



Photo: ST truss works

SYSTEM DESCRIPTION

The ST Roof is a tower-based structure with a pitched roof, a design that inherently offers optimum strength. The larger ST Series offers flexible possibilities for creating stage dimensions up to 30 × 20 m. Technical specifications available on request.

INCLUDING

- Tension gear and steel wires
- Structural report

ROOF STRUCTURE

Towers	6 x ST-tower, mast sections of S40T truss
Main grid	S52SV truss

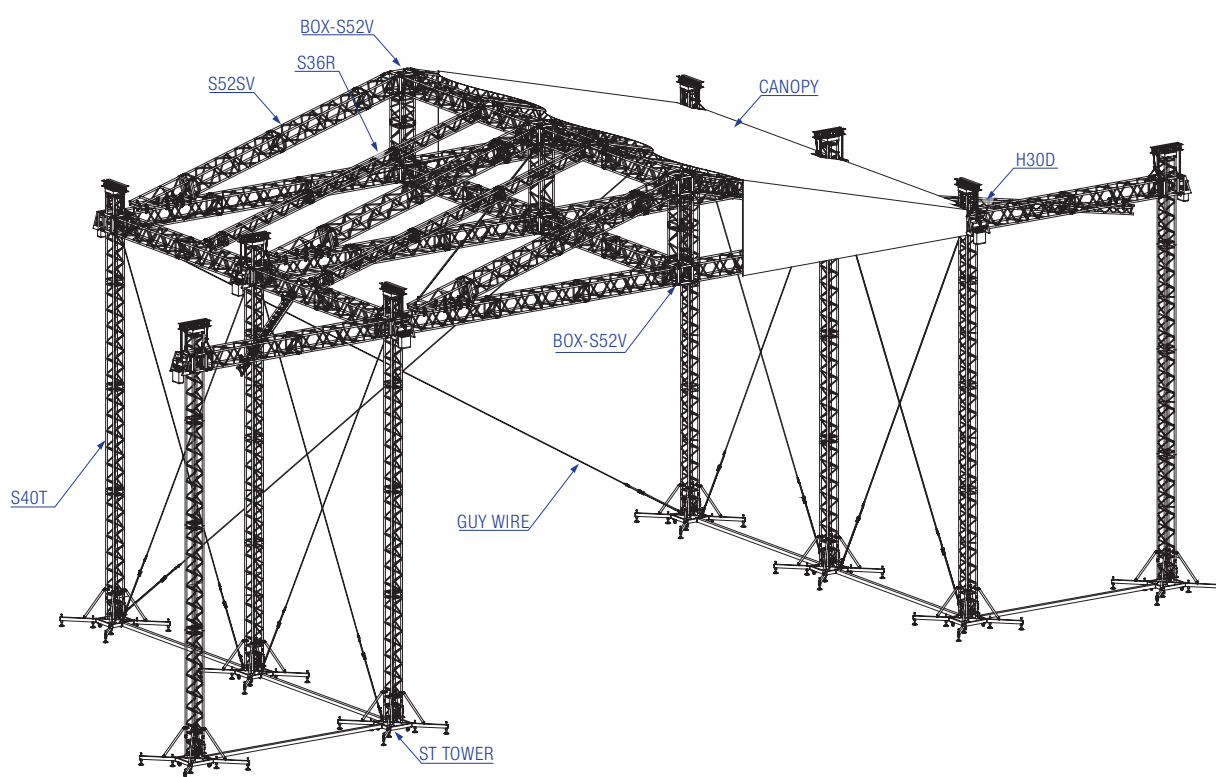
Consult Prolite for up-to-date information on loading capacity, wind speed, total weight and transportation volume in line with the Eurocode regulations.

OPTIONS

Canopy	side, back and top	
Canopy colour	standard: outside grey, inside black (other colours possible)	
Soundwings	Optional (yes, loading 2000 kg each)	
Ballast	several possibilities on request from 1 - 7 ton per tower depending on construction	
Staging	Prolite stage elements, EasyFrame B or Pro-beam combined with a scaffolding stage	
ProLyft hoist (20x14 ST roof without sound-wings) and accessories	6x PAE-1000DC-0030	1x PAE-A-FC19IN4U
	6x PAE-A-FC1000	6x PAE-A-50-010
	3x PLA-33-20	2x PLA-30-20
	4x PLA-30-10	2x PLA-34-02
	1x PAE-C8DC-10	
ProLyft hoist (20x14 ST roof with sound-wings) and accessories	8x PAE-1000DC-0030	1x PAE-A-FC19IN4U
	8x PAE-A-FC1000	8x PAE-A-50-010
	3x PLA-33-20	2x PLA-30-20
	6x PLA-30-10	2x PLA-34-02
	1x PAE-C8DC-10	

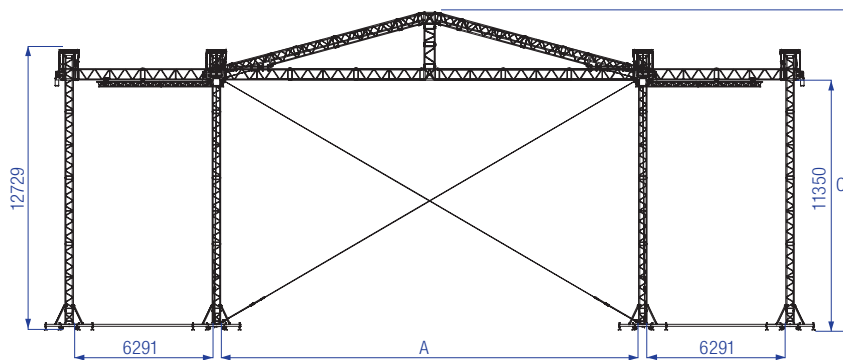


Photo: Showtech, Dubai

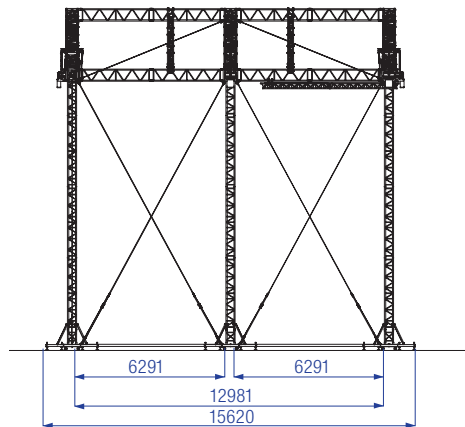




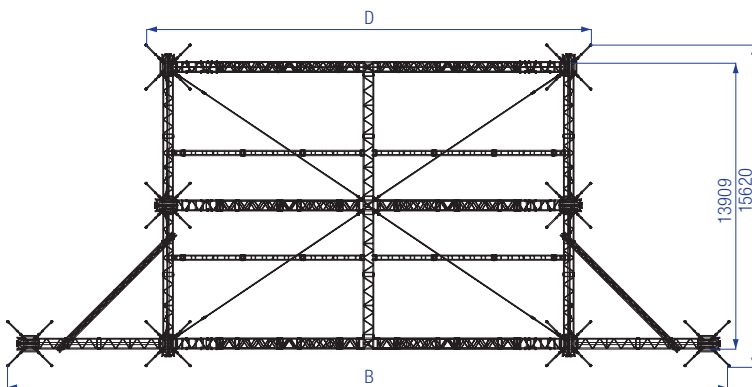
Front view



Side view



Top view

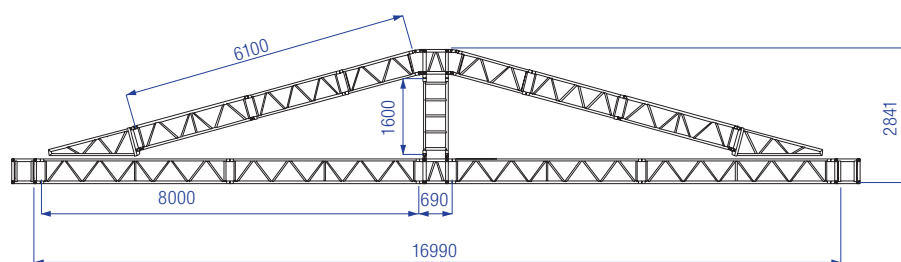


ST-ROOF SYSTEM

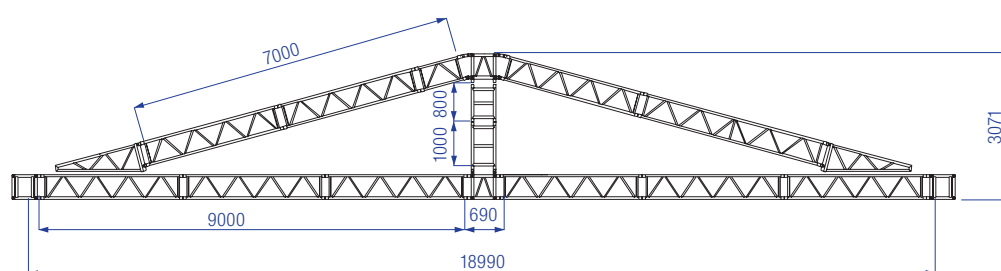
Stage measurements		A		B		C		D	
20 x 14 m	65'6" x 45'9"	20,99 m	68'8"	37,0 m	108'2"	14,70 m	48'2"	23,62 m	77'4"
18 x 14 m	59'0" x 45'9"	18,99 m	62'3"	35,0 m	114'8"	14,70 m	48'2"	21,62 m	70'9"
16 x 14 m	52'5" x 45'9"	16,99 m	55'7"	33,0 m	121'3"	14,70 m	48'2"	19,62 m	64'3"

ST ROOF

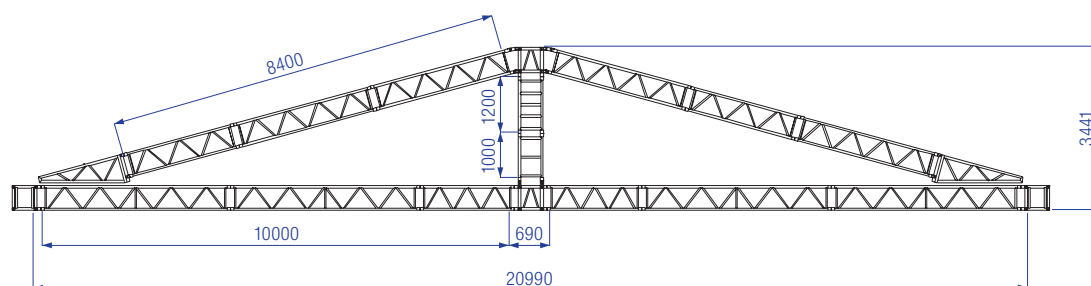
ST ROOF 16 x 14 m



ST ROOF 18 x 14 m



ST ROOF 20 x 14 m



all measurements in mm



EC DECLARATION OF CONFORMITY

L-ACOUSTICS®

13 rue Levacher Cintrat
Parc de la Fontaine de Jouvence
91462 Marcoussis Cedex
France



States that the following product:

Loudspeaker enclosure, I15XT HiQ

Is in conformity with the provisions of:

Low Voltage Directive, 2006/95/EC

Applied rules and standards:

EN60065 (Electrical Safety)

Established at Marcoussis, France,
November 9th, 2009

A handwritten signature in black ink, appearing to read 'Pignon', enclosed within a circular scribble.

Christophe Pignon
Head of Research & Development dept.



EC DECLARATION OF CONFORMITY

L-ACOUSTICS®

13 rue Levacher Cintrat
Parc de la Fontaine de Jouvence
91462 Marcoussis Cedex
France



States that the following product:

Loudspeaker enclosure, V-DOSC

Is in conformity with the provisions of:

Low Voltage Directive, 2006/95/EC
Machinery Directive 2006/42/EC

Applied rules and standards:

EN60065 (Electrical Safety)
EN ISO 12100-1: 2004 (Mechanical Safety)

Established at Marcoussis, France,
January 1st, 2010

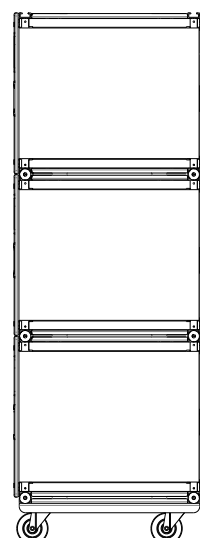
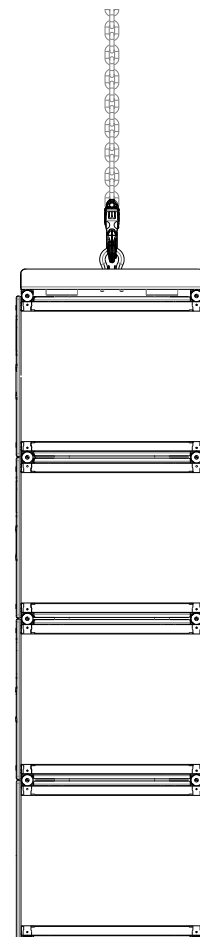
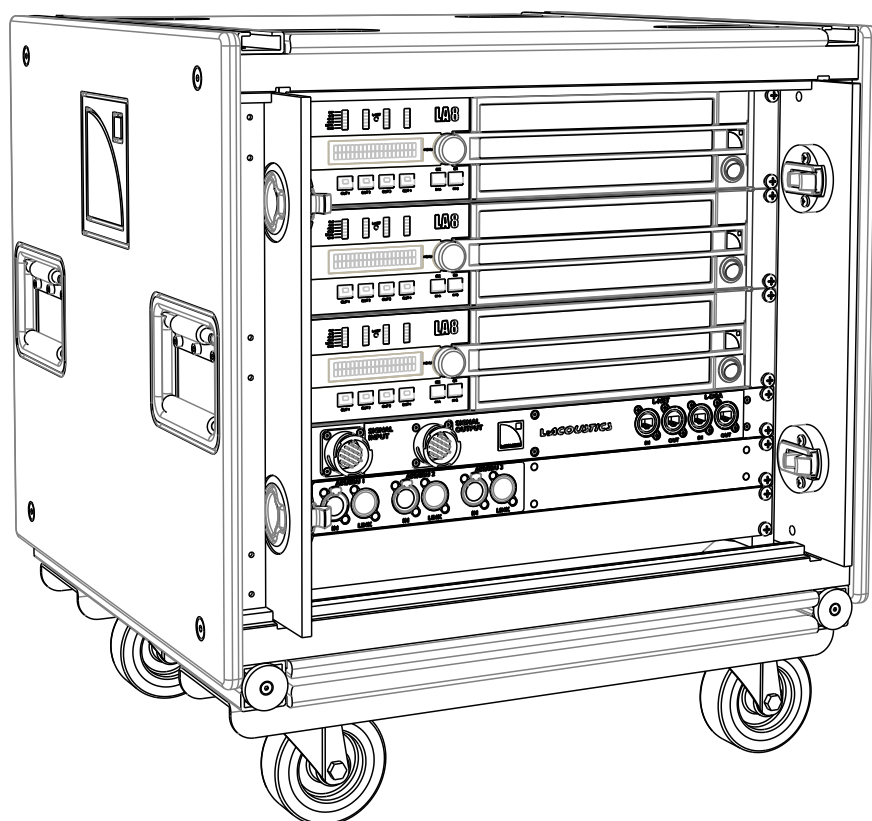
A handwritten signature in black ink, appearing to read 'Pignon', enclosed within a circular scribble.

Christophe Pignon
Head of Research & Development dept.

LA-RAK



user manual



Document Reference: LARAK_UM_EN_2.0

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Parc de la Fontaine de Jouvence, 91462 Marcoussis cedex, France**

Distribution date: February 23, 2017





1 SAFETY WARNINGS

All information hereafter detailed applies to the **L-ACOUSTICS® LA-RAK Touring Rack**, designated in this section as **the product**. The LA-RAK product includes the following components: a **RK 9U** cabinet, three **LA8** amplified controllers and three distribution panels (**LA-POWER**, **LA-PANEL** and **LA-PANEL AES3**).

1.1 Symbol description



1.1.1 Symbols employed in this manual

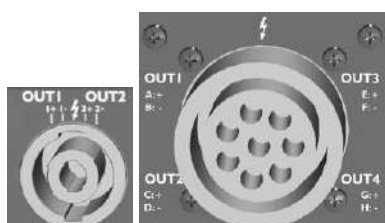
Throughout this manual the potential risks are indicated by the following symbols:

	The VOLTAGE symbol indicates a potential risk of electric shock that could be life threatening. In addition, the product may also be seriously damaged.
	The WARNING symbol indicates a potential risk of physical harm to the user or people within close proximity to the product. In addition, the product may also be damaged.
	The CAUTION symbol notifies the user about information to prevent possible product damage.
	The IMPORTANT symbol is a notification of an important recommendation of use.

1.1.2 Symbols indicated on the product

As the product is an electrical device, it represents potential hazard for the user. For this reason the user may pay particular attention to the symbols that are indicated on the covers of the product electrical components:

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN		WARNING: RISK OF HAZARDOUS ENERGY SEE OPERATING MANUAL CLASS 2 PERMITTED
---	---	---	---



On the rear panel of the LA8 amplified controllers, the lightning flashes symbols next to the 4-point SpeakON® and 8-point CA-COM® connectors indicate that the product can deliver high output voltages that are potentially life threatening. Connections between the product and a speaker should always be done with an all ready-made lead. When the amplified controller is operating, never attempt to touch any exposed speaker wire without disconnecting the connector first.

1.2 Important safety instructions

1. Read this manual
2. Heed all safety warnings
3. Follow all instructions
4. The user should never incorporate equipment or accessories not approved by L-ACOUSTICS®



5. Environments

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



6. Radio interference

A sample of this product has been tested and complies with the limits for the EMC (European Electro Magnetic Compatibility) directive. These limits are designed to provide reasonable protection against harmful interference from electrical equipment. However, there is no guarantee that interference will not occur in a particular installation.



7. Power cord caution

Do not use the product if any power cord is broken or frayed. Protect any power cord from being walked upon or pinched, particularly at the plugs and the points where the power cords exit from the apparatus.



8. Mains supply

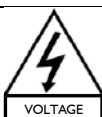
Only connect the product to an appropriate three-phase AC circuit and outlet. Consult an electrician if the output voltage of the local AC mains is not known. Any electric device must be approved for the local voltage & current rating. The specific electrical safety regulations of the country of use must be strictly applied. Warranty will not cover damages caused by a mains wiring error.



9. Grounding

The product may only be connected to mains power supply tied to earth. If the local outlet is obsolete, consult an electrician.

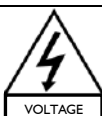
The LA-POWER is fitted with grounding-type sockets. Do not defeat the earth connections between the sockets and the product chassis.



10. Lightning storms

During lightning storms, disconnect the product from mains.

Switching the amplified controllers off does not disconnect them from mains. Therefore, disconnecting can only be achieved by removing the LA-POWER three-phase male plug from mains.



11. Interconnections

Before connecting the product to other equipment, turn the power off and unplug all of the equipment from the supply source. Failure to do so may cause an electric shock and serious personal injury. Read the user manual of the other equipment carefully and follow the manufacturer instructions.

Do not connect any amplified controller output to the output of another amplifier or to other voltage source (such as a battery, mains source, or power supply), regardless of whether the product is turned on or off.



12. Over power risks

The product is very powerful and can be potentially dangerous to both loudspeakers and humans alike. Even when using the product's front panel attenuator to reduce the gain, it is still possible to reach full output power if the input signal level is high enough.



13. Ventilation

Openings in the LA8 amplified controller chassis are provided for ventilation. To prevent overheating and ensure reliable operation, these openings must not be blocked or covered. The product should be installed in accordance with the manufacturer instructions given in this manual.



14. Heat

Do not operate the product near any heat source, such as radiators or other devices.



15. Water and moisture

To prevent fire or shock hazard, do not expose the product to rain or moisture.

Do not use the product near water.

Do not operate the product while wet.



16. Interference with external objects and/or liquids

Never push objects of any kind into the product through openings as they may touch dangerous voltage points or short out parts that could result in fire or electric shock. Never spill liquid of any kind on the product.

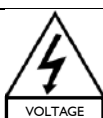


17. Cleaning

Unplug the product from the mains power supply before cleaning.

Do not use liquid or aerosol cleaners.

Use only dry cloth when cleaning any electrical component.



18. Servicing and replacement parts

Do not attempt to service any product component as removing covers may expose to dangerous voltage or other hazards.

All service and repair work must be carried out by an L-ACOUSTICS® authorized dealer.

The use of unauthorized replacement parts may result in injury and/or damage through fire, electric shock, or other electricity-related hazards.



19. Conditions which require immediate service

Servicing is required when the product has been damaged in any way such as:

- Any power supply cord or socket is damaged.
- Liquid has been spilled or an object has fallen into any electrical component.
- The product has been exposed to rain or moisture.
- The product was dropped or the housing is damaged.
- The product does not operate normally.



20. System parts and rigging inspection

All system components must be inspected before use in order to detect any possible defect.

Please refer to the "Care and Maintenance" section of this manual as well as any other manuals pertaining to the system for a detailed description of the inspection procedure.

Any part showing any sign of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.



21. Mounting instructions

Do not place the product on an unstable cart, stand, tripod, bracket, or table. The product may fall and be seriously damaged, and may cause serious human injury. Mounting of the product should follow the manufacturer instructions and should use the mounting accessories recommended by the manufacturer, as described in this manual.



22. Personnel qualification

Installation of an assembly should only be carried out by qualified personnel that are familiar with the rigging techniques and safety recommendations outlined in this manual. Any part showing any sign of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.



23. Personnel health and safety

During installation of an assembly, personnel should wear protective headgear and footwear at all times. Under no circumstances personnel should climb on the assembly.



24. Additional rigging equipment

L-ACOUSTICS® is not responsible for any rigging equipment and accessory that is not manufactured by L-ACOUSTICS®.

It is the user's responsibility to ensure that the Working Load Limit (WLL) of all additional hardware rigging accessories is greater than the total weight of the rack assembly in use.



25. Suspension points

It is the user's responsibility to ensure that the Working Load Limit (WLL) of the suspension points and/or chain hoists is greater than the total weight of the assembly in use.



26. System load capacity and setup safety limits

Load capacity and setup safety limits outlined in this manual must never be exceeded.



27. Local regulations

Some countries require higher Ultimate Strength Safety Factors and specific rigging approvals. It is the user's responsibility to ensure that any overhead suspension of L-ACOUSTICS® systems has been made in accordance with all applicable local regulations.

As a general rule, L-ACOUSTICS® recommends the use of safety steel at all times.



28. Flying an assembly

Always ensure that nobody is standing underneath an assembly when it is being raised.

As the assembly is being raised, check each individual rack to make sure that it is securely fastened to the component above. Never leave the system unattended during the installation process.



29. Ground stacking an assembly

Do not ground stack an assembly on uneven ground or platform.

If the assembly is ground stacked on a structure, platform, or stage, always check that this last can support the total weight of the system.

Secure the assembly to the structure, platform, or stage using ratchet straps or any other applicable device.



30. Dynamic load

When an assembly is deployed in an open air environment, wind effects should be taken into account. Wind can produce dynamic stress to the rigging components and suspension points. If the wind force exceeds 6 bft (Beaufort scale) it is highly recommended to lower down and/or secure the assembly.



31. Manual

Keep this manual in a safe place during the product lifetime.

This manual forms an integral part of the product.

Reselling of the product is only possible if the user manual is available.

Any changes made to the product have to be written in this manual, particularly in the event of resale.

1.3 EC declaration of conformity

L-ACOUSTICS®

13 rue Levacher Cintrat
Parc de la Fontaine de Jouvence
91462 Marcoussis Cedex
France

States that the following products:

LA-RAK touring rack, composed of:

- Rack cabinet, RK 9U;
- Amplified controllers, LA8;
- Distribution panels, LA-POWER, LA-PANEL and LA-PANEL AES3.

LA-RAK BUMP flying frame.

Are in conformity with the provisions of:

98/37/EC: Machinery Directive;

73/23/EC: Low Voltage Directive;

89/336/EC: Electromagnetic Compatibility Directive.

Applied rules and standards:

EN ISO 12100-1: 2004: Safety of machinery;

DIN 18800: Steel Structures;

BGV-C1: Germany safety regulation for overhead rigging;

EN60065: Safety requirements for audio, video and similar electronic apparatus;

EN55103-1: Electromagnetic Interference (Emission);

EN55103-2: Electromagnetic Susceptibility (Immunity).

Established at Marcoussis, France

June 2nd, 2008

A handwritten signature in black ink, appearing to read 'Pignon', enclosed within a circular scribble.

Christophe Pignon

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3 INTRODUCTION

3.1 Welcome to L-ACOUSTICS®

Thank you for purchasing the **L-ACOUSTICS® LA-RAK Touring Rack**.

This manual contains essential information on installing and operating the product correctly and safely. Read this manual carefully in order to become familiar with these procedures.

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

Should the product requires repair or if information about the warranty is needed, please contact an approved L-ACOUSTICS® distributor. In order to obtain the address of the nearest distributor go to the L-ACOUSTICS® web site.


3.2 Unpacking

Carefully open the shipping carton and check the product for any noticeable damage. Each L-ACOUSTICS® product is tested and inspected before leaving the factory and should arrive in perfect condition.

If found to be damaged, notify the shipping company or the distributor immediately. Only the consignee may initiate a claim with the carrier for damage incurred during shipping. Be sure to save the carton and packing materials for the carrier's inspection.

The **LA-RAK package** consists of the following components (see from Figure 4 to Figure 7):

- One **L-ACOUSTICS® RK 9U** cabinet with front and rear LEXAN® doors, one detachable **dolly board** and two **coupling bars**.
- Three **L-ACOUSTICS® LA8** amplified controllers equipped with the LA-AES3 board.
- One **L-ACOUSTICS® LA-POWER**.
- One **L-ACOUSTICS® LA-PANEL** analog signal and network distribution panel, with eight **XLR cables** and six **CAT5e U/FTP cables**.
- One **L-ACOUSTICS® LA-PANEL AES3** digital signal distribution panel.

	<p>The power distribution panel must be adapted to the mains rating of the country of use.</p> <ul style="list-style-type: none">• In Europe use the LA-POWER device (230 V version) presented all along this manual.• In USA use the LA-POWER US device (120 V version) presented in Appendix.• In any other country contact a local L-ACOUSTICS® distributor.
---	---

The optional **LA-RAK BUMP package** consists of the following components (see Figure 13):

- One **L-ACOUSTICS® LA-RAK BUMP** flying frame.
- Two 5/8" shackles.

3.3 Cross-references

All along the manual, a bracketed number refers to a section. For example, [3.3] stands for the present section: **Cross-references**.

3.4 Web links

Please check the L-ACOUSTICS® web site on a regular basis for latest document and software application updates. Table I provides links for all downloadable items mentioned in this manual.


	ALWAYS refer to the latest document version. ALWAYS use the latest software application version.
---	---

Table I: Links to documents and software applications

Generic path for all products	www.l-acoustics.com/ + product name
LA8 User manual LA8 FIRMWARE Pack LA8 PRESET LIBRARY Pack	www.l-acoustics.com/la8
LA-RAK User manual LA-RAK Spec sheets	www.l-acoustics.com/la-rak
LA8 PACOM CABLES Technical bulletin	www.l-acoustics.com/download (Technical publications)
LA NETWORK MANAGER User manual	www.l-acoustics.com/la-network-manager

4 SYSTEM APPROACH BY L-ACOUSTICS®

4.1 LA-RAK as a signal, network and power distribution system

The **L-ACOUSTICS® LA-RAK Touring Rack** is a central element of the L-ACOUSTICS® system architecture built upon the LA8 amplified controller. It offers an advanced rack solution for all L-ACOUSTICS® systems covering signal, power and network distribution in a comprehensive plug and play touring package. LA-RAK was created as a universal platform designed to facilitate cross-rental and to ensure compatibility with the legacy cabling standard of L-ACOUSTICS® systems.

4.2 L-ACOUSTICS® components related to LA-RAK

The system approach developed by L-ACOUSTICS® consists in providing all the components needed to offer the highest, most predictable level of performance. Here are the main components that can be used when setting an L-ACOUSTICS® system with LA-RAK (see Figure 1):

8XT, 8XTi, 12XT, 12XTi, 115XT HiQ	2-way coaxial enclosures
KIVA, KARA®, KARAI®, dV-DOSC, ARCS®	2-way WST® enclosures
KI, KUDO®, V-DOSC®	3-way WST® enclosures
KI-SB, dV-SUB	Subwoofer extensions for KI and dV-DOSC, respectively
SB18, SB18i, SB28	Subwoofer enclosures
LA NETWORK MANAGER	Remote control software
SOUNDVISION	Acoustical and mechanical 3D modeling software

A complete L-ACOUSTICS® system also features standard L-ACOUSTICS® cables and rigging accessories. For more details refer to the appropriate manuals [3.4].

LA-RAK TOURING RACK

USER MANUAL

VERSION 2.0



SOUNDVISION



LA NETWORK MANAGER



LA-RAK



8XT

8XTi



12XT

12XTi



KILO



115XT HiQ



KIVA



dV-SUB



ARCS



KUDO



SB18



dV-DOSC



V-DOSC



KARA



KI



SB18i



KARAi



KI-SB



SB28

Figure 1: Main system components related to the LA-RAK

4.3 Supported configurations

The LA-RAK working principle is entirely modular, so that the engineer can physically assemble and interconnect multiple elements to fit numerous applications. The LA-RAK configuration based on a multiple of 3 LA8 yields the maximum flexibility and power resources for any L-ACOUSTICS® system, from compact coaxial systems up to KUDO® and KI stadium line source array systems. Some examples are illustrated in Figure 2:

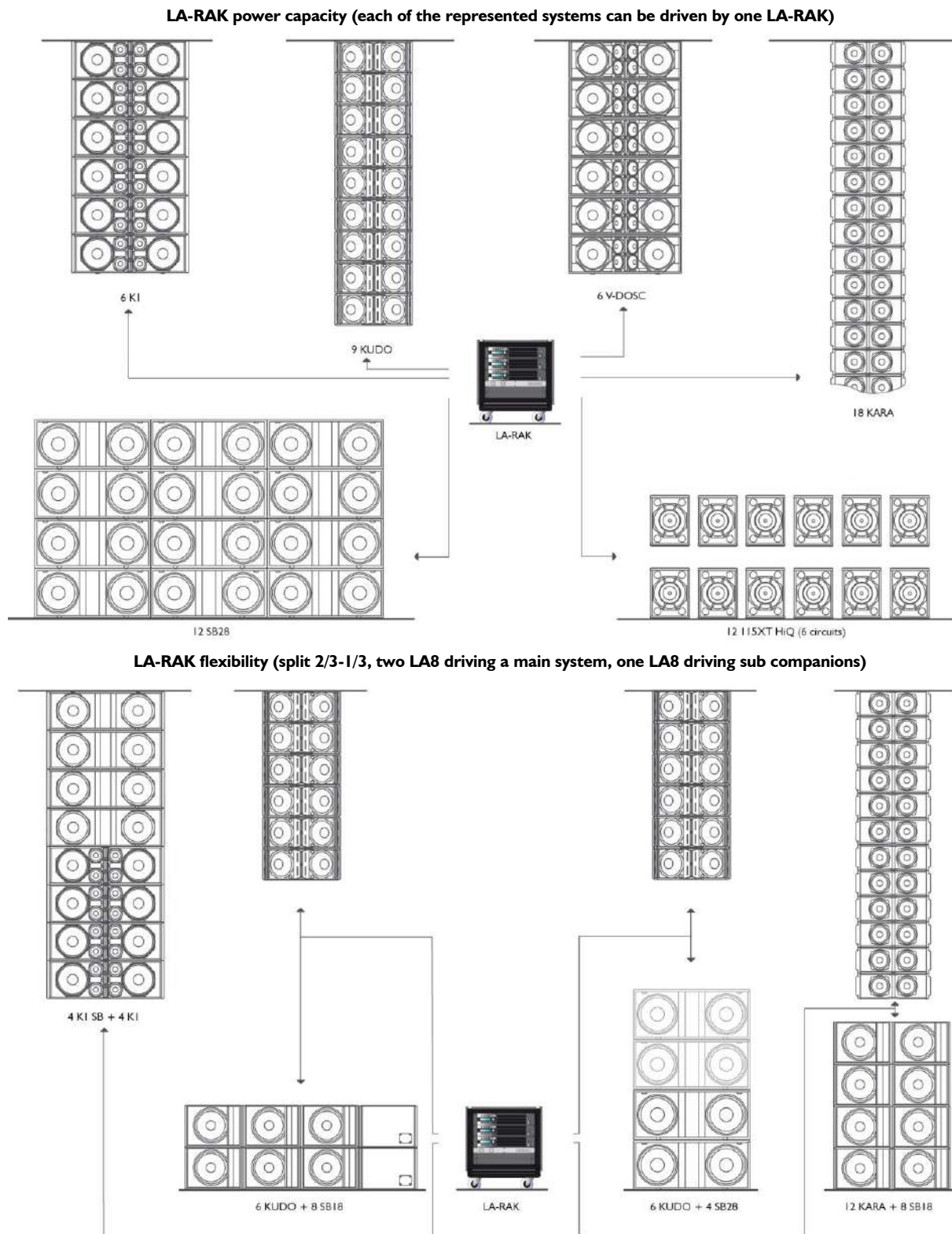


Figure 2: Power capacity and flexibility of the LA-RAK

5 LA-RAK TOURING RACK

5.1 Global architecture

The **L-ACOUSTICS® LA-RAK** is a 9U rack cabinet in which are mounted three LA8 amplified controllers, as well as three distribution panels: LA-POWER for power, LA-PANEL for analog signals and network, and LA-PANEL AES3 for digital audio signals.



Front



Rear

Figure 3: Equipped LA-RAK

5.2 RK 9U

The **L-ACOUSTICS® RK 9U** cabinet is a dual structure consisting of a rubber shock inner steel frame braced by an external aluminum frame sided with highly resistant polyethylene panels. This ensures structural integrity while offering decoupling and maximum protection of the electronics inside the rack. Two retractable LEXAN® doors protect the internal components during transport.

On the front face, one extra U space can be fitted with a shelf to receive an additional switch, for L-NET network star topologies for instance.

On the rear face, two hinge-mounted panels cover and protect the analog, digital and network connectors of the amplified controllers to create a neat and tangle-free cable environment. The rear central part of the amplified controllers remains accessible with its CA-COM® and SpeakON® sockets.

The RK 9U is equipped in standard with a detachable transport dolly board and two coupling bars. These last also allow arraying several LA-RAK in flown or stacked configurations.

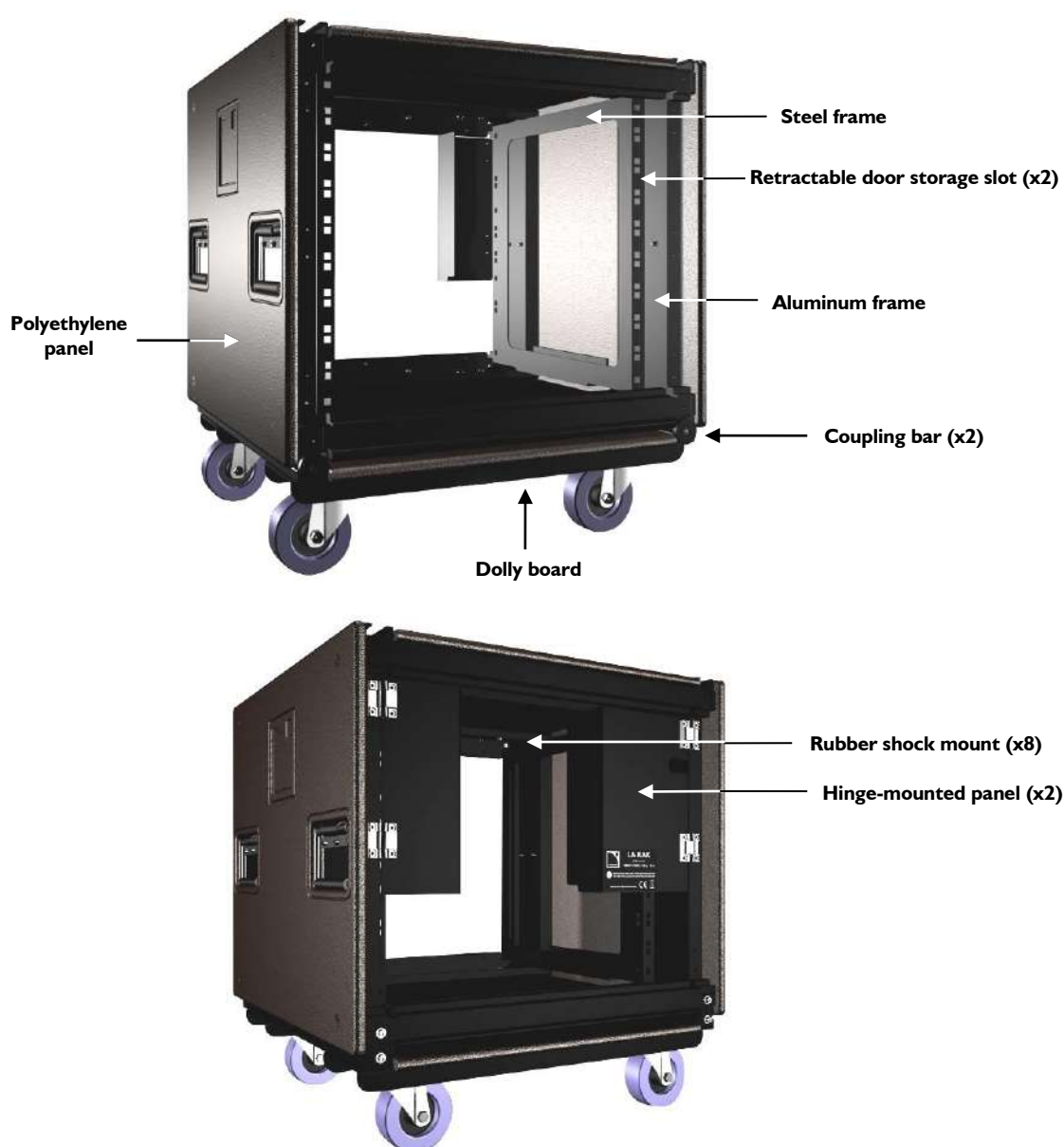


Figure 4: The RK 9U cabinet

5.3 LA8 amplified controllers

The **L-ACOUSTICS® LA8** amplified controller is the top of the range of high-end integrated controllers entirely dedicated to the comprehensive operation of L-ACOUSTICS® loudspeaker systems. In a 2U lightweight chassis, the LA8 combines the resources of a 2 x 4 DSP engine driving four channels of amplification and delivering up to 1800 W per channel at 4 ohms. It features a storage capacity of 99 presets, a user-friendly front panel interface, two I/O Ethernet® connection ports for network remote control, a connection panel for analog audio inputs, an LA-AES3 board for digital audio inputs and a connection panel for speaker outputs. Refer to **LA8 User manual** [3.4] for more details.



Figure 5: The LA8 amplified controller

5.4 LA-POWER

The **L-ACOUSTICS® LA-POWER** is a 2U/19" I/O 230 V power distribution panel featuring a 32 A three-phase circuit: one IN plug and one LINK OUT outlet to power a secondary rack. This configuration allows the power to be automatically balanced with an even number of LA8 per phase.

Three “Shuko” AC outlets (L1, L2, and L3) are available for LA8, and three additional outlets (1 x “Shuko” and 2 x IEC) are available to power auxiliary accessories such as Ethernet® switches, portable computer, and the like. All circuits are protected by discrete circuit breakers and three LED help monitor phase presence.

Note: The three LA8 AC outlets can be replaced by a 3 x 20 A Powercon® plate using the predrilled template fitted with four M5 screws (the “M5” notation refers to the European standard, see applicable external documentation).

Note: See Appendix 0 for LA-POWER US description or contact a local L-ACOUSTICS® representative for any country located outside Europe and USA.

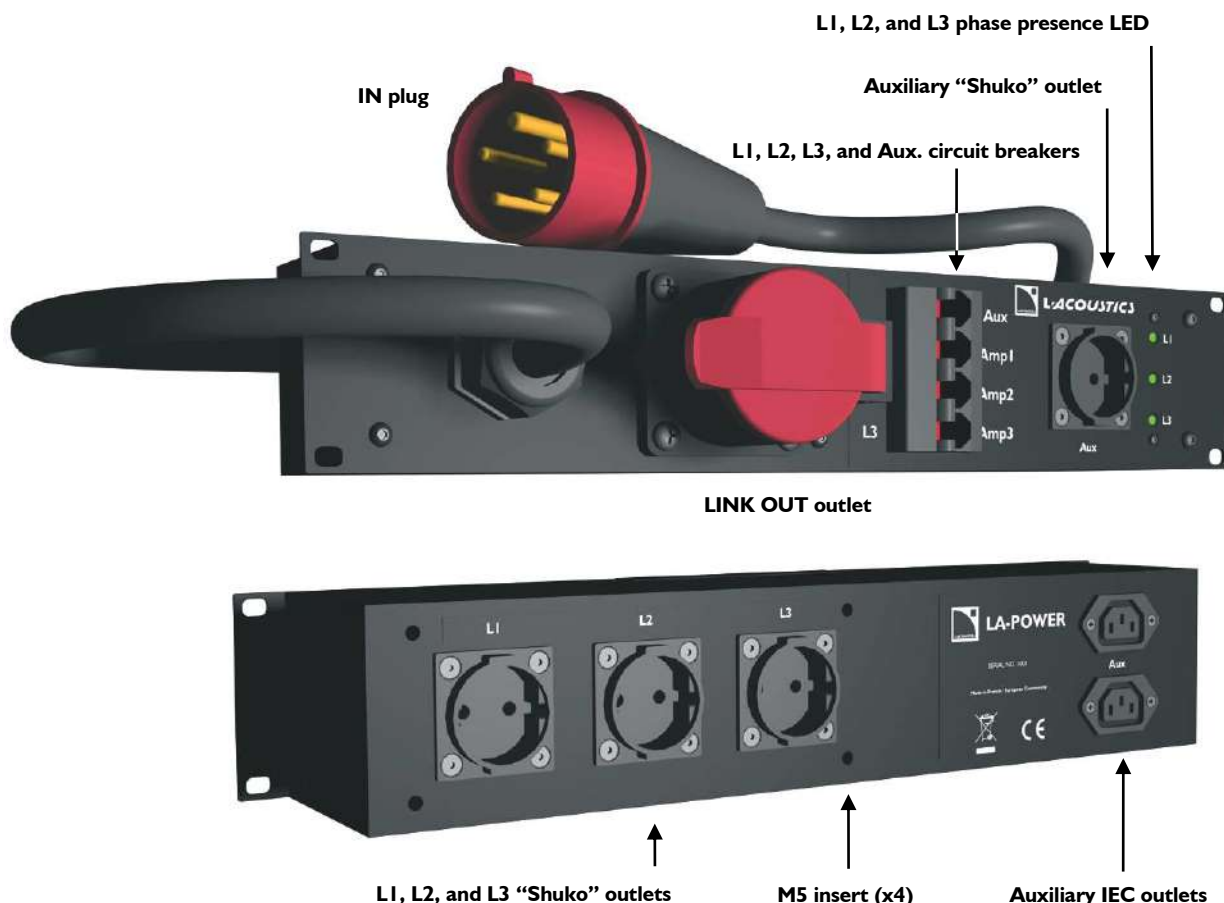


Figure 6: The LA-POWER

5.5 LA-PANEL

The **L-ACOUSTICS® LA-PANEL** allows distribution of 6 analog audio signals. The LA-RAK is fed with the signals through the SIGNAL INPUT 19-point PA-COM® connector. The signals can be distributed to the 3 amplifiers thanks to 6 OUT XLR3 connectors on the rear side of the panel. The SIGNAL OUTPUT 19-point PA-COM® connector allows sending the 6 signals to another LA-RAK in a daisy-chain layout. The PA-COM® connectors ensure compatibility with the L-ACOUSTICS® cabling standard (DOM2, DOM30, DOMF, and DOMM cables).

The panel also features 4 Ethercon® I/O sockets for L-NET control & monitoring network and L-DGA digital audio network (for future applications).

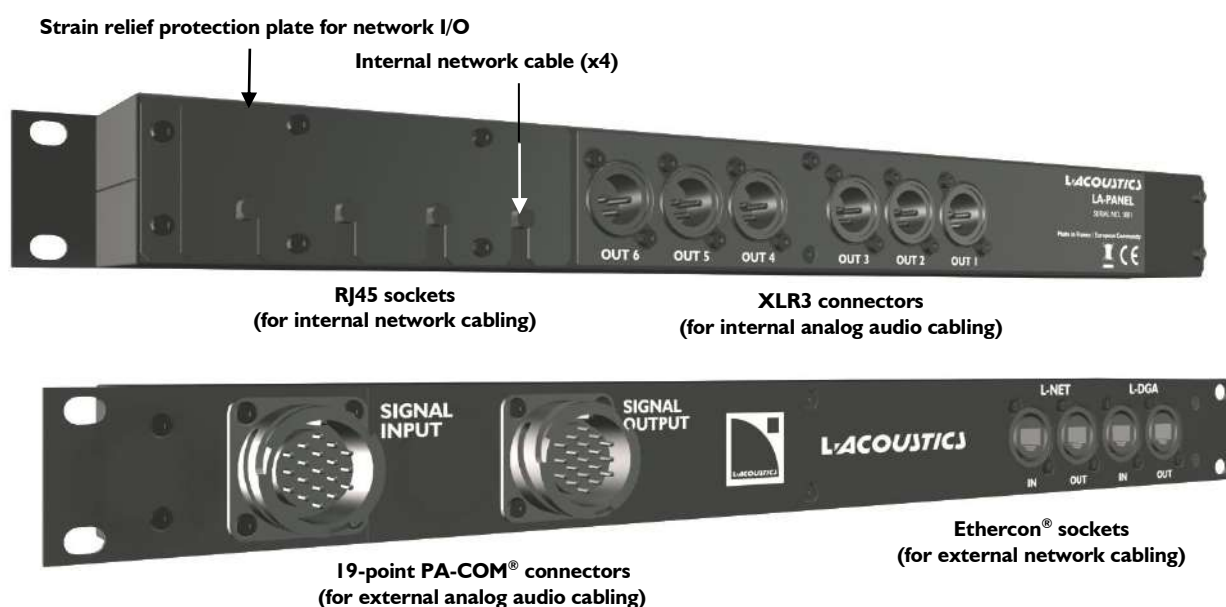


Figure 7: The LA-PANEL

5.6 LA-PANEL AES3

The **L-ACOUSTICS® LA-PANEL AES3** allows distribution of 6 digital audio signals. The LA-RAK is fed with AES/EBU signals through 3 IN XLR3 connectors, each of them receiving 1 digital signal conveying 2 audio channels. The signals can be distributed to the 3 amplifiers thanks to 3 OUT XLR3 cables integrated on the rear side of the panel. In order to set a daisy-chain layout, the 3 LINK XLR3 cables allow routing pairs of channels from the LINK connector of the amplifiers to the corresponding LINK XLR3 connector on the front side of the LA-PANEL AES3.

Also are provided 2 extra XLR cables, to connect LINK and IN connectors on the front of the panel. This operation allows setting a daisy-chain between controllers within the LA-RAK (see [6.7]).

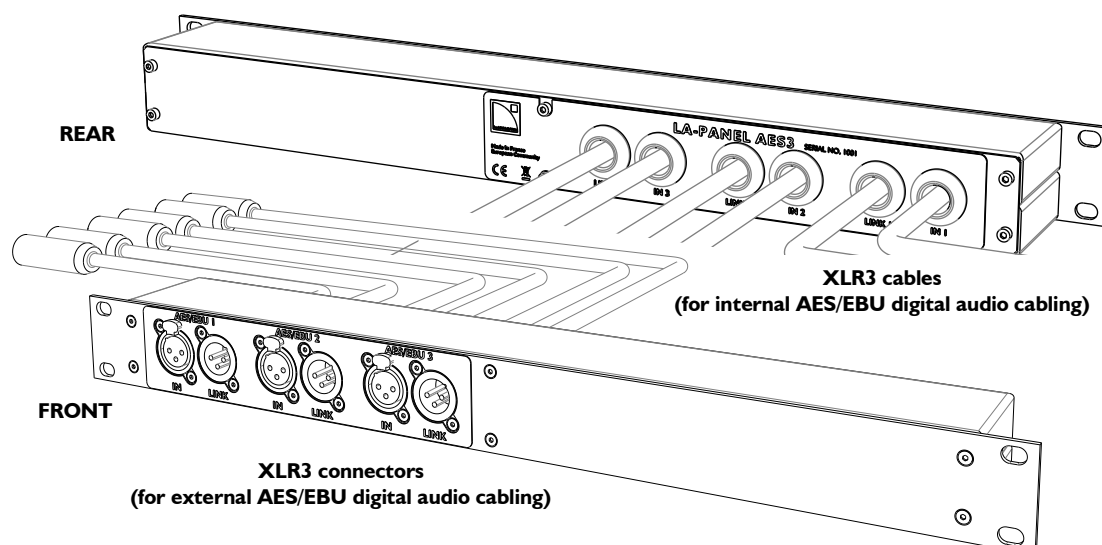



Figure 8: The LA-PANEL AES3

6 INSTALLATION

6.1 Mounting components inside the LA-RAK

The **9U inner frame** (see Figure 4) is for mounting components to both front and rear faces:


- The LA-PANEL, the LA-PANEL AES3 and optional switches mount to the front face using four screws and four washers each.
- The LA-POWER mounts to the rear face using four screws and four washers.
- Each LA8 mounts to both front and rear faces using eight screws and eight washers.



During transport or while on tour it is essential that the LA8 controllers are rear supported in addition to the front panel mounting. Use the rear rack support brackets provided with each LA8 or the LA-RAK optional spacers (see references in section [7.4]).

6.2 Moving and transporting the LA-RAK


The **removable dolly board** (see Figure 10) is for moving and transporting a vertical array of two LA-RAK. It secures to the bottom LA-RAK using two **coupling bars** (see [6.4]).



For moving or transporting purposes, a maximum of **two LA-RAK** can be set onto **one dolly board**.

6.3 Amp cooling

Each LA8 amplified controller uses a forced air cooling system to maintain a low and even operating temperature. All fan cooled L-ACOUSTICS® amplified controllers have front to rear airflow.



Before operation, ensure that the front filter system of each LA8 is clean and dust free (see the **LA8 User Manual** [3.4]).
While operating keep the LEXAN® front and rear doors retracted (see below) and do not block the LA8 front and rear air vents.

Apply the following procedure to retract and lock the LEXAN® doors:

- a. Detach both doors and slide them along both LA-RAK sides (between the outer aluminum frame and the inner steel frame).
- b. Insert and lock both ball locking pins through each door's bottom hole.

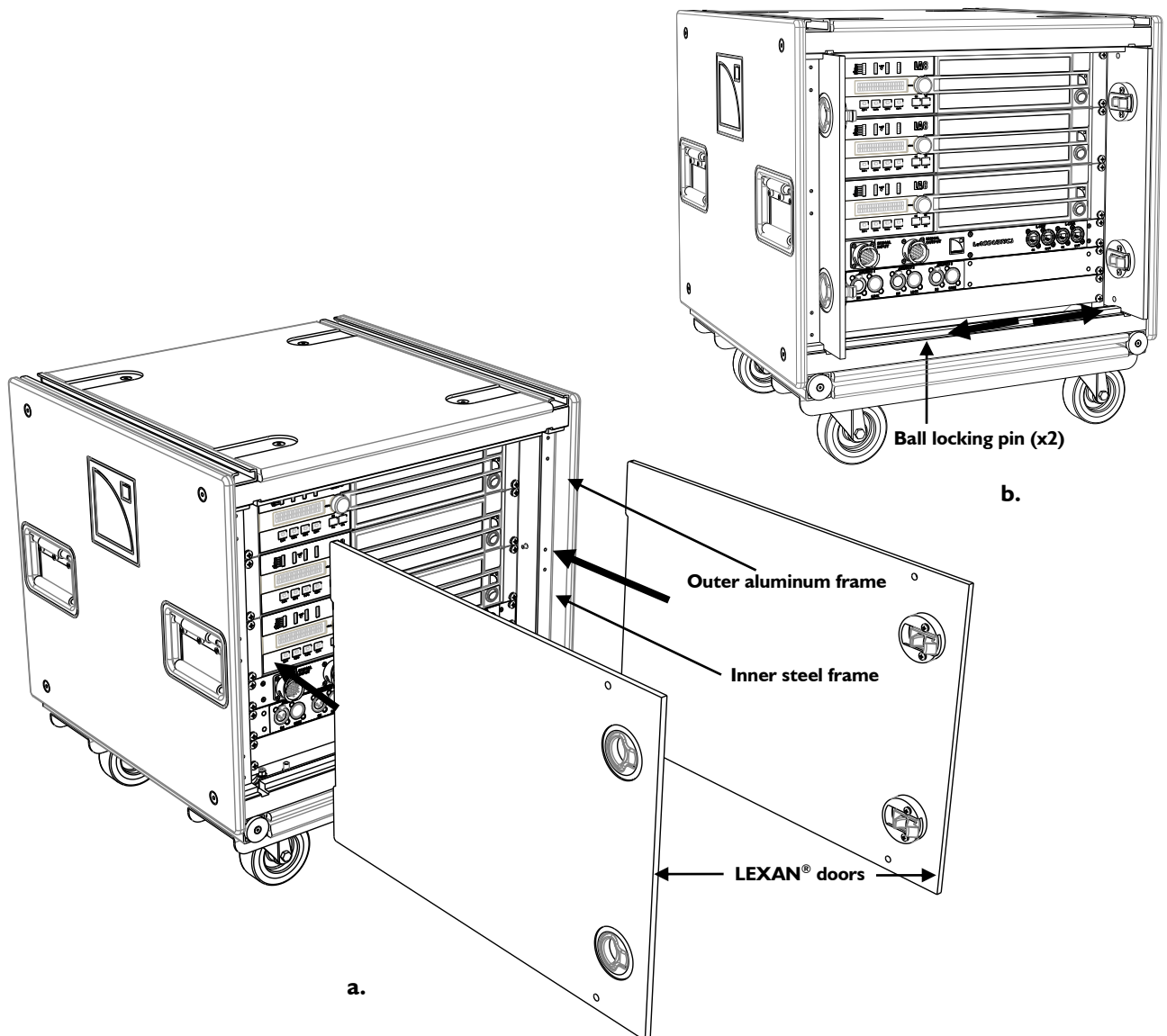


Figure 9: Retracting and locking both LEXAN® doors

6.4 Rigging the LA-RAK

The LA-RAK features four fully integrated rigging rails on top and bottom faces as well as four stacking runners which mate with four runner guides. These are for assembling several LA-RAK in stacked or flown configurations such as:

- Stacking a vertical array of up to 3 LA-RAK onto one **dolly board**;
- Flying a vertical array of up to 4 LA-RAK underneath the **L-ACOUSTICS® LA-RAK BUMP** flying frame or onto the **L-ACOUSTICS® KI-BUMP** flying frame.

6.4.1 Stacking procedure

	<p>All along the procedure:</p> <ul style="list-style-type: none">• Strictly follow the sequence of the successive steps.• Systematically ensure that each spring-loaded safety is in locking position.
--	--

1. Bring a first LA-RAK at the stacking location.
2. Bring a second LA-RAK and remove its dolly board:
 - a. Turn a spring-loaded safety and slide out the coupling bar.
 - b. Repeat for the second coupling bar.

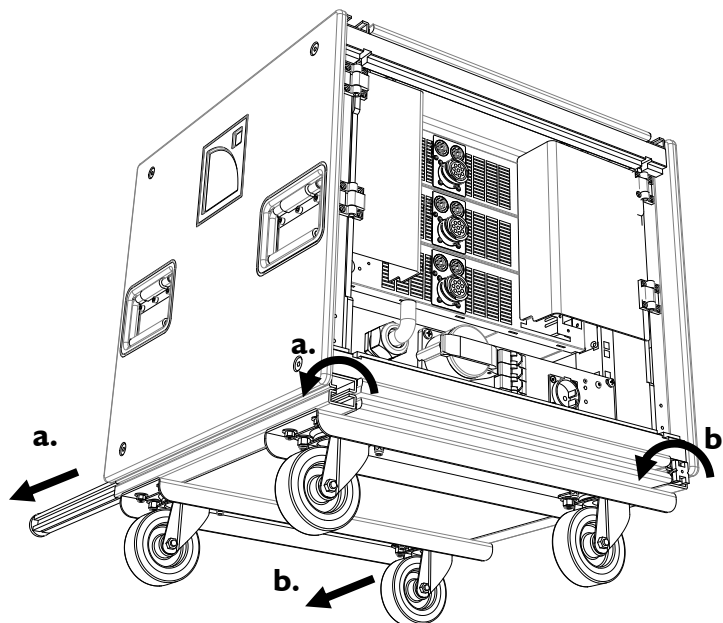


Figure 10: Removing the dolly board from the LA-RAK

3. Lift up the second LA-RAK and install it on the first one: align the rails and set the stacking runners into the runner guides.

4. Secure the second LA-RAK to the first one:
 - a. Turn a spring-loaded safety and slide the coupling bar in along the rails until the safety has returned to locking position (a click should be heard).
 - b. Repeat for the second coupling bar.

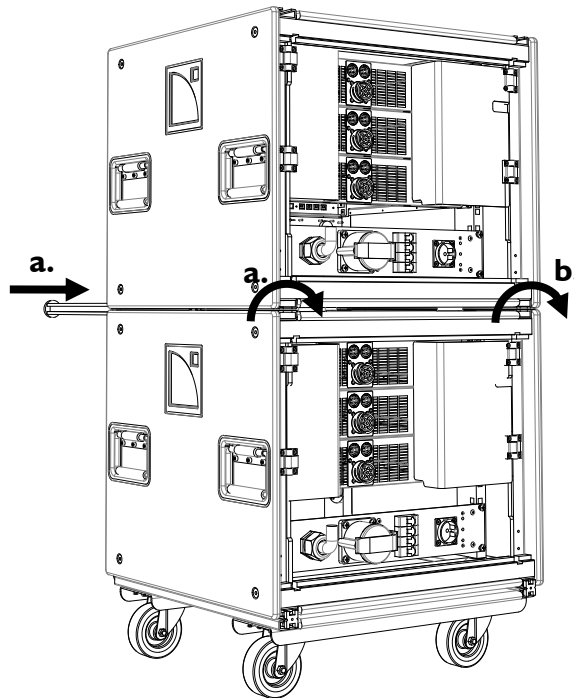


Figure 11: Rigging a second LA-RAK

5. Secure a third LA-RAK by repeating the steps from 2 to 4.



A maximum of **three LA-RAK** can be **stacked** onto one dolly board.

Secure the stacked LA-RAK assembly to the structure, platform, or stage using ratchet strap or any other applicable device.

LA-RAK TOURING RACK

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VERSION 2.0

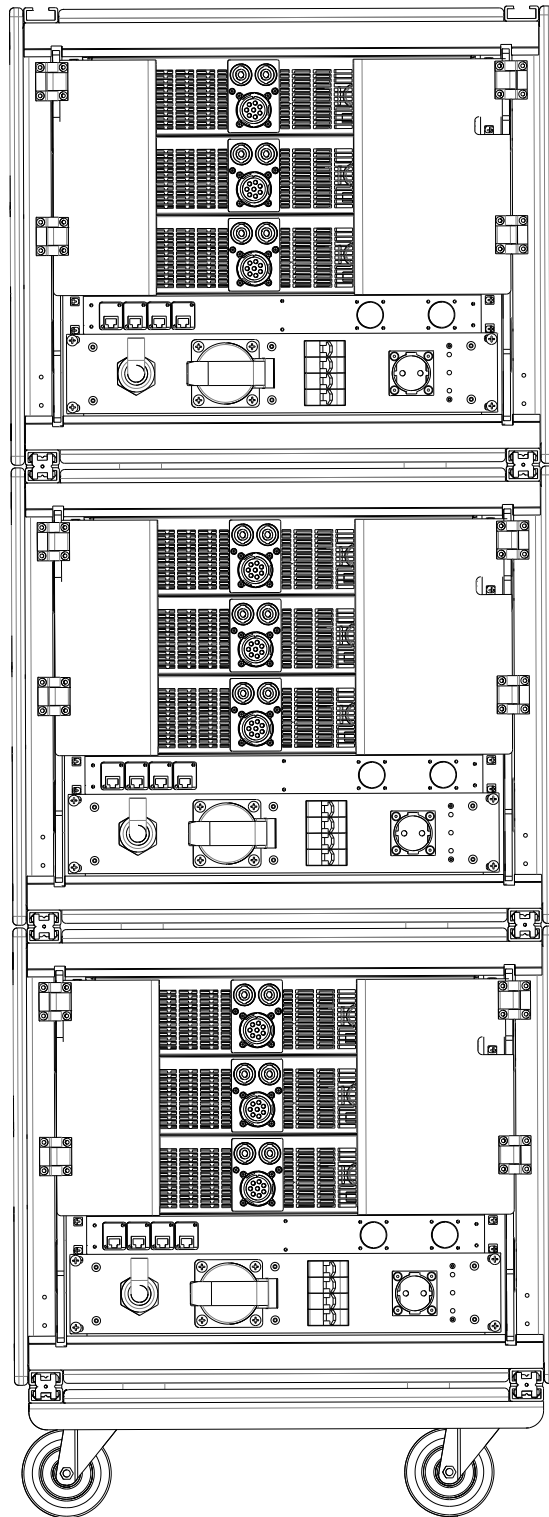


Figure 12: Three stacked LA-RAK (maximum configuration)

6.4.2 Flying procedure using the LA-RAK BUMP

The L-ACOUSTICS® LA-RAK BUMP flying frame is engineered to fly 4 LA-RAK for a drive capacity of up to 24 KI enclosures. It can be flown using single pick-point and secured to an additional safety point. It is assembled with bolts for mechanical integrity visual check and is protected by polyester-coating to enhance weather resistance.

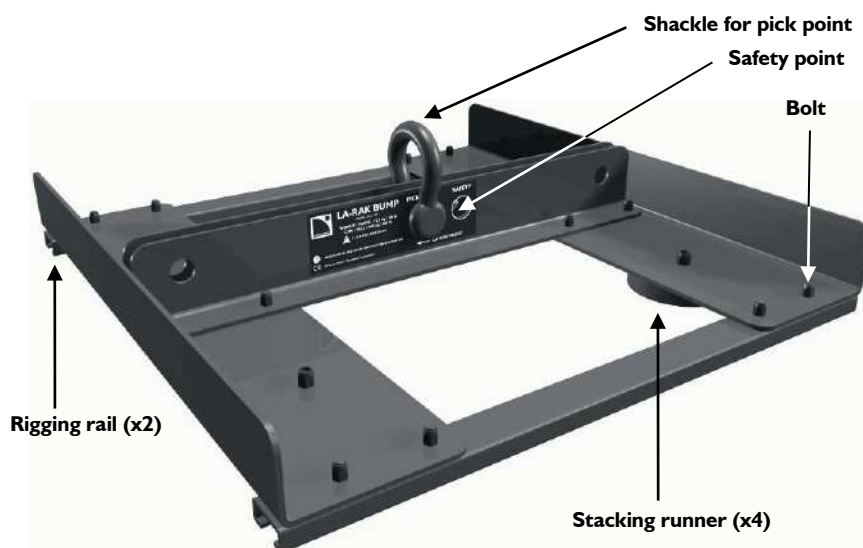



Figure 13: The LA-RAK BUMP



All along the procedure:

- Strictly follow the sequence of the successive steps.
- Systematically ensure that each spring-loaded safety is in locking position and that screw pin is correctly secured on each shackle anchor.

1. Bring a first LA-RAK under the rigging point.
2. Remove both coupling bars:
 - a. Turn a spring-loaded safety and slide the coupling bar out.
 - b. Repeat for the second coupling bar.

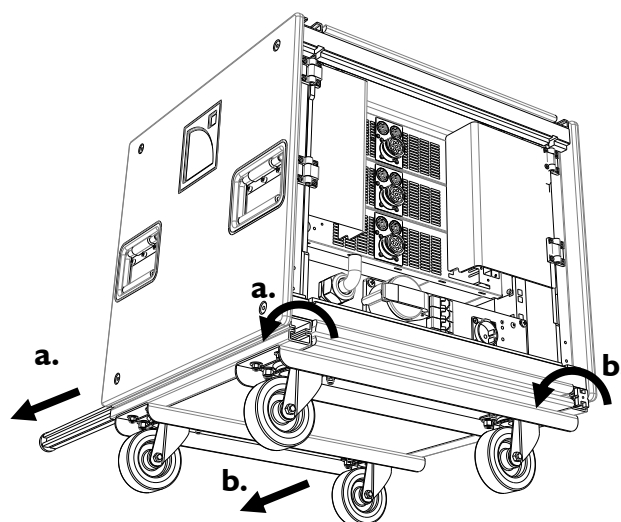


Figure 14: Removing coupling bars from LA-RAK

LA-RAK TOURING RACK

USER MANUAL

VERSION 2.0

3. Install the LA-RAK BUMP on the LA-RAK: align the rails and set the stacking runners into the runner guides.



Respect the orientation indicated beside the LA-RAK FRONT label.

4. Secure the LA-RAK BUMP to the LA-RAK (use both preceding coupling bars):

- a. Turn a spring-loaded safety and slide in the coupling bar along the rails until the safety has returned to locking position (a click is heard).
- b. Repeat for the second coupling bar.

5. Attach the motor hook to the "PICK POINT" shackle.

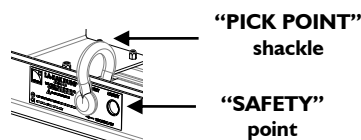
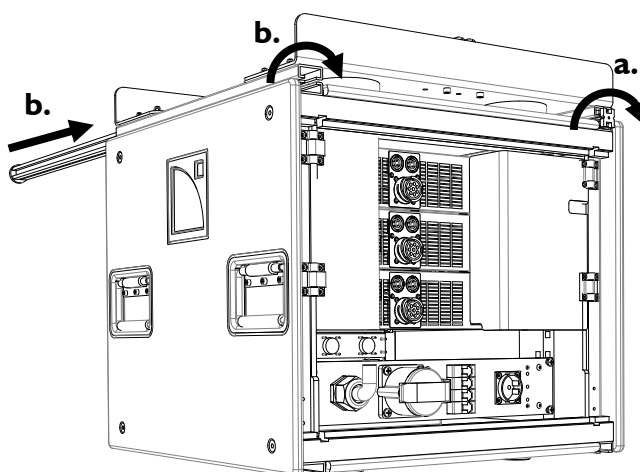


Figure 15: Attaching LA-RAK BUMP to LA-RAK

6. Raise the LA-RAK BUMP/LA-RAK assembly at 0.7 m/2 ft height: the dolly board should separate from the array.
7. Bring a second LA-RAK under the rigging point.
8. Remove both coupling bars by repeating step 2.
9. Lower the first LA-RAK so as to set it on the second one: align the rails and set the stacking runners into the runner guides.
10. Secure the first LA-RAK to the second one (use both preceding coupling bars):
 - a. Turn a spring-loaded safety and slide the coupling bar in along the rails until the safety has returned to locking position (a click should be heard).
 - b. Repeat for the second coupling bar.

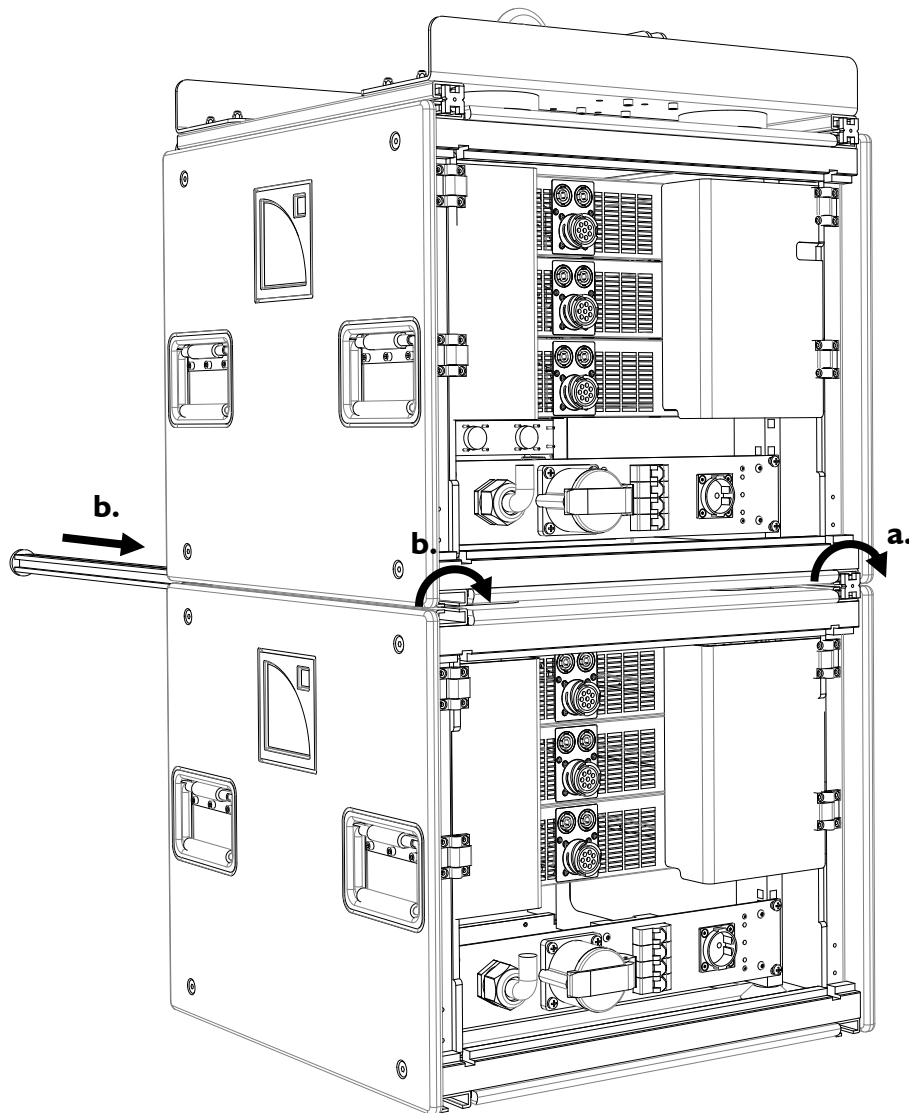


Figure 16: Securing the first LA-RAK to the second one (motor chain not represented)

11. Repeat steps from 6 to 10 for each remaining LA-RAK.



A maximum of **four LA-RAK** can be flown under **one LA-RAK BUMP**.

12. Raise the LA-RAK array at desired height.



Secure the LA-RAK flown array to the main structure using the **SAFETY** shackle (see Figure 15) and a sling.

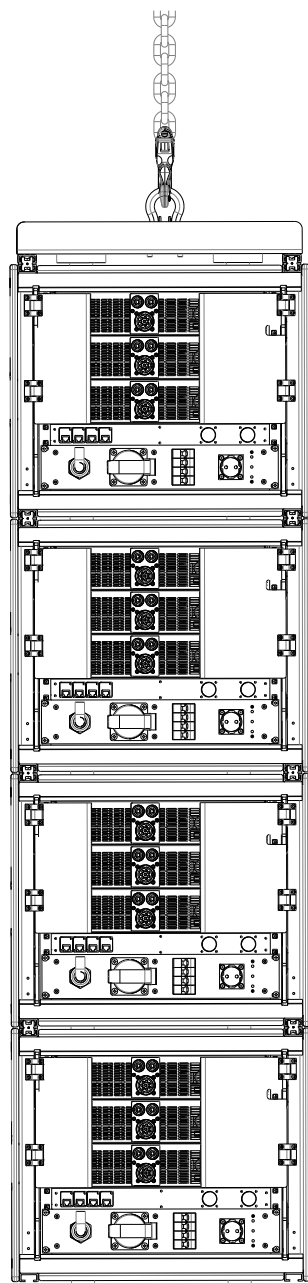


Figure 17: Four flown LA-RAK (maximum configuration)


6.4.3 Flying procedure using the KI-BUMP

Please refer to the **KI Rigging Procedures** manual [3.4].

6.5 Connecting LA-RAK to AC mains


6.5.1 LA-POWER three-phase circuit

The LA-POWER connects to **230 V ($\pm 10\%$) / 32 A three-phase AC mains** using the male IN cable plug (P17 - 32 A - 3P+N+G).



The LA-POWER only connects to three-phase AC mains rated 230 V ($\pm 10\%$) / 32 A, 50 - 60 Hz. Contact a local L-ACOUSTICS® distributor for countries in which this standard does not apply.

A second LA-RAK can be plugged in the female LINK OUT outlet of the first LA-RAK to be powered in parallel.



Powering **two LA-RAK in parallel** is only possible in the 230 V ($\pm 10\%$) countries. In this case a maximum of **two LA-RAK** can be powered in parallel by one AC mains outlet. For any other mains ratings, **a maximum of one LA-RAK** can be connected per AC mains outlet.

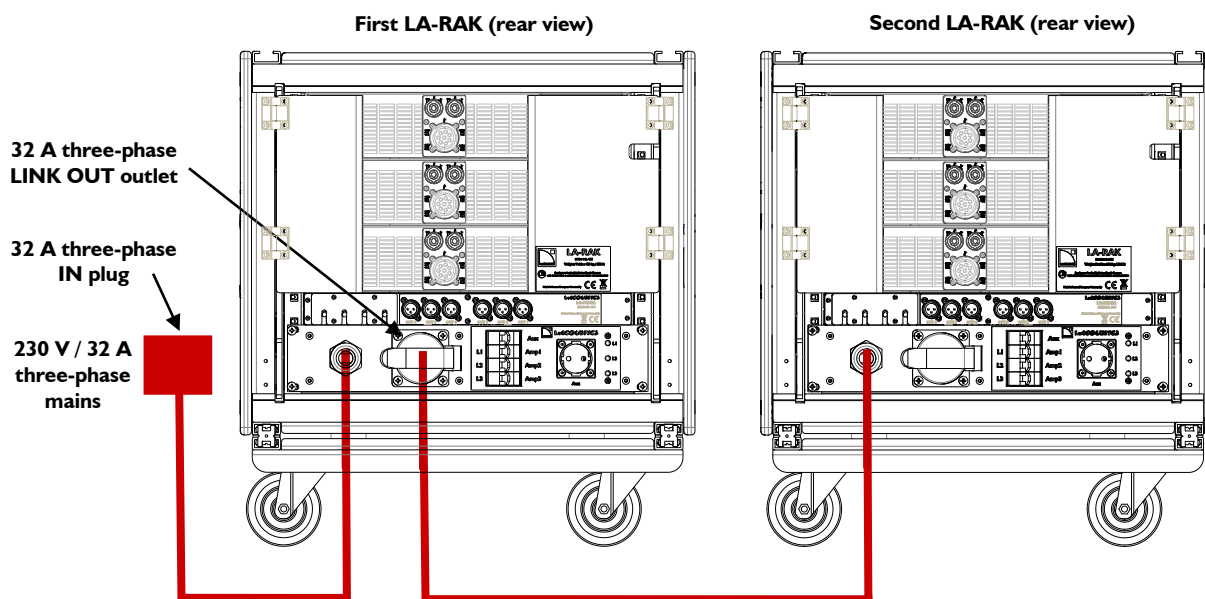


Figure 18: Parallel connection of two 230 V LA-RAK to AC mains

6.5.2 LA-POWER mono-phase circuits



Connect LA-RAK to AC mains **only** if the operating voltage indicated on the LA8 back panels corresponds to the local AC mains rating.

Two LA8 versions are available (also refer to the **LA8 User Manual** [3.4]):

- A universal 120/230 V ($\pm 10\%$) version fitted with automatic switch mode power supply.
- A specific 100 V ($\pm 10\%$) version for Japan.

The LA-POWER three-phase circuit described in section [6.5.1] powers the three mono-phase circuits corresponding to the **L1**, **L2**, and **L3** “Shuko” female outlets located on the rear face. These last allow connection of the three LA8 amplified controllers mounted in the LA-RAK (see Figure 19).

Each outlet is protected by a **16 A type C** circuit breaker located on the front face and three LED help monitor the presence of each phase on the front end of the mains circuit.

The LA-POWER also includes an **auxiliary circuit** protected by the “Aux” **10 A** circuit breaker, shunted from phase I. This circuit powers one “Shuko” outlet located on the front face (to connect portable computer and the like) and two IEC CEE22 outlets located on the rear face (to connect additional Ethernet® switches).

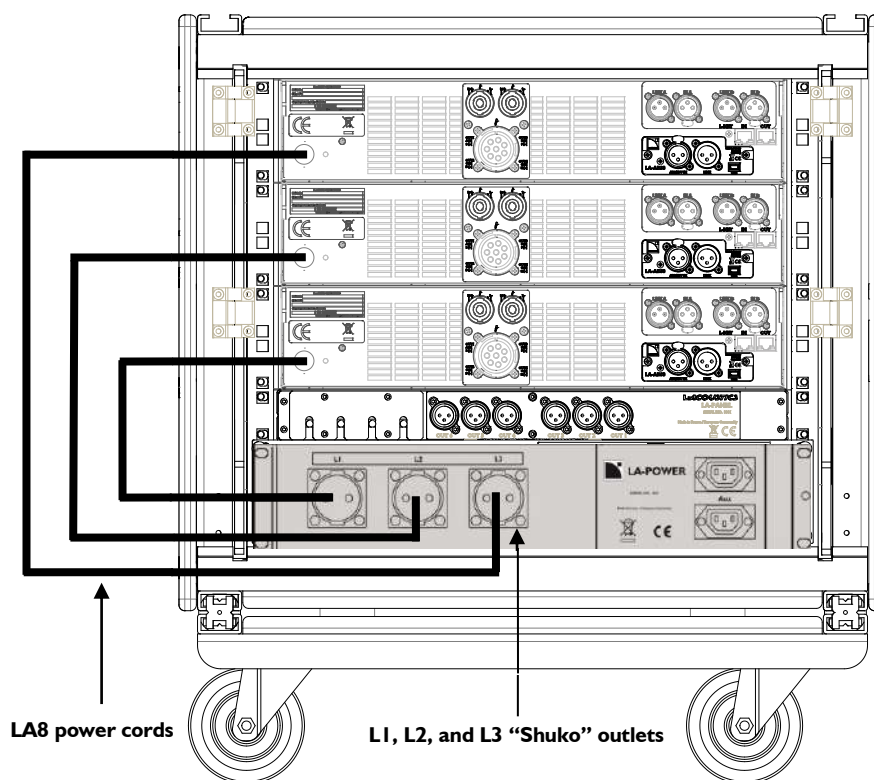


Figure 19: Powering three LA8 within an LA-RAK (LA-POWER rear panel represented)

6.6 Analog audio cabling

6.6.1 Internal cabling

With analog audio, routing modularity is achieved through internal cabling, whereas external cabling uses a constant scheme (see [6.6.2]).

An **XLR connection panel** located on the rear side of the LA-PANEL and a set of **six XLR cables** allow distributing up to six different analog audio signals to the LA8 amplified controllers. As the possible internal audio cabling schemes are numerous only two representative ones are shown in Figure 20:

- One audio signal routed from channel #1 to the analog IN A on the first amplifier. LINK A / IN A cabling is then used to cascade all three LA8.

Note: In this example, only the A channel is physically linked on each LA8 and only the A channel can further be routed to all four output channels on each LA8. Use the LA NETWORK MANAGER Matrix function as described in the **LA NETWORK MANAGER User Manual** [3.4].

- Six audio signals respectively routed from channels #1-6 to the six controller analog inputs. In this case only the INPUT connectors are used on the amplifiers.

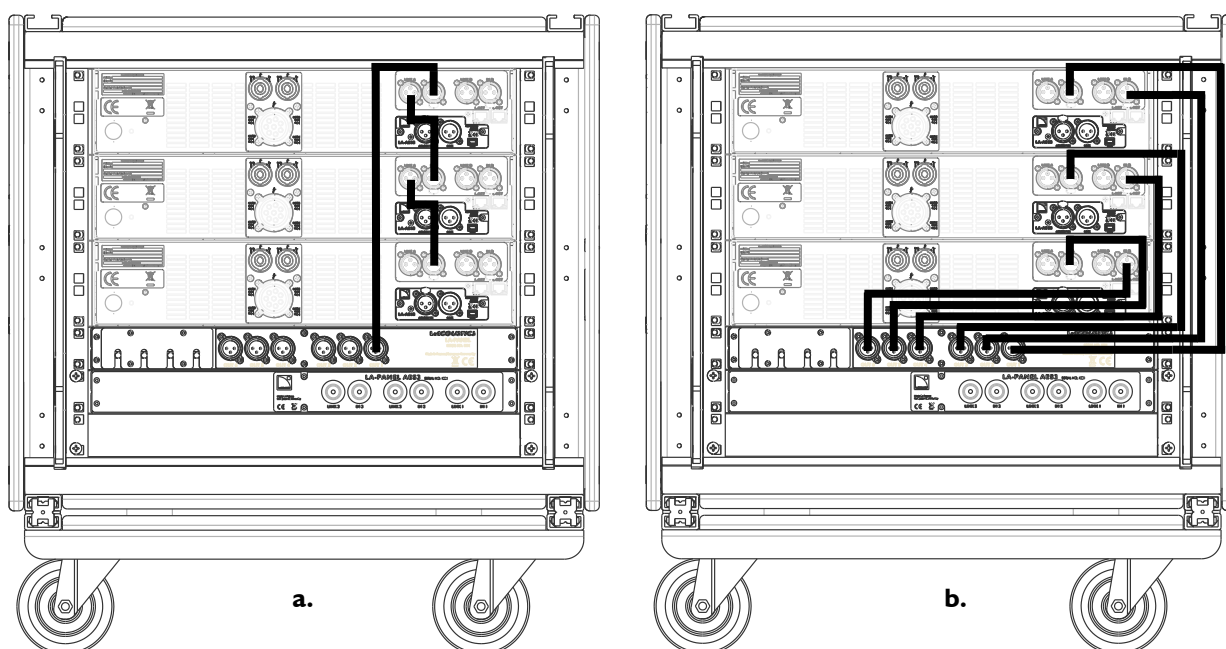


Figure 20: Internal analog audio cabling for (a) 1 or (b) 6 input signals (LA-POWER not represented)

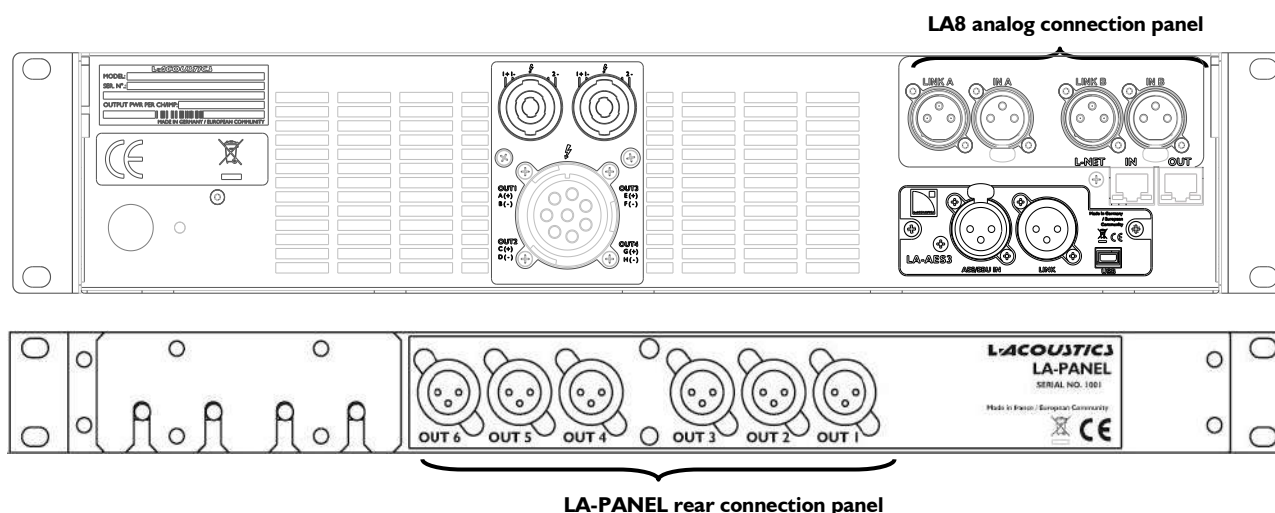


Figure 21: Analog audio connection panels on LA8 and LA-PANEL (rear views)


6.6.2 External cabling

With analog audio, external cabling uses a constant scheme that allows feeding a LA-RAK, or a LA-RAK daisy-chain, with up to 6 signals. For any LA-RAK, the internal cabling (see [6.6.1]) determines how many channels are used, which ones, and which amplifier receives them.

With L-ACOUSTICS® modulation cables (see Table 2), six audio signals can be routed from an analog audio source (mixing console or EQ device) to the SIGNAL INPUT connector (19-point PA-COM®) on the LA-PANEL of a first LA-RAK.

An LA-RAK daisy-chain layout can then be set up by cabling the SIGNAL OUTPUT connector of the LA-PANEL with the SIGNAL INPUT connector located on the LA-PANEL of another LA-RAK.

The six analog audio signals can also be routed from the last LA-RAK to other signal processing devices using the DOMM cable.



Cascading several LA-RAK cause losses in the analog signal. The losses increase in line with the number of LA-RAK and the console output impedance. Typically, cascading 16 LA-RAK will cause a -1 dB loss with a 50 Ω console and a -3 dB loss with a 150 Ω console.

Table 2: L-ACOUSTICS® modulation cables

Cable reference	Input connector(s)	Output connector(s)	Length (m / ft)
DOMF	6 x balanced female XLR	19-point female PA-COM® with ring	1.5 / 5
DOMM	19-point female PA-COM® with ring	6 x balanced male XLR	1.5 / 5
DOM2	19-point female PA-COM® with ring	19-point female PA-COM® with ring	2 / 6.5
DOM30	19-point female PA-COM® with ring	19-point female PA-COM® with ring	30 / 100
DOM45	19-point female PA-COM® with ring	19-point female PA-COM® with ring	45 / 150
DOMP-2	19-point male PA-COM®	19-point male PA-COM®	0.5 / 1.5



DOMF



DOMM



DOM2



DOMP-2



DOM30



DOM45

Figure 22: L-ACOUSTICS® modulation cables

The Figure 23 shows the external analog audio cabling principle including all available L-ACOUSTICS® modulation cables.

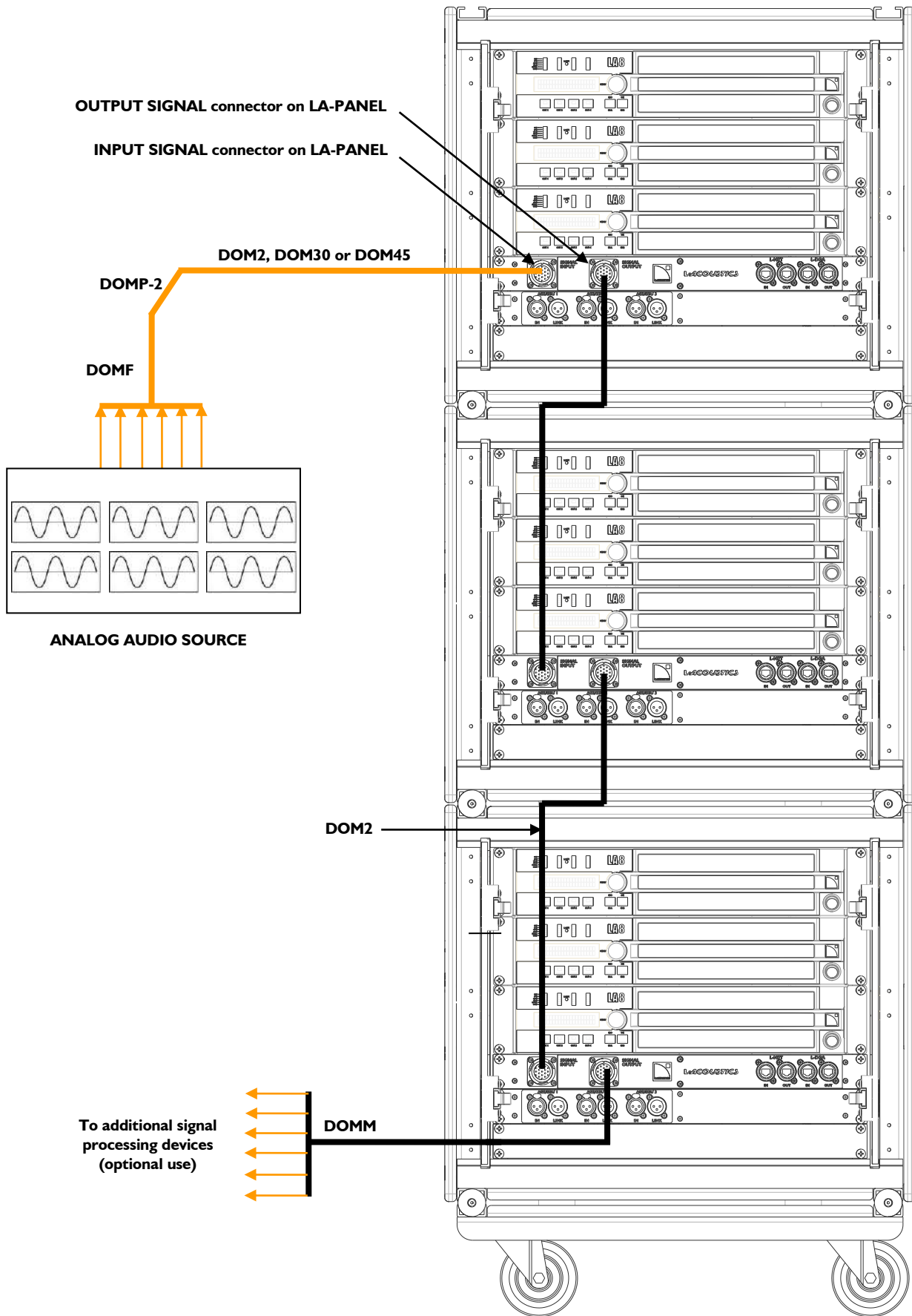


Figure 23: Feeding three LA-RAKs with 6 analog audio signals

6.7 Digital audio cabling

6.7.1 Internal cabling

With digital audio, internal cabling uses a constant scheme. As digital audio requires an active refresh of the signal that is provided by the LA-AES3 card, routing modularity is achieved through external cabling [6.7.2]. The only internal cabling scheme that should be used is shown in Figure 24.

The XLR3 cables (IN/LINK) at the back of the LA-PANEL AES3 allow distributing up to six different digital audio signals. Each IN connector of the front patch panel of the LA-PANEL AES3 is cabled to the AES/EBU IN connector on the respective LA8, using the appropriate IN XLR cable..

Each AES/EBU LINK connector on the amplifiers is then cabled to the respective LINK connector of the LA-PANEL AES3 using the appropriate LINK XLR cable.

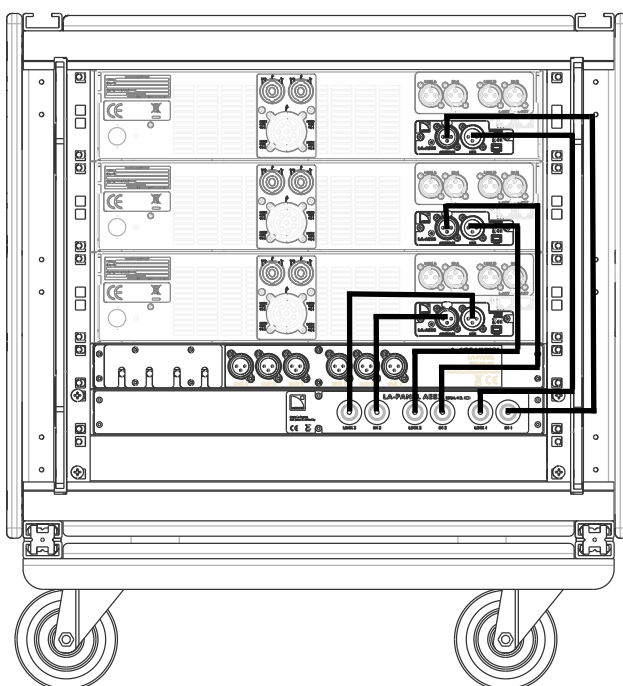


Figure 24: Internal digital audio cabling (LA-POWER not represented)

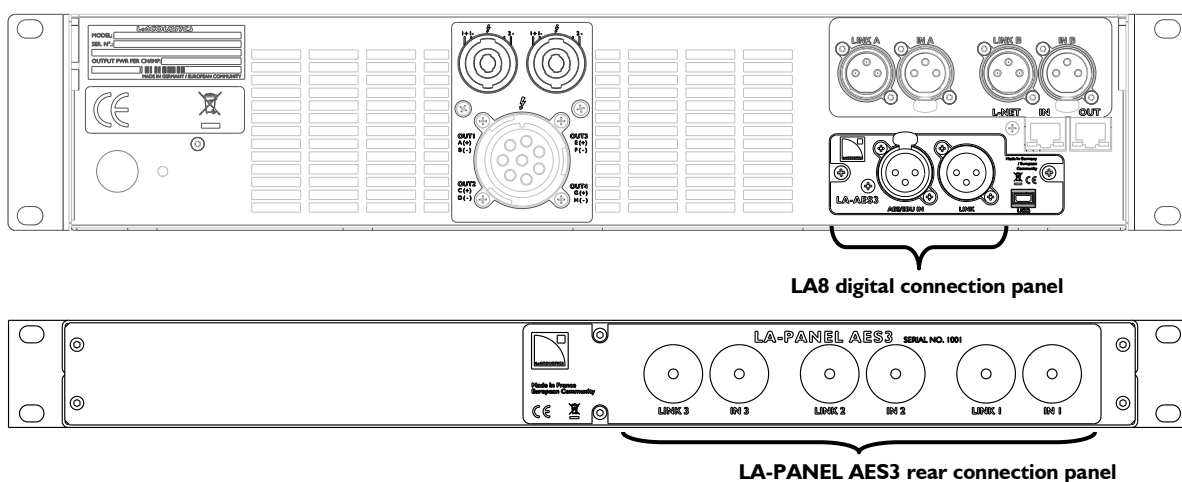


Figure 25: Digital audio connection panels on LA-PANEL and LA8 (rear views)

6.7.2 External cabling

With digital audio, routing of the signals is achieved in a convenient and flexible manner through external cabling, by using the patch panel on the front of the LA-PANEL AES3. Two examples are given in Figure 26 and Figure 27.

Up to six digital audio signals can be routed from an AES/EBU digital audio source (mixing console or EQ device) to the LA-PANEL AES3 via three XLR3 cables, each one conveying two channels.

Provided the internal cabling is correct (see [6.7.1]), each pair of signals can be routed in a daisy-chain layout, by cabling the corresponding LINK connector of the LA-PANEL AES3 to another IN connector of the same LA-PANEL AES3 (for internal daisy-chaining), or to an IN connector of another LA-PANEL AES3 (for external daisy-chaining). It allows modular routing layouts.



Here is important information about **cables for AES/EBU digital audio**:

- The quality required for the XLR cables will depend on the cable length and the signal sampling frequency. As a starting point, a standard balanced microphone cable of maximum length of 50 m/150 ft can be used to transport a signal of maximum sampling frequency of 48 kHz. Higher sampling frequencies may require reducing the cable length since the signal attenuation in cables increases with the sampling frequency.
- As AES/EBU certified cables provide smaller attenuation/length ratio, it is highly recommended to use them in installations requiring long cable runs or high sampling frequency signals.
- The LA-AES3 has been tested with **up to 305 m/1000 ft** of 3 models of AES/EBU rated cables: Belden® 1696A, Klotz Cables® OT234H, and Sommer Cable® SC BINARY 234 (single cuts, digital source signal running at $F_s = 48$ kHz).
- Using several cuts of cables will decrease performances.
- In case an amplified controller shutdowns, the failsafe relay makes a passive connection between the AES/EBU IN port and the LINK port to maintain continuity. However the signal is no longer refreshed for the next amplified controller, so that the input cable and the link cable must be considered as a unique input cable with regard to the maximum supported length.
- In case of transmission losses, try to reduce the sampling frequency of the digital audio source. Moreover, as a general rule, avoid using sources rated beyond 96 kHz as the maximum possible cable length will be reduced while the additional information will anyway be cancelled by SRC to 96 kHz.

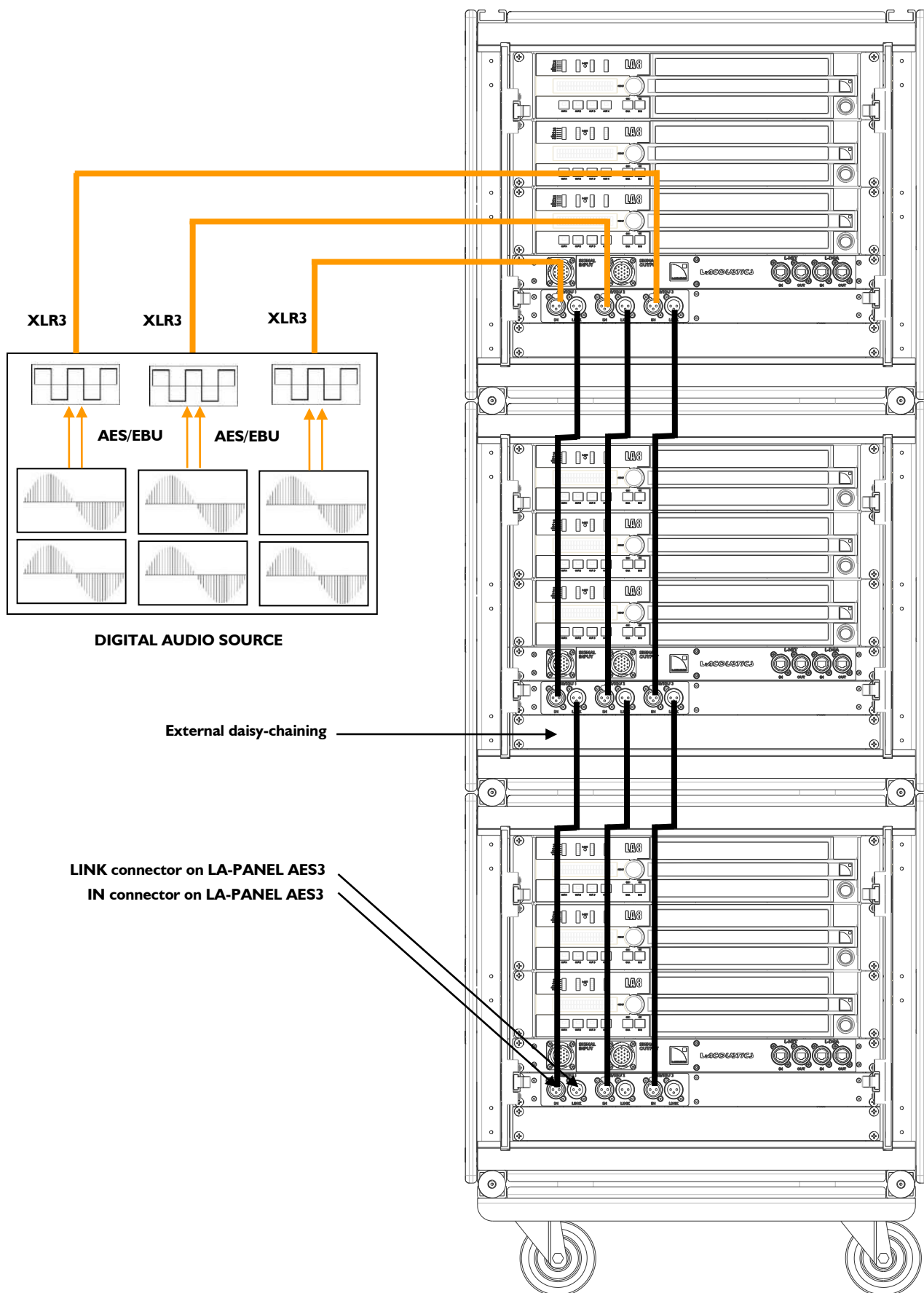


Figure 26: Feeding three LA-RAK with three pairs of digital audio signals

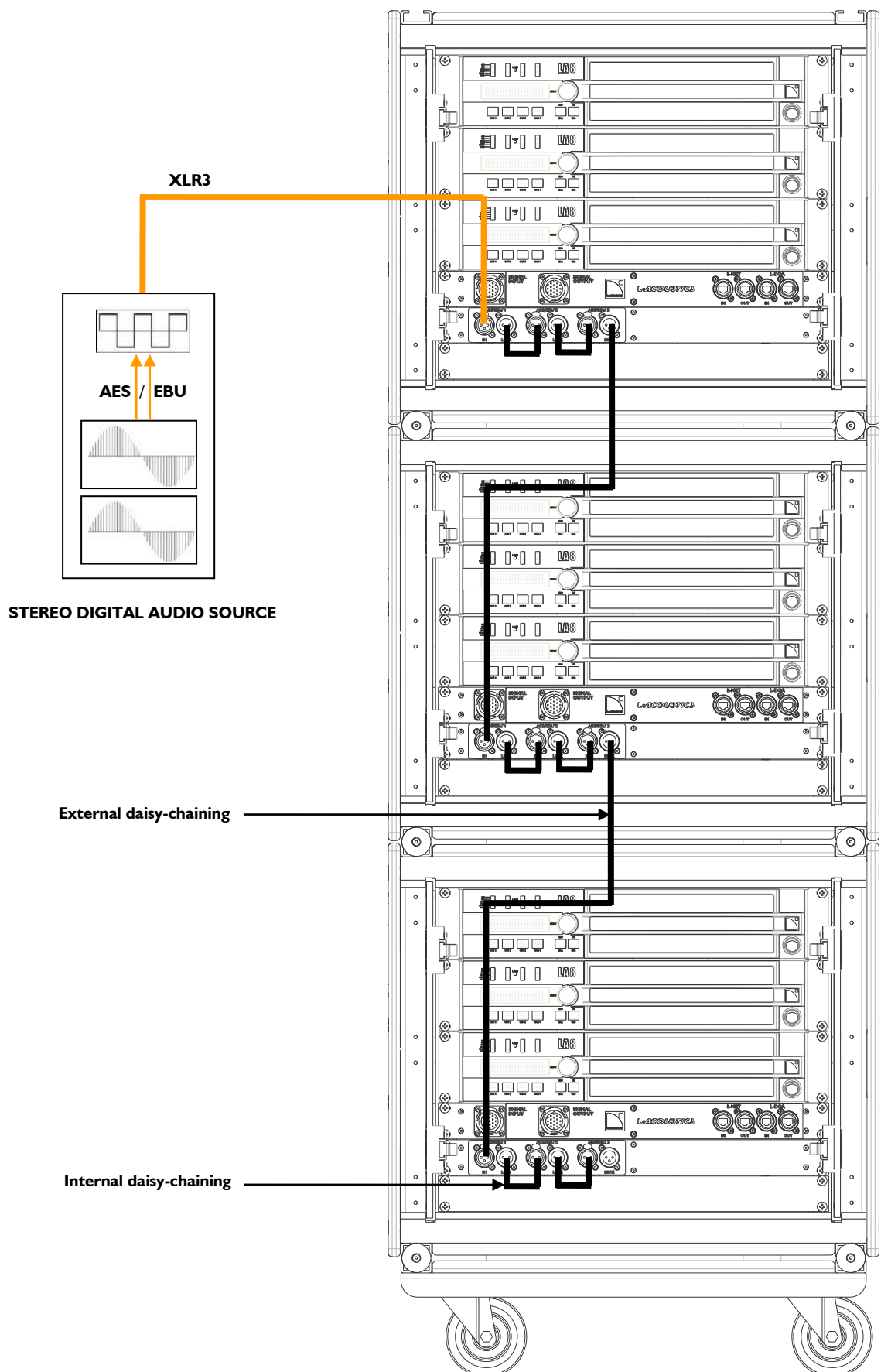


Figure 27: Digital audio cabling with LA-RAK – FOH example

6.8 Loudspeaker cabling

The rear side of the LA-RAK gives access to the output connection panel of each LA8. For each amplifier, this panel feature one CA-COM® connector, as well as three SpeakON® connectors.



Please refer to the appropriate **enclosure User Manual** as well as **LA8 User Manual** [3.4] to connect any L-ACOUSTICS® enclosure to the LA-RAK.

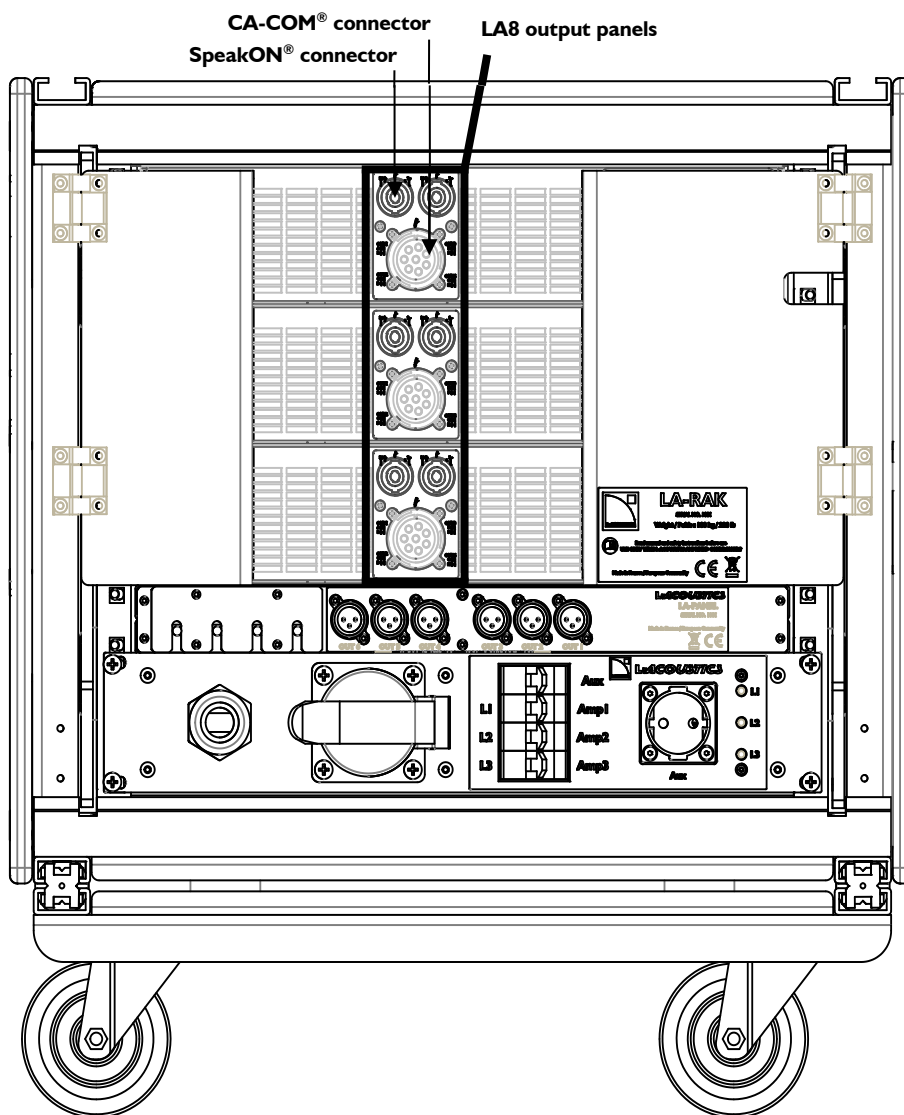



Figure 28: LA-RAK speaker connectors




The 8-point **CA-COM®** connector on the LA8 is fully compatible with all 8-point L-ACOUSTICS **PA-COM®** cables **EXCEPT** for the DO2W, DOFILL and DOSUB cables. Refer to **LA8 PACOM CABLES Technical bulletin** [3.4] for more details

6.9 L-NET network cabling

6.9.1 L-NET network overview

L-NET network is for transferring data to and from LA NETWORK MANAGER software (see the **LA NETWORK MANAGER User Manual** [3.4]). It allows remote control and monitoring of a network of amplified controllers. By using LA-PANEL, various digital network topologies such as daisy-chain, star, and hybrid are quickly and easily configurable, allowing total flexibility in achieving the required system architecture. The star and hybrid network topologies require the addition of a universal Ethernet® switch.

Note: The more reliable digital cabling scheme is the external star/internal star one.



- To cable L-NET network, use CAT5e U/FTP cables (or higher category) fitted with RJ45 connectors.
- The length of each network cable must not exceed 100 m/328 ft.
- Only connect network devices featuring a minimum speed of 100 Mbps.

6.9.2 Internal cabling

LA-PANEL features four RJ45 I/O sockets. When leaving the factory the LA-PANEL also features four CAT5e U/FTP cables already installed. If cables replacement is needed follow the procedure described in [7.3].

The cable linked to the IN connector on the back of LA-PANEL allows network connection for all three LA8, following two potential cabling schemes, illustrated in Figure 30:

- either by connecting a first LA8 via its L-NET IN connector, and routing the network towards another LA8 via the L-NET OUT connector, for a daisy-chain topology;
- or by connecting the cable to a switch (not provided), which will feed all three LA8, for a star topology.

The cable linked to the OUT connector on the back of LA-PANEL allows getting back the network signal from the L-NET OUT connector of a LA8, to send it towards another LA-RAK and set up an external daisy-chain topology.

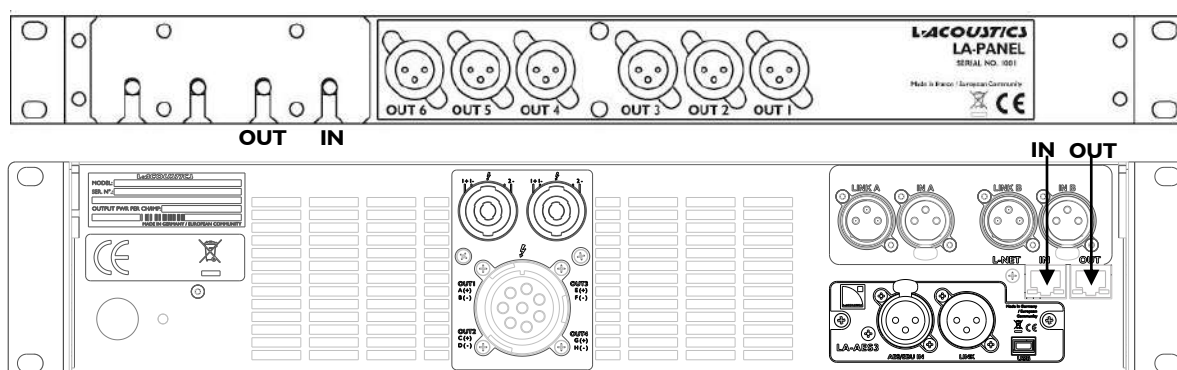


Figure 29: L-NET network connection panels on LA-PANEL and LA8 (rear views)

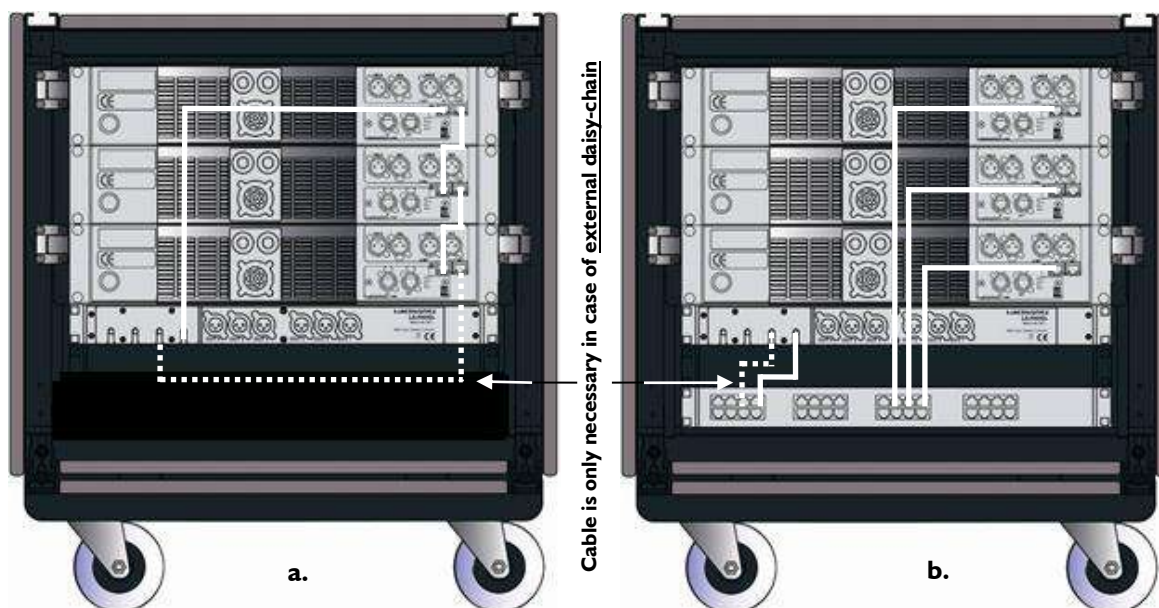


Figure 30: L-NET internal cabling for (a) daisy-chain or (b) star network topologies

6.9.3 External cabling

The LA-PANEL front side features two Ethercon® I/O sockets, for external L-NET network cabling (see Figure 31).

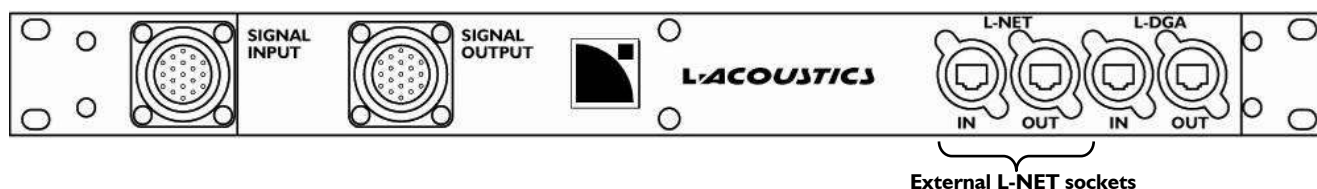
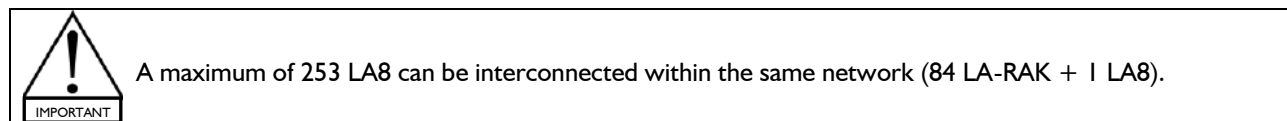


Figure 31: LA-PANEL front view

To set up an L-NET network with several LA-RAK, three cabling schemes can be used, as illustrated in Figure 32, Figure 33 and Figure 34:

- **Daisy-chain:** The IN connector of a first LA-RAK is linked to the computer driving LA NETWORK MANAGER. The network is then set up by linking the OUT connector of each LA-RAK to the IN connector of the following LA-RAK in the chain.
- **Star:** The computer driving LA NETWORK MANAGER is connected to a switch (not provided), which is directly linked to each of the LA-RAKs via their IN connector.
- **Hybrid:** Both topologies are jointly used: the star topology to distribute the network to several LA-RAKs and then the daisy-chain topology to serially cable other LA-RAKs with each of the first LA-RAKs.

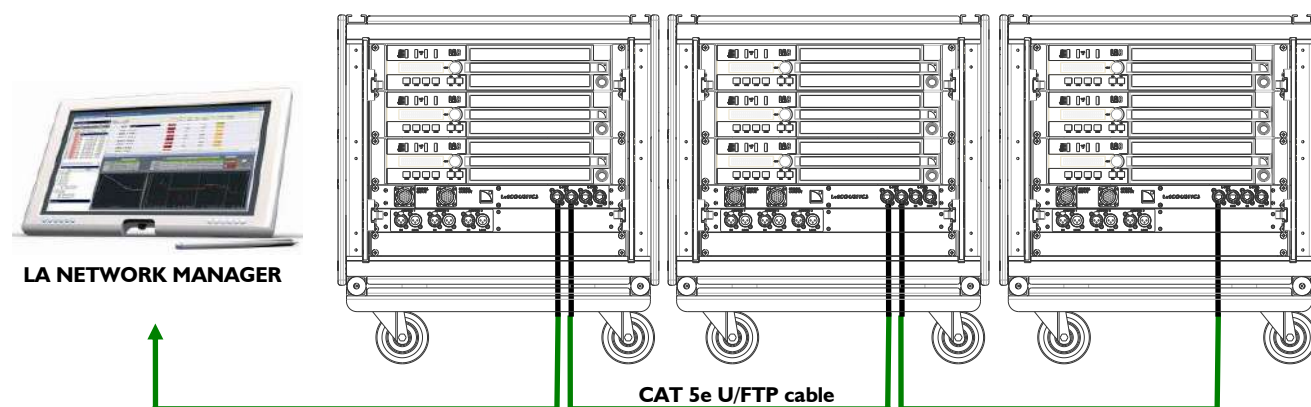


Figure 32: L-NET external cabling – option 1: daisy-chain topology

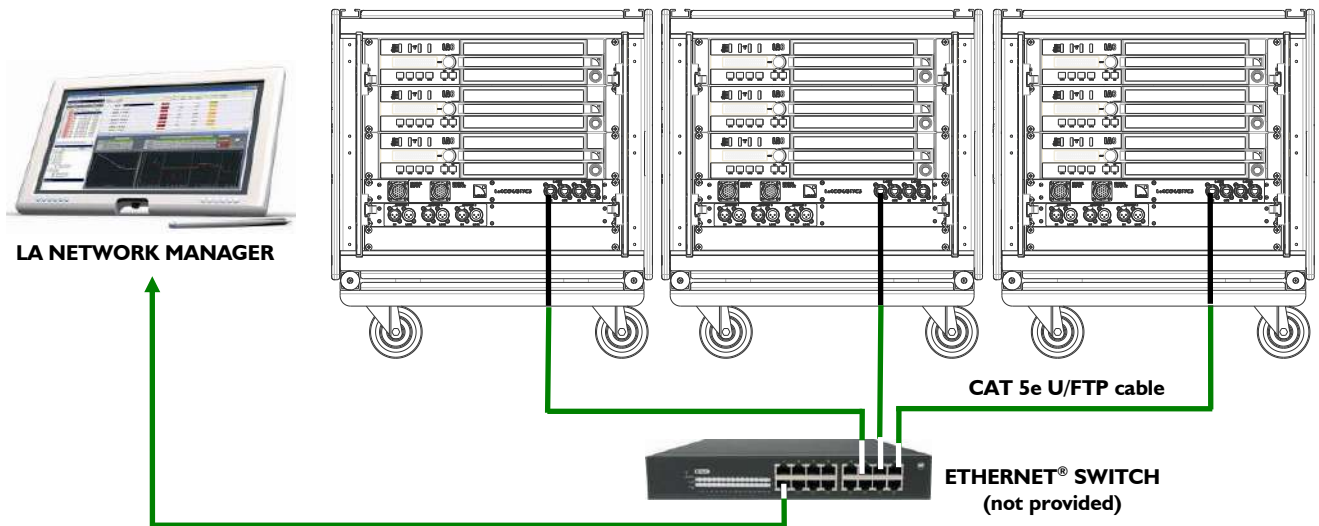


Figure 33: L-NET external cabling – option 2: star topology

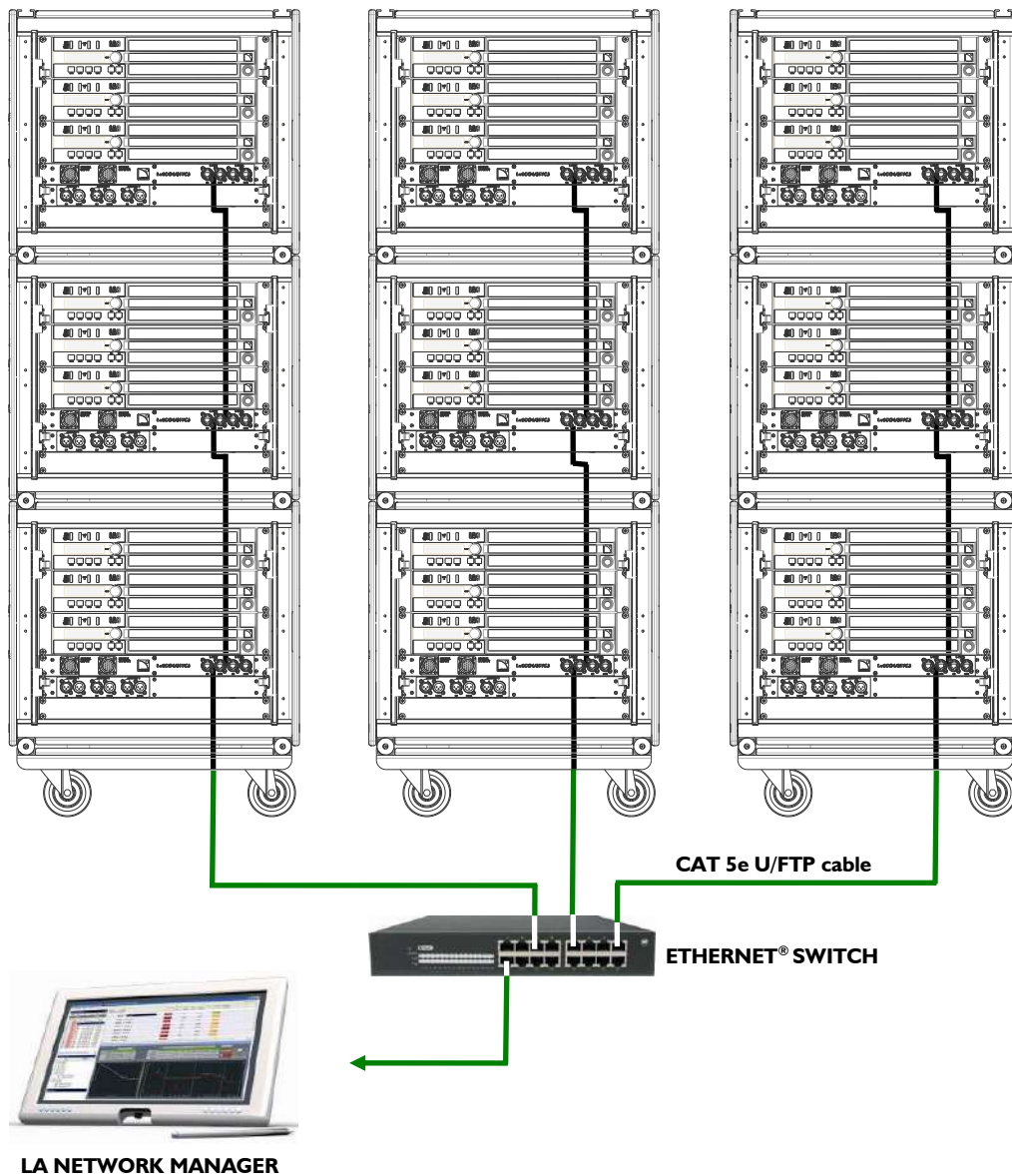


Figure 34: L-NET external cabling – option 3: hybrid topology

7 CARE AND MAINTENANCE

7.1 Maintenance information

The **L-ACOUSTICS® LA-RAK Touring Rack** is a technical product designed for various, intensive indoor and outdoor sound reinforcement applications. To fulfill such demanding conditions L-ACOUSTICS® has designed the LA-RAK with high-grade and reliable components:

- Aluminum and steel frames, rubber shock mounts.
- Polyethylene sides.
- LEXAN® polycarbonate doors.
- Screws and rigging points resistant to oxidation.

However, in order to ensure product performance and safety, it is essential to frequently inspect the LA-RAK and its internal components. These checks need to be done on a regular basis depending on the conditions of system use and are described in section [7.2].

In addition, it is possible to replace the network cables located at the back of the LA-PANEL. Procedure is described in section [7.3].

Spare parts and recommended tools are detailed in section [7.4].

7.2 Checking procedures

7.2.1 Check of internal components

Check the LA8 controllers as described in the **Care and maintenance** section of the **LA8 User Manual** [3.4].

Check the contact quality and the locking action of all sockets (PA-COM®, CA-COM®, SpeakON®, XLR, Ethercon®, RJ45, as well as power plug and sockets) on the LA8, LA-POWER, LA-PANEL and LA-PANEL AES3.

If necessary, contact an L-ACOUSTICS® authorized representative to replace the damaged components.

7.2.2 Mechanical assembly and rigging parts inspection

The assembly and rigging parts of the LA-RAK system are:

- RK 9U internal frames and electric/electronic devices fixed on them, as well as screws and washers.
- RK 9U rigging rails, ball locking pins, rear panels, and LEXAN® doors.
- Dolly board and coupling bars with spring-loaded safeties.
- LA-RAK BUMP including shackles.

The inspection procedure is as follows:

1. Inspect the general aspect of the assembly and rigging parts described above.
2. Check the integrity of mobile and rigging parts (no signs of deformation, indents, or rust).
3. Ensure that the locking mechanism of each spring-loaded safety, ball locking pin, and shackle operates normally.

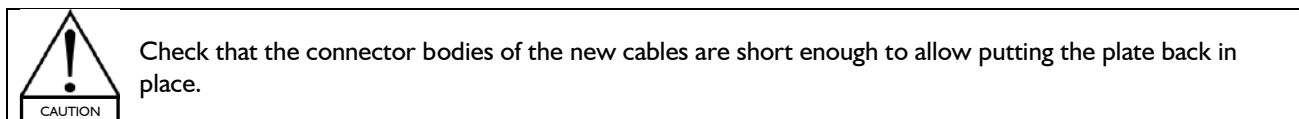


Any component incorporating a part showing signs of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.

7.3 Network cables replacement procedure

When leaving the factory the LA-PANEL features four CAT5e U/FTP cables. If cables replacement is needed follow the procedure below:

- Remove the LA-PANEL from the LA-RAK by removing the four front Pozidriv® screws.
- Unscrew the back protecting plate by removing the four Torx® screws.
- Remove the old cables and install new ones.



- Put the plate and Torx® screws back in place (torque to 1.5 N.m/14 in.lb_f).
- Put the LA-PANEL and Pozidriv® screws back in place into the LA-RAK (torque to 3 N.m/27 in.lb_f).

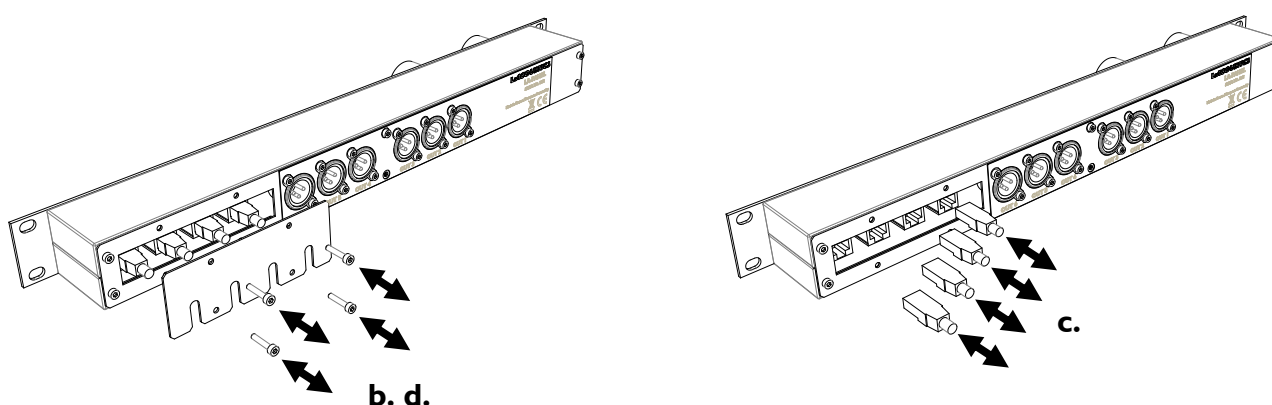


Figure 35: Replacing network cables on the LA-PANEL rear side

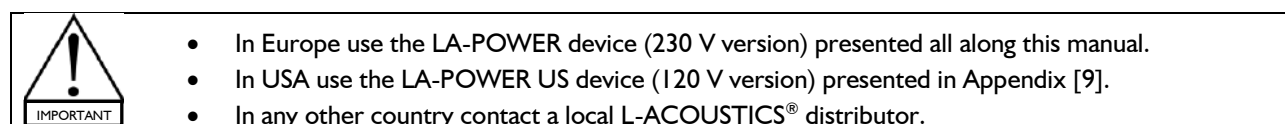
7.4 Spare parts and recommended tools

Table 3: Available spare parts

RK9U	Rack structure with dolly board and 2 coupling bars
SE PLARK9U	Dolly board
SE RIGRK9U	2 Coupling bars
MP RK9UORTE	LEXAN® door
CA RKLOC	LEXAN® door latch
CA RK9UCACHE	1 U blank panel
RKENTR	Spacer to fix the LA8 rear part to the LA-RAK
LA8/LA8 US/LA8 JP	Amplified controller 4x1800 W @ 4 Ω for EU/USA/ Japan
LAPANEL	Analog signal and network distribution panel
LAPANELAES3	Digital signal distribution panel
SE CHPRK9U10	1 m/3 ft XLR cable
SE CHPRK9U03	0.35 m/1 ft XLR cable
CP RK9UETH1	1 m/3 ft CAT5e U/FTP cable
CP RK9UETH2	0.3 m/1 ft CAT5e U/FTP cable
LAPOWER	LA-POWER power distribution panel
LARAKBUMP	LA-RAK BUMP rigging frame
CA MANI9L	5/8" shackle

Table 4: Recommended tools for service

Torque wrench (N.m or in.lb _f)
PZ.3 Pozidriv® screwdriver
T10 Torx® screwdriver

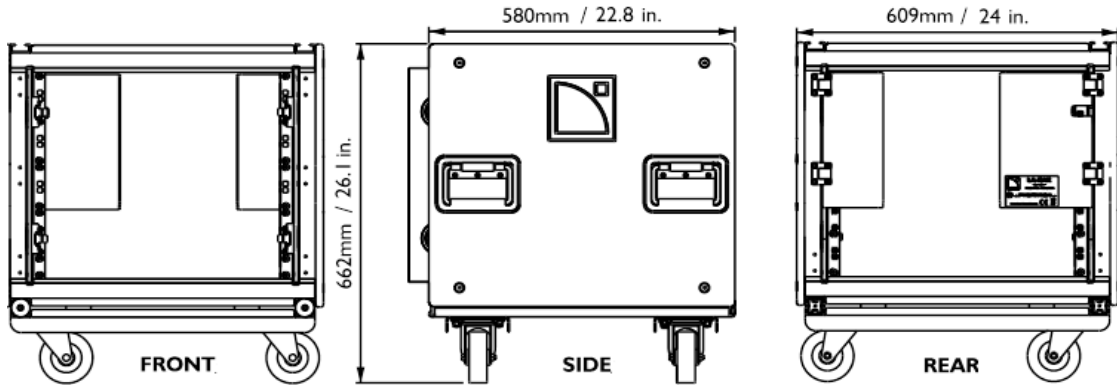


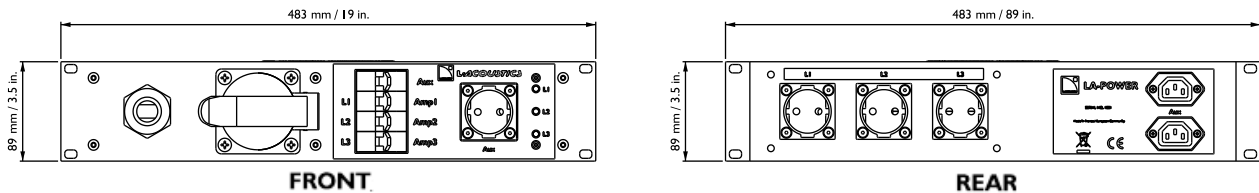
LA-RAK TOURING RACK

USER MANUAL

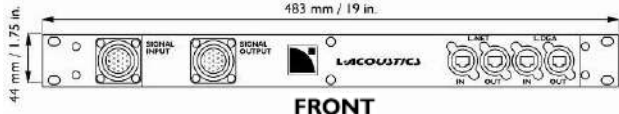
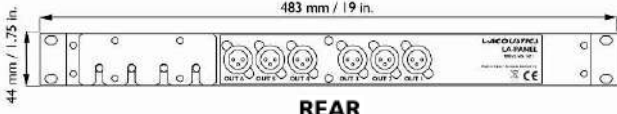
VERSION 2.0

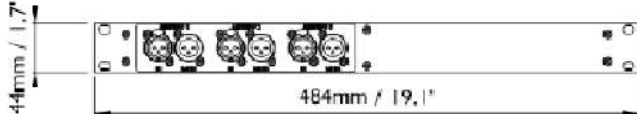
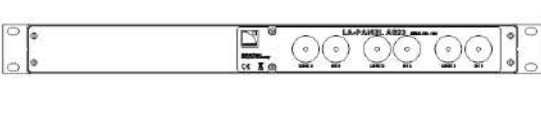
8 SPECIFICATIONS

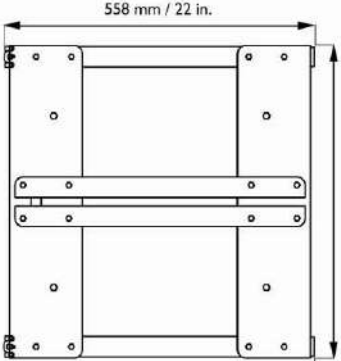

Reference	RK 9U	
Dimensions (W x H x D)	609 x 513 x 580 mm / 25 x 20.2 x 22.8 in	
H including dolly board	663 mm / 26.1 in	
		
Weight	51,4 kg / 113 lbs with dolly board (96,5 kg / 212 lbs when fully equipped)	
Setup safety limits of captive rigging components	Vertical flying	Certified for up to 4 LA-RAK underneath the L-ACOUSTICS® LA-RAK BUMP flying frame (available separately). Certified for up to 4 LA-RAK onto the L-ACOUSTICS® KI-BUMP flying frame (available with the KI system, refer to the KI Rigging Procedures manual [3.4]).
	Vertical stacking	Certified for up to 3 LA-RAK onto the dolly board.
	Moving & transporting	Certified for up to 2 LA-RAK onto the dolly board.
External Structure	Materials	Polyethylene, aluminum, and steel.
	Finish	Grayish-brown, RAL 8019®.
	Doors	LEXAN® polycarbonate.
	Rigging components	Polyester-coated steel.
	Handles	Integrated into the cabinet.
Complementary accessories	1 x dolly board, 2 x coupling bars.	

Reference	LA-POWER ¹	
Dimensions (W x H x D)	483 x 89 (2U) x 103 mm / 19 x 3.5 (2U) x 4 in	
		
Weight	4 kg / 8.8 lbs	
Front connectors	AC input	32 A – P17 (3P+N+G) male plug + power cord.
	AC link out	32 A – P17 (3P+N+G) female outlet.
	AC auxiliary output	1 x type F “Shuko” outlet.
Rear connectors	AC outputs for controllers	3 x type F “Shuko” outlets (L1, L2, L3).
	AC auxiliary outputs	2 x type IEC CEE22 outlets.
Protection	3 x 16 A type C circuit breakers (L1, L2, L3).	
	1 x 10 A type C circuit breaker (Auxiliary).	

¹ European standard. See applicable documentation for other countries.

Reference	LA-PANEL	
Dimensions (W x H x D)	483 x 44 (1U) x 59 mm / 19 x 1.75 (1U) x 2.3 in	
		
Weight		
Front connectors	INPUT/ LINK OUT L-NET I/O L-DGA I/O	2 x PACOM® 19-point sockets 2 x Ethercon® sockets 2 x Ethercon® sockets
Rear connectors	OUT1/ OUT2 /OUT3 /OUT4 /OUT5 / OUT6 L-NET I/O L-DGA I/O	6 x Neutrik® male XLR 3 sockets 2 x RJ45 sockets 2 x RJ45 sockets
Complementary accessories	6 x XLR 1 m/3 ft labeled cables, 2 x XLR 0.35 m/1 ft bridge cables 4 x CAT5e U/FTP 1 m/3 ft labeled cables 2 x CAT5e U/FTP 0.3 m/1 ft bridge cables Ethernet® switch (not provided, only for star network topology)	

Reference	LA-PANEL AES3	
Dimensions (H x W x D)	44 x 484 x 64.8 mm / 1.7 x 19.1 x 2.6 inch	
		
Weight	1.5 kg / 3.3 lbs	
Front connectors	IN 1/ IN 2/ IN 3 LINK 1/ LINK 2/ LINK 3	3 x Neutrik® female XLR3 sockets 3 x Neutrik® male XLR3 sockets
Rear XLR cables	IN 1/ IN 2/ IN 3 LINK 1/ LINK 2/ LINK 3	3 x 1.15 m/3.8 ft male XLR3 cables 3 x 1.15 m/3.8 ft female XLR3 cables
Front finish	Polyester powder-coated steel	
Complementary accessories	2 x 0.55 m/1.8 ft male-female XLR3 link cables	

Reference	LA-RAK BUMP	
Dimensions (W x H x D)	581 x 102 x 558 mm / 22.9 x 4 x 22 in	
		
Weight	13.5 kg / 29.7 lbs	
Setup safety limits	Maximum of 4 LA-RAK per LA-RAK BUMP.	
Material	Polyester-coated steel.	
Complementary accessories	2 x 5/8" shackles	

LA-RAK TOURING RACK

USER MANUAL

VERSION 2.0

Reference	LA8 amplified controller				
Dimensions (W x H x D)	88,1 (2U) x 483 x 420 mm / 3.5 (2U) x 19 x 16.5 in			Weight	12.3 kg / 26.9 lbs
Output power	EIA (1% THD, 1 kHz, all channels driven) 4 x 1100 W at 8 Ω (4 x 1300 W peak) / 4 x 1800 W at 4 Ω (4 x 2500 W peak)				
Max output voltage	150 V (Peak voltage, no load)				
Circuitry	Class D				
Digital Signal Processor (DSP)	DSP SHARC 32 bits / floating point, 96 kHz sampling rate				
Frequency range	10 Hz-20 kHz (±1.5 dB at 8 Ω)				
Distortion THD+N (typical)	< 0.05 % (20 Hz-20 kHz, 8 Ω, 11 dB below rated power)				
Output dynamic range	112 dB (20 Hz-20 kHz, 8 Ω, A-weighted)				
Amplification gain	32 dB				
Noise level	-72 dBV (20 Hz-20 kHz, 8 Ω, A-weighted)				
Channel separation	> 85 dB (at 1 kHz)				
Damping factor	> 600 (8 Ω, 1 kHz and below)				
Mains input power and current draw (all channels driven)	Maximum output power			Mains input power and current draw	
	Load	Nb. of channel	Power	1/3 Output Power (-5 dB)	1/8 Output Power (-9 dB)
	4 Ω	4 x	1800 W	22 A / 3100 W	11 A / 1500 W
	8 Ω	4 x	1100 W	15 A / 1950 W	10 A / 1300 W
	The current values are given for mains rated at 230 V. Multiply by 2 for 120 V, 1.15 for 200 V, and 2.3 for 100 V. If the voltage is outside a plus or minus 10 % range, the maximum power is no longer guaranteed.				
Mains ratings	LA8 & LA8US: 120/230 V AC (±10 %), 50-60 Hz LA8JP: 100/200 V AC (±10 %), 50-60 Hz				
Operating temperature	From -5°C to +50°C (environment) From -5°C to +85°C (internal)				
Circuits protection	Temperature monitoring of transformers and heat-sinks, inrush-current limitation, mains supply failure and over-voltage detection, output DC protection, output over current protection				
Transducers protection	L-DRIVE thermal and over excursion monitoring				
Fans	2 temperature dependent speed-controlled axial fans				
Indicators	LED for Load, Signal, Level (-25 dB, -10 dB, -5 dB), Clip, L-NET, and Mute				
Output Connectors	2x 4-point SpeakON® (1/2 and 3/4 output channels) 1x 8-point CA-COM® (all output channels)				
L-NET connectors	2x Fast Ethernet RJ45 (in/out)				

ANALOG INPUTS

Connectors	Input	2 Neutrik® female XLR3, IEC 268, ESD protected
	Link	2 Neutrik® male XLR3, IEC 268, ESD protected
Input impedance	22 kΩ (balanced)	
Max input level	22 dBu (balanced, THD 1 %)	
Latency	3.9 ms	
Digital conversion	Two cascaded 24 bit A/D converters (130 dB dynamic range)	

DIGITAL INPUT

Connectors	Input	1 Neutrik® female XLR3, IEC 268, ESD protected
	Link	1 Neutrik® male XLR3, IEC 268, ESD protected, electronically buffered, failsafe relay
	USB	1 Mini-B type female USB, reserved for future applications
Supported input formats	Standard	AES/EBU (AES3) or coaxial S/PDIF (IEC 60958 Type II)
	Sampling frequency (Fs)	44.1, 48, 64, 88.2, 96, 128, 176.4, or 192 kHz
	Word length	16, 18, 20, or 24 bits
XLR cabling	Standard	XLR3 cables, common or AES/EBU certified
	Maximum length	300 m with AES/EBU certified cables and for Fs ≤ 48 kHz
Input gain	Adjustable from -12 dB to +12 dB by 0.1 dB steps	
Latency	3.4 ms or 3.9 ms (upon user selection, independent of the input sampling frequency)	
Sample Rate Converter	Sampling frequency	96 kHz (SRC referenced to the amplified controller's internal clock)
	Word length	24 bits
	Dynamic range	140 dB
	Distortion (THD+N)	< -120 dBfs
	Bandpass ripple	±0.05 dB (20 Hz-40 kHz, 96 kHz)
AES/EBU to ANALOG fallback	Switchover conditions	No clock, loss of lock, invalid audio [validity bit], CRC error, bipolar encoding error, data slip
	Constant delay	Yes (upon user selection, independent of input Fs)
	Constant level	Yes (upon user adjustment of AES/EBU input gain, independent of input Fs)
	Revert to AES/EBU	Manual user selection

9 APPENDIX: LA-POWER US

9.1 LA-RAK and LA-POWER US presentation

A 120 V version of the LA-RAK touring rack is also available for use in the USA and countries using the same electric standards. It features the same characteristics as the European version except for the power panel, which is referenced as the LA-POWER US.



Figure 36: Equipped LA-RAK for USA

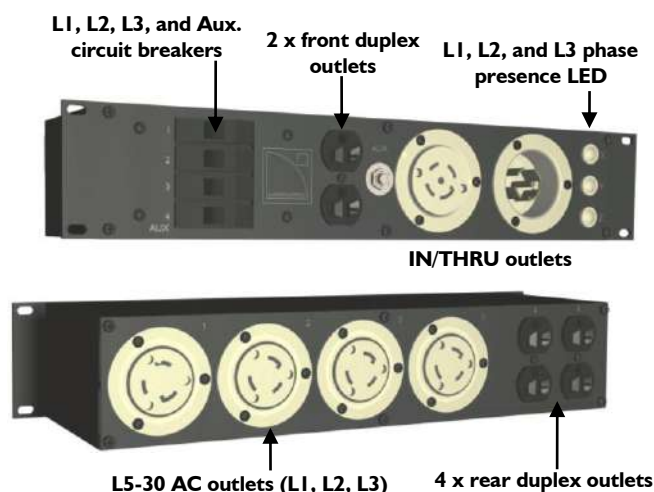
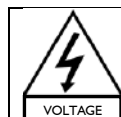


Figure 37: The LA-POWER US

9.2 Connecting LA-RAK US to AC mains

9.2.1 LA-POWER US three-phase circuit

The LA-POWER US connects to **120 V ($\pm 10\%$) / 30 A three-phase AC mains** using the male L-21 IN outlet.



The LA-POWER US only connects to three-phase AC mains rated 120 V ($\pm 10\%$) / 30 A, 50 - 60 Hz. Contact a local L-ACOUSTICS® distributor for countries in which this standard does not apply



A maximum of one LA-RAK can be connected per AC mains outlet.
Never use the female L-21 THRU outlet.

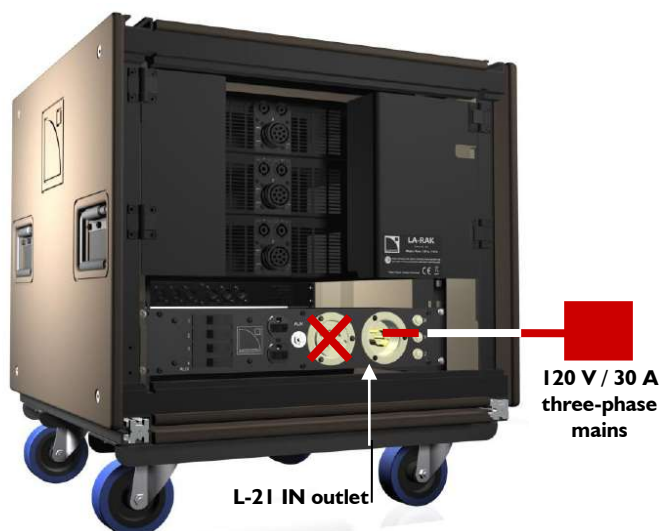


Figure 38: Connection of the LA-RAK US to AC mains

9.2.2 LA-POWER US mono-phase circuits



Connect LA-RAK US to AC mains **only** if the operating voltage indicated on the LA8 back panels corresponds to the local AC mains rating.

Two LA8 versions are available (also refer to the **LA8 User Manual** [3.4]):

- A universal 120/230 V ($\pm 10\%$) version fitted with automatic switch mode power supply.
- A specific 100 V ($\pm 10\%$) version for Japan.

The LA-POWER US three-phase circuit powers the three mono-phase circuits corresponding to the three L5-30 female outlets located on the rear face (L1, L2, and L3). These last allow connection of the three LA8 amplified controllers mounted in the LA-RAK US (see Figure 39).

Each outlet is protected by a **30 A** circuit breaker located on the front face and three LED help monitor the presence of each phase on the front end of the mains circuit.

The LA-POWER US also includes an **auxiliary circuit** protected by the “Aux” **20 A** circuit breaker. This circuit powers six duplex outlets located on the front and rear faces to connect portable computer and the like as well as additional Ethernet® switches.

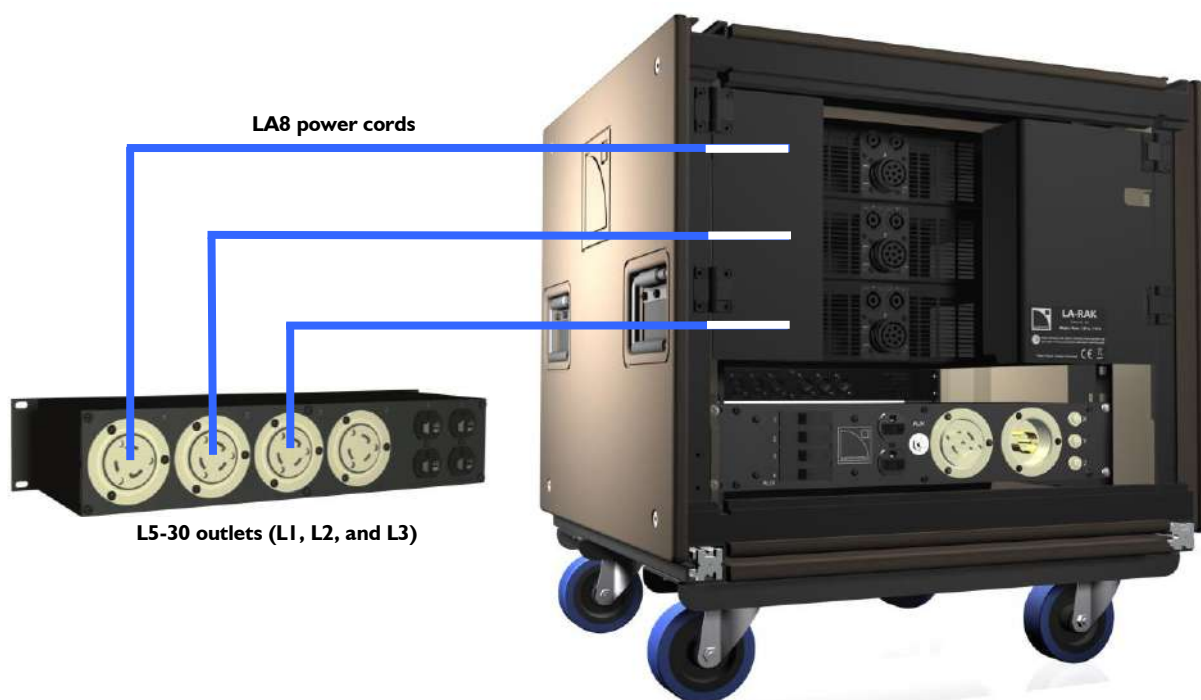


Figure 39: Powering three LA8 within an LA-RAK (LA-POWER external rear view)



L-Acoustics, an L-Group Company

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L-GROUP

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EU Declaration of Conformity (DoC)

We

L-Acoustics

13 rue Levacher Cintrat
Parc de la Fontaine de Jouvence
91462 Marcoussis Cedex
France

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info@l-acoustics.com

declare that the DoC is issued under our sole responsibility and belongs to the following product:

LA8 amplified controller

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

2014/35/EU: Low Voltage Directive

2014/30/EU: Electro-Magnetic Compatibility Directive

2011/65/EU: RoHS 2 Directive

The following harmonized standards and technical specifications have been applied:

EN 60065: 2014 Safety requirements for audio, video and similar electronic apparatus

EN 55103-1: 2009+A1:2012 Electromagnetic compatibility — Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use — Part 1: Emissions

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

Technical file compiled by:

Genio KRONAUER

13 rue Levacher Cintrat
Parc de la Fontaine de Jouvence
91462 Marcoussis Cedex
France

Year CE marking was first affixed: 2008

Issued in Marcoussis, France

06/04/2018



Genio KRONAUER, Electronics Director

DECLARATION OF CONFORMITY

according to
**the Low Voltage Directive
73/23/EEC and 93/68/EEC
the EMC Directive 89/336/EEC**

No: LA48aCE01

Type of equipment:

Audio power amplifier for professional use

Brand name and trade mark

L-ACOUSTICS

Type Model no

LA48a

Manufacturer's name, address, telephone and fax no

L-ACOUSTICS

Parc de la Fontaine de Jouvence

F-91462 MARCOUSSIS Cedex

FRANCE

Telephone +33 1 69 63 69 63

Telefax +33 1 69 63 69 64

Conformity with the Directive stated above relates to the following reference documents:

Standards or other normative documents Test reports and technical files

IEC 60 065:1998

Ref No. 0207284-1 SEMKO

EN 55103-1: 1997 01 17

Ref No. LA48aeme020226 LAB.GRUPPEN

EN 55103-2: 1997 01 17

Ref No. LA48aemi020226 LAB.GRUPPEN

As manufacturer established within EC, we declare under our sole responsibility that the equipment follows the provisions of the Directives stated above.

Date and place of issue

Marcoussis

02/03/01

Name and signature of authorised person

Ch. Pignon



ALLEN & HEATH

manufactured by:

Allen & Heath Limited,
Kernick Industrial Estate,
Penryn,
Cornwall. UK.

Registered office:

Allen & Heath Limited,
Kernick Industrial Estate,
Penryn,
Cornwall. TR10 9LU.
Registered in England No: 4163451

EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The Directives covered by this Declaration

2014/30/EU The Electromagnetic Compatibility Directive.
2014/35/EU The Low Voltage Equipment Directive.
2009/125/EC The Eco-design requirements for Energy related products. (ErP)
2011/65/EU The Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment Directive. (RoHS 2)

The Product(s) covered by this Declaration

dLive S3000	Digital Audio Console	All voltage variants.
dLive S5000	Digital Audio Console	All voltage variants.
dLive S7000	Digital Audio Console	All voltage variants.

The Basis on which Conformity is being declared

The product(s) specified above complies with the requirements of the relevant Union harmonisation legislation by conforming to the following standards:

EN 55032 : 2015 Electromagnetic Compatibility of Multimedia Equipment - Emissions.
EN 61000-3-2 : 2014 Limits for ac Current harmonic – Emissions.
EN 61000-3-3 : 2013 Limits of voltage changes, fluctuations and flicker.
EN 55035 : 2017 Electromagnetic Compatibility of Multimedia equipment – Immunity requirements.
EN 62368-1 : 2014 Audio/video, information & communication technology equipment: Safety Requirements.

Signed:.....

Robin J Clark.

Allen & Heath Ltd. Kernick Industrial Estate,
Penryn. Cornwall. UK

Authority: **Managing Director**

Date:.....

20/3/23

C € 23

Attention!

To maintain compliance with the above directives, attention is drawn to the product User Guide for instructions on correct installation and operation which must be observed when the product is taken into service.

ALLEN & HEATH

manufactured by:

Allen & Heath Limited,
Kernick Industrial Estate,
Penryn,
Cornwall, UK.

Registered office:

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Cornwall, TR10 9LU.
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2011/65/EU The Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment Directive. (RoHS 2)

The Product(s) covered by this Declaration

dLive DM32	Digital Audio Mixrack	All voltage variants.
dLive DM48	Digital Audio Mixrack	All voltage variants.
dLive DM64	Digital Audio Mixrack	All voltage variants.

The Basis on which Conformity is being declared

The product(s) specified above complies with the requirements of the relevant Union harmonisation legislation by conforming to the following standards:

EN 55032 : 2015 Electromagnetic Compatibility of Multimedia Equipment - Emissions.

EN 61000-3-2 : 2014 Limits for ac Current harmonic – Emissions.

EN 61000-3-3 : 2013 Limits of voltage changes, fluctuations and flicker.

EN 55035 : 2017 Electromagnetic Compatibility of Multimedia equipment – Immunity requirements.

EN 62368-1 : 2014 Audio/video, information & communication technology equipment: Safety Requirements.

Signed:.....

Robin J Clark.

Allen & Heath Ltd, Kernick Industrial Estate,
Penryn, Cornwall, UK

Authority: **Managing Director**

Date:.....

C € 23

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To maintain compliance with the above directives, attention is drawn to the product User Guide for instructions on correct installation and operation which must be observed when the product is taken into service.



Speaker Cabinets

Quick Start Guide



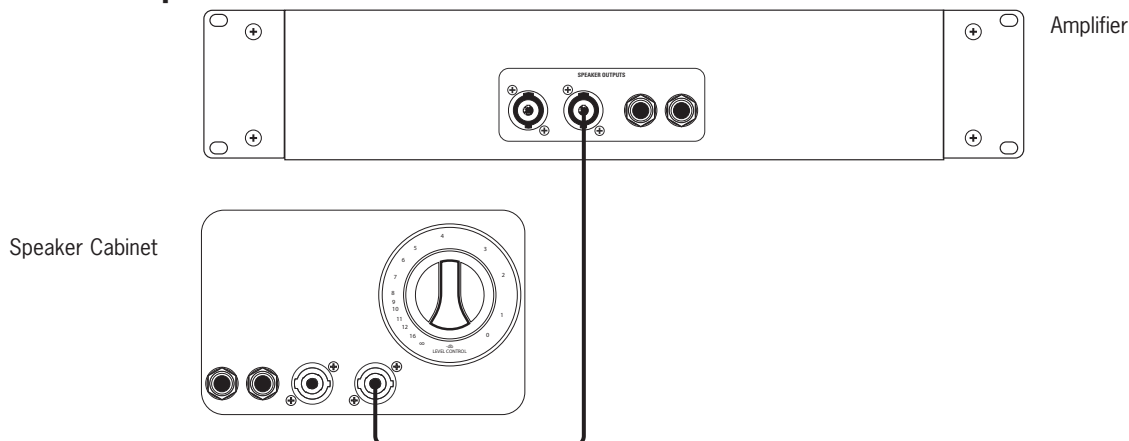
HSVT-810AV, HSVT-810E, SVT-810AV, SVT-810E, SVT-610HLF, HSVT-410HLF, SVT-410HLF, SVT-410HE, SVT-210AV, SVT-212AV, SVT-112AV, SVT-15E, PN-115HLF, PN-210HLF, PN-410HLF, PF-115HE, PF-210HE, PF-115LF, PF-410HLF, and PF-112HLF

What's in the Box

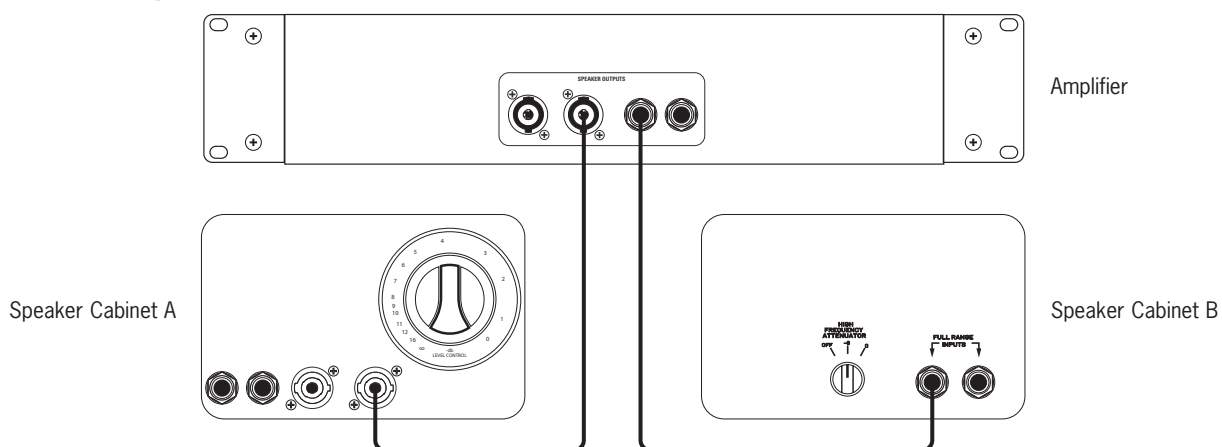
HSVT-810AV, HSVT-810E, SVT®-810AV, SVT-810E, SVT-610HLF, HSVT-410HLF, SVT-410HLF, SVT-410HE, SVT-210AV, SVT-212AV, SVT-112AV, SVT-15E, PN-115HLF, PN-210HLF, PN-410HLF, PF-115HE, PF-210HE, PF-115LF, PF-410HLF, or PF-112HLF Speaker Cabinet, Quick Start Guide.

Hookup Diagrams

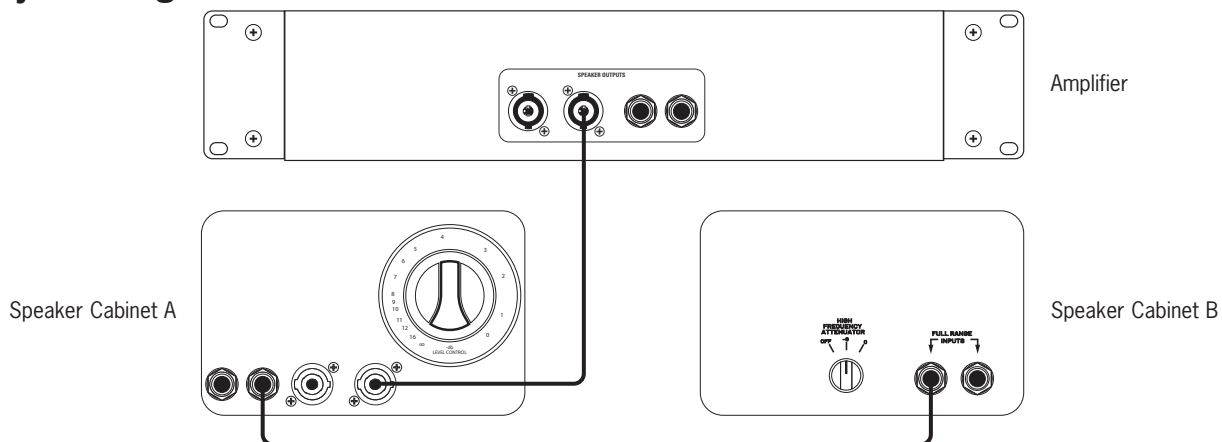
Standard Setup



Parallel Setup

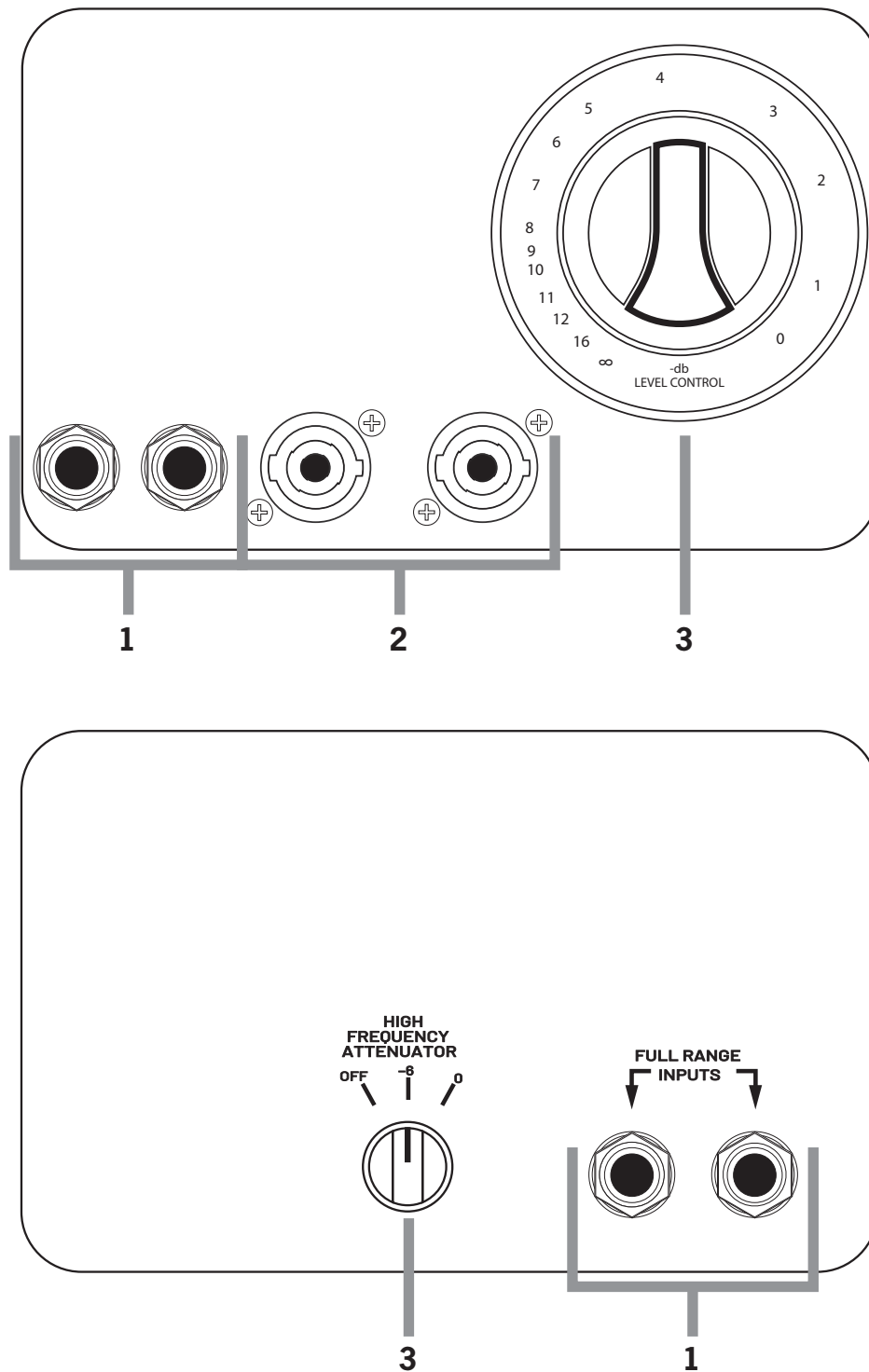


Daisy Chaining



Note: Use same impedance cabinets in parallel setups and when daisy-chaining

Rear Panel Connector Plate Styles



1. **1/4" Input / Output Jacks:** Connect the speaker-level output of an amplifier to the cabinet's Input jack. Each of the jacks may be used as an input or a through connection.
2. **Speakon® Input / Output Jacks:** Connect the speaker-level output of an amplifier to the cabinet's Input jack. Each of the jacks may be used as an input or a through connection.
3. **High Frequency Horn Level Control / Attenuator:** Adjusts the level to the high frequency horn.

Technical Specifications

	Frequency Response (+/-3 dB)	Usable Low Frequency (-10 dB)	Impedance	Power Rating (rms)	Sensitivity (dB SPL 1W/1m)
HSVT-810AV	58 Hz – 5 kHz	40 Hz	Mono: 4 Ω (8x10) Stereo: 8 Ω (4x10)	Mono: 800 W (8x10) Stereo: 400 W 2x (4x10)	100
HSVT-810E	58 Hz – 5 kHz	40 Hz	Mono: 4 Ω (8x10) Stereo: 8 Ω (4x10)	Mono: 800 W (8x10) Stereo: 400 W 2x (4x10)	100
SVT-810AV	58 Hz – 5 kHz	40 Hz	Mono: 4 Ω (8x10) Stereo: 8 Ω (4x10)	Mono: 800 W (8x10) Stereo: 400 W 2x (4x10)	100
SVT-810E	58 Hz – 5 kHz	40 Hz	Mono: 4 Ω (8x10) Stereo: 8 Ω (4x10)	Mono: 800 W (8x10) Stereo: 400 W 2x (4x10)	100
SVT-610HLF	53 Hz – 18 kHz	42 Hz	4 Ω	600 W	98
HSVT-410HLF	48 Hz – 18 kHz	28 Hz	4 Ω	500 W	98
SVT-410HLF	48 Hz – 18 kHz	28 Hz	4 Ω	500 W	98
SVT-410HE	60 Hz – 18 kHz	43 Hz	8 Ω	500 W	98
SVT-210AV	58 Hz – 5 kHz	40 Hz	8 Ω	200 W	97.8
SVT-212AV	71 Hz – 18 kHz	40 Hz	4 Ω	600 W	99
SVT-112AV	70 Hz – 18 kHz	35 Hz	8 Ω	300 W	96
SVT-15E	50 Hz – 3 kHz	33 Hz	8 Ω	200 W	98
PN-115HLF	48 Hz – 10 kHz	28 Hz	8 Ω	575 W	98
PN-210HLF	70 Hz – 10 kHz	40 Hz	8 Ω	550 W	97
PN-410HLF	70 Hz – 10 kHz	38 Hz	8 Ω	850 W	100
PF-115HE	50 Hz – 17 kHz	35 Hz	8 Ω	450 W	99.5
PF-210HE	53 Hz – 17 kHz	38 Hz	8 Ω	450 W	99.6
PF-115LF	57 Hz – 3.7 kHz	32 Hz	8 Ω	400 W	99.5
PF-410HLF	55 Hz – 17 kHz	30 Hz	8 Ω	800 W	101
PF-112HLF	68 Hz – 14 kHz	49 Hz	8 Ω	200 W	96

All specifications subject to change

Maximum SPL (dB)	LF drivers	HF horn	Inputs/Outputs	Size (H x W x D)	Weight
130	8x10"		1 x 1/4" (Mono) / 1 x Speakon® (Mono) 2 x 1/4" (Stereo)	48 x 26 x 16 in 1219 x 660 x 406 mm	137 lb 62.1 kg
130	8x10"		1 x 1/4" (Mono) / 1 x Speakon® (Mono) 2 x 1/4" (Stereo)	48 x 26 x 16 in 1219 x 660 x 406 mm	137 lb 62.1 kg
130	8x10"		1 x 1/4" (Mono) / 1 x Speakon (Mono) 2 x 1/4" (Stereo)	48 x 26 x 16 in 1219 x 660 x 406 mm	140 lb 63.5 kg
130	8x10"		1 x 1/4" (Mono) / 1 x Speakon (Mono) 2 x 1/4" (Stereo)	48 x 26 x 16 in 1219 x 660 x 406 mm	140 lb 63.5 kg
125	6x10"	✓	2 x 1/4" 2 x Speakon	40 x 24 x 16 in 1016 x 610 x 406 mm	115 lb 52.2 kg
125	4x10"	✓	2 x 1/4" 2 x Speakon	30 x 24 x 19 in 762 x 610 x 483 mm	73 lb 33.1 kg
125	4x10"	✓	2 x 1/4" 2 x Speakon	30 x 24 x 19 in 762 x 610 x 483 mm	74 lb 33.6 kg
122	4x10"	✓	2 x 1/4" 2 x Speakon	25 x 24 x 16 in 635 x 610 x 406 mm	71 lb 32.2 kg
121	2x10"		2 x 1/4"	25 x 13 x 11 in 635 x 330 x 280 mm	26 lb 11.8 kg
127	2x12"	✓	2 x 1/4"	25 x 24 x 16 in 635 x 610 x 406 mm	66 lb 29.9 kg
121	1x12"	✓	2 x 1/4"	17 x 24 x 16 in 432 x 610 x 406 mm	45 lb 20.4 kg
123	1x15"		2 x 1/4" 2 x Speakon	24 x 22 x 16 in 610 x 559 x 406 mm	72 lb 32.7 kg
125	1x15"	✓	2 x 1/4" 2 x Speakon	23.5 x 22.8 x 17.5 in 597 x 578 x 445 mm	59 lb 26.8 kg
124	2x10"	✓	2 x 1/4" 2 x Speakon	18 x 22.8 x 17.3 in 456 x 578 x 439 mm	44 lb 20 kg
127	4x10"	✓	2 x 1/4" 2 x Speakon	26.5 x 22.8 x 17.5 in 673 x 578 x 445 mm	64 lb 29 kg
125.5	1x15"	✓	2 x 1/4"	23 x 21 x 14.3 in 584 x 533 x 363 mm	44.8 lb 20.3 kg
125.6	2x10"	✓	2 x 1/4"	23 x 21 x 14.3 in 584 x 533 x 363 mm	47.6 lb 21.6 kg
125.5	1x15"		2 x 1/4"	23.5 x 22.75 x 17.5 in 598 x 578 x 445 mm	55.8 lb 25.4 kg
130	4x10"	✓	2 x 1/4"	27.3 x 22.75 x 17.5 in 693 x 578 x 445 mm	73.4 lb 33.3 kg
122	1x12"	✓	2 x 1/4"	19.8 x 17.1 x 13.1 in 503 x 434 x 333 mm	30.8 lb 14.0 kg



WARRANTY AND SUPPORT

Visit **WWW.AMPEG.COM** to...

- (1) ...identify **WARRANTY** coverage provided in your local market. Please keep your sales receipt in a safe place.
- (2) ...retrieve a full-version, printable **OWNER'S MANUAL** (English only) for your product.
- (3) ...**REGISTER** your product.
- (4) ...**CONTACT** Technical Support, or call 818-575-3600.

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

Unique Identifiers: Ampeg HSVT-810AV, HSVT-810E, SVT®-810AV, SVT-810E, SVT-610HLF, HSVT-410HLF, SVT-410HLF, SVT-410HE, SVT-210AV, SVT-212AV, SVT-112AV, SVT-15E, PN-115HLF, PN-210HLF, PN-410HLF, PF-115HE, PF-210HE, PF-115LF, PF-410HLF, and PF-112HLF Speaker Cabinets

Responsible Party - U.S. Contact Information:

Yamaha Guitar Group, Inc.
26580 Agoura Road
Calabasas, CA 91302-1921
(818) 575-3600
<https://ampeg.com/>

FCC Compliance Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

www.ampeg.com
Yamaha Guitar Group, Inc.
26580 Agoura Road, Calabasas, CA 91302-1921 USA Part
No. 40-00-0527 Rev. C



EU DECLARATION OF CONFORMITY

We, of

Shure Incorporated
5800 Touhy Avenue
Niles, Illinois, 60714-4608 U.S.A.
Phone: (847) 600-2000
Web: www.Shure.com

Certify and declare under our sole responsibility that the following apparatus:

Model: **ULXD2** Description: **Wireless Handheld Transmitter**
Including all variants combined with a microphone capsule
(e.g. ULXD2/SM58)

conforms to the essential requirements of the following applicable European Directives and their associated norms:

Directive	Applicable Standards	
Radio Equipment Directive: 2014/53/EU	Art.3.1a)	EN 62368-1:2014 + A11:2017 EN 62209-1:2006
	Art.3.1b)	EN 301 489-1 V2.1.1 EN 301 489-9 V2.1.1
	Art. 3.2	EN 300 422-1 V2.1.2
ROHS: 2011/65/EU (as amended by 2015/863/EU)	EN IEC 63000:2018	

And therefore complies with the essential requirements and provisions of the applicable directives.

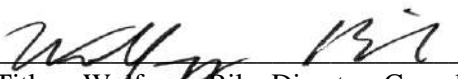
The technical documentation is kept at:

Shure Incorporated, Corporate Global Compliance Engineering Division
SHURE Europe GmbH, Compliance EMEA Division

Manufacturer: Shure Incorporated

Signed:  Date: 16. April 2021
Name and Title: Chad Ayers, Director, Global Compliance

European Representative: SHURE Europe GmbH

Signed:  Date: 16. April 2021
Name and Title: Wolfgang Bilz, Director, Compliance and Regulatory Affairs EMEA
SHURE Europe GmbH
Jakob-Dieffenbacher-Str. 12
75031 Eppingen, Germany
Phone: +49 - (0)7262 - 9249 - 0
Fax: +49 - (0)7262 - 9249 - 114

EU DECLARATION OF CONFORMITY

We, of

Shure Incorporated
5800 Touhy Avenue
Niles, Illinois, 60714-4608 U.S.A.
Phone: (847) 600-2000
Web: www.Shure.com

Certify and declare under our sole responsibility that the following apparatus:

Model: **QLXD2** Description: **Wireless Handheld Transmitter**
Including all variants combined with a microphone capsule
(e.g. QLXD2/SM58)

conforms to the essential requirements of the following applicable European Directives and their associated norms:

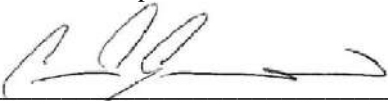
Directive	Applicable Standards	
Radio Equipment Directive: 2014/53/EU	Art.3.1a)	EN 62368-1:2014 + A11:2017
	Art.3.1b)	EN 301 489-1 V2.1.1 EN 301 489-9 V2.1.1
	Art. 3.2	EN 300 422-1 V2.1.2
ROHS: 2011/65/EU (as amended by 2015/863/EU)	EN IEC 63000:2018	

And therefore complies with the essential requirements and provisions of the applicable directives.


The technical documentation is kept at:

Shure Incorporated, Corporate Global Compliance Engineering Division
SHURE Europe GmbH, Compliance EMEA Division

Manufacturer: Shure Incorporated

Signed:  Date: 10. March 2021
Name and Title: Chad Ayers, Director, Global Compliance

European Representative: SHURE Europe GmbH

Signed:  Date: 10. March 2021
Name and Title: Wolfgang Bilz, Director, Compliance and Regulatory Affairs EMEA
SHURE Europe GmbH
Jakob-Dieffenbacher-Str. 12
75031 Eppingen, Germany
Phone: +49 - (0)7262 - 9249 - 0
Fax: +49 - (0)7262 - 9249 - 114

EU Declaration of Conformity



Accepting the responsibility for this declaration:

RCF S.p.A.

Via Raffaello Sanzio 13 - 42124 Reggio Emilia - ITALY

Declares the product(s): **SUB 8004-AS**
 SUB 8005-AS
 SUB 8006-AS

Accessories: -

Specific function: **ACTIVE SUBWOOFER**

Compliant with essentials requirements according to relevant directive and designated standard:

LVD 2014/35/EU directive

- EN IEC 62368-1:2014

EMC 2014/30/EU directive

- EN 55032:2015
- EN 55103-2:2009
- EN 6100-3-2:2014
- EN 61000-3-3:2013

WEEE 2012/19/EC directive

- EN 50419

RoHS 2011/65/EC directive

This declaration is issued on the basis of the results of tests performed.

Reggio Emilia 22/07/2022

RCF S.p.A.

(Dr. Remo Morlini, Managing Director)



EU Declaration of Conformity



Accepting the responsibility for this declaration:

RCF S.p.A.

Via Raffaello Sanzio 13 - 42124 Reggio Emilia - ITALY

Declares the product(s): **HDL 10-A (W)**
 HDL 20-A

Letter "W" after name recognizes the white speaker enclosure

Accessories: -

Specific function: **ACTIVE LINE ARRAY MODULE**

Compliant with essentials requirements according to relevant directive and designated standard:

LVD 2014/35/EU directive

- EN IEC 62368-1:2014

EMC 2014/30/EU directive

- EN 55103-1:2009-07
- EN 55103-2:2009-07
- EN 6100-3-2
- EN 61000-3-3

WEEE 2012/19/EC directive

- EN 50419

RoHS 2011/65/EC directive

This declaration is issued on the basis of the results of tests performed.

Reggio Emilia 24/06/2022

RCF S.p.A.

(Dr. Remo Morlini, Managing Director)



DECLARATION OF CONFORMITY

Manufacturer: DPA Microphones A/S
 Address: 42-44 Gydevang
 DK 3450 Allerød
 Denmark

Designated product: **Adapters: Microdot to XLR**
 including DAD4099 and DAD6001

The manufacturer hereby declares under his sole responsibility that the products designated above are in conformity with the provisions of the following directives and standards, as far as they are applicable:

EMC Directive 2004/108/EC on electromagnetic compatibility	
EN 55103-1	Family product emission standard for Professional Audio (2009)
EN 55103-2	Family product immunity standard for Professional Audio (2009)

Safety standard	
EN 60065	Safety requirements for electrical equipment for measurement, control and laboratory use (2006/corr. 2007)

The technical documentation required to demonstrate that the products meet the requirements above has been compiled and is available for inspection by the relevant enforcement authorities.

Date and place of issue
 July 1, 2009 Allerød



Christina Beltoft
 QA Manager

DECLARATION OF CONFORMITY

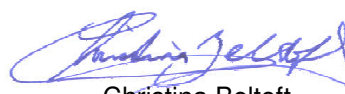
Manufacturer: DPA Microphones A/S
Address: 42-44 Gydevang
DK 3450 Allerød
Denmark

The manufacturer hereby declares under his sole responsibility that all products supplied by DPA Microphones A/S meet the requirements of the Directive 2011/65/EC on the Restriction of Hazardous Materials (RoHS).

RoHS	
Directive 2011/65/EC	Restriction of the use of certain hazardous substances in electrical and electronic equipment

All necessary measures have been taken to ensure that constitutive materials do not include any substances banned by the Directive. As a consequence, all soldering is made with leadless materials, and components have been screened and substituted when required.

Date and place of issue
July 1, 2014 Allerød



Christina Beltoft
QA Manager

DECLARATION OF CONFORMITY

Manufacturer: DPA Microphones A/S
Address: 42-44 Gydevang
DK 3450 Allerød
Denmark

The manufacturer hereby declares under his sole responsibility that all products supplied by DPA Microphones A/S meet the requirements of the Directive 2012/19/EC on the Waste from Electrical and Electronic Equipment (WEEE).


WEEE	
Directive 2012/19/EC	Waste from Electrical and Electronic Equipment

This means that all DPA products, which must be recycled or handled separately, are marked with the WEEE label in accordance with the Directive.

In addition, DPA Microphones A/S accept scrapped equipment from customers and sort it for waste disposal. Used equipment returned to DPA for service may also be scrapped in accordance with the Directive. However, it is not legal to ship waste products across country borders for disposal.

DPA distributors are obliged to register waste in accordance with their national legislation, which may also require them to accept scrapped equipment from end users and dispose of it according to their national laws.

Date and place of issue
July 1, 2014 Allerød



Christina Beltoft
QA Manager

DECLARATION OF CONFORMITY

Manufacturer: DPA Microphones A/S
Address: 42-44 Gydevang
DK 3450 Allerød
Denmark

The manufacturer hereby declares under his sole responsibility that no products manufactured by us discharge, under normal reasonable use, any dangerous substances for human health nor the environment.

DPA Microphones A/S is a designated "downstream user" as product manufacturer, using low quantities and are therefore not subject to registration. DPA Microphones A/S deliver exclusively non-chemical products. These contain no substances intended to be released according to REACH article 7(1) in normal or reasonably predictable conditions of use.

REACH	
Regulation 1907/2006/CE	Registration, Evaluation, Authorisation and Restriction of Chemicals

Further, we confirm that none of our products contain, at today's level of awareness, any of the substances published in the candidate list (article 95(1), issue March 30th, 2010) by the European Chemicals Agency (ECHA) in a concentration of more than 0.1 mass percent (SVHC).

Date and place of issue
July 1, 2009 Allerød


Christina Beltoft
QA Manager



EU Declaration of Conformity

Sennheiser electronic GmbH & Co. KG
Am Labor 1
D-30900 Wedemark, Germany

declares under the sole responsibility that the product:

Product Name: Evolution Wireless Digital
Models: EW-D EM (Diversity Rack Receiver)
EW-D SK (Bodypack Transmitter)
EW-D SKM-S (Handheld Transmitter)

with the included components / additional accessories:

Devices: EW-D ASA; EW-D AB; ADP UHF
Capsules: MMD 835; MMD 845; MME 865; MMD 935; MMD 945
Microphones: ME2; ME3; ME4
Power Supply: NT 12-5 CW+ (FW8006.1/12); NT 12-35 CS (FW8060/12)
Components: BNC Antennas, Cables (Power, Audio, RF)

are in conformity with the provisions of the following relevant harmonized legislations of the European Union.

Quality Assurance System: ISO 9001

Wedemark, 02.11.2020



Dr. Andreas Sennheiser
CEO

History of this document is available in last page

Sennheiser electronic GmbH & Co. KG
Am Labor 1
30900 Wedemark, Germany
T +49 5130 600 - 0
F +49 5130 600 - 1300

Sitz 30900 Wedemark,
Amtsgericht Hannover HRA 120100
phG: Sennheiser Beteiligungs-GmbH

Sitz 30900 Wedemark,
Amtsgericht Hannover HRB 120179

The notified body CTC advanced GmbH (0682) has issued the EU-type examination certificate TEC No. T818696M-01-TEC according to Article 3 of 2014/53/EU.

The EU Declaration of Conformity EU_DoC_External_Power_Supplies is also indicating the conformity of the external power supplies NT 12-5 CW+ (FW8006.1/12) and NT 12-35 CS (FW8060/12).

Applied directives and standards:

The models: EW-D EM; EW-D SK; EW-D SKM-S; EW-D ASA; EW-D AB; ADP UHF; NT 12-5 CW+; NT 12-35 CS and the accessories MMD 835; MMD 845; MME 865; MMD 935; MMD 945; ME2; ME3; ME4 comply with the following:			
Pos.-No.	Document	Short description	Issued / Version
1010	2014/53/EU	Radio Equipment Directive 2014/53/EU (publication references OJEU L153, 22.05.2014, p. 62-106)	2014-04
1116	EN 300422-1	Wireless Microphones; Audio PMSE up to 3 GHz; - Part 1: Class A Receivers; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU	V 2.1.2
1721	EN 300328	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the Radio Equipment Directive 2014/53/EU	V 2.2.2
2016	EN 301489-1	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements	V 2.2.3
2092	EN 301489-9	Part 9: Specific conditions for wireless microphones, similar Radio Frequency (RF) audio link equipment, cordless audio and in-ear monitoring devices; Harmonised Standard covering the essential requirements of article 3.1 (b) of Directive 2014/53/EU (in parts)	V 2.1.1
2178	EN 301489-17	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for	V 3.2.2 (Draft)
2700	EN 62479	Assessment of the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)	2010
3301	EN 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified)	2014/AC:2015/A11:2017
7510	2009/125/EC	ErP Directive 2009/125/EC - Ecodesign requirements for energy-related products (publication references OJEU L285, 31.10.2009, p.10-35)	2009-10
7551	No. 2019/1782	EU-Regulation for External Power Supplies (Energy Efficiency) (publication references OJEU L 272, 25.10.2019, p. 95-106)	2020-04
7801	2011/65/EU	RoHS Directive 2011/65/EU Restriction of the use of certain hazardous substances (publication references OJ L 174, 01.07.2011, p.88-110) amended by (EU) 2015/863)	2011-06 with all amendments

7820	EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances	2018-12
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Document History

Revision Date:	Revision Description	Remarks
2020-11-02	First version	

Declaration of Conformity

CE EU Declaration of Conformity

Manufacturer:

MA Lighting Technology GmbH

Dachdeckerstraße 16
97297 Waldbüttelbrunn
GERMANY

declares that the products

Name of product:

- grandMA2 onPC command wing
 - grandMA2 onPC fader wing
-

are conform to the following directives and harmonized standards

Safety:

2014/35/EU (Low Voltage Directive)

- EN/UL 60065:2003
 - CAN/CSA-C22.2 No. 60065/A1:2006
-



EMC:

2014/30/EU (electromagnetic compatibility)

- EN 55032:2016-02 (Class A)
 - EN 61000-3-2
 - EN 55103-2:2009 (E1, E2, E3)
-

RoHS:

2011/65/EU (RoHS II)

- EN50581:2012
 - WEEE-Reg.-NR. DE 14150988
-

Additional information:

All data lines and signal lines must be shielded and the shielding must be connected to the grounding or the housing of the connector.

Waldbüttelbrunn, November 07, 2016

Dipl.-Ing. Michael Adenau (CEO)

A handwritten signature in black ink, appearing to read 'M. Adenau', written in a cursive style.



Mythos² features a new and reliable Osram Sirius HRI 440W lamp, which ensures the extraordinary performances that have made the success of MYTHOS worldwide. Mythos 2 is an excellent spotlight, which produces an outstanding large light beam, featuring a zoom that ranges from 4° to 50° (1:12 ratio). Light beam is sharp, with perfectly defined edges, from the first millimeters after the front lens right along its entire length. The zoom is optimized for focusing, which is separate from that of the fixed and rotating gobos. Its movements are smooth, fast and very quiet. Mythos 2 also features an indexed visual effect disc, which may be superimposed on all the gobos, both in and out of focus. But Mythos 2 is also an extraordinary beam light, allowing you to switch to a minimum fixed beam angle of just 2.5°. A large, very dense, 160 mm-diameter light beam leaves the Mythos's front lens and remains parallel for its entire length even at great distances. Mythos 2 is a very versatile tool, which is useful in any situation and therefore an excellent investment.

- Osram Sirius HRI 440W discharge lamp - Large 160mm diameter front lens
- Electronic focusing for a perfectly sharp light beam along its entire length
- 4° - 50° electronic zoom (Spotlight mode) - 2.5° aperture and "pipe" effect (Beam mode)
- CMY color mixing with gradually fading color wheels - 14 special color filters on three wheel
- 2 CTO filters (3200 K and 2500 K) + 1 CTB filter - Wheel with 6 HQ dichroic rotating gobos
- Wheel with 18+1 fixed metal gobos - 6 beam reducer filters on the gobo wheel
- Advanced visual effect disc (animation disc)
- 2 indexable rotating prisms (8-facet and linear 4-facet prism) - Frost filter for soft-edge projection
- High precision dimmer and stop-strobe effect - Rapid and extensive pan and tilt movements
- High performance electronics and firmware - Art-Net / RDM
- Patented Italian Design

POWER SUPPLIES

AC power input Neutrik PowerCON TRUE1 (IP65)

115/230V 50/60 Hz

Automatic power supply switching

INPUT POWER

700VA at 230V 50Hz

LIGHT SOURCE

440W discharge lamp

- Type: OSRAM SIRIUS HRI® 440W

- Life: 1,500hrs

- Luminous flux: 22,000 lm

- Cap by faston TM 250 (6.35 mm)

OPTICS

160mm diam. front lens

Electronic focusing for a perfectly sharp light beam along its entire length

Zoom ranging from 4° to 31° for fixed gobos sharp focusing

Zoom range from 6.7° to 50° for rotating gobos sharp focusing

BEAM mode with 2.5° aperture and “pipe” effect

COLOR SYSTEM

CMY color system based on 3 gradually fading color wheels

14 color filters on three wheels

2 CTO filters (3,200K and 2,500K) + 1 CTB filter

EFFECTS SECTION

2 gobo wheels:

- wheel with 6 HQ dichroic, indexable and interchangeable rotating gobos (Ø 25.9mm).

- Interchangeable and variable rotating wheel with 18+1 fixed metal gobos (including 6 beam reducers).

Selectable Gobo-Shake function

Advanced Visual Effect Disc (Animation disc)

2 indexable and interchangeable rotating prisms (8-facet and linear prism)

Frost unit to soften the beam edge

High precision 0-100% dimmer

Mechanical shutter and adjustable speed strobe effect

CONTROL AND PROGRAMMING

30/34 DMX 512 control channels

DMX protocol signal: USITT DMX 512

Art-Net / RDM

Display: Graphic LCD backlit b/w Display

Pan/Tilt Resolution: 16 bit

Gobo Indexing Resolution: 16 bit

Focus Resolution: 16 bit

Dimmer Resolution: 16 bit

Movement control: vectorial

DMX signal connection: 5 pole XLR input and output

Software upload through DMX input

BODY

Aluminum structure with die-cast plastic cover. Two side handles for transportation.
Device locking PAN and TILT mechanisms for transportation and maintenance.

MOVING BODY

Angle:

- PAN = 540° - TILT = 244°

Resolution:

- PAN = 2.11° - PAN FINE = 0.008°

- TILT = 0.960° - TILT FINE = 0.004°

Automatic repositioning of PAN and TILT after accidental movement not controlled by control unit.

ELECTRONICS

Long life self-charging buffer battery. Pre-set macros. Function reset from control unit

"ENERGY SAVING" function: with the stop or total dimmer effect on, or with all the CMY filters full (black), consumption cut by 50%. ON/OFF lamp control from the lighting desk.

Function reset from the lighting desk. "AUTOTEST" function from menu

Electronic monitoring with status error. Cooling system monitoring.

DMX level monitoring on all channels. Internal data transmission diagnostics.

Firmware Upgrade with no power. Firmware upload from another fixture.

SAFETY DEVICES

Bipolar circuit breaker with thermal protection. Automatic break in power supply in case of overheating or failed operation of cooling system. Forced ventilation with axial fans.

WORKING POSITION

Working in any position. Hanging system: with fast-lock omega clamps (1/4 turn) on the base

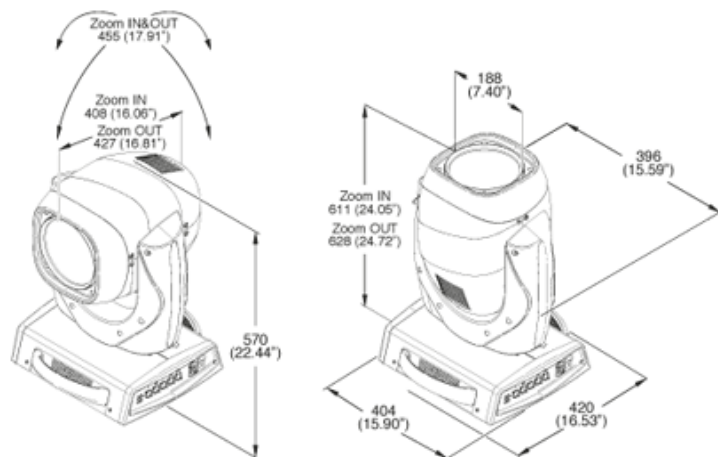
CE MARKING

In conformity with the European Directives:

- 2014/35/EU - Safety of electrical equipment supplied at low voltage (LVD)
- 2014/30/EU - Electromagnetic Compatibility (EMC)
- 2011/65/EU - Restriction of the use of certain hazardous substances (RoHS)
- 2009/125/EC - EcoDesign requirements for Energy-related Products (ErP)

WEIGHT & DIMENSIONS

32 kg (70.54 lbs)



RoHS and REACH Compliance Declaration

D.T.S. Illuminazione srl applicable product(s): All products.

RoHS Compliance

Products made by **DTS Illuminazione srl** are complied with the RoHS Directive (EU Directive 2002/95/EC and subsequent amendments). RoHS COMPLIANT means that the substances restricted by the EU Directive 2011/65/EU (RoHS2) and EU Directive 2015/863/EU (**RoHS3**) and subsequent amendments of the European Parliament are not contained in a finished product above threshold limits stated below, except at trace level due to unintentional impurities.

EU RoHS specifies maximum levels for the following 10 restricted substances. The first six applied to the original RoHS while the last four are added under RoHS3, **from May 2020**.

- Cadmium (Cd): < 100 ppm
- Lead (Pb): < 1000 ppm
- Mercury (Hg): < 1000 ppm
- Hexavalent Chromium: (Cr VI) < 1000 ppm
- Polybrominated Biphenyls (PBB): < 1000 ppm
- Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm
- Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
- Benzyl butyl phthalate (BBP): < 1000 ppm
- Dibutyl phthalate (DBP): < 1000 ppm
- Diisobutyl phthalate (DIBP): < 1000 ppm

REACH Compliance

The REACH Regulation Nr. 1907/2006 of the European Community, concerning the registration, the evaluation and the authorization of the chemical substances, has come into force since 01/06/2007.

The instructions of the regulation provides that who produces or imports from Extra EEC Countries a substance as such or contained in a preparation or in an article in a quantity equal or higher than 10 tons/year, is obliged to register it at the responsible European Agency (ECHA) with timing and modalities defined by the regulation itself, depending on both the quantity and the risk factors.

The preparations needn't be registered but the substances they contain must be registered in accordance with the regulation instructions.

D.T.S. Illuminazione srl is therefore not obliged to register its products.

D.T.S. Illuminazione srl takes on also to assure itself and its customers that the substances contained in its own products will be pre-registered and/or registered.

To do that, we have taken the following actions to achieve REACH-compliance:

1. We request at all of our suppliers a declaration for compliant to REACH and assurance of pre-registered all affected substances.
2. We use only materials where no substances of very high concern (SVHC) are present. Our suppliers have confirmed that the necessary raw materials will be available under REACH.

We can confirm that our products are made with raw materials that do not contain any of the SVHC included in the candidate list which has been published on **June 2023** as part of their formulation.

Disclaimer: The information above is accurate to the best of our current knowledge, but given without any guarantee.

***D.T.S. Illuminazione srl** does not make specific controls on raw materials and on the finished product, so it is conceivable that some of the substances listed in the regulations mentioned may be present as impurities not intentionally added.*

***D.T.S. Illuminazione srl** does not guarantee compliance with REACH and RoHS directives of the products we acquired from third parties.*

Misano Adriatico (RN), ITALY 29/11/2023



Signature (Legal representative), Stamp



Registration number 10.766.622

issued for the manufacturer:

ROBE lighting s.r.o.

Hážovice 2090

CZ - 756 61 Rožnov pod Radhoštěm

Company Registration No.: 64088791

for the product:

Name:	Projector of Light Effects
Type designation:	LW 1200
Modification:	ROBIN 1200 LEDWash, ROBIN 1200 LEDWash/W
Place of the production:	Palackého 416, 757 01 Valašské Meziříčí

at which the certification has been conducted pursuant to ISO/IEC 17067 – scheme 3 certification scheme in accordance with TÜV SÜD Czech certification system. The results are stated in Evaluation report file No. 10.773.981 from 04.07.2017.

The product type mentioned above fulfils the applicable requirements of the following regulations/standards which were the basis for its evaluation:


ČSN EN 60598-1 ed.6:2015 (idt EN 60598-1:2015),
ČSN EN 60598-2-17+A2:1995+Opr.1:1995 (idt EN 60598-2-17:1989+A2:1991),
ČSN EN 55032 ed.2:2016 (idt CISPR 32:2015),
ČSN EN 55103-2 ed.2: 2010+Z1:12 (idt EN 55103-2:2009),
ČSN EN 61000-3-2 ed.4:2015 (idt. IEC 61000-3-2:2014),
ČSN EN 61000-3-3 ed.3:2014 (idt. IEC 61000-3-3:2013),
ČSN EN 62471:2009 (idt IEC 62471:2006).

This certificate is valid till: 4th September 2022

Details and validity conditions are stated in the annex which forms an integral part of this Certificate and contains 1 page.

This certificate is issued on the basis of voluntary certification, and it does not substitute outputs of the authorized or notified body.

Prague, 4th September 2017


Head of the certification body

1. The product specimen was entered for evaluation and type certification on 12.06.2017.
2. The Certificate was issued on the basis of the documents provided by the client:
 - Purchase order form 22.05.2017
 - Application for the certifying from 22.05.2017
 - Producing and accompanying technical documentation.
3. The assessment of factory production control was performed at the product manufacturer concentrating on elements ensuring the continuation of product conformity with certification requirements.
4. Detailed technical data characterizing the product type:

Version:	ROBIN 1200 LEDWash ROBIN 1200 LEDWash/W
Supply voltage:	100 – 250V
Frequency:	50/60 Hz 680W, I=3A (4LED colours- all rings)
Supply:	550W, I=2,4A (2LED colours – all rings)
Power factor:	0,97
Luminary:	RGBW LED
Supply fuse:	T 8 A H 250V
Protection class:	I
IP Code:	IP20



5. List of important parts of the technical documentation:
 - The documentation listed in the Assessment Report Reg. No. 10.773.981 from 04.07.2017
6. Validity Conditions
 - The certificate shall apply only to its holder and products and production places mentioned therein.
 - The transfer of the certificate by its owner to third parties is inadmissible as well as the use of certificate by third parties.
 - TÜV SÜD Czech shall be notified forthwith of any product modifications compared to the certified specimen. This fact may cause the certificate continuation dependent on an additional conformity evaluation.
 - TÜV SÜD Czech shall supervise the proper functioning of the Quality System at the manufacturer within a once a year period on the basis of a concluded contract about the controlling activity.
 - The certificate can be renewed on request.
 - The certificate shall only be reproduced complete including all the annexes.
 - The right to use TÜV SÜD Czech certification mark was not established to the certificate.
 - The certificate holder commits to keep records of all the relevant complaints concerning the conformity of the products with the requirements of regulations and standards and make those records available to the certification body TÜV SÜD Czech.
 - Not specified items (advertising, use of certification mark and certificates) are governed by the General Conditions for Product Certification, as amended.

This language version of the certificate is a translation of a Czech official version No. 10.766.622 issued on 04.09.2017, which is deemed the only one applicable in the event of legal disputes and was printed on 04.09.2017

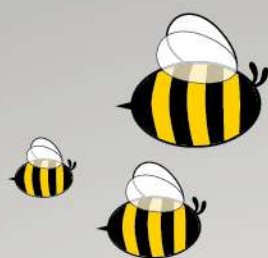
A.LEDA B-EYE

K20 | K10 | K10 Easy | K20 CC | K10 CC

ENGLISH



AN OSRAM BUSINESS



B•EYE™
www.b-eye.it



Steven Bewley
London Grammar tour

"It's a great fixture - the rotating lens, the colors, all of it comes together to give you a vast creative toolbox to play with."



Marck Brickman,
Lighting Designer

"I'm absolutely blown away with B-EYE. It's a good one!"



Peter Morse
Lighting Designer

"It's the B-EYE. It's the B-est... I love it! Just saw it for the first time and it really rocks. Though I'm not a minimalist, I can go down to one LED and it would kick ass. Great light!"



Tim Routledge
Gary Barlow tour

"They can go super tight and also nice and wide. They give me massive flexibility without ever being tacky."



Steve Gray
Lighting Designer

"We have another new fixture from Clay Paky that has given us a whole new world of illusion to project."



Dave Hauss
Excision tour

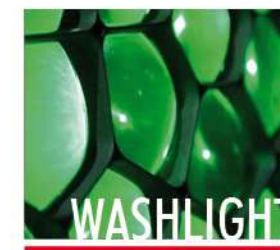
"They're my go-to light right now. They are an all around great fixture, and artists love them."

A.LEDA B-EYE



THREE FUNCTIONS IN ONE

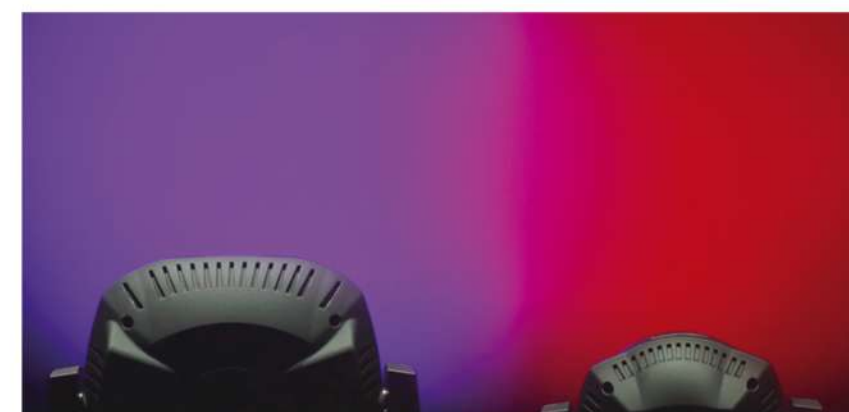
The A.leda B-EYE is an intelligent machine which has revolutionized LED stage lighting as we understand it. Versatility is the first feature that meets the eye: the B-EYE is a high performance LED wash light, a stunning beam light, and a spectacular visual effects projector... all in one unit.



A WASH LIGHT WITH UNPARALLELED PERFORMANCE

A good washlight needs to be able to "wash" a surface with color at any distance by making the most of its light source. The lighting also has to be uniform. The choice of colors and shades must be large and finely adjustable. The Clay Paky A.leda B-EYE excels in all of these features, as we shall see in detail.

B-EYE is one of the brightest LED washlights with the same power rating, thanks to its special optical unit, designed and built by Clay Paky, with a truly amazing lumen/watt ratio. The optical unit consists of tailor-made lenses (and not standard lenses available on the market, like competing products), which collect all the



light produced by the LEDs and convey it all into a beam where the light of the individual electronic chips is mixed and homogenized for utmost

uniformity. An international patent is pending on this optical unit, which is the result of nearly forty years of Clay Paky experience.

A FASCINATING MOSAIC MADE UP OF TILES OF LIGHT

Besides projecting a perfectly uniform light over the entire illuminated surface, the light is also distributed evenly on the front lens. The grid that separates the LEDs is virtually invisible and the individual light sources are no longer perceivable and distinguishable. A person facing the light sees - from every angle they look - a beautiful uniform mosaic made up of numerous tiles of light.



TOTAL COLOR CONTROL

The B-EYE is equipped with an unparalleled electronic color control system. The device is based on RGBW LEDs which cover a wide spectrum of color frequencies. Thanks to the addition of the white chip, the saturated colors generated by the RGB chips may be attenuated. The primary colors are bright and pure, not to mention the beautiful colors obtained through mixing, such as the amber, "honey" and salmon shades. These are mellow colors, widely used in the theatre.

The B-EYE also includes a very sophisticated color balancing system: an algorithm based on a color reading system is able to calibrate each single B-EYE in order to compensate for differences between different light sources (color consistency). In this way the same color coordinates may be achieved for each RGB color combination along with maximum color rendition. This is a fully independent function inside the new B-EYE. It is particularly useful in television studios,

where there are often various lights with different color temperatures. This function allows you to adjust the color control to the color temperature set on the light. The operator only has to set a color temperature value, and the RGB combination required adjusts itself automatically to emulate operation at that color temperature (RGB auto-tuning to lamp CT emulation).

THE B-EYE AS A WHITE LIGHT GENERATOR

The B-EYE is surprising even when used just as a white light. Its color temperature may be accurately adjusted from 8000 K to 2500 K, and its high color rendering index means the colors of objects illuminated by the B-EYE are virtually the same as they appear in natural light.

"Function" Channel	Halogen Lamp Simulation
98 - 102	2500 W
93 - 97	2000 W
88 - 92	1200 W
83 - 87	1000 W
78 - 82	750W
73 - 77	OFF (default)

In addition, a special software algorithm allows full emulation of the behaviour of five different types of tungsten lamp. This algorithm does not only affect the color temperature parameters, but also the dimming characteristics, so that the LED light works in all respects like a real halogen light.

The dimmer function is very sophisticated: extremely smooth and linear light intensity attenuation is achieved through dedicated dimmer and dimmer fine channels. In addition, four different dimmer curves may be selected as desired to fit the various different needs and brightness of the set.



DESIGNED TO WORK AT ANY DISTANCE

As far as being able to work at any distance, no LED wash is today better than the B-EYE. The zoom in wash mode (perfectly uniform light distribution) ranges from 4° to 60°. This means that the range of use of B-EYEs goes from rooms with low-ceilings (small theatres and TV studios, for example), where wide angles are very useful, to shows in arenas or large environments, where a tight zoom is perfect. As the zoom closes, the beam remains uniform with no dark patch in the centre.

The B-EYE also includes an innovative and exclusive Beam Edge Softening function, thanks to which the edge of the wash beam may be hardened or softened linearly.

Lastly, the B-EYE has a digital beam shaper that adapts the shape of the beam and its orientation as the set requires.



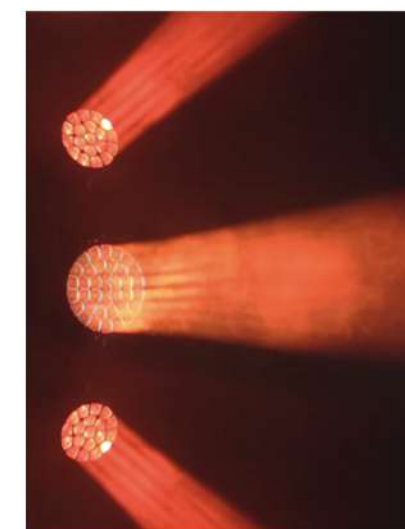
A LED BEAM LIGHT

When the B-EYE beam angle is reduced to 4°, the wash light turns into a beam light. The B-EYE therefore becomes an amazing mid-air parallel light beam generator, able to create fascinating pulsating pencil-beams, which may be controlled individually, each with its own color and shade. ALL the parameters of EACH LED pixel may be completely controlled!

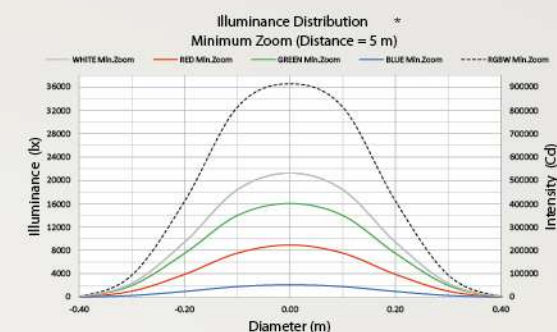
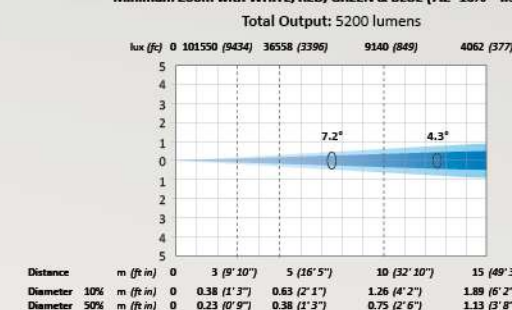
In this operating mode, the B-EYE has all the advantages of a beam light, but - in addition - its light beam consists of an array of several individually controllable pencil-beams, almost indistinguishable from each other. The B-EYE lets you control every single

LED, which turns its light beam into a set of separate pulsating pencil-beams, each with its own color and light intensity. Individual LED control means you can use these lights to create all kinds of images. In this mode, the shape of the light beam may be changed in mid-air with an attractive coordinated morphing effect.

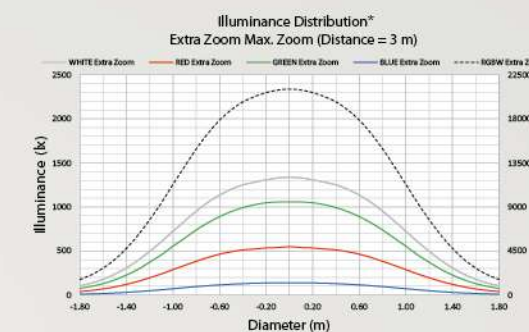
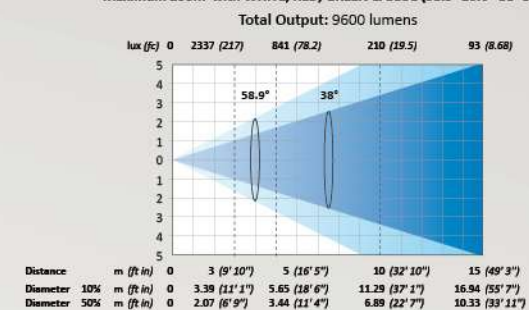
At the same time, you can create color images on the front lens, which transform the B-EYE into a fantastic scenic element. These lighting effects are very effective when they are shot with a TV camera, which makes the B-EYE a great light for use in television.



Minimum Zoom with WHITE, RED, GREEN & BLUE (7.2° 10% - 4.3° 50%)



Maximum Zoom with WHITE, RED, GREEN & BLUE (58.9° 10% - 38° 50%)



*Data refer to A.leda B-EYE K20

AN EXTRAORDINARY CREATIVE EFFECTS MACHINE

Lastly, the B-EYE K20 and B-EYE K10 introduce a totally innovative feature: the front lens may be rotated to create lots of light beams that open and close like flower petals.

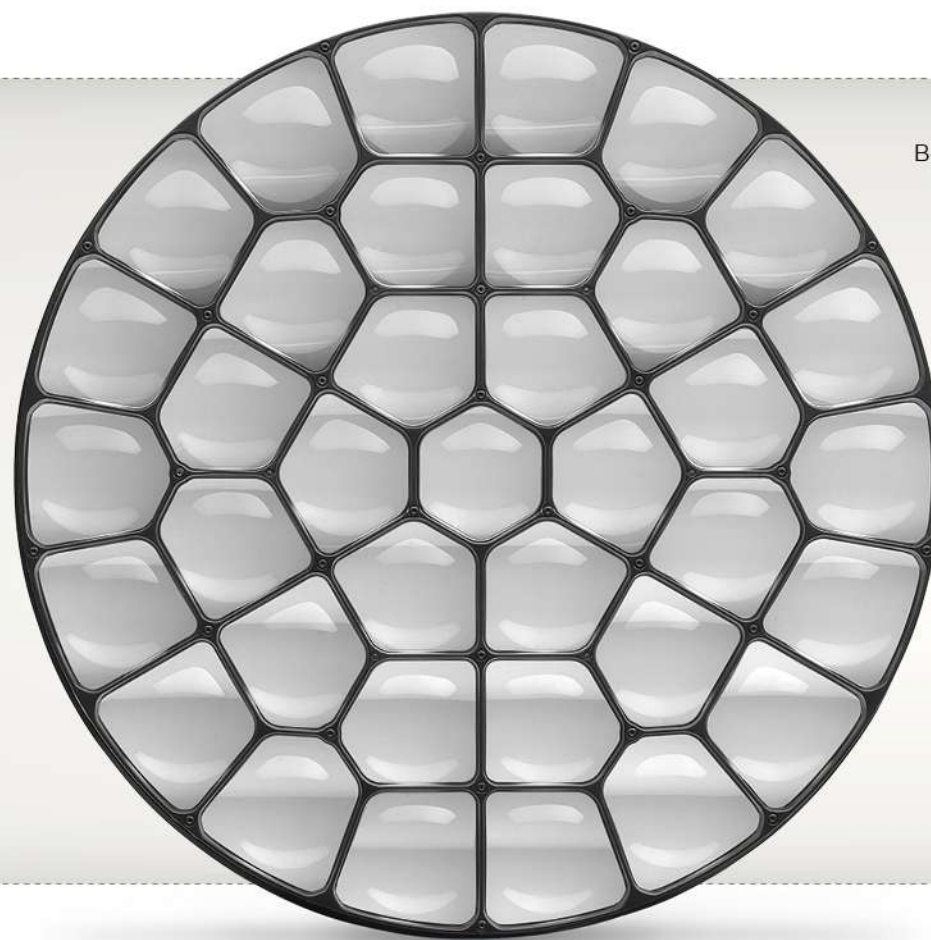
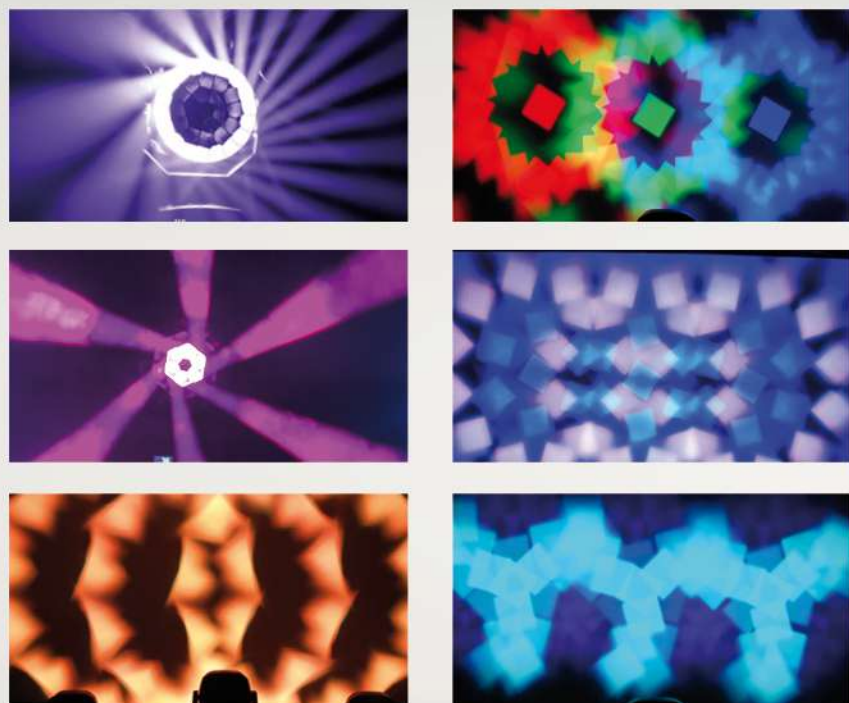
When you add colors and you enable dynamic graphic LED configurations, you get an incredible mid-air effect, never seen before with a LED light. This is the revolutionary "vortex" effect, which fills the scene with atmosphere and gives the audience a unique feeling of being immersed in light.

This B-EYE function may also be used to project beautiful kaleidoscopic images on screens, walls and parts of the scenery. These dynamic images may be geometric or elegantly coordinated.

The vortex effect and kaleidoscopic projections can be programmed and repeated with absolute precision, since their parameters are digitally controlled. The operator is assisted in the use of these effects by a special programming function. It is not a sim-

ple macro channel, but a real effects engine, which varies each of the parameters and combines them in endless ways. This system does not limit creativity, but takes it to new heights.

The most sophisticated use of individual LED control is when you use a set of B-EYEs in pixel mapping mode. There is no limit to the effects a designer's creativity can produce using the B-EYE's sophisticated electronic and mechanical devices!



B-EYE lenses (patent pending) are designed and manufactured exclusively by Clay Paky. For B-EYE K20, they consist of seven different polygonal lenses which "fit together" perfectly to minimize the space between one lens and another. The result is a higher-than-average light output in comparison with LED lights of the same power.



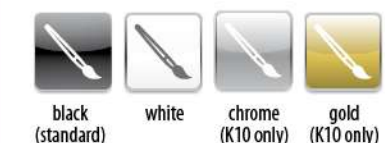
THE B-EYE "SOUL"

- 1 Thermal back protection
- 2 Interchangeable LED module plate
- 3 Rod-bar mixing system
- 4 Front lens rotation mechanism
- 5 Front lens system made of insert lenses
- 6 Front protection flange

Special "rods" (optical bars with reflective internal walls) convey the light output from each LED to the lens. All light dispersion is eliminated. The light emitted is enhanced and the colors are perfectly mixed and uniform.



All B-EYEs are available on request with white, chrome-plated and golden casing.



A HIGHLY SOPHISTICATED "EFFECTS ENGINE"

The intelligent management of the pre-programmed graphic macros deserves a particular mention. It is much more sophisticated than just a set of macros, and has been achieved thanks to excellent work on the electronics by Clay Paky's R&D. In "shape" mode, the operator may set up to fourteen programming variables and use the best in dynamic visual effects, based on the experience of the most famous lighting designers. As a result, you can create almost infinite combinations of shapes, colors, speeds, intensities and transition speeds. Lastly, you can combine the foreground and background by selecting a visual effect for the former and contrasting shades for the latter.



Rotating the front lens is also very useful in wash mode, because you may use it to gradually soften the edges of the light beam. You can also use it as a digital beam shaper to adapt the shape of the beam and its orientation as the set requires (example in the above picture).



A.LEDA B-EYE: SHEDDING CREATIVE LIGHT ON THE PRESENT AND FUTURE OF SHOWS

In short, A.leda B-EYEs are extremely versatile LED lights that lighting designers may use in a myriad of ways, by taking advantage of their three main operating modes:

- As **powerful washlights**, with beautiful colors, a zoom with an outstanding range, and a digital beam shaper.
- As **beamlights**, with a light beam whose shape and color are controlled digitally.
- As a **generator of mid-air visual effects** and with totally new **effect projections**.

They are true gems of mechanical and electronic engineering: lightweight, sturdy and reliable. They are assembled modularly to make routine maintenance simpler. A thousand creative effects for lighting designers. One light to move around, one light to hire. One investment that lasts.

THE B-EYE FAMILY

Besides the two major B-EYE K20 and B-EYE K10 lights, which have all the features described up to now, the B-EYE family also includes:



This is a version of the B-EYE K10 without rotating front lens. It is called "Easy" since its features are "simplified". It is a well-balanced solution for all uses where special visual effects are not needed. The optical unit is identical and all the advantages of the wash and beam modes remain the same.

The "easy" version also provides individual LED control among its important features, since this is essential for fascinating mid-air effects. Versatility, light weight, small size, high brightness and an amazing performance/cost ratio make the B-EYE K10 "Easy" a very interesting alternative for lighting designers.



There are a lot of people who wish to use the superior optical characteristics of B-EYE technology exclusively in wash light mode. For this kind of use, where mid-air and visual effects are not needed, Clay Paky has created a simpler version, called A.leda B-EYE CC (Color Changer). Unlike the full version, this light does not provide control of each LED pixel and does not have a rotating front lens.

A.leda B-EYE K20 CC and K10 CC are therefore two extraordinarily bright LED washes, with a perfectly uniform light, a really wide zoom, and complete color and white light management. B-EYE CC lights make the utmost in modern color wash technology available during every show.



from left to right:

- A.LEDA B-EYE K20 code C61420
- A.LEDA B-EYE K10 code C61419
- A.LEDA B-EYE K10 Easy code C61415
- A.LEDA B-EYE K20 CC code C61421
- A.LEDA B-EYE K10 CC code C61418

COMPARISON TABLE			K20						K10				K5			
	A.LEDA B-EYE / WASH		B-EYE	B-EYE CC Color Changer	WASH	WASH CC Color Changer	WASH TW Tunable White	WASH W White	B-EYE	B-EYE Easy	B-EYE CC Color Changer	WASH	WASH CC Color Changer	WASH TW Tunable White	WASH W White	WASH
	Code	C61420	C61421	C61410	C61413	C61411	C61412	C61419	C61415	C61418	C61405	C61408	C61406	C61407	C61401	
Source Type	RGBW	RGBW	RGBW	RGBW	White 2700 and 8000 K	White 7000 K	RGBW	RGBW	RGBW	RGBW	RGBW	White 2700 and 8000 K	White 7000 K	RGBW		
LED Nominal Wattage	15W	15W	15W	15W	15W	15W	15W	15W	15W	15W	15W	15W	15W	15W		
Number of LEDs	37	37	37	37	37	37	37	19	19	19	19	19	19	19	7	
Enhanced Light Output	•	•						•	•	•						
Individual LED Control	•		•					•	•		•				•	
Washlight Mode	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
Beamlight Mode	•							•	•							
Kaleido / Vortex Effect	•							•								
Zoom Range (@ 10% peak)	7°- 60°	7°- 60°	16°- 68°	16°- 68°	16°- 68°	16°- 68°	16°- 68°	7°- 60°	7°- 60°	7°- 60°	16°- 68°	16°- 68°	16°- 68°	16°- 68°	13° (fixed)	
Zoom Range (@ 50% peak)	4°- 40°	4°- 40°	9°- 43°	9°- 43°	9°- 43°	9°- 43°	9°- 43°	4°- 40°	4°- 40°	4°- 40°	9°- 43°	9°- 43°	9°- 43°	9°- 43°	7° (fixed)	
Unnoticeable Sources and Front Frame	•	•						•	•	•						
Front Lens bi-directional Rotation	•							•								
Digital Beam Shaper (in Wash Mode)	•							•								
Beam Edge Softening Control (in Wash Mode)	•							•								
Pixel Patterning Macros with Enhanced Control	•	•	•					•	•	•	•				•	
White CT Emulation 2500 - 8000 K	•	•	•	•				•	•	•	•	•			•	
White CT Emulation 2900 - 7500 K					•								•			
RGB auto-tuning to Lamp CT Emulation	•	•	•	•				•	•	•	•	•			•	
Tungsten Lamp Emulation	•	•	•	•	•			•	•	•	•	•	•		•	
High CRI (> 94)					•								•			

ACCESSORIES

OMEGA for fixing clamps (standard)	code 183102/805
CLAMPS - 48-51mm, max 300 Kg (optional)	code C21070
FOAM SHELL for A.leda B-EYE K20 / K20 CC (optional)	code F21257
FOAM SHELL for A.leda B-EYE K10 (optional)	code F21260
FOAM SHELL for A.leda B-EYE K10 Easy / CC (optional)	code F21256



ROXTER CASE

Roxter-case (+2 foam shells) for 2 A.leda B-EYE K20 / K20 CC	code F21259
Roxter-case (+4 foam shells) for 4 A.leda B-EYE K10	code F21261
Roxter-case (+4 foam shells) for 4 A.leda B-EYE K10 Easy / CC	code F21258

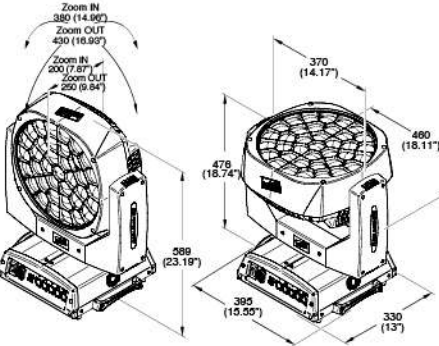


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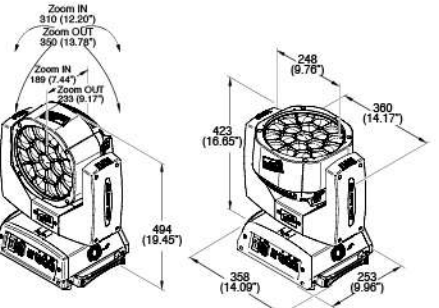
Outdoor cover (optional) with Wireless DMX receiver/transmitter	code C61195
Outdoor cover (optional) Easy version with no W-DMX	code C61198

WEIGHT AND DIMENSIONS (mm/inches)

B-EYE K20 21 kg (46.3 lbs)



B-EYE K10 15 kg (33.1 lbs)







B•EYE™

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A.LEDA B-EYE ON



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Phone +39 035 654311 - Fax +39 035 301876 - www.claypaky.it - info@claypaky.it



UNI EN ISO 9001

A.leda B-Eye K20

C61420

Specifications
01/2018



A.LEDA B-EYE K20

Perfect Wash, Amazing Beam, Spectacular Graphic Effects

The A.leda B-EYE K20 is a high performance wash light, a breathtaking beam light, and a creator of completely new spectacular visual effects. Its unparalleled versatility makes it an extremely interesting creative tool for all lighting designers. The B-EYE is first and foremost an excellent quality wash light. It is able to wash surfaces with colors at any distance, making the most of its light source. B-EYE is brighter than any LED-wash with the same rated power, thanks to its special optical unit with a truly amazing lumen/watt ratio, designed and built by Clay Paky. The zoom ranges from 4° to 60° and it is therefore suitable both for environments with low ceilings (small theatres and TV studios, for example), where large angles are extremely useful, and for shows in arenas or large environments, where a tight zoom is perfect. When the B-EYE beam is zoomed down to 4°, the "wash" light turns into a "beam" fixture. The B-EYE therefore becomes a surprising mid-air parallel effect light, capable of generating a pulsating beam of micro-rays, which may be controlled individually, each with its own colors and shades. All the parameters of each LED can be completely controlled. Lastly, the B-EYE K20 introduces a completely new feature: the front lens may be rotated to create lots of small bright compositions, which may be opened and closed like petals. By adding colors and dynamic graphics, the B-EYE generates never-seen-before graphic light effects.

- Source Type: RGBW LEDs - LED Nominal Wattage: 15W
- Number of LEDs: 37
- Versatile, three operating modes: wash, beam, FX effect
- Unique optical system, featuring unmatched zoom range (4°-60°) and even light spread
- Individual LED control for each parameter - Invisible front grid
- Beam edge softening control (in wash mode)
- Exclusive parallel beam consisting of an array of individually controllable micro-beams
- Enhanced electronic engine for dynamic beam pattern design, with digital accuracy and repeatability
- Art-Net / RDM
- Rotating front lens for countless vortex effects, for aerial or "kaleidoscopic" projection use
- White CT Emulation 2500-8000K
- RGB auto-tuning to lamp CT Emulation - Tungsten Lamp Emulation

A.leda B-Eye K20 - Specifications



A.leda B-Eye K20

C61420

Specifications
01/2018

POWER SUPPLIES

100-240V 50/60Hz

INPUT POWER

750VA

LIGHT SOURCE

37 Osram Ostar RGBW LEDs

LED Nominal Wattage: 15W

LED Average Life: 50,000 h

OPTICS

4°-60° Electronic Zoom Range

EFFECTS SECTION

Three operating modes: wash, beam, FX (Kaleido effects)

Bi-directional Rotating Front Lens

Digital Wash-Beam Framing effect

Beam edge softening control (in Wash mode)

Pixel Patterning Macros with enhanced control

0-100% linear electronic dimmer

Adjustable speed stop/strobe effect, with instantaneous blackout

Dedicated channel for color temperature setting

White CT Emulation 2500-8000K

RGBW auto-tuning to lamp CT Emulation

Tungsten Lamp Emulation

Slow Strobe: 1 flash/sec; Fast Strobe: 25 flash/sec

CONTROL AND PROGRAMMING

Control channels: 21 in standard mode

DMX protocol signal: USITT DMX 512

Art-Net / RDM

Display: Graphic LCD backlit b/w Display

Pan/Tilt Resolution: 16 bit

Dimmer Resolution: 16 bit

Movement control: vectorial

DMX signal connection: 3 and 5 pole XLR input and output

Software upload through DMX input

BODY

Aluminium structure with die-cast plastic cover

Two side handles for transportation

PAN lock for transport and maintenance

MOVING BODY

Movement by means of two stepper motors, controlled by microprocessor

Automatic repositioning of PAN and TILT after accidental movement not controlled by control unit

Travel:

- PAN = 540°

- TILT = 210°

ELECTRONICS

Long-life auto-charging buffer battery

Preset color and graphic effect macros

Function reset controllable from a central control unit

Menu-driven internal self-test function

Ethernet ready with RJ45 socket

Display: backlit black-and-white graphic LCD display

Electronic check-up of every single parameter with error alarm

DMX level monitoring on each channel

Automatic internal data transmission error diagnostics

Firmware upgrade even when the unit is not connected to the power supply

Firmware transfer from one light to another

SAFETY DEVICES

Automatic power safety derating in case of overheat of the LED board

Forced ventilation

WORKING POSITION

Working in any position

Hanging system: with fast-lock omega clamps (1/4 turn) on the base

CE MARKING

In conformity with the European Directives:

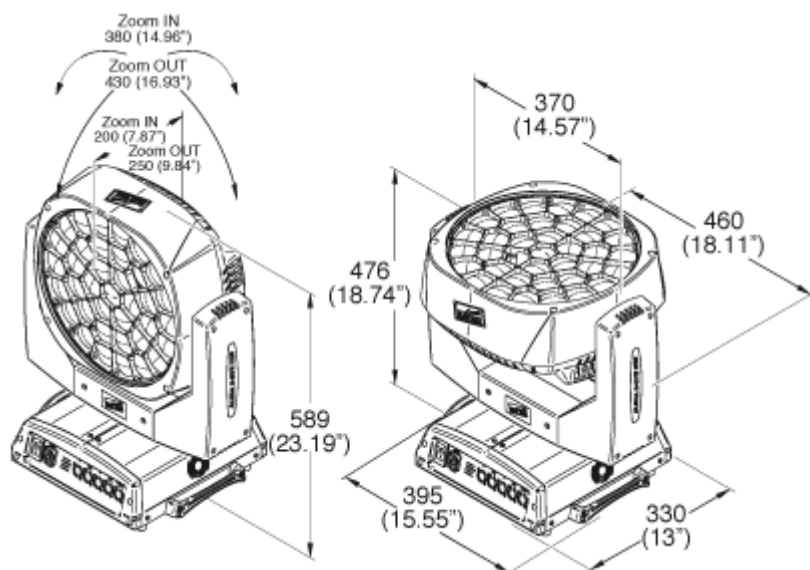
- 2014/35/EU - Safety of electrical equipment supplied at low voltage (LVD)
- 2014/30/EU - Electromagnetic Compatibility (EMC)
- 2011/65/EU - Restriction of the use of certain hazardous substances (RoHS)
- 2009/125/EC - EcoDesign requirements for Energy-related Products (ErP)

ETL

This product is available, on demand, with cETLus Listed Mark, that complies with the UL 1573, UL 8750 and CSA C22.2 No. 166 standards.

WEIGHT & DIMENSIONS

21 Kg (46.3 lbs)



EU Declaration of Conformity

OSRAM

Document: 2017 / 9C1-3420012-EN-02
Manufacturer or representative: OSRAM GmbH
Address: Marcel-Breuer-Str. 6
80807 Munich
Germany
Brand name or trade mark: OSRAM
Product type: LED module
Product designation: LINEARlight FLEX Power
☒ See attached list

The designated product(s) is (are) in conformity with the relevant Union harmonisation legislation:

- | | | |
|-------------------------------------|-----------------------------------|---|
| <input type="checkbox"/> | Low Voltage Directive: | 2014/35/EU: Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits; Official Journal of the EU L96, 29/03/2014, p. 357-374 |
| <input checked="" type="checkbox"/> | EMC Directive: | 2014/30/EU: Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility; Official Journal of the EU L96, 29/03/2014, p. 79-106 |
| <input checked="" type="checkbox"/> | 2009/125/EC and amendments | Directive of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products |
| <input type="checkbox"/> | 244/2009 and amendments | Commission Regulation (EC) implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps |
| <input type="checkbox"/> | 245/2009 and amendments | Commission Regulation (EC) implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and repealing Directive 2000/55/EC of the European Parliament and of the Council |
| <input checked="" type="checkbox"/> | 1194/2012 and amendments | Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment |
| <input checked="" type="checkbox"/> | 2011/65/EU and amendments | Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment; Official Journal of the EU L174, 1/07/2011, p. 88-110 |

Last two digits of the year in which the CE marking was affixed: 16

Place and date of signatures: Munich, the 25.01.2017

Signatures:


Quality Management


Quality Assurance

Names: Mr. Richard Köppl

Mr. Roberto Barbisan

Customer service contact: OSRAM GmbH, Steinerner Furt 62, 86167 Augsburg, Germany

This declaration of conformity is issued under the sole responsibility of the manufacturer or representative. It certifies compliance with the indicated Directives, but implies no warranty of properties.

The conformity of the designated product(s) with the provisions of the European **EMC Directive** is given by the compliance with the following European Standard(s) or other specifications. If not elsewhere/otherwise indicated the edition/amendment as referenced below applies.

- ☒ **EN 61547:** Equipment for general lighting purposes — EMC immunity requirements
2009

The conformity of the designated product(s) with the provisions of the European Directive **2009/125/EC** is given by the compliance with the following European Standard(s). If not elsewhere/otherwise indicated the edition/amendment as referenced below applies.

- ☒ **Internal report** 9C1 3357481

The conformity of the designated product(s) with the provisions of the European Directive **2011/65/EU** is given by the compliance with the following European Standard(s) or other specifications. If not elsewhere/otherwise indicated the edition/amendment as referenced below applies.

- ☒ **Internal report** 2A1 3302697

EU Declaration of Conformity Attached list

Document number: 2017 / 9C1-3420012-EN-02

Models:

LFyyyy-G3-kxx-zz for CRI= 80 or 90

LFyyyy-G3-SWxx-zz for Shop using (CRI>80)

LFyyyy-G3-MW-zz, LFyyyy-G3-MWR-zz for Meat using

LFyyyy-G3-VW-zz for Vegetables using

where:

yyyy: from 400 to 4000 lm/m

k: 8 or 9, first digit of CRI

xx: from 20 to 65, the first 2 digits of CCT

zz: led module length (in m), according to the max length



EU Declaration of Conformity

**This is to certify that the product subsequently referred to
was designed and manufactured in conformity with the
following EU Directives:**

2014/30/EU

2014/35/EU

Including subsequent amendments.

Model Type:	Marshall Vintage reissue Guitar Amplifier
Model Description:	100-Watt valve guitar amplifier head
Model Number:	JCM900 4100
Applicable Standards:	<p>EN 55032: 2015 Electromagnetic compatibility of multimedia equipment -- Emission requirements</p> <p>EN 61000-3-2: 2014 Electromagnetic compatibility - Limits. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)</p> <p>EN 61000-3-3: 2013 Electromagnetic compatibility - Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection</p> <p>EN 55035: 2017 A11:2020 Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use -- Immunity</p> <p>EN 62368-1: 2014 Audio, video and similar electronic apparatus - Safety requirements</p>
Date:	24.10.2023
Place of issue:	Marshall Amplification plc, Denbigh Road, Denbigh Industrial Estate, Bletchley, Milton Keynes, MK1 1DQ, United Kingdom.
Manufacturer's Authorised Signature:	Function of Signatory: Director of R&D Milton Keynes

Jon Magill



+44 (0)1908 375 411
DENBIGH ROAD, BLETCHLEY, ENGLAND MK1 1DQ

REGISTERED IN ENGLAND. REGISTERED NUMBER: 805676



MARSHALL.COM

**DECLARATION OF PERFORMANCE
NO: 1000236-FRAU**

Date: 1/8/19

Product Family Name

NEXANS H07RN-F TITANEX®

(see list of corresponding products and unique identification codes hereafter)

Intended use of the product

Cable for general applications in construction works subject to reaction to fire requirements

AVCP (Assessment and Verification of Constancy of Performance): System 3

Notified body: NB 1812

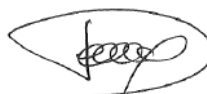
Declared performance and Harmonized Standard

ESSENTIAL CHARACTERISTIC	PERFORMANCE	HARMONIZED STANDARD
Reaction to fire	E _{ca}	according to EN50575:2014+A1:2016
Release of dangerous substances	NPD	NA

The performance of the product(s) identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified below.

Manufacturer
Nexans France
101 Route d'Arnay
71400 Autun France

Signed for the manufacturer by
Michael VEAUX
michael.veaux@nexans.com
Nexans France
1/8/19



You will find hereafter the list of CPR certified products for the selected family

Nexans Ref.	Country Ref.	Name
10277976		Nexans H07RN-F TITANEX 5G6

DECLARATION OF PERFORMANCE NO: 1000236-FRBH

Date: 3/15/22

Product Family Name

NEXANS H07RN-F TITANEX®

(see list of corresponding products and unique identification codes hereafter)

Intended use of the product

Cable for general applications in construction works subject to reaction to fire requirements

AVCP (Assessment and Verification of Constancy of Performance): System 3

Notified body: NB 1812

Declared performance and Harmonized Standard

ESSENTIAL CHARACTERISTIC	PERFORMANCE	HARMONIZED STANDARD
Reaction to fire	Eca	according to EN50575:2014+A1:2016
Release of dangerous substances	NPD	NA

The performance of the product(s) identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified below.

Manufacturer
Nexans France
48 Rue Paulin Pecqueux
02110 Bohain en Vermandois France

Signed for the manufacturer by
Lenaick LEMEE
lenaick.lemee@nexans.com
Nexans France
3/15/22



You will find hereafter the list of CPR certified products for the selected family

Nexans Ref.	Country Ref.	Name
10055459		Nexans H07RN-F TITANEX 8G2,5
10055503		Nexans H07RN-F TITANEX 3X6
10055504		Nexans H07RN-F TITANEX 3X4
10055505	01397067	Nexans H07RN-F TITANEX 3x2.5
10055506	01397895	Nexans H07RN-F TITANEX 5G35
10055507		Nexans H07RN-F TITANEX 2X1,5 C50m
10055508		Nexans H07RN-F TITANEX 2X1,5 100m
10055509	01394719	Nexans H07RN-F TITANEX 2x1.5
10055510	01394809	Nexans H07RN-F TITANEX 2x1.5 D1000m
10055512	01397001	Nexans H07RN-F TITANEX 2x2.5 C50m
10055513	01397002	Nexans H07RN-F TITANEX 2x2.5 C100m
10055514	01394723	Nexans H07RN-F TITANEX 2x2,5
10055516		Nexans H07RN-F TITANEX 2x4 C100m
10055517	01394726	Nexans H07RN-F TITANEX 2x4
10055519	01394727	Nexans H07RN-F TITANEX 2x6
10055521		Nexans H07RN-F TITANEX 3G1,5 C50m
10055522		Nexans H07RN-F TITANEX 3G1,5 C100m
10055523	01394734	Nexans H07RN-F TITANEX 3G1.5
10055525	01394810	Nexans H07RN-F TITANEX 3G1.5 D1000m
10055527		Nexans H07RN-F TITANEX 3G2,5 50m
10055528		Nexans H07RN-F TITANEX 3G2,5 100m
10055529	01394811	Nexans H07RN-F TITANEX 3G2.5 D500m
10055530	01394738	Nexans H07RN-F TITANEX 3G2.5
10055534		Nexans H07RN-F TITANEX 3G4 C50m
10055535	01394742	Nexans H07RN-F TITANEX 3G4
10055537	01394744	Nexans H07RN-F TITANEX 3G6
10055540		Nexans H07RN-F TITANEX 4G1,5 100m
10055541	01394754	Nexans H07RN-F TITANEX 4G1.5
10055542	01394816	Nexans H07RN-F TITANEX 4G1.5 D1000m
10055544		Nexans H07RN-F TITANEX 4G2,5 50m
10055545		Nexans H07RN-F TITANEX 4G2,5 100m
10055547	01394758	Nexans H07RN-F TITANEX 4G2.5
10055548	01394812	Nexans H07RN-F TITANEX 4G2.5 D500m
10055550	01397016	Nexans H07RN-F TITANEX 4G4 C50m

10055551	01394762	Nexans H07RN-F TITANEX 4G4
10055552	01394813	Nexans H07RN-F TITANEX 4G4 D500m
10055555	01394768	Nexans H07RN-F TITANEX 4G10
10055556		Nexans H07RN-F TITANEX 4G10 D500m
10055557		Nexans H07RN-F TITANEX 4G16 C50m
10055558	01394769	Nexans H07RN-F TITANEX 4G16
10055560	01397705	Nexans H07RN-F TITANEX 4G50
10055561		Nexans H07RN-F TITANEX 5G1,5 C50m
10055562		Nexans H07RN-F TITANEX 5G1,5 C100m
10055564	01394777	Nexans H07RN-F TITANEX 5G1.5
10055565	01394814	Nexans H07RN-F TITANEX 5G1.5 D500m
10055567		Nexans H07RN-F TITANEX 5G2,5 50m
10055568		Nexans H07RN-F TITANEX 5G2,5 100m
10055569	01394815	Nexans H07RN-F TITANEX 5G2.5 D500m
10055571	01394781	Nexans H07RN-F TITANEX 5G2.5
10055573	01394771	Nexans H07RN-F TITANEX 4G35
10055574	01394766	Nexans H07RN-F TITANEX 4G6
10055576		Nexans H07RN-F TITANEX 7G1,5 100m
10055577	01394793	Nexans H07RN-F TITANEX 7G1.5
10055579		Nexans H07RN-F TITANEX 1X10 100m
10055580	01394704	Nexans H07RN-F TITANEX 1x10
10055581		Nexans H07RN-F TITANEX 1X16 100m
10055582	01394705	Nexans H07RN-F TITANEX 1x16
10055583		Nexans H07RN-F TITANEX 1X25 100m
10055584	01394706	Nexans H07RN-F TITANEX 1x25
10055586	01394707	Nexans H07RN-F TITANEX 1x35
10055588	01394708	Nexans H07RN-F TITANEX 1x50
10055590	01394709	Nexans H07RN-F TITANEX 1x70
10055591	01394710	Nexans H07RN-F TITANEX 1x95
10055592	01394711	Nexans H07RN-F TITANEX 1x120
10055593	01394712	Nexans H07RN-F TITANEX 1x150
10055594	01394770	Nexans H07RN-F TITANEX 4G25
10055596		Nexans H07RN-F TITANEX 5G4 C50m
10055597	01397251	Nexans H07RN-F TITANEX 5G4
10055600	01394787	Nexans H07RN-F TITANEX 5G6
10055601		Nexans H07RN-F TITANEX 5G6 D500m
10055602	01394789	Nexans H07RN-F TITANEX 5G10
10055604		Nexans H07RN-F TITANEX 5G16 C50m

10055605	01394790	Nexans H07RN-F TITANEX 5G16
10055607		Nexans H07RN-F TITANEX 7G2,5 50m
10055608		Nexans H07RN-F TITANEX 7G2,5 100m
10055609	01394794	Nexans H07RN-F TITANEX 7G2.5
10055611	01394795	Nexans H07RN-F TITANEX 12G1.5
10055614	01397021	Nexans H07RN-F TITANEX 12G2.5
10055615		Nexans H07RN-F TITANEX 19G1,5
10055616		Nexans H07RN-F TITANEX 19G2,5
10055618	01397023	Nexans H07RN-F TITANEX 27G1.5
10055619	01397024	Nexans H07RN-F TITANEX 27G2.5
10055620		Nexans H07RN-F TITANEX 4G95
10055621	01394746	Nexans H07RN-F TITANEX 3G16
10055622	01397009	Nexans H07RN-F TITANEX 3G1 C50m
10055623	01397010	Nexans H07RN-F TITANEX 3G1 C100m
10055624	01394731	Nexans H07RN-F TITANEX 3G1
10055627	01394791	Nexans H07RN-F TITANEX 5G25
10055633		Nexans H07RN-F TITANEX 1X6 100m
10055634	01394703	Nexans H07RN-F TITANEX 1x6
10055635		Nexans H07RN-F TITANEX 1x185
10055636		Nexans H07RN-F TITANEX 1x240
10055637		Nexans H07RN-F TITANEX 1x300
10055638	01397004	Nexans H07RN-F TITANEX 2x1 C50m
10055639	01397005	Nexans H07RN-F TITANEX 2x1 C100m
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10055642	01397006	Nexans H07RN-F TITANEX 2x10
10055643	01397007	Nexans H07RN-F TITANEX 2x16
10055644		Nexans H07RN-F TITANEX 3G10 50m
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10055646	01397013	Nexans H07RN-F TITANEX 3G25
10055647	01397014	Nexans H07RN-F TITANEX 3G35
10055648	01397015	Nexans H07RN-F TITANEX 3G50
10055649		Nexans H07RN-F TITANEX 3G70
10055650		Nexans H07RN-F TITANEX 4G1 C50m
10055651	01272127	Nexans H07RN-F TITANEX 4G1 C100m
10055652	01394752	Nexans H07RN-F TITANEX 4G1
10055653		Nexans H07RN-F TITANEX 4G70
10055654		Nexans H07RN-F TITANEX 5G1 50m
10055655		Nexans H07RN-F TITANEX 5G1 C100m

10055656	01394776	Nexans H07RN-F TITANEX 5G1
10055657		Nexans H07RN-F TITANEX 37G1,5
10055659		Nexans H07RN-F TITANEX 13G2,5
10055662		Nexans H07RN-F TITANEX 12X1,5
10055673		Nexans H07RN-F TITANEX 3X10
10055674	01397066	Nexans H07RN-F TITANEX 3x1.5
10055675	01397008	Nexans H07RN-F TITANEX 2x25
10055676		Nexans H07RN-F TITANEX 4G120
10055678		Nexans H07RN-F TITANEX 3X25
10055679		Nexans H07RN-F TITANEX 3X35
10055680		Nexans H07RN-F TITANEX 3X50
10055681	01397068	Nexans H07RN-F TITANEX 4x1.5
10055682		Nexans H07RN-F TITANEX 4X10
10055683		Nexans H07RN-F TITANEX 3X70
10055684		Nexans H07RN-F TITANEX 3X95
10055685		Nexans H07RN-F TITANEX 4X6
10055686		Nexans H07RN-F TITANEX 4X16
10055688		Nexans H07RN-F TITANEX 4X35
10055689		Nexans H07RN-F TITANEX 4X50
10055705		Nexans H07RN-F TITANEX 4G10 C50m
10055790		Nexans H07RN-F TITANEX 3G6 C50m
10055791		Nexans H07RN-F TITANEX 4G6 C50m
10055792		Nexans H07RN-F TITANEX 4G6 C100m
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10055799	01397900	Nexans H07RN-F TITANEX 5G50
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10055815		Nexans H07RN-F TITANEX 7G4
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10055819		Nexans H07RN-F TITANEX 4X70
10055825		Nexans H07RN-F TITANEX 7X1,5
10055826		Nexans H07RN-F TITANEX 37G2,5
10055828		Nexans H07RN-F TITANEX 24G1.5
10055878		Nexans H07RN-F TITANEX 24G2,5
10055934		Nexans H07RN-F TITANEX 3G185
10055941		Nexans H07RN-F TITANEX 3XA10
10055952		Nexans H07RN-F TITANEX 4G185

10055958		Nexans H07RN-F TITANEX 1x400
10055962		Nexans H07RN-F TITANEX 1x500
10055965		Nexans H07RN-F TITANEX 14G1,5
10056024		Nexans H07RN-F TITANEX 12G4
10056032	01397017	Nexans H07RN-F TITANEX 4G4 C100m
10056033	01272126	Nexans H07RN-F TITANEX 3G6 C100m
10056034		Nexans H07RN-F TITANEX 7G1,5 50m
10056035		Nexans H07RN-F TITANEX 4G6 100m
10056037	01272129	Nexans H07RN-F TITANEX 5G4 C100m
10056056	01272130	Nexans H07RN-F TITANEX 5G6 C100m
10056057	01272125	Nexans H07RN-F TITANEX 3G4 C100m
10056063		Nexans H07RN-F TITANEX 4X4
10056078		Nexans H07RN-F TITANEX 3G120
10056209		Nexans H07RN-F TITANEX 3X120
10056210		Nexans H07RN-F TITANEX 4X95
10056293	01394797	Nexans H07RN-F TITANEX 18G1.5
10056294	01397025	Nexans H07RN-F TITANEX 36G1.5
10056295	01397022	Nexans H07RN-F TITANEX 18G2.5
10056296	01397026	Nexans H07RN-F TITANEX 36G2.5
10056471		Nexans H07RN-F TITANEX 6G1,5
10056490		Nexans H07RN-F TITANEX 3X150
10056497		Nexans H07RN-F TITANEX 3G150
10056547		Nexans H07RN-F TITANEX 4G240
10056705		Nexans H07RN-F TITANEX 16G1,5
10056711		Nexans H07RN-F TITANEX 2X6 C100m
10056799		Nexans H07RN-F TITANEX 16G2,5
10056911		Nexans H07RN-F TITANEX 8G1,5
10058444		Nexans H07RN-F TITANEX 5G150
10062884	01394722	Nexans H07RN-F TITANEX 2x1.5 C50m
10062885	01394721	Nexans H07RN-F TITANEX 2x1.5 C100m
10062886	01394736	Nexans H07RN-F TITANEX 3G1.5 C50m
10062887	01394737	Nexans H07RN-F TITANEX 3G1.5 C100m
10062888	01394740	Nexans H07RN-F TITANEX 3G2.5 C50m
10062889	01394756	Nexans H07RN-F TITANEX 4G1.5 C50m
10062890	01394757	Nexans H07RN-F TITANEX 4G1.5 C100m
10062892	01394761	Nexans H07RN-F TITANEX 4G2.5 C50m
10062893	01394780	Nexans H07RN-F TITANEX 5G1.5 C50m
10062914	01394784	Nexans H07RN-F TITANEX 5G2.5 C50m

10063711	01394741	Nexans H07RN-F TITANEX 3G2.5 C100m
10063724	01394783	Nexans H07RN-F TITANEX 5G2.5 C100m
10063725	01394779	Nexans H07RN-F TITANEX 5G1.5 C100m
10063726	01394760	Nexans H07RN-F TITANEX 4G2.5 C100m
10064431		Nexans H07RN-F TITANEX 5X25
10067159		Nexans H07RN-F TITANEX 1X4 500m
10087253		Nexans H07RN-F TITANEX 7G6
10094396		Nexans H07RN-F TITANEX 4X150
10098270		Nexans H07RN-F TITANEX 4X1
10126435		Nexans H07RN-F TITANEX 12X2,5
10164194		Nexans H07RN-F TITANEX 7G10
10164195		Nexans H07RN-F TITANEX 7G16
10171954		Nexans H07RN-F TITANEX 3X10
10194091	01272211	Nexans H07RN-F TITANEX 5G6 500m
10194092	01272212	Nexans H07RN-F TITANEX 5G6
10194093		Nexans H07RN-F TITANEX 12G1,5 500m
10194104		Nexans H07RN-F TITANEX 3G1 500m
10201428		Nexans H07RN-F TITANEX 2X2,5 100m
10201947		Nexans H07RN-F TITANEX 30G2,5
10205624		Nexans H07RN-F TITANEX 32G1,5
10223121		Nexans H07RN-F TITANEX 3X185
10253895		Nexans H07RN-F TITANEX 19G4
10255198		Nexans H07RN-F TITANEX 3G1,5 500m
10255473		Nexans H07RN-F TITANEX 4G35
10255484		Nexans H07RN-F TITANEX 4G50
10260126		Nexans H07RN-F TITANEX 2X35
10263474		Nexans H07RN-F TITANEX 6G2,5
10264186		Nexans H07RN-F TITANEX 4G10 10m
10264187		Nexans H07RN-F TITANEX 4G16
10264188		Nexans H07RN-F TITANEX 4G25
10264189		Nexans H07RN-F TITANEX 4G35
10264190		Nexans H07RN-F TITANEX 4G50
10267240		Nexans H07RN-F TITANEX 1X630
10273076		Nexans TITANEX 1X25 MBH R50
10273077		Nexans TITANEX 1X35 MBH R50
10273078		Nexans TITANEX 1X50 MBH R50
10273850		Nexans TITANEX 5G16 MBH D1000
10276098		Nexans H07RN-F TITANEX 2x1,5 1000m

10276101		Nexans H07RN-F TITANEX 3G1,5 1000m
10276103		Nexans H07RN-F TITANEX 3G2,5 1000m
10276105		Nexans H07RN-F TITANEX 4G1,5 1000m
10276107		Nexans H07RN-F TITANEX 4G2,5 1000m
10276111		Nexans H07RN-F TITANEX 5G1,5 1000m
10278633		Nexans H07RN-F TITANEX 2x1,5 500m
10278634		Nexans H07RN-F TITANEX 2x1,5 1000m
10278635		Nexans H07RN-F TITANEX 3G1,5 500m
10278636		Nexans H07RN-F TITANEX 3G1,5 1000m
10278637		Nexans H07RN-F TITANEX 3G2,5 500m
10278638		Nexans H07RN-F TITANEX 4G1,5 500m
10278639		Nexans H07RN-F TITANEX 4G2,5 500m
10278640		Nexans H07RN-F TITANEX 5G1,5 500m
10278641		Nexans H07RN-F TITANEX 5G2,5 500m
10278747		Nexans H07RN-F TITANEX 2x1,5 500m
10278748		Nexans H07RN-F TITANEX 3G1,5 500m
10278749		Nexans H07RN-F TITANEX 3G2,5 500m
10278750		Nexans H07RN-F TITANEX 4G1,5 500m
10278752		Nexans H07RN-F TITANEX 4G2,5 500m
10278753		Nexans H07RN-F TITANEX 4G4 500m
10278755		Nexans H07RN-F TITANEX 4G6 500m
10278756		Nexans H07RN-F TITANEX 5G1,5 500m
10278757		Nexans H07RN-F TITANEX 5G2,5 500m
10278759		Nexans H07RN-F TITANEX 5G4 500m
		Nexans H07RN-F TITANEX 5G4 D500m
		Nexans H07RN-F TITANEX 3G95
		Nexans H07RN-F TITANEX 4G150
		Nexans H07RN-F TITANEX 10G1,5
	01397069	Nexans H07RN-F TITANEX 4x2,5
	01397910	Nexans H07RN-F TITANEX 5G70
		Nexans TITANEX 5G16 MBH D500
		Nexans TITANEX 5G6 MBH R50

**DECLARATION OF PERFORMANCE
NO: 1000236-FRLV**

Date: 11/20/23

Product Family Name

NEXANS H07RN-F TITANEX®

(see list of corresponding products and unique identification codes hereafter)

Intended use of the product

Cable for general applications in construction works subject to reaction to fire requirements

AVCP (Assessment and Verification of Constancy of Performance): System 3

Notified body: 1812

Declared performance and Harmonized Standard

ESSENTIAL CHARACTERISTIC	PERFORMANCE	HARMONIZED STANDARD
Reaction to fire	Eca	according to EN50575:2014+A1:2016
Release of dangerous substances	NPD	NA

The performance of the product(s) identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified below.

Manufacturer
Nexans France
Route de Villefontaine
Cedex 38292 La Verpilliere France

Signed for the manufacturer by
Romain MILSANT
romain.milsant@nexans.com
Nexans France
11/20/23



You will find hereafter the list of CPR certified products for the selected family

Nexans Ref.	Country Ref.	Name
10286973		TITANEX H07RN-F 3G2.5 C50m

**DECLARATION OF PERFORMANCE
NO: 1000236-FRLV**

Date: 11/21/23

Product Family Name

NEXANS H07RN-F TITANEX®

(see list of corresponding products and unique identification codes hereafter)

Intended use of the product

Cable for general applications in construction works subject to reaction to fire requirements

AVCP (Assessment and Verification of Constancy of Performance): System 3

Notified body: 1812

Declared performance and Harmonized Standard

ESSENTIAL CHARACTERISTIC	PERFORMANCE	HARMONIZED STANDARD
Reaction to fire	Eca	according to EN50575:2014+A1:2016
Release of dangerous substances	NPD	NA

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Manufacturer
Nexans France
Route de Villefontaine
Cedex 38292 La Verpilliere France

Signed for the manufacturer by
Romain MILSANT
romain.milsant@nexans.com
Nexans France
11/21/23



You will find hereafter the list of CPR certified products for the selected family

Nexans Ref.	Country Ref.	Name
10287015		Nexans TITANEX H07RN-F MOBIWAY™ MOB 3G2.5 D150m



Marine & Offshore

Certificate number: 26673/C0 BV

File number: ACE1/757/2

Product code: 2501H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

NEXANS

BOHAIN - FRANCE

for the type of product

CABLES (LOW VOLTAGE)

450/750V up to 0.6/1kV

TITANEX PREMIUM

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships.

IEC 60092-350 (2020), IEC 60092-353 (2016), IEC 60092-360 (2021)

IEC 60228 (2015)

IEC 60332-1-2 (2005)

IEC 60811 (2012)

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 18 Oct 2027

For Bureau Veritas Marine & Offshore,

At BV VALENCIENNES, on 18 Oct 2022,

Philippe Calbet

This certificate was created electronically and is valid without signature



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarm.com/veristarnb/jsp/viewPublicPdfTypepec.jsp?id=uep9bao212>

BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

- Product model or type designation:

Titanex Premium Type

- Product description:

Flame retardant Marine and Offshore Power, Lighting and Control cables

1.1 - Specification:

Rated Voltage:	450/750V or 06/1kV
Temperature Class:	90°C
Flame retardant:	IEC 60332-1-2

1.2 - Construction:

Conductor:	Stranded plain copper wire, Class 5
Insulation:	EPR
Sheath:	SE

1.3 - Product Range:

Type	Number of cores	Cross-Section area (mm ²)
TITANEX PREMIUM	1	1.5 to 630
	2	1.5 to 25
	3	1.5 to 300
	4	1.5 to 240
	5	1.5 to 150
	6 to 37	1.5 to 16

2. DOCUMENTS AND DRAWINGS:

Specification dated 60 Jun 2022.

3. TEST REPORTS:

Nexans Test Report Conformity approval for cables 450/750V or 0.6/1kV N° 122011-1 dated 16th November 2011.

Nexans Test Report Conformity approval for cables 450/750V or 0.6/1kV N° 122011-3 dated 23th December 2011.

Nexans Test Report Flame retardant test N°11/03/03 dated 02th March 2011.

Nexans Routine Test Report N°122011-0/2 dated 14th December 2011.

Tests Report No: 20170530 dated 18 May 2017.

4. APPLICATION / LIMITATION:

BUREAU VERITAS Rules for the Classification of Steel Ships.

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 - The above products are to be supplied by **NEXANS** in compliance with the type described in this certificate.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 - **NEXANS** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 - For information, **NEXANS** has declared to Bureau Veritas the following production site:

NEXANS
48, rue Paulin Pecqueux
02110 BOHAIN
FRANCE

6. MARKING OF PRODUCT:

The cable shall be marked on the surface outer sheath, in a durable legible and visible manner, with the following information through the length of cable:

- 6.1 - Voltage grade
- 6.2 - Cable symbol and temperature class
- 6.3 - Number of conductors and conductor size
- 6.4 - Applicable standard(s) to flame retardant
- 6.5 - Manufacturer's name or trade mark
- 6.6 - Year of manufacture

7. OTHERS:

7.1 - It is **NEXANS'** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

7.2 - This certificate supersedes the Type Approval Certificate No. 26673/B0 BV issued on 21 Jul 2017 by the Society.

***** END OF CERTIFICATE *****



CERTIFICATE

Of Conformity

EC Council Directive 2006/95/EC

LOW Voltage Directive

Registration No : ATS2010030 002

Applicant : Shenzhen Absen Optoelectronics Co.,Ltd.
Building 2, Number 1, Xixue Industrial Park, Xuexiang, Bantian
Longgang District, Shenzhen, China

Product : OUTDOOR LED SCREEN

Identification : Model No : ABSEN-OF16V ,ABSEN-OF10R, ABSEN-OF20R
ABSEN-OFA90 ,ABSEN-OFA1088, ABSEN-OFA1089
ABSEN-OFRC16En ,ABSEN-OFE1088, ABSEN-OFE1688

Serial No : n.a.

Rating : AC 230V, 50/60 Hz , 5A

Standards: EN 60950-1:2006 + A1:2010

The certificate of conformity is based on an evaluation of a sample of the above mentioned product technical report and documentation are at the applicant's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex I of council Directive 2006/95/EC, referred to as the Low Voltage Directive. This certificate does not imply assessment of the product and does not permit the use of ATC's logo. The applicant of the certificate is authorised to use this certificate in connection with the EC declaration of conformity according to Annex III of the Directive.

December 28, 2010

Date



Certified by

Jerry Wang

Jerry Wang



The CE Marking may only be used if all relevant and effective EC Directives are complied with



Accurate Technology Co., Ltd. -F1, Bldg A&D, Changyuan New Market Port, Keyuan Rd , Science & Industry Park
Nashan District, Shenzhen 518057, P.R.China

Tel: +87-755-26503290 Fax: +87-755-26503396 E-mail : webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)

CERTIFICATE

of Conformity EC Council Directive (EU) 2014/30 Electromagnetic Compatibility

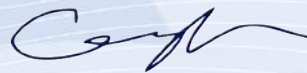
Registration No.: AE 50628255 0001
Report No.: CN243TFZ 001
Holder: LightKing Tech Group Co., Ltd.
Building A, Zhongsheng Industrial Park,
NO.4 Lixin Road, Bao'an District,
Shenzhen,
Guangdong
P.R. China
Product: Display Unit
(LED Display)

Type designation listed on the next page

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical Report and documentation are at the License Holder's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex I of Council Directive (EU) 2014/30. This certificate does not imply assessment of the production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to the a.m. Directive.

Date: 2024-04-25

Certification Body



Gary Chen



TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

The CE marking may be used if all relevant and effective EC Directives/Regulations are complied with.

CERTIFICATE

of Conformity
EC Council Directive (EU) 2014/30
Electromagnetic Compatibility

Registration No.: AE 50628255 0001

Product: Display Unit
(LED Display)




Tested according to: EN 55032:2015+A11+A1
EN IEC 61000-3-2:2019+A1
EN 61000-3-3:2013+A1+A2
EN 55035:2017+A11

Identification: Type Designation
RD1.9 RD2.5 RD2.6 RD2.8 RD3.9
Serial No.: n.a.
Remark: Refer to test report CN243TFZ 001 for details.



TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

The CE marking may be used if all relevant and effective EC Directives/Regulations are complied with.

Prüfbericht-Nr.: Test Report No.:	CN243TFZ 001	Auftrags-Nr.: Order No.:	168478227	Seite 1 von 31 Page 1 of 31
Kunden-Referenz-Nr.: Client Reference No.:	2134460	Auftragsdatum: Order date.:	2023-07-03	
Auftraggeber: Client:	LightKing Tech Group Co., Ltd. Building A, Zhongsheng Industrial Park, NO.4 Lixin Road, Bao'an District, Shenzhen, Guangdong P.R. China			
Prüfgegenstand: Test item:	LED Display			
Bezeichnung / Typ-Nr.: Identification / Type No.:	RD1.9, RD2.5, RD2.6, RD2.8, RD3.9			
Auftrags-Inhalt: Order content:	TÜV Rheinland - EMC service			
Prüfgrundlage: Test specification:	EN 55032:2015+A11+A1 EN IEC 61000-3-2:2019+A1 EN 61000-3-3:2013+A1+A2 EN 55035:2017+A11			
Wareneingangsdatum: Date of receipt:	2023-07-03			
Prüfmuster-Nr.: Test sample No.:	A230612102-001			
Prüfzeitraum: Testing period:	Refer to test report			
Ort der Prüfung: Place of testing:	Refer to section 2.1			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by: Murphy Chen		genehmigt von: authorized by: Tiger Su		
Datum: Date: 2024-04-23		Ausstellungsdatum: Issue date: 2024-04-23		
Stellung / Position:	Project Manager	Stellung / Position:	Reviewer	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
<p>* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>* Legend: P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested</p>				
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</p> <p><i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

Prüfbericht - Nr.: Test Report No.	CN243TFZ 001	Seite 2 von 31 Page 2 of 31
Anmerkungen Remarks		

1	<p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>
2	<p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature</p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature</i></p>
3	<p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i></p> <p><i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>
4	<p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p>

TEST SUMMARY

5.1.1 HARMONICS ON AC MAINS

RESULT: Pass

5.1.2 VOLTAGE FLUCTUATIONS ON AC MAINS

RESULT: Pass

5.1.3 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

RESULT: Pass

5.2.1 RADIATED DISTURBANCE (BELOW 1GHz)

RESULT: Pass

5.2.2 RADIATED DISTURBANCE (ABOVE 1GHz)

Not Applicable

6.2.1 CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES, SWEPT TEST

RESULT: Pass

6.2.2 CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES, SPOT TEST

RESULT: Pass

6.2.3 RADIO-FREQUENCY CONTINUOUS CONDUCTED (CS)

RESULT: Pass

6.3.1 FAST TRANSIENTS (EFT)

RESULT: Pass

6.3.2 SURGE

RESULT: Pass

6.3.3 ELECTROSTATIC DISCHARGES (ESD)

RESULT: Pass

6.4.1 VOLTAGE DIP AND INTERRUPTIONS

RESULT: Pass

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result

Appendix 2: Measurement uncertainties

2. Test Sites

2.1 Test Facilities

Shenzhen LCS compliance testing Laboratory Ltd.
1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen,
Guangdong, China

The tests at the test site have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment in LCS

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Disturbance Voltage				
EMI Test Software	Farad	EZ	N/A	N/A
EMI Test Receiver	R&S	ESR3	102312	2025-02-23
Artificial Mains	R&S	ENV216	101288	2024-06-08
Pulse Limiter	R&S	ESH3-Z2	102750-NB	2024-08-14
Radiated Emission-3m				
EMI Test Software	AUDIX	E3	N/A	N/A
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2024-09-11
EMI Test Receiver	R&S	ESR3	102311	2024-08-14
ESD (LCS)				
ESD Simulator	SCHLODER	SESD 230	604035	2024-07-16
Radio-Frequency Electromagnetic Field Amplitude Modulated				
MXG Vector Signal Generator	Agilent	E4438C	MY42081396(6 G)	2024-06-08
RF POWER AMPLIFIER	SKET	HAP_0306G-50W	/	2024-06-08
RF POWER AMPLIFIER	OPHIR	5225R	1052	2024-06-08
RF POWER AMPLIFIER	OPHIR	5273F	1019	2024-06-08
Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	N/A
Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	N/A
EFT & Surge				
Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2024-08-14
Electric fast pulse group generator	3ctest	EFT-4001G	EC0461044	2024-10-17
Capacitive coupling clamp	3CTEST	EFTC	EC0441098	2024-06-08
Injected Currents / Conducted Susceptibility				
Simulator	FRANKONIA	CIT-10/75	A126A1195	2024-08-14
CDN	FRANKONIA	CDN-M2+M3	A2210177	2024-06-08
6dB Attenuator	FRANKONIA	DAM25W	1172040	2024-06-08
Electromagnetic coupling injection clamp	ZHINAN	ZN23203	14017	2024-06-08
Voltage Dips and Interruptions				

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2024-06-08
Harmonic & Flicker				
HARMONICS&FLICKER MEASUREMENT SYSTEM	EVERFINE	HFM-3000	P630850CD1411116	2025-02-23
HARMONICS&FLICKER TESTING POWER SOURCE	EVERFINE	HFS-4000	P624486CD1411124	2025-02-23

3. General Product Information

3.1 Product Function and Intended Use

The EUT is LED Display used as MME and for indoor use only.
All models are identical in circuit design & construction, but different in type designation or pixel pitch.

Table 2: Model List

Model name	Rated Input	Rated Power	Pixel Pitch (mm)	Size (mm)
RD1.9	AC 100-240V, 50/60Hz	120W	1.9	500* 500
RD2.5			2.5	
RD2.6			2.6	
RD2.8			2.8	
RD3.9			3.9	

The product is compliant with the Class A limits, Class A equipment shall have the following warning in the instructions for use, to inform the user of the risk of operating this equipment in a residential environment:

Warning: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

Refer to user manual and circuit diagram for details.

3.2 Ratings and System Details

System input	: AC 100-240V, 50/60Hz, 16A Max
Rated Output	: AC 100-240V, 50/60Hz, 14A Max
Rated Power	: 120W
Pixel Pitch	: Refer to section 3.1
Protection class	: I
Highest internal frequency	: <108MHz

3.3 Independent Operation Modes

The basic operation modes are:

- A. On (displaying white light or colour bar)
- B. Off

3.4 Input / Output Ports

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
0	Enclosure	N/E	—	--	None
1	Mains Input	AC	Yes	Non-shielded	None
2	Mains Output	AC	No	Non-shielded	None
3	Signal Input	I/O	Yes	Non-shielded	<100m
4	Signal Output	I/O	No	Non-shielded	None
*AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

3.5 Noise Generating and Noise Suppressing Parts

Sources of Interference:

- 1) IC Circuits
- 2) Transformer
- 3) Transistor

Others refer to the Circuit Diagram/Photo Document for details.

Noise Suppressing Parts:

- 1) Inductor
- 2) Capacitor
- 3) Ferrite core

Others refer to Circuit Diagram/Photo Document for details.

3.6 Submitted Documents

- PCB Layout
- Rating Label
- Circuit Diagram
- Instruction Manual

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5 & 6.

Pre-test in voltage input range & all operation modes to find out the worst case for compliance test.

According to section 3.1, full tests were applied on model RD1.9.

4.3 Special Accessories and Auxiliary Equipment

The sample was tested together with the following accessories:

Kind of Equipment	Manufacturer	Type	S/N
Controller	ChuangXian	Master STD	/
PC	Lenovo	E41-55	MP1ZW5C4

The sample was tested with following cables:

Cable name	Length (m)	Shield	Detachable
AC Power Cord	1.5	No	Yes
Signal Cable	2-3	No	Yes

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

5. Test Results EMISSION

5.1 Emission in the Frequency Range up to 30 MHz

5.1.1 Harmonics on AC Mains

RESULT:

Pass

Date of testing	:	Refer to Appendix 1
Test procedure	:	EN IEC 61000-3-2:2019+A1
Class	:	A
Limit	:	Table 1
Measured harmonics	:	1 – 40

Test setup

Input Voltage	:	AC 230V \pm 2%, 50Hz
Operation Condition	:	According to Clause B.10 of EN IEC 61000-3-2:2019+A1
Operation mode	:	A
Earthing	:	Connected

Detailed test data refer to attached Appendix 1.

5.1.2 Voltage Fluctuations on AC Mains

RESULT:

Pass

Date of testing	:	Refer to Appendix 1
Test procedure	:	EN 61000-3-3:2013+A1+A2
Limit	:	Clause 5
Frequency range	:	0 - 2kHz

Test setup

Input Voltage	:	AC 230V \pm 2%, 50Hz
Operation Condition	:	According to Clause 6.6 of EN 61000-3-3:2013+A1+A2
Operation mode	:	A
Earthing	:	Connected

Detailed test data refer to attached Appendix 1.

5.1.3 Mains Terminal Continuous Disturbance Voltage

RESULT:

Pass

Date of testing	:	Refer to Appendix 1
Test standard	:	EN 55032:2015+A11+A1
Frequency range	:	0.15 - 30MHz
Classification	:	Class A
Limits	:	Table A.9 of EN 55032:2015+A11+A1
Kind of test site	:	Shielded room

Test setup

Input Voltage	:	AC 100-240V, 50/60Hz
Operation Condition	:	According to Annex C3.5 & D of EN 55032:2015+A11+A1
Operation mode	:	A
Earthing	:	Connected
Ambient temperature	:	Refer to Appendix 1
Relative humidity	:	Refer to Appendix 1
Atmospheric pressure	:	101kPa

Detailed test data refer to attached Appendix 1.

5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated Disturbance (Below 1GHz)

RESULT:

Pass

Date of testing	:	Refer to Appendix 1
Test standard	:	EN 55032:2015+A11+A1
Frequency range	:	30 - 1000MHz
Classification	:	Class A
Limits	:	Table A.2 of EN 55032:2015+A11+A1
Kind of test site	:	3m Semi-anechoic chamber
Tested Port	:	Enclosure

Test setup

Input Voltage	:	AC 100-240V, 50/60Hz
Operation Condition	:	According to Annex B, C & D of EN 55032:2015+A11+A1
Operation mode	:	A
Earthing	:	Connected
Ambient temperature	:	Refer to Appendix 1
Relative humidity	:	Refer to Appendix 1
Atmospheric pressure	:	101kPa

*Remark: The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes, details refer to section 3.2.

☒ highest frequency is less than 108MHz, measurement shall only be made up to 1GHz

☐ highest frequency is between 108 & 500MHz, measurement shall only be made up to 2GHz

☐ highest frequency is between 500 & 1GHz, measurement shall only be made up to 5GHz

☐ highest frequency is above 1GHz, measurement shall be made up to 5 times the highest frequency or 6GHz, whichever is less.

Method: Measurements were made in a 3-meter semi-anechoic chamber or Open Area Test Site that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter below 1GHz. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak detector below 1GHz) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

Detailed test data refer to attached Appendix 1.

5.2.2 Radiated Disturbance (Above 1GHz)

Not Applicable

Date of testing	:	---
Test standard	:	EN 55032:2015+A11+A1
Frequency range	:	1 – 6GHz
Classification	:	Class A
Limits	:	Table A.3 of EN 55032:2015+A11+A1
Kind of test site	:	3m Semi-Anechoic Chamber with RF absorber on the RGP
Tested Port	:	Enclosure

*Remark: The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes, details refer to section 3.2.

6. Test Results IMMUNITY

6.1 Classification of apparatus

According to EN 55035:2017+A11, the EUT shall be tested in accordance with clause 4 & 5, and comply with the performance criterion in table 1, 2 & 4 of clause 5.

Continuous Disturbance

Continuous RF electromagnetic field disturbances swept test, spot test	Criterion A
Radio-Frequency Continuous Conducted	Criterion A
Power Frequency Magnetic Fields *	Criterion A

Transient Disturbance

Fast Transients (EFT)	Criterion B
Surge	Criterion B
Electrostatic Discharges (ESD)	Criterion B

Power supply Alterations

Voltage Dips, >95% reduction, 0.5 period	Criterion B
30% reduction, 25 periods at 50Hz	Criterion C
30% reduction, 30 periods at 60Hz	Criterion C
Voltage Interruptions, >95% reduction, 250 periods at 50Hz	Criterion C
>95% reduction, 300 periods at 60Hz	Criterion C

Remark:

*The EUT don't contain devices susceptible to magnetic fields, therefore the Power-Frequency Magnetic Fields test is not necessary.

6.2 Continuous Disturbances

6.2.1 Continuous RF electromagnetic field disturbances, swept test

RESULT: Pass

Date of Testing : 2024-03-22
Test Specification : EN 55035:2017+A11
Basic Standard : IEC 61000-4-3: 2006+A1+A2
Criterion : A
Frequency Range : 80 - 1000MHz
Test Level : 3V/m (Unmodulated, r.m.s.)
Modulation : AM 80%, 1kHz sine-wave
Tested port : Enclosure

Test setup

Input Voltage : AC 100-240V, 50/60Hz
Operation Mode : A
Earthing : Connected
Ambient temperature : 25.2°C
Relative humidity : 51.6%
Atmospheric pressure : 101 kPa

Test Result

Frequency	Polarization	Test Level (Unmodulated, rms)	Performance Criterion	Location	Description	Result
80MHz to 1000MHz	Horizontal and Vertical	3V/m (rms)	A	Front/Rear/ Left/Right	Operating as intended, no failure detected	Pass

6.2.2 Continuous RF electromagnetic field disturbances, spot test

RESULT: **Pass**

Date of Testing : 2024-03-22
Test Specification : EN 55035:2017+A11
Basic Standard : IEC 61000-4-3: 2006+A1+A2
Criterion : A
Frequency Range : 1800MHz, 2600MHz, 3500MHz, 5000MHz
Test Level : 3V/m (Unmodulated, r.m.s.)
Modulation : AM 80%, 1kHz sine-wave
Tested port : Enclosure

Test setup

Input Voltage : AC 100-240V, 50/60Hz
Operation Mode : A
Earthing : Connected
Ambient temperature : 25.2°C
Relative humidity : 51.6%
Atmospheric pressure : 101 kPa

Test Result

Frequency	Polarization	Test Level (Unmodulated, rms)	Performance Criterion	Location	Description	Result
1800MHz, 2600MHz, 3500MHz, 5000MHz	Horizontal and Vertical	3V/m (rms)	A	Front/Rear/ Left/Right	Operating as intended, no failure detected	Pass

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6.2.3 Radio-Frequency Continuous Conducted (CS)

RESULT:

Pass

Date of testing : 2024-03-22
Test Specification : EN 55035:2017+A11
Basic Standard : IEC 61000-4-6:2008
Criterion : A
Frequency range : 0.15 - 80 MHz
Source impedance : 150Ω
Test level : 3V, 3 to 1V, 1V (unmodulated, r.m.s.)
Modulation : AM 80%, 1kHz sine-wave
Sweep mode : automatic
Sweep rate : $< 1.5 \times 10^{-3}$ decade / sec.
Tested port : AC mains & Signal port

Test setup

Input Voltage : AC 100-240V, 50/60Hz
Operation Mode : A
Earthing : Connected
Ambient temperature : 25.2°C
Relative humidity : 51.1%
Atmospheric pressure : 101 kPa

Test Result

Ports	Cable Type	Coupling Network	Frequency Range	Test Level	Criterion	Description	Conclusion
AC mains	Unshielded	CDN M3	150kHz-10MHz	3V (rms)	A	Operating as intended, no degradation detected during and after testing	Pass
AC mains	Unshielded	CDN M3	10MHz-30MHz	3V to 1V (rms)	A		Pass
AC mains	Unshielded	CDN M3	30MHz-80MHz	1V (rms)	A		Pass
Signal port	Unshielded	Injection Clamp	150kHz-10MHz	3V (rms)	A		Pass
Signal port	Unshielded	Injection Clamp	10MHz-30MHz	3V to 1V (rms)	A		Pass
Signal port	Unshielded	Injection Clamp	30MHz-80MHz	1V (rms)	A		Pass

Remark:

Required in EN 55035:2017+A11: 0.15-10MHz, 3V (unmodulated, r.m.s.)
10-30MHz, 3 to 1V (unmodulated, r.m.s.)
30-80MHz, 1V (unmodulated, r.m.s.)

6.3 Transient Disturbances

6.3.1 Fast Transients (EFT)

RESULT: **Pass**

Date of testing : 2024-03-22
Test Specification : EN 55035:2017+A11
Basic Standard : IEC 61000-4-4:2012
Criterion : B
Test level : ±0.5kV(Signal Line) & ±1kV(AC Mains)
Test duration : ≥120sec
Rise time : 5/50ns
Repetition frequency : 5 kHz
Tested port : AC mains & Signal port

Test setup

Input Voltage : AC 100-240V, 50/60Hz
Operation Mode : A
Earthing : Connected
Ambient temperature : 25.4°C
Relative humidity : 51.6%
Atmospheric pressure : 101 kPa

Test Result

Applicable	Coupling	Polarity	Voltage	Result
<input checked="" type="checkbox"/>	L, N, PE, L-N, L-PE, N-PE, L-N-PE	+	<input type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
		-	<input checked="" type="checkbox"/> 1 kV <input type="checkbox"/>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
<input checked="" type="checkbox"/>	Signal Line	+	<input type="checkbox"/> 1 kV	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
		-	<input checked="" type="checkbox"/> 0.5 kV <input type="checkbox"/>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Note: Operating as intended, no degradation detected during and after testing.

6.3.2 Surge

RESULT:

Pass

Date of testing : 2024-03-22
Test Specification : EN 55035:2017+A11
Basic Standard : IEC 61000-4-5:2005
Criterion : B
Source impedance : 2Ω, 12Ω
Test level : ±0.5kV, ±1kV, ±2kV
Coupling phases : 90°, 270°
Number of surges : 5 (for each combination of parameters)
Repetition rate : Max. 1/min
Tested port : AC mains

Test Setup

Input Voltage : AC 100-240V, 50/60Hz
Operation Mode : A
Earthing : Connected
Ambient temperature : 23.5°C
Relative humidity : 51.2%
Atmospheric pressure : 101 kPa

Test Result

Ports	Test Level	Coupling Mode	Impedance (ohm)	Criterion	Description	Conclusion
AC Mains	±0.5/±1kV	L-N	2	B	Operating as intended, no failure detected	Pass
AC Mains	±0.5/±1/±2kV	L-PE	12	B	Operating as intended, no failure detected	Pass
AC Mains	±0.5/±1/±2kV	N-PE	12	B	Operating as intended, no failure detected	Pass

Remark: Since the EUTs are used in indoor environment and have no port which according to manufacturer's specification may connect directly to outdoor cable, therefore surge on signal port is not applicable.

6.3.3 Electrostatic Discharges (ESD)

RESULT:

Pass

Date of testing	:	2024-03-22
Test Specification	:	EN 55035:2017+A11
Basic Standard	:	IEC 61000-4-2:2008
Criterion	:	B
Discharge voltage	:	±2.0kV, ±4.0kV, ±8.0kV (air discharge) ±4.0kV (contact discharge)
Number of discharges	:	>20 per point
Tested port	:	Enclosure

Test Setup

Input Voltage	:	AC 100-240V, 50/60Hz
Operation Mode	:	A
Earthing	:	Connected
Ambient temperature	:	25.8°C
Relative humidity	:	51.1%
Atmospheric pressure	:	101 kPa

Test Result

Test Point	Test Mode	Test Level (kV)	Performance Criterion	Description	Result
VCP	C	±4	B	No failure detected	Pass
HCP	C	±4	B	No failure detected	Pass
Conducted Enclosure	C	±4	B	No failure detected	Pass
Slot	A	±2, ±4, ±8	B	No failure detected	Pass
Non-Conducted Enclosure	A	±2, ±4, ±8	B	No failure detected	Pass
Note: A-Air discharge; C- Contact Discharge; VCP- Vertical Coupling Plane; HCP- Horizontal Coupling Plane					

6.4 Power Supply Alterations

6.4.1 Voltage Dip and Interruptions

RESULT:

Pass

Date of testing : 2024-03-22
Test Specification : EN 55035:2017+A11
Basic Standard : IEC 61000-4-11:2004
Criterion : B & C
Tested port : AC mains

Test Setup

Input Voltage : AC 100-240V, 50/60Hz
Operation Mode : A
Earthing : Connected
Ambient temperature : 25.7°C
Relative humidity : 51.3%
Atmospheric pressure : 101 kPa

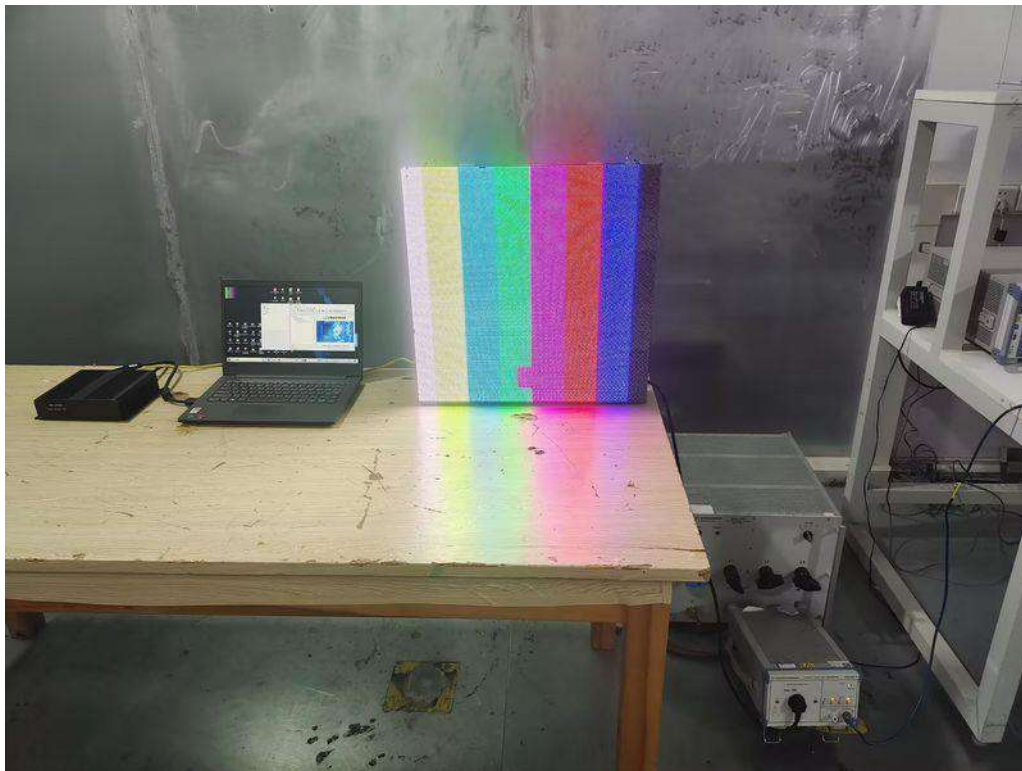
Test Result

Voltage Reduction	Number of cycles	Interval	Rep. Times	Criterion	Result
100%	0.5	10s	3	B	Pass
30%	25 for 50Hz 30 for 60Hz	10s	3	C	Pass
100%	250 for 50Hz 300 for 60Hz	10s	3	C	Pass

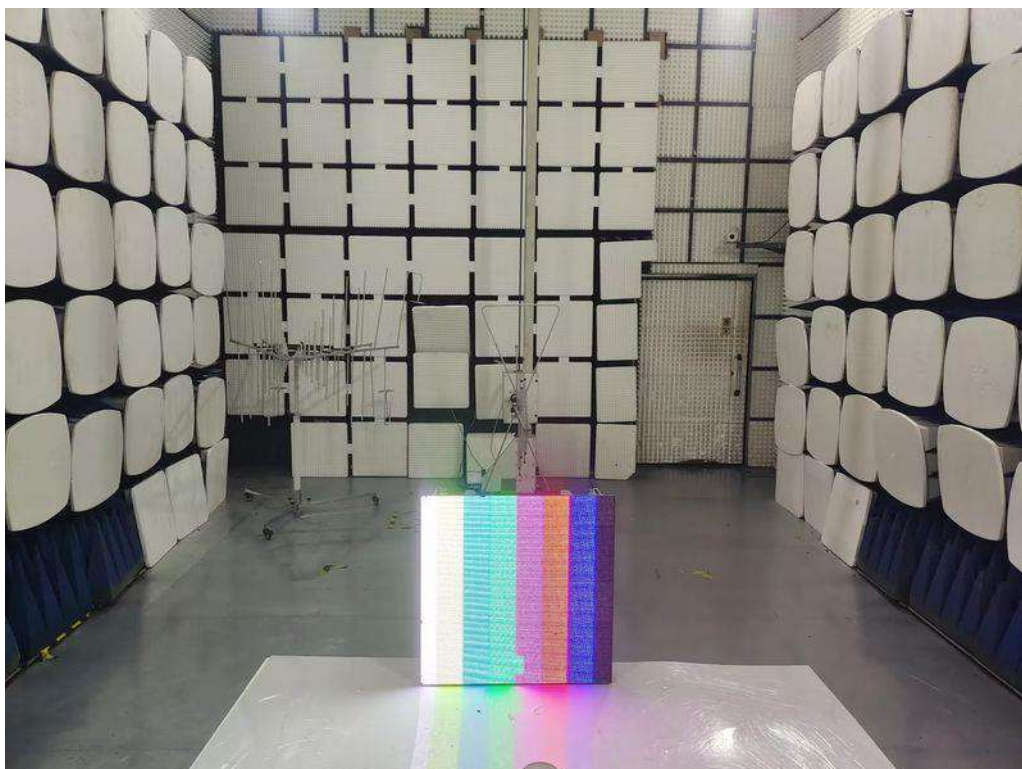
Remark: During the voltage interruptions (100% reduction 250/300 periods), the EUT turned off. However, it could automatically restore normal status after test.

7. Photographs of the Test Set-Up

Photograph 1: Set-up for Conducted Emission

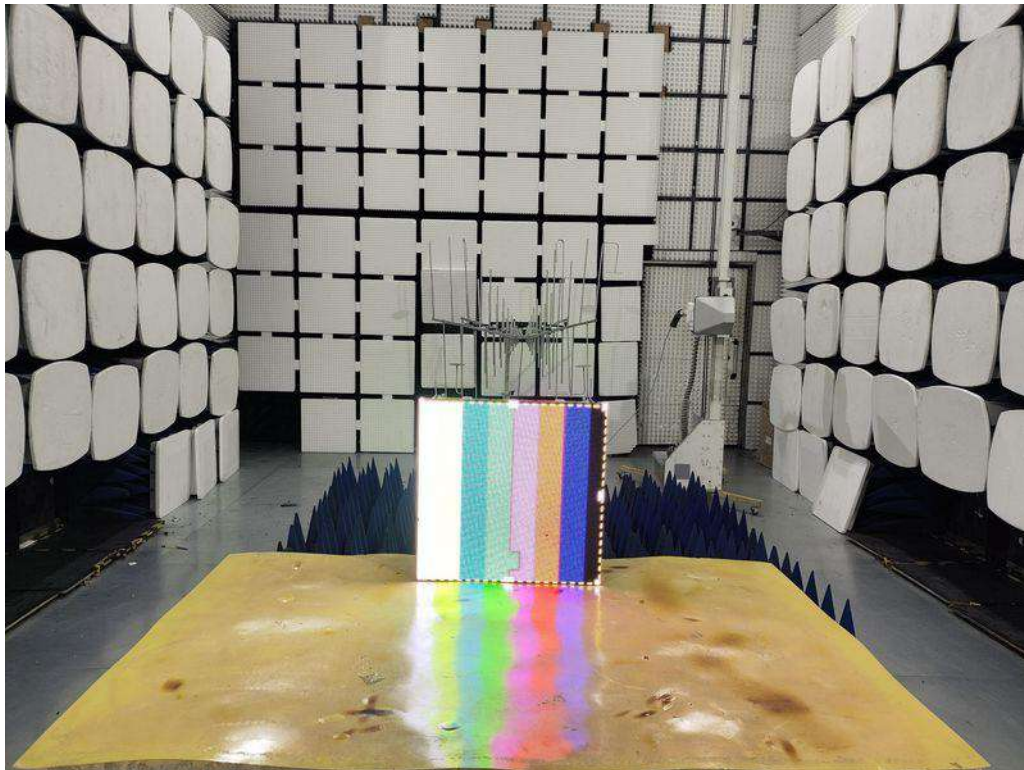


Photograph 2: Set-up for Radiated Emission

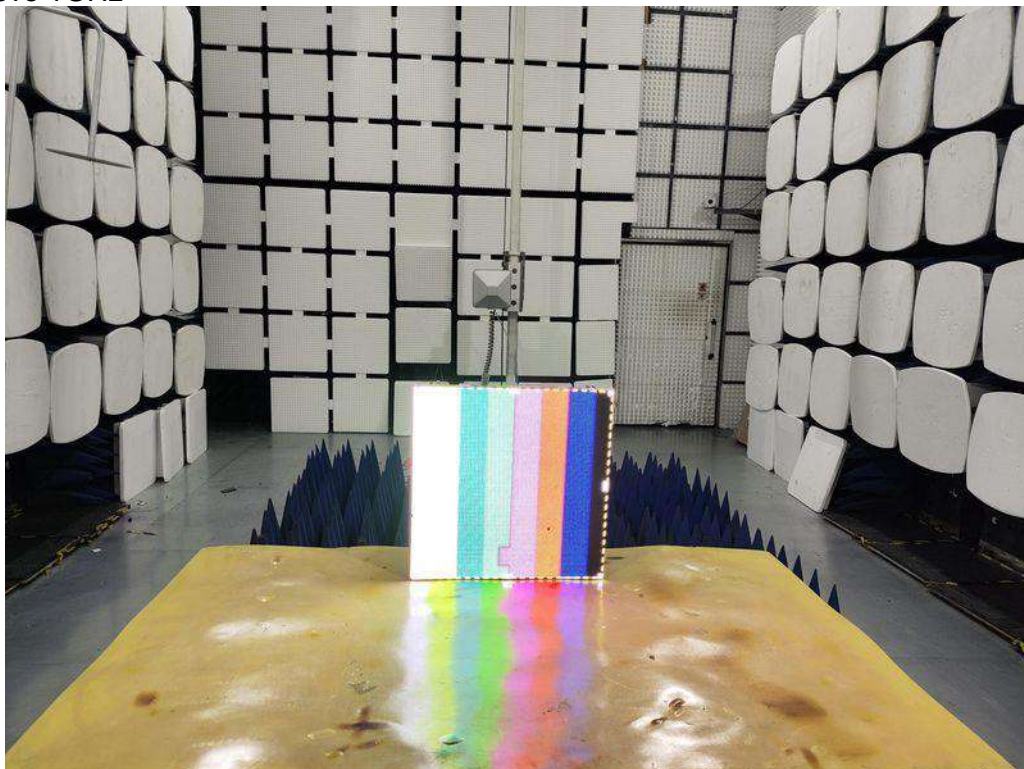


Photograph 3: Set-up for Radio-frequency Electromagnetic Field Amplitude Modulated

Below 1GHz



Above 1GHz

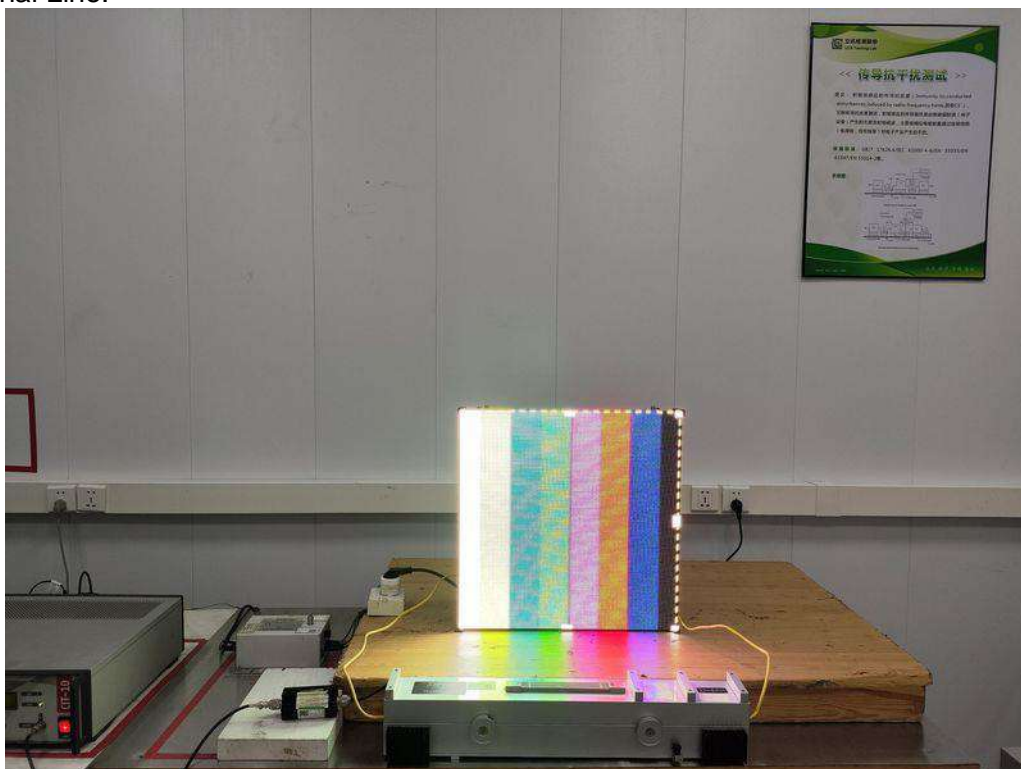


Photograph 4: Set-up for Conducted Susceptibility

AC Mains:



Signal Line:



Photograph 5: Set-up for Fast Transients

AC Mains:



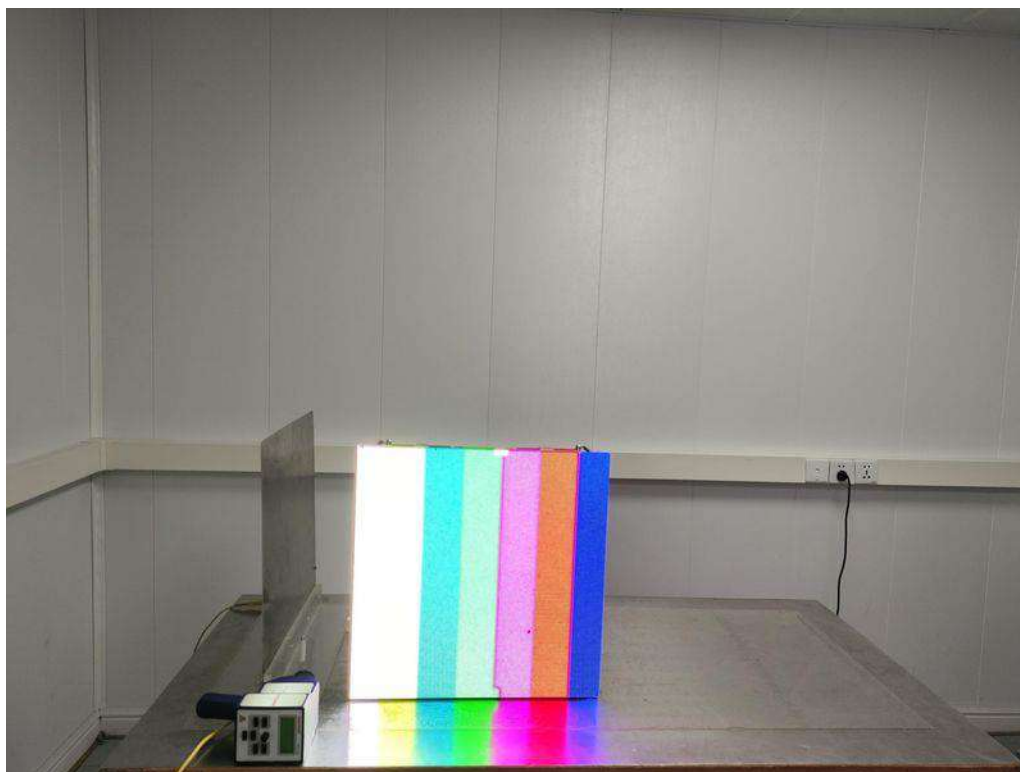
Signal Line:



Photograph 6: Set-up for Voltage Dips on AC Mains



Photograph 7: Set-up for Electrostatic Discharges



Photograph 8: Set-up for Surge



Photograph 9: Set-up for Harmonic & Flicker



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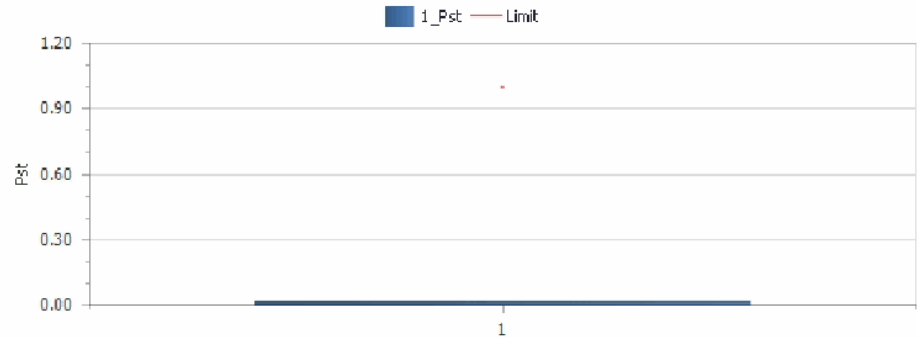


Flicker Test Report

Flicker Test Report IEC 61000-3-3 Ed. 3.1 (2017)

Tester :
Tested : LED DISPLAY Product : RD1.9 Work Mode : White light
Device :
Test Type : All Parameters
Test Date : 2024-04-24 Start Time : 17:48:38 End Time : 17:58:38
Temperature : 25.0°C Humidity : 55.0% Test Volt. : 230.00V
Comments :
Customer : Result : Pass

Pst and Limit



Relevant Parameter and Judgement During Test Period

Vrms at the end of test(V) 230.01

Parameter	Value	Test Limit	Result
Error Max(%)	0.00	Test Limit(%)	
T-max(ms)	0.00	Test Limit(ms)	500 Pass
dc (%)	0.00	Test Limit(%)	3.30 Pass
dmax(%)	0.00	Test Limit(%)	4.00 Pass
Pst	0.017	Test Limit	1.000 Pass

Elem1 Test Parameters

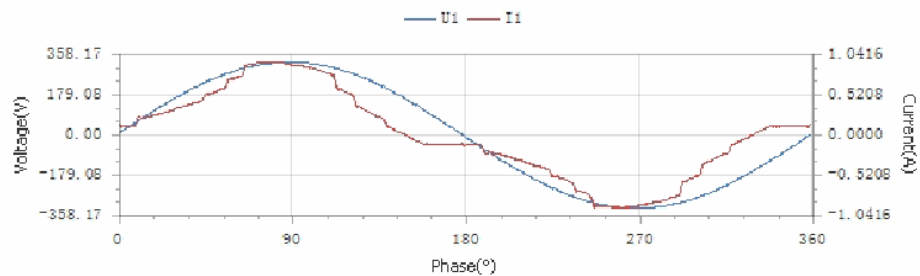
Mum	dc (%)	dmax (%)	Tmax (ms)	Pst
1	0.00	0.00	0.00	0.017



Harmonics Test Report

Harmonics Test Report_IEC 61000-3-2 Ed. 5.1 (2020)

Tester :
Tested Device : LED Display Product Type : RD1.9 Work Mode : White Light
Test Type : Class A_IEC 61000-3-2 Ed. 5.1 (2020) Pre-Heat Time: 10 s
Test Date : 2024-03-19 Start Time : 15:10:11 End Time : 15:12:41
Temperature: 25.0°C Humidity : 55.4% Test Volt. : 230.00V
Comments :
Customer : Result : Pass





Harmonics Test Report

Current Test Record

Tester :
Tested Device : LED Display Product Type : RD1.9 Work Mode : White Light
Test Type : Class A_IEC 61000-3-2 Ed. 5.1 (2020) Pre-Heat Time: 10 s
Test Date : 2024-03-19 Start Time : 15:10:11 End Time : 15:12:41
Temperature : 25.0°C Humidity : 55.4% Test Volt. : 230.00V
Comments :
Customer : Result : Pass

Total Current Harmonic ans Some Odd Harmonic Parameters

THC (A)	0.1534	THD (%)	28.86	POHC (A)	0.0143	POHC Limit (A)	0.2514
---------	--------	---------	-------	----------	--------	----------------	--------

Maximum Value of Relevant Parameter During Test Period

Urms (V)	230.04	Freq(Hz)	49.999
Irms (A)	0.5536	Ipeak (A)	0.9513
II (A)	0.5316	ICF	1.7362
P (W)	119.11	λ	0.9354

Determination of Harmonics and Limits

Order (n)	Harmonics Current Avg. (A)	100% Limit (A)	Limit Percent (%)	Harmonics Current Max. (A)	150% Limit (A)	Limit Percent (%)	Result
2	0.0002	1.0800	N/A	0.0002	1.6200	N/A	Pass
3	0.1505	2.3000	6.54	0.1506	3.4500	4.37	Pass
4	0.0005	0.4300	N/A	0.0006	0.6450	N/A	Pass
5	0.0105	1.1400	0.92	0.0106	1.7100	0.62	Pass
6	0.0005	0.3000	N/A	0.0006	0.4500	N/A	Pass
7	0.0132	0.7700	1.71	0.0133	1.1550	1.15	Pass
8	0.0005	0.2300	N/A	0.0006	0.3450	N/A	Pass
9	0.0153	0.4000	3.83	0.0154	0.6000	2.57	Pass
10	0.0004	0.1840	N/A	0.0005	0.2760	N/A	Pass
11	0.0093	0.3300	2.82	0.0093	0.4950	1.88	Pass
12	0.0004	0.1533	N/A	0.0005	0.2300	N/A	Pass
13	0.0052	0.2100	2.48	0.0052	0.3150	1.65	Pass
14	0.0004	0.1314	N/A	0.0005	0.1971	N/A	Pass
15	0.0026	0.1500	N/A	0.0027	0.2250	N/A	Pass
16	0.0004	0.1150	N/A	0.0005	0.1725	N/A	Pass
17	0.0013	0.1324	N/A	0.0014	0.1985	N/A	Pass
18	0.0004	0.1022	N/A	0.0005	0.1533	N/A	Pass
19	0.0049	0.1184	N/A	0.0049	0.1776	N/A	Pass
20	0.0004	0.0920	N/A	0.0005	0.1380	N/A	Pass
21	0.0047	0.1071	N/A	0.0047	0.1607	N/A	Pass
22	0.0004	0.0836	N/A	0.0005	0.1255	N/A	Pass
23	0.0049	0.0978	N/A	0.0050	0.1467	N/A	Pass
24	0.0005	0.0767	N/A	0.0005	0.1150	N/A	Pass
25	0.0024	0.0900	N/A	0.0025	0.1350	N/A	Pass
26	0.0005	0.0708	N/A	0.0006	0.1062	N/A	Pass
27	0.0056	0.0833	6.72	0.0057	0.1250	4.56	Pass
28	0.0005	0.0657	N/A	0.0006	0.0986	N/A	Pass
29	0.0064	0.0776	8.25	0.0064	0.1164	5.50	Pass
30	0.0005	0.0613	N/A	0.0005	0.0920	N/A	Pass
31	0.0038	0.0726	N/A	0.0040	0.1089	N/A	Pass
32	0.0005	0.0575	N/A	0.0006	0.0863	N/A	Pass
33	0.0052	0.0682	7.62	0.0054	0.1023	5.28	Pass
34	0.0005	0.0541	N/A	0.0005	0.0812	N/A	Pass
35	0.0040	0.0643	N/A	0.0041	0.0964	N/A	Pass
36	0.0005	0.0511	N/A	0.0005	0.0767	N/A	Pass
37	0.0045	0.0608	N/A	0.0047	0.0912	N/A	Pass
38	0.0005	0.0484	N/A	0.0005	0.0726	N/A	Pass
39	0.0018	0.0577	N/A	0.0019	0.0865	N/A	Pass
40	0.0005	0.0460	N/A	0.0006	0.0690	N/A	Pass



Voltage Test Record

Tester :
Tested : LED Display Product : RD1.9 Work Mode : White Light
Device : Type :
Test Type : Class A_IEC 61000-3-2 Ed. 5.1 (2020) Pre-Heat Time: 10 s
Test Date : 2024-03-19 Start Time : 15:10:11 End Time : 15:12:41
Temperature : 25.0°C Humidity : 55.4% Test Volt. : 230.00V
Comments :
Customer : Result : Pass

Determination of Voltage Relevant Parameter During Test Period

Item	Nominal Value	Tested Value	Error Value	Allowable Error Value	Result
Urms (V)	230.00	230.04	0.04	±2.0%	Pass
Frequency (Hz)	50.000	49.998	0.002	±0.5%	Pass

Determination of Voltage Harmonics and Limits

Order (n)	U _{hdf}	Limit (%)	Limit Percent (%)	Result
1	100%	---	---	---
2	0.01%	0.20	5.60%	Pass
3	0.01%	0.90	1.38%	Pass
4	0.00%	0.20	1.45%	Pass
5	0.00%	0.40	1.11%	Pass
6	0.00%	0.20	1.39%	Pass
7	0.00%	0.30	1.15%	Pass
8	0.00%	0.20	1.25%	Pass
9	0.01%	0.20	3.29%	Pass
10	0.00%	0.20	2.16%	Pass
11	0.00%	0.10	3.23%	Pass
12	0.00%	0.10	4.54%	Pass
13	0.01%	0.10	5.76%	Pass
14	0.00%	0.10	2.77%	Pass
15	0.01%	0.10	5.07%	Pass
16	0.00%	0.10	2.03%	Pass
17	0.00%	0.10	2.35%	Pass
18	0.00%	0.10	1.83%	Pass
19	0.01%	0.10	5.24%	Pass
20	0.00%	0.10	1.92%	Pass
21	0.01%	0.10	8.80%	Pass
22	0.00%	0.10	1.87%	Pass
23	0.01%	0.10	9.08%	Pass
24	0.00%	0.10	1.80%	Pass
25	0.01%	0.10	8.15%	Pass
26	0.00%	0.10	1.88%	Pass
27	0.01%	0.10	9.81%	Pass
28	0.00%	0.10	1.97%	Pass
29	0.01%	0.10	8.98%	Pass
30	0.00%	0.10	1.86%	Pass
31	0.01%	0.10	7.97%	Pass
32	0.00%	0.10	1.78%	Pass
33	0.01%	0.10	7.74%	Pass
34	0.00%	0.10	1.86%	Pass
35	0.00%	0.10	4.85%	Pass
36	0.00%	0.10	1.97%	Pass
37	0.01%	0.10	5.82%	Pass
38	0.00%	0.10	1.89%	Pass
39	0.01%	0.10	5.19%	Pass
40	0.00%	0.10	1.94%	Pass

Appendix 1
CN243TFZ 001



Produkte
Products

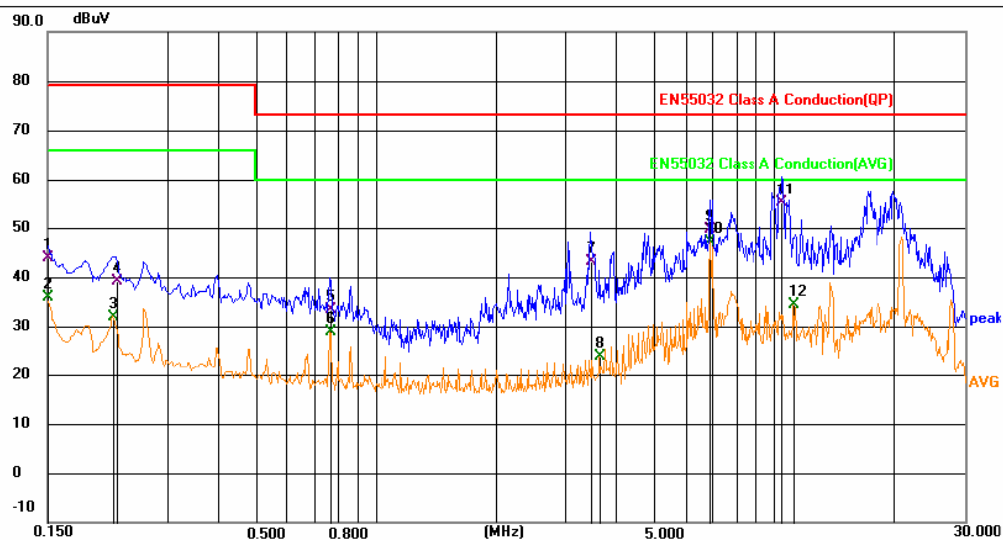
Page 5 of 12



Shenzhen LCS Compliance Testing Laboratory Ltd.
ADD:101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei,
Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com

Conducted Emission Measurement

File :A230612102 Data :#1 Date: 2024/3/19
Site LAB Phase: L1 Temperature: 24.4(C)
Limit: EN55032 Class A Conduction(QP) Power: AC 230V/50Hz Humidity: 53.0 %RH
EUT: LED DISPLAY
M/N: RD1.9
Mode: Running Color BAR
Note:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1		0.1500	24.15	19.63	43.78	79.00	-35.22	QP	
2		0.1500	16.35	19.63	35.98	66.00	-30.02	AVG	
3		0.2176	12.37	19.63	32.00	66.00	-34.00	AVG	
4		0.2221	19.59	19.63	39.22	79.00	-39.78	QP	
5		0.7665	13.77	19.64	33.41	73.00	-39.59	QP	
6		0.7665	9.28	19.64	28.92	60.00	-31.08	AVG	
7		3.4486	23.39	19.77	43.16	73.00	-29.84	QP	
8		3.6241	4.19	19.78	23.97	60.00	-36.03	AVG	
9		6.9001	29.82	19.82	49.64	73.00	-23.36	QP	
10	*	6.9001	27.19	19.82	47.01	60.00	-12.99	AVG	
11		10.4596	35.24	19.85	55.09	73.00	-17.91	QP	
12		11.1571	14.52	19.85	34.37	60.00	-25.63	AVG	

*:Maximum data x:Over limit !:over margin

(Reference Only)

File :A230612102\Data :#1

Page: 1

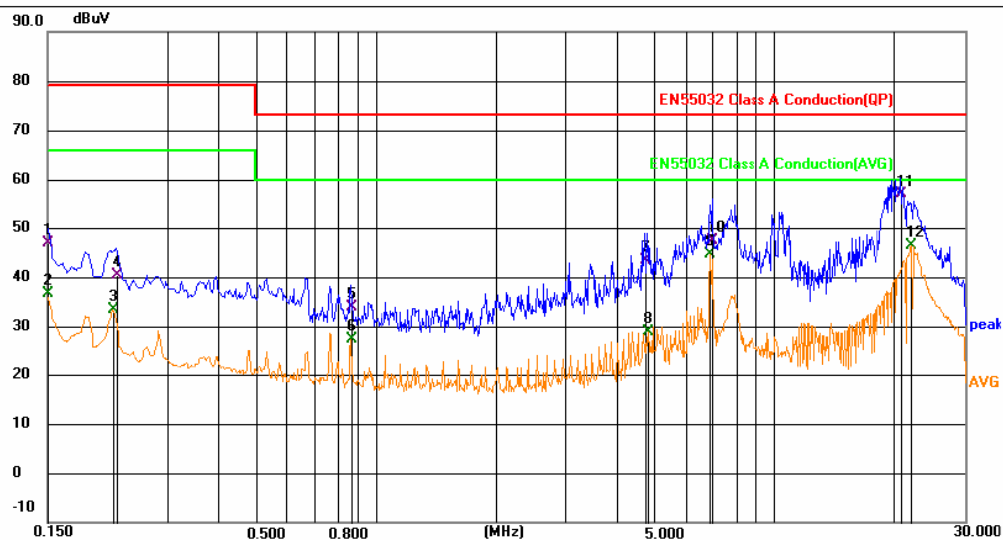
Engineer Signature:



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Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com

Conducted Emission Measurement

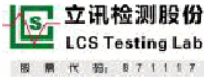
File :A230612102 Data :#2 Date: 2024/3/19
Site LAB Phase: **N** Temperature: 24.4(C)
Limit: EN55032 Class A Conduction(QP) Power: AC 230V/50Hz Humidity: 53.0 %RH
EUT: LED DISPLAY
M/N: RD1.9
Mode: Running Color BAR
Note:



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1500	27.31	19.63	46.94	79.00	-32.06	QP	
2	0.1500	17.02	19.63	36.65	66.00	-29.35	AVG	
3	0.2176	13.84	19.63	33.47	66.00	-32.53	AVG	
4	0.2221	20.66	19.63	40.29	79.00	-38.71	QP	
5	0.8656	14.21	19.64	33.85	73.00	-39.15	QP	
6	0.8656	7.70	19.64	27.34	60.00	-32.66	AVG	
7	4.7311	23.64	19.80	43.44	73.00	-29.56	QP	
8	4.8346	9.18	19.80	28.98	60.00	-31.02	AVG	
9	6.9001	24.77	19.82	44.59	60.00	-15.41	AVG	
10	6.9811	27.60	19.82	47.42	73.00	-25.58	QP	
11	20.7916	36.72	20.16	56.88	73.00	-16.12	QP	
12 *	22.1686	26.32	20.08	46.40	60.00	-13.60	AVG	

*:Maximum data x:Over limit !:over margin

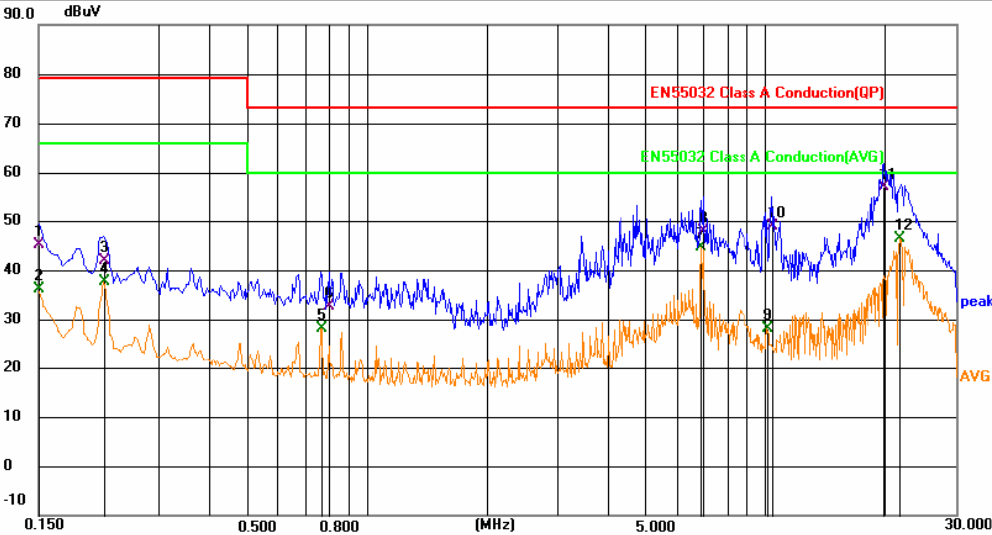
(Reference Only)



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Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com

Conducted Emission Measurement

File :A230612102 Data :#9 Date: 2024/3/19
Site LAB Phase: L1 Temperature: 24.4(C)
Limit: EN55032 Class A Conduction(QP) Power: AC 100V/60Hz Humidity: 53.0 %RH
EUT: LED DISPLAY
M/N: RD1.9
Mode: Running Color BAR
Note:



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1500	25.40	19.63	45.03	79.00	-33.97	QP	
2	0.1500	16.53	19.63	36.16	66.00	-29.84	AVG	
3	0.2176	22.16	19.63	41.79	79.00	-37.21	QP	
4	0.2176	17.92	19.63	37.55	66.00	-28.45	AVG	
5	0.7665	8.56	19.64	28.20	60.00	-31.80	AVG	
6	0.8025	12.96	19.64	32.60	73.00	-40.40	QP	
7	6.9001	24.93	19.72	44.65	60.00	-15.35	AVG	
8	6.9811	28.17	19.72	47.89	73.00	-25.11	QP	
9	10.0771	8.16	19.85	28.01	60.00	-31.99	AVG	
10	10.3606	28.95	19.85	48.80	73.00	-24.20	QP	
11	19.8826	36.75	20.21	56.96	73.00	-16.04	QP	
12 *	21.7635	26.16	20.11	46.27	60.00	-13.73	AVG	

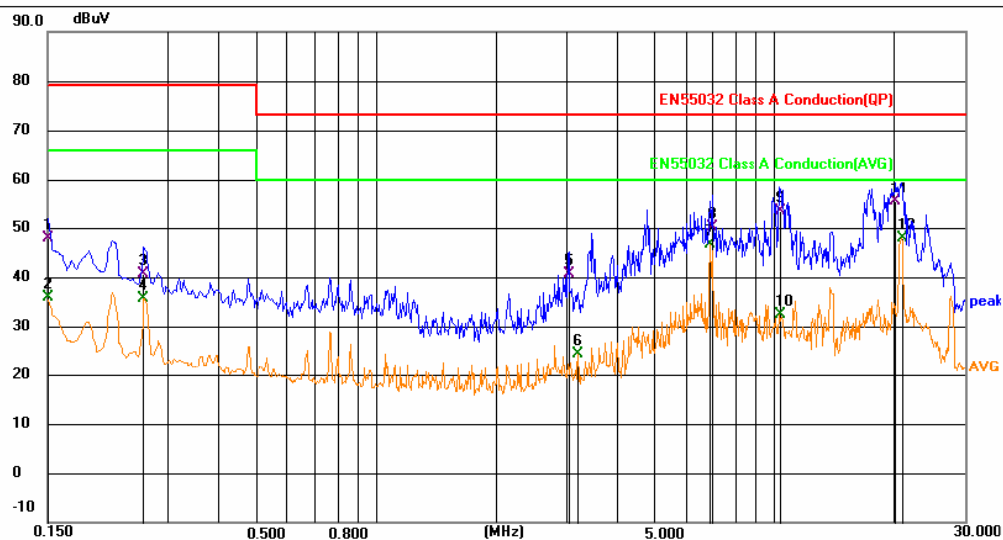
*:Maximum data x:Over limit !:over margin (Reference Only)



Shenzhen LCS Compliance Testing Laboratory Ltd.
ADD:101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei,
Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com

Conducted Emission Measurement

File :A230612102 Data :#10 Date: 2024/3/19
Site LAB Phase: **N** Temperature: 24.4(C)
Limit: EN55032 Class A Conduction(QP) Power: AC 100V/60Hz Humidity: 53.0 %RH
EUT: LED DISPLAY
M/N: RD1.9
Mode: Running Color BAR
Note:



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1500	28.18	19.63	47.81	79.00	-31.19	QP	
2	0.1500	16.33	19.63	35.96	66.00	-30.04	AVG	
3	0.2626	20.89	19.63	40.52	79.00	-38.48	QP	
4	0.2626	16.05	19.63	35.68	66.00	-30.32	AVG	
5	3.0436	20.82	19.75	40.57	73.00	-32.43	QP	
6	3.2191	4.70	19.76	24.46	60.00	-35.54	AVG	
7	6.9001	26.81	19.82	46.63	60.00	-13.37	AVG	
8	6.9766	30.25	19.82	50.07	73.00	-22.93	QP	
9	10.3020	33.51	19.85	53.36	73.00	-19.64	QP	
10	10.3020	12.49	19.85	32.34	60.00	-27.66	AVG	
11	20.1661	35.26	20.20	55.46	73.00	-17.54	QP	
12 *	20.8681	27.82	20.15	47.97	60.00	-12.03	AVG	

*:Maximum data x:Over limit !:over margin

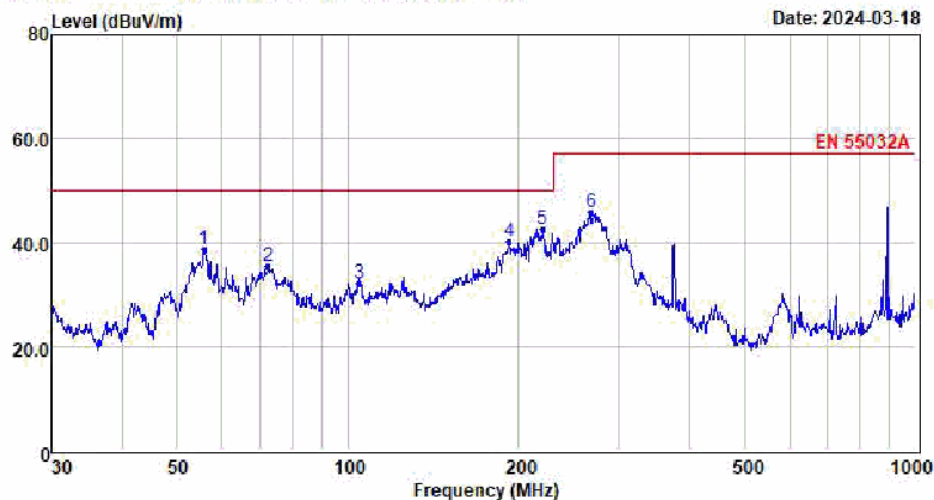
(Reference Only)

Building A and 301 Building C, Juji Industrial Park,
Yabianxueziwei, Shajing Street, Baoan District,
Shenzhen, Guangdong, China
Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com
Fax: 0755-82591332 Http: www.LCS-cert.com



Env./Ins: 22.3°C/53%
EUT: LED DISPLAY
M/N: RD1.9
Power Rating: AC 230V/50Hz
Test Mode: RUNNING COLOUR BAR
Operator:
Memo:
pol: HORIZONTAL

Data: 57 File: D:\2023 Test Data\显示屏.EM6 (76)



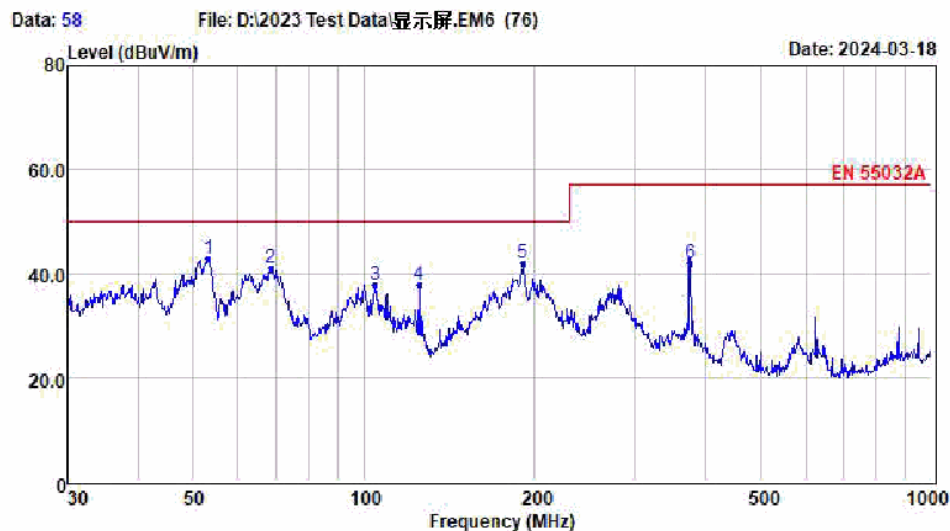
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	55.80	25.53	0.63	12.54	38.70	50.00	-11.30	QP
2	72.34	24.59	0.71	10.10	35.40	50.00	-14.60	QP
3	104.54	20.18	0.83	11.03	32.04	50.00	-17.96	QP
4	192.42	28.68	1.18	10.42	40.28	50.00	-9.72	QP
5	219.84	29.70	1.23	11.68	42.61	50.00	-7.39	QP
6	268.49	31.41	1.28	13.00	45.69	57.00	-11.31	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Building A and 301 Building C, Juji Industrial Park,
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Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com
Fax: 0755-82591332 Http: www.LCS-cert.com



Env./Ins: 22.3°C/53%
EUT: LED DISPLAY
M/N: RD1.9
Power Rating: AC 230V/50Hz
Test Mode: RUNNING COLOUR BAR
Operator:
Memo:
pol: VERTICAL



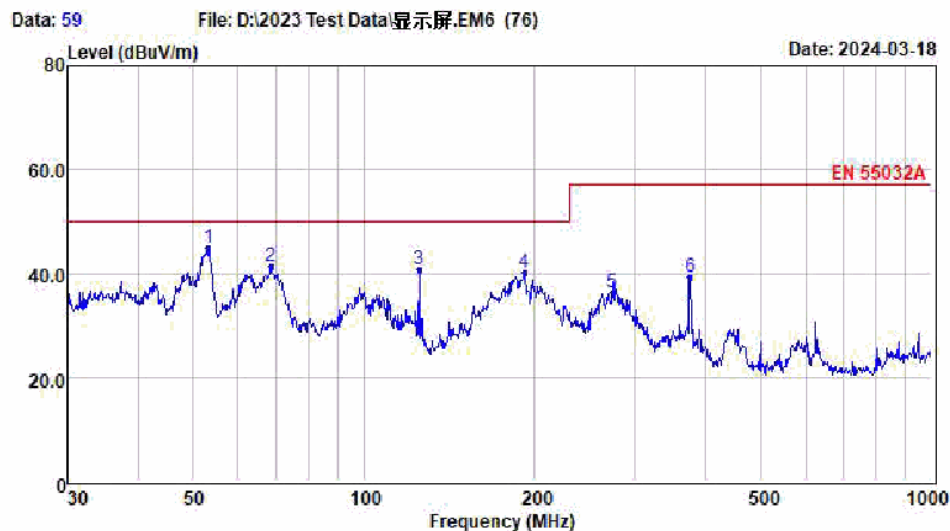
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	53.13	29.77	0.62	12.57	42.96	50.00	-7.04	QP
2	68.63	29.75	0.69	10.49	40.93	50.00	-9.07	QP
3	104.54	26.04	0.83	11.03	37.90	50.00	-12.10	QP
4	125.01	26.86	0.93	9.99	37.78	50.00	-12.22	QP
5	190.41	30.32	1.17	10.32	41.81	50.00	-8.19	QP
6	375.94	25.99	1.38	14.51	41.88	57.00	-15.12	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Building A and 301 Building C, Juji Industrial Park,
Yabianxueziwei, Shajing Street, Baoan District,
Shenzhen, Guangdong, China
Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com
Fax: 0755-82591332 Http: www.LCS-cert.com



Env./Ins: 22.3°C/53%
EUT: LED DISPLAY
M/N: RD1.9
Power Rating: AC 120V/60Hz
Test Mode: RUNNING COLOUR BAR
Operator:
Memo:
pol: VERTICAL



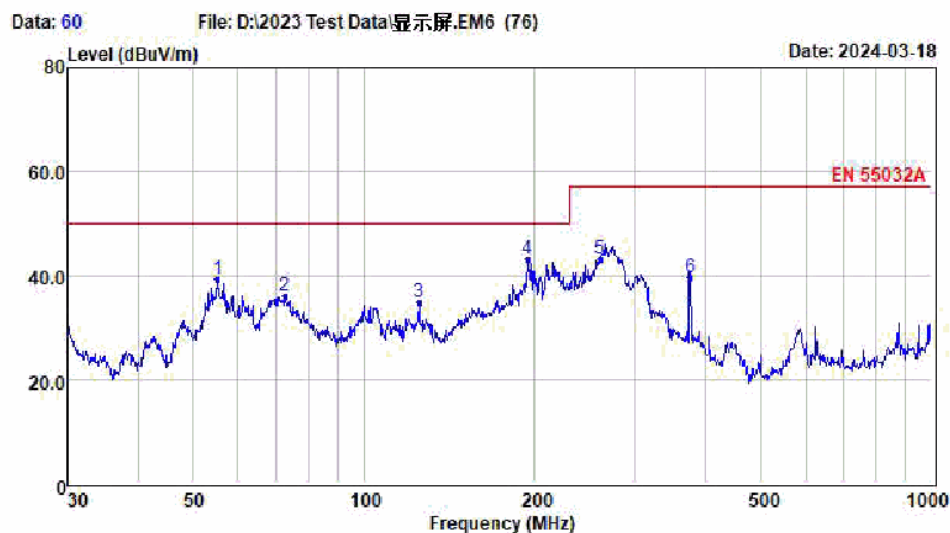
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	53.13	31.86	0.62	12.57	45.05	50.00	-4.95	QP
2	68.63	30.21	0.69	10.49	41.39	50.00	-8.61	QP
3	125.01	29.90	0.93	9.99	40.82	50.00	-9.18	QP
4	191.75	28.49	1.18	10.39	40.06	50.00	-9.94	QP
5	274.19	21.87	1.29	13.18	36.34	57.00	-20.66	QP
6	375.94	23.42	1.38	14.51	39.31	57.00	-17.69	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

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Yabianxueziwei, Shajing Street, Baoan District,
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Tel: 0755-82591330 E-mail: webmaster@LCS-cert.com
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Env./Ins: 22.3°C/53%
EUT: LED DISPLAY
M/N: RD1.9
Power Rating: AC 120V/60Hz
Test Mode: RUNNING COLOUR BAR
Operator:
Memo:
pol: HORIZONTAL



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	55.22	26.03	0.63	12.55	39.21	50.00	-10.79	QP
2	72.59	25.10	0.71	10.09	35.90	50.00	-14.10	QP
3	125.01	23.86	0.93	9.99	34.78	50.00	-15.22	QP
4	194.45	31.27	1.18	10.53	42.98	50.00	-7.02	QP
5	261.06	29.22	1.28	12.76	43.26	57.00	-13.74	QP
6	375.94	23.53	1.38	14.51	39.42	57.00	-17.58	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Measurement Uncertainties

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Table 1: Measurement Uncertainty levels

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cisp})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.61 dB ± 2.33 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.67 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.49 dB	± 6.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.88 dB	N/A
Mains Harmonic	Current	$\pm 0.510\%$	N/A
Voltage Fluctuations& Flicker	Voltage	$\pm 0.508\%$	N/A

As U_{lab} in all applicable tests listed above are less than U_{cisp} according to CISPR 16-4-2:2011+A1:2014+A2:2018,

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

RD Series



Part Number	RD1.9/2.5	RD2/3	RD(O)3	RD(O)4
Pixel pitch	1.9/2.5mm	2.8/3.9mm	3.9mm	4.8mm
LED type	SMD1515(Black)	SMD2020(Black)	SMD1921(Black)	SMD1921(White)
Pixel configuration	1R1G1B	1R1G1B	1R1G1B	1R1G1B
Size of module	250mmx250mm	250mmx250mm	250mmx250mm	250mmx250mm
Resolution of module	128x128/100x100	88x88/64x64	64x64	52x52
Density(dots/m ²)	262144/160000	123904/65536	65536	43264
Size of cabinet (mm)	500x500	500x500,500x1000	500x500,500x1000	500x500,500x1000
Cabinet material	Die-casting	Die-casting	Die-casting	Die-casting
Weight of cabinet	8.6KG	8.6KG,16KG	8.6KG,16KG	8.6KG,16KG
Support hanging or not	Yes	Yes	Yes	Yes
Max power consumption	600W/M ²	600W/M ²	750W/M ²	750W/M ²
Average power consumption	200W/M ²	200W/M ²	250W/M ²	250W/M ²
Colors	16.7M	16.7M	16.7M	16.7M
Gray scale	16bits	16bits	14bits	14bits
Color temperature	3000-10000K	3000-10000K	3000-10000K	3000-10000K
Driving method	1/32,1/25	1/22,1/16	1/8	1/9
Refresh frequency	≥3000Hz	≥3000Hz	≥1920Hz	≥1920Hz
Brightness	800cd/m ²	900cd/m ²	3500/4500cd/m ²	5000cd/m ²
Brightness control	256 grade	256 grade	256 grade	256 grade
IP grade	IP30	IP30	IP65	IP65



Ref. Certif. No.

DK-64245-M2-UL

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

CB TEST CERTIFICATE

Product

LED Display Controller

Name and address of the applicant

XI'AN NOVASTAR TECH CO., LTD
101 BLOCK D-F, 01 SQUARE, XI'AN SOFTWARE PARK, NO.72,
2ND KEJI ROAD, XI'AN, SHAANXI, CHINA

Name and address of the manufacturer

Xi'an NovaStar Tech Co., Ltd
101 Block D-F, 01 Square, Xi'an Software Park, No.72, 2nd Keji
Road, Xi'an, Shaanxi, China

Name and address of the factory

Xi'an NovaStar Tech Co., Ltd.
3rd Floor, Building 2 , No. 38 Tuanjie South Road , Yanta District ,
Xi'an, Shaanxi,
China

Note: When more than one factory, please report on page 2

[□ Additional Information on page 2](#)

Ratings and principal characteristics

Input: 100-240Vac, 50/60Hz, 1.5A max.

Trademark (if any)



Customer's Testing Facility (CTF) Stage used

Model / Type Ref.

MCTRL4K, MKR4K, MKR4K-X, MRCTL4K-X (X=0-9, a-z or A-Z)

Additional information (if necessary may also be reported on page 2)

The report was revised to include technical modifications.
[□ Additional Information on page 2](#)

A sample of the product was tested and found to be in conformity with

IEC 60950-1:2005, IEC 60950-1:2005/AMD1:2009,
IEC 60950-1:2005/AMD2:2013

As shown in the Test Report Ref. No. which forms part of this Certificate

ES210413071S issued on 2021-06-08

This CB Test Certificate is issued by the National Certification Body



- ☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
- ☒ UL (Denko), Borupvang 5A DK-2750 Ballerup, DENMARK
- ☐ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
- ☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/nbnames

Date: 2021-06-16

Original Issue Date: 2017-06-14

Signature:

Jan-Erik Storgaard





Ref. Certif. No.

DK-64245-M2-UL

National Difference specified in the CB Test Report

Summary of Modifications:

- Added additional model name, see test report for details
- Added one new source of power supply with model LO65-10B05-NW, see test report for details
- Updated address of Applicant and Manufacturer and Factory
- Updated Trademark.

Additional information (if necessary)



- ☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
- ☒ UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK
- ☐ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
- ☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2021-06-16
Original Issue Date: 2017-06-14

Signature:

Jan-Erik Storgaard



CERTIFICATE OF COMPLIANCE

Certificate Number 20180208-E472095
Report Reference E472095-A6-UL
Issue Date 2018-FEBRUARY-08

Issued to: Xi'an NovaStar Tech Co Ltd
4F, Block D, Qinfeng Pavilion
Xi'an Software Park No.68 Keji 2nd Rd.
Xi'an
ShaanXi 710000 CHINA

**This is to certify that
representative samples of**

INFORMATION TECHNOLOGY EQUIPMENT INCLUDING
ELECTRICAL BUSINESS EQUIPMENT

LED Display Controller
MCTRL R5, MCTRL R5-X (X can be 0-9 or A-Z for
marketing purpose and no impact to safety)

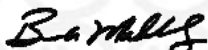
Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07 Standard
for Information Technology Equipment - Safety - Part 1:
General Requirements.

Additional Information: See the UL Online Certifications Directory at
www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's
Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please
contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>





IEC QUALITY ASSESSMENT SYSTEM (IECQ)
covering Electronic Components,
Assemblies, Related Materials and Processes
For rules and details of the IECQ visit www.iecq.org

IECQ Certificate of Conformity Hazardous Substance Process Management

IECQ Certificate No.: IECQ-H MOODY 11.0010

Issue No.: 1

Status: Current

Supersedes:

Issue Date: 2011/05/19 Org Issue: 2011/05/19

CB Certificate Number: 05381104003

Expiration: 2014/05/18

Applicable to:

European Directive 2002/95/EC ("RoHS") requirements

Shenzhen Absen Optoelectronic Co., Ltd.

Floor 1-5 Building 2, No. 1, Xixue Industrial Park, Xiuexiang Community, Bantian Street, Longgang District,
Shenzhen, Guangdong Province,
China

The organization has developed and implemented Hazardous Substance Process Management procedures and related processes which have been assessed and found to comply with the applicable requirements for IECQ HSPM organization approval which is in accordance with the Basic Rules IECQ 01 and Rules of Procedure IECQ 03-5 "IECQ Hazardous Substances Process Management" of the IEC Quality Assessment System for Electronic Components (IECQ), and with respect to the IECQ Specification QC 080000.

This Certificate is applicable to all electronic components, assemblies, related materials and processes for the following scope of activities:

Design, Production, Sale & After-sale Service (Installation Instruction, Training, Regular Maintenance) of LED Screens and LED Lighting Products (Indoor Lighting, Outdoor Lighting, Plant growth lamp). (LED Lighting Products Export only)

Certificate Issued by the Certification Body (CB):

Certification Body Sponsoring NAI:



MOODY International

British Electrotechnical Committee (BEC)

Authorized person:

Eric Liu

Stanier Way Derby DE21 6BF United Kingdom

Web Site: <http://www.moodyint.com>

UNITED KINGDOM

The validity of this certificate is maintained through on-going surveillance inspections.

Note: This Certificate of Conformity may be suspended or withdrawn in accordance with the Rules of Procedure of the IECQ.

This certificate and any schedule(s) may only be reproduced in full.

This certificate is not transferable and remains the property of the issuing body.

The Status and authenticity of this certificate may be verified by visiting the Official IECQ Website (www.iecq.org).

Certificate of Registration



This is to certify that the
Quality Management System of :

Shenzhen Absen Optoelectronic Co., Ltd.

**Floor 1-5, Building 2, No.1, Xiaxue Industrial Park, Xuexiang
Community, Bantian Street, Longgang District, Shenzhen,
Guangdong Province, P.R.China**

has been assessed and found compliant with the requirements of :

ISO 9001: 2008

Approval is hereby granted for registration on the proviso that the
certification rules and conditions are observed at all times.

This certification has been accredited by a member of International
Accreditation Forum MLA for Quality Management System.

The certificate is not valid until the annual hologram is presented.

Certification Scope:

Design, Production, Sales & After-sale Service (Installation Instruction, Training, Regular
Maintenance) of LED Screens and LED Lighting Products (Indoor Lighting, Outdoor Lighting,
Plant Growth Lamp). (LED Lighting Products Export Only)

Certificate No.: 110812045

Original Issue Date: January 13, 2009

Issue Date: June 01, 2011

Expiry Date: January 12, 2012

Authorised Signature

Moody International Certification Ltd.

www.moodyint.com



014

The use of the Accreditation Mark indicates accreditation in respect of those activities covered by the Accreditation Certificate 014.
The certificate remains the property of Moody International Certification Limited to whom it must be returned on request.