



# CAS 3.1 AND CAS 2.1

Owner's Guide



## TECHNOLOGY

CAS Series loudspeakers incorporate several innovative technologies that, when combined with many hours of subjective listening evaluations and our rigorous engineering standards, result in a loudspeaker that realistically and accurately reproduces the signal source with minimal distortion and coloration.

### **Ceramic Metal Matrix Diaphragms™ (C.M.M.D.)**

For decades, loudspeaker engineers have known that the ideal transducer should be stiff, yet light, and have high internal damping (damping is a material's ability to absorb energy). Infinity's C.M.M.D. transducer is a significant advance in transducer technology. Ceramic, a class of material new to loudspeakers, offers better performance than that of other materials. Ceramic is stiffer than metals and lighter than plastics and typical composite materials; it also offers improved damping. These ceramic-based transducers take us a giant step closer to the ever-elusive "ideal transducer."

In tweeters, C.M.M.D. technology offers stiffness and damping superior to that of traditional metals and soft-dome materials. In woofer and midrange applications, it offers accurate pistonic operation over the entire frequency range of the driver, completely eliminating coloration due to cone breakup and dramatically reducing distortion. And when ceramic-metal-matrix transducers are exposed to moisture, sunlight or extreme temperatures, their performance does not deteriorate.

In addition to ceramic diaphragms, all the transducers incorporate rigid cast-frames that, through our FEA computer modeling and scanning-laser-vibrometer measurements, have been optimized to reduce resonances. This ensures minimal distortion and incomparable performance.

### **The Baffle Isolation System™**

Designing a high-performance in-wall loudspeaker poses a unique problem...the wall itself. Drywall is not intended to be a loudspeaker enclosure. It is neither stiff nor rigid and tends to resonate, or vibrate, severely when typical in-wall speakers are used. Wall resonance is generally caused by two things. One is by sound emanating from the back of the loudspeaker bouncing around the inside of the wall cavity. Filling the wall with a suitable damping material, such as fiberglass, helps to minimize this problem. The second – and more difficult problem to solve – results from the energy transfer caused by the mechanical coupling of the loudspeaker to the wall. Infinity's Baffle Isolation System solves this problem by mechanically de-coupling the baffle from the wall. A compliant suspension system "floats" the baffle within the mounting frame and greatly reduces the energy transfer. Four of these assemblies – one at each corner of the baffle – form the isolation system. These assemblies reduce wall resonance in much the same way the suspension system of a car isolates the passenger cabin from road vibration.

### **Noryl® Baffle and Cast-Aluminum Woofers**

The baffle of most in-wall speakers is typically made of ABS plastic, which is prone to flexing. Yet another resonance for our engineers to tame! After exhaustive research, a two-pronged attack was chosen. First, the CAS baffles are constructed of Noryl, a high-stiffness thermoplastic resin. Noryl is 40% stiffer than typical ABS and has higher internal damping, resulting in a rigid, but acoustically "dead," baffle. Also, Noryl's resistance to extreme heat and moisture make it an ideal choice for architectural applications. Second, the cast-aluminum woofer frames have been designed to enhance the structural rigidity of the entire baffle. Structural ribs on the baffle integrate with mounting bosses used to attach the cast-aluminum frame, which further strengthens the entire assembly.

### **Listening Window Selector™**

There should be no question that the CAS loudspeakers are the most "room-friendly" in-wall loudspeakers available. However, speaker location and listener positions vary so much that even the CAS loudspeakers may need the occasional adjustment. Therefore, Infinity has developed a Listening Window Selector that allows the speaker to be fine-tuned for optimal performance and deliver smooth, accurate sound reproduction, regardless of where the speaker is installed or the listener is positioned.

### **Room-Friendly Acoustical Design**

One characteristic of forward-facing loudspeakers is that the sound output lessens as one moves away from the principal axis. This happens both horizontally and vertically and it means that radiated sounds that are reflected from the floor, ceiling and side walls will be lower in amplitude than direct, forward sound. This is usually a good thing. But, if the dispersion characteristics of the loudspeaker are different at various frequencies, the sound quality of the reflected sounds will be very different both from each other and from the first (i.e., direct) sound. The ears don't ignore these differences; they perceive them as coloration, or as sound quality that's been degraded. Intermezzo loudspeakers have been carefully designed to maintain a directional pattern that is similar at every important angle, on- and off-axis. The positive result is that both direct and reflected sounds arriving at the listeners' ears have similar timbral signatures.

### **Completing the Experience**

The technology and performance that make Infinity CAS loudspeakers ideal for music listening also make them the perfect digital multichannel loudspeaker system. To complete a home theater system, Infinity has designed, to the same standards as for the CAS, several powered subwoofers. Ask your Infinity dealer which model is best for your application.

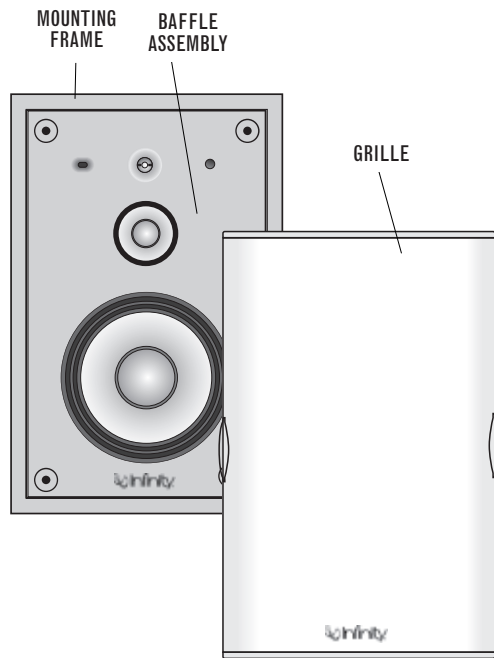
We hope you enjoyed this brief introduction to the technology of CAS loudspeakers. If you would like to further explore their technology and design, please ask your Infinity dealer for the C.M.M.D. and CAS White Papers. The White Papers can also be downloaded from Infinity's Web site at [www.infinitysystems.com](http://www.infinitysystems.com).

## Unpacking the Product

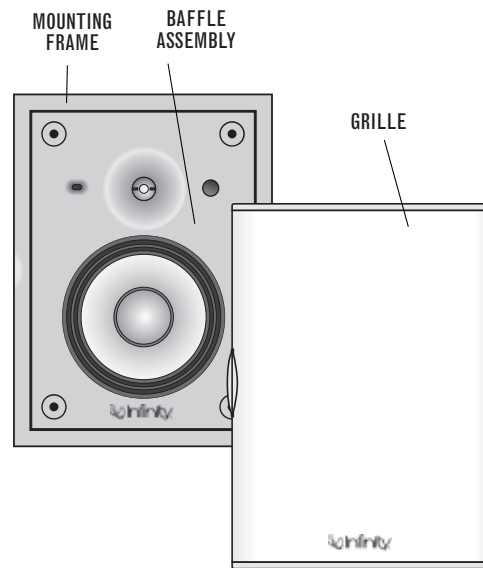
Finish unpacking the speakers and check the contents. If you suspect damage from transit, report it immediately to your dealer. Keep the shipping carton and packing materials for future use.

## Included

### CAS 3.1



### CAS 2.1



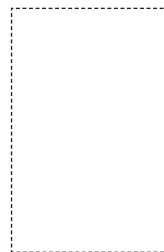
#### GRILLE INSERTS (4)



#### CARDBOARD SHIM



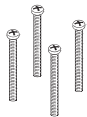
#### TEMPLATE



#### FIBERGLASS INSULATION



#### SCREWS (4)



#### INSERTS (4)



#### EXTRA LOGOS



## PLACEMENT

The Infinity CAS in-wall speakers are designed to offer excellent performance in any listening room or home theater system.

### 2-Channel or Front Left and Front Right in a Home Theater System

Ideally, the speakers should be placed at least three feet away from the side walls. In 2-channel applications, the two speakers should be equidistant from your primary listening position. We recommend that the angle formed between the speakers and the listening area be between 45° and 60°. For example, if the speakers are 8' apart, your listening position should be 8' to 12' from each speaker. See Figure 1.

When used as part of a home theater system, you may find that you achieve excellent performance with the left and right speakers spread apart even further.

### Surround Channels in a Home Theater System

When used as part of a Dolby® Pro Logic,® THX® or discrete 5.1-channel home theater system, the surround speakers should be placed at the sides of, and directed toward, the main listening area. See Figure 2. If there are several rows of seating, place the speakers, as described above, perpendicular to, or slightly behind, the last row of seating.

When used as part of a 7-channel music or home theater system, place the side speakers at the sides of and directed toward the main listening area. If there are several rows of seating, place the speakers, as described above, perpendicular to the middle row of seating. The rear speakers should be placed along the rear wall facing the front of the room. Each rear speaker should be about 1/3 of the way into the room, but never to the outside of the listening area. See Figure 3.

### Listening Window Selector™

We recognize that in-wall speakers are often installed in less than the ideal locations described above. The CAS in-wall speakers include a "Listening Window Selector" (Fig. 4) which allows the speaker to be fine-tuned for optimal performance regardless of where the speaker is installed or the listener is positioned. Choosing the correct position is simple.

If the speakers are installed and the listening position is usually as described above, then set the switch to "Normal."

Set the Listening Window to "Wide" if any of these situations occur:

- The speakers are installed with the tweeter positioned either well above or below ear level.
- The speakers are greater than 8' apart or are on different walls.
- There is no primary listening area or the listeners tend to be moving around such as during a party.

FIGURE 4

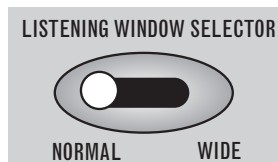


FIGURE 1

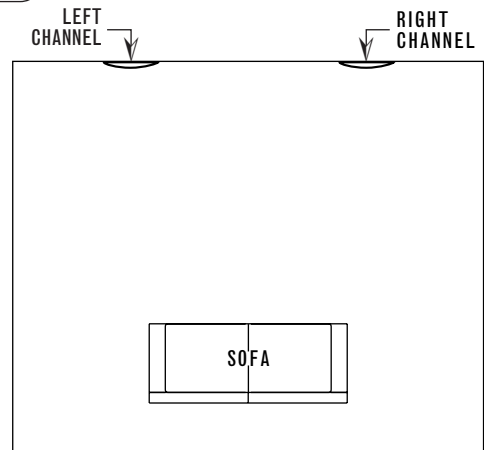


FIGURE 2

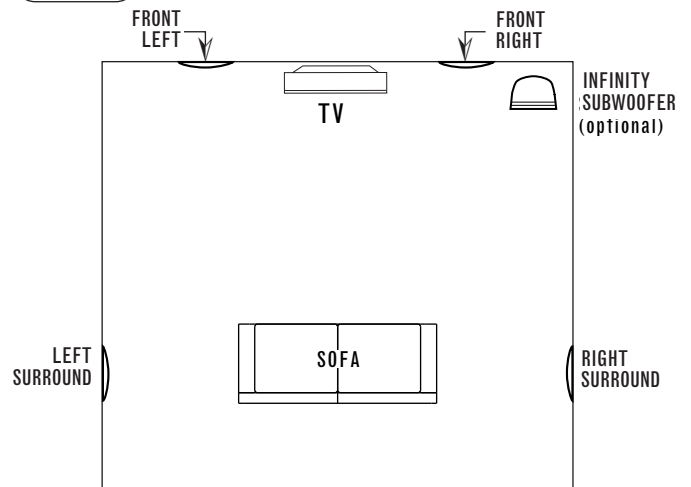
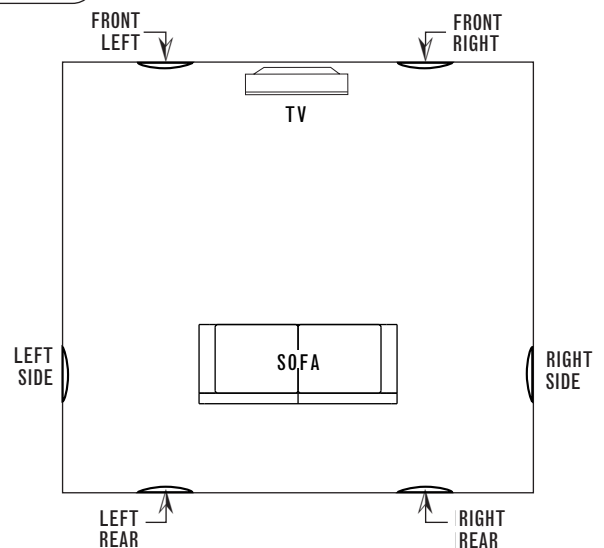


FIGURE 3



# INSTALLATION

The CAS Series of in-wall speakers were designed to be easily installed. However, if you are unsure of your ability to properly install these loudspeakers, please contact your dealer or a qualified installer.

## Tools Needed



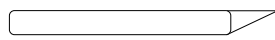
PENCIL



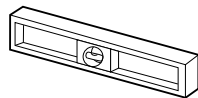
#2 PHILLIPS SCREWDRIVER



MEASURING TAPE



UTILITY KNIFE



CARPENTER'S LEVEL

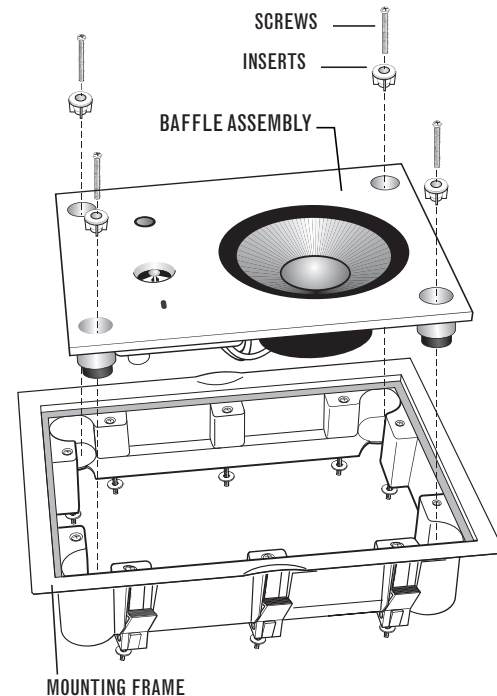
## Installation Instructions

### Step 1

After removing all parts from the box, locate the supplied template and use it to trace a pattern on the wall where you want to mount the speaker system. Take care to locate the system roughly centered between wall studs, allowing at least 1" between the cutout and wall studs. Cut the mounting hole, being careful not to cut into any electrical wiring or plumbing. Run the wiring from your system to the hole. NOTE: Be sure to comply with local wiring codes.

### Step 2

Note that the CAS 3.1 and CAS 2.1 speakers come with the baffle assembly attached to the mounting frame at its four corners to prevent damage during shipping. Unscrew the four screws as shown and carefully lift the baffle assembly out of the mounting frame.

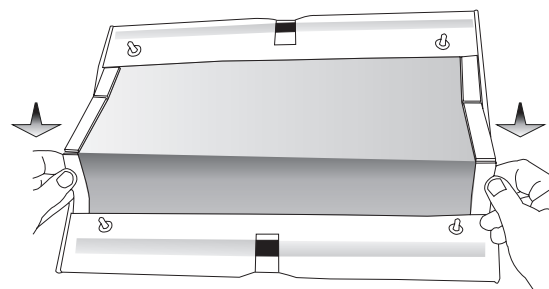


### IR Sensor

The CAS 3.1 and CAS 2.1 speakers are designed for IR connectivity. The IR lens cover is located on the front of the speaker assembly and a place for mounting the sensor (not included) is located behind this lens on the crossover network board. See your IR instructions for specific installation recommendations.

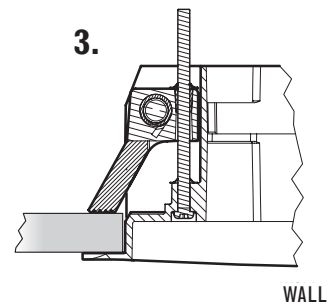
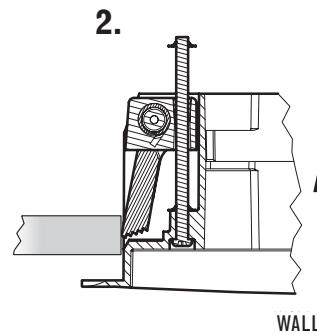
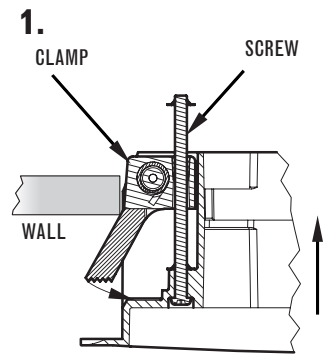
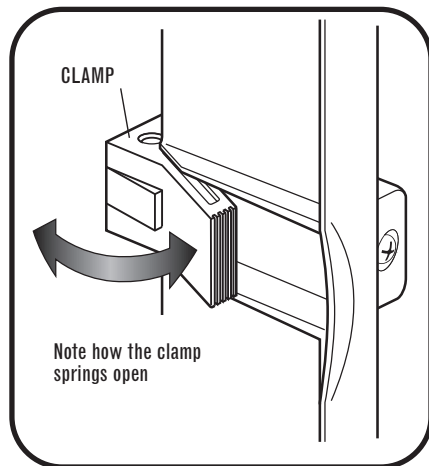
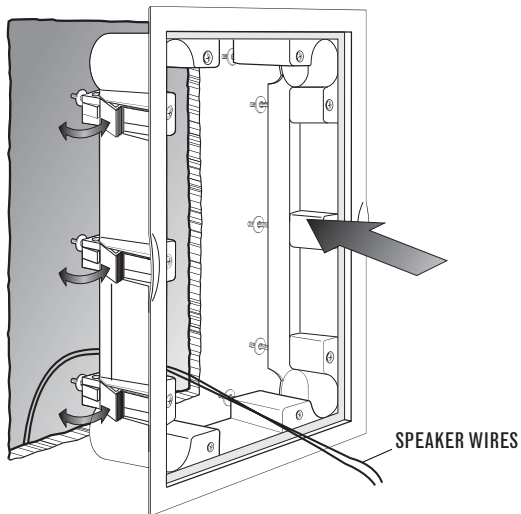
### Step 3 (optional)

If the grilles are going to be painted, it is necessary to remove the cloth behind the grille by lifting the edges of the cloth from the center and pulling it out. After painting the grille, replace the cloth. Also, remove the logo from the grille. Extra logos are provided to attach to the grille after the paint has dried.



## Step 4

The CAS mounting frame has a series of spring-loaded clamps around its perimeter. These are designed to fold shut as you push the mounting frame into the hole and spring open once inside, thus holding the mounting frame in the wall. Insert the mounting frame into the cutout, making sure that you run the speaker wire in through the rear opening. Starting from the lower right-hand corner and working in a counterclockwise fashion, hand-tighten each of the 12 clamp screws (ONLY until almost snug). If needed, adjust the mounting frame so it is level and centered in the cutout. Go around once more and hand-tighten each screw as needed. Before proceeding to Step 5, verify that each of the clamp screws is tight.

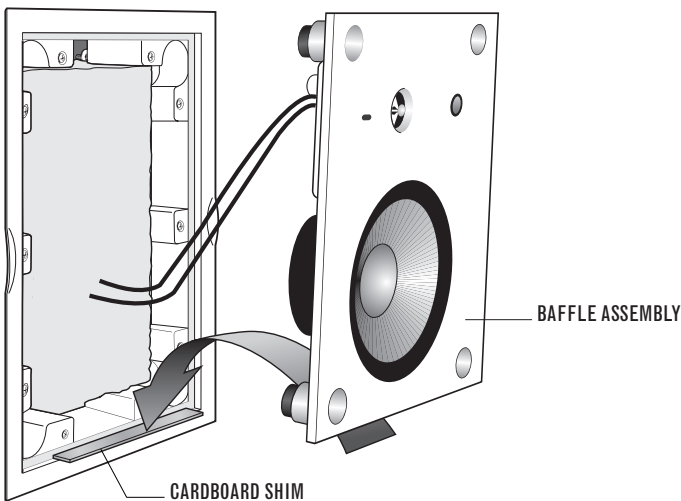
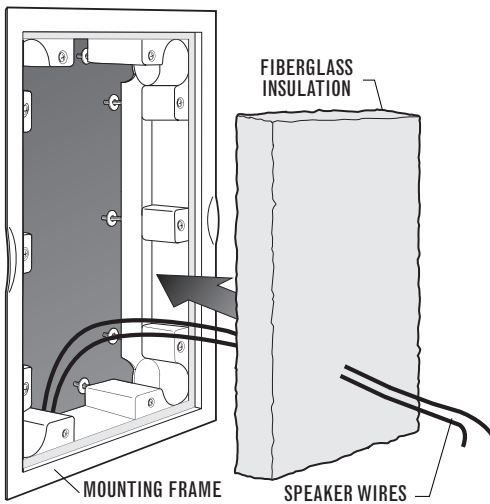
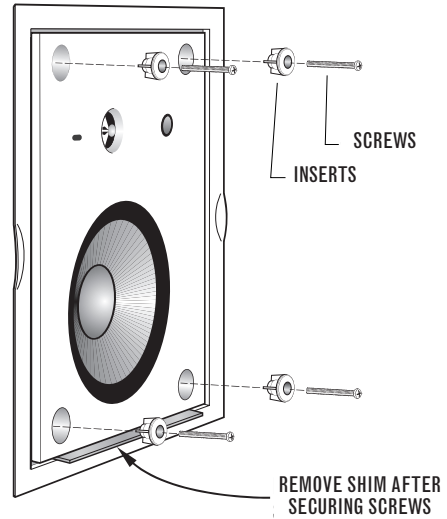


Note how the clamp will push closed while being inserted into the hole in the wall and spring open again once past the wall. Tightening the screw snugly will hold the mounting frame to the wall.

## Step 5

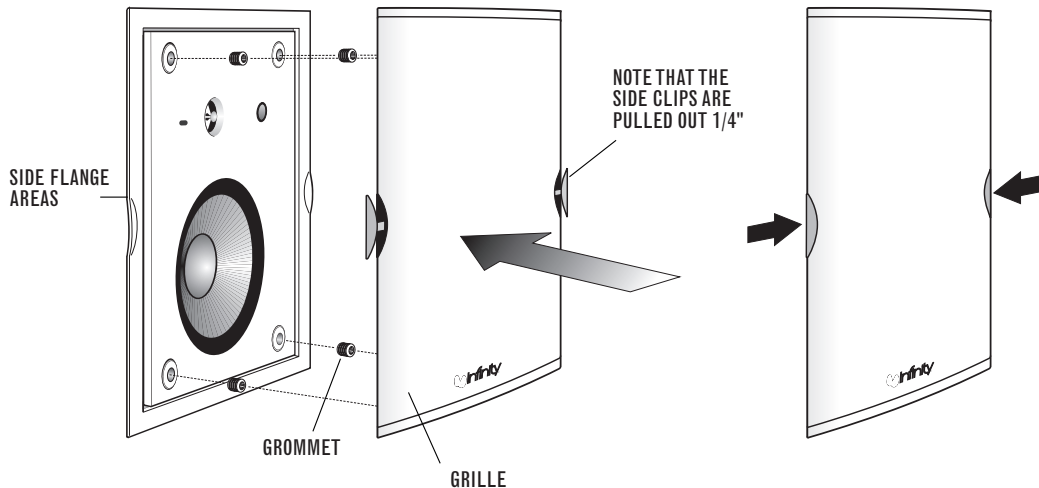
Place the supplied fiberglass insulation in the rear of the mounting frame. Place the cardboard shim on top of the lower front ledge of the frame, as shown. The cardboard shim is for aligning the baffle assembly properly within the speaker mounting frame. Lift the speaker baffle up and place it on the shim. Connect the speaker wires as shown on pages 9 and 10 and slide the baffle into place. Be sure that as you slide the speaker baffle assembly into place, the speaker wires are clear of the woofer basket and do not get pinched between the baffle and the mounting frame. Insert the four screws through the inserts into the holes and tighten by hand just until snug.

**WARNING:** If you overtighten these screws, it may cause the “isolators” to become overcompressed and they will no longer function correctly. Maximum tightening of these screws is no more than 16-inch-pounds. Remove baffle shim when complete.



## Step 6

Insert the four rubber grommets that retain the grille posts into the screw hole on the front, as shown. The grille has two side clips that look like wings. These extend about 1/4." See illustration. Note the side flange areas that catch the clips. Make sure these side clips are extended before attaching or removing the grille. Extend the side clips and attach the grille, reclipping it once in place. These side clips push inward to lock the grille onto the speaker.



## For Removal

### Step 1a

Pull out side clips on sides of the grille. Pull grille off.

### Step 2a

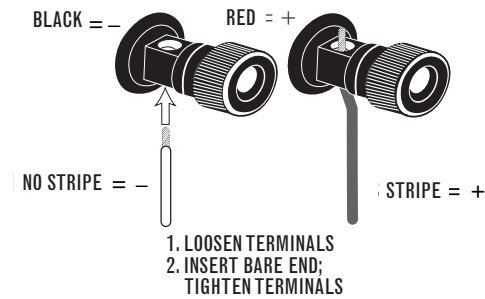
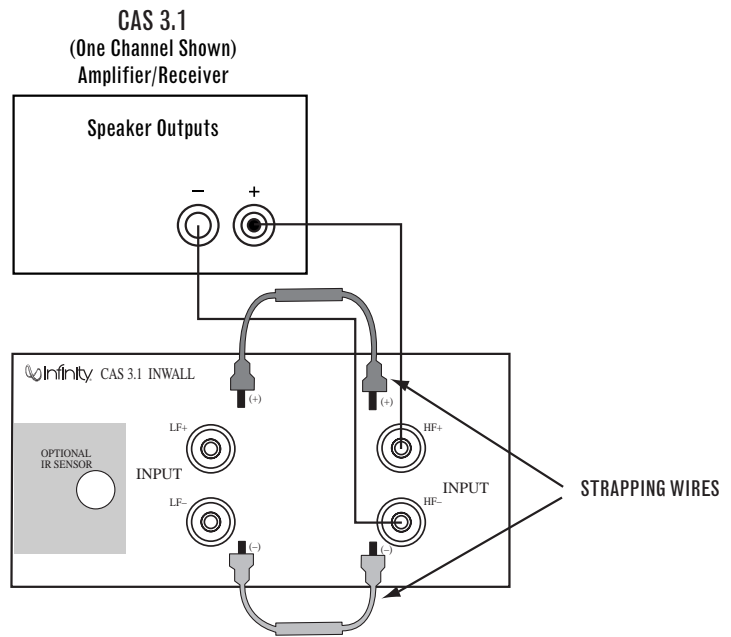
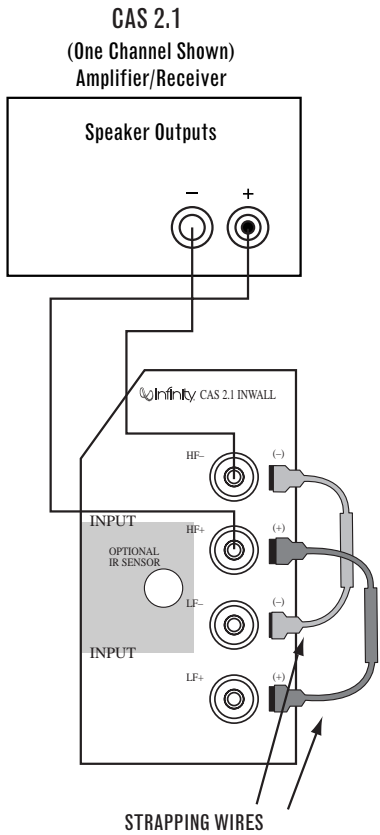
Remove the rubber grommets from the holes to access screws. It is best to use a #2 Phillips screwdriver to gently pry the grommet out. Unscrew the four baffle-retaining screws and carefully remove the speaker housing. Disconnect the speaker wires.

### Step 3a

Fully unscrew all of the clamps around the speaker housing. The clamp screws have a stop on them so you do not have to worry about accidental disassembly. Now move the speaker housing out from the wall enough to wedge your hand behind and pinch a clamp shut. While the clamp is shut, work the speaker housing forward enough to catch the shut clamp in the wall opening. Work your way around the perimeter, carefully doing this to each clamp and remove the speaker housing from the wall.



# STANDARD WIRING

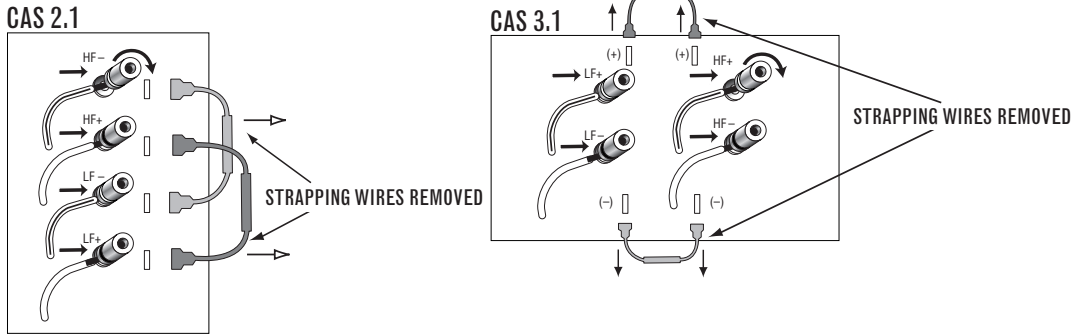


**IMPORTANT:** The high-frequency (HF) and low-frequency (LF) sections are joined by strapping wires. The strapping wires must remain in position for proper operation with standard wiring. See page 10 for bi-wiring instructions.

# BI-WIRING

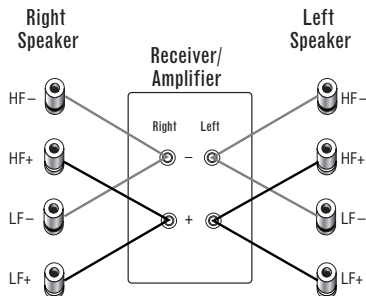
The CAS speaker's connection panel and internal dividing network are designed so that separate sets of speaker cables can be attached to the low-frequency transducer and midrange/high-frequency transducer portions of this dividing network. This is called bi-wiring. Bi-wiring can provide several sonic advantages and considerably more flexibility in power amplifier selection.

1. Remove strapping wires.
2. Insert the speaker wire for the high frequencies into the (HF+) and (HF-) terminals and tighten.
3. Insert the speaker wire for the low frequencies into the (LF+) and (LF-) set of terminals and tighten.

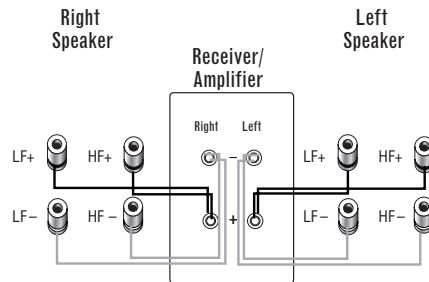


## Single-Stereo Amplifier

### CAS 2.1



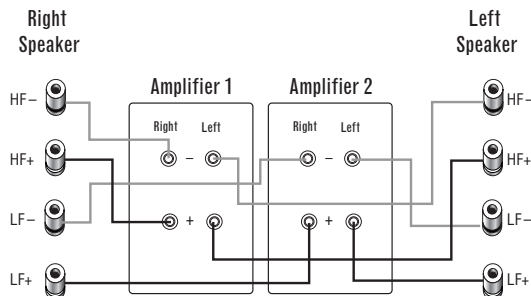
### CAS 3.1



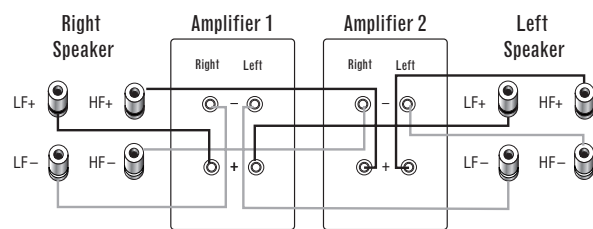
## Dual-Stereo Amplifier

One amplifier drives the low-frequency sections of both speakers. A second amplifier drives the mid/high-frequency sections of both speakers.

### CAS 2.1



### CAS 3.1



# INSTALLER INFORMATION

## Enclosures

The internal volume of an enclosure is directly related to the amount of low-frequency extension and output that can be accurately reproduced by a loudspeaker. The CAS in-wall loudspeakers were designed to use the typical wall cavity dimensions of 8' x 14-1/2" x 3-1/2" for maximum low-frequency extension. However, due to varying construction standards, materials and applications, it is sometimes beneficial to create a dedicated enclosure for the speakers. The charts below show the internal volumes of sample enclosures and the resulting -3dB points for each model.

CAS 3.1		CAS 2.1	
Internal Volume	-3dB Frequency	Internal Volume	-3dB Frequency
2.7 cu. ft.	32Hz	2.7 cu. ft.	40Hz
1.35 cu. ft.	38Hz	1.35 cu. ft.	45Hz

It is important that the enclosures be well-constructed; MDF is recommended. The enclosure should be securely mounted to the adjacent wall studs. In addition, the enclosure should be filled with fiberglass insulation so that the enclosure is full, but the insulation is not compressed.

## Thiele/Small Parameters

		CAS 3.1	CAS 2.1
Total Q	$Q_{TS}$	0.71	0.72
Compliance Volume	$V_{AS}$	72.3 liters	43.1 liters
Free-Air Resonance	$F_s$	34.8Hz	40Hz
Mechanical Q	$Q_{MS}$	11.46	11.27
Electrical Q	$Q_{ES}$	0.76	0.77
Voice-Coil DC Resistance	$R_e$	4.06 ohms	4.05 ohms
Moving Mass, Air Load	$M_{MS}$	34.79 grams	23.10 grams
Suspension Compliance	$C_{MD}$	601um/N	671um/N
Motor Force Factor	$BL$	6.39 Tesla-M	5.56 Tesla-M
Driver Radiating Area	$S_d$	0.0293m <sup>2</sup>	0.0214m <sup>2</sup>

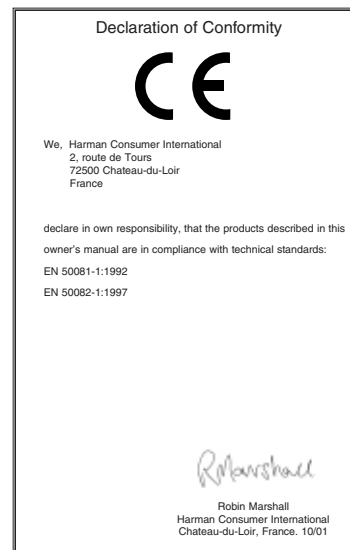
# SPECIFICATIONS

	<b>CAS 3.1</b>	<b>CAS 2.1</b>
<b>Woofer:</b>	9" C.M.M.D.	7-1/2" C.M.M.D.
<b>Midrange:</b>	3-1/2" C.M.M.D.	—
<b>Tweeter:</b>	1" C.M.M.D.	1" C.M.M.D.
<b>System Frequency Response:</b> (±3dB)	32Hz*– 22,000Hz	40Hz*– 22,000Hz
<b>Sensitivity:</b> (2.83V @ 1 meter)	90dB	90dB
<b>Recommended Amplifier Power Range:</b>	15 – 200 Watts	15 – 150 Watts
<b>Nominal Impedance:</b>	8 Ohms	8 Ohms
<b>Crossover Frequency:</b>	400Hz, 2,800Hz; 24dB/octave	2,800Hz; 24dB/octave
<b>Dimensions:</b>		
Outer (including grille) (H x W x D)	22-1/8" x 14-7/8" x 3-1/2"*** (562mm x 378mm x 89mm)	17-7/8" x 13" x 3-1/2"*** (454mm x 330mm x 89mm)
Wall Cutout (H x W)	19-1/8" x 12-1/2" (486mm x 318mm)	14-7/8" x 10-1/2" (378mm x 267mm)
<b>Weight:</b> (including frame, speaker and grille)	15 lb (6.8kg)	11 lb (5kg)

\*Depending upon enclosure volume. See page 11 for detailed information.

\*\*Depth excludes grille.

Infinity continually strives to update and improve existing products, as well as create new ones. The specifications and construction details in this and related Infinity publications are therefore subject to change without notice.



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