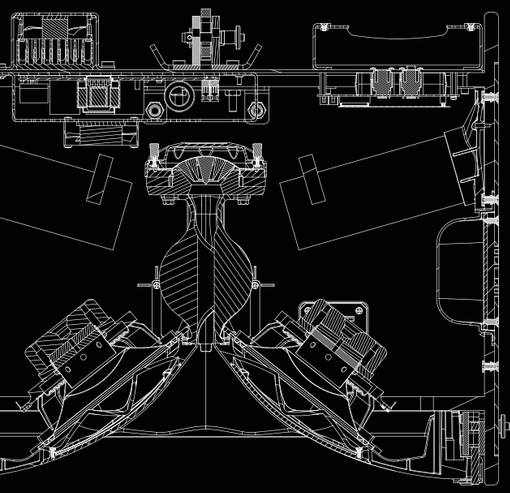
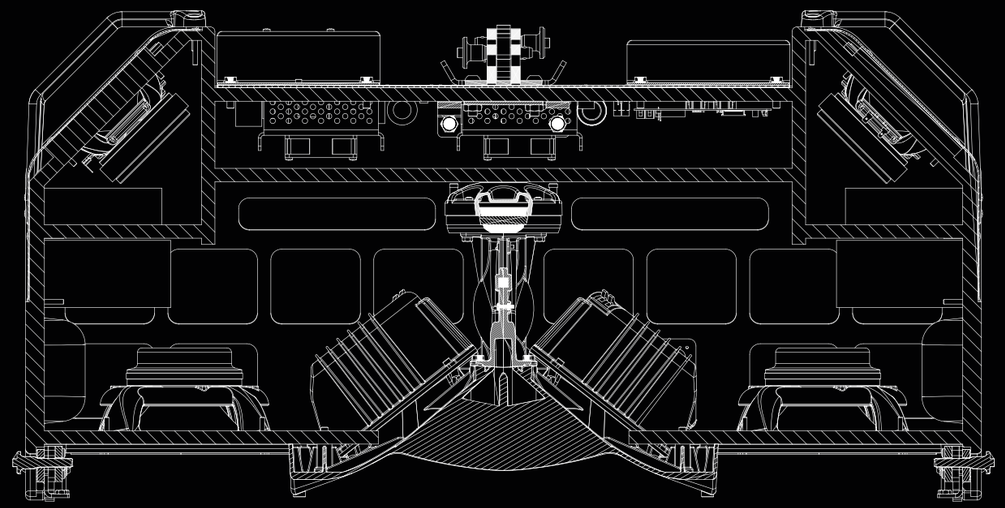
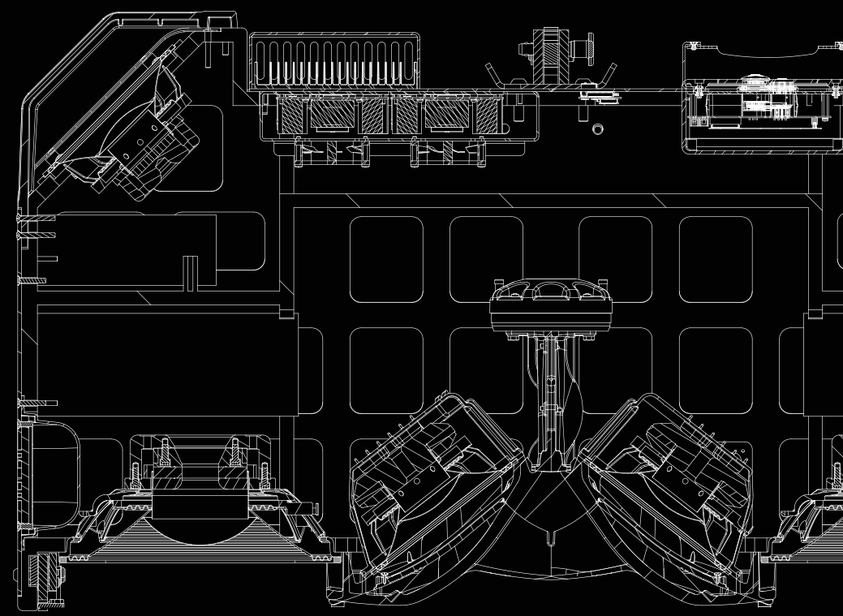
ARA series
Users manual







D.A.S.

SOUND WITH SOUL

www.dasaudio.com

INDEX

ARA series
Safety Precautions

The exclamation point inside an equilateral triangle is intended to alert the users to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product. Heed all warnings. Follow all instructions. Keep these instructions.

WARNING: This is a class A product. In a domestic environment this product may cause radio interferences in which case the user may be required to take adequate measures.

Use this product only in E1, E2, E3 or E4 environments according to EN55103-2.

Do not remove mains connector ground, it is dangerous and illegal. Class I device. The product must be connected to a mains socket outlet with protective earth connection. Only use this equipment with an appropriate mains cord for your country.

The lightning and arrowhead symbol warns about the presence of uninsulated dangerous voltage. To reduce the risk of electric shock, do not remove the cover.

The device have a standard connector IEC60320-14, with fuseholder, for mains.

Only use this equipment with an appropriate mains cord.

The connected outer wiring to these terminals requires of its installation by an instructed person and the use of a flexible cable already prepared.

This symbol on the product indicates that this product should not be treated as household waste. Instead it shall be handed over to the appicable collection point for the recycling of electrical and electronic equipment.

The ON position is indicated in the switch by means of the corresponding standardized symbols (IEC 60417-1 and IEC 60417-2).

If the apparatus is connected permanently, the electrical system of the building must incorporate a multipolar switch with a separation of contact of at least 3mm in each pole.

Do not expose this device to rain or moisture. Do not use this apparatus near water (for example, swimming pools and fountains). Do not place any objects containing liquids, such as bottles or glasses, on top of the unit. Do not splash liquids on the unit. IP-20 equipment.

Clean only with a dry cloth. Do not use any solvent based cleaners.

Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus that produce heat.

The circulation of air must not be blocked.

Unplug this apparatus during lightning storms, earthquakes or when unused for long periods of time.

Take into account that the nominal AC voltage is the value shown in the equipment ±10% (according to IEC 60065:2001). If the fuse needs to be replaced, please pay attention to correct type and ratings.

If the cable or the mains plug are damaged they must be replaced. Contact the manufacturer to provide you with the necessary spare parts. No user serviceable parts inside. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.

ARA series
Warranty

All our products are warrantied against any manufacturing defect for a period of 2 years from date of purchase.

The warranty excludes damage from incorrect use of the product.

All warranty repairs must be exclusively undertaken by the factory or any of its authorised service centers.

To claim a warranty repair, do not open or intend to repair the product.

Return the damaged unit, at shippers risk and freight prepaid, to the nearest service center with a copy of the purchase invoice.

All warranty details (such as extended warranty) can be found in the support section of our website:

www.dasaudio.com

ARA series
Declaration of conformity

DAS Audio Group, S.L.
C/ Islas Baleares, 24 - 46988
Pol. Fuente del Jarro - Valencia. España
(España)

Declares that MATRIX-22

Abide by essential objectives relating Directives:

- Low Voltage Directive 2014/35/UE
- Electromagnetic Compatibility (EMC) 2014/30/UE
- RoHS 2011/65/UE
- RAEE (WEEE) 2012/19/UE

In accordance with Harmonized European Norms:

- EN 60065:2014.- Audio, video and similar electronic apparatus. Safety requirements.
- EN 55032:2012.- Electromagnetic compatibility of multimedia equipment. Emission requirements.
- EN 55103-2:2009.- Electromagnetic compatibility. Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2:Immunity.
- EN 50581:2012.- Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Introduction

Welcome to the user manual for the ARA series. This comprehensive guide is designed to provide all the information needed for the effective and safe operation of our ARA systems.

This manual has been structured into several key sections, each focusing on a specific aspect of system setup, usage, and maintenance. By providing a detailed walkthrough of each process, we aim to ensure that users can optimally benefit from all features that our ARA systems offer.

The ‘Setup and Configuration’ section of this manual will guide you through the initial stages of installing and setting up your ARA system. It will delve into various network configuration options, covering the use of Ethernet switches and routers, with a focus on the DHCP Server distribution.

In the ‘Hardware and Accessories’ section, we outline recommended devices that complement and enhance your ARA system’s performance. It also provides guidelines on how to choose suitable routers and Ethernet switches.

The ‘Rigging Procedures’ section emphasizes the importance of safety and details the process of rigging your ARA systems effectively. It provides a summary of basic concepts related to rigging, though it is advisable to refer to the rigging user’s manual for more comprehensive information.

Lastly, the ‘Troubleshooting’ section provides insights into diagnosing and resolving common issues that you may encounter while operating the ARA system. From power problems to sound issues, this section aims to assist you in maintaining the system’s optimal performance.

Please read this manual thoroughly before using your ARA system and refer to it as needed. Your understanding and correct application of the information contained here are critical to ensuring the best performance from the ARA series.

System components

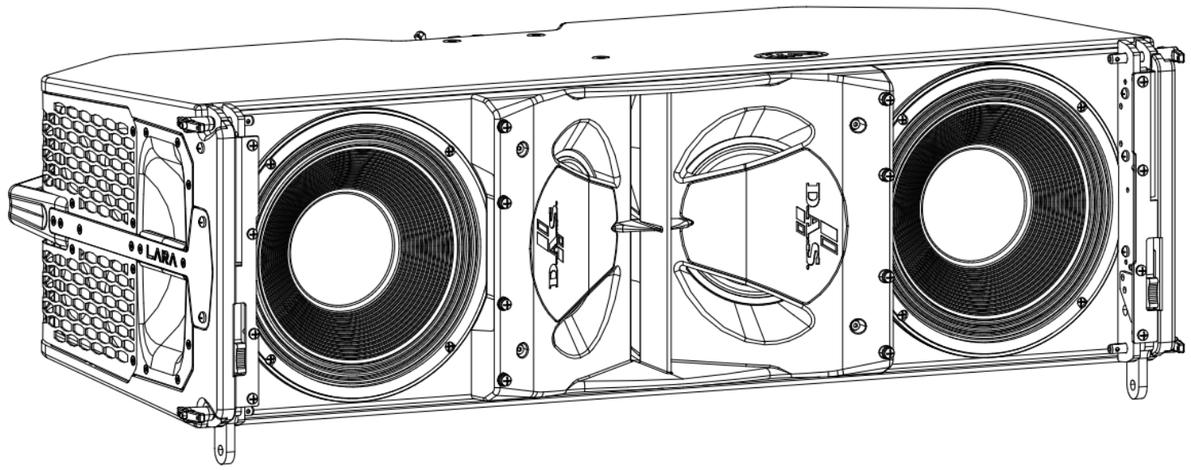
LARA-80 / LARA-100

LARA® is a 4-way symmetrical, cardioid, self-amplified line array system with 6000Wrms power. LARA® has a linear performance of 146 dB SPL MAX and a wide dynamic range making it an ideal system for large events. Thanks to the cardioid design, we achieve a rear attenuation of -15 dB in the range of 63 Hz – 200 Hz.

LARA® incorporates 2 x 12" woofers with a 4" voice coil plus another 2 x 8" in cardioid configuration; for the midrange, it uses another 2 x 8" speakers with 2.5" voice coils. The high-frequency section is made up of two DAS M-78N compression drivers, with 3" voice coils and a 100° or 80° horizontal dispersion waveguide. All the elements have been designed and purpose-built to maximize the system's efficiency.

The LARA® class D amplifier integrates a switching power supply with power factor correction (PFC), ensuring maximum performance and efficiency regardless of the mains voltage. Each amplifier provides 6000Wrms divided into eight channels, 3 of them in bridge mode to feed the 2 x 12" and the two compression drivers. The remaining two channels feed the front 2 x 8" and rear 2 x 8" transducers.

The 3-point rigging system works for both LARA® and LARA® SUB, allowing us to hang arrays of up to 24 LARA units and 16 LARA® SUB units. The FSS TM (Fast Set Splay) angulation system allows angles to be adjusted in steps of 1°, from 0° to 7° from the stacked position, significantly reducing assembly time.

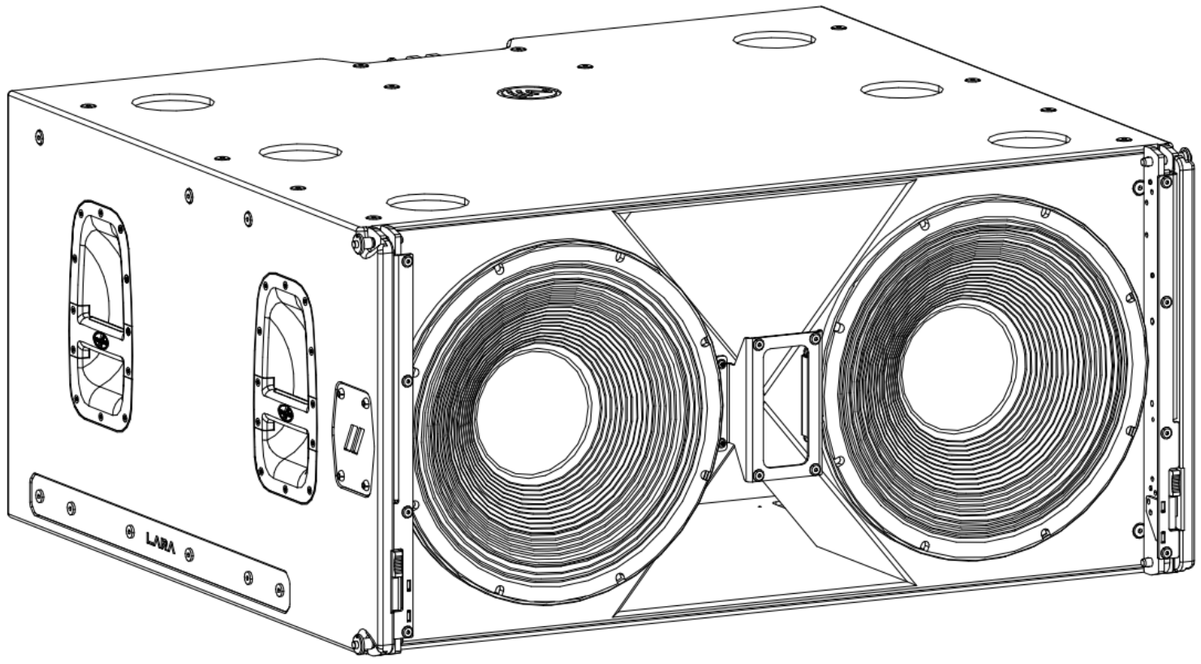


LARA-SUB

The LARA-SUB is a powered cardioid subwoofer system incorporating 2 DAS 18UXN neodymium low frequency transducers with 4” voice coils in a bass-reflex configuration. A single rear-facing 18UXN is used to create the cardioid dispersion pattern avoiding unwanted energy behind the system.

Powering the LARA SUB is a 3 channel Class D amplifier with independent channels powering each of the front-loaded low frequency transducers and the rear facing cardioid speaker. The amplifier´s regulated switch mode power supply is equipped with power factor correction reducing power consumption while enhancing reliability and consistency in all operating conditions. The onboard DSP optimizes the signal parameters for front and rear drivers to maximize the rear rejection 14 dB from 40 Hz – 80 Hz average.

Cabinet construction follows DAS´s strict construction standards employing birch plywood and the durable ISO-flexTM protective exterior coating. The LARA SUB incorporates captive rigging hardware that makes use of the common LARA rigging bumper, only one bumper type is needed to fly either LARA ARRAY or LARA SUB. The protective metal grilles are backed using acoustically transparent and water repellent fabric. Two recessed handles are located on each side of the enclosure.



MARA-80 / MARA-100

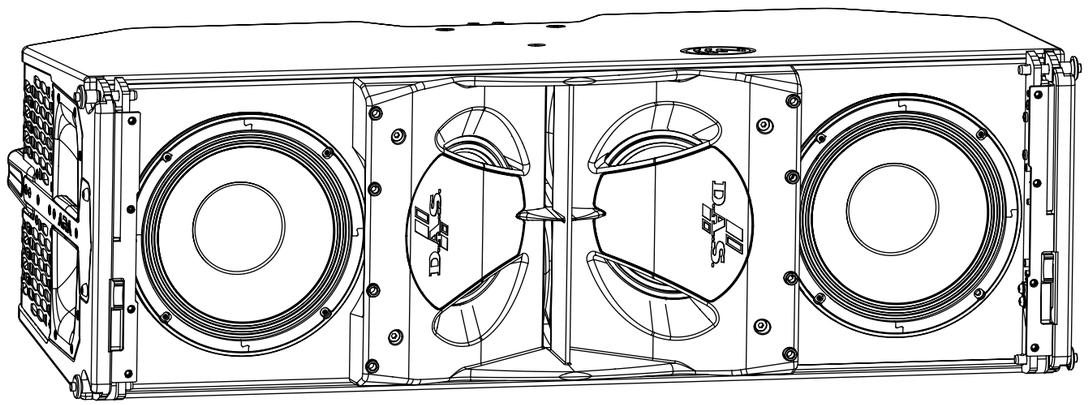
MARA is a self-powered cardioid and symmetrical line array system with a continuous power of 4200 Wrms. The MARA-100 offers a linear MAX SPL of 144 dB, a wide dynamic range, and an 100° horizontal coverage, making it the perfect solution for medium to large events. Thanks to its cardioid design, we achieve a rear attenuation of -12 dB in the range of 80 Hz – 200 Hz.

MARA-100 incorporates two 10” woofers with 3” voice coils, plus two 6” drivers in a cardioid configuration. For the midrange, we use two 8” speakers with 2.5” voice coils. For the high frequencies, it incorporates two M-78N compression drivers with 3” voice coils and a waveguide with a 100° or 80° horizontal dispersion. All components have been custom-designed and manufactured to maximize system efficiency.

The MARA Class D amplifier integrates a switched-mode power supply with power factor correction (PFC) to ensure maximum performance and efficiency, regardless of the mains voltage. Each amplifier provides a total of 4200 W RMS divided into 6 channels.

The 3-point rigging system is compatible with both MARA and MARA-SUB, allowing arrays of up to 24 MARA units and 16 MA-RA-SUB units to be flown. The FSS™ (Fast Set Splay) angulation system allows for angle adjustments in 1° increments, from 0° to 10°, from the stacking position, significantly reducing setup time.

The 3-point rigging system is compatible with both MARA and MARA-SUB, allowing arrays of up to 24 MARA units and 16 MARA-SUB units to be flown. The FSSTM (Fast Set Splay) angulation system allows for angle adjustments in 1° increments, from 0° to 10°, from the stacking position, significantly reducing setup time.

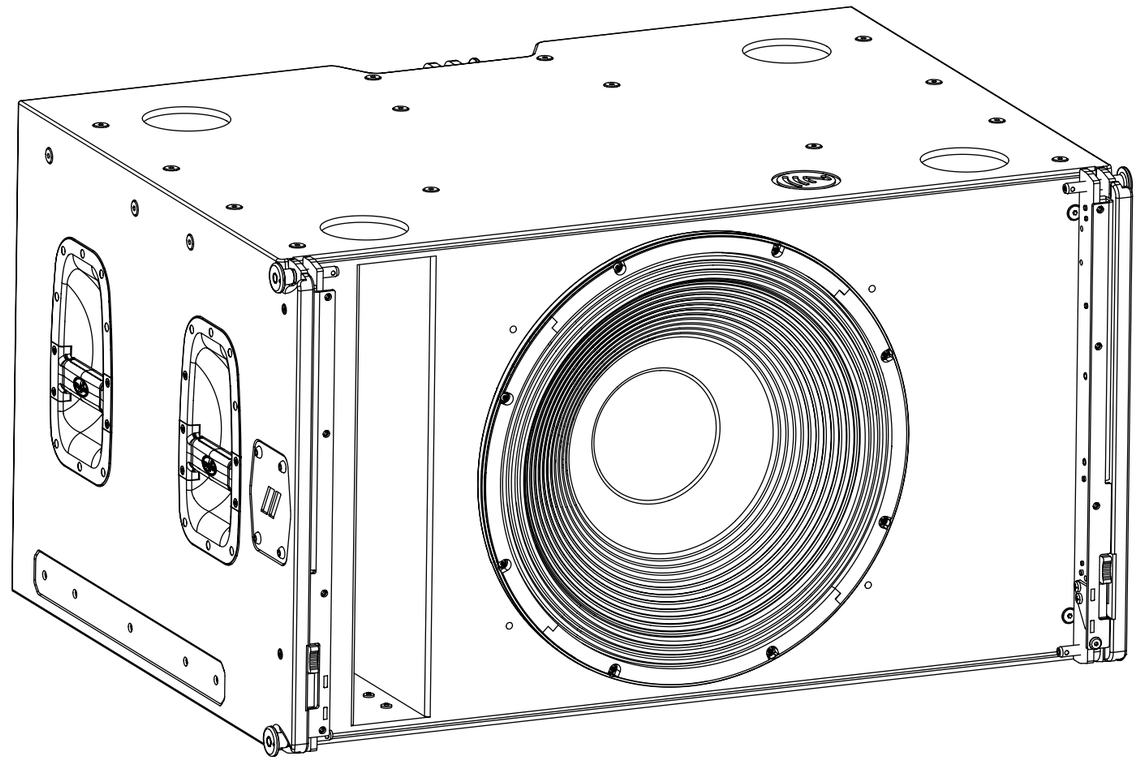


MARA-SUB

MARA-SUB is a self-powered cardioid subwoofer system that incorporates a front 21” speaker and a rear 18” speaker, both with a 4” voice coil, in a bass-reflex configuration. The rear 18” speaker creates the cardioid dispersion pattern needed to compensate for unwanted energy at the rear.

The Class D amplifier of the MARA-SUB has 4 bridged channels, providing power to both the front 21” speaker and the rear cardioid 18” speaker. The switched-mode power supply features power factor correction, reducing power consumption and improving reliability and consistency under all operating conditions. The built-in DSP optimizes the signal parameters for the speakers, allowing compensation of 14 dB of rear energy in the range of 32 Hz – 125 Hz.

The enclosure design adheres to DAS’s strict standards regarding the use of birch plywood and durable ISO-flexTM exterior protection. The MARA-SUB features the necessary rigging system to fly together with the MARA systems using a single support. The metal grilles include acoustically transparent and moisture-repellent fabric. Recessed handles are located on each side of the enclosure.



System components

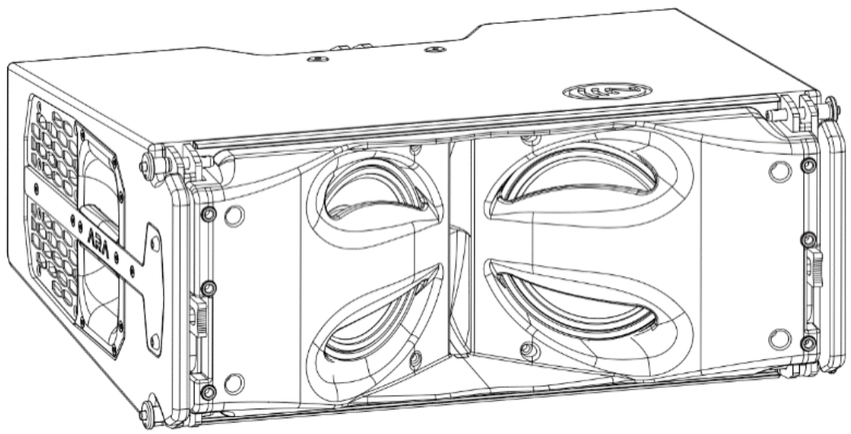
SARA-80 / SARA-100

SARA-80 and SARA-100 is a compact line array system with a symmetrical design and 3000Wrms of power, SARA delivers a linear performance of 139 dB SPL MAX and a wide dynamic range, making it perfect for events and medium-sized installations where sound quality and uniformity are a priority.

SARA features two customized designed 8", 8GXN4 loudspeakers for mid and low frequencies and an M-78N compression driver for high frequencies with 80° or 100° horizontal dispersion waveguide. The model SARA-80 is the narrower version in terms of horizontal coverage featuring 80° of nominal dispersion.

SARA's Class D amplifier integrates a switch-mode power supply with power factor correction (PFC), ensuring optimum performance and efficiency regardless of the mains voltage. The amplifier provides 3000Wrms of power, divided into 4 channels, two of which are used in bridge mode to power the compression driver, and the remaining two are used to power the 8" front speakers.

The advanced electronics of the SARA amplifiers include a 96kHz sampling rate complemented by an intuitive ALMA control interface for precise sound management. Each unit features a unique processing input channel operating at 96kHz with 10 EQ points and a total delay of 823ms, equivalent to 283 meters, enhancing its adaptability in system setup. The power module's DSP platform is equipped with specially designed Finite Impulse Response filters (FIR) for acoustically flat magnitude and phase response.



The three-point rigging system can be used for both SARA and SARA-SUB, allowing arrays of up to 24 SARA and 16 SARA-SUB units to be hung. In addition, using the JP-SARA accessory, up to 12 units of SARA can be hung below the SARA-SUB. The FSS™ (Fast Set Splay) system allows angles to be adjusted in 1° steps from the stacked position, significantly reducing assembly time.

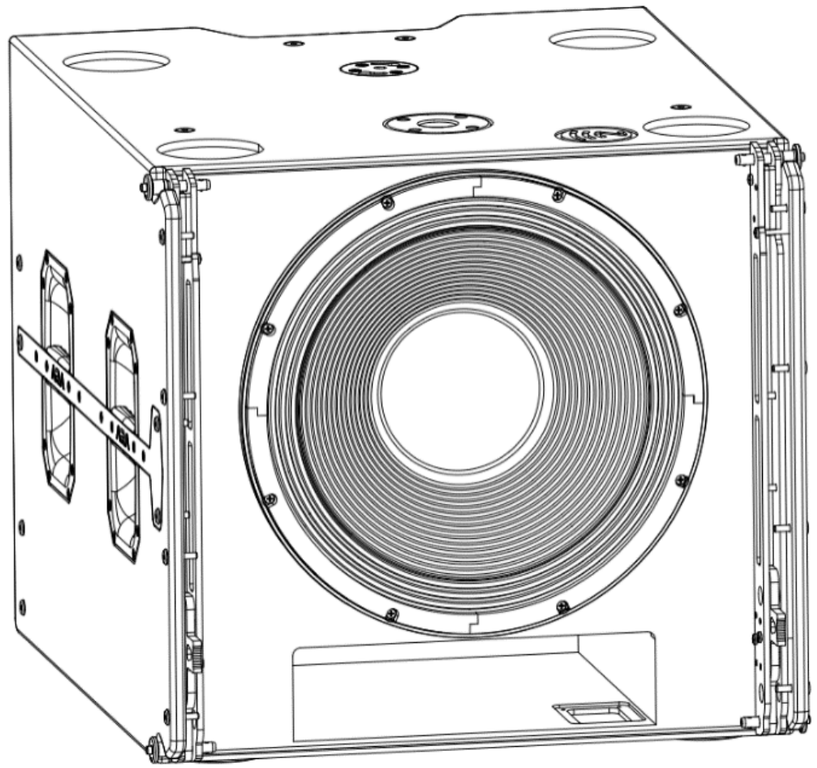
Cabinet construction follows DAS´s strict construction standards employing birch plywood and the durable ISO-flex™ protective exterior coating.

SARA-SUB

SARA-SUB is a high-fidelity subwoofer that offers an accurate and powerful bass response thanks to its cardioid design. The system incorporates a DAS 18UXN neodymium loudspeaker with a 4" voice coil for excellent low-frequency reproduction. In addition, a rear 15FWN neodymium 3" voice coil speaker creates the necessary cardioid dispersion pattern to compensate for unwanted energy in the rear.

The SARA-SUB's built-in class D amplifier has 4 channels in bridge mode for each of the speakers. The switch-mode power supply has a correction factor, allowing for greater efficiency and reliability under all operating conditions. The built-in DSP optimizes the signal parameters for the loudspeakers and allows for 14 dB of rear power compensation in the 40 Hz – 80 Hz range.

The enclosure design meets the strict DAS standards for the use of high-quality materials, such as birch plywood and ISOflex™ exterior protection. In addition, the rigging system allows the SARA to be flown underneath the SARA-SUB, using the JP-SARA. The metal grids incorporate acoustically transparent, moisture-repellent fabric. Recessed handles on the sides of the enclosure facilitate transport and handling.

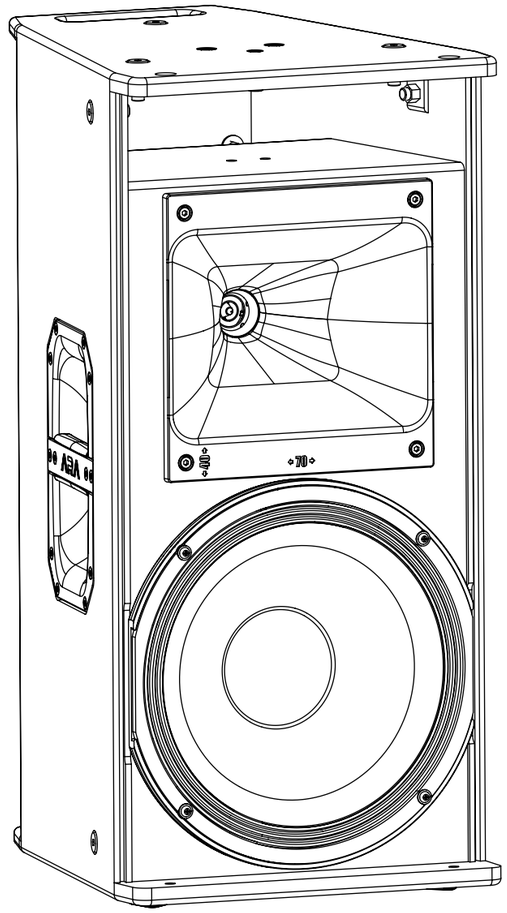


ARA-P12.74 / ARA-P12.115

The ARA-P12.74 and ARA-P12.115 are two point source systems that combine technical innovation with acoustic precision. These models are equipped with a single 12" and one 3” VCD compression driver delivering a broad frequency range from 63 Hz to 17 kHz. Their rotatable aluminum horns provide two nominal horizontal coverages 70° or 110°, two nominal vertical coverages 40° or 50°, depending on the model (74 or 115), ensuring both the ARA-P12.74 and P12.115 offer uniform sound dispersion, perfectly suited for medium to long throw applications in various settings.

Powered by a robust class D amplifier with universal mains switching power supply, the ARA-P12.74 provides a continuous power rating of 1200 W, with peak capabilities reaching 2400 W (1600 W for low frequencies and 800 W for high frequencies). The system achieves a maximum linear SPL of 134dB and a peak SPL of 140 dB, ensuring its powerful performance in any environment.

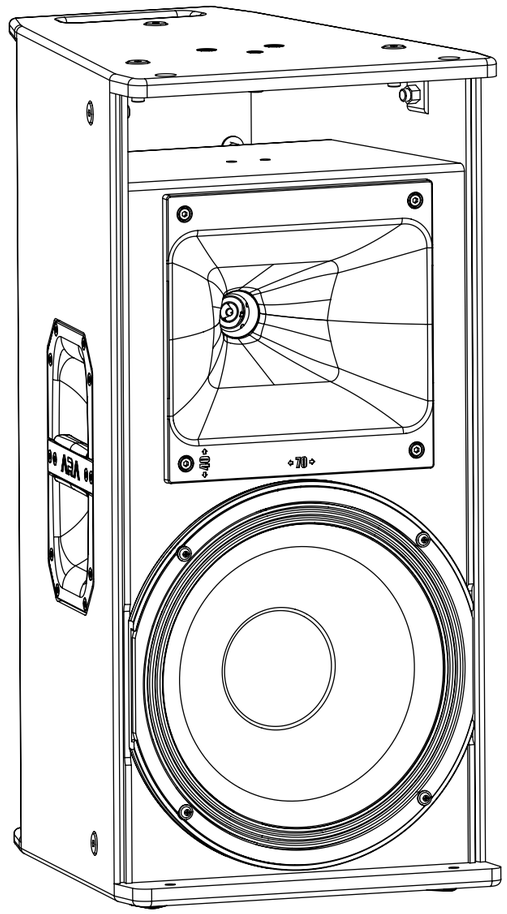
The advanced electronics of the ARA-P12.74 include a 96kHz sampling rate complemented by an intuitive ALMA control interface for precise sound management. Each unit features a unique processing input channel operating at 96kHz with 10 EQ points and a total delay of 823ms, equivalent to 283 meters, enhancing its adaptability in system setup. The power module’s DSP platform is equipped with specially designed Finite Impulse Response filters (FIR) for acoustically flat magnitude and phase response, facilitating a coherent combination with other units of the ARA series, such as the LARA / SARA line arrays.



ARA series
System components

At the core of the ARA-P12.74 are our custom-engineered 12G3XN4C transducers, specifically designed for this model, featuring a neodymium magnet and a 3-inch Voice Coil Diameter (VCD) for high efficiency, extensive displacement capabilities, and minimal distortion. Complementing the transducers is the M78N compression driver, identical to those utilized in the ARA series line arrays, known for its ability to produce crisp, clear high frequencies. This combination of the 12G3XN4C transducer and the M78N compression driver ensures that the ARA-P12.74 delivers an audio experience that is both powerfully resonant and richly detailed, setting a new benchmark in point source system sound clarity and quality. A wider coverage is provided by the P12.115 model, using as well, a rotatable horn coupled to the same M-78N compression driver.

Sound control and management are accomplished through the ALMA software interface, allowing for precise adjustments to fit any performance requirement. Designed with versatility in mind, the ARA-P12.74 / 115 are equipped with M10 rigging points, M8 and M10 threated inserts accommodating a wide array of accessories. This adaptability renders it an ideal fit for a variety of venues, configurations and uses.

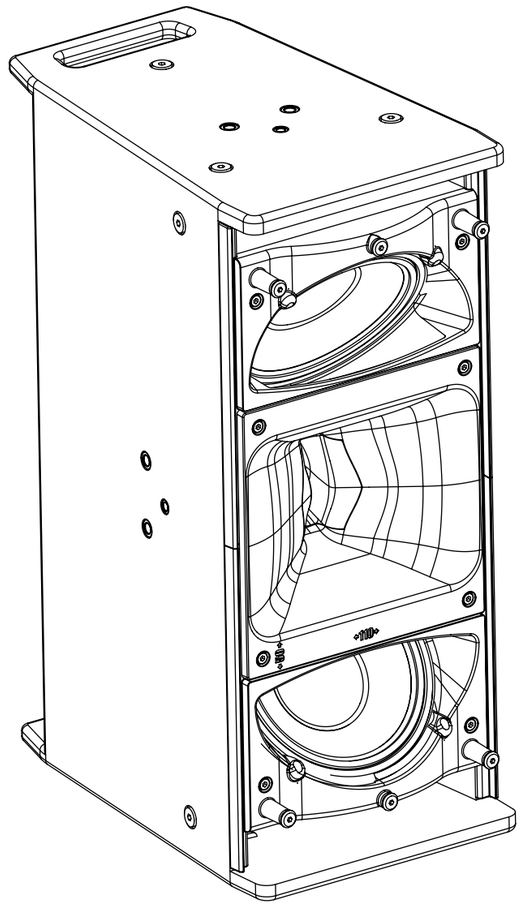


ARA-P28.74 / ARA-P28.115

The ARA-P28.74 and ARA-P28.115 are point source systems that combine technical innovation with acoustic precision. These models include a dual 8” V-shaped configuration working in conjunction with one 3” VCD compression driver delivering a broad frequency range from 70 Hz to 17 kHz. Their rotatable aluminum horns provide two nominal horizontal coverages 70° or 110°, two nominal vertical coverages 40° or 50°, depending on the model (74 or 115), ensuring both the ARA-P28.74 and P28.115 offer uniform sound dispersion, perfectly suited for medium to long throw applications in various settings.

Equipped with a powerful class D amplifier with universal mains switching power supply, the ARAP28.74 offers a continuous power rating of 1200 W, with peak capabilities reaching 2400 W (1600 W for low frequencies and 800 W for high frequencies). This system boasts a maximum linear SPL of 137 dB and a peak SPL of 141 dB, ensuring powerful performance in any environment.

The advanced electronics of the ARA-P28.74 include a 96kHz sampling rate with an intuitive ALMA control interface for precise sound management. One system, one brain; each ARA-P28.74 includes a unique processing input channel working at 96kHz with 10 EQ points and a total delay of 823ms, translating to 283 meters, enhancing its versatility in system setup. The power module’s DSP platform features specially designed Finite Impulse Response filters (FIR) for acoustical flat magnitude and phase response, allowing a coherent combination with other units of the ARA series, like the LARA / SARA line arrays.

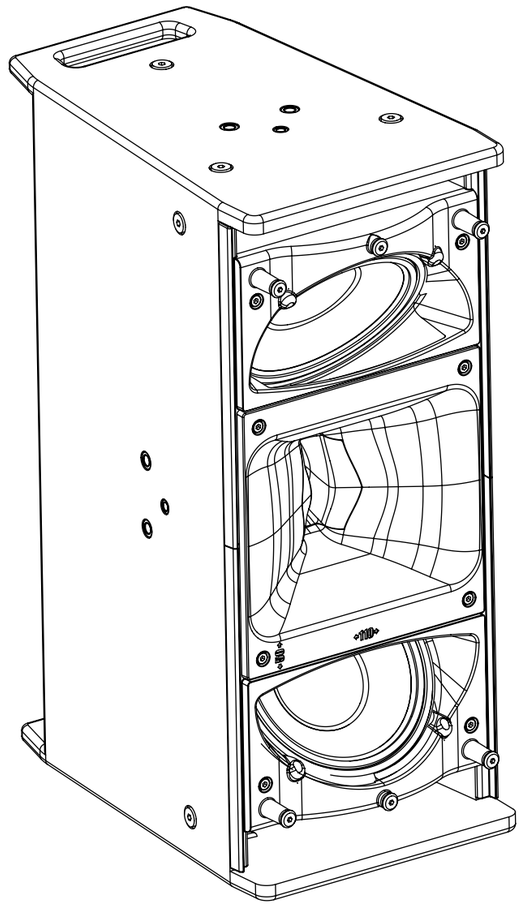


ARA series
System components

At the heart of the ARA-P28.74 are our custom-manufactured transducers, the 8GXN, equipped with a neodymium magnet and a 2.5” Voice Coil Diameter (VCD). These transducers are crafted for exceptional long displacement capabilities and minimal distortion. Complementing this is the M-78N compression driver, identical to those utilized in the ARA series line arrays. With a 3-inch VCD, the M78N is adept at producing crisp, clear high frequencies, contributing to the overall rich and detailed audio experience the ARA-P28.74 offers. A wider coverage is provided by the P28.115 model, using as well, a rotatable horn coupled to the same M78N compression driver.

Sound control and management are accomplished through the ALMA software interface, allowing for precise adjustments to fit any performance requirement

Designed with versatility in mind, the ARA-P28.74 / 115 are equipped with M10 rigging points, M8 and M10 threated inserts accommodating a wide array of accessories. This adaptability renders it an ideal fit for a variety of venues, configurations and uses.

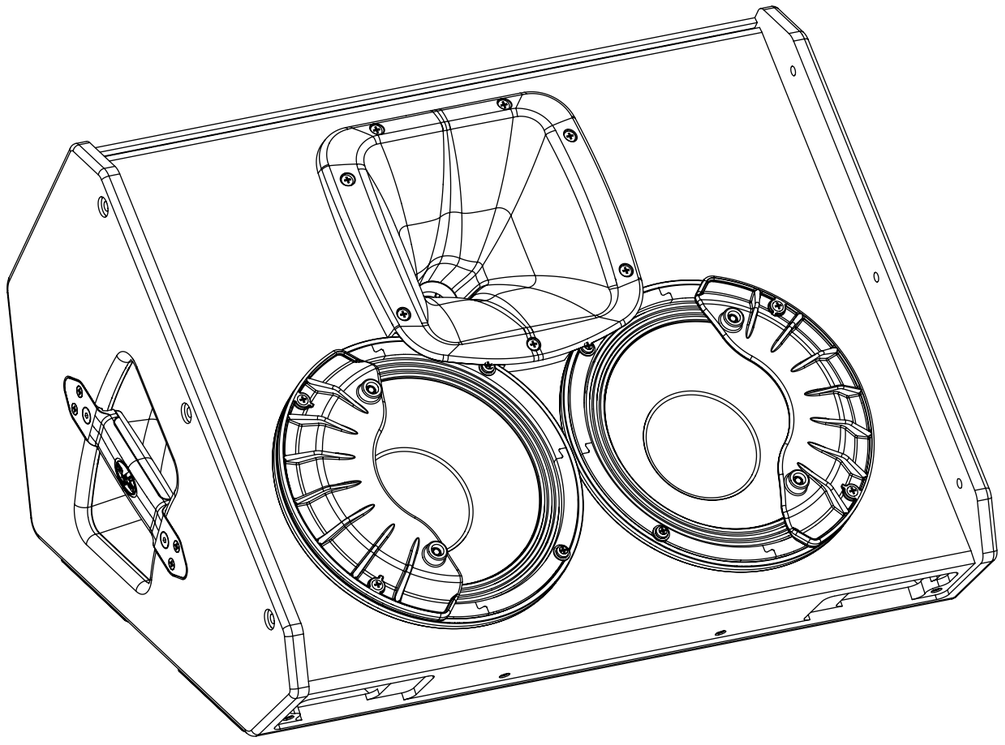


ARA-M210

The ARA-M210 is a stage monitor ARA series, featuring a symmetrical component configuration that provides even sound distribution. This arrangement of mid and low-frequency transducers results in a 50° horizontal spread and an asymmetrical vertical dispersion of 40° downward and 30° upward, optimizing the monitor for a wide variety of stage set up.

This monitor operates within a frequency range of 55 Hz to 20 kHz and is powered by a class D amplifier capable of delivering 1200 W continuously and 2400 W at peak. The maximum SPL of 143 dB ensures ample volume and clarity for live performance settings. The custom-designed 10GXN transducers handle mid and low frequencies, while the M-78N compression driver manages the high frequencies, together providing a clear and reliable sound output. The ARA-M210's enclosure, made from durable birch plywood and finished with ISO-flex paint, is built to withstand the rigors of touring and frequent use. The monitor's electronic architecture includes a 96kHz sampling rate with advanced digital signal processing. The inclusion of Finite Impulse Response (FIR) filters ensures acoustically flat magnitude and phase response, facilitating coherent audio output.

Sound control and management are accomplished through the ALMA software interface, allowing for precise adjustments to fit any performance requirement. The ARA-M210 is designed with both functionality and performance in mind, offering balanced sound delivery for professional stage applications. Its robust construction and advanced technology make it a reliable choice for sound reinforcement in different live settings.



The ARA series is a family of self-powered products that includes newest and most technologically sophisticated power packs in the systems. A very powerful DSP platform working at 96kHz is included allowing control and monitoring features. ALMA software is the dedicated tool to adjust, control and optimize the systems. Connectivity between the amplifier modules and the control computer and ARA-RACKs is done using standard TCP/IP data protocols.

POWER CONNECTORS and POWER CONSUMPTION
At the amplifier's panel 2 powerCON true1 connectors (in and loopthru) are used to inject power into the units and as well linking power to other units.

The maximum number of units that can be linked in terms of power depends on the consumption of each unit.

When working at 230/208V these are the limitations per system model:

	Max number of linked units (power)
LARA-80/100	**2**
LARA-SUB	**2**
MARA-80/100	**3**
MARA-SUB	**3**
SARA-80/100	**4**
SARA-SUB	**3**
ARA-P12.74/115	**8**
ARA-P28.74/115	**8**
ARA-M210	**8**

Please refer to the configuration documents to check connections between units.

AUDIO AND AUDIO & DATA CONNECTORS
All ARA models are using the same interface input board:

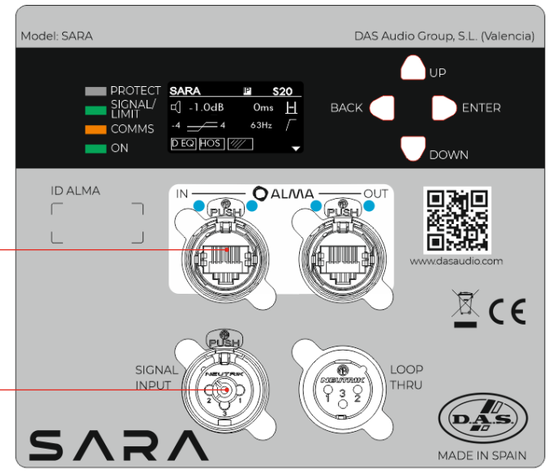
- Two x XLR IN / OUT analog audio connectors.
- Two x Ethercon IN / OUT Audio + ALMA data connectors. Analog Audio injected by the use of the ethercon connector.
- OLED Display, 1.54", and control buttons

Analog audio can be connected independently by using the XLR Signal Input connector or in conjunction with control and monitoring data by the use of the IN ethercon connector.

All amplifiers are including the 1.54" OLED display to provide certain level of configuration by the use of the control knobs (up/down/back/enter) and checking information such as firmware version.

ETHERCON ANALOG AUDIO AND ALMA DATA CONNECTORS

XLR ANALOG AUDIO CONNECTORS



Never connect both types of inputs at the same time! Use XLR or ETHERCON!!!

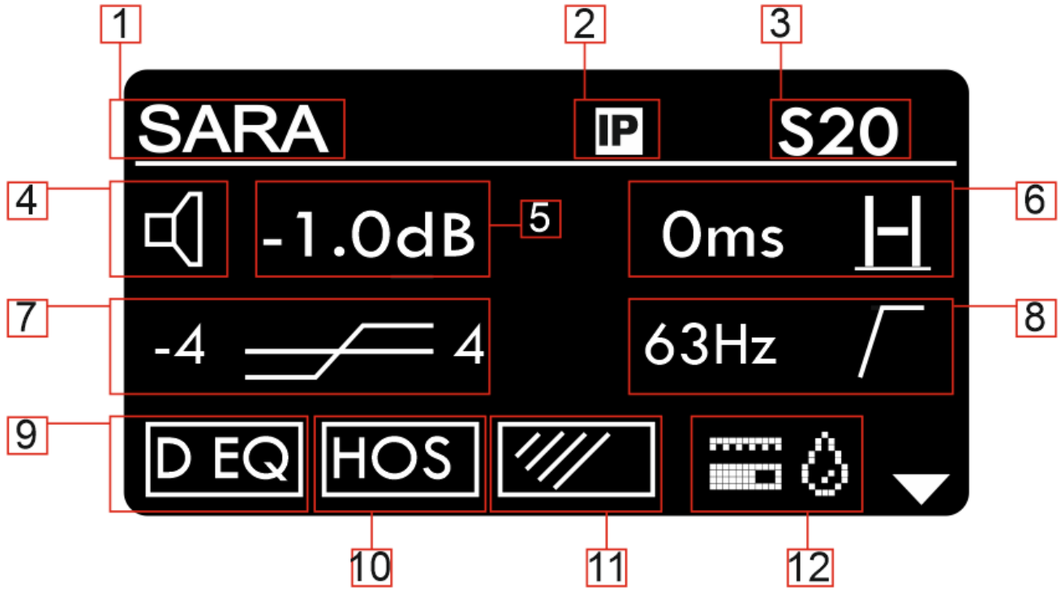
DISPLAY OF THE UNITS AND CONTROL BUTTONS

The display and control buttons of a SARA unit (LARA/LARA-SUB/ MARA/MARA-SUB/SARA/SARA-SUB use the same hardware) are shown below:

On the left side 4 different LEDs are located.

- The ON Led will lit in green when the unit is connected to mains.
- The COMMs Led will lit in orange when the system has been connected to ALMA.
- The SIGNAL / LIMIT led will lit in green or red depending on the signal level. Red shall represent limit status on at least one of the channels of the system.
- The PROTECT Led will lit in red if an amplifier detects failure or activates the protection mode.

The Display shows the status of the system as follows (LARA, MARA and SARA):



1. System Model

2. IP: Active when the system has obtained an IP address from a DHCP server (router) or via Static configuration.

3. L/Sxxxx: ID name of the system. ALMA needs a unique ID name per device. When systems are manufactured the amplifiers are loaded with this unique ID number*.

4. Mute / Unmute: this symbol shows with a X on top of the speaker symbol if the system has been totally or partially muted by using ALMA.

5. Device Gain: variations of Gain (level in dB) are possible from +6dB to -40dB in 0.1 increments / decrements.

6. Device Delay: from 0ms to 323ms.

7. Array Balance settings. The graph shows both, AB Low and AB High settings.

8. HPF filter: In case of “top” units such as SARA / MARA / LARA this part of the display shows the active High Pass Filter (63/80/100Hz). In case of subwoofer units, SARA-SUB / MARA-SUB / LARA-SUB, this part of the display shows the active Low Pass Filter (LPF) 63/80/100Hz.

9. D EQ: When an equalization is active in the device (device EQ or Global EQ on ALMA) this box will say D EQ. When no EQ is applied the box appears empty.

10. HOS: High Order Shelving EQ. When a HOS equalization is being active in the device (via ALMA), this box will say HOS. When no EQ is applied the box appears empty.

11. DASaim: When the system has an active DASaim FIR filter these lines appear in the box.

12. Atmos. Correction enabled: As sound propagates through the atmosphere its energy is gradually absorbed by a number of energy-exchange processes in the air called atmospheric absorption. To compensate this effect Atmos. Correction filter are appied at High frequencies depending on the ambient conditions.

1. System Model

2. IP: Active when the system has obtained an IP address from a DHCP server (router) or via Static configuration.

3. L/Sxxxx: ID name of the system. ALMA needs a unique ID name per device. When systems are manufactured the amplifiers are loaded with this ID number*.

4. Mute / Unmute: this symbol shows with a X on top of the speaker symbol if the system has been totally or partially muted by using ALMA.

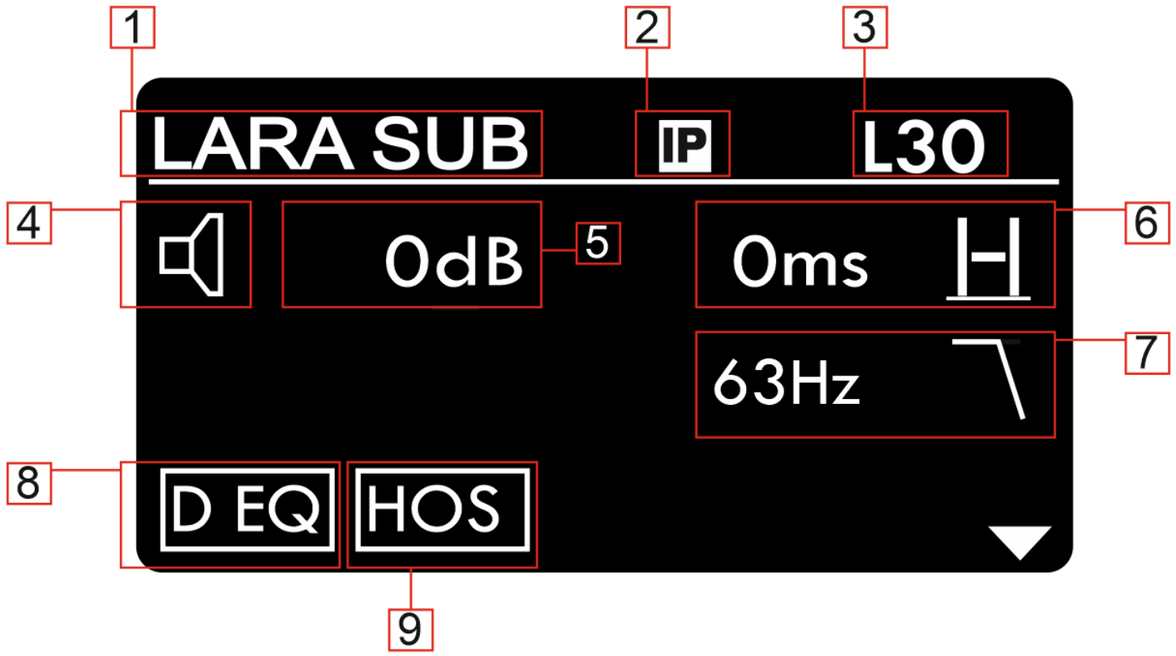
5. Device Gain: variations of Gain (level in dB) are possible from +6dB to -40dB in 0.1 increments / decrements.

6. Device Delay: from 0ms to 323ms.

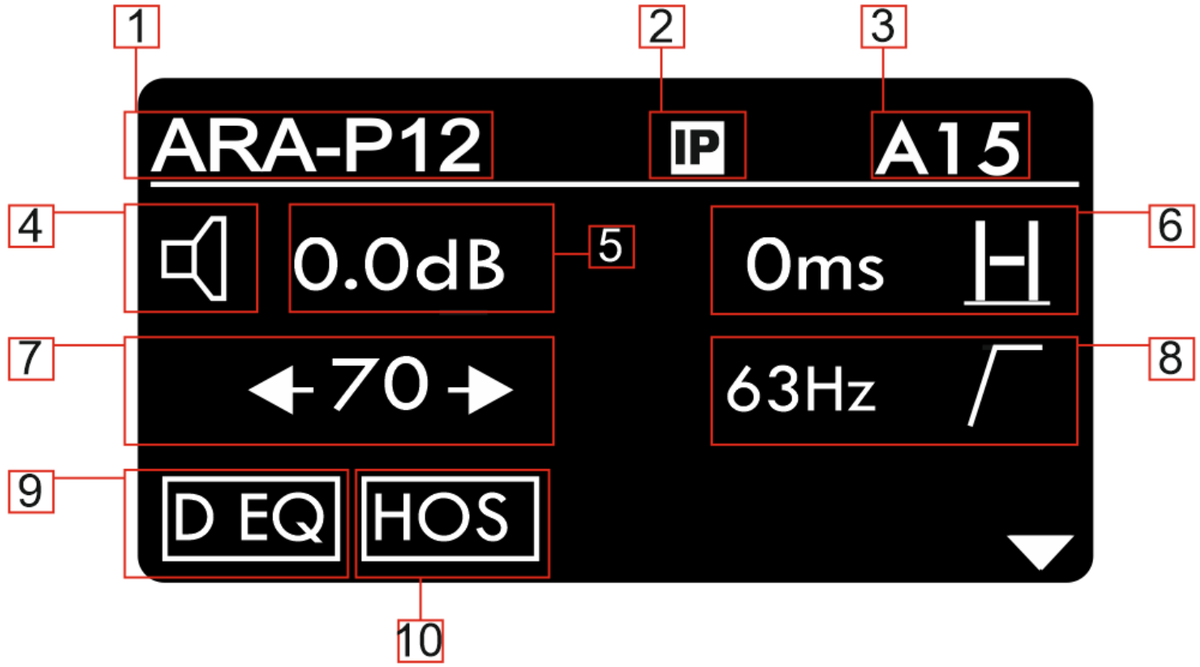
7. LPF filter: In case of “top” units such as SARA / MARA / LARA this part of the display shows the active High Pass Filter (63/80/100Hz). In case of subwoofer units, SARA-SUB / LARA-SUB, this part of the display shows the active Low Pass Filter (LPF) 63/80/100Hz.

8. D EQ: When an equalization is active in the device (device EQ or Global EQ on ALMA) this box will say D EQ. When no EQ is applied the box appears empty.

9. HOS: High Order Shelving EQ. When a HOS equalization is being active in the device (via ALMA), this box will say HOS. When no EQ is applied the box appears empty.



SARA-80	**S1xxxxx**
SARA-100	**S2xxxxx**
SARA-SUB	**S3xxxxx**
MARA-80	**M1xxxxx**
MARA-100	**M2xxxxx**
MARA-SUB	**M3xxxxx**
LARA-80	**L1xxxxx**
LARA-100	**L2xxxxx**
LARA-SUB	**L3xxxxx**



1. System Model

2. IP: Active when the system has obtained an IP address from a DHCP server (router) or via Static configuration.

3. Axxxx: ID name of the system. ALMA needs a unique ID name per device. When systems are manufactured the amplifiers are loaded with this unique ID number*.

4. Mute / Unmute: this symbol shows with a X on top of the speaker symbol if the system has been totally or partially muted by using ALMA.

5. Device Gain**: variations of Gain (level in dB) are possible from +6dB to -40dB in 0.1 increments / decrements.

6. Total Device Delay***: from 0ms to 823ms.

7. Coverage settings****. Two arrows indicate the horn´s position and coverage.

8. HPF filter: In case of “top” units such as SARA / LARA / ARA-P this part of the display shows the active High Pass Filter (63/80/100Hz)

9. D EQ: When an equalization is active in the device (device EQ or Global EQ on ALMA) this box will say D EQ. When no EQ is applied the box appears empty.

10. HOS: High Order Shelving EQ. When a HOS equalization is being active in the device (via ALMA), this box will say HOS. When no EQ is applied the box appears empty.

*ID numbers coding depending on the system model:

LARA-80	L1xxxxx
LARA-100	L2xxxxx
LARA SUB	L3xxxxx
MARA-80	M1xxxxx
MARA-100	M2xxxxx
MARA SUB	M3xxxxx
SARA-80	S1xxxxx
SARA-100	S2xxxxx
SARA-SUB	S3xxxxx

ARA-P28.74	A3xxxxx
ARA-P28.115	A4xxxxx
ARA-P12.74	A1xxxxx
ARA-P12.115	A2xxxxx
ARA-M210	M4xxxxx

** Device Gain: Shown on display the combination of Master Control or Group´s gain and the individual device (relative) gain. For instance, if the master control gain is set to +3dB and the individual device gain is set on ALMA to -1dB, the shown value on the display will be +2dB.

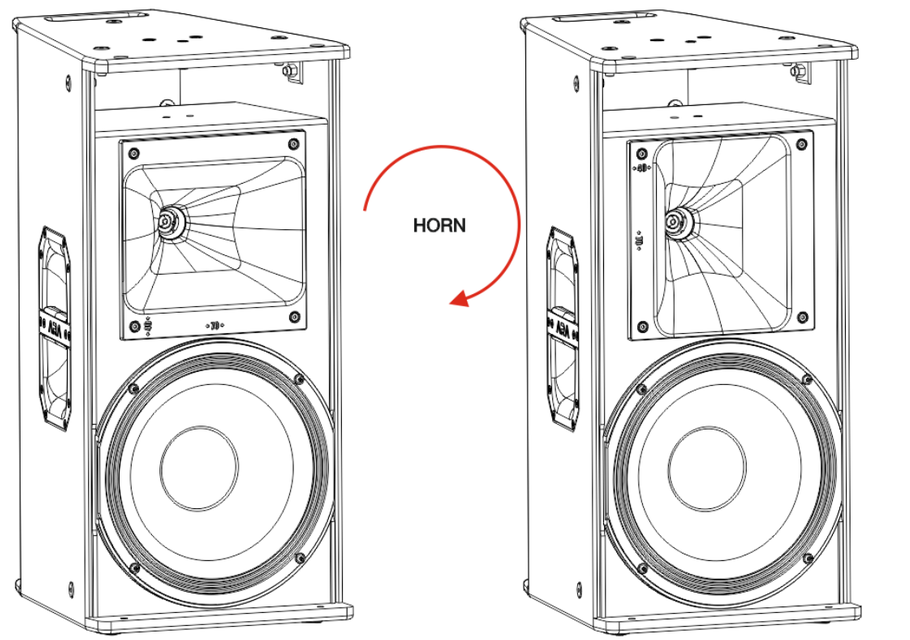
*** Device Delay: Shown on display the combination of device delay (relative) and Group´s (Master Control on ALMA) delay. The maximum value between the two is 823ms.

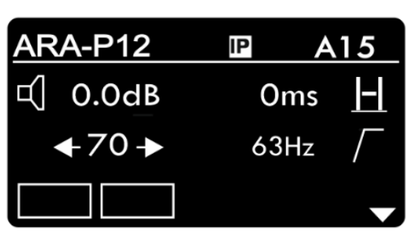
Via display and knobs the maximum available delay would be 323ms. The extra 500ms shall be set on ALMA.

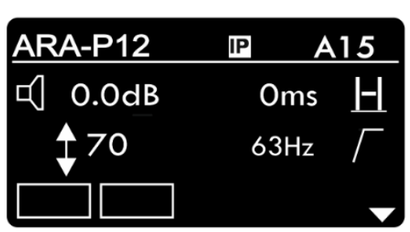
**** Rotatable HF Horn: when the horn has been rotated 90°, the vertical coverage of the unit would be 70° or 110° (ARAPxx.115). The display will automatically show the new dispersion pattern. All Ara-P units are equipped with sensors that read the horn´s position in order to update the internal

DSP preset and the information on the display. 70° or 110° shall be shown on the display depending on the system´s model, ARA-P12.74 or ARA-P12.115.

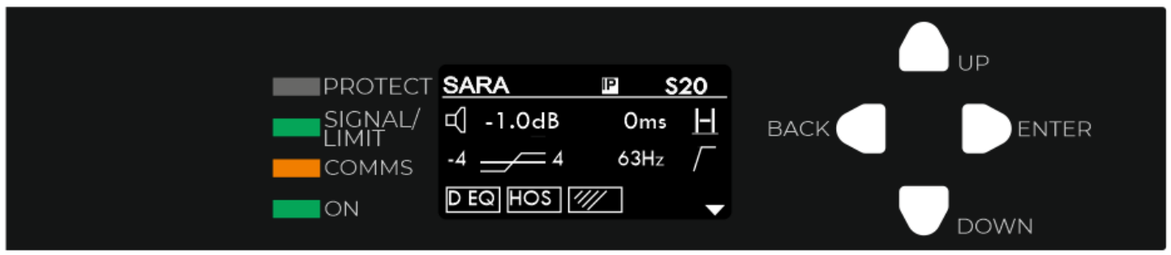
If the horn has been rotated the previous nominal horizontal coverage will be the new vertical coverage and the arrows on the display will be shown in the vertical direction.



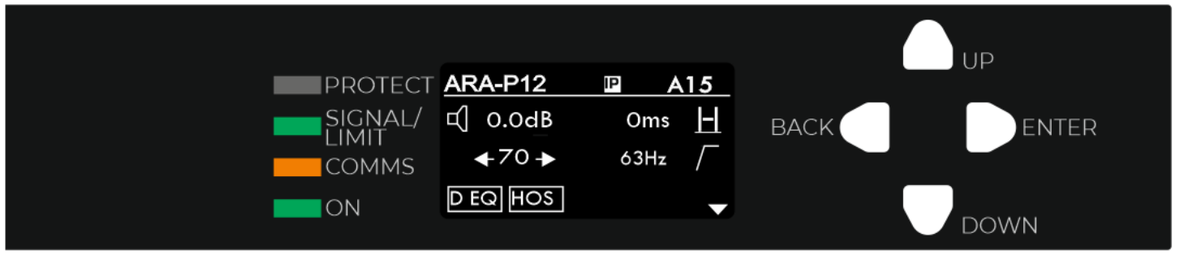




The user can have access to different settings in the units using the control buttons (back / enter / up /down) and the display located at the amplifier's panel:



SARA-80 and SARA-100 Display and control buttons.

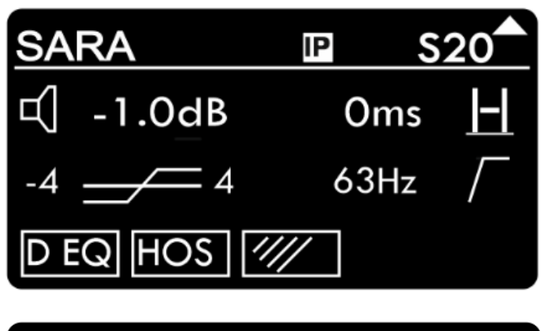


ARA-P12.74 Display and control buttons.

All models belonging to ARA series use the same interface navigation and control buttons and the same display. Shown above, as a reference, the look of a line array unit and a point source system. The information shown on the displays will be slightly different depending of the type of system (line array, subwoofer, point source, monitor), as shown in previous pages.

When pressing BACK button, the system is LOCKED (display turned Off):

When pressing DOWN, system´s configuration detailed information is displayed:
Mute Status / Gain / Delay / Array Balance Lo and Hi / High Pass Filter etc

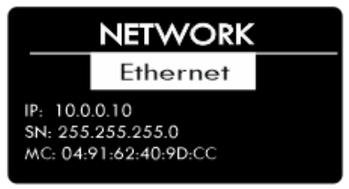


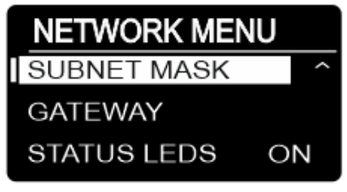
When pressing UP network information is shown:
NFC Status / ID number / IP Address and Dynamic or Static Mode

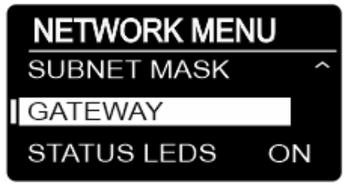
When pressing ENTER, the user has access to the main menu:

DISPLAY AND MAIN MENU
The Main Menu allows the user to access the following sub-menus:

1. Network Sub-Menu:



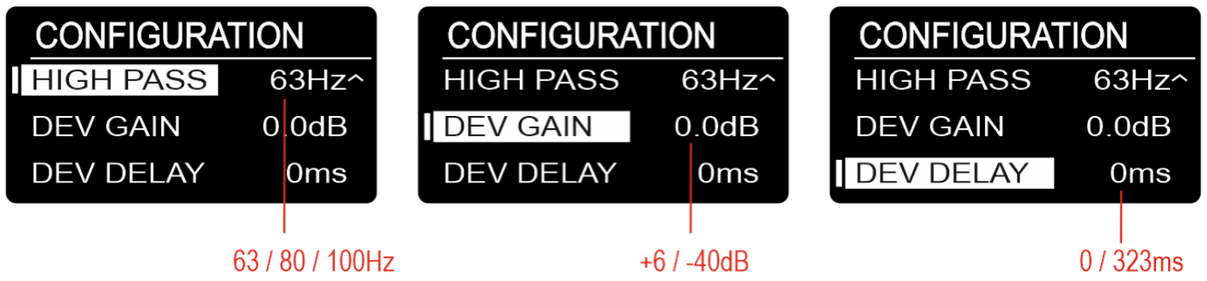




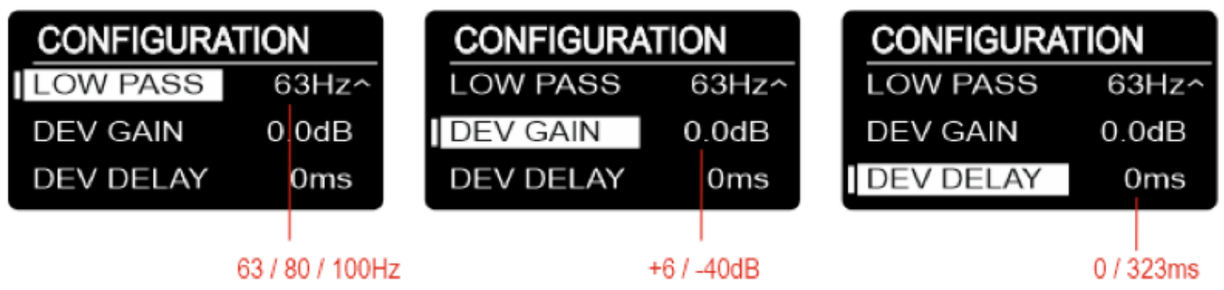
2. Configuration Sub-Menu:

SARA-80, SARA-100, MARA-80, MARA-100, LARA-80, LARA-100

ARA-P12.XX, ARA-P28.XX, ARA-M210

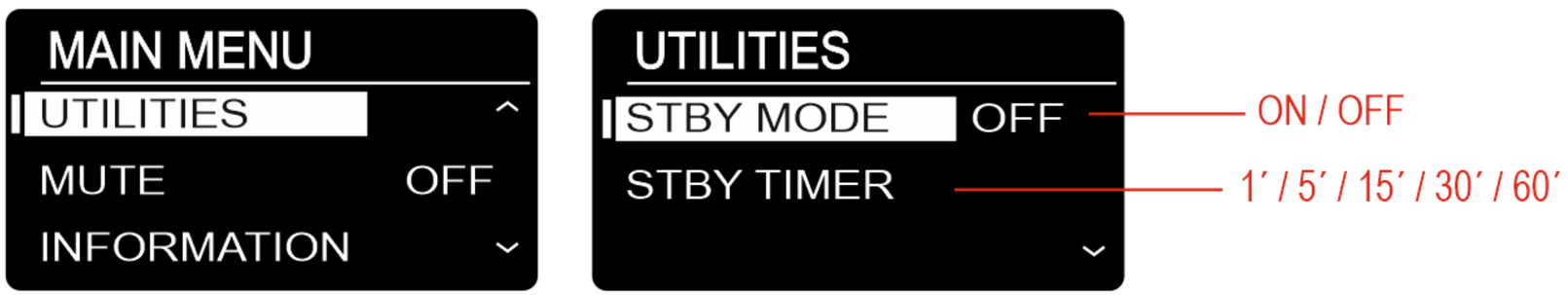


SARA-SUB, MARA-SUB, LARA-SUB



3. Health Check Sub-Menu

4. Utilities Sub-Menu:



5. Mute Sub-menu: On / Off

6. Information Sub-Menu: Shown in the images below, as a reference, the type of information displayed in the systems.

7. Device Reset Sub-menu:

When confirming device reset in a unit, all these parameters are modified:

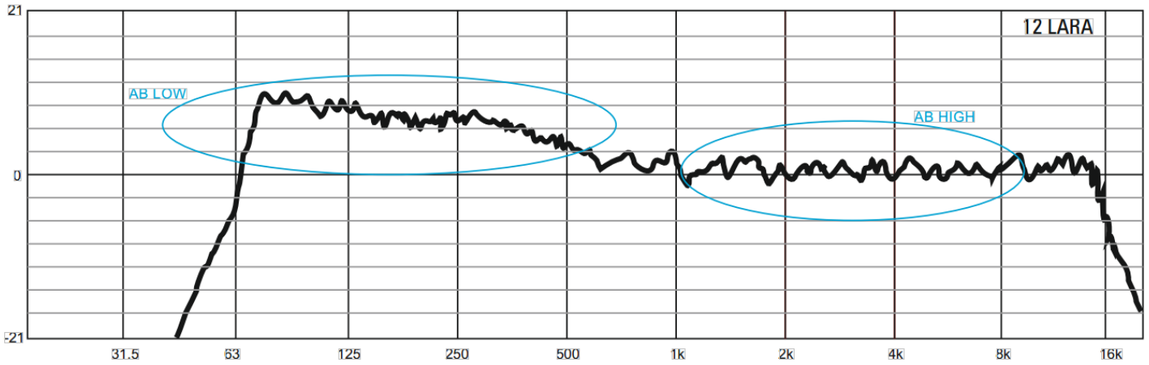
AB LO	SARA-80, SARA-100, MARA-80, MARA-100, LARA-80, LARA-100	Set to 0
AB HIGH	SARA-80, SARA-100, MARA-80, MARA-100, LARA-80, LARA-100	Set to 5
ATMOS CORRECTION	SARA-80, SARA-100, MARA-80, MARA-100, LARA-80, LARA-100	Erased
HPF	SARA-80, SARA-100, MARA-80, MARA-100,LARA-80, LARA-100, ARA-P, ARA-M	Set to 63Hz
LPF	SARA-SUB, MARA-SUB, LARA-SUB	Set to 63Hz
Device Gain	ALL MODELS	Set to 0dB
Device Delay	ALL MODELS	Set to 0dB
DASaim Filters	SARA-80, SARA-100, MARA-80, MARA-100, LARA-80, LARA-100	Erased
Global EQ/ Device EQ	ALL MODELS	Erased
HOS EQ	SARA-80, SARA-100, MARA-80, MARA-100, LARA-80, LARA-100, ARA-P, ARA-M	Erased
Channel SOLO / Device SOLO	ALL MODELS	Erased
Channel Mute / Global Mute / Device Mute	ALL MODELS	Erased

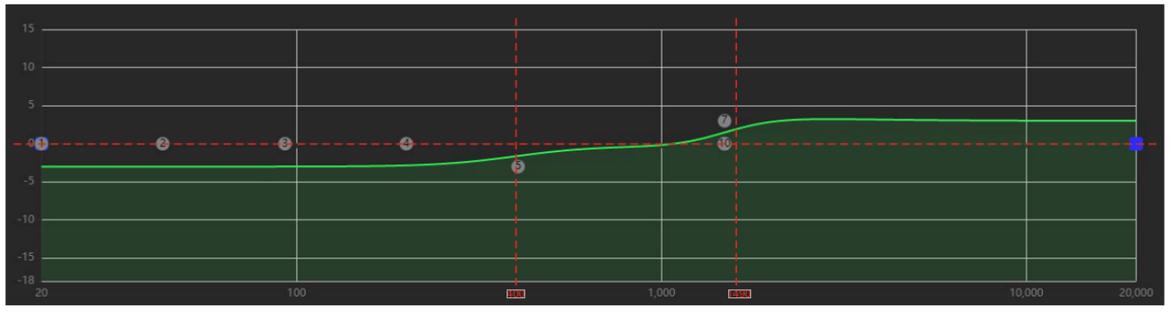
Array Balance (LARA-80 / LARA-100, MARA-80 / MARA-100 and SARA-80 / SARA-100)

To compensate the acoustical coupling between elements of a line array system, two main parameters have been implemented in the units. The “target” frequency response of the entire system will be defined by the use of these 2 parameters.

Shown below, the average frequency response trace of a 12 element Lara system, measured with 3 microphones in different positions.

In this particular case AB Low was set to -4, and AB High was set to 4. The acoustical target response obtained with these 2 values had a lot of energy in the low-mid frequency domain as it was required for the application.





Shown above, as a reference, the electric curve of Array Balance filters. In the sample graph, AB Low is set to -3 and AB High is set to 3:

ARRAY BALANCE LOW (steps of 1dB):

Low Shelving filters starting at 400Hz with 8 different values in gain.

Array Balance Low 0: 0dB
Array Balance Low -1: -1dB
Array Balance Low -2: -2dB
Array Balance Low -3: -3dB (shown in the graph above)

———————

Array Balance Low -8: -8dB

ARRAY BALANCE HIGH (steps of 1dB):

High Shelving filters starting at 1490Hz with 8 different values in gain.

Array Balance High 0: 0dB
Array Balance High 1: 1dB
Array Balance High 2: 2dB
Array Balance High 3: 3dB

———————

Array Balance High 8: 8dB

In SARA and LARA systems the “default parameters” are Array Balance Low 0, Array Balance High 5.

To obtain a flat frequency response of one unique system (device) to be used for instance as a front fill, the user shall use Array Balance Low 0, Array Balance High 0.

ARA series

Atmos. Correction (LARA-80 / LARA-100, MARA-80 / MARA-100 and SARA-80 / SARA-100)

As sound propagates through the atmosphere its energy is gradually absorbed by a number of energy-exchange processes in the air called atmospheric absorption.

The degree of absorption depends on the frequency of the sound wave and the composition of the atmosphere.

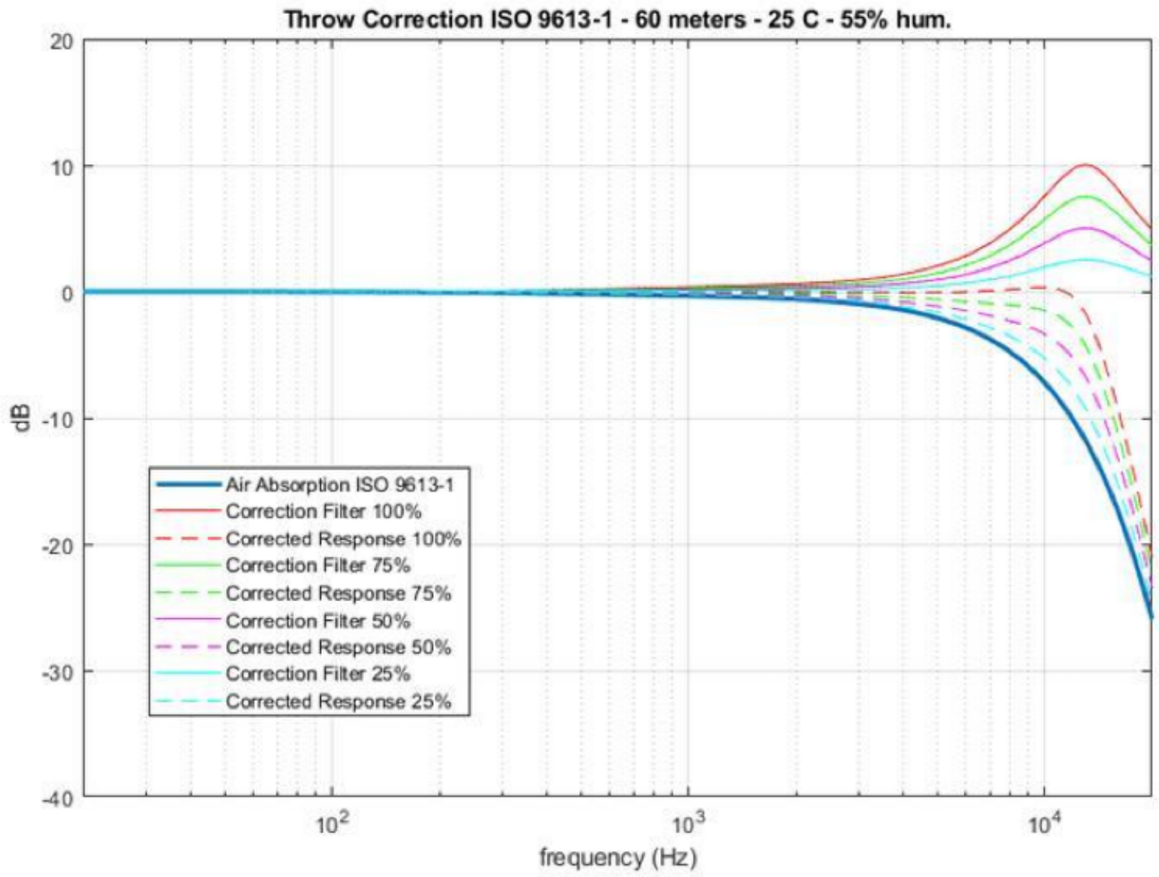
At low frequencies, sound waves are generally not absorbed by the atmosphere and can travel long distances. However, as the frequency increases, the atmosphere becomes more effective at absorbing sound. This is because the air molecules themselves start to absorb some of the sound energy.

In most conditions, dry air can produce high attenuation of sound at high frequencies. Therefore, in the case of a predominantly high-frequency range, measurements made under dry conditions can differ considerably from measurements made under more humid conditions.

The compensation of the absorption of sound by air (humidity and temperature) implemented on ALMA is based in the ISO 9613-1: 1993 “Attenuation of sound during propagation outdoors -Part 1: Calculation of the absorption of sound by atmosphere”.

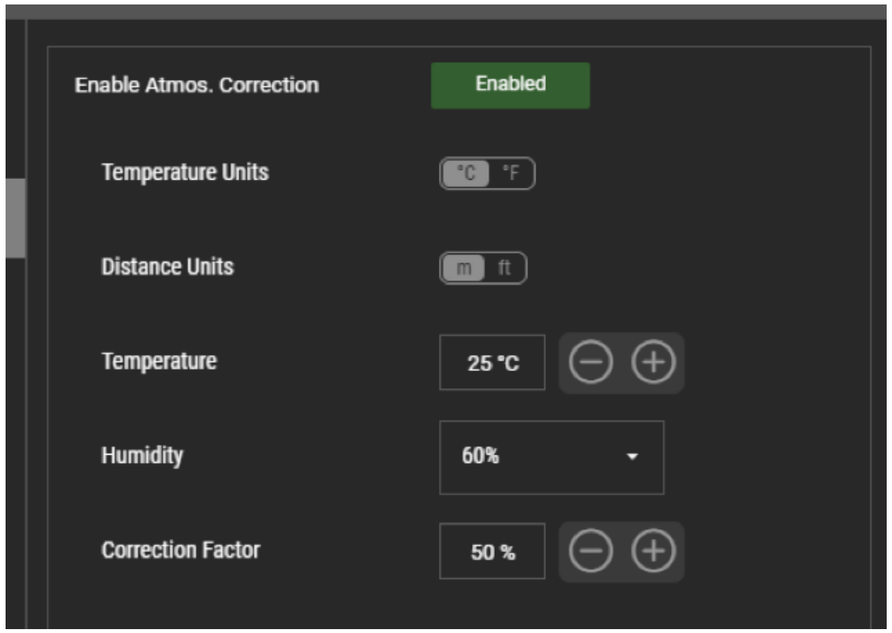
For each ARA system, SARAs, MARAs and LARAs the atmospheric correction can be activated independently per unit considering the target distance of it and the ambient conditions (air temperature and humidity). ALMA includes a family of more than 500 filters that are activated at different frequencies with different gain levels depending on the distance and ambient conditions.

For example, shown in the image the air absorption at 25°C - 55% relative humidity. A percentage of correction parameters is presented.



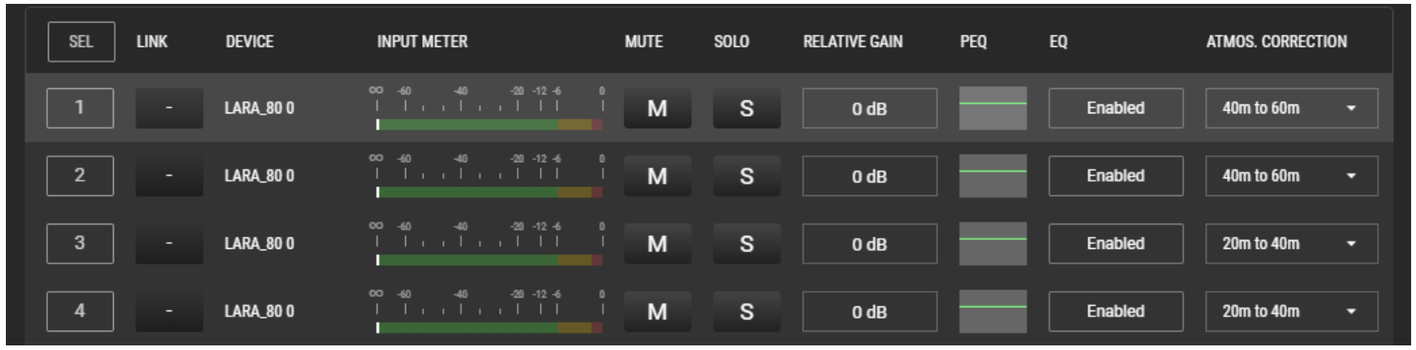
ARA series
Atmos. Correction

The Atmos. correction is activated ON ALMA, not via display of the units. Atmos. Correction - parameters window on ALMA:



When Enabled, Atmos. Correction can be activated independently per unit or per group of units:

Shown below 4x LARA-80 on top of the array (12 units) with 2 different corrections (40m to 60m and 20m to 40m).



ARA series
Health check

The Health Check feature provides essential feedback about the condition and performance of the connected ARA audio systems. It uses real-time impedance data to identify potential issues, helping to ensure optimal operation and system safety. Below is an explanation of the three key error terms encountered during the Health Check process: LOAD WARNING, AMP ERROR, and LOAD OPEN.

1. LOAD WARNING

- **Definition:** This alert occurs when speakers are connected in a parallel configuration, and one of them has been detected with an impedance value outside the acceptable range. Typically, when having two transducers connected in parallel, and one of them fails, the impedance of the way will increase to the double.
- **Recommendation:** It is advised to check the operation of both speakers in the parallel configuration to identify and resolve the issue.

2. AMP ERROR

- **Definition:** Indicates that the measured voltage from the amplifier driving the speakers is outside the expected range.
- **Recommendation:** Verify the amplifier's functionality.

2. LOAD OPEN

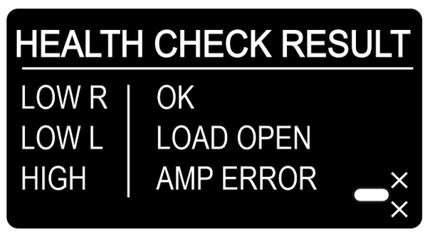
- **Definition:** In a **parallel speaker configuration**, this warning indicates that **both speakers** have impedance values outside the acceptable range. In a **single speaker configuration**, it means that the connected speaker's impedance is outside the specified limits.
- • **Recommendation:** Inspect the speaker(s) connected to the system and verify the impedance values against the acceptable range to identify potential hardware or connection issues.

Health check

Health Check functionality can be activated in two different ways.

1. One option, is working directly with the unit or device just by powering the amplifier; connect the amplifier to mains (only the power is necessary, no signal cables are needed at this point). Go to the amplifier´s back panel buttons and navigate to the “Health Check” Sub-Menu. Press ENTER and CONFIRM:

A sweep signal will be launched thru all the ways and channels of the system (one cabinet) and the result of the test will be displayed as shown:



If the system status is good, a message “SYSTEM OK” will be displayed.

On the contrary, if there exists one of the previously described “error” condition within the unit, a detailed message specifying the type of error and the affected channel will be displayed.

NFCs boards are also checked within this test method.

This option is recommended when checking the systems one by one in the warehouse, for instance.

Health check

Health Check functionality can be activated in two different ways.

2. Second option of activating Health Check is by the use of ALMA; all units on the network could be checked within seconds per groups and sequentially.

A sweep signal will be launched thru all the channels in all the systems (In the same group) and the results of the test will be shown as follows:

LARA

LARA L

LARA R

	Status	System Check	Mute	Id	IP Address	System	Name
	CONNECTED	System OK	-	L1291	10.0.0.67	LARA-80	LARA 1R
	CONNECTED	System OK	-	L1292	10.0.0.63	LARA-80	LARA 2R
	CONNECTED	System OK	-	L1293	10.0.0.68	LARA-80	LARA 3R
	CONNECTED	System OK	-	L1294	10.0.0.70	LARA-80	LARA 4R
	CONNECTED	System OK	-	L1295	10.0.0.65	LARA-80	LARA 5R
	CONNECTED	System OK	-	L227	10.0.0.71	LARA-100	LARA 6R

ARA series
Power distribution

DAS Audio offers two versions of the touring ARA-RACKs, one designed to work a 230V and a second one, intended to work at 208V.

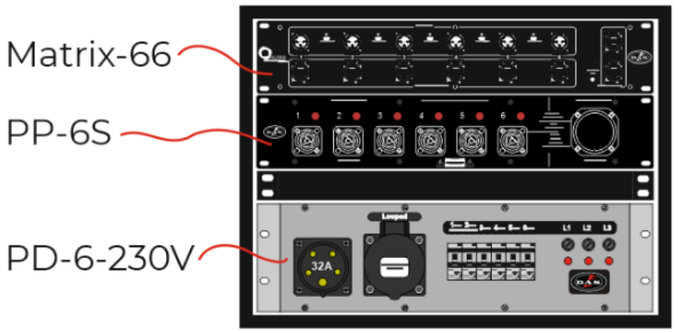
ARA-RACK-230V

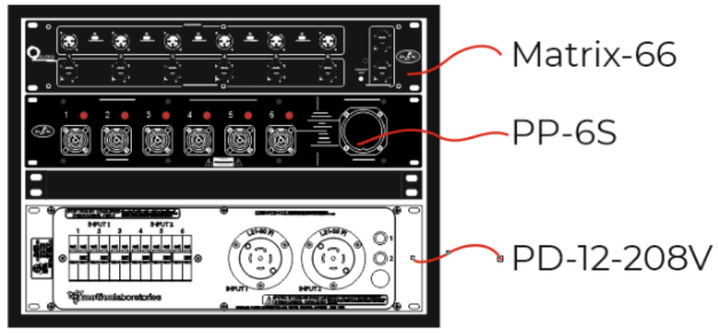
ARA-RACK-208V

Both ARA-Racks include a rack mount 3 Phase Rack Pack that is directly connected to the PP-6S power patch to distribute power to the audio systems. The PP-6S power patch is used to distribute power to the systems using the powercon outlets or the so-capex connector.

The third element of the rack is the audio and monitoring data Matrix-66 distributor.

Elements of the ARA-RACK:





ARA series
Power distribution

The European version of the Power Pack, **PD-6-230V**, is equipped with 3 phase 32 Ampere CEE Input and Thru connectors.

In the graph details of the unit, are shown.

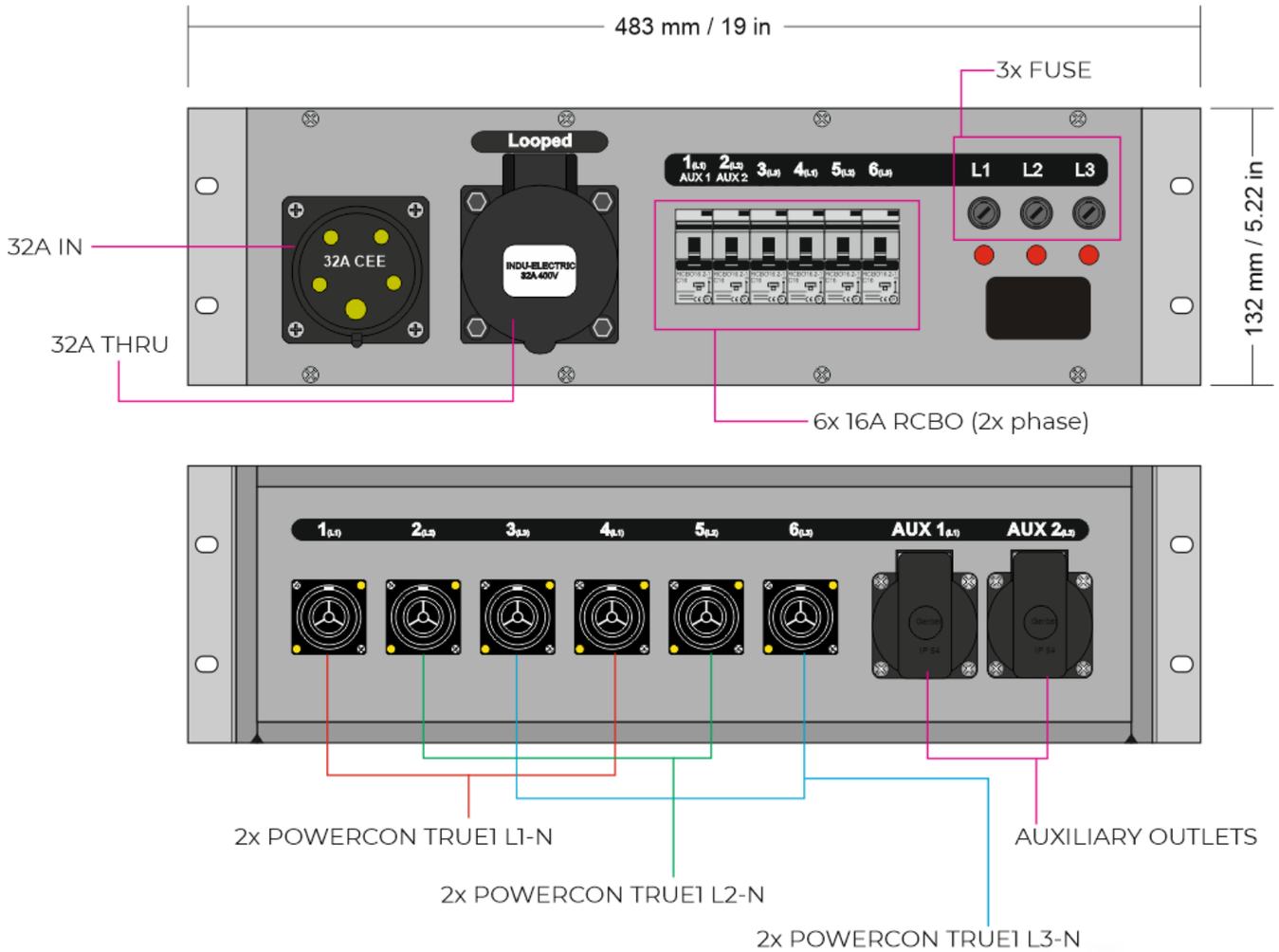
At the front panel six Residual Current Circuit Breakers with Overcurrent Protection are included; one per circuit output. An RCBO is a crucial component in electrical systems. They provide both residual current protection and overcurrent protection (long and short term).

At the front panel, 3 fuses, one per phase, are included.

At the rear panel six female powercon true1 connectors are provided; each pair is connected to the same phase (L1, L2, L3) meaning that the maximum current capacity per powercon is 16A and 32 per phase.

These connectors are used to bring power to the PP-6S power patch in the rack.

At the rear panel two auxiliary outlets are located. These sockets are used to power additional devices as the Matrix-66.



ARA series
Power distribution

The American version of the Power Pack, **PD-12-208V** is equipped with two 3 phase L21-30 input connectors. L21-30 INPUT-1 provides power to the first 6 powercon true1 outlets, named 1, 2, 3. The second L21-30 INPUT-2 connector provides power to the second group of powercon true1 outlets, named 4, 5 and 6.

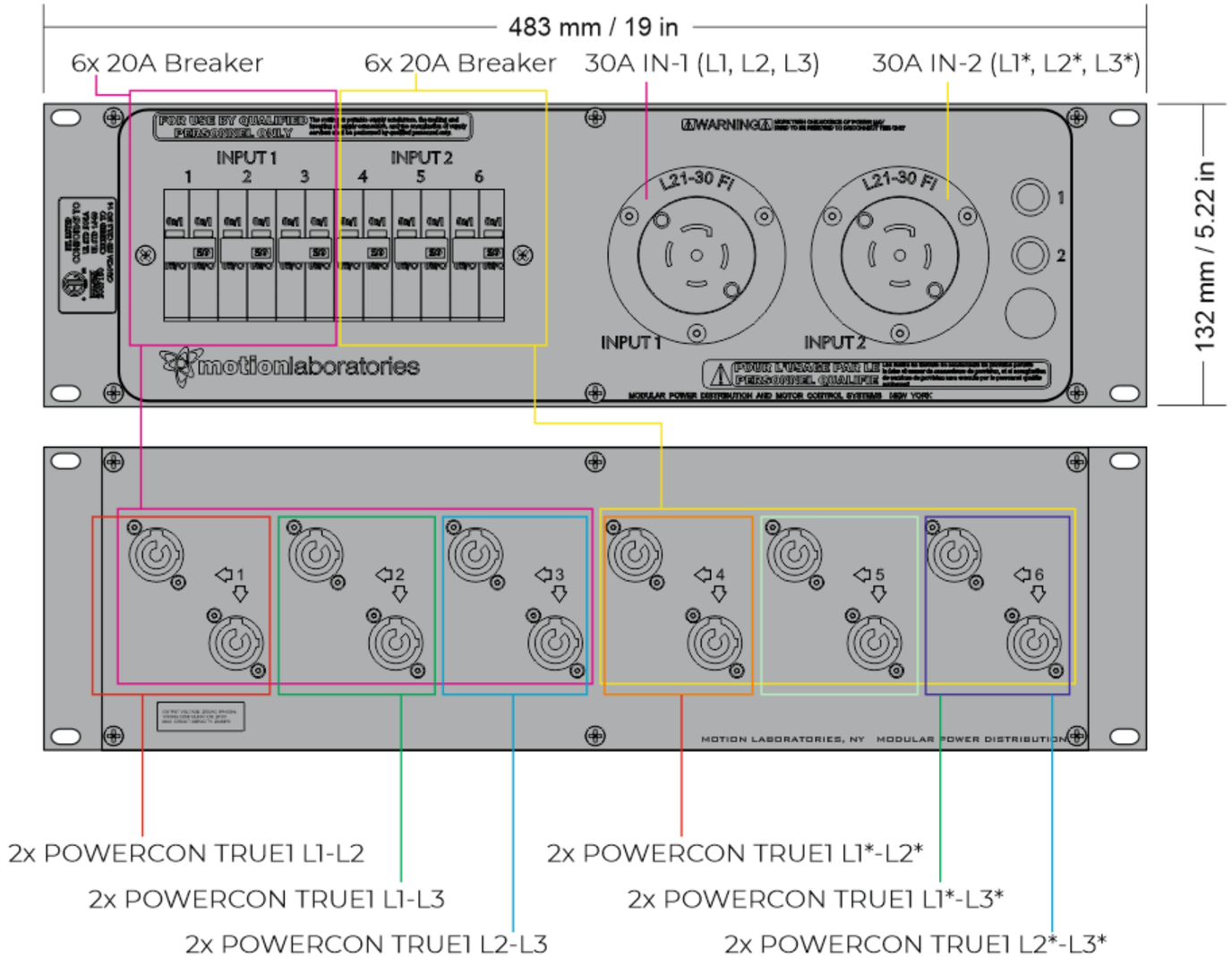
The internal configuration of the rack pack is used to deliver 208V nominal voltage thru each of the rear outlets.

At the front panel, 2x L21-30 connectors are used to power the unit.

At the front panel there are 6x 20A Breakers per each L21-30 input connector.

At the rear panel 12x female powercon true1 outputs can be found. Each pair is internally connected to two phases of the L21-30 input connector.

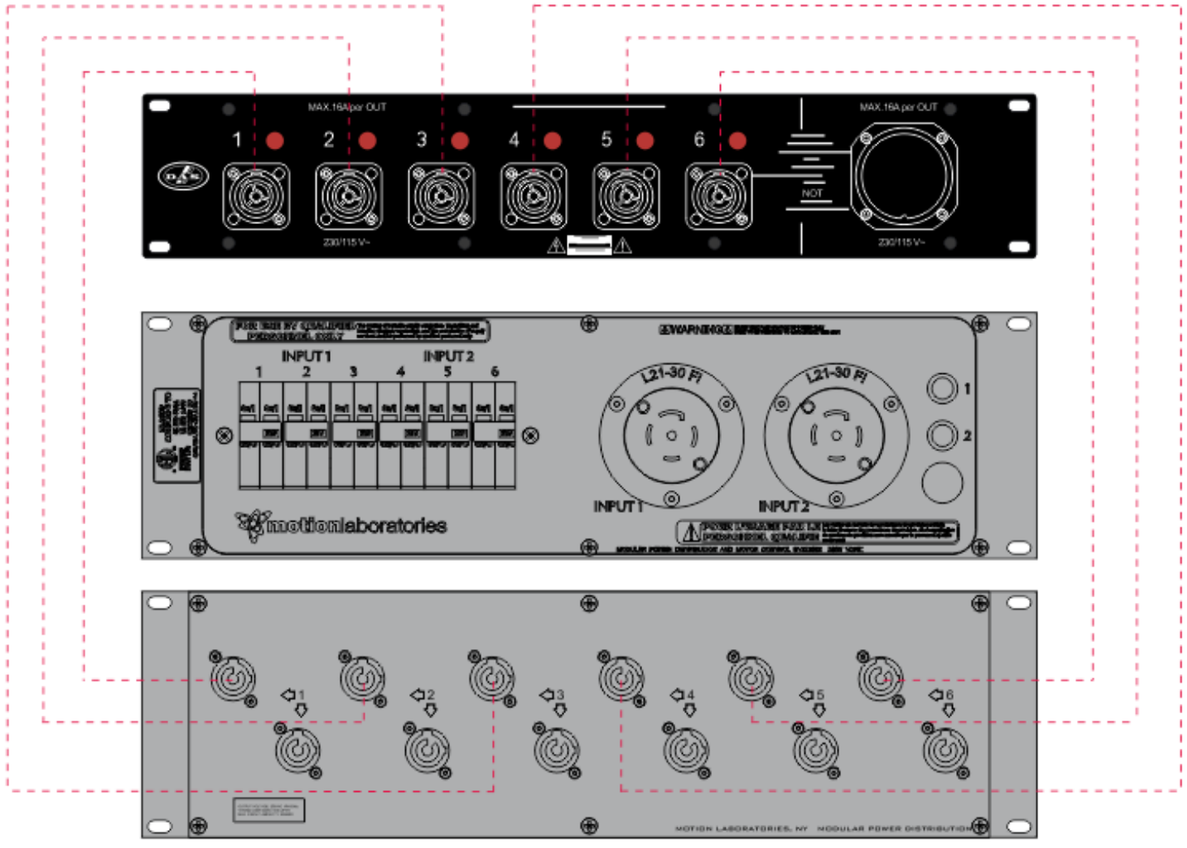
Only 6 of these connectors are used to bring power to the PP-6S power patch in the rack.



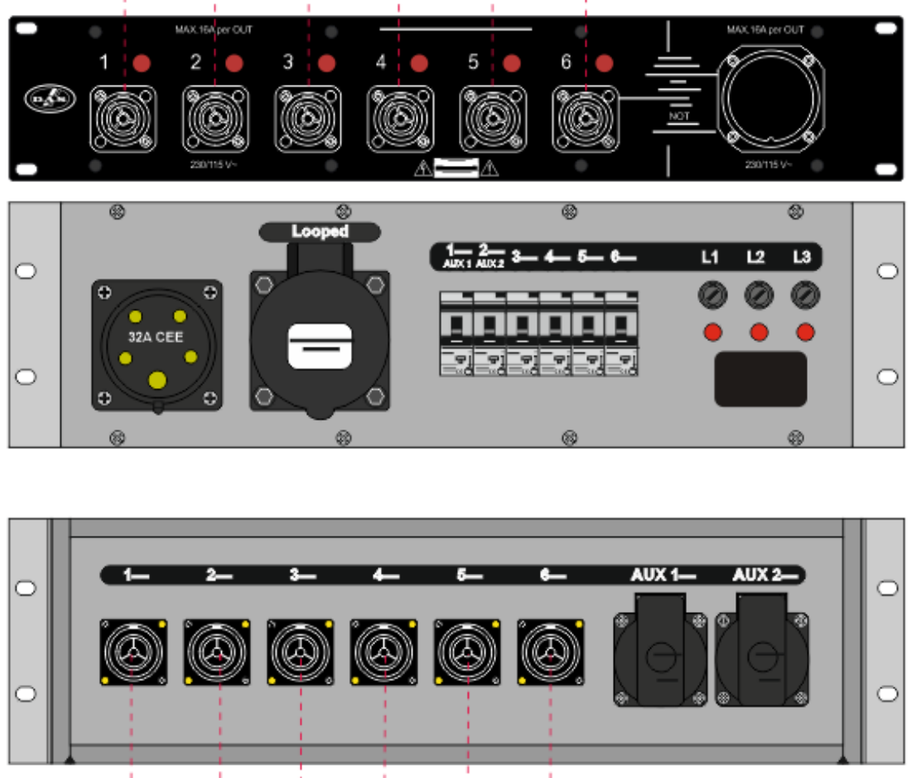
ARA series
Power distribution

The **PP-6S**, power patch, is a rack mount 2U power distributor for the audio systems. The PP-6S is connected to the PD-6-230V or PD-12-208V, rack packs in the ARA-RACK in the following way:

PP-6S and PD-12-208V



PP-6S and PD-6-230V



ARA series
Power distribution

At the front panel it is equipped with 6x PowerCon True1 outputs (3 per phase) and a 19-pin socapex (6 power circuits) connector to offer an additional way of powering the systems. Warning: one option shall be selected, using the powercon outputs or the socapex. Never use both systems at the same time.

There are two options for distributing power to the audio systems from the ARA-RACKs and the PP-6S panel:

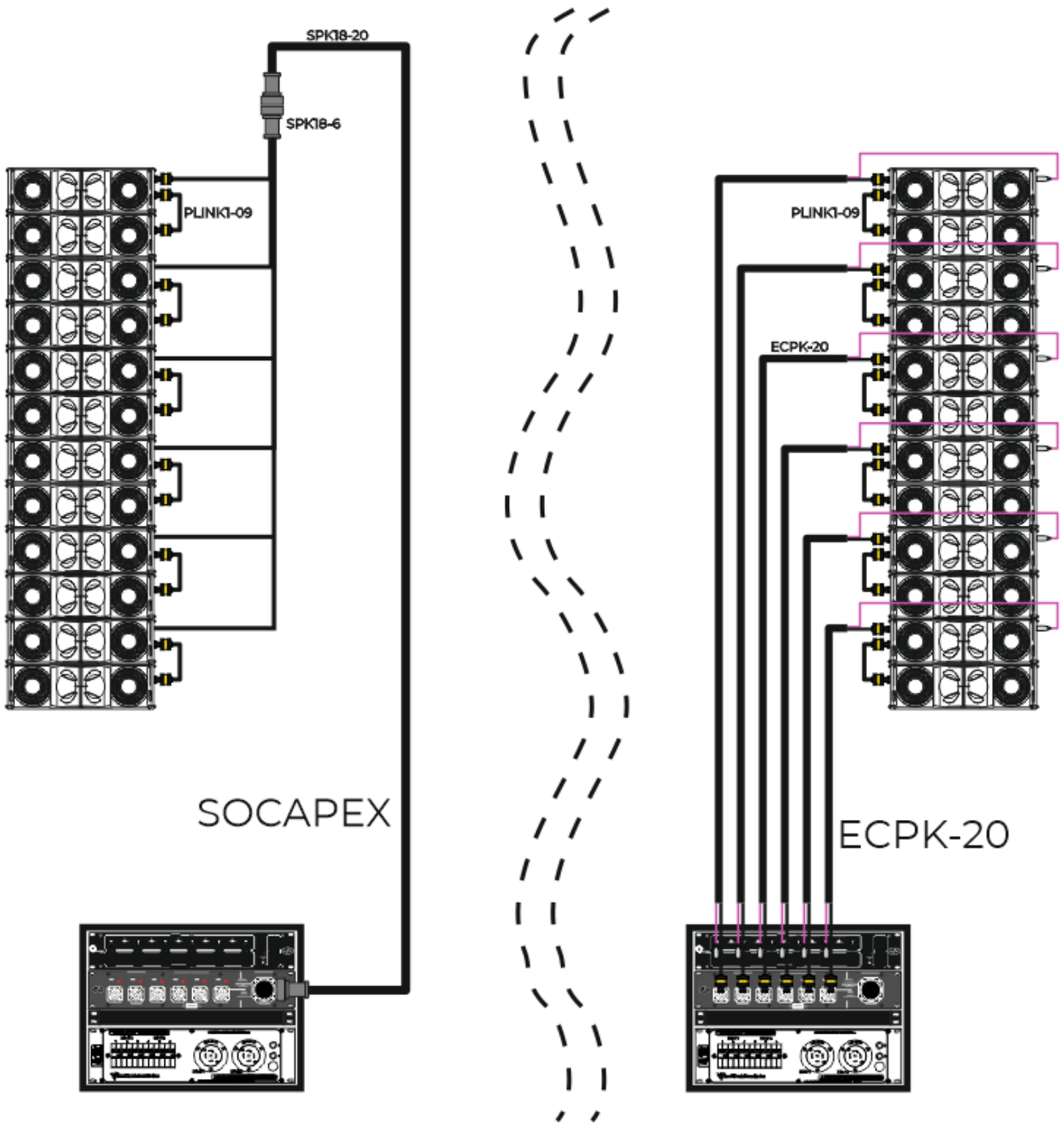
DAS Audio offers hybrid power & data-audio ECPK-20 cables to send both, power and data+audio to the systems.

DAS Audio offers 19-pin Socapex power cables, SPK18-20 as another option. In this case the data+audio shall require and independent CAT 7 cable, DAS +models EC-20 and EC-30.

Power distribution

Shown on the left side, a power distribution using one SPK18-20 and the matching SPK18-6 powercon fan out, to power up to 12 Lara units.

On the right side of the drawing the power distribution is done by the use of 6x ECPK-20 hybrid cables that also provide audio and data to each pair of systems.



ARA series
Power distribution

The ARA series systems can be linked in terms of power by the use of the DAS Audio powercon links, Plink1_09 cables. Depending on the system´s power consumption the number of devices to be linked together shall vary:

Plink1-09

Maximum number of units at 230V in the same power circuit

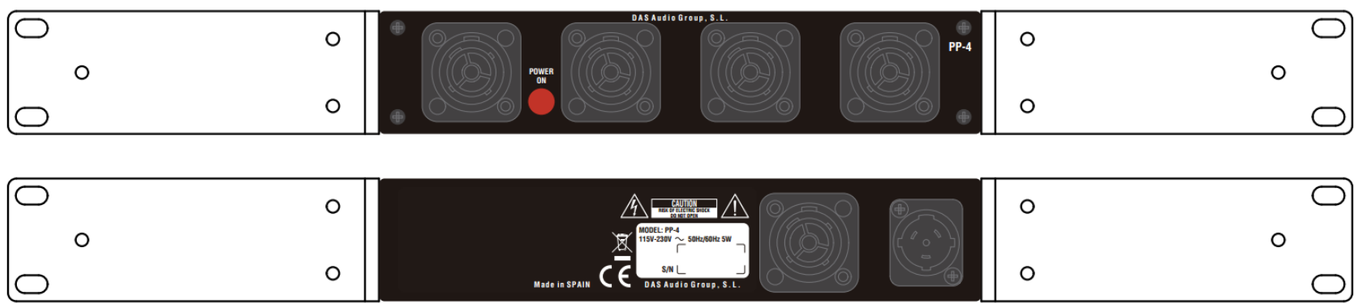
LARA-80/100	2
LARA-SUB	2
MARA-80/100	3
MARA-SUB	3
SARA-80/100	4
SARA-SUB	3
ARA-P12.74/115	8
ARA-P28.74/115	8
ARA-M210	8

Power distribution

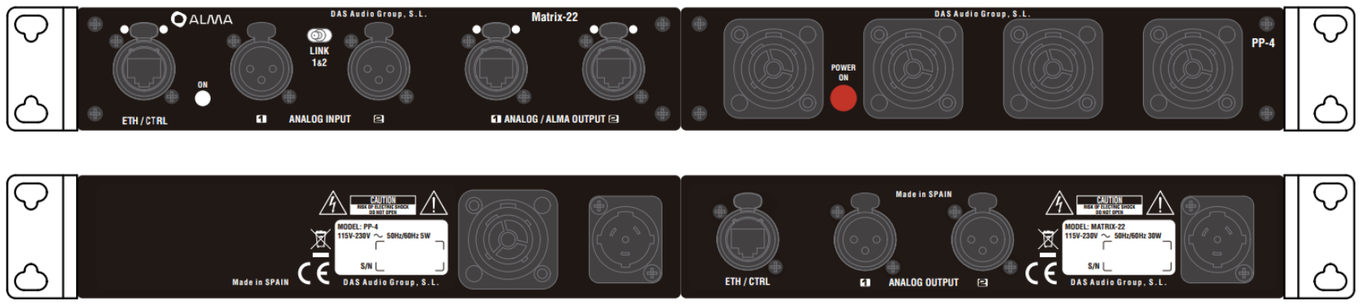
The PP-4, power patch, is a half-rack mount 1U power distributor for smaller audio system. It is ideal for small corporate, live portable or install applications.

It is equipped with 4x Powercon true1 outlets at the front panel. All these units are internally connected in parallel to the AC Input connector located at the rear panel. The maximum current consumption in total must NOT exceed 16Amperes.

The unit can be rack mounted as shown in the figure:



Or in conjunction with the Matrix-22 audio / data distributor:



SIGNAL DISTRIBUTION AND NETWORKING (ALMA)

INTRODUCTION

ARA series systems communicate using standard TCP/IP data protocols. ALMA software is the control and management tool working over IP and developed by DAS Audio.

As professional audio equipment it is almost mandatory the use of ARA products with compatible professional network hardware. Gigabit switches can be found in the industry in a very wide range of prices and features but always keep in mind that domestic intended hardware may not perform properly as there exist limitations managing network bandwidths and impossibility of managing a big number of devices.

The quality of the network cabling used is also a key factor to not face problems specially when dealing with distances close to the limit (100meters) and big bandwidths.

The use of DAS Audio CAT7 cabling with the proper shielding is mandatory.

All DAS cables larger than 1 meter are CAT7: ECPK-5, ECPK-20, EC-30, EC-30.

It’s important to note that the maximum distance is 100m (328feet) for a single ethernet CAT7 cable (for 10 Gbps speeds) segment without any repeaters or switches in between. If you need to extend the distance beyond these limits, you can use repeaters, switches, or fiber optic cables to extend the reach of your Ethernet network.

ARA NETWORK CONNECTIONs

The connection between the audio systems and the ARA-Racks (or Matrix-22, Matrix-66) in terms of audio and control data (ALMA) is provided by two basic different types of cables.

- *ECPK-20 is a hybrid cable that brings both power and Audio + Control data to the systems using CAT7 cable:*

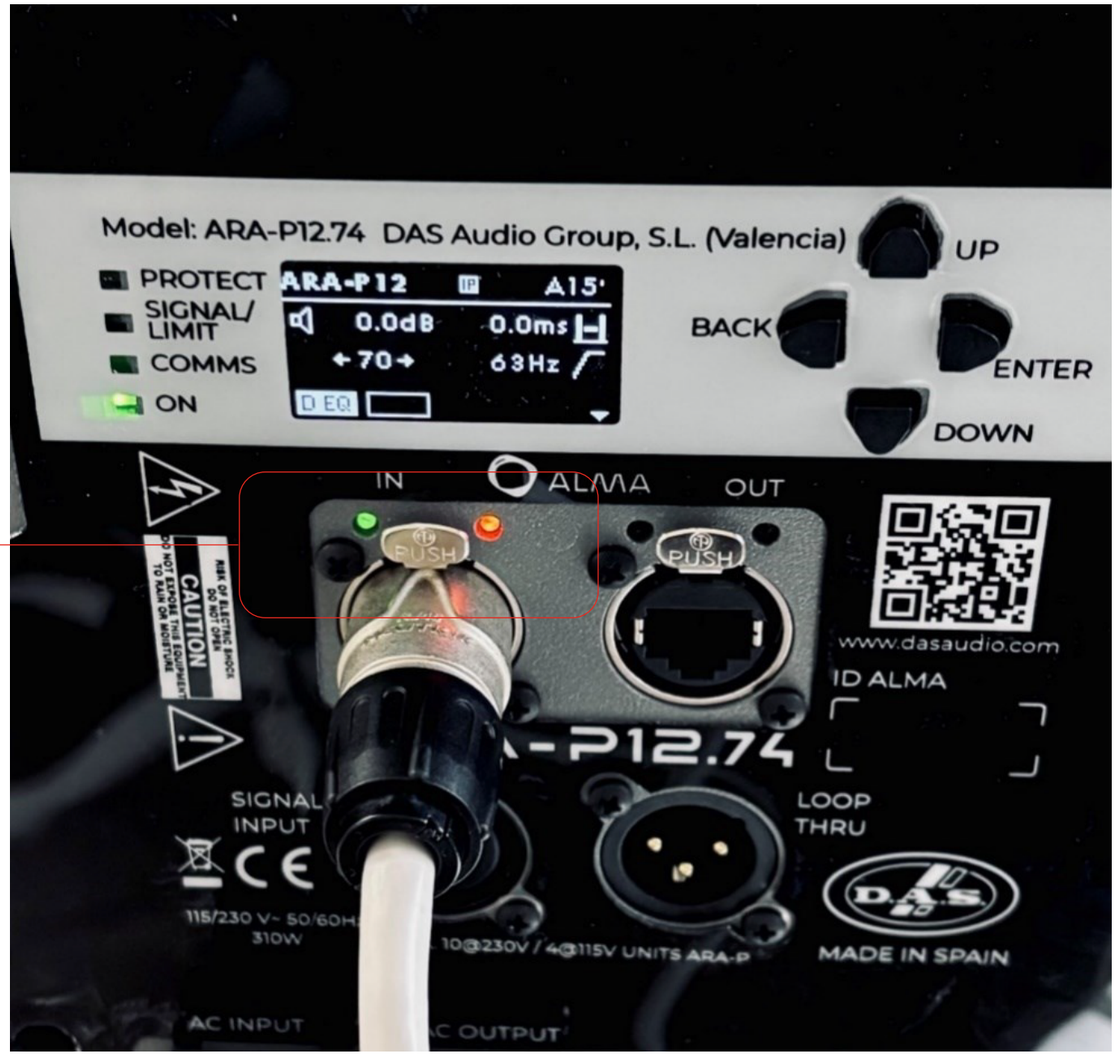
- *If the user selects sending power to the units with a socapex cable, then the Audio and Control Data shall be sent in a separated CAT7 cable named EC-20 (also available in 30m format):*

- *To link systems in terms of Audio and Control Data use the DAS Audio EC-09 cables:*

Networking and Signal Distribution

The amplifier of each ARA system uses an interface board equipped with 2 XLR connectors, named Signal Input and LOOPTHRU, and 2 ethercon connectors named ALMA IN and OUT. The ethercon connectors combine analog /AES audio and ALMA monitoring & control data:

There are two LEDs per ethercon connector. On the left side the green LED will lit in green when the LINK or connectivity has been stablished. On the right side the orange LED will flash when there is data traffic on the network. If case of bad hardwired connection the activity leds won´t lit.



Shown above the input board of an ARA-P12.74. All ARA systems use the same input board.

MATRIX-22 (Analog Audio and network data distributor)

To distribute the audio signals (analog) and monitoring data in small applications when using ARA-P models, the Matrix-22, half rack-mount, is the most convenient solution. Each Matrix-22 is internally equipped with an ethernet switch that combines the control data and analog audio. Each Matrix-22 includes 2 “ALMA outputs” that are going to be used to send audio and data to the groups of systems:

FRONT PANEL

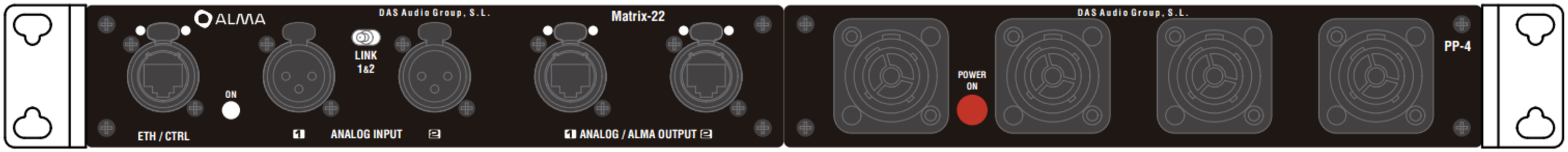
At the rear panel two analog audio outputs, copies (thru) of the inputs are available. The unit uses a powerCon true1 to get the AC power.

REAR PANEL

An extra ALMA Ethercon Connector is available at the rear panel to daisy chain several units.

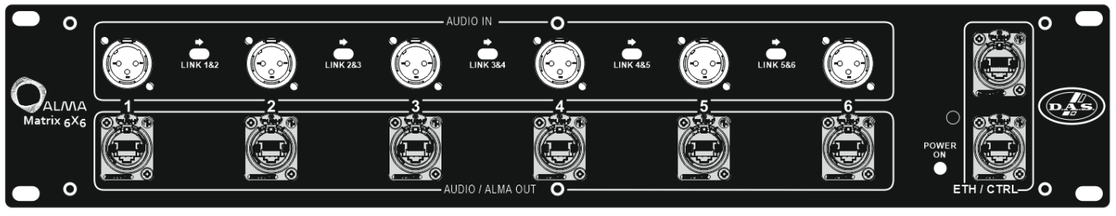
Networking and Signal Distribution

The Matrix-22 can be installed in a 19” rack using half of the space in conjunction with another unit or the PP-4 power patch:



Networking and Signal Distribution

MATRIX-66
To distribute the audio signals (analog) and monitoring data, each rack contains a Matrix-66 ethernet switch that combines the control data and analog audio. Each Matrix-66 is equipped with 6 “ALMA outputs” that are going to be used to send audio and data to the groups of systems:



6x ALMA data & Audio outs

Ethernet IN / OUT

There exist two extra ethercon connectors, named ETH / CTRL, at the right side of the panel, to connect the ALMA network between racks and ethernet switches /routers.

The number of units (LARAs / MARAs / SARAs etc.) that can be “daisy chained” in an array system should not exceed 10* (* this quantity will be less when using power and signal distribution with ECPK-20 cables).

ARA series systems communicate using standard TCP/IP data protocols, and so, like all typical network devices, need a set of unique addresses to communicate with similar devices on the network, and with the ALMA control software.

The users shall configure the systems defining properly these two parameters:

- IP Address
- Subnet Mask

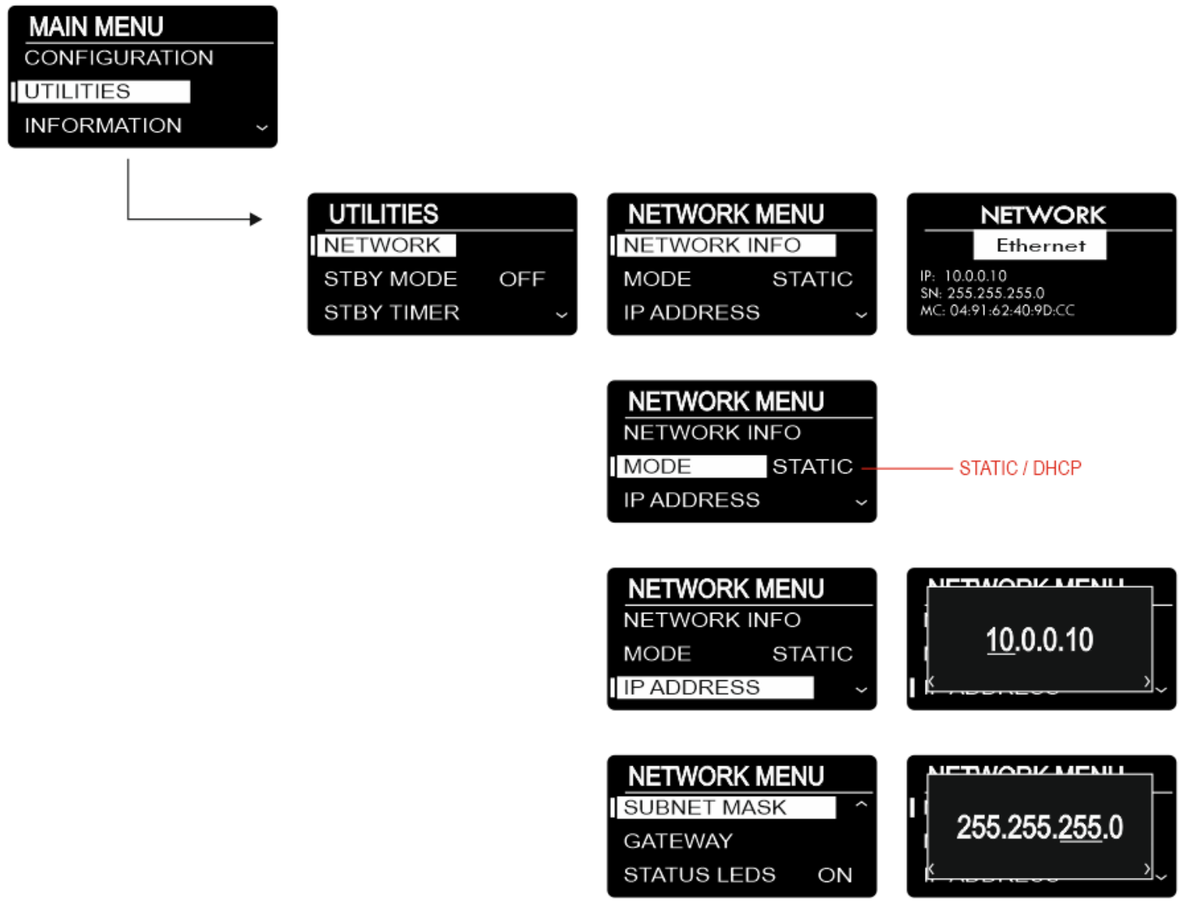
Networking and Signal Distribution

IP ADDRESS

Ethernet networks can operate in either static mode or dynamic mode, which refers to how IP addresses are assigned to devices on the network. Here's a brief overview of each mode:

- **Static mode:** In static mode, IP addresses are manually assigned to each device on the network by the network administrator. This means that the same IP address is assigned to a device every time it connects to the network, which can simplify network management and troubleshooting. However, this approach can be time-consuming and may lead to conflicts if IP addresses are assigned incorrectly or if multiple devices are assigned the same IP address.
- **Dynamic mode:** In dynamic mode, IP addresses are automatically assigned to devices on the network by a DHCP (Dynamic Host Configuration Protocol) server. When a device connects to the network, it sends a request to the DHCP server for an IP address, and the server assigns an available address. This approach allows for more efficient use of IP addresses and reduces the likelihood of conflicts. Additionally, the DHCP server can also assign other network settings, such as the subnet mask and default gateway, which can simplify network configuration.

Overall, dynamic mode is generally preferred for larger networks with many devices, as it simplifies IP address management and reduces the risk of conflicts. However, static mode can be useful for smaller networks or for devices that require a fixed IP address for specific applications or services.



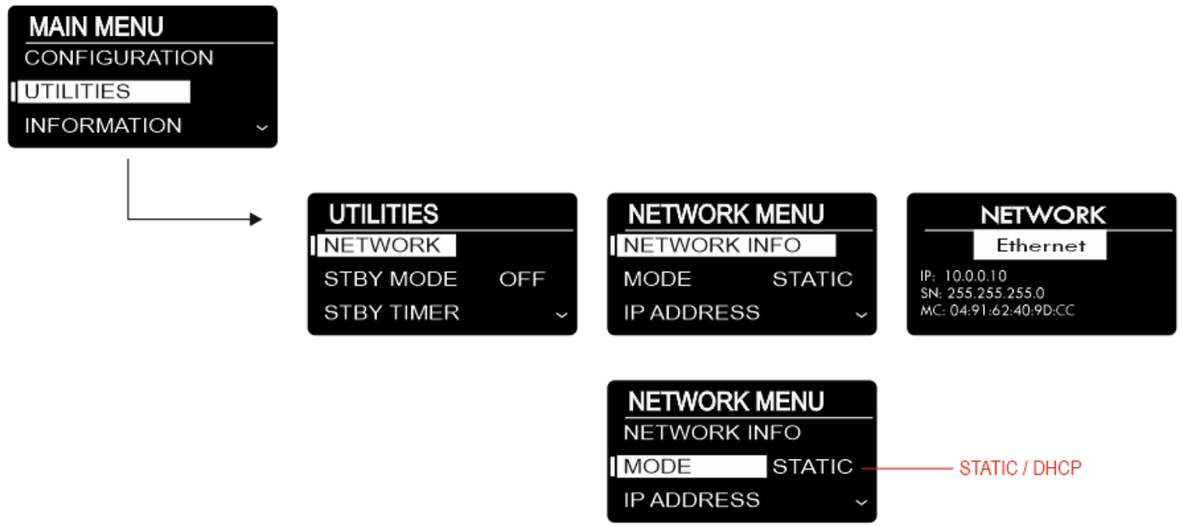
Networking and Signal Distribution

The ALMA network can be configured in the two previous seen different ways:

- **Using STATIC IP on each of the devices.** By doing this no DHCP server or router is needed. The control computer can be connected directly to the network switch and to the racks. The racks on each side of the PA can be daisy chained using the in/out ethercons of the Matrix-66 (ETH/CTRL connectors). The user shall introduce a unique IP address on every single device. The Subnet Mask shall be configured as 255.255.255.0. in all units.

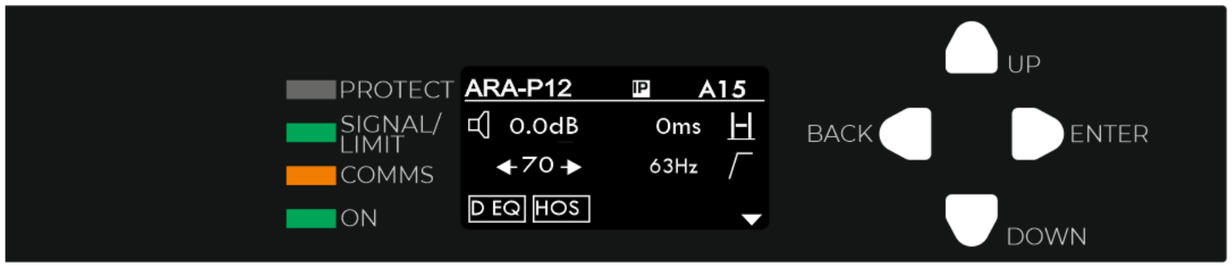
- **Using DHCP or Dymanic IP.** An ethernet switch with DHCP sever capabilities shall be used, or a router to determine automatically IP addresses to all the units present on the network. The switch shall be connected to the racks using the ethercon IN conector of the Matrix-66.

By the use of the control buttons and display of the units, the user can access the main network configuration menu and set the working mode (static / dynamic) accordingly:

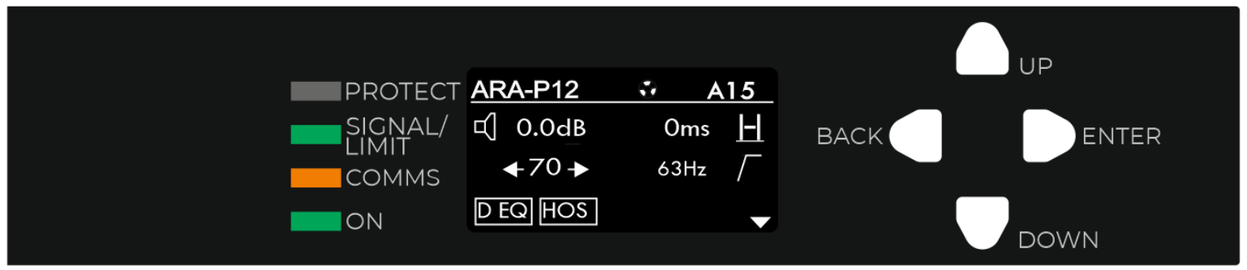


Networking and Signal Distribution

When an IP Address has been assigned to the system, an IP sign of confirmation will be displayed:



If no IP address has been assigned to the unit, the display will show a turning wheel icon, instead:



Remember that if a system is not getting an IP Address one of the following causes could be possible:

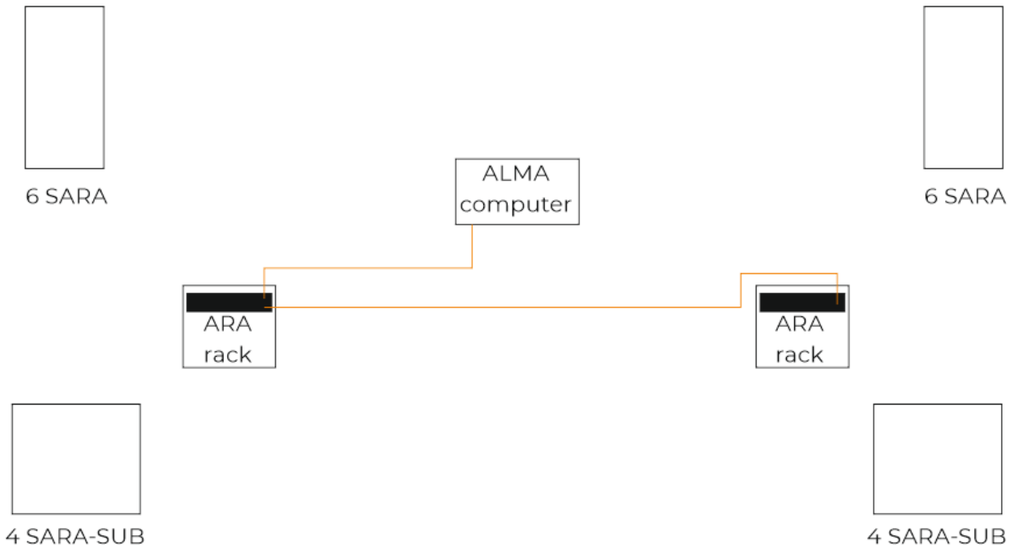
- Not proper hardwired connection (defective cable) between the ARA unit and the ethernet output of a Matrix-22 / 66 unit.
- No DHCP or router available or active (powered) on the network.
- Not having a valid network connection between the DHCP Server or Router and the Matrix-22 / 66 ALMA input ETH connector.
-

Remember that when working on Static mode, the unit will get the IP address defined by the user, but if this address mismatches the IP address range of the control computer, the unit although having an IP address, won´t be found on ALMA.

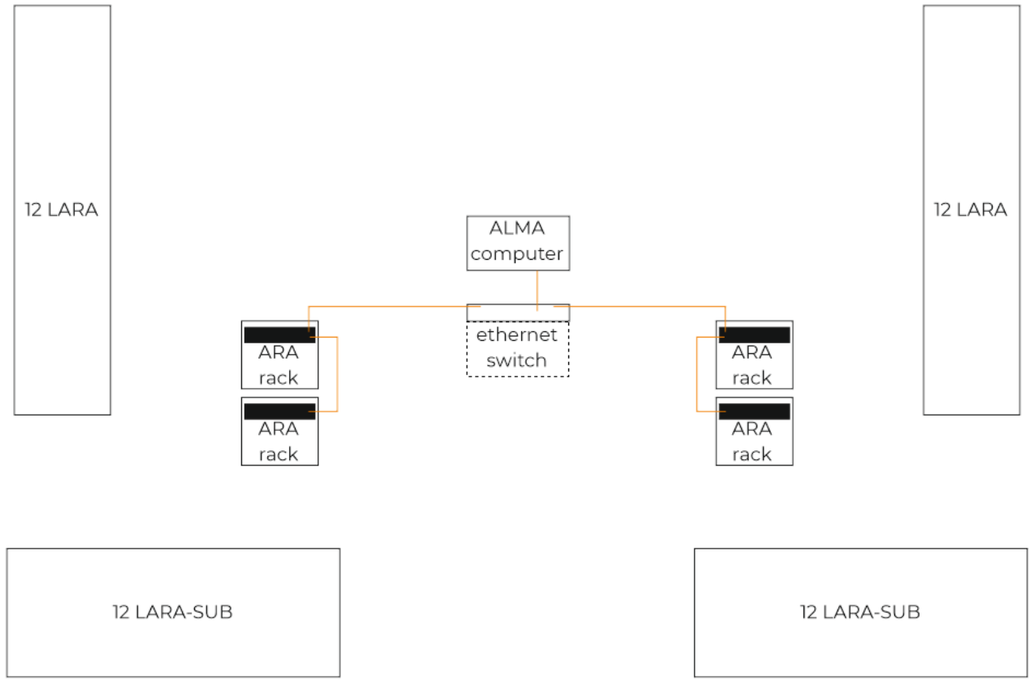
Networking and Signal Distribution

STATIC MODE

A very basic configuration with few units can be driven using static IP addresses and no other extra devices. Connect the ALMA control PC in static mode directly to the network and daisy chain de ARA racks by the use of the intended ethernet ports of the Matrix-66:



A more complex situation with bigger equipment will need a switch to split the network. One ethernet switch to distribute ALMA control to left and right ARA-RACKs. The Racks on each side can be daisy chained using the ETH/CTRL connectors of the Matrix-66:

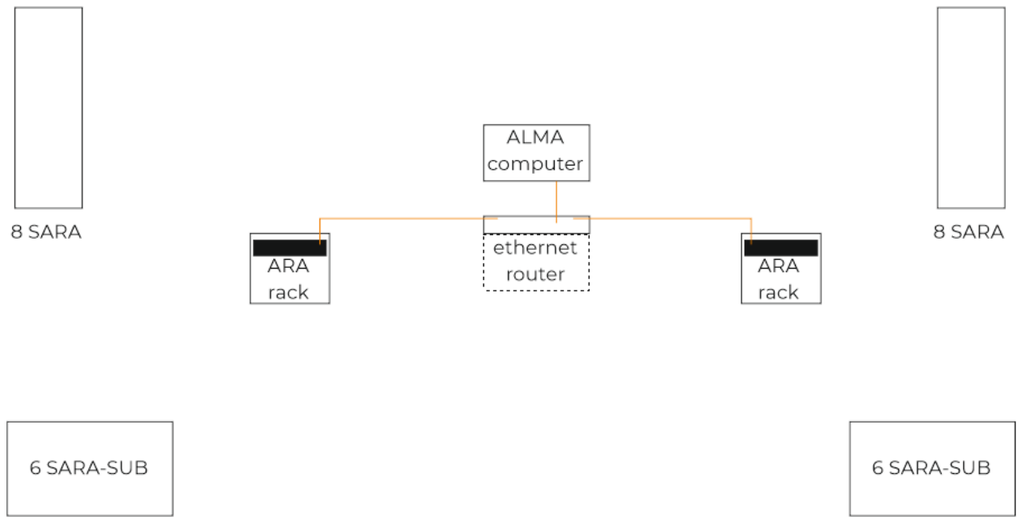


*Note: The control computer shall be configured properly on Static IP mode with an IP Address in the same range of the ones used in the systems.

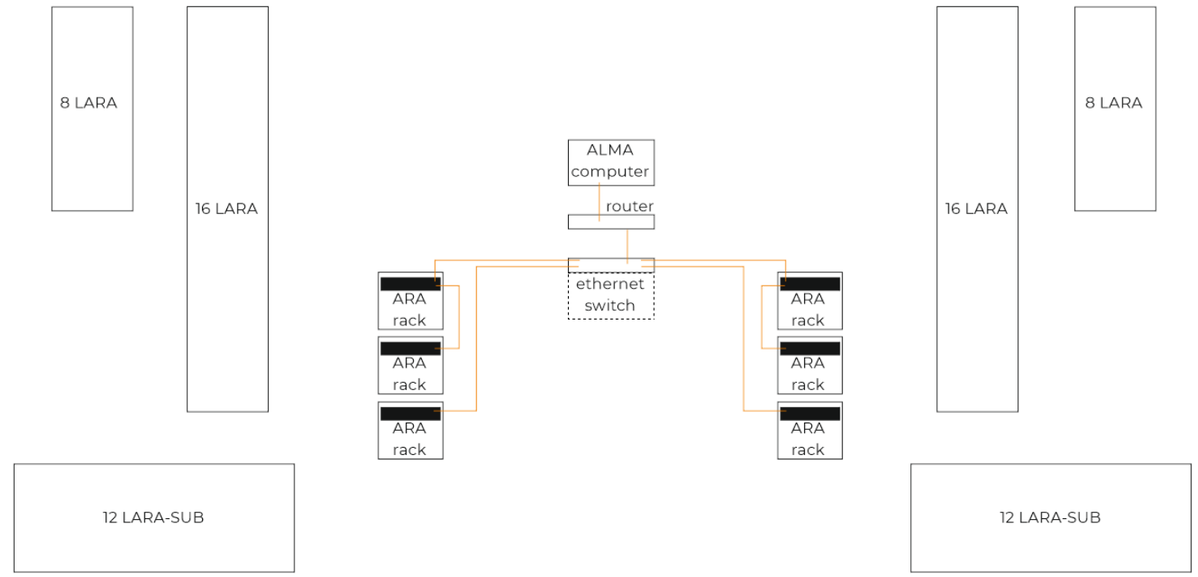
DYNAMIC MODE

One ethernet switch with DHCP Server or router to distribute ALMA control to left and right ARA-RACKs. The Racks on each side can be daisy chained using the ETH/CTRL connectors of the Matrix-66.

In the first example connect a portable router as the recommended GL-iNET AXT1800 to connect both racks and assign automatically IP addresses to all elements on the network:

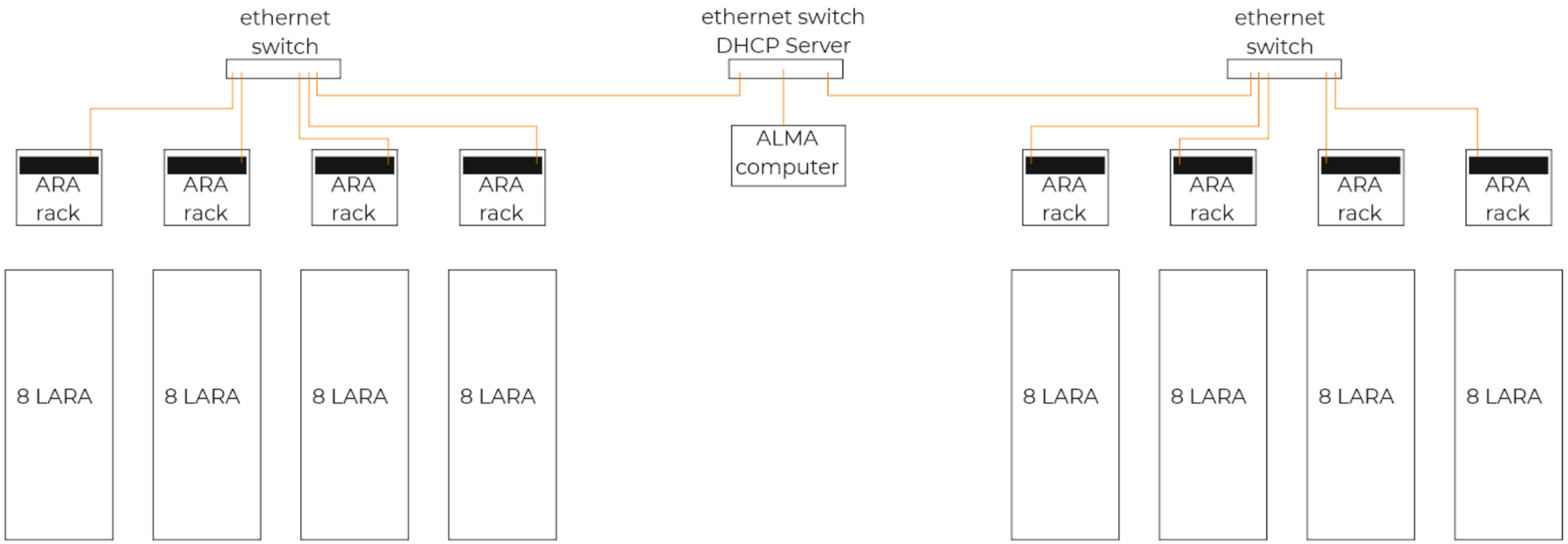


Larger systems will require both elements, router and ethernet switch with more ports available:



Networking and Signal Distribution

In any case, the network configuration possibilities are endless. For fixed installation it is highly recommended to use separated VLAN for the Audio systems and Switches with DHCP server capabilities and advanced configuration features. The Star topology is recommended in this type of installations:



Recommended Ethernet Switches

Yamaha SWP 1-8:
The Yamaha SWP1-8 is an 8-port network switch designed for use in professional audio and video production applications. It is part of Yamaha's SWP series of network switches, which are designed to provide reliable and low-latency network connectivity for digital audio and video networks.

The SWP1-8 supports various network protocols, including Dante, which is a digital audio over Ethernet protocol used by many professional audio applications. The switch also features a web-based user interface for easy configuration and monitoring, as well as support for VLANs (Virtual Local Area Networks) to segment network traffic.

Some of the key features of the Yamaha SWP1-8 include:

- Eight 1 Gbps Ethernet ports for connecting audio and video devices
- Support for Dante digital audio protocol, as well as other network protocols
- Low-latency design for high-quality audio and video streaming
- Web-based user interface for easy configuration and monitoring
- VLAN support for network traffic segmentation

Overall, the Yamaha SWP1-8 is a high-performance network switch designed specifically for professional audio and video applications. Its low-latency design and support for Dante protocol make it a popular choice for use in live sound reinforcement, broadcast, and recording applications.

Luminex GigaCore 12
The Luminex GigaCore 12 is a 12-port network switch designed for use in professional audio, video, and lighting applications. It is part of the GigaCore series of network switches, which are designed to provide reliable and low-latency network connectivity for digital audio, video, and lighting networks.

The GigaCore 12 features twelve 1 Gbps Ethernet ports, including two Gigabit Ethernet ports for uplink or daisy-chaining to other network switches. It also supports various network protocols, including Dante, which is a digital audio over Ethernet protocol used by many professional audio applications. The switch also features a web-based user interface for easy configuration and monitoring, as well as support for VLANs (Virtual Local Area Networks) to segment network traffic.
Some of the key features of the Luminex GigaCore 12 include:

- Twelve 1 Gbps Ethernet ports for connecting audio, video, and lighting devices
- Support for Dante digital audio protocol, as well as other network protocols
- Low-latency design for high-quality audio and video streaming
- Web-based user interface for easy configuration and monitoring
- VLAN support for network traffic segmentation
- Two Gigabit Ethernet ports for uplink or daisy-chaining to other network switches

Overall, the Luminex GigaCore 12 is a high-performance network switch designed specifically for professional audio, video, and lighting applications. Its low-latency design and support for Dante protocol make it a popular choice for use in live sound reinforcement, broadcast, and lighting control applications.

Recommended Ethernet Switches

RECOMMENDED PORTABLE ROUTERS:

GL-iNET, GL-AXT1800

The GLiNET GL-AXT1800is a compact travel router designed for use in small networks and for mobile connectivity. It supports both wired and wireless connections and can be used as a router, access point, or repeater.

The GL-AXT1800 is equipped with two Ethernet ports, one of which can be used as a WAN (wide area network) port to connect to a modem or another router. This port can be configured as well as VLAN. It also features dual-band Wi-Fi, supporting both 2.4GHz and 5GHz frequencies for wireless connectivity. The router is powered by a 1.2GHz dual-core processor and comes with 256MB of RAM and 16MB of flash storage.

Some of the key features of the GLiNET GL-AXT1800 include:

- Two Ethernet ports, one of which can be used as a WAN port
- Dual-band Wi-Fi with support for 802.11ac
- Compact and portable design for travel and mobility
- Support for VPN (Virtual Private Network) and other security protocols
- Web-based user interface for easy configuration and monitoring
- Powered by a 1.2GHz dual-core processor with 256MB of RAM and 16MB of flash storage

Overall, the GLiNET GL-AXT1800 is a versatile and compact travel router designed for use in small networks and for mobile connectivity. Its dual-band Wi-Fi and support for VPN and other security protocols make it a popular choice for use in remote work and travel applications.

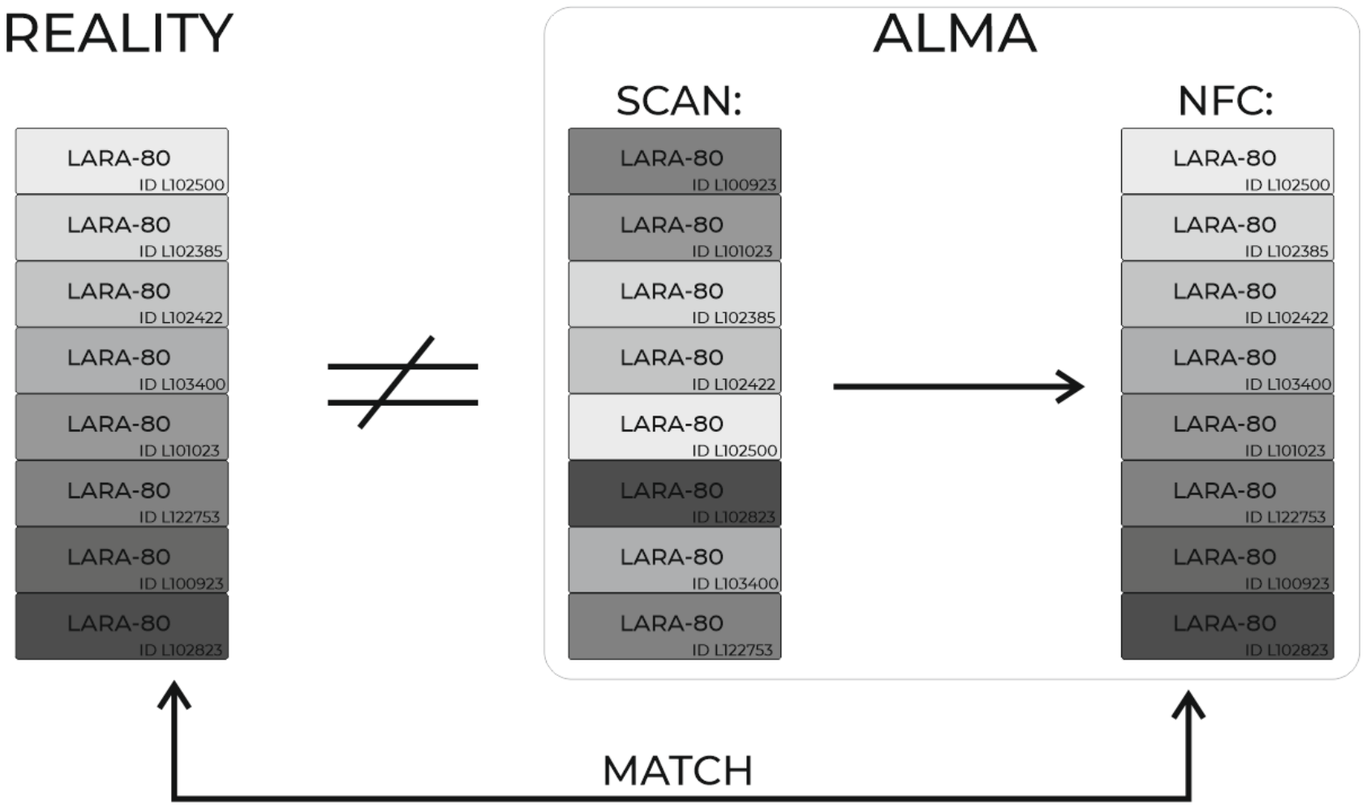
ARA series
Self-positioning (NFC)

ARA series systems communicate using standard TCP/IP data protocols. ALMA software is the control and management tool working over IP and developed by DAS Audio.

The ALMA software scans the network and communicates with the systems in a very fast and easy way. In order to have all the systems in groups or arrays and appear on the software matching the reality, the self-positioning functionality has been created.

By the use of this feature, it will be not necessary, when rigging the systems, knowing the names or IDs of each unit as the self-positioning functionality on ALMA will allocate all units following their real physical position. Let´s say that all the systems in a physical existing group “talk to each other” in order to know their real position in the vertical plane saving set-up time and speeding up the process on ALMA.

The self-positioning functionality is available in all the line array models, LARA-80, LARA-100, MARA-80, MARA-100, SARA-80, SARA-100 and the matching subwoofers, LARA-SUB, MARA-SUB and SARA-SUB. For more details, watch the tutorial video and learn to use the self-positioning tool on ALMA when creating arrays.

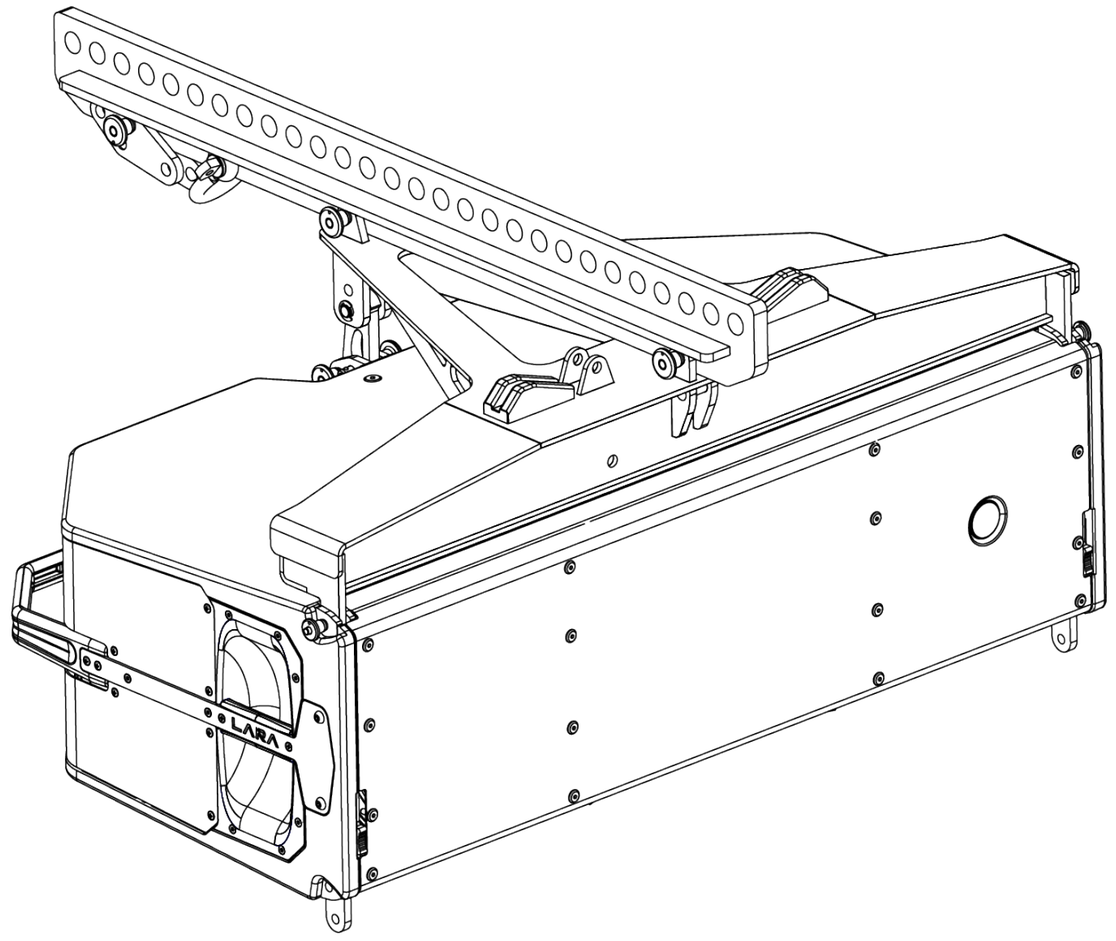


LARA AND LARA-SUB

AX-LARA: STAINLESS STEEL RIGGING BUMPER. VALID FOR LARA (UP TO 24 UNITS) AND LARA-SUB (UP TO 16 UNITS). IT PERMITS UPTILT AND DOWNTILT CONFIGURATIONS.

THE RIGGING BUMPER CAN BE TRANSPORTED ON TOP OF THE FIRST UNIT ON THE DOLLY.

AX-LARA INCLUDES AX-PULL ACCESSORY.

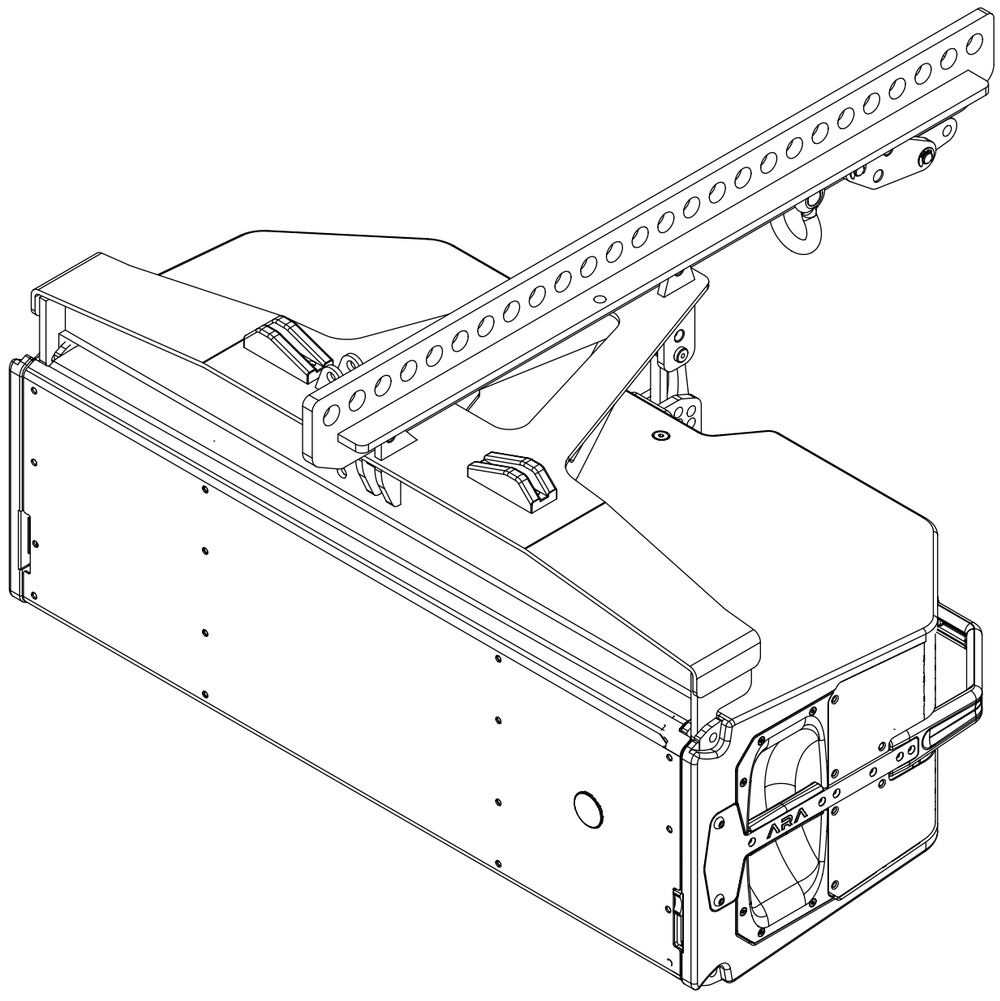


MARA AND MARA-SUB

AX-MARA: STAINLESS STEEL RIGGING BUMPER. VALID FOR LARA (UP TO 24 UNITS) AND LARA-SUB (UP TO 16 UNITS). IT PERMITS UPTILT AND DOWNTILT CONFIGURATIONS.

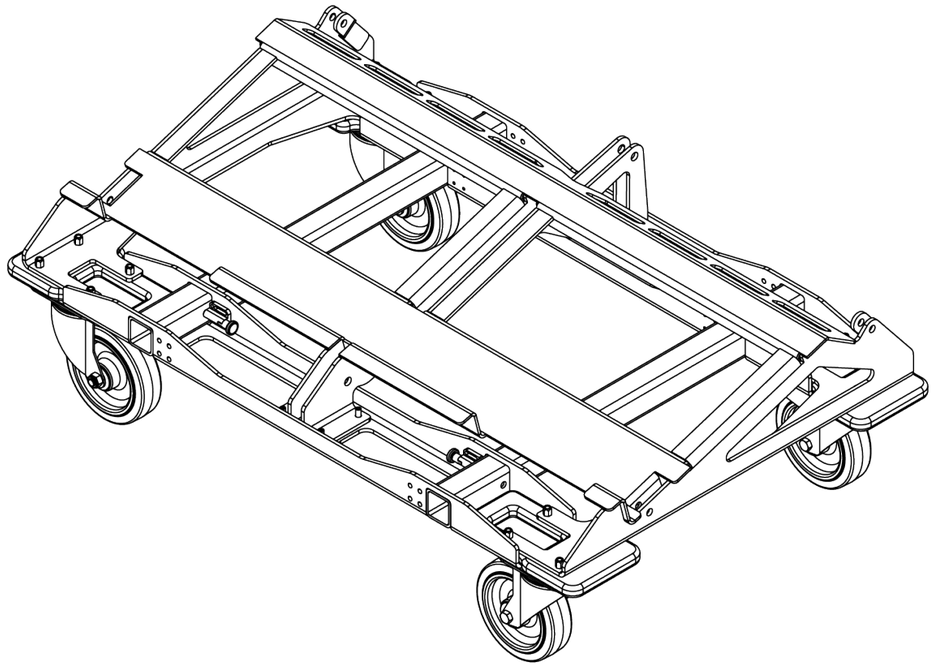
THE RIGGING BUMPER CAN BE TRANSPORTED ON TOP OF THE FIRST UNIT ON THE DOLLY.

AX-MARA INCLUDES AX-PULL ACCESSORY.

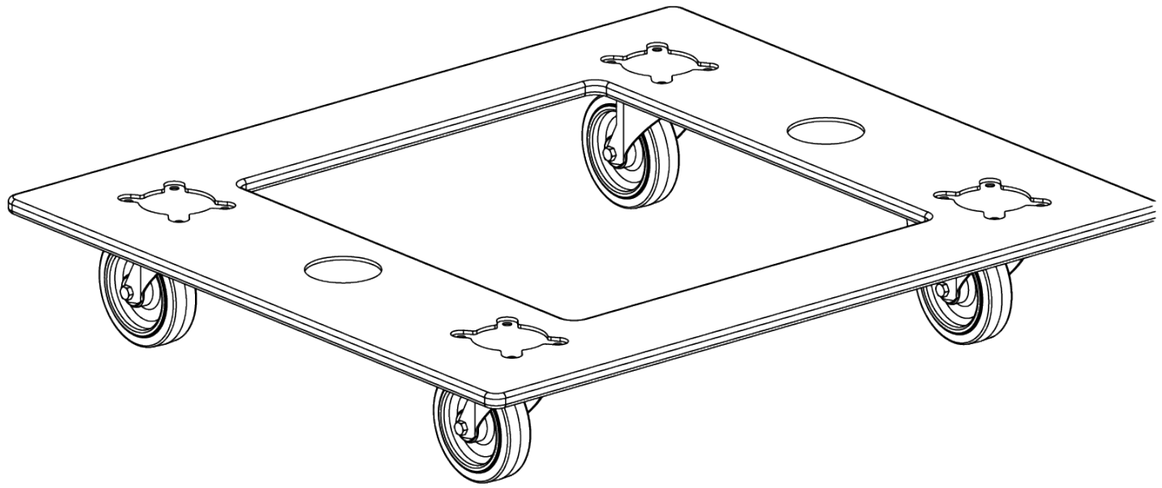


Accessories

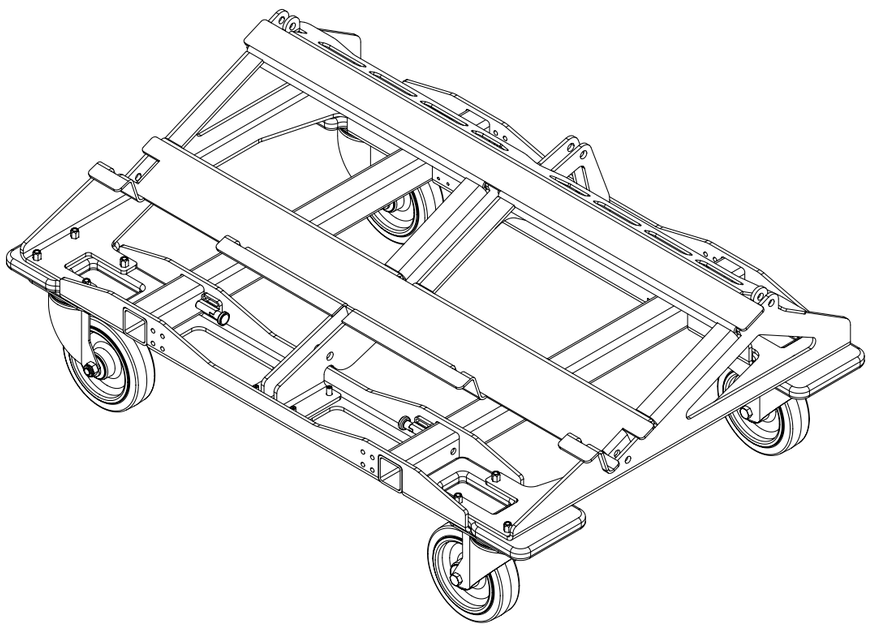
PL-LARA. STEEL TRANSPORT DOLLY FOR 4 LARA SYSTEMS.



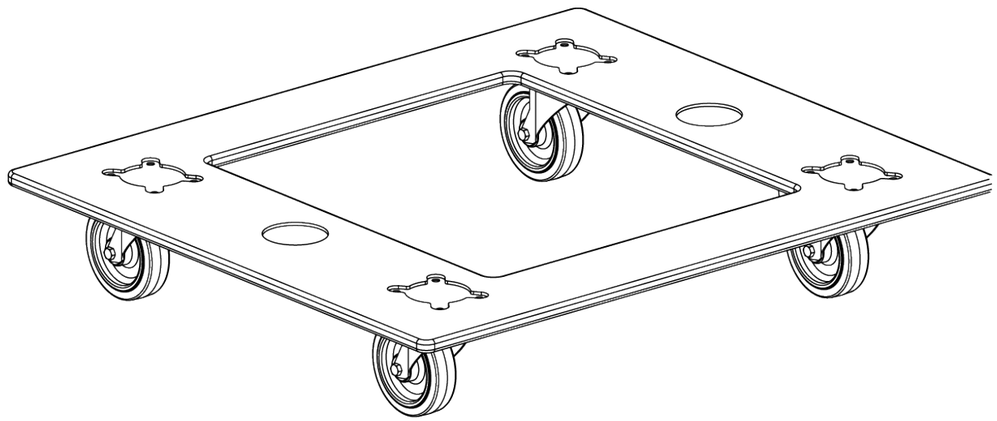
PL-LARA-SUB: WOODEN TRANSPORT DOLLY FOR 2 OR 3 LARA-SUBS.



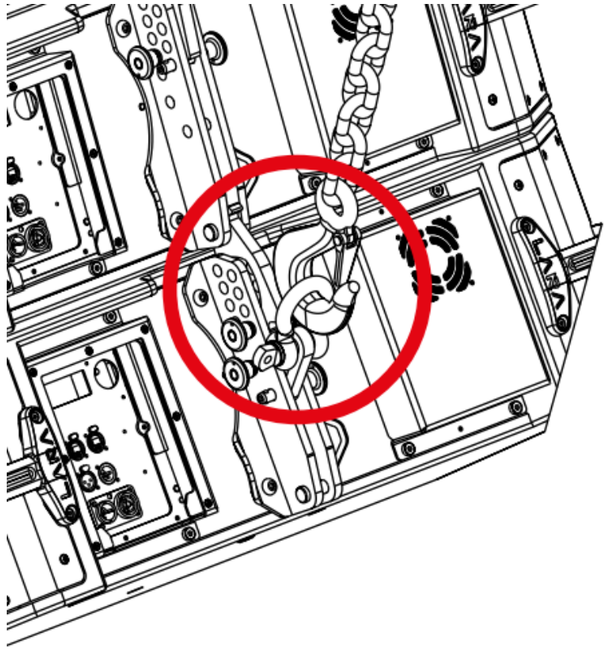
PL-/MARA. STEEL TRANSPORT DOLLY FOR 4 MARA SYSTEMS.

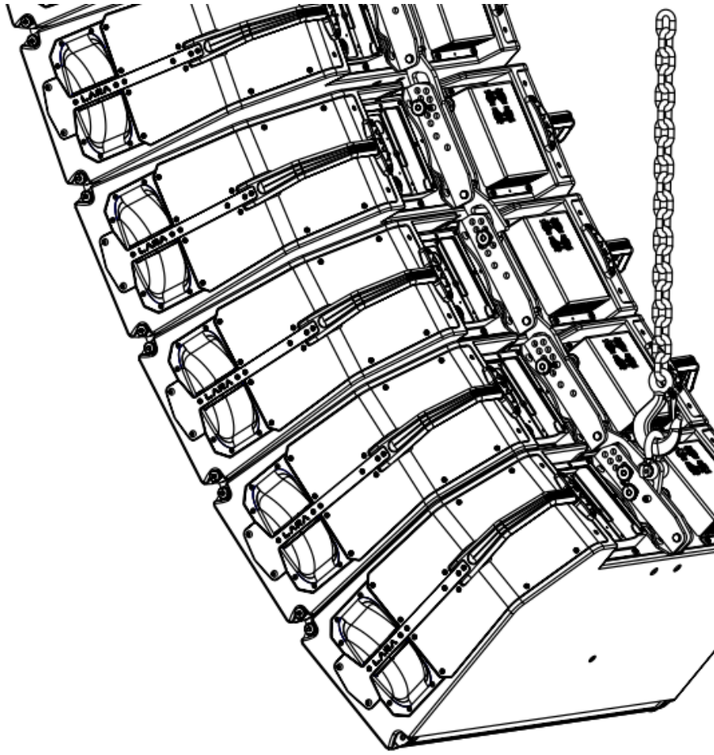


PL-MARA-SUB: WOODEN TRANSPORT DOLLY FOR 2 OR 3 MARA-SUBS.

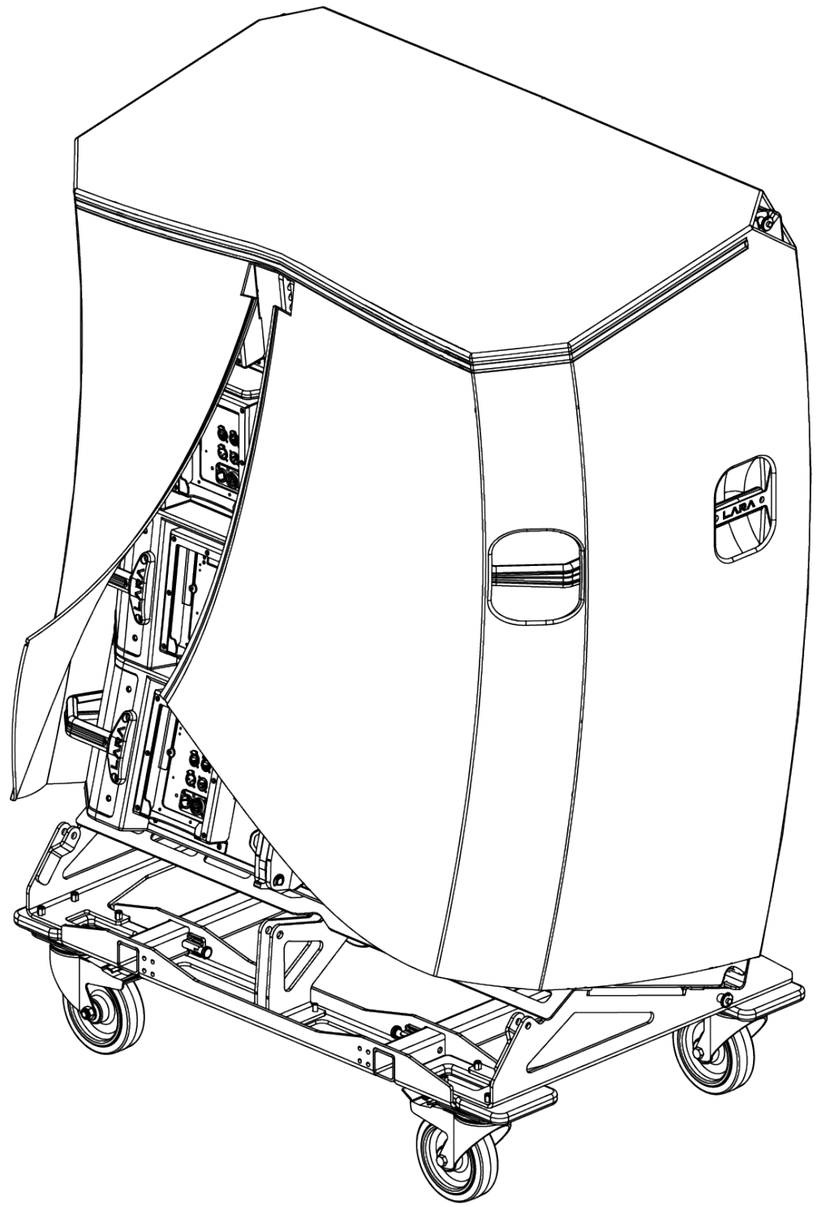


AX-PULL-LARA: INCLUDED PART IN THE AX-LARA AND AX-MARA INTENDED TO ADD A THIRD RIGGING POINT TO PULL-BACK THE SYSTEM FROM THE BOTTOM:

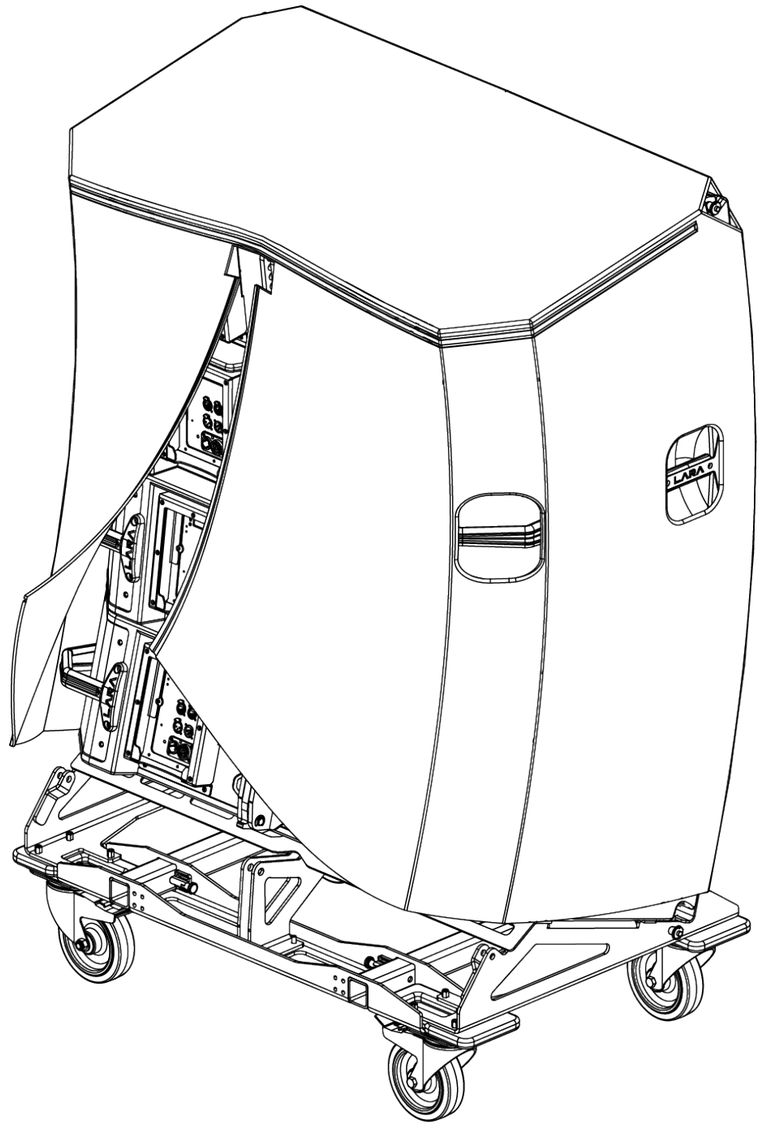




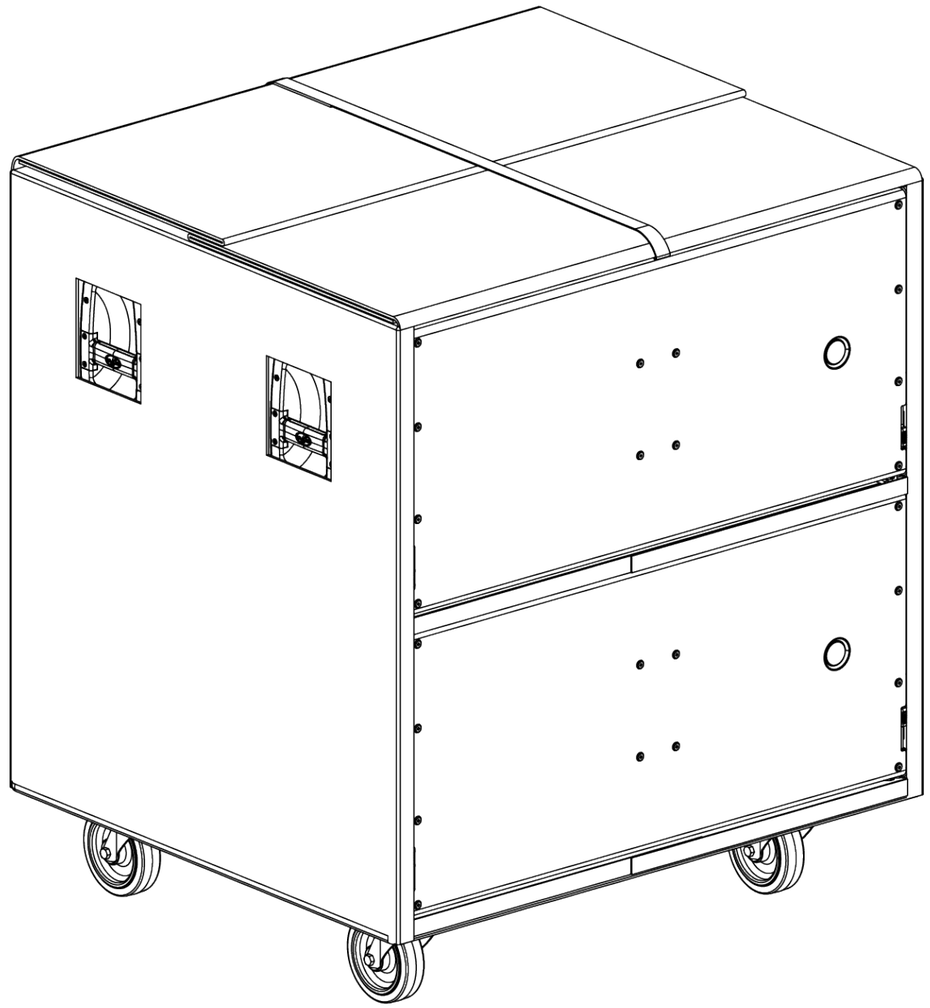
FUN-4-LARA: COVER TO BE USED WHEN TRANSPORTING 4 LARAS ON TOP OF PL-LARA.



FUN-4-MARA: COVER TO BE USED WHEN TRANSPORTING 4 MARAS ON TOP OF PL-MARA.

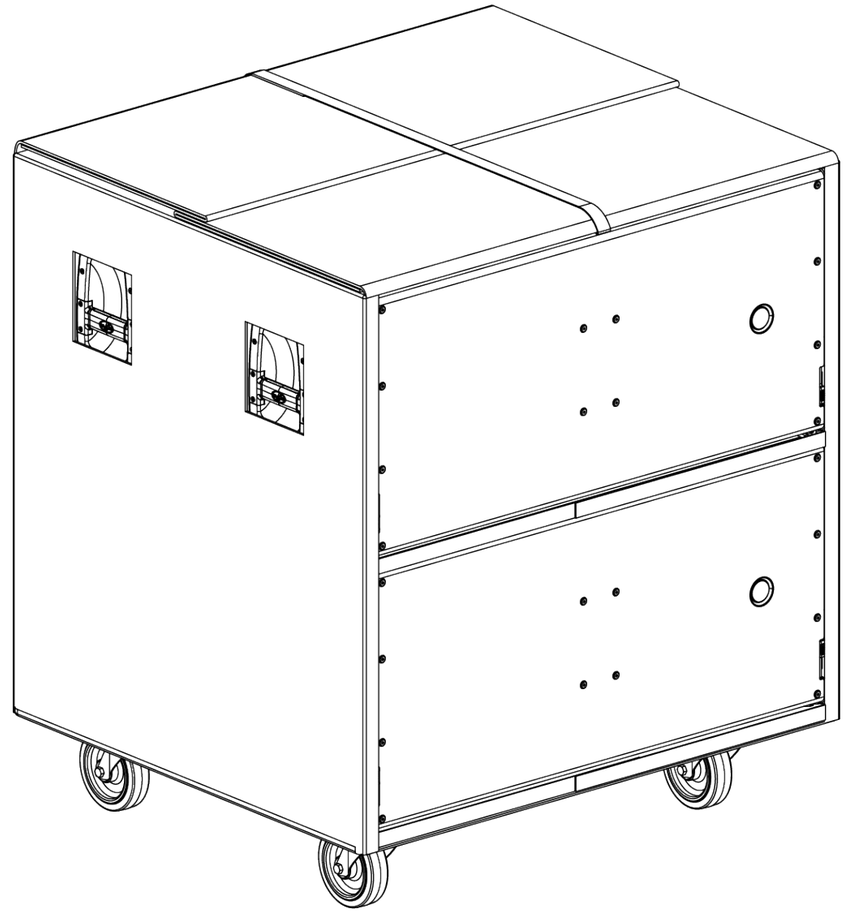


FUN-2-LARA-SUB: COVER TO BE USED WHEN TRANSPORTING 2 SUBS ON TOP OF PL-LARA-SUB. COVER CAN BE KEPT IN POSITION WHILE SYSTEM OPERATION.



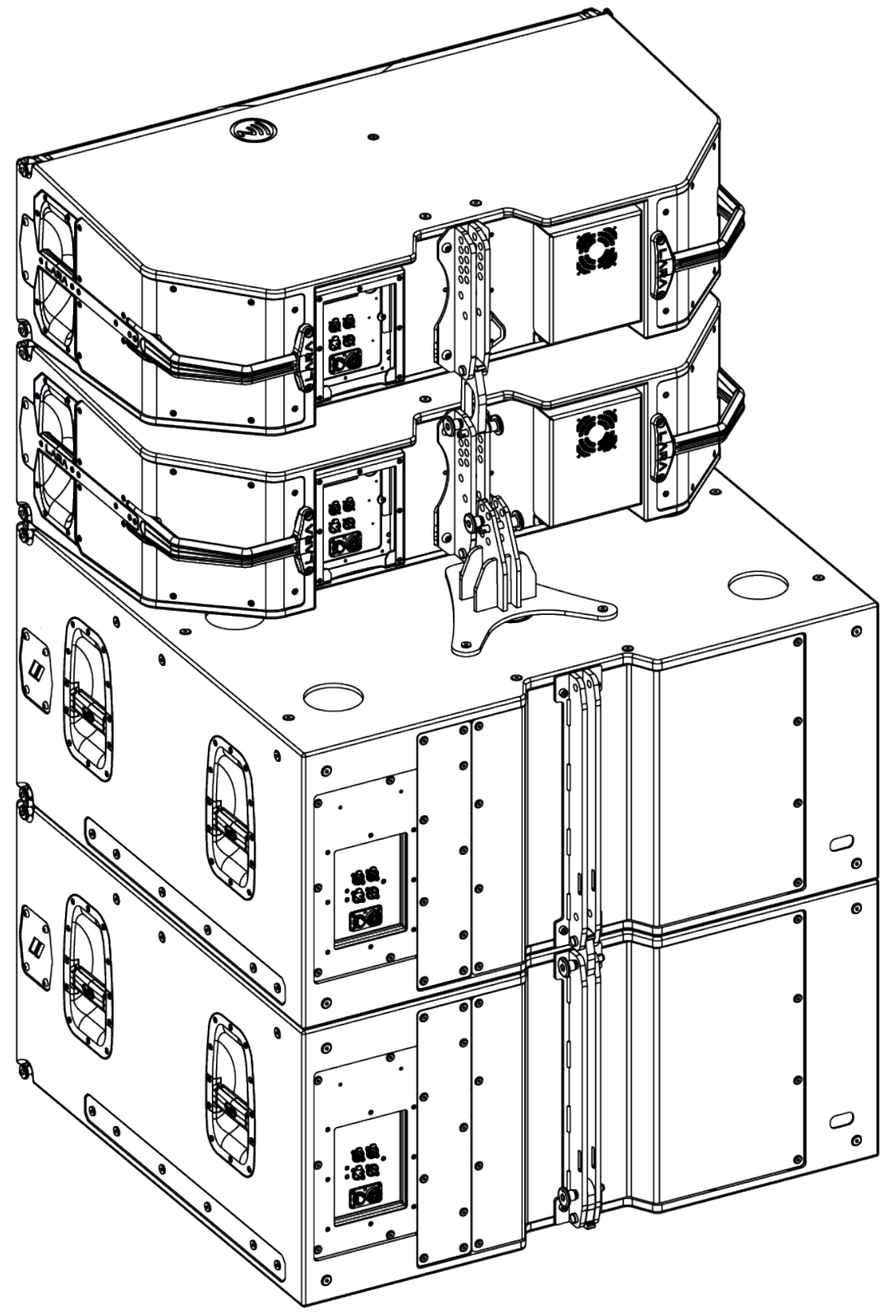
FUN-3-LARA-SUB: COVER TO BE USED WHEN TRANSPORTING 3 SUBS ON TOP OF PL-LARA-SUB. COVER CAN BE KEPT IN POSITION WHILE SYSTEM OPERATION.

FUN-2-MARA-SUB: COVER TO BE USED WHEN TRANSPORTING 2 SUBS ON TOP OF PL-MARA-SUB. COVER CAN BE KEPT IN POSITION WHILE SYSTEM OPERATION.

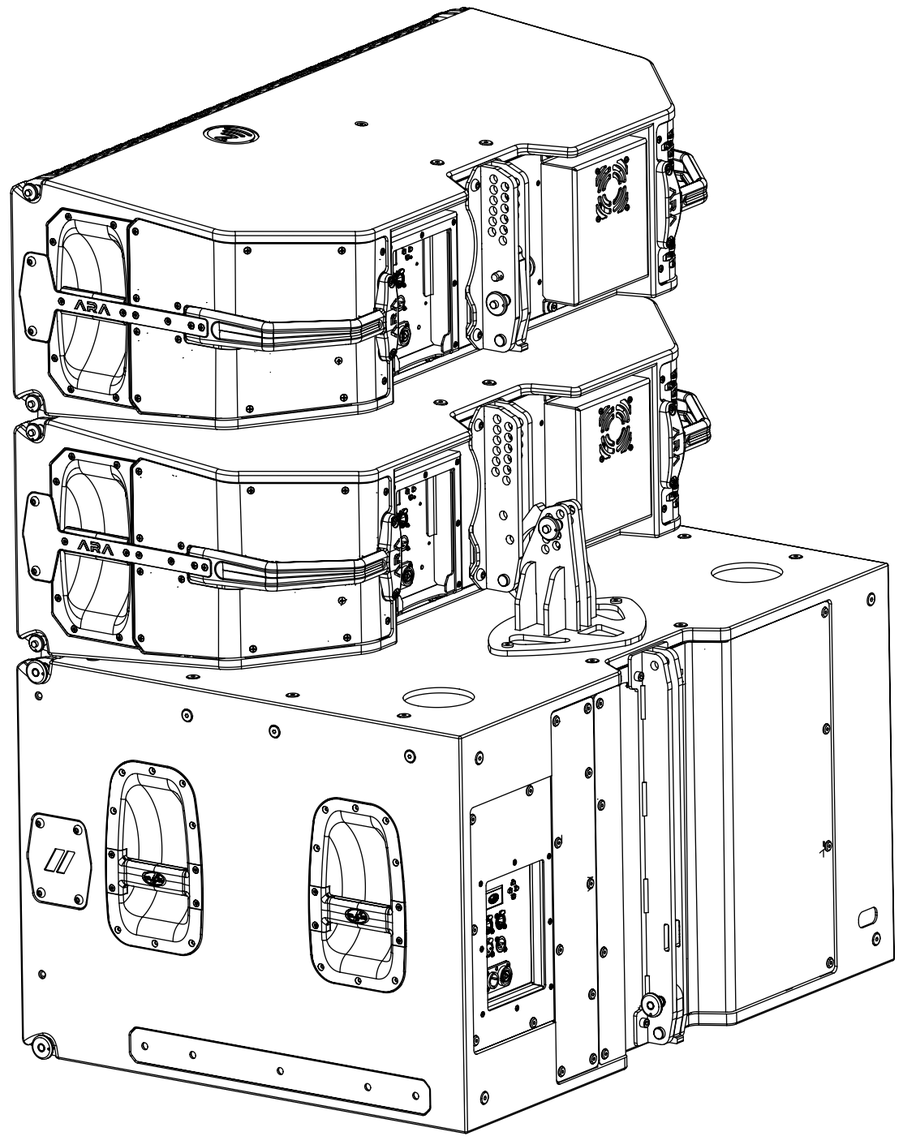


FUN-3-MARA-SUB: COVER TO BE USED WHEN TRANSPORTING 3 SUBS ON TOP OF PL-MARA-SUB. COVER CAN BE KEPT IN POSITION WHILE SYSTEM OPERATION.

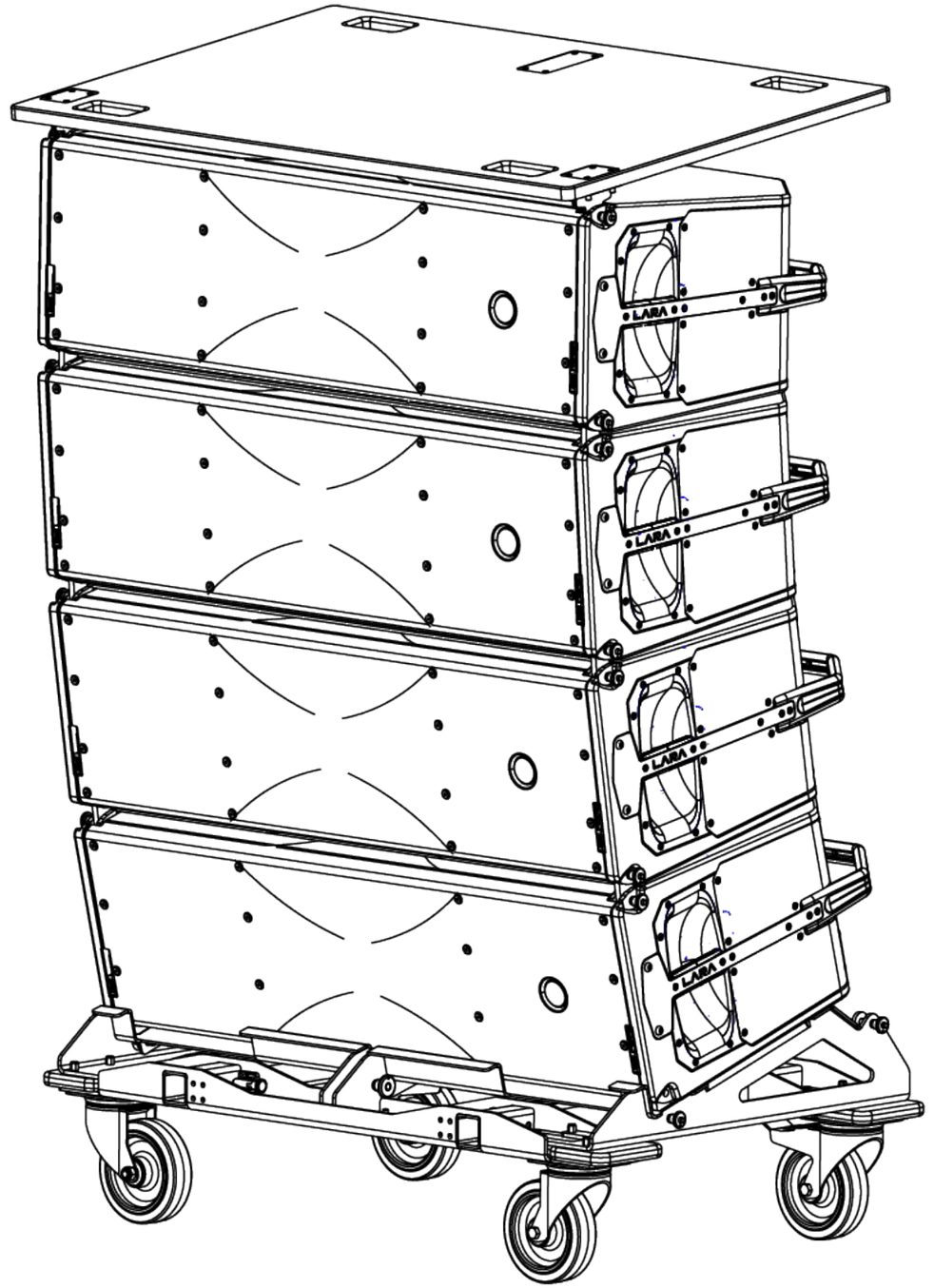
JP-LARA: STEEL STACKING BRACKET TO INSTALL LARAS ON TOP OF LARA-SUBS



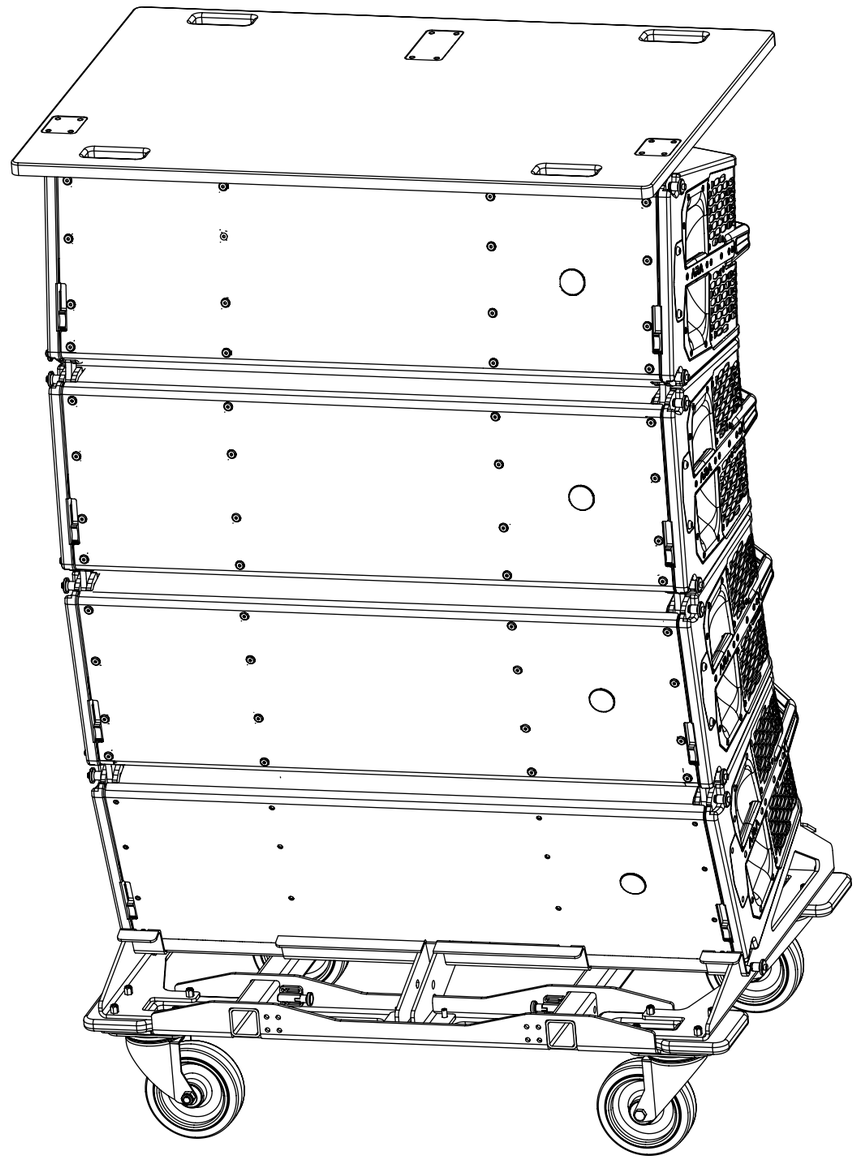
JP-MARA: STEEL STACKING BRACKET TO INSTALL MARAS ON TOP OF MARA-SUBS



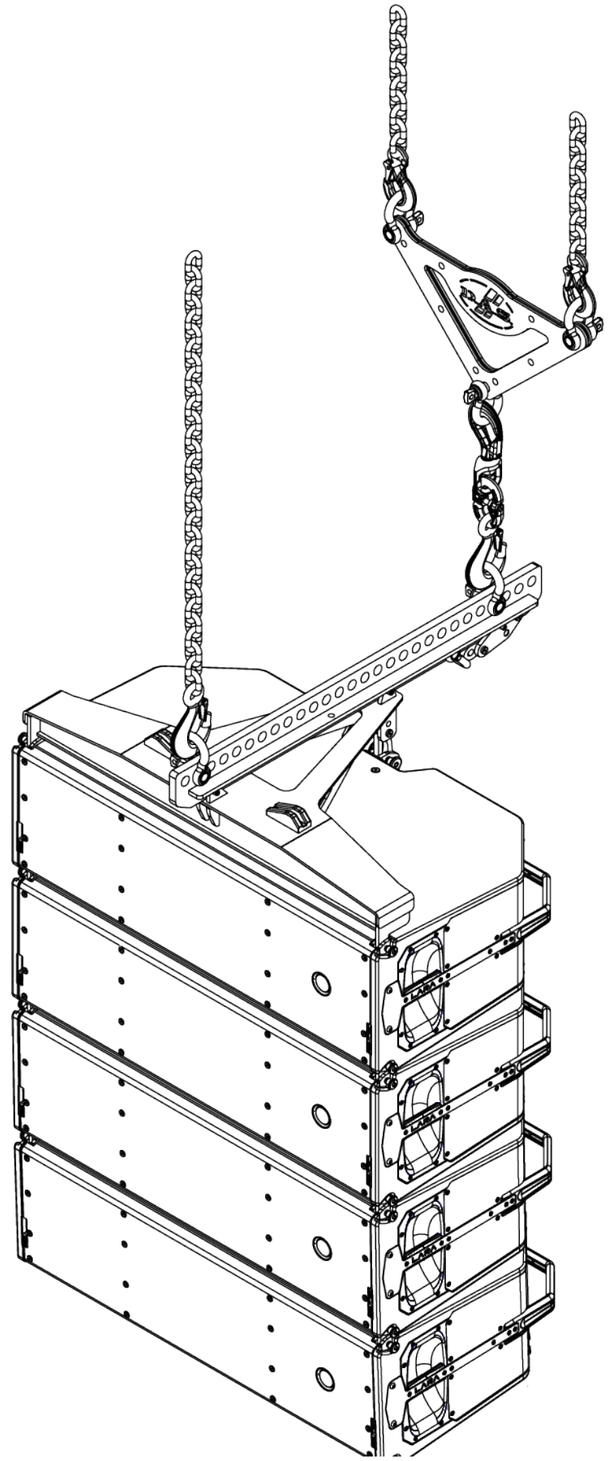
TOP-PL-LARA: WOODEN TRANSPORT SUPPORT FOR 4 LARA ON PL-LARA



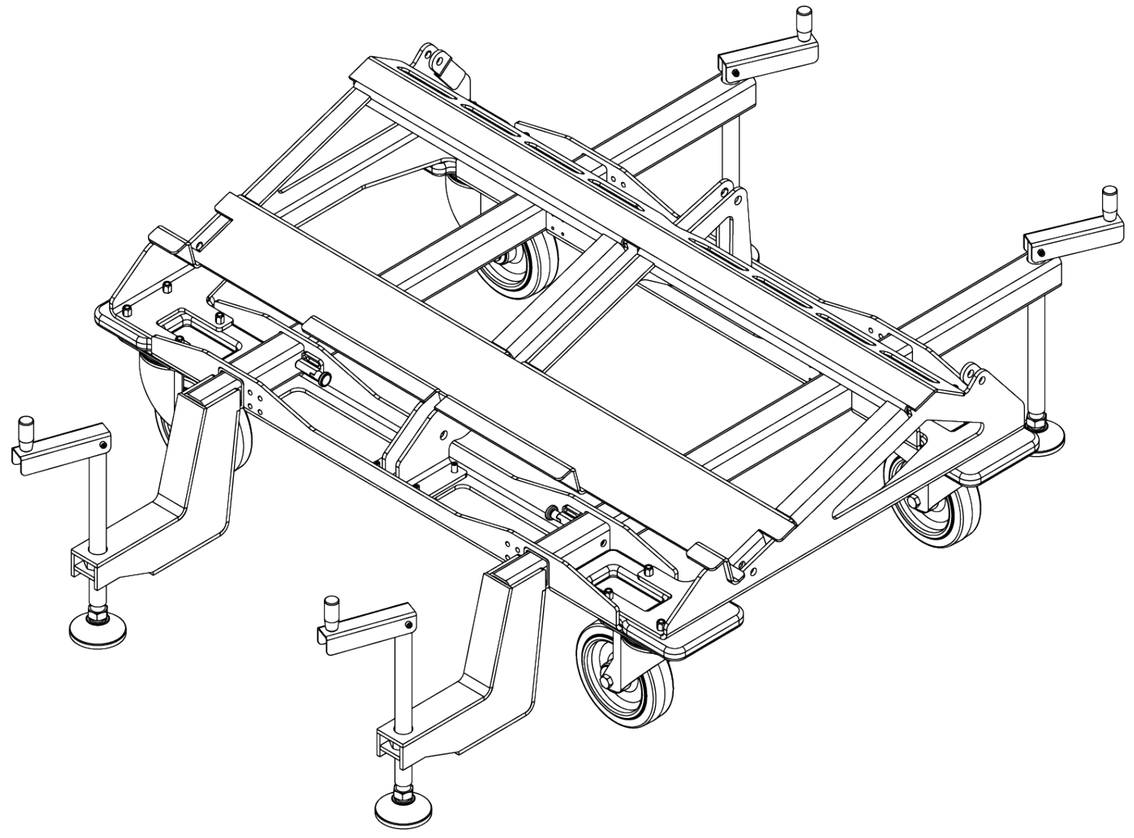
TOP-PL-MARA: WOODEN TRANSPORT SUPPORT FOR 4 MARA ON PL-MARA



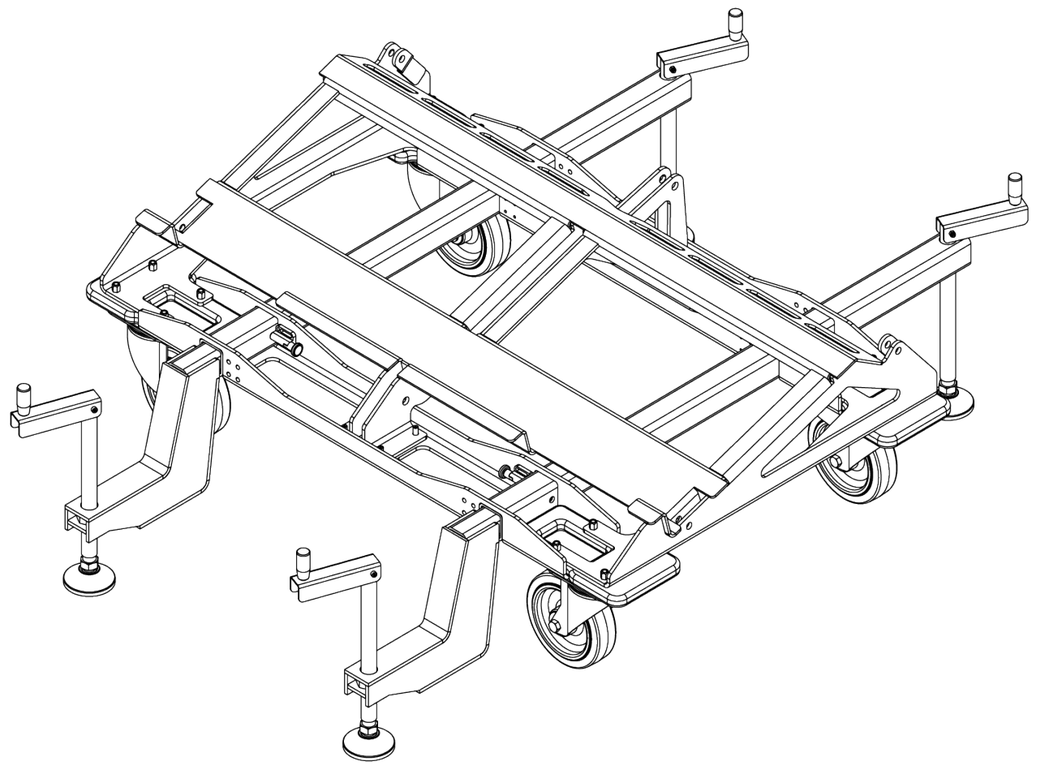
V-AX-LARA: V-SHAPED PIVOT PLATE FOR HORIZONTAL ADJUSTMENT OF THE AX-LARA.



GS-PL-LARA: KIT OF ADJUSTABLE EXTENSIONS COMPATIBLE WITH PL-LARA TO STABILIZE AND ANGLE THE SYSTEM IN STACK CONFIGURATION.

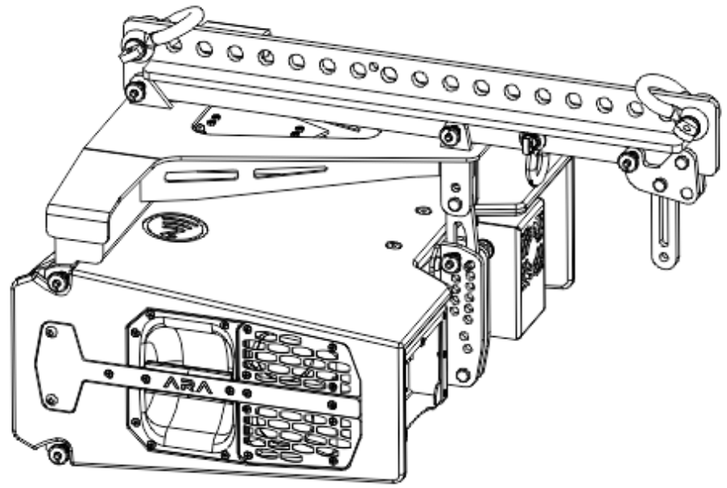


GS-PL-MARA: KIT OF ADJUSTABLE EXTENSIONS COMPATIBLE WITH PL-MARA TO STABILIZE AND ANGLE THE SYSTEM IN STACK CONFIGURATION.

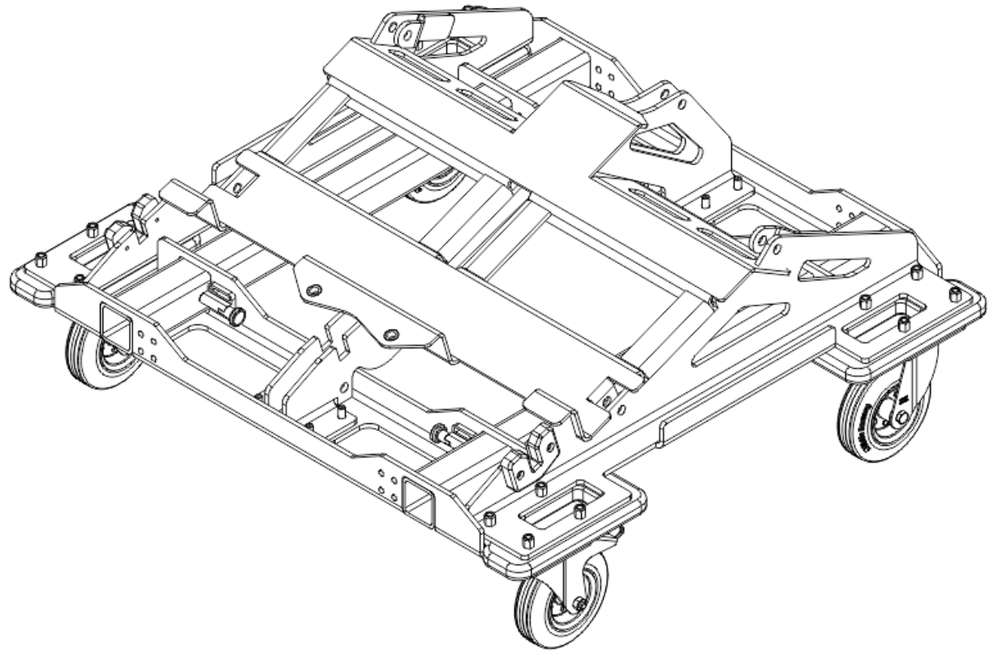


SARA AND SARA-SUB

AX-SARA: RIGGING BUMPER FOR SARA (MAX 24 U.) AND SARA-SUB (MAX 16 U.). IT PERMITS UPTILT AND DOWNTILT CONFIGURATIONS. THE RIGGING BUMPER CAN BE TRANSPORTED ON TOP OF THE FIRST UNIT ON THE DOLLY.

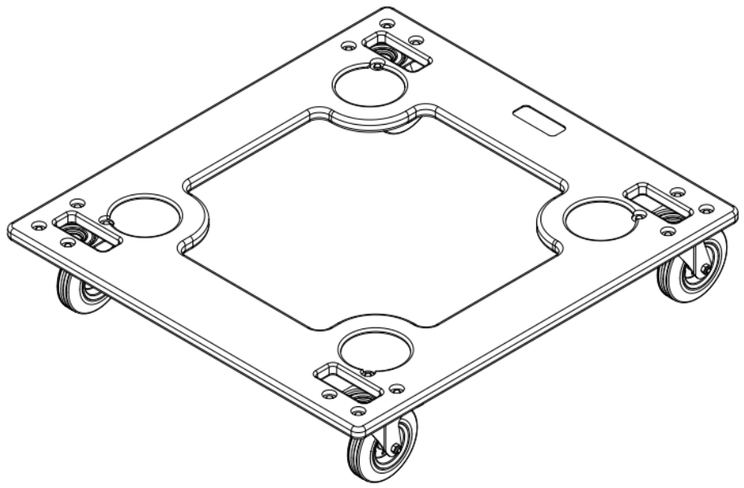


PL-SARA: STEEL TRANSPORT DOLLY FOR SARA (MAX 4 U.):

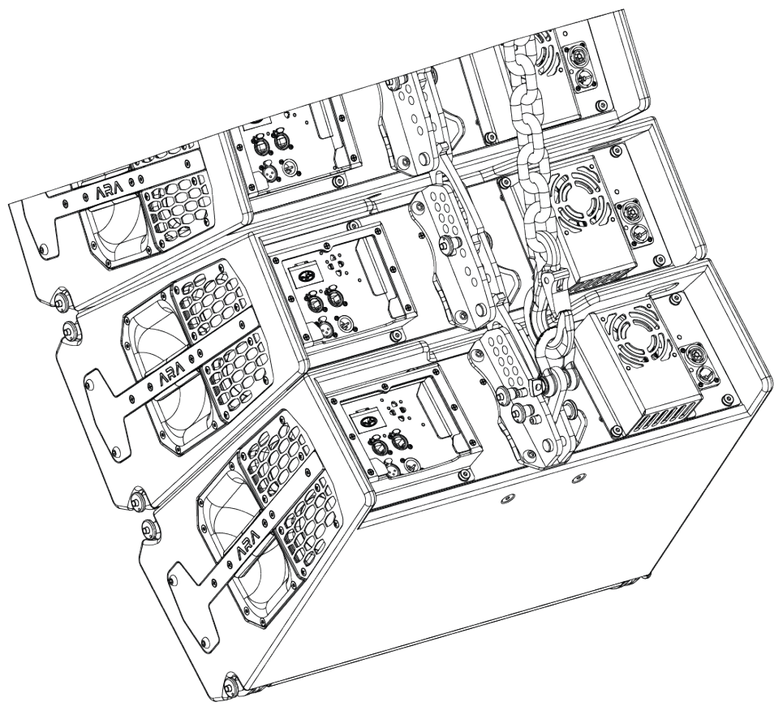


SARA AND SARA-SUB

PL-SARA-SUB: WOODEN TRANSPORT DOLLY FOR 2 OR 3 SARA-SUBS.



AX-PULL-SARA: PULL-BACK HARDWARE FOR THE BOTTOM BOX OF A SARA ARRAY.



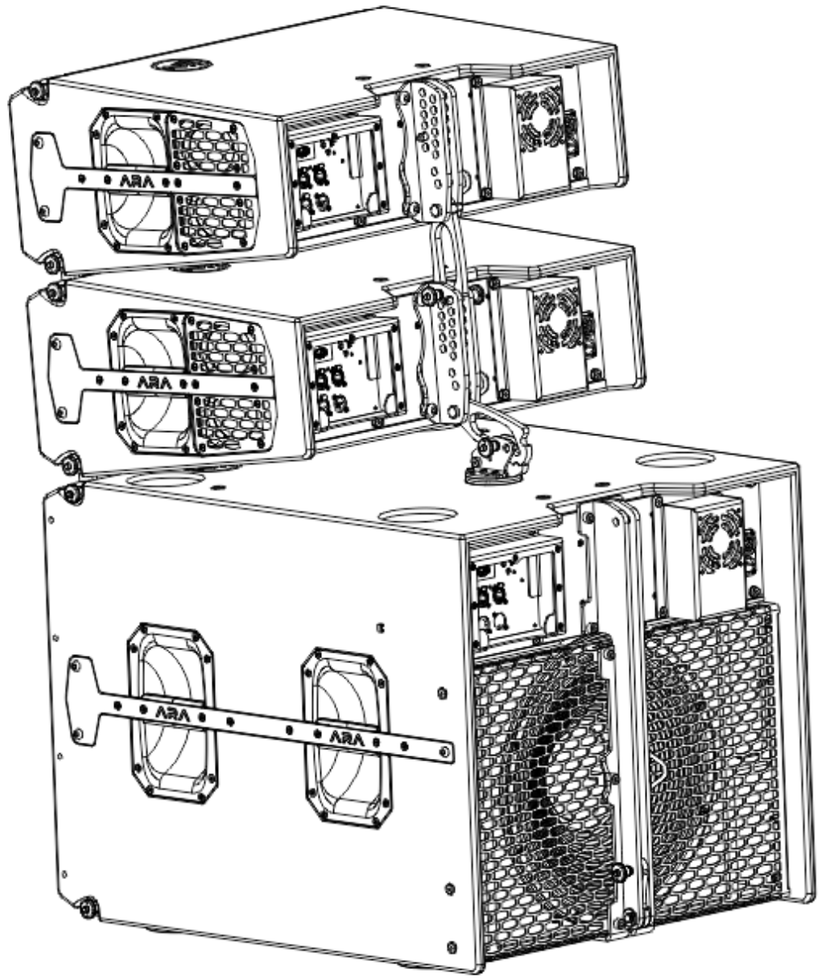
Accessories

SARA AND SARA-SUB

FUN-4-SARA: PROTECTIVE TRANSPORT COVER FOR 4 U. SARA ON PL-SARA.

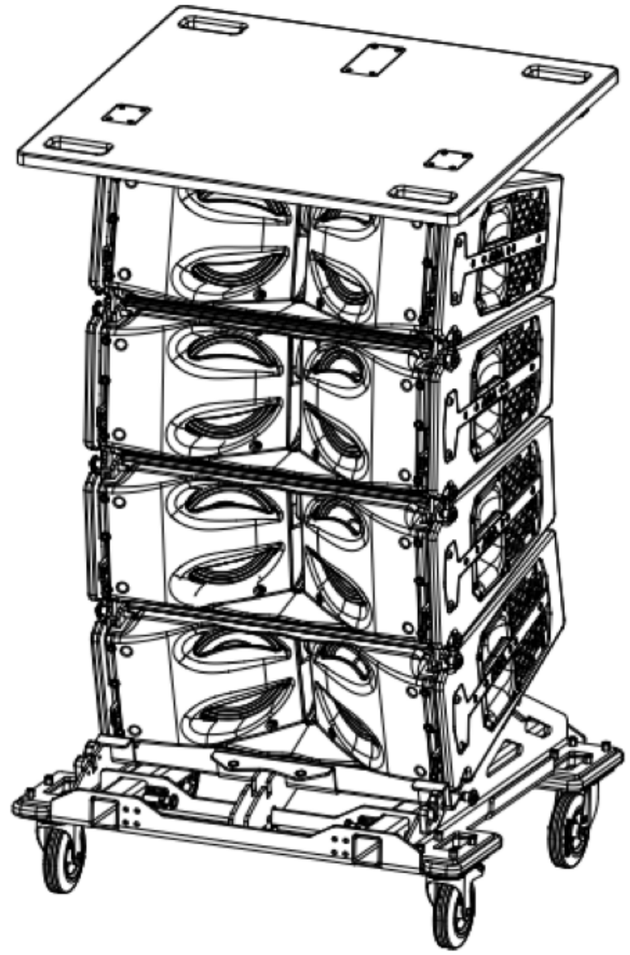
FUN-2-SARA-SUB: PROTECTIVE TRANSPORT COVER FOR 2 U. SARA-SUB ON PL-SARA-SUB.

JP-SARA: JOINING PLATE FOR ARRAY ASSEMBLING SARA/ SARA-SUB. VALID FOR STACKING SARAS ON TOP OF THE SUBS OR RIGGING SARAS BELOW SARA-SUBS.

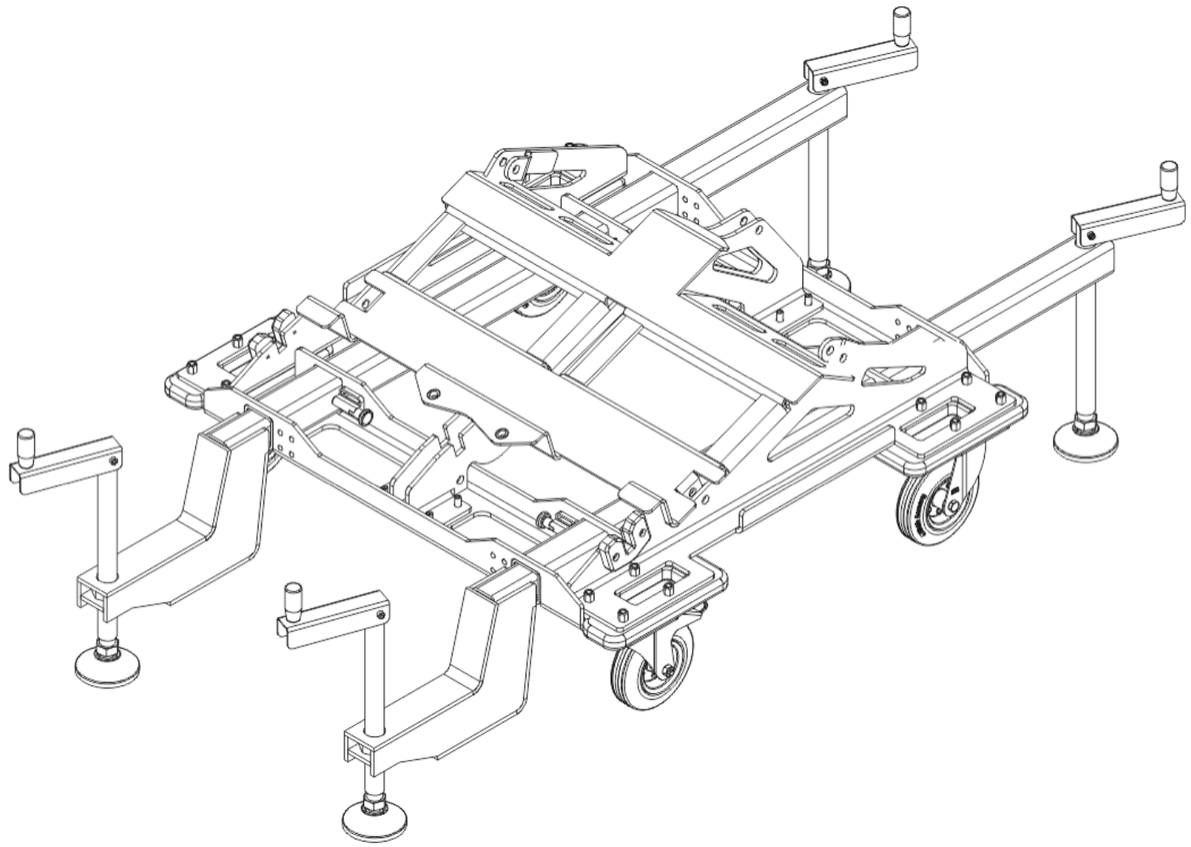


SARA AND SARA-SUB

TOP-PL-SARA: WOODEN TRANSPORT SUPPORT FOR 4 SARA ON PL-SARA

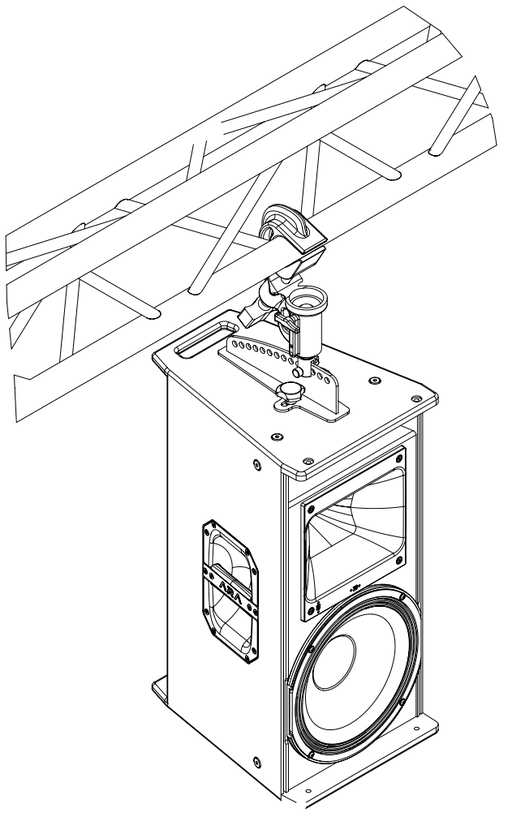


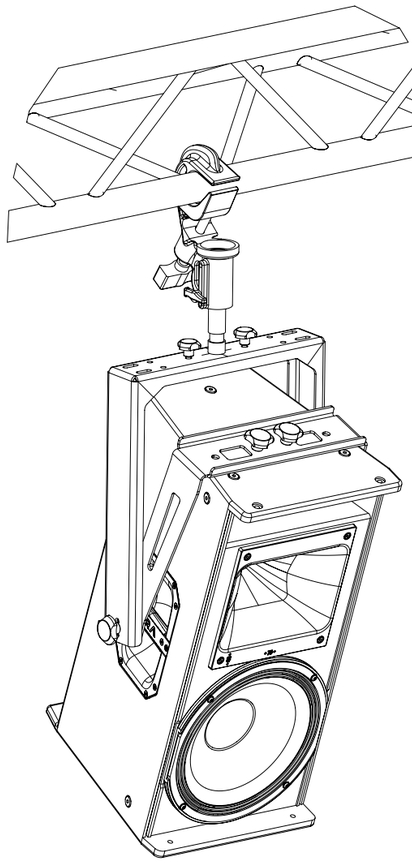
GS-PL-SARA: KIT OF ADJUSTABLE EXTENSIONS COMPATIBLE WITH PL-SARA TO STABILIZE AND ANGLE THE SYSTEM IN STACK CONFIGURATION.

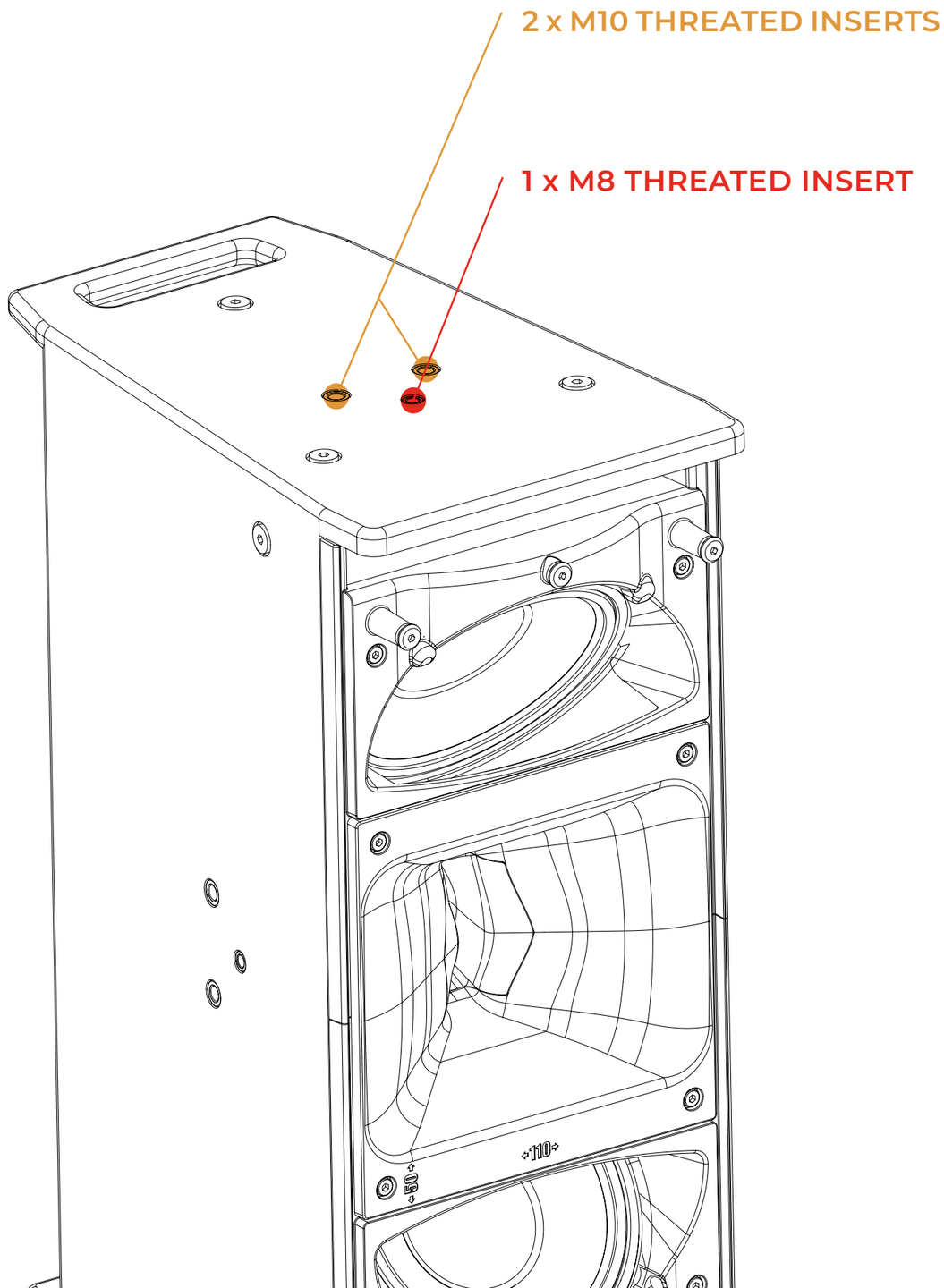


ARA-P ACCESSORIES

All four models, ARA-P28.74/115, ARA-P12.74/115 are equipped with Metric-8 and Metric-10 threated inserts for fast and easy installation, mainly intended for corporate and portable events.

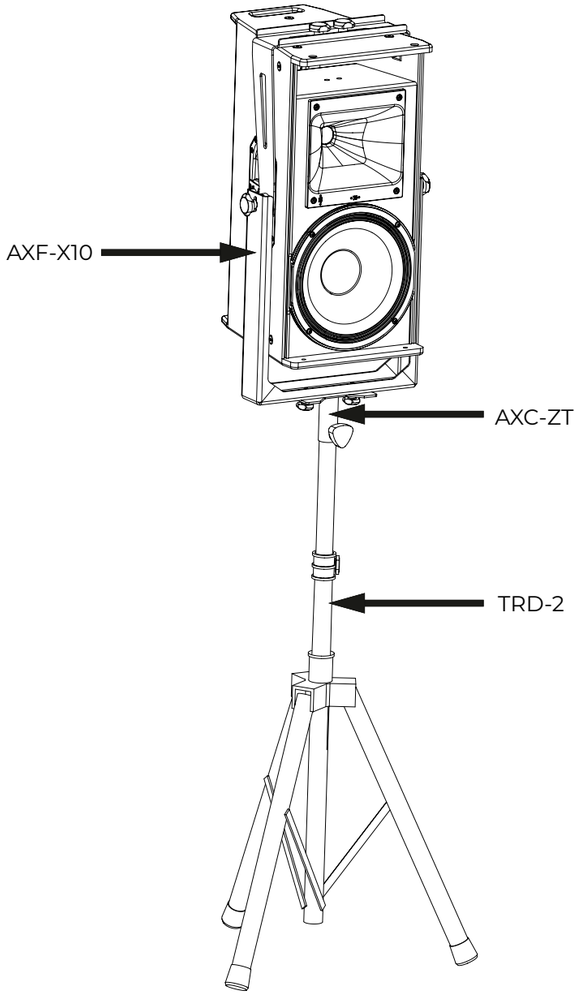




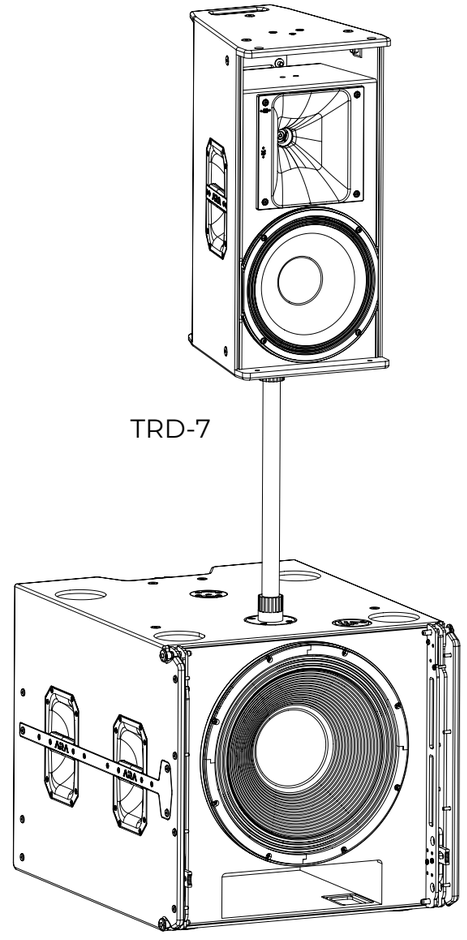


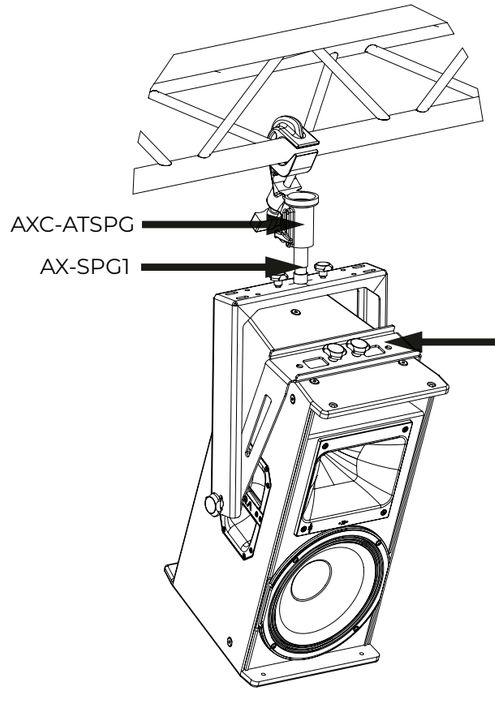
Accessories

ARA-P12.74 AND P12.115

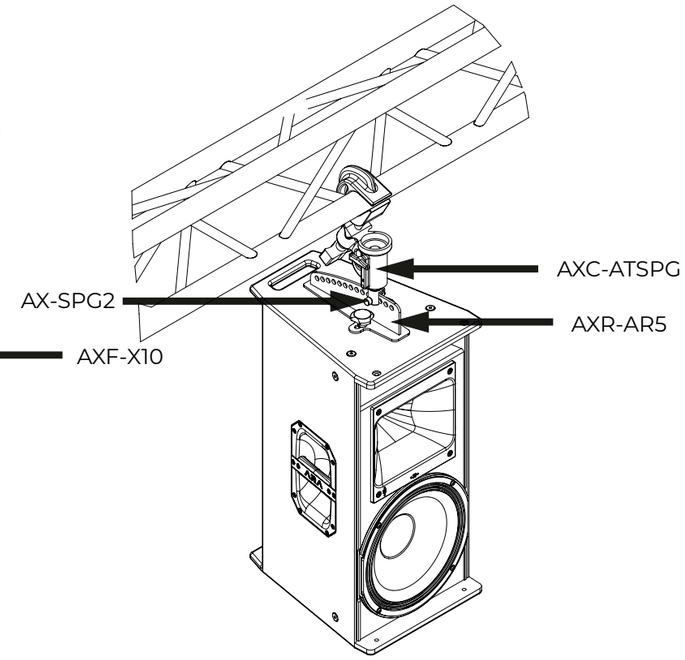


TRD-2 + AXF-X10 + AXC-ZT

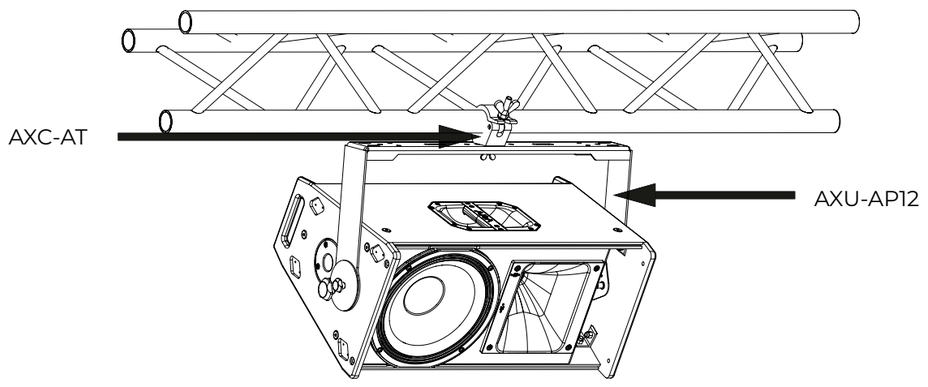




AXF-X10 + AXC-ATSPG + AX-SPG1

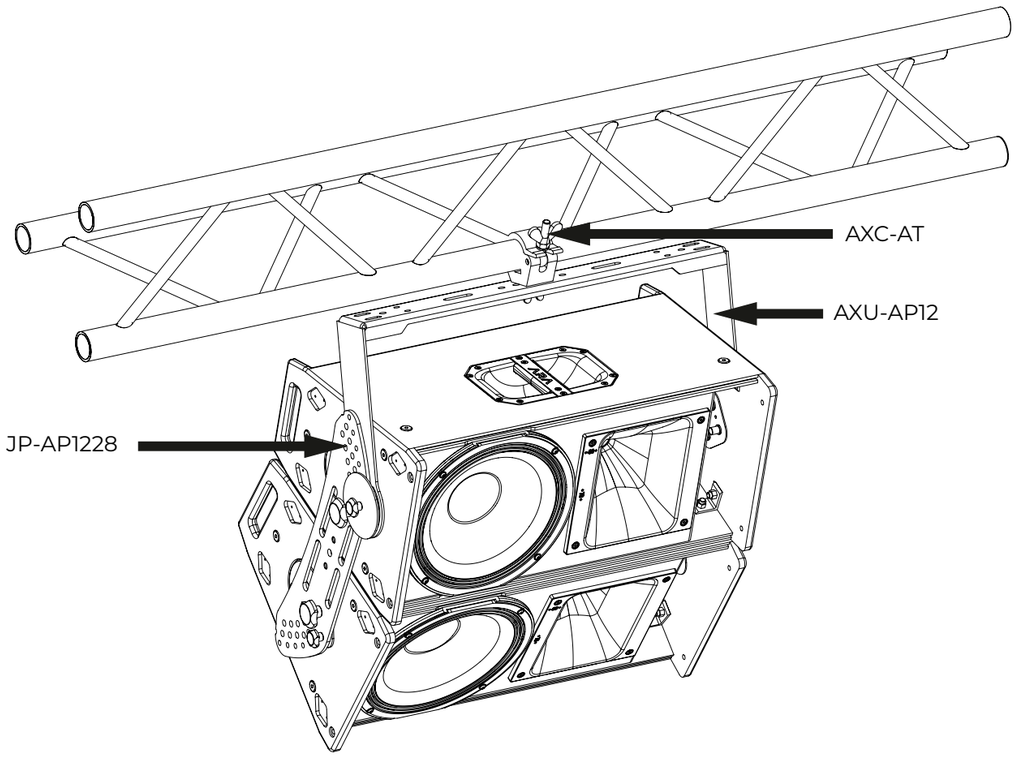


AXR-AR5 + AXC-ATSPG + AX-SPG2

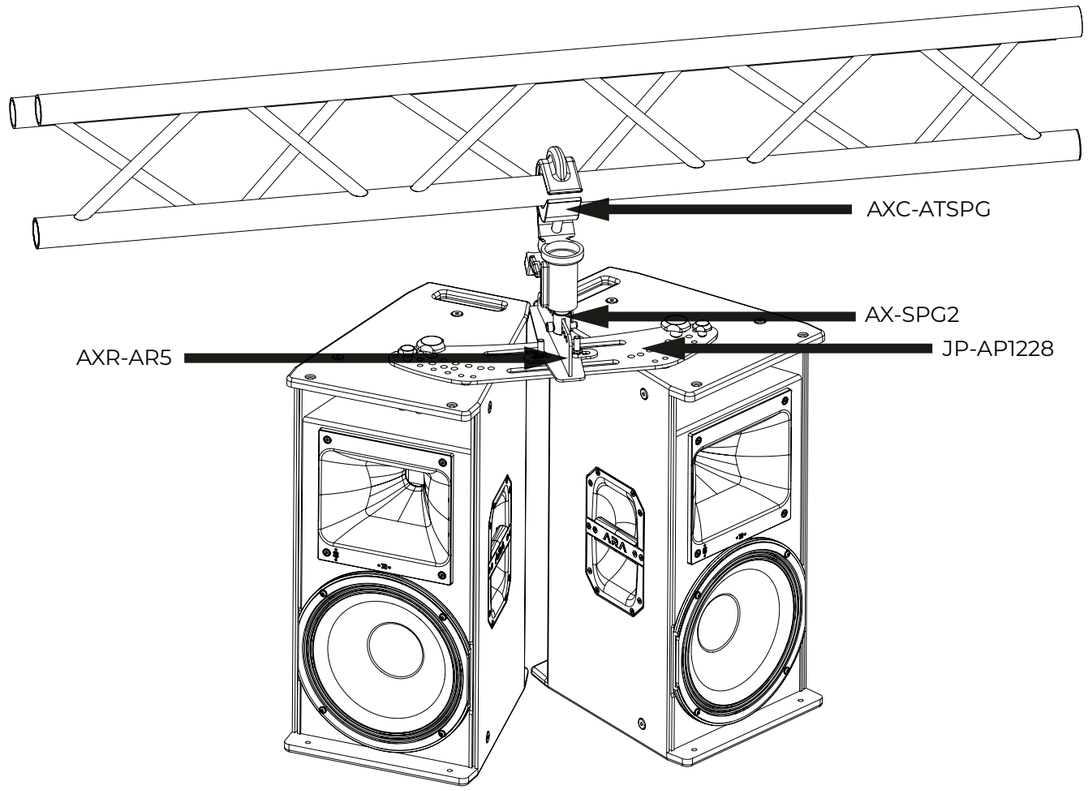


AXU-AP12 + AXC-AT

ARA-P12.74 AND P12.115



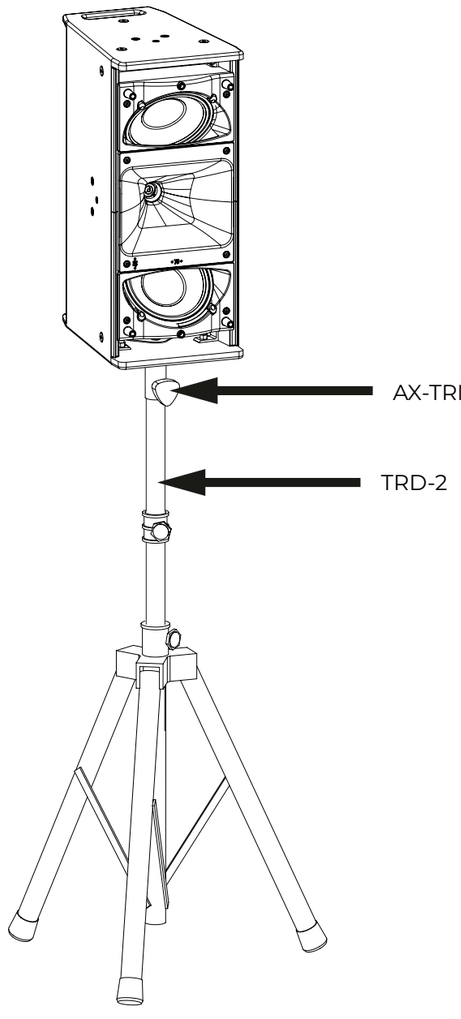
AXU-AP12 + JP-AP1228 + AXC-AT



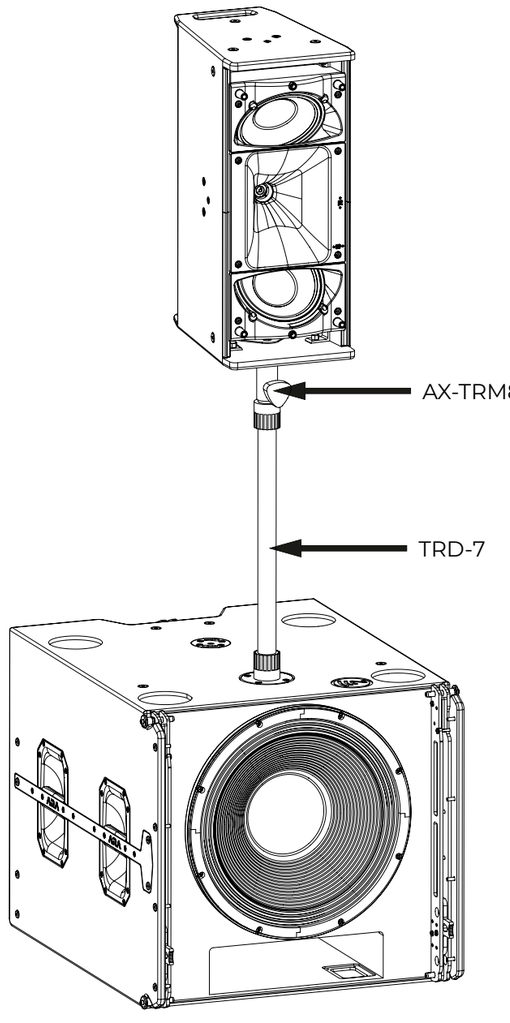
AXR-AR5 + AXC-ATSPG + AX-SPG2 + JP-AP1228

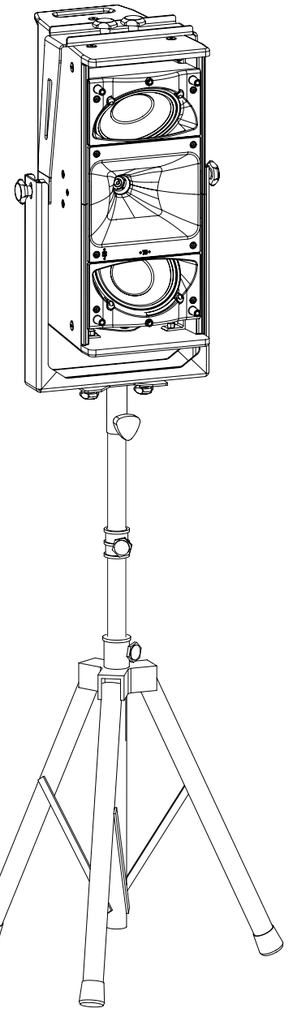
Accessories

ARA-P28.74 AND P28.115

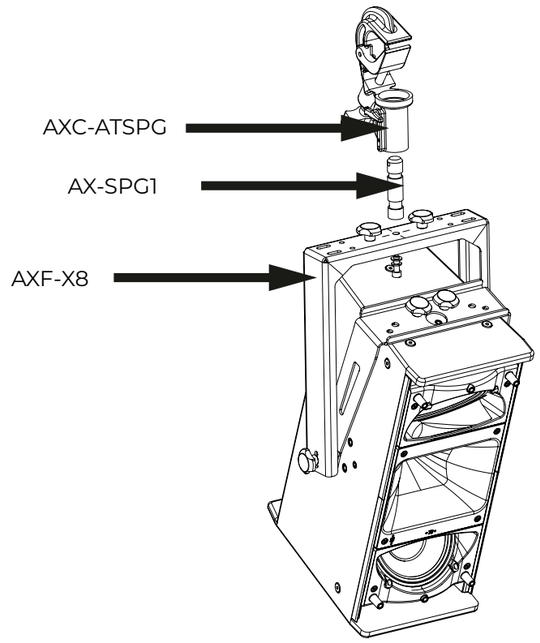


TRD-2 + AX-TRM8

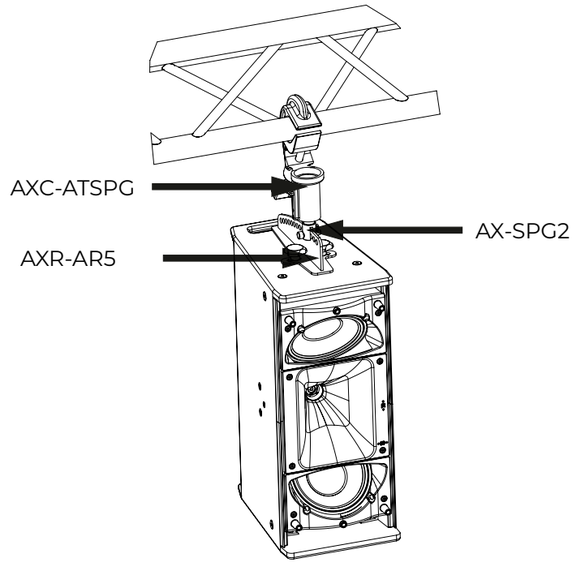




TRD-2 + AXF-X8 + AXC-ZT3



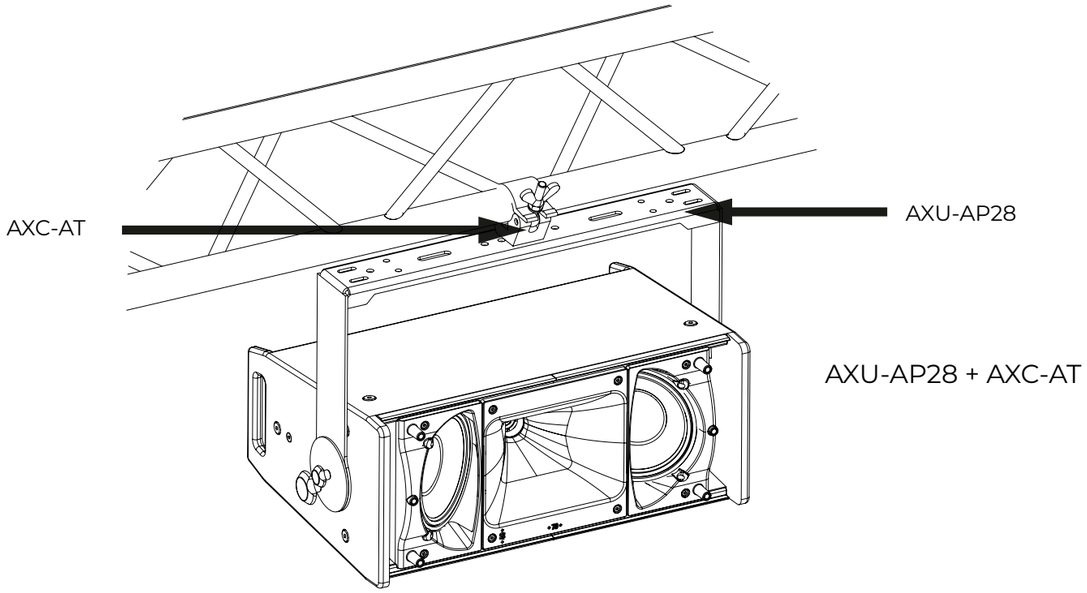
AXF-X8 + AXC-ATSPG + AX-SPG1



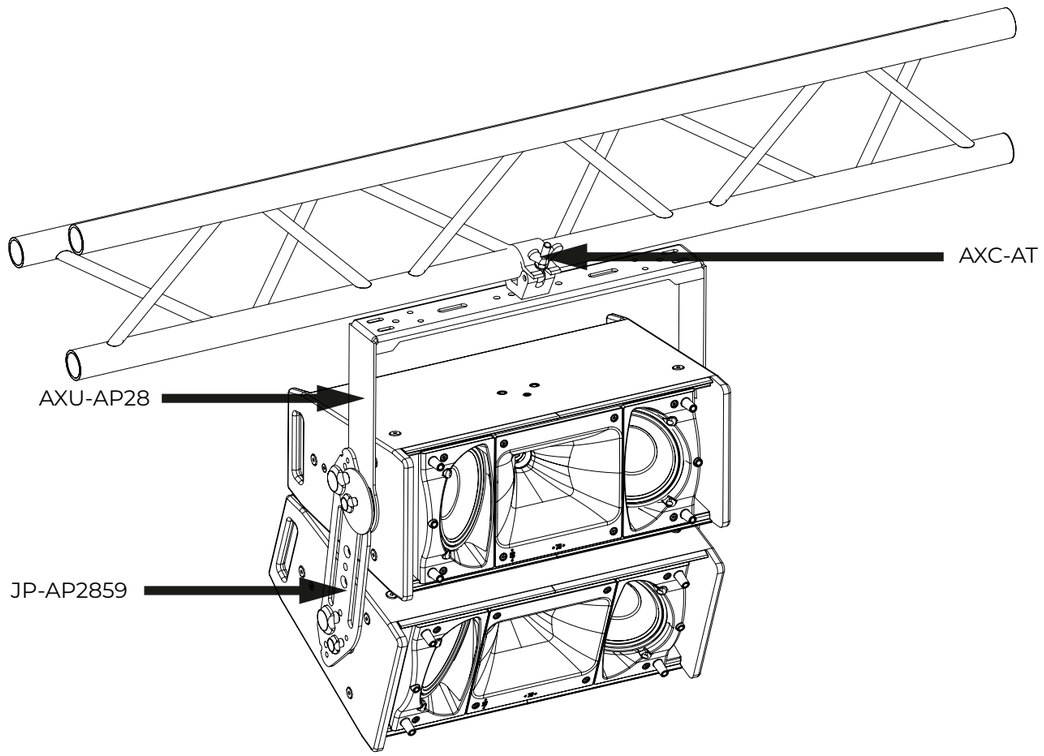
AXR-AR5 + AXC-ATSPG + AX-SPG2

Accessories

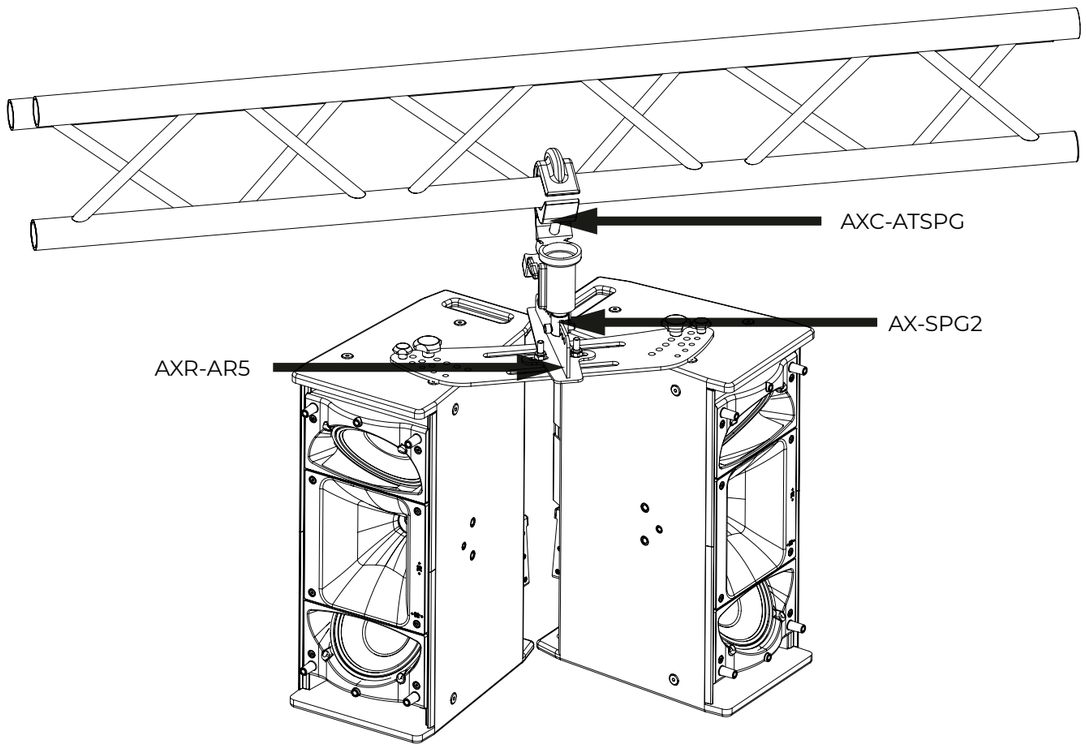
ARA-P28.74 AND P28.115



AXU-AP28 + AXC-AT



AXU-AP28 + JP-AP2859 + AXC-AT



AXR-AR5 + AXC-ATSPG + AX-SPG2 + JP-AP2850

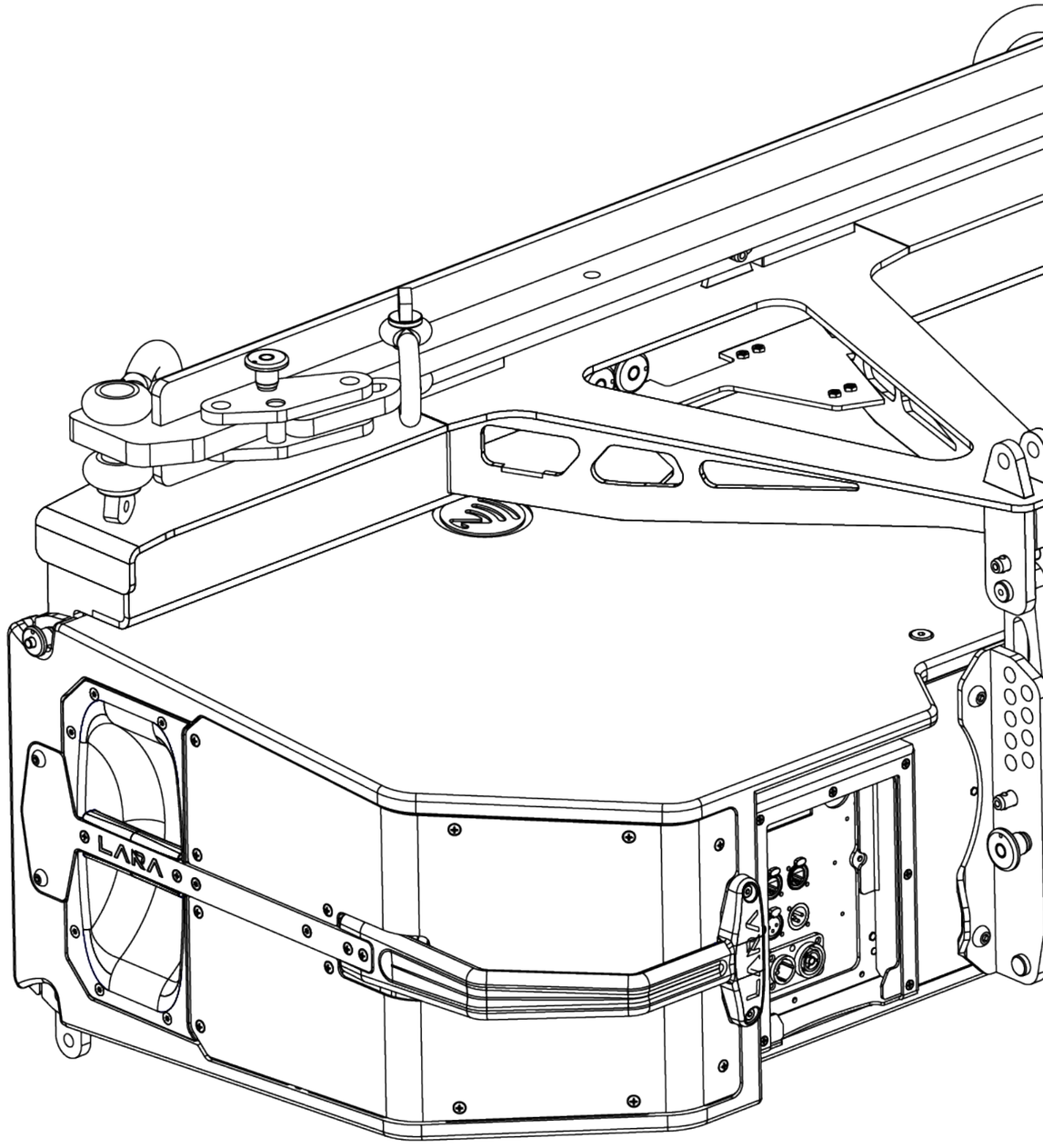
ARA series
Rigging

INTRODUCTION

The present document is not the rigging manual of the products. This chapter is a very brief summary and explanation of the very basic concepts related to the rigging of the ARA systems. Please, refer to the rigging user´s manual for further details. Please read carefully the rigging manual before using the system for the first time.

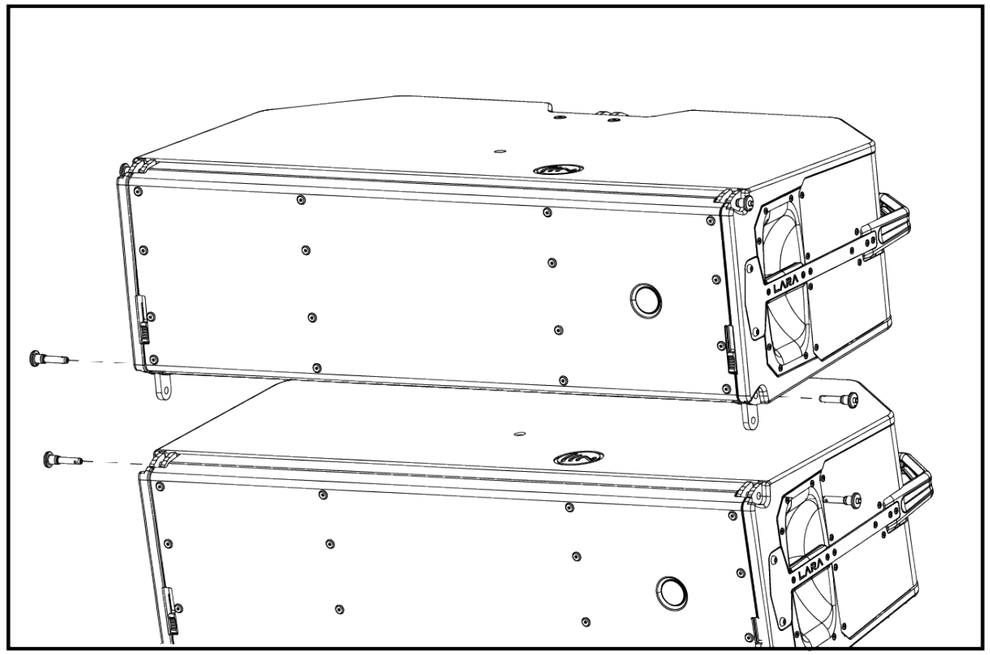
To carry out any operations related to flying a DAS Audio system, it is recommended to read the present document first and comply with the warnings and advice given. The goal is to allow the user to become familiar with the mechanical elements required to fly the acoustic system, as well as the safety measures to be taken during and after assembly. Only experienced installers with adequate knowledge of the equipment and local safety regulations should fly speaker boxes. It is the user´s responsibility to ensure that the systems to be flown (including flying accessories) comply with state and local regulations.

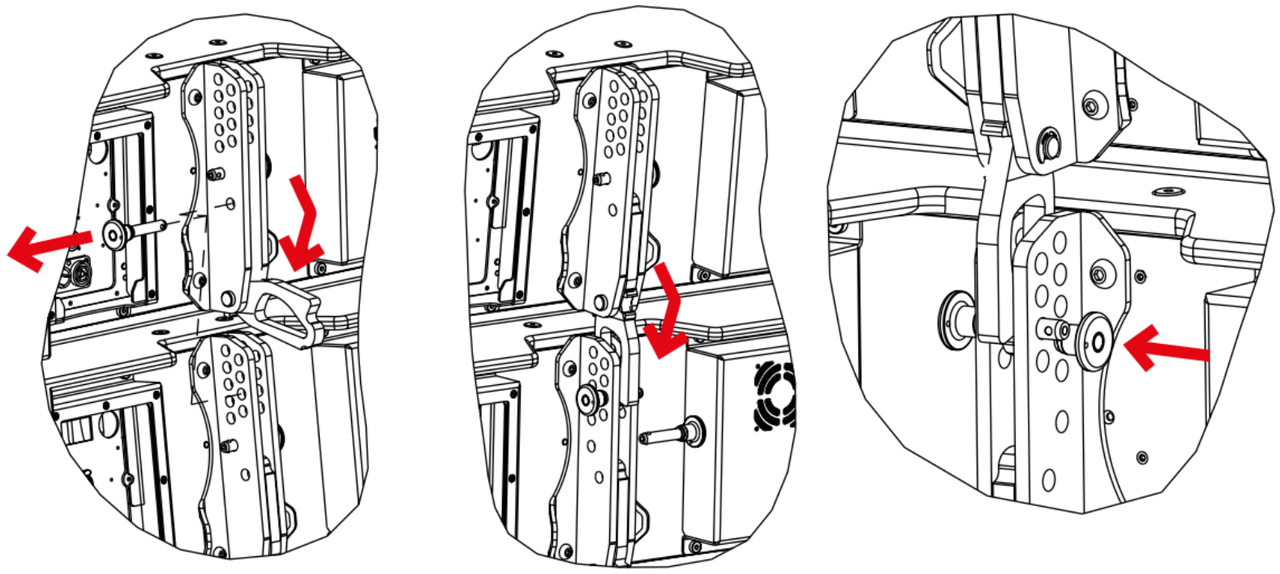
Rigging hardware should be regularly inspected and defective units replaced discarded. It is highly recommended that you implement an equipment inspection and maintenance program, including reports to be filled out by the inspectors. Local regulations may exist that, in case of accident, may require you to submit evidence of inspection reports and corrective actions carried out after defects were found. Absolutely no risks should be taken with regards to public safety.



ARA RIGGING SYSTEM

- All ARA systems include a 3 point stainless steel rigging system.
- AX-LARA, and AX-SARA rigging bumpers are compatible with the companion subwoofer models.
- AX-LARA and AX-SARA permit uptilt and downtilt arrays.
- All models, including subwoofers, can be rigged.
- All models use 6 quick release pins to join other systems. 4 pins are used at the front (2 left, 2 right) and 2 at the back.
- Always keep the 6 pins with in the cabinet meaning that when rigging two cabinets, pins of cabinet number 2 are not going to be changed of position or moved to cabinet number one and vice versa:
- The FSS™ (Fast Set Splay) rigging system to splay angles from the ground-stack position in 1° steps, from 0° to 7° (LARA) and from 0° to 10° (SARA) combined with the three new rigging points streamline processes and reduce assembly time significantly.



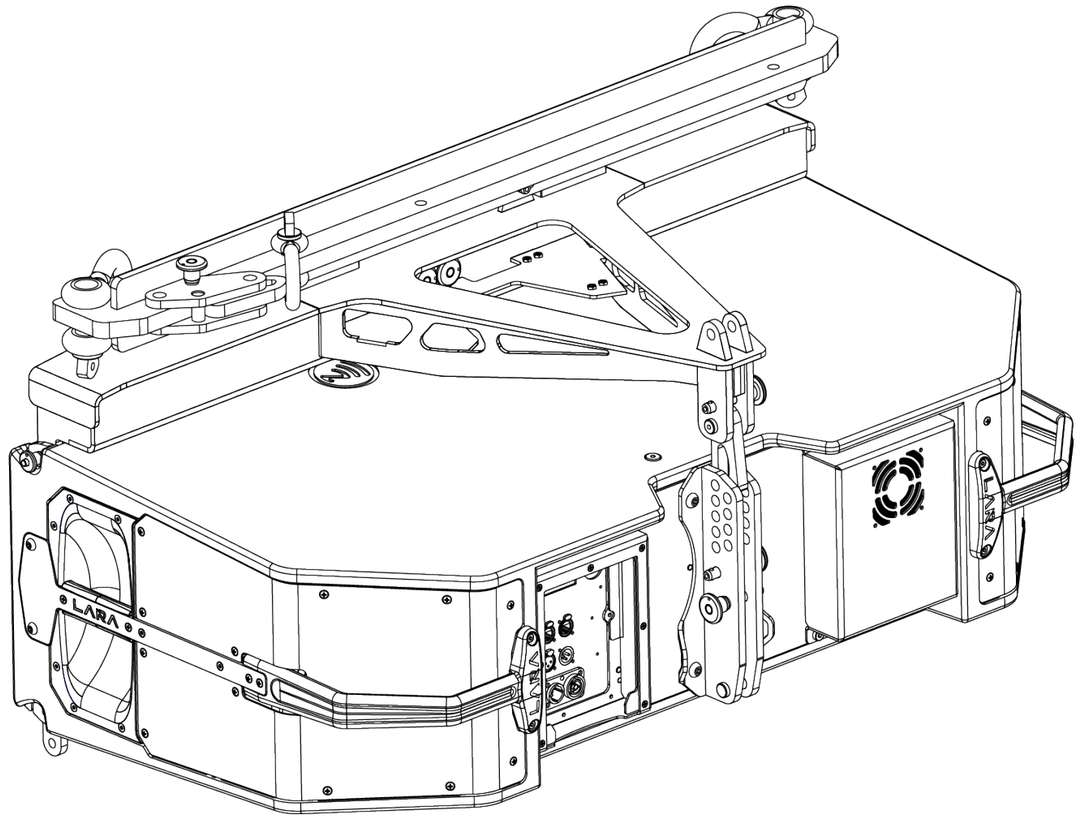


ARA RIGGING SYSTEM

- When shipped from the factory, the units have a rear security pin stowed in the “PIN HOLDER” position, inserted on the right side of their rear plate, and another rear pin stowed in the “STORE LINK” position, inserted on the left. Insert the first pin in the desired splay angle and insert the other pin to lock the connecting rod in the chosen angle plus 1. That is, if the desired angle is 4 degrees, insert the “PIN HOLDER” pin in hole “4” and the “STORE LINK” pin in hole “5”. When the desired angle is 7 degrees, insert the “PIN HOLDER” pin in hole “7”, and the “STORE LINK” pin in the hole marked “7+1”. Make sure the connecting rod from the unit on top is fitted between the rear plates of the unit below to ensure the two units are securely attached.

The use of 2 pins at the rear link is need to stack and lock the possible movement between units. When setting an splay angle for rigging or stacking, insert the first pin in the specific whole, for instance 3°, and the second pin, once the cabinets have achieved the desired 3° angle, into the whole +1° position, in this case 4°.

- The AX-LARA and AX-SARA rigging bumpers can be transported on top of the first cabinet when stacked on the dollies:

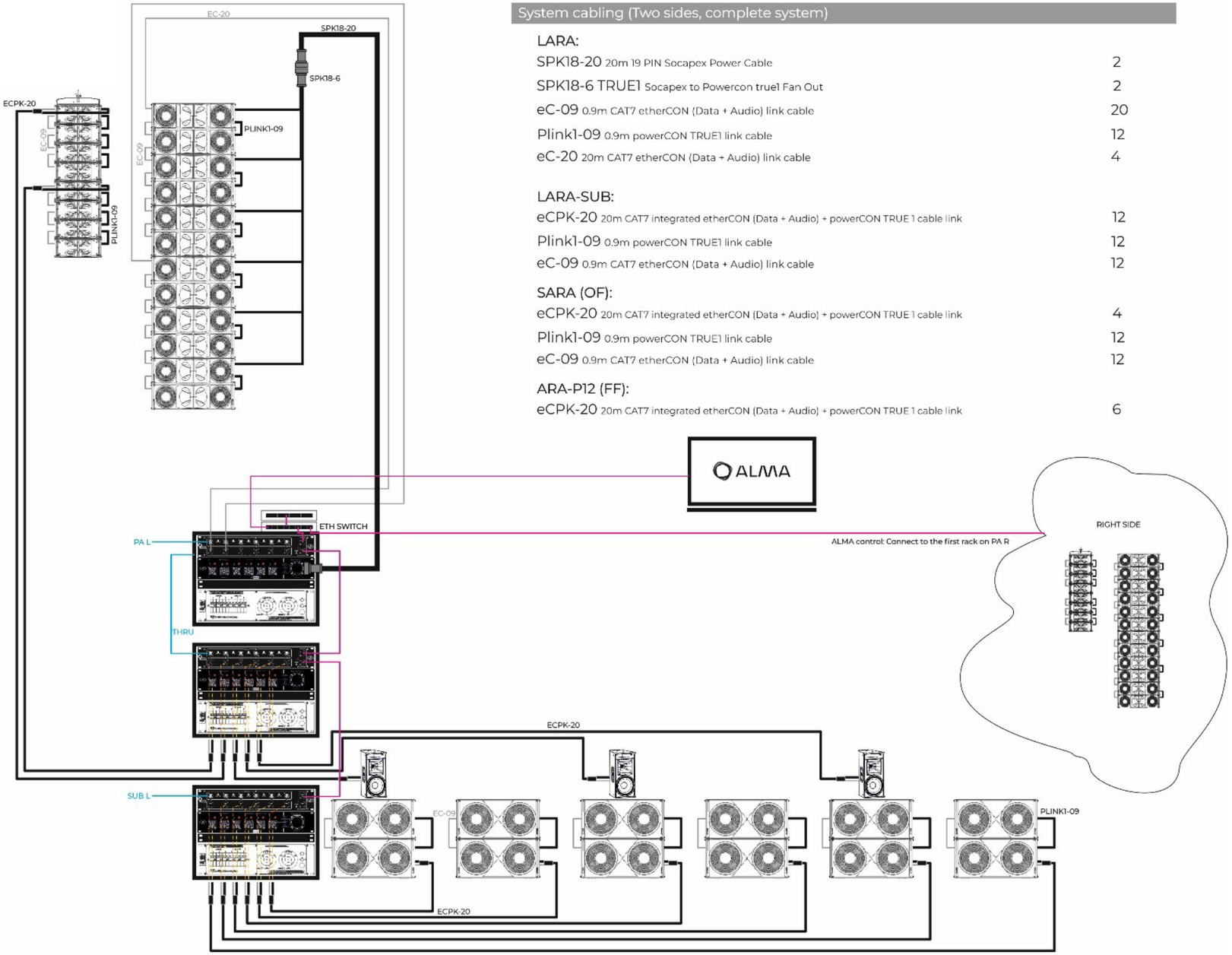


ARA series
System configurations

Consult DAS Audio´s website to download the different system configurations. As an example, the image shows a complete system with all the cabling needed from the ARA-racks. In this case the LARA units have been powered by the 20m length Socapex cable SPK18-20 and the Socapex to powercon Fan out, SPK18-6. The Lara-Subs are powered using the ECPK-20 cables. The full package comprises 24 LARA units, 24 SUBS, 16 SARAs and 6 ARAP units as Front Fills.

24 x LARA + 24 x LARA-SUB (MAIN PA)
16 x SARA(OF) // 6 x ARA-P12(FF)

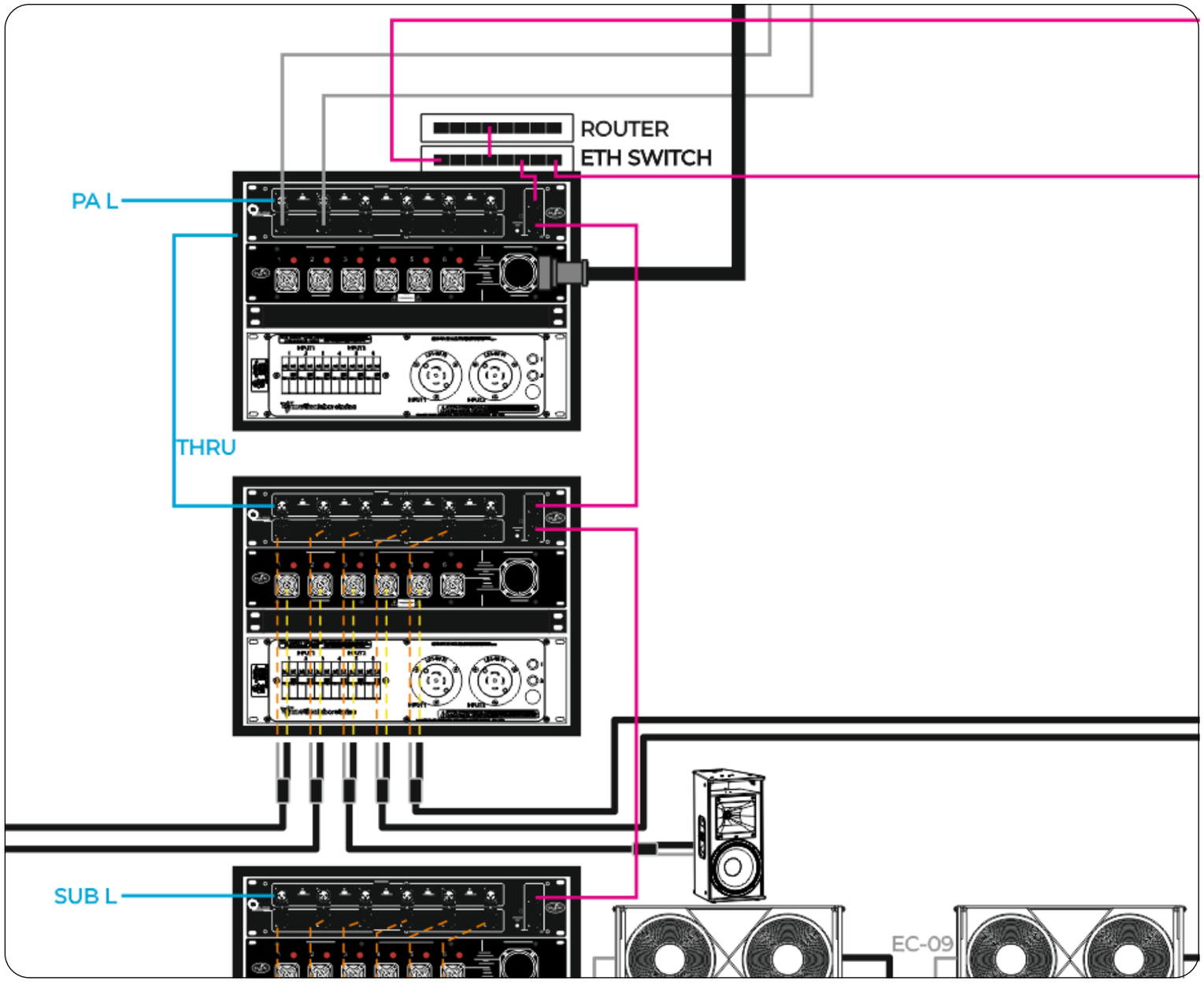
(One side shown)



System cabling (Two sides, complete system)	
LARA:	
SPK18-20 20m 19 PIN Socapex Power Cable	2
SPK18-6 TRUE1 Socapex to Powercon true1 Fan Out	2
eC-09 0.9m CAT7 etherCON (Data + Audio) link cable	20
Plink1-09 0.9m powerCON TRUE1 link cable	12
eC-20 20m CAT7 etherCON (Data + Audio) link cable	4
LARA-SUB:	
eCPK-20 20m CAT7 integrated etherCON (Data + Audio) + powerCON TRUE 1 cable link	12
Plink1-09 0.9m powerCON TRUE1 link cable	12
eC-09 0.9m CAT7 etherCON (Data + Audio) link cable	12
SARA (OF):	
eCPK-20 20m CAT7 integrated etherCON (Data + Audio) + powerCON TRUE 1 cable link	4
Plink1-09 0.9m powerCON TRUE1 link cable	12
eC-09 0.9m CAT7 etherCON (Data + Audio) link cable	12
ARA-P12 (FF):	
eCPK-20 20m CAT7 integrated etherCON (Data + Audio) + powerCON TRUE 1 cable link	6

ARA series
System configurations

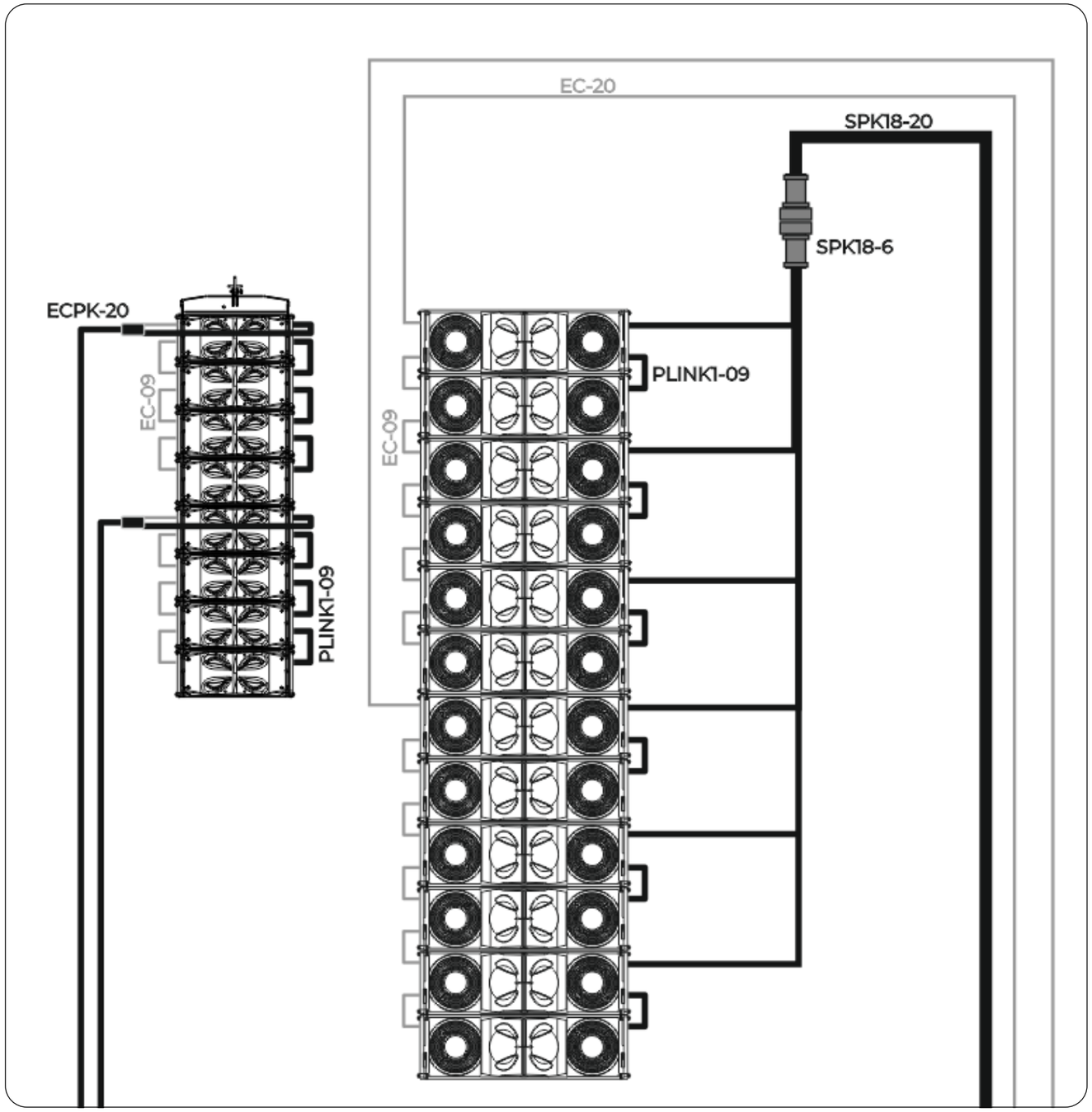
Detail of the network (pink) connection between the racks on one side. Note that only one unique router (DHCP Server) is needed in the whole network. Each rack when using the system on dynamic mode. Each rack includes a Matrix-66 which indeed includes an internal ethernet switch that can be used to daisy chain up to 2 more units, as shown:



ARA series
System configurations

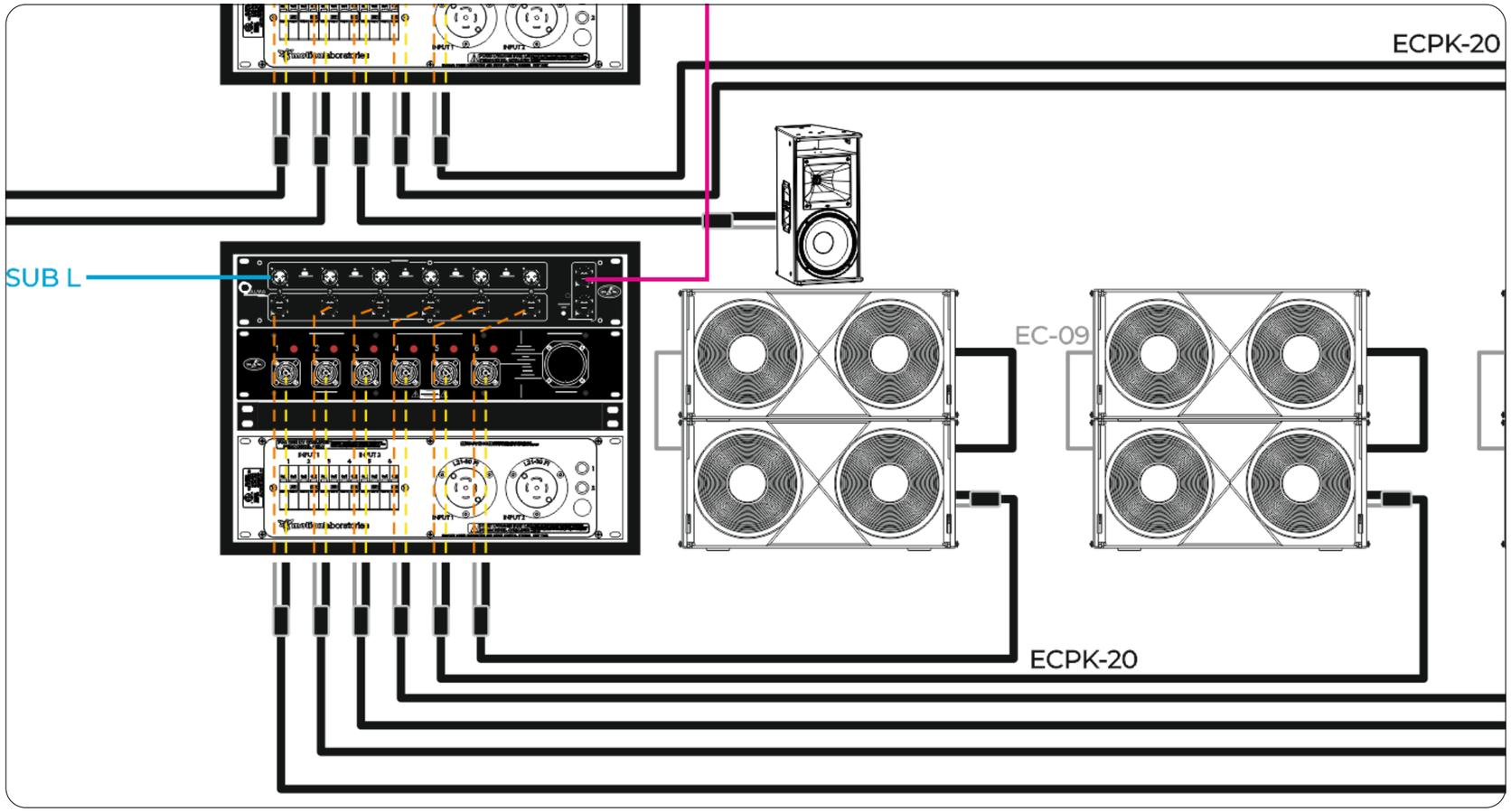
Detail of the cables needed for the PA systems:

As shown in the figure, the LARA systems use independent CAT7 cable for audio and control data (EC-20) while in the sample the SARA systems use the hybrid cables ECPK-20 for both, power and audio + control data.



ARA series
System configurations

The subwoofers and the fills are using the ECPK-20 cables as shown below:



Troubleshooting

PROBLEM	CAUSE	SOLUTION
The ON LED does not light up when mains power is active.	1. Loose connector(s). 2. Defective cable wire. 3. Blown internal fuse. 4. Damaged amplifier (Protect LED ON).	1. Check powercon true1 connectors on both extremes of ECPK cablingCheck connections on the system and power distribution panels. 2. Check the cables. Use another unit if possible. 3. Prior replacing the blown fuse by a new compatible one, check there doesn't exist visible damage in the unit. 4. Replace power module.
No sound from the unit	1. Signal cable with loose connector(s). 2. No audio from the source. 3. Defective signal cable. 4. Matrix-66 with no audio. 5. The unit is Muted via ALMA. 6. Damaged transducers.	1. Check both, XLR and Ethercon connectors on both extremes of the cable. 2. Unmute and turn on the audio source. Double check the signal path. 3. Check that there is no visible damage or cuts in the cable. Try to replace the unit. 4. Check the signal path. 5. Restore parameters in the display of the unit (reset). 6. Check the status of the unit on ALMA. Replace transducers.
Distorted sound from the unit	1. Excessive signal input level. 2. If limit LED is on, the unit has reached maximum operating levels. 3. Damaged transducers	1. Check input level on ALMA. Reduce input level. 2. Check unit´s output level on ALMA. Reduce the input level or Device Gain/Group Gain. 3. Use SOLO functionality on ALMA to supervise transducer´s status.

Troubleshooting

The unit(s) is(are) not connecting to ALMA	1. Check Communication preferences on ALMA. 2. Matrix-66 switch with no power. 3. Defective cable and / or connectors. 4. Unit is set on DHCP mode and there Is no router on the network. 5. Unit is set on static mode but the IP address doesn´t match the computer´s one. 6. Wrong sub-net mask.	1. Select the correct network adapter. 2. Turn on Matrix-66. 3. Check cables and connectors, make sure they are correctly inserted into the amplifier's input connector. 4. Set the unit on Static mode or include a DHCP / router on the network. 5. Use same range of IP addresses. For instance, computer 10.0.0.10, systems 10.0.0.20 - 10.0.0.100 6. Use 255.255.255.0 on both computer and devices.
Hum or buzz.	1. Ground loop.	1. Connect the audio system and mixing console to the same circuit.
ALMA functionalities not operative.	1. Firmware not updated	1. Check your firmware version and update it via ALMA.
The sound of the unit is not as expected	1. Defective transducer(s). 2. Existing Internal "device EQ" on ALMA.	1. Check the transducer status on ALMA or measure the sytem´s frequency response. 2. Check on ALMA or in the display of the unit that there are no active EQs or processing in the unit. Apply reset device if needed.

SOUND WITH SOUL