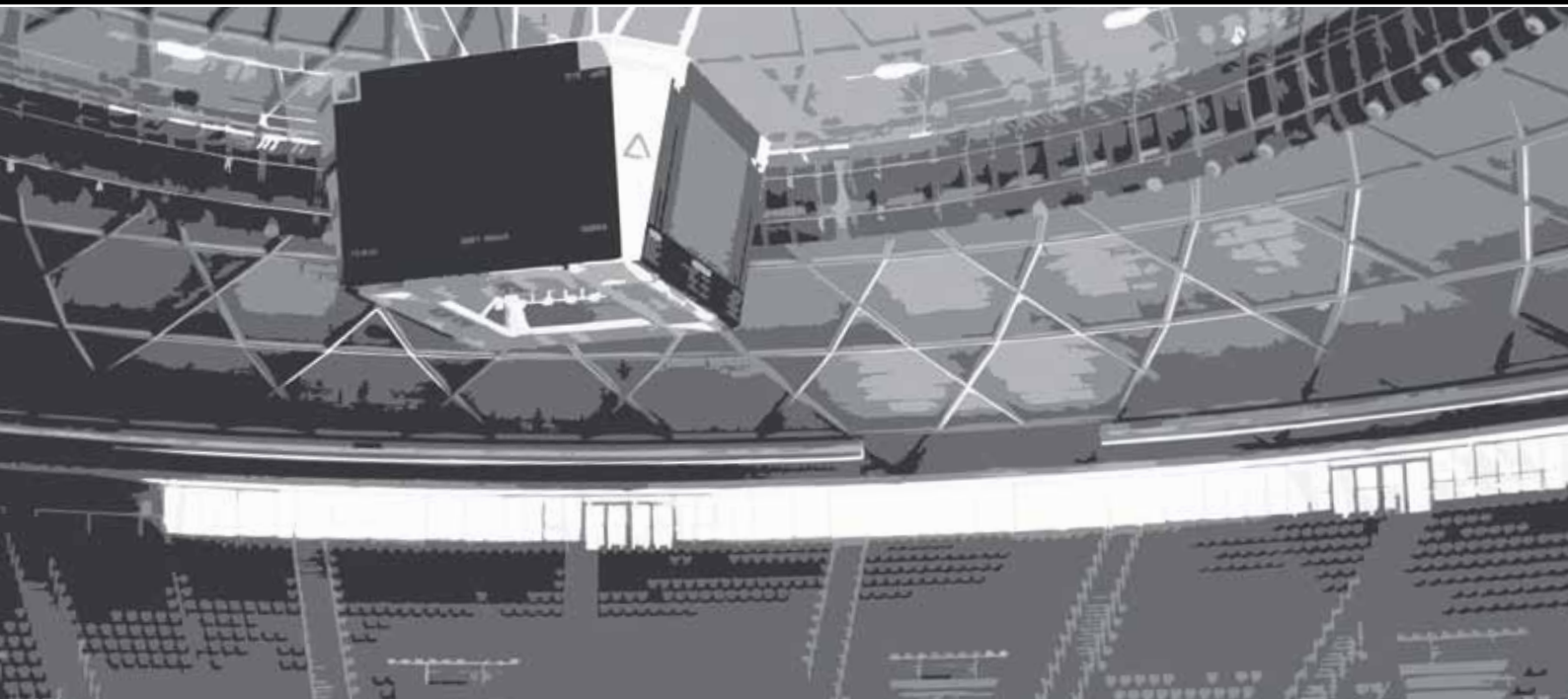


**INSTALLED SOUND
SPEAKER SYSTEMS**

P SERIES APPLICATION GUIDE



the rules of sound

RCF

P 2110

WEATHERPROOF COAXIAL TWO WAY SPEAKER

- Two-way, full-range 95 Hz to 20 kHz
- LF 1 x 10" HF 1 x 1"
- 200 W RMS, (800 W PEAK) 16 Ohm
- System Sensitivity 95 dB 1 W @ 1 m
- Coverage pattern: 90° x 40°
- For short throw applications and down fill



P 3115

WEATHERPROOF COAXIAL TWO WAY SPEAKER

- Two-way, full-range 75 Hz to 20 kHz
- LF 1 x 15", HF 1 x 1"
- 300 W RMS, (1200 W PEAK) 16 Ohm
- System Sensitivity 98 dB 1 W @ 1 m
- Coverage pattern: 90° x 60°
- For short to medium throw applications like gyms and small seating areas



P 6215

WEATHERPROOF COAXIAL TWO WAY SPEAKER

- Two-way, full-range 75 Hz to 20 kHz
- LF 1 x 15", HF 1 x 2"
- 600 W RMS, (2400 W PEAK) 8 Ohm
- System Sensitivity 100 dB 1 W @ 1 m
- Available coverage pattern: 60° x 60°
- For medium throw applications like sport arenas, stadiums...



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1 Application Guide Introduction

This application guide shows system design examples by using the RCF ACUSTICA P Series Speakers. Included are typical speaker layouts using single loudspeakers and speaker clusters suited to different environments and installations.

We hope that this application guide may assist you in a proper speaker system design.

2 P SERIES General description

P-Series products are weatherproof full range, wide-dispersion, coaxial two way loudspeakers offering substantial power and efficiency for a variety of professional indoor and outdoor applications.

P series loudspeaker systems belong to the "RCF ACUSTICA" line, designed for fixed installation.

The cabinet is a single piece moulded in medium density polyethylene, fully UV protected. The cabinet is equipped with 12 x M 10 on P 3115 and P 6215 (12 x M8 on P 2110) brass inserts and provided with a stainless steel U-Bracket and pair of spacers for 90° mounting. The front logo is in aluminium and rotatable. The grille is custom perforated aluminium with open-cell fibres and water repellent woven fabric backing.

P series loudspeakers can be used stand-alone or mounted in cluster of up to 4 cabinets, in order to get more SPL and longer throw and/or wide coverage. Specific accessories are available to install the speakers with differing angles between them.

The P Series speakers:

Code	Model	Description
130 00 125	P 2110	High efficiency weather-proof speaker system, coaxial 10" +1", 200 W RMS
130 00 135	P 3115	High efficiency weather-proof speaker system, coaxial 15" +1", 300 W RMS
130 00 131	P 6215	High efficiency weather-proof speaker system, coaxial 15" +2", 600 W RMS

The P Series accessories:

Code	Model	Description
133 60 095	AC P10A-BR	Cluster brackets for P2110 (including 4 brackets and parts to link 2 speakers)
133 60 094	AC P15A-BR	Cluster brackets for P3115/P6215 (including 4 brackets and parts to link 2 speakers)

3 Installation Guide

Loudspeakers have to be installed securely.

Make sure that the supporting structure (walls / ceilings) has the necessary mechanical characteristics for the loudspeaker weight, without the risk of a fall that could produce damage or cause injuries.

Use fastening elements suitable for walls / ceilings (e.g. screw anchors for bricks, screw anchors for concrete, etc.). After connecting P2110 or P3115 loudspeaker, insulate all unused wires!

3.1 100-Volt Operation

P2110 and P3115 include an internal 100 V transformer (60W and 120W respectively), different power taps can be chosen connecting different wires: black wire for full power, grey wire for half power. Brown wire must be connected to the amplifier common output.

Model	Black 100 V wire	Grey 100 V wire
P 2110	60 W (166 Ω)	30 W (333 Ω)
P 3115	120 W (83 Ω)	60 W (166 Ω)

Model	Black 70 V wire	Grey 70 V wire
P 2110	30 W (163 Ω)	15 W (326 Ω)
P 3115	60 W (81 Ω)	30 W (163 Ω)

For normal low impedance connection connect the amplifier output “-” to the brown wire, “+” to the blue wire. It’s recommended to keep speaker lines well separated from mains cables or microphone cables to avoid inductive phenomena that may cause hum or noises.

3.2 Choosing the right amplifier

In constant voltage systems the sum of the nominal powers of all the speakers connected in parallel to the same line must not exceed the nominal output power of the amplifier.

For example, up to four P3115 or eight P2110 operating at full power (120W and 60W respectively) can be connected to a 480 W power amplifier, such as the RCF model UP 4482, alternatively, twice the amount of speakers running at half power (grey wire) could be used.

In low impedance systems the overall impedance of the speakers connected to the same output (calculated taking in account series/parallel connections) must not be lower than the nominal output impedance of the amplifier.

For example a P6215 speaker can be connected to each output of an RCF HPS 1500 power amplifier, but it’s also possible to connect two of them in parallel (total impedance 4 Ω) per channel, in that case they will be able to get slightly less power from the amplifier. In case the amplifier can give an output power that is higher than the power rating of the speakers (for example if you connect a couple of P6215 to a HPS 2500) it’s important not to push the amplifier to the maximum power to avoid distortion or damages to the speakers.

3.3 Mounting Brackets

Each speaker includes U brackets for the installation in Horizontal or Vertical position.

Horizontal U bracket installation: fix the loudspeaker to the U bracket by tightening the two bolts (M8 on P 2110, M10 on P 3115 and P 6215) into the two loudspeaker central holes.

Vertical U bracket installation: put the two shims on the loudspeaker and fix them by tightening two pairs of bolts (M8 on P 2110, M10 on P 3115 and P 6215).

Then fix the loudspeaker to the U bracket by tightening other two bolts into the two loudspeaker central holes.

3.4 Aiming of P-Series Loudspeakers

The aiming of the P Series speakers is possible while fixing the U brackets. Before tightening the two bolts, adjust the loudspeaker tilt and then (when you are sure of the proper angle) fix that position through thread-forming screws into the U bracket little holes next to the central hole for bolts.

3.5 Conversion to sealed box for outdoor installation

By default, P series loudspeakers are vented boxes (bass-reflex). Yet, every loudspeaker can be converted to a sealed box for outdoor application (in order to get IP 55 protection) by proceeding as following:

- Take off the loudspeaker front grille by removing the eight screws.
- Cover the four reflex ports (the holes) by using the dedicated plugs (to be fixed each with three threadforming screws).
- Re-mount the loudspeaker grille.

3.6 Natural and Artificial Echoes

Outdoor, it's common for sound to be reflected by a wall or a building. If a listener hears a single reflection 50 milliseconds or more after the direct sound, he will perceive it as an annoying echo that reduces intelligibility. It's possible also to perceive an "artificial echo" by separating two loudspeakers so that a listener hears the second loudspeaker at least 50 milliseconds after they hear the first loudspeaker. There's no reflection here but the effect is the same of an unwanted echo.

To avoid natural echoes, try to aim loudspeakers away from walls or buildings. To avoid artificial echoes, use a point source or distributed design as illustrated in this Applications Guide. When it's necessary to split the loudspeakers, try to avoid overlapping coverage. That is, to the possible extent, each listener should hear only one loudspeaker. Imagine an outdoor system at a sports facility where the speaker is located 11 m or more from the loudspeakers. The announcer will hear his or her own voice. Then, about 35 milliseconds later, the announcer will hear his/her own voice again as an echo! Although a broadcast professional or other trained announcer may be able to ignore this echo, most people find it difficult to speak in this situation. To minimize the problem, the announcer should stay in a closed room. Alternatively, give the announcer a local monitor loudspeaker or a set of headphones so he/she can hear his own voice strongly. This masks the echo and minimizes the nuisance.

3.7 Notes on placement

In many cases P series speakers are installed in big environments, either indoor or outdoor, quite often highly reverberant. A distributed system design, where speakers are placed homogeneously (for example hanging from the roof) and each part of the audience is kept as close as possible to a loudspeaker, is usually the better way to keep a good intelligibility even in environments with bad acoustic features. In a distributed system it's important not to overlap the areas that are covered from different speakers to avoid artificial echoes. If the speakers are placed as remote repeaters of the sound coming, for example, from a main stage, it's highly recommended to compensate the different path with a properly configured delay device. In some cases a system design based on big central clusters is preferred due to scarcity of rigging points or ease of installation, in that case it's recommended to point correctly the speakers towards the audience avoiding walls or ceilings and to avoid overlaps as much as possible. For proper cluster configurations we hope the following tables may help you.

4 Cluster Mounting

4.1 Description

P series speakers can be mounted in clusters/line arrays using the AC P10-BR (P2110) or AC P15-BR (P3115/P6215) accessories. For each adjacent speaker the following angles can be chosen using different holes: 0°, 10°, 20°, 30°, 40°. Up to 4 speakers can be mounted in a single cluster.

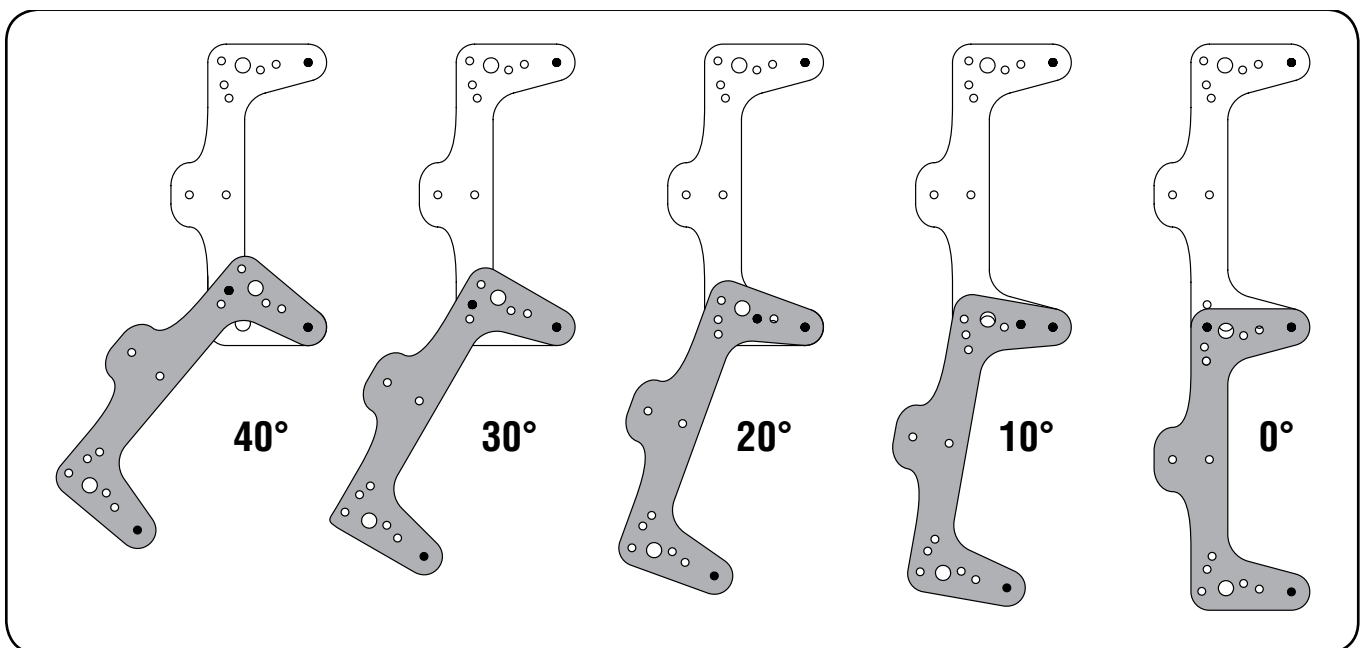
4.2 Setting the angle between loudspeakers

The angle between 2 loudspeakers of a cluster depends on how the U brackets are matched.

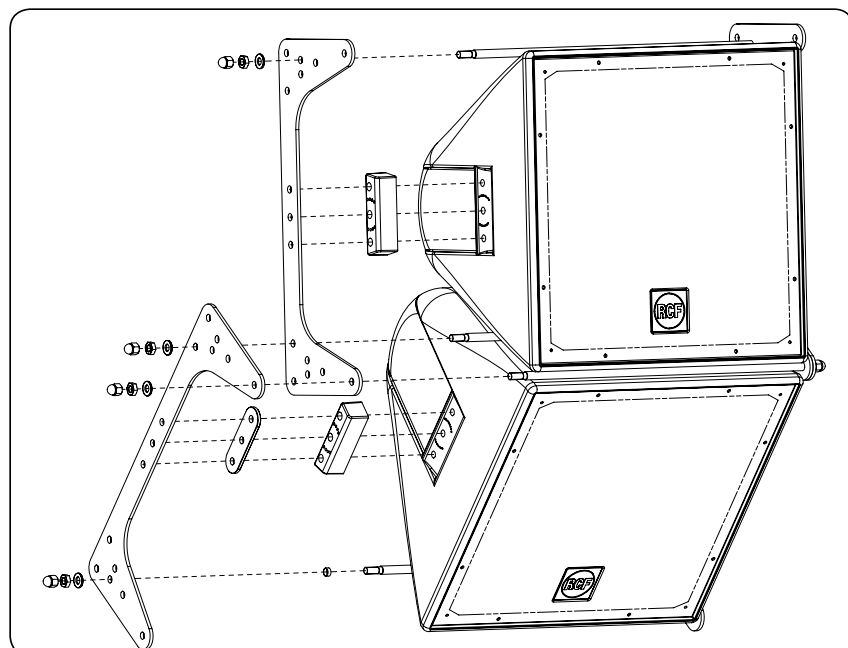
The possible values are:

0° (no angle, the 2 loudspeakers are aimed to the same direction), 10°, 20°, 30° or 40°.

A dedicated acoustic project / study is to be carried out to find the proper angle.

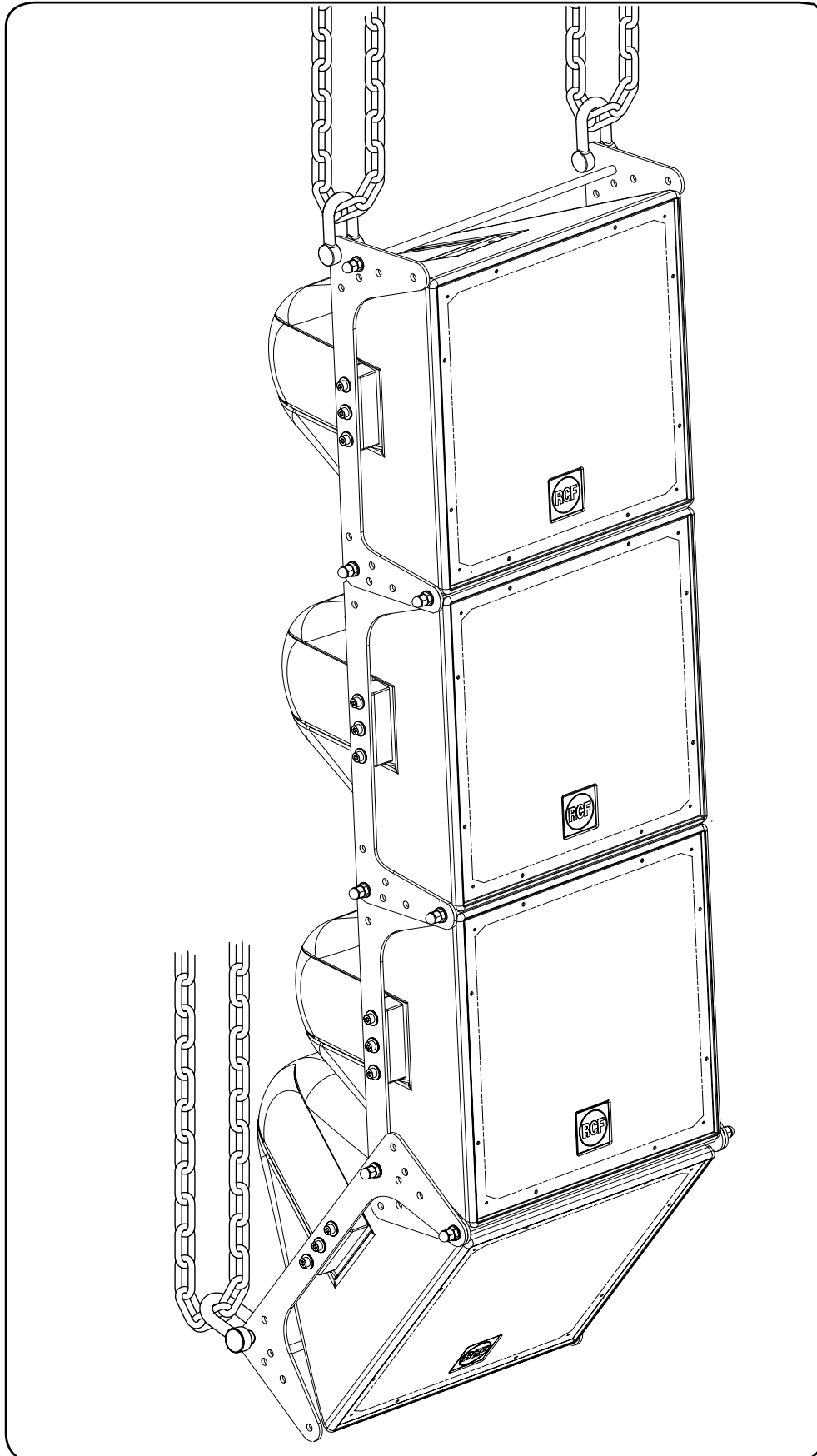


Assemble the loudspeakers to the brackets on both sides, using the accessory which included in each KIT.



4.3 Example of 4 loudspeaker Cluster

For suspended installation with chains (not included) Use 4 M10 D-shackles (not included, 2 on the top and 2 on the bottom; fitted to the rear corner holes of the brackets).



5 System Optimization

5.1 Select the right loudspeaker

Choose a P-Series model powerful enough to provide the needed SPL at the farthest listener's place with an appropriate headroom, we'll take 96dB averaged in the 400 Hz - 4 KHz frequency band as a general reference value. Typical headroom factors are at least 6 dB for voice paging, at least 10 dB for voice reinforcement and at least 20 dB for music reinforcement.

5.2 Throw distance chart single speaker

P 2110 Coaxial speaker 10" +1" 200 W

Model	Pattern (H) - 6 dB	Pattern (V) - 6 dB	Frequency (Hz)	Distance (meters)*								
				16	20	24	28	32	36	40	44	
P 2110	170 °	150 °	500									
P 2110	90 °	70 °	1000									
P 2110	110 °	80 °	2000									
P 2110	80 °	50 °	4000									

P 3115 Coaxial speaker 15" +1" 300 W

Model	Pattern (H) - 6 dB	Pattern (V) - 6 dB	Frequency (Hz)	Distance (meters)*								
				16	20	24	28	32	36	40	44	
P 3115	110 °	110 °	500									
P 3115	60 °	60 °	1000									
P 3115	110 °	120 °	2000									
P 3115	90 °	60 °	4000									

P 6215 Coaxial speaker 15" +2" 600 W

Model	Pattern (H) - 6 dB	Pattern (V) - 6 dB	Frequency (Hz)	Distance (meters)*								
				16	20	24	28	32	36	40	44	
P 6215	110 °	110 °	500									
P 6215	70 °	70 °	1000									
P 6215	80 °	80 °	2000									
P 6215	60 °	60 °	4000									

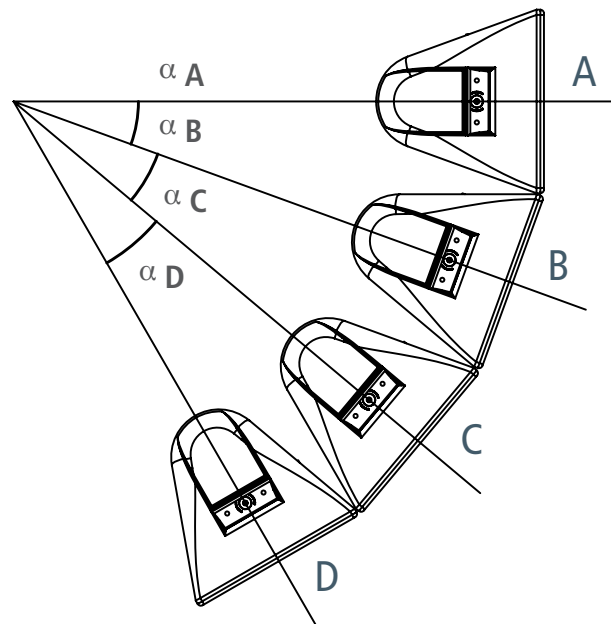
* 96 dB SPL 400Hz-4 kHz with no atmospheric effects; rounded to the nearest 1 meter

5.3 System parameters array P 6215

Array system	Inclination angle (α)	Distance MAX *	Coverage Angle - 6 dB (H - V)				Accessory to be used	Suggested Amplifier
			400 Hz - 4 KHz	500 Hz	1 kHz	2 kHz		
3 - A 3 - B	0° 0°	55 m	110°x60°	70°x35°	80°x60°	60°x70°	AC P15A-BR	HPS 2500
4 - A 4 - B	0° 30°	50 m	110°x60°	70°x40°	80°x70°	60°x90°	AC P15A-BR	HPS 2500
5 - A 5 - B 5 - C	0° 10° 10°	55 m	110°x40°	70°x30°	80°x75°	60°x35°	2 X AC P15A-BR	2 X HPS 2500
6 - A 6 - B 6 - C	0° 0° 30°	60 m	110°x45°	70°x50°	80°x85°	60°x80°	2 X AC P15A-BR	2 X HPS 2500
7 - A 7 - B 7 - C 7 - D	0° 0° 0° 0°	80 m	110°x30°	70°x20°	80°x25°	60°x40°	2 X AC P15A-BR	2 X HPS 2500
8 - A 8 - B 8 - C 8 - D	0° 0° 10° 30°	55 m	110°x40°	70°x55°	80°x25°	60°x35°	2 X AC P15A-BR	2 X HPS 2500
9 - A 9 - B 9 - C 9 - D	0° 10° 10° 10°	65 m	110°x40°	70°x40°	80°x35°	60°x40°	2 X AC P15A-BR	2 X HPS 2500
10 - A 10 - B 10 - C 10 - D	0° 20° 20° 30°	45 m	110°x35°	70°x35°	80°x25°	60°x40°	2 X AC P15A-BR	2 X HPS 2500

* 96 dB SPL 400Hz-4 kHz with no atmospheric effects; rounded to the nearest 1 meter

NOTE: The distances indicated in the table are referred to the frequency range 400Hz-4 kHz.



5.4 System parameters array P 3115

Array system	Inclination angle (α)	Distance MAX *	Coverage Angle - 6 dB (H - V)				Accessory to be used	Suggested Amplifier
			400 Hz - 4 KHz	500 Hz	1 kHz	2 kHz		
13 - A 13 - B	0° 0°	40 m	110°x60°	60°x30°	110°x25°	90°x70°	AC P15A-BR	HPS 2500
14 - A 14 - B	0° 30°	35 m	110°x60°	60°x40°	110°x70°	90°x90°	AC P15A-BR	HPS 2500
15 - A 15 - B 15 - C	0° 10° 10°	40 m	110°x40°	60°x30°	110°x120°	90°x30°	2 X AC P15A-BR	HPS 2500
16 - A 16 - B 16 - C	0° 0° 30°	45 m	110°x45°	60°x50°	110°x85°	90°x85°	2 X AC P15A-BR	HPS 2500
17 - A 17 - B 17 - C 17 - D	0° 0° 0° 0°	50 m	110°x30°	60°x20°	110°x25°	90°x40°	2 X AC P15A-BR	HPS 2500
18 - A 18 - B 18 - C 18 - D	0° 0° 10° 30°	40 m	110°x45°	60°x45°	110°x25°	90°x30°	2 X AC P15A-BR	HPS 2500
19 - A 19 - B 19 - C 19 - D	0° 10° 10° 10°	50 m	110°x40°	60°x40°	110°x130°	90°x40°	2 X AC P15A-BR	HPS 2500
20 - A 20 - B 20 - C 20 - D	0° 20° 20° 30°	30 m	110°x85°	60°x85°	110°x30°	90°x40°	2 X AC P15A-BR	HPS 2500

* 96 dB SPL 400Hz-4 kHz with no atmospheric effects; rounded to the nearest 1 meter

NOTE: The distances indicated in the table are referred to the frequency range 400Hz-4 kHz.

5.5 System parameters array P 2110

Array system	Inclination angle (α)	Distance MAX *	Coverage Angle - 6 dB (H - V)				Accessory to be used	Suggested Amplifier
			400 Hz - 4 KHz	500 Hz	1 kHz	2 kHz		
23 - A 53 - B	0° 0°	25 m	170°x70°	90°x35°	110°x20°	80°x50°	AC P15A-BR	HPS 1500
24 - A 24 - B	0° 30°	20 m	170°x80°	90°x40°	110°x30°	80°x80°	AC P15A-BR	HPS 1500
25 - A 25 - B 25 - C	0° 10° 10°	25 m	170°x50°	90°x30°	110°x80°	80°x60°	2 X AC P15A-BR	HPS 1500
26 - A 26 - B 26 - C	0° 0° 30°	30 m	170°x55°	90°x40°	110°x90°	80°x80°	2 X AC P15A-BR	HPS 1500
27 - A 27 - B 27 - C 27 - D	0° 0° 0° 0°	35 m	170°x40°	90°x20°	110°x20°	80°x50°	2 X AC P15A-BR	HPS 1500
28 - A 28 - B 28 - C 28 - D	0° 0° 10° 30°	25 m	170°x45°	90°x50°	110°x50°	80°x80°	2 X AC P15A-BR	HPS 1500
29 - A 29 - B 29 - C 29 - D	0° 10° 10° 10°	30 m	170°x40°	90°x40°	110°x90°	80°x70°	2 X AC P15A-BR	HPS 1500
30 - A 30 - B 30 - C 30 - D	0° 20° 20° 30°	20 m	170°x80°	90°x90°	110°x130°	80°x115°	2 X AC P15A-BR	HPS 1500

* 96 dB SPL 400Hz-4 kHz with no atmospheric effects; rounded to the nearest 1 meter

NOTE: The distances indicated in the table are referred to the frequency range 400Hz-4 kHz.

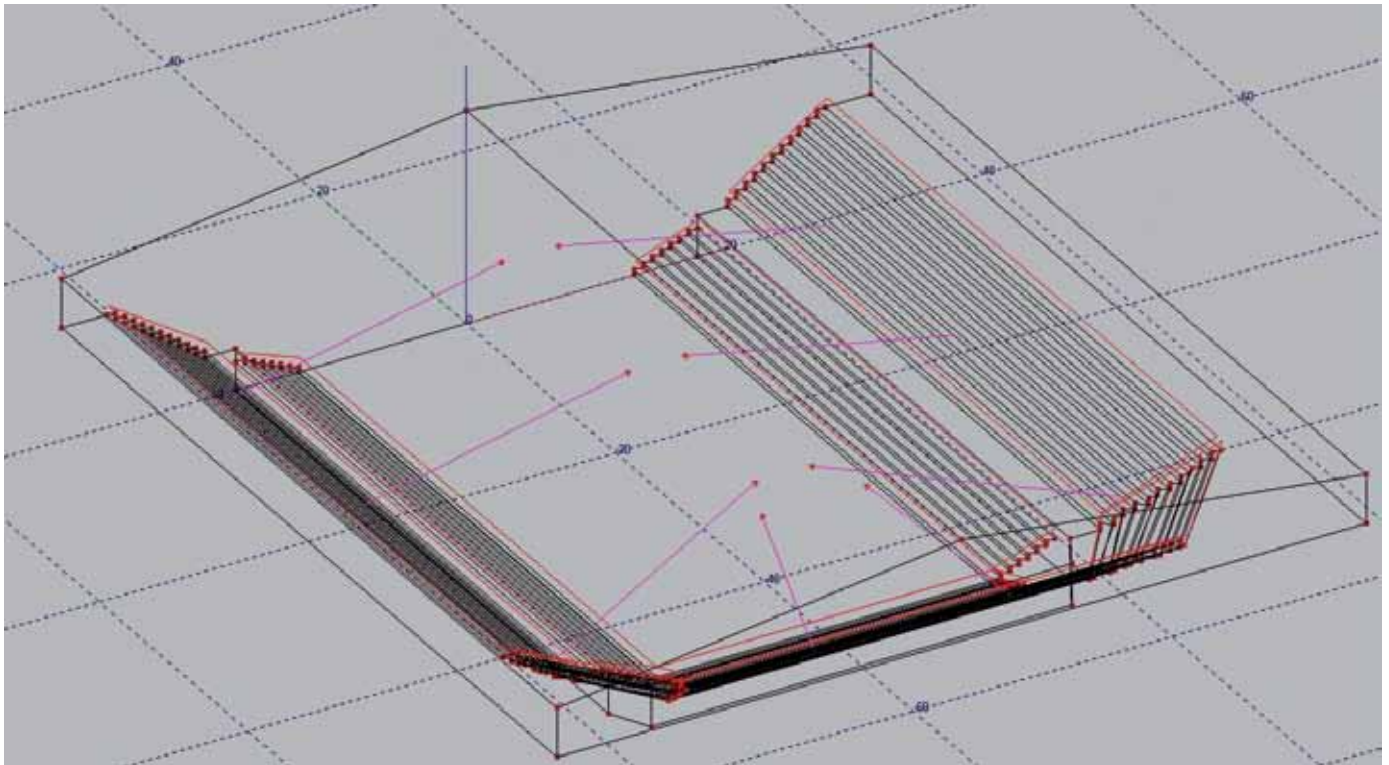
6 Application example


6.1 Sport Hall Field

This installation example refers to a sound system for an indoor sport arena of medium size. The system is mainly used for speech, advertisements, alarm/evacuation messages but also background music when used for other purposes than sport matches.

Speaker Layout

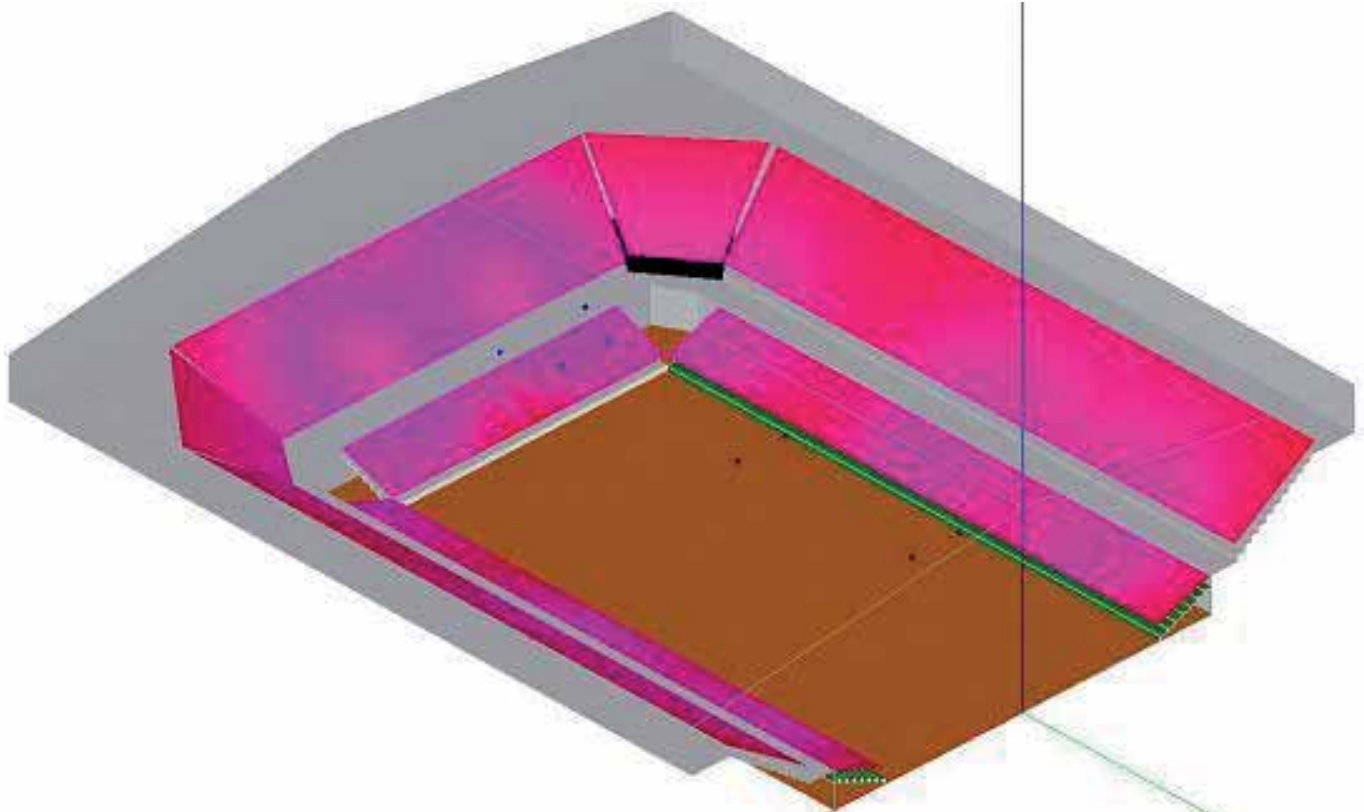
Rigging points are available near the middle axis of the arena, the speakers should be installed there in order to have a good coverage, for this kind of environment we choose ~100dB as a target for the direct SPL in the vocal range of frequencies (400Hz-4KHz). We choose to use 8 x P6215 to have enough power, and we place them in a distributed way to properly cover all the stands and achieve an optimal intelligibility.



Loudspeakers used in the system				
Code	Quantity	Model	Comment	Pictures system
130 00 131	8	P 6215	For the coverage of a complete sport hall	

Speaker system sound level map

The simulation results below show an uniform coverage of all the stands and a satisfying 102 +/- 5dB value of direct SPL in the vocal frequency range.



If requested the play-field can be covered as well from the same rigging points.

Comment

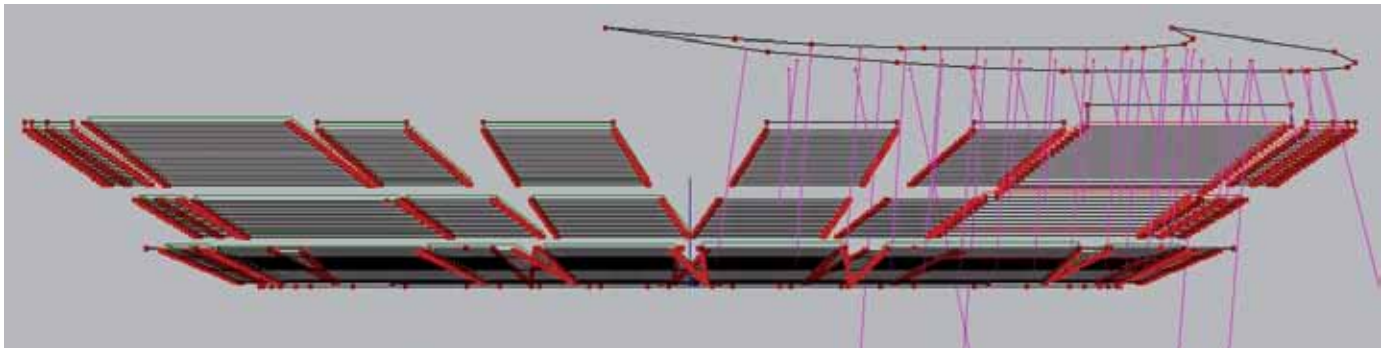
This is a simple example of a well designed sport arena, where all the stands are uniformly covered with a reasonably low amount of P6215 loudspeakers. The speakers are close enough to every part of the stands to ensure a proper intelligibility, even moderately reverberant environment. The cabinets are quite close each other and so the wiring is expected to be easy

6.2 Football Stadium

This installation example refers to a sound system for a big football stadium. The system is mainly used for speech, advertisements, alarm/evacuation messages but also for the national anthems before international matches. Background music distribution should be possible as well when used for other purposes than sport matches.

Speaker Layout

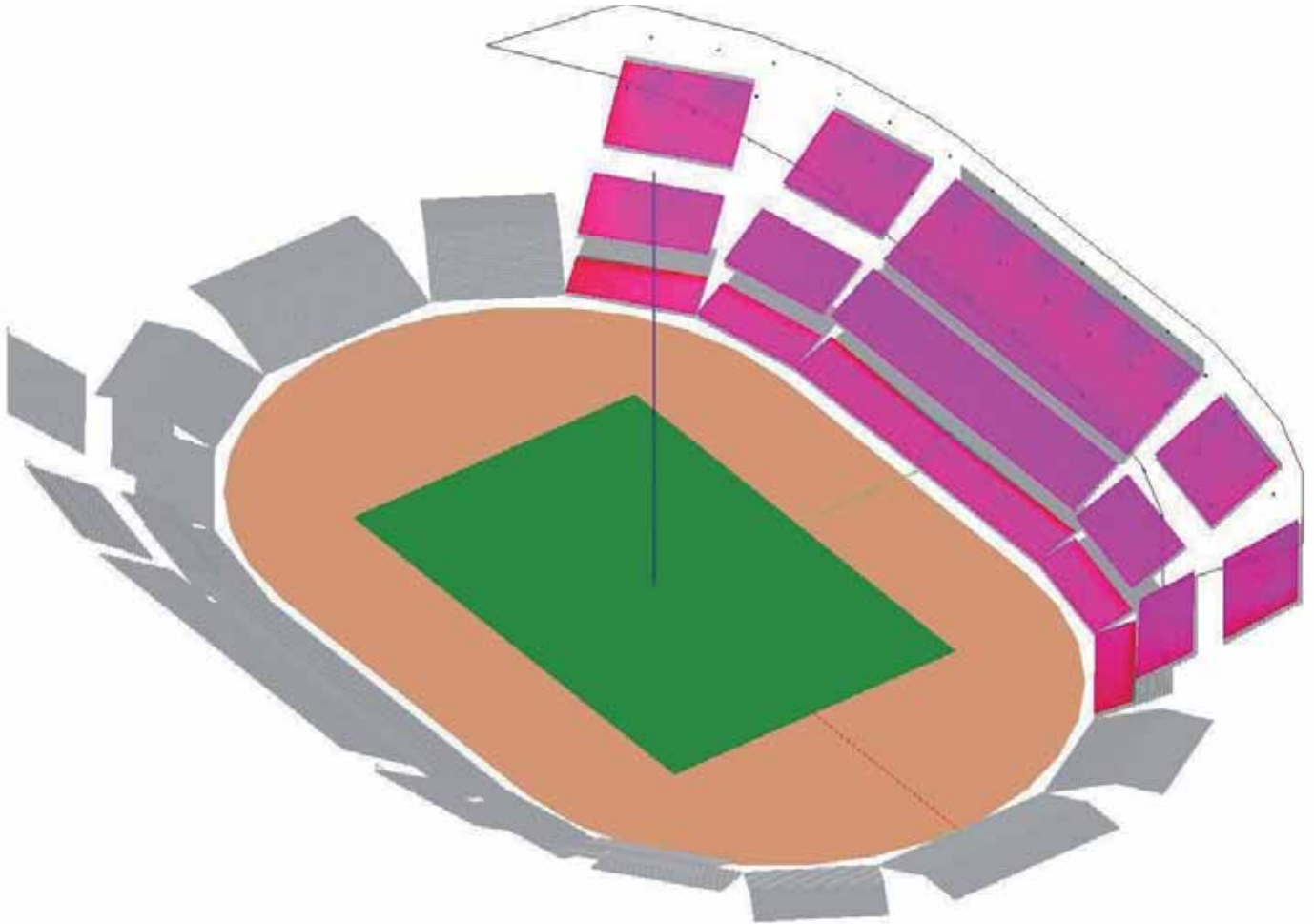
As the speakers can be installed under the coverage we choose a "rain diffusion" set up in order to achieve an uniform coverage and maximize speech intelligibility. The roof is 10 to 40m high over the stands, so we choose to use P6215 to have a proper output power for that distance. Pairs of speakers are spaced by ~15m and homogeneously distributed in order to cover all the area, for this big project we use 44 of them.



Loudspeakers used in the system				
Code	Quantity	Model	Comment	Pictures system
130 00 131	44	P 6215	For the coverage of a complete football stadium	

Speaker system sound level map

The simulation results below show an uniform coverage for all the stands



If requested the field can be covered from the same rigging points as well.

Comment

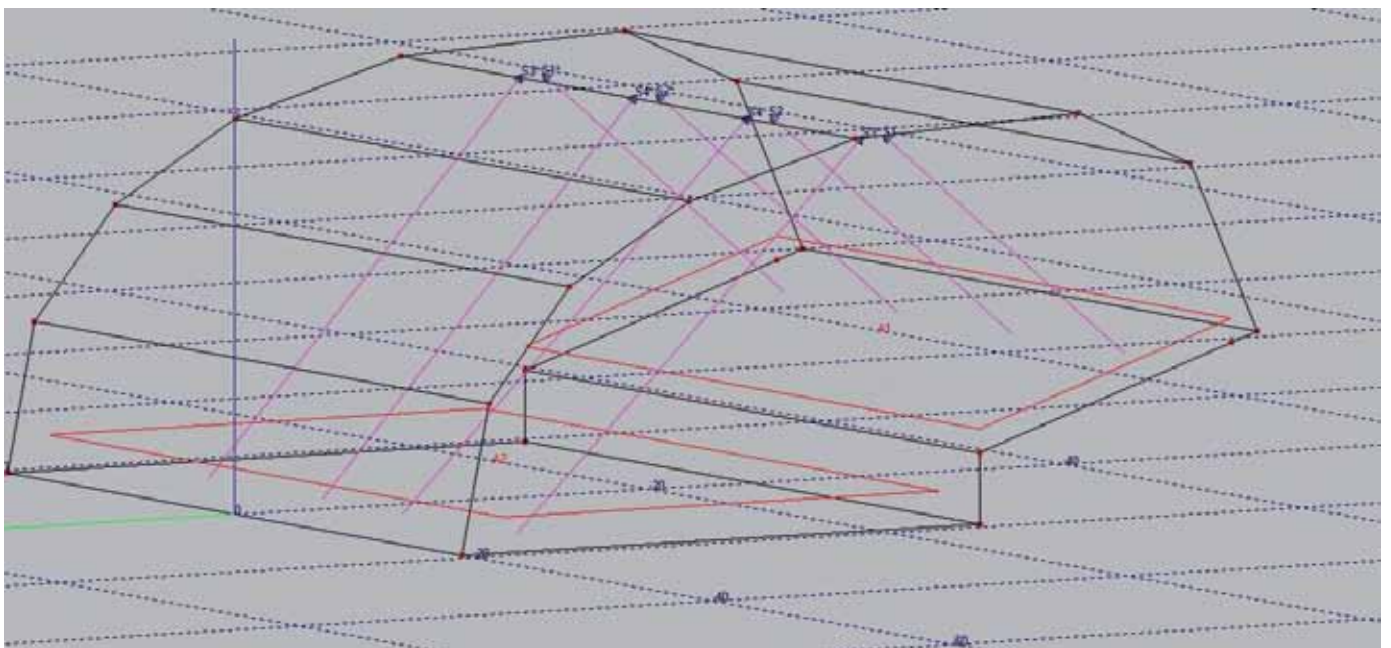
A "rain diffusion" set up guarantees a very uniform coverage, and speech intelligibility is expected to benefit from having each part of the stands as close as possible to a speaker. Some auxiliary loudspeakers may be added to enhance the coverage of the shadowed areas of the lower stands, for example some small P2110's could be easily inserted behind them and driven with a properly delayed signal.


6.3 High School Gym

This installation example refers to a sound system for a multipurpose gym with some stands to be used in case of special events. The system is mainly used for paging inside the school, alarm/evacuation messages, background music and anthems before matches or tournaments

Speaker Layout

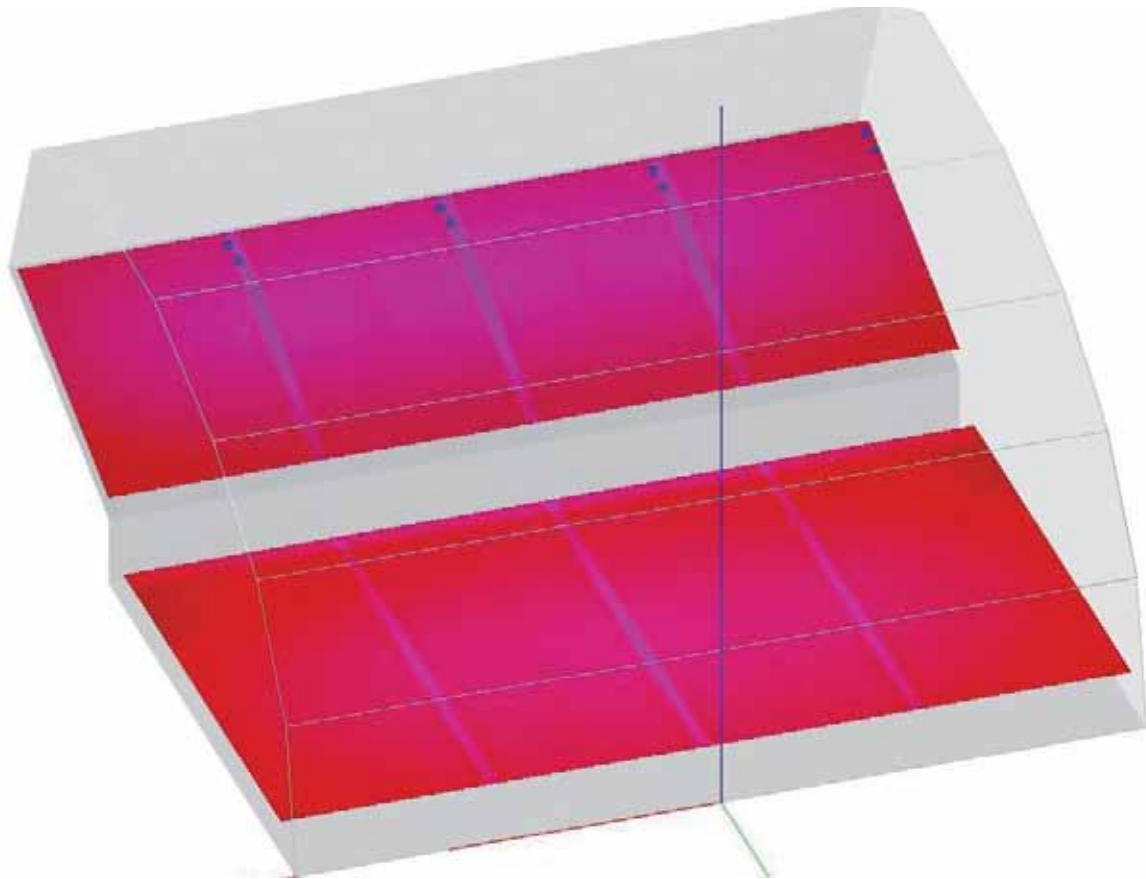
Given that the available rigging points are under the vault, the speakers will be installed there and oriented towards the stands and the field for a complete and uniform coverage. For this kind of environment we choose ~98dB as a target for the direct SPL in the vocal range of frequencies (400Hz-4KHz). We choose to use 8 x P3115 to have enough SPL, to properly cover all the space (in such a highly reverberant environment intelligibility may be critical especially if we use a too centralized system) and to exploit 100V distribution if required.



Loudspeakers used in the system				
Code	Quantity	Model	Comment	Pictures system
130 00 135	8	P 3115	For the coverage of a multipurpose gym	

Speaker system sound level map

The simulation results below show a uniform coverage for all the stands and a satisfying 99 +/- 5dB value of direct SPL



If requested, the field can be covered as well from the same rigging points.

Comment

For this installation we achieved a very good and uniform coverage with a simple but effective design. A good intelligibility is expected on the stands because of the proper placement: the loudspeakers are as close as possible to the seats and to each part of the field.

7 Cluster Equalization

To obtain the best performance from the P series in Line Array configuration, RCF Spa suggests some specific equalization parameters.

These parameters can be easily loaded on Audio processor DX 4008 in configuration 0 level, Positive polarization and 0 Delay.



The DX 4008 is a complete 4 input- 8 output digital loudspeaker management system designed for the touring or fixed sound installation markets.

The absolute latest in available technology, it features a 32 bit floating point processor and high performance 24 bit analog converters.

Sampling rate can be set to 96KHz. The 32-bit DSP prevents noise and distortion induced by truncation errors of the commonly used 24- bit fixed point devices. A complete set of parameters include I/O levels, delay, polarity, 6 bands of parametric EQ per channel, multiple crossover selections and full function limiters. Precise frequency control is achieved with its 1Hz resolution.

Inputs and outputs can be routed in multiple configuration to meet any requirements. The DX 4008 can be controlled or configured in real time through the front panel LCD and keyboard or with the intuitive PC GUI, accessed via the RS 232 interface. Software upgrade for CPU and DSP via PC keeps the device up to date with newly developed algorithms and functions once available. Multiple setup storage and system security complete this professional package.

RCF suggests to equalize speakers and line array systems as indicated in the table below.

Different configurations are available on request to the RCF Technical department info@rcf.it.

7.1 Equalization List

The following table shows the list of the available equalization presets for different configurations:

Model	Configuration	Description
P 6215	1	1 speaker in VOICE setting
P 6215	2	1 speaker in MUSIC setting
P 6215	3	2 speakers in line Array 0° - 0°
P 6215	4	2 speakers in line Array 0° - 30°
P 6215	5	3 speakers in line Array 0° - 10° - 10°
P 6215	6	3 speakers in line Array 0° - 0° - 30°
P 6215	7	4 speakers in line Array 0° - 0° - 0° - 0°
P 6215	8	4 speakers in line Array 0° - 0° - 10° - 30°
P 6215	9	4 speakers in line Array 0° - 10° - 10° - 10°
P 6215	10	4 speakers in line Array 0° - 20° - 20° - 30°
P 3115	11	1 speaker in VOICE setting
P 3115	12	1 speaker in MUSIC setting
P 3115	13	2 speakers in line Array 0° - 0°
P 3115	14	2 speakers in line Array 0° - 30°
P 3115	15	3 speakers in line Array 0° - 10° - 10°
P 3115	16	3 speakers in line Array 0° - 0° - 30°
P 3115	17	4 speakers in line Array 0° - 0° - 0° - 0°
P 3115	18	4 speakers in line Array 0° - 0° - 10° - 30°
P 3115	19	4 speakers in line Array 0° - 10° - 10° - 10°
P 3115	20	4 speakers in line Array 0° - 20° - 20° - 30°
P 2110	21	1 speaker in VOICE setting
P 2110	22	1 speaker in MUSIC setting
P 2110	23	2 speakers in line Array 0° - 0°
P 2110	24	2 speakers in line Array 0° - 30°
P 2110	25	3 speakers in line Array 0° - 10° - 10°
P 2110	26	3 speakers in line Array 0° - 0° - 30°
P 2110	27	4 speakers in line Array 0° - 0° - 0° - 0°
P 2110	28	4 speakers in line Array 0° - 0° - 10° - 30°
P 2110	29	4 speakers in line Array 0° - 10° - 10° - 10°
P 2110	30	4 speakers in line Array 0° - 20° - 20° - 30°

7.2 Equalization parameters P 6215

Table 1: Output configuration for 1, 2 and 3 P6215 speakers

Array system	Inclination angle (α)	Equalization parameter DX 4008				
		Ref.	Level OUT 1	Frequency OUT 1	Bandwidth OUT 1	Type OUT 1
1 - A	0 ° Voice	1 - 1	+ 3	180	0.8	PEQ
		1 - 2	- 4	350	0.4	PEQ
		1 - 3	- 2	1000	0.5	PEQ
		1 - 4	+ 4	1000	6 dB	Lo-Shf
		1 - 5	+ 3	1850	6 dB	Hi-Shf
		1 - 6	+ 5	10000	0.5	PEQ
2 - A	0 ° Music	2 - 1	+ 6	180	0.8	PEQ
		2 - 2	- 4	350	0.4	PEQ
		2 - 3	- 5	1000	0.5	PEQ
		2 - 4	+ 4	1000	6 dB	Lo-Shf
		2 - 5	+ 3	1850	6 dB	Hi-Shf
		2 - 6	+ 5	10000	0.5	PEQ
3 - A 3 - B	0 ° 0 °	3 - 1	+ 3	180	0.8	PEQ
		3 - 2	- 4	350	0.4	PEQ
		3 - 3	- 2	1000	0.5	PEQ
		3 - 4	+ 4	1000	6 dB	Lo-Shf
		3 - 5	+ 5	1850	6 dB	Hi-Shf
		3 - 6	+ 5	10000	0.5	PEQ
4 - A 4 - B	0 ° 30 °	4 - 1	+ 1	180	0.8	PEQ
		4 - 2	- 6	350	0.4	PEQ
		4 - 3	- 2	1000	0.5	PEQ
		4 - 4	+ 4	1000	6 dB	Lo-Shf
		4 - 5	+ 3	1850	6 dB	Hi-Shf
		4 - 6	+ 5	10000	0.5	PEQ
5 - A 5 - B 5 - C	0 ° 10 ° 10 °	5 - 1	+ 4,5	180	1	PEQ
		5 - 2	- 3	350	0.33	PEQ
		5 - 3	- 5	890	0.33	PEQ
		5 - 4	+ 7	3000	0.5	PEQ
		5 - 5	- 3	5000	0.5	PEQ
		5 - 6	+ 5	8100	0.5	PEQ
6 - A 6 - B 6 - C	0 ° 0 ° 30 °	6 - 1	- 6	350	0.4	PEQ
		6 - 2	- 2	1000	0.5	PEQ
		6 - 3	+ 4	1000	6 dB	Lo-Shf
		6 - 4	+ 3	1850	6 dB	Hi-Shf
		6 - 5	+ 5	10000	0.5	PEQ

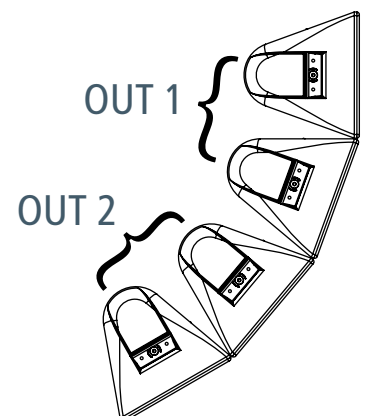
Table 2: Output configuration for 4 P6215 speakers

Array system	Inclination angle (α)	Ref.	Equalization parameter DX 4008							
			Level		Frequency		Bandwidth		Type	
			OUT 1	OUT 2	OUT 1	OUT 2	OUT 1	OUT 2	OUT 1	OUT 2
7 - A	0°	7 - 1	+3	+3	180	180	0.8	0.8	PEQ	PEQ
7 - B	0°	7 - 2	-4	-4	350	350	0.4	0.4	PEQ	PEQ
7 - C	0°	7 - 3	-2	-2	1000	1000	0.5	0.5	PEQ	PEQ
7 - D	0°	7 - 4	+4	+4	1000	1000	6 dB	6 dB	Lo-Shf	Lo-Shf
		7 - 5	+5	+5	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		7 - 6	+5	+5	10000	10000	0.5	0.5	PEQ	PEQ
8 - A	0°	8 - 1	+4	+4	150	150	0.4	0.4	PEQ	PEQ
8 - B	0°	8 - 2	-6	-6	350	350	0.4	0.4	PEQ	PEQ
8 - C	10°	8 - 3	+3	-5	650	1000	0.33	1.2	PEQ	PEQ
8 - D	30°	8 - 4	+4	+4	1000	1000	6 dB	6 dB	Lo-Shf	Lo-Shf
		8 - 5	+5.5	+9	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		8 - 6	+6	+5	9000	9000	0.9	0.5	PEQ	PEQ
9 - A	0°	9 - 1	-6	-6	320	320	0.45	0.45	PEQ	PEQ
9 - B	10°	9 - 2	-2	-2	1000	1000	0.5	0.5	PEQ	PEQ
9 - C	10°	9 - 3	+4	+4	1000	1000	6 dB	6 dB	Lo-Shf	Lo-Shf
9 - D	10°	9 - 4	+3	+3	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		9 - 5	+6	+6	3000	3000	6 dB	6 dB	Hi-Shf	Hi-Shf
		9 - 6	+2	+2	9000	9000	0.4	0.4	PEQ	PEQ
10 - A	0°	10 - 1	-6	-6	320	320	0.45	0.45	PEQ	PEQ
10 - B	20°	10 - 2	-2	-2	1000	1000	0.5	0.5	PEQ	PEQ
10 - C	20°	10 - 3	+4	+4	1000	1000	6 dB	6 dB	Lo-Shf	Lo-Shf
10 - D	30°	10 - 4	+3	+3	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		10 - 5	+8	+8	3000	3000	6 dB	6 dB	Hi-Shf	Hi-Shf
		10 - 6	+2	+2	9000	9000	0.4	0.4	PEQ	PEQ

DX 4008 configuration:

Crossover Parameter : FTRL: Butterworth - FRQL: 50 Hz - SLPL: 24 dB - FTRH: Off

Limiter Parameter: THRESH: + 20 dBu - ATTACK: 10 ms - RELEASE: 8X



7.3 Equalization parameters P 3115

Table 3: Output configuration for 1, 2 and 3 P 3115 speakers

Array system	Inclination angle (α)	Equalization parameter DX 4008				
		Ref.	Level OUT 1	Frequency OUT 1	Bandwidth OUT 1	Type OUT 1
11 - A	0 ° Voice	11 - 1	+ 6	150	0.5	PEQ
		11 - 2	+ 3	1850	6 dB	Hi-Shf
		11 - 3	+ 3	3000	0.5	PEQ
		11 - 4	+ 2	5000	1	PEQ
12 - A	0 ° Music	12 - 1	+ 8	150	0.5	PEQ
		12 - 2	- 2	350	0.4	PEQ
		12 - 3	- 2	1000	0.5	PEQ
		12 - 4	- 2	3000	0.5	PEQ
		12 - 5	- 3	1850	6 dB	Hi-Shf
		12 - 6	+ 3	10000	0.5	PEQ
13 - A 13 - B	0 ° 0 °	13 - 1	+ 6	150	0.5	PEQ
		13 - 2	+ 4.5	1850	6 dB	Hi-Shf
		13 - 3	+ 3	3000	0.5	PEQ
		13 - 4	+ 2	5000	1	PEQ
14 - A 14 - B	0 ° 30 °	14 - 1	+ 6	150	1	PEQ
		14 - 2	+ 6	220	0.9	PEQ
		14 - 3	+ 4	1850	6 dB	Hi-Shf
		14 - 4	+ 6	2370	0.5	PEQ
		14 - 5	- 3	5000	0.33	PEQ
		14 - 6	+ 2	9100	0.33	PEQ
15 - A 15 - B 15 - C	0 ° 10 ° 10 °	15 - 1	+ 6	150	0.5	PEQ
		15 - 2	- 2	650	1	PEQ
		15 - 3	+ 5	1850	6 dB	Hi-Shf
		15 - 4	+ 3	3000	0.5	PEQ
16 - A 16 - B 16 - C	0 ° 0 ° 30 °	16 - 1	+ 6	150	1	PEQ
		16 - 2	+ 6	220	0.9	PEQ
		16 - 3	+ 3	1850	6 dB	Hi-Shf
		16 - 4	+ 6	2370	0.5	PEQ
		16 - 5	- 3	5000	0.33	PEQ
		16 - 6	+ 2	9100	0.33	PEQ

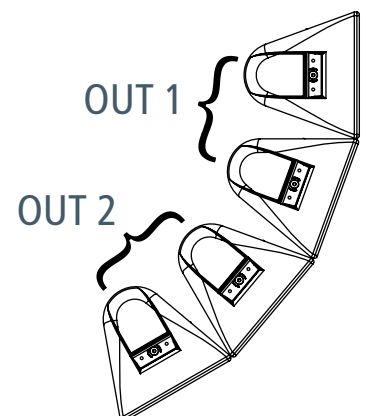
Table 4: Output configuration for 4 P 3115 speakers

Array system	Inclination angle (α)	Ref.	Equalization parameter DX 4008							
			Level		Frequency		Bandwidth		Type	
			OUT 1	OUT 2	OUT 1	OUT 2	OUT 1	OUT 2	OUT 1	OUT 2
17 - A	0°	17 - 1	+ 6	+ 6	150	150	0.5	0.5	PEQ	PEQ
17 - B	0°	17 - 2	+ 4	+ 4	200	200	0.5	0.5	PEQ	PEQ
17 - C	0°	17 - 3	+ 6	+ 6	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
17 - D	0°	17 - 4	+ 3	+ 3	3000	3000	0.5	0.5	PEQ	PEQ
		17 - 5	+ 2	+ 2	5000	5000	1	1	PEQ	PEQ
		17 - 6	+ 1.5	+ 1.5	10000	10000	0.5	0.5	PEQ	PEQ
18 - A	0°	18 - 1	+ 10	+ 10	150	150	0.5	0.5	PEQ	PEQ
18 - B	0°	18 - 2	- 3	- 3	650	650	1	1	PEQ	PEQ
18 - C	10°	18 - 3	+ 5	+ 5	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
18 - D	30°	18 - 4	+ 3	+ 3	3000	3000	0.5	0.5	PEQ	PEQ
19 - A	0°	19 - 1	+ 6	- 6	150	150	0.5	0.5	PEQ	PEQ
19 - B	10°	19 - 2	- 3	- 3	650	650	1	1	PEQ	PEQ
19 - C	10°	19 - 3	+ 5	+ 5	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
19 - D	10°	19 - 4	+ 3	+ 3	3000	3000	0.5	0.5	PEQ	PEQ
20 - A	0°	20 - 1	+ 10	+ 10	150	150	0.5	0.5	PEQ	PEQ
20 - B	20°	20 - 2	+ 2	+ 2	500	500	1	1	PEQ	PEQ
20 - C	20°	20 - 3	+ 5	+ 5	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
20 - D	30°	20 - 4	+ 3	+ 3	3000	3000	0.5	0.5	PEQ	PEQ

DX 4008 configuration:

Crossover Parameter : FTRL: Butterworth - FRQL: 60 Hz - SLPL: 24 dB - FTRH: Off

Limiter Parameter: THRESH: + 20 dBu - ATTACK: 10 ms - RELEASE: 8X



7.4 Equalization parameters P 2110

Table 5: Output configuration for 1, 2 and 3 P 2110 speakers

Array system	Inclination angle (α)	Equalization parameter DX 4008				
		Ref.	Level OUT 1	Frequency OUT 1	Bandwidth OUT 1	Type OUT 1
21 - A	0 ° Voice	21 - 1	+ 6	180	0.33	PEQ
		21 - 2	- 3.5	300	0.65	PEQ
		21 - 3	- 3	1280	0.33	PEQ
		21 - 4	+ 3	1850	6 dB	Hi-Shf
		21 - 5	+ 10	2030	0.33	PEQ
22 - A	0 ° Music	22 - 1	+ 3	120	0.33	PEQ
		22 - 2	+ 6	180	0.33	PEQ
		22 - 3	- 3	1280	0.33	PEQ
		22 - 4	- 3	1520	1.5	PEQ
		22 - 5	+ 7	2000	0.33	PEQ
23 - A 23 - B	0 ° 0 °	23 - 1	+ 6	180	0.33	PEQ
		23 - 2	- 3.5	300	0.65	PEQ
		23 - 3	- 3	1280	0.33	PEQ
		23 - 4	+ 3	1850	6 dB	Hi-Shf
		23 - 5	+ 10	2030	0.33	PEG
		23 - 6	+ 3	10000	0.5	PEQ
24 - A 24 - B	0 ° 30 °	24 - 1	+ 9	176	0.4	PEQ
		24 - 2	- 5	450	2	PEQ
		24 - 3	- 3	1280	0.33	PEQ
		24 - 4	+ 4	1850	6 dB	Hi-Shf
		24 - 5	+ 10	2030	0.33	PEQ
		24 - 6	+ 3	10000	0.5	PEQ
25 - A 25 - B 25 - C	0 ° 10 ° 10 °	25 - 1	+ 9	176	0.4	PEQ
		25 - 2	- 5	450	2	PEQ
		25 - 3	- 3	1280	0.33	PEQ
		25 - 4	+ 3	1850	6 dB	Hi-Shf
		25 - 5	+ 10	2030	0.33	PEQ
		25 - 6	+ 3	10000	0.5	PEQ
26 - A 26 - B 26 - C	0 ° 0 ° 30 °	26 - 1	+ 9	176	0.4	PEQ
		26 - 2	- 5	450	2	PEQ
		26 - 3	- 3	1280	0.33	PEQ
		26 - 4	+ 3	1850	6 dB	Hi-Shf
		26 - 5	+ 10	2030	0.33	PEQ
		26 - 6	+ 3	10000	0.5	PEQ

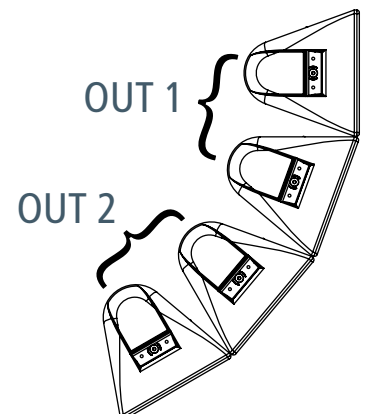
Table 6: Output configuration for 4 P 2110 speakers

Array system	Inclination angle (α)	Ref.	Equalization parameter DX 4008							
			Level		Frequency		Bandwidth		Type	
			OUT 1	OUT 2	OUT 1	OUT 2	OUT 1	OUT 2	OUT 1	OUT 2
27 - A	0°	27 - 1	+ 6	+ 6	180	180	0.33	0.33	PEQ	PEQ
27 - B	0°	27 - 2	- 3.5	- 3.5	300	300	0.65	0.65	PEQ	PEQ
27 - C	0°	27 - 3	- 4	- 4	1280	1280	0.33	0.33	PEQ	PEQ
27 - D	0°	27 - 4	+ 5.5	+ 5.5	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		27 - 5	+ 8	+ 8	2030	2030	0.33	0.33	PEQ	PEQ
		27 - 6	+ 3	+ 3	10000	10000	0.5	0.5	PEQ	PEQ
28 - A	0°	28 - 1	+ 9	+ 9	176	176	0.4	0.4	PEQ	PEQ
28 - B	0°	28 - 2	- 5	- 5	450	450	2	2	PEQ	PEQ
28 - C	10°	28 - 3	- 3	- 3	1280	1280	0.33	0.33	PEQ	PEQ
28 - D	30°	28 - 4	+ 4	+ 4	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		28 - 5	+ 10	+ 10	2030	2030	0.33	0.33	PEQ	PEQ
		28 - 6	+ 3	+ 3	10000	10000	0.5	0.5	PEQ	PEQ
29 - A	0°	29 - 1	+ 7	+ 7	176	176	0.4	0.4	PEQ	PEQ
29 - B	10°	29 - 2	- 5	- 5	450	450	2	2	PEQ	PEQ
29 - C	10°	29 - 3	- 3	- 3	1280	1280	0.33	0.33	PEQ	PEQ
29 - D	10°	29 - 4	+ 3	+ 3	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		29 - 5	+ 10	+ 10	2030	2030	0.33	0.33	PEQ	PEQ
		29 - 6	+ 3	+ 3	10000	10000	0.5	0.5	PEQ	PEQ
30 - A	0°	30 - 1	+ 9	+ 9	176	176	0.4	0.4	PEQ	PEQ
30 - B	20°	30 - 2	- 5	- 5	450	450	2	2	PEQ	PEQ
30 - C	20°	30 - 3	- 3	- 3	1280	1280	0.33	0.33	PEQ	PEQ
30 - D	30°	30 - 4	+ 4	+ 4	1850	1850	6 dB	6 dB	Hi-Shf	Hi-Shf
		30 - 5	+ 10	+ 10	2030	2030	0.33	0.33	PEQ	PEQ
		30 - 6	+ 3	+ 3	10000	10000	0.5	0.5	PEQ	PEQ

DX 4008 configuration:

Crossover Parameter : FTRL: Butterworth - FRQL: 80 Hz - SLPL: 24 dB - FTRH: Off

Limiter Parameter: THRESH: + 20 dBu - ATTACK: 10 ms - RELEASE: 8X



8 More Information

For more information on installing and operating your P Series loudspeakers, please refer to RCF's web site: www.rcfaudio.com

For applications support, service or warranty information, refer to RCF's web site or contact RCF Service department at rcfservice@rcf.it.

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