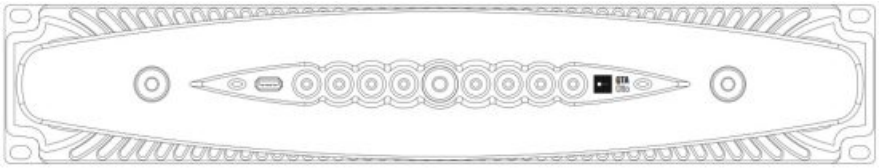
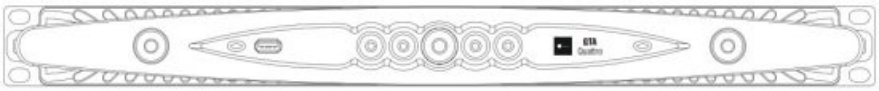
# OUTLINE GTA series Power Amplifiers Instruction Manual



**Operating Manual**
**GTA series**
**Power Amplifiers**
**GTA OTTO**



**GTA QUATTRO**



**DO000268.03**
**[•-] sound vision**

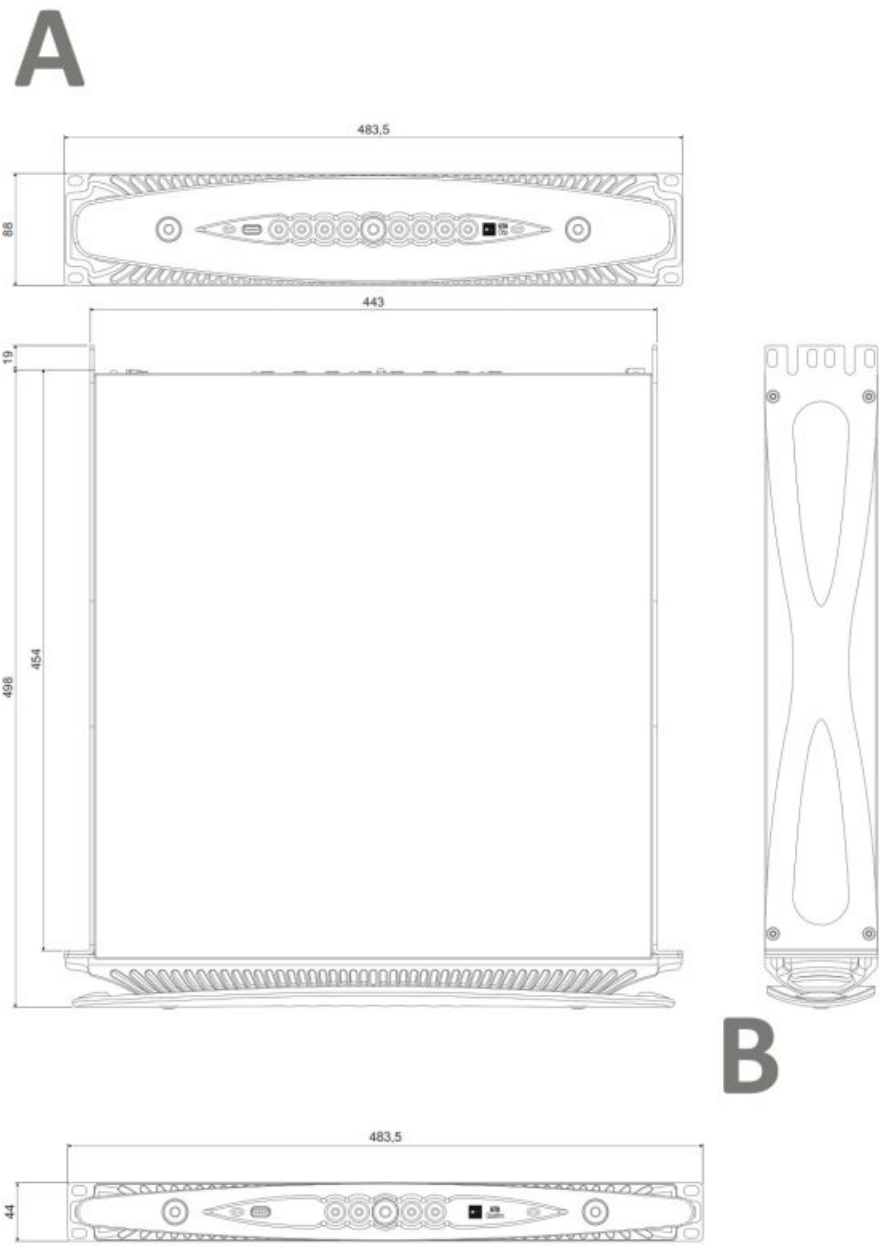
GTA Series Operating Manual
Version: 0300
Release date: 2024/11/14

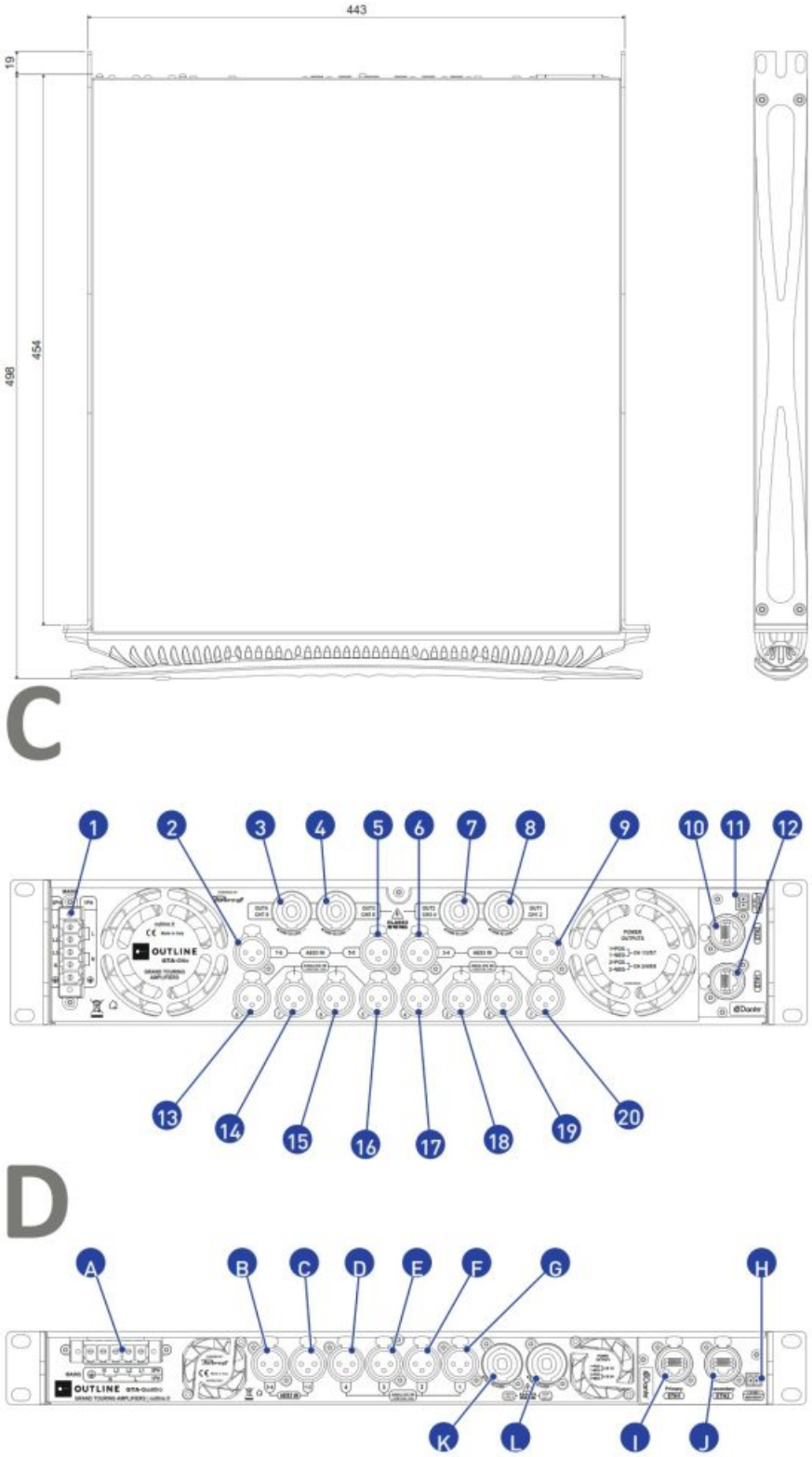
Refer all servicing to qualified personnel, through your Outline dealer.

Contents



# GTA series Power Amplifiers



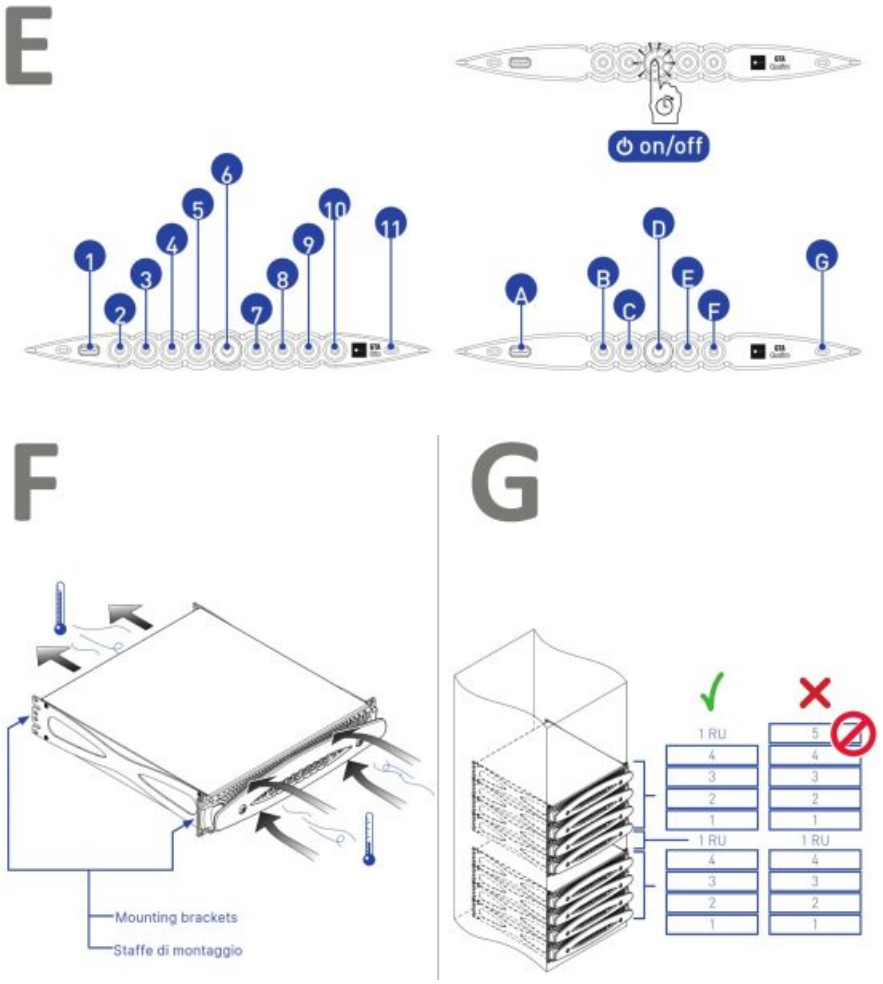



GTA Otto Rear panel

| | |
|---|---|
| 1. AC mains Phoenix connector<br>2. Input: channels 7 & 8 AES XLR<br>3. Output: channels 7 & 8 speakON<br>4. Output: channels 5 & 6 speakON<br>5. Input: channels 5 & 6 AES XLR<br>6. Input: channels 3 & 4 AES XLR<br>7. Output: channels 3 & 4 speakON<br>8. Output: channels 1 & 2 speakON<br>9. Input: channels 1 & 2 AES XLR<br>10. Ethernet: etherCON secondary port | 11. Remote ON/OFF Phoenix connector<br>12. Ethernet: etherCON primary network<br>13. Input: channel 8 analog XLR<br>14. Input: channel 7 analog XLR<br>15. Input: channel 6 analog XLR<br>16. Input: channel 5 analog XLR<br>17. Input: channel 4 analog XLR<br>18. Input: channel 3 analog XLR<br>19. Input: channel 2 analog XLR<br>20. Input: channel 1 analog XLR |

GTA Quattro Rear panel

| | |
|---|---|
| A. AC mains Phoenix connector<br>B. Input: channels 3 & 4 AES XLR<br>C. Input: channels 1 & 2 AES XLR<br>D. Input: channel 4 analog XLR<br>E. Input: channel 3 analog XLR<br>F. Input: channel 2 analog XLR | G. Input: channel 1 analog XLR<br>H. Remote ON/OFF Phoenix connector<br>I. Ethernet: etherCON secondary port<br>J. Ethernet: etherCON primary port<br>K. Output: channels 3 & 4 speakON<br>L. Output: channels 1 & 2 speakON |



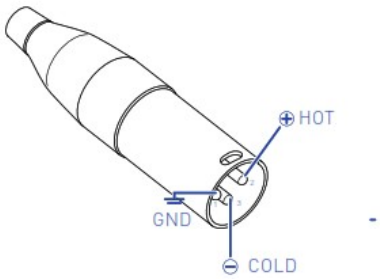

GTA Otto Front panel

| | |
|---|---|
| 1. USB port<br>2. CH1 Status LED and MUTE<br>3. CH2 Status LED and MUTE<br>4. CH3 Status LED and MUTE<br>5. CH4 Status LED and MUTE<br>6. Main on/off switch, status LED and MUTE ALL | 7. CH5 Status LED and MUTE<br>8. CH6 Status LED and MUTE<br>9. CH7 Status LED and MUTE<br>10. CH8 Status LED and MUTE<br>11. Armonía callback |

GTA Quattro Front panel

| | |
|---|---|
| A. USB port<br>B. CH1 Status LED and MUTE<br>C. CH2 Status LED and MUTE<br>D. Main on/off switch, status LED and MUTE ALL | E. CH3 Status LED and MUTE<br>F. CH4 Status LED and MUTE<br>G. Armonía callback |

# H



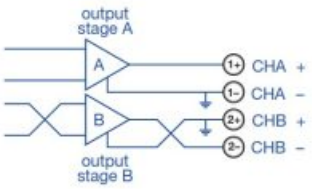

Input XLR-M pinout

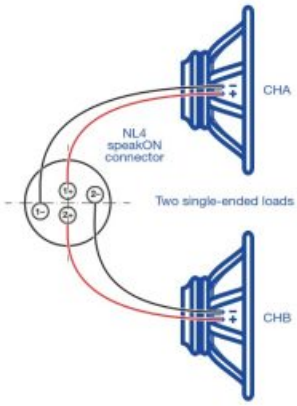
| | |
|---|---|
| Pin 1 | GND |
| Pin 2 | HOT ⊕ |
| Pin 3 | COLD ⊖ |

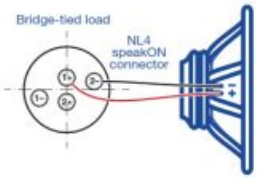
# I


| | | |
|---|---|---|
|  | ORANGE / WHITE | 1 |
|  | ORANGE | 2 |
|  | GREEN / WHITE | 3 |
|  | BLUE | 4 |
|  | BLUE / WHITE | 5 |
|  | GREEN | 6 |
|  | BROWN / WHITE | 7 |
|  | BROWN | 8 |

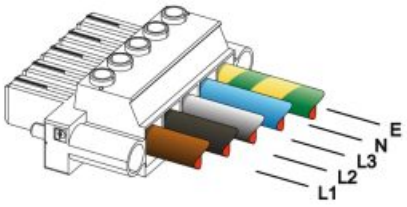
# J

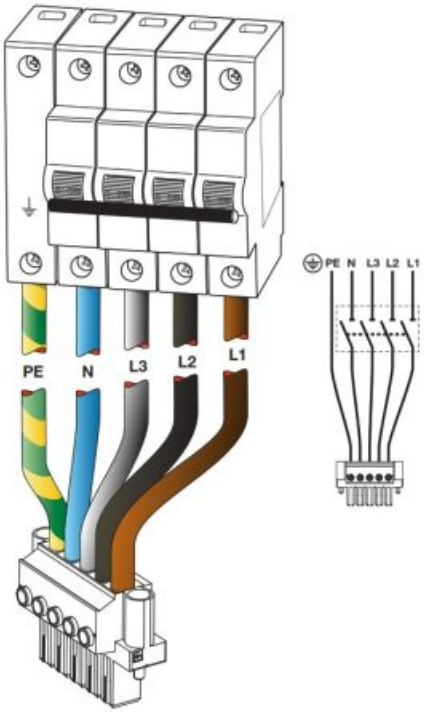

output
stage A
A
B
output
stage B
1+ CHA +
1- CHA –
2+ CHB +
2- CHB –


CHA
NL4
speakON
connector
Two single-ended loads
CHB

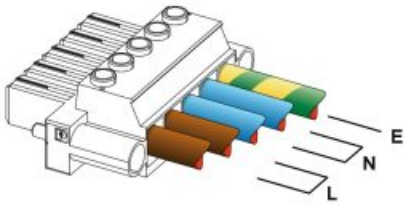

Bridge-tied load
NL4
speakON
connector

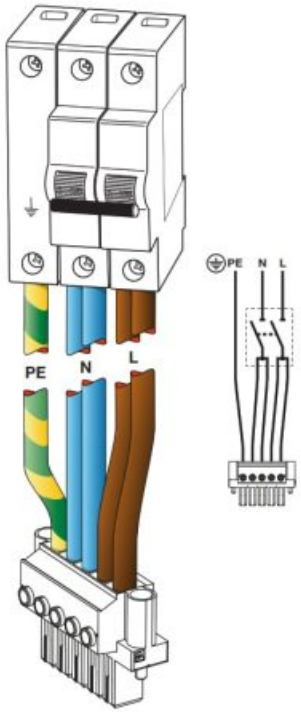
# K


E
N
L3
L2
L1

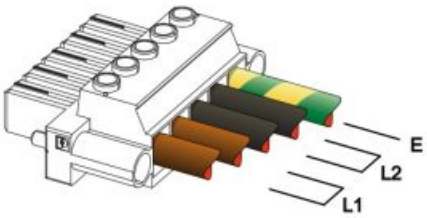

PE
N
L3
L2
L1
PE N L3 L2 L1

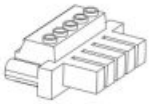
# L

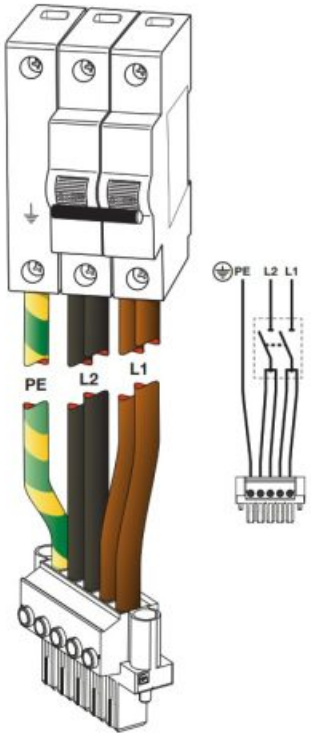

E
N
L


PE
N
L
PE N L

M N






Once properly wired, insert and lock the flying connector into the shell provided by Outline.

## Regulatory information

### 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.

**C A U T I O N :** 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. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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 ortelevision 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.
- Consult the dealer or an experienced radio/TV technician for help.

**WEEE DIRECTIVE**

If the time arises to throw away your product, please recycle all the components possible. 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 distributor.

**EC DECLARATION OF CONFORMITY**

CE

We declare that under our sole responsibility the products:
Model Names: GTA Otto, GTA Quattro
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:

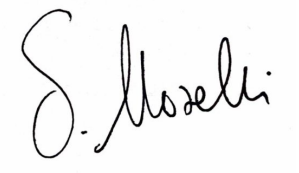
- 2014/35/EU Low Voltage Directive
- 2014/30/EU Electromagnetic Compatibility Directive
- 2011/65/EU RoHs Directive
- 2014/53/EU Radio Equipment Directive

The following harmonized standards are applied:

- EN 55032:2015,
- EN 55032:2015/A11:2020
- EN 55035:2017,
- EN 55035:2017/A11:2020
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 61000-3-11:2000
- EN 301 489-1 v1.9.2
- EN 301 489-17 v2.1.1

- EN 300 328 v2.1.2
- EN 301 893 v2.1.1
- EN 62368-1:2014
- EN 62368-1:2014/AC:2015

Release date: January 2022
OUTLINE SRL
Stefano Noselli – Production and Purchase Director



## Important safety instructions

### EXPLANATIONS OF GRAPHICAL SYMBOLS

 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 with the low voltage and electromagnetic compatibility. |
|  | Symbol for earth/ground connection. |
|  | Symbol indicating that the equipment is for indoor use only. |
|  | Symbol for conformity with Directive 2002/96/EC and Directive 2003/108/EC of the European Parliam ent on waste electrical and electronic equipment (WEEE). |
|   | Do not use the unit at altitudes above 2000 m. |
|  | Do not use the unit in tropical environment. |
|  | **WARNING:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT ATTEMPT TO OPEN ANY PA RT OF THE UNIT.<br>NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSON NEL. |
|  | DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE, DRIPPING OR SPLASHING LIQUI DS.<br>OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THIS APPAR ATUS. |
|  | THE UNIT MUST BE INSTALLED IN RACK CABINETS ONLY: PLUG THE AMPLIFIER'S MAINS CO NNECTIONS VIA A SECTIONING BREAKER TO A POWER DISTRIBUTION PANEL INSIDE THE R ACK CABINET. |
|  | THE SECTIONING BREAKER MUST REMAIN READILYACCESSIBLE. |
|  | WHEN THE UNIT IS INSTALLED IN A RACK CABINET, MAKE SURE THAT IT HAS SUFFICIENT SP ACE ON ALL SIDES TO ALLOW FOR PROPER VENTILATION (50 CM FROM THE FRONT AND RE AR VENTILATION OPENINGS). |
|  | CONNECTION TO THE MAINS SHALL BE DONE ONLY BY A ELECTROTECHNICAL SKILLED PER SON<br>ACCORDING THE NATIONAL REQUIREMENTS OF THE COUNTRIES WHERE THE UNIT IS SOLD . |
|  | **WARNING:**<br>FUSE ON NEUTRAL |

**CAUTION**
**RISK OF ELECTRIC SHOCK**
**DO NOT OPEN**

Electrical energy can perform many useful functions. This unit has been engineered and manufactured to ensure your personal safety. But IMPROPER USE CAN RESULT IN POTENTIAL ELECTRICAL SHOCK OR FIRE HAZARD.

In order not to defeat the safeguards incorporated into this product, observe the following basic rules for its installation, use and service. Please read these “Important Safeguards” carefully before use.

**Important safety instructions**

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 (including amplifiers) that produce heat.
9. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
10. Only use attachments/accessories specified by the manufacturer.
11. 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 tipover.

12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. 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.

## GTA Series

**2：1.Welcome**

Congratulations on buying an Outline GTA series amplifier! We know you are eager to use the GTA series amplifier platform, but please take a moment to read this quick guide and the safety instructions. In case you have any questions, please do not hesitate to contact your dealer or Outline.

Outline GTA series innovates the concept of amplifier platform: it implements a new system of channel routing, new power supply and a revolutionary full featured DSP. Outline GTA series natively supports AES3, two redundant Dante™ by Audinate® digital streams and analog inputs, providing up to 4 different selectable input sources per channel.

For system configuration and fine tuning, ArmoníaPlus™ offers an intuitive interface, a comprehensive control over the digital audio processing and complete real-time monitoring of the system performance.

Outline GTA series raises power amplification to a new standard of quality and usability: they suit any configuration, save space and weight and offer you the legendary Outline efficiency with new worldwide compatible multi-phase power supplies.

**2：2.Unpacking & checking for shipping damage**

Your Outline product has been completely tested and inspected before leaving the factory. Carefully inspect the shipping package before opening it, and then immediately inspect your new product. If you find any damage, notify the shipping company or reseller immediately.

The box contains the following:

- 1x GTA series amplifier.
- 1x AC mains PC 5/5-STF1-7,62 Phoenix plug
- 1x shell for the AC mains plug
- 1x quick guide

**2:3.Disposal of the packaging material**
The protective transport packaging has been selected from materials which are environmentally friendly for disposal and can normally be recycled.
Rather than just throwing these materials away, please ensure they are offered for recycling.

**2:4.List of image panels**
A. GTA Otto mechanical drawings: all dimensions in millimeters
B. GTA Quattro mechanical drawings: all dimensions in millimeters
C. GTA Otto rear panel
D. GTA Quattro rear panel
E. GTA Otto and GTA Quattro front panels
F. Mounting brackets and air flow direction
G. Rule for stacking amplifiers in closed racks
H. Input connector pinout
I. RJ45 Ethernet pinout
J. Loudspeakers wirings
K. Three-phase electric power: AC mains plug wiring
L. Single-phase electric power: AC mains plug wiring
M. Two-phase electric power: AC mains plug wiring
N. AC mains plug shield
O. Regulatory information

## Installation

**3:1.Location**
The intended use of GTA series amplifiers is in a rack only. The AC mains wirings of the units must be connected to a terminal box provided with a proper breaker (refer to §3:4.AC Mains supply for more details). It is not allowed to connect the GTA series AC mains connection directly to the power distribution system. For North America market we recommend to use an approved UL/CSA cable (i.e. ST 600Vac 105°C 5x13AWG).
In order to limit the risk of mechanical damages, the amplifiers must be fixed to the rack using both frontal and rear mounting brackets. We recommend to use eight M6 or 12-24 UNC-2B screws for threaded holes or cage nuts.
Install this amplifier as far as possible from radio tuners and TV sets. An amplifier installed in close proximity of such equipment may experience noise or generic performance degradation. Placing and using the amplifier for long periods of time on heat generating sources will affect its performance. Avoid placing the amplifier on heat generating sources.

**3:2.Cooling**
Install the amplifier in a well-ventilated location: the ventilation openings must not be impeded by any item such as newspapers, tablecloths, curtains, etc; keep a distance of at least 50 cm from the front and rear ventilation openings of the amplifier.
All Outline amplifiers implement a forced-air cooling system to maintain low and constant operating temperatures. Drawn by the internal fans, air enters from the front panel and is forced over all components, exiting at the back of the amplifier.
The amplifier's cooling system features "intelligent" variable-speed DC fans which are controlled by the heatsink temperature sensing circuits: the fans speed will increase only when the temperature detected by the sensors rises over carefully predetermined values. This ensures that fan noise and internal dust accumulation are kept to a strict minimum.
Should however the amplifier be subject to an extreme thermal load, the fan will force a very large volume of air

through the heat sink. In the extremely rare event that the amplifier should dangerously overheat, sensing circuits shut down all channels until the amplifier cools down to a safe operating temperature. Normal operation is resumed automatically without the need for user intervention.
GTA series amplifiers can be stacked one on top of the other due to the efficient cooling system they are equipped with.
There is however a safety limit to be observed: in case a rack with closed back panels is used, leave one rack unit empty every four installed amplifiers to guarantee adequate air flow (see Panel G, p. 7).

### 3:3.Cleaning

Always use a dry cloth for cleaning the chassis and the front panel. Air filter cleaning should be scheduled according to the dust levels in the amplifier's operating environment.

Disconnect the AC mains source before attempting to clean any part of the amplifier
In order to clean the vent filters you need to remove the front cover: never attempt to open any other part of the unit.
By means of a metric hex key #6, unscrew the two screws located on the left and right sides of the front panel, (see FIG. 1) gently lift the cover and remove the filter. You may use compressed air to remove the dust from filters, or wash it with clean water: in the latter case ensure that the filter is dry before reassembly.

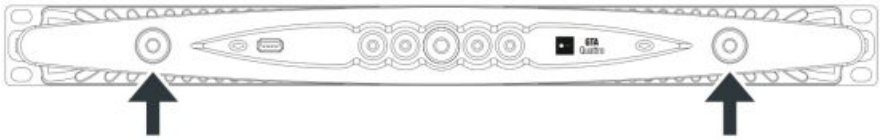


*FIG. 1: Use a #6 hex key to remove the front cover.*

### 3:4.AC mains supply

GTA series amplifiers offer worldwide AC acceptance and direct connection to any regional power line configuration. The power supply is now suitable to singlephase, two-phase or three-phase operation from 90 VAC up to 464 VAC without need of manual selection: true three-phase load balancing is directly achievable by the unit without any complex load assignment in the power distribution system design.
AC mains connection is provided by means of the euroblock Phoenix PC 5/5-STF1-7,62 flying plug (Phoenix product ID 1777862). Proper assembly of the AC mains conductors to the flying plug must respect the power line configuration.
Take care to connect any and all the five contacts of the flying plug to the power cords according to the configuration showed in Panel K, L, M at p. 10 and p. 11. In order to guarantee the proper connection we recommend to use an approved UL/CSA cable (i.e. ST 600Vac 105°C 5x13AWG).

This device must be powered exclusively by earth connected mains sockets in electrical networks compliant to the IEC 364 or similar rules.
Provide a sectioning breaker between the mains connections and the amplifier.

The proper device to use depends on mains configuration; for GTA Otto Outline suggests:

- single-phase AC (P+N+E): 32 A rating, C or D curve, 10 kA;
- three-phase AC (3P+N+E): 4 x 16 A rating, C or D curve, 10 kA.

For GTA Quattro Outline suggests:

- single-phase AC (P+N+E): 16 A rating, C or D curve, 10 kA;
- three-phase AC (3P+N+E): 4 x 10 A rating, C or D curve, 10 kA.

**NOTE:** The pictures and instructions on AC wiring refer to the European CENELEC standards April 2004 (IEC 60446) color code for conductor identification (see TAB. 1).

| Conductor | | Color | |
|---|---|---|---|
| Neutral or mid-point conductor | N | blue |  |
| AC phase conductors | L1 | brown |  |
| | L2 | black |  |
| | L3 | grey |  |
| Protective conductor (earth) | E | green/ yellow |  |

TAB. 1: Color code for conductor identification.

 AC mains connections must be performed only by professional or qualified personnel according to local electrical authoritie guidelines. 

**3:4.1. Three-phase electric power**
Each single conductor must be secured to the PC 5/5-STF1-7,62 flying plug as shown in Panel K, p. 10. In some instances neutral connection may lack: on three-phase systems neutral connection is not even necessary given the capability of the GTA series to work in delta connection.

**3:4.2. Two-phase electric power**
Balanced two-phase AC mains in the configurations 2P+E without neutral must be secured to the PC 5/5-STF1-7,62 flying plug as shown in Panel M, p. 11. Take care to double the phase wires at the connecting terminals of the sectioning breaker in order to guarantee the proper conduction gauge.

**3:4.3. Single-phase electric power**
P+N+E, unbalanced single-phase with neutral is the usual configuration for signle-phase AC mains; wiring must be configured as shown in Panel L, p. 10. Take care to double the phase and neutral wires at the connecting terminals of the sectioning breaker in order to guarantee the proper conduction gauge.

**3:5.Precautions regarding installation**

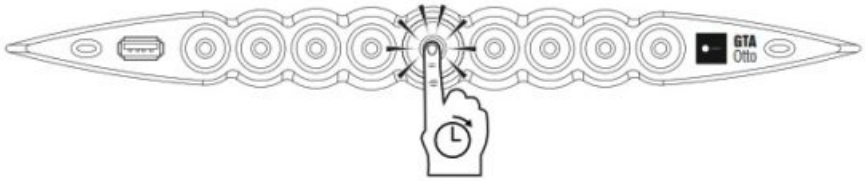
**WARNING:** TO PREVENT FIRE OR ELECTRIC SHOCK

- This device must be powered exclusively by earth connected mains sockets in electrical networks compliant to the IEC 364 or similar rules.
- Install the unit into rack cabinet only.
- A sectioning breaker between the mains connections and the amplifier must be installed inside the rack cabinet.
- Take care to properly lock each power cord wire to the flying connector Phoenix PC 5/5-STF1-7,62.
- Once properly wired, insert and lock the flying connector into the shell provided by Outline.
- Lock the flying connector to the amplifier inlet.
- Before powering this amplifier, verify that the correct voltage rating is being used.

- Verify that your mains connection is capable of satisfying the power ratings of the device.
- Do not use this amplifier if the electrical power cord is frayed or broken.
- Output terminals are hazardous: wiring connection to these terminals require installation by an instructed person and the use of ready-made leads.
- Take care to lock the output terminal before switching the device on.
- 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.
- No naked flame sources such as lighted candles should be placed on the amplifier.
- Do not remove the cover. Failing to do so will expose you to potentially dangerous voltage.
- The manufacturer cannot be held responsible for damages caused to persons, things or data due to an improper or missing ground connection.
- Contact the authorized service center for ordinary and extraordinary maintenance.

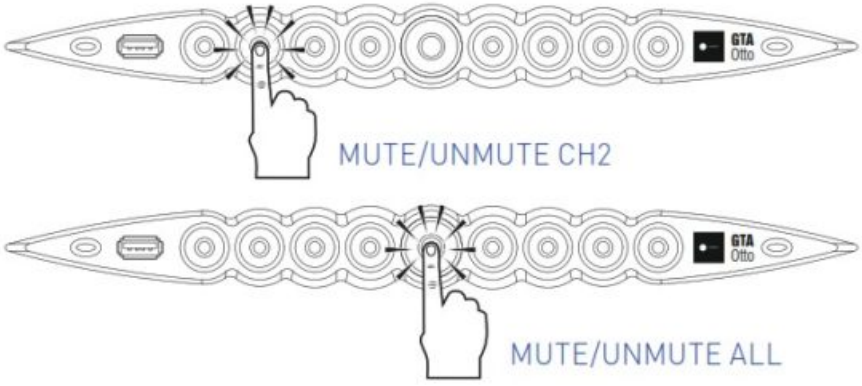
It is absolutely necessary to verify these fundamental requirements of safety and, in case of doubt, require an accurate check by qualified personnel.

**3:6.Switch on**
As soon as you connect the amplifier to the power grid, the amplifier's power supply will start supplying power to the auxiliary systems. The border of the central button starts blinking white: the amplifier is in standby mode.
A pressure on the central button will wake up the amplifier.




**3:7.Switch off**
Keep pressed the central button for 3 seconds to switch the amplifier off. The amplifier platform passes to the standby mode and the border of the central button blinks white.
The amplifier platform turns completely off only when the mains connector is unplugged.

**3:8.Mute**
A short pressure on the central button toggles MUTE/UNMUTE to all active channels: any previously muted channel will remain in mute status.
All other circular buttons (except the central one) toggle the MUTE/UNMUTE to the specified output channel.




**NOTE:** Please note that when the amplifier platform is linked and controlled by ArmoníaPlus™ all MUTE switches are locally disabled.

**3:9.Armonía callback**
In order to identify the unit in the Armonía Workspace, push on the rightmost button. Otherwise, if you click on Un/Blink from the contextual menu of the amplifier into the Armonía Workspace, all the front LEDs of the amplifier

will blink for a while.

## Connections

Make sure the power switch is off before attempting to make any input or output connections.
By using good quality input and speaker cables, the likelihood of erratic signal behavior is reduced to a minimum. Whether you make them or buy them, look for good quality wires, connectors and soldering techniques.

### 4:1.Signal grounding

There is no ground switch or terminal on the GTA series amplifiers. All shield terminals of input connections are directly connected to the chassis. This means that the unit's signal grounding system is automatic. In order to limit hum and/or interference entering the signal path, use balanced input connections.
In the interests of safety, the unit MUST always operate with electrical safety earth connected to the chassis via the dedicated Protective Earth wire.

### 4:2.Analog audio input connections

Analog input is provided by means of Neutrik XLR female connectors, one per channel input. Signal polarity of analog input connections is shown in Panel H, p. 9.

### 4:3.Digital audio input connections

Digital input is supported via AES3 (AES/EBU) and Dante™ standard protocols in Dante equipped devices. AES3 connectors are Neutrik XLR female, one per channel pair. The AES3 connection carries a channel pair through a 110 Ω nominal impedance wire in the form of a balanced (differential) digital signal: in AES3 XLR connectors the identification of hot and cold pins is not an issue; take care to never tie pin 2 or pin 3 (balanced signals) to pin 1 (ground). Avoid the use of microphone cables in AES connections: impedance mismatch can result in signal reflections and jitter, causing bit errors at the receiver.
In Dante equipped devices, Dante connectivity is supported via two Neutrik etherCON ports located on the rightmost side of the GTA Otto and GTA Quattro rear panels. Fast Ethernet (IEEE 802.3u, 100 Mbit/s) and Gigabit Ethernet (IEEE 802.3ab, 1 Gbit/s) network protocols are supported; Cat5e or Cat6 standard UTP twisted pair cables shall be used for connections up to 100 meters (328 ft).
Ethernet cabling must comply to TIA/EIA-568-B and adopt the T568B scheme pinout, as shown in Panel I, p. 9.

### 4:4.Output connections

 **CLASS 3 WIRING**

Output terminals are hazardous: wiring connection to these terminals require installation by an instructed person and the use of ready made leads. Take care to secure the output terminals before switching the device on.
Single-ended and bridge-tied loudspeaker connections are supported as shown in Panel J, p. 9.

### 4:5.Ethernet connections

GTA series amplifier platforms can be remotely controlled via an Ethernet connection through a personal computer and Powersoft ArmoníaPlus software.
Outline recommends the use of Ethernet Cat5 straight through – patch – cables with pin/pair assignments TIA/EIA-568-B, i.e. T568B, as shown in Panel I, p. 9.

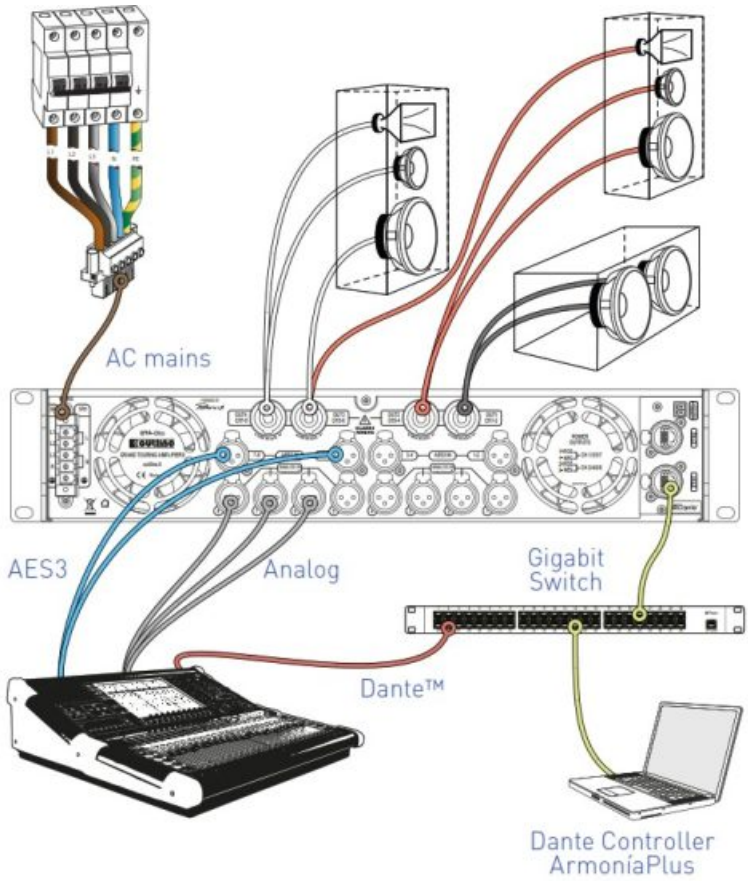
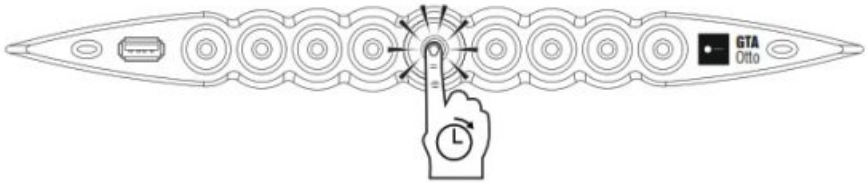


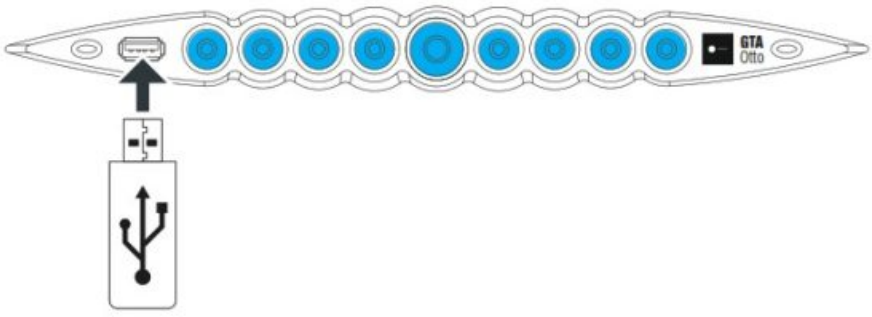

FIG. 2: Example of GTA Otto connections.

## Software update

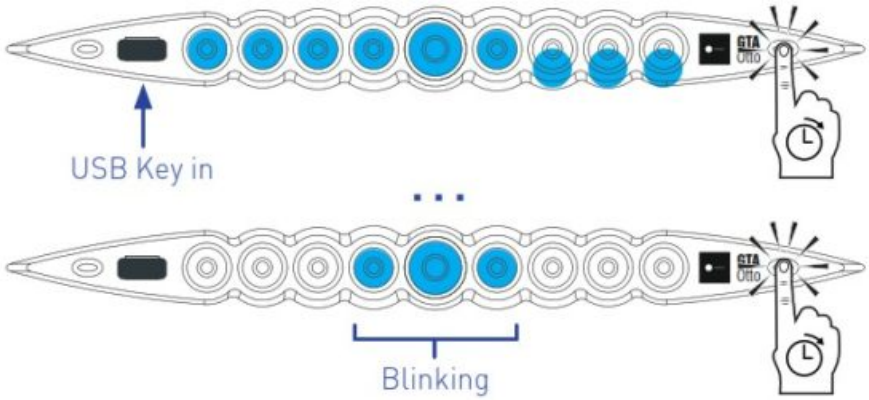
Outline GTA series amplifier platforms embed a complete digital audio signal management system based on ARM Cortex A-8 processor and TI C6000 DSP platform. This impressive on-board computing capacity is driven by a dedicated software environment.
Although the update is typically carried out directly from ArmoníaPlus, if necessary, it can be done using the following procedure. First, contact Outline (or your distributor) to obtain the file named
**update-version#-model.bin**
(e.g. update-v1.5.0.6-GTAQuattro.bin); in order to update the software of your GTA series amplifier platform you must store the software update file into a USB key and follow these steps:




1. Switch the amplifier on and wait for the completion of the boot sequence.




2. Plug the USB key with the software update file into the USB port on the front panel of the amplifier.




3. Keep pressed the rightmost pushbutton (Armonía callback) until the second beep is emitted and the LEDs start blinking.
4. Wait until the amplifier restarts and all front LEDs turn solid blue.

### LED chart

All circular back illuminated buttons provide status information. The CENTER of each channel button provides status information about the OUTPUT signal.

| **Center color OUTPUT indicators** | | | **Center color OUTPUT indicators** | | |
|---|---|---|---|---|---|
| color | | status | color | | status |
| | blue | Channel ready | | orange | MUTE OUTPUT |
| | yellow | Limiteractive | | orange blinking | MUTE INPUT |

The RING of each channel button provides status information about the INPUT signal.

| **Ring color INPUT indicators** | | |
|---|---|---|
| **color** | | **status** |
| | white blinking (center blue) | Input signal presence |
| | red | Input signal clipping |

Channel fault and Armonía callback are associated with the following LED signals.

| color | | status |
|---|---|---|
|  | red blinking (center and ring) | Channel fault |
|  | blinking / all channels (center and ring) | Unit answering to Armonía callback |

The central button light on when the system is in standby mode or in case of failure in the power supply unit:

| Ring color CENTRAL button | | |
|---|---|---|
| color | | status |
|  | white pulsing (all LEDs off) | System powered<br>Standby mode |
|  | red pulsing (normal operating) | fan fault detected<br>(output stage side fan) |

**Center color CENTRAL button**

| color | | status |
|---|---|---|
|  | red blinking | power supply or PSU fan fault detected |
|  | yellow blinking | power supply temperature protection active |

## Networking

GTA series amplifier platforms support linear daisy-chain, star and loop network topologies; in a daisy-chained network the PC with ArmoníaPlus must always be at one end of the chain.
Be aware that daisy-chaining does not guarantee reliability in production environment, since any fault may yield to network sectioning and loss of system control. When efficiency and reliability are aramount, a redundant network topology is advisable. In order to exploit the Dante features, only star and open daisy-chain network topology are allowed.

### 7:1.IP addressing

Factory default network settings are DHCP/AutoIP, in order for the amplifier platform to self-configure when connected to an existing LAN or PC. Fixed IP policy can also be adopted and configured through ArmoníaPlus. If a DHCP server is not active within the network, the amplifier platform initiates a stateless address autoconfiguration (i.e. Zero-configuration networking methodology – Zeroconf): it self- assigns a local numeric network address (of the type 169.254.x.y – 172.31.*.* for the secondary network if present – with a subnet mask 255.255.0.0) and automatically distributes and resolves the hostnames of networked devices. For setting a static IP address, please refer to the ArmoníaPlus user guide.

### 7:1.1.IP Addressing troubleshooting

When connecting the GTA series amplifier to a network environment it may happen that ArmoníaPlus does not

discover or import the amplifier. Usually this is a problem of IP addressing: both Armonia and the GTA series amplifier must belong to the same subnet. If a DHCP server is present in the network and a GTA series amplifier platform is in AUTO IP, networking may become unstable.
As a rule of thumb, turn the DHCP server on before connecting the amplifiers. IP addressing of a GTA series amplifier is established during the bootstrap: when the GTA series amplifier platform discovers a DHCP server in the network during the startup, it negotiates the networking parameters. If the GTA series amplifier platform does not reveal a DHCP server in the network during the startup, it sets itself in AUTO IP mode.

### 7:2.Dante™ networking

The Dante GTA series amplifier platforms support Dante redundant networking via the two etherCON ports on the rear panel:

- Primary/ETH1 is the Primary network port;
- Secondary/ETH2 is the Secondary network port.

Dante connectivity is always supported on the Primary/ETH1 Gigabit Ethernet port; the Secondary/ETH2 Gigabit Ethernet port offers continuity of operation when a parallel redundant network is established.

In order to implement a Dante network, a computer running Dante Controller has to be used. Dante Controller is a software application that manages devices in the network. GTA series amplifier platforms are automatically discovered and displayed in Dante Controller with the default identifier MODELNAME-SERIAL (e.g. GTA Otto-71520).

Dante networks will almost always require at least one network switch. Redundant infrastructures may require multiple switches. For maximum reliability, network switch shall:

- be Rated for Gigabit Ethernet;
- be Non-blocking;
- have Quality of Service (QoS) with at least four queues;
- have Diffserv (DSCP) QoS with strict priority;
- have EEE (Energy efficient ethernet) switched off.

For detailed information on setting up a switch, please refer to the manufacturer’s documentation.

#### 7:2.1. Redundant network configuration

Dante Redundancy can be set-up and used between any supporting Dante-enabled audio equipment: it works by using two completely independent and separate networks, the Primary Network and the Secondary

Network.

To setup and use Dante Redundancy, connect the GTA series amplifier platform and other redundant Danteenabled audio equipment using duplicate Gigabit switches and Ethernet cables. Connect your computer running Dante Virtual Soundcard and Dante Controller, and other non-redundant Dante-enabled audio equipment to the Primary Network.

The primary and secondary networks MUST NOT be interconnected at any point. Make sure any computer is set to automatically configure its IP address.

## ArmoníaPlus

ArmoníaPlus is the default configuring interface that allows system setting and customization of the GTA series amplifier platforms.
ArmoníaPlus can be installed on a PC running Windows (XP SP3 and higher). ArmoníaPlus is available for free from the Armonía website, where a startup guide and in depth tutorials are also provided: **https://armonia.powersoft.it/**
Once you've installed ArmoníaPlus, it is necessary to download the GTA plug-in from Armonía Marketplace. GTA series amplifier platforms can be connected to a PC running ArmoníaPlus through a Fast Ethernet connection. In order to start remote operation, the amplifier must be added into the ArmoníaPlus Workspace. Add the amplifier by selecting the family and model. The GTA series amplifier must then be matched by clicking on the Match section of the workspace, and then by clicking on "Discovery" to reveal any device which is available on the network. The callback button – located rightmost on the front panel of the amplifier – allows you to highlight the amplifier in the discovery panel.

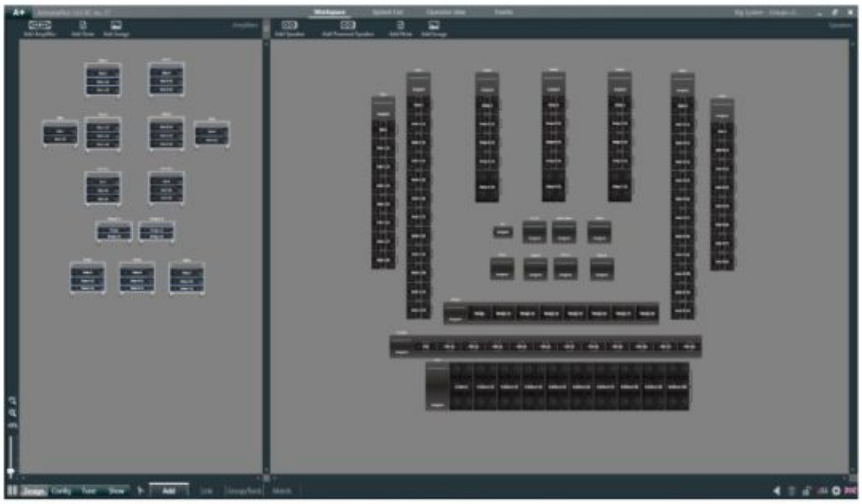


*FIG. 3: ArmoníaPlus.*

### 8:1.Signal routing and DSP architecture

Signal processing on Outline GTA series amplifier platforms accomplishes multiple functions that affect the audio signal before power amplification. The main adjustments include gain, polarity, delay, limiting and signal equalization; some processing functions are related only to particular stages, such as limiting and damping control that are implemented in the output section only, or input priority assignment available in the input section.

The processing architecture is composed of six sections:

- Input source selection. The input section allows you to manage input gain and delay of analog and digital sources, in order to compensate transmission latency and levels. Furthermore, the GTA series implements a backup policy aimed to improve reliability against signal fault. By assigning a bus priority to the four different input sources –analog, AES3 and two Dante streams – per channel, the system is able to automatically switch to a reliable input connection in case of any signal fault.
- Matrix. The innovative routing engine of GTA series allows any input to be routed to any output. The Matrix implements a non-Boolean routing architecture allowing free channel assignment and level adjustment.
- Advanced processing. This allows you to optimize levels and shape the sound of the input signals. Gain and polarity adjustment, asymmetric raisedcosine full parametric filters, delay and mute are available on each channel routed to the speaker section.
- Speaker equalization. Designed to manage the configuration presets for multi-way systems, it implements FIR and IIR full parametric filters.
- Speaker routing. Once properly grouped, the output channels are presented to the matrix as speakers – a

single row representing a speaker (actually group of ways) – allowing a high grade of granularity in signal processing.

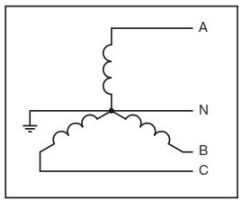
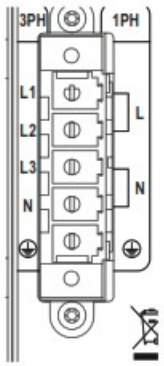
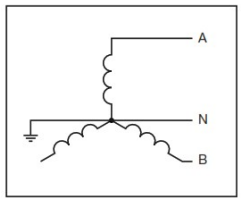
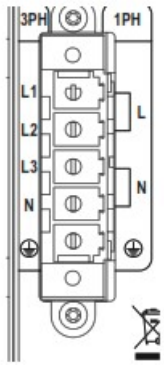
- Output processing. This allows fine-tuning of output signals, aiming to optimize power delivering and loudspeaker performance. It provides gain and polarity adjustment, IIR and FIR full parametric filters, delay, mute, limiting and damping control on each output channel.

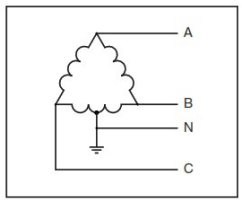
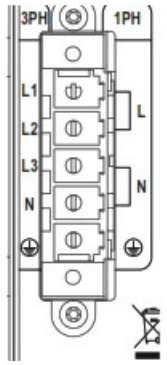
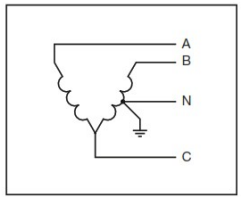
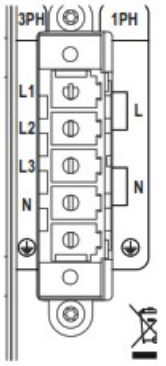
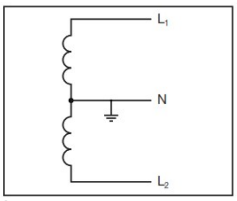
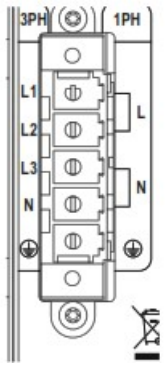
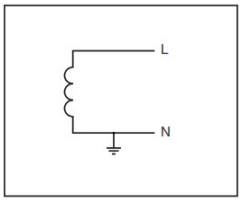
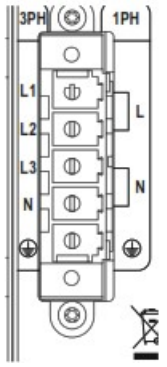
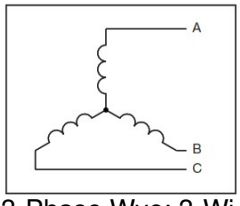
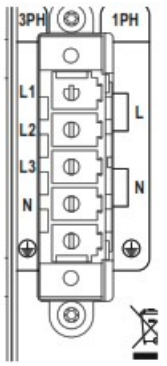
**8:2.Purposed workflow**

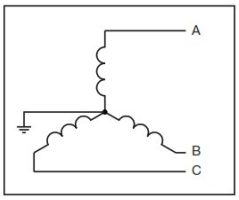
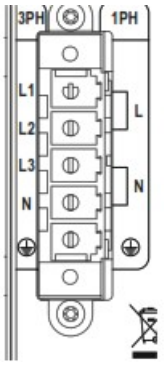
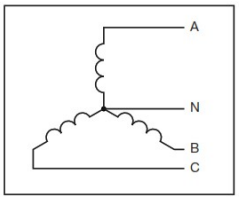
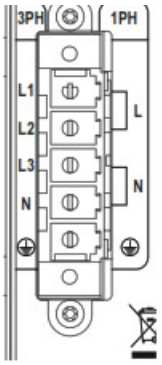
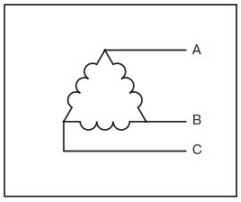
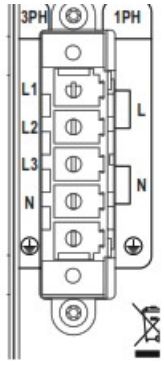
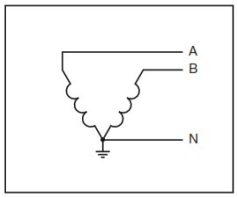
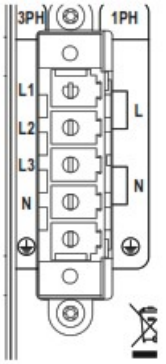
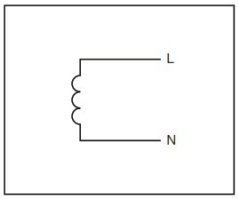
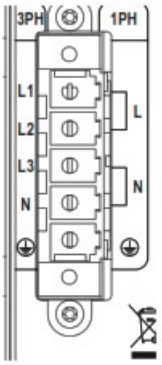
Once the loudspeaker layout has been defined, we suggest a bottom-up configuration procedure that starts from the configuration of the transducers layout and raises toward the input selection and the definition of the backup policy.
Shortly, the main steps to follow are:

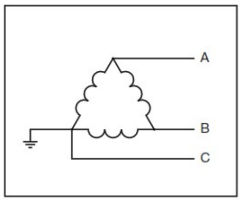
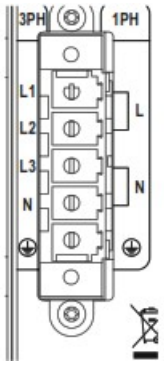
1. Load the loudspeaker presets or manually configure the loudspeaker layout (grouping output channels, crossovering, limiting, speaker processing, etc.).
2. Define the routing path and the levels of the signals from the input channels to the active output channels (matrix).
3. Select the signal source from the input connections and define the backup policy (input source selection).

## Appendix: GTA series Mains Wiring Option

| SL | CONNECTIONSYSTEM | CABLE WIRING | GTA series CONNECTOR | BREAKER CONNECTION |
|---|---|---|---|---|
| 1 |  3-Phase Wye: 4-Wire; Grounded Neutral and Contiguous Ground. | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>N ⑩ N<br>⏚ ⑩ ⏚ |  | |
| 2 |  2-Phase Wye: 3-Wire; Grounded Neutral and Contiguous Ground (typically called a single phase supply in North america). | A ⑩ $L_1$ // $L_2$<br>B ⑩ $L_3$ // N<br>N ⑩ n.c.<br>⏚ ⑩ ⏚ |  | Symbol “L1 // L2” (parallel connection) means connect the pole L1<br>together with the pole L2.<br>The parallel connection must be done at the breaker output and not at the connector level.<br>Symbol “n.c.” means not connected. |

| | | | | |
|---|---|---|---|---|
| 3 |  <br>3-Phase Delta: 4-Wire; Grounded at Midpoint pf Phase and Contiguous Ground | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>N ⑩ n.c.<br>⏚ ⑩ ⏚ |  | |
| 4 |  <br>3-Phase Open Delta: 4-Wire; Grounded at Midpoint pf Phase; Contiguous Ground | A ⑩ $L_1$ // $L_2$<br>B ⑩ $L_3$ // N<br>C ⑩ n.c.<br>N ⑩ n.c.<br>⏚ ⑩ ⏚ |  | Symbol “L1 // L2” (parallel connection) means connect the pole L1<br>together with the pole L2.<br>The parallel connection must be done at the breaker output and not at the connector level.<br>Symbol “n.c.” means not connected. |
| 5 |  <br>Single-Phase: 3-Wire; Grounded Neutral; Grounded at Midpoint pf Phase; Contiguous Ground | $L_1$ ⑩ $L_1$ // $L_2$<br>$L_2$ ⑩ $L_3$ // N<br>N ⑩ n.c.<br>⏚ ⑩ ⏚ |  | Symbol “L1 // L2” (parallel connection) means connect the pole L1<br>together with the pole L2.<br>The parallel connection must be done at the breaker output and not at the connector level.<br>Symbol “n.c.” means not connected. |
| 6 |  <br>Single-Phase: 2-Wire; Grounded Neutral; Contiguous Ground | $L_1$ ⑩ $L_1$ // $L_2$<br>$L_2$ ⑩ $L_3$ // N<br>⏚ ⑩ ⏚ |  | Symbol “L1 // L2” (parallel connection) means connect the pole L1<br>together with the pole L2.<br>The parallel connection must be done at the breaker output and not at the connector level.<br>Symbol “n.c.” means not connected. |
| 7 |  <br>3-Phase Wye: 3-Wire. | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>⏚ ⑩ ⏚ |  | |

| | | | | |
|---|---|---|---|---|
| 8 |  <br>3-Phase Wye: 3-Wire; Grounded Neutral Point. | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>⏚ ⑩ ⏚ |  | |
| 9 |  <br>3-Phase Wye: 4-Wire; Nongrounded Neutral. | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>N ⑩ N<br>⏚ ⑩ ⏚ |  | |
| 10 |  <br>3-Phase Delta: 3-Wire. | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>⏚ ⑩ ⏚ |  | |
| 11 |  <br>3-Phase Delta: 3-Wire; Grounded Junction of Phases. | A ⑩ $L_1$ // $L_2$<br>B ⑩ $L_3$ // N<br>N ⑩ n.c.<br>⏚ ⑩ ⏚ |  | Symbol “L1 // L2” (parallel connection) means connect the pole L1<br>together with the pole L2.<br>The parallel connection must be done at the breaker output and not at the connector level.<br>Symbol “n.c.” means not connected. |
| 12 |  <br>Single-Phase: 2-Wire;<br>Nongrounded Neutral. | A ⑩ $L_1$ // $L_2$<br>N ⑩ $L_3$ // N<br>⏚ ⑩ ⏚ |  | Symbol “L1 // L2” (parallel connection) means connect the pole L1<br>together with the pole L2.<br>The parallel connection must be done at the breaker output and not at the connector level.<br>Symbol “n.c.” means not connected. |

| | | | | |
|---|---|---|---|---|
| 13 |  <br>3-Phase Delta: 3-Wire. | A ⑩ $L_1$<br>B ⑩ $L_2$<br>C ⑩ $L_3$<br>⏚ ⑩ ⏚ |  | |

## GTA Quattro Technical specifications.

### PERFORMANCE

| | |
|---|---|
| Number of channels | 4 |
| Output power (per channel) | Single channel mode: 5200 W @ 2 Ω, 3000 W @ 4 Ω, 1600 W @ 8 Ω<br>Bridge mode: 10400 W @ 4 Ω, 6000 W @ 8 Ω |
| Max output voltage | 175 V peak |
| Max output current | 130 A peak |
| Power consumption (all AC MAINS cases) | Idle Consumption: < 100 W<br>Max Consumption: < 3500 W |
| Current Draw (1/8 Power @ 4 Ω), Single-Phase | @ 100 V – 18 A<br>@ 240 V – 9 A |
| Current Draw (1/8 Power @ 4 Ω), Three-Phase | @ 208 Y – 6 A<br>@ 416 Y – 3 A<br>*Note: 208 Y/120 V = 208 V phase-to-phase, 120 V phase-to-neutral |
| Thermal dissipation (1/8 Power @ 8 Ω) | @115 V – 1127 BTU/h<br>@230 V – 1058 BTU/h |
| AC Mains Power | Universal, Single Phase, Bi-Phase or Three Phase acceptance, switching mode with PFC |
| Operating voltage (for Single-Phase only) | 100 V – 240 V |
| Frequency response | 5 Hz – 30 kHz (-3 dB, 1 W @ 8 Ω) |
| Crosstalk (1kHz) | -70 dB |
| THD+N (from 0.1 W to Full Power) | < 0.5% (typical < 0.01%) |
| SMPTE IMD (from 0.1 W to Full Power) | < 0.5% (typical < 0.01%) |
| Input impedance | 20 kΩ balanced |
| AD Converters | Dual 24 bit 48 kHz Tandem® architecture<br>129 dBA dynamic range |
| DA Converters | Dual 24 bit 48 kHz Tandem® architecture<br>121 dBA dynamic range |
| Sample rate converter | 24 Bit @ 44.1 kHz to 192 kHz<br>140 dB Dynamic Range – 0.0001 % THD+N |
| Internal precision | 40 bit floating point |
| Latency | 2.53 ms fixed latency architecture |

**PHYSICAL**

| | |
|---|---|
| Rack Units | 1 |
| Depth | 495 mm – 19 1/2″ |
| Weight | 15 kg – 33 lb |

**SHIPPING DETAILS**

| | |
|---|---|
| Shipping dimensions (H x W x D) | 180 x 800 x 600 mm – 7 1/16″ x 31 1/2’’ x 23 5/8’’ |
| Shipping weight | 16 kg – 33.2 lb |
| Order code | O1GTA4D |
| Taric number (HS code) | 8518.50.00 |

**PERFORMANCE**

| | |
|---|---|
| Number of channels | 8 |
| Output power (per channel) | Single channel mode: 5200 W @ 2 Ω, 3000 W @ 4 Ω,  1600 W @ 8 Ω<br>Bridge mode: 10400 W @ 4 Ω, 6000 W @ 8 Ω |
| Max output voltage | 175 V peak |
| Max output current | 130 A peak |
| Power consumption  (all AC MAINS cases) | Idle Consumption: < 200 W<br>Max Consumption: < 5000 W |
| Current Draw (1/8 Power @ 4 Ω), Single-Phase | @ 100 V – 32 A<br>@ 240 V – 18 A |
| Current Draw (1/8 Power @ 4 Ω), Three-Phase | @ 208 Y – 12 A<br>@ 416 Y – 6 A<br>*Note: 208 Y/120 V = 208 V phase-to-phase, 120 V phase-to-neutral |
| Thermal dissipation (1/8 Power @ 8 Ω) | @115 V – 2117 BTU/h<br>@230 V – 1946 BTU/h |
| AC Mains Power | Universal, Single Phase, Bi-Phase or Three Phase acceptance,<br>switching mode with PFC |
| Operating voltage (for Single-Phase only) | 100 V – 240 V |
| Frequency response | 5 Hz – 30 kHz (-3 dB, 1 W @ 8 Ω) |
| Crosstalk (1kHz) | -70 dB |
| THD+N (from 0.1 W to Full Power) | < 0.5% (typical < 0.01%) |
| SMPTE IMD (from 0.1 W to Full Power) | < 0.5% (typical < 0.01%) |
| Input impedance | 20 kΩ balanced |
| AD Converters | Dual 24 bit 48 kHz Tandem® architecture<br>129 dBA dynamic range |
| DA Converters | Dual 24 bit 48 kHz Tandem® architecture<br>121 dBA dynamic range |
| Sample rate converter | 24 Bit @ 44.1 kHz to 192 kHz<br>140 dB Dynamic Range – 0.0001 % THD+N |
| Internal precision | 40 bit floating point |
| Latency | 2.53 ms fixed latency architecture |

**PHYSICAL**

| | |
|---|---|
| Rack Units | 1 |
| Depth | 495 mm – 19 1/2″ |
| Weight | 24 kg – 52.9 lb |

**SHIPPING DETAILS**

| | |
|---|---|
| Shipping dimensions (H x W x D) | 250 x 800 x 600 mm – 9 13/16″ x 31 1/2’’ x 23 5/8’’ |
| Shipping weight | 25 kg – 55.1 lb |
| Order code | O1GTA8D |
| Taric number (HS code) | 8518.50.00 |

https://www.outline.it

**OUTLINE S.R.L.**
Via Leonardo Da Vinci, 56 – 25020 Flero (Bs) – Italy
tel. +39 030 35 81 341 – www.outline.it – info@outline.it
VAT IT02902720982

## Documents / Resources

| | |
|---|---|
|  | OUTLINE GTA series Power Amplifiers [pdf] Instruction Manual<br>GTA OTTO, GTA Otto, GTA QUATTRO, GTA series Power Amplifiers, GTA series, Power Amplifiers, Amplifiers |

## References

- User Manual