Ray-On+
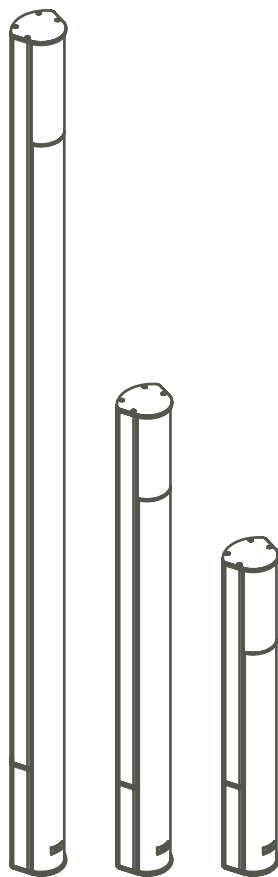
High directivity self-powered column loudspeakers

User Manual

Active audio
L'acoustique active

Table of contents

1. Introduction

Ray-On+ column loudspeakers ensure perfect speech intelligibility and optimal acoustical comfort, even in noisy and reverberant venues. They are based on the DGRC (Digital & Geometric Radiation Control) principle patented by Active Audio.

Compared with a classic sound system in which each loudspeaker is controlled independently, the DGRC method makes it possible to decrease the number of channels to be controlled, thereby enhancing economic efficiency.

Ray-On+ also allows the use of existing network cables and helps to achieve significant savings in wiring, with up to 64 channels on a single Ethernet cable. Ray-On+ combines the features of Dante™ and Ray-On to achieve ever higher levels of efficiency and flexibility.

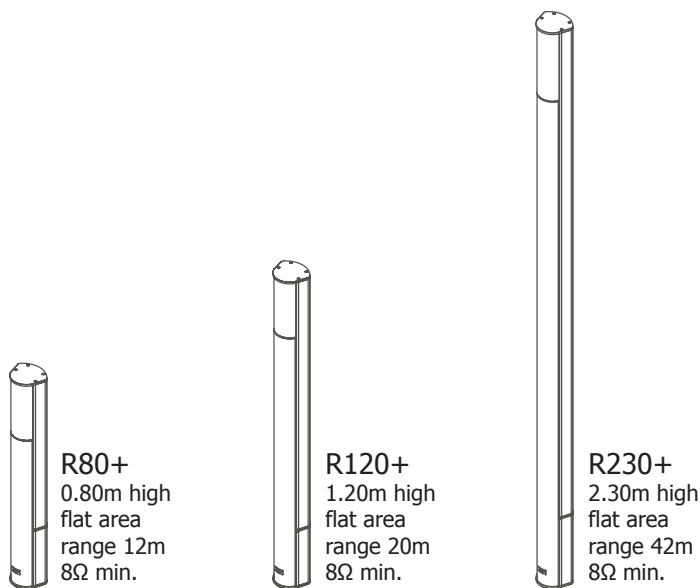The Ray-On+ range includes 3 models of column loudspeakers, from 80cm to 2.30m high.

R80+
0.80m high
flat area
range 12m
8Ω min.

R120+
1.20m high
flat area
range 20m
8Ω min.

R230+
2.30m high
flat area
range 42m
8Ω min.

Figure 1 : *Ray-On+ range*

2. Positioning

The most important parameter for the installation of Ray-On+ loudspeaker is its mounting height because the range of the column directly depends on it. Installing the column higher will increase the range, but will affect SPL. On the contrary, installing the column lower will increase SPL, but decreases its range.
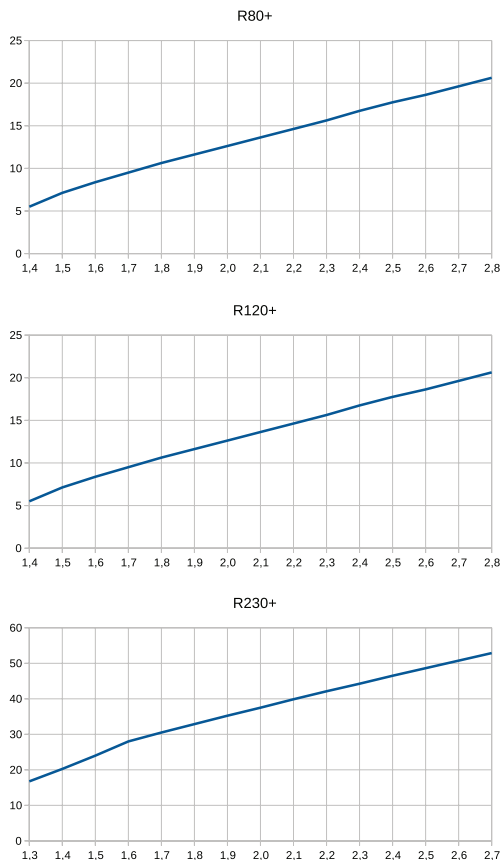

Figure 2 : *±5dB range (m) according to mounting height (from floor to bottom of column, in m)*, for the direct field at mid- frequencies (300Hz-3kHz).

		Mounting height		
		Minimal	Nominal	Maximal
Ray-On R80+	Standing audience	1.40m	1.90m	2.40m
	Seated audience	1.00m	1.50m	2.00m
Ray-On R120+	Standing audience	1.40m	2.10m	2.60m
	Seated audience	1.00m	1.70m	2.20m
Ray-On R230+	Standing audience	1.60m	2.20m	2.70m
	Seated audience	1.20m	1.80m	2.30m

Figure 3 : Ray-On+ mounting height, **from floor to bottom of column**
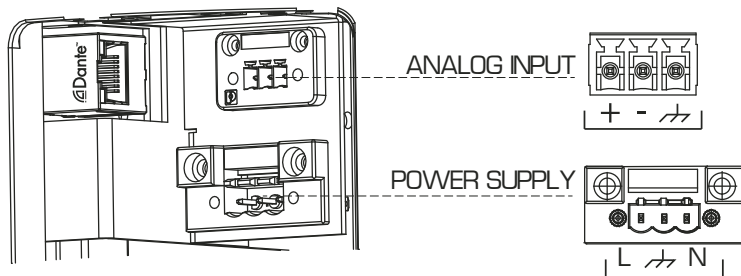
3. Wiring

Figure 4 : *Wiring Ray-On+ columns*
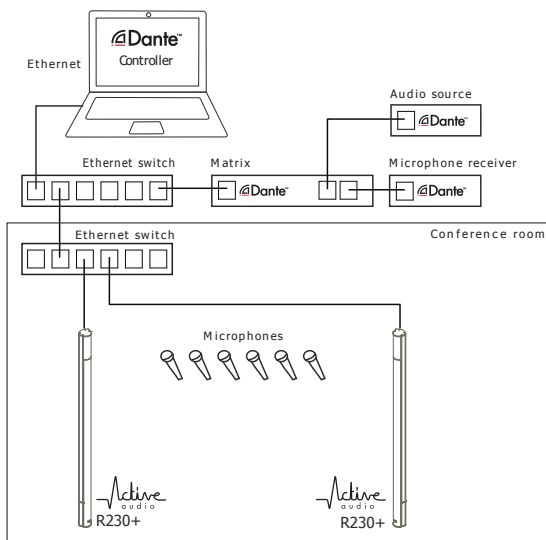
3.1. Example setup using Dante®

Figure 5 : *Ray-On+ setup using Dante network*

4. Ray-On+ Control software

The Ray-On+ control software is available for Windows and OSX operating systems. Installers can be found on the supplied USB key or on Active Audio's website by following this link: http://www.activeaudio.fr/downloads.

4.1. System requirements

Processor	1Ghz or better
Memory	512Mbyte of RAM
Network	Standard wired Ethernet network interface (100Mbps or Gigabit). Wireless LAN (Wi-Fi) Ethernet interfaces are not supported
Operating System	Windows 7 SP1 or newer Mac OS X 10.7.5 or newer

4.2. Installation on Windows

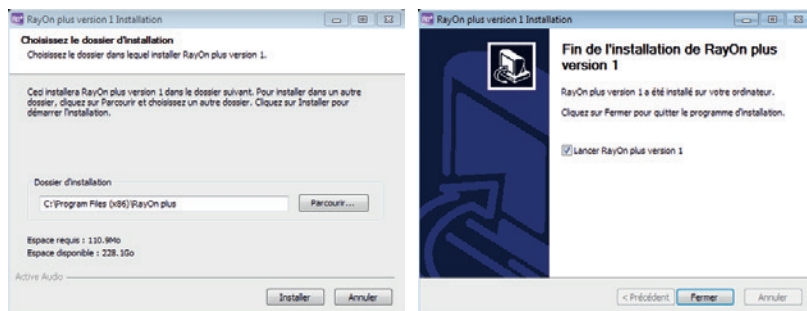Start the installer package by double-clicking on it, then follow the instructions.

Figure 6 : *Ray-On+ Software installation on Windows*

4.3. Installation on OS X

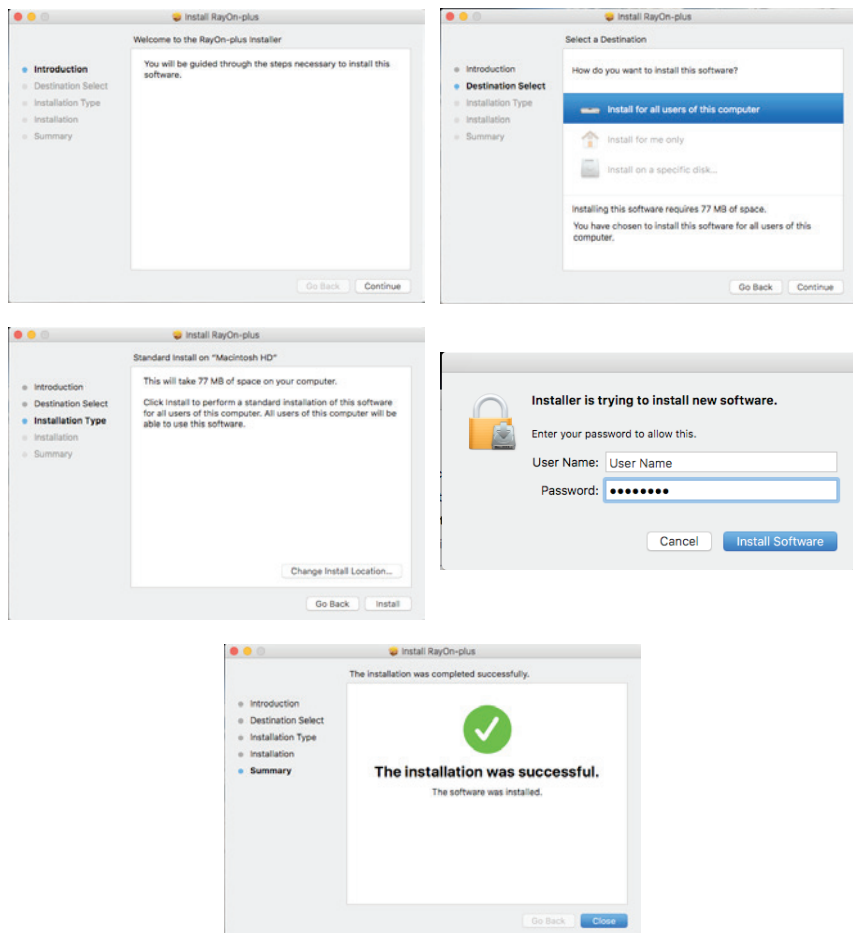Start the installer package by double-clicking on it, then follow the instructions.

Figure 7 : *Ray-On+ Software installation on OS X*

4.4. Using the Ray-On+ Control software

The Ray-On+ control software gives access to the following functions:

- input selection: Dante, Analog or Dante/Analog fallback
- general output volume
- optimized equalization for speech or music

> **The Ray-On+ control software does not include Dante routing functionality. When using Dante to transmit audio, you will need the Dante Controller software to assign Dante channels to Ray-On+ columns.**
> **Dante Controller is available free of charge from the Audinate website: https://www.audinate.com/products/software/dante-controller.**

When launching the Ray-On+ control software, the first screen lists all the Ray-On+ columns it can find on the network. The first connection to a Ray-On+ column can take up to 1 minute: this is the time needed to initiate the communication.
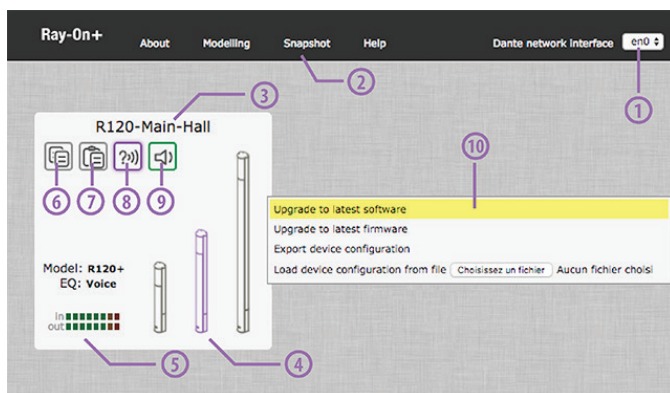
4.4.1 Main page

Figure 8 : *Ray-On+ control software: main screen*

1. Network interface: Select the network corresponding to your Dante network. If you have several network interfaces, the software will select your default network interface.

2. Snapshot: Export a snapshot of your installation as a csv file by clicking on this button. The csv file contains the settings of all the devices detected on the network.

3. Device Name: The device name displayed corresponds to the device name defined in Dante Controller: Device view -> Device config -> Rename Device.

4. Model: The model icon helps you to remember which model of Ray-On+ you are setting up. The Ray-On+ model can be changed in the Device Settings window.

5. Status: Model displays the current model selected. EQ specifies which kind of equalization you are using.

6. Copy: Copy all the device parameters by clicking on this icon.

7. Paste: Paste all parameters from another device.

8. Tone: Enable/Disable a beep through the Dante network to help you localize the device in your installation.

9. Mute: Enable/Disable the general output of the device.

10. Context menu: The context menu actions should be done only by an administrator. Right-click opens the context menu.
  • Upgrade to the latest software: This action upgrades the device to the latest software version. All parameters will be erased.
  • Upgrade to the latest firmware: This action upgrades the device to the latest firmware version. All parameters will be erased.
  • Export device configuration: Allows you to export the device parameters as a binary file (.ro). This file could be loaded into another device.
  • Load device configuration from file: Allows you to import parameters previously exported from a device and load them into the current device.

4.4.2 Device settings

A click on a Ray-On+ box leads to the settings screen for that specific column. All the parameters of the column can be changed within that screen.
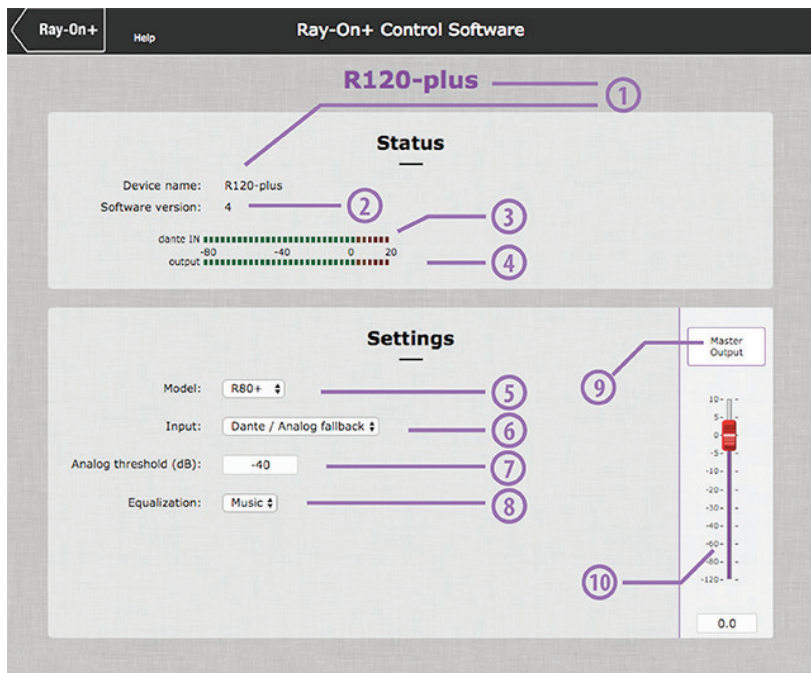

Figure 9 : *Ray-On+ control software: column settings screen*

1. Device Name: The device name displayed corresponds to the device name defined in Dante Controller: Device view -> Device config -> Rename Device.

2. Software version: Software version loaded into the device.

3. Input meter: The input meter displays the current signal level on the selected input.

4. Output meter: The output meter displays the current signal level on the output.

5. Model selection: The model selection helps you remember which model of Ray-On+ you are setting up.

6. Input selection: Select input you want to use.
   - Analog Input: Use the balanced analog input.
   - Dante Input: Use the Dante input.
   - Dante / Analog fallback: If the Dante signal level is higher than -61dBFS, the device switches to the Dante input. If the Dante signal level is less than -61dBFS and the analog signal is higher than the analog threshold defined (see 7.), the input switches to the analog input. If the analog signal is lower than the analog threshold defined and the Dante signal level is less than -61dBFS, a noisegate is activated.

7. Analog threshold: Define a SPL value between [-80 0]dB. If Dante signal is falling down (<-61dBFS) and the analog signal level is upper than the defined value, the device switches to its analog input.

8. Equalization selection: Enable/Disable a beep through the Dante network to help you localize the device in your installation.

9. Mute: Enable/Disable the general output of the device. Mute is enabled when the Master Output button is red.

10. Output gain: The output gain is a dB value between [-120 10]dB.

4.4.3 Coverage prediction

Using the DGRC principle, RayOn columns generate a wave front corresponding to a desired coverage/directivity. But this directivity is fixed ; it cannot be adjusted as in a DSP steerable column such as StepArray.
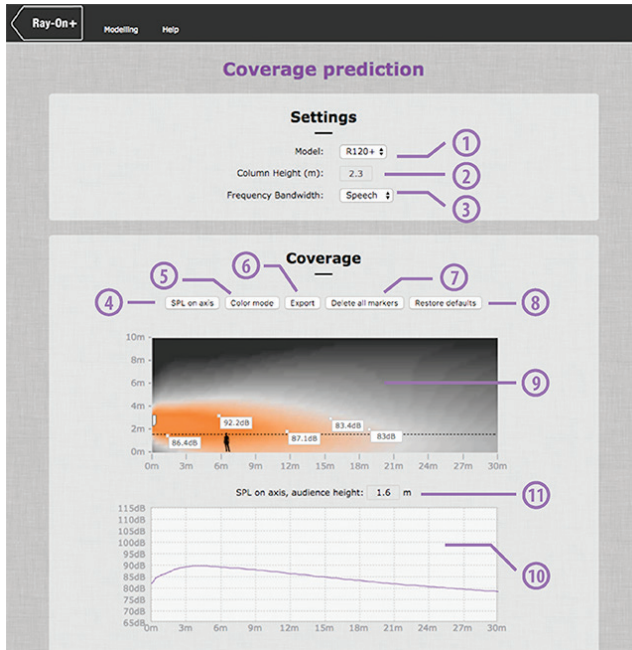

Figure 10 : *Ray-On+ control software: Modelling screen*

1. Model selection: Select the Ray-On+ Model you want to use.

2. Column height: The column height (m) corresponds to the distance from the floor to the bottom of the column. A warning icon warns you if you put the column at a very low altitude.

3. Frequency bandwidth: Display the vertical SPL coverage map for the selected frequency bandwidth.

4. Vertical coverage map: Map displays the SPL coverage in direct field accor-

ding to the user settings. You can add SPL level markers by clicking on the map. The marker's values are automatically updated when you change one parameter.

5. SPL on axis: Show / Hide the SPL level vs distance on the axis.

6. Color mode: Color mode selection allows you to display vertical coverage map using standard or scientific color scale.

7. Export: Get a *.jpg image by clicking on this button.

8. Delete all markers: Delete all markers on the vertical coverage map by clicking on this button.

9. Restore default: Restore the tool to its default values by clicking on this value.

10. SPL on axis graph: The SPL level on axis is calculated according to the column model (see 1.), the column height (see 2.), the audience height (see 11.) and the frequency bandwidth (see 3.) selected. The graph is automatically updated when you change one of these parameters. A dashed line corresponding to the audience height is displayed on the vertical coverage (9).

11. Audience height: Define the audience height (m) for SPL on axis calculation.

5. Installation of the columns

Ray-On+ columns are mounted vertically, usually on a wall, using the supplied brackets. See also figure 11 on the next page for technical drawings of the brackets.
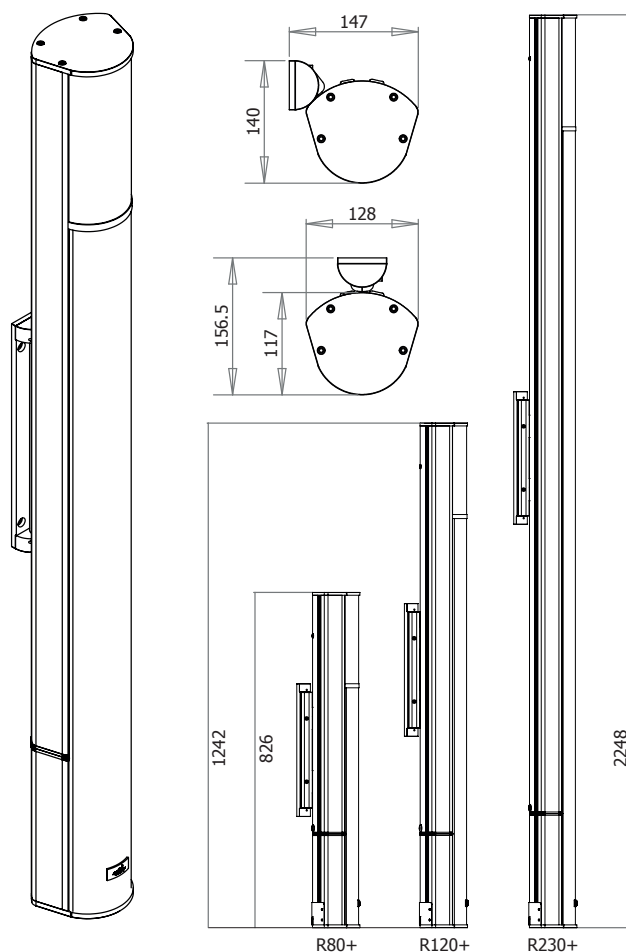

Figure 11 : *Column mounting on a wall*

It is important to ensure verticality when mounting Ray-On+ columns.
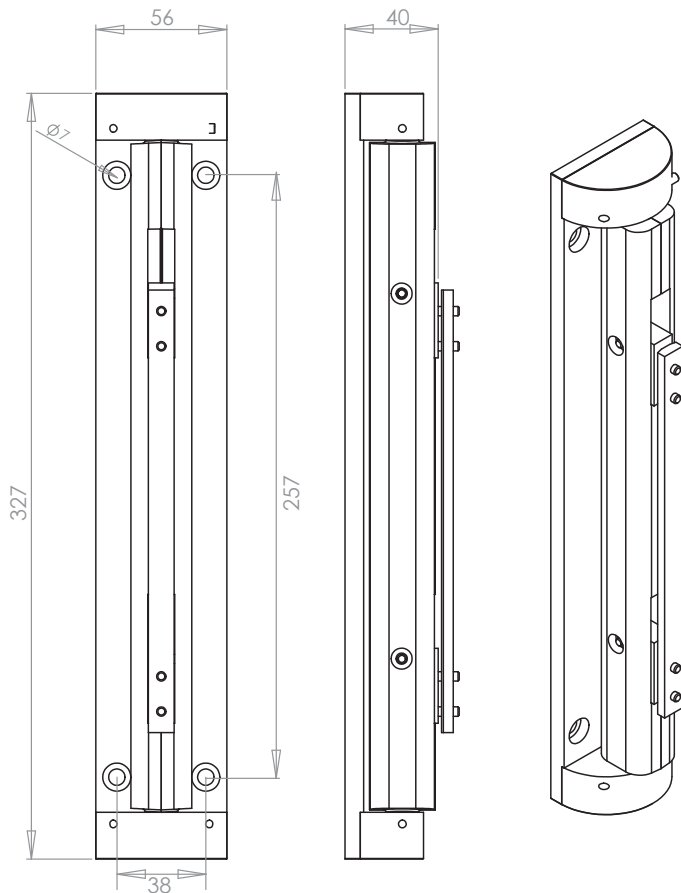
5.1. Dimensions of the brackets

Figure 12 : *Fixing brackets for wall mounting of Ray-On+ columns*

6. Specifications

R80+

Acoustical data
range ±3dB	6,5m
range ±5dB	12m
max SPL	91dBSPL at 5m
tilting angle of audience area	0°-5°
frequency bandwidth (-10dB)	120Hz-17kHz
opening angle at-6dB	100° / 70°

Mechanical data
net weight	7.2kg
shipping weight	7.7kg
height	800mm
width	128mm
depth	117mm
standard colors	white RAL 9016
	black RAL 9005

Electrical data
amplifier type		class-D amplifier
max output power		250W
power consumption	Idle	9W
	Max	290W
power supply		85-264VAC - 45-65Hz

Inputs
1x balanced analog 3-pin input
1x Dante™ input

Network
1x RJ45 connector, Dante™	
max. operating ambient temperature	50°C

R120+

Acoustical data
range ±3dB	15m
range ±5dB	20m
max SPL	92dBSPL at 8m
tilting angle of audience area	0°-5°
frequency bandwidth (-10dB)	120Hz-18kHz
opening angle at-6dB	100° / 70°

Mechanical data
net weight	10.3kg
shipping weight	11.1kg
height	1200mm
width	128mm
depth	117mm
standard colors	white RAL 9016
	black RAL 9005

Electrical data
amplifier type		class-D amplifier
max output power		250W
power consumption	Idle	9W
	Max	290W
power supply		85-264VAC - 45-65Hz

Inputs
1x balanced analog 3-pin input
1x Dante™ input

Network
1x RJ45 connector, Dante™	
max. operating ambient temperature	50°C

R230+

Acoustical data
range ±3dB	31m
range ±5dB	42m
max SPL	94.5dBSPL at 16m
tilting angle of audience area	0°-5°
frequency bandwidth (-10dB)	110Hz-19kHz
opening angle at-6dB	100° / 70°

Mechanical data
net weight	18.2kg
shipping weight	19.8kg
height	2280mm
width	128mm
depth	117mm
standard colors	white RAL 9016
	black RAL 9005

Electrical data
amplifier type		class-D amplifier
max output power		500W
power consumption	Idle	14W
	Max	590W
power supply		85-264VAC - 45-65Hz

Inputs
1x balanced analog 3-pin input
1x Dante™ input

Network
1x RJ45 connector, Dante™	
max. operating ambient temperature	45°C

7. Acoustical data

All data presented below are obtained with columns in their nominal position and using nominal filtering parameters.
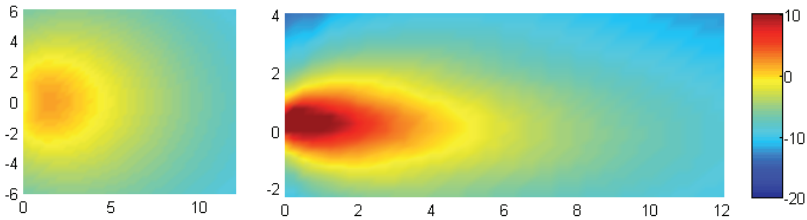
7.1. R80+ acoustical data

Figure 13 : *R80+ directivity: sound level for the voice octaves (500Hz,1kHz,2kHz) Left: horizontal, Right: vertical*
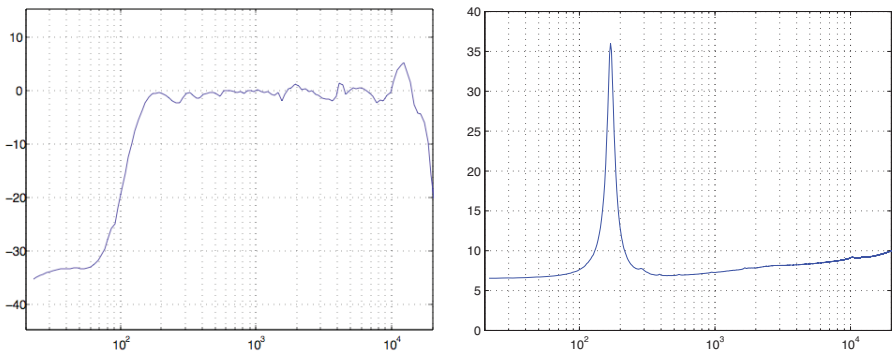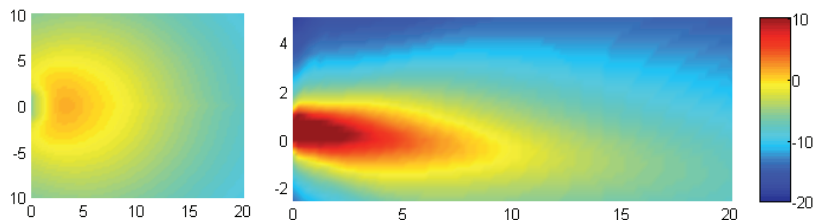

Figure 14 : *R80+: Frequency response frequency response @1W at reference point* (left), Impedance (right)*

*0dB corresponds to the efficiency (dB/1W @ the reference point)

7.2. R120+ acoustical data

Figure 15 : *R120+ directivity: sound level for*
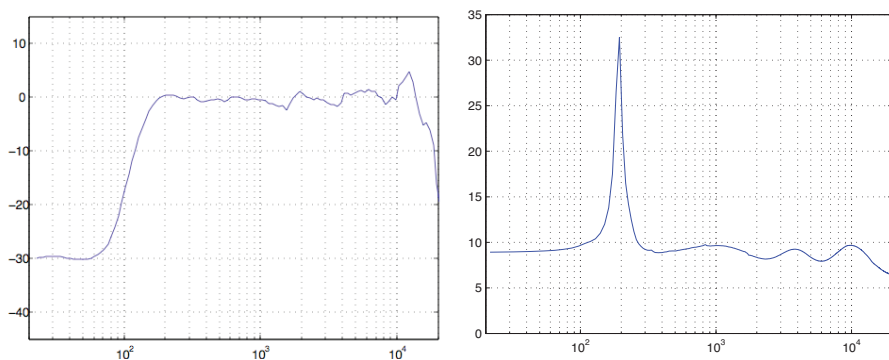*the voice octaves (500Hz,1kHz,2kHz)*
Left: horizontal, Right: vertical

Figure 16 : *R120+: Frequency response frequency response @1W at refe-*
rence point* (left), Impedance (right)

*0dB corresponds to the efficiency (dB/1W @ the reference point)
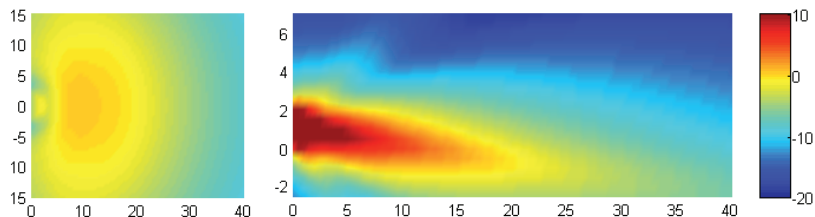
7.3. R230+ acoustical data

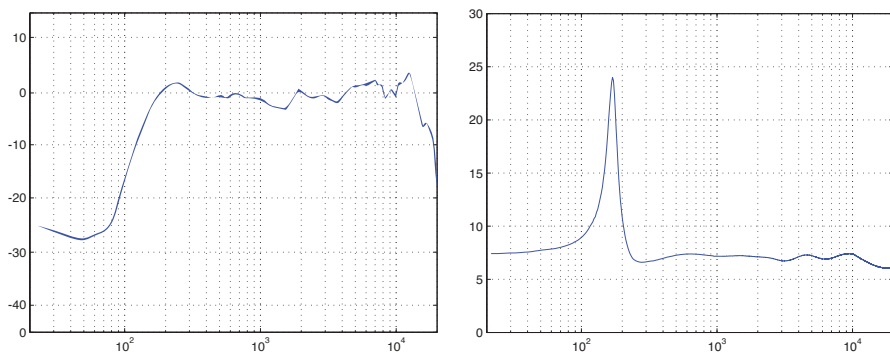Figure 17 : *R230+ directivity: sound level for the voice octaves (500Hz,1kHz,2kHz) Left: horizontal, Right: vertical*

Figure 18 : *R230+: Frequency response frequency response @1W at reference point* (left), Impedance (right)*

*0dB corresponds to the efficiency (dB/1W @ the reference point)

8. Declaration of conformity

$$C\,E$$

We,
ACTIVE AUDIO SAS,
332 Boulevard Marcel Paul 44800 St Herblain, France,

Declares under our sole responsability
that the following products

R80+, R120+, R230+

comply with the council directive 2004/108/CE

Assessment of compliance is based on the following standards:
EN50081-1, EN61000, EN60065

Established on the 6th of January 2016
by Régis CAZIN, CEO.

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