

Jensen 1071

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Prototype speakers

This project started with Steen Jensen writing he'd acquired 2 x 26W/8861T00 bass drivers and after the usual some 20+ mails, the top part of this big 3-way became the 18W/8531G00 for mid and D2905/9900 for treble due to another diy'er giving up *his* project. Not a bad choice! The 18W/8531G00 can go low in a suitable top cabinet and possibly a simple crossover could be implemented to mate bass and mid. I never had the opportunity to do a crossover for the 9900, and having read on the web that this tweeter was a tough one, I never applied for those second hand samples available from time to time. The 9900 measures excellent and modelling the crossover was even easier. So far, this tweeter looks easy.

Soldering the test crossover didn't take long and it was immediately clear that this speaker was quite different from any other big speaker I'd done. The level of transparency was almost scary and bass was dry and firm with excellent timing. Not the deep, fat, overhung kind of bass we're used to from some vented systems, but short and firm - almost like a horn loaded bass driver. Some will miss the boomy bass I'm sure and the cure is simple: Skip the Variovents and insert a port. The 9900 tweeter seems excellent. Probably the best of the Revelator domes. I like the 9500 but never really came to terms with the 9700, being a bit edgy to my ears. The 9900 is basically the same as the 9700, only having the "constant directivity" faceplate - and I like what I hear. It has a presence quality like my DTQWT system.

The 18W/8531-G00: I never heard the level of transparency from this driver until this speaker. Free of the tedious task of pumping deep bass, distortion seems significantly reduced and you can't help playing this speaker loud - because it *can* be played loud. The wider than normal front panel seems to add a certain amount of warmth to the midrange. The big 26W is taking the heat and the 18W is at ease. I wonder how a true mid-driver from the sliced paper (18W size) would perform. Another surround and a short voice coil - underhung. Well, SS will probably never make such a driver.

Size of the bass cab is an issue and if size is of prime concern, 60 liters vented will do and makes an $F3 = 34$ Hz, where 80 liters ported provides a slightly deeper bass, $F3 = 30$ Hz, and this seems an overall good compromise. From 80 liters net volume and Variovents the $F3$ is around 43 Hz. Variovent'ed boxes cannot be calculated but are generally close to closed boxes, but having a slightly shallower roll-off profile, i.e. it reached a bit deeper, but not much.

I know that raw MDF cabs turn people off, so here's what Bob in Holland made of it. [Click image to go to full website.](#)



The Drivers

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ScanSpeak data sheets: **26W/8861T00** + **18W/8531G00** + **D2905/9900**

Click to download data files.

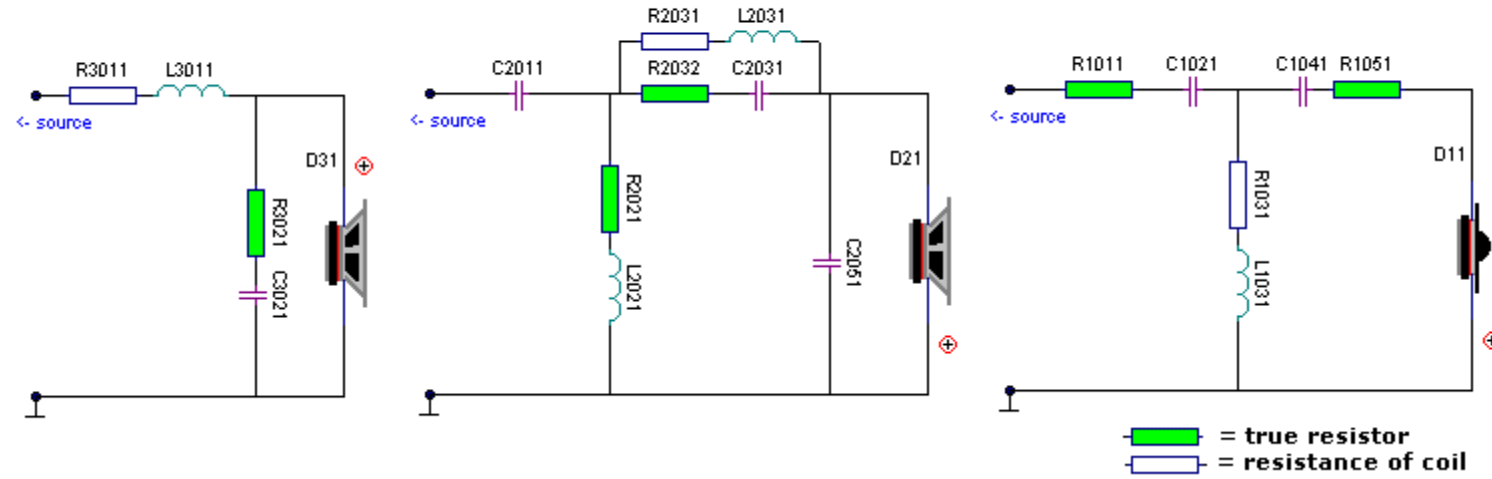


Shown here is the 18W/8530G00, the coated version; same performance as 8531.

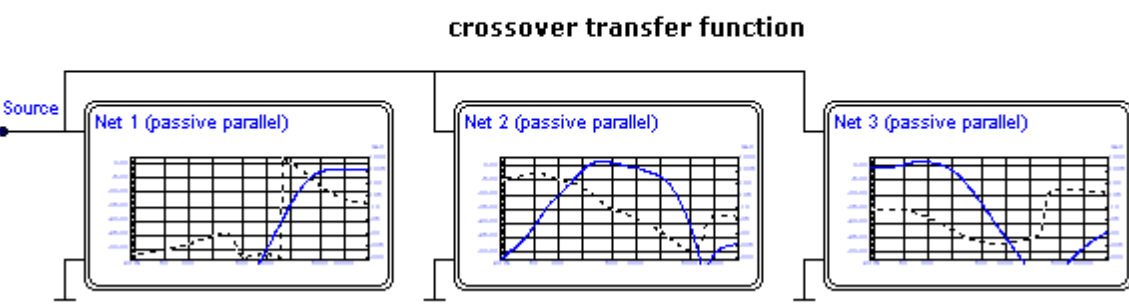
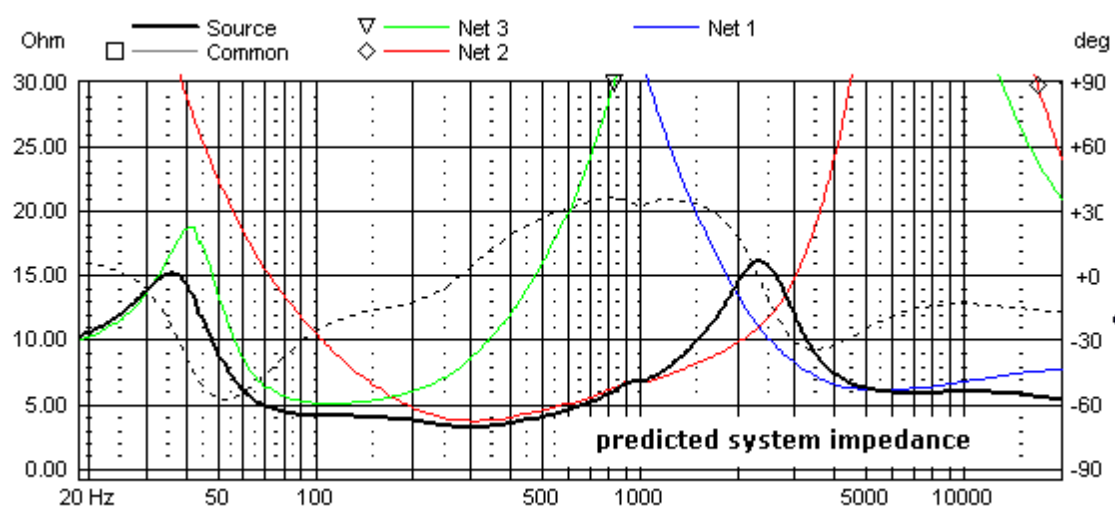
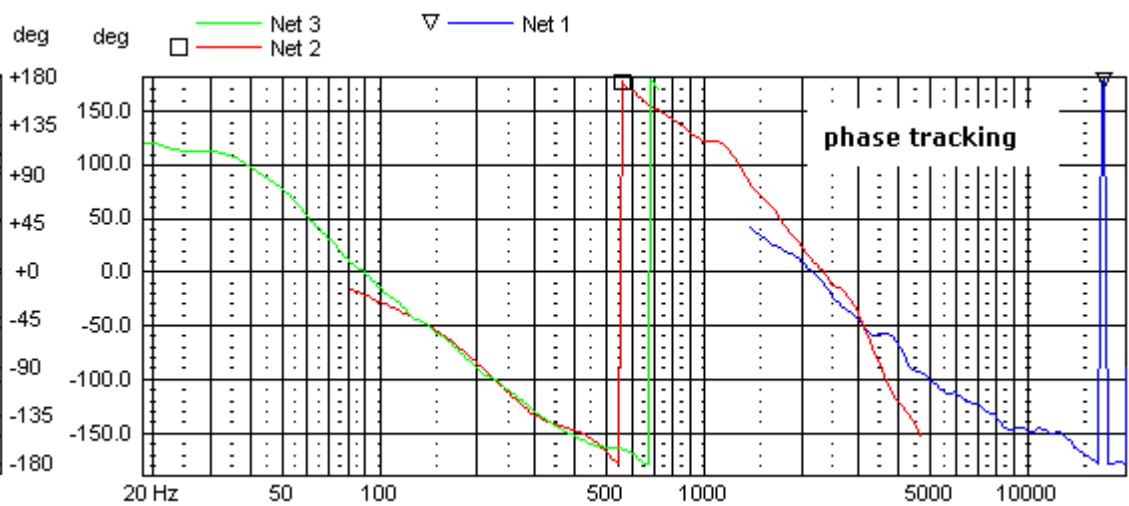
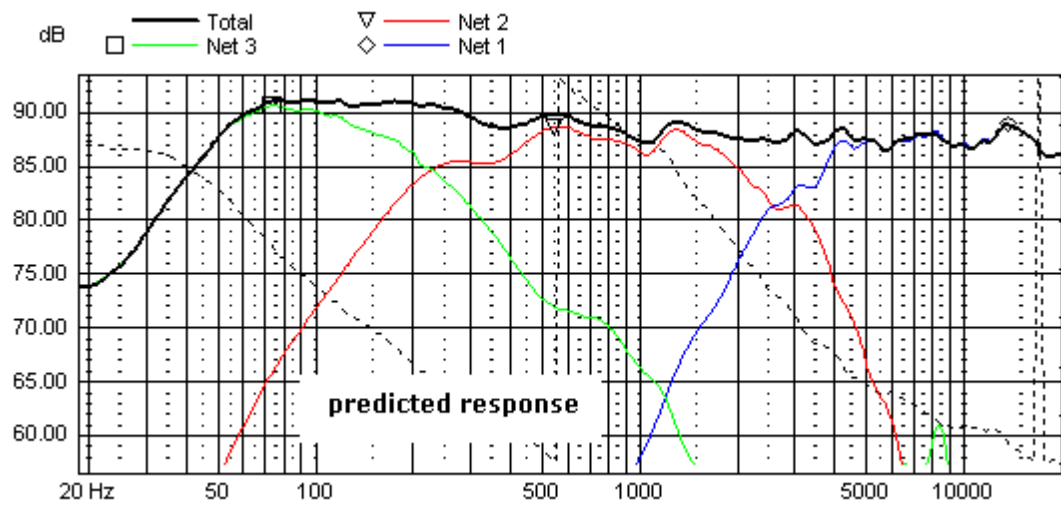
Crossover simulation

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Jensen 1071



The simulated crossover suggests an easy crossover, 2nd order except for 3rd order to the tweeter.

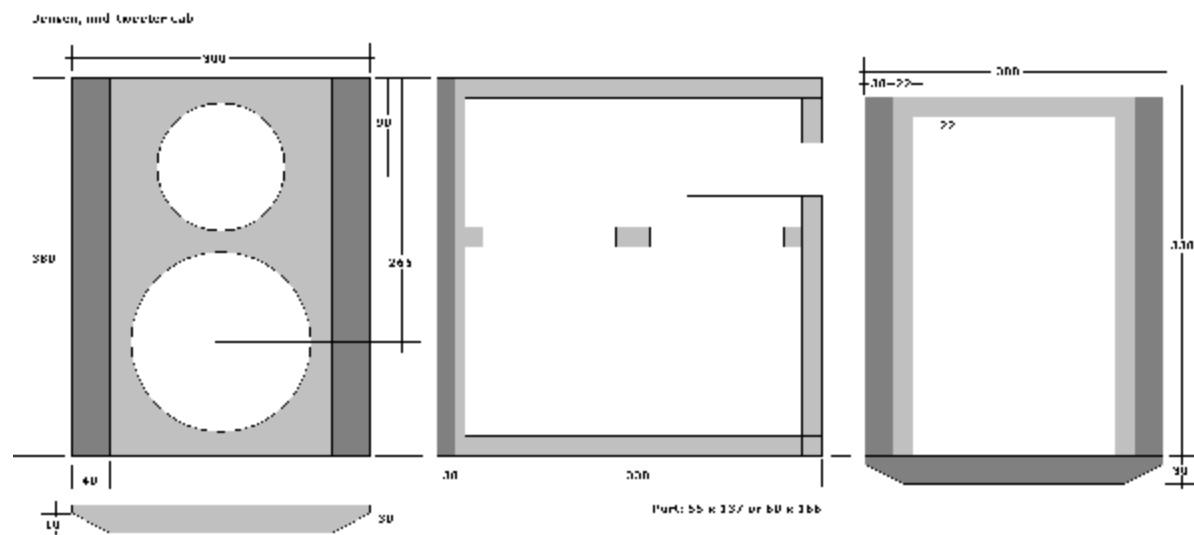


Impedance reaches a minimum of 3.5 ohms at 300 Hz, nothing that will make a good solid state amp sweat, nor a decent PP valve amp of min. 40-50 watts.

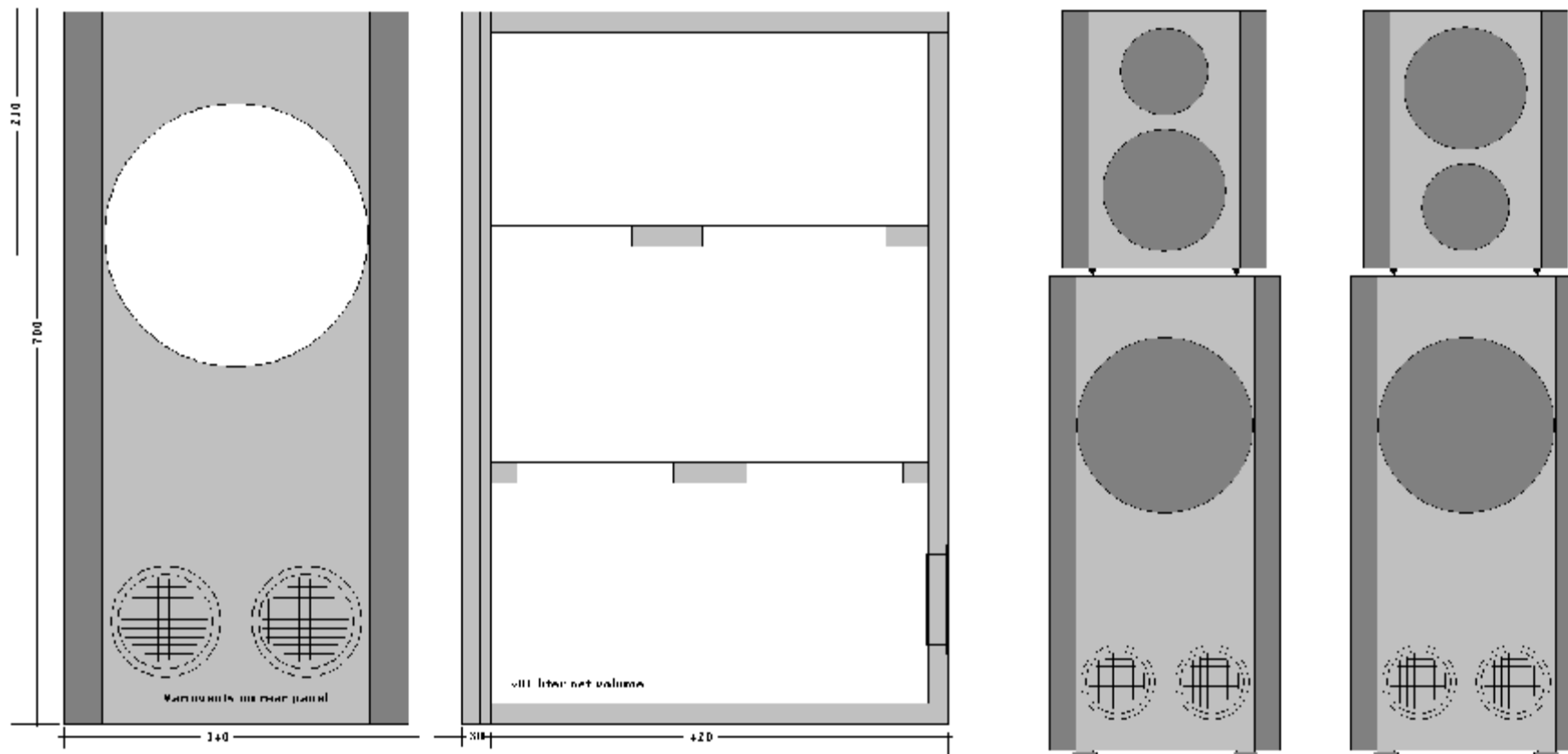
The Cabinets

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Mid cab. Click image to view large.



Bass cab, here 80 liters shown. Click images to view large.
 If 60 liter is preferred, reduce bass cab width to 30 cm and adjust depth to make 60 liter net volume.
 Maintain bass driver placement approx. 21 cm from top of bass cab.

Right: Last minute before Steen took off with his speakers again, we tried inverting mid-cabs.
 The bass cabs was tilted approx. 5-6 deg and the midcab was turned upside down and had a wedge
 to keep vertical position. This definitely didn't sound bad, so give it a try before the final decision is made.

FAQs:

More detailed cabinet drawings are not available.

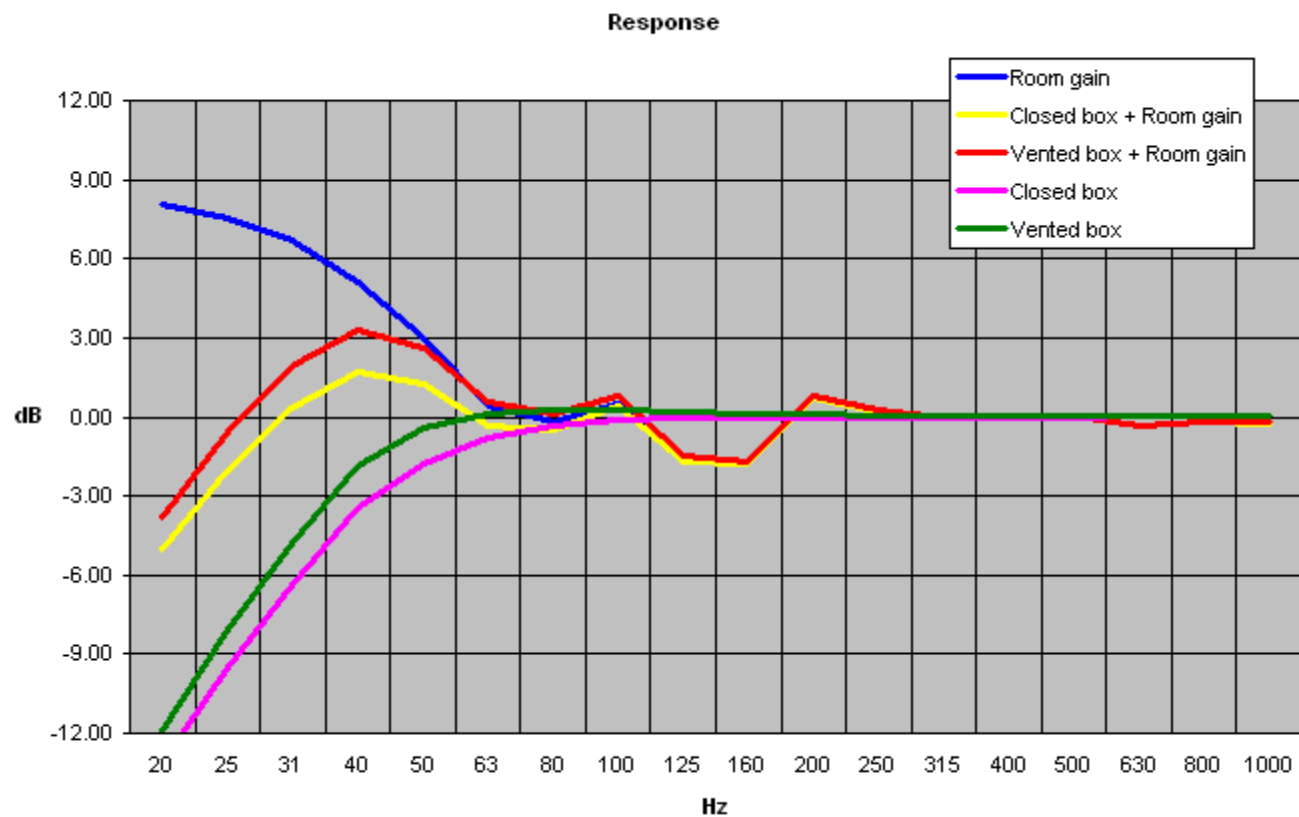
You may place a port on the front if you like.
Check out this for damping: [Cabinet Damping](#) and also this for ideas: [QUATTRO.htm](#)

Box simulation

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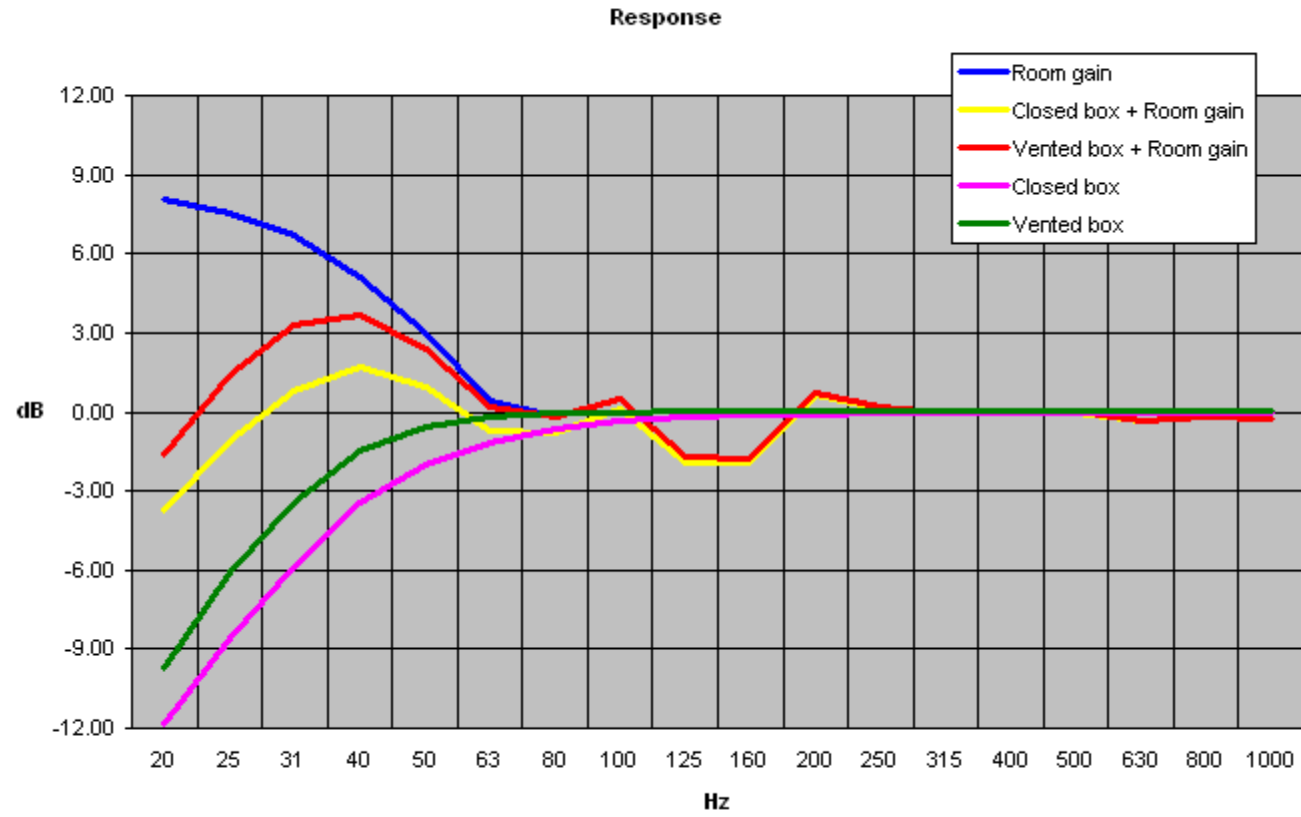
The ScanSpeak 26W/8861T00 is potent bass driver and how should it be used? Closed? Vented? Aperiodic (Variovents)?
Good questions that need to be answered. Let's look at 60 liter and 80 liter net volume for the bass.

Woofers: 26W/8861T00	
Vas (l)	234
Fs (Hz)	19
Qts	0.31
Re (ohm)	6.2
Series res (ohm)	0.2
Qtsn	0.32
Closed box:	
Vb (l)	60
Qtc	0.71
Fc (Hz)	42.1
F3 (Hz)	42.0
Qr	2.2
Vr	3.9
Vented box:	
Vb (l)	60.0
Fb (Hz)	20
Ql	7
F3 (Hz)	34.58
Vent diam (cm)	7.0
Vent length (cm)	30.1
Woofers placement:	
Dist to floor (cm)	80
Dist to back wall (cm)	100
Dist to side wall (cm)	180

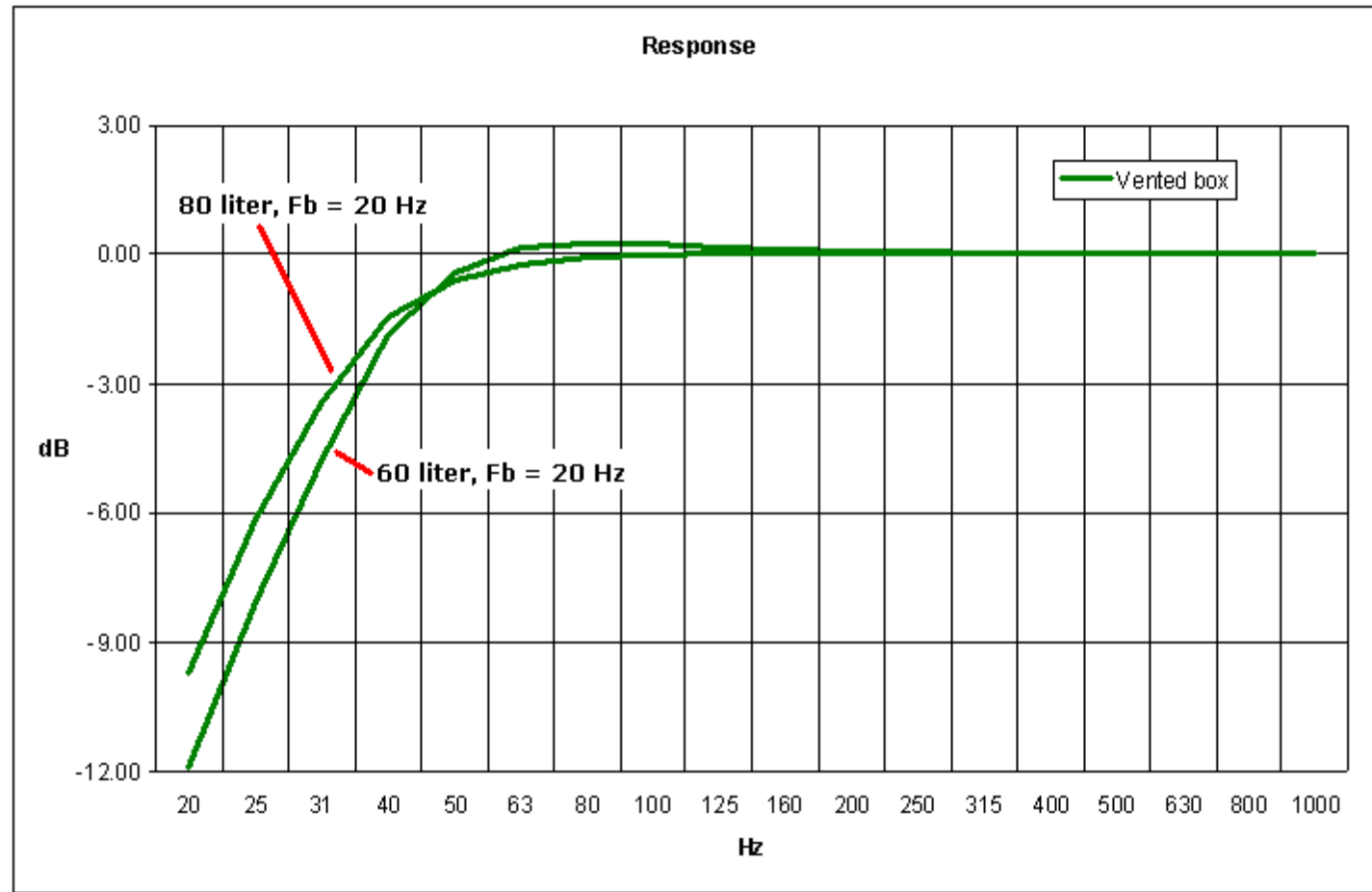


Above a 60 liter closed and vented box. F3 = 42 and 35 Hz respectively. Notice the room-gain at given placement.

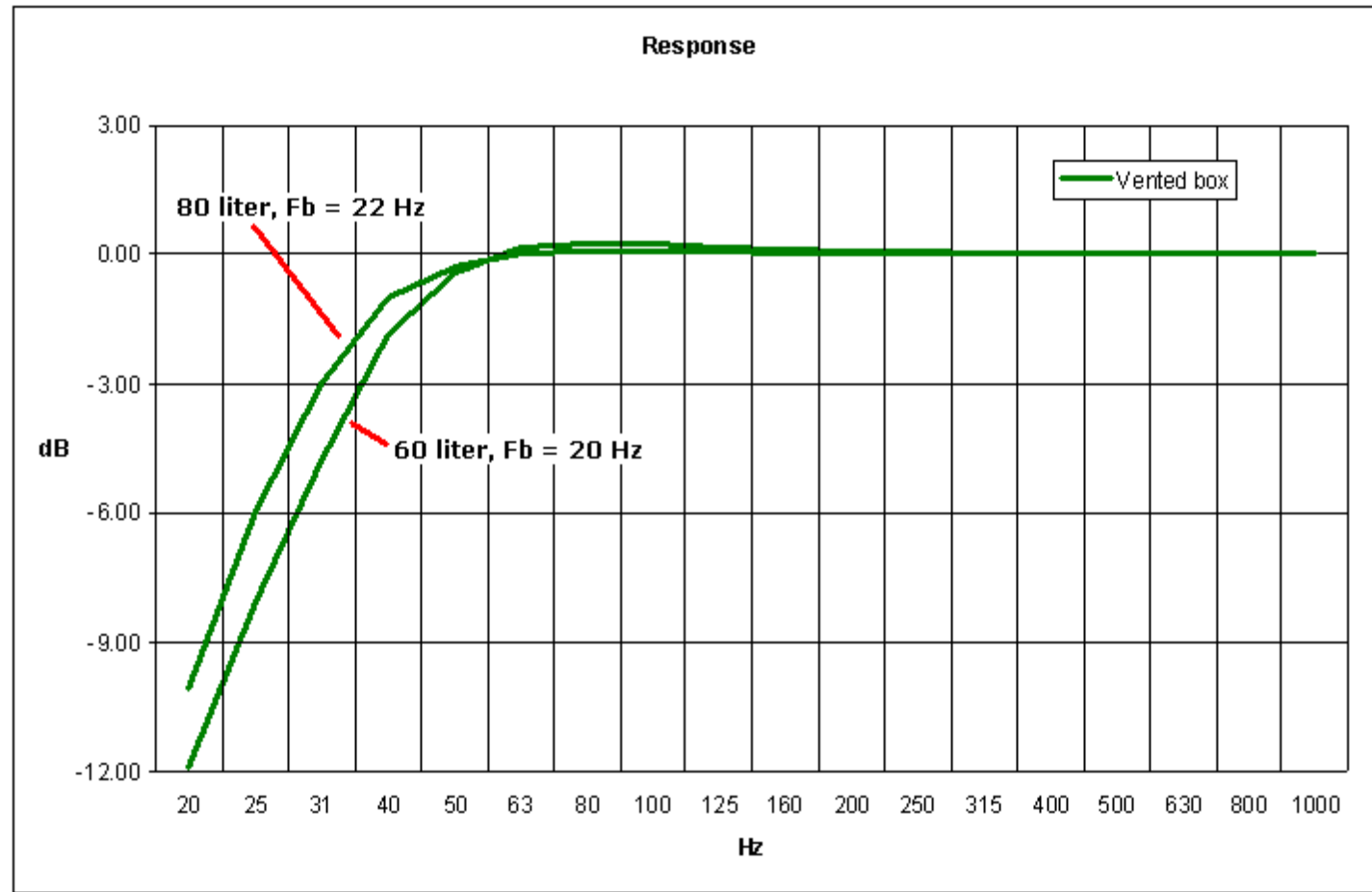
Woofers: 26W/8861T00	
Vas (l)	234
Fs (Hz)	19
Qts	0.31
Re (ohm)	6.2
Series res (ohm)	0.2
Qtsn	0.32
Closed box:	
Vb (l)	80
Qtc	0.63
Fc (Hz)	37.6
F3 (Hz)	42.5
Qr	2.0
Vr	2.9
Vented box:	
Vb (l)	80.0
Fb (Hz)	20
Ql	7
F3 (Hz)	30.47
Vent diam (cm)	7.0
Vent length (cm)	21.7
Woofers placement:	
Dist to floor (cm)	80
Dist to back wall (cm)	100
Dist to side wall (cm)	180



80 liters closed and vented, F3 = 43 and 30 Hz respectively.



Comparing 60 and 80 liters vented. F_b (port tuning) = 20 Hz for both.



Comparing 60 and 80 liter vented, but with 80 liter port tuning at 22 Hz.

Ports and Variovents, bass cab

In case you choose Variovents: 2 pcs per cabinet. Please google "variovent" and find out where to buy them.

Ports for 60 liter, $F_b = 20$ Hz, port dimensions = 60 mm (ID) x 220 mm or 70 mm (ID) x 300 mm
Ports for 80 liters volume, $F_b = 22$ Hz, port dimensions = **68 mm (ID) x 162 mm*** or 80 mm (ID) x 232 mm.
*(68 x 220 mm port supplied with crossover kit)

For 60 liter vented options the ports will be rather long at adequate diameter.
I do not suggest a 60 mm port for this 10" bass driver.
If you use two ports, double port length for same diameter.

Port for mid cab

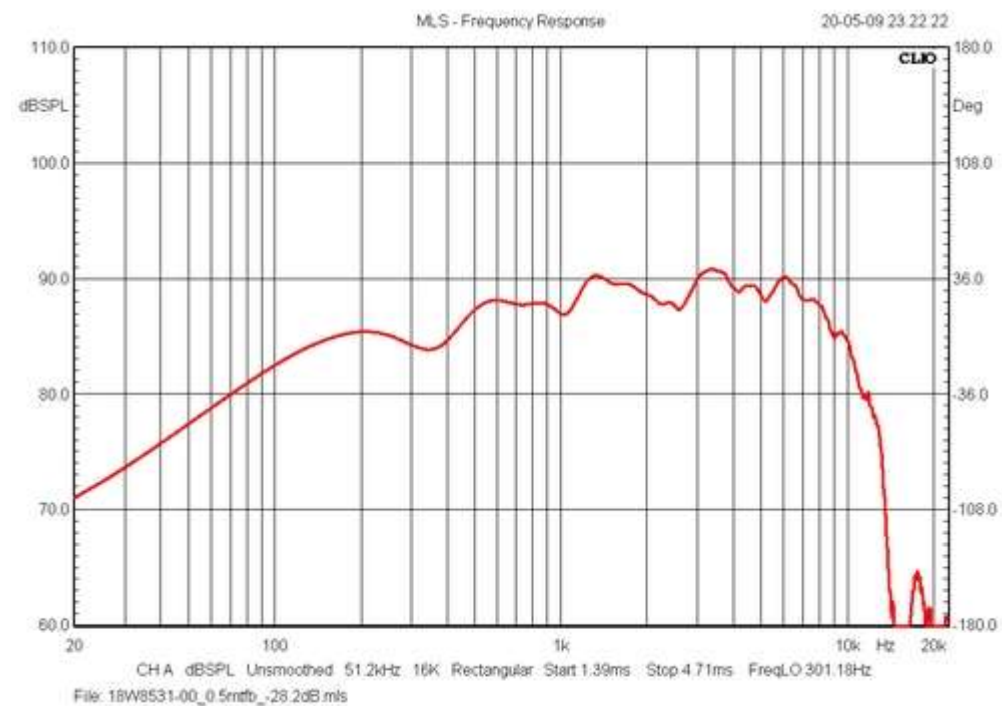
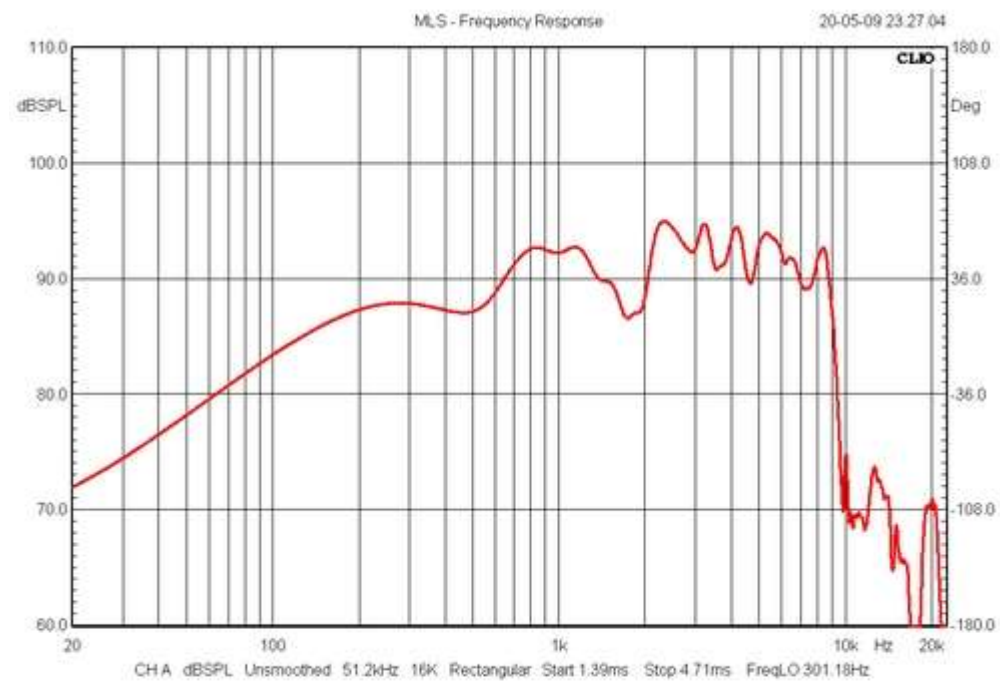
Net volume = 21.5 liter, port tuning (F_b) = 37 Hz:

50 mm (ID) x 111 mm (50 x 145 mm port supplied with crossover kit)
55 mm (ID) x 137 mm, or
60 mm (ID) x 166 mm

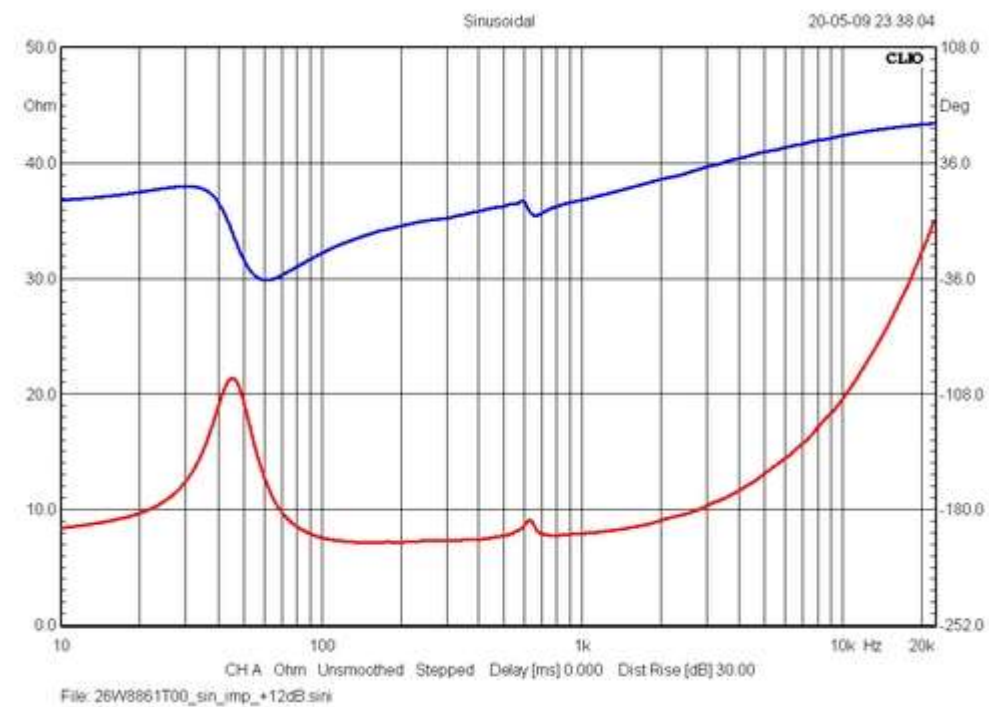
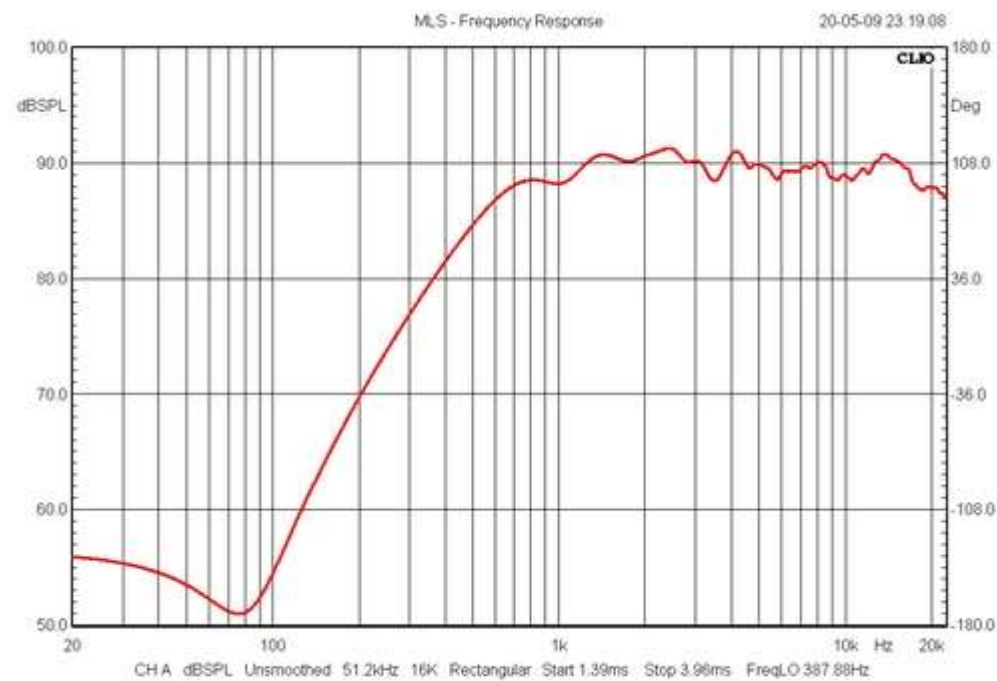


Measurements

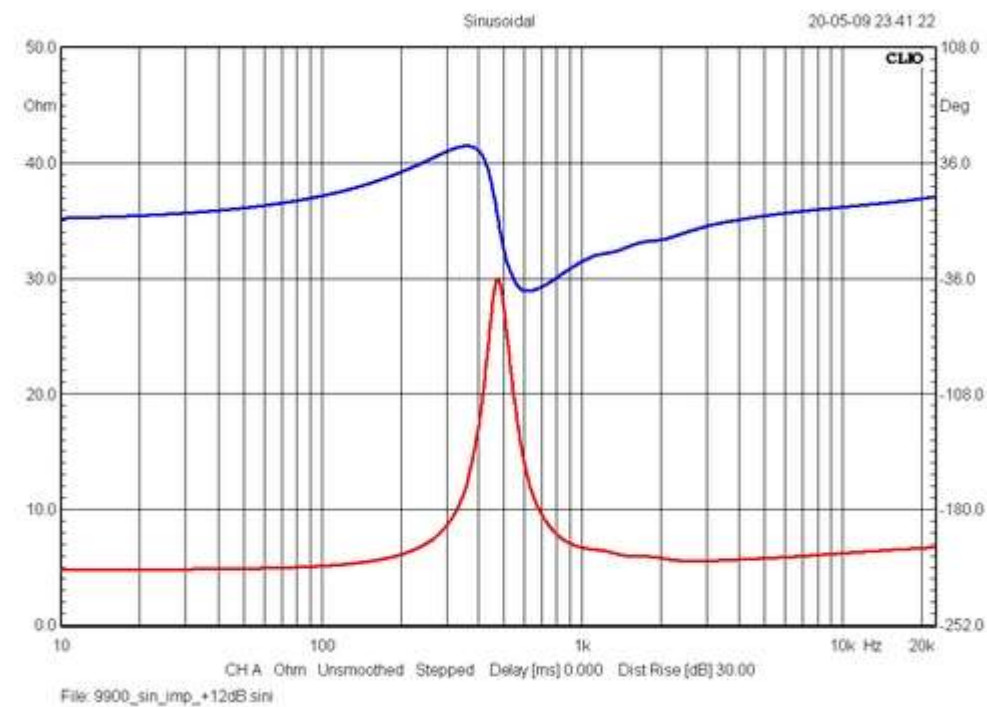
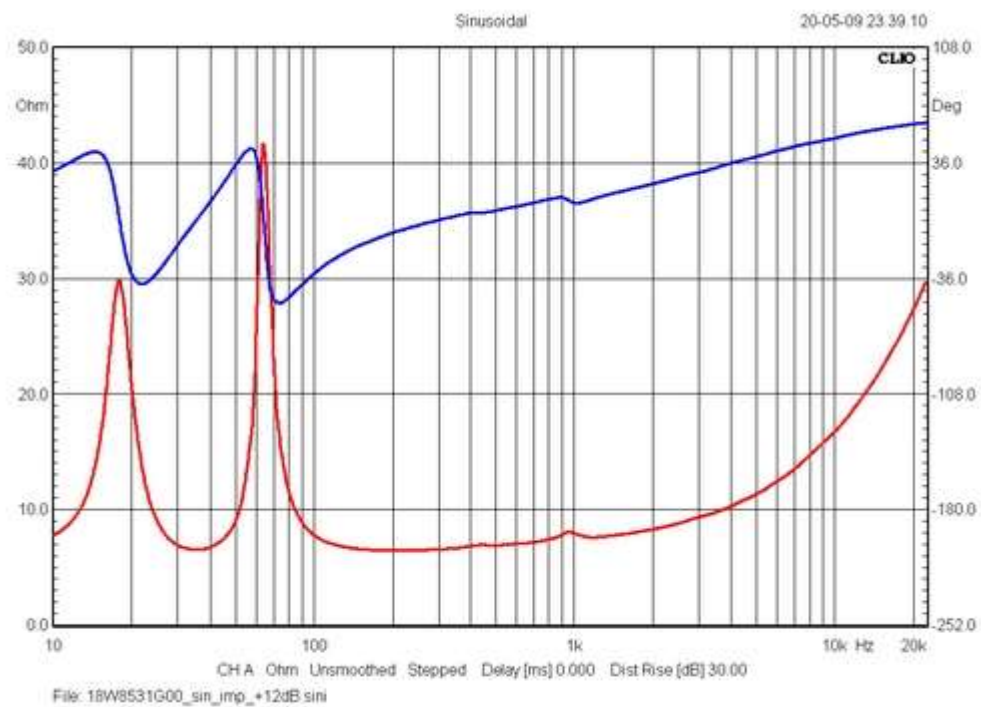
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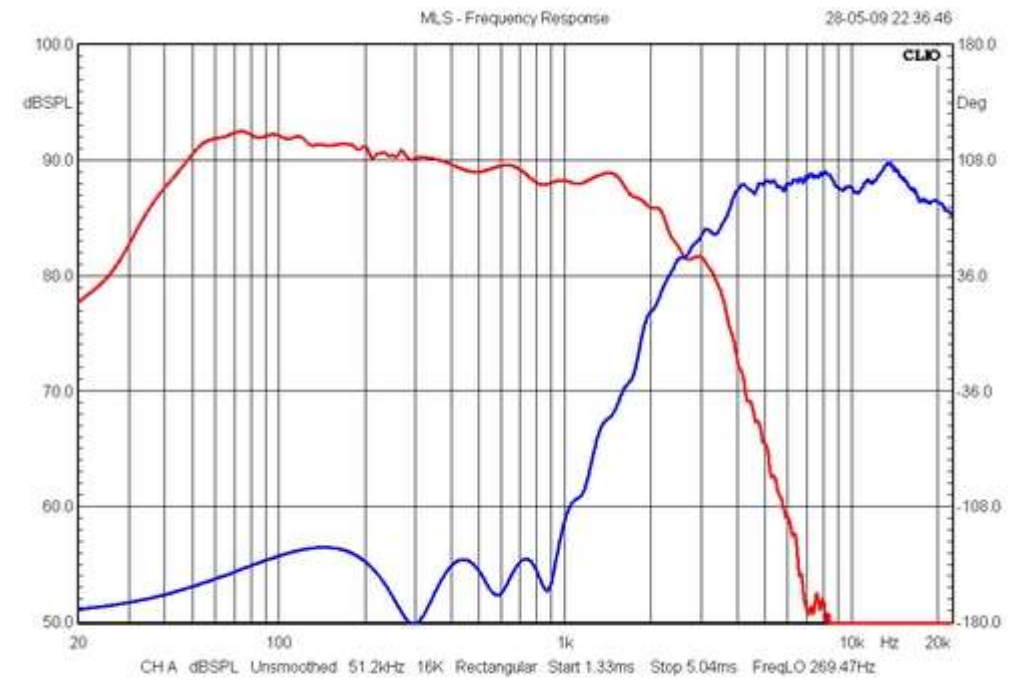
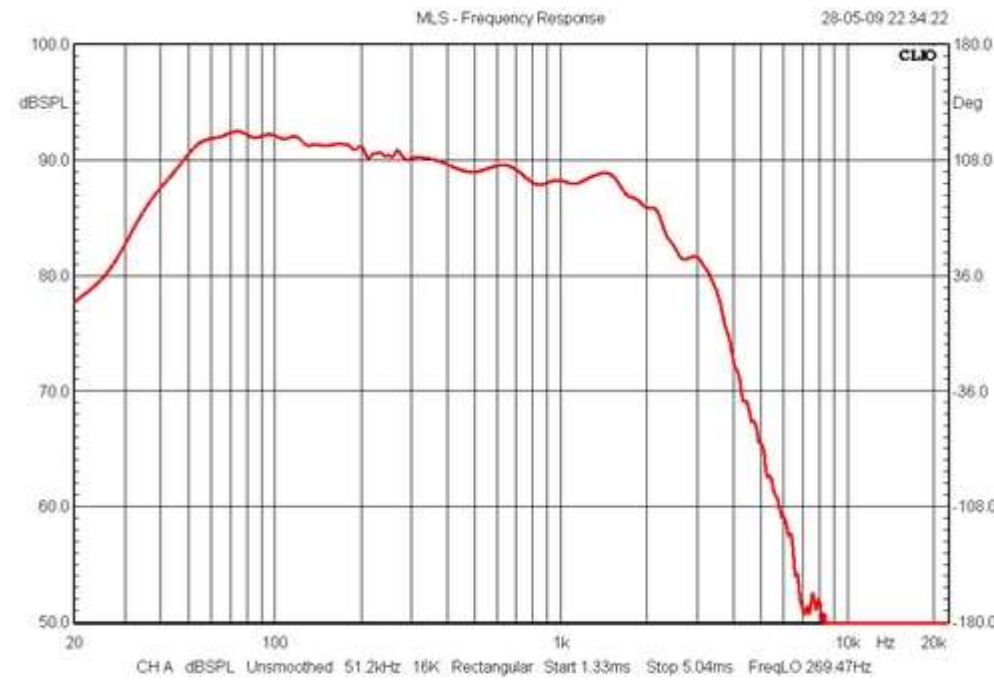
Left: 26W/8861T00 SPL @ 1m/2.8V. Right: 18W/8531G00 SPL @ 1m/2.8V



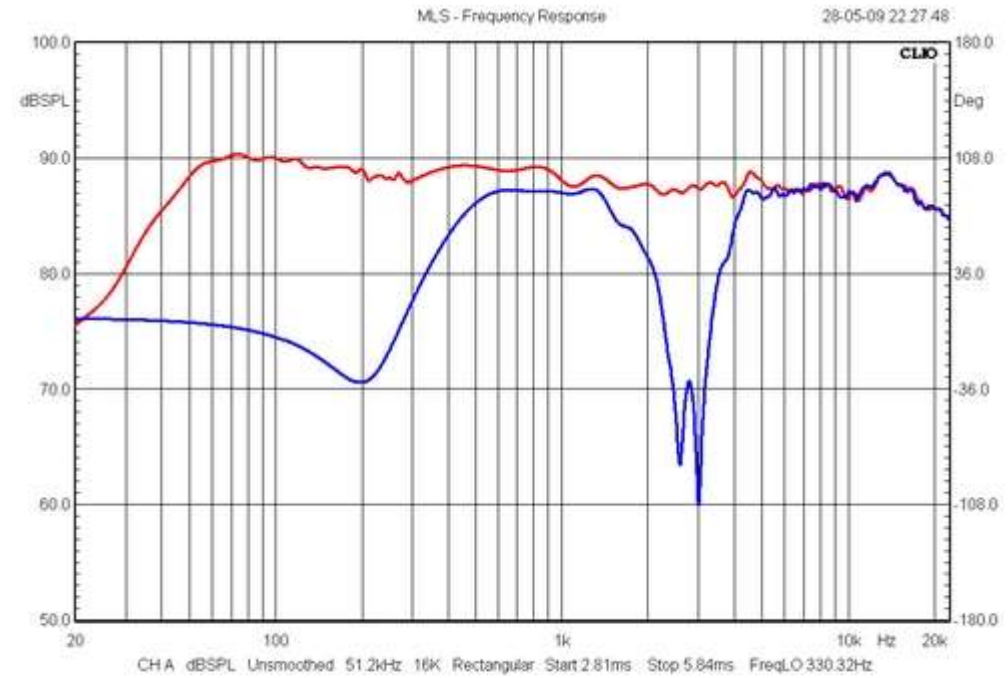
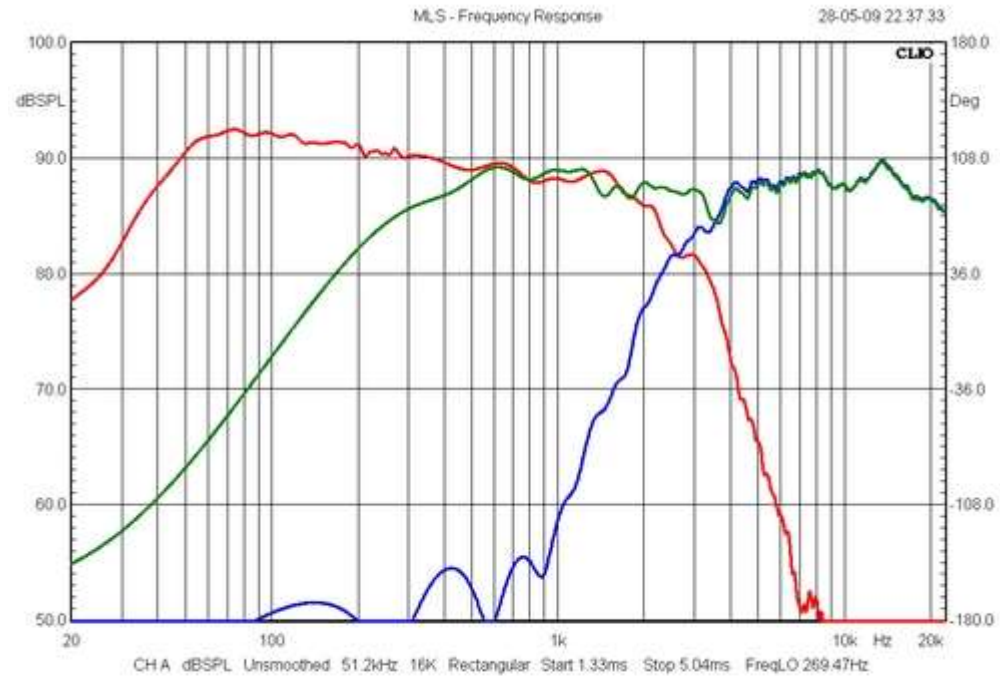
Left: 9900 SPL @ 1m/2.8V. Right: 26W bass driver's impedance in cab with two Variovents.



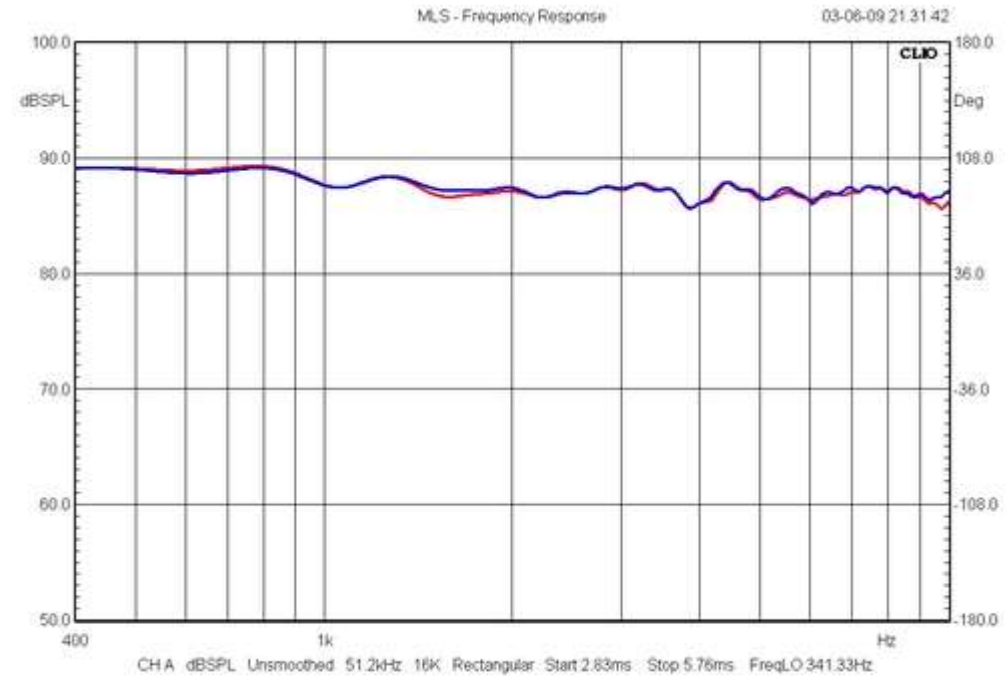
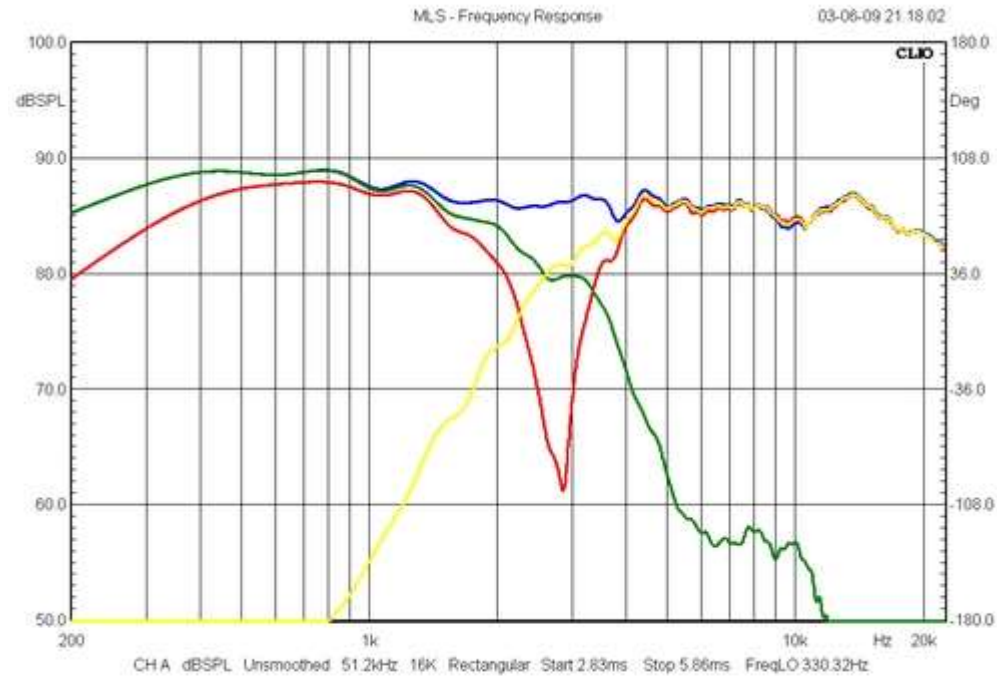
Left: 18W/8531G00 impedance in vented mid cabinet, $F_b = 37$ Hz. Right: 9900 impedance.



Left: SPL @ 1m, 2.8V. Response from bass and mid with bass merged with nearfield response at 300 Hz.
 Right: SPL from BM + T. Point of crossover is 2700 Hz.

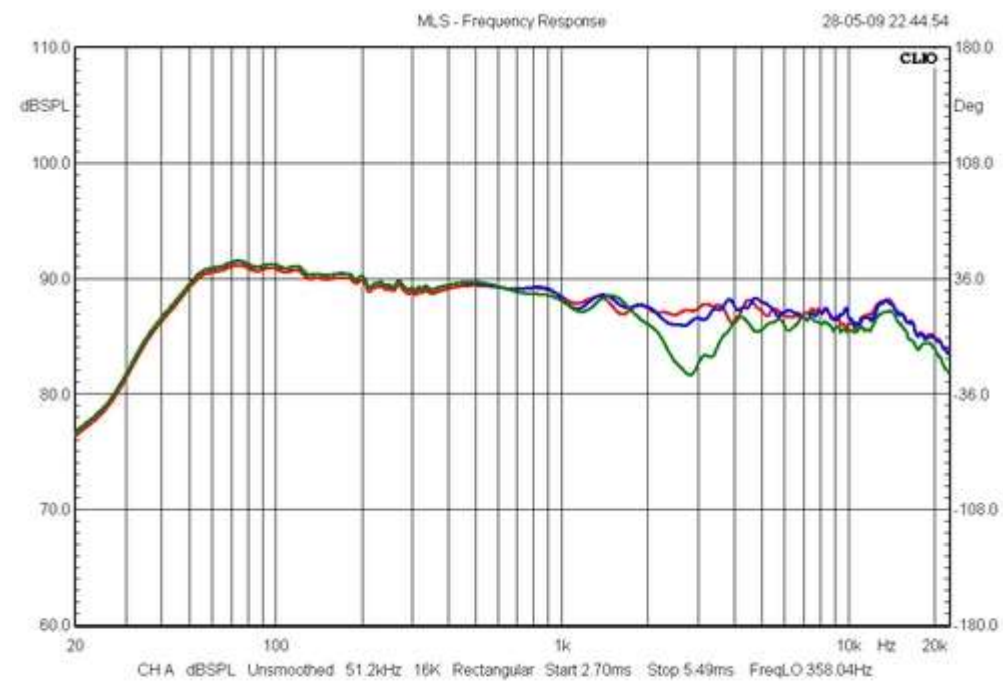
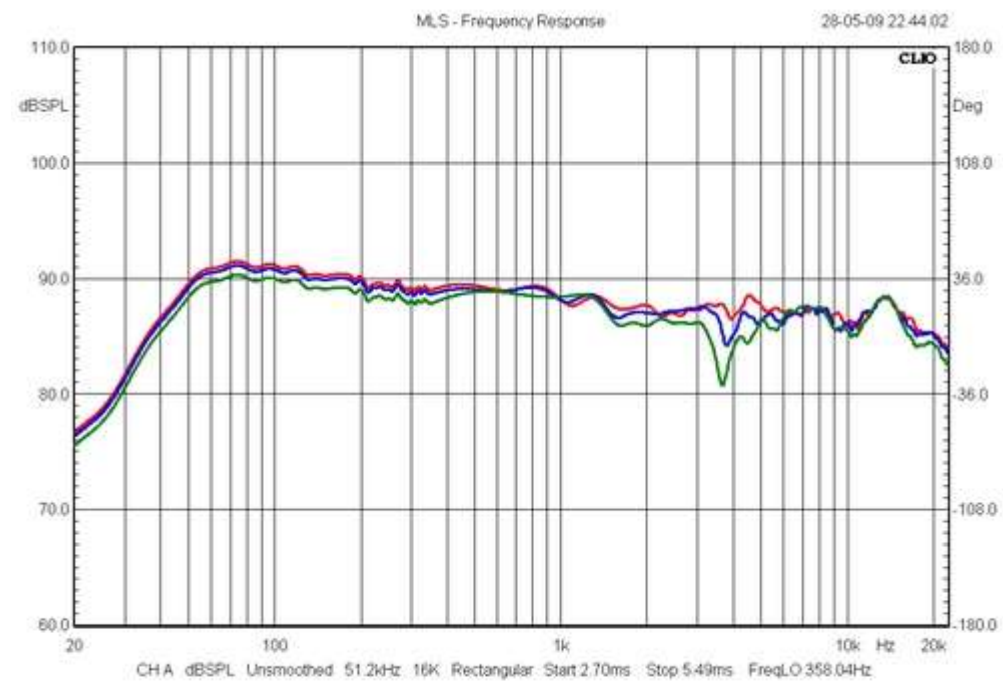


Left: Same as right above, only the mid high-pass slope shown.
 Right: Inverting mid polarity has a dramatic impact on response - and should have.
 Point of crossover between bass and mid around 200 Hz as predicted.
 Some phase tracking between mid and tweeter needs attention, see below.

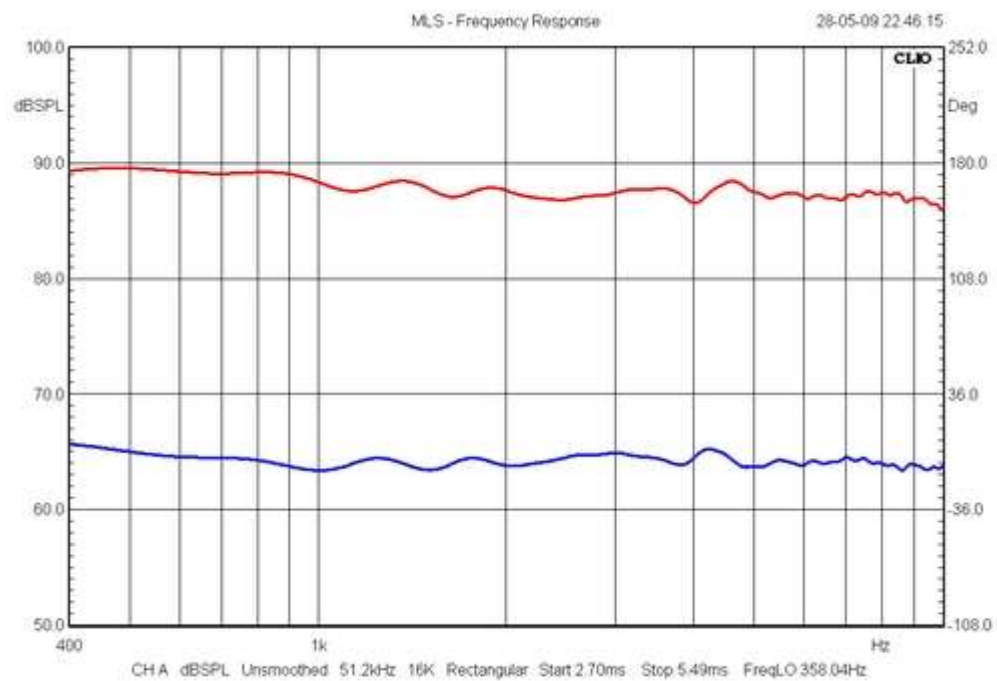


Left: A little fine-tuning of mid and tweeter sections made this performance. The "problem" is the little notch on the 8531 roll-off at 3 kHz. The sonic significance of this is close to zero. The speaker sounded the same as before and no further fine-tuning can be justified.

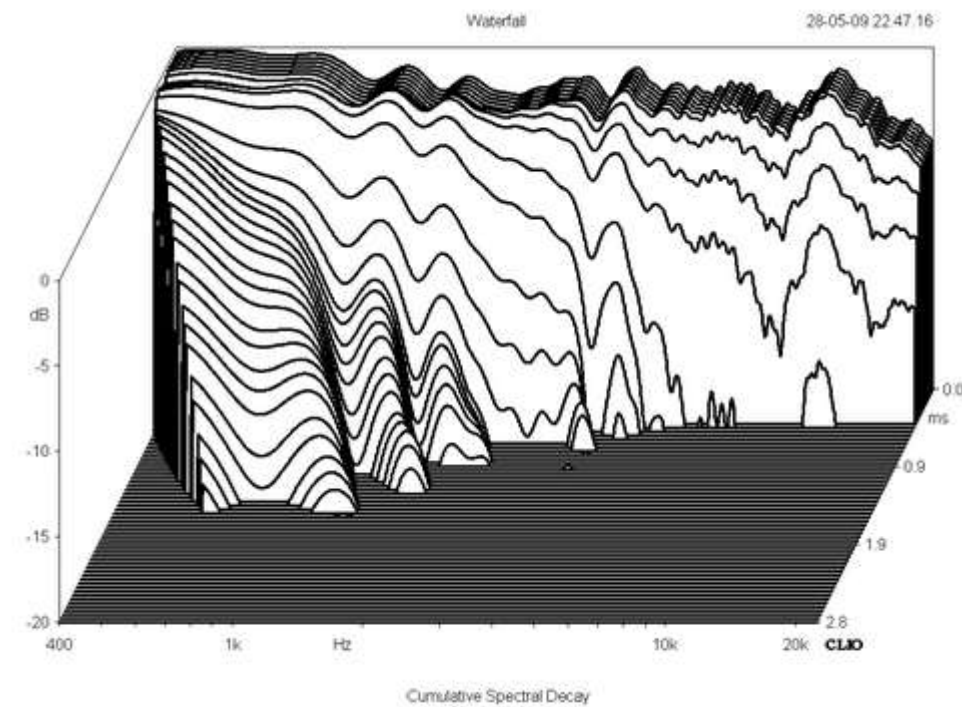
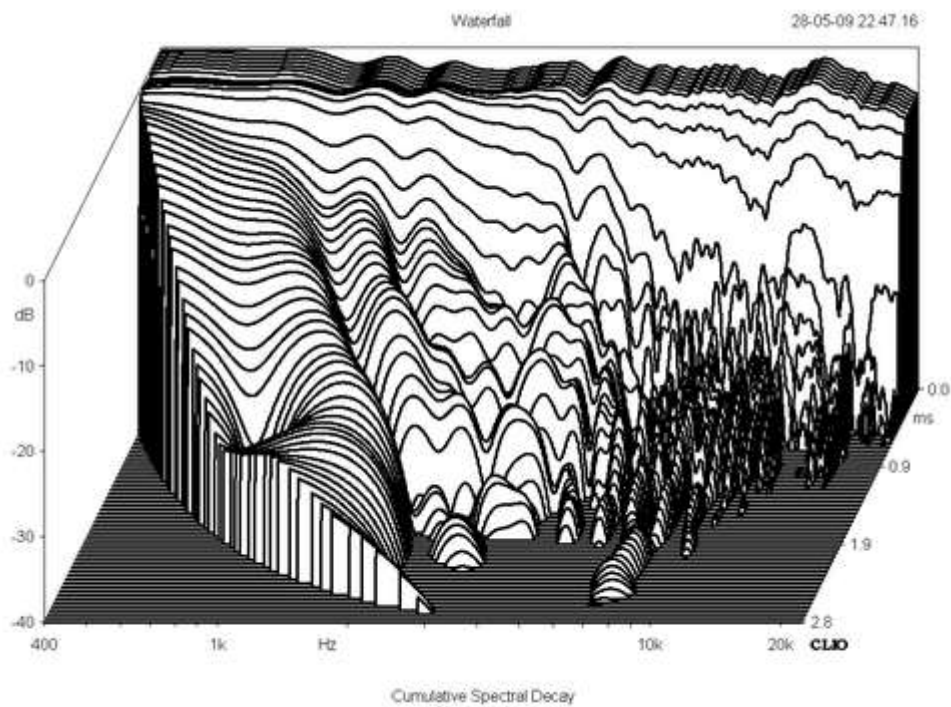
Right: 400-10,000 Hz range for left and right speaker; a matched pair as good as can be.



Left: Vertical dispersion at 0, 5 and 10 deg. up. Right: Vertical dispersion at 0, 5 and 10 deg. down.



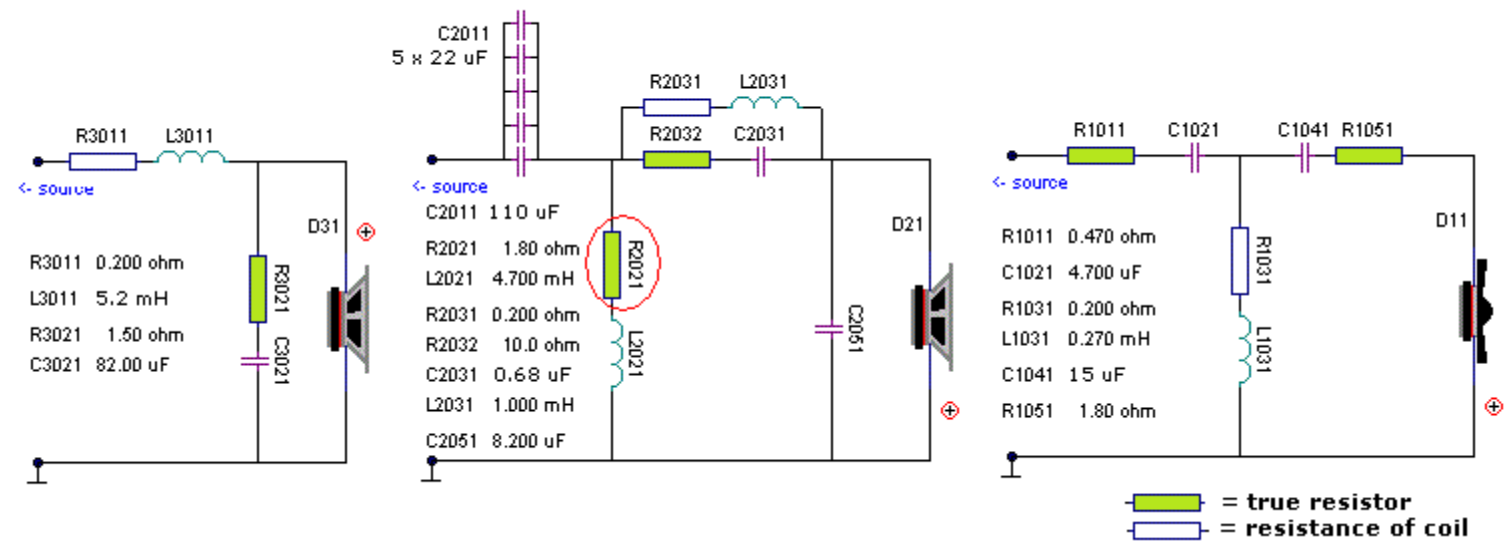
The 400-10000 Hz range. Pretty smooth I dare say.



Left: CSD at 40 dB scaling. Right: CSD at 20 dB scaling.

Final Crossover

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Note: L2021, suggested DCR = 2.2 ohms, thus R2021 not needed!

Crossover Components

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Jensen 1071, Cross Cap version								
Coils:						dim. mm		
Coil No.	Wire Ø mm	AWG	mH	Ohm		ø x h x Ø	core	discs pcs
5423	1.60	15	5.2	0.22		46 x 57	24635	5507 2
1935	0.80	18	4.7	2.20		50 x 36	0	0 2
1094	1.20	16	1.0	0.41		30 x 48	0	0 2
1208	1.00	17	0.27	0.27		25 x 30 x 35	0	0 2
Caps			uF	mm, Ø x L				
CrossCap			82	52 x 62				2
CrossCap			22	32 x 44				10
CrossCap			0.68	13 x 18				2
CrossCap			8.2	25 x 35				2
CrossCap			4.7	19 x 35				2
CrossCap			15	30 x 44				2
Resistors			ohm			mm, 10 W		
10 watt MOX			1.5			8 x 53		2
10 watt MOX			0.47			8 x 53		2
10 watt MOX			10			8 x 53		2
10 watt MOX			1.8			8 x 53		2
Miscellaneous		item #						
Port for 80L bass cab		68 mm (ID) x 220 mm						2
Port for mid-cab		50 mm (ID) x 145 mm						2
terminals, pairs		satin nickel			two pairs for bi-wiring			4
wire		2.5 mm^2, Supra black						2
wire, PTFE					meters, each, black, red			6
solder tag strips								3
8 mm felt					sqm			1.5
30 mm acoustilux					sqm			1
ScanSpeak drivers								
26W/89C1T00								2

