

My testing process began with my setup of my testing area and testing equipment. I placed my speakers up on 2 Henry cubes in order to get some distance between them and the ground. This put my tweeter at about five and a half feet of the ground. My reference mic was placed three feet way even with my tweeter. I placed a fiberglass panel on the floor in order to reduce floor bounce. My testing system is shown in figure 1.

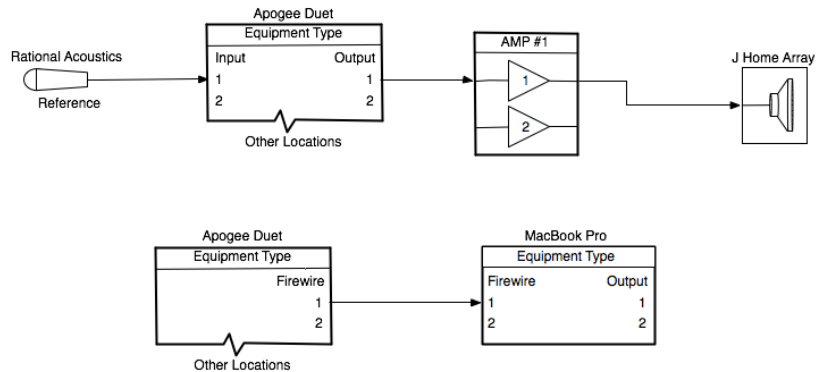


Figure 1: Testing hook

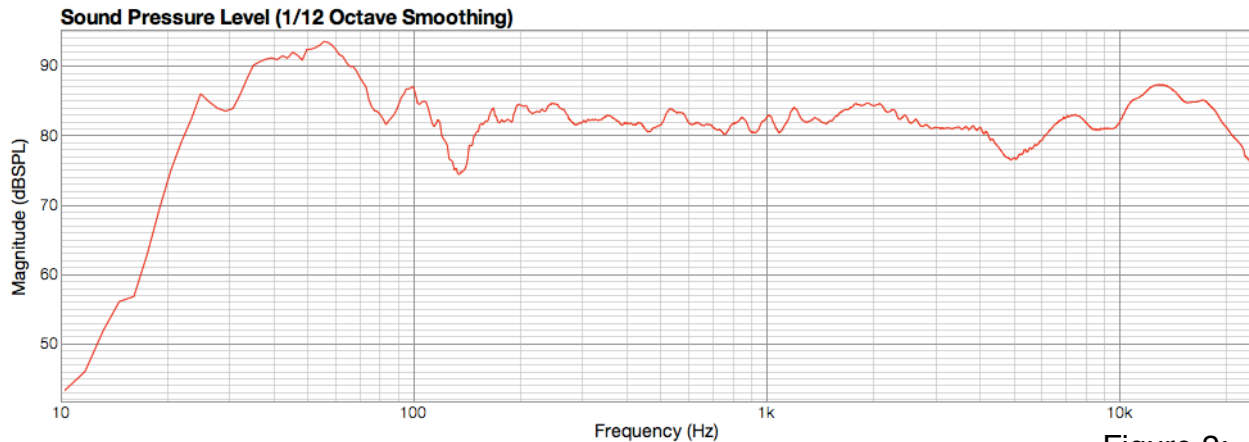


Figure 2:

My first testing plot is shown in figure 2. After I took this plot I knew that I had some work cut out for me. I started with the sub, my first goal was to get the bit bump down that stretches from 35Hz to about 75Hz. I did this very easily by just turning down the gain on the plate amp. The next part to work on is the dip at 150Hz. To analyze what is going on I first moved the crossover frequency on the sub down slowly from 180Hz. Once I knew where the knobs location because there aren't any marks on the plate. From there I moved on to look at the mid with and without the crossover. From this point I was able

to find a happy crossover point at 120Hz. With that in place I flipped the phase on the subs in just to see what would happen and it got worse so I knew that they were in phase. Below in figure 3 the result of these changes is shown.

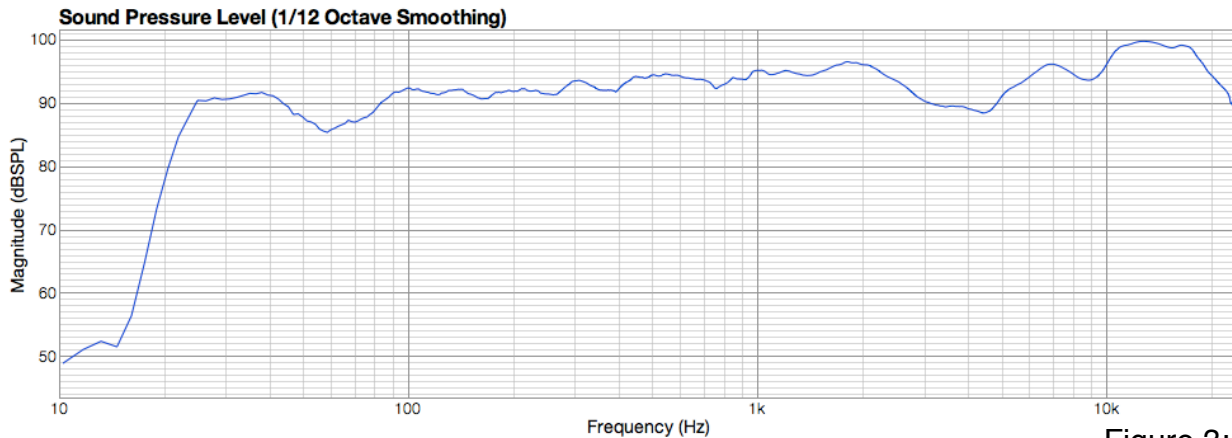


Figure 3:

My next problem that I wanted to look at was the big scoop at 3kHz thru 5kHz. After playing with a lot of different ideas such as phase flip on the tweeter to try and align it with the mid ranges. This made it worse but I was certain that it was an interaction problem between speakers. My next thought was the interaction between the two mid drivers. To test this I moved over to Smaart so that I could use pink noise and the RTA graphs. In this program my initial traces looked very similar with the same dip. From there I moved the mic around and that in turn moved the dip so I knew it was interaction problem. At this frequency it was either a tweeter or mid and it ended up being the mids. Being that it was the mids there was not much I can do about this other than boost one side and try a phase flip. Neither of these things made it look good and sound good. So there for I didn't do anything there.

The third problem that I was faced with is the rise in the upper frequencies. Figure 3 shows this very well. So from this point I started trying everything. In this plot Blue is the

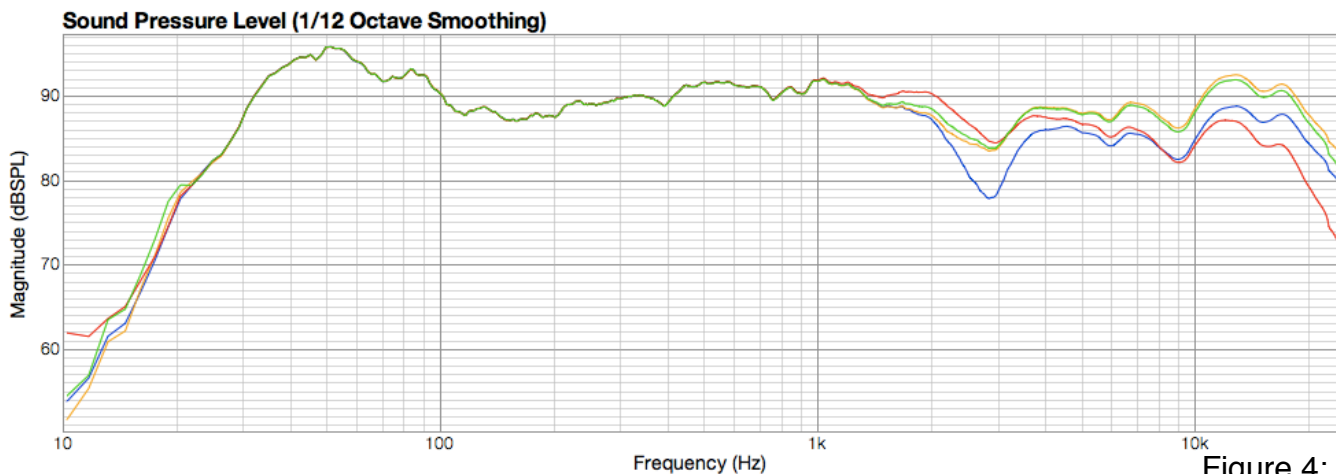


Figure 4:

16uF, Red is 7uF, gold is 7uF, red is a 15uF and a green is the larger capacity. From here I had to just move from capacitor to inductor changing values to get things where I want them. Russell was able to get an Idea of what can be done to knock it down and it came down by using a high shelf of a resistor and inductor. So I took the exact same values that he used and put them in mine. It got me a lot closer so I just started playing with resistor values because the inductor is the frequency and the resistor is the amount of subtraction. The result of this is in figure 4.

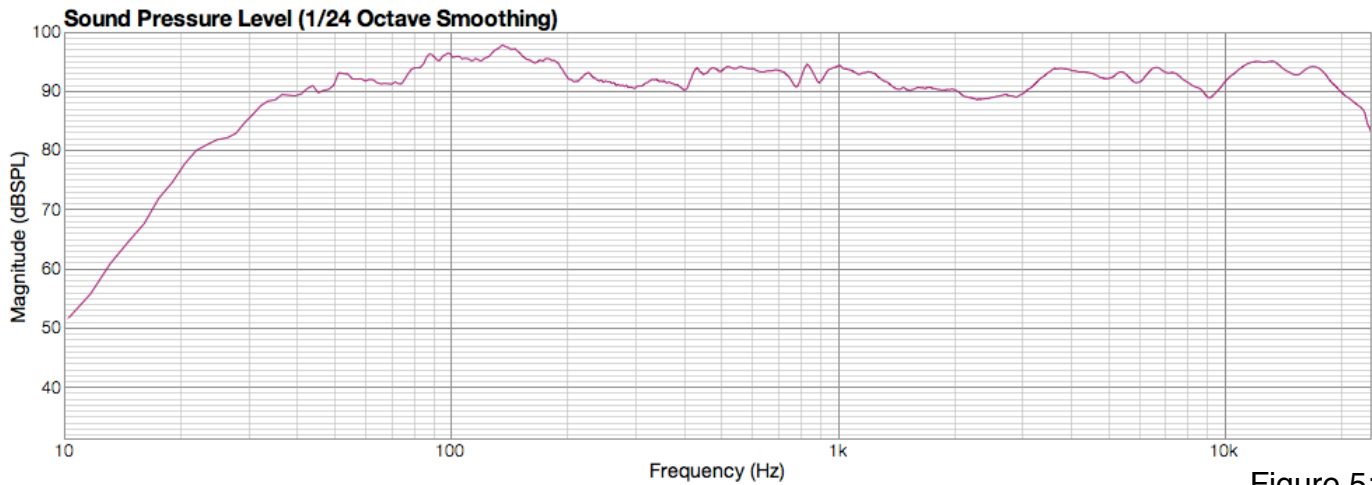


Figure 5:

In figure 5 that is my final trace and set up. I have meet my goal of plus or minus three decibels over my frequency coverage. This was a easier tune to do because of my box design and size. My mid range box is a little big as well as the use of the loaded vinyl and masonite. This box was also sealed so I didn't have to mess with tuning a port or anything like that. My sub box is a little small but it is still giving me great bass so I am not complaining. This box isn't ported as well so I didn't have to tune a port. All in all I feel that my testing went very well and I was able to get my speakers to reach my goals very quickly and easily.