RENKUS-HEINZ

Reference Point Arrays

P12
Non-Powered

PN12
Powered

PN12R
RHAON Empowered

HIGH-PERFORMANCE 2-WAY REFERENCE POINT ARRAYS

12” Woofer - 1” HF Complex Conic Loudspeakers

Uncompromised Performance - Unequalled Versatility

P12, PN12 and PN12R series Reference Point Arrays use advanced technology and application-driven engineering to bring live sound closer to the ultimate reference point: reality. The process produces fully integrated electro-acoustic systems with signal processing, amplification, flying hardware and cabling all optimized to deliver superior fidelity and coverage. Wherever the superior performance demanded by the audiences and operators cannot be met with a single loudspeaker, self-powered PN/PN12R PowerNet and non-powered P series Reference Points Arrays are the choice for reference quality performance.

All PN12R RPAs are RHAON empowered for flexible analog and digital signal distribution and loudspeaker management and control over a CAT 5 Ethernet network.

Applications

- Virtually any application where outstanding sonic performance is required and sound level and coverage needs cannot be satisfied with a single loudspeaker.
- Sound reinforcement systems in Houses of Worship, Performing Arts Centers, Sports Arenas, Theaters and other similiar venues.
- Large Audio Visual playback systems.

PN-1 & PN-1R PowerNet Amplifiers

The PN-1, the heart of PowerNet performance, is a new kind of intelligent electronics system. It combines low feedback Class A/B amplification and comprehensive signal processing into a single compact unit. Crossovers and parametric EQ are integrated into the signal path. Loudspeaker specific processing senses when output levels are about to damage the system and limits them to safe levels.

RHAON The PN-1R adds RHAON, the Renkus-Heinz Audio Operations Network. RHAON empowers you with full control over digital audio distribution, loudspeaker specific DSP and remote control/ monitoring -- all using standard Ethernet hardware and cable.

The PN-1R has dual analog inputs, dual CobraNet inputs and an AES3id serial input. The onboard DSP is easily configured using RHAON software; it includes eight bands of parametric EQ, high and low shelving filters, delay and input level control. Critical operating parameters such as signal clipping, amplifier output voltage and current, and temperature are continually monitored with automatic alert functions.

If you need a reference quality 12-inch 2-way system, order an externally powered P12 or self-powered PN12 series RPA. If you need Ethernet-based audio operations networking, order a RHAON empowered PN12R series RPA.

- **Compact 2-Way Reference Point Arrays**
  Factory assembled and tested PPA arrays provide “plug ‘n play” systems assuring consistent performance. Each RPA is designed, measured and installed as a complete system assuring optimum performance.
- **Flexible Input Configurations**
  Choose external amplification or go self-powered with either the PN-1 PowerNet amplifier or with the RHAON empowered PN-1R for flexible analog and multi-channel digital signal distribution, computer control and supervision.
- **Choice of Horizontal Coverage Patterns**
  Choose between smooth, virtually lobe-free 80°, 120° and 160° Horizontal by 60° Vertical coverage patterns.
- **Exceptional Performance**
  Full-range 55 Hz to 18 kHz performance.
- **Exclusive Complex Conic Design**
  Provides constant beamwidth/directivity without the problems of conventional rectangular horns.
- **TRAP (True Array Principle) Design**
  Practically eliminates interference between adjacent loudspeakers that combine seamlessly to produce a phase aligned wavefront virtually free of lobing.

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Renkus-Heinz Audio Operations Network

RHAON is the first practical system to combine digital audio distribution with individual control and supervision of self-powered loudspeaker systems. RHAON uses standard Ethernet hardware, advanced CobraNet technology and onboard DSP (Digital Signal Processing) to let you communicate with and control an array from a remotely located laptop or desktop PC.

RHAON integrates loudspeakers, amplifiers, signal-processors, audio distribution and remote supervision into a single easy-to-manage network that sets new performance standards in every area of audio operations. Signal connections are faster, with fewer errors. Signal processing is specific to every loudspeaker. System setup is flexible yet powerful with user-configurable GUI software.

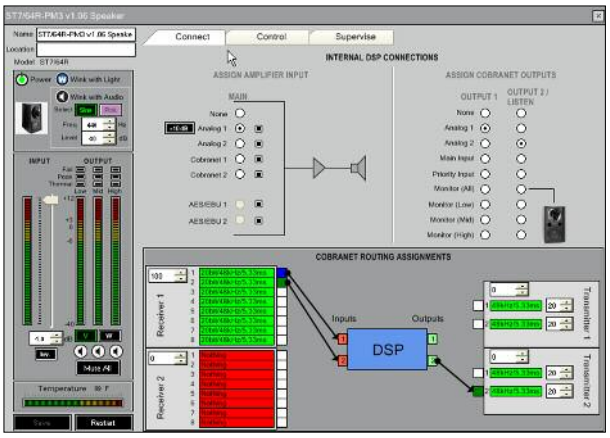
RHAON gives you Maximum Control of:

– Real time digital audio distribution over standard Ethernet networks using proven CobraNet technology to deliver multiple channels of high quality digital audio over a single CAT 5 cable.

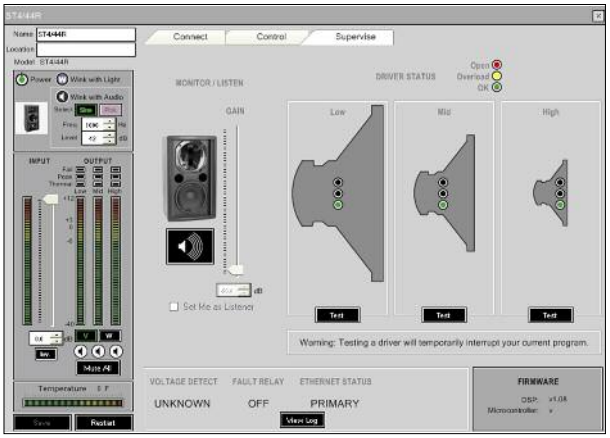
– A powerful DSP inside each loudspeaker on the Ethernet network that includes eight bands of parametric EQ, high and low frequency shelving filters, input level control, muting and delay.

– Monitoring of each loudspeaker's critical operating parameters such as signal clipping, amplifier output voltage and current and temperature with automatic alert functions.

– A user friendly Windows GUI that simplifies network setup, system configuration, loudspeaker management and control.



RHAON Software - Connect Screen



RHAON Software - Supervise Screen

True Array Principle (TRAP) Design

No matter how good a single conventional loudspeaker sounds, once it is used in a cluster or array, interaction with its neighboring loudspeakers produces undesirable lobing or comb filtering - which creates a profusion of "hot spots" and "dead spots" in the overlap areas, along with disturbing variations in frequency response from one location to another.

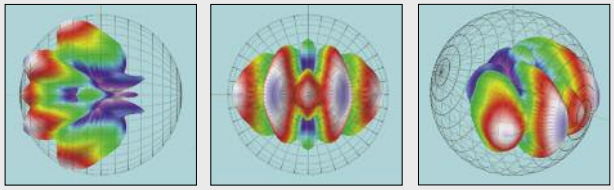
Electronics can improve the performance of any array. But only TRAP loudspeakers are engineered from the inside out to produce a single source of sound even in large arrays. The reason ordinary loudspeakers can't help interfering with each other in clusters is that their acoustic centers are widely spaced.

That's why we designed TRAP horns and enclosures to align the acoustic centers. The horn angles are matched to the trapezoidal enclosures, which are designed to place the drivers as close together as physically possible. All sound originates from the same spot, so interference between adjacent horns is practically eliminated.

Arrays of TRAP loudspeakers produce a phase aligned wavefront with uniform frequency response across the coverage area. Below the horn's cutoff frequency, RPA signal processing eliminates low frequency interference and can improve pattern control. The result is great sound at every seat -- no more "hot spots" and "dead spots" in the overlap areas and disturbing variations in frequency response from one location to another.

Conventional Cluster Performance

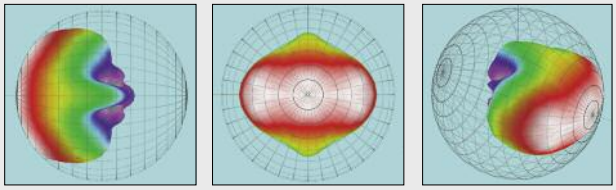
Overhead View | Front (on axis) View | 3-D View



In clusters, conventional loudspeakers can't help interfering with each other.

TRAP (True Array Principle) Cluster Performance

Overhead View | Front (on axis) View | 3-D View



TRAP loudspeakers work together to produce a coherent wavefront.

Reference Point Arrays

Cut the complexity of working with multi-speaker clusters until they're as easy to work with as a single loudspeaker. That's the concept driving Renkus-Heinz engineering as we develop each new Reference Point Array (RPA).

When the entire system comes from one source, it can function as a single acoustic source. RPA integrated systems engineering expands on our proprietary TRue Array Principle (TRAP) that practically eliminates interference between adjacent horns. Complex Conic horns provide constant beamwidth/ directivity without the problems of conventional horns.

We control the location and orientation of each array element with purpose-designed, precision R-Hang hardware. At our automated test and measurement facility, we dial in the parameters for Array-Specific Processing, optimizing low frequency directionality, wavefront coherency and cluster integration.

We make sure that each carefully processed signal is delivered to the right set of transducers with internal intelligent amplification or rack mount amplifier/controllers with pre-configured wiring.

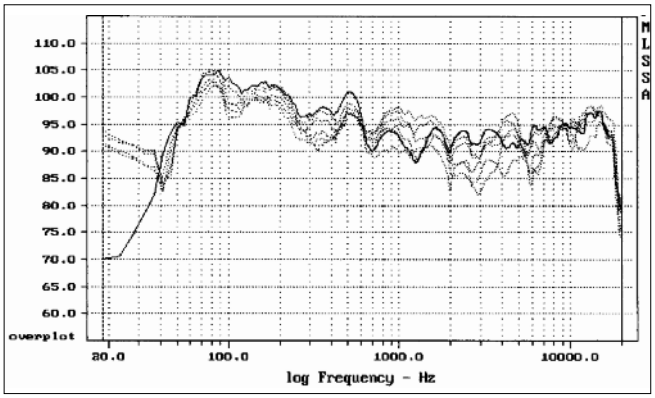
Before we ship any RPA, the entire array is assembled and its performance verified. When your RPA arrives at the job site, all you do is re-assemble the speakers and hardware. Then plug it in, turn it on and walk the room. Like hundreds of designers, operators, owners and audiences around the world, you'll be delighted with the results.

RPA's are the best example of how advanced technologies, real world experience and intelligent system design can provide both uncompromising audio fidelity and unsurpassed practicality - starting with EASE, which includes single-source data for RPA's. You'll save hours of installation and troubleshooting time, while delivering results that are superior to "handmade" arrays using conventional components

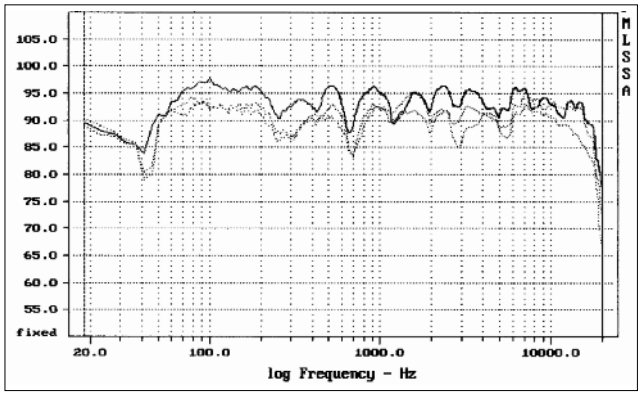
2-wide P/PN12 Array

3-wide P/PN12 Array

4-wide P/PN12 Array



3-wide RPA Array measured without RPA processing.



3-wide RPA Array measured with RPA processing.

TECHNICAL SPECIFICATIONS

P12, PN12 and PN12R Reference Point Arrays

Model	Dispersion (degrees)	Frequency Response	SPL Rating (prog/peak)	Width x Height x Depth (inches / centimeters)	Weight (with hardware)
P12/6-2(T)	80º H by 60º V	55 Hz to 18 kHz	129 / 132 dB	29" x 26 1/2" x 16 1/2" (73.7 cm x 67.3 cm x 41.9 cm)	124 Lbs / 56.2 kg
P12/6-3(T)	120º H by 60º V	55 Hz to 18 kHz	131 / 134 dB	39 1/4" x 26 1/2" x 17 1/2" (99.7 cm x 67.3 cm x 44.5 cm)	189 Lbs / 85.7 kg
P12/6-4(T)	160º H by 60º V	55 Hz to 18 kHz	132 / 135 dB	45 1/2" x 26 1/2" x 22 1/2" (115.6 cm x 67.3 cm x 54 cm)	252 Lbs / 114.3 kg

Externally powered P12/6-2 RPAs require a dual-channel amplifier; PN12/6-3 & -4 RPAs require two dual-channel amplifiers.. The amplifiers should have the same voltage gain; minimum recommended RMS power ratings are 500 W/ch @ 8 ohms, 750 W/ch @ 4 Ohms, 900 W/ch @ 2 Ohms. An associated processor/controller is also required.

PN12/6-2(T)	80º H by 60º V	55 Hz to 18 kHz	128 / 131 dB	29" x 26 1/2" x 16 1/2" (73.7 cm x 67.3 cm x 41.9 cm)	144 Lbs / 56.2 kg
PN12/6-3(T)	120º H by 60º V	55 Hz to 18 kHz	130 / 133 dB	39 1/4" x 26 1/2" x 17 1/2" (99.7 cm x 67.3 cm x 44.5 cm)	219 Lbs / 99.3 kg
PN12/6-4(T)	160º H by 60º V	55 Hz to 18 kHz	131 / 134 dB	45 1/2" x 26 1/2" x 22 1/2" (115.6 cm x 67.3 cm x 54 cm)	292 Lbs / 132.5 kg
PN12/6-2R(T)	80º H by 60º V	55 Hz to 18 kHz	128 / 131 dB	29" x 26 1/2" x 16 1/2" (73.7 cm x 67.3 cm x 41.9 cm)	144 Lbs / 56.2 kg
PN12/6-3R(T)	120º H by 60º V	55 Hz to 18 kHz	130 / 133 dB	39 1/4" x 26 1/2" x 17 1/2" (99.7 cm x 67.3 cm x 44.5 cm)	219 Lbs / 99.3 kg
PN12/6-4R(T)	160º H by 60º V	55 Hz to 18 kHz	131 / 134 dB	45 1/2" x 26 1/2" x 22 1/2" (115.6 cm x 67.3 cm x 54 cm)	292 Lbs / 132.5 kg

Self-powered PN12 and PN12R series RPAs operate from 120 or 240 V AC, 50-60 Hz; each cabinet requires 4 Amps at 120 V and 2 Amps at 240 V. Refer to PN-1 amplifier specifications below for additional details.

PN-121, PN121R & PNX121T/A LOUDSPEAKERS

Sensitivity: PN121 - 1.4 Volt for RPO
PN121R; 1.0 Volt for RPO
PNX121T/A: 98 dB (1W/1m)
Max SPL
PN121 & PN121R: 125 dB program, 128 dB peak
PNX121T/A: 126 dB program, 129 dB peak

Dispersion: 60° H by 40° V, 90° H by 40° V
Freq. Response: 55 Hz to 18 kHz
HF Driver: 1" SSD1802-8 driver, 8 Ohms; 40 W RMS, 80 W program
LF Driver: 12" model SSL12-9, 300 W RMS @ 4 Ohms, 600 W program
Enclosure: Multi-ply hardwood, perforated metal grille

Power – PN121 & PN121R: 115 V AC or 230 V AC, 50/60 Hz
PNX121T/A: Highs; 80 W pgm at 8 Ohms
Lows; 600 W pgm at 4 Ohms
Connectors – PNX121T/A: Screw terminals & looping Neutrik 4-pin SpeakOn style connectors
Finish: Black, white or custom color paint
Natural (unfinished); Weather Resistant
PN Weather Resistant Kit

Dimensions: 26 1/2" H x 15 1/2" W x 13 3/4" D (67.3 cm x 39.4 cm x 34.9 cm)

Weight– PN121 & PN121R: 67 Lbs (30.4 Kg) net
PNX121T/A: 57 Lbs (25.9 Kg) net

PN-1 AMPLIFIER

Power Rating: 300 W RMS @ 8 Ohms
Freq. Response: +0.0, -.5 dB, 20 Hz to 20 kHz
THD Distortion: < 0.02% typical
Hum & Noise: <100 dB (A weighted)
Damping: >100
Input: 10K Ohm balanced differential
Sensitivity: 1.0 V for RPO
CMR 74 dB

Controls: Gain (screwdriver adjustable)
Connectors
Input: Looping XLR; female in, male out (pin 1 chassis, pin 2 +, pin 3 -)
Power: EC Power connector
Power: 90-136 VAC or 180-260 VAC 50/60Hz.
4 A @ 120 V, 2 A @ 240 V
Idle current: 300 mA @ 120 V; 150 mA @ 240 V
Max inrush current: 10 A

PN-1R RHAON EMPOWERED AMPLIFIER

The PN-1R amplifier is identical to the PN-1 except for the addition of the RHAON Network Interface; additional capabilities include:

Inputs: CobraNet; dual RJ45 connectors;accept CAT 5 copper cable.
AES/EBU Phoenix connectors;
Analog Phoenix connectors

Digital Format: 16, 20 or 24 bit PCM; 48 or 96 kHz sample rate; selectable Network Latency.
Protection: Soft & Peak Limiting, Excursion Control & Thermal Regulation

For additional details on the RHAON Audio Operations Network, refer to Renkus-Heinz brochure # RH 606

Note: All analog inputs and outputs comply with AES Standard 45-2005 on interconnecting, grounding and shielding.

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