SLICED PAPER SP95

18W/8531G00 + ScanSpeak D2905/9500

CROSSOVER CABINET MEASUREMENTS SPEAKER KIT

Actually this is a 9700 tweeter.
The copper plating of the pole piece is seen through the dome. But it's supposed to be the 9500.

The 18W/8531 driver has long been on my wish list. Everything about this driver looks good. The TS data suggest impressive bass performance and the response curves do not appear to have any serious break-ups as seen from so many other drivers. A slightly elevated SPL response from 1 - 8 (!) kHz should be easy to control in the crossover. Has Scan-Speak really been able to make a non-coated paper cone with these properties

Indeed the 18W/8531G00 is a remarkable driver. At this point in time it is being tested in a 33 litre cabinet with a port tuning of 33 Hz, vent = 60 x 140 mm (ID x L) placed 30 cm above floor level including base support, and the bass from this set-up by far supersedes the bass from the 2.5 clone 18W/8535-00 driver in terms of depth and low-end resolution. I have never experienced such a rich and articulate bass from a single 6½" driver. In addition to this, the 8531 has the low-midrange weight and warmth the 8535 is short of.

Series and parallel crossovers have been constructed to gain similar frequency response and to compare the performance of the two speakers. The sonic impact of the two filters on the resulting sound has been very confusing. Despite very close response profiles, the sound is very much different. The series filter has an immediate appealing sound with lots of see-through capability where the parallel filter gave rather confusing results. The sound from the parallel filter appears flat and everything seems to happen in front panel plane.

Cabinet construction

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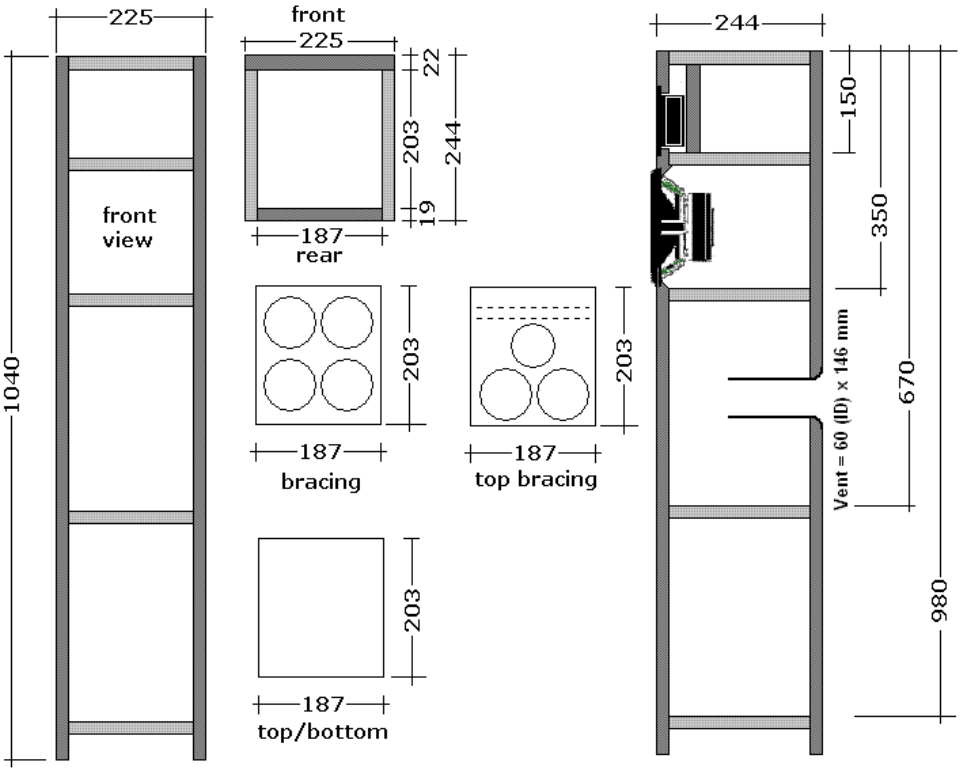
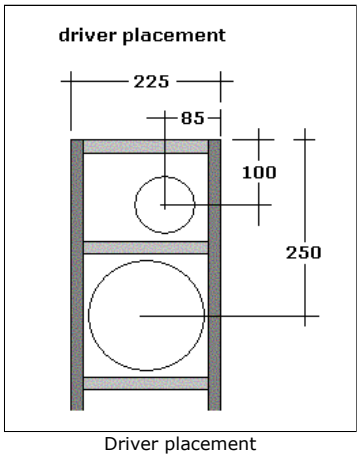


Cutting plan, 2 cabs:

front panels: 2 pcs 22 x 225 x 1040 mm
side panels: 4 pcs 19 x 222 x 1040 mm
rear panels: 2 pcs 19 x 187 x 1040 mm
top/bottom/bracing:
10 pcs 19 x 203 x 187 mm

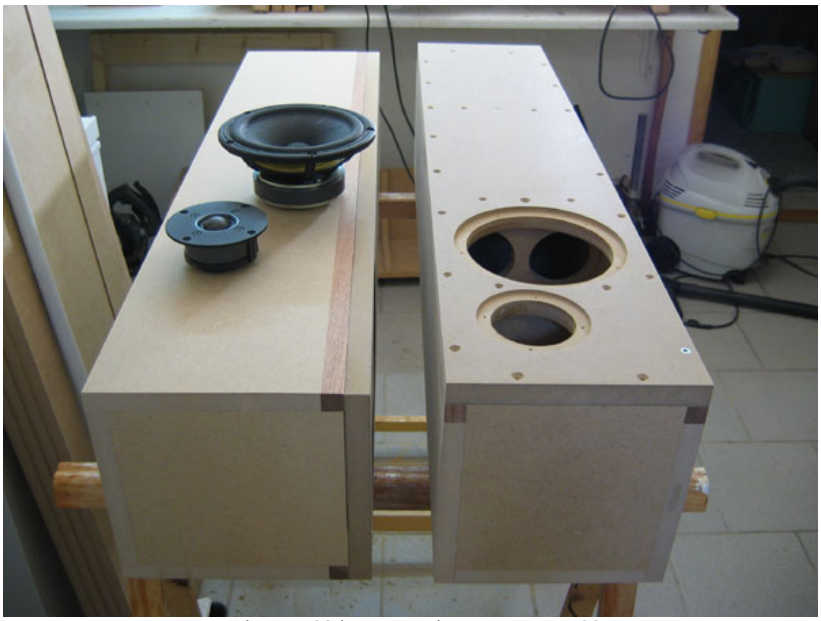
Cabinet drawing SP95, port = 60 (ID) x 140 mm.
I have previously prescribed a 72 (ID) x 210 mm vent, but this leaves too little space between the vent and front panel. I recommend a 60 x 140 mm vent from Monacor, BR60TR, 60 x 140 mm. This will fit perfectly well with the intended tuning frequency.
Or calculate a new vent length from: New vent length = 210 * (new cross section area in cm^2/40.7) mm.



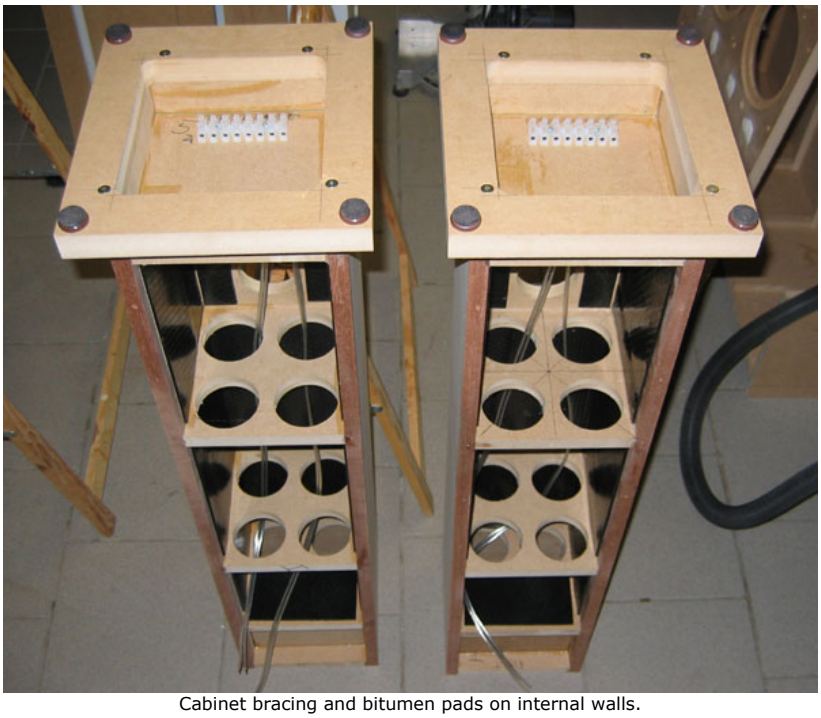
Driver placement

Cabinet damping:

Please read here general advise on damping of a 24-32 litre floorstander:
http://www.troelsgravesen.dk/cabinet-damping.htm


Test cabinets, 33 liter vented, port tuning = 33 Hz.


Chamfering of the bass driver hole to provide proper ventilation.



Cabinet bracing and bitumen pads on internal walls.
Bottom panel lifted 4 cm allowing crossover to be placed here.
Tweeter has it's own chamber.

The Crossover

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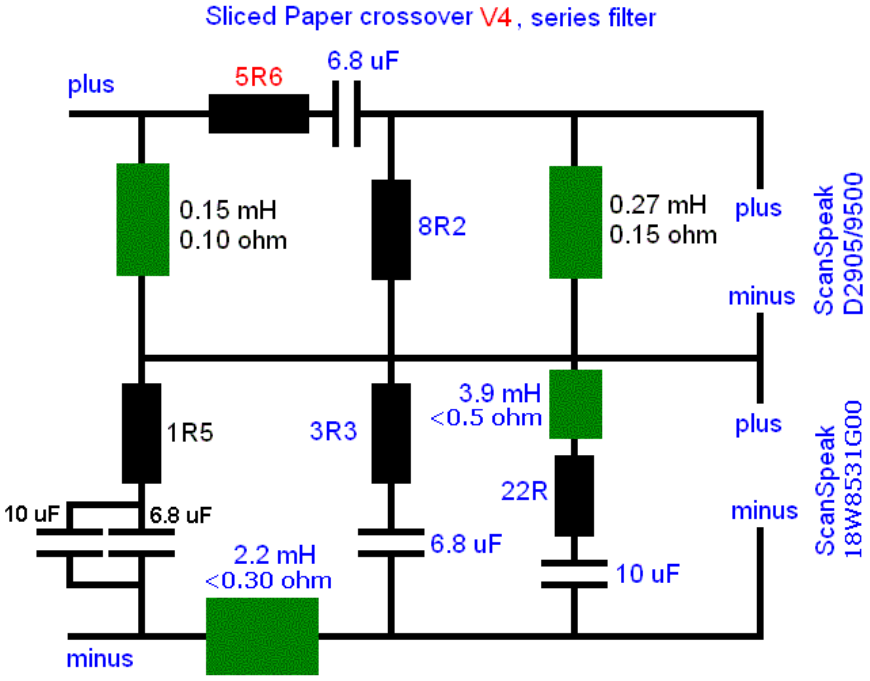

SP95s, series filter, version 4.

SP95 - Superior Z-Caps - Cross Caps - Wire Coils - No drivers							
Coils:					dim. mm		
Coil No.	Wire Ø mm	AWG	mH	Ohm	Dia. / H	core	pcs
Air core wire coil	1.00	18	3.90	1.200	54 x 30	Air	2
Air core wire coil	1.60	14	2.20	0.385	72 x 30	Air	2
Air core wire coil	1.60	14	0.15	0.084	38 x 25	Air	2
Air core wire coil	0.80	20	0.27	0.330	36 x 10	Air	2
Caps	type	volt	uF		mm, Ø x L		
Superior Z-Cap	MKP	800	6.8		35 x 65		6
Cross Cap	MKP	400	10		26 x 36		4
Resistors	watt		Ohm				
MOX	10		1.5		8,5 x 53		2
MOX	10		3.3		8,5 x 53		2
MOX	10		5.6		8,5 x 53		2
MOX	10		8.2		8,5 x 53		2
MOX	10		22		8,5 x 53		2
Miscellaneous	Item#						
Binding Posts	M6	Satin Nickel	27 mm		2 sets of 2 pcs.		2
Port Tube	#900018		68 x 220 mm				2
Cable - Black - 13 AWG	Jantzen Supra		2 x 2,5 mm2		1 pcs of 4 meters		1
Cable Black/Red	Stranded		2 x 1,5 mm2		1 pcs of 3 meters		1
Solder Tag Strips	Gold Plated	28 pins	270 x 20 mm				2
Damping Materials	Item#						
Felt material	8 mm		Width: 2000 mm		1 pcs of 1,3 m2		1
White damping cloth	30 mm		Width: 50 mm		1 pcs of 0,5 m2		1

Complete speaker kit available at Jantzen Audio: contact@jantzen-audio.com

Download kit sales presentation here.

Measurements

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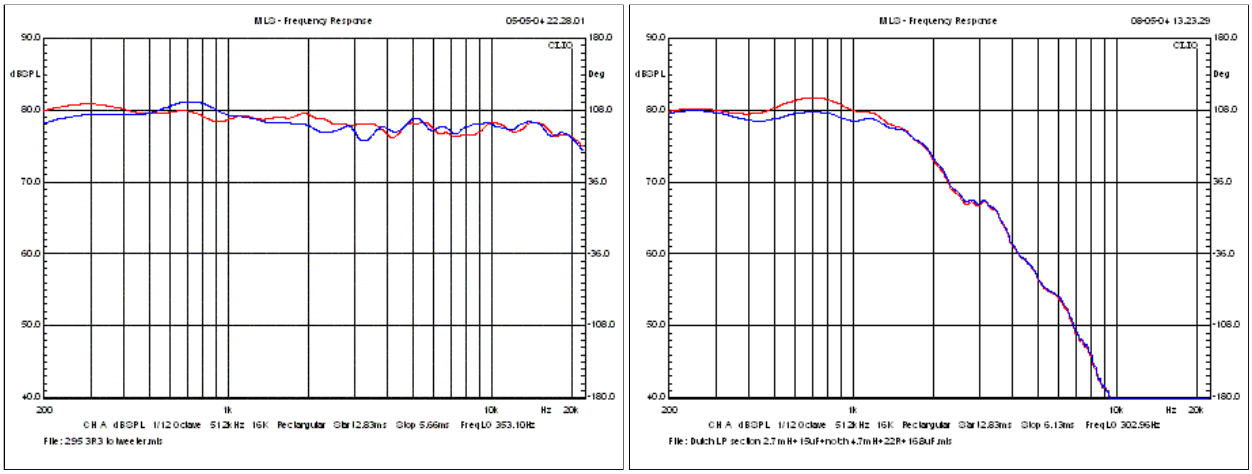
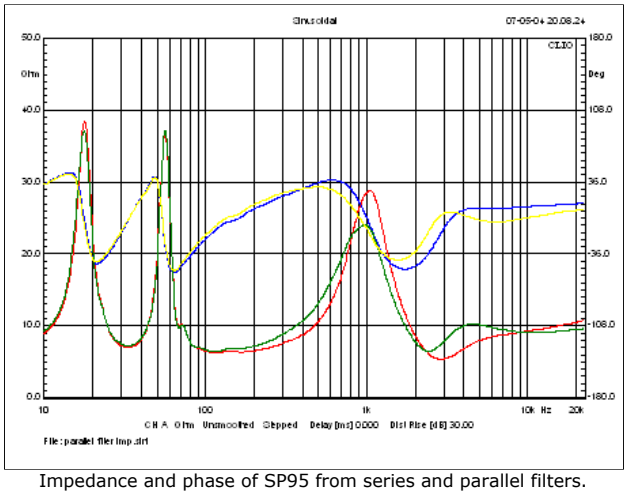
Initially I have run the crossover without a midrange notch filter. However, it is apparent that the midrange, 500-1500 Hz, is a couple of dBs too loud. So I added a mild midrange notchfilter to smooth the performance.



Left: SP95, SPL response, red = V4 series filter. Blue = parallel filter (crossover not shown). Readings not normalised for 2.8 volts/1 meter.
System sensitivity = 86 dB/2.8 volts/1 meter.
Right: Impact on midbass response from midrange LCR notch filter.

The red graph is without the notch filter. This doesn't look too serious and this driver has a midrange quality that actually makes you consider leaving it there. But the sound is very much right in your face and it's too much in the long run. It's just not natural despite the gain in see-through capability. Without the notch filter you can hear every faint cough from a live audience. The addition of the notch filter can certainly be heard and it adds to the naturalness of voices and instruments. The current set-up targets the BBC-dip and the apparent drop in tweeter level is in no way felt the way it looks.

Having a pair of 2.5 clone identical cabs I reinstalled the 2.95 set-up. Quite interesting and exiting to hear it again. These speakers sound quite different and I have some trouble describing the sound. I have gone through a number of vocal recordings and two things become apparent: The 8531 (still series filter) has some presence effect, where the 2.95 has a more lean and distant sound, actually a tonal balance that I think is quite good. BUT, the 8531 has warmth in the lower midrange and upper bass that makes the 2.95 sound "smaller" and "thinner". The 2.95 sound somewhat "cool" - in the sense of cold. The differences in vocal presentation are tricky. Swapping back and forth it becomes apparent that the harshness to vocals singing loud is clearly reduced from the 8531 driver. It's doesn't have that sometimes ear-shredding type of distortion as heard from the 8535.



Impedance and phase of SP95 from series and parallel filters.
Red/blue = parallel filter. Green/yellow = series filter.

Sonic performance, SP95s-V4.

I'm afraid this is where it's going to end for the time being. "Afraid"? Well, I'm not really sure this 8531 driver was meant to perform in a two-way system up to 2.5 kHz. Rather in a three-way system. A classical set-up would be the 8531 + the new 12M sliced paper driver from SS with a point of crossover at some 800 Hz -or a rather more modern three-way system with the 15M for midrange taking over at 300-400 Hz. The sound from this series-V4 is very transparent and with good tonal balance but I still think the 8531 has a certain "paper-sound". Too much lushness, if you get my meaning. Almost a classical JBL sound despite having a rather flat response contrary to the old JBL speakers (I'm thinking of the L100).

I feel very tempted to coat the 8531 driver, but applying coating material to a 300 US$ driver is a one-way ticket and you may end up ruining the driver. I'll have to consider this carefully. I'm sure some people will say that this is just what they want, and others will notice the "sound" (= colouration) from this 8531 driver giving too much sparkle to a piano note or a vocal performance. Running the SP95s-V4 from a Copland CTA505 valve power amplifier in triode mode and a home-made valve pre-amplifier makes this coloration less pronounced, so be sure not to have some aggressive front-end driving this speaker.

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