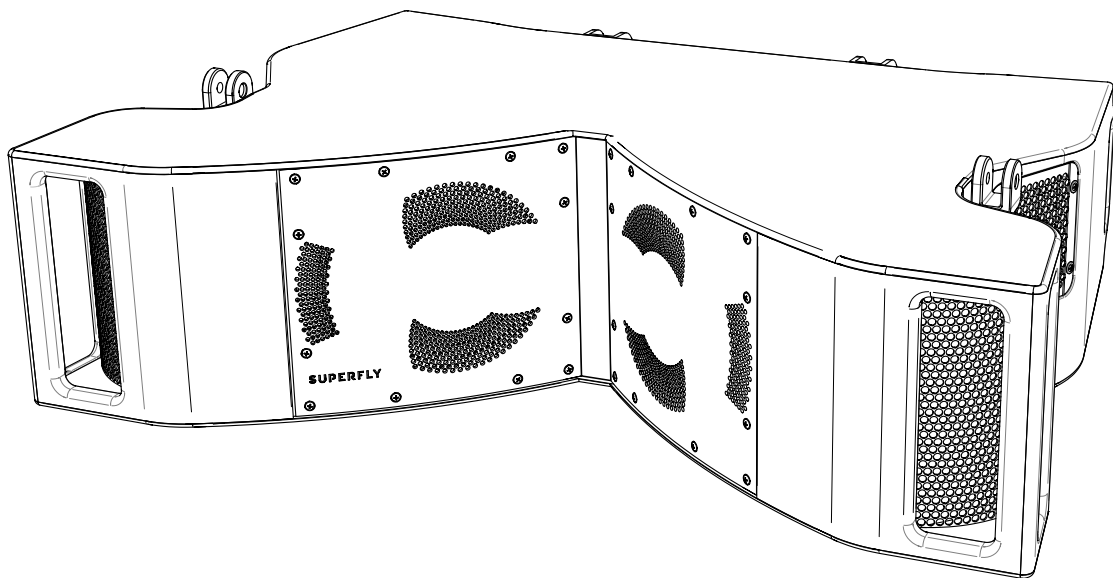




SUPERFLY

Advanced Loudspeaker Concept



OPERATING MANUAL

Superfly Operating Manual

Version: 2.0

Release date: 2022/10/07

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Refer all servicing to qualified personnel, through your Outline dealer.

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1. SAFETY INSTRUCTIONS

We suggest you dedicate some time reading this manual in order to get to know this product in depth and ensure you make the most of its use.

It is important to remain at a suitable distance from the sound reinforcement system, particularly when it is used at high spl.

The *Superfly* system is designed for sound reinforcement in medium-large sized venues and, due to its performance, could cause hearing damage.

Safety precautions to be adopted are as follows:

- for all the information regarding the installation of the system (rigging, derigging and all related matters) the “*Superfly / Mantas 28 Rigging Manual*” must be consulted;
- any configuration of an Outline line array system must **necessarily** be designed and verified with OpenArray2 simulation software;
- for installation, the staff involved must know and be familiar with the safety procedure to follow in these situations;
- it is absolutely inadvisable to use material, cables, amplifiers, acoustic prediction software or anything else that is not expressly foreseen by Outline.

Outline declines any and all responsibility for damage or faulty operation caused by using the *Superfly* system in a different way from that expressly foreseen and specified:

- uncertified or unauthorized modification to any part of the system can damage the system, compromising its real efficiency and safety;
- it is advisable to carry out periodic inspections/ checks and any necessary maintenance of the systems, cables and the amplifiers before using them. In the event of wear or accidental damage of the components, Outline will provide specific support for their replacement;
- frequently check the conditions and correct operation of the mechanical parts (details can be found in the “*Superfly / Mantas 28 Rigging Manual*”).

Since the system is equipped with loudspeakers/ transducers that produce a static magnetic field, it is strongly advisable to keep any electronic devices or magnetic media of any type (computers, hard disks, magnetic card, etc) at a suitable distance (approximately 1 metre) from the loudspeakers.

1.1. INSTRUCTIONS FOR DISPOSAL



The product is designed and manufactured with high quality materials and components, which can be recycled and reused. When this symbol of the crossed “wheelie” bin is attached to a product, it means that the product is covered by the European Directive 2012/19/EU and successive amendments. This means that the product must NOT be disposed of with other household-type waste.

Users are responsible for the disposal of their electric and electronic equipment, consigning it to an approved disposal facility. For further information on where it is possible to send equipment for recycling, contact your local distributor. Correct disposal of the old product will help to prevent potential negative consequences for the environment and people's health.

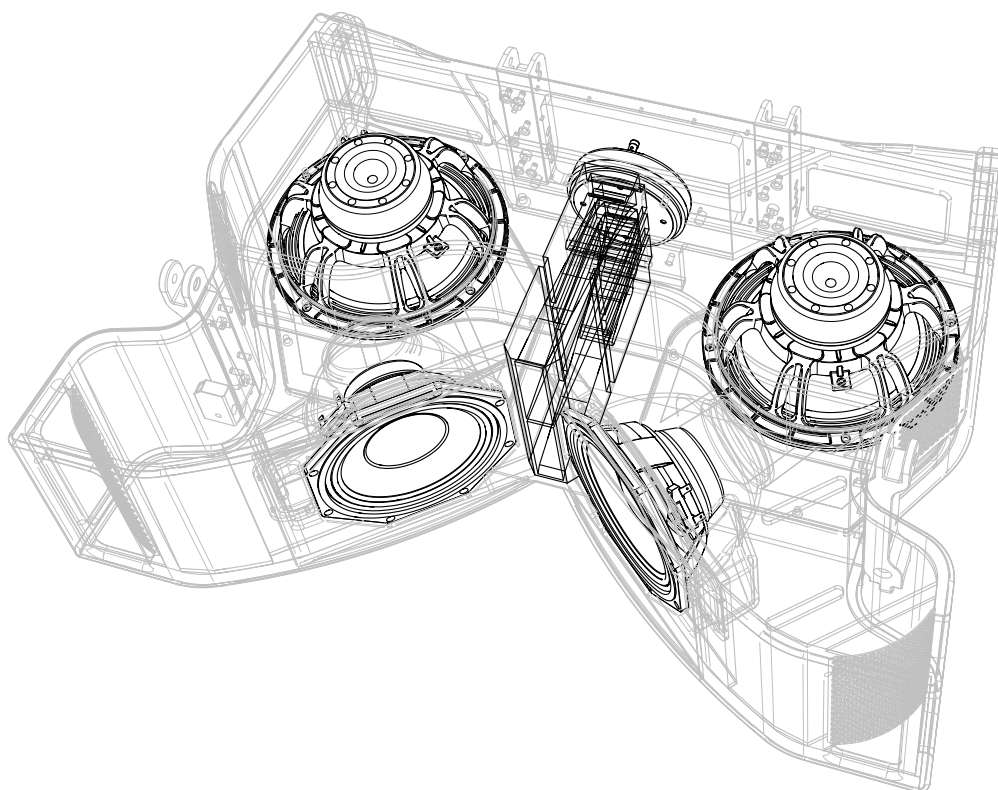
1.2. CONFORMITY AND WARRANTY



All Outline electro-acoustic and electronic devices are in conformity with the provisions of EC/EU directives (as stated in our CE declaration of conformity).

The CE declaration of conformity is attached to the product warranty certificate and is shipped with the product.

2. SYSTEM DESCRIPTION



As in all Outline products, every single component, the cabinet and relative dimensions, are the result of accurate choices following specific studies based on the idea of the design of the element in question, regarding its use as part of a complete system.

Superfly is a three-section active system with no passive crossover filter and fitted with:

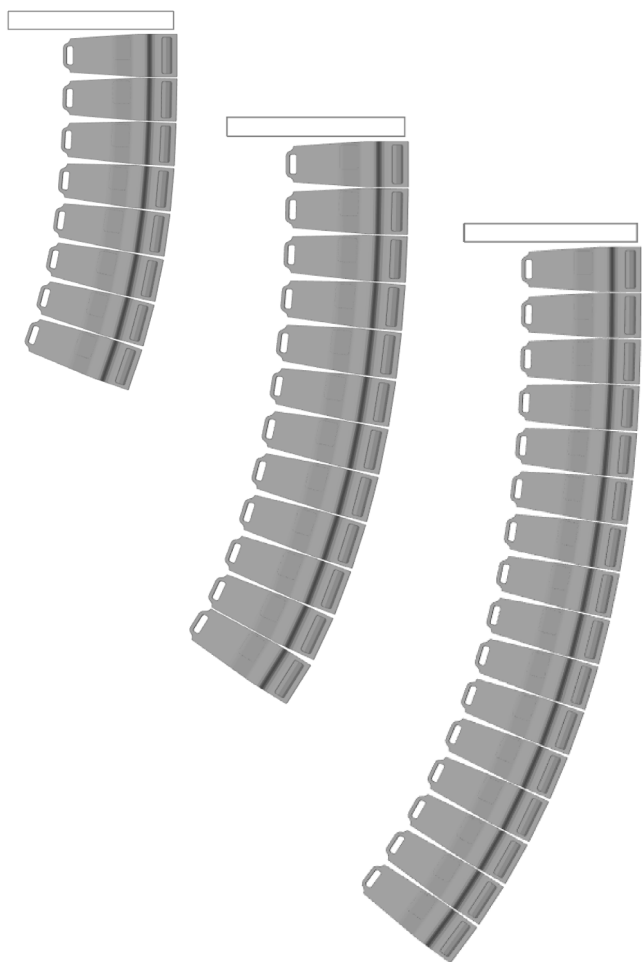
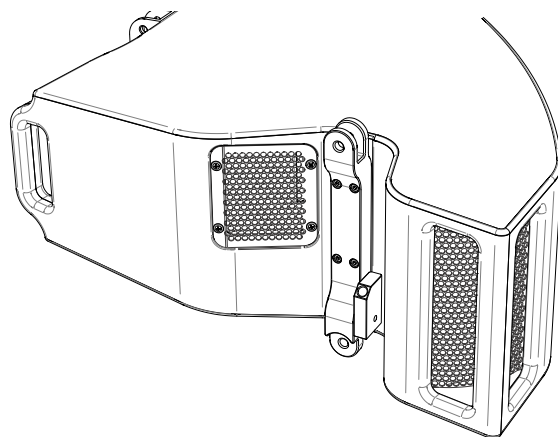
- two 10" woofers with double reflex (band-pass) loading for the low frequency section (two separate amplification channels);
- two 8" mid-woofers coupled with band-pass hybrid loading with partially horn-loaded output for the mid frequencies (one amplification channel);
- a compression driver with a 3" diaphragm, coupled with a D.P.R.W.G. waveguide, and a constant directivity horn for accurate horizontal dispersion control for the high frequency section (one amplification channel).

The cabinet is constructed Baltic birch plywood and undergoes a precise assembly process: some parts are made with curved wood, whereas other sections are formed from appropriately shaped panels. This enables to obtain a very rigid cabinet without any internal resonance. Useful external handles are fitted to facilitate handling and installation to the utmost. The material used, along with the polyurea coating, enables the system to be used even in the event of rain.

The flying hardware is built into the cabinet's structure: the side bars are fixed, whereas the rear ones have moveable elements that enable to set the flying angle. All bars are manufactured in anodized aluminium alloy to ensure that they are light-weight and long-lasting, whereas the quick-locking pins are in steel and ensure anchorage. Rigging instructions are contained in the "*Superfly/Mantas 28 Rigging Manual*".

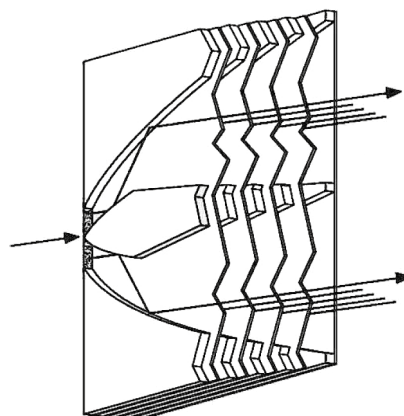
A special features of the *Superfly* is its application of **SART** (Side Acoustic Rejection Technology), which consists in the particular acoustic structure of the LF section, specifically designed to concentrate the low frequencies' energy on the sound projection axis and minimize side emission.

This enables to achieve improved horizontal dispersion control, thanks to which considerable benefits will be obtained, for example, on particularly reverberant stages and/or venues where acoustic energy dispersed outside the required coverage area would cause several problems.



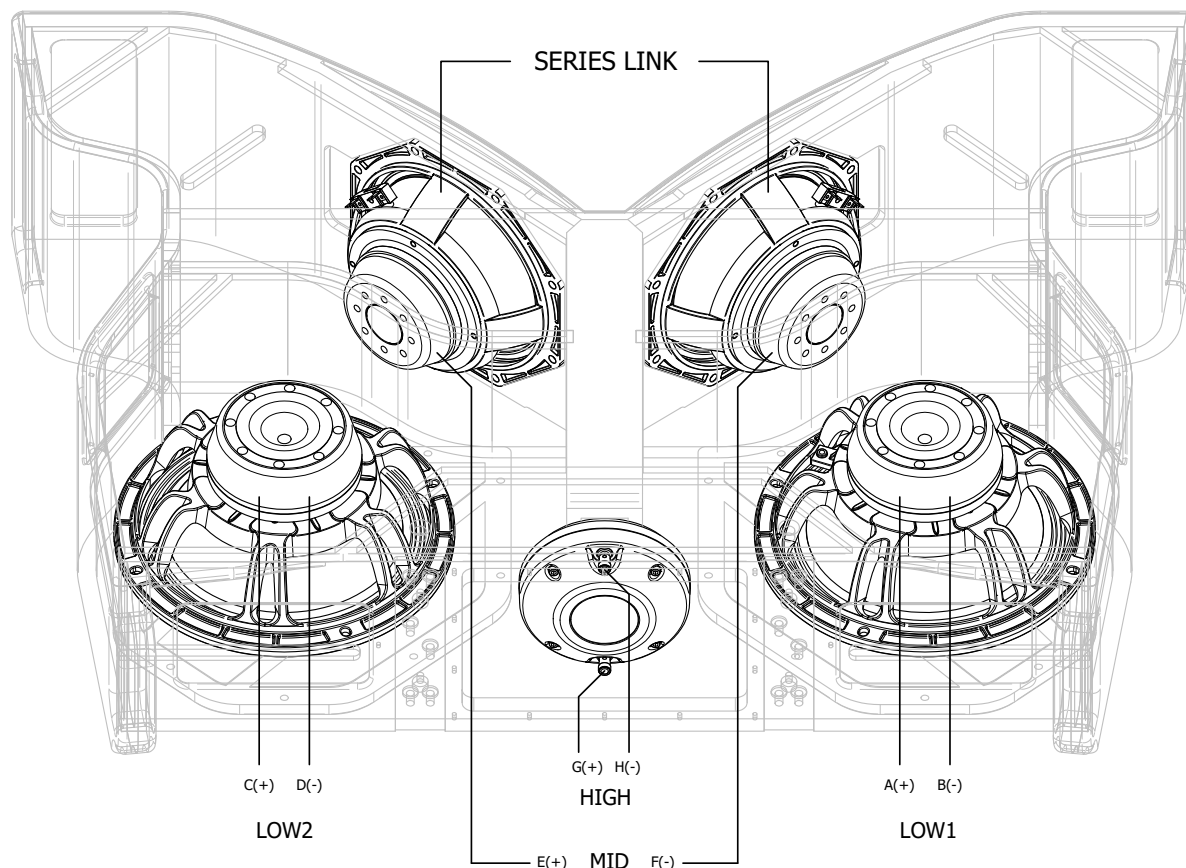
One of *Superfly*'s strong points is its wide frequency response, from 50 Hz to 20 kHz. This enables to obtain:

- the extended bottom end of the low frequencies, even without dedicated subwoofers, makes the *Superfly* system truly "self-sufficient" for a large number of situations;
- powerful controlled emission of the mid frequencies, thanks to the exploitation of the external portion of the horn, shared with the high frequency section;
- a long coherent throw up to the highest frequencies, thanks to the use of a D.P.R.W.G, waveguide, which is also loaded by the constant directivity horn that controls horizontal dispersion for the entire frequency range emitted by the MF and HF sections.



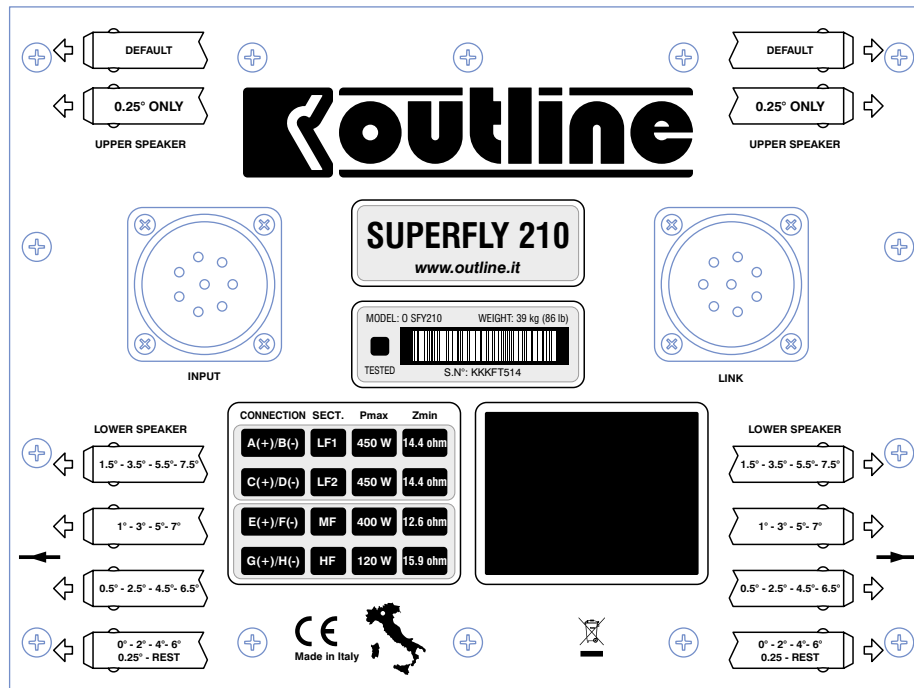
D.P.R.W.G. concept

3. WIRING



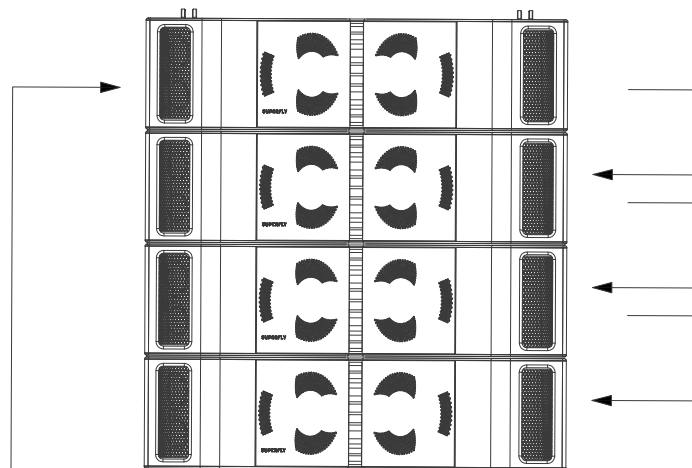
Superfly requires 8-pole cable, compatible with the LK08 connectors on his panel:

- A[+]/B[-] → LOW1
- C[+]/D[-] → LOW2
- E[+]/F[-] → MID
- G[+]/H[-] → HIGH



It is important to periodically check the conditions of the cables and connectors, as they carry voltage that is potentially dangerous in the event of coming into direct contact with parts of the body.

These checks are also carried out to prevent any damage to the components and amplifiers, and above all to avoid faulty system operation.



The nominal impedance is 16 Ohms for each of the four power channels. This enables to link up to four elements in parallel on the same number of amplification channels, thus obtaining optimum energy transfer from the amplifiers to the sound system.

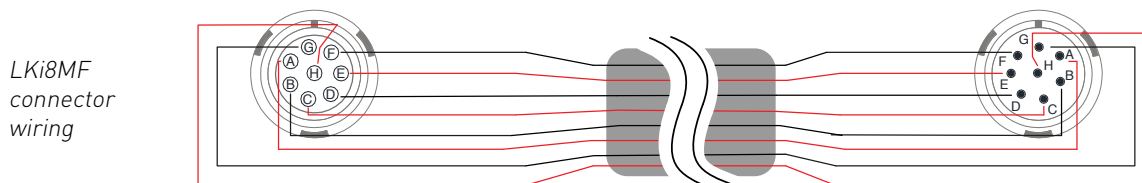
The components' electroacoustic characteristics are therefore sized coherently with the aforementioned criteria to obtain maximum dynamic performance from the array, while also ensuring conditions of extreme reliability and very low distortion.

3.1. CONNECTOR SPECIFICATIONS

The connection is available on the *LK08* connectors (8-pin). Using *LKi8MF-25* cable (male/female 8-pole), with its standard length of 25 m, allows the wiring of arrays flown at considerable height. However, by means of a specific adaptor, it is possible to create an extension by connecting two or more cables of this type.

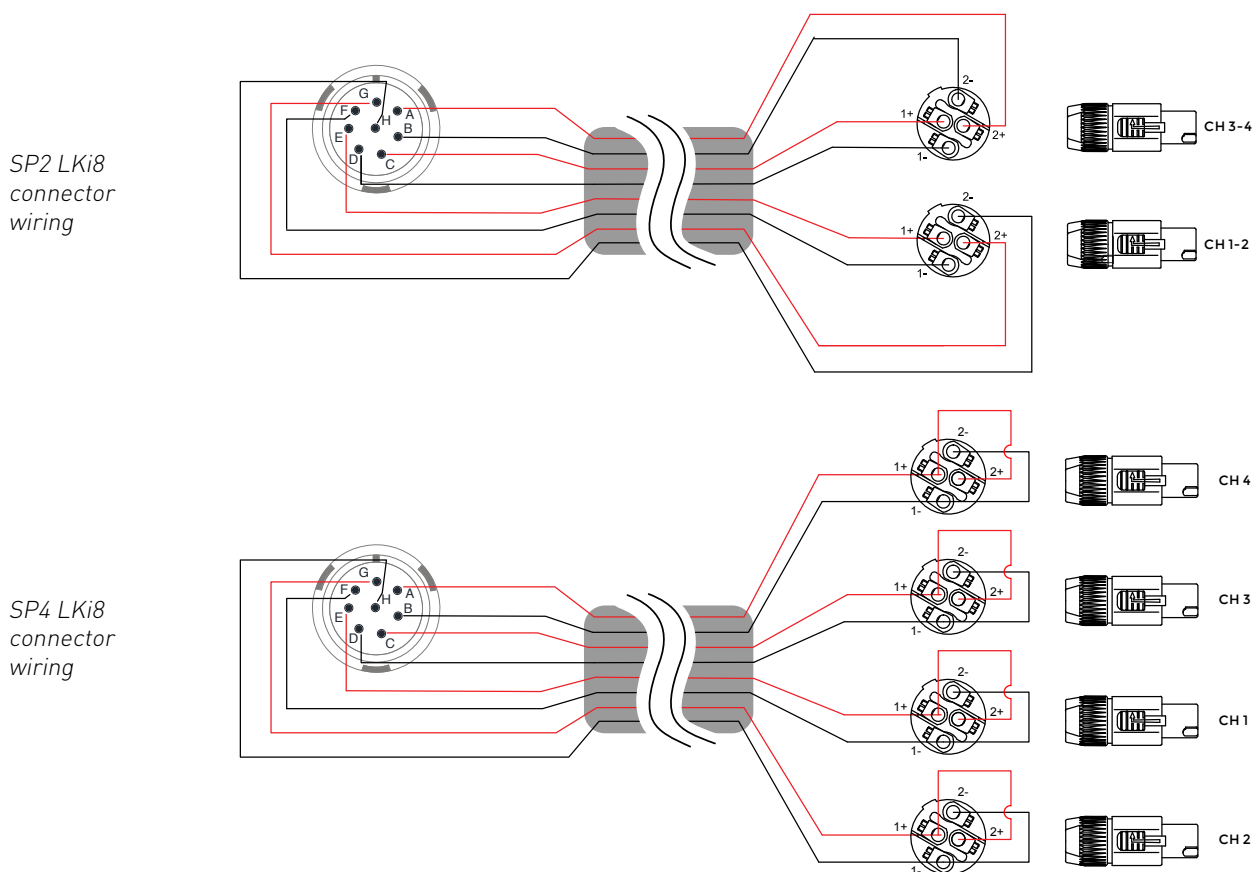
The *LKi8MF-0.9* cable on the other hand is for linking array elements (male/female 8 pin, length 0.9 m). Further details can be found in the table in chap. 3.2.

As far as connectors' wiring is concerned, it is depicted in the following diagram (identical for all Outline products with this type of connector):



The *SP2-LKi8* cable allows the wiring of elements such as front-fill speakers, down-fill enclosures, etc. fitted with speakON NL4 connectors, with the same panels of the amplifier racks used for *Superfly*.

For elements such as Outline DBS 18-2 subwoofers *SP4 LKi8* cables are foreseen, which have 4 speakON NL4, of which 2 are in parallel:



3.2. CABLES AND ILLUSTRATIONS

	CODE	DESCRIPTION
	LKI8MF-25	25 m loudspeaker cable (male/female, 8 poles x 4 mm ²)
	LKI8MF-0.9	0,9 m loudspeaker cable (male/female, 8 poles x 4 mm ²)
	SP2 LKI8-15	15 m loudspeaker cable (8 poles x 4 mm ²) with LKI8/2 speakon connectors
	SP2 LKI8-25	25 m loudspeaker cable (8 poles x 4 mm ²) with LKI8/2 speakon connectors

	CODE	DESCRIPTION
	SP4 LK18-11	10 m subwoofer cable (8 poles x 4 mm ²) with LK18/4 speakon connectors
	SSVLK18MF	Male/female adaptor for LK18 cables
	MPULK-3X8	3U Distro unit, 5 poles 32 A line mains plug 3TH+N+E, 6xLK8 loudspeaker sockets for #3 GTA power amplifiers
	CABLA1-0X8	2U Distro unit, 2 x LK8 loudspeaker sockets, 8x Speakon for #1 GTA power amplifiers

4. AMPLIFICATION

The *Superfly* system is designed to be used with four amplifier channels.

It must be driven by the suggested Outline amplifiers with DSP presets, which provide dedicated signal processing for each section ensuring safe

working condition and expansive dynamics.

Using any other device may cause damage to the loudspeaker components and affect performance.

Make sure the linked elements do not exceed the maximum number of elements per channel.

Available Outline amplifiers: GTA series, TTM12K4.

4.1. SUPERFLY PRESET

ArmoníaPlus, amplifiers' management software, offers a loudspeaker preset library. It is available for free from the Armonía website, where a startup guide and in-depth tutorials are also provided.

The preset can be loaded connecting the amplifiers

to a PC running the software through a Fast Ethernet connection.

It is possible to manage parameters such as levels, delay, polarity and input EQ.

4.2. AVAILABLE PRESETS

Superfly requires dedicated presets for the control of its four sections.

As mentioned before, *Superfly* presets has four ways, therefore loading the preset involves automatically the first and the next three channels of the amplifier as depicted in the picture below.



The order in which the sections are loaded follows the same standard used in the wiring panels: MF (mid), HF (high), LF1 (low), LF2 (low).

Two presets are available in order to deliver the optimal frequency response for each section of the system, according to the application:

- *Full-range*, i.e. without subwoofer;
- *High-pass*, designed to use with companion subwoofers, with a 70 Hz high-pass filter.

4.3. MANUFACTURER EQ

Manufacturer EQs are a set of equalizations aimed at settling known behaviors: compensate low frequencies (loudspeakers coupling), air loss (long, medium, short throw).

There are two categories (A, B) available:

- Category A: selectable amount of boxes that make up the array to compensate loudspeaker coupling, providing the right contour for the system configuration. All the array elements

shall operate with the same Manufacturer EQ;

- Category B: selectable distance (meters) to be covered in order to compensate the loss of high frequencies level, due to air absorption. The array elements can operate with different Manufacturer EQ, according to the distance that every element (or group of elements) need to cover.

Outline declines any responsibility (as well as expired warranty) in case of use with settings other than the official ones provided by Outline library, as these would involve risks for the sound system.

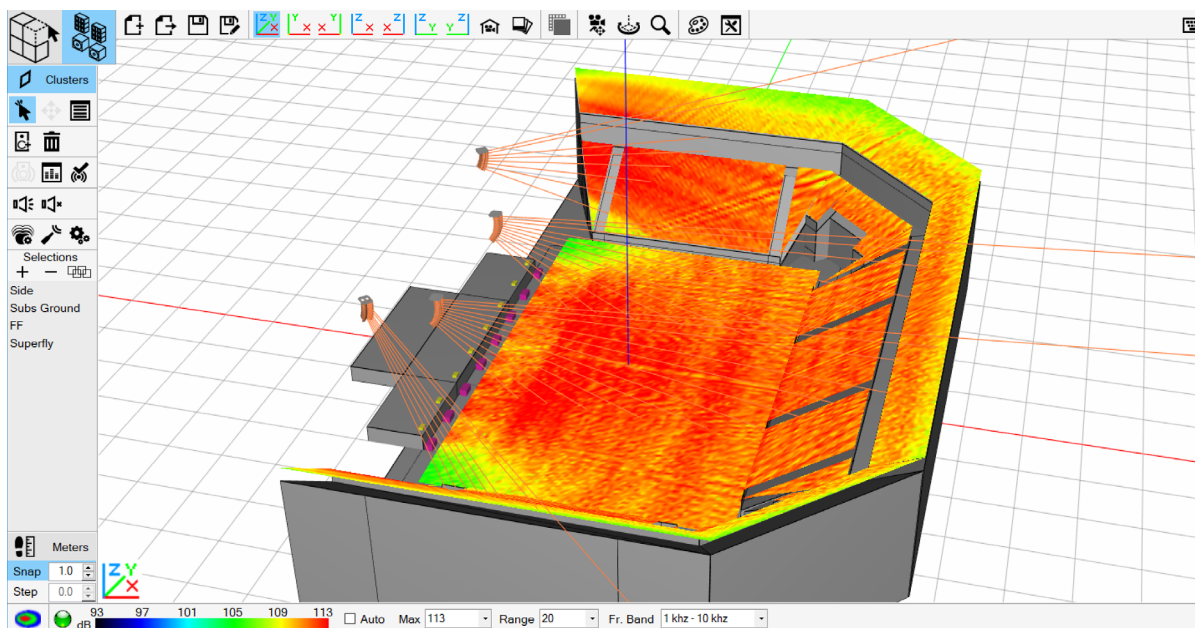
5. OPEN ARRAY 2 AND AIMING

OpenArray is proprietary Outline software for 3D simulation of electro-acoustic events.

A particular feature of OpenArray is its ability to predict direct field sound pressure distribution resulting from the interaction of different sound sources.

Any configuration of an Outline line array system must **necessarily** be designed and mechanically verified with OpenArray2 simulation software.

For a first approach to the software, a quickstart guide with a workflow example is provided on our website.



OpenArray2 mechanical simulation takes into account normal environmental conditions.

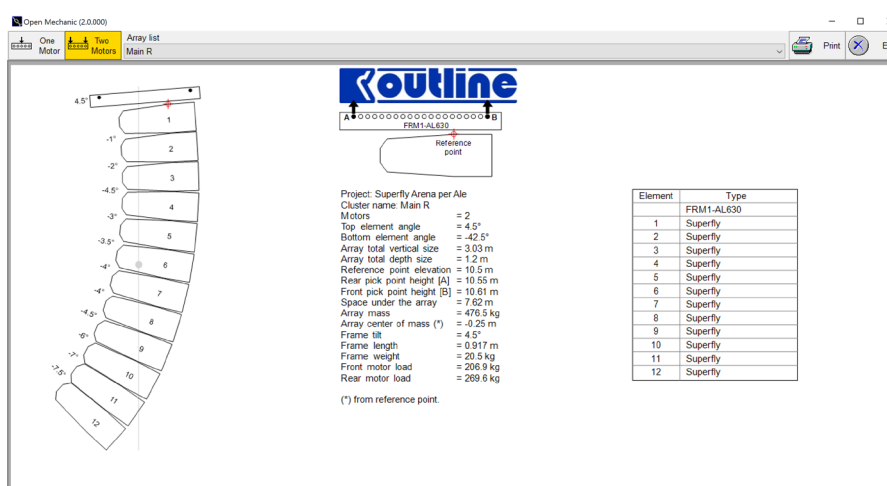
Elements such as strong wind, low or high temperatures, etc. require a higher safety factor.

Assess, on a case-by-case basis, which measures

to adopt, in relation to the risks specifically identified.

Depicted here below an example of the mechanical report provided by Open Mechanics.

All the details to properly install the system can be found in the "Superfly/Mantas 28 Rigging Manual".



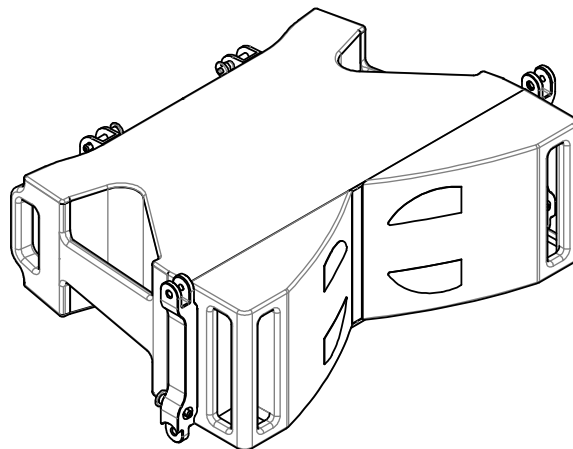
6. MANTAS 28 DOWNFILL

Superfly systems are designed to have a medium-long throw, so their 90° horizontal directivity enables to concentrate the acoustic energy properly over long distances.

On the other hand, for audience areas closer to the array, it may be necessary to use enclosures with wider horizontal directivity for correct sound reinforcement.

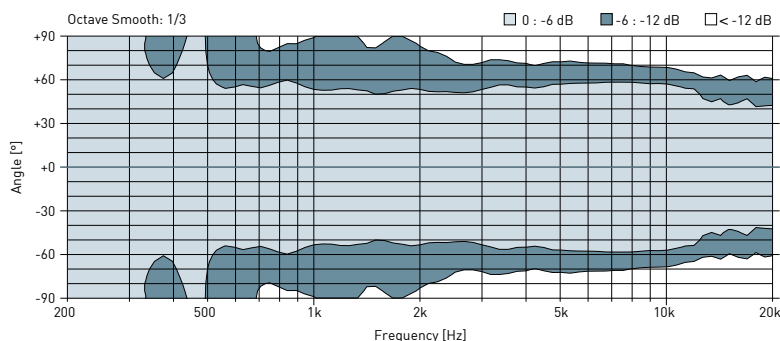
Along with *Superfly*, Outline **Mantas 28** shares the same mechanical hardware as *Superfly* (see *Superfly/Mantas 28 rigging manual*). Having a horizontal directivity of 120°, it can be used as downfill system without the use of adaptors.

It is also suitable for medium-sized events as sidefill system.

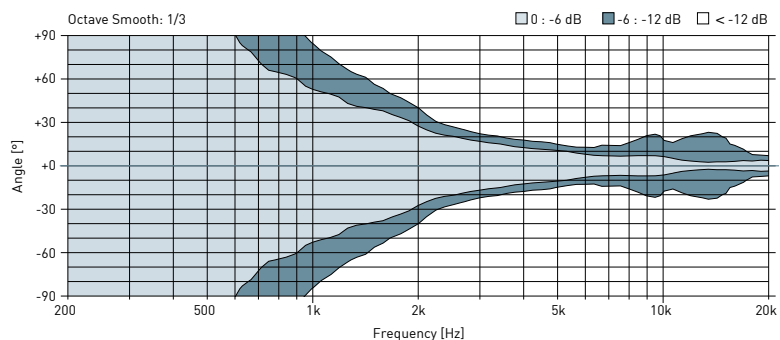


Mantas 28 is a two-way system equipped with two partially horn-loaded bandpass 8" woofers and a 3" diaphragm compression driver coupled with a D.P.R.W.G. waveguide.

Further details on www.outline.it



Mantas28: horizontal isobar diagram



Mantas28: vertical isobar diagram

7. RAPID CHECKS : FASTQC-LS

It is always advisable to carry out a check of the system's electroacoustic components, before every use, in order to ensure perfect operation.

Outline created **FASTQC-LS**, a battery powered tool, so it can be used even without a power supply.

FASTQC-LS was designed for simultaneously measuring the resistance of each Outline element with several sections.

It features a NL4 and LK08 connectors.

All the parameters for each enclosure are stored on board.

For standard use, connect it to the element to be measured with a short cable (e.g. the link cable used to connect enclosures in parallel), select the preset corresponding (↑↓) to the enclosure that needs be tested and press the “measure” button.

The result is shown on the display and via the LEDs on the panel. If the measurement of each section is within the limit values, the result is positive.

In case of negative result (the resistance is too high or too low, or there is a shortcircuit) the loudspeaker will have to be tested more thoroughly.

For further details on its use, head to *FASTQC-LS* manual on www.outline.it



8. TECHNICAL SPECIFICATIONS

PHYSICAL

Component Low	2 x 10" NdFeB double reflex band-pass loaded woofer
Component Midrange	2 x 8" NdFeB partially horn loaded mid woofer
Component High	1 x 3" diaphragm NdFeB compression driver, DPRWG loaded
Connectors	2 x LK18 in parallel (8-pin, military grade)
Cabinet Material	Baltic birch plywood
Cabinet Finish	Black polyurea coating
Grill	Epoxy powder coated
Rigging	Integrated high-load aluminium hardware
Height	239 mm - 9 3/8"
Height (rigging included)	278 mm - 11"
Width	909 mm - 35 3/4"
Depth	636 mm - 25"
Weight	38 kg - 83.8 lb

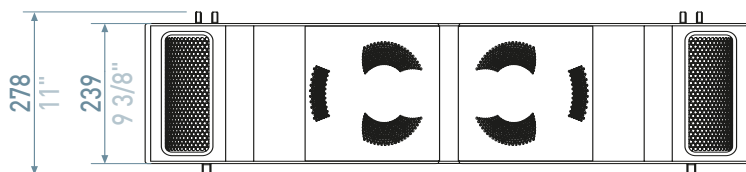
PERFORMANCE SPECIFICATIONS

Frequency Response -10 dB	50 Hz - 20 kHz
Horizontal Dispersion	90°
Vertical Dispersion	Array design dependent
Splay Angles available (Degrees)	from 0° to 7.5° in 0.5° step with additional 0.25° position
Operating configuration	Quad-amplified
Impedance Low (Nom / Min)	2 x 16 Ω / 2 x 14.4 Ω
Impedance Midrange (Nom / Min)	16 Ω / 12.6 Ω
Impedance High (Nom / Min)	16 Ω / 15.9 Ω
Watt AES Low (Continuous / Peak)	2 x 450 W / 2 x 1800 W
Watt AES Midrange (Continuous / Peak)	400 W / 1600 W
Watt AES High (Continuous / Peak)	120 W / 480 W
Maximum SPL Output, one box *	143 dB SPL
Maximum SPL Output, four boxes *	155 dB SPL

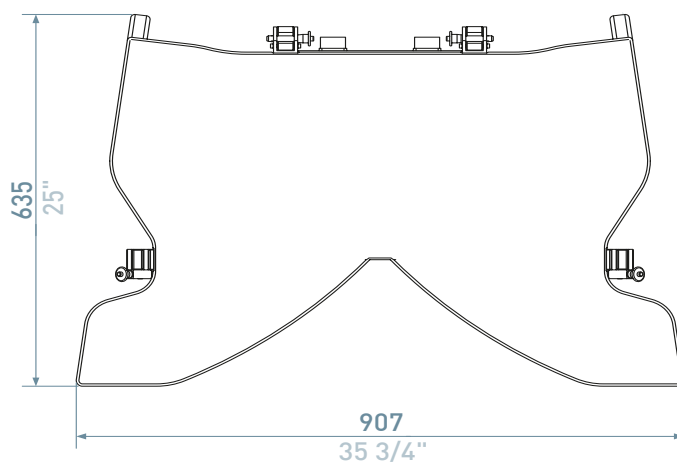
** calculated using +10 dB Crest Factor signal @ 1 m, free field*

9. OVERALL DIMENSIONS

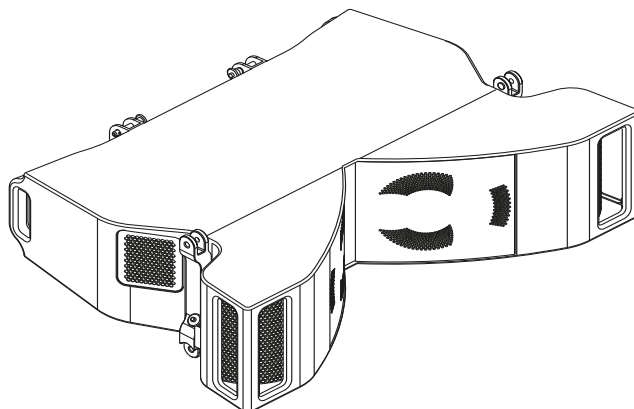
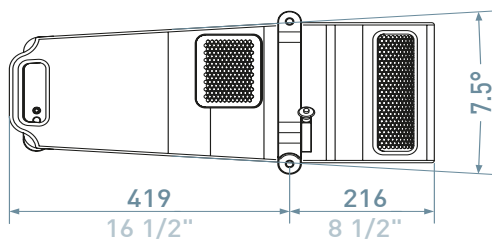
FRONT VIEW



TOP VIEW



SIDE VIEW



10. NOTES

NOTES



Outline carries out on-going research for product improvement. New materials, manufacturing methods and design upgrades are introduced to existing products without prior notice as a routine result of this philosophy. For this reason, any current Outline product may differ in some aspect from its description, but will always equal or exceed the original design specifications unless otherwise stated.

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