

## TECHNOLOGY

### THE CABINET

What is the purpose of a loudspeaker cabinet? Ideally, it should do nothing except reinforce low-frequency output. A loudspeaker drive unit would short circuit acoustically without the box behind it to keep the front and rear soundwaves of the driver from cancelling each other out.

This seems simple enough, just install the driver in a box. But, unfortunately, in addition to enabling deep bass extension, a box can also do a lot of harm. Most speaker cabinets are basic rectangular boxes, simply because they are easy to design and cheap to mass produce.



A simple symmetrical box construction has significant disadvantages, not least of which is the presence of parallel surfaces that generate standing waves (internal soundwaves bouncing back and forth) within the enclosure in three planes:

1. Between the side panels
2. Between the front and rear baffles
3. Between the top and bottom panels

These resonances can actually be calculated quite precisely for a given set of box dimensions and 1st, 2nd and 3rd order standing waves can be reliably predicted.

These resonances show up in the speaker's frequency response as small increases of 1 - 3 dB. However, the problem is not so much these small static changes, as the ears are not very sensitive to such small changes. Alternatively, frequency response can be corrected in the crossover or with massive acoustic damping.

Problem solved? Not by a long shot!

The problem with compensation in the crossover is that resonant energy takes time to build up and takes time to die out. Obviously, constantly variable dynamic changes cannot be corrected by static means. At some levels and frequencies there will be too much output and at other levels and frequencies too little. And the main problem - the resonances themselves - will still be there, modulating the music with a spurious signal.

The base plinth (25 mm thick), spike system, front grille and the front grille neodymium magnet cups and bass reflex ports are all milled and machined from high grade aluminium. The bass reflex ports are double flared for improved airflow and reduced power compression.

The front grille is held firmly in place by 16 neodymium magnets per speaker in an invisible mount.

Each pair of Perfection One incorporates a total of 60 specially made aluminium parts!

### BASS/MIDRANGE

The proprietary, custom designed Scan Speak 5 1/2" bass/midrange driver made exclusively for Neeper Acoustics features a black laser-cut wood fibre cone driven by the same magnet system found in the larger standard Scan Speak 6 1/2" woofer. The SD (Symmetrical Drive) magnet system incorporates copper short circuiting rings mounted at the magnetic focal point to reduce unwanted induction in the voice coil. This reduces harmonic distortion by approximately 20 dB!



The long-stroke bass/midrange driver has a total throw of 20 mm which makes it capable of moving more air and generating more bass output than most 6 1/2" woofers. The special linear spider exerts no additional force even at maximum cone excursion. This allows the unit to respond with extreme precision to dynamic variations.

### HIGH FREQUENCY UNIT

The jewel in the crown, the legendary Scan Speak ring radiator found in many of the world's best and most expensive High End speakers, probably needs no introduction. Why a ring radiator? Because it doesn't try to do something that can't be done! A dome tweeter will try to act like a piston that moves air, but that is impossible! A ring radiator "rolls", maintaining controlled constant diaphragm motion. The tweeter remains flat to 50 kHz without breaking up.



Also, the magnet system features a special, large neodymium NdFeB rare earth magnet 20 times more powerful than commonly used

The second solution - acoustic damping - is often used to suppress resonances. And it actually does work! But it also kills the resonances and the energy in the music! The problem with acoustic damping materials such as Rockwool, acoustilux, etc., is that the resultant damping is non-linear. It simply kills the dynamics, life and energy of the music!

The Neeper Acoustics solution: a totally asymmetrical cabinet:

- The bottom is narrower than the top.
- The sides curve outward.
- The front is tilted slightly back from perpendicular and the rear is tilted even further back.
- The rear is narrower than the front.
- And the top panel slopes upward!

There are absolutely no parallel surfaces anywhere inside the cabinet!

This is an extremely difficult cabinet to design and even more difficult to manufacture. But not only does it work; it totally eliminates standing waves inside the cabinet and as a bonus, the resulting form is simply stunningly beautiful!

The cabinet is produced by Danish Hornslet Cabinets and features their patented Hornflex technology.

#### ALUMINIUM

Next problem: How to securely mount a relatively compact woofer with a very large magnet without blocking the airflow?

Aluminium is the answer. The front baffle is milled out of a solid 16 mm high grade aluminium plate, and airflow optimization is milled out around the rear of the woofer. The 16 mm aluminium baffle is bolted to the cabinet from the inside with 8 x M6 bolts and sealed by butyl rubber, creating a virtually non-resonant sandwich. Killing off resonances right at the drive units gets us off to a very good start.

ferrite. In fact, the magnet is strong enough to drive a serious 15" bass unit! Like the bass/midrange, the tweeter's magnet system incorporates Symmetrical Drive for reduced distortion.

#### CROSSOVER

The crossover is a 2 ½ way electrical higher order filter with acoustically soft slopes. While normal higher order crossovers have a tendency to "ring" on some dynamically complex signals found in music, the Perfection One crossover is designed to effectively suppress ringing, so that the filter does not "sing along."



Although there are 22 components in the crossover, only a few are directly in the signal path. Large 14 AWG air coils are employed to reduce DC resistance and custom ClarityCap SA series capacitors made especially for Neeper Acoustics are incorporated in the high frequency section.

The internal cables are Van den Hul silver-coated copper with additional conductive Linear Structured Carbon and Huliflex insulation.

The binding posts are the very best - the new WBT NextGen!

