OWNER'S MANUAL

MANUALE UTENTE

XPS 16K

FOUR CHANNELS DSP AMPLIFIER

XPS 16KD

FOUR CHANNELS DSP AMPLIFIER
WITH DANTE

CONTENTS

ATTENTION

CAUTION

RISK OF ELECTRIC SHOCK

DO NOT OPEN

CAUTION

WARNING: SHOCK HAZARD – DO NOT OPEN

ATTENTION: RISQUE D'ELÉCTROCUTION - NE PAS OUVRIR

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

ATTENTION: NE PAS EXPOSER CE MATÉRIEL À LA PLUIE OU L'HUMIDITE AFIN DE REDUIRE LE RISQUE D'INFLAMMATION OU DE CHOC ELÉCTRIQUE

PROTECTING EARTHING TERMINAL. THE APPARATUS SHOULD BE CONNECTED TO A MAINS SOCKET WITH A PROTECTIVE EARTH CONNECTION.

RCF S.p.A. thanks you for purchasing this product, which has been designed to guarantee reliability and high performance.

SAFETY PRECAUTIONS AND GENERAL INFORMATION

Symbols used in this document give notice of important operating instructions and warnings which must be strictly followed.

	**CAUTION**	Important operating instructions: explains hazards that could damage a product, including data loss
	**WARNING**	Important advice concerning the use of dangerous voltages and the potential risk of electric shock, personal injury or death.
	**IMPORTANT NOTES**	Helpful and relevant information about the topic
	**SUPPORTS, TROLLEYS AND CARTS**	Information about the use of supports, trolleys and carts. Reminds to move with extreme caution and never tilt.
	**WASTE DISPOSAL**	This symbol indicates that this product should not be disposed with your household waste, according to the WEEE directive (2012/19/EU) and your national law.

IMPORTANT NOTES

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

SAFETY PRECAUTIONS

All the precautions, in particular the safety ones, must be read with special attention, as they provide important information.

1. This is a professional product. Its use is reserved to instructed persons, in relation to the connected risks.
2. Power supply from mains.
    a. The mains voltage is sufficiently high to involve a risk of electrocution; install and connect this product before plugging it in.
    b. Before powering up, make sure that all the connections have been made correctly and the voltage of your mains corresponds to the voltage shown on the rating plate on the unit, if not, please contact your RCF dealer.
    c. The metallic parts of the unit are earthed through the power cable. An apparatus with CLASS I construction shall be connected to a mains socket outlet with a protective earthing connection.
    d. Protect the power cable from damage; make sure it is positioned in a way that it cannot be stepped on or crushed by objects.

e. To prevent the risk of electric shock, never open this product: there are no parts inside that the user needs to access.

f. Be careful: in the case of a product supplied by manufacturer only with POWERCON connectors and without a power cord, all power cords and plug assemblies shall be in compliance with the requirements of the IEC 62368-1 and certified and suitable for use in the particular countries where the product shall be installed.

3. Make sure that no objects or liquids can get into this product, as this may cause a short circuit. This apparatus shall not be exposed to dripping or splashing. No objects filled with liquid, such as vases, shall be placed on this apparatus. No naked sources (such as lighted candles) should be placed on this apparatus.

4. Never attempt to carry out any operations, modifications or repairs that are not expressly described in this manual. Contact your authorized service centre or qualified personnel should any of the following occur:

- The product does not function (or functions in an anomalous way).
- The power cable has been damaged.
- Objects or liquids have got in the unit.
- The product has been subject to a heavy impact.

5. This product does not contain user replaceable fuses. Fuses replacement is a service operation and must be performed by qualified personnel.

6. If this product is not used for a long period, disconnect the power cable.

7. If this product begins emitting any strange odours or smoke, switch it off immediately and disconnect the power cable.

8. Do not connect this product to any equipment or accessories not foreseen. For suspended installation, only use the dedicated anchoring points and do not try to hang this product by using elements that are unsuitable or not specific for this purpose. Also check the suitability of the support surface to which the product is anchored (wall, ceiling, structure, etc.), and the components used for attachment (screw anchors, screws, brackets not supplied by RCF etc.), which must guarantee the security of the system / installation over time, also considering, for example, the mechanical vibrations normally generated by transducers. To prevent the risk of falling equipment, do not stack multiple units of this product unless this possibility is specified in the user manual.

9. RCF S.p.A. strongly recommends this product is only installed by professional qualified installers (or specialised firms) who can ensure correct installation and certify it according to the regulations in force. The entire audio system must comply with the current standards and regulations regarding electrical systems.

10. Supports, trolleys and carts.

The equipment should be only used on supports, trolleys and carts, where necessary, that are recommended by the manufacturer. The equipment / support / trolley / cart assembly must be moved with extreme caution. Sudden stops, excessive pushing force and uneven floors may cause the assembly to overturn. Never tilt the assembly.

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

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

OPERATING PRECAUTIONS

- Place this product far from any heat sources and always ensure an adequate air circulation around it.

- Do not overload this product for a long time.
- Never force the control elements (keys, knobs, etc.).
- Do not use solvents, alcohol, benzene or other volatile substances for cleaning the external parts of this product.

IMPORTANT NOTES

To prevent the occurrence of noise on line signal cables, use screened cables only and avoid putting them close to:

- **Equipment that produces high-intensity electromagnetic fields**
- **Power cables**
- **Loudspeaker lines**

WARNING! CAUTION! To prevent the risk of fire or electric shock, never expose this product to rain or humidity.

WARNING! to reduce the risk of electric shock, do not disassemble this product unless you are qualified. Refer servicing to qualified service personnel.

CORRECT DISPOSAL OF THIS PRODUCT

This product should be handed over to an authorized collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority or your household waste disposal service.

CARE AND MAINTENANCE

To ensure a long-life service, this product should be used following these advices:

- If the product is intended to be set up outdoors, be sure it is under cover and protected to rain and moisture.
- Always use a dry cloth to clean the exterior surfaces of the speaker and always do it when the power is turned off.

CAUTION: to avoid damaging the exterior finishes do not use cleaning solvents or abrasives.

FCC NOTES

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to

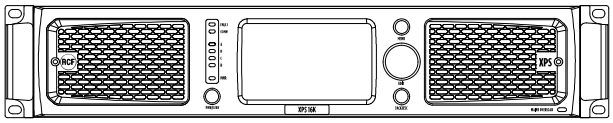
radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Modifications: Any modifications made to this device that are not approved by RCF may void the authority granted to the user by the FCC to operate this equipment.

RCF S.p.A. reserves the right to make changes without prior notice to rectify any errors and / or omissions. Always refer to the latest version of the manual on www.rcf.it.

SUPPLIED IN THE PACKAGING

DEVICE

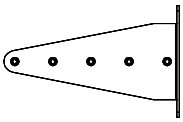


XPS 16K

XPS 16KD

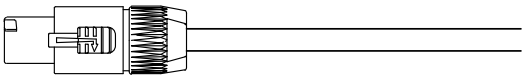
Depending on the part number

RACK MOUNT ACCESSORIES



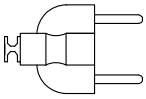
2 x rear brackets

POWER CORD

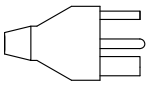


CABLE H07RN-F, 3G2.5, BLACK, 1.2m long

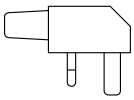
PLUGS (depending on the part number)



SCHUCKO 16A - 250V | IEC 60884-1, CEE7/4, IP 44



NEMA L5-30 30Amp - 125V – Standard UL 498



POWER PLUG 13A – 250V WITH FUSE | BS1363A/95

DOCUMENTATION

USER MANUAL

2 YEARS WARRANTY

WARNING SHEET

XPS 16K CONCEPT

XPS 16K represents the new generation of RCF four-channels DSP amplifiers, and offers a full package of extremely high-power amplification, innovative processing and analogue/digital audio management in a single solution.

It features four, independent processed, channels of audio amplification and can optimize RCF professional speakers' and systems' performance thanks to the on-board dedicated presets library. The powerful multi-DSP architecture, based on Analog Devices SHARC platform, allows refined equalization and advanced speakers' management strategies.

XPS implements several safety strategies, both at hardware and firmware levels, to ensure safe and continuous operability in all operating conditions

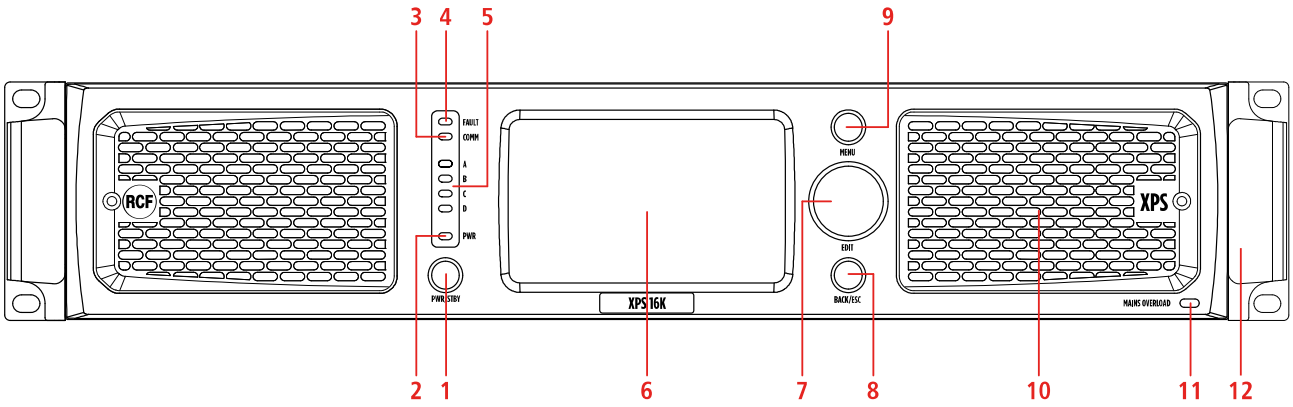
The main user interface is RDNet, the RCF proprietary control and monitoring software that allows to discover, configure, monitor and control a virtually unlimited number of amplifiers. Users will find ready to use definable parametric equalizations, multiband compressors, RCF bass shaper, air absorption compensation, delays and levels.

Most of these settings and monitored parameters are also accessible on the front capacitive 4.3'' touch screen display, that together with a rotary encoder provides a complete, ergonomic and user friendly HMI.

Third parties control is allowed over OSC protocol, providing interoperability, accuracy, flexibility and other advantages.

XPS 16K has been conceived for both installed sound and touring installation.

FRONT PANEL



XPS 16K front panel provides a complete set of commands and information useful to configure, monitor and control amplifier status, behaviour and operability.

1 POWER/STANDBY button

When the amplifier is connected to main supply, press the button switch from STAND BY to ON status.

2 Power LED

RED – standby

YELLOW – starting up

GREEN – device ON

3 Communication LED

YELLOW

4 General fault LED

YELLOW – indicates a general fault has been detected (connected to the FAULT GPO on the rear panel)

5 Output status LED

Show if the signal is:

OFF – absent

GREEN – present

YELLOW – compressing

RED – limiting

6 4.3'' TFT capacitive touch screen display

Implements all amplifier configuration controls and monitoring information

7 Multifunctional encoder

Allows to navigate the user interface on the display as a support to touch screen interaction

8 BACK/ESC button

Short press goes back to previous HMI panel

Long press goes to HOME screen

9 MENU button

Open amplifier MAIN MENU

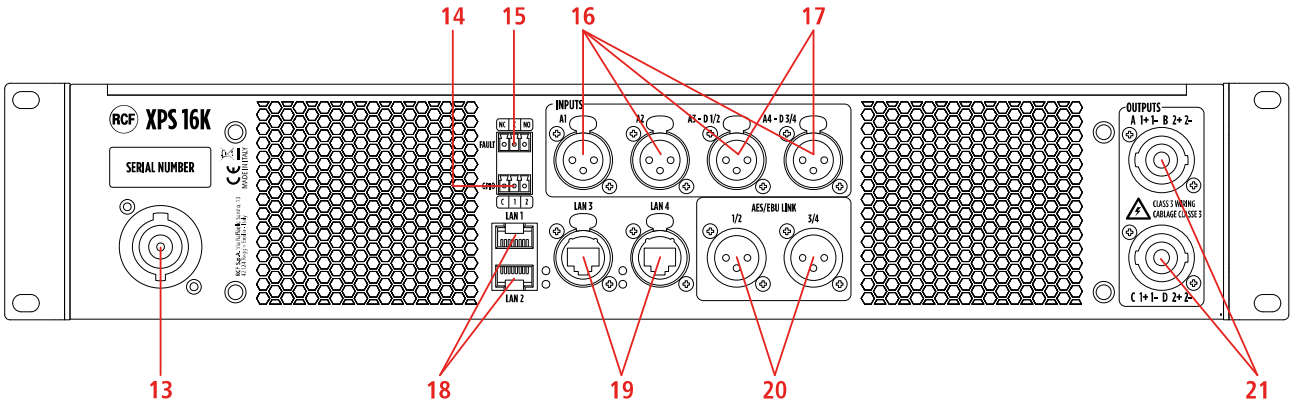
10 Removable grille with dust filter behind

11 Mains Overload LED

RED – indicated an overload on the mains voltage

12 Metal handles

REAR PANEL



13 **Mains socket**

PowerCON connector

14 **2 programmable GPIO**

3 pole Euroblock connector

15 **General fault GPO**

3 pole Euroblock connector working both as NC and NO

16 **4 analogue inputs A1 A2 A3 A4**

XLR connectors

17 **4 digital inputs D1 D2 D3 D4 (alternative to A3 and A4)**

Stereo inputs on XLR connectors

18 **LAN1 LAN2 ports**

Connect the amplifier for configuration, control and monitoring purpose. RJ 45 connectors.

19 **LAN3 LAN4 ports**

Connect the amplifier for configuration, control and monitoring purpose. EtherCON connectors

20 **4 digital signal output O1 O2 O3 O4**

Stereo digital outputs on XLR connectors

21 **Power output**

2 outputs on each speakon connector

PROTECTIONS

XPS 16K implements several safety strategies, both at firmware and hardware level, to ensure safe and continuous operability in all operating conditions.

FIRMWARE

1	RMS signal protection on speakers	>	protects transducers from thermal issues
2	Woofer excursion control	>	maintains a precise and powerful driving
3	Power supply output dynamic limitation	>	for high-performance and long-lasting bursts
4	Peak overvoltage protection	>	protects amplifiers in a very responsive way
5	RMS overcurrent protection	>	for short circuit protection
6	Gain modulation for thermal protection	>	calculated by weighting the signals of the various temperature sensors applied to power and amplification modules

Protections 1) and 2) are specific for each RCF speaker, defined and calibrated by RCF electroacoustic technicians.

Firmware modules are written and optimized using the best closed loop control strategies to work in perfect synergy with hardware protections, which work as fallback protections for the most critical situations.

HARDWARE

1	Current and voltage protections		
2	Speakers' impedance measurement	>	allows to monitor power cables connections status, and to devise speakers' obsolescence protection strategies
3	Fans forced convection dissipation	>	speed controlled fans, to maximize dissipation with the lowest noise

Protections are classified as:

- Fast protections: very responsive, driven by fast signals, such as overvoltage or power absorptions.
- Slow protections: smooth response, driven by signals with longer inertia, such as thermal ones.

PROCESSING

PROCESSING FEATURES

For each channel, XPS 16K provide a full package of advanced processing functions.

Digital Signal Processing (DSP)	2 x SHARC, 40-bit floating point, 96 kHz 2 x ADAU 1442, 32-bit fixed point, 96 kHz
EQ Filters	Peaking HI/LO-shelving HI/LO-pass (Butterworth, Linkwitz-Riley, Bessel)
Advanced algorithms	FiRPHASE technology BASS shaper Air compensation Mid-low correction driver excursion control Dynamic PEQ Multi-band compressor Pilot tone & AES detection Backup recovery strategy Impedance load measurement
Compressors	RMS limiter Dynamic compressor Power limiter Thermal compressor
Delay	0 ÷ 4000 ms (each channel)

PROCESSING CHAINS

All these features are combined into 5 PROCESSING CHAINS, each one dedicated to a specific speaker type:

- **FULL RANGE SPEAKER**
- **SUBWOOFER**
- **BI-AMP SPEAKER**
- **LINE ARRAY**
- **QUAD-AMP SPEAKER**

Choosing a specific speaker model, XPS 16K will automatically activate the dedicated processing chain, assuring an optimized and safe configuration of the system.

Due to the complexity of processing chains, not all parameters are available to the final user.

SETTING AVAILABLE TO THE FINAL USER

- Polarity
- User eq
- Delay

ADJUSTMENT AVAILABLE TO THE FINAL USER

- Air compensation
- Mid-low correction driver excursion control
- BASS shaper
- Hi-pass filter
- Multiband FiR gain

All other processing parameters are included in the speakers' preset library and for safety reason, they are not available for the final user.

INSTALLATION

UNPACKING

Check the carton box and its contents and if there is any sign of damage (should the amplifier be damaged, immediately inform your local distributor / dealer and the forwarder). It is always advisable to keep the packing materials, even if the amplifier has arrived in good condition. Input and output cables are not included.

ENVIRONMENTAL REQUIREMENTS

XPS 16K amplifiers shall not be installed in a place with:

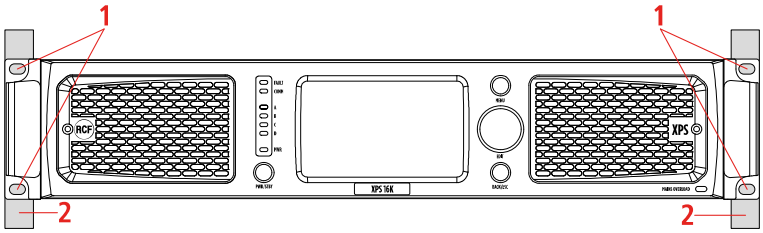
- too high temperature, dust or excessive humidity;
- exhaust air ventilators;
- permanent vibrations;
- high-intensity electromagnetic fields (due to transformers, transmitters, etc.).

RACK MOUNT

XPS 16K amplifier must be installed inside rack cabinets.

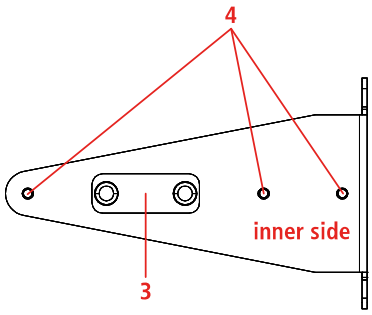
Inside rack cabinets, it cannot be installed on slide rails.

1 Fix the XPS 16K amplifier to the rack front uprights (**2**) using the holes (**1**) on the supports.

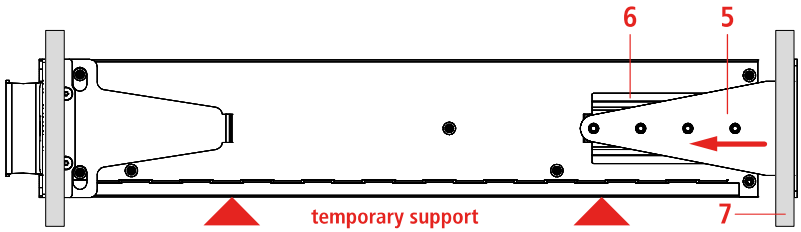


Provide a temporary support during the following steps, in order to avoid accidental product crash and potential operator injuries.

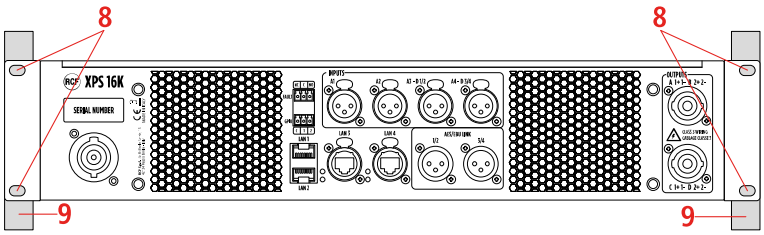
2 Using the holes (4), adjust the position of the bracket insert (3) depending on rack front and rear uprights distance.



3 Insert the rear brackets (**5**) into the side slides of the frame (**6**) and push them against the rear uprights of the rack (**7**).



4 Fix the XPS 16K amplifier to the rack rear uprights (**9**) using the holes (**8**) of the rear brackets.



It is now possible to remove the temporary support.

COOLING

To ensure amplifier operational safety it is crucial to maintain adequate thermal conditions in the installation environment.

XPS 16K is equipped with 3 variable speed fans that provide the necessary airflow from the front to the rear panel of the cabinet. In addition, it is necessary to:

- keep the front grilles free from obstacles;
- check the cleanliness of the filters behind the grilles;
- ensure an adequate cool airflow inside rack cabinets, also with additional ventilation modules if they are not vented.

CONNECTIONS

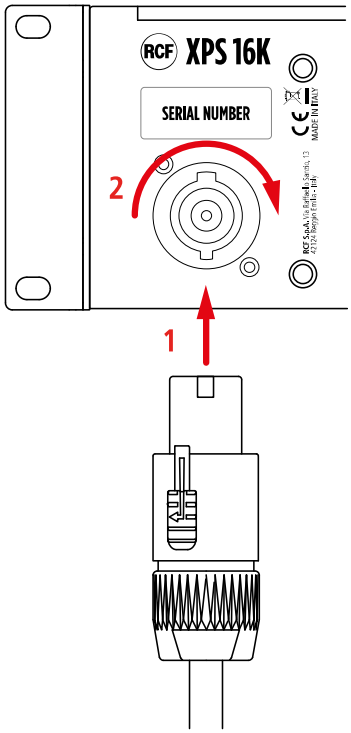
MAINS

WARNING!
RISK OF ELECTRIC SHOCK.

PROTECTING EARTHING TERMINAL. THE APPARATUS SHOULD BE CONNECTED TO A MAINS SOCKET WITH A PROTECTIVE EARTH CONNECTION.

1 Insert the power cord plug in the MAINS socket

2 Turn the connector clockwise to lock it



CONNECTOR SPECIFICATIONS

NEUTRIK NAC3FC-HC

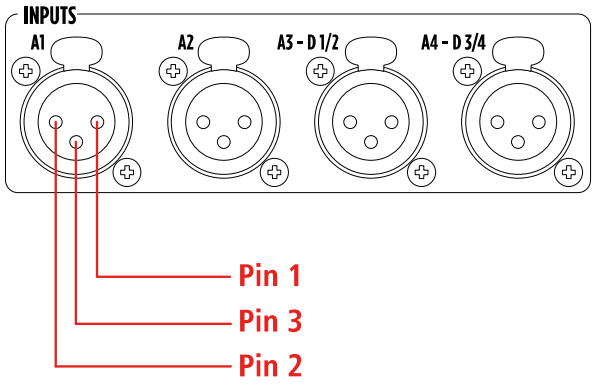
The PowerCon socket is used to disconnect the device from the main power source. It must therefore remain easily accessible after installation.

ANALOG INPUTS A1 - A2 - A3 - A4

Pin 1 GND

Pin 2 A1 – 2 – 3 - 4 Signal +

Pin 3 A1 – 2 – 3 - 4 Signal -



CONNECTOR SPECIFICATIONS

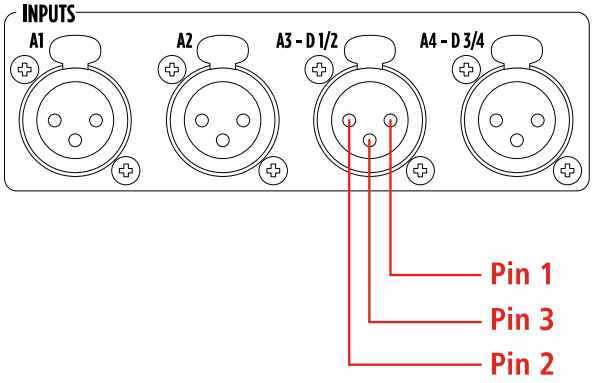
3-pole XLR male connector.

AES/EBU DIGITAL INPUTS D1/2 - D3/D4

Pin 1 GND

Pin 2 D1/2 - D3/4 Stereo Signal +

Pin 3 D1/2 - D3/4 Stereo Signal -



CONNECTOR SPECIFICATIONS

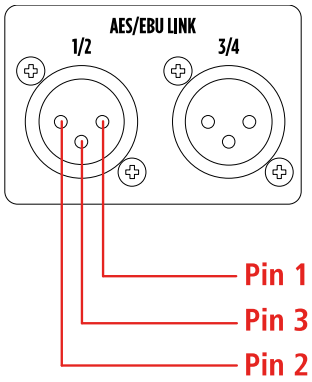
3-pole XLR male connector.

AES/EBU DIGITAL AUDIO LINKS O1/2 - O3/4

Pin 1 GND

Pin 2 O1/2 - O3/4 Stereo Signal +

Pin 3 O1/2 - O3/4 Stereo Signal -



CONNECTOR SPECIFICATIONS

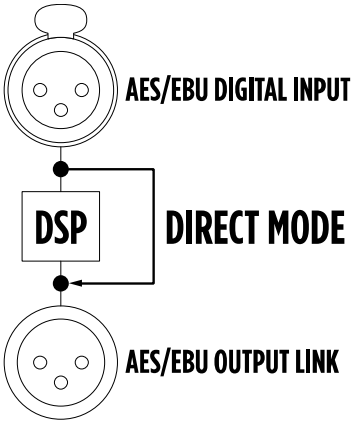
3-pole XLR female connector.

SIGNAL LINK BY-PASS

XPS 16K implements two different DSP by-pass strategies between digital inputs and outputs.

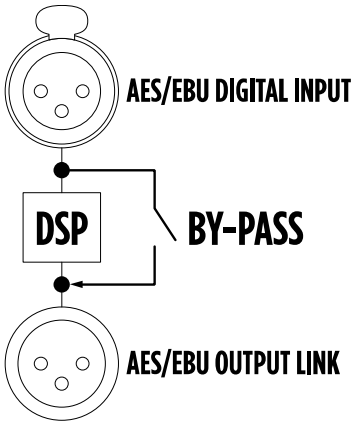
DIRECT MODE

It's a firmware strategy that by-pass DSP in an active way, with signal regeneration and a delay of XX ns.



RELAY BY-PASS

It's a hardware strategy that physically connects inputs and outputs by closing a n.o. relay in case of absence of power supply, in order to guarantee the integrity of the signal path.



OUTPUTS

WARNING!
RISK OF ELECTRIC SHOCK.

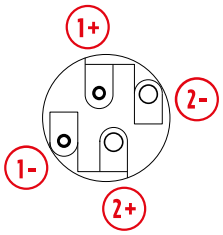
WARNING!
CLASS 3 WIRING IS MANDATORY FOR THIS EQUIPMENT

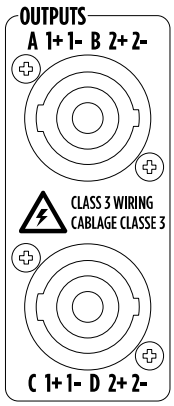
1+ Out A – Out C Signal +

1- Out A – Out C Signal -

2+ Out B – Out D Signal +

2- Out B – Out D Signal -





CONNECTOR SPECIFICATIONS

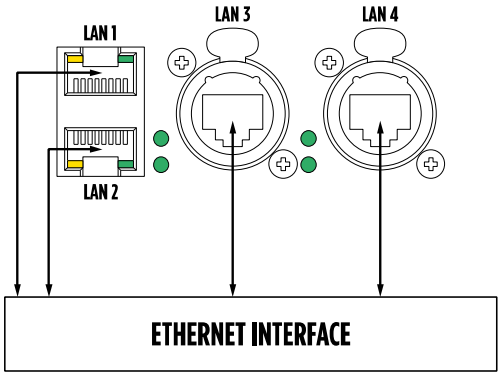
4-pole SPEAKON male connector.

CONTROL

XPS 16K features 4 Gigabit Ethernet network ports, managed by a high-performance switch compliant with IEEE802.1 AVB standard.

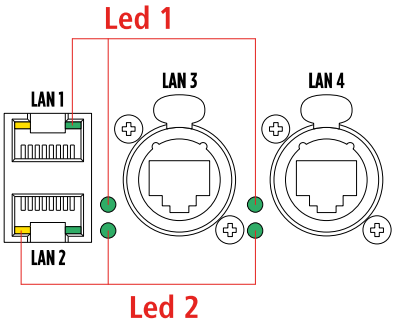
Any of the LAN port can be used as in/out.

It is strongly recommended to reserve a specific VLAN to the control communication, in order to guarantee connection performance and integrity.



Led 1 GREEN – flashing - link/activity

Led 2 YELLOW (LAN 1 and LAN 2) – GREEN (LAN 3 and LAN 4) – steady – device connected to a gigabit network.

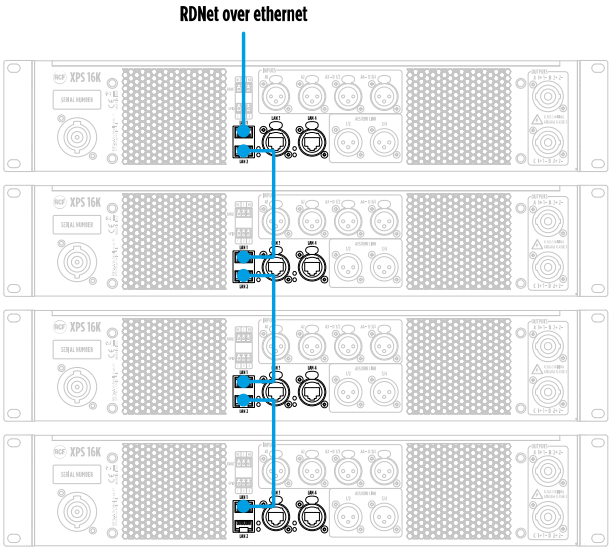


DAISY CHAIN TOPOLOGY

Thanks to the internal switch, XPS 16K can be directly connected to an ethernet network, and a daisy chain topology can be built.

The maximum number of devices that can be connected in daisy-chain depends on the specific user needs in terms of latency, that necessary increases with the number of units.

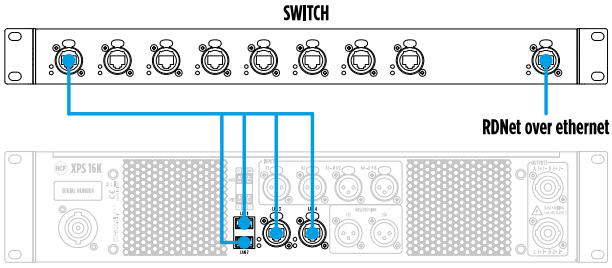
It is good practice not to connect more than 8 units in daisy chain.



STAR TOPOLOGY

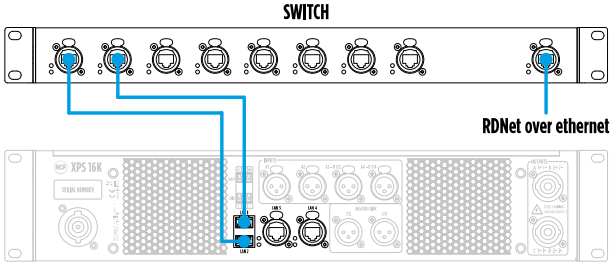
To implement a star topology an external switch is required.

It can be connected to any of the 4 LAN ports of the device.



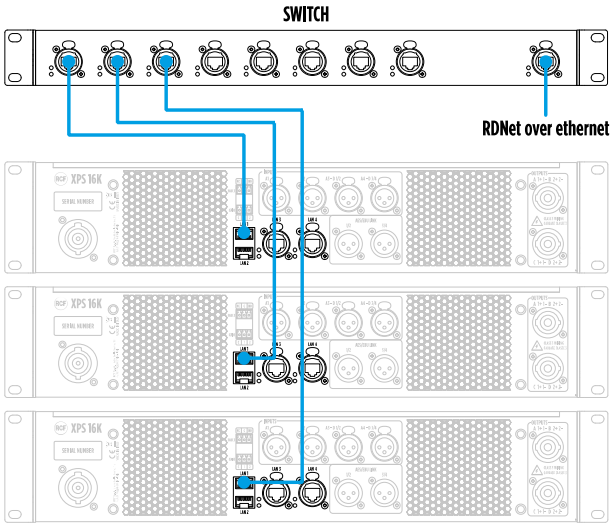
Connecting 2 different ports of the device to the external switch a full redundancy is achieved.

The mandatory requirement is that the external switch must be managed and support STP.



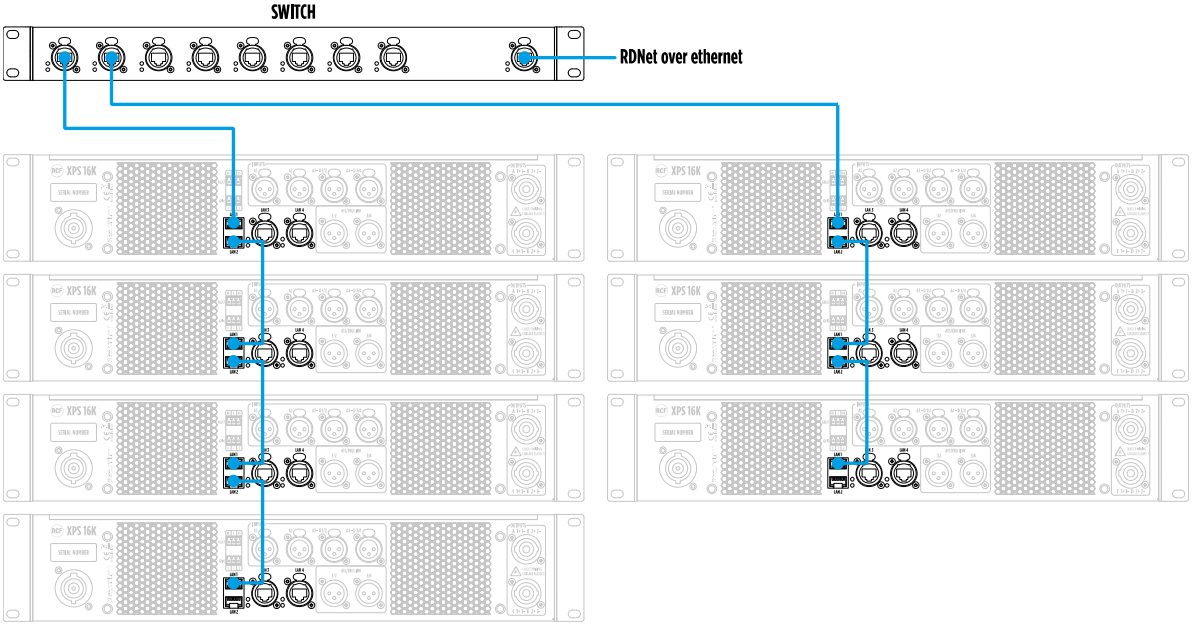
Each XPS 16K device must be connected to a different switch port.

The maximum number of devices that can be connected in the same LAN is determined by IPv4 protocol.



HYBRID TOPOLOGY

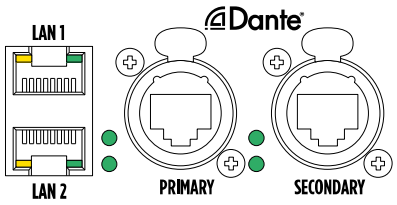
A hybrid topology can also be implemented, with the constraints mentioned above.



DANTE

The XPS 16KD model is equipped with an Audinate Brooklyn II module, which allows XPS 16K to become a node in a Dante digital audio distribution network.

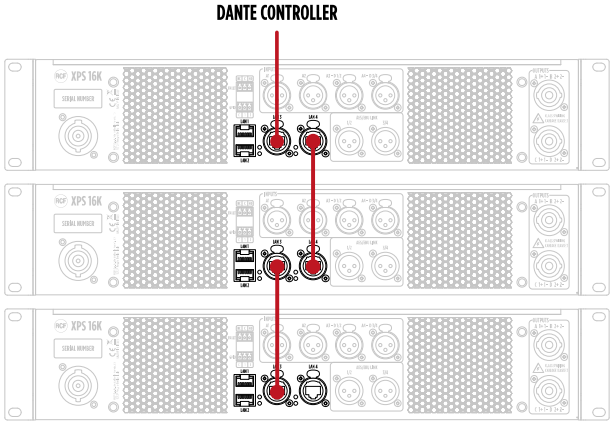
In this configuration, LAN 3 and LAN 4 ports become DANTE primary and secondary ports.



DAISY CHAIN TOPOLOGY

Thanks to the internal switch, XPS 16K can be directly connected to an ethernet network (and consequently to DANTE CONTROLLER TOOL), and a daisy chain topology can be built.

It is strongly recommended to not exceed the number of 3 units connected in daisy chain.



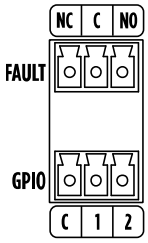
Thanks to the presence of PRIMARY and SECONDARY ports, XPS 16KD allows several configurations with external switches.

Depending on specific installation needs, it will be necessary to choose the most suitable devices and topology.

Moreover, in order to guarantee communication robustness and avoid the loss of data packages, it is strongly recommended to keep audio and control separated into two different vlans.

GPIO

XPS 16K features General Purpose Inputs and Outputs contacts, to be connected with other systems, such as voice alarm systems.



GPIO – Two optoisolated contacts. Their functions are:

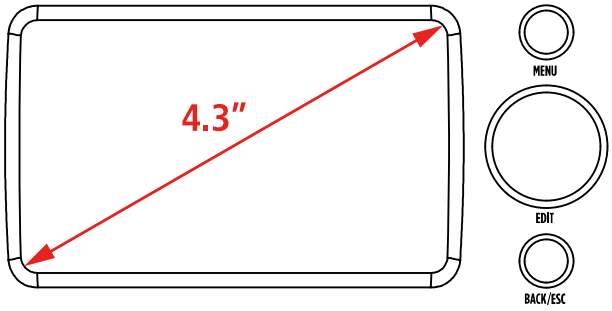
1. **MUTE ALL**, for the connection to a voice alarm system;
2. **PRIORITY**, that triggers the priority input routing on all output channels.

FAULT – general fault dry contact, working both as Normally Closed or Normally Open

FRONT PANEL HMI

XPS 16K features a complete and ergonomic front panel HMI that allows to configure, control and monitor each XPS 16K unit.

HMI ELEMENTS



DISPLAY

4.3'' TFT capacitive touch panel with resolution 480*272 pixel.

MENU button

Always link to MAIN MENU screen.

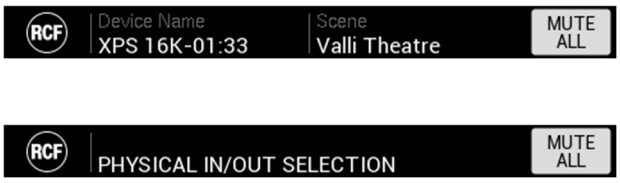
EDIT knob

- **Rotation** – Navigates screen elements
- **Short press** – activates elements EDIT mode, confirm values, change elements status.

BACK/ESC button

- **Short press** – steps back to the previous HMI screen.
- **Long press** – go to IDLE screen.

DISPLAY AREAS

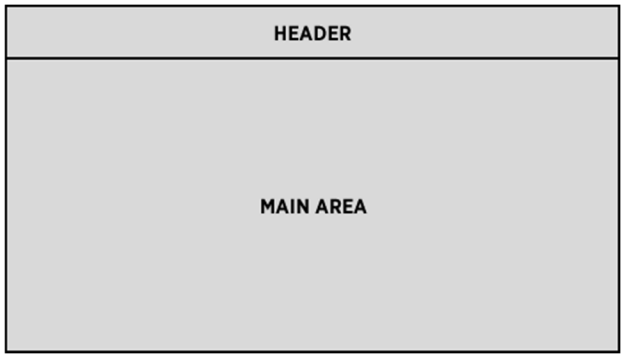


HEADER

- **RCF logo**
- **Device Name** – shows the name assigned to the device in the SETTINGS menu section.
- **Scene** – shows the name of the scene loaded in the SCENES MANAGEMENT menu section.
- **SCREEN TITLE** – alternative to Device name and Scene – contextually shows the screen title.
- **MUTE ALL** button – mutes all amplifier's outputs simultaneously.

MAIN AREA

- Contextually shows information and controls available in a specific screen.



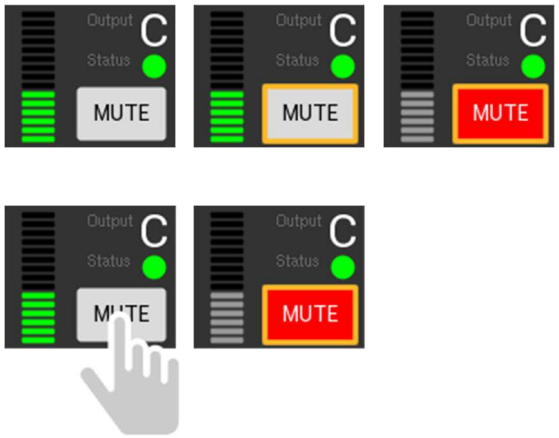
INTERACTIVE ELEMENTS

BISTABLE BUTTONS

- Rotate the EDIT knob to select the button. Selected elements are identified by a yellow frame
- Press the EDIT knob to change the button status.

OR

- Press the button with a SHORT PRESS.
- The button will change its status once released.
- The button will remain selected after press.

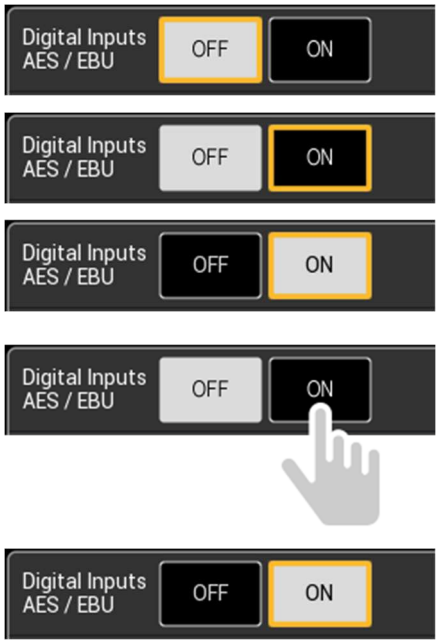


TOGGLE BUTTONS

- Rotate the EDIT knob to select the second value.
- Press the EDIT knob to set the second value.

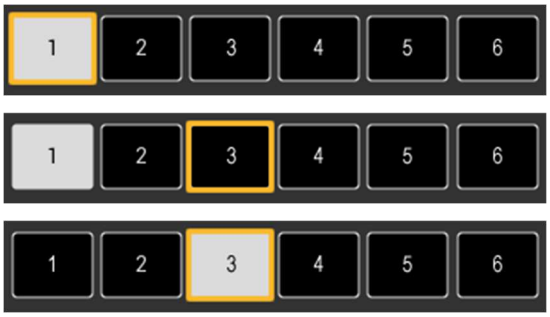
OR

- Press the second value with a SHORT PRESS.
- The value will be set once released.
- The button will remain selected after press.



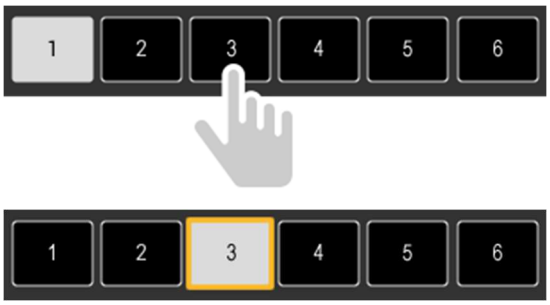
MULTIPLE CHOICE

- Rotate the EDIT knob to select the desired value.
- Press the EDIT knob to set the desired value.



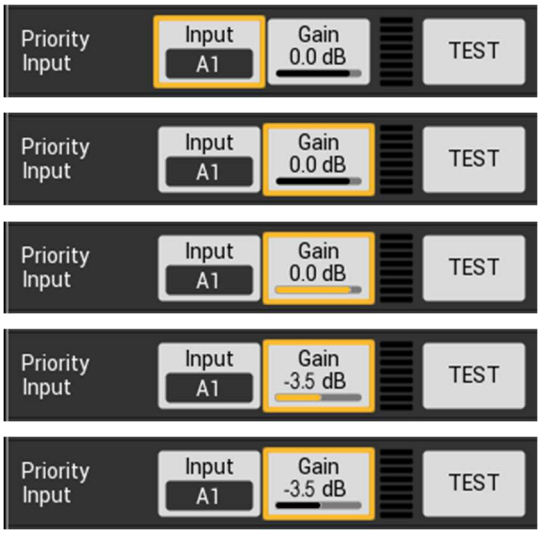
OR

- Press the selected value with a SHORT PRESS.
- The value will be set once released.
- The button will remain selected after press.



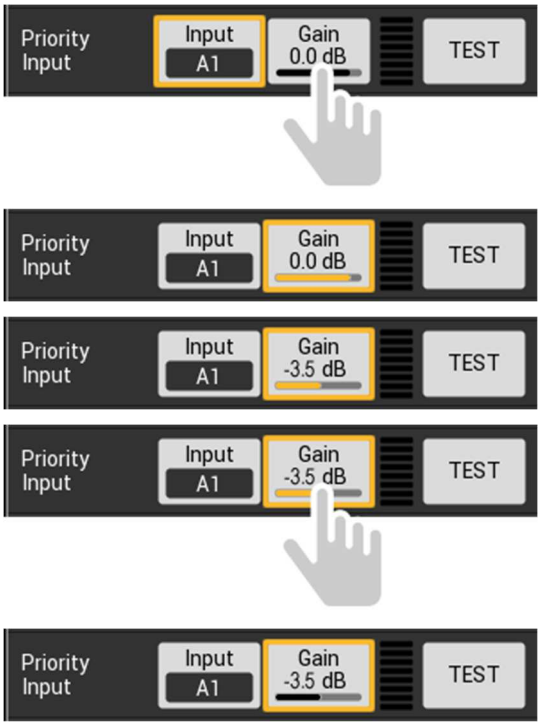
IN-BUTTON VALUE ADJUSTMENT

- Rotate the EDIT knob to select the button.
- Press the EDIT knob to activate adjustment.
- Rotate the EDIT knob to adjust the value.
- Press the EDIT knob to set the value.



OR

- Press the button with a SHORT PRESS.
- Adjustment will be activated once released.
- Rotate the EDIT knob to adjust the value.
- Press the button with a SHORT PRESS to set the value.

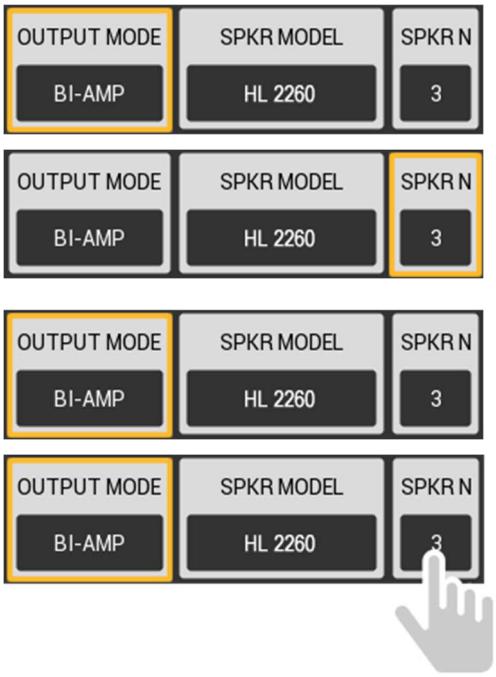


SELECTION BUTTON

- Rotate the EDIT knob to select the button.
- Press the EDIT knob to open the popup window to set the parameter value.

OR

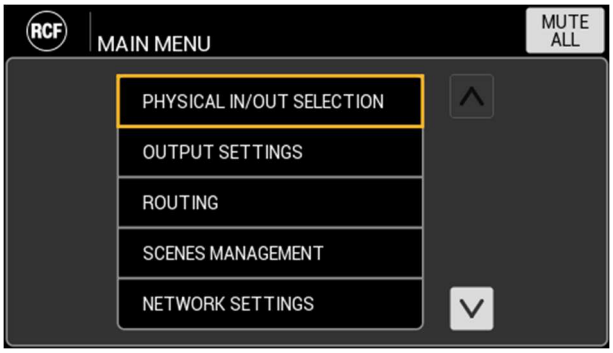
- Press the button with a SHORT PRESS.
- On button release the popup window to set the parameter will be opened.



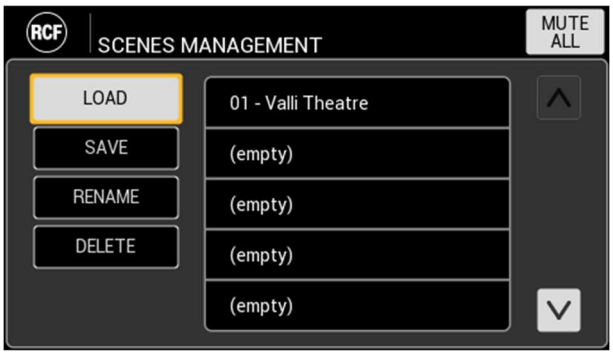
LIST

A list can be both:

- scrolled using the EDIT knob;
- managed by direct selection of the desired item.



Other commands can be present in a list screen, as shown in the example.

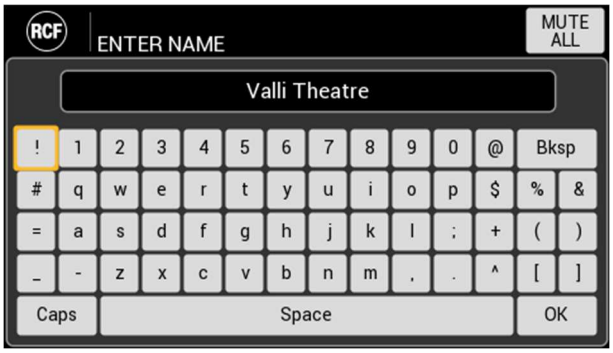


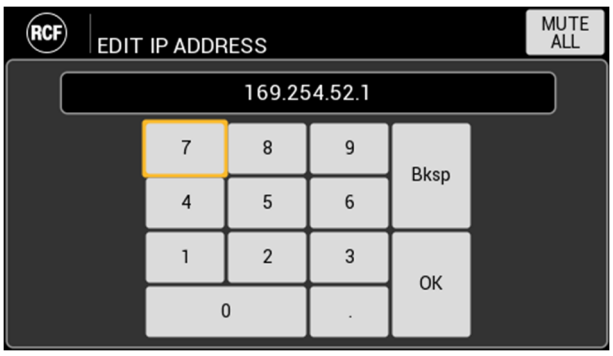
KEYBOARDS

Both alphanumeric and numeric only keyboards are available, depending on the specific context, to provide the best tool to user task.

Keyboards can be both:

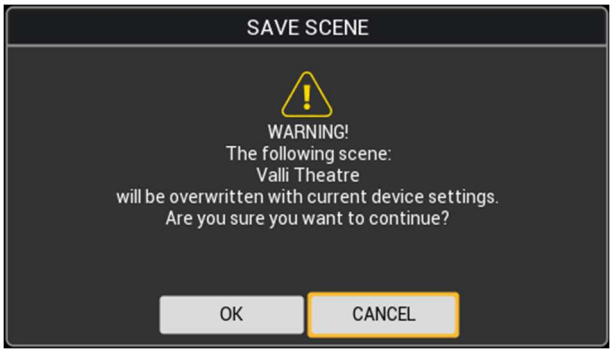
- scrolled using the EDIT knob;
- managed by direct selection of the desired item.



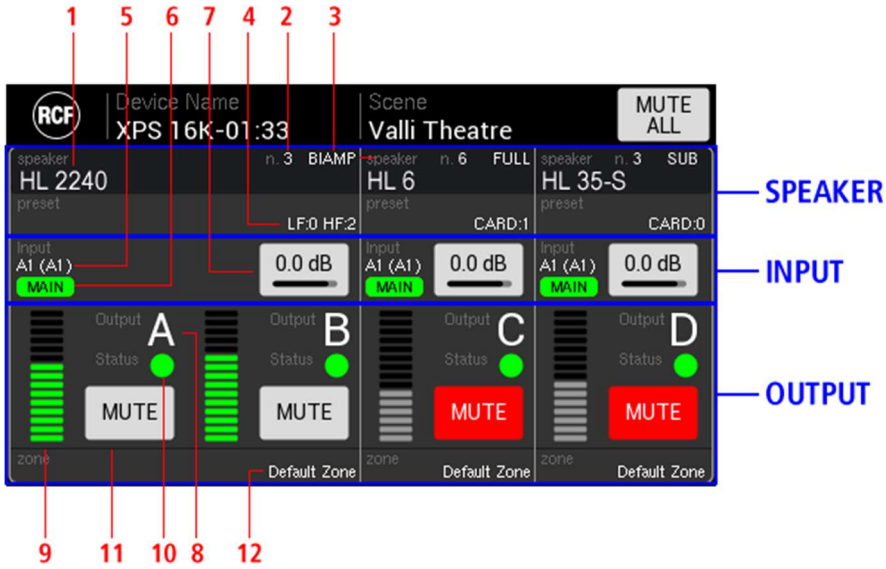


POPUP WINDOW

It is made of a TITLE BAR and a contextual MAIN AREA with different contents depending on the specific function.



IDLE SCREEN



SPEAKER

1 - **SPEAKER MODEL** – shows the specific speaker connected to the output(s).

2 - **SPEAKER NUMBER** – shows the number of speakers connected in parallel to the output(s).

3 - **OUTPUT MODE** – shows if the speaker is FULL RANGE, SUB, LINE ARRAY, BI-AMP or QUAD-AMP.

4 - **SPEAKER PRESET** shows the specific preset chosen for the selected speaker.

INPUTS

5 - **INPUTS** – shows the MAIN and (BACKUP) inputs selected for the specific output.

6 - **ACTIVE INPUT**– shows the input that is currently routed to output(s).

7 - **INPUT GAIN** – allows to adjust input gain. It acts both on MAIN and BACKUP inputs gain.

OUTPUT

8 - **OUTPUT CHANNEL (A – B – C – D)** – shows the label of the specific output.

9 - **OUTPUT VU METER**

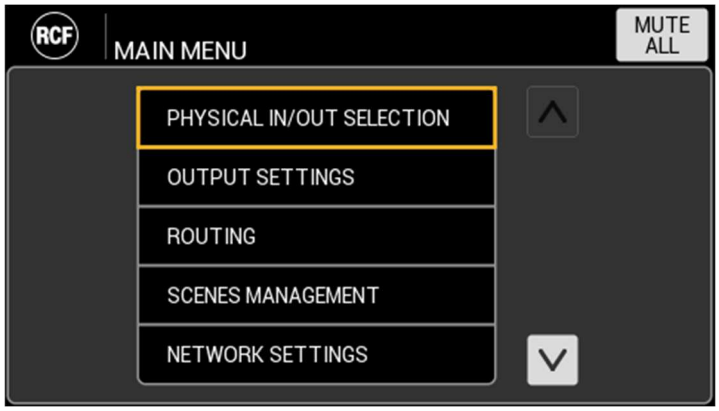
10 - **CHANNEL STATUS** – depending on the colour:

- **GREEN** channel ok
- **RED** channel error

11 - **MUTE** button – mutes the specific amplifier's output(s) channel.

12 - **ZONE** – shows the name assigned to the output(s) zone.

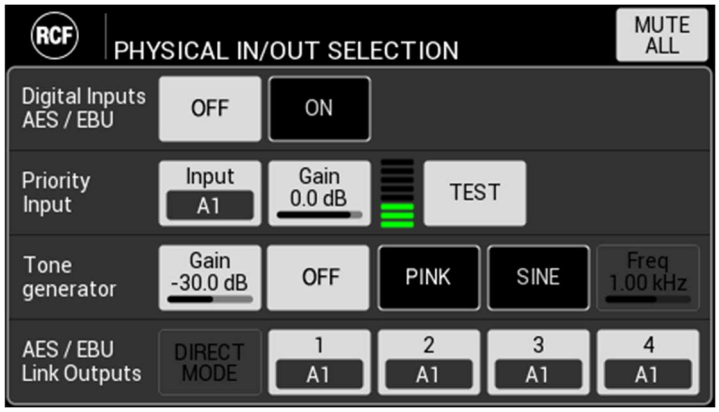
MAIN MENU



It is a list of 5 items:

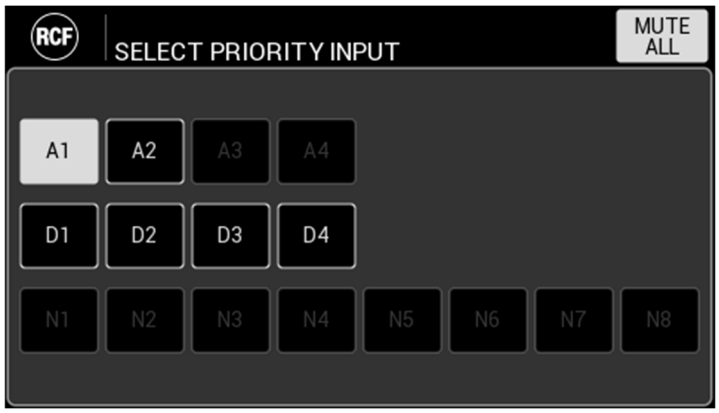
- **PHYSICAL IN / OUT SELECTION**
- **OUTPUT SETTINGS**
- **ROUTING**
- **SCENES MANAGEMENT**
- **SYSTEM SETTINGS**
- **NETWORK SETTINGS**
- **DEVICE SETTINGS**
- **SYSTEM INFO**

PHYSISCAL IN/OUT SELECTION



Digital Inputs AES/EBU – Enable / disable 4 digital inputs AES/EBU (D1 - D2 - D3 e D4) alternative to analogue inputs A3 and A4. These inputs are physically allocated on two connectors.

Priority Input – set the Input to be used as priority over GPI command.



In the XPS 16KD model, DANTE input N1 – N8 are available.

Also adjusts Priority Input gain and shows VU meter.

TEST button routes Priority Input to all output for test purpose. When active, the button is GREEN.

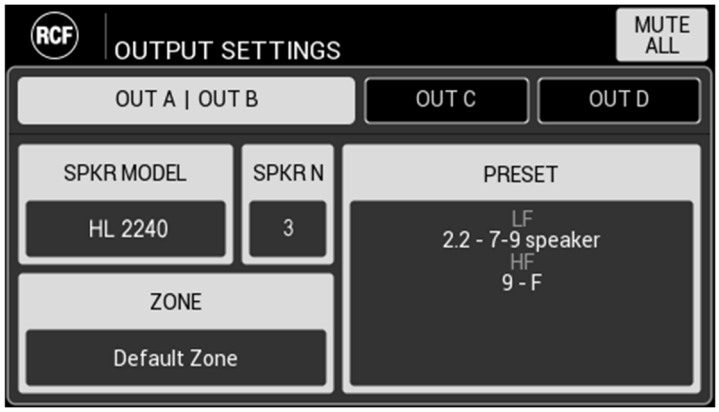
Tone generator – adjust Tone generator gain and activate it choosing between **PINK** noise and **SINE**.

When **SINE** is active, it is possible to set the related frequency.

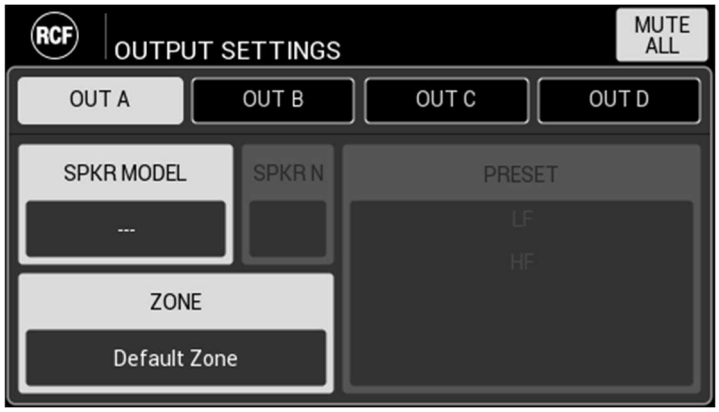
AES/EBU link outputs - set the Inputs to be routed on O1 – O4 digital signal outputs.

When Digital Inputs AES/EBU are active, **DIRECT MODE** function is available. If activated, it by-bass the signal processing and automatically assigns D1 to O1, D2 to O2, etc.

OUTPUT SETTINGS

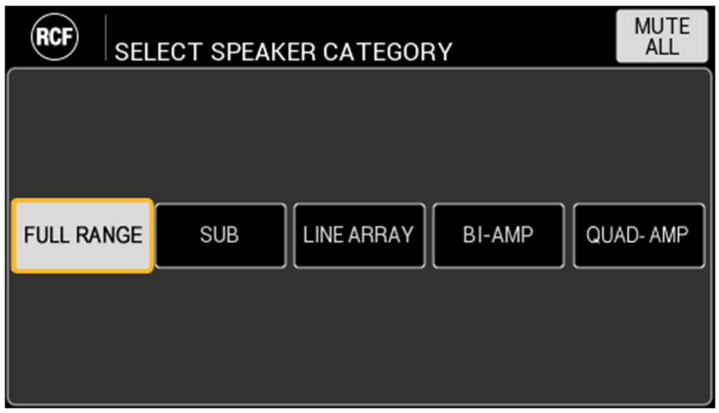


This HMI section allows to completely configure amplifiers outputs channels. Starting from a blank screen, the interaction flow is described in the following example.



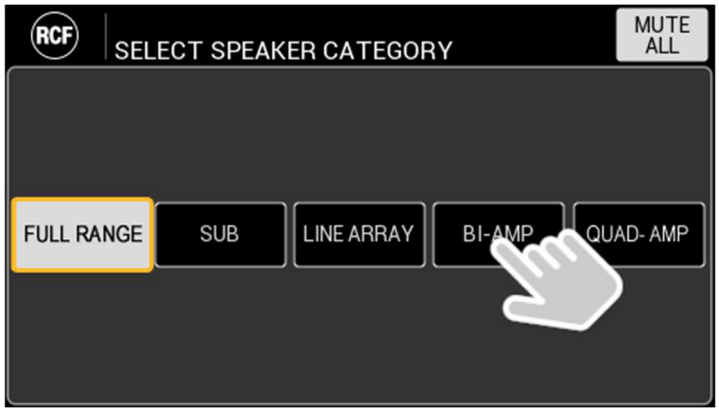
SPKR MODEL

Allows to choose the specific speaker model connected to amplifier's output(s) channel(s) within the RCF speakers' library. This command links to the selection of the **SPEAKER CATEGORY**, and provide a first level filter of the library:

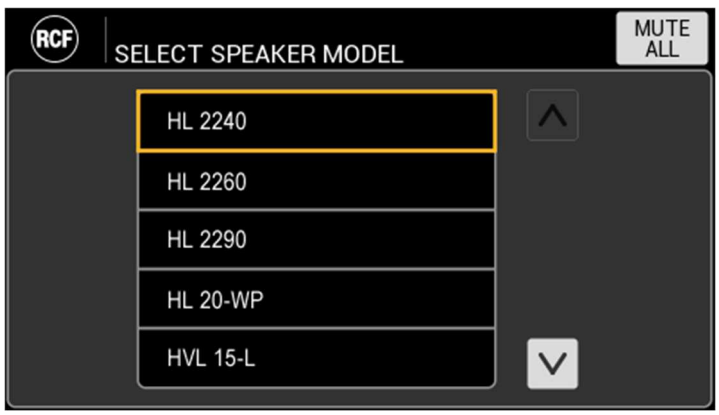


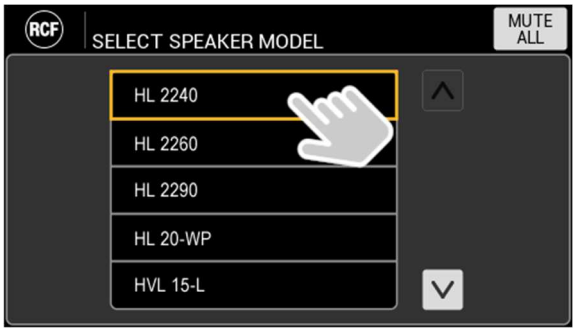
It is possible to choose among:

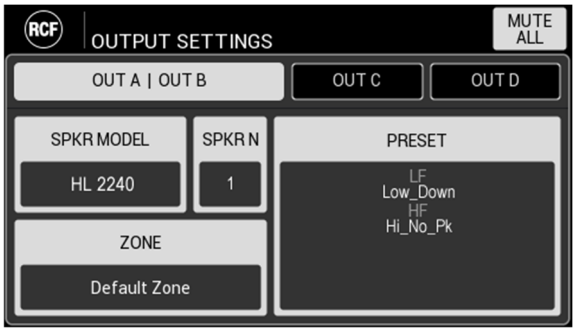
- **FULL RANGE** – full range speaker, connected to a single output channel.
- **SUB** – subwoofer, connected to a single output channel.
- **BI-AMP** – bi-amped speaker. One channel used for LF and one for HF (or MF + HF with crossover).
- **LINE ARRAY** – full range speaker with specific line array settings.
- **QUAD-AMP** – quad-amped speaker, with two different channels for LF, one for MF and one for HF.



After this choice, the list of available speakers in the specific category is provided:







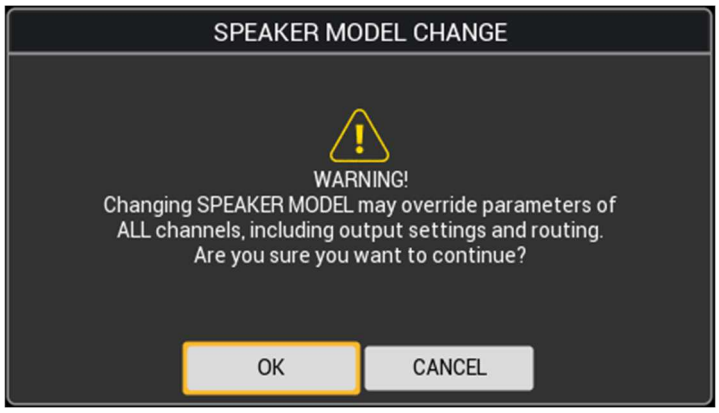
Choosing the speaker model from the list, the number of connected speakers (**SPKR N**) and **PRESET** will be set to the default value.

Moreover, channels tabs automatically adapt to the **SPEAKER CATEGORY** setting:

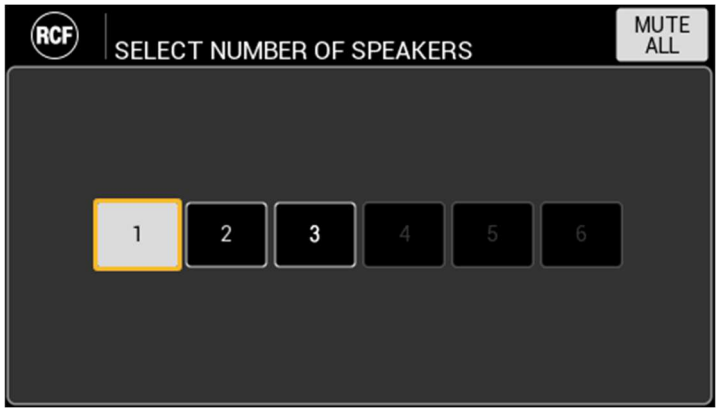
TABS CONFIGURATION	**SPEAKER CATEGORY**
OUT A | OUT B | OUT C | OUT D	FULL RANGE or SUB
OUT A | OUT B | OUT C | OUT D	BI-AMP or LINE ARRAY
OUT A | OUT B | OUT C | OUT D	QUAD-AMP

Changing the **SPEAKER MODEL** setting, all outputs and routing parameters will be consequently reset.

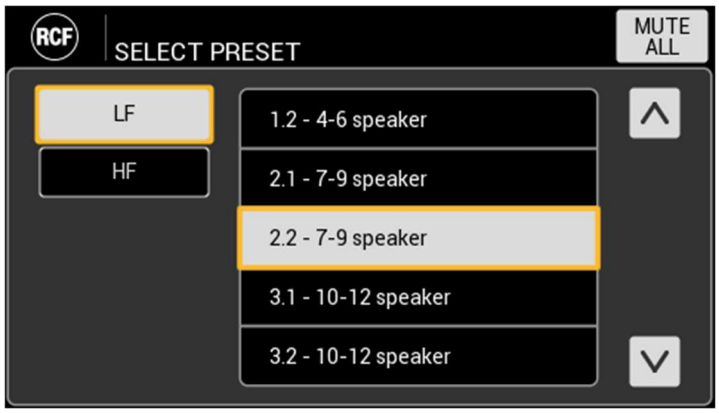
A confirmation popup will ask user to confirm the action.



SPKR NUMBER – Set the number of speakers connected in parallel. The number will be coherent with SPEAKER MODEL in terms of maximum power and impedance.

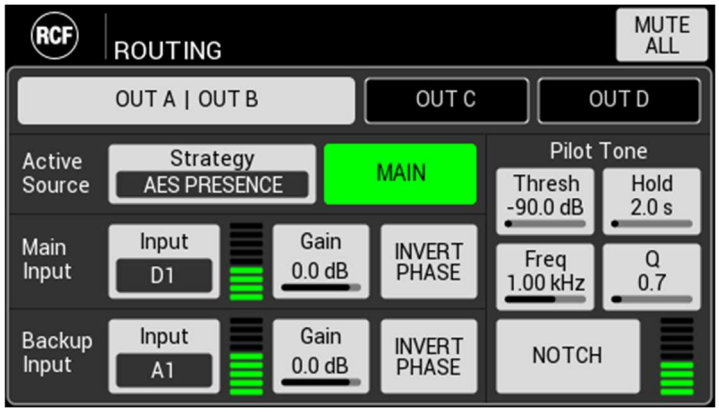


PRESET – set the preset for the selected SPEAKER MODEL. Its structure reflects the SPEAKER CATEGORY, and automatically adapts to speaker type. Depending on it, different preset options will be offered, such as Low Frequencies and High Frequencies for bi-amp speakers, Hi-Pass and Low-Pass filters for subwoofers, etc.



ZONE – Set the name of the zone served by the speakers connected to the output(s).

ROUTING

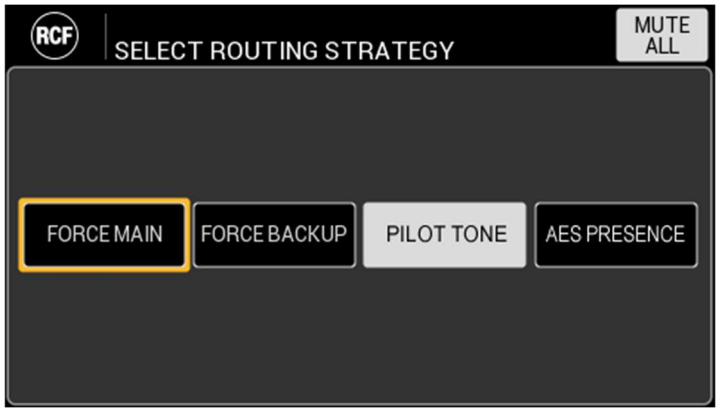


Set the parameters that define the routing configuration of the device. Settings are available for each output, depending on selected OUTPUT MODE.

ACTIVE SOURCE

STRATEGY – choose the routing strategy among:

- **FORCE MAIN** – routes the MAIN INPUT on the selected output(s)
- **FORCE BACKUP** – routes the BACKUP INPUT on the selected output(s)
- **PILOT TONE** – routes the MAIN INPUT as long as the pilot tone is detected on the speaker line. In case of absence, switches on BACKUP INPUT.
- **AES PRESENCE** – routes the MAIN INPUT as long as the clock is detected. In case of absence, switches on BACKUP INPUT. This strategy is available only if a DIGITAL AES/EBU input is selected as MAIN input.



The active source is shown on the right side of the STRATEGY and automatically shows one of the following:

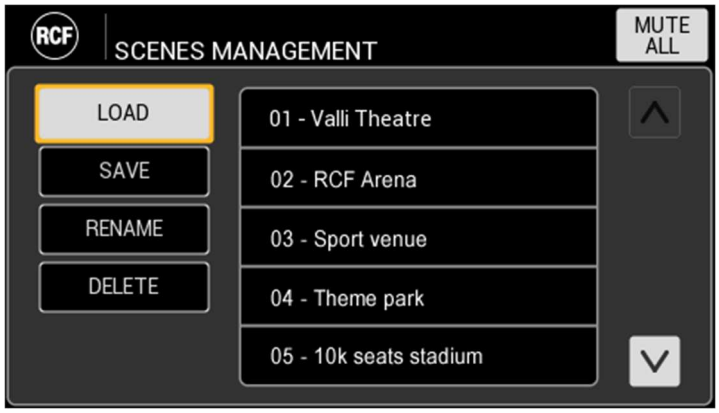
MAIN INPUT – Select input, shows VU meter, set gain and invert polarity.

BACKUP INPUT – Select input, shows VU meter, set gain and invert polarity.

PILOT TONE – Set function parameters:

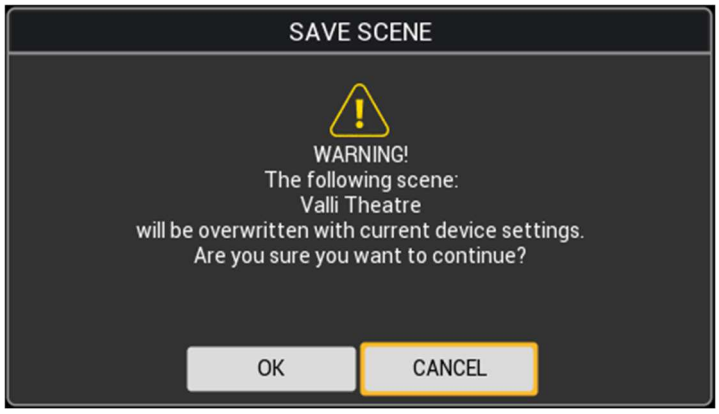
- **Threshold** –the level under which the pilot tone is considered not detected, and trigger the switch from MAIN to BACKUP inputs.
- **Hold time** – the time lapse the tone must stay under the threshold to be considered not detected.
- **Frequency** – frequency on which the pilot tone detection filter is tuned.
- **Q** – Quality Factor of the pilot tone detection filter.
- **NOTCH** – activates filter to cancel the pilot tone in reproduction.

SCENES MANAGEMENT

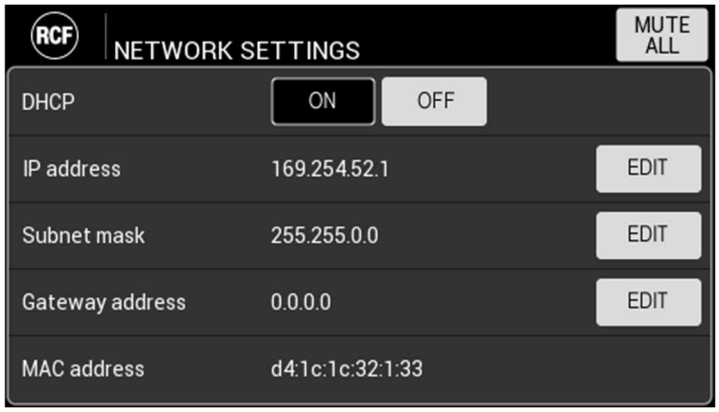


It shows the list of the scenes saved on the device. The toggle buttons on the left side of the screen provide the related function.

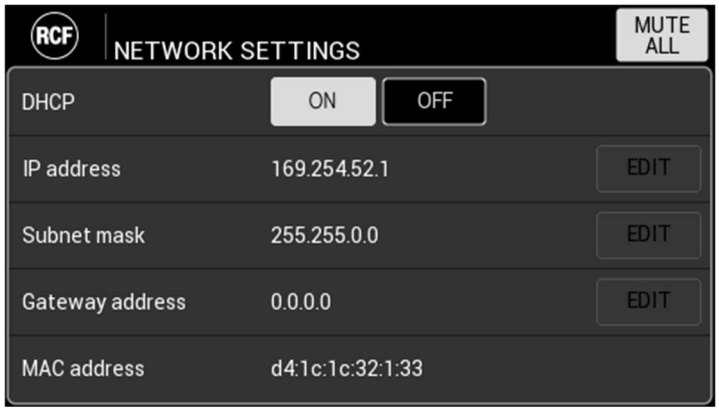
If the user tries to overwrite an existing SCENE, a popup will ask to confirm before proceeding



NETWORK SETTINGS



DHCP – set Dynamic Host Configuration Protocol ON or OFF. If set ON, the following parameters IP address, Subnet mask and Gateway address are assigned automatically and not editable.



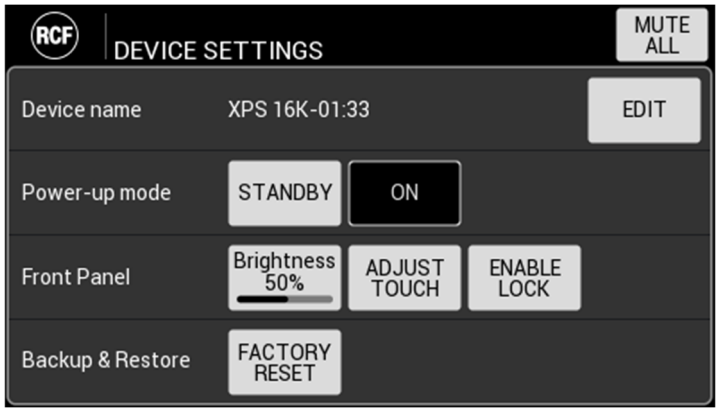
IP address – set the parameter using the context related keyboard (accepted formats 8.8.8.8, 8.8.16 and 8.24):

Subnet mask – set the parameter using the context related keyboard.

Gateway address – set the parameter using the context related keyboard.

MAC address – shows device MAC address (read only)

DEVICE SETTINGS

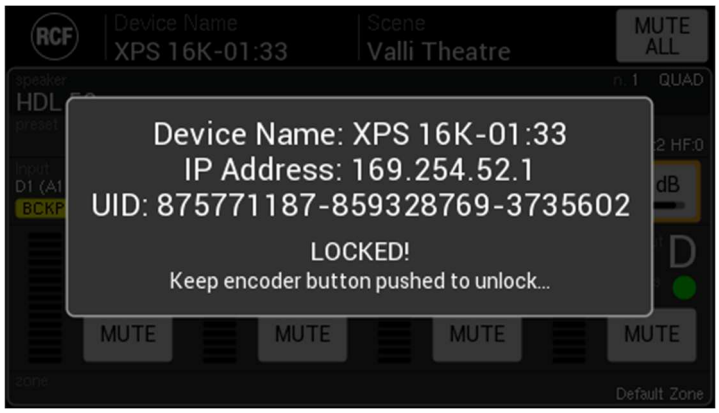


Device name – set a custom name for the device, to better identify it in a system.

Power-up mode – define the status the device will start up when connected to the main. If set to ON, the device will completely power-up, automatically executing the POWER/STANDBY button function via firmware

Front panel – set parameters related to front panel components behaviour:

- **Brightness** – adjust display brightness level
- **ADJUST TOUCH** – start touch screen calibration procedure
- **ENABLE LOCK** – activates front panel LOCK function. All front panel elements will be included in the block, display, buttons and knob. To activate the function, it is required to set a password.



Backup & Restore – the FACTORY RESET button set all parameters to factory default value.

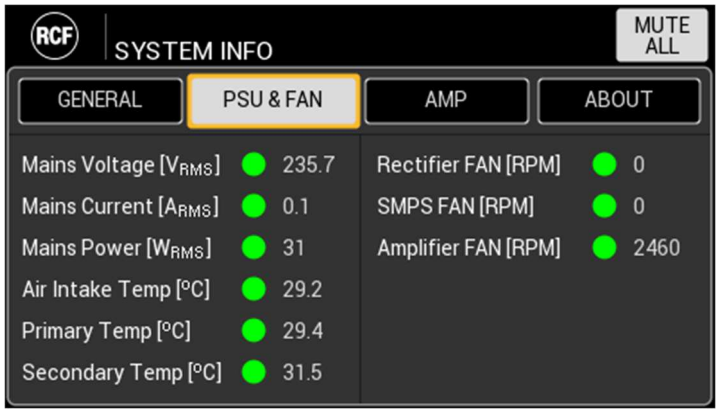
SYSTEM INFO

This page shows relevant, read only system information and it is divided into 4 tabs.

GENERAL

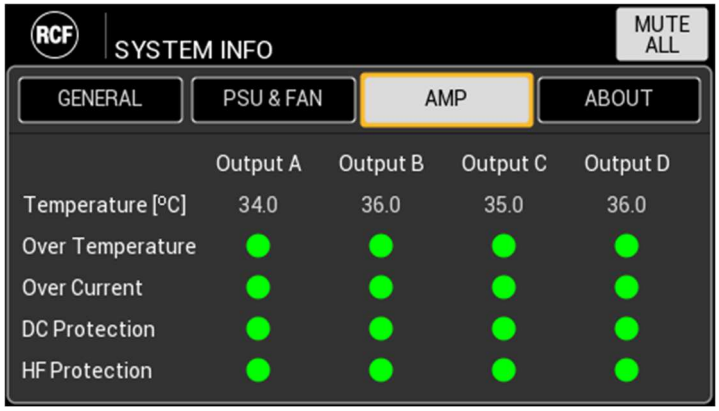
- **Model**.
- **Serial number** – reporting the device production period (year and month).
- **UID** – Unique IDentifier.
- **Firmware version**.
- **Preset library version**.

PSU & FAN



Shows the status of device power supply and fans operativity parameters.

AMP



Shows the status of device power amplifiers modules for each output, as well as the protections operativity.

ABOUT

Shows RCF information and contacts.

RDNet SOFTWARE

RDNet is a powerful management network and control platform for small, medium and large arena-sized sound systems, as well as complex and extended installations. Based on a proprietary network protocol, the software provides intuitive control and monitoring of every connected device in the RCF audio system.

RDNet has been conceived as a serial protocol and it's now moving to Ethernet technology, allowing connecting the devices without the need of intermediate control devices CONTROL 8 and CONTROL 2.

Several devices can be connected to a LAN using one of the 4 ethernet ports present on the rear panel:

- XPS 16K: all LAN 1-4 ports equally converge in a 1Gb/s switch;
- XPS 16KD: LAN 3 and LAN 4 are equipped with Ethercon connectors and are responsible for managing digital audio contributions.

New RCF devices will implement an advanced control based on the most modern IOT technologies, that allows their discovery and univocal identification on the network, this will allow devices to go online without the intervention of the operator.

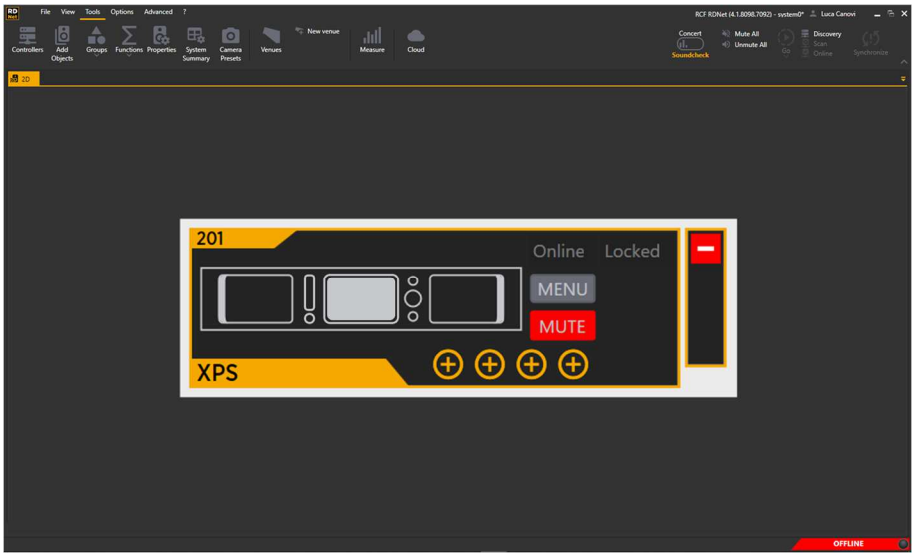
An important challenge has been keeping the **speakers** at the center of the scene, without any change to the control paradigm, that would have created confusion for the operator.

Despite the passive speakers, the workflow has been kept as the active ones, allowing users to maintain the same working approach to RDNet, based on several years of experience side by side with final users, and that is a real added value.

This has been possible recreating the virtual scene in which:

- the amplifier collects the most typical input and system's controls;
- passive speakers are conformed to the very familiar active ones.

XPS 16K works like a controller, with its own configuration menu.



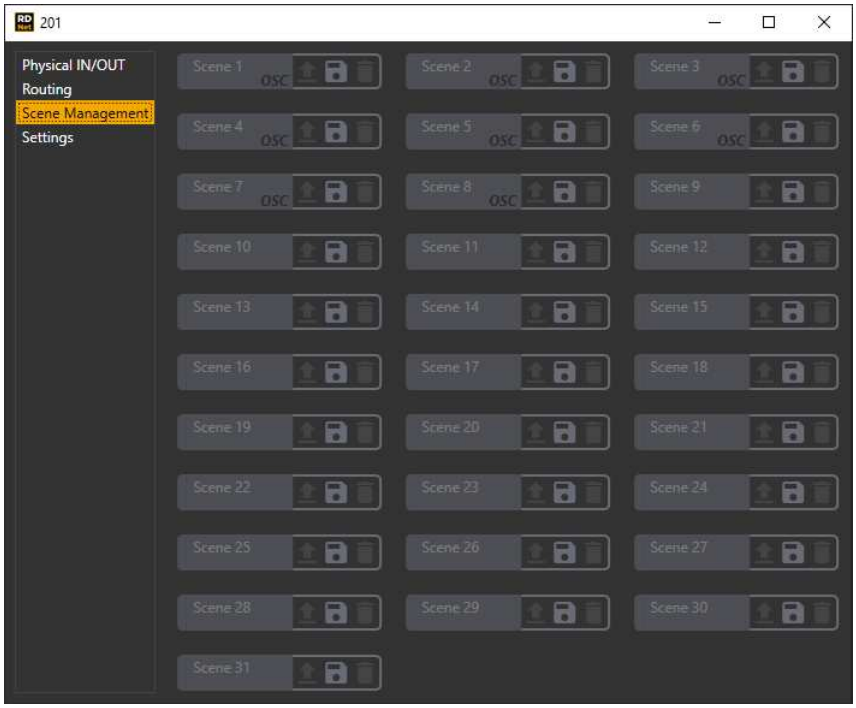
PHYSICAL IN/OUT

Set analogue and digital input and output configuration.

ROUTING

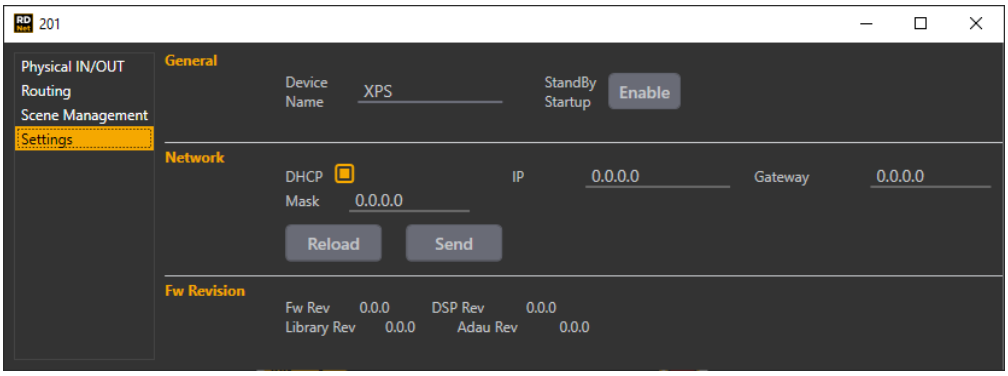
Set, for each output, main and backup inputs parameters, and routing strategy.

SCENE MANAGEMENT



Save, load or delete user-defined scenes.

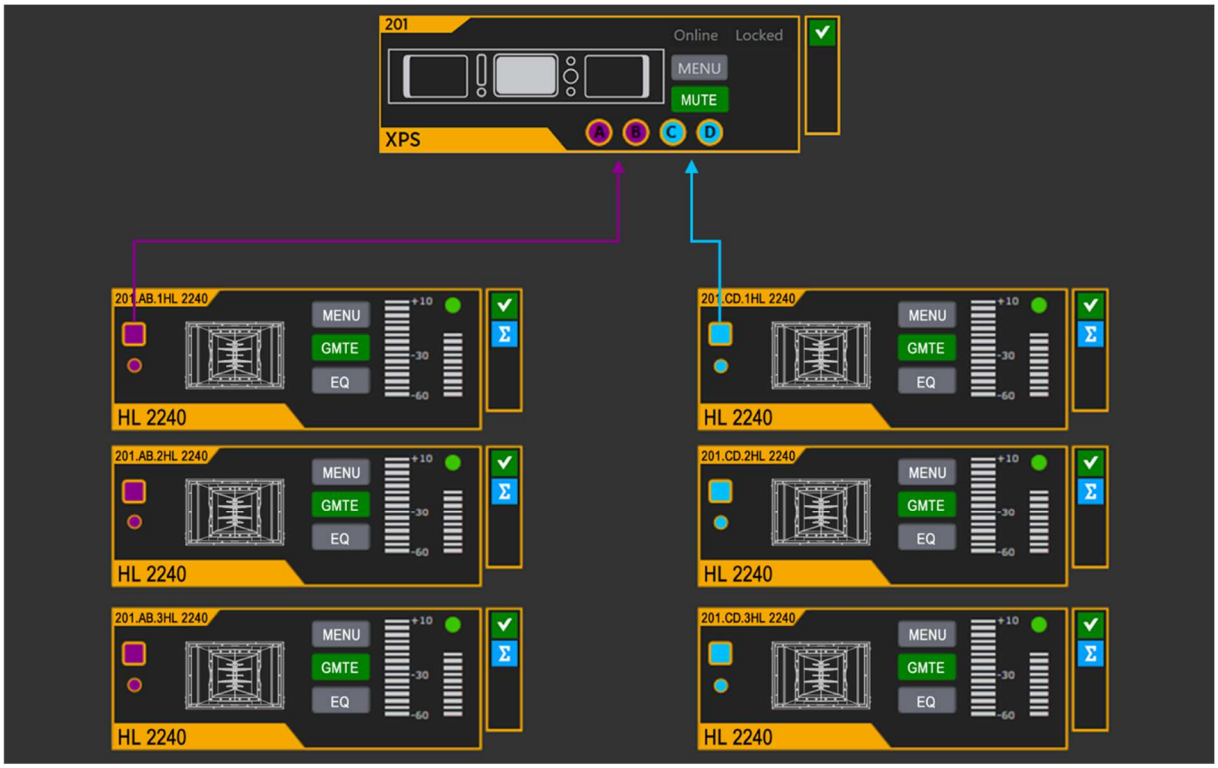
SETTINGS



Set general (e.g. device name) and network configuration parameters.

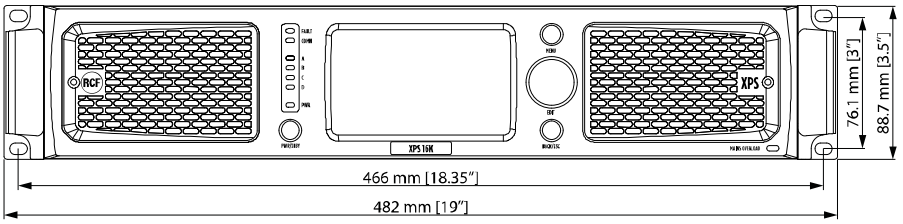
Speakers can be dragged and dropped in the synoptic and connected to amplifier.

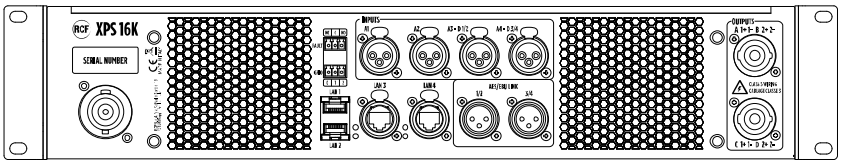
XPS 16K's channels will be assigned automatically depending on the specific speaker.

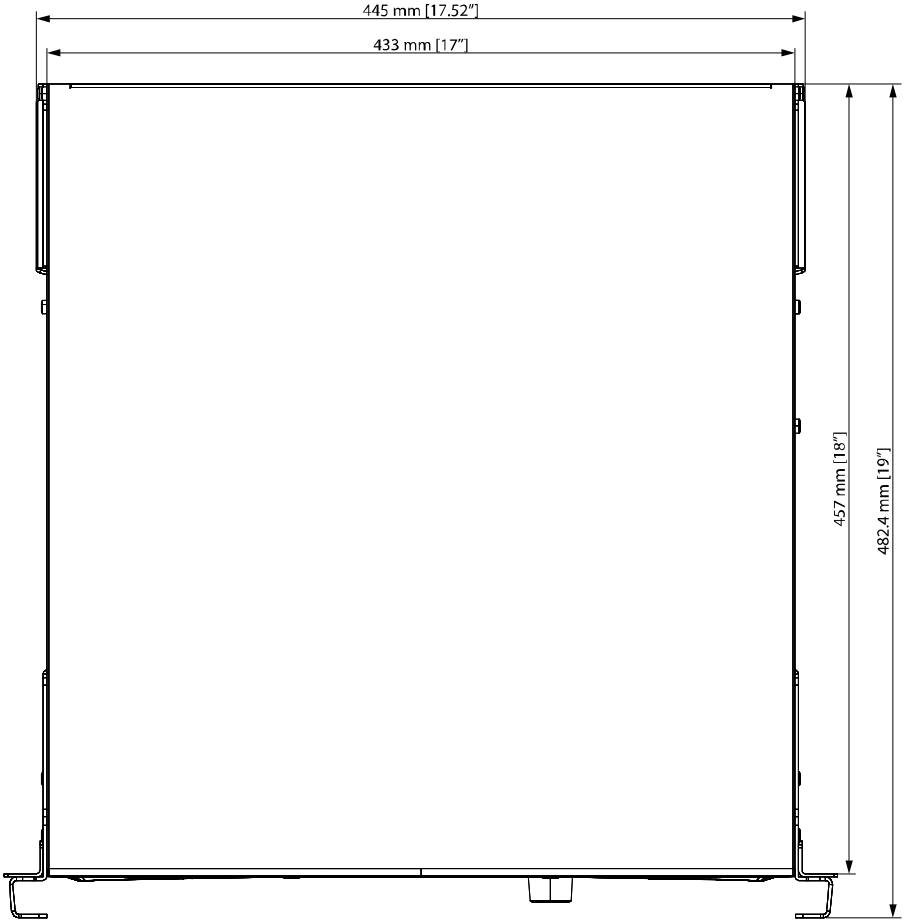


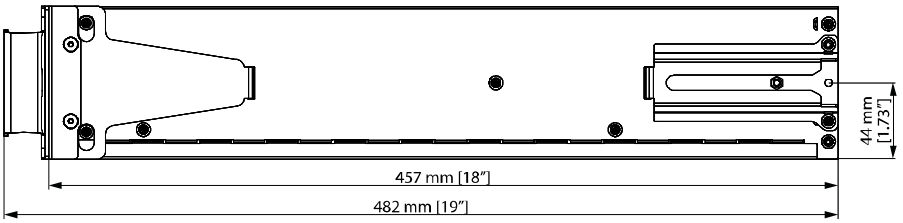
Then, speakers' objects can be open to access the setup menu.

DIMENSIONS


76.1 mm [3"]
88.7 mm [3.5"]
466 mm [18.35"]
482 mm [19"]


XPS 16K
SERIAL NUMBER


445 mm [17.52"]
433 mm [17"]
457 mm [18"]
482.4 mm [19"]


44 mm [1.73"]
457 mm [18"]
482 mm [19"]

TECHNICAL SPECIFICATIONS

Amplifier specifications	
Amplifier Class:	D
Output power (EIAJ 8:32 all channels driven):	4 x 4000 W @ 2.7 ohm
	4 x 2600 W @ 4 ohm
	4 x 1400 W @ 8 ohm
Frequency Response (-3dB):	20 Hz ÷ 23000 Hz
SNR (unweighted)	
Analog inputs:	111 dB
Digital inputs:	115 dB
Crosstalk:	<70 dB
THD+N (20 Hz ÷ 20000 Hz, 1000 W @ 4ohm):	<0.2 %
Gain (linear mode @ 0 dB):	32 dB
Damping factor (@ 4 ohm, 20 Hz ÷ 1500 Hz):	> 95
Max burst length (@ 50 Hz, CF = 7 dB, 4 ohm, 1% THD+N):	200 ms
Input section	
Total number of inputs:	8 / 16 (XPS 16KD)
Line inputs:	4
Line connectors:	XLR
Input impedance:	19 kohm (unbalanced)
Maximum input level:	+24 dBU
Digital inputs:	4 / 12 (XPS 16KD)
Digital connectors:	Ethercon, XLR
Digital type:	4 AES/EBU, 8 DANTE (XPS 16KD)
General Purpose Inputs (GPI):	2
Programmable GPI:	Yes
Photo-coupled GPI:	Yes
Output section	
Signal output number:	4
Signal output connectors:	XLR
Power output lines:	4
Power output connectors:	Speakon
General Purpose Outputs (GPO):	3
Programmable GPO:	Yes
Processing	
Digital Signal Processing (DSP):	2 SHARC, 40-bit floating point, 96 kHz
	2 ADAU 1442, 32-bit fixed point, 96 kHz
EQ Filters:	Peaking, HI/LO-shelving, HI-pass, LO-pass
Advanced algorithms:	FiRPHASE technology, BASS shaper, air compensation, mid-low correction, driver excursion control, dynamic PEQ, multi-band compressor, pilot tone & AES detection, backup recovery strategy, impedance load measurement
Compressors:	RMS limiter, dynamic compressor, power limiter, thermal compressor
Delay:	0 ÷ 4000 ms (each channel)

Configuration and control	
Configuration:	Front panel touch screen, PC Software
Speakers' presets:	RCF presets library
Control and monitoring protocols:	Proprietary OSC based protocol, RDNet
Network:	Gigabit ethernet
Protections	
Protections:	Forced cooling, short circuit, thermal, DC, Fuses, VHF (Very High Frequencies)
Thermal	
Temperature range	
Continuous operation:	-5°C ÷ +40°C / +23°F ÷ +104° F
Reduced output power:	-5°C to +50°C / +23°F to +122°F
Fan noise idle:	<35 dBA
Fan noise max:	<64 dBA
Power supply	
Operating voltage:	90-240 V~ 50/60Hz
Nominal current requirements (@ 100-120 V):	30 A
Nominal current requirements (@ 100-120 V):	16 A
Power consumption standby:	20 W
Power consumption idle:	90 W
Power consumption max:	5800 W
Mains fuse:	Internal
Standard compliance	
Marking:	CE, UL
Physical specifications	
Cabinet/Case Material:	Metal
Handles:	2 metal handles for rack mount
Color:	Black
Rack mounting:	19", 2U
Size	
Height:	88.7 mm / 3.49 inches
Width:	482 mm / 18.98 inches
Depth:	482.4 mm / 18.99 inches
Weight:	15 kg / 33.07 lbs

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10307699 B
Tel +39 0522 274 411 - Fax +39 0522 232 428 - e-mail: info@rcf.it - **www.rcf.it**