



May 13, 2003 AM267565_00_V.pdf Bose Corporation

Important words of caution

⚠ WARNING: Installation shall be in accordance with the applicable section of the National Electrical Code, ANSI/NFPA 70, and/or the National Fire Alarm Code, ANSI/NFPA 72, as applicable. The wiring method and compartment shall be such as not to interfere with the operation of the speaker.

⚠ CAUTION: Consult local building codes before you get started with this installation.

Please read this owner's guide completely before you start. Then carefully consider your experience with using the tools and taking the precautions referred to here.

⚠ CAUTION: Failure to follow the instructions in this owner's guide voids all warranties on your speakers.

If you have doubts about doing this installation, you should contact either the dealer you purchased the product from, an electrician, or a professional audio/video installer. You can describe the job and request a cost estimate before committing to installation service.

✓ Small check marks call your attention to the tools you'll need for the next step.

Tips offer ideas to make the job go easier and help you avoid mistakes.

Use these instructions with wood frame or similar construction only

Each speaker requires 8 1/16 inches (20.5 cm) of horizontal space, and 14 inches (35.6 cm) of vertical space inside the wall or ceiling, plus a minimum of 4 1/8 inches (10.5 cm) of depth from the face of wallboard that is a maximum of 1 inch (2.5 cm) thick.

Bose recommends installing these speakers only in wood frame or similar construction where there is enough space between studs, as is found in 2 x 4 or 2 x 6 wall/ceiling construction. The instructions in this guide are specific to that type of installation only.

🎵 Note: These speakers are not designed for installation in masonry walls or ceilings.



DECLARATION OF CONFORMITY

We, the offerer:

Bose Corporation, The Mountain, Framingham, MA 01701-9168 USA

acknowledge our sole responsibility, that the product:

Kind of equipment: Loudspeaker

Type designation: Virtually Invisible® 191 loudspeaker

in accordance with EMC Directive 89/336/EEC and Article 10(1) of the Directive, is in compliance with the following norm(s) or document(s):

Technical regulations: EN 50081-1, EN 50082-1

Accredited by:

Bose Corporation, The Mountain, Framingham, MA 01701-9168 USA

20 February 2003

Nic Merks

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Vice President, Europe
Manufacturer's authorized
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For your records

Serial numbers are located on the left side, near the top of each of the Virtually Invisible® 191 speakers.

Serial numbers: _____ and _____

Dealer name: _____

Dealer phone: _____ Purchase date: _____

We suggest you keep your sales receipt and warranty card together with this owner's guide.

Before you begin...

Please be sure to read this guide carefully before you do any cutting. There are many factors to consider when choosing a location for your speakers.

Thank you for choosing to install Bose® Virtually Invisible® 191 speakers in your room. Innovative engineering and advanced design enable these speakers to deliver Bose quality performance for big impact in spite of their small size.

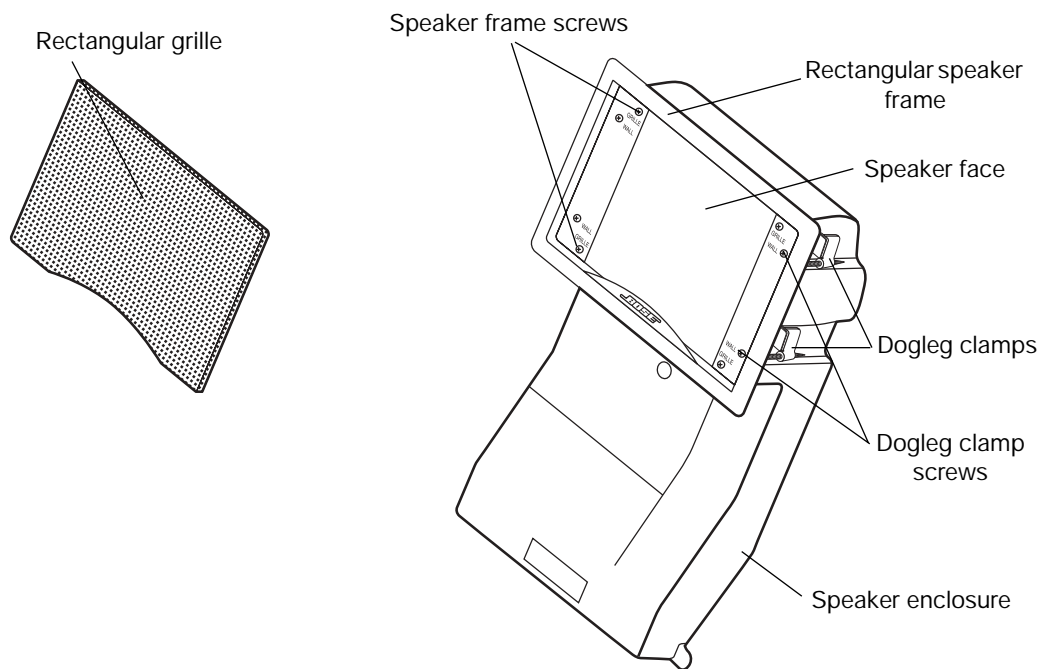
Virtually Invisible® 191 speakers feature an Articulated Array® speaker configuration that delivers the type of clear, lifelike sound and even coverage known as Bose Stereo Everywhere® speaker performance.

What makes this speaker better also makes it different

When installed, Virtually Invisible® 191 speakers take up very little wall space. What isn't apparent is their advanced enclosure design, shown in Figure 1. It ensures predictably fine performance wherever the speakers are installed, regardless of the size and shape of the wall space. It also helps prevent the speaker sound from invading other rooms, a common problem with installed speakers of more conventional design.

Figure 1

Size and shape of the speaker enclosure, as shipped with the rectangular frame attached



Unpacking

Carefully unpack the speakers. Save all packing materials, which provide the safest means to transport your speakers as needed. If any part of the speaker pair appears damaged, do not use the pair. Notify Bose or your authorized Bose® dealer immediately. For Bose contact information, refer to the address list included in the carton.

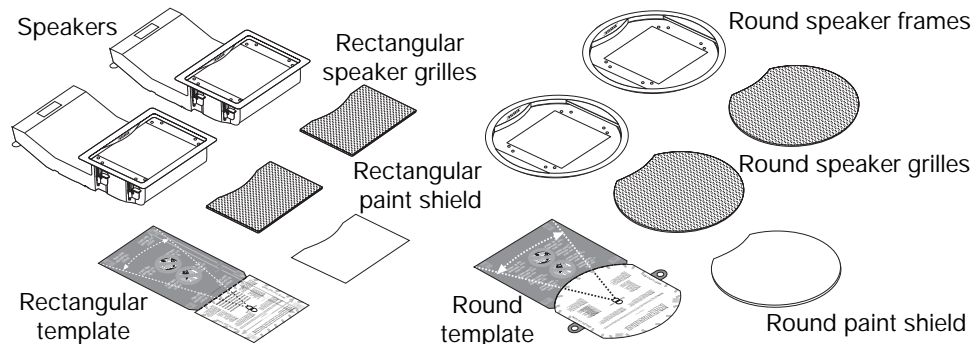
Check to be sure the carton includes all the parts shown in Figure 2.

🎵 **Note:** Now is a good time to find the serial numbers on the side of each speaker. Copy those numbers onto your warranty card and in the "For your records" space on page 3.

Figure 2

Contents of the carton:

- 2 Speakers, rectangular frames attached
- 2 Rectangular speaker grilles
- 1 Rectangular paint shield
- 1 Rectangular template
- 2 Round speaker frames
- 2 Round speaker grilles
- 1 Round paint shield
- 1 Round template

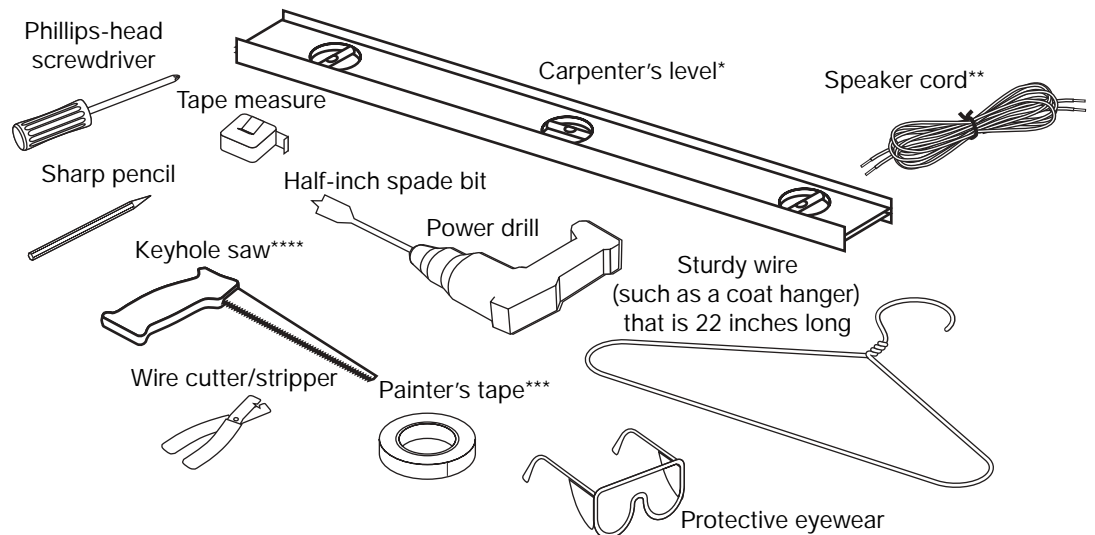


Other equipment you'll need

Hardware for securing the speaker to a wall or ceiling comes attached to the speaker. But you will need a variety of other equipment, including tools, to prepare the surface for installing the speakers (Figure 3).

Figure 3

Items required to install the speakers as instructed



*Carpenter's level is suggested for use when installing speakers in a wall.

**Speaker cord specifications are provided in "Using speaker cord," beginning on page 11.

***Painter's tape or other tape with light adhesive that will not damage paint or wallpaper.

****Cutting tool – For drywall: a keyhole saw, drywall saw, rotary cutting tool, or jigsaw
For plaster and lath: a saber saw or a rotary cutting tool

Wear clothing appropriate for the job, and consider using a drop cloth or other material to protect the area from debris. How and where you install the speakers will determine your need for optional equipment.

Optional items:

- A wire snake for running speaker cord behind wallboard
- A sturdy stool or ladder for installing speakers above your head
- Gloves and protection for your mouth, nose, and eyes for working with insulation

Consider which shape you prefer for your speakers

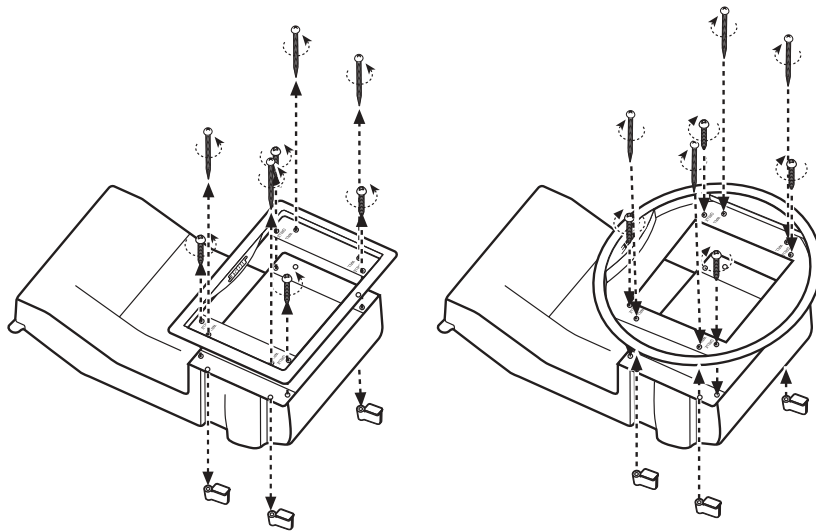
The design of your new Virtually Invisible® 191 speakers makes them well-suited to either wall or ceiling installation. You also have a choice of a rectangular or round speaker face – the part that is visible when the speaker is installed. Consider which shape will work best in the location you choose for the speakers.

If you prefer the round shape, it is easy to remove the rectangular frames and replace them with the round frames provided in the carton. You can do it now or wait until you know for sure where each speaker will fit. However, be sure to make that change before you insert either speaker into the wall or ceiling.

♪ **Note:** *The lip of the speaker frame prevents the speaker from slipping behind the wall and out of reach. Do not remove the frame while the speaker is in the wall.*

Figure 4

Replacing the rectangular speaker frame with the round frame



If you choose the round frames, use the round template provided in the carton. A round paint shield is also supplied, in case you decide to paint the speaker.

Considering your wall type and the approach it requires

For working in a pre-wired room of finished construction with 2 x 4 stud walls covered with wallboard, refer to “Steps to Installing,” beginning on page 15. These instructions cover installation of the speakers, with either a rectangular or round grille, in a wall or ceiling.

If your installation is different, use the information below as it applies.

Accessories that can help

For installation in a drop ceiling (where tile is installed below the ceiling joists), Bose offers an optional Drop Ceiling Kit (Product Code #031355) for two speakers. It protects the tile from bearing the weight of the speakers. Instructions are included with the kit.

For installation in new construction, Bose offers a Rough-in Kit (Product Code #031353) for two speakers. It is designed for use after the studs are in place and before the wallboard is added to reserve a place for the speakers and indicate where the wallboard hole should be made. It also protects the wallboard by providing additional support for the dogleg clamps that secure the speaker to the wall. Instructions are included with the kit.

For more information or to order an accessory, contact your Bose® dealer. Or, to contact Bose directly, refer to the address list included in the carton.

Use special care in cutting through plaster and lath

For wall construction of plaster and lath, use special care to prevent plaster from cracking:

- After you have drawn an outline of the hole to cut, tape around the outline and use a sharp blade to make shallow cuts where the hole will be.
- Then, within the outline only, chip the plaster away until you expose the lath underneath.
- Finally, cut through the lath very carefully. Using an electric sabre saw can be quick but risky. We recommend using a hand saw and proceeding cautiously to avoid damaging the surrounding plaster.

Installing in a pre-wired room

An installation is simplest when the room has been pre-wired during construction. In that case, the builder will have left speaker cord within easy reach of the intended speaker positions.

How to determine pre-wiring

If you are not sure that you have a pre-wired room, or do not know where the wiring is located, check the architectural drawings of your room or call the builder.

⚠ CAUTION: *It is important to know where the pre-wired cord is to prevent damaging it while drilling or cutting into the wall.*

In the ideal situation, after cutting the speaker hole you can simply reach inside to locate the length of cord the builder has installed.

What to do when the room is not pre-wired

In this case, you will need to run speaker cord from the receiver or amplifier through the wall to the area you have chosen for installing the speakers.


If you have not done this before, be sure you understand the steps involved before you get underway. Having a friend who can help with this step is advisable, too.

Information on running speaker cord in new construction is provided in "Before the wallboard goes up," beginning on page 13.

For running speaker cord inside finished walls, refer to "Where the walls are finished," beginning on page 13.

Installing in an exterior wall

If you choose to install these speakers in an exterior wall (abutting the outside of your house), you will undoubtedly encounter insulation behind the wallboard. This can complicate the installation, requiring you to trim and push malleable insulation out of the way. You will need to wear eye protection and gloves for working with fiberglass insulation.

 **WARNING:** *If you believe the insulation inside a wall may be composed of asbestos, **do not cut into the wall.** Choose a different location for the speakers instead.*

Insulation will also impede your use of a pilot hole to test the size of the space behind the wallboard. Doing such a test is recommended to make sure the space is large enough before cutting a speaker-sized hole.

Special considerations in cold climate regions

With exterior wall installations in regions where outdoor temperatures dip below freezing for days at a time, using a humidifier can cause condensation to form inside the speakers. This can be more of a problem if the speakers are mounted upside down.

If you must mount in an exterior wall:

- Avoid installing the speakers upside down.
- Leave some of the insulation between the speakers and the exterior wall.
- Refrain from setting the humidifier on high, especially when outside temperatures are below freezing.

Deciding on speaker placement

How and where you use the speakers will also affect your procedure for installing them. Consider the options below, then follow the instructions that apply to your choices:

- How you will use the speakers?
 - for stereo sound at the front of a room or seating arrangement, or
 - as home theater front speakers, or
 - as surround sound speakers at the rear of your viewing area
- What surface you will install in?
 - a wall or ceiling
 - if a wall, will it be an interior (abutting another room) or exterior (abutting the outside surface) wall
 - in finished or new construction
 - if finished, is it plaster and lath or wallboard construction

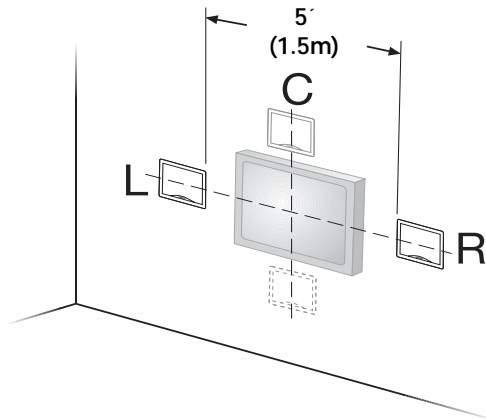
Select the general wall area for one speaker

As you decide where you want each speaker grille, use the guidelines below:

- ⚠ **CAUTION:** Do not install near any heat sources, such as halogen lamps, registers, stoves, or other apparatus (including amplifiers) that produce heat.
- The two speakers should be a minimum of 5 feet (1.5 m) apart.
- For in-wall speakers providing stereo at the front of the room or home theater surround sound from the rear, install them so each speaker grille is 4 to 6 feet (1.2 to 1.8 m) from the floor for best performance.
- Neither speaker should be installed sideways in a wall; the enclosure should be either above or below the speaker face.
- For in-wall home theater front speakers, install the pair horizontally aligned with the center of the video screen (Figure 5).

Figure 5

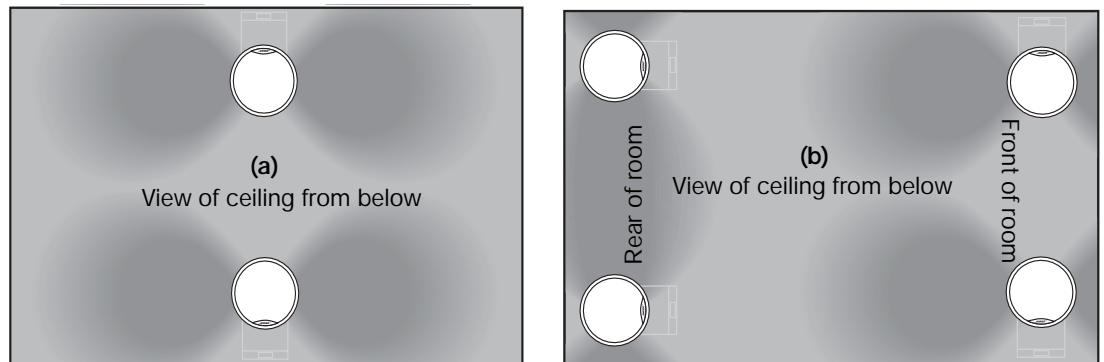
Orienting wall speakers for front home theater use



- For ceiling installation, pay attention to the direction of the speaker enclosure for best performance for stereo (Figure 6a) or for home theater (Figure 6b).

Figure 6

Orienting ceiling speakers for the best coverage (a) for stereo or (b) for home theater front and surround



- Height guidelines for in-wall speakers do not apply to ceiling installations.

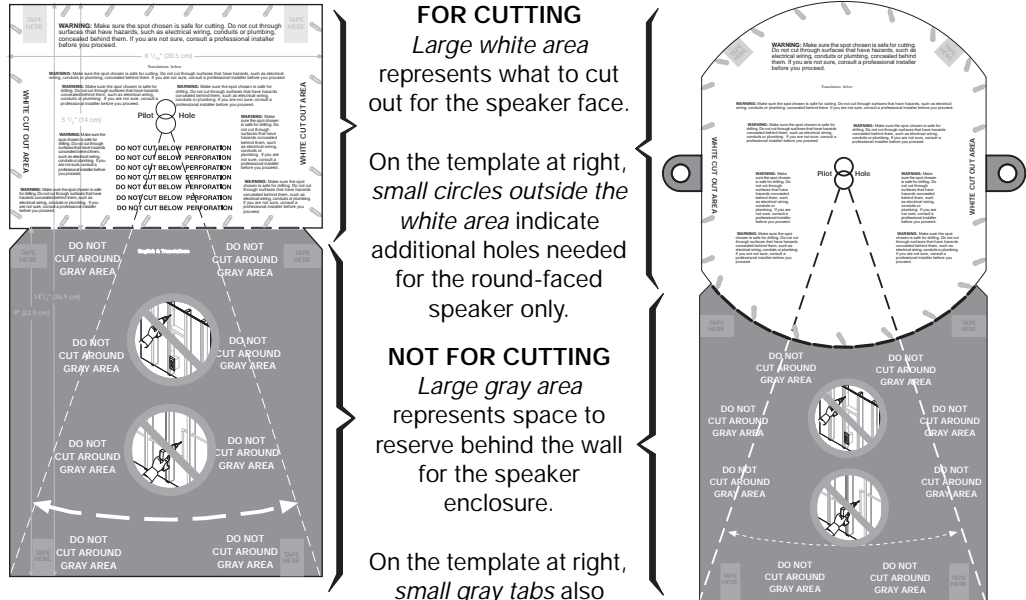
- Each speaker enclosure extends *into the wall or ceiling*, as shown in the gray DO NOT CUT area on the template (Figure 7), and below the grille. The speaker enclosure can be inserted either up or down.

🎵 **Note:** *In cold climates where a humidifier is used, avoid inserting the speaker upside-down in an exterior wall to prevent problems with condensation.*

Allowing enough room both above and below the hole you draw provides a fallback in case the area below your pilot hole is not suitable for the speaker enclosure.

Figure 7

Template for either rectangular-faced (left) or round-faced (right) speakers

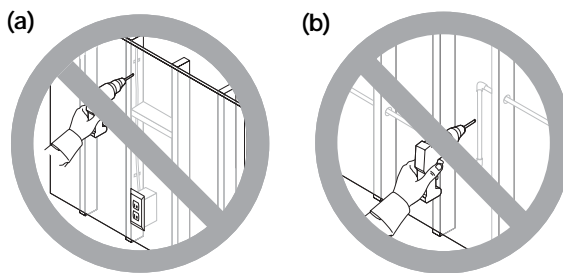


⚠️ **CAUTION:** *When installed, the speaker enclosure cannot be seen behind the wall or ceiling. Do not attempt to nail, cut, or drill on that surface area. Puncturing the speaker enclosure with a tool will seriously damage the speaker.*

- All electrical wiring, vents, and plumbing pipes located inside the walls must be avoided (Figure 8). Check with a trained professional if you need instructions on how to locate and avoid them.

Figure 8

Cautions against unseen danger, such as (a) electrical wires or (b) plumbing pipes, behind the wallboard



- Use of a stud finder can help ensure that the speaker hole is at least $4\frac{3}{4}$ " (12 cm) from a stud or joist.
- The selected location should be at the height you want for both speakers and where you can maintain the minimum distance of 5 feet (1.5 m) between them.

Keeping in mind the guidelines given:

1. Decide where the first speaker will go.
2. Select the location for the second speaker.
3. Use the provided template for drawing both a pilot hole and the speaker-face outline.

Using speaker cord

Before you cut any cord, estimate how much will be needed for each speaker.

To do so, measure the distance from the receiver/amplifier to where each speaker will be installed. Make some allowance if the cord must go around corners or through walls, and leave at least 14 inches (36 cm) of cord to pull from the wall for making the connections easily.

♪ **Note:** *If you are installing ceiling speakers, allowing extra cord will give you the freedom to stand on the floor while making the connections.*

Be sure to use the proper gauge (thickness) of speaker cord, determined by the length of each piece.

Wire recommendations

Based on a maximum frequency response deviation of ± 0.5 dB

Gauge	Maximum Length
18 AWG (0.82 mm ²)	20 ft (6 m)
16 AWG (1.3 mm ²)	30 ft (9 m)
14 AWG (2.1 mm ²)	50 ft (15 m)

⚠ **CAUTION:** *Before running speaker cord through a wall or under a floor, check your local building code requirements and safety regulations. If necessary, contact an A/V installer or electrician for this information.*

Prepare the cord

✓ You will need a **wire cutter and wire stripper** for this work.

Speaker cord consists of two insulated wires. The insulation around one wire is marked (striped, collared, or ribbed) to identify it as positive. The other wire is negative. It is important to connect each wire to the proper terminal, positive to positive (+) and negative to negative (-).

♪ **Note:** *It is sometimes difficult to distinguish wire markings. Inspect both wires carefully.*

At the ends of each cord:

- Strip approximately $\frac{1}{2}$ inch (13 mm) of insulation from both wires.
- Twist the bare end of each wire so loose strands will not touch across terminals.

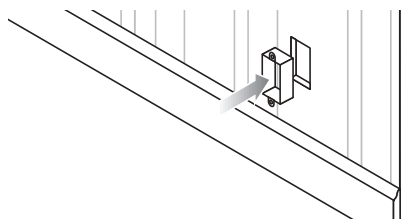
Planning to run speaker cord

The techniques for running cord differ according to the condition of the walls you are working with: new, unfinished construction or finished construction with the walls completed.

In either construction type, you need to mount an open-backed junction box in the wall near the receiver or amplifier for cord coming out of the wall (Figure 9).

Figure 9

An open-backed junction box that allows for cord coming through the wall near the receiver or amplifier



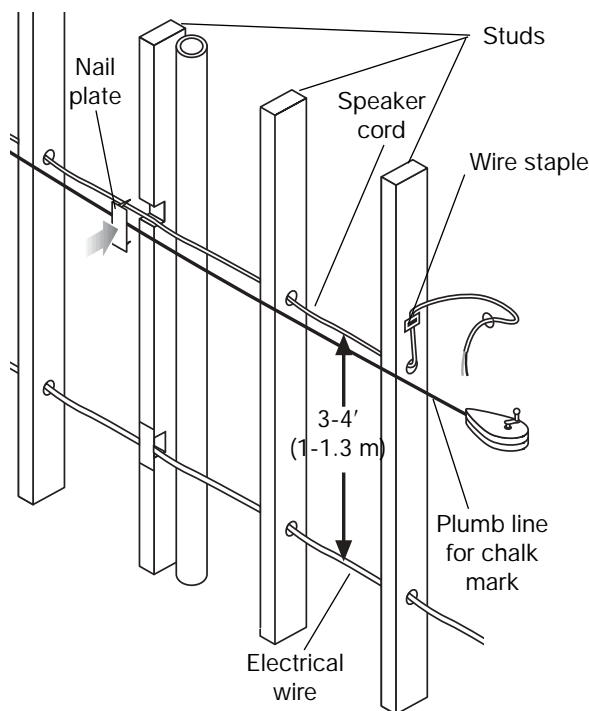
You also need to observe safe and practical standards:

WARNING: Make sure the spot chosen is safe for drilling. Do not drill through surfaces that may have hazards, such as electrical wiring, conduits, or plumbing concealed behind them. Follow all other safety precautions.

- Consult local building codes to inform yourself of the requirements in your area.
- Use a drill bit large enough for the cord you will pull through the holes.
- Use an auger bit, if possible, to make the work of drilling multiple holes less tiring.
- Do not drill through a load-bearing beam. Consult the building contractor if this is an issue.
- Keep the cord 3 to 4 feet (1 to 1.3 m) away from electrical cord, which can create a hum or buzz in the speakers (Figure 10).
- To avoid nails, drill holes in the center of each stud or joist.
- Use a nail plate to protect the cord if your only option is to notch a stud or joist.

Figure 10

Techniques to use for running speaker cord through studs or joists



- Line up holes as perfectly as possible to make pulling the cord through easier.
- Keep the cord taut enough so there are no sags.
- Do not pull the cord tight enough to create tension.

Before the wallboard goes up

There are some standard guidelines for working in unfinished construction.

- Begin this work after the studs and joists are in and the electrical wiring is completed.
- Snap a chalk line across the face of the studs or the bottom of the joists and move backward as you drill, so you can keep the last hole drilled in your line of sight.
- Never run speaker cord and electrical cable through the same hole or into the same junction box.
- If a short section of the cord must run parallel to nearby electrical cable, keeping that run to the absolute minimum will result in less interference.
- Use metal conduit or shielded speaker cord if the cord must run next to electrical cable for 10 feet (3 m) or more.
- Use cable clamps or large wire staples to fasten the cord to a joist or stud wherever the cord runs more than 4½ feet (1.4 m) from a hole.
- Use protective guardstrips, raceways, or conduits to protect the cord from being stepped on or compressed in an attic or crawl space.

Where the walls are finished

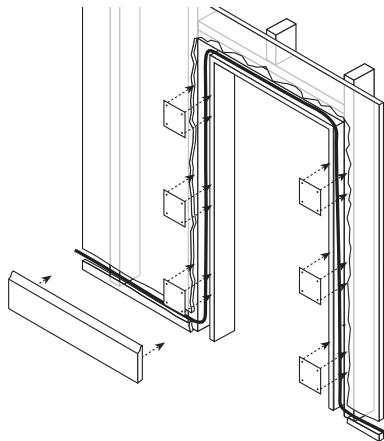
Here are some suggestions for how to make this job easier.

Look for ways to conceal cord outside the walls:

- Along or behind baseboards
- Under carpets (using special flat speaker cord for under-the-rug speaker runs)
- Under doorjams (Figure 11).

Figure 11

Running cord behind baseboards and a doorjam



Find the easiest path for cord that must run behind the wallboard:

- Choose interior walls, which are less likely to have insulation packed behind the wallboard.
- Use an attic or basement run where possible, so you have easy access and can see where plumbing, electrical wires, and other impediments occur.
- In slab construction, consider using plenum-rated wire run through heating or air conditioning vents.

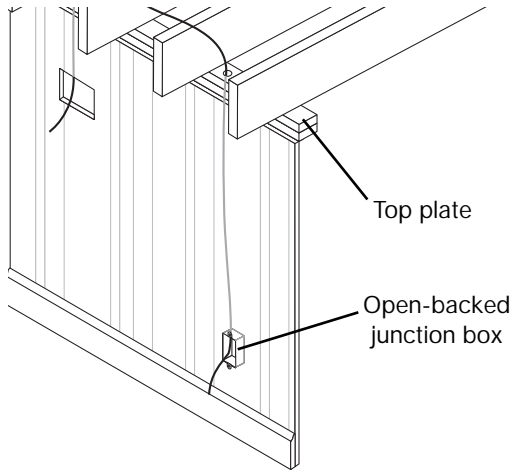
Getting started

Choose a path for the cord that avoids impediments to drill through. Use a stud finder to identify inaccessible studs.

It is common to run cord from the speaker location in a wall or ceiling to the attic and through the wooden top plate that runs horizontally across the top of the vertical studs. From the attic, you can then run the cord to the spot above the junction box near the receiver or amplifier. Drill through the top plate at that point and route the cord through the hole and down into the wall (Figure 12).

Figure 12

Running the cord up through the attic

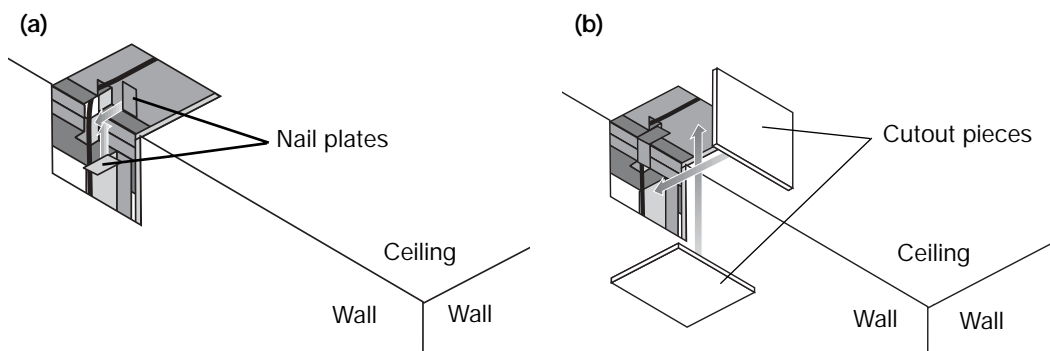


If you must route cord around a corner, you will need to cut out a rectangular piece of wall-board on either side of the joist at that corner. Use each regular-shaped cutout as the patch for the wall when you finish. By reaching through the cutout, you can notch the joist to make room for the cord and use nail plates to cover the cord in each notch (Figure 13a).

To patch the wall, reposition the cutout pieces (Figure 13b) and use joint tape and joint compound to hold them in place. When they are dry, sand and paint the area to match surrounding surfaces.

Figure 13

Running cord around a corner with nail plates for protection (a) and cutout pieces as patches (b)



Before you make any holes

Be sure you have read and understand the considerations provided in "Preparation" starting on page 5, so you can proceed with confidence.

Installation is basically the same, whether you are using these speakers with a rectangular grille or round grille and installing in a wall or ceiling. There are a few exceptions.

Wherever special instructions apply to **ceiling or round-faced speaker** installation, those instructions will appear in a gray box, like this.

⚠ CAUTION: *If you are unsure of your ability to complete this process, contact a professional installer.*

Allow 30 to 60 minutes to complete the steps that follow.

Drill a pilot hole for testing the wall space

Before you make a sizeable cut into the wallboard, check the space by probing behind the wall or ceiling through a small pilot hole. Time spent now can help ensure a successful installation.

🎵 Note: *If you are working in an exterior wall where there is insulation, it may be difficult to probe behind a pilot hole. You may prefer to eliminate this step and skip ahead to "Prepare the wall for inserting the speaker" starting on page 21. Do this only if you can be sure the insulation is malleable and that nothing else behind the wall will impede the installation.*

⚠ WARNING: *If you believe the insulation behind the wall may be composed of asbestos, **do not drill or cut into that wall.** Find a different location for the speakers instead.*

Using the template for this first step

✓ You will need a **sharp pencil** for this step.

The template is designed to show where to drill two half-inch (13 mm) pilot holes first, before you make an opening large enough for the entire speaker. This allows you to probe behind the wall to make sure your chosen location is spacious enough and there are no unseen materials blocking the installation.

Notice the dotted lines extending at an angle from the pilot hole to the bottom corners of the DO NOT CUT area on the template. Use them as a guideline for testing the area below the pilot hole to make sure it is spacious enough behind the hole for the length and width of the speaker enclosure.

To position the template

1. Select a spot on the wall or ceiling where you want the center of the speaker grille.

For **ceiling installations**, carefully consider how the position of the speaker enclosure behind the wallboard affects the orientation of the Bose® logo on the speaker face. To maintain a consistent logo orientation, you can remove and rotate the speaker frame as needed before inserting the speaker into the ceiling hole. See Figure 21 on page 20.

Tip: *Remember to allow enough space for the speaker enclosure both above and below the pilot hole. You may need that second option if you find an impediment in the space below the hole. This does not apply to exterior walls in cold climate regions, where upside-down speaker installation is not recommended.*

Steps to Installing

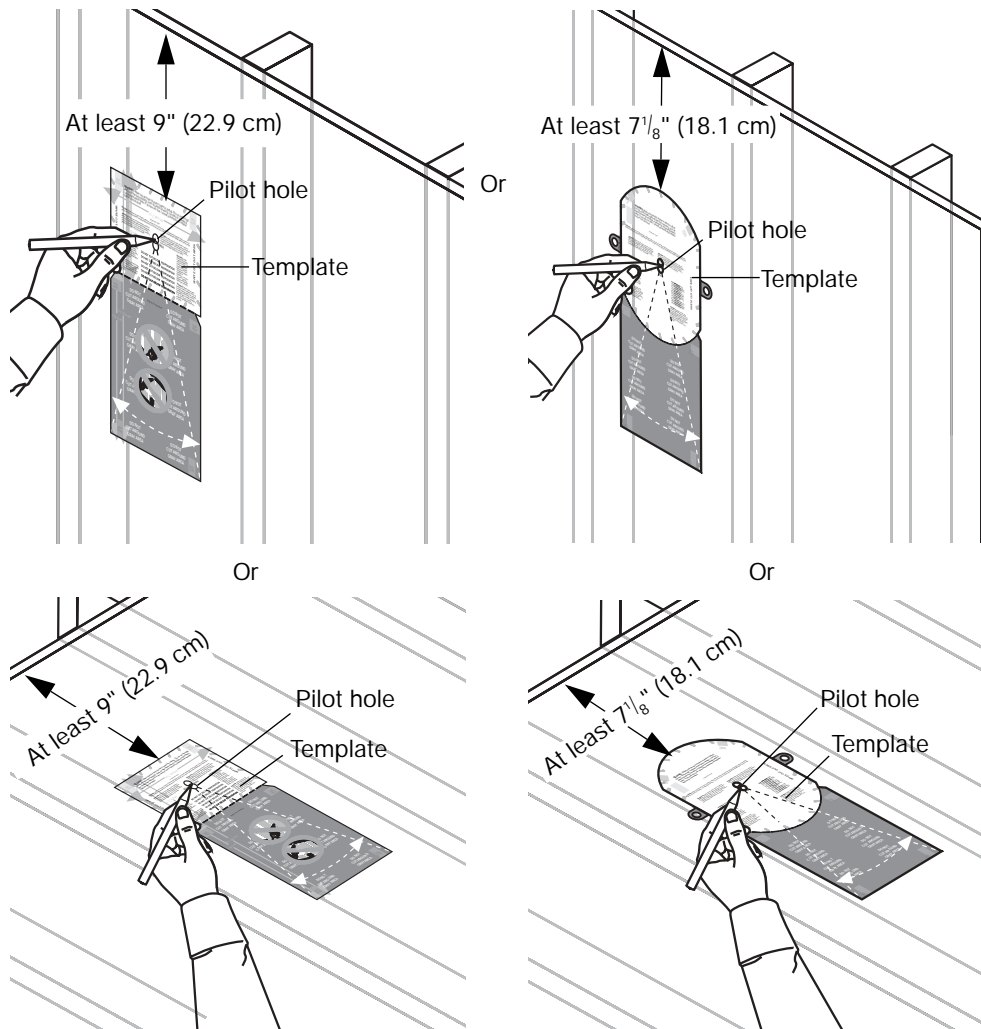
- Center the pilot-hole circles on the selected spot as you press the template to the wall.
- Use a pencil to trace around the inside of the circles (Figure 14).

Round-faced speakers require additional clearance holes on either side of the speaker hole. Draw those circles as well as the pilot hole circles now. However, you may prefer to drill those holes only after you have successfully explored behind the pilot hole and know there are no impediments to installing the speaker there.

- Remove the template.

Figure 14

Preparing to cut a pilot hole



Drilling the pilot hole

- ✓ You will need a half-inch spade bit and power drill, or a special rotary cutting tool for this step.

Using the proper equipment and protection is important.

- ▲ **WARNING:** Use eye protection and be sure to observe all safety precautions while using the drill or cutting tool (Figure 15).

Figure 15

Caution against drilling without eye protection



- ▲ **WARNING:** Make sure the spot chosen is safe for cutting. Do not cut through surfaces that may have hazards such as electrical wiring, conduits, or plumbing concealed behind them. Follow all other safety precautions.

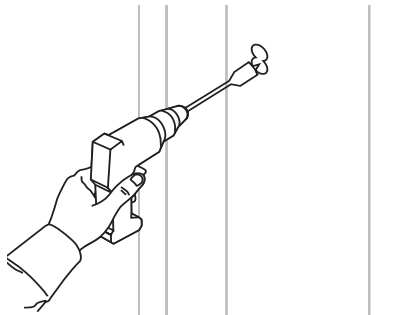
1. Center the tip of the drill bit in the top circle you have drawn).
2. Drill completely through the wallboard to create a hole that you can probe behind.

- ♪ **Note:** If you encounter insulation in the wall, it will be difficult, if not impossible, to probe behind the pilot hole. If you are certain that the location you have chosen is free of hazards and impediments, you may choose to cut the hole for the speaker anyway, remove some of the malleable insulation, and proceed from there. Refer to "Prepare the wall for inserting the speaker" starting on page 21.

3. Drill the second hole just below the first one (Figure 16). This elongates the hole enough to allow for testing the space for the length of the speaker enclosure.

Figure 16

Using a spade bit with the power drill to create the pilot hole

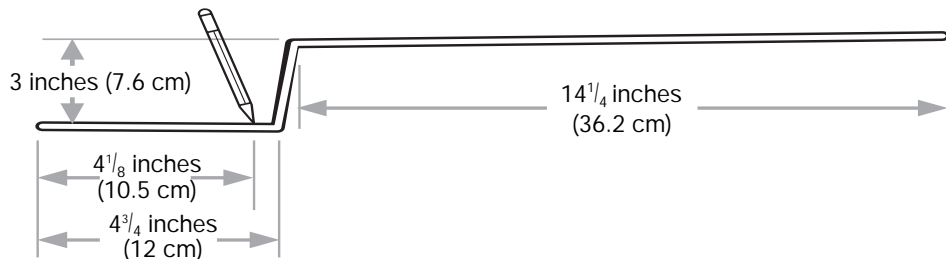


Testing the space behind the hole

- ✓ You need a **tape measure** and a **sturdy wire** (such as a straightened coat hanger) 22 inches (55.9 cm) in length for this step.
1. Bend the wire as shown in Figure 17.

Figure 17

A 22-inch (55.9 cm) length of sturdy wire bent in two places

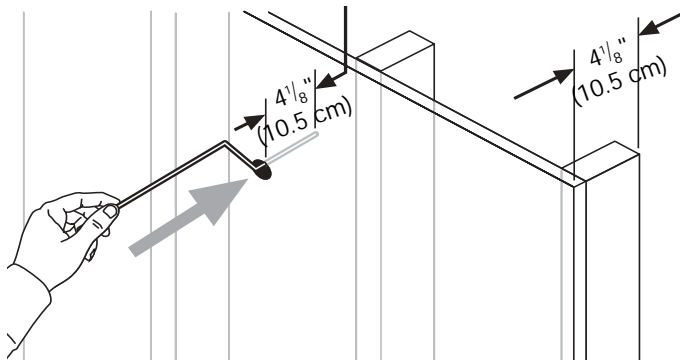


Tip: For greater accuracy, make the first bend a little long, measure again, and cut off the extra length at that end.

- ⚠ **WARNING:** If there is a possibility of electrical wiring in the space behind the wallboard, wrap the wire with electrical tape to prevent electric shock.
2. Make a mark $4\frac{1}{8}$ inches (10.5 cm) from the short end as an indicator of the proper front-to-back depth of the hole.
 3. Use the bent wire to test for enough depth, front-to-back:
Insert the short end of the wire into the hole and straight back (Figure 18). Probe to make sure nothing impedes inserting this end to a depth of $4\frac{1}{8}$ inches (10.5 cm). This indicates that the space behind the wallboard is deep enough for the front-to-back speaker dimension.

Figure 18

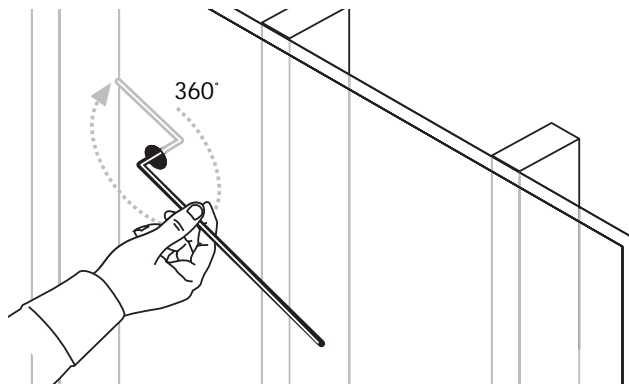
Checking the space for the depth of the speaker



- If the wire goes in without a problem, proceed to step 4, below.
 - If you cannot insert the wire to the $4\frac{1}{8}$ -inch (10.5 cm) mark, you need to drill a new pilot hole elsewhere. Then repeat step 3.
4. Use the wire again to test the width, side-to-side:
With the short end still in the hole, reposition it (as shown in Figure 19) and rotate it 360° around the hole. This indicates if the wall space is wide enough on each side of the hole for the side-to-side dimension of the speaker.

Figure 19

Checking the space for the width of the speaker



- If the wire goes around the 360° arc without a problem, proceed to step 5 below.

Round-faced speakers require an additional 2 inches of clearance above the speaker.

- If you cannot rotate the wire all the way around up to the first bend, you need to drill a new pilot hole elsewhere. Then repeat the preceding steps 3 and 4.

Now remove the wire.

5. Use the long end of the wire to check for enough length below the hole: Holding the short end of the wire, insert the long end into the wall or ceiling and straight down from the hole (Figure 20a).

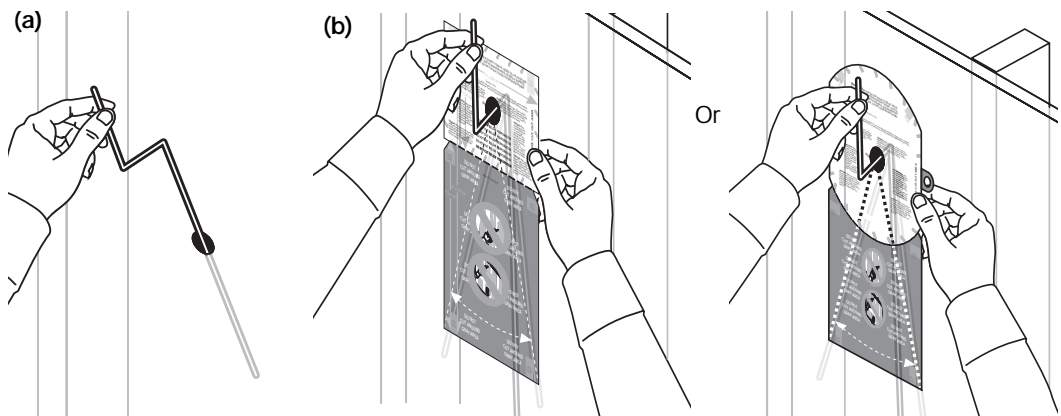
Tip: You may want to use the template for this step, as shown in Figure 20b.

With the long end of the wire still in the hole, sweep it from side to side in a curve as shown on the template. This indicates if the wall or ceiling space is long enough and wide enough at the far end.

Tip: When testing for length, move the wire near the wall or ceiling, then farther back from it.

Figure 20

Inserting the long end of the wire (a) and sweeping from side to side to check the length (b)

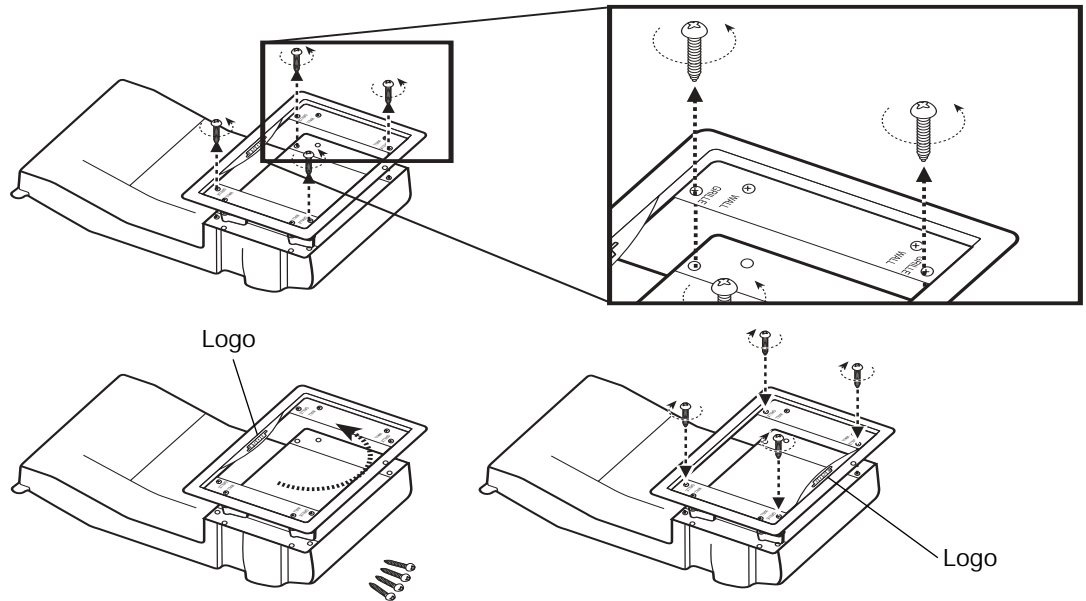


- If the wire goes in and sweeps from side to side at the far end without a problem, proceed to the next major step: "Prepare the wall for inserting the speaker" starting on page 21.
- If you find an impediment below the pilot hole, and you are working in an interior wall, reinsert the wire upward. If there are no impediments above the pilot hole, you can install the speaker upside-down. If you are working in an exterior wall, installing the speaker upside-down is not recommended. In this case, if you find an impediment you need to drill a new pilot hole elsewhere. Then repeat the preceding steps 3, 4, and 5.

🎵 **Note:** To position the logo right-side-up if you insert the speaker upside-down, remove the outer frame from the face of the speaker, rotate it 180°, then reattach the frame. There are four speaker frame screws, labeled GRILLE, that hold the frame in place. They should not be confused with the dogleg clamp screws that are labeled WALL (Figure 21). Those screws hold the dogleg clamps on the frame.

Figure 21

Removing the speaker frame to reorient it as needed



- If you cannot insert the entire length of the wire straight up in an interior wall, and sweep it from side to side as shown on the template, you need to drill a new pilot hole elsewhere. Then repeat the preceding steps 3, 4, and 5.

Repairing a pilot hole

If you need to patch the pilot hole, you can fill it with spackle. You may need to let the spackle dry, then add more until the hole is slightly overfilled. When it is thoroughly dry, sand the area to bring it back flush with the wall.

Passing the pilot hole test

If you have successfully determined that this location will work for one speaker, test the wall or ceiling for the second speaker before making any larger holes. Refer to "Drill a pilot hole for testing the wall space" starting on page 15 and repeat those steps.

If the location for the first speaker is fine, but the second is not, you may want to relocate both speakers.

Round-faced speakers require additional clearance holes on either side of the main speaker hole. If you have marked but have not drilled those holes yet, do so when it is clear you will be installing a speaker in that spot.

Prepare the wall for inserting the speaker

Use care in the steps that follow to ensure satisfaction with the end result.

⚠ CAUTION: Now is a good time to reconsider your comfort level with this job. If you have doubts about cutting into or running cord behind the wall, it's best to stop here. Then you can contact a professional installer, describe the job, and request a cost estimate before engaging the installer's services.

⚠ WARNING: If you believe insulation in a wall may contain asbestos, **do not cut into the wall.** Find a different location for installing the speakers instead.

Using the template a second time

✓ You need a **carpenter's level**, a **sharp pencil**, and **optional tape** with the template to complete this step.

1. Position the template carefully over the pilot hole where you want to install one speaker.

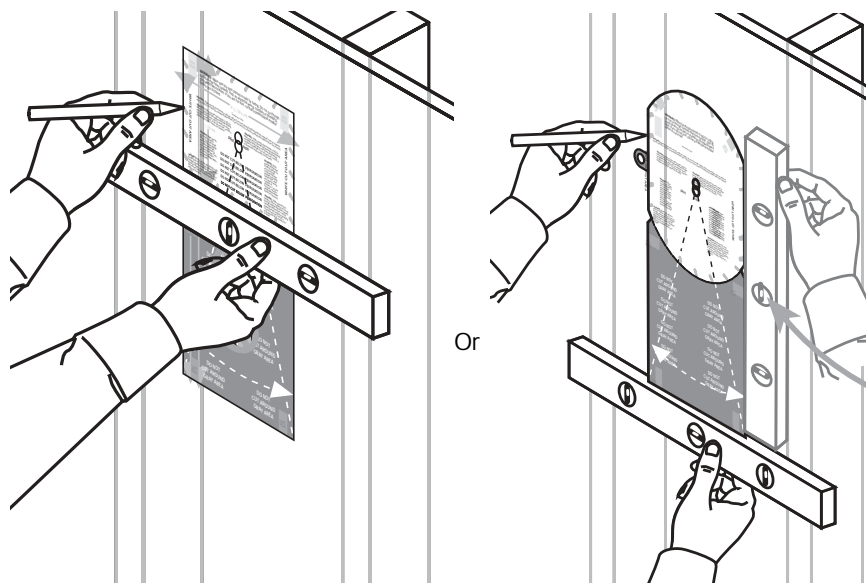
For the **round-faced speaker**, you may want to bend the small tabs on either side of the main cutout area behind it before positioning the template on the wall or ceiling.

2. Make sure the template is level (Figure 22).

Positioning the **round-faced speaker on a ceiling** does not require using a level.

Figure 22

Making sure the template is straight



3. Tape or hold the template firmly in place as you trace around the sides and upper edge of the **WHITE CUT-OUT AREA** portion.
4. Make a dotted line, using the slotted holes along the bottom of the **WHITE CUT-OUT AREA** portion, for the bottom edge of the hole.
5. Remove the template.

Tip: If necessary, use tape to hold the template temporarily in place (see *TAPE HERE* on the template). Then run your pencil along the entire template edge, except where there is tape.

For ceiling installation, notice the orientation of the Bose® logo on the speaker frame. Make sure it will be oriented as you want it when you position the speaker in the hole you cut. If you need the logo to face in the opposite direction, you can do so by removing the speaker frame, rotating it 180° and reattaching it to the speaker. Refer to Figure 21 on page 20.

Cutting the speaker hole

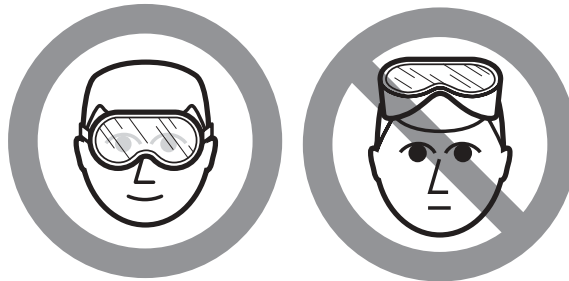
- ✓ You need a **small saw or specialized cutting tool (for example, a keyhole or drywall saw)** for this step of the installation.

Be sure to use the proper equipment and follow all safety precautions as you cut through the wallboard.

- ▲ **WARNING:** Use eye protection (Figure 23) and be sure to observe all safety precautions while using the saw or cutting tool.

Figure 23

Caution against drilling without eye protection



- ▲ **CAUTION:** Use care in handling tools to avoid damage to the surrounding wall area.

Insert the blade into the pilot hole and cut down and at an angle until you reach one pencil line. Or, before you begin cutting, you may prefer to drill holes inside each corner of the rectangular outline you have drawn, to simplify the job.

- ♪ **Note:** Making the corners perfectly square is not important.

Tip: While it is important to cut carefully, remember that the speaker frame overlaps the wallboard by $\frac{1}{4}$ -inch (0.6 cm) when the speaker is in place. Minor cutting inaccuracies will be hidden behind that frame.

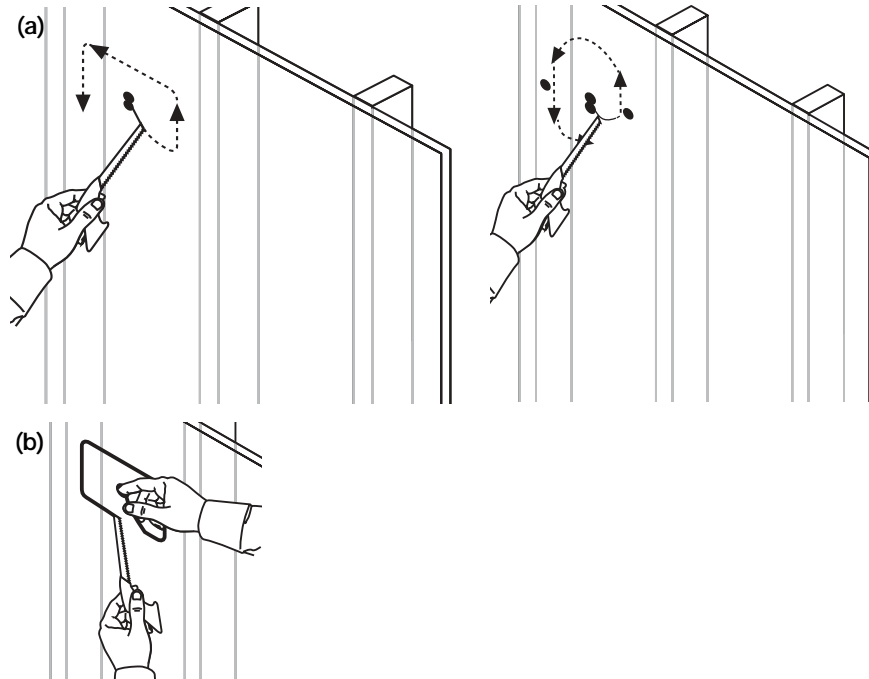
- Cut around three of the four sides of the outline you drew, *not* all the way around (Figure 24a).

⚠ WARNING: Keep fingers away from the cutting blade.

- Hook your finger into the pilot hole and *then* make the final cut (Figure 24b).
- Using your finger, pull out the piece of wallboard you have just cut.

Figure 24

Cutting along the outline (a), and using a finger to hold the cutout piece (b)



If you encounter insulation behind the wall

You can expect to find insulation in an exterior wall and sometimes it appears in an interior wall as well. If the insulation found there is malleable, you can cut it and remove some of it to make room for the speaker. Other types of insulation will be difficult or possibly dangerous to handle.

⚠ CAUTION: Beware of hidden nails when reaching into the wall to remove insulation.

⚠ CAUTION: Wear gloves and protection for your mouth, nose, and eyes before handling insulation that contains fiberglass.

Cut some insulation away from both above and below the speaker hole.

Insert and wire the speaker

- ✓ You need a **Phillips-head screwdriver** and **optional tape** to complete this step.

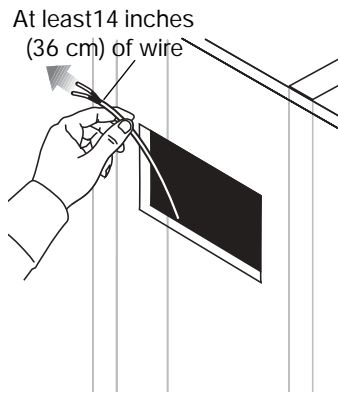
If your wall is not pre-wired, refer to "Planning to run speaker cord" starting on page 11. When wire is within reach of the hole you have cut, follow the procedure below:

- From inside the newly cut speaker hole, locate and pull out 14 inches (36 cm) or more of the pre-wired speaker cord (Figure 25).

Steps to Installing

Figure 25

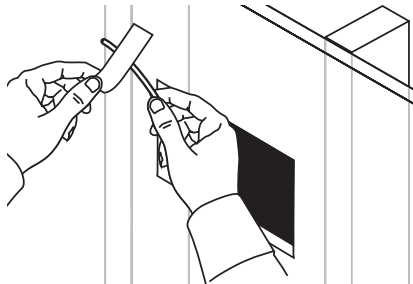
Pulling the wire up and out, to the left



2. Use tape or the assistance of another person to temporarily affix the loose end of the wire above and to the left of the hole (Figure 26). This keeps the wire out of the way until you have the speaker partially inserted in the wall and are ready to make the connections.

Figure 26

Using tape to secure the wire



Insert the speaker into the opening

Before you follow the steps below, check to be sure none of the dogleg clamps (two on each side) are protruding from behind the frame of the speaker. If so, press them back behind the frame so the speaker will fit into the hole.

Tip: Loosening the screw terminals on the upper left side of the speaker before inserting the speaker into the hole may save you effort in making the connections.

- ♪ **Note:** If you must insert the speaker upside-down due to a lack of space below the hole, you need to reorient the logo before inserting it into the hole. If you have not done so yet, remove the outer frame from the face of the speaker, rotate it 180°, then reattach the frame. Refer to Figure 21 on page 20.

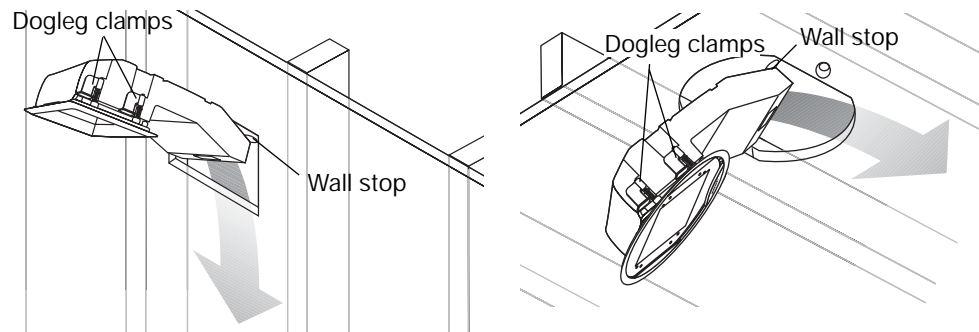
In **ceiling installations**, pay attention to the orientation of the Bose® logo on the speaker frame. Make sure it will be oriented as you want it when you position the speaker in the speaker hole. If the logo should face in the opposite direction, change that before you insert the speaker into the hole. Do so by removing the speaker frame, rotating it 180°, and reattaching it to the speaker. Refer to Figure 21 on page 20.

Also you may notice a draft in the space above the ceiling. To stop the draft, you can wrap some malleable insulation around the speaker enclosure before inserting it into the wall.

1. Use both hands to support the speaker and angle it slightly, so it is diagonal to the hole. This allows clearance for the wall stops.
2. Insert the bottom of the enclosure through the hole and down part of the way – or up, depending on your clearance issues (Figure 27).

Figure 27

Partially inserting the rectangular-faced or round-faced speaker

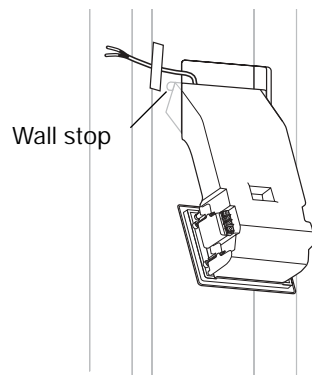


3. Leave the speaker in this partially inserted position, resting on the wall stops that prevent it from falling out (Figure 28). This allows ready access to the connection terminals on the upper left-hand side of the speaker.

For **ceiling installations**, you may feel more secure holding the speaker while making the connections.

Figure 28

Speaker held in place by wall stops



Make the speaker connections

✓ You need a **Phillips-head screwdriver** for this step.

Tip: Pay attention to maintaining the proper polarity (+ to + and – to –) with these connections. An error here will adversely affect speaker performance. Also be sure to tighten each screw securely, but not enough to cause undesirable compression of the wire.

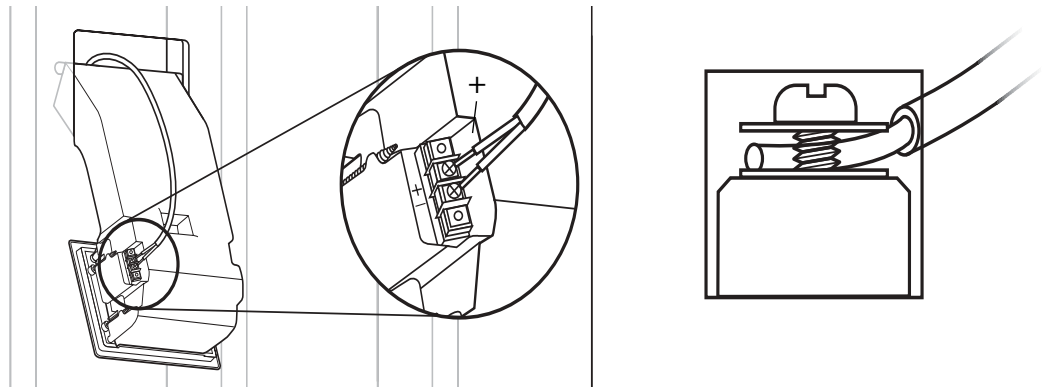
1. If you have not done so earlier, loosen the screws on both terminals.
2. Insert the end of the marked wire (+) into the positive (+) terminal and tighten the screw (Figure 29).
3. Insert the end of the unmarked wire (–) into the negative (–) terminal and tighten the screw.

⚠ **CAUTION:** Do not allow exposed wires to brush against each other, which could damage your components. Trim excess wire and reinsert as necessary.

4. Check for the consistent polarity (+ to + and – to –) of these connections at both the receiver/amplifier and the speaker.

Figure 29

Attaching wires to the terminals



Test the speaker now

With the connections still within reach, now is a good time to test the speaker to make sure it functions properly before you secure it in the wall.

It may be preferable to begin installing the second speaker now, before you test either one. When you get the second speaker connected, you can test both speakers, and make sure they are both functioning fine before proceeding with the installation steps for each one.

⚠ **CAUTION:** If you are testing the first speaker before the other one is connected, make sure the wire to that first speaker is the only one connected to the receiver/amplifier. This will avoid any risk of unattached speaker wires making contact, which can damage the receiver/amplifier.

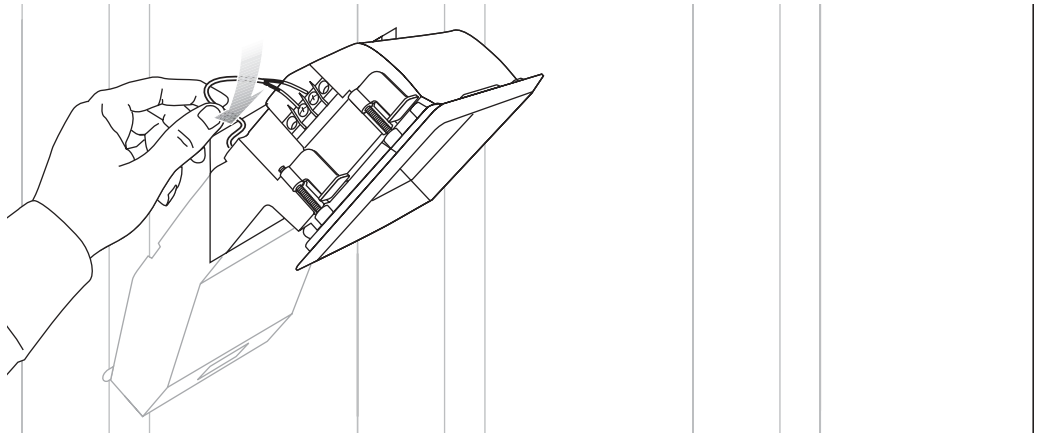
To test the speaker:

1. Turn on the receiver/amplifier and play a piece of music that is familiar to you.
2. Listen for clarity and accuracy of the performance from one speaker.
 - If you hear a problem, refer to "Troubleshooting" starting on page 32.
 - If the performance sounds fine, test the other speaker, or continue with the installation steps for this speaker.

When the connections are completed, push any excess wire into the hole behind the speaker (Figure 30).

Figure 30

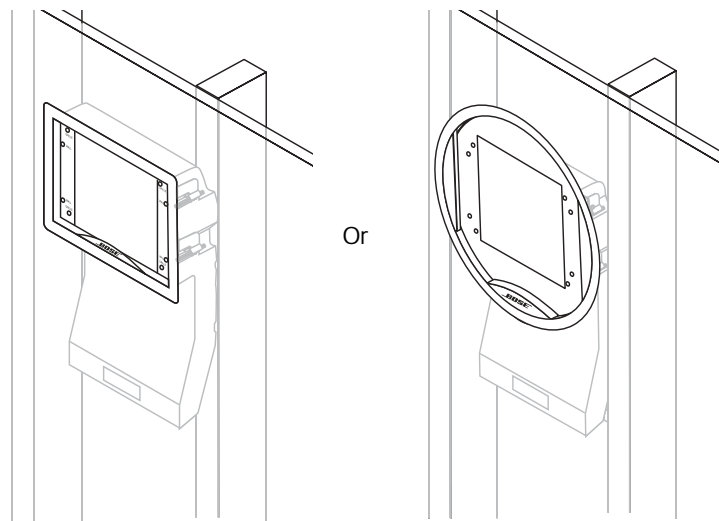
Pushing excess wire behind the speaker



3. Make sure the frame of the speaker is firmly screwed onto the face. The frame prevents the speaker from slipping all the way into the hole. Refer to Figure 23 on page 22 if you need to reverse the frame to properly orient the Bose logo on the speaker face.
4. Now push the speaker into the hole until the face is straight and flush with the wall (Figure 31).

Figure 31

Positioning the speaker all the way in the hole



Secure the speaker to the wall

⚠ CAUTION: If you use a screw gun to tighten any screws, first select the gun's lowest torque setting (do not exceed 2-4 inch-pounds or 0.2-0.5 N-m of torque). If the screw does not seat properly, finish installing the screw at the next highest torque setting, or by hand.

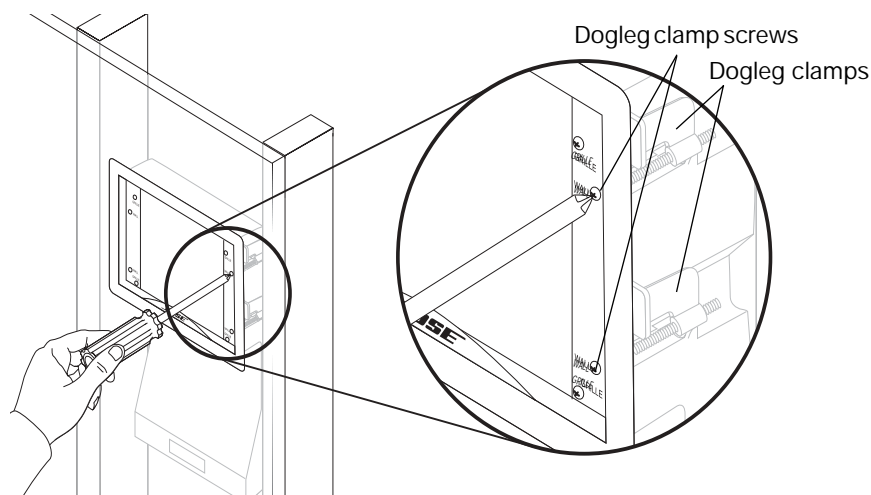
When the speaker is positioned inside the hole with the face straight and flat against the wall, you are ready to tighten the dogleg clamp screws, labeled WALL, along the sides of the frame. These screws are not to be confused with the screws in each corner of the frame, which hold the frame on the speaker face. Dogleg clamps exert pressure from inside to hold the speaker firmly against the wall.

⚠ CAUTION: Although they should be thoroughly screwed down, be sure not to overtighten these screws. Too much compression can crush the wallboard, making it crumble. This creates uneven surface support and can leave gaps between the speaker face and the wall.

1. Slightly tighten the four dogleg clamp screws (Figure 32) until each one begins to grip. This is caused by the clamps that swing out and press against the back of the wallboard.

Figure 32

Tightening the dogleg clamp screws

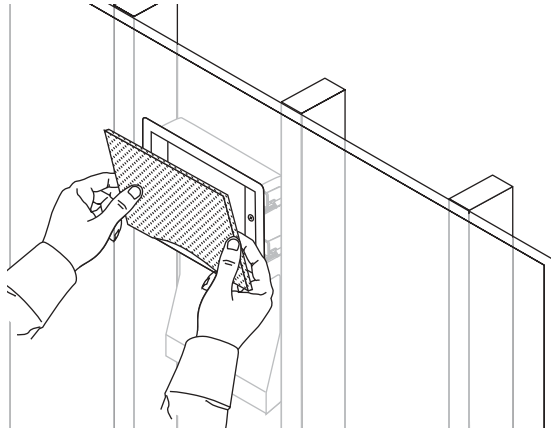


2. With your fingers grasping the frame of the speaker, rock it slightly back and forth into position. Check for even seating of the face before you tighten the screws any further, and adjust the speaker if it needs to be straightened.
3. When the speaker is straight, tighten each screw.

4. Line up the curved edge of the grille with the curve over the Bose® logo and press that edge into the speaker frame first (Figure 33).
5. Press the top of the grille firmly into place until you feel some resistance. When the grille lines up flush with the frame of the speaker, it is seated properly.

Figure 33

Snapping the grille into place



If the speaker looks crooked

When you step back from the wall, you may notice that the speaker is not straight. If so, it is easy to adjust the speaker slightly now:

1. Remove the grille by inserting a thin-bladed tool between the speaker frame and the grille and carefully prying it out.
2. Slightly loosen each of the four dogleg clamp screws, labeled WALL.
3. Press on the sides of the speaker frame to shift it up or down into the proper position.
4. Stand back to make sure it is straight. Repeat step 3 if it is not.
5. Tighten all four dogleg clamp screws.
6. Reattach the grille to the front of the speaker.

When the grille is finally in place

If there are additional speakers to install, repeat the "Steps to Installing," beginning with "Drill a pilot hole" on page 17.

If this is your final speaker, congratulations! Turn on the music while you admire your work... and enjoy the rewards.

Choosing to paint the speakers

The grille and frame of your Virtually Invisible® 191 speakers can be painted before or after the speaker is installed. This is optional, however, and Bose cannot be responsible for the quality of adhesion or finish of non-factory applied paints.

There are different techniques for painting the grille and painting the frame. Be sure to use paint that is appropriate to the technique you choose.

▲ WARNING: Follow all recommended safety procedures for the chemicals involved. This includes the proper use of eye protection, ventilation systems, respirators or filter masks, and fire safety equipment if flammable solvents are used.

Painting the grille

It is important to prevent paint from clogging the grille perforations, which can adversely affect performance. You can use a dry brush technique or choose to spray paint the grille. Do not use a paint roller, however.

Regardless of the technique you choose:

- Remove the grille from the speaker if it has been installed.
- Before you begin to paint, clean the grille to remove possible contaminants. Even fingerprints can prevent uniform coverage.
- Check to be sure the paint is distributed evenly and covers the grille thoroughly. If not, you may need to paint the inside of the grille to fix the problem.
- When it is dry, protect the painted grille with clean cloth or tissue paper until you attach it to the speaker.

Using a dry brush technique

Unthinned latex paint is appropriate for this method. Be sure to put down enough paper to cover your work area and allow for repeatedly blotting the brush.

1. Dip the tip of a clean, dry brush in the paint.
2. Stroke across the paper to reduce the amount of paint on the brush. When you can see individual bristle marks, the brush is ready to use on the grille.
3. Stroke lightly back and forth on the front of the grille, in a horizontal direction, until you need more paint.

***Tip:** If paint clogs any of the grille perforations, try angling your stroke to unclog it, or blow gently on the clog.*

4. Repeat the above steps until the outside of the grille is completely covered.
5. Turn the grille 180° and repaint the entire surface using back-and-forth strokes again.

Using a spray technique

Latex or oil-based architectural paint requires thinning for use with a siphon-feed spray gun set for 30 psi (2.1 bar) and for application in a 3- to 5-inch (7.6-12.7 cm) fan pattern. The thinning formula depends on the type of paint you are using.

- Thin vinyl acrylic latex paint as follows:

To 6 parts of paint, add 3 parts of water and mix thoroughly. Add 1 part of denatured ethyl alcohol (which breaks down paint particles so they do not clog the grille) and mix again.

- For use of architectural or automotive paints:

This type of paint should be used by a professional with the right equipment and technique. This paint must also be thinned, using a solvent.

- For use of lacquer or enamel spray paint:

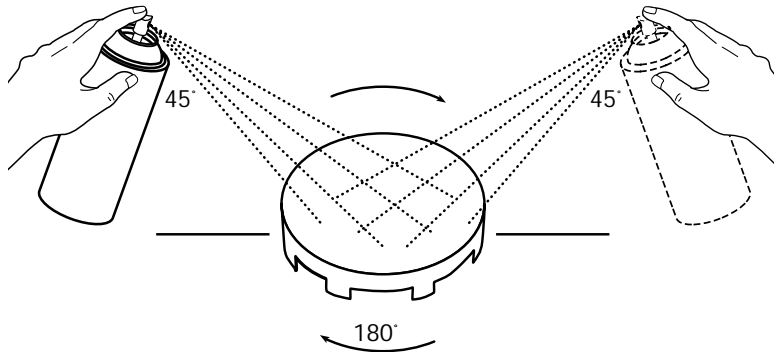
This comes in an aerosol can and needs no further thinning.

Steps for spray painting:

1. To prevent dirt or dried paint particles from blowing back into the grille perforations, suspend the grille or place it on a wire screen.
2. Apply the paint to the grille surface at a 45° angle. Then rotate the grille by 180° and repaint it at 45°.

Figure 34

Angling and turning used to apply the paint twice



Tip: Piercing a perforation with a sharp implement to remove a clog can cosmetically damage the grille and is not recommended. If paint clogs any of the grille perforations, blow gently in that area to unclog it. If that does not work, immediately wash the grille with the appropriate solvent. Make sure the grille is thoroughly dry before repainting.

The paint may feel dry in a few minutes. However, if alcohol has been added, it may take several days to fully cure.

Painting the frame

You can use either latex or oil-based paints, which adhere to the speaker frame. However, both can be easily scratched through careless handling.

Before you begin, protect the speaker cones by inserting the paint shield that came in the carton. Then you can use the same conventional spray or roller equipment used to paint the wall or ceiling.

Be careful so the paint does not puddle or run. You may want to use a brush for spreading paint where needed.

Troubleshooting

Neither speaker plays	<ul style="list-style-type: none"> • Check the settings on your receiver/amplifier. Refer to the owner's guide that came with it for instruction on settings. • If your Virtually Invisible® 191 speakers are the second pair of speakers connected to your receiver/amplifier, make sure the connections have been made to the "B" terminals and that the "B" speakers are selected to play.
The bass or treble is weak	<ul style="list-style-type: none"> • Check the tonal balance setting on your receiver/amplifier. • Check for consistent polarity of the connections (+ to + and – to –) to the receiver/amplifier and to the speaker. Review "Make the speaker connections" on page 26.
Only one speaker plays	<ul style="list-style-type: none"> • Check the balance control on your receiver/amplifier and make sure it is centered. • Check the wires connected to the speaker that does not play. Make sure the wires are in good condition and are firmly connected. Review "Make the speaker connections" on page 26.
Only one speaker still plays	<ul style="list-style-type: none"> • Trace the cord from the speaker in question to the receiver/amplifier. Disconnect the cord from the receiver/amplifier channel and reconnect it to a different receiver/amplifier channel. <ul style="list-style-type: none"> – If the performance is now fine, the problem lies in the original receiver/amplifier channel, the component source of the music, or the connections between the receiver/amplifier and the source. Check all of those to make sure they are performing properly. Reconnect the speaker to the correct channel of a functioning receiver/amplifier. – If the problem persists, its source is either the speaker wire or the speaker in question. Follow the next instruction. • Disconnect the cord from the speaker in question and reconnect it to the second speaker. <ul style="list-style-type: none"> – If the performance is now fine, the problem lies in the original speaker. Contact your authorized Bose® dealer, who will arrange for service. Or, to contact Bose directly, refer to the address list included in the carton. – If the problem persists, its source is the speaker wires. Follow the next instruction. • Before you take steps to replace and re-run the speaker wire, recheck all of the connections. Then repeat the procedure for pinning down the problem source, above.
Static or noise from one speaker	<ul style="list-style-type: none"> • Check the connections at the speaker and at the receiver/amplifier. Make sure the wires are in good condition, are firmly connected, and no wires are touching across terminals. Also check the connections from the receiver/amplifier to the component source of the music. <ul style="list-style-type: none"> – If the problem persists, follow the troubleshooting instructions for "Only one speaker still plays," above.

Customer service

For additional help in solving problems, contact your Bose dealer. Or, to contact Bose Customer Service, refer to the address list included in the carton.

Warranty period

Bose Virtually Invisible® 191 speakers are covered by a limited 5-year transferable warranty. Details of coverage are on the warranty card that came with your speakers. Please fill out the information section, detach, and mail it to Bose.

Accessories

- Drop Ceiling Kit for two speakers – PC031355
Protects the tile from bearing the weight of the speakers. Instructions included.
- Rough-in Kit for two speakers – PC031353
Reserves a place for the speakers after the studs are in place and before the wallboard is added, and indicates where the wallboard hole should be made. Instructions included.

For further information or to order accessories, contact your Bose® dealer. Or, to call Bose directly, refer to the address list included in the carton.

Technical information

Features

- Virtually Invisible® and Articulated Array® speaker design
- Proprietary enclosure technology
- Stereo Everywhere® speaker performance
- Paintable grille
- Syncom® computer tested

Compatibility

- Compatible with amplifiers or receivers rated 10-100W per channel/rated 4 to 8 ohms
- 50W IEC continuous power handling; rated 6 ohms

Driver complement

- Two (2) 2½" (6.4 cm) full-range drivers per speaker

Enclosure

- Ported and molded high-impact polystyrene
- White frame and grille

Dimensions

- Each speaker:
13¾"H x 7⅞"W x 3⅞"D (34.9 cm H x 19.9 cm W x 9.8 cm D)
- Wall or ceiling surface area required for each:
Rectangular-faced speaker – 8¾"W x 6"H (20.5 cm x 14 cm)
Round-faced speaker – 10¼" diameter (26 cm)

Weight

- 4.5 lb (2.0 kg) each



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