

# Reference

**Congratulations!** You have purchased a high quality stereo loudspeaker. When matched to comparable electronic equipment, expect years of quality high fidelity sound. Our belief is that music matters and we are focused on delivering superlative music reproduction everywhere in your home.

The following manual is designed to give you, the installer or owner, basic information as to the speaker's installation and operation. It is beyond the scope of this manual to go into all the details that must be taken into consideration in a sophisticated high fidelity system. When installing the wiring and speakers it is important to adhere to all local codes and regulations. Consulting a professional can help to maximize your system's performance.

If you have any questions regarding this speaker which are not answered by this manual, contact your local dealer for assistance. For the most current information please visit [www.ditopro.com](http://www.ditopro.com).

## MINIMUM TOOLS REQUIRED

# 2 Phillips Head Screw Driver / Drill Driver  
Wire Cutter / Stripper

Other Possible Tools: Tape Measure, Pencil, Ladder, Drywall Saw, Stud-Finder, etc.

## GENERAL DESCRIPTION

These two-way speakers have specially designed woofers with linear long throw butyl rubber surrounds for long life and superior damping. Dome tweeters are utilized for excellent high frequency dispersion throughout your entire listening environment.

## SHIPPING DAMAGE

Each speaker is thoroughly tested before it leaves the factory. However, in shipment, accidents may occur. Please inspect your speakers carefully when you receive them to make sure there is no damage. If there is, please notify your dealer or supplier immediately for assistance. If you received your speakers by public transportation, report the damage immediately to the shipping company.

## AMPLIFIER OPERATION

These speakers will perform well with amplifiers from 5 to 125 Watts RMS. However, damage to the speakers can be done by amplifiers of nearly any power rating if the amplifier is overdriven into clipping. "Amplifier clipping" is a phrase used to describe a condition when, because of the volume demand, an amplifier is being asked for more power than it can give. Clipping cause distortion of the audio signal. If you should hear an unusual amount of distortion at high listening levels then consider reducing the volume. **DAMAGE TO A SPEAKER BY CLIPPING IS NOT COVERED UNDER THE WARRANTY.**

## SPEAKER PLACEMENT

Placement of in-ceiling and in-wall speakers should be carefully considered. Please contact a professional for assistance if you are uncomfortable with the planning or installation process.

Ideally, the speakers should be located where they will provide the best possible sound and ease of installation. It is beyond the scope of this publication to discuss all of the various aspects of speakers placement, but here are some helpful suggestions.

For the front channels of a home theater we recommend that the speakers be placed between and 36 inches (0.45m to 0.9m) from an adjacent wall/surface, as measured to the center of the hole. Avoid placing the speakers less than 12 inches (0.3m) from an adjacent wall. When placing speakers near a corner, avoid locating them an equal distance from the two adjacent surfaces.

If the drywall has not yet been installed, rough-in-kits are available to reserve the speakers location. The hole is then cut when the drywall is installed.

## WIRING

To achieve maximum performance we recommend that the speaker cable be at least 16 gauge or larger for runs over 50 feet (15m) and that the cable be double insulated. A CL-2 or CL-3 rated cable may be required. Check local codes. "Zip cord", which is single insulated and is often made with clear insulation, should be avoided as it is not as durable. Allow about 2½ feet (0.8m) of free cable at the speaker cut-out and sufficient length at the other end to reach the electronics. Having to add extra cable later can be tedious and time consuming.

Avoid bundling speaker cables parallel to electrical cables for extended lengths. Though the impedance is low and the likelihood of interference low, this may help reduce hum and RF interference. When securing the cable, use care not to staple or nail through the electrical conductors. Doing so could result in a short that might damage the electronics.

When connecting your speakers, make sure proper polarity (phasing) is maintained. Simply put, this means ensuring the same wire which is connected to the positive terminal of the amplifier has its other end connected to the positive terminal of the speaker. It is important to check this on all speakers. If the connections on one of the speakers are reversed, (out of phase) the sound quality will be impaired.

	Overall	Cut-Out (Round x Depth)
REF-650HT	9-7/8" round	8-5/8" x 5"

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# Reference

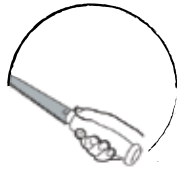
## In-Wall

### INSTALLATION

If the speaker locations have not yet been established then do so now. If possible, assess the area behind the ceiling for possible concealed obstructions such as wiring, heating ducts, crossbracing etc. Absence of a crawl space will require greater study of observable clues and may also require the use of inspection holes and inspection tools (camera, mirror, flashlight, etc.) Use an "electronic stud finder" to locate the positions of the joists or studs. We recommend that the edge of the speaker holes be at least 3/4" (19mm) away from joists or studs whenever possible to allow clearance for the toggle clamps.

Once the speaker locations are established use the cardboard template or the plastic compass provided with your speaker to draw the speaker cut-out. The hole diameters for the various speakers are marked on the compass. The cardboard templates may also be used as visual aid for placement of the speakers. To do this, temporarily hold the templates in place with a push track or tape.

Using the proper tool cut the appropriate sized hole in the ceiling. On drywall, clean cuts can be made with a drywall saw. Make sure to clean the excess debris from the frontface of the hole to ensure a flush fit.

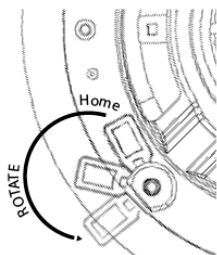


If the cable has not yet been run, do so now that you have better access to the ceiling. Once the speaker cable has been run, pull the end of the cable out of the speaker cut-out, strip back a section of the jacket as needed, and then expose 1/2" (13mm) of each conductor.

To aid in speaker performance, a fibrous material, such as fiberglass, may be placed behind the speaker. This may also help to reduce unwanted sound from being transmitted into adjoining rooms. If the ceiling space has blown or loose insulation, care must be taken to prevent the loose insulation from entering the back of the speaker. This can be accomplished by placing a batt of fiberglass insulation, fabric barrier, or bag over the back of the speaker. Alternatively you may use an **Insu-Flate** cap, which is an acoustically transparent fabric cover specifically designed for this application. Placing a rigid enclosure behind the speakers can be done but the enclosure should be large enough not to degrade the performance of the speaker. Rigid enclosures of less than 0.75 cu ft (21 liters) should be stuffed with acoustic insulation such as fiberglass.



As the drawing shows, the speakers utilize Toggle Clamps, which, after tightening, hold the speakers in place. Ensure that the toggle clamps are rotated into their "Home" position prior to installation.

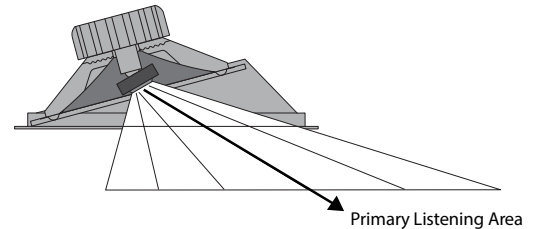


Verify that the speaker fits properly into the cut-out and then remove the speaker from the hole.

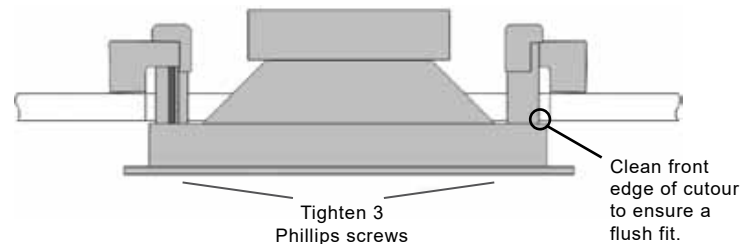
Connect the wire conductors to the terminals on the back of the speaker by depressing each spring terminal, interting the wire into the hole, and releasing the terminal. Use care to observe the proper polarity (+ & -). Speakers wired out of phase will exhibit an apparent loss of bass response.

This speaker is optimized for off-axis listening through the use of a pivoting tweeter and a 15 degree baffle tilt. We recommend directing the woofer and tilting the tweeter toward the listening position. USE

CARE TO  
AVOID  
DAMAGING  
THE DOME  
OF THE  
TWEETER  
WHEN AIMING!



Insert the speaker into the hole and turn each screw clockwise. The toggle clamps will rotate outward to engage the ceiling material as shown. Before tightening the three screws, orient the speaker toward the listening area. Tighten all the screws. CAUTION: DO NOT OVER-TIGHTEN THE CLAMPS. Too much torque may damage the toggle, causing the speaker not to seat securely. A snug fit is all that is necessary to assure proper performance.



Attach the grilles to the speakers and enjoy. Should you wish to remove the grilles from the speakers pull at the grilles' edge. Initially there will be a significant resistance because the grilles are magnetically attached.

The grilles can be painted using multiple light coats of spray paint. Custom color spray paints are available from specialty companies. Contact your dealer for more information. The grilles should be removed from the speaker and painted in a clean environment to prevent contamination. It is best to go around the grilles and apply the paint from multiple angles. DO NOT remove the scrim cloth from the backside of the grille. Is it not replaceable.

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