

Thank you for choosing the Vandersteen SUB THREE Subwoofer System. With proper care, your new subwoofer will provide many years of trouble free, high quality performance.

We recommend that you read this entire manual prior to connecting or using your SUB THREE Subwoofer System. UNPACKING CAUTION: Leave the upper or lower tray in place when pouring the SUB Three out of the box, even on carpet.

The SUB THREE Subwoofer System is the product of extensive research into the qualities required for realistic music and film sound reproduction. The SUB THREE's engineering, construction, and materials far exceed conventional industry standards and result in superior performance and reliability.

The SUB THREE Subwoofer System consists of one or more SUB THREE subwoofers and the appropriate crossover. The SUB THREE uses three eight-inch drivers, each with a massive 1.5 inch, four-layer voice coil and a forty-ounce magnet structure. The integral 300-watt amplifier does not current limit and has ample power for the most demanding situations. The amplifier's feed-forward error correction eliminates response and phase variations that would

compromise the subwoofer's performance.

The SUB THREE Subwoofer System will interface with most electronics, main speakers, and environments. The EQ, crossover, and sensitivity settings allow the SUB THREE's optimization to the main amplifier's input specifications, the main speakers' efficiency, and the listening room requirements. The innovative Q control then allows you to tailor the bass response's character to best suit your tastes and the room characteristics. The SUB THREE's pleasing appearance will enable it to visually complement your main speakers and the decor of your home.

The Vandersteen SUB THREE Subwoofer System is designed and built in the United States of America.

HOW THE SUB THREE WORKS

Conventionally powered subwoofers receive their input signal directly from their crossover instead of the main amplifier. The sonic signature of the main amplifier that is an integral part of the sound you hear from the full-range speakers is missing from the subwoofer. This sonic discontinuity causes blending problems as the system's sonic characteristics are different above and below the subwoofer crossover point. The SUB THREE Subwoofer System uses a unique connection method that reduces the main amplifier's current demands and leaves the main amplifier in the signal path to the subwoofer. This connection method insures

the main amplifier's characteristics, evident through the full-range speakers, sonic continuity are maintained to the deepest bass, but with the power and control of the SUB THREE's internal 300-watt amplifier.

Like conventional subwoofers, the high-pass portion of the SUB THREE's crossover is inserted into the signal path just before the main power amplifier to roll off the low-frequency response of the main amplifier and speakers. The difference is that the SUB THREE does not take its input from its crossover but from the main amplifier in parallel with the main speakers. To compensate for the low-frequency roll-off, the SUB

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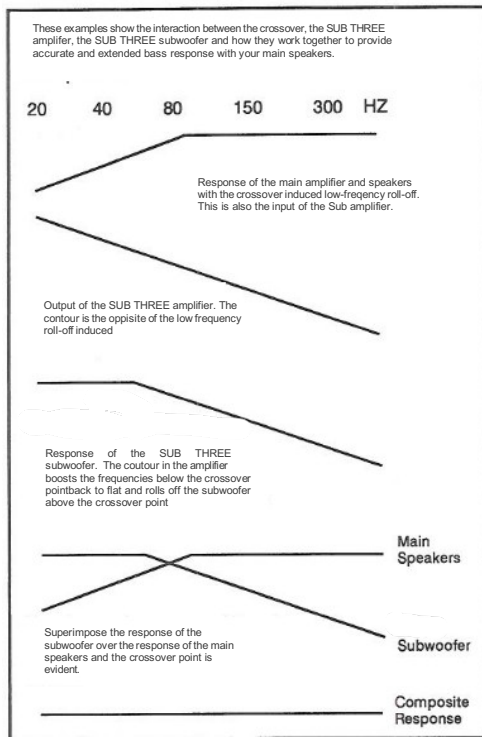
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SUB THREE POWERED SUBWOOFER OPERATION MANUAL

THREE's amplifier's response is contoured to restore the low frequencies to the proper level induced by the crossover. The SUB THREE's input Impedance is high enough (over 100k ohms) that it has no discernible effect on the main amplifier's output.

THE SUB THREE CROSSOVERS

Each SUB THREE subwoofer needs an M5-HP crossover.



Mono OR Stereo Bass?

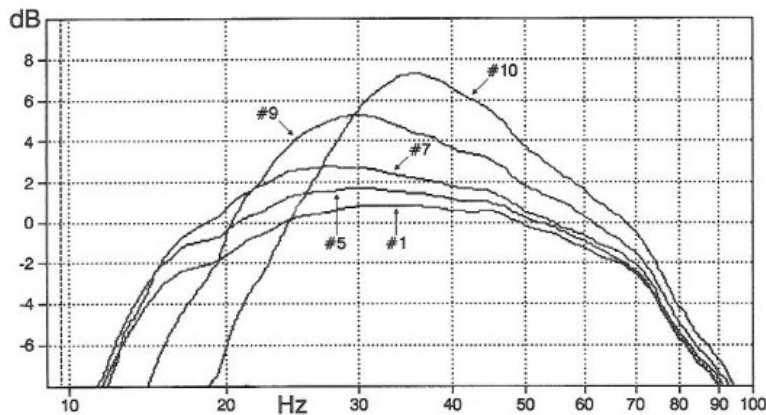
There are significant advantages to using two subwoofers. Summing the channels into a single subwoofer reduces or cancels all the low-frequency information containing phase differences between the channels. Stereo subwoofers reproduce all of the bass information, complete with the phase differences that help provide the imaging and location clues we use to place people and things at distinct points in the sound field. Stereo subwoofers also lend themselves to natural placement near the corners where the low-frequency room gain is more linear and often desirable.

ADJUSTABLE SENSITIVITY, ROOM EQ, AND Q FEATURES EXPLAINED

The sensitivity, room EQ, and Q controls on the SUB THREE's input plate allow you to match the bass level to the full-range speakers and tailor the characteristics of the low frequencies.

The sensitivity control's label is in dB to initially match to the main speaker's efficiency rating, the Q control starting setting is "1", and 11-bands of EQ at noon.

The Q control can then tailor the SUB THREE's low-frequency response to compensate for room characteristics and to best suit your sonic tastes. The Q control is from 1 to 10. Position 1 provides the tightest bass and best transient response, while position 10 emulates a typical home theater subwoofer's peaked response. The Q control effect on the SUB THREE's frequency response is illustrated in the graph below. For clarity, only positions 1, 5, 7, 9, and 10 are shown. (The chart does not include the effects of low-frequency room gain.)



When you want more of a conventional home theater sound, turning up the system's bass tone control will provide the extra low-frequency emphasis that is desirable in many movies. If your system does not have tone controls, setting the SUB THREE's Q control to a higher number will yield similar results.

The 11 Band EQ adjusts your SUB THREE precisely to the room bass nodes to the sub's position. Setup is explained in a later section.

SUB THREE SYSTEM SETUP

PACKING LIST

The following components, accessories, and documents come with each *SUB THREE* subwoofer:

- 1 SUB THREE subwoofer with an integral amplifier.
- 1 Twenty-foot lengths of speaker cable.
- 2 Dual banana plugs.
- 3. Spikes with jam nuts. (3/8 x 16 thread)
- 1 Operation manual
- 1. Five-year warranty registration
- 1 Power Cord

SETTING THE M5-HP FOR YOUR SUB THREE SYSTEM

When the M5-HP is used with the SUB THREE series subwoofers, the sticker on the chassis cover should be ignored because these settings are for 100 Hz High Pass and the SUB THREE is designed for 80 Hz High Pass. Set the switches according to the chart below. An alternate crossover setup method is available via our YouTube Channel on the website.

1. Remove the M5-HP cover and locate the internal set of 8 dip switches. The exact type of switch used may vary.

Single-Ended M5-HP Crossovers (RCA input and output with eight-position switch) Set the Single-Ended M5-HP to match the input impedance of the main amplifier.

Amplifier Input Impedance	Switch(es) ON
400k	4
300k	1,3
200k	1
150k	1,2
100k	2
75k	None
50k	2,6,8
33k	1,2,3,4,5,8
20k	6,7
10k	2,4,7
5k	7,8

Do not change the switch settings when the main amplifier is on



CAUTION: The SUB THREE must be used with a properly adjusted Vandersteen High Pass Filter. If using an integrated, only those with a pre out and amp in loop are useable

Balanced M5-HPB Crossovers (XLR input and output)
Set the Balanced M5-HP to match the impedance SUM of the positive and negative legs of the main amplifier's input. (The individual legs must each be one-half of the impedance sum.)

400k	4
300k	3
200k	5
150k	None
100k	1,3,7,10
75k	1,3,5,7,10
50k	1,4,6,8,10
33k	1,8,10
20k	1,2,9,10

Do not change the switch settings when the main amplifier is on

If the cover of your crossover has different values, always follow the values on the cover.

3. Turn on the switches listed for the value you found. The numbered side is "ON." Slide and toggle type switches are on when they are toward the numbers, and a rocker type switch is on when it is depressed on the side of the numbers. Some switches are labeled "OPEN" and "CLOSED." OPEN is OFF, and CLOSED is ON.

SUB CONNECTION

Do not install the spikes at this time. Without the spikes, the SUB THREE can easily be pushed across the carpet to try different locations. The SUB THREE(s) should be placed on the same wall as the main speakers with just a couple of inches of clearance for amplifier ventilation.

Two 20-foot lengths of speaker cable and two dual banana plugs are provided with each SUB THREE for connection to the main amplifier. Attach a dual banana to one end of each cable to plug into the SUB THREE. Leave the cables full length so you can try the sub in different positions for the SUB THREES once the Break-in period has elapsed. With the M5-HP crossover installed in the signal path just before the main amplifier, connect the SUB THREE(s) in parallel with the main speakers, as shown in the illustrations. With stereo subwoofers, only one input on each subwoofer is connected. In bi-wired systems, three sets of wires are attached to the main amplifier. Use spade lugs on the amplifier end of the wires going to the main speakers and banana plugs on the subwoofer end of the subwoofer wires. After the main speaker wires are connected, insert the subwoofer's banana plugs into the amplifier's binding posts.

If your amplifier has connections for two sets of speakers (i.e., A & B), do not connect the main speakers to one and the subwoofer to the other. Often there are differences between the two sets of outputs. Some systems may also benefit from connecting the SUB THREE with the same cable type as the main speakers. All connections must be in the proper polarity. If one of the SUB THREE's inputs is connected out-of-phase from the other input in a mono subwoofer system, the inputs will cancel. With stereo subwoofers, connecting one subwoofer out-of-phase from the other will seriously affect the amount and quality of bass.

Once the crossover and cables are correctly installed in the system, the subwoofer should be plugged into a non-switched AC outlet. As it is plugged in, the SUB THREE should produce a low-frequency thump.

SUB PLACEMENT

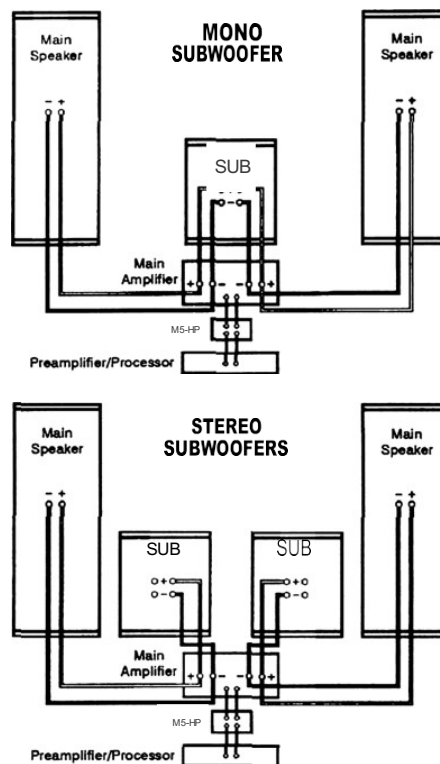
While the SUB THREE(s) should be on the same wall as the main speakers and close to the wall the exact placement will probably depend as much on practical as acoustic considerations. Placement affects the subwoofer's sound, so you should try all the placements that will work in your domestic

situation. Be flexible; it is only important that a single subwoofer be centered when it is mated with small, limited range main speakers. With full-range main speakers, the subwoofer may work better in the corner. In general, a subwoofer will sound fuller and more powerful when it is in a corner and leaner when it is and away from walls. The SUB THREE's adjustable Q allows some compensation for these effects and expands the placement options in most rooms.

As you try different placements, you may also have to readjust the SUB THREE's sensitivity and/or Q setting to maintain the best balance with the main speakers' considerations and redo the room EQ settings outlined later in this manual.

SPECIAL INSTRUCTIONS FOR BI-AMPED SYSTEMS

In horizontally bi-amped systems, install the M5-HP crossover before the bass amplifier: Connect the bass amplifier to the SUB THREE(s). In vertically bi-amped systems, install the M5-HP before the channels being used for bass. Connect the bass channels to the SUB THREE(s).



Audio/Video CONSIDERATIONS

When a SUB THREE is used in an audio/video system, the basic configuration is similar to a music system. The crossover is inserted into the signal path just ahead of the main amplifier, and the SUB THREE is connected to the amplifier in parallel with the right and left main speakers.

With Separates (External Processor)

The crossover is inserted into the signal path after the processor and just ahead of the main front left and right amplifier. The surround processor must be programmed to blend all the low frequencies into the main front left and right channels rather than routing them to the center channel or the processor's subwoofer output. Information on configuring your processor for these parameters is available in the processor's manual or from its manufacturer.

WITH AN A/V RECEIVER

The crossover is inserted into the signal path between the "Pre Out" and "Main In" jacks. Without this connection option, the SUB THREE cannot be used. The receiver must be programmed to redirect the low-frequencies into the main front left and right channels rather than routing them to the center channel or the receiver's subwoofer output. Information on configuring your receiver for these parameters is available in the receiver's manual or from its manufacturer.

DISCRETE MULTI-CHANNEL

Discrete multi-channel audio formats can use up to four subwoofers. The best way to integrate subwoofers into the system depends on how many you use.

All discrete multi-channel formats have a Low-Frequency Effects channel. Experience and research have convinced us that these formats sound much better when the processor is programmed to redistribute the LFE information to the right and left front channels. You should check with your processor's manufacturer as to its capabilities in this regard.

The following recommendations assume that the LFE information is redistributed to the right and left front channels.

The Number of System Subwoofers:

1 Subwoofer:

Connect the subwoofer to the left front and right front channels.

2 Subwoofers:

Connect one subwoofer to the left front channel and the other subwoofer to the right front channel. Two subwoofers are a quantum improvement over a single unit and preferable

in high-quality multi-channel systems.

Systems that have reached the level where there are no significant advantages to improving the electronics or speakers can benefit from adding two more subwoofers for surround channels.

4 Subwoofers:

Left front, right front, left surround, and right surround. (When the SUB THREE'S are used with Vandersteen VSM surround speakers, the crossover should be two settings below the surround amplifier's input impedance. This setting will avoid interaction with the VSM series surround. Like the main amplifier, the surround amplifier will use the speaker's integral high-pass filter.)

OPTIMIZING SETTINGS

The following information assumes that the break-in period has elapsed. Finalizing **the SUB THREE's placement, sensitivity or Q setting before it is fully broken-in could compromise the ultimate performance level.**

POLARITY

The SUB THREE's polarity may need to be reversed with some main speakers to provide the best integration. To reverse the SUB THREE's polarity, simply turn the banana plug(s) around to connect the main amplifier to the subwoofer negative and the main amplifier negative to the subwoofer positive.

SENSITIVITY

The SUB THREE's sensitivity control should initially be set to match the approximate sensitivity of your main speakers and then be fine-tuned per the instructions on page 2. Adjustments to the Q control or polarity may be needed when the sensitivity is changed.

LOW-FREQUENCY ROOM OPTIMIZATION AND LEVEL

The eleven room compensation controls located on the rear input plate help counter the amplitude and phase effects of room nodes and anti-nodes and provide the most linear low-frequency response at the listening position. This disk is calibrated for the Radio Shack analog SPL meter. Once the controls have been set for a particular room, they do not need to be readjusted unless the speaker placement and/or listening position are significantly changed.

TECHNICIAN'S ADJUSTMENT SECTION (A Video of this setup process is linked on our website and on our YouTube channel. It is the same process as the Model Seven setup shown. Setup worksheets are also available on the website)

Only a qualified technician or owner with an Analog Radio Shack S.P.L. Meter and matching test disc should adjust the room compensation controls. This procedure can take several hours. PLEASE NOTE: If you are calibrating a single SUB THREE you will only employ tracks 1-11 with the Preamp set to Mono. If you don't have a mono setting you will need a low-cost "Y" adaptor to drive both left and right channels simultaneously, main speaker included.

The steady state test signal can cause the SUB THREE amplifier to run warm. This disk is calibrated to the Radio Shack analog S.P.L. Meter. Owners take your time, it's possible.

TECHNICIAN'S GUIDE TO ADJUSTING THE ROOM COMPENSATION AND LOW-FREQUENCY LEVEL CONTROLS.

1. Set the S.P.L. Meter at the listening position at ear height. Turn on the S.P.L. Meter to the 70dB scale, "C" weighting, "Fast" response.
2. Insert test disc into a CD Player, set the volume on the preamp to a low level. CD automatically does left first.
3. On the SUB THREE Amplifier set the low frequency contour control to minimum (#1) and verify that all eleven room compensation band are set straight up (slot vertical). Set low frequency level to approximately match the main speaker sensitivity.
4. Play tracks nine through eleven and note on paper the meter readings for all three tracks. Adjust the preamp volume up or down until these tracks average 70dB. Example: track nine 69dB, track ten 72dB and track eleven 68dB. This is your reference volume do not adjust until this entire calibration is complete for both speakers.
5. Play track one through eleven and adjust each band to 25 to 33% of the meter reading noted in step # 4.

Play tracks:

Meter Reading: Noted Step # 4:

Adjust Bands to approximately 33% target

Track#	1	2	3	4	5	6	7	8	9	10	11
SPL Reading	+4	+6	-3	+8	+10	-6	+3	-3	+2	+1	+3
Target	+1	+2	-1	+2.5	+3	-2	+1	-1	+5	0	+1

Note: Do not try to adjust every peak or dip all the way to 0 dB. Our studies have shown that adjusting all the peak and dips to 0dB can cause a non-musical sound with audible equalization effects. Your Sub is now properly compensated for the room.

6. To set Stereo SUBs play tracks twenty four through twenty six and note on paper the meter readings for these tracks. Adjust the right SUB THREE Low Frequency Level Control up or down until these three tracks average 70dB like the left channel. Save this last set of reading for use in step# 7.

7. Play tracks sixteen through twenty six and adjust the right speaker bands as in step# 5. Note: Occasionally full adjustment of one or more of the bands will not adjust to the target value for the right or left SUBs, get it as close as possible. If one or more of the bands turned maximum up or down makes little or no difference on the meter, leave it adjusted straight up (slot vertical). Your speakers are now calibrated to the room.

Note: The eleven bands correspond to the frequencies below:

Track Number	1	2	3	4	5	6	7	8	9	10	11
Frequency	20	24	30	36	42	50	60	72	84	100	120

Q CONTROL

The Q control allows you to tailor the bass's character to your particular tastes and room characteristics. (See the chart on page 2.) When you make sensitivity or polarity changes, you may also need to readjust the Q setting. These are user controls and will not have any effect on the room EQ settings. This control is adjusted while listening to the plucked bass on test disc tracks 13 and 14. Bass should be one instrument and equal weighting top to bottom of the scale.

INSTALLING THE SPIKES

When the best location for the SUB THREE(s) has been found, turn the SUB THREE(s) over onto a soft surface and install the spikes with the jam nuts tightened against the bottom of the subwoofer. If the SUB THREE(s) will be on a hardwood floor, a spike shoe (available from the dealer) should be placed under each spike to reduce the likelihood of damage to the floor. With the spikes installed and the placement finalized, the cables from the main amplifier to the SUB THREE(s) can be shortened as needed.

CROSSOVER OPTIMIZATION

Once the subwoofer(s) is broken-in, you should again use the provided jazz recording with a stand-up bass to evaluate the blend between the SUB THREE(s) and the main speakers. Using the switches inside the M5-HP crossover turn off amps and set one setting above turn on the amps and then listen. Then turn off the amp and reset one setting below the original setting and turn the amps back on and listen to the jazz recording. (Some adjustments to the level and Q controls may be necessary.) When you determine the best crossover selection between the preamplifier and

power amplifier setting for your system, you are all done.

SERVICE

In the unlikely event that your SUB THREE Subwoofer System requires service, please follow these procedures

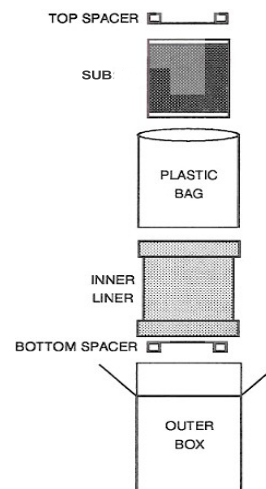
1. Verify that the SUB THREE has been set up and connected according to the Instructions in this manual. Review the troubleshooting guide on the next page.
2. Download the R.M.A. Form and the Repair Instruction Form and follow the troubleshooting.
3. The SUB THREE is a modular system.
4. Return the damaged or defective module and the completed Return Authorization Form to Vandersteen Audio. Any shipment of a complete SUB THREE to the factory will be refused.

MAINTENANCE

All system connections should be cleaned periodically with alcohol or a solution made specifically for cleaning electrical contacts. The wood veneers are lacquered at the factory and can be maintained with a light application of Pledge or a similar product. The grille can be vacuumed using a brush attachment that will not snag the cloth. Care should be taken that objects that could mar the finish are not placed on top of the SUB THREE. The subwoofer should not be exposed to excessive sunlight or heat, which can damage the fit and finish of the veneer.

PACKING THE SUB THREE

To prevent physical or cosmetic damage, always pack the SUB THREE in its original box with complete inner packing prior to transportation or shipment. The proper method of packing the SUB THREE is shown in the illustration below. When you pack the SUB THREE, be sure that the top and bottom spacers are oriented, as shown in the illustration.



TROUBLESHOOTING GUIDE

Problem: Subwoofer hums. Audible at the listening location.

Solution: Try different grounding methods. Run a ground wire from the SUB THREE's ground terminal to either the preamplifier or main amplifier.

Problem: Still hums, grounding changes didn't help.

Solution: Check your interconnect cables. Route cables away from the amplifier. Position the M5-HP crossover away from the amplifier. Verify that the top cover is installed on the M5-HP. Try the system at a very low volume level without the M5-HP crossover installed. If the M5-HP is the source of the hum, it will have to be replaced before the system can be used.

Problem: Still humming, cable, and crossover changes didn't help.

Solution: Disconnect the inputs from the SUB THREE. If the hum is still evident at the listening position, please contact Vandersteen Audio as the unit needs service.

(It is normal for the amplifier's high-voltage transformer to produce a slight hum, but it should not be audible more than a few feet away.)

Problem: Low output level.

Solution: Verify the main amplifier's actual input impedance and that the crossover is set to one value lower. (See page 3.) Check the sensitivity and Q control settings. (See pages two and 5.) Try different placements. Positioning the subwoofer near a corner will make the subwoofer sound fuller and more powerful. (See page 5.)

Problem: No output.

Solution: Verify that the SUB THREE is plugged into a live AC outlet. (It should thump when you plug it in.) Verify the polarity of the SUB THREE's input wires. Unplug one channel's inputs from the SUB THREE; if you then get output, the input wires are out-of-phase from each other and canceled. (See pages three and 4.)

COMMON SUB THREE QUESTIONS

To make the SUB THREE connection easier, can I connect the SUB THREE's wire to the main speakers' input along with the regular speaker wires instead of the main amplifier?

Although connecting the SUB THREE to the main speakers may seem more manageable and, on the surface, it looks like it should work, our tests have shown that the performance of the SUB THREE is compromised when it is connected to the main speakers rather than directly to the main amplifier.

Can the M5-HP crossovers be plugged into either the inputs of the main power amplifier or the preamplifier's outputs?

While it is physically possible to connect the M5-HPs either way, connect the M5-HPs to the inputs of the main power amplifier to minimize their interactions with the cables ahead of the power amplifier.

Is the SUB THREE designed for use only with Vandersteen main speakers?

The SUB THREE will work well with almost any quality loudspeaker. With multiple, moderately sized drivers, superior pitch definition, and adjustable sensitivity, the SUB THREE subwoofer is an excellent match for quality electrostatic, planar, ribbon, and dynamic speakers. Our warranty records indicate that many different speakers have been successfully mated with SUB THREE subwoofers.

Since bass is omnidirectional, what are the advantages of using two subwoofers instead of

one?

Modern digital sources maintain full stereo separation down to the lowest frequencies. Bass with phase differences between the channels is canceled when the two channels are summed into a single subwoofer. Stereo subwoofers reproduce all of the bass information, complete with the phase differences that help provide the imaging and location clues to create a sound field. Stereo subwoofers also lend themselves to natural placement near the corners where the low-frequency room gain is often desirable on music and spectacular film sound effects.

The manual says to use a jazz recording with a stand-up bass to get the sensitivity control. Can I use a test disc with test tones?

Single tones are not representative of the way we hear and can result in gross mis-adjustments. As a stand-up bass scales up and down, the notes pass directly through the crossover range. Simply adjust the sensitivity control so that the lower notes are the same loudness as the upper notes using tracks 13 and 14 on the provided test disc.

Can a SUB THREE and an older model 2W be used as a stereo pair of subwoofers?

No, the performance differences between the models will prevent proper integration. If you have a 2W or 2Ws, either add a second 2W or 2Wq or trade the sub to SUB THREE.

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LIMITED ONE YEAR WARRANTY

VANDERSTEEN AUDIO loudspeakers are warranted to the original purchaser be free from defects in materials or workmanship, SUBJECT TO THE FOLLOWING CONDITIONS, for one (1) year from the date of purchase from an authorized VANDERSTEEN AUDIO dealer.

THIS WARRANTY IS SUBJECT TO THE FOLLOWING CONDITIONS AND LIMITATIONS:

This warranty is void and inapplicable if the loudspeaker has:

- a. not been used in accordance with the Instructions contained in the operation manual.
- b. been subject to misuse or abuse, examples of which would be burned voice coils and/or burned crossover parts.
- c. been modified, repaired, or tampered with by anyone not specifically authorized to do so by Vandersteen Audio.
- d. been subject to inputs in excess of the maximum rating, or inputs from an unstable or clipped amplifier.
- e. been damaged by accident, neglect or transportation.

IF A VANDERSTEEN AUDIO LOUDSPEAKER FAILS TO MEET THE ABOVE WARRANTY AND THE ABOVE CONDITIONS HAVE BEEN MET, THEN THE PURCHASER'S SOLE REMEDY SHALL BE TO RETURN THE PRODUCT TO VANDERSTEEN AUDIO WHERE THE DEFECT WILL BE REPAIRED WITHOUT CHARGE FOR PARTS OR LABOR.

The speaker must be packed in the original packing and returned to VANDERSTEEN AUDIO via insured freight by the consumer at his or her own expense. A returned product must be accompanied by a Return Authorization Form, (available from VANDERSTEEN AUDIO upon request) which includes a written description of the defect and return shipping information.

ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THE ABOVE WARRANTY. THIS WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL COSTS OR DAMAGES TO PURCHASER.

Some states do not allow limitations on how long an implied warranty lasts, or an exclusion of incidental or consequential damages so the above limitations or exclusions may not apply. This warranty gives you specific legal rights, you may also have other rights in your state.

VANDERSTEEN AUDIO reserves the right to modify the design of any product without any obligation to previous purchasers and/or to change the prices or specifications without notice or obligation to anyone.

A PERSONAL NOTE

I have been doing volunteer work for several years with elderly people with severe hearing losses, and I have seen the frustration and anger that are brought on by these losses. We now know that many of these people developed their hearing problems **because of** exposure to high noise levels when younger.

Many audio/video systems, as well as home, portable and auto stereo systems are capable of volume levels potentially damaging to your hearing. Please use common sense and listen to your movies and music at safe levels now so you will still have the ability to hear and enjoy them in the future.



Richard Vandersteen