Thrax Audio Lyra Speakers

Lyra is a unique 2-way speaker system. It features a new breed of high frequency driver loaded with a very special horn system, complimented by 2 magnesium diaphragm mid/bass drivers in a all aluminium ported enclosure.

Loudspeakers are the final component in the reproduction chain. You will hear all kinds of opinions on the importance of loudspeakers in the replay chain pitched by gurus around the globe. Most leaning on the fact that loudspeakers don't measure very well. They all have considerably high harmonic distortion, limited bandwidth and frequency nonlinearity. Those are the parameters that are easily measured even by amateurs. Other, just as important parameters, are directivity, stored energy, time alignment, those are discussed by connoisseurs and by marketing people and require a higher level of equipment and knowledge to identify.

Things like signal to noise ratio (yes speakers have signal to noise!), break up behaviour, diffraction interference and others are discussed only among people with true experience and understanding. To measure those you need special jigs and equipment that is usually purpose-built.
Listing all those shortcomings in a speaker would make you wonder how does it even work and yet when you are comparing 2 DACs with 100 times better specification and measured performance on the obviously imperfect speakers you can clearly hear the difference between the DACs. All arguments that speakers have the most audible artefacts of all components in the signal chain are true, but it does not make the faults of the supply chain go away. The speaker-induced artefacts are of a different character.

Being simple devices the computer models used to predict their behaviour are quite accurate. Very often to simplify description the more complex behaviour is generalised and many things are assumed. In those assumptions the errors start to accumulate until they prevail and the predicted result differs significantly from the measured or intended.
The speaker system features an uncommonly high sensitivity of 90db making it usable with lower power amplifiers or in very big rooms while bass extension is generous considering the size of the speaker and its efficiency. It sustains severe levels of abuse without giving in.

weeters - after exploring the vast array of available dome, cone, ribbon, AMT (Air Motion Transformer) and bullet tweeters, all offering exceptional sound quality and frequency extension, something didn’t sound quite right. Our research led to the fact that although some tweeters do fine at high frequencies they are a disaster as soon as they are asked to play high mids at some realistic level. The unit used in the Lyra is a custom designed low compression ratio ring diaphragm driver loaded with a proprietary waveguide, allowing it to reach under 1500Hz effortlessly with an order

of magnitude better performance than industry standard units.
Distortion and intermodulation distortion - conducting a number of tests with industry standard units revealed large amounts of stored energy and high levels of intermodulation distortion in most of them. They don't cut off when the signal is removed and produce out of band artefacts that are clearly audible. Our implementation is fast and loud with practically no IMD.
Filter slopes - very steep filters are needed to prevent mid frequencies reaching the tweeters. (forget about 6db filters). Unfortunately in physics this translates to large phase shifts and group delay. So solving one problem creates another one. We circumvent all those issues by using radical and different tools. Horn loading creates an acoustic high pass filter that rolls off the tweeter. The slope needed is achieved with an additional first order filter equalizing the tweeter response and preventing any midrange interference.
To preserve midrange purity - having selected the lowest distortion and stored energy drivers for the bass/midrange built with magnesium diaphragms created a problem on the other end.

Playing high frequency signals would excite a resonance of the metal diaphragm confirming once more the need for very steep filter to isolate the driver from that frequency range. To match this we use a trick from the heterodyne based receivers to create a notch filter for the bass/ mid unit killing the resonance of the magnesium membrane. This results in one of the cleanest midrange performances you can hear at any price.
Dynamic compression - is an often overlooked artefact in many speakers. Voice coil heating being the primary cause of it. Having an ultra high sensitivity horn driver (108db/watt) means no electrical power ever heats the tweeter so transients and bursts are crisp and clean, but to complement this the metal diaphragms of the bass/mid drivers aid the cooling of their voice coils adding to the effect of unrestricted dynamic contrasts.
Directivity - of a speaker defines the spectrum of the reflected energy in the room and the interference pattern of the drivers. Here we have optimised the tweeter directivity to complement the radiating pattern of the bass/mid drivers creating a smooth overall response for natural decay and reflection spectra.
Enclosure resonances - a full metal enclosure with one piece front baffle prevents any vibrations of the cabinet around the drivers aiding in the holographic imaging.
Bass extension and group delay - the dual driver ported configuration provides ample low frequency extension to below 35Hz in room and very low group delay to about 50Hz making instruments sound solid and full-bodied.

Filter components are mounted in a potted enclosure preventing any vibration and interference between them, using a foil wound inductor and polypropylene capacitors of the highest quality.
The filters are constructed with resonance-free foil wound inductors and premium Polypropylene capacitors. The all aluminium body is internally damped for any internal vibration and resonance, tastefully styled as a part of the Thrax family of products.
So building a speaker system as a showcase for this technology seemed to be the logical next step. Beware what you hear might change your views on speakers!

TECHNICAL SPECIFICATIONS

Impedance	4Ω
Max Power Handling	250W
Sensitivity	90db
Frequency band	34~20 000Hz
Weight	35 Kg
Dimensions	210W x 385D x 520H mm