



tactile sound transducer

Installation Guide

full
contact
audio™



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CAUTION THE TACTILE SOUND TRANSDUCER CONTAINS AN EXTREMELY POWERFUL MAGNET. DO NOT PLACE IN CLOSE PROXIMITY TO TV SETS, VIDEO MONITORS, AND MAGNETIC MEDIA (TAPES).

Introduction

Before you drill holes and run wires, take a few moments to review this Installation Guide. Then plan out the steps you'll need to take for your particular application. This will save you time in the end and reduce the possibility of errors.

Thank you for purchasing a Clark Synthesis™ Tactile Sound™ Transducer. Welcome to the amazing world of Tactile Sound!

Tactile Sound Transducers (TSTs) are electromechanical devices that are designed to drive large surfaces, such as seats and floors, with auditory information ranging from 1Hz to 800Hz. They are very powerful devices, but are intentionally installed and calibrated so as to subtly add the tactile sense that is missing from music and movie sound tracks. The result is nothing short of engrossing. Anyone who has experienced tactile sound will tell you that it adds another dimension to home entertainment.

Most of the sound we hear reaches our ears via airborne vibrations, like those produced by loudspeakers. However, there are four additional pathways through which we perceive acoustic energy, all of which fall into the category of tactile sound:

- Deep tissue and muscle mass (“Kinesthetic”)
- Skeletal joints (“Haptic”)
- Skin sensation (sense of touch)
- Bone conduction (skull-to-cochlea transmission)

Clark Synthesis’ patented Tactile Sound Transducers produce vibrations over a full range of tactile and audible frequencies (in contrast to gimmicky “shakers” that add only bass vibrations). When attached to a resonant surface, they supplement ordinary speakers and subwoofers, effectively *increasing the proportion of tactile sound*. Consequently, you feel the natural percussive impact of sounds – from plucked strings to explosive movie

effects – while also enjoying greater clarity, depth, and dialogue intelligibility. In addition, the greater perceived loudness of a TST-equipped system allows listening at a lower volume that is both safer for your ears and less bothersome to neighbors.

Tactile sound has dozens of applications, ranging from entertainment to medical research. In a home theater or listening room, Clark TSTs close the gap between simply imagining and truly experiencing movies and music and video games. TSTs mounted under car seats add a startling degree of realism to autosound systems, and also solve a real problem – the temptation to listen at dangerously high levels. Weatherproof TSTs mounted beneath wood decks transfer vibratory energy to the surface, turning it into a large speaker with uniform sound dispersion. No matter where you’re standing or sitting, the sound is right there, rich and detailed.

TSTs have been used to record as well as play back sounds for military simulators and theme park attractions. Recently, TSTs have earned raves from pro musicians, especially drummers, who mount them beneath their thrones (stools), giving them the live, loud feel they miss with in-ear monitors.

Aquasonic™ submersible models for underwater music produce strong vibrations over a full range of tactile and audible frequencies, providing high-quality underwater sound through a combination of acoustic transmission and bone conduction. (See www.clarksynthesis.com for information on Aquasonic models.)



Tactile Output™ Components

The Clark Synthesis Tactile Output™ can be incorporated into surround-sound processors or components such as home theater receivers. **For a list of Tactile Output products, go to www.clarksynthesis.com.**

The Tactile Output is available through a dedicated pair of RCA-type jacks as either a left/right stereo signal or as two identical special mono signals. The default output configuration is

left/right stereo. The Tactile Output signal is derived from the front left and front right channels, the LFE (.1 or SUB) channel, and the rear left and rear right effects channels. In addition, users have the option of mixing in as much as 50% of the center (dialog) channel. This option, which increases dialog intelligibility, is of particular benefit for hearing-impaired users.

An adjustable delay – ranging from 0ms to 50ms – allows users to compensate for the time differential between feeling the sound vibrations (immediate) and hearing the sounds (delayed by distance from loudspeakers).



Tactile Ready™ Theater Seats

Theater seats bearing the Tactile Ready designation include a convenient mounting point for installing a Clark TST in the ideal location for transmission of tactile vibrations. Such seats have been tested and certified Tactile Ready by Clark

Synthesis. **For a list of Tactile Ready™ Theater Seats, go to www.clarksynthesis.com.**

Tactile Ready™ Drum Thrones

Drum thrones bearing the Tactile Ready designation include a convenient mounting point for installing a Clark TST for transmission of tactile vibrations. **For a list of Tactile Ready™ Drum Thrones, go to www.clarksynthesis.com.**



Clark Tactile Theater Chairs

In addition to other manufacturers' Tactile Ready theater seats, Clark has its own line of custom-built Tactile Theater Chairs, including the Sensation (pictured). **For more information on Clark Tactile Theater Chairs, go to www.clarksynthesis.com.**

Clark Thunder Throne Tactile Drum Throne

In addition to other manufacturers' Tactile Ready drum thrones, Clark has its own. **For more information on the Clark Thunder Throne, go to www.clarksynthesis.com.**



Supplied/Required/Optional Items

SUPPLIED PARTS (ILLUSTRATED BELOW)

Not all parts are used for every installation.
General installation instructions begin on page 6.

- A. (1) Tactile Sound Transducer
- B. (1) Unimount Bracket
- C. (1) 3/8"-16 x 3 Hanger Bolt
- D. (1) 3/8"-16 x 3" Threaded Stud
- E. (1) 3/8"-16 Hex Bolt
- F. (4) #14 x 1" Machine Screws
- G. (2) 3/8" Jam Nuts
- H. (4) Washers
- I. (4) Lock Washers
- J. (1) T-Nut

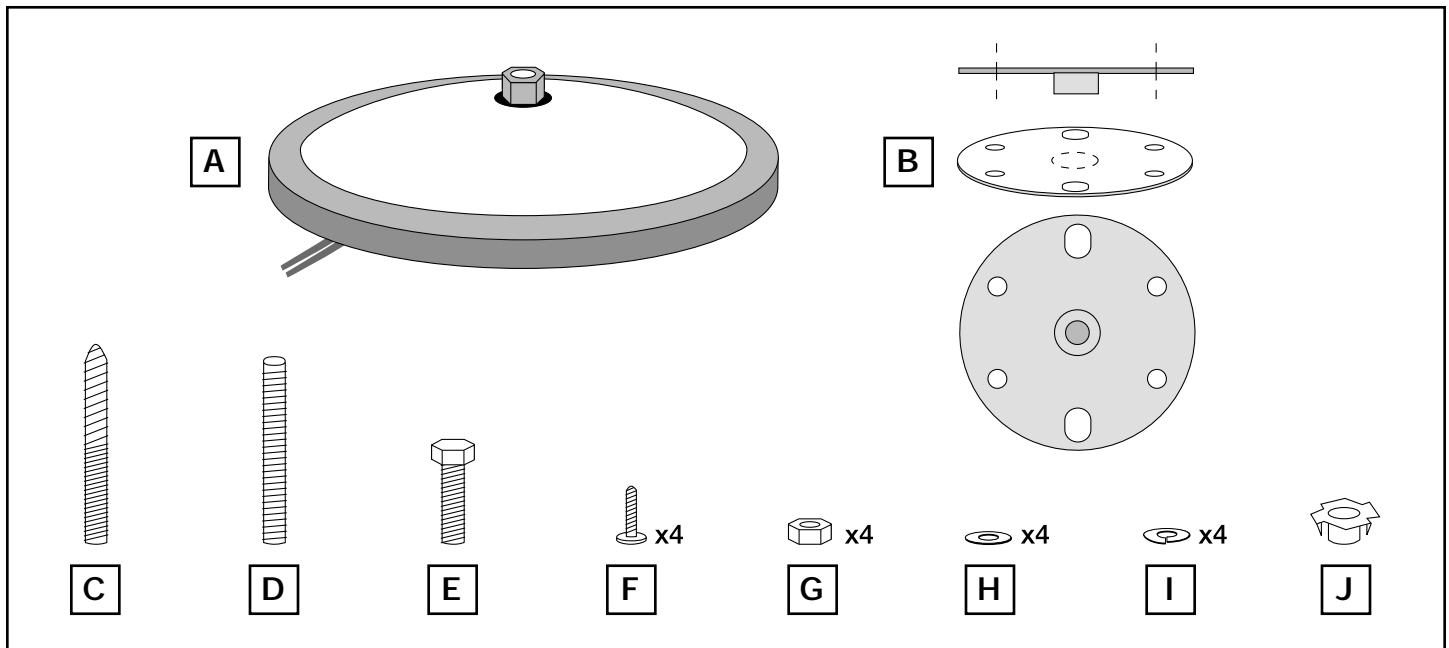
hardwood (oak, maple,
ash, etc not pine balsam)

- Warranty Card
- Installation Guide

REQUIRED TOOLS AND MATERIALS

You will need some or all of these tools and materials for installation, depending on your application:

- #2 Phillips Screw driver
- (2) 9/16" Open-Ended Wrenches
- Drill
- Saw
- Wire Stripper
- Soldering Gun or Wire Nuts
- Adhesive (construction glue)
- Hardwood (oak, maple, ash, etc., not pine balsam) for creating mounting bridges
- Speaker Cable (min. 16 AWG; 12-14 AWG recommended)
- RCA-type audio cables



REQUIRED AUDIO COMPONENTS

- Power Amplifier for the TST(s). All TST models should be powered with between 150 watts and 250 watts. Make sure your amplifier is capable of driving a 4-ohm load.

OPTIONAL AUDIO COMPONENTS

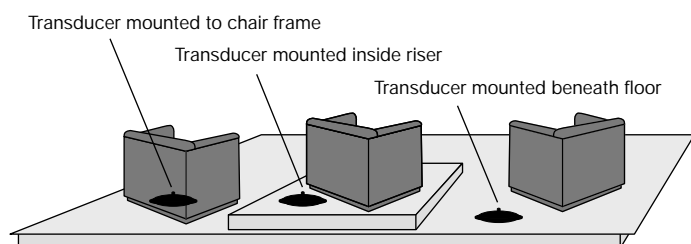
- Equalizer to tailor the frequency response of the TST(s).

General

The TST is a special loudspeaker that is designed to vibrate a structure such as a chair or a floor. Particularly in the case of home theater applications, the TST is used to supplement, not replace, conventional speakers and subwoofers.

When used in a home theater system – for example, in a couch or chair – the optimum configuration is with the TST connected to the front left & front right channels of the mix, with your front speakers set to “large.” In this set-up, the TST will receive the

GENERAL LOCATION DIAGRAM



full

range of frequencies, minus the dialogue channel. Remember, the TST is not an ordinary bass shaker that simply emphasizes ultra-low bass. Rather, the TST is a full-range tactile sound device that reproduces the full spectrum of frequencies in effects ranging from hard footsteps to door slams to massive explosions.

If you plan to install a TST in your car, Clark highly recommends that you contact a car audio installation specialist.

When TSTs are used beneath floors or stages or wood decks, full-range reproduction – including the dialogue channel in a surround-sound mix – is generally desirable. This is because the TSTs are being used both to generate tactile sensations and to supply audible sound (via the coupling surface) that supplements the main speakers. Indeed, some people have used nothing but TSTs under their wood decks for music. In such cases, the deck itself is constructed in such a way that it performs quite well as a giant speaker diaphragm!

Amplifier Considerations

In order to control a TST's volume independently from other speakers in your system, you need a separate amplifier for the TST (see “Wiring and Connections” later in this Guide).

TSTs require a stronger signal than do most conventional speakers.

All TST models should be powered with between 150 watts and 250 watts. Make sure your amplifier is capable of driving a 4-ohm load.

Speaker Cable Considerations

The TST includes a permanently attached 3' speaker wire with tinned ends. **The positive (+) lead is identified by either a red insulator or a + indication.** Observe this polarity when connecting your amplifier (see “Wiring and Connections” later in this Guide).

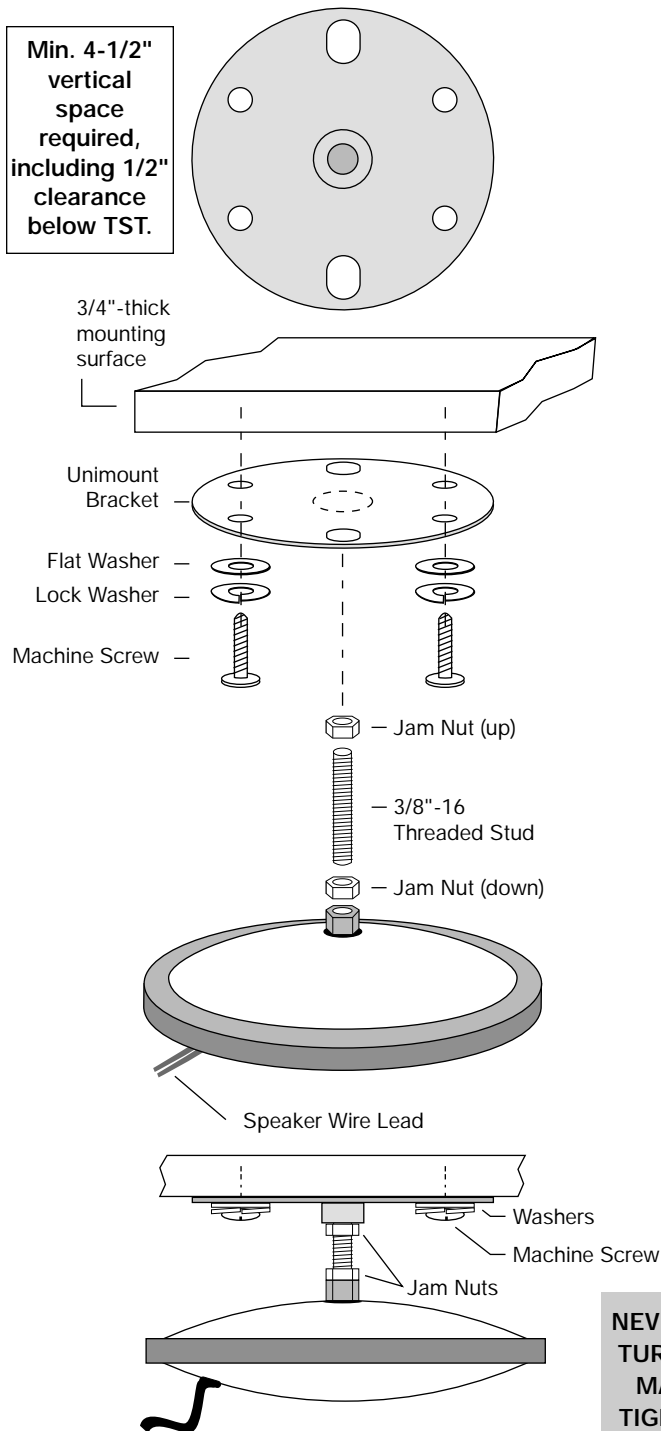
You will need to use solder or wire nuts to attach a length of speaker cable to reach the amplifier in your audio system. In any permanent installation, a soldered connection is preferred because wire nuts may vibrate loose if not tightly secured.

Speaker cable size (gauge) should be calculated for run length; the longer the run, the larger the cable (the lower the gauge). 12 - 14 AWG is recommended; 16 AWG is minimum.

Installation: Overview

Installation Type: Unimount Bracket

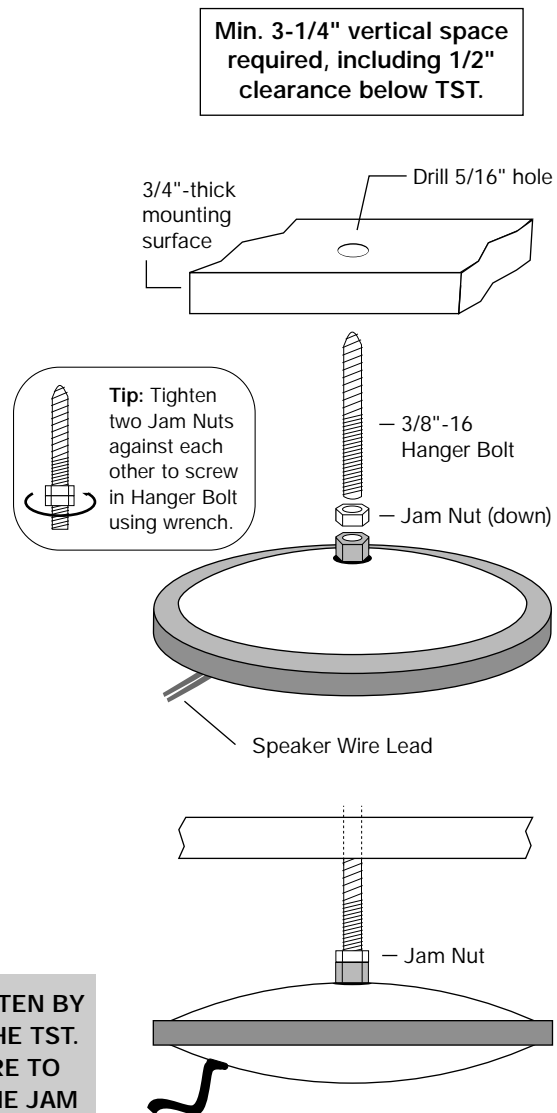
Screws into the bottom of the mounting surface.
Requires access only to the bottom of the mounting surface. Requires a flat or nearly flat mounting surface.



One of the best materials for carrying tactile vibrations is wood. In most applications, the TST should be centrally located on the structure (chair, floor, riser, deck, et al.) in order to evenly distribute the tactile effect. When two or more TSTs are used on one structure, they should be

Installation Type: Hanger Bolt

Screws into the bottom of the mounting surface (into a 5/16" drilled hole). Requires access only to the bottom of the mounting surface.



NEVER TIGHTEN BY TURNING THE TST. MAKE SURE TO TIGHTEN THE JAM NUT AGAINST THE TST'S FASTENER.

Installation: Overview

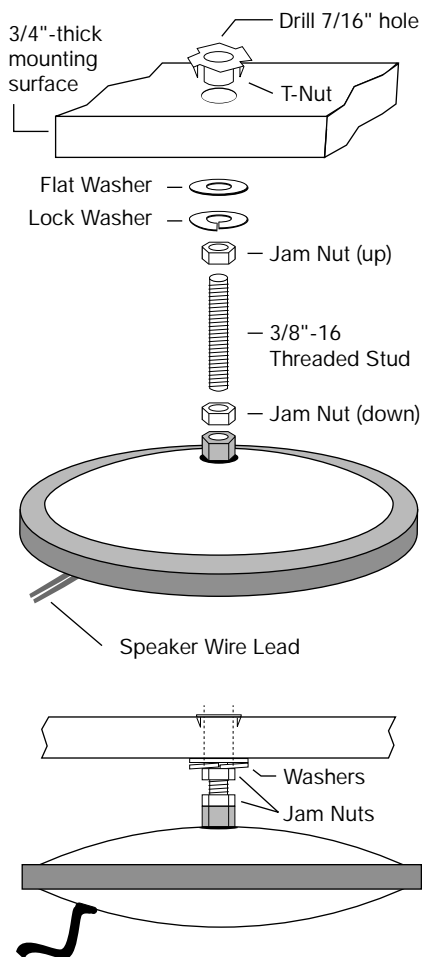
spaced equidistant from each other and the edges or boundaries of the structure. A bridge, joist, or frame member that is central to the overall structure is preferred. Experience has shown that the more rigid the structure, the better the tactile performance.

The TST includes an embedded $3/8"$ female fastener. For maximum installation flexibility, Clark provides a variety of mounting hardware. Specific installation instructions for different applications begin on the next page.

Installation Type: Threaded Stud with T-Nut

Most commonly used on wood cross-members and bridges. *Bridge must be between $1/2"$ and $3/4"$ thick.* Requires initial access to the top of the bridge to insert the T-Nut, which installs near flush to the surface. (Drill a $7/16"$ hole for the T-Nut.)

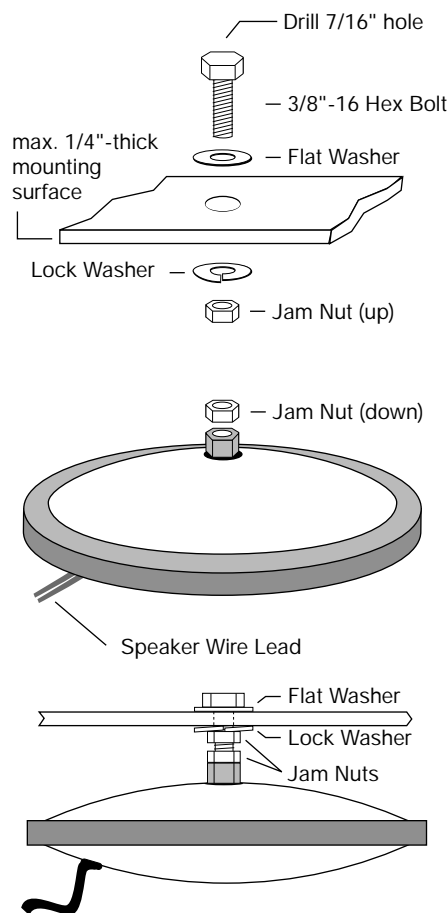
Min. $3-1/2"$ vertical space required, including $1/2"$ clearance below TST.



Installation Type: Hex Bolt

For use with metal or some other high-tensile mounting surfaces no thicker than $1/4"$. Requires access to the top of the mounting surface both to install the Bolt and to tighten it.

Min. $3-1/4"$ vertical space required, including $1/2"$ clearance below TST.



NEVER TIGHTEN BY TURNING THE TST. MAKE SURE TO TIGHTEN THE JAM NUT AGAINST THE TST'S FASTENER.

Installation: Chairs & Couches

Installation Type: Unimount Bracket

Requires minimum clearance of 4-1/2 inches as measured from floor to mounting surface.

- OR -

Installation Type: Threaded Stud with T-Nut

Requires minimum clearance of 3-1/2 inches as measured from floor to mounting surface.

NOTE: If your chair or couch cannot accommodate a TST, consider purchasing or constructing a platform (see "Platforms" on Page 10).

As a general rule, most chairs and couches have an underlying wooden frame. The TST can be mounted directly to a frame member or to a hardwood bridge that is rigidly secured to it. The bridge should be at least 3/4" thick and cut to span two frame members or connect two sides of a box frame. The more centrally located the frame member or bridge is on the overall structure, the better the distribution of tactile sound. For best results, the TST should be parallel to the ground (horizontal) so that the motion is up and down as opposed to sideways.

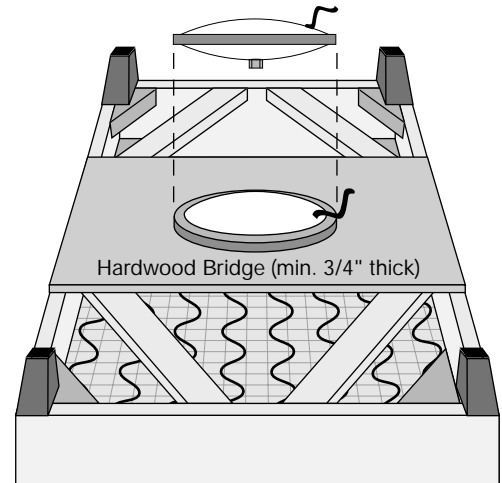
A chair or couch with armrests is preferred since a significant amount of tactile sensation is felt in the hands and arms.

CAUTION: When used in recliners, make sure that the TST and its wire do not interfere with the recliner's mechanical elements.

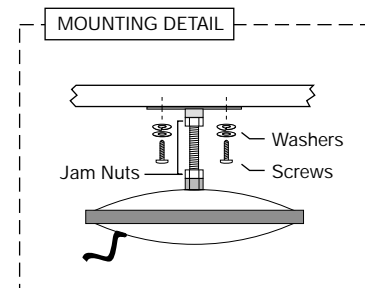
Steps for installation using the Unimount Bracket

1. Attach the Unimount Bracket to the mounting surface using machine screws with flat and lock washers.
2. Screw the 3" Threaded Stud into the threaded insert on the Unimount Bracket.
3. Spin the two Jam Nuts onto the stud. You will tighten them later.
4. Screw the TST onto the Stud until resistance is felt (approx. 5 or 6 turns).
- **DO NOT OVERTIGHTEN THE TST!**
5. Tighten the upper Jam Nut against the threaded insert of the Unimount Bracket.
6. Tighten the lower Jam Nut down against the TST's fastener using two 9/16" wrenches as follows: One wrench firmly grasping the TST's brass fastener while the second tightens the Jam Nut against it.
- **NEVER TIGHTEN BY TURNING THE TST - MAKE SURE TO TIGHTEN THE JAM NUT AGAINST THE TST'S FASTENER.**
7. Use solder or wire nuts to connect the necessary length of speaker wire to the TST's wire leads.
8. Run the speaker wire to your audio system.
9. Connect the TST to your audio system (see "Wiring and Connections" later in this Guide)

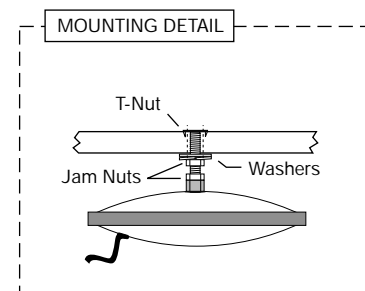
Steps for installation using the Threaded Stud with T-Nut appear on the next page...



TST mounts on hardwood bridge attached to chair frame, or to a centrally located frame member if present. Bridge should be min. 3/4" thick and 6" - 8" wide.

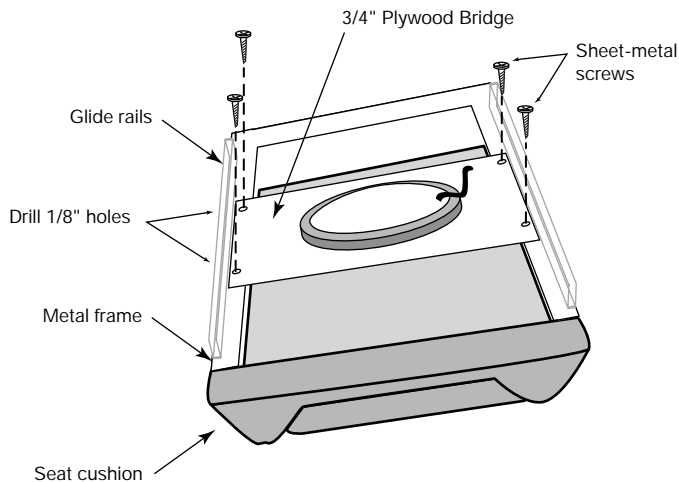


Using Unimount Bracket

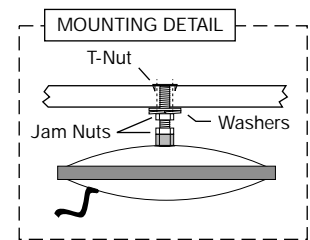


Using Threaded Stud & T-Nut

Installation Type: Threaded Stud with T-Nut



TST mounts on plywood bridge that is either attached to the seat frame or wedged between the bottom of the seat cushion and the wire support grid. Clark highly recommends contacting an installation specialist.



Most car seats can be fitted with a Clark TST. However, It is not possible to provide specific installation instructions for every type of car seat. *If you plan to install a TST in your car, Clark highly recommends that you contact a car audio installation specialist.*

Here are a few general guidelines for car seat installations:

Steps for installation using the Threaded Stud with T-Nut

1. Drill a 7/16" hole in the center of the wood mounting surface for installing the T-Nut. The T-Nut's 4 prongs will be drawn into the bridge as you screw in the Threaded Stud.
 2. Screw the Threaded Stud into the T-Nut until the T-Nut's prongs are all the way into the bridge and the top of the Stud is approximately flush with the top of the T-Nut.
 3. Slide a Flat Washer followed by a Lock Washer onto the Threaded Stud, then screw on one Jam Nut until it is tight against the washers.
 4. Screw a second Jam Nut onto the Threaded Stud far enough to clear room for the TST.
 5. Screw the TST onto the Threaded Stud until resistance is felt (approx. 5 or 6 turns).
 - **DO NOT OVERTIGHTEN THE TST!**
 6. Tighten the second Jam Nut down against the TST's fastener using two 9/16" wrenches as follows: One wrench firmly grasping the TST's brass fastener while the second tightens the Jam Nut against it.
 - **NEVER TIGHTEN BY TURNING THE TST – MAKE SURE TO TIGHTEN THE JAM NUT AGAINST THE TST'S FASTENER.**
 7. Use solder or wire nuts to connect the necessary length of speaker wire to the TST's wire leads.
 8. Run the speaker wire to your audio system.
 9. Connect the TST to your audio system (see "Wiring and Connections" later in this Guide)
- The mounted TST requires a minimum vertical clearance of 3-1/2" inches. Before removing the car seat, see if you can determine in advance whether there is enough space. You may need to stick your hand under the seat to "feel" for the space.
 - Typically, the TST will mount to a plywood bridge that is attached directly to the underside of the seat frame. Obviously, this requires removal of the car seat.
 - Most car seats have a wire "grid" attached to springs, which adds to the cushioning of the seat. If there is not enough space to attach the plywood bridge directly to the seat frame, it may be possible to insert the plywood between the grid and the underside of the seat cushion.
 - Special care should be taken with motorized seats; usually the motors are attached to the seat frame and will come out with the seat. Undo any wiring prior to lifting the seat out. You may want to label the wires for subsequent re-installation.
 - Examine the underside of the seat as well as the exposed floor area. Make certain that the TST attachment area will be free from interference. For example, a cable resting against the TST can produce an undesirable buzzing sound. If you cannot move a cable, pad it with tape, foam rubber insulator, or other such material.
 - Make sure the speaker wire that connects to your audio system is secure at all points so it does not buzz when the TST is on.
 - Verify that the TST is operating properly before re-installing the car seat. Also, double check that the TST is not jammed against the floor or rubbing against cables or fixtures.

Installation: Traditional Floors & Platforms

Installation Type: Hanger Bolt

TRADITIONAL FLOORS

When installing onto a floor, access may be from the basement or the ceiling below the floor. The TST will be mounted to a bridge connected between adjacent floor joists.

If your goal is to use TSTs under the floor to supplement a music system, then you should seek an evenly distributed effect. Note that carpeting and padding reduce the tactile effect; some of this reduction can be overcome by increasing the amount of power to the TST(s).

If your goal is to excite the area of the floor directly beneath a chair, then attach the TST to the closest joist underneath the floor.

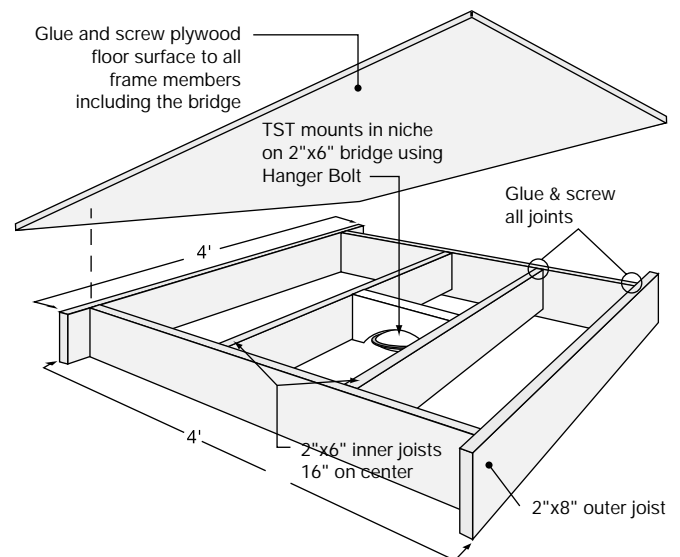
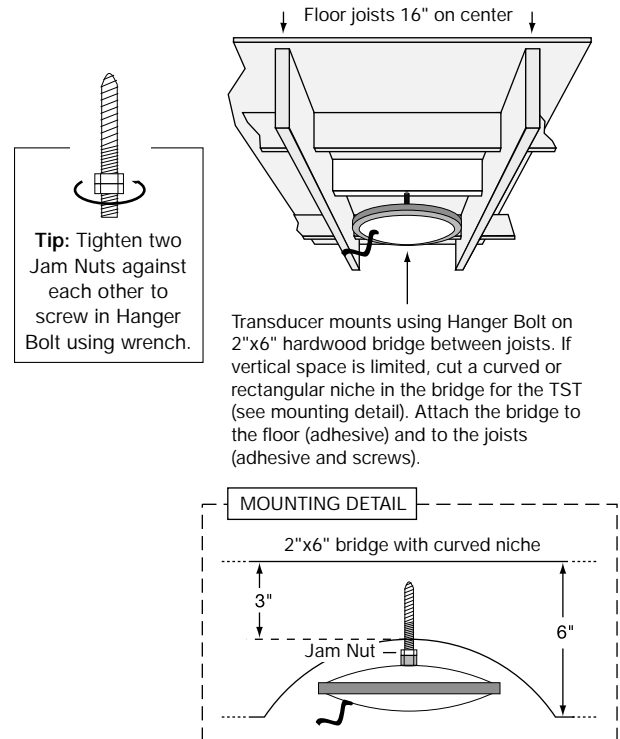
PLATFORMS

Platforms are a great alternative to mounting a TST directly to a chair, and are especially practical in home theaters with multiple rows of seating, where back rows should be elevated on a riser anyway. A "tactilized" platform will deliver tactile sensations to your feet as well as the rest of your body via the chair.

Whether constructing a new platform or fitting TSTs onto an existing one, it is best to space the TSTs equidistant from each other and the edges of the platform. If using only one TST, locate it in the center of the platform.

Steps for installation using the Hanger Bolt

1. Drill a 5/16" hole in the wood mounting surface and screw in the pointed end of the Hanger Bolt until it is secure.
3. Spin one Jam Nut onto the Hanger Bolt far enough to clear room for the TST.
4. Screw the TST onto the Hanger Bolt until resistance is felt (approx. 5 or 6 turns).
 - **DO NOT OVERTIGHTEN THE TST!**
5. Tighten the Jam Nut down against the TST's fastener using two 9/16" wrenches as follows: One wrench firmly grasping the TST's brass fastener while the second tightens the Jam Nut against it.
 - **NEVER TIGHTEN BY TURNING THE TST – MAKE SURE TO TIGHTEN THE JAM NUT AGAINST THE TST'S FASTENER.**
6. Use solder or wire nuts to connect the necessary length of speaker wire to the TST's wire leads.
7. Run the speaker wire to your audio system.
8. Connect the TST to your audio system (see "Wiring and Connections" later in this Guide)



Constructing a platform for optimum TST performance

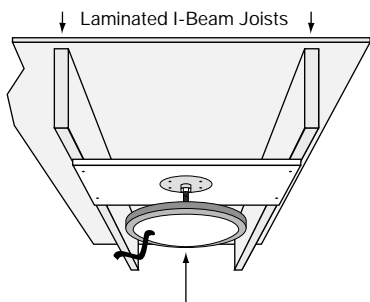
Use 2"x8" outside joists and 2"x6" inside joists. The 2" difference in joist height suspends the center of the platform above the actual floor, improving distribution of the tactile vibrations. Use interior-grade plywood for the platform surface. We highly recommend using adhesive and screws instead of nails. Loose fitting joints can cause unwanted vibrations or buzzing noises, particularly between the joists and the platform surface. Shown is a 4'x4' platform, but you can make any size as long as the joists are spaced 24" or 16" on center to provide sufficient rigidity for tactile wave transmission.

Installation: Laminated I-Beam Floors

Installation Type: Unimount Bracket

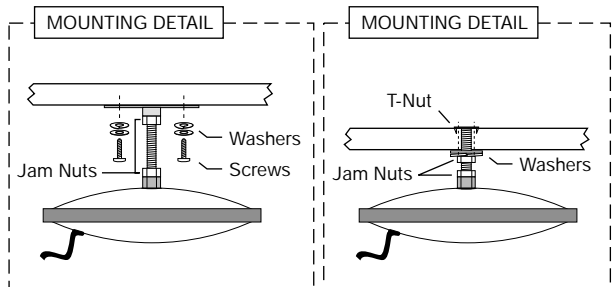
- OR -

Installation Type: Threaded Stud with T-Nut



Steps for installation using the Threaded Stud with T-Nut appear on page 9.

Transducer mounts on 1"x6" hardwood bridge spanning two joists, using the Unimount Bracket (shown) or the Threaded Stud with T-Nut. Attach the bridge to the bottom face of the joists using adhesive and screws.



Using Unimount Bracket

Using Threaded Stud & T-Nut

LAMINATED I-BEAM FLOORS

The TST will be mounted to a bridge that spans adjacent floor joists and is parallel to the floor.

Steps for installation using the Unimount Bracket

1. Attach the Unimount Bracket to the mounting surface using machine screws with flat and lock washers.
2. Screw the 3" Threaded Stud into the threaded insert on the Unimount Bracket.
3. Spin the two Jam Nuts onto the stud. You will tighten them later.
4. Screw the TST onto the Stud until resistance is felt (approx. 5 or 6 turns).
 - **DO NOT OVERTIGHTEN THE TST!**
5. Tighten the upper Jam Nut against the threaded insert of the Unimount Bracket.
6. Tighten the lower Jam Nut down against the TST's fastener using two 9/16" wrenches as follows: One wrench firmly grasping the TST's brass fastener while the second tightens the Jam Nut against it.
 - **NEVER TIGHTEN BY TURNING THE TST - MAKE SURE TO TIGHTEN THE JAM NUT AGAINST THE TST'S FASTENER.**
7. Use solder or wire nuts to connect the necessary length of speaker wire to the TST's wire leads.
8. Run the speaker wire to your audio system.
9. Connect the TST to your audio system (see "Wiring and Connections" later in this Guide)

Installation: Wood Decks

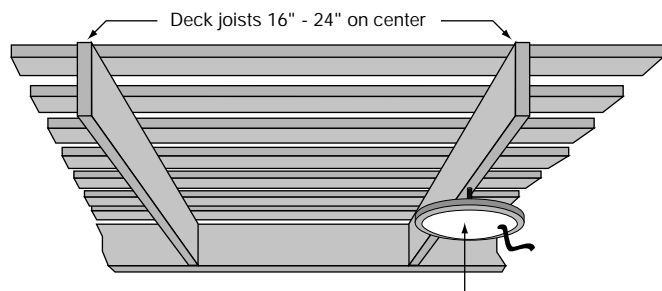
Installation Type: Hanger Bolt

Weatherproof TSTs are recommended for use on outdoor decks. For more information, go to www.clarksynthesis.com.

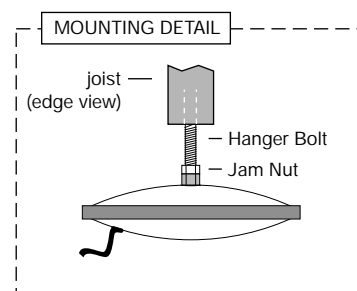
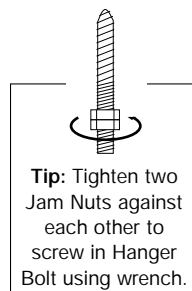
For decks, we recommend using two **Weatherproof TSTs** located equidistant from each other and the edges of the deck in order to create a uniform distribution of the tactile effect. Mount each TST to the bottom of a joist. *Make connections water-tight with electrical tape or molded plastic connectors.*

Note: If for some reason it is not possible to mount to the joists, use a bridge between joists as you would in a floor installation.

Steps for installation using the Hanger Bolt appear on the previous page...



TST mounts directly to bottom of joist using Hanger Bolt



Wiring & Connections

In order to control a TST's volume independently from, or proportionate to, other speakers in your system, you need a separate amplifier for the TST. We call this the "Tactile Amplifier."

Wiring the TST is essentially the same as wiring speakers:

- Use 16AWG or thicker speaker wire.
- Make sure all audio components are OFF before connecting the TST.
- The TST has an attached speaker wire with tinned ends. **The positive (+) lead is identified by either a red insulator or a + indication.** Observe this polarity when making connections to the Tactile Amplifier.

The four diagrams on the following pages show a stereo amplifier powering two TSTs. **However, in some cases – such as in an individual theater seat – only one TST is acceptable. In these cases, you may use a mono amplifier or a stereo amplifier that has been bridged to mono (refer to the amp's instructions for bridging).**

The recommended power range for each Clark TST is between 150 and 250 watts.

There are several ways to connect a TST to your home theater/surround-sound system. Which one you choose depends on your equipment and your application.

We have ordered the diagrams from 1 to 4, with 1 being the most ideal set-up. For consistency, in all set-ups we show a surround-sound processor or receiver. If you are using an ordinary stereo receiver, we recommend you follow Diagram #3.

The four diagrams cover the following set-ups:

- 1 Connecting to a Clark TACTILE-OUTPUT-equipped processor
- 2 Connecting to the FRONT Outputs of a processor or receiver
- 3 Connecting to the SPEAKER Outputs of a receiver
- 4 Connecting to the SUB/LFE Output of a receiver

A troubleshooting section on page 15 lists causes and cures for common problems.

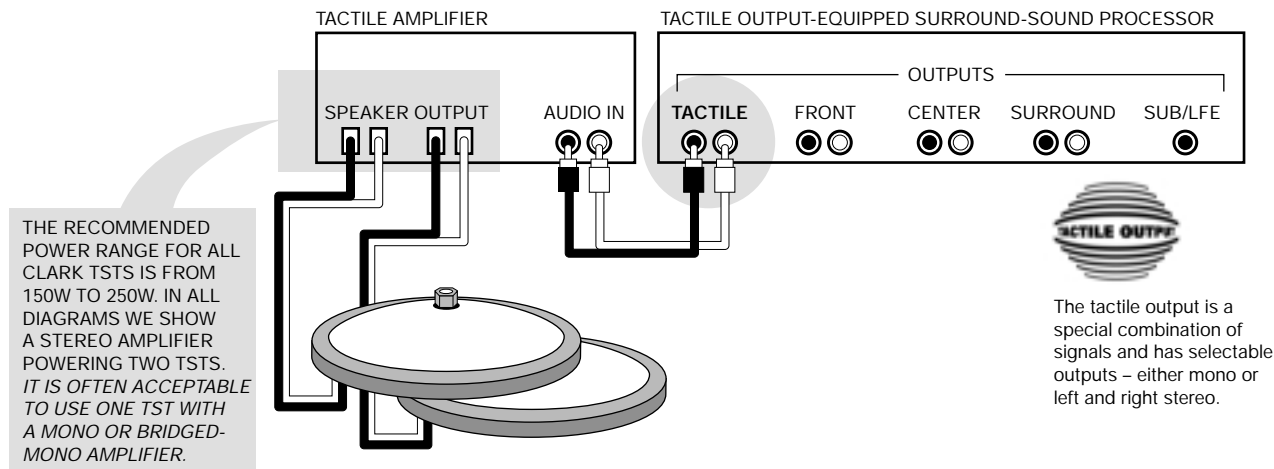
You can find additional installation notes at www.clarksynthesis.com.

You may also contact Clark by phone at (303) 797-7500, or send an e-mail to info@clarksynthesis.com.

1 Connecting to a Clark TACTILE OUTPUT-equipped surround-sound processor

This is the ideal set-up for Home Theater installations. It sends a user-adjustable mix of ALL channels to the Tactile Amplifier. Clark is currently licensing manufacturers who wish to include the TACTILE OUTPUT in their products.

- Follow the set-up instructions supplied with the processor.



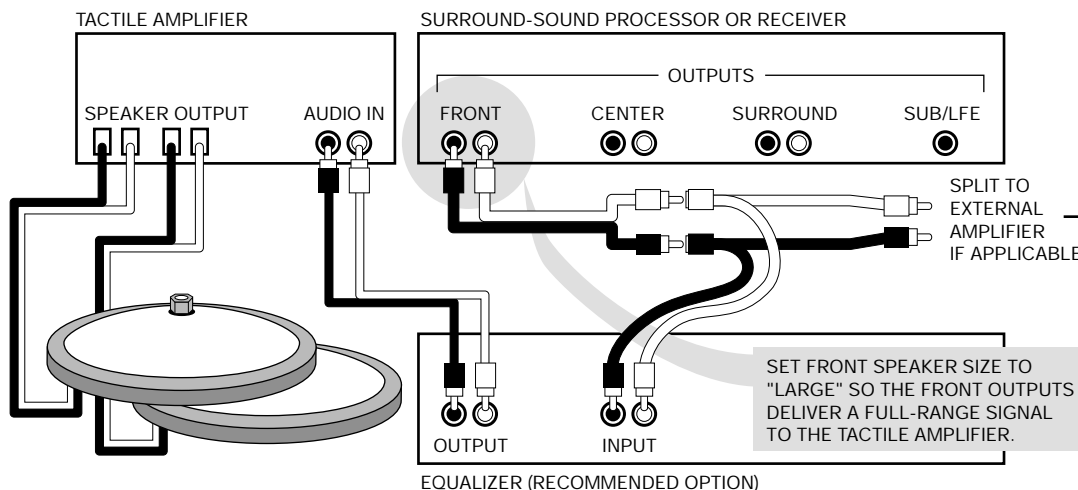
2 Connecting to the FRONT Outputs of a surround-sound processor or receiver

This is the second preferred set-up for Home Theater installations. It delivers the front left & right channel sound – not the center dialogue channel – to the Tactile Amplifier.

- On your processor/receiver, set Front Speakers to Large so the Tactile Amplifier receives a full-range signal.
- The volume of the TST is controlled by the processor/receiver, and will rise or fall in direct proportion to the other speakers in the system. The proportion is determined by the volume setting on the Tactile Amplifier.
- The optional equalizer allows you to tailor the frequency response of the TST.

Steps for balancing TST level when connected to the FRONT Outputs of a processor/receiver...

1. Set the volume of the processor/receiver to the loudest you would normally listen.
2. Slowly turn up the volume of the Tactile Amplifier to achieve the desired balance of TST vs. primary speaker volume.
3. Keep in mind that if you set the processor/receiver volume higher than you did in Step 1, you may have to reduce the volume of the Tactile Amplifier to prevent TST distortion.



NOTE: If you are using a surround-sound receiver with built-in amplifiers, you **DO NOT** need to split the FRONT output as shown in this diagram.

Wiring & Connections (cont'd.)

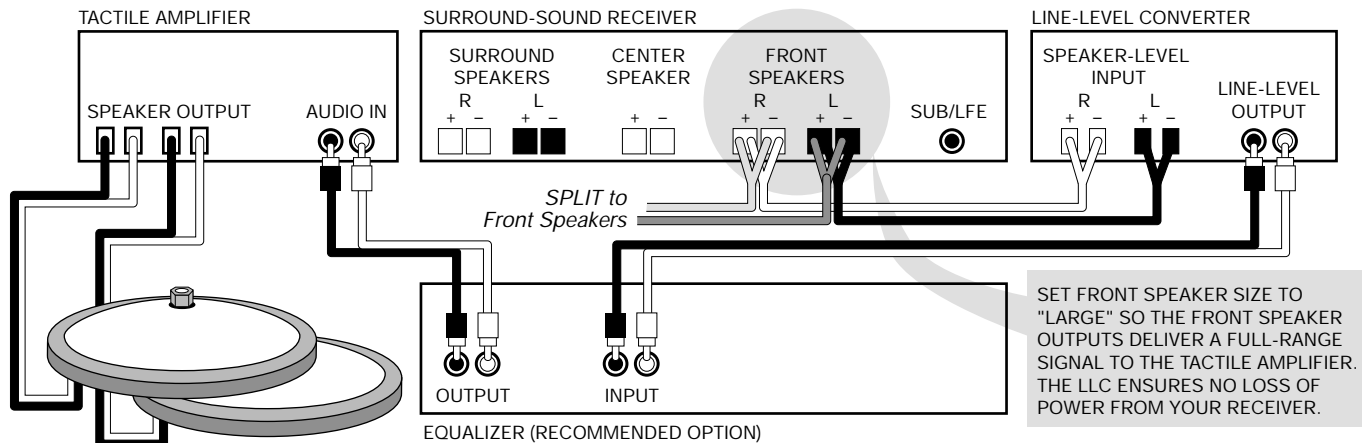
3 Connecting to the SPEAKER Outputs of a surround-sound receiver using a Line Level Converter (LLC)

Use this set-up if your receiver does not have Front Outputs as shown on Diagram 2. LLCs can be found at most audio retailers.

- On your receiver, set Front Speakers to Large so the Tactile Amplifier receives a full-range signal.
- The volume of the TST is controlled by the receiver, and will rise or fall in direct proportion to that of the primary speakers. The proportion is determined by both the volume setting on the Tactile Amplifier and the gain settings on the LLC.
- The optional equalizer allows you to tailor the frequency response of the TST.

Steps for balancing TST level when using a LLC...

1. Turn the LLC's gain levels all the way down.
2. Set the volume of the Tactile Amp to 3/4 of maximum.
3. Set the volume of the receiver to the loudest you would normally listen.
4. Slowly turn up the gain levels on the LLC to achieve the desired balance of TST volume vs. primary speaker volume. **IF YOU HEAR DISTORTION FROM THE TST, IMMEDIATELY REDUCE GAIN LEVELS ON THE LLC.**
5. Keep in mind that if you set the receiver volume higher than you did in Step 3, you may have to reduce the gain levels on the LLC to prevent TST distortion.



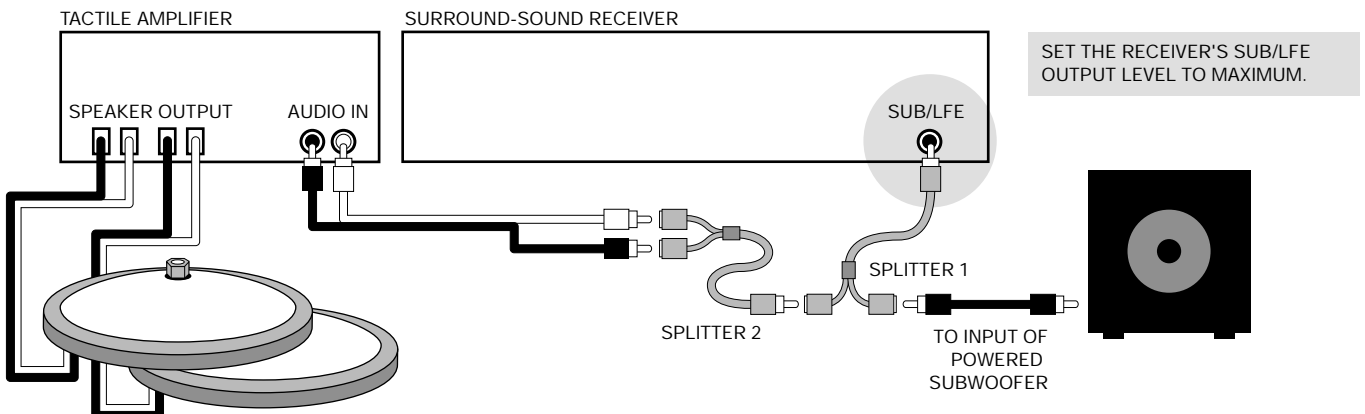
4 Connecting to the LFE/SUB Output of a surround-sound receiver

This alternative to set-up #3 does not require setting your Front Speakers to Large. Note that the SUB/LFE output does not provide the ideal signal for tactile sound.

- The TST will reproduce only the low-bass signals from the LFE/SUB output.
- The volume of the TST is controlled by the Tactile Amplifier; the subwoofer has its own volume control.
- The receiver controls the volume of the other speakers independently.

Steps for balancing TST level when connected to the LFE/SUB Output of a surround-sound receiver...

1. Turn the subwoofer's volume control all the way down.
2. Turn the Tactile Amplifier's volume control all the way down.
3. Set the receiver's SUB output to the maximum level.
4. Turn up the volume of the receiver and the subwoofer to the desired levels.
5. Slowly turn up the volume of the Tactile Amplifier to achieve the desired balance.



Clark is interested in making every installation the best it can be. We are proud of our superior technical support. However, before calling us directly, please consult the following troubleshooting information. Clark technical support can be reached by calling (303) 797-7500, weekdays from 9am to 5pm Mountain time.

TST does not produce enough volume

- *If you are using the Clark Tactile Output on a surround-sound processor:* Make sure the settings for FL, FR, and SUB outputs are set to mid level. Turn up the gain on the Tactile Amplifier to about 3/4 of maximum. Then turn up the gain on the primary amplifier until the system is balanced.
- *If you are using the FL and FR outputs on a surround-sound processor and you are using "Large" front speakers:* Make sure the processor is set to Large (Full Range) front speakers. Turn up the gain on the Tactile Amplifier to about 3/4 of maximum. Then turn up the gain on the primary amplifier until the system is balanced.
- *If you are using the FL and FR outputs on a surround-sound processor and you are using "Small" front speakers:* You still need to set the processor to Large (Full Range) front speakers so the Tactile Amp receives a full-range signal. However, you should insert an in-line high-pass filter/crossover – available at better electronics stores – to protect your small front speakers from receiving low-bass signals. Then follow the same procedure as above to balance the system.
- *If you are using the left and right Speaker Outputs with a Line Level Converter (LLC):* Turn up the gain on the Tactile Amplifier to about 3/4 of maximum. Then adjust the gain on the LLC until the system is balanced.
- *If you are using the LFE/SUB (.1) channel on a surround-sound processor for the Tactile Amplifier as well as a powered subwoofer:* Turn down the subwoofer amplifier. Set the processor's SUB output to maximum. Adjust the gain on the Tactile Amp and the primary amp until the system is balanced. Then turn up the subwoofer amplifier to the desired level.

Not enough volume with multiple TSTs

- Make sure the polarity (the + and – speaker leads) is the same on all TSTs. An out-of-phase TST will cancel much of the output of an in-phase TST.
- Consult the troubleshooting procedures in previous section.

I hear rattles or buzzes from the TST

- Make sure the jam nuts and corresponding hardware connections are secure and tight.
- Make sure the body of the TST and its speaker wire are not in contact with any object or surface.
- Make sure the Tactile Amplifier is not clipping or distorting.
- Turn down the bass and/or Loudness controls on your audio system.
- If you are using an equalizer, cut the bass frequencies, starting with the lowest band.

I hear buzzes from my recliner

- Try wrapping waxed dental floss (any flavor!) in the scissor hinges of the footrest to dampen the vibrations.

I hear voices coming from my chair!

- Make sure that the Tactile Amplifier is connected to the FL/FR outputs of your surround-sound component.

The TST has shut down

The TST has an internal cut-off circuit that protects it from too much power or too much distortion. The protection circuit will automatically reset when the condition has been remedied.

- Lower the volume of the Tactile Amplifier.
- Make sure the Tactile Amplifier is delivering at least 100 watts but less than 400 watts to the TST.

The TST touches the floor under my chair

The body of the TST should not be in contact with any object or surface.

- Raise the chair's feet to clear enough space for the TST.
- Or, if space permits, mount the TST fastener side down inside the chair.

