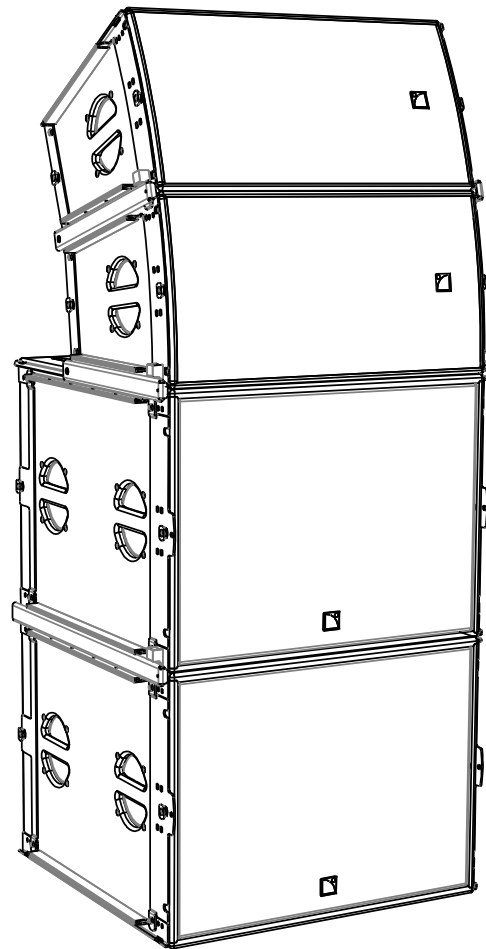
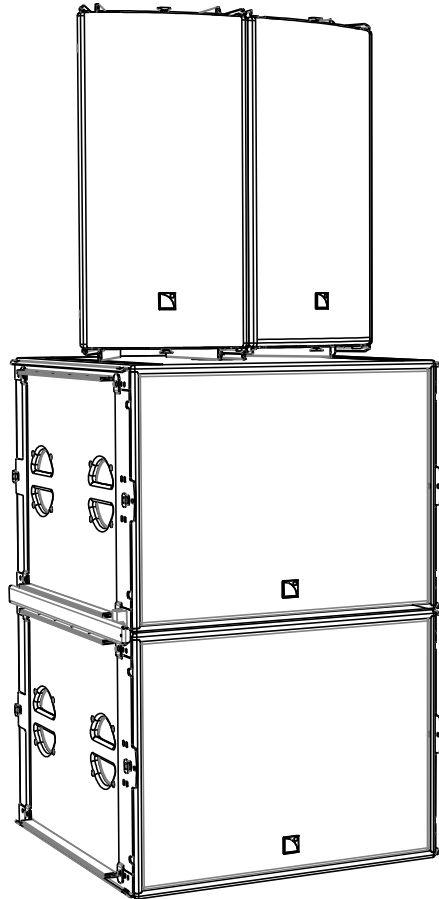


ARCS® WIDE SYSTEM
ARCS® FOCUS SYSTEM
USER MANUAL
VERSION 1.0



SAFETY INSTRUCTIONS

- 1. Read this manual**
- 2. Heed all SAFETY INSTRUCTIONS as well as DANGER and OBLIGATION warnings**
- 3. Never incorporate equipment or accessories not approved by L-ACOUSTICS®**
- 4. Read all the related PRODUCT INFORMATION documents before exploiting the system**
The product information document is included in the shipping carton of the related system component.
- 5. Read the RIGGING MANUAL before installing the product**
Use the rigging elements described in the rigging manual and follow the associated procedures.
- 6. Beware of sound levels**
Do not stay within close proximity of loudspeakers in operation and consider wearing earplugs.
Loudspeaker systems are capable of producing very high sound pressure levels (SPL) which can instantaneously lead to permanent hearing damage to performers, production crew and audience members. Hearing damage can also occur with prolonged exposure to sound: 8 h at 90 dB(A), 30 min at 110 dB(A), less than 4 min at 130 dB(A).

SYMBOLS

The following symbols are used in this document:



DANGER

This symbol indicates a potential risk of harm to an individual or damage to the product. It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.



OBLIGATION

This symbol notifies the user about instructions that must be strictly followed to ensure proper installation or operation of the product.



INFORMATION

This symbol notifies the user about complementary information or optional instructions.



WELCOME TO L-ACOUSTICS®

Thank you for choosing the L-ACOUSTICS® **ARCS® WIDE / FOCUS SYSTEM**.

This document contains essential information on using the system properly. Carefully read this document in order to become familiar with the system.

As part of a continuous evolution of techniques and standards, L-ACOUSTICS® reserves the right to change the specifications of its products and the content of its documents without prior notice.

Please check the L-ACOUSTICS® web site on a regular basis to download latest updates for documents and software:
www.l-acoustics.com.

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1 ARCS® WIDE SYSTEM / ARCS® FOCUS SYSTEM

The ARCS® WIDE and ARCS® FOCUS systems are based on two constant curvature enclosures ensuring distinct directivity pattern and SPL capabilities. Intended for medium-throw applications in rental productions and fixed installations, these line sources deliver remarkable acoustic properties and unmatched versatility for applications including FOH L/R systems, central clusters, side-fill monitors, distributed systems and complementary fills.

The main systems components consist of the following:

- ARCS® WIDE (H x V: 30° x 90°) element, wide coverage, operating from 55 Hz to 20 kHz;
- ARCS® FOCUS (H x V: 15° x 90°) element, focused energy, operating from 55 Hz to 20 kHz;
- SB18m low frequency extension, operating down to 32 Hz;
- LA4 or LA8 amplified controllers.

The ARCS® WIDE or ARCS® FOCUS line sources provide high SPL with perfect acoustic coupling, a solid LF performance and constant tonal balance over distance. Both systems can be deployed either as a horizontal array or as a vertical array.

In the coupling plane, the ARCS® WIDE and ARCS® FOCUS yield a razor-sharp directivity pattern, particularly valuable to sector audience fields while avoiding reflective surfaces. In the other plane, both systems provide a 90° smooth symmetric directivity pattern.

The ARCS® WIDE is suited to achieve an extensive coverage with few elements, offering a remarkably compact array preserving sightlines. The total coverage angle of an ARCS® WIDE line source is proportional to the number N of enclosures in the array, i.e. $N \times 30^\circ$.

The ARCS® FOCUS line source focuses the same acoustic energy within half of the coverage angle, i.e. $N \times 15^\circ$. The ARCS® FOCUS is therefore suited to achieve a narrower coverage, offering a higher SPL with a more extended throw than its sibling.

The ARCS® WIDE and ARCS® FOCUS can also be deployed in “WIFO” hybrid arrays for complex audience geometries. The dual directivity pattern and the various system configurations offered to the sound designer and system engineer allow a high level of creative freedom. Before installation, all these configurations can be acoustically and mechanically modeled with the SOUNDVISION 3D simulation software.

The amplified controllers offer an advanced and precise drive system for the ARCS® WIDE and ARCS® FOCUS enclosures. Both can be driven with the same preset. All L-ACOUSTICS amplified controllers feature the L-DRIVE, a thermal and over-excursion protection circuit.

Up to 253 LA8 amplified controllers can be connected together via the Ethernet-based L-NET protocol. The LANETWORK MANAGER software allows online remote control and monitoring of all the connected units, via a user-friendly and intuitive graphic interface, and features the Array Morphing EQ. This exclusive tool allows the engineer to quickly adjust the tonal balance of the system to reach a reference curve or to ensure consistency of the sonic signature.

2 SYSTEM COMPONENTS

The system approach developed by L-ACOUSTICS® consists in offering a global solution that guarantee the highest and most predictable level of performance at any step of loudspeaker system deployment: modeling, installation and operation. A complete L-ACOUSTICS® system includes enclosures, amplified controllers, cables, rigging system and software applications.

The main components of an **ARCS® WIDE SYSTEM** or **ARCS® FOCUS SYSTEM** are the following:

2.1 Loudspeaker enclosures

ARCS® WIDE	Full-range (55Hz – 20kHz), 2-way passive, constant curvature WST® line source, 90° x 30°
ARCS® FOCUS	Full-range (55Hz – 20kHz), 2-way passive, constant curvature WST® line source, 90° x 15°
SB18m	High power subwoofer (down to 32Hz)



Loudspeaker system design

Sound design aspects are beyond the scope of this document. However, the various applications of the system will be based on the operating modes presented in this document.

2.2 Powering and driving system

LA4 or LA8	Amplified controllers with DSP library and networking capabilities
LA-RAK	Touring rack containing three LA8, for power, audio signals and network distribution



Operating instructions

Refer to the **LA4, LA8** and the **LA-RAK user manual**.

2.3 Loudspeaker cables

DOSUB-LA8	Breakout cable, 1 x 8-point PA-COM® > 4 x 2-point SpeakON®
DO cables (DO.7, DO10, DO25)	8-point PA-COM® loudspeaker cables of respective lengths of 0.7 m/2.3 ft, 10 m/32.8 ft, and 25 m/82 ft
SP cables (SP.7, SP5, SP10, SP25)	4-point SpeakON® loudspeaker cables of respective lengths of 0.7 m/2.3 ft, 5 m/16.4 ft, 10 m/32.8 ft and 25 m/82 ft
SP-Y1	Breakout cable for two passive enclosure SpeakON® < 2 x SpeakON®



Information about the connection of the enclosures to the amplifiers is given in this document.

Refer to the **LA4, LA8** or **LA-RAK user manual** for detailed instructions about the whole cabling scheme, including modulation cables and network.

2.4 Rigging elements



Rigging elements or procedures are not presented in this document.

Refer to the **ARCS® WIDE/FOCUS SYSTEM rigging manual**.

2.5 Software applications

SOUNDVISION	3D acoustical and mechanical modeling
LA NETWORK MANAGER	Remote control and monitoring of amplified controllers



Using L-ACOUSTICS® software

Refer to the **SOUNDVISION training** and the **LA NETWORK MANAGER tutorial**.

ARCS® WIDE SYSTEM / ARCS® FOCUS SYSTEM USER MANUAL VERSION 1.0



ARCS® FOCUS



SB18m



ARCS® WIDE



LA-RAK



SP-Y1



SP.7



LA4



DO.7



SP5



LA8



DO10



SP10



DOSUB-LA8



DO25



SP25



Soundvision



LA Network Manager

ARCS® WIDE SYSTEM / ARCS® FOCUS SYSTEM components (excluding rigging elements & modulation cables)


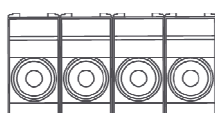
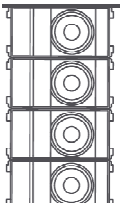
3 OPERATING MODES

3.1 FULL-RANGE mode

In FULL-RANGE mode, the ARCS® WIDE/FOCUS SYSTEM operates within the nominal bandwidth of the enclosure.

It corresponds to the use of ARCS® WIDE/FOCUS enclosure(s) in standalone configuration, i.e. without complementary subwoofers.

The ARCS® WIDE/FOCUS enclosure is driven by the LA4 or the LA8 amplified controller with a choice of two presets.

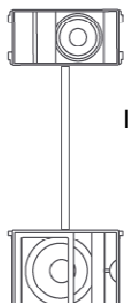
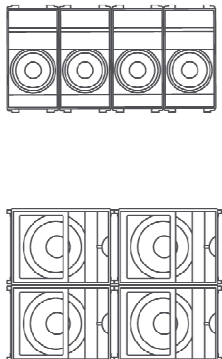
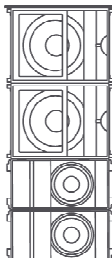
Single ARCS® WIDE / ARCS® FOCUS	Standalone ARCS® WIDE / ARCS® FOCUS line source	
 <p>Enclosure WIDE/FOCUS [PRESET] ► [ARCS_WIFO_FI]</p> <p>Frequency range (-10dB) 55Hz – 20kHz</p>	 <p>Horizontal</p>	 <p>Vertical</p> <p>Enclosure WIDE/FOCUS [PRESET] ► [ARCS_WIFO]</p> <p>Frequency range (-10dB) 55Hz – 20kHz</p>

3.2 LOW-EXTENSION mode

In LOW-EXTENSION mode, the bandwidth of the ARCS® WIDE/FOCUS SYSTEM is extended in the low end.

It corresponds to the use of ARCS® WIDE/FOCUS enclosure(s) in combination with the SB18m subwoofer.

Each enclosure type is driven by the LA4 or LA8 amplified controller with dedicated factory presets. The ARCS® WIDE/FOCUS enclosure is driven with the same presets as in the standalone configuration. The SB18m subwoofer is driven with a preset featuring an upper frequency limit at 60 Hz, for an optimal acoustic coupling with the line source.

Single enclosure + SB18m	Line source + SB18m	
 <p>Recommended ratio 1 WIDE/FOCUS : 1 SB18m</p> <p>Frequency range (-10dB) 32Hz – 20kHz</p> <p>Enclosure WIDE/FOCUS [PRESET] ► [ARCS_WIFO_FI]</p> <p>SB18m ► [SB18_60]</p>	 <p>Flown horizontal with ground-stacked SB18m</p>	 <p>Mixed array</p> <p>Recommended ratio 1 WIDE/FOCUS : 1 SB18m</p> <p>Frequency range (-10dB) 32Hz – 20kHz</p> <p>Enclosure WIDE/FOCUS [PRESET] ► [ARCS_WIFO]</p> <p>SB18m ► [SB18_60]</p>



Delay settings

When combining a line source with subwoofers, delays may have to be added to the presets. Refer to the **LA8 PRESET LIBRARY user manual** to obtain the pre-alignment delay values.



Use [SB18_60_C] with an SB18m array in cardioid configuration

The cardioid configuration consists in reversing 1 element in an array of 4 subwoofers. Refer to the SB18 **user manual** for details about the CARDIOID mode.

4 LOUDSPEAKER CONNECTION

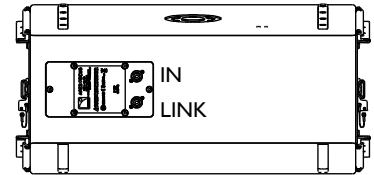
4.1 Connectors

The ARCS® WIDE and the ARCS® FOCUS are 2-way passive enclosures. The SB18m is a subwoofer enclosure. All of them are equipped with two 4-point SpeakON® connectors wired in parallel.

The IN connector allows receiving the audio signals, whereas the LINK connector allows routing them to another similar enclosure in parallel.

❗ Only use the LINK connector with the LA8 amplified controller.

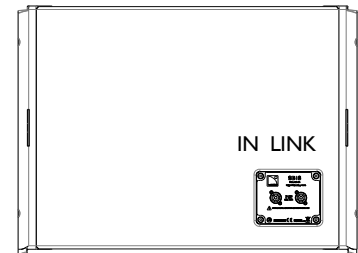
ARCS® WIDE / ARCS® FOCUS



i Internal pinout for ARCS® WIDE, ARCS® FOCUS and SB18m

SpeakON® points	1+	1-	2+	2-
Transducer connectors	+	-	Not used	Not used

SB18m



The ARCS® WIDE/FOCUS and the SB18m can be amplified by the LA4 or the LA8 amplified controller.

4.2 Connection to LA8

To cable the ARCS® WIDE/FOCUS or the SB18m with the LA8, two options are available:

Option A:

▶ Connect a **DO** cable (DO.7, DO10 or DO25) to the PA-COM® connector of the LA8 and use the **DOSUB-LA8** to split the audio signals into four channels, each one feeding one similar enclosure. ❗ With various enclosure types, for example 2 ARCS WIDE FOCUS and 2 SB18m, this cabling scheme needs a dedicated custom preset.

Option B:

▶ Connect an **SP** cable (SP.7, SP5, SP10 or SP25) to one of the SpeakON® connectors of the LA8, and use the **SP-YI** cable to split the audio signals into two channels, each one feeding one enclosure. The **CC4FP** adaptor allows interfacing the **SP** and **SP-YI** cables. Apply the same cabling scheme with the other LA8 SpeakON® connector.

One additional similar enclosure can be connected in parallel with each of the first ones, by using **SP** cables.



PA-COM® standard

Using cable other than specified in this document to connect a subwoofer via the PA-COM® connector of the LA8 may affect the acoustic results. Refer to the **LA8 PACOM CABLES technical bulletin**.



Maximum of 8 enclosures per LA8

2 ARCS® WIDE/FOCUS or 2 SB18m can be connected in parallel to each output channel on the LA8. Therefore, a single LA8 amplified controller can drive up to 8 enclosures (ARCS® WIDE/FOCUS or SB18m).



Impedance load

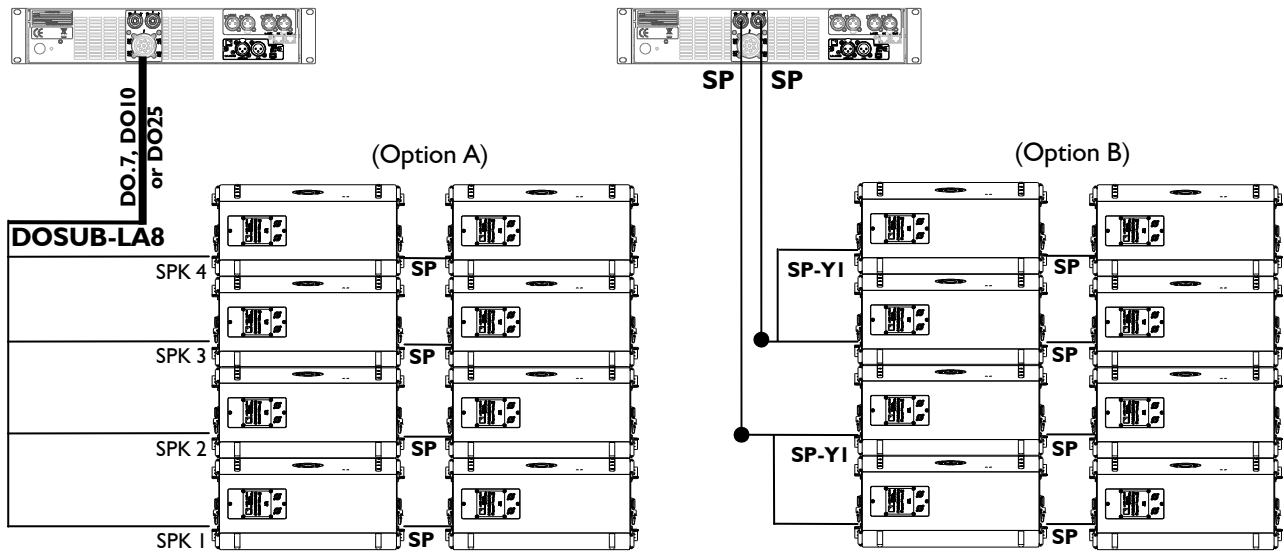
8 Ω for 1 enclosure, 4 Ω for 2 enclosures in parallel (ARCS® WIDE/FOCUS or SB18m).



Subwoofer array in CARDIOID configuration

The reversed sub must be connected to OUT 1.

Corresponding DOSUB-LA8 SpeakON® to LA8 output channels:
 SPK 1 = OUT 1 ; SPK 2 = OUT 2 ; SPK 3 = OUT 3 ; SPK 4 = OUT 4



Connecting 8 enclosures (ARCS® WIDE, ARCS® FOCUS or SB18m) to one LA8 with the DOSUB-LA8

4.3 Connection to LA4

To cable the ARCS®WIDE/FOCUS or the SB18m with the LA4 amplified controller, two options are available:

Option A:

► Connect an **SP** cable (SP.7, SP5, SP10 or SP25) to the OUT1 connector of the LA4, and use the **SP-YI** cable to split the audio signals into two channels, each one feeding one enclosure. The **CC4FP** adaptor allows interfacing the **SP** and **SP-YI** cables. Apply the same cabling scheme with the OUT3 connector to connect two more enclosures.

Option B:

► Use an **SP** cable (SP.7, SP5, SP10 or SP25) to connect one similar enclosure to each of the four LA4 output channels.



Maximum of 4 enclosures per LA4

1 ARCS®WIDE/FOCUS or 1 SB18m can be connected to each output channel on the LA4. Therefore, a single LA4 amplified controller can drive up to 4 SB18m subwoofers.



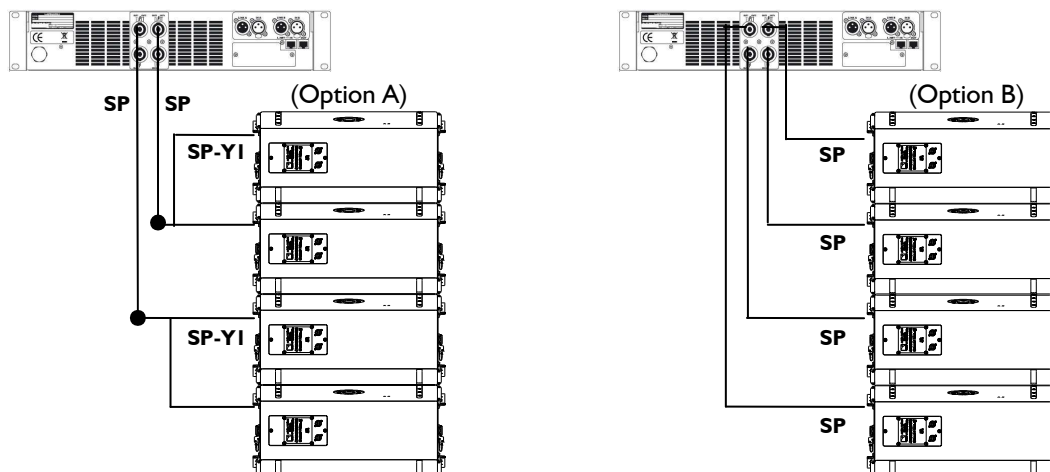
Impedance load

8 Ω for 1 enclosure (ARCS® WIDE/FOCUS or SB18m).



Subwoofer array in CARDIOID configuration

The reversed sub must be connected to OUT 1.



Connecting 4 enclosures (ARCS® WIDE, ARCS® FOCUS or SB18m) to one LA4

APPENDIX A: PRESET DESCRIPTION



The latest version of each **PRESET LIBRARY** and the corresponding **user manuals** are downloadable from the L-ACOUSTICS® web site.

[ARCS WIFO]: full range

To use ARCS®WIDE/FOCUS enclosures in FULL-RANGE mode, as a line source in standalone configuration, or in LOW-EXTENSION mode, as a line source in combination with SB18m subwoofers.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input Signal A	IN A	X	O	O	O
IN B	Input Signal B	IN B	X	O	O	O
OUT 1	ARCS®WIDE/FOCUS	PA A	O	O	O	O
OUT 2	ARCS®WIDE/FOCUS	PA A	O	O	O	O
OUT 3	ARCS®WIDE/FOCUS	PA B	O	O	O	O
OUT 4	ARCS®WIDE/FOCUS	PA B	O	O	O	O

* IN: input signal. A, B: channel A, B. PA: passive enclosure.

[ARCS WIFO FI]: full range fill

To use ARCS®WIDE/FOCUS enclosures in FULL-RANGE mode, as single elements in standalone configuration, or in LOW-EXTENSION mode, as single elements in combination with SB18m subwoofers.

Inputs/Outputs	Elements to connect	Routing *	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input Signal A	IN A	X	O	O	O
IN B	Input Signal B	IN B	X	O	O	O
OUT 1	ARCS®WIDE/FOCUS	PA A	O	O	O	O
OUT 2	ARCS®WIDE/FOCUS	PA A	O	O	O	O
OUT 3	ARCS®WIDE/FOCUS	PA B	O	O	O	O
OUT 4	ARCS®WIDE/FOCUS	PA B	O	O	O	O

* IN: input signal. A, B: channel A, B. PA: passive enclosure.

[SB18 60]: standard

To use SB18m subwoofers in STANDARD mode, as a single elements or within an array in standard configuration.

Inputs/Outputs	Elements to connect	Routing*	Accessible (O) and locked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN A	X	O	O	O
IN B	Input signal B	IN B	X	O	O	O
OUT 1	Subwoofer	SB A	O	O	O	O
OUT 2	Subwoofer	SB A	O	O	O	O
OUT 3	Subwoofer	SB B	O	O	O	O
OUT 4	Subwoofer	SB B	O	O	O	O

* IN: input signal. A, B: channel A, B. SB: subwoofer.

[SB18 60 C]: cardioid

To use SB18m subwoofers in CARDIOID mode, as an array in cardioid configuration.

Inputs/Outputs	Elements to connect	Routing*	Accessible (O) and blocked (X) parameters			
			Mute	Gain	Delay	Polarity
IN A	Input signal A	IN A	X	O	O	O
IN B	Input signal B	IN B	X	O	O	O
OUT 1	Reversed subwoofer	SR A	O	X	X	X
OUT 2	Subwoofer	SB A	O	X	X	X
OUT 3	Subwoofer	SB A	O	X	X	X
OUT 4	Subwoofer	SB A	O	X	X	X

* IN: input signal. A, B: channel A, B. SB: subwoofer. SR: reversed subwoofer.

APPENDIX B: RECOMMANDATIONS FOR SPEAKER CABLES



Cable quality and resistance

Only use high-quality fully insulated speaker cables made of stranded copper wire.

Use cables of gauge offering low resistance per unit length and keep the cables as short as possible.

The following table provides the recommended maximum length depending on the cable cross-section and on the impedance load connected to the amplifier.

Cable cross-section			Recommended maximum length					
			8 Ω load		4 Ω load		2.7 Ω load	
mm ²	SWG	AWG	m	ft	m	ft	m	ft
2.5	15	13	30	100	15	50	10	33
4	13	11	50	160	25	80	17	53
6	11	9	74	240	37	120	25	80
10	9	7	120	390	60	195	40	130



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