

ATR25

2½-way, 90 dB/2.8V Transmission Line Construction

Supplied by [Jantzen Audio](#)



State of the art drivers from AudioTechnology and Raidho

The 18 cm AudioTechnology drivers used here are made to my specifications for Jantzen Audio and provides a thoroughly vented chassis and magnet structure. The copper clad magnet polepiece provides an almost flat impedance profile and reduces non-linear distortion. The chosen voice coil impedance makes this construction well suited for valve amplification although not for 5-10 watt SET. 20-40 watts PSE or push-pull is recommended minimum. Obviously any high-quality solid-state amplifiers may perform just as well. They perform very well with my 20 wpc SET amps from Audio Mirror.

The tweeter is designed and manufactured by Raidho, Denmark. The FTT75-30-8 drive unit provides a ribbon diaphragm operating as a slightly vented unit, thus needs a small closed cabinet to eliminate pressure from the midbass drivers. This planar unit holds an extremely low moving mass, exceptional extension and power handling, but most important an ideal dispersion characteristics when it comes to integration with a conventional dynamic driver. The end result is speed, resolution and dynamic inte

A transmission line cabinet was chosen for this construction and from this the bass drivers deliver a non-boxy, tight and deep bass response. The cabinet is simplicity itself and damping is fairly easy. Takes a little more consideration compared to most vented/closed systems.

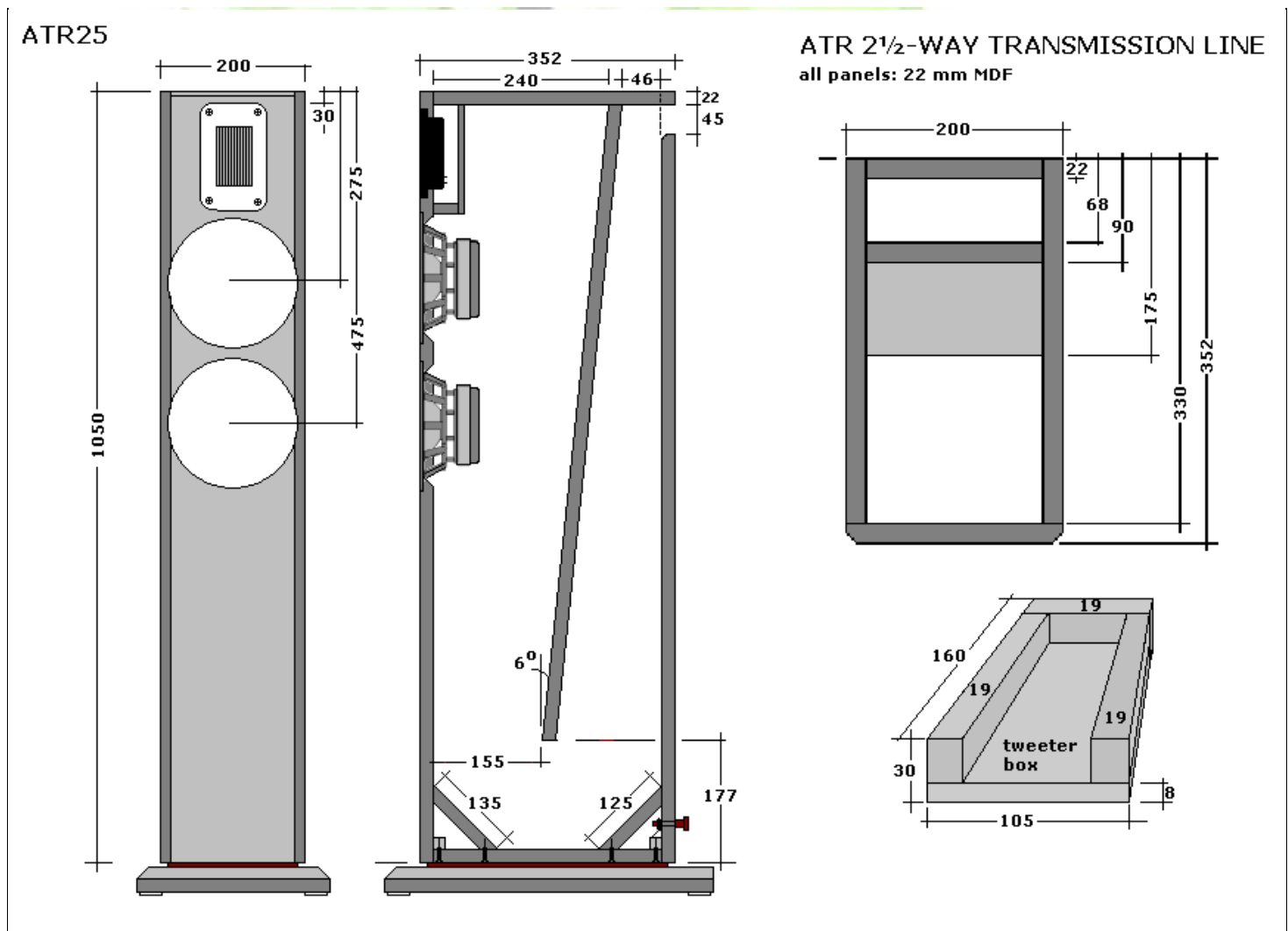
The cab dimensions are a modest, high-WAF 20 x 105 x 35 centimetres (WxHxD) and with the chosen drivers, providing 275 cm² membrane area, we are in for

a relatively potent speaker close the size of a 10" bass driver system. A significant soundstage at modest input is the result.



Kit includes all components excl. cabinet: All perfectly wound baked coils, Superior Z-caps, MOX resistorers, Supra mounting cable, soldering tag strips and satin nickel terminals.

The transmission line cabs



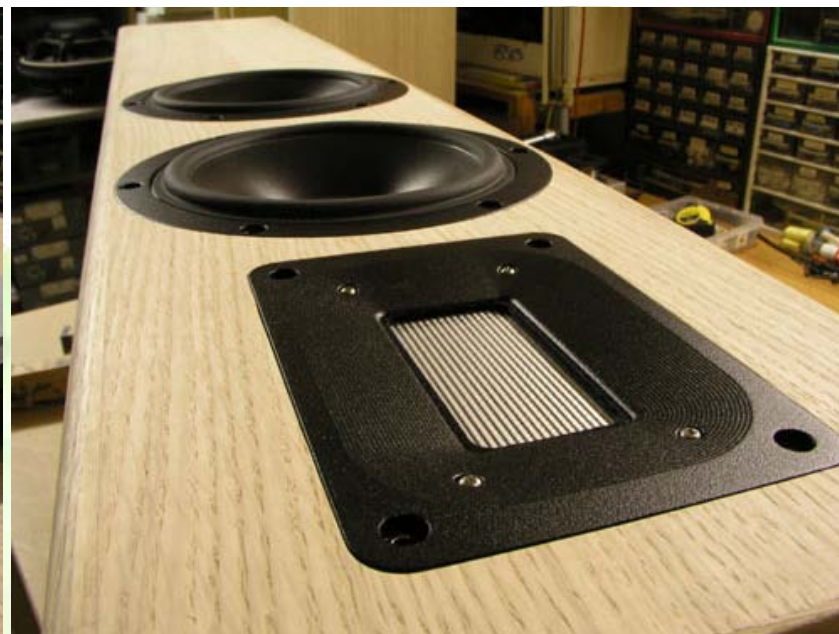
Attach bottom panel with screws to allow access to cabinet for damping material.



Cabs shaping up.



Routing for the Raidho tweeter. Use a 19-20 mm router bit to fit tweeter corners.



Checking driver routings.



Left: The tweeter "cab". Right: Don't forget to chamfer driver holes for free air ventilation!

IMPORTANT: When you have finished the cabs and connected drivers to the crossover, wait mounting the tweeter, play some heavy bass lines and check the tweeter housing for leaks with a lit match. There must be absolutely no leaking from the transmission line to the tweeter housing. I suggest some heavy elastic filler between the front panel and the tweeter cab. And make sure the hole for the tweeter wire is filled with glue/filler to make an air tight connection.

I'm making this note because I had the problem of one tweeter all of a sudden moving heavily from some heavy bass notes.

Cabinet damping

ATR25 cabinet damping
egg crate foam
10-12 mm felt

 MDM3



Cabinet damping, placement and materials.

½ role MDM3 is folded and placed behind the two drivers as seen on drawing.
Standard acoustilux may substitute the MDM3.



10 mm felt material used for basic damping of interior.



Use 20 mm egg crate foam or MDM3 as additional damping behind drivers.

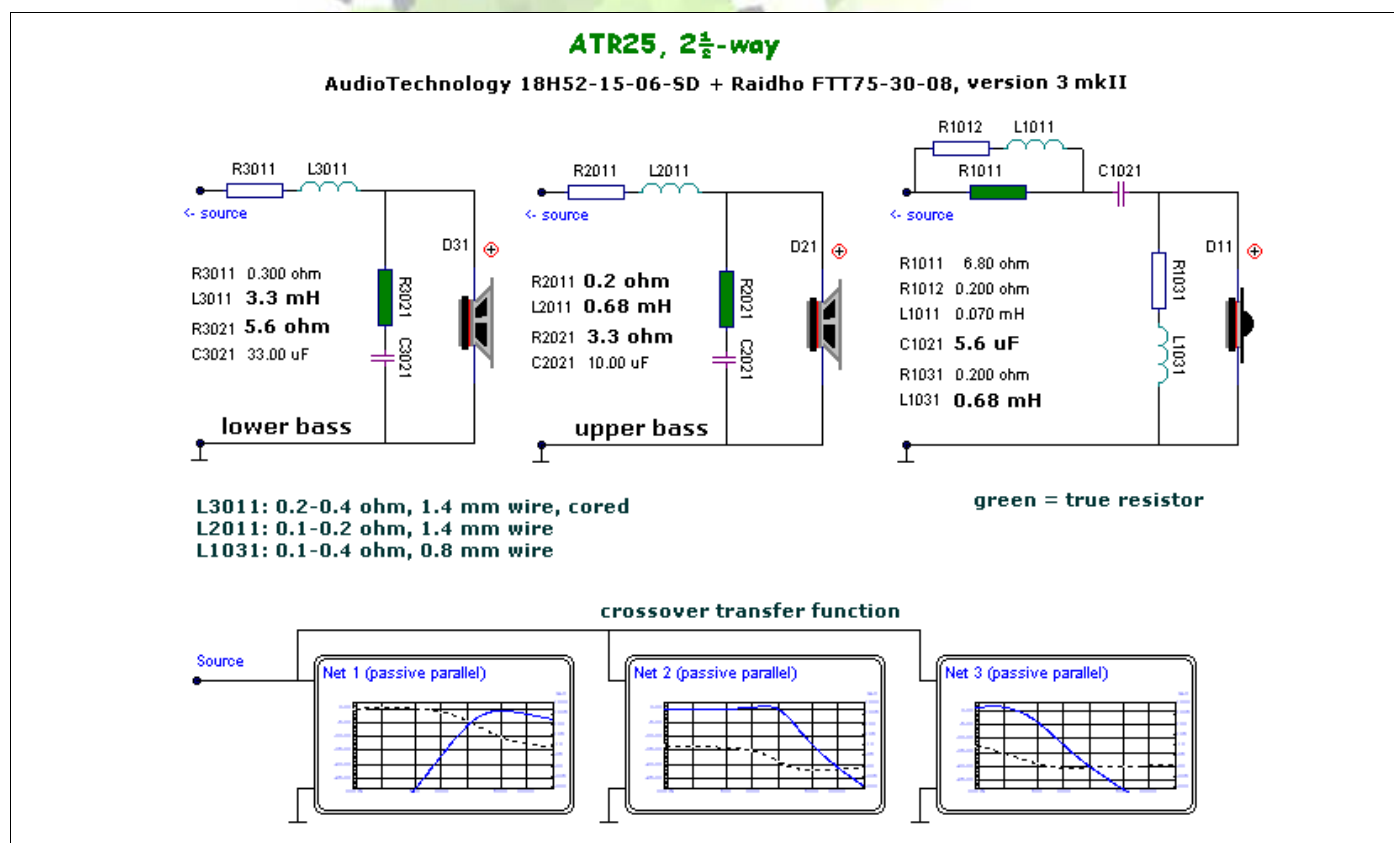


Cabinet feet



Made from solid oak and stained black.

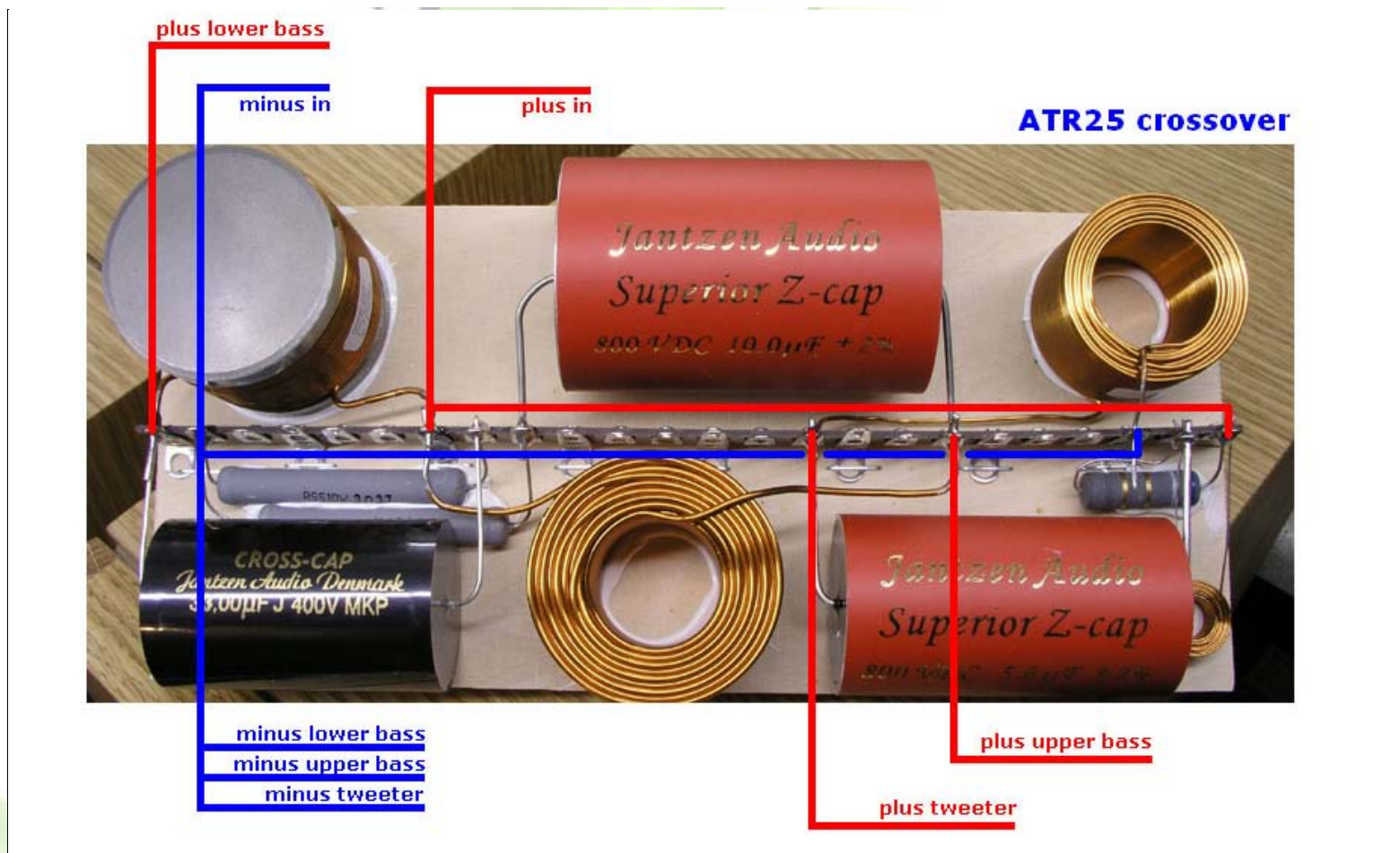
The ATR25 Crossover



Final crossover schematics. A simple second order topology is used here.



As few components as possible - and necessary.



Connecting drivers to the crossover. Two wires from the bass drivers' input need to be drawn to tweeter input. If bi-wiring is preferred these wires can be omitted and upper terminals connected directly to tweeter input. I do not favour bi-wiring, but all options are available here, even tri-wiring if L2011 input and R2021 ground connection is moved to the next soldering tag.



Cute little bugger this 0.07 mH coil!

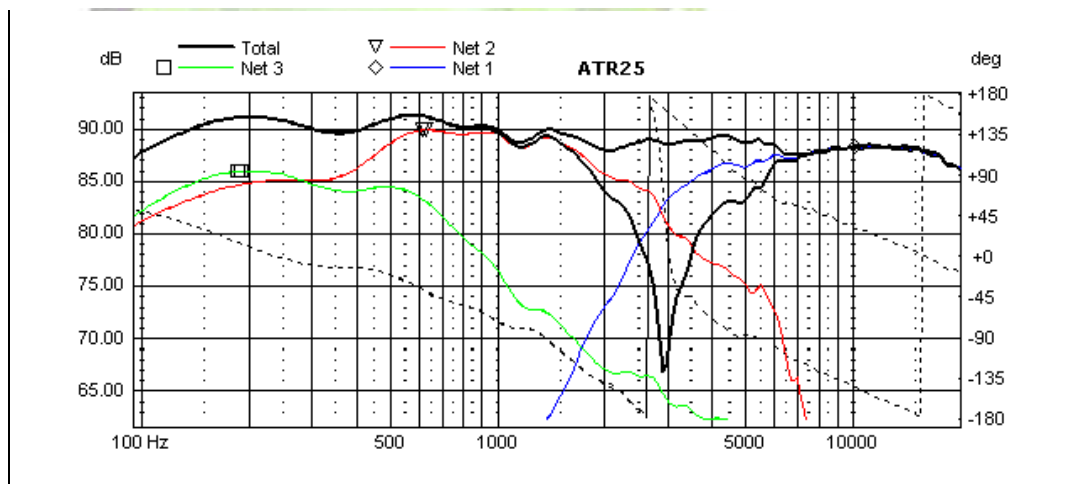
The Complete ATR25 Kit:

Jantzen Audio Denmark								
ATR25								
Coils:					dim. mm			
Coil No.	Wire Ø mm	AWG	mH	Ohm	ø x h x Ø	core	discs	pcs
1807	0.50	24	0.07	0.33	8 x 16	0	0	2
1537	1.00	18	0.68	0.44	30 x 39	0	0	2
1854	1.40	15	0.68	0.24	30 x 49	0	0	2
5227	1.40	15	3.30	0.20	47 x 46	24635	###	2
Caps		leads	type	uF	mm, Ø x L			
Superior caps		axial	MKP	5.6	30 x 56			
Superior caps		axial	MKP	10	45 x 70			
Cross Cap		axial	MKP	33	37 x 56			
Resistors, MOX		ohm	10W	5W	mm, 5 W		mm, 10 W	
		3.3	X		8 x 24		8 x 53	
		5.6	X					
		6.8		X				
Miscellaneous		item #						
terminals, pairs	satin nickel							2
wire	2.5 mm ² , Supra black				10 metres		1	
solder tag strips								2
DRIVERS		item #						
AudioTech 18H52	JA18H52							4
Raidhu tweeter	FTT75-30-8							2

Complete kit available from contact@jantzen-audio.com

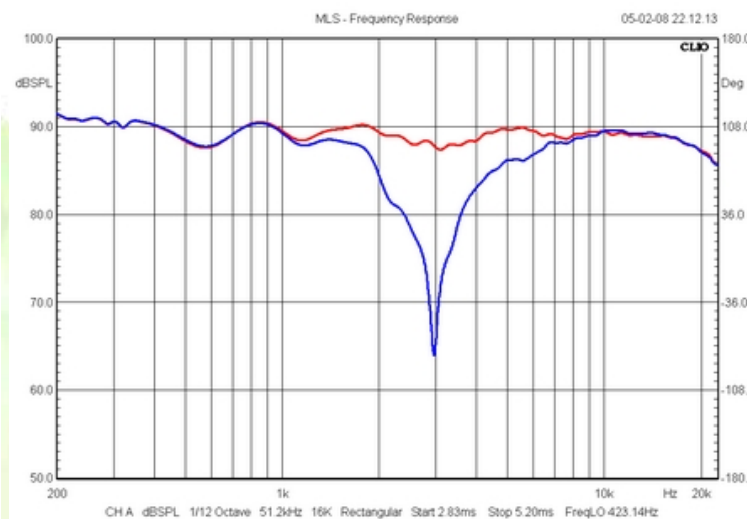
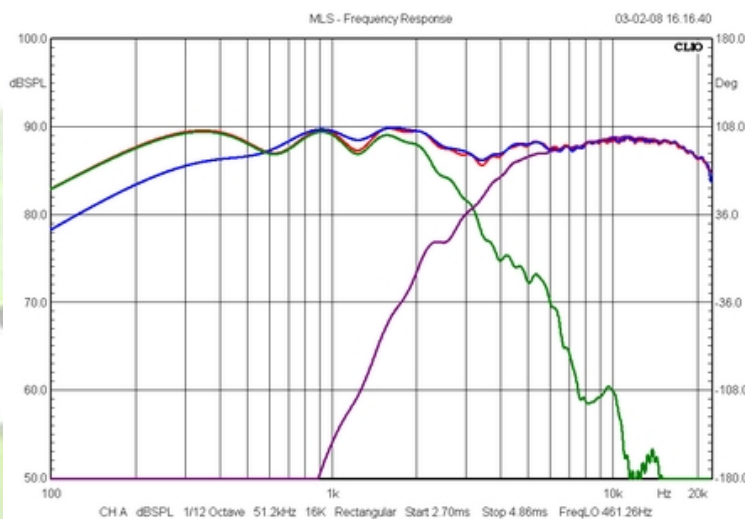
Replacing the Superior Z-cap with Cross Caps is not recommended
 - these drivers deserve the very best - and will deliver accordingly.

Modelling

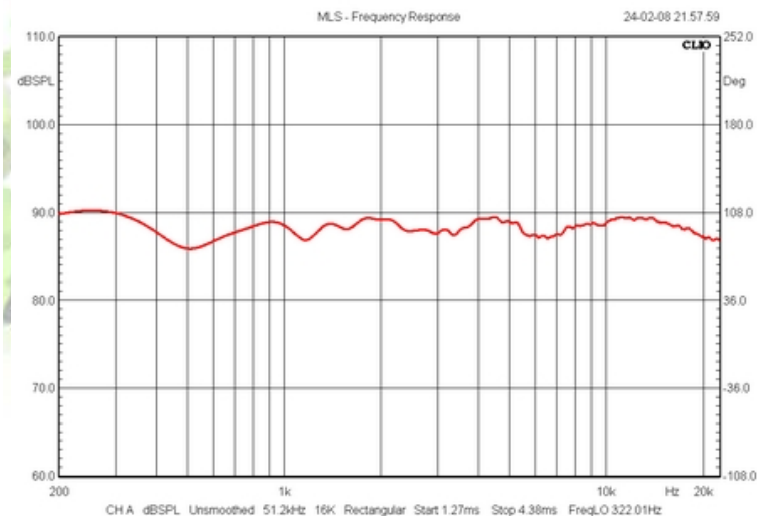
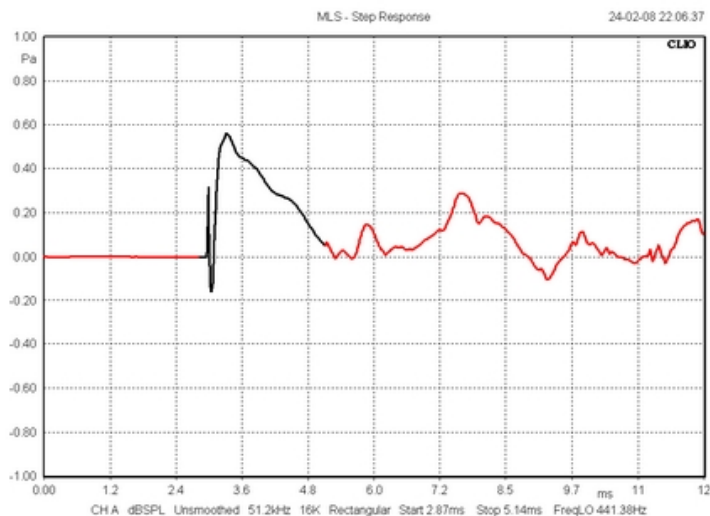


Above the modelled response of individual drivers driven from crossover plus summed system response from tweeter connected with positive and negative polarity. System sensitivity 90 dB/2.8V/1m.

Actual Measurements

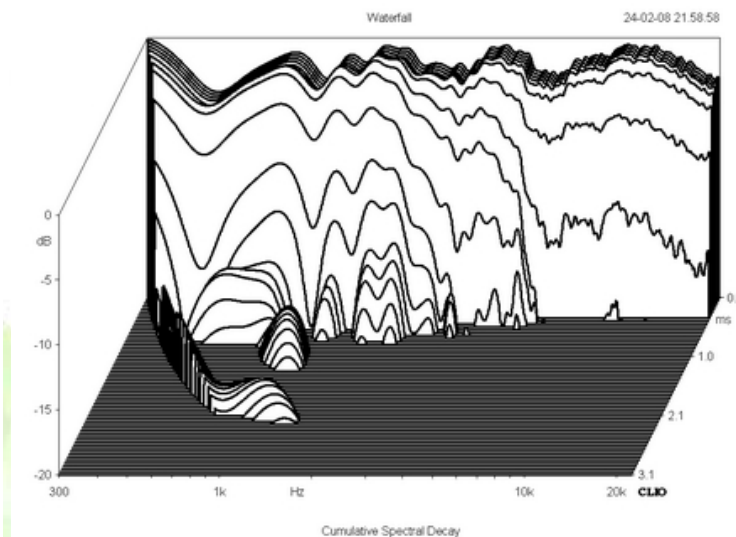
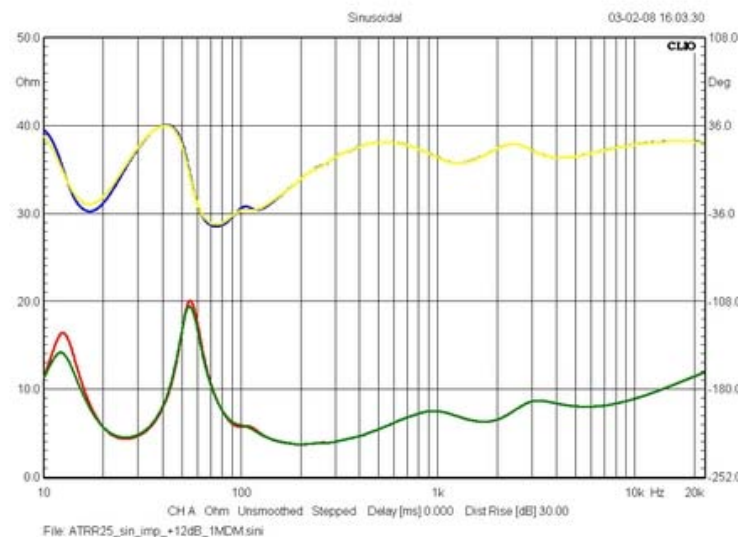


Left: response of upper midbass (green) and tweeter (purple). Summed response (blue) from +/- lower midbass.
 Right: Summed response (red) and with reverse tweeter polarity (blue).



Left: Step response of system. Right: Frequency response at tweeter height.

Measuring the frequency response of a 2½-way system @ 1 meter distance often pose a problem as the distance to the lower middriver becomes longer compared to the upper middriver, thus produce a minor dip at 500 Hz. Measuring the response with microphone placed between middrivers produces a flat response similar to what is perceived at normal listening distance.



Left: System impedance; an overall easy load on the amplifier.

Right: Cumulative spectral decay. An unusual picture of lack of resonances in mid, upper mid and treble regions.

The Sound

Below a copy-paste from the ATR article. Now, that's an easy way of getting away from describing the ATR-2½-way sound, isn't it? Well, the problem is that what I wrote about ATR goes for this speaker too, except for the following:

- 1. Two midbass drivers** deliver an even deeper and more firm bass from the transmission line cabinet compared to the ATR. Unless poorly constructed, a big speaker will always beat a smaller one. Having twice the membrane area compared to the ATR, almost similar to a 10" driver, the ease of handling dynamics become apparent. None of the two drivers have to work hard to deliver sensible sound levels.
- 2. What is also immediately apparent** is that upper frequencies also benefit from having a more solid foundation. Subjectively we hear upper mid and treble more clean when lower octaves are improved.
- 3. This is one of the most neutral sounding speakers** I've made, and I'm not sure the planar tweeter doesn't play a the major role here. The harmonics are what provide character to all instruments and having an absolutely neutral sounding tweeter is part of what it takes to reproduce sound with high fidelity. Now, treble really starts way below 3 kHz, thus the middriver handles a lot of this information too and apparently the AT driver does its part equally gracefully.

Basically it doesn't make much sense trying to describe sound quality. The way we perceive sound varies enormously and every well constructed loudspeaker may have something to offer that will please the ear - for some people. Read ["Why HiFi Experts Dissagree"](#) by Gordon Holt/Stereophile. In the end it's a matter of taste and preference. Please notice this was written i 1963! Not much new under the sun since then.

If you think polypropylene drivers may not be able to provide the same level of transparency compared to magnesium or ceramic drivers, try these AudioTechnology midbass drivers. [Lynn Olson](#) once proclaimed the old ScanSpeak 18W/8543 driver the best polyprop driver in the world - and I think it was - but these AT drivers are simply better, much better. The mineral filled polypropylene material used in AT drivers easily outperforms these more soft ancestors. Where hardcones need careful filtering to eliminate break-up nodes in the upper registers, we can get away with simple low-order filtering from this AT driver.

Due to the natural roll-off characteristic of the Raidho tweeter, a simple filter can be used here too. The treble quality from this construction is where this speaker most noticeable differ from most other brands. If you know the sound from electrostatic loudspeakers, this is where you should seek speakers for comparison, because "electrostatic" is what it is, and dispersion - although not as good as the best domes - is much better compared to what is usually experienced from fullrange electrostatics - and other planars for that matter. My tuning of this construction is rather flat and the Raidho tweeter may have an overall reduced power response compared to conventional domes but even on-axis I don't feel for further treble attenuation.

Magnesium cone drivers will sound like magnesium cone drivers; ceramic cone drivers will sound like ceramic cone drivers and polypropylene cone drivers will sound like - - polypropylene drivers. Don't be mistaken here. Whatever material is used for speaker cones, they will all have their own distinctive way of reproducing sound. Hardcones may sound slightly "clean and sterile" (Read: I miss the colouration of my old paper cones) and polyprop usually have been characterised by having a smoother and more forgiving sound (Read: I can listen to my poorly recorded CDs/LPs). Due to the build quality of the AT midbass combined with the electrostatic quality of the planar tweeter, I think an exceptional good compromise is at hand. We can't have it all, but we can choose carefully to combine some of the best qualities of all technologies available. Enjoy!



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