Developmental Report

Testing Introduction

The initial tests were done about a foot back on the listening axis. When final testing began, the microphone was placed 2 feet back on the listening axis. The reason why the standard, 1 meter, was not used was because the room affected the measurements too much at that distance.

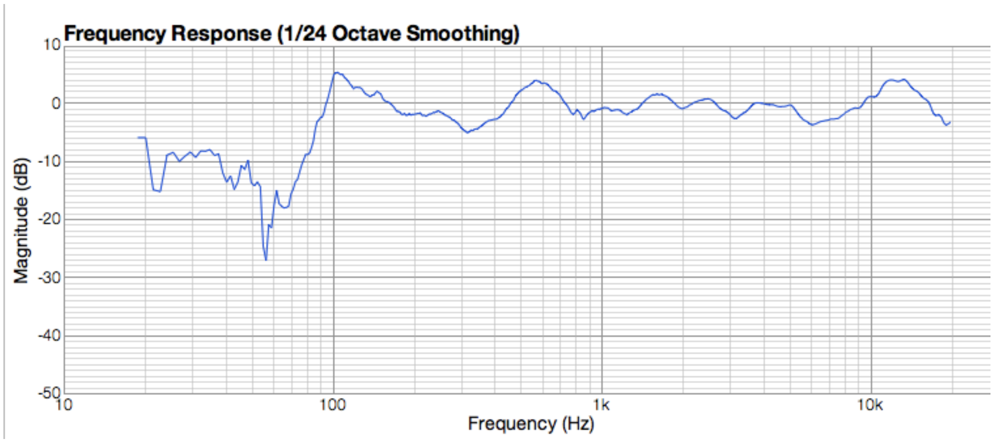


Figure 1:
This is the initial test of the speaker.

For the initial test, I measured the speaker without the back plate since I did not place the crossover inside of the speaker yet. Inside I stuffed it with acoustic foam to faux seal it. The initial problem that was concerning was the summation at the midrange to woofer crossover point. The next point of concern was that there was a hump in the high end and the summation at the midrange to tweeter point. According to the tweeter's manufacturing specs this should not be there, but I realized that this is just the testing microphone's frequency response. The final concern was the low-end response, and all the way up until the final week of testing I was under the impression it was because I didn't seal my box. But it turns out that it was my box volume. Going back to the Winspeakerz document I realized that my driver file was corrupted so it was going me funky result, which at the time looked correct.

Addressing the first problem

I spaced out the two crossover points some because as seen in Figure 2 the midrange has a bump at the initial 520hz crossover point. So I moved up the midrange crossover point to 780hz and then put the woofer at 650hz. This gap between the

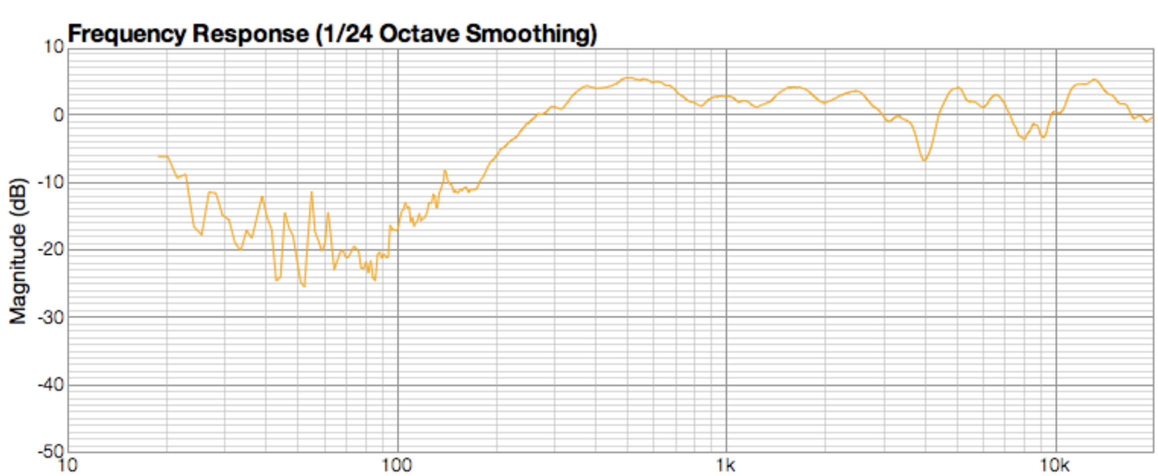


Figure 2:
This is the midran
with no crossover.

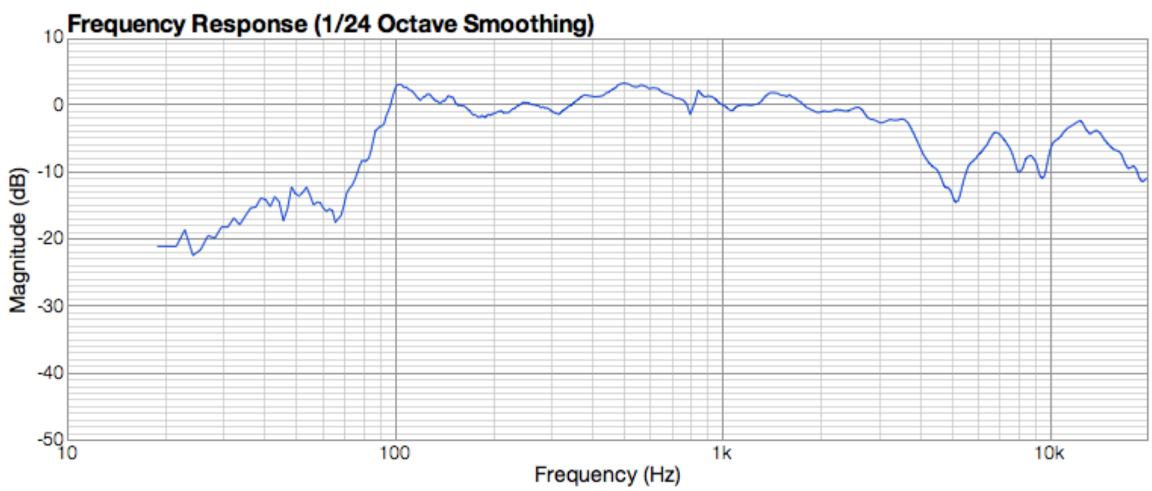
crossover points made it so it evened out.

Addressing the second problem

Simply by putting the microphone calibration on fix this problem, but fixing the summation at this point was not as simple. By spacing out the crossover points (5500hz for the midrange and 6500hz for the tweeter),I was able to again achieve a smooth response.

Addressing the third problem

So there is no simple way of going about fixing a box problem. To remove the problem completely, one would have to build an entirely new box, which I did not have time for. The only other available solution was to use a low shelf filter at the opposing frequency, which would lower the overall volume of everything below that frequency. Initially I tested the low shelf with a 7.5 ohm resistor and a 100 microfarad capacitor, but after extensive testings I found that 400 microfarads gives me the reduction at the opposing frequency but allows the 100hz to 300hz range not to suffer. The before any crossover and final crossover are shown in Figure 3.



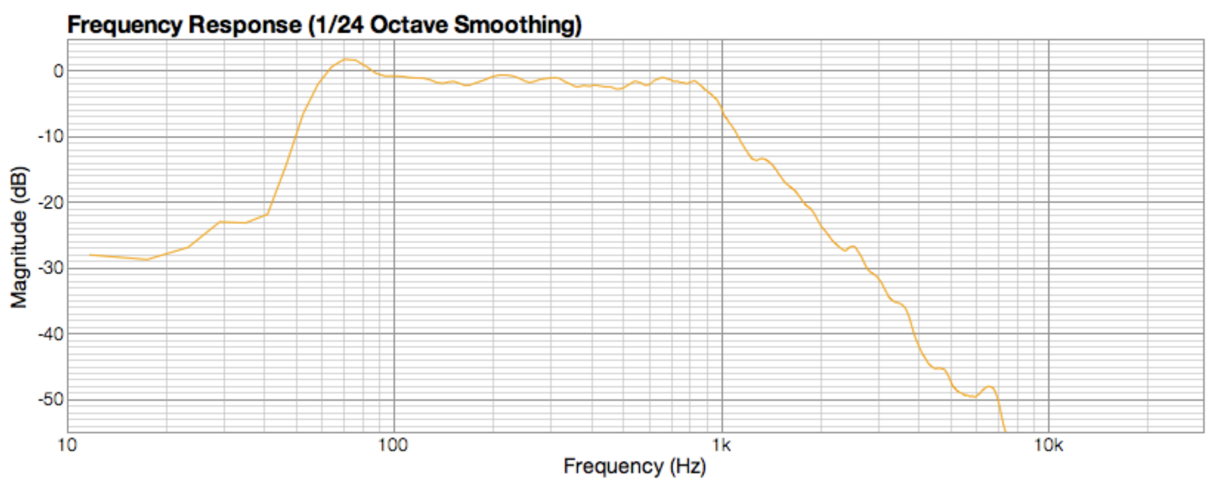


Figure 3:
Before crossover (above) and final crossover (below).