array K

FIRENZE

KH8/KS8 SYSTEM

USER'S GUIDE

English

rev. A

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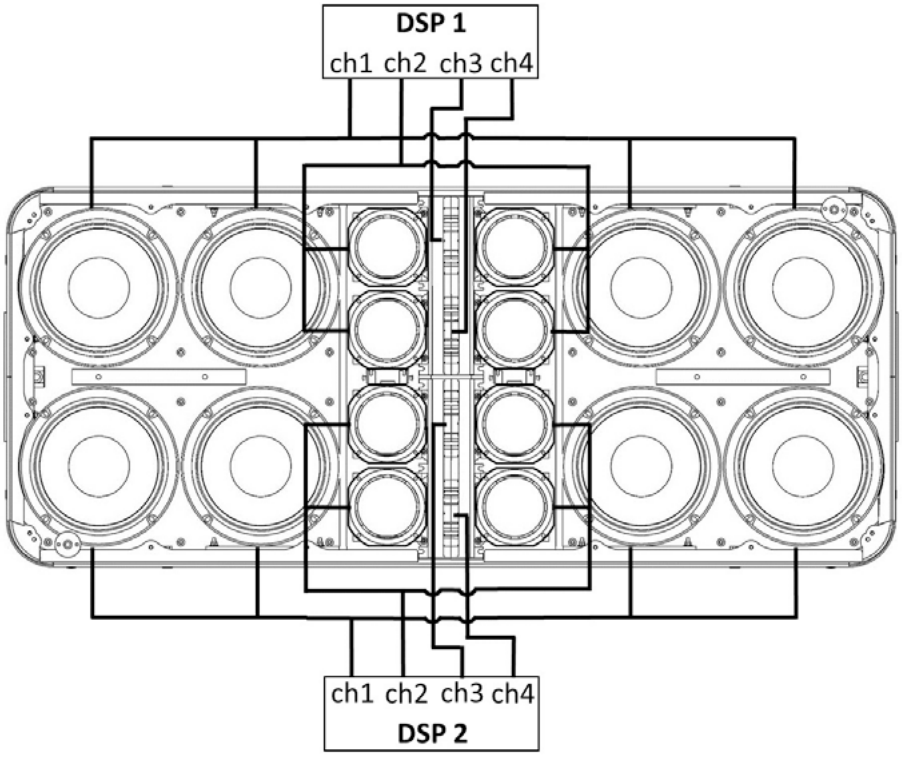
INTRODUCTION

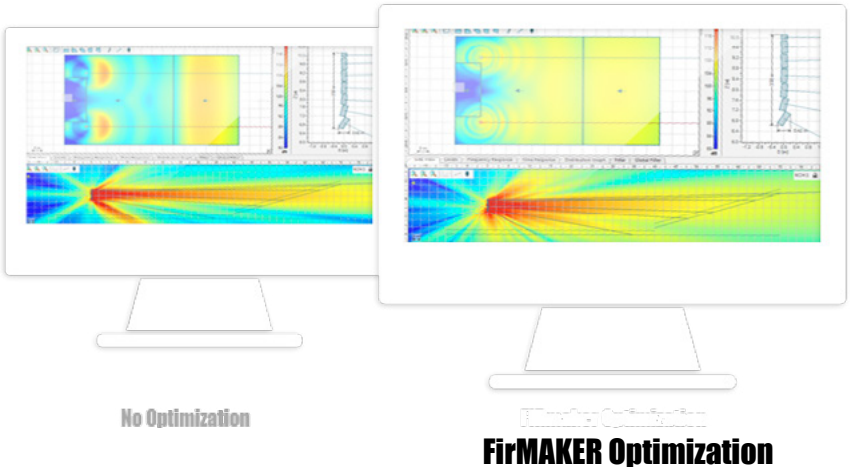
The KH8 is one of the world's first flexible digital "slim array technology" line array speakers (S.A.T); slim and compact in design, self-powered and weather resistant providing an exceptional peak output of 145 dB SPL offering a rather different solution to the touring audio market. It is fully controlled by the on-board DSPs for hyper detailed beam steering and maximum operational flexibility. Its counterpart, the KS8, is a compact, self-powered, weather resistant subwoofer element providing an exceptional peak output of 148 dB SPL. This too has dynamic set up options for optimum delay calibration.
A system of 24 KH8 units can be flown in just 10 minutes. This is possible because it is not necessary to dismount the entire cluster: the speakers are anchored in groups of three within rigid frames that can be connected quickly to create longer clusters (uJZ picp to 24 units). Compared to traditional systems that require wiring and a mechanical connection for each speaker, the KH8 saves time. Every unit can be independently tilted to focus the sound mechanically and then digitally steered.
The portability and ease of assembly are just some of the advantages of configuring a "straight array". For example, suppose you want to change the inclination angle of a speaker when the cluster has already been hoisted: with the KH8 it is not necessary to pull the cluster down, it is sufficient for someone to change the tilt of the single speaker, an operation that requires no more than a few minutes. In addition, the "straight array technology" minimises the cluster's volume and allows maximum freedom on where they are hoisted. For instance, you don't need much space in depth behind the cluster which instead can be flown almost attached to a wall or a Layer tower. The result is to obtain a wave front that has the desired curvature from a perfectly vertical cluster. "We like to say the bananas go digital".
KS8 features IPAL® driver and amplifier technology, including a powerful amplifier module, a differential pressure sensing device, a "zero latency" DSP and two 21' ' specifically designed high efficiency transducers, providing an exceptional peak output of 148 dB SPL. The IPAL® technology allows to correct the intrinsic uncertainties of the acoustical system in real time for state of the art performances. System linearity is guaranteed by a feedback correction based on a differential pressure control method. The integrated DSP ensures an astonishing 10 µs (microseconds) latency on the critical feedback paths allowing "analog type" feedback approach with the flexibility of a DSP core.
The KS8 subwoofers are also integrated in the aiming and design software to give endless possibilities of configuration for example; carded or virtual arcs and whatever the venue will require.

DIGITAL STEERING

The strength of a conventional line array system is its possibility to generate a wavefront that tends to assume a cylindrical shape, longer than a normal array with respect to the emitted wavelength. This allows for uniform coverage and a focused energy that can be directed by the sound engineer. Focusing energy on the vertical plane means that, in the case of an ideal array, the attenuation of the sound pressure will be 3 dB for each doubling distance of the diffuser, in front of the 6 dB of attenuation to occur in the case of sources with spherical emission.
Theoretically the line array should be rectilinear to ensure an optimal relationship between sound sources. However, in many cases, to adequately cover the entire listening area the array needs to be curved in a "J" or "banana" shape. This allows you, through controlling the angle of each speaker in relation to the other, to reach also the audience which sits or stands in proximity of the PA's feet. The "J" configuration is currently the most widespread and produces the highest performance but it also has many limitations in terms of practicality.



An intelligent system such as the KH8 requires a dedicated software to make preparation and setup easy and, equally, give the user plenty to play with. With AFMG®, we approached the most successful software developers in the pro-audio market. Together, we developed the first real FIRmaker implementation where users will have the power to create their own FIR filtersets optimized for each setup they use their KH8 system in.



SYMBOLS

K-array declares that this device is in compliance with applicable CE standards and regulations. Before putting the device into operation, please observe the respective country-specific regulations!

WEEE

Please dispose of this product at the end of its operational lifetime by bringing it to your local collection point or recycling center for such equipment.

This symbol alerts the user to the presence of recommendations about the product's use and maintenance.

Warning! Dangerous voltages: RISK of electric shock.
Terminals marked with this symbol are HAZARDOUS LIVE and the external wiring connected to these terminals requires installation by an instructed person or the use of ready-made leads or cords.

This symbol alerts the user to the presence of recommendations about product's use and maintenance.

This device complies with Restriction of Hazardous Substances Directive.

1. SAFETY

⚠ WARNING ⚠

Read all safety information below and operating instructions before using this device to avoid injury.

SAFETY AND HANDLING INFORMATION

⚠ Warning. Failure to follow these safety instructions could result in fire, shock or other injury or damage to the device or other property.

It is important that loudspeaker systems are used in a safe manner.

Avoiding Hearing Damage. Professional loudspeakers are capable of producing extremely high sound levels and should be used carefully. Never stand close to loudspeakers driven at high volume. Set the volume to a safe level. You can adapt over time to a higher volume of sound that may sound normal but can be damaging to your hearing. Hearing loss get worse every time you're exposed to a sound level of 90 dB or over for an extended period of time. If you experience ringing in your ears or muffled speech, stop listening and have your hearing checked. The louder the volume, the less time is required before your hearing could be affected.

Choking Hazards. This device contains small parts, which may present a choking hazard to small children. Keep the device and its accessories away from small children.

Water and Wet Locations. The level of water resistance of the loudspeakers' boxes is IP45. The electronics of the devices, including the amplifiers and their power supply units, feature a higher IP level (IP65). The system can be installed outside and it's been designed to resist against rain and normal weather conditions.

Take care not to spill any food or liquid through the device's grill. Do not attempt to dry the device with an external heat source, such as a hair dryer.

Keeping the Outside Clean. Handle the device with care to maintain its appearance. To clean it, unplug all cables and turn off it. Warning: unplugging the power cord is the only way to disconnect power completely. Then use a soft, dry or slightly damp cloth. Don't use window cleaners, household cleaners, aerosol sprays, solvents, alcohol, ammonia, or abrasives to clean the device.

Carrying, Handling and Installing the device. The device contains sensitive components. Do not drop, disassemble, open, crush, bend, deform, puncture, shred, incinerate, paint, or insert foreign objects into it. If your device has been dropped or damaged unplug the power cable immediately.

Do not operate speakers for an extended period of time with sound distortion. This is an indication of malfunction, which in turn can generate heat and result in a fire.

To reduce the risk of overheating the device, avoid installing it near heat emitting appliances, such as a room heater or stove.

No naked flame sources such as lighted candles should be placed near the device.

Operate the device in a place where the temperature is between -20°C and 50°C (-4°F to 122° F). Avoid dramatic changes in temperature or humidity when using it, as condensation may form on or within the device.

During the use, it is normal for the device to get warm. The exterior of the device functions as a cooling

surface that transfers heat from inside the unit to the cooler air outside.

The device should be placed so that its location does not interfere with its proper cooling. For example, the device shouldn't be placed next to surfaces that can interfere with the properly cooling of the rear panel's radiators. When operating, the device should not be cover with additional protections.

To reduce the risk of electric shock, unplug the power cord before connecting audio cables.

Set up your device on a stable retaining horizontal surface. If combined or mechanically connected with other products, always verify the stability of the resulted system. Install the unit only in a location that can structurally support the weight of the unit, far away from people who can interfere with the stability of the system. In case of outdoor installation, assure that the wind does not interfere with the system's stability, taking extra securities like chains, weights, ropes or any other certified anchoring systems. Doing otherwise may result in the unit falling down, causing personal injury or property damage or even death. The system should only be suspended by qualified personnel following safe rigging practices. Secure fixings to the building structure are vital. To clarify any doubt you may have, seek help from architects, structural engineers or other specialists.

Protect the power cord from being walked on or pinched.

This audio system is not intended for use in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control systems,or for any other uses where the failure of the audio system could lead to death, personal injury, or sever environmental damage.

Do not make repairs yourself. Caution, risk of electric shock. Do not open the device, it contains potentially hazardous voltage. Never attempt to disassemble, repair or modify the system yourself. Disassembling the unit may cause damage that is not covered under the warranty. The device contains no user-serviceable parts. Repairs should only be performed by factory trained service personnel. Do not plug the power cord if you suspect that your device needs service or repair.

Voltage requirement. Make sure that the supplied voltage stays within the specified range. Verify that your mains connection satisfies the power ratings of the device.

Only connect the power supply to an appropriate power outlet.

Warning: since the device is a CLASS I apparatus, it must be only connected to an AC three-wire grounding outlet. If your outlet isn't grounded, contact a licensed electrician to replace it with a property grounded outlet.

2. UNPACKING

Each K-array loudspeaker is built to the highest standard and thoroughly inspected before leaving the factory. Upon arrival, carefully inspect the shipping carton, then examine and test your new loudspeaker. If you find any damage, immediately notify the shipping company. Only the consignee may institute a claim procedure regarding the system's electronic equipment.

3. SYSTEM COMPONENTS

3.1 KH8 3 UNITS STACK

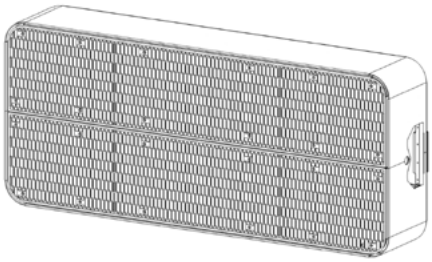
KH8 speakers are anchored in groups of three within rigid frames that can be connected quickly to create longer clusters. The three speakers inside each frame remain cabled, and are ready to go, all you have to do is simply connect only two cables from each frame to the next. Each stack features:

- 3 KH8 Units

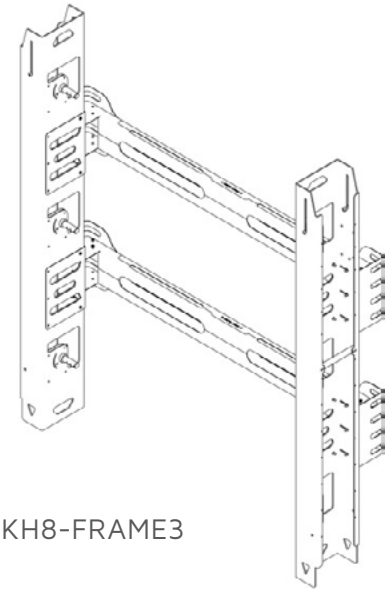
  Compact, self-powered, water resistant loudspeaker providing an exceptional peak output of 145 dB SPL. Fully on-board DSP controlled for hyper detailed beam steering and maximum operational flexibility.

- KH8-FRAME3

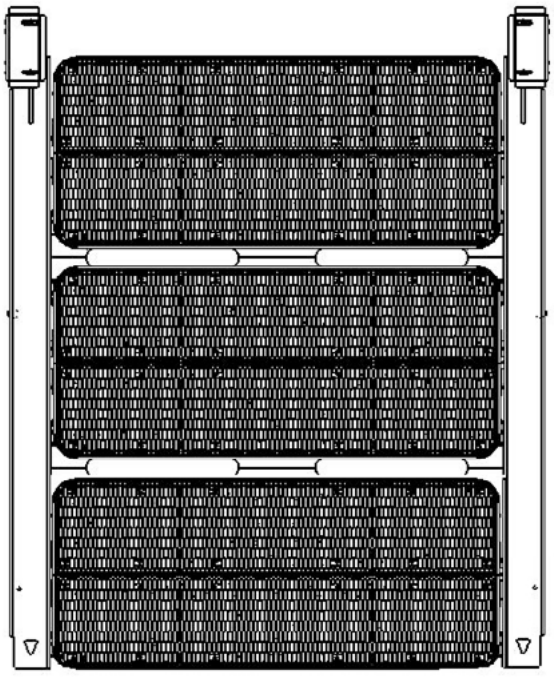
  Pre-wired frame for 3 KH8 units, including hardware to connect to the next frame or to the KH8-FLY24 bumper



KH8 Unit



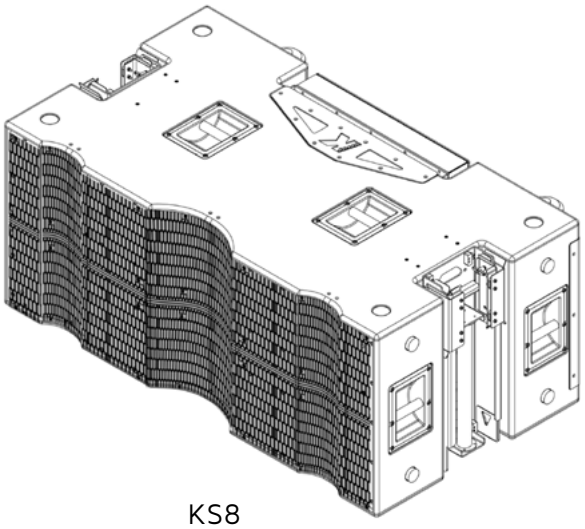
KH8-FRAME3



PRE-WIRED KH8 FRAME

3.2 KS8 SUBWOOFER

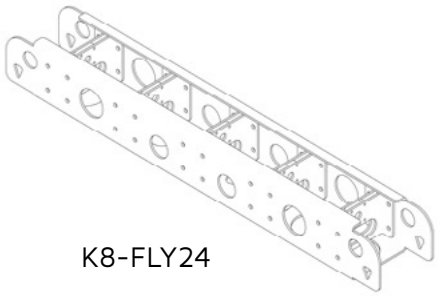
Compact, self-powered, water resistant subwoofer element providing an exceptional peak output of 145 dB SPL. Full characterization of transducer and acoustic load conditions allow to correct in real time the intrinsic uncertainties of the acoustical system with state of the art resulting performances.



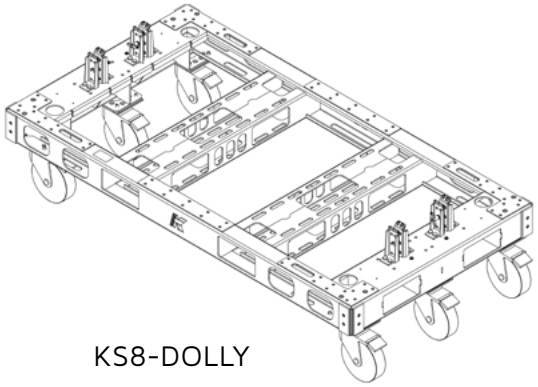
KS8

3.3 RIGGING AND TRANSPORT

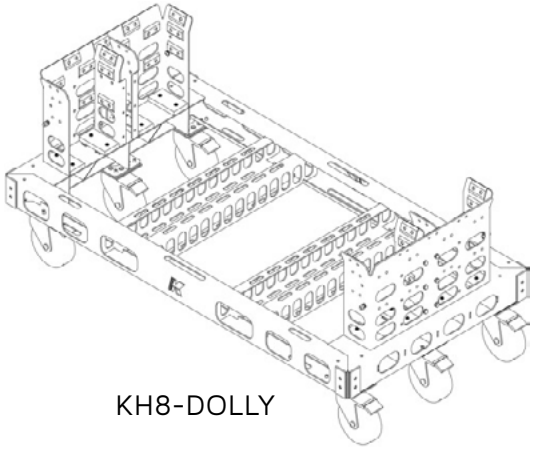
- K8-FLY24
  Bumper to fly up to 24 KH8/KS8
- KH8-DOLLY
  Dolly to trasport one or two pre-cabled stack of 3 KH8 unit (3 or 6 units in total)
- KS8-DOLLY
  Dolly to trasport 3 KS8 unit
- K8-COVER
  Protective semi-rigid cover for KH8-DOLLY or KS8-DOLLY.



K8-FLY24



KS8-DOLLY



KH8-DOLLY

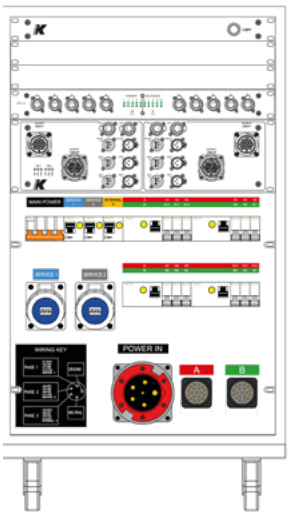
3.4 SIGNAL DISTRIBUTION AND CABLING

- K8-BOX
  Power, signals and control box for up to 12 KH8/KS8. This 19'' rack features an Audio/Data Panel for signal and data distribution, a Power Distro for power distribution and a Ethernet Switch for the network management.

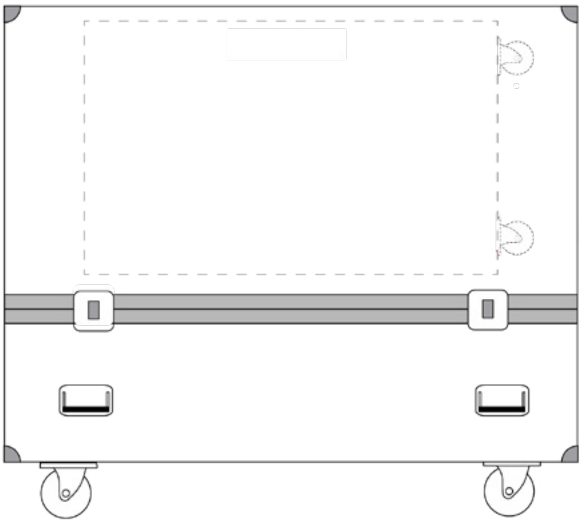
- K8-SIGN
  Multi-cable for signal and control, with 1 male 25 pins LK-25 connector at one end and 1 female 25 pins LK-25 connector at the other. Used for connecting STAGE-BOX out/input to/from KH8 or KS8 clusters and for signal and control linking between cluters. This cable is available as an accessory in four lengths: 2m (K8-SIG2), 10m (K8-SIG10), 25m (K8-SIG25), 50m (K8-SIG50).

- K8-PW
  Multi-cable for power, with 1 male 19 pins Socapex connector at one end and 1 female 19 pins Socapex connector at the other. Used for connecting POWER-BOX out/input to/from KH8 or KS8 clusters and for power linking between clusters. This cable is available as an accessory in four lengths: 2m (K8-PW2), 10m (K8-PW10), 25m (K8-PW25), 50m (K8-PW50).

- K8-CASE1
  Case for K8-BOX and cables transportation.



K8-BOX



K8-CASE1

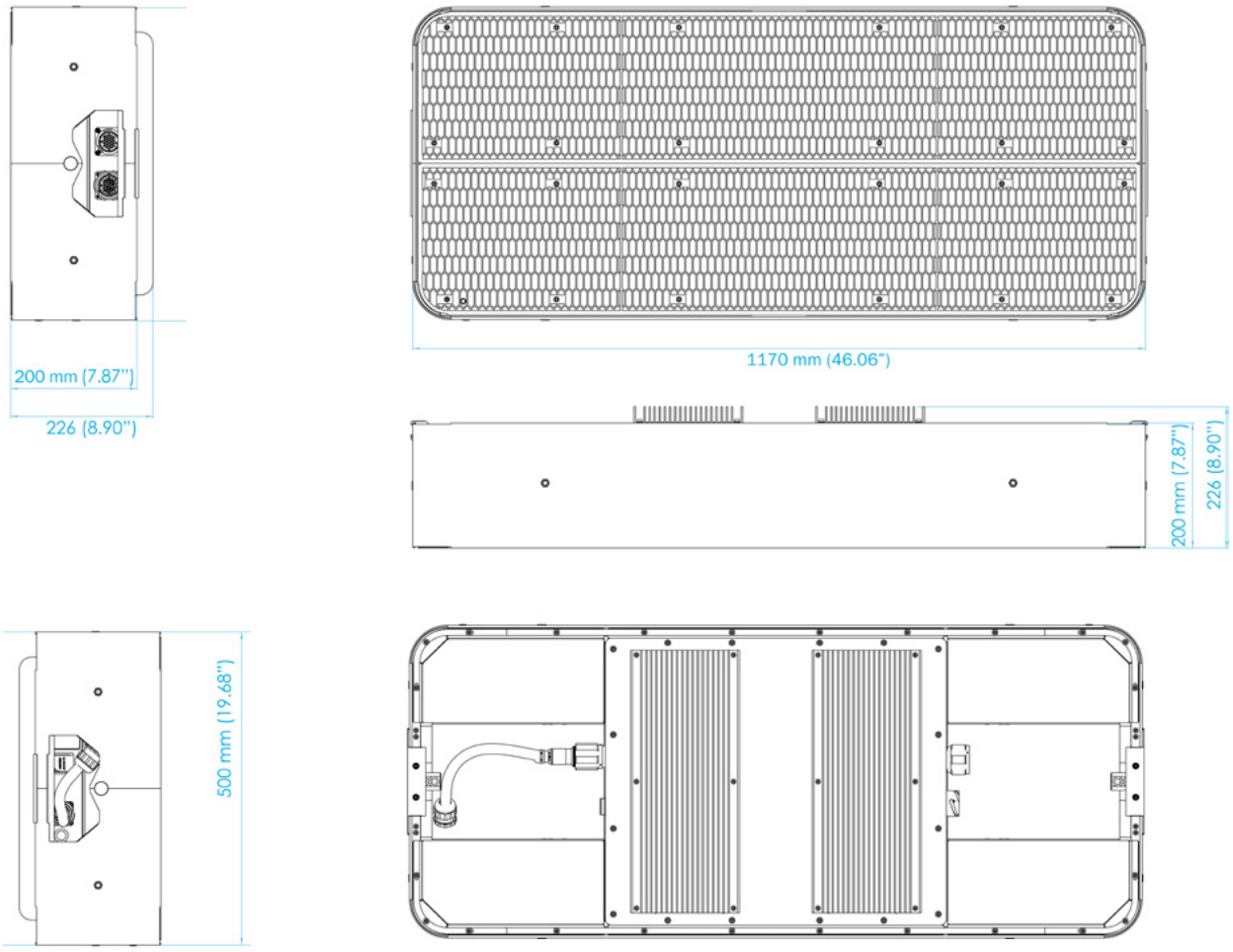
K8-SIG

K8-PW

4. KH8 UNIT SPECIFICATIONS

KH8 features 8" Neodymium magnet woofers, 4" Neodymium magnet woofers and four Neodymium magnet compression drivers coupled to individual, vertically-aligned waveguides, providing a wide operating frequency range (60 Hz to 18 kHz) and an exceptional peak output of 145 dB SPL.
Each unit is designed to be tilted on its own horizontal axis with an accuracy of 2° for exceptional throw capability.
Two integrated class D amplifiers deliver 8 x 2000 W at 4 Ω. The 8 discrete amplifier channels are controlled via integrated DSP, providing a hyper detailed beam steering ability to meet any demanding setup requirement and control sound spillover. All DSP functions are fully remote controlled via software over Ethernet.

4.1 PHYSICAL



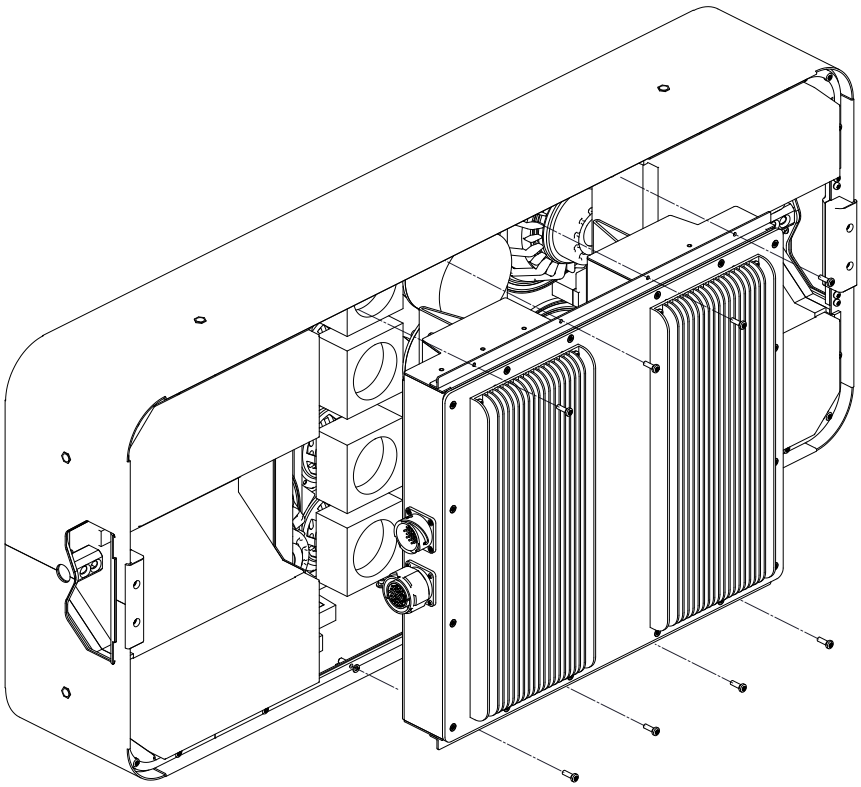
Weight
72.5 Kg (159.84 lb)

4.2 AMPLIFIER ENCLOSURE

The aluminum box which contains the amplifier unit is mechanically fastened with 8 screws to the main chassis. A multi-pin cable with a LK19 plug connects the amp output to the transducers. This setup allows for a very easy amp replacement whenever it becomes necessary.

CAUTION! Risk of electric shock.

Before going on to replace the amplifier box, make sure to have unplugged the AC power cable.



4.3 AC POWER

The amplifier module and any audio equipment connected to it (mixing consoles, processors, etc.) must be properly connected to the AC power distribution, preserving AC line polarity. Every grounding point must be connected to a single node or common point using the same cable gauge as the neutral and line cable. Bad grounding connections between speakers and the rest of the equipment may produce noise, hum or serious damage to the input/output stages in the system's electronic equipment.

Before applying AC to any K-array self-powered speaker, be sure that the voltage potential difference between neutral and earth ground is less than 5 VAC.

5.3 VOLTAGE REQUIREMENT

The auto-range power supply feature allows the amp unit to operate safely and with no audio discontinuity when the AC voltage stays within a nominal range of 100 - 240 V (operating range 85 - 265 V) at 50 or 60 Hz. Please verify that your AC main connections are capable of satisfying the power rating for the device.

CAUTION. Do not connect the system to AC power mains exceeding 265 V. Doing so will cause significant damage to the device and create serious risk for users!

5.4 CURRENT REQUIREMENT

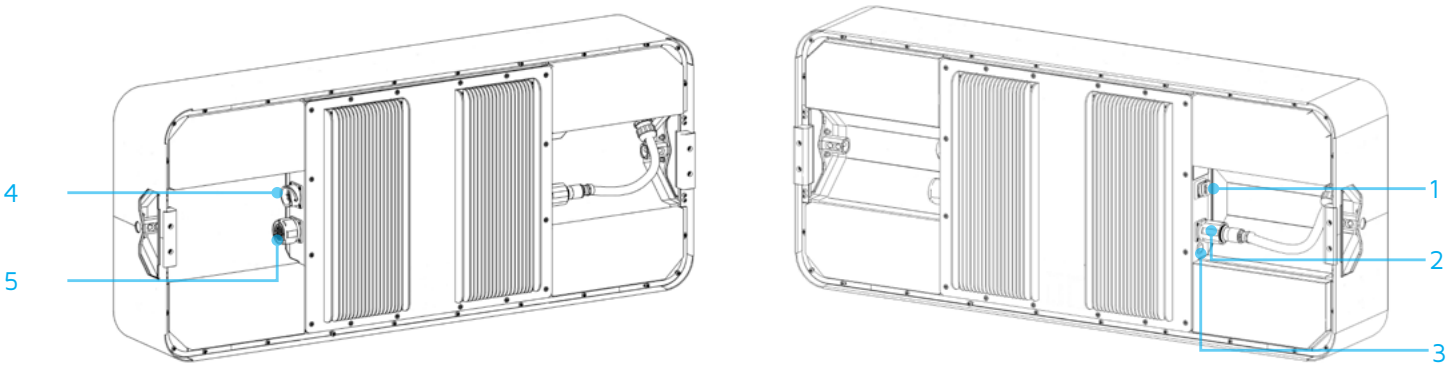
The amplifier presents a dynamic load to the AC mains, drawing additional current as operating levels increase. Different cables and circuit breakers heat up at varying rates, so it is essential to understand current ratings and how they correspond to circuit breaker and cable specifications. Maximum continuous RMS current - measured over a period of at least ten seconds - is used to calculate the temperature increase in cables, which drives the proper size and gauge cable and rating for slow-reacting thermal breakers. Maximum burst RMS current - measured over a period of approximately one second - is used to select the rating for fast reacting magnetic breakers.

For best performance, voltage drops should not exceed 10% at 100 V or 10% at 230 V. The minimum electrical service amperage required by a K-array loudspeakers system is the sum of their maximum continuous RMS current. K-array recommends allowing an additional 30% above the minimum amperage to prevent peak voltage drops at the service entry.

5.5 PROTECTION CIRCUITRY

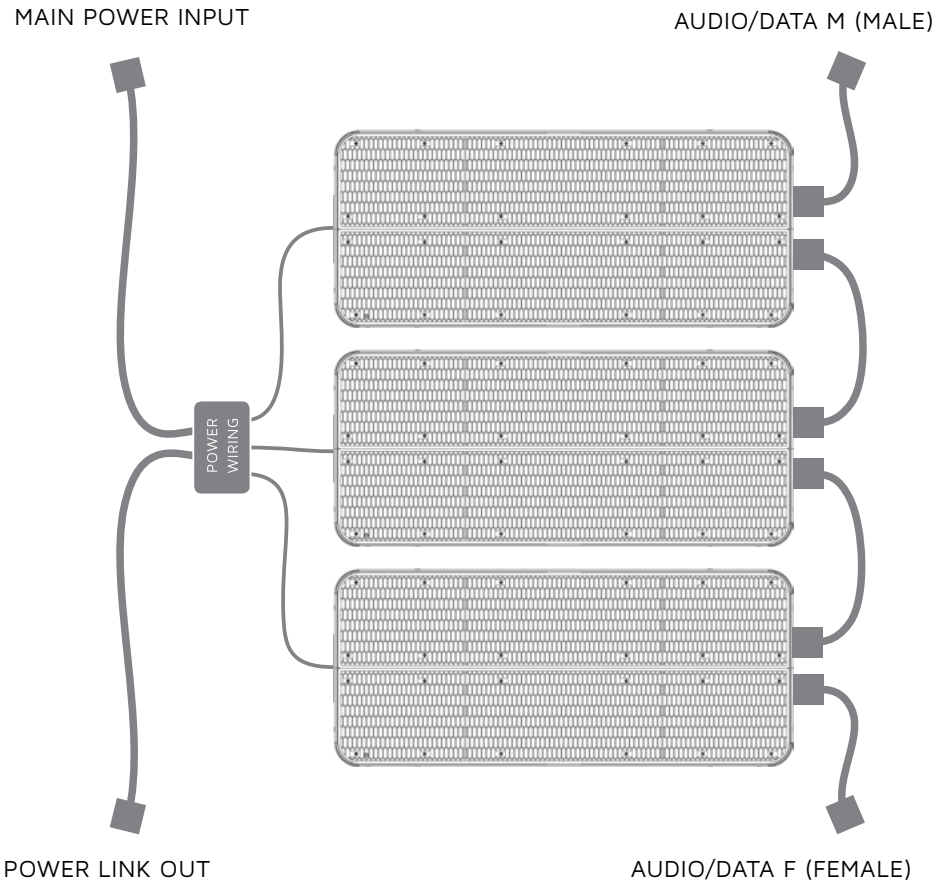
The amplifier modules are equipped with several protection circuits to prevent damage. Many audio limiters protect the internal circuitry against overload. A Peak Current Shut Down protects the output stage with a tripping point at 54 A_{peak}. If tripped, Peak Current Shut Down will reset after 2 seconds. A Temperature Protection Limiter ensures the output stage stays below a temperature of 70°C (approximate temperature of output power device).
High frequency stationary signals, like steady sinusoidal signals – improperly referred as continuous or permanent signals – with high amplitude tend to stress the amplifier section of the modules as well as the loudspeakers voice coils. When a high frequency stationary loud signal is feed into the amplifier a dedicated Limiter limits its mean current depending on its level and frequency. The process is auto adaptive and frequency driven: at higher frequency the Limiter acts faster.

5.6 POWER AND AUDIO/DATA CONNECTIONS



1. Power input. PowerCon TRUE1 connector.
2. This multi-pin cable with a LK19 plug connects the amp output to the transducers. Unless it becomes necessary to replace the amp unit, never unplug this cable.
3. Reset button. Press the button and hold it for 6-7 seconds to reset network configuration settings to factory default.
4. Signal and data input. This 25-pin male LK-25 socket allows to connect the device to the audio sources (digital or analogic) and to the remote control system.
5. Signal and data output. This 25-pin female LK-25 socket allows to link the audio sources (digital or analogic) and the remote control data from the device to another unit. You can link up to 6 units together.

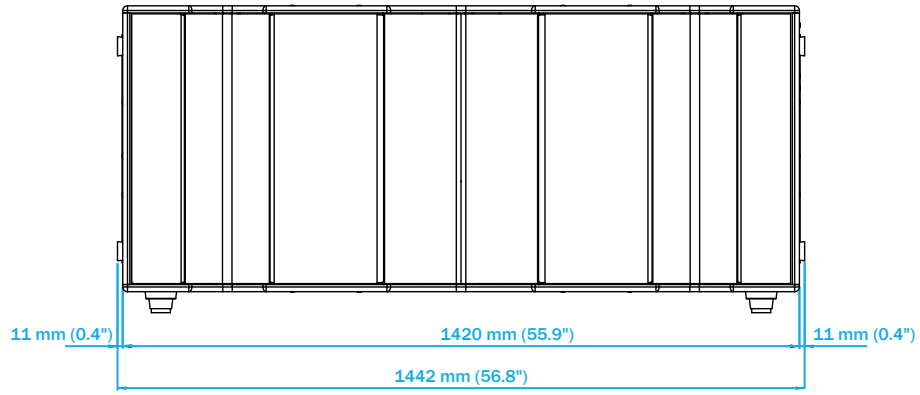
5.7 SAMPLE BLOCK DIAGRAM OF A PRE-CABLED KH8 FRAME

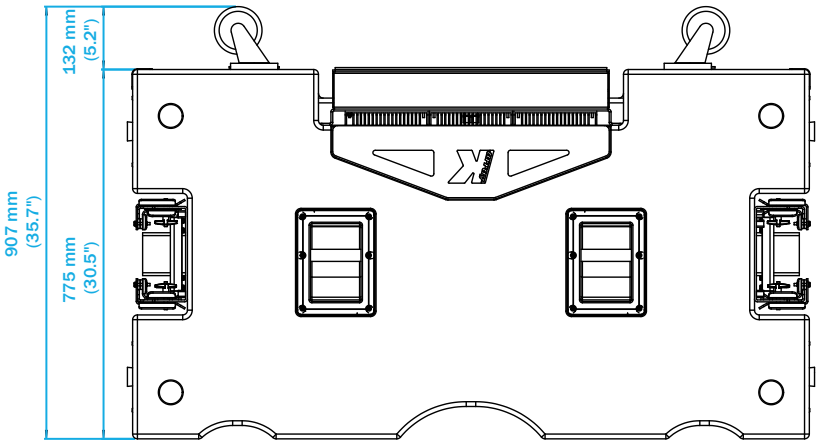


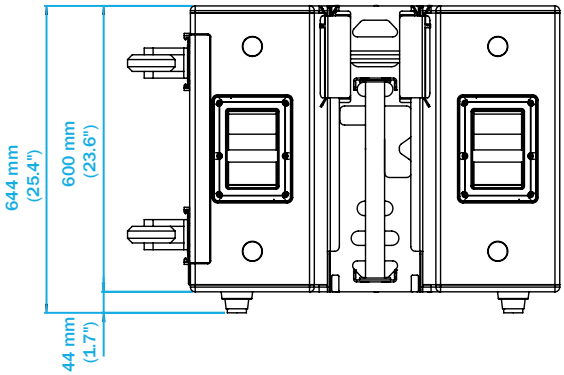
6. KS8 UNIT SPECIFICATIONS

KS8 features IPAL driver and amplifier technology, including a powerful amplifier module, a differential pressure sensing device, a "zero latency" DSP and two 21" specifically designed high efficiency transducers, providing an exceptional peak output of 148 dB SPL.
Full characterization of transducer and acoustic load conditions allow to correct in real time the intrinsic uncertainties of the acoustical system with state of the art resulting performances. System linearity is guaranteed by a feedback correction based on a differential pressure control method. The integrated DSP ensures an astonishing 10 µs (microseconds) latency on the critical feedback paths allowing "analog type" feedback approach with the flexibility of a DSP core.
The power module is a single-channel Class D amplifier, with PFC-equipped power supply, able to deliver up to 8500 W. All DSP functions are fully remote controlled via software over Ethernet.

6.1 PHYSICAL





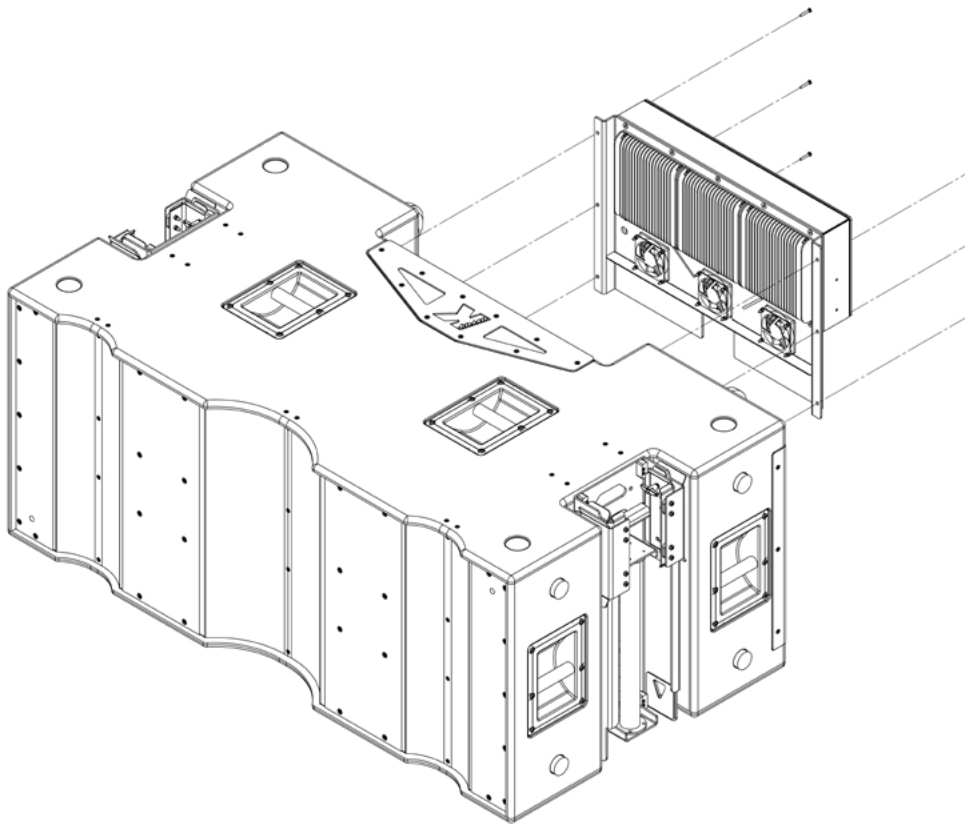


Weight
140 Kg (308.65 lb)

6.2 AMPLIFIER ENCLOSURE

The aluminum box which contains the amplifier unit is mechanically fastned with six screws to the main chassis. A multi-pin cable with a LK19 plug connects the amp output to the transducers. This setup allows a very easy amp replacement whenever it becomes necessary.

CAUTION! Risk of electric shock.
Before going on to replace the amplifier box, make sure to have unplugged the AC power cable.



6.3 AC POWER

The amplifier module and any audio equipment connected to it (mixing consoles, processors, etc.) must be properly connected to the AC power distribution, preserving AC line polarity. Every grounding point must be connected to a single node or common point using the same cable gauge as the neutral and line cable. Bad grounding connections between speakers and the rest of the equipment may produce noise, hum or serious damage to the input/output stages in the system's electronic equipment.

Before applying AC to any K-array self-powered speaker, be sure that the voltage potential difference between neutral and earth ground is less than 5 VAC.

6.4 VOLTAGE REQUIREMENT

The auto-range power supply feature allows the amp unit to operate safely and with no audio discontinuity when the AC voltage stays within a nominal range of 100 - 240 V (operating range 85 - 265 V) at 50 or 60 Hz. Please verify that your AC main connections are capable of satisfying the power rating for the device.

CAUTION. Do not connect the system to AC power mains exceeding 265 V. Doing so will cause significant damage to the device and create serious risk for users!

6.5 CURRENT REQUIREMENT

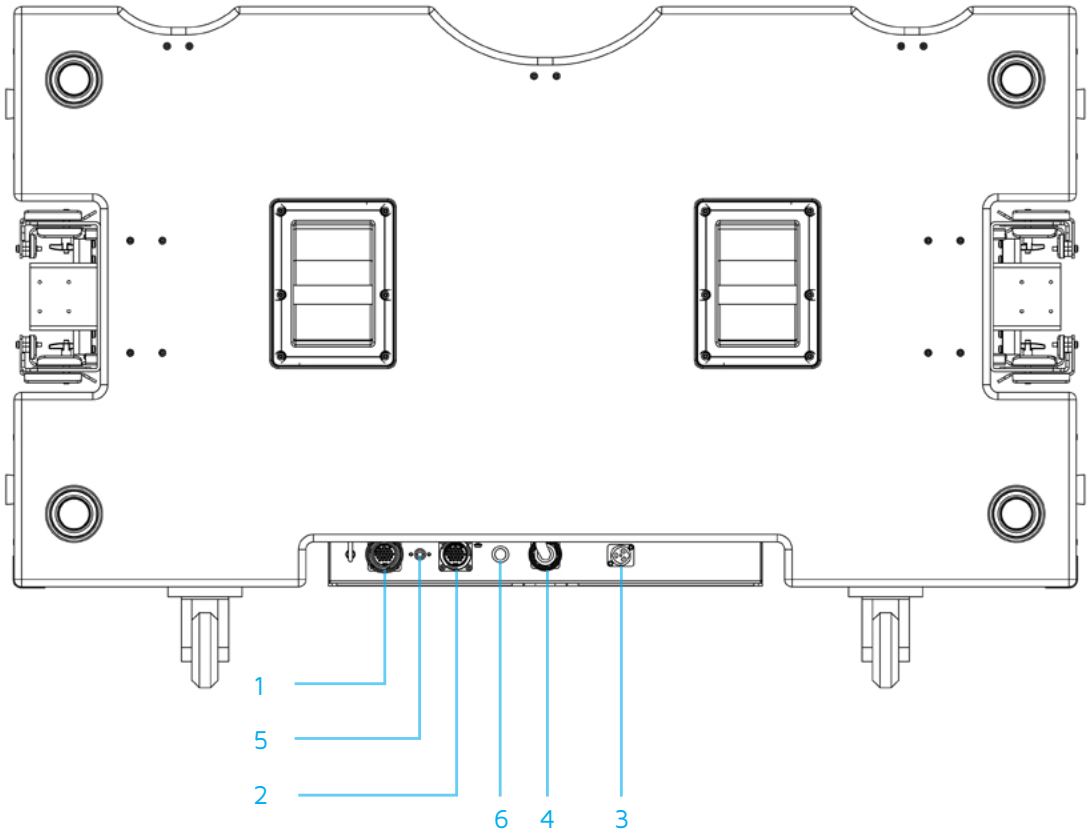
The amplifier presents a dynamic load to the AC mains, drawing additional current as operating levels increase. Different cables and circuit breakers heat up at varying rates, so it is essential to understand current ratings and how they correspond to circuit breaker and cable specifications. Maximum continuous RMS current - measured over a period of at least ten seconds - is used to calculate the temperature increase in cables, which drives the proper size and gauge cable and rating for slow-reacting thermal breakers. Maximum burst RMS current - measured over a period of approximately one second - is used to select the rating for fast reacting magnetic breakers.

For best performance, voltage drops should not exceed 10% at 100 V or 10% at 230 V. The minimum electrical service amperage required by a K-array loudspeakers system is the sum of their maximum continuous RMS current. K-array recommends allowing an additional 30% above the minimum amperage to prevent peak voltage drops at the service entry.

6.6 PROTECTION CIRCUITRY

The amplifier module is equipped with several protection circuits to prevent damage. A Current Limiter, a Current Clamp and an Over Current Protection protect the output stage and the connected loudspeakers from dangerously high peak currents. A Power Limiter ensures that the module's real average output power does not exceed the maximum value allowed. It features also a Brownout Limiter, a fast acting output peak power limiter that quickly reduces the amplifier gain when the rails voltage decrease quickly due to an excessive current/power draw from the load.
An Excursion Limiter keeps the loudspeaker cone range of movement within a defined range. The Excursion Limiter works through a current loop, dynamically changing the value of a resistance value proportionally to the estimated displacement of the cone with respect to its resting position.
A Thermal Limiter reduces the output stage temperature when it exceeds the maximum value allowed.

6.7 POWER AND AUDIO/DATA CONNECTIONS

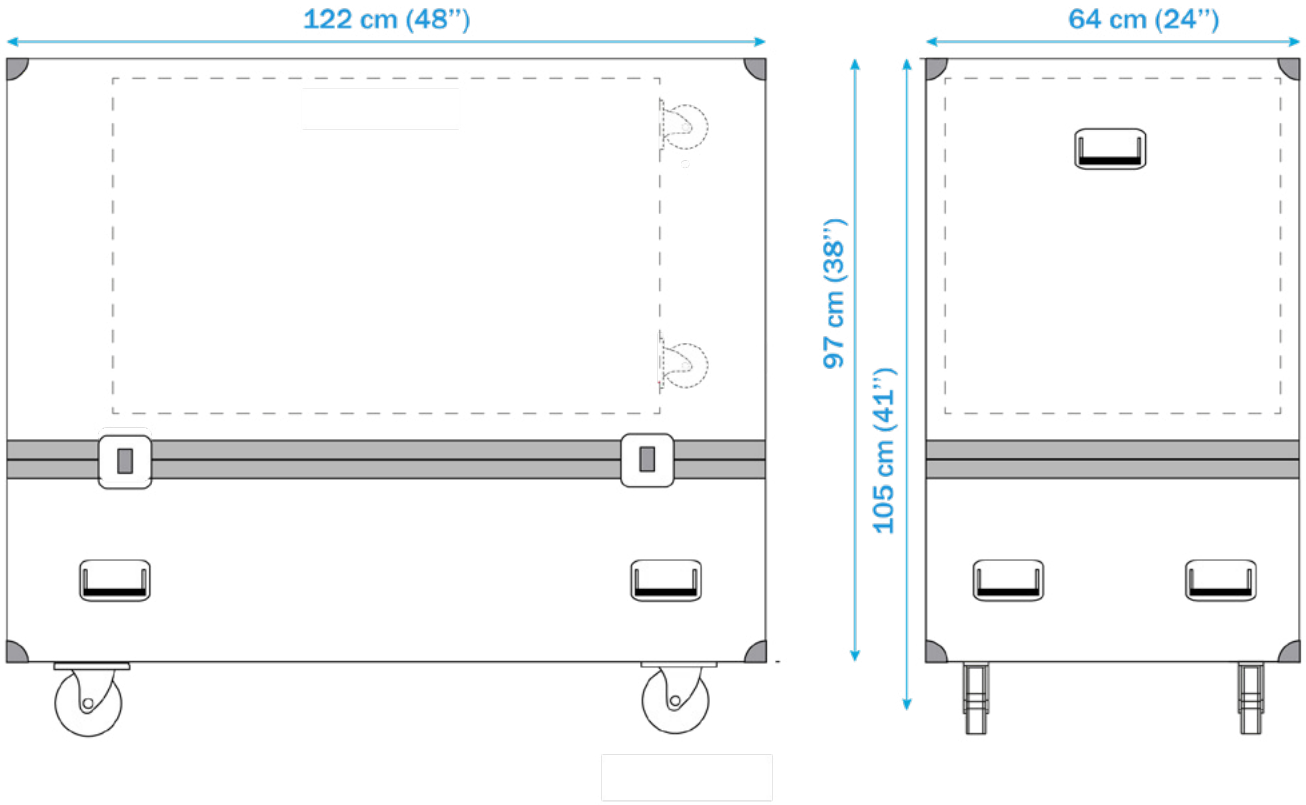


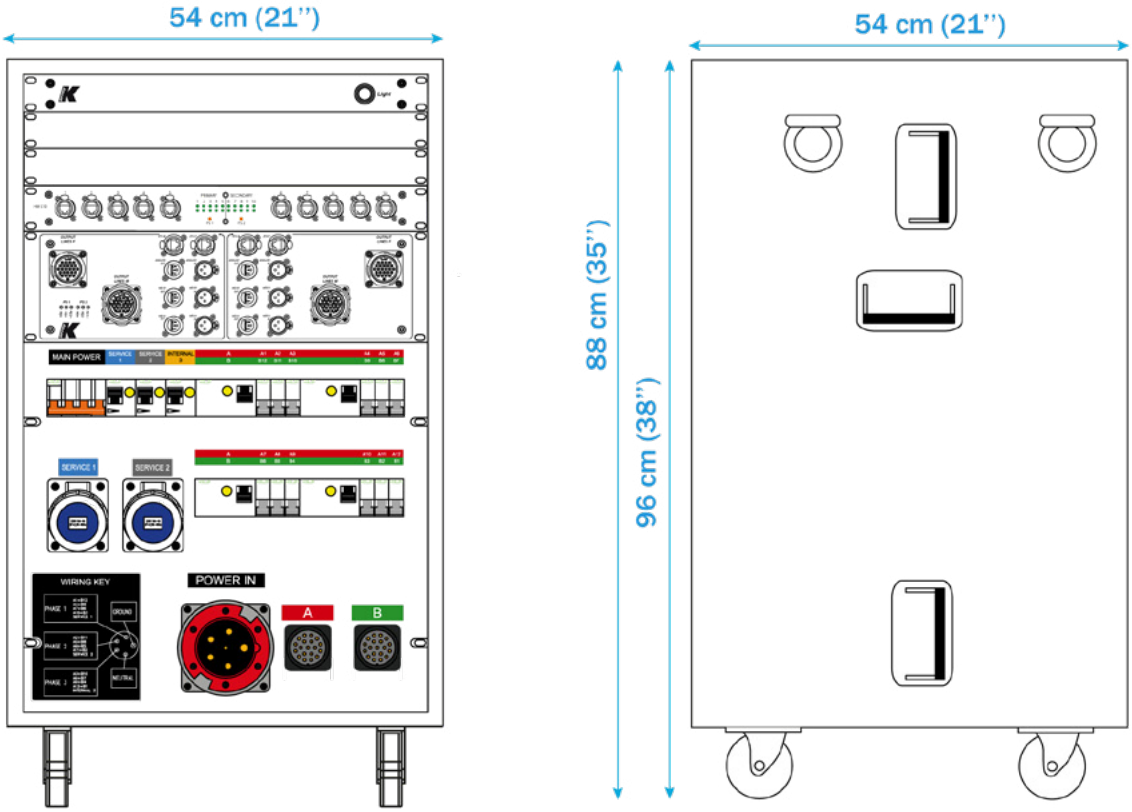
1. Audio/Data F (Female). This 25-pin female LK-25 socket allows to receive Audio and Data from K8-BOX or to send Audio and Data to next unit. You can link up to 6 units.
2. Audio/Data M (Male). Same function of the Audio/Data F connector. The only difference is that this socket is a male one. See next chapter for more informations about cabling.
3. Power input. PowerCon TRUE1 connector.
4. This multi-pin cable with a LK19 plug connects the amp output to the transducers. Unless it becomes necessary to replace the amp unit, never unplug this cable.
5. This led lights whenever the amplifier is on. There is another led at the front of the KS8 with the same functionality.
6. Reset button. Press the button and hold it for 6-7 seconds to reset network configuration settings to factory default.

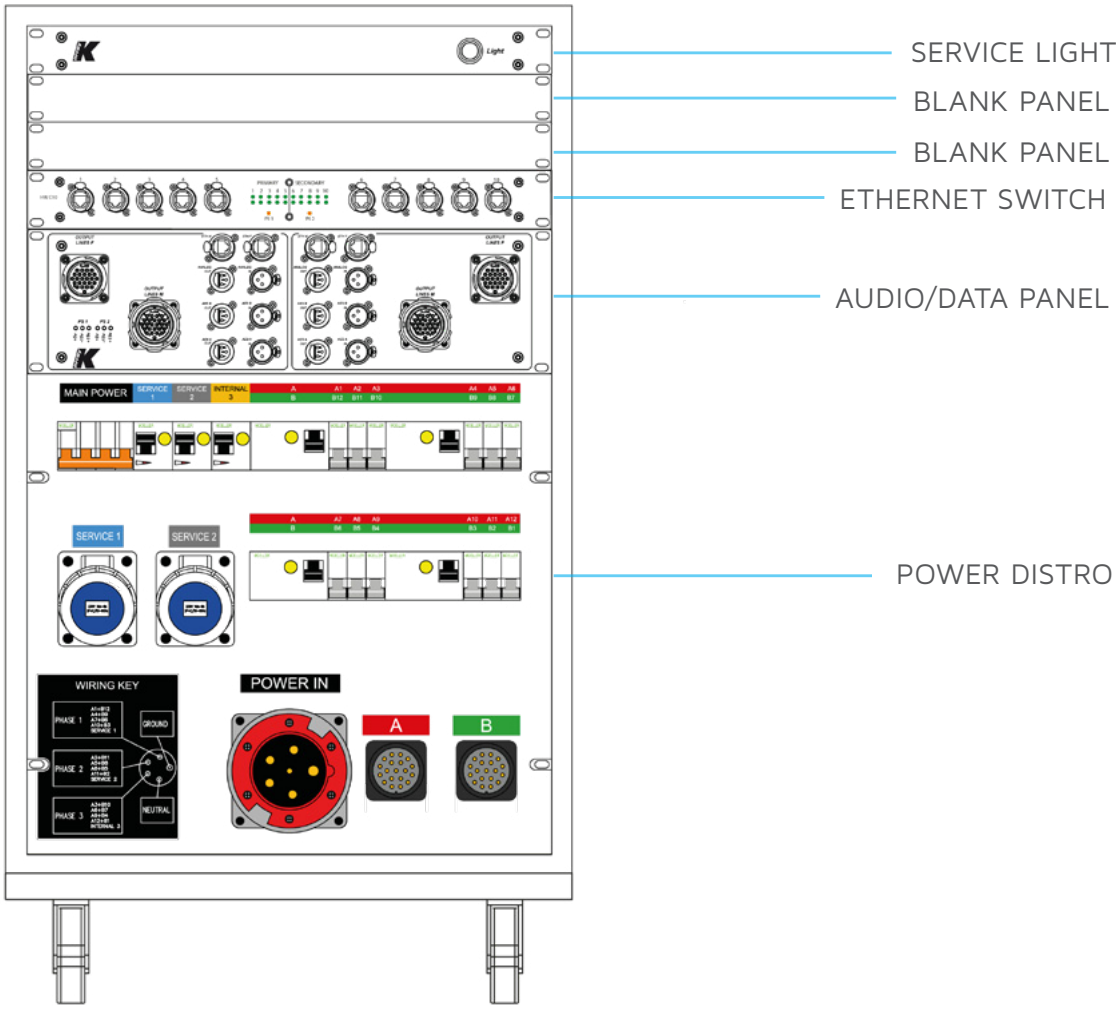
7. POWER AND SIGNAL/DATA DISTRIBUTION

The management of audio, data and power is provided by K8-BOX. This 19-inch rack is carried inside the K8-CASE1 together with the cables.

7.1 PHYSICAL

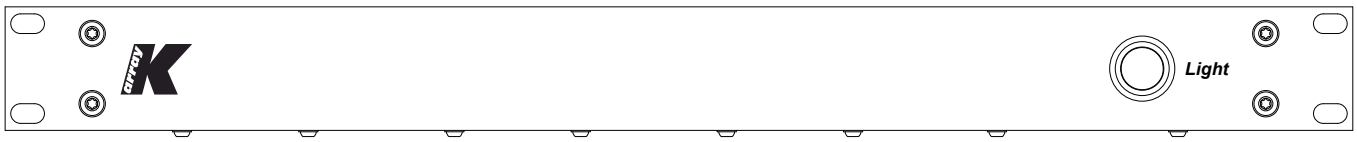






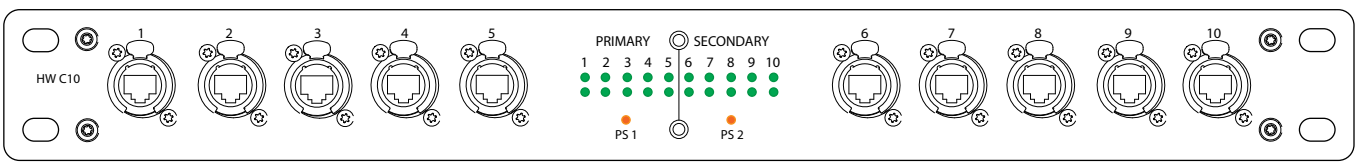
7.2 SERVICE LIGHT

The switch on the right allows to turn on/off a LED array inside the box.



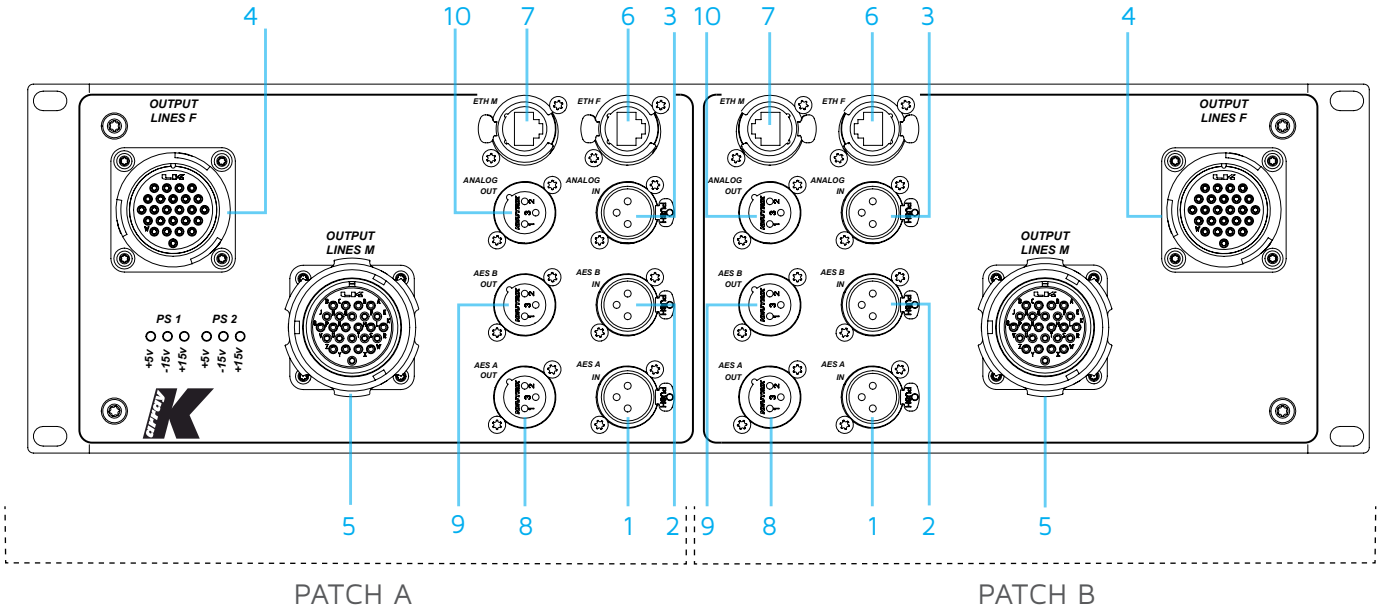
7.3 ETHERNET SWITCH

The Ethernet switch is used to connect many devices together on the same computer network. It features 10 RJ45 ports accepting traffic at 10/100/1000 Mbps. Two independent power supplies ensure perfect operation of the unit even in case of failure of one of them.



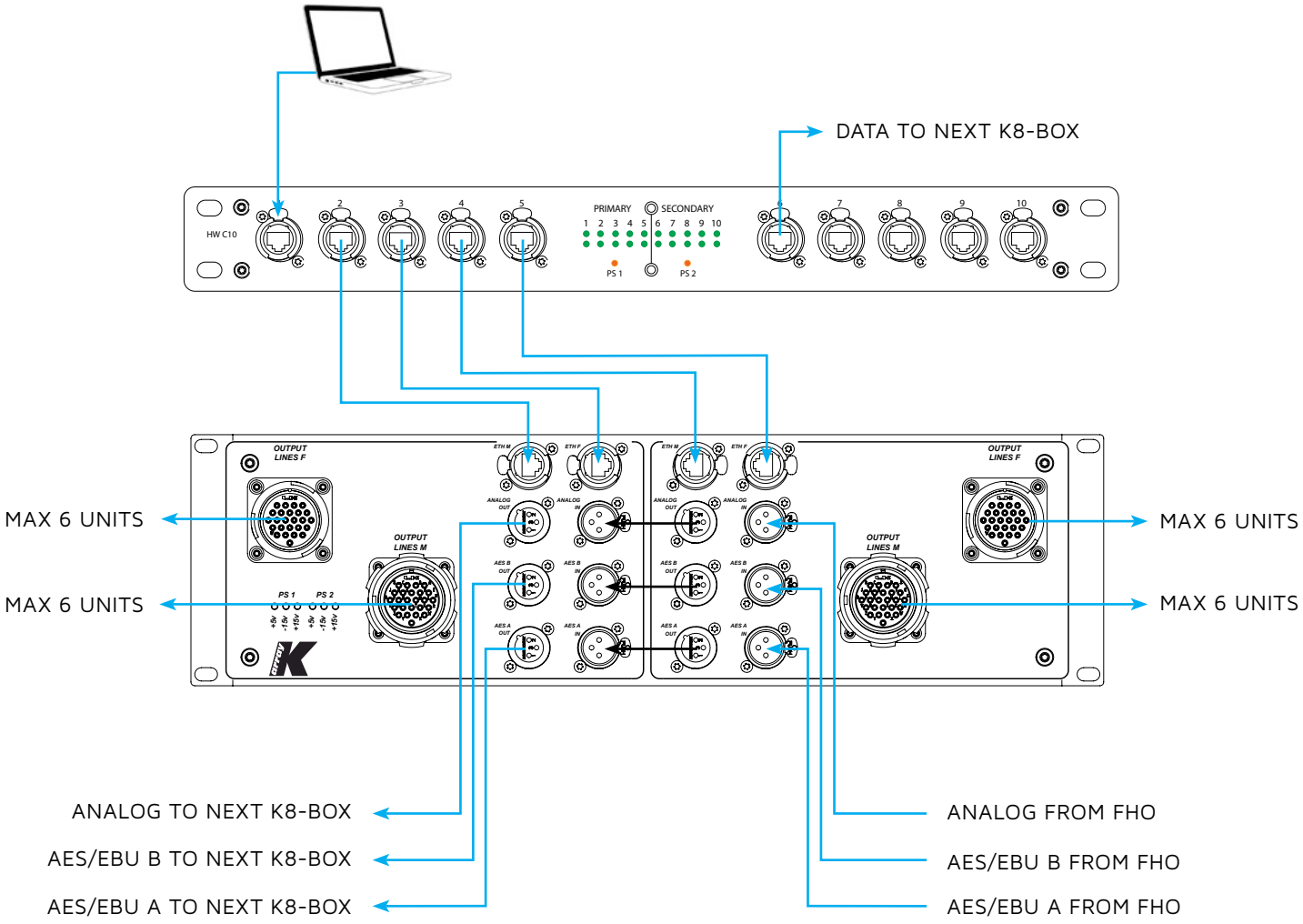
7.4 AUDIO/DATA PANEL

The Audio/Data Panel is used to distribute audio signal and data from FOH to speakers. It features two identical and independent patches.



1. AES/EBU Digital Input A. XLR female connector for two-channel digital audio accepting sample rates from 32 kHz – 48 kHz.
2. AES/EBU Digital Input B. XLR female connector for two-channel digital audio accepting sample rates from 32 kHz – 48 kHz.
3. ANALOG Input.
4. OUTPUT LINES F (Female). LK25 female connector, used to send signal and data up to 6 KH8/KS8.
5. OUTPUT LINES M (Male). LK25 male connector, used to send signal and data up to 6 KH8/KS8.
6. ETHERNET F. RJ45 female connector for data input via Ethernet at 100 Mbps. Connect this port to the network to send data to OUTPUT F.
7. ETHERNET M. RJ45 female connector for data input via Ethernet at 100 Mbps. Connect this port to the network to send data to OUTPUT M.
8. AES/EBU Digital Output A. XLR male connector providing two-channel digital audio from AES/EBU Digital Input A.
9. AES/EBU Digital Output B. XLR male connector providing two-channel digital audio from AES/EBU Digital Input B.
10. ANALOG Output. XLR male connector providing analog signal from the ANALOG Input.

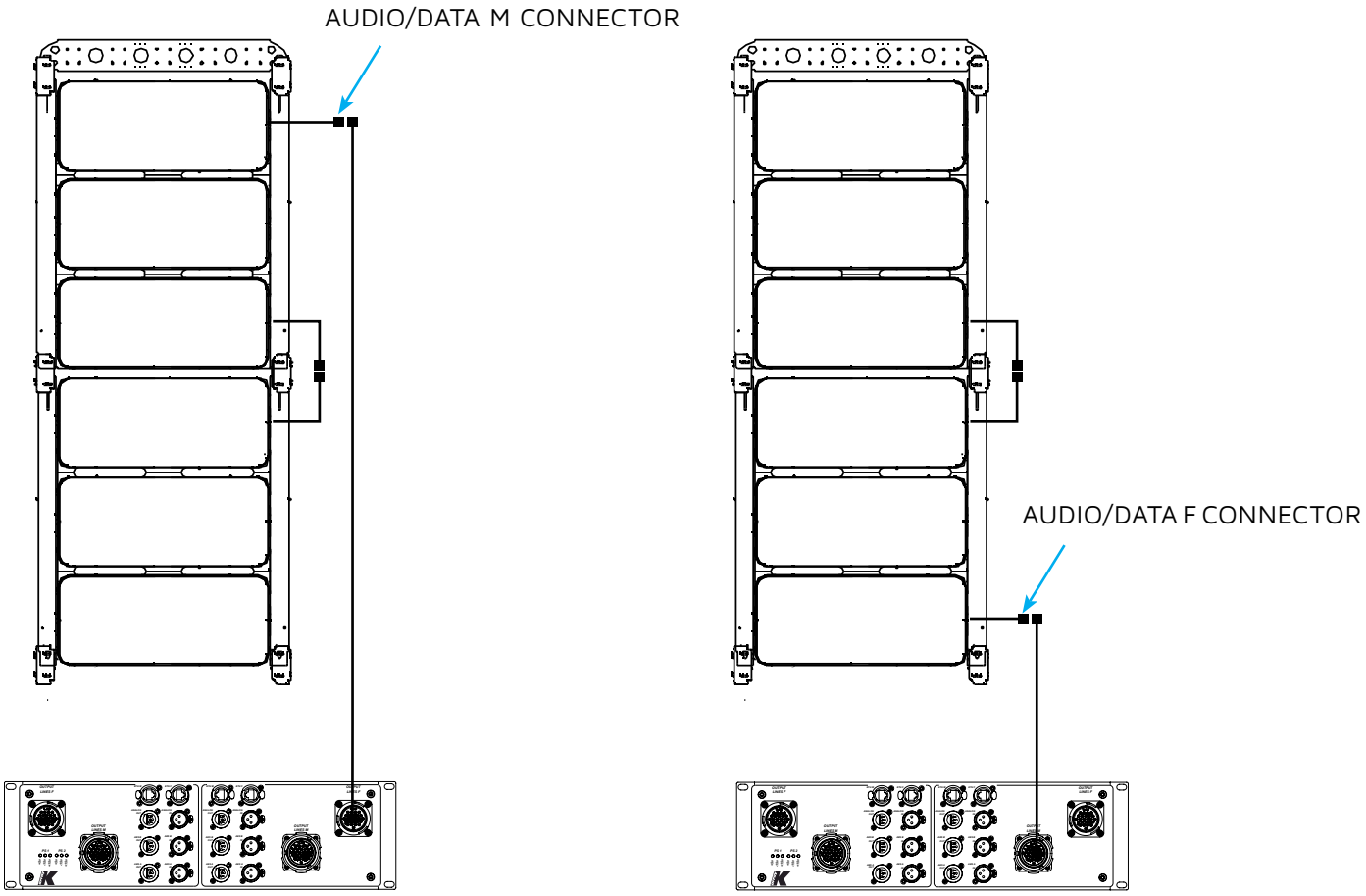
7.6 MAIN INPUT PATCH DIAGRAM



TIP
Unless it becomes necessary, never unplug the four cables connecting the Ethernet switch to the Audio/Data Panel.

7.5 SENDING SIGNAL/DATA TO SPEAKERS

Each patch in the Audio/Data panel features two outputs (OUTPUT LINES M and OUTPUT LINES F) allowing you to cable a KH8/KS8 cluster from the top or from the bottom, as you prefer.
To cable a 6 KH8 cluster from the top, connect a K8-SIGNxx from the OUTPUT LINES F on the Audio/Data panel to the AUDIO/DATA M connector coming out from the top frame. Link the two frames.
To cable a 6 KH8 cluster from the bottom, connect a K8-SIGN from the OUTPUT LINES M on the Audio/Data panel to the SIGNAL/DATA F connector coming out from the frame. Link the two frames
Same connections for a KS8 cluster. The only difference is that KS8 are not pre-cabled in groups of three, so you need to link each KS8 to the next one using a K8-SIGN cable.
Important note: In case of failure of an amplifier unit, signal and data are still transmitted to next units!



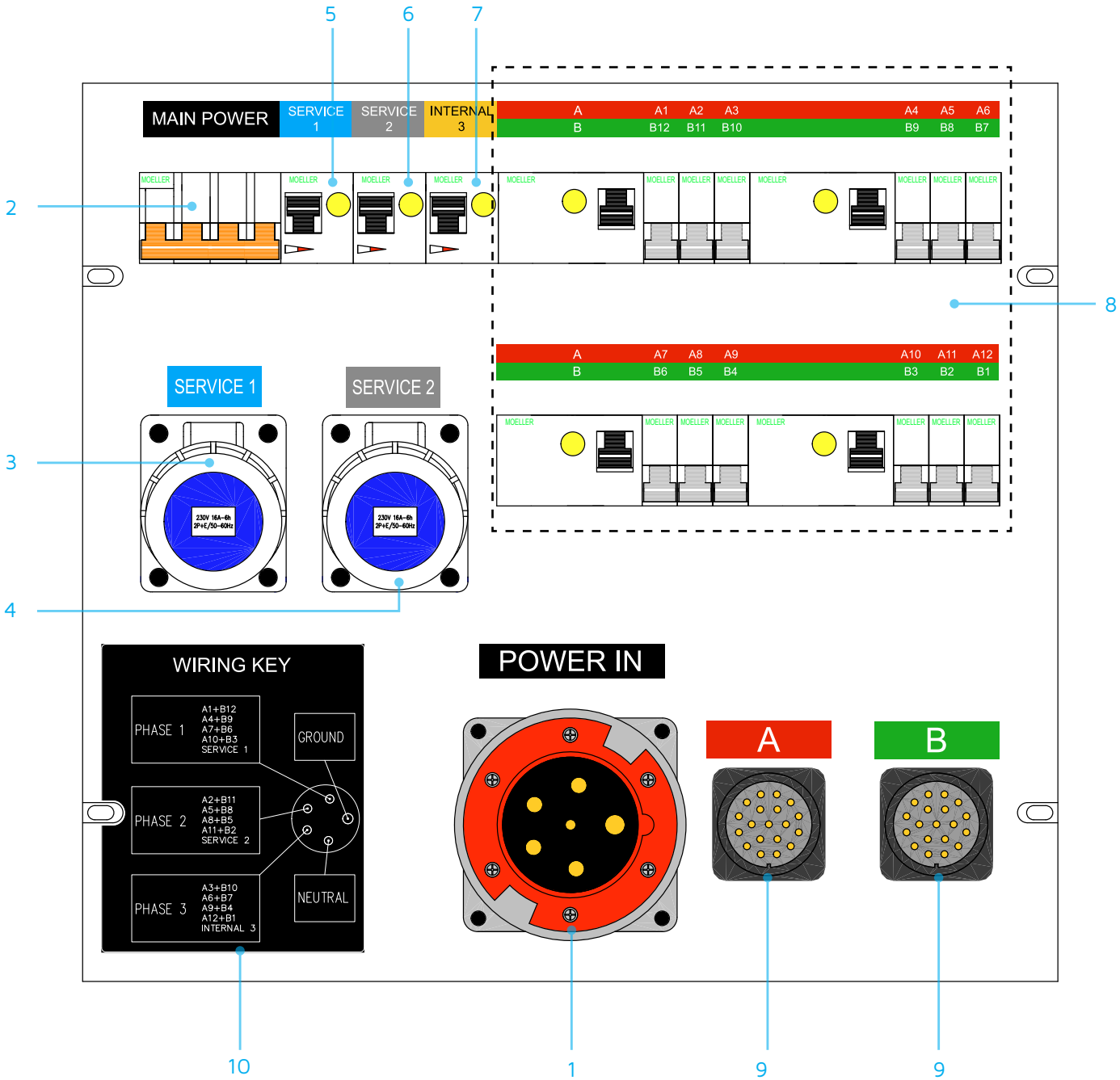
Cabling from the top

Cabling from the bottom

WARNING
Do not connect more than 6 KH8/KS8 on the same OUTPUT LINES connector!

7.7 POWER DISTRO

The Power Distro is used to distribute power to KH8/KS8 amplifiers and to all modules in the K8-BOX

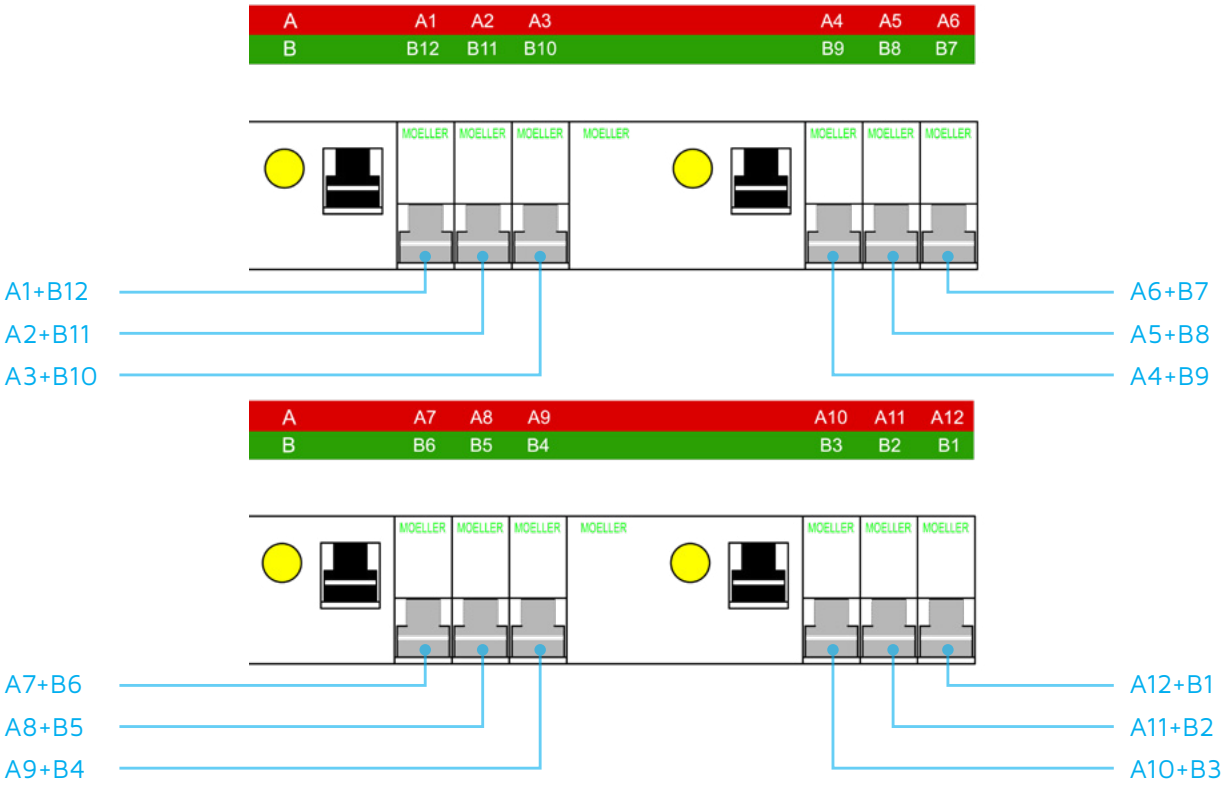


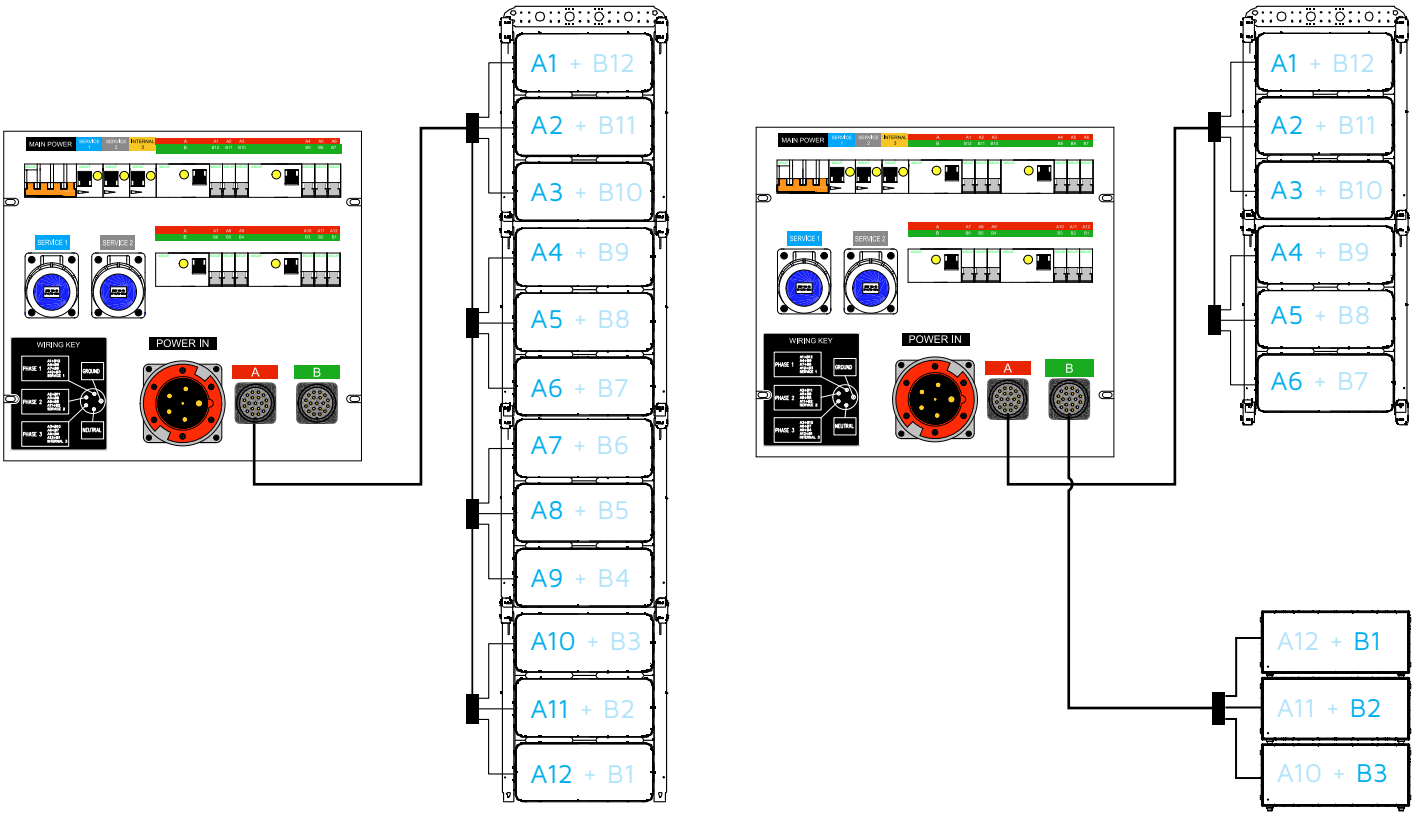
WARNING
Do not connect more than 12 KH8/KS8 in total!

1. POWER INPUT. 63A 400V socket 3P+N+E/50-60Hz.
2. MAIN POWER SWITCH. Switch up/down to turn the Power Distro on/off.
3. SERVICE 1 OUTPUT. 16A 230V socket 2P+E/50-60Hz. Used to power additional devices, if necessary.
4. SERVICE 2 OUTPUT. 16A 230V socket 2P+E/50-60Hz. Used to power additional devices, if necessary.
5. SERVICE 1 SWITCH. Switch up/down to turn the SERVICE 1 OUTPUT on/off.
6. SERVICE 2 SWITCH. Switch up/down to turn the SERVICE 2 OUTPUT on/off.
7. INTERNAL SWITCH. Switch up/down to turn the SERVICE 3 OUTPUT on/off. The SERVICE 3 OUTPUT (located on the top of the Power Distro, not shown in the figure) is used to send power to the Audio/Data Panel, to the Ethernet switch and to the Service Light. Switch always up to use all the modules in the K8-BOX.
8. SPEAKERS SWITCHES: These switches allow to turn on/off each KH8/KS8 connected to the Power Distro. Be sure to read the chart on the next page to understand the association between the switches and the speakers.
9. OUTPUT A and OUTPUT B. 19-pin female Socapex connectors used to send power to KH8/KS8 amplifiers using K8-PW cables. You can power up to 12 KH8/KS8 with a single Power Distro and you can distribute the speakers among the two OUPUT. This can be very usefull, for exemple, if you want to power a KH8 cluster and a KS8 cluster with a single Power Distro. In that case you can connect the KH8 cluster to OUTPUT A and the KS8 cluster to output B, making the cabling more pratical.
10. WIRING KEY: this scheme shows the three-phase distribution among the Speaker Switches and the Service Outputs. As shown, each phase is shared between four switches (therefore between four speakers) and one Service Output.

The following picture shows some typical configurations explaining the relation between the switches on the Power Distro and the speakers connected to it.
The concept is simple: if you connect a cluster to Output A, the first unit is controlled by the first switch in the upper left corner (A1+B12), the second one is controlled by the next switch (A2+B11) and so on till the 12th speaker of the cluster which is controlled by the last switch in the bottom right corner (A12+B1).
If you connect a cluster to Output B, the switches order is reversed: the first unit is controlled by the last switch in the bottom right corner (A12+B1), the second one is controlled by the previous switch (A11+B2) and so on till the 12th speaker of the cluster that is controlled by the first switch in the upper left corner (A1+B12).
This system may appear confusing but actually it is extremely practical: if you have two separated clusters connected to a single Power Distro (e.g. a KH8 cluster and a KS8 cluster), you do not need to link them with a power cable. Just connect a cluster to OUT A and the other to OUT B and you still have a single switch controlling a single unit.

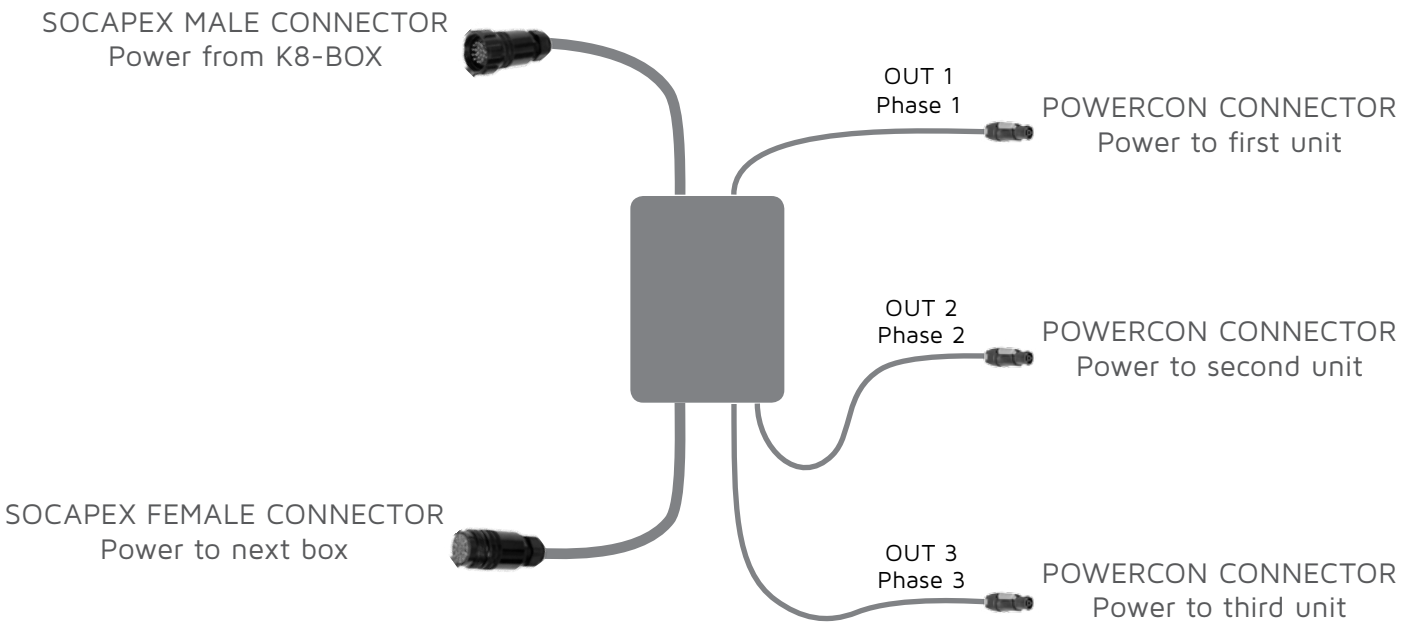
SWITCHES TO SPEAKERS SCHEME





7.8 SENDING POWER TO SPEAKERS

KH8 and KS8 features a PowerCon connector as Power Input. To connect a unit to the Power Distro in the K8-BOX (featuring two Socapex connectors) and to link together more units in a cluster, you need a KH8-PWBOX3 every three KH8s and a KS8-PWBOX3 every three KS8s. The two boxes have the same functionality, the only difference is the cables length. Another important difference is that KH8-PWBOX3 is pre-mounted and pre-cabled in the KH8-FRAME while KS8-PWBOX3 has to be connected by the user.
This box features 5 cables:



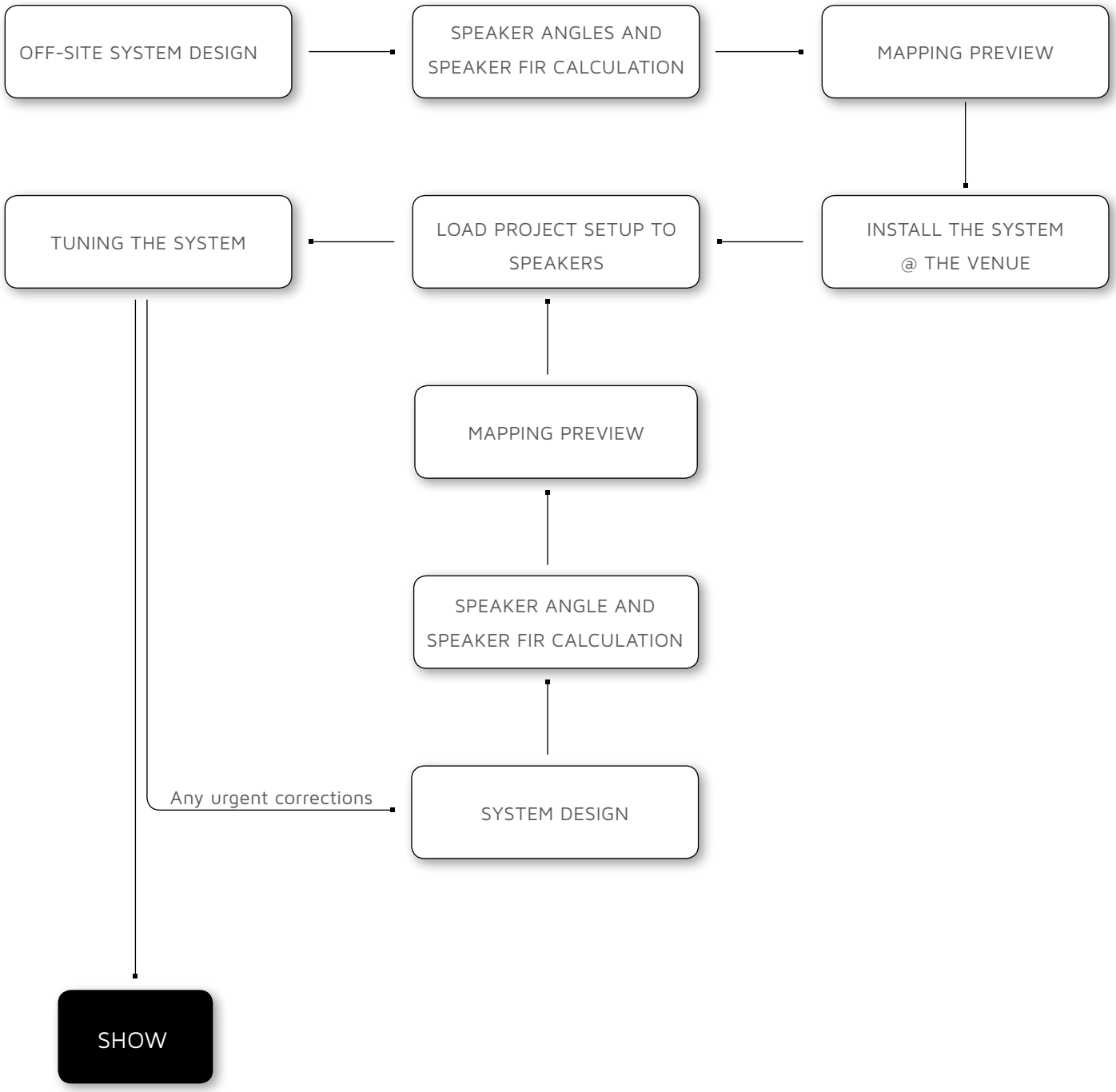
KS8-PWBOX3

The box sends a different phase to each unit. In this way the load between units is well distributed among the three phases. All units are connected to common neutral and earth ground points.
Another function of the box is to spin the Socapex wiring in such a way that the PowerCon cables coming out from the next box receive the signal from different pins. That's how you can switch on and off each unit independently.

> ATTENTION
> When you connect the KS8-PWBOX3 to three KS8s, pay attention and respect the order: each PowerCon cable features a label (OUT 1, OUT 2, OUT 3), be sure to connect the OUT 1 to the first unit, the OUT 2 to the second and the OUT 3 to the third. This is important for the correct association between the power switches on the K8-BOX and the units.

8. SYSTEM DESIGN AND REMOTE CONTROL SOFTWARE

This section guides you through the software you will be using to design your system configuration and to remotely control the system.
Below a simple block diagram showing the system workflow from the off-site system design to the show.



8.1 SOFTWARE INSTALLATION

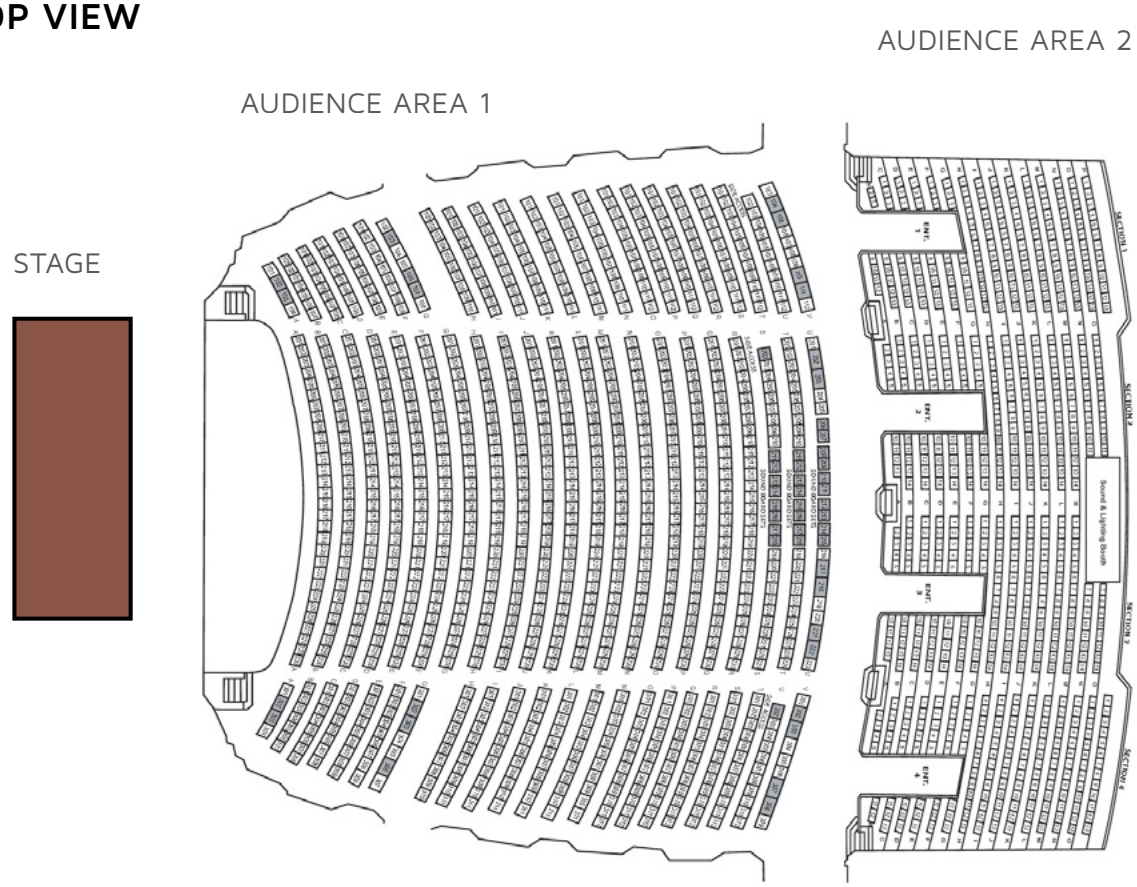
All the software you need to design and manage a KH8/KS8 system are:
EASE Focus 2 (System design), Armonia (Speakers managing and remote controlling), KH8_PluginInstaller (Plugin to load EASE Focus data into Armonia) and WCF_Installer (Plugin to manage KH8 speakers into Armonia).

Please, contact our technical support at tech@k-array.com to get more information about how to download them.

8.1 QUICK GUIDE TO SYSTEM DESIGN AND CONFIGURATION

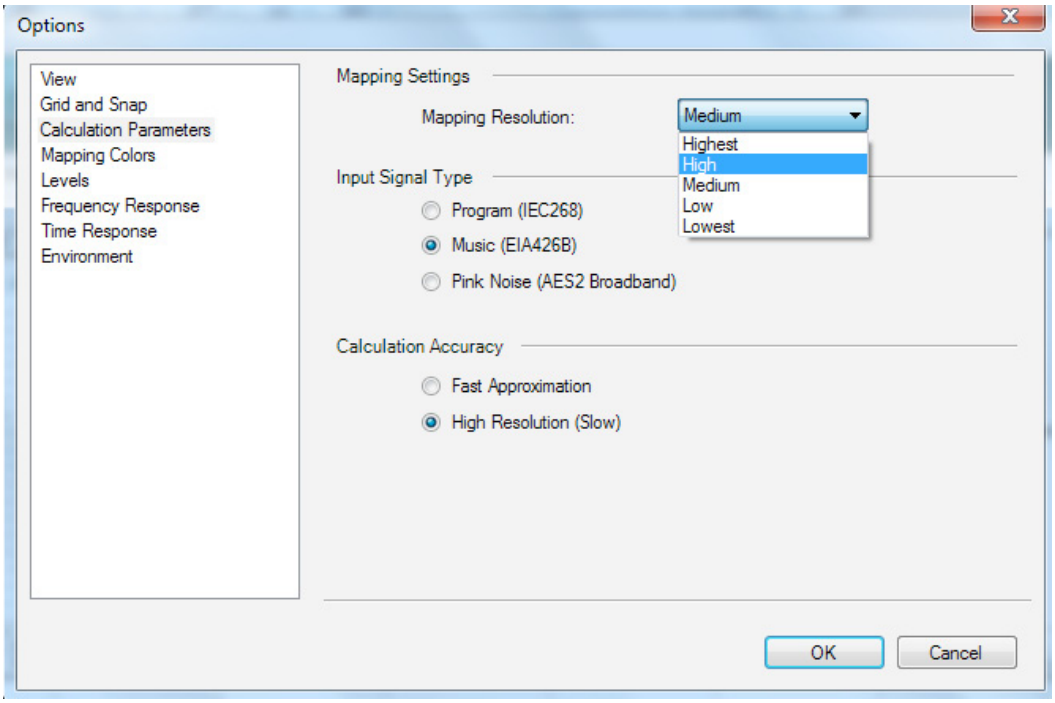
In the following pages we guide you through the main steps to design a venue, to optimize all the parameters in order to obtain the desired acoustic result and to manage the speakers during the show.
In the simple example shown in this section, the user has to design the audio system for the venue shown in the figure below:

TOP VIEW

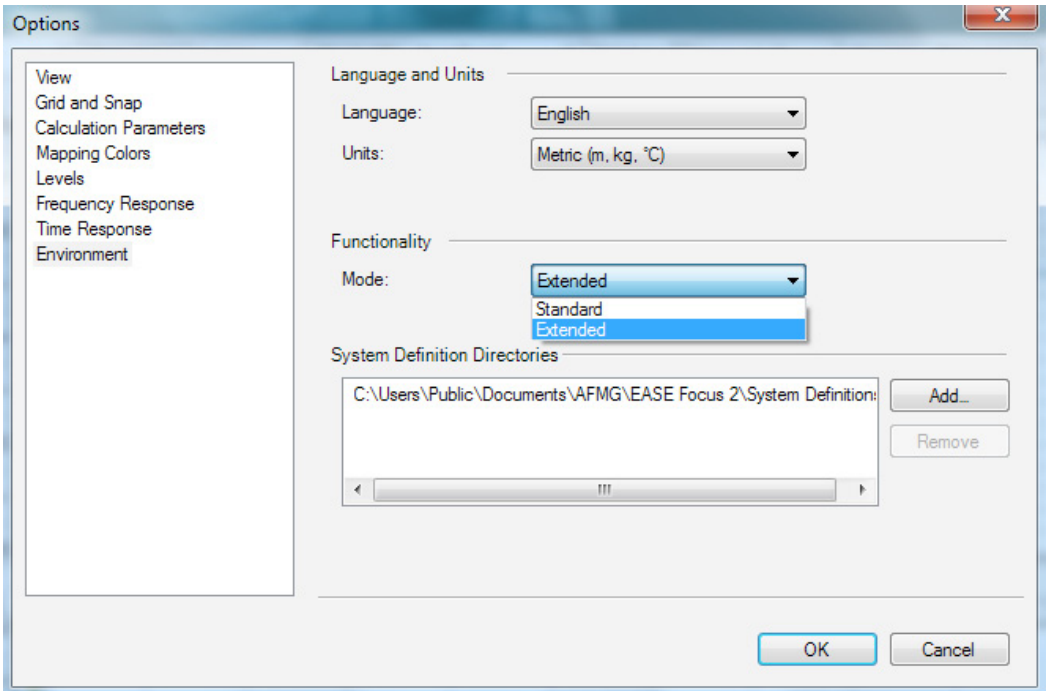


SIDE VIEW

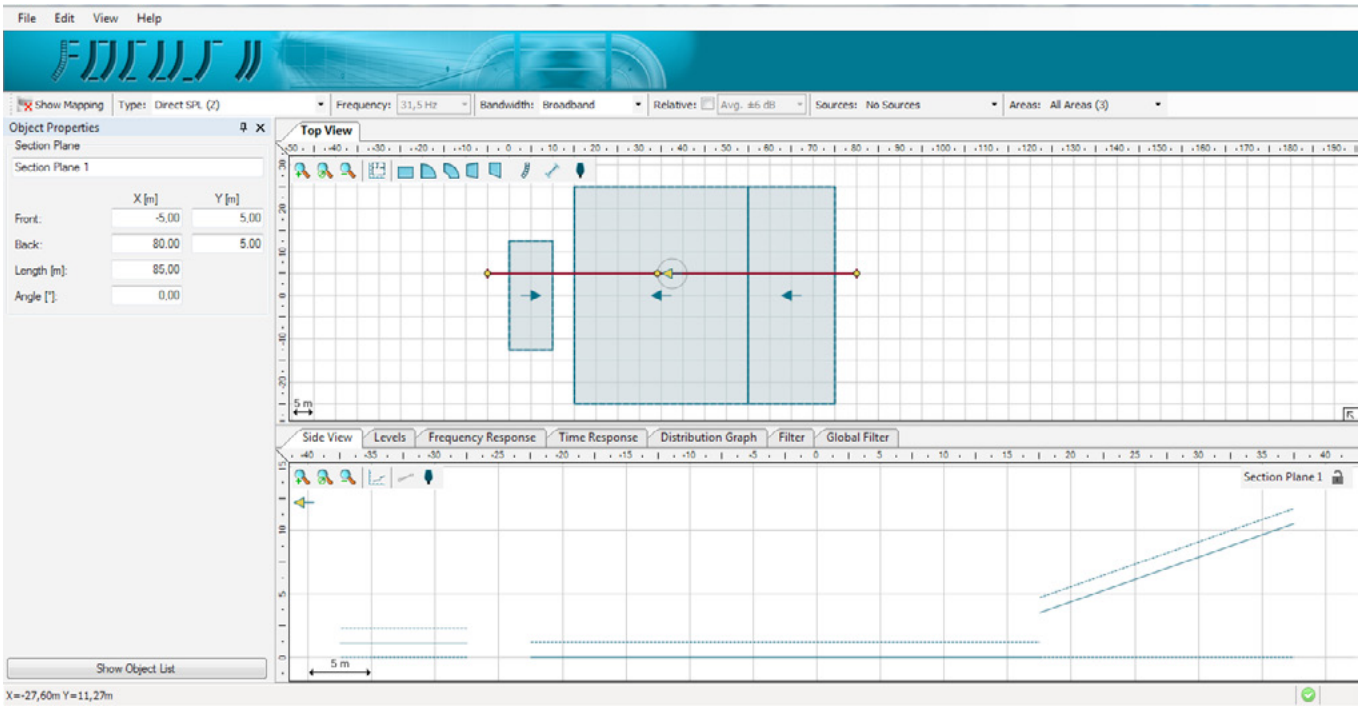
1. Open EASE FOCUS 2. Go to File > Options > Calculation Parameters and set the Mapping Resolution to High and the Calculation Accuracy to High Resolution. This is important to compute reliable FIR results.



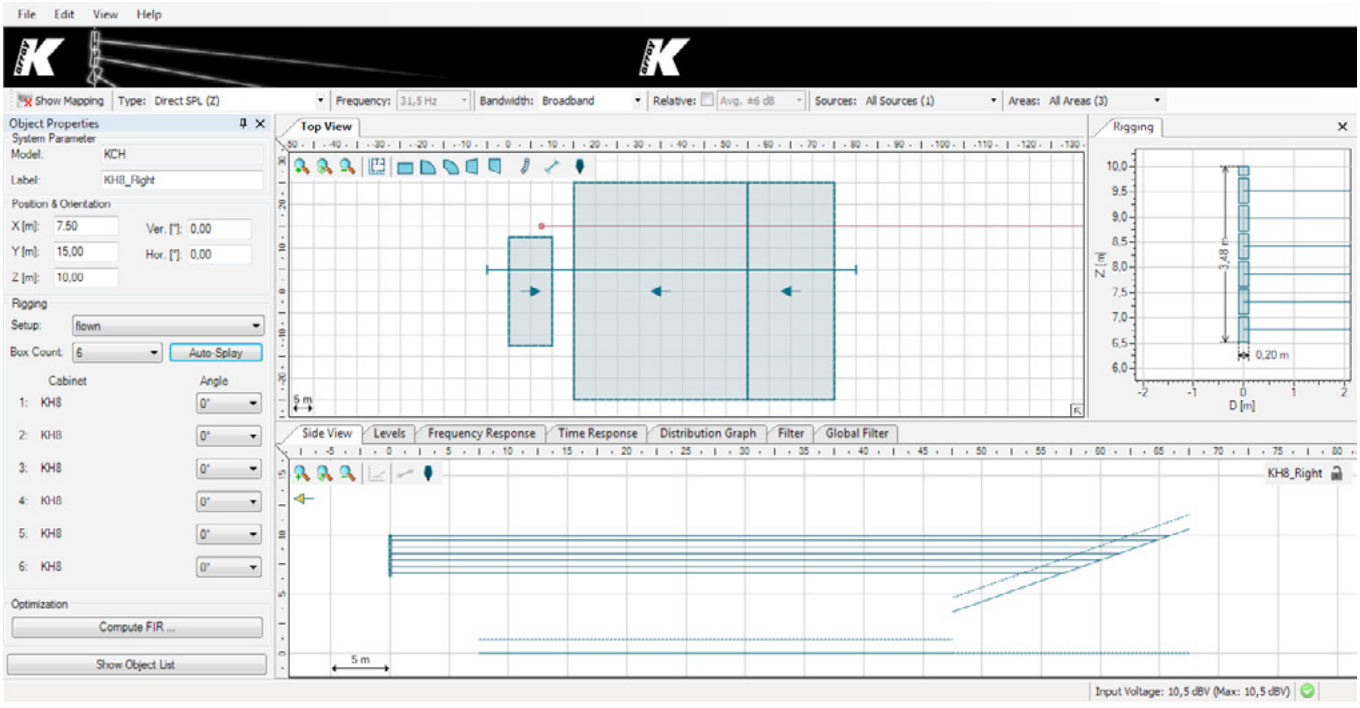
Go to Options > Environment and set the Functionality Mode to Extended. Extended Mode enables 1/3 Octave visualization and other features that you may need when working on complex projects, such as Time Response, Signal to Noise Mappings, Filters and Global Filter (see EASE Focus Manual for details).



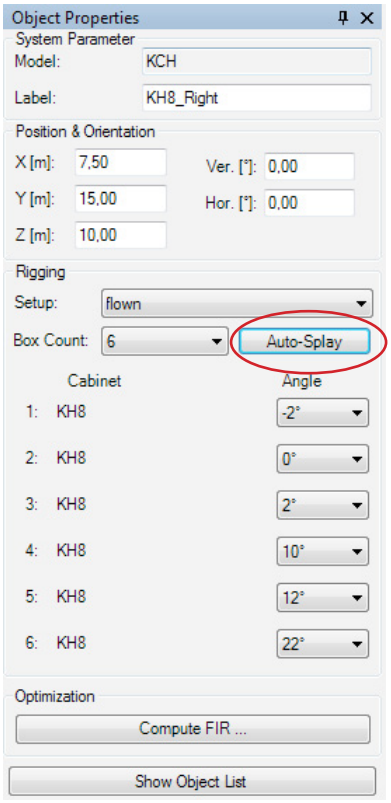
2. Draw your venue. Remember to give each Audience Area a meaningful name like “Stage”, “Parterre”, “Balcony” and so on. Add a Section Plane to have a clear side view of your venue.

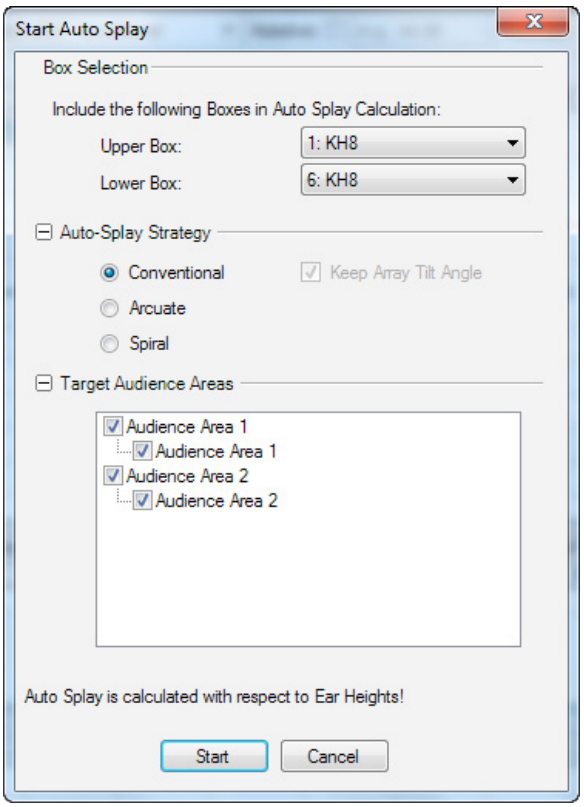


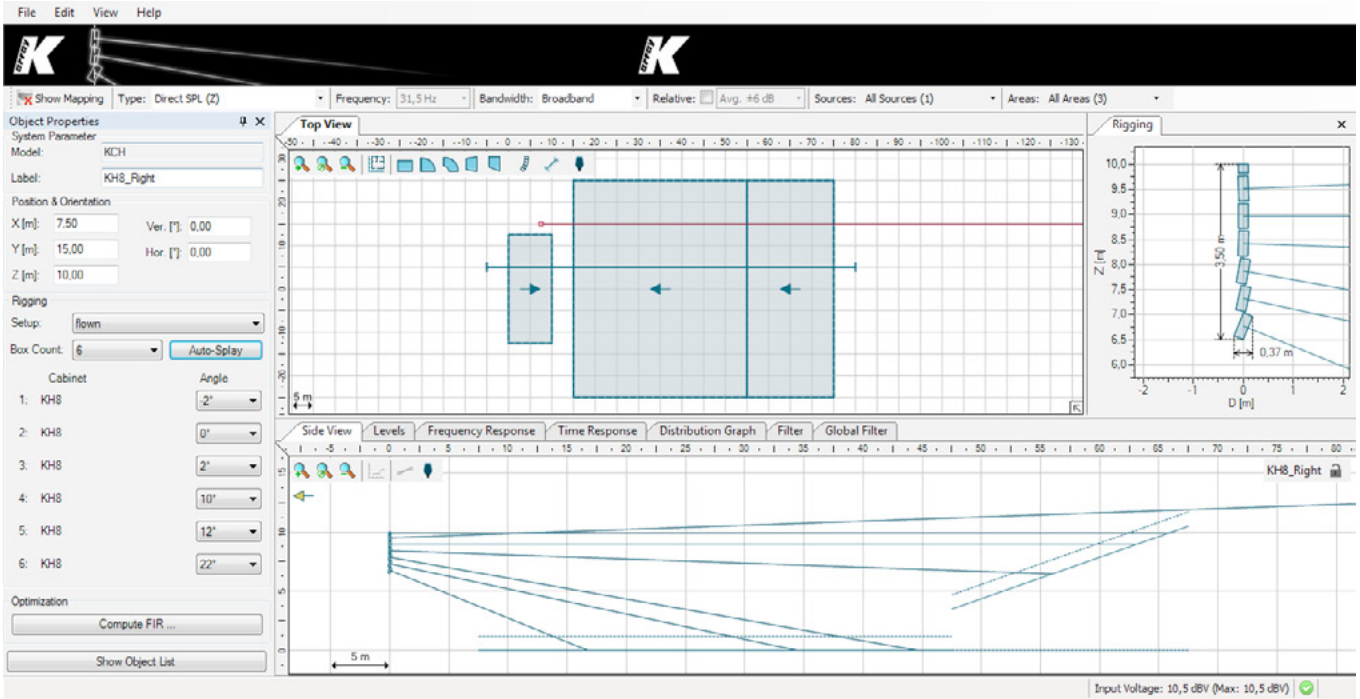
3. Add the speakers. In this example we will use a 6 KH8 cluster on each side of the stage. Insert the first cluster. Go to: Edit > Add Sound Source and select K-array/KCH. Set Box Count to 6.



4. Pressing Auto-Splay, the software suggest the most accurate speaker angles for optimal coverage in the targeted listening areas. Press the button and set the parameters in the Start Auto Splay window. We suggest to always set the Auto Splay Strategy to Conventional. In the Target Audience Areas section, select all the Audience Areas to be covered by the cluster.







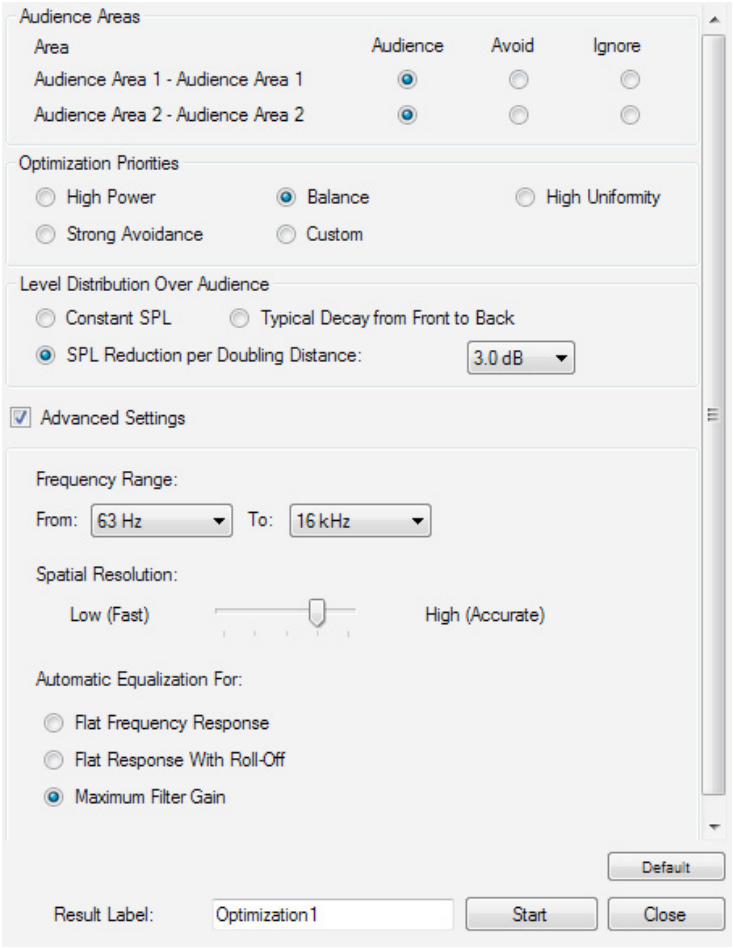
5. Pressing Compute FIR, the software will compute the best FIR settings to meet any demanding setup requirement and control sound spillover. When you press the button, the software reminds you that "It is recommended to switch the Calculation Accuracy to High Resolution under Calculation Parameters". If you already set it, just press OK. In the FIR Filter Optimization window you can define the following parameters:

   Audience Areas: lets you choose which areas are occupied by the audience, which ones must be avoided and which ones must be ignored in the optimization process.

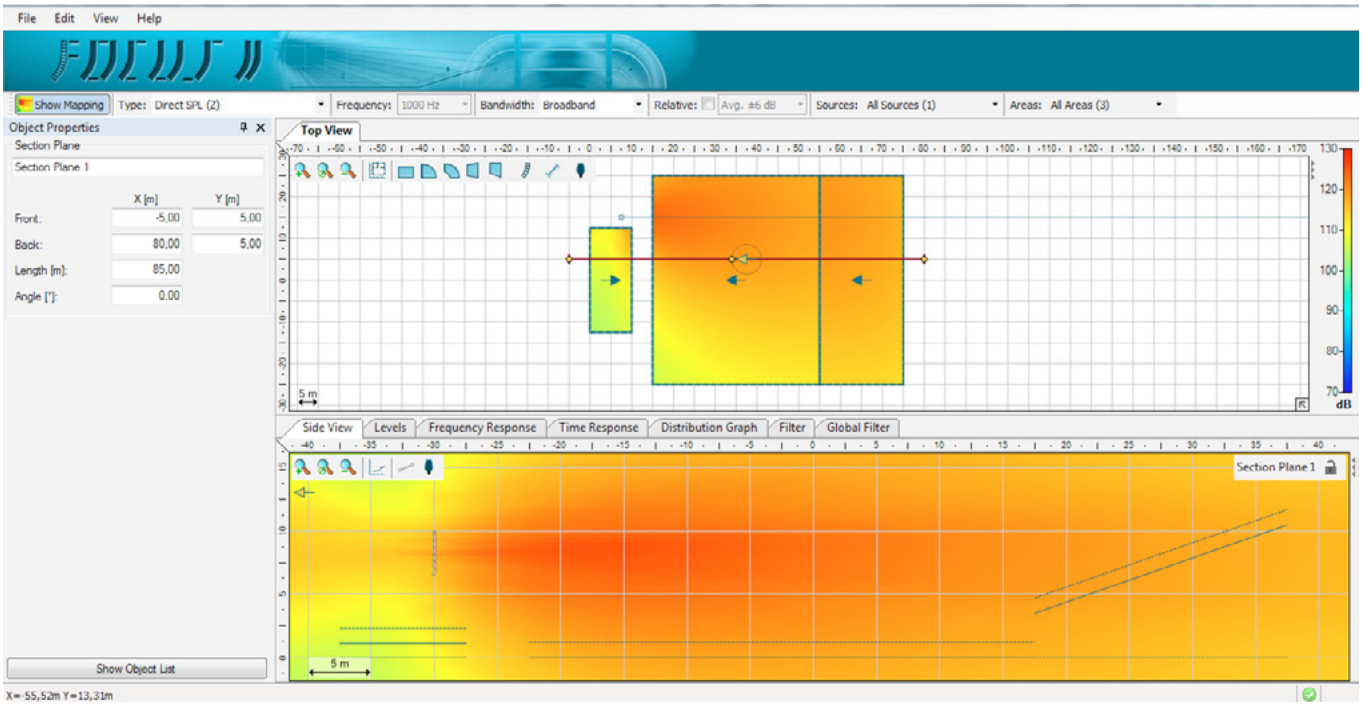
   Optimization Priorities: we suggest to choose Balance. This leads to a well balanced strategy: good coverage, good uniformity and high power. If you absolutely need high uniformity or high power, choose the corresponding parameter. If you absolutely want to avoid sound in the areas selected above, choose Strong Avoidance. If you prefer a custom balancing between Power, Uniformity, Efficiency and Avoidance, choose Custom and set the amount of level for each parameter.

   Level Distribution Over Audience: we suggest to choose a 3.0 dB Reduction per Doubling Distance because it is the typical drop for a line array. Experiment also with the other values.

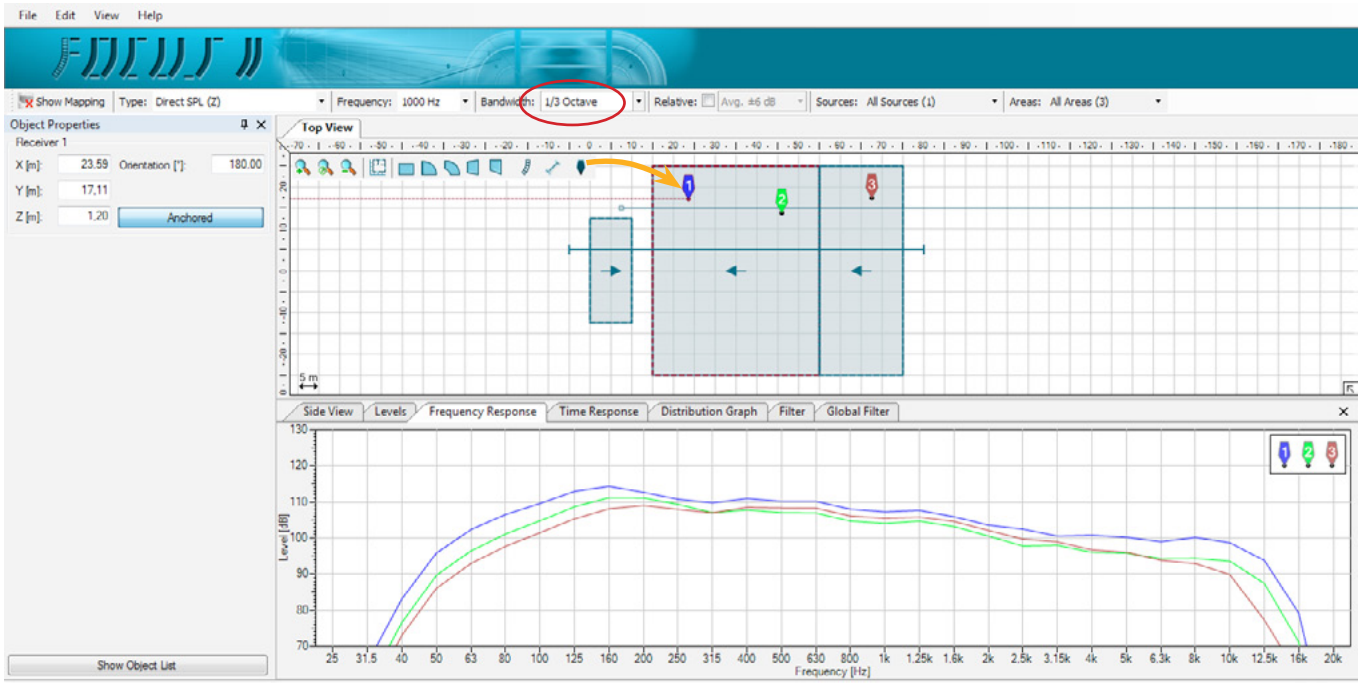
   Advanced: lets you choose the Frequency Range affected by FIR filters and the Spatial Resolution. We suggest not to set extreme values (very Low or very High). The user can also choose the kind of Automatic Equalization to be calculated in the optimization process in order to obtain a Flat Frequency Response, a Flat Frequency Response with Roll-Off or the Maximum Filter Gain. In most cases Maximum Filter Gain gives the best results.



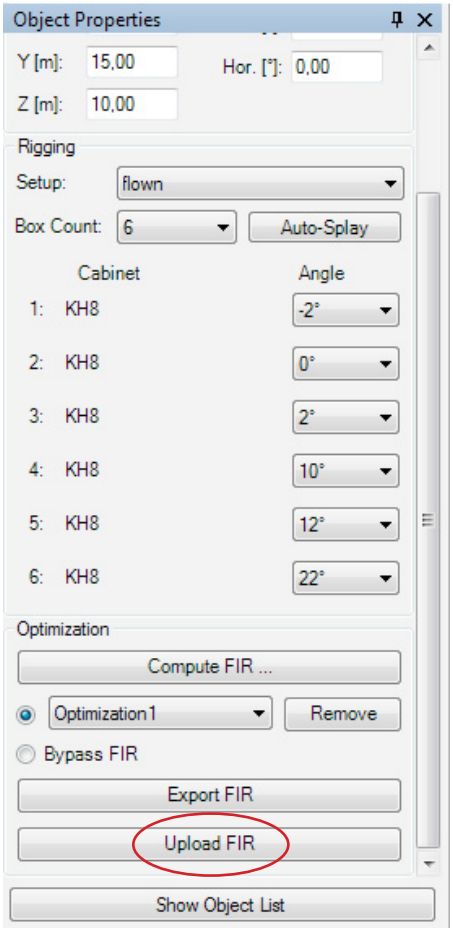
6. Press Start and the software will compute the FIR Filters. Click Show Mapping to enable the SPL mapping display. It can take several minutes to show the results, but the FIR are already calculated and ready to be transferred to the speakers.

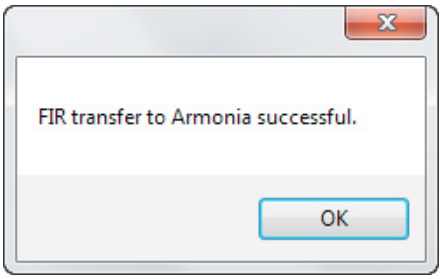


To have a clearer view of the system behavior, put some Receivers in the Audience Areas and look at the Frequency Response. Set 1/3 Octave Resolution to have smoother lines.



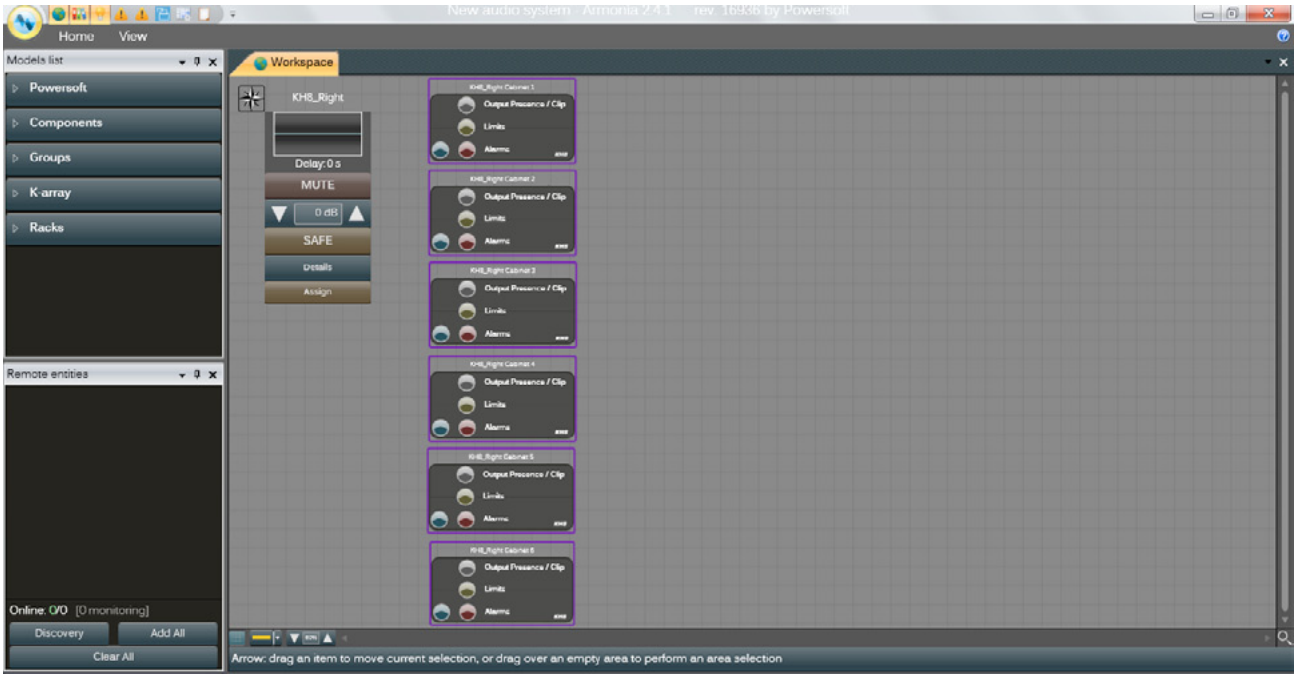
7. Open Armonia. Only now clik Upload FIR on EASE Focus. A message informs you that FIR settings have been transferred to Armonia successfully. Clik Export FIR only if you want to save the FIR settings in a text file.



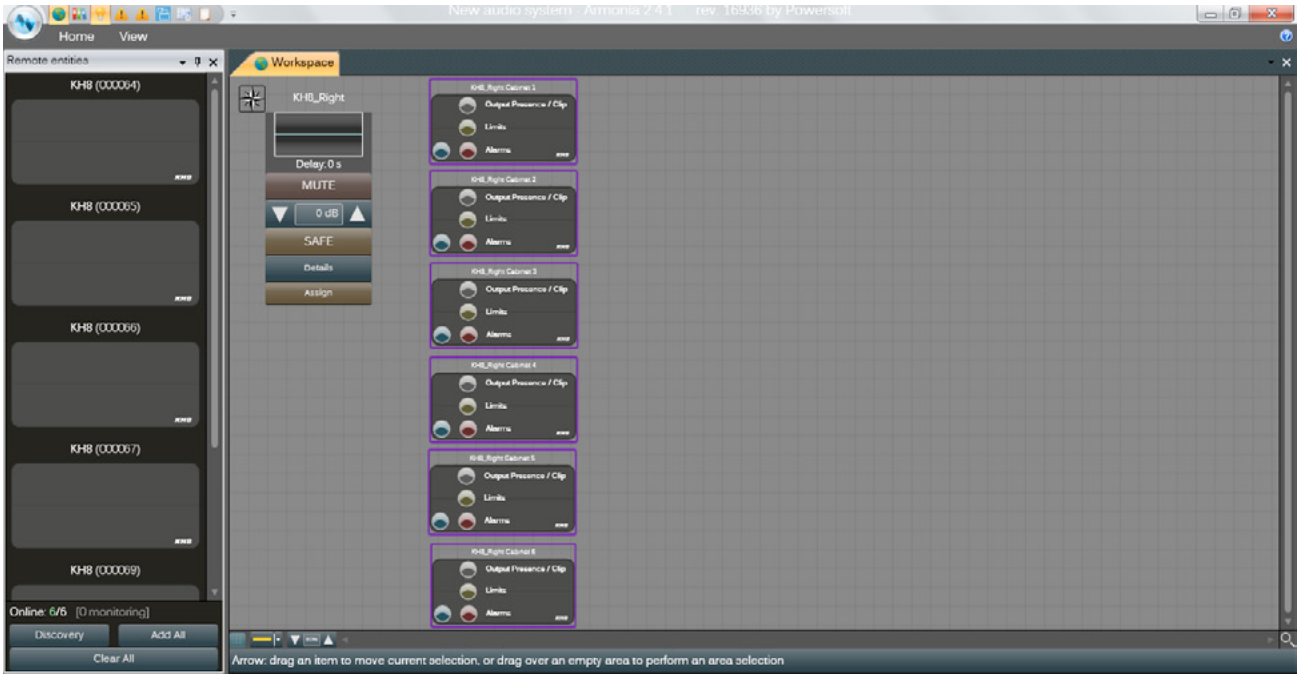


IMPORTANT
Open Armonia before clicking Upload FIR on EASE Focus.

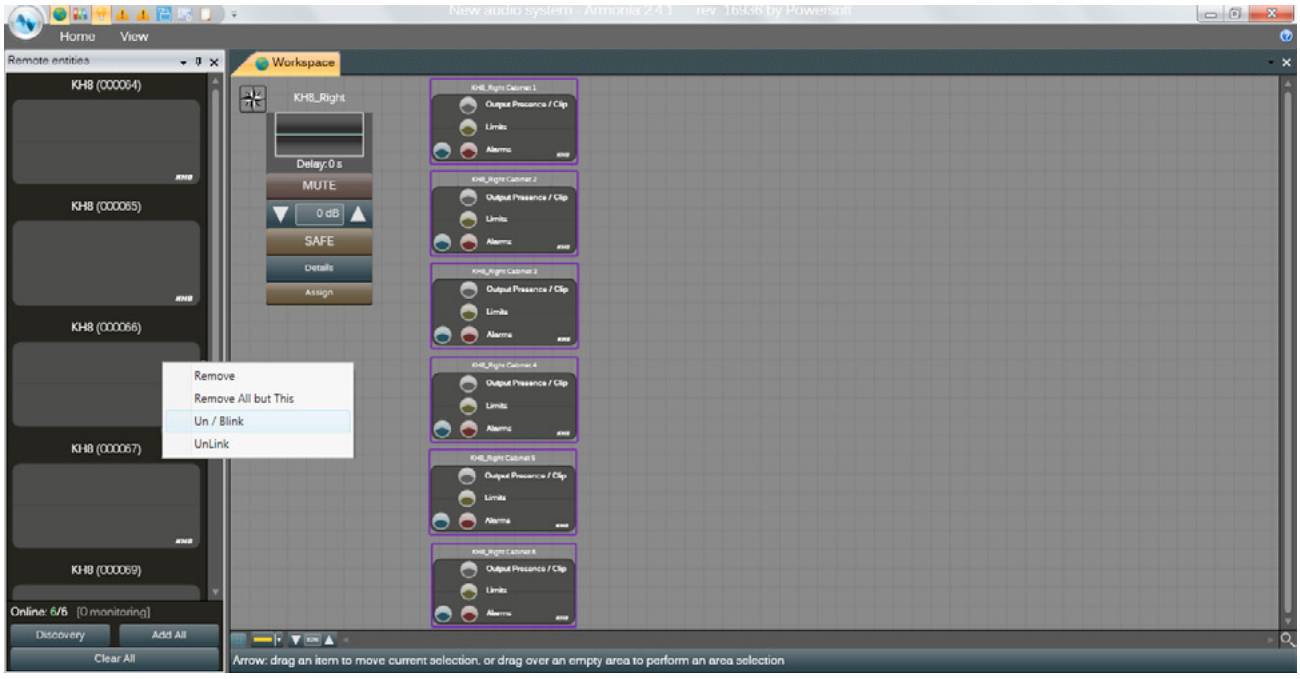
8. At this point you have 6 virtual speakers loaded into Armonia, each with the correct FIR Filters calculated by Focus. The speakers are grouped in a group whose name is the name of the cluster in Focus ("KH8_Right" in our exemple). Adjust the zoom and the speakers position to have a clear view of your virtual cluster.



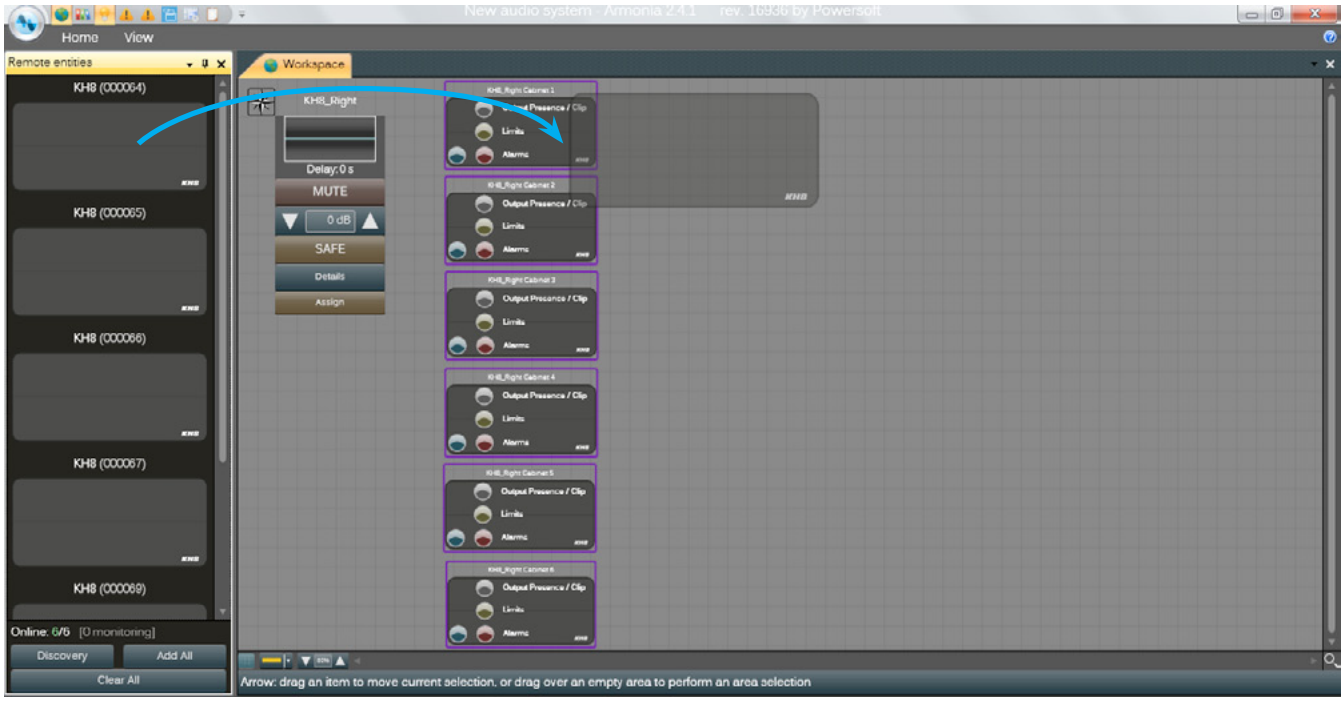
9. Verify all Ethernet connections, Signal connections and Power connections. Switch on the speakers from the K8-BOX. Wait a few seconds, than click Discovery at the bottom of the Remote entities window: it will interrogate the network and generate an icon list of all the speakers found.

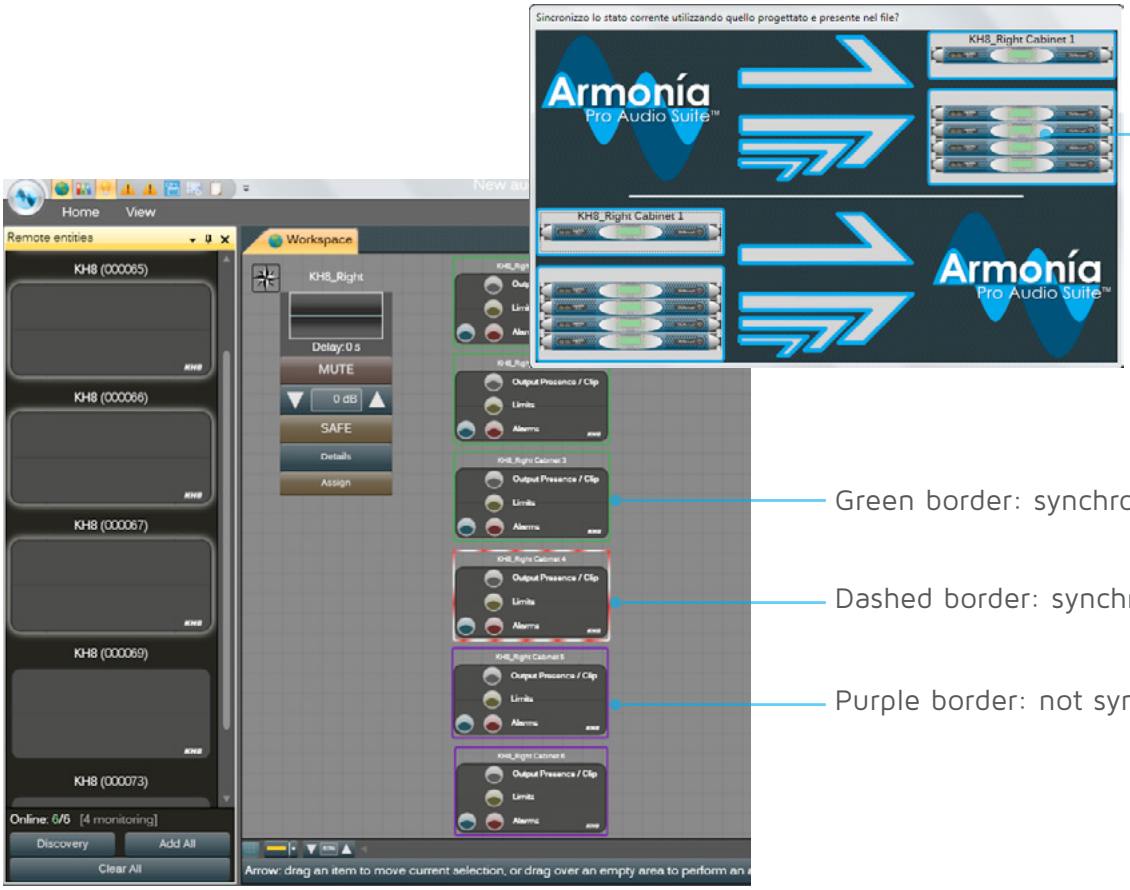


10. Even if the speaker icons are identified with an ID number, we suggest to verify the association between them and the physical speakers. So right click on a speaker icon under Remote Entities and select Un / Blink. A blue LED on the corresponding physical speaker will start blinking.



11. Drag and drop each speaker icon under Remote Entities over the corresponding virtual ones in the Workspace in order to synchronize them to the physical speakers. A window will open asking if you want to synchronize the physical speaker with the virtual one. Select Yes to all and the FIR filters will be loaded into the two DSP inside the speaker. Repeat for all speakers. When a speaker is well synchronized, the speakers icon in the Workspace will show a green border.





12. Click Details over the group icon to manage gain, equalization and delay for the whole cluster. Every change in this section will affect each speaker in the same way. To insert a filter, drag and drop it as shown in the figure below. More details in the "Configuring Amplifiers fitted with DSP" section of the Armonia User Guide.

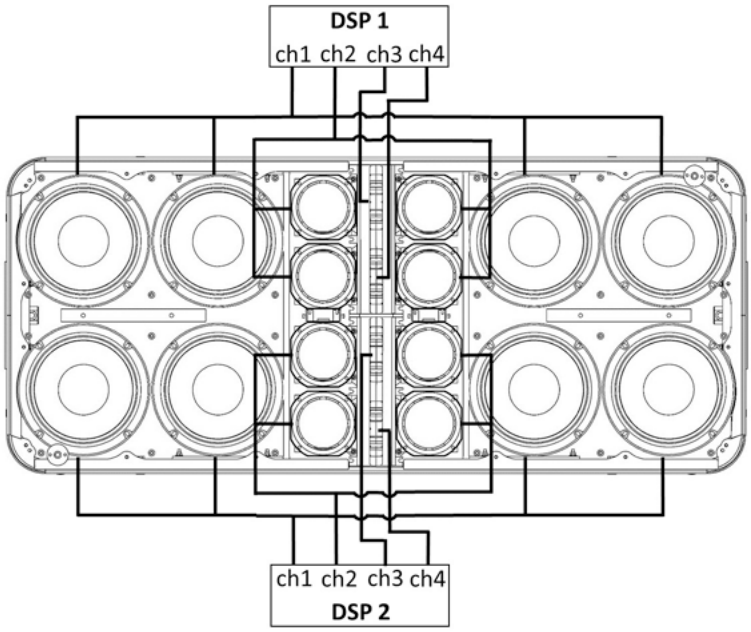
GROUP DETAILS PAGE

13. Double click on a speaker icon in the workspace to manage its properties independently of the other speakers. Each KH8 features two independent amplifiers with 4 independent DSP channels each, wired as shown in the scheme below. The Limiters section allows user to monitor the power and the tension present at

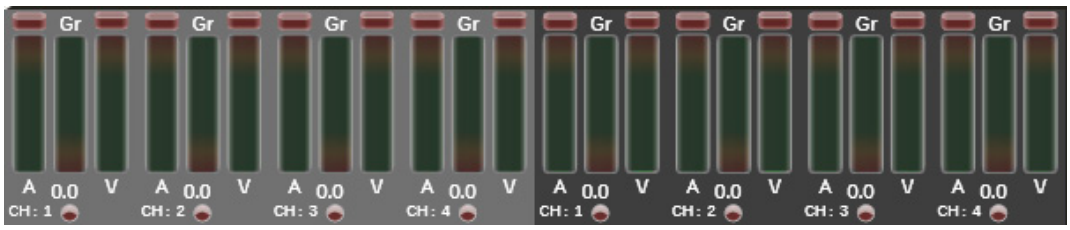
SINGLE SPEAKER PAGE

ATTENTION
We strongly recommend not to use the eq section of the Single Speaker Page because it would alter the FIR settings calculated with Focus. For system tuning use the eq section in the Group Details Page in order to affect all speaker in the same way.

the output of each channel. The Gr meter shows the Gain Reduction applied in case of overloading. The Info section contains important information about amplifiers firmware, ID number and temperature. It also shows the speaker tilt angle measured with an onboard inclinometer.



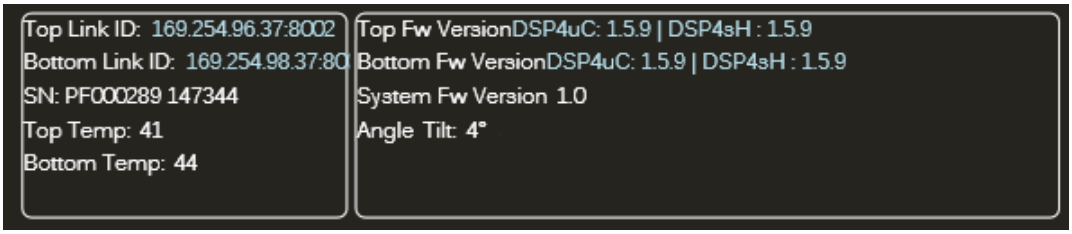
SINGLE SPEAKER PAGE LIMITERS SECTION



DSP1 DSP2

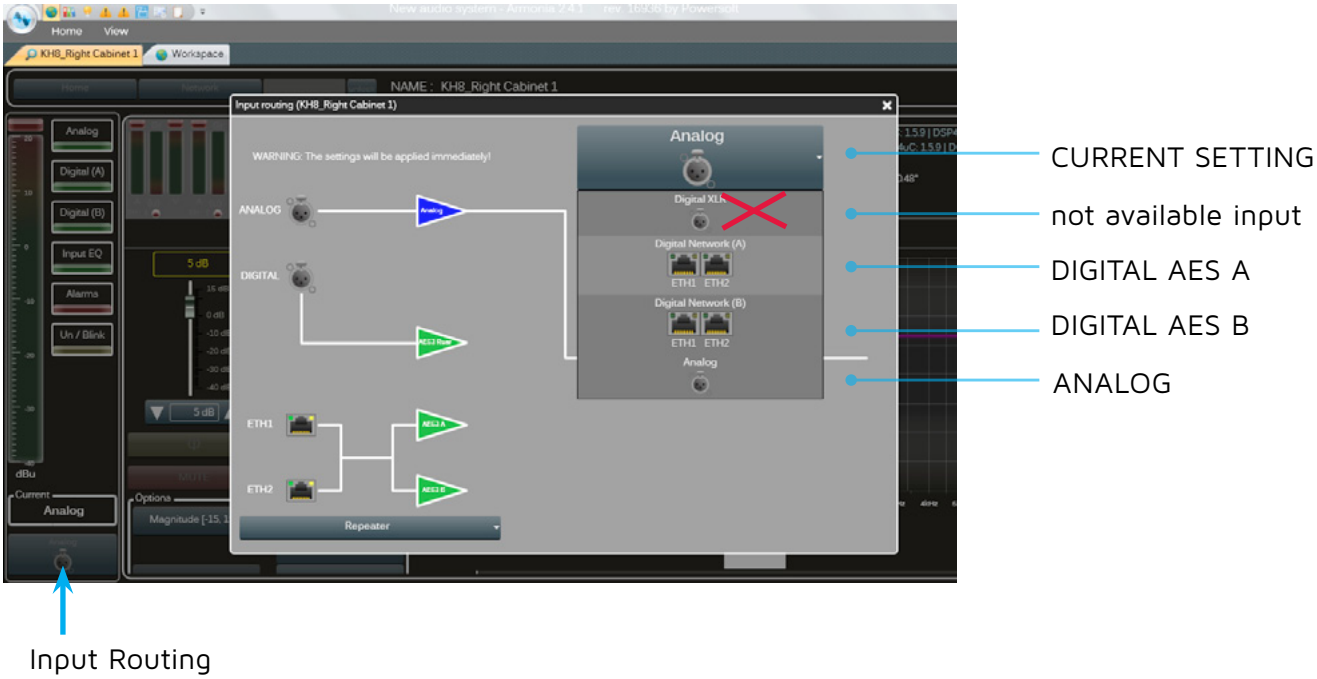
14. In the Single Speaker Page click on the Input Routing button to select the input signal type. As shown in Section 7, K8-SIGxx allows user to send KH8 analog and digital signals. As default, KH8 input is set on Analog. If you are sending a digital signal to the cluster, you have to select Digital Network A or Digital

SINGLE SPEAKER PAGE INFO SECTION



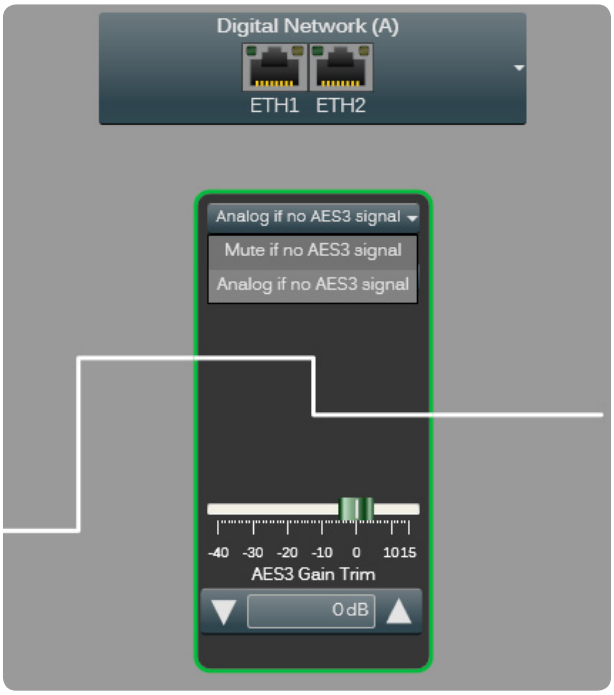
Network B according to the digital input you are using in the K8-BOX (AES A or AES B). In that case, users can decide what happens in case of digital signal absence: the software can mute the speaker

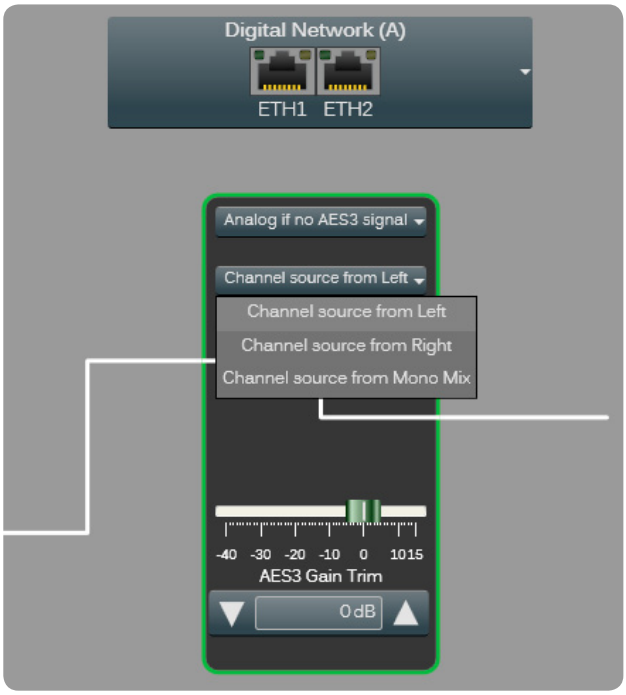
SINGLE SPEAKER PAGE INPUT ROUTING

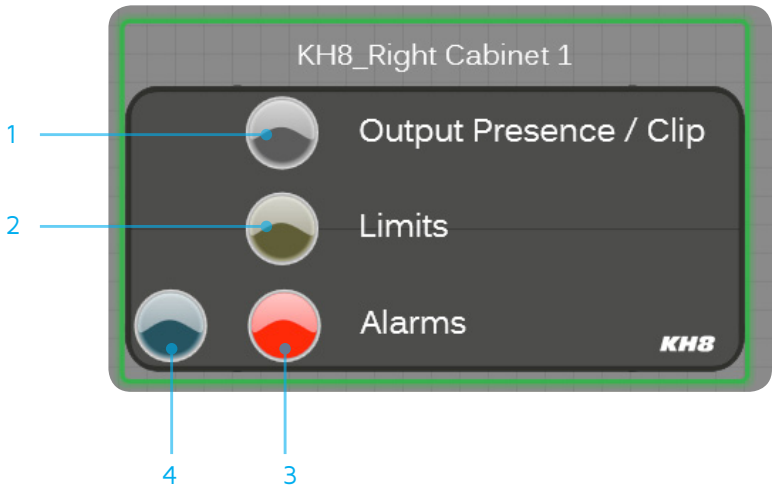


or switch to the analog input. User can also choose which of the two AES channels has to be considered (the left one, the right one or a mono mix of the two).

15. The system is ready to play. During the performance, users can monitor the system just watching the KH8 speaker icons in the Workspace.







1) OUTPUT PRESENCE / CLIP. A green light indicates there is an output signal. A red light alerts users that the output is clipping.

2) LIMITS. A yellow light alerts users that the limiter is working to reduce the output signal gain.

3) ALARMS. A red light alerts users that something is not working well. Move the mouse pointer over the red light and a message will appear giving you some information about the problem found.

4) BLINK. A blue light indicates that the LED on the corresponding physical speaker is blinking.

9. RIGGING

In the following pages we show briefly how to suspend a KH8/KS8 cluster. Although this manual contains much useful information on rigging in general, it does not claim to be a comprehensive resource on the subject. This manual assumes that the owners and/or users of a K-array System are knowledgeable and experienced in the areas of rigging and flying loudspeaker systems.
Many issues of crucial concern, such as the determination of appropriateness and condition of venue rigging points, cannot be addressed here. Therefore, the user must assume all responsibility for the appropriate use of K-array systems, in any particular location or circumstance.
It is recommended to attend the training courses offered by K-array before proceeding with the installation of the system.

9.1 GENERAL SAFETY

LAWS AND REGULATIONS. The suspension of large, heavy objects in public places is subject to numerous laws and regulations at the national/federal, state/provincial, and local levels. This manual does not address the specifics of any such applicable laws and government regulations. This manual details procedures and practices consistent with those generally acknowledged as allowable and safe in Europe. However, the user must assume responsibility for making sure that use of any K-array system and its components in any particular circumstance or venue conforms to all applicable laws and regulations in force at the time.
SAFETY FACTOR. K8-FLY24 and KH8-FRAME3 are in conformity with UNI EN 13155:2009. The safety factor is equal to 10:1 on the breaking load. However there are wide variations internationally in the regulations and practices applying to suspension of sound systems in public places. Government officials in one location may have a stricter interpretation than another local official, even when operating under the same regulations and in the same legal jurisdiction. Consequently, users of K-array rigging systems should be prepared to take additional safety assurance measures beyond those outlined in this manual. in all cases, it is the responsibility of the user to make certain that any K-array loudspeaker system is suspended in accordance with all applicable national/federal, state/provincial, and local regulations.
ATTACHMENT POINT. In most touring applications of rigging systems, the touring sound provider is normally responsible for ensuring the safety of the suspension system only below the attachment point. The safety and suitability of the attachment point is generally seen as the responsibility of the venue owner or operator. However ouring system operators should double-check to make certain that attachment points are approved and suitably load rated, and that the points used are those identified as such by the venue owner or operator.
PERSONNEL HEALTH AND SAFETY. During installation and set-up personnel should wear protective headgear and footwear at all times. Under no circumstances personnel should climb on the loudspeaker assembly.
WIND LOADS. In case of outdoor installation, assure that the wind does not interfere with the system's stability, taking extra securities like chains, weights, ropes or any other certified anchoring systems.
GROUND STACKING. Do not ground stack a KS8 cluster on uneven ground or platform. If the system is ground stacked on a structure, platform, or stage always check that it can support the total weight of the system.

K-FLY24 WORKING LOAD LIMIT = 2400 Kg (5291 lb)

The structure's safety factor is equal to 10 on the breaking load

9.2 SUSPENDING A KH8 CLUSTER

In the following step by step instructions we show how to suspend a 6 units cluster. To suspend a longer cluster just repeat the same steps over. Remember that you cannot connect in a daisy chain audio/data of more then 6 units together, so every six units you need to connect another audio/data cable coming from a KH8-BOX. The same happens with power: you can not link more then 12 units together.

See chapter "7. power and signal/data distribution" (page 25) for more details about signal/data and power connections.

WARNING

Do not suspend more than 24 KH8 with one K8-FLY24 bumper!

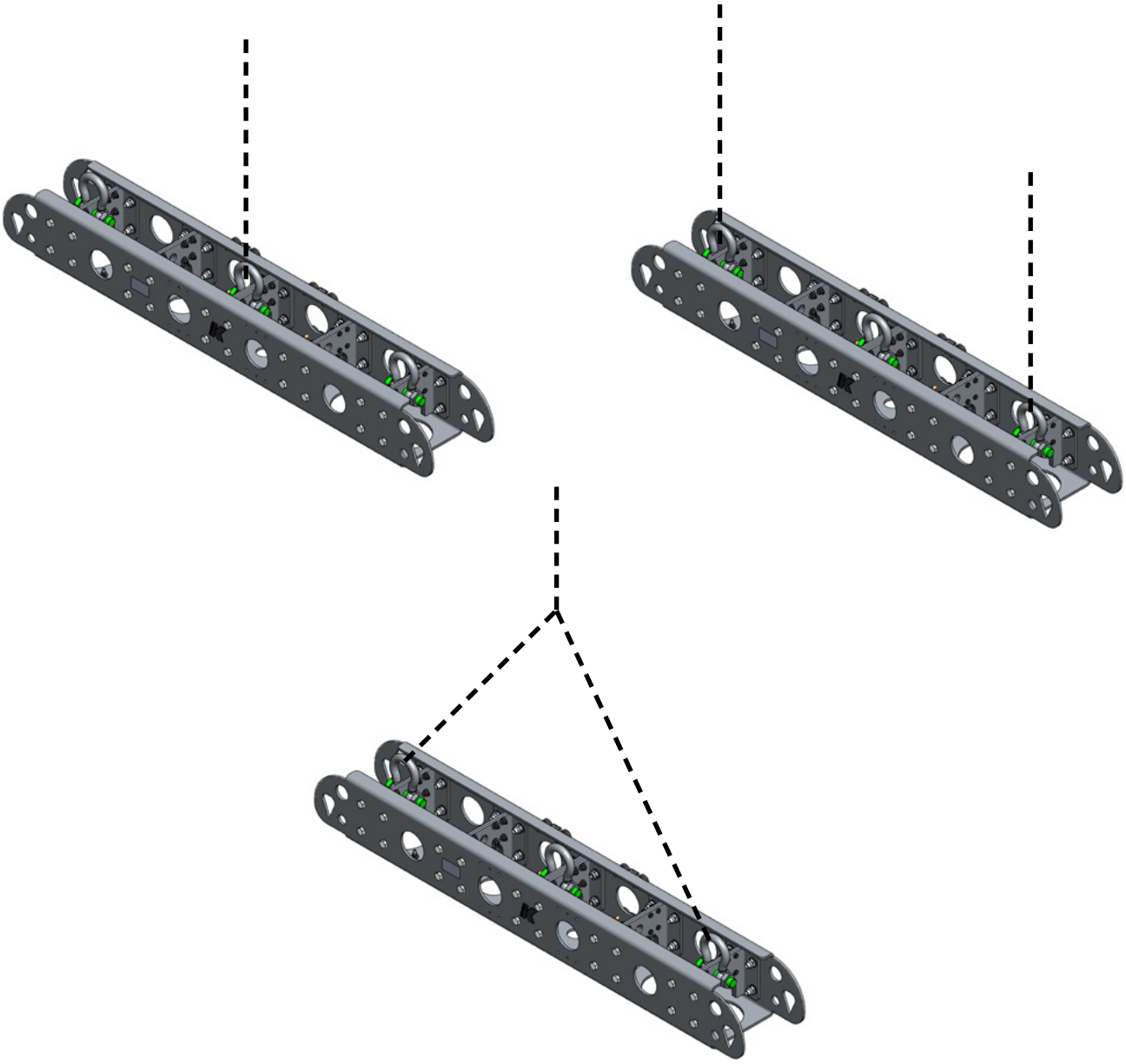
WLL for K8-FLY24 is 2400 Kg (5291 lb).

1. Move the dolly near the motor point.

NOTE

The cabinets, when carried on dolly, may be left with a maximum inclination of 10°.

2. Hook the motor chains to the K-FLY24 bumber. The motor chains can be connected directly to the K-FLY24 using omega shackles (supplied with the system) and stainless steel hooks with security fastening (not supplied). The K-FLY24 has three pick-up points. The figures below show the possible configurations.

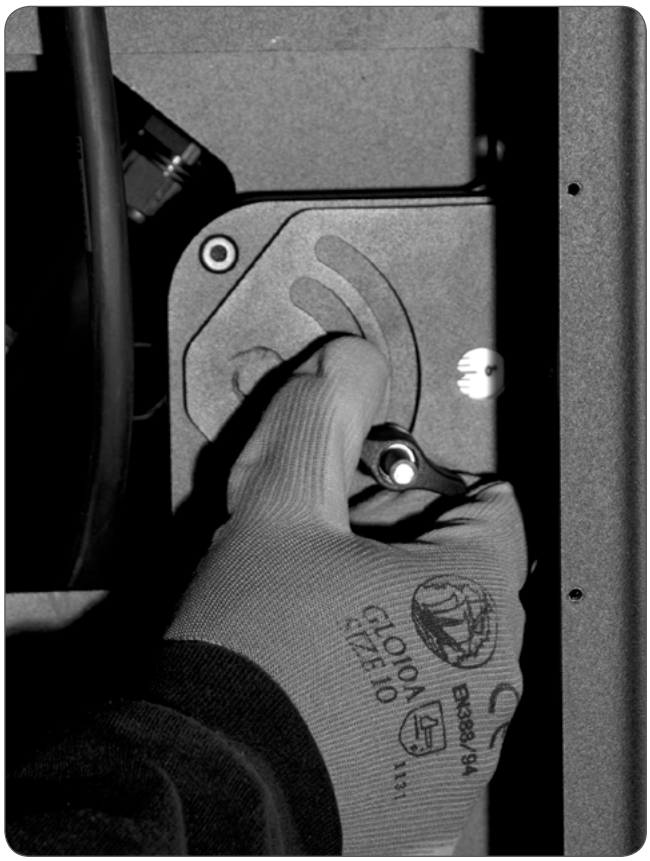


- Each 3 KH8 unit stack is approximately 300 Kg. Check the total weight of the cluster and use appropriate motors.
- Use the omega shackles supplied with the system. Check that the thread locking compound is in a locked position.
- Use stainless steel hooks with security fastening (not supplied). Check that the lock is securely fastened.

3. Plug the Power (Socapex) and the Signal/Data connectors (LK25) to the main cables coming from the K8-BOX. See chapter "7. power and signal/data distribution" (page 25) for more details about these connections. We suggest to secure the cables to the bumper using a cable spanset.

4. Move the frame up just enough to get out of the dolly.

5. If required, set-up the desired angle of the speakers.

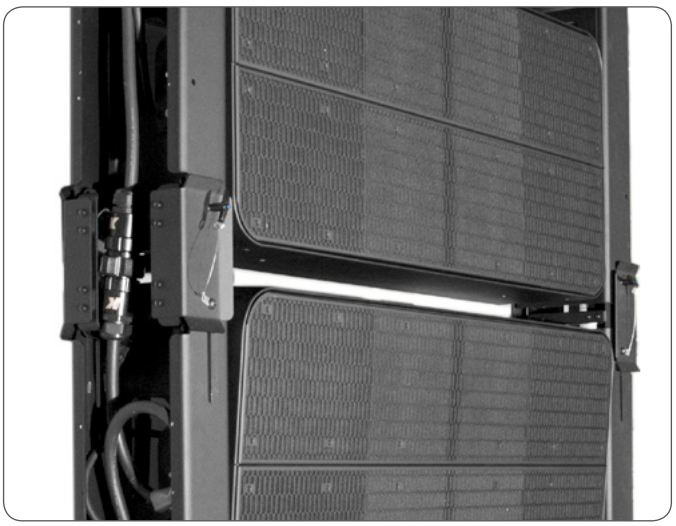


6. Move the first frame up and stop when you reach the second frame height. Spin the dolly 180 degree and move it so that the second frame is exactly under the first one.

7. Lift up the bracket of the bottom frame and plug the two pins to the top frame on both sides.

- Check that the security sphere of the piston pin is visible at the opposite end and cannot accidently fall out.
- The pin must only be released when the push button has been pushed

8. Plug Power (Socapex) and Signal/Data (LK25) cables between the two frames.

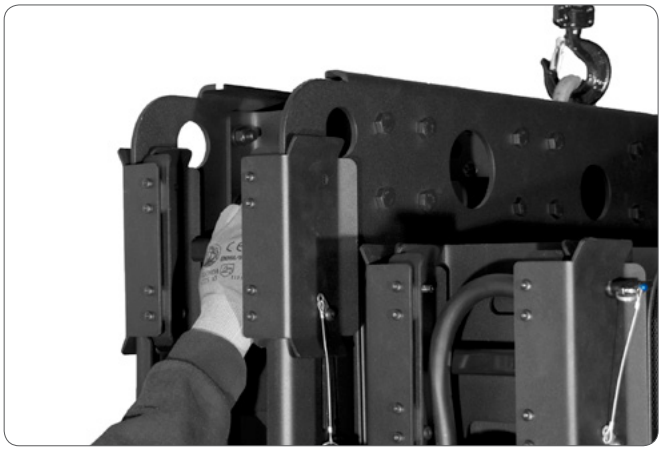


9. Move the frame up just enough to get out of the dolly. If required, set-up the desired speaker angles. The system is ready to go up.

TIP
If necessary, you can change any angles leaving the cluster flown!

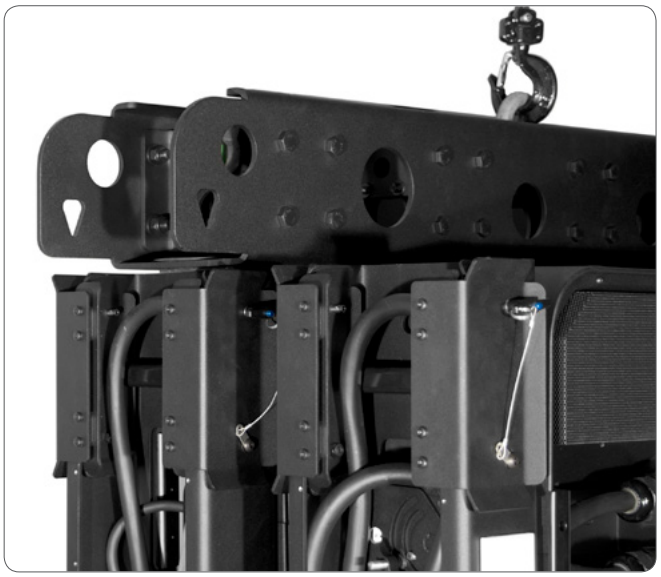
9.3 REMOVING THE BUMPER FROM THE FRAME

To remove the bumper from the frame, unplug the two piston pins from the brackets on both sides. Then lift the brackets down and move the bumper away. To reassemble the bumper on the frame, just repeat the same steps in reverse order.



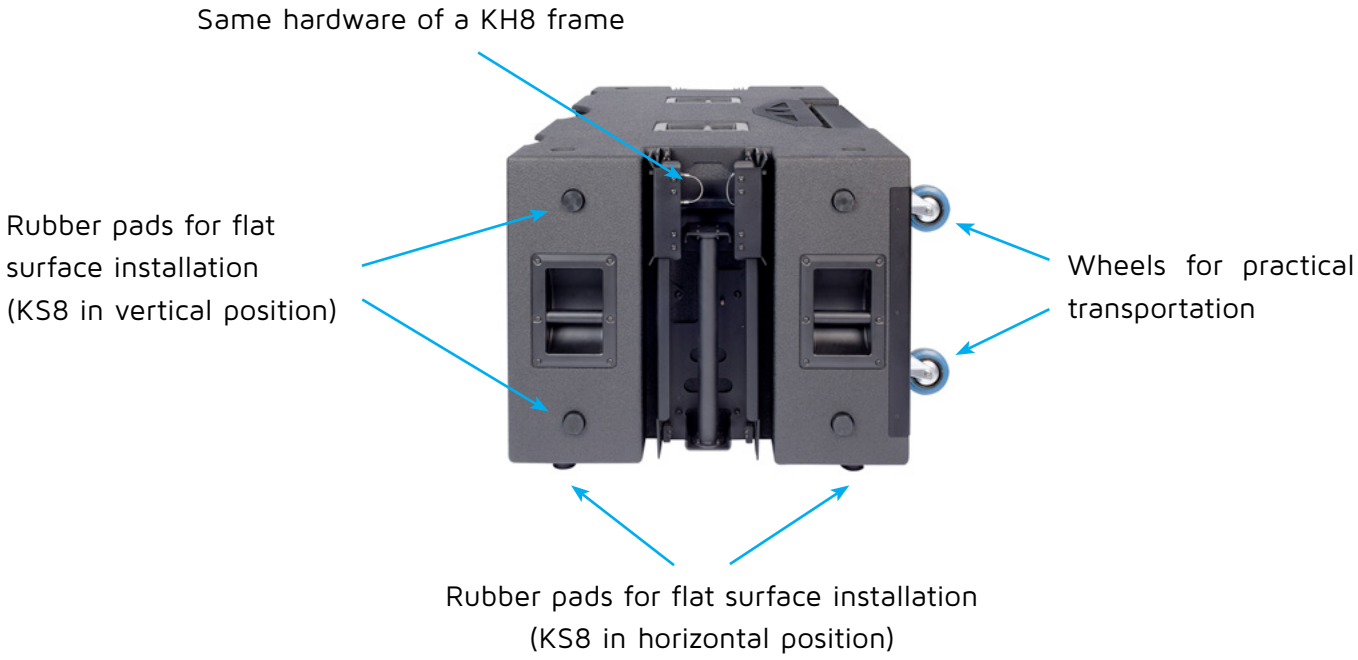
WHILE REASSEMBLING THE BUMPER:

- Check that the security sphere of the piston pin is visible at the opposite end and cannot accidently fall out.
- The pin must only be released hen the push button has been pushed



9.4 KS8 STACKED OR FLOWN

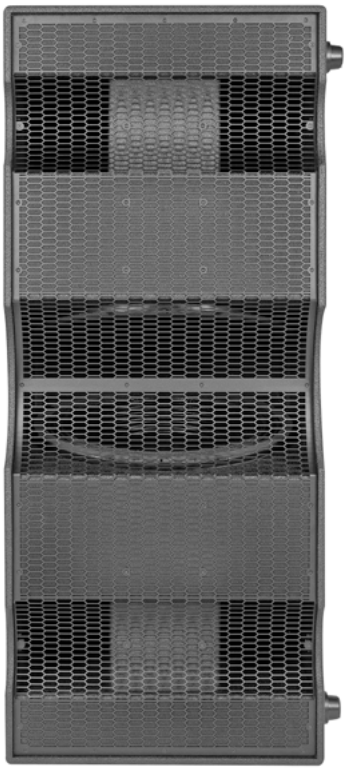
KS8 units can be either stacked or flown. The hardware of a KS8 unit is the same as a KH8 frame: to link two or more KS8 or to link a KS8 to the bumper, follow the same steps described in the previous paragraphs about suspending a KH8 cluster.



Below and in the next page we show some of the most common KS8 configurations.

- Do not ground stack a KS8 cluster on uneven ground or platform.
- If the system is ground stacked on a structure, platform, or stage always check that it can support the total weight of the system.

Single unit in horizontal position



Single unit in vertical position

3 KS8 units stacked

3 KS8 units in cardioid configuration

KS8 flown above KH8

TIP

Users can either leave the KS8 on the dolly or stack them on the a flat surface (up to 3 units).

ATTENTION

WLL for K8-FLY24 is 2400 Kg (5291 lb). Check the total weight of the cluster!

9.5 MAINTENANCE AND SERVICE

Before every assembly and after every disassembly always inspect all components for cracks, wear, deformation, corrosion, missing, loose or damaged parts that can reduce the strength of the assembly.
Discard any worn, defective or suspected parts and replace them with new appropriately load-rated parts.

To obtain service:
1) Contact the official K-array distributor in your country. Your local distributor will direct you to the appropriate service center.
2) If you are calling for service, please have the serial number(s) of the unit(s) available for reference. Ask for Customer Service, and be prepared to describe the problem clearly and completely.
3) If the problem cannot be resolved over the phone, you may be required to send the unit in for service. In this instance, you will be provided with an RA (Return Authorization) number which should be included on all shipping documents and correspondence regarding the repair. Shipping charges are the responsibility of the purchaser.

Any attempt to modify or replace components of the device will invalidate your warranty. Service must be performed by an authorized K-array service center.

Cleaning:
Use only a soft, dry cloth to clean the housing. Do not use any solvents, chemicals, or cleaning solutions containing alcohol, ammonia, or abrasives. Do not use any sprays near the product or allow liquids to spill into any openings.

9.6 SHUTDOWN

WARNING
Once the system is no longer being operated it must not be left abandoned.

All iron made material must be disposed of by an authorized scrap yard.
The sale of components (screws, pins, ...) can be reused by being delivered to authorized recycling centers that deal with industrial recyclable material.

9. SPECIFICATIONS

9.1 KH8 UNIT

Acoustics

Speaker power handling	2000 + 800 + 280 W(AES)
Max Power	6160 W (AES)
Frequency range	60 Hz – 18 kHz - 3dB (1)
SPL 1W/1mt	102.4 dB (Low) - 99.5 dB (Mid) - 119 dB (High) (2)
Maximum SPL	145 dB (3)

Coverage

Horizontal	120°
Vertical	Digitally adjustable

Crossover

Type	DSP controlled
Frequency	300 Hz (Low-Mid) ; 1300 Hz (Mid-High)

Transducers

8 X 8” Neodymium magnet woofer with 2.5” voice coil
8 X 4” Neodymium magnet woofer with 1.5” voice coil
4 X 1.4” Neodymium magnet compression driver with 1.5” voice coil

Remote Control + Audio In/Out

Connectors	1 Male + 1 Female LK25 connector (IP67)
Connection	1 Analog audio - 2 AES/EBU - Remote control over IP

Power Input

Connector	1 x PowerCon TRUE1 (IP65)

Amplifier

Type	2 module class D with PFC - DSP controlled
Nominal output power	8 X 2000 W @ 4 Ω 1% THD + NOISE (4)
Protection	Over Temp.(Power Limiting – Thermal Shutdown), Short Circuit/Overload Output Protection, Power Limiting, Clip Limiter/Permanent Signal Limiter, High Frequency Protection
Frequency response	20 Hz – 20 kHz (+0 -1 dB) for 1 W @ 8 Ω
Damping factor 100 Hz	> 10000
THD+N 1W to Full Power @ 4 Ohm	0.2%
Thermal dissipation	1/4 of max output power @ 4 Ω = 2000 BTU/h (505KCal/h)

AC Power

Nominal voltage	100 / 240 ± 10%, 50/60Hz with PFC
Operating range	85 – 265 Vac

Consumption

Efficiency	> 75% (typical)
1/8 rated power (pink noise) @ 4 Ω per channel	1250 W

IP Certification

Electronics	65
Speaker box	45

Physical

Dimensions	117 cm x 50 cm x 20 cm (46.10“ x 19.70” x 7.88“)
Weight	72.5 Kg (159.84 lb)

Notes for data

1. With dedicated preset
2. Measured @ 4m then scaled @1m
3. Measured with musical signal
4. EIAJ Test Standard, 1 kHz, 1% THD (single ch driven)

New materials and design are introduced into existing products without previous notice. Present systems may differ in some respects from those presented in this catalogue.

9.2 KS8 UNIT

Acoustics

Speaker power handling	4500 W(AES)
Max Power	9000 W (AES)
Frequency range	25 Hz – 150 Hz (1)
SPL 1W/1mt	101 dB (2)
Maximum SPL	148 dB (3)

Coverage

Digitally adjustable in array configurations

Transducers

2 X 21” Neodymium magnet woofer with 5.31” voice coil

Remote Control + Audio In/Out

Connectors	1 Male + 1 Female LK25 connector (IP67)
Connection	1 Analog audio - 2 AES/EBU - Remote control over IP

Power In/Out

Connectors	1 x PowerCon TRUE1 (IP65)

Amplifier

Type	Switch mode fixed frequency PFC power supply IPAL mode
Peak Output Power	8500 W (4)
Protection	Excursion limiter, current & power limiter, current clamp, clip limiter, Brownout limiter, thermal

AC Power

Nominal voltage	100 - 240 Vac ± 10%, 50/60 Hz with PFC
Operating range	85 – 265 Vac

Consumption

Efficiency	95% (typical)
1/8 rated power (pink noise)	400 VA

IP Certification

Electronics	65
Speaker box	45

Physical

Dimensions	142 cm x 60 (+5) (5) cm x 77 (+13.5) (6) cm (55.90“ x 23.62” (+1.97”) (5) x 30.31“ (+5.31”) (6)
Weight	135 Kg (297.62 lb)

Notes for data

1. With dedicated preset
2. Measured @ 4m then scaled @1m
3. Measured with musical signal
4. Max RMS power
5. Removable rubber feet
6. Removable castor wheels

New materials and design are introduced into existing products without previous notice. Present systems may differ in some respects from those presented in this catalogue.

10. DECLARATION OF CONFORMITY

Certification Record

Listing# E113572
Original Certification: August 19, 2014
Revised Certification: N/A

This Certification is issued to:
K-ARRAY S.u.r.l.
Via P. Romagnoli,
17 50038 Scarperia e S. Piero (FI) –
ITALY

For the product(s):
Professional Active Speaker,
Model KH8

Has been certified to the following standard(s):
UL 60065, Audio, Video and Similar Electronic Apparatus – Safety Requirements - Seventh Edition; Reprint with revisions through and including July 24, 2013,
CSA CAN/CSA-C22.2 NO. 60065:03 (R2012), Audio, Video and Similar Electronic Apparatus – Safety requirements - First Edition; May 1, 2003,
CAN/CSA C22.2 NO. 60065A:03 (R2012), Amendment 1 to CAN/CSA-C22.2 NO. 60065:03, Audio, Video and Similar Electronic Apparatus - Safety Requirements, and
CAN/CSA C22.2 NO. 60065B:03 (R2012), Amendment 2 to CAN/CSA-C22.2 NO. 60065:03, Audio, Video and Similar Electronic Apparatus - Safety Requirements

Rick Cooper
Director of Laboratory Operations,
Safety Laboratory

All changes proposed in the previously identified product that affects the above information must be submitted to MET for evaluation prior to implementation to assure continued MET Certification status.

The covered product(s) shall be subject to follow-up inspections to ensure that the Certified product(s) are identical to the product sample evaluated by MET Laboratories, Inc. and that all manufacturer's responsibilities are being fulfilled as specified in the Manufacturer's Responsibility section of the Certification report. The applicant named above has been authorized by MET Laboratories, Inc. to represent the product(s) listed in this record as "MET Certified" and to mark this/these product(s) according to the terms and conditions of the MET Applicant Contract, MET Listing Reports, and the applicable marking agreements. Only the product(s) bearing the MET Mark and under a follow-up service are considered to be included in the MET Certification program. This certification has been granted under a System 3 program as defined in ISO Guide 67.

MET Laboratories, Inc. is accredited by OSHA and the Standards Council of Canada.
The Nation's First Nationally Recognized Testing Laboratory

SAFJ TEMP-130-0, NRTLC Certification Record 4-21-14

Page 1 of 1

IEC IECEE CB SCHEME

Ref. Certificate No.
NL-31998

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEM CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE

CERTIFICAT D'ESSAI OC

Product Produit	Professional active speaker
Name and address of the Applicant Nom et adresse du demandeur	K-ARRAY S.u.r.l. Via P. Romagnoli, 17 50038 Scarperia e S. Piero (FI) Italy
Name and address of the manufacturer Nom et adresse du fabricant	K-ARRAY S.u.r.l. Via P. Romagnoli, 17 50038 Scarperia e S. Piero (FI) Italy
Name and address of the factory Nom et adresse de l'usine	K-ARRAY S.u.r.l. Via P. Romagnoli, 17 50038 Scarperia e S. Piero (FI) Italy
Rating and principal characteristics Valeurs nominales et caractéristiques principales	100-240 V~; 50-60 Hz 100-120 V~; 50-60 Hz (for Canada and United States only) 1200 W
Trademark (if any) Marque de fabrique (si elle existe)	K-ARRAY
Type of manufacturer's Testing Laboratories used Type de programme de laboratoire d'essais constructeur	
Model / Type Ref. Réf. de type	KH8
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiquées sur la 2ème page)	
A sample of product was tested and found to be in conformity with IEC Un échantillon de ce produit a été essayé et été considéré conforme à la CEI	60065(ed.7);am1;am2
National differences / Comments Les différences nationales / Commentaires	EU Group Differences, EU Special National Conditions, EU A-Deviations, AR, AU, CA, CN, JP, KR, US
As shown in the test report Ref. No. which forms part of this certificate Comme indiqué dans le rapport d'essais numéro de référence qui constitue partie de ce certificat	TRP_108_14

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Meander 1051, 6825 MJ
Arnhem
The Netherlands

Ce Certificat d'essai OC est établi par l'Organisme National de Certification

DEKRA

Date: 2014-08-01

Signature: M.Triulzi

page 1 of 1

DECLARATION OF CONFORMITY

Manufacturer/Importer: **K-array** s.u.r.l.

Brand:	**K-ARRAY**
Address:	via Paolina Romagnoli 17 50037 S. Piero a Sieve Firenze ITALY
Date of Issue:	01 / 08 / 14
Model Code:	**KH8**
Declaration:	Complies with safety essential requirements of Council Directive

2004/108/EC on the approximation of the Laws of the Member States relating to electromagnetic compatibility.
2006/95/EC on the harmonisation of the laws of member state relating equipment designed for the use within certain voltage limits
This declaration applies to all specimens manufactured in accordance with the attached manufacturing drawings which form part of this declaration. Assessment of compliance of the product with the requirements relating to electromagnetic compatibility and low voltage directive was based on the following standards:

EMC:

EN 55103-1:2009
EN 55103-2:2009
EN 61000-3-2:2006+A1+A2
EN 61000-3-3:2008

Safety:

EN 60065:2002+A1+A11+A2+A12

Marking: CE

Applying Year: **2014**

Applied by: **K-array** s.u.r.l.
Via Paolina Romagnoli 17
50038 Scarperia e San Piero
Firenze Italy
Tel. +39 055 8487222
Fax +39 055 8487238

Signed by: **Franco Spataro**
Technical Manager

K-array s.r.l. a socio unico società soggetta alla attività di direzione e coordinamento di HP Sound Equipment srl
P. IVA / VAT / CF 06206980480 - R.E.A. 609589 Cap. soc. i.v. € 100.000,00
Sede legale: via Paolina Romagnoli 50037 San Piero a Sieve - Firenze - ITALY tel +39 055 8487222 fax +39 055 8487238 info@k-array.com www.k-array.com

Certification Record

Listing# E113572
Original Certification: January 13, 2015
Revised Certification: N/A

MET Laboratories, Inc.
First in Certification

This Certification is issued to:
K-ARRAY S.u.r.l.
Via P. Romagnoli, 17
50038 Scarperia e S. Piero (FI)
ITALY

For the product(s):
Professional Active Speaker, Model KS8

Has been certified to the following standard(s):
UL60065, UL Standard for Safety for Audio, Video and Similar Electronic Apparatus – Safety Requirements, Seventh Edition, Dated July 24, 2013

CSA C22.2 No. 60065:03 Audio, Video, and Similar Electronic Apparatus – Safety Requirements, Rev. August 1, 2012

Rick Cooper
Director of Safety Business Line
Safety Laboratory

All changes proposed in the previously identified product that affects the above information must be submitted to MET for evaluation prior to implementation to assure continued MET Certification status.

The covered product(s) shall be subject to follow-up inspections to ensure that the Certified product(s) are identical to the product sample evaluated by MET Laboratories, Inc. and that all manufacturer's responsibilities are being fulfilled as specified in the Manufacturer's Responsibility section of the Certification report. The applicant named above has been authorized by MET Laboratories, Inc. to represent the product(s) listed in this record as "MET Certified" and to mark this/these product(s) according to the terms and conditions of the MET Applicant Contract, MET Listing Reports, and the applicable marking agreements. Only the product(s) bearing the MET Mark and under a follow-up service are considered to be included in the MET Certification program. This certification has been granted under a System 3 program as defined in ISO Guide 67.

MET Laboratories, Inc. is accredited by OSHA and the Standards Council of Canada.
The Nation's First Nationally Recognized Testing Laboratory

NRTL

SAFJ TEMP-130-0, NRTLC Certification Record 4-21-14

Page 1

IEC IECEE CB SCHEME

Ref. Certificate No.
NL-34095

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE

CERTIFICAT D'ESSAI OC

Product Produit	Professional active speaker
Name and address of the Applicant Nom et adresse du demandeur	K-ARRAY S.u.r.l. Via P. Romagnoli, 17 50038 Scarperia e S. Piero (FI) Italy
Name and address of the manufacturer Nom et adresse du fabricant	K-ARRAY S.u.r.l. Via P. Romagnoli, 17 50038 Scarperia e S. Piero (FI) Italy
Name and address of the factory Nom et adresse de l'usine	K-ARRAY S.u.r.l. Via P. Romagnoli, 17 50038 Scarperia e S. Piero (FI) Italy
Rating and principal characteristics Valeurs nominales et caractéristiques principales	100-230 V~; 50-60 Hz 115-120 V~; 50-60 Hz (for Canada and United States only) 400 W
Trademark (if any) Marque de fabrique (si elle existe)	K-ARRAY
Type of manufacturer's Testing Laboratories used Type de programme de laboratoire d'essais constructeur	
Model / Type Ref. Réf. de type	KS8
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiquées sur la 2ème page)	
A sample of product was tested and found to be in conformity with IEC Un échantillon de ce produit a été essayé et été considéré conforme à la CEI	60065(ed.7);am1;am2
National differences / Comments Les différences nationales / Commentaires	EU Group Differences, EU Special National Conditions, EU A-Deviations, AR, AU, CA, CN, JP, KR, US
As shown in the test report Ref. No. which forms part of this certificate Comme indiqué dans le rapport d'essais numéro de référence qui constitue partie de ce certificat	TRP_122_14

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Meander 1051, 6825 MJ
Arnhem
The Netherlands

Ce Certificat d'essai OC est établi par l'Organisme National de Certification

DEKRA

Date: 2014-12-22

Signature: M.Triulzi

page 1 of 1

DECLARATION OF CONFORMITY

Manufacturer/Importer: **K-array** s.u.r.l.

Brand: **K-ARRAY**
Address: via P. Romagnoli 17 50038 Scarperia e S. Piero – Firenze - ITALY

Date of Issue: 23 / 12 / 14

Model Code: **KS8**
Declaration: Complies with safety essential requirements of Council Directive 2004/108/EC on the approximation of the Laws of the Member States relating to electromagnetic compatibility.
2006/95/EC on the harmonisation of the laws of member state relating equipment designed for the use within certain voltage limits
This declaration applies to all specimens manufactured in accordance with the attached manufacturing drawings which form part of this declaration. Assessment of compliance of the product with the requirements relating to electromagnetic compatibility and low voltage directive was based on the following standards:

EMC:
EN 55103-1:2009
EN 55103-2:2009
EN 61000-3-2:2006+A1+A2
EN 61000-3-3:2008

Safety:
EN 60065:2002+A1+A11+A2+A12

Marking: CE

Applying Year: **2014**

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