



Reference 6513cs
Automotive Component Speaker System

Owner's Manual
Installation Guide

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Infinity REFERENCE 6513cs AUTOMOTIVE COMPONENT SPEAKER SYSTEM CAR AUDIO

INTRODUCTION

Thank you for choosing one of the finest 3-way component systems available for car audio, the Infinity Reference 6513cs. This complete speaker system features:

- Two 165 mm (6 1/2") woofers and two 102 mm (4") midrange drivers with TLH™ cones for high internal damping and resistance to temperature and humidity extremes
- Two 19 mm (3/4") soft-dome tweeters with surface- and flush-mount kits provide high power-handling and extended sonic accuracy
- One stereo passive crossover network with individual user-selectable output levels for woofers, tweeters, and midrange drivers
- Flexible system configurations with connections for up to three stereo amplifiers
- Attractive black-molded speaker grilles to complement your vehicle's interior
- Heavy-duty stamped steel speaker frames and use of "high-tech" materials ensure rugged construction and consistent reliability

This Infinity product is made with our ongoing dedication to create the best consumer audio products possible. As a result, you can expect your Reference 6513cs to provide you with many years of listening enjoyment.

IMPORTANT

Before you start your installation, please read the following instructions to achieve maximum product performance. Although this installation guide explains how to install the Reference 6513cs in a general sense, it does not show the exact installation methods for your particular vehicle. Installation of automotive stereo components requires extensive experience in dealing with a variety of mechanical and electrical procedures. If you do not feel you have the experience, do not attempt the installation yourself, but instead ask your Authorized Infinity Car Audio Dealer about professional installation options.

PRECAUTIONS AND NOTES

- Turn off all audio system and other electrical devices before you start. As an extra precaution, disconnect the (–) negative lead from your vehicle's battery.
- Protect the speaker components by keeping them in their packages until final installation. This will keep the magnets in these components from attracting metal clips and filings.
- When moving a speaker component, always rest each component so that the cone or dome is facing up.
- Never use force to install any speaker component.
- At the installation sites, locate and make a note of all fuel lines, hydraulic brake lines, and electrical wiring. Use extreme caution when cutting or drilling in and around these areas.
- Check clearances on both sides of a planned mounting surface before drilling any holes or installing any screws. Remember that the enclosed screws can extend up to an inch behind the surface.
- Before drilling or cutting holes, use a utility knife to remove unwanted fabric or vinyl. This will help keep the material from snagging in a drill bit or hole saw.
- Always wear protective eyewear when using power or conventional tools.
- For faithful music reproduction, use only high-quality components with this speaker system.
- A common cause of speaker failure is trying to get more out of your amplifier than it is able to deliver. We suggest using a high-quality amplifier with power rating of at least 100 watts-per-channel into 4 ohms.
- All wires must be secure and protected against damage from folding seats, door jambs, etc. Use rubber grommets when passing wires through holes in metal, and allow "service loops" where needed. NEVER run cables outside the vehicle, since exposure to the elements will corrode their insulation.
- Do not use the chassis of your vehicle as a speaker ground connection.
- Do not operate the vehicle until you are certain that all amplifiers, woofers, etc. are secure in the event of a sudden stop or jolt.
- Only use the enclosed passive crossover network. Modifying or bypassing the network may cause damage to your components and is not covered under the terms of your warranty.

OWNER'S MANUAL AND INSTALLATION GUIDE

PLANNING YOUR INSTALLATION

Carefully read and understand the following instructions before you attempt any installation procedures. Plan for adequate time and the possibility of overnight storage of your vehicle, since it may take more than one day to complete an installation. Unpack and examine the components. Verify that your package includes the following:

- Two 165 mm (6 1/2") woofers with grilles and grille trays
- Two 102 mm (4") midrange drivers with grilles and grille trays
- Two 19 mm (3/4") soft-dome tweeters with surface-mount plates, flush-mount kits, and attached color-keyed wires
- One integrated stereo passive crossover network
- Mounting templates for all speaker components
- Complete mounting hardware, including hook-up wire

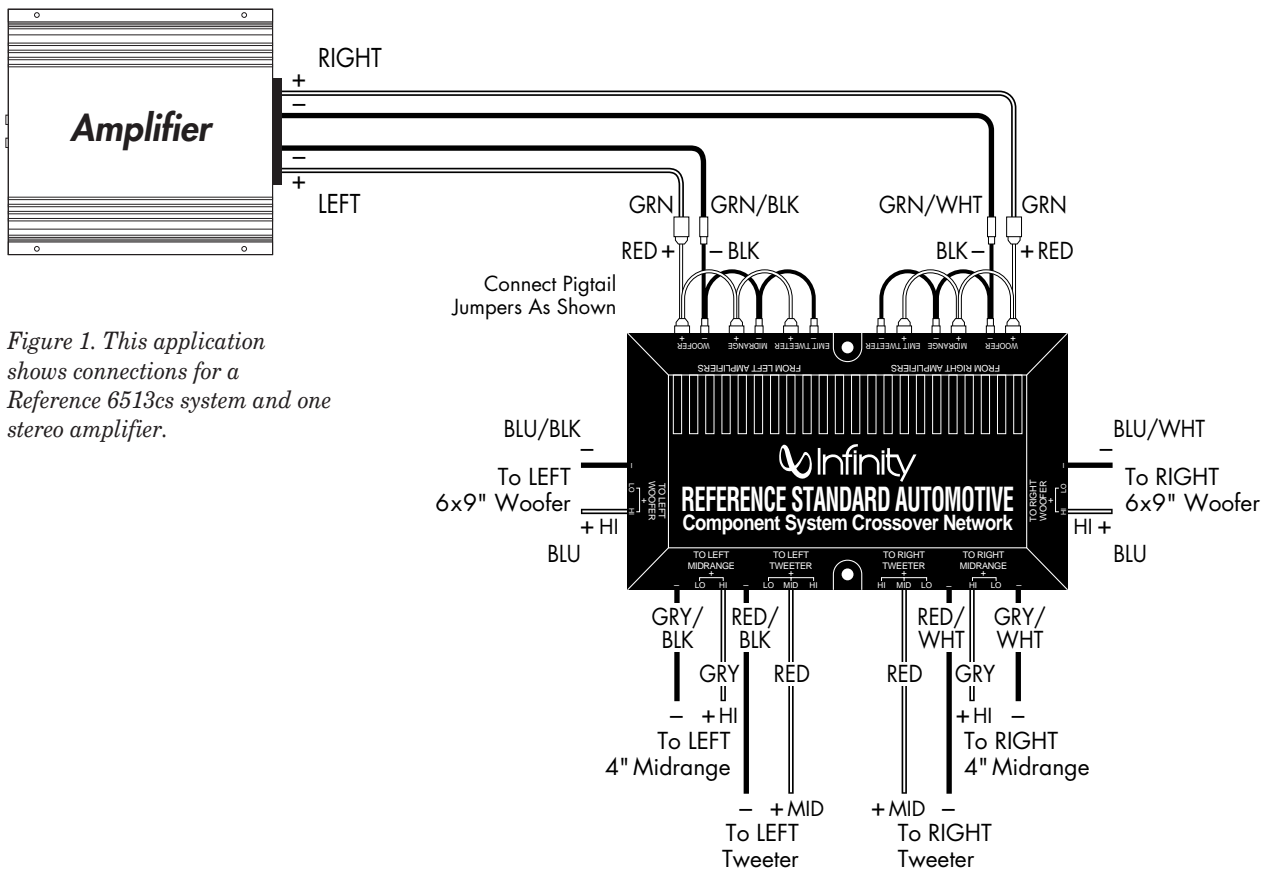
As you survey your vehicle, keep the following installation sequence in mind:

1. Studying the system applications shown in Figures 1 through 3, including application notes on page 5
2. Choosing locations for the speaker components (see *Speaker Placement*)
3. Selecting a crossover location that will make use of the color-keyed wires and attached terminals
4. Installing the crossover and running speaker wires to the amplifier(s)
5. Installing the speaker components and connecting speaker wires
6. Testing the audio system and finishing the installation

SYSTEM APPLICATIONS

The Infinity Reference 6513cs can be configured for use with one to three amplifiers, as shown in Figures 1 through 3.

After studying the illustrations, read the application notes on page 5 for specific wiring details.



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SYSTEM APPLICATIONS (CONTINUED)

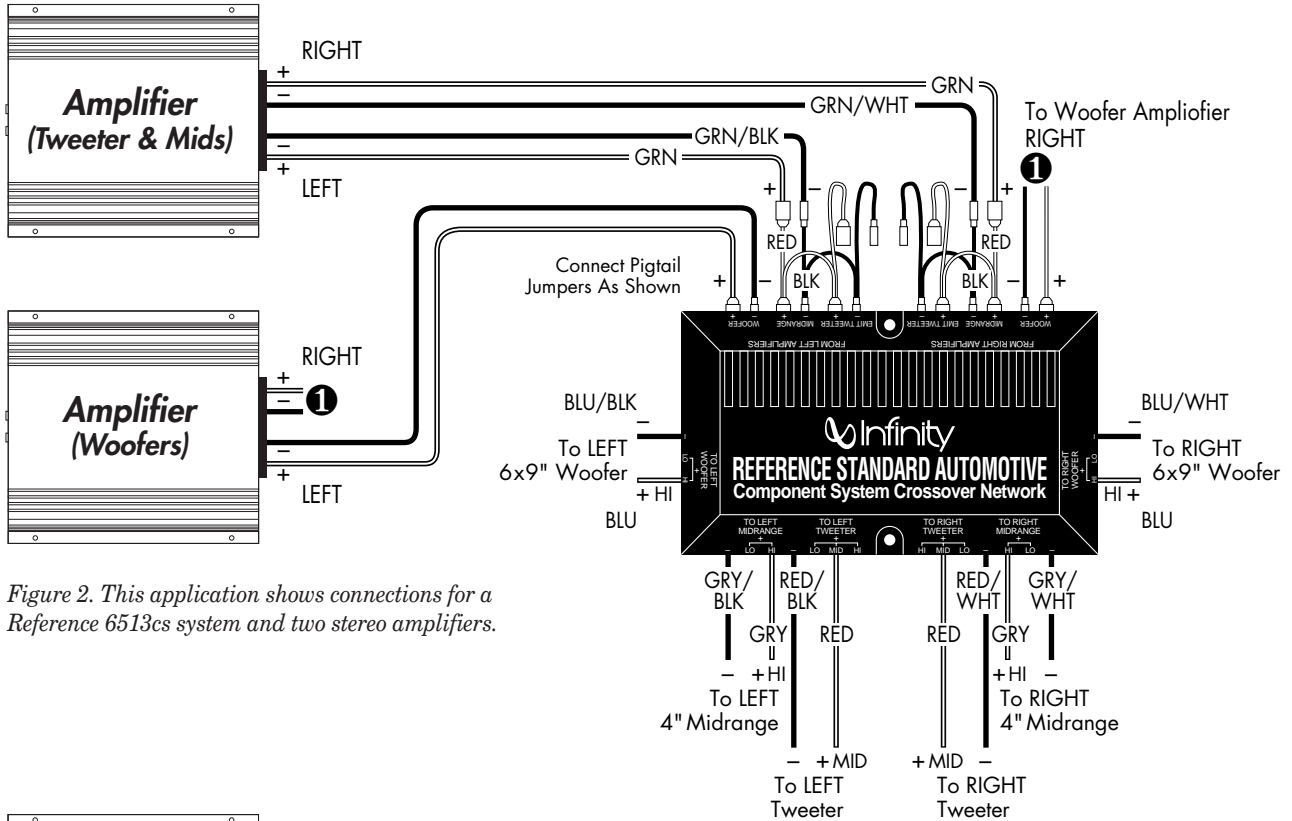


Figure 2. This application shows connections for a Reference 6513cs system and two stereo amplifiers.

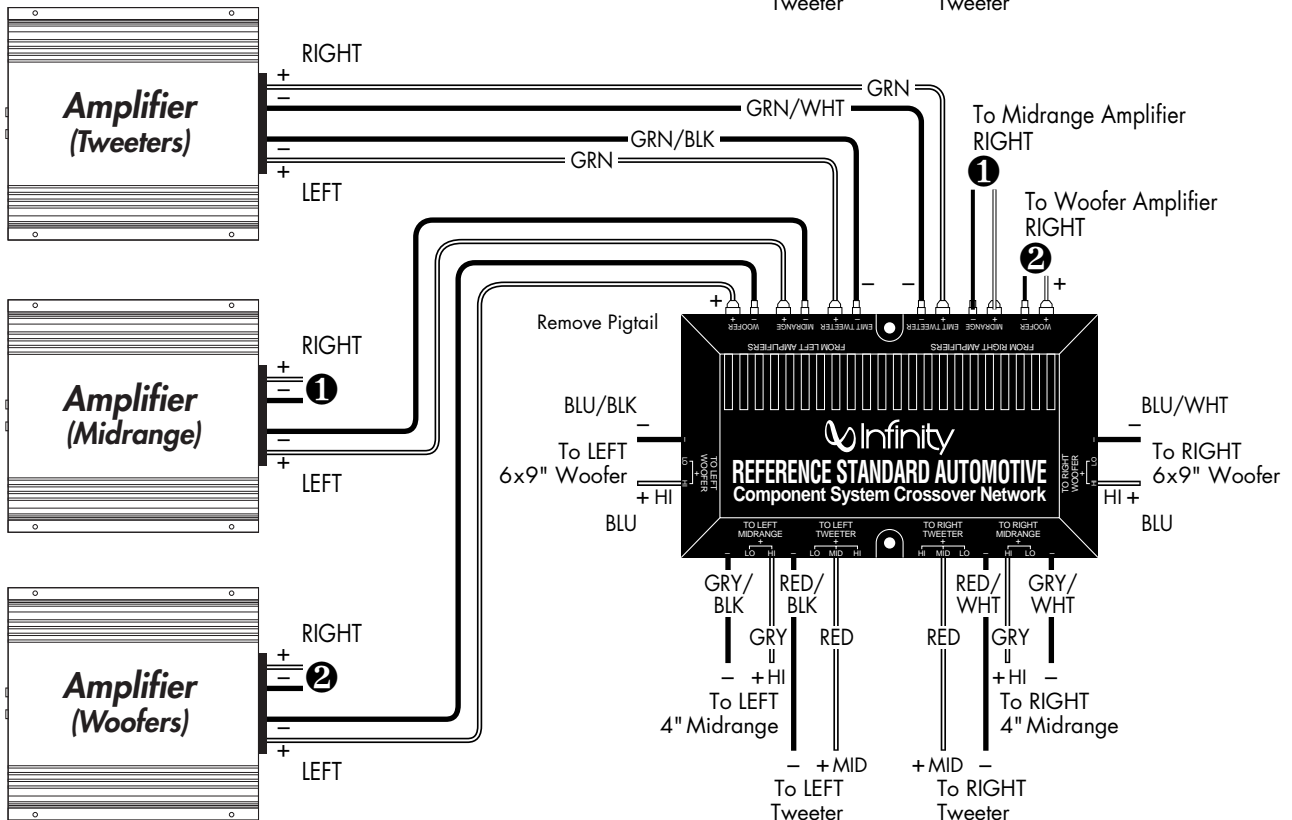


Figure 3. This application shows connections for a Reference 6513cs system and three stereo amplifiers.

SYSTEM APPLICATIONS (CONTINUED)

APPLICATION NOTES – SINGLE AMPLIFIER SYSTEM (SEE FIGURE 1)

For a system with a single amplifier, we recommend using a 50- to 150-watt amplifier. Leave the crossover jumpers in place and observe the following:

- Connect left/right outputs from the amplifier to the corresponding left/right WOOFER inputs on the crossover.
- Connect the 165 mm (6 1/2") woofers, 102 mm (4") midrange drivers, and 19 mm (3/4") soft-dome tweeters to the crossover using the enclosed keyed, color-coded hook-up wires, as shown in Figure 1.
- For woofers and midrange drivers, use the corresponding HI connections on the crossover.
- For tweeters, use the (tweeter) MID connections on the crossover.

APPLICATION NOTES – BI-AMPLIFIED SYSTEM (SEE FIGURE 2)

For this application, we recommend two 50- to 150-watt amplifiers to drive the woofers and satellite speakers (i.e., midrange drivers, and tweeters). On the crossover, connect pigtail jumpers only between MIDRANGE and TWEETER inputs and hook-up the amplifiers, as shown in Figure 2. The speaker connections are the same as those listed for a single amplifier system.

NOTE: You may need additional hook-up wire and terminals to connect the satellite amplifier to the crossover.

APPLICATION NOTES – TRI-AMPLIFIED SYSTEM (SEE FIGURE 3)

In a tri-amplified system, we recommend a 50- to 100-watt amplifier for woofers and two 25- to 50-watt amplifiers to drive the each pair of satellite speakers (i.e., midrange drivers, and tweeters). On the crossover, remove the entire pigtail jumper and connect the amplifiers, as shown in Figure 3. The speaker connections are the same as those listed for a single amplifier system.

NOTE: You may need additional hook-up wire and terminals to connect the two satellite amplifiers to the crossover.

SPEAKER PLACEMENT

Where you place your speakers will greatly affect the total sound quality of your vehicle's audio system. Often the best locations are compromises between the ideal sound stage and the physical limitations of your vehicle. Here are several techniques you can use to place a component in a location where it sounds best:

- Use the supplied templates to find potential placement sites.
- Place each speaker component in its prospective mounting position and make the system connections.
- Power on the system and listen to a variety of your favorite music. Experiment with the midrange and tweeter locations until you find the placement which sounds the best. If possible, try placing these components on the same mounting plane. This will help minimize timing errors in emitting sound waves that occur when they are spaced too far apart.

WOOFERS

The woofers will provide their best response when mounted in the rear deck of most vehicles, with the trunk acting as the woofer enclosure. If this is not feasible, locate the woofers so that there is at least 28 to 57 liters (1 to 2 cubic feet) of airspace behind each one. The front door panels are another possibility.

MIDRANGE DRIVERS

Choose a location for the midrange drivers that offers an unobstructed path to the listener's ears and also places the midranges fairly near the tweeters (preferably on the same mounting plane).

TWEETERS

Because of their small size, the tweeters can be mounted in a number of convenient locations. Suggested areas include the dash, door panels, rear deck, or rear window pillars. For best imaging, install the tweeters at ear level, aimed so that imaginary lines from the center of each tweeter cross at a point between the two front passenger seats. Make sure there are no obstructions between the tweeters and listeners.

CROSSOVER INSTALLATION

The enclosed stereo crossover can be mounted in any convenient location. However, do not mount a crossover in an exposed outside area, and try to place it closer to the speakers than an amplifier.

NOTE: Use only the enclosed Infinity crossover. It is specifically designed to work with the Reference 6513cs speakers. Use of any other crossover may damage one or more audio components and is not covered by the warranty.

1. At the chosen site, use the crossover as a template to mark the screw holes. Make sure the intended site provides necessary clearance for the mounting screws.
2. Use a hole punch for drilling guides. If necessary, clear away any carpet or other material prior to drilling.

3. Use a drill with a 3.2 mm ($1/8$ ") bit to drill four holes.
4. Fasten the crossover to the surface with its supplied self-adhesive backing strip to reduce vibration, and then tighten its mounting screws.
5. Depending on your system configuration (refer to Figures 1 to 3 on pages 3 and 4), pre-run the supplied speaker wires from each amplifier output to each associated crossover input and make the connections.

NOTE: The crossover provides additional level outputs (e.g., LO and HI for midrange and LO, MID, and HI for the tweeter) for sound adjustment. A later section, *Adjusting The Sound*, explains these options.

WOOFER/MIDRANGE INSTALLATION

WOOFER AND MIDRANGE DRIVER INSTALLATION NOTES

For most applications, the woofers and midrange drivers will not need new openings, since they are specifically designed to drop into existing cutouts in most cars, trucks, and vans. However, if you decide to install a woofer or midrange driver in a non-standard location, use the appropriate supplied template to trace a mounting site. Also observe the following mounting precautions:

- Check the sites for adequate clearance and potential water leakage. Make sure components will not interfere with the operation of door controls or windows. Avoid contact with door frames, handles, and window tracks.
- Pick a location with a strong, rigid structure to support the weight of the component. You may have to build out the mounting area if sufficient metal does not exist.

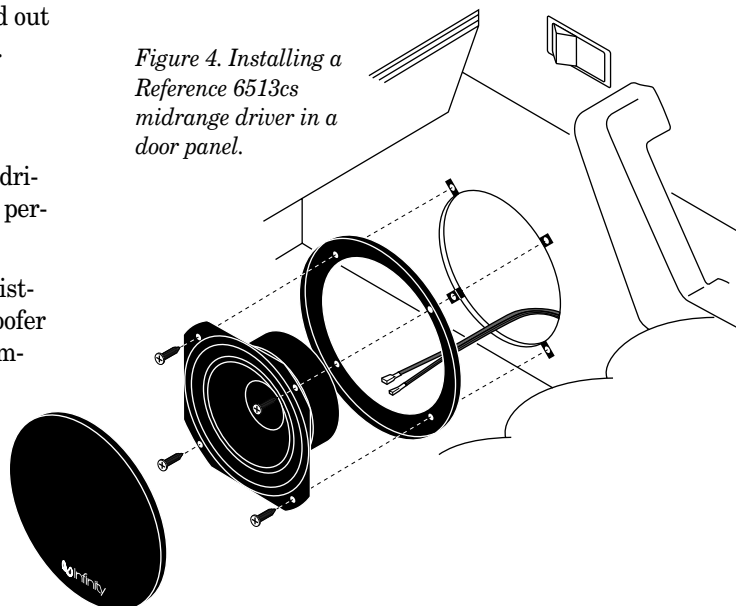
INSTALLING WOOFERS/MIDRANGE DRIVERS

To install the Reference 6513cs woofers and midrange drivers, refer to Figures 4 and 5 (on the next page) as you perform the following steps:

1. For woofer and midrange driver installations in existing cutouts, start with step 5. For non-standard woofer and midrange driver locations, use the supplied templates to create each cutout. Tape or trace a template at each site and mark the locations of the mounting holes and circumferences of woofer and midrange baffle openings.
2. Use a hole punch for drilling guides. If necessary, clear away any carpet or other material prior to drilling.

3. Use a drill with a 3.2 mm ($1/8$ ") to drill a pilot hole at the center of each baffle opening. Then drill holes for the mounting screws. Use a saber or hole saw to create a cutout for each baffle opening.
4. Slip a supplied metal mounting clip over each screw mounting hole. Route the wires for each woofer and midrange driver from the crossover connections through each respective speaker cutout and attach them to the keyed terminals on each component.
5. Position each component into its cutout and align the mounting holes to the drilled holes. Push the wires into each opening and fasten each component with the supplied screws. Place a supplied grille over each speaker.

Figure 4. Installing a Reference 6513cs midrange driver in a door panel.



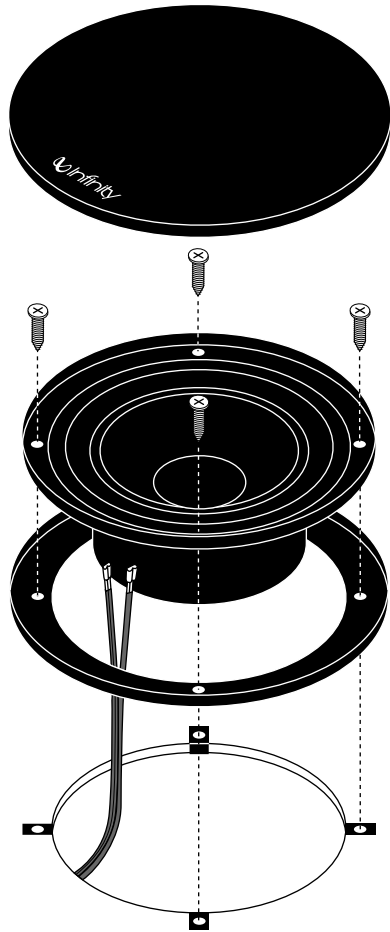


Figure 5. Installing a Reference 6513cs woofer in a deck.

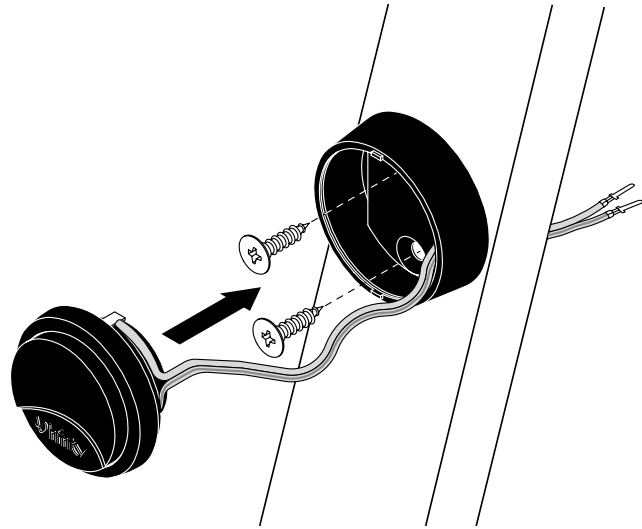


Figure 6. After installing the surface-mount plate, push the Reference 6513cs tweeter onto the mounting plate to snap it into place.

TWEETER INSTALLATION

Reference 6513cs tweeters are easy to install. Each is housed in a surface-mount enclosure with grille and is equipped with an attached color- and terminal-keyed wire pigtail. For custom installations, each tweeter includes a flush-mount kit that features an adjustable firing angle.

SURFACE-MOUNT INSTALLATION

Refer to Figure 6 (above) for correct orientation of the surface-mounting plate. A 7.9 mm ($\frac{5}{16}$ ") diameter hole is required to pass tweeter wires and pre-attached terminals. Make sure each proposed hole will not extend beyond the boundary of the tweeter enclosure.

1. At each chosen site, use the mounting plate (or mounting template) to mark locations of mounting holes and a feed-through hole for speaker wires.
2. Drill 3.2 mm ($\frac{1}{8}$ ") holes for mounting screws.
3. Drill 7.9 mm ($\frac{5}{16}$ ") holes to create passages for wires.

4. Fasten each mounting plate to its site with supplied #8 x 19 mm ($\frac{3}{4}$ ") screws.
5. Route the tweeter's pigtail wire through each feed-through hole and attach it to the yellow terminal-keyed wires from the crossover and make the connections at each pigtail end.
6. Push the wires into the opening and carefully press each tweeter onto the mounting plate until it snaps into place.

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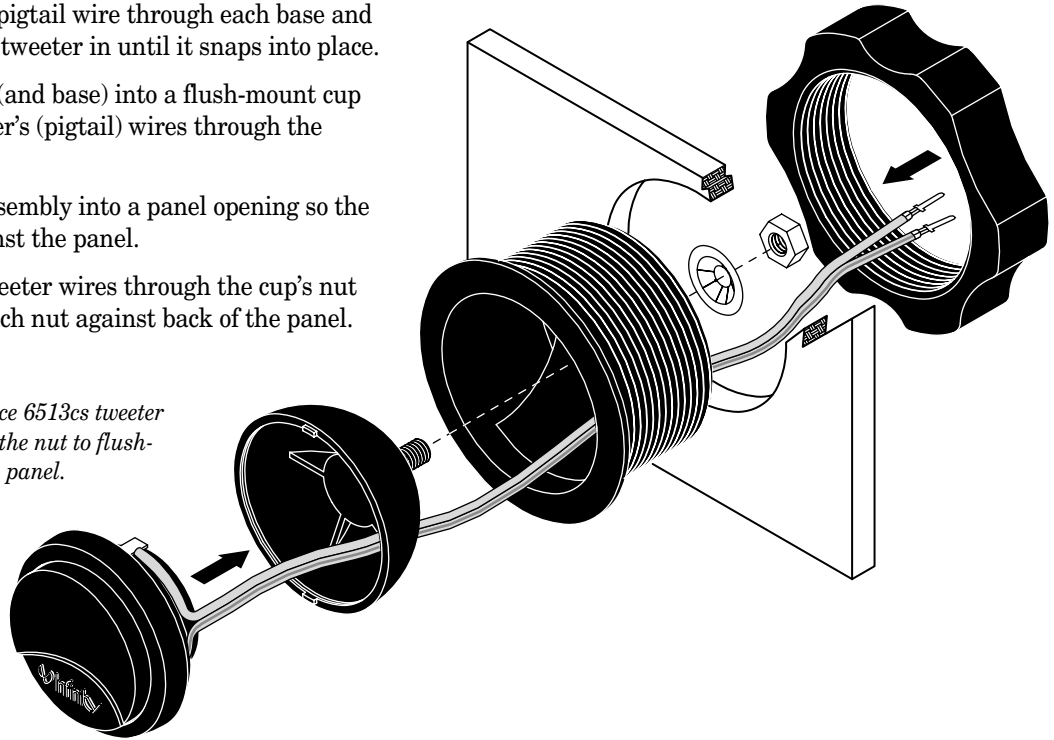
FLUSH-MOUNT INSTALLATION

Refer to Figure 7 (below) for correct orientation of the flush-mount kit. When removing panels at a selected site, make sure there is minimum mounting depth of 44.5 mm (1 3/4") behind each panel.

1. At each chosen site, remove the panel and use the flush-mount cup (or flush-mounting template) as a guide to cut a hole for tweeter mounting.
2. Route the tweeter's pigtail wire through each base and carefully press each tweeter in until it snaps into place.
3. Insert each tweeter (and base) into a flush-mount cup and route the tweeter's (pigtail) wires through the opening in the cup.
4. Place each entire assembly into a panel opening so the cup lip is flush against the panel.
5. Route each set of tweeter wires through the cup's nut and hand-tighten each nut against back of the panel.

6. Check each tweeter's placement with the listening position (e.g., on-axis placement provides the best performance). If necessary, loosen the nut, rotate the assembly and adjust the tweeter's angle, and retighten the nut.
7. Connect tweeter wires to the appropriate connection points and re-install each panel.

Figure 7. After the Reference 6513cs tweeter is in its cup, hand-tighten the nut to flush-mount the assembly on the panel.



ADJUSTING THE SOUND

Initially connect the + leads (on the satellite crossover connections) to the following terminals: woofer to HI, midrange to HI, and tweeter to MID.

Once the wiring has been completed, turn on the system and begin playing a high-quality CD or tape with a wide musical range. Set the controls on your source unit, equalizer, etc. to their normal listening positions and listen to the sound of your Reference 6513cs system.

Experiment with several different setting combinations as you listen to a wide variety of music under different driving conditions. This will help you reach the optimum sound balance and greatly enhance your listening enjoyment. Remember to turn off the system each time you make any changes. For increased tweeter level, move the tweeter + leads to HI terminals. For decreased tweeter level, move them to LO.

SPECIFICATIONS

System Power Handling:	125 watts
System Sensitivity:	90 dB
Frequency Response:	60 Hz ~ 20 kHz

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