



Phlea

Phlea – What's in a name?

What's in a name? Nothing much, I wanted a name that started with the letters of the company that makes the woofer and it's a small loudspeaker – so is a flea. I don't mean that a flea speaks loud. A flea is a parasite that this speaker isn't. This speaker is brown with black bits, so is a flea.



The tweeter

The [Vifa XT25TG30-04](#) / [Vifa XT300](#) / [Scanspeak R2604-8320](#) features a patented dual concentric diaphragm and a wave-guide centre plug. This tweeter is known for having a very "natural" sound with an extremely smooth frequency response that extends well beyond the human hearing range. The dual chamber design allows for a low resonant frequency.

The woofer

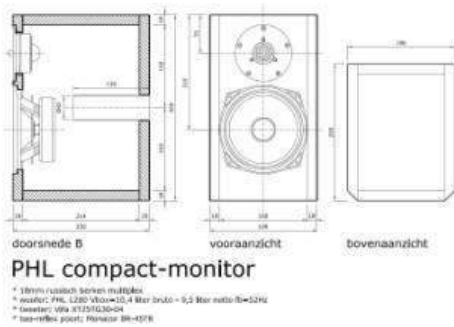
The PHL 1280 is a 17cm front and rear coated paper-cone bass midrange transducer dedicated to the reproduction of 50-4000Hz frequencies. Usable for direct radiation in small volumes. According to PHL its design gives priority to ultimate sounding quality and has better than average efficiency.



The woofers.

The cabinet inside and out

The raw cabinets are made from high quality Marine-grade Baltic Birch plywood with a thickness of 18mm. The cabinet measures 196x250x340mm with an internal volume of 9,5 litres for the woofer tuned to about 52Hz it gives a -3dB point around 60Hz. The inside of the cabinet walls is lined with 4mm thick bitumen and Pritex wedge moulded foam to minimise cabinet vibrations and standing waves. Furthermore the rest of the space is lightly filled with Monacor MDM-3 damping material that consists of 2/3 sheep's wool and 1/3 polyester fibre. The reflex port is kept clear. Depending on the positioning of the speakers in the room and personal taste this fibre can be rolled up densely or loosely to give a tighter and dryer or a fuller and warmer sounding bass – or left out completely. All internal wiring is Van Den Hul CS-122 Hybrid. If you don't mind the speakers being a little larger you could completely cover the enclosure with hardwood like I did on the HATT-MkIII. This gives a greater total cabinet wall thickness and also being made of two different material densities, you get a very hard and dense result with added mass. As I wanted to keep them as small as possible I stuck to the single 18mm Baltic Birch version.



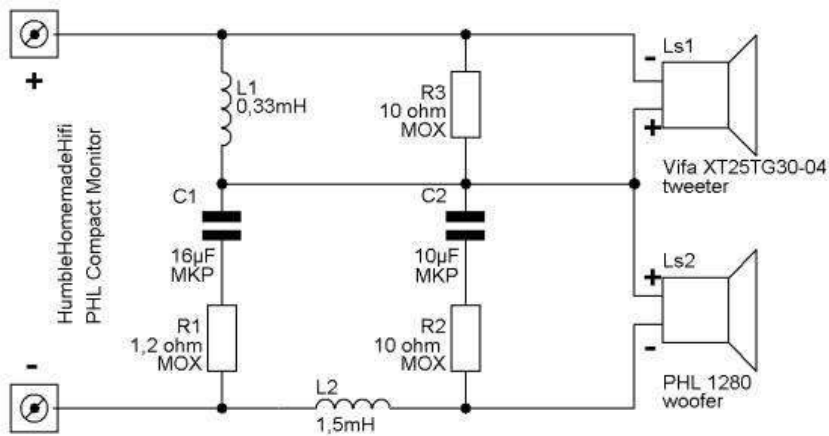
A higher resolution drawing is available on request.



Crossover and listening.

The midwoofer / tweeter network is a classic a-symmetric order series crossover that I have found to be successful with most 2-way driver combinations. Inductor L1 forms the high-pass for the tweeter and C1 the low-pass for the woofer. This low-pass function is mildly damped by resistor R1 which acts as part of the tweeter damping network, R3 is the other half – tweaking the values of R1 will match the treble to your person taste. Furthermore the woofer has a parallel Zobel-network that compensates the natural impedance rise due to the voice-coil inductance of the woofer. Finally L2 works as a baffle-step compensation to bring down the midrange produced by the woofer in line with the bass region. All components are chosen for a good price/quality ratio and physical size. There is no stopping you using better grade components but you may have to build an external crossover to house these things. That will compromise the compact and simple concept of this speaker.

After about 4 weeks of burn-in time (under normal listening conditions) this speaker turned out to be a real "wolf-in-sheep's-clothing". It surprises you with great dynamic expression, especially considering the small size of this speaker. Deep bass is limited but the overall presentation is well balanced. The treble is well detailed, silky and never fatiguing. The overall impression is one of a "fast" and open sounding speaker, very musical with a large image. An added bonus is the relatively high efficiency for such a compact two-way stand-mount speaker. Good midrange articulation is another character that springs to mind.



Crossover components:

L1 = 0,33 mH air-core inductor 1,4 mm wire, R = 0,16 ohms

L2 = 1,50 mH steel laminate inductor, R = 0,15 ohms

C1 = 16uF (15uF +1,0uF) Mundorf M-Cap Supreme or Intertechnik Audyn Cap Plus

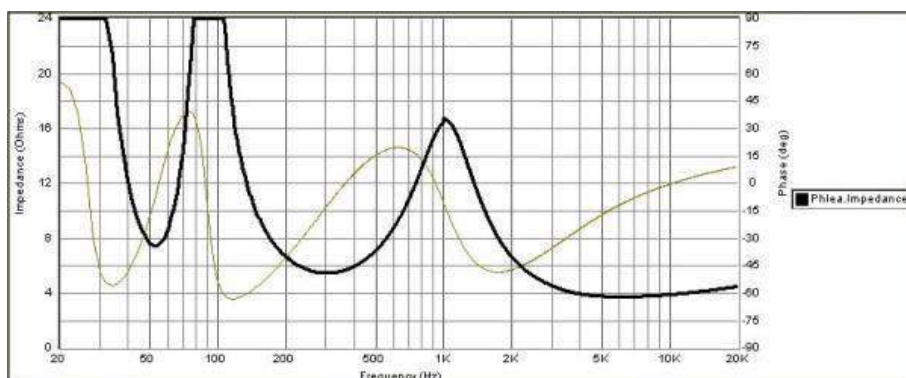
C2 = 10uF MKP polypropylene foil capacitor

R1 = 1,2 ohms, 10 watts carbon film resistor

R2 = 10 ohms, 10 watts metal film resistor

R3 = 10 ohms, 10 watts metal film resistor

Measurements



Overall balance may look a little rougher than other designs, but it is still within +/-2dB. The PHL 1280 shows a couple of ripples around 1,5kHz and a couple of peaks between 3,5-4,5kHz. Trying to filter these out with parallel LCR networks did make them

measure better but I also found them to rob the speaker of some of its dynamic presentation so I left those correction networks out. The crossover point is centred at about 2100Hz. Sensitivity is specified at about 89 to 90 dB at 2.83 V and 1 meter.

The nominal impedance ranges from 8 ohms in the bass to 4 ohms in the treble; impedance minimum is 3,8 ohms at 6kHz. The saddle centred at 52Hz shows the tuning frequency of the port. The electrical phase is moderate and an easy load for most amplifiers. If you want to run them with a tube amplifier I would advise to add an LCR network parallel across the input terminals to flatten the impedance peak at 1kHz. A small air-core inductor of 0,56mH; an MKT capacitor of 33uF and a 10-watt resistor of 6,8 ohms will do the trick.



NOTE: This design is strictly for the home DIY enthusiast and not to be used professionally without my permission!

Tony Gee, The Netherlands

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