

Trinnov Spatial Remapping -- A Major Breakthrough!

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Hsu Research VTF-3 MK-3 subwoofer

"Bass performance
equal to or better than
any competing subwoofer"

112 dB at 20 Hz, a new record

Other reviews:

- Trinnov Audio
- Panasonic



move the speakers unless you want to pay for another calibration. The Audyssey is, however, significantly cheaper in its most complete implementation than the Tact or the Trinnov. Another potential downside for Tact is that it is unclear how well it matches the phase response of different models of loudspeakers in a multi-channel deployment. Both Trinnov and Audyssey have published on this subject. Finally, I would note that Audyssey has published extensively on advanced bass management using optimization. Trinnov and Tact do not yet have such capabilities, although Trinnov is said to have something coming along these lines.

It was fortuitous that the Phase Technology 3.1 IIs did not need a subwoofer, because the only bass management system I had was the one in the \$300 Onkyo Universal player I was using. While I am on the subject of equipment, I will note that I used cables from Radio Shack, Circuit City, and Wal-Mart. For power amps, I used a \$300 Onkyo receiver for most testing although I did also listen with a more expensive Pioneer receiver that has more current sourcing capability. I cannot imagine that changing to more expensive electronics would improve the sound, but I doubt that someone who can afford a \$12,000 processor is going to use it with a \$300 receiver. If you think about it, a \$2,000 receiver with USB 1.3 connections would be a perfect place for the Trinnov. We have seen in past issues of TSS that cost effective \$2000 AV receivers can have state of the art DACs on board as well as robust, extremely low distortion, power amplifiers. A receiver with this type of build quality would complement the Trinnov technology very nicely.

To conclude my remarks on equalization, I will point out that ultimately it does not matter how good the speaker EQ is if the speakers are not in the perfect ITU orientation. To solve that problem, you need Spatial Remapping, and that is a Trinnov exclusive.

-DAR

Manufacturer Comment: What do you really need to hear that concert hall in your home? What does it take to no longer *need* your imagination to build that concert hall in your mind? It comes down to one word: Spatiality – “relating to, occupying, or having the character of space; existing in space.” The natural listening mechanism is to listen in space: sounds in three dimensions, with spatiality. It’s been missing in audio reproduction, listening to two dimensional playback systems (stereo). Listening to surround has not been much better, unless the speakers and listener follow an exacting rule for placement.

We thank *The Sensible Sound* for jumping in and taking a hard look at the **Optimizer** and providing some insight to what is now possible. At Trinnov, our goal is to bring true listening flexibility to your home in a simple and straightforward way. Place the Optimizer in your system, choose connection options, place the cal mic at the preferred listening location, and auto calibrate. Save it as a “snapshot,” and you are ready to listen. Now you can truly bring the studio home for the first time. Want to move a chair, a speaker or add another listening orientation? Calibrate again in a matter of minutes.

Voicing of favorite loudspeakers can be a challenge for most automated EQ’s - the Optimizer incorporates a unique and sophisticated EQ based on what we have learned in our spatiality research. An advanced process is used, where each type of acoustic problem is identified, extracted and cured with the most efficient method. If desired, your loudspeaker’s natural voicing may be retained. Please see our website for details on this and other product innovations in our Customer Installation and Support Guidelines. There you’ll also find the latest enhancements, such as our Bass Management Module. Also, for a detailed discussion of some of the technical points in the article, see trinnov.com/magazine/sensible-sound.php.

Again, we thank David Rich and Karl Nehring of *The Sensible Sound*. The Optimizer has been adopted in studios for music, HDTV, and cinema. Now you can bring the studio listening experience home, retaining both flexibility in speaker placement as well as spatiality. That should make both the room designer and listener in you happy.

-Arnaud Laborie and Curt Hoyt
Trinnov Audio

TSS

**Hsu Research VTF-3 MK-3 subwoofer,
Turbocharger low-bass augmenting
device, and optional outboard
High-Pass filter.**

Manufacturer: Hsu Research, 3160 E. La Palma Avenue, #D, Anaheim, CA 92806; (800) 554-0150; www.hsuresearch.com

Prices: Subwoofer: \$699.00; “Turbocharger” bass booster: \$100.00 with sub purchase (\$199.00 if purchased alone); Outboard High-Pass filter: \$99.00

Source: Manufacturer Loan
Reviewer: Howard Ferstler

I reviewed the first version of the VTF-3 subwoofer (Hsu Research's first attempt at a super-duper "box-type" subwoofer) for *The Audiophile Voice* back in 2002 (issue 8/4), and thought it was an impressive piece of work.

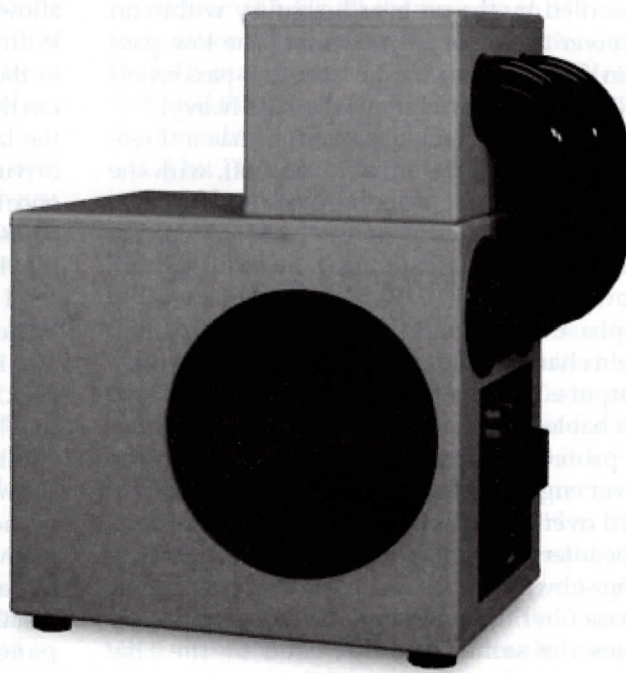
The design involved a large enclosure, a massive 12-inch driver (I do not use the word "massive" casually), a powerful built-in amplifier, and a tunable, ported configuration that allowed the subwoofer to strongly reach down to 20 Hz. This was an impressive package and could do its job with nearly the same authority as the Hsu TN1220 unit that I reviewed in issue 67. (I upgraded my own TN1220 a few months after I did my review by replacing the original driver with the same monster found in the first VTF-3.)

The VTF-3 design has gone through two evolutions since then. I am not familiar with the second, the MK-2, but I am now thoroughly familiar with the latest "MK-3" version and I must say that I am more impressed with Hsu Research engineering than ever.

The MK-1 version had a large enclosure, two "tunable" 3-inch ports, and a 250-watt, on-board amplifier. The MK-2 upgraded the earlier version by replacing the amp with a 350-watt job, changing the woofer driver slightly, and moving the driver from the front panel to the enclosure bottom. Doing the latter mandated standoff feet underneath to allow the driver to breathe, although the enclosure internal dimensions remained pretty much the same. The upgrades allowed for somewhat higher output, although the port diameters still did allow for some wind turbulence at higher low-frequency outputs.

Both of those subwoofers allowed the user to plug one port and flip a switch on the amplifier for extended low-bass reach, but at the expense of higher output at bass frequencies further up the spectrum. Opening both ports and flipping the amplifier switch to another setting allowed the systems to generate high outputs at those higher bass frequencies, but with reduced capabilities down really low.

The MK-3 version is a whole new ball game. First, the enclosure has been made even larger: 21.5 inches high, 17 inches wide, and 25 inches deep, with



a weight of 93 pounds. Second, the dual, rear-mounted 3-inch ports have been replaced by dual, rear-mounted 4-inch jobs that extend into the enclosure and then curve downward towards the bottom. With each being over two feet long, they allow the system to plumb the low-bass range strongly and play loudly, and do so without the port wind noise that was sometimes audible with the earlier versions.

The MK-1 version, with one port open, would generate so much turbulence down low at really high outputs that it could ruffle your pant legs from four feet away if you stood behind it. The MK-3 unit, with port exits almost 80% larger than the earlier versions, will generate equally high bass levels with nary a hit of obnoxious, focussed wind.

Because the long ports have to curve downward in order to fit into the enclosure, neither a front location, nor bottom one could be used for the massive 12-inch driver. Instead, it is now located on the side of the box. At first, I thought this kind of arrangement would be awkward, but after fooling with the subwoofer for some time I have discovered that the configuration works very well in most home-décor situations. For one thing, it can be located against a wall, with the woofer facing outward, and will not protrude obnoxiously into the room.

Like the earlier versions, as well as many competing subwoofers, the MK-3 has only a low-pass network for crossover work, although in most hookup situations the unit's crossover "bypass"

switch would be engaged, with the crossover work then handled by the on-board circuitry within an AV receiver or surround processor. The low-pass filter can be engaged to fine-tune the low-pass rolloff if the response seems a bit middle-bass heavy.

Like other big Hsu subs, the unit has a three-position power switch: on, auto, and off, with the latter actually being a standby mode to eliminate turn-on thumps. An LED on the back will change from red to green when the amp powers up to drive the subwoofer. The VTF-3 MK-3 also has the usual 0/180 phase switch and two line-level inputs (left and right channel), plus stereo speaker-level inputs and outputs. The two-prong, polarized power cord is detachable and there is a user-replaceable fuse and a protected input-voltage switch. With the crossover engaged, the 24 dB low-pass slope can be initiated over a range of 30 to 90 Hz.

One interesting item that I also reviewed along with the subwoofer was a nifty, *outboard*, electronic high-pass filter the company also sells. It basically occupies the same little box used by the Hsu Optimizer equalizer I reviewed in issue 90, and it offers the user two switchable 12-dB-per-octave high-pass filter slopes and a gain control for its output to the satellite speakers. Power comes from a standard "wall-wart" transformer that is part of the package. This device allows a subwoofer with only a low-pass network to easily integrate with a standard preamp/power-amp arrangement that does not have a "sub-out" jack. Many "purist" two-channel installations are of this type.

The standard slopes offered are at 60 and 80 Hz, but the customer can select from several other options prior to making the purchase, depending upon their system needs. Because the VTF-3 MK-3 has that variable low-pass adjustment range of 30-90 Hz, it can integrate to near perfection with any slope offerings available with the high-pass network.

All one needs for a workable hookup is to obtain two RCA-jack Y-connector adapters and the necessary RCA cables. You connect the input leg of each adapter to the left- and right-channel preamp outputs, connect one output leg of each to cables leading to the dual line-level inputs to the sub, and connect the remaining output leg of each to cables leading to the high-pass device. Cables from that unit will then lead back to the satellite-speaker power amps. Once powered up, you just adjust the level, phase, and low-pass network of the subwoofer to dovetail it properly with the high-pass filtered satellites.

The old Carver C-1 preamp I use for some of my stereo-only reviewing work has *two pairs* of line-level outputs, and I assume that some other

preamplifiers offer that feature as well. It basically allows one to forget about using the Y connectors. With it, I simply ran one pair of line-level outputs to the subwoofer, with its low-pass network, and ran the other to the high-pass network's inputs, with the latter's stereo outputs run to the power amp driving the satellite speakers. It worked like a charm, once the levels were balanced and the low-pass slope adjusted to accommodate the 80-Hz high-pass slope that I selected for that listening session.

I also have an old Yamaha DSP-A1000 processor/amp, also used with my reviewing work, and it has full-bandwidth line out/in jacks on the back, as well as a single "subwoofer" output jack that low-passes at a rather high 200 Hz. (This unit was built back in the pre-Dolby Digital age, and the subwoofer output simply allows for augmentation of the low bass with no high-pass filtering for the main-channel outputs.) For basic stereo listening I ran a cable from the sub output to the VTF-3 and installed the high-pass network in place of the back-panel line-out and line-in jumpers normally installed between the preamp and power-amp sections of the unit. Again, the result worked like a charm once the levels were balanced and the sub's low-pass slope adjusted to accommodate the 60-Hz high-pass slope that I selected for that later session.

Note that the filter has stereo inputs and outputs, which means that if Y connectors are involved it cannot work with subwoofers like the low-priced Hsu STF-1 or STF-2 that have only a mono input jack. Subs like that can only be connected to a receiver or processor sub-out connector. (Interestingly, those subs would work with the Yamaha DSP-A1000 hookup, above.) The VTF-3 MK 3 has dual inputs for either a mono-out or stereo-out hookup.

Here comes a short tutorial. Subwoofers have four functions.

First, they relieve woofer/midrange drivers (in two-way speakers) or woofers (in three-way speakers) from having to deal with low-bass frequencies. With bass-decent three-way systems this assistance, depending upon the listener's musical tastes, may not amount to much, although it probably will if the listener is a pipe-organ or synthesizer fan. With two-way systems, particularly those with smallish mid/woofer drivers, the results will be more impressive, because those drivers will be freed from deep-bass chores (which they never handle well, anyway) and the result may be a cleaner midrange sound.

Second, a subwoofer will allow the satellite amps of the system to deal just with frequencies above the low-bass range, increasing dynamic headroom. This will be the case both with two-way

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and three-way speaker systems.

Third, a really good subwoofer will extend the reproduction of the low-bass range further downward with just about any installation, including those that have big full-range speakers with ostensibly potent woofer systems.

Finally, a really good subwoofer will also increase the maximum bass output levels with just about any installation, including those with supposedly powerful woofer systems installed within largish satellite speakers.

The VTF-3 MK-3 is a prime example of just how much of an improvement a good subwoofer can deliver to even the best standard stereo or AV system. Indeed, if one already has a decent but not superb subwoofer and replaces it with the MK-3 they may discover that their old sub was not doing the job the way it should be done.

Yes, the MK-3 is one potent unit, and it not only managed to surpass the previously mentioned Hsu TN1220 subwoofer in my middle system in terms of maximum output abilities, but also managed to equal or nearly match even the most powerful subwoofers I have reviewed in the past.

With my usual measurement technique (subwoofer in the left-front corner of my main room, with the measurement microphone 17 feet away at the prime listening location) the MK-3, in its

maximum-extension mode, managed to cleanly reproduce 31.5 Hz all the way up to 114 dB. Only four other subwoofers I have auditioned could cleanly match that. These were the Velodyne F1800RII that I reviewed in issue 67, the SVS 16-46 that I modified (a stock model reviewed in issue 88 could hit 113), the SVS PC Ultra that I reviewed in issue 102, and a doubled-up pair of Waveform subwoofers that I reviewed in issue 84. My own Hsu TN1220 topped out at 113 dB and the earlier VTF-3 MK-1 could hit 112.

At 20 Hz, where super subwoofers earn their keep, the MK-3 could cleanly hit 109 dB in my big room, at that 17-foot distance, which is impressive to say the least. The only subwoofers I have reviewed that could beat that were the Velodyne F1800II (110 dB) and the Paradigm Servo 15 reviewed in issue 71 (110 dB). The Hsu TN1220 could hit 106 dB (I got a higher reading in my original test, but I goofed during the set up), and the SVS Ultra could also only hit 106. The earlier MK-I version could only hit 100 cleanly, due to port wind noise at higher levels.

Interestingly, there is an optional attachment that can be added to the MK-3 that boosts its ultra-low-bass performance to, for me, a new reference level. With the attachment installed the maximum output at 31.5 Hz remained the same. However, at

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20 Hz the maximum was extended to 112 dB: a new record in the Ferstler main listening room. It might have been possible to go even louder, but by then assorted artifacts in the area (trinkets on shelves and pictures hanging on the walls) were very close to dancing their various ways to the floor. When testing super subwoofers for maximum output, there is a point beyond which it is not really a good idea to go.

This output-boosting device, called the "VTF Turbo," basically extends the length of the ports on the MK-3. It involves an additional box that sits towards the rear and on top of the existing enclosure. (A thin foam pad is supplied with the accessory to make sure the Turbo enclosure does not slide around, buzz, or scratch the top of the MK-3 enclosure.) The Turbo enclosure is about the same size as a large satellite speaker lying on its side, and when it is in place the combination has a blunt stair-step appearance.

Black, flared, four-inch port tubes outlet through the front of the box. From there, the tubes pass through it, extend out the back, and curve downward and then back towards the front, so that they can be inserted into the two tubes that exit through the back of the MK-3 enclosure. The extension tubes have soft rubber gaskets around their perimeter ends and those must be inserted firmly into the MK-3 tubes to make sure that air leaks and buzzes are eliminated.

Normally, to get maximum extension with the MK-3 sub one does the same thing as they did with the MK-1 and MK-2 versions: plug one of the two ports and set the amp-contouring switch for maximum extension. Leaving both ports open without the turbo and selecting the max-output mode with the amp gains you increased output capabilities at higher bass frequencies, while you sacrifice some deep-bass extension. However, with the turbo, you leave both ports open and with the device inserted into position the two extra-long port assemblies do the deep-bass trick in the extreme.

Indeed, while a standard MK-3 can actually get down to 17 Hz at a decent output level with one port open, the dual-port Turbo version tunes both ports to that same frequency, allowing nearly sub-audible 32-foot organ pedals to rattle the walls. Hsu has applied for a patent relating to this curved-tube design, both within the MK-3 and within the Turbo booster, because he has figured out a way to do bend without generating turbulence within the tube itself.

The beauty of this is that the Turbo accessory allows you to duplicate the abilities of two MK-3 units - but for six hundred fewer dollars.

Now, I have for some time decried what I see as a horsepower race when it comes to subwoofers.

I mean, 114 (or even 110) dB at 31.5 Hz, or 112 (or even 109) dB at 20 Hz are not only louder than what one would normally hear at any live music performance not featuring 10,000-watt amplifiers, it is also going to put some listening rooms at risk. If any sub can get up to 105, or even 100, dB at those frequencies in a typical home-listening room, it probably will do the trick with just about any musical source material, and certainly will do the trick with just about any movie soundtrack. (Movies that have special effect sounds that go below 25 or even 30 Hz. do exist, but they still do not grow on trees.)

To be fair, we do have to take into consideration room size. My main room is 3,400 cubic feet. However, I have also been in listening rooms that were up to 6,000 cubic feet, and there is little doubt that for superb low-bass results, really big rooms like that absolutely require super subwoofers in the VTF-3 MK-3 class. If you have a listening room that approaches that size this subwoofer, in combination with its Turbo accessory, is probably one of the best audio investments you will ever make.

If your listening room is more like what I have, you can simply obtain a basic MK-3 unit by itself and still get subjective subwoofer performance equal to what virtually any competing subwoofer I have encountered is able to deliver. Bass freaks can set it up, put on a good organ work, and enjoy smooth, clean, and extended bass right down to the bottom. If they want more crude entertainment, they can put on an energetic action/adventure movie, crank up the gain, and hang on for dear life.

On the other hand, we have the Turbo option. If someone intends to crank up the levels to the point where the MK-3/Turbo combination is approaching its limits in even a very big room it would be a very good idea for them to first install a seat belt in their listening chair. Once that is done and the belt secured, they will experience subjective bass performance equal to or better than what just about any competing subwoofer, no matter what its cost, will be able to do.

-HF

TSS

Panasonic DMR-ES35V Video Recorder

Manufacturer: Panasonic Consumer Electronics, One Panasonic Way, Secaucus, NJ 07094

Price: Purchased for \$246