Guide to Biamplication

Tower Models 3.3, 2.5i, VT-2 and VT-1.2
Subwoofer Amplifiers SA-3 and SA-2

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How do you turn the passive subwoofer section of an NHT tower speaker into a fully adjustable powered subwoofer? How do you customize low frequency balance for any room? How do you increase the dynamics and power handling of your speakers? Take advantage of NHT’s outboard subwoofer amplifiers to biamplify any NHT tower speaker!

Biamplification is the use of two separate amplifiers, one to power the low frequency (subwoofer) drivers and one to power the upper frequency (midrange / tweeter) drivers. The advantages of biamplification include reduced distortion, increased dynamic range and power output. Since both amplifiers are spared the task of reproducing the entire frequency range, both are able to concentrate all of their power toward a specific frequency range. When the speakers are driven to highly elevated listening levels, it is likely the subwoofer amplifier will clip first, but this distortion will be isolated from the upper frequency ranges because they are amplified separately.

Biamplifying tower speakers with the NHT subwoofer amplifiers results in added benefits, as it transforms their built-in subwoofer sections into fully adjustable powered subwoofers. Using the SA-2 or SA-3’s onboard bass tuning functions, the user can fine-tune a tower loudspeaker’s bass response for a specific listening environment. For example, if the speakers are used in a room that tends to under-emphasize or over-emphasize low frequencies, it is possible to increase or decrease the volume level of the subwoofer sections independently of the upper driver sections. Additionally, the subwoofer amplifier’s low-pass crossover allows the user to adjust the rolloff of low frequencies to the subwoofer sections of the speakers, for further fine-tuning of low- to mid-bass frequencies.

Towers may be biamplified monaurally using a single subwoofer amplifier (hereafter called “SA”) and a full-range main (stereo) amplifier, or biamplified in stereo using two SA’s and a main amplifier. Additionally, the towers may be biamplified either in series or in parallel. Wired in series (Method #1), the main amplifier receives a filtered line-level signal via the high-pass output from the SA. Wired in parallel (Method #2), both the main amplifier and the SA receive full-range signals directly from the preamplifier. The main amplifier may be a stand-alone stereo unit, dual monoblocks, or the amplifier section of an integrated amplifier or A/V receiver that features “Pre-Out” and “Main-In” jacks.

All NHT tower loudspeakers are designed with dual sets of binding posts to allow for biamplification. The following chart provides guidelines for the optimal biamplification configuration for any NHT tower speaker. In all cases, two SA’s may be substituted for one to provide enhanced performance.

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<tbody>
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<td>Model 3.3</td>
<td>SA-3</td>
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<td>Model 2.5i</td>
<td>SA-2</td>
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<tr>
<td>VT-2</td>
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<td>VT-1.2</td>
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Biamplification Method #1 (Most Recommended)

Line level connection in series, utilizing the SA's high-pass filter loop

Use If:
You have a separate preamplifier and main amplifier
You have a receiver with front left & right "Pre-Out" and "Main-In" jacks

This connection method routes the full-range line-level signal from the preamplifier through the SA, which passes on a high-pass filtered signal to the main amplifier and powers the subwoofer sections of the speakers directly with a low-pass filtered signal. Do not use the receiver's "Subwoofer Out" jacks to connect the SA, as this signal already contains low-pass filtering.

1. Run a pair of RCA interconnect cables from the preamplifier output to the SA's LINE IN jacks.
2. Run a pair of RCA interconnect cables from the SA's LINE OUT jacks to the main amplifier's line-level inputs.
3. Remove the binding post jumper straps from the tower speaker (VERY IMPORTANT!).
4. Run speaker cables from the main amplifier's speaker output terminals to the tower speakers' upper pairs of binding posts.
5. Run a second pair of speaker cables from the SA's SUBWOOFER OUTPUT terminal to the tower speakers' lower pairs of binding posts (both speakers). Since there is only one SUBWOOFER OUTPUT terminal on the SA, connect both speaker cables to the single terminal.

Note: When biamplifying with two SA's (one for each tower speaker), run the left channel RCA interconnect cable to the left channel SA's LINE IN "L" jack, then out from its LINE OUT "L" jacks. Run the right channel RCA interconnect cable to the right channel SA's LINE IN "R" jack, then out from its LINE OUT "R" jack.
**Biampilification Method #2**

*Line level connection in parallel, with no high-pass filtering*

**Use If:**
You have a receiver with front left & right “Pre-Out” or “Line Out,” but no “Main-In” jacks

This connection method results in sending a full-range line-level signal to both the main amplifier and the SA. If you have a receiver with “Pre-Out” jacks but no “Main-In” jacks, you can use the “Pre-Out” jacks to connect the SA, without having to route the signal back to the receiver. **Do not use the receiver’s “Subwoofer Out” jacks to connect the SA, as this signal already contains low-pass filtering.**

If you have a separate preamplifier that features two sets of line outputs, each set is connected to one amplifier. If the preamplifier features only one set of line outputs, use “Y”-adaptors to split the signal.

1. Run a pair of RCA interconnect cables from preamplifier output #1 to the SA’s **LINE IN** jacks.
2. Run a second pair of RCA interconnect cables from preamplifier output #2 to the main amplifier’s line inputs.
3. Remove the binding post jumper straps from the tower speaker **(VERY IMPORTANT!)**.
4. Run speaker cables from the main amplifier’s speaker output terminals to the tower speakers’ upper pairs of binding posts.
5. Run a second pair of speaker cables from the SA’s **SUBWOOFER OUTPUT** terminal to the tower speakers’ lower pairs of binding posts (both speakers). Since there is only one **SUBWOOFER OUTPUT** terminal on the SA, connect both speaker cables to the single terminal.

**Note:** When biamping with two SA’s, run RCA interconnect cables to either the SA’s left or right **LINE IN** jacks. For more gain, use a “Y”-adaptor to utilize both the left and right inputs.
Bi amplification Method #3 (SA-2 ONLY)

Speaker level connection in parallel, with no high-pass filtering

Use If:
You have a receiver with no “Pre-Out” or “Line Out” jacks

This connection method may be employed if your receiver has no line-level preamplifier output of any sort. The speakers and the SA-2 are connected in parallel off the receiver’s speaker output terminals. If your receiver has two sets of speaker output terminals (“Speaker A” and “Speaker B”), you may connect the speakers directly from “Speaker A” and connect the SA-2 from “Speaker B”.

1. Remove the binding post jumper straps from the tower speaker (VERY IMPORTANT!).

2. Run speaker cables from the receiver's “Speaker A” output terminals to the tower speakers' upper pairs of binding posts.

3. Run a second pair of speaker cables from the receiver's “Speaker B” output terminals to the SA-2's INPUT FROM AMPLIFIER barrier strip terminal. If the receiver has only one set of speaker output terminals, connect both pairs of speaker cables in parallel from the same terminal.

4. Run two pairs of speaker cables from the SA-2’s SUBWOOFER OUTPUT to the tower speakers' lower pairs of binding posts (both speakers). Since there is only one SUBWOOFER OUTPUT terminal on the SA-2, connect both speaker cables to the single terminal. Do not use the SA-2's OUTPUT TO SATELLITES barrier strip terminal.
Recommended SA Settings for Bi-amplification:

1. **SUBWOOFER PHASE**: 0°. If the main amplifier inverts phase, use 180°. If you are unsure about this, select the setting that results in higher bass output with the volume control unchanged.

2. **SUBWOOFER VOLUME**: Adjust for accuracy, listening for seamless blending between upper and lower frequency ranges. When changing electronics, it may become necessary to re-adjust the SA's volume level, since the correct volume setting depends on the sensitivity of partnering electronics.

3. **SATELLITE / HIGH-PASS Fc** (High-pass filter): Set to lowest position (50Hz on SA-2; 65Hz on SA-3). **THIS SETTING ONLY APPLIES TO BIAMPLIFICATION METHOD #1. IF YOU ARE USING METHOD #2 OR #3, IGNORE THIS SETTING.**

   Set the SA's high-pass filter to its lowest setting to ensure that the SA's high-pass filter does not interfere with the tower speaker's passive crossover. In other words, the SA sends only information from 50Hz-up to the main amplifier (and consequently the speaker's upper range drivers). The speaker itself then filters the signal further, according to the low-pass filter designed into its passive crossover.

4. **SUBWOOFER / LOW-PASS Fc** (Low-pass filter): Set to highest position (150Hz). Set the SA's low-pass filter to its highest setting so that the SA's low-pass filter does not interfere with the tower speaker's passive crossover. In other words, the SA sends only information below 150Hz to the speaker's subwoofer section. The speaker itself then filters the signal further, according to the high-pass filter designed into its passive crossover.

Bass Tuning Functions

The following two bass tuning functions can be employed to further "dial in" a tower speaker's bass response, using the SA's onboard low-pass filter.

1. **If there is excessive mid-bass**, lower the SA's low-pass setting (**SUBWOOFER / LOW-PASS Fc**) until the mid-bass response is smoothed out. Lowering the SA's low-pass setting allows gradually increased filtering of the bass information before the signal reaches the speaker's passive crossover network.

2. **If there is not enough low bass output**, lower the SA's low-pass setting and increase its volume. This bass tuning method allows the listener to decrease the mid-bass response, but in conjunction with increased output from the subwoofer amplifier. This effectively increases the audibility of low bass information.

3. Experiment with phase.