

OVERNIGHT SENSATIONS

[Home](#) > [Bookshelf Speakers](#) > Overnight Sensations



I wish I had a time machine. I would go back to my bedroom when I was in Jr. High or High School and give these to myself. These are the little bookshelf speakers I imagined I had: huge soundstage, deep bass, tiny box. In reality, back then all I had were some impish Minimus-7s. Sure, they had a "tiny-but-mighty" quality about them, but come on, who was I kidding?

The "Overnight Sensations" were designed to be just that: a quick, economical build that could put out a surprisingly-big sound in a small box. Could be a weekender project for an addict, a gift for a teenager (see above), or--in my case--a set of small, full-bodied monitors that I could listen to while I graded papers. (Ironically, I have found that if the music sounds too good while I am trying to concentrate, I get distracted and get no work done.)

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≡ Paul Carmody's DIY Speaker Pages

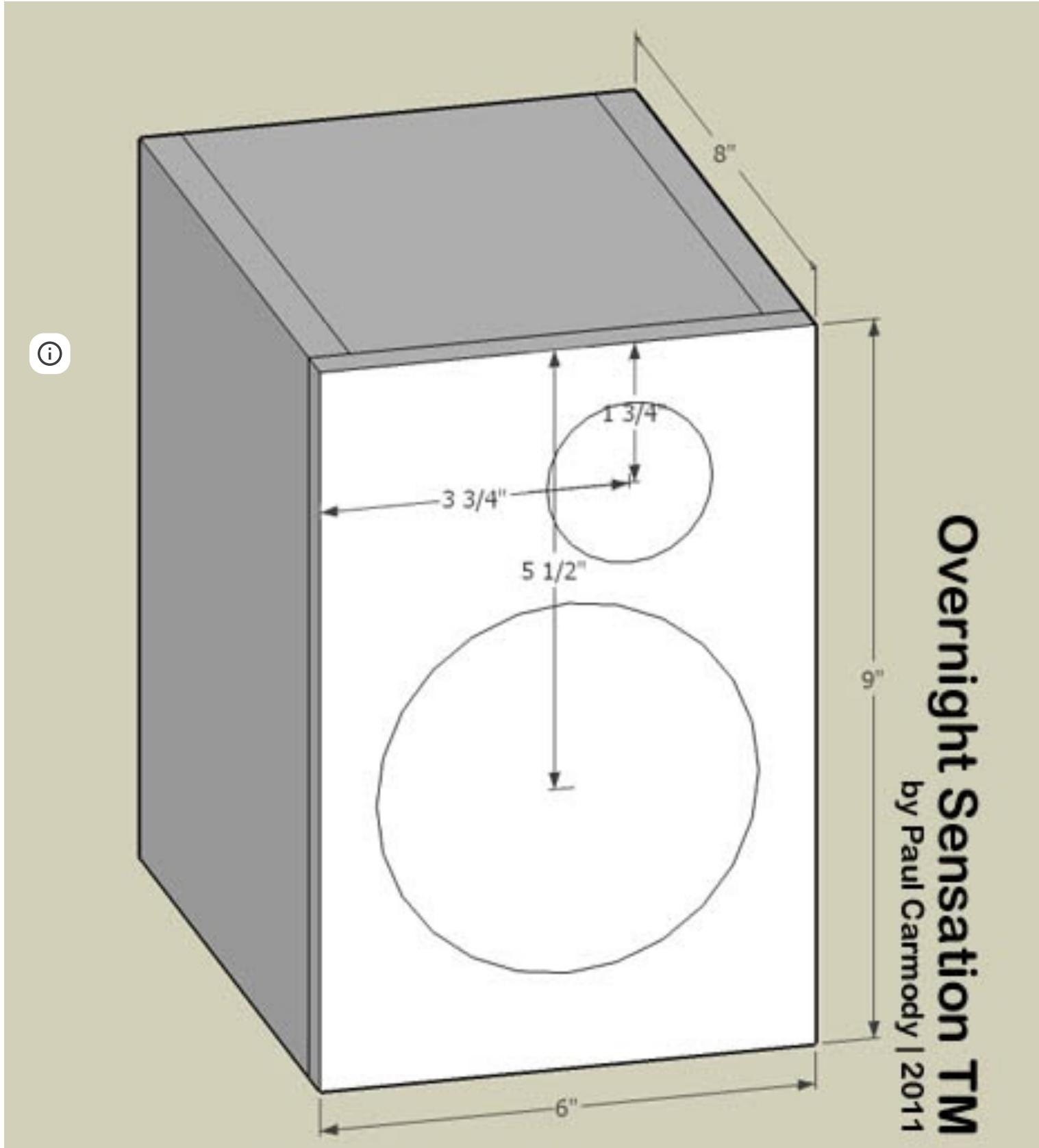


- [Amazon](#) (via Parts Express)
- [Meniscus Audio](#)
- [DIY Sound Group](#)
- ...and probably more I haven't heard of.

Note that some stores sell the kit with a Dayton tweeter, and others sell it with a HiVi tweeter. They're both 20mm dome tweeters, and they sound very similar. The crossover differs *very* slightly depending on which one you get, but the net sonic effect is essentially the same. So, don't worry about which version you get; they're both equal in my eyes.

This writeup isn't specific to one tweeter or the other. It simply covers the basics of how the Overnight Sensations work. If you want to see the myriad of ways people have built these buggers, just type "Overnight Sensations speaker" into your favorite search engine and get reading.

CABINET DESIGN

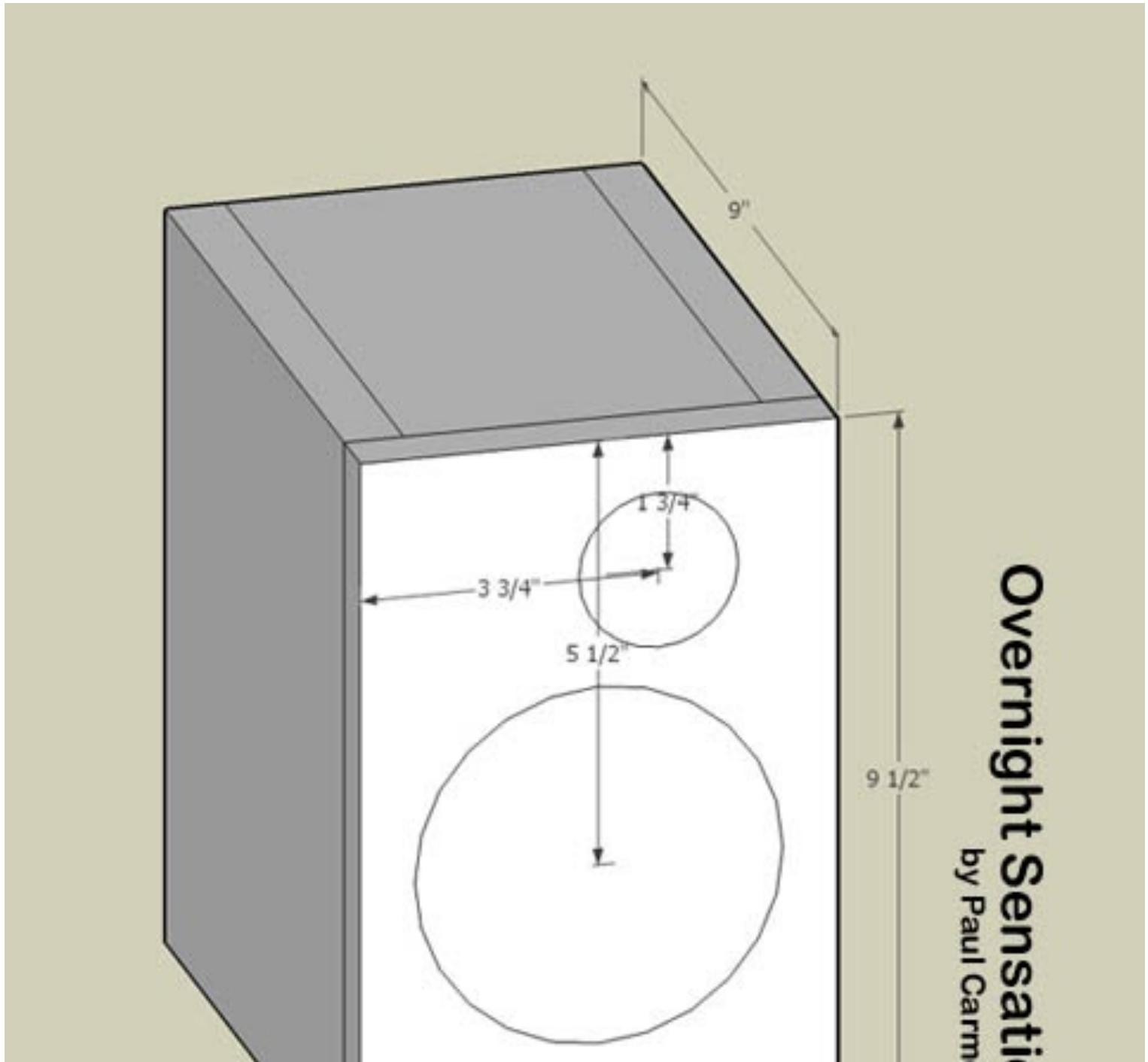


Overnight Sensation™
by Paul Carmody | 2011

* 1/2" MDF Version

Cabinet plans using 1/2" stock

The advantage of using thinner stock is that the cabinet is smaller and lighter. However, some prefer the added rigidity and heft of thicker stock.





* 3/4" MDF Version

Cabinet plans using 3/4" stock

If you use 3/4" material, you should chamfer the woofer hole on the backside of the baffle using a router or file to give the cone some breathing room; this is not necessary with 1/2" material

The cabinet for the Overnight Sensations can be built with 1/2" or 3/4" MDF or plywood. One should be able to build a pair of these using only one 24"x48" "handypanel" of MDF or plywood available at your local home improvement store. You could probably also get away with doing something this small out of hardwood--and it would look really excellent--but please be mindful that hardwood does shrink and expand with the weather, so detachable baffles would probably be smart.

For this project, I decided to keep things simple, and did not countersink the drivers. The HiVi and Dayton drivers both have attractive, unobtrusive frames, so I just cut a simple 3 5/8" hole for the woofer and a 1 5/16" hole for the tweeter. The first one could possibly be done with a hole saw or jigsaw, should one not have access to a router. The tweeter hole can be done with a 1 1/4" forstner or spade drill bit and a bit of extra filing. Then again, if you want to properly countersink the drivers like a good cabinetmaker (and you have the tools), please do so.

The interior volume of the box is about 4.5 Liters. It is vented, and tuned to 53 Hz, which gives a -3 dB point in the mid 40 Hz range. The vent should be mounted on the back baffle, located somewhere behind the tweeter. Its exact location isn't critical, as long as the vent openings are at least 1" away from any other surface inside or outside the cabinet.

NOTES ON PORTS

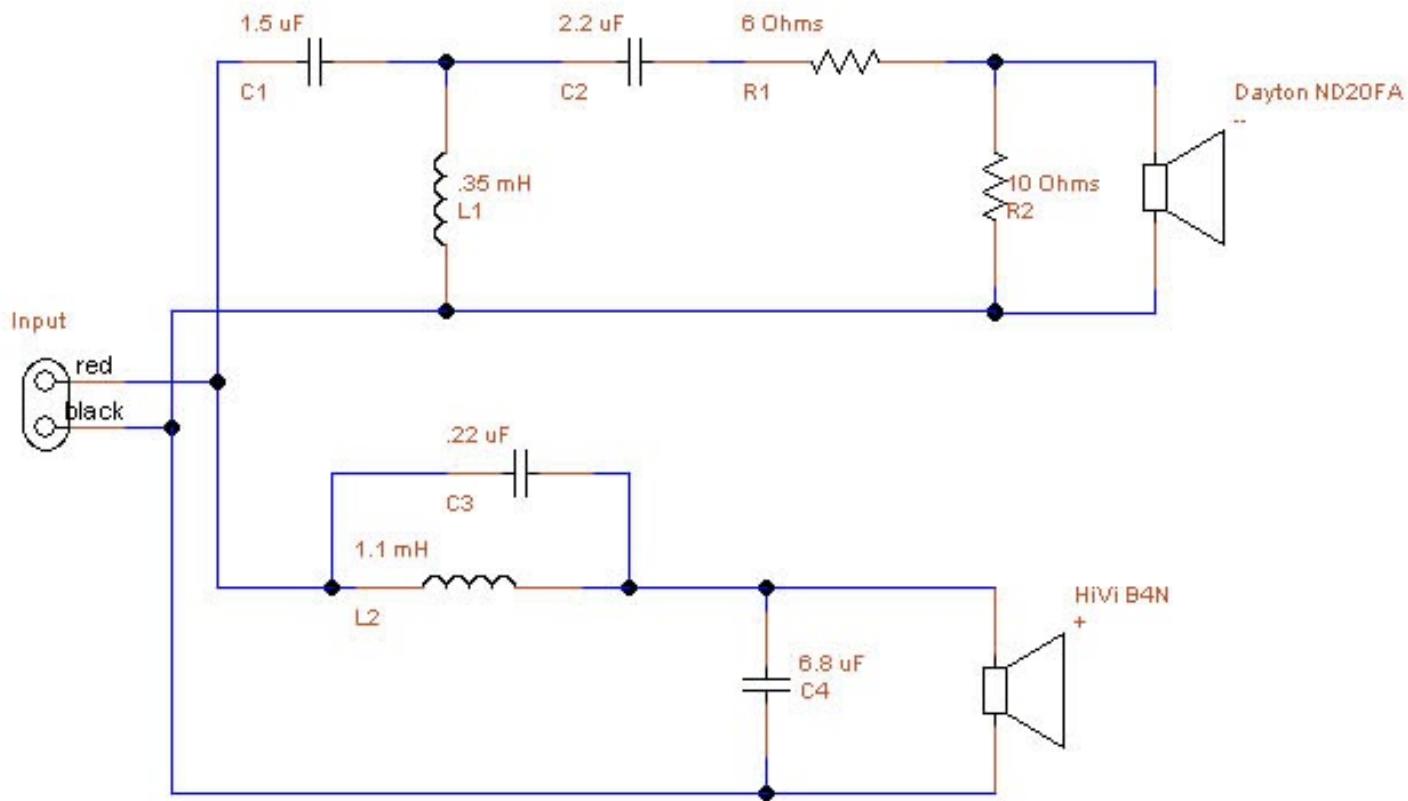
In order to clear up confusion about the vent for the Overnight Sensations, I am spec'ing that one use the 1 3/8" ID Adjustable Port available from Parts Express. Simply glue the sliding portion so that the total vent length is 6". These are easy to mount and give a clean, professional look.

However, if you insist on saving a few bucks, you can use a piece of 1 1/4" SCH 40 PVC pipe. (Whose inner diameter is actually 1 3/8". Why? I have no idea.) This is available at any hardware store. The total vent length is 6" and must include the back baffle.

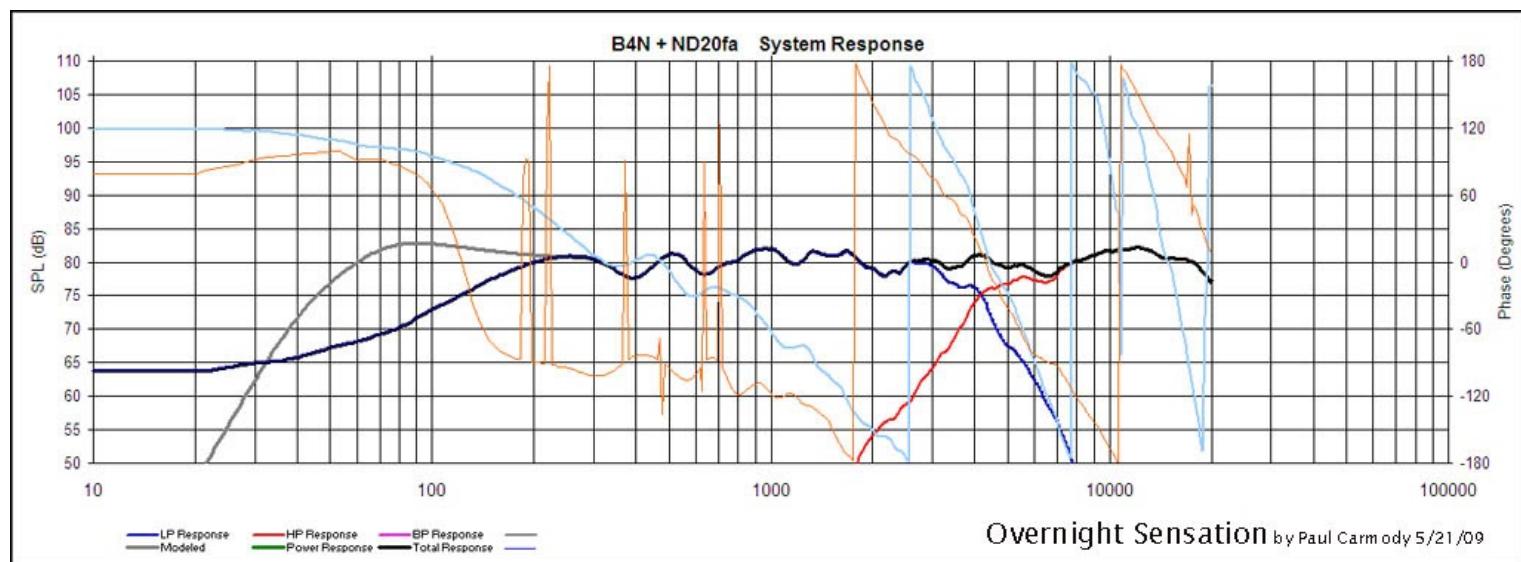
I should also add that this vent from Parts Express has been used by some builders. Due to its reduced diameter, the stock length of 4" is actually right on-target, so no cutting is required. The downside of this vent is that it's pushing the limits of port velocity. However, there are several very nice builds of the Overnight Sensations out there that use this port, so it must be OK.

CROSSOVER DESIGN

Overnight Sensation



Paul Carmody
November 13, 2008



The crossover for the Overnight Sensations uses a 3rd order electrical filter with an L-pad on the tweeter. The woofer uses a 2nd order electrical filter with C3 acting as an Elliptic notch filter. The acoustic slopes are fairly standard 4LR, and cross around 4000 Hz.

LISTENING IMPRESSIONS

In a word: "big." The bass these little HiVi drivers can put out is tremendous. They throw out a very large soundstage and can actually fill a medium-sized room very well. I originally built these to sit on my desk, but since they have very full bass (or as some might say "full BSC"), they sounded best put up on a little stand or riser. Once I did that, I absolutely fell in love with listening to them in the nearfield. They image very well not only from left to right, but also in front of, and far behind the speakers. Although the frequency response looks pretty flat, the midrange is voiced with a very subtle droop; I did this out of concern that the metal-cone driver might get fatiguing or annoying after a while. The end result is a speaker that sounds good on most styles of music. Really bad recordings will be evident, but overall it's a pretty forgiving speaker.

One of my favorite uses for this speaker has been for those "wee hours" listening sessions, where it's not feasible to listen at full volume. What I mean is that, at softer listening levels (75 dB or less), large speakers tend to sound sort of unbalanced across the spectrum and thin in the bass--whereas small speakers seem to sound their best at quieter volumes. At these quiet listening levels, the wide and deep soundstage of the Overnight Sensations was still there in full form, letting me enjoy my music while my wife and neighbors slept.

COMPLETED VERSIONS BY OTHER DIYERS

Maybe it's just the belt-tightening economy, but this project seems to be one of my most popular. Some people have gone the simple route with construction (as the project was originally intended), while others have showed amazing attention to detail to make a tiny speaker that you can't help but marvel at.

First up is the highly-skilled woodworker and photographer Bill Schneider. His ability to plan steps ahead and problem-solve is very evident. His use of jigs and precision measurements is exemplary. This is DIY with machine-shop tolerances!







Bill's listening impressions:

*These came to life after playing with the stuffing. I put in about a fist-sized fluffed-out piece of stuffing near the back plate directly behind the woofer, and that did it. These things sound Way, WAY, **WAY bigger** than their small size would suggest! Paul nailed it - they would be perfect as the only speakers in a room with space limitations. They filled my medium sized listening room with BIG sound, and at one time, I had to check the switch to verify that they were the speakers playing instead of my main set.*

If someone builds these, play the Reference Recording "Fiesta" to see how much of the lower registers they fill. These little things defy physics, and I'm tickled to have them!

Read the full version of his well-documented build thread [here](#).

Next up is Mark [WWWJD] from the Parts Express board. He put everything and the kitchen sink into his version, and it's amazing! First of all, Mark constructed the speakers as "curvy" cabinets, using thin plywood bent around a frame. He then used a small amp kit from 41Hz.com and incorporated it (and volume controls, and LEDs) into the cabinet. To top it off, he used a beautiful quilted maple veneer on the sides.







Mark says:

Sound: Incredible, room filling; a bottom end that is impressive... I don't know all the words to use to fill in the blanks, but I'm stunned. I lucked out on the gains with the 50k pots and 10k mixing resistors... with the iPod wide open, more than enough volume with ZERO distortion that I can detect. First listen was Alice In Chains Unplugged.. Oh my! I have a huge list of others, but I had to quit so I could post this thread up.

Paul? Hats off brother. These little speakers pack a quality that's difficult to describe. I've listened to passages from Alison Krauss, Celtic Women.. Dark New Day.. Hans Zimmer.. Sting.. Dave Matthews.. George Straight.. AHH!! The list goes on and on... and these speakers sing. They literally have the ability to move me... you know? Ever listen to a song and feel it in your gut? Holy crap man. You've nailed DIY.

Read Mark's build diary [here](#). He certainly took on a lot of unfamiliar territory--and succeeded. Great job!



Another build of the Overnight Sensations I found interesting was done by [djh] of the Parts Express board. He built a small 5.1 system, meant to shame the HTIB (Home Theater in a Box) systems they sell at the big box stores. It incorporates the work of 3 different designers to make the system. He used the three Overnight Sensations for mains and center, Zaph's B3N single-driver design for the surrounds, and RJB's Cerberus sub. The system was custom-built for a 13 year-old relative, what a lucky kid!



Here's another clever twist on the Overnight Sensation design. [dguenter] wanted to try his hand at faceted cabinets. This requires some pre-planning and building a table saw jig, but there's no denying that the results look cool! The finish is accomplished using counter laminate, of all products. Looks sharp!



Just when you thought you'd seen it all, [Herman Trivilino] did a very, very original cabinet using the Overnight Sensations. His intention was to replace some cheap Radio Shack patio speakers with something better-sounding and more charismatic-looking. The wood sides of the cabinet were from 20 year-old Cedar fence pickets. And just in case you were concerned about the birds trying to move in, rest assured he covered the port hole with wire mesh. The build is well detailed [here](#).





[Soundslike] from the Parts Express board did two builds of the Overnight Sensations, one in gloss black, and the other veneered with black baffles. Both show very professional-looking results. He documents his builds very well, and the thread is full of great pointers on woodworking and even contains his CAD diagrams. [Link](#)





These were built by Landry, from France. He did a build log as he went along, which includes lots of helpful photographs, as well as Metric conversions which may help other international builders. [Link](#) (The blog is in French, by the way)





I really enjoyed watching this build progress. It was done by [rdrowley], whose wife wanted to be very involved in the build process! (anyone who has dabbled in DIY knows how unusual this sort of thing is) So the two shared the work, and created a really excellent build, both inside and out. Their speaker features precise tolerances, and a special "monogrammed" paint job. To find out more, follow their well-documented build thread [here](#). Who knew DIY speakers could bring about family harmony?





Here's a pair that really caught my eye. They were built by [HomeMoaner]. They are built out of cherry, and feature dovetail jointing. There are lots of really good pics in [this thread](#), which could be helpful regardless of woodworking skill.

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