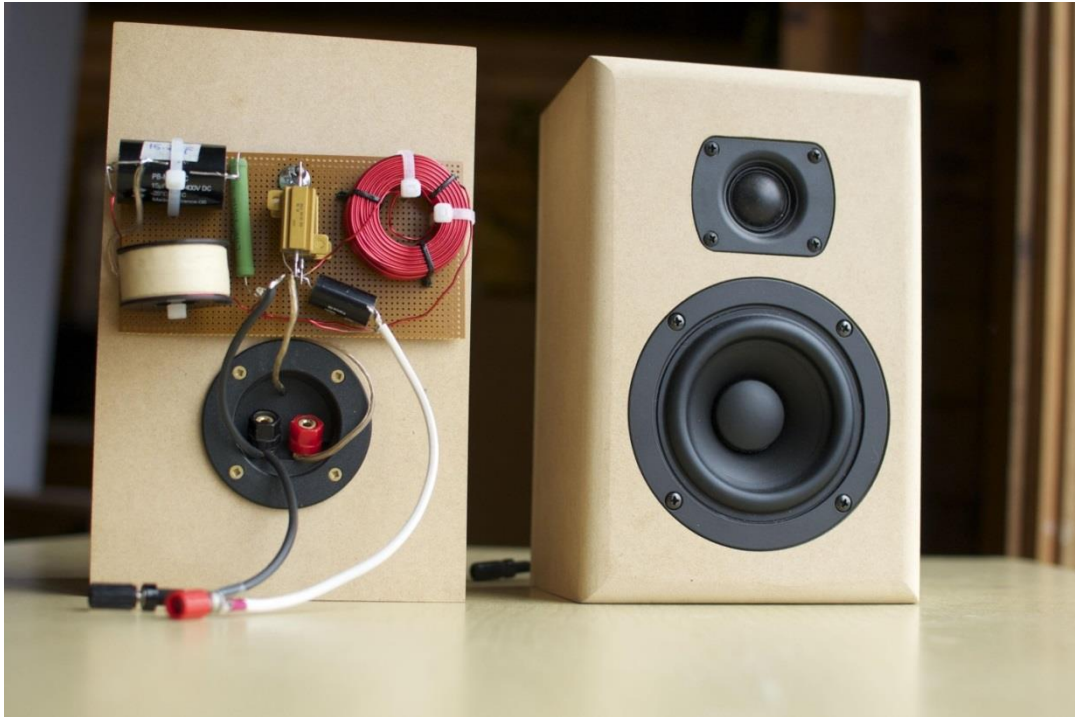


The Napoleons

Small Speakers that punch above their weight



The Napoleons are a small DIY loudspeaker designed to deliver a natural tonal balance and clean loud playback from of a small box optimized for small reflective rooms, but still perform well in larger spaces, at a reasonable price. This write up was in response to requests from the 2013 Ottawa DIY fest, where the speaker was first shown <http://www.diyaudio.com/forums/clubs-events/223294-diy-ottawa-winter-2013-a-17.html>

Appendix I: First Published Crossover

This is the first iteration of the crossover, original published at diyAudio in 2013. This voicing may be preferred in large or well damped rooms. I found it had a bit too much mid-range on some material in my small room, as so could be a bit 'hard' on poorly recorded tracks.

<http://www.diyaudio.com/forums/multi-way/234674-napoleons-compact-2-way-punches-above-its-weight.html>

Low pass

L1: 1.5 mH inductor, 0.7 ohms dc resistance (18 gauge air core).

C1: 15 uF cap (not electrolytic)

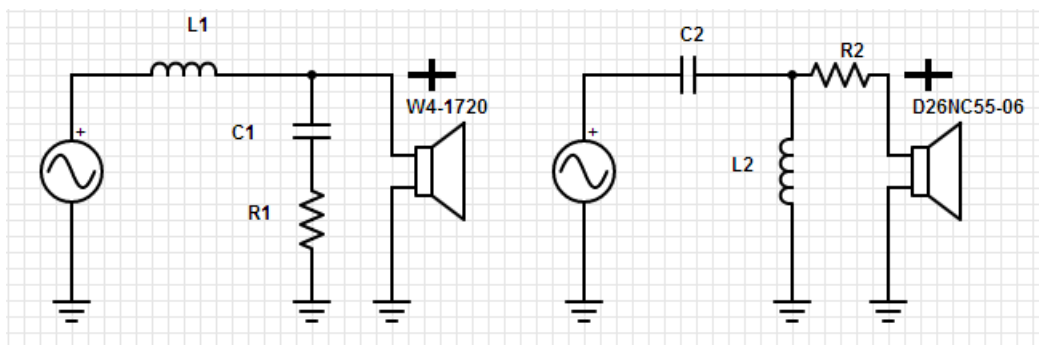
R1: 1 ohm power resistor (10W or greater)

High Pass

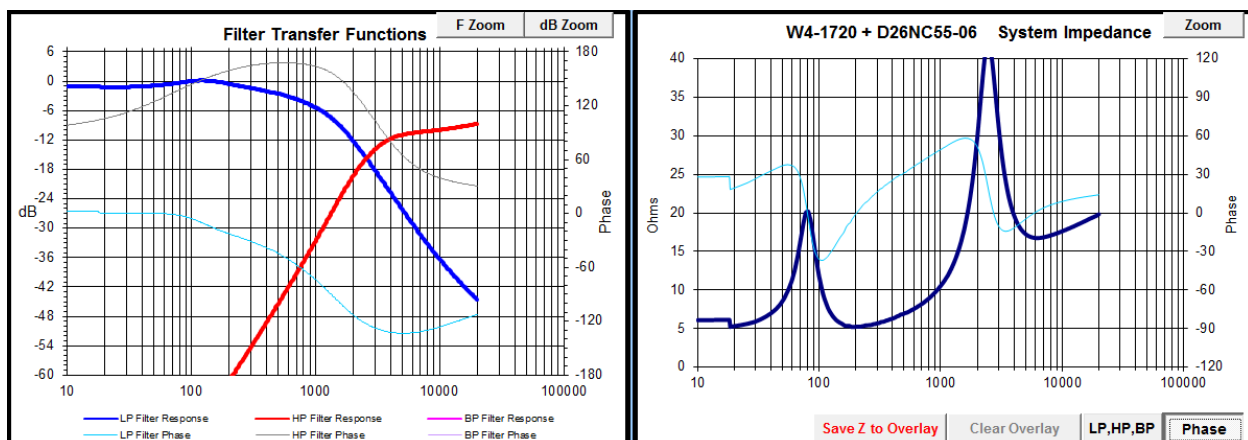
C2: 2 uF cap (not electrolytic)

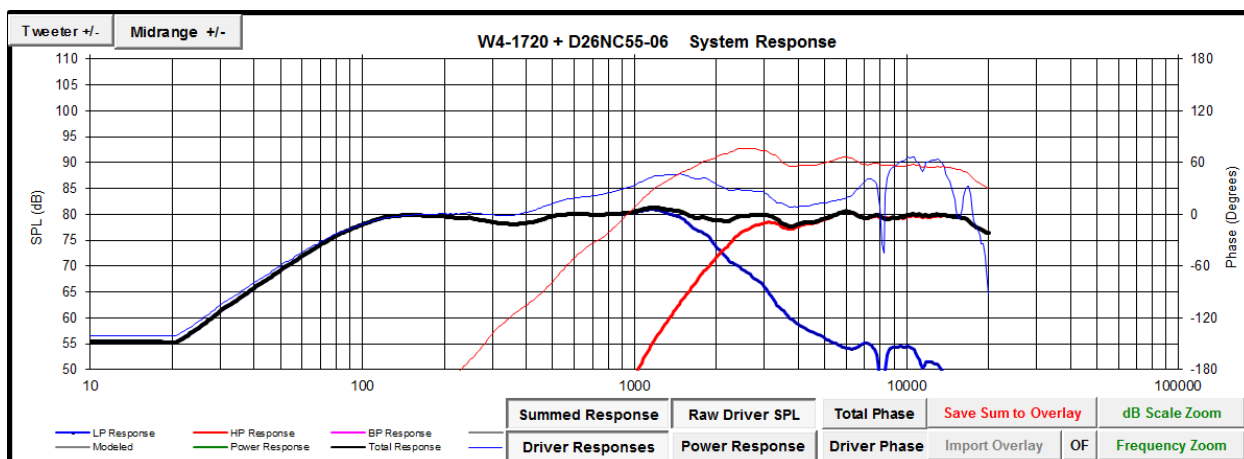
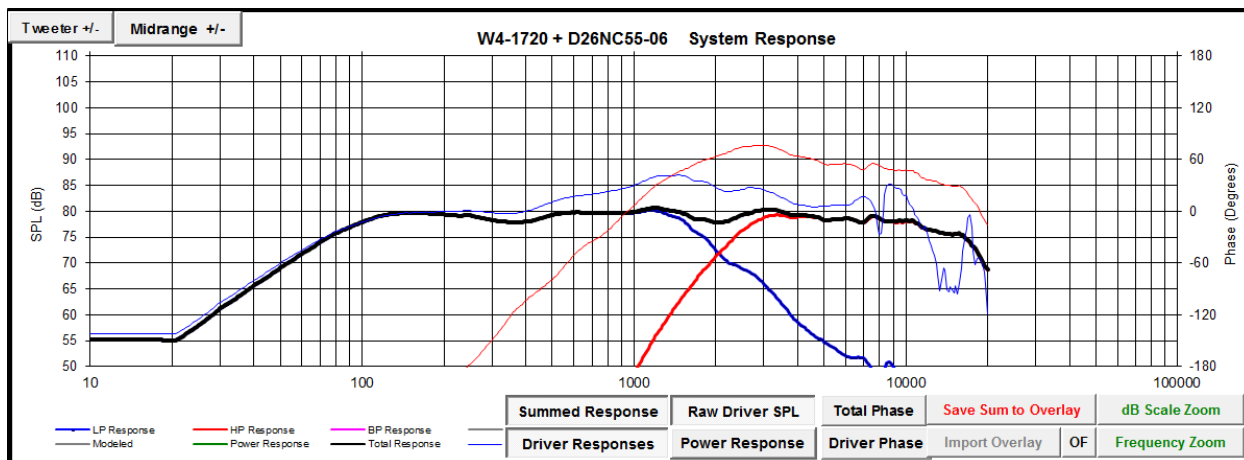
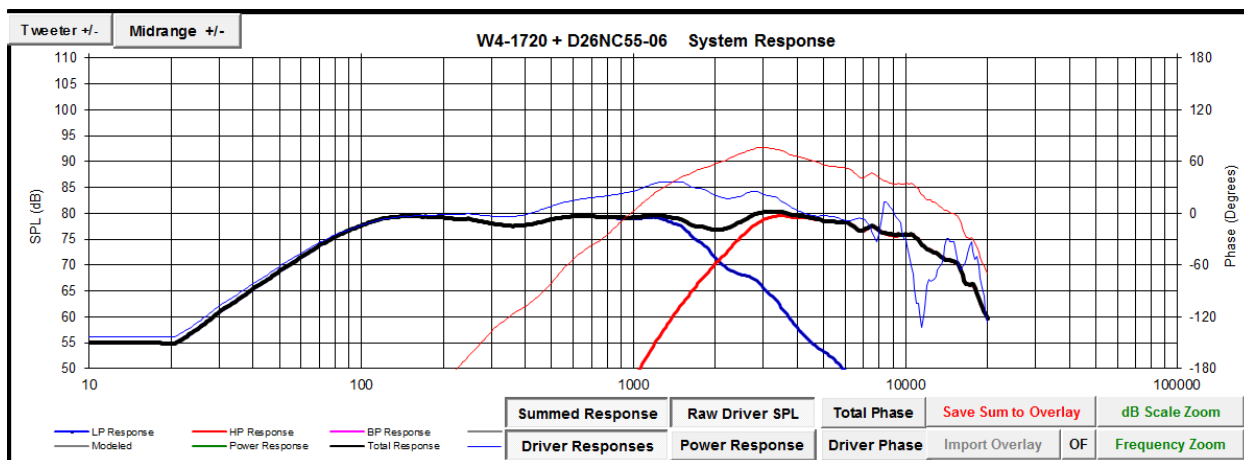
L2: 1.1 mH inductor, 0.5 ohms dc resistance (18 gauge air core)

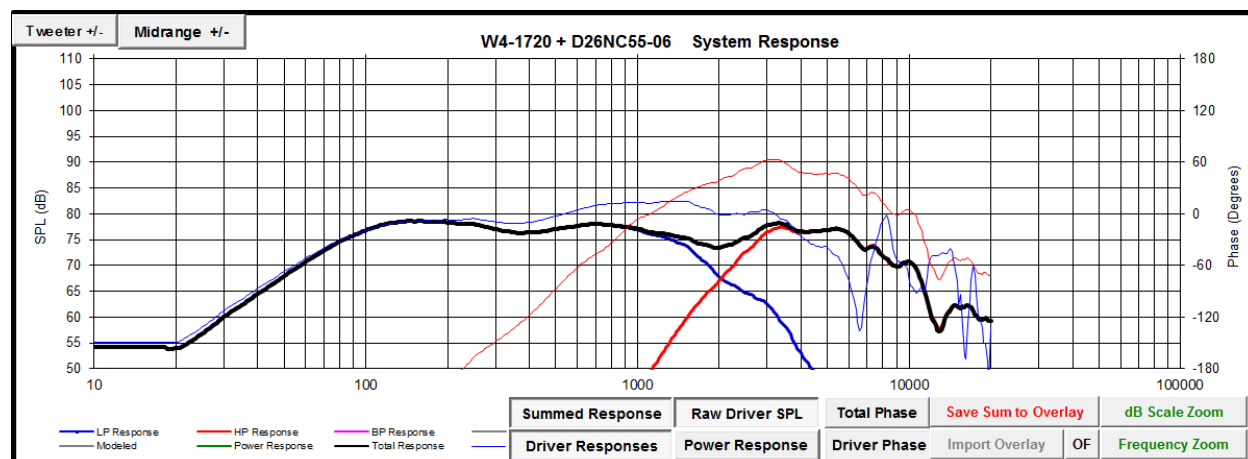
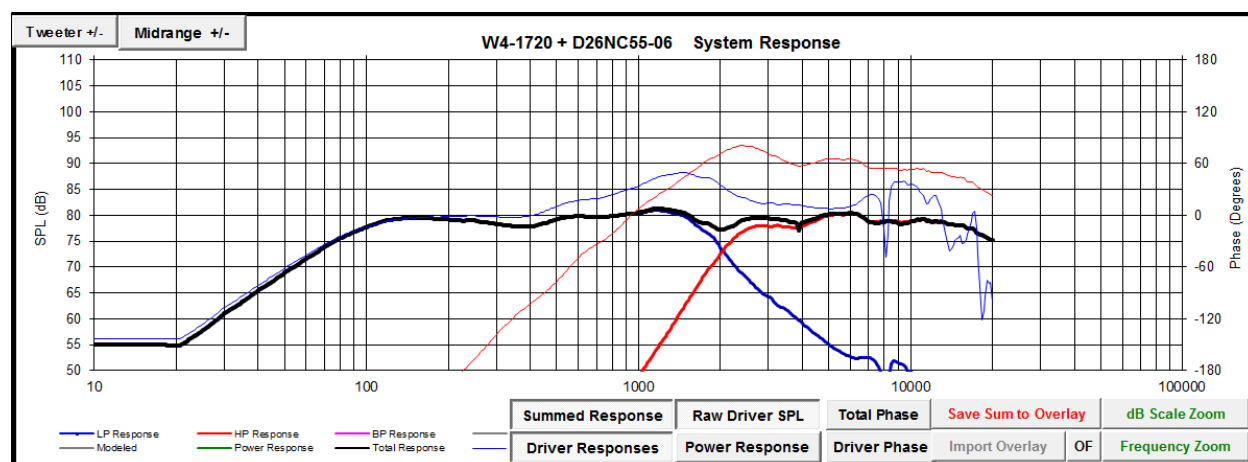
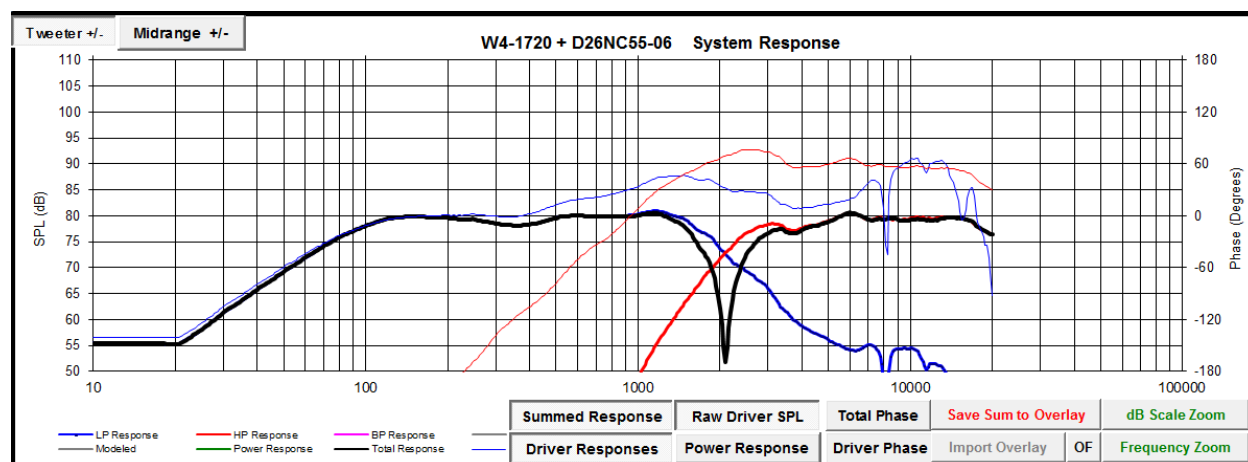
R2: 15 ohm resistor, high power (25W or greater)



Filter Electrical Response loaded by the drivers and the System Impedance



On Axis15 Degrees Horizontal30 Degrees Horizontal

60 Degrees Horizontal+15 Degrees Vertical (represents "listener standing")On Axis Reverse Null

Appendix II: Second Published Crossover

This is the second iteration of the crossover. Voicing over a year in a small 10'x12' lively room led to adding a small depression from 3 kHz to 5 kHz, while trying to minimize component changes from the crossover in Appendix I. This eradicated a small amount of perceived sizzle. The initial publication of this design (Appendix I) had R1 as 1 ohm, and C2 as 2 uF for a flatter response, which may be preferred in a large or well damped room.

Low pass

L1: 1.5 mH inductor, 0.7 ohms dc resistance (18 gauge air core).

C1: 15 uF cap (not electrolytic)

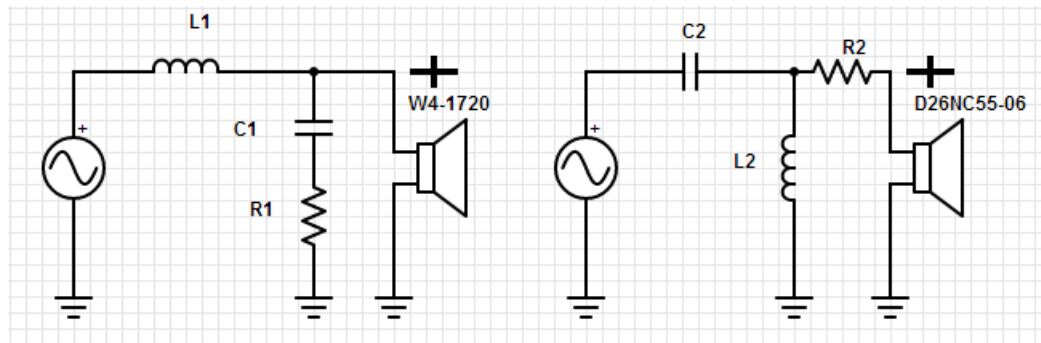
R1: 2 ohm power resistor (10W or greater)

High Pass

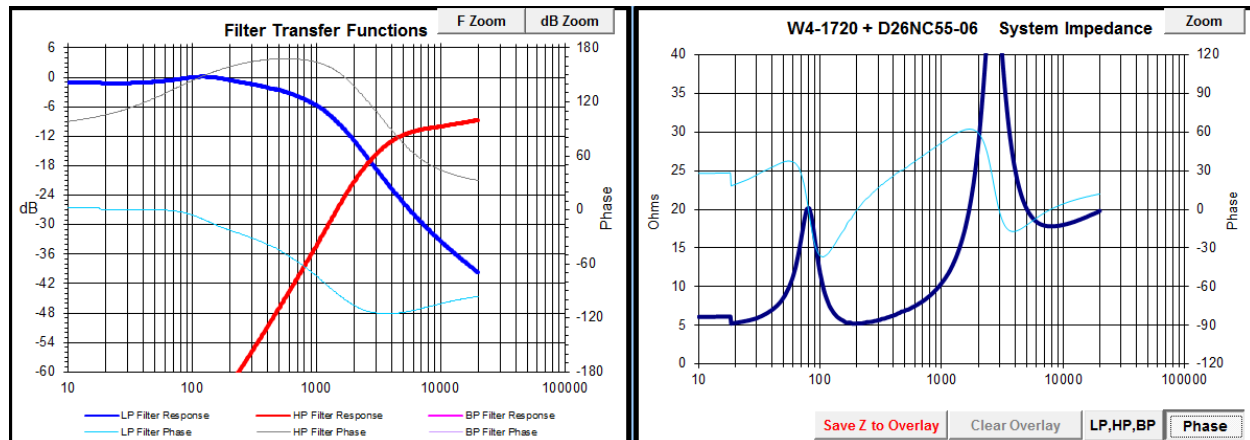
C2: 1.68 uF cap (not electrolytic)

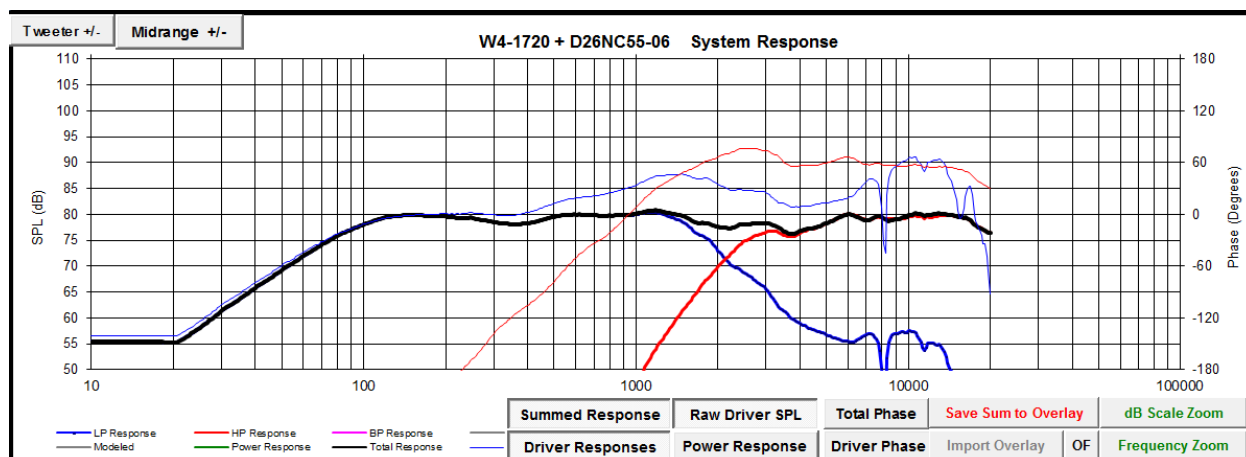
L2: 1.1 mH inductor, 0.5 ohms dc resistance (18 gauge air core)

R2: 15 ohm resistor, high power (25W or greater)

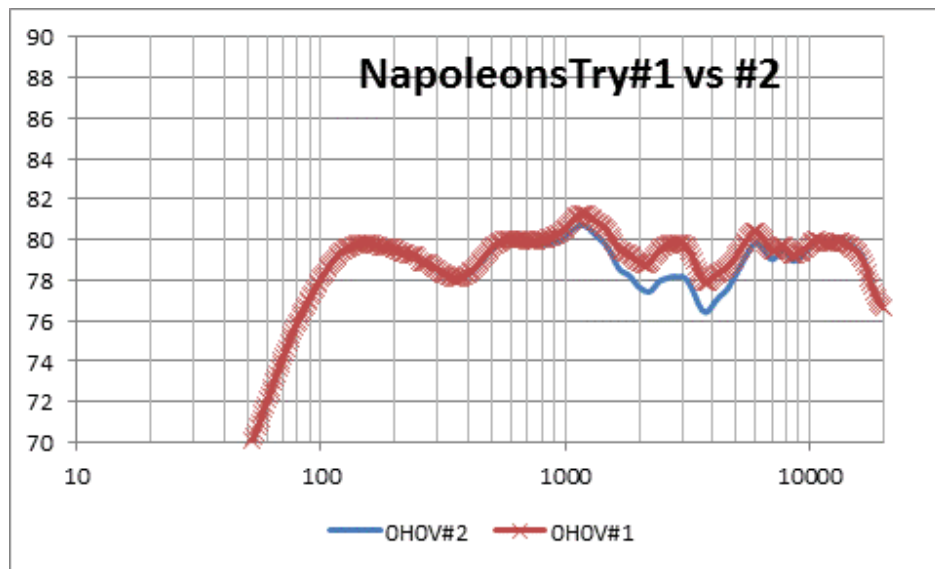


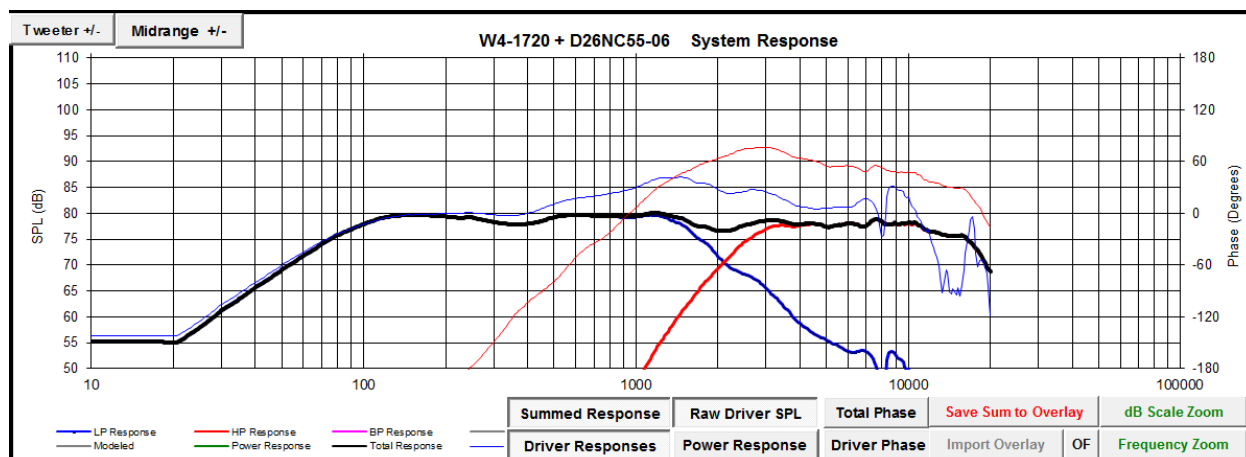
Filter Electrical Response loaded by the drivers and the System Impedance



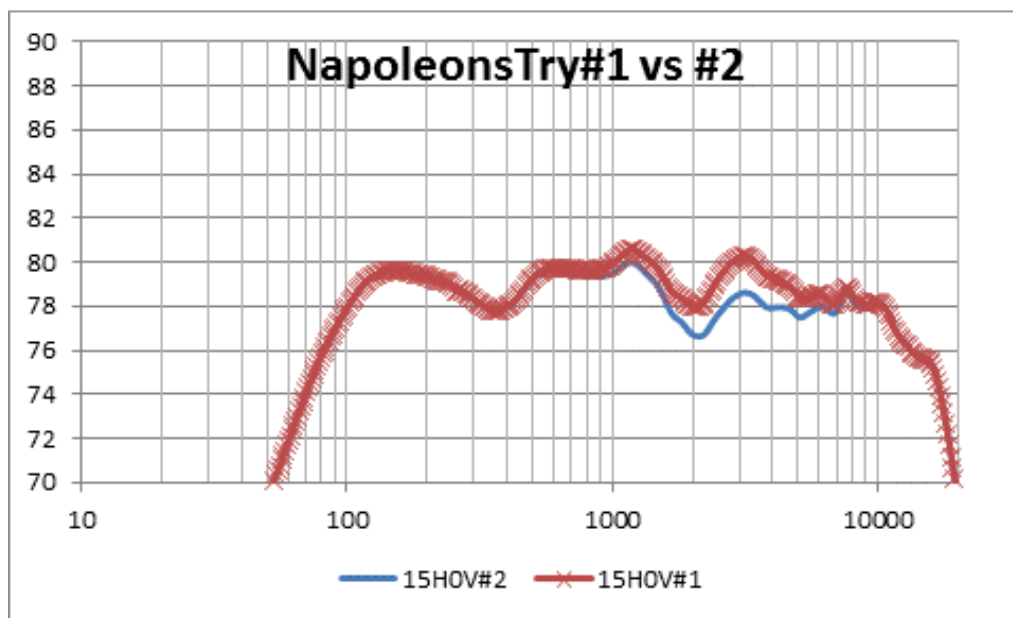
On-Axis

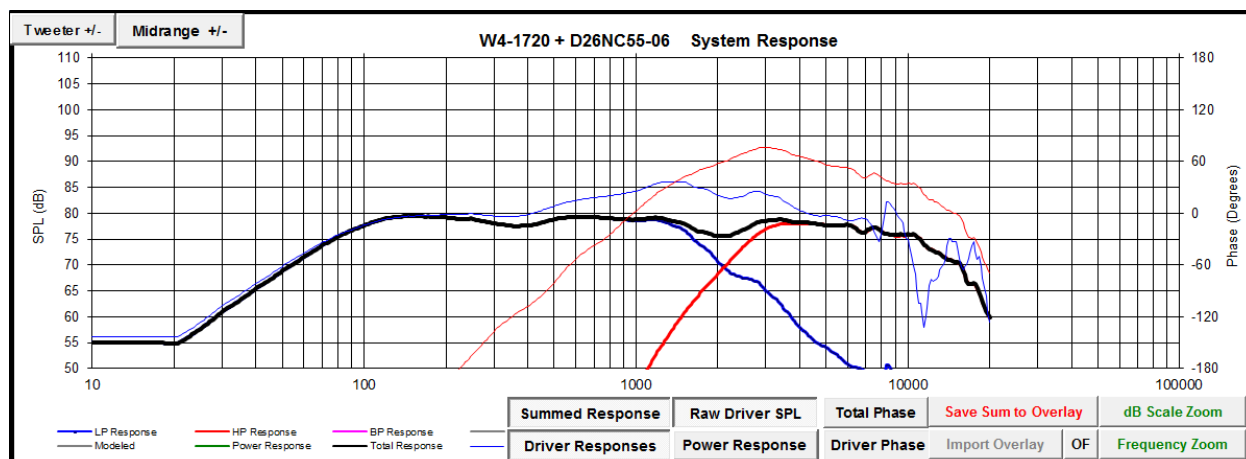
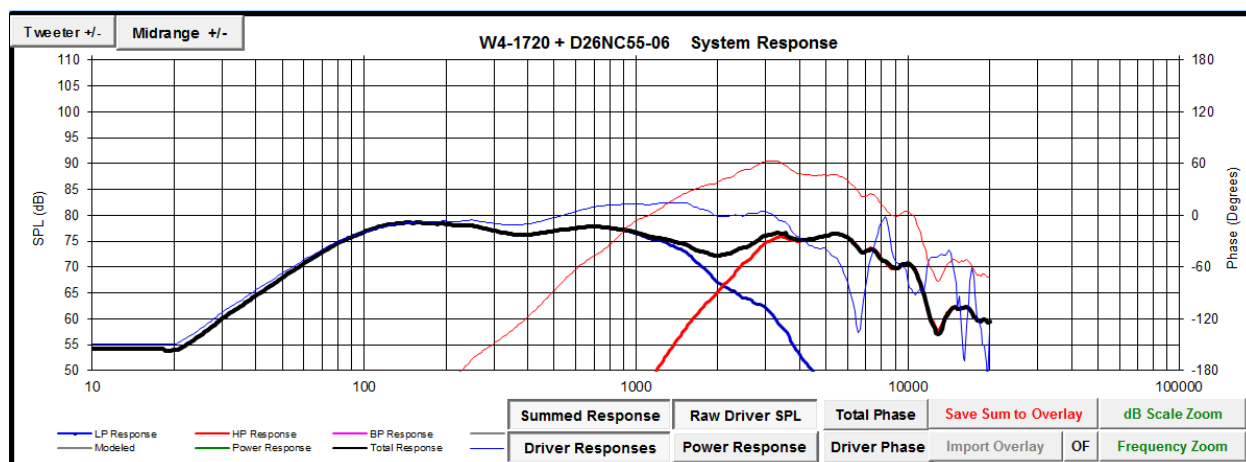
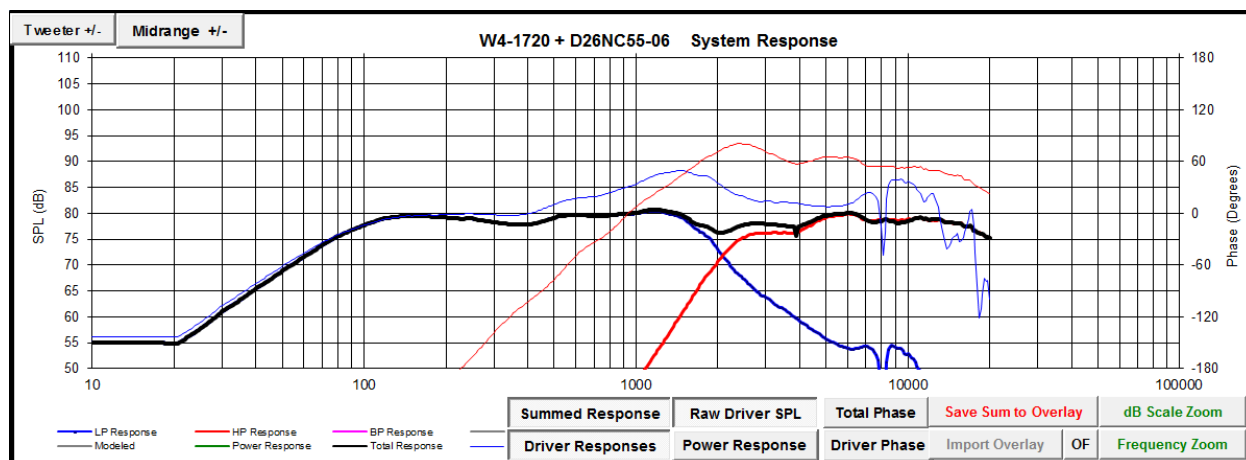
The effect of the change from the first version of the crossover, on axis:



15 Degrees Horizontal

The effect of the change from the first version of the crossover at 15 degrees off axis shows a welcome reduction in energy from 2 to 6 kHz:



30 degrees Horizontal60 Degrees Horizontal+15 Degrees Vertical (represents "listener standing")

On Axis Reverse Null