



aspect[®] series



 **Turbosound[®]**



2

+

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

ASPECT® IS NO ORDINARY SOUND SYSTEM

Through extensive research and the subsequent implementation of innovative and patented Polyhorn™ designs, Turbosound has identified and overcome significant shortcomings in traditional horn designs: namely the tendency for conventional high frequency exponential horns to ‘beam’ with increasing frequency; and the undesirable comb filtering effects between adjacent devices due to the variable curvature of the wavefront caused by the horn’s geometry.

A NEW KIND OF HORN DESIGN

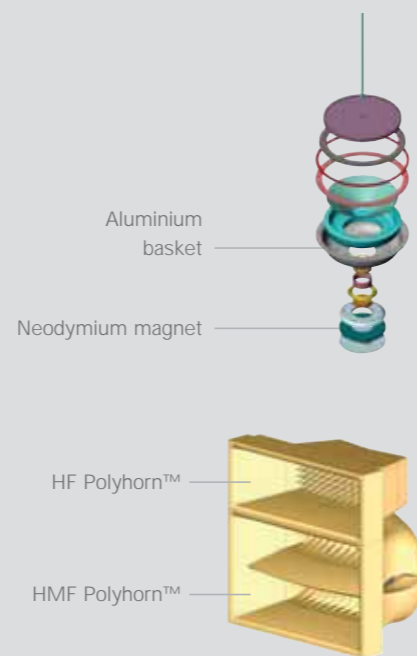
The Polyhorn™ designs applied in both high-mid and high frequency bands simply divide an exponential horn flare into a multiplicity of tapered waveguides, while ensuring that all path lengths from the diaphragm surface to horn mouth are identical. The result is that all frequencies from all parts of the diaphragm arrive at the horn mouth together, providing the wavefront with uniformity of phase. The Polyhorn™ design effectively locates the acoustic centre well behind the motor

system, forming a virtual point source whose radius coincides with the array curvature even though the enclosures are themselves quite shallow and are consequently easily manageable.

The Aspect® series consists of purpose-designed touring and installation-specific cabinets to suit a multitude of sound reinforcement applications. The mid-high and low frequency touring boxes share identical, and very compact, dimensions, which greatly aid trucking and handling requirements. Integral flying systems allow them to be flown or ground stacked for maximum flexibility of use. The trapezoidal mid/high enclosure variant has features that are optimised for ground stacking and permanent installs. Low-mid and high-mid trapezoidal downfills are also offered which integrate into flown arrays.

CUSTOM-DESIGNED LOUDSPEAKER COMPONENTS

The Aspect® concept divides the audio spectrum into four frequency bands, optimised to the custom-designed



KEY SYSTEM BENEFITS

- **Continuous** even coverage above 1kHz, effectively giving seamless arrayability in both horizontal and vertical planes
- **Intuitive** ‘point and shoot’ directivity 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 peak SPL of up to 146dB is easily achievable from one cabinet

- **Greatly improved** driver thermal performance increases power handling resulting in a significant reduction in power compression
- **Flying hardware** is integral to the touring boxes but can quickly be removed for safety testing. The flying hardware also allows systems to be safely and easily ground stacked
- **Smaller** and uniformly sized enclosures simplify handling, flying and truck packing. Cabinet dimensions are optimised for both US and European vehicle truck pack

- **Trapezoidal** cabinets use removable flying hardware and hence there is no cost penalty to users of ground stacked or installed systems
- **Touring cabinets** may be flown horizontally or vertically; mid-high section can be rotated through 90° to optimise the aspect ratio of the array, making the best use of venue sightlines

3

transducers dedicated to each band.

The high frequency section is dedicated to handling frequencies above 6kHz, and this is reproduced by two custom-designed diaphragm assemblies loaded by a high 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.

SEAMLESS ARRAYABILITY

A key feature of the Polyhorn™ design is the very sharp cut-off at the edges of the 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 an intuitive fashion without having to guess at the expected 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 together form part of a square section with 25°H x 15°V dispersion pattern. Frequencies from 405Hz to 6kHz are handled by a custom 10” drive unit on a Polyhorn™ optimised for mid frequencies.

HIGH POWER NEODYMIUM MAGNETS

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.

All the Aspect® touring products’ dimensions have been carefully chosen to optimally truck-pack in the most common US and European vehicles.

THE POLYHORN™ ADVANTAGES

The diagrams below show how the Polyhorn™ design generates a phase-coherent wavefront. The geometry gives a smooth curvature to the wavefront, which is arranged to match the array curvature. As the wave progresses, the wavefront develops 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.

Destructive interference between conventional HF horns



Polyhorn™ creates smoothly curved wavefront



+ 4

5



TA-890H touring mid/high

The TA-890H is designed to be flown in point source arrays or ground stacked, and is applicable to regional touring up to concert touring and festival applications. It packs an incredible 146dB peak SPL into an extremely compact and manageable format.

It houses two HF drivers on an HF Polyhorn™, a single 10" high-mid driver on an HMF Polyhorn™ and two 10" low-mid frequency drivers in a separate horn-loaded enclosure. The mid-high section is removable and can be rotated through 90° within the cabinet, and together with two entirely separate and independent integral flying systems. This allows the touring box to be flown in a vertical or horizontal orientation depending on the cluster shape, venue size and room coverage required.

The cabinet is constructed from 15mm (5/8") beech plywood, with ergonomically placed flush handles for easy handling, and makes extensive use of pre-formed curved plywood sections to improve the strength to weight ratio and eliminate internal reflections. A Speakon NL8MP is fitted on a hinged access door as well as an captive 2 metre NL8 interconnect cable. ■

TA-890L bass enclosure

A very powerful and compact 2 x 15" low frequency enclosure fully equipped for concert touring applications with integral flying hardware, and designed to provide low frequency support for the TA-890H touring mid/high enclosure.

Comprising two TurboBass™ loaded dual 15" drive units in a beech plywood enclosure, the TA-890L is capable of delivering up to 138dB maximum SPL (peak) from a deceptively small box. Reverse-facing neodymium drivers with high excursion voice coils promote a high degree of thermal dissipation to the ambient air.

It is equipped with an integral flying systems which allows it to be flown horizontally or vertically with TA-890H enclosures. In common with the mid/high cabinet, it is supplied with a detachable wheelboard, or alternatively 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 the rear panel. ■

TSW-218 sub-bass enclosure

A large-format horn-loaded subwoofer designed for the reproduction of ultra sub frequency energy at very high levels and primarily intended for large-scale concert touring and festival applications, although it is also ideally suited to large nightclubs that demand no-compromise audio quality.

The TSW-218 incorporates the TurboBass™ device, a patented design which employs a high-velocity partial horn-loading technique, giving precise cone control at high power levels. It addresses an increasing demand for accurate, high definition bass reproduction in 4-way or 5-way systems.

The proprietary 18" drive units are the result of a development project that has produced a unique neodymium motor system. The magnet drives an under-hung 5" coil which, due to the long 25mm gap height, is always completely immersed in a linear flux field—ensuring very low harmonic distortion—even at the excursion limits. The short coil also means a lower system moving mass, resulting in higher sensitivity and exceptional response to fast transient peaks.

The TSW-218 is capable of outstanding electrical to acoustic power conversion (104dB at 1w/1m from a single unit). Optimisation of the curved-profile laminated horn flare produces a dramatic increase in sensitivity when multiple units are coupled, with four cabinets giving 110dB (1w @ 1m) output with flat frequency response down to 32Hz.

Heavy duty T6 wheels are included to aid in transportation, while stacking feet, a durable foam-backed grille, and strap points in the side-mounted handle boxes all make the TSW-218 purpose-built for intensive concert touring use. ■

6 Integrated Rigging Systems

The Aspect® rigging hardware is specifically designed to take advantage of the Polyhorn's™ precise directivity characteristics as well as allowing simple adjustment of vertical angles. This means that arrays can very easily be optimised to suit the coverage requirements of any situation.



+ + + +

Two separate and independent flying systems have been designed for the touring Aspect® enclosures, and this permits a great deal of flexibility when putting together sound systems in widely differing venues and outdoor audience spaces. Both systems are integral to the box.

HORIZONTAL AND VERTICAL RIGGING SYSTEMS

The horizontal, or 'A', flying system is extremely intuitive in use, and allows a single operator to fly a column of loudspeakers in minutes. Consisting of a drop link that engages into the cabinet below with incremental angle adjustment, the flygear is integral to the enclosure and allows cabinets to be pre-configured at the warehouse on a four-up

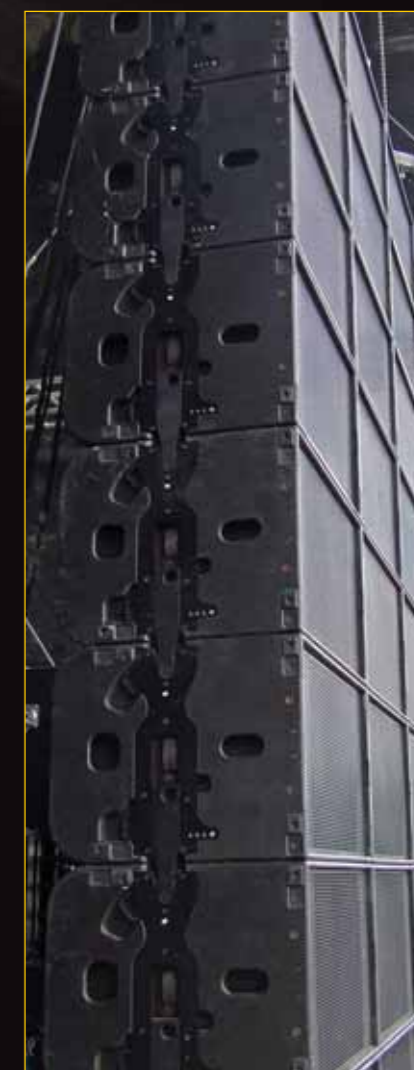
wheel dolly to save time on load-ins. The system provides clear visual indication of swing latch engagement and inter-cabinet angle, making it easy to see when the cluster is safe and ready to lift.

While in the majority of cases Aspect® systems will be flown horizontally in order to optimise venue sightlines, it is also possible, for example where there is no height restriction, to fly cabinets in a vertical mode using the 'B' flygear integral to the long sides of the cabinet. As with the 'A' system, all the load is taken through the load-rated steelwork, while the cabinets are connected vertically using simple removable links.

Aspect® system flybars are designed to offer both simplicity and flexibility, being available in 2-wide and 3-wide fixed angle configurations. They are designed

with reference to international safety standards including BGV C1, BS7905:2001, BS70906:2005, LOLER and ESTA, with a safety factor of 12:1. We also offer purpose-built fly bar trunks for the modular bars, constructed with nylon skids and heavy duty wheels, and as with the speaker cabinets these are designed to truck-pack effectively.

The cabling system is based around eight-core 2.5mm² speaker cable, assigned to the individual frequency bands and wired to touring industry-compatible standards. Input is via the NL8MP panel connector, and loop-through—up to three mid-high cabinets can be powered from one amplifier channel—is made possible by the captive NL8 cable hard-wired to the cabinet and accessed via the hinged rear door.



7

8



+ 9



TA-880H trapezoidal mid/high

Where it is not practical to fly the PA on a regular basis, a cost-effective alternative is presented by the trapezoidal TA-880H Aspect® mid-high enclosure. Although it houses the same components as the touring cabinet, the angled sides ensure repeatable and accurate coverage for ground stacking.

Containing two custom high frequency drivers on an HF Polyhorn™, a single custom 10" high-mid frequency driver on an HMF polyhorn™, and two horn loaded 10" low-mid drivers, the TA-880H covers the frequency range from 100Hz to 20kHz.

A pair of Speakon NL8 connectors are provided on a recessed panel at the rear of the cabinet for input and link connections. Constructed from 15mm (5/8") birch plywood, the TA-880H is finished in black textured paint or optional TurboBlue™. The enclosure features ergonomically placed flush handles, and recesses at the rear of the box that afford protection to the connected speaker cables.

The optional external flying system consists of removable swords which pass through slots in the woodwork, secured inside the handle boxes. ■

TA-880L low frequency

This very compact 2 x 15" horn-loaded bass enclosure is recommended for ground-stacked regional touring applications, as well as being ideal for a wide range of permanent installs like theatres, live performance venues and nightclubs.

Although it is housed in an extremely small enclosure, the high efficiency low frequency drivers are capable of generating 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 drivers are rear-facing in the enclosure—this places the magnets in the air flow and provides additional cooling. The cabinet is constructed from 15mm (5/8") birch plywood, finished in black textured paint (optional TurboBlue™), with four flush handles and nylon feet for easy handling, and two Speakon NL4MP connectors. ■

TA-880HM high/mid

A trapezoidal bi-amped high-mid/high enclosure designed to integrate into flown and ground-stacked TA-880 arrays to provide coverage of the nearest audience rows.

It contains two custom high frequency drivers on an HF Polyhorn™, and a single custom 10" high-mid frequency driver on an HMF polyhorn™. The TA-880HM covers the frequency range from 405Hz to 20kHz.

Two Speakon NL8 connectors provide input and link connections on a recessed rear panel. The cabinet is constructed from 15mm (5/8") birch plywood, and is finished in black textured paint or optional TurboBlue™.

An optional flying system consists of removable swords which pass through slots in the woodwork, and secured inside the handle boxes. ■

TA-880LM low/mid

A trapezoidal low-mid enclosure designed for use with TA-880H arrays, or together with TA-880HM cabinets as front-fills or side-fills. It contains two horn-loaded 10" low-mid drivers, and covers the frequency range from 95Hz to 405Hz.

A pair of Speakon NL8 connectors are provided on a recessed panel at the rear of the cabinet for input and link connections. Constructed from 15mm (5/8") birch plywood, the TA-880LM is finished in black textured paint or optional TurboBlue™.

The enclosure features ergonomically placed flush handles, and recesses at the rear of the box that afford protection to the connected speaker cables, making an efficient and space-saving package.

An optional flying system consists of removable swords which pass through slots in the woodwork, and secured inside the handle boxes. ■

Trapezoidal Touring

TA-880H trapezoidal Aspect® enclosures are a highly effective solution—together with the very compact partner TA-880L bass cabinet—in regional concert touring and corporate applications, for which a system of six mid-highs and eight low frequency cabinets will provide sufficient SPL and very high quality sound coverage for up to around 3,000 people depending on the venue shape.

Because of the true 25° horizontal dispersion pattern of the cabinet—as opposed to a ‘nominal’ 35° offered by many competitors—it is possible to cover a room properly (without wasting reflected sound off the walls) with very few cabinets.

For example, a 3-wide ground-stacked horizontal array of trapezoidal Aspect® TA-880H cabinets, coupled with four TA-880L bass enclosures, will provide a genuine 75° of seamless horizontal dispersion with very little spill outside of the target coverage area.

The TA-880 trapezoidal flying system consists of removable steel swords which pass through slots in the box, secured with lynch pins, forming modular arrays to suit the required coverage. The system provides a choice of three vertical inter-cabinet angles to optimise the room coverage. With the available choice of flybars—two-wide and three-wide fixed angle bars—it is easy to quickly assemble and fly clusters of loudspeakers.



+ 10



Trapezoidal Fixed Installs

Trapezoidal Aspect® mid-high enclosures are the ideal choice for a wide range of permanent installs encompassing live performance venues, theatres, and nightclubs. The precise dispersion pattern makes it very easy to achieve excellent coverage of a room and to deliver high definition sound into audience areas with minimum overspill. A key feature of the TA-880H systems is the cost effective external flying hardware that enables tight-packed clusters to be flown with minimal sightline obstruction.

11



Amplifier Racks / Systems Integration

12

We believe that integrating all elements of the sound reinforcement system under a common design philosophy—including system control, amplification, cabling, loudspeakers and rigging—offers major advantages to rental companies who routinely face unpredictable venue conditions in a competitive market typified by shrinking production budgets.



+ 13

Turbosound can supply a fully integrated turnkey touring sound system, including TA-890 mid-high and bass loudspeakers with integrated rigging hardware, flybars, amplifier racks loaded with low-weight switched-mode power amplifiers, loudspeaker management controllers, speaker cabling and signal returns systems.

The heart of the Aspect® TA-890 touring system is a very powerful and light-weight amplifier rack, superbly packaged and fully equipped for rigorous touring applications. The T-series switch-mode amplifiers are built on a strong but light 2U aluminium chassis, and make use of efficient digital power supplies to provide high peak power without low frequency 'sag' which can deteriorate sub-bass performance. Their sophisticated limiters and power control systems ensure faultless operation under the most arduous conditions.

Two model T-25 amplifiers (delivering 1250 watts / channel into 4 ohms) power the high frequency and high-mid frequency bands respectively, while a T-45

(2250 watts / channel at 4 ohms) is assigned to the low-mid frequencies, with two further T-45 models used for the low/sub frequencies. The amplifier rack is considerably more versatile than a first glance would suggest. It can be configured in mono or stereo simply by moving a jumper; and the standard amplifier complement even allows five-way systems incorporating sub-bass to be configured from the same rack without additional or separate amplifiers. Each rack will deliver over 18,000 watts of r.m.s. power into an optimal load of six high packs and eight bass cabinets.

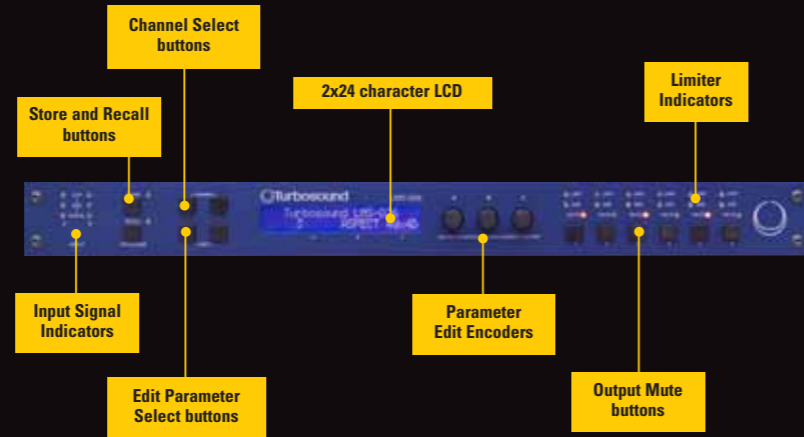
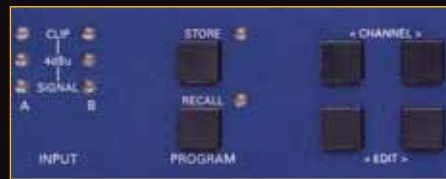
Loudspeaker connections are divided into mid-high and LF sections, and are provided from the amplifier rack via 3-metre multi-way break-outs, long enough to permit ground stacking and flying in small venues, while multi-way cable extensions are available in various lengths for larger flown arrays. The LF and mid-high break-outs are uniquely wired so that it is impossible for drive unit damage to occur if the multi-pin connectors are mistakenly interchanged.

TRANSPORTATION AND HANDLING

TA-890H high packs and TA-890L bass cabinets are both supplied with individual wheel boards, attached with quick release catches to the front of the cabinet. When off the boxes and not in use, they are designed to be neatly stacked off stage with minimal footprint to save space. In order to make load-ins really efficient in a familiar venue, cabinets can be stacked four-up on a wheeled dolly in the horizontal mode—with the 'A' system flying hardware already pre-configured—and simply rolled out of a truck straight onto the loading dock or stage. This means that blocks of four cabinets can be prepared in the warehouse, saving valuable time on load-ins and load-outs.

The touring flybars—normally notoriously awkward to handle and transport—are fabricated from box-section steel with convenient lifting handles, and are packaged in superbly fitted flybar trunks. They are designed with reference to international safety standards including BGV C1, BS7905:2001, BS70906:2005, LOLER and ESTA, with a safety factor of 12:1.

14



Controllers and DSP

The LMS-D24 and LMS-D26 dedicated loudspeaker management systems are specially configured to obtain the full benefit of Aspect's capabilities.

Both units offer minimal signal path design providing exceptional audio quality; carefully optimised processing and high performance converters for wide dynamic range. They provide digital alignment of all drive units within the Aspect® enclosures to ensure coherent acoustic output. System parameters such as crossover frequencies, limiter settings and equalisation are called up from factory pre-set menus, ensuring consistent performance every time. XLR Inputs and outputs are electronically

balanced to provide effective isolation, eliminating hum loops. Precise matching of the limiters to the Aspect® T-series amplifiers further contributes to high reliability under the adverse conditions often encountered in concert touring.

Turbosound provides DSP libraries for the LMS series of controllers as well as for these third party units:

- XTA 4 series
- Dolby Lake Contour Pro 26
- BSS FDS366

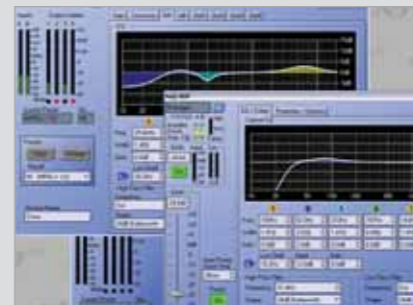
GigMate™

The Turbosound Aspect® system is remarkably intuitive in use, and requires an absolute minimum of theoretical calculations in order to achieve optimal coverage, due to its 'point and shoot' nature.

TurboDrive™

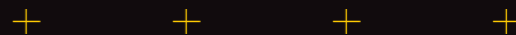
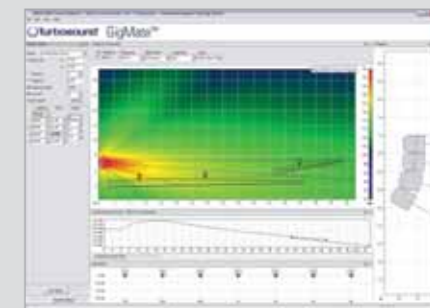
The new control software from Turbosound, TurboDrive™ enables monitoring and control of LMS series controllers. User control of input EQ, delay and mute is available while key factory settings are locked out to ensure maximum user flexibility whilst maintaining consistent voicing and driver protection.

TurboDrive™ control software gives online access and fast, intuitive control of Turbosound controllers, individually or in a BVNet network of up to 100 devices, either on-site with a laptop or wireless device, or remotely over a VPN (virtual private network).

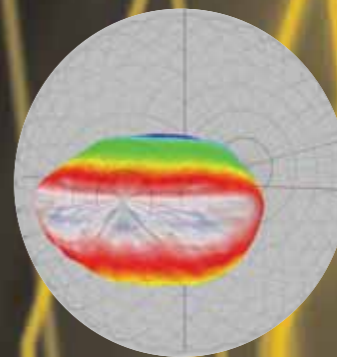
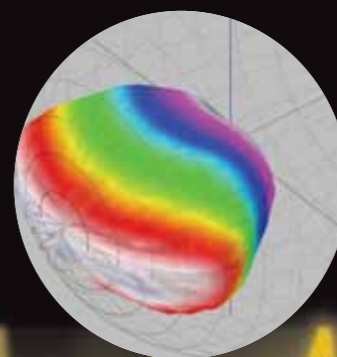


A computer simulation of what to expect in a room you have never worked in before can save time in the selection and number of cabinets required, and in eliminating uncertainty when configuring the sound system. Turbosound's GigMate™ software package gives you

an accurate representation of the included coverage and verification of the sound pressure level anywhere in the room. Running under the Windows® operating system, the software allows you to define the extents of the venue and the location, size and angle of audience. Other physical parameters such as rigging points and PA trim height are similarly defined, while ground stacks can also be accommodated. The program also usefully calculates the total cluster weight as well as its overall depth. SPL mapping allows you to view the predicted sound level over all audience areas.



15



EASE

Designing a sound system for a big fixed installation project can be a daunting task, particularly with a large number of variables to be considered. To simplify this process, Turbosound offers complete and up-to-date performance data for all Aspect® products for use with the EASE (Enhanced Acoustic Simulator for Engineers). A thorough analysis of the room and its surfaces—and a prediction of how the sound system interacts with it—cuts a lot of guesswork out of the design process, and equally importantly provides the client with a convincing representation of the finished project. Turbosound has developed its own .dll file (dynamic linked library) containing proprietary data specific to the Aspect® product's properties, which is loaded and executed by the EASE program dynamically.

Technical specifications

	TA-890H	TA-890L	TA-880H	TA-880HM	TA-880LM	TA-880L	TSW-218
Dimensions (h x w x d)	795 x 477 x 574mm 31.3" x 18.8" x 22.6"	795 x 477 x 574mm 31.3" x 18.8" x 22.6"	1025 x 477 x 463mm 40.3" x 18.8" x 18.3"	477 x 477 x 463mm 18.8" x 18.8" x 18.3"	566 x 477 x 463mm 22.3" x 18.8" x 18.2"	795 x 477 x 574mm 31.3" x 18.8" x 22.6"	574 x 1400 x 770mm 22.6" x 55.1" x 30.3"
Net weight	76kg / 167lbs	68kg / 150lbs	59kg / 130lbs	28kg / 61.6lbs	36kg / 79.2lbs	50kg / 110lbs	110kg / 242lbs
Frequency range (±4dB)	95Hz - 20kHz	45Hz - 250Hz	95Hz - 20kHz	405Hz - 20kHz	95Hz - 405Hz	45Hz - 250Hz	35Hz - 150Hz
Array angle	25°H x 15°V	n/a	25°H x 15°V	25°H x 15°V	n/a	n/a	n/a
Power handling (cont)	LMF: 500 watts HMF: 200 watts HF: 100 watts	1100 watts	LMF: 500 watts HMF: 200 watts HF: 100 watts	HMF: 200 watts HF: 100 watts	500 watts	1100 watts	1200 watts
Sensitivity (1w@1m)	LMF: 107dB HMF: 114dB HF: 114dB	101dB	LMF: 108dB HMF: 114dB HF: 114dB	HMF: 114dB HF: 114dB	108dB	101dB	104dB
Maximum SPL (cont/peak.)	140dB / 146dB	132dB / 138dB	140dB / 146dB	140dB / 146dB	140dB / 146dB	132dB / 138dB	135dB / 141dB
Crossover points	405Hz, 4k/5k99Hz	101Hz	405Hz, 4k/5k99Hz	4k/5k99Hz	405Hz	101Hz	110Hz
Nominal impedance	LMF: 8 ohms HMF: 16 ohms HF: 12 ohms	8 ohms	LMF: 8 ohms HMF: 16 ohms HF: 12 ohms	HMF: 16 ohms HF: 12 ohms	8 ohms	8 ohms	4 ohms
Construction	15mm beech ply	15mm beech ply	15mm birch ply	15mm birch ply	15mm birch ply	15mm birch ply	18mm birch ply
Connectors	NL8	NL4	NL8	NL8	NL8	NL4	NL4

Options

Enclosures are finished as standard in black semi-matt textured paint; TurboBlue™ semi-matt textured paint is optionally available

