

A high performance 2-way ported MTM loudspeaker with SEAS Prestige drivers.

Designed at the SEAS R&D laboratory.

Named after Bragi, the skaldic god of poetry in Norse mythology. The Bragi consist of two 18 cm long throw woofers with a Curv cone made of woven polypropylene and a 27 mm aluminium/magnesium dome with a DXT® lens.

Enclosure and stuffing

The Bragi uses a 30 litre vented cabinet to give it a nice roll-off with a good bass fundament. The cabinet has the same front size as the Idunn to complement them in a surround setup. Figure 1 shows the cabinet drawings. Ask your local loudspeaker dealer if he can help you obtain this, if you are not thinking of building it yourself. The important thing to remember when building is to maintain the baffle width and internal volume of the original enclosure. Adding braces to stiffen the cabinet is a good tip for the advanced builder to take the loudspeaker just a little bit further.

The amount of damping material and port tuning is based on measurements and extensive listening. The cabinet is filled with 350 g of damping material, that is distributed evenly in the box, but kept away from the port opening to allow free airflow. This ensures that airflow noise remains as low as possible. The port length is 13 cm including both the inner and outer flanged end and the inner diameter is 5 cm. This gives a port tuning of 38 Hz providing a smooth low frequency roll-off. We recommend to use a polyester foam for the damping material.



Drive units

U18RNX/P is a 18cm (6.5") High Fidelity woofer with an injection moulded metal chassis, intended for bass reflex and transmission line designs. New Curv cone, a woven polypropylene with excellent internal damping together with perfectly matched moving parts gives a smooth, extended frequency response. Large magnet system gives good transient response, and the bumped back plate together with the very long, and light weight copper clad aluminium voice coil allow for extreme coil excursion with low distortion. Bullet shaped phase plug reduces compression due to temperature variations in the voice coil, avoids resonance problems which would occur in the volume between the dust cap and the pole piece and increases the long term power handling capacity. Extremely stiff and stable injection moulded metal basket, keeps the critical components in perfect alignment. Large windows in the basket both above and below the spider reduce sound reflection, air flow noise and cavity resonance to a minimum.

27TBCD/GB-DXT is a High Definition aluminium/magnesium alloy dome tweeter with DXT[®] lens. An optimally shaped dome and a wide SONOMEX surround, both manufactured by SEAS, ensure excellent performance and consistency. The compensation magnet increases the sensitivity and reduces the magnetic strayfield and allows use in close proximity to CRT screens. A fine mesh grid protects the diaphragm. Stiff and stable rear chamber with optimal acoustic damping allows the tweeter to be used with moderately low crossover frequencies. This revolutionary DXT[®] tweeter addresses the major issues regarding directivity control in traditional loudspeaker designs. DXT[®] solves several well-know issues related to off-axis response, midrange driver integration, and baffle diffraction.

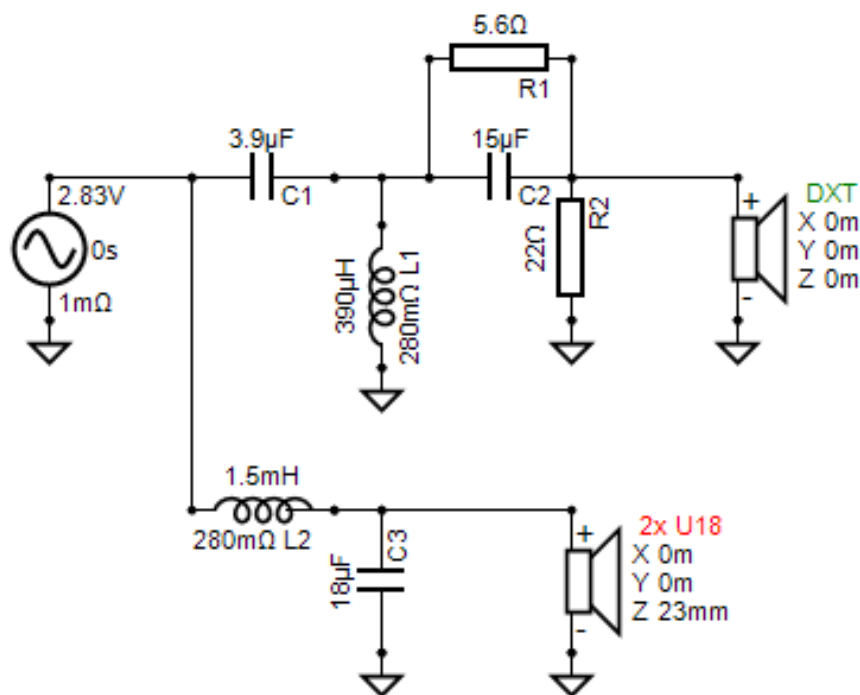
Crossover

The crossover is symmetrical with a 2.4kHz crossover frequency. The crossover point was chosen so that the directivity of the drivers make the overall power response extremely smooth, as can be seen in the measurements.

Complexity of the crossover was held as low as possible without sacrificing any of the audible performance. This is possible to achieve, because of the drivers very smooth response. The crossover align the phase of the drivers accurately and provides a smooth inter-driver transition.

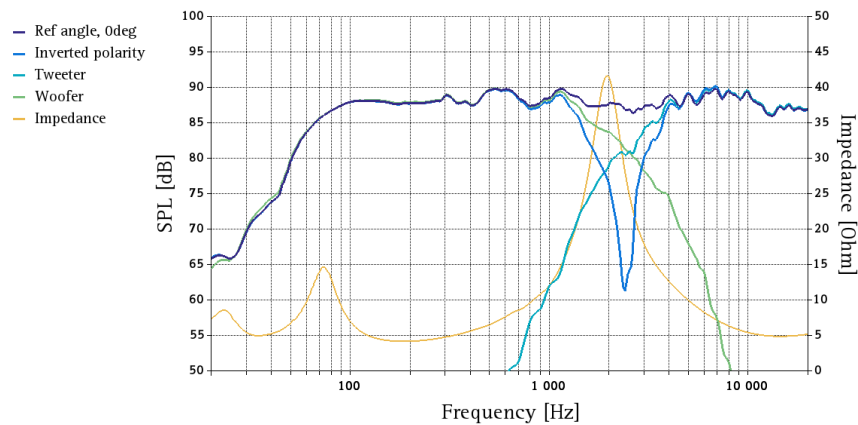
The roll-off of the drivers is steep enough to allow them to operate effortlessly even at high power levels, maintaining smooth and detailed sound quality at all volumes and enabling highly dynamic performance.

Schematics for the crossover is shown below.

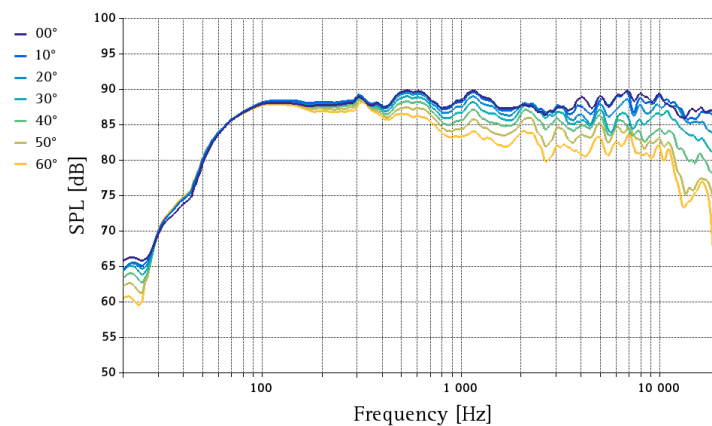


Measurements

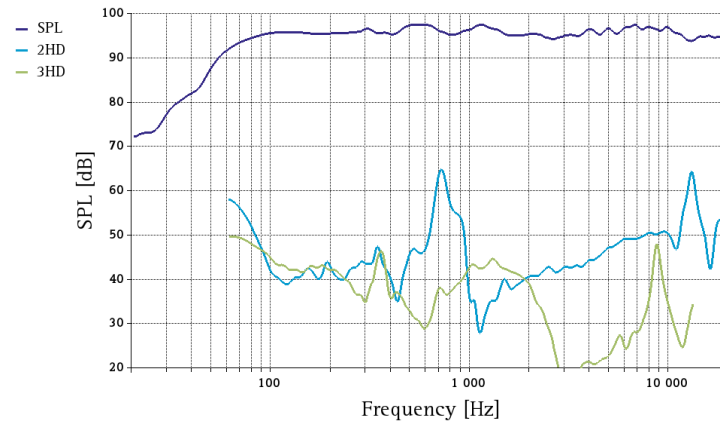
The measurements are taken in free field at 1 metre on tweeter axis. The first graph below show the on axis response of the speaker and the individual drivers. The average sensitivity is 89dB. The curve with the tweeter connected with opposite polarity has a deep and symmetrical notch. This shows that the drivers are in-phase across the whole crossover region.



The next graph show the off-axis respons of the Bragi. Here we really see the beauty of the DXT tweeter. The power response is perfectly smooth throughout the entire frequency range even at 60° off-axis. This gives a huge sweet spot, while still allowing for pin-point imaging. It also keeps the tonal balance of the loudspeaker all over the listening room.



The last graph shows the 2nd- and 3rd-order harmonic distortion with an output of 96dB at 1 m. The overall distortion is very low, with only a small increase around the edge resonance of the woofer cone – fortunately, this is not very audible and allows the reproduced music to remain clean and free from coloration.



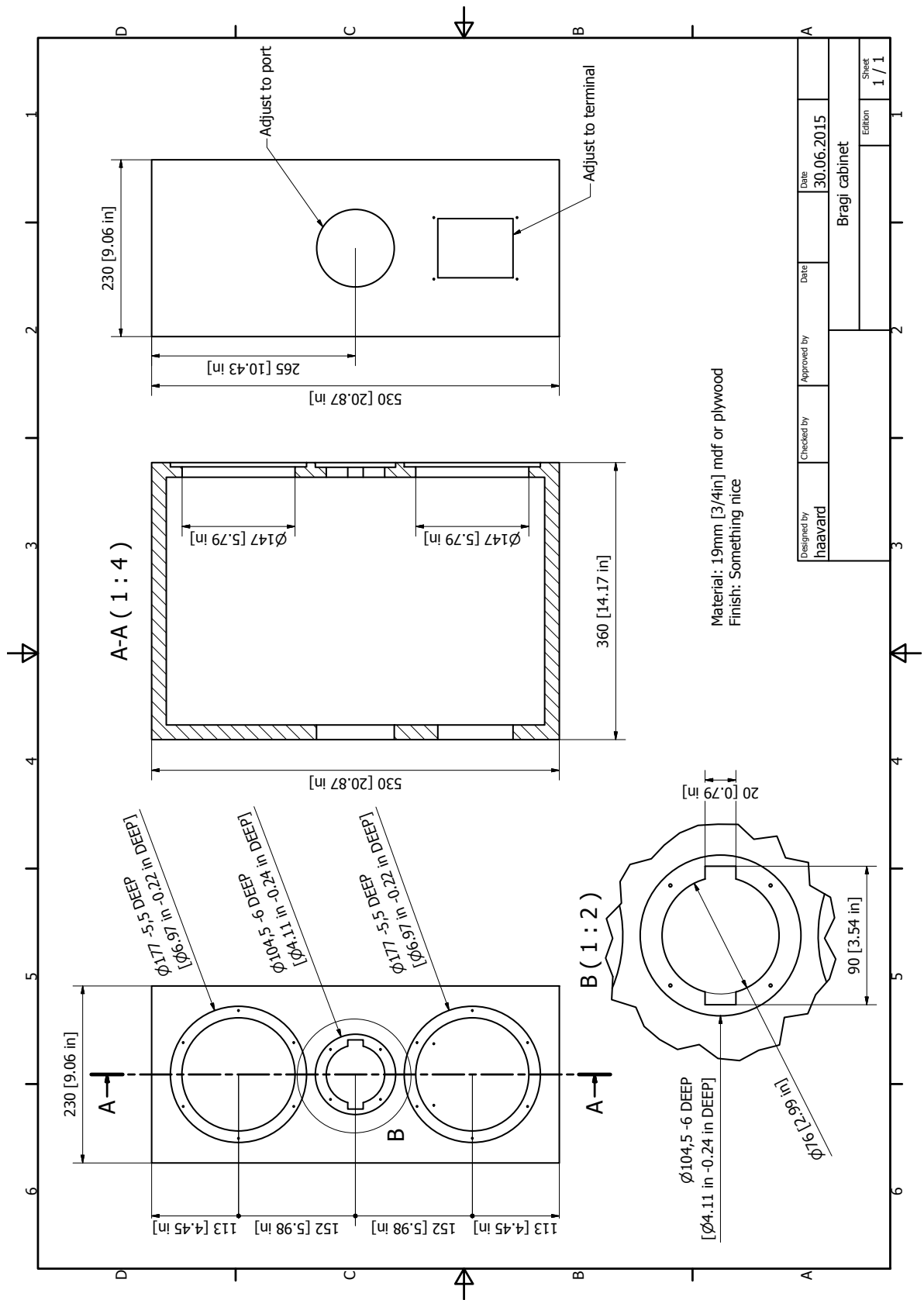


Figure 1: Cabinet drawings