

# aspect

series

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The Turbosound Aspect series is a high performance modular loudspeaker system designed for use across a wide spectrum of sound reinforcement activities, and is easily scaleable to specific acoustical and venue requirements ranging from large scale indoor or outdoor concerts to corporate events, theatre shows and nightclub applications.

The aim of any sound reinforcement system is to distribute sound evenly, with consistent frequency response and in a predictable way, across all seats of an auditorium or listening area. An optimum method of attaining this goal is through the correct application of point source arrays to create a segment of a spherical wavefront. Not only does this approach provide an exceptionally well defined and coherent acoustic source (sound appears to emanate from a single point), but it also allows for considerable flexibility when assembling arrays in both horizontal and vertical dimensions.

In practice, the dispersion characteristics of a typical sound system are less than ideal because of the tendency for conventional high frequency exponential horns to 'beam' with increasing frequency. When arraying such horns, interference between adjacent sources is inevitable due to the variable curvature of the wavefront caused by the horn's geometry, and this results in undesirable comb filtering effects. This means that all seats in an auditorium cannot normally receive the same frequency response.

It is precisely this shortcoming that Turbosound engineers, through intensive research and the subsequent implementation of innovative and patented Polyhorn™ designs, have identified and overcome. Fundamental to these designs – and applied in both high-mid and high frequency bands – is the principle of dividing an exponential horn flare into a multiplicity of tapered waveguides. Doing so ensures that all path lengths from the diaphragm surface to horn mouth are identical, and consequently guarantees uniformity of phase of the wavefront at the horn mouth.

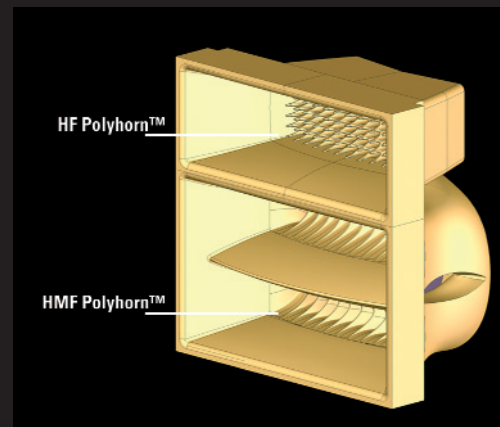
The curvature of the wavefront is arranged such that the acoustic centre is placed well behind the motor system, forming a virtual point source

that can easily be made to coincide with the acoustic centres of adjacent enclosures.

The Aspect series consists of purpose-designed touring and installation-specific cabinets to suit a multitude of applications. Touring boxes share identical, and very compact, dimensions, and this greatly aids trucking and handling as well as simplifying inventory requirements. Integral flying systems allow them to be flown or ground stacked for maximum flexibility of use. A trapezoidal mid/high enclosure variant has features that are optimised for ground stacking and permanent installs.

The audio frequency spectrum is divided into four frequency bands, optimised for the custom designed transducers dedicated to each band. The mid-high enclosure houses high frequency, high-mid frequency and low-mid frequency elements arranged in a vertical orientation.

The high frequency section is dedicated to handling frequencies above 5kHz, and this is reproduced by two custom designed diaphragm assemblies loaded by a high frequency Polyhorn™ device. The proprietary driver combines highly innovative patented (and patent applied for) design features to ensure exceptional high frequency performance and long term

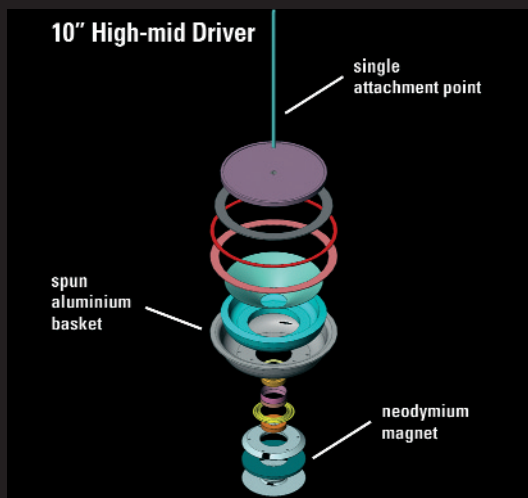


reliability. Magnet performance is optimised through the use of a radially polarised magnet structure.

A key feature of the Polyhorn™ design is the very sharp cut-off at the edges of the horizontal coverage pattern, which all but eliminates the

comb filtering effects common to conventional horn designs. This presents an immediate and obvious benefit in that it is now possible to predict array angles in a very intuitive fashion without having to guess at the expected destructive interference between adjacent boxes.

The patented Polyhorn™ devices create a gently curved wavefront at the horn mouth, which coincides with the optimum array curvature to provide a seamless transition to adjacent cabinets. These principles are applied to both high and



high-mid frequencies, and the two horns form part of a removable square section that will provide either 25°H x 15°V or 15°H x 25°V dispersion pattern.

Frequencies from 450Hz to 5kHz are handled by a custom designed 10" drive unit.

Significant improvements in the individual driver's power handling, and a subsequent reduction in power compression, have also been achieved through the use of high stability, high temperature neodymium magnet structures. This simply means that more of the available amplifier watts are converted into acoustic energy and less power is wasted as heat.

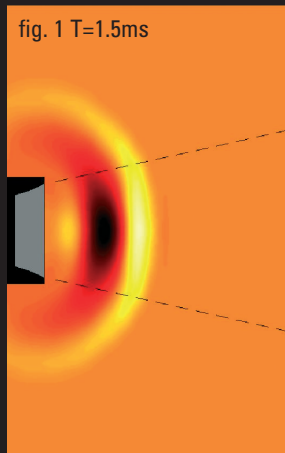
The cabinet dimensions have been carefully chosen to allow the boxes to be optimally truck packed in the most common US and European vehicles without wasted space.

## KEY SYSTEM BENEFITS

- Continuous even coverage above 1kHz, effectively giving seamless arrayability in both horizontal and vertical planes
- Intuitive 'point and shoot' characteristics make it very easy to adapt flown or ground stacked clusters to widely variable venue and audience requirements
- Very high power capability means that continuous sound pressure levels of up to 146dB are easily achievable from one cabinet
- Greatly improved thermal performance of all drivers increases power handling through the reduction of power compression
- Smaller and uniformly sized enclosures simplify handling, flying and truck packing
- Flying hardware is integral to the box but can quickly be removed for safety testing. The flying hardware also allows systems to be safely and easily ground stacked
- Flying hardware allows four cabinets to be pre-assembled on a wheel dolly for easier loads-ins
- Mid-high and LF cabinets are identically sized to simplify truck packing
- Cabinets may be flown horizontally or vertically; mid-high section can be rotated through 90° to optimise the size and aspect ratio of the array, thus making the best use of venue sightlines
- Trapezoidal cabinets use removable flying hardware and hence there is no cost penalty to users of ground stacked systems.

## THE POLYHORN™ ADVANTAGES

The patented Polyhorn™ designs achieve a marked improvement in transient response, which is a major contribution to intelligibility in a sound reinforcement system.



The wave progression plots shown here illustrate the actual result of applying a single impulse to the driver and demonstrate the uniformity of the sound wave leaving the Polyhorn™ mouth.

Conventional exponential horns suffers from two major problems: a non-coherent wavefront caused by differing path lengths at the horn mouth; and diffraction at the horn edges – which has the effect of creating additional virtual sources, further confusing the directionality of the sound source.

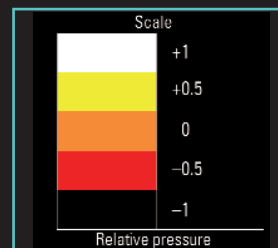
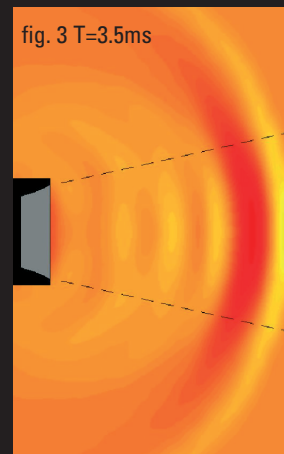
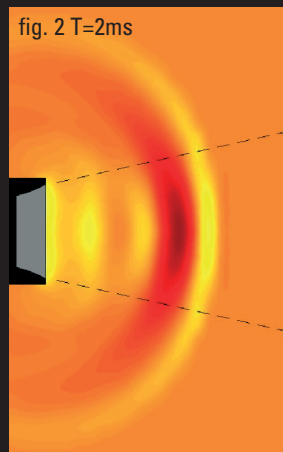
The Polyhorn™ design ensures that the wavefront is phase coherent by making all path lengths from diaphragm to horn mouth identical. The Polyhorn™ geometry gives a smooth curvature to the wavefront, arranged to match the array curvature.

At T=1.5ms (in figure 1) a clean positive

pressure wave (white/yellow) has left the horn mouth, followed by a corresponding negative pressure wave (dark red). Note how practically all of the energy in the positive wave is completely contained within the specific 25° horizontal directivity characteristic of the Polyhorn™, shown as dotted lines on the diagram.

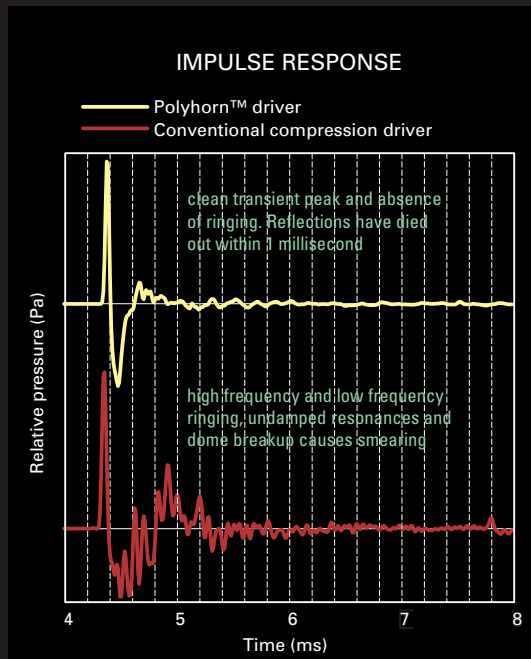
As the wave progresses to T=2ms (figure 2), the wavefront has now developed a well-defined curvature whose radius matches the location of the virtual point source behind the cabinet. There is also a complete absence of edge diffraction effects from the horn edges.

At T=3.5ms the original impulse has developed a smooth, phase-coherent wavefront with no ringing or unwanted resonances. With such a clean cut-off to the dispersion pattern edge it is easy to see how adjacent enclosures can be arrayed without destructive coupling effects, in other words with greatly reduced comb filtering.



The impulse response diagram below illustrates the response of a Polyhorn™ design and a conventional compression driver / exponential horn to a single transient peak in the time domain.

The Polyhorn™ shows a sharp positive spike, with a quick rise time, which settles to near zero amplitude in less than 0.5 milliseconds, with



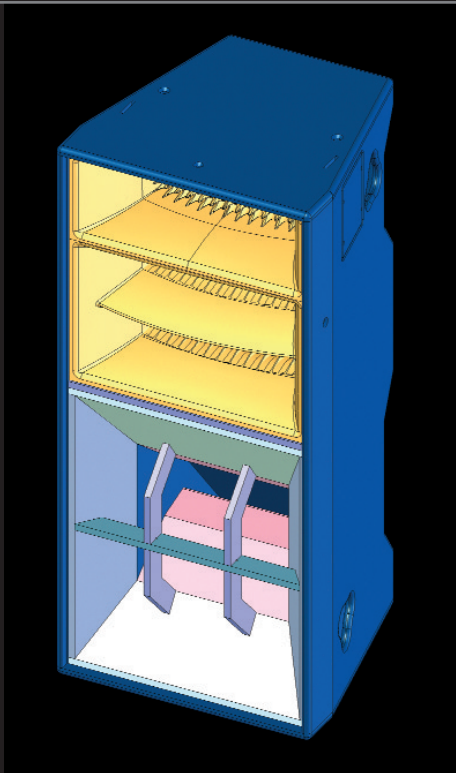
virtually no ringing. The conventional compression driver, by contrast, continues to display undamped resonances – characterised by clearly audible distortion – for as long as 2ms, and this results in a smearing of the original audio programme material.

The Turbosound Polyhorns™ used in both high frequency and high-mid frequency elements produce cleaner sound, lower distortion, and can be seamlessly and intuitively arrayed.

## KEY FEATURES

- Tight dispersion pattern of 25°H x 15°V generates highly focused coverage pattern with exceptional projection capabilities
- Proprietary HF transducer employs a high stability, high temperature radial neodymium magnet structure which offers much higher efficiency, as well as vastly reduced weight
- Patented HF Polyhorn™ design generates equal level across a uniformly curved wavefront identical to that of the array profile
- Directivity over 1kHz exhibits very sharp cut-off at the edges of the pattern, and dramatically reduces out-of-band signal
- 10" high-mid frequency driver is fabricated from a single-piece spun aluminium bowl, serving as a high strength frame, heatsink, rear compression chamber and high pass filter
- 10" high-mid driver uses a high stability, high temperature radial neodymium magnet structure for greatly improved efficiency
- High-mid Polyhorn™ design (patent applied for) generates equal level across a uniformly curved wavefront identical to that of the array profile in the same way as the HF device
- Low-mid enclosure employs rear-facing drivers with combined heatsink/phase plug assemblies (patent applied for)
- All transducers utilise optimised symmetrical magnet gap design and high performance thermally conductive adhesives between magnet plates and heatsinks
- Revolutionary DKNC composite cone materials are used in all cone transducers
- Mid-high cabinet construction based around pre-bent plywood – this entirely eliminates two cabinet corners, reduces internal reflections and pressure build-up, as well as greatly increasing cabinet strength. 9-ply, 15mm marine grade plywood is used throughout
- Cabinet dimensions are optimised for both US and European vehicle truck pack arrangements.

# aspect series

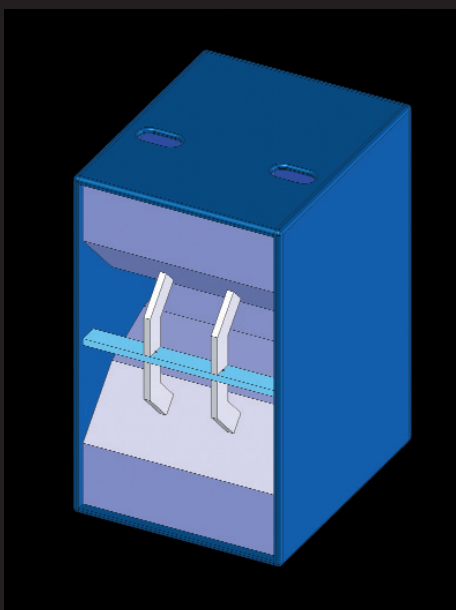


## TA-880H

A trapezoidal tri-amped mid/high enclosure designed for all types of installations, and for ground stacked touring applications.

Containing two high frequency drivers on a HF Polyhorn™, a single 10" high-mid frequency driver on a HMF polyhorn™, and two horn loaded 10" low-mid drivers, the TA-880H is housed in a trapezoidal cabinet with side angles optimised for correct horizontal array performance. Speakon NL8 connectors are provided on a recessed panel at the rear of the cabinet. Constructed from 15mm (5/8") birch plywood, the enclosure features ergonomically placed flush handles and is finished in black textured paint (optional TurboBlue™). The flying system consists of swords that pass through the box, taking the entire load of a column through load-tested steel components.

**trapezoidal mid/high**



## TA-880L

This very compact 2 x 15" horn loaded bass enclosure matches the trapezoidal mid/high, and so is recommended for ground stacked touring applications as well as permanent installs. Although housed in an extremely small enclosure, these high efficiency drivers are able to generate high definition bass energy equivalent to many double 18" configurations.

Neodymium magnet structures give the drivers very high power capability and low power compression, and also ensure that weight is kept to a minimum. The cabinet is constructed from 15mm (5/8") birch plywood, finished in textured black paint, with four flush handles for easy handling and two Speakon NL4MP connectors.

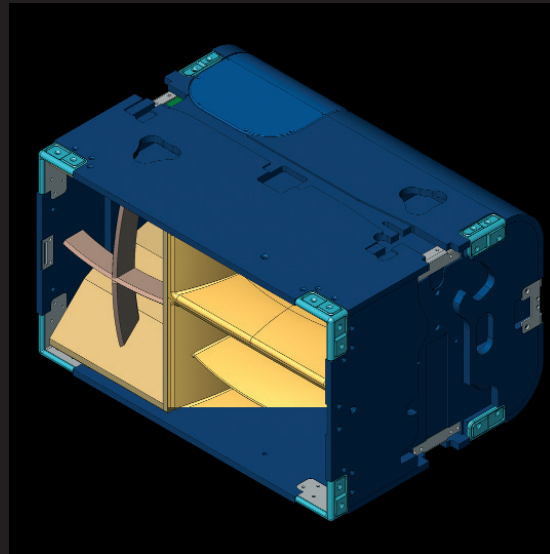
**low frequency**

## TA-890H

The touring mid-high enclosure is designed to be flown in point source arrays for both large and small scale touring applications. It houses two HF drivers on a HF Polyhorn™, a single 10" high-mid driver on a HMF Polyhorn™ and two 10" low-mid frequency drivers in a horn-loaded enclosure. The mid-high section is removable and can rotated through 90° within the cabinet, and together with the integral flying hardware this allows the touring box to be flown in a vertical or horizontal orientation depending on the venue size and room coverage required.

The cabinet is constructed from 15mm (5/8") birch plywood, with ergonomically placed flush handles for easy handling, and makes extensive use of pre-formed curved rear plywood sections to improve the strength to weight ratio and eliminate internal reflections. Speakon NL8s are fitted.

touring mid/high



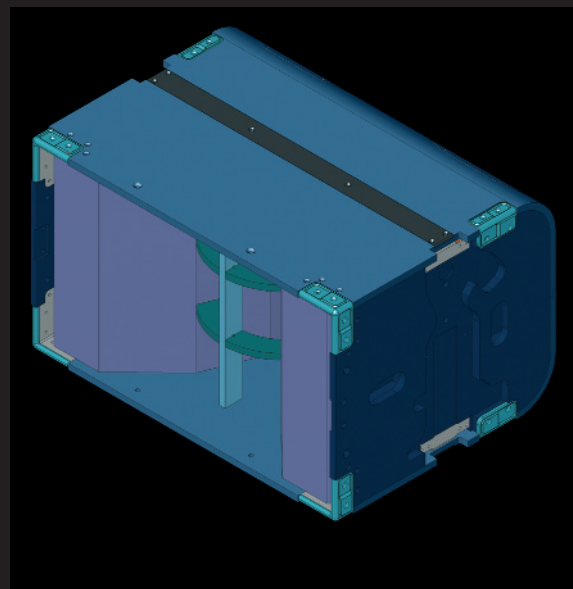
## TA-890L

A very compact 2 x 15" touring low frequency enclosure designed to partner the TA-890H touring mid/high enclosure.

Consisting of TurboBass loaded dual 15" drive units, the TA-890L is capable of delivering up to 137dB maximum SPL (peak) from a deceptively small box. Reverse facing drivers with high excursion voice coils improve the thermal dissipation to the ambient air.

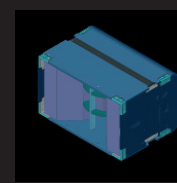
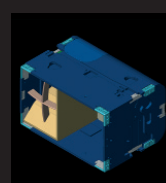
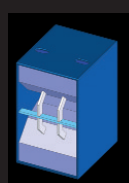
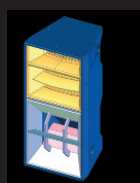
It is equipped with an integral flying system which allows it to be flown horizontally with TA-890H enclosures. In common with the mid/high cabinet, up to four cabinets can be pre-assembled on a wheel dolly to simplify load-ins and transportation. Two Speakon NL4MP connectors are provided on a rear panel.

touring low frequency



# Technical Specifications

	TA-880H	TA-880L	TA-890H	TA-890L
<b>Dimensions (h x w x d)</b>	1025 x 477 x 463 40.3" x 18.8" x 18.3"	795 x 477 x 574 31.3" x 18.8" x 22.6"	795 x 477 x 574 31.3" x 18.8" x 22.6"	795 x 477 x 574 31.3" x 18.8" x 22.6"
<b>Net weight (kg/lbs)</b>	55/121	38/83.6	85/187	58/128
<b>Frequency range (±4dB)</b>	95Hz - 20kHz	45Hz - 250Hz	95Hz - 20kHz	45Hz - 250Hz
<b>Dispersion</b>	25°H x 15°V	n/a	25°H x 15°V	n/a
<b>Power handling (rms)</b>	LMF: 500 watts HMF: 200 watts HF: 100watts	1200 watts	LMF: 500 watts HMF: 200 watts HF: 100watts	1200 watts
<b>Sensitivity (1w@1m)</b>	LMF: 107dB HMF: 114dB HF: 114dB	101dB	LMF: 107dB HMF: 114dB HF: 114dB	101dB
<b>Maximum SPL (dB) (cont/peak.)</b>	140/146	132/138	140/146	132/138
<b>Crossover bands</b>	LMF: 111Hz - 435Hz HMF: 435Hz - 4kHz, L-R HF: 5kHz - 20kHz, L-R	25Hz - 111Hz	LMF: 111Hz - 435Hz HMF: 435Hz - 4kHz, L-R HF: 5kHz - 20kHz, L-R	25Hz - 111Hz
<b>Nominal impedance</b>	LMF: 8 ohms HMF: 16 ohms HF: 12 ohms	8 ohms	LMF: 8 ohms HMF: 16 ohms HF: 12 ohms	8 ohms
<b>Construction</b>	all enclosures are constructed from 15mm (5/8") birch plywood			
<b>Connectors</b>	Speakon NL8MP	Speakon NL4MP	Speakon NL8MP	Speakon NL4MP
<b>Options</b>	Enclosures are available in black semi-matt textured paint; or TurboBlue™ textured paint			



Aspect series  
Preliminary information  
E&EO

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