

RoomMatch® Progressive Directivity Array Loudspeakers

Create concert-quality sound – in any room – at every seat.





Why even the best tour-sound line arrays underperform when installed indoors

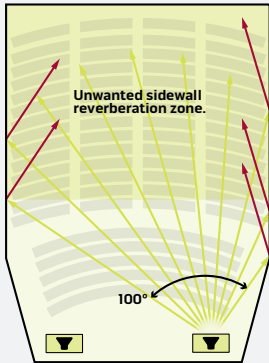
Line-array loudspeakers were originally designed for portable tour-sound applications such as outdoor concerts and large arena shows that require long throw distances and wide coverage areas. To meet the demands of these applications, good designs required “one-size-fits-all” wide coverage patterns, high SPL from small physical size for efficient truck packing, and fast-setup rigging systems. Over 20 years, line array products evolved to solve these design challenges and deliver exciting concert listening experiences to audiences in these outdoor and large-arena venues.

However, when these proven designs were used for indoor installations, system designers often found that the concert-quality sound they expected significantly deteriorated: room reflections and reverberations caused changes in loudspeaker response, tonal balance varied from seat to seat, and speech lacked clarity.

Indoor installations provide challenges beyond the design scope of tour-sound line arrays

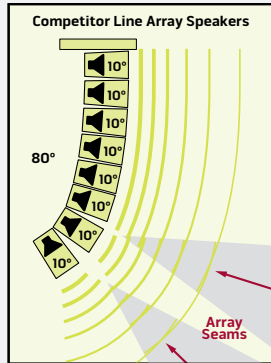
1 Unwanted wall reflections

Tour-sound arrays typically offer wide horizontal coverage patterns to cover large open areas. For many installations, these wide patterns produce unwanted reflections from side walls, which degrade the natural tonal balance of the loudspeakers and increase room reverberations.



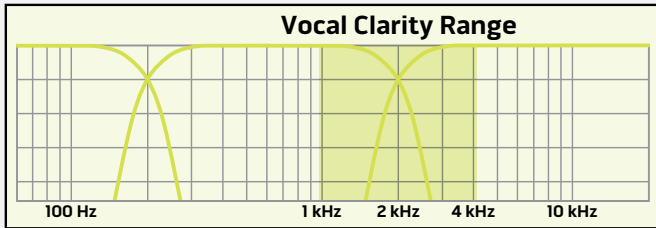
2 High-frequency array “seams”

Tour-sound venues typically require long throw distance with narrow vertical coverage. However, indoor installations often need wide vertical coverage for varied seating elevations, which require splay angles between elements for most tour-sound line arrays. This physical spacing can cause array seams – frequency response variations that degrade sound quality at seating locations near the seams.



3 Reduced vocal projection and speech clarity

Most tour-sound line arrays have 3-way designs and small waveguides to improve the output-to-size ratio for efficient truck packing. The small waveguides compromise coverage control, and 3-way designs use crossover points in the vocal intelligibility range, both of which can reduce vocal projection and speech clarity.





Early Bose® prototype testing versus conventional line array system

Bose engineers collaborated with system designers to improve line arrays for indoor installations

More than 10 years ago, the engineers at Bose began researching solutions to acoustic problems inherent in tour-sound line-array loudspeakers used for indoor installations. Interviews with leading acoustical consultants and sound designers confirmed needed improvements: array coverage patterns had to match many different room sizes and shapes, elimination of high-frequency array seams and, most importantly, a system that can meet or exceed the concert-quality sound of the best tour-sound line arrays, for both live music and speech, at every audience seat. Thus, the direction was set for the development of the next-generation Bose professional loudspeaker.

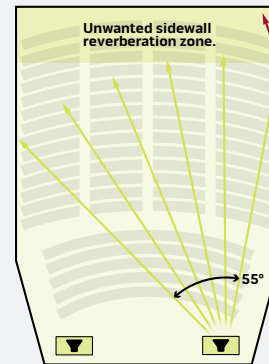
After years of engineering design work, prototype evaluation, and beta-site testing with leading system integrators, Bose professional engineers introduced three key design innovations that would enable the next evolution of line-array loudspeakers.

Bose® design innovations overcome the challenges of tour-sound line arrays installed indoors

1 Coverage patterns to match any room size or shape

To accommodate almost any room size and shape, Bose engineers created array modules with many different combinations of horizontal and vertical coverage patterns. The modules combine to form array coverage that minimizes unwanted acoustic reflections from room walls.

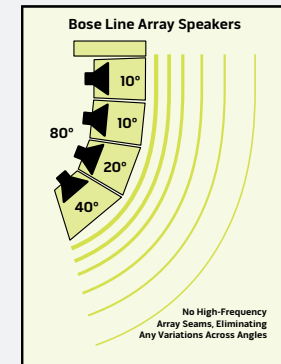
The result? Tonal balance is consistent regardless of room shape or size.



2 High-frequency summation without array "seams"

Bose research produced a new acoustic design that eliminates the need for splay angles between elements for wide vertical coverage.

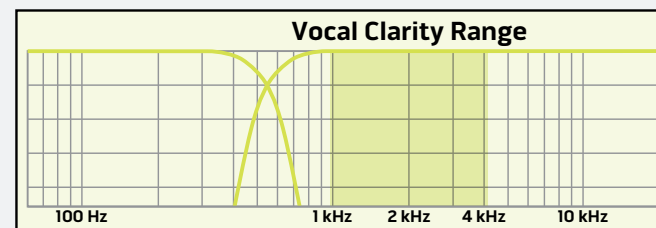
The result? Sound quality is consistent seat to seat, even with large vertical coverage angles.



3 Large-format waveguides with 500-Hz crossover

Bose research showed that waveguides significantly larger than those of current tour-sound arrays would be required to provide good horizontal coverage control in the vocal intelligibility range. Additionally, Bose engineers lowered the frequency range of compression drivers to 500 Hz, without sacrificing high-frequency response or maximum levels.

The result? Vocal projection and speech clarity are demonstrably improved.



Bose® research creates a new class of line array: the Progressive Directivity Array

The design goal to provide concert-quality sound for almost any room size or shape led Bose researchers to fundamentally rethink line-array configurations. For most tour-sound line arrays, the horizontal coverage pattern is the same for each module in the array. Total vertical coverage of the array is determined by the angle of rigging hardware settings. Both factors compromise coverage for many room sizes and shapes. To eliminate these compromises, Bose engineers conceived a new array configuration – the Progressive Directivity Array – that gives sound system designers previously unavailable design flexibility and performance advantages:

Match array coverage to room dimensions for best-in-class sound

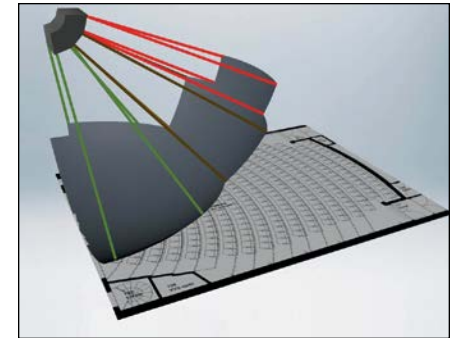
With Progressive Directivity Array configurations, both the horizontal and vertical coverage patterns are selected for each module to provide array coverage that is customized to exact room dimensions. Narrow patterns are typically selected to cover the rear of the room, with progressively wider patterns selected to cover the middle and front seats in the room. The differences in module directivity index (DI) help equalize levels from the front seats to the rear seats. With Progressive Directivity Arrays, virtually any room size or shape can have best-in-class sound at every seat location.

Choose number of modules independent of array vertical coverage needs

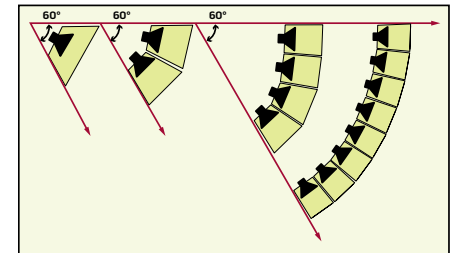
Progressive Directivity Array configurations allow designers to optimize the number of modules based on sound level, low-frequency pattern control and budget requirements – independent of the total array vertical coverage. With tour-sound arrays, the required vertical coverage determines the number of modules in array. For example, to achieve 60° of array coverage, the typical tour-sound array would require about six modules, as no single module can cover more than 10 degrees in the vertical plane. The Progressive Directivity Array concept provides modules with different vertical coverage patterns such that 60° of array coverage can be achieved using one to eight modules. For systems with modest SPL requirements, the number of array modules can be reduced to provide more cost-effective solutions over what's available with typical tour-sound arrays.

Optimize left/center/right system configurations

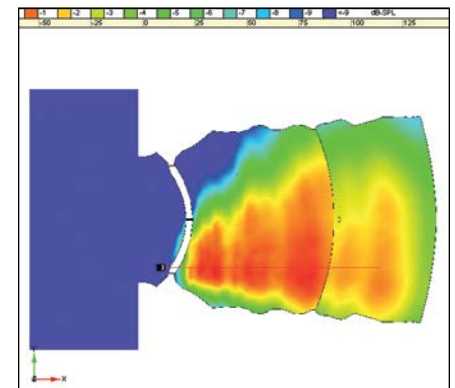
Progressive Directivity Array configurations simplify configuration of true Left/Center/Right sound systems, in which each of the L/C/R arrays cover most of the entire seating area. With tour-sound arrays, it is difficult to achieve true L/C/R systems, as the required length of the center array will often block sight lines. Progressive Directivity Arrays can be configured for similar array vertical coverage, with shorter center arrays. For example: four modules for left and right arrays with two modules for the center array – all with the same total vertical coverage. Additionally, Progressive Directivity Arrays may be configured with horizontally asymmetrical coverage patterns, which enhance stereo soundstage effects. Asymmetrical patterns direct more acoustic energy toward the far-side seating areas, which allow larger audience areas to be covered from both the left and right arrays, thereby improving the stereo soundstage effects.



Both horizontal and vertical coverage patterns are selected for each module in the array



Choose from 1 to 8 modules to configure 60° array vertical coverage



Asymmetrical patterns enhance stereo soundstage effects in L/C/R systems

Bose® research applied – the RoomMatch® product line

The new benchmark for line-array loudspeaker installations

Bose RoomMatch Progressive Directivity Array loudspeakers represent the next evolution of the line-array concept. Designed for the finest performing arts centers, auditoriums, sports arenas, dance clubs and houses of worship, RoomMatch arrays deliver concert-quality sound for live music and speech for indoor installations.

42 full-range array modules including horizontally asymmetrical patterns

Each 2-way, full-range array module contains six (6) Bose EMB2 titanium-diaphragm compression drivers and two (2) Bose LF10 10-inch, high-excursion woofers to provide 60 - 16,000 Hz response (± 3 dB), which allows speech and light music applications without need for additional subwoofers. Full-range modules are available with 5, 10, 20, 40 or 60 degree vertical coverage angles. Symmetrical

horizontal coverage angles are available in 55, 70, 90 or 120 degrees, with an additional 22 patterns available with horizontally asymmetrical coverage patterns.

Subwoofer array modules extend response to 40 Hz or 25 Hz

For additional low-frequency impact, two companion subwoofer modules are available. The RMS215 module extends usable array response down to 40 Hz and features dual Bose 15-inch high-excursion woofers. The RMS218 module extends usable array response down to 25 Hz and features dual Bose 18-inch high-excursion woofers. With equivalent maximum output levels, either subwoofer module may be used for 3-way systems, with choice based on program material bandwidth. For maximum performance RoomMatch systems, the RMS215 and RMS218 may be combined with full-range modules to form 4-way systems. Both subwoofers can be integrated in suspended arrays.



RoomMatch arrays
with subwoofer modules



RM5505
full-range array module



RM286020
asymmetrical array module



RMS215
subwoofer module



RMS218
VLF-subwoofer module

RoomMatch Utility RMU208

The RoomMatch Utility RMU208 loudspeaker is intended for use in high-quality foreground music, under-balcony, zone-fill and vocal-range floor-monitor applications. A single Bose EMB2 compression driver provides mid/high-frequency voicing similar to that of RoomMatch full-range array modules to deliver consistent sound quality from main array to zone-fill coverage areas.



RMU208
zone-fill loudspeaker

RoomMatch® innovative technologies

The concert-quality sound of RoomMatch arrays is enabled by three innovative and proprietary Bose® technologies:

- 1 RoomMatch waveguide
- 2 C.A.D.S. manifold
- 3 Bose EMB2 compression drivers



Bose commitment to research

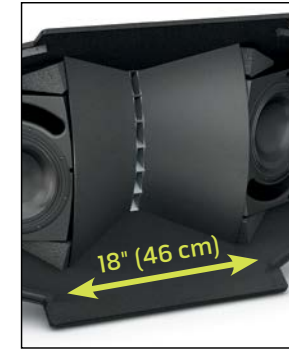
We have a simple mission: think of better solutions, create better products and help people enjoy the things they love. Everything we do supports this mission and points us forward. It started when Dr. Amar G. Bose founded the company in 1964 and continues today with innovative, passionate employees around the globe. And while it's true that we're a company built on scientific research, our vision is guided by human interests – how better sound affects us or what it means to find joy in products that work exactly how you want them to, or why solid customer service isn't a nice-to-have, but a promise we keep.

RoomMatch® innovative technologies

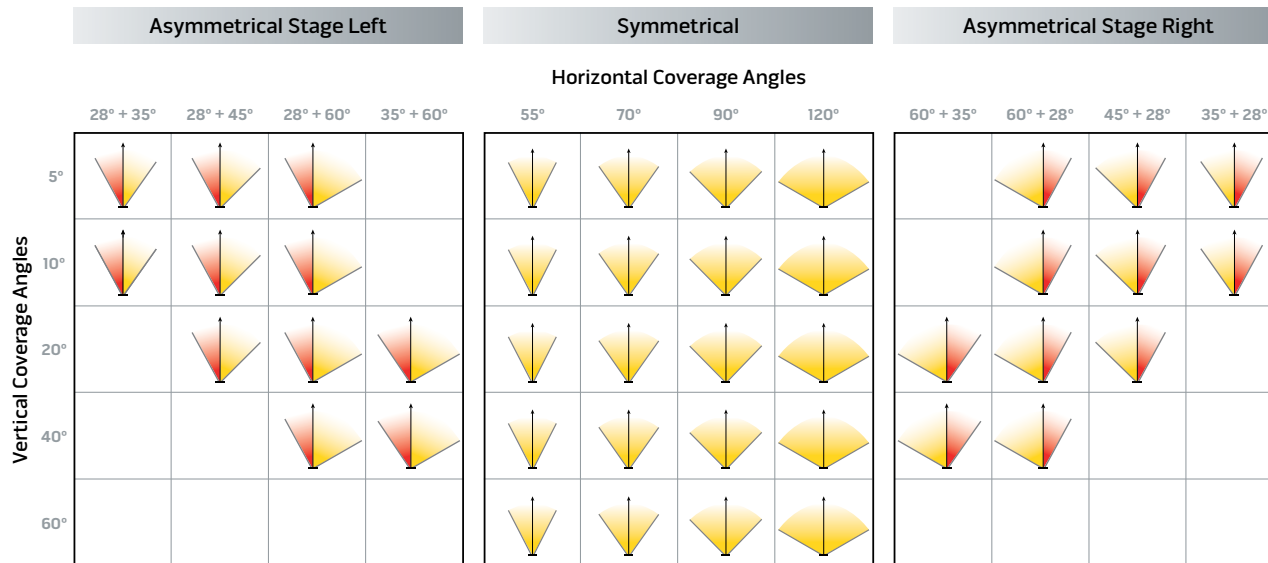
1 RoomMatch waveguides match array coverage to any room size or shape

RoomMatch waveguides utilize a patented process that allows 3-dimensional constant-directivity waveguides to be manufactured from flat panels of plywood and engineered plastics, for unprecedented choice of horizontal and vertical coverage patterns. This allows RoomMatch array coverage to match exact room dimensions to reduce frequency response variations from unwanted wall reflections.

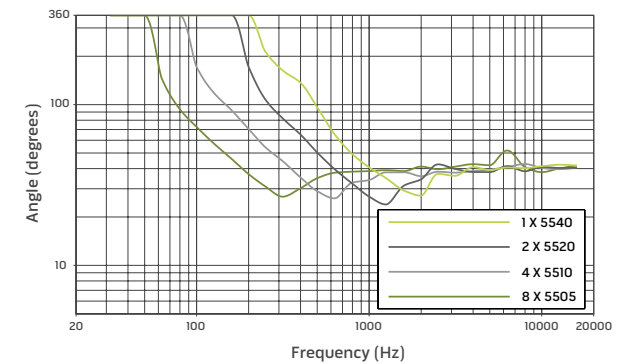
Additionally, this technology allows use of large-format waveguides, up to 18 inches in width, which provide effective horizontal coverage control in the critical 1-4 kHz vocal intelligibility range. As coverage control is proportional to the size of the waveguide, the small waveguides typical of tour-sound arrays compromise pattern control in the vocal range, which can reduce speech clarity. With RoomMatch waveguide technology, horizontal control is maintained down to 750 Hz, which helps vocals remain clear and natural in almost any room size or shape.



RoomMatch waveguides provide horizontal control down to 750 Hz for improved vocal clarity



RoomMatch waveguide technology provides unprecedented choice of coverage patterns – 20 symmetrical and 22 asymmetrical patterns – to deliver quality sound for almost any room size or shape



RoomMatch waveguides and Progressive Directivity Arrays help improve stage-microphone gain before feedback with directivity control to lower frequencies

RoomMatch® innovative technologies

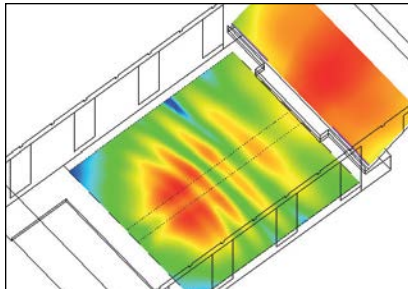
2 C.A.D.S. manifold eliminates array seams, improving sound in every seat

The proprietary Continuous Arc Diffraction Slot (C.A.D.S.) manifold sums the output of six Bose® EMB2 compression drivers and maintains acoustically equal spacing of high-frequency sources module to module throughout the full array length. Five unique manifolds provide precise coverage control for each of the five vertical coverage angles available for RoomMatch modules.

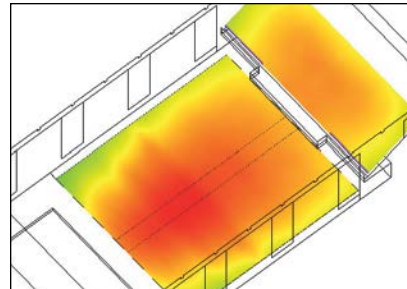
In all point-source arrays and tour-sound line arrays set with large splay angles between high-frequency elements, the physical spacing of high-frequency devices can produce destructive phase-interference, or array "seams." This interference causes frequency response dips in some seating locations. The C.A.D.S. manifold improves sound quality, seat-to-seat, by eliminating these phase-interference seams for all RoomMatch array configurations.



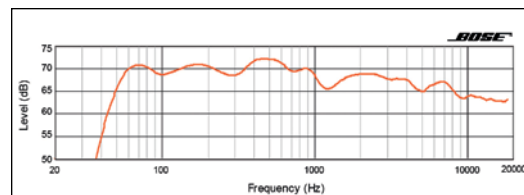
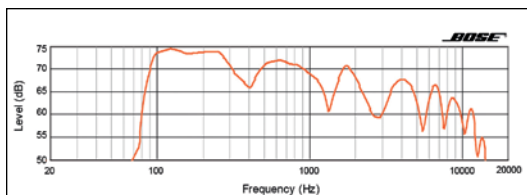
C.A.D.S. manifold with EMB2 compression drivers



Typical tour-sound array with large splay angles
Significant array seams with response dips



RoomMatch array
Virtually no array seams or response dips



C.A.D.S. manifolds provide seamless summation
of all HF drivers for all array configurations

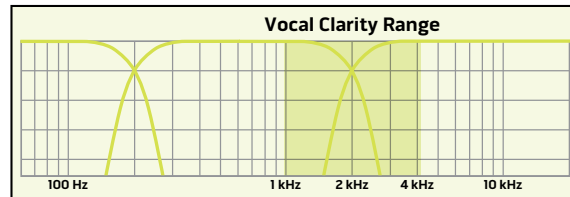
RoomMatch® innovative technologies

3 Bose® EMB2 extended-midband compression driver: pushes the performance envelope for improved vocal clarity

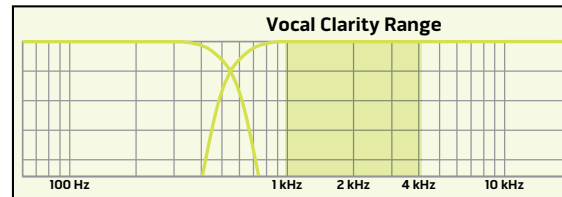
Sound system designers use 3-way systems to achieve the high output levels required for live music. However, this approach typically compromises spoken-word clarity due to the presence of crossover points in the 1-4 kHz vocal intelligibility range. To deliver concert-quality sound for live music and speech, Bose engineers created a new compression driver specifically for RoomMatch arrays.

The EMB2 drivers deliver the vocal power associated with 3-way systems, without the polar response problems typical of 3-way systems that can degrade sound-quality from seat to seat. With the RoomMatch 2-way design, frequencies from 500 Hz to 16 kHz are projected from a single large-format waveguide, to help keep the coverage pattern remarkably consistent over the entire frequency range.

The Bose EMB2 extended-midband compression driver pushes the performance envelope for two-inch-diaphragm high-frequency drivers. A new patented phase plug allows response down to 300 Hz from a small-diaphragm driver, while lowering total harmonic distortion by reducing the compression ratio. With six EMB2 drivers in each full-range module, the combined diaphragm area is 50% greater than that of a four-inch diaphragm driver, for improved midband response from 500 to 1000 Hz.



Typical 3-way loudspeaker with crossover in 1-4 kHz vocal clarity frequency range



RoomMatch 2-way design eliminates crossover in vocal clarity frequency range



Bose EMB2 compression driver



EMB2 titanium diaphragm

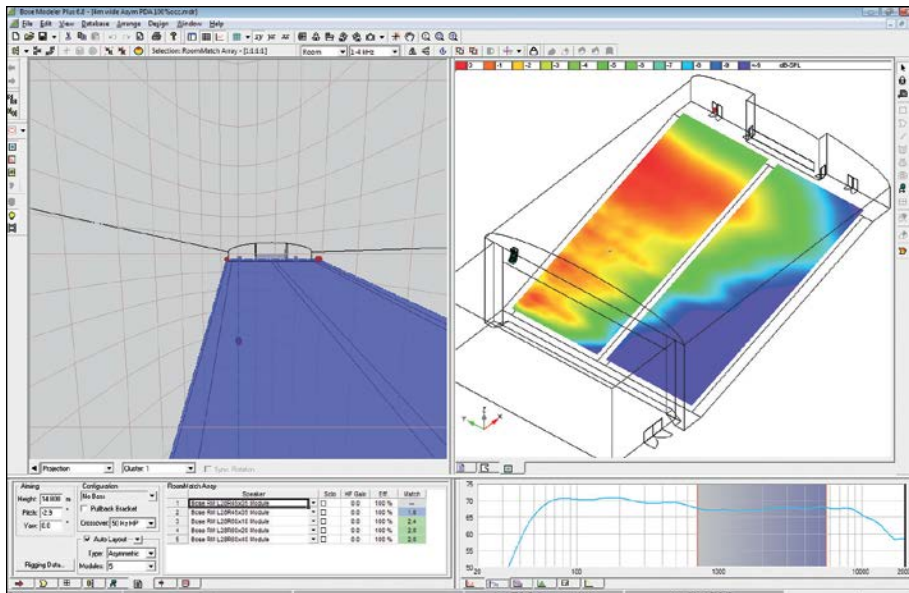


EMB2 phase plug cutaway view

Bose® design software and rigging accessories save design time and reduce installation costs

Modeler® sound system design software

To help system designers select the optimal array modules for target room coverage and sound levels, Bose Modeler sound system design software features the RoomMatch® Array Design Tool. This automated tool allows designers to input room dimensions, select symmetrical or asymmetrical arrays, then select the desired number of modules. The software automatically calculates a recommended array configuration and maps the predicted coverage, sound level and intelligibility of selected locations on the room model. System designers can also manually adjust the array configuration to accommodate special coverage or budget requirements.



Modeler RoomMatch Array Design Tool helps optimize sound quality for any room and reduce design time

RoomMatch array rigging accessories

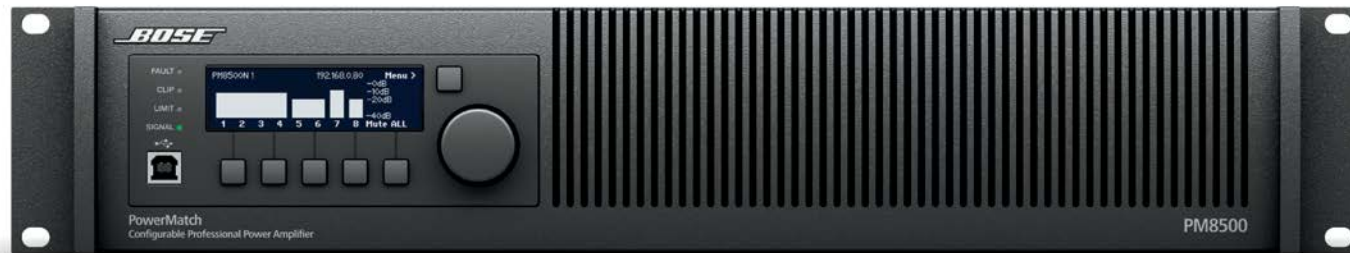
RoomMatch full-range modules feature integrated rigging hardware that allows up to eight modules (with 10:1 safety factor) to simply bolt together without need for setting splay angles. This reduces installation time and associated labor costs for suspending RoomMatch arrays.

Additionally, the RoomMatch product line features a complete line of rigging hardware that includes small and large array frames, extender bars for rear subwoofer mounting, pull-back bracket and wall/ceiling brackets. These accessories accommodate thousands of combinations of RoomMatch Progressive Directivity Array configurations, without requiring expensive, custom-made rigging solutions. All Bose RoomMatch rigging accessories have load ratings that have been certified by an independent professional engineering firm.



RoomMatch rigging accessories

PowerMatch® amplifiers – optimal power and DSP for RoomMatch® loudspeakers

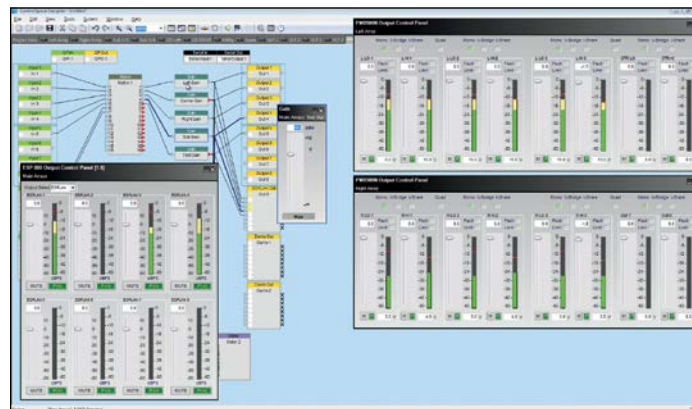


PowerMatch configurable amplifier with loudspeaker DSP

- Provides optimal amplification and loudspeaker DSP for all configurations of RoomMatch arrays
- Energy-efficient Class-D amplifier with up to 4000 watts rated power in a 2-rack-unit, 28.4 lb/12.9 kg chassis
- PowerMatch amplifiers are available in 8-channel versions that allow power to be allocated between 2 and 8 channels
- PowerMatch amplifiers are also available in 4-channel versions that allow power to be allocated between 1 and 4 channels
- Proprietary dual-feedback loop amp design helps deliver class-leading audio quality, efficiency and reliability
- Unique PeakBank™ power supply draws power safely and efficiently from a standard AC outlet, while transferring more of that power directly to the loudspeakers
- QuadBridge™ output configuration allows output channels to be arranged for different power levels and load types
- Onboard DSP provides loudspeaker processing with presets for all Bose® professional loudspeakers
- Front-panel controls allow selection of configurations and loudspeaker presets
- Additional settings are accessed via the USB interface and ControlSpace® Designer™ software
- Available network versions provide integrated Ethernet control and monitoring functions using ControlSpace Designer software
- CobraNet® and Dante™ digital audio network cards available
- Proprietary Bose ESPLink cards available for digital audio distribution from Bose ESP processors

ControlSpace Designer software

Bose ControlSpace Designer software provides complete setup, configuration, control and monitoring for PowerMatch amplifiers. While the front-panel interface allows basic setup, ControlSpace software allows realtime control of EQ, limiting and delay settings for each channel, in addition to status monitoring of amplifier operation.



PM8500 channel recommendations for driving RoomMatch modules



2 channels
for full-range modules



4 channels
for RMS215 subwoofer modules



8 Channels
for RMS218 VLF subwoofer modules

Progressive directivity arrays for almost every room size, shape or budget

With 42 available coverage patterns, designers can customize RoomMatch® arrays to exact venue dimensions – providing unparalleled configurability to deliver best-in-class sound for any room in every seat.

Example RoomMatch array configurations



Full-range	2	2	4	4	6	4	4	8
RMS215 sub	0	1	0	2 cardioid	2 rear	0	2	0
RMS218 sub	0	0	0	0	0	2	1	0



Ground stack arrays

Available rigging accessories allow ground stack arrays of RoomMatch modules for occasional movement to different locations, such as temporary side-stage fills for performing arts centers that require differing seating configurations.



Subwoofer arrays

Equal width allows all RoomMatch modules to be used with rigging frames. Frame extender bars allow RMS215 subwoofers to form cardioid bass arrays with presets available in ControlSpace® and Modeler® software. Additionally, the RMS215 subwoofers can be combined with RMS218 VLF subwoofers for 4-way systems.

RoomMatch® array module specification summary



	RM5505	RM5510	RM7020	RM9040	RM12060	RMS215	RMS218
Single Module Performance							
Frequency Response (+/- 3 dB) (1)	60 – 16k Hz	60 – 16k Hz	60 – 16k Hz	60 – 16k Hz	60 – 16k Hz	48 – 250 Hz	30 – 200 Hz
Frequency Range (-10 dB)	55 – 16k Hz	55 – 16k Hz	55 – 16k Hz	55 – 16k Hz	55 – 16k Hz	40 – 280 Hz	25 – 250 Hz
Coverage Pattern, Horizontal	55°	55°	70°	90°	120°	omni	omni
Coverage Pattern, Vertical	5°	10°	20°	40°	60°	omni	omni
Other Horizontal Patterns Available	70°, 90°, 120°, asymmetrical	70°, 90°, 120°, asymmetrical	55°, 90°, 120°, asymmetrical	55°, 70°, 120°, asymmetrical	55°, 70°, 90°	none	none
Long-Term Power Handling, 500-hour, LF/HF (2)	500 W /150 W	500 W /150 W	500 W /150 W	500 W /150 W	500 W /150 W	500 W + 500 W	750 W + 750 W
Calculated Maximum SPL @ 1 m, peak (3)	139 dB	139 dB	138 dB	136 dB	133 dB	139 dB	140 dB
Transducers							
Low Frequency	2 x Bose LF10	2 x Bose LF10	2 x Bose LF10	2 x Bose LF10	2 x Bose LF10	2 x Bose LF15	2 x Bose LF18
High Frequency	6 x Bose EMB2	6 x Bose EMB2	6 x Bose EMB2	6 x Bose EMB2	6 x Bose EMB2	none	none
Physical							
Dimensions (H x W x D), inches	16.9" x 39.1" x 23.6"	17.9" x 39.1" x 23.6"	20.0" x 39.1" x 23.6"	24.0" x 39.1" x 23.6"	27.5" x 39.1" x 23.6"	17.6" x 37.1" x 21.5"	21.0" x 37.0" x 41.5"
Dimensions (H x W x D), mm	428 x 993 x 598	455 x 993 x 598	509 x 993 x 598	610 x 993 x 598	700 x 993 x 598	446 x 942 x 546	534 x 940 x 1055
Net Weight	123 lb (55.8 kg)	123 lb (55.8 kg)	123 lb (55.8 kg)	124 lb (56.2 kg)	125 lb (56.7 kg)	132 lb (59.9 kg)	203 lb (92.1 kg)

Notes:

1. Frequency response and range measured on-axis with recommended active EQ in an anechoic environment.
2. Bose® extended-lifecycle test using pink noise filtered to meet IEC268-5, 6-dB crest factor, 500-hour, full-power duration.
3. Calculated maximum SPL, array position for full-range HF section, ground stack for subwoofers, no EQ.

For additional specifications and application information, please visit pro.bose.com. Specifications subject to change without notice.

Industry awards



InfoComm
Best of Show



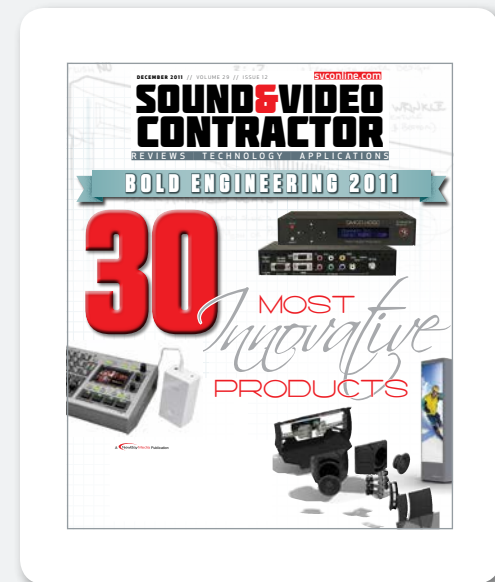
IDEA 2012 Bronze Award
Commercial & Industrial Products



EMEA InAVation Awards 2012 Technology Winner
Most Innovative Commercial Loudspeaker



WFX Worship Facilities Conference and Expo New Product Technology Awards
Best Large Format Loudspeaker



Sound & Video Contractor
30 Most Innovative Products 2011

About Bose Professional Systems Division

Professional sound systems demand an uncommon expertise and specialized products. Bose Professional Systems Division is a dedicated group of engineers, product managers, technical support specialists and customer service teams that are focused on the professional audio markets. For more than three decades, the Professional Division has developed innovative loudspeakers, electronics and software to meet the needs of demanding professional applications.

Bose Professional products are sold only through authorized pro-audio dealers, AV-system integrators and distributors. We provide substantial support for our distribution network, including product technical information, system design support and after-sale support. Bose® sound is found throughout the world in performing arts centers, theaters, houses of worship, stadiums, restaurants, retail stores, corporate buildings and hospitality establishments.

About Bose Corporation

Bose Corporation was founded in 1964 by Dr. Amar G. Bose, professor at the Massachusetts Institute of Technology. Today, the company is primarily known for its research in acoustics, which has produced inventions that have improved the performance of:

- Loudspeakers
- Home entertainment systems
- Automotive music systems designed for the interior acoustics of each car model (first introduced by Bose)
- Noise reducing headsets for pilots and the public (first introduced by Bose)
- Sound in public spaces
- The production of sound for musicians requiring electronic amplification of their instruments
- Materials testing and durability simulation instruments for biomedical applications
- Driver suspension systems for heavy-duty trucks



BOSE[®]
Better sound through research[®]