Concertante



Micro Monitor based on the 12cm Scanspeak 12W/8524G00 midwoofer and the Scanspeak D2010/851100 19mm dome tweeter.

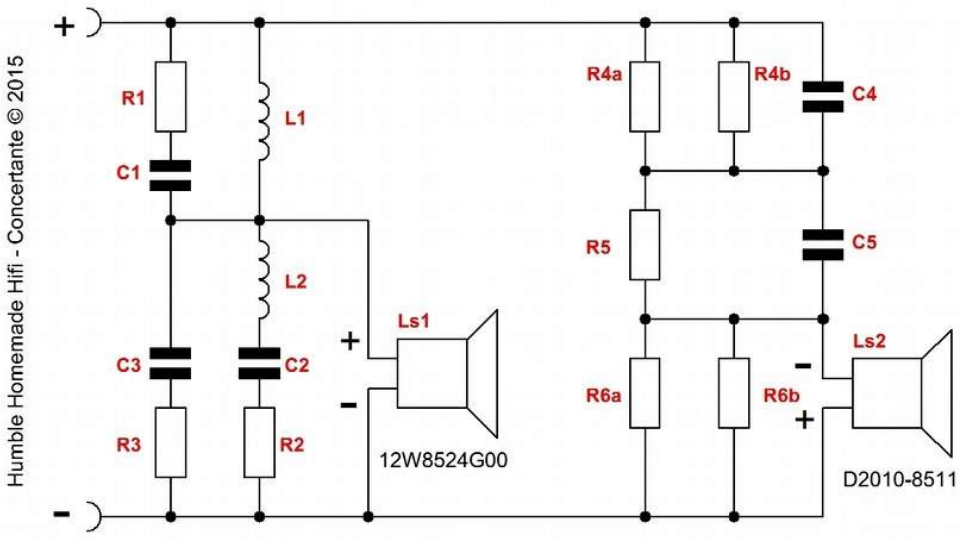
Specifications

Sensitivity	83,5 dB / 2,83 volts
Impedance	8 ohms nominal (minimum 5,3 ohm @ 300 Hz)
Frequency response	57 - 20.000 Hz (-3dB)
Dimensions (W x H x D)	180 x 300 x 210 mm
Weight (finished product)	10 kg each
Price DIY loudspeaker kit (all parts except wood)	EUR. 349,- each (includes ready-made and tested crossover)

The Concertante in detail



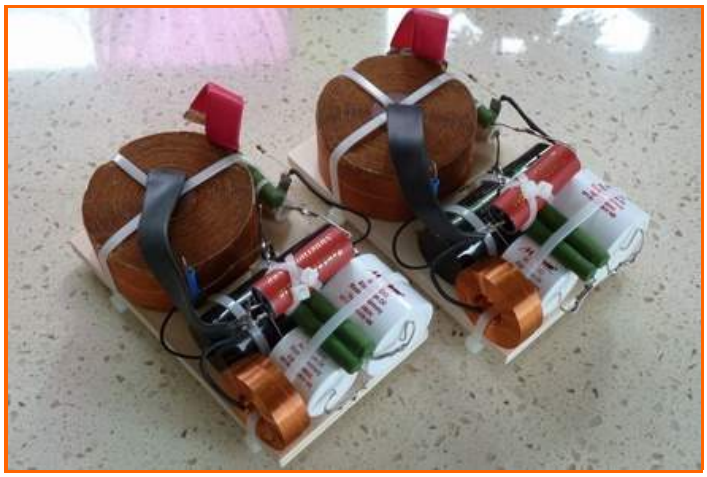
Due to the number of correction-networks around the midwoofer, the crossover-schematic might seem a little complex at first glance, but basically all it is is a simple first-order parallel network. The low-pass function for the midwoofer is created by inductor L1 and the high-pass function for the tweeter by capacitor C4. The tweeter's output level is lowered to that of the midwoofer by means of resistors R4 + R5 that also make sure that the impedance of the tweeter is relatively constant. This is a prerequisite for optimal functioning of a first-order crossover. So around the woofer we can see quite a number of components but, except for inductor L1, they all only have a corrective function. Inductor L1 froms the actual 1st-order low-pass, parallel to it is an RC-network that (together with the inductor) flattens the peak in the output of the woofer around 5500Hz. Further on we can see another RC-network (R3 / C3) that keeps the impedance of the woofer at a constant value, even above the crossover-point, again to create optimal working conditions for the first-order network. Finally there is an LCR-network that corrects the baffle-step. As some of you may know, I like to "cook" when I am designing loudspeaker crossovers. These crossover components are therefore chosen, not only for their high sound and build quality, but they are also selected after extensive listening sessions for their maximum synergy with each other and the chosen loudspeaker drivers. For L1 I choose a Jantzen Audio Wax Coil that sounds very spatious and above all produces harmonics in a very rich and natural sounding manner. The tweeter was granted a Hovland SuperCap, this capacitor has a detailed and honest character with lots of depth. The combination of the two together creates a prefect balance between warmth and detail, analytical capability and tranquility, that can become addictive. The components of the correction-networks are, besides their physical size, also selected for their tonal character.



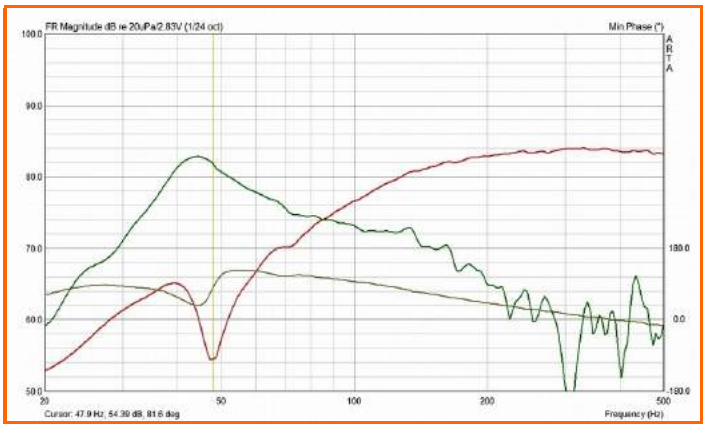
Inductors
L1 = Jantzen Audio 14AWG Wax Coil copper-foil / paper in beeswax
L2 = Jantzen Audio baked varnish air-core / 0,70mm wire

Capacitors
C1 = Jantzen Audio Superior Z-Cap / 800VDC
C2 = Mundorf EVO Oil / 450VDC
C3 = Mundorf EVO Oil / 450VDC
C4 = Film & Foil bypass cap / 3000VDC
C5 = Hovland Super Cap / 200VDC

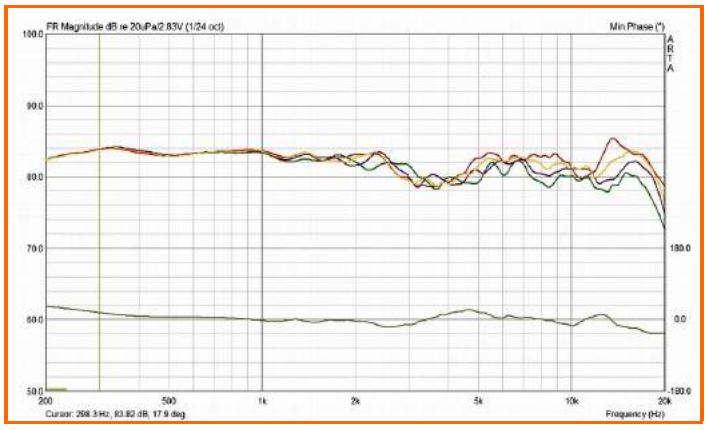
Resistors
R1 = Jantzen Audio SuperRes Non-Inductive / 10 watts
R2 = Jantzen Audio SuperRes Non-Inductive / 10 watts
R3 = Jantzen Audio SuperRes Non-Inductive / 10 watts
R4a = Mundorf M-Resist Supreme / 20 watts
R4b = carbonfilm resistor / 0,25 watts
R5 = carbonfilm resistor / 0,25 watts
R6a = Mundorf M-Resist Supreme / 20 watts
R6b = carbonfilm resistor / 0,25 watts



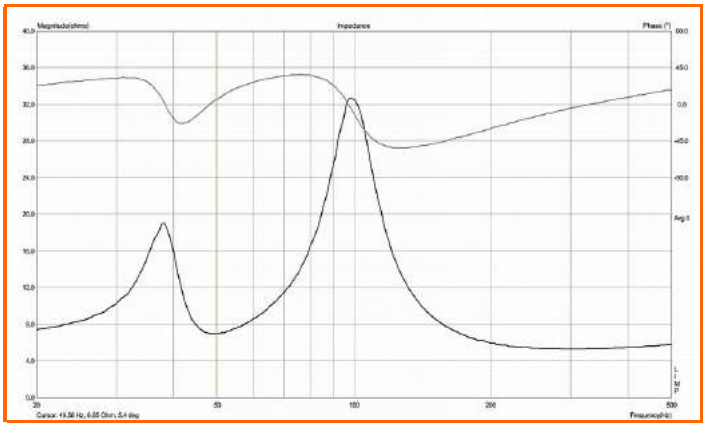
Concertante - listening and measurements



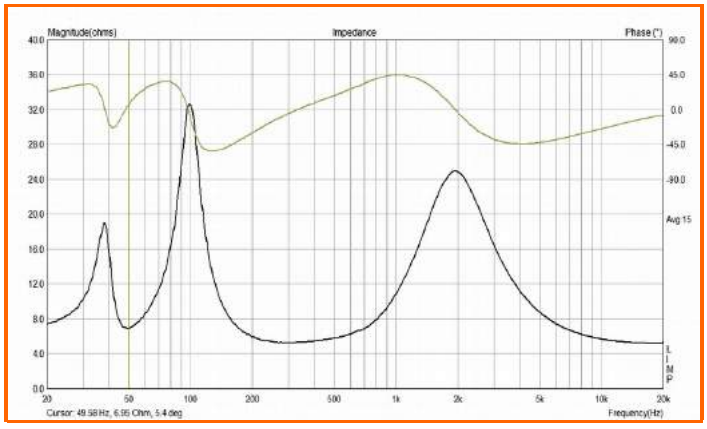
Above left: low frequency curve of the woofer (red) and the reflex-port (green); frequency range 20Hz - 500Hz; vertical range 50dB - 100dB, subdivision 2dB's. The port tuning frequency can be seen at 50Hz (null in the woofer's output), the maximum port output level is between 40-50Hz. Port resonances at higher frequencies are well controlled.



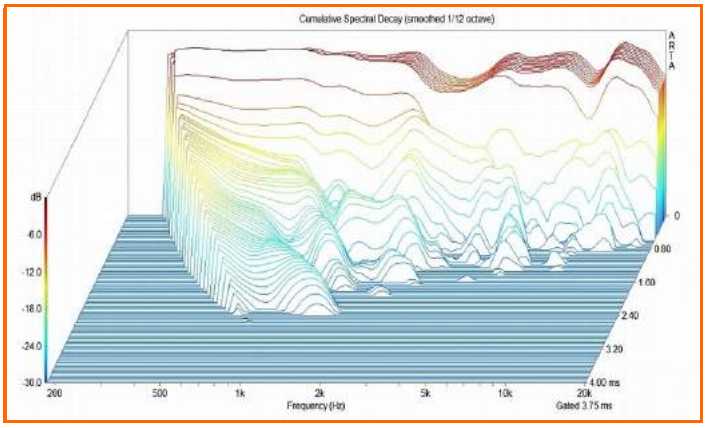
Above right: frequency curves on-axis (red) and off-axis (yellow - 15 degrees / purple - 30 degrees / green - 45 degrees); frequency range 200Hz - 20kHz; vertical range 50dB - 100dB, subdivision 2dB's. Overall very flat response (+/-1dB up to 3kHz), baffle edge diffraction around 3-4kHz due to the sharp edges of the cabinet.



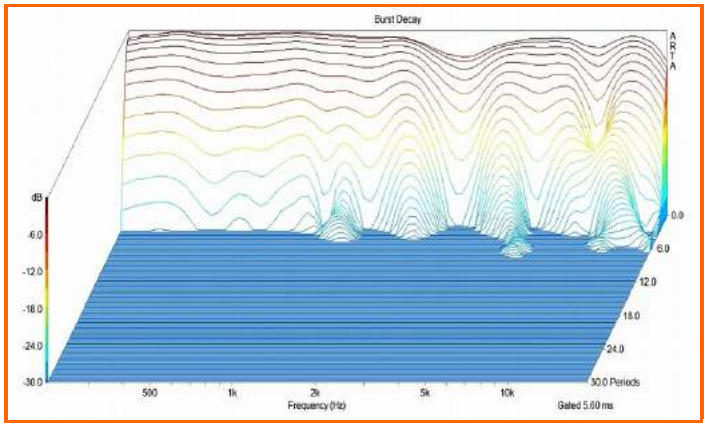
Above left: low frequency Impedance plot (black) with corresponding electrical phase of the finished system; frequency range 20Hz - 500Hz; vertical range 40 ohms, subdivision 4 ohms. Port tuning frequency at 50Hz. Impedance minimum 5,3 ohms at 300Hz.



Above right: Impedance plot (black) with corresponding electrical phase of the finished system; frequency range 20Hz - 20kHz; vertical range 40 ohms, subdivision 4 ohms. An easy load for almost any amplifier.



Above left: Cumulative Spectral Decay of the finished system; frequency range 200Hz - 20kHz; vertical range -30dB, subdivision 6dB's, time window 4 milliseconds.



Above right: Burst Decay of the finished system; frequency range 200Hz - 20kHz; vertical range -30dB, subdivision 6dB's, time window 30 periods.

Loudspeaker currently under development.

Last updated 19.2.2015