OUTLINE®

Operating Manual

TTM Series

Multi-purpose Amplifier Platform

[•-] sound vision.

TTM Series Operating Manual
Version: 2.1
Release date: 2023/12/22
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Refer all servicing to qualified personnel, through your Outline dealer.

Important Safety Instructions.

Safety Warnings.

Common symbols and meanings

THE TRIANGLE WITH THE LIGHTNING BOLT IS USED TO ALERT THE USER TO THE RISK OF ELECTRIC SHOCK.

THE TRIANGLE WITH THE EXCLAMATION POINT IS USED TO ALERT THE USER TO IMPORTANT OPERATING OR MAINTENANCE INSTRUCTIONS.

THE CE-MARK INDICATES THE COMPLIANCE OF THE PRODUCT TO ALL THE APPLICABLE EUROPEAN DIRECTIVES

SYMBOL FOR EARTH/GROUND CONNECTION.

SYMBOL INDICATING THAT THE EQUIPMENT IS FOR INDOOR USE ONLY.

SYMBOL FOR CONFORMITY WITH DIRECTIVE 2012/19/EC OF THE EUROPEAN PARLIAMENT ON WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE).

	OPERATING TEMPERATURE RANGE: 0° C TO +50° C - DERATING ABOVE 35° C
	STORAGE RELATIVE HUMIDITY RANGE: 10% TO 90% HUMIDITY (NON CONDENSING).
	DO NOT USE THE UNIT AT ALTITUDES ABOVE 2000 M.
	DO NOT USE THE UNIT IN TROPICAL ENVIRONMENT.
	TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT ATTEMPT TO OPEN ANY PART OF THE UNIT. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.
	CONNECTION TO THE MAINS SHALL BE DONE ONLY BY A ELECTROTECHNICAL SKILLED PERSON ACCORDING THE NATIONAL REQUIREMENTS OF THE COUNTRIES WHERE THE UNIT IS SOLD.
	DO NOT USE THIS AMPLIFIER IF THE ELECTRICAL POWER CORD IS FRAYED OR BROKEN.
	TO AVOID ELECTRICAL SHOCK, DO NOT TOUCH ANY EXPOSED SPEAKER WIRING WHILE THE AMPLIFIER IS OPERATING.
	DO NOT SPILL WATER OR OTHER LIQUIDS INTO OR ON THE AMPLIFIER.
	THIS DEVICE MUST BE POWERED EXCLUSIVELY BY EARTH CONNECTED MAINS SOCKETS IN ELECTRICAL NETWORKS COMPLIANT TO THE IEC 364 OR SIMILAR RULES
	DISCONNECT THE AC MAINS SOURCE BEFORE ATTEMPTING TO CLEAN ANY PART OF THE AMPLIFIER
	OUTLINE SUGGESTS TO PLUG THE TTM TO A 16 A RATING, C OR D CURVE, 10 kA SECTIONING BREAKER.
	OUTPUT TERMINALS ARE HAZARDOUS: WIRING CONNECTION TO THESE TERMINALS REQUIRES INSTALLATION BY AN INSTRUCTED PERSON AND THE USE OF READY MADE LEADS.
	PROPERLY FIT THE AC MAINS PLUG TO THE AMPLIFIER INLET. BEFORE POWERING THIS AMPLIFIER, VERIFY THAT THE CORRECT VOLTAGE RATING IS BEING USED.

	TAKE CARE TO LOCK THE OUTPUT TERMINAL BEFORE SWITCHING THE DEVICE ON.
	VERIFY THAT YOUR MAINS CONNECTION IS CAPABLE OF SATISFYING THE POWER RATINGS OF THE DEVICE.
	NO NAKED FLAME SOURCES SUCH AS LIGHTED CANDLES SHOULD BE PLACED ON THE AMPLIFIER.
	TO PREVENT INJURY, THIS APPARATUS MUST BE SECURELY RACK MOUNTED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS.
	THIS EQUIPMENT SHALL BE MOUNTED AT A MAXIMUM HEIGHT OF 2 M
	THE MANUFACTURER CANNOT BE HELD RESPONSIBLE FOR DAMAGES CAUSED TO PERSONS, THINGS OR DATA DUE TO AN IMPROPER OR MISSING GROUND CONNECTION.
	IT IS ABSOLUTELY NECESSARY TO VERIFY THESE FUNDAMENTAL REQUIREMENTS OF SAFETY AND, IN CASE OF DOUBT, REQUIRE AN ACCURATE CHECK BY QUALIFIED PERSONNEL.

Please read and keep all safety and use instructions.

This product is intended for installation by professional installers only! This document is intended to provide professional installers with basic installation and safety guidelines for this product in typical fixed-installation systems. Please read this document and all safety warnings before attempting installation.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this equipment near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Warranty and Technical Service

This product is covered by a limited warranty.

This Outline product contains no user-serviceable parts. All warranty repairs must be carried by a certified technician.

Contact The Authorized Service Center For Ordinary And Extraordinary Maintenance.
To learn more about warranty terms and conditions, visit outline.it/terms-of-use/

For any service related enquiry, please send an email to 'tech@outline.it'.

FCC COMPLIANCE NOTICE

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.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

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

WEEE DIRECTIVE

If the time arises to dispose of your product, please recycle all possible component.

This symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities for recovery and recycling. By separating this product from other household-type waste, the volume of waste sent to incinerators or land-fills will be reduced and natural resources will thus be conserved.

The Waste Electrical and Electronic Equipment Directive (WEEE Directive) aims to minimise the impact of electrical and electronic goods on the environment. Outline s.r.l. comply with the Directive 2012/19/EU of the European Parliament on waste electrical and electronic equipment (WEEE) in order to reduce the amount of WEEE that is being disposed of in land-fill site. All of our products are marked with the WEEE symbol; this indicates that this product must NOT be disposed of with other waste. Instead it is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor. For more information about where you can send your waste equipment for recycling, please contact your local distributors.

EC Declaration Of Conformity

We declare that under our sole responsibility the products:

Model Name: TTM 12K4+D, TTM 8K4+D
Intended use: Professional Audio Amplifier

Are in conformity with the provisions of the following EC Directives, including all amendments, and with national legislation implementing these directives:
2014/35/EU Low Voltage Directive
2014/30/EU Electromagnetic Compatibility Directive
2011/65/EU RoHs Directive

The following harmonized standards are applied:
EN 55032:2012,
EN 55032:2012/AC:2013
EN 55035:2017
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 61000-3-11:2000
EN 62368-1:2014
EN 62368-1:2014/AC:2015

Flero,
May 2022

Stefano Noselli
Production and purchase director

Preliminary Operations.

Package list.

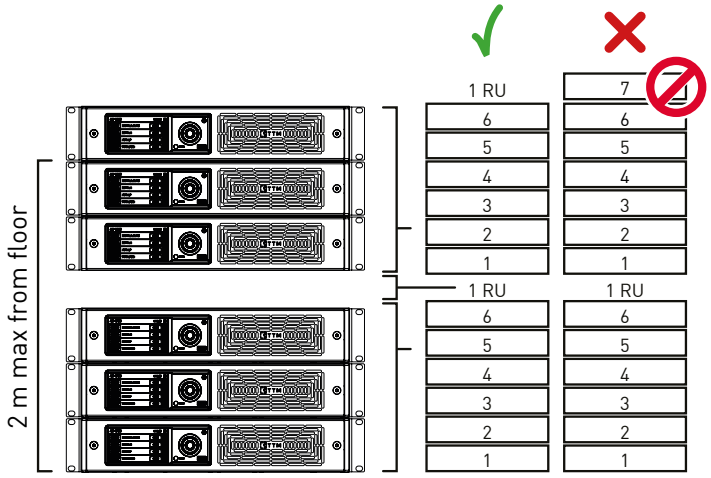
After unpacking the unit, check very carefully for any damage. If any damage is found, please notify your dealer.

The box contains the following:

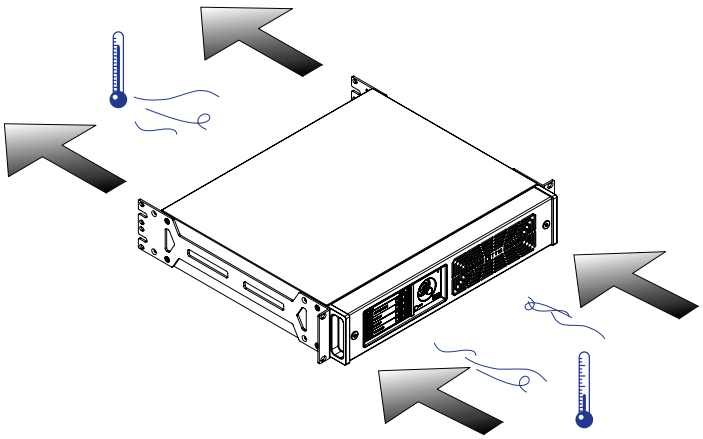
- 1x TTM Series amplifier
- 1x Power cord 3×1.5mm2 16A Type F
- 1x Power cord 3×1.5mm2 16A Type I
- 1x Power cord 16/3 SJT
- 1x User guide

Location.

- Install your TTM Series Amplifier in well ventilated rack cabinets at a maximum height of 2 meters above the floor.
- Secure both front and rear brackets to the rack.
- Connect the AC Mains connector to a circuit breaker.
- Install the amplifier far from EMF emitting devices.
- Avoid placing the amplifier close to heat generating sources.



Cooling.



Do not block the ventilation openings and allow a distance of at least 50 cm from the front and rear ventilation openings of the amplifier.

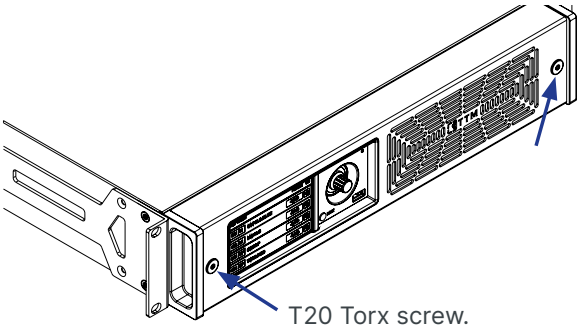
The TTM Series implements a forced-air cooling system to maintain constant operating temperatures. Air enters from the front panel and exits from the back of the amplifier.

The cooling system features variable-speed DC fans controlled by the heat sink mounted sensors. This ensures that fan noise and internal dust accumulation are kept to a minimum.

In the rare case of overheating, the amplifier is protected by limiting the output power to levels that can be sustained at the actual ambient temperature.

The TTM Series amplifiers can be stacked one on top of the other, but it is recommended to leave one rack unit empty every three amplifiers to guarantee adequate air flow.

Cleaning.



Use a dry cloth for cleaning the chassis and the front panel. Air filter cleaning should be scheduled in accordance with the dust levels in the amplifier's operating environment.

To remove the air filter, detach the front metal cover by unscrewing the two T20 Torx screws (visual instructions shown below).

Use compressed air to remove dust from the filter or wash it with clean water (let it dry thoroughly before reinstalling).

AC Mains supply.

The TTM Series amplifiers implement a universal switching mode power supply, with power factor correction operating in the range from 100 V_{AC} up to 240 V_{AC} (±10%).

AC mains connection can be found in the rear panel through the IEC C20 inlet. The approved power cord is provided.

Connections.

Signal grounding.

There is no ground lift switch or terminal on the TTM Series amplifier. To minimise hum and/or interference entering the signal path, always use balanced input connections. For safety, the unit MUST always operate with the electrical safety earth connected.

Input and Output connections.

Input connections

- 4x Analog inputs (XLR female)
- 2x Stereo AES3 inputs (XLR female)
- 4x Dante/AES67 inputs (EtherCon)

Output connections

- 4x Amplified outputs (NL4 speakON)
- 4x Analog Link Out connectors (XLR male)
- 2x AES3 Link Out connectors (XLR male)
- 4x Dante/AES67 outputs (EtherCon)

Digital audio connection.

Digital audio is supported via AES3 (AES/EBU) and Dante™ standard protocols. The AES3 connectors accept input channel pairs through a single balanced XLR cable.

The TTM Series amplifiers offers two Ethercon ports supporting a total of 4-in and 4-out Dante/AES67 channels. Users can configure the amplifier to operate at one of the following three modes: 2-in x 2-out (at 96kHz), 4-in x 4-out (at 48kHz - default), 4-in x 0-out (at 96kHz). This operation is done under the amplifier Dante settings in ArmoníaPlus.

A computer running the software application Dante Controller™ can be used to configure the Dante properties of TTM Series amplifiers, which are automatically discovered and displayed in Dante Controller™ with the default identifier: AMP-XXXXXX, where 'XXXXXX' is the MAC address of the Dante interface.

Link Out connectors.

There are in total six Link Out connectors directly connected to the amplifier's analogue and AES3 inputs.

The four Link Out connectors linked to inputs 1 to 4 are simple passive THRU connections. The other two Link Out connectors are fault-tolerant active repeaters for the AES3 inputs. When the amplifier is on, they actively repeat the AES3 input signal. If power is lost, an internal relay is switched causing these connectors to work as simple passive THRU connections.

Basic Operations.

Switching the amplifier On.

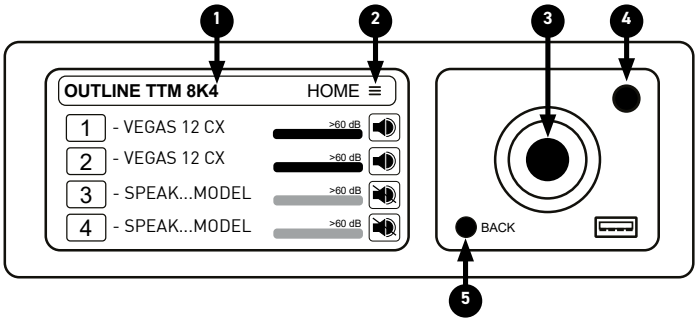
To turn on the amplifier, simply connect it to the mains power with the provided power cord. The time between power on and passing audio is under 10s for analogue sources. Time is longer with Dante sources (about 22 seconds), as the network is rebooted and patching remade.

Once the device is on, it is possible to manually put it in standby mode. Further information is detailed below in a dedicated section called 'Power Off'.

Front panel controls.

The front panel comprises a multitouch capacitive display (1), a rotary encoder with pushbutton (3), a power status LED (4), and a 'Back/ArmoníaPlus Callback pushbutton (5). Users can select what parameters to control and navigate through the different display options and pages available, by touching the screen, rotating and pushing the rotary encoder, or pushing the 'Back' button. Control of some specific parameters, such as output level and delay, are only possible by rotating the encoder.

From the main menu (2), it is possible to access all the different pages from where control operations can be performed.



Home.

The Home page displays the amplifier's output channels, their level, and the speaker presets assigned to them. From this page, it is also possible to mute/unmute the outputs by clicking the respective loudspeaker icons 🔊.

Level and Delay.

The Level and Delay pages allow the control of the amplifier output levels and delay times. Once in one of the two pages, click on any given output and adjust the level or delay by turning the rotary encoder. When an output is selected, the white LED behind the encoder will light up, indicating that the parameter can be altered.

Note that it is possible to select multiple outputs at the same time and simultaneously control their relative levels and delay. Selected outputs will display a check mark ✓ next to the speaker preset name.

Clicking the 'Set Step Size' button on the top of the display, allows the selection of the change steps to be applied when rotating the encoder, if finer adjustments are necessary. Level change steps can be set from 1dB (default) to 0.1dB, while delay steps can be from 10ms to 0.1ms (default is 1ms). For the delay controls, it is also possible to select between metric (m) or imperial (ft) systems.

Matrix.

The TTM amplifier series has an internal 4 × 4 mixing matrix. The Matrix page shows the internal matrix outputs and the matrix inputs that are routed to them. It is possible to change the routing by clicking on one of the 'INPUT' labels and selecting a new input from the list. These can be any of the four matrix inputs, or a mix of input channels 1 + 2, or channels 3 + 4.

Other routing and mixing configurations can be achieved from ArmoníaPlus. In such cases, the TTM will display 'CUSTOM' in the input label.

Source select.

The Source page shows what amplifier input sources are active in each of the 4 internal matrix inputs. These sources can be any of the 4 amplifier analogue inputs, AES3 or Dante inputs.

Manual selection of different sources, as well as configuration of an automatic backup selection based on signal presence, can be achieved from ArmoníaPlus.

Snapshots.

Snapshots are full amplifier configurations that can be saved onboard of the device, and later recalled when necessary. In the Snapshots page, it is possible to load up to 50 different amplifier configurations that have been previously saved onboard using ArmoníaPlus. To load a new snapshot to the amplifier, scroll through the list, select one of the snapshots available, and click the 'Load' button at the bottom of the screen.

Out config.

The Out Config page allows quickly bridging the amplifier's outputs 1 and 2, and/or outputs 3 and 4. Simply click the 'Bridge' button to perform the operation, and 'Unbridge' to revert to the default configuration.

When n-way loudspeaker presets have been load to n-speaker channels, a new button labelled 'Split' will show up in this page. It is possible to split the ways for individual configuration and control by clicking this button.

Speaker preset.

From the Speaker Preset page, it is possible to load different loudspeaker presets to the amplifier's outputs. To load a new preset, click the gear icon, and scroll through the different families, models, and speaker applications. If the preset has been successfully loaded to the output channel, its name will show in the Speaker Preset page.

Net config.

The Net Config page displays the settings for the amplifier control and Dante network configurations. To scroll between the amplifier and Dante settings, use the arrows ▶. Clicking the gear icon ⚙, in one of the two pages, opens the IP configurations, from where it is possible to set the amplifier or the Dante network to Auto (default) or Static IP, and reset the network configurations to the default settings.

Node info.

The Node Info page displays general amplifier information, such as its serial number, operating temperature and mains voltage, firmware versions, and ethercon ports configuration.

From this page it is also possible to access some additional amplifier settings by clicking the gear icon. These settings are as follows:

Lock LCD – allows the user to set a password and subsequently locks the front panel display. When trying to perform any operation, the user will be requested to insert the password to unlock the screen.

Remove Groups – removes the amplifier from all EQ groups that have been previously created using ArmoníaPlus. Group EQ settings will be lost under this operation.

Factory Default – sets the amplifier to the factory default settings. Snapshots saved onboard are not deleted.

LCD Brightness – adjusts the brightness of the front panel display.

Auto Fade – allows different screen on/off options, where 'Always On' never turns the screen off, 'Auto Fade' causes the screen to operate at lower brightness after 30s of not being used, and 'Auto Off' causes the screen to automatically turn off after 30s of not being used. A simple touch to the screen brings it back to its normal operation status.

Power Off.

From the Power Off page, it is possible to manually put the amplifier in standby mode by clicking the 'Power OFF' button. Pushing and holding the rotary encoder for 4s also triggers the standby mode.

The power status LED (4) is green when the amplifier is ON and becomes red when the amplifier is in standby mode.

Once the amplifier is in standby, to turn it back on, simply touch the screen or push the rotary encoder, and select 'Power ON'.

FW update.

Amplifier and Dante firmware updates can be performed via ArmoníaPlus. During the firmware update, the display will show the message 'Updating Firmware', and a status bar will show the progress through the various phases.

Networking.

The TTM Series amplifier supports Dante networking. The two-gigabit ports are internally connected via a Gigabit switch to simplify wiring and eliminate the need for external network switches in small systems. Control and Dante audio are available in both ports by default.

This configuration can be checked from the front panel screen under Node Info > ETH 1/ETH2.

Note: the TTM does not support Dante redundancy, therefore, do never connect two EtherCon ports to separate primary and secondary Dante networks simultaneously.

IP addressing.

The factory default network configuration is AUTO IP/DHCP.

STATIC IP policy can also be adopted and configured through ArmoníaPlus or the screen panel (see 'Net Config' section).

If a DHCP server is not active in the network, the amplifier platform initiates an auto-configuration with a local numeric network address (of the type 169.254.X.Y and subnet mask 255.255.0.0).

It is recommended to always turn on the DHCP server before connecting the amplifiers.

ArmoníaPlus.

ArmoníaPlus System Manager is the default interface that allows setting and customisation of the TTM Series amplifiers. Note that whenever the TTM is connected to ArmoníaPlus, the front panel display operations are disabled.

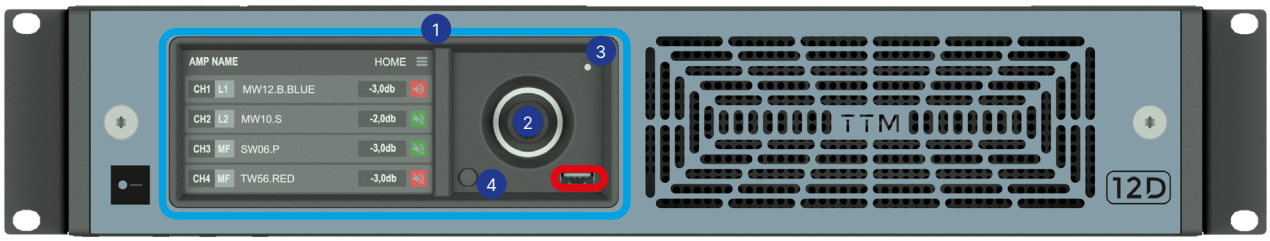
ArmoníaPlus can be installed on a PC running Windows (XP SP3 and higher).

For a successful connection, both ArmoníaPlus and the TTM Series must belong to the same subnet.

Download ArmoníaPlus System Manager for free from the website:

https://www.powersoft.com/en/software/armoniaplus/

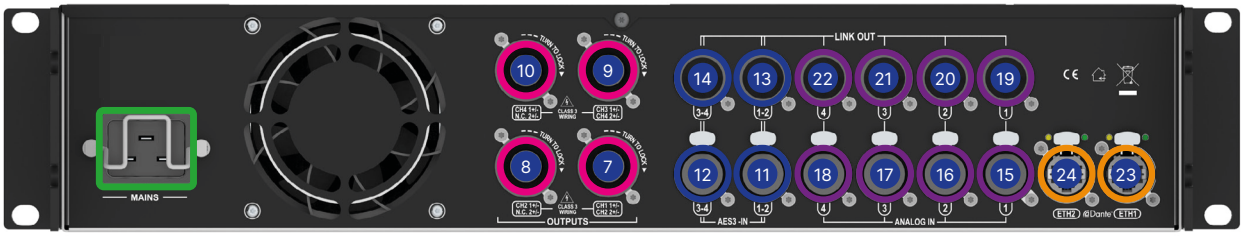
Front panel.



Control Panel	
1	Main Menu
2	Rotary encoder pushbutton
3	Power status LED
4	“Back/Armonía Callback” pushbutton

USB Port
Reserved for servicing purposes

Rear panel.



Output section	
7	CH1 (1+/-) | CH2 (2+/-)
8	CH1 (1+/-) | N.C. (2+/-)
9	CH3 (1+/-) | CH4 (2+/-)
10	CH4 (1+/-) | N.C. (2+/-)

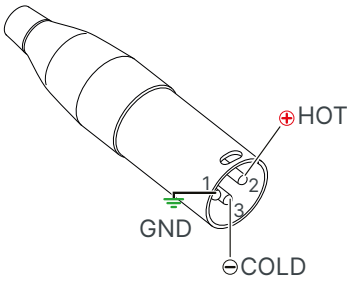
Output section	
11	AES3 In 1-2 (1GND/2+/3-)
12	AES3 In 3-4 (1GND/2+/3-)
13	AES3 Link Out 1-2 (1GND/2+/3-)
14	AES3 Link Out 3-4 (1GND/2+/3-)

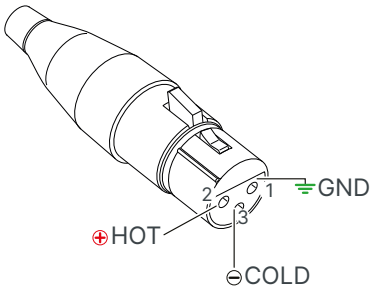
AC Mains Connector
IEC C19

Input section	
15	Input 1 (XLR-F)
16	Input 2 (XLR-F)
17	Input 3 (XLR-F)
18	Input 4 (XLR-F)
19	Link Out 1 (XLR-M)
20	Link Out 2 (XLR-M)
21	Link Out 3 (XLR-M)
22	Link Out 4 (XLR-M)

Network Connectors	
23	ETH 1 (RJ45)
24	ETH 2 (RJ45)

Pinouts.

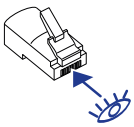


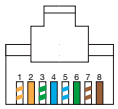


Analog/AES3 Input XLR-M pinout	
Pin #	**Terminal**
1	Ground (GND)
2	Positive (+)
3	Negative (-)

Analog/AES3 Link XLR-F pinout	
Pin #	**Terminal**
1	Ground (GND)
2	Positive (+)
3	Negative (-)

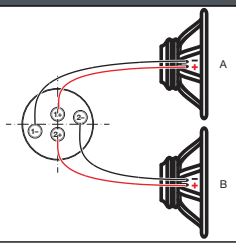
Network Connector RJ45 pinout

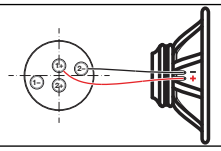


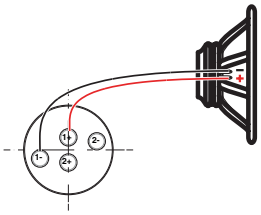


Color code (TIA/EIA-568-B)		Pin
	ORANGE / WHITE	1
	ORANGE	2
	GREEN / WHITE	3
	BLUE	4
	BLUE / WHITE	5
	GREEN	6
	BROWN / WHITE	7
	BROWN	8

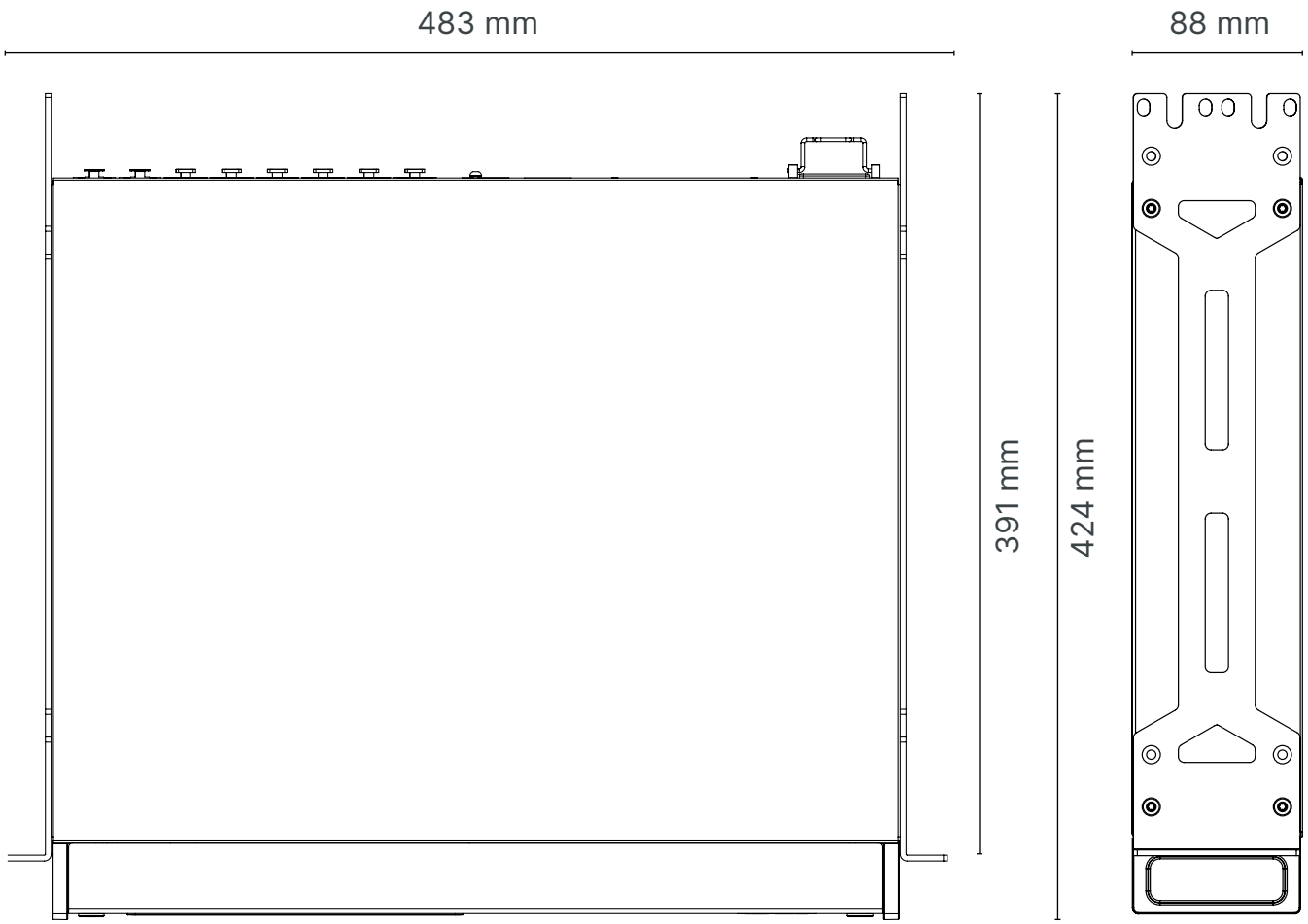
Output NL4 SpeakON-F pinout

Single Ended		
1+	Speaker A positive	
1-	Speaker A negative	
2+	Speaker B positive	
2-	Speaker B negative	

Bridged		
1+	Speaker positive	
2-	Speaker negative	

Even Channels (CH2 - CH4)		
1+	Speaker positive	
1-	Speaker negative	
2+	Not connected	
2-	Not connected	

Overall dimensions.



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[•-] sound vision.