



professional
ACTIVE
LINE ARRAY
MODULE



Touring audio solutions



SAFETY PRECAUTIONS

Before connecting and using the amplifier, please read this instruction manual carefully and keep it on hand for future reference. The manual is to be considered an integral part of the product and must accompany the amplifier when it changes ownership as a reference for correct installation and use as well as for the safety precautions. RCF S.p.A. will not assume any responsibility for the incorrect installation and/or use of the product.

⚠ WARNING: To prevent the risk of fire or electric shock, never expose this equipment to rain or humidity.

1. All the precautions, in particular the safety ones, must be read with special attention, as they provide important information.
2. The power supply voltage of this equipment is sufficiently high to involve a risk of electrocution; therefore, never install or connect the product with the power supply switched on.
3. Before powering up the amplifier, make sure that all the connections have been made correctly and that the voltage of your power mains corresponds to the voltage shown on the rating plate on the unit; if it does not, please contact your RCF dealer.
4. The metallic parts of the unit are earthed by means of the power cable. In the event that the current outlet used for power does not provide the earth connection, contact a qualified electrician to earth the equipment using the dedicated terminal.
5. To protect the power cable from damage, make sure that it is positioned so that it cannot be stepped on or crushed by objects.
6. To prevent the risk of electric shock, never open the amplifier. There are no parts on the inside that the user needs to access.
7. Make sure that no objects or liquids can get into the amplifier, as this may cause a short circuit.
8. Never attempt to carry out any operations, modifications, or repairs that are not expressly described in this manual. Contact your authorized service centre or qualified personnel should any of the following occur:
 - the amplifier does not function (or functions in an anomalous way);
 - the power supply cable has been damaged;
 - objects or liquids have got into the unit;
 - the amplifier has been subject to heavy impact.
9. When the amplifier is not to be used for long periods of time, switch it off and disconnect the power cable.
10. If the amplifier begins to emit any strange odours or smoke, switch it off immediately and disconnect the power supply cable.
11. Do not connect this product to any equipment or accessories not specified.

For suspended installation, only use the dedicated anchoring points and do not try to hang this product using HANDLES or elements that are unsuitable or not specific for this purpose.

Also check the suitability of the support surface to which the product is anchored (wall, ceiling, structure, etc.), and the components used for attachment (screw anchors, screws, brackets not supplied by RCF etc.), which must guarantee the security of the system/installation over time, also considering, for example, the mechanical vibrations normally generated by the transducer.

To prevent the risk of falling equipment, do not stack multiple units of this product unless this possibility is specified in the instruction manual.

12. RCF S.p.A. strongly recommends this product is installed by professional qualified installers (or specialised firms) who can ensure correct installation and certify it according to the regulations in force.

THE ENTIRE AUDIO SYSTEM MUST COMPLY WITH THE CURRENT STANDARDS AND REGULATIONS REGARDING ELECTRICAL SYSTEMS.

13. SUPPORTS AND TROLLEYS

The equipment should only be used on trolleys or supports, where necessary, that are recommended by the manufacturer. The equipment/support/trolley assembly must be moved with extreme caution. Sudden stops, excessive pushing force and uneven floors may cause the assembly to overturn.

14. There are numerous mechanical and electrical factors to be considered when installing a professional audio system (in addition to those which are strictly acoustic, such as sound pressure, angles of coverage, frequency response, etc.).

15. HEARING LOSS

Exposure to high sound levels can cause permanent hearing loss. The acoustic pressure level that leads to hearing loss is different from person to person and depends on the duration of exposure. To prevent potentially dangerous exposure to high levels of acoustic pressure, anyone who is exposed to these levels should use adequate protection devices. When a transducer capable of producing high sound levels is being used, it is therefore necessary to wear ear plugs or protective earphones. See the technical specifications in the instruction manual for the maximum sound pressure the loudspeaker is capable of producing.

IMPORTANT NOTES

To prevent the occurrence of noise on the cables that carry microphone signals or line signals (for example, 0 dB), only use screened cables and avoid running them in the vicinity of:

- equipment that produces high-intensity electromagnetic fields (for example, high power transformers);
- mains cables;
- lines that supply loudspeakers.

OPERATING PRECAUTIONS

Do not obstruct the ventilation grilles of the unit. Situate this product far from any heat sources and always ensure adequate air circulation around the ventilation grilles.

Do not overload this product for extended periods of time.

Never force the control elements (keys, knobs, etc.).

Do not use solvents, alcohol, benzene or other volatile substances for cleaning the external parts of this product.

NX SERIES

TOURING AUDIO SOLUTIONS

The NX Series - a new line of active loudspeakers specifically designed to be the everyday tool for rental companies and professional musicians. With its ultra compact design and choice of formats, together with high output levels, NX Series is the answer to a wide variety of production requirements.

The NX is reliable, easy to use and versatile: for every rental company, musician, venue and audio/visual provider, this high-performance self-powered speaker system offers a degree of simplicity unmatched by traditional amp and speaker PA systems.

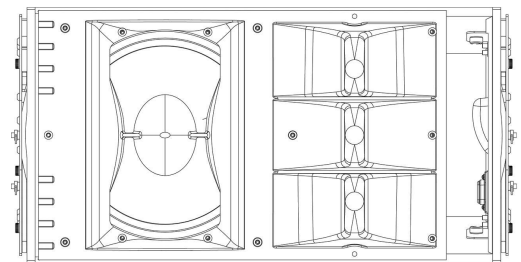
NX Series is a practical solution for high intelligibility speech and audio applications, covering infill or delay, production studios, presentations and high power music sound reinforcement with or without subwoofers. A key requirement for everyday audio systems, delivering simple 'plug and play' solutions, without compromising performance and portability.

Legendary RCF transducer technology coupled with state of the art digital amplification topology resulting in a perfectly optimized loudspeaker series. The NX Series provides high end audio coverage even at extreme sound pressure levels, unmatched reliability and acoustic compatibility across the whole series.

The NX Series offers a wide range of practical mounting hardware, to cover all aspects of system integration, which assist in the overall simple and effortless system set-up, redefining the high performance portable PA.

NX L23-A, ACTIVE LINE ARRAY MODULE

The NX L23-A is a very compact, self-powered, 2-way line array loudspeaker module. The 750-watt Class-D amp modules accurately match the high quality analog signal input boards with precise, complex filter responses that result in the natural, detailed reproduction of the best direct radiating designs. NX L23-A is the ideal choice when line-array performance is needed but the venue size doesn't call for the very long-throw characteristics of larger line-arrays and a fast and easy setup is a must. The NX L23-A speaker deliver extraordinary power handling, clarity, flexibility and great sound in a compact, easy to handle and affordable package.



THE INPUT SECTION PROVIDES:

- In/Out XLR connectors
- system volume control
- 2 configuration switch
- 4 status LEDs

NX L23-A IS A 2-WAY ACTIVE SYSTEM FEATURING:

- 12" neo woofer, 3,5" voice coil in horn loaded configuration
- 3 x 1" exit, 1,75" mm voice coil neo compression driver
- 90° x 15°, constant directivity coverage angle.

THE NX L23-A AMPLIFIER SECTION FEATURES:

- 750 watt switching power supply module
- 500 watt low frequency digital amplifier module
- 250 watt high frequency digital amplifier module
- extra capacitor bus able to sustain the voltage for 100 ms burst signals

The total available power supply power is 750 watts and can be distributed to the 2 final amplifier sections. Each amplifier section has a very high maximum output power capability in order to provide, when necessary, maximum output bursts in a specific frequency range.

REAR PANEL FEATURES AND CONTROLS

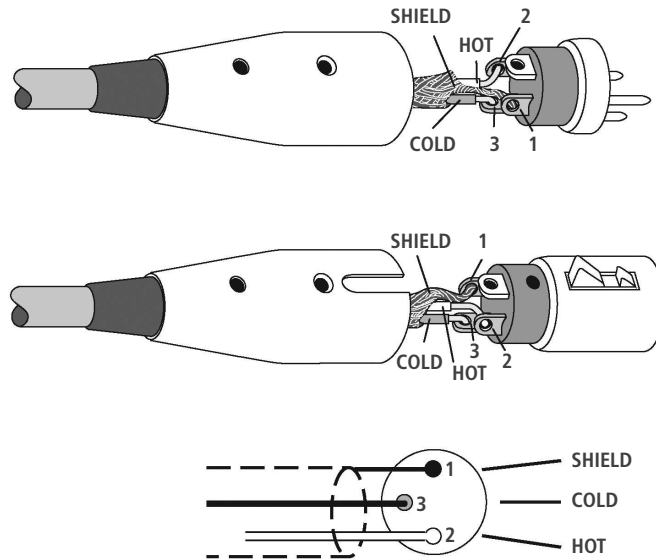


- 1 MAIN XLR INPUT (BAL/UNBAL)**
The system accept female XLR input connectors and line-level signals from a mixing console or other signal source.
- 2 LINK XLR OUTPUT**
The output XLR male connector provides a loop trough for speakers daisy chaining.
- 3 VOLUME**
Controls the volume of the power amplifier. The control ranges from $-\infty$ (maximum attenuation) to the MAX level (maximum output).
- 4 POWER INDICATOR**
Power on indicator. When the power cord is connected and the power switch is turned on this indicator lights green.
- 5 STATUS INDICATOR**
The status indicator lights orange if the main amplifier or power supply is in faulty condition. If the status indicator lights orange, switch off the amplifier and call the closest RCF SERVICE CENTRE.
- 6 SIGNAL INDICATOR**
The signal indicator lights green if there is signal present on the main XLR input.
- 7 LIMITER INDICATOR**
The amplifier has a built in limiter circuit to prevent clipping of the amplifiers or overdriving the transducers. When the peak clipping circuit is active the LED blinks orange. It is okay if the limit LED blinks occasionally. If the LED blinks frequently or lights continuously, turn down the signal level. The amplifier has a built in RMS limiter. If the RMS limiter is active the LED lights red. The RMS limiter has the purpose to prevent damages the transducers. The speaker shall never be used with the limit indicator red, continuous operation with the RMS protection active can cause damages to the speaker.
- 8 LF SHAPE**
The combination of the 2 switches gives 4 possibilities of mid low frequencies correction depending on cluster size:
- 1 module (used for pole mount applications)
- 2-3 modules (ground stacking - small flown systems)
- 4-5 modules (medium flown systems)
- 6-8 modules (maximum flown configuration).
- 9 HF BOOST**
The switch gives the possibility to set high frequencies correction depending on target distance (air absorption correction):
- LINEAR (used for pole mount applications or near field)
- ARRAY (for farthest field).
- 10 AC POWERCON RECEPTACLE**
RCF NX series uses a POWERCON locking 3-pole AC mains. Always use the specific power cord provided in the package.
- 11 AC POWERCON LINK RECEPTACLE**
Use this receptacle to link one or more units. Always make sure that the maximum current requirement does not exceed the maximum admitted POWERCON current. In case of doubt call the closest RCF SERVICE CENTRE.
- 12 POWER MAIN SWITCH**
The power switch turns the AC power ON and OFF. Make sure that the VOLUME is set to $-\infty$ when you turn on the speaker.
- 13 FUSE**

CONNECTIONS

The XLR connectors use the following AES standard:

- PIN 1 = GROUND (SHIELD)
- PIN 2 = HOT (+)
- PIN 3 = COLD (-)



BEFORE TURNING ON THE SPEAKER

At this point you can connect the power supply cable and the signal cable, but before turning on the speaker make sure that the volume control is at the minimum level (even on the mixer output). It is important that the mixer is already ON before turning on the speaker. This will avoid damage to the speakers and noisy "bumps" due to turning on parts on the audio chain. It is a good practice to always turn on speakers at last and turn them off immediately after the show.

Now you can turn ON the speaker and adjust the volume control to a proper level.

⚠ WARNING: Always make sure that the maximum current requirement does not exceed the maximum admitted POWERCON current. In case of doubt call the closest RCF SERVICE CENTRE.

VOLTAGE SETUP

(RESERVED TO THE RCF SERVICE CENTRE)

- 230 Volt, 50 Hz SETUP:
FUSE VALUE T5 AL ~ 250V
- 115 Volt, 60 Hz SETUP:
FUSE VALUE T10 AL ~ 250V

SINGLE NX L23-A

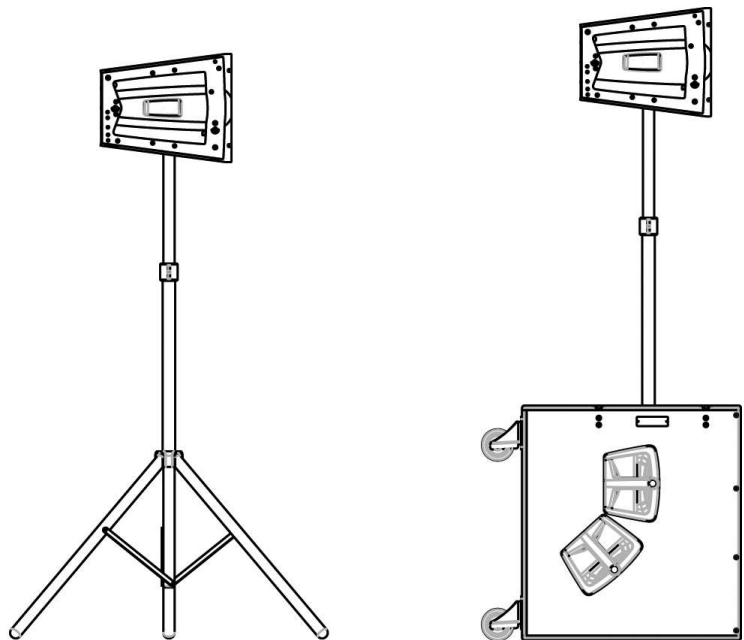
The NX L23-A is a flexible speaker system that can be used in ground-supported or suspended applications. The following information will help you set up your NX L23-A system safely and effectively.

POLE AND TRIPOD SAFETY WARNINGS

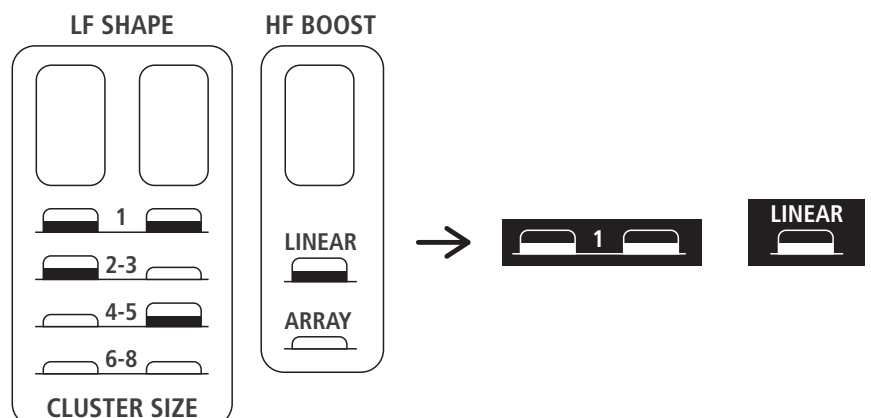
When using stands or poles, be sure to observe the following precautions:

- Check the stand or pole specification to be certain the device is designed to support the weight of the speaker. Observe all safety precautions specified by the manufacturer.
- Be certain that the surface on which the system is to be stacked is flat, stable and solid.
- Inspect the stand (or pole and associated hardware) before each use and do not use equipment with worn, damaged, or missing parts.
- Do not attempt to place more than two NX L23-A loudspeakers on a stand or pole.
- When mounting two NX L23-A speakers on a pole or tripod, integral rigging hardware must be used to secure the speakers to each other.
- Always be cautious when deploying the system outdoors. Unexpected winds may topple a system. Avoid attaching banners or similar items to any part of a speaker system. Such attachments could act as a sail and topple the system.

A single NX L23-A may be used on a tripod stand (AC S260) or on a pole (AC PMA) over its NX Series subwoofers. The use of a subwoofer is recommended for applications requiring more low-frequency power and extension.



Usually, the **LF SHAPE** switch on the input panel should be set to the **1** position and the **HF BOOST** on **LINEAR** when a single speaker is used.



DOUBLE NX L23-A ON A STAND

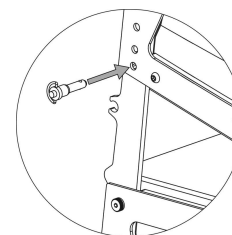
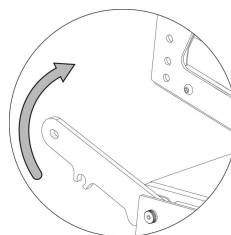
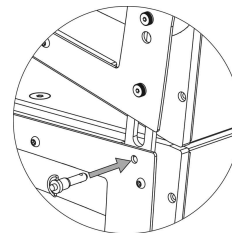
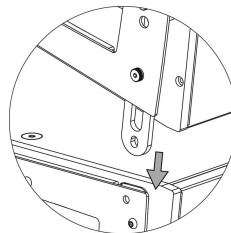
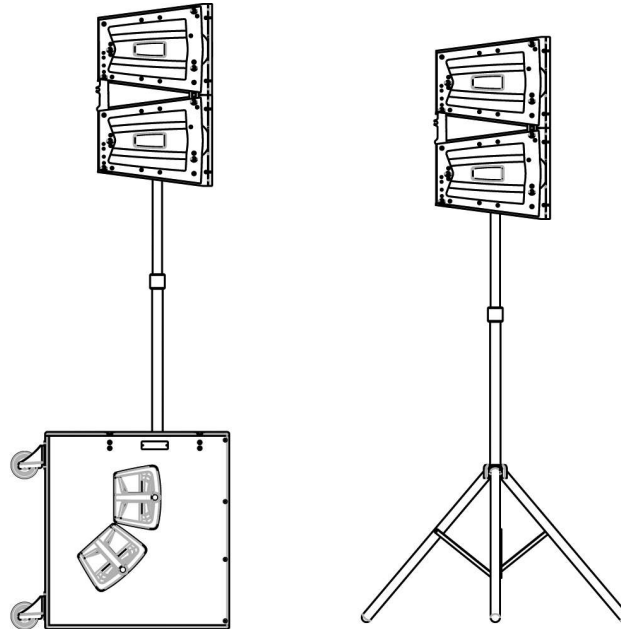
The NX L23-A is designed so that a pair of speakers may be safely mounted onto a pole or tripod stand.

1) Place the speakers on the pole or tripod one at a time. Be sure to lock the two speakers together using its rigging hardware.

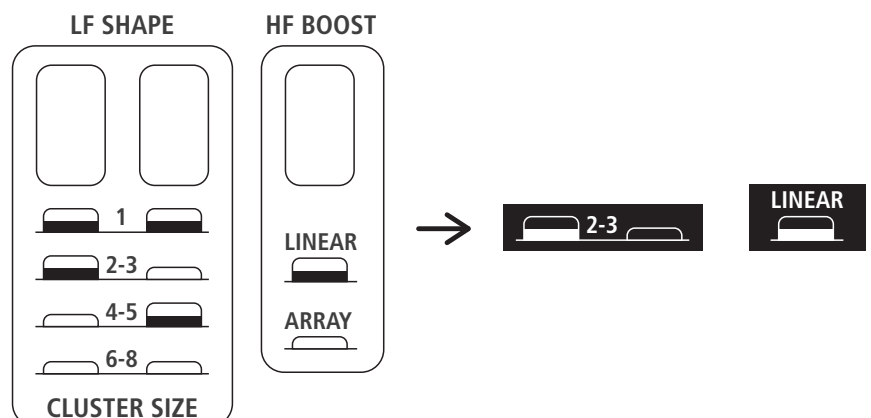
⚠ WARNING: The floor stand support the full load of the part of the system on top. It is very important that the floor stand is certified for the total weight on top.

2) Connect the second cabinet to the first starting from the 2 front brackets.

3) Reverse and connect the rear brackets of the first cabinet using the hole for the proper angle.



Usually, the **LF SHAPE** switch on the input panel should be set to the **2-3** position and the **HF BOOST** on **LINEAR** when two speakers are used.



NX L23-A SUSPENDED

GENERAL RIGGING WARNINGS AND SAFETY PRECAUTIONS

- Suspending loads should be done with extreme caution.
- When deploying a system always wear protective helmets and footwear.
- Never allow people to pass under the system during the installation process.
- Never leave the system unattended during the installation process.
- Never install the system over areas of public access.
- Never attach other loads to the array system.
- Never climb the system during or after the installation.
- Never expose the system to extra loads created from the wind or snow.

⚠ WARNING: The system must be rigged in accordance with the laws and regulations of the Country where the system is used. It is responsibility of the owner or rigger to make sure that the system is properly rigged in accordance with Country and local laws and regulations.

⚠ WARNING: Always check that all the parts of the rigging system that are not provided from RCF are:

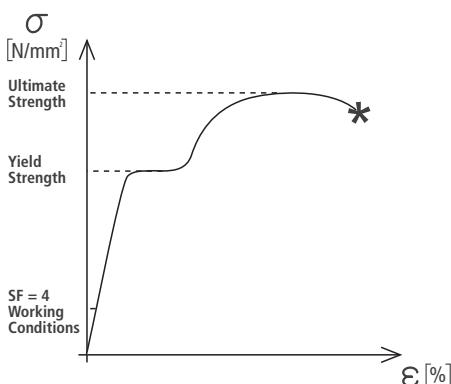
- appropriate for the application;
- approved, certified and marked;
- properly rated;
- in perfect condition.

⚠ WARNING: Each cabinet support the full load of the part of the system below. It is very important that each single cabinet of the system is properly checked.

“RCF SHAPE DESIGNER” SOFTWARE AND SAFETY FACTOR

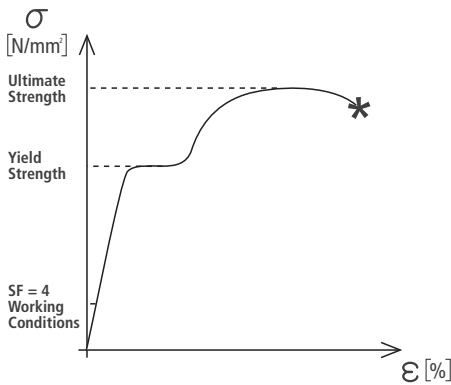
The suspension system is designed to have a proper **Safety Factors** (configuration dependent). Using the “RCF Shape Designer” software it is very easy to understand safety factors and limits for each specific configuration. To better comprehend in which safety range the mechanics are working a simple introduction is needed: NXL23-A mechanics are built with certified **UNI EN 10025-95 S 235 JR Steel**. RCF prediction software calculates forces on every single stressed part of the assembly and shows the minimum safety factor for every link.

S 235 JR is a structural steel and has a stress-strain (or equivalent Force-Deformation) curve like the following:



The curve is characterized by two critical points: the **Break Point** and the **Yield Point**. The tensile ultimate stress is simply the maximum stress attained. Ultimate tensile stress is commonly used as a criterion of the strength of the material for structural design, but it should be recognized that other strength properties may often be more important. One of these is for sure the Yield Strength. Stress-strain diagram of S 235 JR exhibit a sharp break at a stress below the ultimate strength. At this critical stress, the material elongates considerably with no apparent change in stress. The stress at which this occurs is referred to as the yield point. Permanent deformation may be detrimental, and the industry adopted 0.2% plastic strain as an arbitrary limit that is considered acceptable by all regulatory agencies. For tension and compression, the corresponding stress at this offset strain is defined as the yield.

S 235 JR characteristic values are $R=360 \text{ [N/mm}^2\text{]}$ for Ultimate Strength and $Rp0.2=360 \text{ [N/mm}^2\text{]}$ for **Yield Strength**. In our prediction software the **Safety Factors** are calculated considering the **Maximum Stress Limit** equal to the **Yield Strength**, according with many international standards and rules. The resulting Safety Factor is the minimum of all the calculated safety factors, for each link or pin. This is where you are working with a **SF=4**:



Depending on local safety regulation and on situation the required safety factor can vary. It is responsibility of the owner or rigger to make sure that the system is properly rigged in accordance with Country and local laws and regulations. The "RCF Shape Designer" software gives detailed information of the safety factor for each specific configuration.

The safety factor is the result of the forces acting on fly bar's and system's front and rear links and pins and depends on many variables:

- number of cabinets;
- fly bar angles;
- angles from cabinets to cabinets. If one of the cited variables change the safety factor **MUST BE** recalculated using the software before rigging the system.

In case the fly bar is picked up from 2 motors make sure that the fly bar angle is correct. An angle different from the angle used in the prediction software can be potentially dangerous. Never allow persons to stay or pass under the system during the installation process.

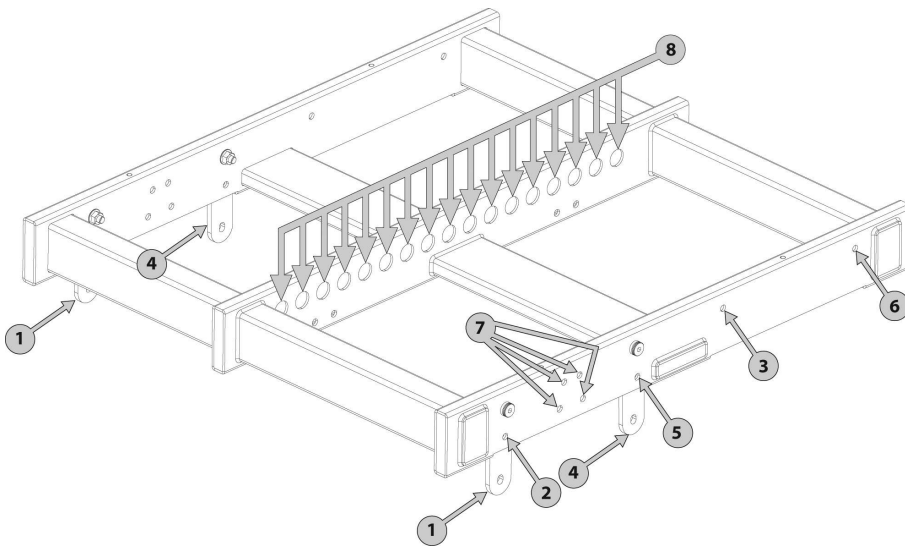
When the fly bar is **particularly tilted** or the array is **very curved** the centre of gravity can move out from the rear links. In this case the front links are in compression and the rear links are supporting the total weight of the system plus the front compression. Always check very carefully with the "RCF Shape Designer" software all this kind of situations (even with a small number of cabinets).

MAXIMUM ARRAY SIZE

THE MAXIMUM NUMBER OF SPEAKERS THAT MAY BE SUSPENDED USING THE NX L23-A FRAME IS 8 (EIGHT).

THE NX L23-A FLY BAR

THE NX L23-A FLY BAR FEATURES:



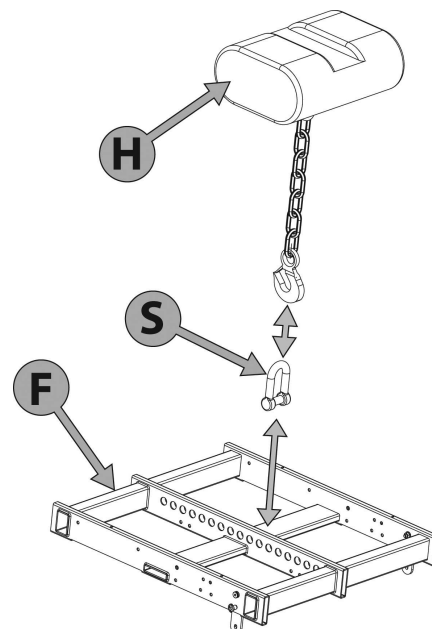
- 1 FRONT FLYING BRACKET**
Front mounting.
- 2 QUICK LOCK PIN HOLE**
Front mounting (to be used to lock the front bracket before installation).
- 3 REAR BAR HOLE**
Front mounting.
- 4 REAR MOUNTING POSITION FLYING BRACKET**
- 5 QUICK LOCK PIN HOLE**
Rear mounting position.
- 6 REAR BAR HOLE**
Rear mounting position.
- 7 FRONT BRACKET TRANSPORT HOLES**
- 8 CENTRAL PICK UP POINTS**

RIGGING PROCEDURE

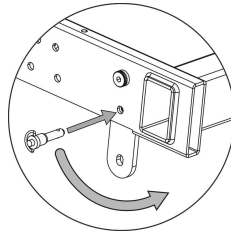
Rigging the system follow the procedure:

- H RIGGING CHAIN HOIST**
- S CERTIFIED SHACKLE**
- F FLY BAR**

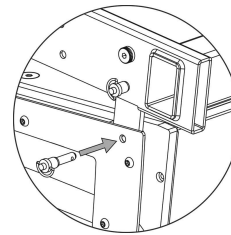
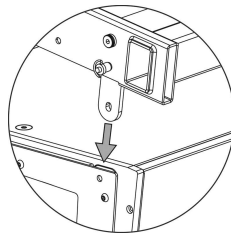
1) Connect the fly-bar F to the chain hoist H (o motors) using a certified shackle. Secure the shackle to prevent un-screwing (following the shackle supplier instructions and warnings).



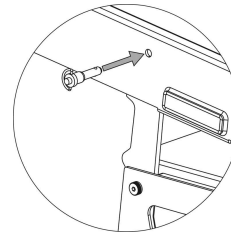
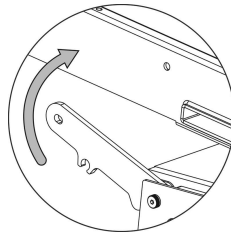
2) Connect the second pin on the front bracket to make sure that the connecting bracket is vertical.



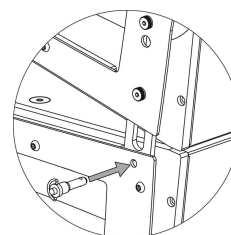
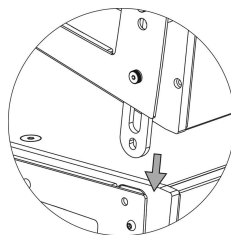
3) Connect the front bracket to the first NX L23-A cabinet using 2 quick lock pins.



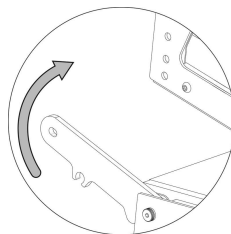
4) Reverse and connect the 2 rear bracket to the fly-bar using 2 quick lock pins.



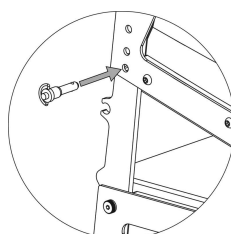
5) Connect the second cabinet to the first always starting from the 2 front brackets.



6) Reverse and connect the rear brackets of the second cabinet using the hole for the proper angle.



7) Connect all the other cabinets following the same procedure and connecting a single cabinet each time.



ARRAY SYSTEMS DESIGN

NX L23-A allow users to choose from different face-to-face angle adjustments to create arrays with varying curvature. Thus, designers can create arrays custom-tailored to each venue's profile.

The basic approach to array design dependent on three factors:

- Number of Array Elements;
- Vertical Splay Angles;
- Horizontal Coverage.

Determining the number of elements to use is critical: the number of elements greatly affects the SPL available from the system as well as the uniformity of coverage in both SPL and frequency response. The number of elements profoundly effects the directivity at lower frequencies. The next easy equation, works as an approximation for flat listening planes.

Coverage (x) \approx 8n (m) Coverage distance required = x (metres).

Changing the splay angles between cabinets has a significant impact on vertical coverage for the high frequencies, with the result that narrower vertical splay angles produce a higher Q vertical beamwidth, while wider splay lowers the Q at high frequencies. In general, the splay angles do not affect the vertical coverage at lower frequencies.

The curved array system design can be summarized as:

- flat-front NX L23-A s for long throw sections;
- increase curvature as distance decreases;
- add more enclosures for more output.

This approach focuses more transducers mounted on long-throw horns at the farthest seat, gradually focusing fewer transducers as distance decreases. As long as the no gap rule is maintained, arrays constructed according to these principles will provide even SPL and a consistent sonic character throughout the venue without requiring complex processing. This approach, where the same amount of acoustic energy is spread over a larger or smaller vertical angle depending on required throw, typically have the following objectives:

- even horizontal and vertical coverage;
- uniform SPL;
- uniform frequency response;
- sufficient SPL for the application.

This discussion represents, of course, just a basic approach. Given the infinite variety of venues and performers, users will find themselves needing to solve specific problems in specific situations. RCF Shape Designer software designed to help calculate optimum splay angles, aiming angles, and fly-bar pick points (crucial in aiming the array) for a given venue, will be explained later in this Guide.

RCF SHAPE DESIGNER SOFTWARE

INSTALLING RCF SHAPE DESIGNER

RCF Shape Designer is supplied in a zip folder which contains a setup executable file:



setup

Double-click on this and follow the on-screen prompts.

COMPUTER REQUIREMENTS

The RCF Shape Designer requires an IBM compatible PC with the Windows® 98, Windows® 98SE, Windows® 2000, Windows® ME, Windows® XP, or Windows NT® operating systems. It is not designed to work with Windows® 3.x, Windows® 95, or Macintosh® operating systems.

INTRODUCTION

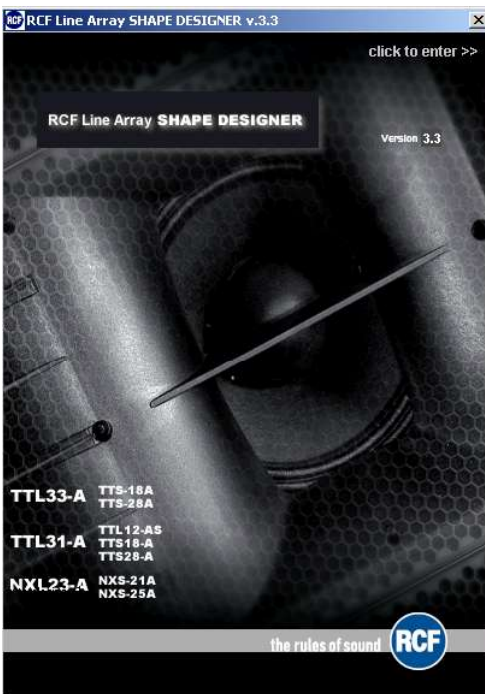
Use the RCF Shape Designer for designing NX L23-A arrays. The RCF Shape Designer's primary function is to determine the configuration that will provide the best vertical performance for a given application. Various venue dimensions are entered that allow the RCF Shape Designer to calculate the resultant array performance.

USING RCF SHAPE DESIGNER SOFTWARE

Once you have installed RCF Shape Designer, it will be visible as a shortcut in **All Programs** via your Windows **Start** button.



A single click on the RCF Shape Designer tab will open the following page:



A single click on the window will open the following page:



Filling the blank tabs it's possible to start the program.

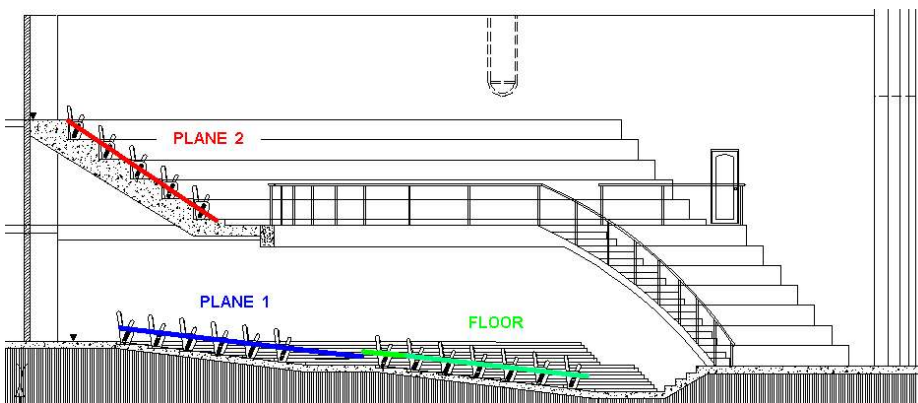
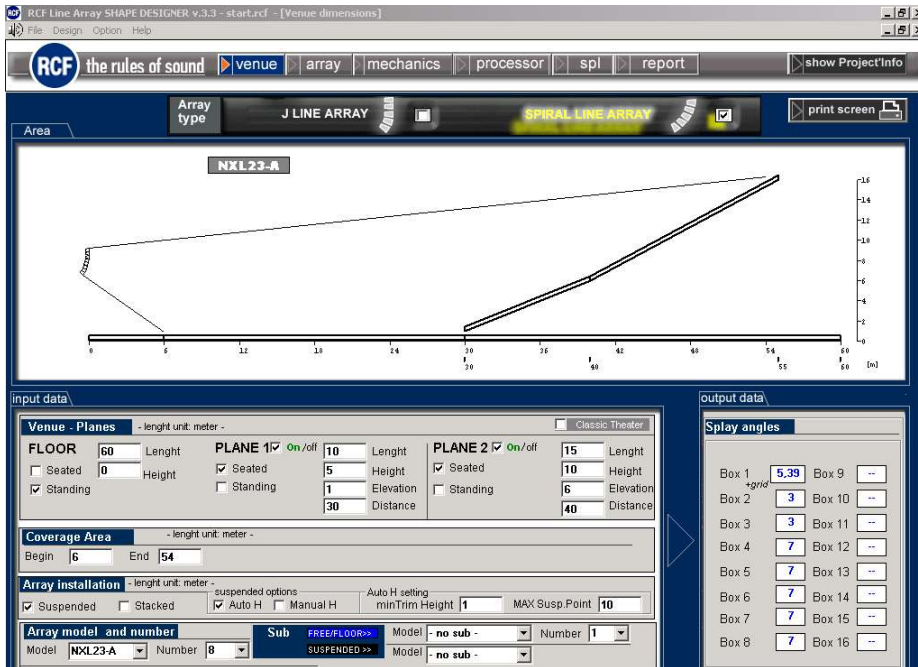
ENTERING VENUE DATA

For best results, planes should be used as follows:

FLOOR is used to simulate the main floor area from the stage to a rear bleacher or boundary.

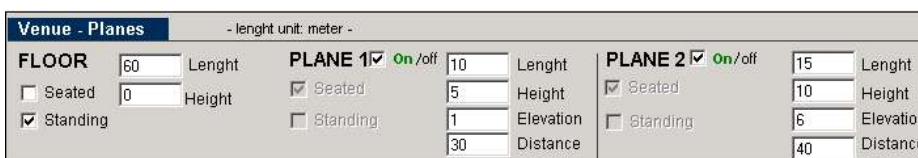
PLANE 1 is used to simulate any audience continuation behind **FLOOR** (e.g. a rear bleacher) from the end of the main floor to furthest and highest seat below **PLANE 2**.

PLANE 2 is used to simulate the furthest/highest audience area.



Example: audience modelling

Enter the height, length and elevation of up to three planes.



For all planes **Length** refers to the horizontal length of that plane.

For all planes **Height** refers to the height of the rear of the plane.

For PLANES 1 and 2 **Elevation** refers to the elevation (height) of the front of the plane.

For PLANE 1 and 2 **Distance** relates to the actual distance from the front of the array to the start of the plane.

For all planes selecting **Seated** or **Standing** places ear level at 1.3 or 1.7 m above the respective plane.

COVERAGE

Specify the horizontal coverage distances from the front of the array.

Coverage Area - lenght unit: meter -

Begin End

ARRAY INSTALLATION

Select either Suspended or Stack in the Array installation section to determines how the array is supported.

Array installation - lenght unit: meter -

Suspended Stacked

suspended options: Auto H Manual H

Auto H setting: minTrim Height MAX Susp.Point

In **Suspended** mode the grid is suspended and cabinets are attached beneath.
 In **Stack** mode the grid forms a base and cabinets are placed on top.

SUSPENDED MODE

AUTO H SETTING - MIN TRIM HEIGHT

This is the low limit for the array and is defined as the smallest allowable distance from the lowest point of the array to the ground below

AUTO H SETTING - MAX SUSPENSION POINT

Set this to the maximum array height allowable (usually the highest part of the flying frame). The maximum pick height is usually chosen to allow for the maximum flying point height minus a sensible allowance for any shackles, stingers, bridles or flying hooks. 1m should be allowed for a stinger between each grid flying lug and the relevant motor hook to ensure that motor chain bags do not rest on the grid or top cabinet and upset its tilt angle.

MANUAL H SETTING

In manual installation mode it is possible to enter the height required for flying the system.

Array installation - lenght unit: meter -

Suspended Stacked

suspended options: Auto H Manual H

Manual H setting: Height

NUMBER OF CABINETS AND SUBWOOFERS

Number of cabinets can be set depending also on cabs availability.

Array model and number

Model: Number:

Sub: **FREE/FLOOR >>** Model: Number:

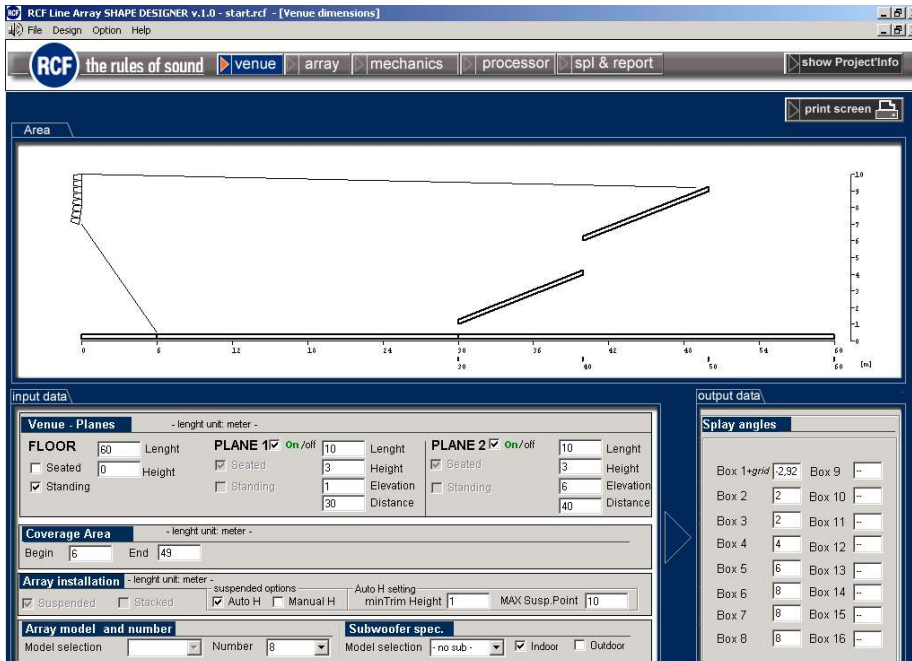
Sub: **SUSPENDED >>** Model:

Model list: TTL33-A, TTL31-A, NXL23-A

RCF SHAPE DESIGNER RESULTS

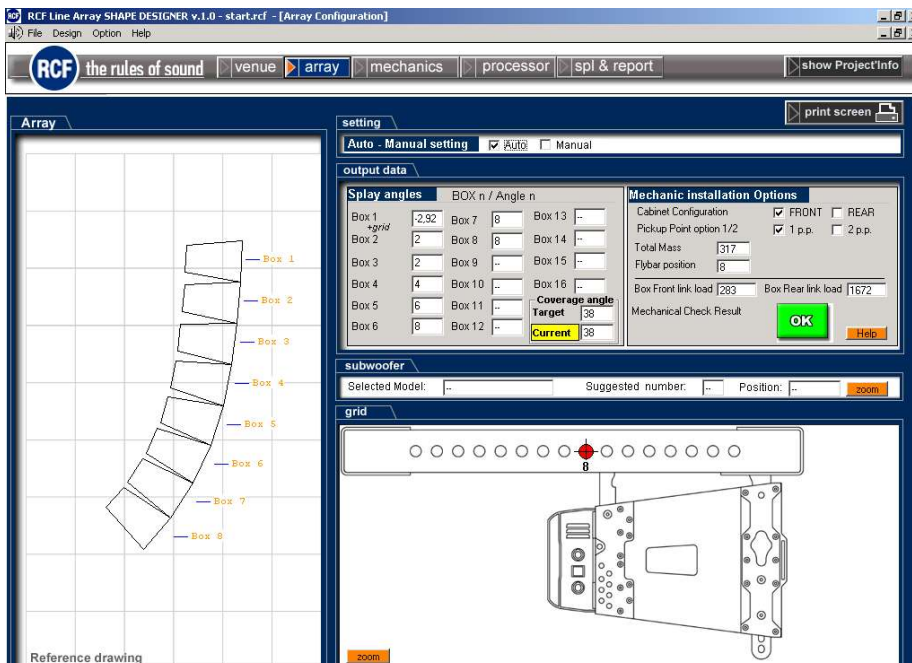
VENUE PAGE

- Graphical representations of the array and the venue
- Aiming splay angle between each pair of enclosures



ARRAY PAGE

- Height of the array and trim height to the bottom of the array from the floor
- Pick Point on the Fly-Bar to achieve the calculated array angle when suspended
- Weight of the array
- Mechanical check result



MECHANICS PAGE

- Cluster Mechanical specifications
- Mechanical safety factors

CLUSTER SPECIFICATIONS

Cluster Type	NXL 23-A Flown	Number of Cabinets	8
Flybar Type	NXL 23-A	Pick-up point	9,5
Flybar Mounting Position	FRONT	Cluster Length (L)	2,64
Flybar Rigging Hole	8	Lowest cluster point(LCP)	6,86
Flybar Splay Angle (alfa)	-2,92	Center of Gravity (Xg; Yg)	(1,04 ; 0,28)
Cluster Weight	317	Weight on Front Hoist	--
Weight on Single Hoist	317	Weight on Rear Hoist	--

SAFETY FACTOR

REAR BRACKET	Applied Tensile Load [N]	1672	
	Allowed Tensile Load [N]	31200	
	Safety Factor - Tensile Load	19,4	
FRONT FLYBAR BRACKET	Applied Shear Load [N]	71	
	Allowed Shear Load [N]	7400	
	Safety Factor - Shear Load	103,8	
FRONT CABINET LINK	Applied Tensile Load [N]	-274	
	Allowed Tensile Load [N]	42500	
	Safety Factor - Tensile Load	155	
FRONT CABINET LINK	Applied Shear Load [N]	195	
	Allowed Shear Load [N]	9300	
	Safety Factor - Shear Load	47,6	
FRONT CABINET LINK	Applied Tensile Load [N]	-155	
	Allowed Tensile Load [N]	28900	
	Safety Factor - Tensile Load	186,6	
Safety Factor - Combined Load		41,1	

CLUSTER MINIMUM SAFETY FACTOR 19,4

OK SF > 7 OK 1,5 < SF < 4 Help
OK 4 < SF < 7 NO SF < 1,5

PROCESSOR PAGE

- DSP preset configuration

Processor

Number	Type	HF BOOST	LF SHAPE
Box # 1	NXL 23-A	ARRAY	6-8
Box # 2	NXL 23-A	ARRAY	6-8
Box # 3	NXL 23-A	ARRAY	6-8
Box # 4	NXL 23-A	ARRAY	6-8
Box # 5	NXL 23-A	ARRAY	6-8
Box # 6	NXL 23-A	ARRAY	6-8
Box # 7	NXL 23-A	LINEAR	6-8
Box # 8	NXL 23-A	LINEAR	6-8

NXL Panel

LF SHAPE HF BOOST

1 2-3 4-5 6-8

CLUSTER SIZE

LINEAR ARRAY

VOLUME

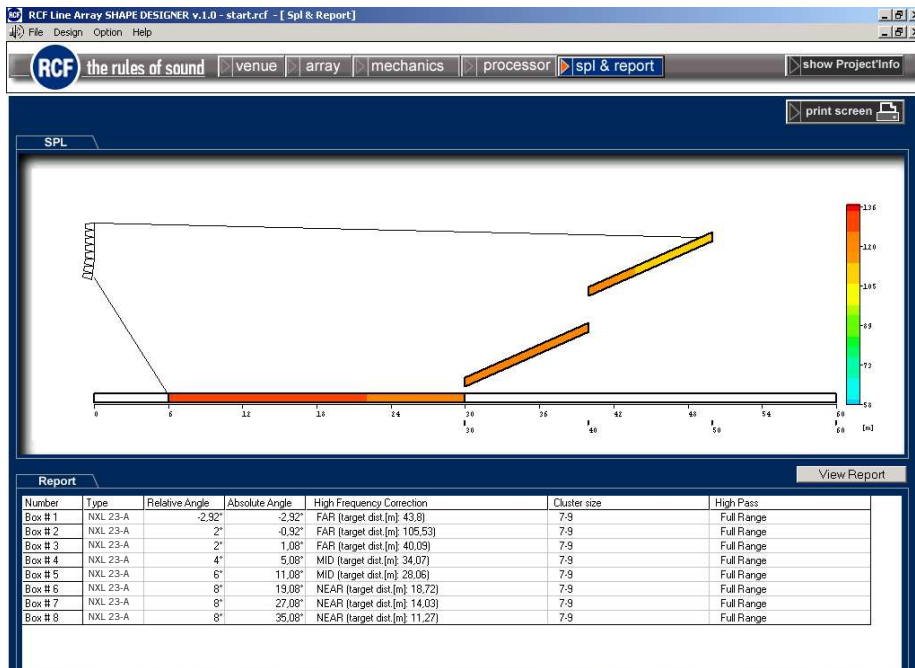
POWER STATUS SIGNAL LIMITER

BALANCED INPUT/LINK

NXL L23-A LINE ARRAY MODULE

SPL & REPORT PAGE

- On-axis aiming angle for each enclosure as a difference from 0° horizontal
- Various angles and throw distances calculated from the venue's dimensions
- DSP preset configuration
- SPL representation on the audience area



⚠ WARNING: It is possible to display different pages only **IN SEQUENCE** (venue ⇒ array ⇒ mechanics ⇒ processor ⇒ spl & report, and back), in order to be sure that all pages will be shown to the user, including the one regarding mechanics.

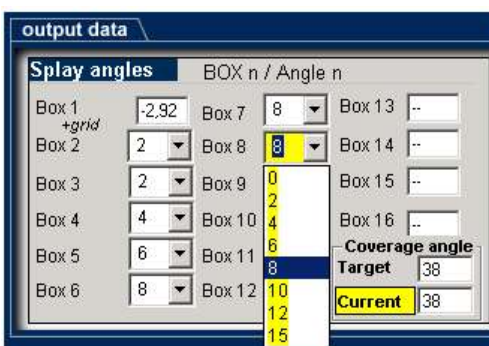
MANUAL MODE

RCF Shape Designer works in either of two basic ways:

- **AUTOMATIC MODE** (default setting): The RCF Shape Designer will select the optimum enclosure splays, array aiming angle, fly-bar pick point and DSP preset configurations.
- **MANUAL MODE:** This provides a partial control over the array's configuration. The enclosure splays can be increased with a progression of 2° steps for each adjacent speaker, in order to maintain a spiral array configuration. Then array aiming angle, and fly-bar pick point can be entered manually by switching on **Box1 + grid changeable** and **MANUAL H** flags.



Array window: Manual splays setting



Angles manual changing

OPTIMIZING THE ARRAY

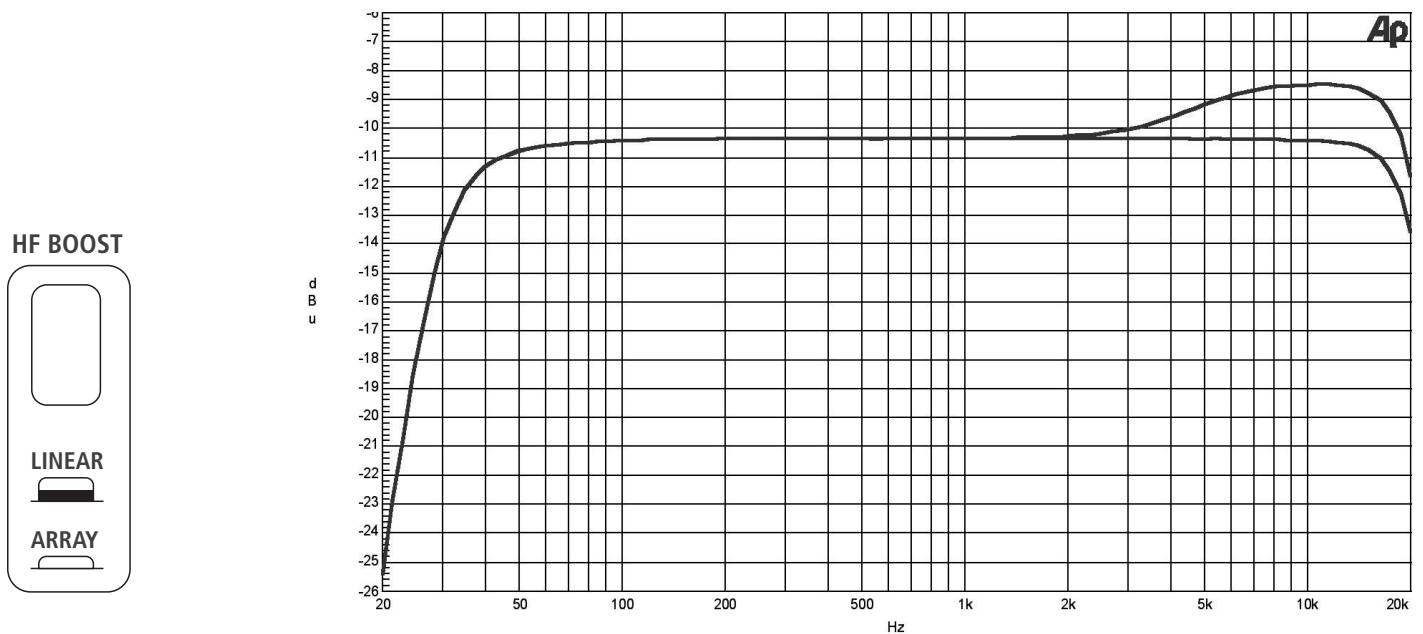
Once the design (number of elements and vertical splay angles) has been designed using Shape Designer software, you can effectively optimise the array depending on the environment and the application by driving it using different DSP presets stored onboard. Typically arrays are divided in two or three zones depending the design and size of the array.

To optimise and EQ the array, different strategies are used for high frequencies (long throws and short throws) and low frequencies.

HIGH-FREQUENCY EQUALIZATION STRATEGIES

The longer the distance, the greater the attenuation at high frequencies. Generally, high frequencies need a correction to compensate for energy lost over distance; the correction needed is usually proportional to the distance and high-frequency air absorption. In the near- to mid-field, the air absorption is not nearly as critical; in this zone, high frequencies need little additional correction.

In the next figure is shown the equalization that corresponds to **HF BOOST** settings for **LINEAR** and **ARRAY**:



LOW-FREQUENCY COUPLING EFFECTS

While wave-guides provide isolated control over various mid- to high-frequency coverage areas, the low-frequency section of a NX L23-A array still requires mutual coupling - with equal amplitude and phase - to achieve better directionality. Low-frequency directionality is less dependent on the array's relative splay angles and more dependent on the number of elements of the array.

At low frequencies, the more elements in the array (the longer the array), the more directional the array becomes, providing more SPL in this range. The directional control of the array is achieved when the length of the array is similar or larger than the wavelength of the frequencies being reproduced by the array.

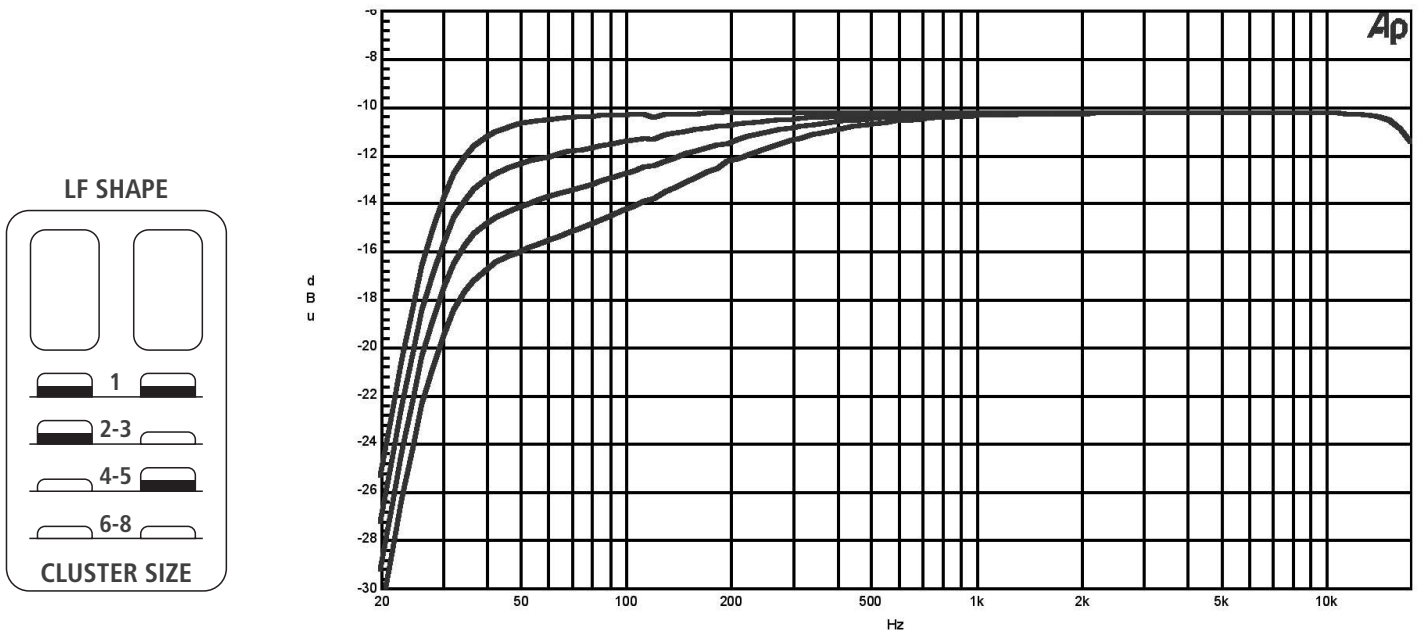
LOW-FREQUENCY STRATEGIES

Although the array can (and usually should) be zoned for implementing different equalization curves for high frequencies, identical equalization should be maintained in all the low-frequency filters.

Different low-frequency equalization settings in the same array will degrade the desired coupling effect. For the same reason, gain differences are not recommended for line arrays, since adjusting various zones with an overall amplitude control for each results in decrease of Low-frequency headroom and directionality.

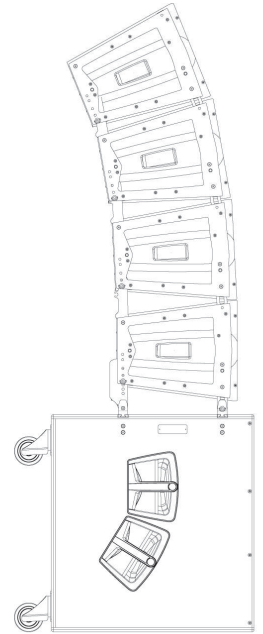
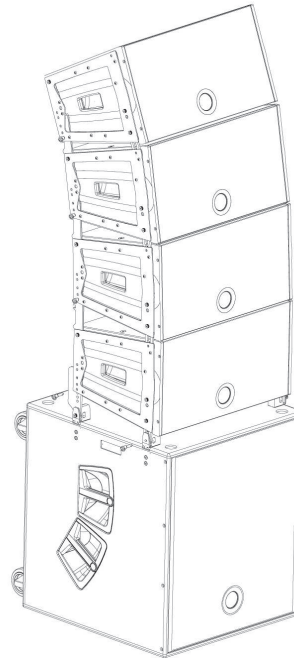
In any case, line arrays generally need a correction to compensate for energy sum on lows.

In the next figure is shown the equalization that corresponds to **LF SHAPE** settings, referring to different number of speakers from **1** up to **6-8**. Increasing the number of cabinets, response curves are decreased in order to compensate the low-frequency section mutual coupling.

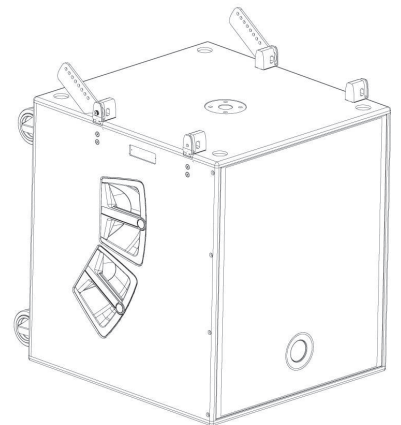
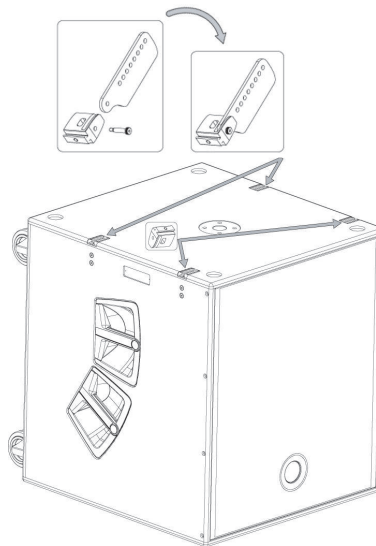


NX L23-A GROUND STACKED

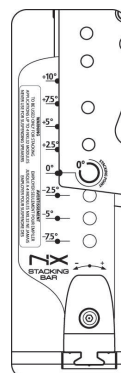
NX L23-A loudspeakers can be stacked on top of NX subwoofers with the optional AC STACKING / NX L23-A adapters.



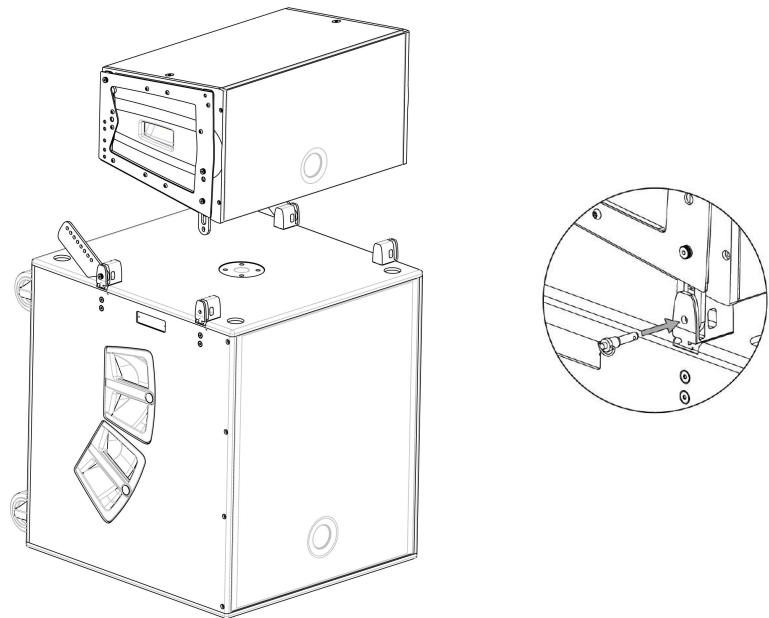
1) Insert the optional AC STACKING / NX L23-A adapters on subs as shown in the picture.



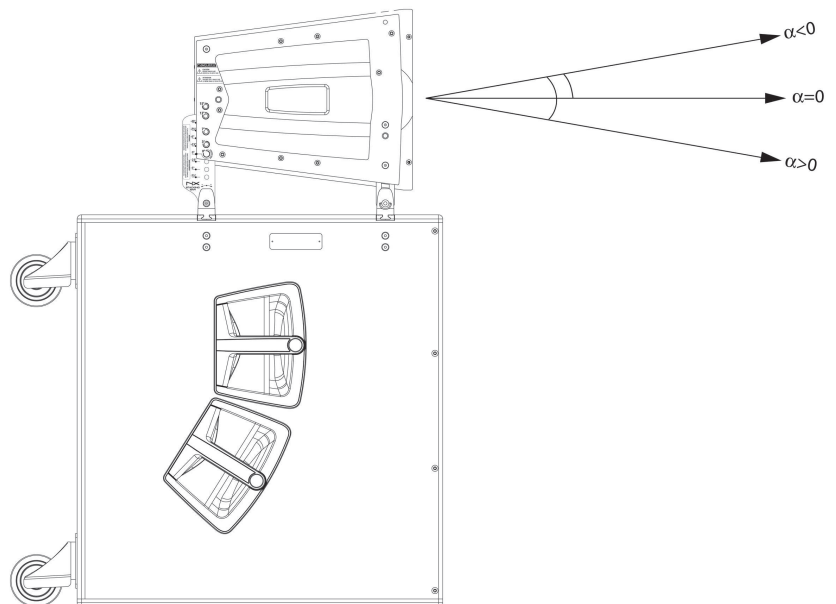
2) The AC STACKING / NX L23-A adds a fixed amount of up or downtilt to ground-stacked NX L23-A loudspeakers, with additional 17,5 degrees of adjustment possible (from +10° to -7,5°).



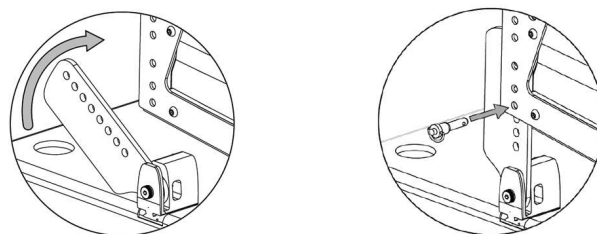
3) Connect front bracket of the first NX L23-A cabinet using 2 quick lock pins.



4) The baffle of the bottom box in a stacked array does not necessarily have to be parallel to the stage or the array frame. It can be tilted up or downward if desired. In this way arced arrays can be readily created from a ground stack position.



5) The bottom box in a stacked array can be tilted to obtain proper coverage patterns (from $+10^\circ$ to $-7,5^\circ$). Reverse and connect the 2 rear AC STACKING / NX L23-A bracket to the first enclosure using the hole for the proper angle and quick lock pins.



Add NX L23-A cabinets one by one as indicated for flown configurations. Up to four NX L23-A enclosures can be stacked and interlinked using the standard NX rigging components and the NX subs as ground support.

TECHNICAL SPECIFICATIONS

ACOUSTICAL	NX L23 - A
Frequency response	60 Hz - 20 kHz
Max SPL	133 dB
Horizontal coverage angle	100°
Vertical coverage angle	15° max, depending on configuration
Compression Driver	3 x 1.0" neo, 1.75" voice coil
Midrange	-
Woofers	12" neo, 3.5" voice coil
INPUT SECTION	
Input connector	combo xlr - jack
Output connector	xlr
Input sensitivity	-2 dBu / +4 dBu
PROCESSOR SECTION	
Crossover frequencies	1.300 Hz
Protections	thermal, rms
Limiter	soft peak limiter
Controls	volume, hf correction, cluster size
AMPLIFIER	
Total power	750 Watt
High frequencies	250 Watt
Low frequencies	500 Watt
Cooling	convection / forced
Connection	powercon in /out
PHISICAL	
Height	346 mm
Width	659 mm
Depth	415 mm
Weight	28.5 Kg
Cabinet	baltic birch
Hardware	array side fittings
Handles	2 side
Pole Mount/Cap	yes



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