

Owner's Manual

**ILLUSION**  
**A7**

Snell

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## A MESSAGE FROM THE DESIGNER

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Thank you for choosing Snell.

The Snell Acoustics ILLUSION A7 is the product of extensive research, development, refinement, listening, prototyping, more listening, more prototyping, and still more of all of the above. At root, the A7 arose from a first-principles reevaluation of loudspeaker design, asking ourselves the simple question, "What is the best we can do, without reference to costs, practicality of manufacture, availability of existing components, or common practices?"

We at Snell believe that the ILLUSION A7 itself speaks most eloquently to the results. Its design is different from conventional design in many ways, some quite obvious, some less so. That said, like any loudspeaker the A7 is merely a lens through which to view, aurally speaking, the music. It is, however, an exceedingly transparent and faithful lens, one that will reveal the qualities or deficiencies of associated equipment, of room acoustics, and of the original recording and performance, with great precision.

Therefore, it is of paramount importance that you take all reasonable measures to optimize your A7s' system, listening room, and setup. I hope you will also budget ample time to study this manual, to get to know your new ILLUSION A7s intimately, and above all to experiment with setup, placement, and "supporting cast" of equipment and accessories. Only in this way can you be sure of hearing the full musical excellence of which these extraordinary loudspeakers are capable.

Once again, thank you.

A handwritten signature in black ink that reads "Joseph D'Appolito". The signature is written in a cursive, flowing style.

—Joseph D'Appolito, Snell Acoustics

## ILLUSION A7 SPECIFICATIONS

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|                                    |  |
|------------------------------------|--|
| Frequency Response ( $\pm 3$ dB)   | 27-40,000Hz  |
| Crossover Frequency                | 250Hz; 2.5kHz  |
| Recommended Amplifier Power        | 250 watts minimum<br>1,000 watts maximum   |
| Maximum Output (per pair)          | 111dB  |
| Sensitivity [1 watt (2.83v) at 1m] | 89dB   |
| Impedance                          | 8 ohms   |
| Tweeter                            | 1" (25mm) Silk Dome, Neo Magnet in Hexadym configuration cast aluminum enclosure |
| Midranges                          | Two 5.25" (135mm) solid Magnesium Cones, Neo Magnet in Hexadym configuration     |
| Woofers                            | Two 10" (250mm) Magnesium Cones  |
| Wiring                             | Bi-wirable, tri-wirable, biampable, triampable,                                  |
| Placement                          | More than 3 feet (1m) from the woofers to the nearest wall                       |
| Dispersion Angle from center       |  |
| Horizontal:                        | +40 degrees  |
| Vertical:                          | +15 degrees  |
| Weight                             | 195 lbs (88.5 kg) with feet  |
| Dimensions                         |  |
| Foot Print (W x D)                 | 19" x 22" (483 x 556 mm)   |
| Height                             | 62" (1575 mm)  |

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## ABOUT THE ILLUSION A7

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Conceived to be quite simply the finest two-channel loudspeaker available, the Snell A7 invites the world's most experienced, rigorous, and critical listeners to devote their closest attention.

The ILLUSION A7 traces its lineage to the very first Snell: the landmark Type A design unveiled by the late Peter Snell in 1976. Like that first Snell, the A7 introduces a dramatic new sculptural form, yet has grown from the most sophisticated current-day technologies. Today's ILLUSION A7 was

engineered under the direction of legendary designer Joe D'Appolito, whose name is synonymous with the paired-vertical array widely accepted as the ideal arrangement of dynamic transducers. But much as did Peter Snell's Type A in its era, the ILLUSION A7 reflects a new concept in enclosure design whose refinements yield unprecedented freedom from resonance and spurious vibration. Consequently, the A7's genuinely full-range, extraordinarily uncolored reproduction can be heard with unimpeded clarity and unrestricted detail.

The slim, tall, deeply rounded tower's subtle shape intrigues the eye while confounding easy description. Though its top and bottom are both ellipsoids of equal area, they are distinctly different diametric shapes. The smoothly tapering column that connects them presents another geometric paradox: surfaces of ever-changing plane dimensions that are never found to be in parallel in either axis, yet that create a solid form that maintains a consistent cross-sectional area.

The resultant volume can thus be calculated with perfect accuracy—a necessity in any loudspeaker design—while its visible result presents a changing profile from every angle. Equally important, this unique vented low-frequency enclosure is inherently vibration-free, and so all but completely devoid of contributed coloration.

Internally, each of the A7's three higher-frequency drivers is acoustically isolated, and each midrange unit exploits a dedicated sub-enclosure with complete transmission-line termination. In this fashion the A7 midranges deliver the totality of their engineered motion and performance, while eliminating backwave interactions with the forward-radiating wavefront that would otherwise degrade reproduction.

Needless to say, the Snell ILLUSION A7's arrangement of midrange and high-frequency drivers is in the "D'Appolito array" originated by Snell's chief designer—one of the very few such genuinely entitled, technically, to the name. Over the past 20 years countless loudspeakers produced with vertical mid-high-mid driver layouts have claimed D'Appolito status without any particular technical (or legal) legitimacy.

A true D'Appolito array is a far more sophisticated entity, whose transducer parameters and dimensions, geometric relationships, and time-domain characteristics of crossover-filter circuits must all be meticulously calibrated to produce the intended result: a coordinated wavefront with smooth and consistent axial dispersion, wide, consistent horizontal spread over a broad frequency range, and controlled vertical directivity. The resulting "sound-front" minimizes deleterious first reflections from nearest surfaces (floor and ceiling), promotes accurate response with spatial character (polar responses) carefully targeted for natural, musical octave-to-octave in-room balance, and maintains maximal clarity, definition, transient accuracy, and dynamic potential, all with a freedom from coloration that is achievable in no other way.

Finally, the ILLUSION A7 incorporates numerous construction details whose acoustical value has been effectively demonstrated by numerous Snell antecedents. Its dramatically radiused front greatly suppresses diffraction, eliminating higher-frequency reflections toward the listening zone and so promoting clarity and definition. Its midrange/high-frequency sub-structure incorporates a precisely machined, cast-alloy bezel that fixes the drivers in rigid alignment and resists any reactive driver motions, inhibiting resonances. Woofer-mounting construction employs a similar alloy structure to maintain perfect rigidity and dimensional accuracy. And of course, each A7 is meticulously crafted, assembled, and finished, by hand, in calibrated pairs matched both acoustically and aesthetically, to the obsessive standards Snell has long established.

## ILLUSION A7 FEATURES

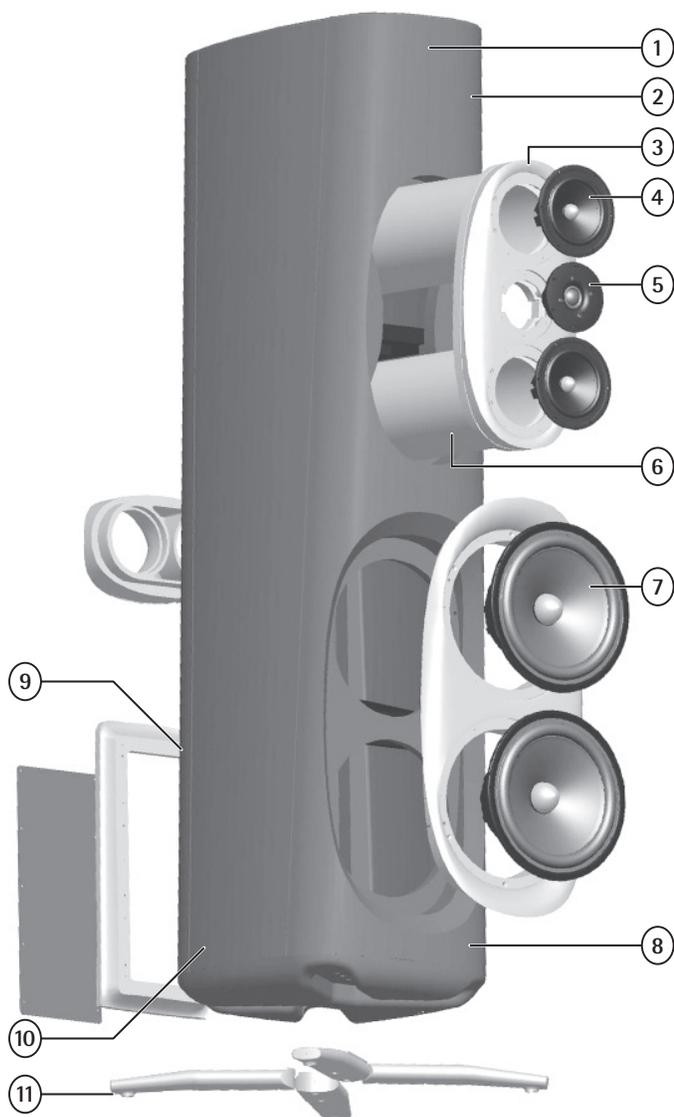
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- ① The geometrically complex form of the A7 enclosure provides nearly ideal acoustical behavior, with non-parallel plane surfaces, precisely calculable volume, and peerless strength, rigidity, and freedom from unwanted vibration and resonance. The overall cabinet is a vented system (woofers) via twin rear-facing ports.
- ② The smoothly elliptical radius of the ILLUSION A7 baffle (front surface) reduces re-radiation or "edge-diffraction" for cleaner and smoother response at midrange and high frequencies, especially off-axis. Snell pioneered this technique in the original Type A system 30 years ago.
- ③ The A7's true D'Appolito array is one of a very few such that is genuinely entitled to the name. This extensively computer-modeled, highly engineered construct yields a nearly perfectly coherent forward-radiating wavefront, with a combination of precisely, moderately controlled vertical directivity and broad, smooth horizontal dispersion that approaches the ideal for a two-channel reproducer.
- ④ The A7 midrange is a proprietary driver developed specifically for the ILLUSION design. A unique cast-magnesium cone, machined to a thickness-contour designed to optimize stiffness and minimize mass, is surface-treated for strength. This singular diaphragm is combined with a natural-rubber surround to eliminate edge resonance, and the proprietary Hexadym™ magnet that anchors an enormously powerful "motor" with vast dynamic linearity and power handling. (The unusually open Hexadym structure further provides free air movement behind the cone, eliminating cavity resonances and turbulence.) Its special injection-molded alloy basket is strong, rigid, and provides the unrestricted airflow the A7's transmission-line midrange sub-enclosures require.
- ⑤ The soft-dome tweeter designed for the A7 develops smooth, resonance-free response to nearly 40 kHz, as well as powerful and accurate output to unusually low frequencies. This facilitates an atypically low midrange/high crossover point, critical to the A7 D'Appolito array's ideal combination of amplitude and directional smoothness. A scaled-down Hexadym magnet (similar to the midrange's) is highly efficient, with an acoustically open structure that frees the tweeter sub-enclosure to negate backwave and internal-resonance factors.
- ⑥ Each A7 midrange operates in an individual, vibration-isolated, transmission-line-terminated sub-enclosure. This effectively absorbs the transducer's rearward-radiating energy or "backwave," eliminating its unwanted cancellations and nonlinearities from influencing midrange motion, or from contributing to port output.
- ⑦ The proprietary A7 woofer's aluminum-magnesium alloy diaphragm is cast, machined, and surface-treated similarly to the midrange's. Matchless stiffness-to-mass, a two-inch, high-temperature voicecoil, an oversized T-shaped polepiece with heavy copper "sandwich" rings and phase-plug are but three of the many factors that underpin this driver's enormous dynamic range, power handling, and linearity. Specialized 12Ω windings match the A7 woofer-pair ideally to the midrange/tweeter array, for absolute bass precision and perfect low-to-mid transitioning. The driver's extraordinarily stiff, injection-molded alloy basket combines superb structural stability with huge "windows" for air movement, making it acoustically invisible at low frequencies and so reducing reflections, cavity resonances, and turbulence-noise to insignificance.
- ⑧ Removable grille brackets accommodate the cloth covered grille. This frameless design reduces high-frequency diffraction reflections. The custom-perforated pattern is calculated for acoustic transparency. The grilles are iso-mounted to decouple induced vibrations from the A7.

9 Each A7 crossover is individually hand built and system-tuned by its technician to within  $\pm 0.5\text{dB}$  of the ILLUSION A7 Master Reference, ensuring perfect replication of the A7 design. (This practice is another Snell hallmark innovated in the mid-1970s.) The A7 networks are "in-phase" Linkwitz-Reilly designs that preserve ideal response in both amplitude and phase domains throughout all driver-to-driver transitions. Each crossover "leg" is individually constructed on a discrete circuit board, so that no induced or capacitive reflections can co-influence circuit actions. The best components are used throughout, including custom-fabricated air-core inductors and polypropylene capacitors.

10 Snell's renowned cabinet shop hand-crafts and hand-finishes each A7 with unequalled workmanship. The A7 finish is an especially developed multi-part lacquer-based application. Lustrous, deep, exceptionally "hard," and remarkably durable, it yields almost palpably three-dimensional depth, and offers an effectively limitless variety of custom colors on request.

11 Cast-alloy feet provide a strong and stable base for the A7 tower, and an attractive form.

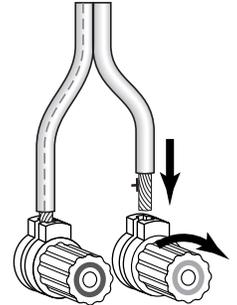


## CONNECTING THE ILLUSION A7

### Choosing Cable

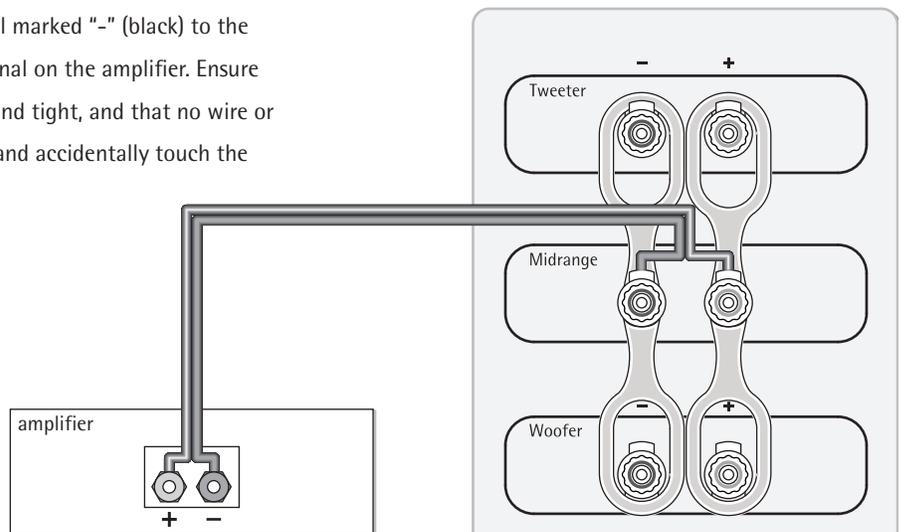
Snell recommends the use of high-quality speaker cabling of substantial weight (gauge); longer runs should receive heavier gauge cables. The specific choice of cabling is an individual decision based on associated equipment, system layout, and personal preference, but lowest-possible resistance-per-meter and minimal inductance and capacitance can be considered universally desirable.

The selection of wire termination is similarly individual. Bare wire, "banana" plugs, spade-lugs, or pins can be employed. The leading factor is that where terminal connectors are used, they be securely, professionally affixed with gas-tight crimps or solder connections.



### Basic Connections

Retain the speaker terminal jumper straps in their shipped positions. When making connections, be sure to connect the terminals marked "+" (red) to the corresponding connection-point on the amplifier, usually also marked "+" and/or red. Connect the A7 terminal marked "-" (black) to the corresponding "-" (black) terminal on the amplifier. Ensure that each connection is clean and tight, and that no wire or strand can escape its terminal and accidentally touch the opposite terminal.

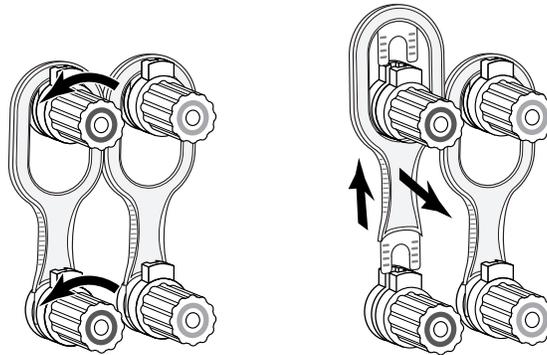


## Bi- and Tri-wiring

By removing one or both metal jumper straps from each ILLUSION A7, you may elect to run multiple cables, i.e. bi- or tri-wiring. This has the advantage of more fully isolating each crossover-filter section, while also doubling or trebling the overall conductivity available between amplifier and loudspeaker.

Unscrew the terminals and remove completely the jumper straps between Woofer and Mid terminals to bi-wire bass and midrange/high-frequency sections (the most usual two-wire configuration). Additionally remove the jumper from Mid to Tweeter terminals to tri-wire the entire A7.

Use equal lengths of identical or at least similar cabling when bi- or tri-wiring each speaker. Your Snell Acoustics installer/specialist will prove a valuable resource in choosing a wiring plan and selecting appropriate cabling.



## Bi- and Triamplifying

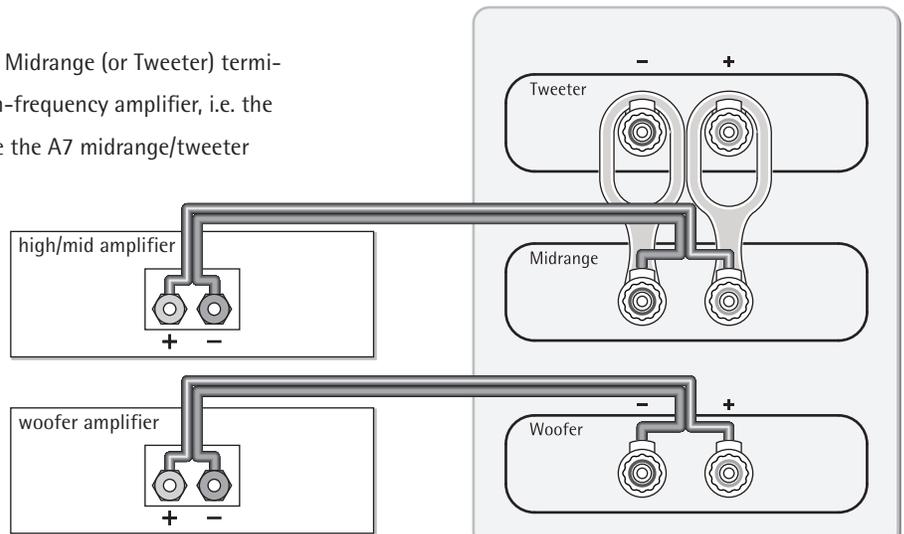
In an extension of bi- or tri-wiring, you may wish to consider multi-amplifying the ILLUSION A7s. Multi-amp setups augment the benefits of bi/tri-wiring by further electrically isolating woofer-, midrange-, and high-frequency A7 sections, while of course increasing the available power, a factor not to be overlooked.

**NOTE:** Do not employ an external crossover of any sort, whether passive or active. Doing so will interfere with the phase and frequency response of the ILLUSION A7. The A7 system's internal crossover circuitry is an integral part of the system, necessary to the proper response and function of its D'Appolito array and overall performance.

**NOTE:** It is imperative that the amplifiers (or channels) employed in any multi-amp A7 setup be identical. At the very least, amps/channels must exhibit perfectly matched gain structures to insure proper performance.

**Biamplying** (using one amplifier for the low-frequency, and one for the midrange/high-frequency sections):

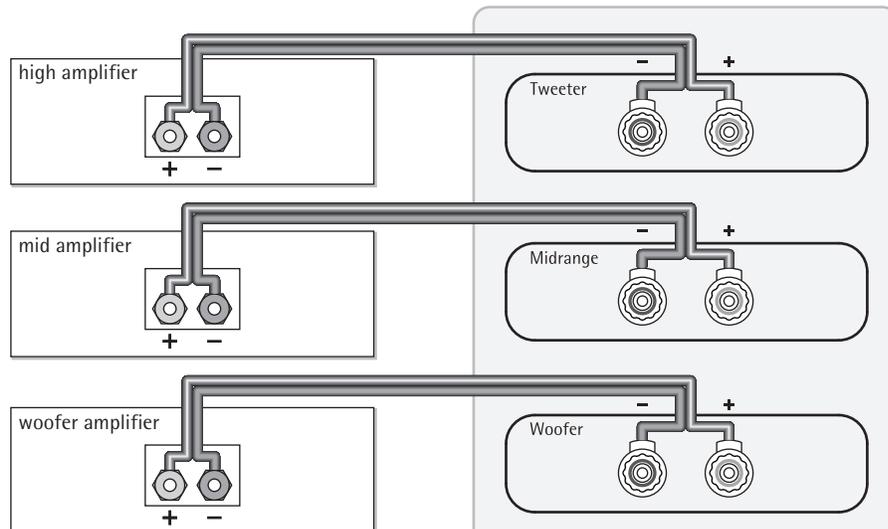
- 1 Unscrew the Woofer and Midrange terminals and remove the jumper straps; be sure to retain the jumper straps bridging the Midrange and Tweeter terminals, and re-tighten the Midrange terminals.
- 2 Connect the cable from the Woofer terminals to the low-frequency amplifier, i.e. the amplifier selected to drive the A7 woofers.
- 3 Connect a cable from the Midrange (or Tweeter) terminals to the midrange/high-frequency amplifier, i.e. the amplifier selected to drive the A7 midrange/tweeter arrays.



**NOTE:** Be certain that the jumper straps are removed entirely before making biamp (or triamp) connections. Failure to remove the jumpers will result in damage to the amplifiers, loudspeakers, or both.

**Triamplifying** (using one amplifier for the low-frequency, one for the midrange- frequency, and a third for the high-frequency sections):

- 1 Unscrew the Woofer and Midrange terminals and remove the jumper straps. Unscrew the Tweeter terminals and remove the jumper straps bridging the Midrange and Tweeter terminals.
- 2 Connect the cable from the Woofer terminals to the low-frequency amplifier, i.e. the amplifier selected to drive the A7 woofers.
- 3 Connect a cable from the Midrange terminals to the midrange-frequency amplifier, i.e. the amplifier selected to drive the A7 midrange arrays.
- 4 Connect a cable from the Tweeter terminals to the high-frequency amplifier, i.e. the amplifier selected to drive the A7 tweeters.



**NOTE:** You may consider deploying multi-amp components "horizontally" or "vertically." That is to say: in a horizontal setup a single two-channel amplifier would power both A7 cabinets' woofers; another would drive the midranges (or midrange/tweeter arrays in a biamp layout); a third both tweeters. In a vertical setup, one three-channel amp (or a grouping of one two-channel plus one single-channel unit)

might power the left-channel woofers, midranges, and tweeter, while an identical component or grouping serves the right channel. Many other arrangements of multiple- and single-channel amplifier components are possible. Experimenting with several possibilities may yield small gains (or at least differences) in imaging and dynamics. In all cases, employing identical or gain-matched channels remains critical.

## SPEAKER PLACEMENT

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Speaker placement is a key factor in any listening room setup. Finding the optimum locations for your ILLUSION A7s is just as important as selecting power amplifier or source components—indeed, potentially more so. However, every listening room and arrangement is different, so without being on the scene we at Snell Acoustics can only advise you as to general principles; there are few “rules.” Your Snell Acoustics installer/specialist will be happy to help you evaluate your room and setup options, and can bring considerable practical experience to bear upon the challenge.

**NOTE:** *The ILLUSION A7s are large, very heavy loudspeakers. We strongly urge you wait until at least one assistant is available to help you in moving and positioning your speakers. We know from experience that when working alone it is far too easy to injure yourself, your speakers, or both. A “two-wheeler” hand-cart, suitably padded with carpeting or similar material, is of incalculable value when positioning the A7s.*

The ILLUSION A7s' cast-alloy feet are integral to the loudspeakers. Their extremities are threaded to accept the supplied carpet-spikes or glides, four to each speaker. In most cases, it is best practice to approach the final placement of the A7s before installing the spikes, as the loudspeakers are difficult to move with spikes in place. The choice of spikes or glides is up to the individual. In most cases, for both physical stability and acoustic performance, spikes will be preferred on carpeted or other soft surfaces while the glides will better serve wood floors.

As a general rule, any loudspeaker with low-frequency capability will produce more audible bass output as its location approaches the junction of two room surfaces, i.e., floor and wall; as the location approaches the junction of three surfaces (a corner), bass output increases exponentially.

Unfortunately, these increases are not smooth and linear. In fact, since they are ruled by the standing-wave “modes” of a particular room they are almost invariably just the opposite, lumpy and severe. Consequently, the first (and virtually the only) “rule” of placement: avoid corners.

Similarly, the A7s will almost always perform best when located well away from the wall behind them. Though this distance is impossible to specify, the optimum location will usually be found somewhere between one and three meters from wall to speaker-baffle, occasionally even approaching half the distance from wall to listening position. Try to place the A7s at least one meter or more away from any large items of furniture, room-dividers or screens, or other large reflective surfaces.

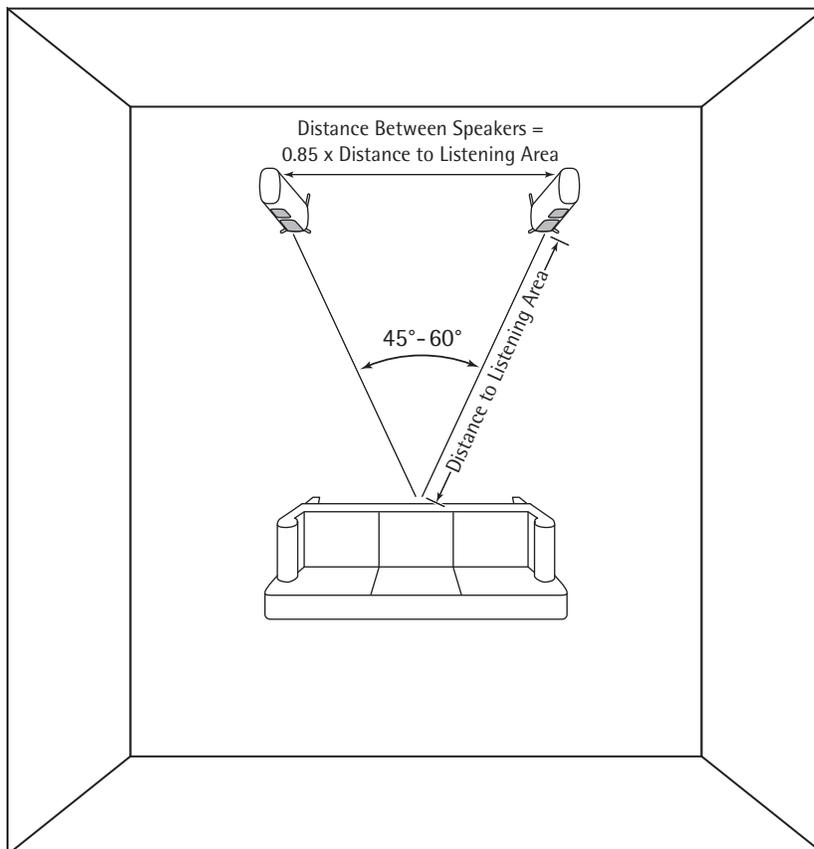
## STEREO IMAGE

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The distance between the ILLUSION A7s will largely dictate breadth of stereo image. If the speakers are placed too close together the image will be too narrow; if too far apart it can become too diffuse, ultimately yielding a "hole in the middle" effect. Most rooms will perform best with an angular separation of between 45° and 60° (viewed from above) between the left and right A7s. Expressed another way, this is usually arrived at by a separation between the two loudspeakers of about 0.85 the distance from the prime listening position to either speaker. It is quite important that the distance from the left and right speakers to the listening position is equal; using a tape measure to confirm these dimensions will prove well worth the effort.

Toe-in—the angling of the speakers inward toward the listening position—is a matter of room acoustics and individual preference. Generally, toe-in adjustment is best left to the last stage of placement fine-tuning. In typical rooms, as toe-in increases the stereo effect can become more sharply defined, that is, more "pinpoint," somewhat like listening via fine headphones. Aligning the A7s square, without toe-in, usually will yield a more spacious sound with a more diffuse center image; adding toe-in generally improves balance of stereo effect for listeners seated off-center. Ultimately, the degree of toe-in will be determined purely by taste, though electing an angle beyond 20° is less usual.

Properly placed, the A7s will produce a palpable "virtual stage" from left to right, with a substantial illusion of sound originating laterally beyond each speaker, as well as a profound impression of depth.



## LISTENING LEVELS AND POWER HANDLING

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Power recommendations and "power-handling" specifications can only serve as vague guidelines at best. Power requirements will depend overwhelmingly upon room size and listening preferences, because as room size/listening distance increase, the power required to achieve a given subjective loudness will rise exponentially. All things being equal, within rational limits more power is almost always better than less power, regardless of room size or listening levels. At the other extreme, while it is tempting to describe the ILLUSION A7s power-handling as "unlimited," experience tells us that any loudspeaker is capable of being over-driven.

That said, the factor that by far most often compromises performance (or in extreme cases, damages loudspeakers) is the operation of one or more amplifiers beyond its linear range; that is, into audible distortion or clipping. Nonlinear (clipped) waveforms induce drivers to move in ways for which they were not designed, and the result is excess heat, which in prolonged or extreme circumstances will prove fatal to transducer "motor" elements.

Therefore, our advice on the first hand is simply to choose amplification for your ILLUSION A7s that is adequate to the needs of your room, your listening habits, and your musical tastes, with a generous margin of headroom. Much as we would like to be more specific, with true candor we cannot. Happily, your Snell Acoustics installer/specialist is eminently qualified to advise you in selecting amplifiers.

On the second hand, an amplifier permitted to operate non-linearly—that is, to produce distortion—can damage any loudspeaker, however capable. If your A7s' playback seems to become strained, harsh, gritty, dynamically "squished," or in any way audibly distorted, even if the effects are heard only in highly transient, dynamic patterns, reduce the volume. Prolonged or repeated operation of your speakers with a distorted signal can cause damage that may not be covered by the warranty.

**NOTE:** *In a multi-amplified system (pages 10-11, above), the demands made upon amplifiers driving woofers, midranges, and tweeters will not be equal. In general, the woofers will require more power than the midranges, and the midranges more than the tweeters. Be aware that distortion, particularly when transient in nature as is almost always the case, is much less noticeable from a dedicated woofer amplifier than a midrange amp. (To a lesser degree, the same is true of a tweeter amplifier.) Therefore, it is wise in a multi-amp system to "size" amplification based upon woofer demands.*

## ILLUSION A7 MAINTENANCE AND CARE

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The high-gloss exterior of the ILLUSION A7 is finished using a multi-part lacquer-based system. This is exceedingly lustrous and durable, and requires only very simple care. Use a soft terry cloth towel slightly dampened with water or a highly diluted, very mild detergent. (The towel should be just damp enough to wipe the surface clean, without leaving a trail of moisture.) Do not in any case employ any abrasive cleaners, abrasive cleaning materials (this includes plastic "Scotchbrite"-type pads), or any cleaning solution more aggressive than common household glass cleaner. Where a higher degree of shine or a more deep-cleaning action is needed, a very low-abrasive, high grade of automotive polish may be considered. Snell has achieved excellent results with, for two examples, Maguiar's™ and Mother's™ (brands commonly available in the U.S.), lightly applied according to the makers' instructions.

The drivers, textured baffles, trim rings and port should be cleaned by dusting gently with a soft paint brush.

The ILLUSION A7 grilles are an engineered, acoustically transparent aluminum mesh covered with cloth. They should require no care beyond occasional gentle vacuuming, inside and out.

The A7's finish is very robust, but continuous exposure to direct sunlight could eventually cause color changes or "tan-lines" over long periods of time. A light-diffusing window treatment is usually all that is required to mitigate this very slight risk.

**Do not permit the loudspeakers to become wet.** Prolonged dampness or standing water will destroy the finish, damage drivers and electrical components, and may compromise the construction of the enclosure.

## LIMITED WARRANTY

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For five years from the date of purchase, Snell Acoustics will repair for the original owner any defect in materials or workmanship that occurs in normal use of the speaker system, without charge for parts and labor. Your responsibilities are to use the product according to the instructions supplied, to provide safe and secure transportation to an authorized Snell Acoustics service representative, and to present proof of purchase from an authorized Snell dealer in the form of your sales slip when requesting service.

Excluded from this warranty is damage that results from abuse, misuse, accidents, shipping, repairs, or modifications by anyone other than an authorized Snell Acoustics service representative. This warranty is void if the serial number has been removed or defaced. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Should service seem necessary, contact the Snell Acoustics installer/specialist from whom you purchased your A7 system. If that is not possible, call Snell Acoustics directly, at 607-352-2488 (U.S.), or write:

Snell Acoustics  
2 Chambers Street  
Binghamton, NY 13903  
info@snellacoustics.com

We will promptly advise you of what action to take.

# Snell

2 Chambers Street

Binghamton, NY 13903-2699

phone: 607-352-2488

fax: 607-352-2498

email: [info@snellacoustics.com](mailto:info@snellacoustics.com)

web: [www.snellacoustics.com](http://www.snellacoustics.com)

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