you will have in the pursuit of music and its enjoyment.

One of the best pieces of advice we can offer is that you take advantage of your ear's ability to identify similarities in sound. This ability is useful in fine-tuning your system because, if every recording you listen to has a similarity of sound (too much or too little of a certain frequency for instance), then you can be fairly certain that you have yet to perfect your set-up. Keep at it, and remember to enjoy your music as you work on perfecting your set-up.

If you have any questions, feel free to contact us at Genesis. Our website is the first place that you can look to for more information, but you are welcome to either send us an email, or just give us a call!

## 5 Home Theater and Multi-Channel Music

While the Genesis 6.1 was designed with the audiophile in mind, its performance and features make it ideal for Home Theater as well. The G6.1 is truly a full frequency loudspeaker that satisfies the requirement for Dolby Digital™ and DTS™ cinema reproduction. However the combination of the low frequency capability and a unique set of controls and connections on the G6.1 provide Home Theater users benefits beyond other loudspeakers on the market.

In essence, the G6.1 has a servo-controlled subwoofer already included in each speaker. This capability allows the G6.1 to provide the ability to reproduce the low frequency effects (LFE) signal available on all modern movie decoders. An additional benefit of using this feature is that the LFE will come from two, or more, locations in your room versus using a single subwoofer for LFE. Utilizing this capability dramatically reduces room bass mode problems. This results in smoother bass integration in the room, and a huge system impact capability.

With the option of full-frequency Center Channel and Surround Channels, the Genesis 6.1 Cinema System is ideal for multi-channel music, which usually requires 5 identical speakers; not a very practical solution in the real world. Each G6.1 Center Channel System and G6.1 Surround Channel System will have the same frequency response as your G6.1 left and right speakers.

### 5.1 LFE Input

The Low Frequency Effects (LFE) input allows the G6.1 to be used in addition to, or in place of, a separate sub-woofer. The LFE input **blends** the low frequency effects signal from the home theatre processor into the woofer section of the speakers.

The LFE input bypasses the internal crossover, and hence uses the home theatre processor's crossover. Since the G6.1 is able to play down to 16Hz (and lower), the bass section can also be used as your Home Theater System's LFE sub-woofer if you do not have one – even if you are using different speakers for your home theatre system!

On the home theatre processor, set the speakers to “LARGE” and sub-woofer to “YES” even if you do not have a separate sub-woofer. Then, take the sub-woofer line-level output from the processor, and plug it into the “LFE IN” connector on the G6.1. The preferred connection is the balanced output from your processor, if it has one. If it does not, use the single-ended RCA output on the processor.

## 5.2 LFE Gain

The G6.1 has a knob that controls LFE GAIN separately from the BASS GAIN. This allows you to have the G6.1's plugged **both** into your audiophile stereo system as well as your home theatre system at the same time without conflicts. The usual way to control the level of the LFE output is to set the LFE gain to 6 – the twelve o'clock position – and then use the home theatre processors level control to dial in the level. However, having the LFE gain control allows you to tune the LFE if your two systems have completely different gain structure.

## 5.3 LFE Output

Along with the LFE input, the G6.1 has a unique capability of LFE output. This buffered output can be used to daisy-chain the LFE signal to other LFE inputs including other G6.1 speakers and separate subwoofers.

Thus, it is possible to channel the LFE signal from your home theatre processor to one speaker, and then from that speaker to another, and to another, and to another! The LFE output is also buffered, which means that even if the input is single-ended RCA, the output can be from the balanced XLR, and vice versa.

In the case of LFE, more sources is better than less. With the full Genesis 6.1 Cinema System, you can have the LFE signal coming out of both G6.1 left/right speakers, out of the G6.1cs center channel system, and out of the G6.1sb surround bass system. In this way, LFE can be distributed around the room, dramatically reducing room modes and increasing the system capability.

Distributing the bass is also helpful for reproduction of multi-channel music because you get incredible articulation and detail in the bass all around the room.



## 6 The Genesis 6.1 Technology

### 6.1 The Servo-bass Advantage

Very few loudspeakers use servo drive, either because most designers think that it is too difficult to design, too expensive or because of the extraordinary demands a servo system makes on the amplifier and the transducer. However, the Chief Scientist of Genesis, Arnie Nudell, first introduced the servo system in the legendary Infinity Servo Statik One in 1968(!) – so we know how to design and build servo systems.

The concept of the Genesis servo bass system is an easy one to understand: It employs an accelerometer as a sensor, to constantly monitor the movement of the woofer cone and instantaneously compare it to the input signal. This comparison circuit identifies any deviation from the input, and instantaneously applies a corrective signal to compensate, thus practically eliminating the inherent distortion of the woofer.

As an example, when you have a high-impact, low-bass signal that starts and stops suddenly (for example a tympani), the inertia of the woofer cone makes it slow to start moving, and then after it is moving, the momentum of the cone makes it continue moving even after the signal has stopped.

The sonic result is overhang, bloat, lack of tautness and definition, and a blurring of dynamic impact.

With the servo system, the circuit senses that the woofer is not moving as fast as it should and it instantaneously applies much more current to make it move faster. When the signal stops, it detects that the woofer will continue to move when it shouldn't and applies a counter-signal to stop woofer.

Open loop woofers are simply not capable of such accurate control and response.

Thus, the servo-drive reduces distortion and improves transient response by making the woofer seem massless. Typical non-servo woofer systems have distortion levels that exceed 10% at even moderate levels. The Genesis servo bass system reduces this distortion to below one percent at almost any output level. It also drives the woofer to constant acceleration which makes its frequency response flat.

The servo system is a more proactive approach to controlling a loudspeaker than high-damping factor and high current in the amplifier.

However, this also means that the woofer, the cables attaching the woofer to the amplifier, and the power amplifier has to be designed as an integrated system. Thus, the G6.1 is designed with a built-in 500W servo amplifier for the bass section.

## 6.2 Dipolar Configuration

What a lot of people don't realize is that the room is as big (if not bigger), a part of their music system as is the loudspeakers. At Genesis, we strive to get the loudspeaker and the room to work well together and hence, design loudspeakers that interact with the room, and have enough of adjustment to make them work with most rooms in the world.

All rooms have floors, ceilings and sidewalls that distort sound because of lateral, early-arriving reflections. We aim to suppress undesirable contribution by reflected sound from these four surfaces (which is why a lot of people put sound absorbers or diffusers at the first reflection point of the room). In order to do that with a majority of rooms, we make our loudspeakers dipolar.

Dipoles radiate the same, but out-of-phase, waveform from the front and rear in "push/pull" fashion. Thus, the sound waves from the front and back of the speakers cancel out as they radiate from the sides and tops of the speakers; which means that there is minimum radiation of sound to the sidewalls of the room.

The G6.1 also uses the wall behind the speaker to give more depth to the soundstage and "air" to the speaker without detail robbing room reflections from the sidewalls. Hence, it has the advantages of omnidirectional speakers, without the disadvantages.

With fewer spurious reflections to confuse your hearing, the program source emerges more clearly. Imaging is stable, sharply focused, deeper, and spacious. Transients are clearer, and sharper.

## 6.3 The Transducers

The transducers in the 4-way G6.1 are all proprietary Genesis-designed drivers manufactured to our exacting standards.

### 6.3.1 The Genesis Ribbon Tweeter

Reviewers in the audiophile press have often remarked that the Genesis circular ribbon tweeter is the world's best. It is a one inch circular planar ribbon design crafted from an extremely thin membrane of Kapton with a photo-etched aluminium "voice coil" that is a mere 0.0005 inch thick. The entire radiating structure has less mass than the air in front of it! That is why it will reproduce accurately, frequencies beyond 35k Hz.

The result of this design is a driver that has a rapid and uniform response to high frequencies and has the speed of the best ribbon/electrostatic designs, without the high distortion and poor dispersion that is typically associated with them.

The G6.1 uses two of these tweeters per channel. One front-firing, and the other rear-firing wired to the crossover out of phase to the front tweeters, creating a dipole.

### **6.3.2 Titanium Midrange**

We sometimes say that the midrange is a window into the mind of a composer or a singer. And indeed, the midrange is where the “magic” is in a well-recorded musical event.

The G6.1 uses a Genesis-designed proprietary 5 inch titanium coned midrange to cover this critical frequency spectrum. Manufactured out of one of the lightest and stiffest materials known, this low mass cone driver is one of the best midrange transducers ever made with nearly instantaneous transient response, enabling the G6.1 to sound lifelike and effortless.

The driver is housed in an enclosure that is open to the back. Thus, the midrange operates as a dipole too.

### **6.3.3 Mid-Bass Couplers**

In order to create a “sound bridge” between the midrange and the bass section, the G6.1 incorporates two front-firing 6.5 inch metal cone mid-bass couplers. The drivers are open to the back of the speakers like the mid-range, and hence, they too work as a dipole.

Made of aluminum, this metal cone is extremely light and stiff. The driver is hence capable of handling the huge dynamic range demands of the system while maintaining extremely low coloration and excellent transient response.

### **6.3.4 Aluminium-cone Woofers**

The transducer used in a servo system must be strong enough to withstand the high current approach of the servo, yet delicate and light enough to react extremely quickly. The G6.1 features two 12-inch ribbed aluminium cone woofers per channel.

While the servo system is able to ensure that the driver works linearly as a perfect piston, it is unable to correct for distortion caused by cone wobble, bending, and break-up. Hence, the drivers were designed to minimize these non-linear distortions, allowing the servo system to achieve maximum accuracy.

The woofers are a uniquely designed metal cone driver made for the Genesis servo system. Made of a cone of solid aluminium, the suspension and voice-coil have been maximized for long, distortion-free excursion so as to increase dynamic range. Our aluminium cones are a magnitude stiffer than plastic or paper cones, and virtually eliminate the problems caused by cone bending and break-up.

The lowest break-up mode (where there can be any chance of distortion at all), is at 6,000Hz – far above the 16Hz to 180Hz frequency range that these woofers operate at. Therefore, the driver is a perfect piston within the frequencies used. Thus, low cone break-up distortion is inherent in the woofer.

Unlike the mid-bass couplers, midrange and the tweeters, which operate in dipole, the two woofers in the G6.1 operate in-phase as a dipolar counter-firing balanced pair. Hence, they are configured to deliver the highest SPLs as well as the least vibration in the cabinet.

All four woofers in a pair of G6.1's work in-phase to control the air mass of the listening room. This means that the surface area of the four cones and the loudspeaker enclosure all work in unison to produce bass output that descends evenly to below your hearing limits.

#### **6.4 500 watt Class D Servo Amplifier**

While the advantages of metal cones include extreme stiffness resulting in very low distortion and break-up, one problem is that of greater mass. The servo system also places extraordinary demands on the amplifier because the system uses enormous amounts of current to make the woofer follow the input signal. Combined with the metal cones, this means that the amplifier used must deliver extraordinarily large amounts of clean power.

To overcome this, Genesis had to build an amplification system of great wattage and high damping factor. In the G6.1, the built-in amplifier was specifically designed and tuned for low frequencies in order to produce “floor-shakingly musical” bass signal to power the servo woofers.

The problem with conventional power amplifiers is that they generate a lot of heat. This is because a lot of electricity is wasted in keeping the transistors on idle, and then channelling power to the drivers. The Class-D amplifier is a *switching* amplifier. In the simplest terms, it is like a tap – it turns on and off to send electrical energy from the electrical mains to the transducer. This makes it highly efficient, and hence it doesn't need big storage capacitors and heat sinks like the conventional amplifiers that you know only too well.

This however means that it has to draw instant power from the walls. Hence, be very careful with the power source. Do not use a power conditioner that is not capable of delivering current extremely quickly. The power conditioner, if not properly designed, could actually slow down the amplifier.

One side benefit of this powered woofer system is that almost any sized amplifier (within reason!) can be used to drive the G6.1. The unique design of the G6.1 means that it has rising impedance below 180Hz, relieving the power amplifier to drive just the speakers from about 200Hz and up; the two mid-bass couplers, the midrange and the tweeter. No longer must one choose between having an amplifier with enough power to drive the woofers, and a smaller amplifier having better spatial and tonal characters.

Nevertheless, we do recommend a very high quality amplifier of no less than 100 watts as a minimum. The amplifier's ability to deliver current is more important than the stated power output.

## 6.5 Crossover

If the servo-controlled bass amplifier is the heart of the loudspeaker, the crossover is the brain. In order to manage and maximize the performance of the extensive complement of transducers used in Genesis loudspeakers, we spend more money on the crossover than many other manufacturers put in their entire speaker.

Each crossover is designed by computer modelling plus years of knowledge and experience. The inductors are made for Genesis with OFC copper windings. The capacitors used are also custom made for Genesis, using high-quality polypropylene-film and tin-foil. The crossover of each G6.1 weighs over five pounds (2.2kg)!

More importantly, the crossovers are designed with many, many hours of music listening, and constant refining, tuning and tweaking of the circuit. Out of this comes the "magic" that is a Genesis designed loudspeaker system. For example, by going the more expensive route of using several smaller capacitors in parallel instead of a single big one, transparency and musicality were improved.

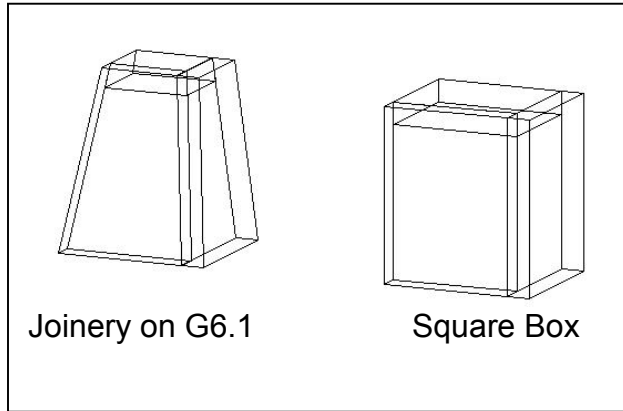
## 6.6 Vibration-free Cabinet

The cabinet was designed for aesthetics, but with an obsession to sonic quality, vibration control, structural strength, and rigidity.

The design had to be bounced around our Chief Scientist, a structural furniture engineer, an interior designer, an architect, and our CEO who



supplied the final “eye” to get the angles right on the cabinets. Consultants on veneers, glues, and a German consultant on CNC machining were used in its development.



The cabinet required incredible precision in manufacturing as the cabinet is made of complex curves and subtle angles that need to be joined seamlessly and perfectly.

For example, there is not a single right-angled joint in the entire construction! In order to achieve the optical illusion to make the cabinet look slimmer than it actually is, the sides of the cabinet are sloped 1degree top to bottom, and also

angled 3degrees front to back, and leans backwards by 5degrees. Joints and braces had to be cut *precisely* at 1degree, 3degree, and 5degree angles.

The result is that the cabinet is not only beautiful, but exceedingly well damped and vibration-free – contributing to a loudspeaker that is extremely low in coloration. It uses subtle angles, complex curves, and contrasting colors to transform a loudspeaker into a beautiful piece of sculpture or musical instrument.

Try this as a party trick for the optical illusion in the G6.1: the rear grill looks like it has parallel sides when you are looking at it – but when you take it out, and try to put it back in upside down, it's impossible. The bottom is more than an inch wider than the top!

The structural principle used in the construction is this: when any loudspeaker is operating, ALL the components of the speaker are set into vibration to a larger or smaller extent. The goal of the cabinet is to reduce this vibration to a minimum, distribute it, and damp it so that there is no energy storage in the cabinet itself. This then eliminates the boxy coloration that is evident in many loudspeakers.

In some parts of the cabinet where vibration would have been the greatest, two inches (52mm) of multi-layer bonded MDF was used to provide the damping, structural integrity, as well as a rigid platform for the drivers to be located. In other parts of the cabinet, extensive bracing was carefully incorporated using 25mm slabs of MDF to eliminate cabinet flex and panel resonance.

Incidentally, MDF was chosen as the material of choice for its damping properties and its consistency in hardness, density and rigidity. It would actually have been cheaper and easier to make the cabinet of solid wood, but that would have been a compromise.

Genesis locates the mid-bass, midrange and high frequency transducers on a gently sloping front. Constructed of two layers of 25mm MDF, this provides a damped, vibration-free structure to rigidly locate these critical elements. This locates the transducers in the perfect environment for the best imaging and soundstaging, and with the lowest distortion.

In the bass frequencies, where the energy created is the strongest, vibration is controlled by using twin 12inch woofers wired in phase and horizontally opposed to cancel out cabinet vibrations. Extensive bracing is also used in the woofer cavity to even further reduce vibrations. The bracing is also directly coupled to the cabinet walls using tongue and groove construction – the braces are not just glued in!

The sides of the cabinet also gently slope to the vertical. Like a pyramid, the shape of the cabinet makes it exceptionally stable. This stability ensures that the cabinet is well-grounded (like a sumo wrestler ☺!) no matter what surface you put it on. The shape of the cabinet effectively puts the center of gravity of the cabinet over the heavy transformer in the base.

The results of this obsession in cabinet design and construction is low coloration, stable imaging, and a wide soundstage. It is also something you can feel! By playing a loud piece of music, and running your fingertips on the surface of the cabinet, you will feel very few places (if any) where there is vibration. On the front baffle, there are no vibrations at all around the critical region that is the mounting environment for the tweeter and mid-range.

Try doing that on other loudspeakers which do not have as well constructed cabinets, and you'll understand why we are so proud of our design and manufacturing.

## 7 Specifications

- Frequency Response: 16Hz to 36kHz, +/- 3dB
- Sensitivity: 90 dB 1 watt 1 meter
- Min/Max Power (Tube): 100/500 watts per side
- Min/Max Power (Solid State): 100/750 watts per side
- High Level Input Impedance: 4 ohms (Nominal)
- Preamp Input Impedance: 16k ohms
- LFE Input Impedance: 16k ohms
- HF Transducers: Two Genesis 1" Circular Ribbon Tweeters (front & rear)
- Midrange Transducers: One Genesis 5 " titanium cone midrange
- Mid-bass Couplers: Two Genesis 6.5" aluminium cone
- LF Transducers: Two Genesis 12" woofers with ribbed aluminium cones - horizontally opposed, side firing
- LF Built-in Amplifier: 500W Class D
- Controls: Low-pass, Upper Midrange Contour, Bass Gain, LFE Gain, Tweeter level
- Inputs: High-level with 5-way binding posts; Preamp single-ended RCA and balanced XLR; LFE single-ended RCA and balanced XLR
- Outputs: Buffered LFE daisy-chain single-ended RCA and balanced XLR
- Dimensions: H 60" x W 17" x D 22"
- Weight: 136 lbs (62kg) per side